TABLES

Table 1.1 LIST OF MEMBER OF JICA STUDY TEAM AND COUNTERPART TEAM FOR THE STUDY

Position	Name	DGWRD	Counterpart Team
Team Leader	Katuyoshi Wada	Agni Handoyoputro (Project Officer, Bina Program)	Rustamaji Hasan Bisri
Water Resources Engineer	Masanobu Sakamoto		Yayok Sutaryo
Water Conveyance System Planner	Sisei Sakoda		Eko Sutrisno Wahyudi Utomo
Hydrologist	Takuji Kataoka		Yoyok Dwi Putranto M. Agus Yudiarto
Geotechnical Engineer	Yuuji Yunoki		ST. Suprapto Milfan Rantawi
Land Use Analyst	Eiichi Hayakawa		Budiono
Construction Planner/Cost Estimator	Akihiro Takato		Bambang Widjayanto
Design Engineer (Water Conveyance System)	Atsuro Takaoka		Endra Suncaka Riswadi
Design Engineer (Dam Structure)	Masanori Miura		Tulus Heri Basuki
Project Economist	Yoshiaki Ishizuka		Maryoni Agus
Environmentalist	Syusuke Minato		Sri Sukaeni
Topographic Survey Expert	Katsuyuki Aoyagi		Gundu Nurwidayat/ Syarif Hidayat
Agronomist	-		Utami Pudji Astuti
Irrigation Engineer	-		Suryanto
Logistician	Shuji Hirota		-

Table 2.1 HALF-MONTHLY MEAN DISCHARGE AT KEY GAUGING STATIONS

(1) Rangkasbitung (unit:cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	66.1	80.6	272.7	118.6	192.7	228.3	131.7	310.8	148.5	145.7	139.7	131.9	66.9	112.1	30.1	33.7	36.2	73.1	51.4	48.9	55.2	172.4	114.4	296.7	127.4
1971	141.8	211.5	355.5	158.4	214.7	120.7	97.8	84.8	62.0	61.7	63.8	61.8	91.4	31.6	51.6	101.7	60.6	40.4	50.3	172.2	164.6	76.8	87.9	92.3	110.7
1972	313.4	209.5	161.5	114.5	245.0	132.2	58.4	103.1	108.2	99.0	26.9	21.5	16.3	11.0	16.8	24.7	6.7	5.8	3.5	14.8	31.4	36.8	56.3	67.7	78.5
1973	170.7	162.3	108.6	113.4	109.8	161.7	167.4	178.3	260.7	121.5	155.0	56.9	51.2	46.0	63.9	63.2	101.5	148.0	82.9	133.5	81.7	120.2	105.2	155.0	121.6
1974	329.2	58.4	141.1	144.8	184.3	98.6	122.0	108.4	140.3	115.5	49.4	67.0	86.6	46.0	85.2	96.3	205.7	162.5	121.1	72.6	56.2	103.9	122.7	55.8	115.6
1975	109.3	96.6	167.7	156.0	100.8	110.6	60.3	50.4	47.4	92.5	56.6	28.1	35.3	87.1	106.0	76.2	141.4	129.2	62.8	86.0	163.5	90.5	206.4	191.8	102.2
1976	218.9	325.5	114.6	87.0	154.4	104.0	63.0	126.8	86.2	32.4	53.8	21.5	28.9	18.2	20.0	28.4	14.9	15.0	65.9	23.3	55.4	96.6	58.7	42.5	77.3
1977	79.3	194.9	115.2	105.9	193.0	120.6	162.5	126.8	163.2	104.6	80.9	69.3	36.9	23.1	15.3	16.0	11.4	19.5	17.7	17.8	33.8	22.2	38.8	53.7	75.9
1978	80.8	278.5	97.1	80.5	151.6	127.3	74.4	97.3	90.9	58.9	68.1	73.4	58.1	63.8	70.9	95.3	64.5	83.3	48.5	103.9	118.0	71.2	74.1	80.8	92.1
1979	100.0	163.8	146.6	155.4	138.6	104.7	185.8	143.5	73.6	54.2	59.2	22.7	51.6	38.0	28.4	25.0	30.2	35.1	37.3	29.2	92.5	100.9	61.4	99.3	82.4
1980	204.1	249.1	136.6	102.6	79.0	65.8	126.2	103.1	120.1	79.8	48.8	45.4	42.2	56.2	127.0	62.1	91.0	103.8	75.7	70.1	87.7	100.4	88.5	179.9	101.9
1981	200.7	228.3	139.7	152.2	105.4	167.0	82.3	145.8	119.6	142.5	145.2	155.7	51.8	176.2	70.9	83.9	117.9	79.2	94.9	122.0	135.0	189.3	80.3	185.2	132.1
1982	288.9	237.4	101.7	71.5	64.1	27.5	82.2	86.4	80.4	40.4	26.0	25.4	12.0	21.1	11.3	6.7	4.1	7.9	7.6	23.4	95.0	74.7	62.2	149.2	67.0
1983	101.0	81.2	54.0	78.7	62.0	47.5	58.8	36.1	57.5	79.6	49.4	15.2	13.4	31.8	12.1	8.6	10.1	16.8	17.9	51.4	77.8	132.0	67.7	87.0	52.0
1984	156.6	82.4	103.3	140.7	199.4	83.0	72.1	216.0	185.7	89.3	56.5	33.0	75.6	80.5	64.3	101.0	138.4	99.9	94.9	49.4	46.7	50.8	47.5	51.5	96.6
1985	88.4	60.3	209.4	84.1	259.8	27.5	45.5	103.4	82.1	69.1	26.4	26.1	32.0	73.5	48.3	34.2	84.7	49.3	37.9	62.3	114.9	45.0	203.2	52.6	80.0
1986	100.7	314.8	149.2	87.5	125.5	122.0	128.5	175.4	119.1	71.4	147.7	60.4	20.6	26.1	24.2	27.0	42.8	19.9	39.4	61.1	41.8	86.8	188.9	98.9	95.0
1987	102.5	135.7	168.8	138.9	112.4	108.8	132.4	137.0	167.3	92.6	184.5	78.3	104.6	58.1	59.3	57.2	39.5	36.3	37.6	37.9	50.8	51.6	68.8	51.7	92.2
1988	118.9	181.0	208.1	158.6	169.3	274.8	275.9	151.0	88.0	96.0	58.1	19.9	35.4	49.4	45.8	44.0	46.9	45.3	36.3	59.9	60.4	70.4	109.4	135.6	105.8
1989	60.3	91.7	152.8	392.4	126.9	55.1	56.8	49.8	93.2	79.0	56.2	38.5	44.1	35.1	51.8	54.7	77.2	50.8	49.5	58.5	76.0	59.7	86.9	114.4	83.8
1990	334.1	438.6	110.7	87.2	144.2	112.6	85.6	83.2	90.8	79.1	91.9	54.8	96.7	133.4	111.2	92.4	97.8	147.2	86.4	94.7	91.9	62.8	26.0	82.6	118.2
1991	31.0	50.0	176.0	181.5	44.9	105.1	80.8	18.0	24.5	11.9	10.4	15.0	13.3	11.8	10.4	9.4	19.8	12.9	25.9	32.3	26.6	34.9	55.0	59.0	44.2
1992	85.6	74.3	119.7	58.9	47.3	113.9	66.1	149.3	99.7	69.5	54.1	46.3	25.8	37.4	33.0	46.6	43.5	36.0	126.7	79.6	128.4	96.8	88.5	48.0	74.0
1993	132.3	242.8	209.4	122.6	95.2	100.6	90.8	182.1	227.9	124.2	114.7	108.9	60.3	57.8	32.3	270.3	185.5	109.8	67.0	153.4	100.4	134.3	96.1	186.3	133.5
Mean	150.6	177.1	155.0	128.8	138.3	113.3	104.5	123.6	114.0	83.8	76.0	53.2	48.0	55.2	49.6	60.8	69.7	63.6	55.8	69.1	82.7	86.7	91.5	109.1	94.2
Min	31.0	50.0	54.0	58.9	44.9	27.5	45.5	18.0	24.5	11.9	10.4	15.0	12.0	11.0	10.4	6.7	4.1	5.8	3.5	14.8	26.6	22.2	26.0	42.5	44.2
Max	334.1	438.6	355.5	392.4	259.8	274.8	275.9	310.8	260.7	145.7	184.5	155.7	104.6	176.2	127.0	270.3	205.7	162.5	126.7	172.2	164.6	189.3	206.4	296.7	133.5

(2) Kopomaja

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Mean
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Annual
1970	15.3	29.4	48.8	22.1	24.5	20.6	26.7	14.8	51.8	28.1	22.7	15.7	4.4	10.5	4.7	9.4	16.2	20.4	7.3	7.6	22.8	34.8	7.6	20.6	20.3
1971	17.9	24.6	69.3	26.0	23.7	25.3	27.3	30.0	17.0	16.1	19.3	17.2	19.7	7.6	12.0	16.3	7.1	5.5	9.9	42.5	13.8	14.2	19.9	18.7	20.9
1972	50.8	72.2	41.6	20.7	60.6	34.0	20.7	33.9	35.1	30.3	14.9	4.4	2.4	2.2	9.9	5.7	1.7	1.5	1.5	6.6	10.5	14.2	20.1	31.2	21.9
1973	33.1	23.5	56.0	37.9	31.7	30.1	47.7	54.7	33.5	33.6	26.9	20.4	14.2	16.6	14.1	21.1	37.3	45.3	24.5	30.7	23.9	16.4	22.4	24.3	30.0
1974	81.3	19.1	31.7	33.0	31.4	15.7	28.7	30.1	42.6	28.5	13.3	20.6	17.9	13.2	25.3	20.7	61.5	49.9	28.2	21.9	24.4	16.6	10.7	11.8	28.3
1975	13.9	35.2	31.7	34.0	23.8	16.9	32.3	33.2	42.7	33.5	21.0	6.4	9.2	20.3	34.6	17.1	33.7	31.7	24.1	18.9	28.6	16.1	15.1	14.6	24.5
1976	56.8	107.8	34.8	22.7	41.9	16.4	22.2	28.1	31.6	7.3	15.2	6.8	5.4	3.2	8.0	9.1	7.6	4.8	30.5	9.9	17.5	27.2	10.6	12.8	22.4
1977	26.0	59.1	28.0	29.9	38.2	28.1	47.8	37.4	65.1	26.6	28.4	16.1	13.6	17.5	14.3	4.6	4.2	10.8	4.2	10.8	22.4	7.6	14.1	36.1	24.6
1978	32.0	42.5	17.2	12.0	49.9	16.9	14.3	26.5	14.3	10.9	8.6	17.7	11.2	14.4	10.4	19.8	28.8	23.6	17.4	25.4	23.2	13.1	14.7	21.7	20.3
1979	19.2	44.6	28.7	19.4	29.8	24.1	34.8	27.7	15.9	16.9	22.7	8.2	22.5	12.5	20.9	8.4	8.2	14.5	21.5	16.0	63.0	32.2	14.0	22.7	22.9
1980	42.1	51.2	26.2	36.2	23.1	16.7	23.6	24.6	37.5	30.5	12.7	11.8	11.0	14.6	33.1	16.1	34.7	18.3	15.6	23.8	26.0	29.3	21.1	24.7	25.2
1981	32.9	55.1	24.2	21.7	32.1	38.5	27.5	43.7	31.2	37.2	37.8	40.6	13.5	45.9	18.5	21.9	30.7	20.6	24.7	31.8	16.2	21.1	5.4	62.6	30.6
1982	49.4	49.3	16.9	10.5	8.3	6.5	19.8	26.4	23.0	21.0	12.1	6.9	4.4	7.0	3.4	1.9	1.0	1.6	4.3	4.3	12.3	17.0	5.8	17.0	13.8
1983	18.7	18.0	25.5	19.0	19.6	19.1	29.2	14.4	24.9	22.6	14.4	5.8	8.3	9.1	8.1	2.8	5.1	10.4	7.4	26.2	40.1	13.9	10.3	17.2	16.3
1984	39.8	17.6	25.3	27.6	32.7	22.5	19.7	43.3	44.0	22.1	25.8	7.2	11.0	16.3	17.2	15.9	32.5	22.1	13.6	9.3	23.9	22.7	21.3	12.5	22.7
1985	23.0	21.3	46.2	16.1	28.0	8.2	14.5	15.2	23.6	24.4	15.1	8.8	14.2	23.3	15.2	14.2	23.2	13.2	11.9	11.6	28.8	11.0	17.5	10.4	18.3
1986	28.4	45.5	28.7	10.8	31.1	27.5	46.7	26.8	40.5	18.9	18.4	12.1	9.1	12.2	16.4	8.5	9.9	24.7	9.5	9.4	21.4	16.4	36.7	21.5	22.1
1987	25.4	28.3	26.5	16.3	40.1	27.7	34.1	19.6	29.6	13.8	18.8	9.4	14.7	7.5	4.8	1.9	3.2	2.9	4.2	4.7	9.4	5.9	9.6	7.8	15.3
1988	8.3	17.7	29.4	11.5	35.2	30.5	25.1	26.4	34.3	24.2	10.0	4.0	4.4	5.3	10.9	3.3	6.7	12.1	8.1	9.9	9.5	4.7	4.7	14.5	14.6
1989	22.0	27.7	44.3	40.2	11.6	8.5	13.2	7.0	29.5	22.8	13.6	6.8	5.4	4.8	4.4	11.5	13.4	5.7	4.7	8.1	11.5	4.0	9.4	14.7	14.4
1990	29.0	46.6	17.2	32.5	15.5	15.7	15.5	12.1	26.4	20.0	14.7	8.8	8.0	14.3	23.9	12.9	26.1	12.9	12.2	13.2	14.7	10.1	12.9	19.4	18.1
1991	20.2	19.9	33.9	36.6	22.0	27.6	31.2	12.6	19.1	5.9	3.5	3.4	2.7	2.7	3.8	1.2	1.8	1.3	1.0	5.3	8.7	8.9	14.1	16.9	12.7
1992	13.2	13.0	19.0	11.7	8.3	32.1	12.6	15.5	27.0	6.4	15.2	8.2	10.7	8.7	7.1	8.5	15.7	9.5	34.2	19.6	23.6	28.0	38.0	17.7	16.8
1993	30.1	41.7	52.9	22.7	24.6	24.9	18.9	30.7	35.0	36.3	26.3	35.6	15.2	15.6	11.7	42.5	38.4	25.6	24.4	28.7	20.4	43.6	33.5	56.6	30.7
Mean	30.4	38.0	33.5	23.8	28.7	22.3	26.4	26.4	32.3	22.4	18.0	12.6	10.5	12.7	13.9	12.3	18.7	16.2	14.4	16.5	21.5	17.9	16.2	22.0	21.1
Min	8.3	13.0	16.9	10.5	8.3	6.5	12.6	7.0	14.3	5.9	3.5	3.4	2.4	2.2	3.4	1.2	1.0	1.3	1.0	4.3	8.7	4.0	4.7	7.8	12.7
Max	81.3	107.8	69.3	40.2	60.6	38.5	47.8	54.7	65.1	37.2	37.8	40.6	22.5	45.9	34.6	42.5	61.5	49.9	34.2	42.5	63.0	43.6	38.0	62.6	30.7

Table 2.2 DESIGN DISCHARGE FOR DRAINAGE STRUCTURE OF WATER CONVEYANCE SYSTEM WITH EXCESS PROBABILITY ONCE IN 5 YEARS (1/2)

Drainage Area No.	Drainage Area (km2)	River Length (m)	Difference of Elevation (m)	Average Gradient	Concentration Time (minutes)	Rinfall Intensity (mm/hour)	Runoff Coeficient	Design Discharge (m3/s)	Specific Discharge (m3/s/km2)
0	99.800							280.0	2.8
1	0.075	500	25.0	0.050	22	90	0.7	1.3	17.4
2	0.497	1,530	55.0	0.036	54	66	0.7	6.3	12.8
3	0.217	620	23.0	0.037	29	84	0.7	3.6	16.4
4	0.103	400	27.5	0.069	17	94	0.7	1.9	18.2
5	0.068	300	27.5	0.092	13	97	0.7	1.3	18.9
6	0.041	250	17.5	0.070	12	98	0.7	0.8	19.0
7	0.078	400	17.5	0.044	20	91	0.7	1.4	17.8
8	0.469	1,100	31.0	0.028	47	70	0.7	6.4	13.6
9	0.209	600	36.0	0.060	24	88	0.7	3.6	17.2
10	2.442	3,900	80.0	0.021	127	37	0.7	17.7	7.2
11	0.196	600	30.0	0.050	25	87	0.7	3.3	16.9
12	0.028	370	12.5	0.034	21	91	0.7	0.5	17.7
13	0.035	200	20.0	0.100	9	100	0.7	0.7	19.4
14	0.035	200	23.5	0.118	9	100	0.7	0.7	19.5
15	0.017	260	22.0	0.085	12	98	0.7	0.3	19.1
16	0.057	250	24.0	0.096	11	99	0.7	1.1	19.2
17	9.872	5,850	77.0	0.013	198	27	0.7	52.7	5.3
18	0.019	210	15.5	0.074	11	99	0.7	0.4	19.2
19	0.067	400	22.5	0.056	18	93	0.7	1.2	18.0
20	0.046	280	19.0	0.068	13	97	0.7	0.9	18.8
21	0.118	500	20.5	0.041	24	88	0.7	2.0	17.2
22	0.047	240	11.5	0.048	13	97	0.7	0.9	18.8
23	3.291	3,420	34.0	0.010	150	34	0.7	21.5	6.5
24	0.488	1,400	25.0	0.018	65	60	0.7	5.7	11.7
25	0.096	400	13.5	0.034	22	90	0.7	1.7	17.5
26	0.254	800	21.5	0.027	38	77	0.7	3.8	14.9
27	0.072	350	7.0	0.020	24	88	0.7	1.2	17.2
28	0.266	1,000	19.0	0.019	51	68	0.7	3.5	13.2
29	0.185	350	12.0	0.034	20	92	0.7	3.3	17.8
30	0.206	1,100	19.5	0.018	55	65	0.7	2.6	12.7
31	30.825							130.0	4.2
32	0.044	300	9.0	0.030	19	92	0.7	0.8	18.0
33	0.519	1,150	19.5	0.017	58	64	0.7	6.4	12.4
34	302.420							530.0	1.8
35	0.239	800	23.5	0.029	37	77	0.7	3.6	15.1
36	0.096	250	21.5	0.086	11	98	0.7	1.8	19.1
37	0.564	1,050	9.5	0.009	68	59	0.7	6.5	11.5
38	0.189	610	19.0	0.031	30	83	0.7	3.1	16.2
39	0.039	200	16.0	0.080	10	99	0.7	0.8	19.3
40	0.125	700	19.0	0.027	35	79	0.7	1.9	15.4
41	0.070	300	22.0	0.073	14	96	0.7	1.3	18.8
42	0.070	270	9.5	0.035	16	94	0.7	1.3	18.3
43	0.180	550	22.0	0.040	26	87	0.7	3.0	16.9
44	6.700	3,750	40.0	0.011	156	33	0.7	42.5	6.3
45	0.530	1,150	24.0	0.021	54	66	0.7	6.8	12.8
46	0.138	650	25.0	0.038	29	84	0.7	2.2	16.3
47	0.189	400	20.0	0.050	19	92	0.7	3.4	17.9
48	0.077	200	12.0	0.060	11	99	0.7	1.5	19.2
49	2.715	2,800	34.0	0.012	121	38	0.7	20.2	7.4
50	0.487	750	12.0	0.016	44	72	0.7	6.8	14.0
51	0.043	100	4.5	0.045	7	101	0.7	0.8	19.7
52	6.108	4,450	35.0	0.008	196	28	0.7	32.8	5.4
53	0.482	1,300	13.0	0.010	76	56	0.7	5.2	10.9
54	0.047	150	12.5	0.083	8	101	0.7	0.9	19.6
55	0.156	450	14.0	0.031	24	88	0.7	2.7	17.1
56	0.032	100	5.0	0.050	7	102	0.7	0.6	19.8
57	2.235	2,800	23.0	0.008	139	35	0.7	15.3	6.9
58	0.282	600	17.0	0.028	31	83	0.7	4.5	16.1
59	0.324	1,100	22.0	0.020	53	66	0.7	4.2	12.9
60	0.126	600	15.0	0.025	32	82	0.7	2.0	15.8

Table 2.3 DESIGN DISCHARGE FOR DRAINAGE STRUCTURE OF WATER CONVEYANCE SYSTEM WITH EXCESS PROBABILITY ONCE IN 5 YEARS (2/2)

Drainage Area No.	Drainage Area (km2)	River Length (m)	Difference of Elevation (m)	Average Gradient	Concentration Time (minutes)	Rinfall Intensity (mm/hour)	Runoff Coeficient	Design Discharge (m3/s)	Specific Discharge (m3/s/km2)
61	0.445	1,300	23.0	0.018	62	62	0.7	5.3	12.0
62	3.809	3,500	31.0	0.009	159	32	0.7	23.8	6.3
63	0.471	1,800	20.0	0.011	92	50	0.7	4.5	9.6
64	19.323							95.0	4.9
65	0.735	2,100	24.0	0.011	101	46	0.7	6.5	8.9
66	5.303	4,500	29.0	0.006	211	27	0.7	27.4	5.2
67	0.039	200	10.0	0.050	12	98	0.7	0.7	19.1
68	0.101	350	20.0	0.057	16	94	0.7	1.8	18.3
69	0.019	150	12.5	0.083	8	101	0.7	0.4	19.6
70	0.178	450	22.0	0.049	21	91	0.7	3.1	17.6
71	0.140	520	16.5	0.032	27	86	0.7	2.3	16.7
72	0.106	350	15.0	0.043	18	93	0.7	1.9	18.0
73	0.336	1,000	30.0	0.030	43	73	0.7	4.7	14.1
74	0.085	400	20.0	0.050	19	92	0.7	1.5	17.9
75	0.086	350	17.0	0.049	17	93	0.7	1.6	18.1
76	0.812	1,500	22.0	0.015	73	57	0.7	9.0	11.1
77	88.247							260.0	2.9
78	0.063	250	15.0	0.060	13	97	0.7	1.2	18.9
79	0.179	600	12.0	0.020	35	79	0.7	2.8	15.4
80	34.251							140.0	4.1
81	0.230	300	13.0	0.043	16	94	0.7	4.2	18.3
82	0.264	700	11.0	0.016	42	73	0.7	3.8	14.3
83	94.348							270.0	2.9
84	0.139	400	3.5	0.009	35	79	0.7	2.1	15.4
85	0.096	400	5.1	0.013	31	83	0.7	1.5	16.1
86	0.084	700	7.0	0.010	49	69	0.7	1.1	13.3
87	0.110	200	6.0	0.030	14	96	0.7	2.1	18.7
88	1.500	1,600	6.0	0.004	124	38	0.7	11.0	7.3
89	1.300	1,400	15.0	0.011	78	55	0.7	13.9	10.7
90	0.336	1,100	10.0	0.009	70	58	0.7	3.8	11.4
91	0.070	350	10.0	0.029	21	90	0.7	1.2	17.6
92	0.209	1,100	6.0	0.005	84	53	0.7	2.2	10.3
93	10.150	3,500	22.0	0.006	179	29	0.7	57.0	5.6
94	0.204	450	13.0	0.029	25	87	0.7	3.5	17.0
95	1.745	2,600	9.0	0.003	179	29	0.7	9.8	5.6
96	0.271	500	8.0	0.016	33	81	0.7	4.3	15.7
97	0.097	400	9.0	0.023	25	87	0.7	1.6	17.0
98	0.096	350	7.5	0.021	23	89	0.7	1.7	17.2
99	1048.000							1005.0	1.0

Note : In the case of catchement area bigger than 10.0 km2, design discharges are calculated by using Creager Curve.

Table 2.4 EXISTING WATER TREATMENT PLANT IN PAM SYSTEM

Treatment Plant	Capacity (lit./sec)	Water Source	Commissioned Year	Remarks
(1) Pejompongan I	2,000	Banjir Canal	1957	
(2) Pejompongan II	3,000	Banjir Canal	1970	
Pejompongan II	4,000	Banjir Canal	1986	Addition of 4 units
(3) Pulogadung	4,000	Sunter River	1982	
(4) Buaran I	2,000	WTC	1992	
(5) Ciburial	300	Spring water in Bogor	1922	
(6) Muara Karang	100	Banjir Canal	1982	
(7) Taman Kota	50		1982	
	200		1992	Upgraded
(8) Cilandak	100	Krukut River	1977	
	200	Krukut River	1979	Upgraded
(9) Condet	50	Ciliwung River	1983	
(10) Cakung	25	WTC	1982	
(11) Pesing	5	Angke River	1980	
(12) Pejaten	5	Ciliwung	1982	
(13) Sunter	50	Sunter River	1982	
Total	15,935			

Table 2.5 EXISTING PIPED WATER SYSTEM IN KABUPATENS IN THE STUDY AREA (1/3)

Kabupaten	Kecamatan	Population		Water	Capacity	Type of	Commencement
		Total	Served	Source	(l/sec)	Development	Year of Service
Bekasi	Pondokgede	282,126	-	-	-	-	-
	Bantargebang	58,200	-	-	-	-	-
	Setu	60,889	2,597	DGW	6.0	IKK	1986
	Cibarusah	54,884	-	-	(2.5)	(IKK)	-
	Serang	65,898	-	-	-	-	-
	Lemahabang	116,290	3,220	DGW	5.0	IKK	1987
	Cikarang	137,874	-	WTC	20.0	BNA	-
	Cibitung	132,469	-	WTC	20.0	BNA	-
	Tambun	159,690	1,561	WTC	27.0	BNA	1984/1985
	Tarumajaya	37,560	-	-	-	-	-
	Babelan	71,032	3,780	DGW	5.0	IKK	1988
	Tambelang	56,450	-	-	-	-	-
	Sukatani	77,482	6,500	Cikarang	20.0	IKK	1988
	Pebayuran	68,814	-	-	-	-	-
	Cabangbungin	39,910	-	-	-	-	-
	Muaragembong	21,500	-	-	-	-	-
	Bekasi Timur	218,677	-	-	-	-	-
	Bekasi Selatan	177,115	53,956	Bekasi	100.0	BNA	1980
				DGW	40.0	BNA	1980
			-	(Bekasi)	(100.0)	(BNA)	-
	Bekasi Barat	164,449	-	-	-	-	-
	Bekasi Utara	103,083	-	(Bekasi)	(150.0)	(BNA)	-
	Total	2,104,392	71,614		243.0		
Bogor	Citeureup	165,074	-	(Cilengi)	(40.0)	(IKK)	-
	Cibinong	125,104	(47000)	(Cikeas)	(65.0)	(BNA)	-
	Gunung Putri	88,323	-	(Cikeas)	(20.0)	(IKK)	-
	Cimanggis	220,308	-	-	-	-	-
	Kedunghalang	185,464	6,226	DGW	10.0	BNA	1974
			-	Ciliwung	60.0	BNA	-
	Jonggol	128,638	2,114	Cipatujah	5.0	IKK	1988
	Cariu	73,825	-	-	-	-	-
	Cileungsi	137,108	-	(Cileungsi)	(20.0)	(IKK)	-
	Leuwiliang	123,084	9,100	Cianten	20.0	BNA	1982
	Rumpin	81,486	-	-	-	-	-
	Ciampea	130,518	476	Spring	15.0	BNA	1974
	Cibungbulang	173,149	2,500	Cianten	20.0	BNA	1989
	Jasinga	79,994	-	-	-	-	-
	Cigudeg	109,283	-	-	-	-	-
	Parungpanjang	91,797	350	Cimanceuri	10.0	IKK	1989
	Nanggung	52,444	-	-	-	-	-
	Ciawi	120,217	(40,000)	(Ciliwung)	(40.0)	(BNA)	-
	Cijeruk/Cigombong	123,388	750	Spring	30.0	BNA	1974
	Cisarua	136,479	5,922	Spring	50.0	BNA	1974
	Caringin	72,204	-	-	-	-	-
	Ciomas	295,104	-	Spring	15.0	IKK	-
	Parung	130,488	-	-	-	-	-
	Gunungsindur	49,589	-	-	-	-	-
	Sawangan	165,835	-	-	-	-	-
	Semplak	160,127	-	-	-	-	-
	Bojonggede	138,898	-	-	-	-	-
	Pancoran Mas	111,380	151,515	Ciliwung	340.0	BNA	1,977
	Beji	71,034		DGW			
	Sukmajaya	198,526		Tap			
	Total	3,738,868	178,953		760.0		

Table 2.6 EXISTING PIPED WATER SYSTEM IN KABUPATENS IN THE STUDY AREA (2/3)

Kabupaten	Kecamatan	Population		Water	Capacity	Type of	Commencement
		Total	Served	Source	(l/sec)	Development	Year of Service
Tangerang	Tangerang	223,355	142,272	Cisadane	140.0	BNA	1980
	Ciledug	191,112	-	-	500.0	BNA	1986
	Cipondoh	140,767	-	-	-	-	-
	Jatiuwung	203,627	-	-	-	-	-
	Batu Ceper	162,987	-	-	-	-	-
	Teluk Naga	72,741	2,982	Cisadane	5.0	IKK	1985
					(40.0)	Provate	
	Mauk	117,005	1,414	NW Cisadane C	5.0	IKK	1990
	Rajeg	62,356	1,442	West Cisadane C	2.5	IKK	1986
	Sepatan	154,860	-	-	-	-	-
	Pasar Kemis	91,378	1,400	SGW	10.0	IKK	1987
	Balaraja	100,005	3,269	DGW	5.0	IKK	1990
	Kresek	71,214	-	Cidurian	5.0	IKK	-
	Kronjo	64,929	3,052	Cipasilian	5.0	IKK	1986
	Curug	96,951	3,000	SGW	20.0	IKK	1986
	Cikupa	118,480	1,100	SGW	5.0	IKK	1987
	Legok	108,356	2,300	SGW	20.0	IKK	1986
	Tiga Raksa	72,741	1,463	DGW	2.5	IKK	1986
	Serpong	131,479	8,127	Cisadane	40.0	BNA	1982
				Cisadane	(200.0)	BNA	
	Ciputat	318,763	-	-	-	-	-
	Cisoka	86,918	-	-	-	-	-
	Pondok Aren	113,029	-	-	-	-	-
	Total	2,703,053	171,821		765.0		
Serang	Cinangka	45,034	-	-	-	-	-
	Padarincang	49,252	-	Spring	10.0	IKK	-
	Ciomas	28,005	-	DGW	5.0	IKK	-
	Pabuaran	39,115	-	Tap	5.0	IKK	-
	Baros	34,856	3,780	Spring	10.0	IKK	1985
	Petir	63,641	-	-	-	-	-
	Cikeusal	77,045	2,034	West Pamarayan C	5.0	IKK	1987
	Pamarayan	52,455	-	DGW	10.0	IKK	-
	Kopo	60,763	-	-	-	-	-
	Cikande	70,451	1,575	Cidurian	2.5	IKK	1987
	Kragilan	45,310	-	DGW	10.0	IKK	-
	Walantaka	43,982	-	DGW	5.0	IKK	-
	Serang	155,296	45,122	Spring	110.0	BNA	1980
	Taktakan	40,400	-	-	-	-	-
	Wr. Kurung	27,334	-	-	-	-	-
	Mancak	31,703	5,296	Spring	5.0	IKK	1987/1988
	Anyer	33,519	1,900	Spring	10.0	IKK	1988
	Bojonegara	50,415	-	Small river	2.5	IKK	-
	Kramat Watu	46,720	-	Spring	15.0	BNA	-
	Kasemen	55,645	-	DGW	5.0	IKK	-
	Ciruas	43,099	1,421	West Pamarayan C	2.5	IKK	1985
	Pontang	42,814	1,470	Pontang C	2.5	IKK	1985
	Carenang	49,250	1,442	East Pamarayan C	2.5	IKK	1984
	Tirtayasa	58,651	784	East Pamarayan C	5.0	IKK	1986
	Ciwandan	63,552	-	-	-	-	-
	Cilegon	77,601	5,586	Tap	20.0	BNA	1985
	Pulomerak	84,930	(27,000)	Tap	35.0	BNA	-
	Total						

Table 2.7 EXISTING PIPED WATER SYSTEM IN KABUPATENS IN THE STUDY AREA (3/3)

Kabupaten	Kecamatan	Population		Water	Capacity	Type of	Commencement
		Total	Served	Source	(l/sec)	Development	Year of Service
Lebak	Rangkasbitung	133,762	18,109	DGW	48.0	BNA	1985
	Maja	55,182	-	-	-	-	-
	Sajira	33,208	1,008	Cibeureum	2.7	IKK	1985
	Wrung Gunung	65,439	-	-	-	-	-
	Cipanas	47,640	-	-	-	-	-
	Leuwidamar	34,868	-	-	-	-	-
	Muncang	47,065	-	-	-	-	-
	Cimarga	42,708	-	-	-	-	-
	Bojongmanik	37,434	-	-	-	-	-
	Cileles	31,989	-	-	-	-	-
	Total	529,295	19,117		50.7		
Pandegrang	Pandeglang	61,195	17,444	Spring	45.0	BNA	1983
	Cadasari	55,459	1,365	Tap	2.5	IKK	1985
	Banjar	50,961	-	-	-	-	-
	Cimanuk	30,444	1,701	Cilancar	2.5	IKK	1986
	Mandalawangi	5,639	-	-	-	-	-
	Labuhan	11,989	12,110 /3	Cidangu	20.0	BNA	1982
	Total	215,687	32,620		70.0		

Source: IWACO, 1988 and/or PDAM 1990

Note:

/1 Total of Pancoran Mas, Beji and Sukmajaya

/2 Total of Tangerang, Ciledug, Cipondoh, Jatiuwung and Batu Ceper

/3 Existing supply system but in the study area

Remarks: Spring : Spring water
DGW : Deep groundwater
SGW : Shallow groundwater
Tap : Tapping

Table 3.1 FUTURE POPULATION PROJECTED BY JWRMS

(unit : thousand)

Areas		Scenario	Year								Average Growth Rate (%)	Groundwater Availability
			1990	1995	2000	2005	2010	2015	2020	2025		
Jakarta	North	A	4,062	4,470	4,888	5,293	5,666	6,000	6,310	6,598	1.40	
		B	4,062	4,644	5,239	5,817	6,348	6,825	7,266	7,677	1.84	1
		C	4,062	4,470	4,888	5,293	5,666	6,000	6,310	6,598	1.40	
	South	A	4,145	4,492	4,848	5,193	5,511	5,795	6,059	6,304	1.21	
		B	4,145	4,640	5,148	5,640	6,094	6,499	6,875	7,225	1.60	3
		C	4,145	4,492	4,848	5,193	5,511	5,795	6,059	6,304	1.21	
	Total	A	8,207	8,962	9,736	10,486	11,177	11,795	12,369	12,902	1.30	
		B	8,207	9,284	10,387	11,457	12,442	13,324	14,141	14,902	1.72	
		C	8,207	8,962	9,736	10,486	11,177	11,795	12,369	12,902	1.30	
Tangerang	North	A	558	664	759	853	955	1,059	1,162	1,265	2.37	
		B	558	650	734	817	907	1,001	1,095	1,188	2.18	1
		C	558	668	768	866	971	1,080	1,188	1,295	2.43	
	Central	A	1,809	2,387	2,988	3,589	4,163	4,693	5,176	5,625	3.29	
		B	1,809	2,339	2,888	3,435	3,956	4,437	4,874	5,281	3.11	2
		C	1,809	2,468	3,152	3,836	4,490	5,094	5,643	6,155	3.56	
	Balaraja	A	83	106	133	172	212	254	296	334	4.06	
		B	83	104	129	164	201	240	279	314	3.87	1
		C	83	114	150	202	256	311	368	419	4.73	
	South	A	180	216	255	304	361	423	490	558	3.29	
		B	180	212	246	291	343	400	461	524	3.10	4
		C	180	239	301	381	474	575	683	793	4.33	
	Cikupa	A	94	120	149	193	243	294	340	385	4.11	
		B	94	117	144	185	231	278	320	361	3.92	2
		C	94	135	183	255	335	418	492	565	5.26	
	Total	A	2,724	3,493	4,284	5,111	5,934	6,723	7,464	8,167	3.19	
		B	2,724	3,422	4,141	4,892	5,638	6,356	7,029	7,668	3.00	
		C	2,724	3,624	4,554	5,540	6,526	7,478	8,374	9,227	3.55	
Bekasi	North	A	415	470	523	578	642	712	784	857	2.09	
		B	415	457	499	545	599	658	721	785	1.84	1
		C	415	490	561	638	724	819	917	1,017	2.59	
	Central	A	1,523	1,972	2,445	2,934	3,430	3,901	4,324	4,703	3.27	
		B	1,523	1,920	2,336	2,764	3,197	3,608	3,976	4,305	3.01	2
		C	1,523	2,049	2,601	3,173	3,754	4,305	4,800	5,243	3.60	
	Southeast	A	135	159	183	211	242	275	312	349	2.75	
		B	135	155	175	199	225	255	287	319	2.49	1
		C	135	177	220	270	324	384	448	514	3.89	
	Total	A	2,073	2,601	3,151	3,723	4,314	4,888	5,420	5,909	3.04	
		B	2,073	2,532	3,010	3,508	4,021	4,521	4,984	5,409	2.78	
		C	2,073	2,716	3,382	4,081	4,802	5,508	6,165	6,774	3.44	
Bogor	North	A	983	1,294	1,634	1,981	2,336	2,672	2,983	3,259	3.48	
		B	983	1,260	1,561	1,866	2,178	2,471	2,743	2,984	3.22	3
		C	983	1,158	1,348	1,543	1,742	1,930	2,104	2,259	2.41	
	South	A	1,319	1,754	2,241	2,749	3,254	3,729	4,161	4,537	3.59	
		B	1,319	1,708	2,140	2,589	3,033	3,449	3,826	4,154	3.33	2
		C	1,319	1,697	2,119	2,560	2,998	3,411	3,785	4,112	3.30	
	Southwest	A	846	1,007	1,170	1,352	1,551	1,756	1,963	2,162	2.72	
		B	846	981	1,118	1,274	1,446	1,624	1,805	1,979	2.46	3
		C	846	980	1,116	1,268	1,433	1,603	1,776	1,942	2.40	
	West	A	396	455	514	574	643	719	798	879	2.30	
		B	396	443	491	541	600	665	733	805	2.05	4
		C	396	444	491	539	595	655	719	784	1.97	
	East	A	405	472	540	619	709	807	905	1,004	2.63	
		B	405	460	516	584	661	746	832	919	2.37	4
		C	405	457	508	569	638	713	788	864	2.19	
	Total	A	3,949	4,982	6,099	7,275	8,493	9,683	10,810	11,841	3.19	
		B	3,949	4,852	5,826	6,854	7,918	8,955	9,939	10,841	2.93	
		C	3,949	4,736	5,582	6,479	7,406	8,312	9,172	9,961	2.68	
Outside Jabotabek	Serang	A	1,471	1,827	2,387	3,147	3,831	4,439	4,978	5,518	3.85	
		B	1,471	1,739	2,161	2,733	3,248	3,706	4,111	4,518	3.26	2
		C	1,471	1,827	2,387	3,147	3,831	4,439	4,978	5,518	3.85	
	Purwakarta/ Karawang	A	2,055	2,413	3,071	3,871	4,730	5,575	6,356	7,136	3.62	
		B	2,055	2,343	2,870	3,514	4,204	4,882	5,510	6,137	3.18	2
		C	2,055	2,413	3,070	3,871	4,730	5,575	6,356	7,137	3.62	
	Grand Total	A	20,479	24,278	28,728	33,613	38,479	43,103	47,397	51,473	2.67	
		B	20,479	24,172	28,395	32,958	37,471	41,744	45,714	49,475	2.55	
		C	20,479	24,278	28,711	33,604	38,472	43,107	47,414	51,519	2.67	

Remarks : Groundwater availability

1 : very poor with serious brackish and polluted condition 2 : medium condition 3 : reasonable aquifer

4 : abundant aquifer

Table 3.2 FUTURE MUNICIPAL AND INDUSTRIAL WATER DEMAND PROJECTED BY JWRMS

(unit : cu.m/s)

