5.3 Pipe Culvert

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Pipe Culvert				
1.Excavation				
1.1.Soft Material		3,965.868	m3	
1.2.Hard Material		65.244	m3	
2.Pipe Culvert Length				
2.1.Dia.300 mm		155.107	m	
2.2.Dia.600 mm		1,030.822	m	
2.3.Dia.750 mm		89.926	m	
2.4.Dia.900 mm		1,066.986	m	
2.5.Dia.1200 mm		294.090	m	
3.Class 15/20 Concrete (Surrounded Pipe Culvert)		1,573.787	m3	

Excavation for Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Average Excavation Depth	Excavation for Pipe Culvert(Soft Material)							Hard Material (m3)	Remarks
						300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2 x 900 mm (m3)	1200 mm (m3)	2 x 1200 mm (m3)		
1	CH.0 +300.000 (G)	1	600	14.280	1.200	0.000	14.936	0.000	0.000	0.000	0.000	0.000	0.000	
2	CH.0 +760.000	2	2 x 900	24.644	1.700	0.000	0.000	0.000	0.000	92.351	0.000	0.000	0.000	
3	CH.0 +820.000 (G)	1	600	11.668	1.300	0.000	13.125	0.000	0.000	0.000	0.000	0.000	0.000	
4	CH.1 +000.000	1	900	11.766	1.300	0.000	0.000	0.000	17.575	0.000	0.000	0.000	0.000	
5	CH.5 +280.000	1	900	15.126	1.300	0.000	0.000	0.000	22.817	0.000	0.000	0.000	0.000	
6	CH.5 +300.000	1	900	13.668	1.300	0.000	0.000	0.000	20.542	0.000	0.000	0.000	0.000	
7	CH.6 +200.000 (G)	1	600	14.817	2.200	0.000	28.447	0.000	0.000	0.000	0.000	0.000	0.000	
8	CH.7 +020.000	2	2 x 900	46.136	1.400	0.000	0.000	0.000	0.000	143.753	0.000	0.000	0.000	
9	CH.7 +028.438 (G)	1	600	19.198	1.200	0.000	20.248	0.000	0.000	0.000	0.000	0.000	0.000	
10	CH.7 +450.000 (G)	1	600	11.990	1.000	0.000	10.386	0.000	0.000	0.000	0.000	0.000	0.000	
11	CH.7 +700.000	1	900	25.390	1.300	0.000	0.000	0.000	38.828	0.000	0.000	0.000	0.000	
12	CH.8 +000.000 (G)	1	600	11.036	1.100	0.000	10.480	0.000	0.000	0.000	0.000	0.000	0.000	
13	CH.8 +180.000 (G)	1	600	14.546	2.200	0.000	27.910	0.000	0.000	0.000	0.000	0.000	0.000	
14	CH.8 +250.000	1	1200	31.172	1.800	0.000	0.000	0.000	0.000	0.000	82.814	0.000	0.000	
15	CH.8 +400.000 (G)	1	600	11.282	1.300	0.000	12.673	0.000	0.000	0.000	0.000	0.000	0.000	
16	CH.8 +880.000 (G)	1	600	11.350	1.200	0.000	11.772	0.000	0.000	0.000	0.000	0.000	0.000	
17	CH.8 +940.000	1	900	61.840	1.400	0.000	0.000	0.000	103.051	0.000	0.000	0.000	0.000	SKEW ANGLE +25
18	CH.9 +340.000 (G)	1	600	10.916	1.400	0.000	13.187	0.000	0.000	0.000	0.000	0.000	0.000	
19	CH.9 +783.604	1	900	28.470	2.200	0.000	0.000	0.000	73.841	0.000	0.000	0.000	0.000	
20	CH.9 +800.000 (G)	1	600	14.328	1.700	0.000	21.233	0.000	0.000	0.000	0.000	0.000	10.727	
21	CH.11 +100.000 (G)	1	600	11.092	1.400	0.000	2.682	0.000	0.000	0.000	0.000	0.000	0.000	
22	CH.11 +240.000	1	1200	26.749	1.700	0.000	0.000	0.000	0.000	0.000	66.935	0.000	54.517	
23	CH.12 +400.000	2	2 x 900	22.935	1.800	0.000	0.000	0.000	0.000	36.345	0.000	0.000	0.000	
24	CH.12 +555.218 (G)	1	600	10.996	1.000	0.000	9.491	0.000	0.000	0.000	0.000	0.000	0.000	
25	CH.12 +900.000	1	600	13.308	1.000	0.000	11.572	0.000	0.000	0.000	0.000	0.000	0.000	
26	CH.13 +400.000	1	1200	29.942	1.800	0.000	0.000	0.000	0.000	0.000	79.493	0.000	0.000	
27	CH.13 +484.164 (G)	1	600	10.927	1.200	0.000	11.315	0.000	0.000	0.000	0.000	0.000	0.000	
28	CH.13 +760.000 (G)	1	600	11.474	1.000	0.000	9.922	0.000	0.000	0.000	0.000	0.000	0.000	
29	CH.14 +595.083 (G)	1	600	10.910	1.300	0.000	12.238	0.000	0.000	0.000	0.000	0.000	0.000	
30	CH.14 +865.086 (G)	1	600	11.496	1.200	0.000	11.950	0.000	0.000	0.000	0.000	0.000	0.000	
31	CH.15 +160.000 (G)	1	600	11.084	1.200	0.000	11.485	0.000	0.000	0.000	0.000	0.000	0.000	
32	CH.15 +400.000 (G)	1	600	11.100	1.200	0.000	11.502	0.000	0.000	0.000	0.000	0.000	0.000	
33	CH.15 +440.000 (G)	1	600	15.434	1.400	0.000	18.880	0.000	0.000	0.000	0.000	0.000	0.000	
34	CH.15 +700.000 (G)	1	600	11.406	1.300	0.000	12.819	0.000	0.000	0.000	0.000	0.000	0.000	
35	CH.16 +100.000 (G)	1	600	10.960	1.200	0.000	11.351	0.000	0.000	0.000	0.000	0.000	0.000	
36	CH.16 +400.000 (G)	1	600	10.962	1.200	0.000	11.353	0.000	0.000	0.000	0.000	0.000	0.000	
37	CH.17 +360.000 (G)	1	900	34.539	1.300	0.000	0.000	0.000	53.101	0.000	0.000	0.000	0.000	
38	CH.17 +717.493 (G)	1	600	10.931	1.100	0.000	10.376	0.000	0.000	0.000	0.000	0.000	0.000	
39	CH.18 +160.000	1	900	38.119	1.300	0.000	0.000	0.000	58.686	0.000	0.000	0.000	0.000	
40	CH.18 +360.000	1	900	46.924	1.600	0.000	0.000	0.000	89.134	0.000	0.000	0.000	0.000	
41	CH.18 +580.000 (G)	1	600	11.290	1.300	0.000	12.683	0.000	0.000	0.000	0.000	0.000	0.000	
42	CH.18 +820.000 (G)	1	600	10.924	1.200	0.000	11.312	0.000	0.000	0.000	0.000	0.000	0.000	
43	CH.19 +020.000 (G)	1	600	12.354	1.500	0.000	16.070	0.000	0.000	0.000	0.000	0.000	0.000	
44	CH.19 +100.000	1	900	37.128	1.400	0.000	0.000	0.000	61.535	0.000	0.000	0.000	0.000	
45	CH.19 +520.000	1	900	47.209	2.400	0.000	0.000	0.000	134.522	0.000	0.000	0.000	0.000	
46	CH.19 +665.167 (G)	1	600	13.740	2.200	0.000	26.314	0.000	0.000	0.000	0.000	0.000	0.000	
47	CH.19 +900.000 (G)	1	600	10.910	1.300	0.000	12.238	0.000	0.000	0.000	0.000	0.000	0.000	
48	CH.20 +120.000 (G)	1	600	11.330	1.000	0.000	9.792	0.000	0.000	0.000	0.000	0.000	0.000	
49	CH.20 +240.000	2	2 x 900	32.559	1.400	0.000	0.000	0.000	0.000	100.986	0.000	0.000	0.000	

Excavation for Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Average Excavation Depth	Excavation for Pipe Culvert (Soft Material)							Hard Material	Remarks
						300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2 x 900 mm (m3)	1200 mm (m3)	2 x 1200 mm (m3)	(m3)	
50	CH.20 +340.000 (G)	1	600	16.132	1.000	0.000	14.114	0.000	0.000	0.000	0.000	0.000	0.000	
51	CH.20 +600.000 (G)	1	600	20.830	1.000	0.000	18.342	0.000	0.000	0.000	0.000	0.000	0.000	
52	CH.21 +010.000	1	750	76.590	1.200	0.000	0.000	95.558	0.000	0.000	0.000	0.000	0.000	
53	CH.21 +060.000 (G)	1	600	16.930	1.000	0.000	14.832	0.000	0.000	0.000	0.000	0.000	0.000	
54	CH.21 +600.000 (G)	1	600	11.283	1.400	0.000	13.650	0.000	0.000	0.000	0.000	0.000	0.000	
55	CH.22 +380.000	2	2 x 1200	22.480	2.000	0.000	0.000	0.000	0.000	0.000	0.000	125.286	0.000	
56	CH.22 +400.000	2	2 x 1200	3.472	2.000	0.000	0.000	0.000	0.000	0.000	0.000	16.940	0.000	
57	CH.22 +400.000	2	2 x 1200	8.121	2.000	0.000	0.000	0.000	0.000	0.000	0.000	43.440	0.000	
58	CH.23 +560.000	1	900	27.146	2.000	0.000	0.000	0.000	63.950	0.000	0.000	0.000	0.000	
59	CH.23 +780.000	1	900	41.546	1.300	0.000	0.000	0.000	64.032	0.000	0.000	0.000	0.000	
60	CH.24 +280.000 (G)	1	600	11.049	1.200	0.000	11.447	0.000	0.000	0.000	0.000	0.000	0.000	
61	CH.24 +380.000	2	2 x 1200	29.124	1.700	0.000	0.000	0.000	0.000	0.000	0.000	138.683	0.000	
62	CH.24 +700.000 (G)	1	600	11.001	1.300	0.000	12.345	0.000	0.000	0.000	0.000	0.000	0.000	
63	CH.25 +248.062 (G)	1	600	10.987	1.300	0.000	12.328	0.000	0.000	0.000	0.000	0.000	0.000	
64	CH.25 +420.000	2	2 x 1200	28.934	1.700	0.000	0.000	0.000	0.000	0.000	0.000	137.763	0.000	
65	CH.27 +800.000 (G)	1	600	10.913	1.200	0.000	11.300	0.000	0.000	0.000	0.000	0.000	0.000	
66	CH.28 +040.000 (G)	1	600	10.911	1.300	0.000	12.239	0.000	0.000	0.000	0.000	0.000	0.000	
67	CH.28 +240.000	1	750	13.336	1.300	0.000	0.000	17.180	0.000	0.000	0.000	0.000	0.000	
68	CH.28 +260.000 (G)	1	600	22.680	1.000	0.000	20.007	0.000	0.000	0.000	0.000	0.000	0.000	
69	CH.28 +380.000 (G)	1	600	8.000	1.200	0.000	8.154	0.000	0.000	0.000	0.000	0.000	0.000	
70	CH.0 +140.000	1	600	9.289	1.500	0.000	11.865	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C A-Slip Rd.
71	CH.0 +275.614	1	600	10.448	1.400	0.000	12.534	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C B-Slip Rd
72	CH.0 +240.000	1	600	10.144	1.400	0.000	12.151	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C C-Slip Rd.
73	CH.0 +065.000	1	600	9.308	1.400	0.000	11.098	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C D-Slip Rd.
74	CH.0 +025.000	1	600	10.136	1.400	0.000	12.141	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C E-Slip Rd.
75	CH.0 +300.000	1	600	9.247	1.300	0.000	10.234	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C F-Slip Rd.
76	CH.0 +300.000	1	600	8.802	1.300	0.000	9.713	0.000	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C G-Slip Rd.
77	CH.0 +800.000 L	2	2 x 900	13.004	1.600	0.000	0.000	0.000	0.000	45.014	0.000	0.000	0.000	Monbasa Rd. (A104)
78	CH.0 +800.000 R	2	2 x 900	12.884	1.600	0.000	0.000	0.000	0.000	44.582	0.000	0.000	0.000	Monbasa Rd. (A104)
79	CH.0 +650.000	2	2 x 900	9.800	1.600	0.000	0.000	0.000	0.000	33.480	0.000	0.000	0.000	Monbasa Rd. (A104)
80	CH.0 +260.000	2	2 x 900	7.148	1.600	0.000	0.000	0.000	0.000	23.933	0.000	0.000	0.000	Monbasa Rd. (A104)
81	CH.0 +950.000	1	900	10.376	1.600	0.000	0.000	0.000	18.962	0.000	0.000	0.000	0.000	Monbasa Rd. (A104)
82	CH.1 +220.000 R	1	900	9.844	1.600	0.000	0.000	0.000	17.940	0.000	0.000	0.000	0.000	Service Rd.
83	CH.6 +520.000 (G)	1	600	9.404	1.400	0.000	11.282	0.000	0.000	0.000	0.000	0.000	0.000	Uhuru Monument J/C A-Slip Rd.
84	CH.0 +110.000 L	1	600	8.882	1.200	0.000	9.053	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
85	CH.0 +140.000 L	1	600	16.112	1.200	0.000	16.361	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
86	CH.0 +165.000 R	1	600	12.798	1.200	0.000	13.282	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
87	CH.0 +177.000 L	1	300	3.887	0.900	1.829	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
88	CH.0 +220.000 L	1	300	3.563	0.900	1.654	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
89	CH.0 +235.000 L	1	600	13.300	1.200	0.000	13.824	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
90	CH.0 +240.000 R	1	300	3.324	0.900	1.525	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
91	CH.0 +260.000 R	1	600	14.800	0.900	0.000	11.583	0.000	0.000	0.000	0.000	0.000	0.000	Uhuru Monument J/C C-Slip Rd.
92	CH.0 +220.000	1	900	4.354	1.300	0.000	0.000	0.000	6.012	0.000	0.000	0.000	0.000	Service Rd.
93	CH.7 +865.086 L	1	600	8.300	1.200	0.000	8.424	0.000	0.000	0.000	0.000	0.000	0.000	Ngong Rd. J/C A-Slip Rd.
94	CH.0 +040.000	1	600	15.364	1.300	0.000	17.391	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
95	CH.0 +260.000	1	600	11.574	1.200	0.000	11.960	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
96	CH.0 +440.000	1	600	14.300	1.200	0.000	14.904	0.600	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
97	CH.0 +620.000	1	600	15.084	1.200	0.000	15.751	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
98	CH.0 +740.000 L	1	300	8.338	0.900	4.233	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)

Excavation for Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Average Excavation Depth	Excavation for Pipe Culvert(Soft Material)							Hard Material	Remarks
						300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2 x 900 mm (m3)	1200 mm (m3)	2 x 1200 mm (m3)	(m3)	
99	CH.18 +400.000 R	1	600	5.340	1.200	0.000	5.227	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
100	CH.18 +480.000 R	1	600	6.242	1.200	0.000	6.201	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
101	CH.19 +060.000 L	1	900	7.358	1.700	0.000	0.000	0.000	13.990	0.000	0.000	0.000	0.000	Service Rd.
102	CH.19 +520.000 L	1	900	7.583	1.700	0.000	0.000	0.000	14.449	0.000	0.000	0.000	0.000	Service Rd.
103	CH.20 +200.000 L	1	300	5.430	0.900	2.662	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
104	CH.20 +200.000 R	1	300	5.376	0.900	2.633	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
105	CH.20 +220.000 L	2	2 x 900	31.426	2.000	0.000	0.000	0.000	0.000	139.167	0.000	0.000	0.000	Service Rd.
106	CH.0 +040.000	1	600	24.923	1.200	0.000	26.377	0.000	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
107	CH.0 +260.000	1	600	12.420	1.000	0.000	10.728	0.000	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
108	CH.0 +080.000	1	600	31.793	1.300	0.000	36.613	0.000	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
109	CH.0 +040.000	1	600	14.529	1.200	0.000	15.151	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C63)
110	CH.0 +160.000	1	900	12.670	1.500	0.000	0.000	0.000	21.906	0.000	0.000	0.000	0.000	Approach Rd. (C63)
111	CH.0 +340.000	1	1200	14.890	1.800	0.000	0.000	0.000	0.000	0.000	38.853	0.000	0.000	Approach Rd. (C63)
112	CH.21 +000.000 L	2	2 x 900	7.424	1.500	0.000	0.000	0.000	0.000	23.369	0.000	0.000	0.000	Service Rd.
113	CH.21 +000.000 R	1	900	7.964	1.500	0.000	0.000	0.000	13.435	0.000	0.000	0.000	0.000	Service Rd.
114	CH.22 +380.000 L	1	1200	7.075	2.200	0.000	0.000	0.000	0.000	0.000	21.698	0.000	0.000	Service Rd.
115	CH.22 +380.000 R	1	600	8.875	2.500	0.000	18.844	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
116	CH.22 +880.000 L	1	900	5.074	1.500	0.000	0.000	0.000	8.233	0.000	0.000	0.000	0.000	Service Rd.
117	CH.22 +880.000 R	1	900	5.964	1.500	0.000	0.000	0.000	9.835	0.000	0.000	0.000	0.000	Service Rd.
118	CH.23 +100.000 R	1	600	5.160	1.200	0.000	5.033	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
119	CH.23 +240.000 L	1	900	9.648	1.500	0.000	0.000	0.000	16.466	0.000	0.000	0.000	0.000	Service Rd.
120	CH.0 -010.000 L	1	300	6.446	0.900	3.211	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
121	CH.0 +080.000 L	1	300	6.930	0.900	3.472	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
122	CH.0 +140.000 L	1	300	7.550	0.900	3.807	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
123	CH.0 +230.000	1	900	9.654	1.500	0.000	0.000	0.000	16.477	0.000	0.000	0.000	0.000	Approach Rd. (D411)
124	CH.0 +280.000	1	900	9.901	1.500	0.000	0.000	0.000	16.922	0.000	0.000	0.000	0.000	Approach Rd. (D411)
125	CH.0 +285.000 L	1	300	8.080	0.900	4.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
126	CH.0 +320.000 R	1	600	5.376	1.200	0.000	5.266	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
127	CH.0 +325.000 L	1	300	5.420	0.900	2.657	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
128	CH.0 +340.000 L	1	300	9.368	0.900	4.789	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
129	CH.0 +040.000	1	900	14.126	1.500	0.000	0.000	0.000	24.527	0.000	0.000	0.000	0.000	Thogoto J/C A-Slip Rd.
130	CH.0 +040.000	1	900	30.141	1.300	0.000	0.000	0.000	46.240	0.000	0.000	0.000	0.003	Thogoto J/C B-Slip Rd.
131	CH.0 +280.000	1	600	13.474	1.700	0.000	19.850	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
132	CH.25 +420.000 L	2	2 x 900	7.208	1.600	0.000	0.000	0.000	0.000	24.149	0.000	0.000	0.000	Ondori Swamp
133	CH.26 +420.000 R	1	600	10.360	1.200	0.000	10.649	0.000	0.000	0.000	0.000	0.000	0.000	Ondori Swamp
134	CH.26 +490.000 L	1	900	9.544	1.500	0.000	0.000	0.000	16.279	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
135	CH.0 +020.000	1	600	12.822	1.500	0.000	16.635	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
136	CH.0 +540.000	1	300	12.124	1.100	7.672	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
137	CH.0 +640.000 R	1	600	20.350	1.200	0.000	21.438	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
138	CH.1 +060.000	1	900	12.552	1.800	0.000	0.000	0.000	26.032	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
139	CH.1 +105.000 R	1	300	8.362	0.900	4.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
140	CH.1 +165.000 R	1	300	8.521	0.900	4.331	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
141	CH.1 +265.000 R	1	300	8.003	0.900	4.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
142	CH.1 +440.000	1	600	17.565	2.000	0.000	30.717	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
143	CH.0 +040.000	1	600	16.041	1.500	0.000	20.980	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
144	CH.0 +060.000 L	1	600	15.206	1.200	0.000	15.882	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
145	CH.0 +030.000 L	1	300	11.783	0.900	6.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
146	CH.0 +040.000	1	600	11.612	1.200	0.000	12.001	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
147	CH.0 +050.000 R	1	300	6.218	0.900	3.088	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.

