Appendix for Chapter 6

Appendix 6.1 Table of Hydraulic Calculation Results

a. Kotagede (PDAM Yogyakarta)
b. Mlati (PDAM Sleman)
c. Turi (PDAM Sleman)
d. Dlingo (PDAM Bantul)
e. Bangunjiwo (PDAM Bantul)

Appendix 6.2 Hydraulic Calculation Model and Results

a. Kotagede (PDAM Yogyakarta)
b. Mlati (PDAM Sleman)
c. Turi (PDAM Sleman)
d. Dlingo (PDAM Bantul)
e. Bangunjiwo (PDAM Bantul)

Appendix 6.3 Comparison of Pipe Volume with Waterworks in Japan

Appendix 6.1.a Table of Hydraulic Calculation Results (Kotagede)

Kota Gede (Yogyakarta)

Nos of nodes 28
Nos of pipes 38

NODE

	NO	Type	Q l/sec	WL m	GL m	EH m
Reservoir	100	1	-48.000	86.00	86.00	0.00
	1	0	2.777	96.61	86.00	10.61
	2	0	0.865587	95.89	85.0	10.89
	3	0	3.798965	78.95	78.0	0.95
	4	0	0.945734	95.32	84.0	11.32
	5	0	0.524962	95.32	87.0	8.32
	6	0	1.370513	93.65	87.0	6.65
	7	0	1.634997	92.64	89.0	3.64
	8	0	2.440474	92.67	89.0	3.67
	9	0	3.73084	93.05	88.0	5.05
	10	0	3.221907	85.32	80.0	5.32
	11	0	2.560695	86.15	83.0	3.15
	12	0	0.444815	86.14	83.0	3.14
	13	0	0.733344	85.02	81.0	4.02
	14	0	3.746869	94.04	87.0	7.04
	15	0	0.729337	84.37	80.0	4.37
	16	0	0.544999	84.25	81.0	3.25
	17	0	1.061947	83.80	76.0	7.80
	18	0	1.839372	83.72	75.0	8.72
	19	0	3.133745	95.90	85.0	10.90
	20	0	2.388379	95.57	81.0	14.57
	21	0	1.550843	90.72	81.0	9.72
	22	0	1.811321	89.11	78.0	11.11
	23	0	1.061947	89.85	78.0	11.85
	24	0	0.853565	89.46	76.0	13.46
	25	0	1.546836	88.79	75.0	13.79
	26	0	1.182167	88.51	78.0	10.51
	27	0	1.498748	89.17	75.0	14.17

PIPE

NO(u)	NO(d)	Dia mm	Length m	C	dH m	Q l/sec	V m/sec	I o/oo
100	1	200.0	693.0	110.0	22.0	48.00	1.53	16.43
1	2	50.0	108.0	110.0		0.77	0.39	6.65
1	2	200.0	108.0	110.0		29.43	0.94	6.65
2	3	75.0	948.0	110.0		3.80	0.86	17.88
2	4	50.0	118.0	110.0		0.65	0.33	4.87
2	4	200.0	118.0	110.0		24.88	0.79	4.87
4	5	200.0	131.0	110.0		0.52	0.02	0.00
4	14	100.0	367.0	110.0		3.34	0.43	3.47
4	14	200.0	367.0	110.0		20.72	0.66	3.47
14	6	100.0	171.0	110.0		2.66	0.34	2.28
14	6	200.0	171.0	110.0		16.51	0.53	2.28
6	7	75.0	408.0	110.0		1.31	0.30	2.48
6	9	200.0	777.0	110.0		9.22	0.29	0.78
6	11	100.0	512.0	110.0		7.28	0.93	14.66
7	8	100.0	609.0	110.0		-0.33	-0.04	-0.05
8	9	100.0	154.0	110.0		-2.77	-0.35	-2.46
9	10	75.0	804.0	110.0		2.72	0.61	9.61
10	11	100.0	127.0	110.0		-4.68	-0.60	-6.48
11	12	50.0	111.0	110.0		0.04	0.02	0.02
12	13	50.0	183.0	110.0		0.73	0.37	6.14
12	14	50.0	568.0	110.0		-1.14	-0.58	-13.91
10	15	100.0	182.0	110.0		4.18	0.53	5.25
15	16	75.0	68.0	110.0		1.10	0.25	1.81
15	16	100.0	68.0	110.0		2.35	0.30	1.81
16	17	75.0	265.0	110.0		1.06	0.24	1.69
16	18	100.0	459.0	110.0		1.84	0.23	1.15
1	19	50.0	391.0	110.0		0.38	0.19	1.83
1	19	200.0	391.0	110.0		14.65	0.47	1.83
19	20	75.0	298.0	110.0		0.84	0.19	1.09
19	20	200.0	298.0	110.0		11.06	0.35	1.09
20	21	75.0	387.0	110.0		3.14	0.71	12.54
20	23	100.0	500.0	110.0		6.37	0.81	11.45
21	22	75.0	452.0	110.0		1.59	0.36	3.55
22	23	100.0	265.0	110.0		-2.95	-0.38	-2.77
22	25	100.0	386.0	110.0		1.55	0.20	0.84
22	26	75.0	295.0	110.0		1.18	0.27	2.06
23	24	100.0	213.0	110.0		2.35	0.30	1.81
24	27	100.0	374.0	110.0		1.50	0.19	0.79

End

Appendix 6.1.b Table of Hydraulic Calculation Results (Mlati)

Mlati

Nos of nodes 25
Nos of pipes 36

NODE

	NO	Type	Q l/sec	WL m	GL m	EH m
Reservoir	100	1	-12.000	208.00	205.00	3.00
	1	0	0.525	206.08	200.00	6.08
	2	0	0.121223	205.01	200.0	5.01
	3	0	0.228027	205.01	200.0	5.01
	4	0	1.120377	203.71	179.0	24.71
	5	0	0.64937	203.08	170.0	33.08
	6	0	0.531352	202.61	163.0	39.61
	7	0	0.833074	203.10	172.0	31.10
	8	0	0.958035	202.52	175.0	27.52
	9	0	0.280895	202.44	177.0	25.44
	10	0	0.648302	200.45	166.0	34.45
	11	0	0.217881	200.25	166.0	34.25
	12	0	0.280361	200.17	160.0	40.17
	13	0	0.974055	199.80	170.0	29.80
	14	0	0.112679	199.80	170.0	29.80
	15	0	0.119621	200.43	165.0	35.43
	16	0	0.129233	200.43	165.0	35.43
	17	0	0.200258	200.40	162.0	38.40
	18	0	0.671265	200.38	162.0	38.38
	19	0	0.218415	200.38	160.0	40.38
	20	0	0.512661	200.37	159.0	41.37
	21	0	0.087046	200.36	156.0	44.36
	22	0	0.896622	200.34	141.0	59.34
	23	0	1.549197	200.28	129.0	71.28
	24	0	0.134573	203.69	180.0	23.69

PIPE

NO(u)	NO(d)	Dia mm	Length m	C	dH m	Q l/sec	V m/sec	I o/oo
100	1	75.0	492.0	110.0		1.67	0.38	3.89
100	1	150.0	492.0	110.0		10.33	0.58	3.89
1	2	150.0	227.0	110.0		11.47	0.65	4.72
2	3	150.0	427.0	110.0		0.23	0.01	0.00
2	4	150.0	1049.0	110.0		5.56	0.31	1.24
2	4	150.0	1049.0	110.0		5.56	0.31	1.24
4	24	150.0	252.0	110.0		1.32	0.07	0.09
24	5	100.0	1216.0	110.0		1.18	0.15	0.51
5	6	75.0	995.0	110.0		0.53	0.12	0.47
4	7	150.0	780.0	110.0		4.34	0.25	0.78
4	7	150.0	780.0	110.0		4.34	0.25	0.78
7	8	150.0	897.0	110.0		3.93	0.22	0.65
7	8	150.0	897.0	110.0		3.93	0.22	0.65
8	9	75.0	526.0	110.0		0.28	0.06	0.14
8	10	100.0	607.0	110.0		3.31	0.42	3.41
8	10	100.0	607.0	110.0		3.31	0.42	3.41
10	11	75.0	204.0	110.0		0.79	0.18	0.98
10	11	75.0	204.0	110.0		0.79	0.18	0.98
11	12	75.0	525.0	110.0		0.28	0.06	0.14
11	13	75.0	912.0	110.0		0.54	0.12	0.49
11	13	75.0	912.0	110.0		0.54	0.12	0.49
13	14	75.0	211.0	110.0		0.11	0.03	0.03
10	15	200.0	112.0	110.0		4.08	0.13	0.17
10	15	75.0	112.0	110.0		0.31	0.07	0.17
15	16	200.0	242.0	110.0		0.13	0.00	0.00
15	17	75.0	375.0	110.0		0.20	0.05	0.08
15	18	200.0	419.0	110.0		3.42	0.11	0.12
15	18	75.0	419.0	110.0		0.26	0.06	0.12
15	18	75.0	419.0	110.0		0.26	0.06	0.12
18	19	150.0	409.0	110.0		0.22	0.01	0.00
18	20	200.0	320.0	110.0		1.47	0.05	0.03
18	20	200.0	320.0	110.0		1.47	0.05	0.03
18	20	75.0	320.0	110.0		0.11	0.03	0.03
20	21	200.0	163.0	110.0		2.53	0.08	0.07
21	22	200.0	1679.0	110.0		0.90	0.03	0.01
21	23	200.0	2901.0	110.0		1.55	0.05	0.03

End

Appendix 6.1.c Table of Hydraulic Calculation Results (Turi)

Turi (Sleman)

Nos of nodes 15
Nos of pipes 16

NODE

	NO	Type	Q l/sec	WL m	GL m	EH m
Bambarakele	100	1	-9.600	465.00	462.00	3.00
Pedro (New)	1	0	2.304	426.07	412.00	14.07
	2	0	0.777791	414.63	402.0	12.63
	3	0	0.415691	414.01	400.0	14.01
	4	0	1.497646	411.33	394.0	17.33
	5	0	0.547495	406.05	387.0	19.05
	6	0	0.302716	405.80	384.0	21.80
	7	0	0.635848	403.98	377.0	26.98
	8	0	1.927821	422.00	429.0	-7.00
	9	0	0.115872	421.89	432.0	-10.11
	10	0	0.449004	421.86	432.0	-10.14
	11	0	0.09994	421.86	435.0	-13.14
	12	0	0.262161	421.85	435.0	-13.15
	13	0	0.143392	421.86	440.0	-18.14
	14	0	0.120217	421.83	435.0	-13.17

PIPE

NO(u)	NO(d)	Dia mm	Length m	C	dH m	Q l/sec	V m/sec	I o/oo
100	1	100.0	1591.0	110.0		9.60	1.22	24.47
1	2	75.0	537.0	110.0		4.18	0.95	21.31
2	3	50.0	287.0	110.0		0.42	0.21	2.15
2	5	50.0	378.0	110.0		1.49	0.76	22.68
5	6	50.0	209.0	110.0		0.30	0.15	1.19
5	7	50.0	439.0	110.0		0.64	0.32	4.72
2	4	75.0	1034.0	110.0		1.50	0.34	3.19
1	8	100.0	1331.0	110.0		3.12	0.40	3.06
8	9	75.0	80.0	110.0		0.96	0.22	1.41
8	10	50.0	194.0	110.0		0.23	0.12	0.71
9	10	75.0	116.0	110.0		0.35	0.08	0.22
9	11	75.0	69.0	110.0		0.49	0.11	0.41
10	12	50.0	65.0	110.0		0.13	0.07	0.26
11	12	75.0	116.0	110.0		0.25	0.06	0.12
11	13	75.0	99.0	110.0		0.14	0.03	0.04
12	14	50.0	83.0	110.0		0.12	0.06	0.22

End

Appendix 6.1.d Table of Hydraulic Calculation Results (Dlingo)

Dlingo (Bantul)

Nos of nodes 32
Nos of pipes 39

NODE

	NO	Type	Q l/sec	WL m	GL m	EH m
Reservoir	100	1	-16.800	237.00	234.00	3.00
	1	0	0.201	235.03	235.00	0.03
	2	0	1.709172	234.65	200.0	34.65
	3	0	0.792127	234.38	187.0	47.38
	4	0	0.177824	234.65	187.0	47.65
	51	0	1.225666	233.25	230.0	3.25
	5	0	0.249836	198.84	175.0	23.84
	6	0	1.331479	217.41	220.0	-2.59
	7	0	0.817111	199.12	217.0	-17.88
	8	0	0.182233	199.01	210.0	-10.99
	9	0	0.088177	232.79	230.0	2.79
	10	0	0.867078	222.91	230.0	-7.09
	11	0	0.922924	227.39	233.0	-5.61
	12	0	0.654717	222.02	225.0	-2.98
	13	0	0.465871	220.34	212.0	8.34
	14	0	0.989791	207.61	211.0	-3.39
	15	0	0.863404	218.83	212.0	6.83
	16	0	0.0992	218.83	212.0	6.83
	17	0	0.688519	214.25	206.0	8.25
	18	0	1.000814	195.13	175.0	20.13
	19	0	0.399738	194.97	185.0	9.97
	20	0	0.067603	194.65	170.0	24.65
	21	0	0.247632	193.65	150.0	43.65
	22	0	0.170476	193.56	150.0	43.56
	24	0	0.163863	193.30	137.0	56.30
	25	0	0.149902	193.24	150.0	43.24
	26	0	0.234405	193.05	150.0	43.05
	27	0	0.149167	192.97	150.0	42.97
	28	0	0.750243	192.92	150.0	42.92
	29	0	0.544495	234.13	175.0	59.13
	30	0	0.393859	233.99	166.0	67.99
	31	0	0.201338	232.93	230.0	2.93

PIPE

NO(u)	NO(d)	Dia mm	Length m	C	dH m	Q l/sec	V m/sec	I o/oo
100	1	159.0	274.0	110.0		16.80	0.85	7.20
1	2	100.0	1163.0	110.0		0.93	0.12	0.32
1	2	150.0	1163.0	110.0		2.69	0.15	0.32
2	4	150.0	242.0	110.0		0.18	0.01	0.00
2	3	100.0	539.0	110.0		1.18	0.15	0.50
2	3	75.0	539.0	110.0		0.55	0.13	0.50
3	29	100.0	741.0	110.0		0.94	0.12	0.33
29	30	75.0	536.0	110.0		0.39	0.09	0.27
1	51	150.0	556.0	110.0		9.28	0.52	3.19
1	51	50.0	556.0	110.0		0.51	0.26	3.19
1	51	100.0	556.0	110.0		3.19	0.41	3.19
51	6	75.0	1812.0	110.0		2.58	0.58	8.74
6	7	50.0	1112.0	110.0		1.25	0.64	16.45
7	5	50.0	340.0	110.0		0.25	0.13	0.84
7	8	50.0	248.0	110.0		0.18	0.09	0.47
51	31	150.0	137.0	110.0		7.90	0.45	2.37
51	31	75.0	137.0	110.0		1.27	0.29	2.37
31	9	150.0	60.0	110.0		7.73	0.44	2.27
31	9	75.0	60.0	110.0		1.25	0.28	2.27
9	10	50.0	1180.0	110.0		0.87	0.44	8.37
9	11	100.0	628.0	110.0		5.46	0.70	8.61
9	11	75.0	628.0	110.0		2.56	0.58	8.61
11	12	75.0	891.0	110.0		2.11	0.48	6.02
12	13	50.0	634.0	110.0		0.47	0.24	2.65
12	14	50.0	1347.0	110.0		0.99	0.50	10.70
11	15	100.0	1175.0	110.0		4.98	0.63	7.28
15	16	100.0	135.0	110.0		0.10	0.01	0.01
15	17	100.0	937.0	110.0		4.02	0.51	4.89
17	18	75.0	1362.0	110.0		3.33	0.75	14.04
18	19	75.0	544.0	110.0		0.40	0.09	0.28
18	20	75.0	92.0	110.0		1.93	0.44	5.12
20	28	50.0	768.0	110.0		0.43	0.22	2.25
20	21	75.0	337.0	110.0		1.44	0.33	2.97
21	22	50.0	232.0	110.0		0.17	0.09	0.41
21	24	75.0	223.0	110.0		1.02	0.23	1.57
24	25	50.0	204.0	110.0		0.15	0.08	0.33
24	26	75.0	319.0	110.0		0.71	0.16	0.80
26	27	75.0	203.0	110.0		0.47	0.11	0.38
27	28	75.0	253.0	110.0		0.32	0.07	0.19

End

Appendix 6.1.e Table of Hydraulic Calculation Results (Bangunjiwo)

Bangunjiwo (Bantul)

Nos of nodes 45
Nos of pipes 47

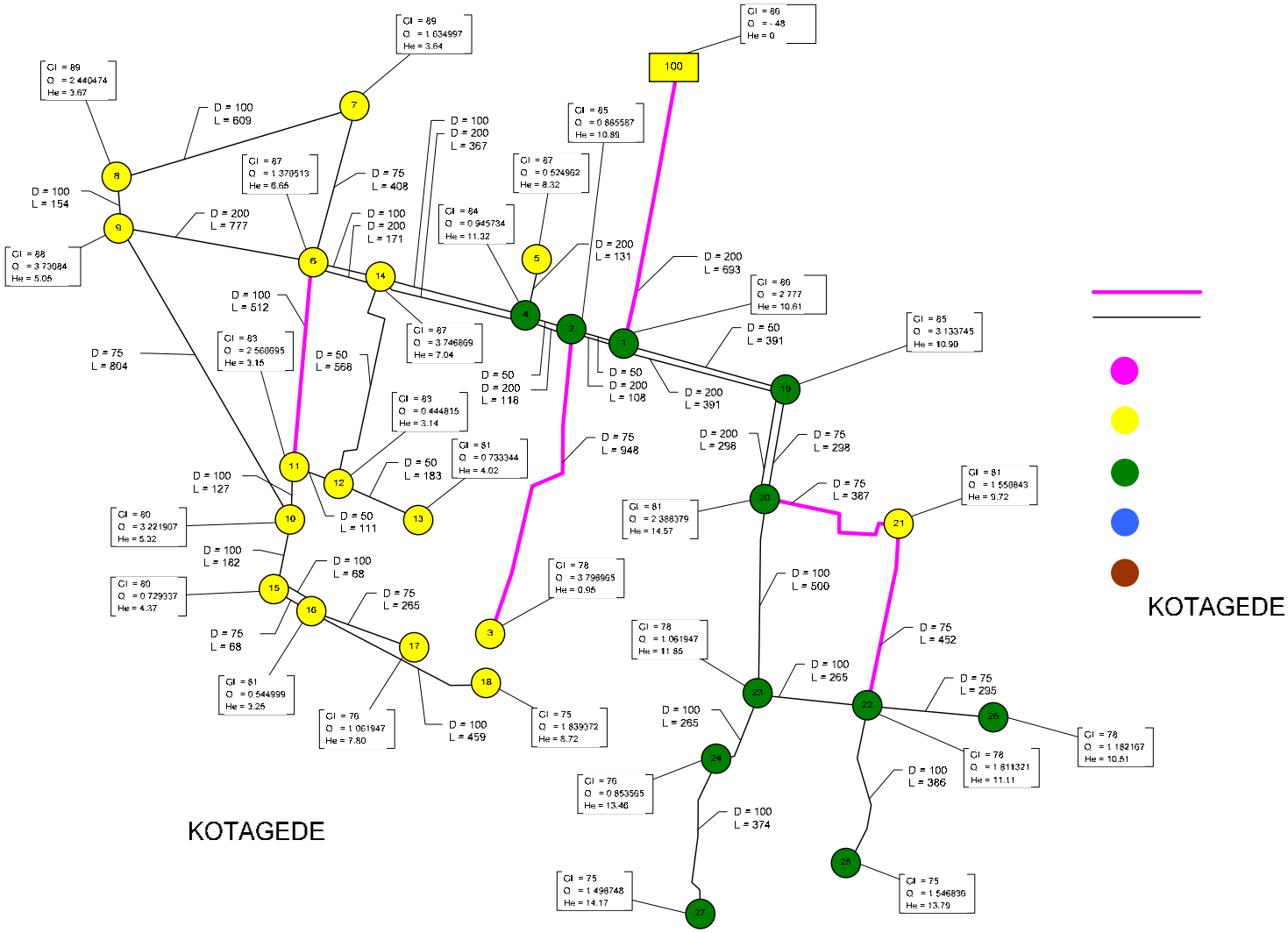
	NODE NO	Type	Q l/sec	WL m	GL m	EH m
Reservoir	100	1	-24.000	98.00	95.00	3.00
	1	0	0.577	97.82	75.00	22.82
	2	0	1.663817	96.16	75.0	21.16
	3	0	1.268289	73.05	82.0	-8.95
	4	0	0.444737	96.09	84.0	12.09
	5	0	0.286897	95.75	86.0	9.75
	6	0	0.46702	94.74	87.0	7.74
	7	0	0.731634	96.07	85.0	11.07
	8	0	0.015784	96.06	85.0	11.06
	9	0	0.457735	94.80	75.0	19.80
	10	0	0.428953	96.03	87.0	9.03
	11	0	0.445665	96.30	75.0	21.30
	12	0	0.112345	96.40	75.0	21.40
	13	0	0.450308	95.20	92.0	3.20
	14	0	0.403884	97.07	91.0	6.07
	15	0	1.549615	97.31	77.0	20.31
	16	0	0.289682	97.30	75.0	22.30
	17	0	1.153159	97.47	75.0	22.47
	18	0	0.18198	96.70	73.0	23.70
	19	0	2.764053	97.22	80.0	17.22
	20	0	1.285001	91.66	75.0	16.66
	21	0	0.717707	87.10	75.0	12.10
	22	0	0.796627	89.59	65.0	24.59
	23	0	0.207049	89.18	62.0	27.18
	24	0	0.163411	89.03	62.0	27.03
	25	0	0.670355	85.28	62.0	23.28
	26	0	0.455878	88.93	58.0	30.93
	27	0	0.285969	88.88	56.0	32.88
	28	0	1.021316	88.02	58.0	30.02
	29	0	0.798484	83.66	45.0	38.66
	30	0	0.457735	81.99	65.0	16.99
	31	0	0.044567	81.92	65.0	16.92
	32	0	0.416883	80.95	70.0	10.95
	33	0	0.023212	81.92	65.0	16.92
	34	0	0.581222	81.59	69.0	12.59
	35	0	0.137413	81.58	80.0	1.58
	36	0	0.506016	79.90	52.0	27.90
	37	0	0.05478	81.95	65.0	16.95
	38	0	0.223761	81.85	67.0	14.85
	39	0	0.117916	81.84	69.0	12.84
	40	0	0.227475	81.80	69.0	12.80
	41	0	0.506016	80.11	52.0	28.11
	42	0	0.27297	89.30	65.0	24.30
	43	0	0.201478	96.58	70.0	26.58
	44	0	0.134628	96.08	85.0	11.08

PIPE

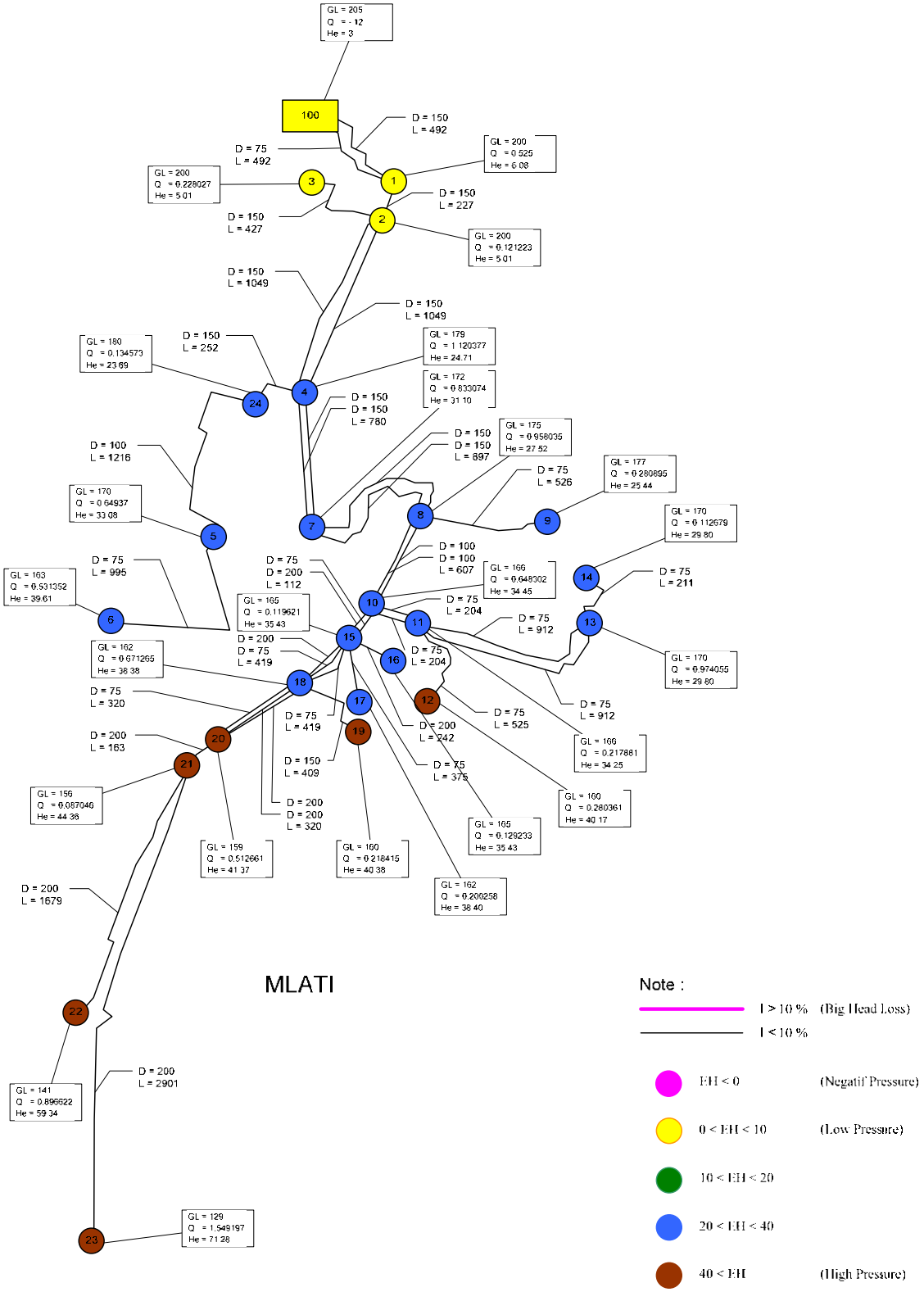
NO(u)	NO(d)	Dia mm	Length m	C	dH m	Q l/sec	V m/sec	I o/oo
100	1	200.0	621.0	110.0		5.33	0.17	0.28
1	2	150.0	1792.0	110.0		4.76	0.27	0.93
2	3	50.0	1366.0	110.0		1.27	0.65	16.92
2	4	150.0	479.0	110.0		1.82	0.10	0.16
4	5	50.0	309.0	110.0		0.29	0.15	1.08
44	6	50.0	503.0	110.0		0.47	0.24	2.67
44	7	150.0	788.0	110.0		0.49	0.03	0.01
7	8	100.0	17.0	110.0		0.90	0.11	0.31
8	9	50.0	493.0	110.0		0.46	0.23	2.57
8	10	100.0	462.0	110.0		0.43	0.05	0.08
7	11	100.0	480.0	110.0		-1.14	-0.15	-0.48
11	12	100.0	121.0	110.0		-1.59	-0.20	-0.88
12	13	50.0	485.0	110.0		0.45	0.23	2.49
12	14	100.0	435.0	110.0		-2.15	-0.27	-1.54
100	15	150.0	863.0	110.0		4.39	0.25	0.80
14	15	150.0	806.0	110.0		-2.55	-0.14	-0.29
15	16	100.0	312.0	110.0		0.29	0.04	0.04
100	17	150.0	621.0	110.0		4.56	0.26	0.86
100	17	200.0	621.0	110.0		9.72	0.31	0.86
17	18	150.0	196.0	110.0		10.36	0.59	3.91
17	19	200.0	2977.0	110.0		2.76	0.09	0.08
18	20	150.0	1384.0	110.0		9.97	0.56	3.64
20	21	50.0	773.0	110.0		0.72	0.37	5.90
20	22	150.0	858.0	110.0		7.97	0.45	2.41
22	23	150.0	223.0	110.0		6.90	0.39	1.84
23	24	100.0	176.0	110.0		1.58	0.20	0.86
24	25	50.0	722.0	110.0		0.67	0.34	5.20
24	26	100.0	491.0	110.0		0.74	0.09	0.21
26	27	75.0	308.0	110.0		0.29	0.06	0.15
23	28	150.0	1100.0	110.0		5.12	0.29	1.06
28	29	100.0	860.0	110.0		4.10	0.52	5.06
29	30	100.0	493.0	110.0		3.30	0.42	3.39
30	31	50.0	48.0	110.0		0.34	0.17	1.45
31	32	50.0	449.0	110.0		0.42	0.21	2.16
31	33	100.0	25.0	110.0		-0.12	-0.02	-0.01
33	34	100.0	626.0	110.0		1.22	0.16	0.54
34	35	100.0	148.0	110.0		0.14	0.02	0.01
34	36	50.0	545.0	110.0		0.51	0.26	3.09
30	37	100.0	22.0	110.0		2.50	0.32	2.03
33	37	100.0	37.0	110.0		-1.37	-0.17	-0.67
37	38	100.0	241.0	110.0		1.08	0.14	0.43
38	39	75.0	127.0	110.0		0.12	0.03	0.03
38	40	100.0	245.0	110.0		0.73	0.09	0.21
40	41	50.0	545.0	110.0		0.51	0.26	3.09
22	42	50.0	294.0	110.0		0.27	0.14	0.99
18	43	50.0	217.0	110.0		0.20	0.10	0.56
4	44	150.0	145.0	110.0		1.09	0.06	0.06

End

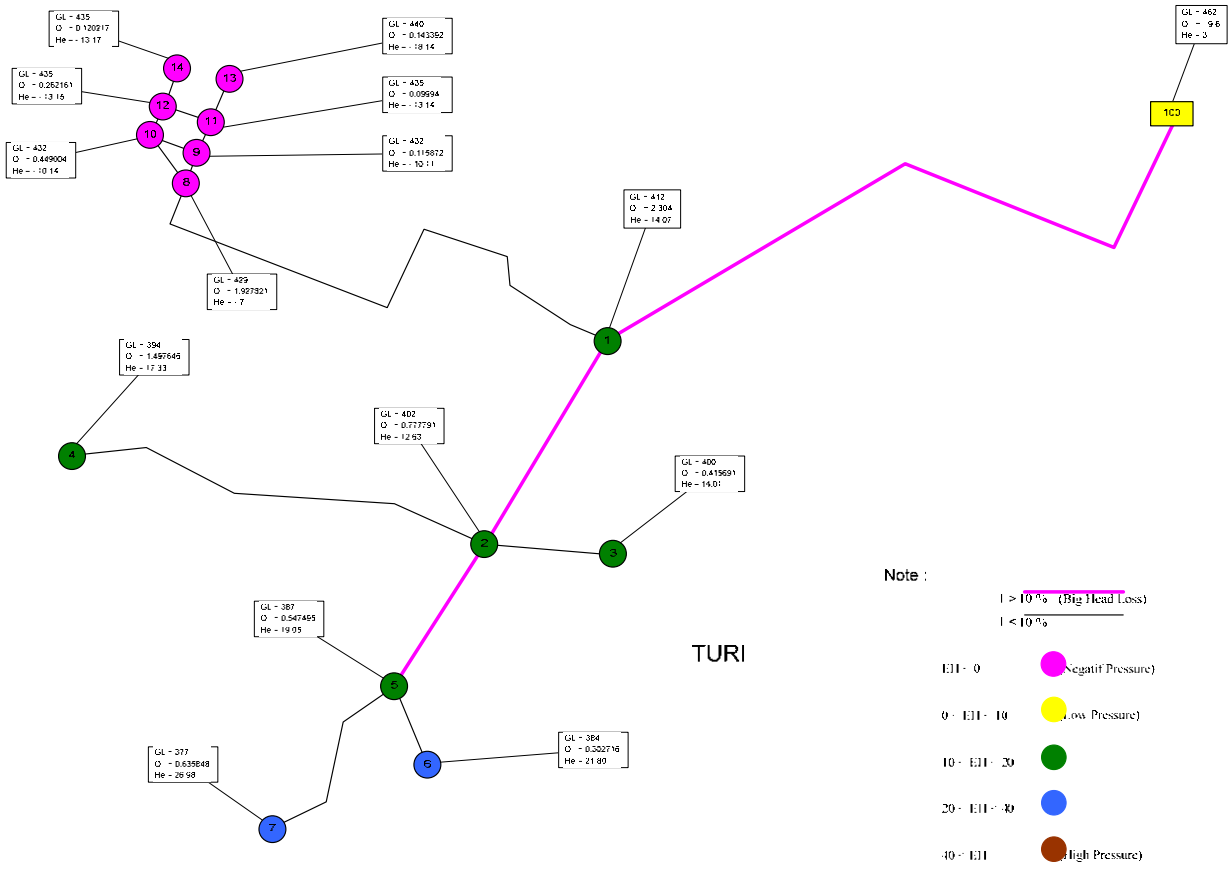
Appendix 6.2.a Hydraulic Calculation Model and Results (Kotabede)



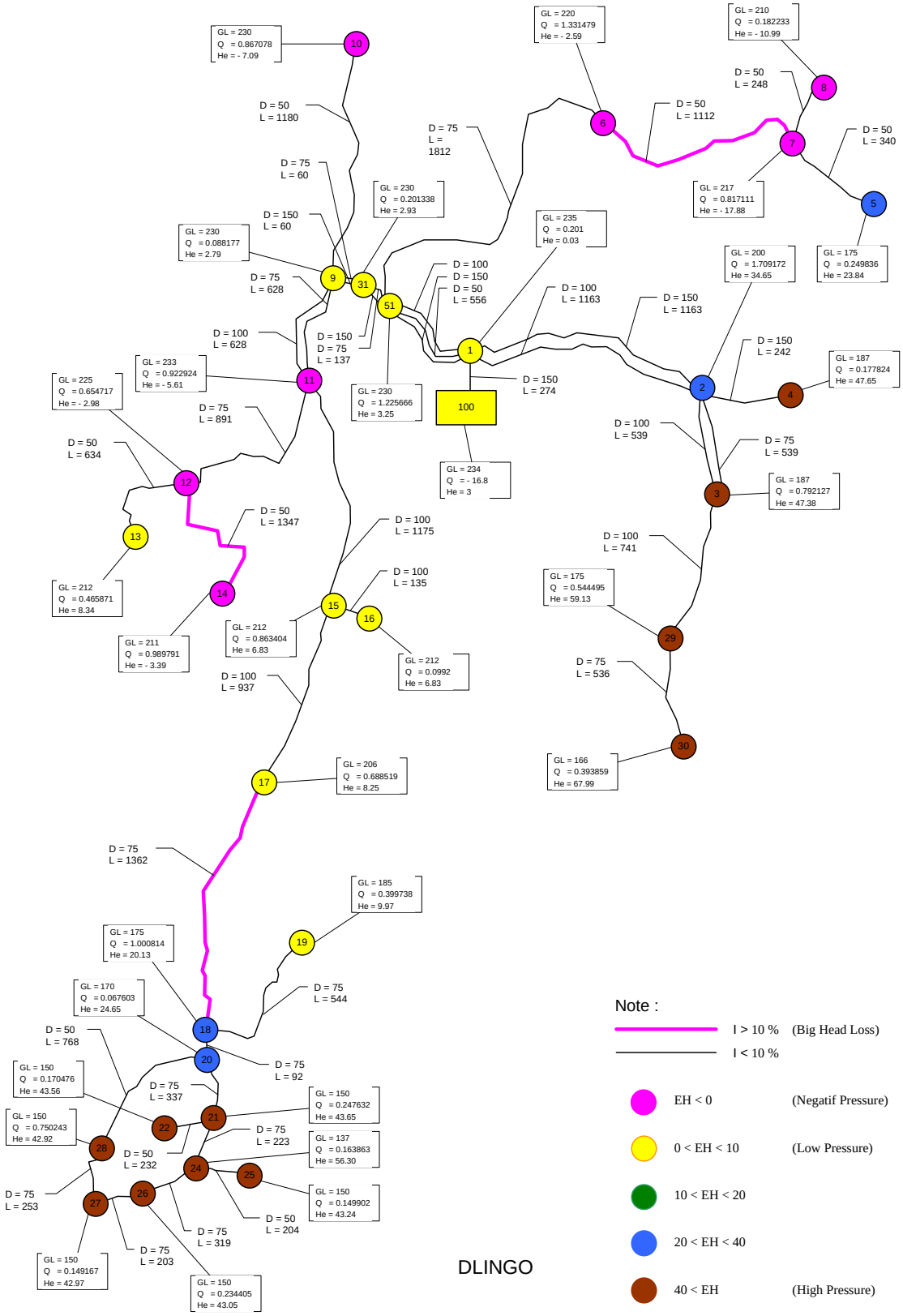
Appendix 6.2.b Hydraulic Calculation Model and Results (Mlati)



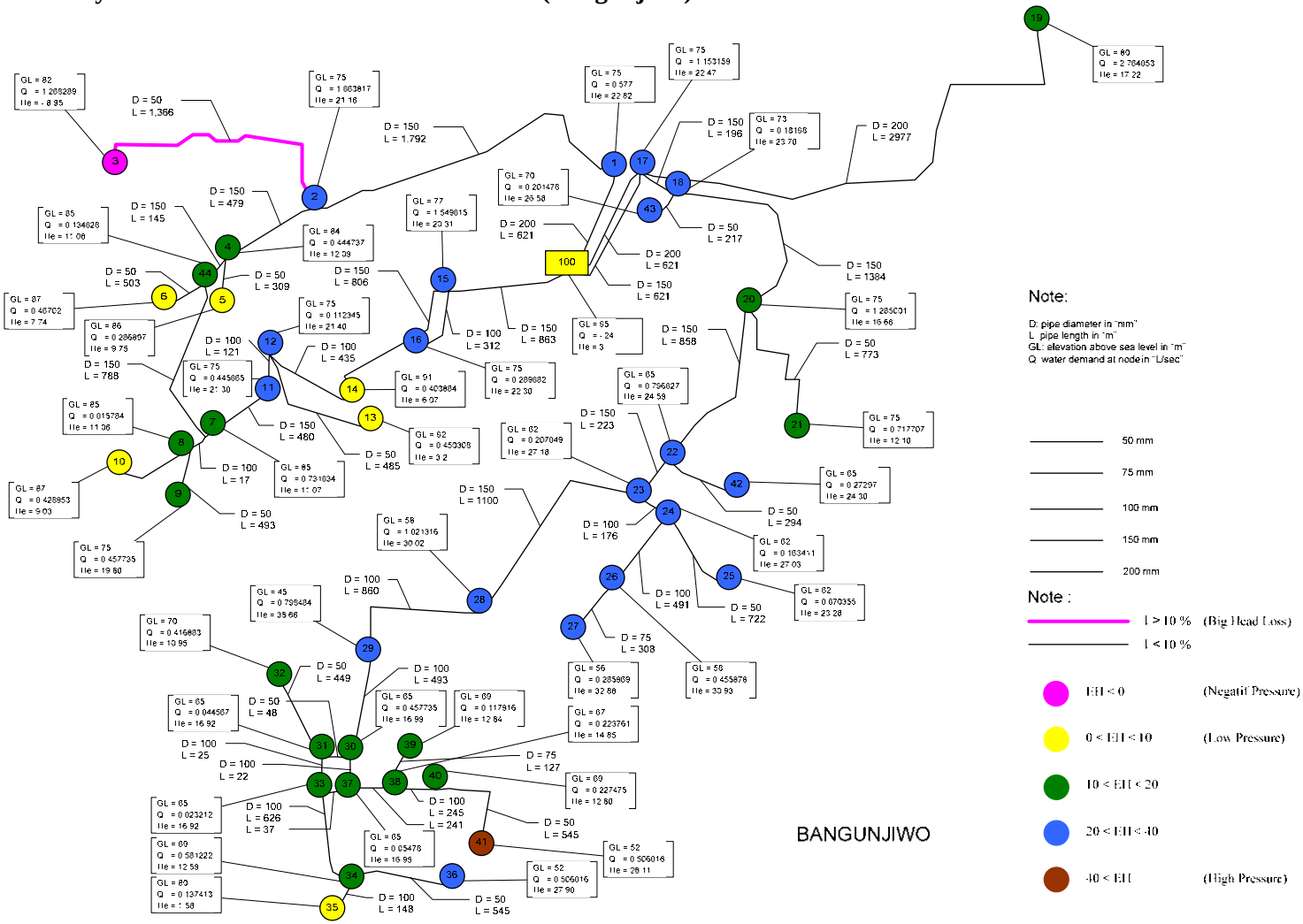
Appendix 6.2.c Hydraulic Calculation Model and Results (Turi)



Appendix 6.2.d Hydraulic Calculation Model and Results (Dlingo)



Appendix 6.2.d Hydraulic Calculation Model and Results (Bangunjiwo)



Appendix 6.3 Comparison of Pipe Volume with Waterworks in Japan

1. PDAM Yogyakarta

Diameter (mm)	Pipe Length (m)	Pipe Volume (m3)	Diameter (mm)	Pipe Length (m)	Pipe Volume (m3)
50	17,026.71	33.4	250	3,530.31	173.2
75	25,423.18	112.3	300	10,954.63	773.9
100	127,136.98	998.0	350	3,669.73	352.9
125	9,534.03	116.9	400	6,531.53	820.4
150	37,410.69	660.8	450	2,000.00	317.9
175	4,194.62	100.8	500	5,254.99	1,031.3
200	22,540.54	707.8	600	5,464.49	1,544.3
			Total	280,672.43	7,743.9

Day Max Supply: 49,250m3/d

Service Population: 123,100 (Assumed that 4.5 person / connection x 27,350 connections)

2. Medium Size System in Japan

Per capita supply (lit)	Number of Sample	Pipe Volume (m3)	Service Population (person)	Supply (m3/d)
～300	2	22,770	350,899	101,971
300～349	9	71,984	1,129,078	383,264
350～399	15	133,010	2,420,555	910,942
400～499	38	426,105	6,831,181	3,048,617

3) Comparison

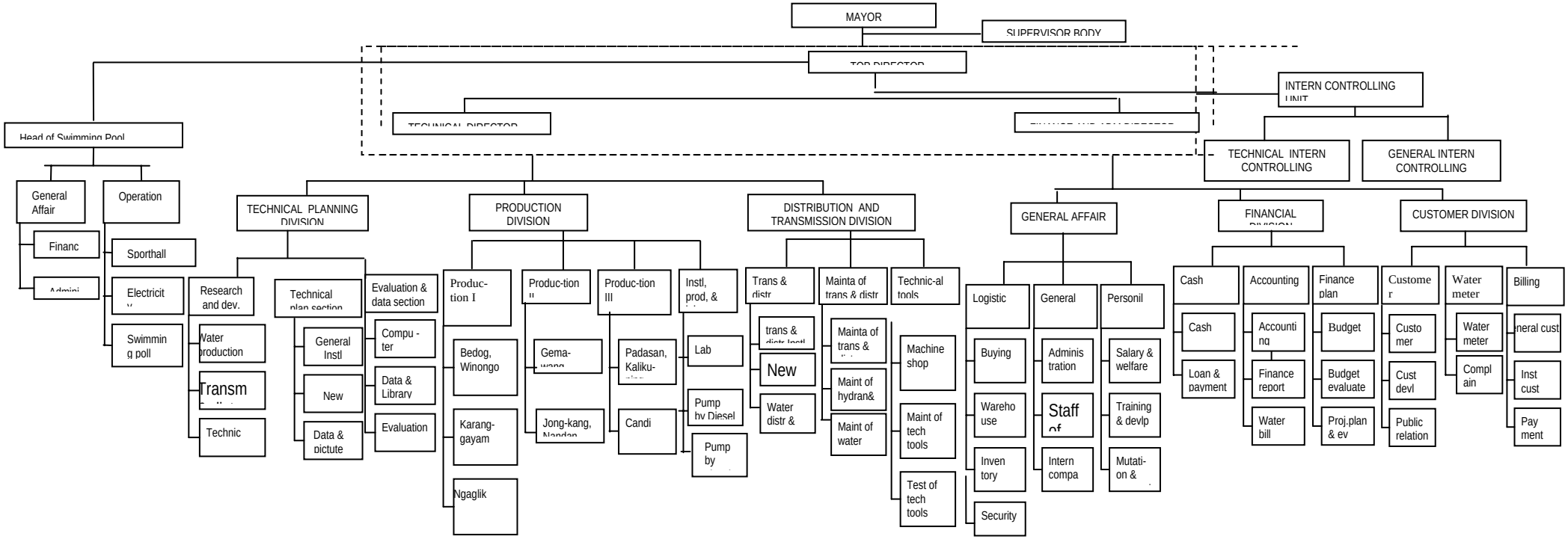
Per Capita Supply (lpcd)	Pipe volume per supply quqntity of water (ltr / (m3/d))	Pipe Volume per Service Population (ltr / pop)
～299	223	65
300～349	188	64
350～399	146	55
400～499	140	62
PDAM Yogyakarta 400 lpcd	157	63

“Pipe volume per supply quantity of water” and “pipe volume per service population” in Yogyakarta Municipality is moderate as far as it is compared with the system of Japan.
It shall be noted that lots of aged CI pipes are used in PDAM Yogyakarta and the actual pipe capacity might be reduced due to clogging.

Appendix for Chapter 7

Appendix 7.1 Administration and Management of 3 PDAMs

FIGURE : 1 ORGANIZATION STRUCTURE OF PDAM YOGYAKARTA



Source : Pdam Yogyakarta

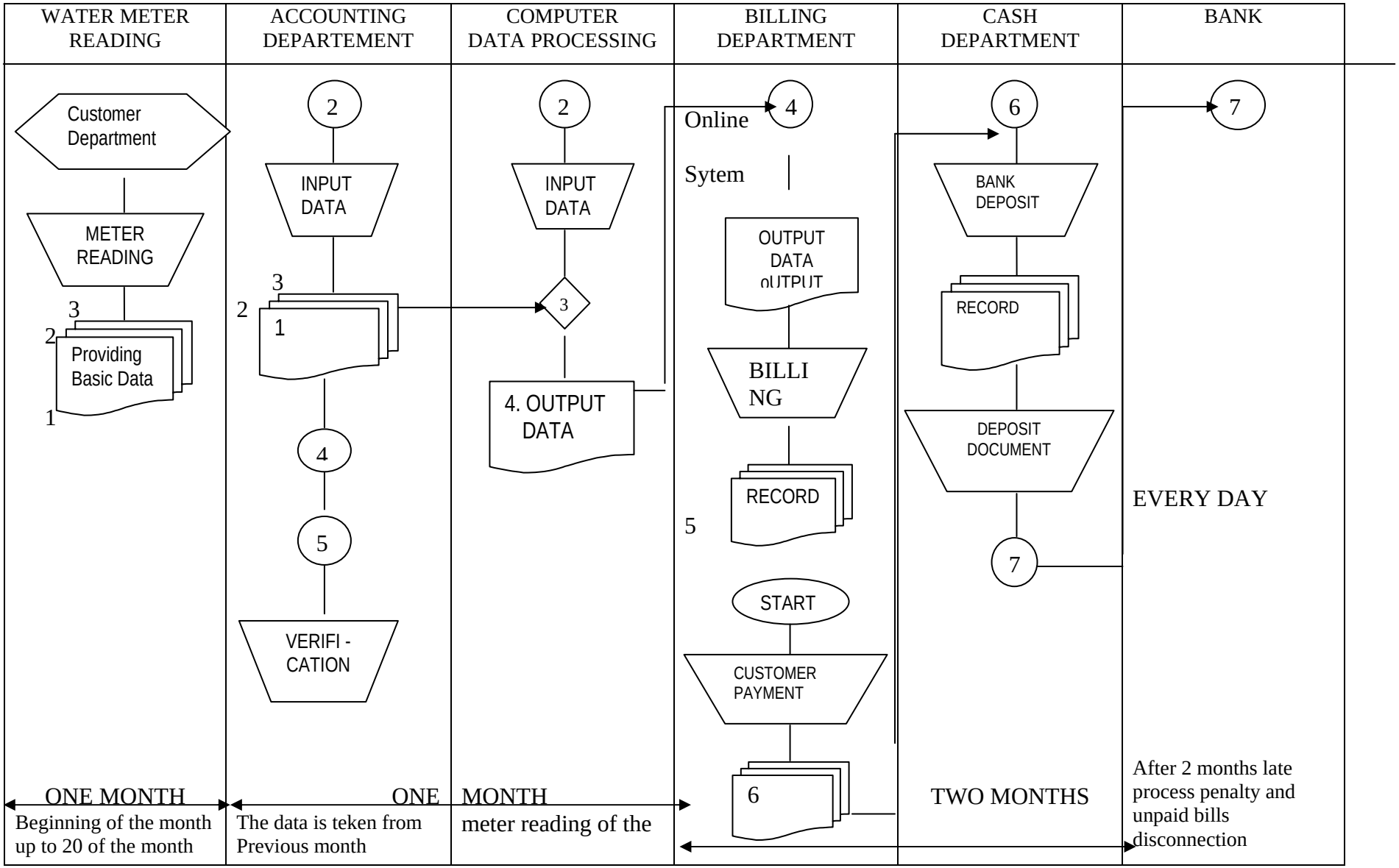


Figure :2 Account Receivable Flowchart PDAM Yogyakarta

Appendix 7- 2

Table 1 PDAM YOGYAKARTA Income Statement Rp million

Operating Revenues	2000		2001	2002	2003	2004	2005
Tariff Revenue	8,651		9,472	13,067	12,622	14,949	17,730
Meter Rental & Non Water Revenue	819		765	644	710	699	770
Total Operating Revenues	**9,470**		**10,237**	**13,711**	**13,332**	**15,648**	**18,500**
Operating Expenses							
Purchase of Well Water	1,755		2,215	2,677	3,062	3,380	4,016
Treatment cost	644		788	1,265	1,388	1,692	2,267
Distribution cost	1,939		2,103	2,399	2,352	2,597	2,720
Total Operating Expenses	**4,338**		**5,106**	**6,341**	**6,802**	**7,669**	**9,003**
Total Direct Profit	**5,132**		**5,131**	**7,370**	**6,530**	**7,979**	**9,497**
Administrative Expenses	3,233		3,611	5,048	4,440	5,651	6,488
Operating Income	**1,899**		**1,520**	**2,322**	**2,090**	**2,328**	**3,009**
Other Income	627		877	797	666	602	310
Other Revenue	949		1,267	1,176	1,015	1,043	793
Other Expenses	322		390	379	349	441	483
Income before Tax	**2,526**		**2,397**	**3,119**	**2,756**	**2,930**	**3,319**
Provision of Income Tax	616		479	1,082	703	803	945
Deferred Tax				13	45	14	57
Profit after Tax	**1,910**		**1,918**	**2,050**	**2,098**	**2,141**	**2,431**

Source: PDAM TIRTAMARTA JOGYKARTA Financial Statement 2000-2005

Table 2 PDAM YOGYAKARTA Balance Sheet Rp million

	2001	2002	2003	2004	2005
Assets					
Cash in Hand and Banks	3,569	3,903	3,282	2,891	2,817
Short-Term Investment	4,500	5,000	5,000	2,700	2,100
Account Receivable	1,190	1,627	1,615	2,016	2,713
Other Receibales	139	45	40	48	78
Inventories	194	217	164	234	189
Prepaid Expenses	27	46	15	761	0
Total Current Assets	**9,619**	**10,838**	**10,116**	**8,650**	**7,897**
Prepaid Tax	0	57	103	118	175
Property, Plant and Equipment	28,854	32,705	34,833	37,963	45,313
Accumulated Depreciation	-14,823	-18,682	-20,541	-22,857	-25,568
Net Property, Plant and Equipment	**14,031**	**14,023**	**14,292**	**15,106**	**19,745**
Construction in Progress	43	33	85	2,138	0
Installation materials	2,658	1,668	1,892	3,446	3,375
Deferred Expenses	139	91	67	316	235
Un-used fixed assets	75	109	122	130	160
New connection	33	0	0	0	0
Total Fixed Assets	**16,979**	**15,924**	**16,458**	**21,136**	**23,515**
Total Assets	**26,598**	**26,819**	**26,677**	**29,904**	**31,587**
Liabilities and Equity					
Account Payable	141	258	759	190	554
Other payables	57	30	66	88	117
Cost payable	421	515	318	261	281
Unaccrued income	21	20	8	33	62
Tax payable	167	984	250	583	374
Short portion of long term debt	804	139	139	139	139
Short term bebt	4,891	128	52	548	73
Total current liability	**6,502**	**2,074**	**1,592**	**1,842**	**1,600**
Long-term Loan from Central Government	6,143	1,534	1,395	1,255	1,116
Interest and Bank Charges Payable	773	0	0	0	0
Total long term liability	**6,916**	**1,534**	**1,395**	**1,255**	**1,116**
Other liability					
Unaccrued income	1	0	0	0	37
Other debts	633	691	751	823	892
Meter deposit	0	708	352	1,492	2,469
Other deposit	869	1,132	1,214	1,297	1,560
New connection	33	0	0	0	0
Delayed interest	620	0	0	0	0
Total Other Liabilities	**2,156**	**2,531**	**2,317**	**3,612**	**4,958**
Total Liabilities	**15,574**	**6,139**	**5,304**	**6,709**	**7,674**
Equity					
Local Government Equity	3,230	3,230	3,230	4,730	4,730
Central Gov Assets of Status not yet determin	2,239	2,239	2,239	2,239	2,239
Assets Revaluation Surplus	1,223	1,223	1,223	1,223	1,223
Reserve(Special/General)	2,414	1,168	1,812	2,092	2,520
Grant Capital	0	10,770	10,770	10,770	10,770
Profit(Loss)of theYear	1,918	2,050	2,099	2,141	2,431
Total Equity	**11,024**	**20,680**	**21,373**	**23,195**	**23,913**
Total Equity and Liabilities	**26,598**	**26,819**	**26,677**	**29,904**	**31,587**

Source: PDAM TIRTAMARTA JOGYKARTA Financial Statement 2001-2005

Table 3 PDAM YOGYAKARTA Cash flow Statement Rp million

	2001	2002	2003	2004	2005
Operating Activities					
Income(Loss) before Tax	2,397	3,119	2,756	2,930	3,319
Depreciation & Amortization	1,311	3,992	1,845	2,319	2,793
Working Capital Needs	509	-4,778	-381	-976	-163
Payment of Income Tax	-479	-1,082	-703	-803	-945
Cash provided by Operating Activities	**3,738**	**1,251**	**3,517**	**3,470**	**5,004**
Investing Activities					
Capital Expenditures	-1,720	-3,840	-2,180	-5,183	-5,212
Other Assets/Liabilities Changes	-1,729	868	-199	-1,814	41
Cash used for Investing Activities	**-3,449**	**-2,972**	**-2,379**	**-6,997**	**-5,171**
Financing Activities					
Repayment of Long-Term Debt	-514	-5,382	-139	-139	-139
Short term investment	-4,500	-500	0	2,300	600
Other Liabilities	10	374	-212	1,294	1,346
Reserve	338	9,480	643	1,780	428
Last year profit distribution	-1,909	-1,918	-2,050	-2,099	**-2,141**
Cash provided by (used for) Financing Activities	**-6,575**	**2,054**	**-1,758**	**3,136**	**94**
Cash Increase/Decrease	-6,286	333	-620	-391	-73
Cash Balance at the Bigining	9,855	3,569	3,902	3,282	2,891
Cash Balance at the End	3,569	3,902	3,282	2,891	2,818

Source: PDAM TIRTAMARTA JOGYKARTA Financial Statement 2001-2005

Table 4 Account Receivable of 2005

PDAM		Sleman	Yogyakarta	Buntul*
Collection Period		50days	65days	52days
Account Receivable	Bad debt allowance	Bad debt	Bad debt	Bad debt
4 to 6 month	30%	4%	2%	1%
7 to 12 month	50%	5%	3%	2%
1 to 2 years	75%	8%	4%	3%
over 2 years	100%	7%	13%	20%
Total	Bad bebt/ACR	24%	22%	27%

*year 2002

Source Financial statement

Table 5 Human Resources

PDAM	Sleman	Yogyakarta	Buntul
Management & Administration			
Director	2	2	2
Division Head	6	7	4
Internal Auditor	1	4	1
Administration staff	97	92	28
Sub Total	**106**	**105**	**35**
Service staff	**80**	**176**	**75**
Total	186	281	110
% of Service staff	**43%**	**63%**	**68%**

Source: PDAM Contract personnel excluded

Table 6 Equity Rp million

PDAM	Sleman	Yogyakarta	Buntul
Total assets	18,362	31,587	10,285
Equity	-5,070	23,913	9,656
Equity ratio	-	76%	94%

Source: PDAM Financial statement

Table 7 PDAM Sleman Income Statement Rp million

	2000	2001	2002	2003	2004	2005
Operating Revenues						
Tariff Revenue	1,926	2,380	2,637	4,726	5,353	5,203
Meter Rental & Non Water Revenue	400	367	384	625	441	578
Total Operating Revenues	**2,326**	**2,747**	**3,021**	**5,351**	**5,794**	**5,781**
Operating Expenses						
Water source cost	961	1,005	1,180	1,579	1,764	1,951
Treatment cost	185	226	292	377	408	369
Transmit & Distribution cost	1,048	1,450	1,426	1,574	1,769	1,734
Total Operating Expenses	**2,194**	**2,681**	**2,898**	**3,530**	**3,941**	**4,054**
Total Direct Profit	**132**	**66**	**123**	**1,821**	**1,853**	**1,727**
Administrative Expenses	1,680	2,864	1,554	3,962	5,260	5,069
Interest of Loan from MOF			1,766			
Operating Income	**-1,548**	**-2,798**	**-3,197**	**-2,141**	**-3,407**	**-3,342**
Other Income	38	169	79	152	153	-156
Other Revenue(interest)	38	169	79	152	274	164
Other Expenses(amortization)				0	121	320
Income before Tax	**-1,510**	**-2,629**	**-3,118**	**-1,989**	**-3,254**	**-3,498**
Provision of Income Tax (PPh BADAN)					0	0
Deferred Tax			4	8	13	0
Profit after Tax	**-1,510**	**-2,629**	**-3,114**	**-1,981**	**-3,241**	**-3,498**

