Table 3 EXISTING AND PROPOSED ABSTRACTION AND TREATMENT CAPACITY OF PWD AND PWA PUBLIC WATER SUPPLY FACILITIES IN 1982 AND 1985 (1/3)

State	Water Supply Region	Intake	Existing Capacity in 1982 (mgd)	Existing Capacity in 1982 (10^6 m^3/y)	Proposed Capacity in 1985 (mgd)	Proposed Capacity in 1985 (10^6 m^3/y)
Perlis	1. Kangar	1 Arau Canal	2.50	4.15	2.50	4.15
		1000 Kaki Bukit	0.05	0.08	0.05	0.08
		1001 Padang Besar	0.25	0.42	0.14	0.42
		1002 Abi	0.40	0.66	N.A.	N.A.
		1003 Arau Well	1.30	2.16	N.A.	N.A.
		101 Arau Canal	-	-	6.50	10.79
		Sub-total	4.50	7.47	9.19/1	15.44/1
		5001 Bt. Way	0.06	0.10	-	-
		Sub-total	0.06	0.10	-	-
		Total	4.56	7.57	9.30/1	15.44/1
	2. Cuping	1004 Cuping	0.24	0.40	0.24	0.40
		Total	0.24	0.40	0.24	0.40
Perlis Total			4.80	7.97	9.54/1	15.84/1
Kedah	3. Changlun	2	1.00	1.66	1.00	1.66
		102	-	-	1.00	1.66
		Total	1.00	1.66	2.00	3.32
	4. Alor Setar	3	20.00	33.20	20.00	33.20
		103	-	-	10.00	16.60
		Sub-total	20.00	33.20	30.00	49.80
		5002	0.60	1.00	-	-
		5003	1.20	1.99	-	-
		5004	0.60	1.00	-	-
		5005	5.00	8.30	-	-
		5006	0.40	0.66	-	-
		Sub-total	7.80	12.95	-	-
		Total	27.80	46.15	30.00	49.80

Remarks; (1): N.A. signifies "data are not available"

(2): Existing river intake number: 1 - 100
Existing well as spring intake number: 1000 - 5000
Proposed intake number: 101 - 200
Number of intakes for temporary water supply systems: 5001 -

(3): Temporary public water supply systems are assumed to stop operation before 5MP.

/1 : Excluding these of intakes 1002 and 1003

Table 4 EXISTING AND PROPOSED ABSTRACTION AND TREATMENT CAPACITY OF PWD AND PWA PUBLIC WATER SUPPLY FACILITIES IN 1982 AND 1985 (2/3)

State	Water Supply Region		Intake	Existing Capacity in 1982 (mgd)	Existing Capacity in 1982 (10^6 m^3/y)	Proposed Capacity in 1985 (mgd)	Proposed Capacity in 1985 (10^6 m^3/y)
	5. Kuala Nerang	4		1.00	1.66	1.00	1.66
		104		-	-	0.30	0.50
		105		-	-	4.00	6.64
			Total	1.00	1.66	5.30	8.80
	6. Pendang	5	MADA Canal	4.00	6.64	4.00	6.64
			Sub-total	4.00	6.64	4.00	6.64
		5007	Yan	1.20	1.99	-	-
			Sub-total	1.20	1.99	-	-
			Total	5.20	8.63	4.00	6.64
	7. Jeneri	6	Sg. Pamoai	0.20	0.33	0.20	0.33
		7	Sg. Potat	0.05	0.08	0.05	0.08
		106		-	-	4.00	6.64
			Total	0.25	0.41	4.25	7.05
	8. Jeniang	8	Jeniang	0.06	0.10	0.06	0.10
		107		-	-	4.00	6.64
			Total	0.06	0.10	4.06	6.74
	9. Sik	9	Sik	0.10	0.17	0.10	0.17
		108		-	-	4.00	6.64
			Total	0.10	0.17	4.10	6.81
	10. Sg. Petani	10	Teroi Intake	0.10	0.17	0.10	0.17
		11	Perigi Intake	0.25	0.42	0.25	0.42
		12	Yen Intake	0.25	0.42	0.25	0.42
		13	Guron Intake	0.20	0.33	0.20	0.33
		14	Merbok Intake	0.25	0.42	0.25	0.42
		15	Tutah Intake	1.20	1.99	1.20	1.99
		16		7.20	11.95	7.20	11.95
		109		-	-	15.00	24.90
			Total	9.45	15.70	24.45	40.60
	11. Kuala Ketil	110		-	-	4.00	6.64
			Total	0.00	0.00	4.00	6.64

Remarks; (1): Existing river intake number: 1 - 100
Existing well as spring intake number: 1000 - 5000
Proposed intake number: 101 - 200
Number of intakes for temporary water supply systems: 5001 -

(2): Temporary public water supply systems are assumed to stop operation before 5MP

Table 5 EXISTING AND PROPOSED ABSTRACTION AND TREATMENT CAPACITY OF PWD AND PWA PUBLIC WATER SUPPLY FACILITIES IN 1982 AND 1985 (3/3)

State	Water Supply Region		Intake	Existing Capacity in 1982 (mgd)	Existing Capacity in 1982 (10^6 m^3/y)	Proposed Capacity in 1985 (mgd)	Proposed Capacity in 1985 (10^6 m^3/y)
	12. Baling	17	Sg. Chrok	0.15	0.25	0.15	0.25
		18	Sg. Baling	1.05	1.74	1.05	1.74
		111		-	-	6.00	9.96
		112	Sg. Baling	-	-	0.60	1.00
			Total	1.20	1.99	7.80	12.95
	13. Kulim/1	113		-	-	3.00	4.98
			Total	0.00	0.00	3.00	4.98
	14. Karangan	19	Karangan	0.06	0.10	0.06	0.10
			Total	0.06	0.10	0.06	0.10
				46.12	76.57	93.02/2	154.43/2
	15. Perai	20	Lahar Tiang	32.00	53.12	32.00	53.12
		21	Bt. Toh Allang	11.50	19.09	11.50	19.09
		22	Berapit	0.20	0.33	0.20	0.33
		23	Sg. Cherok Tokan	0.15	0.25	0.15	0.25
		24	Pt. Seraya	0.005	0.008	0.005	0.008
			Total	43.86	72.80	43.86	72.80
	16. P. Pinang	25-28		3.70	6.14	3.70	6.14
		29-39		8.30	13.78	8.30	13.78
		40-41		3.00	4.98	3.00	4.98
		42		0.08	0.13	0.08	0.13
		43-44		2.80	4.65	2.80	4.65
		45-46		1.70	2.82	1.70	2.82
		47	Ayer Itam Dam	4.00	6.64	4.00	6.64
		48		0.30	0.50	0.30	0.50
			Total	23.88	39.64	23.88	39.64
				67.74	112.44	67.74	112.44
				118.66	196.98	170.30/2	282.71/2

Remarks; (1): Existing river intake number: 1 - 100
Existing well as spring intake number: 1000 - 5000
Proposed intake number: 101 - 200
Number of intakes for temporary water supply systems: 5001 -

(2): Temporary public water supply systems are assumed to stop operation before 5MP

/1 : Water Supply Region 13 is provided with 3.0×10^6 m^3/y (1.8 mgd) of treated water by PWA.