Excavation for Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Average Excavation Depth	Excavation for Pipe Culvert(Soft Material)							Hard Material	Remarks
						300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2 x 900 mm (m3)	1200 mm (m3)	2 x 1200 mm (m3)	(m3)	
148	CH.0 +090.000 L	1	300	7.027	0.900	3.525	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
149	CH.0 +120.000 R	1	300	5.539	0.900	2.721	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
150	CH.0 +135.000 L	1	300	4.102	0.900	1.945	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
151	CH.0 +150.000 R	1	300	4.216	0.900	2.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
152	CH.0 +160.000 L	1	300	5.500	0.900	2.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
153	CH.0 +260.000 L	1	600	9.869	1.200	0.000	10.119	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
154	CH.0 +420.000 L	1	900	8.359	1.500	0.000	0.000	0.000	14.146	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
155	CH.0 +444.278 (G)	1	900	13.356	1.500	0.000	0.000	0.000	23.231	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
156	CH.27 +095.000 L	1	900	5.881	1.500	0.000	0.000	0.000	9.686	0.000	0.000	0.000	0.000	Service Rd.
157	CH.28 +050.000 L	1	600	9.470	1.200	0.000	9.688	0.000	0.000	0.000	0.000	0.000	0.000	
158	CH.0 +460.000	1	900	13.430	1.300	0.000	0.000	0.000	20.171	0.000	0.000	0.000	0.000	Kikuyu J/C A-Slip Rd.
159	CH.0 +120.000	1	600	10.924	1.200	0.000	11.258	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C B-Slip Rd.
160	CH.0 +020.000	1	600	21.884	1.900	0.000	36.567	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C C-Slip Rd.
161	CH.0 +380.000	1	600	10.540	1.200	0.000	10.843	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C Rd. 3.1
	Total					78.943	1158.599	112.738	1156.555	707.129	289.793	462.112	65.244	
												3,965.868		

5.3.6

Pipe Culvert Length

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	300 mm (m)	600 mm (m)	750 mm (m)	900 mm (m)	2 x 900 mm (m)	1200 mm (m)	2 x 1200 mm (m)	Remarks
1	CH.0 +300.000 (G)	1	600	14.280	0.000	14.280	0.000	0.000	0.000	0.000	0.000	
2	CH.0 +760.000	2	2 x 900	24.644	0.000	0.000	0.000	0.000	49.288	0.000	0.000	
3	CH.0 +820.000 (G)	1	600	11.668	0.000	11.668	0.000	0.000	0.000	0.000	0.000	
4	CH.1 +000.000	1	900	11.766	0.000	0.000	0.000	11.766	0.000	0.000	0.000	
5	CH.5 +280.000	1	900	15.126	0.000	0.000	0.000	15.126	0.000	0.000	0.000	
6	CH.5 +300.000	1	900	13.668	0.000	0.000	0.000	13.668	0.000	0.000	0.000	
7	CH.6 +200.000 (G)	1	600	14.817	0.000	14.817	0.000	0.000	0.000	0.000	0.000	
8	CH.7 +020.000	2	2 x 900	46.136	0.000	0.000	0.000	0.000	92.272	0.000	0.000	
9	CH.7 +028.438 (G)	1	600	19.198	0.000	19.198	0.000	0.000	0.000	0.000	0.000	
10	CH.7 +450.000 (G)	1	600	11.990	0.000	11.990	0.000	0.000	0.000	0.000	0.000	
11	CH.7 +700.000	1	900	25.390	0.000	0.000	0.000	25.390	0.000	0.000	0.000	
12	CH.8 +000.000 (G)	1	600	11.036	0.000	11.036	0.000	0.000	0.000	0.000	0.000	
13	CH.8 +180.000 (G)	1	600	14.546	0.000	14.546	0.000	0.000	0.000	0.000	0.000	
14	CH.8 +250.000	1	1200	31.172	0.000	0.000	0.000	0.000	0.000	31.172	0.000	
15	CH.8 +400.000 (G)	1	600	11.282	0.000	11.282	0.000	0.000	0.000	0.000	0.000	
16	CH.8 +880.000 (G)	1	600	11.350	0.000	11.350	0.000	0.000	0.000	0.000	0.000	
17	CH.8 +940.000	1	900	61.840	0.000	0.000	0.000	61.840	0.000	0.000	0.000	SKEW ANGLE +25
18	CH.9 +340.000 (G)	1	600	10.916	0.000	10.916	0.000	0.000	0.000	0.000	0.000	
19	CH.9 +783.604	1	900	28.470	0.000	0.000	0.000	28.470	0.000	0.000	0.000	
20	CH.9 +800.000 (G)	1	600	14.328	0.000	14.328	0.000	0.000	0.000	0.000	0.000	
21	CH.11 +100.000 (G)	1	600	11.092	0.000	11.092	0.000	0.000	0.000	0.000	0.000	
22	CH.11 +240.000	1	1200	26.749	0.000	0.000	0.000	0.000	0.000	26.749	0.000	
23	CH.12 +400.000	2	2 x 900	22.935	0.000	0.000	0.000	0.000	45.870	0.000	0.000	
24	CH.12 +555.218 (G)	1	600	10.996	0.000	10.996	0.000	0.000	0.000	0.000	0.000	
25	CH.12 +900.000 (G)	1	600	13.308	0.000	13.308	0.000	0.000	0.000	0.000	0.000	
26	CH.13 +400.000	1	1200	29.942	0.000	0.000	0.000	0.000	0.000	29.942	0.000	
27	CH.13 +484.164 (G)	1	600	10.927	0.000	10.927	0.000	0.000	0.000	0.000	0.000	
28	CH.13 +760.000 (G)	1	600	11.474	0.000	11.474	0.000	0.000	0.000	0.000	0.000	
29	CH.14 +595.083 (G)	1	600	10.910	0.000	10.910	0.000	0.000	0.000	0.000	0.000	
30	CH.14 +865.086 (G)	1	600	11.496	0.000	11.496	0.000	0.000	0.000	0.000	0.000	
31	CH.15 +160.000 (G)	1	600	11.084	0.000	11.084	0.000	0.000	0.000	0.000	0.000	
32	CH.15 +400.000 (G)	1	600	11.100	0.000	11.100	0.000	0.000	0.000	0.000	0.000	
33	CH.15 +440.000 (G)	1	600	15.434	0.000	15.434	0.000	0.000	0.000	0.000	0.000	
34	CH.15 +700.000 (G)	1	600	11.406	0.000	11.406	0.000	0.000	0.000	0.000	0.000	
35	CH.16 +100.000 (G)	1	600	10.960	0.000	10.960	0.000	0.000	0.000	0.000	0.000	
36	CH.16 +400.000 (G)	1	600	10.962	0.000	10.962	0.000	0.000	0.000	0.000	0.000	
37	CH.17 +360.000	1	900	34.539	0.000	0.000	0.000	34.539	0.000	0.000	0.000	
38	CH.17 +717.493 (G)	1	600	10.931	0.000	10.931	0.000	0.000	0.000	0.000	0.000	
39	CH.18 +160.000	1	900	38.119	0.000	0.000	0.000	38.119	0.000	0.000	0.000	
40	CH.18 +360.000	1	900	46.924	0.000	0.000	0.000	46.924	0.000	0.000	0.000	
41	CH.18 +580.000 (G)	1	600	11.290	0.000	11.290	0.000	0.000	0.000	0.000	0.000	
42	CH.18 +820.000 (G)	1	600	10.924	0.000	10.924	0.000	0.000	0.000	0.000	0.000	
43	CH.19 +020.000 (G)	1	600	12.354	0.000	12.354	0.000	0.000	0.000	0.000	0.000	
44	CH.19 +100.000	1	900	37.128	0.000	0.000	0.000	37.128	0.000	0.000	0.000	
45	CH.19 +520.000	1	900	47.209	0.000	0.000	0.000	47.209	0.000	0.000	0.000	
46	CH.19 +665.167 (G)	1	600	13.740	0.000	13.740	0.000	0.000	0.000	0.000	0.000	
47	CH.19 +900.000 (G)	1	600	10.910	0.000	10.910	0.000	0.000	0.000	0.000	0.000	
48	CH.20 +120.000 (G)	1	600	11.330	0.000	11.330	0.000	0.000	0.000	0.000	0.000	
49	CH.20 +240.000	2	2 x 900	32.559	0.000	0.000	0.000	0.000	65.118	0.000	0.000	

Pipe Culvert Length

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Pipe Culvert Length							Remarks
					300 mm (m)	600 mm (m)	750 mm (m)	900 mm (m)	2 x 900 mm (m)	1200 mm (m)	2 x 1200 mm (m)	
50	CH.20 +340.000 (G)	1	600	16.132	0.000	16.132	0.000	0.000	0.000	0.000	0.000	
51	CH.20 +600.000 (G)	1	600	20.830	0.000	20.830	0.000	0.000	0.000	0.000	0.000	
52	CH.21 +010.000	1	750	76.590	0.000	0.000	76.590	0.000	0.000	0.000	0.000	
53	CH.21 +050.000 (G)	1	600	16.930	0.000	16.930	0.000	0.000	0.000	0.000	0.000	
54	CH.21 +680.000	1	600	11.283	0.000	11.283	0.000	0.000	0.000	0.000	0.000	
55	CH.22 +380.000	2	2 x 1200	22.480	0.000	0.000	0.000	0.000	0.000	0.000	44.960	
56	CH.22 +400.000	2	2 x 1200	3.472	0.000	0.000	0.000	0.000	0.000	0.000	6.944	
57	CH.22 +400.000	2	2 x 1200	8.121	0.000	0.000	0.000	0.000	0.000	0.000	16.242	
58	CH.23 +560.000	1	900	27.146	0.000	0.000	0.000	27.146	0.000	0.000	0.000	
59	CH.23 +780.000	1	900	41.546	0.000	0.000	0.000	41.546	0.000	0.000	0.000	
60	CH.24 +280.000 (G)	1	600	11.049	0.000	11.049	0.000	0.000	0.000	0.000	0.000	
61	CH.24 +380.000	2	2 x 1200	29.124	0.000	0.000	0.000	0.000	0.000	0.000	58.248	
62	CH.24 +700.000 (G)	1	600	11.001	0.000	11.001	0.000	0.000	0.000	0.000	0.000	
63	CH.25 +248.062 (G)	1	600	10.987	0.000	10.987	0.000	0.000	0.000	0.000	0.000	
64	CH.25 +420.000	2	2 x 1200	28.934	0.000	0.000	0.000	0.000	0.000	0.000	57.868	
65	CH.27 +800.000 (G)	1	600	10.913	0.000	10.913	0.000	0.000	0.000	0.000	0.000	
66	CH.28 +040.000 (G)	1	600	10.911	0.000	10.911	0.000	0.000	0.000	0.000	0.000	
67	CH.28 +240.000	1	750	13.336	0.000	0.000	13.336	0.000	0.000	0.000	0.000	
68	CH.28 +260.000 (G)	1	600	22.680	0.000	22.680	0.000	0.000	0.000	0.000	0.000	
69	CH.28 +380.000 (G)	1	600	8.000	0.000	8.000	0.000	0.000	0.000	0.000	0.000	
70	CH.0 +140.000	1	600	9.289	0.000	9.289	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C A-Slip Rd.
71	CH.0 +275.614	1	600	10.448	0.000	10.448	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C B-Slip Rd.
72	CH.0 +240.000	1	600	10.144	0.000	10.144	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C C-Slip Rd.
73	CH.0 +065.000	1	600	9.308	0.000	9.308	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C D-Slip Rd.
74	CH.0 +025.000	1	600	10.136	0.000	10.136	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C E-Slip Rd.
75	CH.0 +300.000	1	600	9.247	0.000	9.247	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C F-Slip Rd.
76	CH.0 +300.000	1	600	8.802	0.000	8.802	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C G-Slip Rd.
77	CH.0 -800.000 L	2	2 x 900	13.004	0.000	0.000	0.000	0.000	26.008	0.000	0.000	Monbasa Rd. (A104)
78	CH.0 -800.000 R	2	2 x 900	12.884	0.000	0.000	0.000	0.000	25.768	0.000	0.000	Monbasa Rd. (A104)
79	CH.0 -650.000	2	2 x 900	9.800	0.000	0.000	0.000	0.000	19.600	0.000	0.000	Monbasa Rd. (A104)
80	CH.0 -260.000	2	2 x 900	7.148	0.000	0.000	0.000	0.000	14.296	0.000	0.000	Monbasa Rd. (A104)
81	CH.0 +950.000	1	900	10.376	0.000	0.000	0.000	10.376	0.000	0.000	0.000	Monbasa Rd. (A104)
82	CH.1 +220.000 R	1	900	9.844	0.000	0.000	0.000	9.844	0.000	0.000	0.000	Service Rd.
83	CH.6 +520.000 (G)	1	600	9.404	0.000	9.404	0.000	0.000	0.000	0.000	0.000	Uhuru Monument J/C A-Slip Rd.
84	CH.0 +110.000 L	1	600	8.882	0.000	8.882	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
85	CH.0 +140.000 L	1	600	16.112	0.000	16.112	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
86	CH.0 +165.000 R	1	600	12.798	0.000	12.798	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
87	CH.0 +177.000 L	1	300	3.887	3.887	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
88	CH.0 +220.000 L	1	300	3.563	3.563	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
89	CH.0 +235.000 L	1	600	13.300	0.000	13.300	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
90	CH.0 +240.000 R	1	300	3.324	3.324	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
91	CH.0 +260.000 R	1	600	14.800	0.000	14.800	0.000	0.000	0.000	0.000	0.000	Uhuru Monument J/C C-Slip Rd.
92	CH.0 +220.000 L	1	900	4.354	0.000	0.000	0.000	4.354	0.000	0.000	0.000	Service Rd.
93	CH.7 +865.086 L	1	600	8.300	0.000	8.300	0.000	0.000	0.000	0.000	0.000	Ngong Rd. J/C A-Slip Rd.
94	CH.0 +040.000	1	600	15.364	0.000	15.364	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
95	CH.0 +260.000	1	600	11.574	0.000	11.574	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
96	CH.0 +440.000	1	600	14.300	0.000	14.300	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
97	CH.0 +620.000	1	600	15.084	0.000	15.084	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
98	CH.0 +740.000 L	1	300	8.338	8.338	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)

