

Table G-61 MEDIUM-TERM PROGRAM COST FOR INDUSTRIAL (H) GWRDP

WRR	2000	2005	2010	2015	2020	2025
I	66.3	66.3	101.4	144.3	202.8	288.6
II	39.0	27.3	39.0	50.8	74.2	101.5
III	218.1	417.0	-	160.4	654.3	577.4
IV	-	284.0	233.3	1,151.1	202.8	329.6
V	127.0	69.6	94.2	127.0	180.3	258.1
VI	64.1	233.2	163.2	163.2	180.7	134.1
VII	65.2	431.8	203.7	505.1	211.8	130.4
VIII	162.4	136.4	201.4	279.4	389.8	532.8
IX	360.0	574.5	436.6	582.2	857.9	1,248.6
X	9.2	156.4	101.2	427.8	634.8	818.8
XI	17.7	41.4	88.6	118.2	159.5	200.9
XII	23.9	43.1	71.8	95.7	105.3	158.0
Nation	1,153.1	2,481.0	1,734.5	3,805.1	3,854.3	4,778.6

unit: Million Peso

WRR	2000	2005	2010	2015	2020	2025
I	54.6	62.4	70.2	78.0	89.7	85.8
II	27.3	31.2	27.3	27.3	31.2	31.2
III	160.4	352.8	-	-	320.8	250.2
IV	-	152.1	304.3	958.4	284.0	243.4
V	73.7	90.1	61.5	65.6	73.7	77.8
VI	46.6	58.3	52.5	64.1	75.8	29.2
VII	57.0	358.5	105.9	293.3	317.7	277.0
VIII	129.9	129.9	136.4	155.9	168.9	155.9
IX	360.0	482.6	287.3	314.1	375.3	406.0
X	9.2	41.4	41.4	216.2	248.4	262.2
XI	17.7	29.5	59.1	65.0	70.9	53.2
XII	14.4	38.3	47.9	52.7	43.1	43.1
Nation	951.0	1,827.2	1,193.7	2,290.6	2,099.6	1,915.0

Table G-62 MEDIUM-TERM PROGRAM COST FOR INDUSTRIAL (L) GWRDP

Table G-63 MEDIUM-TERM PROGRAM COST FOR IRRIGATION GWRDP

WRR	2000	2005	2010	2015	2020	2025
I	386.5	465.1	172.6	177.3	177.0	181.0
II	912.4	1,098.4	403.2	413.6	413.2	424.8
III	451.4	541.4	219.0	224.8	224.8	220.2
IV	123.9	148.9	58.1	59.7	59.7	59.2
V	189.3	227.5	86.7	89.0	89.0	89.4
VI	82.1	97.8	46.5	47.9	47.2	43.1
VII	19.1	22.9	9.8	9.8	9.8	9.3
VIII	37.8	45.4	17.1	17.6	17.6	17.6
IX	32.6	38.9	17.0	17.5	17.5	16.5
X	120.6	145.1	57.2	58.8	58.3	58.3
XI	24.3	28.8	11.3	11.9	11.9	11.3
XII	520.1	625.1	241.4	247.6	247.1	247.6
Nation	2,900.1	3,485.2	1,340.0	1,375.5	1,373.0	1,378.4

Table G-64 O/M COST SHARED BY THE REGIONAL L-III SYSTEMS

Type of Sources	Description	Water Resources Region													Sphere of Population Served			Total/Average							
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	T/A	<9,999	10,000<=9,999	50,000<		unit	unit	unit				
1 0	System W.Rate Major W.Ds	1	0	1	1	3	9	8	7	5	6	8	3	2	6	3	System	49	78%	13	21%	1	2%	65	100%
		5.21		5.27	3.11	2.88	2.97	3.43	4.76	4.81	2.58	2.93	4.37	3.34	P/S(1,000)	197	capita	269	capita	106	capita	571	capita		
		Quezon Mtero WD, Metro Kidapawan WD, Jolo Mainland WD													UWC	170	lpcd	271	lpcd	766	lpcd	328	lpcd		
2 0	System W.Rate Major W.Ds	0	0	0	2	2	0	0	1	0	0	1	0	6	6	System	3	50%	3	50%	0	0%	6	100%	
					3.15	3.14			3.47			5.04		3.51	P/S(1,000)	12	capita	88	capita	0	capita	100	capita		
		Bisitlig WD, Virac WD, Metro Carigara WD													UWC	377	lpcd	140	lpcd	0	lpcd	169	lpcd		
3	System W.Rate Major W.Ds	0	0	1	3	0	3	0	2	1	1	2	0	13	13	System	7	54%	5	38%	1	8%	13	100%	
				5.07	2.87		5.24		4.44	2.79	4.06	5.36		4.04	P/S(1,000)	29	capita	106	capita	177	capita	312	capita		
		Leyte Metro WD, Roxas CWD, Malaybalay WD													UWC	127	lpcd	162	lpcd	147	lpcd	150	lpcd		
4 0 0	System W.Rate Major W.Ds	7	1	3	17	14	11	2	3	0	6	1	2	67	67	System	30	45%	26	39%	11	16%	67	100%	
		5.48	2.34	3.81	4.11	3.66	4.92	6.22	4.38		3.95	5.33	4.53	4.36	P/S(1,000)	158	capita	604	capita	1,397	capita	2,159	capita		
		Cagayan de Oro CWD, Baguio CWD, Bacolod CWD													UWC	190	lpcd	198	lpcd	186	lpcd	190	lpcd		
5	System W.Rate Major W.Ds	10	15	79	30	9	30	7	9	10	6	13	17	235	235	System	163	69%	60	26%	12	5%	235	100%	
		4.55	5.43	4.57	4.32	4.25	5.58	4.11	5.70	5.56	5.58	4.43	4.31	4.75	P/S(1,000)	663	capita	1,231	capita	979	capita	2,874	capita		
		Cabanatuan CWD, San Fernando WD, Angeles CWD													UWC	192	lpcd	172	lpcd	206	lpcd	188	lpcd		
6 0 0 0	System W.Rate Major W.Ds	2	0	0	2	1	1	0	0	0	1	0	0	7	7	System	0	0%	4	57%	3	43%	7	100%	
		6.11			5.11	5.58	3.88				3.33			4.75	P/S(1,000)	0	capita	113	capita	246	capita	359	capita		
		Metro Iloilo WD, Laguna WD, Metro La Union WD													UWC	0	lpcd	152	lpcd	176	lpcd	168	lpcd		
7	System W.Rate Major W.Ds	0	0	0	0	2	0	2	2	1	1	1	0	9	9	System	4	44%	1	11%	4	44%	9	100%	
					3.86		3.86		3.86	4.76	3.33	4.55	3.62	4.90	P/S(1,000)	17	capita	18	capita	1,486	capita	1,521	capita		
		Davao CWD, Zamboanga CWD, Metro Cebu WD													UWC	234	lpcd	99	lpcd	236	lpcd	234	lpcd		

Source : WDs Data-Base (PMO & IDS of LWUA: 1995), PW4SP report (DILG: 1994)

Notes : Price rate was as of 1995.
 ; Only public water supply Level-I-III systems were counted (exclusive LGU's L-III & private L-III such as ex-MWSS & Subic Water, etc.).
 ; Water rate was estimated by WD's commodity charges and household's consumption. Un-accounted for water was adopted by 25 % of production.
 ; Regional water rate was estimated by weighted average.

WD : Water District
 P/S(1,000) : Population Served (unit: 1,000)
 UWC : Unit Water Consumption

Table G-65 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Preliminary Present GW Shortage by Level-III Water Supply Systems

WRR	ID	Province	Average Point	%A Production	product of 2 3 or more	coast: C inland: I	saline: S fresh: F	Shortage
1	1	Abra	1.00	0.00%	0.00	I		
1	2	Benguet	2.00	5.45%	0.11	I		
1	3	Ilocos Norte	1.00	0.00%	0.00	C	S	
1	4	Ilocos Sur	1.00	0.00%	0.00	C	S	
1	5	La Union	1.20	322.03%	3.86	C	S	⊗
2	6	Batanes				C	F	
2	7	Cagayan	1.00	0.00%	0.00	C	S	
2	8	Ifugao				I		
2	9	Isabela	1.00	0.00%	0.00	C	F	
2	10	Kalinga-Apayao				I		
2	11	Mountain Province				I		
2	12	Nueva Vizcaya				I		
2	13	Quirino	1.00	0.00%	0.00	I		
3	14	Bataan	1.00	0.00%	0.00	C	F	
3	15	Bulacan	1.00	0.00%	0.00	C	S	
3	16	Nevea Ecija	1.00	0.00%	0.00	I		
3	17	Pangasinan	1.00	0.00%	0.00	C	S	
3	18	Pangasinan	1.00	0.00%	0.00	C	S	
3	19	Tarlac	1.00	0.00%	0.00	I		
3	20	Zambales	1.40	312.51%	4.38	C	S	⊗
4	21	Aurora	1.00	0.00%	0.00	C	F	
4	22	Batangas	1.00	0.00%	0.00	C	F	
4	23	Cavite	1.00	0.00%	0.00	C	S	
4	24	Laguna	1.10	36.53%	0.40	(C)	S	
4	25	Mirindique	1.00	0.00%	0.00	C	F	
4	26	Metro Manila	3.00	L	50.00	C	S	⊗
4	27	Occidental Mindoro	1.00	0.00%	0.00	C	F	
4	28	Oriental Mindoro	1.75	137.05%	2.40	C	F	
4	29	Palawan	1.67	839.65%	13.92	C	S	⊗
4	30	Quezon	1.51	5.51%	0.08	C	S	
4	31	Rizal	1.00	0.00%	0.00	C	F	
4	32	Romblon	2.00	18.70%	0.37	C	F	
5	33	Albay	1.00	0.00%	0.00	C	F	
5	34	Camarines Norte	1.67	31.12%	0.52	C	F	
5	35	Camarines Sur	1.00	0.00%	0.00	C	F	
5	36	Catanduanes	2.00	219.41%	4.39	C	F	⊗
5	37	Masbate	1.67	62.73%	1.05	C	S	
5	38	Sorsogon	1.14	13.53%	0.15	C	F	
6	39	Aklan	1.00	0.00%	0.00	C	F	
6	40	Antique	1.00	0.00%	0.00	C	F	
6	41	Capiz	1.60	285.54%	4.57	C	S	⊗
6	42	Guimaras	1.00	0.00%	0.00	C	F	
6	43	Iloilo	1.38	2.06%	0.03	C	S	
6	44	Negros Occidental	1.00	0.00%	0.00	C	F	
7	45	Bohol	1.00	0.00%	0.00	C	F	
7	46	Cebu	1.11	411.29%	4.90	C	S	⊗
7	47	Negros Oriental	1.40	89.27%	1.25	C	F	
7	48	Siquijor	1.00	0.00%	0.00	C	F	
8	49	Biliran	1.00	0.00%	0.00	C	F	
8	50	Eastern Samar	1.00	0.00%	0.00	C	F	
8	51	Leyte	1.42	332.06%	4.99	C	S	⊗
8	52	Northern Samar	1.00	0.00%	0.00	C	F	
8	53	Southern Leyte	1.00	0.00%	0.00	C	F	
8	54	Western Samar	3.00	1329.50%	39.82	C	F	⊗
9	55	Basilan	1.00	0.00%	0.00	C	F	
9	56	Sulu	1.00	0.00%	0.00	C	F	
9	57	Tawi-Tawi	1.00	0.00%	0.00	C	F	
9	58	Zamboanga del Norte	1.38	7.52%	0.10	C	F	
9	59	Zamboanga del Sur	1.40	958.37%	13.42	C	S	⊗
10	60	Agusan del Norte	1.00	0.00%	0.00	C	F	
10	61	Agusan del Sur	1.00	0.00%	0.00	I		
10	62	Bukidnon	1.83	74.84%	1.37	I		
10	63	Comiguin	1.00	0.00%	0.00	C	F	
10	64	Misamis Occidental	1.00	0.00%	0.00	C	F	
10	65	Misamis Oriental	1.00	0.00%	0.00	C	F	
10	66	Surigao del Norte	1.50	166.96%	2.50	C	F	
11	67	Davao del Norte	1.00	0.00%	0.00	C	F	
11	68	Davao del Sur	1.20	2722.75%	32.67	C	S	⊗
11	69	Davao Oriental	1.00	0.00%	0.00	C	F	
11	70	Surigao del Sur	2.13	261.96%	5.57	C	F	⊗
12	71	Lanao del Norte	1.00	0.00%	0.00	C	F	
12	72	Lanao del Sur	1.00	0.00%	0.00	C	F	
12	73	Maguindano	1.00	0.00%	0.00	C	F	
12	74	North Cotabato	1.00	0.00%	0.00	I		
12	75	Sarangani	1.00	0.00%	0.00	C	F	
12	76	South Cotabato	1.00	0.00%	0.00	C	F	
12	77	Sultan Kudarat	1.00	0.00%	0.00	C	F	

Average Point : Type of WDs are categorized into A as GW only, B as SW only, C as GW&SW & D as SW&GW by production basis.
The Points of each WD are 1 for A, 2 for C, 3 for D & 4 for B respectively.

%A Production : Total production ratio by (B+C+D)/A.

product of 2 : product of above two factors

shadow : Product of 2 is 3 (none-unit) or more.

Table G-66 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Industrial & Level-III Groundwater Demand by GDP Low Scenario

WRR	ID	Province	1995	2000	2005	2010	2015	2020	2025
			MCM/year	MCM/year	MCM/year	MCM/year	MCM/year	MCM/year	MCM/year
1	1	Abra	1.74	2.57	3.62	4.90	6.41	8.06	9.85
1	2	Benguet	13.09	19.74	26.85	36.19	47.59	60.98	76.51
1	3	Ilocos Norte	6.25	7.93	9.90	12.17	14.67	17.37	20.27
1	4	Ilocos Sur	2.35	3.84	5.81	8.28	11.20	14.43	17.95
1	5	La Union	6.55	8.82	11.47	14.21	17.28	20.51	23.65
2	6	Batanes	-	0.06	0.15	0.29	0.43	0.62	0.85
2	7	Capayan	3.05	4.48	6.24	8.36	10.79	13.49	16.35
2	8	Ifugao	-	0.18	0.42	0.76	1.17	1.66	2.22
2	9	Isabela	4.81	9.38	15.19	21.99	29.83	38.65	48.06
2	10	Kalinga Apayao	-	0.50	1.30	2.47	4.04	6.02	8.47
2	11	Mountain Province	-	0.06	0.14	0.24	0.37	0.51	0.68
2	12	Nueva Vizcaya	-	1.03	2.49	4.43	6.85	9.73	12.98
2	13	Quirino	0.07	0.30	0.72	1.39	2.39	3.75	5.48
3	14	Bataan	33.03	42.65	58.41	76.24	95.96	116.05	134.85
3	15	Bulacan	32.70	51.67	80.99	111.62	153.25	198.93	249.07
3	16	Nueva Ecija	16.96	20.84	26.04	31.72	37.87	44.33	51.06
3	17	Tampanga	73.56	105.28	154.82	213.56	282.64	357.94	435.56
3	18	Pangasinan	30.25	42.53	63.28	89.82	123.28	163.01	208.17
3	19	Tarlac	13.09	18.18	25.56	34.21	43.97	54.33	63.75
3	20	Zambales	19.92	21.44	23.04	24.81	26.71	28.69	30.64
4	21	Aurora	0.13	0.71	1.85	3.79	6.85	11.27	17.31
4	22	Batangas	70.68	87.16	126.89	176.71	230.62	288.60	347.16
4	23	Cavite	35.26	34.35	46.17	62.71	78.89	94.57	111.35
4	24	Laguna	65.26	78.76	120.79	177.84	236.20	302.47	374.44
4	25	Marikina	12.21	12.68	18.23	25.59	32.59	39.30	45.78
4	26	Metro Manila	98.93	99.86	131.87	174.69	214.43	251.84	287.23
4	27	Occidental Mindoro	1.17	3.59	7.54	13.40	21.79	33.09	45.23
4	28	Oriental Mindoro	0.55	1.24	2.11	3.17	4.44	5.91	7.61
4	29	Palawan	1.68	2.25	3.13	4.41	6.25	8.75	12.07
4	30	Quezon	34.19	48.04	62.83	77.56	92.49	105.94	117.64
4	31	Rizal	7.21	7.12	9.56	12.66	15.74	18.81	22.64
4	32	Romblon	1.19	2.09	3.39	5.18	7.60	10.72	14.55
5	33	Albay	11.69	15.71	20.71	26.46	32.58	39.01	45.85
5	34	Camarines Norte	4.89	7.32	10.16	12.67	15.51	18.63	21.64
5	35	Camarines Sur	11.34	19.51	29.90	42.25	57.29	74.98	95.14
5	36	Catanduanes	0.87	1.10	1.45	1.94	2.61	3.54	4.59
5	37	Masbate	0.22	3.03	1.70	2.91	4.46	6.28	8.41
5	38	Sorsogon	5.38	6.83	8.66	10.76	13.10	15.56	18.02
6	39	Aklan	3.93	5.51	7.97	11.62	16.76	23.62	32.49
6	40	Antique	1.79	3.49	5.48	8.30	11.85	16.21	21.36
6	41	Capiz	0.91	1.79	3.14	5.10	7.78	11.30	15.73
6	42	Guimaras	2.24	2.96	4.05	5.44	7.20	9.29	11.70
6	43	Iloilo	12.69	23.05	36.95	55.21	77.99	105.45	136.48
6	44	Negros Occidental	69.76	85.97	108.28	133.27	160.71	189.31	219.99
7	45	Bohol	1.94	5.44	11.61	19.69	31.34	45.71	66.01
7	46	Cebu	150.40	157.08	222.31	231.52	273.61	312.61	347.31
7	47	Negros Oriental	5.20	7.22	10.28	13.78	18.22	23.42	29.42
7	48	Siquijor	0.83	1.09	1.42	1.82	2.32	2.87	3.51
8	49	Biliran	1.30	1.81	2.46	3.25	4.20	5.29	6.53
8	50	Eastern Samar	0.47	1.96	4.01	6.62	9.74	13.35	17.23
8	51	Leyte	21.99	36.30	49.27	61.56	75.39	89.81	103.67
8	52	Northern Samar	0.19	1.68	3.61	6.35	9.77	13.86	18.49
8	53	Southern Leyte	0.85	1.61	2.86	4.48	6.46	8.85	11.63
8	54	Western Samar	1.89	3.17	4.34	5.46	6.76	8.17	9.52
9	55	Basilan	3.88	6.14	9.28	13.94	19.77	26.66	31.16
9	56	Sulu	4.45	8.63	13.82	20.16	27.53	35.72	44.44
9	57	Tawi-Tawi	1.55	4.28	8.31	13.68	19.95	26.80	33.39
9	58	Zamboanga del Norte	2.51	4.31	6.76	9.80	13.45	17.66	22.36
9	59	Zamboanga del Sur	19.42	28.93	40.71	47.20	54.51	63.08	71.35
10	60	Agusan del Norte	4.02	6.32	9.46	13.46	18.33	23.93	30.15
10	61	Agusan del Sur	1.39	3.18	6.00	10.17	16.15	24.18	34.65
10	62	Bukidnon	33.89	35.81	40.98	47.91	64.59	84.38	107.18
10	63	Compostela	1.32	2.47	4.02	5.90	7.94	10.74	14.51
10	64	Misamis Occidental	5.14	8.02	12.07	17.42	24.27	32.55	42.20
10	65	Misamis Oriental	40.78	49.60	63.27	79.55	101.04	122.15	139.27
10	66	Surigao del Norte	1.33	1.98	2.86	4.01	5.49	7.16	9.04
11	67	Davao del Norte	4.85	9.36	14.17	20.19	28.75	38.98	51.20
11	68	Davao del Sur	51.17	51.20	52.25	55.52	58.71	61.41	63.87
11	69	Davao Oriental	0.93	2.07	3.74	5.98	8.66	11.75	15.22
11	70	Surigao del Sur	6.05	6.67	7.90	10.28	13.00	15.96	19.27
12	71	Lanao del Norte	1.54	7.10	16.47	30.54	49.64	73.53	101.60
12	72	Lanao del Sur	1.66	6.27	13.43	23.47	36.03	50.48	65.73
12	73	Maguindanao	6.05	9.84	14.99	22.12	31.27	42.88	56.97
12	74	North Cotabato	5.79	9.27	13.88	20.05	27.56	35.51	46.83
12	75	Sarangani	0.41	0.92	2.36	4.57	7.52	11.39	16.26
12	76	South Cotabato	5.56	11.04	20.10	33.75	51.19	73.43	97.76
12	77	Sultan Kudarat	1.42	4.04	7.97	13.43	20.45	28.87	38.63

Table G-67 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Ratio of GW Consumption (Demand/Recharge) by Low Scenario

WRR	ID	Province	1995	2000	2005	2010	2015	2020	2025
			%	%	%	%	%	%	%
1	1	Abra	0.33%	0.48%	0.67%	0.91%	1.20%	1.51%	1.85%
1	2	Benguet	2.65%	3.93%	5.53%	7.53%	10.01%	12.97%	16.47%
1	3	Ilocos Norte	1.33%	1.64%	2.00%	2.47%	2.99%	3.55%	4.15%
1	4	Ilocos Sur	0.68%	1.11%	1.65%	2.37%	3.22%	4.13%	5.02%
1	5	La Union	3.49%	4.70%	6.16%	7.74%	9.53%	11.45%	13.31%
2	6	Batanes	0.00%	0.24%	0.58%	1.07%	1.63%	2.37%	3.29%
2	7	Baguayan	0.28%	0.41%	0.56%	0.74%	0.96%	1.19%	1.41%
2	8	Iligan	0.00%	0.09%	0.20%	0.36%	0.56%	0.80%	1.05%
2	9	Isabela	0.42%	0.80%	1.25%	1.81%	2.47%	3.15%	3.74%
2	10	Kalinga Apayao	0.00%	0.08%	0.21%	0.39%	0.65%	0.97%	1.34%
2	11	Mountain Province	0.00%	0.03%	0.08%	0.14%	0.21%	0.29%	0.40%
2	12	Nueva Vizcaya	0.00%	0.27%	0.64%	1.13%	1.75%	2.47%	3.19%
2	13	Quirino	0.02%	0.09%	0.21%	0.41%	0.71%	1.11%	1.62%
3	14	Bataan	23.57%	29.97%	40.24%	52.54%	66.45%	80.03%	93.30%
3	15	Bulacan	10.34%	15.97%	24.32%	34.02%	47.61%	62.00%	78.80%
3	16	Nueva Ecija	3.65%	4.12%	4.64%	5.55%	6.66%	7.97%	9.79%
3	17	Pangasinan	39.87%	54.44%	75.35%	106.85%	145.22%	188.46%	234.61%
3	18	Pangasinan	6.67%	8.76%	11.98%	16.87%	23.42%	30.12%	38.39%
3	19	Tarlac	5.89%	7.80%	10.29%	13.77%	17.95%	21.71%	26.69%
3	20	Zambales	5.29%	5.66%	5.99%	6.45%	6.97%	7.45%	7.82%
4	21	Aurora	0.03%	0.15%	0.47%	0.97%	1.78%	2.98%	4.65%
4	22	Batangas	30.71%	37.93%	55.17%	77.19%	101.46%	127.46%	152.84%
4	23	Cavite	38.34%	35.73%	45.37%	61.83%	79.28%	94.36%	105.36%
4	24	Laguna	46.21%	54.72%	81.84%	122.33%	162.29%	194.78%	228.04%
4	25	Marinduque	15.90%	16.47%	23.55%	33.08%	42.17%	50.79%	58.80%
4	26	Metro Manila	190.74%	192.57%	254.23%	336.80%	413.41%	485.56%	553.80%
4	27	Occidental Mindoro	0.24%	0.73%	1.52%	2.75%	4.56%	7.02%	9.54%
4	28	Oriental Mindoro	0.14%	0.32%	0.51%	0.82%	1.16%	1.53%	1.93%
4	29	Palawan	0.14%	0.19%	0.27%	0.39%	0.55%	0.84%	1.20%
4	30	Quezon	3.78%	5.31%	6.92%	8.58%	10.28%	11.80%	13.06%
4	31	Rizal	6.00%	6.06%	6.37%	11.61%	15.33%	19.54%	25.00%
4	32	Romblon	1.15%	2.01%	3.24%	4.95%	7.29%	10.28%	13.87%
5	33	Albay	3.99%	5.17%	6.50%	8.27%	10.23%	12.07%	13.78%
5	34	Camarines Norte	1.38%	2.06%	2.84%	3.54%	4.34%	5.21%	5.45%
5	35	Camarines Sur	2.06%	3.44%	5.06%	7.13%	9.74%	12.58%	15.29%
5	36	Catanduanes	0.43%	0.55%	0.72%	0.96%	1.31%	1.73%	2.32%
5	37	Misbate	0.05%	0.70%	0.39%	0.67%	1.02%	1.44%	1.92%
5	38	Sorsogon	2.28%	2.84%	3.54%	4.38%	5.34%	6.30%	7.30%
6	39	Aklan	2.20%	3.06%	4.37%	6.41%	9.34%	13.30%	18.51%
6	40	Antique	0.61%	1.18%	1.81%	2.75%	3.95%	5.38%	6.99%
6	41	Capiz	0.27%	0.53%	0.92%	1.50%	2.30%	3.35%	4.65%
6	42	Guimaras	3.25%	4.22%	5.61%	7.52%	9.97%	12.73%	15.57%
6	43	Iloilo	2.28%	4.10%	6.45%	9.66%	13.76%	18.47%	23.43%
6	44	Negros Occidental	6.38%	7.85%	9.85%	12.14%	14.69%	17.28%	19.94%
7	45	Bohol	0.74%	2.05%	4.32%	7.36%	11.82%	17.65%	24.67%
7	46	Cebu	37.30%	39.00%	55.21%	57.73%	68.51%	78.49%	87.24%
7	47	Negros Oriental	1.22%	1.69%	2.39%	3.20%	4.24%	5.44%	6.79%
7	48	Siquijor	3.50%	4.55%	5.86%	7.53%	9.59%	11.81%	14.27%
8	49	Biliran	1.67%	2.30%	3.08%	4.05%	5.25%	6.62%	8.19%
8	50	Eastern Samar	0.07%	0.28%	0.58%	0.96%	1.42%	1.94%	2.50%
8	51	Leyte	3.37%	5.45%	7.29%	9.11%	11.22%	13.32%	15.52%
8	52	Northern Samar	0.03%	0.29%	0.61%	1.08%	1.66%	2.36%	3.19%
8	53	Southern Leyte	0.45%	0.85%	1.52%	2.39%	3.47%	4.78%	6.31%
8	54	Western Samar	0.23%	0.39%	0.53%	0.67%	0.83%	1.00%	1.17%
9	55	Basilan	3.92%	6.24%	9.45%	14.34%	20.50%	27.83%	32.67%
9	56	Sulu	3.24%	6.30%	10.12%	14.81%	20.29%	26.41%	32.96%
9	57	Tawi-Tawi	1.54%	4.28%	8.36%	13.81%	20.20%	27.25%	34.07%
9	58	Zamboanga del Norte	0.44%	0.75%	1.17%	1.69%	2.33%	3.05%	3.84%
9	59	Zamboanga del Sur	2.58%	3.80%	5.27%	6.11%	7.08%	8.15%	9.21%
10	60	Agusan del Norte	1.35%	2.16%	3.12%	4.44%	6.07%	7.90%	9.80%
10	61	Agusan del Sur	0.12%	0.28%	0.53%	0.91%	1.41%	2.16%	3.09%
10	62	Bukidnon	3.67%	3.84%	4.33%	5.06%	6.84%	8.89%	11.13%
10	63	Comiguin	5.95%	11.12%	18.06%	26.66%	36.06%	47.62%	62.62%
10	64	Misamis Occidental	3.17%	4.95%	7.43%	10.77%	15.09%	20.29%	26.23%
10	65	Misamis Oriental	14.88%	18.09%	23.15%	29.20%	37.22%	45.11%	51.45%
10	66	Surigao del Norte	0.34%	0.51%	0.74%	1.04%	1.43%	1.86%	2.34%
11	67	Davao del Norte	0.47%	0.90%	1.34%	1.90%	2.71%	3.65%	4.72%
11	68	Davao del Sur	7.53%	7.52%	7.71%	8.22%	8.72%	9.11%	9.44%
11	69	Davao Oriental	0.15%	0.32%	0.58%	0.93%	1.35%	1.83%	2.36%
11	70	Surigao del Sur	0.71%	0.78%	0.92%	1.20%	1.52%	1.87%	2.25%
12	71	Lanao del Norte	0.54%	2.56%	6.19%	12.08%	20.81%	32.75%	48.05%
12	72	Lanao del Sur	0.65%	2.46%	5.26%	9.22%	14.23%	19.96%	25.86%
12	73	Maguindanao	1.72%	2.78%	4.19%	6.22%	8.87%	12.19%	16.00%
12	74	North Cotabato	0.91%	1.43%	2.09%	3.01%	4.15%	5.46%	6.81%
12	75	Sarangani	0.03%	0.25%	0.71%	1.39%	2.31%	3.52%	5.03%
12	76	South Cotabato	1.56%	3.03%	5.37%	9.05%	13.86%	19.79%	25.50%
12	77	Sultan Kudarat	0.36%	0.99%	1.90%	3.20%	4.87%	6.84%	8.86%

Shadow : 10 (%) or more

Table G-68 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS
Industrial & Level-III Groundwater Demand by GDP High Scenario

WRR	ID	Province	1995	2000	2005	2010	2015	2020	2025
			MCM/year	MCM/year	MCM/year	MCM/year	MCM/year	MCM/year	MCM/year
1	1	Abra	1.24	2.57	3.62	4.90	6.41	8.06	9.85
1	2	Benguet	13.09	19.62	27.34	37.52	50.48	66.68	87.04
1	3	Ilocos Norte	6.25	7.95	9.93	12.23	14.80	17.63	20.75
1	4	Ilocos Sur	2.35	3.84	5.81	8.28	11.20	14.43	17.95
1	5	La Union	6.55	9.47	12.21	16.20	21.52	29.01	39.32
2	6	Batanes	-	0.06	0.15	0.29	0.43	0.62	0.85
2	7	Cagayan	3.05	4.48	6.24	8.36	10.79	13.49	16.35
2	8	Iligan	-	0.18	0.42	0.76	1.17	1.66	2.22
2	9	Isabela	4.81	9.87	15.51	22.82	31.60	42.06	54.25
2	10	Kalinga-Apayao	-	0.50	1.30	2.47	4.04	6.02	8.47
2	11	Mountain Province	-	0.06	0.14	0.24	0.37	0.51	0.68
2	12	Nueva Vizcaya	-	1.03	2.49	4.43	6.85	9.73	12.98
2	13	Quirino	0.07	0.30	0.72	1.39	2.39	3.75	5.48
3	14	Bataan	33.03	43.87	60.88	82.98	114.07	146.42	191.15
3	15	Bulacan	32.70	52.42	82.42	115.73	162.48	217.49	283.47
3	16	Nueva Ecija	16.96	20.85	26.06	31.77	38.01	44.60	51.55
3	17	Pangasinan	73.56	108.79	161.87	232.81	325.88	444.86	596.71
3	18	Pangasinan	30.25	43.71	65.65	96.32	137.85	192.30	262.47
3	19	Tarlac	13.09	18.51	26.23	36.02	48.02	62.48	78.85
3	20	Zambales	19.92	21.52	23.21	25.27	27.75	30.77	34.50
4	21	Aurora	0.33	0.71	1.85	3.79	6.86	11.27	17.31
4	22	Batangas	20.68	85.68	120.92	182.42	261.39	367.55	512.67
4	23	Cavite	35.26	34.11	43.24	65.51	93.96	133.24	192.42
4	24	Laguna	65.26	78.20	113.95	184.37	171.41	252.82	376.86
4	25	Mariquina	12.21	12.55	16.63	27.12	40.80	60.39	89.99
4	26	Metro Manila	98.93	99.04	121.90	184.21	265.76	383.56	563.38
4	27	Occidental Mindoro	1.17	3.59	7.52	13.41	21.87	33.30	45.66
4	28	Oriental Mindoro	0.55	1.24	2.11	3.17	4.41	5.91	7.61
4	29	Palawan	1.68	2.25	3.13	4.41	6.25	8.75	12.07
4	30	Quezon	34.19	48.02	62.65	77.74	93.43	108.35	122.70
4	31	Rizal	7.21	7.08	9.09	13.11	18.15	24.99	35.60
4	32	Romblon	1.19	2.09	3.39	5.18	7.60	10.72	14.55
5	33	Albay	11.69	15.71	20.71	26.46	32.58	39.01	45.86
5	34	Camarines Norte	4.89	8.16	10.50	13.52	17.23	21.84	25.40
5	35	Camarines Sur	11.34	20.38	30.26	43.13	59.09	78.34	101.16
5	36	Catanduanes	0.87	1.10	1.45	1.94	2.61	3.54	4.59
5	37	Masbate	0.22	3.03	1.70	2.91	4.46	6.28	8.41
5	38	Sorsogon	5.38	6.83	8.66	10.76	13.10	15.56	18.02
6	39	Aklan	3.93	5.51	7.97	11.62	16.76	23.62	32.49
6	40	Antique	1.79	3.51	5.70	8.61	12.25	16.67	21.88
6	41	Capiz	0.91	1.79	3.18	5.15	7.85	11.38	15.82
6	42	Quinaras	2.24	3.02	4.69	6.36	8.36	10.65	13.23
6	43	Iloilo	12.69	23.08	37.31	55.72	78.63	105.90	137.32
6	44	Negros Occidental	69.76	87.54	125.76	158.10	191.91	225.91	261.12
7	45	Bohol	1.94	5.47	11.79	20.05	32.12	48.22	68.77
7	46	Cebu	150.40	152.85	237.28	262.39	340.11	441.02	581.87
7	47	Negros Oriental	5.20	7.24	10.36	13.94	18.57	24.10	30.66
7	48	Siquijor	0.83	1.09	1.42	1.82	2.32	2.87	3.51
8	49	Biliran	1.30	1.81	2.45	3.25	4.20	5.29	6.53
8	50	Eastern Samar	0.47	1.96	4.01	6.62	9.74	13.33	17.23
8	51	Leyte	21.99	40.25	53.84	73.31	100.24	137.23	190.58
8	52	Northern Samar	0.19	1.68	3.61	6.35	9.77	13.85	18.49
8	53	Southern Leyte	0.85	1.61	2.85	4.48	6.46	8.85	11.63
8	54	Western Samar	1.82	3.54	4.76	6.56	9.07	12.62	17.59
9	55	Basilan	3.88	6.14	9.28	13.94	19.77	26.66	34.16
9	56	Sulu	4.45	8.63	13.82	20.16	27.53	35.72	44.44
9	57	Tawi-Tawi	1.55	4.28	8.31	13.68	19.95	26.80	33.39
9	58	Zamboanga del Norte	2.51	4.31	6.76	9.80	13.45	17.66	22.36
9	59	Zamboanga del Sur	19.42	28.93	42.77	62.38	85.21	112.70	149.23
10	60	Agusan del Norte	4.02	6.32	9.48	13.40	18.39	24.05	30.39
10	61	Agusan del Sur	1.39	3.18	6.00	10.17	16.45	24.18	34.65
10	62	Bukidnon	33.89	35.95	46.07	54.88	79.80	114.85	165.90
10	63	Compostela	1.32	2.47	4.02	5.90	7.94	10.51	13.51
10	64	Misamis Occidental	5.14	8.02	12.14	17.52	24.48	32.98	43.02
10	65	Misamis Oriental	40.78	49.65	65.06	81.99	106.36	132.81	159.83
10	66	Surigao del Norte	1.33	1.98	2.93	4.10	5.68	7.55	9.79
11	67	Davao del Norte	4.85	9.35	14.23	20.34	29.06	39.57	52.26
11	68	Davao del Sur	51.17	51.05	53.55	58.88	65.74	74.62	87.55
11	69	Davao Oriental	0.93	2.07	3.74	5.98	8.66	11.75	15.22
11	70	Surigao del Sur	6.05	6.62	8.35	11.44	15.43	20.52	27.44
12	71	Lanao del Norte	1.54	7.06	16.52	30.67	49.91	74.03	102.50
12	72	Lanao del Sur	1.66	6.27	13.43	23.47	36.03	50.48	65.73
12	73	Maguindano	6.05	9.74	15.13	22.46	31.97	44.18	59.28
12	74	North Cotabato	5.79	9.17	14.00	20.36	28.19	37.68	48.91
12	75	Sarangani	0.11	0.92	2.36	4.57	7.52	11.39	16.26
12	76	South Cotabato	5.56	10.72	20.52	34.79	53.29	77.33	104.70
12	77	Sultan Kudarat	1.42	4.01	8.01	13.53	20.64	29.23	39.27