/2 : Excluding these of intake 1002 and 1003

Table 6 PROJECTED SERVICES FACTOR FOR URBAN AREA

Unit: %

Population Size (10^3)	1983	1990	2000
More than 100	100	100	100
100 - 10	85	90	100

Table 7 PROJECTED SERVICE FACTOR FOR RURAL AREA FOR PWD AND PWA WATER SUPPLY AND MOH SUPPLY THROUGH RESP

Unit: %

	Estimated 1983			1990			2000		
	PWD	MOH	Total	PWD	MOH	Total	PWD	MOH	Total
Perlis	75.0	8.0	83.0	75.0	18.0	93.0	75.0	25.0	100.0
Kedah	41.4	23.6	65.0	60.8	34.2	95.0	64.4	35.6	100.0
P. Pinang	81.0	1.0	82.0	89.4	2.6	92.0	95.2	4.8	100.0

Table 8 PROJECTED PER CAPITA DAILY USE

Unit: lpcd

Population Size (10^3)	Estimated 1983	1990	2000
City/Town			
More than 1,000	220	240	270
1,000 - 500	200	220	250
500 - 100	180	200	230
100 - 10	170	190	220
Rural			
PWD	90	125	175
MOH	40	55	70
Private	40	40	40

Table 9 PROJECTED POPULATION SERVED BY PUBLIC WATER SUPPLY SYSTEMS BY WATER SUPPLY REGION (1/2)

Unit: 10^3

State	Water Supply Region	City & Rural		Estimated 1983	Projected 1990	Projected 2000
Perlis	1. Kangar	1	Kangar	12	16	28
			Rural	106	130	149
			Total	118	146	177
	2. Cuping		Rural	12	14	17
			Total	12	14	17
Perlis Total				130	160	194
Kedah	3. Changlun		Rural	15	21	22
			Total	15	21	22
	4. Alor Setar	2	Alor Setar	60	68	87
		101	Jitra	14	24	49
			Rural	215	339	369
			Total	289	431	505
	5. Kuala Nerang		Rural	30	50	57
			Total	30	50	57
	6. Pendang	102	Guan Chempedak	8	10	14
		103	Yan	5	8	14
			Rural	50	83	97
			Total	63	101	125
	7. Jeneri		Rural	21	35	38
			Total	21	35	38
	8. Jeniang		Rural	33	52	57
			Total	33	52	57
	9. Sik		Rural	17	27	28
			Total	17	27	28
	10. Sg. Petani	3	Sg. Petani	41	51	79
		104	Tikan Batu	4	8	17
			Rural	87	141	164
			Total	132	200	260

Table 10 PROJECTED POPULATION SERVED BY PUBLIC WATER SUPPLY SYSTEMS BY WATER SUPPLY REGION (2/2)

Unit: 10^3

State	Water Supply Region	City & Rural		Estimated 1983	Projected 1990	Projected 2000
	11. Kuala Ketil	203	Kuala Ketil	4	6	12
			Rural	39	57	63
			Total	43	63	75
	12. Baling		Rural	42	59	67
			Total	42	59	67
	13. Kulim	4	Kulim	25	34	56
			Rural	32	47	46
			Total	57	81	102
	14. Karangan		Rural	9	13	12
			Total	9	13	12
Kedah Total				751	1,133	1,348
P. Pinang	15. Perai	5	Butterworth	65	69	77
		6	Bt. Mertajam	25	26	29
		109	Kg. Pmtg Kuching	9	9	10
		110	Perai	9	9	10
		201	Bandar Seberang Jaya	26	76	250
			Rural	267	300	326
			Total	401	489	702
	16. P. Pinang	8	Georgetown	253	253	253
		105	Air Itam	31	33	37
		106	Tg. Tokong	18	14	15
		107	Gelugor	12	13	14
		108	Tg. Bunga	9	10	11
		202	Bandar Bayan Baru	34	80	250
			Rural	124	139	151
			Total	481	542	731
P. Pinang Total				882	1,031	1,433
P.K.P. Total				1,763	2,324	2,975

Table 11 ESTIMATED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 1983 (1/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic					Industrial			Total
			Public			Private	Total	Public	Private	Total	
			Untreated	Treated	Total						
Perlis	1. Kangar	City									
		1 Kangar	1.1	-	1.1	0.0	1.1	1.4	0.1	1.5	2.6
		Rural									
		1 Perlis	4.8	0.2	5.0	0.4	5.4	0.3	0.0	0.3	5.7
		Total	5.9	0.2	6.1	0.4	6.5	1.7	0.1	1.8	8.3
	2. Cuping	Rural									
		1 Perlis	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.5
Perlis Total			6.4	0.2	6.6	0.4	7.0	1.7	0.1	1.8	8.8
Kedah	3. Changlun	Rural									
		3 Kubang Pasu	0.5	0.1	0.6	0.1	0.7	0.1	0.0	0.1	0.8
	4. Alor Setar	City									
		2 Alor Setar	5.6	-	5.6	0.2	5.8	4.3	0.5	4.8	10.6
		101 Jitra	1.3	-	1.3	0.0	1.3	0.1	0.0	0.1	1.4
		City Total	6.9	-	6.9	0.2	7.1	4.4	0.5	4.9	12.0
		Rural									
		3 Kubang Pasu	2.0	0.3	2.3	0.5	2.8	0.3	0.0	0.3	3.1
		5 Kota Setar	4.5	0.8	5.3	1.1	6.4	0.3	0.0	0.3	6.7
		6 Pendang	0.3	0.0	0.3	0.1	0.4	0.0	0.0	0.0	0.4
		Rural Total	6.8	1.1	7.9	1.7	9.6	0.6	0.0	0.6	10.2
		Total	13.7	1.1	14.8	1.9	16.7	5.0	0.5	5.5	22.2
	5. Kuala Nerang	Rural									
		4 Padang Terap	0.9	0.2	1.1	0.2	1.3	0.5	0.0	0.5	1.8
	6. Pendang	City									
		102 Guar Chempedak	0.4	-	0.4	0.0	0.4	0.5	0.0	0.5	0.9
		103 Yan	0.2	-	0.2	0.0	0.2	0.4	0.0	0.4	0.6
		City Total	0.6	-	0.6	0.0	0.6	0.9	0.0	0.9	1.5
		Rural									
		6 Pendang	0.7	0.2	0.9	0.3	1.2	0.2	0.0	0.2	1.4
		7 Yan	0.6	0.1	0.7	0.1	0.8	0.1	0.0	0.1	0.9
		Rural Total	1.3	0.3	1.6	0.4	2.0	0.3	0.0	0.3	2.3
		Total	1.9	0.3	2.2	0.4	2.6	1.2	0.0	1.2	3.8
	7. Jeneri	Rural									
		5 Kota Setar	0.4	0.0	0.4	0.1	0.5	0.0	0.0	0.0	0.5
		6 Pendang	0.4	0.1	0.5	0.1	0.6	0.1	0.0	0.1	0.7
		Rural Total	0.8	0.1	0.9	0.2	1.1	0.1	0.0	0.1	1.2
	8. Jeniang	Rural									
		8 Sik	0.4	0.1	0.5	0.1	0.6	0.3	0.0	0.3	0.9
		9 Kuala Muda	0.6	0.1	0.7	0.2	0.9	0.1	0.0	0.1	1.0
		Rural Total	1.0	0.2	1.2	0.3	1.5	0.4	0.0	0.4	1.9
	9. Sik	Rural									
		8 Sik	0.5	0.1	0.6	0.1	0.7	0.4	0.0	0.4	1.1
	10. Sg. Petani	City									
		3 Sg. Petani	3.8	-	3.8	0.1	3.9	2.7	0.3	3.0	6.9
		104 Tikan Batu	0.2	-	0.2	0.0	0.2	0.3	0.0	0.3	0.5
		City Total	4.0	-	4.0	0.1	4.1	3.0	0.3	3.3	7.4
		Rural									
		7 Yan	0.4	0.1	0.5	0.1	0.6	0.0	0.0	0.0	0.6
		9 Kuala Muda	2.3	0.4	2.7	0.6	3.3	0.3	0.0	0.3	3.6
		Rural Total	2.7	0.5	3.2	0.7	3.9	0.3	0.0	0.3	4.2
		Total	6.7	0.5	7.2	0.8	8.0	3.3	0.3	3.6	11.6