Areas		Scenario	Surface Water Source								Groundwater Source							
			Year								Year							
			1990	1995	2000	2005	2010	2015	2020	2025	1990	1995	2000	2005	2010	2015	2020	2025
Jakarta	North	A	6.6	7.6	8.4	10.8	12.3	13.9	15.3	18.1	7.2	7.5	7.8	7.8	7.7	7.5	7.2	6.6
		B	6.6	7.6	8.4	10.4	11.5	12.8	14.1	16.2	7.2	7.7	8.1	8.3	8.4	8.3	8.1	7.9
		C	6.6	9.1	11.9	18.5	23.9	24.3	24.6	26.2	7.2	7.1	6.7	5.2	3.3	3.0	2.7	2.5
	South	A	2.4	3.0	3.8	5.0	5.9	6.5	7.2	7.9	7.9	8.4	9.0	9.5	9.9	10.3	10.6	11.1
		B	2.4	3.1	4.0	4.8	5.6	6.2	6.7	7.4	7.9	8.5	9.1	9.7	10.1	10.5	10.8	11.2
		C	2.4	4.6	7.0	9.4	12.1	13.2	13.9	15.9	7.9	8.1	8.1	8.2	7.8	7.7	7.7	7.6
	Total	A	9.0	10.6	12.2	15.8	18.2	20.4	22.5	26.0	15.1	15.9	16.8	17.3	17.6	17.8	17.8	17.7
		B	9.0	10.7	12.4	15.2	17.1	19.0	20.8	23.6	15.1	16.2	17.2	18.0	18.5	18.8	18.9	19.1
		C	9.0	13.7	18.9	27.9	36.0	37.5	38.5	42.1	15.1	15.2	14.8	13.4	11.1	10.7	10.4	10.1
Tangerang		A	2.3	3.2	4.4	5.7	7.3	9.0	11.0	12.5	4.4	5.4	6.4	7.4	8.5	9.3	10.1	10.9
		B	2.3	3.0	3.9	4.9	6.0	7.0	8.1	9.0	4.4	5.2	5.9	6.7	7.4	8.0	8.6	9.2
		C	2.3	3.4	4.8	7.3	11.1	15.1	19.1	22.3	4.4	5.6	6.7	7.6	7.9	8.1	8.2	8.4
Bekasi		A	1.6	2.1	2.8	3.7	4.8	5.9	7.4	8.6	3.4	4.3	5.2	6.1	7.0	7.8	8.6	9.2
		B	1.6	2.0	2.5	3.1	3.9	4.6	5.4	6.0	3.4	4.1	4.7	5.4	6.0	6.6	7.2	7.7
		C	1.6	2.2	3.1	4.2	7.4	10.2	13.6	16.2	3.4	4.5	5.5	6.5	6.8	7.1	7.2	7.3
Bogor	North	A	0.4	0.6	1.2	1.7	2.4	3.1	3.7	4.6	1.6	2.1	2.6	3.2	3.7	4.2	4.7	5.0
		B	0.4	0.5	1.0	1.5	1.9	2.4	2.8	3.2	1.6	2.0	2.4	2.8	3.1	3.5	3.8	4.1
		C	0.4	0.7	1.2	1.9	2.7	3.7	4.4	5.3	1.6	1.8	2.1	2.3	2.4	2.4	2.4	2.4
	South	A	0.7	1.2	1.9	2.6	3.5	4.4	5.5	6.5	2.0	2.7	3.5	4.4	5.2	5.9	6.6	7.2
		B	0.7	1.1	1.6	2.3	3.1	3.8	4.7	5.3	2.0	2.6	3.2	3.8	4.4	4.8	5.3	5.6
		C	0.7	1.2	2.0	3.2	5.5	7.5	9.5	10.9	2.0	2.6	3.3	3.7	3.8	3.9	4.0	4.0
	South-west	A	0.3	0.5	0.7	1.0	1.2	1.7	2.0	2.4	1.3	1.6	1.9	2.2	2.5	2.7	3.1	3.3
		B	0.3	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7
		C	0.3	0.5	0.6	0.8	1.4	2.0	2.6	3.3	1.3	1.5	1.8	2.1	2.1	2.2	2.2	2.2
	West	A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.5
		B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.2
		C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4
	East	A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	1.0	1.1	1.3	1.5	1.7
		B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4
		C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5
	Total	A	1.4	2.3	3.8	5.3	7.1	9.2	11.2	13.5	6.1	7.8	9.6	11.7	13.5	15.3	17.2	18.7
		B	1.4	2.0	3.2	4.6	6.0	7.4	9.0	10.2	6.1	7.4	8.8	10.2	11.5	12.7	13.9	15.0
		C	1.4	2.4	3.8	5.9	9.6	13.2	16.5	19.5	6.1	7.3	8.8	9.9	10.3	10.8	11.2	11.5
Outside Jabotabek	Serang	A	2.2	3.2	4.3	5.8	7.1	8.7	10.2	11.8	2.6	3.2	4.0	5.1	6.0	6.8	7.5	8.2
		B	2.2	2.9	3.6	4.6	5.4	6.4	7.0	7.7	2.6	3.0	3.5	4.2	4.8	5.3	5.7	6.2
		C	2.2	3.3	4.4	6.9	9.1	12.2	14.3	17.3	2.6	3.2	4.0	4.6	5.0	5.1	5.2	5.3
	Purwakarta/ Karawang	A	1.0	1.5	2.8	4.1	5.5	7.2	8.9	11.0	3.5	4.0	4.7	5.7	6.8	7.7	8.5	9.2
		B	1.0	1.3	2.4	3.3	4.3	5.4	6.3	7.3	3.5	3.8	4.3	4.9	5.5	6.1	6.6	7.1
		C	1.0	1.5	2.9	4.9	7.7	11.4	14.6	18.1	3.5	4.0	4.7	5.4	5.7	5.7	5.6	5.6
Grand Total		A	17.5	22.9	30.3	40.4	50.0	60.4	71.2	83.4	35.1	40.6	46.7	53.3	59.4	64.7	69.7	73.9
		B	17.5	21.9	28.0	35.7	42.7	49.8	56.6	63.8	35.1	39.7	44.4	49.4	53.7	57.5	60.9	64.3
		C	17.5	26.5	37.9	57.1	80.9	99.6	116.6	135.5	35.1	39.8	44.5	47.4	46.8	47.5	47.8	48.2

Table 3.3 IRRIGATION WATER REQUIREMENT FOR CIUJUNG AREA (1/2)

Present Condition (unit : cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	13.1	9.0	8.2	16.1	11.6	17.6	0.0	18.2	4.8	7.2	6.9	12.2	10.2	21.5	20.0	22.8	20.0	13.7	17.9	6.9	4.9	2.6	3.8	4.5	11.4
1971	8.1	18.0	10.6	11.4	1.5	23.6	0.0	22.0	9.1	3.8	7.4	10.6	22.2	21.9	22.8	17.1	18.9	17.1	17.6	2.1	6.3	1.6	3.4	7.2	11.8
1972	8.1	18.1	19.9	13.2	2.9	17.8	21.9	17.7	1.0	14.1	16.8	18.4	22.2	21.9	23.4	22.8	0.0	22.4	17.9	13.6	7.8	0.3	5.7	5.8	13.9
1973	12.2	10.0	4.1	26.6	11.2	8.6	23.6	7.4	7.5	9.0	7.7	5.9	20.5	17.3	14.4	16.8	19.0	6.3	11.8	12.9	7.6	1.1	5.2	7.6	11.4
1974	3.8	26.2	6.0	21.1	3.7	25.6	11.1	15.0	7.3	9.2	13.1	5.9	16.8	21.6	18.6	13.1	14.3	15.7	5.4	10.1	1.2	2.5	4.1	8.6	11.7
1975	11.1	11.8	6.7	19.5	24.5	14.8	26.5	10.3	9.3	9.6	13.2	18.1	22.2	21.9	22.0	15.9	20.2	16.2	8.3	7.5	4.3	1.9	4.9	5.7	13.6
1976	9.8	13.1	16.7	16.9	9.5	15.9	26.5	7.2	3.8	16.8	9.8	18.4	13.8	18.3	14.6	19.8	21.1	21.2	14.2	13.3	4.2	1.0	5.2	9.6	13.4
1977	11.2	11.2	17.0	5.3	3.5	16.9	14.9	12.1	8.6	12.5	4.8	14.3	2.4	21.9	21.1	19.2	19.3	20.3	17.9	13.6	6.8	3.6	5.6	2.7	11.9
1978	16.2	12.5	18.2	8.9	10.9	14.0	29.0	12.0	7.4	10.6	9.3	10.2	10.0	13.1	11.1	6.0	23.1	8.1	9.4	5.9	5.3	3.4	3.3	5.9	11.0
1979	9.8	13.1	32.9	9.3	1.8	28.0	7.1	14.1	9.2	14.1	13.1	16.7	22.2	11.6	17.7	17.9	16.9	13.3	9.5	13.6	4.0	1.3	2.4	6.3	12.7
1980	10.2	12.6	15.7	7.5	11.4	10.6	7.5	11.4	12.0	10.8	13.6	6.5	14.4	13.4	3.3	22.8	18.0	20.1	15.9	4.0	2.5	2.6	4.9	3.2	10.6
1981	10.2	12.6	11.7	9.9	1.8	21.7	17.7	17.4	16.9	6.1	4.6	9.8	9.6	18.2	23.4	22.8	12.0	13.2	1.2	8.8	1.0	1.9	3.2	5.3	10.9
1982	9.9	13.0	5.0	36.3	13.2	29.0	10.0	20.5	12.1	16.2	5.7	17.9	17.6	10.1	0.3	22.8	23.1	15.4	12.5	9.9	4.5	2.5	6.0	8.3	13.4
1983	13.4	12.2	19.9	14.6	26.3	8.0	14.0	2.5	13.8	11.0	4.4	18.4	9.7	15.9	23.4	22.8	23.1	22.4	14.9	4.6	7.9	2.6	4.4	7.8	13.3
1984	6.6	18.4	12.9	15.9	6.1	19.6	22.9	4.4	12.9	16.7	6.8	18.4	19.8	16.3	10.8	21.4	10.9	19.6	9.0	12.4	3.3	1.0	3.4	5.1	12.3
1985	9.3	21.9	15.8	12.9	8.6	24.4	12.6	10.9	15.4	10.7	15.0	4.7	18.9	16.2	15.7	22.8	17.6	17.6	12.0	11.3	5.0	2.7	5.4	4.8	13.0
1986	14.3	7.7	21.4	29.1	19.5	22.5	16.9	15.5	4.1	13.4	10.9	15.8	17.3	14.2	20.7	20.7	9.1	14.4	15.7	10.3	3.3	2.0	3.4	6.1	13.7
1987	5.7	20.0	20.6	7.7	18.1	25.2	0.0	19.6	16.1	11.9	0.3	18.4	15.2	18.0	23.4	22.8	23.1	0.0	15.2	11.9	6.9	2.9	4.3	5.4	13.0
1988	11.2	11.2	25.1	25.6	21.5	5.4	11.0	10.2	7.7	7.0	13.6	16.4	20.7	15.5	17.9	13.1	20.2	12.8	11.7	6.7	5.4	0.3	2.5	6.2	12.5
1989	15.6	8.9	7.5	17.6	25.3	24.7	21.1	13.2	13.9	10.3	12.6	12.4	17.1	18.5	10.4	4.6	13.7	20.8	13.4	8.5	2.2	2.8	3.6	8.9	12.8
1990	9.6	13.5	12.9	8.5	14.9	24.7	8.0	7.3	13.2	13.0	12.9	15.6	17.7	10.6	21.6	16.4	17.0	21.6	17.9	10.0	7.9	3.1	5.2	9.1	13.0
1991	11.6	10.8	6.2	20.7	21.9	22.9	15.4	16.5	13.4	17.2	16.8	18.4	22.2	21.9	23.4	22.8	23.1	22.4	17.9	11.1	5.1	1.4	5.1	5.5	15.6
1992	14.9	18.0	8.9	15.9	15.2	4.9	2.9	17.1	5.6	10.0	11.4	18.4	22.2	21.9	21.6	18.3	11.1	21.6	6.3	5.1	3.5	2.6	1.9	7.0	11.9
1993	6.4	19.8	7.3	29.1	29.6	22.0	7.7	7.7	2.9	13.6	12.6	12.4	22.2	18.4	5.7	17.2	14.3	17.7	15.7	10.7	6.8	1.6	4.3	6.0	13.0
Mean	10.5	14.3	13.8	16.7	13.1	18.7	13.7	12.9	9.5	11.5	10.1	13.9	17.0	17.5	17.0	18.4	17.0	16.4	12.9	9.4	4.9	2.1	4.2	6.4	12.6
Min.	3.8	7.7	4.1	5.3	1.5	4.9	0.0	2.5	1.0	3.8	0.3	4.7	2.4	10.1	0.3	4.6	0.0	0.0	1.2	2.1	1.0	0.3	1.9	2.7	10.6
Max.	16.2	26.2	32.9	36.3	29.6	29.0	29.0	22.0	16.9	17.2	16.8	18.4	22.2	21.9	23.4	22.8	23.1	22.4	17.9	13.6	7.9	3.6	6.0	9.6	15.6

Scenario A

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	9.8	6.6	6.0	12.2	8.5	13.1	0.0	13.3	3.6	5.5	5.4	10.1	8.3	20.9	19.5	22.2	19.5	11.9	16.1	5.7	4.0	2.1	2.9	3.4	9.6
1971	5.9	13.5	7.9	8.6	1.1	17.6	0.0	16.1	6.7	2.9	5.8	8.7	20.3	21.4	22.6	16.2	18.3	14.9	15.8	1.7	5.1	1.3	2.6	5.3	10.0
1972	5.9	13.6	15.0	9.7	2.1	13.3	16.0	13.0	0.8	10.9	13.7	16.5	20.3	21.4	23.2	22.2	3.3	19.9	16.1	11.1	6.4	0.3	4.4	4.3	11.8
1973	9.1	7.3	3.0	20.3	8.4	6.3	17.3	5.5	5.6	6.8	6.1	4.8	18.5	16.1	13.2	15.8	18.4	5.2	10.3	10.6	6.2	0.9	4.0	5.7	9.4
1974	2.8	20.0	4.4	16.1	2.7	19.1	8.1	11.0	5.4	7.0	10.5	4.7	14.6	21.1	17.9	11.9	13.4	13.7	4.4	8.3	1.0	2.1	3.1	6.5	9.6
1975	8.2	8.6	4.9	14.9	18.5	10.9	19.4	7.5	6.9	7.3	10.5	16.2	20.3	21.4	21.7	14.8	19.6	14.1	7.1	6.1	3.5	1.5	3.8	4.2	11.3
1976	7.2	9.7	12.5	12.6	7.0	11.8	19.4	5.3	2.8	13.1	7.7	16.5	11.5	17.3	13.4	19.1	20.7	18.7	12.6	10.9	3.4	0.8	3.9	7.5	11.1
1977	8.2	8.2	13.0	3.9	2.6	12.6	10.9	8.9	6.4	9.5	3.8	12.2	3.8	21.4	20.7	18.4	18.7	17.9	16.1	11.1	5.6	3.0	4.3	2.0	10.1
1978	12.2	9.1	13.7	6.5	8.1	10.4	21.2	8.8	5.5	8.0	7.3	8.3	8.2	11.8	10.5	5.6	22.8	6.7	8.2	4.8	4.3	2.8	2.5	4.4	8.8
1979	7.2	9.7	25.4	6.8	1.3	20.8	5.2	10.4	6.8	10.8	10.5	14.7	20.3	9.9	16.9	17.0	16.2	11.5	8.1	11.1	3.3	1.0	1.8	4.7	10.5
1980	7.4	9.3	11.9	5.5	8.6	7.9	5.5	8.3	8.9	8.2	10.9	5.2	12.1	11.9	2.7	22.2	17.3	17.8	14.2	3.3	2.1	2.1	3.7	2.4	8.7
1981	7.4	9.3	8.8	7.4	1.3	16.2	12.9	12.7	12.5	4.7	3.6	8.2	7.8	17.2	23.2	22.2	11.0	11.4	1.0	7.2	0.8	1.6	2.4	4.0	9.0
1982	7.2	9.6	3.6	27.9	9.7	21.6	7.4	15.0	9.0	12.6	4.5	16.0	15.5	8.4	3.6	22.2	22.8	13.4	11.0	8.1	3.7	2.1	4.6	6.2	11.1
1983	10.0	9.0	15.0	10.7	19.9	5.9	10.2	1.9	10.2	8.3	3.5	16.5	7.9	14.6	23.2	22.2	22.8	19.9	13.3	3.8	6.5	2.1	3.4	5.8	11.1
1984	4.8	13.9	9.6	12.0	4.5	14.6	16.7	3.2	9.6	13.0	5.8	16.5	17.7	14.9	9.3	20.7	9.7	17.2	7.6	10.1	2.7	0.8	2.6	3.7	10.1
1985	6.8	16.4	11.9	9.5	6.3	18.1	9.2	8.0	11.4	8.1	12.1	3.8	16.8	14.8	14.6	22.2	16.9	15.4	10.5	9.3	4.1	2.2	4.1	3.6	10.7
1986	10.7	5.6	16.1	22.1	14.6	16.7	12.4	11.4	3.1	10.3	8.6	13.7	15.1	12.7	20.2	19.9	8.1	12.5	14.0	8.5	2.7	1.6	2.6	4.5	11.2
1987	4.2	15.1	15.7	5.6	13.4	18.7	0.0	14.4	11.9	9.0	0.6	16.5	12.9	16.9	23.2	22.2	22.8	1.1	13.5	9.8	5.6	2.4	3.3	4.0	11.0
1988	8.3	8.2	19.1	19.3	16.2	4.0	8.0	7.5	5.7	5.3	10.9	14.3	18.7	14.0	17.1	11.9	19.7	11.0	10.2	5.5	4.4	0.2	1.9	4.6	10.3
1989	11.8	6.5	5.5	13.4	19.1	18.3	15.4	9.7	10.3	7.8	10.0	10.3	14.9	17.5	10.0	4.4	12.7	18.4	11.8	7.0	1.8	2.3	2.8	6.8	10.4
1990	7.0	10.0	9.8	6.3	11.0	18.4	5.9	5.4	9.8	9.9	10.3	13.5	15.6	9.0	21.2	15.4	16.2	19.1	16.1	8.2	6.5	2.5	4.0	7.0	10.8
1991	8.6	7.9	4.5	15.8	16.5	17.0	11.3	12.1	9.9	13.4	13.7	16.5	20.3	21.4	23.2	22.2	22.8	19.9	16.1	9.1	4.2	1.2	3.9	4.0	13.1
1992	11.1	13.3	6.6	12.0	11.5	3.6	2.2	12.5	4.2	7.6	8.9	16.5	20.3	21.4	21.2	17.4	10.0	19.1	5.6	4.2	2.8	2.1	1.4	5.2	10.0
1993	4.7	14.9	5.3	22.2	22.5	16.3	5.6	5.6	2.2	10.4	10.0	10.3	20.3	17.3	4.7	16.4	13.4	15.5	14.0	8.8	5.6	1.3	3.3	4.4	10.6
Mean	7.8	10.6	10.4	12.6	9.8	13.9	10.0	9.5	7.1	8.8	8.1	12.1	15.1	16.4	16.5	17.7	16.5	14.4	11.4	7.7	4.0	1.7	3.2	4.8	10.4
Min.	2.8	5.6	3.0	3.9	1.1	3.6	0.0	1.9	0.8	2.9	0.6	3.8	3.8	8.4	2.7	4.4	3.3	1.1	1.0	1.7	0.8	0.2	1.4	2.0	8.7
Max.	12.2	20.0	25.4	27.9	22.5	21.6	21.2	16.1	12.5	13.4	13.7	16.5	20.3	21.4	23.2	22.2	22.8	19.9	16.1	11.1	6.5	3.0	4.6	7.5	13.1

Table 3.4 IRRIGATION WATER REQUIREMENT FOR CIUJUNG AREA (2/2)

Scenario C (unit : cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	8.6	5.6	5.0	10.6	7.3	12.1	0.0	12.1	3.1	5.0	5.1	10.4	8.1	20.3	18.7	20.3	17.9	11.7	17.6	6.5	5.4	4.3	3.7	2.9	9.3
1971	5.0	11.3	6.6	7.4	0.9	16.8	0.0	14.7	6.2	2.6	5.4	8.9	20.9	20.7	21.5	14.8	16.8	15.1	17.3	1.7	7.8	1.8	2.4	4.9	9.6
1972	5.0	11.4	12.6	8.1	1.8	12.6	15.2	11.5	0.7	10.4	14.1	17.1	20.9	20.7	22.1	20.3	1.6	20.8	17.6	15.4	10.4	0.3	6.2	3.6	11.7
1973	8.0	6.2	2.5	18.2	7.5	6.0	16.5	4.6	4.9	6.2	5.8	4.7	19.0	15.9	12.9	14.5	17.0	5.2	10.7	14.4	10.0	0.9	5.2	5.2	9.3
1974	2.4	17.1	3.7	14.1	2.2	18.0	7.0	9.6	4.7	6.4	10.5	4.6	14.9	20.4	17.2	11.2	12.4	13.7	4.5	10.8	1.1	4.4	3.2	6.2	9.2
1975	7.1	7.3	4.1	13.0	16.7	9.7	18.7	6.4	6.1	6.6	10.4	16.8	20.9	20.7	20.7	13.6	18.0	14.1	7.2	7.6	4.6	2.7	4.8	3.5	10.9
1976	6.2	8.1	10.4	10.8	6.0	11.0	18.8	4.4	2.5	12.6	7.2	17.1	11.7	17.0	13.1	17.5	19.0	19.4	13.4	15.0	5.1	1.5	5.1	7.3	10.8
1977	7.2	6.9	10.9	3.3	2.1	11.9	9.9	7.6	5.5	8.7	3.6	12.7	4.5	20.7	19.8	16.9	17.2	18.4	17.6	15.4	8.6	6.8	6.3	1.6	10.2
1978	10.8	7.7	11.5	5.4	7.1	9.7	20.7	7.5	4.8	7.3	6.9	8.3	8.1	11.7	10.2	5.2	20.9	6.7	8.5	5.9	6.0	6.2	2.8	4.0	8.5
1979	6.2	8.1	22.2	5.7	1.1	19.8	4.4	9.2	5.9	10.2	10.4	15.2	20.9	9.9	16.3	15.6	14.9	11.3	8.2	15.4	4.8	1.9	1.6	4.4	10.2
1980	6.4	7.8	10.0	4.6	7.6	7.3	4.9	7.3	8.0	7.5	10.9	5.1	12.3	11.9	2.7	20.3	15.9	18.3	15.4	3.3	2.2	4.4	5.2	2.0	8.4
1981	6.4	7.8	7.4	6.4	1.1	15.4	11.9	11.3	11.9	4.2	3.4	8.5	7.6	16.9	22.1	20.3	10.2	11.2	1.1	9.7	1.2	3.5	2.8	3.6	8.6
1982	6.2	8.1	3.1	25.3	8.1	20.5	6.2	13.5	8.1	12.1	4.2	16.5	15.9	8.4	2.7	20.3	20.9	13.2	11.5	10.3	4.7	4.1	6.6	5.9	10.7
1983	8.8	7.5	12.5	9.0	18.2	4.9	9.9	1.6	9.5	7.6	3.3	17.1	7.7	14.5	22.1	20.3	20.9	20.8	14.3	3.8	10.5	4.2	3.8	5.4	10.8
1984	4.0	11.6	8.0	10.3	3.8	13.7	16.0	2.7	8.8	12.5	6.6	17.1	18.2	14.8	9.2	19.0	9.1	17.7	7.7	13.7	4.2	1.8	3.1	3.3	9.9
1985	5.8	13.7	9.9	8.0	5.3	17.0	8.4	6.9	10.7	7.4	12.3	3.6	17.2	14.8	14.2	20.3	15.6	15.6	10.9	12.2	5.6	4.6	5.6	3.0	10.4
1986	9.6	4.7	13.5	19.6	12.8	15.6	11.3	10.0	2.7	9.6	8.2	14.2	15.4	12.7	19.3	18.2	7.6	12.4	15.1	10.9	3.4	3.1	2.8	4.1	10.7
1987	3.5	12.6	13.3	4.7	11.7	17.6	0.0	13.1	11.3	8.2	1.6	17.1	13.2	16.7	22.1	20.3	20.9	1.6	14.5	13.1	8.7	5.1	4.1	3.5	10.8
1988	7.2	6.9	16.3	16.8	14.8	3.3	7.3	6.5	5.1	4.8	10.9	14.8	19.2	14.0	16.5	11.2	18.1	10.8	10.6	6.3	7.0	0.2	1.9	4.2	9.8
1989	10.5	5.5	4.6	11.7	17.3	17.2	14.6	8.4	9.6	7.1	9.9	10.5	15.3	17.2	9.7	4.0	11.8	19.0	12.5	8.5	1.8	4.9	2.4	6.5	10.0
1990	6.0	8.4	8.1	5.3	9.4	17.3	7.4	5.8	9.0	9.2	10.2	14.0	16.0	9.0	20.3	14.2	15.0	19.9	17.6	10.4	10.6	5.4	5.2	6.8	10.9
1991	7.5	6.6	3.8	13.9	14.7	15.8	10.2	10.7	9.1	13.0	14.1	17.1	20.9	20.7	22.1	20.3	20.9	20.8	17.6	11.9	6.1	1.7	5.0	3.4	12.8
1992	9.7	11.2	5.5	10.5	10.5	3.4	1.8	11.2	3.6	7.0	8.6	17.1	20.9	20.7	20.3	15.9	9.4	19.9	5.7	5.4	3.2	4.3	1.2	4.9	9.7
1993	4.0	12.5	4.5	19.8	20.7	15.1	5.3	5.0	1.9	9.9	9.9	10.5	20.9	17.0	4.7	15.0	12.4	15.7	15.1	11.4	8.6	1.8	3.9	3.9	10.4
Mean	6.8	8.9	8.8	10.9	8.7	13.0	9.4	8.4	6.4	8.2	8.1	12.5	15.4	16.1	15.9	16.2	15.2	14.7	12.2	10.0	5.9	3.3	4.0	4.3	10.1
Min.	2.4	4.7	2.5	3.3	0.9	3.3	0.0	1.6	0.7	2.6	1.6	3.6	4.5	8.4	2.7	4.0	1.6	1.6	1.1	1.7	1.1	0.2	1.2	1.6	8.4
Max.	10.8	17.1	22.2	25.3	20.7	20.5	20.7	14.7	11.9	13.0	14.1	17.1	20.9	20.7	22.1	20.3	20.9	20.8	17.6	15.4	10.6	6.8	6.6	7.3	12.8

Table 3.5 IRRIGATION WATER REQUIREMENT FOR CIDURIAN-RANCASUMUR AREA (1/2)

Present Condition (unit : cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	6.3	3.4	3.4	7.6	5.5	7.9	0.0	7.8	2.2	2.9	2.3	3.9	2.9	6.5	6.1	7.0	5.9	3.9	5.1	1.9	1.4	0.8	2.4	3.1	4.2
1971	3.7	7.3	4.5	5.4	0.7	10.6	0.0	9.4	4.1	1.4	2.5	3.3	6.6	6.6	7.0	5.3	5.6	4.9	5.0	0.6	1.8	0.5	2.2	5.0	4.3
1972	3.7	7.4	8.8	6.2	1.3	8.0	9.5	7.6	0.5	5.9	6.1	6.0	6.6	6.6	7.2	7.0	0.0	6.4	5.1	3.8	2.2	0.1	3.5	4.0	5.1
1973	5.9	3.7	1.7	12.4	5.3	3.8	10.2	3.2	3.4	3.7	2.6	1.7	6.0	5.2	4.4	5.2	5.6	1.8	3.3	3.6	2.1	0.3	3.2	5.3	4.3
1974	1.8	11.1	2.4	9.9	1.7	11.5	4.8	6.4	3.3	3.8	4.7	1.7	4.9	6.5	5.7	4.0	4.2	4.5	1.5	2.8	0.4	0.8	2.5	5.9	4.5
1975	5.3	4.5	2.7	9.2	11.4	6.7	11.5	4.4	4.2	3.9	4.7	5.9	6.6	6.6	6.8	4.9	6.0	4.6	2.3	2.1	1.2	0.6	3.0	3.9	5.1
1976	4.6	5.1	7.3	7.9	4.5	7.1	11.5	3.1	1.7	6.9	3.4	6.0	4.0	5.5	4.5	6.1	6.2	6.1	4.0	3.7	1.2	0.3	3.1	6.6	5.0
1977	5.3	4.2	7.5	2.5	1.6	7.6	6.4	5.2	3.9	5.2	1.5	4.6	0.6	6.6	6.5	5.9	5.7	5.8	5.1	3.8	1.9	1.1	3.4	1.8	4.3
1978	7.9	4.8	8.0	4.2	5.1	6.3	12.5	5.2	3.4	4.3	3.3	3.2	2.9	3.9	3.4	1.9	6.8	2.3	2.6	1.6	1.5	1.0	2.1	4.1	4.3
1979	4.6	5.1	14.8	4.4	0.8	12.6	3.0	6.1	4.2	5.9	4.7	5.4	6.6	3.5	5.5	5.5	5.0	3.8	2.7	3.8	1.1	0.4	1.6	4.4	4.8
1980	4.8	4.8	6.9	3.6	5.4	4.8	3.2	4.9	5.4	4.4	4.9	1.9	4.2	4.0	1.1	7.0	5.3	5.8	4.5	1.1	0.7	0.8	3.0	2.2	3.9
1981	4.8	4.8	5.0	4.7	0.8	9.8	7.6	7.5	7.6	2.4	1.4	3.1	2.7	5.5	7.2	7.0	3.6	3.8	0.3	2.4	0.3	0.6	2.0	3.7	4.1
1982	4.6	5.0	2.0	16.9	6.2	13.0	4.3	8.8	5.5	6.7	1.8	5.8	5.2	3.0	0.1	7.0	6.8	4.4	3.5	2.7	1.3	0.8	3.6	5.7	5.2
1983	6.5	4.7	8.8	6.9	12.2	3.6	6.0	1.1	6.3	4.5	1.4	6.0	2.8	4.8	7.2	7.0	6.8	6.4	4.2	1.3	2.2	0.8	2.7	5.4	5.0
1984	3.0	7.5	5.6	7.5	2.9	8.8	9.9	1.9	5.9	6.9	2.3	6.0	5.8	4.9	3.3	6.6	3.2	5.6	2.5	3.4	0.9	0.3	2.1	3.5	4.6
1985	4.4	9.1	6.9	6.1	4.1	11.0	5.4	4.7	6.9	4.4	5.4	1.3	5.6	4.9	4.8	7.0	5.2	5.0	3.4	3.1	1.4	0.8	3.2	3.3	4.9
1986	6.9	2.8	9.5	13.5	9.1	10.1	7.3	6.7	1.9	5.6	3.9	5.1	5.1	4.3	6.3	6.3	2.7	4.1	4.4	2.9	0.9	0.6	2.2	4.2	5.3
1987	2.6	8.2	9.1	3.7	8.4	11.3	0.0	8.4	7.3	4.9	0.1	6.0	4.4	5.4	7.2	7.0	6.8	0.0	4.3	3.3	1.9	0.9	2.7	3.8	4.9
1988	5.3	4.2	11.2	11.9	10.0	2.4	4.7	4.4	3.5	2.8	4.9	5.3	6.1	4.7	5.5	4.0	6.0	3.7	3.3	1.9	1.5	0.1	1.6	4.3	4.7
1989	7.6	3.3	3.1	8.3	11.8	11.1	9.1	5.7	6.3	4.2	4.5	4.0	5.0	5.6	3.2	1.5	4.1	6.0	3.8	2.4	0.6	0.9	2.3	6.1	5.0
1990	4.5	5.2	5.6	4.1	7.0	11.1	3.5	3.2	6.0	5.4	4.6	5.0	5.2	3.2	6.6	5.0	5.0	6.2	5.1	2.8	2.2	0.9	3.2	6.3	4.9
1991	5.5	4.0	2.5	9.7	10.2	10.3	6.7	7.1	6.1	7.1	6.1	6.0	6.6	6.6	7.2	7.0	6.8	6.4	5.1	3.1	1.5	0.4	3.1	3.8	5.8
1992	7.2	7.3	3.7	7.5	7.1	2.2	1.2	7.3	2.5	4.1	4.0	6.0	6.6	6.6	6.6	5.6	3.3	6.2	1.8	1.4	1.0	0.8	1.3	4.8	4.4
1993	3.0	8.1	3.0	13.6	13.8	9.9	3.3	3.3	1.3	5.6	4.5	4.0	6.6	5.5	1.8	5.3	4.3	5.1	4.4	3.0	1.9	0.5	2.6	4.1	4.9
Mean	5.0	5.7	6.0	7.8	6.1	8.4	5.9	5.6	4.3	4.7	3.6	4.5	5.0	5.3	5.2	5.7	5.0	4.7	3.6	2.6	1.4	0.6	2.6	4.4	4.7
Min.	1.8	2.8	1.7	2.5	0.7	2.2	0.0	1.1	0.5	1.4	0.1	1.3	0.6	3.0	0.1	1.5	0.0	0.0	0.3	0.6	0.3	0.1	1.3	1.8	3.9
Max.	7.9	11.1	14.8	16.9	13.8	13.0	12.5	9.4	7.6	7.1	6.1	6.0	6.6	6.6	7.2	7.0	6.8	6.4	5.1	3.8	2.2	1.1	3.6	6.6	5.8

Scenario A (unit : cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	5.0	2.6	2.7	6.1	4.3	6.3	0.0	6.1	1.7	2.3	1.9	3.5	2.5	7.2	6.8	7.5	6.5	3.7	5.0	1.7	1.2	0.7	1.9	2.5	3.7
1971	2.9	5.9	3.6	4.4	0.5	8.5	0.0	7.4	3.3	1.1	2.1	3.0	6.8	7.4	7.9	5.4	6.0	4.7	5.0	0.5	1.5	0.4	1.7	3.9	3.9
1972	2.9	5.9	7.1	4.9	1.1	6.4	7.4	6.0	0.4	4.9	5.5	6.0	6.8	7.4	8.2	7.5	1.4	6.3	5.0	3.2	1.9	0.1	2.7	3.2	4.7
1973	4.6	2.9	1.3	10.1	4.2	3.1	8.0	2.5	2.7	3.0	2.2	1.5	6.2	5.4	4.5	5.3	6.1	1.6	3.2	3.1	1.8	0.3	2.5	4.1	3.8
1974	1.4	9.1	1.9	8.1	1.3	9.2	3.8	5.1	2.6	3.0	4.1	1.5	4.8	7.3	6.2	4.0	4.4	4.3	1.3	2.4	0.3	0.7	2.0	4.7	3.9
1975	4.2	3.5	2.1	7.5	9.2	5.2	9.0	3.5	3.4	3.2	4.1	5.8	6.8	7.4	7.6	5.0	6.5	4.4	2.2	1.8	1.0	0.5	2.4	3.1	4.6
1976	3.6	4.0	5.9	6.3	3.5	5.7	9.0	2.4	1.4	5.9	2.8	6.0	3.6	5.9	4.6	6.4	6.8	5.9	3.9	3.2	1.0	0.3	2.5	5.4	4.4
1977	4.2	3.3	6.1	1.9	1.3	6.0	5.1	4.1	3.1	4.2	1.3	4.3	1.5	7.4	7.2	6.2	6.2	5.6	5.0	3.2	1.7	0.9	2.7	1.4	3.9
1978	6.4	3.7	6.5	3.3	4.1	5.0	9.8	4.1	2.7	3.5	2.7	2.8	2.5	3.9	3.6	1.9	7.6	2.0	2.5	1.4	1.3	0.9	1.7	3.2	3.6
1979	3.6	4.0	12.2	3.5	0.6	10.0	2.4	4.8	3.3	4.8	4.0	5.3	6.8	3.2	5.8	5.7	5.3	3.6	2.5	3.2	1.0	0.3	1.2	3.4	4.2
1980	3.8	3.8	5.6	2.8	4.3	3.8	2.5	3.8	4.3	3.6	4.3	1.6	3.9	3.9	0.9	7.5	5.7	5.6	4.4	1.0	0.6	0.7	2.4	1.7	3.4
1981	3.8	3.8	4.1	3.8	0.7	7.8	6.0	5.9	6.0	2.0	1.2	2.8	2.3	5.8	8.2	7.5	3.6	3.5	0.3	2.1	0.2	0.5	1.6	2.9	3.6
1982	3.6	4.0	1.6	13.9	4.8	10.4	3.4	6.9	4.4	5.6	1.5	5.8	5.1	2.7	1.7	7.5	7.6	4.2	3.4	2.4	1.1	0.7	2.9	4.5	4.6
1983	5.1	3.7	7.1	5.4	9.8	2.8	4.7	0.9	5.0	3.6	1.1	6.0	2.4	4.9	8.2	7.5	7.6	6.3	4.1	1.1	1.9	0.7	2.2	4.2	4.4
1984	2.4	6.1	4.4	6.0	2.3	7.0	7.8	1.5	4.6	5.8	2.2	6.0	5.9	5.0	3.1	7.0	3.1	5.4	2.3	3.0	0.8	0.3	1.7	2.7	4.0
1985	3.4	7.3	5.6	4.8	3.2	8.7	4.3	3.7	5.5	3.6	4.8	1.1	5.6	5.0	5.0	7.5	5.6	4.8	3.2	2.7	1.2	0.7	2.6	2.6	4.3
1986	5.5	2.2	7.6	11.0	7.3	8.0	5.7	5.2	1.5	4.6	3.2	4.9	5.0	4.2	7.0	6.7	2.6	3.9	4.4	2.5	0.8	0.5	1.7	3.3	4.6
1987	2.1	6.7	7.4	2.9	6.7	9.0	0.0	6.6	5.7	4.0	0.4	6.0	4.2	5.7	8.2	7.5	7.6	0.6	4.2	2.9	1.7	0.8	2.1	3.0	4.4
1988	4.2	3.3	9.1	9.7	8.1	1.9	3.7	3.5	2.8	2.2	4.2	5.1	6.3	4.7	5.9	4.0	6.5	3.4	3.1	1.6	1.3	0.1	1.3	3.3	4.1
1989	6.1	2.6	2.4	6.7	9.5	8.8	7.1	4.5	5.0	3.4	3.9	3.5	4.9	5.9	3.5	1.5	4.1	5.8	3.7	2.0	0.6	0.7	1.8	4.9	4.3
1990	3.5	4.2	4.5	3.2	5.5	8.8	2.7	2.5	4.8	4.4	4.0	4.8	5.1	2.9	7.4	5.2	5.3	6.0	5.0	2.4	1.9	0.8	2.5	5.1	4.3
1991	4.4	3.2	2.0	7.9	8.2	8.2	5.2	5.6	4.8	6.0	5.5	6.0	6.8	7.4	8.2	7.5	7.6	6.3	5.0	2.6	1.3	0.4	2.4	3.0	5.2
1992	5.7	5.8	2.9	6.0	5.7	1.8	1.0	5.8	2.0	3.3	3.4	6.0	6.8	7.4	7.4	5.9	3.2	6.0	1.7	1.2	0.8	0.7	1.0	3.8	4.0
1993	2.3	6.6	2.3	11.1	11.1	7.8	2.6	2.6	1.1	4.7	3.9	3.5	6.8	5.9	1.5	5.5	4.4	4.9	4.4	2.6	1.7	0.4	2.1	3.2	4.3
Mean	3.9	4.5	4.8	6.3	4.9	6.7	4.6	4.4	3.4	3.9	3.1	4.3	5.0	5.6	5.8	6.0	5.5	4.5	3.5	2.2	1.2	0.5	2.1	3.5	4.2
Min.	1.4	2.2	1.3	1.9	0.5	1.8	0.0	0.9	0.4	1.1	0.4	1.1	1.5	2.7	0.9	1.5	1.4	0.6	0.3	0.5	0.2	0.1	1.0	1.4	3.4
Max.	6.4	9.1	12.2	13.9	11.1	10.4	9.8	7.4	6.0	6.0	5.5	6.0	6.8	7.4	8.2	7.5	7.6	6.3	5.0	3.2	1.9	0.9	2.9	5.4	5.2

Table 3.6 IRRIGATION WATER REQUIREMENT FOR CIDURIAN-RANCASUMUR AREA (2/2)