Table G-69 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Ratio of GW Consumption (Demand Recharge) by High Scenario

WRR	ID	Province	1995	2000	2005	2010	2015	2020	2025
			%	%	%	%	%	%	%
1	1	Abra	0.33%	0.48%	0.67%	0.91%	1.20%	1.51%	1.85%
1	2	Benguet	2.65%	4.01%	5.64%	7.81%	10.62%	14.16%	18.74%
1	3	Ilocos Norte	1.33%	1.65%	2.01%	2.48%	3.01%	3.60%	4.25%
1	4	Ilocos Sur	0.68%	1.11%	1.65%	2.37%	3.22%	4.13%	5.02%
1	5	La Union	3.49%	5.01%	6.56%	8.82%	11.91%	16.19%	22.15%
2	6	Batanes	0.00%	0.24%	0.58%	1.09%	1.63%	2.37%	3.29%
2	7	Capayan	0.28%	0.41%	0.56%	0.74%	0.96%	1.19%	1.41%
2	8	Hugao	0.00%	0.09%	0.20%	0.35%	0.56%	0.80%	1.05%
2	9	Isabela	0.42%	0.84%	1.27%	1.87%	2.62%	3.43%	4.22%
2	10	Kalinga-Apayao	0.00%	0.05%	0.21%	0.39%	0.65%	0.97%	1.34%
2	11	Mountain Province	0.00%	0.03%	0.08%	0.14%	0.21%	0.29%	0.40%
2	12	Nueva Vizcaya	0.00%	0.27%	0.64%	1.13%	1.75%	2.47%	3.19%
2	13	Quirino	0.02%	0.09%	0.21%	0.41%	0.71%	1.11%	1.62%
3	14	Batangas	23.57%	30.85%	41.94%	57.18%	76.92%	100.98%	132.23%
3	15	Bulacan	10.34%	16.20%	24.78%	35.28%	50.48%	67.78%	89.68%
3	16	Nueva Ecija	3.66%	4.12%	4.64%	5.56%	6.68%	7.53%	8.77%
3	17	Pangasinan	39.87%	56.25%	78.79%	116.50%	167.43%	234.23%	321.41%
3	18	Pangasinan	6.67%	9.00%	12.43%	18.09%	26.19%	35.54%	44.62%
3	19	Tarlac	5.89%	7.94%	10.56%	14.50%	19.61%	24.96%	29.30%
3	20	Zambales	5.29%	5.65%	6.04%	6.57%	7.24%	7.99%	8.89%
4	21	Aurora	0.03%	0.18%	0.47%	0.97%	1.78%	2.93%	4.65%
4	22	Batangas	30.73%	37.72%	52.57%	79.68%	115.00%	162.33%	225.72%
4	23	Cavite	38.34%	35.43%	42.50%	64.59%	94.42%	132.79%	182.06%
4	24	Izuna	46.21%	54.34%	77.21%	126.83%	121.17%	178.62%	257.33%
4	25	Marinduque	15.90%	16.30%	21.49%	35.05%	52.81%	78.04%	115.59%
4	26	Metro Manila	190.74%	190.96%	235.04%	355.16%	512.40%	739.52%	1086.22%
4	27	Occidental Mindoro	0.24%	0.73%	1.52%	2.75%	4.58%	7.07%	9.63%
4	28	Oriental Mindoro	0.14%	0.32%	0.54%	0.82%	1.16%	1.53%	1.93%
4	29	Palawan	0.14%	0.19%	0.27%	0.39%	0.53%	0.81%	1.20%
4	30	Quezon	3.78%	5.31%	6.90%	8.60%	10.39%	12.07%	13.62%
4	31	Rizal	6.00%	6.02%	7.96%	12.02%	17.68%	25.97%	39.46%
4	32	Romblon	1.15%	2.01%	3.24%	4.93%	7.29%	10.28%	13.87%
5	33	Albay	3.99%	5.17%	6.50%	8.27%	10.23%	12.03%	13.78%
5	34	Camarines Norte	1.38%	2.29%	2.93%	3.78%	4.82%	6.11%	7.05%
5	35	Camarines Sur	2.06%	3.59%	5.12%	7.28%	10.04%	13.13%	16.26%
5	36	Caranduanes	0.43%	0.55%	0.72%	0.96%	1.31%	1.78%	2.32%
5	37	Marikot	0.05%	0.70%	0.39%	0.67%	1.02%	1.41%	1.92%
5	38	Sorsogon	2.28%	2.84%	3.54%	4.38%	5.34%	6.30%	7.39%
6	39	Aklan	2.20%	3.06%	4.37%	6.41%	9.34%	13.30%	18.51%
6	40	Antique	0.61%	1.18%	1.89%	2.85%	4.08%	5.53%	7.16%
6	41	Capiz	0.27%	0.53%	0.93%	1.52%	2.32%	3.37%	4.68%
6	42	Quimaras	3.25%	4.30%	6.51%	8.79%	11.57%	14.58%	17.60%
6	43	Iloilo	2.28%	4.11%	6.51%	9.75%	13.87%	18.60%	23.58%
6	44	Negros Occidental	6.38%	7.99%	11.43%	14.41%	17.54%	20.62%	23.67%
7	45	Bohol	0.74%	2.06%	4.30%	7.50%	12.12%	18.22%	25.70%
7	46	Cebu	37.30%	37.69%	58.93%	65.43%	85.20%	110.74%	146.16%
7	47	Negros Oriental	1.22%	1.69%	2.41%	3.24%	4.33%	5.60%	7.07%
7	48	Siquijor	3.50%	4.55%	5.85%	7.53%	9.59%	11.81%	14.27%
8	49	Biliran	1.67%	2.30%	3.08%	4.05%	5.25%	6.62%	8.19%
8	50	Eastern Samar	0.07%	0.28%	0.58%	0.96%	1.42%	1.94%	2.50%
8	51	Leyte	3.37%	6.05%	7.96%	10.85%	14.91%	20.50%	28.53%
8	52	Northern Samar	0.03%	0.29%	0.61%	1.08%	1.66%	2.36%	3.18%
8	53	Southern Leyte	0.45%	0.85%	1.52%	2.39%	3.47%	4.78%	6.31%
8	54	Western Samar	0.23%	0.43%	0.58%	0.80%	1.11%	1.55%	2.16%
9	55	Basilan	3.92%	6.24%	9.48%	14.34%	20.50%	27.81%	37.67%
9	56	Sulu	3.24%	6.30%	10.12%	14.81%	20.29%	26.41%	32.96%
9	57	Tawi-Tawi	1.54%	4.28%	8.36%	13.81%	20.20%	27.25%	34.09%
9	58	Zamboanga del Norte	0.44%	0.75%	1.17%	1.69%	2.33%	3.05%	3.84%
9	59	Zamboanga del Sur	2.58%	3.80%	5.54%	6.78%	8.47%	10.82%	14.10%
10	60	Agusan del Norte	1.35%	2.10%	3.12%	4.45%	6.09%	7.91%	9.88%
10	61	Agusan del Sur	0.12%	0.28%	0.53%	0.91%	1.41%	2.16%	3.09%
10	62	Bukidnon	3.67%	3.85%	4.87%	5.80%	6.44%	7.20%	8.09%
10	63	Camiguin	5.95%	11.12%	18.06%	26.66%	36.06%	46.62%	58.62%
10	64	Misamis Occidental	3.17%	4.95%	7.47%	10.83%	15.22%	20.56%	26.74%
10	65	Misamis Oriental	14.88%	18.11%	23.80%	30.10%	39.18%	49.05%	59.05%
10	66	Surigao del Norte	0.34%	0.51%	0.75%	1.06%	1.43%	1.96%	2.53%
11	67	Davao del Norte	0.47%	0.90%	1.34%	1.91%	2.74%	3.71%	4.82%
11	68	Davao del Sur	7.63%	7.57%	7.91%	8.72%	9.77%	11.07%	12.94%
11	69	Davao Oriental	0.15%	0.32%	0.58%	0.93%	1.35%	1.83%	2.36%
11	70	Surigao del Sur	0.71%	0.77%	0.97%	1.31%	1.81%	2.41%	3.21%
12	71	Lanao del Norte	0.51%	2.54%	6.21%	12.14%	20.92%	32.97%	48.50%
12	72	Lanao del Sur	0.65%	2.46%	5.26%	9.22%	14.23%	19.96%	25.86%
12	73	Maguindano	1.72%	2.75%	4.23%	6.31%	9.07%	12.56%	16.65%
12	74	North Cotabato	0.91%	1.41%	2.11%	3.06%	4.25%	5.63%	7.14%
12	75	Sarangani	0.03%	0.28%	0.71%	1.39%	2.31%	3.52%	5.03%
12	76	South Cotabato	1.56%	2.94%	5.48%	9.32%	14.43%	20.84%	27.41%
12	77	Sultan Kudarat	0.36%	0.99%	1.91%	3.22%	4.91%	6.93%	9.01%

shadow : 10 (%) or more

Table G-70 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS
Urban Population

WRR	ID	Province	1995 capita	2000 capita	2005 capita	2010 capita	2015 capita	2020 capita	2025 capita
1	1	Abra	41,741	46,228	51,295	55,900	60,204	63,407	65,926
1	2	Benguet	310,916	394,301	487,926	592,821	707,817	828,612	956,136
1	3	Ilocos Norte	137,556	151,214	163,437	174,996	184,318	191,941	198,367
1	4	Ilocos Sur	128,166	141,592	159,824	174,605	186,325	194,344	199,955
1	5	La Union	157,727	185,064	215,643	244,236	270,370	292,654	308,332
2	6	Batanes	5,332	6,828	7,700	9,078	9,591	10,589	11,593
2	7	Cagayan	143,210	154,842	167,721	181,082	193,308	203,720	211,495
2	8	Ifugao	15,857	19,624	22,391	25,301	27,824	30,091	32,045
2	9	Isabela	294,827	355,706	413,014	467,620	510,251	545,879	571,340
2	10	Kalinga-Apayao	44,708	53,960	66,486	79,790	93,080	105,693	118,310
2	11	Mountain Province	6,015	6,323	6,978	7,705	8,356	8,751	9,329
2	12	Nueva Vizcaya	97,476	109,431	124,637	139,967	154,254	167,109	177,415
2	13	Quirino	32,649	38,238	45,343	52,583	60,094	67,052	73,510
3	14	Bataan	345,501	407,143	466,757	527,274	578,767	621,396	657,273
3	15	Bulacan	1,452,560	1,681,671	2,000,213	2,332,664	2,574,841	2,773,807	2,961,020
3	16	Nueva Ecija	442,720	476,679	526,811	569,864	607,437	637,864	662,345
3	17	Pampanga	1,189,222	1,467,249	1,696,067	1,915,039	2,120,435	2,304,949	2,472,304
3	18	Pangasinan	910,590	1,078,241	1,271,058	1,472,368	1,677,254	1,850,422	2,079,111
3	19	Tarlac	273,343	324,943	378,679	430,533	476,658	516,100	549,029
3	20	Zambales	318,793	383,114	416,047	446,528	472,459	495,114	515,062
4	21	Aurora	67,200	90,511	114,035	139,767	169,590	200,305	232,029
4	22	Batangas	830,955	1,006,567	1,185,191	1,344,711	1,523,112	1,703,854	1,846,735
4	23	Cavite	1,180,384	1,293,713	1,427,053	1,661,294	1,925,045	2,199,838	2,456,090
4	24	Laguna	1,345,659	1,679,905	2,105,089	2,539,840	2,995,688	3,352,638	3,718,673
4	25	Marikina	27,988	30,852	33,415	35,604	37,990	39,981	41,438
4	26	Metro Manila	9,454,190	10,369,987	11,243,097	11,964,236	12,525,987	12,954,059	13,272,876
4	27	Occidental Mindoro	177,722	224,069	286,414	358,703	441,417	538,922	614,477
4	28	Oriental Mindoro	91,294	108,234	122,414	136,468	150,774	164,324	178,294
4	29	Palawan	229,937	290,350	358,590	462,400	578,738	711,623	865,539
4	30	Quezon	498,236	585,095	661,571	733,023	812,161	887,624	963,275
4	31	Rizal	1,257,334	1,493,956	1,801,645	2,142,016	2,543,004	2,984,655	3,471,091
4	32	Romblon	49,421	62,112	73,859	86,696	101,402	117,050	132,775
5	33	Albay	262,391	298,201	337,091	373,360	402,095	424,760	444,559
5	34	Camarines Norte	118,134	136,996	155,118	173,879	191,531	208,647	224,702
5	35	Camarines Sur	501,417	613,678	719,464	832,519	945,700	1,056,684	1,151,258
5	36	Catanduanes	55,273	63,904	78,420	94,975	113,275	134,788	151,120
5	37	Masbate	131,426	141,901	152,848	163,315	172,238	178,001	182,902
5	38	Sorsogon	152,127	156,670	168,332	179,491	182,772	197,352	201,670
6	39	Aklan	114,131	141,963	178,312	220,069	266,630	315,790	367,476
6	40	Antique	123,471	141,951	167,840	191,870	216,081	240,536	264,483
6	41	Capiz	206,078	263,339	334,471	417,222	508,768	607,547	711,697
6	42	Guimaras	47,553	61,181	71,959	83,262	94,327	104,429	113,678
6	43	Iloilo	657,844	848,738	997,644	1,149,966	1,298,383	1,437,092	1,563,903
6	44	Negros Occidental	1,209,809	1,402,944	1,603,737	1,786,146	1,931,703	2,036,075	2,124,985
7	45	Bohol	251,595	328,064	410,294	504,805	611,751	729,360	851,784
7	46	Cebu	1,708,896	1,992,810	2,299,993	2,610,103	2,901,394	3,169,556	3,362,907
7	47	Negros Oriental	326,033	376,074	438,251	505,309	574,030	642,086	709,881
7	48	Siquijor	11,653	13,229	15,246	16,842	18,517	19,764	21,047
8	49	Biliran	36,358	42,779	50,777	58,732	67,372	75,982	84,246
8	50	Eastern Samar	117,394	131,427	149,343	165,668	179,562	191,451	199,579
8	51	Leyte	518,367	611,500	726,142	840,201	961,368	1,083,199	1,202,920
8	52	Northern Samar	136,259	157,737	170,918	194,822	216,063	235,106	245,939
8	53	Southern Leyte	62,878	83,542	98,334	113,825	128,889	144,170	158,988
8	54	Western Samar	138,504	162,646	197,155	234,339	275,042	318,854	350,263
9	55	Basilan	139,213	174,748	210,293	258,235	303,061	343,205	374,391
9	56	Sulu	146,385	186,648	224,623	264,544	304,749	343,826	380,356
9	57	Tawi-Tawi	83,490	106,296	138,310	174,388	210,206	245,772	276,494
9	58	Zamboanga del Norte	143,351	164,267	189,857	214,222	237,156	258,116	276,592
9	59	Zamboanga del Sur	739,762	978,350	1,259,917	1,576,804	1,919,418	2,288,753	2,554,323
10	60	Agusan del Norte	227,920	258,703	290,378	319,726	345,012	365,011	379,614
10	61	Agusan del Sur	124,053	152,345	189,805	232,807	283,784	338,804	398,443
10	62	Bukidnon	338,550	471,876	611,877	766,612	927,906	1,084,269	1,222,569
10	63	Cantiguin	40,619	50,446	60,951	71,392	80,306	86,102	89,985
10	64	Misamis Occidental	130,985	166,717	197,120	229,395	261,804	293,892	323,997
10	65	Misamis Oriental	681,654	784,059	937,579	1,099,896	1,265,580	1,393,368	1,439,745
10	66	Surigao del Norte	172,018	203,627	227,492	249,374	267,122	279,510	288,625
11	67	Davao del Norte	324,077	430,762	467,092	501,685	562,547	618,257	672,941
11	68	Davao del Sur	848,704	908,703	1,031,482	1,153,989	1,244,297	1,318,280	1,373,518
11	69	Davao Oriental	114,534	132,321	151,362	168,433	179,994	188,180	194,019
11	70	Surigao del Sur	203,588	248,717	297,052	348,263	392,510	434,013	472,636
12	71	Lanao del Norte	211,997	291,880	392,666	507,109	628,588	748,984	862,206
12	72	Lanao del Sur	239,680	300,256	379,179	463,708	542,643	609,533	658,157
12	73	Maguindanao	275,859	349,584	421,639	499,153	579,340	664,551	748,973
12	74	North Cotabato	202,730	251,158	306,145	362,509	418,127	473,714	527,455
12	75	Sarangani	218,373	251,798	321,451	397,413	469,896	544,782	608,897
12	76	South Cotabato	451,412	519,466	663,149	821,555	970,431	1,126,958	1,260,081
12	77	Sultan Kudarat	209,640	250,235	303,477	359,931	416,028	467,378	514,084

shadow : 1,500,000 (capita) or more

Table G-71 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Population Density

WRR	ID	Province	1995 c/sq km	2000 c/sq km	2005 c/sq km	2010 c/sq km	2015 c/sq km	2020 c/sq km	2025 c/sq km
1	1	Abra	49	52	56	59	61	63	64
1	2	Benguet	204	235	266	297	327	356	383
1	3	Ilocos Norte	142	154	165	175	184	191	197
1	4	Ilocos Sur	211	226	240	253	265	273	280
1	5	La Union	400	432	469	503	536	565	590
2	6	Batanes	68	81	86	95	95	100	105
2	7	Cagayan	103	111	120	129	137	143	149
2	8	Ifugao	60	71	79	87	94	100	106
2	9	Isabela	107	121	134	144	152	159	164
2	10	Kalinga-Apayao	35	37	41	44	47	48	50
2	11	Mountain Province	62	64	69	75	80	84	87
2	12	Nueva Vizcaya	86	93	103	113	123	132	139
2	13	Quirino	43	48	55	61	68	74	79
3	14	Bataan	358	391	429	463	491	514	534
3	15	Bulacan	680	730	815	899	981	1,057	1,128
3	16	Nueva Ecija	282	297	322	343	359	373	383
3	17	Pampanga	750	872	953	1,025	1,084	1,133	1,174
3	18	Pangasinan	406	442	481	518	550	578	602
3	19	Tarlac	320	353	383	409	432	449	464
3	20	Zarabaly	153	181	192	213	225	235	244
4	21	Aurora	49	61	70	80	92	103	114
4	22	Batangas	524	550	634	685	738	786	830
4	23	Cavite	1,336	1,412	1,506	1,699	1,915	2,134	2,358
4	24	Laguna	929	1,027	1,307	1,506	1,705	1,929	2,117
4	25	Marinduque	208	227	242	254	268	278	285
4	26	Metro Manila	14,865	16,305	17,678	18,812	19,695	20,368	20,859
4	27	Occidental Mindoro	57	63	71	79	87	96	105
4	28	Oriental Mindoro	139	165	186	206	227	248	267
4	29	Palawan	43	50	59	68	80	92	105
4	30	Quezon	177	204	226	248	271	294	315
4	31	Rizal	1,003	1,141	1,376	1,637	1,943	2,280	2,652
4	32	Romblon	180	207	227	246	267	287	305
5	33	Albay	391	428	467	503	534	560	582
5	34	Canarines Norte	208	241	273	305	336	366	394
5	35	Canarines Sur	272	311	342	372	400	425	447
5	36	Carandunnes	134	151	167	184	199	214	228
5	37	Mastote	162	167	173	179	183	185	186
5	38	Sorsogon	276	279	291	303	313	320	324
6	39	Aklan	225	242	263	284	304	322	337
6	40	Antique	171	190	207	226	243	260	276
6	41	Capiz	237	258	281	304	324	342	357
6	42	Guimaras	209	246	267	288	308	324	339
6	43	Iloilo	371	437	474	510	543	574	597
6	44	Negros Occidental	307	331	353	371	384	395	402
7	45	Bohol	242	275	301	330	355	379	400
7	46	Cebu	574	636	702	764	820	879	914
7	47	Negros Oriental	190	198	210	222	231	239	245
7	48	Siquijor	215	238	249	261	272	278	284
8	49	Bihran	238	264	296	324	355	383	410
8	50	Eastern Samar	83	89	98	105	110	115	118
8	51	Leyte	265	293	328	361	394	425	455
8	52	Northern Samar	130	140	141	151	158	162	165
8	53	Southern Leyte	183	232	261	290	319	346	373
8	54	Western Samar	104	111	124	136	148	160	172
9	55	Basilan	245	253	263	285	303	318	331
9	56	Sulu	343	406	456	504	546	584	615
9	57	Tawi-Tawi	231	236	252	267	278	287	293
9	58	Zamboanga del Norte	127	140	157	173	183	202	214
9	59	Zamboanga del Sur	196	225	254	280	305	327	348
10	60	Agusan del Norte	199	219	240	258	275	288	298
10	61	Agusan del Sur	57	68	81	97	115	135	157
10	62	Bukidnon	118	141	161	180	199	217	232
10	63	Comiguin	296	321	347	373	394	407	420
10	64	Misamis Occidental	237	253	270	284	296	303	307
10	65	Misamis Oriental	265	293	326	351	373	390	403
10	66	Surigao del Norte	161	182	195	207	215	219	222
11	67	Davao del Norte	147	192	205	218	242	265	287
11	68	Davao del Sur	264	276	307	338	359	376	389
11	69	Davao Oriental	80	89	98	107	111	115	117
11	70	Surigao del Sur	104	118	132	146	156	165	172
12	71	Lanao del Norte	242	270	301	330	356	378	397
12	72	Lanao del Sur	204	229	246	272	296	316	333
12	73	Maguindanao	167	198	222	245	266	284	299
12	74	North Cotabato	132	153	172	189	205	219	231
12	75	Sarangani	99	106	127	148	165	182	199
12	76	South Cotabato	253	272	325	379	425	469	511
12	77	Sultan Kudarat	117	128	143	159	173	185	195

shadow : 500 (capita square km) or more

Table G-72 GW SHORTAGE FORECASTING BY PROVINCIAL BASIS

Level-III Population Served

WRR	ID	Province	1995 capita	2000 capita	2005 capita	2010 capita	2015 capita	2020 capita	2025 capita
1	1	Abra	17,460	24,779	33,703	41,012	55,589	67,657	80,090
1	2	Benquet	190,680	264,543	354,598	463,917	593,416	740,934	908,329
1	3	Ilocos Norte	100,290	121,584	145,434	171,930	199,563	228,026	257,182
1	4	Ilocos Sur	43,140	66,034	93,751	126,077	161,146	196,995	233,097
1	5	La Union	88,590	117,290	154,482	198,495	248,229	301,556	354,451
2	6	Batanes	-	1,081	2,441	4,312	6,074	8,383	11,014
2	7	Cagayan	51,660	72,184	95,928	122,838	151,899	182,163	212,240
2	8	Ifugao	-	2,941	6,717	11,385	16,694	22,568	28,840
2	9	Isabela	74,450	128,024	195,688	276,530	363,854	455,967	548,316
2	10	Kalinga-Apayao	-	8,364	20,611	37,102	57,709	81,912	110,029
2	11	Mountain Province	-	1,001	2,210	3,660	5,292	6,928	8,863
2	12	Nueva Vizcaya	-	17,326	39,468	66,485	97,695	132,295	168,544
2	13	Quirino	2,810	8,237	16,866	27,261	40,068	54,775	71,175
3	14	Bataan	149,120	209,581	286,307	374,250	468,472	566,217	664,752
3	15	Bulacan	378,010	634,457	958,561	1,331,814	1,795,422	2,284,640	2,812,967
3	16	Nueva Ecija	303,340	350,265	412,411	474,806	537,561	598,296	656,921
3	17	Pampanga	325,640	562,057	835,707	1,153,907	1,510,753	1,895,766	2,305,503
3	18	Pangasinan	353,310	517,137	730,030	990,211	1,296,970	1,647,138	2,037,580
3	19	Tarlac	110,370	160,859	222,687	293,752	370,627	450,822	521,577
3	20	Zambales	245,770	306,684	354,980	405,901	452,240	509,198	561,649
4	21	Aurora	4,300	18,631	40,411	70,689	111,707	162,875	224,727
4	22	Batangas	296,710	458,284	660,570	890,967	1,170,687	1,492,185	1,818,053
4	23	Cavite	697,840	844,624	1,019,766	1,288,469	1,611,304	1,977,536	2,361,225
4	24	Laguna	318,500	594,373	995,633	1,511,121	94,054	100,821	108,588
4	25	Marinduque	13,870	18,755	24,452	30,782	37,930	45,522	53,236
4	26	Metro Manila	5,862,000	7,673,791	8,994,478	10,528,528	11,899,688	12,906,356	12,609,232
4	27	Occidental Mindoro	18,890	54,959	110,457	189,381	298,410	439,760	583,752
4	28	Oriental Mindoro	18,220	35,210	55,688	79,956	108,217	139,756	175,379
4	29	Palawan	38,750	85,458	157,750	258,572	399,937	586,038	827,803
4	30	Quezon	171,650	261,661	367,040	487,342	629,895	787,939	963,856
4	31	Rizal	990,390	1,194,931	1,495,187	1,841,976	2,263,148	2,745,809	3,297,538
4	32	Romblon	14,340	24,174	37,722	55,521	78,561	107,005	140,476
5	33	Albay	136,260	176,496	224,540	277,250	330,252	382,895	436,271
5	34	Camarines Norte	68,070	83,218	112,127	140,386	171,960	206,956	208,972
5	35	Camarines Sur	161,920	261,146	385,254	539,785	722,423	931,299	1,161,589
5	36	Catanduanes	37,710	47,828	62,543	82,823	109,451	144,416	181,273
5	37	Masbate	9,670	119,267	56,706	84,942	115,331	145,880	177,347
5	38	Sorsogon	75,680	94,946	118,734	144,913	173,039	201,286	228,187
6	39	Aklan	72,780	95,188	129,245	177,312	241,645	322,781	421,882
6	40	Antique	19,740	45,266	72,889	110,878	156,591	210,164	270,999
6	41	Capiz	54,040	97,931	162,732	252,636	370,267	517,799	695,736
6	42	Guimaras	9,200	18,887	31,987	48,749	68,940	91,873	117,194
6	43	Iloilo	177,870	318,459	494,696	713,689	971,902	1,263,011	1,580,930
6	44	Negros Occidental	362,340	573,721	833,027	1,127,067	1,436,222	1,744,228	2,061,406
7	45	Bohol	14,170	66,113	141,096	253,952	401,613	591,581	823,365
7	46	Cebu	369,220	676,305	1,066,815	1,538,319	2,076,910	2,671,763	3,264,909
7	47	Negros Oriental	424,420	179,281	250,648	337,248	438,055	551,569	677,977
7	48	Siguir	8,520	10,694	13,348	16,520	20,248	24,166	28,515
8	49	Biliran	20,600	26,959	35,611	45,673	57,429	70,543	84,893
8	50	Eastern Samar	7,080	27,889	54,372	85,772	120,803	158,646	196,680
8	51	Leyte	256,850	351,260	477,380	628,943	811,343	1,021,541	1,257,167
8	52	Northern Samar	500	25,457	54,542	92,598	137,105	185,270	249,226
8	53	Southern Leyte	13,100	23,701	41,002	62,630	88,094	117,750	151,039
8	54	Western Samar	31,220	56,456	92,421	138,815	197,258	268,777	339,845
9	55	Basilan	54,740	83,354	121,478	175,913	241,044	314,343	355,672
9	56	Sulu	32,410	63,989	104,285	154,943	215,498	284,883	361,337
9	57	Tawi-Tawi	8,800	25,630	52,598	91,634	141,930	203,370	271,470
9	58	Zamboanga del Norte	38,390	63,191	95,387	133,388	176,599	224,024	274,422
9	59	Zamboanga del Sur	353,930	544,458	799,862	1,125,710	1,522,707	1,997,905	2,433,726
10	60	Agusan del Sur	108,790	145,379	188,573	236,536	287,272	338,531	388,634
10	61	Agusan del Sur	20,470	44,672	80,644	130,841	192,383	266,815	395,551
10	62	Bukidnon	87,310	173,608	295,767	460,932	668,788	912,253	1,177,030
10	63	Camiguin	8,560	16,547	27,861	42,471	59,421	68,164	85,486
10	64	Misamis Occidental	47,530	73,787	108,812	153,132	206,394	268,099	336,724
10	65	Misamis Oriental	389,890	498,016	654,724	837,724	1,044,247	1,234,645	1,367,756
10	66	Surigao del Norte	54,000	85,637	120,766	160,194	201,688	242,794	283,643
11	67	Davao del Norte	88,210	164,544	233,167	309,444	412,667	526,155	651,983
11	68	Davao del Sur	827,140	885,040	1,003,136	1,121,106	1,208,334	1,279,998	1,333,746
11	69	Davao Oriental	21,560	42,207	68,522	99,408	131,676	164,617	197,728
11	70	Surigao del Sur	91,590	131,775	184,440	250,564	324,246	406,437	496,005
12	71	Lanao del Norte	9,630	57,263	136,236	252,394	407,623	598,617	819,095
12	72	Lanao del Sur	18,000	66,331	139,057	237,674	357,258	490,177	625,249
12	73	Maguindanao	103,530	164,683	230,013	330,764	439,390	567,499	711,525
12	74	North Cotabato	64,370	106,996	161,677	230,915	312,525	406,846	512,140
12	75	Sarangani	3,040	21,471	47,454	80,717	118,712	162,267	211,114
12	76	South Cotabato	35,120	116,003	244,430	422,362	640,291	907,857	1,184,353
12	77	Sultan Kudarat	17,850	57,478	113,514	187,047	277,101	379,993	493,723

shaded : 500,000 (capita) or more

Table G-73 LARGE SQ. DEVIATION RATIO OF MUNICIPAL POP.