Table 12 ESTIMATED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 1983 (2/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic					Industrial			
			Public			Private	Total	Public	Private	Total	Total
			Treated	Untreated	Total						
	11. Kuala Ketil	City									
		203 Kuala Ketil	0.2	-	0.2	0.0	0.2	0.0	0.0	0.0	0.2
		Rural									
		9 Kuala Muda	0.3	0.0	0.3	0.1	0.4	0.0	0.0	0.0	0.4
		10 Baling	0.8	0.1	0.9	0.2	1.1	0.1	0.0	0.1	1.2
		11 Kulim	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1
		Rural Total	1.2	0.1	1.3	0.3	1.6	0.1	0.0	0.1	1.7
		Total	1.4	0.1	1.5	0.3	1.8	0.1	0.0	0.1	1.9
	12. Baling	Rural									
		10 Baling	1.3	0.2	1.5	0.3	1.8	0.4	0.0	0.4	2.2
	13. Kulim	City									
		4 Kulim	2.3	-	2.3	0.1	2.4	0.4	0.0	0.4	2.8
		Rural									
		11 Kulim	1.0	0.2	1.2	0.3	1.5	0.2	0.0	0.2	1.7
		Total	3.3	0.2	3.5	0.4	3.9	0.6	0.0	0.6	4.5
	14. Karangan	Rural									
		11 Kulim	0.3	0.0	0.3	0.1	0.4	0.1	0.0	0.1	0.5
Kedah Total			32.3	3.1	35.4	5.1	40.5	12.2	0.8	13.0	53.5
P. Pinang	15. Perai	City									
		5 Butterworth	5.3	-	5.3	0.2	5.5	15.1	1.7	16.8	22.3
		6 Bt. Mertajam	2.0	-	2.0	0.1	2.1	5.8	0.6	6.4	8.5
		109 Kg. Pmtg Kuching	0.7	-	0.7	0.0	0.7	1.3	0.1	1.4	2.1
		110 Perai	0.7	-	0.7	0.0	0.7	12.3	1.4	13.7	14.4
		201 Bandar Seberang Jaya	2.1	-	2.1	0.1	2.2	1.4	0.1	1.5	3.7
		City Total	10.8	-	10.8	0.4	11.2	35.9	3.9	39.8	51.0
		Rural									
		13 Utara	4.3	0.0	4.3	0.3	4.6	4.8	0.5	5.3	9.9
		14 Tengah	4.4	0.0	4.4	0.3	4.7	4.3	0.4	4.7	9.4
		15 Selatan	2.7	0.0	2.7	0.2	2.9	4.4	0.5	4.9	7.8
		Rural Total	11.4	0.0	11.4	0.8	12.2	13.5	1.4	14.9	27.1
		Total	22.2	0.0	22.2	1.2	23.4	49.4	5.3	54.7	78.1
	16. P. Pinang	City									
		8 Georgetown	20.6	-	20.6	0.0	20.6	8.1	0.9	9.0	29.6
		105 Air Itam	2.5	-	2.5	0.1	2.6	4.1	0.4	4.5	7.1
		106 Tg. Tokong	1.5	-	1.5	0.0	1.5	1.6	0.2	1.8	3.3
		107 Gelugor	1.0	-	1.0	0.0	1.0	0.7	0.1	0.8	1.8
		108 Tg. Bunga	0.7	-	0.7	0.0	0.7	1.2	0.1	1.3	2.0
		202 Bandar Bayan Baru	2.8	-	2.8	0.1	2.9	1.6	0.2	1.8	4.7
		City Total	29.1	-	29.1	0.2	29.3	17.3	1.9	19.2	48.5
		Rural									
		16 Timur Laut	3.0	0.0	3.0	0.2	3.2	2.2	0.2	2.4	5.6
		17 Barat Daya	2.3	0.0	2.3	0.2	2.5	3.1	0.3	3.4	5.9
		Rural Total	5.3	0.0	5.3	0.4	5.7	5.3	0.5	5.8	11.5
		Total	34.4	0.0	34.4	0.6	35.0	22.6	2.4	25.0	60.0
P. Pinang Total			56.6	0.0	56.6	1.8	58.4	72.0	7.7	79.7	138.1
P.K.P. Total			95.3	3.3	98.6	7.3	105.9	85.9	8.6	94.5	200.4

Table 13 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 1990 (1/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic					Industrial			
			Public			Private	Total	Public	Private	Total	Total
			Treated	Untreated	Total						
Perlis	1. Kangar	City									
		1 Kangar	1.5	-	1.5	0.0	1.5	3.1	0.3	3.4	4.9
		Rural									
		1 Perlis	6.3	0.5	6.8	0.2	7.0	0.2	0.0	0.2	7.2
		Total	7.8	0.5	8.3	0.2	8.5	3.3	0.3	3.6	12.1
	2. Cuping	Rural									
		1 Perlis	0.7	0.1	0.8	0.0	0.8	0.0	0.0	0.0	0.8
Perlis Total			8.5	0.6	9.1	0.2	9.3	3.3	0.3	3.6	12.9
Kedah	3. Changlun	Rural									
		3 Kubang Pasu	0.8	0.2	1.0	0.0	1.0	0.0	0.0	0.0	1.0
	4. Alor Setar	City									
		2 Alor Setar	6.2	-	6.2	0.1	6.3	9.5	1.1	10.6	16.9
		101 Jitra	2.2	-	2.2	0.0	2.2	0.4	0.0	0.4	2.6
		City Total	8.4	-	8.4	0.1	8.5	9.9	1.1	11.0	19.5
		Rural									
		3 Kubang Pasu	3.5	0.7	4.2	0.1	4.3	0.2	0.0	0.2	4.5
		5 Kota Setar	9.0	1.7	10.7	0.2	10.9	0.2	0.0	0.2	11.1
		6 Pendang	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7
		Rural Total	13.1	2.5	15.6	0.3	15.9	0.4	0.0	0.4	16.3
		Total	21.5	2.5	24.0	0.4	24.4	10.3	1.1	11.4	35.8
	5. Kuala Nerang	Rural									
		4 Padang Terap	1.9	0.4	2.3	0.0	2.3	0.3	0.0	0.3	2.6
	6. Pendang	City									
		102 Guan Chempedak	0.9	-	0.9	0.0	0.9	0.9	0.1	1.0	1.9
		103 Yan	0.5	-	0.5	0.0	0.5	0.8	0.1	0.9	1.4
		City Total	1.4	-	1.4	0.0	1.4	1.7	0.2	1.9	3.3
		Rural									
		6 Pendang	2.0	0.4	2.4	0.0	2.4	0.1	0.0	0.1	2.5
		7 Yan	1.2	0.2	1.4	0.0	1.4	0.0	0.0	0.0	1.4
		Rural Total	3.2	0.6	3.8	0.0	3.8	0.1	0.0	0.1	3.9
		Total	4.6	0.6	5.2	0.0	5.2	1.8	0.2	2.0	7.2
	7. Jeneri	Rural									
		5 Kota Setar	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7
		6 Pendang	0.8	0.1	0.9	0.0	0.9	0.0	0.0	0.0	0.9
		Rural Total	1.4	0.2	1.6	0.0	1.6	0.0	0.0	0.0	1.6
	8. Jeniang	Rural									
		8 Sik	0.8	0.1	0.9	0.0	0.9	0.2	0.0	0.2	1.1
		9 Kuala Muda	1.2	0.2	1.4	0.0	1.4	0.0	0.0	0.0	1.4
		Rural Total	2.0	0.3	2.3	0.0	2.3	0.2	0.0	0.2	2.5
	9. Sik	Rural									
		8 Sik	1.0	0.2	1.2	0.0	1.2	0.2	0.0	0.2	1.4
	10. Sg. Petani	City									
		3 Sg. Petani	4.7	-	4.7	0.1	4.8	6.0	0.7	6.7	11.5
		104 Tikan Batu	0.5	-	0.5	0.0	0.5	0.8	0.1	0.9	1.4
		City Total	5.2	-	5.2	0.1	5.3	6.8	0.8	7.6	12.9
		Rural									
		7 Yan	0.8	0.2	1.0	0.0	1.0	0.0	0.0	0.0	1.0
		9 Kuala Muda	4.6	0.9	5.5	0.1	5.6	0.2	0.0	0.2	5.8
		Rural Total	5.4	1.1	6.5	0.1	6.6	0.2	0.0	0.2	6.8
		Total	10.6	1.1	11.7	0.2	11.9	7.0	0.8	7.8	19.7