Scenario C (unit : cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	4.2	2.1	2.1	5.0	3.4	5.4	0.0	5.3	1.4	2.1	1.7	3.4	2.3	6.4	6.0	6.6	5.7	3.5	5.6	2.0	1.8	1.5	2.0	2.0	3.4
1971	2.3	4.7	2.9	3.5	0.4	7.4	0.0	6.4	2.8	1.0	1.8	2.9	6.7	6.6	6.9	4.7	5.3	4.6	5.5	0.5	2.7	0.6	1.4	3.3	3.5
1972	2.3	4.7	5.6	3.8	0.8	5.6	6.6	5.0	0.3	4.5	5.4	5.9	6.7	6.6	7.1	6.6	0.9	6.5	5.6	5.1	3.7	0.1	3.2	2.5	4.4
1973	3.8	2.3	1.0	8.5	3.5	2.7	7.1	2.0	2.2	2.6	2.0	1.4	6.1	5.0	4.1	4.6	5.4	1.5	3.3	4.8	3.5	0.3	2.7	3.5	3.5
1974	1.1	7.4	1.5	6.6	1.1	8.0	3.0	4.2	2.2	2.7	3.9	1.3	4.6	6.5	5.5	3.5	3.8	4.2	1.3	3.5	0.3	1.6	1.8	4.1	3.5
1975	3.4	2.8	1.7	6.1	7.8	4.3	8.1	2.8	2.8	2.7	3.9	5.8	6.7	6.6	6.7	4.3	5.7	4.3	2.2	2.4	1.5	0.9	2.6	2.4	4.1
1976	2.9	3.2	4.6	5.1	2.8	4.9	8.1	1.9	1.1	5.4	2.6	5.9	3.5	5.3	4.2	5.6	6.0	6.1	4.2	4.9	1.8	0.5	2.7	4.8	4.1
1977	3.4	2.6	4.9	1.5	1.0	5.3	4.3	3.3	2.5	3.7	1.1	4.2	1.7	6.6	6.4	5.4	5.4	5.7	5.6	5.1	3.0	2.5	3.2	1.1	3.7
1978	5.3	2.9	5.1	2.6	3.3	4.3	8.9	3.3	2.2	3.1	2.5	2.6	2.3	3.6	3.3	1.6	6.7	1.9	2.6	1.8	2.0	2.3	1.6	2.7	3.3
1979	2.9	3.2	10.1	2.7	0.5	8.8	1.9	4.0	2.7	4.4	3.9	5.2	6.7	3.0	5.2	5.0	4.7	3.4	2.4	5.1	1.6	0.7	1.0	2.9	3.8
1980	3.0	3.0	4.4	2.2	3.6	3.3	2.1	3.2	3.7	3.1	4.1	1.5	3.7	3.7	0.9	6.6	5.0	5.7	4.8	0.9	0.6	1.6	2.7	1.4	3.1
1981	3.0	3.0	3.2	3.0	0.5	6.8	5.1	4.9	5.4	1.7	1.1	2.7	2.1	5.3	7.1	6.6	3.1	3.4	0.3	3.2	0.4	1.3	1.6	2.4	3.2
1982	2.9	3.2	1.2	11.8	3.8	9.1	2.7	5.9	3.7	5.2	1.4	5.7	5.0	2.5	1.1	6.6	6.7	4.0	3.6	3.3	1.5	1.5	3.4	3.9	4.2
1983	4.2	2.9	5.6	4.2	8.4	2.2	4.2	0.7	4.4	3.2	1.0	5.9	2.2	4.5	7.1	6.6	6.7	6.5	4.5	1.0	3.7	1.5	2.1	3.6	4.0
1984	1.9	4.8	3.5	4.9	1.8	6.1	6.9	1.2	4.0	5.4	2.5	5.9	5.8	4.6	2.9	6.1	2.7	5.5	2.3	4.5	1.4	0.6	1.7	2.3	3.7
1985	2.7	5.8	4.4	3.8	2.5	7.6	3.6	3.0	4.9	3.1	4.7	1.0	5.4	4.6	4.5	6.6	4.9	4.8	3.4	4.0	1.8	1.6	2.9	2.0	3.9
1986	4.7	1.7	6.0	9.1	6.0	6.9	4.9	4.3	1.2	4.1	3.0	4.8	4.8	3.9	6.2	5.9	2.3	3.8	4.8	3.5	1.1	1.1	1.6	2.7	4.1
1987	1.6	5.3	6.0	2.3	5.4	7.8	0.0	5.7	5.2	3.5	0.8	5.9	4.0	5.2	7.1	6.6	6.7	0.8	4.6	4.3	3.0	1.8	2.2	2.4	4.1
1988	3.4	2.6	7.4	7.9	6.9	1.5	3.2	2.8	2.3	2.0	4.1	5.0	6.1	4.4	5.3	3.5	5.8	3.3	3.3	1.9	2.5	0.1	1.1	2.8	3.7
1989	5.2	2.0	1.9	5.5	8.0	7.7	6.3	3.6	4.4	3.0	3.7	3.4	4.7	5.4	3.1	1.3	3.6	5.9	3.9	2.6	0.5	1.8	1.5	4.3	3.9
1990	2.8	3.3	3.6	2.6	4.4	7.7	3.2	2.6	4.1	3.9	3.8	4.7	5.0	2.7	6.5	4.5	4.7	6.2	5.6	3.3	3.7	2.0	2.7	4.5	4.1
1991	3.6	2.5	1.5	6.5	6.8	7.0	4.4	4.6	4.2	5.6	5.4	5.9	6.7	6.6	7.1	6.6	6.7	6.5	5.6	3.8	2.1	0.6	2.7	2.3	4.8
1992	4.7	4.6	2.3	4.9	4.9	1.5	0.8	4.9	1.6	2.9	3.1	5.9	6.7	6.6	6.5	5.1	2.8	6.2	1.8	1.7	1.0	1.5	0.8	3.3	3.6
1993	1.8	5.2	1.8	9.2	9.6	6.7	2.3	2.2	0.9	4.2	3.7	3.4	6.7	5.3	1.5	4.8	3.8	4.8	4.8	3.7	3.0	0.6	2.1	2.6	3.9
Mean	3.2	3.6	3.8	5.1	4.1	5.8	4.1	3.7	2.9	3.5	3.0	4.2	4.8	5.1	5.1	5.2	4.8	4.5	3.8	3.2	2.0	1.2	2.1	2.9	3.8
Min.	1.1	1.7	1.0	1.5	0.4	1.5	0.0	0.7	0.3	1.0	0.8	1.0	1.7	2.5	0.9	1.3	0.9	0.8	0.3	0.5	0.3	0.1	0.8	1.1	3.1
Max.	5.3	7.4	10.1	11.8	9.6	9.1	8.9	6.4	5.4	5.6	5.4	5.9	6.7	6.6	7.1	6.6	6.7	6.5	5.6	5.1	3.7	2.5	3.4	4.8	4.8

Table 3.7 HALF-MONTHLY MEAN DISCHARGE AT DAMSITES (1/2)

(1) Karian dam

(unit:cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	16.1	19.7	66.5	28.9	47.0	55.7	32.1	75.8	36.2	35.5	34.1	32.2	16.3	27.3	7.3	8.2	7.9	17.8	12.5	11.9	13.5	42.0	27.9	72.3	31.0
1971	34.6	51.6	86.7	38.6	52.3	29.4	23.8	20.7	15.1	15.0	15.5	15.0	22.3	7.7	12.6	24.8	14.8	9.8	12.2	42.0	40.1	18.7	21.4	22.5	27.0
1972	76.4	51.1	39.4	27.9	59.7	32.2	14.2	25.1	26.4	24.1	6.6	5.2	4.0	2.7	4.1	6.0	1.6	1.4	0.8	3.6	7.7	9.0	13.7	16.5	19.1
1973	41.6	39.6	26.5	27.6	26.8	39.4	40.8	43.5	63.5	29.6	37.8	13.9	12.5	11.2	15.6	15.4	24.7	36.1	20.2	32.5	19.9	29.3	25.6	37.8	29.6
1974	80.3	14.2	34.4	35.3	44.9	24.0	29.7	26.4	34.2	28.1	12.0	16.3	21.1	11.2	20.8	23.5	50.2	39.6	29.5	17.7	13.7	25.3	29.9	13.6	28.2
1975	26.6	23.6	40.9	38.0	24.6	27.0	14.7	12.3	11.5	22.5	13.8	6.9	8.6	21.2	25.8	18.6	34.5	31.5	15.3	21.0	39.8	22.1	50.3	46.8	24.9
1976	53.4	79.4	27.9	21.2	37.7	25.4	15.4	30.9	21.0	7.9	13.1	5.3	7.0	4.4	4.9	6.9	3.6	3.7	16.1	5.7	13.5	23.6	14.3	10.4	18.9
1977	19.3	47.5	28.1	25.8	47.1	29.4	39.6	30.9	39.8	25.5	19.7	16.9	9.0	5.6	3.7	3.9	2.8	4.8	4.3	4.4	8.2	5.4	9.5	13.1	18.5
1978	19.7	67.9	23.7	19.6	37.0	31.0	18.1	23.7	22.2	14.3	16.6	17.9	14.2	15.6	17.3	23.2	15.7	20.3	11.8	25.3	28.8	17.3	18.1	19.7	22.5
1979	24.4	39.9	35.8	37.9	33.8	25.5	45.3	35.0	17.9	13.2	14.4	5.5	12.6	9.3	6.9	6.1	7.4	8.6	9.1	7.1	22.5	24.6	15.0	24.2	20.1
1980	49.7	60.7	33.3	25.0	19.3	16.0	30.8	25.1	29.3	19.5	11.9	11.1	10.3	13.7	31.0	15.1	22.2	25.3	18.5	17.1	21.4	24.5	21.6	43.9	24.8
1981	48.9	55.7	34.1	37.1	25.7	40.7	20.1	35.5	29.2	34.8	35.4	38.0	12.6	43.0	17.3	20.4	28.8	19.3	23.1	29.8	33.0	46.3	19.6	45.3	32.2
1982	70.4	57.9	24.8	17.4	15.6	6.7	20.0	21.1	19.6	9.8	6.3	6.2	2.9	5.2	2.8	1.6	1.0	1.9	1.9	5.7	23.2	18.2	15.2	36.4	16.3
1983	24.6	19.8	13.2	19.2	15.1	11.6	14.3	8.8	14.0	19.4	12.0	3.7	3.3	7.7	3.0	2.1	2.5	4.1	4.4	12.5	19.0	32.2	16.5	21.2	12.7
1984	38.2	20.1	25.2	34.3	48.6	20.2	17.6	52.7	45.3	21.8	13.8	8.0	18.4	19.6	15.7	24.6	33.7	24.3	23.1	12.0	11.4	12.4	11.6	12.6	23.6
1985	21.5	14.7	51.0	20.5	63.3	6.7	11.1	25.2	20.0	16.8	6.4	6.4	7.8	17.9	11.8	8.3	20.7	12.0	9.2	15.2	28.0	11.0	49.5	12.9	19.5
1986	24.6	76.7	36.4	21.3	30.6	29.7	31.3	42.8	29.0	17.4	36.0	14.7	5.0	6.4	5.9	6.6	10.4	4.9	9.6	14.9	10.2	21.2	46.1	24.1	23.2
1987	25.0	33.1	41.2	33.9	27.4	26.5	32.3	33.4	40.8	22.6	45.0	19.1	25.5	14.2	14.5	13.9	9.6	8.8	9.2	9.2	12.4	12.6	16.8	12.6	22.5
1988	29.0	44.1	50.7	38.7	41.3	67.0	67.3	36.8	21.4	23.4	14.2	4.8	8.6	12.0	11.2	10.7	11.4	11.1	8.8	14.6	14.7	17.2	26.7	33.1	25.8
1989	14.7	22.4	37.2	95.7	30.9	13.4	13.8	12.1	22.7	19.3	13.7	9.4	10.8	8.5	12.6	13.3	18.8	12.4	12.1	14.3	18.5	14.5	21.2	27.9	20.4
1990	81.5	106.9	27.0	21.3	35.2	27.4	20.9	20.3	22.1	19.3	22.4	13.4	23.6	32.5	27.1	22.5	23.8	35.9	21.1	23.1	22.4	15.3	6.4	20.2	28.8
1991	7.6	12.2	43.0	44.3	11.0	25.7	19.7	4.4	6.0	2.9	2.5	3.7	3.3	2.9	2.5	2.3	4.8	3.2	6.3	7.9	6.5	8.5	13.4	14.4	10.8
1992	20.9	18.1	29.2	14.4	11.5	27.8	16.1	36.4	24.3	16.9	13.2	11.3	6.3	9.1	8.0	11.4	10.6	8.8	30.9	19.4	31.3	23.6	21.6	11.7	18.0
1993	32.3	59.2	51.0	29.9	23.2	24.5	22.1	44.4	55.6	30.3	28.0	26.5	14.7	14.1	7.9	65.9	45.2	26.8	16.3	37.4	24.5	32.7	23.4	45.4	32.6
Mean	36.7	43.2	37.8	31.4	33.7	27.6	25.5	30.1	27.8	20.4	18.5	13.0	11.7	13.5	12.1	14.8	16.9	15.5	13.6	16.8	20.2	21.1	22.3	26.6	23.0
Min	7.6	12.2	13.2	14.4	11.0	6.7	11.1	4.4	6.0	2.9	2.5	3.7	2.9	2.7	2.5	1.6	1.0	1.4	0.8	3.6	6.5	5.4	6.4	10.4	10.8
Max	81.5	106.9	86.7	95.7	63.3	67.0	67.3	75.8	63.5	35.5	45.0	38.0	25.5	43.0	31.0	65.9	50.2	39.6	30.9	42.0	40.1	46.3	50.3	72.3	32.6

(2) Pasir Kopo dam

(unit:cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	8.5	10.4	35.2	15.3	24.9	29.5	17.0	40.1	19.2	18.8	18.0	17.0	8.6	14.5	3.9	4.3	4.2	9.4	6.6	6.3	7.1	22.3	14.8	38.3	16.4
1971	18.3	27.3	45.9	20.4	27.7	15.6	12.6	10.9	8.0	7.9	8.2	8.0	11.8	4.1	6.7	13.1	7.8	5.2	6.5	22.2	21.2	9.9	11.3	11.9	14.3
1972	40.4	27.0	20.8	14.8	31.6	17.1	7.5	13.3	14.0	12.8	3.5	2.8	2.1	1.4	2.2	3.2	0.9	0.7	0.4	1.9	4.1	4.7	7.3	8.7	10.1
1973	22.0	21.0	14.0	14.6	14.2	20.9	21.6	23.0	33.6	15.7	20.0	7.3	6.6	5.9	8.2	8.2	13.1	19.1	10.7	17.2	10.5	15.5	13.6	20.0	15.7
1974	42.5	7.5	18.2	18.7	23.8	12.7	15.7	14.0	18.1	14.9	6.4	8.6	11.2	5.9	11.0	12.4	26.6	21.0	15.6	9.4	7.3	13.4	15.8	7.2	14.9
1975	14.1	12.5	21.6	20.1	13.0	14.3	7.8	6.5	6.1	11.9	7.3	3.6	4.6	11.2	13.7	9.8	18.2	16.7	8.1	11.1	21.1	11.7	26.6	24.8	13.2
1976	28.3	42.0	14.8	11.2	19.9	13.4	8.1	16.4	11.1	4.2	6.9	2.8	3.7	2.4	2.6	3.7	1.9	1.9	8.5	3.0	7.2	12.5	7.6	5.5	10.0
1977	10.2	25.2	14.9	13.7	24.9	15.6	21.0	16.4	21.1	13.5	10.4	8.9	4.8	3.0	2.0	2.1	1.5	2.5	2.3	2.3	4.4	2.9	5.0	6.9	9.8
1978	10.4	35.9	12.5	10.4	19.6	16.4	9.6	12.6	11.7	7.6	8.8	9.5	7.5	8.2	9.2	12.3	8.3	10.7	6.3	13.4	15.2	9.2	9.6	10.4	11.9
1979	12.9	21.1	18.9	20.1	17.9	13.5	24.0	18.5	9.5	7.0	7.6	2.9	6.7	4.9	3.7	3.2	3.9	4.5	4.8	3.8	11.9	13.0	7.9	12.8	10.6
1980	26.3	32.1	17.6	13.2	10.2	8.5	16.3	13.3	15.5	10.3	6.3	5.9	5.5	7.3	16.4	8.0	11.7	13.4	9.8	9.1	11.3	13.0	11.4	23.2	13.2
1981	25.9	29.5	18.0	19.6	13.6	21.5	10.6	18.8	15.4	18.4	18.7	20.1	6.7	22.7	9.1	10.8	15.2	10.2	12.2	15.8	17.5	24.5	10.4	24.0	17.1
1982	37.3	30.6	13.1	9.2	8.3	3.6	10.6	11.2	10.4	5.2	3.4	3.3	1.6	2.7	1.5	0.9	0.5	1.0	1.0	3.0	12.3	9.6	8.0	19.3	8.7
1983	13.0	10.5	7.0	10.2	8.0	6.1	7.6	4.7	7.4	10.3	6.4	2.0	1.7	4.1	1.6	1.1	1.3	2.2	2.3	6.6	10.0	17.0	8.7	11.2	6.7
1984	20.2	10.6	13.3	18.2	25.7	10.7	9.3	27.9	24.0	11.5	7.3	4.3	9.8	10.4	8.3	13.0	17.9	12.9	12.2	6.4	6.0	6.6	6.1	6.6	12.5
1985	11.4	7.8	27.0	10.9	33.5	3.5	5.9	13.4	10.6	8.9	3.4	3.4	4.1	9.5	6.2	4.4	10.9	6.4	4.9	8.0	14.8	5.8	26.2	6.8	10.3
1986	13.0	40.6	19.3	11.3	16.2	15.7	16.6	22.6	15.4	9.2	19.1	7.8	2.7	3.4	3.1	3.5	5.5	2.6	5.1	7.9	5.4	11.2	24.4	12.8	12.3
1987	13.2	17.5	21.8	17.9	14.5	14.0	17.1	17.7	21.6	12.0	23.8	10.1	13.5	7.5	7.7	7.4	5.1	4.7	4.9	4.9	6.6	6.7	8.9	6.7	11.9
1988	15.3	23.4	26.9	20.5	21.9	35.5	35.6	19.5	11.4	12.4	7.5	2.6	4.6	6.4	5.9	5.7	6.0	5.9	4.7	7.7	7.8	9.1	14.1	17.5	13.7
1989	7.8	11.8	19.7	50.6	16.4	7.1	7.3	6.4	12.0	10.2	7.2	5.0	5.7	4.5	6.7	7.1	10.0	6.6	6.4	7.5	9.8	7.7	11.2	14.8	10.8
1990	43.1	56.6	14.3	11.3	18.6	14.5	11.1	10.7	11.7	10.2	11.9	7.1	12.5	17.2	14.4	11.9	12.6	19.0	11.2	12.2	11.9	8.1	3.4	10.7	15.3
1991	4.0	6.5	22.8	23.5	5.8	13.6	10.5	2.3	3.2	1.5	1.3	1.9	1.7	1.5	1.3	1.2	2.6	1.7	3.3	4.2	3.4	4.5	7.1	7.6	5.7
1992	11.0	9.6	15.4	7.6	6.1	14.7	8.5	19.3	12.9	9.0	7.0	6.0	3.3	4.8	4.3	6.0	5.6	4.6	16.4	10.3	16.6	12.5	11.4	6.2	9.5
1993	17.1	31.3	27.0	15.8	12.3	13.0	11.7	23.5	29.4	16.0	14.8	14.1	7.8	7.5	4.2	34.9	23.9	14.2	8.7	19.8	13.0	17.3	12.4	24.0	17.2
Mean	19.4	22.8	20.0	16.6	17.9	14.6	13.5	16.0	14.7	10.8	9.8	6.9	6.2	7.1	6.4	7.8	9.0	8.2	7.2	8.9	10.7	11.2	11.8	14.1	12.2
Min	4.0	6.5	7.0	7.6	5.8	3.5	5.9	2.3	3.2	1.5	1.3	1.9	1.6	1.4	1.3	0.9	0.5	0.7	0.4	1.9	3.4	2.9	3.4	5.5	5.7
Max	43.1	56.6	45.9	50.6	33.5	35.5	35.6	40.1	33.6	18.8	23.8	20.1	13.5	22.7	16.4	34.9	26.6	21.0	16.4	22.2	21.2	24.5	26.6	38.3	17.2

Table 3.8 HALF-MONTHLY MEAN DISCHARGE AT DAMSITES (2/2)

(3) Cilawang dam

(unit:cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	4.7	9.0	15.0	6.8	7.5	6.3	8.2	4.5	15.9	8.6	6.9	4.8	1.4	3.2	1.4	2.9	5.0	6.3	2.2	2.3	7.0	10.7	2.3	6.3	6.2
1971	5.5	7.5	21.2	8.0	7.3	7.7	8.4	9.2	5.2	4.9	5.9	5.3	6.0	2.3	3.7	5.0	2.2	1.7	3.0	13.0	4.2	4.4	6.1	5.7	6.4
1972	15.6	22.1	12.8	6.3	18.6	10.4	6.3	10.4	10.8	9.3	4.6	1.3	0.7	0.7	3.0	1.8	0.5	0.4	0.4	2.0	3.2	4.4	6.1	9.6	6.7
1973	10.1	7.2	17.2	11.6	9.7	9.2	14.6	16.7	10.3	10.3	8.2	6.2	4.3	5.1	4.3	6.5	11.4	13.9	7.5	9.4	7.3	5.0	6.8	7.5	9.2
1974	24.9	5.8	9.7	10.1	9.6	4.8	8.8	9.2	13.0	8.7	4.1	6.3	5.5	4.0	7.8	6.3	18.8	15.3	8.6	6.7	7.5	5.1	3.3	3.6	8.6
1975	4.2	10.8	9.7	10.4	7.3	5.2	9.9	10.2	13.1	10.3	6.4	2.0	2.8	6.2	10.6	5.2	10.3	9.7	7.4	5.8	8.7	4.9	4.6	4.5	7.5
1976	17.4	33.0	10.7	7.0	12.9	5.0	6.8	8.6	9.7	2.2	4.6	2.1	1.6	1.0	2.5	2.8	2.3	1.5	9.4	3.0	5.4	8.3	3.2	3.9	6.9
1977	8.0	18.1	8.6	9.2	11.7	8.6	14.6	11.5	19.9	8.2	8.7	4.9	4.2	5.4	4.4	1.4	1.3	3.3	1.3	3.3	6.9	2.3	4.3	11.1	7.6
1978	9.8	13.0	5.3	3.7	15.3	5.2	4.4	8.1	4.4	3.3	2.6	5.4	3.4	4.4	3.2	6.1	8.8	7.2	5.3	7.8	7.1	4.0	4.5	6.6	6.2
1979	5.9	13.7	8.8	5.9	9.1	7.4	10.7	8.5	4.9	5.2	7.0	2.5	6.9	3.8	6.4	2.6	2.5	4.5	6.6	4.9	19.3	9.9	4.3	6.9	7.0
1980	12.9	15.7	8.0	11.1	7.1	5.1	7.2	7.5	11.5	9.3	3.9	3.6	3.4	4.5	10.2	4.9	10.6	5.6	4.8	7.3	8.0	9.0	6.5	7.6	7.7
1981	10.1	16.9	7.4	6.6	9.8	11.8	8.4	13.4	9.6	11.4	11.6	12.5	4.2	14.1	5.7	6.7	9.4	6.3	7.6	9.8	5.0	6.5	1.7	19.2	9.4
1982	15.1	15.1	5.2	3.2	2.5	2.0	6.1	8.1	7.0	6.4	3.7	2.1	1.3	2.1	1.0	0.6	0.3	0.5	1.3	1.3	3.8	5.2	1.8	5.2	4.2
1983	5.7	5.5	7.8	5.8	6.0	5.8	8.9	4.4	7.6	6.9	4.4	1.8	2.5	2.8	2.5	0.9	1.6	3.2	2.3	8.0	12.3	4.3	3.1	5.3	5.0
1984	12.2	5.4	7.8	8.5	10.0	6.9	6.0	13.3	13.5	6.8	7.9	2.2	3.4	5.0	5.3	4.9	10.0	6.8	4.2	2.8	7.3	7.0	6.5	3.8	7.0
1985	7.1	6.5	14.1	4.9	8.6	2.5	4.5	4.7	7.2	7.5	4.6	2.7	4.3	7.1	4.7	4.4	7.1	4.0	3.6	3.6	8.8	3.4	5.4	3.2	5.6
1986	8.7	13.9	8.8	3.3	9.5	8.4	14.3	8.2	12.4	5.8	5.7	3.7	2.8	3.7	5.0	2.6	3.0	7.6	2.9	2.9	6.6	5.0	11.2	6.6	6.8
1987	7.8	8.7	8.1	5.0	12.3	8.5	10.5	6.0	9.1	4.2	5.8	2.9	4.5	2.3	1.5	0.6	1.0	0.9	1.3	1.4	2.9	1.8	2.9	2.4	4.7
1988	2.5	5.4	9.0	3.5	10.8	9.4	7.7	8.1	10.5	7.4	3.1	1.2	1.3	1.6	3.4	1.0	2.1	3.7	2.5	3.0	2.9	1.4	1.4	4.4	4.5
1989	6.7	8.5	13.6	12.3	3.6	2.6	4.0	2.2	9.0	7.0	4.2	2.1	1.7	1.5	1.4	3.5	4.1	1.8	1.4	2.5	3.5	1.2	2.9	4.5	4.4
1990	8.9	14.3	5.3	10.0	4.7	4.8	4.7	3.7	8.1	6.1	4.5	2.7	2.4	4.4	7.3	3.9	8.0	3.9	3.7	4.0	4.5	3.1	3.9	6.0	5.5
1991	6.2	6.1	10.4	11.2	6.7	8.5	9.5	3.9	5.8	1.8	1.1	1.0	0.8	0.8	1.2	0.4	0.5	0.4	0.3	1.6	2.7	2.7	4.3	5.2	3.9
1992	4.0	4.0	5.8	3.6	2.6	9.8	3.9	4.8	8.3	2.0	4.7	2.5	3.3	2.7	2.2	2.6	4.8	2.9	10.5	6.0	7.2	8.6	11.7	5.4	5.2
1993	9.2	12.8	16.2	7.0	7.5	7.6	5.8	9.4	10.7	11.1	8.1	10.9	4.6	4.8	3.6	13.0	11.7	7.8	7.5	8.8	6.3	13.4	10.3	17.3	9.4
Mean	9.3	11.6	10.3	7.3	8.8	6.8	8.1	8.1	9.9	6.9	5.5	3.9	3.2	3.9	4.3	3.8	5.7	5.0	4.4	5.1	6.6	5.5	5.0	6.7	6.5
Min	2.5	4.0	5.2	3.2	2.5	2.0	3.9	2.2	4.4	1.8	1.1	1.0	0.7	0.7	1.0	0.4	0.3	0.4	0.3	1.3	2.7	1.2	1.4	2.4	3.9
Max	24.9	33.0	21.2	12.3	18.6	11.8	14.6	16.7	19.9	11.4	11.6	12.5	6.9	14.1	10.6	13.0	18.8	15.3	10.5	13.0	19.3	13.4	11.7	19.2	9.4

(4) Tanjung dam

(unit:cu.m/s)

Year	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Annual
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	Mean
1970	14.6	28.0	46.5	21.1	23.3	19.6	25.4	14.1	49.3	26.8	21.6	15.0	4.2	10.0	4.5	9.0	15.4	19.5	7.0	7.3	21.7	33.1	7.2	19.6	19.3
1971	17.0	23.4	66.0	24.8	22.6	24.1	26.0	28.6	16.2	15.3	18.4	16.4	18.8	7.2	11.4	15.5	6.8	5.3	9.5	40.5	13.1	13.5	18.9	17.8	19.9
1972	48.4	68.8	39.6	19.7	57.7	32.4	19.7	32.3	33.5	28.8	14.2	4.2	2.3	2.1	9.4	5.5	1.6	1.4	1.4	6.3	10.0	13.6	19.1	29.7	20.9
1973	31.5	22.4	53.4	36.1	30.2	28.6	45.5	52.1	31.9	32.0	25.6	19.4	13.5	15.8	13.4	20.1	35.5	43.1	23.4	29.2	22.8	15.6	21.3	23.2	28.6
1974	77.4	18.2	30.2	31.4	29.9	15.0	27.3	28.7	40.6	27.1	12.7	19.6	17.0	12.6	24.1	19.7	58.6	47.5	26.8	20.9	23.2	15.8	10.2	11.3	26.9
1975	13.2	33.6	30.2	32.4	22.6	16.1	30.7	31.6	40.7	31.9	20.0	6.1	8.7	19.3	33.0	16.3	32.1	30.2	22.9	18.0	27.2	15.3	14.4	13.9	23.4
1976	54.1	102.7	33.2	21.7	40.0	15.6	21.2	26.8	30.1	7.0	14.4	6.4	5.1	3.1	7.7	8.7	7.2	4.5	29.1	9.4	16.7	26.0	10.1	12.2	21.4
1977	24.8	56.3	26.7	28.5	36.4	26.8	45.5	35.6	62.0	25.4	27.1	15.3	12.9	16.7	13.6	4.4	4.0	10.3	4.0	10.3	21.3	7.2	13.4	34.4	23.5
1978	30.5	40.4	16.3	11.5	47.6	16.1	13.6	25.2	13.6	10.4	8.2	16.9	10.7	13.8	9.9	18.9	27.4	22.5	16.6	24.2	22.1	12.5	14.0	20.7	19.3
1979	18.3	42.4	27.4	18.4	28.4	22.9	33.2	26.4	15.1	16.1	21.6	7.8	21.4	11.9	19.9	8.0	7.8	13.9	20.5	15.2	60.0	30.6	13.3	21.6	21.8
1980	40.1	48.8	25.0	34.5	22.0	15.9	22.5	23.4	35.7	29.1	12.1	11.3	10.5	14.0	31.5	15.3	33.0	17.4	14.9	22.7	24.8	27.9	20.1	23.5	24.0
1981	31.4	52.5	23.0	20.6	30.6	36.7	26.2	41.7	29.7	35.4	36.0	38.7	12.8	43.7	17.6	20.8	29.3	19.6	23.5	30.3	15.4	20.1	5.1	59.6	29.2
1982	47.0	47.0	16.1	10.0	7.9	6.2	18.8	25.2	21.9	20.0	11.5	6.5	4.2	6.6	3.2	1.8	0.9	1.5	4.1	4.1	11.7	16.2	5.5	16.2	13.1
1983	17.8	17.1	24.2	18.1	18.7	18.2	27.8	13.7	23.8	21.5	13.7	5.5	7.9	8.7	7.7	2.7	4.9	9.9	7.1	25.0	38.2	13.3	9.8	16.4	15.5
1984	37.9	16.7	24.1	26.3	31.1	21.4	18.8	41.3	41.9	21.0	24.6	6.8	10.5	15.6	16.4	15.1	31.0	21.0	13.0	8.8	22.7	21.6	20.3	11.9	21.7
1985	22.0	20.3	44.0	15.4	26.7	7.8	13.8	14.5	22.5	23.2	14.4	8.4	13.5	22.2	14.5	13.5	22.1	12.5	11.3	11.1	27.5	10.5	16.7	9.9	17.4
1986	27.0	43.4	27.3	10.3	29.7	26.2	44.5	25.5	38.6	18.0	17.6	11.6	8.7	11.6	15.6	8.1	9.4	23.5	9.1	8.9	20.4	15.6	34.9	20.5	21.1
1987	24.2	26.9	25.2	15.6	38.2	26.4	32.5	18.6	28.2	13.1	17.9	8.9	14.0	7.2	4.6	1.8	3.1	2.7	4.0	4.4	9.0	5.6	9.1	7.5	14.5
1988	7.9	16.9	28.0	10.9	33.5	29.1	23.9	25.1	32.7	23.1	9.5	3.9	4.2	5.0	10.4	3.1	6.4	11.6	7.7	9.4	9.0	4.5	4.5	13.8	13.9
1989	20.9	26.3	42.2	38.3	11.1	8.1	12.6	6.7	28.1	21.7	12.9	6.4	5.2	4.6	4.2	10.9	12.7	5.4	4.5	7.7	11.0	3.8	8.9	14.0	13.7
1990	27.6	44.4	16.4	30.9	14.7	15.0	14.7	11.5	25.1	19.0	14.0	8.4	7.6	13.7	22.7	12.2	24.9	12.3	11.6	12.6	14.0	9.6	12.3	18.5	17.2
1991	19.3	19.0	32.2	34.9	21.0	26.3	29.7	12.0	18.2	5.6	3.3	3.2	2.6	2.6	3.6	1.1	1.7	1.2	0.9	5.0	8.3	8.4	13.4	16.1	12.1
1992	12.6	12.4	18.1	11.2	7.9	30.5	12.0	14.8	25.8	6.1	14.5	7.8	10.2	8.3	6.8	8.1	15.0	9.0	32.6	18.7	22.5	26.7	36.2	16.9	16.0
1993	28.6	39.7	50.4	21.6	23.4	23.8	18.0	29.2	33.3	34.6	25.1	33.9	14.4	14.9	11.2	40.5	36.5	24.4	23.2	27.3	19.5	41.6	31.9	53.9	29.2
Mean	28.9	36.2	31.9	22.7	27.3	21.2	25.2	25.2	30.8	21.3	17.1	12.0	10.0	12.1	13.2	11.7	17.8	15.4	13.7	15.7	20.5	17.0	15.4	21.0	20.1
Min	7.9	12.4	16.1	10.0	7.9	6.2	12.0	6.7	13.6	5.6	3.3	3.2	2.3	2.1	3.2	1.1	0.9	1.2	0.9	4.1	8.3	3.8	4.5	7.5	12.1
Max	77.4	102.7	66.0	38.3	57.7	36.7	45.5	52.1	62.0	35.4	36.0	38.7	21.4	43.7	33.0	40.5	58.6	47.5	32.6	40.5	60.0	41.6	36.2	59.6	29.2

Table 4.1 COST COMPARISON OF ALTERNATIVE ROUTES BETWEEN PARUNGPANJANG AND DKI JAKARTA

	Alternative Routes		Distance (km)	Discharge (m3/s)	Pipe Diam. (m)	Land Acquisition: Area (1000 m2)	Land Acquisition: Unit Price (1000 Rp. /m2)	Cost (bill. Rp.): Const-ruction	Land Acquist.	Replace-ment	Mainte-nance (/year)	Opera-tion (/year)	Present Value	System Total
	1N	Sec.4 In BSD	10.31	3.00	1.80	3.1	500	39.30	1.55	1.42	0.39	0.87	37.72	
	1S	Sec.4	11.07	3.00	1.80	128.0	15	22.21	1.92	1.46	0.23	0.89	24.31	
	1N	Sec.4 In BSD	10.31	6.00	2.20	3.1	500	52.30	1.55	3.29	0.52	2.01	54.41	
	1S	Sec.4	11.07	6.00	2.20	130.7	15	32.22	1.96	3.41	0.33	2.08	38.88	
Alt-1	1S	Sec.4	11.07	6.00	2.20	130.7	15	32.22	1.96	3.41	0.33	2.08	38.88	
	0	Along Exist. Pipeline	10.55	6.00	2.20	155.0	100	31.03	15.50	0.94	0.31	0.58	40.04	
	0	Along Exist. Pipeline	1.75	3.00	1.50	1.1	500	5.15	0.55	0.00	0.05	0.00	4.58	
	1	Along Exist. Pipeline	12.30	3.00	1.50	7.4	500	36.08	3.70	0.00	0.36	0.00	32.05	
		Total	35.67					104.48	21.71	4.35	1.05	2.66	115.55	115.55
Alt-2	1S	Sec.4	11.07	6.00	2.20	130.7	15	32.22	1.96	3.41	0.33	2.08	38.88	
	0	Along Exist. Pipeline	12.30	3.00	1.50	139.1	100	24.65	13.91	1.07	0.25	0.66	34.11	
	2	Along Toll Road	20.25	3.00	1.50	12.2	500	60.44	6.10	0.68	0.61	0.42	55.92	
		Total	43.62					117.31	21.97	5.16	1.19	3.16	128.91	128.91
Alt-3	1S	Sec.4	11.07	6.00	2.20	130.7	15	32.22	1.96	3.41	0.33	2.08	38.88	
	0	Along Exist. Pipeline	12.30	3.00	1.50	139.1	100	24.65	13.91	1.07	0.25	0.66	34.11	
	3	Along Existing Road	22.20	3.00	1.50	6.7	500	66.24	3.35	0.75	0.66	0.46	58.72	
		Total	45.57					123.11	19.22	5.23	1.24	3.20	131.70	131.70
Alt-4	1S	Sec.4	11.07	3.00	1.80	128.0	15	22.21	1.92	1.45	0.23	0.89	24.31	
	0	Along Exist. Pipeline	12.30	3.00	1.50	139.1	100	24.65	13.91	1.07	0.25	0.66	34.11	
	4	Direct Connection	25.55	3.00	1.50	127.8	500	77.75	63.90	2.03	0.78	1.24	118.18	
	-	Parungpanjang WTP	-	-	-	30.0	100	-	3.00	-	-	-	3.00	
		Total	48.92					124.61	82.73	4.55	1.26	2.79	179.60	179.60
Alt-5	1S	Sec.4	11.07	3.00	1.80	128.0	15	22.21	1.92	1.45	0.23	0.89	24.31	
	0	Along Exist. Pipeline	12.30	3.00	1.50	139.1	100	24.65	13.91	1.07	0.25	0.66	34.11	
	5	Along Existing Road	31.20	3.00	1.50	9.4	500	94.89	4.70	2.64	0.95	1.61	89.19	
	-	Parungpanjang WTP	-	-	-	30.0	100	-	3.00	-	-	-	3.00	
		Total	54.57					141.75	23.53	5.16	1.43	3.16	150.61	150.61

Table 5.1 LAND ACQUISITION AND COMPENSATION COSTS

(unit : Rp. million)

Items	Karian	Pasir Kopo		Cilawang	Tanjung	KSCS	River Improvement
		Scenario A	Scenario C				
A. House compensation							
I. Houses							
a) Monetary compensation	4,530	5,100	10,736	-	4,523	67	63
b) Housing cost to be handled to resettlers	14,951	2,616	5,506	8,046	34,529	1,263	960
II. Housing plot							
a) Monetary compensation	1,599	1,066	2,244	-	5,064	121	20
b) Land cost for resettlement area	2,277	263	555	1,762	10,351	973	133
B. Land compensation							
I. Monetary compensation	4,265	3,667	3,591	12,752	21,259	5,288	634
II. Land cost for resettlement area	12,672	2,519	1,475	-	-	-	-
C. Preparation of resettlement area							
I. Construction of public facilities	5,202	2,233	5,213	2,396	8,177	-	-
II. Infra-structures	13,105	2,628	4,163	230	5,180	230	110
D. Trees	111	46	96	40	163	7	5
Total	58,714	20,138	33,579	25,226	89,246	7,949	1,925

Table 7.1 FINANCIAL COST FOR CIUJUNG-CIDURIAN INTEGRATED WATER RESOURCES DEVELOPMENT

First Phase Development

(Unit : million Rp)

Description	Karian Dam		Ciuyah Tunnel		KSCS I		River Improvement		Total	
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC
I. Basic Cost										
1) Preparatory Works	11,032	7,266	469	205	10,703	8,799	2,659	2,541	24,863	18,811
2) Civil Works	87,765	34,892	10,277	4,383	97,002	59,854	17,862	11,392	212,906	110,521
3) Metal Works	11,390	1,266	2,021	225	1,894	211	0	0	15,305	1,702
4) Engineering Service	15,426	3,908	1,787	433	15,344	6,198	2,873	1,254	35,430	11,793
5) Administration	0	7,681	0	879	0	8,923	0	1,723	0	19,205
6) Compensation Cost	0	58,714	0	0	0	6,266	0	1,926	0	66,906
7) Tax (PPN)	0	17,295	0	1,980	0	20,001	0	3,858	0	43,133
Sub-total	125,613	131,021	14,554	8,105	124,943	110,251	23,394	22,694	288,504	272,072
II. Contingency										
1) Physical Contingency	12,561	13,102	1,455	811	12,494	11,025	3,503	3,404	30,014	28,342
2) Price Escalation	21,647	53,483	2,738	4,506	22,728	57,850	4,061	11,144	51,173	126,982
Sub-total	34,208	66,585	4,193	5,316	35,222	68,875	7,563	14,548	81,187	155,324
III. Interest During Construction	14,946	0	1,534	0	13,813	0	2,869	0	33,162	0
Total	174,767	197,606	20,281	13,422	173,978	179,127	33,826	37,242	402,853	427,396
Grand Total (FC+LC)		372,373		33,703		353,105		71,068		830,249

Second Phase Development (IIA) in Scenario A

(Unit : million Rp)

Description	Posir Kopo Dam		Cilawang Dam		KSCS II&III Cilawang Canal		Total	
	FC	LC	FC	LC	FC	LC	FC	LC
I. Basic Cost								
1) Preparatory Works	5,936	3,255	10,217	5,154	8,763	7,602	24,916	16,011
2) Civil Works	43,704	19,573	33,116	13,926	89,475	55,635	166,295	89,134
3) Metal Works	9,185	1,021	7,483	831	49,941	5,549	66,609	7,401
4) Engineering Service	8,236	2,146	7,114	1,792	20,745	6,191	36,095	10,129
5) Administration	0	4,134	0	3,536	0	10,848	0	18,518
6) Compensation Cost	0	20,138	0	25,226	0	1,270	0	46,634
7) Tax (PPN)	0	9,306	0	7,963	0	24,390	0	41,659
Sub-total	67,061	59,573	57,930	58,429	168,924	111,485	293,915	229,486
II. Contingency								
1) Physical Contingency	6,706	5,957	5,793	5,843	16,892	11,149	29,391	22,949
2) Price Escalation	17,890	50,692	15,454	49,719	45,064	94,866	78,408	195,277
Sub-total	24,596	56,649	21,247	55,562	61,956	106,015	107,799	218,226
III. Interest During Construction	8,228	0	7,578	0	16,998	0	32,804	0
Total	99,884	116,222	86,756	113,990	247,879	217,500	434,518	447,712
Grand Total (FC+LC)		216,106		200,746		465,378		882,230

Second Phase Development (IIC) in Scenario C

(Unit : million Rp)

Description	Posir Kopo Dam		Tanjung Dam		Cilawang Dam		KSCS II&III Tanjung Canal		Cilawang Canal		Total	
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC
I. Basic Cost												
1) Preparatory Works	5,936	3,255	27,531	14,590	10,217	5,154	7,741	7,371	6,708	4,977	58,133	35,347
2) Civil Works	55,063	19,573	265,468	107,442	33,116	13,926	78,946	46,846	25,136	17,730	457,729	205,517
3) Metal Works	11,860	1,021	2,352	261	7,483	831	49,828	5,537	269	30	71,792	7,680
4) Engineering Service	10,200	2,146	41,349	17,121	7,114	1,792	19,112	5,378	4,496	2,046	82,272	28,484
5) Administration	0	4,835	0	20,882	0	3,536	0	9,813	0	2,743	0	41,810
6) Compensation Cost	0	33,579	0	89,246	0	25,226	0	1,512	0	171	0	149,734
7) Tax (PPN)	0	10,905	0	47,611	0	7,963	0	22,076	0	6,139	0	94,695
Sub-total	83,059	75,315	336,700	297,154	57,930	58,429	155,627	98,533	36,609	33,836	669,926	563,267
II. Contingency												
1) Physical Contingency	8,306	7,532	33,670	29,715	5,793	5,843	15,563	9,853	3,661	3,384	66,993	56,327
2) Price Escalation	22,158	64,088	87,009	246,096	15,454	49,719	41,517	83,845	9,766	28,792	175,903	472,540
Sub-total	30,464	71,620	120,679	275,812	21,247	55,562	57,079	93,698	13,427	32,176	242,896	528,867
III. Interest During Construction	10,159	0	54,960	0	7,578	0	15,639	0	3,145	0	91,481	0
Total	123,682	146,935	512,339	572,965	86,756	113,990	228,345	192,231	53,180	66,012	1,004,302	1,092,134
Grand Total (FC+LC)		270,617		1,085,304		200,746		420,577		119,192		2,096,436