Source: PDAM SLEMAN Financial Statement

Table 8 PDAM Sleman Balance Sheet Rp million

	2002	2003	2004	2005
Assets				
Cash in Hand and Banks	59	317	310	215
Account Receibable	833	1,226	1,237	797
(Bad debt allowance)	-501	-527	-571	-134
Net Account Receivable	332	699	666	663
Other Receivable	100	105	98	98
Tax receivable	10	10		
Inventories	36	36	37	66
Prepaid Expenses	6	6	9	7
Total Current Assets	**543**	**1,173**	**1,120**	**1,049**
Differed Tax	150	158	171	
Property, Plant and Equipment	26,931	28,031	29,373	29,830
Accumulated Depreciation	-10,165	-11,564	-12,984	-13,922
Net Property, Plant and Equipment	**16,766**	**16,467**	**16,389**	**15,908**
Un-used fixed assets	364	364	400	430
Construction in Progress	91	393	319	
Total Fixedt Assets	**17,221**	**17,224**	**17,108**	**16,338**
Installation materials	542	794	391	319
Payment for local government	269	269	269	269
Fixed payment-deposit	11	11	13	13
Un-used assets	318	319	405	374
Total Other Assets	**1,140**	**1,393**	**1,079**	**975**
Total Assets	**19,054**	**19,948**	**19,478**	**18,362**
Liabilities and Equity				
Account Payable	489	1,008	772	542
Accrued Expenses	318	240	135	170
Tax payable	1	7		
Interest Expenses	2,455	4,354	6,558	9,059
Long term loan payable	1,318	2,197	3,955	4,834
Local government loan payable			278	458
Total Current Liabilities	**4,581**	**7,806**	**11,698**	**15,063**
Local government loan			222	69
Domestic loan from Central government	10,107	9,228	7,470	6,591
Reserve fund for watwr meter	560	898	1,135	1,569
Other liabilities	157	179	195	140
Total Long-Term and Other Liabilities	**10,824**	**10,305**	**9,022**	**8,369**
Total Liabilities	**15,405**	**18,111**	**20,720**	**23,432**
Equity				
Local Government Equity	14,229	14,402	14,527	14,527
Status not determined yet	125	125		
Grant Capital	686	686	686	1,032
Total Capital	**15,040**	**15,213**	**15,213**	**15,559**
Reserve(Special/General)	-8,277	-11,395	-13,214	-17,131
Profit(Loss)of the Year	-3,114	-1,981	-3,241	-3,498
Total Equity	**3,649**	**1,837**	**-1,242**	**-5,070**
Total Equity and Liabilities	**19,054**	**19,948**	**19,478**	**18,362**

Source: PDAM SLEMAN Financial Statement

Table 9 PDAM Sleman Cash flow Statement Rp million

	2002	2003	2004	2005
1 Cash Flow from Operating Activities				
Cash received from customer and others	3,352	5,425	6,320	12,092
Cash disbursement for suppliers and employe	-3,103	-4,485	-5,437	-11,716
Cash from Operating Activities	**249**	**940**	**883**	**376**
2 Cash Flow from Investment Activities				
Acquisition of property, vehicle and equipme	-316	-855	-1,390	-720
Cash used for investment activities	**-316**	**-855**	**-1,390**	**-720**
3 Cash Flow from Finance Activities				
Finance Department loan				
BPD (Bank) loan				
Bank Pasar loan				
SlemanRegency Government loan				
Income from local government				
Loan from local government		173	500	250
Cash Flow from Finance Activities		**173**	**500**	**250**
4 Cash Increase/Decrease	-67	258	-7	-94
5 Cash Balance at the Bigining	126	59	317	310
6 Cash Balance at the End	**59**	**317**	**310**	**216**

Source: PDAM SLEMAN Financial Statement

Table 10 Break Even Point

	PDAM	Sleman	Yogyakarta	Buntul
BEP Sales	Rp million	16,968	12,639	4,654
Revenue in 2005	Rp million	5,781	18,500	4,026
BEP/Revenue	%	294%	68%	116%

Source: Study team

Table 11 PDAM Bantul Income Statement Rp million

	2001	2002	2003	2004	2005
Revenue					
Tariff Revenue	1,478	2,613	2,791	3,073	3,364
Meter Rental & Non Water Rever	615	365	675	770	662
Total revenue	2,093	2,978	3,466	3,843	4,026
Expense					
Water source cost	731	852	1,127	1,263	1,531
Processing cost	62	50	49	131	186
Transmission & Distribution cost	707	722	714	743	687
Total direct cost	**1,500**	**1,624**	**1,890**	**2,137**	**2,404**
Direct profit	593	1,354	1,576	1,706	1,622
General & Administrative cost	**958**	**1,702**	**2,075**	**1,883**	**1,875**
Operating profit(Loss)	-365	-348	-499	-177	-253
Other income	20	32	77	13	13
Bank cost	2	3	4	1	1
Other income	18	29	73	12	12
Profit(Loss) before Tax	-347	-319	-426	-165	-241
Pph Tax refund	9	5			
Profit(Loss) after Tax	-338	-314	-426	-165	-241

Source: PDAM BantulFinancial Statement

Table 12 PDAM Bantul Balance Sheet Rp million

	2001	2002	2003	2004	2005
Assets					
Cash in Hand and Banks	97	309	586	239	274
Short term investment	225	125			
Account Receibable (Gross)		421			
Bad debt reserve		-112			
Account Receibable	194	309	328	396	492
Other Receibales	100				
Inventories	2	1	1		19
Tax Differred	27	34	33	33	33
Total Current Assets	**645**	**778**	**948**	**668**	**818**
Property, Plant and Equipment	12,291	12,721	13,118	16,868	16,879
Accumulated Depreciation	-8,568	-9,313	-10,031	-11,149	-11,504
Net Property, Plant and Equipment	**3,723**	**3,408**	**3,087**	**5,719**	**5,375**
Construction in Progress	10		3,007		39
Total Fixed Assets	**3,733**	**3,408**	**6,094**	**5,719**	**5,414**
Assets not determined yet	3,512	3,512	3,512	3,512	3,512
Other Assets	150	332	367	665	541
Total Assets	**8,040**	**8,030**	**10,921**	**10,564**	**10,285**
Liabilities and Equity					
Account Payable	64	118	119	122	128
Income Tax Payable	8	11	236	16	5
Others	3	110	222	47	
Total Current Liabilities	**75**	**239**	**577**	**185**	**133**
Deposit for meter	58	86	73	74	74
Guaranty money from customer		73	38	310	422
Leasing	19	82	145	98	
Other liability	73				
Total Long-Term and Other Liabilities	**150**	**241**	**256**	**482**	**496**
Total Liabilities	**225**	**480**	**833**	**667**	**629**
Equity					
Local Government Equity	12,130	12,130	15,094	15,094	15,094
Contribution	4,860	4,909	4,909	4,909	4,909
Assets Revaluation Surplus	30	30	30	30	30
Reserve(Special/General)	-8,867	-9,205	-9,519	-9,970	-10,136
Profit(Loaa)of theYear	-338	-314	-426	-166	-241
Other Reserve					
Total Equity	**7,815**	**7,550**	**10,088**	**9,897**	**9,656**
Total Equity and Liabilities	**8,040**	**8,030**	**10,921**	**10,564**	**10,285**

Source: PDAM BantulFinancial Statement

Table 13 PDAM Bantul Cash flow Statement Rp million

	2001	2002	2003	2004	2005
1 Cash from operation activity					
-Cash from water bill payment	1,476	2,447	2,734	2,965	3,300
-Cash from non-water bill payment	115	25	26	24	1
-Shallow well incme	319	210	239	501	431
-Non-water incme					157
-Penalty, Interest and othres	219	324	3,957	139	415
In-flow total	2,129	3,006	6,956	3,629	4,304
-Cash used for salary payment	763	953	1,101	1,609	1,656
-Cash used for electricity	512	684	869	947	1,224
-Other cost	417	763	1,542	582	534
-Inventory	241	182	577	732	576
-Installment for vehiecles	5	2	13	19	15
-Down payment to Regional governmenat		60			100
Out-flow total	1,938	2,644	4,102	3,889	4,105
Cash from operation activity	**191**	**362**	**2,854**	**-260**	**199**
2 Cash from investment activity					
-Cash used investment	9	238	2,645	27	68
-Cash used for leasing	5	13	55	60	97
Cash used for investment activity	**-14**	**-251**	**-2,700**	**-87**	**-165**
3 Cash from finance activity	**0**	**0**	**0**	**0**	**0**
4 Cash Increase/Decrease	177	111	154	-347	34
5 Cash Balance at the Bigining	145	322	433	587	240
6 Cash Balance at the End	322	433	587	240	274

Source: PDAM BantulFinancial Statement

Table 14 PERPAMSI PDAM Benchmarking

10 best PDAM KOTA

Financial

		Best	Mean	1	2	3	4	5	6	7	8	9	10
P1	Operating Cost Recovery Ratio	150%	136%	Surabaya	Banjarmasin	Bogor	**Yogyakarta**	Padang	Palemban	Pontianak	Makassar	Malang	Bandung
	excluding depreciation and interest			251	224	168	155	152	152	147	147	147	142
P2	Debt Service Coverage Ratio	142%	117%	Bogor	Sukabumi	Palembang	Surakarta	Medan	Jambi	Padang	Bandar Lam	Banjalmasin	ParePare
				463	461	443	175	166	123	93	70	60	54
P3	Current Ratio	104%	90%	**Yogyakarta**	Palembang	Malang	Tangerang	Medan	ParePare	Pontianak	Kediri	Bogor	Kendari
				484	402	297	195	121	105	104	69	64	46
P4	Tariff Revision	142%	121%	Manado	Makassar	**Yogyakarta**	Padang	Dumai	Pangkal Pin	ParePare	Bandung	Semarang	Banjarmasin
	average revenue to last year			189	175	158	156	146	145	142	141	135	132
S1	Full Cost Recovery	105%	101%	Plembang	Malang	Bandar Lam	Cirebon	Bogor	Medan	Bandung	Sukabumi	ParePare	Surakarta
	including depreciation and interest			143	126	117	114	114	105	104	103	102	102
S2	Return on Fixed Assets	8%	4%	Malang	**Yogyakarta**	Padang	Bogor	ParePare	Banjarmasin	Pontianak	Cirebon	Bandung	Sukabumi
				29	23	14	12	10	9	7	6	5	4
S3	Unit Operating Cost	Rp 882/m3	Rp 1,318/m3	Surabaya	Magelang	Padang Pan	Yogyakarta	Cirebon	Palembang	Bogor	Kediri	Sukabumi	Padang
				469	623	717	778	815	866	868	886	1,012	1,014
S4	Labour Cost Ratio	32%	38%	Plembang	Tangerang	Pekanbaru	Dumai	Pasuran	Kendari	Semarang	Bengkulu	Jambi	Makassar
	to operating cost			22	26	26	26	28	29	31	32	33	33
S5	Energy Cost Ratio	16%	38%	Cirebon	Bandung	Sukabumi	Bogor	Padang	**Yogyakarta**	Tangerang	Padang Pan	Dumai	Malang
	to operating cost			2	5	6	7	13	15	16	18	19	20
S6	Unit Operating Revenue	Rp 1,890/m	Rp 1,500/m3	Dumai	Manado	Pekanbaru	Banjarmasin	Pangkal Pin	Makkasar	Pontianak	ParePare	Bandung	Kendari
				2,955	2,666	2,659	2,044	1,974	1,964	1,944	1,872	1,849	1,843
S7	Collection Period	2 months	3 months	Bengkulu	Cirebon	Medan	Jambi	Lampung	Pontianak	**Yogyakarta**	Mlang	N/A	Bogor
				1	1	1	1	2	2	2	2	-	2
S8	Ratio of Social Charge	2%	3%	Pangkal Pin	Bandar Lam	Bandung	Kendari	Pekanbaru	Dumai	Pontianak	Mlang	Semarang	Jambi
				0	0	1	1	1	1	2	2	2	2
S9	Ratio of Business Charge	23%	18%	Dumal	Palembang	Makkasar	Jambi	Cirebon	Semalang	Medan	Pontianak	Manado	**Yogyakarta**
	commerce and industry			50	43	33	32	27	26	23	22	20	19
S10	Debt Equity Ratio	-	37%	Padang	Bandung	Manado	**Yogyakarta**	Tangerang	Malang	Cirebon	ParePare	Kendari	Pangkal Pinang
				-	-	-	14	24	36	52	68	75	86
S11	Average Age of Tangible Assets	60%	50%	Bandung	Semarang	Bengkalu	Magelang	Kendari	Medan	Padang Pan	Mlang	Jambi	Pekanbaru
	productive life exceeded			74	71	62	62	60	59	59	58	57	52

Customer

		Best	Mean	1	2	3	4	5	6	7	8	9	10
P5	Customer Satisfaction Index	N/A											
	1～ 7 assess by survey												
P6	Population Served in Service Area	76%	59%	Kediri	ParePare	Cirebon	Banjarmasin	Jambi	Semarang	Pasuruan	Manado	Bogor	Pontianak
				85	82	82	78	76	76	74	71	70	68
S12	Idle Capacity	3%	18%	Medan	Palembang	Semalang	Magelang	**Yogyakarta**	Kendari	Malang	Surabaya	Tangerang	Bogor
	use installed production capacity			0	0	0	1	1	2	2	3	4	5
S13	Service Area Ratio	98%	77%	Surabaya	N/A	N/A	N/A	Banjarmasin	Kendari	Padang	ParePare	Bogor	Jambi
	to local government population			100	-	-	-	99	94	86	82	77	71
S14	Meter Replaced	6%	4%	ParePare	Medan	Bogor	Bandung	**Yogyakarta**	Banjarmasin	Cirebon	Malang	Magelang	Pontianak
	changed in the year			-	-	8	8	7	6	6	5	5	4
S17	Affordability	0%	1%	Padang	ParePare	Medan	Malang	Padan Panja	**Yogyakarta**	Magelang	Semarang	Jambi	Manado
	10m3/month to household income			0	0	0	0	0	1	1	1	2	2

Technical/Operational

		Best	Mean	1	2	3	4	5	6	7	8	9	10
P7	Non Revenue Water	25%	35%	Cirebon	Medan	ParePare	**Yogyakarta**	Tangerang	Padang Pan	Kediri	Dumai	Banjarmasin	Surakarta
				20	21	22	24	24	25	25	26	28	29
P8	Water Quality Index	9	7	Padang	ParePare	Sukabumi	Bogor	Semarang	Magelang	N/A	Bandar Lam	N/A	N/A
	1～15 level of certainty			15	14	11	9	8	7	-	5	-	-
P9	Continuity Service	24hrs	20hrs	Bogor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Tangerang	**Yogyakarta**
	per day service			24	-	-	-	-	-	-	-	24	23
S15	Operating Bulk Meter	100%	84%	Tangerang	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Bogor
	installed and functioning			100	-	-	-	-	-	-	-	-	100
S16	Mains Rehabilitation	1.3%	1.4%	Cirebon	Manado	Banjarmasin	Malang	Medan	Palembang	Bogor	Kediri	Bandar Lam	Surakarta
	net work rehabilitation each year			N/A	3.1	2.3	1.7	1.5	1.1	1	0.9	0.7	0.7

Personnel/HRD

		Best	Mean	1	2	3	4	5	6	7	8	9	10
P10	Employee Satisfaction Index	N/A											
	1～5 level of workplace conditions												
S18	Staff/1,000 Connection	6.1	8.1	Medan	Banjarmasin	Surabaya	Palembang	Makassar	Pontianak	N/A	Bogor	Bandung	Padang Panjang
				4.6	4.8	4.9	5.2	5.8	5.9	-	6.1	6.6	6.8
S19	Training Budget	0.8%	0.6%	Padang Pan	Kendari	Jambi	Banjarmasin	Sukabumi	Makassar	Pangkal Pin	Surakarta	Medan	Cirebon
	to operating cost			1.3	1.1	1	0.9	0.8	0.8	0.8	0.8	0.7	0.5

Souece: PERPAMSI Homepage Jan. 2007

Table 15 Cash flow of 2005

Rp million

	Sleman	Yogyakarta	Buntul
Operation	379	5,004	199
Investment	-720	-5,171	-165
Finance	250	94	0
Total	-91	-73	34

Source: Financial statemant

Table 16

Customer Classification	Consumption Brakets	Tariff Comparison																
		Surabaya, 2000	Jakarta, 2001	Bandung, 2001	Medan, 2000	Ujung Pandang, 2001	Malang, 2001	Semarang, 2001	Average	Indicator, (A2=100)	Sleman, 2006	Comparison with Average	Indicator, (A2=100)	Bantul, 2002	Comparison with Average	Indicator, (A2=100)	Yogya, 2005	Comparison with Average	Indicator, (A2=100)
Social General (Social Umum)	0-10	240	375	560	335	260	235	400	344	36	1,500	4.4	236	1,000	2.9	184	750	2.2	206
	11-20	300	375	560	335	275	235	450	361	38	1,500	4.2	224	1,000	2.8	174			
	above 20	370	375	560	335	600	235	850	475	50	1,500	3.2	171	1,000	2.1	133	800	1.7	159
Special Social A (Social Khusus A)	0-10	270	375	560	365	300	235	900	429	45	1,500	3.5	189	1,000	2.3	147	750	1.7	165
	11-20	390	375	875	405	400	235	900	511	54	1,750	3.4	185	1,250	2.4	154			
	above 20	950	850	1,225	455	1,600	835	900	974	103	2,000	2.1	111	1,500	1.5	97	1,250	1.3	121
Average												3.4	186		2.3	148		1.7	163
Residential A1 (Perumahan A1)	0-10	400	1,035	700	870	650	850	800	758	80	1,500	2.0	107	1,000	1.3	83	750	1.0	94
	11-20	850	1,330	1,225	1,300	1,000	850	1,150	1,101	116	2,000	1.8	98	1,250	1.1	72			
	above 20	1,300	1,560	2,750	1,960	2,800	1,950	2,550	2,124	225	2,250	1.1	57	1,500	0.7	45	1,650	0.8	73
Residential A2 (Perumahan A2)	0-10	750	1,335	875	1,210	800	750	900	946	100	1,750	1.9	100	1,500	1.6	100	1,000	1.1	100
	11-20	1,300	1,520	1,400	1,820	1,100	750	1,850	1,391	147	2,250	1.6	87	1,875	1.3	85			
	above 20	1,880	2,100	2,975	2,730	3,800	2,150	3,050	2,669	282	2,500	0.9	51	2,250	0.8	53	1,650	0.6	58
Residential A3 (Perumahan A3)	0-10	1,000	2,500	1,050	1,210	1,000	850	1,000	1,230	130	2,000	1.6	88				1,650	1.3	127
	11-20	1,750	2,500	1,750	1,820	1,700	850	2,200	1,796	190	2,500	1.4	75						
	above 20	2,550	3,500	3,500	2,730	3,000	2,500	3,650	3,061	324	2,750	0.9	49				1,950	0.6	60
Average												1.5	79		1.2	73		0.9	85
Small Commercial (Niaga Kecil)	0-10	1,850	1,335	1,050	1,830	6,000	3,350	2,150	2,509	265	3,900	1.6	84	2,500	1.0	63	2,125	0.8	80
	11-20	3,200	1,520	1,750	2,170	7,000	3,350	2,350	3,049	322	3,900	1.3	69	2,500	0.8	52			
	above 20	4,500	2,100	3,500	3,800	10,000	5,560	5,100	4,937	522	4,500	0.9	49	3,000	0.6	38	2,775	0.6	53
Small Industry (Industri Kecil)	0-10	1,850	2,500	1,750	1,870	6,000	3,350	1,550	2,696	285	5,000	1.9	100	2,500	0.9	58	3,200	1.2	112
	11-20	3,600	2,500	2,450	3,470	7,000	3,350	1,750	3,446	364	5,000	1.5	78	2,500	0.7	46			
	above 20	4,600	3,500	4,375	4,620	10,000	5,050	4,000	5,164	546	7,000	1.4	73	3,000	0.6	37	3,200	0.6	59
Big Commercial (Niaga Besar)	0-10	3,300	5,200	1,400	2,425	6,350	4,350	2,250	3,611	382	4,250	1.2	64	3,000	0.8	52	4,250	1.2	111
	11-20	5,100	5,200	2,975	2,710	7,520	4,350	2,450	4,329	458	4,250	1.0	53	3,000	0.7	44			
	above 20	6,600	5,200	3,850	4,310	10,810	7,000	5,900	6,239	659	5,500	0.9	48	3,600	0.6	36	4,250	0.7	64
Big Industry (Industri Besar)	0-10	3,700	5,200	2,100	2,425	7,500	5,050	2,750	4,104	434	5,500	1.3	72	5,000	1.2	77	4,675	1.1	108
	11-20	5,700	5,200	3,675	4,070	9,000	5,050	3,050	5,106	540	5,500	1.1	58	5,000	1.0	62			
	above 20	6,900	5,200	4,725	5,380	12,000	8,150	6,200	6,936	733	8,000	1.2	62	6,000	0.9	55	4,675	0.7	64
Average												1.3	68		0.8	52		0.9	81

Appendix 7.2 Job Description of PDAM Yogyakarta

Job Description of PDAM Yogyakarta
(from Walikota Yogyakarta Decision No 162/KD/1987 about the organization of PDAM Tirta Marta)

Chapter I
General Definition
Section 1

On this decision, the definitions are:

a. Regional Government is the government of Yogyakarta Municipal
b. Head of Regional Government is Walikotamadya
c. Regional Company is PDAM Tirtamarta Yogyakarta
d. Controll Unit is Controll Unit of PDAM Tirtamarta Yogyakarta
e. Management is management of PDAM Tirtamarta Yogyakarta

Chapter II
Main Duty and Function
Section 2

1. Regional company is a company which the owner is regional government on autonomy
2. Regional company is held based on economy principle on Indonesian economic system based on Pancasila and has a function to increase the welfare
3. Regional company is lead by director and supervisor body to control it

Main Duty
Section 3

Main duty of regional company is held the clean water management to increase the welfare, include social aspect, health, and public services

Function
Section 4

(1) The functions of regional company consists of:
    a. Public services
    b. Held the public utilization
    c. Get revenue
(2) Regional company held :
    a. Development, operasionalization, and maintenance the water source, reservoir, transmission and distribution pipe, and supporting installation on clean and health drinking water.
    b. Drinking water supply on certain place for fire prevention
    c. The regulation on drinking water services
    d. Testing, connection, seal, read, and retraction of water meter
    e. Regional company management with efficient and effective based on the principle of economy

Chapter III
Organization Structure
Section 5

(1) The organization structure of regional company is :
    a. Head of regency/municipal
    b. Supervisor body
    c. Management
    d. Division
    e. Section
    f. Sub-section
    g. Operator
(2) The flowchart of organization structure is on the 1st attachment of this letter

Chapter IV
THE DESCRIPTION OF DUTIES
Part 1
Management
Section 6

The management of regional company consists of:

a. Top Director
b. Technical Director
c. General Director

Section 7

(1) The duties of top director :
   a. Management and founding the company with policy of head of municipal
   b. Company represent in and out of jurisdiction
   c. Planning the company activities and signed by head of municipal
   d. Remove the employee of company based on the regulation
   e. Founding the employee to make a good work condition
   f. Evaluation on efficiency, affectivity, and activities of company
   g. Reporting the annual calculation of profit and activities of company to head of municipal
   h. Give the yearly report to head of municipal
   i. Relationship with other institution
   j. Regulations for conduct the company
   k. Other jobs from head of municipal which is suitable with the regulations
(2) Top director has responsibility to head of municipal

Section 8

(1) The duties of technical director
   a. Management and founding the technical section with policy of top director
   b. Company represent in and out of jurisdiction
   c. Planning the technical activities, such as planning, production, distribution, and tools
   d. Technical evaluation on efficiency, effectiveness, and consummation
   e. Coordinate the activities of planning, production, distribution
   f. Give the direction to all activities of planning, production, distribution, and tools
   g. Give the idea, input, and consideration to top director on technical employee
   h. Controlling the technical activities of planning, production, distribution
   i. Give the annual report to top director
   j. Other jobs from top director
(1) Technical director has responsibility to top director

Section 9

(1) The duties of general director
   a. Management and founding the general section with policy of top director
   b. Company represent in and out of jurisdiction
   c. Planning the activities of finance and customer
   d. Coordinate the activities of general, finance and customer
   e. Give the direction to all activities of revenue and cost of the company, supplying and maintenance the goods of company, and employment administration
   f. Controlling the activities of general, finance, and customer
   g. Give the idea, input, and consideration to top director on remove the employee
   h. Evaluation on efficiency, effectiveness, and consummation of general activities
   i. Give the annual report to top director
   j. Other jobs from top director
(2) General director has responsibility to top director

Section 10

(1) The technical director consists of:

a. Technical Planning Division
b. Production division
c. Distribution division

(2) The general director consists of:
a. General division
b. Finance division
c. Customer division

Second Part
Technical Plan Division
Section 11

(1) Technical Planning Division has duties :
a. Help the technical director on the planning of technical budget
b. Research and development on drinking water supply for distribution
c. Coordinate the technical planning on installation pipe of transmission, distribution, connection and land, and other drinking water installation
d. Training program for technical employment
e. Inventory of all the drinking water installation to make the program of maintenance, repair, and development
f. Evaluation all activities on technical plan and propose the repair and consummation to technical director
g. Computerize
h. Controlling the activities of sections below
i. Give the monthly report to technical director
j. Other jobs from technical director

(2) Technical Planning division is lead by a head of division and has responsibility to technical director

Section 12

Technical Planning division consists of:
a. Research and development section
b. Technical Plan section
c. Data and evaluation section

Section 13

(1) Research and development section has duties :
a. The research and development of the company
b. Collect the company data as a material of research and development of the company
c. Do the technological research and development of the company
d. Research of water source, pump, management and distribution
e. Technical and marketing analysis to increase the customer
f. Research of company participate on regional development
g. Periodic evaluation of research and development
h. Monthly report, ideas, input, and consideration are sent to head of technical planning division
i. Control the other duties
j. Do other jobs from head of technical planning division

(2) Research and development section is lead by a head of section and has responsibility to head of technical planning division

Section 14

Research Section consists of:
(1) Research and development Sub-section of Water Production
(2) Research and development Sub-section of Transmission and distribution
(3) Research and development Sub-section of General Technical

Section 15

(1) Technical Planning section has duties:

a. Plan activities to support the plan of Technical Planning section
b. Examinee the propose of common installation construction
c. Arrange the education, training program, and technical guidelines
d. Arrange the technical guidelines of construction and operational of technical tools
e. Evaluation on construction
f. Archive of construction design and pipe network
g. Evaluation on all activities
h. Control the other duties
i. Monthly report, ideas, input, and consideration are sent to head of technical division
j. Do other jobs from head of technical planning division

(2) Technical Planning section is lead by a head of section and has responsibility to head of technical planning division

Section 16

Technical Planning division consists of:
1. Planning Sub-section of General Installation
2. Planning Sub-section of New connection installation
3. Sub-section of Data and Picture

Section 17

(1) Data and Evaluation section has duties:
a. Plan activities to support the plan of Technical Planning section
b. Collecting, processing, and reporting the data of company
c. Computerize
d. Library
e. Water quality controlling
f. Evaluation on all activities
g. Control the other duties
h. Evaluation on the section of evaluation and data activities
i. Monthly report, ideas, input, and consideration are sent to head of technical planning division
j. Do other jobs from head of technical planning division

(2) Data and Evaluation section is lead by a head of section and has responsibility to head of technical planning division

Section 18

Data and Evaluation section consists of:
1. Sub-section of computer
2. Sub-section of Data and Library
3. Sub-section of Evaluation

Third Part
Production Division
Section 19

(1) Production division has duties:
a. Help the technical director on the planning of technical budget
b. Production schedule to efficiency and effectiveness
c. Water treatment
d. Operational, maintenance, and repairing on the installation of production
e. Research on water source and reporting to the director
f. Good relationship with other drinking water institution
g. Data of water production
h. Evaluation all activities on production division and propose the repair to technical director
i. Controlling the activities of sections below
j. monthly report, ideas, inputs, and consideration to technical director
k. Other jobs from technical director

(2) Production division is lead by a head of division and has responsibility to technical director

Section 20

Production division consists of:

1. Section I of Production
2. Section II of Production
3. Section III of Production
4. Section of Maintenance of Production Installation

Section 21

(1) Section I of Production has duties :
   a. Plan to support the planning on production division
   b. Production activities with consideration on efficiency and effectively of water production
   c. Chemically on drinking water
   d. Controlling on quality and production volume
   e. Pacification on water source installation, pump, and processing
   f. Good environment of work
   g. Controlling the activities of sub-sections below
   h. Evaluation all activities of sub-sections below
   i. monthly report, ideas, inputs, and consideration to head of Production division
   j. Other jobs from head of Production division

(2) Section I of Production is lead by a head of section and has responsibility to head of Production division

Section 22

Section I of Production consists of:

a. Sub-section of Bedog and Winongo
b. Sub-section of Karanggayam
c. Sub-section of Ngaglik

Section 23

(1) Section II of Production has duties :
   a. Plan to support the planning on production division
   b. Production activities with consideration on efficiency and effectively of water production
   c. Chemically on drinking water
   d. Controlling on quality and production volume
   e. Pacification on water source installation, pump, and processing
   f. Good environment of work
   g. Controlling the activities of sub-sections below
   h. Evaluation all activities of sub-sections below
   i. monthly report, ideas, inputs, and consideration to head of Production division
   j. Other jobs from head of Production division

(2) Section II of Production is lead by a head of section and has responsibility to head of Production division

Section 24

Section II of Production consists of:

a. Sub-section of Reservoir of Gemawang and Kentungan
b. Sub-section of Jongkang, Nandan, and Gemawang Well

Section 25

(1) Section III of Production has duties :
   a. Plan to support the planning on production division
   b. Production activities with consideration on efficiency and effectiveness of water production
   c. Chemically on drinking water
   d. Controlling on quality and production volume
   e. Pacification on water source installation, pump, and processing
   f. Good environment of work
   g. Controlling the activities of sub-sections below
   h. Evaluation all activities of sub-sections below
   i. monthly report, ideas, inputs, and consideration to head of Production division

j. Other jobs from head of Production division

(2) Section III of Production is lead by a head of section and has responsibility to head of Production division

Section 26

Section III of Production consists of:

a. Sub-section of Kalikuning, Padasan
b. Sub-section of Candi

Section 27

(1) Maintenance of Production Installation Section has duties:

a. Plan to support the planning on production division
b. Manage and maintenance of pipe Installation
c. Evaluation on efficiency and effectively of production istallation
d. Decide the component of production installation which is efficient and effectively operational
e. Administration on maintenance and repair the production installation
f. Evaluation all activities of sub-sections below
g. Coordinate the laboratory activities
h. Controlling the activities of sub-sections below
i. monthly report, ideas, inputs, and consideration to head of Production division
j. Other jobs from head of Production division

(2) Maintenance of Production Installation Section is lead by a head of section and has responsibility to head of Production division

Section 28

Maintenance of Production Installation Section consists of:

a. Sub-section of Laboratory
b. Sub-section of maintennance of diesel pump installation
c. Sub-section of maintennance of electric pump installation

Fourth Part
Distribution Division
Section 29

(1) Distribution Division has duties:

a. Help the technical director on the planning of technical budget
b. Manage the drinking water distribution to customer
c. Pacification on water source installation, pump, and processing
d. Repair and rechange the pipe of drinking water
e. Maintenance of new connection
f. Operational, maintenance, and repairing on water meter
g. Technical maintenance
h. Evaluation all activities on distribution division
i. monthly report, ideas, inputs, and consideration to technical director
j. Other jobs from technical director

(2) Distribution division is lead by a head of division and has responsibility to technical director

Section 30

(1) Distribution Division consists of:

a. Section of transmission and distribution
b. Section of maintenance of installation, transmission and distribution
c. Section of technical tools

(2) The each section on point (1) is lead by a head of section and has responsibility to head of distribution

Section 31

(1) Section of transmission and distribution has duties:

a. Plan to support the planning on distribution division
b. Data collecting of all transmission and distribution pipe
c. Coordinate of new connection

d. Pacification of all transmission and distribution pipe
e. Disturbance services
f. Coordinate the discontinuance and new connection
g. Administration and costumer services
h. Evaluation all activities of sub-sections below
i. Controlling the activities of sub-sections below
j. monthly report, ideas, inputs, and consideration to head of distribution division
k. Other jobs from head of distribution division

(2) Section of transmission and distribution is lead by a head of section and has responsibility to head of distribution division

Section 32

Section of transmission and distribution consists of:

a. Sub-section of installation, transmission and distribution
b. Sub-section of new connection installation
c. Sub-section of Water Distribution and disturbance servises

Section 33

(1) Maintenance instalation section has duties:
a. Plan to support the planning on distribution division
b. Coordinate the maintenance and change of transmission and distribution pipe network
c. Manage the change, movement, disconnection, and repair of water meter
d. Decreace the water leakage
e. Test of transmission and distribution pipe for changing time
f. Administration on maintenance and change of transmission and distribution pipe
g. Controlling the activities of sub-sections below
h. Evaluation all activities of sub-sections below
i. monthly report, ideas, inputs, and consideration to head of distribution division
j. Other jobs from head of distribution division

(2) Maintenance instalation section is lead by a head of section and has responsibility to head of distribution division

Section 34

Maintenance instalation section consists of:

a. Sub-section of installation, transmission and distribution maintenance
b. Sub-section of hydrant afsluiter maintenance
c. Sub-section of Water meter maintenance

Section 35

(1) Section of Technical Tools has duties :
a. Plan to support the planning on distribution division
b. Repair shop
c. Maintenance of technical tools
d. Test, research, and estimation on technical tools need
e. Effective and efficient on the operational of technical tools
f. Administration of repair shop and technical tools
g. Evaluation all activities of sub-sections below
h. monthly report, ideas, inputs, and consideration to head of distribution division
i. Other jobs from head of distribution division

(2) Section of Technical Tools is lead by a head of section and has responsibility to head of distribution division

Section 36

Section of Technical Tools consists of:

a. Sub-section of machine shop

b. Sub-section of maintenance of technical tools
c. Sub-section of test of technical tools

Fifth Part
General Division
Section 37

(1) The Duties of General Division are:
a. Help the general director in managing the Budget of Company.
b. Organize the activities in secretariat and management part.
c. Organize the activities in maintenance, office tools, and regulations
d. Organize the meeting and accepting the guest.
e. Manage the office tools and technical office.
f. Organize the training and education of Staff Company.
g. Evaluate the organization and administration of company.
h. Control the activity of sections below.
I. Monthly report, ideas, inputs, and consideration to general director.
j. Other jobs from head of distribution division

(2) General Division is lead by a head of section and has responsibility to General Director.

Section 38

(1) General Division is consists of:
a. Supplier section
b. General section
c. Human Resource section

(2) The each section on point (1) is lead by a head of section and has responsibility to General Director.

Section 39

(1) The Duties of supplier section are:
a. Plan to support the planning on General Division.
b. To manage the creating, accepting and saving the equipments.
c. Monitoring of prices in companies naturally.
d. Value of supplier which is services the company.
e. To manage the accepting, saving and services all equipment
f. To organize the activity of the office and technical tools
g. Evaluate the activities in this section.
h. Control all activities which handling.
i. monthly report,s ideas, inputs, and consideration to the head of general division
j. Other jobs from head of general division

(2) Supplier section is lead by a head of section and has responsibility to the head of general division

Section 40

The Supplier section is consists of:
a. Buying sub-section
b. Warehouse sub-section
c. Inventory sub-section

Section 41

(1) The duties of general section are:
a. Plan to support the planning on General Division
b. Manage the activity in secretariat and management part.
c. To manage the activity inside the company.
d. To manage the using and maintenance of office tools, include the vehicle.
e. Collect and distribute the regulation for all the part of company
f. To manage the meetings in the company.
g. To coordinate the security on the company.
h. Evaluate the activities in this section.
i. Control all activities which handling.
j. monthly report,s ideas, inputs, and consideration to the head of general division

k. Other jobs from head of general division

(2) General section is lead by a head of section and has responsibility to the head of general division.

Section 42

The general section is consists of:

a. Management Sub-Section
b. Domestic Sub-section
c. Security Sub-Section

Section 43

(1) The duties of Human Resources Section are:

a. Plan to support the planning on General Division
b. Manage the payroll and welfare of the company employee
c. Make an evaluation list to value the performance of duties
d. Propose the promotion and mutation of the company employee.
e. Arrange the statistical and stratification of the company employee
f. Manage the furlough of the company employee
g. Annual evaluation of quantity and quality of the company employee, which suitable on the function and the duties of company.
h. Founding and education of the company employee.
i. Evaluate the activities in this section.
j. Control all activities which handling.
k. monthly report,s ideas, inputs, and consideration to the head of general division
l. Other jobs from head of general division

(2) Human Resources Section is lead by a head of section and has responsibility to the head of general division.

Section 44

The Human resource section is consists of:

1. Salary and welfare sub-section
2. Founding and development sub-section
3. Promotion and mutation sub-section

Sixth Part
Finance Division

(1) The duties of finance division are:

a. To help the general director managing the budget of company
b. Do the account system of company and examining the systematic financial
c. Accept, count and report the daily revenue and save it in the bank.
d. Checking all payment transaction, by cash even bank which trustee by head regional government and guarantee that all transaction is valid.
e. Checking the financial report of company including the evaluation to asking agreement management.
f. Help the management to arrange the financial report, it will sent to the Head regional government.
g. Evaluate of all activities in this division.
h. Guarantee the relationship between the bank and the other institution.
i. Control all activities in this division.
j. monthly report,s ideas, inputs, and consideration to the head of general division
k. Other jobs from head of general division

Section 46

The Finance division is consists of:

a. Cash section
b. Accounting section
c. Financial planning section

Section 47

(1) The duties of cash section are:

a. Arrange the activity plan to the plan of finance division
b. Manage Accept, count and report the daily revenue and save it in the bank which trustee by walikota
c. To organize the assets of company (cash, deposit and obligation)
d. To carry on all payment by cash.
e. To manage the reporting and arranging the schedule of payment – debt of company.
f. To manage the reporting and arranging the list of credit and the proccess of abrogation.
g. To evaluate the liquidity of company periodicaly
h. Evaluate the activities in this section.
i. Control all activities in this division.
j. monthly report,s ideas, inputs, and consideration to the head of finance division
k. Other jobs from head of finance division

(2) Cash section is lead by a head of section and has responsibility to the head of finance division.

Section 48

The cash section is consists of:

a. cash sub-section
b. Debt Sub-section

Section 49

(1) The duties of accountancy section are:

a. Arrange the activity plan to the plan of finance division
b. Do the account system of company and examining the systematic financial
c. To carry on the payment by bank (voucher).
d. To rechecking on accounting books every month
e. To arrange the financial report of company including evaluation.
f. To arrange the report of management costs of the company including evaluation.
g. To making the water bills and the other bills.
h. Evaluate the system and procedure of administration which the company is using
i. Evaluate the activities in this section.
j. Control all activities in this division.
k. monthly report,s ideas, inputs, and consideration to the head of finance division
l. Other jobs from head of finance division

(2) Cash section is lead by a head of section and has responsibility to the head of finance division

Section 50

The accountancy section is consists of:

a. Financial accounting Sub-section
b. Cost accounting Sub-section
c. Bill Sub-section

Section 51

(1) The duty of financial plan section

a. Arrange the activity plan to the plan of finance division
b. Prepare the material to arrange the company budget.
c. Collect all the proposal of budget from all activities.
d. Arrange the budget of company such as the management policy.
e. The periodic evaluation in budget of company implementation.
f. To arrange the long term finance plan such as the management policy
g. Periodic evaluation of the projects implementation in financial plan.
h. Monitoring in the liquidity, rentability and solvability of company including the government monetary policy
m. Evaluate the activities in this section.
n. Control all activities in this division.

o. monthly report,s ideas, inputs, and consideration to the head of finance division
p. Other jobs from head of finance division

(2) Finance plan section is lead by a head of section and has responsibility to the head of finance division

Section 52

The financial plan section is consists of:

a. Budget Sub-section
b. budget evaluation sub-section
c. Planning and project evaluation sub-section

Seventh Part
Customer Division
Section 53

(1) The duties of customer division are:

a. Arrange the activity plan to the plan of finance division
b. marketing, customer service and taking the bill
c. customer service, billing and the data of customer management
d. To guarantee the relationship of customer
e. Give the information about the duty and tight as a customer
f. Evaluate the activities in this section.
g. Control all activities in this division.
h. monthly report,s ideas, inputs, and consideration to the general director
i. Other jobs from general director

(2) Customer division is lead by a head of division and has responsibility to general director

Section 54

The customer division is consists of:

a. Customer section
b. Meter checker section
c. Collector section

Section 55

(1) The duty of customer section are :

a. Arrange the activity plan to the plan of customer division
b. Arrange the customer service and data of customer
c. Marketing activity in order to support the development program of customer.
d. Information about the duty and right of customer
e. Monitoring in company services to the customer
f. Relationship between customer and community
g. Evaluate the activities in this section.
h. Control all activities in this division.
i. monthly report,s ideas, inputs, and consideration to the head of customer division
j. Other jobs from general director

(2) Customer section is lead by a head of section and has responsibility to the head of customer division

Section 56

The customer section is consists of:

a. Customer Sub-section
b. Customer development sub-section
c. Relationship Sub-section.

Section 57

(1) The duties of Meter checker section are:

a. Arrange the activity plan to the plan of customer division
b. Reporting the abnormal water meter
c. Propose the change of broken and not clear water meter
d. Monthly administration of water use

e. Customer complaint
f. Solution of customer complaint
g. Arrange the statistic of water use and water lose / leakage
h. Evaluate the activities in this section.
i. Control all activities in this division.
j. monthly report,s ideas, inputs, and consideration to the head of customer division
k. Other jobs from the head of customer division

(2) Meter checker section is lead by a head of section and has responsibility to the head of customer division

Section 58

The Meter checker section is consists of:
a. Meter checker sub-section
b. Customer complaint sub-section

Section 59

(1) The duties of collector section are:
a. Arrange the activity plan to the plan of customer division
b. Billing of water.
c. Administration of water billing every month
d. Propose the cutout of water based on the regulation
e. Payment from customer, and it sent to the head of Cash Section
f. Enclose the water billing which is not pay yet, and sent it to the head of Cash Section
g. Evaluate the efficiency of water billing
h. Evaluate the activities in this section.
l. Control all activities in this division.
m. monthly reports, ideas, inputs, and consideration to the head of customer division
n. Other jobs from the head of customer division

(2) Collector section is lead by a head of section and has responsibility to the head of customer division

Section 60

The collector section is consisting of:
a. Billing on general customer Sub-section
b. Billing on institutional customer sub-section
c. Billing payment sub-section

Eighth Part
Intern controlling unit
Section 61

(1) The duties of intern controlling unit are:
a. Implementation the intern controlling for technical activities in company.
b. Check on the implementation of the system and procedure of administration and reporting the mistakes and send it to the top director.
c. To check all financial transaction in company which is record in accountancy
d. Controlling on the implementation of budget in company.
e. Help on the examination which is done by other institution outside the company
f. Help on arranging financial report which will be sent to the regional head office.
g. Give the ideas, inputs, and consideration to the top director.
h. Other jobs from the top director

(2) Intern controlling unit is lead by a head of section and has responsibility to the top director.

Section 62

The intern controlling unit is consists of:
a. Intern controlling on technical division.
b. Intern controlling on general division.

Section 63

(1) The duties of intern controlling on technical division are:
a. Controll on the technical activities
b. Collect, process, and show the data on technical division to support the controll activities.

c. Controll the budget on the technical division.
d. Controll on the quality, price, standard and construction of the technical tools which buy.
e. Controll the technical construction
f. Help the Controll of the technical construction, which do the other institution outside the company
g. Help on arranging the yearly report of technical division, which is sent to Head of Region
h. Give the ideas, inputs, and consideration to the head of intern controlling unit.
i. Other jobs from the head of intern controlling unit

(2) Intern controlling on technical division is lead by a head and has responsibility to the head of intern controlling unit

Section 64

(1) The duties of Intern controlling on general division are:
a. Controll on the general activities
b. Collect, process, and show the data on general division to support the controll activities.
c. Controll the budget on the general division.
d. Controll on the quality, price, standard and construction of the technical tools which buy.
e. Controll the aplication of system and procedure of administration in company
f. Review all supporting document on financial transaction of the company on the accountancy
g. Help the Controll of the general division, which do the other institution outside the company
h. Help on arranging the yearly report of technical division, which is sent to Head of Region
i. Give the ideas, inputs, and consideration to the head of intern controlling unit.
j. Other jobs from the head of intern controlling unit

(2) Intern controlling on general division is lead by a head and has responsibility to the head of intern controlling unit

Ninth part
Sub-section
Section 65

The specify duties and mayor of the head of sub-section will be own ruled by the manager.

Chapter V
THE SYSTEM OF WORK
Section 66

(1) Manager, the head office of intern controlling unit, the head of division, the head of section, the head of sub-section are implement the pronciple of coordination, integration, synchronic and simplification by vertical & horizontal.
(2) Every leader in PDAM Tirtamarta has the responsibility to lead and coordinate the each subordinate and giving the clue in implementation duty.

Section 67

(1) Every leader in PDAM Tirtamarta obeys the guidelines and has responsiblility to their head and send the report on time.
(2) Every report which is accepted by the leader in PDAM will be manage and using as a basic to the arranging the next report.

Section 68

(1) The head of sub-section sends the report to the head of section as a basic report which will be sent to the head of division on time.
(2) The head of section sends the report to the head of division as a basic report which will be sent to the director on time
(3) The head of division sends the report to the director as a basic report which will be sent to top director on time
(4) The director sends the report to the top director as a basic report which will be sent to the head region on time
(5) The top director must send the report for the regional head on time

Section 69

In this case (section 68) every report is delivered to the every components / organizations unit by functional.

Section 70

In the duty, the top director, the director, the head of intern controlling unit, the head division, the head section and the head of sub-section will do the annual meeting in order to give the guidedance for the each subordinate.

Chapter VI
EMPLOYEMENT

Section 71

(1) The manager, the head office of intern controlling unit, the head of division, the head of section and the head of sub-section are appointed and stopped based on the valid regulation.
(2) The structure of employement and stratification according to rank in regional company as shown on the second attachment.

Chapter VII
Last Clause

This decision is valid on the validity date and will be change if founded the mistakes.

Valid In Yogyakarta
On September 3rd 1987

CC:
1. Vice Governor of DIY Province
2. Head of DPRD (Parliament) of Yogyakarta Municipal
3. Head of Services/Division/Board/Office/Regional Company of Yogyakarta Municipal
4. Archives

Appendix 7.3 MOHA Tariff Instructions

A. General

Based on the Foundation Law 1945 Article 33 sub 3 stated: "Water as natural resources and as basic need to all inhabitants in Indonesia is controlled by the State and to be used to maximized people prosperity, etc."

B. Affordability to Pay and Cross Subsidy of water Tariff

C. Efficient Use of Water Consumption

D. Simple and Transparency
Easy to calculate the water tariff, and transparency to all customers

In order to provide the simple system of water tariff:

a. Customers are classified into five (5) groups:
   I. Social/Public
   II. Households
   III. Commerce
   IV. Industry
   V. Special

b. Water Block Consumption
   1. $0 – 10\ m^3$
   2. $>10 – 20m^3$
   3. $>20m^3$

c. Levels of Expense Component
   1. Expense Component I : Low Rate
   2. Expense Component II : Base Rate
   3. Expense Component III : Full Rate

Quoted from Page 12 of MOHA Instruction Manual No : 8 Year 1998.

C. Formula of Water Tariff Computation

1. Computation of Accounting Expense and Average Accounting Expense
   a) Accounting Expense computation: The accounting expense is the minimum of total expenses to be recovered from water tariff revenue. And the expenses is based upon the expense elements of operation, maintenance, and administration, and select one of which the higher expenses between depreciation cost at purchase value or loan installment (principal and interest)

   b) Average Rate of Expenses Accounting

The average rate of expenses accounting is computed and used as the lowest score in various alternatives of water tariff rate determination.
Formula :
"The water tariff rate is computed based upon the total expenses accounting divided by the total volume of current 12 months water sold."

2. Computation of Financial Expense and Average Financial Expense

a) Financial Expense computation : The financial expense computation is the maximum of company expenses to be recovered from water tariff revenue. And the financial expense is consist of total expenses of operation, maintenance, administration and depreciation (reevaluated) and included loan interest to be paid plus 10% ROA (return on assets).

b) Average Rate of Financial Expense Computation
The average rate of financial expense is computed and used as the highest score in various alternatives of water tariff rate determination.
Formula :
"The water tariff rate is computed based upon the total financial expenses divided by the total volume of current 12 months water sold."

Quoted from Page 16 of MOHA Instruction Manual No.: 8 Year 1998

a) Tariff Determination/Adjustment
The levels of expense component are based for classification of customers and related to the block water consumption levels, as follows :

Customer groups	Base of Water Tariff Rate Water consumption (m^3)		
	0-10	>10-20	>20
Group I	Low Rate	Low Rate	Low Rate
Group II	Low Rate	**Base Rate**	*Full Rate*
Group III	**Base Rate**	*Full Rate*	*Full Rate*
Group IV	*Full Rate*	*Full Rate*	*Full Rate*
Group V	Based on Mutual Agreement		

b) Option of Expense Component Figures
If Base Rate>Full Rate ⟶ Base Rate must be applied to substitute Full Rate.

*****

COMPUTATION:
On Average of Accounting Expense, and
On Average of Financial Expense

1.0. Average Accounting Expense (=Water Tariff Rate – Low)

a) Operation, maintenance, and administration (current year) including depreciation (Historical Data) = OMA

b) Adding Factor of Inflation Rate to the Projected Year, based year 2000 (Historical Data) by (1 + i) = YOPA

c) Y is 12 months in the projected year, based year 2000 = Y

d) Estimated Future OMA = FOMA

and the FOMA = OMA x $(1+i)^n$

e) Divided by Volume of Water Sold (current year) = Xm^3

f) Average Accounting Expense non Loan Interest=FOMA/Xm^3 = WTR-L non LI

g) Loan Interest, Fines (due date, over due) + FD = FB

h) Divided by Volume of Water Sold (projected year) = Ym^3

i) Average rate of Loan Interest, Fines= (FB+FD)/Ym^3 = RTBD

j) Average Accounting Expense = Water Tariff Rate – Low = WTR-L

and the **WTR-L = WTR-L non LI + RTBD**

2.0. Average of Financial Expense (=Water Tariff Rate – Full)

a) Depreciation Expense (Revaluated/Projected) = D2

b) Estimated Future OMA = FOMA

and the FOMA = OMA x $(1+i)^n$

c) Total Assets (current year) = TAX

d) Expected Average ROA= 10% of TAX = ROAX

e) Average Financial Expense (=Average Water Rate – Full) = WTR-F

and the **<u>WTR-F = WTR-L + ROAX</u>**

FORMULA:
For Computation of Water Tariff Rate
(Low, Base and Full)

1.0. Water Tariff Rate – Low : (Accounting Expense)

a) Expenses of operation, maintenance, and administration (current year) Including depreciation = OMA

b) Projected OMA and Depreciation Expenses (based year 2000) = YOPA

c) Total Water Sold (based year 2000) = Xm^3

d) Water Tariff Rate – Low = WTR-L

<u>and the WTR – L = YOPA/Xm^3</u>

2.0. Water Tariff Rate – Base

a) Water Tariff Rate – Low = WTR-L

b) Loan Installment (Principal + Interest) = JP

c) Average Water Rate = TJP
<u>and the TJP= JP/Xm^3</u>

d) Water Tariff Rate – Base = WTR-B

and the WTR-B = WTR-L + TJP

3.0. Water Tariff Rate – Full: (Financial Expense)

a) Water Tariff Rate – Low = WTR-L

b) Total Assets (current year) = TAX

c) Expected Average ROA =10% of TAX = ROAX

d) Water Tariff Rate – Full $\frac{\textbf{(WTR-L + ROAX)}}{\text{WTR-F}}$ =

e) Water Tariff Rate – Full Y^n $\frac{\textbf{(WTR-L + ROAX (1+i)}^{\textbf{n}}}{\text{WTR-FY}^n}$ =

Appendix 7.4 Guideline to Classify Success Rate and Calculate PDAM Performance

A. CLASSIFY SUCCESS RATE

NO	PERFORMANCE VALUE	EXPLANATIONS
1	Performance Classification Calculation Score — Performance >75 — Very good >60 – 75 — Good > 45 – 60 — Enough > 30 – 45 — Not enough <= 30 — Not good	Aspect — Calculation Finance = total value x score / max value = total value x 45 / 60 Operational = total value x score / max value = total value x 40 / 47 Administration = total value x score / max value = total value x 15 / 36
2.	Performance Valuation Aspect — Score — Total Indicator — Max Value Finance — 45 — 10 — 60 Operation — 40 — 10 — 47 Administration — 15 — 10 — 36 100 — 30 — 143	

B. GUIDELINE FOR CALCULATION OF PDAM PERFORMANCE

NO	FORMULA AND INDICATOR OF PERFORMANCE	EXPLANATIONS
I	Finance Aspect	
1.	Profit ratio to productive assets Profit before tax x 100% productive assets Ratio — Value >10 % — 5 > 7%-10% — 4 > 3%-7% — 3 > 0%-3% — 2 <= 0% — 1	Profit before tax = operational revenue (water selling revenue + non-water selling revenue) + non operational revenue – operational cost (direct cost + administration cost) – non operational cost Productive Asset = Current asset + Long Term Investment + Fixed Asset (Book Value), not include Fixed Asset under construction
	Bonus Value Profit increase ratio to productive assets Profit ratio to productive assets this year – last year Ratio — Value	The increase of ratio of profit and Productive Asset this year compare with last year

	>12 % 5 > 9%-12% 4 > 6%-9% 3 > 3%-6% 2 > 0%-3% 1	
2.	Profit ratio to selling Profit before tax x 100% Selling Ratio Value >20 % 5 >14%-20% 4 > 6%-14% 3 > 0%-6% 2 <= 0% 1 Bonus Value The increasing of Profit Ratio to Selling Formula : Profit Ratio to Selling this year – last year Ratio Value >12 % 5 > 9%-12% 4 > 6%-9% 3 > 3%-6% 2 > 0%-3% 1	Profit before tax = operational revenue (water selling revenue + non-water selling revenue) + non operational revenue – operational cost (direct cost + administration cost) – non operational cost Selling = Operational Revenue Operational Revenue = Revenue Water Selling + Non-water selling Water Selling : - water price - administration fee - meter rent - other revenue Non Water Selling : - new connection - administration fine - other The increase of Profit Ratio to Selling this year – last year
3.	Ratio Current Assets to Current Liabilities Formula : Current Assets Current Liabilities Ratio Value >1,75 - 2,00 5	Current Asset = the assets that the liquidity max 1 year Current Assets are : - Cash and bank - Short term investment - Account receivable - Other receivable - Inventory

	>1,50 -1,75 or 2,00-2,30 4 >1,25-1,50 or 2,30–2,70 3 > 1,00-1,25 or 2,70-3,00 2 <= 1,00 or >3,00 1	- Down payment - Other current assets Current Liability = obligation which is paid max 1 year Current Liabilities are : - Account payable - Other payable - Not pay cost - Down payment - Short term debt - Tax debt - Long term debt on payment - Retribution - Other short term liability
4.	Ratio of Long term debt to Equity Formula : <u>Long Term Debt</u> Equity <u>Ratio</u> <u>Value</u> <= 0.5 5 > 0.5 - 0.7 4 > 0.7 – 0.8 3 > 0.8 – 1.0 2 > 1.0 1	Long term debt = the debt that must be paid after 1 year Long term debt : - central government loan - foreign loan - long term bank loan Equity = assets and stock : - government assets which status not determined yet - regional government assets, which is separated - central government equity - the grant asset - asset revaluation surplus - special reserve - general reserve - loss accumulation - profit/loss of current year
5.	Ratio of Total assets to total loan Formula : <u>Total assets</u> total loan <u>Ratio</u> <u>Value</u> > 2.0 5	Total assets = current assets + long term investment + fixed assets + other assets Total Loan = current loan + long term loan + other loan

	> 1.7 – 2.0 4 > 1.3 – 1.7 3 > 0.0 – 1.3 2 <= 0.0 1	
6.	Ratio of Operational Cost to Operational Revenue Formula : <u>Operational Cost</u> Operational Revenue <u>Ratio</u> <u>Value</u> <= 0.5 5 > 0.5 - 0.65 4 > 0.65 – 0.85 3 > 0.85 – 1.0 2 > 1.0 1	Operational Cost = direct cost + administration and general cost Direct cost : - source water cost - treatment water cost - transmission and distribution cost Administration and general cost : - Wages - Office cost - Costumer relationship cost - R&D cost - Finance cost - Maintenance cost - Loan elimination cost - Other general cost - The cost of Depreciation and amortization of non-water company installation Operational revenue = Revenue from water selling + non-water selling Water selling revenue : - water price - administration services - meter rent - other revenue from water selling Non- Water selling revenue : - new connection - installation rent - fine, and the others
7.	Ratio of Operational Profit before depreciation to installment and interest on valid time Formula : <u>Operational Profit before depreciation</u> installment and interest on valid time	Operational Profit before depreciation = Operational revenue (revenue from water selling + non-water selling) - Operational cost before depreciation cost (direct cost + administration and general cost before depreciation cost) Installment is installment on long term loan

	Ratio Value > 2.0 5 > 0.7 – 2.0 4 > 1.3 – 1.7 3 > 0.0 – 1.3 2 <= 0.0 1	include arrears Interest is interest on long term loan include arrears
8	Ratio of Productive Assets to Water Selling Productive Assets Water Selling Ratio Value <= 2.0 5 > 2.0–4.0 4 > 4.0-6.0 3 > 6.0-8.0 2 > 8.0 1	Productive Asset = Current asset + Long Term Investment + Fixed Asset (Book Value), not include Fixed Asset under construction Water selling = Water selling revenue, such as : - water price - administration services - meter rent - other revenue from water selling
9.	Term of billing Account receivable Total selling per-day Ratio Value <= 60 5 > 60–90 4 > 90-150 3 > 150-180 2 > 180 1	Account receivable = water receivable + non water receivable + non-fixed receivable - delay account receivable Total selling per day = Operation revenue / 360 Operational revenue = Water selling revenue + non water selling revenue Water selling revenue, such as, - water price - administration services - meter rent - other revenue from water selling Non water selling revenue, such as : - new connection - administration penalty - other
10.	Billing Effectivity Billing . x 100% Water selling	Billing Revenue = total revenue from water selling billing for 1 year Water selling = Water selling revenue, such as : - water price - administration services