Table 14 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 1990 (2/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic: Public Treated	Domestic: Public Un-Treated	Domestic: Public Total	Domestic: Private	Domestic Total	Industrial: Public	Industrial: Private	Industrial Total	Total
	11. Kuala Ketil	City									
		203 Kuala Ketil	0.4	-	0.4	0.0	0.4	0.0	0.0	0.0	0.4
		Rural									
		9 Kuala Muda	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7
		10 Baling	1.3	0.3	1.6	0.0	1.6	0.1	0.0	0.1	1.7
		11 Kulim	0.2	0.1	0.3	0.0	0.3	0.0	0.0	0.0	0.3
		Rural Total	2.1	0.5	2.6	0.0	2.6	0.1	0.0	0.1	2.7
		Total	2.5	0.5	3.0	0.0	3.0	0.1	0.0	0.1	3.1
	12. Baling	Rural									
		10 Baling	2.3	0.4	2.7	0.0	2.7	0.2	0.0	0.2	2.9
	13. Kulim	City									
		4 Kulim	3.1	-	3.1	0.1	3.2	0.7	0.1	0.8	4.0
		Rural									
		11 Kulim	1.7	0.4	2.1	0.0	2.1	0.1	0.0	0.1	2.2
		Total	4.8	0.4	5.2	0.1	5.3	0.8	0.1	0.9	6.2
	14. Karangan	Rural									
		11 Kulim	0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6
Kedah Total			53.9	6.9	60.8	0.7	61.5	20.9	2.2	23.1	84.6
P. Pinang	15. Perai	City									
		5 Butterworth	6.3	-	6.3	0.1	6.4	22.2	2.5	24.7	31.1
		6 Bt. Mertajam	2.4	-	2.4	0.0	2.4	8.5	0.9	9.4	11.8
		109 Kg. Pmtg Kuching	0.8	-	0.8	0.0	0.8	1.5	0.2	1.7	2.5
		110 Perai	0.8	-	0.8	0.0	0.8	18.1	2.0	20.1	20.9
		201 Bandar Seberan Jaya	6.9	-	6.9	0.1	7.0	9.4	1.0	10.4	17.4
		City Total	17.2	-	17.2	0.2	17.4	59.7	6.6	66.3	83.7
		Rural									
		13 Utara	6.7	0.1	6.8	0.1	6.9	3.7	0.4	4.1	11.0
		14 Tengah	6.8	0.1	6.9	0.1	7.0	3.2	0.4	3.6	10.6
		15 Selatan	4.1	0.0	4.1	0.1	4.2	3.3	0.4	3.7	7.9
		Rural Total	17.6	0.2	17.8	0.3	18.1	10.2	1.2	11.4	29.5
		Total	34.8	0.2	35.0	0.5	35.5	69.9	7.8	77.7	113.2
	16. P. Pinang	City									
		8 Georgetown	22.9	-	22.9	0.0	22.9	11.9	1.4	13.3	36.2
		105 Air Itam	3.0	-	3.0	0.1	3.1	5.9	0.6	6.5	9.6
		106 Tg. Tokong	1.3	-	1.3	0.0	1.3	2.3	0.2	2.5	3.8
		107 Gelugor	1.2	-	1.2	0.0	1.2	2.0	0.2	2.2	3.4
		108 Tg. Bunga	0.9	-	0.9	0.0	0.9	1.8	0.2	2.0	2.9
		202 Bandar Bayan Baru	7.3	-	7.3	0.1	7.4	13.1	1.5	14.6	22.0
		City Total	36.6	-	36.6	0.2	36.8	37.0	4.1	41.1	77.9
		Rural									
		16 Timur Laut	4.6	0.0	4.6	0.1	4.7	1.6	0.2	1.8	6.5
		17 Barat Daya	3.5	0.0	3.5	0.1	3.6	2.4	0.3	2.7	6.3
		Rural Total	8.1	0.0	8.1	0.2	8.3	4.0	0.5	4.5	12.8
		Total	44.7	0.0	44.7	0.4	45.1	41.0	4.6	45.6	90.7
P. Pinang Total			79.5	0.2	79.7	0.9	80.6	96.3	10.7	107.0	187.6
P.K.P. Total			141.9	7.7	149.6	1.8	151.4	120.5	13.2	133.7	285.1

Table 15 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 2000 (1/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic					Industrial			
			Public			Pri-			Pri-		
			Un-Treated	Treated	Total	vate	Total	Public	vate	Total	Total
Perlis	1. Kangar	City									
		1 Kangar	3.0	-	3.0	0.0	3.0	13.8	1.5	15.3	18.3
		Rural									
		1 Perlis	9.5	1.0	10.5	0.0	10.5	0.2	0.0	0.2	10.7
		Total	12.5	1.0	13.5	0.0	13.5	14.0	1.5	15.5	29.0
	2. Cuping	Rural									
		1 Perlis	1.0	0.1	1.1	0.0	1.1	0.0	0.0	0.0	1.1
Perlis Total			13.5	1.1	14.6	0.0	14.6	14.0	1.5	15.5	30.1
Kedah	3. Changlun	Rural									
		3 Kubang Pasu	1.2	0.2	1.4	0.0	1.4	0.1	0.0	0.1	1.5
	4. Alor Setar	City									
		2 Alor Setar	9.2	-	9.2	0.0	9.2	43.5	4.8	48.3	57.5
		101 Jitra	5.2	-	5.2	0.0	5.2	1.3	0.2	1.5	6.7
		City Total	14.4	-	14.4	0.0	14.4	44.8	5.0	49.8	64.2
		Rural									
		3 Kubang Pasu	5.0	0.8	5.8	0.0	5.8	0.2	0.0	0.2	6.0
		5 Kota Setar	13.9	2.4	16.3	0.0	16.3	0.2	0.0	0.2	16.5
		6 Pendang	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1
		Rural Total	19.8	3.4	23.2	0.0	23.2	0.4	0.0	0.4	23.6
		Total	34.2	3.4	37.6	0.0	37.6	45.2	5.0	50.2	87.8
	5. Kuala Nerang	Rural									
		4 Padang Terap	3.1	0.5	3.6	0.0	3.6	0.4	0.0	0.4	4.0
	6. Pendang	City									
		102 Guan Chempedak	1.5	-	1.5	0.0	1.5	4.5	0.5	5.0	6.5
		103 Yan	1.5	-	1.5	0.0	1.5	3.8	0.4	4.2	5.7
		City Total	3.0	-	3.0	0.0	3.0	8.3	0.9	9.2	12.2
		Rural									
		6 Pendang	3.1	0.5	3.6	0.0	3.6	0.1	0.0	0.1	3.7
		7 Yan	2.1	0.4	2.5	0.0	2.5	0.0	0.0	0.0	2.5
		Rural Total	5.2	0.9	6.1	0.0	6.1	0.1	0.0	0.1	6.2
		Total	8.2	0.9	9.1	0.0	9.1	8.4	0.9	9.3	18.4
	7. Jeneri	Rural									
		5 Kota Setar	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1
		6 Pendang	1.2	0.2	1.4	0.0	1.4	0.0	0.0	0.0	1.4
		Rural Total	2.1	0.4	2.5	0.0	2.5	0.0	0.0	0.0	2.5
	8. Jeniang	Rural									
		8 Sik	1.2	0.2	1.4	0.0	1.4	0.2	0.0	0.2	1.6
		9 Kuala Muda	2.0	0.3	2.3	0.0	2.3	0.0	0.0	0.0	2.3
		Rural Total	3.2	0.5	3.7	0.0	3.7	0.2	0.0	0.2	3.9
	9. Sik	Rural									
		8 Sik	1.5	0.2	1.7	0.0	1.7	0.3	0.0	0.3	2.0
	10. Sg. Petani	City									
		3 Sg. Petani	8.3	-	8.3	0.0	8.3	27.4	3.0	30.4	38.7
		104 Tikan Batu	1.8	-	1.8	0.0	1.8	4.1	0.5	4.6	6.4
		City Total	10.1	-	10.1	0.0	10.1	31.5	3.5	35.0	45.1
		Rural									
		7 Yan	1.4	0.2	1.6	0.0	1.6	0.0	0.0	0.0	1.6
		9 Kuala Muda	7.5	1.3	8.8	0.0	8.8	0.2	0.0	0.2	9.0
		Rural Total	8.9	1.5	10.4	0.0	10.4	0.2	0.0	0.2	10.6
		Total	19.0	1.5	20.5	0.0	20.5	31.7	3.5	35.2	55.7

