

Appendix 7.5.2 Density of Population in Each SPZ

Table 7.5.2.1 Density of Population in Each SPZ (Year 1991)

Zone (SPZ No.)	Areas		Established Urban + Urban Fringe	Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Urban Fringe				+ Residential	+ Non-resident						
1	Area (ha)	858	0	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)		858										858
	Population (person)		246,000										246,000
	Density (ha/person)		287										287
2	Area (ha)	1,248	40	0	0	0	0	0	0	0	55	55	1,343
	Sub-total Area (ha)		1,288										1,343
	Population (person)		382,000										382,000
	Density (ha/person)		297										297
3	Area (ha)	1,071	50	0	0	0	0	0	0	0	28	28	1,149
	Sub-total Area (ha)		1,121										1,149
	Population (person)		887,000										887,000
	Density (ha/person)		791										791
4	Area (ha)	365	694	0	0	0	0	157	0	0	795	795	2,011
	Sub-total Area (ha)		1,059					157					1,216
	Population (person)		563,000					157					563,000
	Density (ha/person)		532					102					532
4	Area (ha)	945	0	0	0	63	0	102	0	0	163	163	1,273
	Sub-total Area (ha)		945			63		102					1,110
	Population (person)		336,000			0		0					336,000
	Density (ha/person)		356			0		0					356
5	Area (ha)	877	115	0	232	0	0	437	0	0	115	115	2,625
	Sub-total Area (ha)		992		232			437					1,229
	Population (person)		418,000		12,000			0					430,000
	Density (ha/person)		421		53			0					421
6	Area (ha)	635	97	0	68	0	0	0	0	0	132	132	932
	Sub-total Area (ha)		732		68			0					800
	Population (person)		172,000		4,000			0					176,000
	Density (ha/person)		235		53			0					235
7	Area (ha)	403	1,133	0	0	0	0	344	0	0	8	8	1,888
	Sub-total Area (ha)		1,536		0			344					1,880
	Population (person)		824,000		0			0					824,000
	Density (ha/person)		536		0			0					536

Table 7.5.2.1 Density of Population in Each SPZ (Year 1991) (Continued)

Zone (SPZ No.)	Areas	Established Urban	Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
					Residential	+Security Zone Non-resident						
12	Area (ha)	34	423	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457		0	0	255	1,624	0	0	1,323	3,659
	Population (person)		67,000			0	0	0	0	0	0	67,000
13-1	Density (ha/person)		147		0	0	0	0	0	0	0	18
	Area (ha)	236	237	0	855	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274	210	261	0	64	0	2,137
13-2	Population (person)		62,000		45,000	0	0	0	0	0	0	107,000
	Density (ha/person)		131		53	0	0	0	0	0	0	50
	Area (ha)	327	332	244	65	483	292	4,647	0	0	608	6,998
14	Sub-total Area (ha)		903		65	483	292	4,647	0	0	608	6,998
	Population (person)		150,000		3,000	0	0	0	0	0	0	153,000
	Density (ha/person)		166		53	0	0	0	0	0	0	22
14	Area (ha)	832	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832		0	0	0	0	978	0	1,416	3,226
	Population (person)		162,000		0	0	0	0	0	0	0	162,000
Total	Density (ha/person)		195		0	0	0	0	0	0	0	50
	Area (ha)	7,831	3,121	244	1,220	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820	1,797	6,532	978	179	5,377	28,099
Total	Population (person)		4,269,000		64,000	0	0	0	0	0	0	4,333,000
	Density (ha/person)		381		52	0	0	0	0	0	0	154
	Remark	Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14) Area (ha): 20,850 Population (person): 1,431,000 Density (ha/person): 69										

Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban Area, and is included in Others.

2) SPZ12 is indicated Study area only.

3) Area refer to Appendix 7.4.1, and Population refer to Table 7.5.2.

Table 7.5.2.2 Density of Population in Each SPZ (Year 1997)

Zone (SPZ No.)	Areas		Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Urban + Urban Fringe			+Security Zone Residential	Non-resident						
1	Area (ha)	858	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)		858									858
	Population (person)		309,000									309,000
2	Density (ha/person)		360									360
	Area (ha)	1,248	40	0	0	0	0	0	0	0	55	1,343
	Sub-total Area (ha)		1,288									1,343
3	Population (person)		485,000									485,000
	Density (ha/person)		377									361
	Area (ha)	1,071	50	0	0	0	0	0	0	0	28	1,149
4	Sub-total Area (ha)		1,121									1,149
	Population (person)		971,000									971,000
	Density (ha/person)		866									845
4	Area (ha)	365	694	0	0	0	157	0	0	0	795	2,011
	Sub-total Area (ha)		1,059					157	0	0	795	2,011
	Population (person)		720,000					63,000	0	0	0	783,000
4	Density (ha/person)		680					401	0	0	0	389
	Area (ha)	945	0	0	0	63	102	0	0	0	163	1,273
	Sub-total Area (ha)		945					102	0	0	163	1,273
4	Population (person)		444,000					40,000	0	0	0	484,000
	Density (ha/person)		470					392	0	0	0	380
	Area (ha)	877	115	0	232	0	437	0	0	115	849	2,625
5	Sub-total Area (ha)		992					437	0	115	849	2,625
	Population (person)		513,000			13,000		0	0	0	0	526,000
	Density (ha/person)		517					0	0	0	0	200
6	Area (ha)	635	97	0	68	0	0	0	0	0	132	932
	Sub-total Area (ha)		732									932
	Population (person)		223,000			4,000		32,000	0	0	0	259,000
7	Density (ha/person)		348					0	0	0	0	278
	Area (ha)	403	1,133	0	0	0	344	0	0	0	8	1,888
	Sub-total Area (ha)		1,536					344	0	0	8	1,888
7	Population (person)		1,061,000					21,000	0	0	0	1,082,000
	Density (ha/person)		691					61	0	0	0	573

Table 7.5.2.2 Density of Population in Each SPZ (Year 1997) (Continued)

Zone (SPZ No.)	Areas	Established Urban	Established Urban + Ur -ban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Deve -lopment	Cantonment Security Zone	Others	Total
					Residential	+Security Zone Non-resident						
12	Area (ha)	34	423	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457		0	0		1,879		0	1,323	3,659
	Population (person)		97,000		0	0		78,000		0	0	175,000
	Density (ha/person)		212		0	0		42		0	0	48
13-1	Area (ha)	236	237	0	855	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274		471		64		2,137
	Population (person)		66,000		49,000	0		34,000		0	0	149,000
	Density (ha/person)		140		57	0		72		0	0	70
13-2	Area (ha)	327	332	244	65	483	292	4,647	0	0	608	6,998
	Sub-total Area (ha)		903		65	483		4,939		0	608	6,998
	Population (person)		158,000		4,000	0		107,000		0	0	269,000
	Density (ha/person)		175		57	0		72		0	0	38
14	Area (ha)	832	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832		0	0		978		0	1,416	3,226
	Population (person)		174,000		0	0		90,000		0	0	264,000
	Density (ha/person)		209		0	0		92		0	0	82
Total	Area (ha)	7,831	3,121	244	1,220	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820		9,307		179	5,377	28,099
	Population (person)		5,221,000		70,000	0		358,000		0	0	5,649,000
	Density (ha/person)		466		57	0		38		0	0	207
Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14) Area (ha): 20,850 Population (person): 2,126,000 Density (ha/person): 102												

Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban Area, and is included in Others.

2) SPZ12 is indicated Study area only.

3) Area refer to Appendix 7.4.1, and Population refer to Table 7.5.2.

Table 7.5.2.3 Density of Population in Each SPZ (Year 2005)

Zone (SPZ No.)	Areas		Established Urban	Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Urban	Urban + Urban Fringe				Residential	+Security Zone Non-resident						
1	Area (ha)	858	0	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)		858										858
	Population (person)		393,000										393,000
2	Density (ha/person)	458											458
	Area (ha)	1,248	40	0	0	0	0	0	0	0	0	55	1,343
	Sub-total Area (ha)		1,288										1,343
3	Population (person)		624,000										624,000
	Density (ha/person)	484											465
	Area (ha)	1,071	50	0	0	0	0	0	0	0	0	28	1,149
4	Sub-total Area (ha)		1,121										1,149
	Population (person)		1,082,000										1,082,000
	Density (ha/person)	965							965				942
5	Area (ha)	365	694	0	0	0	0	157	0	0	0	795	2,011
	Sub-total Area (ha)		1,059						157				2,011
	Population (person)		928,000						147,000				1,075,000
6	Density (ha/person)	945							936				535
	Area (ha)		0	0	0	0	63	102	0	0	0	163	1,273
	Sub-total Area (ha)		945				63		102			163	1,273
7	Population (person)		589,000						93,000				682,000
	Density (ha/person)	623							912				536
	Area (ha)	877	115	0	232	0	0	437	0	0	115	849	2,625
8	Sub-total Area (ha)		992						437				2,625
	Population (person)		639,000		15,000				0				654,000
	Density (ha/person)	447			64				447				249
9	Area (ha)	655	97	0	68	0	0	0	0	0	0	132	952
	Sub-total Area (ha)		732						0				952
	Population (person)		291,000		4,000				75,000				370,000
10	Density (ha/person)	500							500				397
	Area (ha)	403	1,133	0	0	0	0	344	0	0	0	8	1,888
	Sub-total Area (ha)		1,536						344				1,888
11	Population (person)		1,378,000						50,000				1,428,000
	Density (ha/person)	897							145				756

Table 7.5.2.3 Density of Population in Each SPZ (Year 2005) (Continued)

Zone (SPZ No.)	Areas										Total	
	Established Urban	Established Urban + Fringe	Established Urban + New Urban	Established Urban + Security Zone		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others		
	Urban	Urban + Fringe	Urban + New Urban	Residential	Non-residential							
12	Area (ha)	34	423	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457					1,879			1,323	3,659
	Population (person)		136,000					183,000			0	319,000
	Density (ha/person)		298					97			0	87
13-1	Area (ha)	236	237	0	855	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274		471		64		2,137
	Population (person)		71,000		55,000			80,000				206,000
	Density (ha/person)		150		64			170				96
13-2	Area (ha)	327	332	244	65	483	292	4,647	0	0	608	6,998
	Sub-total Area (ha)		903		65	483		4,939			608	6,998
	Population (person)		169,000		4,000			250,000				423,000
	Density (ha/person)		187		64			51				60
14	Area (ha)	832	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832					0	978		1,416	3,226
	Population (person)		190,000		0	0		210,000			0	400,000
	Density (ha/person)		228		0			215			0	124
Total	Area (ha)	7,831	3,121	244	1,220	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820		9,307		179	5,377	28,099
	Population (person)		6,490,000		78,000			1,088,000			0	7,656,000
	Density (ha/person)		580		64			117			0	272
Remark	Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14) Area (ha): 20,850 Population (person): 3,054,000 Density (ha/person): 146											

Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban area, and is included in Others.

2) SPZ12 indicate Study area only.

3) Area refer to Appendix 7.4.1, and Population refer to Table 7.5.2.

Table 7.5.2.4 Density of Population in Each SPZ (Year 2010)

Zone (SPZ No.)	Areas				Established Urban		Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban + Residential	Security Zone	Non-resident								
1	Area (ha)	858	0	0	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)		858											858
	Population (person)		407,000											407,000
	Density (ha/person)		474											474
2	Area (ha)	1,248	40	0	0	0	0	0	0	0	0	55	55	1,343
	Sub-total Area (ha)		1,288											1,343
	Population (person)		649,000											649,000
	Density (ha/person)		504											504
3	Area (ha)	1,071	50	0	0	0	0	0	0	0	0	28	28	1,149
	Sub-total Area (ha)		1,121											1,149
	Population (person)		1,100,000											1,100,000
	Density (ha/person)		981							981				981
4	Area (ha)	365	694	0	0	0	0	0	157	0	0	795	795	2,011
	Sub-total Area (ha)		1,059						157					2,011
	Population (person)		984,000						182,000					1,166,000
	Density (ha/person)		929						1,159					929
4	Area (ha)	945	0	0	0	63	63	63	102	0	0	163	163	1,273
	Sub-total Area (ha)		945						102					1,273
	Population (person)		625,000						115,000					740,000
	Density (ha/person)		661						1,127					661
5	Area (ha)	877	115	0	232	0	232	0	437	0	0	115	115	2,625
	Sub-total Area (ha)		992						437					2,625
	Population (person)		684,000				16,000		0					700,000
	Density (ha/person)		479				68		479					479
6	Area (ha)	635	97	0	68	0	68	0	0	0	0	132	132	932
	Sub-total Area (ha)		732						0					932
	Population (person)		306,000				5,000		93,000					404,000
	Density (ha/person)		545				68		545					545
7	Area (ha)	403	1,133	0	0	0	0	0	344	0	0	8	8	1,888
	Sub-total Area (ha)		1,536						344					1,888
	Population (person)		1,458,000						62,000					1,520,000
	Density (ha/person)		949						180					949

Table 7.5.2.4 Density of Population in Each SPZ (Year 2010) (Continued)

Zone (SPZ No.)	Areas	Established Urban	Established Urban + Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Deve- lopment	Cantonment Security Zone	Others	Total
					Residential	Non-resident						
12	Area (ha)	34	423	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457		0	0		1,879		0	1,323	3,659
	Population (person)		140,000		0	0		226,000		0	0	366,000
	Density (ha/person)		306		0	0		120		0	0	100
13-1	Area (ha)	236	237	0	855	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274		471		64	0	2,137
	Population (person)		70,000		58,000	0		99,000		0	0	227,000
	Density (ha/person)		148		68	0		210		0	0	106
13-2	Area (ha)	327	332	244	65	483	292	4,647	0	0	608	6,998
	Sub-total Area (ha)		903		65	483		4,939		0	608	6,998
	Population (person)		171,000		4,000	0		309,000		0	0	484,000
	Density (ha/person)		189		68	0		63		0	0	69
14	Area (ha)	832	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832		0	0		978		0	1,416	3,226
	Population (person)		197,000		0	0		260,000		0	0	457,000
	Density (ha/person)		237		0	0		266		0	0	142
Total	Area (ha)	7,831	3,121	244	1,220	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820		9,307		179	5,377	28,099
	Population (person)		6,791,000		83,000	0		1,346,000		0	0	8,220,000
	Density (ha/person)		607		68	0		145		0	0	293
Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14) Area (ha): 20,850 Population (person): 3,378,000 Density (ha/person): 162												
Remark Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban area, and is included in Others. 2) SPZ12 indicate Study area only. 3) Area refer to Appendix 7.4.1, and Population refer to Table 7.5.2.												