Pipe Culvert Length

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Pipe Culvert Length							Remarks
					300 mm (m)	600 mm (m)	750 mm (m)	900 mm (m)	2 x 900 mm (m)	1200 mm (m)	2 x 1200 mm (m)	
99	CH.18 +400.000 R	1	600	5.340	0.000	5.340	0.000	0.000	0.000	0.000	0.000	Service Rd.
100	CH.18 +480.000 R	1	600	6.242	0.000	6.242	0.000	0.000	0.000	0.000	0.000	Service Rd.
101	CH.19 +060.000 L	1	900	7.358	0.000	0.000	0.000	7.358	0.000	0.000	0.000	Service Rd.
102	CH.19 +520.000 L	1	900	7.583	0.000	0.000	0.000	7.583	0.000	0.000	0.000	Service Rd.
103	CH.20 +200.000 L	1	300	5.430	5.430	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
104	CH.20 +200.000 R	1	300	5.376	5.376	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
105	CH.20 +220.000 L	2	2 x 900	31.426	0.000	0.000	0.000	0.000	62.852	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
106	CH.0 +040.000	1	600	24.923	0.000	24.923	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
107	CH.0 +260.000	1	600	12.420	0.000	12.420	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
108	CH.0 +080.000	1	600	31.793	0.000	31.793	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C63)
109	CH.0 +040.000	1	600	14.529	0.000	14.529	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C63)
110	CH.0 +160.000	1	900	12.670	0.000	0.000	0.000	12.670	0.000	0.000	0.000	Approach Rd. (C63)
111	CH.0 +340.000	1	1200	14.890	0.000	0.000	0.000	0.000	0.000	14.890	0.000	Service Rd.
112	CH.21 +000.000 L	2	2 x 900	7.424	0.000	0.000	0.000	0.000	14.848	0.000	0.000	Service Rd.
113	CH.21 +000.000 R	1	900	7.964	0.000	0.000	0.000	7.964	0.000	0.000	0.000	Service Rd.
114	CH.22 +380.000 L	1	1200	7.075	0.000	0.000	0.000	0.000	0.000	7.075	0.000	Service Rd.
115	CH.22 +380.000 R	1	600	8.875	0.000	8.875	0.000	0.000	0.000	0.000	0.000	Service Rd.
116	CH.22 +880.000 L	1	900	5.074	0.000	0.000	0.000	5.074	0.000	0.000	0.000	Service Rd.
117	CH.22 +880.000 R	1	900	5.964	0.000	0.000	0.000	5.964	0.000	0.000	0.000	Service Rd.
118	CH.23 +100.000 R	1	600	5.160	0.000	5.160	0.000	0.000	0.000	0.000	0.000	Service Rd.
119	CH.23 +240.000 L	1	900	9.648	0.000	0.000	0.000	9.648	0.000	0.000	0.000	Approach Rd. (D411)
120	CH.0 +010.000 L	1	300	6.446	6.446	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
121	CH.0 +080.000 L	1	300	6.930	6.930	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
122	CH.0 +140.000 L	1	300	7.550	7.550	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
123	CH.0 +230.000	1	900	9.654	0.000	0.000	0.000	9.654	0.000	0.000	0.000	Approach Rd. (D411)
124	CH.0 +280.000	1	900	9.901	0.000	0.000	0.000	9.901	0.000	0.000	0.000	Approach Rd. (D411)
125	CH.0 +285.000 L	1	300	8.080	8.080	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
126	CH.0 +320.000 R	1	600	5.376	0.000	5.376	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
127	CH.0 +325.000	1	300	5.420	5.420	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
128	CH.0 +340.000 L	1	300	9.368	9.368	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
129	CH.0 +040.000	1	900	14.126	0.000	0.000	0.000	14.126	0.000	0.000	0.000	Thogoto J/C A-Slip Rd.
130	CH.0 +040.000	1	900	30.141	0.000	0.000	0.000	30.141	0.000	0.000	0.000	Thogoto J/C B-Slip Rd.
131	CH.0 +280.000	1	600	13.474	0.000	13.474	0.000	0.000	0.000	0.000	0.000	Thogoto J/C B-Slip Rd.
132	CH.25 +420.000 L	2	2 x 900	7.208	0.000	0.000	0.000	0.000	14.416	0.000	0.000	Service Rd.
133	CH.26 +420.000 R	1	600	10.360	0.000	10.360	0.000	0.000	0.000	0.000	0.000	Ondori Swamp
134	CH.26 +490.000 L	1	900	9.544	0.000	0.000	0.000	9.544	0.000	0.000	0.000	Ondori Swamp
135	CH.0 +020.000	1	600	12.822	0.000	12.822	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
136	CH.0 +540.000	1	300	12.124	12.124	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
137	CH.0 +640.000 R	1	600	20.350	0.000	20.350	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
138	CH.1 +060.000	1	900	12.552	0.000	0.000	0.000	12.552	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
139	CH.1 +105.000 R	1	300	8.362	8.362	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
140	CH.1 +165.000 R	1	300	8.521	8.521	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
141	CH.1 +265.000 R	1	300	8.003	8.003	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
142	CH.1 +440.000	1	600	17.565	0.000	17.565	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
143	CH.0 +040.000	1	600	16.041	0.000	16.041	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
144	CH.0 +060.000 L	1	600	15.206	0.000	15.206	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
145	CH.0 +030.000 L	1	300	11.783	11.783	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
146	CH.0 +040.000	1	600	11.612	0.000	11.612	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
147	CH.0 +050.000 R	1	300	6.218	6.218	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.

Pipe Culvert Length

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Pipe Culvert Length							Remarks
					300 mm (m)	600 mm (m)	750 mm (m)	900 mm (m)	2 x 900 mm (m)	1200 mm (m)	2 x 1200 mm (m)	
148	CH.0 +090.000 L	1	300	7.027	7.027	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
149	CH.0 +120.000 R	1	300	5.539	5.539	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
150	CH.0 +135.000 L	1	300	4.102	4.102	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
151	CH.0 +150.000 R	1	300	4.216	4.216	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
152	CH.0 +160.000 L	1	300	5.500	5.500	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
153	CH.0 +260.000 L	1	600	9.869	0.000	9.869	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
154	CH.0 +420.000 L	1	900	8.359	0.000	0.000	0.000	8.359	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
155	CH.0 +444.278 (G)	1	900	13.356	0.000	0.000	0.000	13.356	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
156	CH.27 +095.000 L	1	900	5.881	0.000	0.000	0.000	5.881	0.000	0.000	0.000	Service Rd.
157	CH.28 +050.000 L	1	600	9.470	0.000	9.470	0.000	0.000	0.000	0.000	0.000	
158	CH.0 +460.000	1	900	13.430	0.000	0.000	0.000	13.430	0.000	0.000	0.000	Kikuyu J/C A-Slip Rd.
159	CH.0 +120.000	1	600	10.924	0.000	10.924	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C B-Slip Rd.
160	CH.0 +020.000	1	600	21.884	0.000	21.884	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C C-Slip Rd.
161	CH.0 +380.000	1	600	10.540	0.000	10.540	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C Rd. 3.1
	Total				155.107	1,030.822	89.926	636.650	430.336	109.828	184.262	
								1,066.986			294.090	

Class 15/20 Concrete Surrounded Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Class 15/20 Concrete Surrounded Pipe Culvert							Remarks
					300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2x900 mm (m3)	1200 mm (m3)	2x1200mm (m3)	
1	CH.0 +300.000 (G)	1	600	14.280	0.000	5.573	0.000	0.000	0.000	0.000	0.000	
2	CH.0 +760.000	2	2 x 900	24.644	0.000	0.000	0.000	0.000	40.272	0.000	0.000	
3	CH.0 +820.000 (G)	1	600	11.668	0.000	4.521	0.000	0.000	0.000	0.000	0.000	
4	CH.1 +000.000	1	900	11.766	0.000	0.000	0.000	7.627	0.000	0.000	0.000	
5	CH.5 +280.000	1	900	15.126	0.000	0.000	0.000	9.902	0.000	0.000	0.000	
6	CH.5 +300.000	1	900	13.668	0.000	0.000	0.000	8.915	0.000	0.000	0.000	
7	CH.6 +200.000 (G)	1	600	14.817	0.000	5.790	0.000	0.000	0.000	0.000	0.000	
8	CH.7 +020.000	2	2 x 900	46.136	0.000	0.000	0.000	0.000	76.121	0.000	0.000	
9	CH.7 +028.438 (G)	1	600	19.198	0.000	7.555	0.000	0.000	0.000	0.000	0.000	
10	CH.7 +450.000 (G)	1	600	11.990	0.000	4.651	0.000	0.000	0.000	0.000	0.000	
11	CH.7 +700.000	1	900	25.390	0.000	0.000	0.000	16.851	0.000	0.000	0.000	
12	CH.8 +000.000 (G)	1	600	11.036	0.000	4.266	0.000	0.000	0.000	0.000	0.000	
13	CH.8 +180.000 (G)	1	600	14.546	0.000	5.681	0.000	0.000	0.000	0.000	0.000	
14	CH.8 +250.000	1	1200	31.172	0.000	0.000	0.000	0.000	0.000	30.089	0.000	
15	CH.8 +400.000 (G)	1	600	11.282	0.000	4.365	0.000	0.000	0.000	0.000	0.000	
16	CH.8 +880.000	1	600	11.350	0.000	4.393	0.000	0.000	0.000	0.000	0.000	
17	CH.8 +940.000 (G)	1	900	61.840	0.000	0.000	0.000	41.527	0.000	0.000	0.000	SKEW ANGLE +25
18	CH.9 +340.000 (G)	1	600	10.916	0.000	4.218	0.000	0.000	0.000	0.000	0.000	
19	CH.9 +783.604	1	900	28.470	0.000	0.000	0.000	18.936	0.000	0.000	0.000	
20	CH.9 +800.000 (G)	1	600	14.328	0.000	5.593	0.000	0.000	0.000	0.000	0.000	
21	CH.11 +100.000 (G)	1	600	11.092	0.000	4.289	0.000	0.000	0.000	0.000	0.000	
22	CH.11 +240.000	1	1200	26.749	0.000	0.000	0.000	0.000	0.000	25.750	0.000	
23	CH.12 +400.000	2	2 x 900	22.935	0.000	0.000	0.000	0.000	37.422	0.000	0.000	
24	CH.12 +555.218 (G)	1	600	10.996	0.000	4.250	0.000	0.000	0.000	0.000	0.000	
25	CH.12 +900.000 (G)	1	600	13.308	0.000	5.182	0.000	0.000	0.000	0.000	0.000	
26	CH.13 +400.000	1	1200	29.942	0.000	0.000	0.000	0.000	0.000	28.883	0.000	
27	CH.13 +484.164 (G)	1	600	10.927	0.000	4.222	0.000	0.000	0.000	0.000	0.000	
28	CH.13 +760.000 (G)	1	600	11.474	0.000	4.443	0.000	0.000	0.000	0.000	0.000	
29	CH.14 +595.083 (G)	1	600	10.910	0.000	4.215	0.000	0.000	0.000	0.000	0.000	
30	CH.14 +865.086 (G)	1	600	11.496	0.000	4.452	0.000	0.000	0.000	0.000	0.000	
31	CH.15 +160.000 (G)	1	600	11.084	0.000	4.286	0.000	0.000	0.000	0.000	0.000	
32	CH.15 +400.000 (G)	1	600	11.100	0.000	4.292	0.000	0.000	0.000	0.000	0.000	
33	CH.15 +440.000	1	600	15.434	0.000	6.039	0.000	0.000	0.000	0.000	0.000	
34	CH.15 +700.000 (G)	1	600	11.406	0.000	4.415	0.000	0.000	0.000	0.000	0.000	
35	CH.16 +100.000 (G)	1	600	10.960	0.000	4.236	0.000	0.000	0.000	0.000	0.000	
36	CH.16 +400.000 (G)	1	600	10.962	0.000	4.236	0.000	0.000	0.000	0.000	0.000	
37	CH.17 +360.000	1	900	34.539	0.000	0.000	0.000	23.044	0.000	0.000	0.000	
38	CH.17 +717.493 (G)	1	900	38.119	0.000	0.000	0.000	25.468	0.000	0.000	0.000	
39	CH.18 +160.000	1	900	46.924	0.000	0.000	0.000	31.429	0.000	0.000	0.000	
40	CH.18 +360.000	1	600	11.290	0.000	4.369	0.000	0.000	0.000	0.000	0.000	
41	CH.18 +580.000 (G)	1	600	10.924	0.000	4.221	0.000	0.000	0.000	0.000	0.000	
42	CH.18 +820.000 (G)	1	600	12.354	0.000	4.797	0.000	0.000	0.000	0.000	0.000	
43	CH.19 +020.000 (G)	1	900	37.128	0.000	0.000	0.000	24.797	0.000	0.000	0.000	
44	CH.19 +100.000	1	900	47.209	0.000	0.000	0.000	31.622	0.000	0.000	0.000	
45	CH.19 +520.000	1	600	13.740	0.000	5.356	0.000	0.000	0.000	0.000	0.000	
46	CH.19 +665.167 (G)	1	600	10.910	0.000	4.215	0.000	0.000	0.000	0.000	0.000	
47	CH.19 +900.000 (G)	1	600	11.330	0.000	4.385	0.000	0.000	0.000	0.000	0.000	
48	CH.20 +120.000 (G)	1	600		0.000		0.000	0.000	0.000	0.000	0.000	
49	CH.20 +240.000	2	2 x 900	32.559	0.000	0.000	0.000	0.000	53.474	0.000	0.000	

Class 15/20 Concrete Surrounded Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Class 15/20 Concrete Surrounded Pipe Culvert							Remarks
					300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2x900 mm (m3)	1200 mm (m3)	2x1200mm (m3)	
50	CH.20 +340.000 (G)	1	600	16.132	0.000	6.320	0.000	0.000	0.000	0.000	0.000	
51	CH.20 +600.000 (G)	1	600	20.830	0.000	8.213	0.000	0.000	0.000	0.000	0.000	
52	CH.21 +010.000	1	750	76.590	0.000	0.000	41.320	0.000	0.000	0.000	0.000	
53	CH.21 +060.000 (G)	1	600	16.930	0.000	6.641	0.000	0.000	0.000	0.000	0.000	
54	CH.21 +600.000 (G)	1	600	11.283	0.000	4.366	0.000	0.000	0.000	0.000	0.000	
55	CH.22 +380.000	2	2 x 1200	22.480	0.000	0.000	0.000	0.000	0.000	0.000	51.367	
56	CH.22 +400.000	2	2 x 1200	3.472	0.000	0.000	0.000	0.000	0.000	0.000	6.946	
57	CH.22 +400.000	2	2 x 1200	8.121	0.000	0.000	0.000	0.000	0.000	0.000	17.810	
58	CH.23 +560.000	1	900	27.146	0.000	0.000	0.000	18.039	0.000	0.000	0.000	
59	CH.23 +780.000 (G)	1	900	41.546	0.000	0.000	0.000	27.788	0.000	0.000	0.000	
60	CH.24 +280.000 (G)	1	600	11.049	0.000	4.271	0.000	0.000	0.000	0.000	0.000	
61	CH.24 +380.000	2	2 x 1200	29.124	0.000	0.000	0.000	0.000	0.000	0.000	66.894	
62	CH.24 +700.000 (G)	1	600	11.691	0.000	4.252	0.000	0.000	0.000	0.000	0.000	
63	CH.25 +248.062 (G)	1	600	10.987	0.000	4.246	0.000	0.000	0.000	0.000	0.000	
64	CH.25 +420.000	2	2 x 1200	28.934	0.000	0.000	0.000	0.000	0.000	0.000	66.450	
65	CH.27 +800.000 (G)	1	600	10.913	0.000	4.217	0.000	0.000	0.000	0.000	0.000	
66	CH.28 +040.000 (G)	1	600	10.911	0.000	4.216	0.000	0.000	0.000	0.000	0.000	
67	CH.28 +240.000	1	750	13.336	0.000	0.000	7.416	0.000	0.000	0.000	0.000	
68	CH.28 +260.000 (G)	1	600	22.680	0.000	8.959	0.000	0.000	0.000	0.000	0.000	
69	CH.28 +380.000 (G)	1	600	8.000	0.000	3.043	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C A-Slip Rd.
70	CH.0 +140.000	1	600	9.289	0.000	3.542	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C B-Slip Rd.
71	CH.0 +275.614	1	600	10.448	0.000	4.009	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C C-Slip Rd.
72	CH.0 +240.000	1	600	10.144	0.000	3.887	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C D-Slip Rd.
73	CH.0 +065.000	1	600	9.308	0.000	3.550	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C E-Slip Rd.
74	CH.0 +025.000	1	600	10.136	0.000	3.883	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C F-Slip Rd.
75	CH.0 +300.000	1	600	9.247	0.000	3.525	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. J/C G-Slip Rd.
76	CH.0 +300.000	1	600	8.802	0.000	3.346	0.000	0.000	0.000	0.000	0.000	Monbasa Rd. (A104)
77	CH.0 -800.000 L	2	2 x 900	13.004	0.000	0.000	0.000	0.000	20.857	0.000	0.000	Monbasa Rd. (A104)
78	CH.0 -800.000 R	2	2 x 900	12.884	0.000	0.000	0.000	0.000	20.657	0.000	0.000	Monbasa Rd. (A104)
79	CH.0 -650.000	2	2 x 900	9.800	0.000	0.000	0.000	0.000	15.512	0.000	0.000	Monbasa Rd. (A104)
80	CH.0 -260.000	2	2 x 900	7.148	0.000	0.000	0.000	0.000	11.089	0.000	0.000	Monbasa Rd. (A104)
81	CH.0 +950.000	1	900	10.376	0.000	0.000	0.000	6.686	0.000	0.000	0.000	Service Rd.
82	CH.1 +220.000 R	1	900	9.844	0.000	0.000	0.000	6.326	0.000	0.000	0.000	Uhuru Monument J/C A-Slip Rd.
83	CH.6 +520.000 (G)	1	600	9.404	0.000	3.608	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
84	CH.0 +110.000 L	1	600	8.882	0.000	3.378	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
85	CH.0 +140.000 L	1	600	16.112	0.000	6.292	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
86	CH.0 +165.000 R	1	600	12.798	0.000	4.956	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
87	CH.0 +177.000 L	1	300	3.887	0.965	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
88	CH.0 +220.000 L	1	300	3.563	0.873	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
89	CH.0 +235.000 L	1	600	13.300	0.000	5.158	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
90	CH.0 +240.000 R	1	300	3.324	0.805	0.000	0.000	0.000	0.000	0.000	0.000	Langata Rd. (C58)
91	CH.0 +260.000 R	1	600	14.800	0.000	5.763	0.000	0.000	0.000	0.000	0.000	Uhuru Monument J/C C-Slip Rd.
92	CH.0 +220.000	1	900	4.354	0.000	0.000	0.000	2.609	0.000	0.000	0.000	Service Rd.
93	CH.7 +865.086 L	1	600	8.300	0.000	3.143	0.000	0.000	0.000	0.000	0.000	Ngong Rd. J/C A-Slip Rd.
94	CH.0 +040.000	1	600	15.364	0.000	5.990	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
95	CH.0 +260.000	1	600	11.574	0.000	4.463	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
96	CH.0 +440.000	1	600	14.300	0.000	5.561	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
97	CH.0 +620.000	1	600	15.084	0.000	5.877	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)
98	CH.0 +740.000 L	1	300	8.338	2.234	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C60)

