1.3. Pavement

QUANTITY OF PAVEMENT (Throughway+interchange+service area)

ITEM	QUANTITY OF PAVEMENT					
	ASC (m2)	TACK COAT (m2)	ABC (m2)	PRIME COAT (m2)	FA-BASE (m3)	CA-SUBBASE (m3)
THROUGHWAY	164 710	165 052	165 735	167 106	51 652	54 232
INTERCHANGE	35 543	35 674	35 933	36 196	11 104	11 566
SERVICE AREA	9 548	9 548	9 609	9 609	2 892	2 974
TOTAL	209 801	210 275	211 277	212 911	65 647	68 772

Note :

ASC	: asphalt surface concrete
ABC	: asphalt binder concrete
FA-base	: fine aggregate base coure
CA-subbase	: crushed aggregate subbase coure
AC-leveling	: asphalt concrete - levelling
FA-leveling	: fine aggregate - levelling

1 - 3 - 2

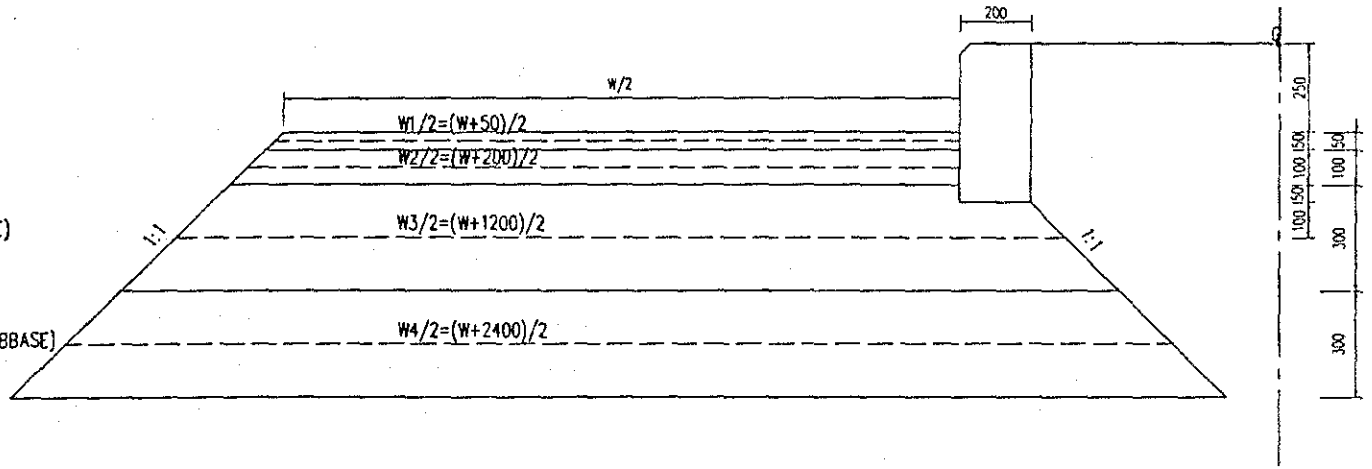
PAVEMENT

Asphalt Surface Concrete (ASC)

Asphalt Binder Concrete (ABC)

Fine Aggregate Base Coure (FA - BASE)

Crushed Aggregate Subbase Coure (CA - SUBBASE)



NOTE

ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE INDICATED

QUANTITY OF PAVEMENT (throughway)

SECTION No.	BRIDGE NAME	STATION	SECTION LENGTH (m)		QUANTITY OF PAVEMENT					
			BRIDGE	PAVEMENT	ASC (m2)	TACK COAT (m2)	ABC (m2)	PRIME COAT (m2)	FA-BASE (m3)	CA-SUBBASE (m3)
1	MAIN-BRIDGE	7 + 660.00		796.85	29 552	29 592	29 672	29 831	9 127	9 428
	CAI TAC 1	8 + 456.85	185.9							
2		8 + 642.75		788.70	18 501	18 541	18 617	18 774	5 802	6 092
	CAI TAC 2	9 + 431.45	37.1							
3		9 + 468.55		947.70	22 211	22 258	22 353	22 543	6 974	7 331
	CAI D.A	10 + 416.25	93.5							
4		10 + 509.75		692.70	15 615	15 650	15 719	15 857	4 911	5 173
	BA MANG	11 + 202.45	25.1							
5		11 + 227.55		1 108.70	23 892	23 948	24 059	24 281	7 531	7 949
	CAI NAI	12 + 336.25	93.5							
6		12 + 429.75		679.80	14 650	14 684	14 752	14 888	4 618	4 874
	AP MY	13 + 109.55	140.9							
7		13 + 250.45		555.95	11 981	12 009	12 064	12 175	3 776	3 986
	CAI RANG	13 + 806.40	258.5							
8		14 + 64.90		1 285.10	28 307	28 371	28 500	28 757	8 913	9 398
	E.P	15 + 350.00								
TOTAL			**834.50**	**6 855.50**	**164 710**	**165 052**	**165 735**	**167 106**	**51 652**	**54 232**

Note : ASC : asphalt surface concrete

ABC : asphalt binder concrete

FA-base : fine aggregate base coure

CA-subbase : crushed aggregate subbase coure

AC-leveling : asphalt concrete - levelling

FA-leveling : fine aggregate - levelling

QUANTITY OF PAVEMENT
MAIN BRIDGE - CAI TAC 1 (KM7+660,00 - KM8+456,85)

No,	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km7+ 660		21.50				
2	Km7+ 680	20.00	21.50	431.00	434.00	135.85	143.40
3	Km7+ 700	20.00	21.50	431.00	434.00	135.85	143.40
4	Km7+ 740	40.00	21.50	862.00	868.00	271.70	286.80
5	Km7+ 780	40.00	21.50	862.00	868.00	271.70	286.80
6	Km7+ 820	40.00	21.50	862.00	868.00	271.70	286.80
7	Km7+ 860	40.00	21.50	862.00	868.00	271.70	286.80
8	Km7+ 900	40.00	21.50	862.00	868.00	271.70	286.80
9	Km7+ 940	40.00	21.50	862.00	868.00	271.70	286.80
10	Km7+ 980	40.00	23.35	899.00	905.00	282.80	297.90
11	Km8+ 020	40.00	36.50	1199.00	1205.00	372.80	387.90
12	Km8+ 060	40.00	42.90	1590.00	1596.00	490.10	505.20
13	Km8+ 100	40.00	51.24	1884.80	1890.80	578.54	593.64
14	Km8+ 140	40.00	63.50	2296.80	2302.80	702.14	717.24
15	Km8+ 180	40.00	65.90	2590.00	2596.00	790.10	805.20
16	Km8+ 200	20.00	65.90	1319.00	1322.00	402.25	409.80
17	Km8+ 220	20.00	65.90	1319.00	1322.00	402.25	409.80
18	Km8+ 260	40.00	64.30	2606.00	2612.00	794.90	810.00
19	Km8+ 300	40.00	51.24	2312.80	2318.80	706.94	722.04
20	Km8+ 340	40.00	42.90	1884.80	1890.80	578.54	593.64
21	Km8+ 380	40.00	36.50	1590.00	1596.00	490.10	505.20
22	Km8+ 420	40.00	23.35	1199.00	1205.00	372.80	387.90
23	Km8+ 457	36.85	21.50	828.20	833.73	260.53	274.44
SUM				**29552.40**	**29671.93**	**9126.69**	**9427.50**

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2)*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

CAI TAC1 - CAI TAC2 (KM8+642,75 - KM9+431,45)

No,	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km8+ 642.75		21.50				
2	Km8+ 660.00	17.250	21.50	371.74	374.33	117.17	123.68
3	Km8+ 700.00	40.000	21.50	862.00	868.00	271.70	286.80
4	Km8+ 740.00	20.000	21.50	431.00	434.00	135.85	143.40
5	Km8+ 780.00	40.000	21.50	862.00	868.00	271.70	286.80
6	Km8+ 820.00	40.000	25.16	935.20	941.20	293.66	308.76
7	Km8+ 860.00	40.000	28.00	1065.20	1071.20	332.66	347.76
8	Km8+ 900.00	40.000	28.30	1128.00	1134.00	351.50	366.60
9	Km8+ 940.00	40.000	21.50	998.00	1004.00	312.50	327.60
10	Km8+ 980.00	40.000	21.50	862.00	868.00	271.70	286.80
11	Km9+ 020,00	40.000	21.50	862.00	868.00	271.70	286.80
12	Km9+ 060,00	40.000	21.50	862.00	868.00	271.70	286.80
13	Km9+ 100.00	40.000	21.50	862.00	868.00	271.70	286.80
14	Km9+ 140.00	40.000	21.50	862.00	868.00	271.70	286.80
15	Km9+ 180.00	40.000	29.40	1020.00	1026.00	319.10	334.20
16	Km9+ 220.00	40.000	27.11	1132.20	1138.20	352.76	367.86
17	Km9+ 260.00	40.000	24.76	1039.40	1045.40	324.92	340.02
18	Km9+ 300.00	40.000	25.97	1016.60	1022.60	318.08	333.18
19	Km9+ 322.00	22.000	21.68	525.25	528.55	164.78	173.09
20	Km9+ 340.00	18.000	23.20	404.82	407.52	127.34	134.14
21	Km9+ 380.00	40.000	27.00	1006.00	1012.00	314.90	330.00
22	Km9+ 420.00	40.000	27.00	1082.00	1088.00	337.70	352.80
23	Km9+ 431.45	11.450	27.41	312.05	313.76	97.36	101.69
SUM				***18501.45***	***18616.76***	***5802.19***	***6 092.37***

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT
CAI TAC 2 - CAI DA (KM9+468,45 - KM10+416,25)

No,	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km9+ 468.55		21.50				
2	Km9+ 480	11.45	21.50	246.75	248.47	77.77	82.10
3	Km9+ 520	40.00	21.50	862.00	868.00	271.70	286.80
4	Km9+ 560	40.00	21.50	862.00	868.00	271.70	286.80
5	Km9+ 600	40.00	21.50	862.00	868.00	271.70	286.80
6	Km9+ 640	40.00	21.50	862.00	868.00	271.70	286.80
7	Km9+ 680	40.00	22.74	886.80	892.80	279.14	294.24
8	Km9+ 720	40.00	27.00	996.80	1002.80	312.14	327.24
9	Km9+ 760	40.00	28.17	1105.40	1111.40	344.72	359.82
10	Km9+ 800	40.00	34.03	1246.00	1252.00	386.90	402.00
11	Km9+ 840	40.00	21.50	1112.60	1118.60	346.88	361.98
12	Km9+ 880	40.00	21.50	862.00	868.00	271.70	286.80
13	Km9+ 920	40.00	21.50	862.00	868.00	271.70	286.80
14	Km9+ 960	40.00	21.50	862.00	868.00	271.70	286.80
15	Km10+ 000	40.00	21.50	862.00	868.00	271.70	286.80
16	Km10+ 040	40.00	21.50	862.00	868.00	271.70	286.80
17	Km10+ 080	40.00	21.50	862.00	868.00	271.70	286.80
18	Km10+ 120	40.00	21.50	862.00	868.00	271.70	286.80
19	Km10+ 160	40.00	21.50	862.00	868.00	271.70	286.80
20	Km10+ 200	40.00	31.87	1069.40	1075.40	333.92	349.02
21	Km10+ 240	40.00	25.36	1146.60	1152.60	357.08	372.18
22	Km10+ 280	40.00	24.75	1004.20	1010.20	314.36	329.46
23	Km10+ 320	40.00	22.78	952.60	958.60	298.88	313.98
24	Km10+ 360	40.00	21.50	887.60	893.60	279.38	294.48
25	Km10+ 400	40.00	21.50	862.00	868.00	271.70	286.80
26	Km10+ 416	16.25	21.50	350.19	352.63	110.38	116.51
SUM				22210.94	22353.09	6973.65	7 331.41

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

CAI DA - BA MANG (KM10+509,75 - KM11+202,45)

No.	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km10+ 509.75		21.50				
2	Km10+ 540	30.25	21.50	651.89	656.43	205.47	216.89
3	Km10+ 580	40.00	26.92	970.40	976.40	304.22	319.32
4	Km10+ 620	40.00	24.75	1035.40	1041.40	323.72	338.82
5	Km10+ 660	40.00	24.75	992.00	998.00	310.70	325.80
6	Km10+ 700	40.00	24.75	992.00	998.00	310.70	325.80
7	Km10+ 740	40.00	23.51	967.20	973.20	303.26	318.36
8	Km10+ 780	40.00	21.50	902.20	908.20	283.76	298.86
9	Km10+ 820	40.00	21.50	862.00	868.00	271.70	286.80
10	Km10+ 840	20.00	21.50	431.00	434.00	135.85	143.40
11	Km10+ 880	40.00	21.50	862.00	868.00	271.70	286.80
12	Km10+ 920	40.00	21.50	862.00	868.00	271.70	286.80
13	Km11+ 000	80.00	21.50	1724.00	1736.00	543.40	573.60
14	Km11+ 040	40.00	21.50	862.00	868.00	271.70	286.80
15	Km11+ 080	40.00	21.50	862.00	868.00	271.70	286.80
16	Km11+ 120	40.00	21.50	862.00	868.00	271.70	286.80
17	Km11+ 140	20.00	21.50	431.00	434.00	135.85	143.40
18	Km11+ 160	20.00	21.50	431.00	434.00	135.85	143.40
19	Km11+ 180	20.00	21.50	431.00	434.00	135.85	143.40
20	Km11+ 200	20.00	21.50	431.00	434.00	135.85	143.40
21	Km11+ 202	2.45	21.50	52.80	53.16	16.64	17.57
SUM				**15614.89**	**15718.79**	**4911.32**	**5 172.82**

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

BA MANG - CAI NAI (KM11+227,55 - KM12+336,25)

No.	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km11+ 227.55		21.50				
2	Km11+ 240	12.45	21.50	268.30	270.17	84.57	89.27
3	Km11+ 260	20.00	21.50	431.00	434.00	135.85	143.40
4	Km11+ 280	20.00	21.50	431.00	434.00	135.85	143.40
5	Km11+ 300	20.00	21.50	431.00	434.00	135.85	143.40
6	Km11+ 340	40.00	21.50	862.00	868.00	271.70	286.80
7	Km11+ 380	40.00	21.50	862.00	868.00	271.70	286.80
8	Km11+ 420	40.00	21.50	862.00	868.00	271.70	286.80
9	Km11+ 460	40.00	21.50	862.00	868.00	271.70	286.80
10	Km11+ 500	40.00	21.50	862.00	868.00	271.70	286.80
11	Km11+ 540	40.00	21.50	862.00	868.00	271.70	286.80
12	Km11+ 580	40.00	21.50	862.00	868.00	271.70	286.80
13	Km11+ 620	40.00	21.50	862.00	868.00	271.70	286.80
14	Km11+ 660	40.00	21.50	862.00	868.00	271.70	286.80
15	Km11+ 700	40.00	21.50	862.00	868.00	271.70	286.80
16	Km11+ 740	40.00	21.50	862.00	868.00	271.70	286.80
17	Km11+ 780	40.00	21.50	862.00	868.00	271.70	286.80
18	Km11+ 820	40.00	21.50	862.00	868.00	271.70	286.80
19	Km11+ 860	40.00	21.50	862.00	868.00	271.70	286.80
20	Km11+ 900	40.00	21.50	862.00	868.00	271.70	286.80
21	Km11+ 940	40.00	21.50	862.00	868.00	271.70	286.80
22	Km12+ 000	60.00	21.50	1293.00	1302.00	407.55	430.20
23	Km12+ 040	40.00	21.50	862.00	868.00	271.70	286.80
24	Km12+ 080	40.00	21.50	862.00	868.00	271.70	286.80
25	Km12+ 120	40.00	21.50	862.00	868.00	271.70	286.80
26	Km12+ 160	40.00	21.50	862.00	868.00	271.70	286.80
27	Km12+ 200	40.00	21.50	862.00	868.00	271.70	286.80
28	Km12+ 240	40.00	21.50	862.00	868.00	271.70	286.80
29	Km12+ 280	40.00	21.50	862.00	868.00	271.70	286.80
30	Km12+ 320	40.00	21.50	862.00	868.00	271.70	286.80
31	Km12+ 336	16.25	21.50	350.19	352.63	110.38	116.51
SUM				23892.49	24058.79	7530.84	7 949.38

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

CAI NAI - AP MY (KM12+429,75 - KM13+109,55)

No.	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km12+ 429.75		21.50				
2	Km12+ 440	10.25	21.50	220.89	222.43	69.62	73.49
3	Km12+ 480	40.00	21.50	862.00	868.00	271.70	286.80
4	Km12+ 520	40.00	21.50	862.00	868.00	271.70	286.80
5	Km12+ 540	20.00	21.50	431.00	434.00	135.85	143.40
6	Km12+ 580	40.00	21.50	862.00	868.00	271.70	286.80
7	Km12+ 620	40.00	21.50	862.00	868.00	271.70	286.80
8	Km12+ 660	40.00	21.50	862.00	868.00	271.70	286.80
9	Km12+ 700	40.00	21.50	862.00	868.00	271.70	286.80
10	Km12+ 740	40.00	21.50	862.00	868.00	271.70	286.80
11	Km12+ 780	40.00	21.50	862.00	868.00	271.70	286.80
12	Km12+ 820	40.00	21.50	862.00	868.00	271.70	286.80
13	Km12+ 860	40.00	21.50	862.00	868.00	271.70	286.80
14	Km12+ 900	40.00	21.50	862.00	868.00	271.70	286.80
15	Km12+ 940	40.00	21.50	862.00	868.00	271.70	286.80
16	Km12+ 980	40.00	21.50	862.00	868.00	271.70	286.80
17	Km13+ 000	20.00	21.50	431.00	434.00	135.85	143.40
18	Km13+ 020	20.00	21.50	431.00	434.00	135.85	143.40
19	Km13+ 060	40.00	21.50	862.00	868.00	271.70	286.80
20	Km13+ 100	40.00	21.50	862.00	868.00	271.70	286.80
21	Km13+ 110	9.55	21.50	205.80	207.24	64.87	68.47
SUM				14649.69	14751.66	4617.54	4 874.17

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

AP MY - CAI RANG (KM13+250,45 - KM13+806,40)

No,	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km13+ 250.45		21.50				
2	Km13+ 260	9.55	21.50	205.80	207.24	64.87	68.47
3	Km13+ 300	40.00	21.50	862.00	868.00	271.70	286.80
4	Km13+ 320	20.00	21.50	431.00	434.00	135.85	143.40
5	Km13+ 360	40.00	21.50	862.00	868.00	271.70	286.80
6	Km13+ 400	40.00	21.50	862.00	868.00	271.70	286.80
7	Km13+ 440	40.00	21.50	862.00	868.00	271.70	286.80
8	Km13+ 480	40.00	21.50	862.00	868.00	271.70	286.80
9	Km13+ 520	40.00	21.50	862.00	868.00	271.70	286.80
10	Km13+ 560	40.00	21.50	862.00	868.00	271.70	286.80
11	Km13+ 600	40.00	21.50	862.00	868.00	271.70	286.80
12	Km13+ 640	40.00	21.50	862.00	868.00	271.70	286.80
13	Km13+ 680	40.00	21.50	862.00	868.00	271.70	286.80
14	Km13+ 720	40.00	21.50	862.00	868.00	271.70	286.80
15	Km13+ 740	20.00	21.50	431.00	434.00	135.85	143.40
16	Km13+ 780	40.00	21.50	862.00	868.00	271.70	286.80
17	Km13+ 800	20.00	21.50	431.00	434.00	135.85	143.40
18	Km13+ 806	6.40	21.50	137.92	138.88	43.47	45.89
SUM				**11980.72**	**12064.12**	**3776.29**	**3 986.16**

NOTE :

ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

QUANTITY OF PAVEMENT

CAI RANG - E.P (KM14+064,90 - KM15+350,00)

