

APPENDIX 5E

EVALUATION OF REINFORCEMENT OPTIONS

EVALUATION OF REINFORCEMENT OPTIONS

1. STUDY ASSUMPTIONS

1.1 Water Demand and its Distribution

The average daily water consumption in CMC was approximately 128,000 m³ in December 1999. Assuming that the current NRW in CMC is 54%,

- Average day demand = $128,000 / 0.46 = 278,260 \text{ m}^3$
- Maximum day demand = $278,260 \times 1.1 = 306,086 \text{ m}^3$

Water billing system in CMC is divided into a total of 3,000 small areas called “Pack Number”, and the code number designating each Pack Number is marked on 1/5,000 scaled pipeline maps and maintained by the Area Office of NWSDB. Amount of the water consumption in each “Pack Number” area in CB1, CB2, CB3 districts has been identified and assigned as the nodal water demand for the purpose of hydraulic network analysis.

1.2 Pipeline Network Structure

A pipeline network structure has been formulated by electrically scanning a total of 125 sheets of 1/1,000 scaled pipeline network maps and by integrating them in the computer. From the network structure map, main distribution pipes 300 mm and over in size were identified and used for the network analysis.

1.3 C-values

C-values are initially estimated from the age of pipes and later modified based on the result of pipe assessment carried out by the Study Team. Values used in this study are shown in Table 1.

Table 1 C-Values

Dia. (inch)	C values according to the respective pipe age			
	scraped within last 15 years	less than 20 years	20 to 50 years	more than 50 years
3	85	95	60	50
4	90	100	70	55
5	95	100	75	55
6		100	75	60
7		100	75	60
8		100	80	60
9		100	80	65
10		100	80	65
12		100	80	65
14		100	80	70
15		105	85	70
16		105	85	70
18		105	85	70
20		105	85	70
24 to 60		110	87	75

2. HYDRAULIC NETWORK ANALYSIS

Hydraulic analysis was conducted base on the following assumptions.

- i) Without transmission main tapping.
- ii) Without booster pumping stations in operation.
- iii) Above 300 mm dia. considered except in critical pipelines.
- iv) Supply from four reservoirs namely Ellie House, Maligakanda, Jubilee and Dehiwala to CMC is considered.

Hydraulic analyses were conducted for the following four cases.

Case 1: Existing Condition (without any reinforcement)

Case 2: SAPS Recommendation (reinforcement according to SAPS recommendations)

Case 3: Modified SAPS Recommendation (partial modifications to SAPS recommendations)

Case 4: Modified SAPS Recommendation (partial modifications to SAPS recommendations)

Locations of additional pipelines to be reinforced under Cases 2, 3 and 4 are shown in the following Table 2.

Table 2 Reinforcement Pipelines

Dia. (mm)	Length (m)	Location of Reinforcing Mains		
		Case2	Case 3	Case 4
500	1,100	Port Access Rd.	Port Access Rd.	Port Access Rd.
450	2,300	Prince of Wales Ave., Vajiragnana Mawatha	Prince of Wales Ave.	Prince of Wales Ave.
400	1,500	Ward Place	Blumendhal Rd., Skinners Rd., Central Rd.	St. James Peiris Mawatha
350	400	Stace Rd.	Stace Rd.	Stace Rd.
300	3,500	Fergusons Rd., Vajiragnana Mawatha, Saranapala Himi Mawatha	Fergusons Rd., Saranapala Himi Mawatha, Center Rd.	Fergusons Rd., Saranapala Himi Mawatha
Total	8,800			

2.1 Case 1 (Existing Condition)

Existing condition was analysed in Case 1. No reinforcement pipe was therefore considered. The existing main distribution network is shown in Figure 1. The results of the hydraulic analysis are presented in Table 3.

2.2 Case 2 (SAPS Recommendation)

In this Case 2, reinforcement pipelines are assumed to be exactly the same as that recommended by the SAPS Study as shown in Figure 2. The results of the hydraulic analysis are provided in Table 4.

2.3 Case 3

In this Case 3, reinforcement pipelines are assumed to be installed at the locations shown in Figure 3. The results of the hydraulic analysis are provided in Table 5.

2.4 Case 4

In this Case 4, reinforcement pipelines are assumed to be installed at the locations shown in Figure 4. The results of the hydraulic analysis are provided in Table 6.

3. CONCLUSION

Hydraulic analysis on Case 1 (Existing Condition) indicates that water supply condition in terms of system pressure is the poorest in CB1 area. The following table provides a summary of system pressures in each of the three billing districts.

Area	Pressure Range (m)
CB1	2 to 10
CB2	7 to 13
CB3	15 to 20

It is therefore obvious that the reinforcement of water supply to CB1 district is most urgent. Table 7 following highlights the system pressures at important locations of CMC distribution pipe network.

Table 7 System Pressure at Important Locations in CMC

Node No.	Water Pressure (m)			
	Case 1	Case 2	Case 3	Case 4
4	9.83	13.8	13.6	13.8
18	6.89	10.1	9.8	9.8
19	-9.45	16.4	15.9	16.4
21	5.62	9.3	10.6	9.2
42	-2.55	14.3	8.9	8.9
53	.84	7.9	7.8	8.6
57	8.69	12.3	11.6	11.3
58	14.47	13.4	15.3	15.2
67	0.99	7.8	7.5	8.1

Table 8 provides the advantages and disadvantages of each alternative case. It is judged from the table that Case 2 (SAPS Recommendation) will most efficiently improve water supply in CMC, in particular in CB1 district. Therefore it is concluded that Case-2 is the most favorable option among the three alternatives studied.

Table 8 Advantages and Disadvantages of Each Option

Reinforcements	Case 2	Case 3	Case4	Remarks
1) Port Access Road, Prince of Wales Avenue, Furgusion Road pipe reinforcements in all three cases.	Improve the system pressure in the Northern part of CMC marginally in comparison to the existing condition.	Improve the system pressure in the Northern part of CMC marginally in comparison to the existing condition.	Improve the system pressure in the Northern part of CMC marginally in comparison to the existing condition.	Refer to Node 4
2) Vajiraghana Mawatha Reinforcement is considered in SAPS Recommendation not in other two cases.	Improve the system pressure in the Middle part of Base line rd of CMC appreciably from the existing condition.	Medium improvement the system pressure in the Middle part of Base line rd of CMC from the existing condition	Medium Improvement the system pressure in the Middle part of Base line rd of CMC from the existing condition.	Refer to Node 42
3) Saranapala Himi Mawatha pipe Reinforcements considered in all three cases	Improve the system pressure in the Saranapala Himi Mawatha area appreciably in CMC.	Improve the system pressure in the Saranapala Himi Mawatha area appreciably in CMC.	Improve the system pressure in the Saranapala Himi Mawatha area appreciably in CMC.	Refer to Node 481
4) Ward Place Pipe Reinforcement Considered only in SAPS Recommended case.	Improve the system pressure marginally in the central area of CMC	No Improvement in the system pressure in the central CMC	No Improvement in the system pressure in the central CMC	Refer to Node57
5) Bluemedhal ,Central Road pipe reinforcements are considered only in Case 3 without Vajiraghana Mawatha and Ward Place Reinforcements recommendation	No Improvement of the system pressure in North Central part of CMC	Marginal Improvement of the system pressure in North Central part of CMC	No Improvement of the system pressure in North Central part of CMC	Refer to Node 21
6) James Peiris Mawatha Reinforcements considered only in case 4 instead of the Vajiraghana Mawatha and Ward Place Reinforcements recommended in SAPS	No Improvement of the system pressure in West part of CMC	No Improvement of the system pressure in West part of CMC	Marginal Improvement of the system pressure in West part of CMC	Refer to Node 53 & 67

CASE -1



FIG. 1

Case - 1 (Existing Pipe Network in CMC)

SCALE

Not to Scale

JICA STUDY TEAM

THE DETAILED DESIGN STUDY ON THE PROJECT FOR REDUCTION OF
NON-REVENUE WATER IN THE GREATER COLOMBO AREA IN THE
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

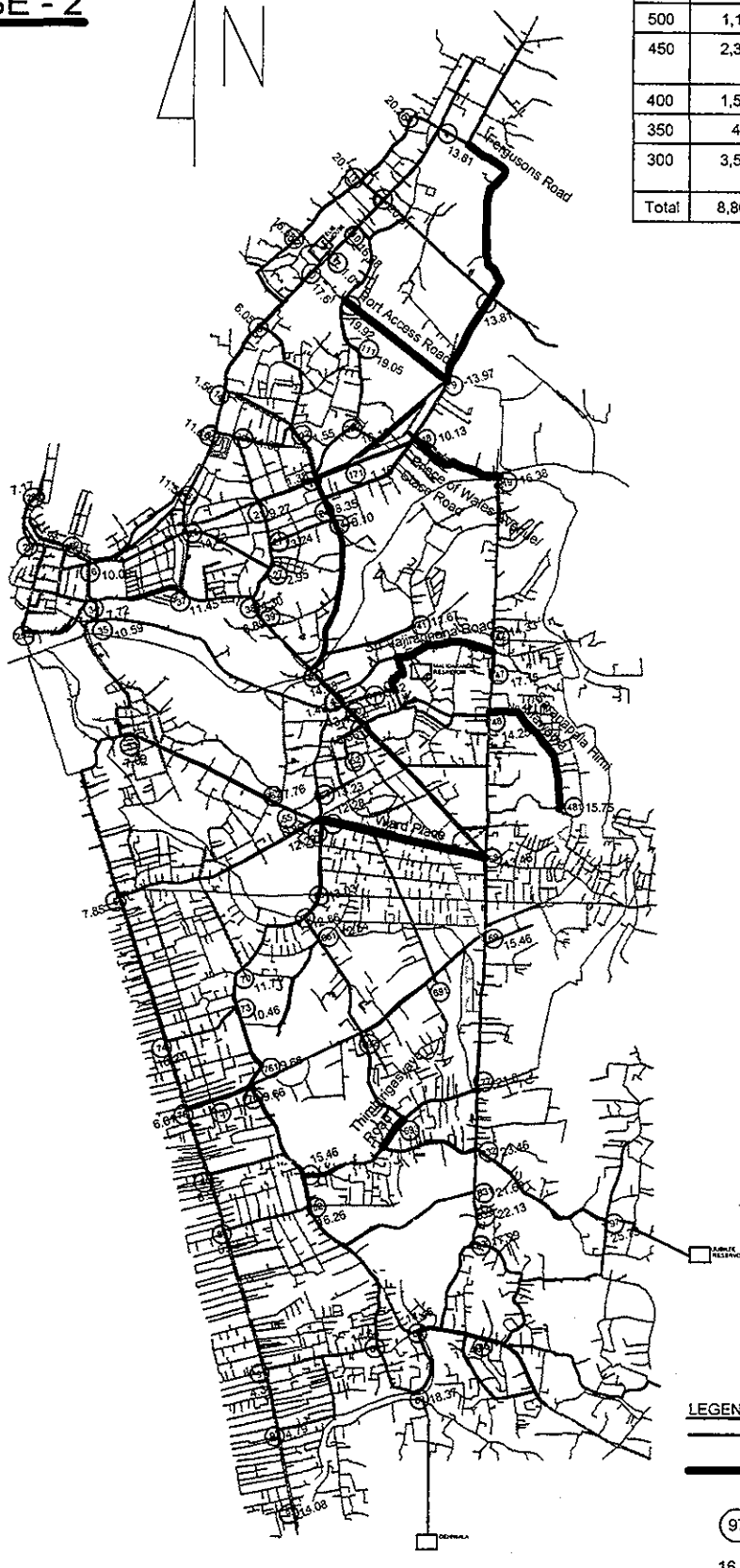
Table 3 Calculation Result of Case 1

Node	Node Type	Demand (l/s)	Elevation (m)	b	Net Pressure (m)	Output from Source (m ³ /s)	Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
1		9.88	3.1	22.07	18.97		50		21.68	7.3	20.54	13.24	
10		0.00	6.5	24.24	17.74		51		29.95	7.3	20.28	12.98	
101		0.00	8.0	22.35	14.35		53		155.14	6.7	14.33	7.63	
102		0.00	6.5	22.33	15.83		54		0.00	6.3	19.32	13.02	
11		0.00	4.0	24.14	20.14		55		78.59	7.4	14.04	6.64	
111		15.00	3.6	22.94	19.34		56		20.38	7.7	19.31	11.61	
12		52.99	8.0	19.48	11.48		57		142.34	7.7	19.28	11.58	
13		10.06	13.5	19.49	5.99		58		0.00	8.0	23.25	15.25	
131		16.26	18.0	19.82	1.82		6		0.00	24.0	24.30	0.30	
132		0.00	18.0	19.49	1.49		65		7.17	6.9	19.24	12.34	
14		10.91	18.0	19.49	1.49		66		0.00	0.0	18.17	18.17	
171		19.97	18.1	19.36	1.26		662		134.66	4.2	11.72	7.52	
18		73.73	10.0	20.65	10.65		67		0.00	7.3	14.86	7.56	
19		20.17	3.5	-13.73	-17.23		68		17.18	6.6	18.80	12.20	
2		0.00	3.1	22.00	18.90		681		13.90	6.9	18.78	11.88	
20		20.07	7.8	19.42	11.62		69		0.00	8.0	24.56	16.56	
201		0.00	8.0	19.31	11.31		7		18.20	23.2	24.29	1.11	
21		22.86	10.0	19.23	9.23		70		31.49	4.5	15.81	11.31	
22		26.62	18.0	19.38	1.38		73		41.73	5.0	15.14	10.14	
222		0.00	4.0	20.65	16.65		74		0.00	5.0	14.92	9.92	
24		72.70	11.1	19.12	8.02		75		61.70	8.5	14.84	6.34	
241		0.00	11.0	19.34	8.34		76		20.02	6.1	15.50	9.40	
25		2.97	4.6	19.14	14.54		761		0.00	6.1	15.50	9.40	
26		58.88	4.0	13.90	9.90		77		0.00	5.0	27.22	22.22	
261		13.39	7.8	19.27	11.47		775		0.00	6.1	28.18	22.08	
27		3.30	16.3	19.15	2.85		78		41.22	6.8	22.28	15.48	
271		0.00	16.0	19.15	3.15		781		0.00	7.0	25.60	18.60	
272		0.00	16.0	19.28	3.28		79		0.00	7.5	15.40	7.90	
28		36.35	3.0	-12.11	-15.11		80		59.65	8.6	14.90	6.30	
29		38.40	4.1	9.88	5.78		81		42.50	7.8	13.76	5.96	
291		46.08	2.8	9.88	7.08		810		3.81	7.8	24.26	16.46	
3		3.12	3.1	22.08	18.98		82		56.32	6.0	22.28	16.28	
34		115.20	6.0	13.78	7.78		83		7.83	7.8	25.85	18.05	
35		61.95	6.6	17.10	10.50		831		12.88	4.8	26.58	21.78	
37		42.75	4.7	16.06	11.36		832		21.89	4.6	28.18	23.58	
38		8.99	15.0	19.19	4.19		833		16.79	4.1	26.31	22.21	
39		16.64	10.5	19.28	8.78		85		32.26	9.0	23.48	14.48	
4		3.87	9.8	21.88	12.08		86		20.40	6.0	23.42	17.42	
40		49.66	5.0	19.54	14.54		873		23.53	6.0	23.43	17.43	
41		0.00	8.0	19.37	11.37		88		0.00	8.0	22.65	14.65	
42		62.72	7.4	7.91	0.51		89		5.55	5.0	23.38	18.38	
43		35.07	18.5	19.81	1.31		9		8.01	10.0	21.01	11.01	
441		6.35	18.5	21.87	3.37		90		445.44	3.0	7.93	4.93	
442		0.00	18.5	22.56	4.06		91		3.10	4.2	8.50	4.30	
443		0.00	18.5	21.67	3.17		92		46.85	4.5	9.25	4.75	
46		0.00	10.0	22.79	12.79		93		0.00	4.5	18.57	14.07	
47		0.00	5.0	14.03	9.03		94		0.00	3.8	24.31	20.51	
48		18.38	8.5	22.60	14.10		96		0.00	25.0	31.86	6.86	
5		9.86	9.8	21.88	12.08		97		7.45	4.7	30.48	25.78	
							DEHI	Reservoir	0.00	16.0	25.00	9.00	480.43
							DEHIWAL		0.00	16.0	24.94	8.94	
							ELLI	Reservoir	0.00	16.0	25.00	9.00	462.13
							JUBILEE	Reservoir	0.00	28.0	32.00	4.00	501.24
							MALI		0.00	20.0	22.79	2.79	
							MALIGA	Reservoir	0.00	16.0	23.00	7.00	1210.95

CASE - 2



Dia mm	Length, m	Road Name
500	1,100	Port Access Road
450	2,300	Prince of Wales Avenue, Vajiragnana Mawatha
400	1,500	Ward Place
350	400	Stace Road
300	3,500	Fergusons Road, Vajiragnana Mawatha Saranapala Himi Mawatha
Total	8,800	



LEGEND

	MAIN DISTRIBUTION PIPE
	PROPOSED PIPE REINFORCEMENT (BY SAPS REPORT)
	NODE NUMBER OF MAIN DISTRIBUTION PIPE
16.88	AVAILABLE HEAD, m

FIG. 5B-2	Case - 2
SCALE	Not to Scale
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Table 4 Calculation Result of Case 2

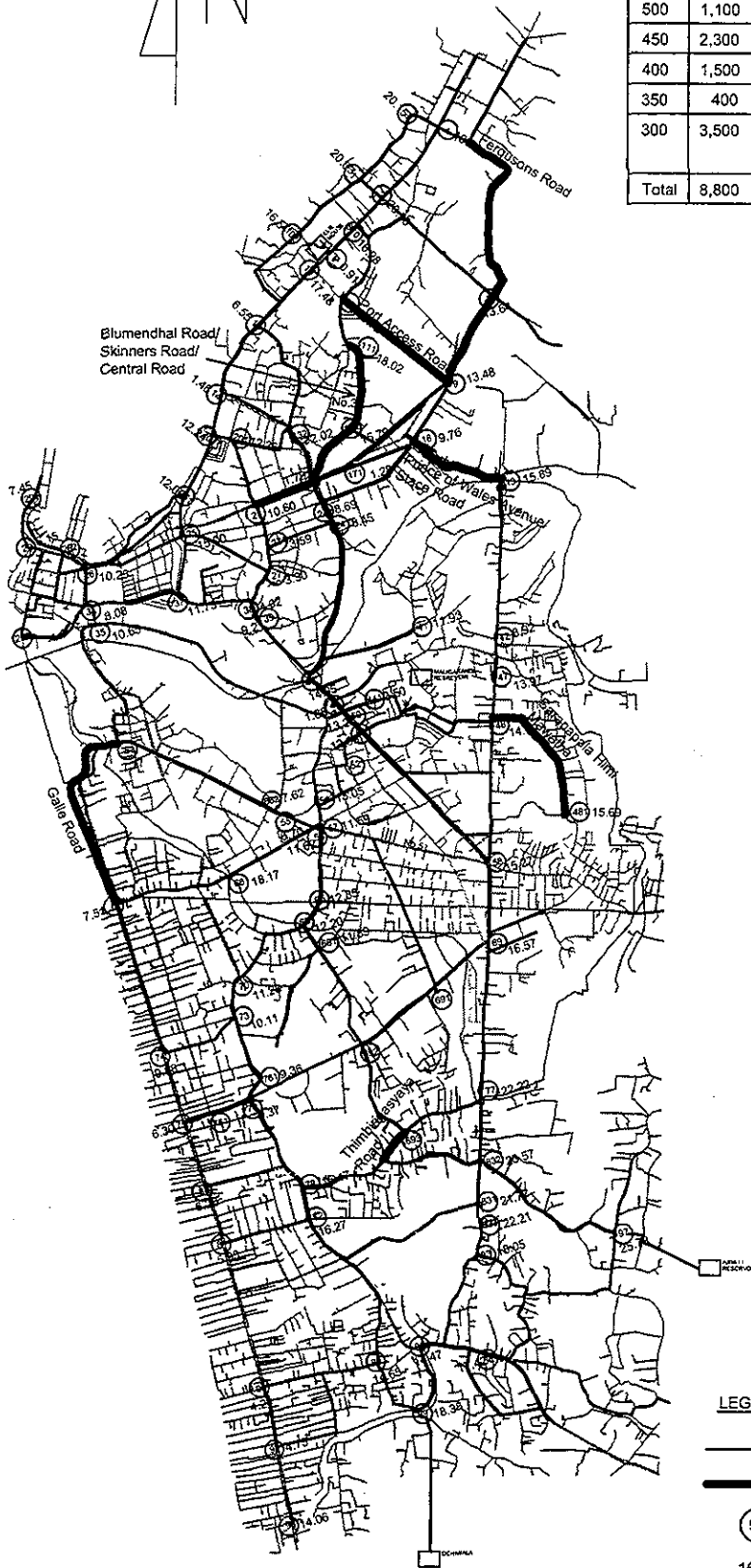
Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
1		9.88	3.1	23.21	20.11	
10		0.00	6.5	24.10	17.60	
101		0.00	8.0	22.71	14.71	
102		0.00	6.5	23.05	16.55	
11		0.00	4.0	23.92	19.92	
111		15.00	3.6	22.65	19.05	
12		52.99	8.0	19.55	11.55	
13		10.06	13.5	19.55	6.05	
131		16.26	18.0	19.86	1.86	
132		0.00	18.0	19.55	1.55	
14		10.91	18.0	19.56	1.56	
171		19.97	18.1	19.26	1.16	
18		73.73	10.0	20.13	10.13	
19		20.17	3.5	19.88	16.38	
2		0.00	3.1	23.36	20.26	
20		20.07	7.8	19.49	11.69	
201		0.00	8.0	19.36	11.36	
21		22.86	10.0	19.27	9.27	
22		26.62	18.0	19.38	1.38	
222		0.00	4.0	20.13	16.13	
24		72.70	11.1	19.20	8.10	
241		0.00	11.0	19.35	8.35	
25		2.97	4.6	19.23	14.63	
26		58.88	4.0	14.00	10.00	
261		13.39	7.8	19.34	11.54	
27		3.30	16.3	19.25	2.95	
271		0.00	16.0	19.24	3.24	
272		0.00	16.0	19.39	3.39	
28		36.35	3.0	18.46	15.46	
29		38.40	4.1	9.97	5.87	
291		46.08	2.8	9.97	7.17	
3		3.12	3.1	23.61	20.51	
34		115.20	6.0	13.87	7.87	
35		61.95	6.6	17.19	10.59	
37		42.75	4.7	16.15	11.45	
38		8.99	15.0	19.30	4.30	
39		16.64	10.5	19.39	8.89	
4		3.87	9.8	23.61	13.81	
40		49.66	5.0	19.68	14.68	
41		0.00	8.0	19.67	11.67	
42		62.72	7.4	21.73	14.33	
43		35.07	18.5	19.93	1.43	
441		6.35	18.5	21.92	3.42	
442		0.00	18.5	22.59	4.09	
443		0.00	18.5	21.85	3.35	
46		0.00	10.0	22.80	12.80	
47		0.00	5.0	22.15	17.15	
48		18.38	8.5	22.75	14.25	
481		0.00	7.0	22.75	15.75	
5		9.86	9.8	23.61	13.81	

Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
50		21.68	7.3	20.75	13.45	
51		29.95	7.3	20.66	13.36	
53		155.14	6.7	14.59	7.89	
54		0.00	6.3	19.53	13.23	
55		78.59	7.4	14.26	6.86	
56		20.38	7.7	19.99	12.29	
57		142.34	7.7	19.98	12.28	
58		0.00	8.0	21.45	13.45	
6		0.00	24.0	24.20	0.20	
65		7.17	6.9	19.93	13.03	
66		0.00	0.0	18.75	18.75	
662		134.66	4.2	11.96	7.76	
67		0.00	7.3	15.15	7.85	
68		17.18	6.6	19.46	12.86	
681		13.90	6.9	19.44	12.54	
69		0.00	8.0	23.34	15.34	
7		18.20	23.2	24.19	1.01	
70		31.49	4.5	16.21	11.71	
73		41.73	5.0	15.46	10.46	
74		0.00	5.0	15.21	10.21	
75		61.70	8.5	15.11	6.61	
76		20.02	6.1	15.76	9.66	
761		0.00	6.1	15.76	9.66	
77		0.00	5.0	26.80	21.80	
775		0.00	6.1	28.06	21.96	
78		41.22	6.8	22.26	15.46	
781		0.00	7.0	25.45	18.45	
79		0.00	7.5	15.64	8.14	
80		59.65	8.6	15.15	6.55	
81		42.50	7.8	13.93	6.13	
810		3.81	7.8	24.18	16.38	
82		56.32	6.0	22.26	16.26	
83		7.83	7.8	25.79	17.99	
831		12.88	4.8	26.49	21.69	
832		21.89	4.6	28.06	23.46	
833		16.79	4.1	26.23	22.13	
85		32.26	9.0	23.46	14.46	
86		20.40	6.0	23.40	17.40	
873		23.53	6.0	23.41	17.41	
88		0.00	8.0	22.64	14.64	
89		5.55	5.0	23.37	18.37	
9		8.01	10.0	23.65	13.65	
90		445.44	3.0	7.95	4.95	
91		3.10	4.2	8.54	4.34	
92		46.85	4.5	9.29	4.79	
93		0.00	4.5	18.58	14.08	
94		0.00	3.8	24.31	20.51	
96		0.00	25.0	31.86	6.86	
97		7.45	4.7	30.43	25.73	
DEHI	Reservoir	0.00	16.0	25.00	9.00	481.81
DEHIWAL		0.00	16.0	24.94	8.94	
ELLI	Reservoir	0.00	16.0	25.00	9.00	492.36
JUBILEE	Reservoir	0.00	28.0	32.00	4.00	508.92
MALI		0.00	20.0	22.80	2.80	
MALIGA	Reservoir	0.00	16.0	23.00	7.00	1171.65

CASE -3



Dia mm	Length, m	Road Name
500	1,100	Port Access Road
450	2,300	Prince of Wales Avenue
400	1,500	Blumendhal Road, Skinners Rd, Central Road
350	400	Stace Road
300	3,500	Fergusons Road, Saranapala Himi Mawatha Center Road, Galle Road
Total	8,800	



LEGEND

	MAIN DISTRIBUTION PIPE
	PROPOSED PIPE REINFORCEMENT
	NODE NUMBER OF MAIN DISTRIBUTION PIPE
16.88	AVAILABLE HEAD, m

FIG. 3	Case-3
SCALE	Not to Scale
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Table 5 Calculation Result of Case 3

Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
1		9.88	3.1	23.13	20.03	
10		0.00	6.5	23.98	17.48	
101		0.00	8.0	22.78	14.78	
102		0.00	6.5	23.04	16.54	
11		0.00	4.0	23.72	19.72	
111		15.00	3.6	21.62	18.02	
12		52.99	8.0	20.04	12.04	
13		10.06	13.5	20.05	6.55	
131		16.26	18.0	20.25	2.25	
132		0.00	18.0	20.02	2.02	
14		10.91	18.0	20.07	2.07	
171		19.97	18.1	19.38	1.28	
18		73.73	10.0	19.76	9.76	
19		20.17	3.5	19.39	15.89	
2		0.00	3.1	23.25	20.15	
20		20.07	7.8	20.04	12.24	
201		0.00	8.0	20.36	12.36	
21		22.86	10.0	20.60	10.60	
22		26.62	18.0	19.79	1.79	
222		0.00	4.0	19.79	15.79	
24		72.70	11.1	19.55	8.45	
241		0.00	11.0	19.69	8.69	
25		2.97	4.6	19.60	15.00	
26		58.88	4.0	14.25	10.25	
261		13.39	7.8	19.80	12.00	
27		3.30	16.3	19.60	3.30	
271		0.00	16.0	19.59	3.59	
272		0.00	16.0	19.71	3.71	
28		36.35	3.0	16.25	13.25	
29		38.40	4.1	10.25	6.15	
291		46.08	2.8	10.25	7.45	
3		3.12	3.1	23.46	20.36	
34		115.20	6.0	14.08	8.08	
35		61.95	6.6	17.25	10.65	
37		42.75	4.7	16.43	11.73	
38		8.99	15.0	19.62	4.62	
39		16.64	10.5	19.71	9.21	
4		3.87	9.8	23.44	13.64	
40		49.66	5.0	19.95	14.95	
41		0.00	8.0	19.93	11.93	
42		62.72	7.4	16.32	8.92	
43		35.07	18.5	20.18	1.68	
441		6.35	18.5	22.00	3.50	
442		0.00	18.5	22.58	4.08	
443		0.00	18.5	21.69	3.19	
46		0.00	10.0	22.81	12.81	
47		0.00	5.0	18.97	13.97	
48		18.38	8.5	22.69	14.19	
481		0.00	7.0	22.69	15.69	
5		9.86	9.8	23.44	13.64	

1005.15

Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
50		21.68	7.3	20.57	13.27	
51		29.95	7.3	20.29	12.99	
53		155.14	6.7	14.47	7.77	
54		0.00	6.3	19.35	13.05	
55		78.59	7.4	14.10	6.70	
56		20.38	7.7	19.32	11.62	
57		142.34	7.7	19.29	11.59	
58		0.00	8.0	23.27	15.27	
6		0.00	24.0	24.10	0.10	
65		7.17	6.9	19.25	12.35	
66		0.00	0.0	18.17	18.17	
662		134.66	4.2	11.82	7.62	
67		0.00	7.3	14.81	7.51	
68		17.18	6.6	18.80	12.20	
681		13.90	6.9	18.79	11.89	
69		0.00	8.0	24.57	16.57	
7		18.20	23.2	24.09	0.91	
70		31.49	4.5	15.78	11.28	
73		41.73	5.0	15.11	10.11	
74		0.00	5.0	14.88	9.88	
75		61.70	8.5	14.80	6.30	
76		20.02	6.1	15.47	9.37	
761		0.00	6.1	15.46	9.36	
77		0.00	5.0	27.22	22.22	
775		0.00	6.1	28.17	22.07	
78		41.22	6.8	22.27	15.47	
781		0.00	7.0	25.60	18.60	
79		0.00	7.5	15.36	7.86	
80		59.65	8.6	14.86	6.26	
81		42.50	7.8	13.73	5.93	
810		3.81	7.8	24.08	16.28	
82		56.32	6.0	22.27	16.27	
83		7.83	7.8	25.85	18.05	
831		12.88	4.8	26.57	21.77	
832		21.89	4.6	28.17	23.57	
833		16.79	4.1	26.31	22.21	
85		32.26	9.0	23.47	14.47	
86		20.40	6.0	23.42	17.42	
873		23.53	6.0	23.43	17.43	
88		0.00	8.0	22.65	14.65	
89		5.55	5.0	23.38	18.38	
9		8.01	10.0	23.48	13.48	
90		445.44	3.0	7.92	4.92	
91		3.10	4.2	8.49	4.29	
92		46.85	4.5	9.25	4.75	
93		0.00	4.5	18.56	14.06	
94		0.00	3.8	24.31	20.51	
96		0.00	25.0	31.86	6.86	
97		7.45	4.7	30.48	25.78	
DEHI	Reservoir	0.00	16.0	25.00	9.00	480.81
DEHIWAL		0.00	16.0	24.94	8.94	
ELLI	Reservoir	0.00	16.0	25.00	9.00	521.00
JUBILEE	Reservoir	0.00	28.0	32.00	4.00	501.30
MALI		0.00	20.0	22.81	2.81	
MALIGA	Reservoir	0.00	16.0	23.00	7.00	1151.63

1649.61

CASE -4



Dia mm	Length, m	Name of Road
500	1,100	Port Access Road
450	2,300	Prince of Wales Avenue
400	1,500	Sir James Peiris Mawatha
350	400	Stace Road
300	3,500	Fergusons Road, Saranapala Himi Mawatha
Total	8,800	

LEGEND





-  MAIN DISTRIBUTION PIPE
-  PROPOSED PIPE REINFORCEMENT
-  NODE NUMBER OF MAIN DISTRIBUTION PIPE
-  AVAILABLE HEAD, m

FIG. 4	Case-4
SCALE	Not to Scale
JICA STUDY TEAM THE DETAILED DESIGN STUDY ON THE PROJECT FOR REDUCTION OF NON-REVENUE WATER IN THE GREATER COLOMBO AREA IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA	

Table 6 Calculation Result of Case 4

Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)	Node	Node Type	Demand (l/s)	Elevation (m)	Gross Pressure (m)	Net Pressure (m)	Output from Source (m ³ /s)
1		9.88	3.1	23.17	20.07		50		21.68	7.3	20.57	13.27	
10		0.00	6.5	24.08	17.58		51		29.95	7.3	20.10	12.80	
101		0.00	8.0	22.66	14.66		53		155.14	6.7	15.31	8.61	
102		0.00	6.5	23.01	16.51		54		0.00	6.3	19.40	13.10	
11		0.00	4.0	23.88	19.88		55		78.59	7.4	14.39	6.99	
111		15.00	3.6	22.54	18.94		56		20.38	7.7	19.00	11.30	
12		52.99	8.0	19.47	11.47		57		142.34	7.7	18.97	11.27	
13		10.06	13.5	19.47	5.97		58		0.00	8.0	23.20	15.20	
131		16.26	18.0	19.78	1.78		6		0.00	24.0	24.17	0.17	
132		0.00	18.0	19.46	1.46		65		7.17	6.9	18.94	12.04	
14		10.91	18.0	19.48	1.48		66		0.00	0.0	16.41	16.41	
171		19.97	18.1	19.10	1.00		662		134.66	4.2	12.31	8.11	
18		73.73	10.0	19.83	9.83		67		0.00	7.3	15.39	8.09	
19		20.17	3.5	19.45	15.95		68		17.18	6.6	18.54	11.94	
2		0.00	3.1	23.32	20.22		681		13.90	6.9	18.53	11.63	
20		20.07	7.8	19.41	11.61		69		0.00	8.0	24.53	16.53	
201		0.00	8.0	19.27	11.27		7		18.20	23.2	24.16	0.98	
21		22.86	10.0	19.17	9.17		70		31.49	4.5	16.03	11.53	
22		26.62	18.0	19.27	1.27		73		41.73	5.0	15.53	10.53	
222		0.00	4.0	19.83	15.83		74		0.00	5.0	15.40	10.40	
24		72.70	11.1	19.12	8.02		75		61.70	8.5	15.30	6.80	
241		0.00	11.0	19.24	8.24		76		20.02	6.1	15.89	9.79	
25		2.97	4.6	19.15	14.55		761		0.00	6.1	15.89	9.79	
26		58.88	4.0	14.00	10.00		77		0.00	5.0	27.22	22.22	
261		13.39	7.8	19.26	11.46		775		0.00	6.1	28.19	22.09	
27		3.30	16.3	19.17	2.87		78		41.22	6.8	22.36	15.56	
271		0.00	16.0	19.16	3.16		781		0.00	7.0	25.63	18.63	
272		0.00	16.0	19.32	3.32		79		0.00	7.5	15.80	8.30	
28		36.35	3.0	16.25	13.25		80		59.65	8.6	15.33	6.73	
29		38.40	4.1	9.97	5.87		81		42.50	7.8	14.07	6.27	
291		46.08	2.8	9.97	7.17		810		3.81	7.8	24.16	16.36	
3		3.12	3.1	23.57	20.47		82		56.32	6.0	22.36	16.36	
34		115.20	6.0	13.90	7.90		83		7.83	7.8	25.87	18.07	
35		61.95	6.6	17.34	10.74		831		12.88	4.8	26.60	21.80	
37		42.75	4.7	16.13	11.43		832		21.89	4.6	28.19	23.59	
38		8.99	15.0	19.22	4.22		833		16.79	4.1	26.33	22.23	
39		16.64	10.5	19.32	8.82		85		32.26	9.0	23.50	14.50	
4		3.87	9.8	23.57	13.77		86		20.40	6.0	23.45	17.45	
40		49.66	5.0	19.60	14.60		873		23.53	6.0	23.46	17.46	
41		0.00	8.0	19.59	11.59		88		0.00	8.0	22.69	14.69	
42		62.72	7.4	16.31	8.91		89		5.55	5.0	23.41	18.41	
43		35.07	18.5	19.87	1.37		9		8.01	10.0	23.61	13.61	
441		6.35	18.5	21.89	3.39		90		445.44	3.0	8.02	5.02	
442		0.00	18.5	22.57	4.07		91		3.10	4.2	8.61	4.41	
443		0.00	18.5	21.60	3.10		92		46.85	4.5	9.35	4.85	
46		0.00	10.0	22.80	12.80		93		0.00	4.5	18.61	14.11	
47		0.00	5.0	18.97	13.97		94		0.00	3.8	24.32	20.52	
48		18.38	8.5	22.69	14.19		96		0.00	25.0	31.86	6.86	
481		0.00	7.0	22.69	15.69		97		7.45	4.7	30.48	25.78	
5		9.86	9.8	23.57	13.77		DEHI	Reservoir	0.00	16.0	25.00	9.00	476.12
							DEHIWAL		0.00	16.0	24.94	8.94	
							ELLI	Reservoir	0.00	16.0	25.00	9.00	499.87
							JUBILEE	Reservoir	0.00	28.0	32.00	4.00	500.23
							MALI		0.00	20.0	22.80	2.80	
							MALIGA	Reservoir	0.00	16.0	23.00	7.00	1178.52

CHAPTER 8

APPENDIX 8A

COST RELATED INFORMATION

COST RELATED INFORMATION

1. Exchange Rates

The following exchange rates (effective as of 16 August 2000) are used in cost estimates.

Japanese Yen (¥) 1.0 = Sri Lanka Rupee (Rs.) 0.727

Sri Lanka Rupee (Rs.) 1.0 = Japanese Yen (¥) 1.37552

United States Dollar (US\$) 1.0 = Sri Lanka Rupee (Rs.) 79.47

United Kingdom Pound (UK£) 1.0 = Sri Lanka Rupee (Rs.) 119.0

2. Consulting Service for Project Implementation

The total cost required for consulting services is estimated at Japanese Yen 389,177,139 as shown in Figure 1.

3. Price Escalation and Physical Contingencies

For Civil Works contract, allowances for price escalation and physical contingencies have been included in the "Preliminary and General Requirements" of Bill of Quantities as Provisional Sums.

For other two contracts, no allowance has been included given the nature and the small size of the contracts.

4. Interest During Construction and Service Charge

The following interest rates and service charges have been included in the cost estimate.

- For contracts for Civil Works, Leak Repair Works and Low Income Settlement Environmental Improvement: 1.3% per annum (Interest Rate) + 0.1% (Service Charge) = 1.4%
- For Consulting Services: 0.75% (Interest Rate) + 0.1% (Service Charge) = 0.85%

5. Project Administration Cost

1.5% of the total value of the three contracts (excluding custom duties, GST, etc) is taken as the project administration cost.

6. Land Acquisition Cost

The following costs have been included for land acquisition.

- Maligakanda site: 0.36 ha x Rs. 40,000,000/ha = Rs. 14,400,000
- Gothatuwa site: 0.23 ha x Rs. 24,000,000/ha = Rs. 5,520,000

It is assumed that these land will be acquired by NWSDB in the year 2001.

7. Project Cost and Breakdown

The total cost and its breakdown estimated for the Project are summarized as follows:

Project Cost	L/C (Rs.)	F/C (Yen)	Total (Yen)
JBIC Loan Part	1,929,433,374	1,660,510,651	4,314,498,601
NWSDB Part	569,603,326	0	783,500,767
Total	2,499,046,700	1,660,510,651	5,097,999,368

Details of Project Cost are presented in Table 1.

8. Disbursement Schedules of JBIC Loan and Project Cost

Disbursement of JBIC loan and Total Project Cost has been estimated as follows:

Project Cost	(1,000 yen)						
	2001	2002	2003	2004	2005	2006	Total
JBIC Loan Part	7,850	514,358	1,182,019	1,415,647	724,322	470,303	4,314,499
NWSDB Part	33,872	74,298	198,853	276,100	193,906	6,472	783,501
Total	41,722	588,656	1,380,872	1,691,747	918,228	476,775	5,098,000

Details of the above estimate are provided in Table 2.

9. Methodologies and Assumptions Used for Cost Estimate

Methodologies and assumptions used for estimate other than those mentioned above are presented in Annex.