Table 7.5.2.5 Density of Population in Each SPZ (Year 2015)

Zone (SPZ No.)	Areas		Established Urban	Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Urban Fringe				Residential	Non-residential						
1	Area (ha)		858	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)			858		0	0	0	0	0	0	0	858
	Population (person)			421,000			0	0	0	0	0	0	421,000
2	Density (ha/person)			491		0	0	0	0	0	0	0	491
	Area (ha)		1,248	40	0	0	0	0	0	0	0	55	1,343
	Sub-total Area (ha)			1,288			0	0	0	0	0	55	1,343
3	Population (person)		676,000			0	0	0	0	0	0	0	676,000
	Density (ha/person)			525		0	0	0	0	0	0	0	503
	Area (ha)		1,071	50	0	0	0	0	0	0	0	28	1,149
4	Sub-total Area (ha)			1,121		0	0	0	0	0	0	28	1,149
	Population (person)		1,119,000			0	0	0	0	0	0	0	1,119,000
	Density (ha/person)			998			0	0	0	0	0	0	974
4	Area (ha)		365	694	0	0	0	157	0	0	0	795	2,011
	Sub-total Area (ha)			1,059		0	0	157	157	0	0	795	2,011
	Population (person)		1,042,000			0	0	217,000	217,000	0	0	0	1,259,000
4	Density (ha/person)			984		0	0	1,382	1,382	0	0	0	626
	Area (ha)		945	0	0	0	63	102	0	0	0	163	1,273
	Sub-total Area (ha)			945		0	63	102	102	0	0	163	1,273
5	Population (person)		659,000			0	0	137,000	137,000	0	0	0	796,000
	Density (ha/person)			697		0	0	1,343	1,343	0	0	0	625
	Area (ha)		877	115	0	0	232	437	0	0	115	849	2,625
5	Sub-total Area (ha)			992		0	0	437	437	0	115	849	2,625
	Population (person)		728,000			17,000	0	0	0	0	0	0	745,000
	Density (ha/person)			509		73	0	509	509	0	0	0	254
6	Area (ha)		635	97	0	0	68	0	0	0	0	132	932
	Sub-total Area (ha)			732		0	68	0	0	0	0	132	932
	Population (person)		324,000			5,000	0	0	110,000	0	0	0	439,000
7	Density (ha/person)			593		73	0	593	593	0	0	0	471
	Area (ha)		403	1,133	0	0	0	344	0	0	0	8	1,888
	Sub-total Area (ha)			1,536		0	0	344	344	0	0	8	1,888
7	Population (person)		1,539,000			0	0	74,000	74,000	0	0	0	1,613,000
	Density (ha/person)			1,002		0	0	215	215	0	0	0	854

Table 7.5.2.5 Density of Population in Each SPZ (Year 2015) (Continued)

Zone (SPZ No.)	Areas		Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Established Urban + Urban Fringe			Residential	+Security Zone Non-residential						
12	Area (ha)	34	423	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457		0	0		1,879			1,323	3,659
	Population (person)		145,000		0	0		270,000			0	415,000
	Density (ha/person)		317		0	0		144			0	113
13-1	Area (ha)	236	237	0	855	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274		471		64		2,137
	Population (person)		67,000		62,000	0		118,000		0		247,000
	Density (ha/person)		142		73	0		251		0		116
13-2	Area (ha)	327	332	244	65	483	292	4,647	0	0	608	6,998
	Sub-total Area (ha)		903		65	483		4,939		0	608	6,998
	Population (person)		172,000		5,000	0		369,000		0		546,000
	Density (ha/person)		190		73	0		75		0		78
14	Area (ha)	832	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832		0	0		978		0	1,416	3,226
	Population (person)		205,000		0	0		309,000		0	0	514,000
	Density (ha/person)		246		0	0		316		0	0	159
Total	Area (ha)	7,831	3,121	244	1,220	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820		9,307		179	5,377	28,099
	Population (person)		7,097,000		89,000	0		1,604,000		0	0	8,790,000
	Density (ha/person)		2,274		0	0		246		0	0	313
Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14) Area (ha): 20,850 Population (person): 3,702,000 Density (ha/person): 178												
Remark Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban area, and is included in Others. 2) SPZ No.12 indicate Study area of whole area. 3) Area refer to Appendix 7.4.1, and Population refer to Table 7.5.2.												

Table 7.5.2.6 Density of Population in Each SPZ (Year 2020)

Zone (SPZ No.)	Areas		Established Urban + Urban Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Established Urban + Urban Fringe			Residential	+Security Zone Non-resident						
1	Area (ha)	858	0	0	0	0	0	0	0	0	0	858
	Sub-total Area (ha)		858									858
	Population (person)		435,000									435,000
	Density (ha/person)		507									507
2	Area (ha)	1,248	40	0	0	0	0	0	0	0	55	1,343
	Sub-total Area (ha)		1,288									1,343
	Population (person)		701,000									701,000
	Density (ha/person)		544									522
3	Area (ha)	1,071	50	0	0	0	0	0	0	0	28	1,149
	Sub-total Area (ha)		1,121									1,149
	Population (person)		1,137,000									1,137,000
	Density (ha/person)		1,014									990
4	Area (ha)	365	694	0	0	0	157	0	0	0	795	2,011
	Sub-total Area (ha)		1,059				157					2,011
	Population (person)		1,098,000				252,000					1,350,000
	Density (ha/person)		1,037				1,605					671
4	Area (ha)	945	0	0	0	63	102	0	0	0	163	1,273
	Sub-total Area (ha)		945			63	102					1,273
	Population (person)		695,000				159,000					854,000
	Density (ha/person)		735				1,559					671
5	Area (ha)	877	115	0	0	232	437	0	0	115	849	2,625
	Sub-total Area (ha)		992			232	437			115		2,625
	Population (person)		773,000			18,000	0			0		791,000
	Density (ha/person)		541			76	541					301
6	Area (ha)	635	97	0	0	68	0	0	0	0	132	932
	Sub-total Area (ha)		732			68	0					932
	Population (person)		340,000			5,000						473,000
	Density (ha/person)		639			76						508
7	Area (ha)	403	1,133	0	0	0	344	0	0	0	8	1,888
	Sub-total Area (ha)		1,536			0	344					1,888
	Population (person)		1,619,000			0	86,000					1,705,000
	Density (ha/person)		1,054			0	250					903

Table 7.5.2.6 Density of Population in Each SPZ (Year 2020) (Continued)

Zone (SPZ No.)	Areas		Established Urban	Established Urban + Fringe	Established Urban + New Urban	Established Urban		Urban Fringe	New Urban	Peripheral Urban Development	Cantonment Security Zone	Others	Total
	Established Urban	Urban + Fringe				Residential	Non-residential						
12	Area (ha)	34	423	0	0	0	0	255	1,624	0	0	1,323	3,659
	Sub-total Area (ha)		457						1,879			1,323	3,659
	Population (person)		149,000						313,000			0	462,000
	Density (ha/person)		326						167			0	126
13-1	Area (ha)	236	237	0	855	274	274	210	261	0	64	0	2,137
	Sub-total Area (ha)		473		855	274	274		471		64		2,137
	Population (person)		66,000		65,000	0	0		137,000		0		268,000
	Density (ha/person)		140		76	0	0		291		0		125
13-2	Area (ha)	327	332	244	65	483	483	292	4,647	0	0	608	6,998
	Sub-total Area (ha)		903		65	483	483		4,939		0	608	6,998
	Population (person)		174,000		5,000	0	0		428,000		0		607,000
	Density (ha/person)		193		76	0	0		87		0		87
14	Area (ha)	832	0	0	0	0	0	0	0	978	0	1,416	3,226
	Sub-total Area (ha)		832		0	0	0		978		0	1,416	3,226
	Population (person)		212,000		0	0	0		359,000		0		571,000
	Density (ha/person)		255		0	0	0		367		0		177
Total	Area (ha)	7,831	5,121	244	1,220	820	820	1,797	6,532	978	179	5,377	28,099
	Sub-total Area (ha)		11,196		1,220	820	820		9,307		179	5,377	28,099
	Population (person)		7,399,000		93,000	0	0		1,862,000		0		9,354,000
	Density (ha/person)		2,371		0	0	0		285		0		333
Total of Study Area (SPZ 4, 5, 6, 12, 13-1, 13-2, 14)													
Area (ha): 20,850													
Population (person): 4,026,000													
Density (ha/person): 193													
Remark													

Note: 1) Industrial Area 266ha in SPZ No.14 is excluded from Established Urban area, and is included in Others.

2) SPZ No.12 indicate Study area of whole area.

3) Area refer to Appendix 7.4.1. and Population refer to Table 7.5.2.

Appendix 7.5.3 Area and Population of Sewerage Service Zone

Table 7.5.3.1 Area and Population of Sewerage Service Zone (Year 1991)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area				
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Total	Established Urban	Additional Urban	Sub-total	
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	195	0	192	0	192	195	0	120	130
		Popu.	29,000	0	29,000	0	29,000	107,000	0	107,000	136,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	166	0	131	0	131	166	0	94	112
		Popu.	66,000	0	66,000	0	66,000	48,000	0	48,000	114,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	356	0	364	0	364	356	0	320	322
		Popu.	20,000	0	20,000	0	20,000	317,000	0	317,000	337,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	421	0	421	53	366	421	0	152	271
		Popu.	309,000	0	309,000	7,000	316,000	104,000	0	104,000	420,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	417	0	417	54	366	370	0	251	292
		Popu.	329,000	0	329,000	7,000	336,000	421,000	0	421,000	757,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	53	49	0	0	0	49
		Popu.	0	0	0	5,000	5,000	0	0	0	5,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	235	0	235	53	220	0	0	0	220
		Popu.	172,000	0	172,000	4,000	176,000	0	0	0	176,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	147	0	94	94
		Popu.	0	0	0	0	0	67,000	0	67,000	67,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	131	0	132	53	64	131	0	80	70
		Popu.	18,000	0	18,000	45,000	63,000	44,000	0	44,000	107,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	53	46	166	0	63	56
		Popu.	0	0	0	3,000	3,000	7,000	0	7,000	10,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	219	0	219	52	126	141	0	86	110	
	Popu.	190,000	0	190,000	57,000	247,000	118,000	0	118,000	365,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	278	0	266	52	192	247	0	156	172	
	Popu.	614,000	0	614,000	64,000	678,000	694,000	0	694,000	1,372,000	

Note: 1) Area in hector

2) Density in person per hector

3) Population in person

4) Density of sub-total, total and grand total colums are calculated in this table as average.

Table 7.5.3.2 Area and Population of Sewerage Service Zone (Year 1997)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area				
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Total	Established Urban	Additional Urban	Sub-total	
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	209	0	212	0	212	209	92	165	172
		Popu.	32,000	0	32,000	0	32,000	115,000	32,000	147,000	179,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	175	72	155	0	155	175	72	129	142
		Popu.	70,000	8,000	78,000	0	78,000	50,000	16,000	66,000	144,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	470	0	473	0	473	470	392	462	462
		Popu.	26,000	0	26,000	0	26,000	418,000	40,000	458,000	484,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	517	0	516	57	447	517	517	517	478
		Popu.	379,000	0	379,000	7,000	386,000	128,000	226,000	354,000	740,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	513	0	513	54	448	480	494	484	471
		Popu.	405,000	0	405,000	7,000	412,000	546,000	266,000	812,000	1,224,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	57	59	0	0	0	59
		Popu.	0	0	0	6,000	6,000	0	0	0	6,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	348	0	348	57	324	0	0	0	324
		Popu.	255,000	0	255,000	4,000	259,000	0	0	0	259,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	212	42	152	152
		Popu.	0	0	0	0	0	97,000	11,000	108,000	108,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	140	0	140	57	69	140	72	113	85
		Popu.	19,000	0	19,000	49,000	68,000	47,000	15,000	62,000	130,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	57	62	175	72	116	96
		Popu.	0	0	0	4,000	4,000	8,000	5,000	13,000	17,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	316	0	316	58	172	181	58	133	156	
	Popu.	274,000	0	274,000	63,000	337,000	152,000	31,000	183,000	520,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	354	76	341	57	243	307	210	271	259	
	Popu.	781,000	8,000	789,000	70,000	859,000	863,000	345,000	1,208,000	2,067,000	

Note: 1) Area in hector
 2) Density in person per hector
 3) Population in person
 4) Density of sub-total, total and grand total columns are calculated in this table as average.

Table 7.5.3.3 Area and Population of Sewerage Service Zone (Year 2005)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area			Total	
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Established Urban	Additional Urban	Sub-total		
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	228	0	225	0	225	228	215	223	223
		Popu.	34,000	0	34,000	0	34,000	125,000	74,000	199,000	233,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	187	51	159	0	159	187	51	127	143
		Popu.	75,000	5,000	80,000	0	80,000	54,000	11,000	65,000	145,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	623	0	618	0	618	623	912	652	650
		Popu.	34,000	0	34,000	0	34,000	554,000	93,000	647,000	681,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	447	0	447	64	389	447	447	447	414
		Popu.	328,000	0	328,000	8,000	336,000	111,000	195,000	306,000	642,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	459	0	459	62	403	584	534	568	510
		Popu.	362,000	0	362,000	8,000	370,000	665,000	288,000	953,000	1,323,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	64	69	0	0	0	69
		Popu.	0	0	0	7,000	7,000	0	0	0	7,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	500	0	500	64	463	0	0	0	463
		Popu.	366,000	0	366,000	4,000	370,000	0	0	0	370,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	298	97	226	226
		Popu.	0	0	0	0	0	136,000	25,000	161,000	161,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	150	0	147	64	76	150	64	117	90
		Popu.	20,000	0	20,000	55,000	75,000	51,000	13,000	64,000	139,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	64	62	187	51	98	85
		Popu.	0	0	0	4,000	4,000	8,000	3,000	11,000	15,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	445	0	445	64	233	233	77	172	208	
	Popu.	386,000	0	386,000	70,000	456,000	195,000	41,000	236,000	692,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	388	48	373	64	266	369	253	326	300	
	Popu.	857,000	5,000	862,000	78,000	940,000	1,039,000	414,000	1,453,000	2,393,000	

Note: 1) Area in hector

2) Density in person per hector

3) Population in person

4) Density of sub-total, total and grand total columns are calculated in this table as average.

Table 7.5.3.4 Area and Population of Sewerage Service Zone (Year 2010)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area				
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Total	Established Urban	Additional Urban	Sub-total	
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	237	0	238	0	238	237	266	248	246
		Popu.	36,000	0	36,000	0	36,000	130,000	91,000	221,000	257,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	189	63	163	0	163	189	63	133	148
		Popu.	75,000	7,000	82,000	0	82,000	54,000	14,000	68,000	150,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	661	0	655	0	655	661	1,127	709	706
		Popu.	36,000	0	36,000	0	36,000	588,000	115,000	703,000	739,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	479	0	480	68	418	479	479	479	445
		Popu.	352,000	0	352,000	9,000	361,000	119,000	209,000	328,000	689,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	492	0	492	69	432	621	601	615	550
		Popu.	388,000	0	388,000	9,000	397,000	707,000	324,000	1,031,000	1,428,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	68	69	0	0	0	69
		Popu.	0	0	0	7,000	7,000	0	0	0	7,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	545	0	545	68	505	0	0	0	505
		Popu.	399,000	0	399,000	5,000	404,000	0	0	0	404,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	306	120	240	240
		Popu.	0	0	0	0	0	140,000	31,000	171,000	171,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	148	0	147	68	79	148	210	172	112
		Popu.	20,000	0	20,000	58,000	78,000	50,000	44,000	94,000	172,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	68	62	189	63	107	90
		Popu.	0	0	0	4,000	4,000	8,000	4,000	12,000	16,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	483	0	483	68	252	236	148	202	231	
	Popu.	419,000	0	419,000	74,000	493,000	198,000	79,000	277,000	770,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	416	67	400	68	285	387	310	359	326	
	Popu.	918,000	7,000	925,000	83,000	1,008,000	1,089,000	508,000	1,597,000	2,605,000	

Note: 1) Area in hector

2) Density in person per hector

3) Population in person

4) Density of sub-total, total and grand total columns are calculated in this table as average.