Table 7.2 DISBURSEMENT SCHEDULE IN FIRST PHASE (1/2)

Karian Dam

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	1995	1996	1997	1998	1999	2000	2001	2002	Total	1995	1996	1997	1998	1999	2000	2001	2002
I. Basic Cost																		
1) Preparatory Works	11,032				8,274	2,758				7,266				5,450	1,817			
2) Civil Works																		
River diversion	13,930				4,040	7,940	1,950			6,451				1,871	3,677	903		
Coffer dam	4,237						4,237			1,605						1,605		
Main dam	51,844				7,777	15,553	15,553	12,961		19,309				2,896	5,793	5,793	4,827	
Saddle dam	6,414				2,117	4,297				2,429				802	1,627			
Spillway	10,491					2,623	3,882	3,987		4,616					1,154	1,708	1,754	
Intake	849					340	509			482					193	289		
Subtotal	87,765				13,933	30,753	26,131	16,948		34,892				5,569	12,444	10,298	6,581	
3) Metal Works	11,390					3,417	3,417	3,417	1,139	1,266					380	380	380	127
Total of 1 to 3	110,187				22,207	36,928	29,548	20,365	1,139	43,424				11,018	14,640	10,678	6,961	127
4) Engineering Service	15,426	1,620	2,314	694	2,052	2,700	2,700	2,700	648	3,908	410	586	176	520	684	684	684	164
5) Administration										7,681	768	768	768	1,152	1,152	1,152	1,152	768
6) Compensation Cost										58,714			39,338	19,376				
7) Tax (PPN)										17,295	203	290	87	3,580	5,495	4,361	3,071	208
Total of 1 to 7	125,613	1,620	2,314	694	24,259	39,628	32,248	23,064	1,787	131,021	1,381	1,644	40,369	35,645	21,971	16,875	11,868	1,267
II. Contingency																		
1) Physical	12,561	162	231		2,426	3,963	3,225	2,306	179	13,102	138	164	4,037	3,565	2,197	1,687	1,187	127
2) Price Escalation	21,647	49	141	64	3,045	6,312	6,258	5,302	477	53,483	111	274	10,484	12,850	10,312	9,903	8,472	1,078
Total of 1 & 2	34,208	211	372		5,471	10,274	9,483	7,608	655	66,585	249	438	14,521	16,414	12,509	11,591	9,659	1,204
III. Interest during Construction	14,946	48	117	135	908	2,206	3,291	4,088	4,152									
Financial Cost	174,767	1,879	2,804	830	30,638	52,108	45,022	34,761	6,594	197,606	1,630	2,082	54,891	52,060	34,480	28,466	21,527	2,471
IV. O & M	935									355								1,290

Ciuyah Tunnel

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	1995	1996	1997	1998	1999	2000	2001	2002	Total	1995	1996	1997	1998	1999	2000	2001	2002
I. Basic Cost																		
1) Preparatory Works	469				469					205				205				
2) Civil Works																		
Inlet and Outlet	465				465					260				260				
Tunnel	7,263				436	2,542	1,307	2,542	436	3,076				185	1,077	554	1,077	185
Intake Shaft	2,216						1,418	798		823						527	296	
Approach Channel	333							266	67	224						179	45	
Subtotal	10,277				901	2,542	2,726	3,606	502	4,383				445	1,077	1,260	1,418	185
3) Metal Works	2,021					606	606	606	202	225					68	68	68	23
Total of 1 to 3	12,767				1,370	3,148	3,332	4,213	704	4,813				650	1,144	1,327	1,485	207
4) Engineering Service	1,787	188	268	80	238	313	313	313	75	433	45	65	19	58	76	76	76	18
5) Administration										879	88	88	88	132	132	132	132	88
6) Compensation Cost																		
7) Tax (PPN)										1,980	23	33	10	231	468	505	609	100
Total of 1 to 7	14,554	188	268	80	1,608	3,461	3,645	4,525	780	8,105	157	186	117	1,070	1,820	2,040	2,301	414
II. Contingency																		
1) Physical	1,455	19	27	8	161	346	364	453	78	811	16	19		107	182	204	230	41
2) Price Escalation	2,738	6	16	7	202	551	707	1,040	208	4,506	13	31	30	386	854	1,197	1,643	352
Total of 1 & 2	4,193	24	43	16	363	897	1,072	1,493	286	5,316	28	50	30	493	1,036	1,401	1,873	393
III. Interest during Construction	1,534	6	14	16	67	181	303	460	487									
Financial Cost	20,281	218	325	112	2,037	4,539	5,020	6,478	1,553	13,422	185	236	148	1,563	2,856	3,440	4,174	807
IV. O & M	113									45								158

Note: Enginnering service FC : 14 % and LC : 9 % for total of items I.1 to I.3.
Administration FC : 5 % and LC : 5 % for total of items I.1 to I.3.
Tax FC : 10 % and LC : 10 % for total of items I.1 to I.4.
O&M 1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC

Physical Copntingency FC : 10 % and LC : 10 % for total of items I.
Price escalation FC : 3 % and LC : 8 % for total of items I.
Interest rate 2.6 % for FC

Table 7.3 DISBURSEMENT SCHEDULE IN FIRST PHASE (2/2)

Karia-Serpong Conveuance System (KSCS)

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	1995	1996	1997	1998	1999	2000	2001	2002	Total	1995	1996	1997	1998	1999	2000	2001	2002
I. Basic Cost																		
1) Preparatory Works	10,703				10,703					8,799				8,799				
2) Civil Works																		
Waterway	72,652				9,445	19,616	19,616	19,616	4,359	45,794				5,953	12,364	12,364	12,364	2,748
Syphon	4,455				579	1,292	1,292	1,292		2,769				360	803	803	803	
Railway Crossing	6,537							6,014	523	1,863							1,714	149
Road Crossing	3,589				251	1,113	1,113	1,113		2,272				159	704	704	704	
Spillway at Cicinta	191							191		123							123	
Division Structure at Tenjo	856						856			543						543		
Division Structure at Parunpanjang	194					194				124					124			
Inspection Road	5,164						2,582	2,582		3,988						1,994	1,994	
Foot path	132				25	36	36	36		61				12	16	16	16	
Cross Drain	3,232				420	937	937	937		2,317				301	672	672	672	
Subtotal	97,002				10,720	23,188	26,432	31,781	4,882	59,854				6,785	14,684	17,097	18,391	2,897
3) Metal Works																		
Syphon	59				8	17	17	17		7				1	2	2	2	
Spillway at Cicinta	372							372		41							41	
Division Structure at	945						945			105						105		
Division Structure at	518					518				58					58			
Subtotal	1,894				8	535	962	389		211				1	60	107	43	
Total of 1 to 3	109,599				21,431	23,723	27,394	32,170	4,882	68,864				15,585	14,744	17,204	18,434	2,897
4) Engineering Service	15,344	1,611	2,302	690	2,041	2,685	2,685	2,685	644	6,198	651	930	279	824	1,085	1,085	1,085	260
5) Administration										8,923	892	892	892	1,338	1,338	1,338	1,338	892
6) Compensation Cost										6,266			4,198	2,068				
7) Tax (PPN)										20,001	226	323	97	3,988	4,224	4,837	5,437	868
Total of 1 to 7	124,943	1,611	2,302	690	23,472	26,408	30,079	34,855	5,527	110,251	1,769	2,145	5,466	23,804	21,391	24,464	26,295	4,918
II. Contingency																		
1) Physical	12,494	161	230		2,347	2,641	3,008	3,485	553	11,025	177	215		2,380	2,139	2,446	2,629	492
2) Price Escalation	22,728	48	140	64	2,946	4,206	5,837	8,012	1,474	57,850	142	357	1,420	8,581	10,039	14,357	18,770	4,185
Total of 1 & 2	35,222	209	370		5,293	6,847	8,845	11,498	2,027	68,875	318	571	1,420	10,961	12,178	16,804	21,399	4,676
III. Interest during Construction	13,813	47	117	135	883	1,747	2,759	3,964	4,161									
Financial Cost	173,978	1,868	2,789	825	29,648	35,002	41,683	50,317	11,714	179,127	2,088	2,717	6,886	34,765	33,569	41,268	47,694	9,594
IV. O & M	979									600								1,579

First Phase : River Improvement Works

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	1995	1996	1997	1998	1999	2000	2001	2002	Total	1995	1996	1997	1998	1999	2000	2001	2002
I. Basic Cost																		
1) Preparatory Works	2,659				2,659					2,541				2,541				
2) Civil Works																		
Earth Works	14,158				2,690	3,823	3,823	3,823		9,016				1,713	2,434	2,434	2,434	
Structural Works	1,490				283	402	402	402		1,371				260	370	370	370	
Road Works	2,214						1,107	1,107		1,005						503	503	
Subtotal	17,862				2,973	4,225	5,332	5,332		11,392				1,974	2,804	3,307	3,307	
Total of 1 & 2	20,521				5,632	4,225	5,332	5,332		13,933				4,515	2,804	3,307	3,307	
3) Engineering Service	2,873	302	431	129	382	503	503	503	121	1,254	132	188	56	167	219	219	219	53
4) Administration										1,723	172	172	172	258	258	258	258	172
5) Compensation Cost										1,926			1,290	636				
6) Tax (PPN)										3,858	43	62	19	1,070	775	936	936	17
Total of 1 to 6	23,394	302	431	129	6,014	4,728	5,835	5,835	121	22,694	347	422	1,538	6,645	4,058	4,721	4,721	242
II. Contingency																		
1) Physical	3,503	45	65	13	902	709	875	875	18	3,404	52	63	231	997	609	708	708	36
2) Price Escalation	4,061	9	26	12	755	753	1,132	1,341	32	11,144	28	70	399	2,395	1,904	2,771	3,370	206
Total of 1 & 2	7,563	54	91	25	1,657	1,462	2,007	2,216	50	14,548	80	134	630	3,392	2,513	3,479	4,078	242
III. Interest during Construction	2,869	9	23	27	226	387	591	800	805									
Financial Cost	33,826	365	545	181	7,897	6,577	8,433	8,852	976	37,242	427	556	2,168	10,037	6,570	8,200	8,799	485
IV. O & M	205									139								345

Note:
- Enginnering service: FC : 14 % and LC : 9 % for total of items I.1 to I.3.
- Administration: FC : 5 % and LC : 5 % for total of items I.1 to I.3.
- Tax: FC : 10 % and LC : 10 % for total of items I.1 to I.4.
- O&M: 0.5 % for civil work and metal work in both FC and LC
- Physical Coptingenc: FC : 10 % and LC : 10 % for total of items I. (KSCS)
  FC : 15 % and LC : 15 % for total of items I. (River improvement)
- Price escalation: FC : 3 % and LC : 8 % for total of items I.
- Interest rate: 2.6 % for FC

Table 7.4 DISBURSEMENT SCHEDULE OF PHASE IIA (1/2)

Pasir Kopo Dam

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2008	2009	2010	2011	2012	2013	2014	2015	Total	2008	2009	2010	2011	2012	2013	2014	2015
I. Basic Cost																		
1) Preparatory Works	5,936				4,452	1,484				3,255				2,441	814			
2) Civil Works																		
River diversion	5,991				1,737	3,415	839			2,689				780	1,533	376		
Coffer dam	1,764						1,764			653						653		
Main dam	14,872				2,231	4,462	4,462	3,718		5,507				826	1,652	1,652	1,377	
Spillway	20,002					5,001	7,401	7,601		10,194					2,549	3,772	3,874	
Intake and Emergency Outlet	1,075					430	645			530					212	318		
Subtotal	43,704				3,968	13,307	15,110	11,319		19,573				1,606	5,945	6,771	5,250	
3) Metal Works	9,185					2,756	2,756	2,756	919	1,021					306	306	306	102
Total of 1 to 3	58,825				8,420	17,546	17,866	14,074	919	23,849				4,047	7,065	7,078	5,557	102
4) Engineering Service	8,236	865	1,235	371	1,095	1,441	1,441	1,441	346	2,146	225	322	97	285	376	376	376	90
5) Administration										4,134	413	413	413	620	620	620	620	413
6) Compensation Cost										20,138			13,492	6,646				
7) Tax (PPN)										9,306	109	156	47	1,385	2,643	2,676	2,145	146
Total of 1 to 7	67,061	865	1,235	371	9,516	18,988	19,307	15,515	1,264	59,573	748	891	14,049	12,983	10,704	10,749	8,697	751
II. Contingency																		
1) Physical	6,706	86	124	37	952	1,899	1,931	1,552	126	5,957	75	89	1,405	1,298	1,070	1,075	870	75
2) Price Escalation	17,890	231	330	99	2,538	5,065	5,150	4,139	337	50,692	636	758	11,954	11,048	9,108	9,147	7,401	639
Total of 1 & 2	24,596	317	453	136	3,490	6,964	7,081	5,691	464	56,649	711	847	13,359	12,346	10,179	10,222	8,270	714
III. Interest during Construction	8,228	31	75	88	426	1,101	1,787	2,338	2,383									
Financial Cost	99,884	1,213	1,763	594	13,431	27,052	28,175	23,544	4,111	116,222	1,459	1,738	27,408	25,330	20,883	20,971	16,968	1,466
IV. O & M	483									201								684

Note:
- Engineering service: FC : 14 % and LC : 9 % for total of items I.1 to I.3.
- Administration: FC : 5 % and LC : 5 % for total of items I.1 to I.3.
- Tax: FC : 10 % and LC : 10 % for total of items I.1 to I.4.
- O&M: 1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC
- Physical Copntingency: FC : 10 % and LC : 10 % for total of items I.
- Price escalation: FC : 3 % and LC : 8 % for total of items I till 2002. 0 % after 2002
- Interest rate: 2.6 % for FC

Table 7.5 DISBURSEMENT SCHEDULE OF PHASE IIA (2/2)

Cilawang Dam

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2008	2009	2010	2011	2012	2013	2014	2015	Total	2008	2009	2010	2011	2012	2013	2014	2015
I. Basic Cost																		
1) Preparatory Works	10,217				7,663	2,554				5,154				3,866	1,289			
2) Civil Works																		
River diversion	5,514				1,599	3,143	772			2,582				749	1,472	361		
Coffer dam	2,147						2,147			802						802		
Main dam	15,174				2,276	4,552	4,552	3,794		5,495				824	1,649	1,649	1,374	
Saddle dam	1,563				516	1,047				586				193	393			
Spillway	8,280					2,070	3,064	3,146		4,239					1,060	1,568	1,611	
Intake	438					175	263			222					89	133		
Subtotal	33,116				4,391	10,988	10,798	6,940		13,926				1,766	4,661	4,514	2,985	
3) Metal Works	7,483					2,245	2,245	2,245	748	831					249	249	249	83
Total of 1 to 3	50,816				12,054	15,787	13,042	9,185	748	19,911				5,632	6,199	4,763	3,234	83
4) Engineering Service	7,114	747	1,067	320	946	1,245	1,245	1,245	299	1,792	188	269	81	238	314	314	314	75
5) Administration										3,536	354	354	354	530	530	530	530	354
6) Compensation Cost										25,226			16,901	8,325				
7) Tax (PPN)										7,963	94	134	40	1,887	2,354	1,936	1,398	121
Total of 1 to 7	57,930	747	1,067	320	13,000	17,032	14,287	10,430	1,047	58,429	635	756	17,376	16,612	9,398	7,543	5,476	633
II. Contingency																		
1) Physical	5,793	75	107	32	1,300	1,703	1,429	1,043	105	5,843	64	76	1,738	1,661	940	754	548	63
2) Price Escalation	15,454	199	285	85	3,468	4,544	3,811	2,782	279	49,719	541	643	14,786	14,136	7,997	6,419	4,659	538
Total of 1 & 2	21,247	274	391	117	4,768	6,247	5,240	3,825	384	55,562	604	719	16,523	15,797	8,937	7,173	5,207	602
III. Interest during Construction	7,578	27	64	76	538	1,143	1,651	2,021	2,059									
Financial Cost	86,756	1,048	1,523	513	18,306	24,422	21,178	16,277	3,490	113,990	1,239	1,475	33,899	32,409	18,334	14,717	10,683	1,234
IV. O & M	369									143								512

KSCS II & III and Cilawang Canal

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2008	2009	2010	2011	2012	2013	2014	2015	Total	2008	2009	2010	2011	2012	2013	2014	2015
I. Basic Cost																		
1) Preparatory Works	8,763					8,763				7,602					7,602			
2) Civil Works																		
Waterway	41,404					7,453	14,905	14,905	4,140	29,535					5,316	10,633	10,633	2,954
Aqueduct	2,549					510	1,020	1,020		499					100	200	200	
Syphon	2,826						1,413	1,413		1,445						723	723	
Railway Crossing	5,989							5,510	479	1,502							1,382	120
Road Crossing	3,738					897	1,420	1,420		2,348					564	892	892	
Spillway at Cicinta	202							202		130							130	
Inspection Road	3,971						1,986	1,986		2,632						1,316	1,316	
Foot Path	137					36	51	51		56					15	21	21	
Cross Drain	490					108	191	191		352					77	137	137	
Parunpanjang P.S.	2,908					291	1,163	1,163	291	1,175					118	470	470	118
Pipeline	25,261					4,547	9,094	9,094	2,526	15,961					2,873	5,746	5,746	1,596
Subtotal	89,475					13,841	31,243	36,955	7,436	55,635					9,062	20,137	21,649	4,787
3) Metal Works																		
Aqueduct	2,294						1,147	1,147		255						128	128	
Syphon	61						31	31		7						4	4	
Spillway at Cicinta	178							178		20							20	
Division Structure at Tenjo	388							388		43							43	
Division Structure at Parunpanjang	210							210		23							23	
P.S.at Parunpanjang	34,067					10,220	10,220	10,220	3,407	3,785					1,136	1,136	1,136	379
Pipeline	12,743					2,294	4,587	4,587	1,274	1,416					255	510	510	142
Subtotal	49,941					12,514	15,985	16,761	4,681	5,549					1,390	1,776	1,862	520
Total of 1 to 3	148,179					35,118	47,228	53,716	12,117	68,786					18,054	21,913	23,511	5,307
4) Engineering Service	20,745		2,178	3,112	934	2,614	5,228	5,228	1,452	6,191		650	929	279	780	1,560	1,560	433
5) Administration										10,848		1,085	1,085	1,085	2,170	2,170	2,170	1,085
6) Compensation Cost										1,270				851	419			
7) Tax (PPN)										24,390		283	404	121	5,657	7,593	8,401	1,931
Total of 1 to 7	168,924		2,178	3,112	934	37,732	52,456	58,944	13,570	111,485		2,018	2,417	2,336	27,080	33,236	35,642	8,757
II. Contingency																		
1) Physical	16,892		218	311	93	3,773	5,246	5,894	1,357	11,149		202	242	234	2,708	3,324	3,564	876
2) Price Escalation	45,064		581	830	249	10,066	13,994	15,724	3,620	94,866		1,717	2,057	1,987	23,043	28,281	30,329	7,451
Total of 1 & 2	61,956		799	1,141	342	13,839	19,239	21,619	4,977	106,015		1,919	2,299	2,221	25,751	31,605	33,893	8,327
III. Interest during Construction	16,998		77	188	221	1,562	3,426	5,521	6,003									
Financial Cost	247,879		3,055	4,441	1,497	53,132	75,121	86,083	24,549	217,500		3,936	4,716	4,556	52,831	64,841	69,535	17,083
IV. O&M	1,636									900								

Note: Enginnering service FC : 14 % and LC : 9 % for total of items I.1 to I.3.
Administration FC : 5 % and LC : 5 % for total of items I.1 to I.3.
Tax FC : 10 % and LC : 10 % for total of items I.1 to I.4.
O&M 1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC

Physical Copntingency FC : 10 % and LC : 10 % for total of items I.
Price escalation FC : 3 % and LC : 8 % for total of items I till 2002.
0 % after 2002
Interest rate 2.6 % for FC

Table 7.6 DISBURSEMENT SCHEDULE OF PHASE IIC (1/3)

Pasir Kopo Dam

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2004	2005	2006	2007	2008	2009	2010	2011	Total	2004	2005	2006	2007	2008	2009	2010	2011
I. Basic Cost																		
1) Preparatory Works	5,936				4,452	1,484				3,255				2,441	814			
2) Civil Works																		
River diversion	6,766				1,962	3,857	947			2,689				780	1,533	376		
Coffer dam	3,497						3,497			653						653		
Main dam	23,547				3,532	7,064	7,064	5,887		5,507				826	1,652	1,652	1,377	
Spillway	19,892					4,973	7,360	7,559		10,194					2,549	3,772	3,874	
Intake and Emergency Outlet	1,361					544	817			530					212	318		
Subtotal	55,063				5,494	16,438	19,685	13,446		19,573				1,606	5,945	6,771	5,250	
3) Metal Works	11,860					3,558	3,558	3,558	1,186	1,021					306	306	306	102
Total of 1 to 3	72,859				9,946	21,480	23,243	17,004	1,186	23,849				4,047	7,065	7,078	5,557	102
4) Engineering Service	10,200	1,071	1,530	459	1,357	1,785	1,785	1,785	428	2,146	225	322	97	285	376	376	376	90
5) Administration										4,835	484	484	484	725	725	725	725	484
6) Compensation Cost										33,579			22,498	11,081				
7) Tax (PPN)										10,905	130	185	56	1,564	3,071	3,248	2,472	181
Total of 1 to 7	83,059	1,071	1,530	459	11,303	23,265	25,028	18,789	1,614	75,315	839	991	23,134	17,702	11,237	11,427	9,130	856
II. Contingency																		
1) Physical	8,306	107	153	46	1,130	2,327	2,503	1,879	161	7,532	84	99	2,313	1,770	1,124	1,143	913	86
2) Price Escalation	22,158	286	408	122	3,015	6,206	6,677	5,012	431	64,088	714	843	19,685	15,064	9,562	9,723	7,769	729
Total of 1 & 2	30,464	393	561	168	4,146	8,533	9,180	6,891	592	71,620	797	942	21,999	16,834	10,686	10,866	8,682	814
III. Interest during Construction	10,159	38	92	109	510	1,337	2,227	2,894	2,952									
Financial Cost	123,682	1,502	2,184	736	15,959	33,135	36,434	28,574	5,158	146,935	1,636	1,933	45,132	34,536	21,922	22,293	17,812	1,671
IV. O & M	610									201								811

Note:
- Engineering service: FC : 14 % and LC : 9 % for total of items I.1 to I.3.
- Administration: FC : 5 % and LC : 5 % for total of items I.1 to I.3.
- Tax: FC : 10 % and LC : 10 % for total of items I.1 to I.4.
- O&M: 1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC
- Physical Cogntingency: FC : 10 % and LC : 10 % for total of items I.
- Price escalation: FC : 3 % and LC : 8 % for total of items I till 2002. 0 % after 2002
- Interest rate: 2.6 % for FC

Table 7.7 DISBURSEMENT SCHEDULE IN SECOND PHASE IIC (2/3)

Tanjung Dam

Description	Disbursement (F.C. in million Rp)											Disbursement (L.C. in million Rp)									
	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
I. Basic Cost																						
1) Preparatory Works	27,531				20,648	6,883						14,590				10,943	3,648					
2) Civil Works																						
River diversion	7,707				2,235	4,393	1,079					3,303				958	1,883	462				
Coffer dam	11,161					3,683	7,478					4,414					1,457	2,957				
Main dam	227,316				18,185	43,190	43,190	43,190	43,190	36,371		90,279				7,222	17,153	17,153	17,153	17,153	14,445	
Saddle dam	1,289				425	864						630				208	422					
Spillway	9,648						1,833	2,798	2,798	2,219		5,108						971	1,481	1,481	1,175	
Low level outlet	6,973								3,068	3,905		2,830								1,245	1,585	
Intake	1,374							605	769			878							386	492		
Subtotal	265,468				20,846	52,130	53,580	46,593	49,826	42,494		107,442				8,388	20,914	21,543	19,021	20,371	17,204	
3) Metal Works	2,352							706	706	706	235	261							78	78	78	26
Total of 1 to 3	295,351				41,494	59,013	53,580	47,298	50,531	43,200	235	122,293				19,331	24,562	21,543	19,099	20,450	17,283	26
4) Engineering Service	41,349	4,342	6,202	1,861	2,026	5,210	5,210	5,210	5,210	5,210	868	17,121	1,798	2,568	770	839	2,157	2,157	2,157	2,157	2,157	360
5) Administration												20,882	1,044	1,044	1,253	1,253	2,506	3,132	3,132	3,132	3,132	1,253
6) Compensation Cost												89,246			59,795	29,451						
7) Tax (PPN)												47,611			263	6,369	9,094	8,249	7,376	7,835	6,785	149
Total of 1 to 7	336,700	4,342	6,202	1,861	43,520	64,223	58,790	52,508	55,741	48,410	1,104	297,154	2,842	3,612	62,081	57,242	38,319	35,082	31,765	33,574	29,357	1,787
II. Contingency																						
1) Physical	33,670	434	620	186	4,352	6,422	5,879	5,251	5,574	4,841	110	29,715	284	361	6,208	5,724	3,832	3,508	3,176	3,357	2,936	179
2) Price Escalation	87,009	1,158	1,655	496	11,610	17,133	15,683	14,008	14,870	12,914	294	246,096	2,418	3,074	52,827	48,709	32,607	29,852	27,030	28,569	24,981	1,521
Total of 1 & 2	120,679			682	15,962	23,555	21,562	19,258	20,444	17,755	405	275,812	2,702	3,435	59,035	54,434	36,439	33,361	30,206	31,926	27,917	1,700
III. Interest during Construction	54,960	113	274	340	1,887	4,169	6,258	8,124	10,105	11,825	11,864											
Financial Cost	512,339	4,455	6,477	2,883	61,369	91,946	86,611	79,891	86,290	77,991	13,373	572,965	5,544	7,047	121,117	111,676	74,758	68,442	61,971	65,500	57,274	3,487
IV. O & M	2,666											1,076										3,742

KSCS II & III and Tanjung Canal

Description	Disbursement (F.C. in million Rp)											Disbursement (L.C. in million Rp)									
	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
I. Basic Cost																						
1) Preparatory Works	7,741							7,741				7,371							7,371			
2) Civil Works																						
Waterway	34,001							6,120	12,240	12,240	3,400	22,687							4,084	8,167	8,167	2,269
Aqueduct	2,549							510	1,020	1,020		499							100	200	200	
Syphon	1,904								952	952		1,064								532	532	
Railway Crossing	6,532									6,009	523	1,853									1,705	148
Road Crossing	2,313							555	879	879		1,306							313	496	496	
Inspection Road	2,763								1,382	1,382		1,827								914	914	
Foot Path	158							41	58	58		73							19	27	27	
Cross Drain	557							123	217	217		401							88	156	156	
Parunpanjang P.S.	2,908							291	1,163	1,163	291	1,175							118	470	470	118
Pipeline	25,261							4,547	9,094	9,094	2,526	15,961							2,873	5,746	5,746	1,596
Subtotal	78,946							12,187	27,005	33,015	6,740	46,846							7,595	16,708	18,413	4,131
3) Metal Works																						
Aqueduct	2,294								1,147	1,147		255								128	128	
Syphon	61								31	31		7								4	4	
Division Structure at Tenjo	388									388		43									43	
Division Structure at P.panjang	275									275		31									31	
P.S.at P.panjang	34,067							10,220	10,220	10,220	3,407	3,785							1,136	1,136	1,136	379
Pipeline	12,743							2,294	4,587	4,587	1,274	1,416							255	510	510	142
Subtotal	49,828							12,514	15,985	16,648	4,681	5,537							1,390	1,776	1,850	520
Total of 1 to 3	136,515							32,441	42,990	49,663	11,421	59,754							16,356	18,484	20,263	4,651
4) Engineering Service	19,112				2,007	2,867	860	2,408	4,816	4,816	1,338	5,378				565	807	242	678	1,355	1,355	376
5) Administration												9,813				981	981	981	1,963	1,963	1,963	981
6) Compensation Cost												1,512						1,013	499			
7) Tax (PPN)												22,076				257	367	110	5,188	6,765	7,610	1,779
Total of 1 to 7	155,627				2,007	2,867	860	34,849	47,807	54,479	12,758	98,533				1,803	2,155	2,347	24,684	28,567	31,191	7,787
II. Contingency																						
1) Physical	15,563				201	287	86	3,485	4,781	5,448	1,276	9,853				180	216	235	2,468	2,857	3,119	779
2) Price Escalation	41,517				535	765	229	9,297	12,753	14,533	3,404	83,845				1,534	1,834	1,997	21,004	24,308	26,541	6,626
Total of 1 & 2	57,079				736	1,051	315	12,782	17,534	19,981	4,679	93,698				1,715	2,050	2,231	23,472	27,165	29,660	7,405
III. Interest during Construction	15,639				71	173	204	1,442	3,141	5,077	5,530											
Financial Cost	228,345				2,814	4,091	1,379	49,073	68,482	79,537	22,968	192,231				3,518	4,205	4,578	48,156	55,732	60,851	15,192
IV. O&M	1,077											533										1,610

Note:

Enginnering service	FC : 14 % and LC : 9 % for total of items I.1 to I.3.	Physical Coptingency	FC : 10 % and LC : 10 % for total of items I.
Administration	FC : 5 % and LC : 5 % for total of items I.1 to I.3.	Price escalation	FC : 3 % and LC : 8 % for total of items I till 2002.
Tax	FC : 10 % and LC : 10 % for total of items I.1 to I.4.		0 % after 2002
O&M	1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC (Cilawang dam)	Interest rate	2.6 % for FC
	0.5 % for Items I.2 and I.3 in both FC and LC (KSCS)		

Table 7.8 DISBURSEMENT SCHEDULE OF PHASE IIC (3/3)

Cilawang Dam

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2011	2012	2013	2014	2015	2016	2017	2018	Total	2011	2012	2013	2014	2015	2016	2017	2018
I. Basic Cost																		
1) Preparatory Works	10,217				7,663	2,554				5,154				3,866	1,289			
2) Civil Works																		
River diversion	5,514				1,599	3,143	772			2,582				749	1,472	361		
Coffer dam	2,147						2,147			802						802		
Main dam	15,174				2,276	4,552	4,552	3,794		5,495				824	1,649	1,649	1,374	
Saddle dam	1,563				516	1,047				586				193	393			
Spillway	8,280					2,070	3,064	3,146		4,239					1,060	1,568	1,611	
Intake	438					175	263			222					89	133		
Subtotal	33,116				4,391	10,988	10,798	6,940		13,926				1,766	4,661	4,514	2,985	
3) Metal Works	7,483					2,245	2,245	2,245	748	831					249	249	249	83
Total of 1 to 3	50,816				12,054	15,787	13,042	9,185	748	19,911				5,632	6,199	4,763	3,234	83
4) Engineering Service	7,114	747	1,067	320	946	1,245	1,245	1,245	299	1,792	188	269	81	238	314	314	314	75
5) Administration										3,536	354	354	354	530	530	530	530	354
6) Compensation Cost										25,226			16,901	8,325				
7) Tax (PPN)										7,963	94	134	40	1,887	2,354	1,936	1,398	121
Total of 1 to 7	57,930	747	1,067	320	13,000	17,032	14,287	10,430	1,047	58,429	635	756	17,376	16,612	9,398	7,543	5,476	633
II. Contingency																		
1) Physical	5,793	75	107	32	1,300	1,703	1,429	1,043	105	5,843	64	76	1,738	1,661	940	754	548	63
2) Price Escalation	15,454	199	285	85	3,468	4,544	3,811	2,782	279	49,719	541	643	14,786	14,136	7,997	6,419	4,659	538
Total of 1 & 2	21,247	274	391	117	4,768	6,247	5,240	3,825	384	55,562	604	719	16,523	15,797	8,937	7,173	5,207	602
III. Interest during Construction	7,578	27	64	76	538	1,143	1,651	2,021	2,059									
Financial Cost	86,756	1,048	1,523	513	18,306	24,422	21,178	16,277	3,490	113,990	1,239	1,475	33,899	32,409	18,334	14,717	10,683	1,234
IV. O & M	369									143								512

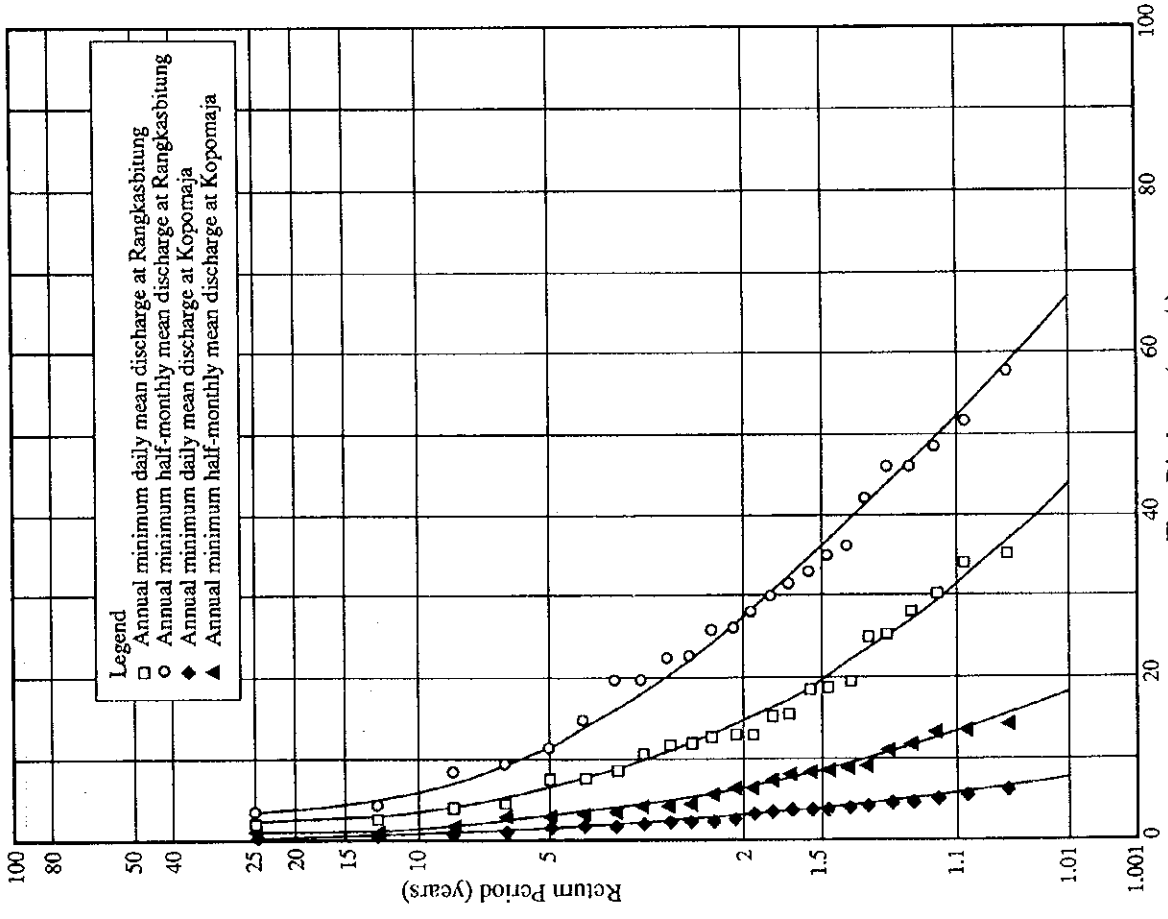
Cilawang Canal

Description	Disbursement (F.C. in million Rp)									Disbursement (L.C. in million Rp)								
	Total	2011	2012	2013	2014	2015	2016	2017	2018	Total	2011	2012	2013	2014	2015	2016	2017	2018
I. Basic Cost																		
1) Preparatory Works	6,708						6,708			4,977						4,977		
2) Civil Works																		
Waterway	19,446						5,639	11,084	2,722	14,037						4,071	8,001	1,965
Syphon	1,099							1,099		694							694	
Spillway at Cicinta	202							202		130							130	
Division structure at	287							287		207							207	
Road Crossing	1,833						697	1,136		1,133						431	702	
Inspection Road	1,819							1,819		1,226							1,226	
Foot Path	39						13	26		13						4	9	
Cross Drain	411						148	263		290						104	186	
Subtotal	25,136						6,497	15,917	2,722	17,730						4,610	11,155	1,965
3) Metal Works																		
Syphon	49							49		5							5	
Spillway at Cicinta	178							178		20							20	
Division Structure at Tenjo	42							42		5							5	
Subtotal	269							269		30							30	
Total of 1 to 3	32,113						13,205	16,186	2,722	22,737						9,587	11,185	1,965
4) Engineering Service	4,496			472	674	202	913	1,794	441	2,046			215	307	92	415	816	201
5) Administration										2,743			274	274	527	724	724	219
6) Compensation Cost										171					115	56		
7) Tax (PPN)										6,139			69	98	29	2,412	2,998	533
Total of 1 to 7	36,609			472	674	202	14,117	17,980	3,163	33,836			558	679	763	13,194	15,723	2,918
II. Contingency																		
1) Physical	3,661			47	67	20	1,412	1,798	316	3,384			56	68	76	1,319	1,572	292
2) Price Escalation	9,766			126	180	54	3,766	4,796	844	28,792			475	578	649	11,227	13,380	2,483
Total of 1 & 2	13,427			173	247	74	5,178	6,594	1,160	32,176			530	646	726	12,547	14,952	2,775
III. Interest during Construction	3,145			17	41	48	550	1,189	1,301									
Financial Cost	53,180			662	962	324	19,845	25,763	5,624	66,012			1,088	1,325	1,489	25,741	30,675	5,693
IV. O&M	286									202								

Note: Enginnering service FC : 14 % and LC : 9 % for total of items I.1 to I.3.
Administration FC : 5 % and LC : 5 % for total of items I.1 to I.3.
Tax FC : 10 % and LC : 10 % for total of items I.1 to I.4.
O&M 1 % for Item I.2 and 0.5 % for Item I.3 in both FC and LC
0.5 % for Items I.2 and I.3 in both FC and LC (KSCS)

Physical Coptingency FC : 10 % and LC : 10 % for total of items I.
Price escalation FC : 3 % and LC : 8 % for total of items I till 2002.
0 % after 2002
Interest rate 2.6 % for FC

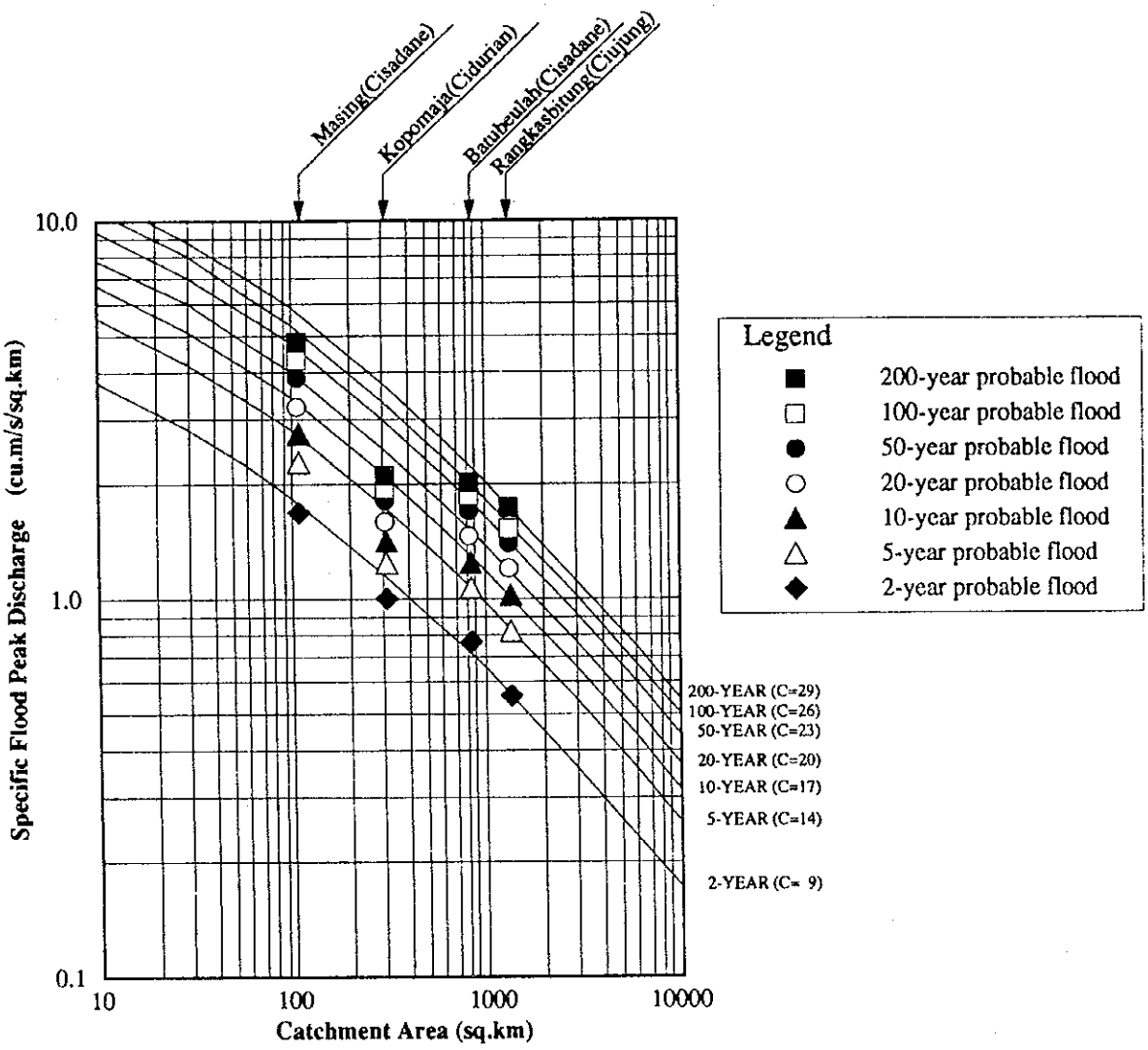
FIGURES



Return Period (years)	Probable Drought Discharges (cu.m/s)			
	Rangkasbitung		Kopomaja	
	Daily	Half-month	Daily	Half-month
2	14.9	26.4	2.7	6.4
5	7.0	11.7	1.3	3.5
10	3.5	5.5	0.9	1.2
20	2.4	3.8	0.4	0.7