Figure 1 Engineering and Personnel Cost Breakdowns for Consulting Services for Project Implementation 1 of 2

Positions/resources	Service provider	Required man months												Total Man-Months	F/C Yen	L/C Rs.	Total Yen	
		2001	2002	2003	2004	2005	2006	2007	F	L								
1) PROJECT MANAGEMENT OFFICE																		
1-1 Tendering (LCB)																		
1-2 Tendering (LCB)																		
Consultant Services - Team Leader	Foreign Consultant	1	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Assistant Team Leader - scheduling, documentation, cost control	local consultant	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
O&M Engineer - manuals, and training	Foreign Consultant	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Secretary/typist (2)	local consultant	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
office boy																		
per diems F/C																		
car rentals (1)																		
2) MALIGAKANDA and ELLIE HOUSE RESERVOIRS																		
Sub-team leader - civil/structural engineer	Foreign Consultant	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
per diems																		
car rentals (1)																		
2-1 Maligakanda Office Building																		
Resident - civil/structural engineer	Local Consultant	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2-2 Maligakanda New Reservoir	Local Consultant	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
2-3a Maligakanda roof rehabilitation	Local Consultant	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
structural engineer	Local Consultant																	
architect	Local Consultant																	
electrical engineer	Local Consultant																	
mechanical engineer	Local Consultant																	
pipng engineer	Local Consultant																	
construction inspectors - structural (1)	Local Consultant																	
construction inspector - electrical	Local Consultant																	
construction inspector - mechanical	Local Consultant																	
construction inspector - building trades	Local Consultant																	
2-3b Structural appraisal old Maligakanda reservoir	Local Consultant	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
construction inspector - piping	Local Consultant																	
structural engineer - appraisal and rehabilitation specialist	Local Consultant																	
structural engineer	Local Consultant																	
geotechnical engineer	Local Consultant																	
per diems																		
car rentals (1)																		
2-4 Ellie House Reservoir																		
Resident - civil/structural engineer	Local Consultant	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
pipe engineer	Local Consultant																	
structural engineer	Local Consultant																	
architect	Local Consultant																	
electrical engineer	Local Consultant																	
mechanical engineer	Local Consultant																	
construction inspector - structural (1)	Local Consultant																	
construction inspector - electrical/mechanical	Local Consultant																	
construction inspector - piping	Local Consultant																	

Figure 1 Engineering and Personnel Cost Breakdowns for Consulting Services for Project Implementation 2 of 2

Positions/resources	Service provider	Required man months												Total Man-Months F L	F/C Yen	L/C Rs.	Total Yen	
		2001	2002	2003	2004	2005	2006	2007										
3) WATER SUPPLY ENHANCEMENT IN KOTIKAWATTE and MULLERIYAWA AREA																		
3.1 Transmission main	Foreign Consultant																	
3.2 Gohhalawa-Kolonnawa Pump House	Local Consultant																	
3.3 Gohhalawa Reservoir, pump house and tower	Local Consultant																	
3.4 Gohhalawa Distribution mains	Local Consultant																	
Sub-team leader - civil/structural engineer	Foreign Consultant																	
Resident - civil/structural engineer	Local Consultant																	
mechanical engineer	Foreign Consultant																	
electrical engineer	Local Consultant																	
pipeline engineer	Foreign Consultant																	
architect	Local Consultant																	
construction inspector - structural (1)	Local Consultant																	
construction inspector - electrical/mechanical	Local Consultant																	
construction inspectors - piping (2)	Local Consultant																	
per diems F/C	Local Consultant																	
car rentals (2)	Local Consultant																	
4) REHABILITATION AND REINFORCEMENT OF MEDIUM AND LARGE DIAMETER PIPE NETWORK																		
rehabilitation	Local Consultant																	
reinforcement	Local Consultant																	
Sub-team leader - water supply/pipeline engineer	Local Consultant																	
Assistant Resident Engineer	Local Consultant																	
pipe snapping and relining inspectors (4)	Local Consultant																	
pipe laying inspectors (4)	Local Consultant																	
CAD Operators (2)	Local Consultant																	
per diems F/C	Local Consultant																	
car rentals	Local Consultant																	
5) REHABILITATION/REPLACEMENT OF SMALL DIAMETER DISTRIBUTION MAINS																		
rehabilitation	Local Consultant																	
reinforcement	Local Consultant																	
pipe snapping and relining inspectors (4)	Local Consultant																	
pipe laying inspectors (4)	Local Consultant																	
CAD Operators (3)	Local Consultant																	
per diems F/C	Local Consultant																	
car rentals	Local Consultant																	
6) IMPLEMENTATION of NRW REDUCTION																		
6-1 Leak Repair Works	Foreign																	
6-2 Low Income Settlement Environmental Improvements	local consultant																	
6-3 Supply of materials and equipment	local consultants																	
6-4 Advisory and management services on NRW Program	Local Consultant/NGO																	
Technical adviser - NRW/Water supply engineer	Foreign																	
Project Engineer	local consultant																	
Technical assistants (2)	local consultants																	
Sociologists (3)	Local Consultant/NGO																	
per diems F/C	Local Consultant/NGO																	
car rentals (1)	Local Consultant/NGO																	
Cost for Consulting Services																		
Plus misc. cost allowances (e.g. travel, testing, soils, courier, printing, office supplies,																		
TOTAL COST OF SERVICES DURING CONSTRUCTION																		

Table 1 Project Cost

Work Item	L/C (Rs.)	F/C (Yen)	Total (Yen)
A. CIVIL WORKS CONTRACT			
A1 PRELIMINARY AND GENERAL WORKS	388,460,150	5,250,000	539,584,706
A2 CONSTRUCTION AND REHABILITATION OF RESERVOIRS			
A2.1 Maligakanda Office Building	91,334,906	33,940,268	159,573,238
A2.2 Maligakanda New Reservoir	139,881,456	97,964,133	290,373,873
A2.3 Rehabilitation of the Roof Structure of the Existing Maligakanda Reservoir	141,630,170	48,901,144	243,716,275
A2.4 Reconstruction of Ellie House Reservoir	338,636,849	159,133,260	625,017,550
<i>Sub-total for Item A2</i>	<i>711,543,381</i>	<i>339,938,805</i>	<i>1,318,680,956</i>
A3 WATER SUPPLY ENHANCEMENT IN KOTIKAWATTE AND MULLEIYAWA AREA			
A3.1 Gothatuwa-Kolonmawa Pump House	38,123,877	149,531,001	201,971,156
A3.2 Gothatuwa Transmission Main	27,138,818	126,167,374	163,497,361
A3.3 Gothatuwa Ground Reservoir and Pump House	78,981,179	125,608,858	234,249,049
A3.4 Gothatuwa New Water Tower	24,718,092	12,561,273	46,561,503
A3.5 Distribution Mains in Kotikawatte and Mulleiyawa Area	60,021,423	117,453,020	200,013,688
<i>Sub-total for Item A3</i>	<i>228,983,389</i>	<i>531,321,526</i>	<i>846,292,757</i>
A4 REHABILITATION/REINFORCEMENT OF MEDIUM AND LARGE DIAMETER PIPE NETWORK IN CMC AREA			
A4.1 Rehabilitation of Existing Mains	183,399,508	67,776,285	320,045,976
A4.2 Reinforcement Mains and Replacement of Valves	33,269,371	104,380,092	150,142,777
<i>Sub-total for Item A4</i>	<i>216,668,879</i>	<i>172,156,377</i>	<i>470,188,733</i>
A5 REHABILITATION/REPLACEMENT OF SMALL DIAMETER DISTRIBUTION MAINS IN CB1 AREA			
A5.1 Rehabilitation of Existing Mains	42,566,527	25,255,174	83,806,283
A5.2 Replacement of Existing Mains, Service Connections and Valves	90,858,240	66,141,242	191,118,568
<i>Sub-total for Item A5</i>	<i>133,424,767</i>	<i>91,396,416</i>	<i>274,924,852</i>
A6 SUPPLY OF MATERIALS AND EQUIPMENT FOR REDUCTION OF NRW	15,252,825	102,512,198	123,492,764
<i>Sub-total for A. Civil Works Contract</i>	<i>1,694,333,391</i>	<i>1,242,575,322</i>	<i>3,573,164,788</i>
B. LEAK REPAIR WORKS CONTRACT	104,068,062	11,701,811	154,849,512
C. LOW INCOME SETTLEMENT ENVIRONMENTAL IMPROVEMENT CONTRACT	14,139,121	808,969	20,257,613
<i>Total for Three Contracts (A + B + C)</i>	<i>1,812,540,574</i>	<i>1,255,086,102</i>	<i>3,748,271,912</i>
D. CONSULTING SERVICE	116,902,800	228,375,000	389,177,139
E. INTEREST DURING CONSTRUCTION AND SERVICE CHARGE	0	177,049,549	177,049,549
<i>SUB-TOTAL FOR JBIC LOAN/PART</i>	<i>1,929,443,374</i>	<i>1,660,510,651</i>	<i>4,314,498,601</i>
F. PROJECT ADMINISTRATION COST	47,049,519	0	64,717,555
G. LAND ACQUISITION COST	19,920,000	0	27,400,358
H. CUSTOM DUTIES FOR CIVIL WORKS CONTRACT	170,729,139	0	234,841,345
I. CUSTOM DUTIES FOR LEAK REPAIR WORKS CONTRACT	6,751,956	0	9,287,451
J. CUSTOM DUTIES FOR LOW INCOME SETTLEMENT CONTRACT	442,005	0	607,987
K. GST FOR CIVIL WORKS CONTACT	324,710,707	0	446,646,072
<i>SUB-TOTAL FOR NHSDDB PART</i>	<i>569,603,326</i>	<i>0</i>	<i>783,500,767</i>
TOTAL PROJECT COST	2,499,046,700	1,660,510,651	5,097,999,368

Table 2 Disbursement Schedule of JBIC Loan and Total Project Cost

Work Item	Total (Yen)	2001 (Yen)	2002 (Yen)	2003 (Yen)	2004 (Yen)	2005 (Yen)	2006 (Yen)
A) Total Civil Works Contract							
A1) Preliminary and general works	539,584,706	0	161,875,412	107,916,941	107,916,941	107,916,941	53,950,471
A2) Construction and rehabilitation of reservoirs							
2-1 Maitigakanda Office Building	159,573,258	0	15,957,326	87,765,292	55,850,640	0	0
2-2 Maitigakanda New Reservoir	290,373,873	0	0	87,112,162	203,261,711	0	0
2-3 Rehabilitation of the roof structure of the existing Maitigakanda reservoir	243,716,275	0	0	0	0	85,300,696	158,415,579
2-4 Reconstruction of Ellis House reservoir	625,017,550	0	31,250,878	156,254,388	156,254,388	156,254,388	125,003,510
A3) Water supply enhancement in Kotikawatte and Mulleriyawa Area							
3-1 Gohatuxa-Kolonnawa pump house	201,971,156	0	0	90,887,020	111,084,136	0	0
3-2 Gohatuxa transmission main	163,487,361	0	16,349,736	89,923,549	57,224,076	0	0
3-3 Gohatuxa ground reservoir and pump house	234,249,045	0	0	93,699,630	140,549,429	0	0
3-4 Gohatuxa new water tower	46,561,502	0	0	0	9,312,301	37,249,202	0
3-5 Distribution mains in Kotikawatte and Mulleriyawa area	200,013,888	0	0	60,004,106	120,008,213	20,001,369	0
A4) Rehabilitation/reinforcement of medium and large diameter pipe network in CMC							
4-1 rehabilitation of existing mains	320,045,976	0	32,004,598	96,013,793	96,013,793	96,013,793	0
4-2 reinforcement mains and replacement of valves	150,142,777	0	0	52,549,972	97,592,805	0	0
A5) Rehabilitation/replacement of small diameter distribution mains in CB1 area							
5-1 rehabilitation of existing mains	83,806,203	0	0	33,522,513	33,522,513	16,761,257	0
5-2 replacement of existing mains, service connections and valves	191,118,568	0	0	38,223,714	57,335,570	57,335,570	38,223,714
A6) Supply of materials and equipment for reduction of non-revenue water	123,492,764	0	123,492,764	0	0	0	0
<i>sub-total for civil works</i>	3,573,164,787	0	380,930,713	993,873,069	1,245,926,517	576,833,216	375,601,273
B) Leak Repair Works Contract	154,849,512	0	77,424,756	77,424,756	0	0	0
C) Low Income Settlement Environmental Improvement Contract	20,297,613	0	10,128,807	10,128,807	0	0	0
<i>sub-total for contracts A) + B) + C)</i>	3,748,271,912	0	468,484,275	1,081,426,631	1,245,926,517	576,833,216	375,601,273
<i>1.4 %/year - interest and service charge on amount disbursed for construction</i>	167,092,452	0	5,559,780	21,698,753	39,141,724	47,217,388	52,475,907
b) Consulting Services	389,177,139	7,763,543	38,917,714	77,835,428	128,428,456	97,294,285	38,917,714
<i>0.85 %/year - interest and service charge on amount disbursed for consulting services</i>	9,957,097	66,160	396,961	1,058,562	2,150,204	2,977,205	3,308,006
<i>sub-total for disbursement of JBIC loan part</i>	4,314,499,600	7,849,703	514,357,730	1,182,019,374	1,415,646,900	724,322,095	470,302,799
Administration costs	64,717,479	6,471,748	12,943,496	12,943,496	12,943,496	12,943,496	6,471,748
Land Acquisition Cost	27,400,358	27,400,358	0	0	0	0	0
Custom duties for civil works	234,841,345	0	11,742,067	46,969,269	129,162,740	46,969,269	0
Custom duties for leak repairs	9,287,451	0	4,643,726	4,643,726	0	0	0
Custom duties for low income settlements	607,987	0	303,994	303,994	0	0	0
GST for civil works	446,646,072	0	44,664,607	133,993,822	133,993,822	133,993,822	0
<i>sub-total for disbursement of NWSDB part</i>	763,500,692	33,872,106	74,297,689	198,853,305	276,100,057	193,905,566	6,471,748
F) Total Project Cost	5,097,999,292	41,721,809	588,655,619	1,380,872,679	1,691,746,957	918,227,681	476,774,547

ANNEX

METHODOLOGIES AND ASSUMPTIONS USED FOR COST ESTIMATE

- **Basic Approach**
- **Devaluation Rate of Sri Lankan Rupee**
- **Preliminaries**
- **Goods and Service Tax (GST)**
- **Custom Duty**
- **Road Reinstatement**
- **Power Supply**
- **Supply and Laying of DI Pipes, Fittings and Valves**
- **Supply and Laying of PVC Pipes, Fittings and Valves**
- **Rates for Laying of PVC and DI Pipes, Fittings and Valves**
- **Unit Prices for Basic Construction Materials**
- **Unit Rates for Labour**
- **Unit Rates for Buildings**
- **Unit Rates for Demolition**
- **Unit Rates for Civil Structures**
- **Unit Rates for Daywork**

METHODOLOGIES AND ASSUMPTIONS USED FOR COST ESTIMATE

Basic Approach

The basic approach adopted in preparation of the engineer's estimate was the development of rates for each and every item in the Bill of Quantities in respect of each category of works.

Devaluation Rate of Sri Lankan Rupee

The devaluation of Sri Lanka Rupee (SLRs.) against US Dollar for the last five years is as follows.

Devaluation of Sri Lanka Rupee Against US Dollar

Year	1995	1996	1997	1998	1999	2000
Parity rate, SLRs./US\$	51.25	55.27	58.99	64.59	70.39	79.47
Yearly devaluation, SLRs.		4.02	3.72	5.60	5.80	9.08
Devaluation Rate, %		7.80	6.73	9.50	9.00	12.90

Source : Central Bank of Sri Lanka, Bulletin

Average devaluation rate is assumed as 10% and is used for price escalation of imported items.

Preliminaries

The cost of contractor's preliminaries was estimated by studying and reviewing of such estimates for similar projects recently implemented by the NWSDB.

Goods and Services Tax (GST)

The present figure of 12.5% has been used to estimate the GST component. As far as the contract is concerned GST on works items only will be reimbursed to the contractor. With regard to supply items the contractor will be required to estimate the relevant GST component and include it in the custom duty column in respect of each of the supply items.

Custom Duty

The rates used in computing custom duty component were obtained from the Custom Tariff Guide 1996 (Imports and Exports) and allowance had been made for the National Security Levy (NSL) at 6.5%. The GST component was estimated in accordance with the Operational Instructions issued by the Deputy Director of Customs dated 30 March 1998.

Road Reinstatement

An amount was included in the cost estimate for repairing roads owned by RDA, PRDA and PS, which would get damaged during construction. These amounts are reflected as provisional sums in the BOQ. The contractor is required to make payments direct to the relevant authorities and get them reimbursed by the NWSDB.

Road reinstatement cost is obtained from road authorities namely, Road Development Authority (RDA), CMC, Provincial RDA and Pradesiya Sabha (PS).

For CMC roads contractor shall carry out the permanent road reinstatement and is included in the Contract price.

My No RDA/CE/COL/KMW
Chief Engineer (RDA)'s
Office
Torrington Square
Colombo 7
7 Dec 2000

Project Manager
NWS&DE

**Road Reinstatement in Kotikawatte - Mulleriyawa
Water Supply Enhancement**

Reference your letter No 23rd October 2000 regarding the above matter.


Most of the roads that has been requested for trenching under the above scheme has been rehabilitated recently or repaired extensively in recent years. Therefore the trenching for laying pipe should be done in a manner to minimize the damage.

However, I am forwarding the details of road reinstatement costs of the requested areas.

No	Name of the Road	Trench length	Cost of Reinst
1	Old Awissawella Road	8326m	25,138,700.00
2	Pohilawatte Road	1003m	4,471,900.00
3	Kotikawatte Road	1200m	5,979,000.00
4	Pothgamuwa Road	1300m	3,313,000.00
5	TIP Kolonnawa Road	1443m	2,984,267.00
	Sub Total		41,886,467.00
	GST 11.84		5,135,807.50
	Total Re		47,122,267.50

Action will be taken to grant the permission for trenching work once the above payment is made to RDA.

The cheques should be written in favor of General Manager RDA.


Chief Engineer, Colombo
Colombo
Sri Lanka
2D (Western)
EE Colombo

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50, කිතුල්වත්ත පාර,
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 කොළඹ 08.

50, kitulwatta Road,
 Colombo 8.



Tel : 679652 681684 - 5
 075 - 331392 - 3
 Fax : 681686

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මෙම: மாகாண
 மாகாண வீதி அபிவிருத்தி அதிகாரகபை

WESTERN PROVINCE
 PROVINCIAL ROAD DEVELOPMENT AUTHORITY

ව්‍යාපෘති කළමනාකරු,
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 7/9, ජයන්ති මාවත,
 පැලවත්ත.

කොට්ඨාශයේ මුල්ලේටියාව ප්‍රදේශයේ ජල සැපයුම්
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 හා 2000.11.03 දිනැති ලිපිය සා මැදි.

උක්ත ලිපිය අනුව යෝජිත ජල ව්‍යාපෘති වලදී කැබ්ලි කිරීමට අදහස් කරන පහත සඳහන් මාගේ
 වන අලාභ සහිත වෙනුවෙන් සහස් කරන ලද ඇස්තමේන්තු මේ සමඟ ඉදිරිපත් කරමි.

අදාළ ඇස්තමේන්තු මුදල් මෙම අධිකාරිය වෙත ලබාදීමෙන් පසු කැබ්ලි කිරීමට අනුමැතිය ලබාදිය
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අදාළ වෙන්පත "සභාපති, පළාත්බද මාර්ග සංවර්ධන අධිකාරිය(බ.ප)" නමින් නිකුත් කරන්නේ නම්
 මැනවි.

අධිකාරියේ ලියා පදිංචි භාණ්ඩ හා සේවා මුද් අංකය: 409093094 - 5000 වේ.

මෙම මිල ගණන් 2000 වර්ෂය සඳහා වලංගු වන අතර මින් ඉදිරියට සෑම වර්ෂයක් සඳහාම 25%
 බැගින් වැඩිවන බව සලකන්න.

මාගේ නම ROAD NAME	කැබ්ලි කරන ප්‍රමාණය m ²	ඇස්තමේන්තු මුදල SR
01. වැල්ලේපිටිය - කොටුපිල මාර්ගය (කලපාලු වැව)	වක.මි. 978.75	රු: 1,803,444.75
02. මුත්තියාවත්ත මාර්ගය BRANDIYAWATTIA	වක.මි. 1068.0	රු: 1,967,896.80
03. ගොතුව මාර්ගය (අඹගහ හන්දිය) GOTHAWA	වක.මි. 603.75	රු: 1,112,469.75
04. එම්.ඩී.එච්. ජයවර්ධන මාවත (මාදින්නාගොඩ M.D. JAYAWARDENA පාර)	වක.මි. 1086.0	රු: 2,001,063.60
05. බන්ධාරනායකපුර මාර්ගය (දොඩම්ගහහේන පාර) BANDARANAYAKAPURA	වක.මි. 917.25	රු: 1,690,124.85
06. කොස්වත්ත මාර්ගය (කලපලුවාව ගලහේන පාර) KALAPALU WAWA	වක.මි. 1267.50	රු: 2,335,495.50

ප්‍රධාන, මහාමාර්ග, මුහුණත සහ
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Ministry of Transport Highways Soprts.
 Youth and Women's Affairs
 Western Province

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මාර්ගයේ නම	කැපීම් කරන ප්‍රමාණය	ඇස්තමේන්තු මුදල
07. FEVER HOSPITAL ROAD දේශීය රෝහල මාර්ගය ((අයි.ඩී.එම්.පාර)	වග.මී. 2278.50	රු: 4,198,364.10
08. දෙල්හත්වත්ත මාර්ගය(අංගොඩ කොට්ඨාසය DELGAHAWATA ROAD) පාර)	වග.මී. 995.25	රු: 1,833,847.65
09. වැලිවල මාර්ගය WELI WELA	වග.මී. 538.50	රු: 992,240.10
10. නාගඟවෙල මාර්ගය NAGAHAWELA	වග.මී. 257.25	රු: 474,008.85
11. සිරි සුමන මාවත (අංගොඩ -කැලේමුල්ල ANGODA SIRI SUMANA පාර)	වග.මී. 629.25	රු: 1,159,456.05
12. අංගොඩ මාර්ගය (අංගොඩ රෝහල පාර) ANGODA HOSPITAL ROAD	වග.මී. 2002.80	රු: 3,690,359.28
13. උඩුමුල්ල පාර (හලංගම මුල්ලේරියාව) UDUMULLA ROAD	වග.මී. 1304.25	රු: 2,403,211.05
14. හල්වලයේ පාර (හිතවිකුණර පාර)	වග.මී. 353.25	රු: 650,898.45
15. හිම්බුටාන පාර GAL WALAHENA HIMBUTANA	වග.මී. 4544.85	රු: 8,374,340.61
		රු: 34,687,221.39 =====

.....
 (වි.එස්.මාපා)
 ප්‍රධාන ඉංජිනේරු
 Provincial Road Development Board
 No. 80, Kukulwatta Road
 COLOMBO 08.