Table 7.5.3.5 Area and Population of Sewerage Service Zone (Year 2015)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area			Grand Total	
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Total	Established Urban	Additional Urban		
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	246	0	245	0	245	246	316	272	268
		Popu.	37,000	0	37,000	0	37,000	135,000	108,000	243,000	280,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	190	75	167	0	167	190	75	141	154
		Popu.	76,000	8,000	84,000	0	84,000	55,000	17,000	72,000	156,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	697	0	691	0	691	697	1,343	763	759
		Popu.	38,000	0	38,000	0	38,000	620,000	137,000	757,000	795,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	509	0	510	73	443	509	509	508	472
		Popu.	374,000	0	374,000	9,000	383,000	126,000	222,000	348,000	731,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	522	0	522	69	458	656	666	659	588
		Popu.	412,000	0	412,000	9,000	421,000	746,000	359,000	1,105,000	1,526,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	73	69	0	0	0	69
		Popu.	0	0	0	7,000	7,000	0	0	0	7,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	593	0	593	73	549	0	0	0	549
		Popu.	434,000	0	434,000	5,000	439,000	0	0	0	439,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	317	144	256	256
		Popu.	0	0	0	0	0	145,000	37,000	182,000	182,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	142	0	140	73	82	142	251	185	118
		Popu.	19,000	0	19,000	62,000	81,000	48,000	53,000	101,000	182,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	73	77	190	75	116	102
		Popu.	0	0	0	5,000	5,000	8,000	5,000	13,000	18,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	522	0	522	72	272	240	178	216	249	
	Popu.	453,000	0	453,000	79,000	532,000	201,000	95,000	296,000	828,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	443	76	426	72	304	404	353	385	349	
	Popu.	978,000	8,000	986,000	88,000	1,074,000	1,137,000	579,000	1,716,000	2,790,000	

Note: 1) Area in hector

2) Density in person per hector

3) Population in person

4) Density of sub-total, total and grand total columns are calculated in this table as average.

Table 7.5.3.6 Area and Population of Sewerage Service Zone (Year 2020)

Sewerage Zone	SPZ No.	Item	Sewerage Service Area								Grand Total
			Core Area				Transitional Area				
			Established Urban	Additional Urban	Sub-total	Cantonment (Residence)	Total	Established Urban	Additional Urban	Sub-total	
Tongi	14	Area	151	0	151	0	151	549	343	892	1,043
		Density	255	0	258	0	258	255	367	298	292
		Popu.	39,000	0	39,000	0	39,000	140,000	126,000	266,000	305,000
Uttara	13-2	Area	399	105	504	0	504	288	224	512	1,016
		Density	193	87	171	0	171	193	87	146	158
		Popu.	77,000	9,000	86,000	0	86,000	56,000	19,000	75,000	161,000
North Dhaka West	4	Area	55	0	55	0	55	890	102	992	1,047
		Density	735	0	727	0	727	735	1,559	820	815
		Popu.	40,000	0	40,000	0	40,000	654,000	159,000	813,000	853,000
	5	Area	734	0	734	130	864	248	437	685	1,549
		Density	541	0	541	76	471	541	541	540	502
		Popu.	397,000	0	397,000	10,000	407,000	134,000	236,000	370,000	777,000
	Total	Area	789	0	789	130	919	1,138	539	1,677	2,596
		Density	554	0	554	77	486	692	733	705	628
		Popu.	437,000	0	437,000	10,000	447,000	788,000	395,000	1,183,000	1,630,000
North Dhaka East	5	Area	0	0	0	102	102	0	0	0	102
		Density	0	0	0	76	78	0	0	0	78
		Popu.	0	0	0	8,000	8,000	0	0	0	8,000
	6	Area	732	0	732	68	800	0	0	0	800
		Density	639	0	639	76	591	0	0	0	591
		Popu.	468,000	0	468,000	5,000	473,000	0	0	0	473,000
	12	Area	0	0	0	0	0	457	255	712	712
		Density	0	0	0	0	0	326	167	270	270
		Popu.	0	0	0	0	0	149,000	43,000	192,000	192,000
	13-1	Area	136	0	136	855	991	337	210	547	1,538
		Density	140	0	140	76	85	140	291	197	125
		Popu.	19,000	0	19,000	65,000	84,000	47,000	61,000	108,000	192,000
	13-2	Area	0	0	0	65	65	44	68	112	177
		Density	0	0	0	76	77	193	87	125	107
		Popu.	0	0	0	5,000	5,000	8,000	6,000	14,000	19,000
Total	Area	868	0	868	1,090	1,958	838	533	1,371	3,329	
	Density	561	0	561	76	291	243	206	229	266	
	Popu.	487,000	0	487,000	83,000	570,000	204,000	110,000	314,000	884,000	
Total	Area	2,207	105	2,312	1,220	3,532	2,813	1,639	4,452	7,984	
	Density	471	86	454	76	323	422	397	413	373	
	Popu.	1,040,000	9,000	1,049,000	93,000	1,142,000	1,188,000	650,000	1,838,000	2,980,000	

Note: 1) Area in hector

2) Density in person per hector

3) Population in person

4) Density of sub-total, total and grand total columns are calculated in this table as average.

Appendix 7.7.1 Present Per Capita of Water Consumption

ZONE-V

Area	Account Number	Person	Holding Number	Billing Category	Period	Connection Pipe Size	Consumption (m ³ /2months)	Consumption (l/day person)
Mohakhali	3070/2	10	3old D.O.H.S	Residential	11.05.97- 14.07.97	φ 20mm	44	72.1
ditto	3071/3	10	4old D.O.H.S	Residential	25.10.96- 28.12.96	φ 20mm	34	55.7
ditto	1407/1	8	Rd#51 N.W.H.16	Residential	28.02.97- 31.04.97	φ 20mm	32	65.6
BANANI	980/1	7	Rd#17 1e	Residential	01.03.97- 03.05.97	φ 25mm	54	126.5
EAST NAKAKHA L.PARA	7612/5	25	294	Residential	09.02.97- 01.04.97	φ 20mm	126	82.6
ditto	10519/8	25	305	Residential	25.03.97- 25.05.97	φ 20mm	98	64.3
ditto	17230/4	15	314	Residential	08.03.97- 08.05.97	φ 20mm	120	131.1
ditto	18108/7	15	315/A-2	Residential	30.09.96- 30.11.96	φ 20mm	100	109.3
ditto	8892/5	10	325/1	Residential	08.03.97- 08.05.97	φ 20mm	70	114.8
ditto	1783/2	5	Sorowadhi Road House- Sha-16	Residential	29.04.97- 25.06.97	φ 20mm	38	124.6
BADDA	5454/2	12	Middle Badda Sha-6	Residential	25.03.97- 25.05.97	φ 20mm	83	113.4
ditto	6628/4	15	Middle Badda Sha-6	Residential	08.03.97- 08.05.97	φ 20mm	90	98.4
ditto	4288/8	7	Kha-155/1 Middle Badda	Residential	20.03.97- 24.05.97	φ 20mm	55	128.8
ditto	4334/5	10	TA-94 Middle Badda	Residential	18.03.97- 12.05.97	φ 20mm	65	106.6
ditto	4318/5	45	TA-13 Middle Badda	Residential	10.05.97- 28.07.97	φ 20mm	242	68.1
ditto	4254/8	12	TA-93	Residential	18.03.97- 12.05.97	φ 20mm	85	116.1
ditto	4263/9	9	TA-39/2	Residential	10.03.97- 10.05.97	φ 20mm	58	105.6
ditto	4275/3	32	TA-90/1	Residential	18.03.97- 11.05.97	φ 20mm	196	100.4
ditto	7667/3	14	TA-91/4	Residential	18.03.97- 12.05.97	φ 20mm	84	98.4
ditto	5338/1	40	TA-169	Residential	20.03.97- 17.05.97	φ 20mm	116	47.5
ditto	5429/1	11	TA-133/1	Residential	19.03.97- 12.05.97	φ 20mm	63	93.9
ditto	6602/4	26	JA-17	Residential	04.03.97- 04.05.97	φ 20mm	143	90.2
ditto	6543/2	30	DAG-636	Residential	21.03.97- 27.05.97	φ 25mm	125	68.3
ditto	6509/0	35	JA-92/1	Residential	04.03.97- 07.05.97	φ 20mm	130	60.9
ditto	6520/5	17	JA-70	Residential	22.04.97- 17.06.97	φ 20mm	91	87.8
ditto	6498/6	15	JA-65/2	Residential	22.04.97- 17.06.97	φ 20mm	80	87.4
ditto	6505/6	28	GA-74	Residential	06.03.97- 08.05.97	φ 20mm	139	81.4
Average Consumption (l/day person)								92.6

Appendix 7.7.2 Water Demands for 1991, 1995, 2000, 2010 and 2020

Zone	1991				1995				2000				2010				2020			
	Population person	Projected Demand m ³ /day	Per Capita Demand l/day	Per Capita Demand l/day	Population person	Projected Demand m ³ /day	Per Capita Demand l/day	Per Capita Demand l/day	Population person	Projected Demand m ³ /day	Per Capita Demand l/day	Per Capita Demand l/day	Population person	Projected Demand m ³ /day	Per Capita Demand l/day	Per Capita Demand l/day	Population person	Projected Demand m ³ /day	Per Capita Demand l/day	Per Capita Demand l/day
1 Baillun	25,254	1,175	46	1,693	32,567	43,582	58	2,528	74,444	5,211	70	12,671	121,261	12,671	104					
2 Utara	31,740	4,755	150	7,359	48,184	77,600	156	12,078	175,453	28,336	162	68,568	375,296	68,568	183					
3 Utara Khan	27,187	1,870	69	2,682	37,331	53,594	72	4,014	107,917	9,820	91	24,201	212,288	24,201	114					
4 Digun	983	45	46	75	1,439	2,318	52	134	6,581	461	70	1,962	18,687	1,962	105					
5 Bhasantek	9,900	550	56	810	12,617	16,884	64	1,229	33,214	2,989	90	6,485	62,347	6,485	104					
6 Dakshinkhan	58,946	4,860	82	6,998	80,941	116,201	86	10,513	233,981	25,387	109	59,762	471,145	59,762	127					
7 Mirpur	204,739	29,093	142	35,334	238,478	322,111	137	42,293	422,497	57,248	135	78,671	527,785	78,671	149					
8 Pollabi	288,912	30,784	107	38,494	332,816	385,825	116	48,141	456,668	65,303	143	74,329	494,545	74,329	150					
9 Dumalkot	59,532	4,051	68	5,115	70,181	84,569	73	6,573	118,145	11,507	97	19,669	161,887	19,669	121					
10 Khalikhet	34,005	2,489	73	3,510	43,256	58,710	81	5,231	110,207	11,572	105	23,345	208,824	23,345	112					
11 Paikpara	334,623	38,097	114	50,066	422,454	539,170	119	66,412	782,887	107,647	138	147,438	982,778	147,438	150					
12 Culsuhan Banan	130,111	24,768	190	31,316	164,262	223,999	191	42,768	420,476	81,572	194	141,050	622,408	141,050	227					
13 Badda	43,257	3,538	82	5,277	57,768	81,023	101	8,175	156,431	18,772	120	44,742	307,723	44,742	145					
14 Mohanmadpur	246,441	37,471	152	41,716	282,797	327,839	148	46,873	411,545	59,427	144	69,711	450,120	69,711	155					
15 Shara Bang.	125,971	20,420	162	24,040	143,997	166,932	167	28,679	205,493	38,324	186	50,282	236,143	50,282	213					
16 Dhanmondi	158,860	28,865	182	32,939	177,069	200,337	186	38,134	251,488	50,046	199	62,921	280,562	62,921	224					
17 Teigaon	393,007	63,353	161	72,845	449,244	520,797	163	84,942	578,138	95,393	165	110,128	692,202	110,128	159					
18 Khilgaon Gora	404,084	48,207	119	60,205	491,167	569,397	123	71,659	641,535	84,939	132	112,805	705,153	112,805	160					
19 Nandipara	50,400	3,790	75	4,734	61,965	80,985	76	6,284	145,032	13,053	90	30,430	272,246	30,430	112					
20 Labagh	322,600	51,004	158	54,717	345,109	369,952	159	58,822	410,685	65,669	160	74,739	436,002	74,739	171					
21 Ramna	288,750	45,634	158	48,119	308,891	332,764	154	51,086	367,578	56,607	154	69,148	402,033	69,148	172					
22 Motjheel	113,374	16,400	145	18,049	121,760	131,170	148	19,915	143,465	22,811	159	28,678	154,596	28,678	186					
23 Manda	40,161	3,550	88	4,145	47,345	59,001	87	5,115	91,626	9,621	105	15,937	142,293	15,937	112					
24 Kotwali Sutrap	455,590	66,106	145	69,983	479,746	506,719	146	74,310	554,216	82,135	148	98,593	597,213	98,593	165					
25 Jarrabari	286,378	35,414	124	38,595	316,108	351,238	122	42,335	403,628	52,635	130	64,852	450,291	64,852	144					
26 Jurin	129,578	13,735	106	14,110	145,841	167,028	97	14,615	211,733	20,536	97	31,084	267,096	31,084	116					
27 DND area	37,484	2,496	67	4,455	60,042	92,382	74	7,557	218,702	21,214	97	59,023	517,748	59,023	114					
28 Demra	37,484	4,063	108	6,810	57,936	81,258	118	10,295	120,281	17,441	145	26,041	164,814	26,041	158					
29 Alibahar	29,753	3,103	104	4,062	38,420	52,639	106	5,640	105,501	12,660	120	23,709	207,536	23,709	114					
30 Pagla	45,000	3,096	69	4,499	58,546	88,033	77	7,474	173,175	17,491	101	44,258	356,918	44,258	124					
31 Ghoshpara	38,000	2,918	77	3,639	47,974	67,286	76	5,040	132,362	12,045	91	29,683	260,376	29,683	114					
32 Kachpur	66,000	7,339	111	9,211	81,762	109,417	114	12,484	215,239	27,335	127	56,663	385,460	56,663	147					
33 Siddirganj	29,000	2,187	75	2,693	36,612	49,332	74	4,039	55,085	11,590	91	28,562	250,547	28,562	114					
34 Farulla	16,000	1,357	85	1,640	19,972	26,727	82	2,122	35,085	5,178	94	11,246	98,649	11,246	114					
35 Godnail	60,000	4,824	80	6,805	74,329	97,607	92	10,024	151,581	18,948	125	31,004	213,819	31,004	145					
36 Naravanganj	192,977	26,013	135	31,078	239,065	316,916	130	39,678	447,041	60,842	136	84,379	572,250	84,379	147					
North Dhaka	1,249,489	146,075	117	188,729	1,562,294	2,005,586	121	250,089	3,098,901	425,825	137	702,893	4,566,974	702,893	154					
Total	4,816,387	637,420	132	747,818	5,647,991	6,778,342	132	897,211	9,261,395	1,281,765	138	1,916,769	12,681,041	1,916,769	151					

Note: 1) North Dhaka Area is from Zone 1 to 13.