	Ratio Value > 90 % 5 > 85%-90% 4 > 80%-85% 3 > 75%-80% 2 <= 75% 1	- meter rent - other revenue from water selling
II		Total Costumer is the amount of people which gets clean water services on PDAM area
1.	OPERATIONAL ASPECT Scope of services People which is serviced x 100% Population MUNICIPAL REGENCY Ratio Value Ratio Value > 80 % 5 > 60 % 5 > 60%-80% 4 > 45%-60% 4 > 40%-60% 3 > 30%-45% 3 > 20%-40% 2 > 15%-30% 2 <= 20% 1 <= 15% 1 Bonus Value The increase of services scope Services scope this year - last year MUNICIPAL REGENCY Ratio Value Ratio Value > 12 % 5 > 8 % 5 > 9%-12% 4 > 6%-8% 4 > 6%-9% 3 > 4%-6% 3 > 3%-6% 2 > 2%-4% 2 > 0%-3 % 1 > 0%-2% 1	The assumption of total person for every connection : House connection = 6 person General Hydrant = 100 person Note : PDAM be able to using other suitable assumption Population is population in PDAM area The increase of services scope this year compare with last year
2.	The quality of Water Distribution The quality of Water Value - Fulfill the drinking water requirement 3 - Fulfill the clean water requirement 2 - Not fulfill both of requirement 1	Fulfill the water quality
3.	Water continuity Water continuity Value - All customer get 24 hours	The costumer get full water flow or not

	water flows 2 - Not All customer get 24 hours water flows 1	
4.	Productivity of Production Installation Production Capacity x 100 % Connecting Capacity Ratio Value > 90 % 4 > 80%-90% 3 > 70%-80% 2 <= 70% 1	Production capacity is capacity which are operated on water production Design capacity
5.	Water Loss distribution water–selling water x 100% distribution water Ratio Value <= 20% 4 > 20%-30% 3 > 30%-40% 2 > 40% 1 Bonus Value Decrease of Water Loss Ratio of Water Loss Last Year This Year Value > 60% <= 20% 10 > 60% > 20%-21% or 9 > 50%-60% <= 20% > 60% > 21%-22% or 8 > 50%-60% > 20%-21% or > 40%-50% <= 20% > 60% > 22%-23% or 7 > 50%-60% > 21%-22% or > 40%-50% > 20%-21% or > 30%-40% <= 20%	The amount of distributed water (m3) which are noted in main meter The amount of selling water (m3) which are noted in main meter Decrease of water loss this water compare with last year

	> 60%	> 23%-24% or	6
	> 50%-60%	> 22%-23% or	
	> 40%-50%	> 21%-22% or	
	> 30%-40%	> 20%-21% or	
	> 20%-30%	<= 20%	
	> 60%	> 24%-25% or	5
	> 50%-60%	> 23%-24% or	
	> 40%-50%	> 22%-23% or	
	> 30%-40%	> 21%-22% or	
	> 27%-30%	> 20%-21% or	
	> 24%-27%	<= 20%	
	> 60%	> 25%-27% or	4
	> 50%-60%	> 24%-25% or	
	> 40%-50%	> 23%-24% or	
	> 30%-40%	> 22%-23% or	
	> 27%-30%	> 21%-22% or	
	> 24%-27%	> 20%-21% or	
	> 23%-24%	<= 20%	
	> 60%	> 27%-30% or	3
	> 50%-60%	> 25%-27% or	
	> 40%-50%	> 24%-25% or	
	> 30%-40%	> 23%-24% or	
	> 27%-30%	> 22%-23% or	
	> 24%-27%	> 21%-22% or	
	> 23%-24%	> 20%-21% or	
	> 22%-23%	<= 20%	
	> 60%	> 30%-40% or	2
	> 50%-60%	> 27%-30% or	
	> 40%-50%	> 25%-27% or	
	> 30%-40%	> 24%-25% or	
	> 27%-30%	> 23%-24% or	
	> 24%-27%	> 22%-23% or	
	> 23%-24%	> 21%-22% or	
	> 22%-23%	> 20%-21% or	
	> 21%-22%	<= 20%	
	> 60%	> 40%-450% or	1
	> 50%-60%	> 30%-40% or	
	> 40%-50%	> 27%-30% or	
	> 30%-40%	> 25%-27% or	
	> 27%-30%	> 24%-25% or	
	> 24%-27%	> 23%-24% or	
	> 23%-24%	> 22%-23% or	
	> 22%-23%	> 21%-22% or	

6.	> 21%-22% > 20%-21% or <= 21% <= 20% Water meter checking Customer with water mater x 100% Amount of all customer Ratio Value > 20%-25% 3 > 10%-20% 2 > 0%-10% or >25% 1	How often PDAM do the water meter checking, not include the new water meter
7.	New connection speed Time need from new customer payment to connection Time Value <= 6 working days 2 > 6 working days 1	Time speed to service new customer, beginning on sign the contract, payment, and connection
8.	Handle the customer complaint (average/month) Customer complain handled x 100% Total customer complaint Ratio Value >= 80% 2 < 80% 1	PDAM ability to handling the customer complaint
9.	Services easily There is a service point outside the office Service Point Value There is a service point 2 There is no service point 1	There is a supporting tools to give easily services for payment and complaint
10.	Ratio employee per 1000 customer Total employee x 1000 Total customer MUNICIPAL REGENCY Ratio Value Ratio Value <= 6 5 <= 8 5	Total employee = active employee until the end of current year, such as : - PDAM employee - Contract employee Total customer = active customer until the end of current year

	> 6-7 4 > 8-11 4 > 7-9 3 > 11-15 3 > 9-10 2 > 15-18 2 > 10 1 > 18 1		
III.			
1.	ADMINISTRATION ASPECT Corporate Plan (CP) <u>Implementation</u> <u>Value</u> - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2 - haven't CP 1		To see the implementation of Corporate Plan Corporate Plan is strategic plan with goals and objections of company in 5 years future
2.	Organization Plan and Job Description <u>Implementation</u> <u>Value</u> - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2 - haven't CP 1		How Organization Plan and Job Description is implemented Organization Plan and Job Description is organization structure and job description of PDAM and signed by Head of Regency (Bupati/Walikota)
3.	Standard Operation Procedure <u>Implementation</u> <u>Value</u> - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2 - haven't CP 1		How the Standard Operation Procedure is implemented Standard Operation Procedure is the guideline of company operational management
4.	As Built Drawing <u>Implementation</u> <u>Value</u> - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2 - haven't CP 1		How As Built Drawing implemented is, as a management tools As Built Drawing for all of distribution system is a measurement of production management and distribution
5.	The guideline of Employee Performance - haven't CP 1		How the Guideline of Employee Performance is implemented, such as career and salary Guideline of Employee Performance is the

	Implementation Value - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2	tools to give value of employee performance
6.	- haven't CP 1 Master Plan and Company Budget Implementation Value - fully implementation 4 - part implementation 3 - have CP, not implemented yet 2	How Master Plan and Company Finance is implemented Master Plan and Company Finance is the explanation of Long term plan, such as job plan and budget plan
7.	- haven't CP 1 Internal Report Report Value - on time 2	Implementation of annual finance report, operational and administration report form manager to decision maker The reports are Daily Cash-flow and Monthly Cash-flow
8.	- not on time 1 External Report Report Value - on time 2	Annual External Report, such as : - Yearly Finance Report to Supervisor Board - Tax Report
9.	- not on time 1 Independent Auditor Opinion Opinion Value - true without exception 4 - true with exception 3 - no opinion 2	The opinion of Independent Auditor about the true of finance report, which is made by manager
10.	- not true opinion 1 Action Plan of Investigation Report in Last year Action Plan Value - no founding 4 - all actions finished 3 - few actions finished 2 - no action plan 1	The result of action plan by institution

Appendix 7.5 Bupati Sleman Decision No 5/Per.Bup/2006 about Tariff on PDAM Sleman

Considering : a. PDAM has duty to serve the clean water need of people
b. the shape of the people support is a payment of drinking water
c. the tariff of drinking water on Bupati Sleman decision No 15/Kep.KDH/2000 about drinking water tariff and services tariff on PDAM Sleman is changed on Bupati Sleman decision No 02/Kep.KDH/A/2003 is not enough to cover the operational cost on drinking water supply services, so it need to change
d. need to enact the Bupati Sleman regulation about drinking water tariff on PDAM Sleman

Considering :1. UU No 15 year 1950 about the establish of regency on DIY Province
2. UU No 32 year 2004 about regional government, is changed by UU No 3 year 2005 and UU no 8 year 2005
3. MOHA regulation No 2 year 1998 about the guideline of arrangement of drinking water tariff
4. Regional regulation on Sleman Regency No 5 year 1990 about PDAM Sleman
5. Regional regulation on Sleman Regency No 13 year 2003 about the employments of PDAM Sleman

DECIDED

Considering : BUPATI SLEMAN DECISION ABOUT TARIFF ON PDAM SLEMAN

CHAPTER 1
GENERAL CLAUSE
Section 1

On this regulation, the definitions are :

1. PDAM is drinking water company of Sleman regency
2. Tariff is the price (on Rupiahs) of water which must paid by the costumer of PDAM for using per-m3 clean water which is flowed by PDAM
3. Costumer is person or agency who are using the water from PDAM and listed as a customer.

CHAPTER II
TARIFF CLAUSE
Section 2

(1) the costumer must pay the drinking water tariff for using the water which is flowed by PDAM
(2) the drinking water tariff is paid max on 20 every month

Section 3

The drinking water tariff is arranged based on :

a. Group 1
    1) Common social
        a) Common hydrant
        b) Common toilet

c) Water terminal
d) The low income people

2) Specific social
a) social foundation
b) public school
c) orphan foundation
d) public hospital
e) mosque, church,
f) get a fund source

b. Group 2

1) Household A1
a) the house function is only for live
b) the house type is 36 above and on housing complex

2) Household A2
a) the house type is 72 and on housing complex
b) the house type is the same as 72 and on housing complex

3) Household A3
a) the house type is 72 above and on housing complex
b) luxury housing
c) the extent house or the type is the same as 72 above

4) Household B
the house functions are for live and for industry

5) Government Institution
a) the facilities of Government Institution
b) other Government Institution
c) swimming pool which is the owner is government
d) the government office
e) private school
f) military institution

c. Group 3

For industry activities

1) Small trade
a) shop
b) trader
c) store
d) office company
e) private doctor
f) bureau service
g) home service
h) little hotel
i) private hospital type D
j) art studio
k) furniture company
l) agriculture industry

2) Big trade
a) Exporter /importer
b) Expeditor
c) Agent

d) Supermarket
e) Private hospital type A and B
f) Private swimming pool
g) Gasoline station
h) Distributor/big trader
i) Night cub, disco tic, sauna
j) Hotel and restaurant
k) Car washing
l) Other big house trading
m) Other trade which is the same type

d. Group 4
    1) Small industry
        a) handicraft
        b) house-craft
        c) assembly company
        d) small convection industry
        e) small husbandry
    2) Big industry
        a) car factory
        b) chemical factory
        c) timber company
        d) big husbandry
        e) beverage factory
        f) ice factory and cooler room
        g) lamp factory
        h) roof, brick, ceramic factory
        i) water for development industry
e. Special group
    1) airport
    2) tank car

Section 4

The drinking water tariff is remained step by step and calculated with the nominal which is shown on the attachment of this regulation

CHAPTER III
RIGHTS AND DUTIES

Section 5

Every costumer has rights such as :

a. has a good services from PDAM
b. has a assurance on clean water available from PDAM

Section 6

Every costumer has duties such as :

a. keep and care the facilities of PDAM on the costumer house connection
b. pay the tariff of water uses on time

CHAPTER IV

ADMINISTRATIVE SANCTION

Section 7

(1) …….

a. do the activities that cause the disturbance of clean water flows or broken the facilities of PDAM on the costumer house connection
b. they aren't fulfill the clause on section 6

(2) the next clause of administration sanction is remained by direction with agreement from supervisor

Section 8

(1) The meter is sealed if the costumer doesn't pay the tariff on 2 month
(2) The meter is sealed for a month
(3) The sealed meter is decided by the director
(4) The sealed meter can opened if the costumer fulfill the regulation

Section 9

(1) the meter is took apart if :

a. the costumer request
b. the costumer doesn't do the duties and pass the time of meter sealed

(2) the took apart meter is decided by director

CHAPTER V

IMPLEMANTATION

Section 10

This regulation is doing by PDAM
On the time this regulation is valid, the Bupati Sleman decision No 15/Kep.KDH/2000 about drinking water tariff and services tariff on PDAM Sleman (Regional Sheet Sleman year 2000 No 13 Seri C) and changed with the Bupati Sleman decision No 2/Kep.KDH/A/2003 (Regional Sheet Sleman year 2000 No 1 Seri C) is not valid.

Section 11

This regulation is valid since the validity date
In order that everybody knows, this regulation is placed on Regional New of Slaman Regency

Valid on Sleman
On March 27th, 2006

Bupati Sleman
Ibnu Subiyanto

Publish on Sleman
On March 28th, 2006

Regional Secretary of Sleman
Sutrisno

THE DRINKING WATER TARIFF PDAM SLEMAN

a. Valid on April 1st to September 30th 2006

No	Group of Costumer	Based remained of tariff (Rp/m3)			
		0-10	11-20	21-30	>31
1.	Group 1				
	a. Common social	1.500	1.500	1.500	1.500
	b. Specific social	1.500	1.750	2.000	2.250
2.	Group II				
	a. Household A1	1.500	2.000	2.250	2.500
	b. Household A2	1.750	2.250	2.500	2.750
	c. Household A3	2.000	2.500	2.750	3.000
	d. Household B	2.250	2.750	3.000	3.500
	e. Government Institution	2.250	2.750	3.000	3.500
3.	Group III				
	a. Small trade	3.900	3.900	4.500	6.000
	b. Big trade	4.250	4.250	5.500	7.500
4.	Group IV				
	a. Small industry	5.000	5.000	7.000	9.000
	b. Big industry	5.500	5.500	8.000	10.000
5.	Group V				
	a. airport	-	-	-	-
	b. tank car	7.500	7.500	7.500	7.500

b. …….

No	Group of Costumer	Based remained of tariff (Rp/m3)			
		0-10	11-20	21-30	>31
1.	Group 1				
	a. Common social	1.750	1.750	1.750	1.750
	b. Specific social	1.750	2.000	2.250	2.500
2.	Group II				
	a. Household A1	1.750	2.000	2.500	2.750
	b. Household A2	2.000	2.500	2.750	3.000
	c. Household A3	2.000	2.500	3.000	3.250
	d. Household B	2.250	2.750	3.250	3.500
	e. Government Institution	2.250	2.750	3.250	3.500
3.	Group III				
	a. Small trade	3.900	3.900	4.500	6.000
	b. Big trade	4.250	4.250	5.500	7.500
4.	Group IV				
	a. Small industry	5.000	5.000	7.000	9.000
	b. Big industry	5.500	5.500	8.000	10.000
5.	Group V				
	a. airport	-	-	-	-
	b. tank car	7.500	7.500	7.500	7.500

c. ……

No	Group of Costumer	Based remained of tariff (Rp/m3)			
		0-10	11-20	21-30	>31
1.	Group 1				
	a. Common social	2.000	2.000	2.000	2.000
	b. Specific social	1.500	2.200	2.400	2.600
2.	Group II				
	a. Household A1	2.000	2.300	2.500	2.750
	b. Household A2	2.200	2.600	3.000	3.250
	c. Household A3	2.200	2.600	3.250	3.500
	d. Household B	2.300	2.800	3.400	3.800
	e. Government Institution	2.300	2.800	3.400	3.800
3.	Group III				
	a. Small trade	4.000	4.000	4.500	6.000
	b. Big trade	4.500	4.500	6.000	7.500
4.	Group IV				
	a. Small industry	5.000	5.000	7.000	9.000
	b. Big industry	6.000	6.000	8.000	10.000
5.	Group V				
	a. airport	-	-	-	-
	b. tank car	7.500	7.500	7.500	7.500

The house type 36 means the size of house is 6 x 6 m2
The house type 72 means the size of house is 8 x 9 m2

Appendix 7.6 MOHA Regulation No 23/2006 About The Regulation of Technical and Regulation Tariff on PDAM

(Translation under revision)

MINISTER OF HOME AFFAIR REGULATION

NUMBER 23 YEAR 2006

About

THE GUIDELINE OF TECHNICAL AND REGULATION TARIFF ON PDAM

WITH THE BLESSING of GOD

MINISTER OF HOME AFFAIR

Considering: in order to do the stipulations of Section 60 article (8) Government Regulation number 16 Year 2005 about Water Supply System Development establish Minister of Home Affair Regulation about The Guideline of Technical and Regulation Tariff on PDAM

Considering:

1. Act Number 5 Year 1962 about Regional Enterprise (Indonesia Republic Sheet State Year 1962 Number 10, Indonesia Republic Additional Sheet State Number 2387)
2. Act Number 8 Year 1999 about Consumer Protection (Indonesia Republic Sheet State Number 42, Indonesia Republic Additional Sheet State Number 3821)
3. Act Number 7 Year 2004 about Water Resources (Indonesia Republic Sheet State Number 32 Year 2004, Indonesia Republic Additional Sheet State Number 4377)
4. Act Number 10 Year 2004 about Act of Regulation Making (Indonesia Republic Sheet State Number 53 Year 2004, Indonesia Republic Additional Sheet State Number 4389)
5. Act Number 32 Year 2004 about Local Government (Indonesia Republic Sheet State Number 125 Year 2004, Indonesia Republic Additional Sheet State Number 4437) that already revised with Act Number 8 Year 2005 about Determination Government Regulation of Act Replacement Number 3 Year 2005 about Changing of Act Number 32 Year 2004 about Local Government Become Act (Indonesia Republic Sheet State Number 108 Year 2005, Indonesia Republic Additional Sheet State Number 4493)
6. Act Number 33 Year 2004 about Financial Balance Between Central and Local Government (Indonesia Republic Sheet State Number 126 Year 2004, Indonesia Republic Additional Sheet State Number 4438)
7. Government Regulation Number 16 Year 2005 about Water Supply System Development (Indonesia Republic Sheet State Number 33 Year 2005, Indonesia Republic Additional Sheet State Number 4490)

8. Government Regulation Number 79 Year 2005 about Establishment and Supervision Guideline by Local Government (Indonesia Republic Sheet State Number 165 Year 2005, Indonesia Republic Additional Sheet State Number 4593)
9. Minister of Home Affair Settlement Number 47 Year 1999 about The Guideline of PDAM Judgment Appraisal
10. Minister of Local Autonomy Settlement Number 8 Year 2000 about Accounting Guideline of PDAM
11. Minister of Home Affair Settlement Number 130 Year 2003 about Ministry of Home Affair Organization and Working System

DECIDING:

Specifying: **THE TECHNICAL GUIDELINE AND REGULATION OF TARIFF ON PDAM**

CHAPTER I
PUBLIC REGULATION

Section 1

This Regulation explained that:

1. Local Government is Province Government and/or Regency/City Government
2. Regional Leader is Governor or Mayor or Regency Leader
3. PDAM is Regional Enterprise that concern with the water supply
4. Water supply is water that supplied by PDAM
5. Board of director is PDAM board of director
6. Supervisor is PDAM supervisor
7. Customer is individual or corporation that using water supply from PDAM and register as a member
8. Water Supply Basic Need Standard is 10 meter cubic per head of household per month or 60 liter/person/day, or other volume measurement that made by Government Minister that relate to water resources
9. Operational Cost is total cost of producing water supply that include water resources cost, water management cost, distribution and transmission cost, partnering cost, general and administration cost
10. Basic Cost is Operational cost divided by volume of water produced minus standard missing water volume

11. PDAM Tariff is the policy of selling water supply in meter cubic (m3) or other volume measurement based on policy that measured by Regional Leader and PDAM
12. Low tariff is subsidized tariff that the value is lower than basic tariff
13. Basic tariff is the tariff that the value is same or equivalent with basic cost
14. Full tariff is the tariff that the value is higher than basic cost since it include profit and contra cross subsidy
15. Average tariff is total tariff income divided by total of water volume being sold

CHAPTER II
POLICY BASE IN TARIFF DETERMINING

Section 2

Tariff is determined based on the principle of:

a. affordable and justice
b. service quality
c. recovery cost
d. water used efficiency
e. transparency and accountability
f. protection of water standard

Section 3

1. Tariff for basic need of water supply must be affordable by the consumer community buying power that has income equal to Province Minimum Wage
2. Tariff is fulfilling the affordable principle (like mention in article 1) if household expense to fulfilling basic need of water supply is not more than 4% from consumer total income
3. Justice in applying the tariff can be reached through the application of differentiation tariff with cross subsidy between the consumer groups

Section 4

Tariff is applied by considering the service quality that accept by consumer

Section 5

1. PDAM income should fulfill the principle of cost recovery
2. Full cost recovery can be reached from the calculation of average tariff, minimum equal to the basic cost

3. In order to develop the water supply service, average tariff should covered basic cost added by proper profit
4. Proper profit reached based on benefit ratio through productive assets in amount of 10%

Section 6

1. Water using efficiency can be reached through the application of progressive tariff
2. Progressive tariff is calculated based on consumption group decision
3. Progressive tariff is applied to the consumer who consume above the Water Supply Basic Need Standard

Section 7

1. In calculation process and decided tariff should be transparent and accountable
2. Calculation process and decided tariff (like mention in article 1) is done by PDAM through:
   a. clearly delivering the information related to the calculation and tariff decision to the person concern with it
   b. seriously collect all the aspiration related to the calculation and tariff decision to the person concern with it
3. Calculation process and accountable tariff decision (like mention in article 1) must use calculation base that easy to understand and can be responsible to the person concern with it

Section 8

1. Tariff calculation should consider the protection of long term function of water supply
2. The application of progressive tariff (like mention on section 6) is aimed to standard water protection

Section 9

Consumption Group and Customer Group

1. Consumption group of PDAM user are:
   a. Category I, and
   b. Category II
2. Category I is a group of consuming water supply for fulfilling basic need standard
3. Category II is a group of consuming water supply above basic need standard

Section 10

1. Consumer of PDAM can be classified into 4 (four) groups, which are:
   a. Group I;

b. Group II;
c. Group III; and
d. Special Group

2. Group I is a consumer who pay low tariff to fulfill their water supply basic need standard
3. Group II is a consumer who pay basic tariff to fulfill their water supply basic need standard
4. Group III is a consumer who pay full tariff to fulfill their water supply basic need standard
5. Group III (like mention in article 1(c)), is specialized to cover consumers that pay the water supply based on the agreement

Section 11

PDAM may determine the type of consumer policy in each group like mention in Section 10 article (1) based on the object and characteristics of consumer condition in each area, as long as it did not change the amount of consumer group

CHAPTER IV
CALCULATION AND ESTIMATION OF WORKING COST AND BASIC COST

Section 12

1. Basic cost that is needed to produce every meter cubic of water supply is calculate based on working cost divided by volume of water produced deduct by the volume of the missing standard water in one year period
2. Working cost is calculate by added all the PDAM management cost, which are: water source cost, water management cost, transmission and distribution cost, partnering cost, general and administration cost, and financial cost in one year period
3. Produced water volume is calculate based on total of water volume that produced by production system that ready to distribute to consumer in one year period
4. Standard water missing volume is calculate based on percentage standard that made by the Minister that related to water resources times by produced water volume

Section 13

1. Estimation of basic cost in Rp/m3 or Rp/other volume measurement, is calculate based on working cost estimation divided by the estimation of water volume produced deduct by estimation of missing standard water volume in an estimated year

2. Estimation of water supply working cost is calculate based on historical data that focused on price level estimation, inflation rate estimation, possibility of cost efficiency, plan of production level, and investment plan, with the plan of funding source 恩
3. Estimation of produced water volume is calculate based on historical data, that focused on plan of production level, distribution and new development plan
4. Estimation of missing standard water volume is based on percentage standard that made by the Minister that related to water resources times by estimation of water volume produced

Section 14

1. Calculation and cost estimation that will became the reference in determining the tariff should be accountable and auditable, and considering cost efficiency aspect
2. In order to do cost calculation and estimation , it should be supported by the data which are:
   a. Component of water resource cost
   b. Component of water processing cost
   c. Component of transmission and distribution cost
   d. Component of partnering cost
   e. Component of general and administrative cost
   f. Component of financial cost
   g. Component of productive assets
   h. Inflation rate
   i. Water volume produced
   j. Missing of standard water volume
   k. Water volume sold to consumer with low tariff group
   l. Water volume sold to consumer with basic tariff group
   m. Water volume sold to consumer with full tariff and special tariff group
   n. Consumption category
   o. Consumer group
   p. Total of consumer in every consumption category
   q. Total of consumer in every consumption group
   r. Consumption level
   s. Valid cost
   t. Component of water selling income
   u. Component of non water income
   v. Component of partnering income
   w. Elasticity level of water supply consumption concerning tariff

x. Consumer average income

y. Province minimum wage

CHAPTER V

INCOME AND TARIFF

Section 15

1. PDAM income are consists of:
   a. selling water income
   b. non water income
   c. partnering income
2. Selling water income (like mention in article 1), are consists of:
   a. price of water
   b. administrative include monthly flat cost
   c. other water selling income
3. Non water income (like mention in article 1), are consists of:
   a. new connection income
   b. rent installation income
   c. laboratory water checking income
   d. installation re-connection income
   e. fine income
   f. consumer installation checking income
   g. replacement of broken meter income
   h. replacement of pipe income
   i. other non water income
4. Partnering income (like mention in article 1), are consists of:
   a. royalty income
   b. income sharing from partnering
   c. production sharing from partnering
   d. cooperation share

Section 16

1. Every new customer must pay connection fee
2. Connection fee (like mention in article 1) include the supplied and meter installation cost
3. PDAM charging monthly flat cost to every customer water connection for meter maintenance and bill of administrative cost

4. PDAM should seek the operation of water meter running well, through accuracy of meter reading and maintenance of meter
5. PDAM can charge a monthly flat cost for a passive customer

Section 17

1. Tariff can be classified into:
   a. low tariff
   b. basic tariff
   c. full tariff
   d. agreement tariff
2. The value of low tariff is lower than basic cost
3. The value of basic tariff is equal to basic cost
4. The value of agreement tariff is based on the agreement between PDAM and customer

Section 18

PDAM decide the tariff structure based on the consumption classification, consumer group, and kinds of tariff

Section 19

1. Tariff calculation is based on:
   a. calculate the basic cost
   b. calculate basic tariff
   c. calculate low tariff and cross subsidized
   d. calculate full tariff
2. Tariff calculation is refer to the calculation formula of water supply
3. The amount of cross subsidy can be varied between customer group in different service area and calculate through subsidy calculation

CHAPTER VI
MECHANISM AND PROCEDURE OF TARIFF DETERMINING

Section 20

1. Mechanism of tariff decision is based on proportionality importance of:
   a. customer community

b. PDAM as a government enterprise
c. Government as the owner of PDAM

2. Consideration of customer need should guarantee customer interest
3. Consideration of PDAM interest like mention in article 1(b) should guarantee PDAM need as an enterprise to reach full cost recovery target, implement the vision and reach the goal of development target that already stated in the PDAM long term corporate plan
4. Consideration of owner interest like mention in article 1(c) should guarantee regional government need, capital owners or PDAM shareholder to get the result of managing PDAM in the form quality of water supply service and/or profit to develop the service

Section 21

1. Tariff is decided by head of area based on board of director suggestion after approved by Supervisory Council
2. Draft of the tariff like mention on article 1 proposed by PDAM board of director by considering service quality, cost of recovery and service level of development target, completed with supporting data, which are:
   a. basic calculation on tariff decision suggestion
   b. the result of calculation of estimation basic cost
   c. comparison of basic cost estimation with the applied tariff
   d. estimation of quality development, quantity and continuity of service
   e. calculation the amount of subsidy that given to the poor customer group
   f. the impact analyze of monthly charge to customer groups
3. The draft of tariff decision should be consult first with the representatives or customer forum through communication media to get the feed back before it is give to head of area
4. The draft of tariff with the supporting data and the feedback is in the written format and give to head of area through supervision agent
5. The result of tariff determination draft and supervisor agent opinion, head of the area make a written decision whether accept or reject the tariff to PDAM Board of Director not more than two(2) months since the tariff is accepted
6. Based on tariff decision by the head of area, Board of Director establish the decision tariff to customer
7. Board of Director do the socialization on the decided tariff to the consumer through the mass media, maximum 30 days before new tariff is effective

Section 22

8. Annual tariff adjustment is done with the index formula by considering:
    a. value annual inflation index on the running year that established by in charge government enterprise
    b. interest of loan, and/or
    c. other parameter that appropriate with contract agreement

2. Tariff adjustment like mention in article 1, is suggest by board of director to Head of Area through observation team to be decided

Section 23

9. Periodical tariff observation can be done in extraordinary condition that made changing of corporate plan
10. For PDAM service continuity, at least once in 5 year, board of director do the tariff observation
11. Tariff observation is suggest by board of director to Head of Area through observation team to be decided

Section 24

12. Head of the area reject tariff determination suggestion that propose by board of management and approved by supervisor group based on the transparent and accountable calculation, that will caused the average tariff is under the basic cost, local government seek the subsidy to cover the deficit through APBD based on law regulation
13. To synchronize tariff planning and development of PDAM by RPJMD and APBD. Board of director is compulsory to made corporate plan and working planning and PDAM budget with involve the stakeholders
14. Guideline of PDAM corporate plan arrangement as mention in article 2 is managed by Minister of Home Affair

CHAPTER VII
TRAINING AND SUPERVISING

Section 25

15. Minister of Home Affair do the founding of tariff assessment
16. Governor do the supervision on the tariff assessment guideline

CHAPTER VIII
RULES OF TRANSFER

Section 26

Rules of law that related with the determination on water supply tariff on PDAM is made by Regional Government as long as 1 (one) year since this rule is valid.

CHAPTER IX
CLOSURE

Section 27

Technique of assessment water supply tariff on PDAM stated on this Regulation Enclosure

Section 28

When this Regulation is valid, so Minister of Home Affair Regulation Number 2 Year 1998 about The Guideline of Technical and Regulation of Tariff on PDAM is cancelled and no longer valid

Section 29

This guideline is valid from the date decided

Deciced in: Jakarta

Date: Juli 3 2006

MINISTER OF HOME AFFAIR

H. Moh Ma'Ruf, SE

Appendix for Chapter 10

Appendix 10.1 **Form 1**
Interview Note of City/Village Profile and The Water Supply System

Appendix 10.2 **Form 2**
Questionnaire of Household Survey

Appendix 10.1 Form 1

INTERVIEW NOTE OF CITY/VILLAGE PROFILE

AND THE WATER SUPPLY SYSTEM

(Information from BPS, head of village, water administrator and etc.)

(Draft)

Ref. No.: _____

Date and time: _____

Name of interviewer: _____

Section A Location

1.	Name of the City / Village	A1	
2.	District	A2	
3.	Province	A3	
4.	Names of respondents (position/status in the village)	A4	

5. Damage of water supply system by earthquake of the village A5

Section B Profile of the Village / City (Source: BPS and etc.)

1. Population/Household of the village

Population		Number of Household	
B1a		B1b	

2. Land Use of the village

Land use	Km2	(%)
Farm land (Irrigated)	B2a	
Farm land (Non-irrigated)	B2b	
Grazing area (Grassland)	B2c	
Forest	B2d	
Settlement area	B2e	
others	B2f	
Total	B2g	100.0

3. Distance from the village to major towns

Town	Distance (km)	Time to reach (hrs)	Major means of transportation
Approach road from main road	B3a ⇒	1. Paved 2. Partly paved 3.Un-paved	
District capital (Name:)	B3b1	B3b2	B3b3
Regency capital (Name:)	B3c1	B3c2	B3c3
Provincial capital (Name:)	B3d1	B3d2	B3d3
Other popular town (Name:)	B3e1	B3e2	B3e3

4. Major economic activity/industry and living standard of the village people

B4

5. Village History/Remarkable incidents (Road, Electricity, Economic crisis, Disasters and etc.)

Year	Incident	note

6. Public/Economic facilities in the village

Facility/Infrastructure	Number		
	Water system	Non-water system	Total
Nursery school	B6a1	B6a2	B6a3
Primary school	B6b1	B6b2	B6b3
Middle school	B6c1	B6c2	B6c3
High school	B6d1	B6d2	B6d3
Basic health unit	B6e1	B6e2	B6e3
Rural health center	B6f1	B6f2	B6f3
Hospital/clinic	B6g1	B6g2	B6g3
Population welfare center	B6h1	B6h2	B6h3
Bank	B6i1	B6i2	B6i3
Post office/agency	B6j1	B6j2	B6j3
Mosque	B6k1	B6k2	B6k3
Church	B6l1	B6l2	B6l3
Public Market	B6n1	B6n2	B6n3

7 . Public/Economic facilities in the village

Public service	1. Yes / 2. No	Beneficiary household (%)
Electricity	B7a1	B7a2
Public water supply	B7b1	B7b2
Public gas supply	B7c1	B7c2
Telephone line	B7d1	B7d2
Public sewage	B7e1	B7e2

Section C Water System of the City / Village

1. Map of the Village
   - Location of respondents of household survey
   - Arrow of northern direction
   - Location of the Water Supply System (PDAM, Water Stand Post, Ponds, River)

Lay Out Water Supply System

2. What kinds of water supply systems did your village install?
3. What is the percentage of disseminations?

			no	minor	major		
a.	PDAM	C2a	1	2	3	C3a	%
b.	PU Community Water Supply System	C2b	1	2	3	C3b	%
c.	Private Well	C2c	1	2	3	C3c	%
d.	River / Pond	C2d	1	2	3	C3d	%
e.	Others (specify)	C2e	1	2	3	C3e	%

4. PDAM Water Supply System (skip, if no PDAM)

a.	Year of establishment	C4a	
b.	Water system (see listed name)	C4b	
c.	Capacity of stand post in the village	C4c	
d.	Percentage of users in the village	C4d	

e. Reputation of the PDAM water supply system C4e

General remarks (Potential / Constraint)

f. Reason why there are inhabitants who do not use PDAM water supply system C4f

g. Trouble cases C4g

5. Community Water Supply System (skip, if no PU community system)

a. Year of establishment C5a

b. Water source C5b

c. Capacity of stand post in the village C5c

d. Percentage of users in the village C5d

e. Reputation of the PDAM water supply system C5e

General remarks (Potential / Constraint)

f. Reason why there are inhabitants who do not use Community water supply system C5f

g. Trouble cases C5g

6. Other Water Supply Systems (only no system of PDAM and PU Community in the village)

a. Present water systems in the city /village C6a

General remarks (Potential / Constraint)

b. Reason why there are no public water supply system in the village C6b

c. Trouble cases regarding water C6c

d. Opinion about public water supply system in the city / village C6d

Section D Problems and Complains in terms of water in the village (if any)

Section E Future Plans (if any)

Thank you very much.

Appendix 10.2 Form 2

QUESTIONNAIRE OF HOUSEHOLD SURVEY

THE STUDY ON REGIONAL WATER SUPPLY DEVELOPMENT PLAN FOR GREATER YOGYAKARTA

District Code No.: ____

Village Code No.: ____

Interviewee No.: ____

Name of enumerator: _____

JICA Study Team would be most honor to have opportunity to cooperate with people in Yogyakarta. In order to formulate regional water supply development plan of Bantul, Sleman and Yogyakarta, it is necessary for us to understand current situation of inhabitants. It would be very appreciated if you would answer questions below. Information you give us will be analyzed as quantitative data and be utilized for future regional plans. We don't use your personel data except our study. We hope that you would answer the questions without skipping and would enjoy conversation with enumerator as well. Thank you again for your kind cooperation.

Section A Basic data

Date: ____ / ____ / 2006

Time: start ____ end ____

1. Name of Kabupaten/Kotamadya 1. Bantul 2. Sleman 3. Yogyakarta A1 ____
2. Name of Kecamatan A2 ____ A2 ____
3. Name of Desa/Kelurahan A3 ____ A3 ____
4. Classification of urban/rural 1. Big City 2. Middle City A4 ____
   3. Little City 4. Rural
5. Classification of area 1. PDAM system's covered area A5 ____
   2. Community system's covered area
   3. Others
6. Damage of water supply by earthquake A6 ____
   1. No damage. 2. Water supply was cut off less than one week and recovered.
   3. It was cut off for one week to one month and recovered.
   4. It was cut off and not recovered yet.
7. Name of respondent: A7 ____ A7 ____
8. Age of respondent: A8 ____ years old A8 ____
9. Sex of respondent: 1. Male 2. Female A9 ____
10. Relationship with head of household A10 ____
    A10 ____

Section B Family

1. How many family members? B1 ____ members B1 ____
   (Family means a unit of relative people who live together and share a livelihood)
2. Structure of your family:
   a Male (age 15 and above) ____ person B2a ____
   b Male (age under 14) ____ person B2b ____
   c Female (age 15 and above) ____ person B2c ____
   d Female (age under 14) ____ person B2d ____
3. Age of the head of family : B3 ____ years old B3 ____
4. Sex of the head of family : 1. Male 2. Female B4 ____
5. Education of the head of family : B5 ____
   1. No school/Primary drop-out 2. Primary graduate
   3. Junior High graduate 4. Senior High graduate
   5. Diploma I-III 6. University graduate and more

6. Main job of the head of family : B6

1. Owner cultivator	2. Owner-cum-tenant farmer
3. Tenant/Share-cropper	4. Farm labour
5. Off-farm employee/labour (Non Govt.)	6. Self-employed (Shopkeeper/Workman)
7. Company executives/Investor	8 Govt. employee/Teacher
9. Not working/Retired	10. Others (Specify_____)

7. Type of Industry B7

1. Agriculture	2. Industry/Manufacuture	3. Construction
4. Wholesale	5. Transportation	6. Finance
7. Services	8. Others	

Section C Assets and Income/Expenditure

1. What kind of house does your family live? C1

1. Own Detached House	2. Own Condominium
3. Tenant Detached House	4. Tenant Rooms

2. How much is your family's monthly expenditure by purpose?

a	Running cost of house (house)	C2a	Rp.
b	Running cost of house (electricity)	C2b	Rp.
c	Running cost of house (water)	C2c	Rp.
d	Running cost of house (fuel)	C2d	Rp.
e	Running cost of house (telephone)	C2e	Rp.
f	Food	C2f	Rp.
g	Others (Specify_____)	C2i	Rp.

3. What are your familiy's income sources?

		none	minor	main		
a	Own business	1	2	3	C3a	
b	Salaries/wages	1	2	3	C3b	
c	Remittance from family members/relatives	1	2	3	C3c	
d	Pension	1	2	3	C3d	
e	Debt/Loan/Credit	1	2	3	C3e	
f	Others (Specify_____)	1	2	3	C3f	

4. How much is your family's annual income (from Jan. 2006 to Dec. 2006)? C4 Rp
(Income does not include Debt/Loan/Credit in this question)
Rp _____

5. Does your family have the following goods and electric appliances?

a	Radio	1. Yes	2. No	C5a
b	Television	1. Yes	2. No	C5b
c	Wind fan	1. Yes	2. No	C5c
d	Iron	1. Yes	2. No	C5d
e	Washing machine	1. Yes	2. No	C5e
f	Refrigerator/Freezer	1. Yes	2. No	C5f
g	Personal computer	1. Yes	2. No	C5g
h	Telephone	1. Yes	2. No	C5h
i	Mobile Phone	1. Yes	2. No	C5i
j	Motorcycle	1. Yes	2. No	C5j
k	Car (Sedan/Pickup)	1. Yes	2. No	C5k
l	Truck/Tractor	1. Yes	2. No	C5l
m	Well(for daily utility)	1. Yes	2. No	C5m
n	Well (for irrigation)	1. Yes	2. No	C5n
o	Water pump for well	1. Yes	2. No	C5o
p	Water pump for piped water	1. Yes	2. No	C5p

6. What type of light sources does your family use in the house?
   1. Electric light 2. Kerosene oil lamp 3. Candle 4. Others C6 [ ]

7. What type of fuel does your family use for cooking in the house?
   1. Electric heater 2. Firewood 4. Charcoal, Coal C7 [ ]
   5. Gas stove 6. Others

Section D Water Utilization

1. What type of water supply for drinking and cooking does your family use in the house?

		no use	sub-sidiary	main	
a	Tap water supply by PDAM	1	2	3	D1a [ ]
b	Community water stand post in the village	1	2	3	D1b [ ]
c	Tube-well of the landlord	1	2	3	D1c [ ]
d	Private tube-well of the house	1	2	3	D1d [ ]
e	Water harvesting (rain)	1	2	3	D1e [ ]
f	River or pond	1	2	3	D1f [ ]
g	Bottle water	1	2	3	D1g [ ]
h	Others (spesify_____)	1	2	3	D1h [ ]

2. What type of water supply for washing, bathing and the others does your family use in the house?

		no use	sub-sidiary	main	
a	Tap water supply by PDAM	1	2	3	D2a [ ]
b	Community water stand post in the village	1	2	3	D2b [ ]
c	Well of the landlord	1	2	3	D2c [ ]
d	Private Well of the house	1	2	3	D2d [ ]
e	Water cultivation (rain)	1	2	3	D2e [ ]
f	River or pond	1	2	3	D2f [ ]
g	Bottle water	1	2	3	D2g [ ]
h	Others(Specify_____	1	2	3	D2h [ ]

3. How many/much does your family use water in a day?

a	Tap water supply by PDAM	D3a	lit/day
b	Community water stand post in the village	D3b	lit/day
c	Tube-well of the landlord	D3c	lit/day
d	Private tube-well of the house	D3d	lit/day
e	Water harvesting, rain water storege	D3e	lit/day
f	River or pond	D3f	lit/day
g	Bottle water purchased from vandors	D3g	lit/day
h	Others(Specify_____)	D3h	lit/day

4. How much is a unit cost of the water sources?

a	Tap water supply by PDAM	D4a	Rp. /month
b	Community water stand post in the village	D4b	Rp. /month
c	Tube-well of the landlord	D4c	Rp. /month
d	Private tube-well of the house	D4d	Rp. /month
e	Water harvesting, rain water storege	D4e	Rp. /month
f	River or pond	D4f	Rp. /month
g	Bottle water purchased from vandors	D4g	Rp. /month
h	Others(Specify_____)	D4h	Rp. /month

5. How much does your family spend for water in total? D5 [ ]
   Rp. _____ /month (Average of last 12 months)

6. Do you have your own water sources listed below in your house?

a	Dug well	1. Yes	2. No	D6a
b	Tube-well	1. Yes	2. No	D6b
c	Pond	1. Yes	2. No	D6c
d	Rain water tank	1. Yes	2. No	D6d
e	Others (specify_____)	1. Yes	2. No	D6e

7. If you have well, how deep is the well?

a	Depth of well	D7a	m
b	Water level (lowest)	D7b	m
c	Water level (highest)	D7c	m

(If you don't have, skip to D11)

8. Can you use the well in dry season? 1. Yes 2. No D8

9. If No above, what is the period you can not use the well? And how long?

a	From month 1-12	D9a	
b	Until month 1-12	D9b	
c	Total months	D9c	

10. Do you worry about water level?

1. Not at all 2. Yes, because it is not stable. D10

3. Yes, because it has been going down last 10 years. 4. Yes, I can not use it now.

11. What is mportant factors of water resorces? Select upto 3 in priority. D11a

1. Price (tariff) 2. Quality of water 3. Convenience to use 4.Taste of water D11b

5. Sustainable supply 6. Quantity of resources D11c

Section E Impacts of Public Water Supply System

1. When you sign up the PDAM or/and the community water supply system? **E1**

1. Not sign up yet 2. < 1 year ago
3. 1 - < 3 years ago 4. 3 - < 5 years ago
5. 5 - <10 years ago 6. More than 10 years ago
7. I withdrew from membership though I was customer

(If be not introduced water system of PDAM or Community, skip to "**Section F**")

2. Which system do you join, PDAM or community water supply system?

1. PDAM 2. PU Community System E2

3. Who was the first person in the family to say that public water system (PDAM, Community) was necessary?

1. House head 2. Wife of the head 3. Father of the head E3
4. Mother of the head 5. Son of the head 6. Daughter of the head
7. Neighbours 8. Others (Specify_____)

4. Outcome and impact of the introduction of public water system (both PDAM and Community).

		much worse	worse	no change	better	much better	
a	Burden of housekeeping	1	2	3	4	5	E4a
b	Keep clean of house	1	2	3	4	5	E4b
c	Keep clean of body and closes	1	2	3	4	5	E4c
d	Sickness and illness	1	2	3	4	5	E4d
e	Time management	1	2	3	4	5	E4e
f	Quality of water	1	2	3	4	5	E4f
g	Quantity of water(declese-inclese)	1	2	3	4	5	E4g
h	Cost of water(inclese-declese)	1	2	3	4	5	E4h

i Other positive impact if any

j Other negative impact if any

5. How much did you pay at the time of **initial water connection** of **PDAM**? (Skip if you didn't pay)
   Rp. _____ E5 Rp

6. How much did you pay for the meter fee? (Skip if you didn't pay)
   a at the time of connection for rental of meter E6a
   b monthly payment for meter E6b

7. How much did you pay at the time of **community water system** introduced? (Skip if you didn't pay)
   Rp. _____ E7 Rp

8. How did you manage the money for the water **connection fee**? E8
   1. General living expense/pocket money
   2. Withdraw savings
   3. Selling assets/livestock
   4. Borrow money/loan
   5. Others (Specify _____)

9. How did you think about the water **connection fee**? E9
   1. Very expensive, not affordable (go question 9 & 10)
   2. Expensive, but still affordable 3. Reasonable 4. Cheap

10. If answer "1. Very expensive, not affordable" in question 9, how much is the affordable fee?
    Rp. _____ E10 Rp

11. If answer "1. Very expensive, not affordable" in question 9,
    How much is your affordable monthly payment for the fee, if you can utilize monthly instalments system?
    Rp. _____ /month E11 Rp /month

12. How do you know your monthly **water consumption bill**? E12
    1. Get postal information from the water supply company
    2. Get a payment bill through an agent/staff of PDAM
    3. Get information from neighbor, shop-keeper, mosque or influential person of the village
    4. I don't know the bill (I have never got the information)
    5. Others (Specify _____)
    (If answer is "4", skip over questions 13 - 15)

13. How do you think about present level of the **water consumption bill**? E13
    1. Very expensive, not affordable 2. Expensive, but still affordable
    3. Reasonable 4. Cheap

14. How much is your affordable/willing monthly payment of the **water consumption**?
    Rp. _____ /month E14 Rp /month

15. How do you pay the **water consumption bill**? E15 [ ]
    1. Pay the money at the nearest water supply company's office
    2. Pay the money to the person in charge of community water system
    3. An agent/staff of the water supply company comes to home to collect the bill
    4. Cash deposit to a bank
    5. Pay to the neighbor who allows to diverge the water pipe
    6. Others (Specify _____)

16. What do you think about water supply services as listed below?

		Teriible, very bad	a bit complained	accept-able	yes satisfied	very much satisfied	
a	Unit price	1	2	3	4	5	E16a [ ]
b	Billing system (procedure)	1	2	3	4	5	E16b [ ]
c	Accuracy of meter reading	1	2	3	4	5	E16c [ ]
d	Transparency in billing system	1	2	3	4	5	E16d [ ]
e	Frequency of suspension of water supp	1	2	3	4	5	E16e [ ]
f	Recovery from suspension of water sup	1	2	3	4	5	E16f [ ]
g	Maintainance of the water system	1	2	3	4	5	E16g [ ]
h	Attitude of staffs of PDAM	1	2	3	4	5	E16h [ ]
i	Quality of water	1	2	3	4	5	E16i [ ]
j	Water pressure	1	2	3	4	5	E16j [ ]
k	Quantity of water	1	2	3	4	5	E16k [ ]

17. Have you ever thought about withdrowing of the member of water system? E17 [ ]
    1. No, not at all. 2. Yes, I have thought about it.
    3. Yes, I already withdrew from the membership.

18. If Yes (2 or 3) above , what is the main reasons to decide?

19. In case of using **community water suply system**, would you like to use connection from standpipe to your house?
    1. No, not at all. E19a [ ]
    2. Yes, if the connection cost is affordable. (E19b Rp_____)

Section F Non-public-water-system Household (Only for the person who answer "1 and 7" of E1)

1. Why do you hesitate about introduction of pipe water supply system in your house?

		Yes	No	
a	No water infrastructure near house	1	2	F1a [ ]
b	I don't have enough income for pay water	1	2	F1b [ ]
c	Initial cost for the water system is expensive	1	2	F1c [ ]
d	Unit cost of water is not affordable (expensive)	1	2	F1d [ ]
e	Water supply is unreliable	1	2	F1e [ ]
f	Enough alternative water source	1	2	F1f [ ]
g	Procedure of the application is complicated/difficult	1	2	F1g [ ]
h	It is difficult to make consensus among neighbours for the application (Nobody take initiatives)	1	2	F1h [ ]
i	I do not have any information about water suply program, since we are neglected	1	2	F1i [ ]
j	I get water without application to PDAM	1	2	F1j [ ]
k	Others (Specify_____)	1	2	F1k [ ]

2. What impact/benefit do you expect, if your house will be connected to the water system?

		not	expect to some extent	expect much	
a	Reduce burdon of housekeeping	1	2	3	F2a
b	Keep clean of house	1	2	3	F2b
c	Keep clean of body and closes	1	2	3	F2c
d	Less sickness and illness	1	2	3	F2d
e	Better time management	1	2	3	F2e
f	Better quality of water	1	2	3	F2f
g	Large quantity of water	1	2	3	F2g
h	Less cost of water	1	2	3	F2h
i	Ohter expectations if any				F2i

3. Family member's opinion/attitude on the water supply system at present

	(Keep blank, if not applicable)	very negative	negative	neutral	positive	very positive	
a	Male head	1	2	3	4	5	F3a
b	Female head	1	2	3	4	5	F3b
c	Wife or husband of the head	1	2	3	4	5	F3c
d	Father of the head	1	2	3	4	5	F3d
e	Mother of the head	1	2	3	4	5	F3e
f	Influential person in the village	1	2	3	4	5	F3f

4. What is the affordable connection fee of modern water supply system F4 Rp
   Rp.

5. What is the affordable of monthly payment of water supply if it is connected? F5 Rp
   Rp.

6. Are you willing to pay to connect water system if those problems would be improved? F6
   1. Yes 2. No

Section G Sanitation and Health

1. Do you think that the quality of water and health has correlation? G1
   1. I don't know. 2. No, I don't think so.
   3. Yes, more or less correlated. 4. Yes, very much correlated.

2. Do you think that the water is good quality? G2
   1. I don't know, I have never care about it.
   2. No, I don't think so. It is not good quality water.
   3. Yes, someone check the quality periodically and keep quality good.

3. How much do you care about good quality of water? Answer Yes or No as below questions

a	I don't care. I use same water source in anytime.	1.Yes	2. No	G3a
b	I use bad quality water because of lack of water system	1.Yes	2. No	G3b
c	I use same water but boild for drinking.	1.Yes	2. No	G3c
d	I fixed a water filter for drinking.	1.Yes	2. No	G3d
e	I change water source by intended purpose.	1.Yes	2. No	G3e

4. Do your household members often get sick caused by water quality? G4
   1. No, not at all 2. Yes, but seldom. 3. Yes, sometime but not often.
   4. Yes, very often.

5. What kinds of sicks have your household members gotten?

a	Diarrhea	1.Yes 2. No	G5a	
b	Typhoid fever	1.Yes 2. No	G5b	
c	Amoebic dysentery	1.Yes 2. No	G5c	
d	Dysentery	1.Yes 2. No	G5d	
e	Dengue fever	1.Yes 2. No	G5e	

6. How much does your family spend for doctor inspection and medicines per month in average for disease relating water? G6 Rp. /month

7. Where is location of toilet you use? G7
   1. Inside my home 2. Shared public toilet 3. Neighbor house
   4. No designated toilet

8. What type of toilet do you use? G8
   1. Simple pit latrine 2. Pure-Flush toilet 3. Others

9. What kind of toilet system do you use? G9
   1. Septic Tank (treated water is infiltrated into underground by using leaching pit)
   2. Septic Tank (treated water is infiltrated into underground from septic tank)
   3. Septic Tank (treated water is discharged to sewerage pipe)
   4. Septic Tank (treated water is discharged to river / channel /canal)
   5. Pit Latrine (treated water is infiltrated into underground)
   6. Pit Latrine (treated water is discharged to sewer pipe)
   7. Pit Latrine (treated water is discharged to river / channel / canal)
   8. Others (specify _____)

10. If you use pail for flush toilet, how many times do you pour water by the pail?

a	When you defecate	G10a	times
b	When you urinate	G10b	times

11. How often do you remove toilet sludge or night soil? G11
    1. Once in three month 2. Once in six month 3. Once a year
    4. Once in 3 years 5. Once in 5 years 6. Once in 6 years and more

12. Who removes the toilet sludge or night soil? G12
    1. Local governments 2. Other public organization (specify_____)
    3. Neighbor famer 5. Private company 4. by yourself (scattering outside)
    6. I don't know

13. Is toilet water is infiltrated into underground? G13
    1. Yes 2. No

14. What is distance from toilet pit / septic tank to well? G14
    1. I don't have well 2. less than 4.9 m 3. 5 m upto 9.9 m
    4. 10 m upto 14.9 m 5. 15 m upto 19.5 m 6. 20 m and more

Section H Any other comments

Thank you for your cooperation

Appendix for Chapter 11

Appendix 11.1 Result of Primary Screening

Appendix 11.2 a The List of First Selection for Systems and Facilities for Emergency Pilot Project (EPP)【 PDAM 】

Appendix 11.2 b The List of First Selection for Systems and Facilities for Emergency Pilot Project (EPP)【 Community Water Supply 】

Appendix 11.3 Summary Sheet for Contract of EPP

Appendix 11.4 Documents of Handover

- **Appendix 11.4 (1) Handover to the Government of Special Province of Yogyakarta (Dinas Kimpraswil) on March 30, 2007**
- **Appendix 11.4 (2) Handover to the Local Government of Bnatul Regency from Government of Special Province of Yogyakarta (Dinas Kimpraswil) on June 28, 2007**

Appendix 11.5 a Evaluation and Effects of Emergency Pilot Project【PDAM Bantul System】

Appendix 11.5 b Evaluation and Effects of Emergency Pilot Project 【Community Water Supply System in Bantul Regency】

Appendix 11.6 Photos of Emergency Pilot Project (EPP)

Appendix 11.1 Result of Primary Screening

Priority of Indonesian Side (Priority Order by PDAM / PU)		Affected by Earthquake	Urgency			Effectivenes			Other Donor/NGO's Involvement	Feedbacks to M/P	Selection for Emergency Pilot Project	Note
			Reduction (%) (Production/Consumption)	Major Facilities Damaged		Beneficially	Cost per Beneficially in Thousand Rp.					
1. PDAM Yogyakarta	Repair of leakage of distribution pipelines	Yes	-	-	-	-	-	-	Non	-		Note 1) As shown below
	Repair of service connection and installation of distribution pipe (2" & 4" dia)	Yes	-	-	-	-	-	-	Non	-		
	Repair of fences, buildings, etc.	Yes	-	-	-	-	-	-	Non	-		
	Emergency supply by water tanker	Yes	-	-	-	-	-	-	Non	-		
2. PDAM Sleman	Unit Depok	Yes	54 / 55	Transmission pipe	High	8,250	154	High	Non	-		Inappropriate pipe selection
	Bebeng System	No	-	-	-	-	-	-	Non	-		Volcane-rendered damage
3. PDAM Bantul	Unit Dlingo	Yes	46 / 77	Water source	High	7,422	241	High	Non	・Operation & Maintenance of Facilities ・Project Implementation	○	
	Unit Trimulyo	Yes	96 / 93	Water source	High	3,102	18	High	Non	− do −	○	
	Unit Imogiri	Yes	89 / 67	Distrubution trunk main	High	1,326	327	Medium	Non	− do −	○	
	Unit Sedayu	No	95 / 96	-	Medium	9,294	2	-	Non	-		
	Unit Banguntapan	Yes	91 / 84	Distrubution trunk main / building	High	1,536	342	Medium	Non	・Operation & Maintenance of Facilities ・Project Implementation	○	
	Unit Bantul	Yes	103 / 96	Office building	High	5,880	18	High	Non	− do −	○	
	Unit Sewon	Yes	107 / 85	Water source / building	High	6,666	3	High	Non	− do −	○	
	Unit Bangunjiwo	Yes	-	-	Not Urgent	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Unit Guwosari	Yes	-	-	Not Urgent	-	-	-	Non	-		- do -
	Unit Kasihan	Yes	-	-	Not Urgent	-	-	-	Non	-		- do -
	Unit Bambanglipuro	Yes	-	-	Not Urgent	-	-	-	Non	-		- do -
	Unit Slandakan	Yes	-	-	Not Urgent	-	-	-	Non	-		- do -

Note1) Emergency repair works are undergoing. Proposed distribution pipe installation is judged not for urgent rehabilitation but for supply improvement.