No,	Station	Distance (m)	Width of pavement	AREA(M2)		QUANTITY (M3)	
				ASC	ABC	FA- BASE	CA-SUBBASE
1	Km14+ 064,90		21.50				
2	Km14+ 080	15.10	21.50	325.41	327.67	102.57	108.27
3	Km14+ 100	20.00	21.50	431.00	434.00	135.85	143.40
4	Km14+ 140	40.00	21.50	862.00	868.00	271.70	286.80
5	Km14+ 180	40.00	21.50	862.00	868.00	271.70	286.80
6	Km14+ 220	40.00	21.50	862.00	868.00	271.70	286.80
7	Km14+ 260	40.00	21.50	862.00	868.00	271.70	286.80
8	Km14+ 300	40.00	21.50	862.00	868.00	271.70	286.80
9	Km14+ 340	40.00	21.50	862.00	868.00	271.70	286.80
10	Km14+ 380	40.00	21.50	862.00	868.00	271.70	286.80
11	Km14+ 420	40.00	21.50	862.00	868.00	271.70	286.80
12	Km14+ 460	40.00	21.50	862.00	868.00	271.70	286.80
13	Km14+ 500	40.00	21.50	862.00	868.00	271.70	286.80
14	Km14+ 540	40.00	21.50	862.00	868.00	271.70	286.80
15	Km14+ 580	40.00	21.50	862.00	868.00	271.70	286.80
16	Km14+ 620	40.00	21.50	862.00	868.00	271.70	286.80
17	Km14+ 660	40.00	21.50	862.00	868.00	271.70	286.80
18	Km14+ 700	40.00	21.50	862.00	868.00	271.70	286.80
19	Km14+ 740	40.00	21.50	862.00	868.00	271.70	286.80
20	Km14+ 780	40.00	21.50	862.00	868.00	271.70	286.80
21	Km14+ 820	40.00	21.50	862.00	868.00	271.70	286.80
22	Km14+ 860	40.00	21.50	862.00	868.00	271.70	286.80
23	Km14+ 900	40.00	21.50	862.00	868.00	271.70	286.80
24	Km14+ 940	40.00	21.50	862.00	868.00	271.70	286.80
25	Km15+ 000	60.00	21.50	1293.00	1302.00	407.55	430.20
26	Km15+ 020	20.00	21.50	431.00	434.00	135.85	143.40
27	Km15+ 040	20.00	29.85	514.50	517.50	160.90	168.45
28	Km15+ 080	40.00	26.69	1132.80	1138.80	352.94	368.04
29	Km15+ 120	40.00	26.00	1055.80	1061.80	329.84	344.94
30	Km15+ 160	40.00	26.00	1042.00	1048.00	325.70	340.80
31	Km15+ 200	40.00	26.00	1042.00	1048.00	325.70	340.80
32	Km15+ 240	40.00	24.25	1007.00	1013.00	315.20	330.30
33	Km15+ 350	110.00	10.75	1930.50	1947.00	615.18	656.70
SUM				**28307.01**	**28499.77**	**8912.97**	**9 398.10**

NOTE :

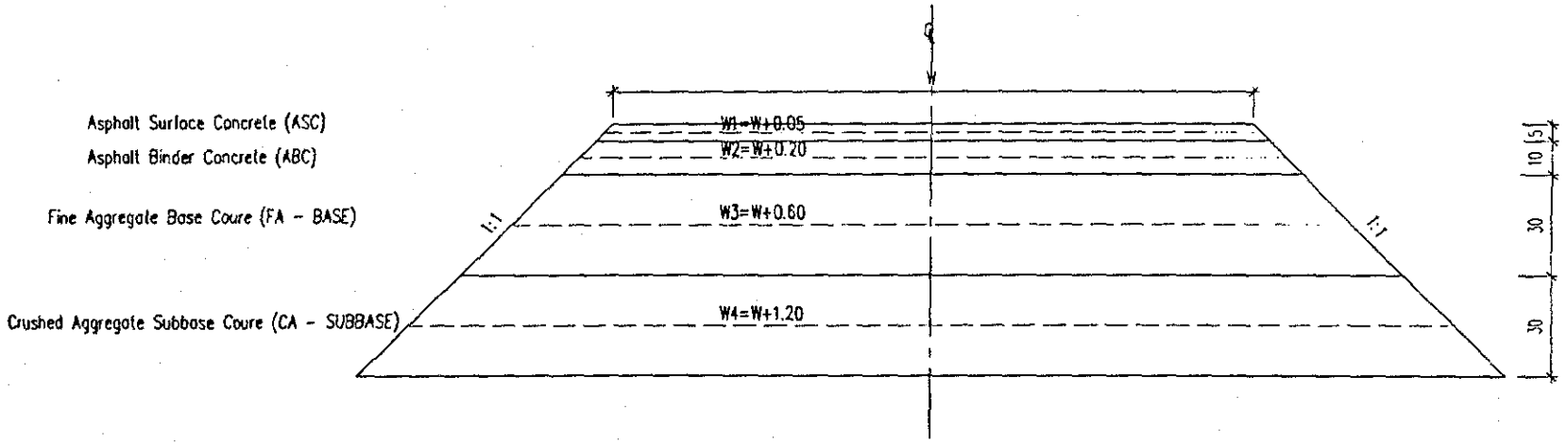
ASC = (W+0.05)*D

ABC = (W+0.2)*D

FA-BASE = [(W+1.2)*0.3-(0.15+0.2)*0.05*2/2]*D

CA-SUBBASE = (W+2.4)*0.3*D

PAVEMENT



NOTE

ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE INDICATED

Quantity of Pavement (Ramp) IC3 - IS - P3

SECTION No.	RAMP NAME	CHAINAGE	SECTION LENGTH (m)		QUANTITY OF PAVEMENT					
			BRIDGE	PAVEMENT	ASC (m2)	TACK COAT (m2)	ABC (m2)	PRIME COAT (m2)	FA-BASE (m3)	CA-BASE (m3)
IC - 3	"A" RAMP	0 + 40.00 0 + 342.05		302.05	2,733.51	2,865.13	2,752.61	3,015.85	846.31	877.09
	"B" RAMP	0 + 54.28 0 + 500.00		445.72	6,614.72	6,614.72	6,697.63	6,697.63	2,082.04	2,181.53
	"C" RAMP	0 + 66.07 0 + 420.17		354.10	3,385.27	3,385.27	3,438.39	3,438.39	1,074.01	1,137.75
	"D" RAMP	0 + 40.00 0 + 409.38	93.50	369.38	1,669.09	1,669.09	1,710.47	1,710.47	546.25	595.91
	"E" RAMP	0 + 43.43 0 + 140.00		96.57	1,631.40	1,631.40	1,657.77	1,657.77	518.42	545.30
	"F" RAMP	0 + 60.00 0 + 210.00		150.00	5,205.09	5,205.09	5,250.14	5,250.14	1,611.08	1,656.11
	NH No.91	0 + 40.00 0 + 540.00	100.1	500.00	9,217.70	9,217.70	9,277.68	9,277.68	2,831.29	2,903.27
IS	"A" ROAD	0 + 12.05 0 + 100.00		87.95	1,753.32	1,753.32	1,766.51	1,766.51	540.51	556.34
	"B" ROAD	0 + 0.00 0 + 326.69		326.69	3,332.76	3,332.76	3,381.77	3,381.77	1,053.73	1,112.54
	TOTAL		193.60	2,632.45	35,542.86	35,674.49	35,932.96	36,196.21	11,103.63	11,565.84

INTERCHANGE 3 - "A" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 40.000		9.00				
2	Km0+ 80.000	40.000	9.00	362.00	368.00	115.20	122.40
3	Km0+ 120.000	40.000	9.00	362.00	364.00	111.60	115.20
4	Km0+ 160.000	40.000	9.00	362.00	364.00	111.60	115.20
5	Km0+ 200.000	40.000	9.00	362.00	364.00	111.60	115.20
6	Km0+ 240.000	40.000	9.00	362.00	364.00	111.60	115.20
7	Km0+ 280.000	40.000	9.00	362.00	364.00	111.60	115.20
8	Km0+ 320.000	40.000	9.00	362.00	364.00	111.60	115.20
9	Km0+ 342.045	22.045	9.00	199.51	200.61	61.51	63.49
TOTAL				2733.51	2752.61	846.31	877.09

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - "B" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 54.283		6.00				
2	Km0+ 80.000	25.717	6.00	155.59	159.45	50.92	55.55
3	Km0+ 120.000	40.000	6.00	242.00	248.00	79.20	86.40
4	Km0+ 160.000	40.000	6.00	242.00	248.00	79.20	86.40
5	Km0+ 200.000	40.000	6.00	242.00	248.00	79.20	86.40
6	Km0+ 240.000	40.000	6.00	242.00	248.00	79.20	86.40
7	Km0+ 280.000	40.000	6.00	242.00	248.00	79.20	86.40
8	Km0+ 320.000	40.000	6.00	242.00	248.00	79.20	86.40
9	Km0+ 360.000	40.000	6.00	242.00	248.00	79.20	86.40
10	Km0+ 400.000	40.000	6.15	245.00	251.00	80.10	87.30
11	Km0+ 440.000	40.000	6.80	261.00	267.00	84.90	92.10
12	Km0+ 480.000	40.000	6.80	274.00	280.00	88.80	96.00
13	Km0+ 500.000	20.000	6.00	129.00	132.00	42.00	45.60
14	Intrersection			3856.13	3872.19	1180.92	1200.19
TOTAL				6614.72	6697.63	2082.04	2181.53

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - "C" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 66.073		9.00				
2	Km0+ 80.000	13.927	9.00	126.04	128.13	40.11	42.62
3	Km0+ 120.000	40.000	9.00	362.00	368.00	115.20	122.40
4	Km0+ 160.000	40.000	9.00	362.00	368.00	115.20	122.40
5	Km0+ 200.000	40.000	9.00	362.00	368.00	115.20	122.40
6	Km0+ 240.000	40.000	9.00	362.00	368.00	115.20	122.40
7	Km0+ 280.000	40.000	9.00	362.00	368.00	115.20	122.40
8	Km0+ 320.000	40.000	9.00	362.00	368.00	115.20	122.40
9	Km0+ 360.000	40.000	9.00	362.00	368.00	115.20	122.40
10	Km0+ 400.000	40.000	14.00	462.00	468.00	145.20	152.40
11	Km0+ 420.171	20.171	12.00	263.23	266.26	82.30	85.93
TOTAL				3385.27	3438.39	1074.01	1137.75

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - "D" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 40.000		6.00				
2	Km0+ 80.000	40.000	6.00	242.00	248.00	79.20	86.40
3	Km0+ 120.000	40.000	6.00	242.00	248.00	79.20	86.40
4	Km0+ 160.000	40.000	6.00	242.00	248.00	79.20	86.40
5	Km0+ 200.000	40.000	6.00	242.00	248.00	79.20	86.40
6	Km0+ 240.000	40.000	6.00	242.00	248.00	79.20	86.40
7	Km0+ 252.250	12.250	6.00	74.11	75.95	24.26	26.46
	"D" Ramp Bridge	93.500					
8	Km0+ 345.750		6.00				
9	Km0+ 360.000	14.250	6.00	86.21	88.35	28.22	30.78
10	Km0+ 400.000	40.000	6.00	242.00	248.00	79.20	86.40
11	Km0+ 409.382	9.382	6.00	56.76	58.17	18.58	20.27
TOTAL				1669.09	1710.47	546.25	595.91

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - "E" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (*D*) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 43.428		6.80				
2	Km0+ 80.000	36.572	6.12	238.08	243.57	77.46	84.04
3	Km0+ 120.000	40.000	6.00	244.40	250.40	79.92	87.12
4	Km0+ 140.000	20.000	6.00	121.00	124.00	39.60	43.20
5	Intersection			1027.92	1039.80	321.44	330.94
TOTAL				1631.40	1657.77	518.42	545.30

NOTE:

ASC = (W + 0.05) * *D*

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * *D*

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - "F" RAMP
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 60.000		9.00				
2	Km0+ 80.000	20.000	9.00	181.00	184.00	57.60	61.20
3	Km0+ 120.000	40.000	9.00	362.00	368.00	115.20	122.40
4	Km0+ 160.000	40.000	9.00	362.00	368.00	115.20	122.40
5	Km0+ 200.000	40.000	9.00	362.00	368.00	115.20	122.40
6	Km0+ 210.000	10.000	9.00	90.50	92.00	28.80	30.60
	Intersection			3847.59	3870.14	1179.08	1197.11
SUM				5205.09	5250.14	1611.08	1656.11

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERCHANGE 3 - NATIONAL HIGHWAY No.91
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 40.000		23.00				
2	Km0+ 80.000	40.000	23.00	922.00	928.00	283.20	290.40
3	Km0+ 120.000	40.000	23.00	922.00	928.00	283.20	290.40
4	Km0+ 160.000	40.000	23.00	922.00	928.00	283.20	290.40
5	Km0+ 200.000	40.000	23.00	922.00	928.00	283.20	290.40
6	Km0+ 240.000	40.000	23.00	922.00	928.00	283.20	290.40
7	Km0+ 259.970	19.970	23.00	460.31	463.30	141.39	144.98
	Fly Over Bridge	100.100					
8	Km0+ 360.070		23.00				
9	Km0+ 400.000	39.930	23.00	920.39	926.38	282.70	289.89
10	Km0+ 440.000	40.000	23.00	922.00	928.00	283.20	290.40
11	Km0+ 480.000	40.000	23.00	922.00	928.00	283.20	290.40
12	Km0+ 520.000	40.000	23.00	922.00	928.00	283.20	290.40
13	Km0+ 540.000	20.000	23.00	461.00	464.00	141.60	145.20
TOTAL				9217.70	9277.68	2831.29	2903.27

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERSECTION - "A" ROAD
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 12.050		32.34				
2	Km0+ 40.000	27.950	17.10	692.32	696.51	212.31	217.34
3	Km0+ 80.000	40.000	17.90	702.00	708.00	217.20	224.40
4	Km0+ 100.000	20.000	17.90	359.00	362.00	111.00	114.60
TOTAL				1753.32	1766.51	540.51	556.34

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

INTERSECTION - "B" ROAD
QUANTITY OF PAVEMENT

No	Chainage	Distance (D) (m)	Width of pavement surface (W) (m)	Quantity			
				ASC (m^2)	ABC (m^2)	FA-BASE (m^3)	CA-SUBBASE (m^3)
1	Km0+ 0.000		11.00				
2	Km0+ 60.000	60.000	15.97	812.10	821.10	253.53	264.33
3	Km0+ 80.000	20.000	25.36	414.30	417.30	127.59	131.19
4	Km0+ 120.000	40.000	7.00	649.20	655.20	201.36	208.56
5	Km0+ 160.000	40.000	7.00	282.00	288.00	91.20	98.40
6	Km0+ 200.000	40.000	7.00	282.00	288.00	91.20	98.40
7	Km0+ 240.000	40.000	7.00	282.00	288.00	91.20	98.40
9	Km0+ 280.000	40.000	7.00	282.00	288.00	91.20	98.40
10	Km0+ 326.690	46.690	7.00	329.16	336.17	106.45	114.86
TOTAL				3332.76	3381.77	1053.73	1112.54

NOTE:

ASC = (W + 0.05) * D

ABC = (W + 0.20) * D

FA-BASE = (W + 0.60) * 0.30 * D

CA-SUBBASE = (W + 1.2) * 0.30 *D

Quantity of Pavement (Service Area)

ITEM	QUANTITY OF PAVEMENT					
	ASC (m2)	TACK COAT (m2)	ABC (m2)	PRIME COAT (m2)	FA-BASE (m3)	CA-SUBBASE (m3)
CAN THO SERVICE AREA	9 548	9 548	9 609	9 609	2 892	2 974

QUANTITY OF SERVICE ROAD

No	CHAINAGE		LOCATION	LENGTH	WIDTH	GROUND	DESIGN ELEVATION (m)		QUANTITY (m^3)	
	FROM	TO		(m)	(m)	ELEVATION (m)	FROM	TO	GRAVEL	SANDFILL
1	7+640.00	7+700.00	LEFT+RIGHT	162.00	2.50 / 3.00	0.10	1.74	1.74	60.8	1232.8
2	7+700.00	7+769.00	LEFT+RIGHT	139.00	2.50 / 3.00	0.10	1.74	4.65	52.1	2622.1
3	8+321.00	8+478.00	LEFT+RIGHT	221.00	2.50 / 3.00	0.41	1.74	5.60	82.9	4510.1
4	8+614.00	8+724.50	LEFT+RIGHT	230.00	2.50 / 3.00	0.31	1.74	1.74	86.3	1457.0
5	8+724.50	8+785.00	LEFT+RIGHT	123.00	2.50 / 3.00	0.41	1.74	4.61	46.1	1960.6
6	9+337.00	9+380.00	LEFT+RIGHT	90.00	2.50 / 3.00	1.10	4.98	1.74	33.8	1069.9
7	9+380.00	9+440.00	LEFT+RIGHT	138.00	2.50 / 3.00	0.50	1.74	1.74	51.8	725.5
8	9+461.00	9+521.50	LEFT+RIGHT	147.00	2.50 / 3.00	0.50	1.74	1.74	55.1	772.9
9	9+521.50	9+592.00	LEFT+RIGHT	157.00	2.50 / 3.00	1.50	1.74	5.02	58.9	1440.4
10	10+341.00	10+446.00	LEFT+RIGHT	339.00	2.50 / 3.00	1.20	1.74	1.74	127.1	648.0
11	10+473.00	10+560.00	LEFT+RIGHT	148.00	2.50 / 3.00	0.65	1.74	1.74	55.5	659.8
12	10+560.00	10+602.00	LEFT+RIGHT	80.00	2.50 / 3.00	1.45	1.74	4.09	30.0	523.3
13	11+084.00	11+160.00	LEFT+RIGHT	124.00	2.50 / 3.00	1.00	4.47	1.74	46.5	1332.5
14	11+160.00	11+203.00	LEFT+RIGHT	160.00	2.50 / 3.00	1.00	1.74	1.74	60.0	442.8
15	11+227.00	11+280.00	LEFT+RIGHT	175.00	2.50 / 3.00	1.00	1.74	1.74	65.6	484.3
16	11+280.00	11+337.00	LEFT+RIGHT	109.00	2.50 / 3.00	1.00	1.74	4.68	40.9	1255.0
17	12+188.00	12+254.00	LEFT+RIGHT	135.00	2.50 / 3.00	0.90	6.15	1.74	50.6	2484.9
18	12+254.00	12+361.00	LEFT+RIGHT	287.00	2.50 / 3.00	0.90	1.74	1.74	107.6	925.7
19	12+451.00	12+507.00	LEFT+RIGHT	258.00	2.50 / 3.00	1.00	1.74	1.74	96.8	714.0
20	12+507.00	12+586.00	LEFT+RIGHT	149.00	2.50 / 3.00	1.00	1.74	5.60	55.9	2255.7
21	12+967.00	13+023.00	LEFT+RIGHT	108.00	2.50 / 3.00	1.00	3.79	1.74	40.5	908.3
22	13+023.00	13+159.00	LEFT+RIGHT	287.00	2.50 / 3.00	1.00	1.74	1.74	107.6	794.3
23	13+206.00	13+320.00	LEFT+RIGHT	263.00	2.50 / 3.00	1.10	1.74	1.74	98.6	612.7
24	13+320.00	13+380.00	LEFT+RIGHT	101.00	2.50 / 3.00	11.00	1.74	4.01	37.9	4205.7
25	13+674.00	13+754.00	LEFT+RIGHT	120.00	2.50 / 3.00	1.20	2.63	1.74	45.0	471.0
26	13+754.00	13+877.00	LEFT+RIGHT	327.00	2.50 / 3.00	1.20	1.74	1.74	122.6	625.1
27	13+959.00	14+160.00	LEFT+RIGHT	381.00	2.50 / 3.00	1.00	1.74	1.74	142.9	1054.5
28	14+160.00	14+245.00	LEFT+RIGHT	152.00	2.50 / 3.00	1.10	1.74	5.58	57.0	2163.5
TOTAL				5110.00					1916.3	38352.6

1.4. Miscellaneous

QUANTITY TABLE OF GUARDRAILS

SECTION	LEFT											RIGHT									
	From		To		Quantities							From		To		Quantities					
					Lengths of guard rails (m)	Numbers of guard rails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5					Lengths of guardrails	Numbers of guardrails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5
						L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.					m	L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.
Main bridge (Can Tho Bridge)																					
	7+	660	8+	65	405	101			405				7+	660	7+	966	306	76			306			
	8+	65	8+	394	329	82	1		325	1			7+	966	8+	165	199	49	1		195	1		
	8+	405	8+	450	45	16	1		33	1	1		8+	235	8+	323	88	21	2		80	2		
													8+	346	8+	452	106	31	1		94	1	1	
Cai Tac 1 bridge																					
	8+	648	8+	765	117	34	1		105	1	1		8+	648	8+	776	128	36	1		116	1	1	
	8+	778	8+	894	116	28	2		108	2			8+	788	9+	334	546	136	2		538	2		
	9+	175	9+	338	163	40	2		155	2			9+	346	9+	426	80	24	1		68	1	1	
	9+	345	9+	426	81	25	1		69	1	1													
Cai Tac 2 bridge																					
	9+	560	9+	820	260	64	2		252	2			9+	474	9+	580	106	31	1		94	1	1	
	10+	266	10+	341	75	18	2		67	2			9+	594	9+	732	138	34	1		134	1		
	10+	354	10+	410	56	18	1		44	1	1		10+	268	10+	342	74	18	2		66	2		
													10+	354	10+	410	56	18	1		44	1	1	
Cai Da bridge																					
	10+	517	10+	586	69	22	1		57	1	1		10+	517	10+	538	21	10	1		9	1	1	
	10+	600	10+	641	41	10	2		33	2			10+	600	10+	640	40	9	2		32	2		
	10+	687	10+	693	6	1		2				1	10+	687	10+	693	6	1		2	0			1
	10+	948	10+	954	6	1		2				1	10+	948	10+	954	6	1		2	0			1
	11+	20	11+	84	64	15	2		56	2			11+	20	11+	108	88	21	2		80	2		
	11+	100	11+	197	97	29	1		85	1	1		11+	120	11+	197	77	24	1		65	1	1	
Ba Mang bridge																					
	11+	232	11+	327	95	28	1		83	1	1		11+	234	1+	326	92	27	1		80	1	1	
	11+	338	12+	187	849	212	2		841	2			11+	333	12+	187	854	213	2		846	2		
	12+	202	12+	330	128	36	1		116	1	1		12+	202	12+	332	130	37	1		118	1	1	
Cai Nai bridge																					