2) Source: "Dhaka City Emergency Water Supply Project"

A. 8

FACILITY PLANNING FOR NORTH DHAKA



Appendix 8.4.1 Construction and Operation & Maintenance Cost of Alternatives

Table 8.4.1.1 Construction Cost Estimate of Sewerage Facilities (I)

(TK'000)

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Tongi	Branch Sewer	1,043 ha	5,031	m	426,764	426,764	426,764	426,764	
	Sub-total				426,764	426,764	426,764	426,764	
	Trunk Main (RC Pipe)	500mm H=4.0m		34,763	m	17,381	17,381	17,381	17,381
		600mm H=2.0m		9,019	m	4,509	3,607	4,509	4,509
		600mm H=3.0m		10,598	m	0	7,418	0	0
		600mm H=4.0m		40,197	m	0	20,098	0	0
		600mm H=5.0m		42,520	m	21,260	0	21,260	21,260
		600mm H=6.0m		51,615	m	0	25,807	0	0
		600mm H=8.0m		62,091	m	0	31,045	0	0
		700mm H=1.0m		8,716	m	4,358	3,486	4,358	4,358
		700mm H=2.0m		10,110	m	8,088	0	8,088	8,088
		700mm H=3.0m		11,654	m	0	0	0	0
		800mm H=4.0m		43,984	m	21,992	21,992	21,992	21,992
		900mm H=2.0m		12,894	m	6,447	0	6,447	6,447
		900mm H=3.0m		14,527	m	0	4,358	0	0
		900mm H=6.0m		57,322	m	57,322	17,196	57,322	57,322
	Trunk Main (Steel Pipe)	300mm H=1.0m		6,242	m	0	29,337	0	0
		800mm H=1.0m		11,318	m	0	53,194	0	0
		Sewer Bridge					8,109		
	Sub-total					141,357	243,028	141,357	141,357
	Pumping Station	No.1				109,149	104,306	109,149	109,149
		Site		6,250	m2	1,293	1,262	1,293	1,293
		No.2				185,371	109,149	185,371	185,371
		Site		6,250	m2	1,737	1,293	1,737	1,737
		No.3				0	185,371	0	0
	Site		6,250	m2	0	1,737	0	0	
	Sub-total					297,550	403,118	297,550	297,550
Sewage Treatment Plant	Flow Rate				646,157	0	646,157	646,157	
	Site		13,470,000	ha	565,740	0	565,740	565,740	
	Reclamation		200	m3	168,000	0	168,000	168,000	
Sub-total					1,379,897	0	1,379,897	1,379,897	
Tongi Total					2,245,568	1,072,910	2,245,568	2,245,568	
Uttara	Branch Sewer	1,016 ha	5,031	m	415,716	415,716	415,716	415,716	
	Sub-total				415,716	415,716	415,716	415,716	
	Trunk Main (RC Pipe)	500mm H=5.0m		39,612	m	19,806	19,806	19,806	0
		500mm H=6.0m		49,868	m	24,934	24,934	24,934	0
		500mm H=7.0m		51,272	m	0	0	0	51,272
		600mm H=2.0m		9,019	m	4,509	4,509	4,509	4,509
		600mm H=3.0m		10,598	m	0	0	0	5,299
		600mm H=4.0m		40,197	m	20,098	20,098	20,098	20,098
		600mm H=5.0m		42,520	m	42,520	42,520	42,520	21,260
		700mm H=4.0m		41,488	m	0	0	0	20,744
		700mm H=6.0m		52,742	m	52,742	52,742	52,742	26,371
		700mm H=7.0m		55,250	m	27,625	27,625	27,625	0
	Trunk Main (Steel Pipe)	450mm H=1.0m		6,604	m	6,604	13,208	6,604	0
		450mm H=1.0m		6,604	m	6,604	13,208	6,604	0
		Sub-total				205,442	218,650	205,442	149,553
	Pumping Station	No.1				85,821	85,821	85,821	81,493
		Site		7,500	m2	1,357	1,357	1,357	1,320

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Uttara		No.2			127,665	127,665	127,665	0
		Site	7,500	m2	1,695	1,695	1,695	0
		No.3			0	0	0	0
		Site	7,500	m2	0	0	0	0
	Sub-total				216,538	216,538	216,538	82,813
	Sewage Treatment Plant	Flow Rate			397,112	894,761	0	0
		Site	13,470,000	ha	336,750	781,260	0	0
		Reclamation	200	m3	50,000	116,000	0	0
	Sub-total				783,862	1,792,021	0	0
	Uttara Total				1,621,558	2,642,925	837,696	648,082
East	Branch Sewer	1,580 ha	5,031	m	843,306	843,306	843,306	843,306
	Sub-total				843,306	843,306	843,306	843,306
	Trunk Main (RC Pipe)	500mm H=2.0m	7,815	m	7,815	7,815	7,815	3,907
		500mm H=4.0m	34,763	m	17,381	17,381	17,381	17,381
		500mm H=5.0m	39,612	m	17,825	17,825	17,825	17,825
		600mm H=3.0m	10,598	m	10,598	10,598	10,598	5,299
		600mm H=4.0m	40,197	m	34,167	34,167	34,167	34,167
		700mm H=4.0m	41,488	m	20,744	20,744	20,744	0
		700mm H=5.0m	46,951	m	46,951	46,951	46,951	46,951
		800mm H=2.0m	11,351	m	5,675	5,675	5,675	5,675
		800mm H=4.0m	43,984	m	39,585	39,585	39,585	0
		800mm H=6.0m	55,361	m	16,608	16,608	16,608	71,969
		900mm H=2.0m	12,894	m	6,447	6,447	6,447	12,894
		900mm H=5.0m	51,456	m	46,310	46,310	46,310	20,582
		900mm H=6.0m	57,322	m	28,661	28,661	28,661	0
		900mm H=7.0m	62,923	m	0	0	0	31,461
		1000mm H=2.0m	15,511	m	7,755	7,755	7,755	13,959
		1000mm H=6.0m	61,631	m	61,631	61,631	61,631	0
		1100mm H=2.0m	17,978	m	8,989	8,989	8,989	0
		1100mm H=3.0m	19,612	m	9,806	9,806	9,806	19,612
		1100mm H=4.0m	52,741	m	0	0	0	26,370
		1200mm H=4.0m	55,785	m	27,892	27,892	27,892	0
		1200mm H=5.0m	66,342	m	0	0	0	0
		1400mm H=3.0m	28,085	m	28,085	28,085	28,085	0
		1400mm H=4.0m	68,694	m	30,912	30,912	30,912	0
		1500mm H=5.0m	79,635	m	0	0	0	39,817
	1500mm H=6.0m	82,145	m	0	0	0	78,037	
	Trunk Main (Steel Pipe)	900mm H=1.0m	12,183	m	30,457	30,457	30,457	0
		1000mm H=1.0m	15,421	m	0	0	0	38,552
		1100mm H=1.0m	18,397	m	45,992	45,992	45,992	0
		1200mm H=1.0m	21,865	m	0	0	0	54,662
	Sub-total				550,286	550,286	550,286	539,120
	Pumping Station	No.1			209,991	209,991	209,991	173,151
		Site	25,000	m2	7,475	7,475	7,475	6,700
		No.2			141,967	141,967	141,967	141,967
		Site	25,000	m2	6,000	6,000	6,000	6,000
		No.3			357,924	357,924	357,924	186,391
Site		25,000	m2	10,050	10,050	10,050	6,975	
Sub-total				926,773	926,773	926,773	928,643	
	Sewage Treatment Plant	Flow Rate		m3/day	1,463,501	1,463,501	1,463,501	1,663,590

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4
East		Site	8,980,000	ha	871,060	871,060	871,060	996,780
		Reclamation	200	m3	388,000	388,000	388,000	444,000
	Sub-total				2,722,561	2,722,561	2,722,561	3,104,370
	East Total				5,042,926	5,042,926	5,042,926	5,415,439
West	Branch Sewer	789 ha	5,031	m	180,829	180,829	180,829	180,829
		1,677 ha	5,031	m	768,691	768,691	768,691	768,691
	Sub-total				949,520	949,520	949,520	949,520
	Trunk Main (RC Pipe)	500mm H=2.0m	7,815	m	0	0	0	0
		600mm H=2.0m	9,019	m	8,568	8,568	8,568	8,568
		600mm H=3.0m	10,598	m	9,538	9,538	9,538	9,538
		700mm H=4.0m	41,488	m	41,488	41,488	41,488	41,488
		800mm H=3.0m	12,932	m	6,466	6,466	6,466	6,466
		800mm H=5.0m	49,532	m	49,532	49,532	49,532	49,532
		800mm H=6.0m	55,361	m	27,680	27,680	27,680	27,680
		900mm H=6.0m	57,322	m	22,928	22,928	22,928	22,928
		1000mm H=7.0m	67,288	m	67,288	67,288	67,288	67,288
		1100mm H=2.0m	17,978	m	8,989	8,989	8,989	8,989
		1200mm H=2.0m	20,325	m	10,162	10,162	10,162	10,162
		1200mm H=3.0m	21,999	m	10,999	10,999	10,999	10,999
		1500mm H=3.0m	30,902	m	15,451	15,451	15,451	15,451
		1500mm H=5.0m	79,635	m	39,817	39,817	39,817	39,817
		1600mm H=5.0m	83,899	m	41,949	41,949	41,949	41,949
		1700mm H=4.0m	81,951	m	40,975	40,975	40,975	40,975
	1800mm H=4.0m	86,516	m	34,606	34,606	34,606	34,606	
	Trunk Main (Steel Pipe)	600mm H=1.0m	9,331	m	18,662	18,662	18,662	18,662
		1100mm H=1.0m	18,397	m	18,397	18,397	64,389	18,397
		1800mm H=1.0m	46,398	m	46,398	46,398	162,393	46,398
	Sub-total				519,893	519,893	681,880	519,893
	Pumping Station	No.1			157,297	157,297	157,297	157,297
		Site	5,000	m2	1,270	1,270	1,270	1,270
		No.2			123,969	123,969	123,969	123,969
		Site	5,000	m2	1,110	1,110	1,110	1,110
		No.3			366,282	366,282	366,282	366,282
		Site	5,000	m2	2,035	2,035	2,035	2,035
		No.4			523,872	523,872	523,872	523,872
	Site	5,000	m2	2,490	2,490	2,490	2,490	
Sub-total				1,178,325	1,178,325	1,178,325	1,178,325	
Sewage Treatment Plant	Flow Rate			2,340,602	2,340,602	2,515,489	2,340,602	
	Site	11,230,000	ha	1,763,110	1,763,110	1,897,870	1,763,110	
	Reclamation	200	m3	628,000	628,000	676,000	628,000	
Sub-total				4,731,712	4,731,712	5,089,359	4,731,712	
West Total				7,379,450	7,379,450	7,899,084	7,379,450	

Table 8.4.1.2 Construction Cost Estimate of Sewerage Facilities (2)

(TK'000)

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9
Tongi	Branch Sewer	1,043 ha	5,031	m	426,764	426,764	426,764	426,764	426,764
	Sub-total				426,764	426,764	426,764	426,764	426,764
	Trunk Main (RC Pipe)	500mm H=3.0m	9,342	m	0	0	0	0	0
		500mm H=4.0m	34,763	m	17,381	17,381	17,381	17,381	17,381
		600mm H=2.0m	9,019	m	4,509	3,607	4,509	3,607	3,607
		600mm H=3.0m	10,598	m	0	7,418	0	7,418	7,418
		600mm H=4.0m	40,197	m	0	20,098	0	20,098	20,098
		600mm H=5.0m	42,520	m	21,260	0	21,260	0	0
		600mm H=6.0m	51,615	m	0	25,807	0	25,807	25,807
		600mm H=8.0m	62,091	m	0	31,045	0	31,045	31,045
		700mm H=1.0m	8,716	m	0	4,358	0	4,358	4,358
		700mm H=2.0m	10,110	m	5,055	4,044	5,055	4,044	4,044
		700mm H=3.0m	11,654	m	9,323	0	9,323	0	0
		800mm H=4.0m	43,984	m	6,597	0	6,597	0	0
		900mm H=2.0m	12,894	m	6,447	6,447	6,447	6,447	6,447
		900mm H=3.0m	14,527	m	7,263	0	7,263	0	0
		900mm H=4.0m	45,842	m	0	13,752	0	13,752	13,752
	900mm H=6.0m	57,322	m	57,322	17,196	57,322	17,196	17,196	
	Trunk Main (Steel Pipe)	300mm H=1.0m	6,242	m	0	29,337	0	1,248	1,248
		800mm H=1.0m	11,318	m	0	53,194	0	2,263	2,263
		Sewer Bridge				8,109		8,109	8,109
	Sub-total				135,157	241,793	135,157	162,773	162,773
	Pumping Station	No.1			109,149	108,979	109,149	104,313	104,313
		Site	6,250	m2	1,293	1,293	1,293	1,262	1,262
		No.2			185,371	99,918	185,371	109,149	109,149
		Site	6,250	m2	1,737	1,231	1,737	1,293	1,293
		No.3			0	185,371	0	185,371	185,371
Site	6,250	m2	0	1,737	0	1,737	1,737		
Sub-total				297,550	398,529	297,550	403,125	403,125	
Sewage Treatment Plant	Flow Rate			646,157	0	646,157	0	0	
	Site	13,470,000	ha	565,740	0	565,740	0	0	
	Reclamation	200	m3	168,000	0	168,000	0	0	
Sub-total				1,379,897	0	1,379,897	0	0	
Tongi Total					2,239,368	1,067,086	2,239,368	992,662	992,662
Uttara	Branch Sewer	1,016 ha	5,031	m	415,716	415,716	415,716	415,716	415,716
	Sub-total				415,716	415,716	415,716	415,716	415,716
	Trunk Main (RC Pipe)	500mm H=5.0m	39,612	m	19,806	19,806	0	0	0
		500mm H=6.0m	49,868	m	24,934	24,934	0	0	0
		500mm H=7.0m	51,272	m	0	0	51,272	0	0
		600mm H=2.0m	9,019	m	4,509	4,509	0	0	0
		600mm H=3.0m	10,598	m	0	0	5,299	0	0
		600mm H=4.0m	40,197	m	20,098	20,098	20,098	0	0
		600mm H=5.0m	42,520	m	42,520	42,520	0	0	0
		700mm H=4.0m	41,488	m	0	0	20,744	0	0
		700mm H=6.0m	52,742	m	52,742	52,742	26,371	0	0
		700mm H=7.0m	55,250	m	27,625	27,625	0	0	0
		900mm H=2.0m	12,894	m	0	0	0	9,025	9,025
		1000mm H=6.0m	61,631	m	0	0	0	123,262	123,262
		1100mm H=2.0m	17,978	m	0	0	0	17,978	17,978
		1100mm H=3.0m	19,612	m	0	0	0	9,806	9,806
		1100mm H=4.0m	52,741	m	0	0	0	26,370	26,370
	1100mm H=6.0m	64,189	m	0	0	0	32,094	32,094	
	Trunk Main (Steel Pipe)	450mm H=1.0m	6,604	m	6,604	13,208	0	0	0
		450mm H=1.0m	6,604	m	6,604	13,208	0	0	0
	Sub-total				205,442	218,650	128,293	218,535	218,535
	Pumping Station	No.1			85,821	85,821	104,380	227,458	227,458
		Site	7,500	m2	1,357	1,357	1,515	2,340	2,340
		No.2			127,665	127,665	0	0	0
		Site	7,500	m2	1,695	1,695	0	0	0
		No.3			0	0	0	0	0
	Site	7,500	m2	0	0	0	0	0	
Sub-total				216,538	216,538	105,895	229,798	229,798	
Sewage Treatment Plant	Flow Rate			397,112	0	0	0	0	
	Site	13,470,000	ha	336,750	0	0	0	0	
	Reclamation	200	m3	50,000	0	0	0	0	
Sub-total				783,862	0	0	0	0	
Uttara Total					1,621,558	850,904	649,904	864,049	864,049
East	Branch Sewer	1,580 ha	5,031	m	843,306	843,306	843,306	843,306	843,306
	Sub-total				843,306	843,306	843,306	843,306	843,306
	Trunk Main (RC Pipe)	500mm H=2.0m	7,815	m	7,815	7,815	3,907	3,907	3,907
		500mm H=4.0m	34,763	m	17,381	17,381	17,381	17,381	17,381
		500mm H=5.0m	39,612	m	17,825	17,825	17,825	17,825	17,825
		600mm H=3.0m	10,598	m	10,598	5,299	5,299	5,299	5,299
	600mm H=4.0m	40,197	m	34,167	34,167	34,167	34,167	34,167	