Priority of Indonesian Side (Priority Order by PDAM / PU)		Affected by Earthquake	Urgency			Effectivenes			Other Donor/NGO's Involvement	Feedbacks to M/P	Selection for Emergency Pilot Project	Note
			Reduction (%) (Production/Consumption)	Major Facilities Damaged		Beneficially	Cost per Beneficially in Thousand Rp.					
3. Community System	Terong I, Terong, Dlingo	Yes	High	Water source / transmission main / Reservoir	High	300	337	High	Non	・Adequecy of design ・Training for operation & maintenance ・Project Implementation ・Management of water supply system	○	
	Cempluk I, Mangunan, Dlingo	No	High	Intake pump	-	480	52		Non	-		
	Cempluk II, Mangunan, Dlingo	Yes	Low	Water source / transmission main	High	110	300	High	Non	・Adequecy of design ・Training for operation & maintenance ・Project Implementation ・Management of water supply system	○	
	Mangnan I, Mangunan, Dlingo	Yes	High	Water source / transmission main	High	290	145	High	Non	- do -	○	
	Mangnan II, Mangunan, Dlingo	Yes	High	Transmission main	High	190	379	Medium	Non	- do -	○	
	Siluk, Selopamioro, Dlingo	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Kediwung, Mangunan, Dlingo	No	High	Intake pump	-	530	108		Non	-		
	Nawungan, Selopamioro, Imogiri	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Kalinongko, Bangunjiwo, Kasihan	Yes	High	Reservoir	High	460	111	High	Non	・Adequecy of design ・Training for operation & maintenance ・Project Implementation ・Management of water supply system	○	
	Klepu, Temwuh, Dlingo	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Kenalan, Bangunjiwo, Kasihan	No	-	-	-	-	-	-	Non	-		- do -
	Kanigoro, Mangunan, Dlingo	No	-	-	-	-	-	-	Non	-		- do -
	Lemahabang, Mangunan, Dlingo	Yes	High	Transmission main / Reservoir	High	130	369	Medium	Non	・Adequecy of design ・Training for operation & maintenance ・Project Implementation ・Management of water supply system	○	
	Seropan III, Muntuk, Dlingo	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Seropan II, Muntuk, Dlingo	No	-	-	-	-	-	-	Non	-		- do -
	Siluk II, Selopamioro, Imogiri	No	-	-	-	-	-	-	Non	-		- do -

Priority of Indonesian Side (Priority Order by PDAM / PU)		Affected by Earthquake	Urgency			Effectivenes			Other Donor/NGO's Involvement	Feedbacks to M/P	Selection for Emergency Pilot Project	Note
			Reduction (%) (Production/Consumption)	Major Facilities Damaged		Beneficially	Cost per Beneficially in Thousand Rp.					
3. Community System	Jambon, Bawuran, Plered	No	-	-	-	-	-	-	Non	-		- do -
	Dingkikan, Argodadi, Sedayu	No	-	-	-	-	-	-	Non	-		- do -
	Jojoran, Triwidadi, Pajangan	No	-	-	-	-	-	-	Non	-		- do -
	Selogedong, Argodadi, Sedayu	No	-	-	-	-	-	-	Non	-		- do -
	Sambikerep, Bangunjiwo, Kasihan	No	-	-	-	-	-	-	Non	-		- do -
	Kenalan/Banyuuripan, Bangunjiwo, Kasihan	No	-	-	-	-	-	-	Non	-		- do -
	Banyuurip, Jatimulyo	No	High	Intake pump / transmission main	-	-	-	-	Non	-		
	Badegan, Jatimulyo, Dlingo	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Banjarharjo II, Muntuk, Dlingo	No	-	-	-	-	-	-	Non	-		- do -
	Nanggulan, Triwidadi, Pajangan	No	-	-	-	-	-	-	Non	-		- do -
	Mangunan, Mangunan, Dlingo	Yes	High	Transmission	Medium	300	73	High	Non	・Adequecy of design ・Training for operation & maintenance ・Project Implementation ・Management of water supply system	○	
	Petung, Bangunjiwo, Kasihan	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Bangen/Bibis, Bangunjiwo, Kasihan	No	High	Intake pump / distribution main	High	710	42	-	Non	-		
	Pagergunung, Sitimulyo, Piyungan	No	-	-	-	-	-	-	Non	-		Excluded from the priority list by 1st screening at the meeting on 25/Sep/06
	Plesedan, Srimulyo, Piyungan	No	-	-	-	-	-	-	Non	-		- do -
	Srimulyo, Piyungan	No	-	-	-	-	-	-	Non	-		- do -
	Saradan, Terong, Dlingo	No	-	-	-	-	-	-	Non	-		- do -
	Metes, Argorejo, Sedayu	No	High	Water source / Transmission main / distribution mains	High	480	169	-	Non	-		

Appendix 11.2 a The List of First Selection for Systems and Facilities for Emergency Pilot Project (EPP)【 PDAM 】

Name of Systems/Facilities	Work Items	Dimensions/Qualities	Cost	Evaluation					Priority	Note
				[1]Decrease of Water Production	[2]Beneficiary	[3]Per Capita consumption (pcd)	[4]Per Capita Cost	Urgent Priority proposed by		
			(Million Rp.)	(%)		Before / After	(Thousand Rp. /person)	Indonesian Side		
1. PDAM Yogyakarta			-	-	-	-	-	-	-	Emergency repair works are undergoing
(1) Distribution	1) Installation of Distribution Pipe	ϕ 50mm x L5.0km								Proposed distribution pipe installation is judged not for urgent rehabilitation but for supply improvement
	2) Installation of Distribution Pipe	ϕ 100mm x L5.0km								
2. PDAM Sleman										[5]Due to leakage of pipeline, water supply quantity
2.1 【Unit Depok】			1,267	54	8,250	164 / 90	154	1	-	considerably reduced.
(1) Transmission	1) Installation of Transmission Pipe	ϕ 250mm x L1.7km								
3. PDAM Bantul										
3.1 【Unit Trimulyo】			56	96	3,102	56 / 52	18	2	Urgent	Yield reduced after earthquake. There is a risk for further reduction of yield.
(1) Intake	1) Digging of Shallow Well	ϕ 1.5m x D6m w/10m Casing&Screen								Damage of chemical building by earthquake hamper water treatment which need urgent repair.
(2) Treatment Plant	1) Repair of Chemical Building									Damage of retaining wall around clear water reservoir
	2) Repair of Retaining Wall	H 2.0m x L60m								makes risk of contamination of treated water. 【 Selected 】
3.2 【Unit Sewon】			19	107	6,666	94 / 80	3	7	Urgent	Damaged pipe bridge have a risk to stop water supply by further deterioration.
(1) Distribution	1) Repair of Pipe Bridge (Inc. Abutment)	GIP ϕ 100mm x L10m								【 Selected 】
3.3 【Unit Dlingo】			1,792	46	7,422	86 / 66	241	1	Urgent	15 l/s of original spring yield reduced to 5 l/s after earthquake. No alternative water source other than river water exist.
3.3.1 [Sub-unit Ngreboh]										
(1) Intake	1) Spring Capture									Need urgent recovery for production.
(2) Treatment Plant	1) Construction of Treatment Plant (Package Plant)	Capacity 5 l/s								Damage of pump room has a risk to stop pump operation.
(3) Transmission	1) Installation of Transmission Pump (Centrifugal)&Panel	Q10 l/s x H60m x 11kW x 2 units								【 Selected 】
	2) Installation of Transmission Pipe	ϕ 125mm x L800m								
	3) Installation of Power cable	L800m								
3.3.2 [Sub-unit Grajekan]										
(1) Miscellaneous	1) Repair of Operation Building									

Name of Systems/Facilities	Work Items	Dimensions/Qualities	Cost	Evaluation					Priority	Note
				[1]Decrease of Water Production	[2]Beneficiary	[3]Per Capita consumption (pcd)	[4]Per Capita Cost	Urgent Priority proposed by		
			(Million Rp.)	(%)		Before / After	(Thousand Rp. /person)	Indonesian Side		
3.4 【Unit Imogiri】			433	89	1,326	105 / 70	327	3	Urgent	River crossing by siphon was collapsed and washed away by earthquake.
(1) Distribution	1) Construction of Pipe Bridge	GIP ϕ 150mm x L57m								Temporary piping on the road bridge shall be changed to permanent pipe bridge urgently. 【 Selected 】
3.5 【Unit Banguntapan】			526	91	1,536	90 / 76	342	5	Urgent	Distribution main (PVC ϕ 150) was damaged at the delivery of water treatment plant.
(1) Distribution	1) Installation of Distribution Pipe	PVC ϕ 150mm x L1200m								Temporary pipe (PVC ϕ 50) is to be replaced urgently.
(2) Administration Office	1) Reconstruction of Office Building	Brick structure, 48m2								Office building was collapsed by earthquake which need urgent reconstruction. 【 Selected 】
3.6 【Unit Bantul】			106	103	5,880	131 / 126	18	6	Urgent	Office building and storages were damaged by earthquake which hamper routine operation.
(1) Treatment Plant	1) Repair of Storage	Concrete block wall, 40m2								
(2) Administration Office	1) Repair of Office Building	Brick structure, 36m2								
	2) Repair of Storage	Concrete block wall, 40m2								【 Selected 】
3.7 【Unit Sedayu】			20	95	9,294	71 / 68	2	4	-	No damage caused by earthquake is found.
(1) Intake	1) Reconstruction of Shallow Well	ϕ 1.5m x D6m								

[1] Decrease of Water Suppy Quantity (%) = Water Quantity after earthquake / Water Quantity before earthquake (This is the indicator which shows "Emergency".)

[2] Beneficiary: Beneficiary is equal to served population .

[3] Per Capita consumption: Left side: Per capita consumption (litter/person/day) before Earthquake, Right side: Per capita consumption (litter/person/day) after Earthquake.

[4] Per Capita Cost : (Thousand Rp./person) = Cost / Beneficiary (This is the indicator which shows "Efficiency".)

[5] PDAM Sleman :

The transmission pipe of Unit Depok, PDAM Sleman is composed of two sections using PVC (Polyvinyl Chloride Pipe) and GRP (Glass Fiber Reinforced Pipe). The leakage occurred from GRP for about 1.7 km in length.
The leaks found before the earthquake which became serious after the earthquake. Most of leaks are found from pipe joint.
The full water supply can not be made at the present because the leaked pipeline needed to reduce pressure by valve control. It is assumed that the GRP will not be suitable for pressure pipeline due to very thin pipe wall.
Although leaks may be caused by adequate pipe materials, the reduction of water supply quantity is significant. Taking the increasing water demand due to rapid development of the service area located at the fringe of Yogyakarta city, the PDAM Sleman strongly proposed the replacement of the defect pipeline. In this circumstance, it is recommended to include the replacement of defect pipeline in the project if budget allows.

Appendix 11.2 b The List of First Selection for Systems and Facilities for Emergency Pilot Project (EPP)【 Community Water Supply 】

Name of Systems/Facilities	Work Items	Dimensions/Qualities	Cost (Million Rp.)	Evaluation					Priority	Note
				[1)]Decrease of Water Production	[2)]Beneficiary	[3)]Per Capita consumption (pcd) Before / After	[4)]Per Capita Cost (Thousand Rp. /person)	Urgent Priority proposed by Indonesian Side		
4. PU Kab.Bantul (Community System)										
4.1 【Desa Mangunan II】			72	Considerably	190	314/114	379	5	Urgent	Damaged well was abandoned and new well was developed and small capacity of intake pump was installed by the community which is to be replaced. 【 Selected 】
(1) Transmission	1) Installation of Transmission Pipe	ϕ 25mm x L600m								
4.2 【Desa Mangunan I】			42	Considerably	290	223/Decrease	145	4	Urgent	Out of two sources, spring was dry up and shallow well yield is reducing after earthquake. New well needs to be constructed urgently together with intake and booster pump installation. Transmission pipe was damaged by earthquake partly which is to be repaired. 【 Selected 】
(1) Intake	1) Construction of Dug Well	ϕ 1.0m x H6m								
	2) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Booster Pump (centrifugal)	Q0.75 l/s x H60m x 1 kW x 1 unit								
	2) Construction of Pump Well	Capacity 1m3 (Brick structire)								
	3) Installation of Transmission Pipe	ϕ 25mm x L50m								
4.3 【Desa Cempluk II】			33	Considerably	110	589/Decrease	300	3	Urgent	Yield of spring was reduced after earthquake. and new well is required urgently. Transmission pipe was damaged by earthquake partly which is to be repaired. 【 Selected 】
(1) Intake	1) Construction of Dug Well	ϕ 1.0m x H6m								
	2) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Transmission Pipe	ϕ 25mm x L40m								
4.4 【Desa Cempluk I】			25	-	480	-	52	2	-	No damage caused by earthquake was found, although intake pump and booster pump were out of order[5)]
(1) Intake	1) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Booster Pump (centrifugal)	Q0.75 l/s x H60m x 1 kW x 2 units								
	2) Construction of Pump Well	Brick structure 1 m3x 2 nos								
4.5 【Desa Mangunan】			22	Slightly	300	-	73	7	Urgent	Transmission pipe was damaged by earthquake partly which is to be repaired. 【 Selected 】
(1) Intake	1) Installation of Intake Pump	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Transmission Pipe	ϕ 25mm x L50m								

Name of Systems/Facilities	Work Items	Dimensions/Qualities	Cost	Evaluation					Priority	Note
			(Million Rp.)	[1]Decrease of Water Production	[2]Beneficiary	[3]Per Capita consumption (pcd) Before / After	[4]Per Capita Cost (Thousand Rp. /person)	Urgent Priority proposed by Indonesian Side		
4.6 【Desa Kanigoro】			51	Slightly	460	-	111	7	Urgent	Reservoir is seriously damaged by earthquake and out of service. Need urgent reconstruction of reservoir. Damaged transmission and distribution pipes by earthquake are to be repaired. 【 Selected 】
(1) Intake	1) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Booster Pump (centrifugal)	Q0.75 l/s x H60m x 1 kW x 1 unit								
	2) Construction of Pump Well	Brick structure 1 m3x 1 no								
(3) Distribution	1) Reconstruction of Reservoir	Brick structure, 8m3 x 1 no								
	2) Installation of Distribution Pipe	PVC, ϕ 25mm x L70m								
	3) Repair of Public Hydrant	Platform x 4 nos								
4.7 【Desa Kediwung】			57	-	530	-	108	6	-	No damage by the earthquake was found, although intake pump was out of order[5]
(1) Intake	1) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Transmission Pipe	GIP, ϕ 25mm x L500m								
4.8 【Desa Lemahabang】			48	Slightly	130	-	369	7	Urgent	Reservoir is seriously damaged by earthquake and out of service. Need urgent reconstruction of reservoir. Damaged transmission and distribution pipes by earthquake are to be repaired. 【 Selected 】
(1) Intake	1) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Transmission Pipe	GIP, ϕ 25mm x L150m								
(3) Distribution	1) Reconstruction of Reservoir	Brick structure, 8m3 x 1 no								
4.9 【Desa Terong I】			101	Considerably	300	216/Decrease	337	1	Urgent	Water table was dropped and yield of well was reduced after earthquake. Need urgent construction of new well. Capacity of transmission pipe was reduced due to scale in the pipe. Although it is not due to earthquake, transmission pipe is to be replaced at the same time for new well construction. Damaged distribution pipe is repaired and inclined public hydrant is to be protected. 【 Selected 】
(1) Intake	1) Construction of Dug Well	ϕ 1.0m x D6m w/10m Casing&Screen								
	2) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Transmission Pipe	GIP, ϕ 25mm x L500m								
(3) Distribution	1) Reconstruction of Reservoir	Brick structure, 8m3 x 1 no								
	2) Construction of retaining wall behind Public Hydrant	h=1.5m x L5m								
	3) Distribution pipe	PVC ϕ 25mm x L50m								

Name of Systems/Facilities	Work Items	Dimensions/Qualities	Cost	Evaluation					Priority	Note
			(Million Rp.)	[1]Decrease of Water Production	[2]Beneficiary	[3]Per Capita consumption (pcd) Before / After	[4]Per Capita Cost (Thousand Rp. /person)	Urgent Priority proposed by Indonesian Side		
4.10 【Desa Banyuurip】			147	-	870	-	169	7	-	No serious damage was found, although intake and booster pumps are required to be replaced[5].
(1) Intake	2) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Transmission	1) Installation of Booster Pump (centrifugal)	Q0.75 l/s x H60m x 1 kW x 1 unit								
	2) Construction of Pump Well	Brick structure 1 m3x 1 no								
	3) Installation of Transmission Pipe	GIP, ϕ 25mm x L160m								
(3) Distribution	1) Installation of Distribution Pipe	PVC, ϕ 25mm x L1200m								
4.11 【Desa Metes】			81	-	480	-	169	7	-	No damage was found due to earthquake, although water supply is hampered due to damage of transmission and distribution pipes by other reason. Intake pump is put of order[5]
(1) Intake	1) Construction of Dug Well	ϕ 1.0m x D6m w/10m Casing&Screen								
	2) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 units								
(2) Transmission	1) Installation of Transmission Pipe	GIP, ϕ 25mm x L300m								
(3) Distribution	1) Installation of Distribution	PVC, ϕ 25mm x L200m								
4.12 【Desa Bangen Bibis】			30	-	710	-	42	7	-	No damage was found due to earthquake, although increase of capacity extension is proposed. Intake pump was replaced by the comunity[5]
(1) Intake	1) Installation of Intake Pump (submersible)	Q0.75 l/s x H60m x 1 kW x 1 unit								
(2) Distribution	1) Installation of Distribution Pipe	PVC, ϕ 25mm x L200m								

[1] Decrease of Water Suppy Quantity Comparing Water Quantity after earthquake to Water Quantity before earthquake (This is the indicator which shows "Emergency".)

[2] Beneficiary: Beneficiary is equal to served population .

[3] Per Capita consumption: It was assumed that per capita consumption is same amount as quantities of water production.

[4] Per Capita Cost : (Thousand Rp./person) = Cost / Beneficiary (This is the indicator which shows "Efficiency".)

[5] Pumps for Community Water Supply System :

The community water supply system is constructed based on the standard design of PU without the consideration of the specific conditions of the site such as water demand, hydraulic conditions, etc.
All intake pumps are designed with the same characteristics of 0.75l/s of pump discharge and 60 m of pump head and impeller is made of plastic. Where the static head is large or transmission pipeline is longer, a booster pump (line pump) is used with the same pump characteristics (0.75l/s x 60 m). Further, no pump protection device is designed. The operator of the community water supply system has little knowledge on the operation and maintenance method of pump.
Above conditions make trouble for pump operation. As the results, it is common that impeller of pump is to be changed frequentls and life of pump is very short, say more or less one year.
All pump for the community water supply system, which were inspected, are out of order and many of them were replaced with smaller capacity of pumps by their own expense due to financial constraint.

Appendix 11.3 Summary Sheet for Contract of EPP

	Consultant	Package 1	Package 2	Package 3
Contractor	PT. Dacrea Design and Engineering Consultants	PT. Tunas Jaya PT. Maswandi	PB.Sarana Jaya	CV.Srikandi Mataram
Name of Contact person	Ir. Gardito Wedyosunu	Mr. Rochmadi	Mr. Sagiman	Ms. SRI YEKTI WENING
Tel	+ 62-21- 5737816	+ 62-274-522981	+ 62-274-522981	+ 62-274-7877591
Contract Date	October 30, 2007	Jan. 10, 2007	Dec. 23, 2006	Dec.23, 2006
Invitation to Tender	(October 25, 2007)	Dec. 7, 2006	Dec. 11, 2006	Dec. 15, 2006
Tender Opening	(October 27, 2007)	Dec. 14, 2006	Dec. 18, 2006	Dec. 22, 2006
Contract Period	March 31, 2007	March 26, 2007	March 3, 2007	March 16, 2007
Contract Price	Rp. 575,270,000	Rp. 2,195,000,000	Rp. 671,399,000	Rp. 600,884,000
Advance payment	Rp. 115,054,000	Rp. 878,000,000	Rp. 201,000,000	Rp. 240,000,000
Interim Payment	Rp. 200,000,000	-	-	Rp. 180,000,000
Advance payment	Rp. 260,216,000	Rp. 1,317,000,000	Rp. 470,399,000	Rp. 180,884,000
Maintenance Period	-	Sep. 23, 2007	Sep. 18, 2007	Sep. 18, 2007
Major Component	Detailed Design Preparation of Tender Documents Assistance on Tendering Construction Supervision	- Intake - WTP - Sprig Capture - Reservoir - Pipeline	- Shallow well - Pipe Bridges - Pipe Installation	- Shallow wells - Booster pumps - Pipe installation (GIP 25) - Reservoir - Repair of offices / warehouses/ buildings

Appendix 11.4 Documents of Handover

Appendix 11.4 (1)
Handover to the Government of Special Province of Yogyakarta (Dinas Kimpraswil) on March 30, 2007

Appendix 11.4 (2)
Handover to the Local Government of Bnatul Regency from Government of Special Province of Yogyakarta (Dinas Kimpraswil) on June 28, 2007

Appendix 11.4 (1)
Handover to the Government of Special Province of Yogyakarta (Dinas Kimpraswil) on March 30, 2007

Nihon Suido Consultants Co., Ltd.
Water and Environmental Consultants
22-1, Nishi-Shinjuku 6-Chome,
Shinjuku-ku, Tokyo 163-1122, Japan

No. G 069
Lamp: 2 lembar

BERITA ACARA

Pada hari ini Jum'at tanggal 30 Maret 2007 pekerjaan EPP (Emergency Pilot Projects) pada Studi Pengembangan Penyediaan Air Minum Daerah untuk Greater Yogyakarta telah selesai dan diserahterimakan dari pihak JICA Study Team (Nihon Suido Consultants Co., Ltd) kepada Dinas Kimpraswil Propinsi DIY untuk selanjutnya digunakan oleh DPU Bantul dan PDAM Bantul. Terlampir ketiga paket pekerjaan EPP.

Demikian Berita Acara ini dibuat untuk keperluan seperlunya.

Yogyakarta, 30 Maret 2007

NIHON SUIDO CONSULTANTS

Takemasa MAMIYA
Team Leader
JICA Study Team for
Regional Water Supply Development Plan
For Greater Yogyakarta

PEMERINTAH PROPINSI DAERAH ISTIMEWA YOGYAKARTA
DISKIMPRASWIL

Ir. Bambang, MSc.
Head of Dinas Kimpraswil
DIY Province

Attachment : Work of Each Package of EPP

Table 1 Work Item of Emergency Pilot Project - Package 1

Project Site	Scope of Work	
PDAM Bantul		
Unit Dlingo	Package Treatment Plant including intake pump	Capacity 5 l/s
	Transmission Pump and Panel	Q10 l/s x H70m x 15kW x2 units
	Transmission Pipe	ϕ 150mm x L 760m
	Power cable	L 1,000m
	Spring Capture	1 L.S.
	Operation Building	1 L.S.
	Access Road	1 L.S.

Table 2 Work Item of Emergency Pilot Project - Package 2

Project Site	Scope of Work	
PDAM Bantul		
Unit Trimulyo	Shallow Well	1.5m x 1.5m x d 5m
Unit Sewon	Repair of Pipe Bridge	GIP ϕ 100mm x L 10m
Unit Imogiri	Construction of Pipe Bridge	GIP ϕ 150mm x L 84m
	Pipe Installation	GIP ϕ 150mm x L 90m
Unit Banguntapan	Pipe Replacement	PVC ϕ 150mm x L1200m

Table 3 Work Item of Emergency Pilot Project - Package 3

Project Site	Scope of Work	
1) Community water supply system in Bantul Regacy		
Desa Mangunan		
Dusun Mangunan II	Transmission Pipe	ϕ 25mm x L66m
Dusun Mangunan I	Construction of shallow Well	ϕ 1.0m x H2.7m
	Intake Pump	Q0.75 l/s x H46m x 450W x 1unit
	Booster Pump	Q0.75 l/s x H46m x 450W x 1unit
	Construction of Sump Well	1m^3
	Transmission Pipe	ϕ 25mm x L50m
Dusun Cempluk II	Construction of shallow Well	ϕ 1.0 m x H 10m
	Intake Pump	Q 0.27 l/s x H 45m x 320 W x 1unit
	Transmission Pipe	ϕ 25 mm x L 1230m
Dusun Mangunan	Intake Pump	Q0.52 l/s x H 60m x 450W x 1unit
	Transmission Pipe	ϕ 25mm x L50m
Dusun Kanigoro	Intake Pump	Q0.35 l/s x H60m x 450W x 1unit
	Booster Pump	Q0.35 l/s x H60m x 450W x 1unit
	Construction of Sump Well	1m^3
	Transmission Pipe	GIP, ϕ 25mm xL120m
	Reconstruction of Reservoir	8m^3
	Distribution Pipe	PVC, ϕ 25mm x L70m
	Repair of Public Hydrant	Platform 4 nos
Dusun Lemahabang	Intake Pump	Q0.37 l/s x H60m x 450W x 1unit
	Booster Pump	Q0.37 l/s x H60m x 450W x 1unit
	Construction of Sump Well	1m^3
	Transmission Pipe	GIP, ϕ 25mm x L240 m
	Reservoir	8m^3
Desa Terong		
Dusun Terong I	Construction of shallow well	ϕ 1.0m x d3.5m
	Intake Pump	Q0.75 l/s x H 21m x 250W x 1unit
	Booster Pump	Q0.75 l/s x H 60m x 450W x 1unit
	Construction of Sump Well	1m^3
	Transmission Pipe	GIP, ϕ 25mm xL280m
	Reservoir	8m^3
	Construction of retaining wall for Public Hydrant	h 1.5m x L 5m
	Distribution pipe	PVC ϕ 25mm x L70m
2) PDAM Bantul water supply system		
Unit Dlingo Unit Trimulyo Unit Banguntapan	Repair of Pump House	1 L.S.
	Repair of Chemical Bldg.	1 L.S.
	Reconstruction of Retaining wall	Brick structure, 10m^2
	Reconstruction of Operation Bldg./Warehouse	Brick structure, 64m^2
Unit Bantul	Repair of Operation Bldg.	1 L.S.
	Repair of Storehouse at Office	1 L.S.
	Repair of Storehouse at Plant	1 L.S.

Appendix 11.4 (2)

Handover to the Local Government of Bnatul Regency from Government of Special Province of Yogyakarta (Dinas Kimpraswil) on June 28, 2007

PEMERINTAH PROVINSI DAERAH ISTIMEWA YOGYAKARTA
DINAS PERMUKIMAN DAN PRASARANA WILAYAH
(DISKIMPRASWIL)
JALAN : BUMIJO NO. 5 TELEPON : (0274) - 589074,589091 Facsimili : (0274) – 516518
YOGYAKARTA

BERITA ACARA SERAH TERIMA

Nomor : 019.5/06/C

Pada hari ini, Kamis tanggal dua puluh delapan bulan Juni tahun Dua ribu tujuh (28 Juni 2007), kami yang bertanda tangan dibawah ini ;

1 Nama : **Ir. Bayudono, MSc.**
NIP : 110 024 622
Jabatan : Kepala Dinas Kimpraswil Propinsi DIY
Alamat : Jalan Bumijo No. 5 Yogyakarta

Dalam hal ini bertindak untuk dan atas nama Pemerintah Propinsi DIY Cq. Dinas Kimpraswil Propinsi DIY yang selanjutnya disebut **PIHAK KESATU**

2 Nama : **Drs. H. Gendut Sudarto KD, BSc.MMA**
NIP : 490 017 858.
Jabatan : Sekretaris Daerah Kabupaten Bantul
Alamat : Jalan Wolter Mongin Sidi – Bantul.

Dalam hal ini bertindak untuk dan atas nama Pemerintah Daerah Kabupaten Bantul, yang selanjutnya disebut **PIHAK KEDUA**

Berdasarkan Berita Acara Serah Terima pekerjaan Emergency Pilot Project (EPP) tanggal 30 Maret 2007 antara *JICA Study Team* dengan Kepala Dinas Kimpraswil Propinsi DIY dan sehubungan dengan project tersebut telah dapat berfungsi :

Maka PIHAK KESATU menyerahkan kepada PIHAK KEDUA dan PIHAK KEDUA menerima penyerahan itu dari PIHAK KESATU : Sarana Prasarana Penyediaan Air Minum di Kabupaten Bantul yang rusak akibat gempa bumi dan telah direhabilitasi dan direkonstruksi, atas kerjasama/bantuan Pemerintah RI – Jepang melalui JICA sesuai dengan lampiran Berita Acara ini.

Demikian Berita Acara Serah Terima ini dibuat, untuk dapat dipergunakan sebagaimana mestinya.

PIHAK KEDUA	PIHAK KESATU
SETDA	
Drs. H. Gendut Sudarto KD,BSc.MMA	Ir. Bayudono, MSc.
NIP. 490 017 858	NIP. 110 024 622

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LAMPIRAN BERITA ACARA SERAH TERIMA

Nomor : 019.5/06/C
Tangal : 28 JUNI 2007

DAFTAR PEKERJAAN

I. Emergency Pilot Project-Paket 1

No	Lokasi	Jenis Pekerjaan	Volume	Keterangan
1	Unit Dlingo	Paket Instalasi Pengolah Air (WTP) beserta Pompa Intake	Kapasitas 5 l/detik	Baik dan berfungsi
		Pompa Transmisi lengkap dengan Panel Pompa	Q10l/s x H70m x 15kW x 2 units	Baik dan berfungsi
		Pipa Transmisi Air Bersih	□150mm x L 760m	Berfungsi
		Kabel Pembangkit Listrik	L 1,000m	Berfungsi
		Penangkap Mata Air	1 Unit.	Berfungsi
		Rehabilitasi Rumah Pompa	1 Unit.	Berfungsi
		Rehabilitasi Ruang Operasi	1 Unit.	Berfungsi
		Rehabilitasi Bangunan Pencampur Bahan Kimia.	1 Unit.	Berfungsi
		Rehabilitasi Jalan masuk	1 Unit.	Berfungsi

II. Emergency Pilot Project-Paket 2 & 3

No	Lokasi	Jenis Pekerjaan	Volume	Keterangan
2	Unit Bantul	Rehabilitasi Ruang Operasi	1 Unit.	Berfungsi
		Perbaikan Storehouse at Office	1 Unit	Berfungsi
		Perbaikan Storehouse at Plant	1 Unit	Berfungsi
3	Unit Trimulyo	Pembuatan Shallow Well	1 Unit (5 liter/det)	Berfungsi
		Rekonstruksi Retaining Wall	1 Unit (10 M2)	Berfungsi
4	Unit Sewon	Perbaikan Pipe Bridge	GIP □100mm x L 10m	Berfungsi
5	Unit Imogiri	Pembangunan Pipe Bridge	GIP □150mm x L 84m	Berfungsi
		Perbaikan Pipa instalasi	GIP □150mm x L 90m	Berfungsi
6	Unit Banguntapan	Perbaikan Pipa distribusi	PVC □ 150mm x L1200m	Berfungsi
		Pembangunan kembali Gedung Kantor Operasi/Warehouse	Brick structure, 64m^2	Berfungsi

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III. Emergency Pilot Project-Paket 3 (Penyediaan Air Minum Pedesaan)

No.	Lokasi	Jenis Pekerjaan	Volume	Keterangan
I	Desa Mangunan			
1	Dusun Mangunan II	Pipa Transmisi	25mm x L66m	
		Pompa Intake	Q0.52 l/s x H 60m x 450W x 1 unit	
2	Dusun Mangunan I	Pembuatan shallow Well	□1.0m x H2.7m	
		Pompa Intake	Q0.75 l/s x H46m x 450W x 1unit	
		Pompa Booster	Q0.75 l/s x H46m x 450W x 1unit	
		Pembuatan Sump Well	1 m3	
		Pipa Transmisi	25mm x L50m	
3	Dusun Mangunan	Pompa Intake	Q 0.52 l/s x H 60m x 320 W x 1 unit	
		Pipa Transmisi	25mm x L50m	
4	Dusun Cempluk II	Pembuatan shallow Well	□1.0m x H 10m	
		Pompa Intake	Q 0.27 l/s x H 45m x 320 W x 1 unit	
		Pipa Transmisi	□25mm x L 1230m	
		Pipa Transmisi	□25mm x L 50m	
5	Dusun Kanigoro	Pompa Intake	Q0.35 l/s x H 60m x 450W x 1unit	
		Pompa Booster	Q0.35 l/s x H 60m x 450W x 1unit	
		Pembuatan Sump Well	$1m^3$	
		Pipa Transmisi	GIP, □25mm xL120m	
		Pembuatan Sump Well	$8m^3$	
		Pipa Distribusi	PVC, □25mm x L240m	
		Perbaikan Hidrant Umum	Platform 4 nos	
6	Dusun Lemahabang	Pompa Intake	Q0.37 l/s x H60m x 450W x 1 unit	
		Pompa Booster	Q0.37 l/s x H60m x 450W x 1 unit	
		Pembuatan Sump Well	$1m^3$	
		Pipa Transmisi	GIP, □25mm xL240m	
		Reservoir	$8m^3$	
II	Desa Terong			
7	Dusun Terong I	Pembuatan shallow Well	□1.0m x d3.5m	
		Pompa Intake	Q0.75l/s x H 21m x 250W x 1 unit	
		Pompa Booster	Q0.75l/s x H 60m x 450W x 1 unit	

3

		Pembuatan Sump Well	$1m^3$	
		Pipa Transmisi	GIP, Π25mm xL280m	
		Reservoir	$8m^3$	
		Rehabilitasi Talud Penahan Tebing Public Hydrant	h 1.5m x L 5m	
		Pipa Distribusi	PVC, Π25mm x L70m	

PIHAK KEDUA

SETDA

Drs. H. Gendut Sudarto KD,BSc.MMA
NIP. 490 017 858

PIHAK KESATU

DISKIMPRASWIL

Ir. Bayudono, MSc.
NIP. 110 024 622

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Appendix 11.5 a Evaluation and Effects of Emergency Pilot Project 【PDAM Bantul System】

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
Unit Trimulyo	Shallow Well	□1.5m x h 5m +φ200 x 5.5m casing & screen	Intake Capacity : 295 m3/day (Average of June and July 2006, Data of PDAM Bantul)	Shallow well was damaged and easy to be clogged even after cleaning by PDAM.	Intake Capacity : 278 m3/day (The average of April and May 2007, Data of PDAM Bantul.) (Calculation from data of pump capacity and operation hour shows; 5 l/s x 16 hrs＝288 m3/day)	Sand and smell of water in new shallow well is less than the existing well (Information from PDAM Bantul). The new well is expected to be stable while further observation is necessary.
	Repair of Chemical Bldg.	1 L.S.	Evaluation of O & M (Chlorine doser): Level 2 (Problematic)	Chlorination was not safe due to damage of floor and improper setting of chorine tanks. Damaged chemical building might be collapsed and hypochlorite could not be stored in the building.	Evaluation of O & M (Chlorine doser): Level 5 (Very Good)	After repair of chemical building, chlorination becomes normal and safe. Wall is repaired to avoid collapse of the building and ready to store calcium hypochlorite. PDAM is to store the chemicals to execute easy operation.
	Repair of Retaining Wall	h = 2.0m x 60m	―	Retaining wall around clear water reservoir was collapsed and rain water might enter into the reservoir. Deterioration of water quality was suspected.	―	Retaining wall around the reservoir is repaired and rain water does not enter into the reservoir.

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
Unit Sewon	Repair of Pipe Bridge	GIPφ100mm x L10m	Supplied connection: 0 connection (When pipe bridge is damaged, water supply will be stopped. Considering the unstable condition, number of supplied connection is set as 0)	Abutment of pipe bridge was damaged by the earthquake. If river water level was high, pipe bridge would be collapsed and water supply to the area would be stopped.	Supplied connection: 75 connections (Data of PDAM) Distribution to the downstream can be estimated as: 0.05 l/s x 12 hrs＝2.2 m3/day (Measurement of flow rate and information of operation period)	Abutment of pipe bridge is repaired and continuous water supply is expected even when river water level is high.
Unit Dlingo Sub-unit Ngreboh	WTP with intake pump	Capacity 5 l/s	Intake Capacity: 476 m3/day (The average of intake capacity in June and July 2006 - Data from PDAM Bantul)	Intake capacity from shallow well was reduced from 20 □/s to 10 □/s in dry season. (Information from PDAM Bantul)	Intake Capacity: 971 m3/day (The average of intake capacity in April and May 2007 - Data from PDAM Bantul)	New WTP secures additional capacity of 10 □/s (5□/s of surface water and 5 □/s of spring water) to supplement water shortage in dry season. Power arrangement is insufficient for the operation of the total system and PDAM is going to increase the power receiving to satisfy the requirement. (Information from PDAM Bantul)
	Transmission Pump and Panel	Centrifugal, Q10 l/s x H60m x 11kW x 2sets				
	Transmission Pipe	φ125mm x L760m				
	Power cable	1 L.S				
	Spring Capture	Capacity 5 l/s				
Sub-unit Grajekan	Repair of Operation Bldg.	1 L.S.	Evaluation of O & M (Pump): Level 1 (Seriously Problematic)	Pump would be easily damaged due to leaks from damaged roof of pump house.	Evaluation of O & M (Pump): Level 5 (Very Good)	Pump house is repaired and pump operation can be continued.
Unit Imogiri	Construction of Pipe Bridge	GIPφ150mm x L84m	Supplied connection: 0 connection	River crossing pipe was damaged by the earthquake	Supplied Connection: 260 connection	Permanent distribution pipeline of SPφ150 is

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
			(Number of supplied connections before EPP was considered as 0 since nobody would get water after removal of the temporary pipes.)	and temporary pipes were laid along bridge. Road authority requested to remove the temporary the pipes along bridge.	(Information from PDAM) Distribution to the downstream is 373 m3/day. (The average of April and May 2007- Data of PDAM Bantul)	installed along the bridge. The new pipeline enables the continuous water supply to the downstream of the bridge.
Unit Banguntapan	Pipe Replacement	PVCφ150mm x L1200m	Water pressure in distribution system: 0.025 Mpa. (Measured at 12:55 on Dec. 1, 2006 at Jl.Wonosari Km 7.5) Supplied connection: 0 connection (The number of supplied connection is set as 0 since water supply is insufficient and frequently stopped)	Some parts of distribution pipe were floated and appeared to the earth after the earthquake. The frequent leakage due to the damage was disturbing continuous water supply.	Water pressure in distribution system: 0.22 MPa (Measured at 12:45 on July 19, 2007 at Jl. Wonosari Km 7.5) Supplied connection: 247 connections (Information form PDAM Bantul) Distribution to downstream is 179 m3/day. (The average of Apirl and May 2007- Data of PDAM Bantul)	The damaged distribution main is replaced with new pipes and stable water supply is possible. Leakage is reduced from 50.9% (average of Jan and Feb 2007) to 32.3 % (average of Mar. Apr. and May 2007). Operation hour of transmission pump is shortened from 14 hrs to 8 hrs since leakage is reduced. (Data of PDAM Bantul)

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
Unit Banguntapan (continued)	Reconstruction of Office Bldg.	Brick structure, 48m2	Evaluation of O & M (Customer relation and meter reading): Level 2 (Problematic)	Customer services, staff meeting and storing of document were done in temporary office. This made the service level low. Reaction to complains from the consumer was slow and office works for meter reading was difficult to execute. (Information from PDAM Bantul)	Evaluation of O & M (Customer relation and meter reading): Level 5 (Very Good)	As the office building is reconstructed, seven staff starts normal office works, such as customer service, staff meeting, and document storing. Complain from the customers is reduced becomes of easy response by the staff. Office works for meter reading is done in normal way. (Information from PDAM Bantul)
Unit Bantul	Repair of Office Bldg.	Brick structure, 36m2	Evaluation of O & M (Customer relation and meter reading): Level 2 (Problematic)	Customer services, staff meeting, and office works for meter reading were done in temporary office. This caused level down of services. (Information from PDAM Bantul)	Evaluation of O & M (Customer relation and meter reading): Level 5 (Very Good)	As the office building is repaired, nine staff starts normal office works, such as customer service, staff meeting, and office works for meter reading. Complain from customers are reduced due to easy response. (Information from PDAM Bantul)

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
Unit Bantul (continued)	Repair of Storage at Office	Concrete block wall, 40m2	Evaluation of O & M (Storage): Level 2 (Problematic)	Stored documents and equipment were easy to be damaged and/or lost due to broken roof and/or walls of storehouse. (Information from PDAM Bantul)	Evaluation of O & M (Storage): Level 5 (Very Good)	As walls of the storage are repaired, tool/ equipment can be stored in proper manner. Safety from theft is also secured. The storage will soon be used in normal way. (Information from PDAM Bantul)
	Repair of Storage at Plant	Concrete block wall, 40m2	Evaluation of O & M (Storage): Level 2 (Problematic)	The store house is used as the central storage of PDAM Bantul but was damaged by the earthquake. Due to fall down of the walls, it was worried that stored materials would be deteriorated and/or stolen. The stored materials included pipes, vales, water meters, chlorine, equipment for repair, and documents.	Evaluation of O & M (Storage): Level 4 (Good)	As the walls are repaired the stored material can not be stolen easily. The store house becomes safe and acts as the central storage of PDAM Bantul. PDAM Bantul is going to repair leakage from roof, which is damaged before earthquake and not included in EPP.

Appendix 11.5 b Evaluation and Effects of Emergency Pilot Project

【Community Water Supply System in Bantul Regency】

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
Dusun Mangunan II	Transmission Pipe	GIP φ25mm x L66m	Intake Capacity: 7.1 m3/day (0.33 □/s×6 h/day) Supplied connection: 25 connections (Information of Community)	Temporal PVC pipe was used after transmission pipe was damaged by the earthquake. Leakage was big from the temporal pipe, which reliability was low.	Intake Capacity:10.0 m3/day (0.31 □/s×9h/day) Supplied connection: 40 connections (Information of Community)	Water supply becomes stable and leakage is reduced after replacement with GIP transmission pipes.
Dusun Mangunan I	construction of shallow well	φ1.0m x H3m deepening	Intake Capacity: 0 m3/day Supplied connection: 0 connection (Information of Community)	Water was not available due to drop of water table after earthquake. Transmission pipe was also damaged.	Intake Capacity:5.2 m3/day (0.72 □/s×2h/day) Supplied connection: 70 connection （5 connection/d） (Information of Community)	Water is transmitted after deepening shallow wells by 3 meters and repairing transmission system. Water supply is improved after EPP while it is still insufficient in dry season.
	Intake Pump (submergible)	Q0.75 l/s x H46m x 450 W				
	Booster Pump (Centrifugal)	Q0.75 l/s x H46m x 450 W				
	Construction of Sump Well	Brick structure Cap. 1m3				
	Transmission Pipe	GIP φ25mm x L50m				
Dusun Cempluk II	construction of shallow Well	φ1.0m x H10m	Intake Capacity: 3.2 m3/day (0.09 □/s×10 h/day) Supplied connection: 2 connections	Water was not available due to drop of water table after earthquake. Transmission pipe was also damaged. In dry season water from other sources was not available.	Intake Capacity: 0 m3/day (Expected usage in dry season: 0.31 □/s x 7.5 h/day =8.4 m3/day） Expected supply: 28 connections	Stable water supply can be done from the new well in dry season through repaired transmission pipe by EPP.
	Intake Pump (submersible)	Q0.27 l/s x H45m x 320 W				
	Transmission Pipe	GIP φ25mm x L1,230m				
Dusun Mangunan	Intake Pump (submersible)	Q0.52 l/s x H60m x 450 W	Intake Capacity: 5.2 m3/day	Water supply was easy to stop due to damage of	Intake Capacity: 5.2 m3/day	Water supply becomes stable because of pump

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
	Transmission Pipe	GIP φ25mm x L50m	(0.29 □/s×5 h/day) Supplied connection: 20 connections	intake pump. Transmission pipe was also damaged.	(0.48 □/s×3 h/day) Supplied connection: 100 connections	replacement and pipe repair.
Dusun Kanigoro	Intake Pump (submersible)	Q0.35 l/s x H60m x 450 W	Intake Capacity: 0 m3/day Supplied connection: 0 connection (Information of Community)	Water was not lifted due to damage of intake pump. Reservoir, pipes, public hydrant were also damaged. Residents were procuring water from water tanker.	Intake Capacity: 0 m3/day (Expected usage in dry season: 0.29 □/s x 7h/day =7.3 m3/day) Expected supply: 85 connections	It becomes possible to transmit water after replacement of pumps and reconstruction of reservoir. (Power arrangement is done by the community.) Repaired public hydrants are also ready to be used.
	Booster Pump	Q0.35 l/s x H60m x 450 W				
	Construction of Sump Well	Brick structure 1m3x 1no				
	Reconstruction of Reservoir	Brick structure, 8m3 x 1no				
	Distribution Pipe	PVC, φ25mm x L70m				
	Repair of Public Hydrant	Platform, 4 nos				
Dusun Lemahabang	Intake Pump (submersible)	Q0.37 l/s x H60m x 450 W	Intake Capacity: 0 m3/day Supplied connection: 0 connection (Information of Community)	Water was not lifted due to damage of intake pump. Transmission pipe was also damaged. In dry season water from other sources was insufficient.	Intake Capacity: 0 m3/day (Expected usage in dry season: 0.30 □/s x 1 7.5 h/day =18.9 m3/day) Expected supply : 120 connections (Information of Community)	It becomes possible to transmit water after replacement of pumps and repair of transmission pipe and reservoir.
	Transmission Pipe	GIP, φ25mm xL240m				
	Reservoir	Brick structure, 8m3 x 1no				
Dusun Terong I	construction of shallow well	φ1.0m x D6m w/casing (10m)	Intake Capacity: 0 m3/day Supplied connection:	Water was not available due to drop of water table after earthquake. Reservoir, pipes and public	Intake Capacity: 10.4 m3/day (0.72 □/s×4 h/day) Supplied connection:	Water supply is started by using newly constructed shallow well, transmission pipe, and reservoir. By
	Intake Pump	Q0.75 l/s x H21m x 250 W				

Project Site	Scope of Work		After Earthquake (Before EPP)		After Execution of EPP	
			Indices of Evaluation	Status and Damage after the earthquake	Indices of Evaluation	Status and Improvement after EPP
	Booster Pump	Q0.75 l/s x H60m x 450 W	0 connection (Information of Community)	hydrant were also damaged.	55 connections (Information of Community)	repair of distribution pipe, number of supplied connection is increased from 15 to 55.
	Construction of Sump Well	Brick structure 1 m3x 1 no				
	Transmission Pipe	GIP, φ25mm x L380m				
	Reservoir	Brick structure, 8m3 x 1 no				
	Construction of retaining wall for Public Hydrant	h=1.5m x L5m				
	Distribution pipe	PVCφ25mm x L 3800m				

Appendix 11.6 Photos of Emergency Pilot Project (EPP)

1. Water Treatment Plant in Unit Dlingo (PDAM Bantul)

1) Status of the Site Before and After Construction

Access road (Before Construction)

Access road (After Construction)

WTP Site (Before Construction)

WTP Site (After Construction)

Spring Capture Site (Before Construction)

Spring Capture Site (After Construction)

Appendix for Chapter 13

Appendix 13.11 Summary of Domestic Water Demand in Bantul Regency (l/sec)

Appendix 13.12 Summary of Domestic Water Demand

Appendix 13.1 Past Population Data for Future Population Projection, Yogyakarta Municipality

ID No.	Kecamatan/Kelurahan	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
10100	**MANTRIJERON**	**31,561**	**31,689**	**31,818**	**31,946**	**32,075**	**32,203**	**32,331**	**32,460**	**32,588**	**32,717**	**32,845**	**32,908**	**32,970**	**33,033**	**33,095**	**33,158**	**33,037**	**32,917**	**32,797**	**32,677**	**32,557**	**32,913**	**33,269**	**33,625**	**33,981**	**34,338**
10101	Gedongkiwo	11,463	11,560	11,658	11,755	11,852	11,950	12,047	12,144	12,241	12,339	12,436	12,455	12,473	12,492	12,510	12,529	12,478	12,428	12,377	12,327	12,276	12,405	12,534	12,662	12,791	12,920
10102	Suryodiningratan	9,349	9,392	9,434	9,477	9,519	9,562	9,604	9,647	9,689	9,732	9,774	9,864	9,955	10,045	10,136	10,226	10,260	10,295	10,329	10,363	10,397	10,586	10,776	10,965	11,155	11,344
10103	Mantrijeron	10,749	10,738	10,726	10,715	10,703	10,692	10,681	10,669	10,658	10,646	10,635	10,589	10,542	10,496	10,449	10,403	10,299	10,195	10,091	9,988	9,884	9,922	9,960	9,997	10,035	10,073
10200	**KRATON**	**26,557**	**26,182**	**25,807**	**25,432**	**25,057**	**24,682**	**24,307**	**23,932**	**23,557**	**23,182**	**22,807**	**22,564**	**22,320**	**22,077**	**21,833**	**21,590**	**21,227**	**20,865**	**20,503**	**20,140**	**19,778**	**19,692**	**19,606**	**19,520**	**19,434**	**19,348**
10201	Patehan	6,955	6,844	6,732	6,621	6,510	6,399	6,287	6,176	6,065	5,953	5,842	5,801	5,760	5,719	5,678	5,637	5,565	5,493	5,421	5,349	5,277	5,280	5,283	5,285	5,288	5,291
10202	Panembahan	11,581	11,435	11,289	11,142	10,996	10,850	10,704	10,558	10,411	10,265	10,119	9,966	9,813	9,660	9,506	9,353	9,149	8,944	8,739	8,535	8,330	8,239	8,149	8,058	7,968	7,877
10203	Kadipaten	8,021	7,904	7,786	7,669	7,551	7,434	7,316	7,199	7,081	6,964	6,846	6,797	6,747	6,698	6,649	6,599	6,514	6,428	6,342	6,257	6,171	6,173	6,175	6,176	6,178	6,180
10300	**MERGANGSAN**	**32,683**	**32,634**	**32,584**	**32,535**	**32,485**	**32,436**	**32,386**	**32,337**	**32,287**	**32,238**	**32,188**	**32,196**	**32,203**	**32,211**	**32,219**	**32,227**	**32,057**	**31,887**	**31,717**	**31,548**	**31,378**	**31,665**	**31,952**	**32,238**	**32,525**	**32,812**
10301	Brontokusuman	9,709	9,761	9,812	9,864	9,915	9,967	10,018	10,070	10,121	10,173	10,224	10,330	10,436	10,542	10,648	10,754	10,801	10,848	10,894	10,941	10,988	11,199	11,411	11,622	11,834	12,045
10302	Keparakan	9,873	9,795	9,716	9,638	9,559	9,481	9,403	9,324	9,246	9,167	9,089	9,081	9,073	9,064	9,056	9,048	8,990	8,932	8,874	8,816	8,758	8,827	8,896	8,965	9,034	9,103
10303	Wirogunan	13,101	13,078	13,056	13,033	13,011	12,988	12,965	12,943	12,920	12,898	12,875	12,785	12,695	12,605	12,515	12,425	12,266	12,108	11,949	11,791	11,632	11,638	11,645	11,651	11,658	11,664
10400	**UMBULHARJO**	**39,823**	**41,643**	**43,464**	**45,284**	**47,104**	**48,925**	**50,745**	**52,565**	**54,385**	**56,206**	**58,026**	**59,328**	**60,630**	**61,932**	**63,234**	**64,536**	**65,483**	**66,429**	**67,376**	**68,322**	**69,269**	**71,283**	**73,296**	**75,310**	**77,324**	**79,337**
10401	Semaki	6,788	6,787	6,786	6,785	6,784	6,784	6,783	6,782	6,781	6,780	6,779	6,728	6,677	6,625	6,574	6,523	6,436	6,348	6,261	6,174	6,087	6,086	6,085	6,084	6,083	6,082
10402	Muja-muju	6,034	6,460	6,886	7,312	7,738	8,164	8,589	9,015	9,441	9,867	10,293	10,388	10,482	10,577	10,671	10,766	10,801	10,836	10,871	10,907	10,942	11,141	11,339	11,538	11,737	11,935
10403	Tahunan	5,343	5,628	5,913	6,199	6,484	6,769	7,054	7,339	7,625	7,910	8,195	8,357	8,519	8,682	8,844	9,006	9,119	9,231	9,344	9,456	9,569	9,828	10,087	10,347	10,606	10,865
10404	Warungboto	7,084	7,157	7,229	7,302	7,375	7,448	7,520	7,593	7,666	7,738	7,811	8,047	8,282	8,518	8,754	8,989	9,175	9,362	9,548	9,734	9,920	10,261	10,602	10,944	11,285	11,626
10405	Pandeyan	5,089	5,622	6,155	6,688	7,221	7,754	8,287	8,820	9,353	9,886	10,419	10,650	10,882	11,113	11,344	11,575	11,743	11,910	12,078	12,245	12,413	12,772	13,130	13,489	13,848	14,206
10406	Sorosutan	6,738	7,064	7,390	7,715	8,041	8,367	8,693	9,019	9,344	9,670	9,996	10,460	10,924	11,389	11,853	12,317	12,713	13,110	13,506	13,903	14,299	14,925	15,550	16,176	16,802	17,427
10407	Giwangan	2,747	2,926	3,104	3,283	3,461	3,640	3,819	3,997	4,176	4,354	4,533	4,698	4,864	5,029	5,194	5,360	5,496	5,631	5,767	5,903	6,039	6,270	6,502	6,733	6,964	7,195
10500	**KOTAGEDE**	**16,775**	**17,427**	**18,079**	**18,732**	**19,384**	**20,036**	**20,688**	**21,340**	**21,993**	**22,645**	**23,297**	**24,473**	**25,650**	**26,826**	**28,003**	**29,179**	**28,923**	**28,668**	**28,412**	**28,156**	**27,900**	**28,719**	**29,538**	**30,357**	**31,176**	**31,995**
10501	Rejowinangun	4,187	4,526	4,864	5,203	5,542	5,881	6,219	6,558	6,897	7,235	7,574	8,326	9,078	9,830	10,582	11,335	11,063	10,792	10,520	10,249	9,977	10,350	10,723	11,096	11,469	11,842
10502	Prenggan	6,181	6,401	6,621	6,841	7,061	7,281	7,501	7,721	7,941	8,161	8,381	8,549	8,717	8,884	9,052	9,220	9,337	9,454	9,571	9,688	9,805	10,072	10,340	10,607	10,874	11,141
10503	Purbayan	6,407	6,501	6,594	6,688	6,781	6,875	6,968	7,062	7,155	7,249	7,342	7,599	7,855	8,112	8,368	8,625	8,523	8,422	8,321	8,219	8,118	8,297	8,475	8,654	8,832	9,011
10600	**GONDOKUSUMAN**	**57,067**	**57,016**	**56,966**	**56,915**	**56,865**	**56,814**	**56,763**	**56,713**	**56,662**	**56,612**	**56,561**	**55,897**	**55,233**	**54,569**	**53,905**	**53,241**	**52,283**	**51,326**	**50,369**	**49,411**	**48,454**	**48,171**	**47,887**	**47,604**	**47,320**	**47,037**
10601	Demangan	12,291	12,286	12,280	12,275	12,270	12,265	12,259	12,254	12,249	12,243	12,238	12,093	11,948	11,803	11,658	11,514	11,305	11,097	10,889	10,680	10,472	10,409	10,347	10,284	10,221	10,158
10602	Kotabaru	4,486	4,431	4,377	4,322	4,267	4,213	4,158	4,103	4,048	3,994	3,939	3,865	3,791	3,717	3,644	3,570	3,476	3,383	3,289	3,196	3,102	3,050	2,998	2,947	2,895	2,843
10603	Klitren	12,480	12,621	12,762	12,903	13,044	13,186	13,327	13,468	13,609	13,750	13,891	13,670	13,449	13,228	13,007	12,786	12,495	12,203	11,912	11,620	11,329	11,192	11,055	10,918	10,781	10,645
10604	Baciro	15,256	15,147	15,037	14,928	14,818	14,709	14,600	14,490	14,381	14,271	14,162	14,078	13,993	13,909	13,825	13,741	13,581	13,421	13,261	13,101	12,941	12,965	12,990	13,014	13,038	13,063
10605	Terban	12,554	12,532	12,509	12,487	12,465	12,443	12,420	12,398	12,376	12,353	12,331	12,191	12,051	11,911	11,771	11,631	11,427	11,222	11,018	10,814	10,610	10,554	10,497	10,441	10,385	10,328
10700	**DANUREJAN**	**26,246**	**25,964**	**25,683**	**25,401**	**25,120**	**24,838**	**24,556**	**24,275**	**23,993**	**23,712**	**23,430**	**23,123**	**22,816**	**22,508**	**22,201**	**21,894**	**21,466**	**21,038**	**20,611**	**20,183**	**19,755**	**19,600**	**19,446**	**19,291**	**19,136**	**18,981**
10701	Suryatmajan	6,291	6,212	6,132	6,053	5,973	5,894	5,815	5,735	5,656	5,576	5,497	5,426	5,355	5,284	5,212	5,141	5,042	4,942	4,843	4,743	4,644	4,609	4,574	4,538	4,503	4,468
10702	Tegalpanggung	10,321	10,246	10,171	10,097	10,022	9,947	9,872	9,797	9,723	9,648	9,573	9,469	9,366	9,262	9,158	9,055	8,901	8,748	8,594	8,441	8,287	8,249	8,211	8,174	8,136	8,098
10703	Bausasran	9,634	9,507	9,379	9,252	9,124	8,997	8,870	8,742	8,615	8,487	8,360	8,228	8,095	7,963	7,830	7,698	7,523	7,348	7,174	6,999	6,824	6,742	6,661	6,579	6,497	6,416
10800	**PAKUALAMAN**	**14,309**	**14,096**	**13,883**	**13,671**	**13,458**	**13,245**	**13,032**	**12,819**	**12,607**	**12,394**	**12,181**	**12,054**	**11,927**	**11,800**	**11,673**	**11,546**	**11,355**	**11,165**	**10,974**	**10,784**	**10,593**	**10,551**	**10,508**	**10,466**	**10,423**	**10,381**
10801	Gunungketur	6,224	6,139	6,054	5,968	5,883	5,798	5,713	5,628	5,542	5,457	5,372	5,326	5,279	5,233	5,187	5,140	5,066	4,991	4,916	4,842	4,767	4,760	4,752	4,745	4,737	4,730
10802	Purwokinanti	8,085	7,957	7,830	7,702	7,575	7,447	7,319	7,192	7,064	6,937	6,809	6,728	6,648	6,567	6,486	6,406	6,290	6,174	6,058	5,942	5,826	5,791	5,756	5,721	5,686	5,651
10900	**GONDOMANAN**	**20,105**	**19,860**	**19,616**	**19,371**	**19,127**	**18,882**	**18,637**	**18,393**	**18,148**	**17,904**	**17,659**	**17,325**	**16,990**	**16,656**	**16,321**	**15,987**	**15,564**	**15,142**	**14,719**	**14,297**	**13,874**	**13,638**	**13,402**	**13,165**	**12,929**	**12,693**
10901	Ngupasan	13,793	13,180	12,567	11,953	11,340	10,727	10,114	9,501	8,887	8,274	7,661	7,467	7,273	7,078	6,884	6,690	6,459	6,228	5,997	5,766	5,535	5,376	5,216	5,057	4,897	4,738
10902	Prawirodirjan	6,312	6,681	7,049	7,418	7,786	8,155	8,524	8,892	9,261	9,629	9,998	9,858	9,717	9,577	9,437	9,297	9,105	8,914	8,722	8,531	8,339	8,262	8,186	8,109	8,032	7,955
11000	**NGAMPILAN**	**22,403**	**22,212**	**22,021**	**21,830**	**21,639**	**21,449**	**21,258**	**21,067**	**20,876**	**20,685**	**20,494**	**20,253**	**20,013**	**19,772**	**19,532**	**19,291**	**18,944**	**18,597**	**18,251**	**17,904**	**17,557**	**17,454**	**17,352**	**17,249**	**17,146**	**17,044**
11001	Notoprajan	9,191	9,141	9,091	9,041	8,991	8,942	8,892	8,842	8,792	8,742	8,692	8,622	8,553	8,483	8,414	8,344	8,228	8,113	7,997	7,882	7,766	7,760	7,754	7,748	7,742	7,737
11002	Ngampilan	13,212	13,071	12,930	12,789	12,648	12,507	12,366	12,225	12,084	11,943	11,802	11,631	11,460	11,289	11,118	10,947	10,716	10,485	10,253	10,022	9,791	9,694	9,597	9,501	9,404	9,307
11100	**WIROBRAJAN**	**25,312**	**25,478**	**25,645**	**25,811**	**25,977**	**26,144**	**26,310**	**26,476**	**26,642**	**26,809**	**26,975**	**27,016**	**27,056**	**27,097**	**27,137**	**27,178**	**27,069**	**26,959**	**26,850**	**26,741**	**26,632**	**26,912**	**27,192**	**27,472**	**27,752**	**28,032**
11101	Patangpuluhan	6,097	6,183	6,269	6,355	6,441	6,528	6,614	6,700	6,786	6,872	6,958	6,956	6,954	6,951	6,949	6,947	6,907	6,866	6,826	6,785	6,745	6,803	6,860	6,918	6,975	7,033
11102	Wirobrajan	8,626	8,738	8,849	8,961	9,072	9,184	9,295	9,407	9,518	9,630	9,741	9,770	9,799	9,829	9,858	9,887	9,862	9,837	9,811	9,786	9,761	9,879	9,997	10,115	10,233	10,351
11103	Pakuncen	10,589	10,558	10,526	10,495	10,464	10,433	10,401	10,370	10,339	10,307	10,276	10,289	10,303	10,316	10,330	10,343	10,300	10,256	10,213	10,169	10,126	10,230	10,335	10,439	10,543	10,648

ID No.	Kecamatan/Kelurahan	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
11200	**GEDONGTENGEN**	**26,058**	**25,735**	**25,411**	**25,088**	**24,765**	**24,442**	**24,118**	**23,795**	**23,472**	**23,148**	**22,825**	**22,385**	**21,945**	**21,505**	**21,065**	**20,625**	**20,071**	**19,518**	**18,964**	**18,411**	**17,857**	**17,543**	**17,229**	**16,914**	**16,600**	**16,286**
11201	Pringgokusuman	13,923	13,835	13,747	13,660	13,572	13,484	13,396	13,308	13,221	13,133	13,045	12,886	12,727	12,567	12,408	12,249	12,023	11,796	11,569	11,343	11,116	11,044	10,971	10,899	10,827	10,754
11202	Sosromenduran	12,135	11,900	11,664	11,429	11,193	10,958	10,722	10,487	10,251	10,016	9,780	9,499	9,218	8,937	8,657	8,376	8,049	7,722	7,395	7,068	6,741	6,499	6,257	6,015	5,773	5,532
11300	**JETIS**	**32,669**	**32,462**	**32,256**	**32,049**	**31,843**	**31,636**	**31,429**	**31,223**	**31,016**	**30,810**	**30,603**	**30,218**	**29,832**	**29,447**	**29,061**	**28,676**	**28,132**	**27,589**	**27,046**	**26,502**	**25,959**	**25,775**	**25,592**	**25,408**	**25,224**	**25,040**
11301	Bumijo	10,516	10,586	10,655	10,725	10,795	10,865	10,934	11,004	11,074	11,143	11,213	11,111	11,009	10,908	10,806	10,704	10,543	10,382	10,222	10,061	9,900	9,878	9,857	9,835	9,814	9,792
11302	Gowongan	10,580	10,419	10,257	10,096	9,934	9,773	9,612	9,450	9,289	9,127	8,966	8,808	8,649	8,491	8,332	8,174	7,971	7,767	7,564	7,360	7,157	7,050	6,944	6,837	6,730	6,624
11303	Cokrodiningratan	11,573	11,458	11,343	11,228	11,113	10,999	10,884	10,769	10,654	10,539	10,424	10,299	10,174	10,048	9,923	9,798	9,619	9,440	9,260	9,081	8,902	8,846	8,791	8,735	8,680	8,624
11400	**TEGALREJO**	**26,624**	**27,178**	**27,733**	**28,287**	**28,842**	**29,396**	**29,950**	**30,505**	**31,059**	**31,614**	**32,168**	**32,560**	**32,952**	**33,344**	**33,736**	**34,128**	**34,332**	**34,536**	**34,740**	**34,944**	**35,148**	**35,881**	**36,614**	**37,347**	**38,080**	**38,813**
11401	Kricak	8,790	9,025	9,259	9,494	9,728	9,963	10,198	10,432	10,667	10,901	11,136	11,281	11,427	11,572	11,717	11,863	11,943	12,023	12,103	12,183	12,263	12,528	12,793	13,058	13,323	13,588
11402	Karangwaru	9,722	9,711	9,699	9,688	9,677	9,666	9,654	9,643	9,632	9,620	9,609	9,664	9,718	9,773	9,828	9,883	9,883	9,883	9,883	9,884	9,884	10,031	10,177	10,324	10,470	10,617
11403	Tegalrejo	5,787	5,981	6,176	6,370	6,564	6,759	6,953	7,147	7,341	7,536	7,730	7,842	7,955	8,067	8,180	8,292	8,359	8,426	8,492	8,559	8,626	8,823	9,021	9,218	9,415	9,613
11404	Bener	2,325	2,462	2,599	2,735	2,872	3,009	3,146	3,283	3,419	3,556	3,693	3,772	3,852	3,931	4,011	4,090	4,147	4,204	4,261	4,318	4,375	4,499	4,623	4,748	4,872	4,996
Total		398,192	399,579	400,965	402,352	403,739	405,126	406,512	407,899	409,286	410,672	412,059	412,298	412,537	412,776	413,015	413,254	409,945	406,637	403,328	400,020	396,711	399,796	402,881	405,966	409,051	412,137

Note:
Census data is applied for populations in 1980, 1990, and 2000. Population in other years are calculated as average of interpolated census data and interpolated SUPAS data.