SECTION	LEFT												RIGHT											
	From		To		Quantities								From		To		Quantities							
					Lengths of guard rails (m)	Numbers of guard rails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5					Lengths of guardrails	Numbers of guardrails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5
						L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.					m	L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.
	12+	437	12+	568	131	37	1		119	1	1		12+	437	12+	568	131	37	1		119	1	1	
	12+	587	12+	968	381	95	2		373	2			12+	588	12+	968	380	94	2		372	2		
	12+	980	13+	102	122	35	1		110	1	1		12+	979	13+	102	123	35	1		111	1	1	
Ap My bridge																								
	13+	258	13+	370	112	32	1		100	1	1		13+	257	13+	370	113	33	1		101	1	1	
	13+	381	13+	681	300	74	2		292	2			13+	380	13+	680	300	74	2		292	2		
	13+	692	13+	800	108	31	1		96	1	1		13+	679	13+	801	122	35	1		110	1	1	
Cai Rang bridge																								
	14+	70	14+	213	143	40	1		131	1	1		14+	70	14+	229	159	44	1		147	1	1	
	14+	225	14+	399	174	43	2		166	2			14+	240	14+	396	156	38	2		148	2		
	14+	447	14+	453	6	1		2	0			1	14+	447	14+	453	6	1		2	0			1
	14+	622	14+	628	6	1		2	0			1	14+	622	14+	628	6	1		2	0			1
	14+	887	14+	893	6	1		2	0			1	14+	887	14+	893	6	1		2	0			1
"A" Rampway of Interchange 3																								
	0+	28	0+	130	102	25	2		94	2			0+	20	0+	126	106	26	2		98	2		
													0+	260	0+	310	50	12	2		42	2		
													0+	320	0+	410	90	22	2		82	2		
	0+	260	0+	322				6	0															
"B" Rampway of Interchange 3																								
	0+	384	0+	512	128	31	2		120	2			0+	384	0+	512	128	31	2		120	2		
"C" Rampway of Interchange 3																								
	0+	85	0+	360				29	0															
													0+	0	0+	80	80	19	1		76	1		
	0+	297	0+	303	6	1		2	6															
"D" Rampway of Interchange 3																								
	0+	20	0+	130	110	27	2		102	2			0+	28	0+	130	102	25	2		94	2		
	0+	220	0+	250	30	12	1		18	1	1		0+	215	0+	248	33	13	1		21	1	1	
	0+	345	0+	390	45	16	1		33	1	1		0+	345	0+	436	91	27	1		79	1	1	
"E" Rampway of Interchange 3																								

SECTION	LEFT											RIGHT									
	From		To		Quantities							From		To		Quantities					
					Lengths of guard rails (m)	Numbers of guard rails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5				Lengths of guardrails	Numbers of guardrails (Nos.)		Numbers of guideposts	Type1	Type2	Type3	Type5
						L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.				m	L=1.8m	L=1.5m	Nos.	m	Nos.	Nos.	Nos.
	0+	60	0+	164	104	25	2		96	2			0+	60	0+	164	104	25	2		96	2		
"F" Rampway of Interchange 3																								
	0+	100	0+	232	132	32	2		124	2			0+	97	0+	232	135	33	2		127	2		
Overfly																								
	0+	120	0+	270	150	42	1		138	1	1		0+	100	0+	240	140	39	1		128	1	1	
	0+	380	0+	520	140	39	1		128	1	1		0+	350	0+	520	170	47	1		158	1	1	
"B" Rampway of Intersection																								
	0+	220	0+	226	6	1		2	0			1	0+	220	0+	226	6	1		2	0			1
TOTAL						1421	48	49	5080	48	17	6						1530	53	12	5486	53	18	6

NOTES :

- Type1 : Guard rails installed on road (L=4m, L=3m or L=2m).
- Type2 : Guard rails installed at interupting space (L=4m).
- Type3 : Guard rails installed to link to bridge's hand railing(L=8m).
- Type5 : Guard rails installed at double box culvert (L=6m).
- Total of length of guard rails 11322 m

  Include :

  + Type 1 : 10566 m
  + Type 2 : 404 m
  + Type 3 : 280 m
  + Type 5 : 72 m
- Total of guardposts (L=1.8m) : 2951 posts
- Total of guardposts (L=1.5m) : 101 posts
- Total of guidepost : 61 posts

- Standard terminal section : 828 Nos.
- Special washer : 404 Nos.
- Rectangle washer : 2648 Nos.
- Nut-bolt-circle washer : 27468 sets
- Concrete 20MPa : 488.32 m3
- Lean concrete 15MPa for bed : 76.3 m3
- Reflector at the top of guardpost : 3052 sets
- Reflector at the top of guidepost : 61 sets
- Total of excavation : 778 m3
- Total of back fill : 202 m3

QUANTITY TABLE OF SIGN BOARDS (P3)

Section	Location	Code	Function	Quantities	Remarks	
Can Tho side	7+680	440	Bridge's name (Can Tho)	1	L	
		419	Province boundary	1	R	
	7+900	129	Toll station	1	R (Double)	
		502	Distant to indicated object	1		
	7+960	127	Maximum limited speed	1	R (Double)	
		501	Effective range of indicated activity	1		
	8+000	129	Toll station	1	R	
	8+100	129	Toll station	1	R	
	8+300	129	Toll station	1	L	
	8+350	129	Toll station	1	L	
	8+400	127	Maximum limited speed	1	L	
	8+440	129	Toll station	1	L (Double)	
		502	Distant to indicated object	1		
	8+450	440	Bridge's name (Cai Tac 1)	1	R	
	8+650	440	Bridge's name (Cai Tac 1)	1	L	
	8+880	208	Intersection with priority road	1	L	
	9+300	432	Hotel	1	L	
	9+420	440	Bridge's name (Cai Tac 2)	1	R	
	9+480	440	Bridge's name (Cai Tac 2)	1	L	
	9+640	414a	Direction of province	1	R	
	9+740	237a	Merging stream on right	1	L	
	9+760	226	Bicycle crossing	1	R (Double)	
		201b	Dangerous bend to the right	1		
	10+320	414a	Direction of province	1	R	
	10+400	440	Bridge's name (Cai Da)	1	R	
	10+520	440	Bridge's name (Cai Da)	1	L	
		237a	Merging stream on right	1	R	
	0+200	226	Bicycle crossing	1	L	"A" Rampway of No.91 N.H Interchange
	0+260	208	Intersection with priority road	1	L	
	0+400	201a	Dangerous bend to the left	1	R	"B" Rampway of No.91 N.H Interchange
	0+520	122	Stop	1	R (Double)	
		208	Intersection with priority road	1		
	0+530	102	No entry	1	L	
	0+300	301g	Only going straight and turn left	1	R	"C" Rampway of No.91B N.H Interchange
	0+250	440	Bridge's name (Rampway Cai Da)	1	R	"D" Rampway of No.91 N.H Interchange
	0+350	226	Bicycle crossing	1	R	
	0+400	208	Intersection with priority road	1	R	
	0+000	414a	Direction of province	1	R	"E" Rampway of No.91 N.H Interchange

QUANTITY TABLE OF SIGN BOARDS (P3)

Section	Location	Code	Function	Quantities	Remarks	
Can Tho side	0+150	102	No entry	1	L	Ramp No.9 Interc
	0+100	123b	No turning right	1	L	
	0+200	414a	Direction of province	1	R	
	0+240	122	Stop	1	R (Double)	
		208	Intersection with priority road	1		
	0+100	414a	Direction of province	1	L	No.91 N.H Interchange
	0+260	440	Bridge's name (No.91 N.H Interchange	1	R	
	0+380	440	Bridge's name (No.91 N.H Interchange	1	L	
	0+520	301g	Only going straight and turn left	1	R	
	0+540	414a	Direction of province	1	R	
	11+190	440	Bridge's name (Ba Mang)	1	R	
	11+240	440	Bridge's name (Ba Mang)	1	L	
	12+330	440	Bridge's name (Cai Nai)	1	R	
	12+440	440	Bridge's name (Cai Nai)	1	L	
	13+100	440	Bridge's name (Ap My)	1	R	
	13+260	440	Bridge's name (Ap My)	1	L	
	13+700	201a	Dangerous bend to the left	1		
	13+800	440	Bridge's name (Cai Rang)	1	R	
	14+080	440	Bridge's name (Cai Rang)	1	L	
	14+600	201b	Dangerous bend to the right	1	L	
	14+650	301f	Only going straight and turn right	1	R	
	14+700	415	Road direction indicator	1	R	
	14+790	302a	Avoiding obstruction	1	On median	
	14+850	302a	Avoiding obstruction	1	On median	
	14+900	415	Road direction indicator	1	L	
	14+940	237a	Merging stream on right	1	R	
	15+160	203a	Narrower road both sides	1	R (Double)	
		236	Ending road with median	1		
	15+200	402	Ending of priority road	1	R	
	15+240	302a	Avoiding obstruction	1	On median	
	15+300	401	Beginning of priority road	1	L (Double)	
		235	Beginning of road with median	1		
	0+025	302a	Avoiding obstruction	1	On median	"A" Rampway of Intersection of Endpoint
		122	Stop	1	L (Double)	
		208	Intersection with priority road	1		
	0+050	123b	No turning right	1	L	
	0+100	302a	Avoiding obstruction	1	On median	
	0+000	301g	Only going straight and turn left	1	R	"B" Rampway of Intersection of Endpoint
	0+050	415	Road direction indicator	1	R	
	0+200	226	Bicycle crossing	1	R	
	0+320	208	Intersection with priority road	1	R	

Code 102: 2 Code 237a: 3

QUANTITY TABLE OF SIGN BOARDS (P3)

Section	Location	Code	Function	Quantities	Remarks
	Code 122:	3		Code 237b:	0
	Code 123a:	0		Code 301a:	0
	Code 123b:	2		Code 301d:	0
				Code 301e:	0
	Code 127:	2		Code 301f:	1
	Code 129:	6		Code 301g:	3
	Code 201a:	2		Code 302a:	5
	Code 201b:	2		Code 401:	1
	Code 202b:	0		Code 402:	1
	Code 203a:	1		Code 410:	0
	Code 207a:	0		Code 414a:	6
	Code 207b:	0		Code 415:	3
	Code 208:	7		Code 419:	1
				Code 432:	1
	Code 226:	4		Code 440:	18
	Code 235:	1		Code 501:	1
	Code 236:	1		Code 502:	2

QUANTITY TABLE OF SIGNPOSTS AND COMPONENTS (P3)

ITEM	UNIT	QUANTITIES	REMARKS	
Type 1	m	205.20	54 posts,L=3800 (for single signboard)	Galvanised steel, 80mm dia.
Type 2	m	40.50	9posts,L=4500 (for double signboard)	Galvanised steel, 80mm dia.
Type 3	m	8.60	1 post, L1=4550+L2=4050 (for signboard 4.19)	Galvanised steel, 80mm dia.
Type 4	m	52.68	6 posts, L1=4700+L2=4080 (for signboard 4.14a)	Channel steel 100x140x5mm
Steel 1300x50x8mm			=(Total of signboards 414a)*3*1.3=	23.4
Steel 1100x50x8mm			=(Total of signboards 419)*3*1.1=	3.3
Steel 900x50x8mm			=(Total of signboards 415)*1*0.9=	2.7
Steel 480x50x5mm			=((Total of circle signboards)*2+ (Total of triangle signboards)+ (Total of signboards 440)*2)*0.48=	40.32
Steel 340x50x5mm			=(Total of signboards 401,402)*1*0.34=	0.68
Steel 280x50x5mm			=(Total of circle signboards)*1*0.28=	6.72
Nut-bolt-circle washer, 10mm dia., L=100mm			=((Total of circle signboards)*2+ (Total of triangle signboards)*2+ (Total of signboards 401,402,432,440)*2+ (Total of signbards 414a,415,419,501,502)*3)=	86
Nut-bolt-circle washer, 6mm dia., L=50mm			=((Total of circle signboards)*4+ (Total of triangle signboards)*4+ (Total of signboards 401,402,432,440)*4+ (Total of signbards 414a,419)*12+ (Total of signboards 415,501,502)*2=	428
Lean concrete 20MPa			=(Total of signposts)*0.4*0.4*1=	12.32

1.5. Appendix

STONE MASONRY FOR SLOP PROTECTION

	Pay Item	Unit	Quantities	Remarks
I	**Stone Masonry for Slop Protection**	sqm		
	Stone Masonry, t=300mm	m3	0.3	
	Blinding aggregate, t=100mm	m3	0.1	
	Geotextile	m2	1	
	ϕ50 PVC pile	lm	0.5	
II	**Footing for stone Masonry for Slop Protection**	lm		
	Stone Masonry	m3	0.36	
	Blinding aggregate	m3	0.08	
	Wood pile	nos	20	

UNIT QUANTITY OF DRAINAGE SYSTEM (1/4)

Pay Item	Unit	Concrete		Re-Bar		Form	Rubber	Excavation	Back Fill	Remarks
		30MPa	20MPa	D6	D8					
		m3	m3	kg	kg	m2	m2	m3	m3	
R.C. Pipe, D-400mm	4m	0.03	-	13.24	17.91			6.60	5.12	SA, IC3,IS1
R.C. Pipe, D-500mm	4m	0.445	-	1.62	41.10			7.08	5.44	SA
Support for D-400mm	1.2m support/ 4m R.C.pile		0.063	1.35	5.43	1.38				SA, IC3,IS1
Support for D-500mm	1.2m support/ 4m R.C.pile		0.12	2.04	6.09	1.63				SA
Joint sealing for D-400mm	1 nos /4m R.C.pile						0.014			SA, IC3,IS1
Joint sealing for D-500mm	1 nos /4m R.C.pile						0.021			SA

UNIT QUANTITY OF DRAINAGE SYSTEM (2/4)

Pay Item	Unit	Stone masonry	Gravel Compacted	Precast Concrete Kerb	Wooden Pile	Concrete		Form	Re-Bar		Excavation	Back Fill	Remarks
					D-80mm	20MPa	15MPa		D8	D10			
		m3	m3	m	m	m3	m3	m2	kg	kg	m3	m3	
U-Shaped side ditch (500*550)	lm	0.78	0.235	-	30	-	-	-	-	-	2.57	1.62	SA
U-Shaped side ditch (500*1000)	lm	1.53	0.29	-	40	-	-	-	-	-	5.19	3.29	SA
U-Shaped side ditch (400x400)	lm	0.43	0.10	-	-	-	-	-	-	-	1.5	0.9	
U-Shaped side ditch (400x400-500)	lm	0.45	0.10	-	-	-	-	-	-	-	1.7	1.1	
U-Shaped side ditch(400x400-750)	lm	0.51	0.10	-	-	-	-	-	-	-	2.0	1.2	
U-Shaped gutter (400*250)	lm	-	0.04	1x2	-	0.04	0.13	2.1	-	-	-	-	
U-Shaped gutter with concrete cover (500*250)	lm	-	0.11456	1.6x2		0.08	0.1984	3.36	12.8	-	-	-	
U-Shaped gutter with concrete cover (400*400)	lm		0.08			0.38				7.59	1.54	0.92	SA

UNIT QUANTITY OF DRAINAGE SYSTEM (3/4)

Per each

Pay Item	Unit	Stone masonry	Gravel Compacted	Wooden Pile D-80mm	Excavation	Back Fill	Remarks
		m3	m3	m	m3	m3	
Out let 1	each	2.20	0.34	56	21.06	11.70	SA
Out let 2	each	4.93	0.66	110	32.29	23.27	SA
Out let 3	each	2.34	0.33	54	11.34	9.65	SA
Out let 4	each	0.89	0.14	24	9.16	8.32	IC3 (C1,C2,C3,C4)

UNIT QUANTITY OF DRAINAGE SYSTEM (4/4)

Pay Item	Unit	Concrete			Re-Bar			Steel	Channel Steel		Fillet		Stone	Wooden	Gravel	Ex-		Remarks
		20MPa	25MPa	Form	D10	D12	D16	Mesh	L80x50x5	[80x40x4.5	Point	10mm	Masonry	Pile	Compacted	cavation	Back Fill	
		m3	m3	m2	kg	kg	kg	kg	kg	kg	Nos.	m	m3	pile	m3	m3	m3	
Catch Basin Type-A	per each	1.30	0.11	11.05	1.96	13.71	0.63	12.6	15.72	24.68	34	0.64			0.20	19.04	16.55	SA (A1-A7)
Catch Basin Type-B	per each	2.05	0.22	11.90	3.36	23.59	1.26	12.6	29.44	46.54	64	1.28			0.36	29.48	25.75	SA (B1-B8)
Catch Basin Type-C	per each		3.02	29.02	259.4										0.48	24.22	15.87	IC1
Catch Basin Type-D	per each	0.83	0.12	8.33	10.01	6.37	0.63	18.09	11.98	22.98	34	0.64			0.18	11.60	9.87	IS1
Catch Basin Type-E	per each	0.87	0.11	8.61	10.01	6.37	0.63	18.09	11.98	22.98	34	0.64			0.18	11.89	10.11	IC3 (R1-R8,R11-R18, L1-L8,L11-L19)
Catch Basin Type-F	per each			10.32									2.05	49	0.29	18.80	15.57	IC3 (L9,L10,R9,R10)

UNIT QUANTITY OF ISLAND (TOLL GATE)

per each

Pay Item	Unit	Steel (ϕ14)	(Stone 1x2) Concrete grade 200	Cement grout qrade 75 with broken-brick	Sand blanket
		kg	m3	m3	m3
TYPE 1 (29m)	per each	2281.56	21.9	1.7	9.9
TYPE 2 (25m)	per each	2097.94	19.5	1.5	8.9

UNIT QUANTITY OF CONCRETE PAVEMENT (TOLL GATE)

per 1sqm

Pay Item	Unit	Quantity	Remarks
Concrete 30MPa	m3	0.25	
Mixed sand and Bitument	m3	0.03	
Fine aggregate base course	m3	0.17	
Crush aggregate subbase course	m3	0.30	

UNIT QUANTITY OF VEHICLE GUARD RAIL

Pay Item	Unit	Guard Rail Post [-100x140x5, L=1.8m	Standard Terminal Section	Rectangle Washer	Special Washer	Nut-Bolt-Circle Washer	Concrete		Form	Excation	Back Fill	Remarks
							20MPa	15MPa				
		Nos.	Nos.	Nos.	Nos.	Nos.	m3	m3	m2	m3	m3	
Vehicle Guard Rail (TYPE 1)	4m	2	-	1	-	18	0.32	0.05	3.2	0.5	0.130	
Vehicle Guard Rail (TYPE 2)	4m	P1: L=1.8m P2: L=1.5m	1	1	1	18	0.32	0.05	3.2	0.5	0.13	
Vehicle Guard Rail (TYPE 3)	8m	7	1	7	-	63	1.12	0.175	11.2	1.75	0.5	
Vehicle Guard Rail (TYPE 4)	4m	4	2	4	-	36	0.64	0.1	6.4	1	0.3	
Vehicle Guard Rail (TYPE 5)	6m	3	2	3	-	27	0.48	0.075	4.8	0.75	0.2	

UNIT QUANTITY OF WARNING SIGNS (1/2)

Pay Item	Unit	Code and Quantity of Signboard								Concrete		Form	Excavation	Back Fill	Length of signpost	L50x50x8	Remarks
										20MPa	15MPa						
		Code	Quantity	Code	Quantity	Code	Quantity	Code	Quantity	m3	m3	m2	m3	m3	m3	m	
Regulatory and warning signs Type-1	each	102	5	134	2	301e	2	302a	3	3.45	0.37	36.8	18.7	15.25	110.4	11.2	
		122	4	301a	2	301f	2	-	-								
		127	2	301d	1	301g	3	-	-								
Regulatory and warning signs Type-2	each	201a	3	203b	1	226	7	237a	3	3.75	0.40	40.0	20.3	16.55	91.875	19.0	
		201b	3	207b	2	235	1	237b	1								
		202b	4	208	6	236	1	-	-								
Regulatory and warning signs Type-3	each	415	6	410	1	-	-	-	-	2.85	0.30	30.4	15.5	12.65	69.83	17.32	
		401	1	432	1	-	-	-	-								
		402	1	440	9	-	-	-	-								
Regulatory and warning signs Type-4	each	414a	4	-	-	-	-	-	-	2.00	0.30	16.32	9.28	7.28	21.9	18.9	
		419	1	-	-	-	-	-	-								
		-	-	-	-	-	-	-	-								
TOTAL										12.1	1.4	123.5	64	52	294	66.4	