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	
East	700mm H=4.0m	41,483	m	20,741	20,744	0	0	0	0	
	700mm H=5.0m	46,951	m	0	46,951	0	46,951	0	0	
	800mm H=2.0m	11,351	m	0	5,675	5,675	5,675	0	0	
	800mm H=3.0m	12,932	m	0	0	6,466	0	0	0	
	800mm H=4.0m	43,984	m	39,585	39,585	0	0	0	0	
	800mm H=6.0m	55,361	m	0	16,608	0	16,608	0	0	
	900mm H=2.0m	12,894	m	0	6,447	0	6,447	0	0	
	900mm H=3.0m	14,527	m	0	0	7,263	0	0	0	
	900mm H=4.0m	45,842	m	0	0	22,921	0	0	0	
	900mm H=5.0m	51,456	m	25,728	46,310	0	25,728	0	0	
	900mm H=6.0m	57,322	m	28,661	28,661	0	0	0	0	
	1000mm H=2.0m	15,511	m	15,511	7,755	0	0	0	0	
	1000mm H=3.0m	17,183	m	8,591	0	0	0	0	0	
	1000mm H=4.0m	50,025	m	0	0	45,022	0	0	0	
	1000mm H=6.0m	61,631	m	30,815	61,631	0	0	0	0	
	1100mm H=2.0m	17,978	m	0	8,989	0	0	0	0	
	1100mm H=3.0m	19,612	m	19,612	9,806	0	0	0	0	
	1100mm H=4.0m	52,741	m	0	0	79,111	0	0	0	
	1100mm H=5.0m	63,218	m	0	0	88,505	0	0	0	
	1200mm H=2.0m	20,325	m	0	0	20,325	0	0	0	
	1200mm H=3.0m	21,999	m	0	0	21,999	0	0	0	
	1200mm H=4.0m	55,785	m	0	0	0	83,677	83,677	83,677	
	1200mm H=5.0m	66,342	m	0	0	0	33,171	33,171	33,171	
	1300mm H=5.0m	71,123	m	0	0	0	64,010	64,010	64,010	
	1300mm H=6.0m	73,524	m	0	0	0	73,524	73,524	73,524	
	1400mm H=2.6m	26,313	m	0	0	0	26,313	26,313	26,313	
	1400mm H=3.0m	28,085	m	0	28,085	0	28,085	28,085	28,085	
	1400mm H=4.0m	68,694	m	0	30,912	0	0	0	0	
	1400mm H=6.0m	77,246	m	0	0	0	38,623	38,623	38,623	
	1600mm H=3.0m	34,495	m	0	0	0	0	0	0	
	1600mm H=4.0m	77,742	m	0	0	0	0	0	0	
	1800mm H=1.0m	37,998	m	18,999	0	18,999	0	18,999	18,999	
	1800mm H=2.0m	39,800	m	51,740	0	51,740	51,740	51,740	51,740	
	1800mm H=5.0m	92,746	m	0	0	0	0	0	0	
	1800mm H=7.0m	103,639	m	0	0	0	0	0	134,730	
	2000mm H=1.0m	46,158	m	23,079	0	23,079	0	0	23,079	
	2000mm H=3.0m	50,113	m	0	0	0	0	0	0	
	2000mm H=4.0m	102,628	m	0	0	0	0	0	0	
	2000mm H=5.0m	104,063	m	41,625	0	41,625	0	41,625	41,625	
	2200mm H=3.0m	59,246	m	0	0	29,623	0	29,623	29,623	
	2200mm H=4.0m	113,438	m	164,485	0	107,766	0	107,766	107,766	
	Trunk Main (Steel Pipe)	900mm H=1.0m	12,183	m	0	30,457	0	0	0	0
		1100mm H=1.0m	18,397	m	0	45,992	0	0	0	0
		1200mm H=1.0m	21,865	m	0	0	0	54,662	0	0
		1500mm H=1.0m	36,964	m	92,410	0	0	0	0	0
		1600mm H=1.0m	39,701	m	0	0	99,252	99,252	99,252	99,252
		2000mm H=1.0m	59,268	m	148,170	0	148,170	0	0	0
		2100mm H=1.0m	64,572	m	0	0	0	0	161,430	161,430
	Sub-total				774,520	474,074	857,007	693,932	1,003,373	
	Pumping Station	No.1			181,578	209,991	248,705	334,908	334,908	
		Site	25,000	m2	6,875	7,475	8,200	9,700	9,700	
		No.2			582,286	141,967	582,286	141,967	553,980	
Site		25,000	m2	13,200	6,000	13,200	6,000	12,825		
No.3				561,873	186,391	561,873	186,391	561,873		
Site		25,000	m2	12,925	6,975	12,925	6,975	12,925		
No.4				682,040	357,924	708,620	464,448	582,286		
Site		25,000	m2	14,425	10,050	14,725	11,625	13,200		
No.5				109,485	0	109,485	0	757,192		
Site		25,000	m2	5,175	0	5,175	0	15,275		
Sub-total				2,169,862	926,773	2,265,194	1,162,014	2,854,164		
Sewage Treatment Plant	Flow Rate			3,260,690	1,463,501	3,419,331	2,022,932	3,712,950		
	Site	8,980,000	ha	1,975,600	871,060	2,074,380	1,212,300	2,262,960		
	Reclamation	200	m3	880,000	388,000	924,000	540,000	1,008,000		
Sub-total				6,116,290	2,722,561	6,417,711	3,775,232	6,983,910		
East Total				9,903,978	4,966,714	10,383,218	6,474,484	11,684,753		
Branch Sewer	789 ha	5,031	m	180,829	180,829	180,829	180,829	180,829		
	1,677 ha	5,031	m	768,691	768,691	768,691	768,691	768,691		
Sub-total				949,520	949,520	949,520	949,520	949,520		
Trunk Main (RC Pipe)	500mm H=3.0m	9,342	m	0	0	0	0	0		
	600mm H=2.0m	9,019	m	4,509	8,568	4,509	8,568	4,509		
	600mm H=3.0m	40,197	m	36,177	36,177	20,098	36,177	36,177		
	700mm H=3.0m	11,654	m	5,827	11,654	5,827	11,654	5,827		
	700mm H=4.0m	41,488	m	41,488	41,488	41,488	20,744	41,488		
	800mm H=2.0m	11,351	m	4,540	0	4,540	0	4,540		
	800mm H=3.0m	12,932	m	6,466	6,466	6,466	6,466	6,466		
	800mm H=5.0m	49,532	m	49,532	49,532	49,532	49,532	49,532		

Service Area	Sewerage Facility	Unit Cost	Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9
	800mm H=6.0m	53,361	m	27,680	27,680	27,680	0	27,680
	900mm H=6.0m	57,322	m	22,928	22,928	22,928	22,928	22,928
	1000mm H=3.0m	17,183	m	8,591	0	8,591	0	8,591
	1000mm H=7.0m	67,288	m	33,644	67,288	33,644	67,288	33,644
	1100mm H=2.0m	17,978	m	8,989	8,989	8,989	8,989	8,989
	1100mm H=5.0m	63,218	m	31,609	0	31,609	0	31,609
	1200mm H=2.0m	20,325	m	10,162	10,162	10,162	10,162	10,162
	1200mm H=3.0m	21,999	m	10,999	10,999	10,999	10,999	10,999
	1200mm H=5.0m	66,342	m	33,171	0	33,171	0	33,171
	1300mm H=4.0m	61,829	m	30,914	0	30,914	0	30,914
	1500mm H=3.0m	29,904	m	0	14,952	0	14,952	0
	1500mm H=5.0m	30,902	m	0	15,451	0	15,451	0
	1600mm H=4.0m	77,742	m	0	38,871	0	38,871	0
	1700mm H=2.0m	35,788	m	35,788	0	35,788	0	35,788
	1700mm H=3.0m	37,682	m	16,956	0	16,956	0	16,956
	1700mm H=4.0m	37,682	m	0	18,841	0	18,841	0
	1800mm H=3.0m	41,752	m	18,788	0	18,788	0	18,788
	1800mm H=4.0m	41,752	m	0	16,700	0	16,700	0
	1800mm H=5.0m	92,746	m	473,004	0	473,004	0	473,004
	Trunk Main (Steel Pipe)							
	600mm H=1.0m	9,331	m	0	18,662	0	18,662	0
	1100mm H=1.0m	18,397	m	0	64,389	0	18,397	0
	1800mm H=1.0m	46,398	m	0	162,393	0	46,398	0
	Sub-total			911,762	406,746	895,683	358,322	911,762
	Pumping Station							
	No.1			139,969	157,297	139,969	157,297	139,969
	Site	5,000	m2	1,190	1,270	1,190	1,270	1,190
	No.2			215,727	123,969	215,727	123,969	215,727
	Site	5,000	m2	1,515	1,110	1,515	1,110	1,515
	No.3			490,221	366,282	490,221	366,282	490,221
	Site	5,000	m2	2,395	2,035	2,395	2,035	2,395
	No.4			0	523,872	0	523,872	0
	Site	5,000	m2	0	2,490	0	2,490	0
	Sub-total			851,017	1,178,325	851,017	1,178,325	851,017
West	Sewage Treatment Plant							
	Flow Rate			0	2,836,073	0	2,340,602	0
	Site	11,230,000	ha	0	2,144,930	0	1,763,110	0
	Reclamation	200	m3	0	764,000	0	628,000	0
	Sub-total			0	5,745,003	0	4,731,712	0
	West Total			2,712,299	8,279,594	2,696,220	7,217,879	2,712,299

Table 8.4.1.3 Operation and Maintenance Cost Estimate of Sewerage Facilities (1) (TK'000)

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Tongi	Pumping Station	No.1		m3/day	25,756	24,191	25,756	25,756
		No.2		m3/day	53,535	25,756	53,535	53,535
		No.3		m3/day	0	2,676	0	0
	Sub-total				79,291	52,623	79,291	79,291
	Sewage Treatment Plant	Flow Rate		m3/day	5,079	0	5,079	5,079
	Sub-total				5,079	0	5,079	5,079
	Tongi Total				84,370	52,623	84,370	84,370
Uttara	Pumping Station	No.1		m3/day	18,477	18,477	18,477	17,202
		No.2		m3/day	31,981	31,981	31,981	0
		No.3		m3/day	0	0	0	0
	Sub-total				50,458	50,458	50,458	17,202
	Sewage Treatment Plant	Flow Rate		m3/day	3,633	6,353	0	0
	Sub-total				3,633	6,353	0	0
	Uttara Total				54,091	56,811	50,458	17,202
East	Pumping Station	No.1		m3/day	63,600	63,600	63,600	48,723
		No.2		m3/day	37,034	37,034	37,034	37,034
		No.3		m3/day	132,856	132,856	132,856	53,943
		No.4		m3/day	53,943	53,943	53,943	153,198
	Sub-total				233,490	233,490	233,490	292,898
	Sewage Treatment Plant	Flow Rate		m3/day	8,913	8,913	8,913	9,734
	Sub-total				8,913	8,913	8,913	9,734
East Total				242,403	242,403	242,403	302,632	
West	Pumping Station	No.1		m3/day	42,669	42,669	42,669	42,669
		No.2		m3/day	30,709	30,709	30,709	30,709
		No.3		m3/day	137,160	137,160	137,160	137,160
		No.4		m3/day	224,860	224,860	224,860	224,860
	Sub-total				435,398	435,398	435,398	435,398
	Sewage Treatment Plant	Flow Rate		m3/day	12,312	12,312	12,938	12,312
	Sub-total				12,312	12,312	12,938	12,312
West Total				447,710	447,710	448,336	447,710	

Table 8.4.1.4 Operation and Maintenance Cost Estimate of Sewerage Facilities (2)

(TK'000)

Service Area	Sewerage Facility		Unit Cost	Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	
Tongi	Pumping Station	No.1		m3/day	25,756	25,701	25,756	24,193	24,193	
		No.2		m3/day	53,535	22,796	53,535	25,756	25,756	
		No.3		m3/day	0	53,535	0	53,535	53,535	
	Sub-total					79,291	102,032	79,291	103,484	103,484
	Sewage Treatment Plant	Flow Rate		m3/day	5,079	0	5,079	0	0	
	Sub-total					5,079	0	5,079	0	0
	Tongi Total					84,370	102,032	84,370	103,484	103,484
Uttara	Pumping Station	No.1		m3/day	18,477	18,477	24,215	71,022	71,022	
		No.2		m3/day	31,981	31,981	0	0	0	
		No.3		m3/day	0	0	0	0	0	
	Sub-total					50,458	50,458	24,215	71,022	71,022
	Sewage Treatment Plant	Flow Rate		m3/day	3,633	0	0	0	0	
	Sub-total					3,633	0	0	0	0
	Uttara Total					54,091	50,458	24,215	71,022	71,022
East	Pumping Station	No.1		m3/day	52,028	63,600	80,347	121,200	121,200	
		No.2		m3/day	260,217	37,034	260,217	37,034	242,906	
		No.3		m3/day	247,699	53,943	247,699	53,943	247,699	
		No.4		m3/day	323,743	132,856	341,301	190,407	260,217	
		No.5		m3/day	25,866	0	25,866	0	374,035	
	Sub-total					909,553	287,433	955,430	402,584	1,246,057
	Sewage Treatment Plant	Flow Rate		m3/day	15,466	8,913	15,980	11,136	16,912	
	Sub-total					15,466	8,913	15,980	11,136	16,912
East Total					925,019	296,346	971,410	413,720	1,262,969	
West	Pumping Station	No.1		m3/day	36,316	42,669	36,316	42,669	36,316	
		No.2		m3/day	66,013	30,709	66,013	30,709	66,013	
		No.3		m3/day	205,155	137,160	205,155	137,160	205,155	
		No.4		m3/day	0	224,860	0	224,860	0	
	Sub-total					307,484	435,398	307,484	435,398	307,484
	Sewage Treatment Plant	Flow Rate		m3/day	0	14,051	0	12,312	0	
	Sub-total					0	14,051	0	12,312	0
West Total					307,484	449,449	307,484	447,710	307,484	