Appendix 13.2 Past Population Data for Future Population Projection, Sleman Regency

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
20100	**MOYUDAN**	**30,444**	**30,352**	**30,260**	**30,168**	**30,076**	**29,984**	**29,892**	**29,800**	**29,708**	**29,616**	**29,524**	**29,331**	**29,138**	**28,945**	**28,753**	**28,560**	**28,662**	**28,764**	**28,867**	**28,969**	**29,071**	**29,110**	**29,150**	**29,189**	**29,228**	**29,268**
20101	Sumberahayu	6,204	6,197	6,191	6,184	6,177	6,171	6,164	6,157	6,150	6,144	6,137	6,076	6,016	5,955	5,894	5,833	5,833	5,832	5,832	5,831	5,831	5,817	5,803	5,789	5,775	5,761
20102	Sumbersari	7,046	7,038	7,029	7,021	7,012	7,004	6,996	6,987	6,979	6,970	6,962	6,921	6,881	6,840	6,799	6,758	6,788	6,817	6,846	6,875	6,904	6,918	6,933	6,947	6,962	6,976
20103	Sumberagung	10,284	10,273	10,263	10,252	10,242	10,231	10,220	10,210	10,199	10,189	10,178	10,128	10,079	10,029	9,979	9,930	9,982	10,035	10,088	10,141	10,194	10,226	10,257	10,289	10,320	10,352
20104	Sumberarum	6,910	6,844	6,777	6,711	6,645	6,579	6,512	6,446	6,380	6,313	6,247	6,205	6,164	6,122	6,080	6,039	6,059	6,080	6,101	6,121	6,142	6,149	6,157	6,164	6,171	6,179
20200	**MINGGIR**	**31,056**	**30,863**	**30,670**	**30,477**	**30,284**	**30,091**	**29,897**	**29,704**	**29,511**	**29,318**	**29,125**	**28,879**	**28,633**	**28,387**	**28,141**	**27,895**	**27,938**	**27,980**	**28,022**	**28,065**	**28,107**	**28,086**	**28,065**	**28,045**	**28,024**	**28,003**
20201	Sendangmulyo	7,147	7,095	7,044	6,992	6,941	6,889	6,837	6,786	6,734	6,683	6,631	6,597	6,563	6,529	6,495	6,461	6,493	6,526	6,559	6,591	6,624	6,643	6,661	6,680	6,699	6,718
20202	Sendangarum	3,568	3,546	3,524	3,501	3,479	3,457	3,435	3,413	3,390	3,368	3,346	3,321	3,297	3,272	3,248	3,223	3,232	3,241	3,249	3,258	3,267	3,269	3,270	3,272	3,273	3,275
20203	Sendangrejo	7,690	7,666	7,643	7,619	7,596	7,572	7,548	7,525	7,501	7,478	7,454	7,394	7,334	7,274	7,215	7,155	7,169	7,183	7,197	7,211	7,225	7,223	7,221	7,219	7,217	7,215
20204	Sendangagung	7,708	7,652	7,596	7,540	7,484	7,428	7,371	7,315	7,259	7,203	7,147	6,830	6,514	6,197	5,881	5,564	5,305	5,046	4,787	4,528	4,269	3,990	3,710	3,431	3,151	2,872
20205	Sendangsari	4,943	4,903	4,864	4,824	4,785	4,745	4,705	4,666	4,626	4,587	4,547	4,736	4,925	5,114	5,303	5,493	5,738	5,984	6,230	6,476	6,722	6,962	7,203	7,443	7,684	7,924
20300	**SAYEGAN**	**36,524**	**36,598**	**36,672**	**36,746**	**36,820**	**36,895**	**36,969**	**37,043**	**37,117**	**37,191**	**37,265**	**37,266**	**37,267**	**37,268**	**37,269**	**37,270**	**37,656**	**38,043**	**38,429**	**38,815**	**39,201**	**39,512**	**39,824**	**40,135**	**40,447**	**40,758**
20301	Margodadi	7,138	7,135	7,131	7,128	7,124	7,121	7,117	7,114	7,110	7,107	7,103	7,071	7,039	7,007	6,976	6,944	6,984	7,023	7,063	7,103	7,143	7,168	7,193	7,218	7,243	7,268
20302	Margoluwih	7,059	7,090	7,121	7,153	7,184	7,215	7,246	7,277	7,309	7,340	7,371	7,390	7,409	7,428	7,448	7,467	7,563	7,659	7,755	7,852	7,948	8,030	8,112	8,194	8,275	8,357
20303	Margomulyo	8,177	8,258	8,338	8,419	8,499	8,580	8,660	8,741	8,821	8,902	8,982	9,005	9,028	9,052	9,075	9,098	9,215	9,332	9,450	9,567	9,684	9,784	9,883	9,983	10,083	10,182
20304	Margoagung	7,740	7,755	7,771	7,786	7,801	7,817	7,832	7,847	7,862	7,878	7,893	7,879	7,864	7,850	7,836	7,821	7,888	7,954	8,021	8,087	8,154	8,204	8,255	8,305	8,356	8,406
20305	Margokaton	6,410	6,361	6,311	6,262	6,212	6,163	6,114	6,064	6,015	5,965	5,916	5,921	5,926	5,931	5,936	5,941	6,007	6,073	6,139	6,206	6,272	6,327	6,381	6,436	6,490	6,545
20400	**GODEAN**	**44,137**	**44,623**	**45,109**	**45,595**	**46,081**	**46,567**	**47,052**	**47,538**	**48,024**	**48,510**	**48,996**	**49,224**	**49,451**	**49,679**	**49,906**	**50,134**	**50,880**	**51,625**	**52,371**	**53,116**	**53,862**	**54,514**	**55,166**	**55,817**	**56,469**	**57,121**
20401	Sidorejo	6,067	6,046	6,024	6,003	5,981	5,960	5,938	5,917	5,895	5,874	5,852	5,808	5,763	5,719	5,674	5,630	5,644	5,658	5,671	5,685	5,699	5,700	5,701	5,703	5,704	5,705
20402	Sidoluhur	7,939	7,958	7,976	7,995	8,013	8,032	8,051	8,069	8,088	8,106	8,125	8,131	8,138	8,144	8,150	8,157	8,247	8,338	8,429	8,519	8,610	8,684	8,759	8,833	8,908	8,982
20403	Sidomulyo	4,798	4,820	4,842	4,864	4,886	4,908	4,930	4,952	4,974	4,996	5,018	5,024	5,030	5,036	5,042	5,048	5,106	5,164	5,223	5,281	5,339	5,387	5,435	5,484	5,532	5,580
20404	Sidoagung	5,920	5,996	6,073	6,149	6,225	6,302	6,378	6,454	6,530	6,607	6,683	6,692	6,702	6,711	6,721	6,730	6,809	6,888	6,967	7,046	7,125	7,191	7,257	7,322	7,388	7,454
20405	Sidokarto	7,382	7,409	7,436	7,464	7,491	7,518	7,545	7,572	7,600	7,627	7,654	7,688	7,723	7,757	7,791	7,825	7,940	8,056	8,171	8,286	8,401	8,501	8,602	8,702	8,803	8,903
20406	Sidoarum	6,789	7,110	7,430	7,751	8,071	8,392	8,713	9,033	9,354	9,674	9,995	10,189	10,383	10,577	10,771	10,965	11,273	11,580	11,887	12,195	12,502	12,793	13,084	13,375	13,666	13,957
20407	Sidomoyo	5,242	5,285	5,327	5,370	5,413	5,456	5,498	5,541	5,584	5,626	5,669	5,691	5,713	5,735	5,756	5,778	5,860	5,941	6,023	6,104	6,186	6,257	6,327	6,398	6,468	6,539
20500	**GAMPING**	**48,514**	**49,682**	**50,850**	**52,017**	**53,185**	**54,353**	**55,521**	**56,689**	**57,856**	**59,024**	**60,192**	**63,743**	**67,294**	**70,845**	**74,396**	**77,948**	**77,600**	**77,253**	**76,906**	**76,559**	**76,212**	**78,061**	**79,910**	**81,760**	**83,609**	**85,458**
20501	Balecatur	10,498	10,588	10,679	10,769	10,859	10,950	11,040	11,130	11,220	11,311	11,401	11,759	12,117	12,475	12,833	13,191	13,685	14,179	14,674	15,168	15,662	16,140	16,619	17,097	17,575	18,054
20502	Ambarketawang	11,876	12,065	12,255	12,444	12,634	12,823	13,012	13,202	13,391	13,581	13,770	14,713	15,656	16,599	17,542	18,486	18,235	17,984	17,733	17,483	17,232	17,634	18,036	18,438	18,839	19,241
20503	Banyuraden	8,209	8,489	8,768	9,048	9,327	9,607	9,886	10,166	10,445	10,725	11,004	11,844	12,684	13,524	14,364	15,204	14,977	14,749	14,521	14,294	14,066	14,418	14,770	15,122	15,474	15,826
20504	Nogotirto	8,083	8,603	9,122	9,642	10,162	10,682	11,201	11,721	12,241	12,760	13,280	14,032	14,783	15,535	16,287	17,038	16,847	16,655	16,463	16,271	16,079	16,410	16,741	17,073	17,404	17,735
20505	Trihanggo	9,848	9,937	10,026	10,115	10,204	10,293	10,381	10,470	10,559	10,648	10,737	11,395	12,054	12,712	13,370	14,029	13,858	13,686	13,515	13,344	13,173	13,459	13,745	14,031	14,316	14,602
20600	**MLATI**	**50,328**	**51,731**	**53,133**	**54,536**	**55,938**	**57,341**	**58,744**	**60,146**	**61,549**	**62,951**	**64,354**	**65,478**	**66,602**	**67,726**	**68,850**	**69,974**	**71,821**	**73,668**	**75,515**	**77,362**	**79,209**	**80,949**	**82,689**	**84,428**	**86,168**	**87,908**
20601	Tirtoadi	6,694	6,729	6,764	6,799	6,834	6,869	6,904	6,939	6,974	7,009	7,044	7,072	7,099	7,127	7,154	7,182	7,284	7,386	7,487	7,589	7,691	7,779	7,867	7,956	8,044	8,132
20602	Sumberadi	9,580	9,625	9,670	9,714	9,759	9,804	9,849	9,894	9,938	9,983	10,028	10,142	10,257	10,371	10,485	10,600	10,824	11,047	11,271	11,495	11,719	11,925	12,131	12,337	12,543	12,749
20603	Tlogoadi	7,423	7,471	7,520	7,568	7,616	7,665	7,713	7,761	7,809	7,858	7,906	8,035	8,164	8,293	8,422	8,551	8,768	8,986	9,203	9,421	9,638	9,842	10,046	10,250	10,454	10,658
20604	Sendangadi	8,496	8,720	8,944	9,169	9,393	9,617	9,841	10,065	10,290	10,514	10,738	10,852	10,967	11,081	11,196	11,310	11,542	11,773	12,004	12,236	12,467	12,679	12,891	13,103	13,315	13,527
20605	Sinduadi	18,135	19,185	20,236	21,286	22,336	23,387	24,437	25,487	26,537	27,588	28,638	29,377	30,115	30,854	31,592	32,331	33,404	34,476	35,549	36,621	37,694	38,724	39,753	40,783	41,812	42,842
20700	**DEPOK**	**82,661**	**87,227**	**91,792**	**96,358**	**100,923**	**105,489**	**110,054**	**114,620**	**119,185**	**123,751**	**128,316**	**130,588**	**132,860**	**135,133**	**137,405**	**139,677**	**143,392**	**147,108**	**150,823**	**154,539**	**158,254**	**161,756**	**165,258**	**168,761**	**172,263**	**175,765**
20701	Caturtunggal	47,068	49,828	52,589	55,349	58,109	60,870	63,630	66,390	69,150	71,911	74,671	75,065	75,459	75,853	76,246	76,640	77,826	79,012	80,198	81,383	82,569	83,613	84,656	85,700	86,744	87,788
20702	Maguwoharjo	15,174	15,806	16,437	17,069	17,701	18,333	18,964	19,596	20,228	20,859	21,491	22,268	23,045	23,822	24,599	25,376	26,415	27,454	28,494	29,533	30,572	31,583	32,594	33,605	34,617	35,628
20703	Condongcatur	20,419	21,593	22,766	23,940	25,113	26,287	27,460	28,634	29,807	30,981	32,154	33,255	34,357	35,458	36,559	37,661	39,151	40,642	42,132	43,623	45,113	46,560	48,008	49,455	50,902	52,350
20800	**BERBAH**	**32,515**	**32,748**	**32,982**	**33,215**	**33,449**	**33,682**	**33,915**	**34,149**	**34,382**	**34,616**	**34,849**	**35,003**	**35,156**	**35,310**	**35,463**	**35,617**	**36,138**	**36,660**	**37,181**	**37,703**	**38,224**	**38,679**	**39,133**	**39,588**	**40,043**	**40,497**
20801	Sendangtirto	8,778	8,920	9,062	9,204	9,346	9,489	9,631	9,773	9,915	10,057	10,199	10,307	10,415	10,523	10,631	10,740	10,959	11,178	11,397	11,616	11,835	12,036	12,236	12,437	12,638	12,839
20802	Tegaltirto	7,585	7,647	7,710	7,772	7,834	7,897	7,959	8,021	8,083	8,146	8,208	8,194	8,180	8,166	8,151	8,137	8,207	8,277	8,347	8,417	8,487	8,540	8,593	8,647	8,700	8,753
20803	Jogotirto	7,773	7,765	7,757	7,749	7,741	7,733	7,724	7,716	7,708	7,700	7,692	7,660	7,629	7,597	7,566	7,534	7,580	7,626	7,673	7,719	7,765	7,795	7,825	7,856	7,886	7,916
20804	Kalitirto	8,379	8,416	8,453	8,490	8,527	8,565	8,602	8,639	8,676	8,713	8,750	8,841	8,932	9,023	9,115	9,206	9,392	9,578	9,764	9,951	10,137	10,307	10,478	10,648	10,819	10,989

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
20900	**PRAMBANAN**	**37,322**	**37,493**	**37,665**	**37,836**	**38,007**	**38,179**	**38,350**	**38,521**	**38,692**	**38,864**	**39,035**	**39,061**	**39,086**	**39,112**	**39,138**	**39,163**	**39,594**	**40,024**	**40,454**	**40,885**	**41,315**	**41,668**	**42,020**	**42,373**	**42,725**	**43,078**
20901	Sumberharjo	10,169	10,223	10,276	10,330	10,383	10,437	10,490	10,544	10,597	10,651	10,704	10,703	10,703	10,702	10,702	10,701	10,811	10,921	11,031	11,141	11,251	11,340	11,428	11,517	11,605	11,694
20902	Wukirharjo	2,054	2,064	2,073	2,083	2,092	2,102	2,112	2,121	2,131	2,140	2,150	2,142	2,134	2,125	2,117	2,109	2,123	2,136	2,150	2,163	2,177	2,186	2,195	2,204	2,214	2,223
20903	Gayamharjo	3,866	3,870	3,874	3,879	3,883	3,887	3,891	3,895	3,900	3,904	3,908	3,890	3,873	3,855	3,838	3,820	3,842	3,864	3,886	3,908	3,930	3,944	3,958	3,971	3,985	3,999
20904	Sambirojo	4,121	4,169	4,217	4,264	4,312	4,360	4,408	4,456	4,503	4,551	4,599	4,571	4,542	4,514	4,485	4,457	4,475	4,492	4,510	4,527	4,545	4,553	4,561	4,569	4,576	4,584
20905	Madurojo	9,854	9,847	9,839	9,832	9,824	9,817	9,810	9,802	9,795	9,787	9,780	9,744	9,709	9,673	9,637	9,601	9,665	9,728	9,792	9,855	9,919	9,962	10,005	10,049	10,092	10,135
20906	Bokoharjo	7,258	7,322	7,385	7,449	7,512	7,576	7,640	7,703	7,767	7,830	7,894	8,010	8,126	8,242	8,358	8,475	8,678	8,882	9,086	9,289	9,493	9,683	9,873	10,063	10,253	10,444
21000	**KALASAN**	**43,543**	**43,981**	**44,418**	**44,856**	**45,293**	**45,731**	**46,168**	**46,606**	**47,043**	**47,481**	**47,918**	**48,736**	**49,554**	**50,371**	**51,189**	**52,007**	**53,362**	**54,717**	**56,073**	**57,428**	**58,783**	**60,058**	**61,333**	**62,608**	**63,883**	**65,158**
21001	Purwomartani	13,087	13,431	13,774	14,118	14,461	14,805	15,149	15,492	15,836	16,179	16,523	17,228	17,934	18,639	19,345	20,050	20,963	21,875	22,788	23,700	24,613	25,506	26,399	27,292	28,185	29,079
21002	Tirtomartani	10,530	10,599	10,668	10,737	10,806	10,875	10,944	11,013	11,082	11,151	11,220	11,280	11,339	11,399	11,458	11,518	11,697	11,875	12,054	12,232	12,411	12,568	12,726	12,883	13,040	13,197
21003	Tamanmartani	10,686	10,716	10,747	10,777	10,808	10,838	10,868	10,899	10,929	10,960	10,990	11,061	11,133	11,204	11,275	11,346	11,535	11,723	11,912	12,100	12,289	12,457	12,625	12,793	12,960	13,128
21004	Selomartani	9,240	9,235	9,229	9,224	9,218	9,213	9,207	9,202	9,196	9,191	9,185	9,167	9,148	9,130	9,111	9,093	9,168	9,244	9,319	9,395	9,470	9,527	9,583	9,640	9,697	9,754
21100	**NGEMPLAK**	**35,732**	**35,974**	**36,215**	**36,457**	**36,699**	**36,941**	**37,182**	**37,424**	**37,666**	**37,907**	**38,149**	**38,782**	**39,416**	**40,049**	**40,682**	**41,316**	**42,376**	**43,436**	**44,497**	**45,557**	**46,617**	**47,613**	**48,609**	**49,605**	**50,601**	**51,597**
21101	Wedomartani	11,249	11,538	11,827	12,116	12,405	12,694	12,982	13,271	13,560	13,849	14,138	14,639	15,139	15,640	16,141	16,642	17,314	17,987	18,660	19,332	20,005	20,659	21,313	21,967	22,621	23,275
21102	Widodomartani	6,434	6,389	6,345	6,300	6,256	6,211	6,166	6,122	6,077	6,033	5,988	5,992	5,997	6,001	6,005	6,009	6,076	6,142	6,208	6,275	6,341	6,395	6,450	6,504	6,559	6,613
21103	Bimomartani	5,697	5,665	5,633	5,601	5,569	5,537	5,505	5,473	5,441	5,409	5,377	5,354	5,330	5,307	5,284	5,260	5,291	5,322	5,353	5,384	5,415	5,435	5,454	5,474	5,494	5,514
21104	Sindumartani	6,068	6,048	6,029	6,009	5,989	5,970	5,950	5,930	5,910	5,891	5,871	5,880	5,890	5,899	5,909	5,918	5,989	6,059	6,130	6,200	6,271	6,330	6,389	6,448	6,507	6,566
21105	Umbulmartani	6,284	6,333	6,382	6,431	6,480	6,530	6,579	6,628	6,677	6,726	6,775	6,917	7,060	7,202	7,344	7,487	7,706	7,926	8,146	8,365	8,585	8,794	9,003	9,212	9,420	9,629
21200	**NGAGLIK**	**42,471**	**43,844**	**45,217**	**46,590**	**47,963**	**49,337**	**50,710**	**52,083**	**53,456**	**54,829**	**56,202**	**57,703**	**59,205**	**60,706**	**62,208**	**63,709**	**65,869**	**68,028**	**70,188**	**72,347**	**74,507**	**76,583**	**78,659**	**80,735**	**82,811**	**84,887**
21201	Sariharjo	8,023	8,305	8,587	8,870	9,152	9,434	9,716	9,998	10,281	10,563	10,845	11,307	11,769	12,231	12,693	13,155	13,753	14,350	14,948	15,546	16,144	16,729	17,314	17,899	18,484	19,069
21202	Donoharjo	6,251	6,231	6,210	6,190	6,169	6,149	6,129	6,108	6,088	6,067	6,047	6,095	6,144	6,192	6,241	6,289	6,402	6,516	6,629	6,743	6,856	6,958	7,060	7,163	7,265	7,367
21203	Sardonoharjo	10,189	10,289	10,389	10,490	10,590	10,690	10,790	10,890	10,991	11,091	11,191	11,450	11,709	11,968	12,227	12,485	12,873	13,261	13,649	14,037	14,425	14,795	15,166	15,536	15,907	16,277
21204	Sukoharjo	7,359	7,455	7,551	7,648	7,744	7,840	7,936	8,032	8,129	8,225	8,321	8,546	8,772	8,997	9,223	9,448	9,772	10,095	10,418	10,741	11,064	11,375	11,686	11,996	12,307	12,618
21205	Sinduharjo	8,157	8,378	8,600	8,821	9,042	9,264	9,485	9,706	9,927	10,149	10,370	10,690	11,011	11,331	11,651	11,972	12,416	12,860	13,304	13,748	14,192	14,621	15,051	15,480	15,910	16,339
21206	Minomartani	2,492	3,186	3,879	4,573	5,266	5,960	6,654	7,347	8,041	8,734	9,428	9,614	9,801	9,987	10,173	10,359	10,653	10,946	11,239	11,533	11,826	12,104	12,382	12,660	12,938	13,216
21300	**SLEMAN**	**45,285**	**45,642**	**45,998**	**46,355**	**46,712**	**47,069**	**47,425**	**47,782**	**48,139**	**48,495**	**48,852**	**48,926**	**49,000**	**49,073**	**49,147**	**49,221**	**49,803**	**50,386**	**50,968**	**51,551**	**52,133**	**52,619**	**53,105**	**53,591**	**54,077**	**54,563**
21301	Caturharjo	10,780	10,772	10,765	10,757	10,749	10,742	10,734	10,726	10,718	10,711	10,703	10,708	10,712	10,717	10,722	10,726	10,842	10,957	11,073	11,188	11,304	11,398	11,492	11,586	11,681	11,775
21302	Triharjo	11,883	12,039	12,196	12,352	12,508	12,665	12,821	12,977	13,133	13,290	13,446	13,385	13,324	13,263	13,202	13,141	13,216	13,291	13,365	13,440	13,515	13,562	13,608	13,655	13,702	13,748
21303	Tridadi	8,256	8,439	8,622	8,805	8,988	9,171	9,353	9,536	9,719	9,902	10,085	10,170	10,254	10,339	10,423	10,508	10,701	10,894	11,087	11,280	11,473	11,648	11,822	11,997	12,171	12,346
21304	Pandowoharjo	7,705	7,708	7,712	7,715	7,718	7,722	7,725	7,728	7,731	7,735	7,738	7,777	7,815	7,854	7,893	7,931	8,052	8,172	8,293	8,413	8,534	8,640	8,746	8,851	8,957	9,063
21305	Trimulyo	6,661	6,683	6,705	6,727	6,749	6,771	6,792	6,814	6,836	6,858	6,880	6,887	6,894	6,901	6,908	6,915	6,993	7,072	7,150	7,229	7,307	7,372	7,437	7,501	7,566	7,631
21400	**TEMPEL**	**40,076**	**40,200**	**40,325**	**40,449**	**40,574**	**40,698**	**40,822**	**40,947**	**41,071**	**41,196**	**41,320**	**41,381**	**41,441**	**41,502**	**41,562**	**41,623**	**42,113**	**42,604**	**43,095**	**43,585**	**44,076**	**44,485**	**44,894**	**45,303**	**45,712**	**46,121**
21401	Banyurejo	6,672	6,666	6,660	6,653	6,647	6,641	6,635	6,629	6,622	6,616	6,610	6,584	6,557	6,531	6,505	6,479	6,519	6,560	6,601	6,641	6,682	6,709	6,736	6,763	6,790	6,817
21402	Tambakrejo	4,372	4,341	4,309	4,278	4,246	4,215	4,183	4,152	4,120	4,089	4,057	4,035	4,012	3,990	3,968	3,946	3,964	3,983	4,001	4,020	4,038	4,048	4,058	4,068	4,078	4,088
21403	Sumberejo	3,903	3,877	3,851	3,825	3,799	3,774	3,748	3,722	3,696	3,670	3,644	3,635	3,626	3,617	3,608	3,599	3,627	3,655	3,683	3,711	3,739	3,760	3,780	3,801	3,821	3,842
21404	Pondokrejo	4,604	4,631	4,659	4,686	4,713	4,741	4,768	4,795	4,822	4,850	4,877	4,869	4,861	4,853	4,845	4,837	4,879	4,921	4,963	5,005	5,047	5,079	5,111	5,143	5,175	5,207
21405	Mororejo	3,988	3,988	3,988	3,988	3,988	3,988	3,987	3,987	3,987	3,987	3,987	3,996	4,005	4,014	4,023	4,032	4,082	4,133	4,184	4,234	4,285	4,328	4,371	4,413	4,456	4,499
21406	Margorejo	6,440	6,510	6,580	6,651	6,721	6,791	6,861	6,931	7,002	7,072	7,142	7,245	7,348	7,451	7,554	7,657	7,839	8,022	8,204	8,386	8,568	8,738	8,908	9,078	9,247	9,417
21407	Lumbungrejo	5,455	5,514	5,574	5,633	5,692	5,752	5,811	5,870	5,929	5,989	6,048	6,053	6,057	6,062	6,066	6,071	6,138	6,205	6,272	6,340	6,407	6,462	6,517	6,573	6,628	6,683
21408	Merdikorejo	4,642	4,673	4,705	4,736	4,767	4,799	4,830	4,861	4,892	4,924	4,955	4,965	4,974	4,984	4,994	5,003	5,065	5,126	5,187	5,249	5,310	5,362	5,413	5,465	5,516	5,568
21500	**TURI**	**26,037**	**26,078**	**26,119**	**26,160**	**26,201**	**26,242**	**26,283**	**26,324**	**26,365**	**26,406**	**26,447**	**26,575**	**26,703**	**26,830**	**26,958**	**27,086**	**27,493**	**27,901**	**28,309**	**28,716**	**29,124**	**29,481**	**29,838**	**30,195**	**30,552**	**30,910**
21501	Bangunkerto	6,611	6,630	6,649	6,668	6,687	6,706	6,724	6,743	6,762	6,781	6,800	6,829	6,858	6,887	6,916	6,945	7,046	7,147	7,247	7,348	7,449	7,537	7,624	7,712	7,800	7,888
21502	Donokerto	7,082	7,054	7,026	6,999	6,971	6,943	6,915	6,887	6,860	6,832	6,804	6,792	6,780	6,768	6,757	6,745	6,803	6,860	6,918	6,976	7,034	7,078	7,122	7,166	7,210	7,254
21503	Girikerto	6,045	6,034	6,023	6,013	6,002	5,991	5,980	5,969	5,959	5,948	5,937	5,966	5,995	6,025	6,054	6,083	6,175	6,267	6,359	6,451	6,543	6,624	6,704	6,785	6,866	6,946
21504	Wonokerto	6,299	6,360	6,420	6,481	6,542	6,603	6,663	6,724	6,785	6,845	6,906	6,987	7,069	7,150	7,232	7,313	7,470	7,627	7,784	7,941	8,098	8,243	8,387	8,532	8,677	8,822

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
21600	**PAKEM**	**26,762**	**26,772**	**26,783**	**26,793**	**26,803**	**26,814**	**26,824**	**26,834**	**26,844**	**26,855**	**26,865**	**26,843**	**26,821**	**26,799**	**26,777**	**26,754**	**27,009**	**27,263**	**27,517**	**27,772**	**28,026**	**28,226**	**28,426**	**28,626**	**28,826**	**29,026**
21601	Purwobinangun	6,782	6,765	6,748	6,730	6,713	6,696	6,679	6,662	6,644	6,627	6,610	6,595	6,579	6,564	6,549	6,533	6,585	6,638	6,690	6,742	6,794	6,833	6,871	6,910	6,948	6,987
21602	Candibinangun	4,423	4,401	4,379	4,357	4,335	4,313	4,291	4,269	4,247	4,225	4,203	4,237	4,272	4,306	4,340	4,375	4,454	4,534	4,613	4,693	4,772	4,844	4,915	4,987	5,059	5,131
21603	Harjobinangun	4,162	4,145	4,129	4,112	4,096	4,079	4,062	4,046	4,029	4,013	3,996	3,977	3,958	3,939	3,921	3,902	3,923	3,945	3,966	3,988	4,009	4,022	4,035	4,048	4,061	4,074
21604	Pakembinangun	5,168	5,178	5,188	5,198	5,208	5,218	5,228	5,238	5,248	5,258	5,268	5,254	5,240	5,227	5,213	5,199	5,239	5,279	5,319	5,359	5,399	5,428	5,457	5,486	5,516	5,545
21605	Hargobinangun	6,227	6,283	6,339	6,395	6,451	6,508	6,564	6,620	6,676	6,732	6,788	6,780	6,771	6,763	6,754	6,746	6,807	6,868	6,930	6,991	7,052	7,099	7,147	7,194	7,242	7,289
21700	**CANGKRINGAN**	**23,916**	**23,817**	**23,718**	**23,619**	**23,520**	**23,421**	**23,321**	**23,222**	**23,123**	**23,024**	**22,925**	**22,978**	**23,032**	**23,085**	**23,138**	**23,191**	**23,484**	**23,777**	**24,070**	**24,363**	**24,656**	**24,904**	**25,152**	**25,400**	**25,648**	**25,896**
21701	Wukirsari	8,668	8,630	8,592	8,555	8,517	8,479	8,441	8,403	8,366	8,328	8,290	8,269	8,248	8,227	8,206	8,185	8,249	8,312	8,376	8,439	8,503	8,550	8,596	8,643	8,689	8,736
21702	Argomulyo	6,934	6,874	6,815	6,755	6,696	6,636	6,576	6,517	6,457	6,398	6,338	6,326	6,315	6,303	6,291	6,279	6,332	6,386	6,439	6,492	6,545	6,585	6,625	6,666	6,706	6,746
21703	Glagaharjo	3,063	3,054	3,045	3,036	3,027	3,018	3,008	2,999	2,990	2,981	2,972	2,978	2,983	2,989	2,995	3,000	3,037	3,074	3,111	3,147	3,184	3,215	3,246	3,277	3,307	3,338
21704	Kepuharjo	2,295	2,290	2,285	2,280	2,275	2,270	2,265	2,260	2,255	2,250	2,245	2,272	2,298	2,325	2,352	2,379	2,430	2,481	2,532	2,584	2,635	2,682	2,730	2,777	2,824	2,872
21705	Umbulharjo	2,956	2,968	2,981	2,993	3,006	3,018	3,030	3,043	3,055	3,068	3,080	3,134	3,187	3,241	3,294	3,348	3,436	3,524	3,613	3,701	3,789	3,872	3,955	4,038	4,121	4,204
Total		677,323	687,624	697,925	708,226	718,527	728,829	739,130	749,431	759,732	770,033	780,334	790,496	800,659	810,821	820,983	831,146	845,192	859,238	873,285	887,331	901,377	916,304	931,232	946,159	961,087	976,014

Note:
Census data is applied for populations in 1980, 1990, and 2000. Population in other years are calculated as average of interpolated census data and interpolated SUPAS data.

Appendix 13.3 Past Population Data for Future Population Projection, Bantul Regency

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
30100	**SRANDAKAN**	**26,641**	**26,621**	**26,602**	**26,582**	**26,563**	**26,543**	**26,523**	**26,504**	**26,484**	**26,465**	**26,445**	**26,403**	**26,360**	**26,318**	**26,276**	**26,233**	**26,423**	**26,612**	**26,801**	**26,991**	**27,180**	**27,387**	**27,594**	**27,801**	**28,008**	**28,215**
30101	Poncosari	11,876	11,806	11,736	11,666	11,596	11,526	11,455	11,385	11,315	11,245	11,175	11,132	11,090	11,047	11,005	10,962	11,017	11,071	11,125	11,180	11,234	11,294	11,355	11,415	11,476	11,536
30102	Trimurti	14,765	14,816	14,866	14,917	14,967	15,018	15,068	15,119	15,169	15,220	15,270	15,270	15,270	15,270	15,271	15,271	15,406	15,541	15,676	15,811	15,946	16,093	16,239	16,386	16,532	16,679
30200	**SANDEN**	**28,526**	**28,417**	**28,308**	**28,198**	**28,089**	**27,980**	**27,871**	**27,762**	**27,652**	**27,543**	**27,434**	**27,424**	**27,414**	**27,404**	**27,394**	**27,384**	**27,616**	**27,847**	**28,079**	**28,311**	**28,543**	**28,795**	**29,047**	**29,299**	**29,551**	**29,803**
30201	Gadingsari	9,513	9,464	9,415	9,366	9,317	9,269	9,220	9,171	9,122	9,073	9,024	8,974	8,924	8,874	8,824	8,774	8,802	8,829	8,857	8,884	8,912	8,944	8,975	9,007	9,039	9,071
30202	Gadingharjo	3,133	3,140	3,148	3,155	3,162	3,170	3,177	3,184	3,191	3,199	3,206	3,198	3,190	3,182	3,174	3,166	3,186	3,206	3,226	3,246	3,266	3,288	3,310	3,332	3,354	3,376
30203	Srigading	8,494	8,466	8,438	8,409	8,381	8,353	8,325	8,297	8,268	8,240	8,212	8,251	8,290	8,328	8,367	8,406	8,519	8,632	8,745	8,858	8,971	9,092	9,213	9,335	9,456	9,577
30204	Murtigading	7,386	7,347	7,307	7,268	7,228	7,189	7,150	7,110	7,071	7,031	6,992	7,001	7,010	7,019	7,028	7,038	7,109	7,180	7,251	7,323	7,394	7,471	7,548	7,625	7,702	7,779
30300	**KRETEK**	**27,250**	**27,113**	**26,976**	**26,838**	**26,701**	**26,564**	**26,427**	**26,290**	**26,152**	**26,015**	**25,878**	**25,863**	**25,849**	**25,834**	**25,819**	**25,805**	**26,018**	**26,231**	**26,444**	**26,658**	**26,871**	**27,103**	**27,335**	**27,567**	**27,799**	**28,031**
30301	Tirtohargo	2,804	2,775	2,746	2,717	2,688	2,659	2,630	2,601	2,572	2,543	2,514	2,510	2,506	2,501	2,497	2,493	2,511	2,529	2,546	2,564	2,582	2,601	2,621	2,640	2,660	2,679
30302	Parangtritis	5,929	5,943	5,958	5,972	5,986	6,001	6,015	6,029	6,043	6,058	6,072	6,132	6,193	6,253	6,313	6,373	6,490	6,606	6,723	6,839	6,956	7,080	7,205	7,329	7,453	7,577
30303	Donotirto	8,073	8,011	7,949	7,888	7,826	7,764	7,702	7,640	7,579	7,517	7,455	7,414	7,373	7,332	7,291	7,250	7,273	7,296	7,319	7,342	7,365	7,391	7,418	7,444	7,471	7,497
30304	Tirtosari	4,082	4,059	4,035	4,012	3,988	3,965	3,941	3,918	3,894	3,871	3,847	3,815	3,783	3,751	3,719	3,688	3,688	3,689	3,690	3,690	3,691	3,693	3,695	3,697	3,699	3,701
30305	Tirtomulyo	6,362	6,325	6,288	6,250	6,213	6,176	6,139	6,102	6,064	6,027	5,990	5,992	5,994	5,997	5,999	6,001	6,056	6,111	6,167	6,222	6,277	6,337	6,397	6,456	6,516	6,576
30400	**PUNDONG**	**29,643**	**29,644**	**29,646**	**29,647**	**29,649**	**29,650**	**29,651**	**29,653**	**29,654**	**29,656**	**29,657**	**29,567**	**29,476**	**29,386**	**29,295**	**29,205**	**29,372**	**29,540**	**29,707**	**29,875**	**30,042**	**30,227**	**30,412**	**30,597**	**30,782**	**30,967**
30401	Seloharjo	9,255	9,295	9,336	9,376	9,416	9,457	9,497	9,537	9,577	9,618	9,658	9,614	9,570	9,526	9,482	9,438	9,477	9,517	9,556	9,596	9,635	9,679	9,724	9,768	9,812	9,857
30402	Panjangrejo	8,442	8,414	8,386	8,357	8,329	8,301	8,273	8,245	8,216	8,188	8,160	8,158	8,155	8,153	8,150	8,148	8,218	8,287	8,357	8,426	8,496	8,572	8,647	8,723	8,798	8,874
30403	Srihandono	11,946	11,935	11,925	11,914	11,903	11,893	11,882	11,871	11,860	11,850	11,839	11,795	11,751	11,707	11,663	11,618	11,677	11,735	11,794	11,852	11,911	11,976	12,041	12,106	12,171	12,237
30500	**BAMBANGLIPURO**	**35,065**	**35,028**	**34,992**	**34,955**	**34,919**	**34,882**	**34,845**	**34,809**	**34,772**	**34,736**	**34,699**	**34,595**	**34,490**	**34,386**	**34,282**	**34,177**	**34,375**	**34,572**	**34,770**	**34,967**	**35,165**	**35,383**	**35,601**	**35,820**	**36,038**	**36,256**
30501	Sidomulyo	11,318	11,300	11,282	11,265	11,247	11,229	11,211	11,193	11,176	11,158	11,140	11,095	11,049	11,004	10,958	10,913	10,963	11,014	11,065	11,116	11,167	11,224	11,281	11,338	11,395	11,451
30502	Mulyodadi	10,316	10,303	10,290	10,277	10,264	10,251	10,237	10,224	10,211	10,198	10,185	10,141	10,097	10,053	10,009	9,965	10,009	10,053	10,097	10,141	10,185	10,234	10,284	10,333	10,382	10,432
30503	Sumbermulyo	13,431	13,425	13,420	13,414	13,408	13,403	13,397	13,391	13,385	13,380	13,374	13,359	13,344	13,329	13,315	13,300	13,402	13,505	13,608	13,710	13,813	13,925	14,037	14,149	14,261	14,373
30600	**PANDAK**	**40,530**	**40,740**	**40,950**	**41,161**	**41,371**	**41,581**	**41,791**	**42,001**	**42,212**	**42,422**	**42,632**	**42,641**	**42,649**	**42,658**	**42,667**	**42,676**	**43,061**	**43,447**	**43,833**	**44,218**	**44,604**	**45,022**	**45,440**	**45,859**	**46,277**	**46,695**
30601	Caturharjo	9,356	9,389	9,421	9,454	9,486	9,519	9,551	9,584	9,616	9,649	9,681	9,662	9,643	9,624	9,604	9,585	9,651	9,716	9,782	9,847	9,913	9,985	10,057	10,128	10,200	10,272
30602	Triharjo	9,622	9,732	9,841	9,951	10,060	10,170	10,279	10,389	10,498	10,608	10,717	10,738	10,758	10,779	10,799	10,820	10,936	11,052	11,168	11,284	11,400	11,525	11,650	11,776	11,901	12,026
30603	Gilangharjo	12,875	12,916	12,957	12,998	13,039	13,080	13,120	13,161	13,202	13,243	13,284	13,268	13,253	13,237	13,221	13,205	13,306	13,407	13,508	13,609	13,710	13,820	13,930	14,040	14,150	14,260
30604	Wijirejo	8,677	8,704	8,732	8,759	8,786	8,814	8,841	8,868	8,895	8,923	8,950	8,973	8,996	9,019	9,042	9,065	9,168	9,272	9,375	9,478	9,581	9,692	9,803	9,914	10,025	10,136
30700	**BANTUL**	**45,587**	**45,952**	**46,317**	**46,682**	**47,047**	**47,413**	**47,778**	**48,143**	**48,508**	**48,873**	**49,238**	**49,354**	**49,470**	**49,586**	**49,702**	**49,817**	**50,373**	**50,929**	**51,485**	**52,041**	**52,597**	**53,196**	**53,795**	**54,394**	**54,993**	**55,592**
30701	Palbapang	9,967	10,064	10,160	10,257	10,353	10,450	10,547	10,643	10,740	10,836	10,933	10,944	10,956	10,967	10,978	10,990	11,098	11,207	11,315	11,424	11,532	11,649	11,766	11,884	12,001	12,118
30702	Ringinharjo	5,783	5,819	5,855	5,891	5,927	5,963	5,999	6,035	6,071	6,107	6,143	6,161	6,179	6,197	6,215	6,233	6,306	6,380	6,453	6,526	6,599	6,678	6,756	6,835	6,914	6,992
30703	Bantul	12,268	12,350	12,432	12,514	12,596	12,678	12,759	12,841	12,923	13,005	13,087	13,121	13,154	13,188	13,222	13,255	13,406	13,557	13,708	13,858	14,009	14,171	14,334	14,496	14,658	14,821
30704	Trirenggo	13,084	13,187	13,290	13,394	13,497	13,600	13,703	13,806	13,910	14,013	14,116	14,143	14,171	14,198	14,225	14,253	14,406	14,559	14,713	14,866	15,019	15,184	15,350	15,515	15,680	15,845
30705	Sapdodadi	4,485	4,532	4,580	4,627	4,675	4,722	4,769	4,817	4,864	4,912	4,959	4,984	5,010	5,035	5,061	5,086	5,157	5,227	5,297	5,368	5,438	5,513	5,589	5,664	5,740	5,815
30800	**JETIS**	**40,932**	**41,162**	**41,391**	**41,621**	**41,851**	**42,081**	**42,310**	**42,540**	**42,770**	**42,999**	**43,229**	**43,360**	**43,490**	**43,621**	**43,752**	**43,882**	**44,401**	**44,919**	**45,437**	**45,956**	**46,474**	**47,032**	**47,589**	**48,147**	**48,704**	**49,262**
30801	Patalan	9,265	9,289	9,312	9,336	9,360	9,384	9,407	9,431	9,455	9,478	9,502	9,537	9,572	9,607	9,642	9,677	9,798	9,918	10,039	10,159	10,280	10,410	10,539	10,669	10,798	10,928
30802	Canden	9,459	9,489	9,519	9,549	9,579	9,610	9,640	9,670	9,700	9,730	9,760	9,719	9,679	9,638	9,598	9,557	9,601	9,645	9,689	9,733	9,777	9,826	9,875	9,924	9,974	10,023
30803	Sumberagung	10,847	10,917	10,986	11,056	11,126	11,196	11,265	11,335	11,405	11,474	11,544	11,561	11,577	11,594	11,610	11,627	11,746	11,865	11,985	12,104	12,223	12,352	12,481	12,609	12,738	12,867
30804	Trimulyo	11,361	11,467	11,573	11,680	11,786	11,892	11,998	12,104	12,211	12,317	12,423	12,543	12,662	12,782	12,901	13,021	13,256	13,490	13,725	13,959	14,194	14,444	14,694	14,945	15,195	15,445

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
30900	**IMOGIRI**	**46,084**	**46,446**	**46,808**	**47,171**	**47,533**	**47,895**	**48,257**	**48,619**	**48,982**	**49,344**	**49,706**	**49,687**	**49,669**	**49,650**	**49,631**	**49,612**	**50,032**	**50,451**	**50,871**	**51,290**	**51,710**	**52,166**	**52,622**	**53,078**	**53,534**	**53,989**
30901	Selopamioro	10,952	11,094	11,236	11,378	11,520	11,663	11,805	11,947	12,089	12,231	12,373	12,325	12,277	12,229	12,181	12,133	12,192	12,251	12,311	12,370	12,429	12,495	12,561	12,627	12,693	12,759
30902	Sriharjo	7,720	7,695	7,669	7,644	7,618	7,593	7,568	7,542	7,517	7,491	7,466	7,449	7,433	7,416	7,400	7,383	7,432	7,481	7,530	7,578	7,627	7,680	7,734	7,787	7,841	7,894
30903	Kebonagung	2,951	2,956	2,960	2,965	2,969	2,974	2,978	2,983	2,987	2,992	2,996	2,991	2,986	2,982	2,977	2,972	2,993	3,015	3,036	3,058	3,079	3,102	3,126	3,149	3,173	3,196
30904	Karangtengah	3,459	3,491	3,523	3,555	3,587	3,619	3,651	3,683	3,715	3,747	3,779	3,808	3,838	3,867	3,896	3,925	3,989	4,053	4,117	4,181	4,245	4,313	4,382	4,450	4,518	4,587
30905	Girirejo	3,776	3,808	3,839	3,871	3,902	3,934	3,965	3,997	4,028	4,060	4,091	4,071	4,051	4,031	4,011	3,990	4,006	4,021	4,036	4,051	4,066	4,083	4,100	4,117	4,135	4,152
30906	Karangtalun	2,407	2,433	2,459	2,486	2,512	2,538	2,564	2,590	2,617	2,643	2,669	2,650	2,631	2,612	2,592	2,573	2,577	2,580	2,584	2,587	2,591	2,596	2,600	2,605	2,609	2,614
30907	Imogiri	3,061	3,088	3,115	3,142	3,169	3,196	3,222	3,249	3,276	3,303	3,330	3,321	3,312	3,303	3,294	3,285	3,305	3,325	3,345	3,365	3,385	3,407	3,429	3,451	3,473	3,495
30908	Wukirsari	11,758	11,882	12,007	12,131	12,256	12,380	12,504	12,629	12,753	12,878	13,002	13,072	13,141	13,211	13,281	13,350	13,538	13,725	13,913	14,100	14,288	14,489	14,690	14,891	15,092	15,293
31000	**DLINGO**	**30,022**	**30,044**	**30,067**	**30,089**	**30,111**	**30,134**	**30,156**	**30,178**	**30,200**	**30,223**	**30,245**	**30,398**	**30,552**	**30,705**	**30,858**	**31,012**	**31,439**	**31,866**	**32,293**	**32,721**	**33,148**	**33,606**	**34,064**	**34,522**	**34,980**	**35,438**
31001	Mangunan	3,814	3,831	3,848	3,865	3,882	3,900	3,917	3,934	3,951	3,968	3,985	3,972	3,959	3,946	3,933	3,919	3,941	3,962	3,984	4,005	4,027	4,051	4,075	4,098	4,122	4,146
31002	Muntuk	5,999	6,051	6,103	6,154	6,206	6,258	6,310	6,362	6,413	6,465	6,517	6,547	6,577	6,607	6,637	6,667	6,756	6,844	6,933	7,022	7,111	7,206	7,302	7,397	7,492	7,588
31003	Dlingo	5,281	5,242	5,204	5,165	5,126	5,088	5,049	5,010	4,971	4,933	4,894	4,910	4,925	4,941	4,957	4,973	5,032	5,092	5,152	5,211	5,271	5,335	5,399	5,463	5,528	5,592
31004	Temuwuh	5,239	5,231	5,223	5,216	5,208	5,200	5,192	5,184	5,177	5,169	5,161	5,229	5,298	5,366	5,435	5,503	5,621	5,738	5,855	5,972	6,089	6,214	6,338	6,463	6,587	6,712
31005	Jatimulyo	5,706	5,689	5,672	5,655	5,638	5,622	5,605	5,588	5,571	5,554	5,537	5,539	5,540	5,542	5,543	5,545	5,595	5,646	5,696	5,747	5,797	5,852	5,906	5,961	6,016	6,071
31006	Terong	3,983	4,000	4,017	4,033	4,050	4,067	4,084	4,101	4,117	4,134	4,151	4,202	4,252	4,303	4,354	4,405	4,494	4,584	4,674	4,763	4,853	4,948	5,044	5,139	5,235	5,330
31100	**PLERET**	**30,047**	**30,322**	**30,597**	**30,872**	**31,147**	**31,422**	**31,697**	**31,972**	**32,247**	**32,522**	**32,797**	**33,061**	**33,326**	**33,590**	**33,854**	**34,119**	**34,684**	**35,250**	**35,816**	**36,381**	**36,947**	**37,551**	**38,155**	**38,759**	**39,364**	**39,968**
31101	Wonokromo	8,338	8,450	8,562	8,674	8,786	8,899	9,011	9,123	9,235	9,347	9,459	9,611	9,763	9,915	10,068	10,220	10,462	10,705	10,947	11,190	11,432	11,689	11,947	12,204	12,462	12,719
31102	Pleret	8,018	8,097	8,176	8,255	8,334	8,413	8,491	8,570	8,649	8,728	8,807	8,877	8,947	9,017	9,087	9,157	9,308	9,459	9,610	9,761	9,912	10,073	10,234	10,396	10,557	10,718
31103	Segoroyoso	5,734	5,761	5,788	5,815	5,842	5,870	5,897	5,924	5,951	5,978	6,005	6,058	6,111	6,163	6,216	6,269	6,377	6,485	6,594	6,702	6,810	6,925	7,041	7,156	7,272	7,387
31104	Bawuran	4,311	4,365	4,419	4,473	4,527	4,582	4,636	4,690	4,744	4,798	4,852	4,837	4,822	4,808	4,793	4,778	4,805	4,833	4,860	4,888	4,915	4,945	4,976	5,006	5,036	5,066
31105	Wonolelo	3,646	3,649	3,652	3,654	3,657	3,660	3,663	3,666	3,668	3,671	3,674	3,678	3,682	3,686	3,690	3,694	3,731	3,768	3,805	3,841	3,878	3,918	3,957	3,997	4,037	4,076
31200	**PIYUNGAN**	**33,168**	**33,365**	**33,563**	**33,760**	**33,958**	**34,155**	**34,352**	**34,550**	**34,747**	**34,945**	**35,142**	**35,325**	**35,509**	**35,692**	**35,875**	**36,059**	**36,561**	**37,062**	**37,564**	**38,066**	**38,568**	**39,106**	**39,644**	**40,182**	**40,719**	**41,257**
31201	Sitimulyo	10,299	10,382	10,464	10,547	10,630	10,713	10,795	10,878	10,961	11,043	11,126	11,249	11,371	11,494	11,616	11,739	11,965	12,191	12,418	12,644	12,870	13,111	13,352	13,593	13,834	14,075
31202	Srimulyo	12,680	12,718	12,755	12,793	12,830	12,868	12,906	12,943	12,981	13,018	13,056	13,046	13,037	13,027	13,017	13,007	13,112	13,218	13,323	13,428	13,533	13,647	13,762	13,876	13,991	14,105
31203	Srimartani	10,189	10,266	10,343	10,420	10,497	10,575	10,652	10,729	10,806	10,883	10,960	11,031	11,101	11,172	11,242	11,313	11,483	11,654	11,824	11,995	12,165	12,347	12,530	12,712	12,895	13,077
31300	**BANGUNTAPAN**	**56,335**	**57,874**	**59,413**	**60,953**	**62,492**	**64,031**	**65,570**	**67,109**	**68,649**	**70,188**	**71,727**	**73,052**	**74,377**	**75,702**	**77,027**	**78,352**	**80,369**	**82,386**	**84,403**	**86,420**	**88,437**	**90,577**	**92,717**	**94,857**	**96,998**	**99,138**
31301	Tamanan	6,008	6,163	6,317	6,472	6,626	6,781	6,936	7,090	7,245	7,399	7,554	7,691	7,828	7,964	8,101	8,238	8,448	8,657	8,867	9,076	9,286	9,508	9,731	9,953	10,176	10,398
31302	Jagalan	2,937	2,960	2,983	3,005	3,028	3,051	3,074	3,097	3,119	3,142	3,165	3,137	3,109	3,081	3,053	3,025	3,023	3,022	3,021	3,019	3,018	3,018	3,017	3,017	3,016	3,016
31303	Singosaren	1,923	1,949	1,975	2,002	2,028	2,054	2,080	2,106	2,133	2,159	2,185	2,241	2,297	2,353	2,409	2,465	2,543	2,621	2,698	2,776	2,854	2,936	3,019	3,101	3,183	3,266
31304	Wirokerten	6,478	6,648	6,818	6,988	7,158	7,328	7,497	7,667	7,837	8,007	8,177	8,297	8,418	8,538	8,658	8,779	8,977	9,174	9,372	9,570	9,768	9,978	10,189	10,399	10,609	10,820
31305	Jambidan	5,959	5,998	6,037	6,076	6,115	6,154	6,193	6,232	6,271	6,310	6,349	6,389	6,429	6,468	6,508	6,548	6,646	6,743	6,841	6,938	7,036	7,140	7,245	7,349	7,454	7,558
31306	Potorono	6,843	6,905	6,966	7,028	7,090	7,152	7,213	7,275	7,337	7,398	7,460	7,568	7,676	7,784	7,893	8,001	8,180	8,358	8,537	8,716	8,895	9,085	9,275	9,465	9,655	9,845
31307	Baturetno	6,826	6,945	7,064	7,184	7,303	7,422	7,541	7,660	7,780	7,899	8,018	8,369	8,719	9,070	9,420	9,771	10,208	10,644	11,081	11,518	11,955	12,416	12,877	13,339	13,800	14,261
31308	Banguntapan	19,361	20,307	21,253	22,198	23,144	24,090	25,036	25,982	26,927	27,873	28,819	29,360	29,902	30,443	30,984	31,526	32,346	33,165	33,985	34,805	35,625	36,495	37,365	38,234	39,104	39,974
31400	**SEWON**	**57,820**	**59,004**	**60,187**	**61,371**	**62,554**	**63,738**	**64,922**	**66,105**	**67,289**	**68,472**	**69,656**	**70,995**	**72,333**	**73,672**	**75,010**	**76,349**	**78,362**	**80,375**	**82,388**	**84,401**	**86,414**	**88,549**	**90,685**	**92,820**	**94,955**	**97,090**
31401	Pendowoharjo	13,069	13,257	13,445	13,633	13,821	14,009	14,196	14,384	14,572	14,760	14,948	15,212	15,476	15,741	16,005	16,269	16,677	17,085	17,493	17,901	18,309	18,742	19,175	19,608	20,041	20,474
31402	Timbulharjo	14,363	14,503	14,643	14,783	14,923	15,063	15,202	15,342	15,482	15,622	15,762	15,883	16,004	16,125	16,246	16,367	16,632	16,898	17,163	17,429	17,694	17,978	18,261	18,545	18,829	19,112
31403	Bangunharjo	14,050	14,416	14,783	15,149	15,515	15,882	16,248	16,614	16,980	17,347	17,713	18,156	18,598	19,041	19,483	19,926	20,545	21,163	21,782	22,400	23,019	23,674	24,329	24,984	25,639	26,294
31404	Panggungharjo	16,338	16,828	17,317	17,807	18,296	18,786	19,275	19,765	20,254	20,744	21,233	21,744	22,255	22,766	23,276	23,787	24,508	25,229	25,950	26,671	27,392	28,156	28,919	29,683	30,446	31,210
31500	**KASIHAN**	**51,913**	**53,590**	**55,267**	**56,944**	**58,621**	**60,298**	**61,975**	**63,652**	**65,329**	**67,006**	**68,683**	**70,163**	**71,644**	**73,124**	**74,604**	**76,084**	**78,237**	**80,389**	**82,541**	**84,694**	**86,846**	**89,127**	**91,409**	**93,690**	**95,971**	**98,252**
31501	Bangunjiwo	13,531	13,819	14,108	14,396	14,685	14,973	15,261	15,550	15,838	16,127	16,415	16,712	17,009	17,307	17,604	17,901	18,357	18,812	19,267	19,723	20,178	20,661	21,144	21,628	22,111	22,594
31502	Tirtonimolo	13,199	13,441	13,682	13,924	14,165	14,407	14,649	14,890	15,132	15,373	15,615	15,875	16,134	16,394	16,653	16,913	17,322	17,731	18,140	18,549	18,958	19,392	19,827	20,261	20,695	21,129
31503	Tamantirto	10,247	10,550	10,854	11,157	11,460	11,764	12,067	12,370	12,673	12,977	13,280	13,614	13,949	14,283	14,617	14,951	15,418	15,884	16,350	16,817	17,283	17,777	18,271	18,764	19,258	19,752
31504	Ngestiharjo	14,936	15,780	16,623	17,467	18,311	19,155	19,998	20,842	21,686	22,529	23,373	23,962	24,551	25,140	25,730	26,319	27,140	27,962	28,784	29,605	30,427	31,297	32,167	33,037	33,907	34,777

ID No.	Kecamatan/Desa	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
31600	**PAJANGAN**	**23,128**	**23,341**	**23,555**	**23,768**	**23,981**	**24,195**	**24,408**	**24,621**	**24,834**	**25,048**	**25,261**	**25,409**	**25,558**	**25,706**	**25,854**	**26,002**	**26,380**	**26,758**	**27,136**	**27,514**	**27,892**	**28,297**	**28,701**	**29,106**	**29,511**	**29,915**
31601	Triwidadi	7,907	7,948	7,988	8,029	8,070	8,111	8,151	8,192	8,233	8,273	8,314	8,342	8,371	8,399	8,427	8,456	8,559	8,662	8,765	8,868	8,971	9,082	9,193	9,303	9,414	9,525
31602	Sendangsari	8,144	8,229	8,314	8,399	8,484	8,570	8,655	8,740	8,825	8,910	8,995	9,022	9,048	9,075	9,101	9,128	9,235	9,342	9,450	9,557	9,664	9,779	9,895	10,010	10,125	10,241
31603	Guwosari	7,077	7,165	7,252	7,340	7,427	7,515	7,602	7,690	7,777	7,865	7,952	8,045	8,139	8,232	8,325	8,419	8,586	8,754	8,922	9,089	9,257	9,436	9,614	9,793	9,971	10,150
31700	**SEDAYU**	**31,751**	**32,024**	**32,296**	**32,569**	**32,841**	**33,114**	**33,386**	**33,659**	**33,931**	**34,204**	**34,476**	**34,826**	**35,176**	**35,526**	**35,876**	**36,226**	**36,895**	**37,565**	**38,235**	**38,905**	**39,575**	**40,289**	**41,003**	**41,717**	**42,431**	**43,145**
31701	Argodadi	8,435	8,484	8,532	8,581	8,629	8,678	8,726	8,775	8,823	8,872	8,920	8,925	8,929	8,934	8,938	8,943	9,026	9,110	9,193	9,277	9,360	9,450	9,541	9,631	9,722	9,812
31702	Argorejo	6,800	6,878	6,955	7,033	7,111	7,189	7,266	7,344	7,422	7,499	7,577	7,809	8,041	8,273	8,505	8,737	9,046	9,355	9,665	9,974	10,283	10,610	10,937	11,264	11,591	11,918
31703	Argosari	6,984	7,010	7,037	7,063	7,090	7,116	7,142	7,169	7,195	7,222	7,248	7,231	7,214	7,197	7,180	7,163	7,209	7,255	7,302	7,348	7,394	7,445	7,496	7,546	7,597	7,648
31704	Argomulyo	9,532	9,652	9,772	9,892	10,012	10,132	10,251	10,371	10,491	10,611	10,731	10,861	10,992	11,122	11,253	11,383	11,614	11,845	12,076	12,307	12,538	12,784	13,030	13,276	13,521	13,767
	Total	634,442	640,688	646,935	653,181	659,427	665,674	671,920	678,166	684,412	690,659	696,905	702,123	707,340	712,558	717,776	722,994	734,597	746,201	757,805	769,409	781,013	793,413	805,813	818,214	830,614	843,014

Note:
Census data is applied for populations in 1980, 1990, and 2000. Population in other years are calculated as average of interpolated census data and interpolated SUPAS data.