WRR	Province	Municipality	Population					
			Population capita	average capita	ave.dev. capita	ave.dev.ratio %	deviation θ	sq.dev.ratio
9	Zamboanga del Sur	Zamboanga City	511,147	39,782	25,728	65.5%	18.34	12.01
7	Cebu	Cebu City	662,310	55,117	40,980	74.4%	14.82	11.02
10	Misamis Oriental	Cagayan de Oro City	428,321	39,072	34,347	87.9%	11.33	9.96
11	Davao del Sur	Davao City	1,006,856	105,246	112,866	107.2%	7.99	8.57
12	Lanao del Norte	Iligan City	273,008	31,035	25,147	81.0%	9.62	7.80
6	Iloilo	Iloilo City	334,544	39,763	19,568	49.2%	15.06	7.41
10	Surigao del Norte	Surigao City	104,911	15,793	8,622	54.6%	10.34	5.64
1	Benguet	Baguio City	226,887	38,623	31,837	82.4%	5.91	4.87
10	Agusan del Norte	Batuan City	247,078	42,874	35,896	83.7%	5.69	4.76
8	Western Samar	Calbayog City	129,218	22,668	15,473	68.3%	6.89	4.70
12	Lanao del Sur	Marawi City	114,391	20,407	7,808	38.3%	12.04	4.61
6	Negros Occidental	Bacolod City	402,351	76,069	40,085	52.7%	8.14	4.29
1	Abra	Bangued	35,451	7,258	4,328	59.6%	6.51	3.88
4	Palawan	Puerto Princesa City	129,579	26,687	16,251	60.9%	6.33	3.86
8	Leyte	Tacloban City	167,513	33,146	17,178	50.6%	7.43	5.76

Table G-74 LARGE SQ. DEVIATION RATIO OF MUNICIPAL POP. DENSITY

WRR	Province	Municipality	Population Density					
			Pop.Density c/sq km	average c/sq km	ave.dev. c/sq km	ave.dev.ratio %	deviation θ	sq.dev.ratio
7	Cebu	Mandaue City	16,645	881.3	832.0	94.4%	18.95	17.89
6	Iloilo	Iloilo City	5,974	507.8	334.3	65.8%	16.35	10.77
1	Benguet	Baguio City	4,640	500.2	666.8	133.3%	6.21	8.28
9	Sulu	Jolo	5,700	614.7	589.6	95.9%	8.62	8.27
4	Quezon	Lucena City	2,595	301.7	204.0	67.6%	11.24	7.60
12	Lanao del Sur	Marawi City	5,062	614.9	475.7	77.4%	9.35	7.23
4	Rizal	Cainta	19,760	2,575.2	2,620.1	101.7%	6.56	6.67
7	Bohol	Tagbilaran City	2,201	289.4	129.3	44.7%	14.78	6.60
4	Laguna	San Pedro	8,567	1,166.8	923.8	79.2%	8.01	6.34
3	Tarlac	Victoria	4,135	609.1	402.0	66.0%	8.77	5.79
3	Zambales	Olongapo City	1,740	259.6	227.3	87.5%	6.51	5.70
8	Eastern Samar	Guiuan	838	126.6	82.7	65.3%	8.60	5.62
6	Antique	San Jose	1,677	263.3	169.2	64.3%	8.35	5.37
6	Negros Occidental	Bacolod City	2,578	431.1	258.7	60.0%	8.30	4.98
7	Negros Oriental	Dumaguete City	1,660	278.0	162.8	58.5%	8.49	4.97
3	Pangasinan	Dagupan City	3,393	607.2	398.7	65.7%	6.99	4.59
8	Leyte	Tacloban City	1,658	305.3	151.8	49.7%	8.91	4.43
4	Cavite	Rosario	13,024	2,823.4	2,927.2	104.1%	4.13	4.32

Table G-75 LARGE GW FED L-III WATER SUPPLY SYSTEMS

WRR	Province	Water District	Intake Type		Water Supply Index			
			Wells numeric	SPs numeric	GW Mcum/y	Q Mcum/y	Pop.Served capita	UWC lpcd
7	Cebu	Metro Cebu WD	19	-	51.97	52.64	300,000	450.73
11	Davao del Sur	Davao City WD	33	-	37.91	47.76	793,970	164.81
4	Quezon	Quezon Micro WD	-	5	29.57	29.57	105,720	766.17
10	Misamis Oriental	Cagayan de Oro CWD	14	1	28.63	28.63	365,100	214.83
4	Metro Manila	MWSS	109	-	26.88	975.98	7,291,480	366.72
3	Pampanga	Angeles City WD	12	-	19.05	19.05	92,710	563.05
6	Negros Occidental	Bacolod City WD	23	1	16.78	16.79	130,460	352.56
9	Zamboanga del Sur	Zamboanga City WD	3	-	15.49	24.21	321,000	206.66
3	Zambales	Olongapo City WD	5	1	14.10	14.20	173,430	224.35
4	Batangas	Batangas City WD	13	-	11.83	11.83	76,270	424.95
1	Benguet	Baguio City WD	39	12	10.77	10.77	172,000	171.63
3	Nueva Ecija	Cabanatuan City WD	11	-	8.22	8.22	151,070	149.04
6	Iloilo	Metro Iloilo WD	7	2	7.54	7.54	113,830	181.41
4	Batangas	Lipa City WD	135	6	7.32	7.32	120,590	166.22
3	Tarlac	Tarlac WD	9	-	6.50	6.50	60,200	295.68
4	Cavite	Dasmariñas WD	30	1	6.24	6.24	151,000	113.29
3	Pampanga	San Fernando WD	12	-	5.44	5.44	107,700	138.35
4	Laguna	Calamba WD	8	1	5.39	5.39	74,510	198.28
3	Pangasinan	Dagupan City WD	15	-	5.35	5.35	93,190	157.17
3	Bataan	Balanga WD	9	-	5.35	5.35	33,430	437.18

Table G-76 PROVINCIAL GW SHORTAGE & COUNTERMEASURE

<i>< SW Development ></i>						
1995	2000	2005	2010	2015	2020	2025
<i>Bataan</i>	<i>Camiguin</i>	<i>Sulu</i>	<i>Leyte</i>	<i>Braguet</i>	<i>Aklan</i>	
<i>Carile</i>			<i>Rizal</i>	<i>La Union</i>	<i>Siquijor</i>	
<i>Marinduque</i>			<i>Basilan</i>	<i>Zamboanga del Sur</i>	<i>Bukidnon</i>	
<i>Metro Manila</i>			<i>Tawi-Tawi</i>	<i>Lanao del Sur</i>		
<i>Cebu</i>			<i>Misamis Occidental</i>			
<i>Misamis Oriental</i>						
<i>< Improvement of GWRD ></i>						
1995	2000	2005	2010	2015	2020	2025
		<i>Tarlac</i>		<i>Albay</i>	<i>Romblon</i>	
		<i>Negros Occidental</i>		<i>Camarines Sur</i>	<i>Maguindanao</i>	
				<i>Guimaras</i>		
				<i>Bohol</i>		
<i>< SW Development &/or Improvement of GWRD ></i>						
1995	2000	2005	2010	2015	2020	2025
<i>Pampanga</i>		<i>Pangasinan</i>	<i>Lanao del Norte</i>	<i>Quezon</i>	<i>Davao del Sur</i>	
<i>Batangas</i>						
<i>Bulacan</i>				<i>Iloilo</i>		
<i>Laguna</i>				<i>South Cotabato</i>		

Notes : There is/are large scale water supply system(s) (5 M cum/y or more) in **BOLD & ITALIC** province.

Table G-77 L-III WATER SUPPLY SYSTEMS IN GW SHORTAGE PROVINCE

<i>SW Development (for detailed Domestic Water Demand Forecasting)</i>						
1995	2000	2005	2010	2015	2020	2025
<i>Balanga WD</i>			<i>Misamis Occi. WD</i>	<i>Baguio CWD</i>	<i>Davao CWD</i>	
<i>Mariveles WD</i>				<i>Zamboanga CWD</i>		
<i>MWSS</i>						
<i>Metro Cebu WD</i>						
<i>Cagayan de Oro CWD</i>						
<i>Improvement of GWRD (for detailed GW Balance Evaluation)</i>						
1995	2000	2005	2010	2015	2020	2025
<i>Angeles CWD</i>		<i>Tarlac WD</i>		<i>Metro Naga WD</i>	<i>Cotabato CWD</i>	
<i>San Fernando WD</i>		<i>Bacolod CWD</i>		<i>Metro Iloilo WD</i>		
<i>Dasmariñas WD</i>		<i>Dagupan CWD</i>				
<i>Calamba WD</i>						
<i>Batangas CWD</i>						
<i>Lipa CWD</i>						

Table G-78 L-III WATER SUPPLY SYSTEMS FOR SW DEVELOPMENT

Water District	Source Type	Province	Major River Basin
<i>Balanga WD</i>	<i>GW</i>	<i>Bataan</i>	<i>others</i>
<i>Mariveles WD</i>	<i>GW</i>	<i>Bataan</i>	<i>others</i>
<i>MWSS</i>	<i>SW>GW</i>	<i>Metro Manila</i>	<i>Pasig-Laguna River Basin</i>
<i>Metro Cebu WD</i>	<i>GW>SW</i>	<i>Cebu</i>	-
<i>Cagayan de Oro City WD</i>	<i>GW</i>	<i>Misamis Oriental</i>	<i>Cagayan de Oro River Basin</i>
<i>Zamboanga City WD</i>	<i>SW>GW</i>	<i>Zamboanga del Sur</i>	-
<i>Davao City WD</i>	<i>GW</i>	<i>Davao del Sur</i>	<i>Davao River Basin</i>
<i>Misamis Occidental WD</i>	<i>GW</i>	<i>Misamis Occidental</i>	-
<i>Baguio City WD</i>	<i>GW</i>	<i>Benguet</i>	<i>others</i>

Table G-79 GW DEMAND & CONSUMPTION BY WRR

MCM year

WRR	1995					2000				
	Recharge	Low GDP	Consum.	High GDP	Consum.	Recharge	Low GDP	Consum.	High GDP	Consum.
I	2,029.4	115.2	5.68%	115.2	5.68%	2,044.4	215.5	10.54%	216.5	10.59%
II	3,954.3	69.2	1.75%	69.2	1.75%	4,017.2	495.1	12.32%	495.5	12.34%
III	2,156.9	419.3	19.44%	419.3	19.44%	2,262.7	803.5	35.51%	810.5	35.82%
IV	4,154.2	503.4	12.12%	503.4	12.12%	4,152.2	621.8	14.97%	619.5	14.92%
V	2,069.0	102.0	4.93%	102.0	4.93%	2,103.0	218.1	10.37%	219.8	10.45%
VI	2,527.9	259.9	10.28%	259.9	10.28%	2,543.7	389.0	15.29%	390.7	15.36%
VII	1,114.8	272.2	24.41%	272.2	24.41%	1,119.0	297.4	26.57%	300.2	26.83%
VIII	3,014.6	70.0	2.32%	70.0	2.32%	3,025.5	110.5	3.65%	114.9	3.80%
IX	1,662.2	85.6	5.15%	85.6	5.15%	1,671.7	130.3	7.79%	130.3	7.79%
X	3,189.9	163.9	5.14%	163.9	5.14%	3,202.8	273.2	8.53%	273.4	8.54%
XI	3,203.7	134.3	4.19%	134.3	4.19%	3,218.1	164.7	5.12%	164.5	5.11%
XII	2,617.1	199.9	7.64%	199.9	7.64%	2,639.6	497.4	18.84%	496.8	18.82%
Total	31,694.2	2,394.9	7.56%	2,394.9	7.56%	31,999.9	4,216.5	13.18%	4,232.7	13.23%

WRR	2005					2010				
	Recharge	Low GDP	Consum.	High GDP	Consum.	Recharge	Low GDP	Consum.	High GDP	Consum.
I	2,056.8	318.4	15.48%	319.7	15.54%	2,043.9	338.2	16.55%	341.6	16.71%
II	4,106.0	923.7	22.50%	924.0	22.50%	4,107.0	941.1	22.92%	942.0	22.94%
III	2,406.1	1,228.7	51.06%	1,242.9	51.66%	2,409.5	1,370.8	56.89%	1,409.7	58.51%
IV	4,156.3	825.5	19.86%	797.6	19.19%	4,105.8	972.8	23.69%	999.5	24.34%
V	2,149.7	333.8	15.53%	334.5	15.56%	2,152.4	362.6	16.84%	364.3	16.92%
VI	2,569.4	527.9	20.55%	546.7	21.28%	2,564.1	584.7	22.80%	611.3	23.84%
VII	1,125.5	382.1	33.95%	397.4	35.31%	1,122.9	399.3	35.56%	430.7	38.36%
VIII	3,040.5	150.5	4.95%	155.4	5.11%	3,037.3	172.3	5.67%	185.2	6.10%
IX	1,684.7	179.5	10.66%	181.6	10.78%	1,683.8	203.1	12.06%	208.3	12.37%
X	3,222.1	394.4	12.24%	401.5	12.46%	3,217.1	440.0	13.68%	449.6	13.98%
XI	3,237.8	195.1	6.03%	196.9	6.08%	3,236.1	206.3	6.37%	210.9	6.52%
XII	2,668.6	810.0	30.35%	810.8	30.38%	2,650.8	873.7	32.96%	875.6	33.03%
Total	32,423.5	6,269.7	19.34%	6,309.0	19.46%	32,330.6	6,864.9	21.23%	7,028.8	21.74%

WRR	2015					2020				
	Recharge	Low GDP	Consum.	High GDP	Consum.	Recharge	Low GDP	Consum.	High GDP	Consum.
I	2,030.1	360.7	17.77%	368.0	18.13%	2,021.7	384.6	19.02%	399.1	19.74%
II	4,087.8	960.6	23.50%	962.3	23.54%	4,119.1	980.5	23.80%	983.9	23.89%
III	2,384.2	1,537.2	64.47%	1,624.5	68.14%	2,424.5	1,713.7	70.68%	1,889.3	77.93%
IV	4,031.5	1,123.1	27.86%	1,267.1	31.43%	3,974.6	1,250.6	31.46%	1,620.1	40.76%
V	2,144.0	394.7	18.41%	398.3	18.58%	2,159.7	428.4	19.84%	435.0	20.14%
VI	2,551.3	650.7	25.50%	684.1	26.81%	2,554.7	723.2	28.31%	762.4	29.84%
VII	1,117.8	448.5	40.13%	516.2	46.18%	1,117.3	491.6	43.99%	622.2	55.68%
VIII	3,029.4	196.4	6.48%	223.5	7.38%	3,026.8	220.1	7.27%	272.5	9.00%
IX	1,679.4	228.9	13.63%	239.6	14.27%	1,682.1	255.9	15.22%	276.6	16.44%
X	3,205.9	504.9	15.75%	525.9	16.40%	3,208.7	574.8	17.91%	616.9	19.23%
XI	3,229.9	217.8	6.74%	227.6	7.05%	3,236.4	227.2	7.02%	245.6	7.59%
XII	2,621.1	951.1	36.29%	955.0	36.44%	2,615.3	1,041.2	39.81%	1,048.4	40.09%
Total	32,112.4	7,574.4	23.59%	7,992.1	24.89%	32,140.9	8,291.8	25.80%	9,172.0	28.54%

WRR	2025					Ratio (1995/2025)	
	Recharge	Low GDP	Consum.	High GDP	Consum.	Low GDP	High GDP
I	2,020.0	410.5	20.32%	437.2	21.64%	3.56	3.79
II	4,227.8	1,001.9	23.70%	1,008.1	23.84%	14.49	14.57
III	2,550.8	1,895.5	74.31%	2,221.1	87.07%	4.52	5.30
IV	3,949.0	1,426.4	36.12%	2,201.2	55.74%	2.83	4.37
V	2,198.9	462.5	21.03%	474.3	21.57%	4.53	4.65
VI	2,580.6	805.4	31.21%	849.5	32.92%	3.10	3.27
VII	1,123.7	529.2	47.10%	767.8	68.33%	1.94	2.82
VIII	3,023.8	245.7	8.12%	340.7	11.27%	3.51	4.86
IX	1,684.7	281.6	16.71%	319.5	18.96%	3.29	3.73
X	3,232.8	650.3	20.12%	731.4	22.62%	3.97	4.46
XI	3,259.1	236.2	7.25%	269.1	8.26%	1.76	2.00
XII	2,647.4	1,142.1	43.14%	1,155.0	43.63%	5.71	5.78
Total	32,498.5	9,087.3	27.96%	10,774.8	33.15%	3.79	4.50

Notes : The volumes of Recharge & Demand (Low & High GDP) column are estimated by the Study Team.
Consumption is calculated by Demand Recharge.

Table G-80 GW DEMAND & CONSUMPTION BY MRB

(Unit: MCM/year)

WRR	MRB	1995					2000					2005					2010								
		Recharge	Low	Consum	High	Consum.	Recharge	Low	Consum	High	Consum.	Recharge	Low	Consum.	High	Consum.	Recharge	Low	Consum.	High	Consum.				
		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP
I.	Total	2,029.4	115.2	5,687%	115.2	5,687%	2,044.4	215.5	10,542%	215.5	10,542%	2,056.8	218.4	15,487%	218.4	15,487%	2,119.7	155.47%	1,955.3	323.5	323.5	323.5	16,717%	16,717%	
II.	Total	3,954.3	69.2	1,757%	69.2	1,757%	4,017.2	495.1	12,324%	495.1	12,324%	4,106.0	923.7	22,502%	923.7	22,502%	4,107.0	941.1	22,922%	941.1	22,922%	941.1	22,922%		
III.	Total	2,156.9	41.9	19,448%	41.9	19,448%	2,262.7	803.5	35,514%	803.5	35,514%	2,406.1	1,228.7	51,064%	1,228.7	51,064%	2,429.9	51,664%	2,409.5	1,370.8	56,692%	1,370.8	56,692%		
IV.	Total	4,154.2	503.4	12,124%	503.4	12,124%	4,152.2	621.8	14,974%	621.8	14,974%	4,155.3	825.5	19,867%	825.5	19,867%	4,105.8	922.8	22,692%	922.8	22,692%	922.8	22,692%		
V.	Total	2,069.0	102.0	4,932%	102.0	4,932%	2,103.0	218.1	10,377%	218.1	10,377%	2,149.7	333.8	15,534%	333.8	15,534%	2,152.4	362.6	16,942%	362.6	16,942%	362.6	16,942%		
VI.	Total	1,114.8	222.2	24,417%	222.2	24,417%	1,119.0	207.4	26,577%	207.4	26,577%	1,125.5	282.1	31,554%	282.1	31,554%	1,122.9	299.3	35,564%	299.3	35,564%	299.3	35,564%		
VII.	Total	3,014.6	70.0	2,322%	70.0	2,322%	3,025.5	110.5	3,658%	110.5	3,658%	3,040.5	150.5	4,932%	150.5	4,932%	3,023.3	172.2	5,672%	172.2	5,672%	172.2	5,672%		
VIII.	Total	1,662.7	85.6	5,154%	85.6	5,154%	1,671.7	130.3	7,792%	130.3	7,792%	1,684.7	179.5	10,607%	179.5	10,607%	1,681.6	10,782%	1,683.8	203.1	12,062%	203.1	12,062%		
IX.	Total	1,870.1	192.3	10,284%	192.3	10,284%	1,884.8	287.8	28,802%	287.8	28,802%	1,900.8	390.5	40,444%	390.5	40,444%	1,896.9	432.6	45,222%	432.6	45,222%	432.6	45,222%		
X.	Total	3,183.9	163.9	5,144%	163.9	5,144%	3,202.8	273.2	8,532%	273.2	8,532%	3,222.1	394.4	12,244%	394.4	12,244%	3,217.4	440.0	13,682%	440.0	13,682%	440.0	13,682%		
XI.	Total	3,203.7	134.2	4,192%	134.2	4,192%	3,218.1	164.7	5,122%	164.7	5,122%	3,237.8	195.1	6,024%	195.1	6,024%	3,236.1	206.3	6,372%	206.3	6,372%	206.3	6,372%		
XII.	Total	2,621.1	195.9	7,444%	195.9	7,444%	2,639.6	472.4	18,842%	472.4	18,842%	2,655.6	610.0	20,352%	610.0	20,352%	2,650.8	813.7	32,902%	813.7	32,902%	813.7	32,902%		
Nation		31,622.7	2,394.0	7,567%	2,394.0	7,567%	31,960.9	4,216.5	13,182%	4,216.5	13,182%	32,423.5	6,269.7	19,342%	6,269.7	19,342%	32,830.0	6,664.0	21,222%	6,664.0	21,222%	6,664.0	21,222%		

WRR	MRB	2015					2020					2025					Ratio (1995-2025)		
		Recharge	Low	Consum	High	Consum.	Recharge	Low	Consum	High	Consum.	Recharge	Low	Consum.	High	Consum.	Low	High	
		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP		CEP	CEP	GDP	GDP		GDP	GDP	
I.	Total	2,030.1	360.7	17,772%	360.7	18,132%	2,021.7	384.6	19,022%	384.6	19,742%	2,020.0	410.5	20,322%	437.2	21,642%	3.56	3.8	
II.	Total	4,057.8	950.6	23,502%	950.6	23,542%	4,119.1	980.5	23,802%	980.5	23,892%	4,227.8	1,001.9	23,792%	1,008.1	23,842%	14.49	14.6	
III.	Total	2,384.2	153.2	64,472%	153.2	68,142%	2,424.5	1,713.7	70,682%	1,713.7	79,792%	2,550.8	1,895.5	74,312%	2,221.1	87,072%	4.52	5.3	
IV.	Total	4,031.5	1,123.4	27,862%	1,123.4	31,432%	3,974.8	1,250.6	31,462%	1,250.6	40,702%	3,940.0	1,436.4	36,122%	2,201.2	55,742%	2.83	4.4	
V.	Total	2,144.0	394.7	18,412%	394.7	18,582%	2,152.7	428.4	19,842%	428.4	20,142%	2,195.9	462.5	21,032%	474.3	21,572%	4.53	4.6	
VI.	Total	1,117.6	445.9	40,132%	445.9	46,182%	1,117.3	491.6	43,992%	491.6	45,682%	1,123.7	529.2	47,102%	767.8	68,132%	1.94	2.8	
VII.	Total	3,029.4	196.4	6,452%	196.4	7,382%	3,026.8	220.1	7,272%	220.1	7,272%	3,023.8	245.7	8,122%	340.7	11,252%	3.51	4.9	
VIII.	Total	1,679.4	228.9	13,632%	228.9	14,222%	1,682.1	255.9	15,222%	255.9	16,412%	1,684.7	281.6	16,712%	319.5	18,962%	3.29	3.7	
IX.	Total	1,870.1	192.3	10,284%	192.3	10,284%	1,884.8	287.8	28,802%	287.8	28,802%	1,900.8	390.5	40,444%	1,896.9	432.6	45,222%	432.6	45,222%
X.	Total	3,205.9	163.9	5,144%	163.9	5,144%	3,208.7	174.8	5,392%	174.8	5,392%	3,232.8	195.1	6,024%	331.4	22,622%	3.97	4.5	
XI.	Total	3,229.9	134.2	4,192%	134.2	4,192%	3,236.4	164.7	5,122%	164.7	5,122%	3,259.1	195.1	6,024%	269.1	8,262%	1.76	2.0	
XII.	Total	2,621.1	195.9	7,444%	195.9	7,444%	2,639.6	472.4	18,842%	472.4	18,842%	2,647.4	610.0	20,352%	1,555.0	43,632%	5.72	5.8	
Nation		32,112.4	2,574.4	7,922%	2,574.4	8,242%	32,140.0	4,216.5	13,182%	4,216.5	13,182%	32,423.5	6,269.7	19,342%	10,772.8	33,152%	3.29	4.3	

Table G-82 M/I DEMAND & SOURCES AVAILABILITY FOR MAJOR CITIES

Service Area	Water Use	Service Level	Source	1995	2000	2005	2010	2015	2020	2025	Remarks
EX-SMWS; Municipal Water Services Company (SMWS)	Municipal	Level III	Demand	976.0	1,250.0	1,480.0	1,746.0	1,993.0	2,074.0	2,299.0	
			GW	27.0	25.0	20.0	15.0	10.0	10.0	10.0	no Rehabilitation
			SW	949.0	1,224.0	1,460.0	1,731.0	1,983.0	2,064.0	2,289.0	
	Industrial (High GDP)	Private	Demand	91.5	91.7	115.9	182.0	268.5	393.5	584.2	
			GW	76.4	76.6	100.8	166.9	253.4	378.4	569.1	Max 181 MCM/year
			SW	15.1	15.1	15.1	15.1	15.1	15.1	15.1	Recycle
Total		Demand	1,067.5	1,350.7	1,595.9	1,928.0	2,261.5	2,467.5	2,883.2		
		GW	103.4	101.6	120.8	181.9	263.4	388.4	579.1	GPL: 191 MCM/year	
		SW	964.1	1,249.1	1,475.1	1,746.1	1,998.1	2,079.1	2,304.1		
Metro Cebu WD	Municipal	Level III	Demand	40.8	58.9	92.9	151.2	194.8	245.3	300.6	
			GW	40.8	52.9	52.9	52.9	52.9	52.9	52.9	
			SW	0.0	6.0	40.0	98.3	141.9	192.4	247.7	
	Industrial (High GDP)	Private	Demand	18.2	18.3	22.5	23.4	27.6	33.3	41.6	
			GW	5.5	5.5	9.8	10.7	14.9	20.6	28.9	Max 7.2 MCM/year
			SW	12.7	12.7	12.7	12.7	12.7	12.7	12.7	Recycle
Total		Demand	59.1	77.2	115.4	174.6	222.4	278.6	342.2		
		GW	46.3	58.4	62.7	63.5	67.7	73.4	81.8	GPL: 60.1 MCM/year	
		SW	12.7	18.8	52.7	111.0	154.7	205.2	260.5		
Angeles City WD	Municipal	Level III	Demand	11.1	13.0	14.7	16.5	20.2	24.3	30.6	
			GW	11.1	13.0	14.7	16.5	20.2	24.3	30.6	Capa=13.6 MCM/year
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(year 2025)
	Industrial (High GDP)	Private	Demand	0.0	0.1	0.5	0.6	0.6	0.6	0.6	
			GW	0.0	0.1	0.5	0.6	0.6	0.6	0.6	
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		Demand	11.1	13.1	15.2	17.1	20.8	24.9	31.3		
		GW	11.1	13.1	15.2	17.1	20.8	24.9	31.3	GPL: 1.0 MCM/year	
		SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Cagayan de Oro City WD	Municipal	Level III	Demand	28.7	47.1	58.0	72.6	84.7	93.4	96.4	
			GW	28.7	33.8	33.7	33.7	33.4	33.0	32.4	Capa=34.0 MCM/year
			SW	0.0	13.3	24.3	39.0	51.3	60.4	64.0	
	Industrial (High GDP)	Private	Demand	0.5	0.5	0.6	0.6	0.9	1.3	1.9	
			GW	0.5	0.5	0.6	0.6	0.9	1.3	1.9	
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		Demand	29.2	47.6	58.6	73.3	85.6	94.7	98.3		
		GW	29.2	34.3	34.3	34.3	34.3	34.3	34.3	GPL: 34.3 MCM/year	
		SW	0.0	13.3	24.3	39.0	51.3	60.4	64.0		
Zamboanga City WD	Municipal	Level III	Demand	24.2	38.5	54.7	74.4	97.9	123.7	148.0	
			GW	1.0	4.3	20.5	40.2	63.6	89.5	113.8	De-salination
			SW	23.3	34.2	34.2	34.2	34.2	34.2	34.2	(thinned water)
	Industrial (High GDP)	Private	Demand	3.2	9.0	17.5	22.5	29.3	39.6	55.0	
			GW	1.0	6.8	15.2	20.2	27.0	37.3	52.8	Recycle
			SW	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
Total		Demand	27.5	47.5	72.2	96.9	127.1	163.3	203.0		
		GW	2.0	11.1	35.8	60.4	90.7	126.8	166.5	GPL: 51.8 MCM/year	
		SW	25.5	36.5	36.5	36.5	36.5	36.5	36.5		
Bago City WD	Municipal	Level III (Aus: 2.57) (BOT=18.3)	Demand	12.0	29.4	37.8	50.0	61.1	73.7	87.3	
			GW	12.0	14.5	14.5	14.5	14.5	14.5	14.5	
			SW	0.0	14.9	23.3	35.6	46.6	59.2	72.9	
	Industrial (High GDP)	Private	Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	supplied by BWD
			GW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		Demand	12.0	29.4	37.8	50.0	61.1	73.7	87.3		
		GW	12.0	14.5	14.5	14.5	14.5	14.5	14.5	GPL: 14.5 MCM/year	
		SW	0.0	14.9	23.3	35.6	46.6	59.2	72.9		
Bacolod City WD	Municipal	Level III (add: 9.9)	Demand	16.1	22.0	31.9	40.5	49.5	59.4	72.3	
			GW	16.1	22.0	31.9	40.5	49.5	59.4	72.3	de-salination
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Binu River?
	Industrial (High GDP)	Private	Demand	20.5	20.9	28.9	32.1	34.8	36.9	38.4	
			GW	20.5	20.9	28.9	32.1	34.8	36.9	38.4	Recycle
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		Demand	36.6	42.9	60.8	72.6	84.3	96.3	110.7		
		GW	36.6	42.9	60.8	72.6	84.3	96.3	110.7	GPL: 103.3 MCM/year	
		SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Metro Bolo WD	Municipal	Level III	Demand	7.5	28.7	31.7	33.2	37.1	49.9	44.4	
			GW	0.2	21.3	24.3	25.9	29.7	33.6	37.1	
			SW	7.3	7.3	7.3	7.3	7.3	7.3	7.3	
	Industrial (High GDP)	Private	Demand	1.5	1.5	1.8	2.0	2.1	2.2	2.2	
			GW	0.9	0.9	1.2	1.4	1.5	1.6	1.6	
			SW	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Total		Demand	9.0	30.2	33.5	35.2	39.1	43.1	46.6		
		GW	1.1	22.2	25.6	27.3	31.2	35.2	38.7	GPL: 39.9 MCM/year	
		SW	7.9	7.9	7.9	7.9	7.9	7.9	7.9		
Davao City WD	Municipal	Level III (add: 8.0) (BOT=84.0)	Demand	48.7	54.2	58.2	72.9	90.4	113.5	146.3	
			GW	48.7	0.0	0.0	0.0	6.4	29.6	62.4	
			SW	0.0	54.2	58.2	72.9	84.0	84.0	84.0	
	Industrial (High GDP)	Private	Demand	1.6	1.5	1.8	2.5	3.3	4.5	6.2	
			GW	1.6	1.5	1.8	2.5	3.3	4.5	6.2	
			SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total		Demand	50.2	55.7	60.0	75.4	93.7	118.0	152.5		
		GW	50.2	1.5	1.8	2.5	9.7	34.1	68.6	GPL: 84.4 MCM/year	
		SW	0.0	54.2	58.2	72.9	84.0	84.0	84.0		

Table G-83 WELL PRODUCTION RECORDS
IN MWSS SERVICE AREA (1991)

Province	Municipality	Amount of Production			Number of Wells			Ave. Well Capacity		
		Private MWS	Sub T. MWS	Sub T. MWS	Private MWS	Sub T. MWS	Sub T. MWS	Private MWS	Sub T. MWS	Ave. MWS
M. Manila	Valenzuela	12.1	0.3	12.4	127	3	130	0.10	0.09	0.10
	2 Navotas	1.5	0.0	1.5	17	2	19	0.09	0.02	0.08
	3 Malabon	6.7	0.2	6.9	67	3	70	0.10	0.07	0.10
	4 Orlan (C)	35.3	5.1	38.5	307	16	323	0.11	0.32	0.12
	5 Caloocan (C)	10.0	-	10.0	114	-	114	0.09	-	0.09
	6 Marikina	5.0	-	5.0	36	-	36	0.14	-	0.14
	7 Manila (C)	4.6	-	4.6	48	-	49	0.09	-	0.09
	8 San Juan	0.2	-	0.2	2	-	2	0.08	-	0.08
	9 Mandaluyon	3.3	-	3.3	31	-	31	0.11	-	0.11
	10 Pasig (C)	27.7	0.0	27.7	197	2	199	0.14	0.01	0.14
	11 Makati (C)	9.2	1.4	10.6	98	11	109	0.09	0.12	0.10
	12 Pasay (C)	6.6	1.6	8.2	47	3	50	0.14	0.54	0.16
	13 Pateros	0.6	-	0.6	2	-	2	0.32	-	0.32
	14 Taguig	24.2	0.2	24.5	121	3	124	0.20	0.08	0.20
	15 Paranaque	25.6	0.4	26.0	278	5	283	0.09	0.08	0.09
	16 Las Pinas	29.9	0.6	30.4	157	2	159	0.19	0.28	0.19
	17 Muntinlupa (C)	33.4	2.1	35.6	182	7	189	0.18	0.30	0.19
	sub-total	233.9	12.0	245.9	1,332	57	1,389	0.13	0.21	0.13
Rizal	Mandalayan	2.9	1.2	4.1	23	3	26	0.15	0.10	0.16
	2 San Mateo	1.3	1.7	3.1	11	5	16	0.12	0.34	0.19
	3 Antipolo	16.1	4.2	20.4	115	15	130	0.14	0.28	0.16
	4 Cainta	17.7	1.4	19.1	78	5	83	0.23	0.28	0.23
	5 Taytay	13.7	2.4	16.0	62	7	69	0.22	0.34	0.23
	sub-total	51.8	10.9	62.7	289	33	324	0.18	0.31	0.19
Cavite	Bacoor	11.8	2.3	14.1	47	8	55	0.25	0.29	0.26
	Go Imus	1.6	0.6	2.2	9	2	11	0.18	0.30	0.20
	3 Kawit	1.0	1.6	2.6	4	4	8	0.26	0.40	0.33
	4 Cavite (C)	1.6	2.5	4.0	11	15	26	0.14	0.16	0.16
	5 Novleta	2.1	2.6	4.7	8	9	17	0.26	0.29	0.27
	6 Rosario	3.1	0.3	3.4	16	1	17	0.19	0.32	0.20
	sub-total	21.2	9.8	31.0	95	30	124	0.22	0.25	0.23
	Total	308.9	32.7	339.6	2,210	131	2,341	0.14	0.25	0.14

Source: Metro Manila Groundwater Development Project, Nov. 1991 (JICA)

Table G-84 DISTRIBUTION OF WELL DEPTH
OPERATED BY MWSS (1995)

Province	Municipality	No. Dep.	Deepwell Structure					Total
			Range of Well Depth (m)					
			0-1 m	1-1.5 m	1.5-2 m	2-3 m	3-4 m	
M. Manila	Valenzuela	Ave.	-	-	-	-	304.8	304.8
	2 Navotas	Ave.	-	-	-	-	304.8	304.8
	3 Malabon	Ave.	-	-	-	-	304.8	304.8
	4 Orlan (C)	Ave.	-	-	5	-	304.8	304.8
	5 Caloocan (C)	Ave.	-	-	-	10	304.8	304.8
	6 Marikina	Ave.	-	-	-	-	304.8	304.8
	7 Manila (C)	Ave.	-	-	-	-	304.8	304.8
	8 San Juan	Ave.	-	-	-	-	304.8	304.8
	9 Mandaluyon	Ave.	-	-	-	-	304.8	304.8
	10 Pasig (C)	Ave.	-	-	2	-	304.8	304.8
	11 Makati (C)	Ave.	-	-	14	-	304.8	304.8
	12 Pasay (C)	Ave.	-	-	-	-	304.8	304.8
	13 Pateros	Ave.	-	-	-	-	304.8	304.8
	14 Taguig	Ave.	-	-	-	-	304.8	304.8
	15 Paranaque	Ave.	-	-	1	-	304.8	304.8
	16 Las Pinas	Ave.	-	-	-	-	304.8	304.8
	17 Muntinlupa (C)	Ave.	-	-	-	-	304.8	304.8
	sub-total	Ave.	-	-	22	-	304.8	304.8
Rizal	Mandalayan	Ave.	-	-	-	-	304.8	304.8
	2 San Mateo	Ave.	-	-	-	-	304.8	304.8
	3 Antipolo	Ave.	-	-	-	-	304.8	304.8
	4 Cainta	Ave.	-	-	-	-	304.8	304.8
	5 Taytay	Ave.	-	-	-	-	304.8	304.8
	sub-total	Ave.	-	-	-	-	304.8	304.8
Cavite	Bacoor	Ave.	-	-	-	-	304.8	304.8
	2 Imus	Ave.	-	-	-	-	304.8	304.8
	3 Kawit	Ave.	-	-	-	-	304.8	304.8
	4 Cavite (C)	Ave.	-	-	-	-	304.8	304.8
	5 Novleta	Ave.	-	-	-	-	304.8	304.8
	6 Rosario	Ave.	-	-	-	-	304.8	304.8
	sub-total	Ave.	-	-	-	-	304.8	304.8
	Total	Ave.	-	-	-	-	304.8	304.8

Source: Specifications of MWSS Deepwell Stations, as of 24 June 1996 (MWSS)