Table 16 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND BY WATER SUPPLY REGION AND BY PURPOSE BY TYPE OF SUPPLY FOR 2000 (2/2)

Unit: 10^6 m^3/y

State	Water Supply Region	City & Rural	Domestic					Industrial			Total
			Public			Private	Total	Public	Private	Total	
			Treated	Untreated	Total						
	11. Kuala Ketil	City									
		203 Kuala Ketil	1.3	-	1.3	0.0	1.3	0.0	0.0	0.0	1.3
		Rural									
		9 Kuala Muda	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1
		10 Baling	2.1	0.4	2.5	0.0	2.5	0.2	0.0	0.2	2.7
		11 Kulim	0.4	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.5
		Rural Total	3.4	0.7	4.1	0.0	4.1	0.2	0.0	0.2	4.3
		Total	4.7	0.7	5.4	0.0	5.4	0.2	0.0	0.2	5.6
	12. Baling	Rural									
		10 Baling	3.6	0.6	4.2	0.0	4.2	0.3	0.0	0.3	4.5
	13. Kulim	City									
		4 Kulim	5.9	-	5.9	0.0	5.9	3.4	0.4	3.8	9.7
		Rural									
		11 Kulim	2.5	0.4	2.9	0.0	2.9	0.2	0.0	0.2	3.1
		Total	8.4	0.4	8.8	0.0	8.8	3.6	0.4	4.0	12.8
	14. Karangan	Rural									
		11 Kulim	0.7	0.1	0.8	0.0	0.8	0.0	0.0	0.0	0.8
Kedah Total			89.9	9.4	99.3	0.0	99.3	90.4	9.8	100.2	199.5
P. Pinang											
	15. Perai	City									
		5 Butterworth	8.1	-	8.1	0.0	8.1	33.9	3.8	37.7	45.8
		6 Bt. Mertajam	3.1	-	3.1	0.0	3.1	13.0	1.4	14.4	17.5
		109 Kg. Pmtg Kuching	1.1	-	1.1	0.0	1.1	2.4	0.3	2.7	3.8
		110 Perai	1.1	-	1.1	0.0	1.1	27.8	3.1	30.9	32.0
		210 Bandar Seberang Jaya	27.6	-	27.6	0.0	27.6	56.4	6.3	62.7	90.3
		City Total	41.0	-	41.0	0.0	41.0	133.5	14.9	148.4	189.4
		Rural									
		13 Utara	9.9	0.2	10.1	0.0	10.1	4.3	0.5	4.8	14.9
		14 Tengah	10.1	0.2	10.3	0.0	10.3	3.8	0.4	4.2	14.5
		15 Selatan	6.0	0.1	6.1	0.0	6.1	4.0	0.4	4.4	10.5
		Rural Total	26.0	0.5	26.5	0.0	26.5	12.1	1.3	13.4	39.9
		Total	67.0	0.5	67.5	0.0	67.5	145.6	16.2	161.8	229.3
	16. P. Pinang	City									
		8 Georgetown	26.3	-	26.3	0.0	26.3	18.2	2.0	20.2	46.5
		105 Air Itam	3.9	-	3.9	0.0	3.9	8.8	1.0	9.8	13.7
		106 Tg. Tokong	1.6	-	1.6	0.0	1.6	3.4	0.4	3.8	5.4
		107 Gelugor	1.5	-	1.5	0.0	1.5	3.2	0.3	3.5	5.0
		108 Tg. Bunga	1.2	-	1.2	0.0	1.2	2.7	0.3	3.0	4.2
		202 Bandar Bayan Baru	27.6	-	27.6	0.0	27.6	56.4	6.3	62.7	90.3
		City Total	62.1	-	62.1	0.0	62.1	92.7	10.3	103.0	165.1
		Rural									
		16 Timur Laut	6.8	0.1	6.9	0.0	6.9	2.0	0.2	2.2	9.1
		17 Barat Daya	5.3	0.1	5.4	0.0	5.4	2.8	0.3	3.1	8.5
		Rural Total	12.1	0.2	12.3	0.0	12.3	4.8	0.5	5.3	17.6
		Total	74.2	0.2	74.4	0.0	74.4	97.5	10.8	108.3	182.7
P. Pinang Total			141.2	0.7	141.9	0.0	141.9	169.3	18.8	188.1	330.0
P.K.P. Total			244.6	11.2	255.8	0.0	255.8	273.7	30.1	303.8	559.6

TAble 17 PROJECTED NET UNIT INDUSTRIAL WATER USE PER GROSS VALUE OF MANUFACTURING OUTPUT BY COMMODITY GROUP

Unit: $m^3/d/M\$10^6/y$

Commodity Group	Estimated 1983	Projected 1990 & 2000	Malaysian Data: Sampling Survey/1	Malaysian Data: Kedah & Perlis Report/2
1. Food	74.0	71.0	-	97
2. Textile	76.0	73.0	27	-
3. Wood Product	12.7	13.0	-	24
4. Paper Product	552.5	520.0	-	-
5. Publishing	10.0	10.0	-	-
6. Chemicals	135.3	130.0	392	65
7. Rubber Manufacturing	97.5	65.0	-	28
8. Nonmetal	79.7	68.0	108	-
9. Basic Metal	51.1	49.0	0	-
10. Machinery	18.7	20.0	22	96
11. Miscellaneous	48.7	49.0	12	-

Remarks; (1) The values indicated are net manufacturing freshwater use excluding seawater and water used cyclically per $M\$10^6$ of the gross value of manufacturing output at 1970 price.

/1 : Sampling survey carries out by the Study Team in 1980

/2 : Ref. B 20

Table 18 GROSS OUTPUT VALUE RATIOS OF CITIES/TOWNS AND RURAL AREA TO STATE

Unit: %

State		City/Rural	1983	1990	2000
Kedah & Perlis					
	1.	Kangar	10.2	12.4	13.2
	2.	Alor Setar	32.0	39.3	41.7
	3.	Sg. Petani	20.1	24.6	26.2
	4.	Kulim	2.5	3.1	3.3
	101.	Jitra	1.0	1.3	1.3
	102.	Guan Chempedak	3.2	3.8	4.3
	103.	Yan	2.7	3.4	3.6
	104.	Tikan Batu	1.8	3.2	4.0
	203.	Kuala Ketil	0.0	0.0	0.0
		City Total	73.5	91.1	97.6
		Rural	26.5	8.9	2.4
		Total	100.0	100.0	100.0
Pulau Pinang					
	5.	Butterworth	21.0	19.9	13.9
	6.	Bukit Mertajam	8.0	7.6	5.3
	8.	Georgetown	11.9	11.3	7.9
	105.	Air Itam	5.6	5.2	3.6
	106.	Tg. Tokong	2.2	2.0	1.4
	107.	Takek Gelugor	1.0	1.8	1.3
	108.	Tg. Bunga	1.6	1.6	1.1
	109.	Kg. Pmtg Kuching	1.7	1.4	1.0
	110.	Perai	17.1	16.2	11.4
	201.	Bandar Seberang Jaya	1.9	8.4	23.1
	202.	Bandar Bayan Baru	2.2	11.8	23.1
		City Total	74.2	87.2	93.1
		Rural	25.8	12.8	6.9
		Total	100.0	100.0	100.0