Appendix 13.4 Future Population Projection for Each Kelurahan/Desa

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
10101	Gedongkiwo	12,651	12,668	12,683	12,699	12,713	12,728	12,741	12,755	12,768	12,780	12,793	12,805	12,816	12,828	12,839	12,850
10102	Suryodiningratan	10,975	11,052	11,129	11,207	11,286	11,365	11,444	11,525	11,605	11,687	11,769	11,851	11,934	12,018	12,102	12,187
10103	Mantrijeron	9,923	9,883	9,843	9,802	9,762	9,721	9,680	9,639	9,598	9,557	9,515	9,474	9,432	9,390	9,348	9,305
10201	Patehan	5,058	5,000	4,943	4,886	4,830	4,775	4,720	4,666	4,612	4,559	4,507	4,455	4,404	4,354	4,304	4,254
10202	Panembahan	7,839	7,712	7,588	7,465	7,345	7,226	7,110	6,995	6,882	6,771	6,662	6,554	6,449	6,344	6,242	6,141
10203	Kadipaten	6,233	6,209	6,187	6,166	6,145	6,125	6,106	6,087	6,069	6,052	6,035	6,018	6,003	5,987	5,972	5,957
10301	Brontokusuman	11,649	11,741	11,834	11,928	12,023	12,118	12,214	12,311	12,408	12,506	12,606	12,705	12,806	12,908	13,010	13,113
10302	Keparakan	8,866	8,853	8,840	8,828	8,817	8,806	8,795	8,785	8,774	8,765	8,755	8,746	8,737	8,728	8,720	8,711
10303	Wirogunan	11,536	11,455	11,372	11,289	11,205	11,120	11,035	10,948	10,860	10,772	10,682	10,591	10,500	10,407	10,314	10,219
10401	Semaki	6,058	6,018	5,978	5,938	5,898	5,857	5,815	5,774	5,732	5,690	5,647	5,604	5,561	5,517	5,473	5,429
10402	Muja-muju	11,843	11,946	12,046	12,143	12,238	12,330	12,420	12,508	12,594	12,678	12,760	12,840	12,919	12,996	13,072	13,146
10403	Tahunan	10,787	10,970	11,150	11,330	11,507	11,683	11,858	12,031	12,203	12,373	12,542	12,709	12,875	13,039	13,202	13,364
10404	Warungboto	11,073	11,297	11,524	11,757	11,994	12,236	12,483	12,735	12,991	13,254	13,521	13,794	14,072	14,356	14,645	14,941
10405	Pandeyan	13,567	13,743	13,916	14,084	14,249	14,410	14,568	14,722	14,874	15,022	15,168	15,311	15,452	15,590	15,726	15,860
10406	Sorosutan	17,240	17,809	18,390	18,980	19,581	20,191	20,811	21,439	22,076	22,720	23,372	24,030	24,695	25,364	26,039	26,717
10407	Giwangan	7,042	7,212	7,383	7,553	7,724	7,894	8,065	8,235	8,406	8,576	8,747	8,917	9,087	9,258	9,428	9,599
10501	Rejowinangun	11,425	11,589	11,749	11,906	12,059	12,209	12,356	12,500	12,642	12,781	12,917	13,051	13,183	13,313	13,441	13,567
10502	Prenggan	10,909	11,074	11,238	11,401	11,562	11,722	11,880	12,037	12,193	12,347	12,500	12,652	12,802	12,951	13,099	13,245
10503	Purbayan	8,974	9,067	9,159	9,251	9,342	9,432	9,522	9,611	9,699	9,787	9,874	9,960	10,046	10,132	10,216	10,300
10601	Demangan	10,243	10,131	10,017	9,903	9,787	9,671	9,553	9,434	9,314	9,193	9,070	8,947	8,822	8,696	8,569	8,441
10602	Kotabaru	2,818	2,746	2,673	2,600	2,526	2,452	2,378	2,304	2,230	2,155	2,080	2,004	1,928	1,852	1,776	1,699
10603	Klitren	11,301	11,193	11,084	10,974	10,862	10,750	10,636	10,521	10,406	10,289	10,170	10,051	9,930	9,808	9,685	9,561
10604	Baciro	12,748	12,658	12,568	12,479	12,391	12,303	12,216	12,130	12,044	11,959	11,874	11,790	11,707	11,624	11,542	11,460
10605	Terban	10,350	10,233	10,115	9,997	9,876	9,755	9,633	9,509	9,384	9,258	9,130	9,001	8,871	8,740	8,607	8,473
10701	Suryatmajan	4,391	4,324	4,258	4,193	4,128	4,064	4,001	3,939	3,878	3,817	3,757	3,698	3,639	3,581	3,524	3,468
10702	Tegalpanggung	7,955	7,847	7,738	7,629	7,518	7,407	7,295	7,182	7,068	6,954	6,838	6,722	6,604	6,486	6,367	6,247
10703	Bausasran	6,294	6,159	6,024	5,888	5,753	5,618	5,483	5,348	5,213	5,078	4,943	4,808	4,673	4,538	4,402	4,267

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
10801	Gunungketur	4,576	4,523	4,470	4,418	4,367	4,316	4,266	4,216	4,167	4,119	4,071	4,023	3,976	3,930	3,885	3,839
10802	Purwokinanti	5,905	5,876	5,849	5,822	5,797	5,772	5,749	5,726	5,704	5,683	5,662	5,642	5,622	5,604	5,585	5,567
10901	Ngupasan	4,453	4,266	4,087	3,916	3,752	3,595	3,444	3,300	3,161	3,029	2,902	2,780	2,664	2,552	2,445	2,343
10902	Prawirodirjan	9,175	9,206	9,236	9,264	9,292	9,319	9,345	9,371	9,395	9,420	9,443	9,466	9,488	9,510	9,531	9,552
11001	Notoprajan	7,951	7,932	7,913	7,896	7,878	7,862	7,846	7,830	7,815	7,801	7,786	7,773	7,759	7,746	7,734	7,721
11002	Ngampilan	9,098	8,909	8,718	8,525	8,330	8,134	7,935	7,735	7,532	7,327	7,121	6,912	6,701	6,488	6,273	6,056
11101	Patangpuluhan	7,010	7,022	7,033	7,044	7,054	7,064	7,074	7,084	7,093	7,102	7,111	7,120	7,128	7,136	7,144	7,152
11102	Wirobrajan	10,093	10,115	10,135	10,155	10,174	10,193	10,211	10,229	10,246	10,262	10,279	10,294	10,310	10,325	10,339	10,354
11103	Pakuncen	10,293	10,289	10,286	10,283	10,281	10,278	10,275	10,273	10,270	10,268	10,265	10,263	10,261	10,259	10,256	10,254
11201	Pringgokusuman	10,636	10,480	10,322	10,163	10,002	9,840	9,676	9,511	9,344	9,176	9,006	8,835	8,662	8,488	8,312	8,135
11202	Sosromenduran	5,850	5,667	5,491	5,320	5,154	4,993	4,838	4,687	4,541	4,400	4,262	4,130	4,001	3,876	3,756	3,639
11301	Bumijo	10,302	10,292	10,283	10,274	10,265	10,256	10,248	10,240	10,232	10,225	10,217	10,210	10,203	10,197	10,190	10,184
11302	Gowongan	6,620	6,492	6,367	6,244	6,123	6,005	5,889	5,776	5,664	5,555	5,448	5,342	5,239	5,138	5,039	4,942
11303	Cokrodiningratan	8,534	8,427	8,321	8,216	8,112	8,010	7,909	7,809	7,711	7,614	7,518	7,423	7,329	7,237	7,146	7,056
11401	Kricak	13,396	13,554	13,711	13,866	14,020	14,173	14,325	14,476	14,625	14,774	14,921	15,067	15,212	15,356	15,499	15,641
11402	Karangwaru	10,208	10,237	10,266	10,295	10,325	10,354	10,384	10,413	10,443	10,472	10,502	10,532	10,562	10,592	10,622	10,653
11403	Tegalrejo	9,505	9,629	9,753	9,876	9,997	10,118	10,237	10,355	10,473	10,589	10,705	10,819	10,932	11,045	11,156	11,267
11404	Bener	4,979	5,072	5,165	5,257	5,349	5,440	5,531	5,621	5,711	5,801	5,890	5,978	6,067	6,154	6,242	6,329
20101	Sumberahayu	5,722	5,701	5,679	5,658	5,637	5,615	5,594	5,572	5,551	5,529	5,508	5,486	5,465	5,443	5,422	5,401
20102	Sumbersari	6,873	6,871	6,868	6,866	6,864	6,862	6,860	6,858	6,856	6,854	6,852	6,851	6,849	6,847	6,846	6,844
20103	Sumberagung	10,139	10,137	10,136	10,134	10,133	10,132	10,130	10,129	10,128	10,127	10,126	10,125	10,124	10,123	10,122	10,121
20104	Sumberarum	6,053	6,042	6,032	6,022	6,012	6,003	5,994	5,986	5,977	5,969	5,961	5,954	5,946	5,939	5,932	5,925
20201	Sendangmulyo	6,537	6,530	6,523	6,516	6,510	6,503	6,497	6,491	6,486	6,480	6,475	6,470	6,465	6,460	6,455	6,450
20202	Sendangarum	3,237	3,232	3,228	3,224	3,220	3,216	3,212	3,209	3,205	3,202	3,199	3,196	3,193	3,190	3,187	3,184
20203	Sendangrejo	7,100	7,079	7,057	7,036	7,015	6,994	6,973	6,952	6,931	6,910	6,889	6,868	6,848	6,827	6,807	6,786
20204	Sendangagung	3,506	3,374	3,247	3,124	3,006	2,893	2,784	2,679	2,578	2,481	2,387	2,297	2,211	2,127	2,047	1,970
20205	Sendangsari	7,228	7,385	7,545	7,709	7,877	8,048	8,222	8,401	8,583	8,770	8,960	9,154	9,353	9,556	9,764	9,976

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20301	Margodadi	7,133	7,135	7,137	7,139	7,141	7,144	7,146	7,148	7,150	7,152	7,154	7,156	7,159	7,161	7,163	7,165
20302	Margoluwih	8,173	8,226	8,280	8,334	8,388	8,442	8,497	8,552	8,608	8,663	8,720	8,776	8,833	8,891	8,948	9,006
20303	Margomulyo	10,076	10,159	10,244	10,328	10,414	10,500	10,587	10,674	10,763	10,852	10,942	11,032	11,123	11,215	11,308	11,402
20304	Margoagung	8,248	8,271	8,296	8,320	8,344	8,368	8,392	8,417	8,441	8,466	8,490	8,515	8,540	8,564	8,589	8,614
20305	Margokaton	6,238	6,244	6,250	6,256	6,262	6,268	6,274	6,280	6,286	6,292	6,298	6,305	6,311	6,317	6,323	6,329
20401	Sidorejo	5,668	5,662	5,657	5,651	5,646	5,641	5,636	5,632	5,627	5,623	5,618	5,614	5,610	5,606	5,603	5,599
20402	Sidoluhur	8,774	8,814	8,855	8,897	8,938	8,980	9,022	9,064	9,106	9,149	9,191	9,234	9,277	9,320	9,364	9,407
20403	Sidomulyo	5,474	5,505	5,536	5,568	5,599	5,631	5,663	5,696	5,728	5,761	5,793	5,826	5,859	5,893	5,926	5,960
20404	Sidoagung	7,398	7,450	7,503	7,555	7,607	7,658	7,710	7,761	7,811	7,862	7,912	7,962	8,012	8,061	8,110	8,159
20405	Sidokarto	8,664	8,728	8,792	8,857	8,922	8,988	9,054	9,121	9,188	9,256	9,324	9,393	9,462	9,532	9,602	9,673
20406	Sidoarum	13,799	14,047	14,292	14,535	14,777	15,016	15,253	15,487	15,720	15,951	16,180	16,406	16,631	16,854	17,075	17,294
20407	Sidomoyo	6,433	6,487	6,542	6,598	6,654	6,711	6,768	6,825	6,883	6,941	7,000	7,060	7,120	7,180	7,241	7,303
20501	Balecatur	17,225	17,624	18,033	18,451	18,879	19,317	19,765	20,224	20,693	21,173	21,664	22,166	22,681	23,207	23,745	24,296
20502	Ambarketawang	19,424	19,702	19,977	20,249	20,518	20,784	21,047	21,307	21,564	21,819	22,071	22,320	22,566	22,810	23,051	23,290
20503	Banyuraden	16,247	16,530	16,811	17,088	17,363	17,634	17,904	18,170	18,434	18,696	18,955	19,211	19,465	19,716	19,965	20,211
20504	Nogotirto	17,576	17,766	17,952	18,134	18,311	18,483	18,652	18,817	18,979	19,137	19,292	19,444	19,593	19,739	19,883	20,024
20505	Trihanggo	14,657	14,848	15,037	15,225	15,412	15,597	15,780	15,963	16,144	16,323	16,502	16,678	16,854	17,028	17,201	17,373
20601	Tirtoadi	7,948	8,009	8,069	8,130	8,192	8,254	8,316	8,379	8,442	8,506	8,570	8,635	8,700	8,766	8,833	8,899
20602	Sumberadi	12,302	12,446	12,591	12,738	12,887	13,038	13,190	13,345	13,501	13,659	13,818	13,980	14,143	14,309	14,476	14,645
20603	Tlogoadi	10,262	10,416	10,572	10,730	10,891	11,054	11,220	11,388	11,559	11,732	11,908	12,086	12,267	12,451	12,638	12,827
20604	Sendangadi	13,443	13,636	13,830	14,023	14,216	14,409	14,602	14,796	14,989	15,182	15,375	15,569	15,762	15,955	16,148	16,341
20605	Sinduadi	42,561	43,526	44,490	45,454	46,419	47,383	48,347	49,312	50,276	51,241	52,205	53,169	54,134	55,098	56,062	57,027
20701	Caturtunggal	86,177	86,869	87,541	88,194	88,830	89,449	90,052	90,641	91,216	91,778	92,327	92,865	93,391	93,906	94,411	94,906
20702	Maguwoharjo	35,982	37,228	38,518	39,853	41,234	42,662	44,141	45,670	47,253	48,890	50,584	52,336	54,150	56,026	57,967	59,976
20703	Condongcatur	53,294	55,046	56,832	58,654	60,508	62,396	64,316	66,266	68,245	70,253	72,287	74,346	76,429	78,534	80,658	82,802
20801	Sendangtirto	12,705	12,894	13,087	13,282	13,481	13,682	13,886	14,094	14,304	14,518	14,735	14,955	15,178	15,405	15,635	15,868
20802	Tegaltirto	8,695	8,737	8,778	8,819	8,860	8,902	8,943	8,984	9,026	9,067	9,108	9,149	9,191	9,232	9,273	9,315
20803	Jogotirto	7,752	7,755	7,757	7,760	7,763	7,765	7,768	7,771	7,774	7,776	7,779	7,782	7,784	7,787	7,790	7,793
20804	Kalitirto	10,612	10,730	10,848	10,968	11,090	11,212	11,336	11,462	11,588	11,716	11,846	11,977	12,109	12,243	12,379	12,516

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20901	Sumberharjo	11,516	11,576	11,635	11,695	11,755	11,816	11,876	11,937	11,999	12,060	12,122	12,185	12,247	12,310	12,374	12,437
20902	Wukirharjo	2,204	2,209	2,215	2,221	2,226	2,232	2,238	2,243	2,249	2,255	2,261	2,266	2,272	2,278	2,284	2,289
20903	Gayamharjo	3,939	3,942	3,946	3,949	3,953	3,956	3,959	3,963	3,966	3,970	3,973	3,977	3,980	3,984	3,987	3,990
20904	Sambirojo	4,596	4,602	4,608	4,613	4,619	4,624	4,629	4,634	4,638	4,643	4,647	4,652	4,656	4,660	4,664	4,668
20905	Madurojo	9,921	9,929	9,936	9,944	9,951	9,959	9,966	9,974	9,981	9,989	9,996	10,004	10,011	10,019	10,026	10,034
20906	Bokoharjo	10,124	10,274	10,427	10,582	10,739	10,899	11,061	11,226	11,393	11,562	11,734	11,908	12,085	12,265	12,447	12,633
21001	Purwomartani	28,531	29,490	30,480	31,505	32,563	33,657	34,788	35,957	37,166	38,414	39,705	41,039	42,418	43,844	45,317	46,839
21002	Tirtomartani	12,906	13,020	13,135	13,251	13,368	13,486	13,605	13,726	13,847	13,969	14,093	14,217	14,343	14,470	14,597	14,726
21003	Tamanmartani	12,708	12,813	12,919	13,026	13,134	13,242	13,351	13,462	13,573	13,685	13,798	13,912	14,027	14,143	14,260	14,378
21004	Selomartani	9,517	9,534	9,552	9,570	9,588	9,606	9,624	9,642	9,660	9,678	9,696	9,714	9,732	9,750	9,768	9,786
21101	Wedomartani	22,900	23,592	24,305	25,039	25,795	26,575	27,377	28,205	29,057	29,935	30,839	31,771	32,731	33,719	34,738	35,788
21102	Widodomartani	6,317	6,325	6,332	6,340	6,347	6,355	6,363	6,370	6,378	6,385	6,393	6,401	6,408	6,416	6,424	6,431
21103	Bimomartani	5,351	5,347	5,343	5,339	5,336	5,332	5,329	5,326	5,323	5,320	5,317	5,314	5,312	5,309	5,306	5,304
21104	Sindumartani	6,319	6,339	6,359	6,379	6,399	6,419	6,440	6,460	6,480	6,501	6,521	6,542	6,562	6,583	6,604	6,625
21105	Umbulmartani	9,251	9,416	9,585	9,756	9,930	10,107	10,288	10,472	10,659	10,849	11,043	11,240	11,441	11,645	11,853	12,065
21201	Sariharjo	18,998	19,681	20,388	21,120	21,879	22,665	23,479	24,322	25,196	26,101	27,038	28,010	29,016	30,058	31,138	32,256
21202	Donoharjo	7,013	7,061	7,110	7,160	7,209	7,259	7,310	7,360	7,411	7,463	7,514	7,567	7,619	7,672	7,725	7,779
21203	Sardonoharjo	15,673	15,981	16,294	16,613	16,939	17,271	17,609	17,954	18,306	18,665	19,031	19,404	19,784	20,172	20,567	20,970
21204	Sukoharjo	12,190	12,465	12,747	13,035	13,329	13,630	13,938	14,253	14,575	14,904	15,241	15,585	15,937	16,297	16,665	17,041
21205	Sinduharjo	16,165	16,625	17,099	17,587	18,088	18,604	19,134	19,680	20,241	20,818	21,411	22,022	22,650	23,295	23,959	24,643
21206	Minomartani	13,567	13,847	14,124	14,395	14,663	14,926	15,185	15,441	15,694	15,943	16,188	16,431	16,671	16,907	17,141	17,373
21301	Caturharjo	11,427	11,466	11,504	11,543	11,582	11,621	11,660	11,699	11,738	11,778	11,817	11,857	11,897	11,937	11,977	12,017
21302	Triharjo	13,664	13,689	13,712	13,735	13,757	13,778	13,799	13,819	13,839	13,858	13,876	13,894	13,912	13,929	13,945	13,962
21303	Tridadi	12,261	12,418	12,574	12,730	12,887	13,043	13,199	13,356	13,512	13,668	13,825	13,981	14,137	14,294	14,450	14,606
21304	Pandowoharjo	8,746	8,803	8,861	8,918	8,977	9,035	9,094	9,154	9,214	9,274	9,334	9,395	9,457	9,518	9,581	9,643
21305	Trimulyo	7,466	7,505	7,543	7,582	7,621	7,660	7,699	7,739	7,778	7,818	7,859	7,899	7,939	7,980	8,021	8,062

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
21401	Banyurejo	6,675	6,678	6,681	6,685	6,688	6,691	6,694	6,698	6,701	6,704	6,707	6,710	6,714	6,717	6,720	6,723
21402	Tambakrejo	3,987	3,982	3,978	3,973	3,969	3,965	3,961	3,957	3,954	3,950	3,947	3,943	3,940	3,937	3,934	3,931
21403	Sumberejo	3,682	3,680	3,678	3,676	3,674	3,672	3,671	3,669	3,667	3,666	3,664	3,663	3,662	3,660	3,659	3,657
21404	Pondokrejo	5,153	5,175	5,198	5,220	5,243	5,266	5,289	5,312	5,335	5,359	5,382	5,406	5,429	5,453	5,477	5,501
21405	Mororejo	4,358	4,379	4,399	4,420	4,441	4,462	4,483	4,504	4,526	4,547	4,568	4,590	4,612	4,633	4,655	4,677
21406	Margorejo	9,173	9,315	9,458	9,604	9,752	9,902	10,055	10,210	10,367	10,527	10,689	10,854	11,021	11,191	11,363	11,538
21407	Lumbungrejo	6,651	6,701	6,751	6,801	6,852	6,903	6,955	7,007	7,059	7,112	7,165	7,219	7,273	7,327	7,382	7,437
21408	Merdikorejo	5,480	5,518	5,556	5,594	5,632	5,671	5,710	5,749	5,789	5,829	5,869	5,909	5,950	5,991	6,032	6,073
21501	Bangunkerto	7,664	7,717	7,771	7,825	7,879	7,934	7,989	8,045	8,101	8,157	8,214	8,271	8,329	8,387	8,445	8,504
21502	Donokerto	7,017	7,023	7,028	7,034	7,040	7,045	7,051	7,057	7,063	7,068	7,074	7,080	7,086	7,091	7,097	7,103
21503	Girikerto	6,669	6,707	6,745	6,784	6,822	6,861	6,900	6,939	6,979	7,018	7,058	7,098	7,139	7,179	7,220	7,261
21504	Wonokerto	8,600	8,716	8,834	8,954	9,075	9,198	9,323	9,450	9,578	9,707	9,839	9,972	10,108	10,245	10,384	10,524
21601	Purwobinangun	6,790	6,797	6,803	6,810	6,816	6,823	6,829	6,836	6,843	6,849	6,856	6,862	6,869	6,875	6,882	6,889
21602	Candibinangun	4,862	4,893	4,924	4,956	4,987	5,019	5,051	5,084	5,116	5,149	5,181	5,214	5,248	5,281	5,315	5,349
21603	Harjobinangun	3,971	3,969	3,967	3,965	3,963	3,961	3,959	3,958	3,956	3,954	3,953	3,951	3,950	3,948	3,947	3,945
21604	Pakembinangun	5,449	5,462	5,475	5,488	5,501	5,514	5,527	5,541	5,554	5,567	5,580	5,593	5,607	5,620	5,633	5,647
21605	Hargobinangun	7,236	7,271	7,307	7,342	7,378	7,413	7,448	7,482	7,517	7,551	7,586	7,620	7,654	7,687	7,721	7,755
21701	Wukirsari	8,398	8,396	8,394	8,393	8,391	8,390	8,388	8,387	8,385	8,384	8,383	8,381	8,380	8,379	8,378	8,376
21702	Argomulyo	6,423	6,418	6,413	6,409	6,405	6,401	6,397	6,393	6,389	6,386	6,382	6,379	6,375	6,372	6,369	6,366
21703	Glagaharjo	3,213	3,224	3,235	3,246	3,258	3,269	3,280	3,291	3,303	3,314	3,325	3,337	3,348	3,360	3,371	3,383
21704	Kepuharjo	2,725	2,751	2,778	2,804	2,831	2,858	2,885	2,912	2,940	2,968	2,997	3,025	3,054	3,083	3,112	3,142
21705	Umbulharjo	4,022	4,082	4,142	4,203	4,265	4,328	4,392	4,457	4,523	4,590	4,658	4,726	4,796	4,867	4,939	5,012
30101	Poncosari	11,136	11,128	11,120	11,112	11,105	11,098	11,091	11,084	11,078	11,072	11,066	11,060	11,054	11,049	11,043	11,038
30102	Trimurti	16,307	16,378	16,449	16,521	16,593	16,665	16,737	16,810	16,883	16,956	17,030	17,104	17,178	17,253	17,328	17,403
30201	Gadingsari	8,861	8,853	8,845	8,837	8,830	8,822	8,816	8,809	8,802	8,796	8,790	8,784	8,778	8,773	8,767	8,762
30202	Gadingharjo	3,310	3,318	3,326	3,334	3,342	3,350	3,358	3,366	3,374	3,382	3,390	3,398	3,406	3,414	3,422	3,430
30203	Srigading	9,135	9,179	9,223	9,267	9,312	9,356	9,401	9,446	9,492	9,538	9,583	9,629	9,676	9,722	9,769	9,816
30204	Murtigading	7,430	7,444	7,459	7,474	7,488	7,503	7,518	7,533	7,548	7,563	7,578	7,592	7,607	7,622	7,638	7,653

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
30301	Tirtohargo	2,538	2,535	2,533	2,530	2,528	2,526	2,523	2,521	2,519	2,517	2,515	2,513	2,511	2,510	2,508	2,506
30302	Parangtritis	7,265	7,337	7,410	7,483	7,557	7,632	7,707	7,784	7,861	7,939	8,017	8,096	8,177	8,258	8,339	8,422
30303	Donotirto	7,298	7,288	7,279	7,270	7,262	7,254	7,246	7,238	7,230	7,223	7,216	7,209	7,203	7,196	7,190	7,184
30304	Tirtosari	3,679	3,673	3,668	3,662	3,657	3,652	3,648	3,643	3,639	3,634	3,630	3,626	3,622	3,618	3,615	3,611
30305	Tirtomulyo	6,284	6,292	6,299	6,307	6,314	6,322	6,330	6,337	6,345	6,352	6,360	6,367	6,375	6,383	6,390	6,398
30401	Seloharjo	9,756	9,773	9,790	9,807	9,824	9,840	9,857	9,874	9,892	9,909	9,926	9,943	9,960	9,977	9,994	10,012
30402	Panjangrejo	8,545	8,560	8,574	8,589	8,604	8,619	8,634	8,649	8,664	8,679	8,694	8,709	8,724	8,739	8,755	8,770
30403	Srihandono	11,942	11,947	11,953	11,958	11,963	11,968	11,973	11,978	11,984	11,989	11,994	11,999	12,004	12,009	12,015	12,020
30501	Sidomulyo	11,136	11,134	11,133	11,131	11,130	11,128	11,127	11,125	11,124	11,123	11,122	11,121	11,119	11,118	11,117	11,116
30502	Mulyodadi	10,163	10,162	10,160	10,159	10,157	10,156	10,155	10,154	10,153	10,151	10,150	10,149	10,148	10,147	10,146	10,145
30503	Sumbermulyo	13,961	13,993	14,025	14,057	14,089	14,121	14,154	14,186	14,219	14,251	14,284	14,316	14,349	14,382	14,415	14,448
30601	Caturharjo	10,087	10,118	10,150	10,181	10,213	10,244	10,276	10,308	10,340	10,372	10,404	10,436	10,469	10,501	10,534	10,567
30602	Triharjo	11,917	12,014	12,112	12,211	12,310	12,411	12,512	12,614	12,717	12,820	12,925	13,030	13,136	13,243	13,351	13,460
30603	Gilangharjo	13,970	14,019	14,068	14,117	14,167	14,216	14,266	14,316	14,367	14,417	14,468	14,518	14,569	14,620	14,672	14,723
30604	Wijirejo	9,854	9,912	9,970	10,028	10,087	10,146	10,205	10,264	10,324	10,385	10,445	10,506	10,568	10,629	10,691	10,754
30701	Palbapang	11,987	12,071	12,157	12,243	12,329	12,416	12,504	12,593	12,682	12,771	12,862	12,953	13,044	13,137	13,230	13,323
30702	Ringinharjo	6,840	6,889	6,938	6,987	7,037	7,087	7,137	7,188	7,239	7,290	7,342	7,394	7,447	7,500	7,553	7,607
30703	Bantul	14,522	14,624	14,727	14,831	14,935	15,040	15,146	15,253	15,360	15,468	15,577	15,686	15,796	15,908	16,019	16,132
30704	Trirenggo	15,586	15,696	15,806	15,918	16,030	16,143	16,256	16,371	16,486	16,602	16,719	16,837	16,956	17,075	17,195	17,317
30705	Sapdodadi	5,719	5,775	5,832	5,890	5,948	6,006	6,065	6,125	6,185	6,246	6,308	6,370	6,432	6,496	6,560	6,624
30801	Patalan	10,588	10,655	10,722	10,790	10,858	10,926	10,995	11,065	11,134	11,205	11,275	11,347	11,418	11,490	11,563	11,636
30802	Canden	9,884	9,900	9,916	9,932	9,948	9,963	9,979	9,995	10,011	10,027	10,043	10,059	10,075	10,091	10,107	10,123
30803	Sumberagung	12,629	12,708	12,787	12,867	12,947	13,028	13,110	13,192	13,274	13,357	13,441	13,525	13,609	13,694	13,780	13,866
30804	Trimulyo	15,043	15,224	15,408	15,594	15,782	15,972	16,165	16,360	16,558	16,757	16,960	17,164	17,371	17,581	17,793	18,008

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
30901	Selopamioro	12,608	12,631	12,653	12,674	12,695	12,715	12,734	12,753	12,772	12,789	12,807	12,824	12,840	12,856	12,872	12,887
30902	Sriharjo	7,634	7,638	7,642	7,646	7,650	7,654	7,658	7,662	7,666	7,670	7,674	7,679	7,683	7,687	7,691	7,695
30903	Kebonagung	3,122	3,130	3,139	3,147	3,155	3,164	3,172	3,181	3,189	3,198	3,206	3,215	3,223	3,232	3,240	3,249
30904	Karangtengah	4,479	4,528	4,578	4,628	4,679	4,730	4,782	4,834	4,887	4,940	4,995	5,049	5,105	5,161	5,217	5,274
30905	Girirejo	4,108	4,112	4,116	4,120	4,124	4,128	4,132	4,135	4,138	4,142	4,145	4,148	4,151	4,154	4,157	4,160
30906	Karangtalun	2,632	2,635	2,637	2,639	2,642	2,644	2,646	2,648	2,650	2,652	2,654	2,656	2,657	2,659	2,661	2,663
30907	Imogiri	3,471	3,485	3,498	3,512	3,526	3,539	3,552	3,566	3,579	3,592	3,605	3,619	3,632	3,645	3,658	3,671
30908	Wukirsari	15,035	15,185	15,337	15,490	15,644	15,800	15,958	16,117	16,278	16,441	16,605	16,770	16,938	17,107	17,278	17,450
31001	Mangunan	4,093	4,103	4,114	4,125	4,135	4,146	4,157	4,168	4,179	4,189	4,200	4,211	4,222	4,233	4,244	4,255
31002	Muntuk	7,439	7,505	7,572	7,639	7,707	7,776	7,845	7,915	7,985	8,056	8,128	8,200	8,273	8,347	8,421	8,496
31003	Dlingo	5,294	5,307	5,319	5,332	5,345	5,357	5,370	5,383	5,395	5,408	5,421	5,434	5,447	5,459	5,472	5,485
31004	Temuwuh	6,347	6,413	6,480	6,547	6,615	6,683	6,752	6,822	6,893	6,965	7,037	7,110	7,183	7,258	7,333	7,409
31005	Jatimulyo	5,844	5,857	5,870	5,883	5,897	5,910	5,923	5,936	5,949	5,963	5,976	5,989	6,003	6,016	6,029	6,043
31006	Terong	5,115	5,175	5,236	5,298	5,361	5,424	5,488	5,553	5,619	5,685	5,752	5,820	5,889	5,958	6,029	6,100
31101	Wonokromo	12,386	12,596	12,809	13,026	13,247	13,471	13,699	13,931	14,167	14,407	14,651	14,899	15,151	15,408	15,668	15,934
31102	Pleret	10,476	10,594	10,714	10,834	10,956	11,080	11,205	11,331	11,458	11,587	11,718	11,850	11,984	12,119	12,255	12,393
31103	Segoroyoso	7,132	7,204	7,276	7,349	7,423	7,498	7,573	7,649	7,726	7,804	7,882	7,962	8,042	8,123	8,204	8,287
31104	Bawuran	4,979	4,988	4,997	5,006	5,015	5,023	5,031	5,039	5,047	5,054	5,061	5,068	5,075	5,082	5,089	5,095
31105	Wonolelo	3,953	3,969	3,985	4,001	4,018	4,034	4,051	4,068	4,084	4,101	4,118	4,135	4,152	4,169	4,186	4,203
31201	Sitimulyo	13,643	13,812	13,984	14,157	14,333	14,511	14,691	14,874	15,059	15,246	15,435	15,627	15,821	16,017	16,216	16,418
31202	Srimulyo	13,799	13,850	13,901	13,953	14,005	14,057	14,109	14,161	14,214	14,267	14,319	14,373	14,426	14,480	14,533	14,587
31203	Srimartani	12,752	12,874	12,999	13,124	13,250	13,378	13,507	13,637	13,769	13,902	14,036	14,171	14,308	14,446	14,585	14,726
31301	Tamanan	10,341	10,564	10,793	11,026	11,264	11,507	11,755	12,009	12,269	12,533	12,804	13,081	13,363	13,652	13,946	14,248
31302	Jagalan	3,061	3,062	3,062	3,063	3,064	3,064	3,065	3,066	3,066	3,067	3,067	3,068	3,068	3,069	3,069	3,070
31303	Singosaren	3,151	3,220	3,290	3,362	3,436	3,511	3,588	3,666	3,747	3,829	3,912	3,998	4,086	4,175	4,266	4,360
31304	Wirokerten	10,813	11,028	11,248	11,472	11,700	11,933	12,171	12,413	12,660	12,912	13,169	13,431	13,699	13,972	14,250	14,533
31305	Jambidan	7,356	7,423	7,492	7,561	7,630	7,701	7,771	7,843	7,915	7,988	8,061	8,136	8,210	8,286	8,362	8,439
31306	Potorono	9,518	9,658	9,800	9,943	10,089	10,237	10,387	10,540	10,694	10,851	11,010	11,172	11,335	11,502	11,670	11,841

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
31307	Baturetno	13,705	14,135	14,578	15,036	15,508	15,994	16,496	17,014	17,548	18,099	18,667	19,253	19,857	20,480	21,123	21,786
31308	Banguntapan	39,484	40,189	40,888	41,580	42,266	42,947	43,621	44,290	44,953	45,610	46,261	46,906	47,546	48,180	48,809	49,432
31401	Pendowoharjo	19,938	20,299	20,665	21,039	21,419	21,806	22,200	22,601	23,009	23,425	23,848	24,279	24,718	25,164	25,619	26,082
31402	Timbulharjo	18,686	18,893	19,102	19,313	19,527	19,743	19,962	20,183	20,406	20,632	20,860	21,091	21,325	21,561	21,800	22,041
31403	Bangunharjo	25,988	26,643	27,315	28,003	28,709	29,433	30,175	30,936	31,716	32,515	33,335	34,175	35,037	35,920	36,826	37,754
31404	Panggungharjo	31,083	31,885	32,707	33,551	34,416	35,304	36,215	37,149	38,107	39,090	40,098	41,132	42,193	43,282	44,398	45,543
31501	Bangunjiwo	22,290	22,744	23,206	23,679	24,161	24,653	25,154	25,666	26,189	26,722	27,266	27,821	28,387	28,965	29,554	30,156
31502	Tirtonimolo	20,761	21,149	21,545	21,947	22,358	22,776	23,201	23,635	24,077	24,527	24,985	25,452	25,928	26,412	26,906	27,409
31503	Tamantirto	19,640	20,156	20,685	21,228	21,785	22,357	22,944	23,546	24,165	24,799	25,450	26,118	26,804	27,508	28,230	28,971
31504	Ngestiharjo	34,436	35,204	35,973	36,742	37,511	38,279	39,048	39,817	40,585	41,354	42,123	42,891	43,660	44,429	45,197	45,966
31601	Triwidadi	9,287	9,353	9,419	9,485	9,551	9,619	9,686	9,754	9,823	9,892	9,962	10,032	10,102	10,173	10,245	10,317
31602	Sendangsari	10,109	10,194	10,281	10,368	10,456	10,545	10,635	10,725	10,816	10,908	11,001	11,094	11,188	11,283	11,379	11,476
31603	Guwosari	9,918	10,059	10,202	10,347	10,494	10,643	10,794	10,947	11,103	11,261	11,421	11,583	11,748	11,915	12,084	12,256
31701	Argodadi	9,634	9,686	9,739	9,792	9,846	9,899	9,953	10,007	10,062	10,117	10,172	10,227	10,283	10,339	10,395	10,452
31702	Argorejo	11,401	11,670	11,946	12,228	12,516	12,812	13,114	13,424	13,741	14,065	14,397	14,737	15,085	15,441	15,806	16,179
31703	Argosari	7,522	7,544	7,566	7,589	7,611	7,634	7,657	7,679	7,702	7,725	7,748	7,771	7,794	7,817	7,841	7,864
31704	Argomulyo	13,450	13,646	13,844	14,045	14,249	14,455	14,665	14,878	15,094	15,313	15,535	15,761	15,990	16,222	16,457	16,696

Appendix 13.5 Yogyakarta Municipality, Future Domestic Water Demand (l/sec)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
10101	Gedongkiwo	9.6	10.6	11.7	12.8	13.9	15.0	16.1	17.2	18.4	19.6	20.7	20.9	21.0	21.1	21.3	21.4
10102	Suryodiningratan	8.3	9.3	10.3	11.3	12.3	13.4	14.5	15.6	16.7	17.9	19.1	19.3	19.6	19.8	20.1	20.3
10103	Mantrijeron	7.5	8.3	9.1	9.9	10.7	11.4	12.2	13.0	13.8	14.6	15.4	15.4	15.5	15.5	15.5	15.5
10201	Patehan	3.8	4.2	4.6	4.9	5.3	5.6	6.0	6.3	6.6	7.0	7.3	7.3	7.2	7.2	7.1	7.1
10202	Panembahan	5.9	6.5	7.0	7.5	8.0	8.5	9.0	9.5	9.9	10.4	10.8	10.7	10.6	10.5	10.3	10.2
10203	Kadipaten	4.7	5.2	5.7	6.2	6.7	7.2	7.7	8.2	8.7	9.3	9.8	9.8	9.8	9.9	9.9	9.9
10301	Brontokusuman	8.8	9.9	10.9	12.0	13.1	14.3	15.4	16.6	17.9	19.1	20.4	20.7	21.0	21.3	21.6	21.9
10302	Keparakan	6.7	7.4	8.2	8.9	9.6	10.4	11.1	11.9	12.6	13.4	14.2	14.3	14.3	14.4	14.5	14.5
10303	Wirogunan	8.7	9.6	10.5	11.4	12.2	13.1	13.9	14.8	15.6	16.5	17.3	17.3	17.2	17.2	17.1	17.0
10401	Semaki	4.6	5.1	5.5	6.0	6.4	6.9	7.4	7.8	8.3	8.7	9.2	9.1	9.1	9.1	9.1	9.0
10402	Muja-muju	9.0	10.0	11.1	12.2	13.4	14.5	15.7	16.9	18.1	19.4	20.7	20.9	21.2	21.4	21.7	21.9
10403	Tahunan	8.2	9.2	10.3	11.4	12.6	13.8	15.0	16.3	17.6	18.9	20.3	20.7	21.1	21.5	21.9	22.3
10404	Warungboto	8.4	9.5	10.6	11.8	13.1	14.4	15.8	17.2	18.7	20.3	21.9	22.5	23.1	23.7	24.3	24.9
10405	Pandeyan	10.3	11.5	12.8	14.2	15.6	17.0	18.4	19.9	21.4	23.0	24.6	25.0	25.3	25.7	26.1	26.4
10406	Sorosutan	13.1	15.0	17.0	19.1	21.4	23.8	26.3	29.0	31.8	34.8	37.9	39.2	40.5	41.8	43.2	44.5
10407	Giwangan	5.3	6.1	6.8	7.6	8.4	9.3	10.2	11.1	12.1	13.1	14.2	14.5	14.9	15.3	15.6	16.0
10501	Rejowinangun	8.7	9.7	10.8	12.0	13.2	14.4	15.6	16.9	18.2	19.6	20.9	21.3	21.6	21.9	22.3	22.6
10502	Prenggan	8.3	9.3	10.4	11.5	12.6	13.8	15.0	16.3	17.6	18.9	20.3	20.6	21.0	21.3	21.7	22.1
10503	Purbayan	6.8	7.6	8.5	9.3	10.2	11.1	12.0	13.0	14.0	15.0	16.0	16.2	16.5	16.7	16.9	17.2
10601	Demangan	7.8	8.5	9.2	10.0	10.7	11.4	12.1	12.8	13.4	14.1	14.7	14.6	14.5	14.3	14.2	14.1
10602	Kotabaru	2.1	2.3	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.3	3.2	3.1	2.9	2.8
10603	Klitren	8.6	9.4	10.2	11.0	11.9	12.7	13.4	14.2	15.0	15.7	16.5	16.4	16.3	16.2	16.1	15.9
10604	Baciro	9.7	10.6	11.6	12.6	13.5	14.5	15.4	16.4	17.3	18.3	19.2	19.2	19.2	19.2	19.1	19.1
10605	Terban	7.8	8.6	9.3	10.1	10.8	11.5	12.2	12.9	13.5	14.2	14.8	14.7	14.5	14.4	14.3	14.1
10701	Suryatmajan	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.3	5.6	5.8	6.1	6.0	6.0	5.9	5.8	5.8
10702	Tegalpanggung	6.0	6.6	7.1	7.7	8.2	8.7	9.2	9.7	10.2	10.6	11.1	11.0	10.8	10.7	10.6	10.4
10703	Bausasran	4.8	5.2	5.6	5.9	6.3	6.6	6.9	7.2	7.5	7.8	8.0	7.8	7.7	7.5	7.3	7.1
10801	Gunungketur	3.5	3.8	4.1	4.4	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.6	6.5	6.5	6.4	6.4
10802	Purwokinanti	4.5	4.9	5.4	5.9	6.3	6.8	7.3	7.7	8.2	8.7	9.2	9.2	9.2	9.2	9.3	9.3
10901	Ngupasan	3.4	3.6	3.8	3.9	4.1	4.2	4.4	4.5	4.6	4.6	4.7	4.5	4.4	4.2	4.1	3.9
10902	Prawirodirjan	7.0	7.7	8.5	9.3	10.1	11.0	11.8	12.7	13.5	14.4	15.3	15.4	15.5	15.7	15.8	15.9
11001	Notoprajan	6.0	6.7	7.3	7.9	8.6	9.3	9.9	10.6	11.3	11.9	12.6	12.7	12.7	12.8	12.8	12.9
11002	Ngampilan	6.9	7.5	8.0	8.6	9.1	9.6	10.0	10.5	10.8	11.2	11.5	11.3	11.0	10.7	10.4	10.1
11101	Patangpuluhan	5.3	5.9	6.5	7.1	7.7	8.3	8.9	9.6	10.2	10.9	11.5	11.6	11.7	11.8	11.8	11.9
11102	Wirobrajan	7.6	8.5	9.4	10.2	11.1	12.0	12.9	13.8	14.8	15.7	16.7	16.8	16.9	17.0	17.1	17.3
11103	Pakuncen	7.8	8.6	9.5	10.4	11.2	12.1	13.0	13.9	14.8	15.7	16.6	16.7	16.8	16.9	17.0	17.1
11201	Pringgokusuman	8.1	8.8	9.5	10.2	10.9	11.6	12.2	12.9	13.5	14.0	14.6	14.4	14.2	14.0	13.8	13.6
11202	Sosromenduran	4.4	4.8	5.1	5.4	5.6	5.9	6.1	6.3	6.5	6.7	6.9	6.7	6.6	6.4	6.2	6.1
11301	Bumijo	7.8	8.6	9.5	10.3	11.2	12.1	13.0	13.8	14.7	15.6	16.6	16.6	16.7	16.8	16.9	17.0
11302	Gowongan	5.0	5.5	5.9	6.3	6.7	7.1	7.4	7.8	8.2	8.5	8.8	8.7	8.6	8.5	8.4	8.2
11303	Cokrodiningratan	6.5	7.1	7.7	8.3	8.9	9.4	10.0	10.6	11.1	11.6	12.2	12.1	12.0	11.9	11.8	11.8
11401	Kricak	10.1	11.4	12.7	14.0	15.3	16.7	18.1	19.6	21.1	22.6	24.2	24.6	24.9	25.3	25.7	26.1
11402	Karangwaru	7.7	8.6	9.5	10.4	11.3	12.2	13.1	14.1	15.0	16.0	17.0	17.2	17.3	17.5	17.6	17.8
11403	Tegalrejo	7.2	8.1	9.0	9.9	10.9	11.9	12.9	14.0	15.1	16.2	17.3	17.6	17.9	18.2	18.5	18.8
11404	Bener	3.8	4.3	4.8	5.3	5.8	6.4	7.0	7.6	8.2	8.9	9.5	9.7	9.9	10.1	10.3	10.5
	Sub-Total	**309.4**	**343.1**	**377.2**	**411.8**	**446.9**	**482.3**	**518.3**	**554.6**	**591.5**	**628.8**	**666.5**	**670.9**	**675.3**	**679.8**	**684.2**	**688.7**

Appendix 13.6 Sleman and Bantul Regencies, Future Domestic Water Demand for PDAM (Urban) (l/sec)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20000	**Sleman**																
20405	Sidokarto	2.4	3.1	3.8	4.6	5.5	6.5	7.5	8.7	9.9	11.2	12.7	13.3	14.0	14.7	15.4	16.1
20406	Sidoarum	2.4	3.5	4.8	6.2	7.9	9.7	11.8	14.0	16.4	19.1	22.0	23.3	24.6	26.0	27.4	28.8
20407	Sidomoyo	2.4	2.9	3.4	4.0	4.6	5.3	6.0	6.8	7.7	8.6	9.5	10.0	10.5	11.1	11.6	12.2
20501	Balecatur	2.0	3.4	5.1	7.0	9.2	11.7	14.6	17.7	21.2	25.1	29.4	31.5	33.6	35.8	38.1	40.5
20502	Ambarketawan	2.8	4.4	6.1	8.2	10.5	13.0	15.9	19.0	22.3	26.0	30.0	31.7	33.4	35.2	37.0	38.8
20503	Banyuraden	2.0	3.3	4.8	6.6	8.6	10.8	13.3	16.0	19.0	22.2	25.7	27.3	28.8	30.4	32.0	33.7
20504	Nogotirto	2.0	3.4	5.0	6.8	8.9	11.2	13.7	16.5	19.5	22.7	26.2	27.6	29.0	30.5	31.9	33.4
20505	Trihanggo	1.5	2.7	4.1	5.6	7.4	9.3	11.5	13.9	16.5	19.3	22.4	23.7	25.0	26.3	27.6	29.0
20601	Tirtoadi	0.2	0.8	1.6	2.4	3.4	4.5	5.7	7.0	8.4	10.0	11.6	12.3	12.9	13.5	14.2	14.8
20602	Sumberadi	2.9	3.8	4.9	6.1	7.5	9.0	10.6	12.4	14.4	16.5	18.8	19.8	21.0	22.1	23.2	24.4
20603	Tlogoadi	1.2	2.0	3.0	4.1	5.3	6.7	8.2	10.0	11.9	13.9	16.2	17.2	18.2	19.2	20.3	21.4
20604	Sendangadi	4.5	5.6	6.8	8.0	9.5	11.0	12.7	14.5	16.5	18.6	20.9	22.1	23.4	24.6	25.9	27.2
20605	Sinduadi	9.0	12.4	16.4	21.0	26.2	31.9	38.3	45.4	53.2	61.7	70.9	75.5	80.2	85.0	90.0	95.0
20701	Caturtunggal	10.2	17.0	24.8	33.6	43.5	54.4	66.4	79.5	93.7	109.0	125.4	131.8	138.4	144.9	151.5	158.2
20702	Maguwoharjo	3.1	6.1	9.7	14.0	19.1	25.0	31.7	39.3	48.0	57.8	68.7	74.3	80.2	86.5	93.0	100.0
20703	Condongcatur	11.9	16.4	21.7	27.8	34.7	42.6	51.5	61.4	72.5	84.7	98.2	105.6	113.2	121.2	129.5	138.0
20801	Sendangtirto	0.5	1.5	2.8	4.2	5.8	7.6	9.6	11.8	14.3	17.0	20.0	21.2	22.5	23.8	25.1	26.4
20802	Tegaltirto	0.9	1.6	2.4	3.2	4.2	5.3	6.5	7.8	9.2	10.7	12.4	13.0	13.6	14.2	14.9	15.5
21001	Purwomartani	5.4	7.8	10.6	14.0	17.8	22.2	27.1	32.7	39.0	46.1	53.9	58.3	62.8	67.7	72.7	78.1
21101	Wedomartani	3.4	5.3	7.5	10.2	13.2	16.7	20.7	25.1	30.1	35.7	41.9	45.1	48.5	52.0	55.8	59.6
21201	Sariharjo	1.9	3.5	5.5	7.7	10.4	13.5	17.1	21.1	25.7	30.9	36.7	39.8	43.0	46.4	50.0	53.8
21202	Donoharjo	1.8	2.3	2.9	3.6	4.3	5.1	6.0	6.9	8.0	9.0	10.2	10.7	11.3	11.8	12.4	13.0
21203	Sardonoharjo	2.5	3.8	5.2	6.9	8.9	11.0	13.4	16.1	19.1	22.3	25.8	27.5	29.3	31.1	33.0	35.0
21205	Sinduharjo	4.1	5.5	7.0	8.8	10.8	13.1	15.7	18.5	21.7	25.2	29.1	31.3	33.6	35.9	38.5	41.1
21206	Minomartani	0.0	1.1	2.4	4.0	5.8	7.8	10.1	12.7	15.5	18.6	22.0	23.3	24.7	26.1	27.5	29.0
21303	Tridadi	4.6	5.6	6.6	7.7	9.0	10.3	11.8	13.4	15.0	16.9	18.8	19.8	20.9	22.1	23.2	24.3
30000	**Bantul**																
30702	Ringinharjo	2.0	2.6	3.2	3.9	4.6	5.5	6.3	7.3	8.2	9.3	10.4	10.9	11.3	11.8	12.2	12.7
30703	Bantul	4.2	5.5	6.8	8.3	9.9	11.6	13.4	15.4	17.5	19.7	22.1	23.0	24.0	24.9	25.9	26.9
30704	Trirenggo	0.0	1.5	3.2	5.1	7.2	9.5	11.9	14.6	17.4	20.5	23.7	24.7	25.7	26.8	27.8	28.9
30705	Sapdodadi	0.1	0.6	1.3	2.0	2.7	3.6	4.5	5.5	6.6	7.7	9.0	9.4	9.8	10.2	10.6	11.0
30803	Sumberagung	0.3	1.6	2.9	4.4	6.1	7.9	9.8	11.9	14.1	16.5	19.1	19.9	20.7	21.5	22.3	23.1
30804	Trimulyo	3.5	4.8	6.3	7.9	9.7	11.7	13.8	16.1	18.6	21.2	24.1	25.2	26.4	27.6	28.8	30.0
30907	Imogiri	0.3	0.6	0.9	1.3	1.8	2.2	2.7	3.3	3.9	4.5	5.1	5.3	5.5	5.7	5.9	6.1
31101	Wonokromo	0.0	1.2	2.6	4.2	6.0	7.9	10.0	12.4	15.0	17.8	20.8	21.9	23.0	24.2	25.3	26.6
31102	Pleret	0.0	1.0	2.2	3.5	4.9	6.5	8.2	10.1	12.1	14.3	16.6	17.4	18.2	19.0	19.8	20.7
31103	Segoroyoso	0.0	0.7	1.5	2.4	3.3	4.4	5.6	6.8	8.2	9.6	11.2	11.7	12.2	12.7	13.3	13.8
31201	Sitimulyo	0.0	1.3	2.9	4.6	6.4	8.5	10.8	13.2	15.9	18.8	21.9	23.0	24.0	25.1	26.2	27.4
31301	Tamanan	0.0	1.0	2.2	3.6	5.1	6.7	8.6	10.7	13.0	15.5	18.2	19.2	20.3	21.4	22.6	23.7
31302	Jagalan	0.0	0.3	0.6	1.0	1.4	1.8	2.2	2.7	3.2	3.8	4.4	4.5	4.7	4.8	5.0	5.1
31303	Singosaren	0.0	0.3	0.7	1.1	1.5	2.1	2.6	3.3	4.0	4.7	5.6	5.9	6.2	6.5	6.9	7.3
31304	Wirokerten	0.0	1.1	2.3	3.7	5.3	7.0	8.9	11.0	13.4	15.9	18.7	19.7	20.8	21.9	23.0	24.2
31305	Jambidan	0.0	0.7	1.5	2.4	3.4	4.5	5.7	7.0	8.4	9.9	11.4	12.0	12.5	13.0	13.5	14.1
31306	Potorono	0.1	1.1	2.1	3.3	4.6	6.1	7.7	9.4	11.3	13.4	15.6	16.4	17.2	18.0	18.9	19.7
31307	Baturetno	0.6	2.0	3.6	5.4	7.5	9.8	12.5	15.5	18.8	22.4	26.5	28.3	30.2	32.1	34.2	36.3
31308	Banguntapan	0.6	4.5	8.9	13.9	19.5	25.6	32.3	39.7	47.7	56.4	65.7	68.9	72.2	75.5	78.9	82.4
31401	Pendowoharjo	3.5	5.3	7.4	9.8	12.4	15.2	18.3	21.7	25.5	29.5	33.9	35.7	37.5	39.5	41.4	43.5
31402	Timbulharjo	0.1	1.9	4.0	6.3	8.8	11.6	14.7	18.0	21.6	25.5	29.6	31.0	32.4	33.8	35.3	36.7
31403	Bangunharjo	4.0	6.5	9.4	12.6	16.1	20.2	24.6	29.5	34.9	40.8	47.3	50.2	53.2	56.3	59.6	62.9
31404	Panggungharjo	3.1	6.1	9.6	13.5	18.0	22.9	28.5	34.6	41.4	48.8	56.9	60.4	64.1	67.9	71.8	75.9
31501	Bangunjiwo	6.0	8.0	10.3	12.8	15.6	18.7	22.0	25.7	29.7	34.0	38.7	40.9	43.1	45.4	47.8	50.3
31502	Tirtonimolo	0.6	2.6	4.9	7.6	10.5	13.8	17.3	21.3	25.6	30.3	35.5	37.4	39.4	41.4	43.5	45.7
31503	Tamantirto	2.8	4.7	6.9	9.3	12.1	15.2	18.6	22.4	26.5	31.1	36.1	38.4	40.7	43.1	45.7	48.3
31504	Ngestiharjo	6.4	9.6	13.3	17.4	21.9	27.0	32.5	38.5	45.0	52.1	59.8	63.0	66.3	69.7	73.1	76.6
Sub-Total	**Sleman**	**85.6**	**128.8**	**179.0**	**236.5**	**301.9**	**375.4**	**457.4**	**548.4**	**648.7**	**758.9**	**879.3**	**937.0**	**996.7**	**1,058.2**	**1,121.7**	**1,187.2**
	Bantul	**38.3**	**77.4**	**121.7**	**171.2**	**226.4**	**287.3**	**354.3**	**427.6**	**507.4**	**594.1**	**687.9**	**724.2**	**761.5**	**799.8**	**839.3**	**879.8**