UNIT QUANTITY OF WARNING SIGNS (2/2)

Pay Item	Unit	Concrete		Form	Re-Bar			Excavation	Back Fill	Painting		Reflector mirror (setting at the top of guide post)	Remarks
		20MPa	15MPa		D6	D8	D12			White	Red		
		(m3)	(m3)	(m2)	(kg)	(kg)	(kg)	(m3)	(m3)	(m2)	(m2)	(unit)	
Pre-cast Concrete kilometre Posts	each	0.254	0.036	2.7	-	4.42	8.13	0.8	0.6	0.9	0.42	-	
Guide Posts (Box-Culvert)	each	0.05348	0.1526	1.2	1.3	2.4	-	0.9	0.7	0.432	0.11	1	

UNIT QUANTITY OF TRAFFIC CONTROL UTILITY

Pay Item	Unit	Precast Concrete Kerb		Precast Concrete Barrier	Concrete		Filling Mortar	Sand	Crushed Material	Reflector	Excavation	Back Fill	Remarks
		Type-A	Type-B		20MPa	15MPa		3cm Thick	10cm Thick	100x100x30			
		m	m	m	m3	m3	m3	m3	m3	Nos.	m3	m3	
Concrete Curb Type-A	lm	1	-	-	0.08	0.06	0.0008	-	-	-	0.09	0.02	
Concrete Curb Type-B	lm	-	1	-	0.11	0.1	0.0011	-	-	-	0.12	0.01	
Concrete Barrier Type-A	lm	-	-	1	0.08	0.06	0.0008	-	-	-	0.68	0.54	
Nose of Interchanges	each	26.74			3.48	1.61	0.02	0.81	2.69	14	2.4	0.4	

UNIT QUANTITY OF LANDSCAPING WORKS

Pay Item	Unit	Paving Block 165x200x60	Sand Mixed Cement 2cm	Crushed Material 10cm Thick	Remarks
		m2	m3	m3	
Interlocking Concrete Paving	1sqm	1	0.02	0.01	

Calculation Result of Settlement - Embankment width = 24.1m
Main Way

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	12.05	
	2.0	-	-	2.00	2.00	12.05	
	3.0	-	-	4.00	4.00	10.05	
	4.0	-	-	5.50	5.50	9.05	
	5.0	-	9.50	9.25	4.25	8.05	
	6.0	-	9.50	10.25	5.25	8.05	
	7.0	-	10.30	12.45	6.25	8.05	
	8.0	-	10.30	13.45	7.25	8.05	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	11.2
	2.0	0.38	-	0.66	0.76	0.92	32.2
	3.0	0.54	-	1.04	1.27	1.44	68.3
	4.0	0.64	-	1.31	1.64	1.80	105.6
	5.0	0.58	1.36	1.88	2.06	2.18	111.4
	6.0	0.61	1.41	2.05	2.30	2.43	131.4
	7.0	0.62	1.41	2.21	2.53	2.64	156.8
	8.0	0.63	1.45	2.37	2.76	2.87	179.3

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	12.05	
	2.0	-	-	2.00	2.00	12.05	
	3.0	-	-	4.00	4.00	10.05	
	4.0	-	-	5.50	5.50	9.05	
	5.0	-	9.10	9.45	4.45	8.05	
	6.0	-	9.10	10.45	5.45	8.05	
	7.0	-	9.90	12.45	6.45	8.05	
	8.0	-	9.90	13.45	7.45	8.05	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	11.6
	2.0	0.35	-	0.61	0.74	0.95	32.0
	3.0	0.46	-	0.97	1.23	1.44	66.9
	4.0	0.53	-	1.22	1.59	1.77	103.2
	5.0	0.43	1.20	1.76	1.96	2.09	103.4
	6.0	0.43	1.23	1.90	2.17	2.30	120.7
	7.0	0.42	1.23	2.05	2.37	2.49	143.0
	8.0	0.43	1.22	2.16	2.56	2.67	161.1

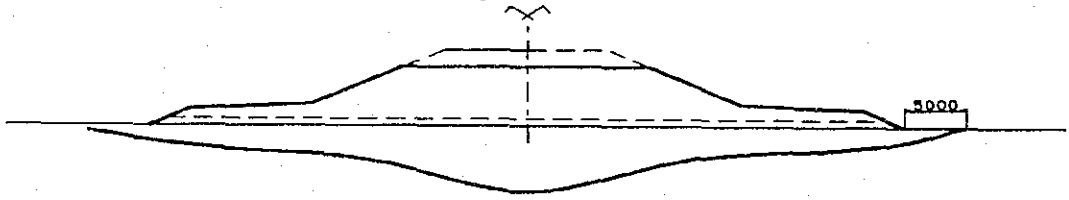
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	12.05	
	2.0	-	-	2.00	2.00	12.05	
	3.0	-	-	4.00	4.00	10.05	
	4.0	-	-	5.50	5.50	9.05	
	5.0	-	9.10	9.45	4.45	8.05	
	6.0	-	9.10	10.45	5.45	8.05	
	7.0	-	9.90	12.45	6.45	8.05	
	8.0	-	9.90	13.45	7.45	8.05	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	9.2
	2.0	0.19	-	0.45	0.57	0.70	25.5
	3.0	0.24	-	0.71	0.93	1.06	57.0
	4.0	0.27	-	0.89	1.19	1.30	90.8
	5.0	0.22	0.85	1.27	1.43	1.51	73.3
	6.0	0.22	0.86	1.37	1.56	1.64	84.9
	7.0	0.21	0.84	1.45	1.69	1.76	99.3
	8.0	0.21	0.84	1.52	1.79	1.86	111.1

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Calculation Result of Settlement - Embankment width = 7.5m
Rampway

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	3.75	
	2.0	-	-	2.00	2.00	3.75	
	3.0	-	-	4.00	4.00	1.75	
	4.0	-	-	5.50	5.50	0.75	
	5.0	-	9.50	9.25	4.25	0.75	
	6.0	-	9.50	10.25	5.25	0.75	
	7.0	-	10.30	12.45	6.25	0.75	
	8.0	-	10.30	13.45	7.25	0.75	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	5.8
	2.0	0.38	-	0.66	0.76	0.92	18.3
	3.0	0.54	-	1.04	1.27	1.44	45.8
	4.0	0.64	-	1.31	1.64	1.80	77.0
	5.0	0.58	1.36	1.88	2.06	2.18	80.5
	6.0	0.61	1.41	2.05	2.30	2.43	96.8
	7.0	0.62	1.41	2.21	2.53	2.64	119.1
	8.0	0.63	1.45	2.37	2.76	2.87	138.2

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	3.75	
	2.0	-	-	2.00	2.00	3.75	
	3.0	-	-	4.00	4.00	1.75	
	4.0	-	-	5.50	5.50	0.75	
	5.0	-	9.10	9.45	4.45	0.75	
	6.0	-	9.10	10.45	5.45	0.75	
	7.0	-	9.90	12.45	6.45	0.75	
	8.0	-	9.90	13.45	7.45	0.75	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	6.0
	2.0	0.35	-	0.61	0.74	0.95	18.0
	3.0	0.46	-	0.97	1.23	1.44	44.7
	4.0	0.53	-	1.22	1.59	1.77	75.3
	5.0	0.43	1.20	1.76	1.96	2.09	73.8
	6.0	0.43	1.23	1.90	2.17	2.30	88.0
	7.0	0.42	1.23	2.05	2.37	2.49	107.5
	8.0	0.43	1.22	2.16	2.56	2.67	122.9

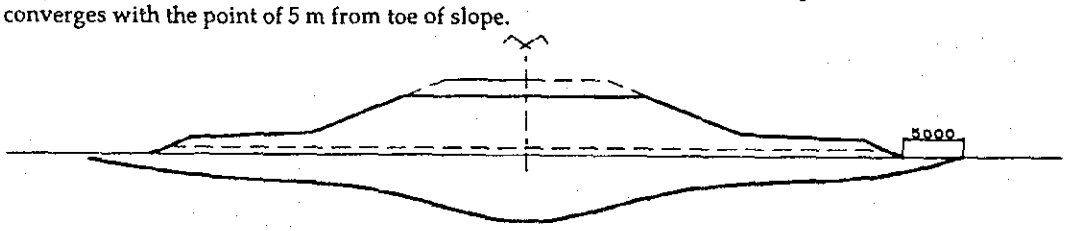
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	3.75	
	2.0	-	-	2.00	2.00	3.75	
	3.0	-	-	4.00	4.00	1.75	
	4.0	-	-	5.50	5.50	0.75	
	5.0	-	9.10	9.45	4.45	0.75	
	6.0	-	9.10	10.45	5.45	0.75	
	7.0	-	9.90	12.45	6.45	0.75	
	8.0	-	9.90	13.45	7.45	0.75	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	4.9
	2.0	0.19	-	0.45	0.57	0.70	15.0
	3.0	0.24	-	0.71	0.93	1.06	40.5
	4.0	0.27	-	0.89	1.19	1.30	70.1
	5.0	0.22	0.85	1.27	1.43	1.51	51.8
	6.0	0.22	0.86	1.37	1.56	1.64	61.5
	7.0	0.21	0.84	1.45	1.69	1.76	74.1
	8.0	0.21	0.84	1.52	1.79	1.86	84.4

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Calculation Result of Settlement - Embankment width = 9.5m
Rampway

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	4.75	
	2.0	-	-	2.00	2.00	4.75	
	3.0	-	-	4.00	4.00	2.75	
	4.0	-	-	5.50	5.50	1.75	
	5.0	-	9.50	9.25	4.25	0.75	
	6.0	-	9.50	10.25	5.25	0.75	
	7.0	-	10.30	12.45	6.25	0.75	
	8.0	-	10.30	13.45	7.25	0.75	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	6.5
	2.0	0.38	-	0.66	0.76	0.92	20.0
	3.0	0.54	-	1.04	1.27	1.44	48.5
	4.0	0.64	-	1.31	1.64	1.80	80.4
	5.0	0.58	1.36	1.88	2.06	2.18	80.5
	6.0	0.61	1.41	2.05	2.30	2.43	96.8
	7.0	0.62	1.41	2.21	2.53	2.64	119.1
	8.0	0.63	1.45	2.37	2.76	2.87	138.2

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	4.75	
	2.0	-	-	2.00	2.00	4.75	
	3.0	-	-	4.00	4.00	2.75	
	4.0	-	-	5.50	5.50	1.75	
	5.0	-	9.10	9.45	4.45	0.75	
	6.0	-	9.10	10.45	5.45	0.75	
	7.0	-	9.90	12.45	6.45	0.75	
	8.0	-	9.90	13.45	7.45	0.75	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	6.7
	2.0	0.35	-	0.61	0.74	0.95	19.7
	3.0	0.46	-	0.97	1.23	1.44	47.4
	4.0	0.53	-	1.22	1.59	1.77	78.7
	5.0	0.43	1.20	1.76	1.96	2.09	73.8
	6.0	0.43	1.23	1.90	2.17	2.30	88.0
	7.0	0.42	1.23	2.05	2.37	2.49	107.5
	8.0	0.43	1.22	2.16	2.56	2.67	122.9

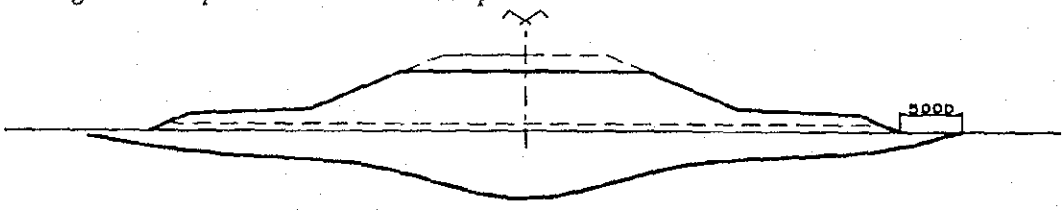
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	4.75	
	2.0	-	-	2.00	2.00	4.75	
	3.0	-	-	4.00	4.00	2.75	
	4.0	-	-	5.50	5.50	1.75	
	5.0	-	9.10	9.45	4.45	0.75	
	6.0	-	9.10	10.45	5.45	0.75	
	7.0	-	9.90	12.45	6.45	0.75	
	8.0	-	9.90	13.45	7.45	0.75	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	5.4
	2.0	0.19	-	0.45	0.57	0.70	16.3
	3.0	0.24	-	0.71	0.93	1.06	42.5
	4.0	0.27	-	0.89	1.19	1.30	72.6
	5.0	0.22	0.85	1.27	1.43	1.51	51.8
	6.0	0.22	0.86	1.37	1.56	1.64	61.5
	7.0	0.21	0.84	1.45	1.69	1.76	74.1
	8.0	0.21	0.84	1.52	1.79	1.86	84.4

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Calculation Result of Settlement - Embankment width = 10.5m
Rampway

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	5.25	
	2.0	-	-	2.00	2.00	5.25	
	3.0	-	-	4.00	4.00	3.25	
	4.0	-	-	5.50	5.50	2.25	
	5.0	-	9.50	9.25	4.25	1.25	
	6.0	-	9.50	10.25	5.25	1.25	
	7.0	-	10.30	12.45	6.25	1.25	
	8.0	-	10.30	13.45	7.25	1.25	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	6.8
	2.0	0.38	-	0.66	0.76	0.92	20.8
	3.0	0.54	-	1.04	1.27	1.44	49.8
	4.0	0.64	-	1.31	1.64	1.80	82.2
	5.0	0.58	1.36	1.88	2.06	2.18	82.6
	6.0	0.61	1.41	2.05	2.30	2.43	99.2
	7.0	0.62	1.41	2.21	2.53	2.64	121.7
	8.0	0.63	1.45	2.37	2.76	2.87	141.0

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	5.25	
	2.0	-	-	2.00	2.00	5.25	
	3.0	-	-	4.00	4.00	3.25	
	4.0	-	-	5.50	5.50	2.25	
	5.0	-	9.10	9.45	4.45	1.25	
	6.0	-	9.10	10.45	5.45	1.25	
	7.0	-	9.90	12.45	6.45	1.25	
	8.0	-	9.90	13.45	7.45	1.25	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	7.0
	2.0	0.35	-	0.61	0.74	0.95	20.5
	3.0	0.46	-	0.97	1.23	1.44	48.7
	4.0	0.53	-	1.22	1.59	1.77	80.3
	5.0	0.43	1.20	1.76	1.96	2.09	75.9
	6.0	0.43	1.23	1.90	2.17	2.30	90.3
	7.0	0.42	1.23	2.05	2.37	2.49	109.9
	8.0	0.43	1.22	2.16	2.56	2.67	125.5

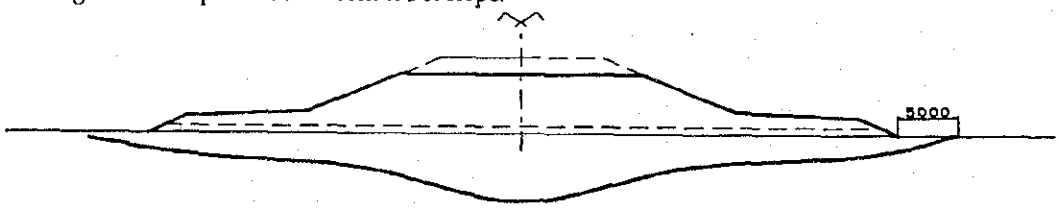
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	5.25	
	2.0	-	-	2.00	2.00	5.25	
	3.0	-	-	4.00	4.00	3.25	
	4.0	-	-	5.50	5.50	2.25	
	5.0	-	9.10	9.45	4.45	1.25	
	6.0	-	9.10	10.45	5.45	1.25	
	7.0	-	9.90	12.45	6.45	1.25	
	8.0	-	9.90	13.45	7.45	1.25	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	5.6
	2.0	0.19	-	0.45	0.57	0.70	16.9
	3.0	0.24	-	0.71	0.93	1.06	43.5
	4.0	0.27	-	0.89	1.19	1.30	73.8
	5.0	0.22	0.85	1.27	1.43	1.51	53.3
	6.0	0.22	0.86	1.37	1.56	1.64	63.1
	7.0	0.21	0.84	1.45	1.69	1.76	75.9
	8.0	0.21	0.84	1.52	1.79	1.86	86.3

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Calculation Result of Settlement - Embankment width = 19.6m
Rampway

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	9.80	
	2.0	-	-	2.00	2.00	9.80	
	3.0	-	-	4.00	4.00	7.80	
	4.0	-	-	5.50	5.50	6.80	
	5.0	-	9.50	9.25	4.25	5.80	
	6.0	-	9.50	10.25	5.25	5.80	
	7.0	-	10.30	12.45	6.25	5.80	
	8.0	-	10.30	13.45	7.25	5.80	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	9.8
	2.0	0.38	-	0.66	0.76	0.92	28.4
	3.0	0.54	-	1.04	1.27	1.44	62.2
	4.0	0.64	-	1.31	1.64	1.80	97.8
	5.0	0.58	1.36	1.88	2.06	2.18	101.9
	6.0	0.61	1.41	2.05	2.30	2.43	120.7
	7.0	0.62	1.41	2.21	2.53	2.64	145.2
	8.0	0.63	1.45	2.37	2.76	2.87	166.6

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	9.80	
	2.0	-	-	2.00	2.00	9.80	
	3.0	-	-	4.00	4.00	7.80	
	4.0	-	-	5.50	5.50	6.80	
	5.0	-	9.10	9.45	4.45	5.80	
	6.0	-	9.10	10.45	5.45	5.80	
	7.0	-	9.90	12.45	6.45	5.80	
	8.0	-	9.90	13.45	7.45	5.80	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	10.1
	2.0	0.35	-	0.61	0.74	0.95	28.2
	3.0	0.46	-	0.97	1.23	1.44	60.8
	4.0	0.53	-	1.22	1.59	1.77	95.6
	5.0	0.43	1.20	1.76	1.96	2.09	94.3
	6.0	0.43	1.23	1.90	2.17	2.30	110.6
	7.0	0.42	1.23	2.05	2.37	2.49	132.0
	8.0	0.43	1.22	2.16	2.56	2.67	149.3

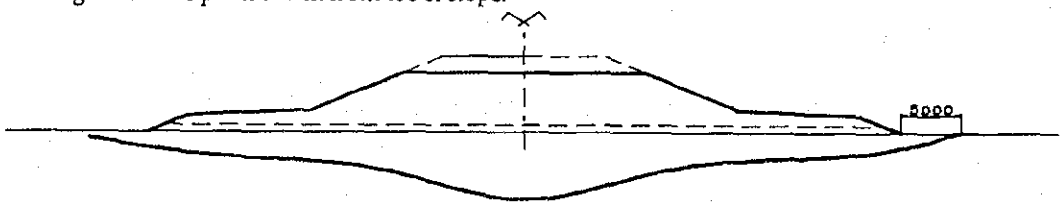
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	9.80	
	2.0	-	-	2.00	2.00	9.80	
	3.0	-	-	4.00	4.00	7.80	
	4.0	-	-	5.50	5.50	6.80	
	5.0	-	9.10	9.45	4.45	5.80	
	6.0	-	9.10	10.45	5.45	5.80	
	7.0	-	9.90	12.45	6.45	5.80	
	8.0	-	9.90	13.45	7.45	5.80	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	8.0
	2.0	0.19	-	0.45	0.57	0.70	22.7
	3.0	0.24	-	0.71	0.93	1.06	52.5
	4.0	0.27	-	0.89	1.19	1.30	85.2
	5.0	0.22	0.85	1.27	1.43	1.51	66.7
	6.0	0.22	0.86	1.37	1.56	1.64	77.7
	7.0	0.21	0.84	1.45	1.69	1.76	91.6
	8.0	0.21	0.84	1.52	1.79	1.86	102.9

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Calculation Result of Settlement - Embankment width = 31.0m
Interchange 3 - Overroad

Segment 1

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	15.50	
	2.0	-	-	2.00	2.00	15.50	
	3.0	-	-	4.00	4.00	13.50	
	4.0	-	-	5.50	5.50	12.50	
	5.0	-	9.50	9.25	4.25	11.50	
	6.0	-	9.50	10.25	5.25	11.50	
	7.0	-	10.30	12.45	6.25	11.50	
	8.0	-	10.30	13.45	7.25	11.50	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.19	-	0.27	0.27	0.38	13.5
	2.0	0.38	-	0.66	0.76	0.92	38.0
	3.0	0.54	-	1.04	1.27	1.44	77.6
	4.0	0.64	-	1.31	1.64	1.80	117.4
	5.0	0.58	1.36	1.88	2.06	2.18	126.1
	6.0	0.61	1.41	2.05	2.30	2.43	147.7
	7.0	0.62	1.41	2.21	2.53	2.64	174.7
	8.0	0.63	1.45	2.37	2.76	2.87	198.7