Table 8.4.1.5 Bill of Quantity of Sewerage Facilities (1)

Service Area	Sewerage Facility	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4	
Tongi	Branch Sewer	1,043 ha	m	84,827	84,827	84,827	84,827
	Trunk Main (RC Pipe)	500mm H=4.0m	m	500	500	500	500
		600mm H=2.0m	m	500	400	500	500
		600mm H=3.0m	m		700		
		600mm H=4.0m	m		500		
		600mm H=5.0m	m	500		500	500
		600mm H=8.0m	m		500		
		700mm H=1.0m	m		500		
		700mm H=2.0m	m	500	400	500	500
		700mm H=3.0m	m	800		800	800
		800mm H=4.0m	m				
		900mm H=2.0m	m	500	500	500	500
		900mm H=3.0m	m	500		500	500
		900mm H=4.0m	m		300		
		900mm H=6.0m	m	1,000	300	1,000	1,000
		Trunk Main (Steel Pipe)	300mm H=1.0m	m		4,700	
	800mm H=1.0m		m		4,700		
	Pumping Station	No.1 Flow Rate	m ³ /day	20,598	19,136	20,598	20,598
		Site	m ²	207	202	207	207
		No.2 Flow Rate	m ³ /day	48,640	20,598	48,640	48,640
		Site	m ²	278	207	278	278
		No.3 Flow Rate	m ³ /day		48,640		
Site		m ²	0	278	0	0	
Sewage Treatment Plant	Flow Rate	m ³ /day	30,400	0	30,400	30,400	
	Site	ha	42	0	42	42	
	Reclamation H=2m	m ³	840,000	0	840,000	840,000	
Uttara	Branch Sewer	1,016 ha	m	82,631	82,631	82,631	82,631
	Trunk Main (RC Pipe)	500mm H=5.0m	m	500	500	500	
		500mm H=6.0m	m	500	500	500	
		500mm H=7.0m	m				1,000
		600mm H=2.0m	m	500	500	500	500
		600mm H=3.0m	m				500
		600mm H=4.0m	m	500	500	500	500
		600mm H=5.0m	m	1,000	1,000	1,000	500
		700mm H=4.0m	m				500
		700mm H=6.0m	m	1,000	1,000	1,000	500
		700mm H=7.0m	m	500	500	500	
	Trunk Main (Steel Pipe)	450mm H=1.0m	m	1,000	2,000	1,000	
		450mm H=1.0m	m	1,000	2,000	1,000	
	Pumping Station	No.1 Flow Rate	m ³ /day	13,945	13,945	13,945	12,822
		Site	m ²	181	181	181	176
		No.2 Flow Rate	m ³ /day	26,560	26,560	26,560	0
		Site	m ²	226	226	226	0
		No.3 Flow Rate	m ³ /day				0
		Site	m ²	0	0	0	0
	Sewage Treatment Plant	Flow Rate	m ³ /day	16,100	46,500	0	0
		Site	ha	25	58	0	0
		Reclamation H=1m	m ³	250,000	580,000	0	0
East	Branch Sewer	1,580 ha	m	167,622	167,622	167,622	167,622
	Trunk Main (RC Pipe)	500mm H=2.0m	m	1,000	1,000	1,000	500
		500mm H=4.0m	m	500	500	500	500
		500mm H=5.0m	m	450	450	450	450
	600mm H=3.0m	m	1,000	1,000	1,000	500	

Service Area	Sewerage Facility	Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4		
East		600mm H=4.0m	m	850	850	850	850	
		700mm H=4.0m	m	500	500	500		
		700mm H=5.0m	m	1,000	1,000	1,000	1,000	
		800mm H=2.0m	m	500	500	500	500	
		800mm H=4.0m	m	900	900	900		
		800mm H=6.0m	m	300	300	300	1,300	
		900mm H=2.0m	m	500	500	500	1,000	
		900mm H=5.0m	m	900	900	900	400	
		900mm H=6.0m	m	500	500	500		
		900mm H=7.0m	m				500	
		1000mm H=2.0m	m	500	500	500	900	
		1000mm H=6.0m	m	1,000	1,000	1,000		
		1100mm H=2.0m	m	500	500	500		
		1100mm H=3.0m	m	500	500	500	1,000	
		1100mm H=4.0m	m				500	
		1200mm H=4.0m	m	500	500	500		
		1200mm H=5.0m	m					
		1400mm H=3.0m	m	1,000	1,000	1,000		
		1400mm H=4.0m	m	450	450	450		
		1500mm H=5.0m	m				500	
	1500mm H=6.0m	m				950		
	Trunk Main (Steel Pipe)	900mm H=1.0m	m	2,500	2,500	2,500		
		1000mm H=1.0m	m				2,500	
		1100mm H=1.0m	m	2,500	2,500	2,500		
		1200mm H=1.0m	m				2,500	
	Pumping Station	No.1 Flow Rate	m3/day	59,547	59,547	59,547	43,546	
		Site	m2	299	299	299	268	
		No.2 Flow Rate	m3/day	31,553	31,553	31,553	31,553	
		Site	m2	240	240	240	240	
		No.3 Flow Rate	m3/day	141,440	141,440	141,440	49,075	
		Site	m2	402	402	402	279	
		No.4 Flow Rate	m3/day	49,075	49,075	49,075	167,200	
		Site	m2	279	279	279	426	
	Sewage Treatment Plant	Flow Rate	m3/day	88,400	88,400	88,400	104,500	
		Site	ha	97	97	97	111	
		Reclamation H=2m	m3	1,940,000	1,940,000	1,940,000	2,220,000	
	West	Branch Sewer	789 ha	m	35,943	35,943	35,943	35,943
			1,677 ha	m	152,791	152,791	152,791	152,791
		Trunk Main (RC Pipe)	500mm H=2.0m	m				
			600mm H=2.0m	m	950	950	950	950
			600mm H=3.0m	m	900	900	900	900
			700mm H=4.0m	m	1,000	1,000	1,000	1,000
800mm H=3.0m			m	500	500	500	500	
800mm H=5.0m			m	1,000	1,000	1,000	1,000	
800mm H=6.0m			m	500	500	500	500	
900mm H=6.0m			m	400	400	400	400	
1000mm H=7.0m			m	1,000	1,000	1,000	1,000	
1100mm H=2.0m			m	500	500	500	500	
1200mm H=2.0m			m	500	500	500	500	
1200mm H=3.0m			m	500	500	500	500	
1500mm H=3.0m			m	500	500	500	500	
1500mm H=5.0m			m	500	500	500	500	
1600mm H=5.0m			m	500	500	500	500	
1700mm H=4.0m			m	500	500	500	500	
1800mm H=4.0m			m	400	400	400	400	

Service Area	Sewerage Facility		Unit	Alternative 1	Alternative 2	Alternative 3	Alternative 4
West	Trunk Main (Steel Pipe)	600mm H=1.0m	m	2,000	2,000	2,000	2,000
		1100mm H=1.0m	m	1,000	1,000	3,500	1,000
		1800mm H=1.0m	m	1,000	1,000	3,500	1,000
	Pumping Station	No.1 Flow Rate	m ³ /day	37,264	37,264	37,264	37,264
		Site	m ²	254	254	254	254
		No.2 Flow Rate	m ³ /day	25,324	25,324	25,324	25,324
		Site	m ²	222	222	222	222
		No.3 Flow Rate	m ³ /day	146,837	146,837	146,837	146,837
		Site	m ²	407	407	407	407
		No.4 Flow Rate	m ³ /day	262,397	262,397	262,397	262,397
		Site	m ²	498	498	498	498
	Sewage Treatment Plant	Flow Rate	m ³ /day	163,200	163,200	179,300	163,200
		Site	ha	157	157	169	157
		Reclamation H=2m	m ³	3,140,000	3,140,000	3,380,000	3,140,000

Table 8.4.1.6 Bill of Quantity of Sewerage Facilities (2)

Service Area	Sewerage Facility		Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	
Tongl	Branch Sewer	1,043 ha	m	84,827	84,827	84,827	84,827	84,827	
	Trunk Main (RC Pipe)	500mm H=3.0m	m						
		500mm H=4.0m	m	500	500	500	500	500	
		600mm H=2.0m	m	500	400	500	400	400	
		600mm H=3.0m	m		700		700	700	
		600mm H=4.0m	m		500		500	500	
		600mm H=5.0m	m	500		500			
		600mm H=6.0m	m		500		500	500	
		600mm H=8.0m	m		500		500	500	
		700mm H=1.0m	m		500		500	500	
		700mm H=2.0m	m	500	400	500	400	400	
		700mm H=3.0m	m	800		800			
		800mm H=4.0m	m	150		150			
		900mm H=2.0m	m	500	500	500	500	500	
		900mm H=3.0m	m	500		500			
		900mm H=4.0m	m		300		300	300	
		900mm H=6.0m	m	1,000	300	1,000	300	300	
		Trunk Main (Steel Pipe)	300mm H=1.0m	m		4,700		200	200
	800mm H=1.0m		m		4,700		200	200	
	Pumping Station	No.1 Flow Rate	m ³ /day	20,598	20,546	20,598	19,138	19,138	
		Site	m ²	207	207	207	202	202	
		No.2 Flow Rate	m ³ /day	48,640	17,847	48,640	20,598	20,598	
		Site	m ²	278	197	278	207	207	
		No.3 Flow Rate	m ³ /day		48,640		48,640	48,640	
		Site	m ²	0	278	0	278	278	
	Sewage Treatment Plant	Flow Rate	m ³ /day	30,400		30,400			
		Site	ha	42	0	42	0	0	
Reclamation H=2m		m ³	840,000	0	840,000		0		
Uttara	Branch Sewer	1,016 ha	m	82,631	82,631	82,631	82,631	82,631	
	Trunk Main (RC Pipe)	500mm H=5.0m	m	500	500				
		500mm H=6.0m	m	500	500				
		500mm H=7.0m	m			1,000			
		600mm H=2.0m	m	500	500	500			
		600mm H=3.0m	m			500			
		600mm H=4.0m	m	500	500	500			
		600mm H=5.0m	m	1,000	1,000				
		700mm H=4.0m	m			500			
		700mm H=6.0m	m	1,000	1,000	500			
		700mm H=7.0m	m	500	500				
		900mm H=2.0m	m				700	700	
		1000mm H=6.0m	m				2,000	2,000	
		1100mm H=2.0m	m				1,000	1,000	
		1100mm H=3.0m	m				500	500	
		1100mm H=4.0m	m				500	500	
		1100mm H=6.0m	m				500	500	
		Trunk Main (Steel Pipe)	450mm H=1.0m	m	1,000	2,000			
	450mm H=1.0m		m	1,000	2,000				
	Pumping Station	No.1 Flow Rate	m ³ /day	13,945	13,945	19,158	67,788	67,788	
		Site	m ²	181	181	202	312	312	
		No.2 Flow Rate	m ³ /day	26,560	26,560			0	
		Site	m ²	226	226	0	0	0	
		No.3 Flow Rate	m ³ /day					0	
		Site	m ²	0	0	0	0	0	
	Sewage Treatment Plant	Flow Rate	m ³ /day	16,100					
		Site	ha	25	0	0	0	0	
Reclamation H=1m		m ³	250,000	0	0	0	0		
East	Branch Sewer	1,580 ha	m	167,622	167,622	167,622	167,622	167,622	
	Trunk Main (RC Pipe)	500mm H=2.0m	m	1,000	1,000	500	500	500	
		500mm H=4.0m	m	500	500	500	500	500	

Service Area	Sewerage Facility	Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	
East	500mm H=5.0m	m	450	450	450	450	450	
	600mm H=3.0m	m	1,000	500	500	500	500	
	600mm H=4.0m	m	850	850	850	850	850	
	700mm H=4.0m	m	500	500				
	700mm H=5.0m	m		1,000		1,000		
	800mm H=2.0m	m		500	500	500		
	800mm H=3.0m	m			500			
	800mm H=4.0m	m	900	900				
	800mm H=6.0m	m		300			300	
	900mm H=2.0m	m		500			500	
	900mm H=3.0m	m				500		
	900mm H=4.0m	m				500		
	900mm H=5.0m	m	500	900			500	
	900mm H=6.0m	m	500	500				
	1000mm H=2.0m	m	1,000	500				
	1000mm H=3.0m	m	500					
	1000mm H=4.0m	m				900		
	1000mm H=6.0m	m	500	1,000				
	1100mm H=2.0m	m		500				
	1100mm H=3.0m	m	1,000	500				
	1100mm H=4.0m	m				1,500		
	1100mm H=5.0m	m				1,400		
	1200mm H=2.0m	m				1,000		
	1200mm H=3.0m	m				1,000		
	1200mm H=4.0m	m					1,500	
	1200mm H=5.0m	m				500	500	
	1300mm H=5.0m	m				900	900	
	1300mm H=6.0m	m				1,000	1,000	
	1400mm H=2.0m	m				1,000	1,000	
	1400mm H=3.0m	m			1,000		1,000	
	1400mm H=4.0m	m			450			
	1400mm H=6.0m	m				500	500	
	1600mm H=3.0m	m						
	1600mm H=4.0m	m						
	1800mm H=1.0m	m	500			500	500	
	1800mm H=2.0m	m	1,300			1,300	1,300	
	1800mm H=5.0m	m						
	1800mm H=7.0m	m					1,300	
	2000mm H=1.0m	m	500			500	500	
	2000mm H=3.0m	m						
	2000mm H=4.0m	m						
	2000mm H=5.0m	m	400			400	400	
	2200mm H=3.0m	m				500	500	
	2200mm H=4.0m	m	1,450			950	950	
	Trunk Main (Steel Pipe)	900mm H=1.0m	m		2,500			
		1100mm H=1.0m	m		2,500			
		1200mm H=1.0m	m				2,500	
		1500mm H=1.0m	m	2,500				
		1600mm H=1.0m	m			2,500	2,500	2,500
		2000mm H=1.0m	m	2,500		2,500		
		2100mm H=1.0m	m					2,500
	Pumping Station	No.1 Flow Rate	m ³ /day	47,036	59,547	78,356	126,982	126,982
		Site	m ²	275	299	328	388	388
		No.2 Flow Rate	m ³ /day	311,489	31,553	311,489	31,553	287,297
		Site	m ²	528	240	528	240	513
		No.3 Flow Rate	m ³ /day	293,967	49,075	293,967	49,075	293,967
		Site	m ²	517	279	517	279	517
		No.4 Flow Rate	m ³ /day	402,580	141,440	428,340	215,840	311,489
		Site	m ²	577	402	589	465	528
		No.5 Flow Rate	m ³ /day	20,701		20,701		476,980
		Site	m ²	207	0	207	0	611