Class 15/20 Concrete Surrounded Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2x900 mm (m3)	1200 mm (m3)	2x1200mm (m3)	Remarks
99	CH.18 +400.000 R	1	600	5.340	0.000	1.951	0.000	0.000	0.000	0.000	0.000	Service Rd.
100	CH.18 +480.000 R	1	600	6.242	0.000	2.314	0.000	0.000	0.000	0.000	0.000	Service Rd.
101	CH.19 +060.000 L	1	900	7.358	0.000	0.000	0.000	4.643	0.000	0.000	0.000	Service Rd.
102	CH.19 +520.000 L	1	900	7.583	0.000	0.000	0.000	4.795	0.000	0.000	0.000	Service Rd.
103	CH.20 +200.000 L	1	300	5.430	1.405	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
104	CH.20 +200.000 R	1	300	5.376	1.390	0.000	0.000	0.000	0.000	0.000	0.000	Service Rd.
105	CH.20 +220.000 L	2	2 x 900	31.426	0.000	0.000	0.000	0.000	51.585	0.000	0.000	Service Rd.
106	CH.0 +040.000	1	600	24.923	0.000	9.842	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
107	CH.0 +260.000	1	600	12.420	0.000	4.804	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
108	CH.0 +080.000	1	600	31.793	0.000	12.611	0.000	0.000	0.000	0.000	0.000	Dagoretti Forest J/C A-Slip Rd.
109	CH.0 +040.000	1	600	14.529	0.000	5.654	0.000	0.000	0.000	0.000	0.000	Approach Rd. (C63)
110	CH.0 +160.000	1	900	12.670	0.000	0.000	0.000	8.239	0.000	0.000	0.000	Approach Rd. (C63)
111	CH.0 +340.000	1	1200	14.890	0.000	0.000	0.000	0.000	0.000	14.117	0.000	Approach Rd. (C63)
112	CH.21 +000.000 L	2	2 x 900	7.424	0.000	0.000	0.000	0.000	11.549	0.000	0.000	Service Rd.
113	CH.21 +000.000 R	1	900	7.964	0.000	0.000	0.000	5.053	0.000	0.000	0.000	Service Rd.
114	CH.22 +380.000	1	1200	7.075	0.000	0.000	0.000	0.000	0.000	6.450	0.000	Service Rd.
115	CH.22 +380.000 R	1	600	8.875	0.000	3.375	0.000	0.000	0.000	0.000	0.000	Service Rd.
116	CH.22 +880.000 L	1	900	5.074	0.000	0.000	0.000	3.097	0.000	0.000	0.000	Service Rd.
117	CH.22 +880.000 R	1	900	5.964	0.000	0.000	0.000	3.699	0.000	0.000	0.000	Service Rd.
118	CH.23 +100.000	1	600	5.160	0.000	1.878	0.000	0.000	0.000	0.000	0.000	Service Rd.
119	CH.23 +240.000 L	1	900	9.648	0.000	0.000	0.000	6.193	0.000	0.000	0.000	Service Rd.
120	CH.23 +010.000 L	1	300	6.446	1.695	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
121	CH.0 +080.000 L	1	300	6.930	1.833	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
122	CH.0 +140.000 L	1	300	7.550	2.000	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
123	CH.0 +230.000	1	900	9.654	0.000	0.000	0.000	6.197	0.000	0.000	0.000	Approach Rd. (D411)
124	CH.0 +280.000	1	900	9.901	0.000	0.000	0.000	6.364	0.000	0.000	0.000	Approach Rd. (D411)
125	CH.0 +285.000 L	1	300	8.080	2.160	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
126	CH.0 +320.000 R	1	600	5.376	0.000	1.965	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
127	CH.0 +325.000 L	1	300	5.420	1.402	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
128	CH.0 +340.000 L	1	300	9.368	2.527	0.000	0.000	0.000	0.000	0.000	0.000	Approach Rd. (D411)
129	CH.0 +040.000	1	900	14.126	0.000	0.000	0.000	9.225	0.000	0.000	0.000	Thogoto J/C A-Slip Rd.
130	CH.0 +040.000	1	900	30.141	0.000	0.000	0.000	20.067	0.000	0.000	0.000	Thogoto J/C B-Slip Rd.
131	CH.0 +280.000	1	600	13.474	0.000	5.229	0.000	0.000	0.000	0.000	0.000	Thogoto J/C B-Slip Rd.
132	CH.25 +420.000 L	2	2 x 900	7.208	0.000	0.000	0.000	0.000	11.189	0.000	0.000	Service Rd.
133	CH.26 +420.000 R	1	600	10.360	0.000	3.974	0.000	0.000	0.000	0.000	0.000	Ondori Swamp
134	CH.26 +490.000 L	1	900	9.544	0.000	0.000	0.000	6.123	0.000	0.000	0.000	Ondori Swamp
135	CH.0 +020.000	1	600	12.822	0.000	4.966	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
136	CH.0 +540.000	1	300	12.124	3.313	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
137	CH.0 +640.000 R	1	600	20.350	0.000	8.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
138	CH.1 +060.000	1	900	12.552	0.000	0.000	0.000	8.159	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
139	CH.1 +105.000 R	1	300	8.362	2.241	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
140	CH.1 +165.000 R	1	300	8.521	2.286	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
141	CH.1 +265.000 R	1	300	8.003	2.138	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C A-Slip Rd.
142	CH.1 +440.000	1	600	17.565	0.000	6.877	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
143	CH.0 +040.000	1	600	16.041	0.000	6.263	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C C-Slip Rd.
144	CH.0 +060.000 L	1	300	15.206	3.216	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
145	CH.0 +030.000 L	1	600	11.783	0.000	4.478	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
146	CH.0 +040.000	1	300	11.612	3.216	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
147	CH.0 +050.000 R	1	300	6.218	1.650	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.

Class 15/20 Concrete Surrounded Pipe Culvert

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	Length (m)	Class 15/20 Concrete Surrounded Pipe Culvert							Remarks
					300 mm (m3)	600 mm (m3)	750 mm (m3)	900 mm (m3)	2x900 mm (m3)	1200 mm (m3)	2x1200mm (m3)	
148	CH.0 +090.000 L	1	300	7.027	1.860	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
149	CH.0 +120.000 R	1	300	5.539	1.436	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd
150	CH.0 +135.000 L	1	300	4.102	1.027	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
151	CH.0 +150.000 R	1	300	4.216	1.059	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
152	CH.0 +160.000 L	1	300	5.500	1.425	0.000	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
153	CH.0 +260.000 L	1	600	9.869	0.000	3.776	0.000	0.000	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
154	CH.0 +420.000 L	1	900	8.359	0.000	0.000	0.000	5.321	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
155	CH.0 +444.278 (G)	1	900	13.356	0.000	0.000	0.000	8.737	0.000	0.000	0.000	Kikuyu Town J/C D-Slip Rd.
156	CH.27 +095.000 L	1	900	5.881	0.000	3.615	0.000	3.643	0.000	0.000	0.000	Service Rd.
157	CH.28 +050.000 L	1	600	9.470	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
158	CH.0 +460.000	1	900	13.430	0.000	0.000	0.000	8.754	0.000	0.000	0.000	Kikuyu J/C A-Slip Rd.
159	CH.0 +120.000	1	600	10.924	0.000	4.201	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C B-Slip Rd.
160	CH.0 +020.000	1	600	21.884	0.000	8.618	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C C-Slip Rd.
161	CH.0 +380.000	1	600	10.540	0.000	4.046	0.000	0.000	0.000	0.000	0.000	Kikuyu J/C Rd.3.1
	Total				40.928	399.765	48.736	419.875	349.726	105.289	209.468	
											1,573.787	

Calculation Sheet

Pipe Culvert (Dia.300mm)

   1. Excavation (m^3)

    1.1 Soft Material

      Volume = (0.30+0.30) x D' x Length

    1.2 Hard Material

      Volume = (0.30+0.30) x D" x Length

   2. Pipe Culvert (m)

   3. Class 20/20 Concrete (m^3)

      Volume = ((0.67 x 0.62)-0.15^2-3.14 x 0.185^2) x Length
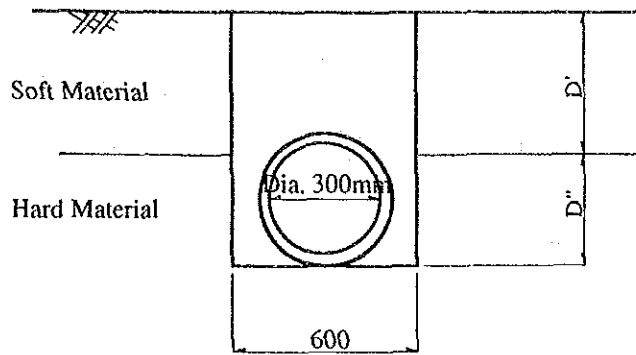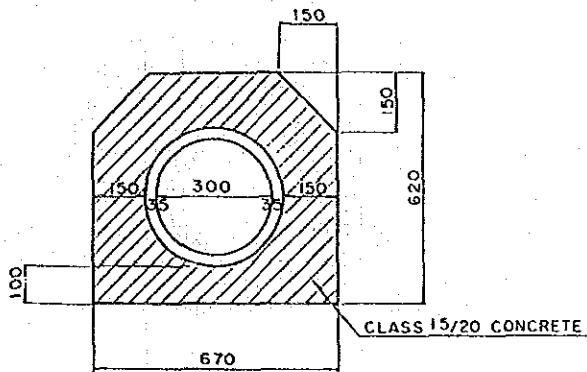
Pipe Culvert (Dia.600mm)

   1. Excavation (m^3)

    1.1 Soft Material

      Volume = (0.60+0.30) x D' x Length

    1.2 Hard Material

      Volume = (0.60+0.30) x D" x Length

   2. Pipe Culvert (m)

   3. Class 20/20 Concrete (m^3)

      Volume = ((0.85 x 1.00)-0.25^2-3.14 x 0.350^2) x Length
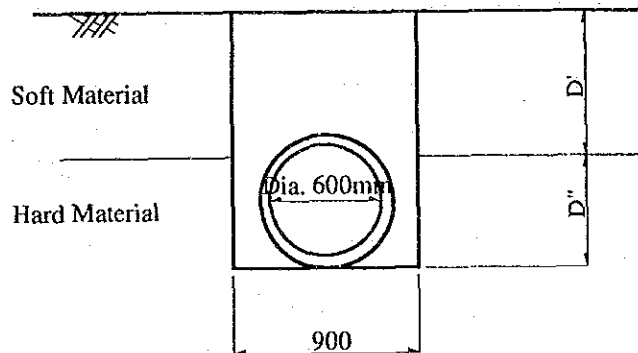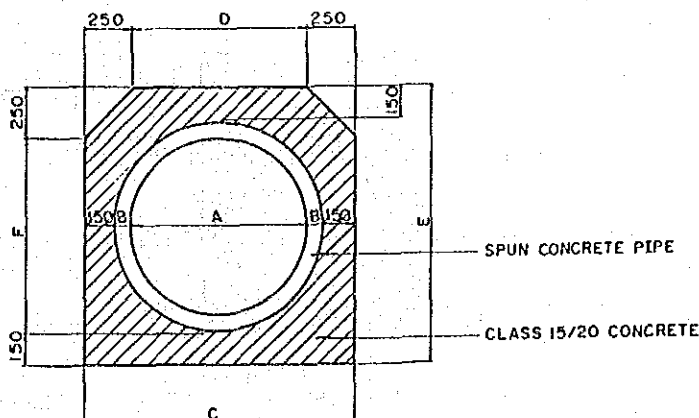
A = 0.60 m
B = 0.05 m
C = 0.85 m
D = 0.35 m
E = 1.00 m
F = 0.60 m

Pipe Culvert (Dia.750mm)

   1. Excavation (m^3)

     1.1 Soft Material

       Volume = (0.75+0.30) x D' x Length

     1.2 Hard Material

       Volume = (0.75+0.30) x D" x Length

   2. Pipe Culvert (m)

   3. Class 20/20 Concrete (m^3)

     Volume = $((1.02 \times 1.17)-0.25^2-3.14 \times 0.435^2)$ x Length
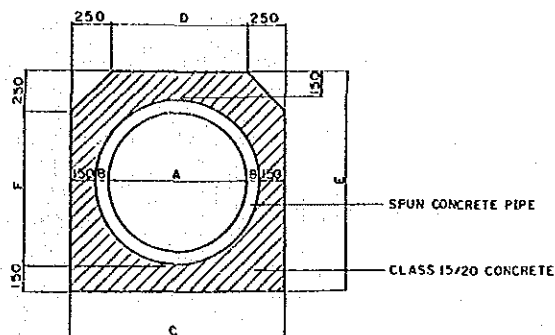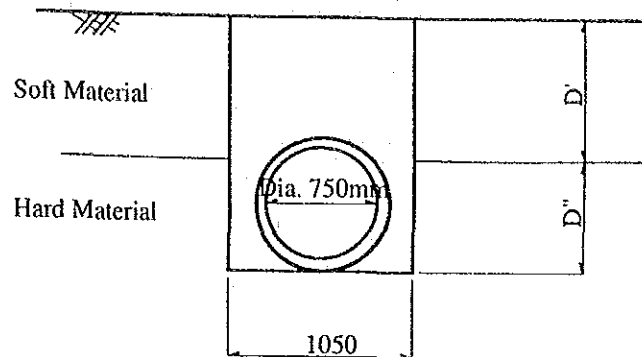
A = 0.75 m
B = 0.06 m
C = 1.02 m
D = 0.52 m
E = 1.17m
F = 0.77 m

Pipe Culvert (Dia.900mm)

   1. Excavation (m^3)

     1.1 Soft Material

       Volume = (0.90+0.30) x D' x Length

     1.2 Hard Material

       Volume = (0.90+0.30) x D" x Length

   2. Pipe Culvert (m)

   3. Class 20/20 Concrete (m^3)

     Volume = $((1.18 \times 1.33)-0.25^2-3.14 \times 0.514^2)$ x Length
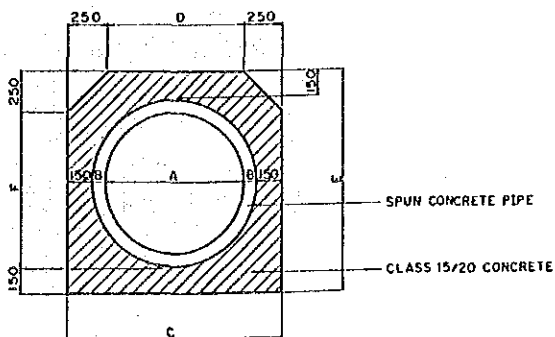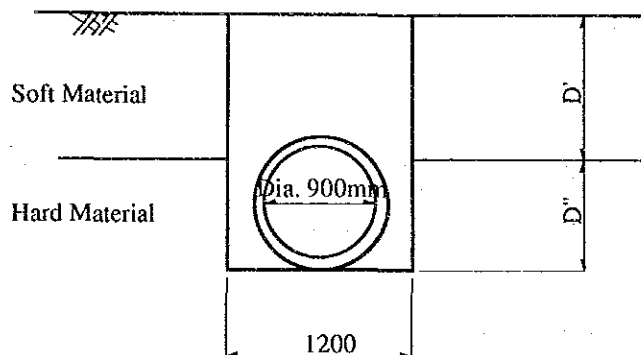
A = 0.90 m
B = 0.064 m
C = 1.18 m
D = 0.68 m
E = 1.33 m
F = 0.93 m

Calculation Sheet

Pipe Culvert (Dia.1200mm)

1. Excavation (m^3)

    1.1 Soft Material

    Volume = (1.20+0.30) x D' x Length

    1.2 Hard Material

    Volume = (1.20+0.30) x D" x Length

2. Pipe Culvert (m)

3. Class 20/20 Concrete (m^3)

    Volume = ((1.50 x 1.65)-0.25^2-3.14 x 0.675^2) x Length
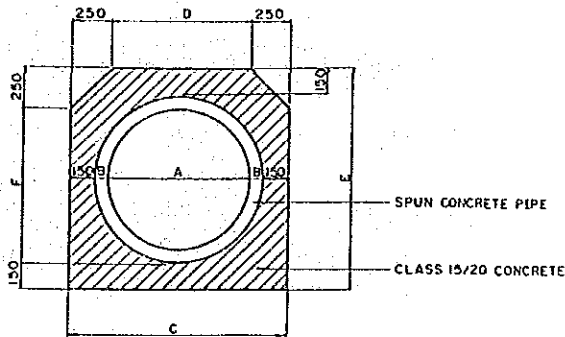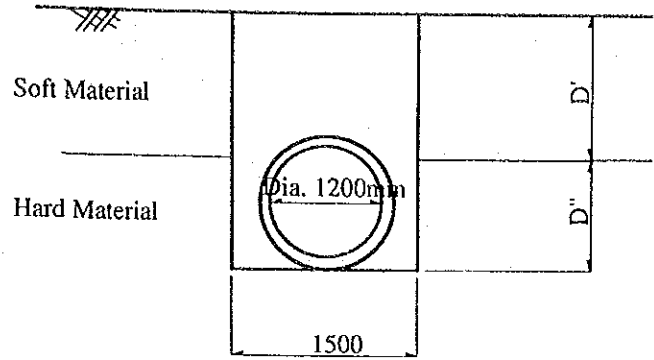
A = 1.20 m
B = 0.075 m
C = 1.50 m
D = 1.00 m
E = 1.65 m
F = 1.25 m

Calculation Sheet

Pipe Culvert (2 x Dia.900mm)

  1. Excavation (m^3)

    1.1 Soft Material

      Volume = (2 x 0.90+0.15+0.30) x D' x Length

    1.2 Hard Material

      Volume = (2 x 0.90+0.15+0.30) x D" x Length

  2. Pipe Culvert (m)

  3. Class 20/20 Concrete (m^3)

    Volume = ((2.53 x 1.34)-0.25^2-3.14 x 0.514^2 x 2) x Length

Soft Material

Hard Material

2250

SPUN CONCRETE PIPE

CLASS 15/20 CONCRETE
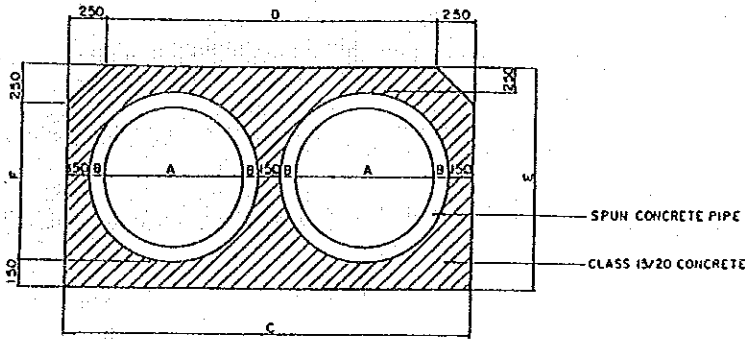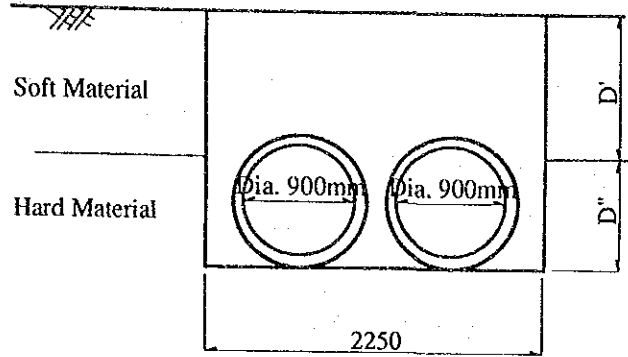
A = 0.90 m
B = 0.07 m
C = 2.53 m
D = 2.03 m
E = 1.34 m
F = 0.94 m