Segment 3

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	15.50	
	2.0	-	-	2.00	2.00	15.50	
	3.0	-	-	4.00	4.00	13.50	
	4.0	-	-	5.50	5.50	12.50	
	5.0	-	9.10	9.45	4.45	11.50	
	6.0	-	9.10	10.45	5.45	11.50	
	7.0	-	9.90	12.45	6.45	11.50	
	8.0	-	9.90	13.45	7.45	11.50	
	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.20	-	0.24	0.27	0.41	14.0
	2.0	0.35	-	0.61	0.74	0.95	37.9
	3.0	0.46	-	0.97	1.23	1.44	76.1
	4.0	0.53	-	1.22	1.59	1.77	114.8
	5.0	0.43	1.20	1.76	1.96	2.09	117.4
	6.0	0.43	1.23	1.90	2.17	2.30	136.1
	7.0	0.42	1.23	2.05	2.37	2.49	159.7
	8.0	0.43	1.22	2.16	2.56	2.67	179.1

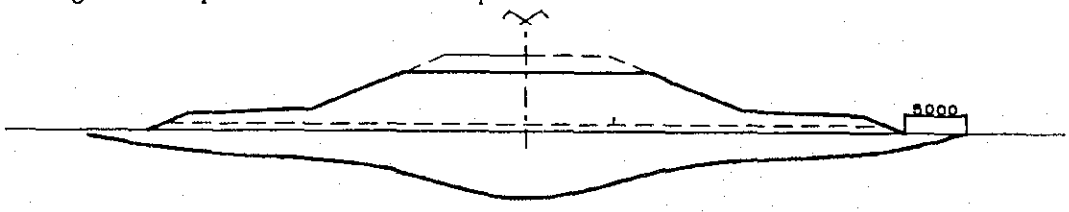
Segment 4

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Remarks
	m	m	m	m	m	m	
Distance of Section	1.0	-	-	1.00	1.00	15.50	
	2.0	-	-	2.00	2.00	15.50	
	3.0	-	-	4.00	4.00	13.50	
	4.0	-	-	5.50	5.50	12.50	
	5.0	-	9.10	9.45	4.45	11.50	
	6.0	-	9.10	10.45	5.45	11.50	
	7.0	-	9.90	12.45	6.45	11.50	
	8.0	-	9.90	13.45	7.45	11.50	

	Height of Embankment	Toe of Slope	Center of Counter Berm	Center of Slope	Shoulder of Slope	Center of Carriage way	Area of Settlement
	m	m	m	m	m	m	m^2
Degree of Settlement	1.0	0.12	-	0.18	0.21	0.31	11.0
	2.0	0.19	-	0.45	0.57	0.70	29.9
	3.0	0.24	-	0.71	0.93	1.06	63.9
	4.0	0.27	-	0.89	1.19	1.30	99.4
	5.0	0.22	0.85	1.27	1.43	1.51	83.4
	6.0	0.22	0.86	1.37	1.56	1.64	95.9
	7.0	0.21	0.84	1.45	1.69	1.76	111.2
	8.0	0.21	0.84	1.52	1.79	1.86	123.7

Note: The settlement quantity that was displayed is the value that 20 cm were added as settlement quantity for long time in the final settlement quantity by consolidation. (Toe of Slope was not added 20cm.)

The calculation of the settlement area was calculated on the basis of the assumption that settlement converges with the point of 5 m from toe of slope.



Settlement of embankment height 1 m and 2 m was calculated with the proportional distribution method as below.

$$S_n = (S_{n+1}/S_{n+2})^2 \times S_{n+1}$$

Height and Area of Removing Surcharge - Embankment width = 24.1m
Main Way

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	24.10	22.10	
4.0	1.50	1.31	1.46	1.17	24.10	25.40	
5.0	2.00	1.68	1.79	1.32	24.10	28.20	
6.0	2.00	1.90	2.02	1.09	24.10	23.90	
7.0	2.00	2.10	2.20	0.90	24.10	20.10	
8.0	2.00	2.31	2.41	0.69	24.10	15.70	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	24.10	21.70	
4.0	1.50	1.32	1.48	1.15	24.10	25.10	
5.0	2.00	1.61	1.73	1.38	24.10	29.40	
6.0	2.00	1.82	1.94	1.17	24.10	25.50	
7.0	2.00	2.02	2.12	0.98	24.10	21.70	
8.0	2.00	2.21	2.31	0.79	24.10	17.80	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	24.10	28.50	
4.0	1.50	0.91	1.01	1.59	24.10	33.30	
5.0	2.00	1.13	1.21	1.88	24.10	38.20	
6.0	2.00	1.26	1.33	1.76	24.10	36.10	
7.0	2.00	1.39	1.45	1.63	24.10	34.00	
8.0	2.00	1.50	1.56	1.52	24.10	32.00	

Height and Area of Removing Surcharge - Embankment width = 7.5m
Rampway

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	7.50	5.50	
4.0	1.50	1.31	1.46	1.17	7.50	6.00	
5.0	2.00	1.68	1.79	1.32	7.50	6.40	
6.0	2.00	1.90	2.02	1.09	7.50	5.80	
7.0	2.00	2.10	2.20	0.90	7.50	5.10	
8.0	2.00	2.31	2.41	0.69	7.50	4.20	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	7.50	5.40	
4.0	1.50	1.32	1.48	1.15	7.50	6.00	
5.0	2.00	1.61	1.73	1.38	7.50	6.50	
6.0	2.00	1.82	1.94	1.17	7.50	6.00	
7.0	2.00	2.02	2.12	0.98	7.50	5.40	
8.0	2.00	2.21	2.31	0.79	7.50	4.70	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	7.50	6.40	
4.0	1.50	0.91	1.01	1.59	7.50	6.90	
5.0	2.00	1.13	1.21	1.88	7.50	7.00	
6.0	2.00	1.26	1.33	1.76	7.50	7.00	
7.0	2.00	1.39	1.45	1.63	7.50	6.90	
8.0	2.00	1.50	1.56	1.52	7.50	6.80	

Height and Area of Removing Surcharge - Embankment width = 9.5m
Rampway

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	9.50	7.50	
4.0	1.50	1.31	1.46	1.17	9.50	8.40	
5.0	2.00	1.68	1.79	1.32	9.50	9.00	
6.0	2.00	1.90	2.02	1.09	9.50	8.00	
7.0	2.00	2.10	2.20	0.90	9.50	6.90	
8.0	2.00	2.31	2.41	0.69	9.50	5.60	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	9.50	7.40	
4.0	1.50	1.32	1.48	1.15	9.50	8.30	
5.0	2.00	1.61	1.73	1.38	9.50	9.30	
6.0	2.00	1.82	1.94	1.17	9.50	8.40	
7.0	2.00	2.02	2.12	0.98	9.50	7.40	
8.0	2.00	2.21	2.31	0.79	9.50	6.30	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	9.50	9.10	
4.0	1.50	0.91	1.01	1.59	9.50	10.00	
5.0	2.00	1.13	1.21	1.88	9.50	10.80	
6.0	2.00	1.26	1.33	1.76	9.50	10.50	
7.0	2.00	1.39	1.45	1.63	9.50	10.20	
8.0	2.00	1.50	1.56	1.52	9.50	9.80	

Height and Area of Removing Surcharge - Embankment width = 10.5m
Rampway

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	10.50	8.50	
4.0	1.50	1.31	1.46	1.17	10.50	9.50	
5.0	2.00	1.68	1.79	1.32	10.50	10.30	
6.0	2.00	1.90	2.02	1.09	10.50	9.10	
7.0	2.00	2.10	2.20	0.90	10.50	7.80	
8.0	2.00	2.31	2.41	0.69	10.50	6.30	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	10.50	8.40	
4.0	1.50	1.32	1.48	1.15	10.50	9.40	
5.0	2.00	1.61	1.73	1.38	10.50	10.70	
6.0	2.00	1.82	1.94	1.17	10.50	9.50	
7.0	2.00	2.02	2.12	0.98	10.50	8.40	
8.0	2.00	2.21	2.31	0.79	10.50	7.00	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	10.50	10.40	
4.0	1.50	0.91	1.01	1.59	10.50	11.60	
5.0	2.00	1.13	1.21	1.88	10.50	12.70	
6.0	2.00	1.26	1.33	1.76	10.50	12.30	
7.0	2.00	1.39	1.45	1.63	10.50	11.80	
8.0	2.00	1.50	1.56	1.52	10.50	11.30	

Height and Area of Removing Surcharge - Embankment width = 19.6m
Rampway

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	19.60	17.60	
4.0	1.50	1.31	1.46	1.17	19.60	20.10	
5.0	2.00	1.68	1.79	1.32	19.60	22.30	
6.0	2.00	1.90	2.02	1.09	19.60	19.00	
7.0	2.00	2.10	2.20	0.90	19.60	16.00	
8.0	2.00	2.31	2.41	0.69	19.60	12.60	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	19.60	17.30	
4.0	1.50	1.32	1.48	1.15	19.60	19.90	
5.0	2.00	1.61	1.73	1.38	19.60	23.20	
6.0	2.00	1.82	1.94	1.17	19.60	20.20	
7.0	2.00	2.02	2.12	0.98	19.60	17.30	
8.0	2.00	2.21	2.31	0.79	19.60	14.20	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	19.60	22.50	
4.0	1.50	0.91	1.01	1.59	19.60	26.10	
5.0	2.00	1.13	1.21	1.88	19.60	29.80	
6.0	2.00	1.26	1.33	1.76	19.60	28.20	
7.0	2.00	1.39	1.45	1.63	19.60	26.60	
8.0	2.00	1.50	1.56	1.52	19.60	25.20	

Height and Area of Removing Surcharge - Embankment width = 31.0m
Interchange 3 - Overroad

Segment 1

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.13	1.00	31.00	29.00	
4.0	1.50	1.31	1.46	1.17	31.00	33.40	
5.0	2.00	1.68	1.79	1.32	31.00	37.30	
6.0	2.00	1.90	2.02	1.09	31.00	31.40	
7.0	2.00	2.10	2.20	0.90	31.00	26.30	
8.0	2.00	2.31	2.41	0.69	31.00	20.40	

Segment 3

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.97	1.17	0.98	31.00	28.50	
4.0	1.50	1.32	1.48	1.15	31.00	33.00	
5.0	2.00	1.61	1.73	1.38	31.00	39.00	
6.0	2.00	1.82	1.94	1.17	31.00	33.50	
7.0	2.00	2.02	2.12	0.98	31.00	28.50	
8.0	2.00	2.21	2.31	0.79	31.00	23.20	

Segment 4

Height of Embankment	Height of Surcharge	Settlement of the time that removes surcharge		Average height of removing surcharge	Width of road surface	Average area of removing surcharge	Remarks
		Shoulder	Center				
m	m	m	m	m	m	m^2	
3.0	1.00	0.66	0.78	1.33	31.00	37.70	
4.0	1.50	0.91	1.01	1.59	31.00	44.20	
5.0	2.00	1.13	1.21	1.88	31.00	51.20	
6.0	2.00	1.26	1.33	1.76	31.00	48.20	
7.0	2.00	1.39	1.45	1.63	31.00	45.20	
8.0	2.00	1.50	1.56	1.52	31.00	42.50	

1.6. Summary

SUMMARY OF QUANTITY

No.	CATEGORY			Name	UNIT	Quantities	Remarks
	2			Site clearing			
	2	1		Site clearing and Demolition			
	2	1	(1)	Site clearing and Demolition (rice field)	m2	241 918	
	2	1	(2)	Removal of Existing Tree (More than 50 trees/100m2)	m2	460 789	
	3			EARTHWORKS & SLOPE PROTECTION			
	3	1		Embankment & Removal Material			
	3	1	(1)	Sand Blanket (t=700mm)	m2	385 067	
	3	1	(2)	Supply, place, compact & trim sand fill to embankment more than 1.05 m below pavement surface level	m3	969 311	
	3	1	(3)	Supply, place, compact & trim sand fill to embankment less than 1.05 m below pavement surface level (Sub-grade)	m3	72 629	selected material
	3	1	(4)	Supply, place, compact & trim sand fill to Preloading embankment more than over surface of pavement level	m3	77 385	abutments +culverts
	3	1	(5)	Supply and place sand fill as Surcharge to embankment, more than over surface of pavement level	m3	131 274	
	3	1	(6)	Removal Pr-loading Material	m3	102 308	abutments +culverts
	3	1	(7)	Removal Surcharge Material	m3	122 865	
	3	2		Soft ground Treatment			
	3	2	(1)	Prefabricated Vertical Drain (PVD)	m	3 453 916	
	3	2	(2)	Gravel Pile (f=700mm) in selected locations as specified	m	22 625	
	3	2	(3)	Establish the measuring instrument for Soft Grand Treatment A (SSP-Surface Settlement Plate)	Each	309	
	3	2	(4)	The measurement for Soft Grand Treatment A (SSP-Surface Settlement Plate)	Day	61 808	
	3	2	(5)	Establish the measuring instrument for Soft Grand Treatment B (AS-Alignment Stakes)	Each	368	
	3	2	(6)	The measurement for Soft Grand Treatment B (AS-Alignment Stakes)	Day	82 048	
	3	2	(7)	Establish the measuring instrument for Soft Grand Treatment C (DSP - Deep Settlement Plate)	Each	10	
	3	2	(8)	The measurement for Soft Grand Treatment C (DPS - Deep Settlement Plate)	Day	2 320	
	3	2	(9)	Establish the measuring instrument for Soft Grand Treatment D (INC - Inclinometer)	Each	20	
	3	2	(10)	The measurement for Soft Grand Treatment D (INC - Inclinometer)	Day	4 640	
	3	2	(11)	Establish the measuring instrument for Soft Grand Treatment E (EP - Electrical Piezometer)	Each	20	
	3	2	(12)	The measurement for Soft Grand Treatment E (EP - Electrical Piezometer)	Day	4 640	

No.	CATEGORY			Name	UNIT	Quantities	Remarks
	3	2	(13)	Establish the measuring instrument for Soft Grand Treatment F (OW - Observation Well)	Each	10	
	3	2	(14)	The measurement for Soft Grand Treatment F (OW - Observation Well)	Day	1 904	
	3	**3**		**Structure Excavation & Backfilling**			
	3	3	(1)	Excavation for structures in any material over the water table	m3		
	3	3	(2)	Excavation for structures in any material below the water table	m3	17 313	abutments +culverts
	3	3	(3)	Backfill to structures	m3	48 770	abutments +culverts
	3	3	(5)	Excavation of any material over the water table other than the structure section	m3	15 406	earth work
	3	3	(6)	Excavation of any material below the water table other than the structure section	m3	28 337	canal
	4			**Slope protection**			
	4	**1**		**Slope protection**			
	4	1	(1)	Supply, place, compact & trim Cray material fill to side slope.(t=50cm)	m2	147 870	
	4	1	(2)	Trim side slopes by bulldozer	m2	147 870	
	4	1	(3)	Sodding	m2	158 953	slope+median
	4	1	(5)	Stone Masonry for Slop Protection	m2		(see quantity of bridge)
	4	1	(6)	Stone Masonry Slab for slope protection to side berms	m2		
	4	1	(7)	Footing for Stone Masonry for slope protection	m		
	5			**DRAINAGE**			
	5	**1**		**R.C.Pipe**			
	5	1	(1)	R.C. Pipe, D-400mm	m	1 614	
	5	1	(2)	R.C. Pipe, D-500mm	m	206	
	5	**2**		**Side Ditch**			
	5	2	(1)	U-Shaped gutter with concrete cover (400*400)	m	40	
	5	2	(2)	U-Shaped side ditch (500*550)	m	209	
	5	2	(3)	U-Shaped side ditch (500*1000)	m	166	
	5	**3**		**Catch Basin**			
	5	3	(1)	Catch Basin Type A	Each	7	
	5	3	(2)	Catch Basin Type B	Each	8	
	5	3	(3)	Catch Basin Type C	Each	0	
	5	3	(4)	Catch Basin Type D	Each	9	
	5	3	(5)	Catch Basin Type E	Each	33	

No.	CATEGORY			Name	UNIT	Quantities	Remarks
	5	3	(6)	Catch Basin Type F	Each	4	
	5	3	(7)	Out-let 1	Each	1	
	5	3	(8)	Out-let 2	Each	1	
	5	3	(9)	Out-let 3	Each	1	
	5	3	(10)	Out-let 4	Each	4	
	6			PAVEMENT			
	6	1		Base course & Sub-base course			
	6	1	(1)	Supply, place & compact Subbase course (t=300)	m3	68 772	
	6	1	(2)	Supply, place & compact Base course (t=300mm)	m3	65 647	
	6	2		Coat			
	6	2	(1)	Bituminous prime coat (grade MC-70 or RC-250)	m2	212 911	
	6	2	(2)	Bituminous tack coat (grade RC-250)	m2	210 275	
	6	3		Asphalt concrete			
	6	3	(1)	Asphalt concrete binder course (t=100mm)	m2	211 277	
	6	3	(3)	Asphalt concrete surface course (t=50mm)	m2	209 801	
	6	4		Service Road			
	6	4	(1)	Granular Road (t=150mm)	m3	1 916	
	7			CONCRETE WORKS & PRECAST CONCRETE WORKS			
	7	6		Culvert-Box			
	7	6	(1)	Culvert-Box, Type A-s (2.50*1.50)	m		Quantity of approach road (volume 2 - drainage system)
	7	6	(2)	Culvert-Box, Type A-d (2.50*1.50*2)	m		
	7	6	(3)	Culvert-Box, Type B-d (2.50*2.00*2)	m		
	7	6	(4)	Culvert-Box, Type C-s (3.00*3.20)	m		
	7	6	(5)	Culvert-Box, Type D-s (3.00*3.50)	m		
	7	6	(6)	Culvert-Box, Type E-s (3.00*3.80)	m		
	7	6	(7)	Culvert-Box, Type F-s (5.00*3.80)	m		
	7	6	(8)	Culvert-Box, Type G-s (5.00*4.00)	m		
	7	6	(9)	Culvert-Box, Type H-s (5.00*4.50)	m		
	7	6	(10)	Culvert-Box, Type H-d (5.00*4.50*2)	m		
	7	6	(11)	Culvert-Box, Type I-s (6.50*4.50)	m		
	13			ELECTRICAL SERVICES			
	13	1		Lighting			
	13	1	(1)	Street Lighting Pole, Type-A	Each		
	13	1	(2)	Street Lighting Pole, Type-B	Each		

No.	CATEGORY		Name	UNIT	Quantities	Remarks
	13	2	Cable for Electric Facility			(see quantity of lighting system)
	13	2 (1)	Cable, Type-4 (NYFGbY 4C-16mm2)	m		
	13	2 (2)	P.V.C. Conduit, D=50mm	m		
	13	2 (3)	Cable Rack-mounting brackets and deck plate	Each		
	14		Toll Collection Systems			
	14	1	Toll Collection Systems			
	14	1 (1)	Toll Collection Booths (Buildings)	Each		(see quaintity of tollgate)
	14	1 (2)	Concrete Pavement	m2		
	14	1 (3)	Maintenance office (Building)	LS		
	15		Vehicle Guardrail, precast concrete km Posts			
	15	1	Vehicle Guardrail, precast concrete km Posts			
	15	1 (1)	Vehicle guardrail (Type-1)	m	10 566	
	15	1 (2)	Vehicle guardrail (Type-2)	m	404	
	15	1 (3)	Vehicle guardrail (Type-3)	m	280	
	15	1 (4)	Vehicle guardrail (Type-4)	m		
	15	1 (5)	Vehicle guardrail (Type-5)	m	72	
	15	1 (6)	Precast concrete km Posts	Each	8	
	16	1	Traffic Signs			
	16	1 (1)	Regulatory and warning signs, Type-1	Each	24	
	16	1 (2)	Regulatory and warning signs, Type-2	Each	21	
	16	1 (3)	Regulatory and warning signs, Type-3	Each	27	
	16	1 (4)	Regulatory and warning signs, Type-4	Each	6	
	16	1 (6)	Guide Posts (Box-Culvert)	Each	61	
	17	4	Traffic Control Utility			
	17	4 (1)	Road marking	m2	7 990	
	17	4 (2)	Delineator (Top of Guard Rail)	Each	61	
	17	4 (3)	Concrete Curb Type-A	m	15 986	
	17	4 (4)	Concrete Curb Type-B	m	1 798	
	17	4 (5)	Concrete Barrier, Type-A (Road section)	m	1 798	
	17	4 (6)	Concrete Barrier, Type-B (Bridge section)	m	210	
	17	4 (7)	Nose of Interchange	Each	8	
	18	5	Landscaping Works			
	18	5 (1)	Interlocking Concrete Paving (for Service Area)	m2	4 672	