Service Area	Sewerage Facility		Unit	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	
East	Sewage Treatment Plant	Flow Rate	m ³ /day	251,600	88,400	267,700	134,900	298,100	
		Site	ha	220	97	231	135	252	
		Reclamation H=2m	m ³	4,400,000	1,940,000	4,620,000	2,700,000	5,040,000	
West	Branch Sewer	789 ha	m	35,943	35,943	35,943	35,943	35,943	
		1,677 ha	m	152,791	152,791	152,791	152,791	152,791	
	Trunk Main (RC Pipe)	500mm H=3.0m	m						
		600mm H=2.0m	m	500	950	500	950	500	
		600mm H=3.0m	m	900	900	500	900	900	
		700mm H=3.0m	m	500	1,000	500	1,000	500	
		700mm H=4.0m	m	1,000	1,000	1,000	500	1,000	
		800mm H=2.0m	m	400		400		400	
		800mm H=3.0m	m	500	500	500	500	500	
		800mm H=5.0m	m	1,000	1,000	1,000	1,000	1,000	
		800mm H=6.0m	m	500	500	500		500	
		900mm H=6.0m	m	400	400	400	400	400	
		1000mm H=3.0m	m	500		500		500	
		1000mm H=7.0m	m	500	1,000	500	1,000	500	
		1100mm H=2.0m	m	500	500	500	500	500	
		1100mm H=5.0m	m	500		500		500	
		1200mm H=2.0m	m	500	500	500	500	500	
		1200mm H=3.0m	m	500	500	500	500	500	
		1200mm H=5.0m	m	500		500		500	
		1300mm H=4.0m	m	500		500		500	
		1500mm H=3.0m	m			500		500	
		1500mm H=5.0m	m			500		500	
		1600mm H=4.0m	m			500		500	
		1700mm H=2.0m	m	1,000			1,000		1,000
		1700mm H=3.0m	m	450			450		450
		1700mm H=4.0m	m			500		500	
		1800mm H=3.0m	m	450			450		450
		1800mm H=4.0m	m			400		400	
		1800mm H=5.0m	m	5,100			5,100		5,100
	Trunk Main (Steel Pipe)	600mm H=1.0m	m			2,000		2,000	
		1100mm H=1.0m	m			3,500		1,000	
		1800mm H=1.0m	m			3,500		1,000	
	Pumping Station	No.1 Flow Rate	m ³ /day	30,836	37,264	30,836	37,264	30,836	
Site		m ²	238	254	238	254	238		
No.2 Flow Rate		m ³ /day	62,208	25,324	62,208	25,324	62,208		
Site		m ²	303	222	303	222	303		
No.3 Flow Rate		m ³ /day	235,604	146,837	235,604	146,837	235,604		
Site		m ²	479	407	479	407	479		
No.4 Flow Rate		m ³ /day		262,397		262,397			
Site		m ²	0	498	0	498	0		
Sewage Treatment Plant	Flow Rate	m ³ /day		209,700		163,200			
	Site	ha	0	191	0	157	0		
	Reclamation H=2m	m ³	0	3,820,000	0	3,140,000	0		

Appendix 8.5.1 Design Sewage Flow

Table 8.5.1.1 Design Sewage Flow by Sewerage Service Area (Year 1997)

Sewerage Service Area	Sewerage Zone	Item	Unit	Core Area	Cantonment Security	Sub-total	Transitional Area	Total	
Tongi	Tongi	Area	ha	151	0	151	892	1,043	
		Population	person	32,000	0	32,000	147,000	179,000	
		Q1	cu.m/day	2,400	0	2,400	11,025	13,425	
		Q2	cu.m/day	2,880	0	2,880	13,230	16,110	
		Q3	cu.m/day	3,680	0	3,680	16,905	20,585	
North Dhaka East	Uttara	Area	ha	504	0	504	512	1,016	
		Population	person	78,000	0	78,000	66,000	144,000	
		Q1	cu.m/day	5,850	0	5,850	4,950	10,800	
		Q2	cu.m/day	7,020	0	7,020	5,940	12,960	
		Q3	cu.m/day	8,970	0	8,970	7,590	16,560	
	North Dhaka East	North Dhaka East	Area	ha	868	1,090	1,958	1,371	3,329
			Population	person	274,000	63,000	337,000	183,000	520,000
			Q1	cu.m/day	20,550	4,725	25,275	13,725	39,000
			Q2	cu.m/day	24,660	5,670	30,330	16,470	46,800
	North Dhaka East	Total	Area	ha	1,372	1,090	2,462	1,883	4,345
			Population	person	352,000	63,000	415,000	249,000	664,000
			Q1	cu.m/day	26,400	4,725	31,125	18,675	49,800
			Q2	cu.m/day	31,680	5,670	37,350	22,410	59,760
Q3			cu.m/day	40,480	7,245	47,725	28,635	76,360	
North Dhaka West	North Dhaka West	Area	ha	789	130	919	1,677	2,596	
		Population	person	405,000	7,000	412,000	812,000	1,224,000	
		Q1	cu.m/day	30,375	525	30,900	60,900	91,800	
		Q2	cu.m/day	36,450	630	37,080	73,080	110,160	
		Q3	cu.m/day	46,575	805	47,380	93,380	140,760	
Total	Total	Area	ha	2,312	1,220	3,532	4,452	7,984	
		Population	person	789,000	70,000	859,000	1,208,000	2,067,000	
		Q1	cu.m/day	59,175	5,250	64,425	90,600	155,025	
		Q2	cu.m/day	71,010	6,300	77,310	108,720	186,030	
		Q3	cu.m/day	90,735	8,050	98,785	138,920	237,705	

- Note: 1) Q1: Design Average Daily Flow, Per Capita Sewage Flow = 75 lpcd
 2) Q2: Design Maximum Daily Flow, Per Capita Sewage Flow = 90 lpcd
 3) Q3: Design Maximum Hourly Flow, Per Capita Sewage Flow = 115 lpcd
 4) Cantonment Security Zone is included the core area, but the outlet sewer shall be connected to the trunk sewer of planned public sewerage in certain connection point.

Table 8.5.1.2 Design Sewage Flow by Sewerage Service Area (Year 2005)

Sewerage Service Area	Sewerage Zone	Item	Unit	Core Area	Cantonment Security	Sub-total	Transitional Area	Total	
Tongi	Tongi	Area	ha	151	0	151	892	1,043	
		Population	person	34,000	0	34,000	199,000	233,000	
		Q1	cu.m/day	3,230	0	3,230	18,905	22,135	
		Q2	cu.m/day	3,910	0	3,910	22,885	26,795	
		Q3	cu.m/day	4,930	0	4,930	28,855	33,785	
North Dhaka East	Uttara	Area	ha	504	0	504	512	1,016	
		Population	person	80,000	0	80,000	65,000	145,000	
		Q1	cu.m/day	7,600	0	7,600	6,175	13,775	
		Q2	cu.m/day	9,200	0	9,200	7,475	16,675	
		Q3	cu.m/day	11,600	0	11,600	9,425	21,025	
	North Dhaka East	North Dhaka East	Area	ha	868	1,090	1,958	1,371	3,329
			Population	person	386,000	70,000	456,000	236,000	692,000
			Q1	cu.m/day	36,670	6,650	43,320	22,420	65,740
			Q2	cu.m/day	44,390	8,050	52,440	27,140	79,580
			Q3	cu.m/day	55,970	10,150	66,120	34,220	100,340
	Total	Total	Area	ha	1,372	1,090	2,462	1,883	4,345
			Population	person	466,000	70,000	536,000	301,000	837,000
			Q1	cu.m/day	44,270	6,650	50,920	28,595	79,515
Q2			cu.m/day	53,590	8,050	61,640	34,615	96,255	
Q3			cu.m/day	67,570	10,150	77,720	43,645	121,365	
North Dhaka West	North Dhaka West	Area	ha	789	130	919	1,677	2,596	
		Population	person	362,000	8,000	370,000	953,000	1,323,000	
		Q1	cu.m/day	34,390	760	35,150	90,535	125,685	
		Q2	cu.m/day	41,630	920	42,550	109,595	152,145	
		Q3	cu.m/day	52,490	1,160	53,650	138,185	191,835	
Total	Total	Area	ha	2,312	1,220	3,532	4,452	7,984	
		Population	person	862,000	78,000	940,000	1,453,000	2,393,000	
		Q1	cu.m/day	81,890	7,410	89,300	138,035	227,335	
		Q2	cu.m/day	99,130	8,970	108,100	167,095	275,195	
		Q3	cu.m/day	124,990	11,310	136,300	210,685	346,985	

Note: 1) Q1: Design Average Daily Flow, Per Capita Sewage Flow = 95 lpcd
 2) Q2: Design Maximum Daily Flow, Per Capita Sewage Flow = 115 lpcd
 3) Q3: Design Maximum Hourly Flow, Per Capita Sewage Flow = 145 lpcd
 4) Cantonment Security Zone is included the core area, but the outlet sewer shall be connected to the trunk sewer of planned public sewerage in certain connection point.

Table 8.5.1.3 Design Sewage Flow by Sewerage Service Area (Year 2010)

Sewerage Service Area	Sewerage Zone	Item	Unit	Core Area	Cantonment Security	Sub-total	Transitional Area	Total	
Tongi	Tongi	Area	ha	151	0	151	892	1,043	
		Population	person	36,000	0	36,000	221,000	257,000	
		Q1	cu.m/day	3,600	0	3,600	22,100	25,700	
		Q2	cu.m/day	4,500	0	4,500	27,625	32,125	
		Q3	cu.m/day	5,760	0	5,760	35,360	41,120	
North Dhaka East	Uttara	Area	ha	504	0	504	512	1,016	
		Population	person	82,000	0	82,000	68,000	150,000	
		Q1	cu.m/day	8,200	0	8,200	6,800	15,000	
		Q2	cu.m/day	10,250	0	10,250	8,500	18,750	
		Q3	cu.m/day	13,120	0	13,120	10,880	24,000	
	North Dhaka East	North Dhaka East	Area	ha	868	1,090	1,958	1,371	3,329
			Population	person	419,000	74,000	493,000	277,000	770,000
			Q1	cu.m/day	41,900	7,400	49,300	27,700	77,000
			Q2	cu.m/day	52,375	9,250	61,625	34,625	96,250
			Q3	cu.m/day	67,040	11,840	78,880	44,320	123,200
	North Dhaka East	Total	Area	ha	1,372	1,090	2,462	1,883	4,345
			Population	person	501,000	74,000	575,000	345,000	920,000
			Q1	cu.m/day	50,100	7,400	57,500	34,500	92,000
Q2			cu.m/day	62,625	9,250	71,875	43,125	115,000	
Q3			cu.m/day	80,160	11,840	92,000	55,200	147,200	
North Dhaka West	North Dhaka West	Area	ha	789	130	919	1,677	2,596	
		Population	person	388,000	9,000	397,000	1,031,000	1,428,000	
		Q1	cu.m/day	38,800	900	39,700	103,100	142,800	
		Q2	cu.m/day	48,500	1,125	49,625	128,875	178,500	
		Q3	cu.m/day	62,080	1,440	63,520	164,960	228,480	
Total	Total	Area	ha	2,312	1,220	3,532	4,452	7,984	
		Population	person	925,000	83,000	1,008,000	1,597,000	2,605,000	
		Q1	cu.m/day	92,500	8,300	100,800	159,700	260,500	
		Q2	cu.m/day	115,625	10,375	126,000	199,625	325,625	
		Q3	cu.m/day	148,000	13,280	161,280	255,520	416,800	

- Note: 1) Q1: Design Average Daily Flow, Per Capita Sewage Flow = 100 lpcd
 2) Q2: Design Maximum Daily Flow, Per Capita Sewage Flow = 125 lpcd
 3) Q3: Design Maximum Hourly Flow, Per Capita Sewage Flow = 160 lpcd
 4) Cantonment Security Zone is included the core area, but the outlet sewer shall be connected to the trunk sewer of planned public sewerage in certain connection point.

Table 8.5.1.4 Design Sewage Flow by Sewerage Service Area (Year 2015)

Sewerage Service Area	Sewerage Zone	Item	Unit	Core Area	Cantonment Security	Sub-total	Transitional Area	Total	
Tongi	Tongi	Area	ha	151	0	151	892	1,043	
		Population	person	37,000	0	37,000	243,000	280,000	
		Q1	cu.m/day	3,700	0	3,700	24,300	28,000	
		Q2	cu.m/day	4,625	0	4,625	30,375	35,000	
		Q3	cu.m/day	5,920	0	5,920	38,880	44,800	
North Dhaka East	Uttara	Area	ha	504	0	504	512	1,016	
		Population	person	84,000	0	84,000	72,000	156,000	
		Q1	cu.m/day	8,400	0	8,400	7,200	15,600	
		Q2	cu.m/day	10,500	0	10,500	9,000	19,500	
		Q3	cu.m/day	13,440	0	13,440	11,520	24,960	
	North Dhaka East	North Dhaka East	Area	ha	868	1,090	1,958	1,371	3,329
			Population	person	453,000	79,000	532,000	296,000	828,000
			Q1	cu.m/day	45,300	7,900	53,200	29,600	82,800
			Q2	cu.m/day	56,625	9,875	66,500	37,000	103,500
			Q3	cu.m/day	72,480	12,640	85,120	47,360	132,480
	Total	Total	Area	ha	1,372	1,090	2,462	1,883	4,345
			Population	person	537,000	79,000	616,000	368,000	984,000
			Q1	cu.m/day	53,700	7,900	61,600	36,800	98,400
Q2			cu.m/day	67,125	9,875	77,000	46,000	123,000	
Q3			cu.m/day	85,920	12,640	98,560	58,880	157,440	
North Dhaka West	North Dhaka West	Area	ha	789	130	919	1,677	2,596	
		Population	person	412,000	9,000	421,000	1,105,000	1,526,000	
		Q1	cu.m/day	41,200	900	42,100	110,500	152,600	
		Q2	cu.m/day	51,500	1,125	52,625	138,125	190,750	
		Q3	cu.m/day	65,920	1,440	67,360	176,800	244,160	
Total	Total	Area	ha	2,312	1,220	3,532	4,452	7,984	
		Population	person	986,000	88,000	1,074,000	1,716,000	2,790,000	
		Q1	cu.m/day	98,600	8,800	107,400	171,600	279,000	
		Q2	cu.m/day	123,250	11,000	134,250	214,500	348,750	
		Q3	cu.m/day	157,760	14,080	171,840	274,560	446,400	