Table 19 PROJECTED WATER DEMAND FOR PALM OIL MILLS AND RUBBER FACTORIES BY STATE

Unit: 10^3 m^3/y

State	1983		1990		2000	
	Palm	Rubber	Palm	Rubber	Palm	Rubber
Pelis	-	-	-	-	-	-
Kedah	29	3,974	48	4,477	60	6,284
P. Pinang	9	1,806	61	2,197	160	4,285
P.K.P. Total	38	5,780	109	6,674	220	10,569

Table 20 COMPARISON OF D & M WATER DEMAND PROJECTION FOR THE REGION IN 2000 BETWEEN PART 1 AND PART 2 STUDIES

Unit: 10^6 m^3/y

Case	D			M			D & M		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Part 2	255.8	0.0	255.8	273.7	30.1	303.8	529.5	30.1	559.6
Part 1									
Case 1	257.2	0.0	257.2	338.2	113.7	451.9	595.4	113.7	709.1
Case 2	195.0	1.7	196.7	187.4	40.0	227.4	382.4	41.7	424.1

Table 21 PROJECTED D & I WATER ABSTRACTION AT THE RIVER INTAKES BY PURPOSE

Unit: 10^6 m^3/y

State	No.	Water Supply Region	Intake No.	1983 D	1983 M	1983 T	1990 D	1990 M	1990 T	2000 D	2000 M	2000 T
Perlis	1.	Kangar	1/101	3.2	1.7	4.9	5.7	3.5	9.2	10.6	15.5	26.1
			1001	0.1	0.0	0.1	-	-	-	-	-	-
			1002	0.4	0.0	0.4	-	-	-	-	-	-
			1003	0.7	0.0	0.7	0.7	0.0	0.7	0.7	0.0	0.7
			1004	2.1	0.1	2.2	2.1	0.1	2.2	2.2	0.0	2.2
	2.	Cuping	1005	0.5	0.0	0.5	0.8	0.0	0.8	1.1	0.0	1.1
		Sub-total		7.0	1.8	8.8	9.3	3.6	12.9	14.6	15.5	30.1
Kedah	3.	Changlun	2/102	0.7	0.1	0.8	1.0	0.0	1.0	1.4	0.1	1.5
	4.	Alor Setar	3/103	7.1	4.9	12.0	8.5	11.0	19.5	14.4	49.8	64.2
			10001	6.7	0.4	7.1	11.1	0.3	11.4	16.2	0.3	16.5
			10002	2.9	0.2	3.1	4.8	0.1	4.9	7.0	0.1	7.1
	5.	Kuala Nerang	4/105	1.2	0.5	1.7	2.2	0.3	2.5	3.4	0.4	3.8
			104	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.0	0.2
	6.	Pendang	5	2.6	1.2	3.8	5.2	2.0	7.2	9.1	9.3	18.4
	7.	Jeneri	106	0.6	0.1	0.7	0.8	0.0	0.8	1.3	0.0	1.3
			10003	0.5	0.0	0.5	0.8	0.0	0.8	1.2	0.0	1.2
	8.	Jeniang/1	8/107	1.5	0.4	1.9	2.3	0.2	2.5	3.7	0.2	3.9
	9.	Sik/1	9/108	0.7	0.4	1.1	1.2	0.2	1.4	1.7	0.3	2.0
	10.	Sg. Petani	15	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0
			16/109	6.0	3.6	9.6	9.9	7.8	17.7	18.5	35.2	53.7
	11.	Kuala Ketil	110/10004	1.8	0.1	1.9	3.0	0.1	3.1	5.4	0.2	5.6
	12.	Baling	18/112	0.4	0.1	0.5	0.6	0.0	0.6	0.9	0.1	1.0
			111	1.4	0.3	1.7	2.1	0.2	2.3	3.3	0.2	3.5
	13.	Kulim/2	113	0.7	0.1	0.8	1.2	0.9	2.1	4.4	3.9	8.3
			114/10005	0.6	0.1	0.7	1.1	0.0	1.1	1.4	0.1	1.5
	14.	Karagan	19	0.4	0.1	0.5	0.6	0.0	0.6	0.8	0.0	0.8
		Sub-total		37.9	12.6	50.5	58.5	23.1	81.6	96.3	100.2	196.5
P.Pinang	15.	Perai &										
	16.	P.Pinang/3		61.0	80.1	141.1	83.6	123.3	206.9	144.9	270.1	415.0
P.K.P Total				105.9	94.5	200.4	151.4	150.0	301.4	255.8	385.8	641.6

Remarks; /1 : The figures are assumed ones for the purpose of the water balance study.

/2 : Water Supply Region 13 is provided with 3.0 x 10^6 m^3/y (1.8 mgd) of treated water by PWA.

/3 : Since P. Pinang State can eventually be considered as one water supply area, no figure is given for each river intake in the Water Supply Regions 15 and 16.

Table 22 PROJECTED D & I WATER ABSTRACTION AT THE RIVER INTAKES BY TYPE

State	No.	Water Supply Region	Intake No.	1983 Public	1983 Private	1983 Total	1990 Public	1990 Private	1990 Total	2000 Public	2000 Private	2000 Total
Perlis	1.	Kangar	1/10	4.6	0.3	4.9	8.8	0.4	9.2	24.6	1.5	26.1
			1001	0.1	0.0	0.1	-	-	-	-	-	-
			1002	0.4	0.0	0.4	-	-	-	-	-	-
			1003	0.7	0.0	0.7	0.7	0.0	0.7	0.7	0.0	0.7
			1004	2.0	0.2	2.2	2.1	0.1	2.2	2.2	0.0	2.2
	2.	Cuping	1005	0.5	0.0	0.5	0.8	0.0	0.8	1.1	0.0	1.1
		Sub-total		8.3	0.5	8.8	12.4	0.5	12.9	28.6	1.5	30.1
Kedah	3.	Changlun	2/102	0.7	0.1	0.8	1.0	0.0	1.0	1.5	0.0	1.5
	4.	Alor Setar	3/103	11.3	0.7	12.0	18.3	1.2	19.5	59.2	5.0	64.2
			10001	5.9	1.2	7.1	11.2	0.2	11.4	16.5	0.0	16.5
			10002	2.6	0.5	3.1	4.8	0.1	4.9	7.1	0.0	7.1
	5.	Kuala Nerang	4/105	1.5	0.2	1.7	2.5	0.0	2.5	3.8	0.0	3.8
			104	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.0	0.2
	6.	Pendang	5	3.4	0.4	3.8	7.0	0.2	7.2	17.5	0.9	18.4
	7.	Jeneri	106	0.6	0.1	0.7	0.8	0.0	0.8	1.3	0.0	1.3
			10003	0.5	0.0	0.5	0.8	0.0	0.8	1.2	0.0	1.2
	8.	Jeniang/1	8/107	1.6	0.3	1.9	2.5	0.0	2.5	3.9	0.0	3.9
	9.	Sik/1	9/108	1.0	0.1	1.1	1.4	0.0	1.4	2.0	0.0	2.0
	10.	Sg. Petani	15	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0
			16/109	8.5	1.1	9.6	16.7	1.0	17.7	50.2	3.5	53.7
	11.	Kuala Ketil	110/10004	1.6	0.3	1.9	3.1	0.0	3.1	5.6	0.0	5.6
	12.	Baling	18/112	0.4	0.1	0.5	0.6	0.0	0.6	1.0	0.0	1.0
			111	1.5	0.2	1.7	2.3	0.0	2.3	3.5	0.0	3.5
	13.	Kulim/2	113	0.6	0.2	0.8	1.9	0.2	2.1	7.9	0.4	8.3
			114/10005	0.5	0.2	0.7	1.1	0.0	1.1	1.5	0.0	1.5
	14.	Karagan	19	0.4	0.1	0.5	0.6	0.0	0.6	0.8	0.0	0.8
		Sub-total		44.7	5.8	50.5	78.7	2.9	81.6	186.7	9.8	196.5
P.Pinang	15. 16.	Perai & P.Pinang/3		131.6	9.5	141.1	193.6	13.3	206.9	388.0	27.0	415.0
P.K.P Total				184.6	15.8	200.4	284.7	16.7	301.4	603.3	38.3	641.6

Remarks; /1 : The figures are assumed ones for the purpose of the water balance study.