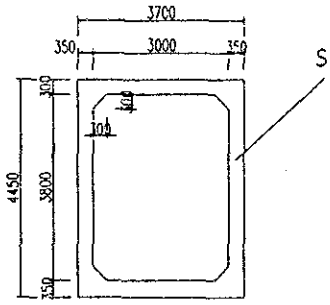
2. Drainage system

2.1. Box culvert at station 7+820

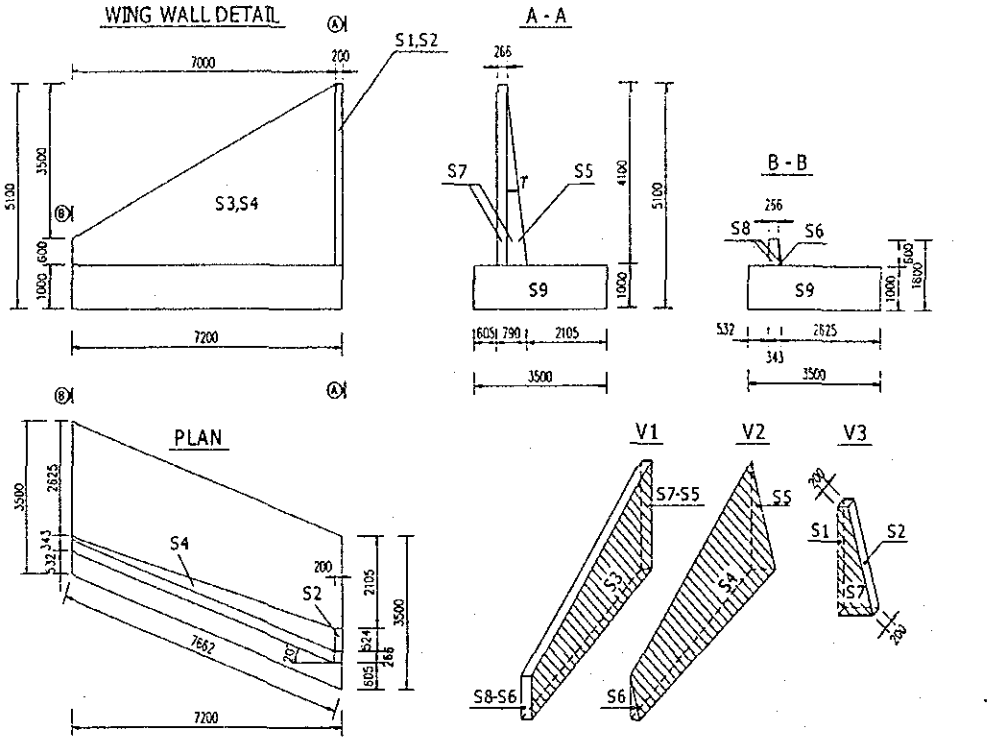
CULVERT 07+820

I	BOX CULVERT STATION 7+820														QUANTITIES
	L	=	13.460	+	13.460	+	0.02	=	26.94						
1	CULVERT														
+	CONCRETE (M3)														
	S	=	3.700	x	4.450	-	3.800	x	3.000	+	2	x	0.300	x 0.300 =	5.245
	VOLUME	=	S	x	(13.460	+	13.460)	+	3.700	x	0.200	x	0.300	x 2 =	141.64
+	FORM														541.10
*	INSIDE FORM (M2)														282.581
	BOX BULWARK	=	(3.800	+	2	x	0.300	x	(1:SIN45^0	-	1))	x	26.920	x 2 =	217.973
	BOTTOM OF THE BOX	=	(3.000	-	0.300	x	2)	x	26.920	x	1			=	64.608
*	OUTSIDE FORM (M2)														258.523
	BOX BULWARK	=	4.450	x	2	x	26.920	+	4	x	0.300	x	0.200	=	239.828
	THE END OF CULVERT	=	S	x	2	+	3.700	x	0.200	x	4			=	13.450
	CENTER	=	S											=	5.245
+	SCAFFOLDING (M2)	=	4.450	x	2.000	x	26.920	+	4.000	x	0.300	x	0.200	=	239.83
+	SUPPORT														
	AREA (M2)	=	3.700	x	4.450	-	S							=	11.220
	VOLUME (M3)	=	AREA	x	L									=	302.27

SINGLE BOX CULVERT



2 WINGWALL

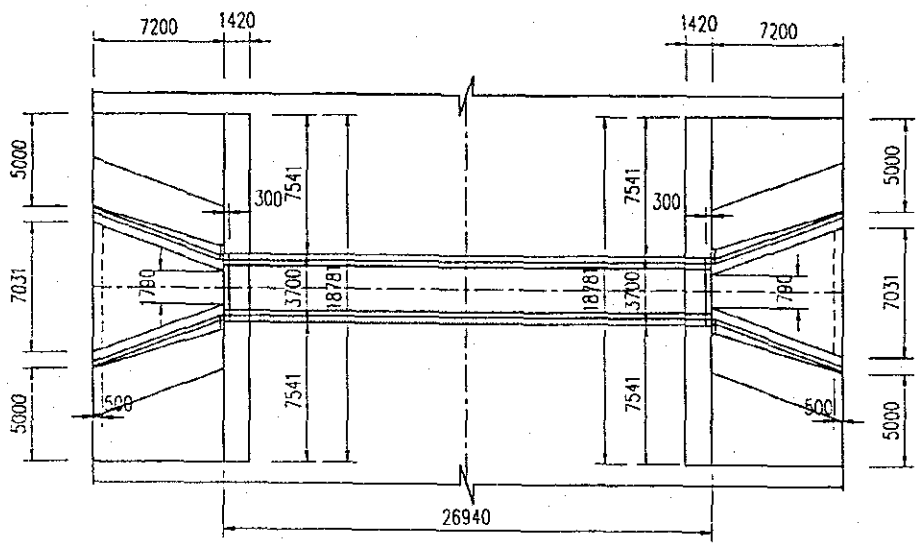


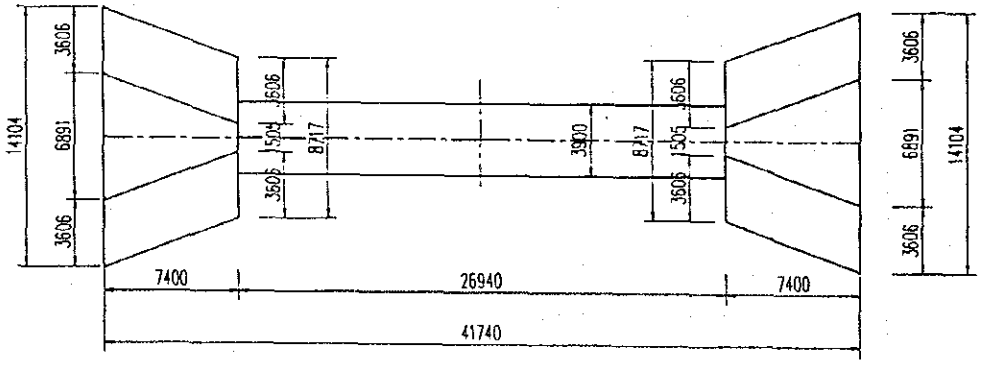
+	CALCULATING VALUES												
	S1	=	0.200	x	4.100							=	0.820
	S2	=	S1	:	$\cos 7^0$	=	0.820	:	0.993			=	0.826
	S3	=	(4.100	+	0.600)	x	(7.200	-	0.200)	:	2 x $\cos 20^0$	=	17.506
	S4	=	S3	:	$\cos 7^0$	=	17.506	:	0.993			=	17.637
	S5	=	(0.790	-	0.266)	x	4.100	:	2			=	1.074
	S6	=	(0.343	-	0.266)	x	0.600	:	2			=	0.023
	S7	=	S5	+	(4.100	x	0.266)	=	1.074	+	1.091	=	2.165
	S8	=	S6	+	(0.600	x	0.266)	=	0.023	+	0.160	=	0.183
	S9	=	3.500	x	1.000							=	3.500
+	CONCRETE (m^3)											=	33.22
	- Footing	=	S9	x	7.200	=	3.500	x	7.200			=	25.200
	- Wing wall	=	V1	+	V2	+	V3	=	4.657	+	2.930 + 0.433	=	8.020
	V1	=	S3	x	0.266	=	17.506	x	0.266			=	4.657
	V2	=	(7.200	-	0.200)	:	3	x	(S5	+	S6 + $(S5 \times S6)^{0.5}$)		
		=	2.333	x	(1.074	+	0.023	+	0.157)			=	2.930
	V3	=	S7	x	0.200	=	2.165	x	0.200			=	0.433
+	FORM (m^2)											=	61.46
	- Footing	=	(7.200	:	$\cos 20^0$	+	S9)	x	2	=	(7.662 + 3.500) x 2	=	22.324
	- Wing wall	=	S1	+	S2	+	S3	+	S4	+	S7 + S8		
		=	0.820	+	0.826	+	17.506	+	17.637	+	2.165 + 0.183	=	39.136
+	SCAFFOLDING (m^2)											=	62.27
	- Footing	=	(7.200	:	$\cos 20^0$	+	1.000	+	3.500	+	1.000) x 2 x 1.000	=	26.324
	- Wing wall	=	S3	+	S4	+	0.600	x	(0.343	+	1.000)		
		=	17.506	+	17.637	+	0.806					=	35.949

BOX CULVERT STATION 7+820
REINFORCEMENT OF WINGWALL

BAR MARK	UNIT LENGTH (MM)	DIAMETER (MM)	NUMBER OF BAR	UNIT WEIGHT (KG/M)	TOTAL LENGTH (M)	TOTAL WEIGHT (KG)
1a	3424	12	39	0.888	133.5	118.6
1b	3520	16	39	1.578	137.3	216.7
2a	7647	12	3	0.888	22.9	20.4
2b	4386	12	16	0.888	70.2	62.3
2c	592	12	39	0.888	23.1	20.5
3	8597	12	2	0.888	17.2	15.3
4	8617	12	34	0.888	293.0	260.1
5a	4953	12	33	0.888	163.4	145.1
5b	3286	12	10	0.888	32.9	29.2
5c	3947	22	33	2.984	130.3	388.7
5d	2280	22	10	2.984	22.8	68.0
6	2944	12	72	0.888	212.0	188.2
7	3801	12	4	0.888	15.2	13.5
8	3801	12	6	0.888	22.8	20.2
9	7543	12	6	0.888	45.3	40.2
10	1304	14	14	1.208	18.3	22.1
11	893	12	12	0.888	10.7	9.5
12	3134	12	2	0.888	6.3	5.6
		REIFORCEMENT		D<=14		970.6 KG
		REIFORCEMENT		14< D<=25		673.4 KG
		TOTAL REINFORCEMENT :				**1644.0 KG**

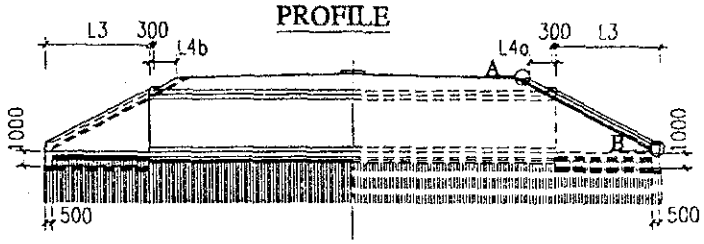
BOX CULVERT FOR DRAINAGE
(STATION 7+820)





NOTATIONS FOR QUANTITY CALCULATION OF BOX CULVERT FOR DRAINAGE

PROFILE



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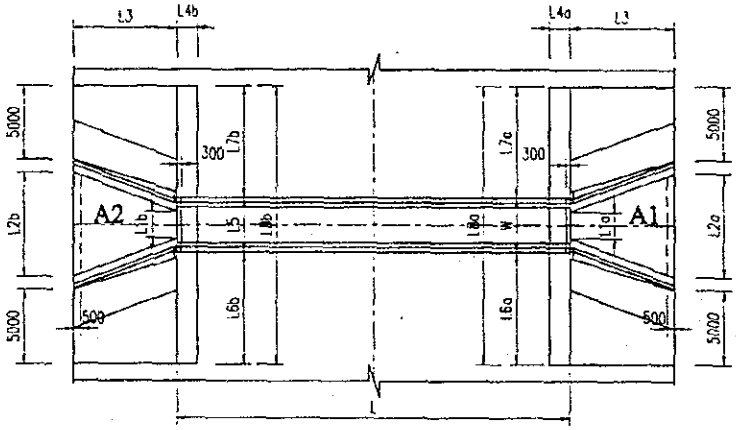
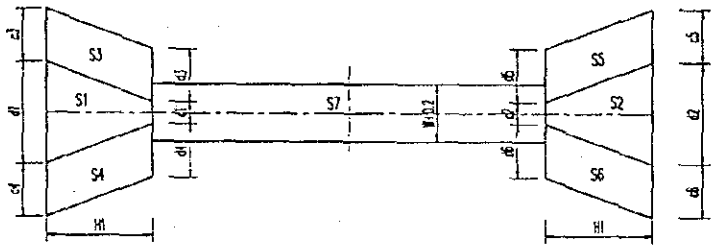
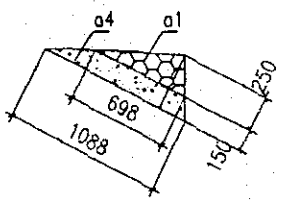


PLAN LAYOUT OF WOOD PILE



DETAIL A



DETAIL B

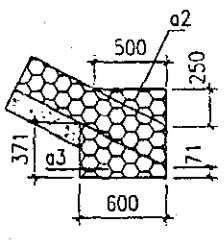


TABLE OF EXPLAINING QUANTITIES OF CULVERT

CULVERT KM7+820

S1=	(	c1	+	d1	)	x	H1	:	2	=		
=	(	1.505	+	6.891	)	x	7.400	:	2	=	31.065	(m2)
S2=	(	c2	+	d2	)	x	H1	:	2	=		
=	(	1.505	+	6.891	)	x	7.400	:	2	=	31.065	(m2)
S3=	(	c3	+	d3	)	x	H1	:	2	=		
=	(	3.606	+	3.606	)	x	7.400	:	2	=	26.684	(m2)
S4=	(	c4	+	d4	)	x	H1	:	2	=		
=	(	3.606	+	3.606	)	x	7.400	:	2	=	26.684	(m2)
S5=	(	c5	+	d5	)	x	H1	:	2	=		
=	(	3.606	+	3.606	)	x	7.400	:	2	=	26.684	(m2)
S6=	(	c6	+	d6	)	x	H1	:	2	=		
=	(	3.606	+	3.606	)	x	7.400	:	2	=	26.684	(m2)
S7=		L	x	(W + 0.2)	=							
=		26.94	x	3.900	=		105.066		(m2)			

1. APRON CONCRETE:

A1=	(	L1a	+	L2a	)	x	L3	:	2	=		
=	(	1.790	+	7.031	)	x	7.200	:	2	=	31.756	(m2)
A2=	(	L1b	+	L2b	)	x	L3	:	2	=		
=	(	1.790	+	7.031	)	x	7.200	:	2	=	31.756	(m2)

	(	A1	+	A2	)	x 0.3	+	(	L2a	+	L2b	) x 0.7 x 0.5	=		
=	(	31.756	+	31.756	)	x 0.3	+	(	7.031	+	7.031	) x 0.7 x 0.5	=	23.98	(m3)

2. CONCRETE FOUNDATION OF CULVERT:

L	x	(W + 0.2)	x	0.2	=	26.940	x	3.900	x	0.2	=	21.01 (m3)

3. LEAN CONCRETE:

=	(	S1	+	S2	+	S3	+	S4	+	S5	+	S6	)	x	0.1	=			
=	(	31.065	+	31.0652	+	26.684	+	26.684	+	26.684	+	26.684	)	x	0.1	=	***16.89***	(m3)	

4. WOOD PILE:

**** L=5M***

W5=	(	S3,	+	S4	+	S5	+	S6	+	S7	)	x 25 x 5 :100	=						
=	(	26.684	+	26.684	+	26.684	+	26.684	+	105.066	)	x 25 x 5 :100	=	***264.75***	(100m)				

**** L=3M***

W3=	(	S1	+	S2	+	(0.8 x 4.5 x 4)	)	x 25 x 3 : 100	=										
=	(	31.065	+	31.0652	+	14.400	)	x 25 x 3 : 100	=	***57.40***	(100m)								

NOTE: S=0.8 x 4.5 x 4 IS AREA WOOD PILE TOE OF SLOPE

5. SAND BEDDING:

=	(	S1	+	S2	+	S3	+	S4	+	S5	+	S6	+	S7	+	(0.8 x 4.5 x 4)	) x 0.15 =								
=	(	31.065	+	31.065	+	26.684	+	26.684	+	26.684	+	26.684	+	105.066	+	(0.8 x 4.5 x 4)	) x 0.15 =	***43.25***	(m3)						

6. STONE MASONRY

a1=		0.695	x	0.25	x		0.5	=		0.087	(m2)								
a2=		0.5	x	0.25	x		0.5	=		0.063	(m2)								
a3=	(	0.071	+	0.371	)	x	0.5	x	0.6	=	0.133	(m2)							
a4=	(	0.698	+	1.088	)	x	0.5	x	0.15	=	0.134	(m2)							

b1=		0.300	x	L5	=	0.300	x	3.700	=	1.110	(m2)	(b1 IS AREA OF HEAD WALL)							

b2a=	(	L6a	+	5.000	)	x	L3	x 0.5	=										
=	(	7.541	+	5.000	)	x	7.200	x 0.5	=	45.1476	(m2)								

b2b= (L6b + 5.000) x L3 x 0.5 =
= (7.541 + 5.000) x 7.200 x 0.5 = 45.1476 (m2)

b3a= (L7a + 5.000) x L3 x 0.5 =
= (7.541 + 5.000) x 7.200 x 0.5 = 45.1476 (m2)

b3b= (L7b + 5.000) x L3 x 0.5 =
= (7.541 + 5.000) x 7.200 x 0.5 = 45.1476 (m2)

b4a= L8a x L4a = 18.781 x 1.420 = 26.669 (m2)

b4b= L8b x L4b = 18.781 x 1.420 = 26.669 (m2)

b5= 0.6 x 5 x 2 = 6.000 (m2)

V1a= a1 x L8a = 0.087 x 18.781 = 1.632 (m3)

V1b= a1 x L8b = 0.087 x 18.781 = 1.632 (m3)

V2= (a2 + a3) x 5 x 4 = (0.063 + 0.133) x 5 x 4 = 3.902 (m3)

V3a= (b4a - b1 + b2a + b3a) x 0.25 : COS(26.56) =
= (26.669 - 1.110 + 45.1476 + 45.1476) x 0.25 : 0.894 = 32.398 (m3)

V3b= (b4b - b1 + b2b + b3b) x 0.25 : COS(26.56) =
= (26.669 - 1.110 + 45.1476 + 45.1476) x 0.25 : 0.894 = 32.398 (m3)

TOTAL = (V1a + V1b + V2 + V3a + V3b) =
(1.632 + 1.632 + 3.902 + 32.398 + 32.398) = ***71.961*** (m3)

7. BASE BEDDING:

V4a=		a4	x	L8a			=	0.134	x	18.781			=	2.516	(m3)			
V4b=		a4	x	L8b			=	0.134	x	18.781			=	2.516	(m3)			
V5a=	(	b4a	-	b1	+	b2a	+	b3a	-	b5	)	x	0.15	:	COS(26.56)	=		
=	(	26.669	-	1.110	+	45.1476	+	45.1476	-	6.000	)	x	0.15	:	0.894	=	18.432	(m3)
V5b=	(	b4b	-	b1	+	b2b	+	b3b	-	b5	)	x	0.15	:	COS(26.56)	=		
=	(	26.669	-	1.110	+	45.1476	+	45.1476	-	6.000	)	x	0.15	:	0.894	=	18.432	(m3)
TOTAL =			(	V4a	+	V4b	+	V5a	+	V5b	)=							
			(	2.516	+	2.516	+	18.432	+	18.432	)=	***41.90***			(m3)			

8. FORM :

=	(L2a	+	L2b)	)	X 1	x	2	=	
	(7.031	+	7.031	)	X 1	x	2	=	**28.124** (m2)

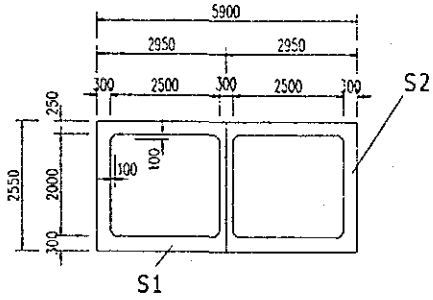
9. SCAFFOLDING :