Return Period (years)	Probable Drought Discharges (cu.m/s)			
	Pamarayan Weir		Rancasumur Weir	
	Daily	Half-month	Daily	Half-month
2	15.5	27.4	3.2	7.7
5	7.3	12.1	1.6	4.2
10	3.6	5.7	1.1	1.4
20	2.5	3.9	0.5	0.8

Figure 2.1 FREQUENCY CURVE FOR ANNUAL MINIMUM FLOW DISCHARGESAT RANGKASBITUNG AND KOPOMAJA



Probable Flood Discharge with Excess Probability Once in 100 Years (cu.m/s)

Location	Name of River	Catchment Area (km2)	Peak Discharges (cu.m/s)
Ciuyah	Cibeureum	99.8	530
Maja	Cicinta	30.8	245
Cikasungka	Cidurian	302.4	1010
Daru	Payaheun	19.3	175
Jagabita	Cimatuk	88.3	490
Cibunar	Cibunar	34.3	265
Parungpanjang	Cimanceuri	94.4	515
Serpong	Cisadane	1,048.0	1910

Figure 2.2 RELATION BETWEEN SPECIFIC FLOOD PEAK DISCHARGE AND CATCHMENT AREA AND PROBABLE FLOOD DISCHARGE AT RIVER CROSSING SECTIONS

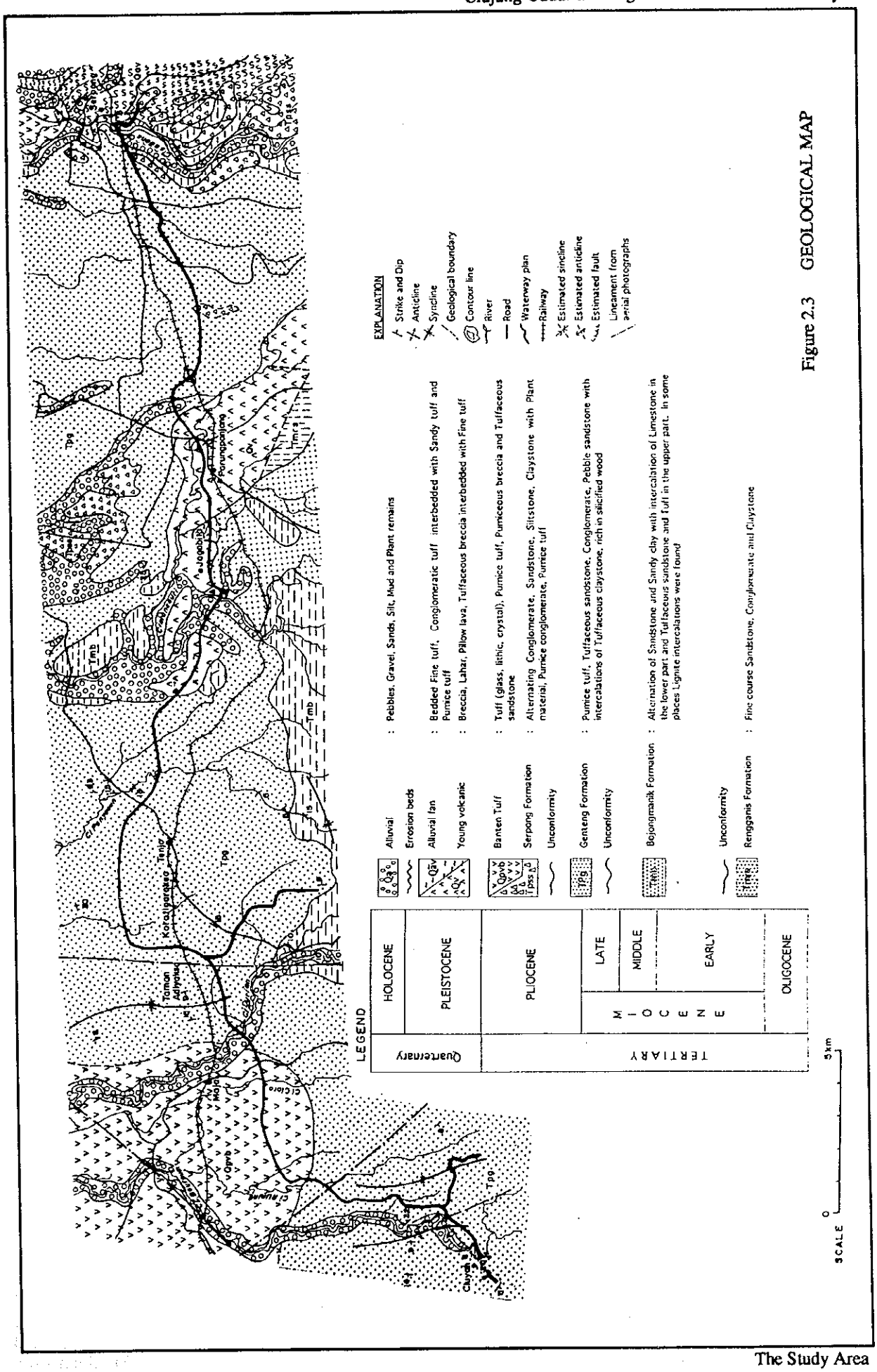


Figure 2.3 GEOLOGICAL MAP

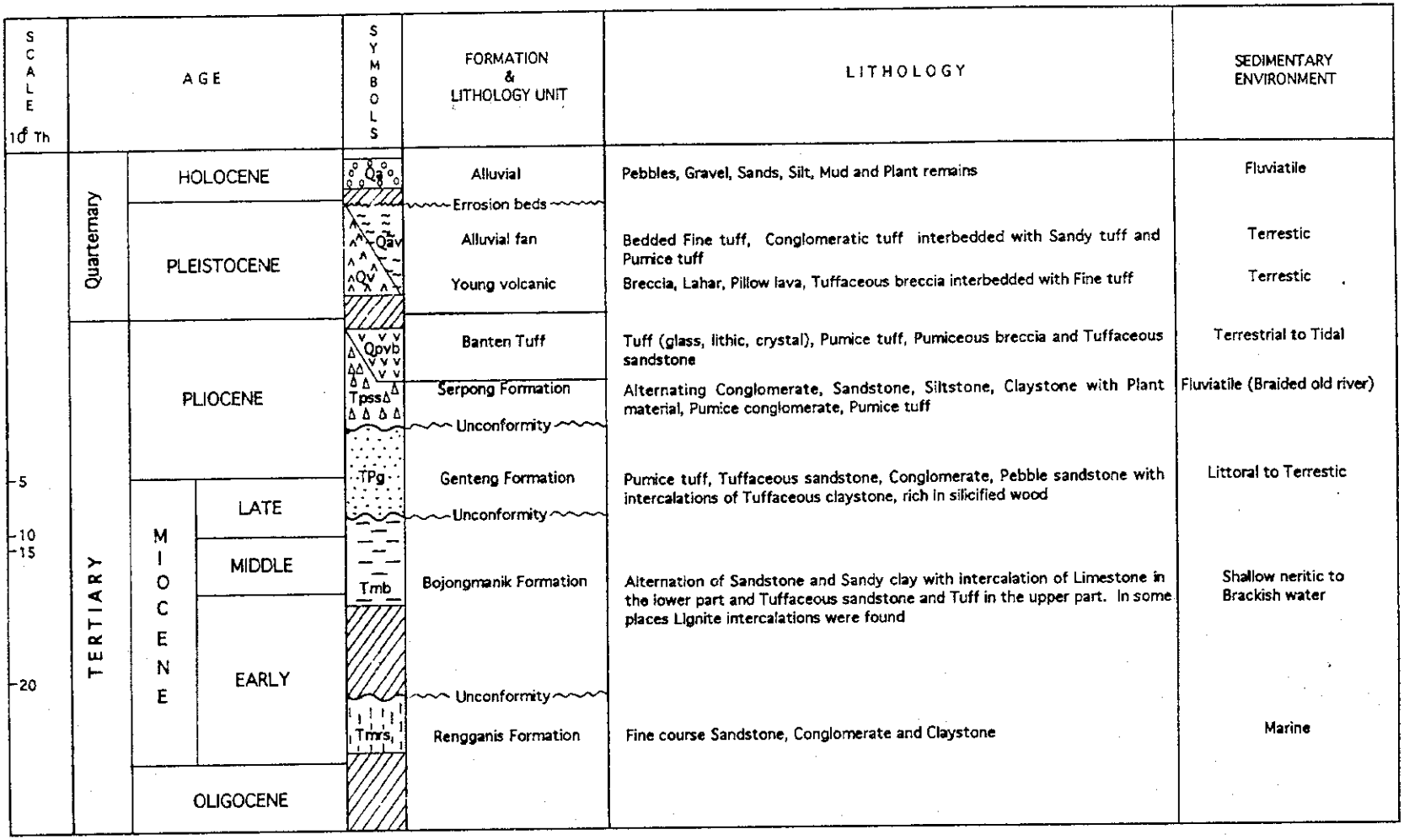
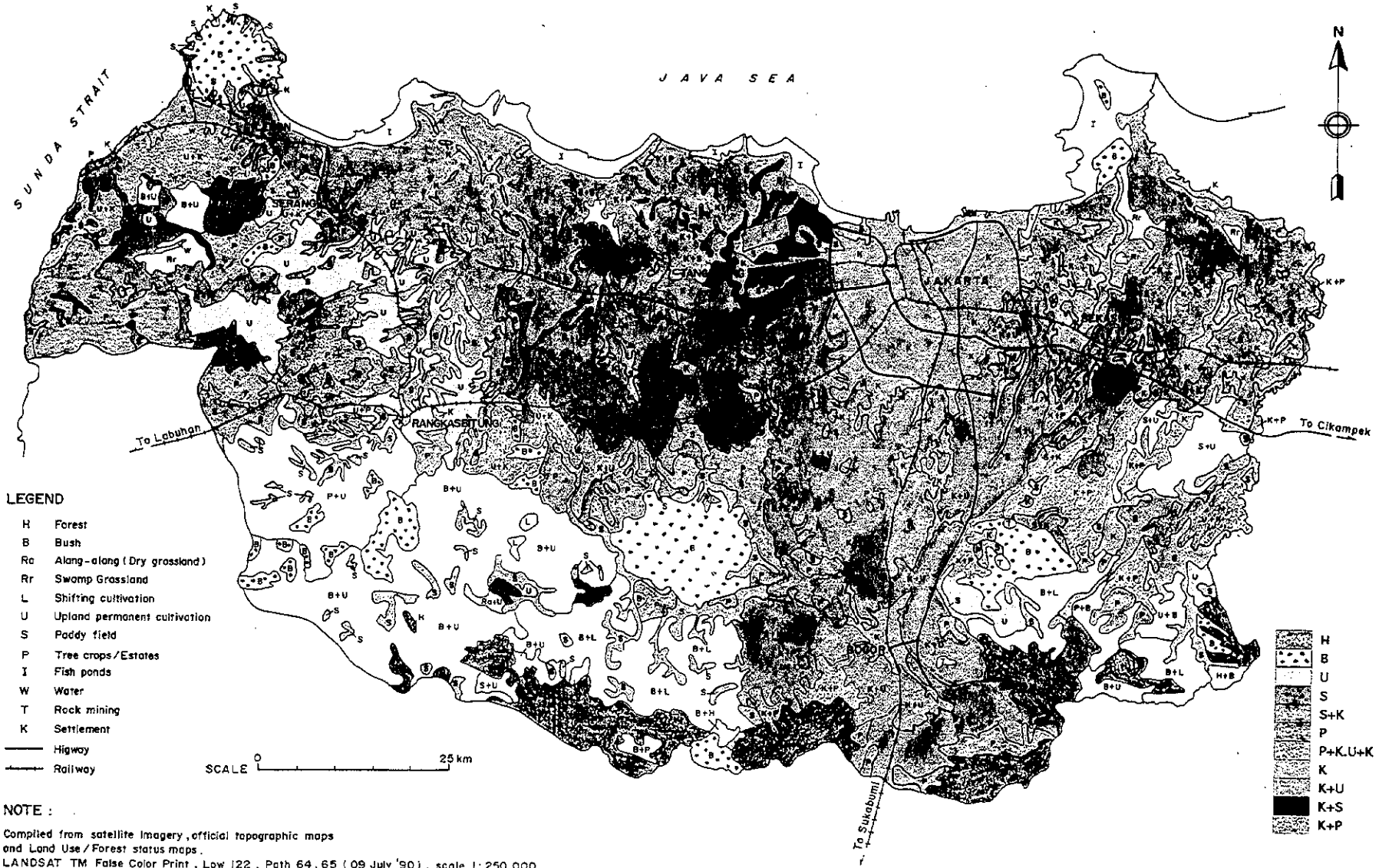


Figure 2.4 LOCAL STRATIGRAPHY LOG



NOTE :

Compiled from satellite imagery, official topographic maps and Land Use / Forest status maps.
LANDSAT TM False Color Print, Low 122, Path 64, 65 (09 July '90), scale 1:250,000
SPOT False Color Prints, Low 122, Path 362 364 (12, June '90), scale 1:250,000
Processed by Pusdata (Center for Data Processing and Mapping), Ministry of Public Works
Present Land Use and Land status (1989), sheet 1109, 1110, 1209, 1210, scale 1:250,000

Figure 2.5 PRESENT LAND USE IN THE STUDY AREA

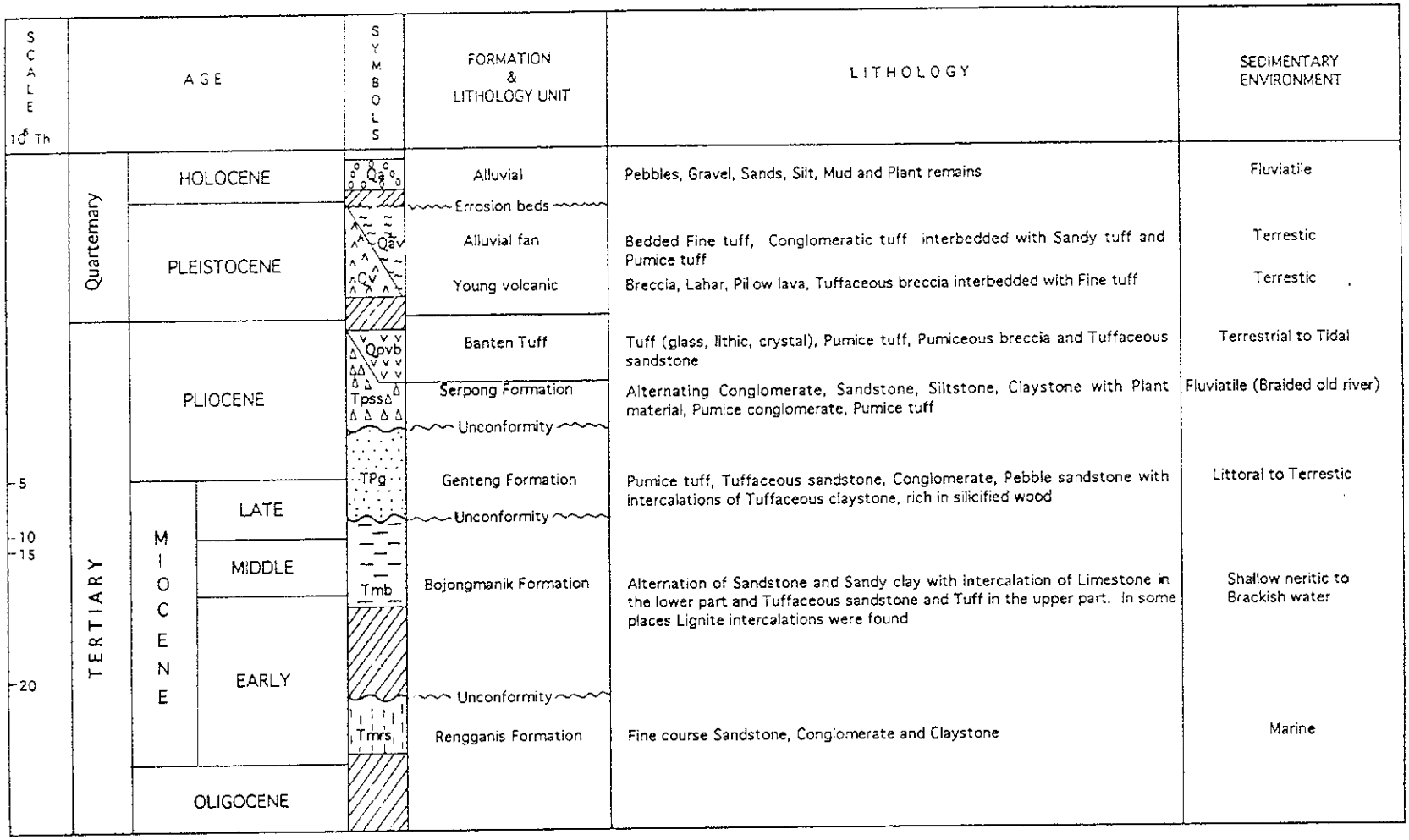
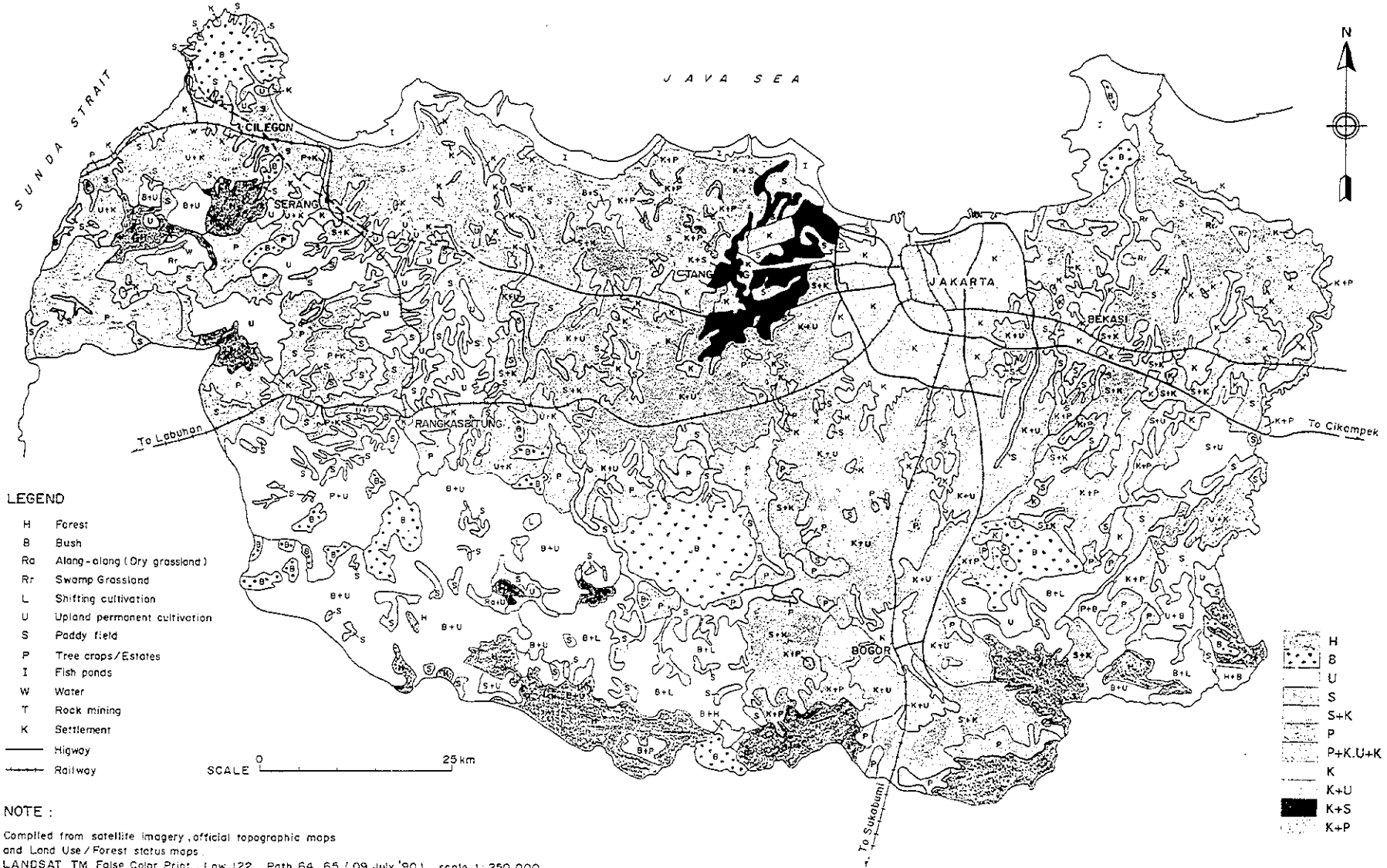


Figure 2.4 LOCAL STRATIGRAPHY LOG



NOTE :

Compiled from satellite imagery, official topographic maps and Land Use / Forest status maps.
LANDSAT TM False Color Print, Low 122, Path 64, 65 (09 July '90), scale 1: 250,000
SPOT False Color Prints, Low 122, Path 362 364 (12, June '90), scale 1: 250,000
Processed by Pusdata (Center for Data Processing and Mapping), Ministry of Public Works
Present Land Use and Land status (1989), sheet: 1109, 1110, 1209, 1210, scale 1: 250,000

Figure 2.5 PRESENT LAND USE IN THE STUDY AREA

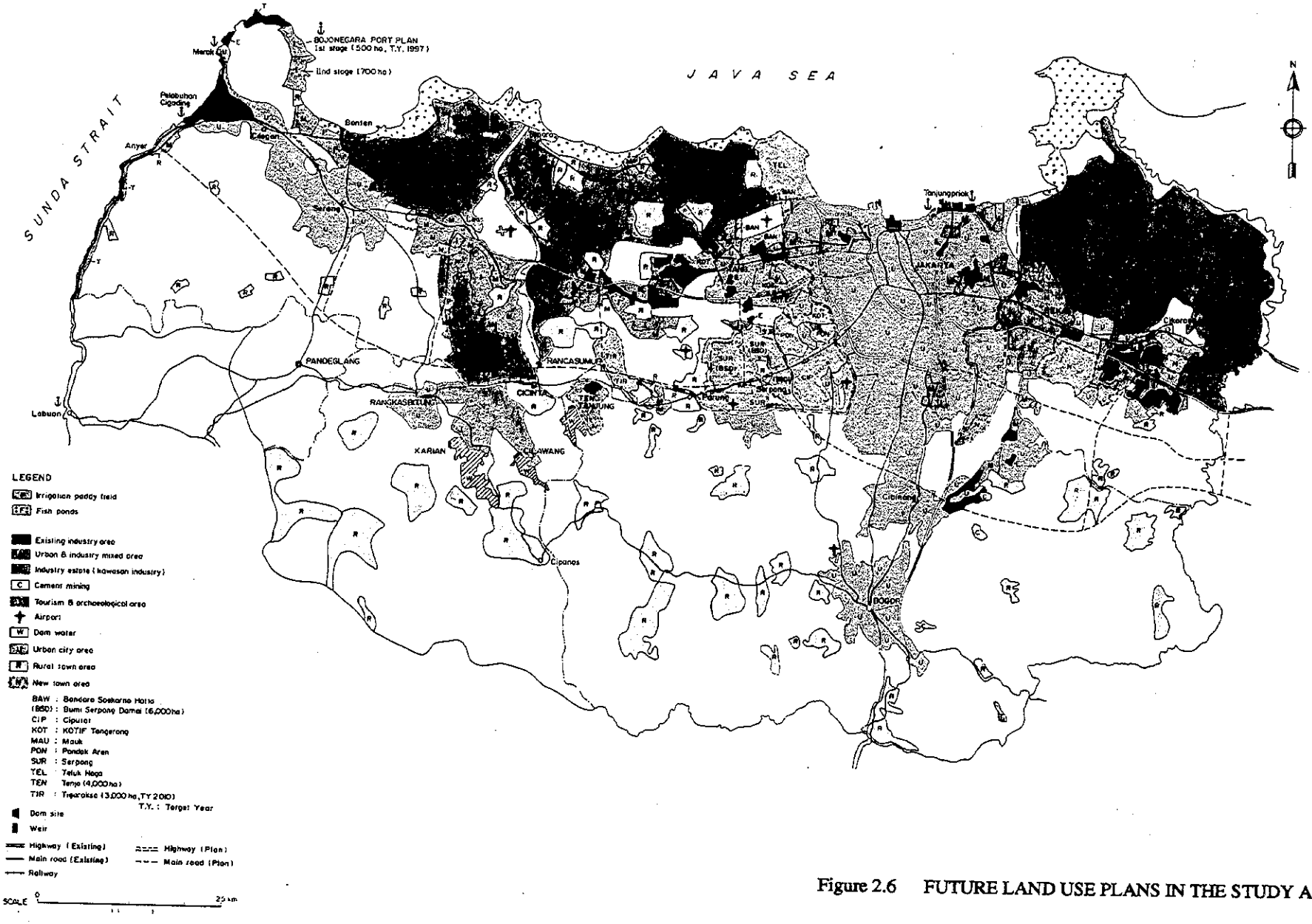


Figure 2.6 FUTURE LAND USE PLANS IN THE STUDY AREA

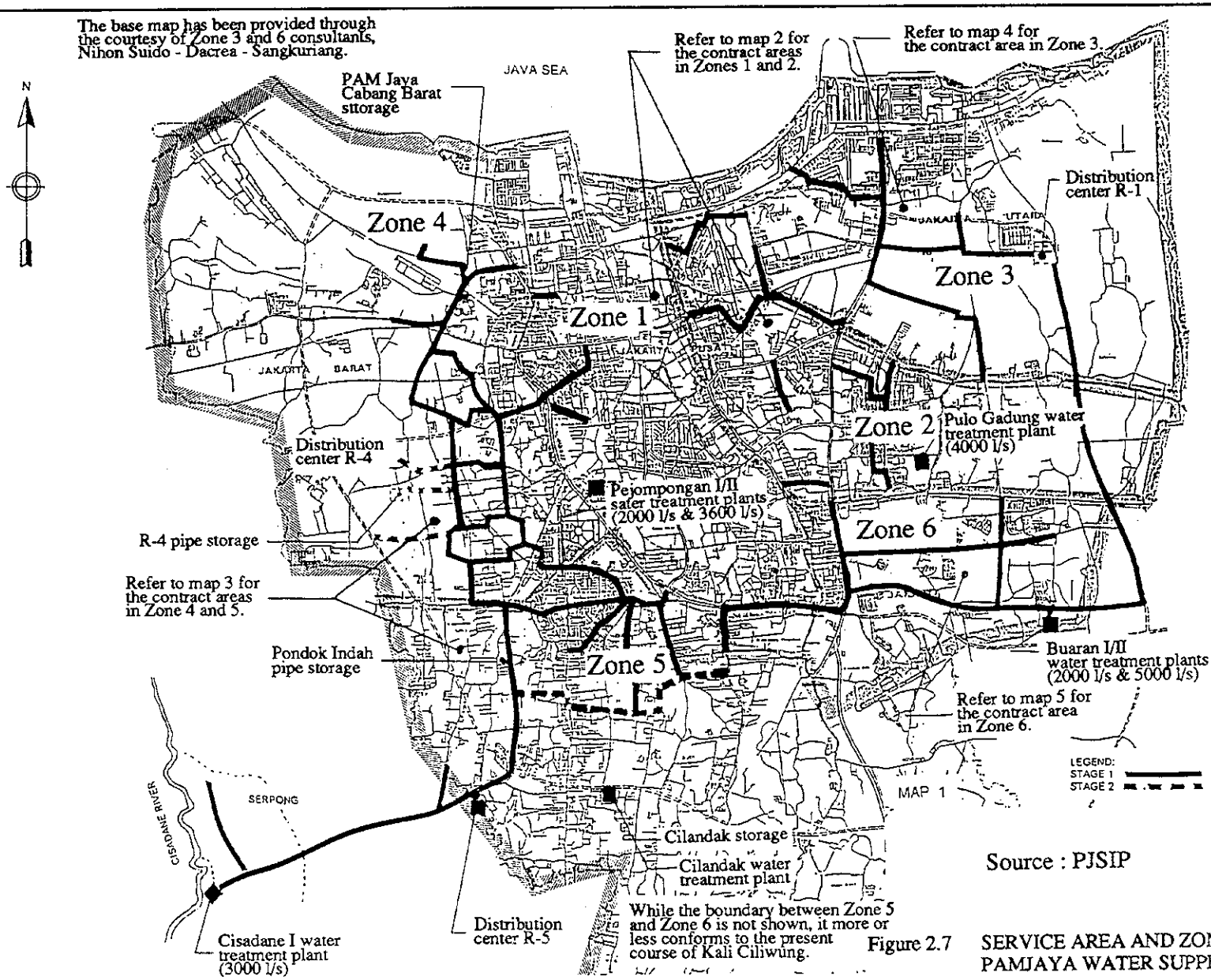


Figure 2.7 SERVICE AREA AND ZONE OF THE PAMJAYA WATER SUPPLY SYSTEM

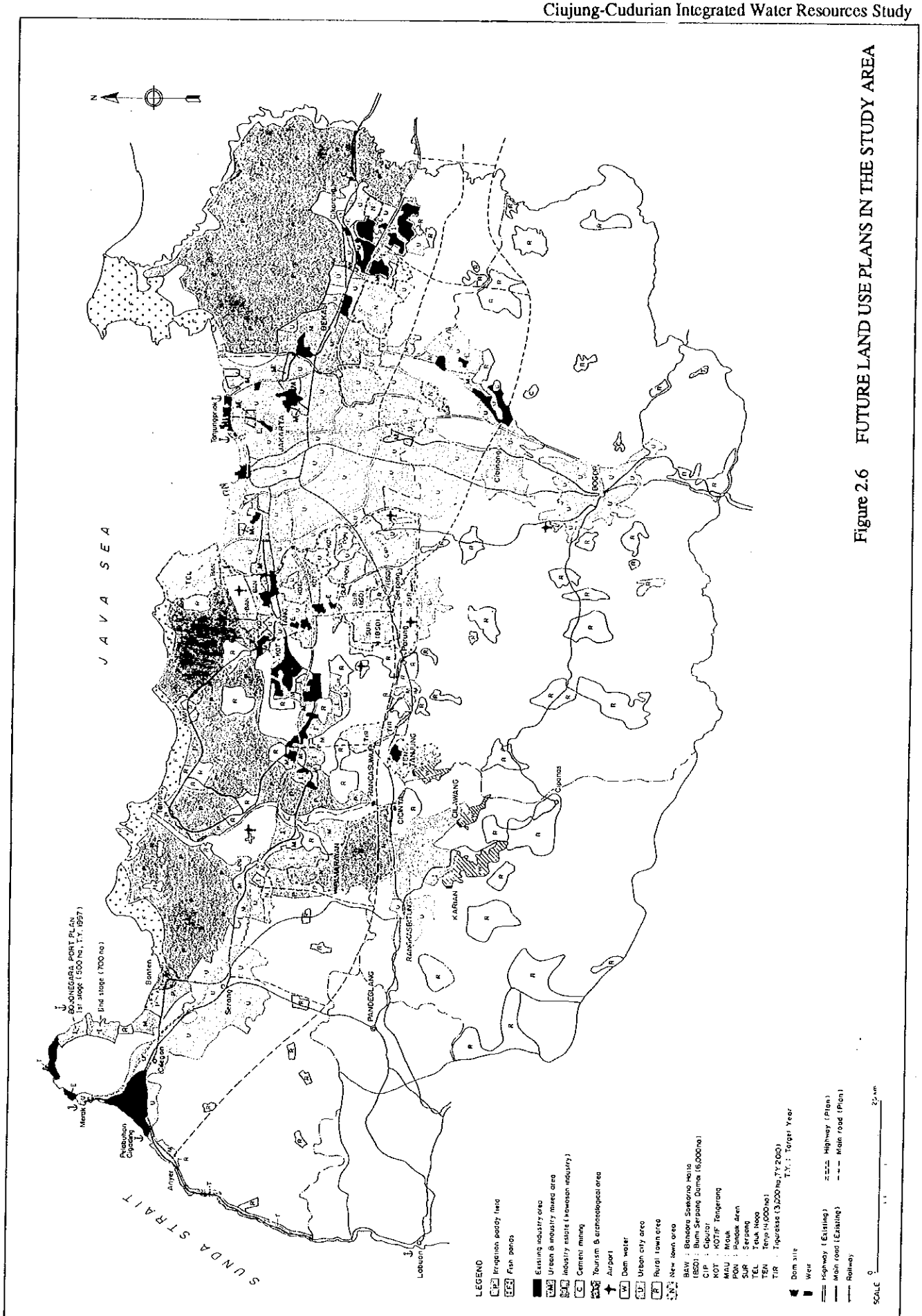


Figure 2.6 FUTURE LAND USE PLANS IN THE STUDY AREA

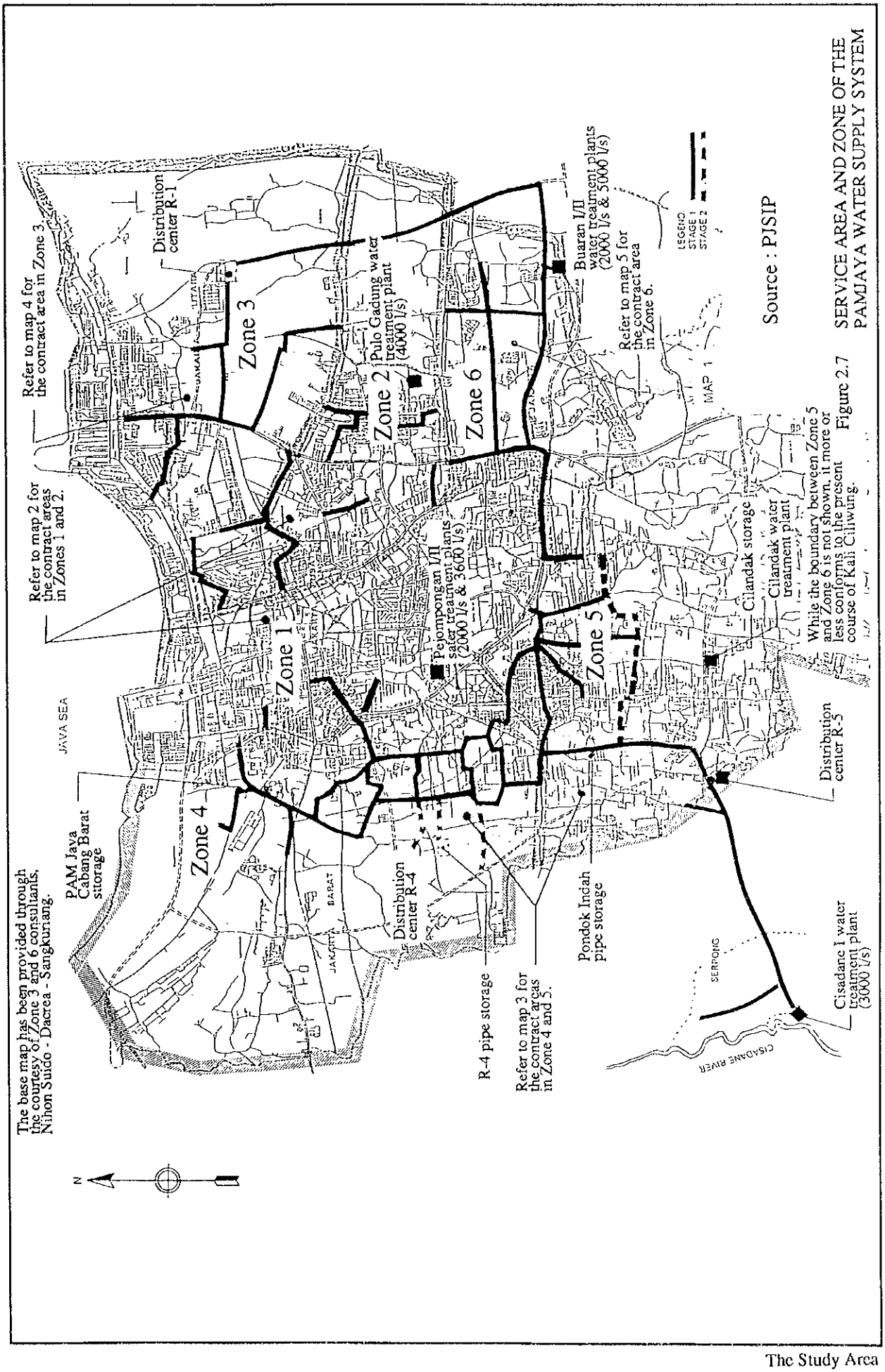


Figure 2.7 The Study Area

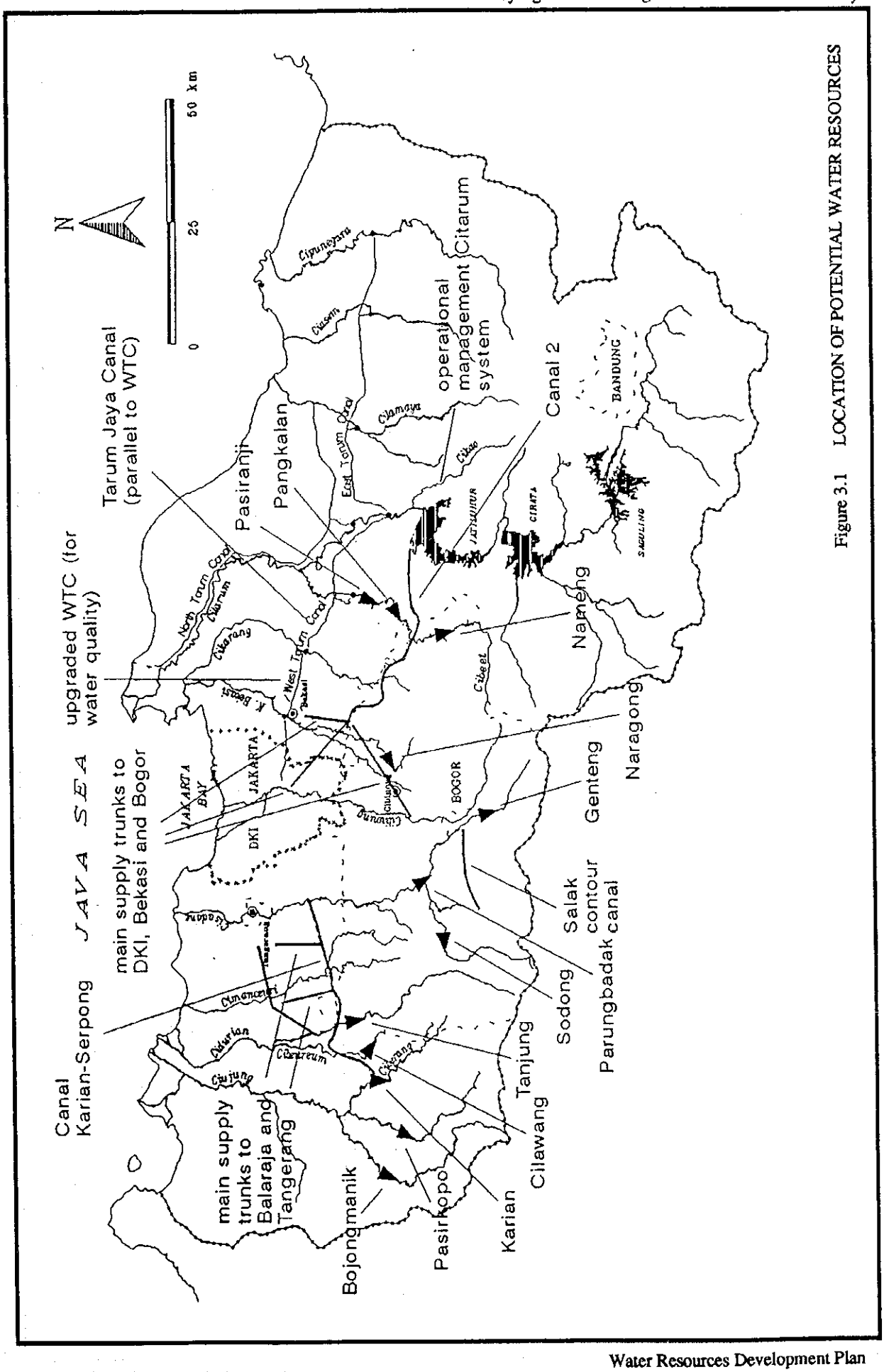
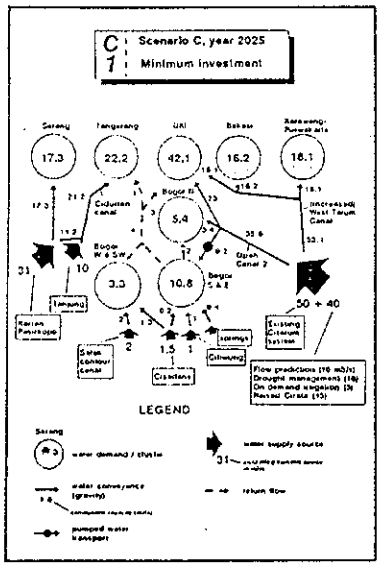
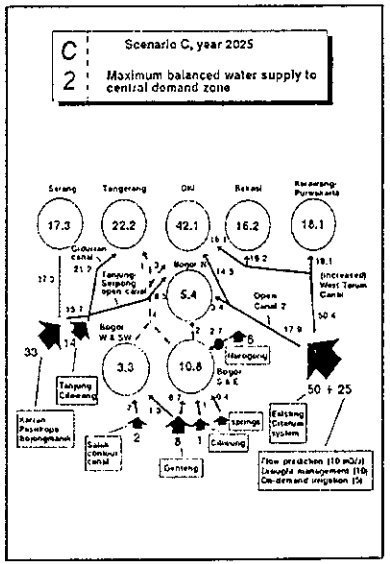
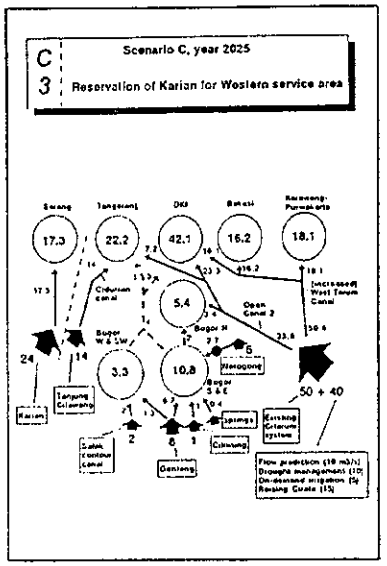
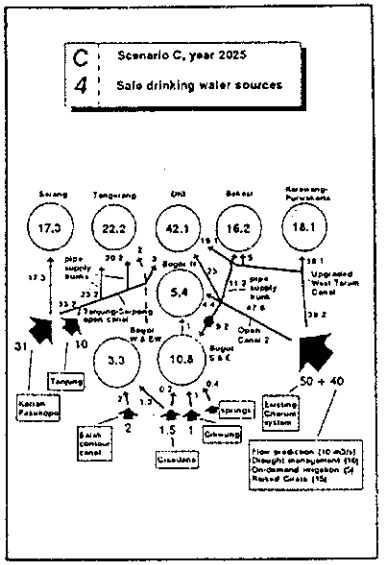