Appendix 13.7 Sleman and Bantul Regencies, Future Domestic Water Demand for PDAM (Rural) (l/sec)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20000	**Sleman**																
20103	Sumberagung	0.9	1.4	1.9	2.5	3.1	3.7	4.4	5.1	5.8	6.6	7.4	7.6	7.8	8.0	8.2	8.4
20203	Sendangrejo	0.1	0.5	0.9	1.3	1.8	2.2	2.7	3.3	3.8	4.4	5.0	5.2	5.3	5.4	5.5	5.7
20204	Sendangagung	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.6
20402	Sidoluhur	1.2	1.6	2.1	2.5	3.0	3.6	4.1	4.7	5.3	6.0	6.7	6.9	7.2	7.4	7.6	7.8
20404	Sidoagung	0.9	1.3	1.7	2.1	2.5	3.0	3.5	4.0	4.6	5.1	5.8	6.0	6.2	6.4	6.6	6.8
20804	Kalitirto	1.3	1.8	2.4	3.0	3.6	4.3	5.1	5.9	6.8	7.7	8.6	9.0	9.3	9.7	10.1	10.4
20906	Bokoharjo	1.5	2.0	2.5	3.1	3.7	4.4	5.1	5.9	6.7	7.6	8.6	8.9	9.3	9.7	10.1	10.5
21002	Tirtomartani	0.6	1.3	2.0	2.8	3.7	4.6	5.6	6.7	7.8	9.0	10.3	10.7	11.1	11.5	11.9	12.3
21004	Selomartani	0.2	0.7	1.3	1.9	2.5	3.1	3.8	4.6	5.4	6.2	7.1	7.3	7.5	7.7	7.9	8.2
21102	Widodomartani	1.2	1.4	1.7	2.0	2.3	2.7	3.0	3.4	3.8	4.2	4.7	4.8	4.9	5.1	5.2	5.4
21103	Bimomartani	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	3.4	3.6	3.9	4.0	4.1	4.2	4.3	4.4
21104	Sindumartani	2.3	2.5	2.7	3.0	3.2	3.4	3.7	3.9	4.2	4.5	4.8	4.9	5.1	5.2	5.4	5.5
21105	Umbulmartani	2.3	2.7	3.1	3.6	4.1	4.7	5.3	5.9	6.6	7.3	8.1	8.4	8.8	9.2	9.6	10.1
21204	Sukoharjo	2.3	2.9	3.5	4.2	5.0	5.8	6.7	7.7	8.7	9.9	11.1	11.7	12.3	12.9	13.5	14.2
21301	Caturharjo	0.6	1.2	1.8	2.5	3.2	4.0	4.8	5.7	6.6	7.6	8.6	8.9	9.2	9.5	9.7	10.0
21302	Triharjo	0.8	1.5	2.2	3.0	3.9	4.8	5.7	6.8	7.8	8.9	10.1	10.4	10.7	11.0	11.3	11.6
21304	Pandowoharjo	0.8	1.2	1.7	2.2	2.7	3.3	3.9	4.6	5.3	6.0	6.8	7.0	7.3	7.5	7.8	8.0
21401	Banyurejo	0.7	1.0	1.3	1.7	2.1	2.5	2.9	3.4	3.9	4.4	4.9	5.0	5.2	5.3	5.5	5.6
21402	Tambakrejo	0.2	0.4	0.6	0.8	1.1	1.3	1.6	1.9	2.2	2.5	2.9	3.0	3.0	3.1	3.2	3.3
21403	Sumberejo	0.1	0.3	0.5	0.7	0.9	1.2	1.5	1.7	2.0	2.3	2.7	2.7	2.8	2.9	3.0	3.0
21502	Donokerto	1.0	1.3	1.6	2.0	2.4	2.8	3.2	3.7	4.1	4.6	5.2	5.3	5.5	5.6	5.8	5.9
21504	Wonokerto	0.2	0.7	1.2	1.8	2.4	3.0	3.7	4.5	5.3	6.2	7.2	7.5	7.8	8.1	8.4	8.8
21603	Harjobinangun	0.2	0.4	0.7	0.9	1.1	1.4	1.7	1.9	2.2	2.6	2.9	3.0	3.0	3.1	3.2	3.3
21604	Pakembinangun	1.0	1.2	1.5	1.7	2.0	2.3	2.6	3.0	3.3	3.7	4.1	4.2	4.3	4.4	4.6	4.7
21702	Argomulyo	0.3	0.6	1.0	1.3	1.7	2.2	2.6	3.1	3.6	4.1	4.7	4.8	4.9	5.0	5.2	5.3
30000	**Bantul**																
30101	Poncosari	0.6	1.4	2.1	3.0	3.8	4.7	5.7	6.7	7.8	8.9	10.1	10.4	10.7	10.9	11.2	11.5
30102	Trimurti	0.6	1.7	2.9	4.2	5.5	6.9	8.5	10.1	11.8	13.7	15.6	16.1	16.6	17.1	17.6	18.1
30201	Gadingsari	0.1	0.7	1.3	2.0	2.7	3.5	4.3	5.2	6.1	7.0	8.0	8.3	8.5	8.7	8.9	9.1
30202	Gadingharjo	0.1	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.4	2.7	3.1	3.2	3.3	3.4	3.5	3.6
30203	Srigading	0.0	0.6	1.3	2.1	2.9	3.7	4.6	5.5	6.6	7.6	8.8	9.0	9.3	9.6	9.9	10.2
30204	Murtigading	0.6	1.1	1.6	2.2	2.7	3.3	4.0	4.7	5.4	6.1	6.9	7.1	7.3	7.6	7.8	8.0
30302	Parangtritis	0.2	0.7	1.2	1.8	2.5	3.1	3.9	4.7	5.5	6.4	7.3	7.6	7.9	8.2	8.5	8.8
30303	Donotirto	0.1	0.6	1.1	1.7	2.3	2.9	3.6	4.3	5.0	5.8	6.6	6.8	7.0	7.1	7.3	7.5
30304	Tirtosari	0.0	0.3	0.5	0.8	1.1	1.5	1.8	2.1	2.5	2.9	3.3	3.4	3.5	3.6	3.7	3.8
30305	Tirtomulyo	0.0	0.5	0.9	1.4	1.9	2.5	3.1	3.7	4.4	5.1	5.8	6.0	6.2	6.3	6.5	6.7
30402	Panjangrejo	0.2	0.7	1.4	2.0	2.7	3.5	4.3	5.1	6.0	7.0	7.9	8.2	8.4	8.7	8.9	9.1
30403	Srihandono	0.1	0.9	1.8	2.7	3.7	4.7	5.9	7.0	8.3	9.6	11.0	11.3	11.6	11.9	12.2	12.5
30501	Sidomulyo	1.9	2.5	3.2	3.9	4.7	5.5	6.3	7.2	8.2	9.2	10.2	10.5	10.7	11.0	11.3	11.6
30502	Mulyodadi	0.2	0.8	1.6	2.4	3.2	4.1	5.0	6.0	7.1	8.1	9.3	9.5	9.8	10.1	10.3	10.6
30503	Sumbermulyo	0.2	1.2	2.2	3.3	4.5	5.7	7.0	8.4	9.9	11.4	13.1	13.5	13.9	14.2	14.6	15.1
30603	Gilangharjo	0.0	1.0	2.0	3.1	4.3	5.6	7.0	8.4	9.9	11.5	13.2	13.6	14.1	14.5	14.9	15.3
30604	Wijirejo	0.4	1.1	1.8	2.6	3.4	4.3	5.2	6.2	7.2	8.4	9.6	9.9	10.2	10.5	10.9	11.2
30701	Palbapang	0.1	0.9	1.8	2.8	3.8	4.9	6.1	7.4	8.8	10.2	11.8	12.2	12.6	13.0	13.4	13.9
30801	Patalan	0.0	0.8	1.5	2.4	3.3	4.3	5.4	6.5	7.7	9.0	10.3	10.7	11.0	11.4	11.8	12.1
30904	Karangtengah	0.0	0.3	0.7	1.0	1.4	1.9	2.3	2.8	3.4	4.0	4.6	4.7	4.9	5.1	5.3	5.5
30905	Girirejo	0.0	0.3	0.6	0.9	1.3	1.7	2.0	2.4	2.9	3.3	3.8	3.9	4.0	4.1	4.2	4.3
30906	Karangtalun	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.9	2.2	2.4	2.5	2.6	2.6	2.7	2.8
30908	Wukirsari	0.2	1.3	2.4	3.6	4.9	6.4	7.9	9.6	11.3	13.2	15.2	15.8	16.3	16.9	17.6	18.2
31003	Dlingo	0.5	0.9	1.2	1.6	2.0	2.4	2.9	3.4	3.9	4.4	5.0	5.1	5.3	5.4	5.6	5.7
31004	Temuwuh	1.2	1.6	2.0	2.4	2.9	3.4	3.9	4.5	5.1	5.7	6.4	6.7	6.9	7.2	7.5	7.7
31005	Jatimulyo	1.2	1.5	1.9	2.2	2.6	3.0	3.5	3.9	4.4	4.9	5.5	5.6	5.8	6.0	6.1	6.3
31006	Terong	0.1	0.4	0.8	1.2	1.7	2.2	2.7	3.3	3.9	4.6	5.3	5.5	5.7	5.9	6.1	6.4
31202	Srimulyo	0.6	1.6	2.5	3.6	4.7	5.9	7.2	8.6	10.0	11.5	13.1	13.5	13.9	14.3	14.8	15.2
31203	Srimartani	0.6	1.5	2.4	3.4	4.5	5.7	6.9	8.3	9.7	11.2	12.8	13.3	13.8	14.3	14.8	15.3
31602	Sendangsari	0.8	1.4	2.2	2.9	3.8	4.6	5.6	6.6	7.7	8.8	10.1	10.4	10.8	11.2	11.6	12.0
31603	Guwosari	2.8	3.3	3.9	4.6	5.2	6.0	6.8	7.6	8.5	9.4	10.4	10.9	11.3	11.8	12.3	12.8
31702	Argorejo	3.3	4.0	4.7	5.5	6.3	7.3	8.3	9.4	10.5	11.8	13.2	13.9	14.6	15.3	16.1	16.9
31703	Argosari	0.8	1.3	1.8	2.3	2.9	3.5	4.1	4.8	5.5	6.3	7.1	7.3	7.5	7.7	8.0	8.2
31704	Argomulyo	4.2	4.9	5.7	6.5	7.4	8.4	9.4	10.5	11.6	12.9	14.2	14.8	15.4	16.1	16.7	17.4
Sub-Total	**Sleman**	**23.3**	**32.8**	**43.0**	**54.0**	**65.8**	**78.4**	**91.7**	**105.9**	**120.9**	**136.8**	**153.5**	**158.9**	**164.3**	**169.7**	**175.3**	**180.9**
	Bantul	**22.3**	**42.4**	**64.2**	**87.7**	**112.8**	**139.7**	**168.3**	**198.7**	**230.9**	**264.9**	**300.8**	**311.0**	**321.4**	**331.8**	**342.4**	**353.1**

Appendix 13.8 Sleman and Bantul Regencies, Future Domestic Water Demand for Community Water Supply System (l/sec)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20000	**Sleman**																
20101	Sumberahayu	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3
20102	Sumbersari	0.5	0.6	0.8	1.0	1.1	1.3	1.4	1.6	1.7	1.9	2.1	2.2	2.4	2.5	2.7	2.9
20104	Sumberarum	0.0	0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.1	2.3	2.5
20201	Sendangmulyo	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	2.2	2.4	2.5	2.7
20202	Sendangarum	0.0	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.2	1.3
20205	Sendangsari	0.1	0.3	0.5	0.8	1.0	1.2	1.5	1.7	2.0	2.3	2.5	2.8	3.2	3.5	3.8	4.2
20301	Margodadi	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
20302	Margoluwih	0.3	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8
20303	Margomulyo	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.4	3.7	4.0	4.4	4.8
20304	Margoagung	0.0	0.2	0.5	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.1	3.3	3.6
20305	Margokaton	0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.3	1.5	1.6	1.8	2.0	2.1	2.3	2.5	2.6
20401	Sidorejo	0.3	0.4	0.5	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6	1.8	1.9	2.1	2.2	2.3
20403	Sidomulyo	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6	1.8	2.0	2.1	2.3	2.5
20803	Jogotirto	0.0	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.7	1.9	2.2	2.4	2.6	2.8	3.0	3.2
20901	Sumberharjo	0.7	1.0	1.3	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.9	5.2
20902	Wukirharjo	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20903	Gayamharjo	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.7
20904	Sambirojo	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9
20905	Madurojo	0.0	0.3	0.6	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8	3.1	3.3	3.6	3.9	4.2
21003	Tamanmartani	0.0	0.4	0.7	1.1	1.5	1.8	2.2	2.6	3.0	3.4	3.8	4.3	4.7	5.1	5.5	6.0
21305	Trimulyo	0.0	0.2	0.4	0.6	0.8	1.1	1.3	1.5	1.7	2.0	2.2	2.4	2.6	2.9	3.1	3.4
21404	Pondokrejo	0.0	0.1	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.1	2.3
21405	Mororejo	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9
21406	Margorejo	0.0	0.3	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	3.0	3.3	3.7	4.0	4.4	4.8
21407	Lumbungrejo	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.9	3.1
21408	Merdikorejo	0.0	0.2	0.3	0.5	0.6	0.8	1.0	1.1	1.3	1.5	1.6	1.8	2.0	2.2	2.3	2.5
21501	Bangunkerto	0.8	1.0	1.2	1.3	1.5	1.7	1.9	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.3	3.5
21503	Girikerto	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
21601	Purwobinangun	0.3	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.7	2.9
21602	Candibinangun	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2
21605	Hargobinangun	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
21701	Wukirsari	0.0	0.2	0.5	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.3	2.6	2.8	3.0	3.3	3.5
21703	Glagaharjo	0.0	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
21704	Kepuharjo	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3
21705	Umbulharjo	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1
30000	**Bantul**																
30301	Tirtohargo	0.0	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0
30401	Seloharjo	0.0	0.3	0.5	0.8	1.1	1.4	1.6	1.9	2.2	2.5	2.8	3.0	3.3	3.6	3.9	4.2
30601	Caturharjo	0.0	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4
30602	Triharjo	0.0	0.3	0.7	1.0	1.4	1.7	2.1	2.5	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6
30802	Canden	0.0	0.3	0.6	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2
30901	Selopamioro	1.7	2.0	2.2	2.4	2.7	2.9	3.2	3.4	3.7	3.9	4.1	4.4	4.6	4.9	5.1	5.4
30902	Sriharjo	0.0	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.6	2.8	3.0	3.2
30903	Kebonagung	0.0	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
31001	Mangunan	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
31002	Muntuk	0.8	0.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.4	2.5	2.7	2.9	3.1	3.3	3.5
31104	Bawuran	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1
31105	Wonolelo	0.4	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
31601	Triwidadi	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.6	2.9	3.1	3.4	3.7	4.0	4.3
31701	Argodadi	0.5	0.8	1.0	1.2	1.5	1.7	2.0	2.2	2.5	2.7	3.0	3.3	3.5	3.8	4.1	4.4
Sub-Total	**Sleman**	**11.1**	**16.8**	**22.5**	**28.4**	**34.2**	**40.2**	**46.1**	**52.2**	**58.3**	**64.4**	**70.6**	**76.9**	**83.3**	**89.7**	**96.1**	**102.7**
	Bantul	**6.4**	**9.0**	**11.6**	**14.2**	**16.8**	**19.5**	**22.1**	**24.8**	**27.6**	**30.3**	**33.1**	**35.9**	**38.7**	**41.5**	**44.3**	**47.2**

Appendix 13.9 Sleman and Bantul Regencies, Future Domestic Groundwater Requirement (l/sec)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20000	**Sleman**																
20101	Sumberahayu	4.0	3.8	3.6	3.5	3.3	3.1	3.0	2.8	2.6	2.5	2.3	2.1	2.0	1.8	1.7	1.5
20102	Sumbersari	4.3	4.1	4.0	3.8	3.6	3.5	3.3	3.2	3.0	2.9	2.7	2.5	2.4	2.2	2.1	1.9
20103	Sumberagung	6.9	6.8	6.6	6.4	6.1	5.8	5.4	5.1	4.6	4.2	3.7	3.7	3.7	3.7	3.7	3.7
20104	Sumberarum	4.2	4.0	3.9	3.7	3.5	3.3	3.2	3.0	2.8	2.7	2.5	2.3	2.1	2.0	1.8	1.6
20201	Sendangmulyo	4.4	4.2	4.0	3.8	3.7	3.5	3.3	3.2	3.0	2.8	2.6	2.5	2.3	2.1	2.0	1.8
20202	Sendangarum	2.2	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.9
20203	Sendangrejo	4.9	4.8	4.7	4.5	4.3	4.1	3.9	3.6	3.2	2.9	2.5	2.5	2.5	2.5	2.5	2.5
20204	Sendangagung	2.3	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.2	1.0	0.9	0.8	0.8	0.8	0.7	0.7
20205	Sendangsari	4.9	4.8	4.7	4.6	4.5	4.4	4.2	4.1	4.0	3.8	3.7	3.5	3.3	3.2	3.0	2.8
20301	Margodadi	5.0	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0
20302	Margoluwih	5.4	5.2	5.0	4.9	4.7	4.5	4.3	4.1	3.9	3.7	3.5	3.3	3.1	2.9	2.7	2.5
20303	Margomulyo	7.0	6.8	6.5	6.3	6.1	5.8	5.6	5.3	5.1	4.8	4.6	4.3	4.0	3.7	3.5	3.2
20304	Margoagung	5.7	5.5	5.3	5.1	4.9	4.6	4.4	4.2	4.0	3.8	3.5	3.3	3.1	2.9	2.6	2.4
20305	Margokaton	4.2	4.0	3.8	3.7	3.5	3.4	3.2	3.0	2.9	2.7	2.6	2.4	2.2	2.1	1.9	1.8
20401	Sidorejo	3.7	3.5	3.4	3.2	3.1	3.0	2.8	2.7	2.5	2.4	2.3	2.1	2.0	1.8	1.7	1.6
20402	Sidoluhur	5.9	5.8	5.7	5.5	5.3	5.0	4.8	4.5	4.1	3.7	3.3	3.3	3.4	3.4	3.4	3.4
20403	Sidomulyo	3.8	3.7	3.5	3.4	3.3	3.1	3.0	2.8	2.7	2.6	2.4	2.3	2.1	2.0	1.8	1.7
20404	Sidoagung	5.0	4.9	4.8	4.7	4.5	4.3	4.1	3.8	3.5	3.2	2.9	2.9	2.9	2.9	2.9	2.9
20405	Sidokarto	5.7	5.5	5.3	5.1	4.8	4.5	4.2	3.8	3.3	2.9	2.3	2.3	2.4	2.4	2.4	2.4
20406	Sidoarum	9.2	9.1	8.9	8.7	8.3	7.9	7.3	6.6	5.9	5.0	4.0	4.1	4.2	4.2	4.3	4.3
20407	Sidomoyo	4.1	4.0	3.8	3.7	3.5	3.3	3.0	2.7	2.4	2.1	1.8	1.8	1.8	1.8	1.8	1.8
20501	Balecatur	11.7	11.6	11.5	11.2	10.8	10.3	9.6	8.8	7.9	6.7	5.4	5.5	5.7	5.8	5.9	6.1
20502	Ambarketawang	13.1	12.9	12.6	12.2	11.7	11.0	10.2	9.2	8.1	6.9	5.5	5.6	5.6	5.7	5.8	5.8
20503	Banyuraden	11.0	10.9	10.7	10.4	9.9	9.4	8.7	7.9	7.0	5.9	4.7	4.8	4.9	4.9	5.0	5.1
20504	Nogotirto	11.9	11.7	11.4	11.0	10.5	9.9	9.1	8.2	7.2	6.1	4.8	4.9	4.9	4.9	5.0	5.0
20505	Trihanggo	9.9	9.8	9.6	9.3	8.9	8.4	7.7	7.0	6.2	5.2	4.1	4.2	4.2	4.3	4.3	4.3
20601	Tirtoadi	5.5	5.4	5.3	5.1	4.8	4.5	4.2	3.8	3.3	2.7	2.1	2.2	2.2	2.2	2.2	2.2
20602	Sumberadi	8.1	8.0	7.7	7.4	7.1	6.7	6.2	5.6	5.0	4.3	3.5	3.5	3.5	3.6	3.6	3.7
20603	Tlogoadi	7.0	6.9	6.7	6.5	6.3	5.9	5.5	5.0	4.4	3.7	3.0	3.0	3.1	3.1	3.2	3.2
20604	Sendangadi	8.7	8.5	8.2	7.9	7.5	7.1	6.6	6.0	5.4	4.6	3.8	3.9	3.9	4.0	4.0	4.1
20605	Sinduadi	28.2	28.0	27.5	26.8	25.8	24.5	22.8	20.9	18.6	16.0	13.1	13.3	13.5	13.8	14.0	14.3
20701	Caturtunggal	58.3	57.3	55.7	53.6	50.9	47.7	43.9	39.6	34.7	29.2	23.1	23.2	23.3	23.5	23.6	23.7
20702	Maguwoharjo	24.5	24.8	24.7	24.5	23.9	23.0	21.8	20.2	18.1	15.6	12.6	13.1	13.5	14.0	14.5	15.0
20703	Condongcatur	35.2	35.3	35.0	34.4	33.4	32.1	30.2	28.0	25.2	21.9	18.1	18.6	19.1	19.6	20.2	20.7
20801	Sendangtirto	8.7	8.7	8.5	8.3	7.9	7.5	7.0	6.3	5.6	4.7	3.7	3.7	3.8	3.9	3.9	4.0
20802	Tegaltirto	5.9	5.8	5.6	5.4	5.1	4.8	4.4	3.9	3.4	2.9	2.3	2.3	2.3	2.3	2.3	2.3
20803	Jogotirto	5.4	5.2	5.0	4.7	4.5	4.3	4.1	3.9	3.7	3.5	3.2	3.0	2.8	2.6	2.4	2.2
20804	Kalitirto	7.2	7.1	7.0	6.8	6.6	6.3	6.0	5.7	5.3	4.8	4.3	4.3	4.4	4.4	4.5	4.5
20901	Sumberharjo	7.3	7.1	6.8	6.6	6.3	6.1	5.8	5.6	5.3	5.1	4.8	4.5	4.3	4.0	3.7	3.5
20902	Wukirharjo	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
20903	Gayamharjo	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.5	1.4	1.3	1.2	1.1
20904	Sambirojo	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20905	Madurojo	6.9	6.6	6.3	6.1	5.8	5.5	5.3	5.0	4.7	4.4	4.2	3.9	3.6	3.3	3.1	2.8
20906	Bokoharjo	6.8	6.7	6.6	6.5	6.3	6.1	5.8	5.5	5.1	4.7	4.2	4.3	4.4	4.4	4.5	4.6
21001	Purwomartani	19.0	19.1	19.0	18.7	18.2	17.5	16.6	15.4	13.9	12.1	9.9	10.3	10.6	11.0	11.3	11.7
21002	Tirtomartani	8.9	8.8	8.6	8.4	8.2	7.8	7.4	6.9	6.4	5.8	5.1	5.1	5.2	5.2	5.3	5.3
21003	Tamanmartani	8.8	8.5	8.3	8.0	7.7	7.4	7.0	6.7	6.4	6.1	5.7	5.4	5.1	4.7	4.4	4.0
21004	Selomartani	6.6	6.5	6.3	6.1	5.9	5.6	5.3	4.9	4.5	4.0	3.5	3.5	3.5	3.5	3.5	3.5
21101	Wedomartani	15.4	15.4	15.3	15.1	14.6	14.0	13.2	12.2	11.0	9.5	7.7	7.9	8.2	8.4	8.7	8.9
21102	Widodomartani	4.2	4.1	4.0	3.9	3.7	3.5	3.3	3.1	2.9	2.6	2.3	2.3	2.3	2.3	2.3	2.3
21103	Bimomartani	3.4	3.3	3.2	3.1	2.9	2.8	2.6	2.5	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9
21104	Sindumartani	4.0	3.9	3.8	3.6	3.5	3.3	3.1	3.0	2.8	2.6	2.4	2.4	2.4	2.4	2.4	2.4
21105	Umbulmartani	6.1	6.0	5.9	5.8	5.6	5.5	5.2	5.0	4.7	4.4	4.0	4.1	4.1	4.2	4.3	4.4
21201	Sariharjo	12.9	13.0	13.0	12.9	12.6	12.2	11.5	10.7	9.6	8.3	6.8	7.0	7.3	7.5	7.8	8.1
21202	Donoharjo	4.6	4.5	4.3	4.2	3.9	3.7	3.4	3.1	2.7	2.3	1.9	1.9	1.9	1.9	1.9	1.9
21203	Sardonoharjo	10.5	10.4	10.2	10.0	9.6	9.1	8.5	7.7	6.9	5.9	4.8	4.9	4.9	5.0	5.1	5.2
21204	Sukoharjo	8.1	8.1	8.0	7.9	7.8	7.5	7.3	6.9	6.5	6.0	5.5	5.6	5.8	5.9	6.0	6.2
21205	Sinduharjo	10.6	10.6	10.4	10.2	9.9	9.4	8.9	8.2	7.4	6.5	5.4	5.5	5.7	5.8	6.0	6.2
21206	Minomartani	9.4	9.4	9.3	9.1	8.7	8.3	7.7	7.0	6.2	5.2	4.0	4.1	4.2	4.2	4.3	4.3
21301	Caturharjo	7.8	7.7	7.6	7.3	7.1	6.7	6.3	5.9	5.4	4.9	4.3	4.3	4.3	4.3	4.3	4.3
21302	Triharjo	9.4	9.2	9.0	8.7	8.4	8.0	7.5	7.0	6.4	5.7	5.0	5.0	5.0	5.0	5.0	5.0
21303	Tridadi	7.8	7.6	7.4	7.1	6.7	6.3	5.9	5.4	4.8	4.1	3.5	3.5	3.5	3.6	3.6	3.7
21304	Pandowoharjo	5.9	5.9	5.8	5.6	5.4	5.2	4.9	4.6	4.2	3.8	3.4	3.4	3.4	3.4	3.5	3.5
21305	Trimulyo	5.2	5.0	4.8	4.6	4.4	4.3	4.1	3.9	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.2
21401	Banyurejo	4.5	4.4	4.3	4.2	4.0	3.8	3.6	3.3	3.1	2.8	2.4	2.4	2.4	2.4	2.4	2.4
21402	Tambakrejo	2.7	2.7	2.6	2.5	2.4	2.3	2.2	2.0	1.8	1.6	1.4	1.4	1.4	1.4	1.4	1.4
21403	Sumberejo	2.5	2.5	2.4	2.4	2.3	2.2	2.0	1.9	1.7	1.5	1.3	1.3	1.3	1.3	1.3	1.3
21404	Pondokrejo	3.6	3.5	3.3	3.2	3.1	2.9	2.8	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.5
21405	Mororejo	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.5	1.4	1.3
21406	Margorejo	6.4	6.2	6.0	5.9	5.7	5.5	5.3	5.1	4.9	4.7	4.5	4.2	4.0	3.7	3.5	3.2
21407	Lumbungrejo	4.6	4.5	4.3	4.2	4.0	3.8	3.7	3.5	3.3	3.2	3.0	2.8	2.6	2.4	2.3	2.1
21408	Merdikorejo	3.8	3.7	3.5	3.4	3.3	3.2	3.0	2.9	2.7	2.6	2.4	2.3	2.1	2.0	1.8	1.7
21501	Bangunkerto	4.5	4.4	4.2	4.1	4.0	3.8	3.7	3.6	3.4	3.3	3.1	3.0	2.8	2.7	2.5	2.4
21502	Donokerto	4.7	4.6	4.5	4.3	4.2	4.0	3.7	3.5	3.2	2.9	2.6	2.6	2.6	2.6	2.6	2.6
21503	Girikerto	3.2	3.1	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.1	2.0
21504	Wonokerto	5.9	5.9	5.8	5.7	5.6	5.4	5.1	4.8	4.5	4.0	3.6	3.6	3.7	3.7	3.7	3.8
21601	Purwobinangun	4.4	4.3	4.1	3.9	3.8	3.6	3.4	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	1.9
21602	Candibinangun	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
21603	Harjobinangun	2.7	2.7	2.6	2.5	2.4	2.3	2.2	2.0	1.8	1.6	1.4	1.4	1.4	1.4	1.4	1.4
21604	Pakembinangun	3.6	3.5	3.5	3.3	3.2	3.1	2.9	2.7	2.5	2.3	2.0	2.0	2.0	2.0	2.0	2.0
21605	Hargobinangun	4.8	4.6	4.5	4.3	4.1	4.0	3.8	3.6	3.4	3.3	3.1	2.9	2.7	2.5	2.3	2.2
21701	Wukirsari	5.8	5.6	5.4	5.1	4.9	4.7	4.4	4.2	4.0	3.7	3.5	3.3	3.0	2.8	2.6	2.3
21702	Argomulyo	4.4	4.3	4.2	4.1	3.9	3.7	3.5	3.2	3.0	2.6	2.3	2.3	2.3	2.3	2.3	2.3
21703	Glagaharjo	2.2	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.9
21704	Kepuharjo	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
21705	Umbulharjo	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4
Sub-Total	**Sleman**	**639.6**	**629.6**	**615.6**	**597.4**	**574.8**	**547.5**	**515.4**	**478.2**	**435.8**	**387.9**	**334.2**	**332.3**	**330.4**	**328.6**	**326.7**	**324.9**

30000	Bantul	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
30101	Poncosari	7.7	7.5	7.3	7.1	6.8	6.4	6.1	5.6	5.1	4.6	4.0	4.0	4.0	4.0	4.0	4.0
30102	Trimurti	11.2	11.1	10.9	10.6	10.2	9.7	9.2	8.6	7.8	7.0	6.1	6.2	6.2	6.2	6.3	6.3
30201	Gadingsari	6.1	6.0	5.9	5.7	5.5	5.2	4.9	4.5	4.1	3.7	3.2	3.2	3.2	3.2	3.2	3.2
30202	Gadingharjo	2.3	2.2	2.2	2.1	2.1	2.0	1.8	1.7	1.6	1.4	1.2	1.2	1.2	1.2	1.2	1.2
30203	Srigading	6.3	6.3	6.2	6.0	5.8	5.5	5.2	4.8	4.4	4.0	3.5	3.5	3.5	3.5	3.5	3.5
30204	Murtigading	5.1	5.0	4.9	4.7	4.5	4.3	4.1	3.8	3.5	3.1	2.7	2.7	2.7	2.8	2.8	2.8
30301	Tirtohargo	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7
30302	Parangtritis	5.0	5.0	4.9	4.8	4.7	4.5	4.2	4.0	3.7	3.3	2.9	2.9	3.0	3.0	3.0	3.0
30303	Donotirto	5.1	5.0	4.8	4.7	4.5	4.3	4.0	3.7	3.4	3.0	2.6	2.6	2.6	2.6	2.6	2.6
30304	Tirtosari	2.6	2.5	2.4	2.4	2.3	2.2	2.0	1.9	1.7	1.5	1.3	1.3	1.3	1.3	1.3	1.3
30305	Tirtomulyo	4.4	4.3	4.2	4.1	3.9	3.7	3.5	3.3	3.0	2.6	2.3	2.3	2.3	2.3	2.3	2.3
30401	Seloharjo	6.8	6.5	6.3	6.0	5.7	5.5	5.2	4.9	4.7	4.4	4.1	3.9	3.6	3.3	3.1	2.8
30402	Panjangrejo	5.9	5.8	5.7	5.5	5.3	5.1	4.8	4.4	4.0	3.6	3.1	3.1	3.2	3.2	3.2	3.2
30403	Srihandono	8.3	8.2	8.0	7.7	7.4	7.1	6.6	6.1	5.6	5.0	4.3	4.3	4.3	4.3	4.3	4.3
30501	Sidomulyo	7.5	7.3	7.1	6.9	6.6	6.3	5.9	5.5	5.0	4.6	4.0	4.0	4.0	4.0	4.0	4.0
30502	Mulyodadi	7.0	6.9	6.8	6.5	6.3	6.0	5.6	5.2	4.7	4.2	3.7	3.7	3.7	3.7	3.7	3.7
30503	Sumbermulyo	9.7	9.5	9.3	9.1	8.7	8.3	7.8	7.3	6.6	5.9	5.2	5.2	5.2	5.2	5.2	5.2
30601	Caturharjo	7.0	6.7	6.5	6.2	6.0	5.7	5.4	5.2	4.9	4.6	4.3	4.1	3.8	3.5	3.2	2.9
30602	Triharjo	8.3	8.0	7.7	7.5	7.2	6.9	6.6	6.3	6.0	5.7	5.4	5.1	4.7	4.4	4.1	3.7
30603	Gilangharjo	9.7	9.6	9.4	9.1	8.8	8.4	7.9	7.3	6.7	6.0	5.2	5.2	5.3	5.3	5.3	5.3
30604	Wijirejo	6.8	6.7	6.6	6.4	6.2	5.9	5.6	5.2	4.8	4.3	3.8	3.8	3.8	3.8	3.9	3.9
30701	Palbapang	8.3	8.2	8.1	7.9	7.6	7.3	6.9	6.5	5.9	5.3	4.6	4.7	4.7	4.7	4.8	4.8
30702	Ringinharjo	4.5	4.4	4.3	4.1	3.9	3.6	3.3	3.0	2.7	2.3	1.8	1.8	1.9	1.9	1.9	1.9
30703	Bantul	9.6	9.3	9.0	8.7	8.2	7.7	7.1	6.4	5.7	4.8	3.9	3.9	3.9	4.0	4.0	4.0
30704	Trirenggo	10.8	10.7	10.4	10.0	9.6	9.0	8.3	7.4	6.5	5.4	4.2	4.2	4.2	4.3	4.3	4.3
30705	Sapdodadi	4.0	3.9	3.8	3.7	3.5	3.3	3.1	2.8	2.4	2.0	1.6	1.6	1.6	1.6	1.6	1.7
30801	Patalan	7.3	7.3	7.2	7.0	6.7	6.4	6.1	5.7	5.2	4.7	4.1	4.1	4.1	4.1	4.2	4.2
30802	Canden	6.9	6.6	6.3	6.1	5.8	5.5	5.3	5.0	4.7	4.5	4.2	3.9	3.6	3.4	3.1	2.8
30803	Sumberagung	8.7	8.6	8.4	8.1	7.7	7.2	6.6	5.9	5.2	4.3	3.4	3.4	3.4	3.4	3.4	3.5
30804	Trimulyo	10.0	9.9	9.6	9.3	8.8	8.3	7.7	7.0	6.2	5.3	4.2	4.3	4.3	4.4	4.4	4.5
30901	Selopamioro	7.0	6.8	6.6	6.4	6.1	5.9	5.7	5.4	5.2	5.0	4.8	4.5	4.3	4.1	3.8	3.6
30902	Sriharjo	5.3	5.1	4.9	4.7	4.5	4.3	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.1
30903	Kebonagung	2.2	2.1	2.0	1.9	1.8	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	0.9
30904	Karangtengah	3.1	3.1	3.1	3.0	2.9	2.8	2.6	2.5	2.3	2.1	1.8	1.8	1.8	1.9	1.9	1.9
30905	Girirejo	2.8	2.8	2.7	2.7	2.6	2.4	2.3	2.1	1.9	1.7	1.5	1.5	1.5	1.5	1.5	1.5
30906	Karangtalun	1.8	1.8	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0
30907	Imogiri	2.4	2.3	2.3	2.2	2.1	1.9	1.8	1.6	1.4	1.2	0.9	0.9	0.9	0.9	0.9	0.9
30908	Wukirsari	10.4	10.3	10.2	10.0	9.7	9.3	8.8	8.2	7.6	6.8	6.0	6.1	6.1	6.2	6.2	6.3
31001	Mangunan	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2
31002	Muntuk	4.4	4.3	4.1	4.0	3.9	3.8	3.6	3.5	3.4	3.2	3.1	3.0	2.8	2.7	2.5	2.4
31003	Dlingo	3.6	3.5	3.5	3.4	3.2	3.1	2.9	2.7	2.5	2.2	2.0	2.0	2.0	2.0	2.0	2.0
31004	Temuwuh	4.3	4.2	4.1	4.0	3.9	3.7	3.6	3.4	3.1	2.8	2.5	2.6	2.6	2.6	2.6	2.7
31005	Jatimulyo	3.9	3.8	3.7	3.6	3.5	3.3	3.1	2.9	2.7	2.4	2.2	2.2	2.2	2.2	2.2	2.2

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
31006	Terong	3.5	3.5	3.5	3.4	3.3	3.2	3.0	2.8	2.6	2.4	2.1	2.1	2.1	2.2	2.2	2.2
31101	Wonokromo	8.6	8.6	8.4	8.2	7.9	7.5	7.0	6.3	5.6	4.7	3.7	3.7	3.8	3.9	3.9	4.0
31102	Pleret	7.3	7.2	7.1	6.8	6.5	6.2	5.7	5.1	4.5	3.8	2.9	3.0	3.0	3.0	3.1	3.1
31103	Segoroyoso	5.0	4.9	4.8	4.6	4.4	4.2	3.8	3.5	3.0	2.5	2.0	2.0	2.0	2.0	2.1	2.1
31104	Bawuran	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4
31105	Wonolelo	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.2
31201	Sitimulyo	9.5	9.4	9.2	8.9	8.6	8.1	7.5	6.7	5.9	4.9	3.9	3.9	4.0	4.0	4.1	4.1
31202	Srimulyo	9.5	9.4	9.2	8.9	8.6	8.2	7.7	7.2	6.6	5.9	5.2	5.2	5.2	5.2	5.2	5.3
31203	Srimartani	8.8	8.7	8.6	8.4	8.1	7.8	7.4	6.9	6.4	5.8	5.1	5.1	5.2	5.2	5.3	5.3
31301	Tamanan	7.2	7.2	7.1	7.0	6.7	6.4	6.0	5.4	4.8	4.1	3.2	3.3	3.3	3.4	3.5	3.6
31302	Jagalan	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.4	1.2	1.0	0.8	0.8	0.8	0.8	0.8	0.8
31303	Singosaren	2.2	2.2	2.2	2.1	2.1	2.0	1.8	1.7	1.5	1.2	1.0	1.0	1.0	1.0	1.1	1.1
31304	Wirokerten	7.5	7.5	7.4	7.2	7.0	6.6	6.2	5.6	5.0	4.2	3.3	3.4	3.4	3.5	3.6	3.6
31305	Jambidan	5.1	5.0	4.9	4.8	4.6	4.3	3.9	3.6	3.1	2.6	2.0	2.0	2.1	2.1	2.1	2.1
31306	Potorono	6.6	6.5	6.4	6.3	6.0	5.7	5.3	4.8	4.2	3.5	2.8	2.8	2.8	2.9	2.9	3.0
31307	Baturetno	9.4	9.5	9.5	9.4	9.1	8.8	8.3	7.6	6.8	5.8	4.7	4.8	5.0	5.1	5.3	5.4
31308	Banguntapan	27.3	27.2	26.8	26.1	25.1	23.8	22.1	20.0	17.6	14.8	11.6	11.7	11.9	12.0	12.2	12.4
31401	Pendowoharjo	13.4	13.3	13.1	12.7	12.2	11.5	10.8	9.8	8.7	7.4	6.0	6.1	6.2	6.3	6.4	6.5
31402	Timbulharjo	13.0	12.8	12.6	12.2	11.6	11.0	10.1	9.1	8.0	6.7	5.2	5.3	5.3	5.4	5.5	5.5
31403	Bangunharjo	17.6	17.5	17.3	17.0	16.4	15.7	14.7	13.5	12.0	10.3	8.3	8.5	8.8	9.0	9.2	9.4
31404	Panggungharjo	21.2	21.2	21.0	20.6	20.0	19.1	17.9	16.4	14.6	12.5	10.0	10.3	10.5	10.8	11.1	11.4
31501	Bangunjiwo	14.8	14.6	14.3	13.9	13.4	12.7	11.9	10.9	9.7	8.3	6.8	7.0	7.1	7.2	7.4	7.5
31502	Tirtonimolo	14.3	14.3	14.1	13.8	13.2	12.6	11.7	10.6	9.4	7.9	6.2	6.4	6.5	6.6	6.7	6.9
31503	Tamantirto	13.3	13.3	13.2	12.9	12.5	11.9	11.2	10.3	9.2	7.9	6.4	6.5	6.7	6.9	7.1	7.2
31504	Ngestiharjo	23.1	23.0	22.7	22.1	21.3	20.2	18.9	17.2	15.3	13.1	10.5	10.7	10.9	11.1	11.3	11.5
31601	Triwidadi	6.2	6.0	5.8	5.6	5.4	5.2	4.9	4.7	4.5	4.3	4.1	3.8	3.6	3.4	3.1	2.9
31602	Sendangsari	6.9	6.9	6.7	6.6	6.4	6.1	5.8	5.4	5.0	4.5	4.0	4.0	4.0	4.1	4.1	4.1
31603	Guwosari	6.5	6.5	6.3	6.2	6.0	5.8	5.6	5.3	4.9	4.5	4.1	4.2	4.2	4.3	4.4	4.4
31701	Argodadi	6.2	6.0	5.8	5.6	5.4	5.1	4.9	4.7	4.5	4.3	4.1	3.8	3.6	3.4	3.1	2.9
31702	Argorejo	7.5	7.5	7.4	7.3	7.2	7.0	6.7	6.4	6.1	5.7	5.2	5.3	5.4	5.6	5.7	5.8
31703	Argosari	5.1	5.0	4.9	4.8	4.6	4.4	4.1	3.8	3.5	3.2	2.8	2.8	2.8	2.8	2.8	2.8
31704	Argomulyo	8.8	8.7	8.6	8.4	8.1	7.8	7.5	7.1	6.7	6.2	5.6	5.7	5.8	5.9	5.9	6.0
Sub-Total	**Bantul**	**559.3**	**552.5**	**541.4**	**526.1**	**506.3**	**481.9**	**452.6**	**418.4**	**379.1**	**334.3**	**284.0**	**284.4**	**284.7**	**285.1**	**285.5**	**285.9**

Appendix 13.10 Summary of Domestic Water Demand in Sleman Regency (l/sec)

Sleman Regency	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PDAM (Urban) Domestic Water Demand	85.6	128.8	179.0	236.5	301.9	375.4	457.4	548.4	648.7	758.9	879.3	937.0	996.7	1,058.2	1,121.7	1,187.2
PDAM (Rural) Domestic Water Demand	23.3	32.8	43.0	54.0	65.8	78.4	91.7	105.9	120.9	136.8	153.5	158.9	164.3	169.7	175.3	180.9
Community System Domestic Water Demand	11.1	16.8	22.5	28.4	34.2	40.2	46.1	52.2	58.3	64.4	70.6	76.9	83.3	89.7	96.1	102.7
GW Requirement for Domestic Private Well	639.6	629.6	615.6	597.4	574.8	547.5	515.4	478.2	435.8	387.9	334.2	332.3	330.4	328.6	326.7	324.9
Total Domestic Water Demand	759.6	808.0	860.2	916.3	976.7	1,041.4	1,110.7	1,184.8	1,263.8	1,348.0	1,437.6	1,505.1	1,574.6	1,646.2	1,719.9	1,795.7

Appendix 13.11 Summary of Domestic Water Demand in Bantul Regency (l/sec)

Bantul Regency	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PDAM (Urban) Domestic Water Demand	38.3	77.4	121.7	171.2	226.4	287.3	354.3	427.6	507.4	594.1	687.9	724.2	761.5	799.8	839.3	879.8
PDAM (Rural) Domestic Water Demand	22.3	42.4	64.2	87.7	112.8	139.7	168.3	198.7	230.9	264.9	300.8	311.0	321.4	331.8	342.4	353.1
Community System Domestic Water Demand	6.4	9.0	11.6	14.2	16.8	19.5	22.1	24.8	27.6	30.3	33.1	35.9	38.7	41.5	44.3	47.2
GW Requirement for Domestic Private Well	559.3	552.5	541.4	526.1	506.3	481.9	452.6	418.4	379.1	334.3	284.0	284.4	284.7	285.1	285.5	285.9
Total Domestic Water Demand	626.2	681.2	738.9	799.2	862.3	928.4	997.4	1,069.6	1,145.0	1,223.7	1,305.9	1,355.4	1,406.2	1,458.2	1,511.5	1,566.0

Appendix 13.12 Summary of Domestic Water Demand

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Yogyakarta PDAM	309	343	377	412	447	482	518	555	591	629	667	671	675	680	684	689
Yogyakarta Private Well	261	251	241	228	214	199	183	165	146	125	103	103	103	103	103	103
Sleman PDAM (Urban)	86	129	179	237	302	375	457	548	649	759	879	937	997	1,058	1,122	1,187
Sleman PDAM (Rural)	23	33	43	54	66	78	92	106	121	137	154	159	164	170	175	181
Sleman Community System	11	17	23	28	34	40	46	52	58	64	71	77	83	90	96	103
Sleman Private Well	640	630	616	597	575	548	515	478	436	388	334	332	330	329	327	325
Bantul PDAM (Urban)	38	77	122	171	226	287	354	428	507	594	688	724	761	800	839	880
Bantul PDAM (Rural)	22	42	64	88	113	140	168	199	231	265	301	311	321	332	342	353
Bantul Community System	6	9	12	14	17	19	22	25	28	30	33	36	39	41	44	47
Bantul Private Well	559	552	541	526	506	482	453	418	379	334	284	284	285	285	285	286
Total	1,956	2,084	2,217	2,356	2,500	2,652	2,809	2,974	3,146	3,325	3,513	3,634	3,759	3,887	4,019	4,154

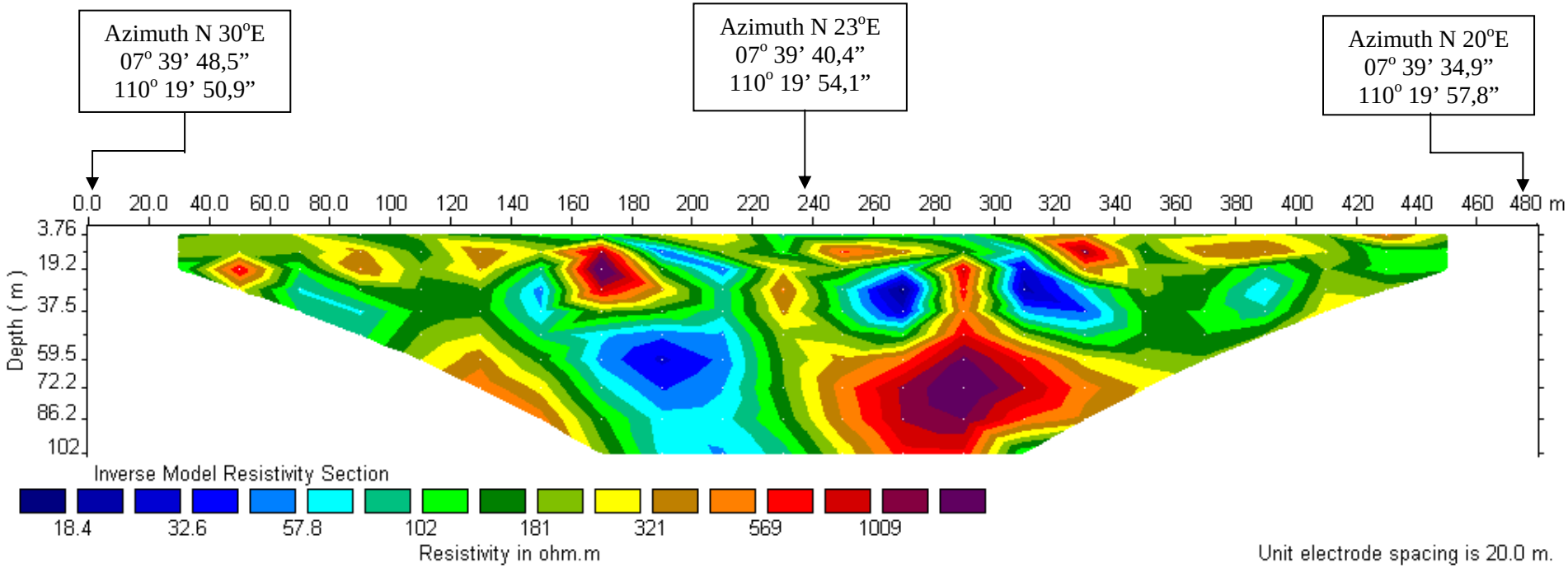
Appendix for Chapter 14

Appendix 14.1 Results of 2D Imaging Survey

Appendix 14.2 Results of VES Survey

Appendix 14.1 Results of 2D Imaging Survey

LINE 01 : LOCATION KADISONO, MARGOREJO, TEMPEL, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 140 – 220 m (deepness 15 – > 100 m). The distance 250 – 340 m (deepness 15 – 40 m). and the distance 370 – 390 m (aquifer deepness 20 – 40 m)

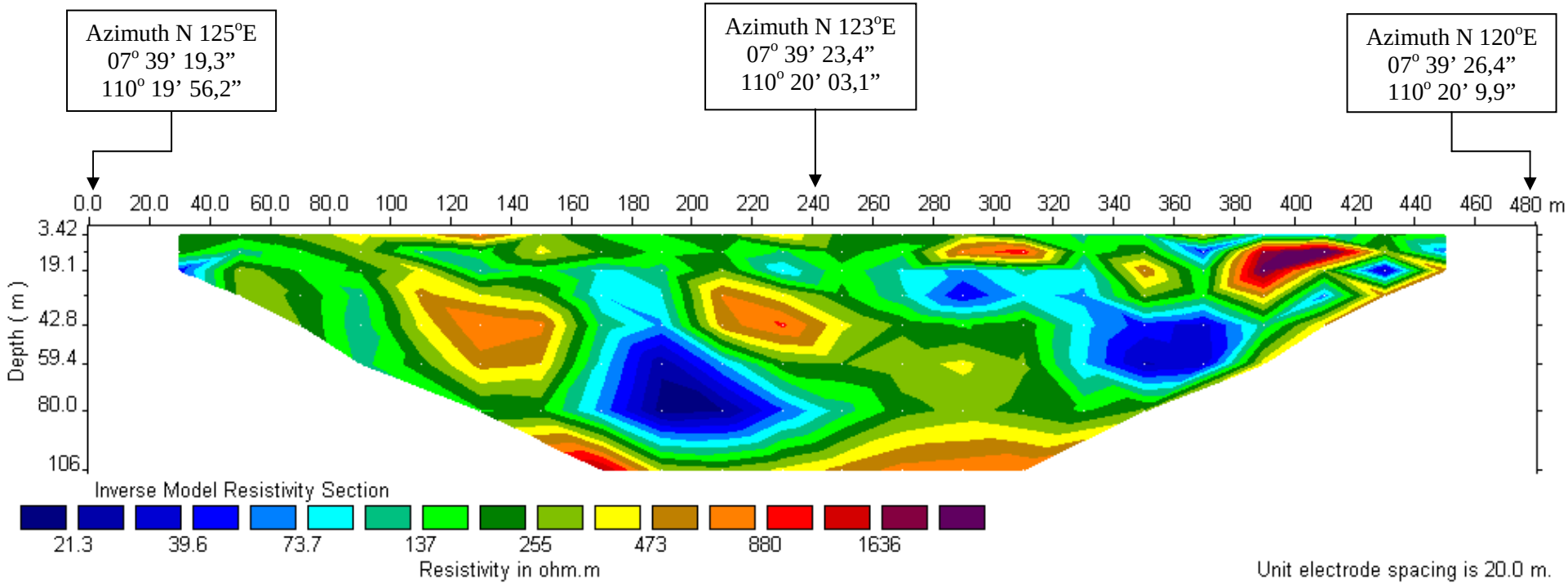
Resistivity 100 – 500 ohm-m (Green, Yellow, brown and dark red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Dark red) : Massive Andesitic Lava or pyroclastic lava

Sleman No.1

LINE 02 : LOCATION LUMBUNGREJO, MARGOREJO, TEMPEL, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 160 – 230 (deepness 40 – 100 m). The distance 280 – 380 m (deepness 15 – 60 m). and the distance 420 – 460 m (aquifer deepness 10 – 20 m)

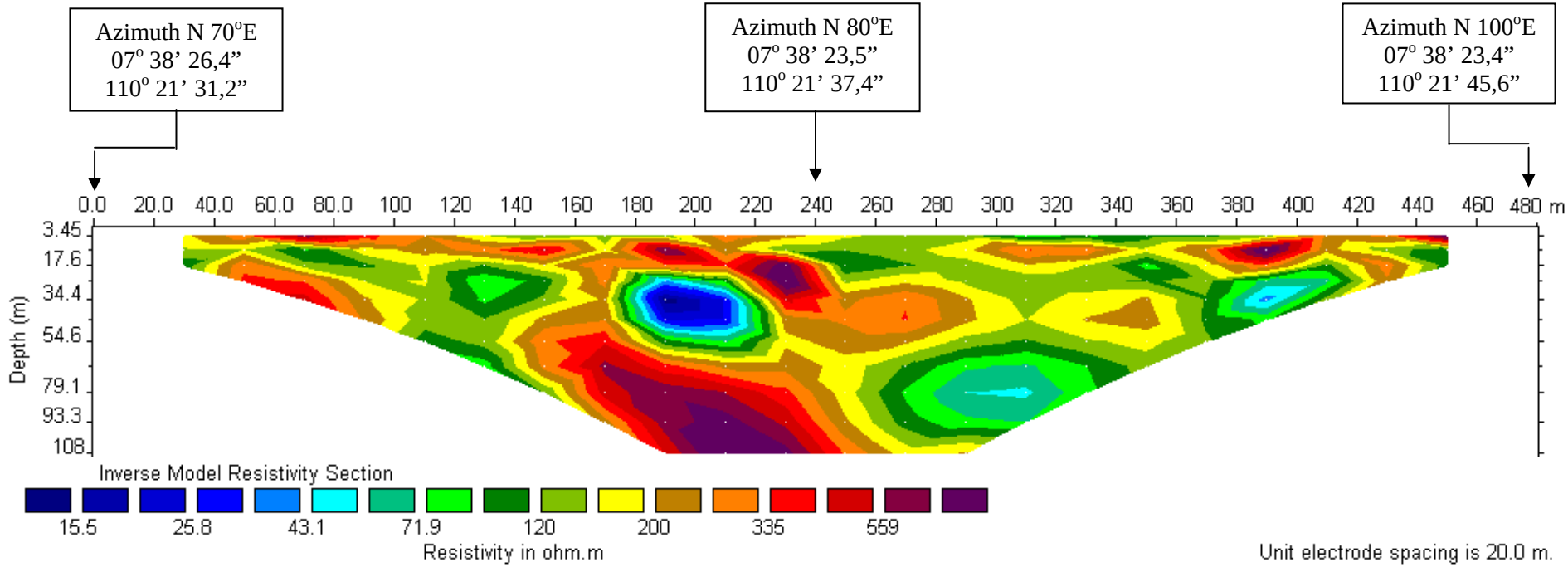
Resistivity 100 – 500 ohm-m (Green, Yellow, brown and dark red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Dark red - purple) : Andesitic or pyroclastic lava