2000.12.05.

පිටපත: විධායක ඉංජිනේරු - කොළඹ.

27.08. 998

Mr. N.A.G. Senanayake,
Project Manager,
Head of Section/G.R. Contractd,
Sri Lanka Telecom Limited.

Trenching of roads for telecommunication
Development work in Pradesiya Saba Roads.

With reference to your letter dated 31st July 1998 on to above subject.

(1) According to your Duct route diagram and total lengths of proposed trenching works along our roads as following.

1. <u>Cab 101</u>	Length	2881.00 m.
2. <u>Cab 107</u>	Length	9206.00 m.
3. <u>Cab 107 - 1</u>	Length	4861.00 m.
Total Length		<u>11948.00 m.</u>

(2) Above roads length will be damaged at width of
0.35 (x34%) m
= 0.4725 m.

(3) Total damage of road surface
= 11948.00 x 0.4725
= 5645.43 m²

(4) The rate of re-construction for roads surface

1250/- per sq.m.

Contd. - Panya m. u
සමස්ත වැඩ - ප්‍රදේශීය මාර්ග සංරක්ෂණය සඳහා
සහතික කළේ - ප්‍රදේශීය මාර්ග සංරක්ෂණ සභාව

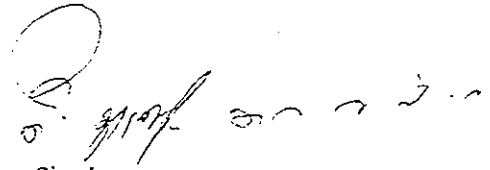
(5)

The total will be paid to Kotikawatta Praderiya Sabaya for roads damages.

5645.43 x 1250.00

= Rs. 7056787.50

(Rupees. Seven Million and Fifty Six thousand and Seven Hundred Eighty Seven and Fifty cents.)



Chairman

Kotikawatta Mulleriyawa Pradesiya Sabawa.

සභාවරයා - මුලාශ්‍රයේ ප්‍රාදේශීය සභාව

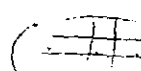
CMC

Reinstatement charges

Carriageway

- 1. Asphalt surfacing road - 1,150.00 / m²
- 2. Metalling & tarring road - 465.00 / m²
- 3.

Footwalk

- 1. Slab paving - 1,065 / m² 
- 2. Metalling & tarring - 465.00 / m²
- 3.

Verge - kerb filling - 83.00 / m² (shoulder)

Kerb laying - ~~75.00~~ 750.00 / m.

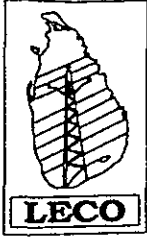
~~slab paving~~

Power Supply

Power supplies has to be obtained at the following facilities.

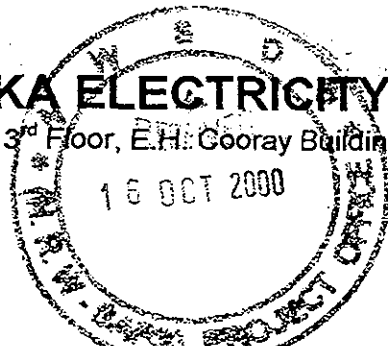
- Gothatuwa Ground Reservoir and Pump House Site
- Maligakanda Site
- Ellie House Site

Cost of obtaining power supply to the above is included in the BOQ as provisional sums. Power supply at Ambatale WTP for Gothatuwa-Kolonnawa Pump House has already been obtained by NWSDB.



LANKA ELECTRICITY COMPANY (PRIVATE) LTD.

3rd Floor, E.H. Gooray Building, 411, Galle Road, Colombo 03, Sri-Lanka.



Kotte Branch Office Address : 189, Nawala Rd
Nugegoda.

Tel : 852184

856380

Fax : 828323

E-Mail : lecokot@sri.lanka.net

Our Ref: ~~OPR/LOT~~ /BULK/00/13

October 6, 2000

18 Oct 2000

Chairman:

Mr. H. S. Subasinghe

Directors:

Mr. P.A.M. Deraniyagala

Mrs. D.D.J. Kudaligama

Mr. S.H. Ferdinandez

M^r. P. Seneviratne

Project Manager,
PM/NRW-SAPS/04
NRW-SAPS Project office
7/9, Jayanthi Mv.
Pelawatta

Dear Sir,

ELECTRICITY SUPPLY TO KOTIKAWATTA - MULLERIYAWA WATER SUPPLY ENHANCEMENT

This refers to your letter dated 08.09.2000 on the above subject and wishes to forward our estimate as follows:

Supply and Installation 400 kVA out door transformer with necessary material	RS. 588,463.30
Add : G & S Tax (12.5% G S T No.1140064245000)	RS. 73,557.91
Total Estimate	RS. 662,021.21

Please note that the above estimate is based on the followings:

1. The transformer is out door type will be fixed on double poles located inside your premises 11 kV feeding will be over head.
2. Low voltage cable will be terminated at the transformer and hence you are requested to provide LV cables up to transformer pole with additional length of 9m (as riser cables along the poles up to the transformer).
3. Meters will be fixed on to the transformer pole.

You are advised to submit a test certificate prior to energise the system and you may use the attached blank copy of the certificate for this purpose.

For any clarification do not hesitate to contact the under signed or the Branch Manager please. (This estimate valid only upto 31.12.2000)

Thank you.


Yours faithfully,

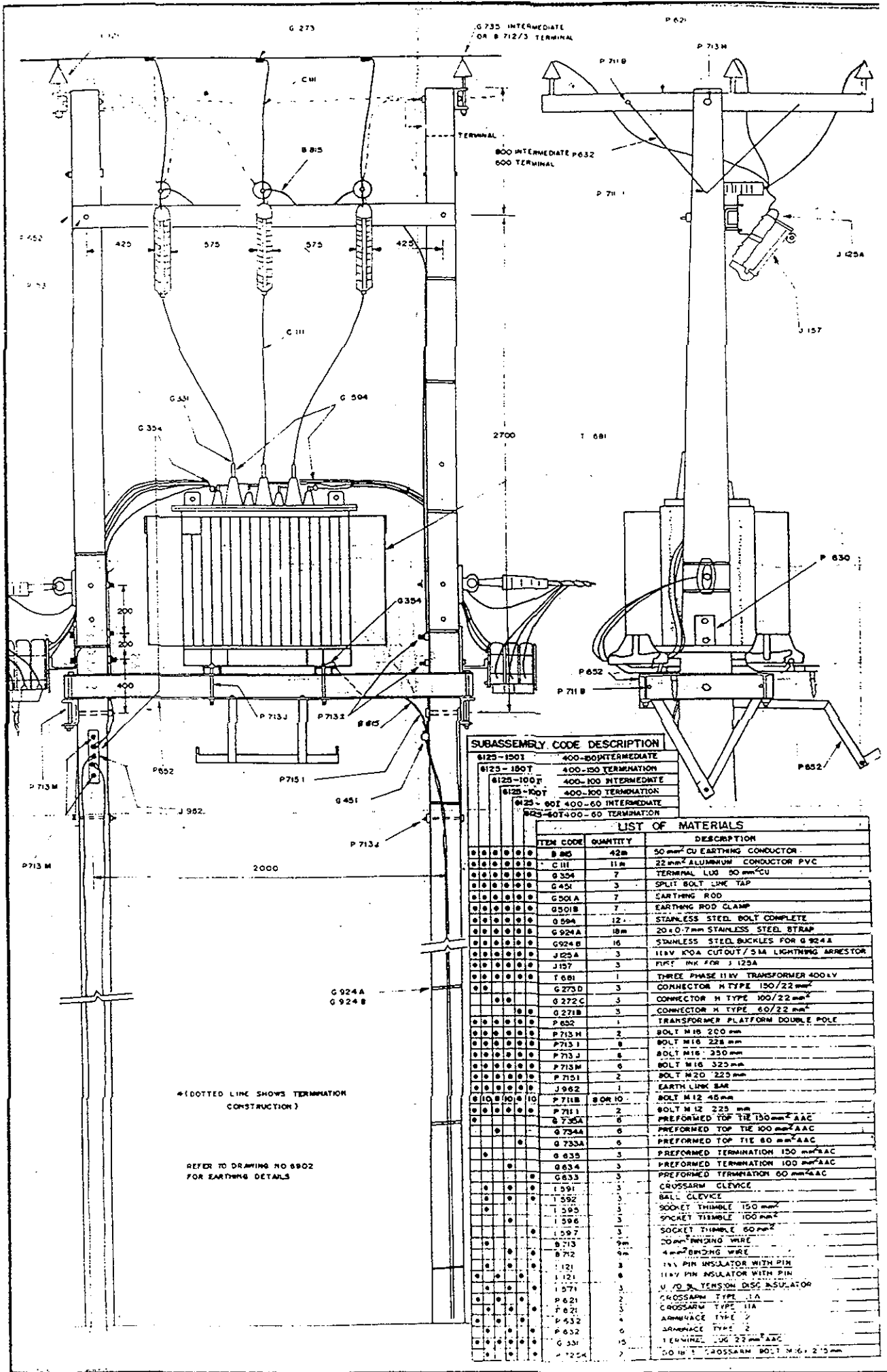
LANKA ELECTRICITY COMPANY (PVT) LTD.,


Branch Engineer
Kotte.

Mr. Sawara
(Team leader)

Forwarded Pl.


18/10
PM (NRW-SAPS)



SUBASSEMBLY CODE DESCRIPTION	
6125-150T	400-60 INTERMEDIATE
6125-150T	400-100 TERMINATION
6125-100T	400-100 INTERMEDIATE
6125-100T	400-100 TERMINATION
6125-60T	400-60 INTERMEDIATE
6125-60T	400-60 TERMINATION

LIST OF MATERIALS

ITEM CODE	QUANTITY	DESCRIPTION
0 0 0 0 0 0	B 805	42m 50 mm ² CU EARTHING CONDUCTOR
0 0 0 0 0 0	C III	11m 22 mm ² ALUMINUM CONDUCTOR PVC
0 0 0 0 0 0	G 354	7 TERMINAL LUG 60 mm ² CU
0 0 0 0 0 0	G 451	3 SPLIT BOLT LINE TAP
0 0 0 0 0 0	G 504	7 EARTHING ROD
0 0 0 0 0 0	G 501B	7 EARTHING ROD CLAMP
0 0 0 0 0 0	G 594	12 STAINLESS STEEL BOLT COMPLETE
0 0 0 0 0 0	G 924 A	18m 20 x 7 mm STAINLESS STEEL STRAP
0 0 0 0 0 0	G 924 B	16 STAINLESS STEEL BUCKLES FOR G 924 A
0 0 0 0 0 0	J 125 A	3 11kV KVA CUTOUT / 5/8 LIGHTNING ARRESTOR
0 0 0 0 0 0	J 157	3 FUSE LINK FOR J 125 A
0 0 0 0 0 0	T 681	1 THREE PHASE 11kV TRANSFORMER 400V
0 0 0 0 0 0	G 273 D	3 CONNECTOR H TYPE 150/22 mm ²
0 0 0 0 0 0	G 272 C	3 CONNECTOR H TYPE 100/22 mm ²
0 0 0 0 0 0	G 271 B	3 CONNECTOR H TYPE 60/22 mm ²
0 0 0 0 0 0	P 652	1 TRANSFORMER PLATFORM DOUBLE POLE
0 0 0 0 0 0	P 713 H	2 BOLT M16 200 mm
0 0 0 0 0 0	P 713 I	6 BOLT M16 228 mm
0 0 0 0 0 0	P 713 J	6 BOLT M16 350 mm
0 0 0 0 0 0	P 713 M	6 BOLT M16 325 mm
0 0 0 0 0 0	P 713 N	2 BOLT M20 225 mm
0 0 0 0 0 0	J 962	1 EARTH LINK BAR
0 10 0 0 0 10	P 711 B 8 OR 10	BOLT M12 45 mm
0 0 0 0 0 0	P 711 I	2 BOLT M12 225 mm
0 0 0 0 0 0	B 735 A	6 PREFORMED TOP TIE 150 mm ² AAC
0 0 0 0 0 0	G 734 A	6 PREFORMED TOP TIE 100 mm ² AAC
0 0 0 0 0 0	G 733 A	6 PREFORMED TOP TIE 80 mm ² AAC
0 0 0 0 0 0	G 635	3 PREFORMED TERMINATION 150 mm ² AAC
0 0 0 0 0 0	G 634	3 PREFORMED TERMINATION 100 mm ² AAC
0 0 0 0 0 0	G 633	3 PREFORMED TERMINATION 60 mm ² AAC
0 0 0 0 0 0	I 591	3 CROSSARM CLEVIS
0 0 0 0 0 0	I 592	3 BALL CLEVIS
0 0 0 0 0 0	I 593	3 SOCKET THIMBLE 150 mm ²
0 0 0 0 0 0	I 594	3 SOCKET THIMBLE 100 mm ²
0 0 0 0 0 0	I 597	3 SOCKET THIMBLE 60 mm ²
0 0 0 0 0 0	B 713	20 mm ² BRONZE WIRE
0 0 0 0 0 0	B 712	9m 4 mm ² BRONZE WIRE
0 0 0 0 0 0	I 121	8 11kV PIN INSULATOR WITH PIN
0 0 0 0 0 0	I 121	8 11kV PIN INSULATOR WITH PIN
0 0 0 0 0 0	I 571	3 U / D % TENSION DISC INSULATOR
0 0 0 0 0 0	P 621	2 CROSSARM TYPE 1A
0 0 0 0 0 0	P 621	3 CROSSARM TYPE 1A
0 0 0 0 0 0	P 632	4 ARMORACE TYPE 2
0 0 0 0 0 0	P 632	6 ARMORACE TYPE 2
0 0 0 0 0 0	G 33	15 TERMINAL LUG 22 mm ² AAC
0 0 0 0 0 0	P 1254	7 60 mm I CROSSARM BOLT M16 210 mm

(DOTTED LINE SHOWS TERMINATION CONSTRUCTION)

REFER TO DRAWING NO 6902 FOR EARTHING DETAILS

INSPECTION CERTIFICATE

Inspection Certificate to be given by the contractor or other person responsible for carrying out an inspection and test of an installation, or part of an installation, or by an authorised person acting on his behalf.

I Certify that the electrical installation as:

has been inspected and tested, in accordance with the IEE Regulations for Electrical Installation (15th Edition) and that the results are satisfactory in the respects mentioned below, except as indicated in the comments below:

I recommend that the installation be further inspected and tested after an interval of not more than 05 years.

.....
Items inspected or tested :

.....
Continuity of earth conductors and equipotential bonding.

Insulation resistance of the: 1) Conductors to earth.
2) Between conductors.

Polarity, and position of fuses single-pole switches.

Type(s) of protective device - Fuses
- Type 1 MCB.
- Residual current circuit breaker
- fault-voltage operated circuit breaker

Earth electrode resistance

Earth fault loop impedance, for operation of devices relied upon for earth fault protection.

Operation of residual current operated/fault-voltage operated circuit breaker.

Insulation resistance to earth of each item of equipment tested separately.

Conditions of flexible cables and cords, switches, plugs and socket outlets.

Sizes of live conductors in relation to the rating of fuses and MCB.

Continuity of ring final circuit conductors.

Equipment tested includes/does not include portable equipment:

Comments (if any) and departures from the IEE Regulations:

Signed: date:

For and on behalf of:

Address:

* delete or complete items as appropriate. Where a failure to comply with the Regulations is indicated further details should be entered, if necessary, overleaf.

+++++
The City of London

Supply and Laying of DI Pipes, Fittings and Valves

(a) Supply Rates

Supply rates for imported items in the BOQ are based on the suppliers quotation given for the Engineer's Estimate of Towns North of Colombo Water Supply Project in 1998 .

(b) Taxes and Duties

Following taxes and duties are applicable to the CIF value.

For DI pipes and fittings	32% of CIF value in SLRs.
For DI Valves	26% of CIF value in SLRs.

Import Levies for DI Pipes, fittings and Valves

Taxes and Duties	DI Pipes & Fittings	Valves
Custom Duty	10%	5%
NSL	6.5%	6.5%
GST	12.50%	12.50%
Total Import Levies	32%	26%

(c) Foreign Component and Local Component

Foreign component of supply rates for DI pipes and fittings is the CIF value converted in to Japanese Yen using the parity rate.

Local component of supply rate covers the bank charges, clearance charges, transport, handling, storage etc. and is estimated at 15% of the CIF value converted in to SLRs.

Supply of DI Pipes, fittings and Valves

Category	Description	Calculation
Foreign component	Cost of pipe	CIF value in Yen
Local component	Bank charges, clearance charges, transport, handling, storage etc.	CIF value in SLRs. * 15%
Total Import levies	Taxes and duties	For DI Pipes - CIF value in SLRs. *32% For Valves - CIF value in SLRs. * 26%

(e) Laying and Installation

Cost of laying and installation is calculated separately for each and every item in the BOQ. Foreign component of laying rates for DI pipes, fitting and valves cover the cost of expatriate supervisory staff and is estimated at 8% of the total estimated cost for laying and installation.

Local component of laying rates cover the cost of excavation, shoring, de-watering, laying and installation, back-filling and compacting etc. and is estimated at 92% of the total cost of the total estimated cost for laying and installation.

Laying and Installation of DI Pipes, fittings and Valves

Category	Description	Calculation
Foreign component	Cost of expatriate supervisory staff	8% * TOTAL LAYING COST
Local component	Cost of excavation, shoring and dewatering, laying and installation, backfilling and compaction etc.	92% * TOTAL LAYING COST

Note 1 : Total laying cost is calculated for each and every item separately and compared with NWSDB Rate Book 2000.

82-1

RATES FOR SUPPLY OF DI PIPES, FITTINGS AND VALVES ETC.