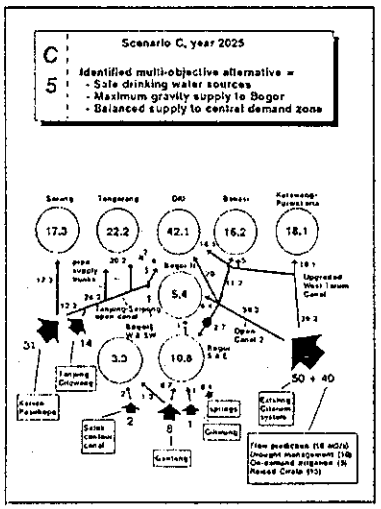
Figure 3.1 LOCATION OF POTENTIAL WATER RESOURCES

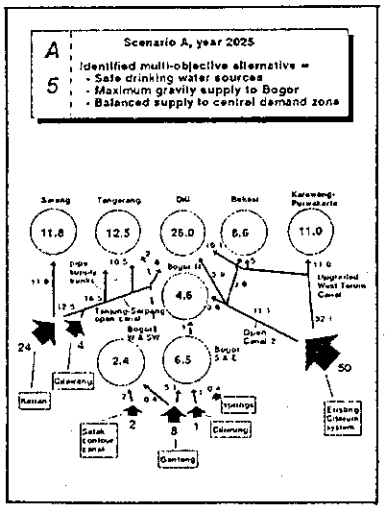












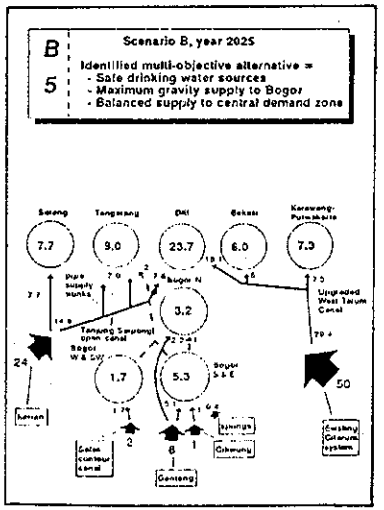


Figure 3.2 ALTERNATIVE WATER RESOURCES DEVELOPMENT PLANS

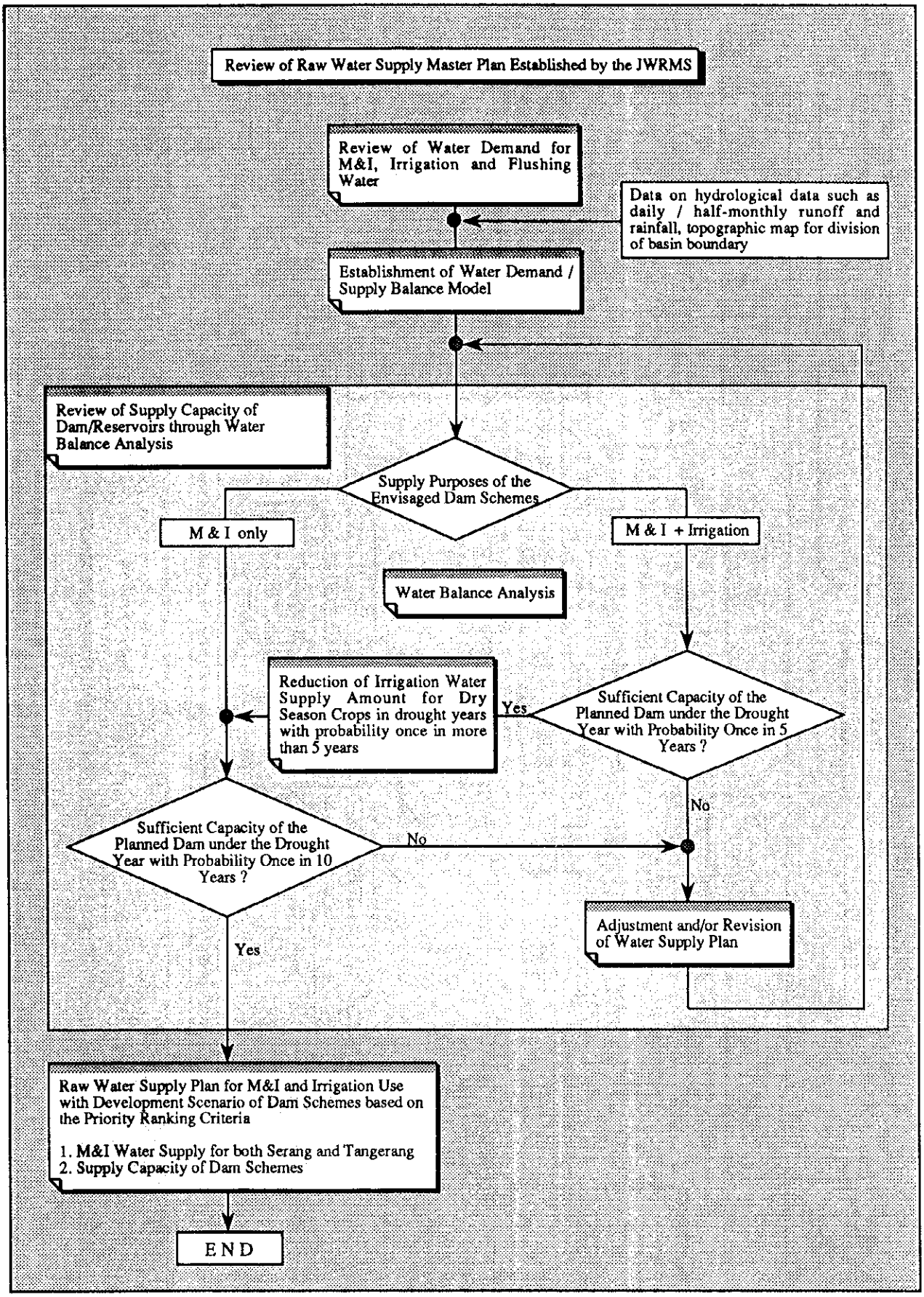
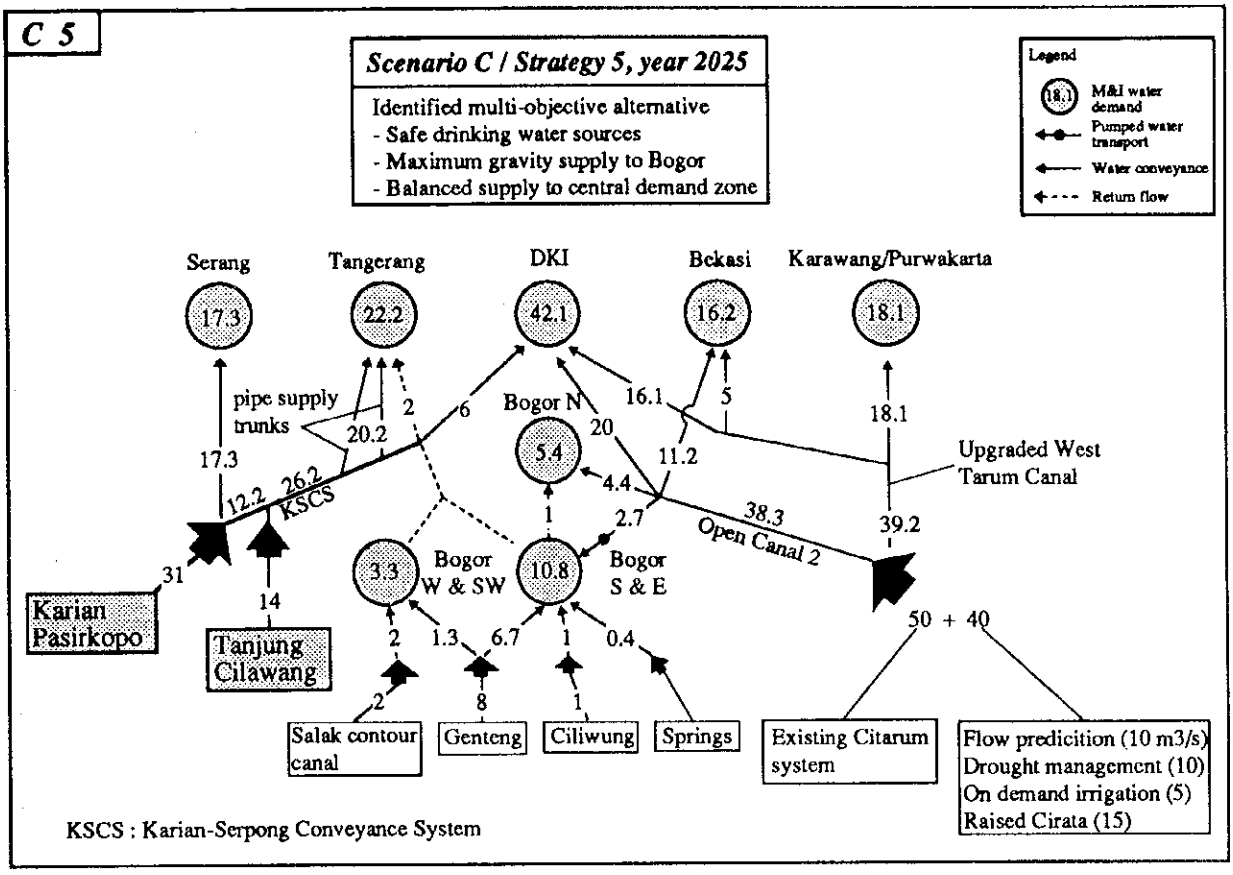


Figure 3.3 PROCEDURES FOR REVIEW OF RAW WATER SUPPLY MASTER PLAN ESTABLISHED BY JWRMS

Figure 3.4 DATA AND METHOD OF WATER DEMAND PROJECTION BY JWRMS



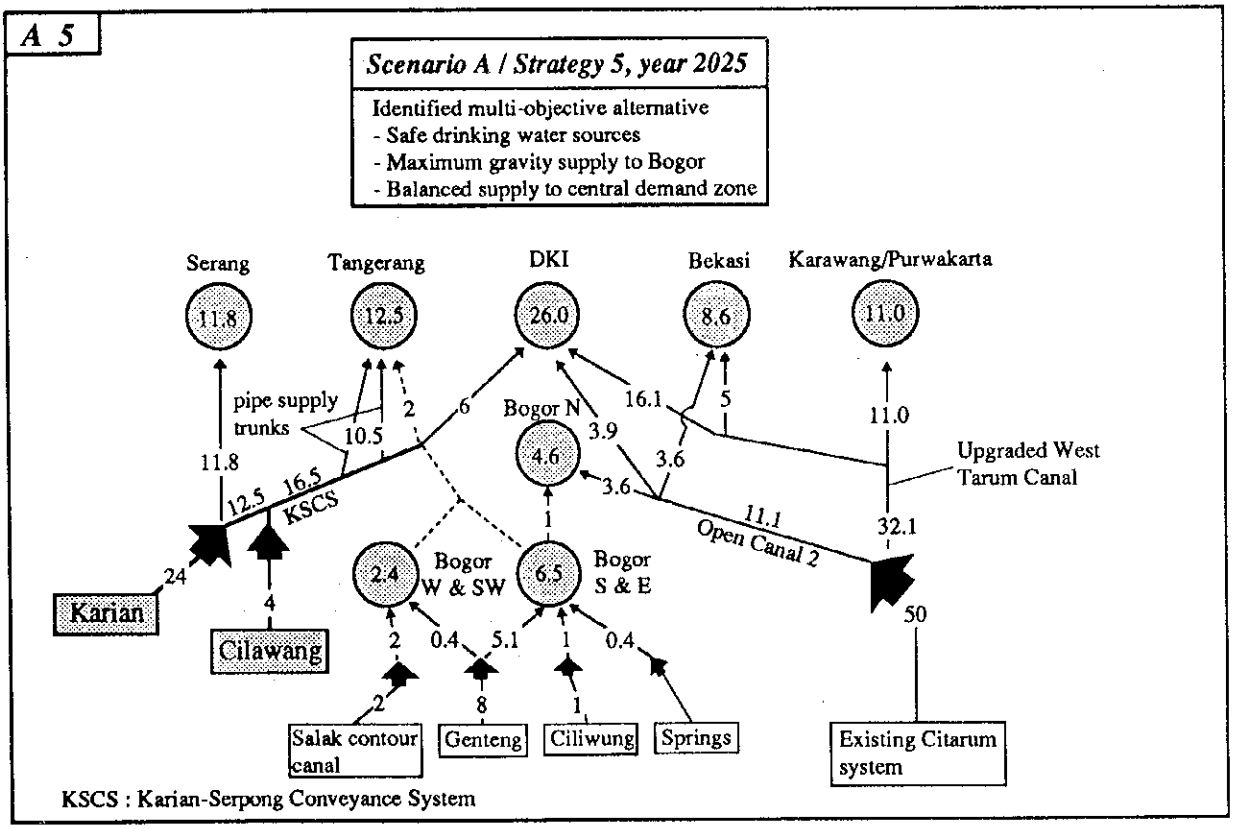


Figure 3.5 RAW WATER SUPPLY PLAN IN JABOTABEK AREA AND SURROUNDING KABUPATENS, ESTABLISHED BY JWRMS

M&I Water Demands (cu.m/s)

Scenario C			
Year	Serang	Tangerang	Jakarta
1990	2.2	0.3	
1995	3.3	1.4	
2000	4.4	2.8	
2005	6.9	5.3	
2010	9.1	9.1	
2015	12.2	13.1	6.0
2020	14.3	17.1	6.0
2025	17.3	20.2	6.0
Scenario A			
	Serang	Tangerang	Jakarta
1990	2.2	0.3	
1995	3.2	1.2	
2000	4.3	2.4	
2005	5.8	3.7	
2010	7.1	5.3	
2015	8.7	7.0	6.0
2020	10.2	9.0	6.0
2025	11.8	10.5	6.0

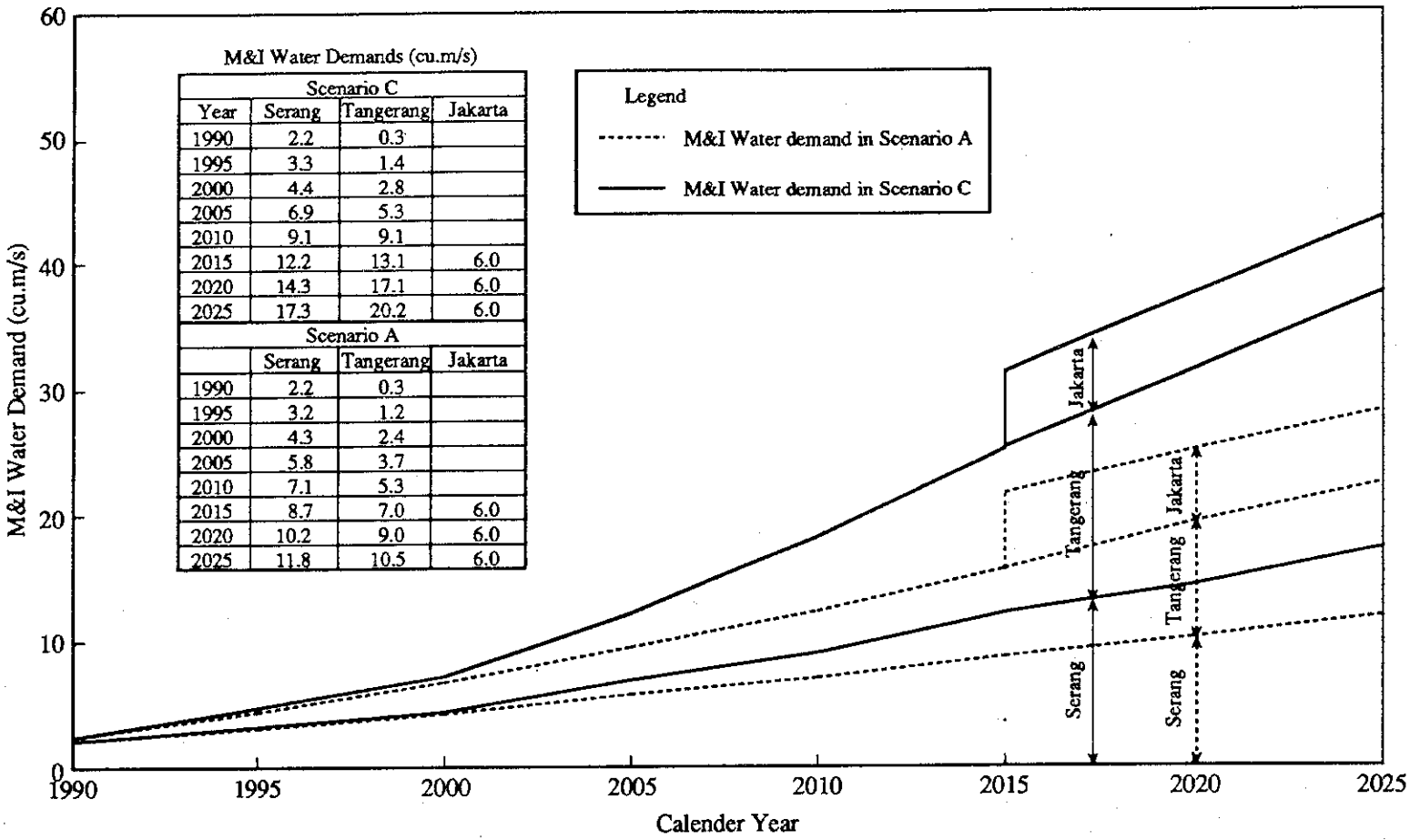
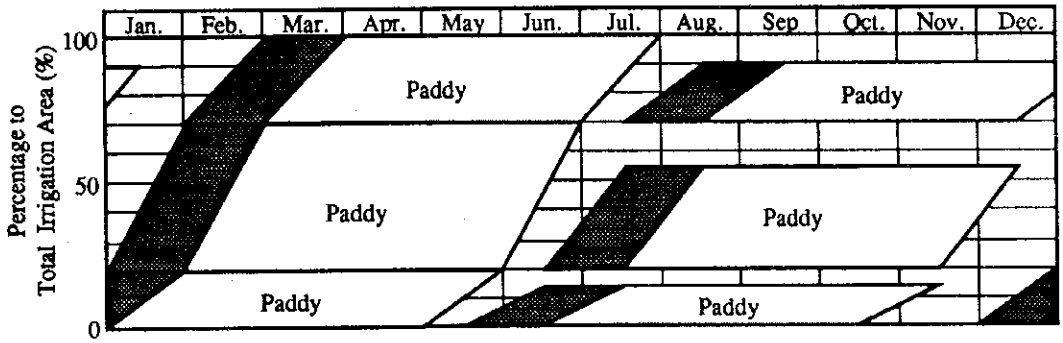


Figure 3.6 FUTURE MUNICIPAL AND INDUSTRIAL WATER DEMAND PLANNED TO BE SUPPLYED FROM THE CIUJUNG AND CIDURIAN RIVER BASINS

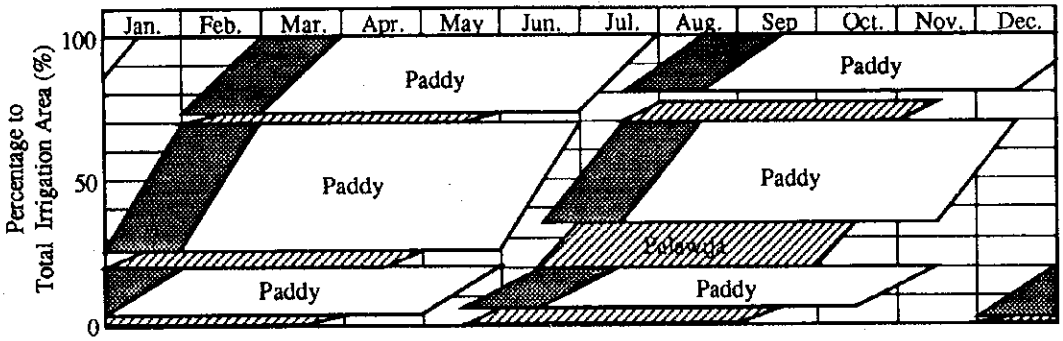
Present Condition

Irrigation area (ha) : 22,988
Average intensity : 168 %



Scenario A

Irrigation area (ha) : 18,862
Average intensity : 168 + 29 = 197 %



Scenario C

Irrigation area (ha) : 18,862 ha
Average intensity : 168 + 55 = 223 %

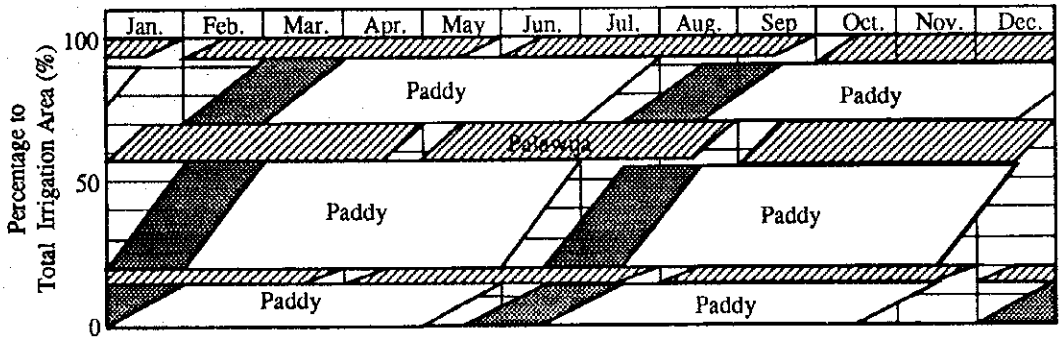
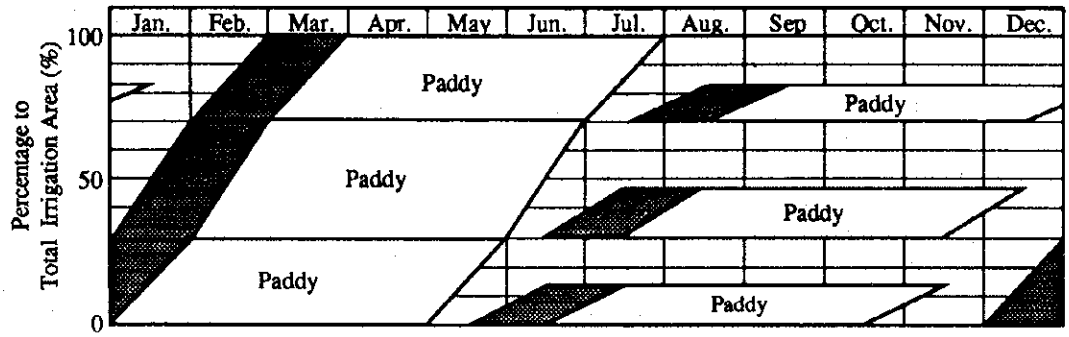


Figure 3.7 TYPICAL CROPPING PATTERNS FOR SCENARIOS IN CIUJUNG IRRIGATION AREA

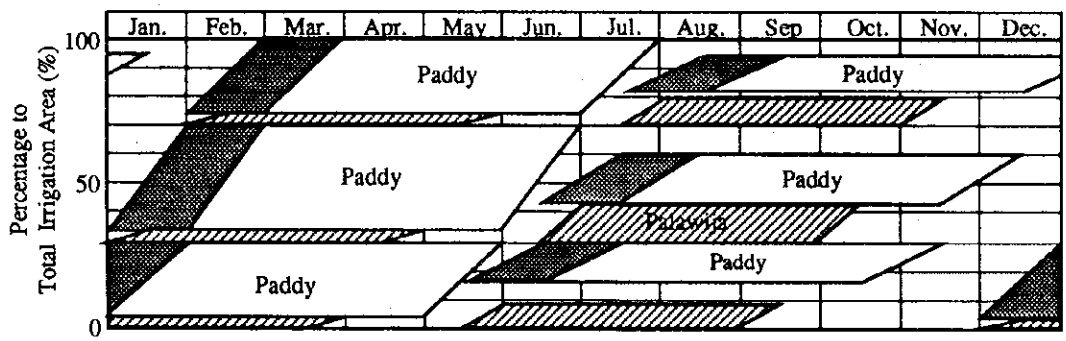
Present Condition

Irrigation area (ha) : 10,805
Average intensity : 142 %



Scenario A

Irrigation area (ha) : 9,312
Average intensity : 142 + 29 = 171 %



Scenario C

Irrigation area (ha) : 8,873 ha
Average intensity : 142 + 55 = 197 %

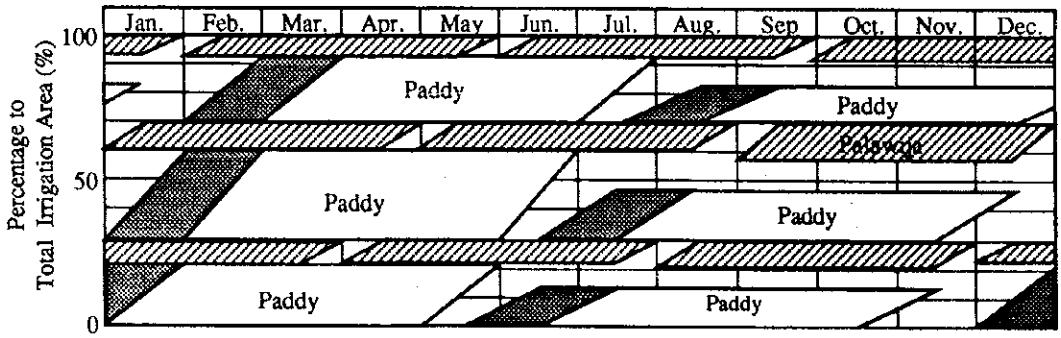


Figure 3.8 TYPICAL CROPPING PATTERNS FOR SCENARIOS IN CIDURIAN-RANCASUMUR IRRIGATION AREA

Main Features of Dams	Karian	Pasir Kopo	Cilawang	Tanjung
(1) River basin	Cibeurang	Cisumut	Cibeureum	Cidurian
(2) Catchment area (km2)	288.0	172.0	93.0	280.0
(3) Dam crest elevation (El.m)	72.5	-	81.0	60.5
(4) Dam height (m)	60.5	-	36.0	35.5
(5) High water level	67.5	90.5/100.5	76.5	56.5
(6) Low water level	46.0	80.0	66.5	50.0
(7) Gross storage volume (million m3)	306.0	-	82.0	237.0
(8) Effective storage volume (million m3)	219.0	44.5/112.6	62.0	120.0

Note :
Figures of Pasir Kopo dam in high water level and effective storage volume show those in the scenarios A and C.

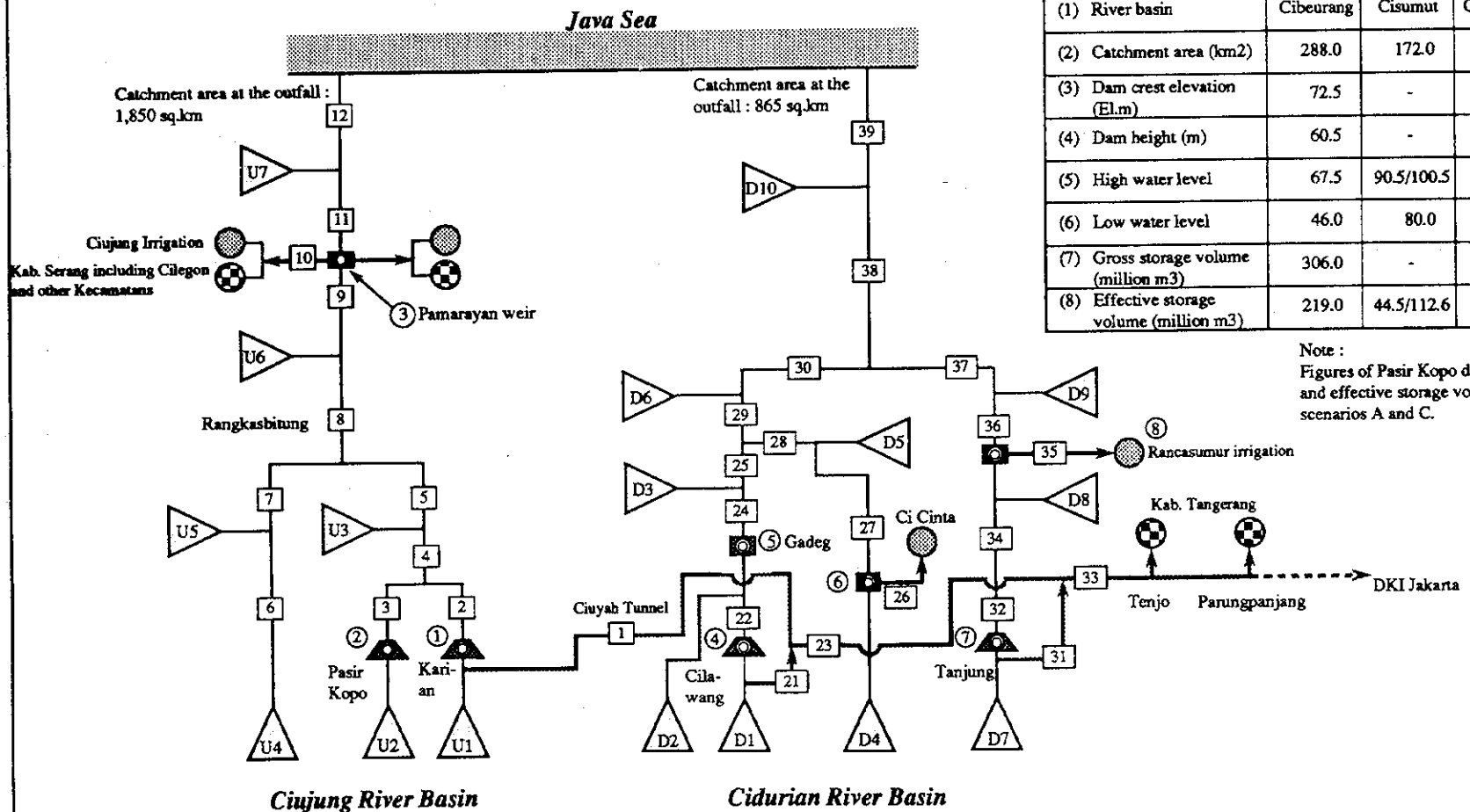
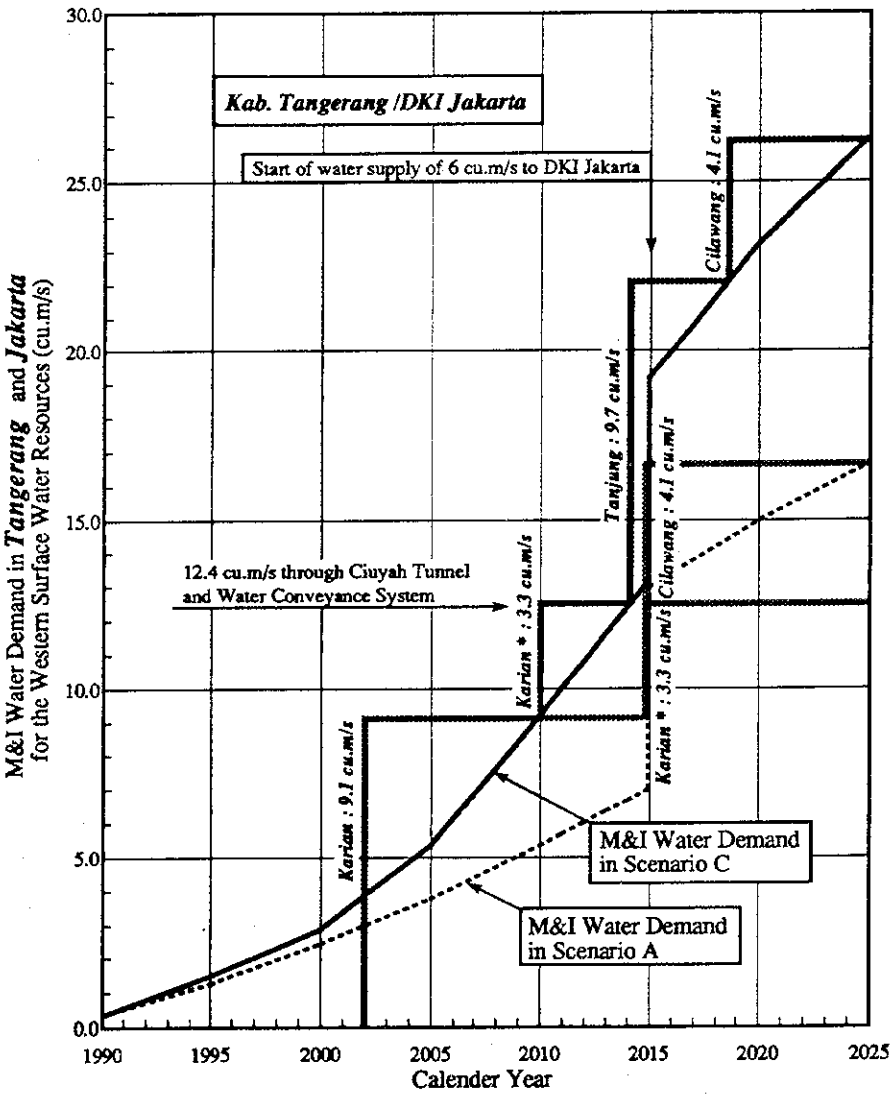
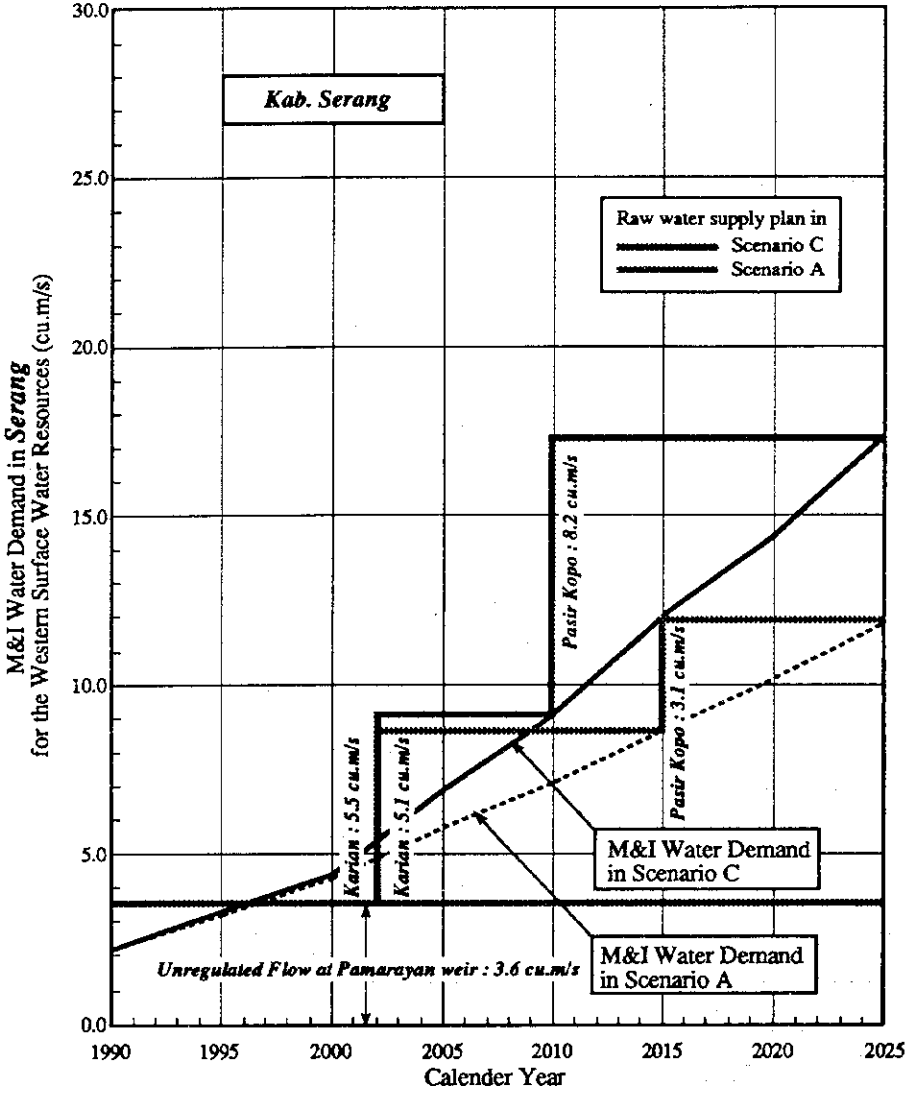


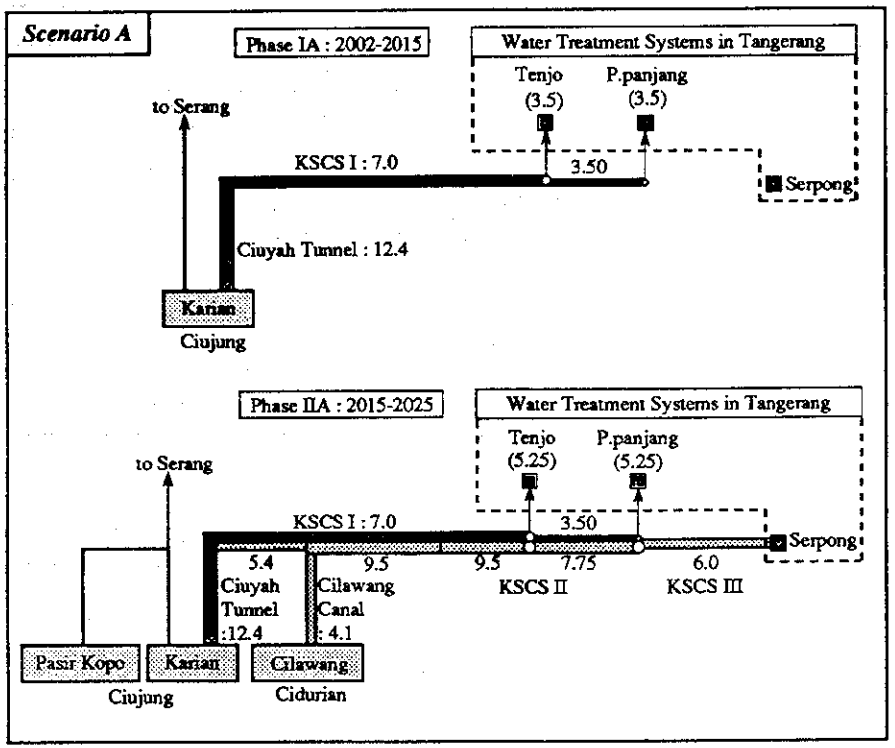
Figure 3.9 MODEL COMPOSITION OF WATER SUPPLY AND DEMAND BALANCE

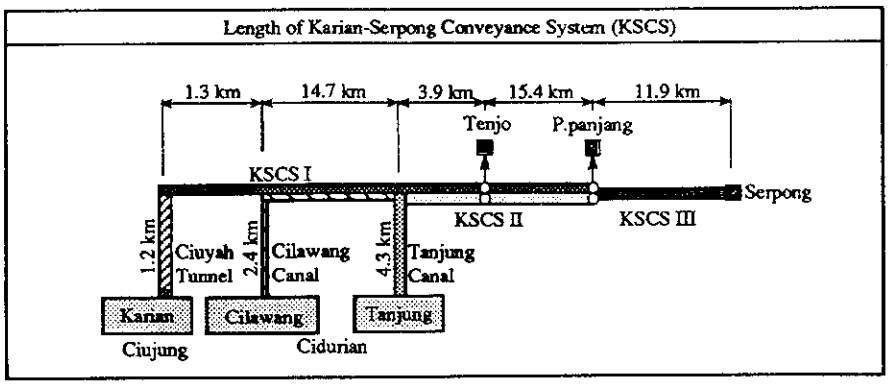




Note : Karian with a symbol of " *" means incremental discharge from the Karian dam to Karian-Serpong Conveyance System and decrease of water supply amount for Serang. The decreased discharge is planned to be replaced by the Pasir Kopo dam.