Pipe Culvert (2 x Dia.1200mm)

  1. Excavation (m^3)

    1.1 Soft Material

      Volume = (2 x 1.20+0.15+0.30) x D' x Length

    1.2 Hard Material

      Volume = (2 x 1.20+0.15+0.30) x D" x Length

  2. Pipe Culvert (m)

  3. Class 20/20 Concrete (m^3)

    Volume = ((3.17 x 1.66)-0.25^2-3.14 x 0.675^2 x 2) x Length

Soft Material

Hard Material

2850

SPUN CONCRETE PIPE

CLASS 15/20 CONCRETE
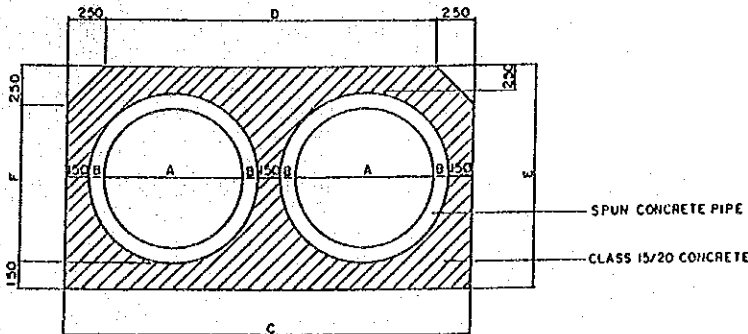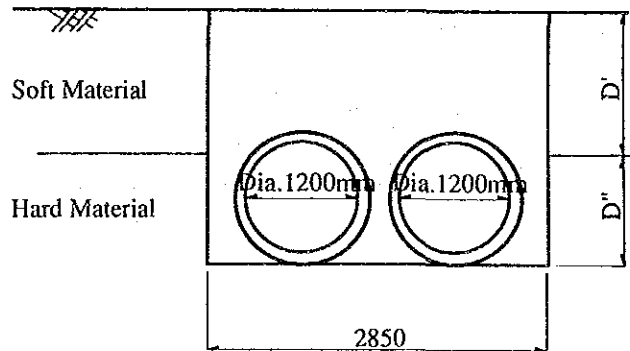
A = 1.20 m
B = 0.08 m
C = 3.17 m
D = 2.67 m
E = 1.66 m
F = 1.26 m

5.4 Inlet/Outlet

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Inlet/Outlet				
1.Excavation				
1.1.Soft Material		2,962.384	m3	
1.2.Hard Material		59.645	m3	
2.Class 25/20 Concrete		923.678	m3	

Inlet/Outlet Schedule

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	n	m	Excavation Soft Material (m3)	Hard Material (m3)	Class 25/20 Concrete (m3)	Remarks
1	CH.0 +300.000 (G)	1	600	1.500	0.000	0.000	0.000	3.013	
2	CH.0 +760.000	2	900	2.000	2.000	37.379	0.000	10.941	
3	CH.0 +820.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
4	CH.1 +000.000	1	900	1.500	2.000	25.970	0.000	8.801	
5	CH.5 +280.000	1	900	2.000	2.000	28.573	0.000	8.801	
6	CH.5 +300.000 (G)	1	900	1.500	2.000	25.970	0.000	8.801	
7	CH.6 +200.000	1	600	2.000	0.000	14.287	0.000	4.401	
8	CH.7 +020.000	2	900	1.500	1.500	0.000	31.047	10.941	
9	CH.7 +028.438 (G)	1	600	1.500	0.000	8.512	0.000	3.013	
10	CH.7 +450.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
11	CH.7 +700.000	1	900	2.000	2.000	28.573	0.000	8.801	
12	CH.8 +000.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
13	CH.8 +180.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
14	CH.8 +250.000	1	1200	2.000	2.000	40.182	0.000	10.877	
15	CH.8 +400.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
16	CH.8 +880.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
17	CH.8 +940.000	1	900	2.000	2.000	28.573	0.000	8.801	
18	CH.9 +340.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
19	CH.9 +783.604	1	900	2.000	2.000	28.573	0.000	8.801	
20	CH.9 +800.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
21	CH.11 +100.000 (G)	1	600	0.000	2.000	0.000	9.908	3.013	
22	CH.11 +240.000	1	1200	2.000	2.000	40.182	0.000	10.877	
23	CH.12 +400.000	2	900	2.000	2.000	18.690	18.690	10.941	
24	CH.12 +555.218 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
25	CH.12 +900.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
26	CH.13 +400.000	1	1200	2.000	2.000	40.182	0.000	10.877	
27	CH.13 +484.164 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
28	CH.13 +760.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
29	CH.14 +595.083 (G)	1	600	2.000	2.000	9.908	0.000	3.013	
30	CH.14 +865.086 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
31	CH.15 +160.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
32	CH.15 +400.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
33	CH.15 +440.000 (G)	1	600	0.000	0.000	9.908	0.000	3.013	
34	CH.15 +700.000 (G)	1	600	2.000	2.000	9.908	0.000	3.013	
35	CH.16 +100.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
36	CH.16 +400.000 (G)	1	600	2.000	2.000	9.908	0.000	3.013	
37	CH.17 +360.000	1	900	1.500	2.000	25.970	0.000	8.801	
38	CH.17 +717.493 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
39	CH.18 +160.000	1	900	1.500	2.000	25.970	0.000	8.801	
40	CH.18 +360.000	1	900	1.500	1.500	23.367	0.000	8.801	
41	CH.18 +580.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
42	CH.18 +820.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
43	CH.19 +020.000	1	600	0.000	2.000	9.908	0.000	3.013	
44	CH.19 +100.000	1	900	1.500	1.500	23.367	0.000	8.801	
45	CH.19 +520.000	1	900	1.500	1.500	23.367	0.000	8.801	
46	CH.19 +665.167 (G)	1	600	0.000	1.500	8.512	0.000	3.013	
47	CH.19 +900.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
48	CH.20 +120.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
49	CH.20 +240.000	2	900	1.500	2.000	34.213	0.000	10.941	

Inlet/Outlet Schedule

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	n	m	Excavation Soft Material (m3)	Excavation Hard Material (m3)	Class 25/20 Concrete (m3)	Remarks
50	CH.20 +340.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
51	CH.20 +600.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
52	CH.21 +010.000	1	750	1.500	0.000	9.970	0.000	3.440	
53	CH.21 +060.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
54	CH.21 +600.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
55	CH.22 +380.000	2	1200	2.000	2.000	54.543	0.000	13.807	
56	CH.22 +400.000	2	1200	2.000	2.000	54.543	0.000	13.807	
57	CH.22 +400.000	2	1200	2.000	2.000	54.543	0.000	13.807	
58	CH.23 +560.000	1	900	2.000	2.000	28.573	0.000	8.801	
59	CH.23 +780.000	1	900	1.500	1.500	23.367	0.000	8.801	
60	CH.24 +280.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
61	CH.24 +380.000	2	1200	1.500	2.000	49.209	0.000	13.807	
62	CH.24 +700.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
63	CH.25 +248.062 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
64	CH.25 +420.000	2	1200	1.500	2.000	49.209	0.000	13.807	
65	CH.27 +800.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
66	CH.28 +040.000 (G)	1	600	0.000	2.000	9.908	0.000	3.013	
67	CH.28 +240.000	1	750	1.500	0.000	9.970	0.000	3.440	
68	CH.28 +260.000 (G)	1	600	1.500	0.000	8.512	0.000	3.013	
69	CH.28 +380.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	
70	CH.0 +140.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C A-Slip Rd.
71	CH.0 +275.614	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C B-Slip Rd.
72	CH.0 +240.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C C-Slip Rd.
73	CH.0 +065.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C D-Slip Rd.
74	CH.0 +025.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C E-Slip Rd.
75	CH.0 +300.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C F-Slip Rd.
76	CH.0 +300.000	1	600	2.000	2.000	19.817	0.000	6.026	Monbasa Rd. J/C G-Slip Rd.
77	CH.0 -800.000 L	2	900	2.000	2.000	37.379	0.000	10.941	Monbasa Rd. (A104)
78	CH.0 -800.000 R	2	900	2.000	2.000	37.379	0.000	10.941	Monbasa Rd. (A104)
79	CH.0 -650.000	2	900	2.000	2.000	37.379	0.000	10.941	Monbasa Rd. (A104)
80	CH.0 -260.000	2	900	2.000	2.000	37.379	0.000	10.941	Monbasa Rd. (A104)
81	CH.0 +950.000	1	900	1.500	2.000	25.970	0.000	8.801	Monbasa Rd. (A104)
82	CH.1 +220.000 R	1	900	2.000	2.000	28.573	0.000	8.801	Service Rd.
83	CH.6 +520.000 (G)	1	600	2.000	0.000	9.908	0.000	3.013	Uhuru Monument J/C A-Slip Rd.
84	CH.0 +110.000 L	1	600	2.000	2.000	19.817	0.000	6.026	Langata Rd. (C58)
85	CH.0 +140.000 L	1	600	2.000	2.000	19.817	0.000	6.026	Langata Rd. (C58)
86	CH.0 +165.000 R	1	300	2.000	2.000	4.614	0.000	0.914	Langata Rd. (C58)
87	CH.0 +177.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Langata Rd. (C58)
88	CH.0 +220.000 L	1	600	2.000	2.000	19.817	0.000	6.026	Langata Rd. (C58)
89	CH.0 +235.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Langata Rd. (C58)
90	CH.0 +240.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Langata Rd. (C58)
91	CH.0 +260.000 R	1	900	1.500	0.000	11.683	0.000	4.401	Uhuru Monument J/C C-Slip Rd.
92	CH.0 +220.000 L	1	600	2.000	2.000	19.817	0.000	6.026	Service Rd.
93	CH.7 +865.086	1	600	2.000	2.000	19.817	0.000	6.026	Ngong Rd. J/C A-Slip Rd.
94	CH.0 +040.000	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (C60)
95	CH.0 +260.000	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (C60)
96	CH.0 +440.000	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (C60)
97	CH.0 +620.000	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (C60)
98	CH.0 +740.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (C60)

Inlet/Outlet Schedule

Ref. No.	Chainage	No. of Pipes	Diameter (mm)	n	m	Excavation Soft Material (m3)	Excavation Hard Material (m3)	Class 25/20 Concrete (m3)	Remarks
99	CH.18 +400.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Service Rd.
100	CH.18 +480.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Service Rd.
101	CH.19 +060.000 L	1	900	1.500	1.500	23.367	0.000	8.801	Service Rd.
102	CH.19 +520.000 L	1	900	1.500	1.500	23.367	0.000	8.801	Service Rd.
103	CH.20 +200.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Service Rd.
104	CH.20 +200.000 R	1	300	2.000	2.000	4.614	0.000	0.914	Service Rd.
105	CH.20 +220.000 L	2	900	2.000	2.000	34.213	0.000	10.941	Service Rd.
106	CH.0 +040.000	1	600	1.500	1.500	17.024	0.000	6.026	Dagoretti Forest J/C A-Slip Rd.
107	CH.0 +260.000	1	600	2.000	2.000	19.817	0.000	6.026	Dagoretti Forest J/C A-Slip Rd.
108	CH.0 +080.000	1	600	1.500	1.500	17.024	0.000	6.026	Dagoretti Forest J/C A-Slip Rd.
109	CH.0 +040.000	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (C63)
110	CH.0 +160.000	1	900	2.000	2.000	28.573	0.000	8.801	Approach Rd. (C63)
111	CH.0 +340.000	1	1200	2.000	2.000	40.182	0.000	10.877	Approach Rd. (C63)
112	CH.21 +000.000 L	2	900	2.000	2.000	37.379	0.000	10.941	Service Rd.
113	CH.21 +000.000 R	1	900	2.000	2.000	28.573	0.000	8.801	Service Rd.
114	CH.22 +380.000 L	1	1200	1.500	1.500	31.634	0.000	10.877	Service Rd.
115	CH.22 +380.000 R	1	600	1.500	1.500	17.024	0.000	6.026	Service Rd.
116	CH.22 +880.000 L	1	900	2.000	2.000	28.573	0.000	8.801	Service Rd.
117	CH.22 +880.000 R	1	900	2.000	2.000	28.573	0.000	8.801	Service Rd.
118	CH.23 +100.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Service Rd.
119	CH.23 +240.000 L	1	900	1.500	1.500	23.367	0.000	8.801	Service Rd.
120	CH.0 +010.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (D411)
121	CH.0 +080.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (D411)
122	CH.0 +140.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (D411)
123	CH.0 +230.000	1	900	2.000	2.000	28.573	0.000	8.801	Approach Rd. (D411)
124	CH.0 +280.000	1	900	2.000	2.000	28.573	0.000	8.801	Approach Rd. (D411)
125	CH.0 +285.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (D411)
126	CH.0 +320.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Approach Rd. (D411)
127	CH.0 +325.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Approach Rd. (D411)
128	CH.0 +340.000 L	1	900	2.000	2.000	28.573	0.000	8.801	Approach Rd. (D411)
129	CH.0 +040.000	1	900	2.000	2.000	28.573	0.000	8.801	Thogoto J/C A-Slip Rd.
130	CH.0 +040.000	1	900	1.500	1.500	23.367	0.000	8.801	Thogoto J/C B-Slip Rd.
131	CH.0 +280.000	1	600	2.000	2.000	19.817	0.000	6.026	Thogoto J/C B-Slip Rd.
132	CH.25 +420.000 L	2	900	1.500	1.500	31.047	0.000	10.941	Service Rd.
133	CH.26 +420.000 R	1	600	2.000	2.000	19.817	0.000	6.026	Ondori Swamp
134	CH.26 +490.000 L	1	900	2.000	2.000	28.573	0.000	8.801	Ondori Swamp
135	CH.0 +020.000	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C A-Slip Rd.
136	CH.0 +540.000	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C A-Slip Rd.
137	CH.1 +640.000	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C A-Slip Rd.
138	CH.1 +060.000	1	900	2.000	2.000	28.573	0.000	8.801	Kikuyu Town J/C A-Slip Rd.
139	CH.1 +105.000 R	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C A-Slip Rd.
140	CH.1 +165.000 R	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C A-Slip Rd.
141	CH.1 +440.000	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C A-Slip Rd.
142	CH.1 +440.000	1	600	1.500	1.500	17.024	0.000	6.026	Kikuyu Town J/C C-Slip Rd.
143	CH.0 +040.000	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C C-Slip Rd.
144	CH.0 +060.000 L	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C D-Slip Rd.
145	CH.0 +030.000 L	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
146	CH.0 +040.000	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C D-Slip Rd.
147	CH.0 +050.000 R	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.

Inlet/Outlet Schedule

Ref. No.	Chainage			No. of Pipes	Diameter (mm)	n	m	Excavation Soft Material (m3)	Excavation Hard Material (m3)	Class 25/20 Concrete (m3)	Remarks
148	CH.0	+090.000	L	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
149	CH.0	+120.000	R	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
150	CH.0	+135.000	L	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
151	CH.0	+150.000	R	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
152	CH.0	+160.000	L	1	300	2.000	2.000	4.614	0.000	0.914	Kikuyu Town J/C D-Slip Rd.
153	CH.0	+260.000	L	1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu Town J/C D-Slip Rd.
154	CH.0	+420.000	L	1	900	2.000	2.000	28.573	0.000	8.801	Kikuyu Town J/C D-Slip Rd.
155	CH.0	+444.278	(G)	1	900	2.000	2.000	28.573	0.000	8.801	Kikuyu Town J/C D-Slip Rd.
156	CH.27	+095.000	L	1	900	2.000	2.000	28.573	0.000	8.801	Service Rd.
157	CH.28	+050.000	L	1	600	2.000	2.000	19.817	0.000	6.026	
158	CH.0	+460.000		1	900	2.000	2.000	28.573	0.000	8.801	Kikuyu J/C A-Slip Rd.
159	CH.0	+120.000		1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu J/C B-Slip Rd.
160	CH.0	+020.000		1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu J/C C-Slip Rd.
161	CH.0	+380.000		1	600	2.000	2.000	19.817	0.000	6.026	Kikuyu J/C Rd. 3.1
	Total							2,962.384	59.645	923.678	

Calculation Sheet

Outlet/Inlet (for Dia.300mm pipe culvert)

1. Excavation (m³)

    (1') 1.770 x 1.035/2 x 1.670 = 1.530

    (2') 1.600 x 1.670 x 0.150   = 0.401

    (3') 0.750 x 0.300 x 1.670   = 0.376

         ─────────────────────────────────
         Total   2.307 m³/no.

2. Class 25/20 Concrete (m³)

    (1) 1.070 x 0.450 x 0.150   = 0.072

    (2)   -

    (3) 0.850 x 1.070 x 0.150   = 0.136

    (4) 1.070 x (0.485+0.300) x 0.150-0.185 x 3.14 x 0.150= 0.110

    (5) (0.485+0.300+0.300) x 0.850/2 x 0.150 x 2   = 0.138

         ─────────────────────────────────
         Total   0.457 m /no.