=	(L2a	+	L2b)	)	X 1	x	2	=	
	(7.031	+	7.031	)	X 1	x	2	=	**28.124** (m2)

2.2. Box culvert at station 7+950

BOX CULVERT 7+950

I	BOX CULVERT STATION 7+950			QUANTITIES
	L	= 13.340 + 13.340 + 0.02 = 26.700		
1	CULVERT			
+	CONCRETE (M3)			
	S1	= 2.950 x 2.550 - 2.500 x 2.000 + 2 x 0.100 x 0.100	=	2.543
	S	= S1 + S2	=	5.085
	VOLUME	= S x (13.340 + 13.340) + 5.900 x 0.200 x 0.300 x 2	=	136.38
		DOUBLE BOX CULVERT		
+	FORM (M2)			503.96
*	INSIDE FORM (M2)			347.677
	BOX BULWARK	= (2.000 + 2 x 0.100 x (1:SIN45^0 - 1)) x 26.680 x 4	=	222.281
	BOTTOM OF THE BOX	= (2.950 - 0.300 x 2) x 26.680 x 2	=	125.396
*	OUTSIDE FORM (M2)			156.283
	BOX BULWARK	= 2.550 x 2 x 26.680 + 4 x 0.300 x 0.200	=	136.308
	THE END OF CULVERT	= S x 2 + 5.900 x 0.200 x 4	=	14.890
	CENTER	= S	=	5.085
+	SCAFFOLDING (M2)	= 2.550 x 2.000 x 26.680 + 4.000 x 0.300 x 0.200	=	136.31
+	SUPPORT			
	AREA (M2)	= 5.900 x 2.000 - S	=	6.715
	VOLUME (M3)	= AREA x L	=	179.29

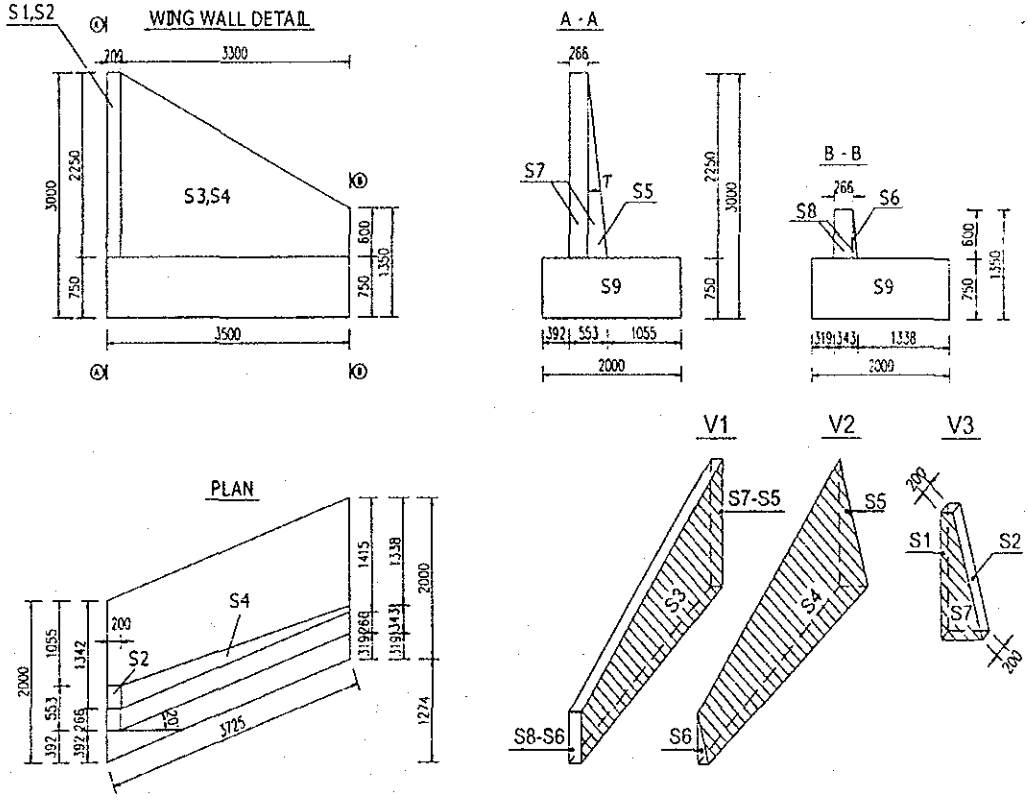


BOXCULVERT STATION 7+950
QUANTITIES TABLE OF REINFORCEMENT
SEGMENT 1 & 2

SYMBOL OF BAR	UNIT LENGTH (mm)	SPACE (mm)	DIAMETER (mm)	NUMBER OF BAR	UNIT WEIGHT (kg/m)	TOTAL LENGTH (m)	TOTAL WEIGHT (kg)
1	4160	125	14	214	1.208	890.2	1075.8
2	2850	250	12	108	0.888	307.8	273.3
3	6270	250	14	108	1.208	677.2	818.3
4	1500	250	14	212	1.208	318.0	384.3
5	1550	125	18	214	1.998	331.7	662.6
6	1970	250	12	216	0.888	425.5	377.8
7	2850	125	12	214	0.888	609.9	541.5
8	1049	250	12	216	0.888	226.6	201.2
9	1120	250	12	216	0.888	241.9	214.8
10	13845	250	12	52	0.888	719.9	639.2
11	13945	250	12	100	0.888	1394.5	1238.1
12	5780	250	12	2	0.888	11.6	10.3
13	1440	250	12	26	0.888	37.4	33.2
14	1180	250	12	320.16	0.888	377.8	335.4
15	1280	250	12	320.16	0.888	409.8	363.8

REINFORCEMENT :	D<=14	6171.4	TOTAL FOR SEGMENT 1 :
REINFORCEMENT :	16=D<=25	662.6	REINFORCEMENT (KG): 7169.4
REINFORCEMENT :	25<D=32		CONCRETE (M^3): 68.19
TOTAL FOR SEGMENT 1 & 2			
REINFORCEMENT :	D<=14	12342.75	REINFORCEMENT (KG) : 14338.8
REINFORCEMENT :	16=D<=25	1325.195	
REINFORCEMENT :	25<D=32		CONCRETE (M^3) : 136.38

2 WINGWALL

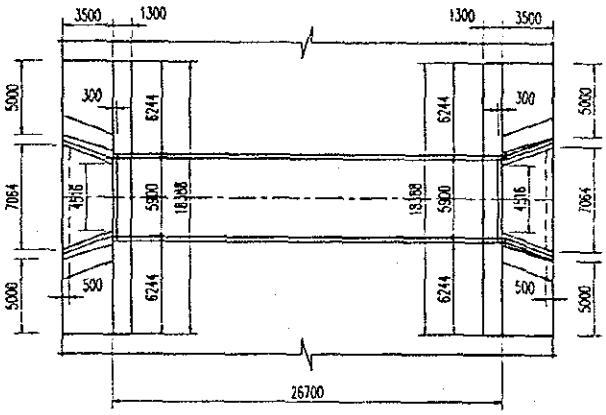


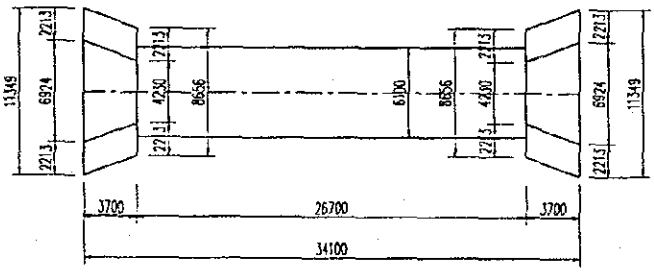
+	CALCULATING VALUES												
	S1	=	0.200	x	2.250							=	0.450
	S2	=	S1	:	$\cos 7^0$	=	0.450	:	0.993			=	0.453
	S3	=	(2.250 + 0.600)	x	(3.500 - 0.200)	:	2	x	$\cos 20^0$			=	5.004
	S4	=	S3	:	$\cos 7^0$	=	5.004	:	0.993			=	5.042
	S5	=	(0.553 - 0.266)	x	2.250	:	2					=	0.323
	S6	=	(0.343 - 0.266)	x	0.600	:	2					=	0.023
	S7	=	S5	+	(2.250 x 0.266)		=		0.323	+	0.599	=	0.922
	S8	=	S6	+	(0.600 x 0.266)		=		0.023	+	0.160	=	0.183
	S9	=	2.000	x	0.750							=	1.500
+	CONCRETE (m^3)											=	7.25
	- Footing	=	S9	x	3.500	=	1.500	x	3.500			=	5.250
	- Wing wall	=	V1	+	V2	+	V3	=	1.331	+	0.480 + 0.184	=	1.995
	V1	=	S3	x	0.266	=	5.004	x	0.266			=	1.331
	V2	=	(3.500 - 0.200)	:	3	x	(S5	+	S6	+	$(S5 \times S6)^{0.5}$)		
		=	1.100	x	(0.323 + 0.023 + 0.086)							=	0.480
	V3	=	S7	x	0.200	=	0.922	x	0.200			=	0.184
+	FORM (m^2)											=	22.50
	- Footing	=	(3.500 : $\cos 20^0$ +	S9)	x	2	=	(3.725	+	1.500)	x 2	=	10.449
	- Wing wall	=	S1	+	S2	+	S3	+	S4	+	S7	+ S8	
		=	0.450	+	0.453	+	5.004	+	5.042	+	0.922	+ 0.183	=	12.053
+	SCAFFOLDING (m^2)											=	22.44
	- Footing	=	(3.500 : $\cos 20^0$ +	1.000	+	2.000	+	1.000)	x	2	x 0.750	=	11.587
	- Wing wall	=	S3	+	S4	+	0.600	x	(0.343	+	1.000)		
		=	5.004	+	5.042	+	0.806					=	10.852

BOX CULVERT STATION 7+950
REINFORCEMENT OF WINGWALL

BAR MARK	UNIT LENGTH (MM)	DIAMETER (MM)	NUMBER OF BAR	UNIT WEIGHT (KG/M)	TOTAL LENGTH (M)	TOTAL WEIGHT (KG)
1a	2258	12	20	0.888	45.2	40.1
1b	2310	14	20	1.208	46.2	55.8
2a	3723	12	6	0.888	22.3	19.8
2b	2100	12	16	0.888	33.6	29.8
2c	582	12	20	0.888	11.6	10.3
3	4254	12	2	0.888	8.5	7.6
4	4429	12	20	0.888	88.6	78.6
5a	3043	12	15	0.888	45.6	40.5
5b	2150	12	6	0.888	12.9	11.5
5c	2467	20	15	2.466	37.0	91.3
5d	1574	20	6	2.466	9.4	23.3
6	2444	14	16	1.208	39.1	47.3
7	2301	12	4	0.888	9.2	8.2
8	2301	12	4	0.888	9.2	8.2
9	3605	12	4	0.888	14.4	12.8
10	1304	14	8	1.208	10.4	12.6
11	744	12	11	0.888	8.2	7.3
12	2143	12	1	0.888	2.1	1.9
		REINFORCEMENT :		D<=14	**392.2** KG	
		REINFORCEMENT :		14< D<=25	**114.6** KG	
		TOTAL REINFORCEMENT :			**506.8** KG	

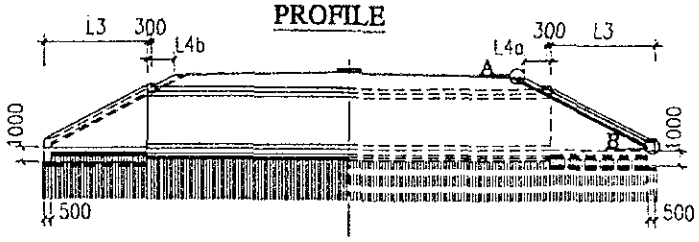
BOX CULVERT FOR DRAINAGE
(STATION 7+950)



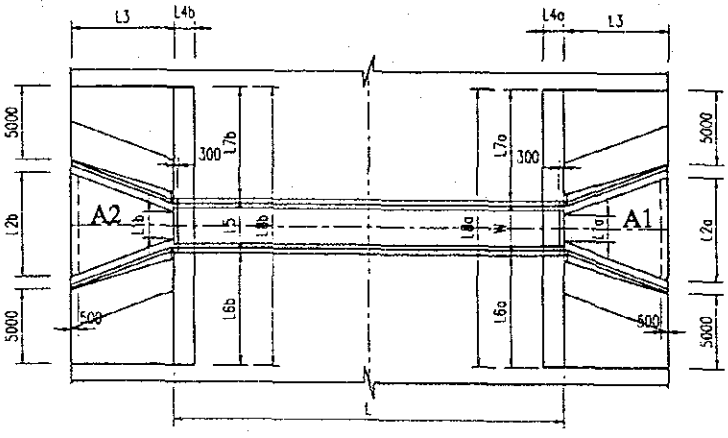


NOTATIONS FOR QUANTITY CALCULATION OF BOX CULVERT FOR DRAINAGE

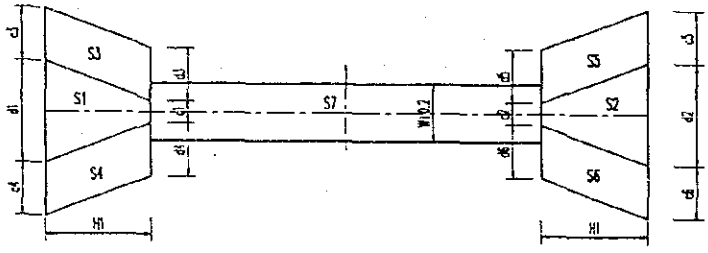
PROFILE



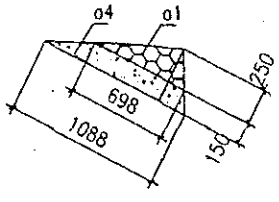
PLAN



PLAN LAYOUT OF WOOD PILE



DETAIL A



DETAIL B

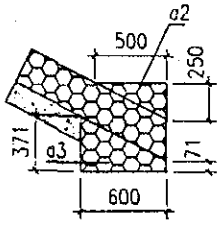


TABLE OF EXPLAINING QUANTITIES OF CULVERT

CULVERT KM7+950

S1=	(	c1	+	d1	)	x	H1	:	2	=		
=	(	4.230	+	6.924	)	x	3.700	:	2	=	20.635	(m2)
S2=	(	c2	+	d2	)	x	H1	:	2	=		
=	(	4.230	+	6.924	)	x	3.700	:	2	=	20.635	(m2)
S3=	(	c3	+	d3	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S4=	(	c4	+	d4	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S5=	(	c5	+	d5	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S6=	(	c6	+	d6	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S7=		L	x	(W + 0.2)	=							
=		26.700	x	6.100	=		162.870		(m2)			

1. APRON CONCRETE:

A1=	(	L1a	+	L2a	)	x	L3	:	2	=		
=	(	4.516	+	7.064	)	x	3.500	:	2	=	20.265	(m2)
A2=	(	L1b	+	L2b	)	x	L3	:	2	=		
=	(	4.516	+	7.064	)	x	3.500	:	2	=	20.265	(m2)

	(	A1	+	A2	)	x 0.3	+	(	L2a	+	L2b	) x 0.45 x 0.5	=		
=	(	20.265	+	20.265	)	x 0.3	+	(	7.064	+	7.064	) x 0.45 x 0.5	=	15.34	(m3)

2. CONCRETE FOUNDATION OF CULVERT:

L	x	(W + 0.2)	x	0.2	=	26.700	x	6.100	x	0.2	=	32.57 (m3)

3. LEAN CONCRETE:

= (S1 + S2 + S3 + S4 + S5 + S6) x 0.1 =

= (20.635 + 20.6349 + 8.188 + 8.188 + 8.188 + 8.188) x 0.1 = ***7.40*** (m3)

4. WOOD PILE:

**** L=5M***

W5= (S3 + S4 + S5 + S6 + S7) x 25 x 5 :100 =

= (8.188 + 8.188 + 8.188 + 8.188 + 162.870) x 25 x 5 :100 = ***244.53*** (100m)

**** L=3M***

W3= (S1 + S2 + (0.8 x 4.5 x 4)) x 25 x 3 : 100 =

= (20.635 + 20.6349 + 14.400) x 25 x 3 : 100 = ***41.75*** (100m)

NOTE: S=0.8 x 4.5 x 4 IS AREA WOOD PILE TOE OF SLOPE

5. SAND BEDDING:

= (S1 + S2 + S3 + S4 + S5 + S6 + S7 + (0.8 x 4.5 x 4)) x 0.15 =

= (20.635 + 20.635 + 8.188 + 8.188 + 8.188 + 8.188 + 162.870 + (0.8 x 4.5 x 4)) x 0.15 = 37.69 (m3)

6. STONE MASONRY

a1= 0.695 x 0.25 x 0.5 = 0.087 (m2)

a2= 0.5 x 0.25 x 0.5 = 0.063 (m2)

a3= (0.071 + 0.371) x 0.5 x 0.6 = 0.133 (m2)

a4= (0.698 + 1.088) x 0.5 x 0.15 = 0.134 (m2)

b1= 0.300 x L5 = 0.300 x 5.900 = 1.770 (m2) (b1 IS AREA OF HEAD WALL)

b2a= (L6a + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b2b= (L6b + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b3a= (L7a + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b3b= (L7b + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b4a= L8a x L4a = 18.388 x 1.300 = 23.904 (m2)

b4b= L8b x L4b = 18.388 x 1.300 = 23.904 (m2)

b5= 0.6 x 5 x 2 = 6.000 (m2)

V1a= a1 x L8a = 0.087 x 18.388 = 1.597 (m3)

V1b= a1 x L8b = 0.087 x 18.388 = 1.597 (m3)

V2= (a2 + a3) x 5 x 4 = (0.063 + 0.133) x 5 x 4 = 3.902 (m3)

V3a= (b4a - b1 + b2a + b3a) x 0.25 : COS(26.56) =
= (23.904 - 1.770 + 19.677 + 19.677) x 0.25 : 0.894 = 17.195 (m3)

V3b= (b4b - b1 + b2b + b3b) x 0.25 : COS(26.56) =
= (23.904 - 1.770 + 19.677 + 19.677) x 0.25 : 0.894 = 17.195 (m3)

TOTAL = (V1a + V1b + V2 + V3a + V3b) =
(1.597 + 1.597 + 3.902 + 17.195 + 17.195) = *41.486* (m3)

7. BASE BEDDING:

V4a=		a4	x	L8a			=	0.134	x	18.388			=		2.463	(m3)			
V4b=		a4	x	L8b			=	0.134	x	18.388			=		2.463	(m3)			
V5a=	(	b4a	-	b1	+	b2a	+	b3a	-	b5	)	x	0.15	:	COS(26.56)	=			
=	(	23.904	-	1.770	+	19.677	+	19.677	-	6.000	)	x	0.15	:	0.894	=	9.310	(m3)	
V5b=	(	b4b	-	b1	+	b2b	+	b3b	-	b5	)	x	0.15	:	COS(26.56)	=			
=	(	23.904	-	1.770	+	19.677	+	19.677	-	6.000	)	x	0.15	:	0.894	=	9.310	(m3)	
TOTAL =			(	V4a	+	V4b	+	V5a	+	V5b	)=								
			(	2.463	+	2.463	+	9.310	+	9.310	)=	23.55		(m3)					

8. FORM :

=	(L2a	+	L2b)	)	X 0.75	x	2	=	
	(7.064	+	7.064	)	X 0.75	x	2	=	**21.192** (m2)

9. SCAFFOLDING :

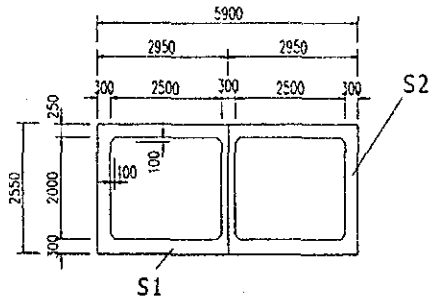
=	(L2a	+	L2b)	)	X 0.75	x	2	=	
	(7.064	+	7.064	)	X 0.75	x	2	=	**21.192** (m2)

2.3. Box culvert at station 8+820

BOX CULVERT 8+820

I	BOX CULVERT STATION 8+820		QUANTITIES
	L	= 17.224 + 13.720 + 0.02 = 30.964	
1	CULVERT		
+	CONCRETE (M3)		
	S1=S2	= 2.950 x 2.550 - 2.500 x 2.000 + 2 x 0.100 x 0.100 =	2.543
	S	= S1 + S2 =	5.085
	VOLUME	= S x (17.224 + 13.720) + 5.900 x 0.200 x 0.300 x 2 =	158.06