Figure 3.10 RAW WATER SUPPLY PLAN FOR MUNICIPAL AND INDUSTRIAL USE IN SERANG, TANGERANG AND DKI JAKARTA





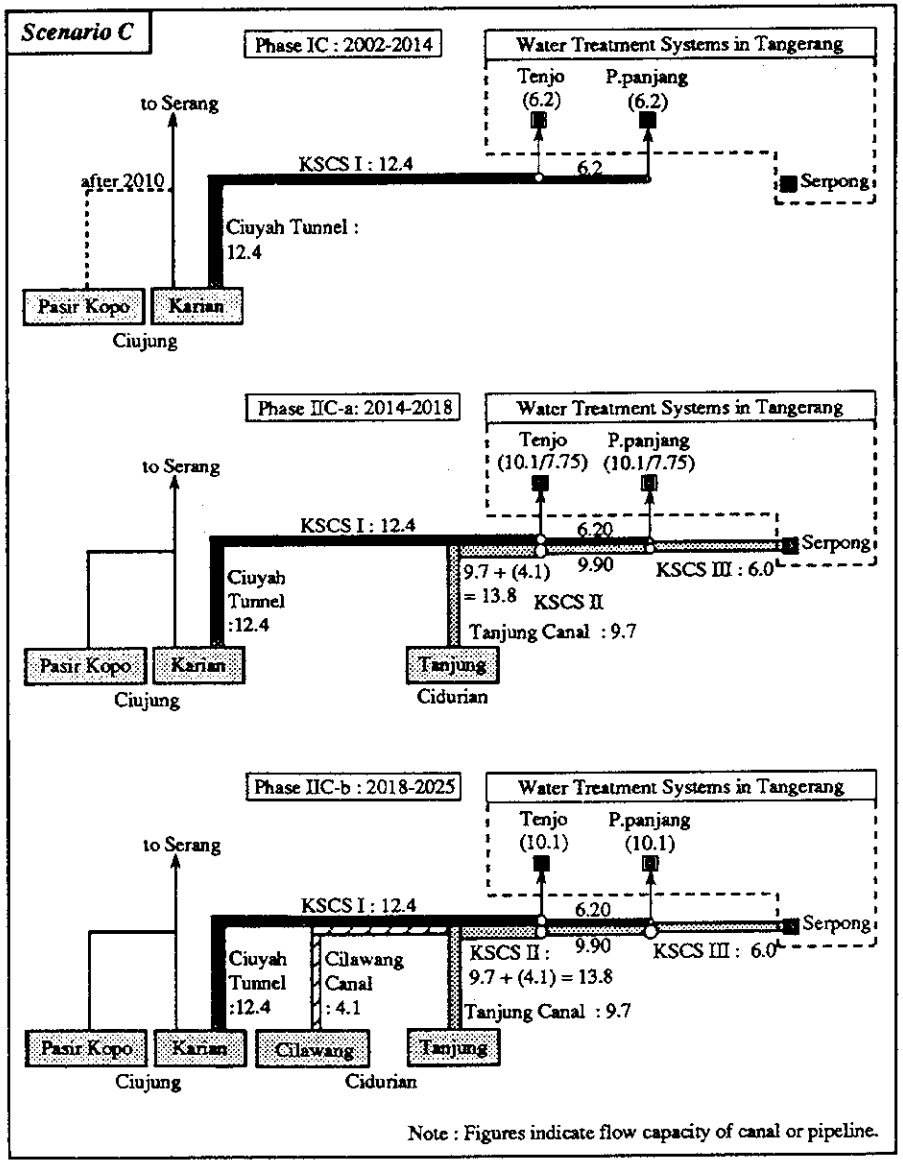
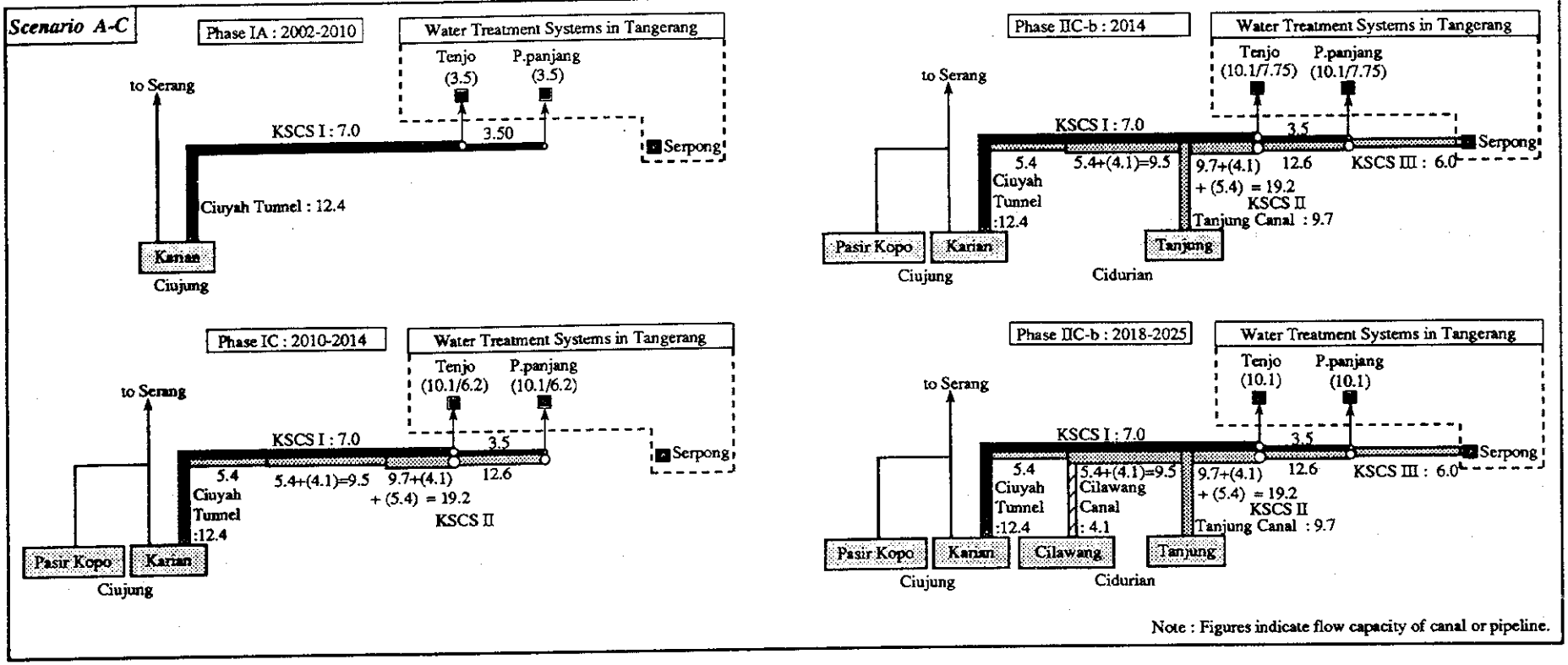


Figure 3.11 FLOW CAPACITY OF KSCS IN PAHSING DEVELOPMENT (1/2)



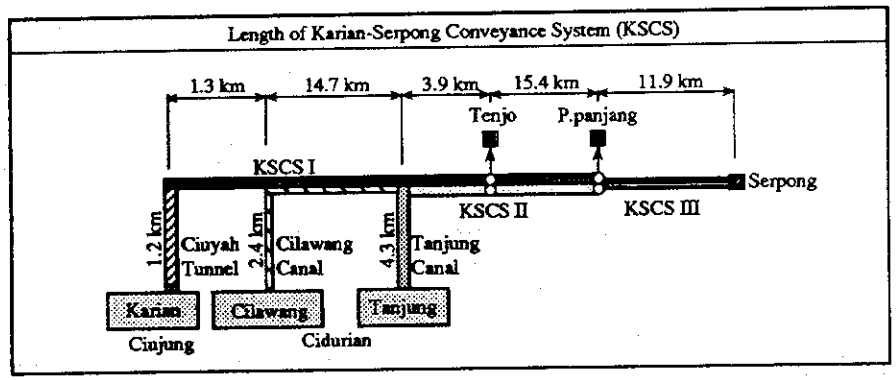


Figure 3.12 FLOW CAPACITY OF KSCS IN PAHSING DEVELOPMENT (2/2)

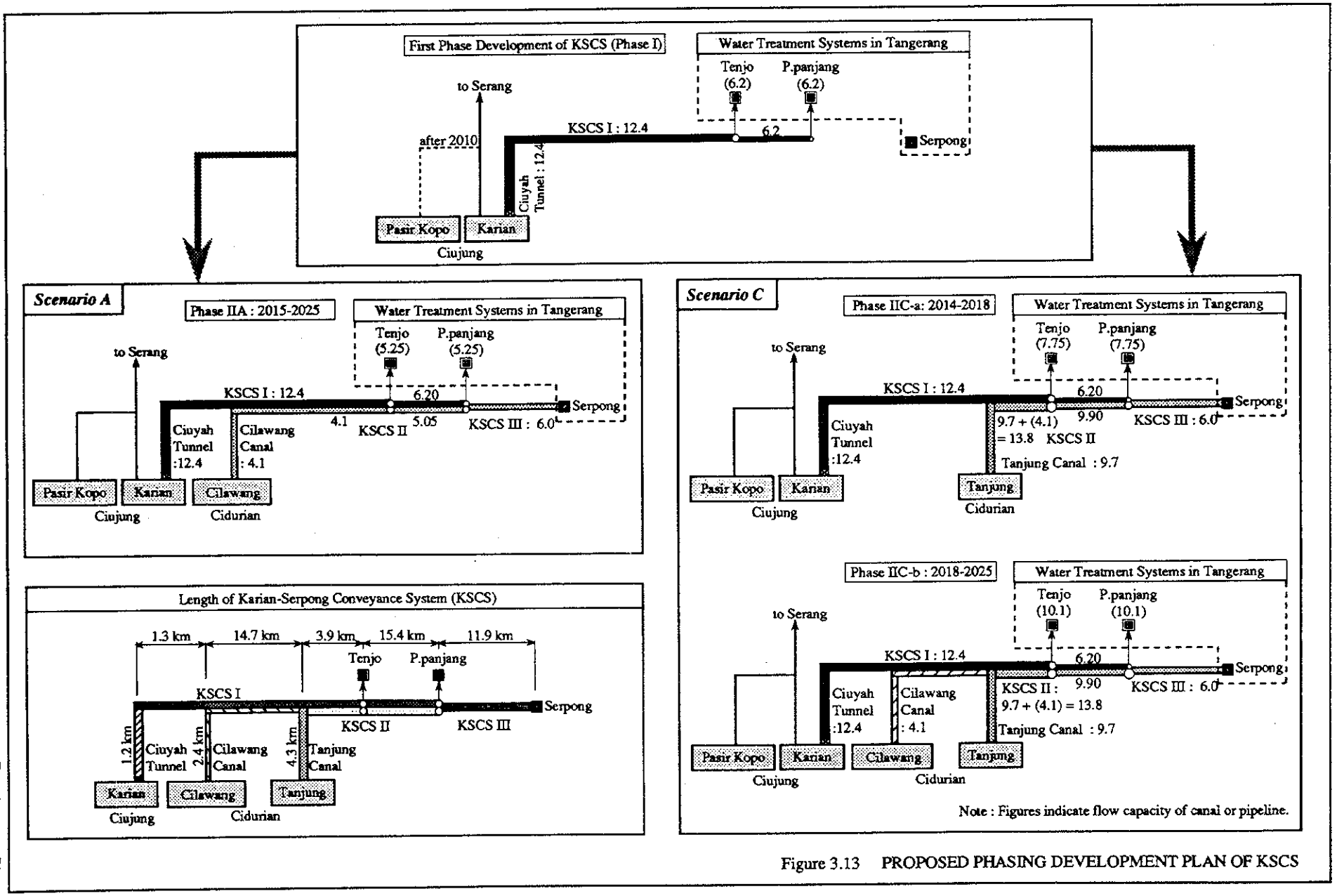


Figure 3.13 PROPOSED PHASING DEVELOPMENT PLAN OF KSCS

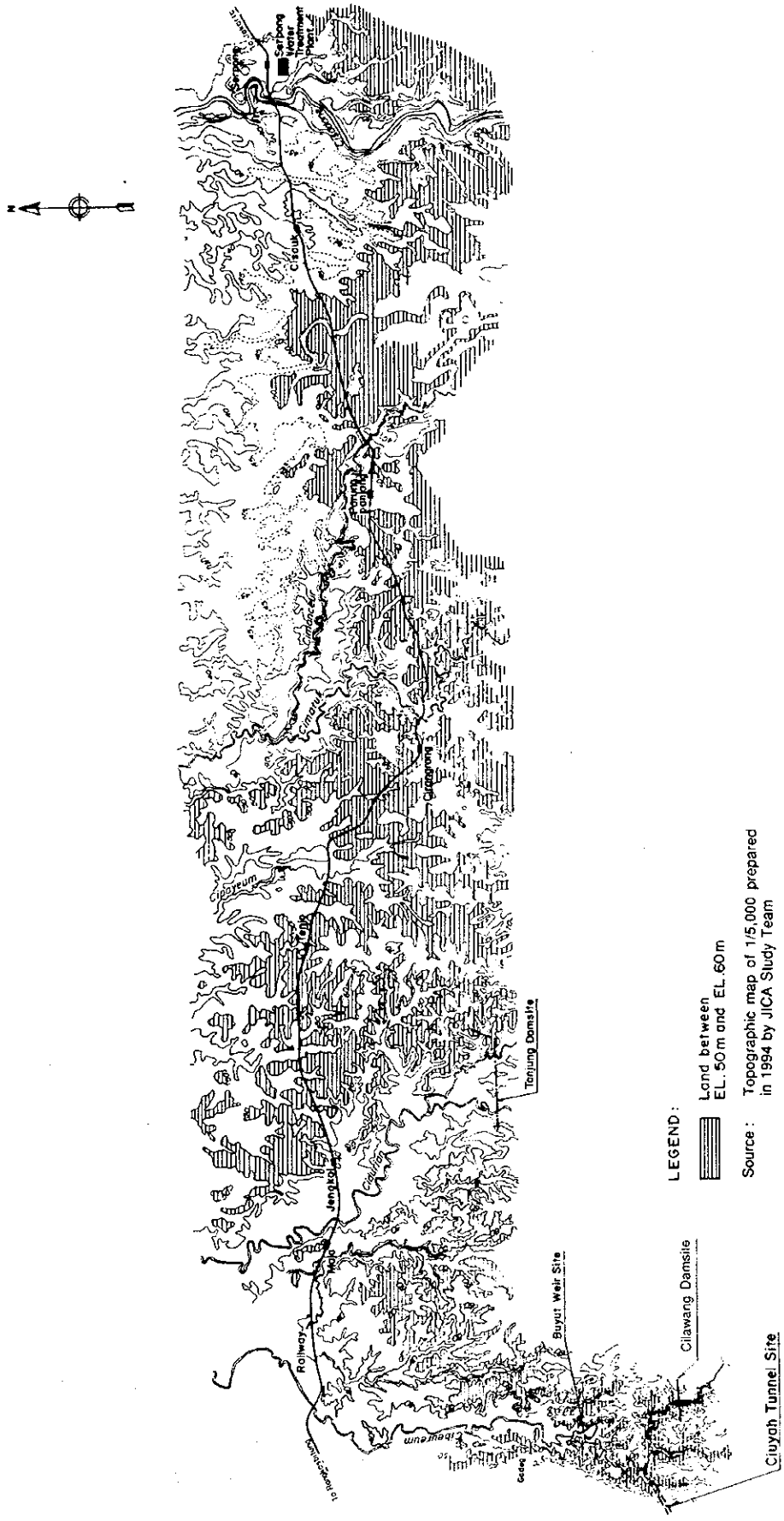


Figure 4.1 TOPOGRAPHIC CONDITION BETWEEN CIUYAH AND SERPONG

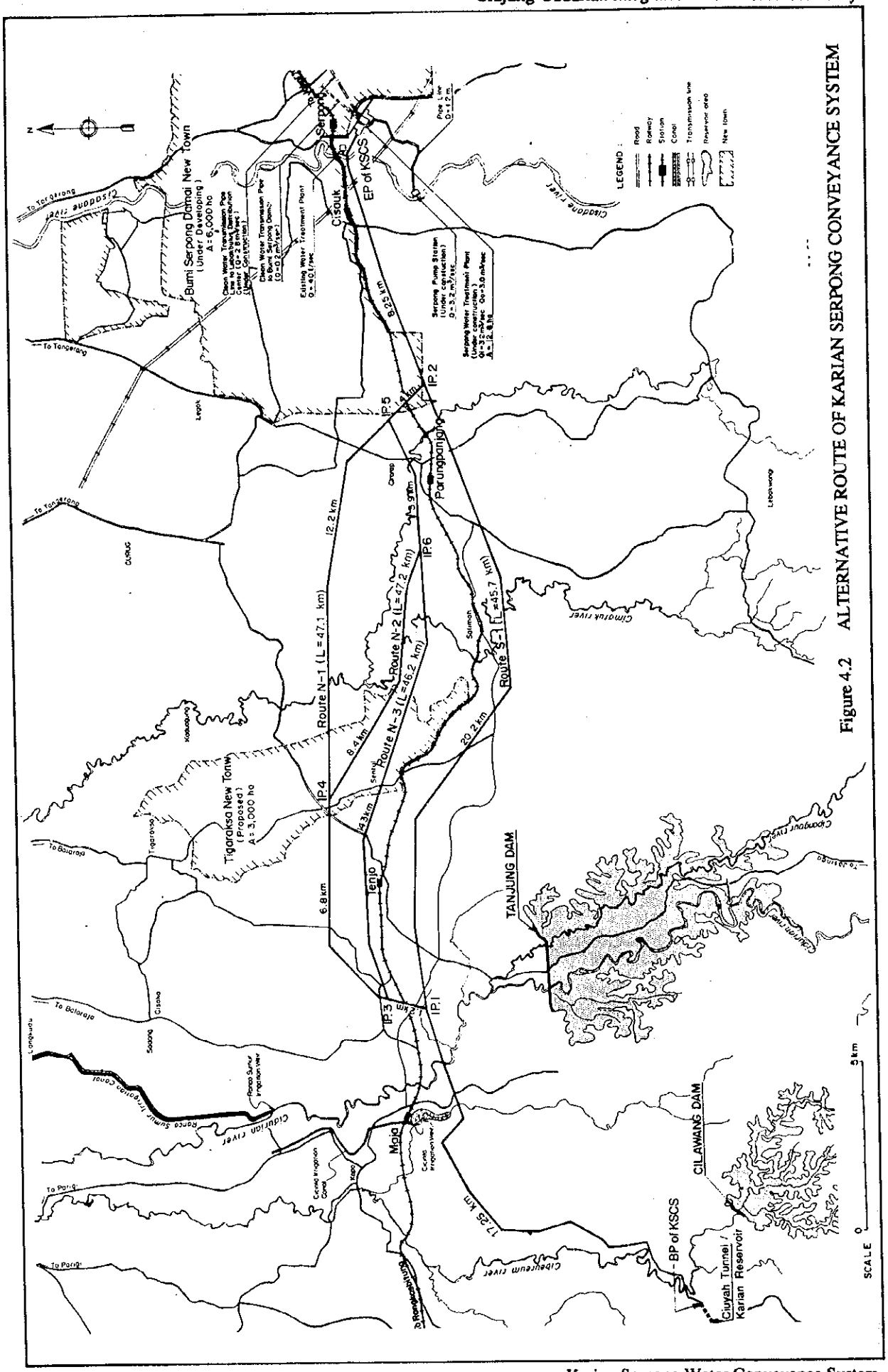
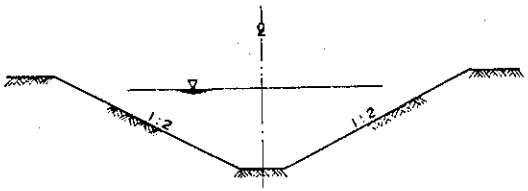
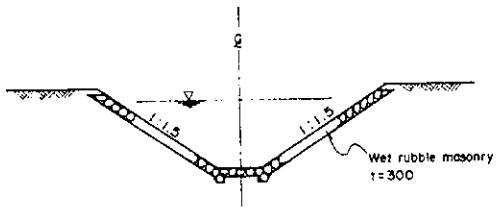


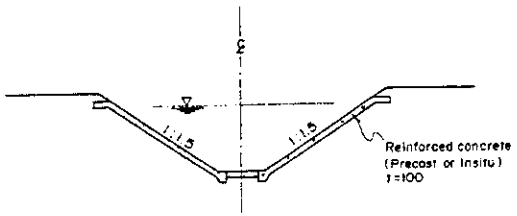
Figure 4.2 ALTERNATIVE ROUTE OF KARIAN SERPONG CONVEYANCE SYSTEM



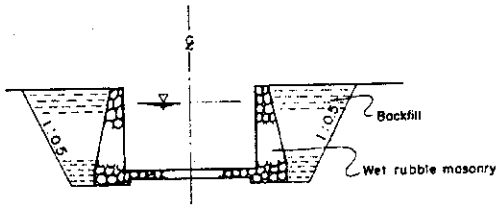
Alt - 1 Unlined Trapezoidal Channel



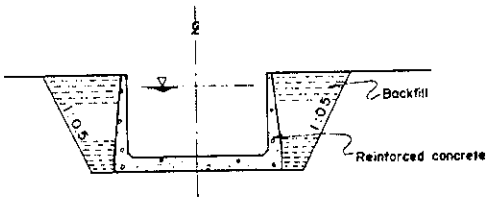
Alt - 2 Masonry Lining Trapezoidal Channel



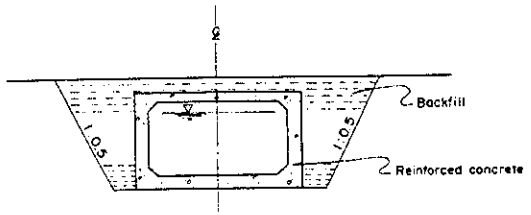
Alt - 3 Concrete Lining Trapezoidal Channel



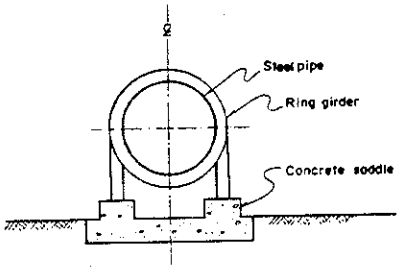
Alt - 4 Masonry Rectangular Channel



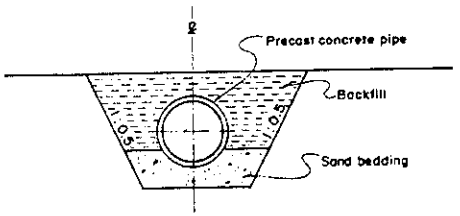
Alt - 5 Reinforced Concrete Rectangular Channel



Alt - 6 Box Culvert Channel



Alt - 7 Steel Pipeline



Alt - 8 Concrete Pipeline

Figure 4.3 OPTIONS FOR WATER CONVEYANCE TYPES

Figure 4.4 ALTERNATIVE WATERWAY ROUTES BETWEEN PARUNGPANJANG AND DKI JAKARTA

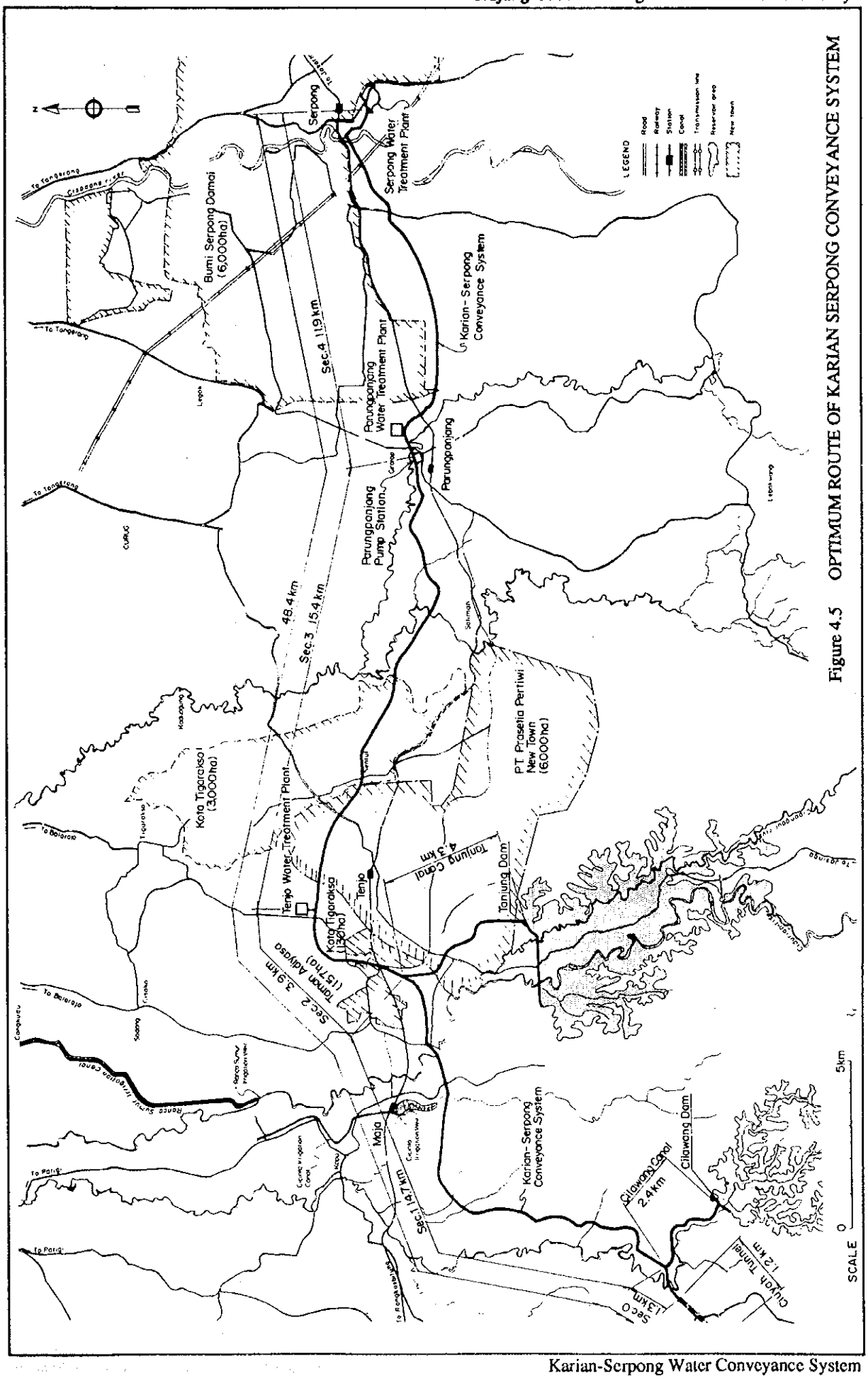


Figure 4.5 OPTIMUM ROUTE OF KARIAN SERPONG CONVEYANCE SYSTEM

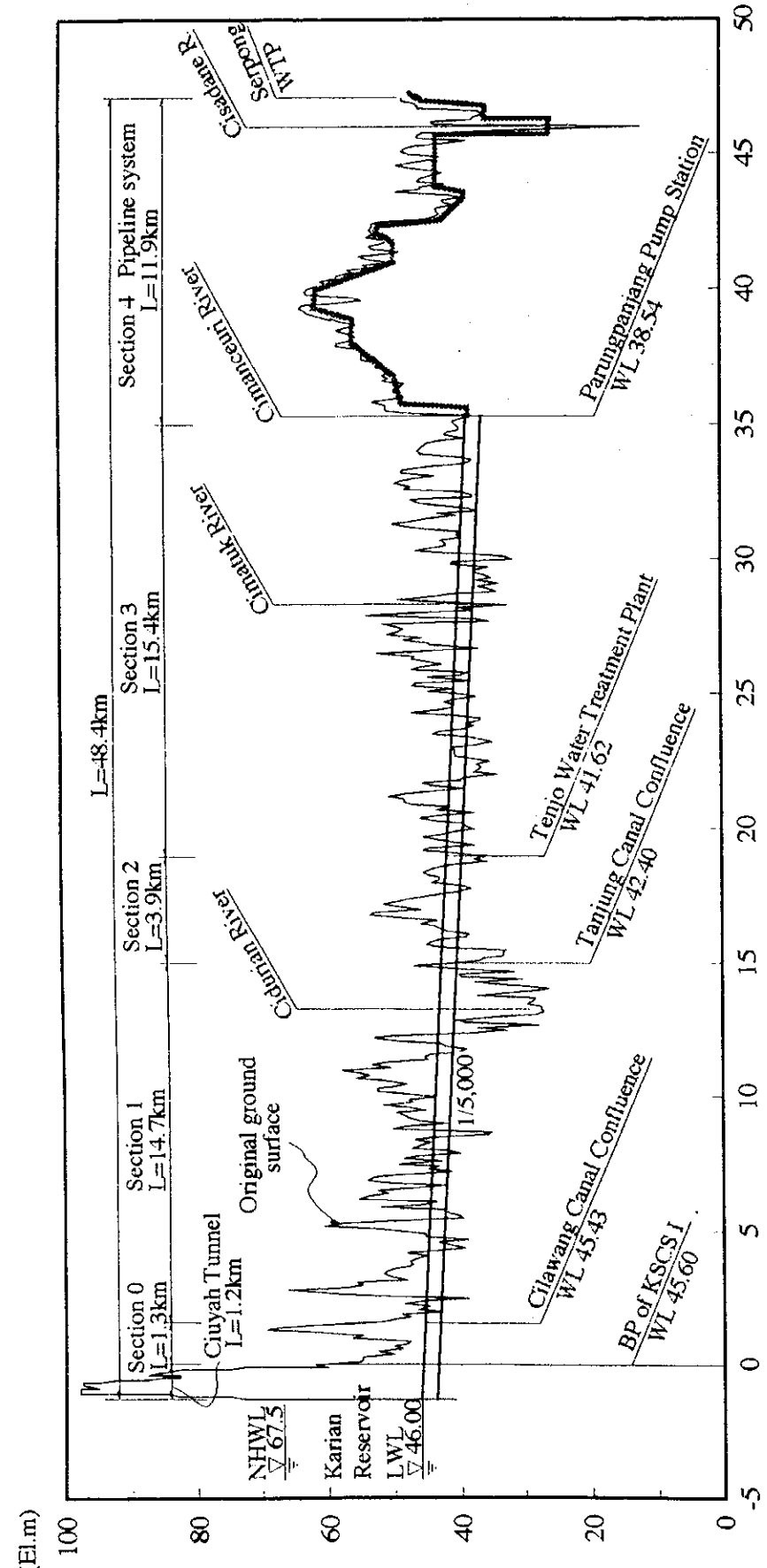


Figure 4.6 PROPOSED LONGITUDINAL PROFILE OF KSCS

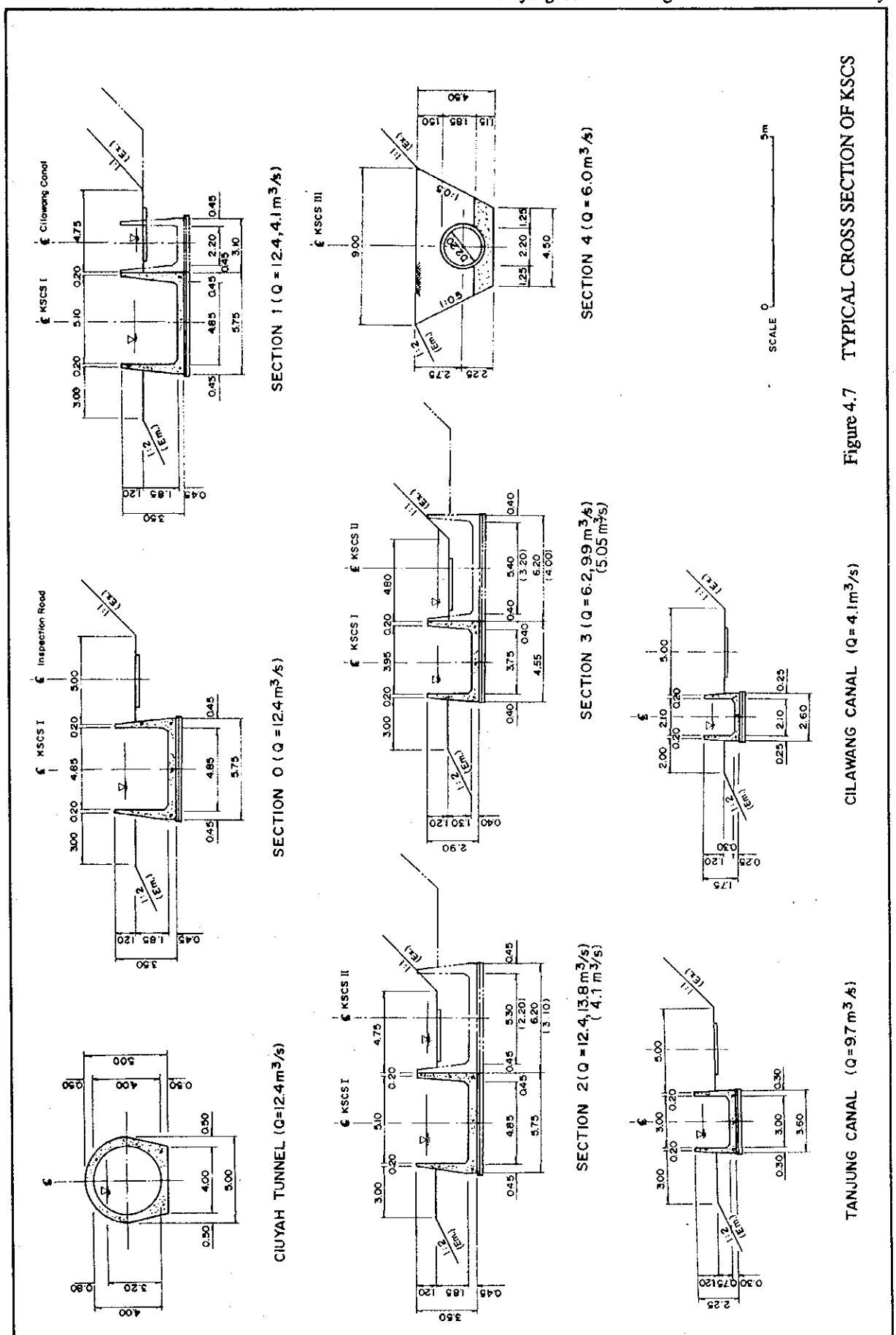
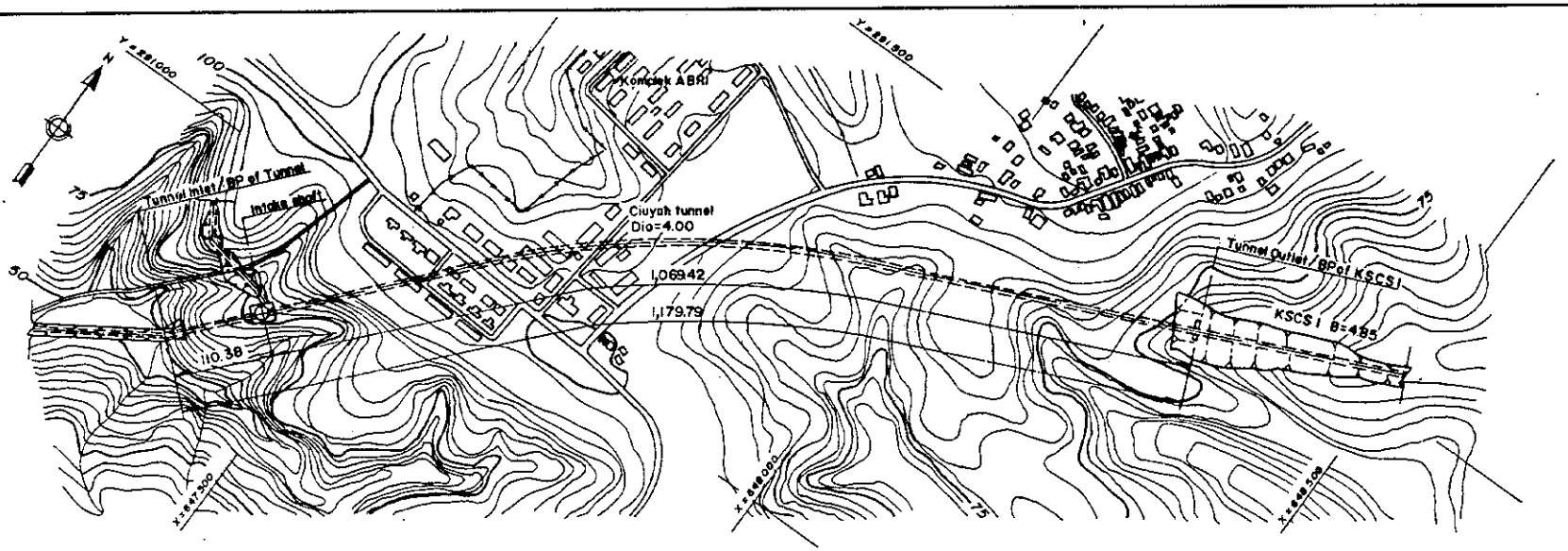
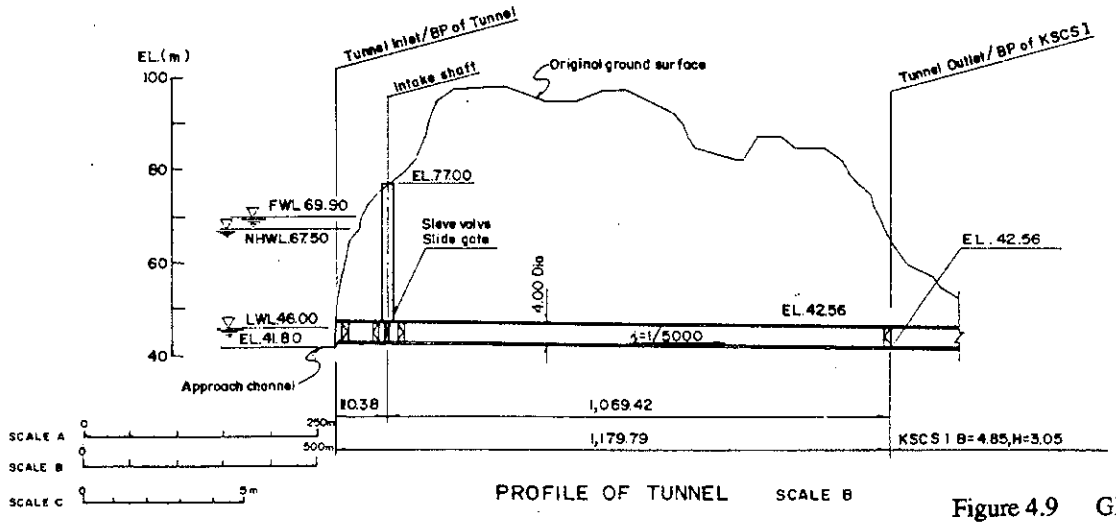