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs..	FC - in ¥	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' *A1*1.1025) *119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
1	Socket & Spigot Pipes								
	800 mm	L.m	128.34	141.49		16,837.30	23,385	2,525.60	5,387.90
	700 mm	L.m	106.42	117.33		13,962.30	19,392	2,094.30	4,467.90
	600 mm	L.m	79.80	87.98		10,469.60	14,541	1,570.40	3,350.30
	500 mm	L.m	62.53	68.94		8,203.90	11,394	1,230.60	2,625.20
	450 mm	L.m	58.36	64.34		7,656.50	10,634	1,148.50	2,450.10
	400 mm	L.m	45.95	50.65		6,027.40	8,371	904.10	1,928.80
	350 mm	L.m	41.89	46.19		5,496.60	7,634	824.50	1,758.90
	300 mm	L.m	32.47	35.80		4,260.20	5,917	639.00	1,363.30
	250 mm	L.m	26.77	29.52		3,512.90	4,879	526.90	1,124.10
	200 mm	L.m	33.10	36.49		4,342.30	6,031	651.30	1,389.50
	150mm	L.m	18.18	20.04		2,384.80	3,312	357.70	763.10
	80mm	L.m	13.64	15.04		1,789.80	2,486	268.50	572.70
2	Double Socket bends								
	800 mm x 11 1/4 °	Nr.	946.93	1043.99		124,234.80	172,548	18,635.20	39,755.10
	600 mm x 11 1/4 °	Nr.	460.84	508.08		60,461.50	83,974	9,069.20	19,347.70
	500 mm x 11 1/4 °	Nr.	337.06	371.81		44,221.60	61,419	6,633.20	14,150.90
	450 mm x 11 1/4 °	Nr.	351.37	387.39		46,099.40	64,027	6,914.90	14,751.80
	400 mm x 11 1/4 °	Nr.	172.81	190.52		22,671.90	31,489	3,400.80	7,255.00
	350 mm x 11 1/4 °	Nr.	197.48	217.70		25,906.30	35,981	3,885.90	8,290.00
	300 mm x 11 1/4 °	Nr.	105.95	116.81		13,900.40	19,306	2,085.10	4,448.10
	250 mm x 11 1/4 °	Nr.	89.21	98.35		11,703.70	16,255	1,755.60	3,745.20
	200 mm x 11 1/4 °	Nr.	75.81	83.58		9,946.00	13,614	1,491.90	3,182.70
	800 mm x 22 1/2 °	Nr.	1016	1120.14		133,296.70	185,134	19,994.50	42,654.90
	600 mm x 22 1/2 °	Nr.	458.97	506.01		60,215.20	83,632	9,032.30	19,268.90
	500 mm x 22 1/2 °	Nr.	349.07	384.85		45,797.20	63,607	6,869.60	14,655.10
	450 mm x 22 1/2 °	Nr.	434.27	478.78		56,974.80	79,132	8,546.20	18,231.90
	400 mm x 22 1/2 °	Nr.	189.67	209.11		24,884.10	34,561	3,732.60	7,962.90
	350 mm x 22 1/2 °	Nr.	189.89	209.35		24,912.70	34,601	3,736.90	7,972.10
	300 mm x 22 1/2 °	Nr.	107.01	117.98		14,039.60	19,499	2,105.90	4,492.70
	250 mm x 22 1/2 °	Nr.	88.73	97.82		11,640.60	16,168	1,746.10	3,725.00
	800 mm x 45 °	Nr.	1420.86	1566.50		186,413.50	258,908	27,962.00	59,652.30
	600 mm x 45 °	Nr.	508.43	560.54		66,704.30	92,645	10,005.60	21,345.40
	500 mm x 45 °	Nr.	356.65	393.21		46,792.00	64,989	7,018.80	14,973.40
	400 mm x 45 °	Nr.	196.26	216.38		25,749.20	35,763	3,862.40	8,239.70
	350 mm x 45 °	Nr.	201.08	221.69		26,381.10	36,640	3,957.20	8,442.00
	300 mm x 45 °	Nr.	120.26	132.59		15,778.20	21,914	2,366.70	5,049.00
	250 mm x 45 °	Nr.	86.24	95.08		11,314.50	15,715	1,697.20	3,620.60
	200 mm x 45 °	Nr.	71.06	78.34		9,322.50	12,948	1,398.40	2,983.20
	150 mm x 45 °	Nr.	58.57	64.57		7,683.80	10,672	1,152.60	2,458.80
	800 mm x 90 °	Nr.	3967.38	4374.04		520,510.80	722,932	78,076.60	166,563.50
	600 mm x 90 °	Nr.	1082.9	1193.90		142,074.10	197,325	21,311.10	45,463.70
	500 mm x 90 °	Nr.	907.46	1000.47		119,055.90	165,355	17,858.40	38,097.90
	450 mm x 90 °	Nr.	576.86	635.99		75,682.80	105,115	11,352.40	24,218.50
	400 mm x 90 °	Nr.	362.4	399.55		47,546.50	66,037	7,132.00	15,214.90
	350 mm x 90 °	Nr.	250.60	276.29		32,878.50	45,665	4,931.80	10,521.10
	300 mm x 90 °	Nr.	167.52	184.69		21,978.10	30,525	3,296.70	7,033.00
	250 mm x 90 °	Nr.	128.72	141.91		16,887.30	23,455	2,533.10	5,403.90
	200 mm x 90 °	Nr.	93.09	102.63		12,213.00	16,963	1,832.00	3,908.20
	150 mm x 90 °	Nr.	87.42	96.38		11,469.20	15,929	1,720.40	3,670.10
	80 mm x 90 °	Nr.	27.76	30.61		3,642.60	5,059	546.40	1,165.60
3	Duck foot Bend								
	400 mm x 90 °	Nr.	672.59	741.53		88,242.10	122,558	13,236.30	28,237.50
	300 mm x 90 °	Nr.	216.78	239.00		28,441.00	39,501	4,266.20	9,101.10
	200 mm x 90 °	Nr.	112.8	124.36		14,798.80	20,554	2,219.80	4,735.60

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ¥	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A'+A1*1.1025) *119	B'=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
4	Double Flange Bends								
	800 mm x 90°	Nr.	2188.81	2413.16	72.08	295,622.80	411,976	44,493.40	94,919.30
	800 mm x 45°	Nr.	1380.05	1521.51	72.08	190,516.40	264,606	28,577.50	60,965.20
	800 mm x 22 1/2°	Nr.	966	1065.02	72.08	136,194.10	189,158	20,429.10	43,582.10
	800 mm x 11 1/4°	Nr.	676.2	745.51	72.08	98,172.40	136,351	14,725.90	31,415.20
	700 mm x 90°	Nr.	2070.1	2282.29	72.08	281,049.20	390,346	42,157.40	89,935.70
	700 mm x 45°	Nr.	1380.05	1521.51	72.08	190,516.40	264,606	28,577.50	60,965.20
	700 mm x 22 1/2°	Nr.	966	1065.02	72.08	136,194.10	189,158	20,429.10	43,582.10
	700 mm x 11 1/4°	Nr.	676.2	745.51	72.08	98,172.40	136,351	14,725.90	31,415.20
	600 mm x 90°	Nr.	1185.07	1306.54	54.01	162,564.20	225,784	24,384.60	52,020.50
	600 mm x 45°	Nr.	785.6	866.12	54.01	110,154.30	152,992	16,523.10	35,249.40
	600 mm x 22 1/2°	Nr.	611.91	674.63	54.01	87,366.90	121,343	13,105.00	27,957.40
	600 mm x 11 1/4°	Nr.	489.5	539.67	54.01	71,306.70	99,037	10,696.00	22,818.10
	500 mm x 90°	Nr.	705.6	777.92	45.74	98,573.50	136,908	14,789.00	31,543.50
	500 mm x 45°	Nr.	629.47	693.99	45.74	88,585.80	123,036	13,287.90	28,347.50
	500 mm x 22 1/2°	Nr.	440.6	485.76	45.74	63,806.40	88,620	9,571.00	20,418.00
	500 mm x 11 1/4°	Nr.	308.4	340.01	45.74	46,462.20	64,531	6,969.30	14,867.90
	400 mm x 90°	Nr.	269.89	297.55	21.85	38,275.10	53,160	5,741.30	12,248.00
	400 mm x 45°	Nr.	188.9	208.26	21.85	27,649.60	38,402	4,147.40	8,847.90
	400 mm x 22 1/2°	Nr.	132.2	145.75	21.85	20,210.90	28,071	3,031.60	6,467.50
	400 mm x 11 1/4°	Nr.	92.5	101.98	21.85	15,002.30	20,837	2,250.30	4,800.70
	300 mm x 90°	Nr.	180.4	198.89	11.42	25,166.20	34,953	3,774.90	8,053.20
	300 mm x 45°	Nr.	120.26	132.59	11.42	17,275.50	23,995	2,591.50	5,528.50
	300 mm x 22 1/2°	Nr.	84.2	92.83	11.42	12,545.00	17,424	1,881.80	4,014.40
	300 mm x 11 1/4°	Nr.	58.9	64.94	11.42	9,226.10	12,814	1,383.90	2,952.40
	200 mm x 90°	Nr.	92.49	101.97	5.77	12,891.40	17,905	1,933.70	4,125.20
	200 mm x 45°	Nr.	86.24	95.08	5.77	12,071.50	16,766	1,810.70	3,862.90
	200 mm x 22 1/2°	Nr.	60.4	66.59	5.77	8,681.20	12,057	1,302.20	2,778.00
	200 mm x 11 1/4°	Nr.	42.3	46.64	5.77	6,307.20	8,760	946.10	2,018.30
	150 mm x 90°	Nr.	129.4	142.68	4.45	17,560.40	24,389	2,634.10	5,619.30
	150 mm x 45°	Nr.	86.24	95.08	4.45	11,898.30	16,525	1,784.70	3,807.50
	150 mm x 22 1/2°	Nr.	60.4	66.59	4.45	8,508.00	11,817	1,276.20	2,722.60
	150 mm x 11 1/4°	Nr.	42.3	46.64	4.45	6,134.00	8,519	920.10	1,962.90
	100 mm x 22 1/2°	Nr.	23.86	26.31	3.00	3,524.50	4,895	528.70	1,127.80
	80 mm x 90°	Nr.	16.89	18.62	2.26	2,512.30	3,489	376.80	803.90
	80 mm x 22 1/2°	Nr.	23.07	25.43	2.26	3,322.70	4,615	498.40	1,063.30
5	All Flanged Tee								
	800mm x 800 mm	Nr.	2352.14	2593.23	108.12	322,779.40	448,305	48,416.90	103,289.40
	800 mm x 600 mm	Nr.	1810.61	1996.20	99.09	250,547.50	347,983	37,582.10	80,175.20
	800mm x 300 mm	Nr.	1737.87	1916.00	77.79	238,209.90	330,847	35,731.50	76,227.20
	700 mm x 200 mm	Nr.	3330.13	3671.47	74.97	446,740.20	620,473	67,011.00	142,956.90
	600 mm x 600 mm	Nr.	1410.44	1555.01	81.02	195,675.20	271,771	29,351.30	62,616.10
	500 mm x 500 mm	Nr.	1051.52	1159.30	68.61	146,958.20	204,109	22,043.70	47,026.60
	500 mm x 200 mm	Nr.	1153.92	1272.20	48.63	157,771.30	219,127	23,665.70	50,486.80
	500mm x 100 mm	Nr.	873.58	963.12	47.24	120,809.00	167,790	18,121.40	38,658.90
	400 mm x 400 mm	Nr.	382.52	421.73	32.78	54,485.60	75,675	8,172.90	17,435.50
	400 mm x 200 mm	Nr.	327.64	361.22	24.74	46,230.40	64,209	6,934.60	14,793.70
	400 mm x 250 mm	Nr.	331.66	366.66	27.40	47,108.40	65,428	7,066.30	15,074.70
	400 mm x 150 mm	Nr.	325.81	359.21	24.08	45,904.60	63,756	6,885.70	14,689.50
	400mm x 100 mm	Nr.	325.18	358.51	23.35	45,726.20	63,509	6,858.90	14,632.40
	350 mm x 350 mm	Nr.	293.18	323.23	23.19	41,506.80	57,648	6,226.00	13,282.20
	300 mm x 300 mm	Nr.	231.32	255.03	17.13	32,596.00	45,272	4,889.40	10,430.70
	300 mm x 250 mm	Nr.	164.91	181.81	16.97	23,861.80	33,141	3,579.30	7,635.80
	300 mm x 200 mm	Nr.	172.67	190.37	14.31	24,530.80	34,071	3,679.60	7,849.90
	300 mm x 150 mm	Nr.	162.35	178.99	13.65	23,090.00	32,069	3,463.50	7,388.80
	300mm x 100 mm	Nr.	158.07	174.27	12.92	22,433.20	31,157	3,365.00	7,178.60
	300mm x 80 mm	Nr.	138.00	152.15	12.55	19,752.40	27,434	2,962.90	6,320.80

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ₹	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' +A1*1.1025) *119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	250 mm x 250 mm	Nr.	140.75	155.18	16.65	20,650.90	28,682	3,097.60	6,608.30
	250 mm x 200 mm	Nr.	136.58	150.58	13.99	19,753.80	27,436	2,963.10	6,321.20
	250 mm x 150 mm	Nr.	135.65	149.55	13.33	19,544.70	27,145	2,931.70	6,254.30
	250mm x 100 mm	Nr.	133.39	147.06	12.60	19,153.20	26,602	2,873.00	6,129.00
	250mm x 80 mm	Nr.	130.28	143.63	12.23	18,696.50	25,967	2,804.50	5,982.90
	200mm x 200 mm	Nr.	87.46	96.42	8.66	12,609.50	17,513	1,891.40	4,035.00
	200mm x 150 mm	Nr.	87.46	96.42	8.00	12,522.90	17,393	1,878.40	4,007.30
	200mm x 100 mm	Nr.	78.72	86.79	7.27	11,281.80	15,689	1,692.30	3,610.20
	200mm x 80 mm	Nr.	76.70	84.56	6.90	10,967.90	15,233	1,645.20	3,509.70
	150 mm x 150 mm	Nr.	76.70	84.56	6.68	10,938.40	15,192	1,640.80	3,500.30
	150 mm x 100 mm	Nr.	58.67	64.68	5.95	8,477.50	11,774	1,271.60	2,712.80
	100 mm x 100 mm	Nr.	76.70	84.56	4.50	10,653.00	14,796	1,598.00	3,409.00
	100mm x 80 mm	Nr.	76.70	84.56	4.13	10,604.50	14,728	1,590.70	3,393.40
	80 mm x 80 mm	Nr.							
6	All Socketed Tees								
	600mm x 600mm	Nr.	1411.57	1556.26		185,194.90	257,215	27,779.20	59,282.40
	500mm x 500mm	Nr.	1237.79	1364.66		162,394.50	225,548	24,359.20	51,966.20
	500mm x 80 mm	Nr.	420.24	463.31		55,133.90	76,575	8,270.10	17,642.80
	450mm x 450mm	Nr.	789.98	870.95		103,643.10	143,949	15,546.50	33,165.80
	300mm x 80 mm	Nr.	134.94	148.77		17,703.60	24,588	2,655.50	5,665.20
	300mm x 250mm	Nr.	230.34	253.95		30,220.10	41,972	4,583.00	9,670.40
	250mm x 80 mm	Nr.	170.43	187.90		22,360.10	31,056	3,354.00	7,155.20
	400 mm x 300 mm	Nr.	371.95	410.07		48,798.30	67,775	7,319.70	15,615.50
	400 mm x 150 mm	Nr.	318.65	351.31		41,805.90	58,064	6,270.90	13,377.90
	300 mm x 300 mm	Nr.	241.49	266.24		31,682.60	44,004	4,752.40	10,138.40
	300 mm x 200 mm	Nr.	224.8	247.84		29,493.00	40,963	4,424.00	9,437.80
	250 mm x 250 mm	Nr.	200.59	221.13		26,316.90	36,551	3,947.50	8,421.40
7	Double Socket Tees with Flange Branch								
	800 mm x 200 mm	Nr.	1455.69	1604.90	2.89	191,361.60	265,780	28,704.20	61,235.70
	600 mm x 100 mm	Nr.	1001.39	1104.03	1.50	131,576.40	182,745	19,736.50	42,104.40
	500 mm x 300 mm	Nr.	425.24	468.83	5.71	56,539.90	78,528	8,481.00	18,092.80
	500 mm x 200 mm	Nr.	425.24	468.83	2.89	56,169.30	78,013	8,425.40	17,974.20
	500 mm x 150mm	Nr.	628.36	692.77	2.23	82,731.50	114,905	12,409.70	26,474.10
	500 mm x 100 mm	Nr.	452.05	498.39	1.50	59,505.20	82,646	8,925.80	19,041.70
	500 mm x 80mm	Nr.	557.21	614.32	1.13	73,252.30	101,739	10,987.80	23,440.70
	450 mm x 100mm	Nr.	485.23	536.07	1.50	63,989.10	88,874	9,598.40	20,476.50
	450 mm x 80mm	Nr.	483.61	533.19	1.13	63,596.70	88,329	9,539.50	20,350.80
	400 mm x 400mm	Nr.	665.66	733.89	10.93	88,766.20	123,286	13,314.90	28,405.20
	400 mm x 300mm	Nr.	625.95	690.11	5.71	82,872.20	115,100	12,430.80	26,519.10
	400 mm x 200 mm	Nr.	328.74	362.44	2.89	43,508.90	60,429	6,526.90	13,922.80
	400 mm x 150 mm	Nr.	361.29	398.32	2.23	47,692.00	66,239	7,153.80	15,261.40
	400 mm x 100 mm	Nr.	415.16	457.71	1.50	54,664.30	75,923	8,199.60	17,492.60
	400 mm x 80 mm	Nr.	325.66	359.04	1.13	42,874.00	59,547	6,431.10	13,719.70
	350 mm x 80mm	Nr.	340.78	375.71	1.13	44,857.70	62,302	6,728.70	14,354.50
	300 mm x 150 mm	Nr.	173.03	190.77	2.23	22,993.50	31,935	3,449.00	7,257.90
	300 mm x 100 mm	Nr.	155.75	171.71	1.50	20,630.30	28,653	3,094.50	6,601.70
	300 mm x 80 mm	Nr.	146.19	161.17	1.13	19,327.50	26,844	2,999.10	6,184.80
	250 mm x 250mm	Nr.	212.95	234.78	5.55	28,667.00	39,815	4,300.10	9,173.40
	250 mm x 200mm	Nr.	205.91	227.02	2.89	27,393.90	38,047	4,109.10	8,766.00
	250 mm x 150mm	Nr.	144.11	158.88	2.23	19,198.60	26,655	2,879.80	6,143.60
	250 mm x 100 mm	Nr.	151.89	167.46	1.50	20,124.50	27,951	3,018.70	6,439.80
	250 mm x 80 mm	Nr.	137.03	151.08	1.13	18,126.80	25,176	2,719.00	5,800.60
	300 mm x 80 mm (AV)	Nr.	260.45	287.15	1.13	34,319.10	47,665	5,147.90	10,982.10
	250 mm x 80 mm (AV)	Nr.	192.65	212.40	1.13	25,423.90	35,311	3,813.60	8,135.60
8	Double Flange Tapers								
	800 mm x 600 mm	Nr.	1017.05	1121.30	63.08	141,706.00	196,814	21,255.90	45,345.90
	800 mm x 400 mm	Nr.	1306.82	1440.77	46.97	177,613.30	246,585	26,642.00	56,836.30
	600 mm x 500 mm	Nr.	648.94	715.46	49.88	91,683.20	127,338	13,752.50	29,338.60

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ¥	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' *A1*1.1025)*119	B'=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	500 mm x 400 mm	Nr.	548.24	604.43	33.80	76,361.00	106,057	11,454.20	24,435.50
	500 mm x 250mm	Nr.	538.6	593.81	25.76	74,042.40	102,837	11,106.40	23,693.60
	400 mm x 350 mm	Nr.	175.09	193.04	18.66	25,419.20	35,304	3,812.90	8,134.10
	400 mm x 300 mm	Nr.	233.87	257.84	16.64	32,865.40	45,646	4,926.80	10,516.90
	400 mm x 200 mm	Nr.	228	251.37	13.81	31,724.90	44,062	4,758.70	10,152.00
	300 mm x 250 mm	Nr.	83.39	91.94	11.25	12,418.10	17,247	1,862.70	3,973.80
	300 mm x 200 mm	Nr.	96.02	105.86	8.60	13,725.00	19,063	2,058.80	4,392.00
	300 mm x 150 mm	Nr.	96.96	106.90	7.94	13,762.20	19,114	2,064.30	4,403.90
	250 mm x 200 mm	Nr.	96.02	105.86	8.44	13,704.00	19,033	2,055.60	4,385.30
	250 mm x 150 mm	Nr.	89.4	98.56	7.78	12,748.70	17,707	1,912.30	4,079.60
	250 mm x 100 mm	Nr.	89.4	98.56	7.05	12,653.60	17,574	1,898.00	4,049.20
	200 mm x 150 mm	Nr.	32.18	35.48	5.11	4,892.50	6,795	733.90	1,565.60
	150 mm x 100 mm	Nr.	24.19	26.67	3.73	3,662.40	5,087	549.40	1,172.00
	80 mm x 50 mm	Nr.	67.19	74.08	2.26	9,112.00	12,656	1,366.80	2,918.80
9	Double Socket Tapers								
	800 mm x 600 mm	Nr.	1175.57	1296.07		154,232.30	214,212	23,124.80	49,354.30
	600 mm x 500 mm	Nr.	739.60	815.41		97,033.80	134,769	14,555.10	31,050.80
	600 mm x 450 mm	Nr.	751.30	828.31		98,568.90	136,901	14,785.30	31,542.00
	600 mm x 400 mm	Nr.	841.78	928.06		110,439.10	153,388	16,565.90	35,340.50
	600 mm x 300 mm	Nr.	1069.80	1179.45		140,354.60	194,937	21,053.20	44,913.50
	500 mm x 450 mm	Nr.	397.36	438.09		52,132.70	72,407	7,819.90	16,682.50
	500 mm x 350 mm	Nr.	383.48	422.79		50,312.00	69,878	7,546.80	16,099.80
	450 mm x 400 mm	Nr.	382.97	422.22		50,244.20	69,784	7,536.60	16,078.10
	400 mm x 350 mm	Nr.	324.26	357.50		42,542.50	59,087	6,381.40	13,613.60
	350 mm x 300 mm	Nr.	220.19	242.76		28,888.40	40,123	4,333.30	9,244.30
	300 mm x 250 mm	Nr.	125.57	138.44		16,474.40	22,881	2,471.20	5,271.80
	300 mm x 200 mm	Nr.	97.41	107.39		12,779.40	17,749	1,916.90	4,089.40
	250 mm x 200 mm	Nr.	75.58	83.33		9,916.30	13,773	1,487.40	3,173.20
	250 mm x 150 mm	Nr.	140.65	155.07		18,453.30	25,630	2,768.00	5,905.10
	100 mm x 80 mm	Nr.	31.22	34.42		4,096.00	5,689	614.40	1,310.70
10	Flanged Adapters (VJFA)								
	800 mm	Nr.	924.41	1019.16		121,280.00	168,444	18,192.00	38,809.60
	700 mm	Nr.	924.41	1019.16		121,280.00	168,444	18,192.00	38,809.60
	600 mm	Nr.	560.45	617.90		73,530.10	102,125	11,029.50	23,529.60
	500 mm	Nr.	482.89	532.39		63,354.40	87,992	9,503.20	20,273.40
	450 mm	Nr.	350.35	386.26		45,964.90	63,840	6,894.70	14,708.80
	400 mm	Nr.	348.76	384.51		45,756.70	63,551	6,863.50	14,642.10
	350 mm	Nr.	260.15	286.82		34,131.60	47,405	5,119.70	10,922.10
	300 mm	Nr.	89.91	99.13		11,796.50	16,384	1,769.50	3,774.90
	250 mm	Nr.	73.52	81.06		9,646.10	13,397	1,446.90	3,086.80
	200 mm	Nr.	51.38	56.65		6,741.40	9,363	1,011.20	2,157.20
	150 mm	Nr.	36.36	40.09		4,770.70	6,626	715.60	1,526.60
	100 mm	Nr.	23.28	25.67		3,054.70	4,243	458.20	977.50
	80 mm (FH)	Nr.	27.89	30.75		3,659.30	5,082	548.90	1,171.00
	90 mm (FH)	Nr.	27.89	30.75		3,659.30	5,082	548.90	1,171.00
	225 mm PVC	Nr.	51.38	56.65		6,741.40	9,363	1,011.20	2,157.20
	180 mm PVC	Nr.	40.32	44.45		5,289.60	7,347	793.40	1,692.70
	110 mm PVC	Nr.	28.79	31.74		3,777.10	5,246	566.60	1,208.70
	90 mm PVC	Nr.	27.89	30.75		3,659.30	5,082	548.90	1,171.00
	63 mm PVC	Nr.	19.04	20.99		2,497.80	3,469	374.70	799.30
11	Straight Couplings (VJC)								
	800 mm	Nr.	386.75	426.39		50,740.40	70,473	7,611.10	16,236.90
	800 mm	Nr.	386.75	426.39		50,740.40	70,473	7,611.10	16,236.90
	700 mm	Nr.	386.75	426.39		50,740.40	70,473	7,611.10	16,236.90
	600 mm	Nr.	255.53	281.72		33,524.70	46,562	5,028.70	10,727.90
	500 mm	Nr.	214.7	236.71		28,168.50	39,123	4,225.30	9,013.90
	400 mm	Nr.	168.92	186.23		22,161.40	30,780	3,324.20	7,091.60
	300 mm	Nr.	116.67	128.63		15,307.00	21,260	2,296.10	4,898.20
	250 mm	Nr.	50.66	55.85		6,646.20	9,231	996.90	2,126.80
	200 mm	Nr.	93.33	102.90		12,245.10	17,007	1,836.80	3,918.40
	150 mm	Nr.	64.19	70.77		8,421.60	11,697	1,263.20	2,694.90
	100 mm	Nr.	48.22	53.16		6,326.00	8,786	948.90	2,024.30
	80 mm	Nr.	39.87	43.36		5,231.20	7,286	784.70	1,674.00
	Step Couplings (VJC)								
	200mm DI/ 225 mm PVC	Nr.	50.66	55.85		6,646.20	9,231	996.90	2,126.80
	150 mm DI/ 160 mm PVC	Nr.	36.73	40.49		4,818.30	6,692	722.70	1,541.90