/2 : Water Supply Region 13 is provided with 3.0 x 10^6 m^3/y (1.8 mgd) of treated water by PWA.

/3 : Since P.Pinang State can eventually be considered as one water supply area, no figure is given for each river intake in the Water Supply Regions 15 and 16.

Table 23 ESTIMATED CONSTRUCTION COST FOR PUBLIC WATER SUPPLY

Unit: $M\$10^6$

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	13.7	43.8	47.3	19.2	124.0
	2. Cuping	0.7	1.3	1.0	0.5	3.5
	Perlis Total	14.4	45.1	48.3	19.7	127.5
Kedah	3. Changlun	1.2	2.9	2.3	0.9	7.3
	4. Alor-Setar	38.4	144.9	168.8	68.3	420.4
	5. Kuala Nerang	4.3	9.3	7.1	2.9	23.6
	6. Pendang	11.6	34.6	35.5	14.4	96.1
	7. Jeneri	3.1	6.3	5.1	2.2	16.7
	8. Jeniang	3.1	6.8	5.9	2.5	18.3
	9. Sik	1.8	4.2	3.4	1.4	10.8
	10. Sg. Petani	18.7	82.0	101.6	41.0	243.3
	11. Kuala Ketil	3.6	10.5	10.9	4.6	29.6
	12. Baling	4.8	11.2	9.7	4.0	29.7
	13. Kulim	6.4	22.3	25.1	10.1	63.9
	14. Karangan	0.4	0.8	0.6	0.2	2.0
	Kedah Total	97.4	335.8	376.0	152.5	961.7
P. Pinang	15. Perai	70.9	269.5	317.6	127.2	785.2
	16. P. Pinang	45.4	182.7	220.6	88.4	537.1
	P. Pinang Total	116.3	452.2	538.2	215.6	1,322.3
P.K.P. Total		228.1	833.1	962.5	387.8	2,411.5

Remarks; (1): In 1983 constant price
(2): Public water supply by PWD, PWA and RESP (MOH)

Table 24 ESTIMATED O&M COST FOR PUBLIC WATER SUPPLY

Unit: M$10^6

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0	2.3	6.7	11.4	20.4
	2. Cuping	0	0.1	0.3	0.4	0.8
	Perlis Total	0	2.4	7.0	11.8	21.2
Kedah	3. Changlun	0	0.2	0.5	0.7	1.4
	4. Alor-Setar	0	6.5	20.9	37.8	65.2
	5. Kuala Nerang	0	0.7	1.6	2.4	4.7
	6. Pendang	0	2.0	5.4	8.9	16.3
	7. Jeneri	0	0.5	1.2	1.7	3.4
	8. Jeniang	0	0.5		1.8	
	9. Sik	0	0.3	0.7	1.1	2.1
	10. Sg. Petani	0	3.2	11.3	21.5	36.0
	11. Kuala Ketil	0	0.6		2.8	
	12. Baling	0	0.8	1.9	2.9	5.6
	13. Kulim	0	1.1	3.3	5.8	10.2
	14. Karangan	0	0.1	0.2	0.2	0.5
	Kedah Total	0	16.5	49.9	87.6	154.0
P. Pinang	15. Perai	0	11.8	38.8	70.5	121.1
	16. P. Pinang	0	7.6	25.9	47.9	81.4
	P. Pinang Total	0	19.4	64.7	118.4	202.5
P.K.P. Total		0	38.3	121.6	217.8	377.7

Remarks; (1): In 1983 constant price
(2): Public water supply by PWD, PWS and RESP (MOH)

Table 25 ESTIMATED CONSTRUCTION COST FOR PRIVATE WATER SUPPLY

Unit: M$10^6

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	5.5	31.0	41.6	16.6	94.7
	2. Cuping	0.0	0.0	0.0	0.0	0.0
	Perlis Total	5.5	31.0	41.6	16.6	94.7
Kedah	3. Changlun	0.0	0.0	0.0	0.0	0.0
	4. Alor-Setar	14.9	96.6	133.4	53.4	298.3
	5. Kuala Nerang	0.0	0.0	0.0	0.0	0.0
	6. Pendang	2.9	18.0	24.7	9.9	55.5
	7. Jeneri	0.0	0.0	0.0	0.0	0.0
	8. Jeniang	0.0	0.0	0.0	0.0	0.0
	9. Sik	0.0	0.0	0.0	0.0	0.0
	10. Sg. Petani	9.7	66.0	92.0	36.8	204.5
	11. Kuala Ketil	0.0	0.0	0.0	0.0	0.0
	12. Baling	0.0	0.0	0.0	0.0	0.0
	13. Kulim	1.1	7.4	10.3	4.1	22.9
	14. Karangan	0.0	0.0	0.0	0.0	0.0
	Kedah Total	28.6	188.0	260.4	104.2	581.2
P. Pinang	15. Perai	50.4	208.8	254.7	101.9	615.8
	16. P. Pinang	37.1	152.8	185.9	74.4	450.2
	P. Pinang Total	87.5	361.6	440.6	176.3	1,066.0
P.K.P. Total		121.6	580.6	742.6	297.1	1,741.9

Remark ; (1): In 1983 constant price

Table 26 ESTIMATED O & M COST FOR PRIVATE WATER SUPPLY

Unit: M$10^6

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0	0.9	4.0	8.2	13.1
	2. Cuping	0	0	0	0	0
	Perlis Total	0	0.9	4.0	8.2	13.1
Kedah	3. Changlun	0	0	0	0	0
	4. Alor-Setar	0	2.5	12.1	25.5	40.1
	5. Kuala Nerang	0	0	0	0	0
	6. Pendang	0	0.5	2.3	4.8	7.6
	7. Jeneri	0	0	0	0	0
	8. Jeniang	0	0	0	0	0
	9. Sik	0	0	0	0	0
	10. Sg. Petani	0	1.6	8.2	17.4	27.2
	11. Kuala Ketil	0	0	0	0	0
	12. Baling	0	0	0	0	0
	13. Kulim	0	0.2	0.9	2.0	3.1
	14. Karangan	0	0	0	0	0
	Kedah Total	0	4.8	23.5	49.7	78.0
P. Pinang	15. Perai	0	8.4	29.3	54.8	92.5
	16. P. Pinang	0	6.2	21.5	40.1	67.8
	P. Pinang Total	0	14.6	50.8	94.9	160.3
P.K.P. Total		0	20.3	78.3	152.8	251.4