SECTION I - I

FRONT ELEVATION

PLAN
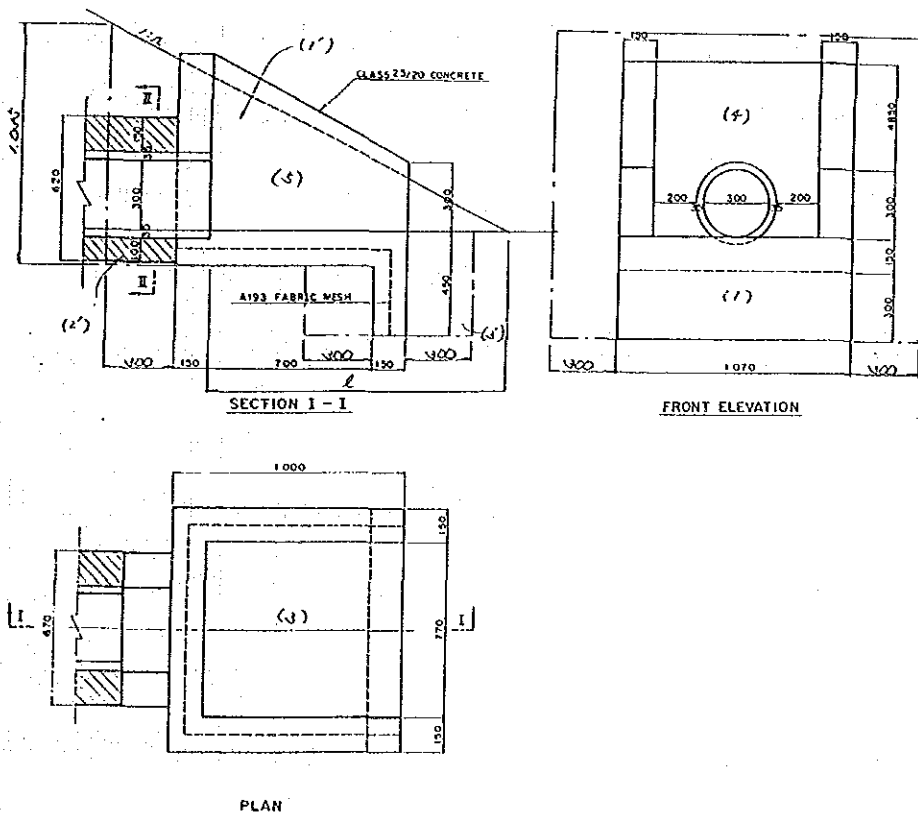
Calculation Sheet

Outlet/Inlet (for Dia.600mm/Dia.750mm/Dia.900mm/Dia.1200mm pipe culvert)

1. Excavation (m^3)

   (1') $(((I+0.550)/n \times (G+2 \times 0.550 \times \tan(O))+(G+(2 \times I+1.6) \times \tan(O)) \times (1-I+0.300)/n) \times (1+0.25)/2) \times$ no.

   (2') $(((1-I+0.300)/n \times (G+2 \times H+2.6)) \times (1-I+0.300)/2) \times$ no.

   (3') $(((G+1.1 \times \tan(O) \times 2+(I+1.1) \times \tan(O) \times 2) \times (I+1.1)/2 \times 0.250) \times$ no.

   (4') $(0.750 \times 0.850 \times (G+2 \times H+2.6)) \times$ no.

2. Class 25/20 Concrete (m^3)

   (1) $(K \times I \times 0.250) \times$ no.

   (2) $((1-M) \times L \times 0.250 \times 2) \times$ no.

   (3) $(((G+2 \times H+2 \times M)+(G+2 \times M)) \times (0.250+I)/2 \times 0.250) \times$ no.

   (4) $((Q \times G+Q \times (G+2 \times M))/2 \times 0.250-((A/2+B)^2 \times 3.14) \times 0.250)) \times$ no.

   (5) $(((L+Q)/2 \times P \times 0.250) \times 2+M \times 0.250 \times L) \times$ no.
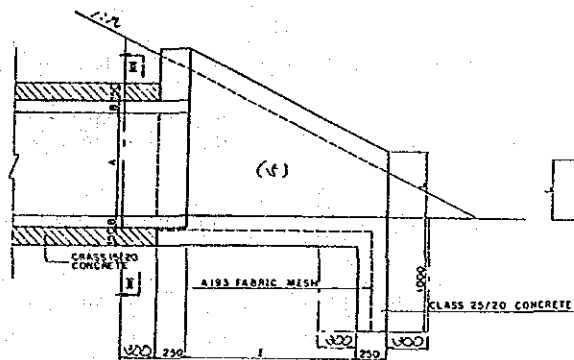
SECTION I – I
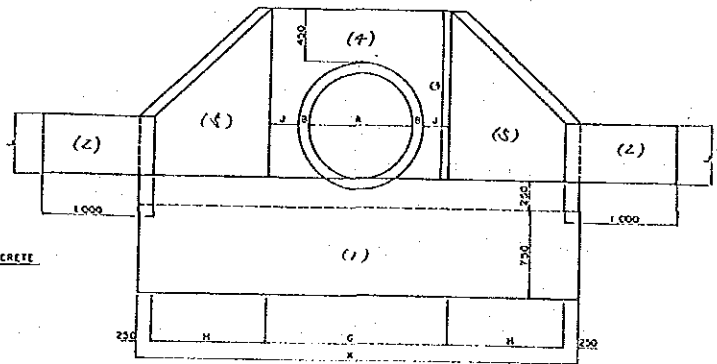
FRONT ELEVATION
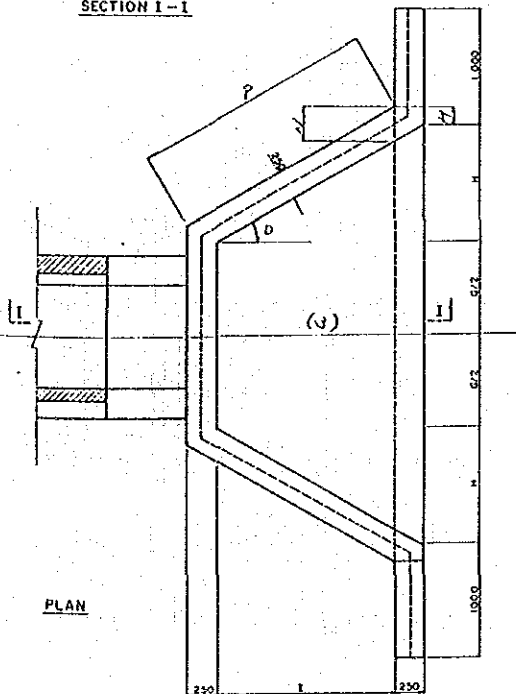
PLAN

Calculation Sheet

Outlet/Inlet (for 2 x Dia.900mm/ 2 x Dia.1200mm pipe culvert)

1. Excavation (m^3)

(1') $(((I+0.550)/n \times (G+2 \times 0.550 \times \tan(O))+(G+(2 \times I+1.6) \times \tan(O)) \times (I-I+0.300)/n) \times (I+0.25)/2) \times$ no.

(2') $(((I-I+0.300)/n \times (G+2 \times H+2.6)) \times (I-I+0.300)/2) \times$ no.

(3') $(((G+1.1 \times \tan(O) \times 2+(I+1.1) \times \tan(O) \times 2) \times (I+1.1)/2 \times 0.250) \times$ no.

(4') $(0.750 \times 0.850 \times (G+2 \times H+2.6)) \times$ no.

2. Class 25/20 Concrete (m^3)

(1) $(K \times I \times 0.250) \times$ no.

(2) $((1-M) \times L \times 0.250 \times 2) \times$ no.

(3) $(((G+2 \times H+2 \times M)+(G+2 \times M)) \times (0.250+I)/2 \times 0.250) \times$ no.

(4) $((Q \times G+Q \times (G+2 \times M))/2 \times 0.250-((A/2+B)^2 \times 3.14) \times 0.250 \times 2)) \times$ no.

(5) $(((L+Q)/2 \times P \times 0.250) \times 2+M \times 0.250 \times L) \times$ no.
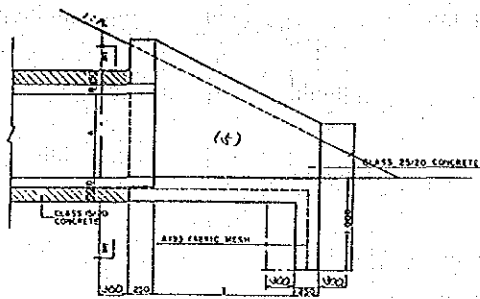
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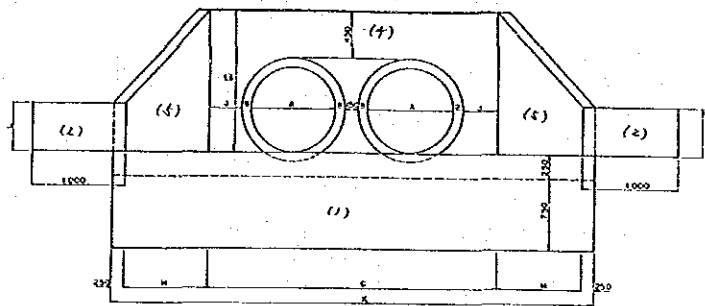
FRONT ELEVATION
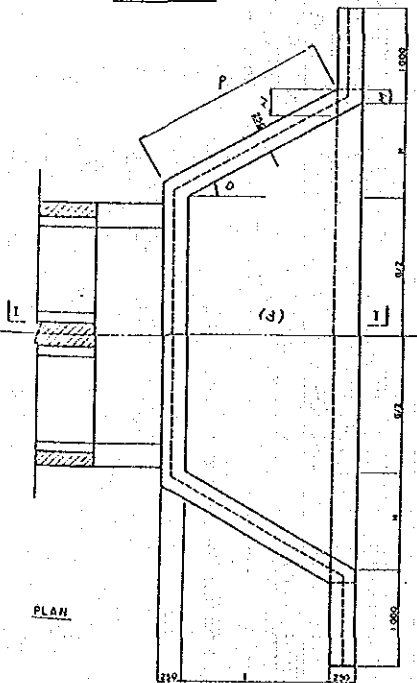
PLAN

Pipe Culvert Quantity Caluculation

Culvert	A(m)	B(m)	C(m)	D(m)	E(m)	F(m)	G(m)	H(m)	I(m)	J(m)	K(m)	L(m)	M(m)	N(m)	O(deg.)	P(m)	Q(m)	I(m)	n
0.30m Diameter	0.30	0.035	0.67	0.37	0.52	0.37	0.77	0.00	0.70	0.20	1.07	0.30	0.15	0.15	0.00	0.85	0.79	1.32	2.00
0.60m Diameter	0.60	0.050	1.00	0.50	1.00	0.60	1.30	0.90	1.20	0.30	3.60	0.50	0.14	0.29	31.83	1.71	1.10	1.33	1.50
	0.60	0.050	1.00	0.50	1.00	0.60	1.30	0.90	1.20	0.30	3.60	0.50	0.14	0.29	31.83	1.71	1.10	1.85	2.00
0.75m Diameter	0.75	0.060	1.17	0.67	1.17	0.77	1.45	0.95	1.35	0.29	3.85	0.50	0.14	0.29	30.70	1.86	1.26	1.57	1.50
	0.75	0.060	1.17	0.67	1.17	0.77	1.45	0.95	1.35	0.29	3.85	0.50	0.14	0.29	30.70	1.86	1.26	2.17	2.00
0.90m Diameter	0.90	0.070	1.34	0.84	1.34	0.94	1.62	1.00	1.50	0.29	4.12	1.00	0.15	0.29	29.74	2.02	1.42	1.80	1.50
	0.90	0.070	1.34	0.84	1.34	0.94	1.62	1.00	1.50	0.29	4.12	1.00	0.15	0.29	29.74	2.02	1.42	2.48	2.00
1.20m Diameter	1.20	0.080	1.66	1.16	1.66	1.26	1.92	1.10	1.80	0.28	4.62	1.00	0.15	0.28	28.22	2.33	1.73	2.26	1.50
	1.20	0.080	1.66	1.16	1.66	1.26	1.92	1.10	1.80	0.28	4.62	1.00	0.15	0.28	28.22	2.33	1.73	3.10	2.00
2x0.90m Diameter	0.90	0.070	2.53	2.03	1.33	0.93	2.85	1.00	1.50	0.31	5.35	1.00	0.15	0.29	29.74	2.02	1.42	1.80	1.50
	0.90	0.070	2.53	2.03	1.33	0.93	2.85	1.00	1.50	0.31	5.35	1.00	0.15	0.29	29.74	2.02	1.42	2.48	2.00
2x1.20m Diameter	1.20	0.080	3.17	2.67	1.66	1.26	3.45	1.10	1.80	0.29	6.15	1.00	0.15	0.28	28.22	2.33	1.73	2.26	1.50
	1.20	0.080	3.17	2.67	1.66	1.26	3.45	1.10	1.80	0.29	6.15	1.00	0.15	0.28	28.22	2.33	1.73	3.10	2.00

| | | Class 25/20 Concrete | | | | | | Excavation | | | | |
| | n | Volume | | | | | | | | | | |
		(1)	(2)	(3)	(4)	(5)	Total	(1)	(2)	(3)	(4)	Total
0.30m Diameter	1:2.0	0.072	0.000	0.136	0.110	0.138	0.457	1.530	0.401	0.376		2.307
0.60m Diameter	1:1.5	0.900	0.215	0.898	0.300	0.700	3.013	2.574	0.343	1.961	3.634	8.512
	1:2.0	0.900	0.215	0.898	0.300	0.700	3.013	3.028	1.286	1.961	3.634	9.908
0.75m Diameter	1:1.5	0.963	0.214	1.074	0.353	0.837	3.440	3.472	0.526	2.179	3.793	9.970
	1:2.0	0.963	0.214	1.074	0.353	0.837	3.440	4.082	1.866	2.179	3.793	11.920
0.90m Diameter	1:1.5	1.030	0.427	1.273	0.414	1.256	4.401	4.554	0.736	2.427	3.965	11.683
	1:2.0	1.030	0.427	1.273	0.414	1.256	4.401	5.354	2.540	2.427	3.965	14.287
1.20m Diameter	1:1.5	1.155	0.425	1.701	0.532	1.625	5.438	7.281	1.304	2.948	4.284	15.817
	1:2.0	1.155	0.425	1.701	0.532	1.625	5.438	8.558	4.301	2.948	4.284	20.091
2x0.90m Diameter	1:1.5	1.338	0.427	1.811	0.639	1.256	5.470	6.665	0.882	3.227	4.749	15.523
	1:2.0	1.338	0.427	1.811	0.639	1.256	5.470	7.671	3.042	3.227	4.749	18.690
2x1.20m Diameter	1:1.5	1.538	0.425	2.485	0.830	1.625	6.904	11.020	1.601	4.057	5.259	21.937
	1:2.0	1.538	0.425	2.485	0.830	1.625	6.904	12.675	5.280	4.057	5.259	27.272

5.5 Gulley Pot

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Gulley Pot				
1.Excavation				
1.1.Soft Material	5.5.2	179.670	m3	
1.2.Hard Mateial		5.100	m3	
2.Class 20/20 Concrete		63.195	m3	
3.Grated Crashed Stone		18.752	m3	
4.Concrete Cover		168.000	nos.	

Gulley Pot Schedule

Ref. NO.	Chainage	Type	Excavation		Class 20/20 Concrete (m3)	Grated Crushed Stone (m3)	Concrete Cover (No.)
			Soft Material (m3)	Hard Material (m3)			
1	CH.0 +300.000	I	0.000	0.000	1.287	0.416	4
2	CH.0 +820.000	II	4.930	0.000	1.250	0.416	4
3	CH.6 +200.000	I	5.440	0.000	1.728	0.416	4
4	CH.6 +520.000	III	0.000	0.000	1.341	0.640	0
5	CH.7 +028.438	I	0.000	0.000	1.714	0.416	4
6	CH.7 +450.000	I	2.380	0.000	1.603	0.416	4
7	CH.8 +000.000	I	5.100	0.000	1.363	0.416	4
8	CH.8 +180.000	I	7.480	0.000	1.887	0.416	4
9	CH.8 +400.000	I	5.100	0.000	1.284	0.416	4
10	CH.8 +880.000	I	4.760	0.000	1.284	0.416	4
11	CH.9 +340.000	I	2.040	0.000	1.543	0.416	4
12	CH.9 +800.000	I	7.480	0.000	1.909	0.416	4
13	CH.11 +100.000	II	0.680	5.100	1.250	0.416	4
14	CH.12 +555.218	I	5.100	0.000	1.300	0.416	4
15	CH.12 +900.000	I	2.040	0.000	2.011	0.416	4
16	CH.13 +484.164	I	5.440	0.000	1.418	0.416	4
17	CH.13 +760.000	I	2.040	0.000	1.298	0.416	4
18	CH.14 +595.083	I	5.440	0.000	1.417	0.416	4
19	CH.14 +865.086	I	5.100	0.000	1.284	0.416	4
20	CH.15 +160.000	I	5.100	0.000	1.286	0.416	4
21	CH.15 +400.000	I	5.440	0.000	1.285	0.416	4
22	CH.15 +440.000	I	5.100	0.000	1.284	0.416	4
23	CH.15 +700.000	I	5.440	0.000	1.284	0.416	4
24	CH.16 +100.000	I	5.440	0.000	1.339	0.416	4
25	CH.16 +400.000	I	5.440	0.000	1.339	0.416	4
26	CH.17 +717.493	I	5.440	0.000	1.284	0.416	4
27	CH.18 +580.000	I	5.100	0.000	1.284	0.416	4
28	CH.18 +820.000	I	5.780	0.000	1.402	0.416	4
29	CH.19 +020.000	I	0.000	0.000	1.284	0.416	4
30	CH.19 +665.167	I	0.000	0.000	1.658	0.416	4
31	CH.19 +900.000	I	5.780	0.000	1.418	0.416	4
32	CH.20 +120.000	I	3.740	0.000	1.284	0.416	4
33	CH.20 +340.000	I	0.000	0.000	1.831	0.416	4
34	CH.20 +600.000	I	0.000	0.000	1.956	0.416	4
35	CH.21 +060.000	I	0.000	0.000	1.284	0.416	4
36	CH.21 +600.000	I	5.440	0.000	1.284	0.416	4
37	CH.24 +280.000	II	5.440	0.000	1.250	0.416	4
38	CH.24 +700.000	I	5.780	0.000	1.368	0.416	4
39	CH.25 +248.062	I	5.780	0.000	1.368	0.416	4
40	CH.27 +740.000	III	5.760	0.000	1.282	0.640	0
41	CH.27 +800.000	I	5.440	0.000	1.446	0.416	4
42	CH.28 +040.000	I	5.780	0.000	1.452	0.416	4
43	CH.28 +260.000	I	7.140	0.000	1.788	0.416	4
44	CH.28 +380.000	I	4.760	0.000	1.284	0.416	4
	Total		179.670	5.100	63.195	18.752	168

Gulley Pot (Type-I)

1. Excavation (m^3)

   1.1 Soft Material

   Volume = 1.70 x 2.00 x D' x no.