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ₹	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' +A*1.1025)*119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	90 mm PVC /80 mm Steel	Nr	21.34	23.53		2,800.10	3,889	420.00	896.00
	160 mm PVC /150 mm Steel	Nr	36.73	40.49		4,818.20	6,692	722.70	1,541.90
	225 mm PVC /200 mm Steel	Nr	50.66	55.85		6,646.20	9,231	996.90	2,126.80
	250 mm DI / 250 mm Steel	Nr	50.66	55.85		6,646.20	9,231	996.90	2,126.80
	400 mm DI / 400 mm Steel	Nr	168.92	186.23		22,161.40	30,780	3,324.20	7,091.60
	500 mm DI / 500 mm Steel	Nr	214.7	236.71		28,168.50	38,123	4,225.30	9,013.90
12	Flange and Spigot Pipe Piece with Integral Puddle Flange at 650 mm away from Flange End								
	800 mm x 2000 mm	Nr	1231.55	1357.78	36.04	166,304.20	230,978	24,945.60	53,217.30
	800 mm x 1800 mm	Nr	1231.53	1357.76	36.04	166,301.80	230,975	24,945.30	53,216.60
	600 mm x 1800 mm	Nr	680.41	750.15	27.01	92,810.80	128,904	13,921.60	29,699.50
	600mm x 1000 mm	Nr	515.42	568.25	27.01	71,164.70	98,840	10,674.70	22,772.70
	500 mm x 1800 mm	Nr	515.42	568.25	22.87	70,622.20	98,086	10,593.30	22,599.10
	450mm x 3100 mm	Nr	409.25	451.20	15.81	55,786.40	77,453	8,368.00	17,845.20
	450mm x 1900 mm	Nr	397.94	438.73	15.81	54,282.40	75,392	8,142.40	17,370.40
	400mm x 4700 mm	Nr	480.58	529.84	10.93	64,484.30	89,562	9,672.60	20,635.00
	400mm x 1300 mm	Nr	272.71	300.66	10.93	37,211.90	51,683	5,581.80	11,907.80
	350mm x 1500 mm	Nr	252.44	278.32	7.73	34,134.20	47,409	5,120.10	10,922.90
	300mm x 1500 mm	Nr	180.69	199.21	5.71	24,455.10	33,965	3,668.30	7,825.60
	300mm x 1400 mm	Nr	155.33	171.25	5.71	21,127.90	29,344	3,159.20	6,760.90
	300mm x 900 mm	Nr	127.18	140.22	5.71	17,435.30	24,216	2,615.30	5,579.30
	250mm x 1700 mm	Nr	145.13	160.01	5.55	19,769.30	27,457	2,965.40	6,326.20
	250mm x 1500 mm	Nr	145.69	160.62	5.55	19,841.90	27,558	2,976.30	6,349.40
	200mm x 2918mm	Nr	137.98	152.12	2.89	18,480.80	25,668	2,772.10	5,913.90
	200mm x 2000 mm	Nr	123.25	135.88	2.89	16,548.20	22,984	2,482.20	5,295.40
	200mm x 1500 mm	Nr	108.52	119.64	2.89	14,615.70	20,300	2,192.40	4,677.00
	200 mm x 1400 mm	Nr	94.64	104.34	2.89	12,795.00	17,771	1,919.30	4,064.40
	200mm x 1000 mm	Nr	93.79	103.40	2.89	12,683.10	17,615	1,902.50	4,058.60
	100mm x 1000 mm	Nr	50.09	55.22	1.50	6,768.00	9,400	1,015.20	2,165.80
	100mm x 1200 mm	Nr	50.51	55.69	1.50	6,823.90	9,478	1,023.60	2,183.60
13	Flange Spigot Pipe								
	800 mm x 2000 mm	Nr	655.7	722.91	36.04	90,754.60	126,048	13,613.20	29,041.50
	700 mm x 2000 mm	Nr	661.34	729.13	36.04	91,494.80	127,078	13,724.20	29,278.30
	600 mm x 2372mm	Nr	429.74	473.79	27.01	59,924.00	83,228	8,988.60	19,175.70
	600 mm x 2500 mm	Nr	531.48	585.96	27.01	73,272.20	101,767	10,990.80	23,447.10
	600 mm x 3100mm	Nr	531.48	585.96	27.01	73,272.20	101,767	10,990.80	23,447.10
	600 mm x 4000 mm	Nr	850.36	937.52	27.01	115,107.90	159,872	17,266.20	36,834.50
	500 mm x 4000 mm	Nr	372.28	410.44	22.87	51,642.80	72,004	7,776.40	16,589.70
	450 mm x 1000mm	Nr	235.34	259.46	15.81	32,949.30	45,763	4,942.40	10,543.80
	450 mm x 2080mm	Nr	323.50	356.66	15.81	44,516.10	61,828	6,677.40	14,245.20
	400 mm x 1600mm	Nr	147.70	162.84	10.93	20,811.30	28,905	3,121.70	6,659.60
	400 mm x 275mm	Nr	155.83	171.80	10.93	21,877.50	30,385	3,281.60	7,000.80
	400 mm x 550mm	Nr	147.70	162.84	10.93	20,811.30	28,905	3,121.70	6,659.60
	400 mm x 1200mm	Nr	179.72	198.14	10.93	25,012.00	34,739	3,751.80	8,003.80
	400 mm x 1480mm	Nr	179.72	198.14	10.93	25,012.00	34,739	3,751.80	8,003.80
	400 mm x 2538mm	Nr	267.64	295.07	10.93	36,546.70	50,759	5,482.00	11,694.90
	400 mm x 4000 mm	Nr	267.67	295.11	10.93	36,551.40	50,766	5,482.70	11,696.40
	350mm x 1500mm	Nr	252.44	278.32	7.73	34,134.20	47,409	5,120.10	10,922.90
	350mm x 1750mm	Nr	180.34	198.82	7.73	24,673.70	34,269	3,701.10	7,895.60
	350mm x 3500mm	Nr	302.03	332.99	7.73	40,640.00	56,444	6,096.00	13,004.80
	300 mm x 4000 mm	Nr	214.03	235.97	5.71	28,829.60	40,041	4,324.40	9,225.50
	300mm x 3190mm	Nr	214.31	236.28	5.71	28,866.50	40,092	4,330.00	9,237.30
	300mm x 1500mm	Nr	180.69	199.21	5.71	24,455.10	33,965	3,668.30	7,825.60
	250 mm x 3000 mm	Nr	290.26	320.01	5.55	38,809.30	53,902	5,821.40	12,419.00
	250mm x 4070mm	Nr	212.16	233.91	5.55	28,563.40	39,671	4,284.50	9,140.30
	250mm x 3300mm	Nr	171.14	189.68	5.55	23,181.10	32,196	3,477.20	7,418.00
	250mm x 2500mm	Nr	149.53	164.86	5.55	20,346.50	28,259	3,052.00	6,510.90
	250mm x 2140mm	Nr	130.13	143.47	5.55	17,801.10	24,724	2,670.20	5,696.40
	250mm x 2000mm	Nr	146.69	161.73	5.55	19,974.00	27,742	2,996.10	6,391.70
	250mm x 1200mm	Nr	89.11	98.24	5.55	12,418.70	17,248	1,862.80	3,974.00
	250mm x 1000mm	Nr	88	97.02	5.55	12,273.50	17,047	1,841.00	3,927.50
	200 mm x 3000 mm	Nr	217.04	239.29	2.89	28,854.00	40,075	4,328.10	9,233.30
	200 mm x 2900 mm	Nr	109.33	120.54	2.89	14,722.80	20,448	2,208.40	4,711.30
	200 mm x 2070 mm	Nr	95.46	105.24	2.89	12,902.10	17,920	1,935.30	4,128.70
	200 mm x 1770 mm	Nr	79.87	88.06	2.89	10,857.60	15,080	1,628.60	3,474.40
	200 mm x 1630 mm	Nr	79.87	88.06	2.89	10,857.60	15,080	1,628.60	3,474.40
	200 mm x 1470 mm	Nr	66	72.77	2.89	9,038.10	12,553	1,355.70	2,892.20
	200 mm x 1000 mm	Nr	66.58	73.40	2.89	9,113.10	12,657	1,367.00	2,916.20

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ¥	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' *A1*1.1025) *119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	200 mm x 900 mm	Nr	50.42	55.59	2.89	6,993.70	9,713	1,049.10	2,238.00
	200 mm x 600 mm	Nr	50.42	55.59	2.89	6,993.70	9,713	1,049.10	2,238.00
	200 mm x 400mm	Nr	50.42	55.59	2.89	6,993.70	9,713	1,049.10	2,238.00
	200 mm x 304mm	Nr	50.42	55.59	2.89	6,993.70	9,713	1,049.10	2,238.00
	150 mm x 3000 mm	Nr	214.7	236.71	2.23	28,460.40	39,528	4,269.10	9,107.30
	100 mm x 2450mm	Nr	50.32	55.48	1.50	6,798.90	9,443	1,019.80	2,175.60
	100 mm x 1205mm	Nr	35.38	39.01	1.50	4,839.00	6,721	725.90	1,548.50
	100 mm x 1000mm	Nr	64.07	70.64	1.50	8,603.00	11,949	1,290.50	2,753.00
	80 mm x 2000 mm	Nr	49.63	54.72	1.13	6,659.90	9,250	999.00	2,131.20
	80 mm x 600 mm	Nr	44.29	48.83	1.13	5,959.00	8,276	893.90	1,906.90
14	Flanged Spigot Piece								
	500 mm	Nr.	438.13	483.04	22.87	60,482.20	84,003	9,072.30	19,354.30
	450 mm	Nr.	202.63	223.40	15.81	28,658.20	39,803	4,298.70	9,170.60
	400 mm	Nr.	192.53	212.26	10.93	26,692.30	37,073	4,003.80	8,541.50
	350 mm	Nr.	141.7	156.22	7.73	19,604.30	27,228	2,940.60	6,273.40
	300 mm	Nr.	99.05	109.20	5.71	13,743.90	19,089	2,061.60	4,398.00
	250 mm	Nr.	73.48	81.01	5.55	10,368.30	14,400	1,555.20	3,317.90
	200 mm	Nr.	55.87	61.60	2.89	7,708.90	10,707	1,156.30	2,466.80
	150 mm	Nr.	42.15	46.47	2.23	5,821.80	8,086	873.30	1,863.00
	100 mm	Nr.	22.11	24.38	1.50	3,098.00	4,303	464.70	991.40
	80 mm	Nr.	20.88	23.02	1.13	2,887.60	4,011	433.10	924.00
15	Flanged Socket Piece								
	500 mm	Nr.	341.42	376.42	22.87	47,794.50	66,381	7,169.20	15,294.20
	400 mm	Nr.	188.38	207.64	10.93	23,524.50	32,673	3,528.70	7,527.80
	300 mm	Nr.	90.28	99.53	5.71	12,593.20	17,491	1,889.00	4,029.80
	250 mm	Nr.	69.59	76.72	5.55	9,857.80	13,691	1,478.70	3,154.50
	80 mm	Nr.	22.05	24.31	1.13	3,041.10	4,224	456.20	973.20
16	Double Flange Pipe								
	700 mm x 4800 mm	Nr.	1995.59	2201.24	72.08	271,404.30	376,950	40,710.60	86,849.40
	700 mm x 4000 mm	Nr.	1663.04	1833.50	72.08	227,643.20	316,171	34,146.50	72,845.80
	700 mm x 3350 mm	Nr.	1393.45	1535.28	72.08	192,274.00	267,047	28,841.10	61,527.70
	600 mm x 4000 mm *	Nr.	919.26	1013.48	54.01	127,690.10	177,347	19,153.50	40,860.80
	600 mm x 1715 mm *	Nr.	459.63	506.74	54.01	67,388.00	93,594	10,108.20	21,564.20
	600 mm x 2000 mm	Nr.	459.63	506.74	54.01	67,388.00	93,594	10,108.20	21,564.20
	600 mm x 5000 mm	Nr.	919.26	1013.48	54.01	127,690.10	177,347	19,153.50	40,860.80
	500 mm x 2000 mm	Nr.	348.17	383.86	45.04	51,680.30	71,778	7,752.00	16,537.70
	450 mm x 5000 mm	Nr.	701.24	773.12	31.61	96,148.40	133,539	14,422.30	30,767.50
	450 mm x 4000 mm	Nr.	621.96	685.71	31.61	85,746.60	119,093	12,862.00	27,438.90
	450 mm x 3030 mm	Nr.	538.60	593.81	31.61	74,810.50	103,903	11,221.60	23,939.40
	400 mm x 5000 mm *	Nr.	515.84	568.71	21.85	70,543.20	97,977	10,581.50	22,573.80
	400 mm x 4000 mm *	Nr.	373.82	412.14	21.85	51,911.30	72,099	7,786.70	16,611.60
	400 mm x 3000 mm	Nr.	401.36	442.50	21.85	55,524.20	77,117	8,328.60	17,767.70
	400 mm x 2000 mm	Nr.	401.36	442.50	21.85	55,524.20	77,117	8,328.60	17,767.70
	400 mm x 1400 mm	Nr.	283.45	312.50	21.85	40,054.20	55,631	6,008.10	12,817.30
	300 mm x 5000 mm	Nr.	355.58	392.03	11.42	48,149.80	66,875	7,222.50	15,407.90
	300 mm x 4044 mm	Nr.	306.14	337.52	11.42	41,663.20	57,866	6,249.50	13,332.20
	300 mm x 3000 mm	Nr.	355.58	392.03	11.42	48,149.80	66,875	7,222.50	15,407.90
	300 mm x 2000 mm	Nr.	237.05	261.35	11.42	32,598.90	45,276	4,889.80	10,431.60
	250 mm x 5000 mm	Nr.	286.25	315.59	11.10	39,011.50	54,183	5,851.70	12,483.70
	250 mm x 3340 mm	Nr.	208.44	229.81	11.10	28,803.70	40,005	4,320.60	9,217.20
	250 mm x 2000 mm	Nr.	186.91	206.07	11.10	25,978.60	36,081	3,896.80	8,313.20
	200 mm x 5000 mm	Nr.	209.51	230.98	5.77	28,243.60	39,227	4,236.50	9,038.00
	200 mm x 4000 mm	Nr.	182.24	200.92	5.77	24,666.50	34,259	3,700.00	7,893.30
	200 mm x 3000 mm	Nr.	153.81	169.58	5.77	20,937.00	29,079	3,140.60	6,699.80
	200 mm x 2000 mm	Nr.	123.35	135.99	5.77	16,939.80	23,528	2,541.00	5,420.70
	200 mm x 1580 mm	Nr.	107.74	118.78	5.77	14,891.80	20,683	2,233.80	4,765.40
	200 mm x 1400 mm	Nr.	94.56	104.25	5.77	13,162.80	18,282	1,974.40	4,212.10
	200 mm x 1250 mm	Nr.	93.88	103.48	5.77	13,071.10	18,184	1,960.70	4,182.80
	200 mm x 1000 mm	Nr.	93.88	103.48	5.77	13,071.10	18,184	1,960.70	4,182.80
	150 mm x 4000 mm	Nr.	186.91	206.07	4.45	25,106.20	34,870	3,765.90	8,034.00
	150 mm x 2000 mm	Nr.	186.91	206.07	4.45	25,106.20	34,870	3,765.90	8,034.00
	100mm x 2100mm	Nr.	66.46	73.27	3.00	9,112.70	12,657	1,366.90	2,916.10
	100mm x 2140mm	Nr.	66.81	73.66	3.00	9,159.10	12,721	1,373.90	2,930.90
	100mm x 2500mm	Nr.	75.11	82.81	3.00	10,248.00	14,233	1,537.20	3,279.40
	100 mm x 200 mm	Nr.	25.17	27.75	3.00	3,695.80	5,133	554.40	1,182.70
	80mm x 3500mm	Nr.	86.92	95.83	2.26	11,700.30	16,250	1,755.00	3,744.10
	80mm x 3300mm	Nr.	79.35	87.48	2.26	10,706.60	14,870	1,606.00	3,426.10
	80mm x 3100mm	Nr.	79.35	87.48	2.26	10,706.60	14,870	1,606.00	3,426.10
	80mm x 3000mm	Nr.	78.97	87.06	2.26	10,656.60	14,801	1,598.50	3,410.10