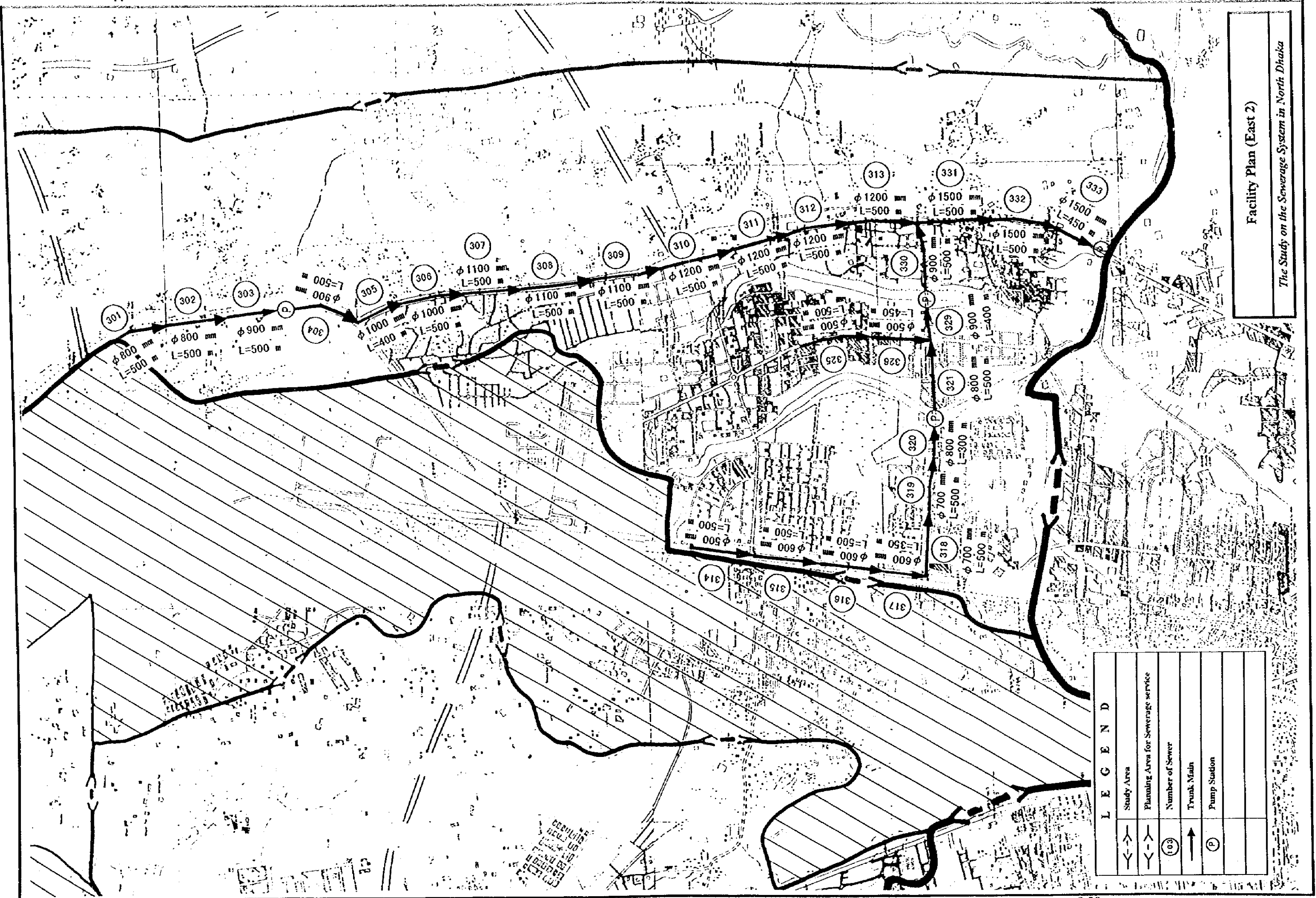
- Note: 1) Q1: Design Average Daily Flow, Per Capita Sewage Flow = 100 lpcd
 2) Q2: Design Maximum Daily Flow, Per Capita Sewage Flow = 125 lpcd
 3) Q3: Design Maximum Hourly Flow, Per Capita Sewage Flow = 160 lpcd
 4) Cantonment Security Zone is included the core area, but the outlet sewer shall be connected to the trunk sewer of planned public sewerage in certain connection point.

Table 8.5.1.5 Design Sewage Flow by Sewerage Service Area (Year 2020)

Sewerage Service Area	Sewerage Zone	Item	Unit	Core Area	Cantonment Security	Sub-total	Transitional Area	Total	
Tongi	Tongi	Area	ha	151	0	151	892	1,043	
		Population	person	39,000	0	39,000	266,000	305,000	
		Q1	cu.m/day	3,900	0	3,900	26,600	30,500	
		Q2	cu.m/day	4,875	0	4,875	33,250	38,125	
		Q3	cu.m/day	6,240	0	6,240	42,560	48,800	
North Dhaka East	Uttara	Area	ha	504	0	504	512	1,016	
		Population	person	86,000	0	86,000	75,000	161,000	
		Q1	cu.m/day	8,600	0	8,600	7,500	16,100	
		Q2	cu.m/day	10,750	0	10,750	9,375	20,125	
		Q3	cu.m/day	13,760	0	13,760	12,000	25,760	
	North Dhaka East	North Dhaka East	Area	ha	868	1,090	1,958	1,371	3,329
			Population	person	487,000	83,000	570,000	314,000	884,000
			Q1	cu.m/day	48,700	8,300	57,000	31,400	88,400
			Q2	cu.m/day	60,875	10,375	71,250	39,250	110,500
			Q3	cu.m/day	77,920	13,280	91,200	50,240	141,440
	Total	Total	Area	ha	1,372	1,090	2,462	1,883	4,345
			Population	person	573,000	83,000	656,000	389,000	1,045,000
			Q1	cu.m/day	57,300	8,300	65,600	38,900	104,500
Q2			cu.m/day	71,625	10,375	82,000	48,625	130,625	
Q3			cu.m/day	91,680	13,280	104,960	62,240	167,200	
North Dhaka West	North Dhaka West	Area	ha	789	130	919	1,677	2,596	
		Population	person	437,000	10,000	447,000	1,183,000	1,630,000	
		Q1	cu.m/day	43,700	1,000	44,700	118,300	163,000	
		Q2	cu.m/day	54,625	1,250	55,875	147,875	203,750	
		Q3	cu.m/day	69,920	1,600	71,520	189,280	260,800	
Total	Total	Area	ha	2,312	1,220	3,532	4,452	7,984	
		Population	person	1,049,000	93,000	1,142,000	1,838,000	2,980,000	
		Q1	cu.m/day	104,900	9,300	114,200	183,800	298,000	
		Q2	cu.m/day	131,125	11,625	142,750	229,750	372,500	
		Q3	cu.m/day	167,840	14,880	182,720	294,080	476,800	

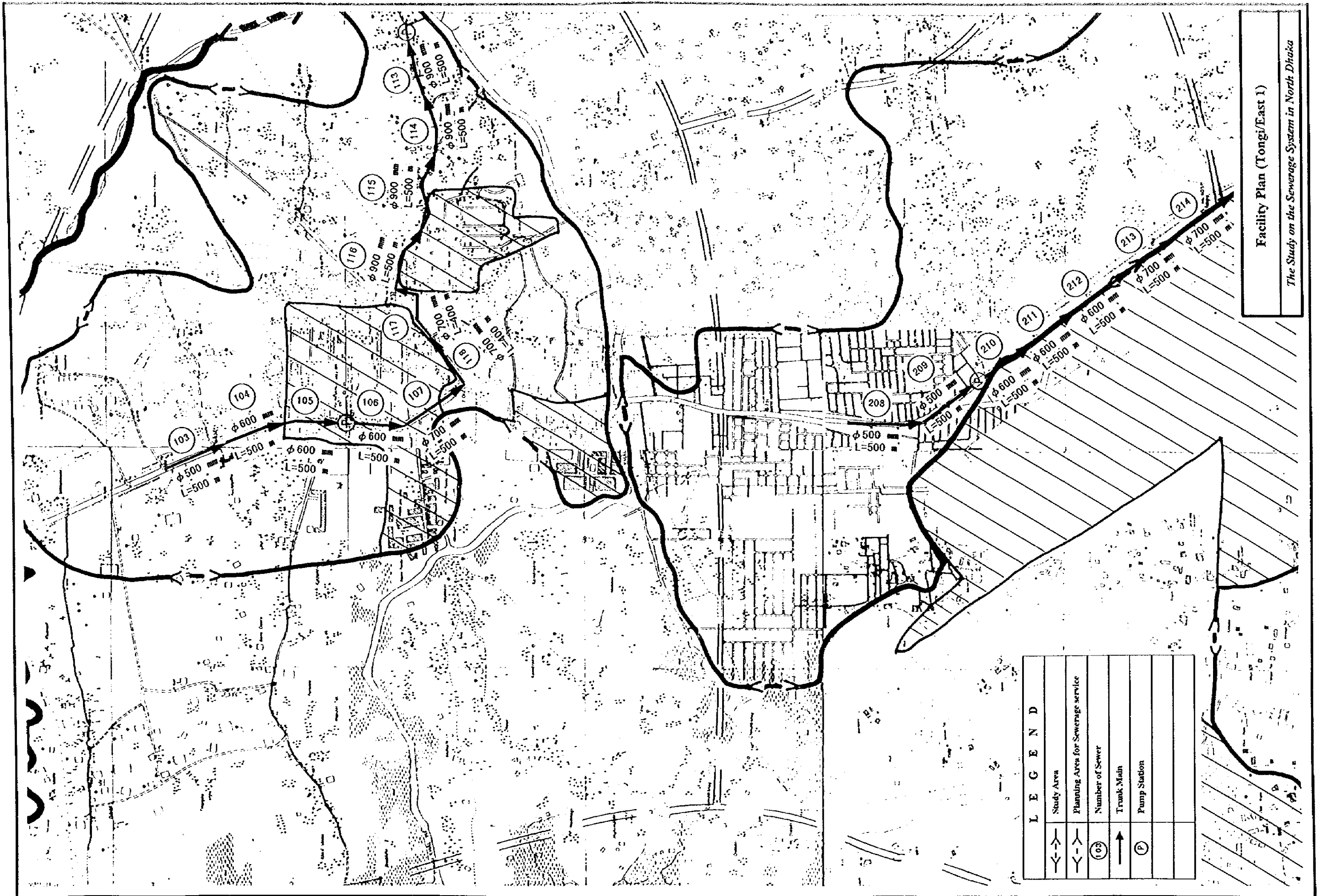
Note: 1) Q1: Design Average Daily Flow, Per Capita Sewage Flow = 100 lpcd
 2) Q2: Design Maximum Daily Flow, Per Capita Sewage Flow = 125 lpcd
 3) Q3: Design Maximum Hourly Flow, Per Capita Sewage Flow = 160 lpcd
 4) Cantonment Security Zone is included the core area, but the outlet sewer shall be connected to the trunk sewer of planned public sewerage in certain connection point.





Facility Plan (East 2)
The Study on the Sewerage System in North Dhaka

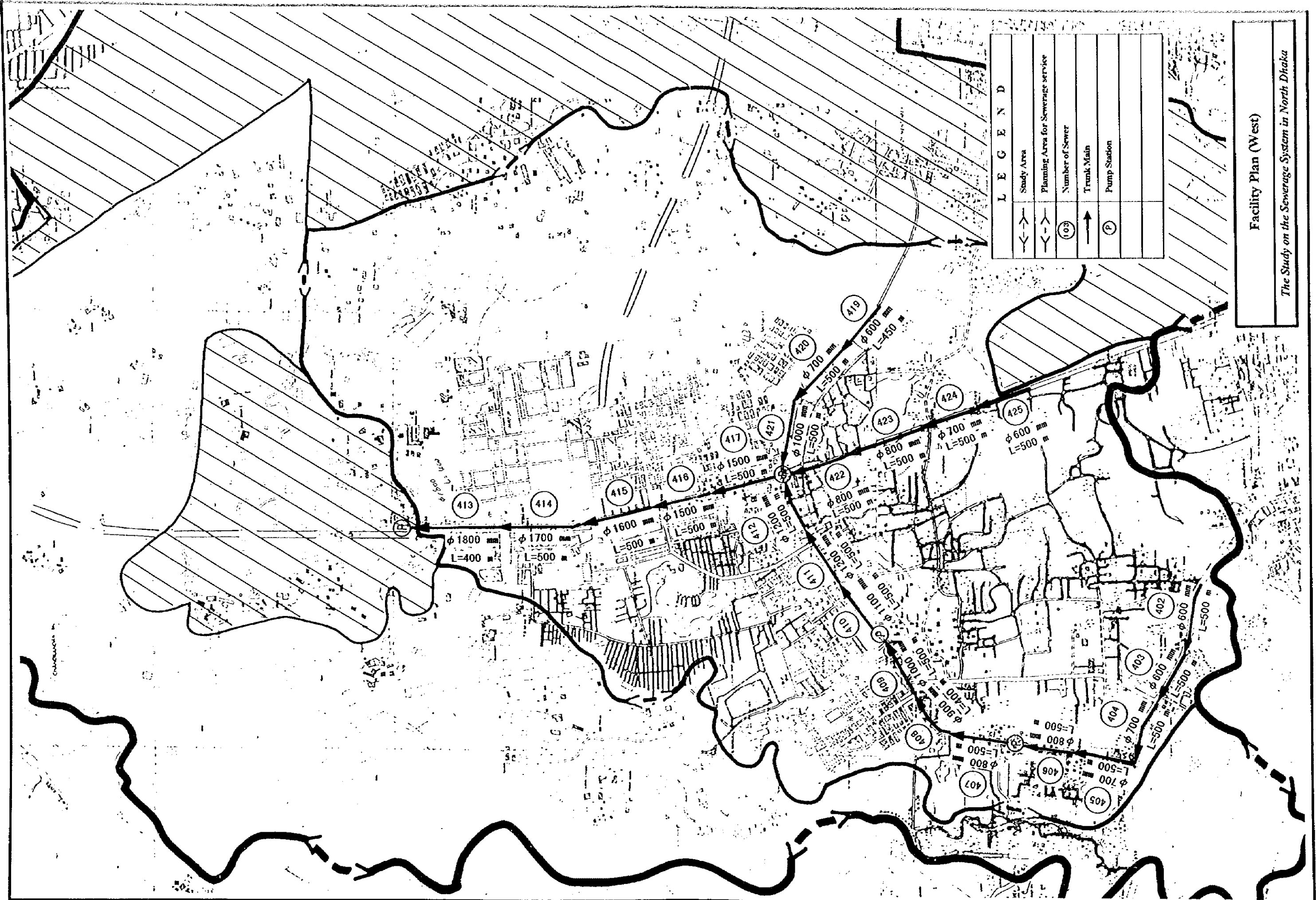
L E G E N D	
	Study Area
	Planning Area for Sewerage service
	Number of Sewer
	Trunk Main
	Pump Station



LEGEND

Study Area	
Planning Area for Sewerage service	
Number of Sewer	
Trunk Main	
Pump Station	

Facility Plan (Tongi/East 1)
The Study on the Sewerage System in North Dhaka



L E G E N D	
Study Area	↗ ↘
Planning Area for Sewerage service	↗ ↘
Number of Sewer	⊙
Trunk Main	↑
Pump Station	⊙

Facility Plan (West)
The Study on the Sewerage System in North Dhaka