   1.2 Hard Material

   Volume = 1.70 x 2.00 x D" x no.

2. Class 20/20 Concrete (m^3)

   Volume = (1.10 x 1.40 x 0.20+((1.40 x 1.10)-(1.00 x 0.70)) x D-(0.525 x 0.325 x 0.20) x 2-3.14 x 0.305^2) x no.

3. Grated Crushed Stone (m^3)

   Volume = 1.30 x 1.60 x 0.20 x no.

4. Concrete Cover (no.)

   Number = 4 x no.
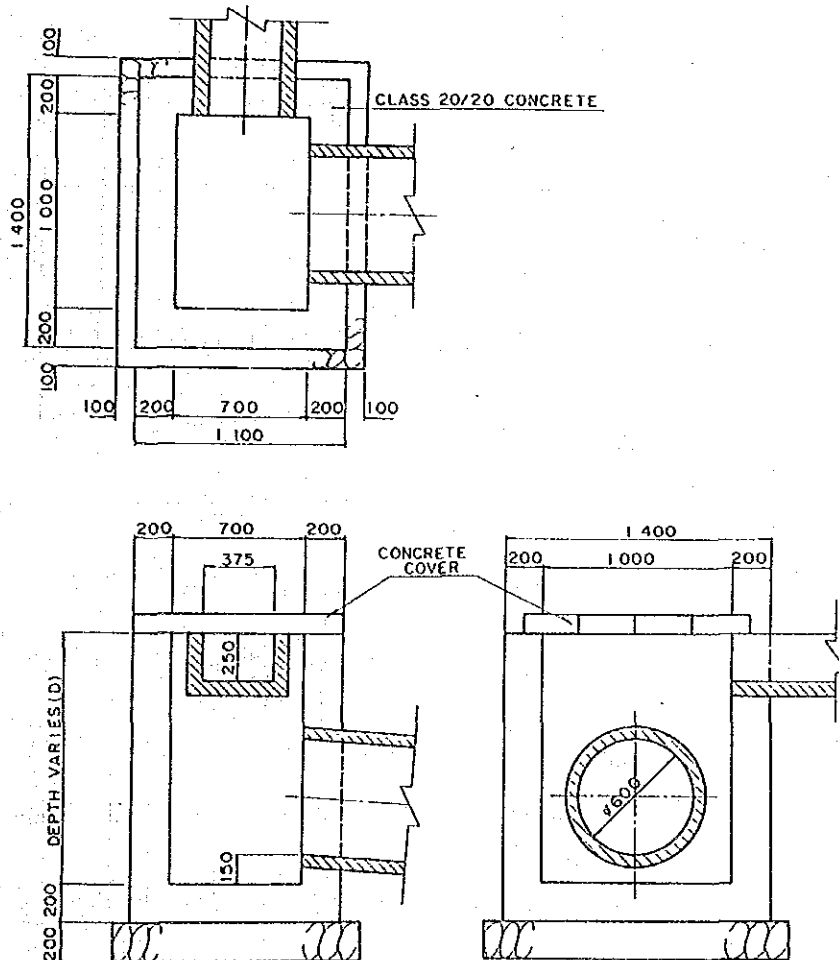
GULLEY POT (I)

Calculation Sheet

Gulley Pot (Type-II)

1. Excavation (m^3)

   1.1 Soft Material

   Volume = 1.70 x 2.00 x D' x no.

   1.2 Hard Material

   Volume = 1.70 x 2.00 x D" x no.

2. Class 20/20 Concrete (m^3)

   Volume = (1.10 x 1.40 x 0.20+((1.40 x 1.10)-(1.00 x 0.70)) x D-(0.525 x 0.325 x 0.20) x 2-3.14 x 0.305^2) x no.

3. Grated Crushed Stone (m^3)

   Volume = 1.30 x 1.60 x 0.20 x no.

4. Concrete Cover (no.)

   Number = 4 x no.

GULLEY POT (II) SCALE 1:20
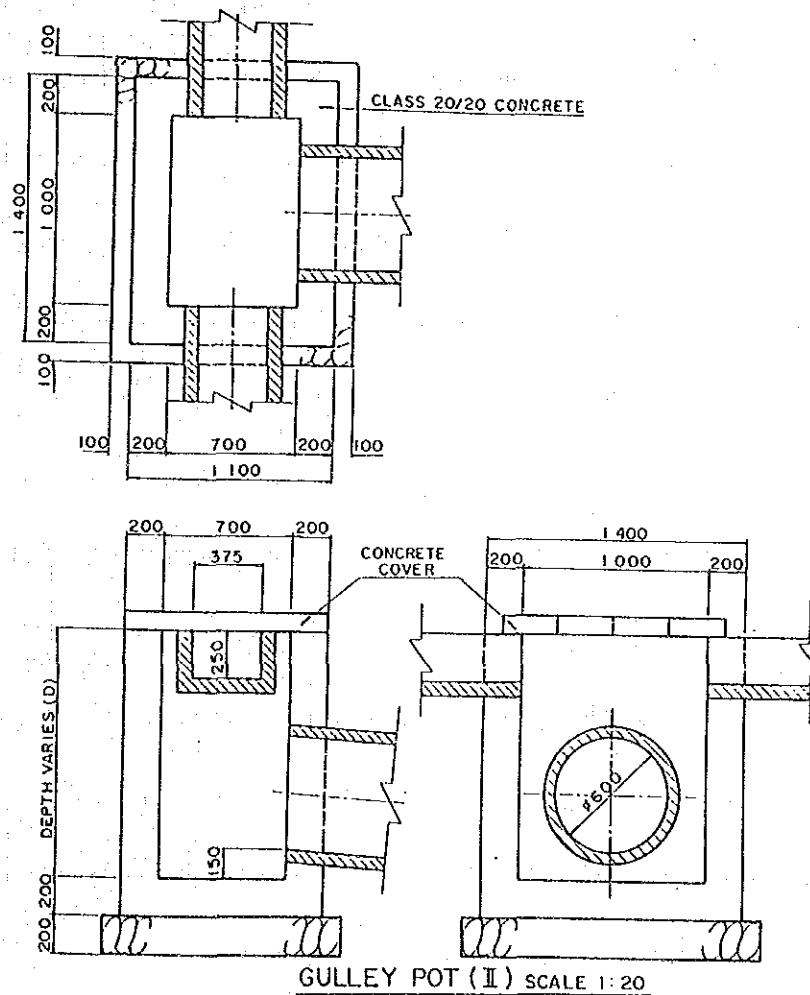
Calculation Sheet

Gulley Pot (Type-III)

1. Excavation (m³)

   1.1 Soft Material

   Volume = 2.40 x 2.00 x D' x no.

   1.2 Hard Material

   Volume = 2.40 x 2.00 x D" x no.

2. Class 20/20 Concrete (m³)

   Volume = (1.40 x 1.80 x 0.20+((1.40 x 1.80)-(1.00 x 1.40)) x D-((0.50+1.00) x 0.50/2) x 0.20 x 2-3.14 x 0.305²) x no.

3. Grated Crushed Stone (m³)

   Volume = 1.30 x 1.60 x 0.20 x no.

4. Concrete Cover (no.)

   Number = 0 x no.

GULLEY POT (III)

5.5.6

5.6 Gabion

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Gabion				
1.Excavation		577.500	m3	
2.Gabion		430.000	m2	
3.Mattress (t=300mm)		200.000	m2	
4.Rockfill		490.000	m3	
5.Filter Fabric		335.000	m2	
1.Excavation		577.500	m3	
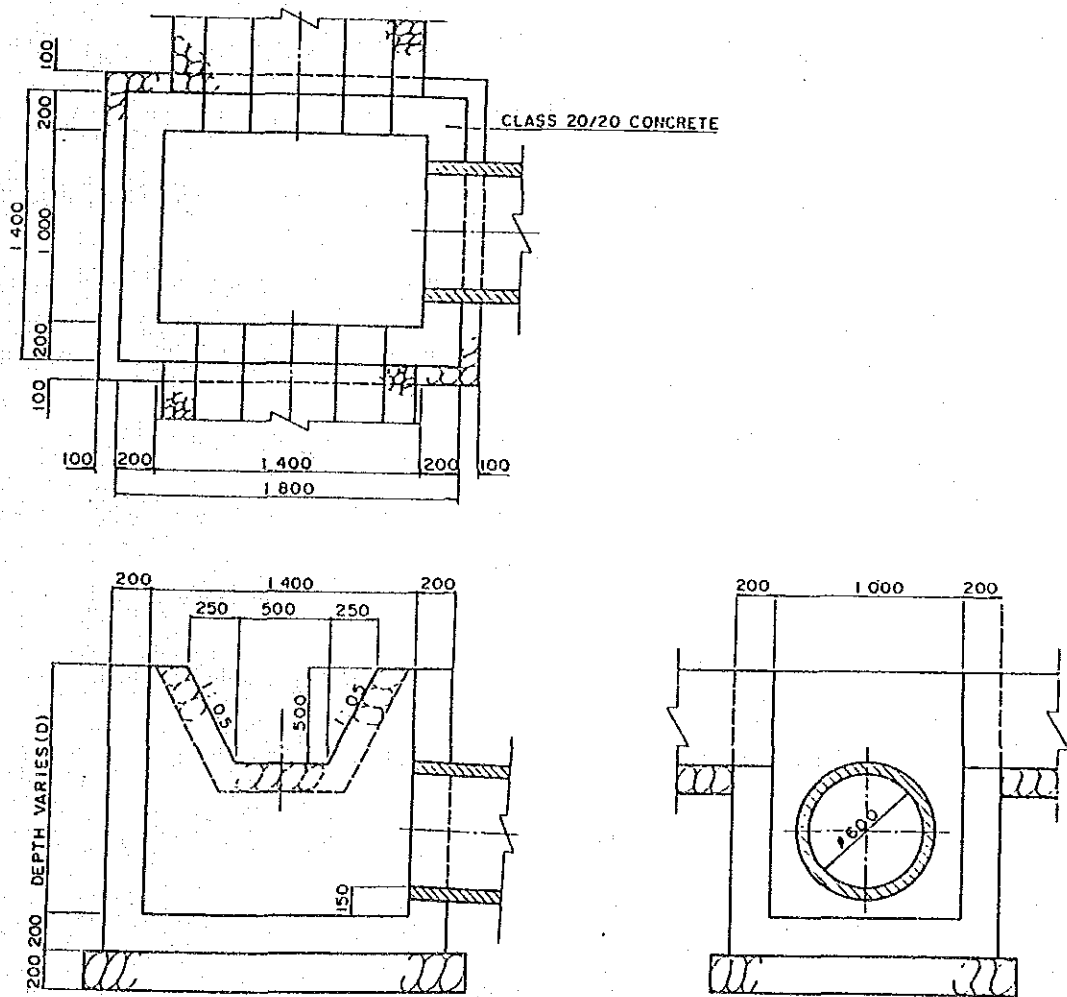
Calculation Sheet

Gabion

1. Excavation (m³)

    (1) Volume = 3.00 x 4.50/2 x 50.00 = 337.50

    (2) Volume = 2.00 x 4.00/2 x 60.00 = 240.00

2. Gabion, t=1000mm (m²)

    (1) Area = 5.00 x 50.00 = 250.00

    (2) Area = 3.00 x 60.00 = 180.00

3. Mattress, t=300mm (m²)

    (1) Area = 4.00 x 50.00 = 200.00

    (2) Area = 0.00 x 60.00 = 0.00

4. Rock Backfill (m³)

    (1) Volume(Gabion) = 250.00 x 1.00 = 250.00

        Volume(Mattress) = 200.00 x 0.30 = 60.00

    (1) Volume(Gabion) = 180.00 x 1.00 = 180.00

        Volume(Mattress) = 0.00 x 0.30 = 0.00

5. Filter Fabric (m²)

    (1) Area = 4.30 x 50.00 = 215.00

    (2) Area = 2.00 x 60.00 = 120.00

(1) High Bank (CH.26+320)
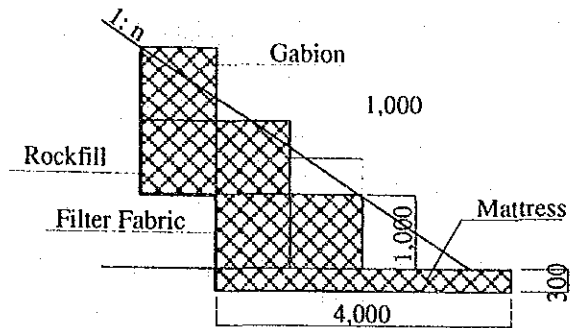
(2) Kikuyu Town Junction A-Slip Road
(CH.27+810~CH.27+870)

Gabion

5.7 Mattress

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Mattress				
1.Mattress for	3.0x5.0x15	225.000	m2	
Drain(t=300mm)				
2.Rockfill	225x0.3	67.500	m3	
1.Mattress for	3.0x5.0x15	225.000	m2	
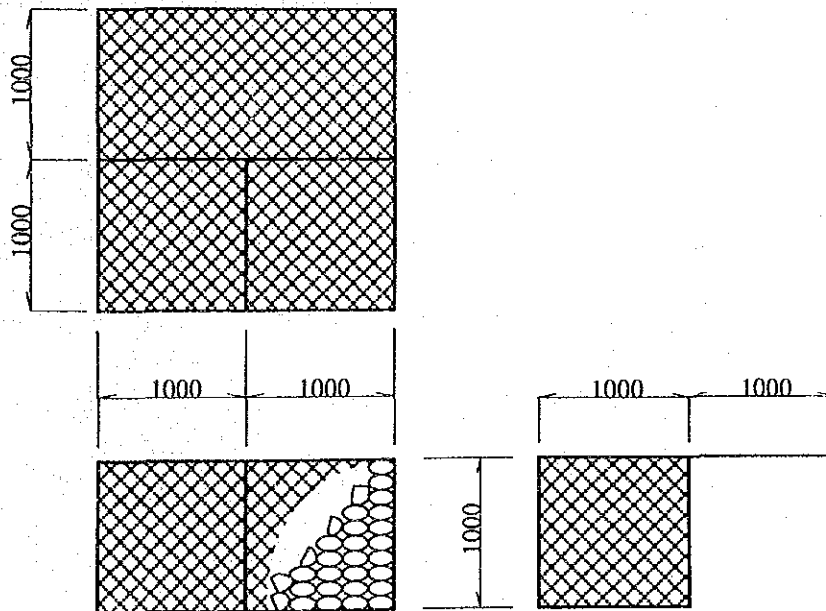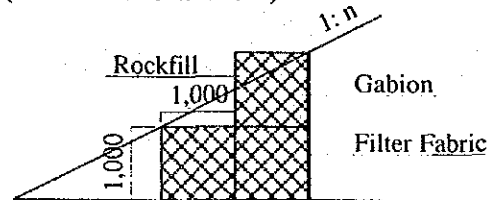
Mattress Schedule

Chainage		Location	Mattress (m2)	Rockfill (m3)	Remarks
CH.7+	20.000	Right	15.000	4.500	
CH.8+	250.000	Right	15.000	4.500	
CH.8+	940.000	Right	15.000	4.500	
CH.9+	783.604	Right	15.000	4.500	
CH.11+	240.000	Right	15.000	4.500	
CH.12+	400.000	Right	15.000	4.500	
CH.13+	400.000	Right	15.000	4.500	
CH.17+	360.000	Left	15.000	4.500	
CH.18+	160.000	Left	15.000	4.500	
CH.18+	360.000	Left	15.000	4.500	
CH.19+	60.000	Left	15.000	4.500	
CH.19+	520.000	Left	15.000	4.500	
CH.20+	220.000	Left	15.000	4.500	
CH.22+	380.000	Right	15.000	4.500	
CH.0+	260.000	Right	15.000	4.500	Ngong Rd. J/C Approach Rd.
Total			225.000	67.500	

Calculation Sheet

Mattress

    1. Mattress for Drain, t=300mm (m2)

      Area = 3.00 x 5.00 x no.