Table G-86 EXISTING WELLS OPERATION BY BAGUIO CITY WD

No.	Well Location Cord Name	ope.	Operation											daily ave.	
			Dec 1997 until November 1998 (monthly average)												
			Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct		Nov
1	Amparo3	hr/day m3/day	23.10 8.212	24.17 8.394	23.82 8.856	23.81 7.594	23.73 7.656	23.73 6.364	23.73 6.373	23.73 7.006	23.73 8.034				23.6 7.649
2	Amparo 5	hr/day m3/day			5.64 2.10	19.00 1.311	17.89 1.580	17.89 1.289	17.89 1.290	17.89 1.335	17.89 1.410				17.9 1.220
3	Camp 7	hr/day m3/day			19.43 7.54	21.68 1.864	20.57 2.064	20.57 2.064	20.57 2.000	20.57 2.030	20.57 2.087				20.5 1.851
4	Milo	hr/day m3/day			20.00 2.011										20.0 2.011
5	Bahizan	hr/day m3/day	17.52 475	19.07 410	19.43 1,291	22.19 330	19.57 357	19.57 341	19.57 384	19.57 393	19.57 429				19.5 481
6	MRR	hr/day m3/day	22.65 621	23.23 692	23.82 714	24.00 629	23.43 623	23.43 613	23.43 587	23.43 669	23.43 730				23.3 652
7	Labsan	hr/day m3/day	18.74 472	19.07 427	18.54 217	18.61 345	18.74 416	18.74 416	18.74 451	18.74 466	18.74 607				18.7 436
8	City Camp	hr/day m3/day			20.00 229										20.0 229
9	Lower Quezon Hill	hr/day m3/day			20.00 97										20.0 97
10	Taray	hr/day m3/day			20.00 97										20.0 97
11	Dominican	hr/day m3/day			20.00 149										20.0 149
12	Harrison	hr/day m3/day	22.00 582	24.00 672	15.11 206	18.00 601	19.80 801	19.80 776	19.80 773	19.80 778	19.80 787				19.8 668
13	Market	hr/day m3/day	8.52 364	23.90 940	21.64 542	23.61 982	19.23 998	19.23 1,007	19.23 1,011	19.23 1,080	19.23 1,070				19.1 598
14	Hilltop	hr/day m3/day	23.06 457	24.00 479	22.89 387	22.03 300	23.00 327	23.00 327	23.00 327	23.00 435	23.00 545				23.9 399
15	P. Burgos	hr/day m3/day	19.39 196	20.37 159	23.50 178	24.00 139	21.82 139	21.82 106	21.82 119	21.82 159	21.82 146				21.7 149
16	Asin Shangrila	hr/day m3/day	23.61 167	24.00 156	23.82 56	24.00 82	23.86 82	23.86 82	23.86 171	23.86 176	23.86 261				23.8 139
17	Skating Rink	hr/day m3/day			20.00 25	12.19 20	16.03 137	16.03 221	16.03 194	16.03 162	16.03 130				16.9 135
18	Kisad	hr/day m3/day			20.00 47	5.94 43	17.85 195	17.85 170	17.85 425	17.85 355	17.85 524				17.7 239
19	Ramsey	hr/day m3/day			11.50 668	14.10 782	17.82 1,332	17.82 1,315	17.82 1,034	17.82 1,262	17.82 1,375				17.8 1,116
20	Riverwell	hr/day m3/day													
21	Athletic Bowl	hr/day m3/day			21.14 482	23.97 467	22.58 468	22.58 531	22.58 447	22.58 447	22.58 293				22.5 447
22	Sio. Rosario	hr/day m3/day													
23	Filam	hr/day m3/day													
24	STRB Amilang	hr/day m3/day													
25	Stage 1	hr/day m3/day			20.07 3,093	22.23 2,834									21.7 2,853
26	QM	hr/day m3/day			22.11 176	19.94 158									21.6 166
27	Camp 8	hr/day m3/day			19.00 1,942	16.97 1,734	17.97 2,452	17.97 2,489	17.97 2,431	17.97 2,074	17.97 2,506				17.9 2,233
28	Cabinet Hill	hr/day m3/day			23.46 892	23.68 790	23.57 890	23.57 641	23.57 524	23.57 600	23.57 732				23.5 710
29	Happy Glenn	hr/day m3/day			21.21 579	23.55 593	22.42 604	22.42 633	22.42 635	22.42 661	22.42 683				22.3 638
30	MPW12	hr/day m3/day													
31	Bonifacio	hr/day m3/day													
32	Ambione 1	hr/day m3/day	22.61 1,106	23.17 828	23.04 1,177	23.53 1,309	23.10 1,332	23.10 1,223	23.10 1,141	23.10 1,236	23.10 1,313				23.0 1,165
33	Ambione 2	hr/day m3/day	22.94 1,439	24.77 1,500	23.32 1,299	23.48 1,216	23.64 1,242	23.64 1,119	23.64 1,090	23.64 1,086	23.64 772				23.5 1,195
34	Gibraltar	hr/day m3/day	22.58 325	24.80 323	23.96 343	23.74 348	23.78 352	23.78 391	23.78 435	23.78 442	23.78 480				23.7 383
35	Pardal	hr/day m3/day	14.71 260	18.37 236	18.82 292	17.87 303	17.45 407	17.45 406	17.45 414	17.45 849	17.45 673				17.4 421
36	Amsing	hr/day m3/day	7.23 69	24.80 137	23.89 121	21.52 116	19.42 130	19.42 200	19.42 153	19.42 137	19.42 137				19.3 113
37	Idcan	hr/day m3/day	17.42 748	18.23 811	10.39 521	8.52 441	13.64 1,341	13.64 1,227	13.64 1,276	13.64 1,223	13.64 1,267				13.6 976
38	Evangelista	hr/day m3/day	11.06 74	24.50 186	20.43 117	23.90 101	20.04 101	20.04 99	20.04 176	20.04 106	20.04 106				20.0 122
39	Wright Park	hr/day m3/day	0.71 5	0.50 5	0.75 7	2.26 13	1.06 139	1.06 200	1.06 378	1.06 257	1.06 246				1.1 140
40	M. Roxas 1	hr/day m3/day			23.25 1,570	21.71 1,459	22.47 1,613	22.47 1,623	22.47 1,621	22.47 1,661	22.47 1,618				22.4 1,595
41	M. Roxas 2	hr/day m3/day			23.71 1,380	23.84 1,432	23.76 1,440	23.76 966	23.76 983	23.76 1,121	23.76 1,333				23.6 1,153
42	Busog	hr/day m3/day			21.14 925	18.52 810	19.71 817	19.71 731	19.71 743	19.71 813	19.71 737				19.6 790
43	Teachers Camp	hr/day m3/day			21.57 925	23.77 810	22.69 817	22.69 731	22.69 720	22.69 796	22.69 914				22.6 815
44	CBL	hr/day m3/day			0.50 6	13.94 166	7.33 166	7.33 287	7.33 285	7.33 290					7.4 210
45	Quisad	hr/day m3/day			15.04 169	12.29 141	13.64 215	13.64 193	13.64 471	13.64 483	13.64 411				13.6 307
46	Ferguson	hr/day m3/day			23.36 589	23.87 524	23.62 527	23.62 549	23.62 613	23.62 625	23.62 622				23.5 578
47	Paisao	hr/day m3/day			21.96 633	24.06 684	23.03 682	23.03 693	23.03 705	23.03 715	23.03 712				22.9 690
48	Easter	hr/day m3/day			23.57 296	24.03 304	23.81 304	23.81 308	23.81 309	23.81 304	23.81 303				23.7 304

Source: Baguio City Water District (1997)

Table G-87 WATER QUALITY OF EXISTING WELLS IN BAGUJO CITY WD

Location No.	Well Name	Sampling date (m/d/y)	Physical Analysis				Chemical Analysis				Major Cations						Major Anions			Trace Etc.																
			T	NTU	TCU	Odor	TDS	EC	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l							
PNSDW		-1994	26	>	>	>	>	8.5																												
1	Amparo	1995/3/20	168																																	
2	Amparo	1995/3/20	177																																	
3	Camp 7	1995/3/20	161																																	
4	Milo	1995/3/20	180																																	
5	Islesjan	1995/3/20	213																																	
6	MRR	1995/3/20	180																																	
7	Labuan	1995/3/20	189																																	
8	City Camp	1995/3/20																																		
9	Lower Quizon																																			
10	Tacey																																			
11	Dominican																																			
12	Harrison																																			
13	Market																																			
14	Hilop																																			
15	P. Burgos																																			
16	Shangnia																																			
17	Skating Rink																																			
18	Kissad																																			
19	Ramsey																																			
20	Riverwell																																			
21	Athletic Bowl																																			
22	Sio. Rosario																																			
23	Pilayn																																			
24	STRE/Amiang																																			
25	Sage																																			
26	QM																																			
27	Camp 8																																			
28	Cabinet Hill																																			
29	Happy Clean																																			
30	MPWH																																			
31	Benifacio																																			
32	Ambiong 1																																			
33	Ambiong 2																																			
34	Gibraltar																																			
35	Pecel																																			
36	Amasing																																			
37	Idian																																			
38	Evangelista																																			
39	Wright Park																																			
40	M. Kovas 1																																			
41	M. Kovas 2																																			
42	Puyog																																			
43	Teachers Camp																																			
44	CBL																																			
45	Cuslad																																			
46	Bergnon																																			
47	Pinkie																																			
48	Easter																																			

Source: Baguio City Water District

Table G-88 EXISTING WELLS PERFORMANCE IN ANGELES CITY WD

Well Location Cord Name No. completion year	Well Structure				Operation (1997-upper/original-lower)				Existing Water Well Capacities					
	Dia. mm	Dep. m	from mbsl	Screen to mbsl	Length m	Water Level static mbsl	sw m	Q lps	Sp. Cap. lps/m	Run hr	Pump TO cumid	Ø lps	TO cumid	Remarks
1 Mabini 1972	300	122.0				6.10	13.70	45.00	3.28	24.00	3,888	32.9	20.0	2,365 Stand-by
2 San Nicolas 1972	150	93.0				15.00		38.98				28.5	20.0	2,049 Stand-by
3 Rizal 1972								38.98				28.5	20.0	2,049 Stand-by
4 Kuliat 1972								38.98				28.5	20.0	2,049 Stand-by
5 Sta. Teresita 1972	250	110.0				8.38		38.98				28.5	20.0	2,049 Stand-by
6 Magalang av. 1972	200	122.0				5.03	17.29	34.00	1.97	24.00	2,938	24.8	20.0	1,787 Stand-by
7 Pampang Road 1972	200	81.0				7.08	10.33	29.73	2.88	14.00	1,498	21.7	20.0	1,562 Stand-by
8 Belen Homesite 1991	250	183.0				6.10	12.20	75.68	6.20	15.00	4,087	55.2	20.0	3,978 Stand-by
9 Mac Arthur 1972	250	91.0				7.33		38.98				28.5	20.0	2,049 Stand-by
10 Lourdes NW 1972	200	137.0				5.84		38.98				28.5	20.0	2,049 Stand-by
11 Old Pampang 1986	400	137.0				9.14	36.56	25.25	0.69	24.00	2,180	18.4	20.0	1,326 Stand-by
12 Busong Bayan 1993	200	86.0	51.8	86.0	34.2	6.80	24.90	27.76	1.11	21.00	2,099	20.3	20.0	1,459 Stand-by
13 Town & Country 1993	200	200.0	104.2	188.0	59.0	15.00	18.50	35.48	1.92	16.00	2,043	25.9	20.0	1,865 Stand-by
14 Central #1 1996	300	100.0				6.00	17.00	40.00	2.35	24.00	3,456	29.2	20.0	2,102 Stand-by
15 Central #2 1996	200	200.0				14.00	21.00	20.00	0.95	24.00	1,728	14.6	20.0	1,051 Stand-by
16 Central #3 1996	300	100.0	34.0	76.0	42.0	5.00	17.00	50.00	2.94	24.00	4,320	36.5	20.0	2,628 Stand-by
17 Central #4 1996	200	200.0				15.00	15.50	25.00	1.61	24.00	2,160	18.3	20.0	1,314 Stand-by
18 Central #5 1996	300	100.0	41.0	83.0	42.0	6.00		35.30				25.8	20.0	1,855 Stand-by
19 Central #6 1996	250	200.0	128.0	194.0	54.0	16.00	24.00	18.00	0.75	24.00	1,555	13.1	20.0	946 Stand-by
20 Central #7 1996	300	100.0				7.00	18.00	16.00	0.89	24.00	1,382	11.7	20.0	841 Stand-by
Total								51,196		21.69	33,344			37,373 each unit
								18.7			19.2			13.6 MCM/year

Source: Angeles City Water District

Table G-89 EXISTING WELLS PERFORMANCE OF CAGAYAN DE ORO CITY WD

No.	Well Location	Cond Name	Completion year	Well Structure			Operation (1977-apparatus/normal/over)			Existing Water Well Capacities			Remarks				
				Diag.	Casing	Screen	Water Level	Q	Hydraulics	Run	Pump	Q		2025 (design year)	7Q		
				mm.	Deph. m.	from mbnl	static mbnl	sw m	Q lit	T symd	Stk.Cap. from	hr/d	cum/d	lit	hr/d	cum/d	
1	PW#1	400	1975	121.9	255.2	210.5	255.2	24.7	117.7	2,782	5.87	19.0	8,058	85.9	20.0	6,188	Telescope type
2	PW#2	400	1976	211.0	226.2	211.0	226.2	15.2	103.2	2,483	18.66	14.2	5,292	75.3	20.0	5,424	
3	PW#3A	450	1991	89.0	198.0	111.0	198.0	57.0	150.0			14.8	7,979	109.5	20.0	7,884	
4	PW#4	400	1975	192.6	210.9	192.6	210.9	18.3	112.6	1,080	6.72	14.9	6,048	82.2	20.0	5,917	
5	PW#5	300	1976	66.5	75.6	66.5	75.6	9.1	50.8	2,562	6.41	15.5	2,845	37.1	20.0	2,671	
6	PW#6	250		75.6					3.1			8.0	90	0.0	20.0		low-yield
7	PW#7	450	1984	66.0	191.0	74.0	191.0	73.0	92.0	3,231	8.63	19.0	6,305	67.2	20.0	4,836	
8	PW#8	400	1986	73.0	252.0	75.0	252.0	60.0	150.0			13.8	7,473	109.5	20.0	7,884	
9	PW#9	400	1986	68.0	230.0	68.0	230.0	84.0	165.0	2,894		12.4	7,341	120.5	20.0	8,672	
10	PW#10	400	1986	41.0	120.0	48.0	120.0	43.0	67.5	457	4.66	17.2	4,170	49.3	20.0	3,548	
11	PW#11	400	1986	55.8	148.9	55.3	148.9	54.0	125.0	4,539	9.03	21.3	9,607	91.3	20.0	6,570	
12	PW#12	400	1990	50.0	136.0	67.0	136.0	43.0	75.7	406	3.28	9.9	2,705	55.3	20.0	3,979	
13	PW#14	400	1997	58.7	144.6	62.0	144.6	54.4	94.6	817	8.25	18.9	6,435	69.1	20.0	4,972	
14	PW#15	400	1994	52.7	98.3	59.0	98.3	30.3	75.0	270	3.23	18.6	5,025	54.8	20.0	3,942	
15	PW#16	450	1995	66.7	181.3	71.0	181.3	60.4	85.5	614	6.75	16.4	5,063	62.4	20.0	4,494	
16	PW#17	300	1998	187.0					50.5	2,279				36.8	20.0	2,653	under construction by OBCF fund
17	PW#18	250	1998						50.8	502	2.37			37.1	20.0	2,670	under construction by OBCF fund
18	PW#19	250	1998						61.0	13.74				44.5	20.0	3,206	under construction by OBCF fund
19	PW#20	450	1998						64.0	5,059	11.57			46.7	20.0	3,364	under construction by OBCF fund
20	Malasag SP								4.6			24.0	395	4.6	24.0	395	no seasonal variation observed
Total:									1,699				84,829			89,268	each unit
									53.6				31.0			37.6	MCM/year

Source: Cagayan de Oro City Water District

Table G-90 EXISTING WELLS OPERATION BY ZAMBOANGA CITY WD

Well Location No.	Cord Name	ope.	Operation												daily ave.		
			May 1996 until April 1997 (monthly average)														
			Q	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
1	Putik DW	hr/dg m ³ /d	-	585	1,146	771	1,160	-	1,242	1,239	1,288	1,459	1,466	1,501	1,535	1,215	
2	Ramos DW	hr/dg m ³ /d	-	-	-	-	-	-	-	-	-	-	-	754	366	764	
3	Camins DW	hr/dg m ³ /d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	Baliwasan DW	hr/dg m ³ /d	-	-	-	-	-	-	-	-	-	643	1,166	528	1,087	1,154	
5	Guiwan DW	hr/dg m ³ /d	-	-	-	-	-	-	-	-	-	-	-	-	390	1,171	
6	Malasiga DW	hr/dg m ³ /d	-	-	-	-	-	-	829	565	115	695	1,232	1,305	1,363	1,360	
7	Ayala DW	hr/dg m ³ /d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table G-91 EXISTING WELL PERFORMANCE OF ZAMBOANGA CITY WD

Well Location	Well Structure			Operation (1997)			Well Capacities							
	Casing		Screen			Water Level		Run	Pump		2025 (design year)			
Cord Name	Dia.	Dep.	from	to	length	static	1	TQ	Q	1	TQ	Q	1	TQ
	mm	m	mbgl	mbgl	m	mbgl	hr/d	cun/d	lps	hr/d	cun/d	lps	hr/d	cun/d
1 Putik DW								1,215			887			
2 Ramos DW								764			557			
3 Camins DW		80.5	65.0	76.0	11.0			1,154			842			
4 Baliwasan DW								1,171			854			
5 Guiwan DW		70.0	28.0	67.0	12.0			1,360			993			
6 Malasiga DW								1,416			1,034			
7 Ayala DW								1,416			1,034			
								8,494			6,201			
								3.1			2.3			

Table G-92 WATER QUALITY OF EXISTING WELLS IN ZAMBOANGA CITY WD

Location No.	Cord Name	Sampling date	Physical Analysis						Chemical Analysis				Major Cations					Major Anions				Trace Ele.		
			T	NH	TCU	Odor	TDS	EC	pH	TH	Alka.	Acid.	Na	K	Ca	Mg	total	CO ₃	HCO ₃	Cl	SO ₄	total	Fe	Mn
			°C	-	mg/l	mgpc	-	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Philippine National Standard for Drinking Water -1994			< 5>	< 5>	unobj	500>	-	to	300>	-	-	-	200>	-	-	-	-	-	200>	250>	-	1>	0.5>	
1	Putik DW	Feb.95	0.5				370	2.0	110	200	430	28							350	15		0.0	0.2	
Putik, Zamb. City																								
2	Ramos DW	Feb.95	0.9				170	8.0	190	170	190	56							200	14		0.0	0.4	
Gov. Ramos, Zamb. City																								
3	Camins DW	Feb.95	1.0				250	8.0	180	180	290	60							250	14		0.1	0.3	
Gov. Camins, Zamb. City																								
4	Baliwasan DW	Feb.95	0.7				290	7.9	150	260	290	36							250	6		0.0	0.4	
Baliwasan, Zamb. City																								
5	Guiwan DW	Feb.95	4.7				270	8.0	110	270	320	20								21		0.0	0.0	
Cadena de Amor, Zamb. City																								
6	Malasiga DW																							
Malasiga, Zamb. City																								
7	Ayala DW																							
Ayala, Zamb. City																								

Data Source : Zamboanga City Water District

Table G-93 EXISTING WELL PERFORMANCE OF BACOLOD CITY WD

No.	Well Location Cord Name completion year	Well Structure				Operation (1977-upper/original-lower)				Well Capacities				Remarks	
		Casing Dia. mm	Depth m	Screen front m	Screen to mbel	length m	Water Level static mbel	sw m	Q lps	Hydraulics T Sp.Cap. lps	Run hr./d	Pump TQ cum/d	Q lps		hr./d
1	Mabini No.1 1955	400	34.9	57.9	109.7	18.3			15.83	23.00	1,311	11.56	20.0	832	Telescope type
2	Paclaum No.2 1962	250	112.7						20.28	24.00	1,752	14.80	20.0	1,066	
3	Lowgov No.4 1975	400	60.0	65.5	96.0	15.2			23.06	24.00	1,992	16.83	20.0	1,212	
4	Lowgov No.5 1976	400	100.1	67.1	107.9	34.9			8.89	24.00	768	6.49	20.0	467	
5	Lowgov No.6 1976	400	73.2	79.6	143.9	19.1			16.67	24.00	1,440	12.17	20.0	876	
6	Lowgov No.7 1975	400	147.2	100.1	176.2	61.1			13.89	24.00	1,200	10.14	20.0	730	
7	Lowgov No.9 1979	400	76.2	68.6	96.0	20.7			14.44	23.00	1,196	10.54	20.0	759	
8	Lowgov No.10 1978	400	102.1	100.6	175.3	61.1			20.56	23.00	1,702	15.01	20.0	1,080	
9	Lowgov No.11 1978	400	178.4	128.6	166.4	23.3			22.22	23.00	1,840	16.22	20.0	1,168	
10	Lowgov No.12 1977	400	68.6	57.9	179.8	60.2			25.56	23.00	2,116	18.66	20.0	1,343	
11	Espinos No.14 1980	400	76.2						11.11	23.00	920	8.11	20.0	584	sand pumping
12	Mansilingin No.15 1983	250	182.9						35.83	24.00	3,096	26.16	20.0	1,883	
13	Villa Soledad No.16 1990	300	90.0	49.5	193.0	93.7			26.67	24.00	2,304	19.47	20.0	1,402	
14	Vista Alegre No.17 1990	300	200.9	60.0	192.0	75.6			33.61	24.00	2,904	24.54	20.0	1,767	
15	Vista Alegre No.18 1990	300	198.0	61.1	180.0	68.5			28.89	24.00	2,496	21.09	20.0	1,518	
16	Vista Alegre No.19 1992	300	96.5	47.0	178.0	51.2			18.06	24.00	1,560	13.18	20.0	949	
17	Vista Alegre No.20 1992	300	180.0	48.0	163.0	57.0			41.94	24.00	3,624	30.62	20.0	2,205	
18	Capitol Subd. No.21 1995	300	150.0						31.39	24.00	2,712	22.91	20.0	1,650	
19	Vista Alegre No.22 1997	300	69.0						23.61	24.00	2,040	17.24	20.0	1,241	
20	Bocal Bocal Spring 1997	300	100.0						55.56	24.00	4,800	40.56	20.0	2,920	
21	Boro Boro Spring Total	200	60.0						23.61	24.00	2,040	17.24	20.0	1,241	
									511.67	23.71	43,813	373.52	20.0	26,893	each unit
									16.14		15.99	11.78		9.82	MCW/year

Source: Bacolod City Water District

Table G-94 EXISTING WELL OPERATION BY METRO ILOILO WD

Well Location No. Cord Name	ope. Q	Operation												daily ave.						
		1996	1997																	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
1 PS-1	hr/day	20.58	22.00	20.87	20.22	19.74	20.47	19.78	20.96	21.20	21.69	20.91	21.39	20.48	18.50	21.59	21.74	21.35	18.26	20.7
	m ³ /day	2,012	2,160	1,969	1,895	1,847	1,988	1,931	2,012	2,035	2,072	2,151	2,091	2,008	1,724	1,882	1,750	1,902	1,513	1,941
2 PS-2	hr/day	-	14.99	21.33	18.84	20.91	21.60	21.09	21.75	19.91	18.89	20.15	21.64	21.81	21.90	22.01	21.63	21.65	19.5	19.5
	m ³ /day	-	891	1,211	1,105	1,350	1,529	1,527	1,608	1,463	1,284	1,450	1,412	1,356	1,297	1,538	1,519	1,645	1,301	1,301
3 PS-3A	hr/day	22.57	23.57	21.98	21.85	21.47	22.21	21.83	22.35	22.86	20.74	20.38	21.00	20.94	21.03	20.96	20.90	21.02	21.09	21.6
	m ³ /day	2,353	2,304	1,999	2,011	1,968	2,028	1,970	2,009	2,093	1,587	1,659	1,626	1,865	1,834	1,781	1,712	1,629	1,730	1,897
4 PS-7	hr/day	13.07	14.89	12.39	12.79	15.01	16.81	16.95	13.23	9.54	10.91	10.77	5.15	18.99	16.37	19.71	20.76	20.22	20.83	14.9
	m ³ /day	755	877	753	652	706	672	842	699	547	594	430	204	286	955	1,114	812	805	967	704
5 PS-8	hr/day	22.59	23.38	22.66	22.23	22.57	22.84	22.82	22.12	22.42	22.56	21.78	21.71	21.57	21.76	22.37	22.49	21.23	18.41	22.1
	m ³ /day	2,147	2,173	2,032	1,907	1,865	1,871	1,837	1,725	1,762	1,766	1,715	1,707	1,783	1,909	1,933	1,911	1,782	1,582	1,856
6 PS-9	hr/day	21.95	22.19	21.53	22.03	21.61	22.56	21.82	21.92	22.72	23.17	22.40	20.97	19.46	18.12	22.76	23.47	18.70	21.35	21.6
	m ³ /day	2,229	2,237	2,121	2,107	2,072	2,005	1,971	1,854	1,762	1,469	1,210	941	704	1,200	1,145	1,157	1,529	1,848	1,642
7 PS-10	hr/day	22.50	21.75	22.83	22.60	22.07	23.37	15.82	22.55	22.49	22.95	21.90	22.07	21.81	22.76	22.59	23.40	21.47	22.58	22.1
	m ³ /day	1,835	1,628	1,605	1,564	1,499	1,550	130	1,956	1,969	2,176	2,261	2,235	2,230	2,176	2,320	2,420	2,206	2,355	1,895
Total		17,61	20,39	20,51	20,08	20,48	21,41	20,02	20,68	20,42	20,28	19,57	18,92	20,70	20,05	21,70	22,11	20,80	20,59	20,4
		11,331	12,270	11,690	11,240	11,306	11,443	10,209	11,862	11,640	10,886	10,690	10,255	10,288	11,154	11,472	11,299	11,371	11,641	11,285

Table G-95 WATER QUALITY OF EXISTING WELLS IN METRO ILOILO WD

Location No. Cord Name	Sampling date (m/d/y)	Physical Analysis										Chemical Analysis					Major Cations			Major Anions			Trace Ele.	
		T	NTU	TCU	Odor	TDS	pH	TH	Alkal.	Acid.	Na	K	Ca	Mg	CO ₂	HCO ₃	Cl	SO ₄	Fe	Mn				
PNSDW	-1994	5>	5>	5>	unobj.	500>	6.5	300>	-	-	200>	-	-	-	-	200>	250>	1>	0.5>					
1 PS-1		nil	7.6	26	416	100									508	22								
2 PS-2		nil	7.6	64	368	84									449	15								
3 PS-3A		nil	7.6	78	446	80									544	51				nil				
4 PS-7		nil	7.6	20	330	58									464	10				nil				
5 PS-8		nil	7.6	96	416	86									508	19								
6 PS-9		nil	7.6	76	446	52									544	76				nil				
7 PS-10		nil	7.6	52	434	40									529	23				nil				

Source: Metro Iloilo Water District

Part - G

Figures

Time Schedule	Year	1997												1998		
		Month	April	May	June	July	August	September	October	November	December	January	February	March		
		5-day period	1st Stage												2nd Stage	
Description of Tasks	Work Stage	1st Stage												2nd Stage		
	Fieldwork	[Task bars]												[Task bars]		
Home Work	[Task bars]															
1. Basic Investigation for the Sectoral Present Condition	[Task bars]															
a. Data/Information Collection (Central Government Level)	[Task bars]															
b. Data/Information Collection (Local Districts Level)	[Task bars]															
c. Review/Analysis/Consistent of Collected Data/Information	[Task bars]															
d. Extraction of Analysis Results	[Task bars]															
e. Field Reconnaissance & Request Questionnaire	[Task bars]															
2. Study on the Nation Sectoral GWRDPs	[Task bars]															
a. Groundwater Consumption/Shortage Forecasting	[Task bars]															
b. Balancing & Recycling Study on GW Availability	[Task bars]															
c. Set Up of the Nation GWRDPs	[Task bars]															
d. Finalization of the Nation GWRDPs	[Task bars]															
3. Study on the Urgent GWRDPs for Water Supply Systems	[Task bars]															
a. Selection of the Major Domestic Water Supply Systems	[Task bars]															
b. Supplemental Data Collection from the Major WDs	[Task bars]															
c. Set Up of the Urgent GWRDPs	[Task bars]															
d. Finalization of the Urgent GWRDPs	[Task bars]															
4. Preparation of Reports on the Interim Study Results	[Task bars]															
a. Progress Report-1 (P/R-1)	[Task bars]															
b. Interim Report (I/R)	[Task bars]															
c. Progress Report-2 (P/R-2)	[Task bars]															
d. Draft Final Report (DF/R)	[Task bars]															
5. Steering Committee Meeting with the Concerned Agencies	[Task bars]															
a. Progress Report-1 (P/R-1)	[Task bars]															
b. Interim Report (I/R)	[Task bars]															
c. Progress Report-2 (P/R-2)	[Task bars]															

Figure G-01 WORK SCHEDULE FOR THE GWRDPs

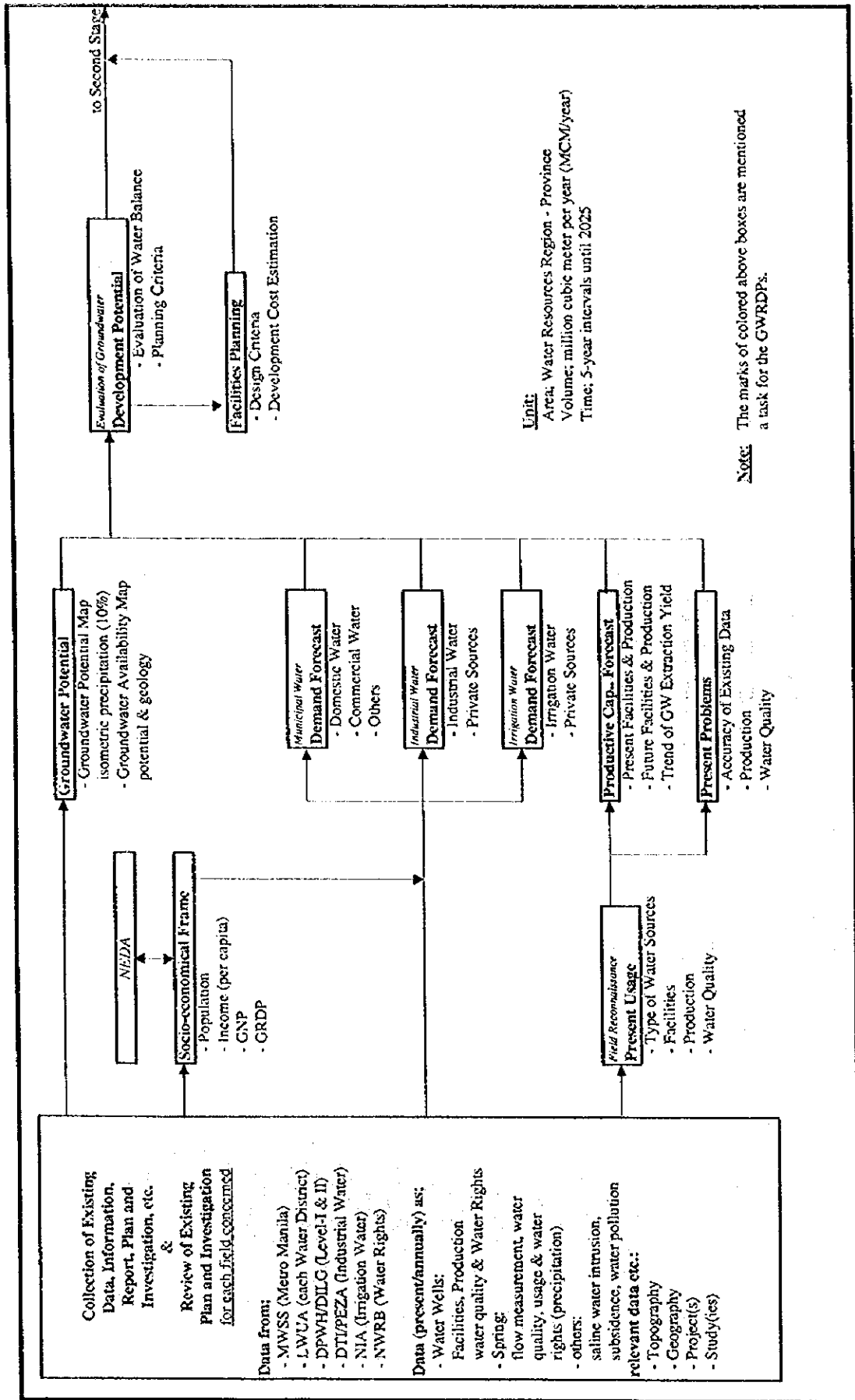


Figure G-02 WORKFLOW CHART FOR THE FIRST STAGE

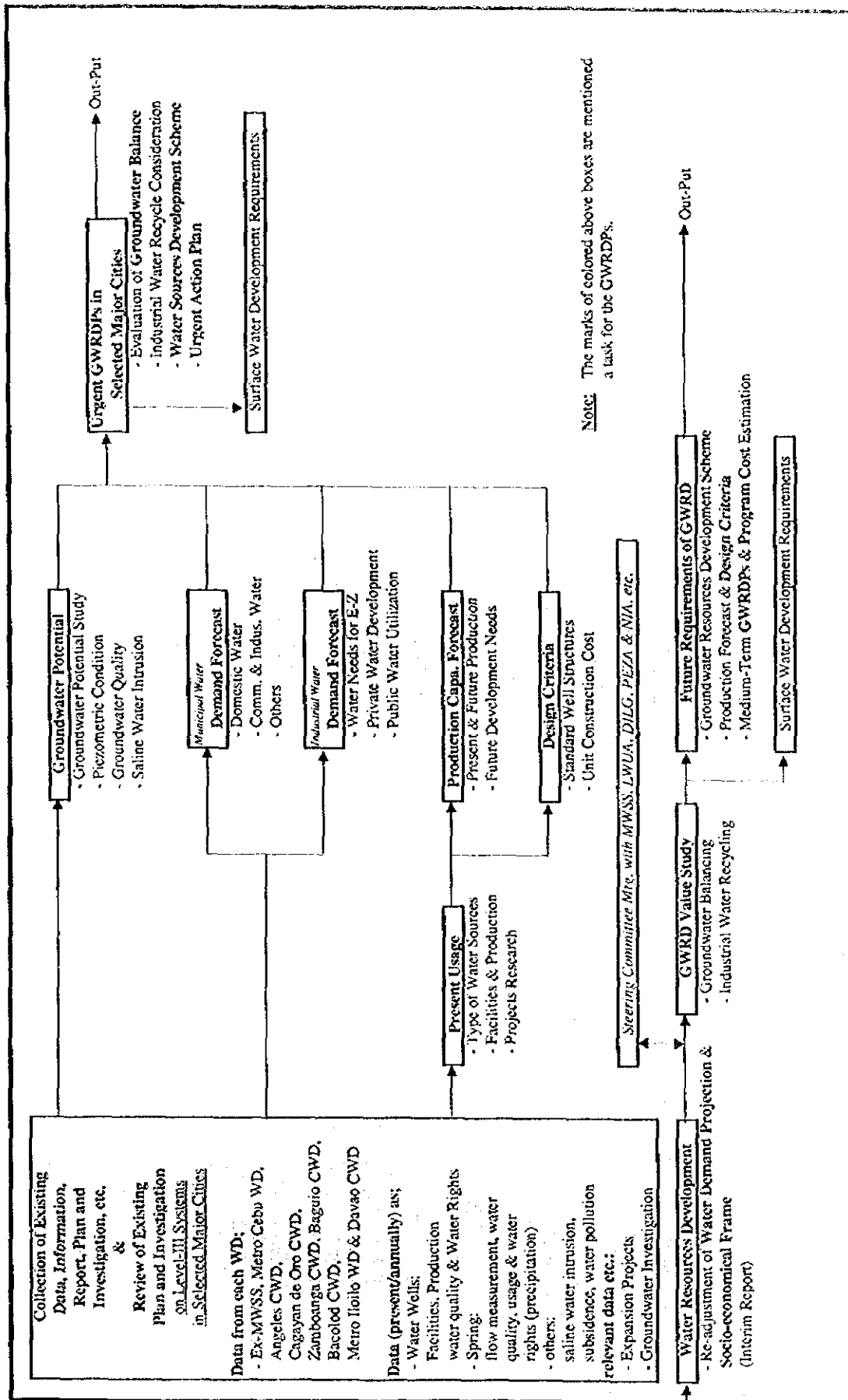


Figure G-03 WORKFLOW CHART FOR THE SECOND STAGE

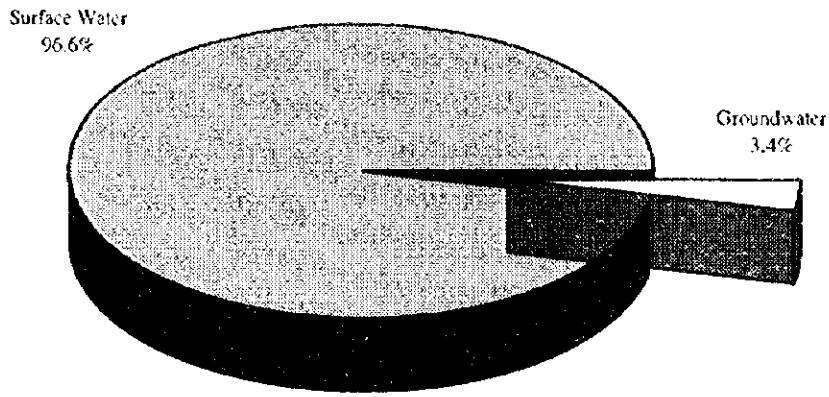


Figure G-04 AMOUNT RATIO OF SOURCE WRs (NWRB)