Figure 4.7 TYPICAL CROSS SECTION OF KSCS

Figure 4.8 LOCATION OF MAJOR STRUCTURES IN KSCS





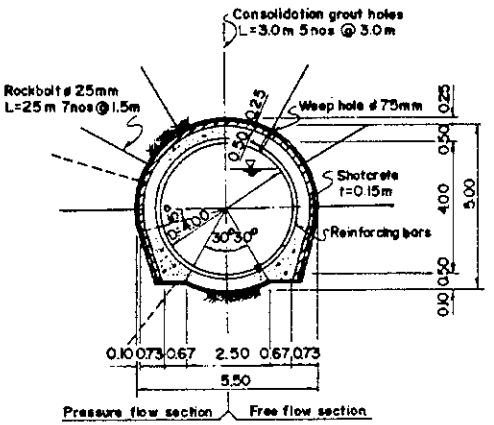


Figure 4.9 GENERAL PLAN, PROFILE AND SECTION OF CIUYAH TUNNEL

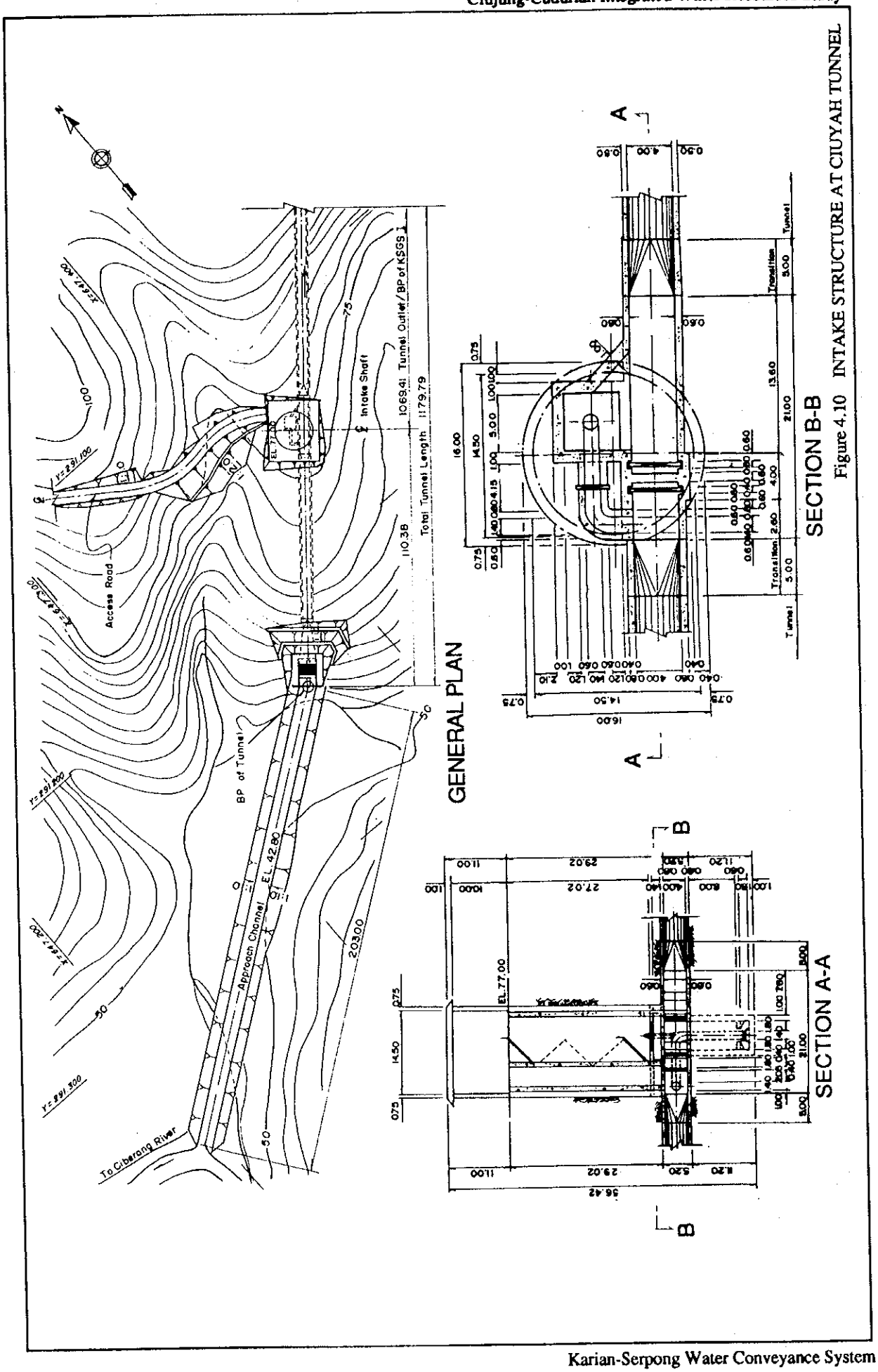


Figure 4.10 INTAKE STRUCTURE AT CIUYAH TUNNEL

Figure 4.11 GENERAL PLAN OF INTAKE OF CILAWANG CANAL

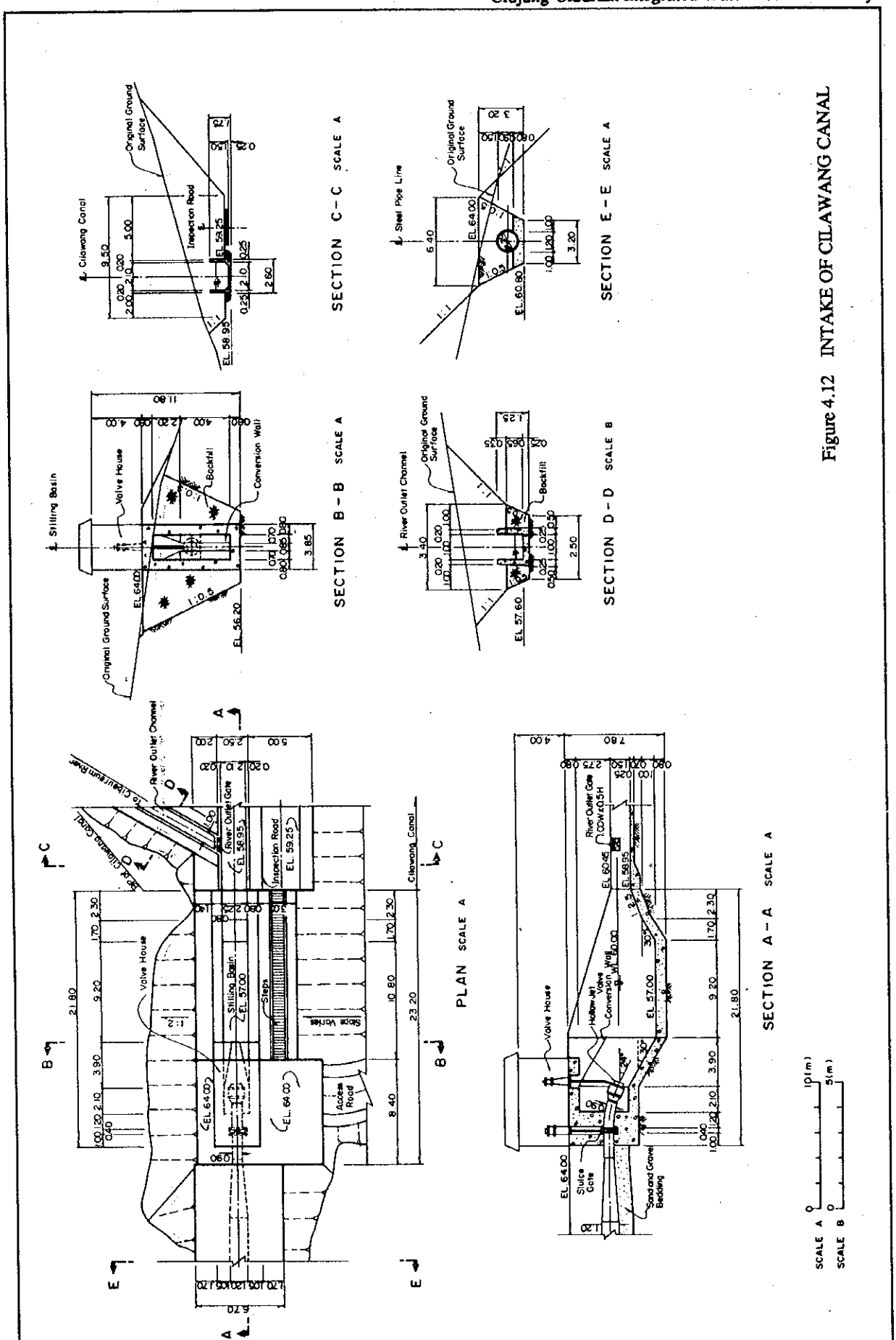


Figure 4.12 INTAKE OF CILAWANG CANAL

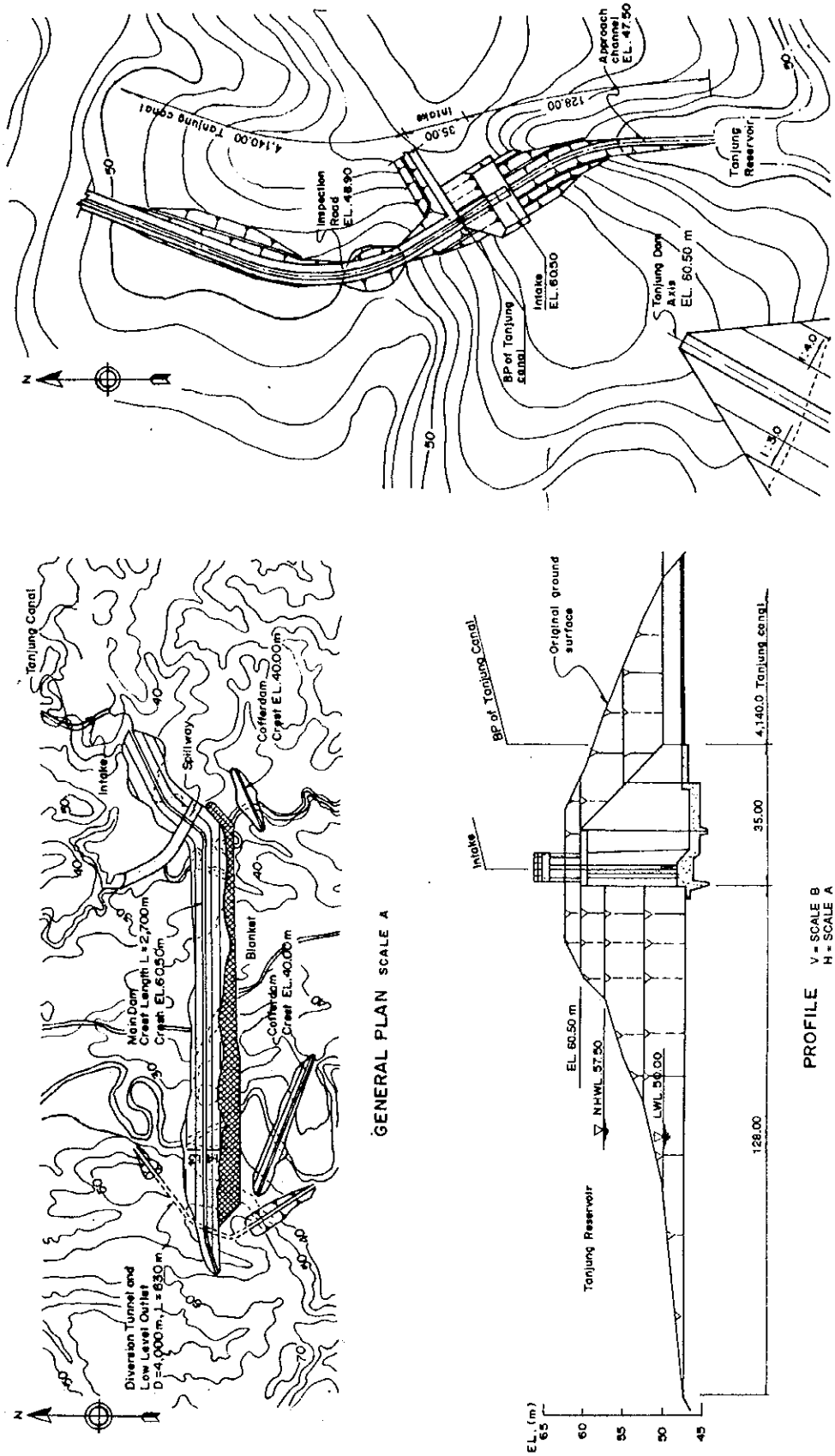


Figure 4.13 GENERAL PLAN AND INTAKE OF TANJUNG CANAL

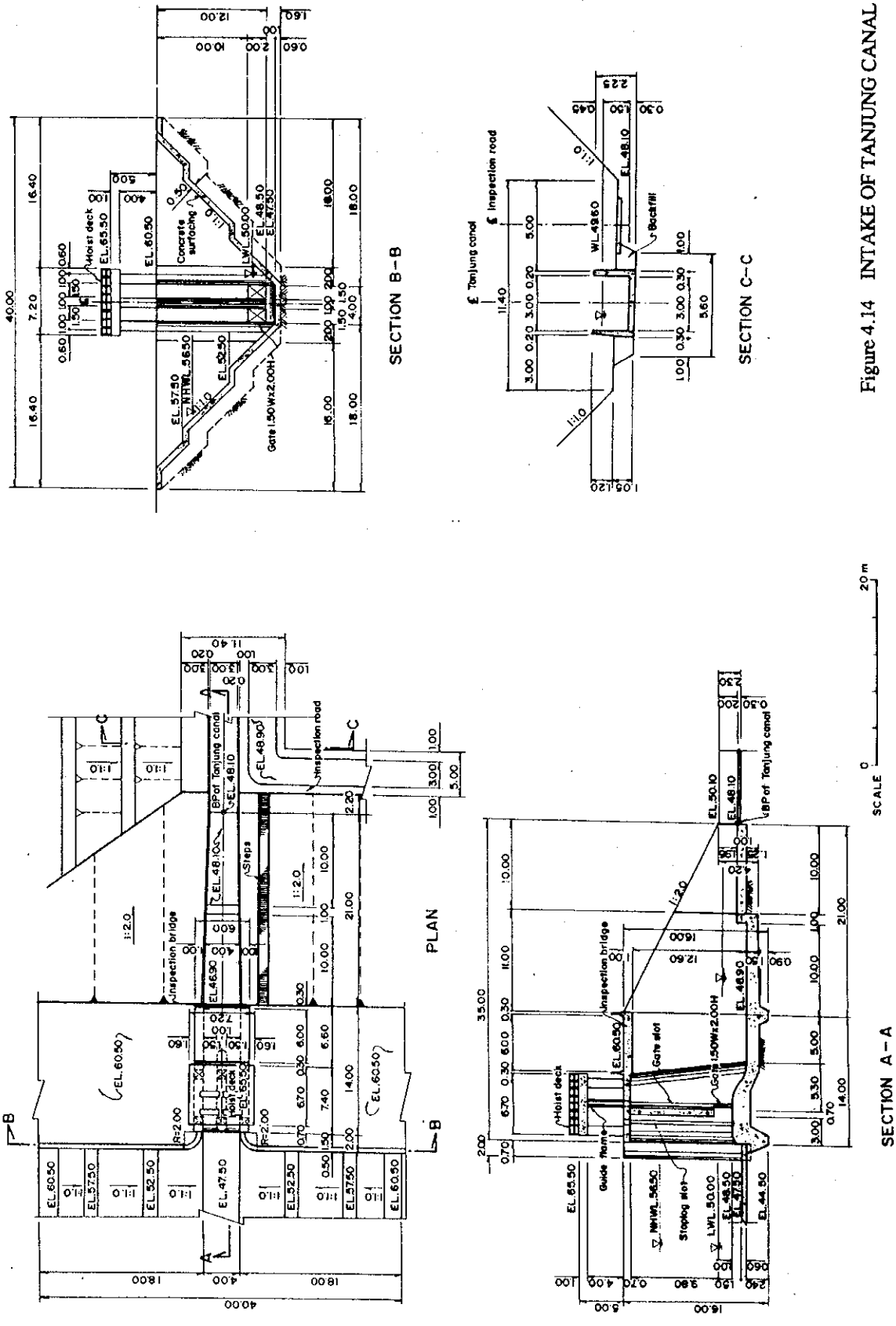


Figure 4.14 INTAKE OF TANJUNG CANAL

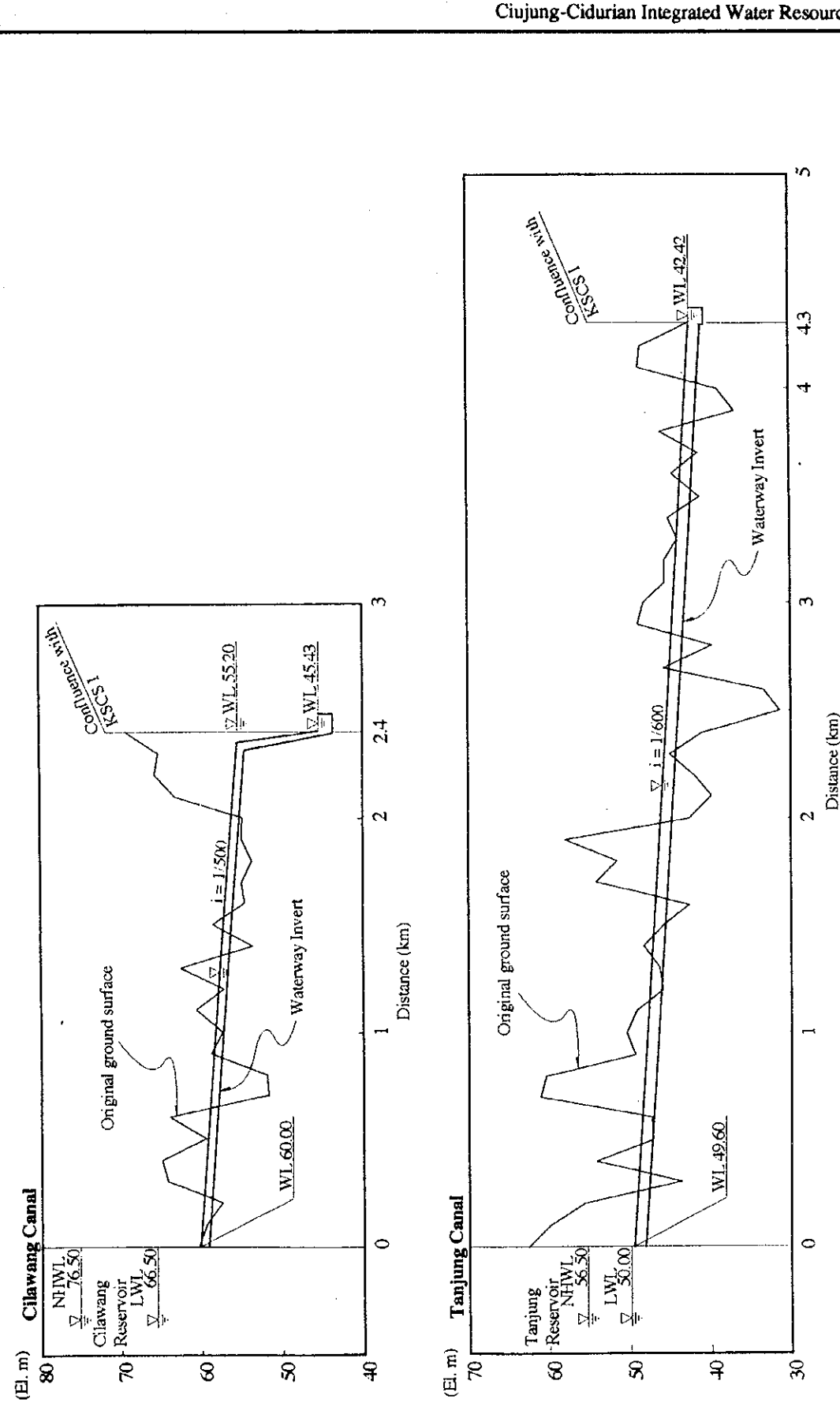
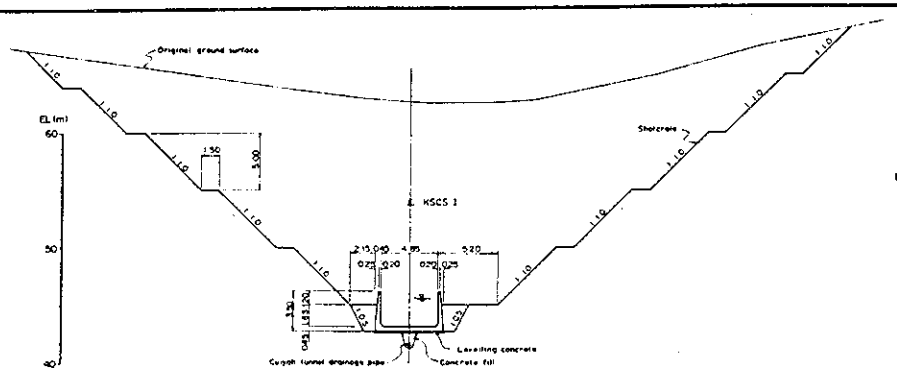
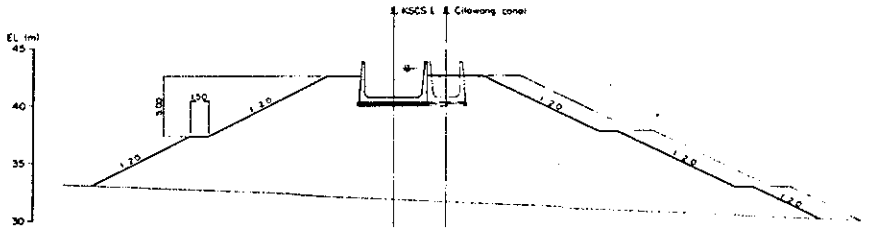


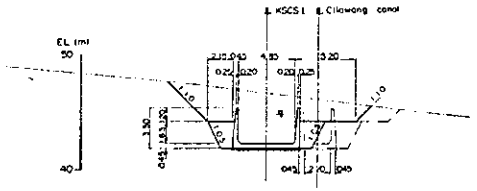
Figure 4.15 PROPOSED LONGITUDINAL PROFILE OF TANJUNG AND CILAWANG CANAL



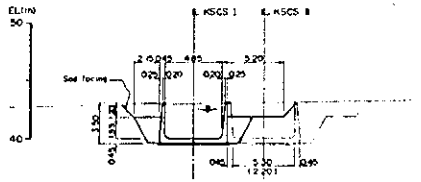
SEC. 0 Km (BP of KSCS)



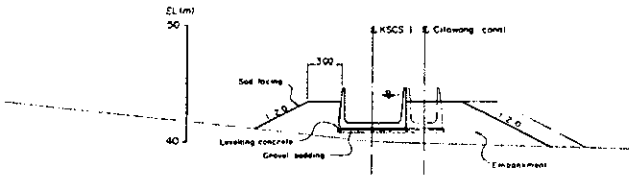
SEC. 14.0 Km



SEC. 4.0 Km



SEC. 16.0 Km



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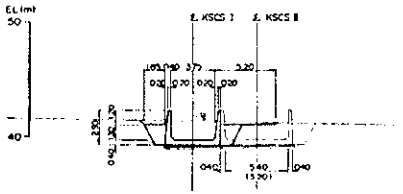
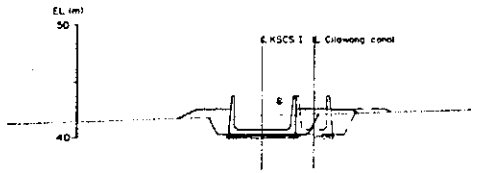
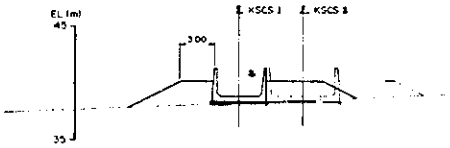


SEC. 20.0 Km



SEC. 12.0 Km



SEC. 24.0 Km

Scale 0 10 20(m)

Figure 4.16 CROSS SECTION OF KARIAN SERPONG CONVEYANCE SYSTEM (1/2)

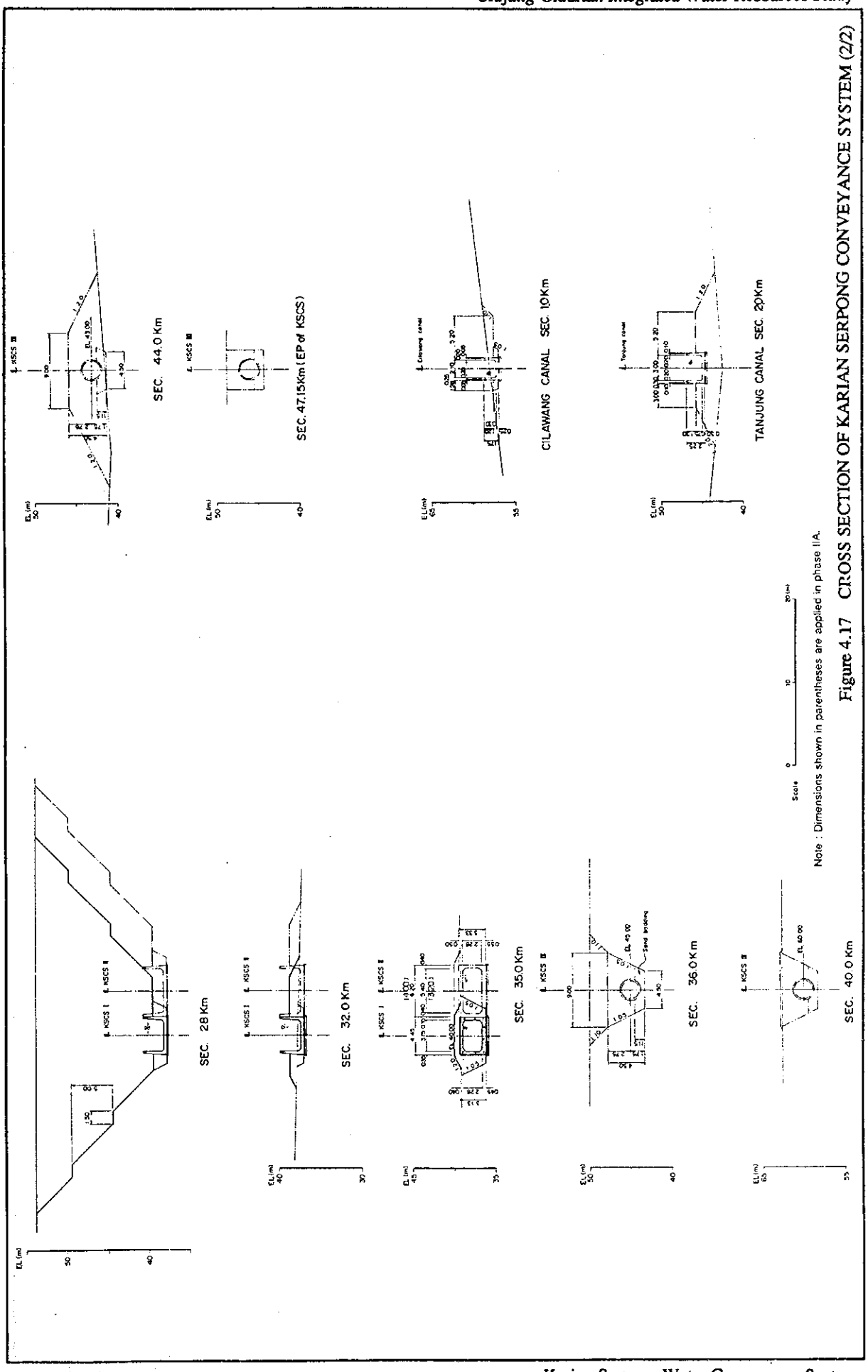


Figure 4.17 CROSS SECTION OF KARIAN SERPONG CONVEYANCE SYSTEM (2/2)

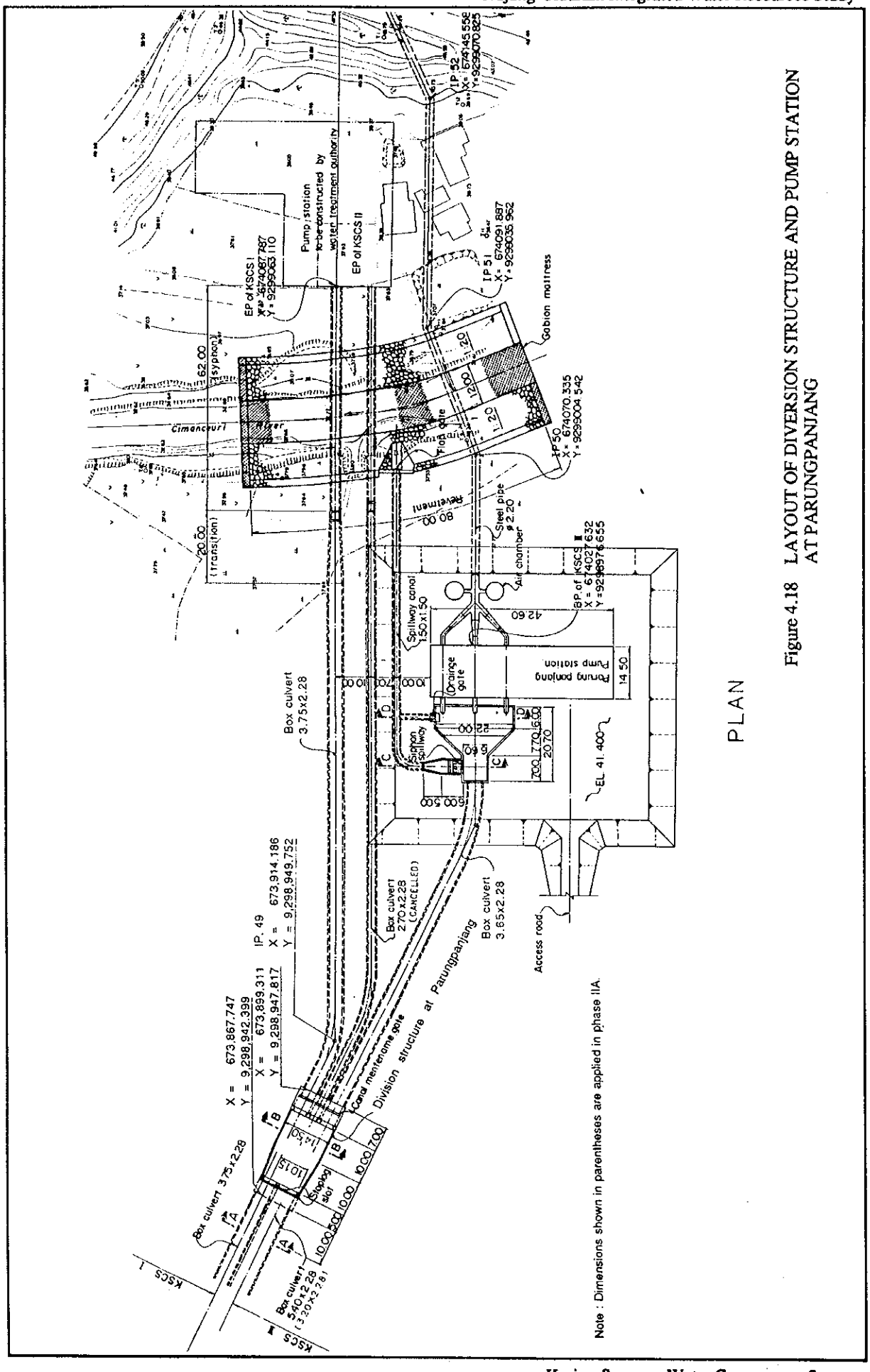


Figure 4.18 LAYOUT OF DIVERSION STRUCTURE AND PUMP STATION AT PARUNGPANJANG

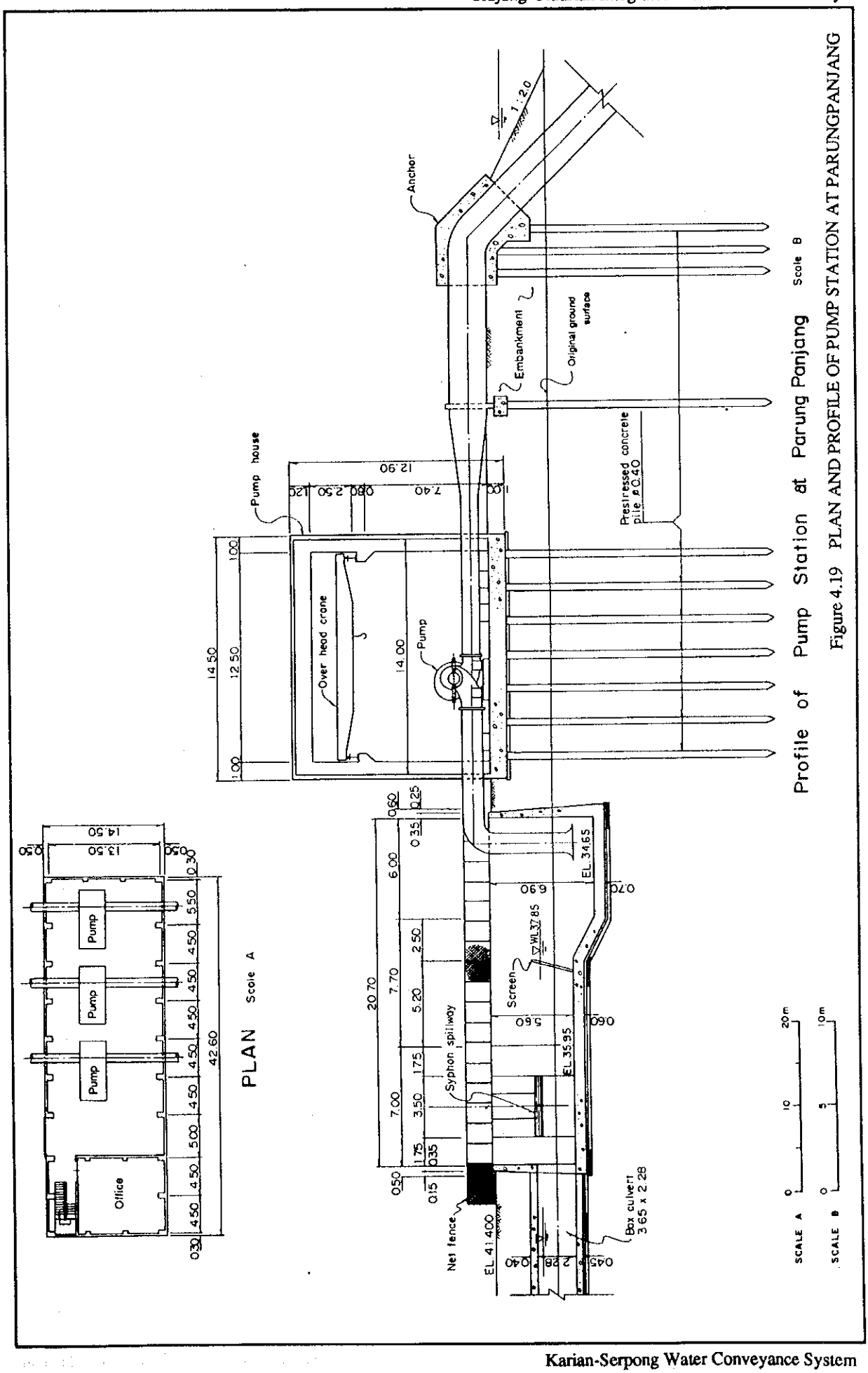


Figure 4.19 PLAN AND PROFILE OF PUMP STATION AT PARUNGPANJANG

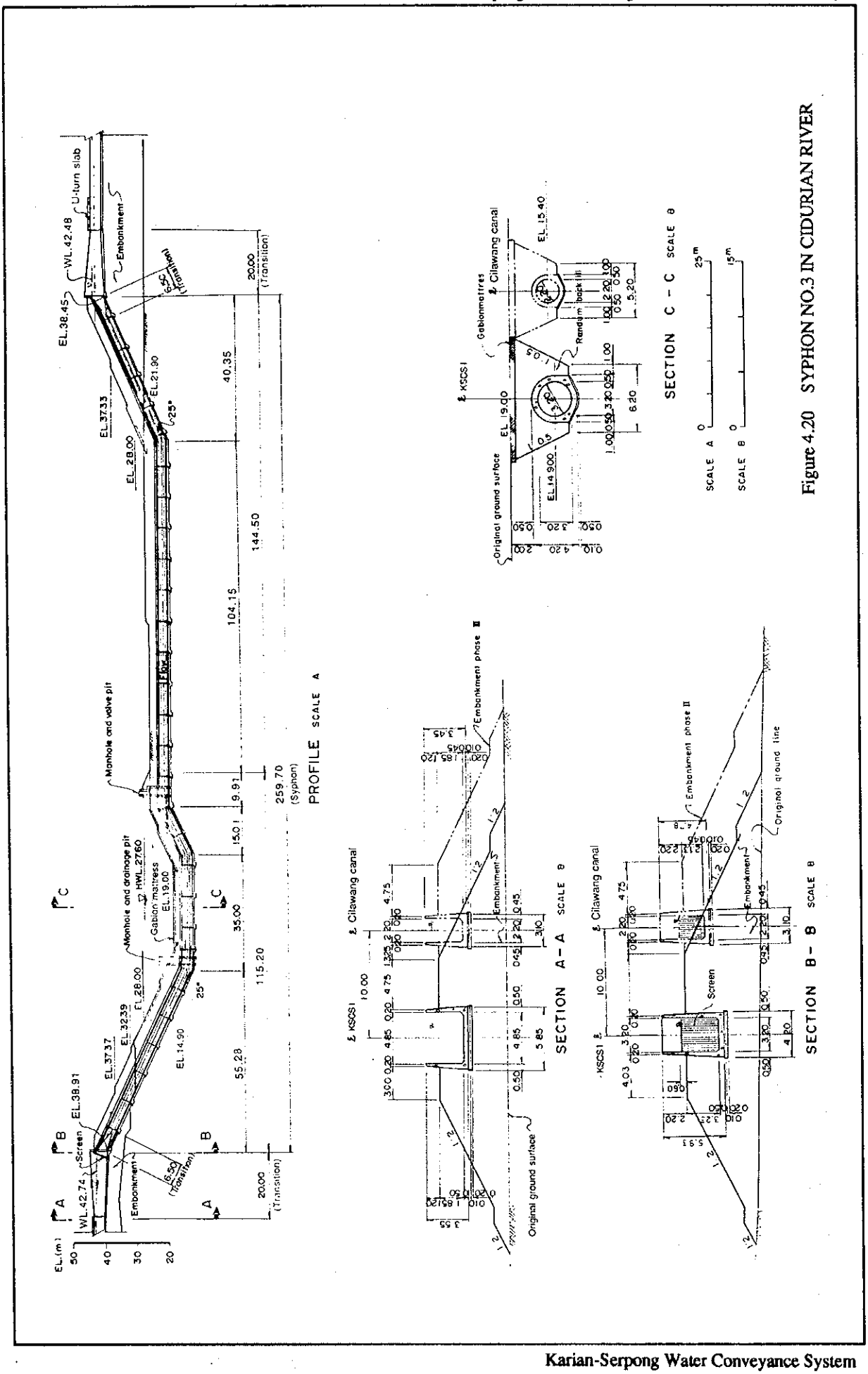


Figure 4.20 SYPHON NO.3 IN CIDURIAN RIVER

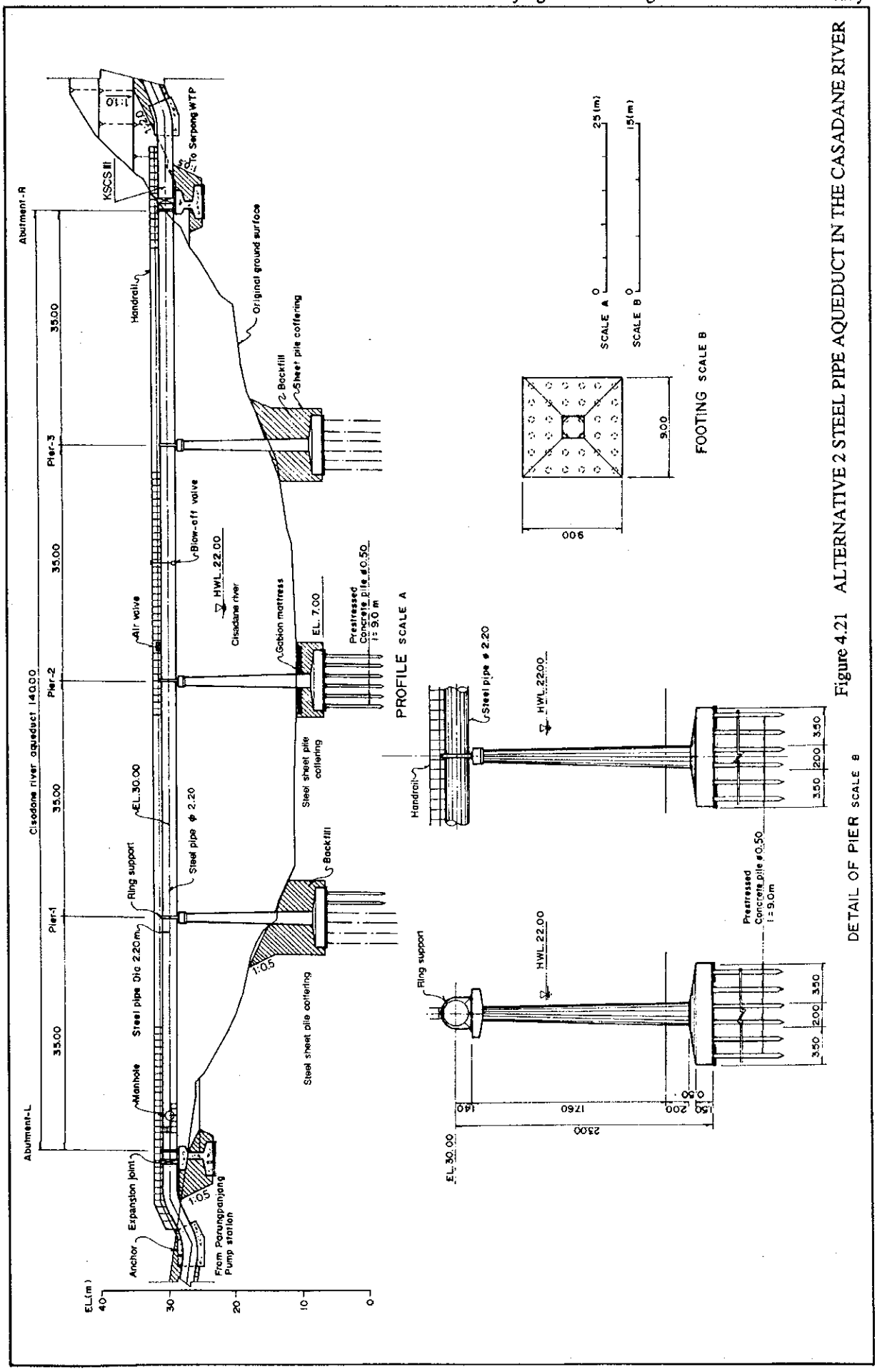


Figure 4.21 ALTERNATIVE 2 STEEL PIPE AQUEDUCT IN THE CASADANE RIVER