    2. Rock Backfill (m3)

      Volume = 3.00 x 5.00 x no. x 0.30

Matress

5.8 Subsoil Drain

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Subsoildrain				
1.Excavation	0.6x0.6x1,265	455.400	m3	
2.Rock Backfill	(0.6x0.6-0.1x0.1x 3.1416)x1,265	416.185	m3	
3.Filter Fabric	0.6x4x1,265	3,036.000	m2	
4.Pipe (200mm Dia.)	1x1,265	1,265.000	m	
Subsoildrain				
1.Excavation				
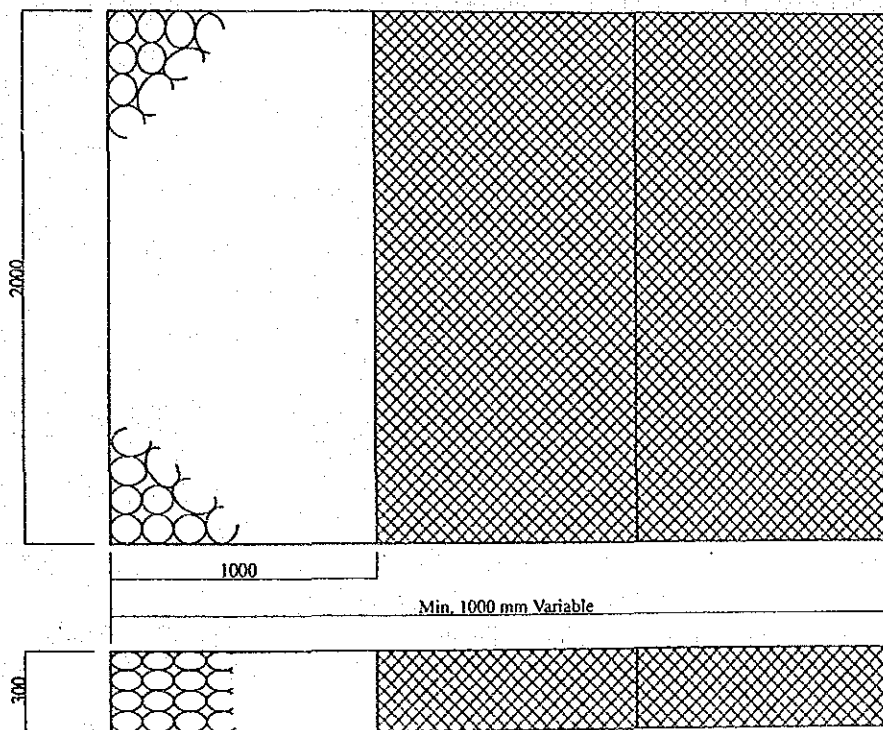
Calculation Sheet

Subsoil Drain

1. Excavation (m3)

   Volume = 0.60 x 0.60 x Length

2. Rock Backfill (m3)

   Volume = $0.60^2 - 0.10^2$ x 3.14 x Length

3. Filter Fabric (m2)

   Area = 0.60 x 4 x Length

4. Pipe, Dia.200mm (m)

600

600

200 mm ⌀ PVC PIPE

200

FILTER FABRIC   ROCKFILL

120° 120°

120°

200

20   20

320
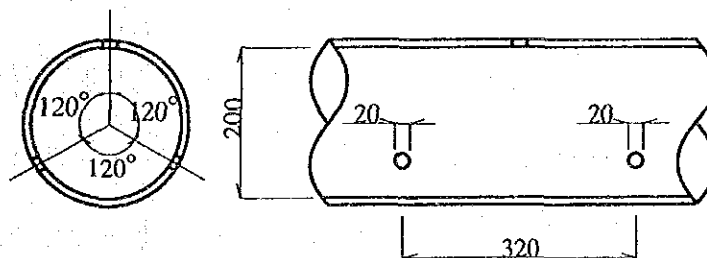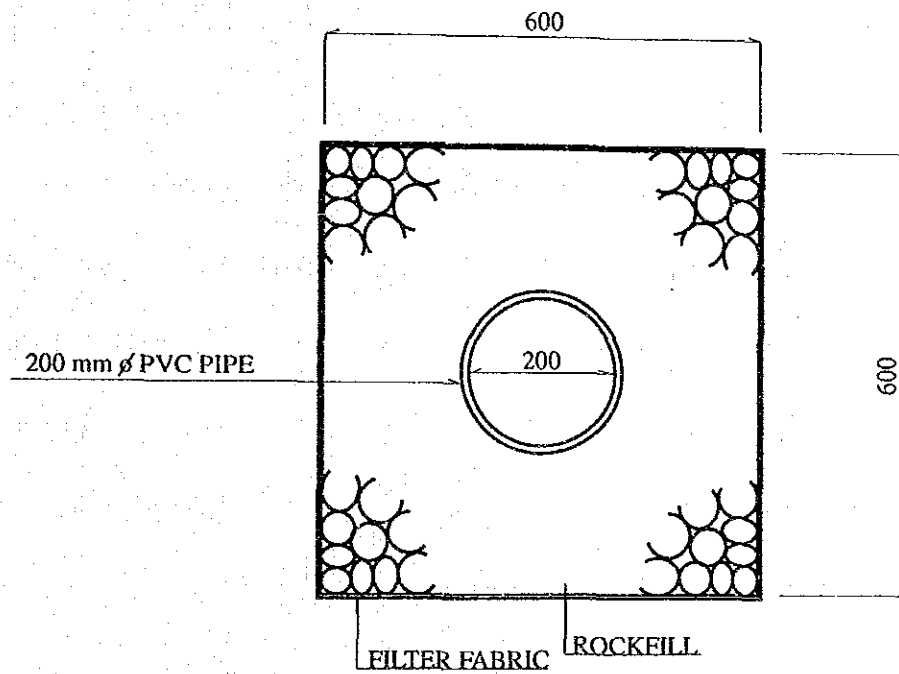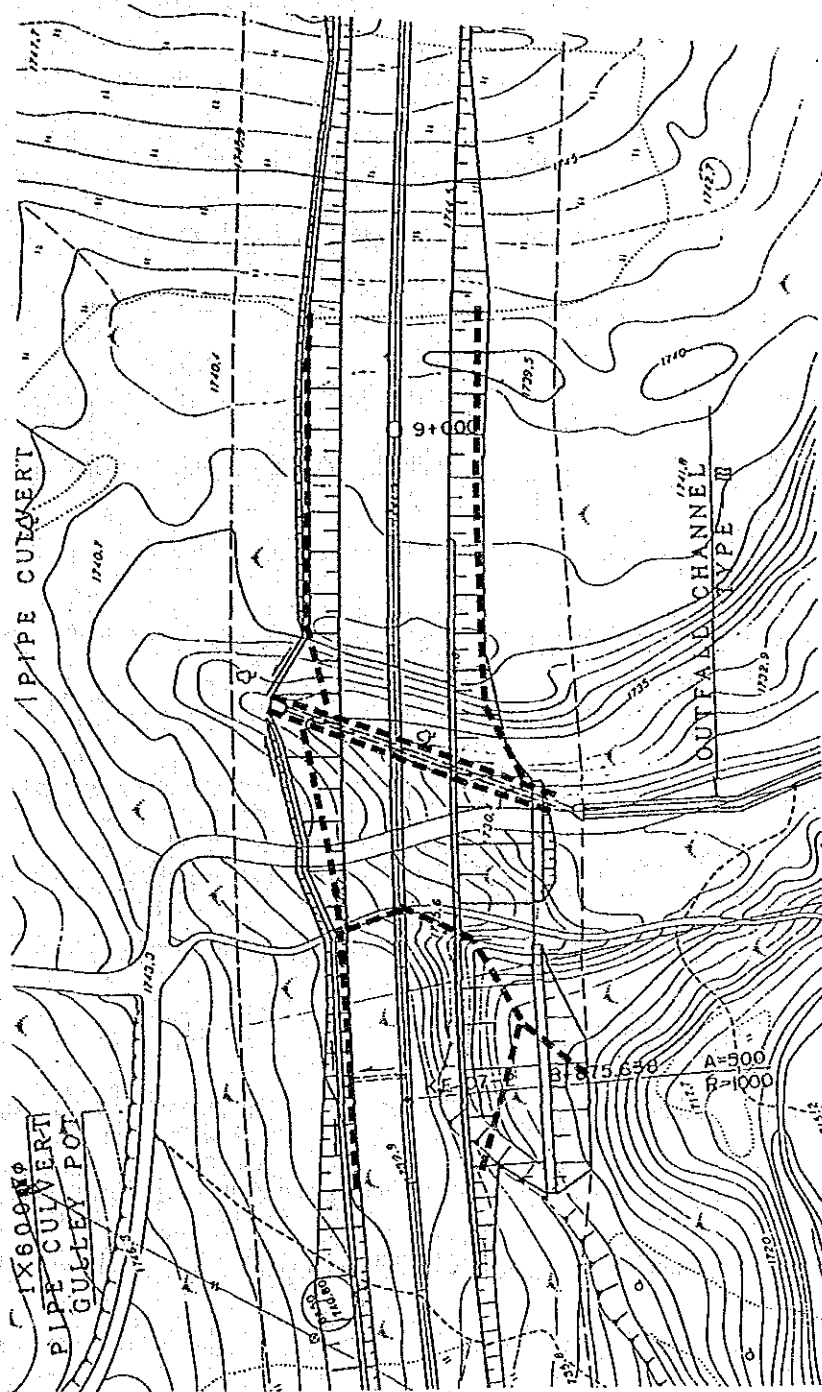
Subsoil Drain

Location of Subsoil Drain (1/2)

Location of Subsoil Drain (2/2)

Subsoil Drain

5.9 Drain at Busbay

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Drain at Busbay				
1.Concrete Kerb Inlet	2 x 2 x 8	32.000	nos.	
2.Precast Intake Channel Block	2 x 2 x 8	32.000	nos.	
3.Concrete Drain	2 x 2 x 1.5 x 8	48.000	m	
Drain at Busbay				
1.Concrete Kerb Inlet	2 x 2 x 8			

GENERAL LAYOUT STANDARD BUS BAY

5.9.3

PLAN

CONCRETE DRAIN

CONCRETE KERB INLET

PRECAST INTAKE CHANNEL BLOCK

125

150

50

100 100

SECTION E-E

SHOULDER MATERIAL

SLOPE SAME AS SHOULDER SLOPE.

CONCRETE GUTTER

25 100

50

75

100

SECTION A — A

Y 6 AT 200 C:C

REINFORCED CONCRETE COVER

SLAB (395mm WIDE)

CONCRETE CLASS 15

100 50 100

150

250

600

FRONT ELEVATION

600

250

100

400

PLAN

CONCRETE KERB INLET

150

125

400

5.10 Drainage Pond

ITEM	CALCULATION	QUANTITY	UNIT	REMARKS
Drainage Pond				
1.Excavation				
1.1.Soft Material	(53x53+35x35)x4.5/2	9,076.500	m3	
1.2.Hard Material	-	0.000	m3	
1.3.Top Soil	61x61	3,721.000	m2	
1.4.Clearing	65x65	4,225.000	m2	
2.Earth Dike	(2+4)x1.0/2x59x4	708.000	m3	
3.Grouted Stone Pitching(150mm)	(1) $(1+2x\sqrt{5})x6+1x2x2+(2x\sqrt{5}\,x2/2)$ =41.305 (2) $(1+2x\sqrt{5})x2+1x2x2+(2x\sqrt{5}\,x2)$ =23.889 (3) $7.826x(1+2x\sqrt{0.2x0.2+2x2}\,)$ =39.286	104.480	m2	
4.Grassing	$(2+2x\sqrt{5}\,)x59x4$	1,527.424	m2	
5. Mattress(300mm)	7x6	42.000	m2	
6.Rockfill	7x6x0.3	12.600	m3	
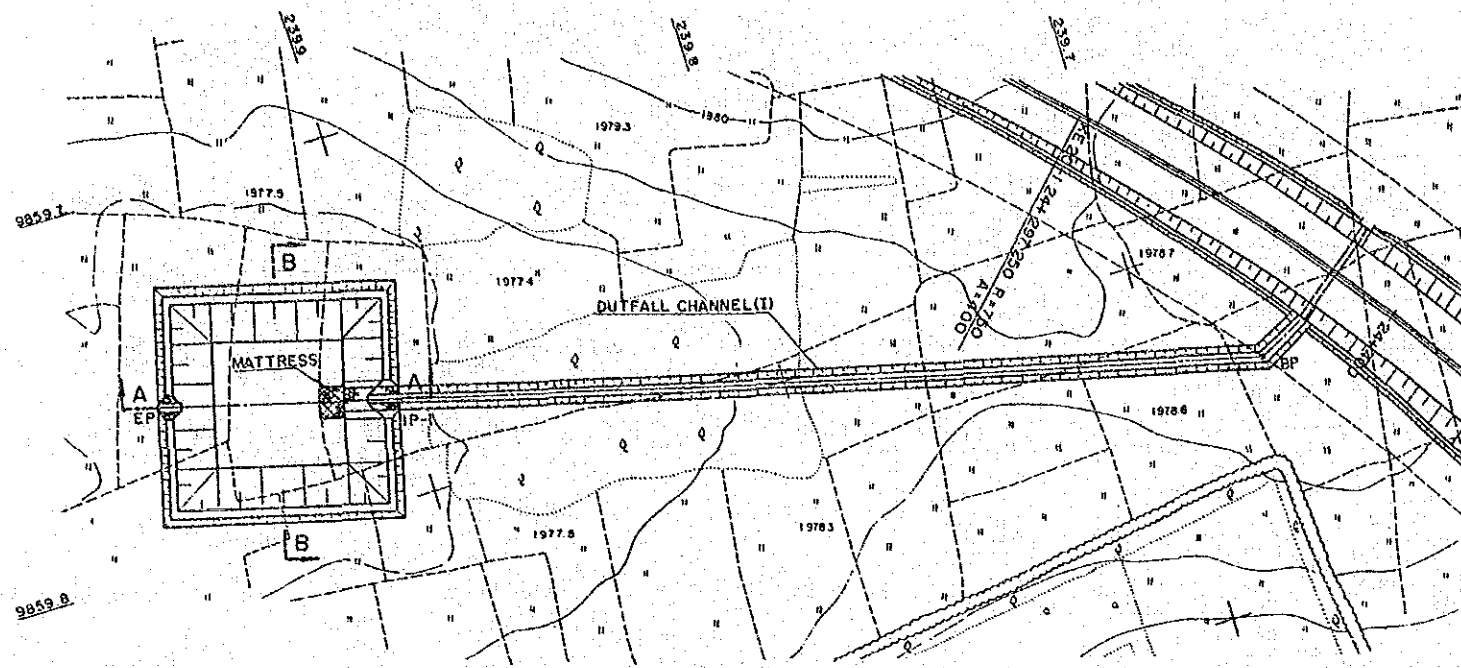
DRAINAGE POND PLAN

SCALE 1:1000

OUTFALL CHANNEL (I)

MATTRESS

B

A

EP

BP

A

B

2000 11000   35 000   11 000 2000

1977.0

A-A SECTION
SCALE 1:500

MATTRESS

C"   D"

2000 11000   35 000   11 000 2000

1977.0

B-B SECTION

SCALE 1:500

2 000

15mm GROUTED
STONE PITCHING

1:2

5.500

2 000

1:2

150mm GROUTED
STONE PITCHING

MATTRESS

5.500

7 000

2 000 1000 2 000

1:2

150mm GROUTED
STONE PITCHING
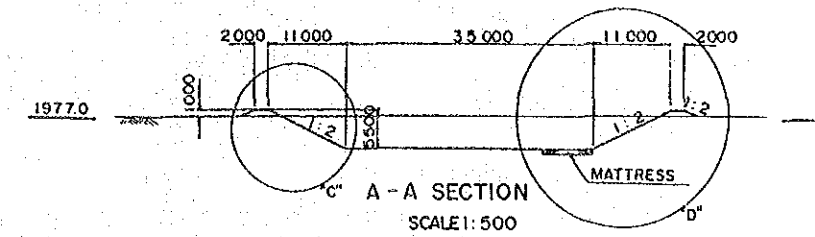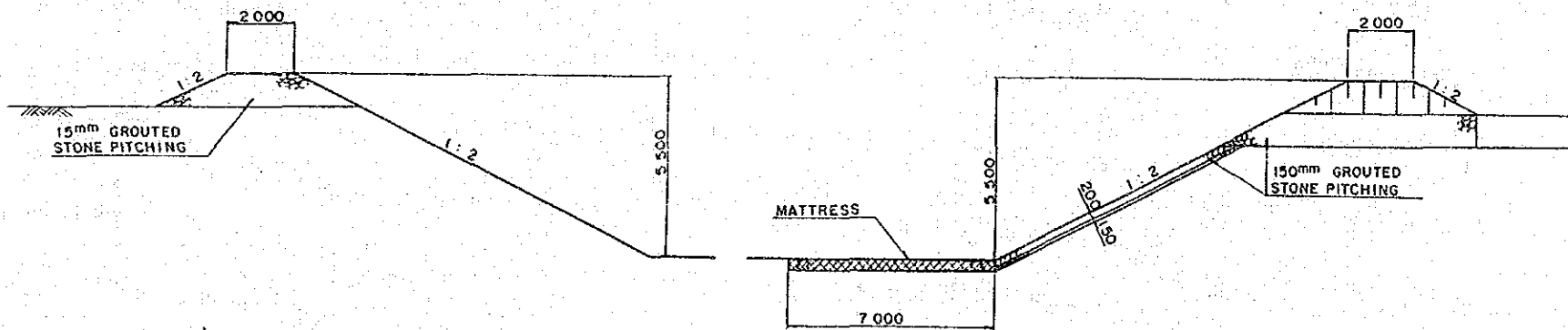
FRONT ELEVATION

DETAIL OF "C"

SCALE 1:100

4 000   1000   4 000

1:10   1:10

150mm GROUTED
STONE PITCHING

6 000
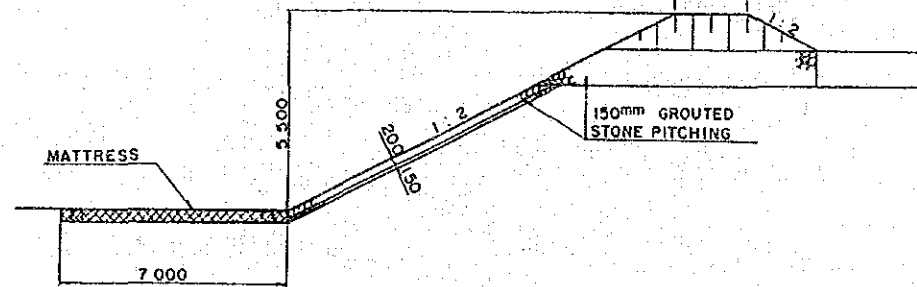
MATTRESS

FRONT ELEVATION

DETAIL OF "D"

SCALE 1:100

2 000

1 000

MIN 1000 TO VARIABLE

300
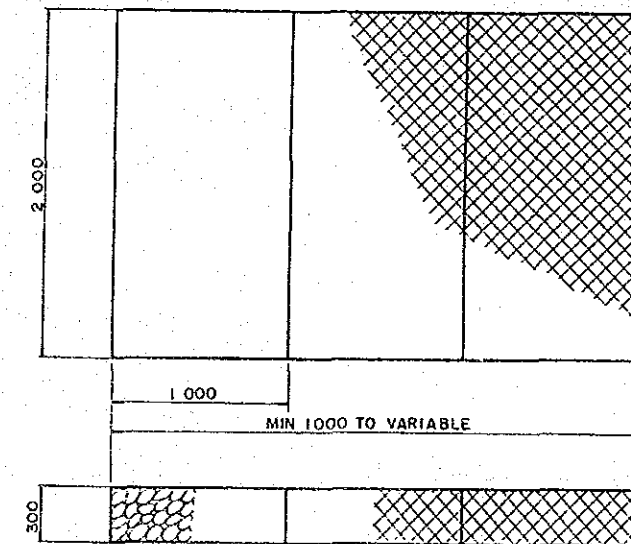
MATTRESS

SCALE 1:200

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. MATTRESS SHALL BE MADE OF A GALVANIZED STEEL WELDMESH WITH
   WIRE DIAMETRE OF AT LEAST 2.5mm AND A MESH SIZE OF MAXIMUM
   100×120.
   THE GALVANIZING SHALL COMPLY WITH B.S 443.

5.10.3