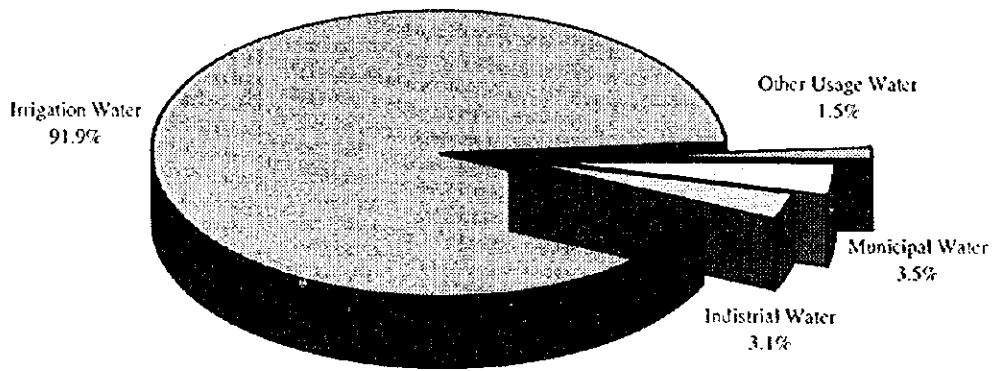


Figure G-05 AMOUNT RATIO OF USAGE WRs (NWRB)

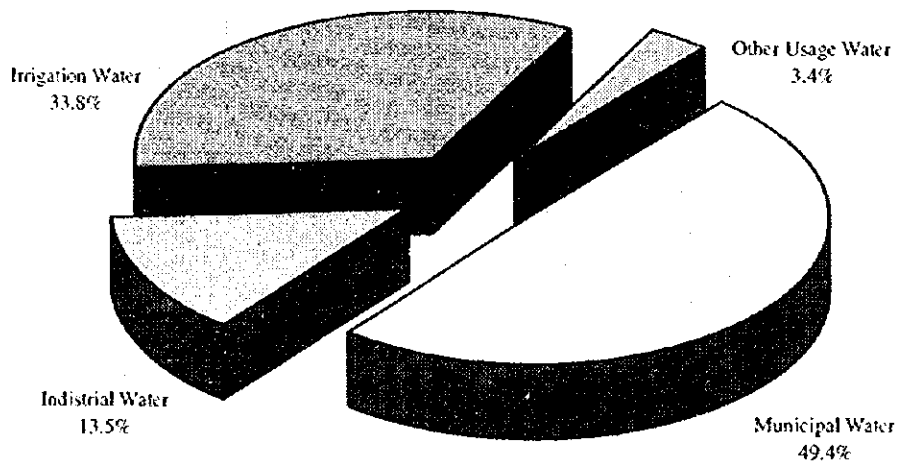
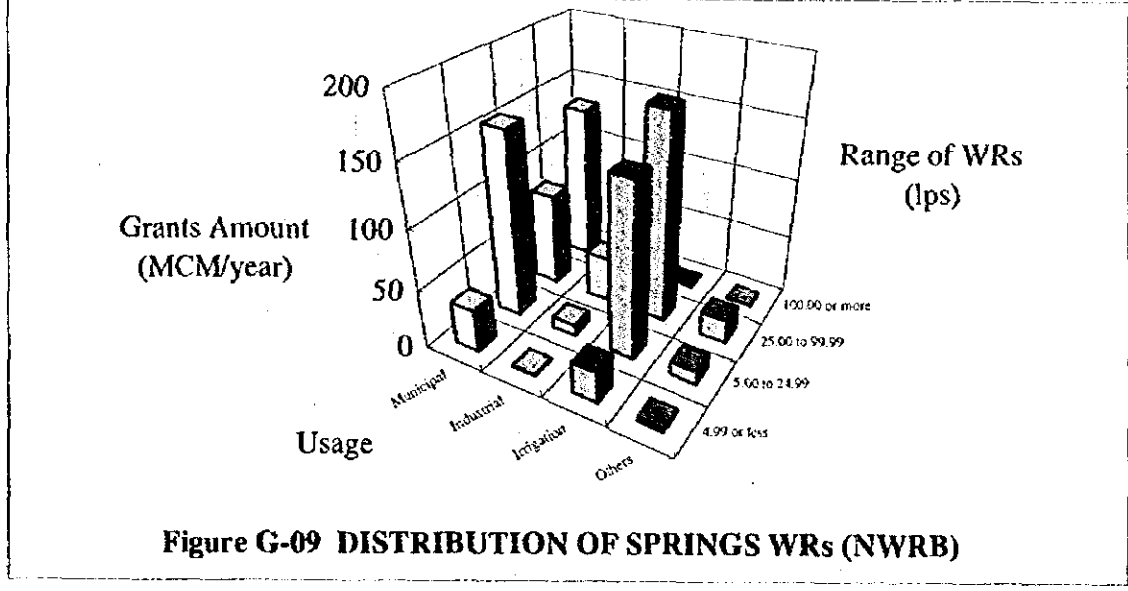
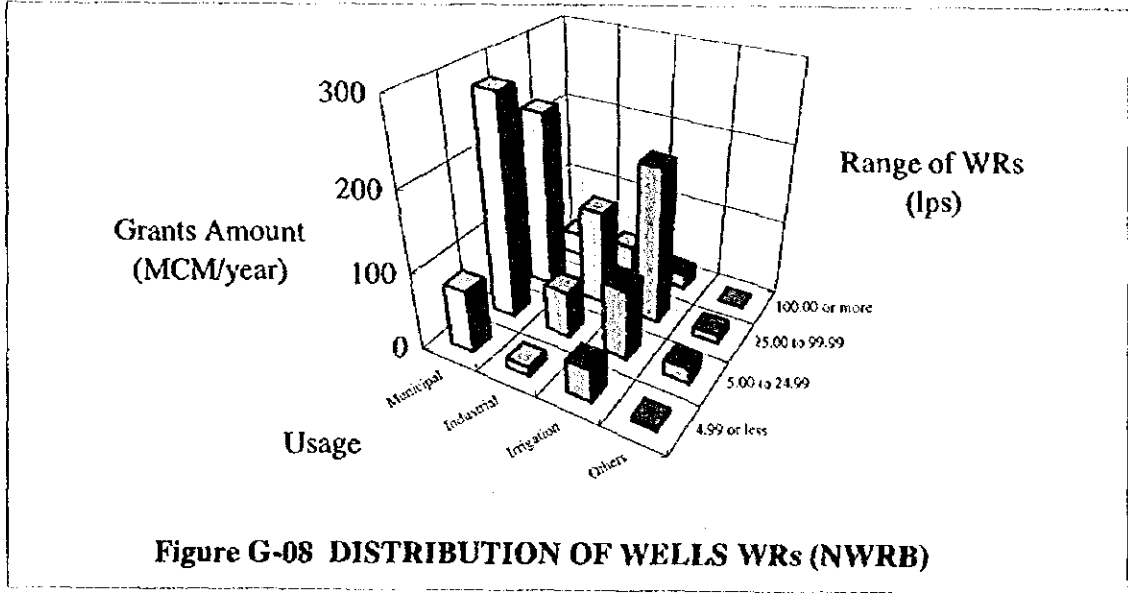
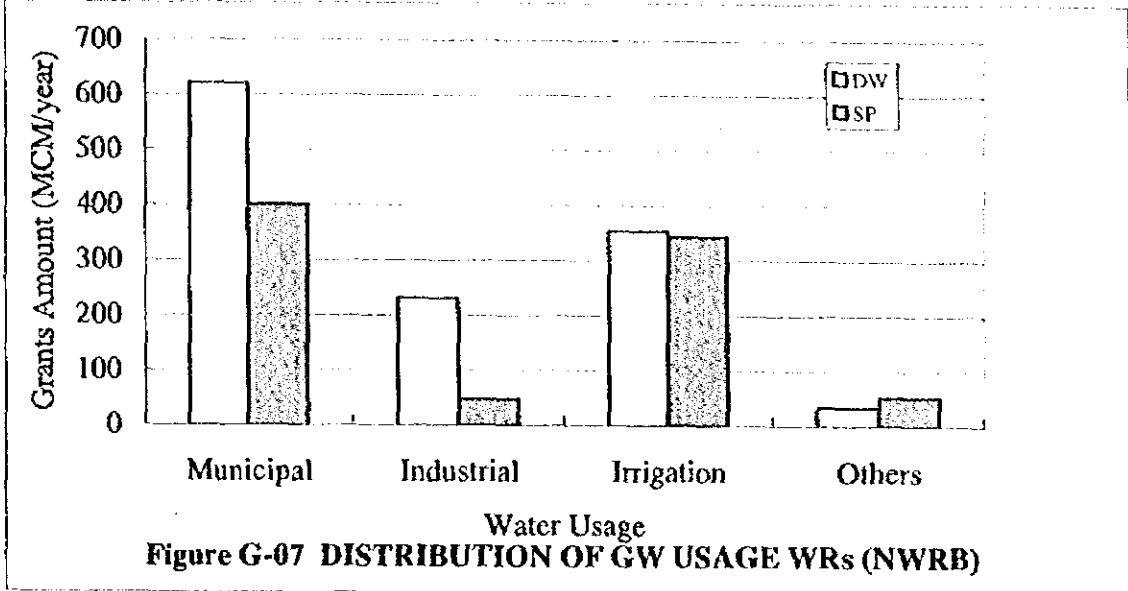


Figure G-06 AMOUNT RATIO OF GW USAGE WRs (NWRB)



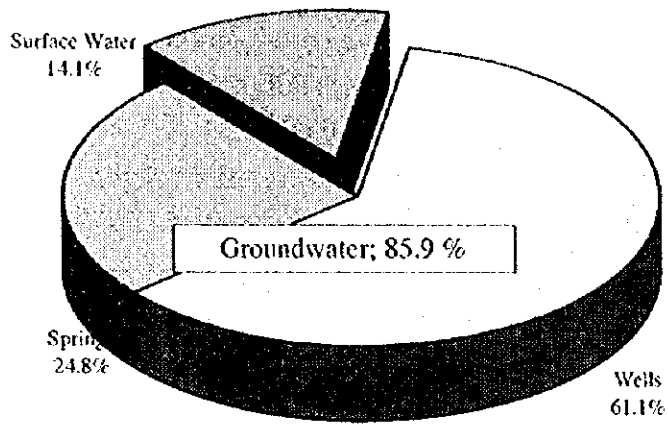


Figure G-10 AMOUNT RATIO OF MUNICIPAL WATER WRs

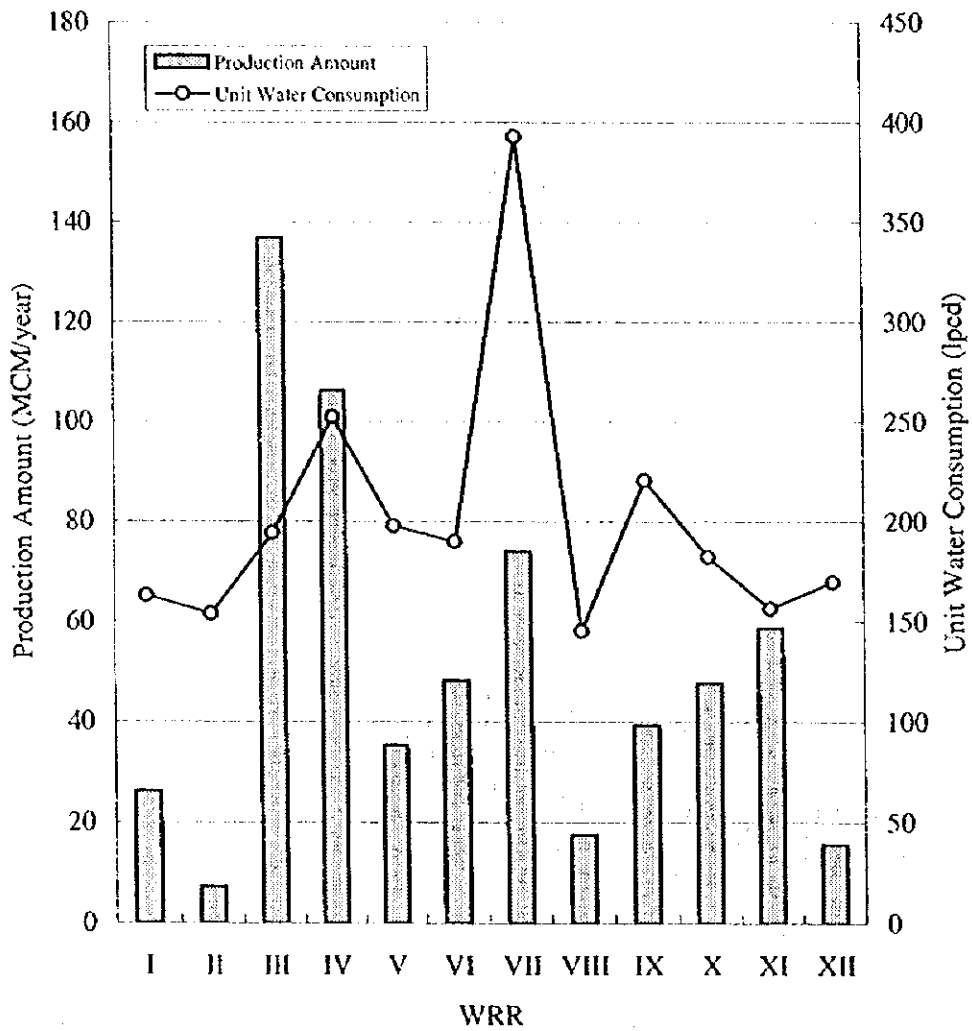
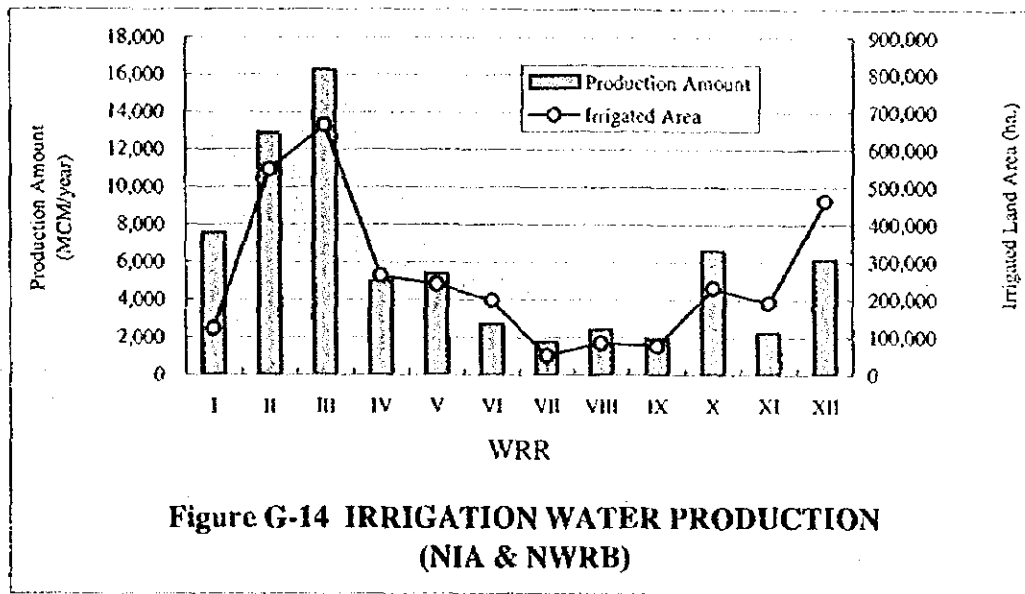
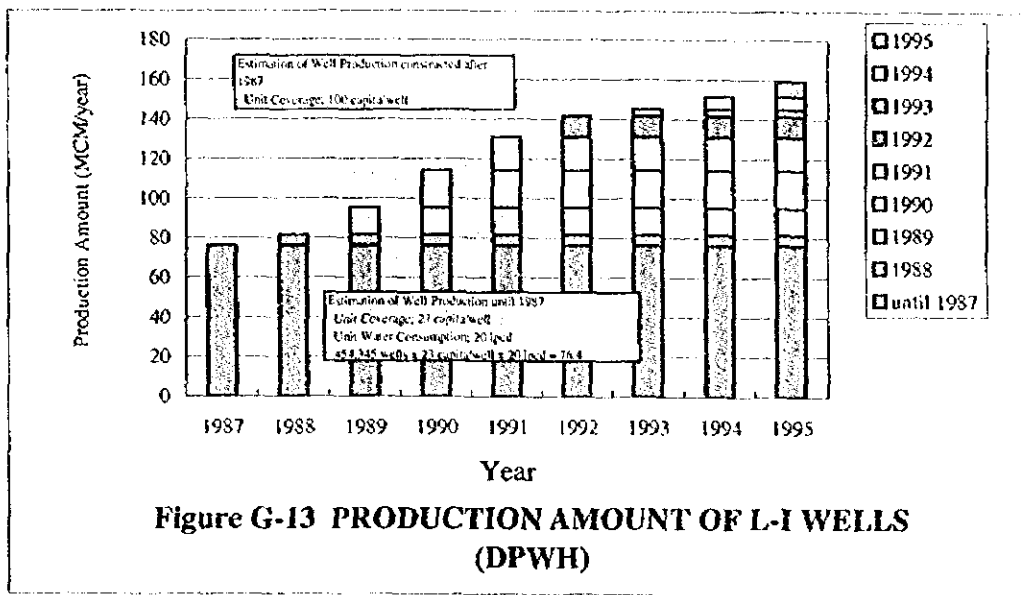
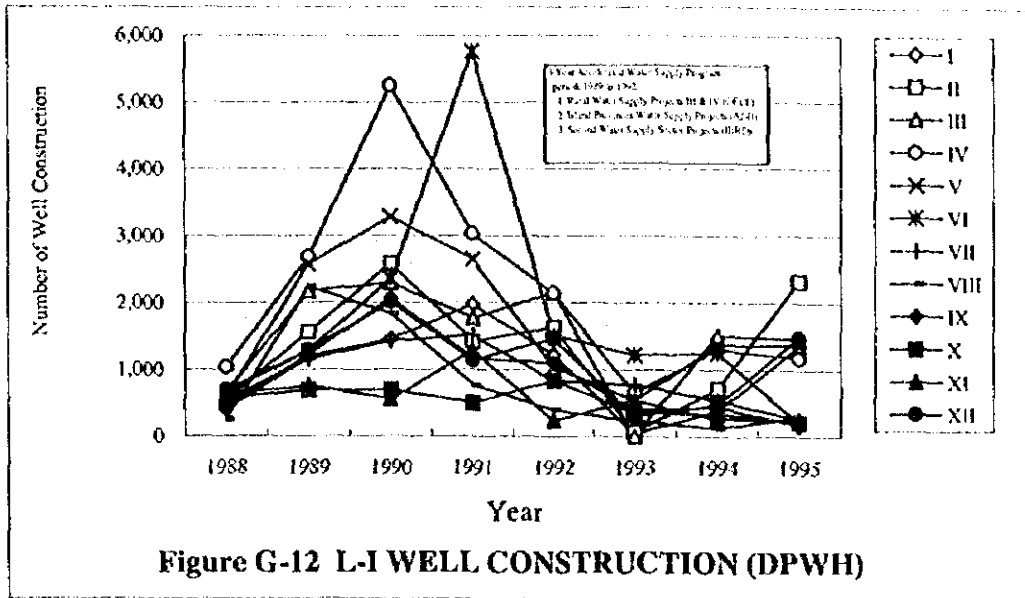


Figure G-11 AMOUNT RATIO OF MUNICIPAL WATER WRs (LWUA)



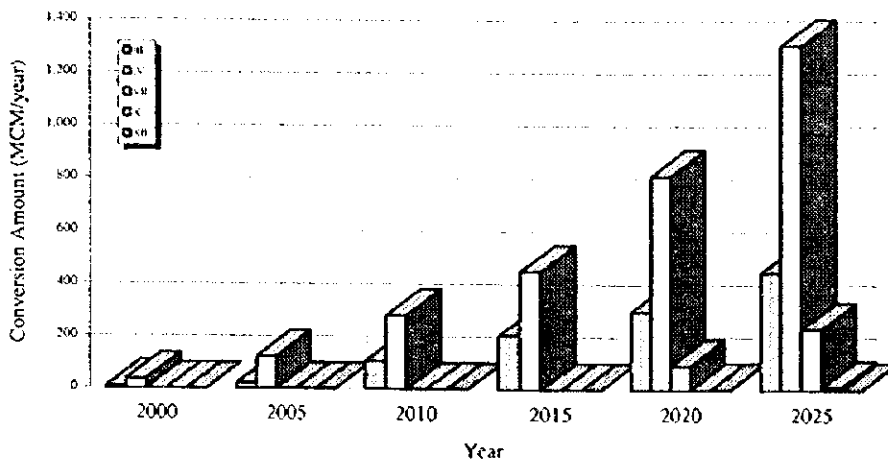


Figure G-15 CONVERSION AMOUNT (II)
OF I-M BY WRR

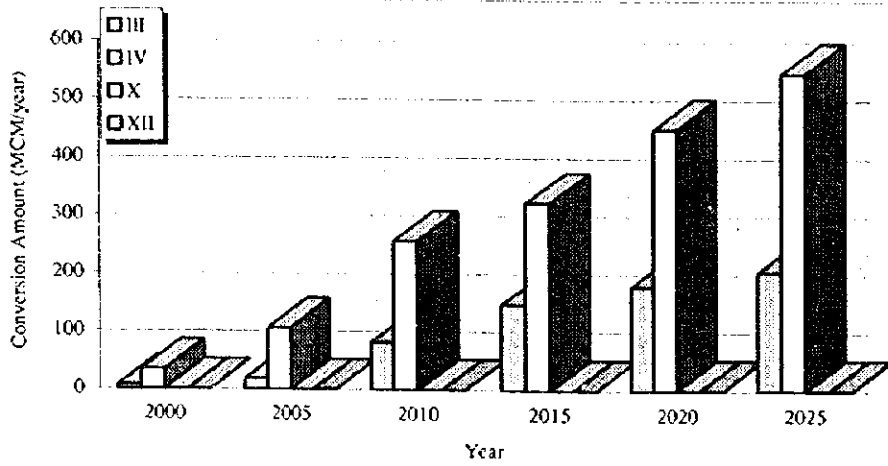


Figure G-16 CONVERSION AMOUNT (I)
OF I-M BY WRR

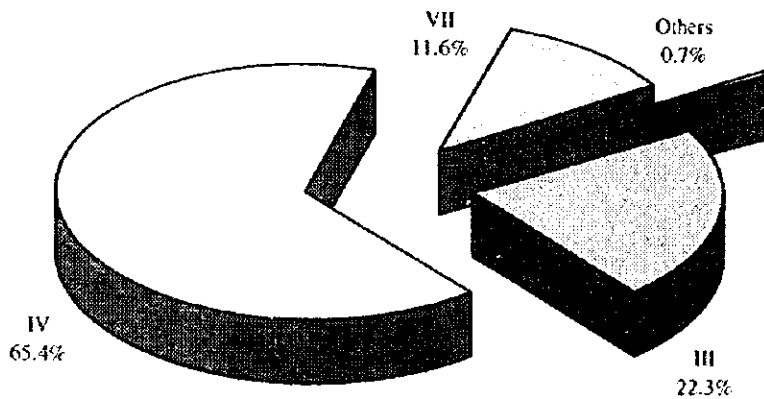


Figure G-17 CONVERSION RATIO (II)
OF I-M BY WRR AT 2025

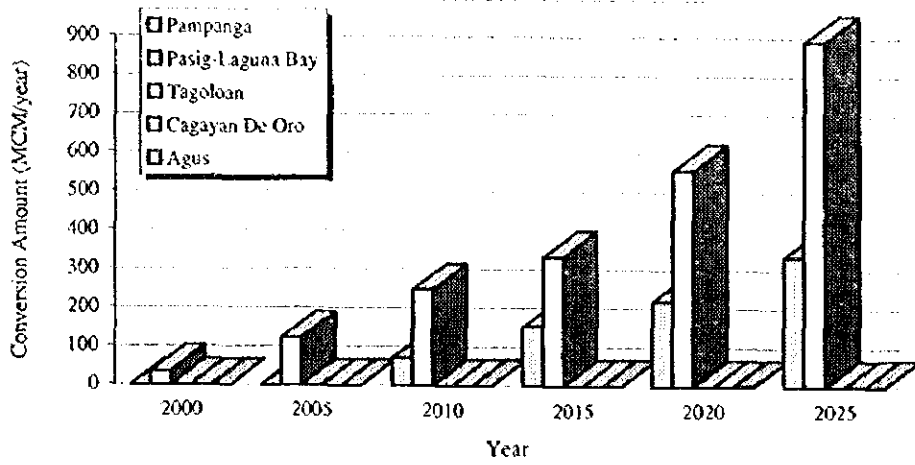


Figure G-18 CONVERSION AMOUNT (II) OF I-M BY MRB

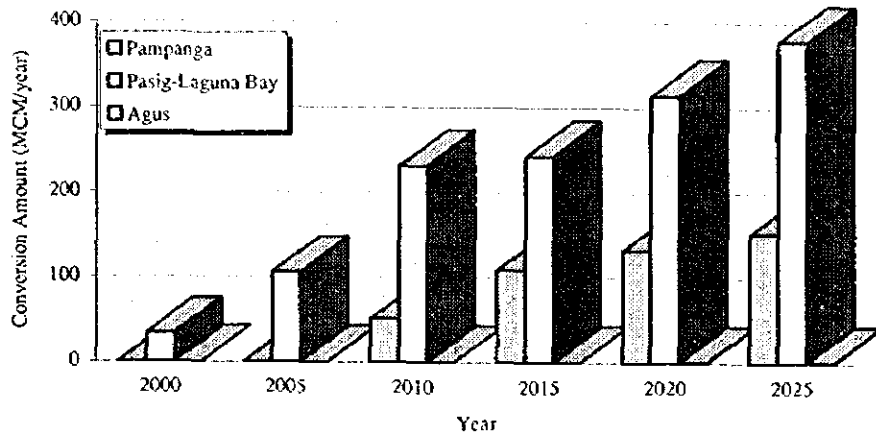


Figure G-19 CONVERSION AMOUNT (I) OF I-M BY MRB

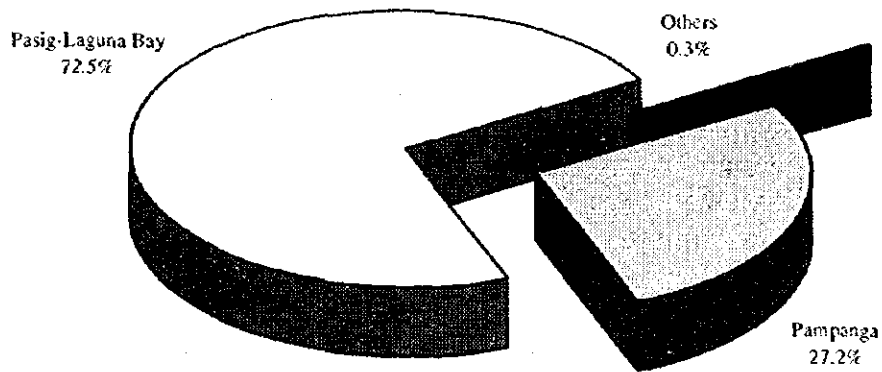
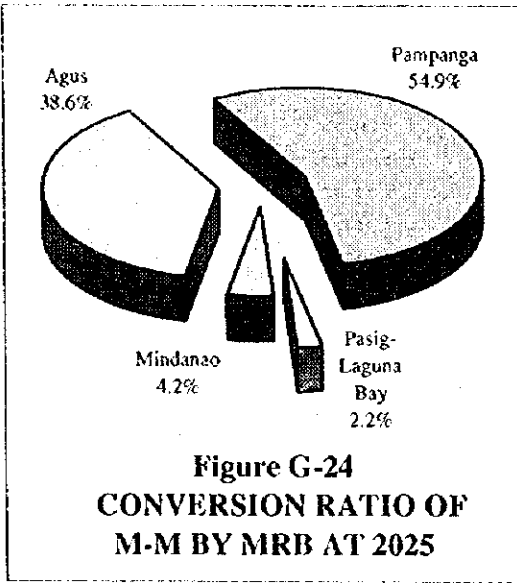
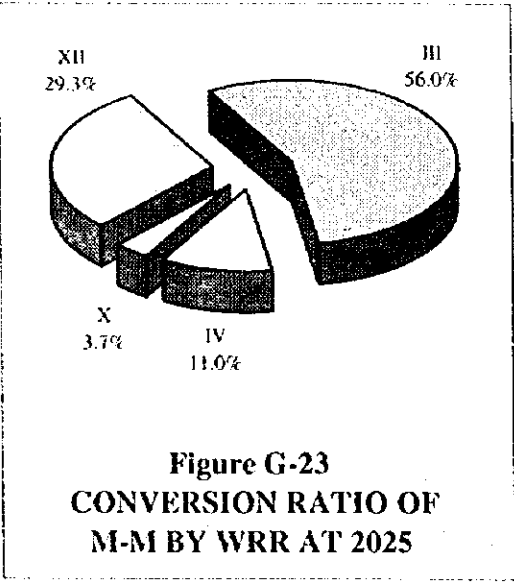
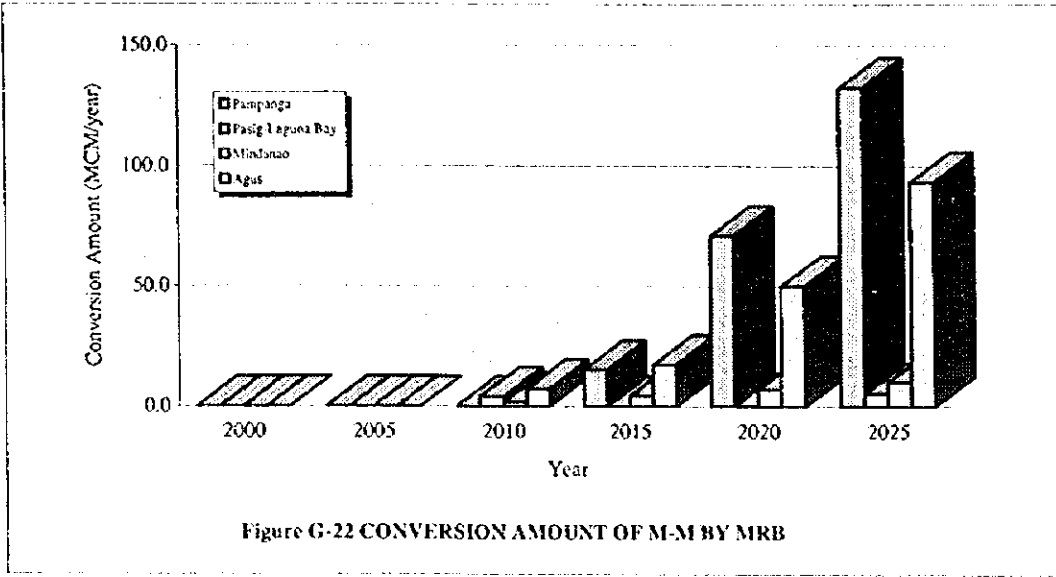
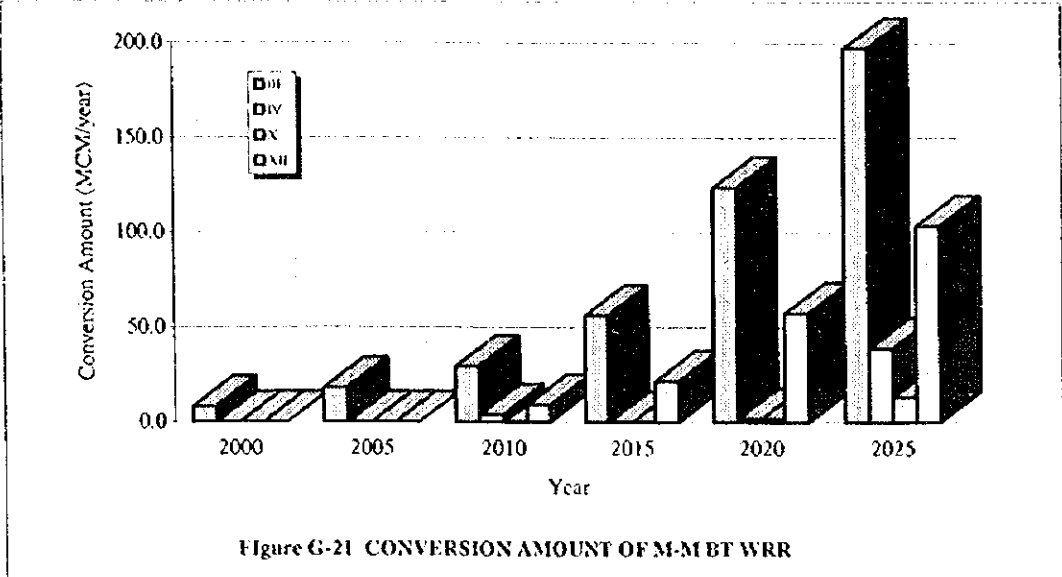