DOUBLE BOX CULVERT



+	FORM (M2)		581.27
*	INSIDE FORM (M2)		403.243
	BOX BULWARK	= (2.000 + 2 x 0.100 x (1:SIN45^0 - 1)) x 30.944 x 4 =	257.806
	BOTTOM OF THE BOX	= (2.950 - 0.300 x 2) x 30.944 x 2 =	145.437
*	OUTSIDE FORM (M2)		178.029
	BOX BULWARK	= 2.550 x 2 x 30.944 + 4 x 0.300 x 0.200 =	158.054
	THE END OF CULVERT	= S x 2 + 5.900 x 0.200 x 4 =	14.890
	CENTER	= S =	5.085
+	SCAFFOLDING (M2)	= 2.550 x 2.000 x 30.944 + 4.000 x 0.300 x 0.200 =	158.05
+	SUPPORT		
	AREA (M2)	= 5.900 x 2.000 - S =	6.715
	VOLUME (M3)	= AREA x L =	207.92

BOXCULVERT STATION 8+820
QUANTITIES TABLE OF REINFORCEMENT
SEGMENT 1

SYMBOL OF BAR	UNIT LENGTH (mm)	SPACE (mm)	DIAMETER (mm)	NUMBER OF BAR	UNIT WEIGHT (kg/m)	TOTAL LENGTH (m)	TOTAL WEIGHT (kg)
1	4160	125	14	274	1.208	1139.84	1377.397
2	2850	250	12	138	0.888	393.3	349.177
3	6270	250	14	138	1.208	865.26	1045.591
4	1500	250	14	272	1.208	408	493.032
5	1550	125	18	274	1.998	424.7	848.372
6	1970	250	12	276	0.888	543.72	482.722
7	2850	125	12	274	0.888	780.9	693.293
8	1049	250	12	276	0.888	289.524	257.043
9	1120	250	12	276	0.888	309.12	274.441
10	17729	250	12	52	0.888	921.908	818.482
11	17829	250	12	100	0.888	1782.9	1582.882
12	5780	250	12	2	0.888	11.56	10.263
13	1440	250	12	26	0.888	37.44	33.240
14	1180	250	12	413.376	0.888	487.78368	433.061
15	1280	250	12	413.376	0.888	529.12128	469.761

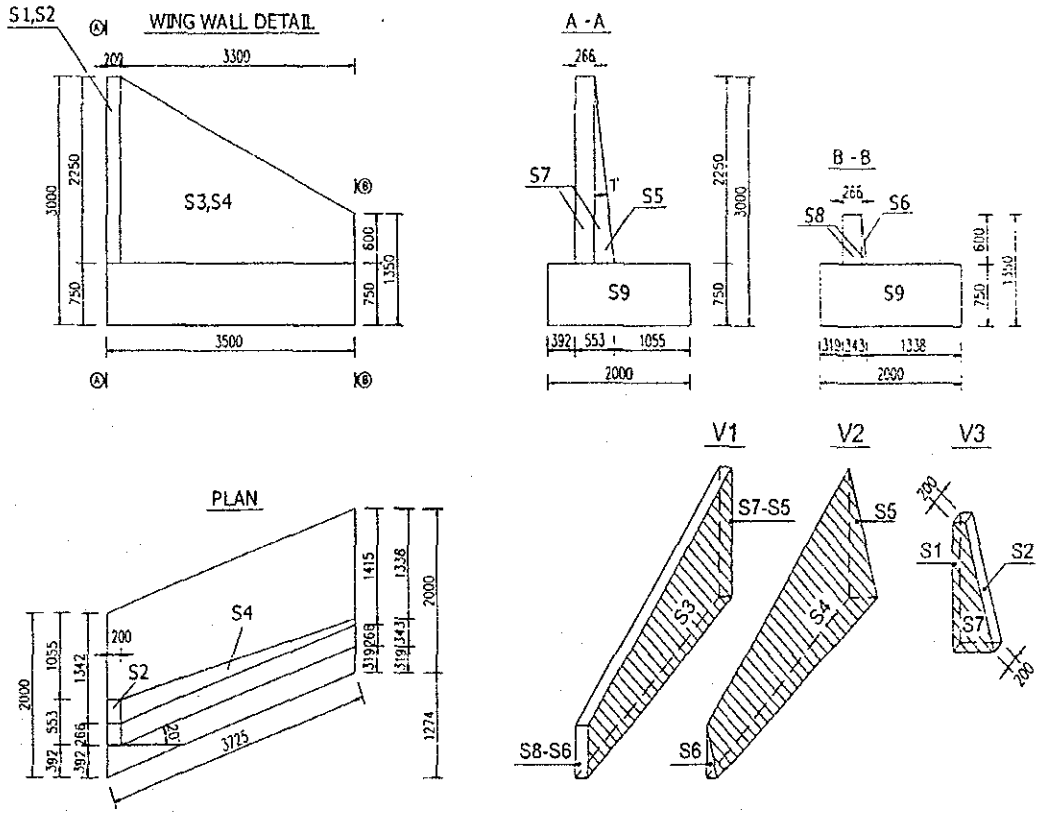
REINFORCEMENT : D<=14	8320.4	TOTAL FOR SEGMENT 1 :	
REINFORCEMENT : 16=D<=25	848.4	REINFORCEMENT (KG):	9168.8
REINFORCEMENT : 25<D=32		CONCRETE (M^3):	87.94

SEGMENT 2

SYMBOL OF BAR	UNIT LENGTH (mm)	SPACE (mm)	DIAMETER (mm)	NUMBER OF BAR	UNIT WEIGHT (kg/m)	TOTAL LENGTH (m)	TOTAL WEIGHT (kg)
1	4160	125	14	218	1.208	906.88	1095.89
2	2850	250	12	110	0.888	313.5	278.33
3	6270	250	14	110	1.208	689.7	833.44
4	1500	250	14	216	1.208	324	391.53
5	1550	125	18	218	1.998	337.9	674.98
6	1970	250	12	220	0.888	433.4	384.78
7	2850	125	12	218	0.888	621.3	551.60
8	1049	250	12	220	0.888	230.78	204.89
9	1120	250	12	220	0.888	246.4	218.76
10	14225	250	12	52	0.888	739.7	656.72
11	14325	250	12	100	0.888	1432.5	1271.79
12	5780	250	12	2	0.888	11.56	10.26
13	1440	250	12	26	0.888	37.44	33.24
14	1180	250	12	329.28	0.888	388.5504	344.96
15	1280	250	12	329.28	0.888	421.4784	374.19

REINFORCEMENT : D<=14	6650.4	TOTAL FOR SEGMENT 2 :	
REINFORCEMENT : 16=D<=25	675.0	REINFORCEMENT (KG):	7325.4
REINFORCEMENT : 25<D=32		CONCRETE (M^3):	70.12
TOTAL FOR SEGMENT 1 & 2			
REINFORCEMENT : D<=14	14970.8	REINFORCEMENT (KG) :	16494.1
REINFORCEMENT : 16=D<=25	1523.4		
REINFORCEMENT : 25<D=32		CONCRETE (M^3) :	158.06

2 WINGWALL

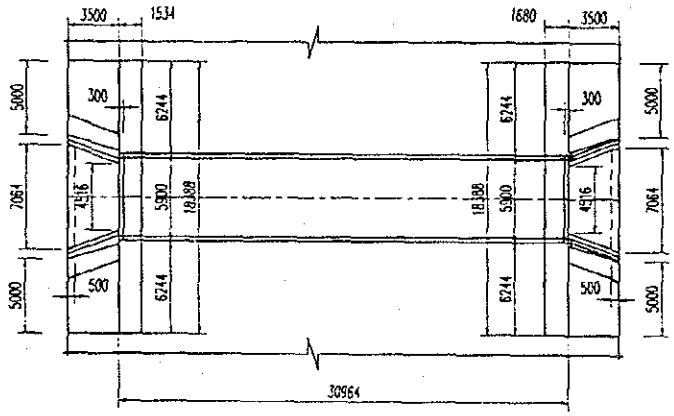


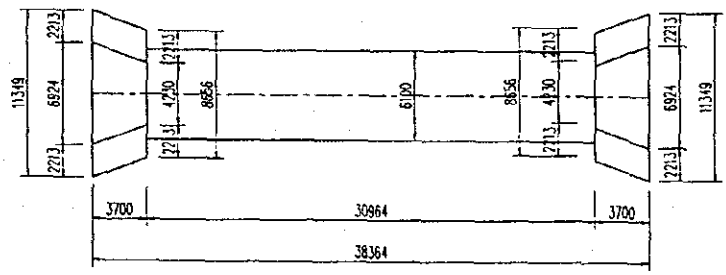
+	CALCULATING VALUES												
	S1	=	0.200	x	2.250							=	0.450
	S2	=	S1	:	$\cos 7^0$	=	0.450	:	0.993			=	0.453
	S3	=	(2.250	+	0.600)	x	(3.500	-	0.200)	:	2	x $\cos 20^0$	=	5.004
	S4	=	S3	:	$\cos 7^0$	=	5.004	:	0.993			=	5.042
	S5	=	(0.553	-	0.266)	x	2.250	:	2			=	0.323
	S6	=	(0.343	-	0.266)	x	0.600	:	2			=	0.023
	S7	=	S5	+	(2.250	x	0.266)	=	0.323	+	0.599	=	0.922
	S8	=	S6	+	(0.600	x	0.266)	=	0.023	+	0.160	=	0.183
	S9	=	2.000	x	0.750							=	1.500
+	CONCRETE (m^3)											=	7.25
	- Footing	=	S9	x	3.500	=	1.500	x	3.500			=	5.250
	- Wing wall	=	V1	+	V2	+	V3	=	1.331	+	0.480 + 0.184	=	1.995
	V1	=	S3	x	0.266	=	5.004	x	0.266			=	1.331
	V2	=	(3.500	-	0.200)	:	3	x	(S5	+	S6 + $(S5 \times S6)^{0.5}$)		
		=	1.100	x	(0.323	+	0.023	+	0.086)			=	0.480
	V3	=	S7	x	0.200	=	0.922	x	0.200			=	0.184
+	FORM (m^2)											=	22.50
	- Footing	=	(3.500	:	$\cos 20^0$	+	S9)	x	2	=	(3.725 + 1.500) x 2	=	10.449
	- Wing wall	=	S1	+	S2	+	S3	+	S4	+	S7 + S8		
		=	0.450	+	0.453	+	5.004	+	5.042	+	0.922 + 0.183	=	12.053
+	SCAFFOLDING (m^2)											=	22.44
	- Footing	=	(3.500	:	$\cos 20^0$	+	1.000	+	2.000	+	1.000) x 2 x 0.750	=	11.587
	- Wing wall	=	S3	+	S4	+	0.600	x	(0.343	+	1.000)		
		=	5.004	+	5.042	+	0.806					=	10.852

BOX CULVERT STATION 8+820
REINFORCEMENT OF WINGWALL

BAR MARK	UNIT LENGTH (MM)	DIAMETER (MM)	NUMBER OF BAR	UNIT WEIGHT (KG/M)	TOTAL LENGTH (M)	TOTAL WEIGHT (KG)
1a	2258	12	20	0.888	45.2	40.1
1b	2310	14	20	1.208	46.2	55.8
2a	3723	12	6	0.888	22.3	19.8
2b	2100	12	16	0.888	33.6	29.8
2c	582	12	20	0.888	11.6	10.3
3	4254	12	2	0.888	8.5	7.6
4	4429	12	20	0.888	88.6	78.6
5a	3043	12	15	0.888	45.6	40.5
5b	2150	12	6	0.888	12.9	11.5
5c	2467	20	15	2.466	37.0	91.3
5d	1574	20	6	2.466	9.4	23.3
6	2444	14	16	1.208	39.1	47.3
7	2301	12	4	0.888	9.2	8.2
8	2301	12	4	0.888	9.2	8.2
9	3605	12	4	0.888	14.4	12.8
10	1304	14	8	1.208	10.4	12.6
11	744	12	11	0.888	8.2	7.3
12	2143	12	1	0.888	2.1	1.9
REINFORCEMENT :				D<=14		**392.2** KG
REINFORCEMENT :				14< D<=25		**114.6** KG
TOTAL REINFORCEMENT :						**506.8** KG

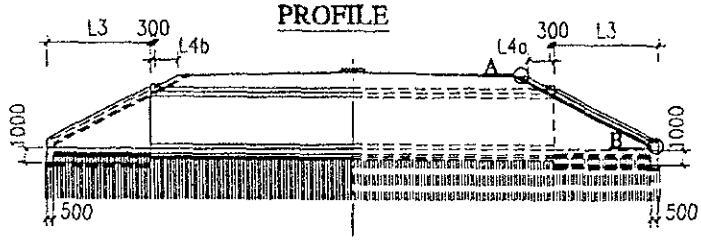
BOX CULVERT FOR DRAINAGE
(STATION 8+820)



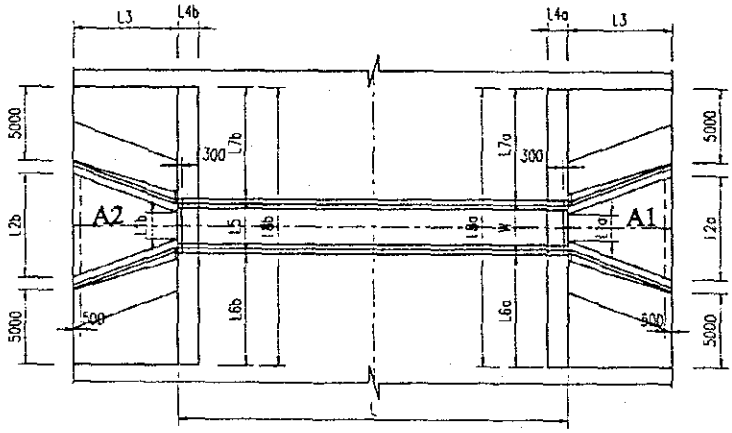


NOTATIONS FOR QUANTITY CALCULATION OF BOX CULVERT FOR DRAINAGE

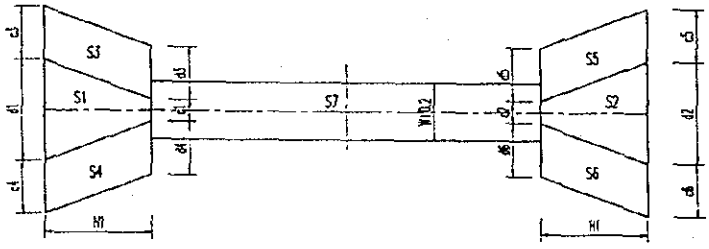
PROFILE



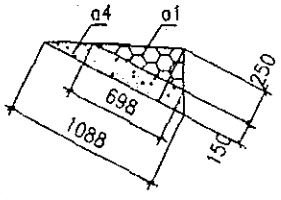
PLAN



PLAN LAYOUT OF WOOD PILE



DETAIL A



DETAIL B

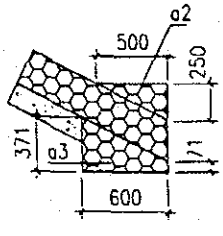


TABLE OF EXPLAINING QUANTITIES OF CULVERT

CULVERT KM8+820

S1=	(	c1	+	d1	)	x	H1	:	2	=		
=	(	4.230	+	6.924	)	x	3.700	:	2	=	20.635	(m2)
S2=	(	c2	+	d2	)	x	H1	:	2	=		
=	(	4.230	+	6.924	)	x	3.700	:	2	=	20.635	(m2)
S3=	(	c3	+	d3	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S4=	(	c4	+	d4	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S5=	(	c5	+	d5	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S6=	(	c6	+	d6	)	x	H1	:	2	=		
=	(	2.213	+	2.213	)	x	3.700	:	2	=	8.188	(m2)
S7=		L	x	(W + 0.2)	=							
=		30.964	x	6.100	=		188.880		(m2)			

1. APRON CONCRETE:

A1=	(	L1a	+	L2a	)	x	L3	:	2	=		
=	(	4.516	+	7.064	)	x	3.500	:	2	=	20.265	(m2)
A2=	(	L1b	+	L2b	)	x	L3	:	2	=		
=	(	4.516	+	7.064	)	x	3.500	:	2	=	20.265	(m2)

	(	A1	+	A2	)	x 0.3	+	(	L2a	+	L2b	) x 0.45 x 0.5	=		
=	(	20.265	+	20.265	)	x 0.3	+	(	7.064	+	7.064	) x 0.45 x 0.5	=	15.34	(m3)

2. CONCRETE FOUNDATION OF CULVERT:

L	x	(W + 0.2)	x	0.2	=	30.964	x	6.100	x	0.2	=	37.78 (m3)

3. LEAN CONCRETE:

=	(	S1	+	S2	+	S3	+	S4	+	S5	+	S6	)	x	0.1	=			
=	(	20.635	+	20.6349	+	8.188	+	8.188	+	8.188	+	8.188	)	x	0.1	=	7.40	(m3)	

4. WOOD PILE:

** L=5M*

W5=	(	S3	+	S4	+	S5	+	S6	+	S7	)	x 25 x 5 :100	=						
=	(	8.188	+	8.188	+	8.188	+	8.188	+	188.880	)	x 25 x 5 :100	=	277.04	(100m)				

** L=3M*

W3=	(	S1	+	S2	+	(0.8 x 4.5 x 4)	)	x 25 x 3 : 100	=										
=	(	20.635	+	20.6349	+	14.400	)	x 25 x 3 : 100	=	41.75	(100m)								

NOTE: S=0.8 x 4.5 x 4 IS AREA WOOD PILE TOE OF SLOPE

5. SAND BEDDING:

=	(	S1	+	S2	+	S3	+	S4	+	S5	+	S6	+	S7	+	(0.8 x 4.5 x 4)	) x 0.15 =								
=	(	20.635	+	20.635	+	8.188	+	8.188	+	8.188	+	8.188	+	188.880	+	(0.8 x 4.5 x 4)	) x 0.15 =	41.60	(m3)						

6. STONE MASONRY

a1=		0.695	x	0.25	x		0.5	=		0.087	(m2)								
a2=		0.5	x	0.25	x		0.5	=		0.063	(m2)								
a3=	(	0.071	+	0.371	)	x	0.5	x	0.6	=	0.133	(m2)							
a4=	(	0.698	+	1.088	)	x	0.5	x	0.15	=	0.134	(m2)							

b1=	0.300	x	L5	=	0.300	x	5.900	=	1.770	(m2)	(b1 IS AREA OF HEAD WALL)

b2a= (L6a + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b2b= (L6b + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b3a= (L7a + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b3b= (L7b + 5.000) x L3 x 0.5 =
= (6.244 + 5.000) x 3.500 x 0.5 = 19.677 (m2)

b4a= L8a x L4a = 18.388 x 1.680 = 30.892 (m2)

b4b= L8b x L4b = 18.388 x 1.534 = 28.207 (m2)

b5= 0.6 x 5 x 2 = 6.000 (m2)

V1a= a1 x L8a = 0.087 x 18.388 = 1.597 (m3)

V1b= a1 x L8b = 0.087 x 18.388 = 1.597 (m3)

V2= (a2 + a3) x 5 x 4 = (0.063 + 0.133) x 5 x 4 = 3.902 (m3)

V3a= (b4a - b1 + b2a + b3a) x 0.25 : COS(26.56) =
= (30.892 - 1.770 + 19.677 + 19.677) x 0.25 : 0.894 = 19.149 (m3)

V3b= (b4b - b1 + b2b + b3b) x 0.25 : COS(26.56) =
= (28.207 - 1.770 + 19.677 + 19.677) x 0.25 : 0.894 = 18.398 (m3)

TOTAL = (V1a + V1b + V2 + V3a + V3b) =
(1.597 + 1.597 + 3.902 + 19.149 + 18.398) = **44.644** (m3)

7. BASE BEDDING:

V4a=		a4	x	L8a			=	0.134	x	18.388			=		2.463	(m3)			
V4b=		a4	x	L8b			=	0.134	x	18.388			=		2.463	(m3)			
V5a=	(	b4a	-	b1	+	b2a	+	b3a	-	b5	)	x	0.15	:	COS(26.56)	=			
=	(	30.892	-	1.770	+	19.677	+	19.677	-	6.000	)	x	0.15	:	0.894	=	10.483 (m3)		
V5b=	(	b4b	-	b1	+	b2b	+	b3b	-	b5	)	x	0.15	:	COS(26.56)	=			
=	(	28.207	-	1.770	+	19.677	+	19.677	-	6.000	)	x	0.15	:	0.894	=	10.032 (m3)		
TOTAL =			(	V4a	+	V4b	+	V5a	+	V5b	)=								
			(	2.463	+	2.463	+	10.483	+	10.032	)=	25.44		(m3)					

8. FORM :

=	(L2a	+	L2b)	)	X 0.75	x	2	=
	(7.064	+	7.064	)	X 0.75	x	2	= **21.192** (m2)

9. SCAFFOLDING :

=	(L2a	+	L2b)	)	X 0.75	x	2	=
	(7.064	+	7.064	)	X 0.75	x	2	= **21.192** (m2)