Remark; (1): In 1983 constant price

Table 27 ESTIMATED OVERALL ECONOMIC CONSTRUCTION COST FOR WATER SUPPLY

Unit: M$10^6

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	15.5	60.7	72.0	29.4	177.6
	2. Cuping	0.3	0.8	1.0	0.5	2.6
	Perlis Total	15.8	61.5	73.0	29.9	180.2
Kedah	3. Changlun	1.1	2.7	1.9	0.8	6.5
	4. Alor-Setar	43.4	196.5	244.0	99.1	583.0
	5. Kuala Nerang	3.6	8.2	5.9	2.5	20.2
	6. Pendang	11.8	43.3	48.8	20.0	123.9
	7. Jeneri	2.5	5.1	4.5	2.1	14.2
	8. Jeniang	2.5	5.5	5.2	2.4	15.6
	9. Sik	1.5	3.7			9.5
	10. Sg. Petani	23.0	119.7	155.9	63.1	361.7
	11. Kuala Ketil	3.0	8.9	9.4	4.2	25.5
	12. Baling	4.0	9.4			25.2
	13. Kulim	6.1	24.1	28.5	11.5	70.2
	14. Karangan	0.3	0.7	0.5	0.2	1.7
	Kedah Total	102.8	427.8	515.8	210.8	1,257.2
P. Pinang	15. Perai	97.2	383.4	458.4	183.8	1,122.8
	16. P. Pinang	66.0	268.4	325.7	130.5	790.6
	P. Pinang Total	163.2	651.8	784.1	314.3	1,913.4
P.K.P. Total		281.8	1,141.1	1,372.9	555.0	3,350.8

Remark; Overall cost comprises public water supply cost and private water supply cost

Table 28 ESTIMATED OVERALL ECONOMIC O&M COST FOR WATER SUPPLY

Unit: $M\$10^6$

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0.0	2.6	8.7	15.9	27.2
	2. Cuping	0.0	0.0	0.1	0.2	0.3
	Perlis Total	0.0	2.6	8.8	16.1	27.5
Kedah	3. Changlun	0.0	0.2	0.4	0.6	1.2
	4. Alor-Setar	0.0	7.4	26.9	51.3	85.6
	5. Kuala Nerang	0.0	0.6	1.4	2.0	4.0
	6. Pendang	0.0	2.0	6.3	11.2	19.5
	7. Jeneri	0.0	0.4	1.0	1.4	2.8
	8. Jeniang	0.0	0.4	1.0	1.5	2.9
	9. Sik	0.0	0.3	0.6	0.9	1.8
	10. Sg. Petani	0.0	3.9	15.8	31.4	51.1
	11. Kuala Ketil	0.0	0.5	1.4	2.4	4.3
	12. Baling	0.0	0.7	1.6	2.4	4.7
	13. Kulim	0.0	1.0	3.4	6.3	10.7
	14. Karangan	0.0	0.1	0.1	0.2	0.4
	Kedah Total	0.0	17.5	59.9	111.6	189.0
P. Pinang	15. Perai	0.0	16.2	54.6	100.4	171.2
	16. P. Pinang	0.0	11.0	37.9	70.4	119.3
	P. Pinang Total	0.0	27.2	92.5	170.8	290.5
P.K.P. Total		0.0	47.3	161.2	298.5	507.0

Remark; Overall cost comprises public water supply cost and private water supply cost.

Table 29 REVISED D & I WATER DEMAND

Unit: 10^6 m^3

	Estimates in the Previous Section			Revised Estimate		
	Domestic	Industrial	Total	Domestic	Industrial	Total
1990						
Perlis	9.3	3.6	12.9	9.3	3.6	12.9
Kedah	61.5	23.1	84.6	61.5	23.1	84.6
Pulau Pinang	80.6	123.3	203.9	80.6	107.0	187.6
Region Total	151.4	150.0	301.4	151.4	133.7	285.1
2000						
Perlis	14.6	15.5	30.1	14.6	15.5	12.9
Kedah	99.3	100.2	199.5	99.3	100.2	84.6
Pulau Pinang	141.9	270.1	412.0	141.9	188.1	330.0
Region Total	255.8	385.8	641.6	255.8	303.8	559.6

FIGURES

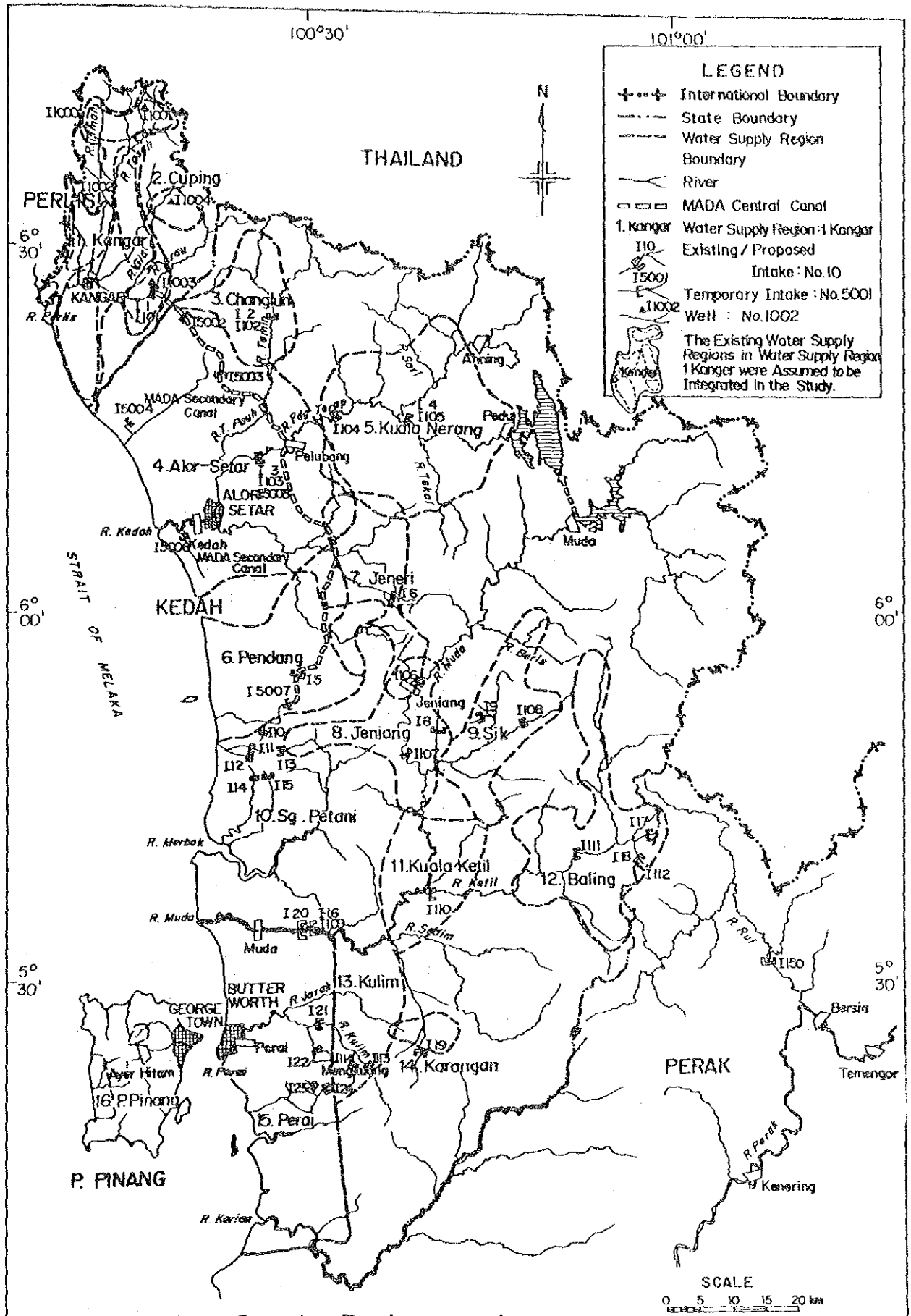

Fig. 1 Water Supply Regions and Existing & Proposed Water Intakes in the Region

GOVERNMENT OF MALAYSIA
NATIONAL WATER RESOURCES STUDY, MALAYSIA
PERLIS-KEDAH-PULAU PINANG
REGIONAL WATER RESOURCES STUDY PART 2
JAPAN INTERNATIONAL COOPERATION AGENCY