Figure G-20 CONVERSION RATIO (II) OF I-M BY MRB AT 2025



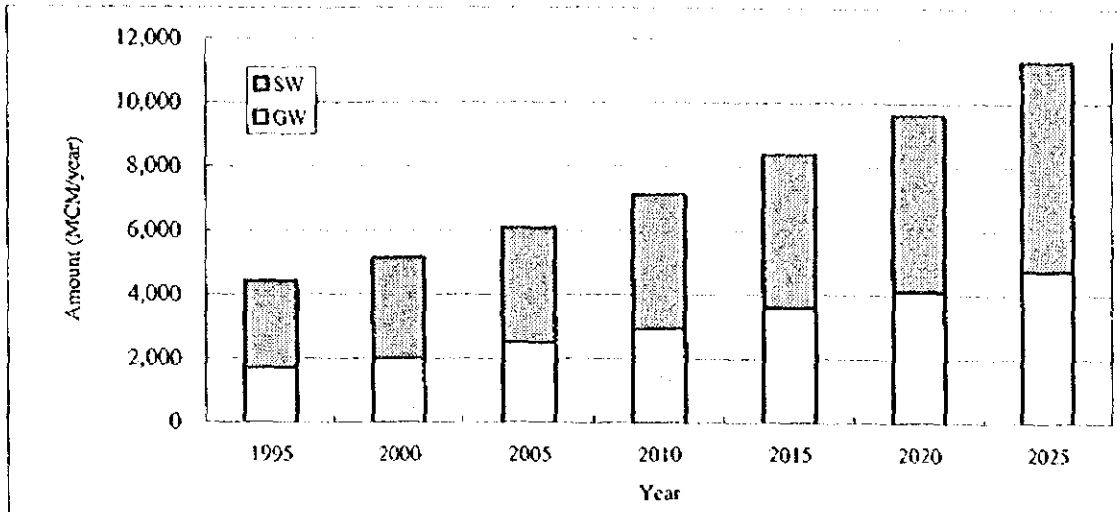


Figure G-25 NATION M/I DEMAND (H)

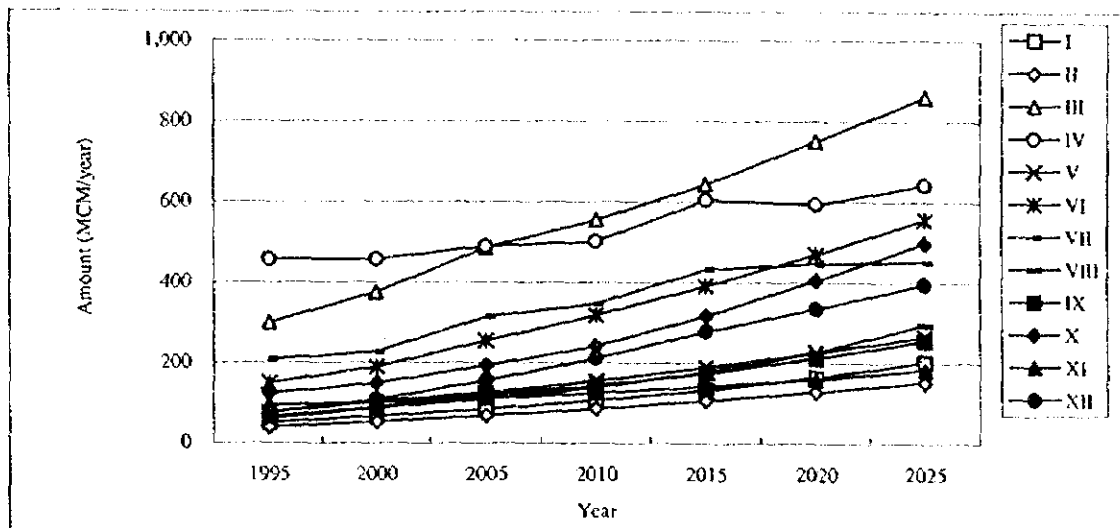


Figure G-26 M-I GW DEMAND (H) BY WRR

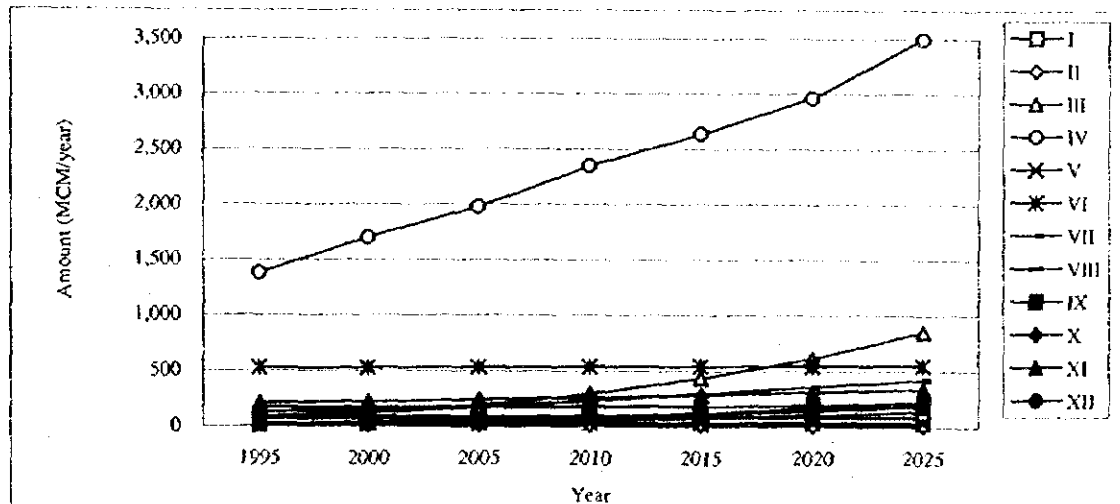


Figure G-27 M-I SW DEMAND (H) BY WRR

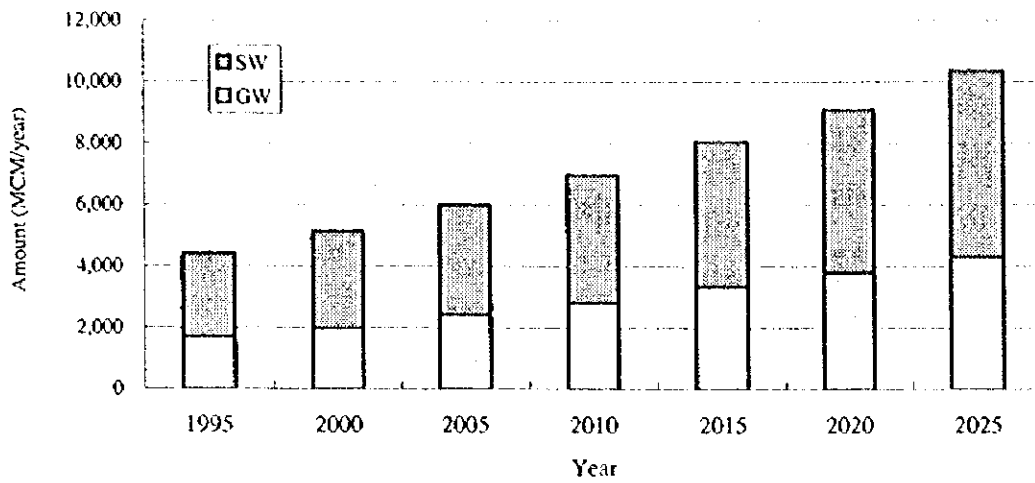


Figure G-28 NATION M-I DEMAND (L)

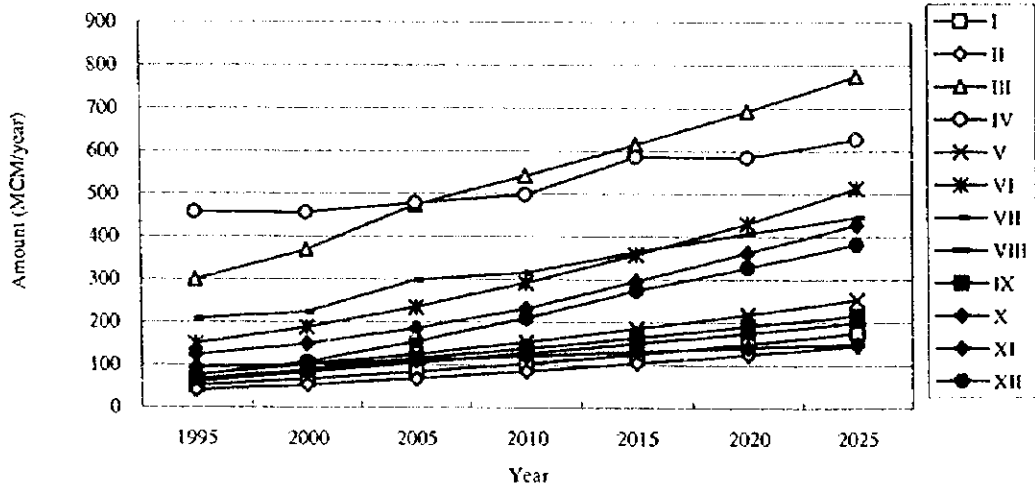


Figure G-29 M-I GW DEMAND (L) BY WRR

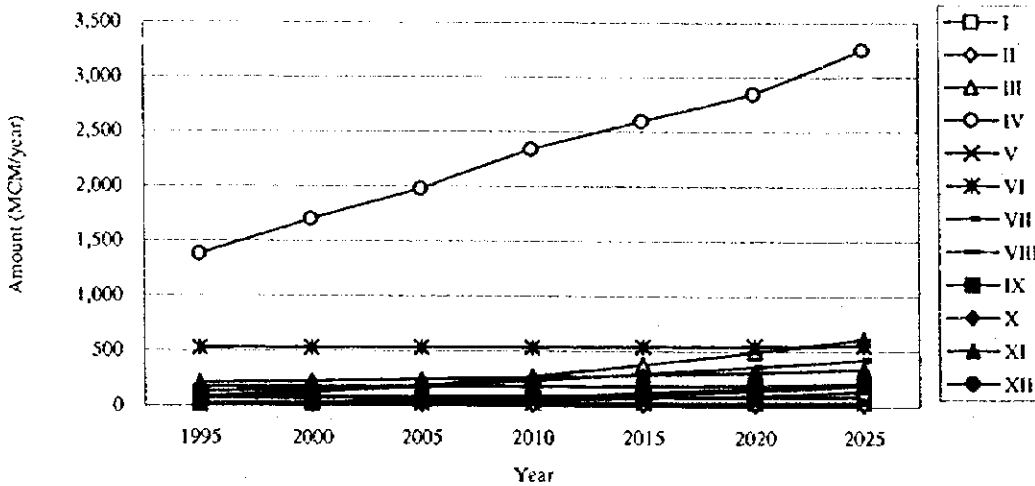


Figure G-30 M-I SW DEMAND (L) BY WRR

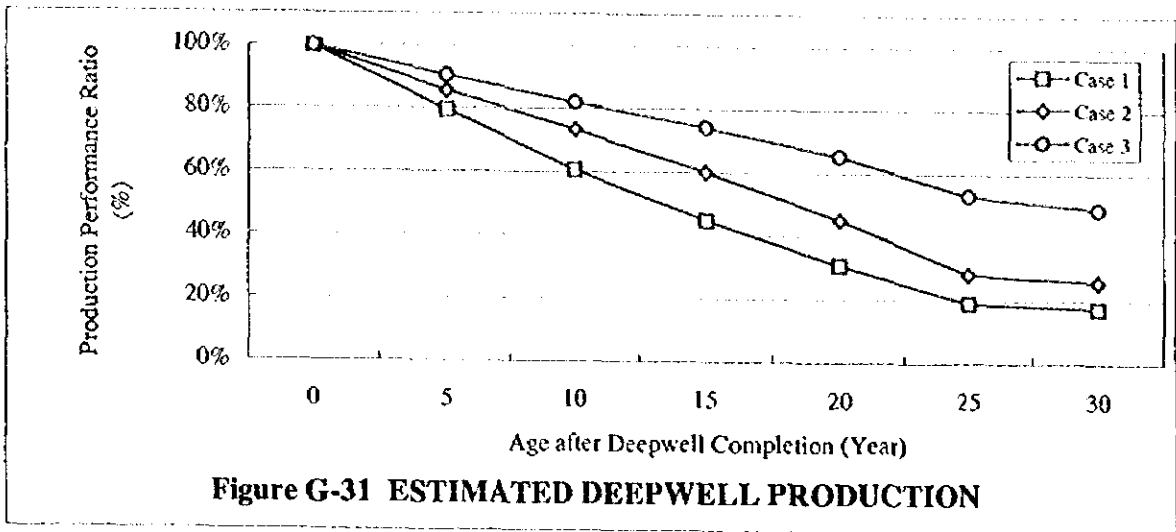


Figure G-31 ESTIMATED DEEPWELL PRODUCTION

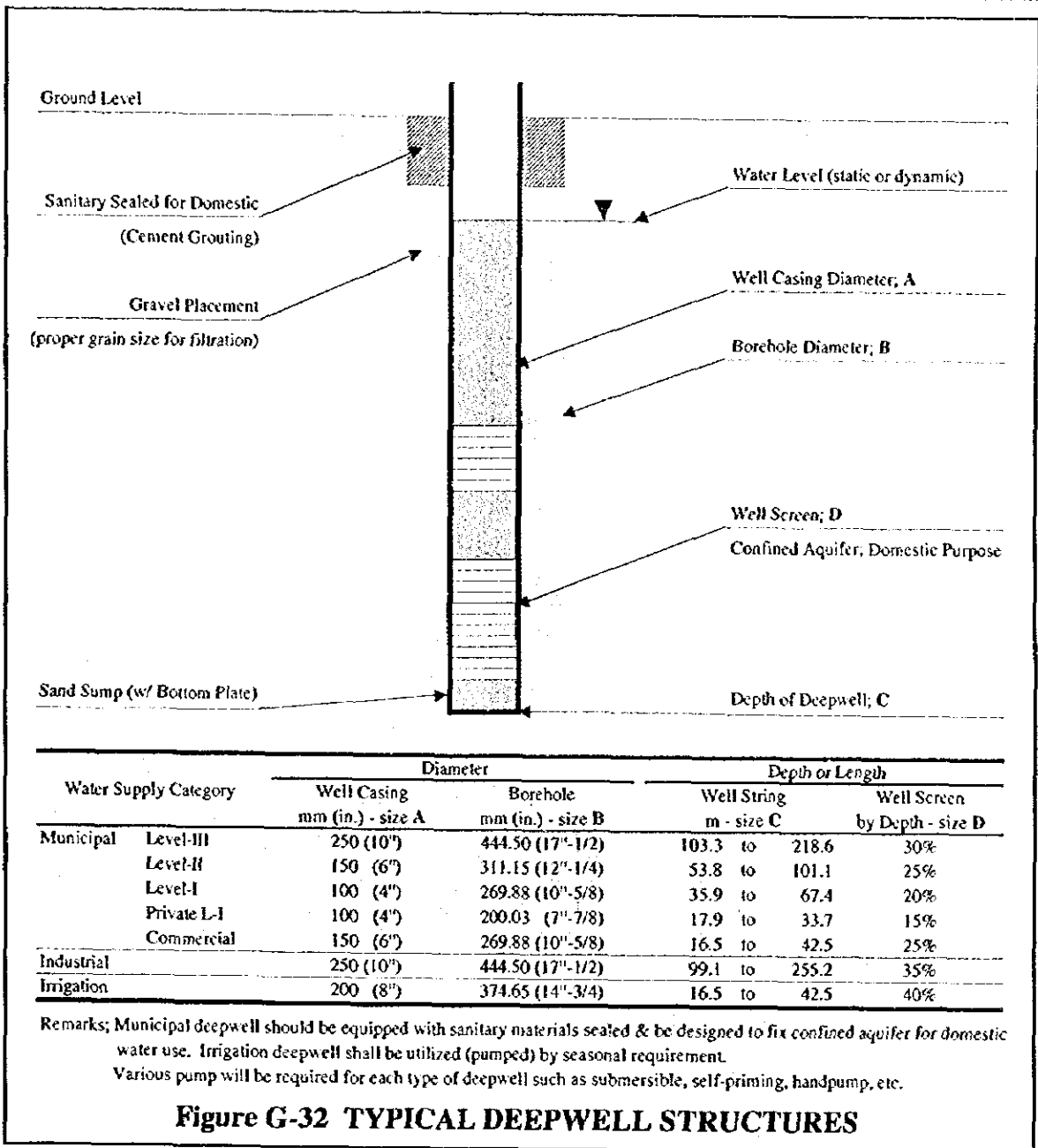


Figure G-32 TYPICAL DEEPWELL STRUCTURES

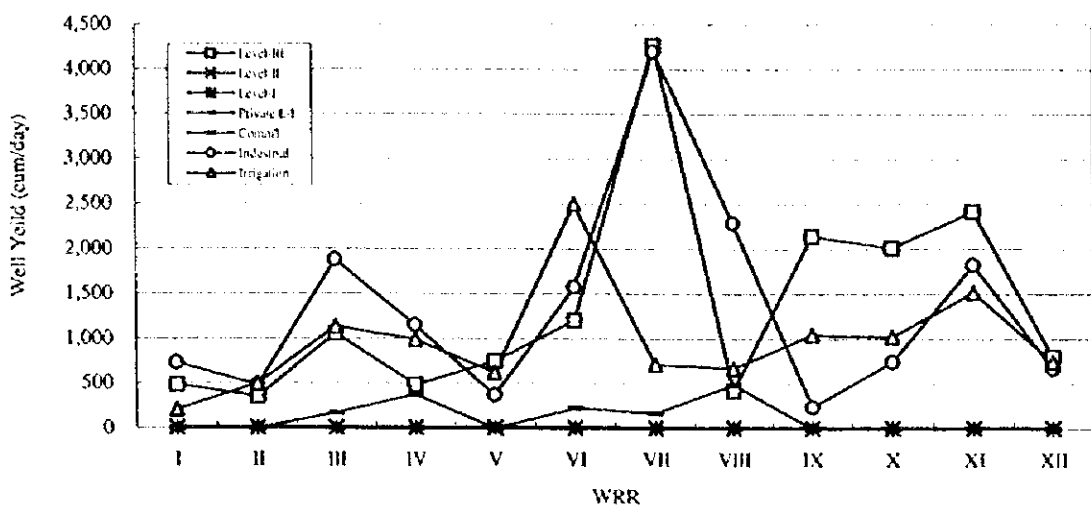


Figure G-33 DEEPWELL PRODUCTION CAPACITY

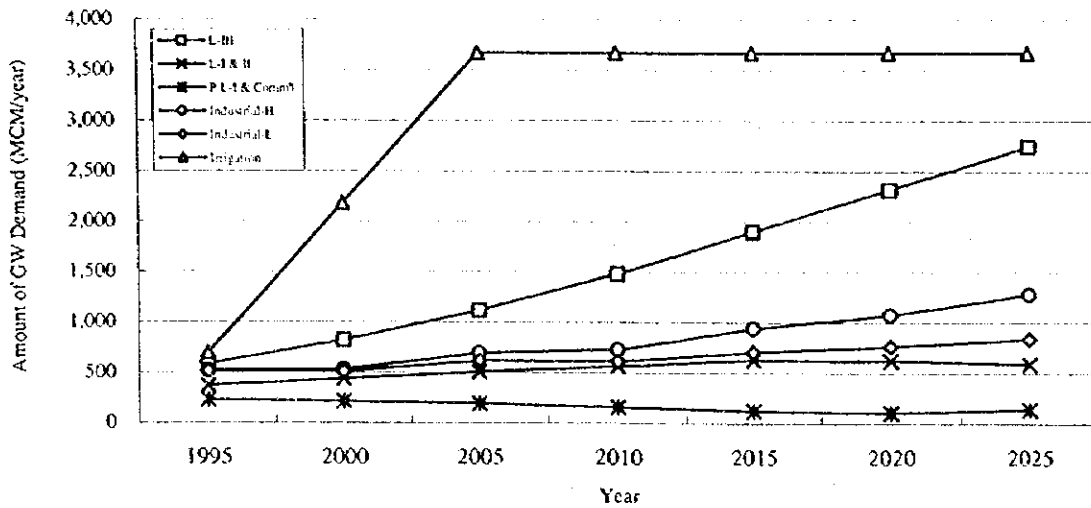


Figure G-34 GW DEMAND BY WATER USAGE

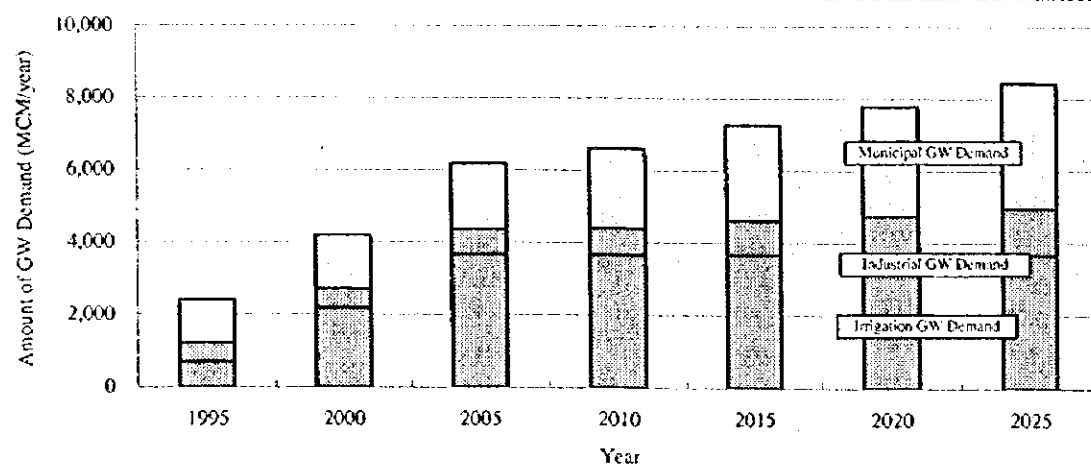
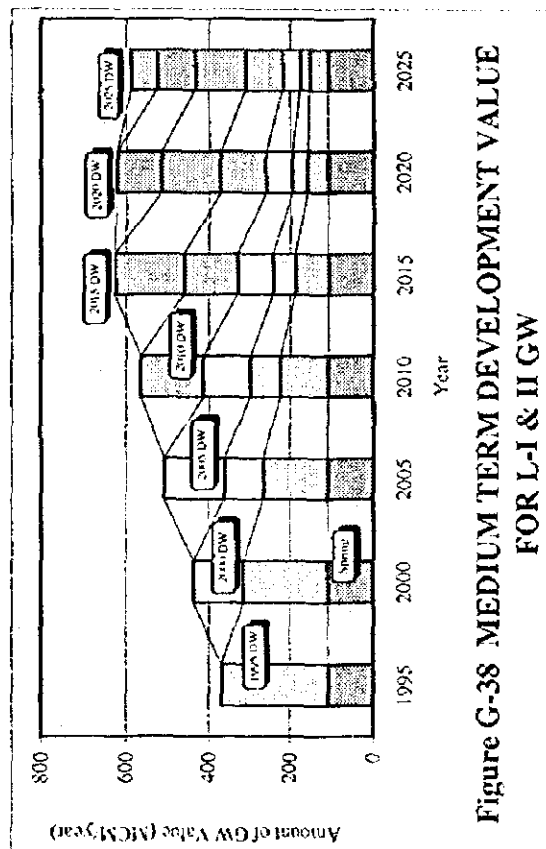
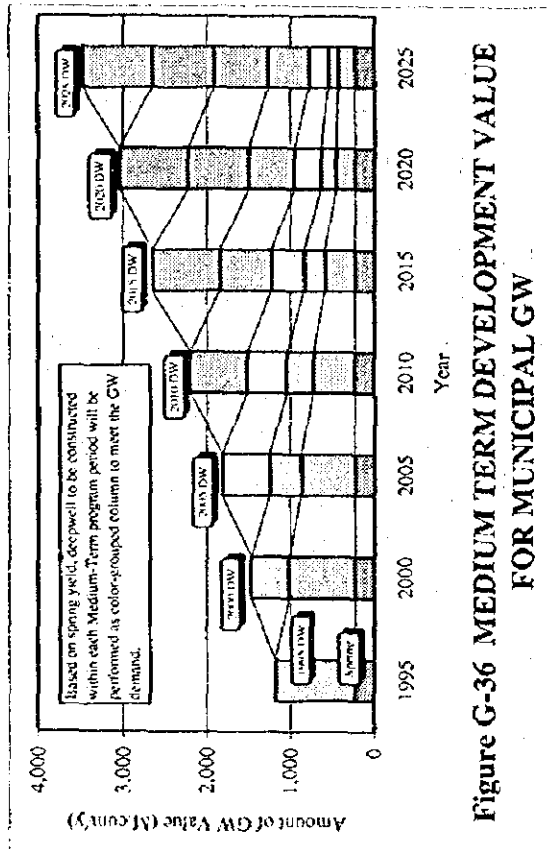
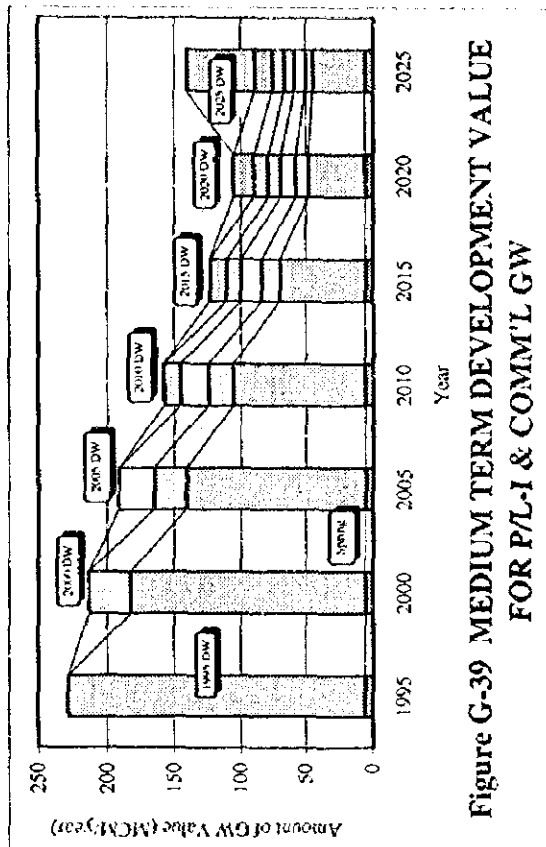
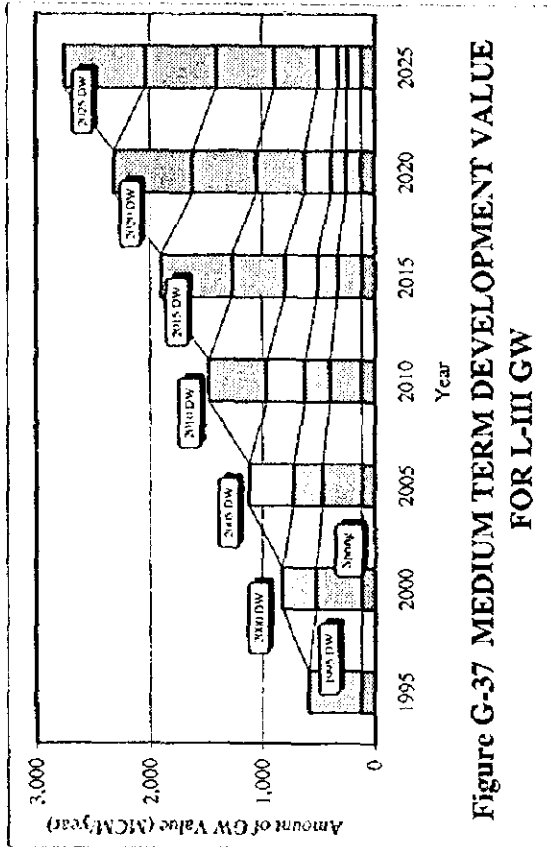
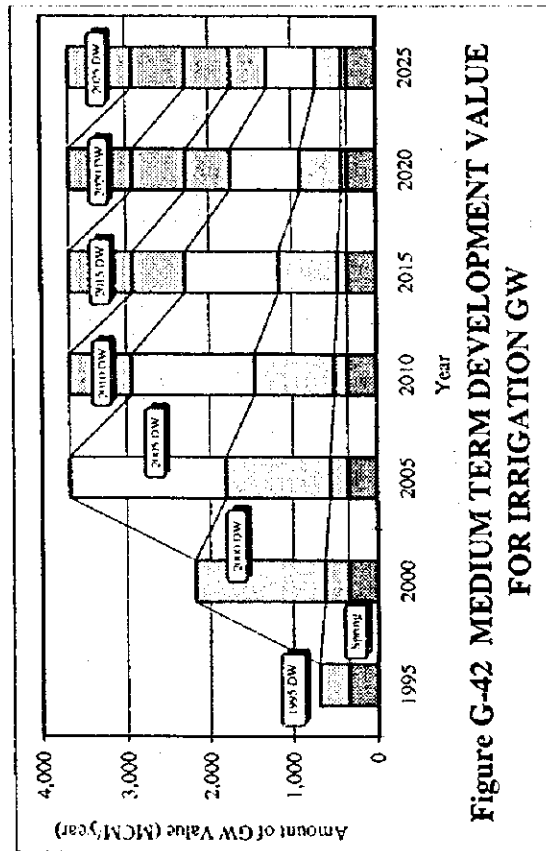
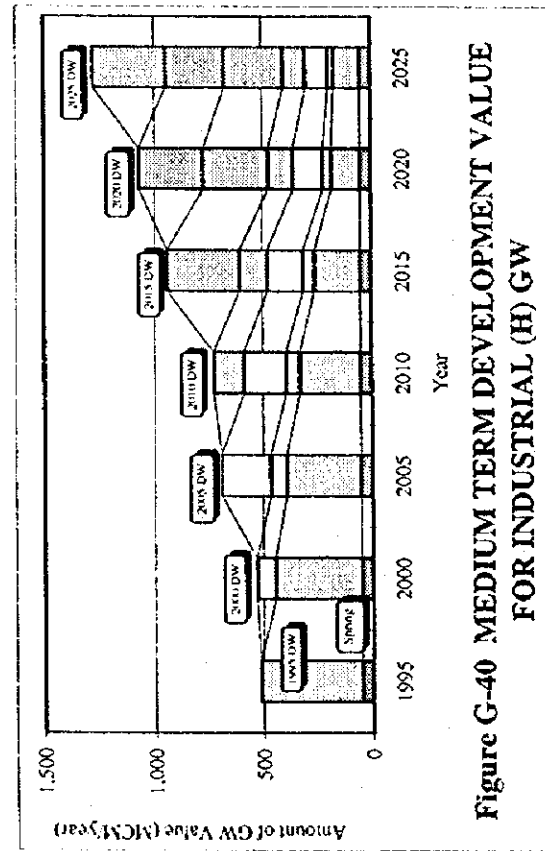
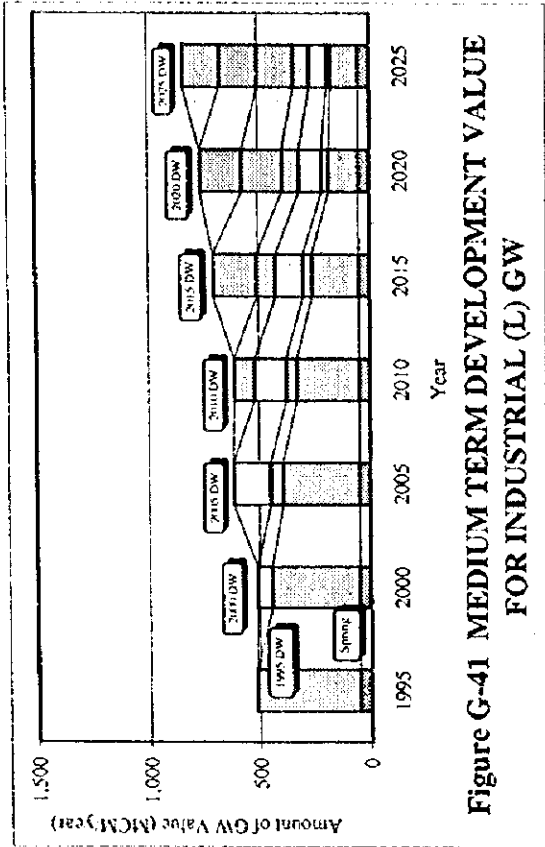