Sleman No.2

LINE 03 : LOCATION LEDOKNONGKO, BANGUNKERTO, TEMPEL, SLEMAN

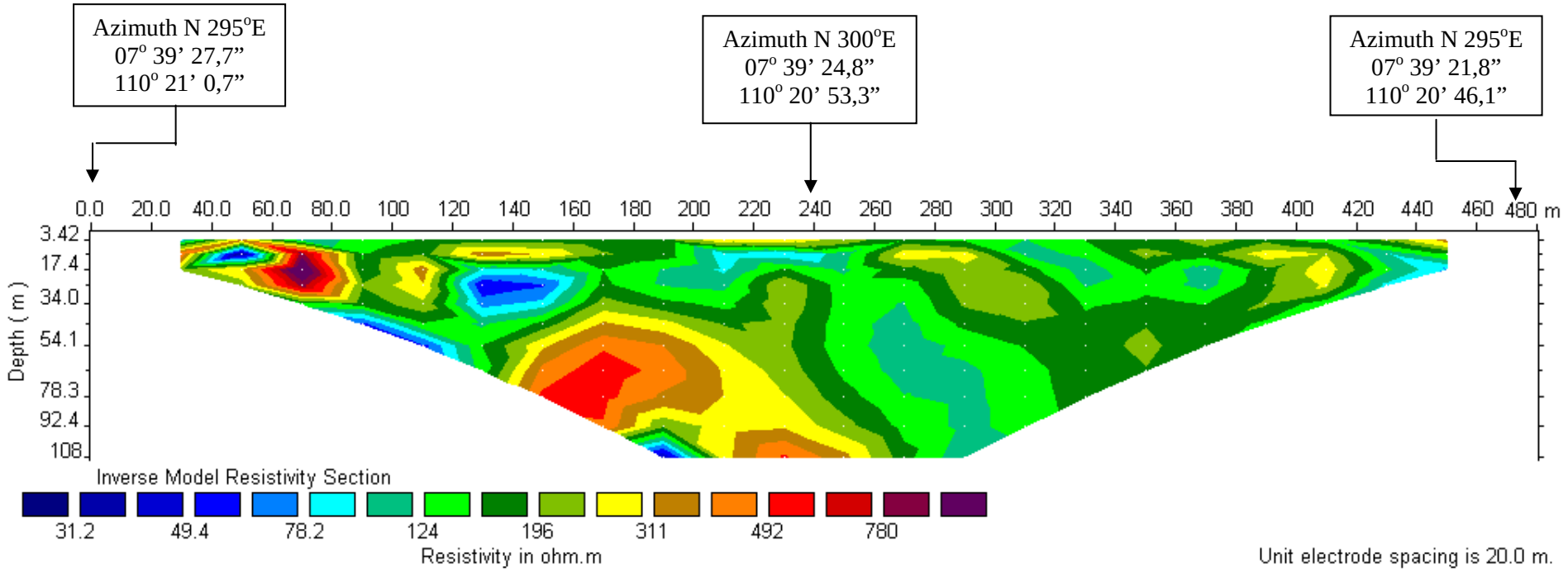


INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 120 – 140 (deepness 15 – 35 m). The distance 180 – 220 m (deepness 25 – 50 m). and the distance 270 – 310 m (aquifer deepness 20 – 40 m) and 370 – 410 m (deepness 17 – 35 m).
Resistivity 100 – 500 ohm-m (Green, Yellow, brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement
Resistivity 500 – 1000 ohm-m (Red – dark red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.3

LINE 04 : LOCATION JURUGAN, BANGUNKERTO, TURI, SLEMAN

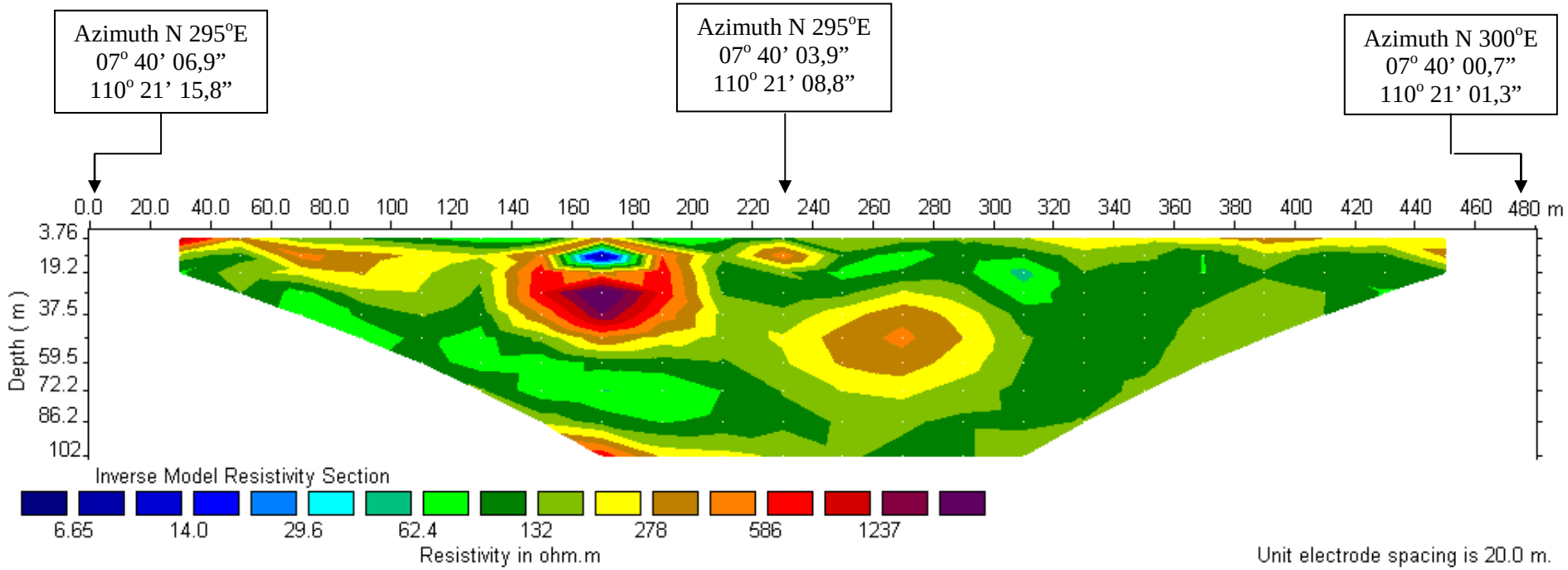


INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with good ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 80 – 120 m (Deepness 30 - 50 m). The distance 120 – 140 (deepness 15 – 35 m). The distance 200 – 250 m (deepness 5 – 15 m). and the distance 430 – 460 m (deepness 15 – 40 m).
Resistivity 100 – 500 ohm-m (Green - red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement
Resistivity 500 – 1000 ohm-m (Red – purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.4

LINE 05 : LOCATION KAWEDAN, BANGUNKERTO, TURI, SLEMAN

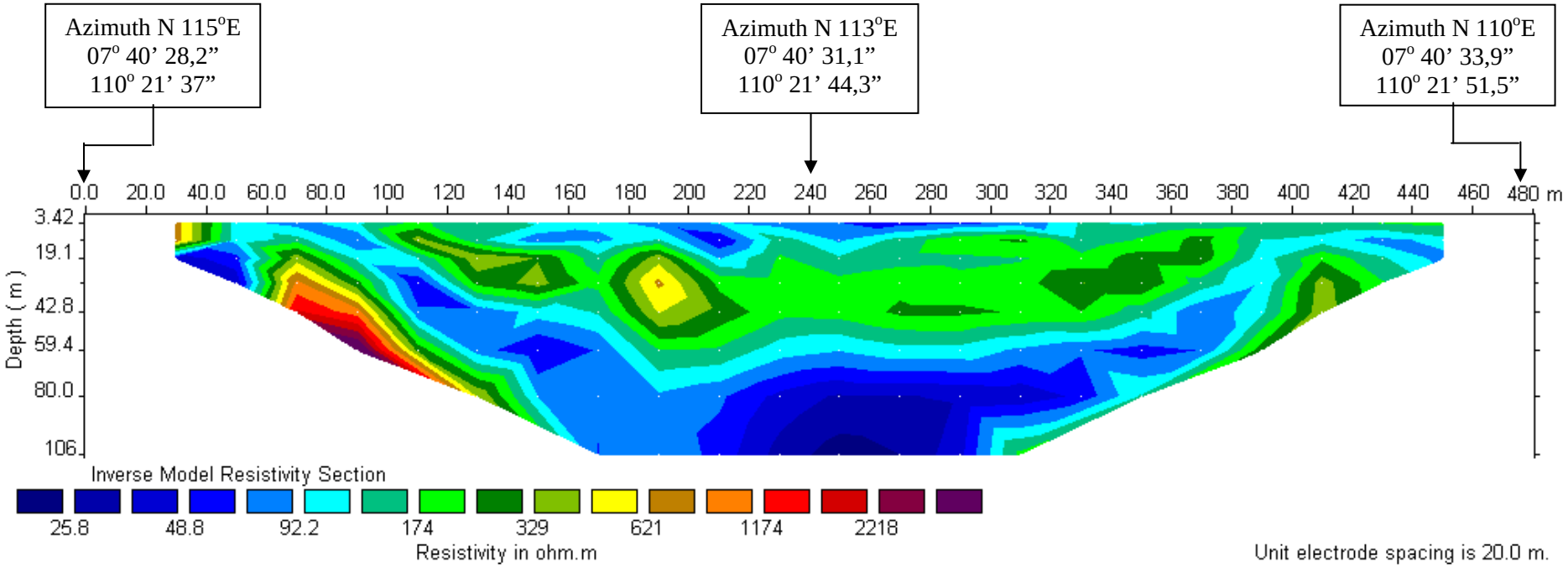


INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 60 – 200 (deepness 20 – 90 m). The distance 160 – 180 m (deepness 7 – 20 m). and the distance 250 – 280 m (deepness 20 – 35 m). distance 290 – 320 (deepness 15 – 30 m).
Resistivity 100 – 500 ohm-m (Green - brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement
Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.
Resistivity > 1000 ohm-m (Dark red - purple) : Andesitic or pyroclastic lava

Sleman No.5

LINE 06 : LOCATION KLEGEN, TRIMULYO, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – light green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. There are aquifer all place.The distance 40 – 460m (deepness varying. 5 – 100 m). in place between there are breccia form lens (120 m – 380 m)

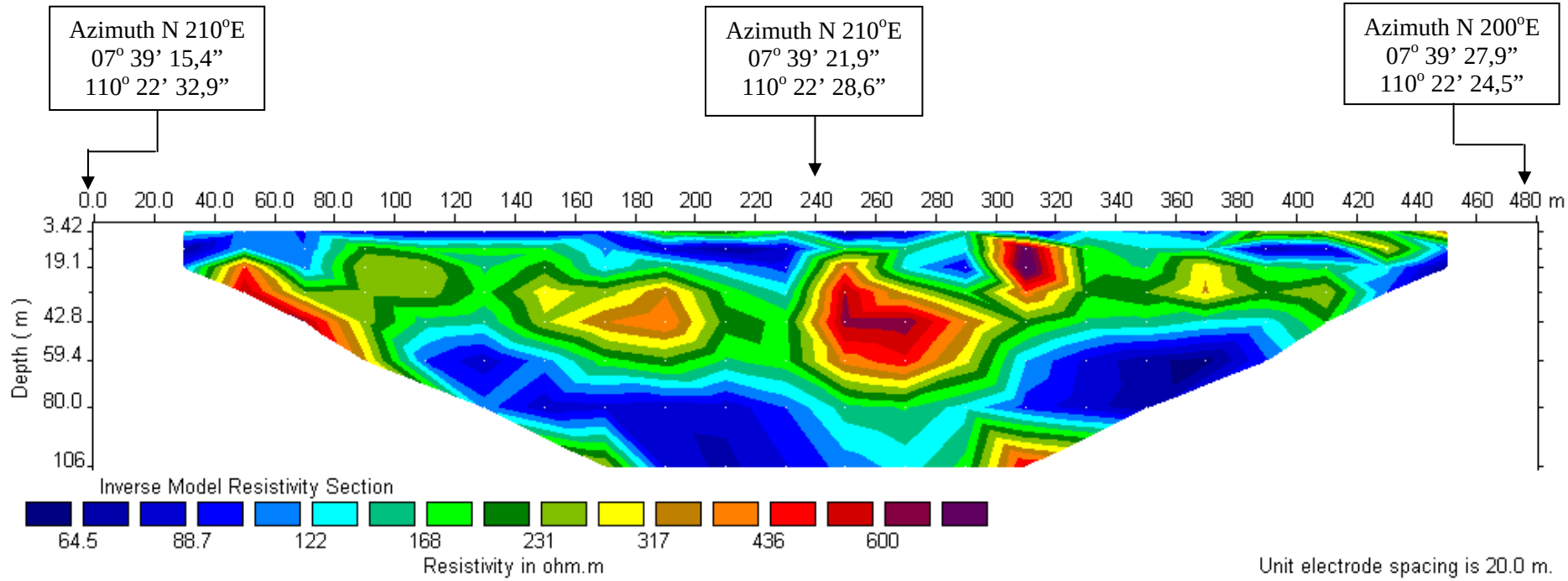
Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (light Brown – brown) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava

Sleman No.6

LINE 07 : LOCATION KEMBANG ARUM, DONOKERTO, TURI, SLEMAN



INTERPRETATION :

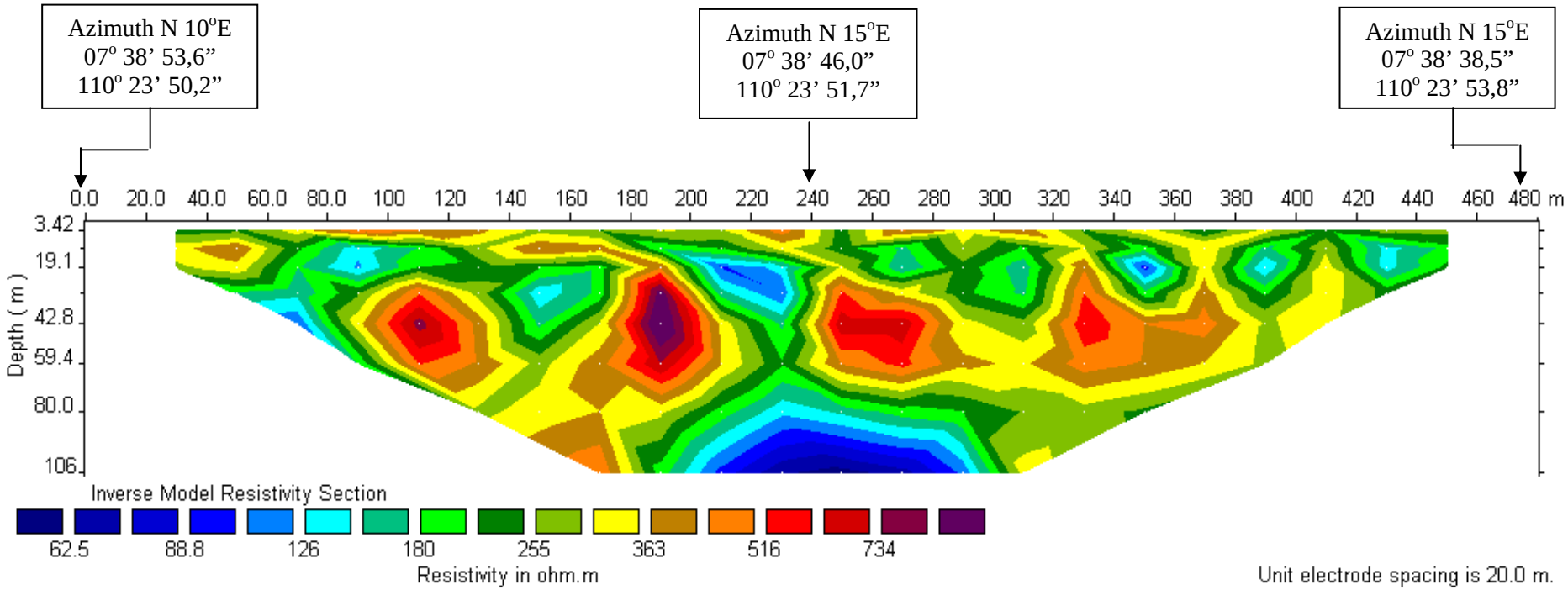
Resistivity < 100 ohm-m, (Blue colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 20 – 450 near surface (deepness 4 – 15m). rather depth surface, The distance 110 – 240 m (deepness 50 – 100 m). and the distance 300 – 400 m (deepness 55 – 90 m.

Resistivity 100 – 500 ohm-m (Green - red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Red - purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclastic rocks.

Sleman No.7

LINE 08 : LOCATION WRINGIN KIDUL, PURWOBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

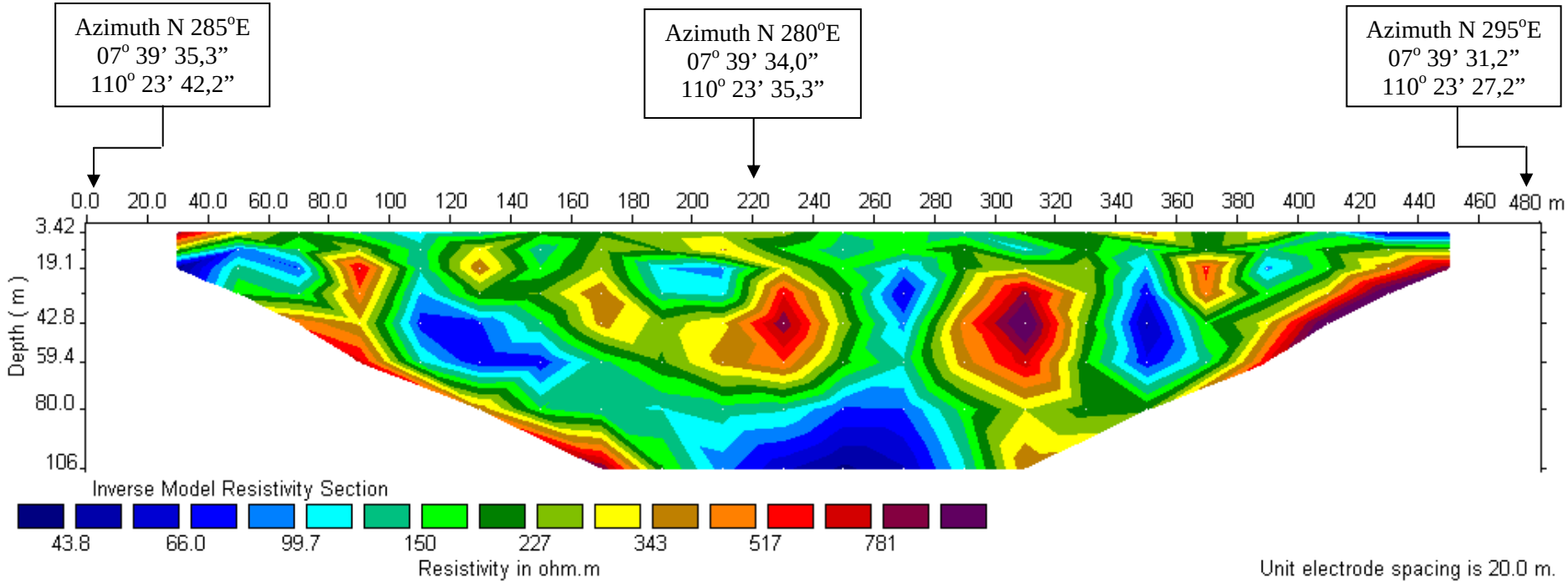
Resistivity < 100 ohm-m, (Blue colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. Near surface, the distance 200 – 230 near surface (deepness 10 – 45 m). depth surface, The distance 190 – 300 m (deepness 80 – 110 m).

Resistivity 100 – 500 ohm-m (Green - red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Red - purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.8

LINE 09 : LOCATION PULOWATU, PURWOBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

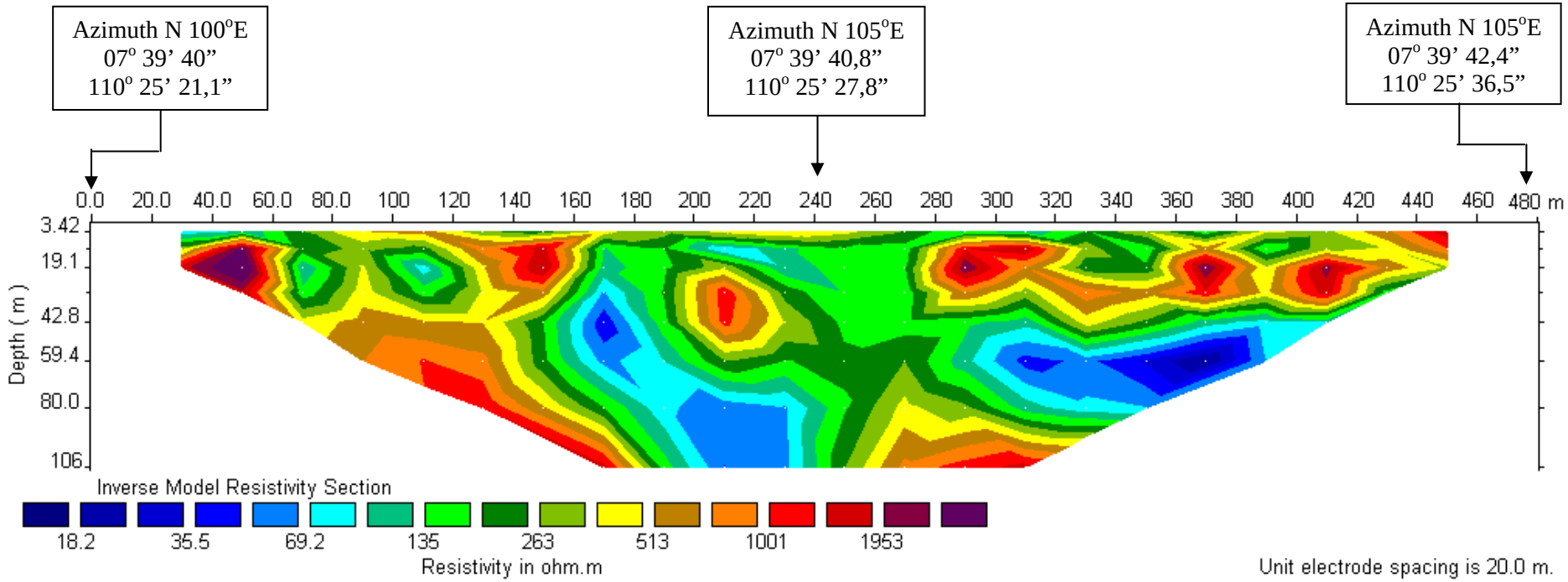
Resistivity < 100 ohm-m, (Blue colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The distance 20 – 70 m, near surface (deepness 4 – 15 m). Distance 260 – 280 m (deepness 15 – 50 m). The depth surface, distance 100 – 160 m (deepness 20 – 60 m). and the distance 200 – 290 m (deepness >80 m, and distance 340 – 360 m (deepness 20 – 80 m).

Resistivity 100 – 500 ohm-m (Light blue - Brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown- purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.9

LINE 10 : LOCATION MANGUNAN/MAGERSARI, CANDIBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – light green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. Near surface aquifer, distance 200 – 225m (deepness varying. 10 – 20 m). in the depth surface, distance 160 – 240 m (deepness 25 – more than 100 m) and distance 300 – 390 m (deepness 50 – 80 m).

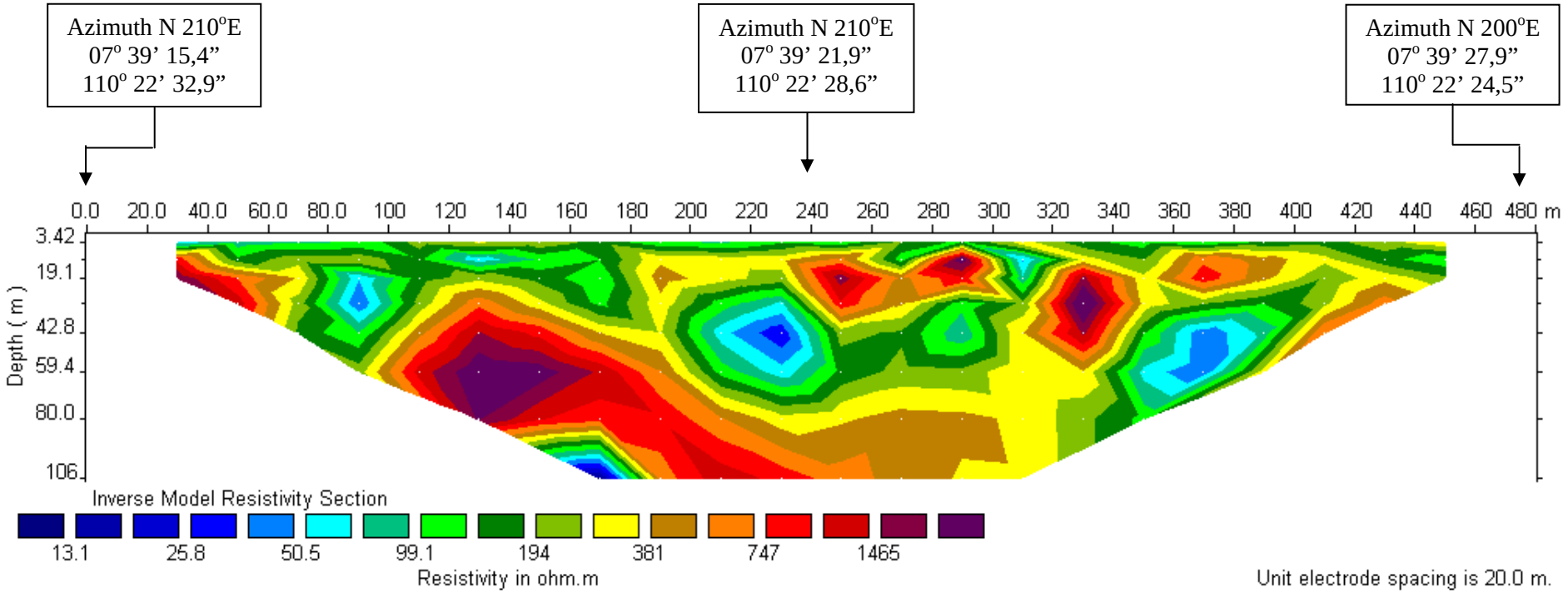
Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava.

Sleman No.10

LINE 11 : LOCATION KLABANGAN UTARA (BLEMBEM), CANDIBINANGUN, PAKEM, SLEMAN

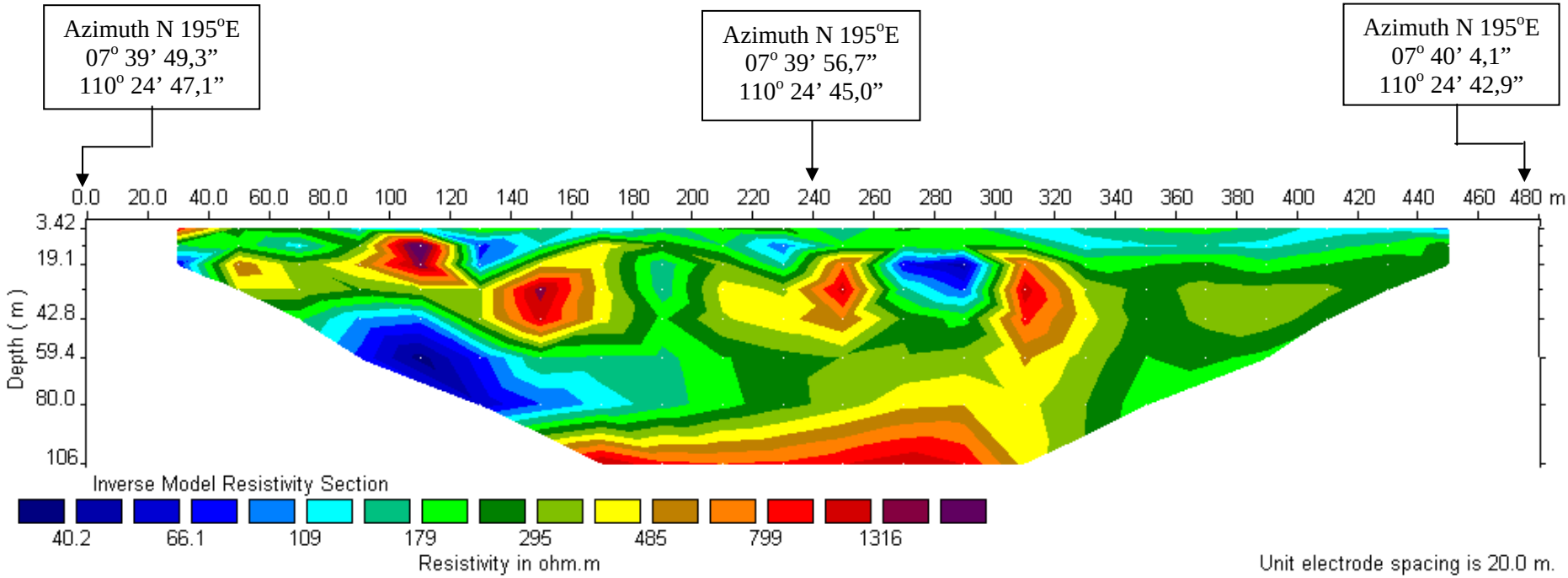


INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – light green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. Near surface aquifer, distance 80 – 100 m (deepness varying. 15 – 40 m). in the depth surface, distance 200 – 240 m (deepness 30 – 60 m), and distance 340 – 380 m (deepness 45 – 70 m).
Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement
Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.
Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava.

Sleman No.11

LINE 12 : LOCATION POJOK/KLABANGAN SELATAN, CANDIBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – light green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. Near surface aquifer, distance 20 – 40 m (deepness varying. 10 – 20 m), distance 120 – 160 m(deepness 10 –23 m) and distance 260 – 290 m(deepness 30 – 45 m). The depth surface, distance 80 – 160 m (deepness 45 – 85 m).

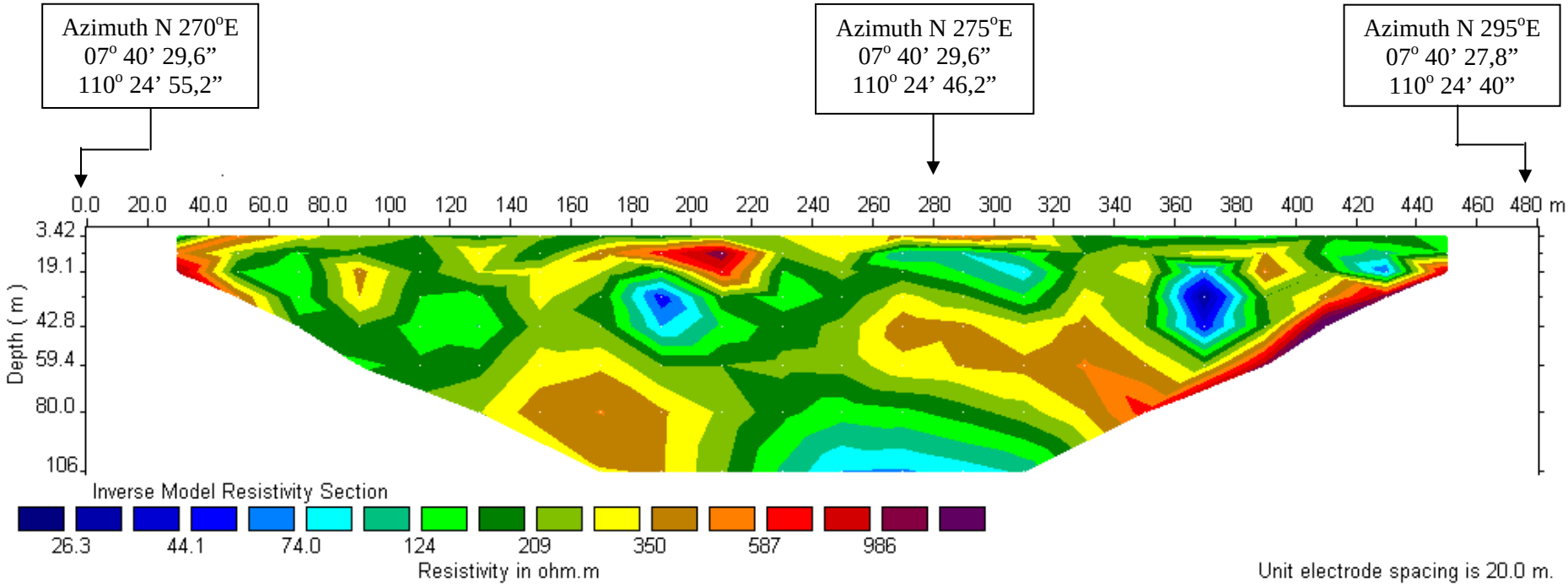
Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava.

Sleman No.12

LINE 13 : LOCATION BEJI, HARGOBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

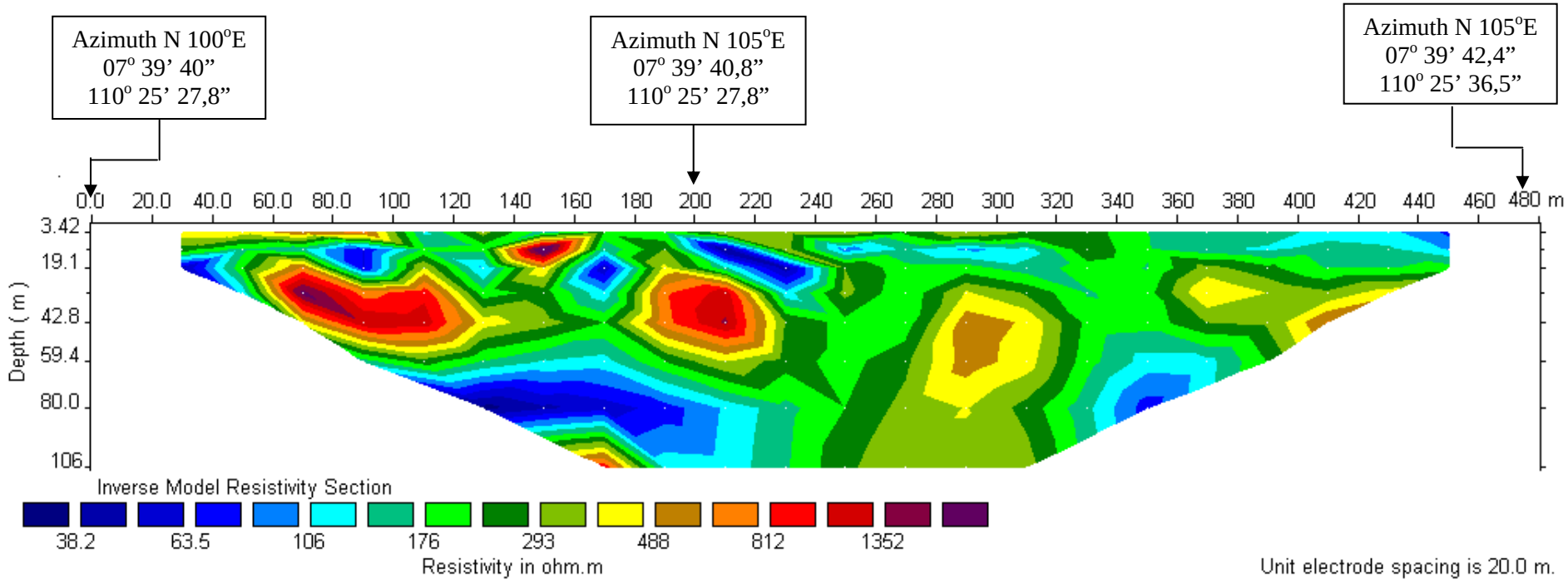
Resistivity < 100 ohm-m, (Blue – light green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. Near surface aquifer, distance 180 – 210 m (deepness varying. 20 – 40 m), distance 290 – 310 m(deepness 10 –23 m) and distance 360 – 380 m(deepness 20 – 45 m). distance 420 – 430 m (deepness 16 – 25 m). The depth surface, distance 220 – 300 m (deepness more than 100 m).

Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.13

LINE 14 : LOCATION DUWETSARI, HARGOBINANGUN, PAKEM, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, distance 20 – 100 m (deepness varying. 5 – 30 m), distance 160 – 180 m(deepness 10 –30 m) and distance 440 – 460 m (deepness 5 – 15 m). The depth aquifers, distance 80 – 200 m (deepness 55 – 85 m), distance 340 – 360 m (deepness 75 – 100 m).

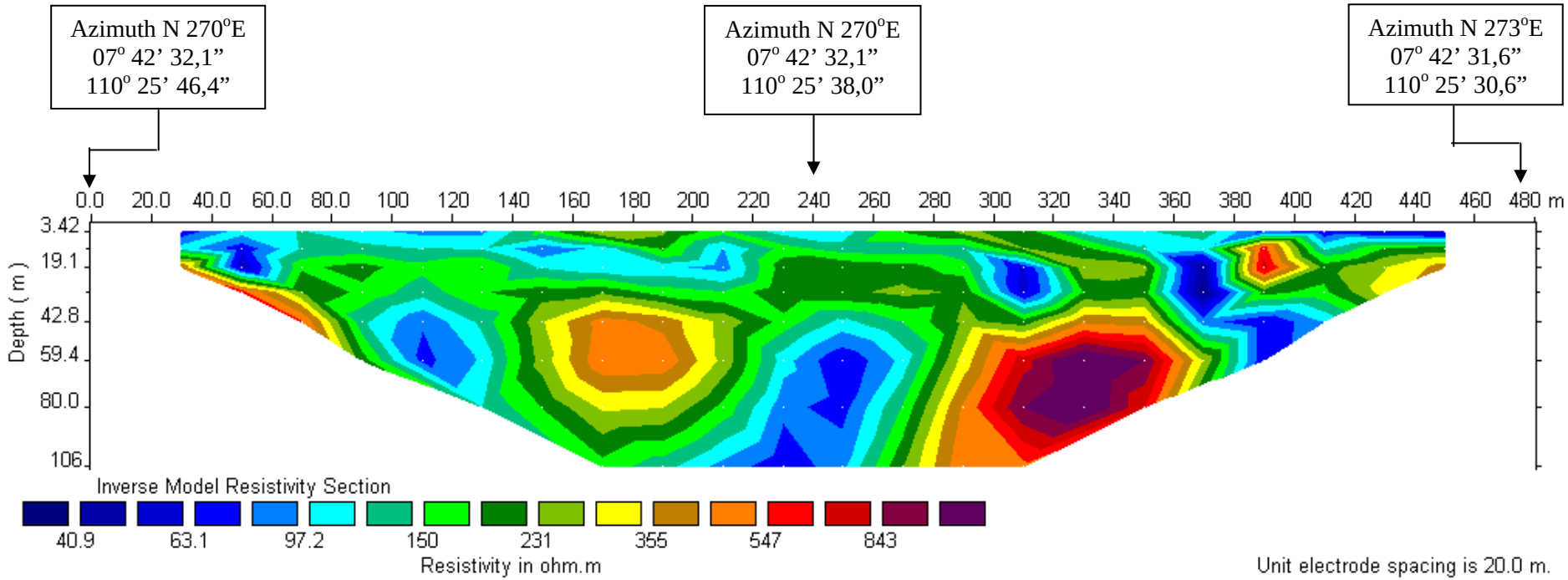
Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava.

Sleman No.14

LINE 15 : LOCATION KLIDON, SUKOHARJO, NGAGLIK, SLEMAN



INTERPRETATION :

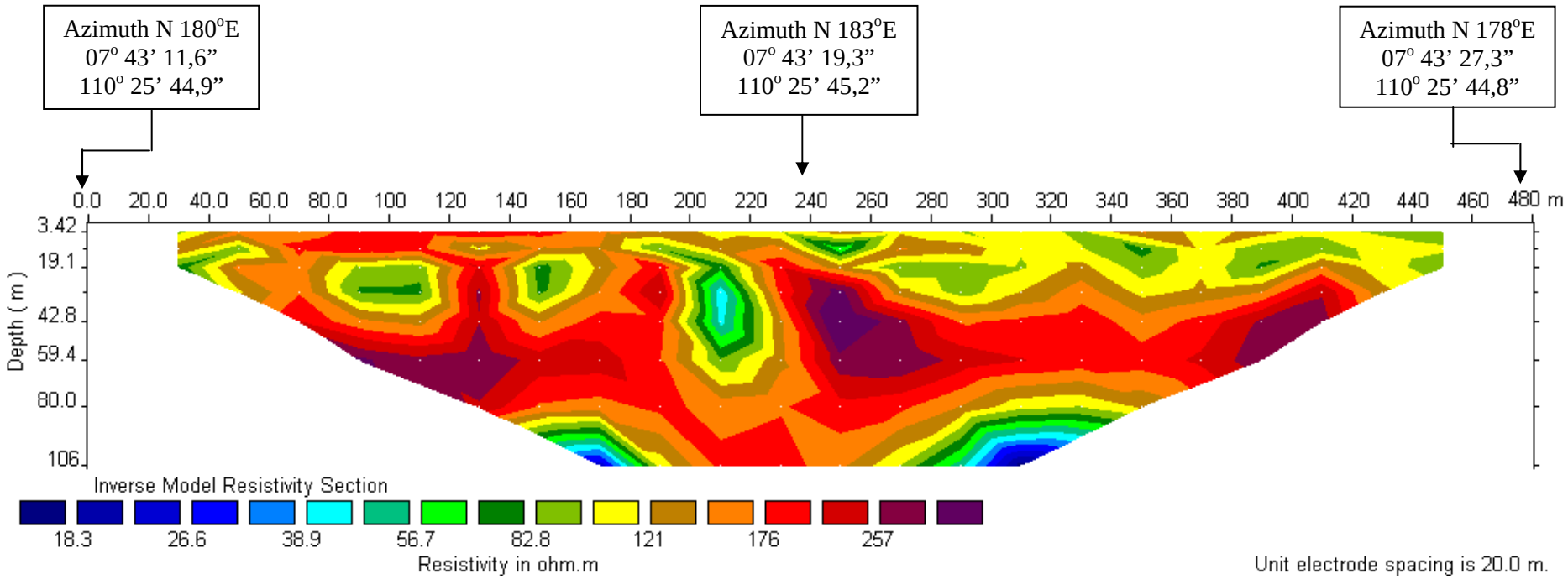
Resistivity < 100 ohm-m, (Blue colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying : distance 20 – 60 m (deepness. 5 – 20 m), distance 100 – 220 m(deepness 5–20 m) and distance 300 – 320 m (deepness 20 – 40 m), distance 350 – 370 and 400 – 460 m (deepness 10 - 60 m). The depth aquifers, distance 100 – 130 m (deepness 40 – 80 m), distance 220 – 260 m (deepness 45 – 100 m).

Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Red – purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.15

LINE 16 : LOCATION WONOREJO, WEDOMARTANI, NGEMPLAK, SLEMAN



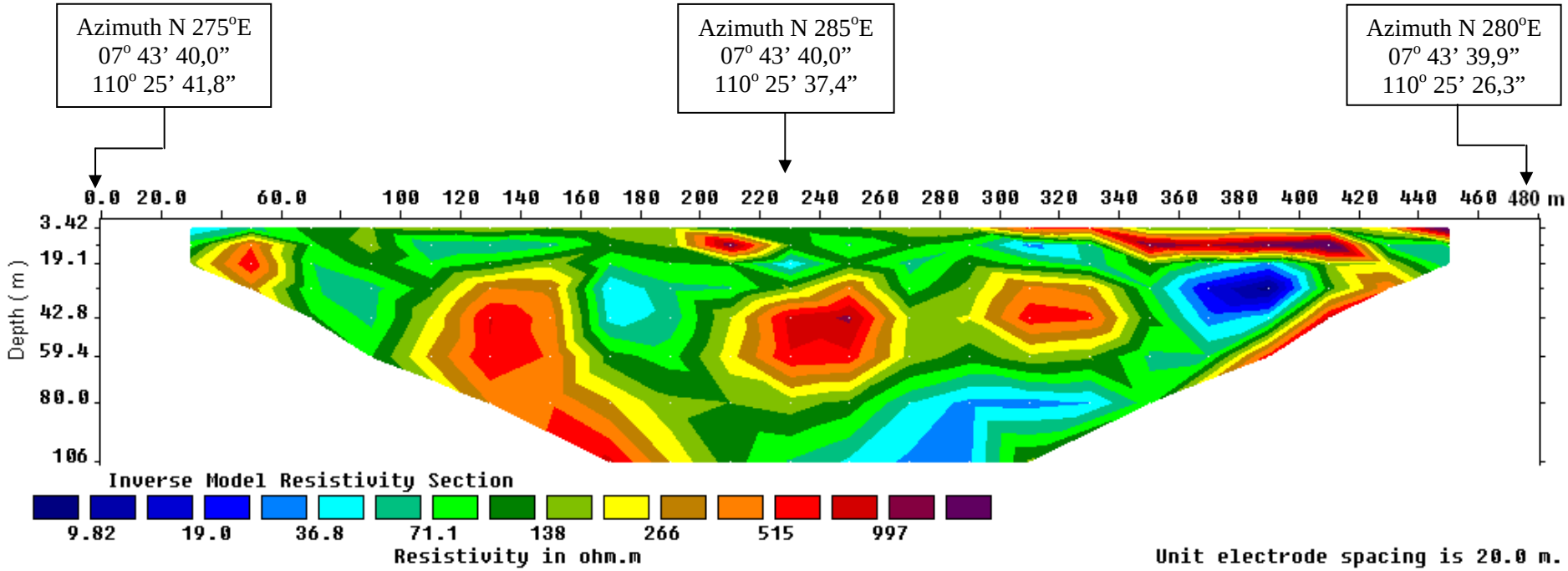
INTERPRETATION :

Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying places : distance 20 – 60 m (deepness. 5 – 20 m), distance 80 – 110 m(deepness 20–40 m), distance 140 – 160 m (deepness 20 – 40 m), distance 240 – 260, 340 – 360 m and 380 – 420 m (deepness 10 - 20 m). The depth aquifers, distance 140 – 180 m (deepness 90 – 110 m), distance 280 – 320 m (deepness >100 m).

Resistivity 100 – 500 ohm-m (Green - purples) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Sleman No.16

LINE 17 : LOCATION TEGALREJO,WEDOMARTANI, NGEMPLAK, SLEMAN



INTERPRETATION :

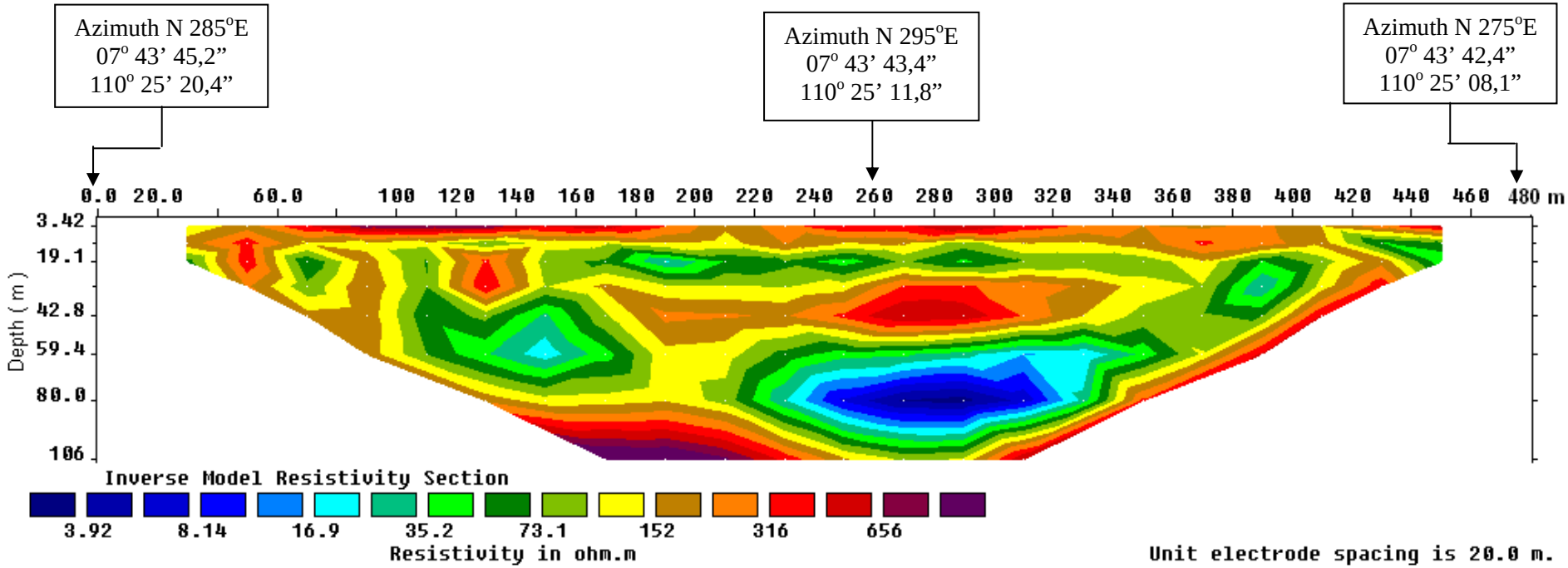
Resistivity < 100 ohm-m, (Blue – green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying : distance 20 – 340 m (deepness. 5 – 50 m), distance 420 – 460 m(deepness 5–20 m). The depth aquifers, distance 240 – 340 m (deepness 80 – 100 m.

Resistivity 100 – 500 ohm-m (Green - light brown) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Red – purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.17

LINE 18 : LOCATION KARANGMOJO, WEDOMARTANI, NGEMPLAK, SLEMAN



INTERPRETATION :

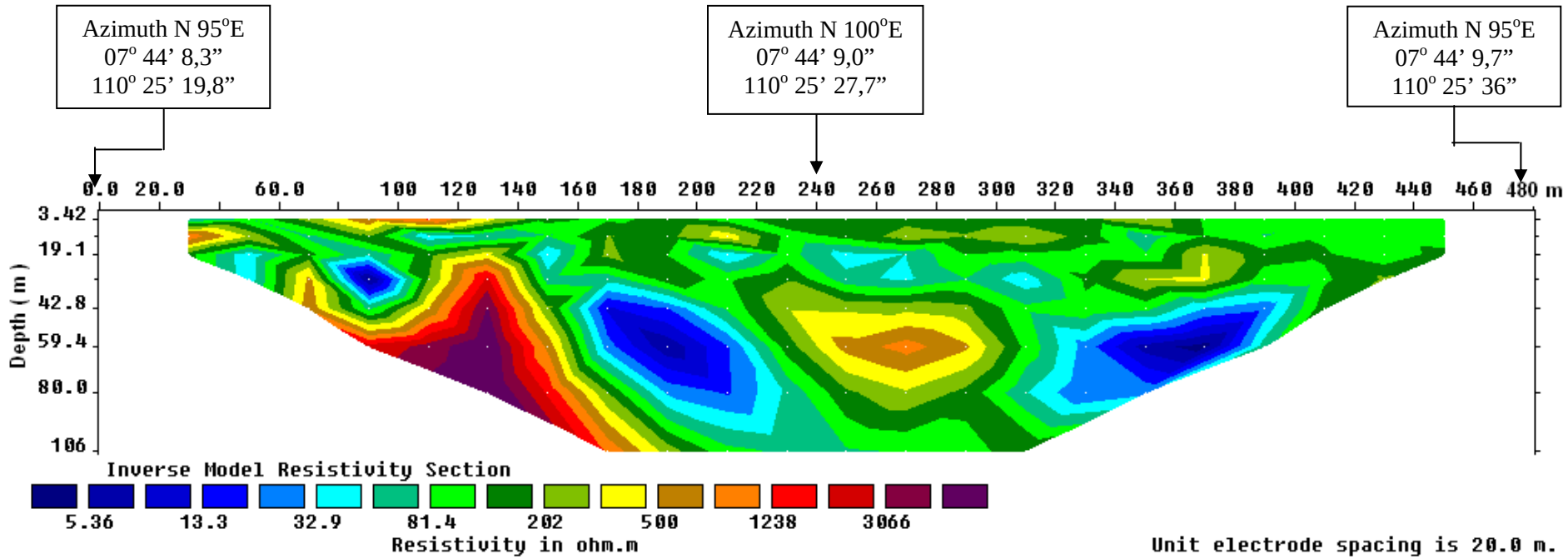
Resistivity < 100 ohm-m, (Blue - green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying : distance 60 – 80 m (deepness. 20 – 30 m), distance 150 – 400 m(deepness 10–40 m) and distance 370 – 400 m (deepness 20 – 40 m), distance 420 – 460 and 400 – 460 m (deepness 10 - 30 m). The depth aquifers, distance 220 – 340 m (deepness 80 – 100 m).

Resistivity 100 – 500 ohm-m (Yellow- red) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Dark Red – purple) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclactic rocks.

Sleman No.18

LINE 19 : LOCATION KAYEN, WEDOMARTANI, NGEMPLAK, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue - green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying : distance 20 – 160 m (deepness. 7 – 40 m), distance 200 – 460 m (deepness 10–40 m). The depth aquifers : distance 160 – 220 m (deepness 40 – 90 m), and distance 310 m – 400 m (deepness 40 – 80 m).

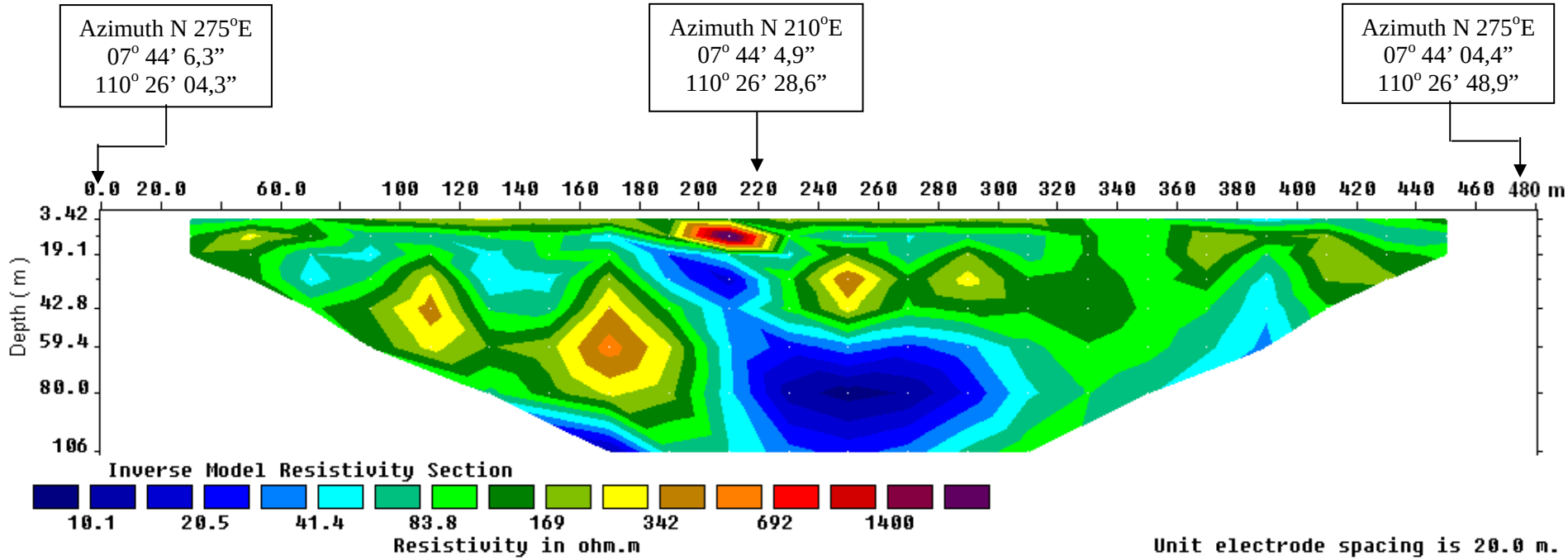
Resistivity 100 – 500 ohm-m (Green- yellow) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – reddish brown) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclastic rocks.

Resistivity > 1000 ohm-m (Red - purple) : Andesitic or pyroclastic lava

Sleman No.19

LINE 20 : LOCATION POKOH, WEDOMARTANI, NGEMPLAK, SLEMAN



INTERPRETATION :

Resistivity < 100 ohm-m, (Blue - green colour) is volcanic sand rocks (fine – coarse sand) with ground water aquifer, good porosity and permeability. Lenses shape or channeling with surrounding hard rocks in sub surface area. The shallow quifers, varying : distance 20 – 160 m (deepness. 7 – 40 m), distance 240 – 310 m (deepness 10–30 m), distance 340 – 460 m (deepness 10–30 m). The depth aquifers : distance 100 – 200 m (deepness > 90 m), distance 200 m – 310 m (deepness 50 – 100 m), and distance 320 – 400 m (deepness 35 – 60 m).

Resistivity 100 – 500 ohm-m (Green- brown colour) is Volcanic breccias, with andesitic fragments (5 – 50 Cm), sand matrix and silica cement

Resistivity 500 – 1000 ohm-m (Brown – red colour) is Volcanic breccia with fragmental volcanic material/bomb (> 50 cm), pyroclastic rocks.

Resistivity > 1000 ohm-m (Dark red - purple) : Andesitic or pyroclastic lava

Sleman No.20