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ¥	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' +A1*1.1025) *119	B'=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	80mm x 2550mm	Nr.	71.12	78.41	2.26	9,627.30	13,371	1,444.10	3,080.70
	80mm x 2400mm	Nr.	63.57	70.09	2.26	8,637.20	11,996	1,295.60	2,763.90
	80mm x 2100mm	Nr.	63.25	69.73	2.26	8,594.40	11,957	1,289.20	2,750.20
	80 mm x 600 mm	Nr.	50.34	55.50	2.26	6,901.00	9,685	1,035.20	2,208.30
	80 mm x 500 mm	Nr.	40.75	44.93	2.26	5,643.20	7,838	845.50	1,805.80
	80 mm x 200 mm	Nr.	25.17	27.75	2.26	3,698.80	4,998	539.80	1,151.60
	Double Flange Pipe with Puddle Flange								
	400 mm x 1800 mm (V)	Nr.	186.91	206.07	21.85	27,389.00	38,040	4,108.40	8,764.50
	300mm x 1875mm	Nr.	105.42	116.23	11.42	15,329.60	21,291	2,299.40	4,905.50
17	Blank Flange								
	600 mm	Nr.	170.78	188.28	27.01	25,948.30	36,039	3,892.20	8,303.50
	500 mm	Nr.	201	221.60	22.87	29,370.90	40,793	4,405.60	9,398.70
	450 mm	Nr.	198.46	218.80	15.81	28,110.80	39,043	4,215.60	8,955.60
	350 mm	Nr.	115.52	127.36	7.73	18,170.00	22,458	2,425.50	5,174.40
	300 mm	Nr.	78.99	87.09	5.71	11,112.80	15,434	1,666.90	3,556.10
	250 mm	Nr.	50.37	55.53	5.55	7,336.20	10,189	1,100.40	2,347.60
	200 mm	Nr.	56.99	62.83	2.89	7,855.30	10,910	1,178.30	2,513.70
	150 mm	Nr.	56.99	62.83	2.23	7,768.70	10,790	1,165.30	2,486.00
	100 mm	Nr.	56.99	62.83	1.50	7,673.60	10,658	1,151.00	2,455.60
	80 mm	Nr.	10.14	11.18	1.13	1,478.70	2,054	221.80	473.20
18	Double Spigot Pipe with Puddle Flange								
	200mm x 1750mm	Nr.	63.70	70.23		8,357.40	11,608	1,253.60	2,674.40
	200mm x 1880mm	Nr.	63.70	70.23		8,357.40	11,608	1,253.60	2,674.40
	250mm x 1905 mm	Nr.	82.94	91.44		10,881.40	15,113	1,632.20	3,482.00
	450mm x 1812mm	Nr.	222.33	245.12		29,169.30	40,513	4,375.40	9,334.20
	600mm x 3020mm	Nr.	480.98	530.28		63,103.30	87,643	9,465.50	20,193.10
19	Plain Ended Spigot Pipe								
	800 mm x 2000 mm	Nr.	256.68	282.99		33,675.80	46,772	5,051.40	10,776.30
	800 mm x 1425 mm	Nr.	192.51	212.24		25,256.60	35,079	3,788.50	8,082.10
	600mm x 1500mm	Nr.	167.54	173.69		20,669.10	28,707	3,100.40	6,614.10
	600 mm x 1425 mm	Nr.	119.07	131.27		15,621.10	21,696	2,343.20	4,998.80
	600mm x 1000mm	Nr.	118.17	130.28		15,503.30	21,532	2,325.50	4,961.10
	500mm x 1500mm	Nr.	119.08	131.29		15,623.50	21,699	2,343.50	4,999.50
	500 mm x 1425 mm	Nr.	93.08	102.62		12,211.80	16,961	1,831.80	3,907.80
	450mm x 1500mm	Nr.	102.61	113.13		13,462.50	18,698	2,019.40	4,308.00
	450mm x 1860mm	Nr.	102.61	113.13		13,462.50	18,698	2,019.40	4,308.00
	400 mm x 1425 mm	Nr.	68.92	75.98		9,041.60	12,558	1,356.20	2,893.30
	400mm x 1000mm	Nr.	65.27	71.96		8,563.20	11,893	1,284.50	2,740.20
	400mm x 532mm	Nr.	39.67	43.74		5,205.10	7,229	780.80	1,665.60
	350mm x 1000mm	Nr.	53.11	58.55		6,967.50	9,677	1,045.10	2,229.60
	300mm x 580mm	Nr.	26.41	29.12		3,465.30	4,813	519.80	1,108.90
	300mm x 600mm	Nr.	26.41	29.12		3,465.30	4,813	519.80	1,108.90
	300mm x 1000mm	Nr.	42.31	46.65		5,551.40	7,710	832.70	1,776.40
	300mm x 1095mm	Nr.	42.31	46.65		5,551.40	7,710	832.70	1,776.40
	300mm x 2000mm	Nr.	75.50	83.24		9,905.60	13,758	1,485.80	3,169.80
	300mm x 2000mm	Nr.	75.50	83.24		9,905.60	13,758	1,485.80	3,169.80
	300mm x 2300mm	Nr.	82.42	90.87		10,813.50	15,019	1,622.00	3,460.30
	300mm x 3655mm	Nr.	121.80	134.28		15,979.30	22,193	2,396.90	5,113.40
	250mm x 830mm	Nr.	21.24	23.42		2,787.00	3,871	418.10	891.80
	250mm x 960mm	Nr.	21.24	23.42		2,787.00	3,871	418.10	891.80
	250mm x 1000mm	Nr.	33.79	37.25		4,432.80	6,157	664.90	1,418.50
	250mm x 1200mm	Nr.	34.90	38.48		4,579.10	6,360	686.90	1,485.30
	250mm x 1500mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	250mm x 1535mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	250mm x 1550mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	250mm x 1600mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	250mm x 1630mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	250mm x 1920mm	Nr.	46.33	51.08		6,078.50	8,442	911.80	1,945.10
	200mm x 700mm	Nr.	16.44	18.13		2,157.50	2,997	323.60	690.40
	200mm x 1000mm	Nr.	26.80	29.55		3,516.50	4,884	527.50	1,125.30
	200mm x 1100mm	Nr.	26.80	29.55		3,516.50	4,884	527.50	1,125.30
	200mm x 1300mm	Nr.	26.80	29.55		3,516.50	4,884	527.50	1,125.30
	200mm x 1400mm	Nr.	26.80	29.55		3,516.50	4,884	527.50	1,125.30
	200mm x 1500mm	Nr.	35.44	39.07		4,649.30	6,457	697.40	1,487.80
	200mm x 1900mm	Nr.	35.44	39.07		4,649.30	6,457	697.40	1,487.80
	200mm x 2450mm	Nr.	45.80	50.49		6,008.30	8,345	901.20	1,922.70
	200mm x 2800mm	Nr.	54.45	60.03		7,143.60	9,922	1,071.50	2,286.00
	200mm x 2900mm	Nr.	54.45	60.03		7,143.60	9,922	1,071.50	2,286.00

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES			
			in £	in £	in £	FC - in Rs.	FC - in ₹	LC - Rs.	Duty - Rs.
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' *A1*1.1025) *119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26
	150 mm x 2450 mm	Nr.	34.20	37.71		4,487.50	6,233	673.10	1,436.00
	150 mm x 2600 mm	Nr.	40.80	44.76		5,326.40	7,398	799.00	1,704.40
	150 mm x 2650 mm	Nr.	40.80	44.76		5,326.40	7,398	799.00	1,704.40
	150 mm x 2900 mm	Nr.	40.80	44.76		5,326.40	7,398	799.00	1,704.40
	100 mm x 1000 mm	Nr.	13.34	14.71		1,750.50	2,431	262.50	560.20
	100 mm x 2500 mm	Nr.	27.35	30.15		3,587.90	4,983	538.20	1,148.10
	100 mm x 2900 mm	Nr.	27.35	30.15		3,587.90	4,983	538.20	1,148.10
	100 mm x 4410 mm	Nr.	41.78	46.06		5,481.10	7,613	822.20	1,754.00
	80 mm x 1000mm	Nr.	12.96	14.29		1,700.50	2,362	255.10	544.20
	80 mm x 1800 mm	Nr.	17.55	19.35		2,302.70	3,198	345.40	736.90
	80 mm x 2300 mm	Nr.	22.48	24.78		2,948.80	4,096	442.30	943.60
	80 mm x 2400 mm	Nr.	22.48	24.78		2,948.80	4,096	442.30	943.60
	80 mm x 2450 mm	Nr.	22.48	24.78		2,948.80	4,096	442.30	943.60
	80 mm x 2500 mm	Nr.	26.72	29.46		3,505.70	4,869	525.90	1,121.80
	80 mm x 2600 mm	Nr.	26.72	29.46		3,505.70	4,869	525.90	1,121.80
	80 mm x 2900 mm	Nr.	26.72	29.46		3,505.70	4,869	525.90	1,121.80
	80 mm x 3000 mm	Nr.	32.44	35.77		4,256.60	5,912	638.50	1,362.10
	80 mm x 3300 mm	Nr.	31.66	34.91		4,154.30	5,770	623.10	1,329.40
	80 mm x 4500 mm	Nr.	45.08	49.70		5,914.30	8,214	887.10	1,892.60
	200 mm x 3000 mm	Nr.	80.31	88.54		10,536.30	14,634	1,580.40	3,371.60
	200 mm x 6000 mm	Nr.	160.62	177.08		21,072.50	29,267	3,160.80	6,743.20
	150 mm x 3000 mm	Nr.	120.00	132.30		15,743.70	21,866	2,361.60	5,038.00
	150 mm x 4000 mm	Nr.	140.00	154.35		18,367.70	25,511	2,755.20	5,877.70
20	Double Socket level Invert Tee with Flange Branch								
	800 mm x 200 mm	Nr.	1455.69	1604.90	2.89	191,361.60	265,780	28,704.20	61,235.70
	600 mm x 100 mm	Nr.	1001.39	1104.03	1.50	131,576.40	182,745	19,736.50	42,104.40
	600 mm x 100mm	Nr.	519.19	572.41	1.50	68,313.60	94,880	10,247.00	21,860.40
	450 mm x 100 mm	Nr.	340.53	375.43	1.50	44,873.00	62,324	6,731.00	14,359.40
	400 mm x 100 mm *	Nr.	415.16	457.71	1.50	54,654.30	75,923	8,199.60	17,492.60
	350 mm x 100 mm	Nr.	431.18	475.38	1.50	56,767.00	78,843	8,515.10	18,165.40
	300 mm x 80 mm	Nr.	260.45	287.15	1.13	34,319.10	47,665	5,147.90	10,982.10
	250 mm x 80 mm	Nr.	192.65	212.40	1.13	25,423.90	35,311	3,813.60	8,135.60
21	D/F Level Inv. Tee with Flanged Branch								
	700 x 200	Nr.	1455.69	1604.90	74.97	200,818.30	278,914	30,122.70	64,261.90
	600 x 150	Nr.	1001.39	1104.03	56.24	138,757.50	192,719	20,813.60	44,402.40
22	Flanged Bellmouth								
	600mm	Nr.	303.17	334.24	27.01	43,317.50	60,163	6,497.60	13,851.60
	450mm	Nr.	227.07	250.34	15.81	31,864.00	44,256	4,779.60	10,196.50
	400mm	Nr.	189.2	208.59	10.93	26,255.50	36,466	3,938.30	8,401.80
	300mm	Nr.	84.53	93.19	5.71	11,838.70	16,443	1,775.80	3,788.40
	250mm	Nr.	61.18	67.45	5.55	8,754.70	12,159	1,313.20	2,801.50
	200mm	Nr.	43.27	47.71	2.89	6,056.00	8,411	908.40	1,937.90
23	Collar								
	100mm	Nr.	33.55	36.99		4,401.80	6,114	660.30	1,408.60
	200mm	Nr.	65.81	72.56		8,634.60	11,993	1,295.20	2,763.10
	250mm	Nr.	126.29	139.23		16,568.40	23,012	2,485.30	5,301.90
	300mm	Nr.	163.51	180.27		21,452.10	29,795	3,217.80	6,864.70
	400mm	Nr.	388.65	428.49		50,990.30	70,820	7,648.50	16,316.90
24	Socket & Spigot Pipes								
	200mm x 4530mm	Nr.	91.68	101.08		12,028.50	16,706	1,804.30	3,849.10
	200mm x 2100mm	Nr.	47.15	51.98		6,185.60	8,591	927.80	1,979.40
	200mm x 1000mm	Nr.	29.34	32.35		3,849.70	5,347	577.50	1,231.90
	250mm x 1000mm	Nr.	38.38	42.31		5,034.90	6,993	755.20	1,611.20
	250mm x 1200mm	Nr.	38.38	42.31		5,034.90	6,993	755.20	1,611.20
	250mm x 1380mm	Nr.	38.38	42.31		5,034.90	6,993	755.20	1,611.20
	250mm x 3000mm	Nr.	85.46	94.22		11,212.20	15,573	1,681.80	3,587.90
	250mm x 3710mm	Nr.	97.23	107.20		12,756.80	17,718	1,913.50	4,082.20
	250mm x 3890mm	Nr.	97.23	107.20		12,756.80	17,718	1,913.50	4,082.20
	250mm x 4220mm	Nr.	109.01	120.18		14,301.40	19,863	2,145.20	4,576.40
	250mm x 4580mm	Nr.	120.77	133.15		15,844.90	22,007	2,376.70	5,070.40
	300mm x 2180mm	Nr.	70.58	77.81		9,259.40	12,860	1,388.90	2,963.00
	300mm x 2455mm	Nr.	77.72	85.69		10,197.10	14,163	1,529.60	3,263.10
	300mm x 2500mm	Nr.	92.85	102.15		12,155.90	16,883	1,823.40	3,889.90
	350mm x 1000mm	Nr.	64.67	71.30		8,484.70	11,784	1,272.70	2,715.10
	350mm x 2000mm	Nr.	101.70	112.12		13,342.30	18,531	2,001.30	4,269.50

Item No.	Description	Unit	UNIT RATES (1998) FOR DI PIPES AND FITTINGS	UNIT RATES (2000) FOR DI PIPES AND FITTINGS	SUPPLY RATE (1998) OF FLANGES	UNIT RATES (2000) FOR SUPPLY OF DI PIPES, FITTINGS & VALVES				
			in £	in £	in £	FC - in Rs.	FC - in ¥	LC - Rs.	Duty - Rs.	
			A	A' = A*1.1025 (5% per annum)	A1	B=(A' +A1*1.1025) *119	B=B / 0.72	C = B*0.15	D = B*0.32 D = B*0.26	
25	Socket & Spigot Pipes with puddle flange									
	400mm x 1500 mm	Nr	327.72	361.31		42,995.90	59,717	6,449.40	13,758.70	
	500mm x 1500 mm	Nr	493.9	544.52		64,797.90	89,997	9,719.70	20,735.30	
26	Socket & Unchantered spigot pipe									
	100mm x 1000mm	Nr	15.75	17.36		2,065.80	2,869	309.90	661.10	
	200mm x 1500mm	Nr	77.45	85.39		10,161.40	14,113	1,524.20	3,251.60	
27	Flange Socket pipe with puddle flange									
	600mm x 1500mm	Nr	789.84	870.80	27.01	107,168.20	148,845	16,075.20	34,293.80	
	500mm x 1500mm	Nr	632.12	696.91	22.87	85,932.80	119,351	12,889.90	27,498.50	
	450mm x 1500mm	Nr	548.37	604.58	15.81	74,018.60	102,804	11,102.80	23,686.00	
28	Polythene Sleeving									
	1750mm Wide	Lm	0.91	1.00		119.00	165	17.90	38.10	
	1350mm Wide	Lm	0.71	0.78		92.80	129	13.90	29.70	
	800mm Wide	Lm	0.42	0.46		54.70	76	8.20	17.50	
	700mm Wide	Lm	0.36	0.40		47.60	66	7.10	15.20	
	PVC Adhesive Tape Black									
	50mm x 33m		1.37	1.51		179.70	250	27.00	57.50	
VALVES, FIRE HYDRANTS, AIR VALVES ETC.										
1	Gate Valves D/F PN16 Resilient Seated									
	50 mm	Nr.	75.43	83.16		9,896.00	13,744	1,484.40	2,573.00	
	80 mm	Nr.	75.43	83.16		9,896.00	13,744	1,484.40	2,573.00	
	100 mm	Nr.	87.22	96.16		11,443.00	15,893	1,715.50	2,975.20	
	150 mm	Nr.	132.89	146.51		17,434.70	24,215	2,615.20	4,533.00	
	200 mm	Nr.	260.25	286.93		34,144.70	47,423	5,121.70	8,877.60	
	250 mm	Nr.	377.5	416.19		48,526.60	68,787	7,429.00	12,876.90	
	300 mm	Nr.	456.73	503.54		59,921.30	83,224	8,988.20	15,579.50	
2	Butterfly Valve D/F PN 16 Resilient Seated									
	400 mm	Nr.	1487.95	1640.46		195,214.70	271,132	29,282.20	50,755.80	
	500 mm	Nr.	2547.38	2808.49		334,210.30	464,181	50,131.50	86,894.70	
	600 mm	Nr.	3061.38	3375.17		401,645.20	557,841	60,246.80	104,427.80	
3	Air Valves									
	25 mm Single Orifice with Isolating Cock Ferrule	Nr.	89.15	98.29		11,696.50	16,245	1,754.50	3,041.10	
	60 mm double orifice with 80 mm flange	Nr.	263.92	290.97		34,625.40	48,091	5,193.80	9,002.60	
	100 mm double orifice with 80 mm flange	Nr.	415.15	457.70		54,466.30	75,648	8,169.90	14,161.20	
	100 mm double orifice with 100 mm flange	Nr.	433.11	477.50		56,822.50	78,920	8,523.40	14,773.90	
	150 mm double orifice with 150 mm flange	Nr.	1013.06	1116.90		132,911.10	184,599	19,936.70	34,556.90	
4	Fire Hydrant									
	80 mm screw down type fire hydrant	Nr.	64.16	70.74		8,418.10	11,692	1,262.70	2,188.70	
5	Flap Valve									
	200mm (TSC)	Nr	151.97	167.55		19,938.50	27,692	2,980.80	5,184.00	
	100mm (TSC) TF TIDAL Flap valve	Nr	71.94	79.31		9,437.90	13,108	1,415.70	2,453.90	
6	Manhole Cover									
	AV - Heavy Duty Ventilated Hinged type for Air Valve Chambers	Nr.	62.7	69.13		8,226.50	11,426	1,234.00	2,138.90	
	WV - Heavy Duty Hinged type for Washout	Nr.	95.04	104.78		12,468.80	17,318	1,870.30	3,241.90	
	FH - Heavy Duty Hinged type Fire Hydrant	Nr.	95.04	104.78		12,468.80	17,318	1,870.30	3,241.90	
	SV - Heavy Duty Hinged Type for Section Valve	Nr.	95.04	104.78		12,468.80	17,318	1,870.30	3,241.90	
	Waste Meter Chamber/Covers	Nr.	95.04	104.78		12,468.80	17,318	1,870.30	3,241.90	
7	Surface Box Lockable Heavy Duty									
	150 x 150 Surface Box	Nr.	27.8	30.65		3,647.40	5,066	547.10	948.30	

Supply and Laying of PVC Pipes, Fittings and Valves

(a) Supply Rates

Supply rates for PVC items are based on manufacturers price list which is given in SLRs. Total supply cost is estimated by adding 25% of the manufacturers supply rate to cover the overhead and profit of contractor.

(b) Foreign Component and Local Component

Foreign component of supply rates for PVC pipes and fittings are calculated as 18% of the total supply cost and converted in to Japanese Yen.

Local component of supply rates for PVC pipes and fittings are calculated as 82% of the total supply cost to cover transport, handling and storage.

Supply of PVC Pipes and Fittings

Category	Description	Calculation
Foreign component	Cost of expatriate supervisory staff	(Quotation Price +Overhead & Profit) * 18%
Local component	Cost of pipes including transport and handling	CIF value in SLRs. * 82%

(d) Laying and Installation

Basis is same as that of laying DI pipes

SUPPLY RATES FOR PVC PIPES AND FITTINGS

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	Description	Length in m	Unit	Rate per Unit in Rs. (2000)		Unit	Rate	
				T1000	T600		Local Component in Rs.	Foreign Component in Yen
1	Plain Ended Pipes			T1000	T600		T1000	
	20mm	4	Length	56.00	-	m	15	5
	25mm	4	Length	97.99	-	m	27	8
	32mm	4	Length	147.00	100.80	m	41	12
	40mm	4	Length	226.73	181.01	m	63	19
	50mm	4	Length	336.00	215.60	m	93	28
	63mm	4	Length	562.53	352.80	m	156	47
	75mm	4	Length	1,166.82	668.35	m	323	98
	90mm	6	Length	2,073.68	1,328.25	m	383	116
	110mm	6	Length	3,100.06	1,948.24	m	572	173
	140mm	6	Length	5,569.20	3,386.60	m	1,028	310
	160mm	6	Length	6,996.50	4,412.10	m	1,291	390
	225mm	6	Length	13,650.00	8,648.50	m	2,518	760
	280mm	6	Length	21,072.80	13,300.00	m	3,888	1,174
	315mm	6	Length	26,759.60	16,952.60	m	4,937	1,491
2	Solvent Socket Joint Pipes							
	63mm	4	Length	564.61	355.59	m	156	47
	75mm	4	Length	1,182.23	673.26	m	327	99
	90mm	6	Length	2,104.48	1,347.84	m	388	117
	110mm	6	Length	3,138.56	1,973.44	m	579	175
	140mm	6	Length	5,616.80	3,416.00	m	1,036	313
	160mm	6	Length	7,051.10	4,447.80	m	1,301	393
	225mm	6	Length	13,883.80	8,711.50	m	2,562	773
	280mm	6	Length	21,205.10	13,397.30	m	3,912	1,181
	315mm	6	Length	26,947.20	17,063.20	m	4,972	1,501
3	Bell Ended Pipes							
	90mm	6	Length	2,329.05	1,504.83	m	430	130
	110mm	6	Length	3,454.65	2,170.57	m	637	192
	160mm	6	Length	7,114.80	4,501.00	m	1,313	396
	225mm	6	Length	13,834.80	8,852.90	m	2,553	771
	280mm	6	Length	21,324.80	13,505.10	m	3,934	1,188
	315mm	6	Length	27,167.70	17,222.10	m	5,012	1,513
4	Drainage Pipes (Solv.Socket)			Drainage pipe				
	110mm	6	length	507.50		m	94	28
	160mm	6	length	1,004.50		m	185	56
INJECTION MOULDED FITTINGS								
5	Equal Socket							
	20mm		Nr	5.56		Nr	6	2
	25mm		Nr	8.09		Nr	9	3
	32mm		Nr	11.62		Nr	13	4
	40mm		Nr	17.69		Nr	20	6
	50mm		Nr	26.25		Nr	29	9
	63mm		Nr	43.71		Nr	48	15
	75mm		Nr	73.78		Nr	82	25
	90mm		Nr	128.36		Nr	142	43
	110mm		Nr	196.58		Nr	218	66