Figure G-35 CATEGORIZED GW DEMAND





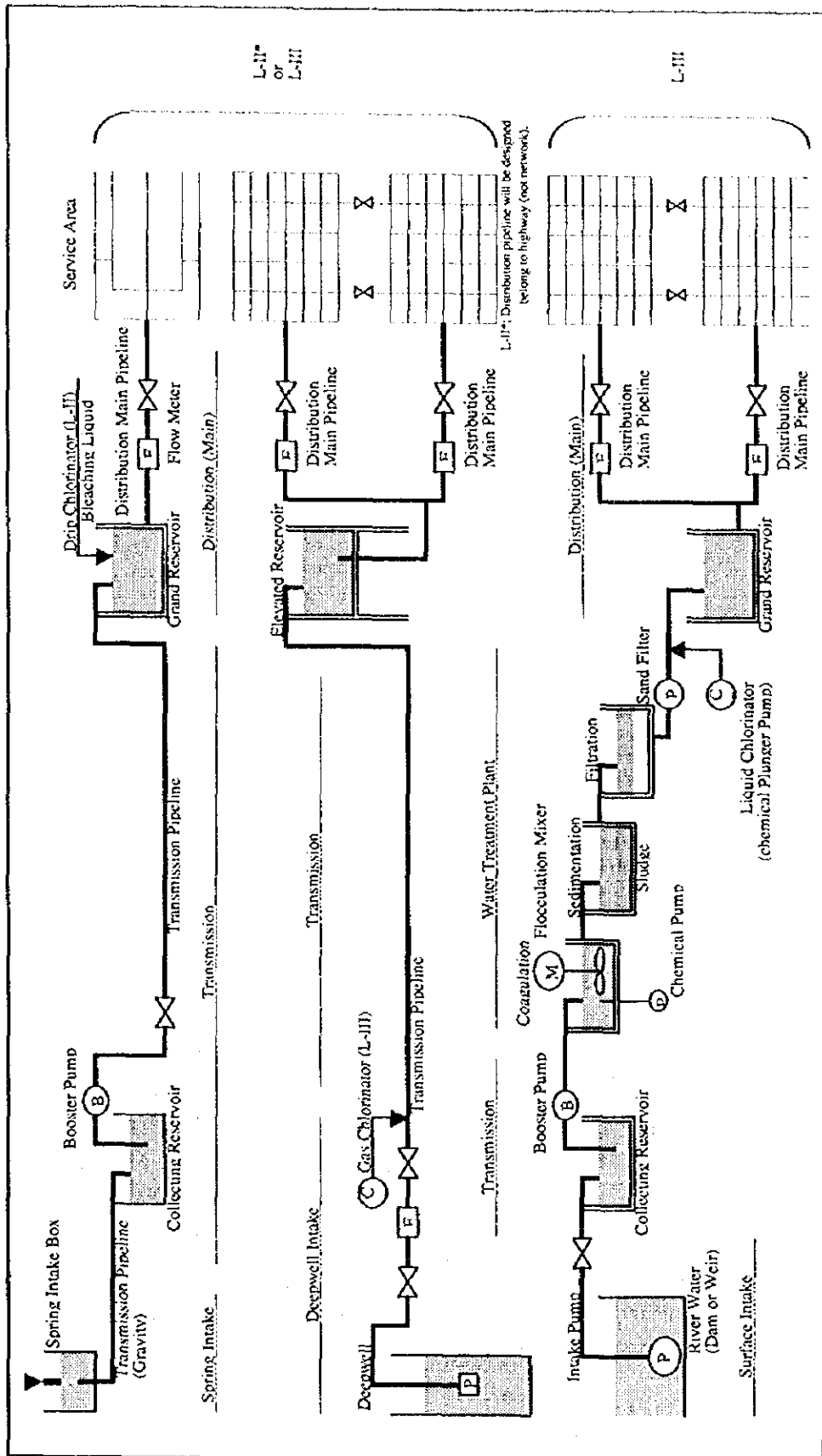


Figure G-43 TYPICAL WATER SUPPLY SYSTEMS FOR COST ESTIMATION OF GW DEVELOPMENT

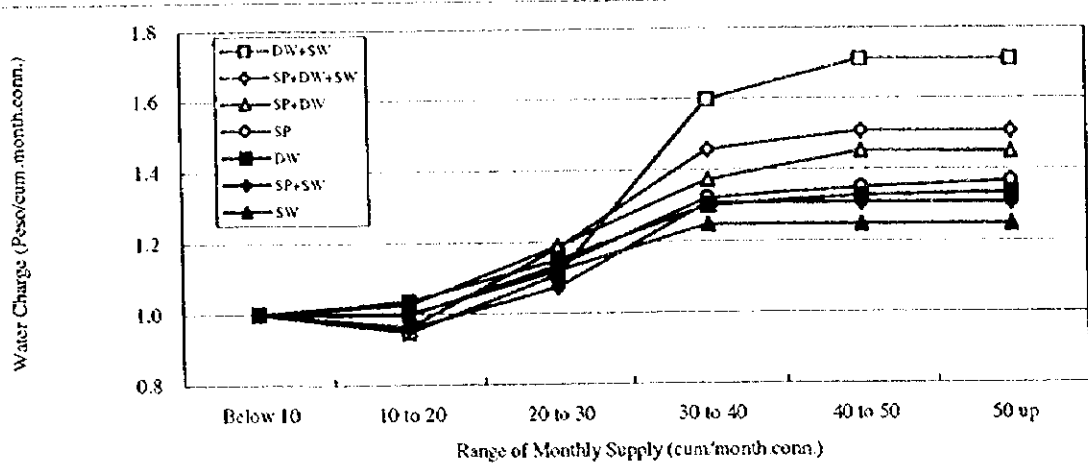


Figure G-44 VALUE RATIO OF WATER RATE BY SOURCE CATEGORY

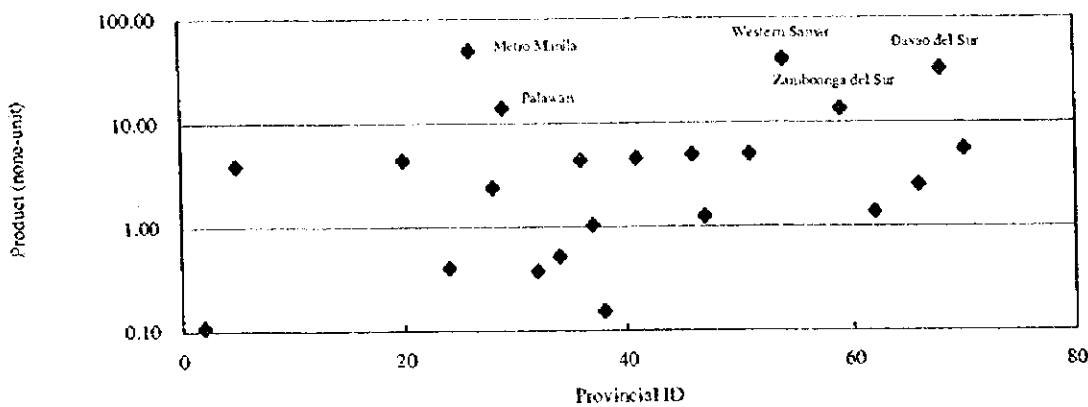


Figure G-45 PRODUCT DISTRIBUTION OF PROVINCIAL GW SHORTAGE

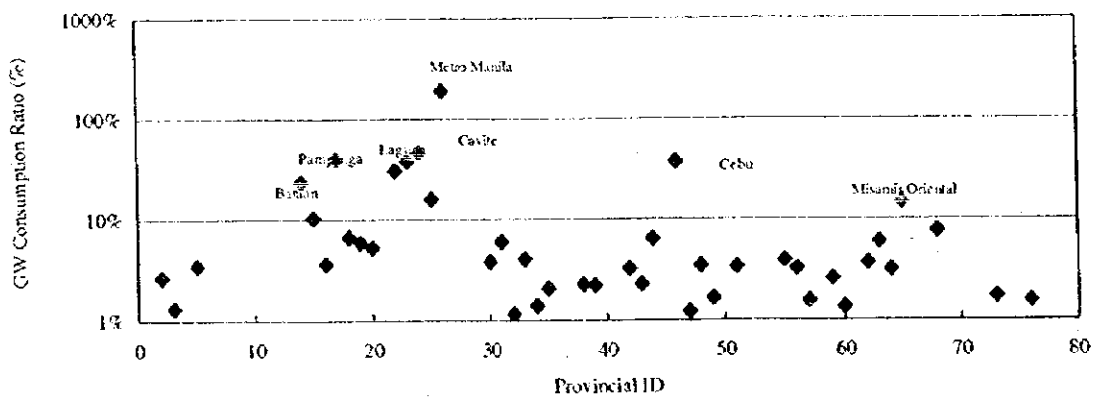
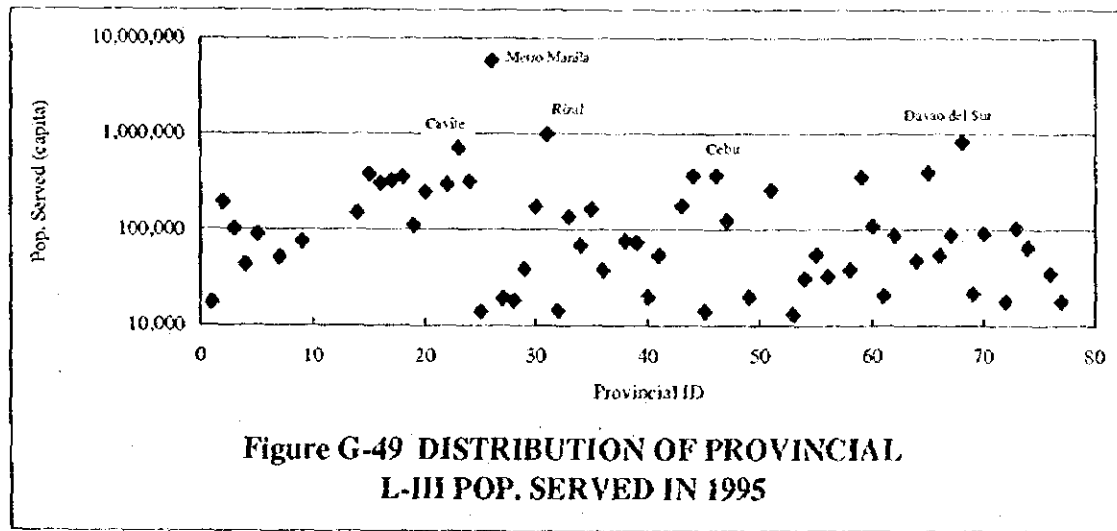
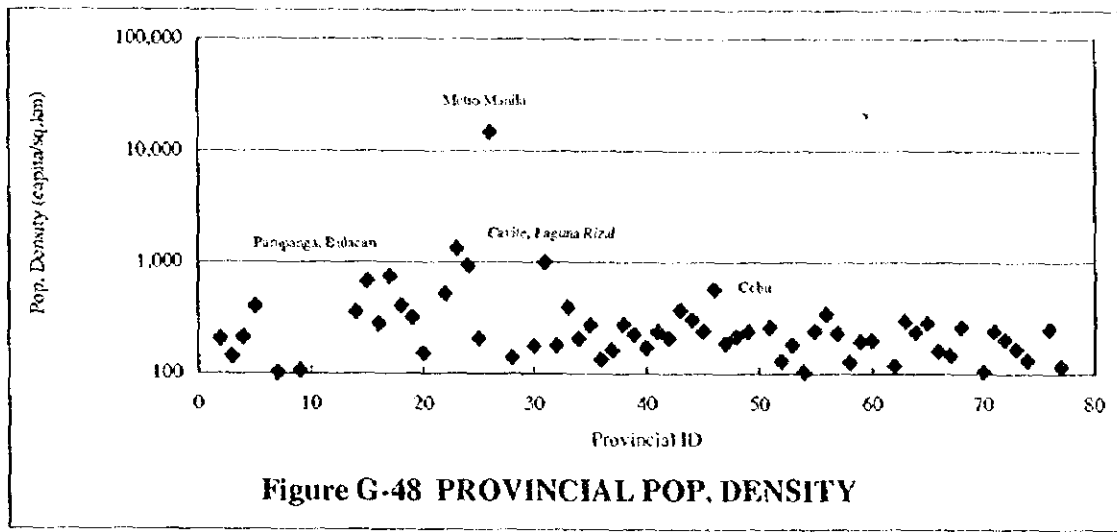
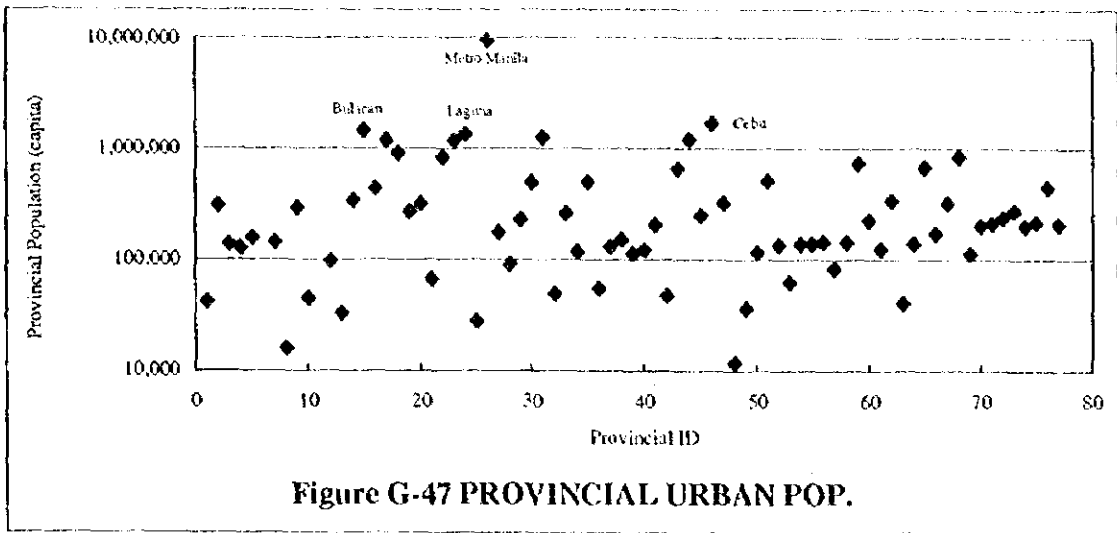
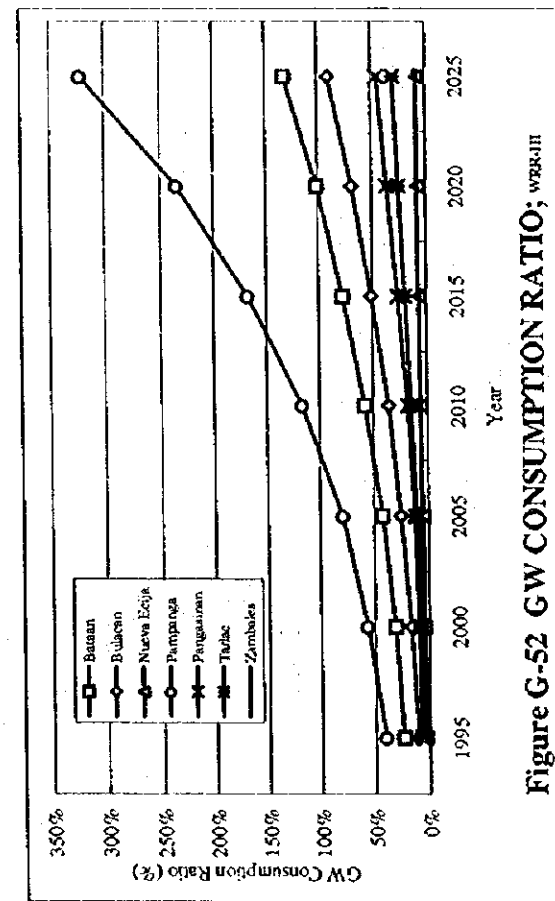
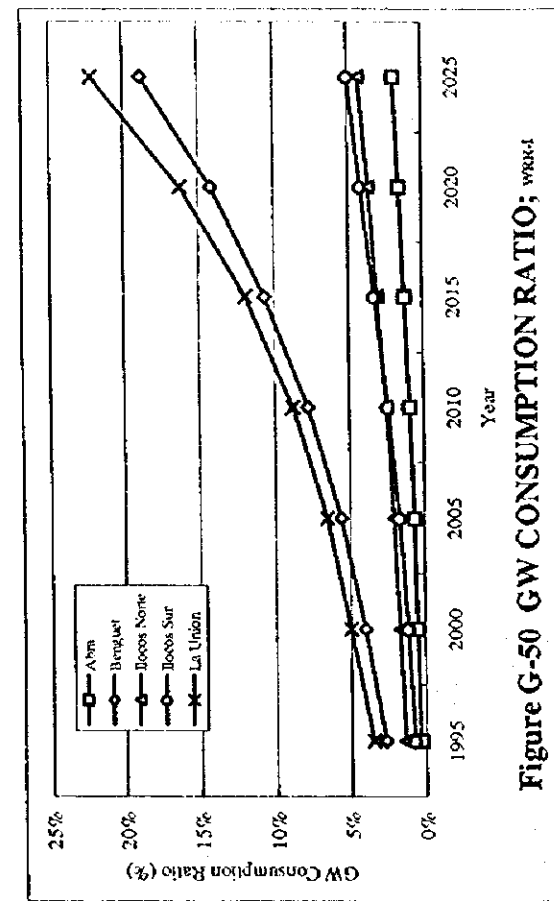
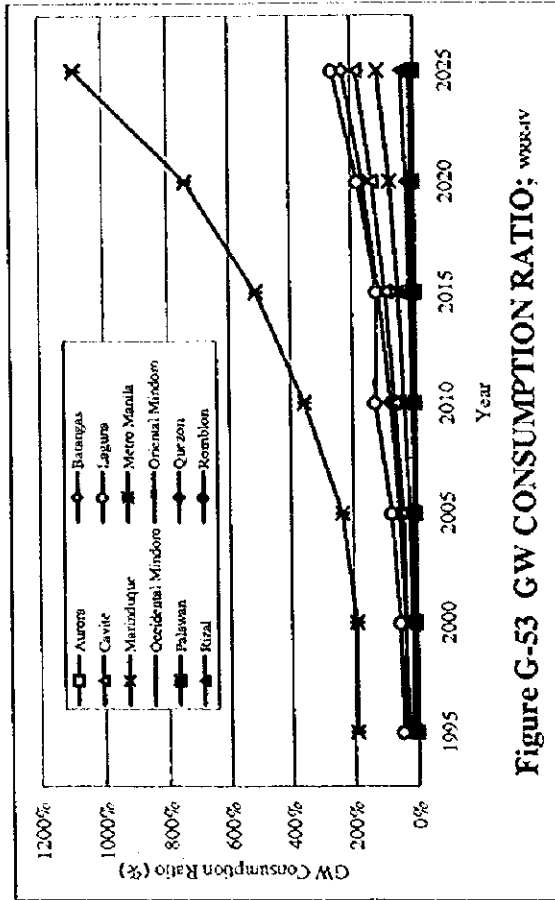
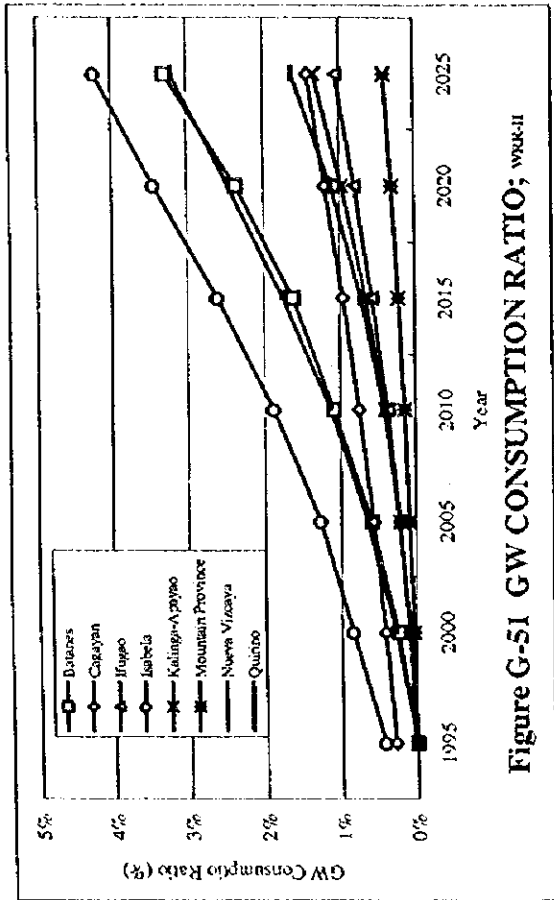


Figure G-46 DISTRIBUTION OF PROVINCIAL GW CONSUMPTION RATIO IN 1995





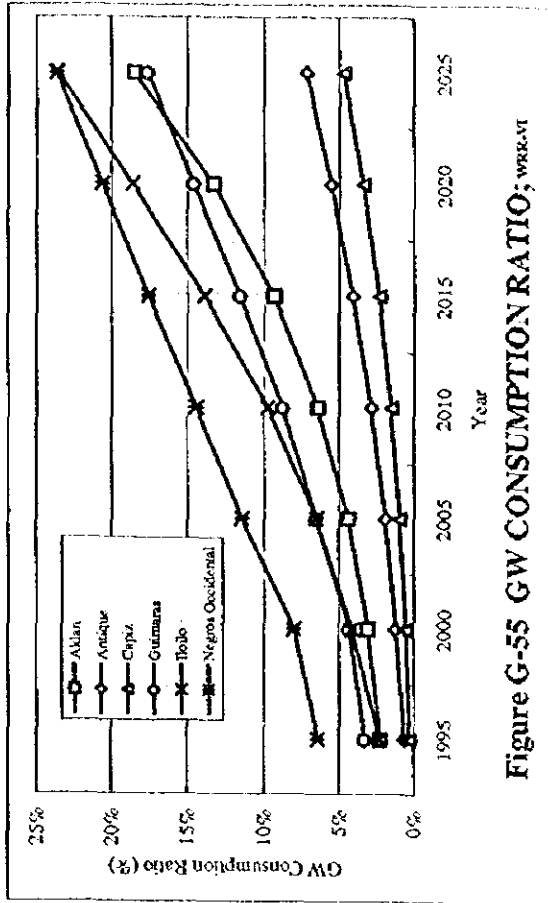


Figure G-55 GW CONSUMPTION RATIO; WRR-VI

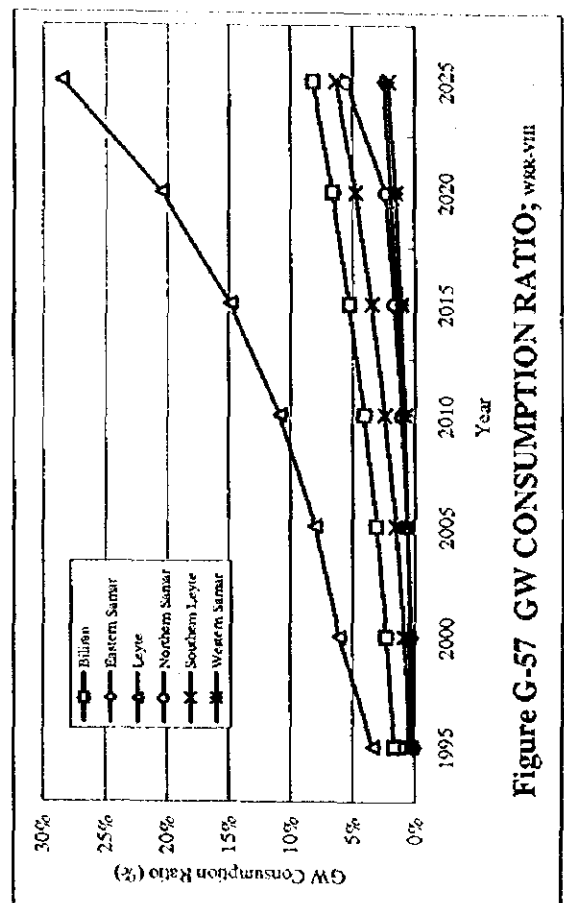


Figure G-57 GW CONSUMPTION RATIO; WRR-VIII

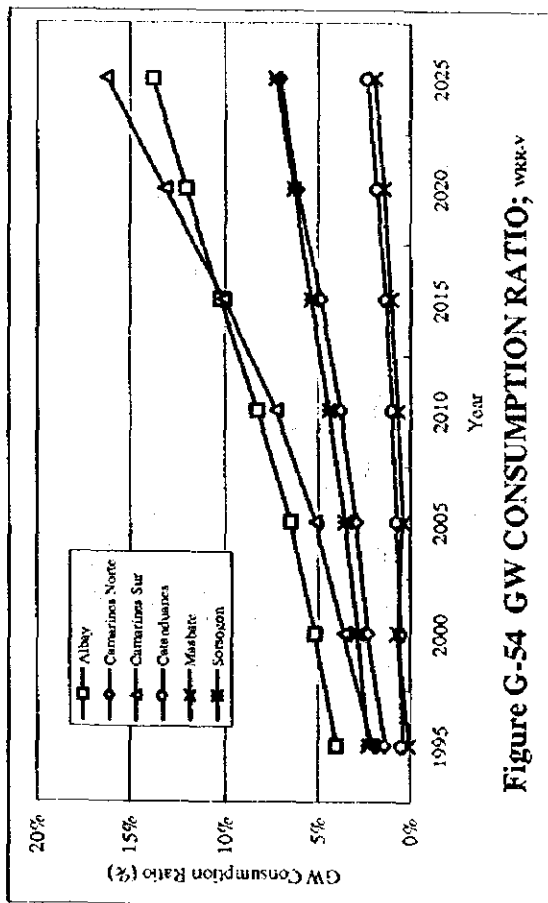


Figure G-54 GW CONSUMPTION RATIO; WRR-V

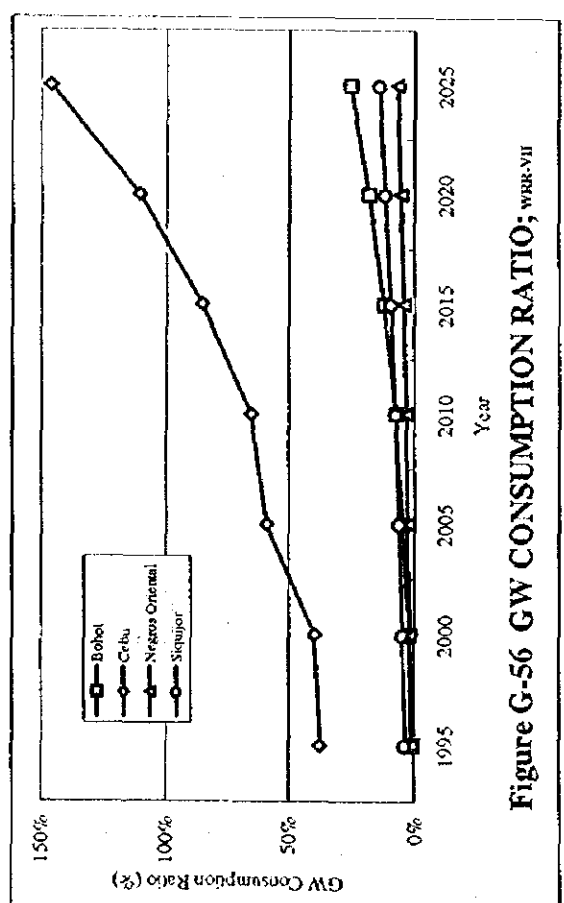


Figure G-56 GW CONSUMPTION RATIO; WRR-VII

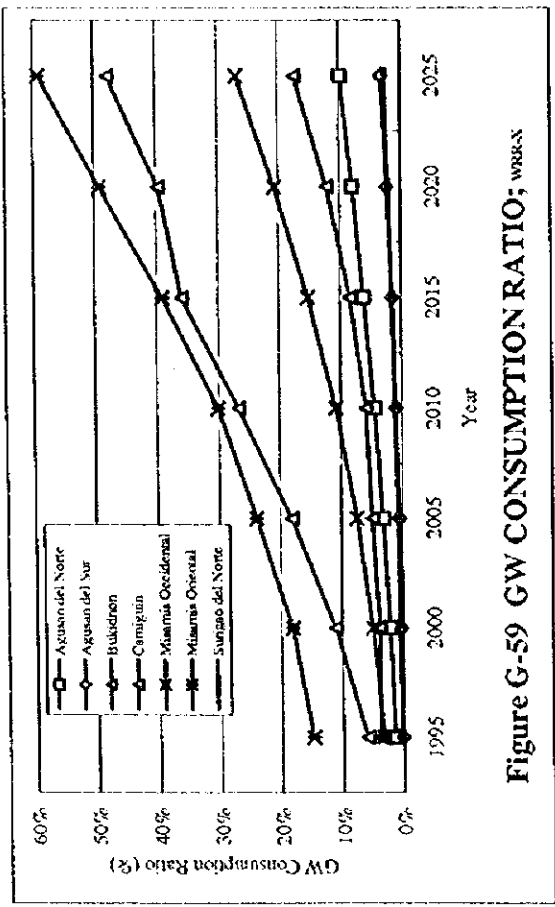


Figure G-59 GW CONSUMPTION RATIO; WRR-N

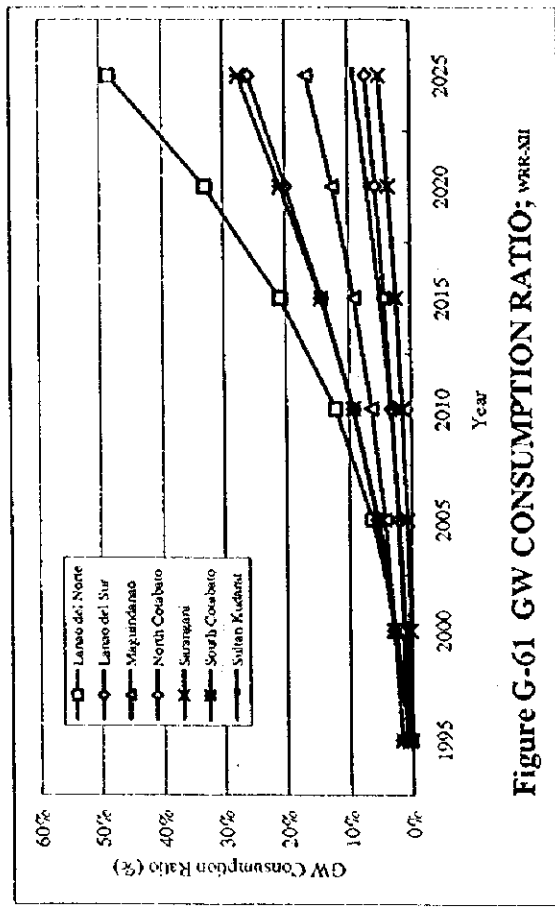


Figure G-61 GW CONSUMPTION RATIO; WRR-XI

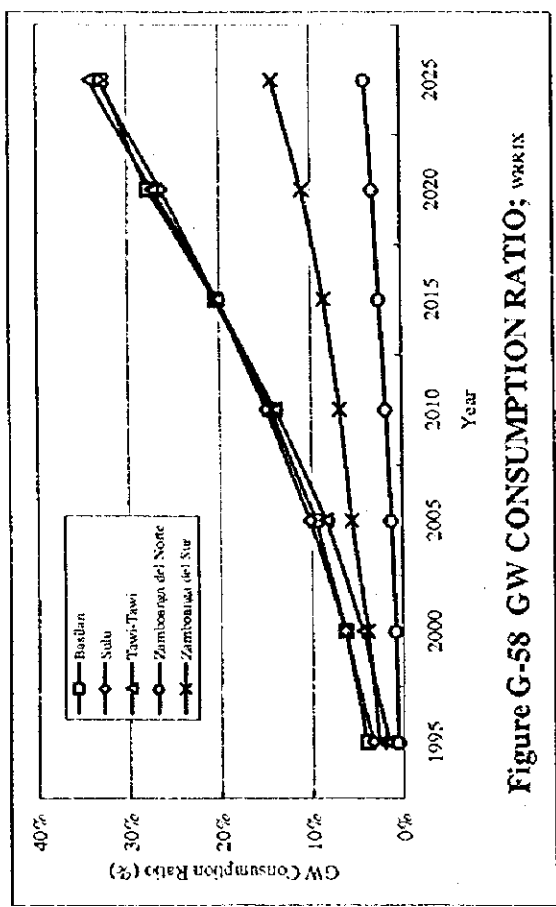


Figure G-58 GW CONSUMPTION RATIO; WRR-IX

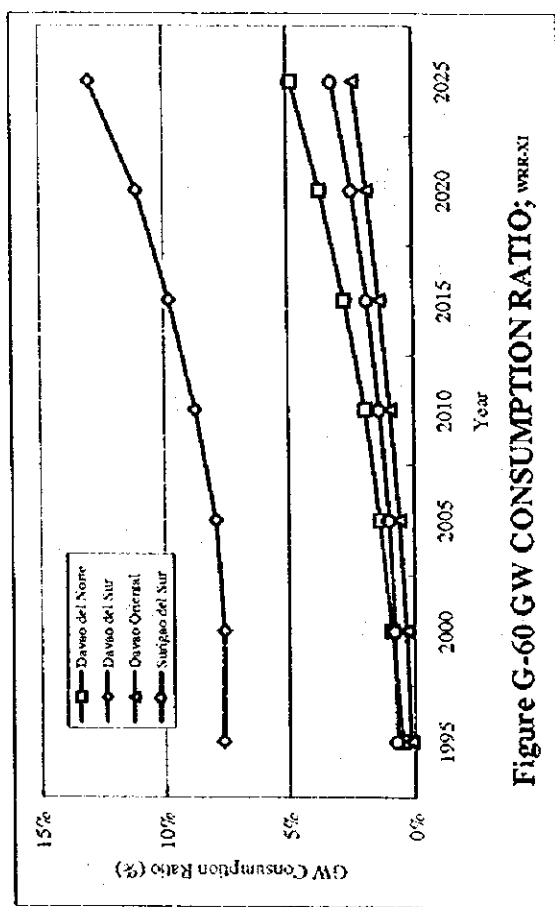


Figure G-60 GW CONSUMPTION RATIO; WRR-XI

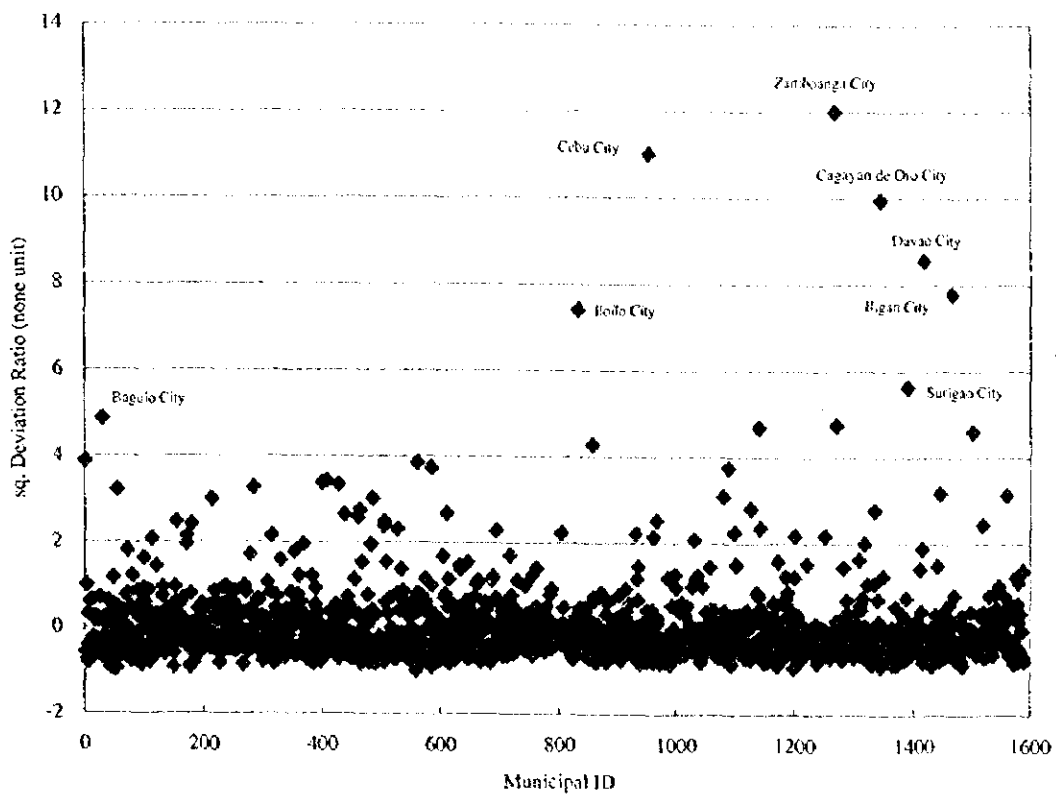


Figure G-62 SQ. DEVIATION RATIO OF MUNICIPAL POP.