	Description	Length in m	Unit	Rate per Unit in Rs. (2000)		Unit	Rate	
							Local Component in Rs.	Foreign Component in Yen
6	Elbow							
	20mm		Nr	5.56		Nr	6	2
	25mm		Nr	8.59		Nr	10	3
	32mm		Nr	14.66		Nr	16	5
	40mm		Nr	21.73		Nr	24	7
	50mm		Nr	39.42		Nr	44	13
	63mm		Nr	67.21		Nr	74	22
	110mm		Nr	278.93		Nr	307	93
7	Equal Tee							
	Solvent Socket							
	20mm		Nr	7.07		Nr	8	2
	25mm		Nr	11.88		Nr	13	4
	32mm		Nr	19.71		Nr	22	7
	40mm		Nr	29.31		Nr	32	10
	50mm		Nr	51.55		Nr	57	17
	63mm		Nr	78.83		Nr	87	26
	75mm		Nr	144.53		Nr	160	48
	90mm		Nr	329.88		Nr	365	110
	110mm		Nr	510.40		Nr	565	171
	Injection moulded Bell ended Rubber ring joint Equal Tees							
	110mm		Nr	9,000.00		Nr	9,963	3,008
	160mm		Nr	14,500.00		Nr	16,052	4,847
	225mm		Nr	85,500.00		Nr	94,649	28,578
8	Valve Socket							
	20mm		Nr	7.07		Nr	8	2
	25mm		Nr	9.10		Nr	10	3
	32mm		Nr	12.13		Nr	13	4
	40mm		Nr	35.37		Nr	39	12
	50mm		Nr	41.44		Nr	46	14
	63mm		Nr	61.65		Nr	68	21
9	Faucet Socket							
	20mm		Nr	7.33		Nr	8	2
	25mm		Nr	11.62		Nr	13	4
	32mm		Nr	15.67		Nr	17	5
	40mm		Nr	25.01		Nr	28	8
	50mm		Nr	37.14		Nr	41	12
10	Faucet Elbow							
	20mm		Nr	1.63		Nr	2	1
	25mm		Nr	15.16		Nr	17	5
	32mm		Nr	22.49		Nr	25	8
11	Faucet Tee							
	20mm		Nr	18.19		Nr	20	6
	25mm		Nr	23.25		Nr	26	8
	32mm		Nr	31.84		Nr	35	11

	Description	Length in m	Unit	Rate per Unit in Rs. (2000)		Unit	Rate	
							Local Component in Rs.	Foreign Component in Yen
12	End Cap							
	20mm		Nr	6.82		Nr	8	2
	25mm		Nr	8.09		Nr	9	3
	32mm		Nr	10.61		Nr	12	4
	40mm		Nr	14.66		Nr	16	5
	50mm		Nr	20.21		Nr	22	7
	63mm		Nr	29.31		Nr	32	10
	90mm		Nr	800.00		Nr	886	267
	110mm		Nr	850.00		Nr	941	284
	160mm		Nr	1,947.00		Nr	2,155	651
	225mm		Nr	5,500.00		Nr	6,089	1,838
13	Reducing Socket							
	25x20		Nr	8.09		Nr	9	3
	32x20		Nr	9.85		Nr	11	3
	32x25		Nr	12.13		Nr	13	4
	40x20		Nr	16.17		Nr	18	5
	40x25		Nr	18.19		Nr	20	6
	40x32		Nr	21.22		Nr	23	7
	50x25		Nr	35.37		Nr	39	12
	50x32		Nr	29.31		Nr	32	10
	50x40		Nr	30.83		Nr	34	10
	63x25		Nr	47.00		Nr	52	16
	63x32		Nr	41.44		Nr	46	14
	63x40		Nr	46.49		Nr	51	16
	63x50		Nr	48.51		Nr	54	16
14	Reducing Elbow							
	25x20		Nr	8.09		Nr	9	3
	32x20		Nr	11.62		Nr	13	4
	32x25		Nr	12.13		Nr	13	4
	40x20		Nr	19.48		Nr	22	7
	40x25		Nr	20.72		Nr	23	7
15	Reducing Tee							
	25x20		Nr	14.15		Nr	16	5
	32x20		Nr	18.19		Nr	20	6
	32x25		Nr	20.21		Nr	22	7
	40x20		Nr	24.00		Nr	27	8
	40x25		Nr	31.08		Nr	34	10
	40x32		Nr	29.31		Nr	32	10
	50x20		Nr	45.48		Nr	50	15
	50x25		Nr	40.68		Nr	45	14
	50x32		Nr	46.49		Nr	51	16
	50x40		Nr	63.08		Nr	70	21
	63x25		Nr	85.91		Nr	95	29
	63x32		Nr	80.35		Nr	89	27
	63x40		Nr	86.41		Nr	96	29
	63x50		Nr	89.86		Nr	99	30
	75x50		Nr	141.50		Nr	157	47
	75x63		Nr	148.55		Nr	164	50
	90x50		Nr	212.25		Nr	235	71
	90x63		Nr	232.48		Nr	257	78
	90x75		Nr	242.57		Nr	269	81
	110x20		Nr	525.56		Nr	582	176
	110x63		Nr	525.58		Nr	582	176
	110x90		Nr	596.31		Nr	660	199

	Description	Length in m	Unit	Rate per Unit in Rs. (2000)			Unit	Rate	
								Local Component in Rs.	Foreign Component in Yen
	Injection moulded Bell ended Rubber ring joint reducing Tees								
	225x160mm		Nr	56,500.00			Nr	62,546	18,885
	225x110mm		Nr	48,000.00			Nr	53,136	16,044
	225x90mm		Nr	47,000.00			Nr	52,029	15,710
	160x110mm		Nr	15,000.00			Nr	16,605	5,014
	160x90mm		Nr	18,000.00			Nr	19,926	6,017
	160x63mm		Nr	21,000.00			Nr	23,247	7,019
	110x90mm		Nr	10,000.00			Nr	11,070	3,343
	110x63mm		Nr	14,600.00			Nr	16,162	4,860
15	Reducing F'cet Tee								
	25x20		Nr	28.30			Nr	31	9
	32x20		Nr	34.11			Nr	38	11
	32x25		Nr	34.67			Nr	38	12
	PVC FABRICATED FITTINGS			Bends Solvent Socket	Bends Solvent Socket	E/Socket S/S		Bends Solvent Socket T1000	
16	Bends S/S			T1000	T600	T1000			
	20mm		Nr	9.10	-	-	Nr	10	3
	25mm		Nr	12.13	-	-	Nr	13	4
	32mm		Nr	18.19	-	-	Nr	20	6
	40mm		Nr	36.39	-	-	Nr	40	12
	50mm		Nr	60.64	-	-	Nr	67	20
	63mm		Nr	126.34	-	-	Nr	140	42
	75mm		Nr	303.21	-	73.78	Nr	336	101
	90mm		Nr	505.35	359.81	128.36	Nr	559	169
	110mm		Nr	758.02	555.88	196.58	Nr	839	253
	140mm		Nr	1,819.25	1,288.64	-	Nr	2,014	608
	160mm		Nr	2,172.99	1,586.58	-	Nr	2,405	726
	225mm		Nr	5,028.21	3,436.36	-	Nr	5,566	1,681
	280mm		Nr	13,543.32	9,753.21	-	Nr	14,992	4,527
	315mm		Nr	23,726.07	18,091.44	-	Nr	26,265	7,930
	Bends Bell ended rubber ring joint								
	90mm		Nr	505.35			Nr	559	169
	110mm		Nr	758.02			Nr	839	253
	160mm		Nr	2,172.99			Nr	2,405	726
	225mm		Nr	5,028.21			Nr	5,566	1,681
17	PVC Bell Ended sleeves								
	225mm		Nr	6,270.00			Nr	6,941	2,096
	160mm		Nr	4,400.00			Nr	4,871	1,471
	110mm		Nr	2,310.00			Nr	2,557	772
	90mm		Nr	1,210.00			Nr	1,339	404
	63mm		Nr	605.00			Nr	670	202
18	Special fittings								
	Clam saddle 110x20mm		Nr	239.25			Nr	265	80
	Clam saddle 110x25mm		Nr	255.71			Nr	283	85
19	Tapered Core								
	50mm		Nr	89.06			Nr	99	30
	63mm		Nr	122.30			Nr	135	41

	Description	Length in m	Unit	Rate per Unit in Rs. (2000)		Unit	Rate	
							Local Component in Rs.	Foreign Component in Yen
20	PVC Reducer - Tapers							
	225 mm x 160 mm - Type 1000		Nr	40500		Nr	44,834	13,537
	225 mm x 110 mm - Type 1000			45000			49,815	15,041
	160 mm x 110 mm - Type 1000		Nr	9000		Nr	9,963	3,008
	160 mm x 63 mm - Type 1000		Nr	10500		Nr	11,624	3,510
	110 mm x 90 mm - Type 1000		Nr	6750		Nr	7,472	2,256
	110 mm x 63 mm - Type 1000		Nr	6750		Nr	7,472	2,256
	90 mm x 63 mm - Type 1000		Nr	6000		Nr	6,642	2,006
21	Solvent Cement							
	25g		1Nr	24.76		1Nr	27	8
	50g		1Nr	42.95		1Nr	48	14
	100g		1Nr	89.74		1Nr	99	30
	250g		1Nr	173.84		1Nr	192	58
	500g		1Nr	336.56		1Nr	373	112
	1000g		1Nr	643.81		1Nr	713	215

Note: 1. The above prices are based on budgetary prices received from St. Anthony's in June 2000

2. All prices include 12.5% GST & 6.5% NSL

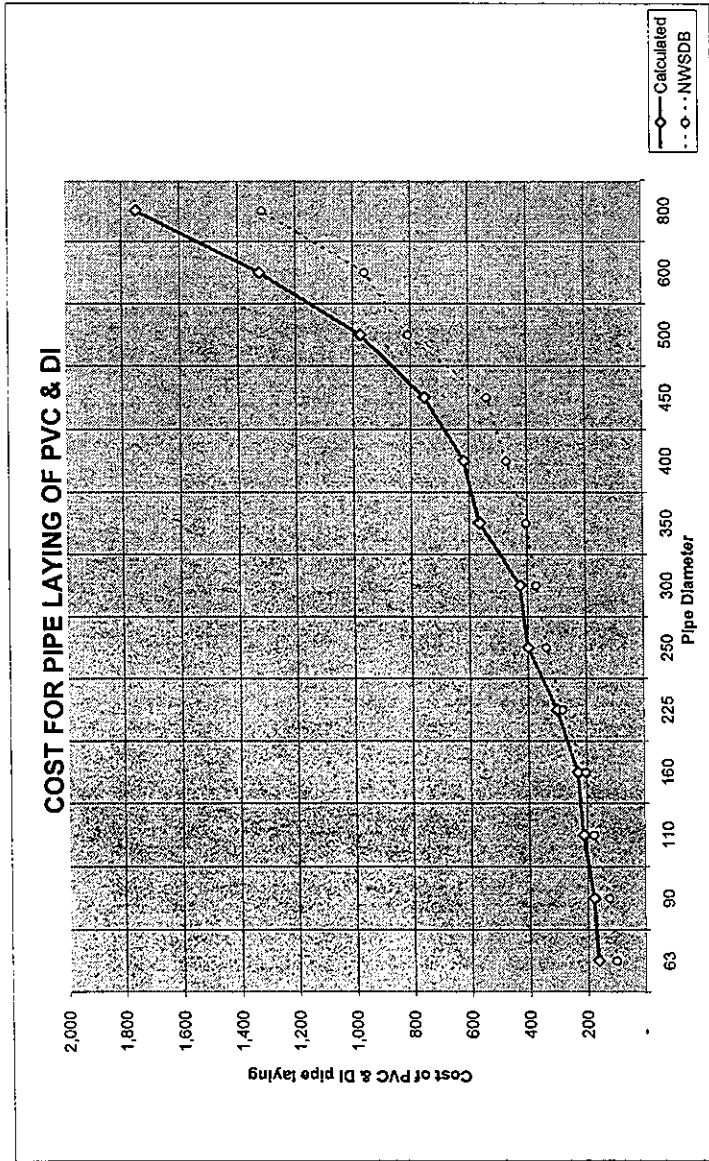
Rates for Laying of PVC and DI Pipes, Fittings and Valves

- Summary of Pipe Laying Up to 2 m depth
- Summary of Installation Rates for PVC & DI Bends
- Thrust Blocks for Tees and Anchor Blocks
- Thrust Block for Tapers
- Summary of Chamber Costs (Butterfly Valve, Waste meter, Air Valve & Washout)
- Surface Box and Marker Posts
- Miscellaneous
 - Calculation of rates for supply of flanges
 - Calculation of rates for supply & installation of joint protection for flanges on pipes
 - Calculation of Rates for Supply & Installation of Joint Protection for Couplings and Adapters
 - Calculation of Rates for Supply & Installation of Joint Protection for Valves
 - Other expenditure on 1 Nr. Testing (for PVC & DI lines up to 350 mm dia) – length 1000 mm (for 63 mm dia length 1500 m)
 - Other Expenditure on 1 Nr. Testing (for DI lines of 350 mm dia & above)- length 500 m

Summary of Rates for Laying Pipes up to 2m depth

Description	Unit	Calculated Rate in Rs.	Local Component in Rs. (92%)	Foreign Component in Rs. (8%)	Foreign Component in Yen Rs./0.727
			0.92	0.08	0.727
PVC					
63	m	163	150.00	13.04	18
90	m	178	163.80	14.24	20
110	m	212	195.00	16.96	23
160	m	231	212.50	18.48	25
225	m	301	276.90	24.08	33
DI					
250	m	400	368.00	32.00	44
300	m	427	392.80	34.16	47
350	m	566	520.70	45.28	62
400	m	617	567.60	49.36	68
450	m	753	692.80	60.24	83
500	m	974	896.10	77.92	107
600	m	1,326	1,219.90	106.08	146
800	m	1,750	1,610.00	140.00	193

	63	90	110	160	225	250	300	350	400	450	500	600	800
Calculated	163	178	212	231	301	400	427	566	617	753	974	1,328	1,750
NWSDB	101.00	125.00	177.00	203.00	282.00	338.00	371.00	405.00	473.00	540.00	810.00	959.00	1,316.00



Summary of Installation Rates for PVC & DI Bends

Description	Unit	Calculated Rate in Rs.	Local Component in Rs. (92%)	Foreign Component in Rs. (8%)	Foreign Component in Yen Rs./0.727
			0.92	0.08	0.727
Bends					
90 deg					
PVC					
63	Nr	555	510.60	44.40	61
90	Nr	780	717.60	62.40	86
110	Nr	915	841.80	73.20	101
160	Nr	1,465	1,347.80	117.20	161
225	Nr	2,300	2,116.00	184.00	253
DI					
250	Nr	3,376	3,105.90	270.08	371
300	Nr	4,818	4,432.60	385.44	530
350	Nr	6,541	6,017.70	523.28	720
400	Nr	10,587	9,740.00	846.96	1,165
450	Nr	1,432	1,317.40	114.56	158
500	Nr	15,474	14,236.10	1,237.92	1,703
600	Nr	22,986	21,147.10	1,838.88	2,529
800	Nr	1,682	1,547.40	134.56	185
45 deg					
PVC					
63	Nr	470	432.40	37.60	52
90	Nr	567	521.60	45.36	62
110	Nr	639	587.90	51.12	70
160	Nr	981	902.50	78.48	108
225	Nr	1,463	1,346.00	117.04	161
DI					
250	Nr	2,129	1,958.70	170.32	234
300	Nr	2,888	2,657.00	231.04	318
350	Nr	3,957	3,640.40	316.56	435
400	Nr	6,211	5,714.10	496.88	683
450	Nr	1,257	1,156.40	100.56	138
500	Nr	8,887	8,176.00	710.96	978
600	Nr	1,473	1,355.20	117.84	162
800	Nr	1,551	1,426.90	124.08	171

Description	Unit	Calculated Rate in Rs.	Local Component in Rs. (92%)	Foreign Component in Rs. (8%)	Foreign Component in Yen Rs./0.727
			0.92	0.08	0.727
22.5 deg					
PVC					
63	Nr	371	341.30	29.68	41
90	Nr	483	444.40	38.64	53
110	Nr	528	485.80	42.24	58
160	Nr	705	648.60	56.40	78
225	Nr	961	884.10	76.88	106
DI					
250	Nr	1,416	1,302.70	113.28	156
300	Nr	1,813	1,668.00	145.04	200
350	Nr	2,487	2,288.00	198.96	274
400	Nr	3,661	3,368.10	292.88	403
450	Nr	1,207	1,110.40	96.56	133
500	Nr	5,202	4,785.80	416.16	572
600	Nr	1,422	1,308.20	113.76	156
800	Nr	1,473	1,355.20	117.84	162
11.25 deg					
PVC					
63	Nr	340	312.80	27.20	37
90	Nr	377	346.80	30.16	41
110	Nr	412	379.00	32.96	45
160	Nr	516	474.70	41.28	57
225	Nr	660	607.20	52.80	73
DI					
250	Nr	809	744.30	64.72	89
300	Nr	1,195	1,099.40	95.60	131
350	Nr	1,727	1,588.80	138.16	190
400	Nr	2,384	2,193.30	190.72	262
450	Nr	1,131	1,040.50	90.48	124
500	Nr	3,214	2,956.90	257.12	354
600	Nr	1,345	1,237.40	107.60	148
800	Nr	1,422	1,308.20	113.76	156

CALCULATION OF RATES FOR INSTALLATION OF PVC & DI BENDS

11.25 deg PVC & DI BENDS

Description	Unit	Rate in Rs.	Quantity of Machinery & Labour for Each Pipe Diameters (PVC)										Quantity of Machinery & Labour for Each Pipe Diameters (DI)										Amount for Machinery & Labour for Each Pipe Diameters (PVC)										Amount for Machinery & Labour for Each Pipe Diameters (DI)																				
			63	90	110	160	225	250	300	350	400	450	500	600	800	63	90	110	160	225	250	300	350	400	450	500	600	800	63	90	110	160	225	250	300	350	400	450	500	600	800	63	90	110	160	225	250	300	350	400	450	500	600
a Average Time consumption per bend	Hrs./No.		0.19	0.2	0.21	0.23	0.25	0.3	0.35	0.4	0.43	0.45	0.5	0.55	0.19	0.2	0.21	0.23	0.25	0.3	0.35	0.4	0.43	0.45	0.5	0.55	0.19	0.2	0.21	0.23	0.25	0.3	0.35	0.4	0.43	0.45	0.5	0.55	0.19	0.2	0.21	0.23	0.25	0.3	0.35	0.4	0.43	0.45	0.5	0.55			
b No. of Working Days/Month	days/month		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
c Working Hours per day	Hrs./Day		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
d Average Working Hours per month	Hrs./month		192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192		
e Production per month			1011	960	914	835	768	640	548	480	447	427	384	348																																							
PLANT REQUIRED																																																					
f Excavator	Hrs.	2,000																																																			
g Backhoe Excavator (Bucket width 0.3-0.45/0.6m)	Hrs.	1,200																																																			
h Tractor Truck	Months	30,000																																																			
i Pick-up	Months	24,000																																																			
j Rammer Compactor	Months	18,000																																																			
k Roller Compactors	Months	22,000																																																			
l Survey Instruments	Months	3,000																																																			
m Water Pump	Months	12,000																																																			
n Diesel Generator	Months	18,000																																																			
p Asphalt Cutter	Months	12,000																																																			
q Pipe Cutter	Months	12,000																																																			
r Small Tools	Months	3,000																																																			
s Trench Boxes	Months	5,000																																																			
t Diesel for Vehicles & Pumps	Rs./Month	3,800																																																			
LABOUR REQUIRED																																																					
u Foreman	Months	10,800																																																			
v Machine Operator	Months	10,000																																																			
w Drivers	Months	9,000																																																			
x Skilled (Fitter, Surveyors, Mechanics etc.)	Months	9,000																																																			
y Un-Skilled	Months	6,000																																																			
A TOTAL AMOUNT/ MONTH	Rs.																																																				
Production/Month	Nr./Mth																																																				
Rate/Nr.	Rs./Nr.																																																				
Concrete volume /11.25°Thrust Block	Cum./Nr	0.0017	0.0035	0.0053	0.0125	0.0237	0.0283	0.0553	0.0732	0.1323																																											
Concrete cost per 1 Nr. Thrust Block	Rs./Nr	7500																																																			
Basic Rate for fixing of 11.25° PVC & DI Bends	Rs./Nr.																																																				
Add 35% for Overhead, Profit & Other Expenses	1.35																																																				
B Rate for installation of 11.25° PVC & DI Bends	Rs./m																																																				

- Cost of installation with out Thrust Blocks

	250	300	350	400	450	500	600	800
NWSDB	745	884	959	1,368	1,801	1,862	4,032	3,704
Calculated	809	1,195	1,727	2,384	1,131	3,214	1,345	1,422