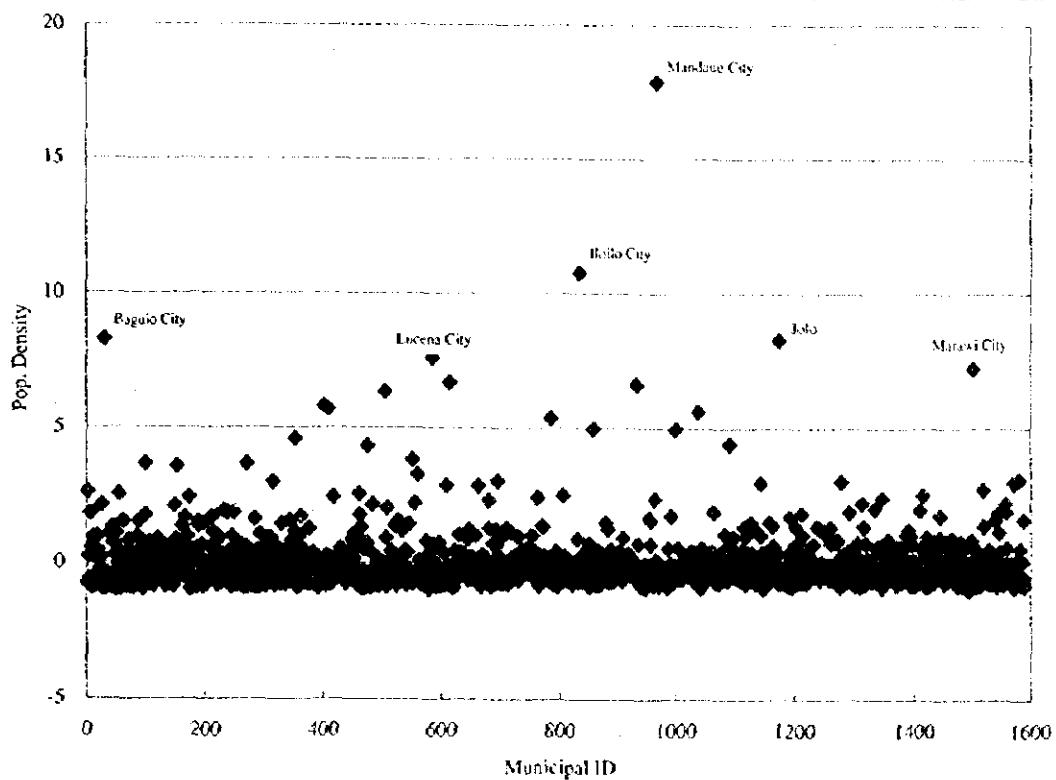


Figure G-63 SQ. DEVIATION RATIO OF POP. DENSITY

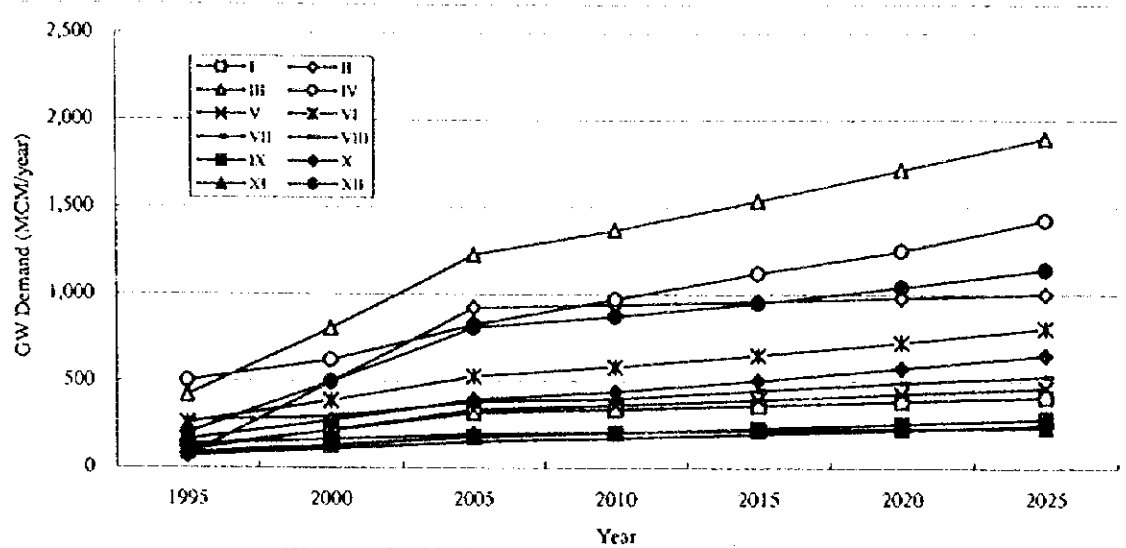


Figure G-64 GW DEMAND (I) BY WRR

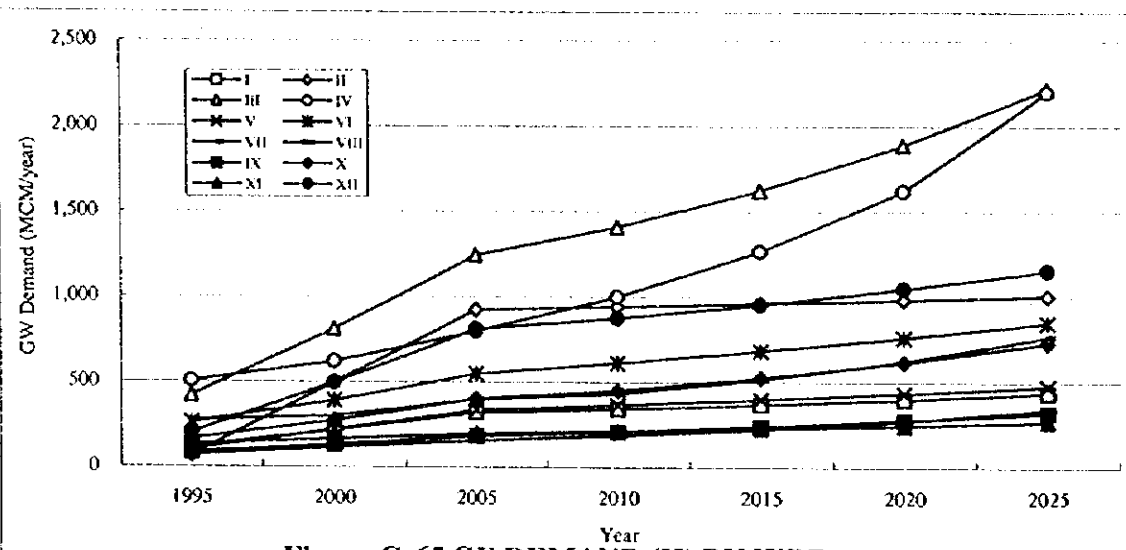


Figure G-65 GE DEMAND (II) BY WRR

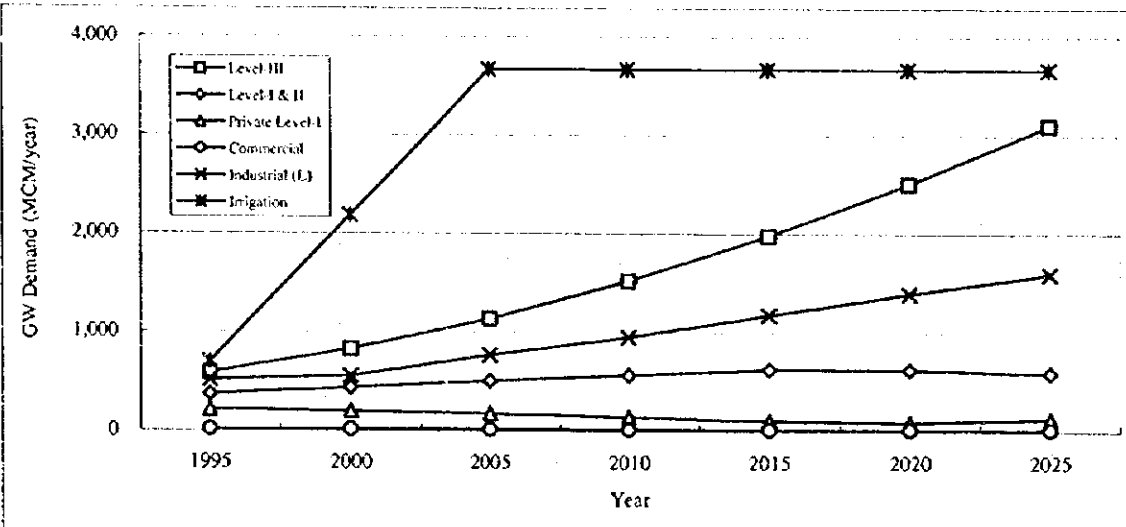
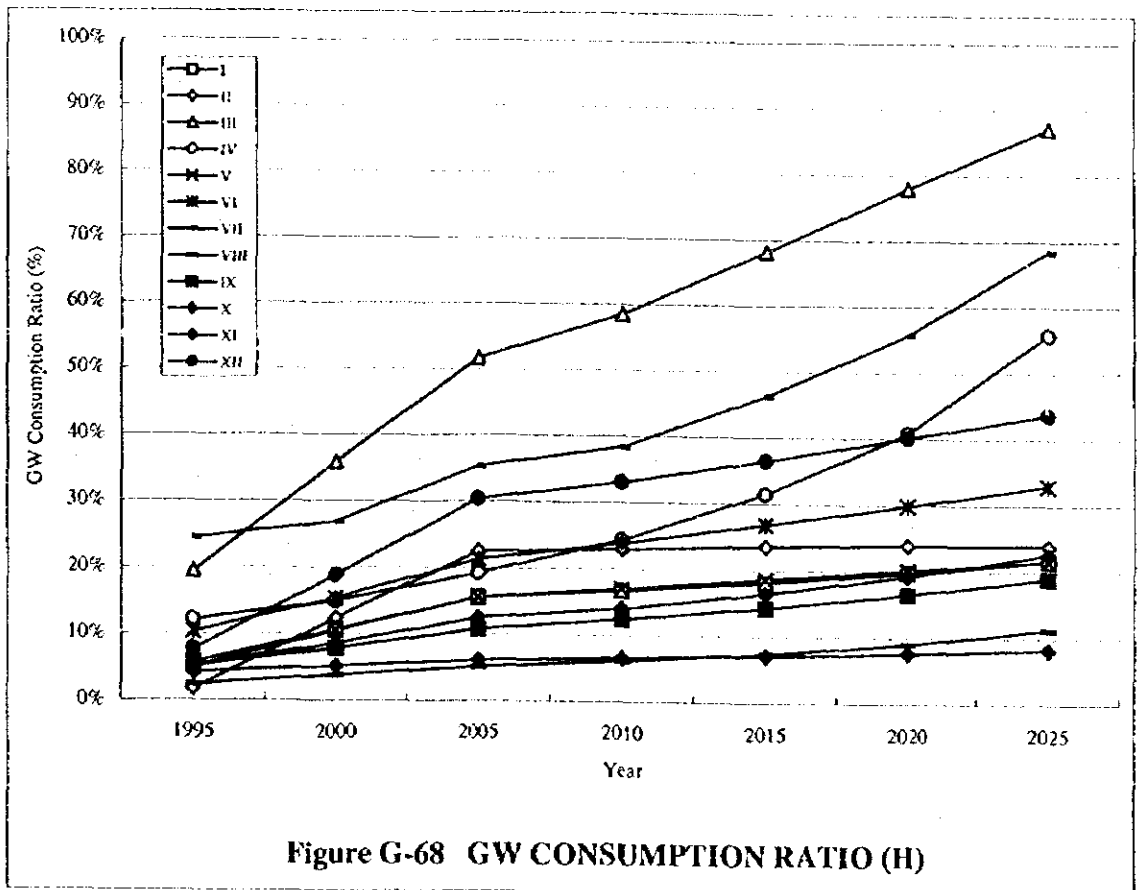
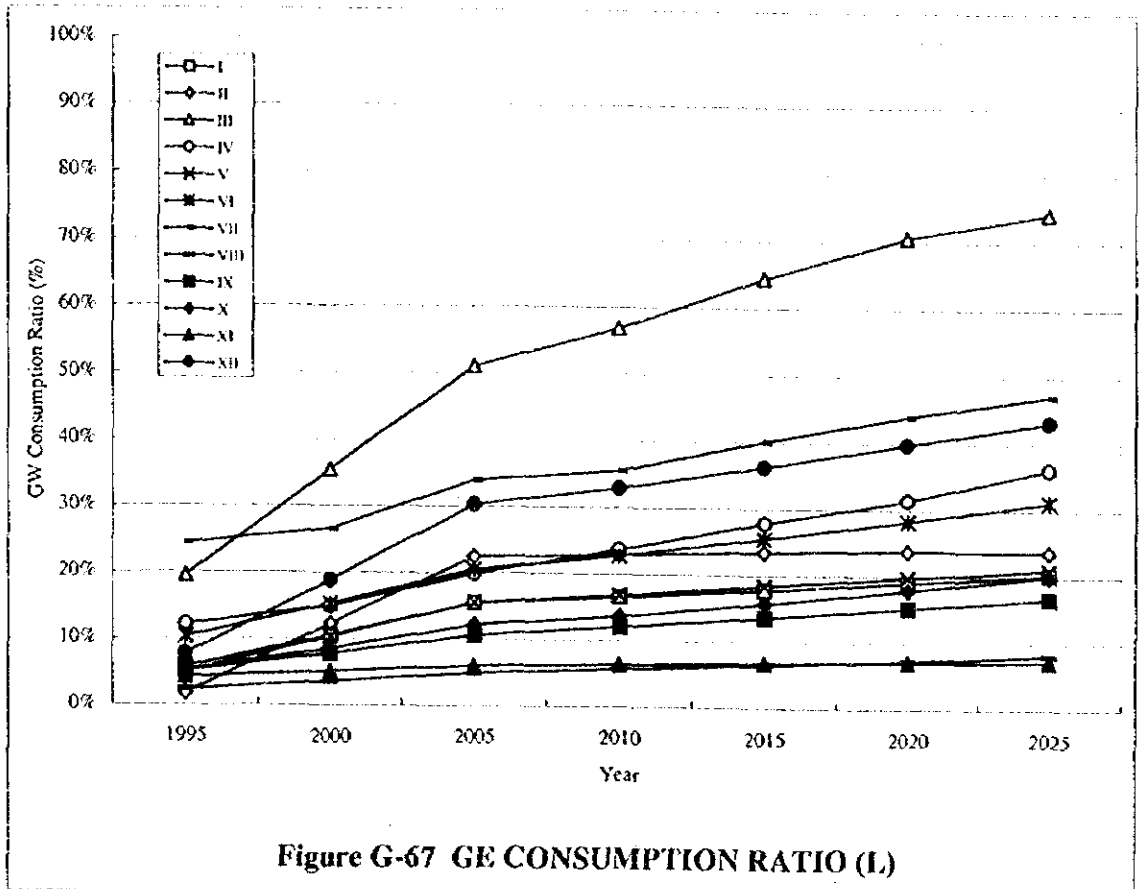


Figure G-66 GW DEMAND BY USAGE



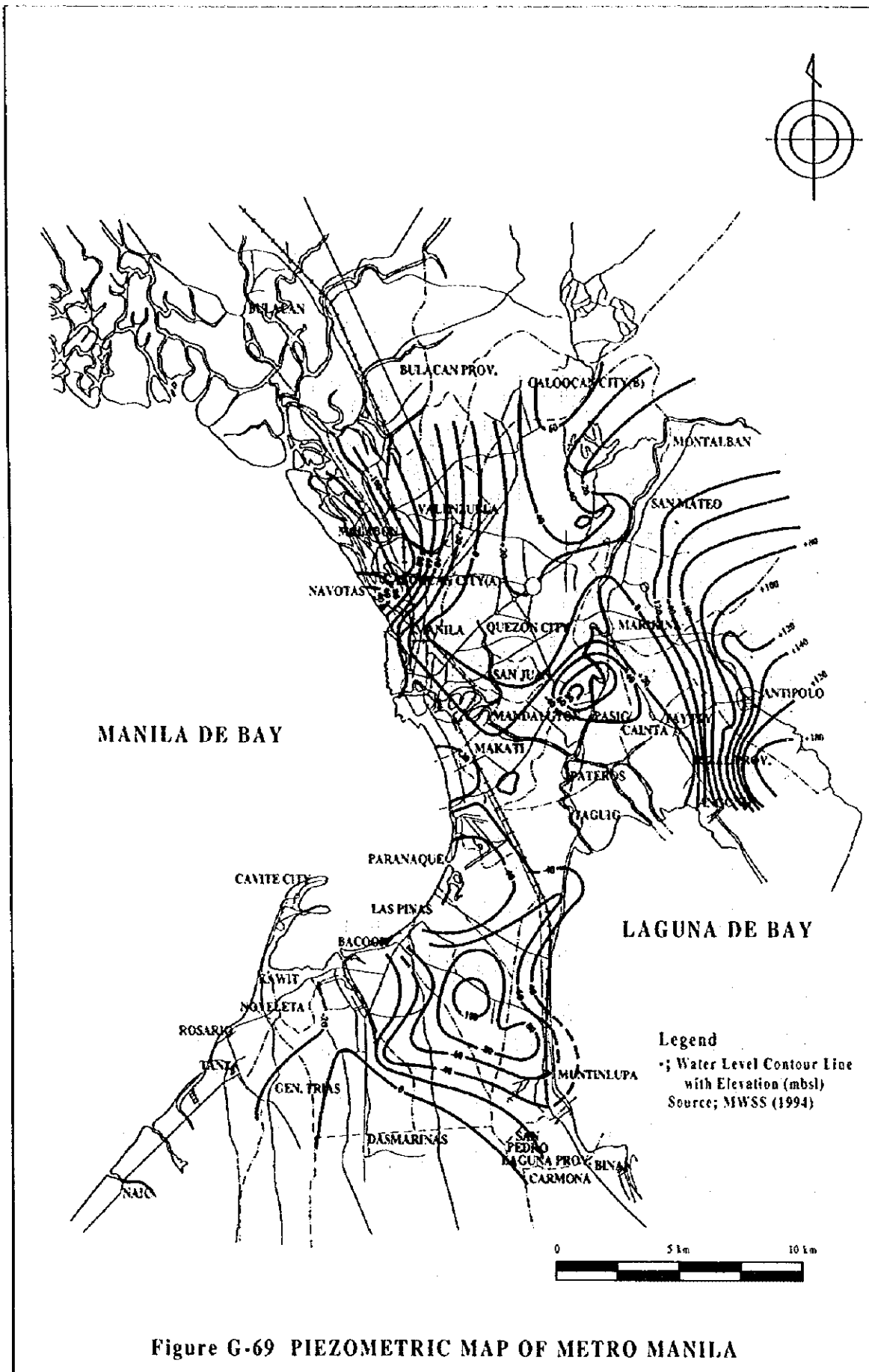


Figure G-69 PIEZOMETRIC MAP OF METRO MANILA

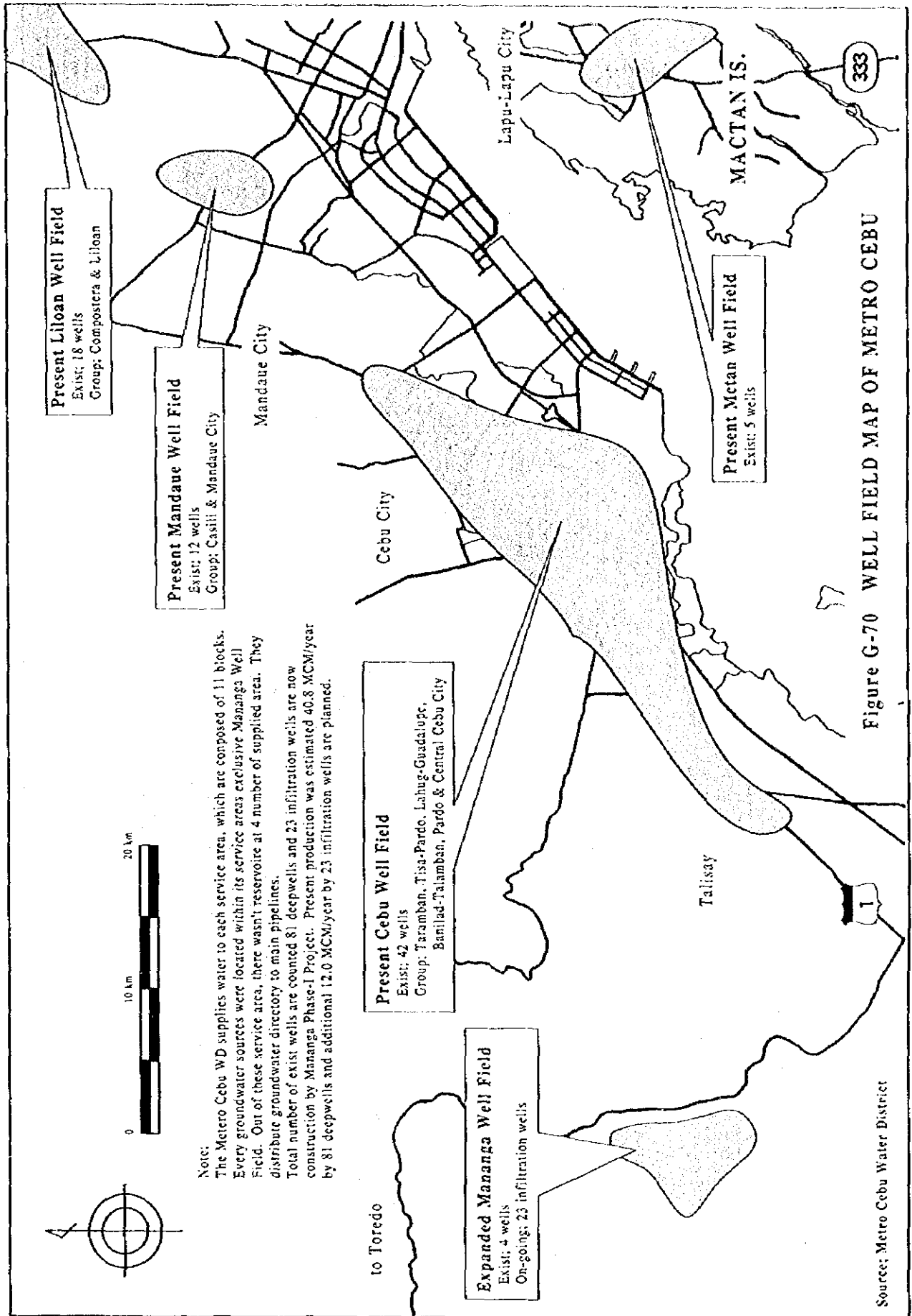


Figure G-70 WELL FIELD MAP OF METRO CEBU

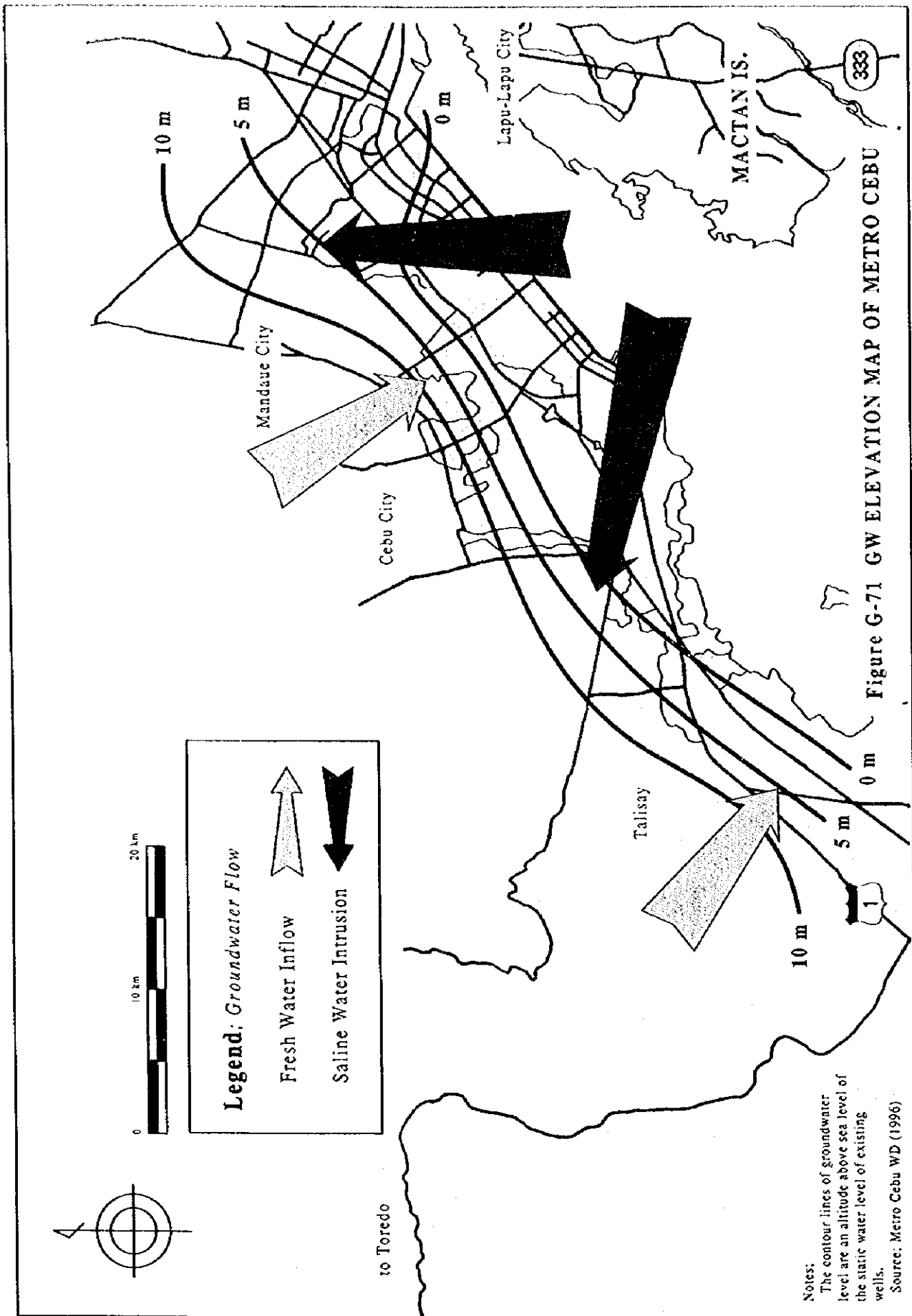


Figure G-71 GW ELEVATION MAP OF METRO CEBU

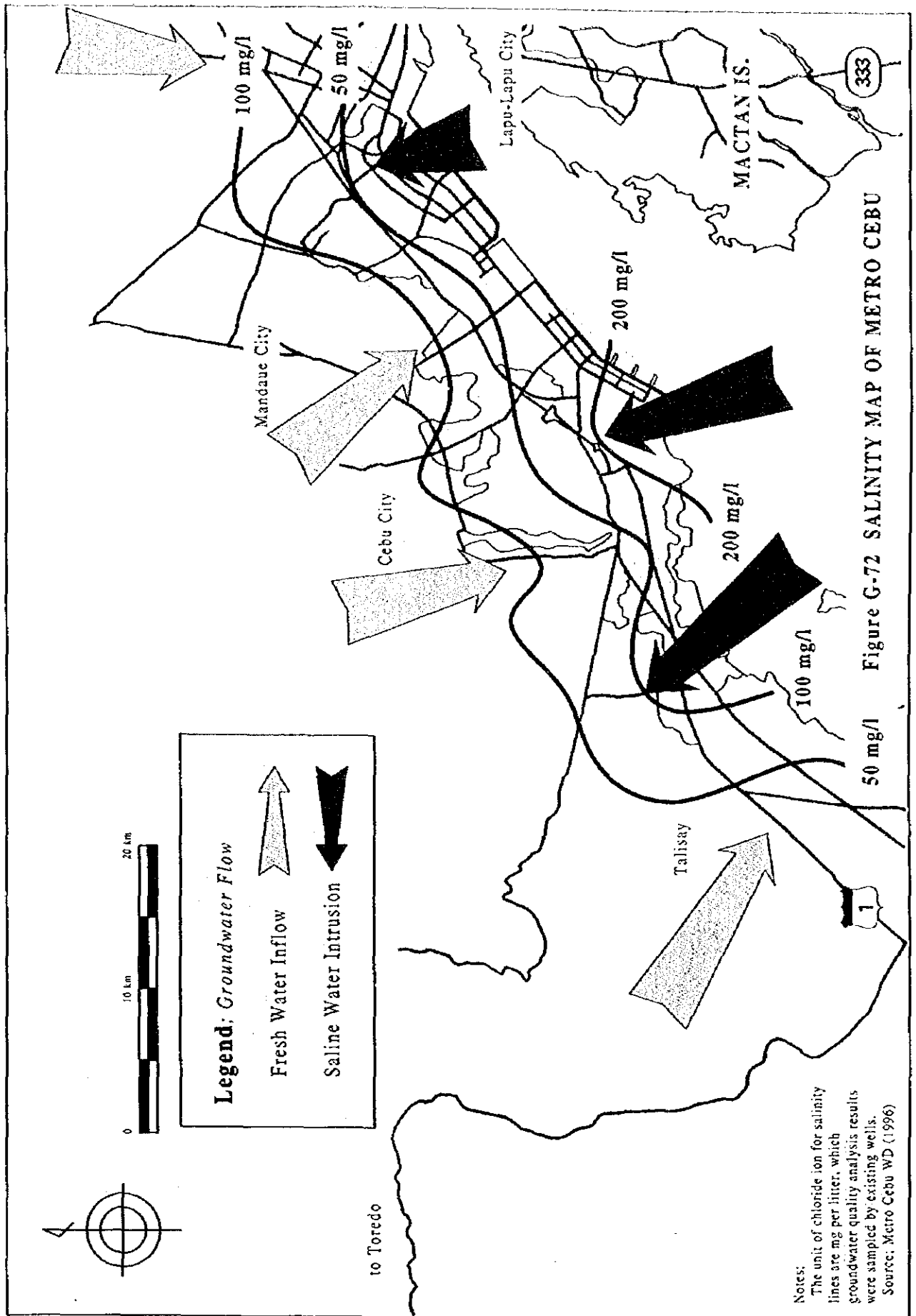


Figure G-72 SALINITY MAP OF METRO CEBU

Notes:
 The unit of chloride ion for salinity lines are mg per liter, which groundwater quality analysis results were sampled by existing wells.
 Source: Metro Cebu WD (1996)

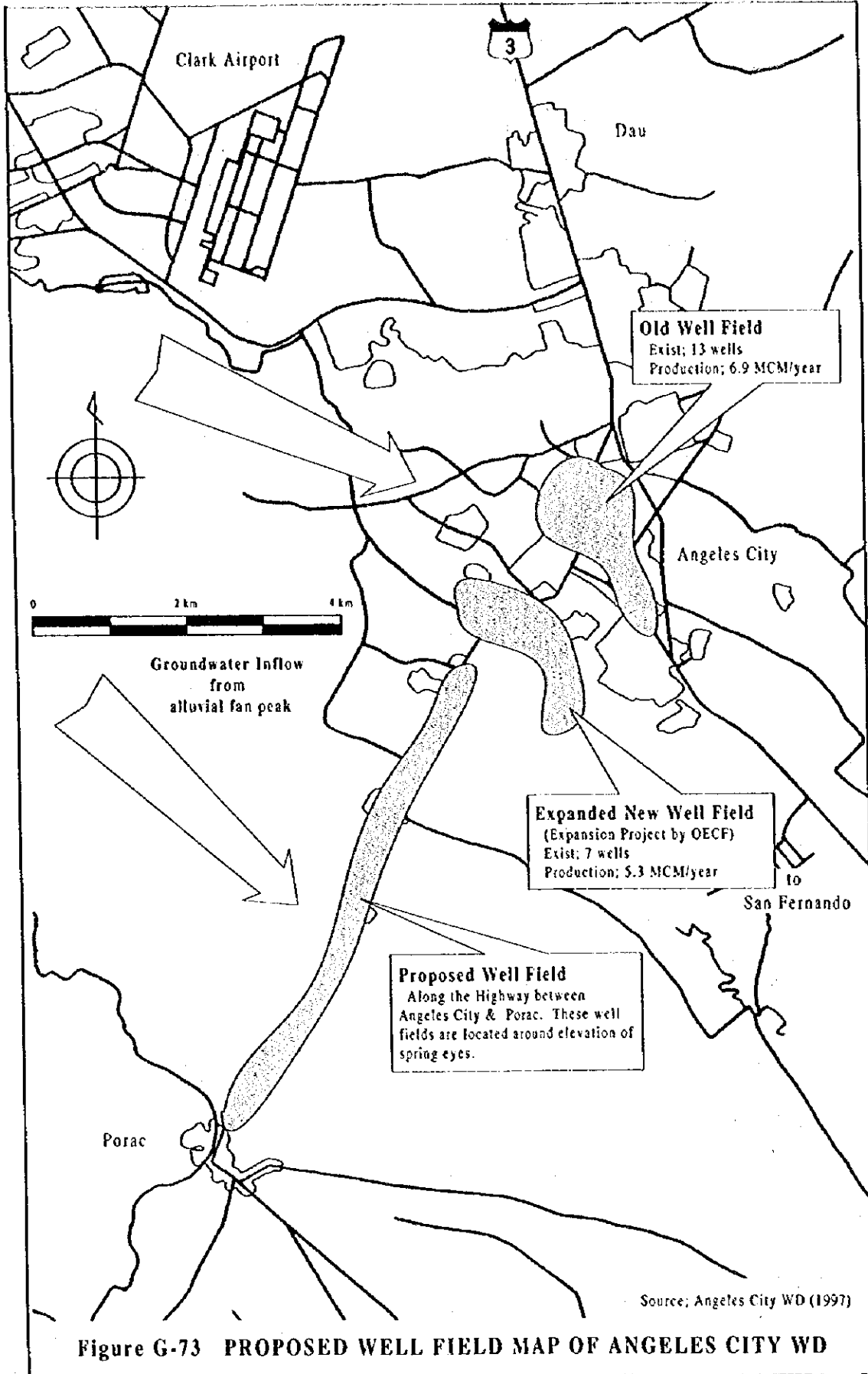


Figure G-73 PROPOSED WELL FIELD MAP OF ANGELES CITY WD

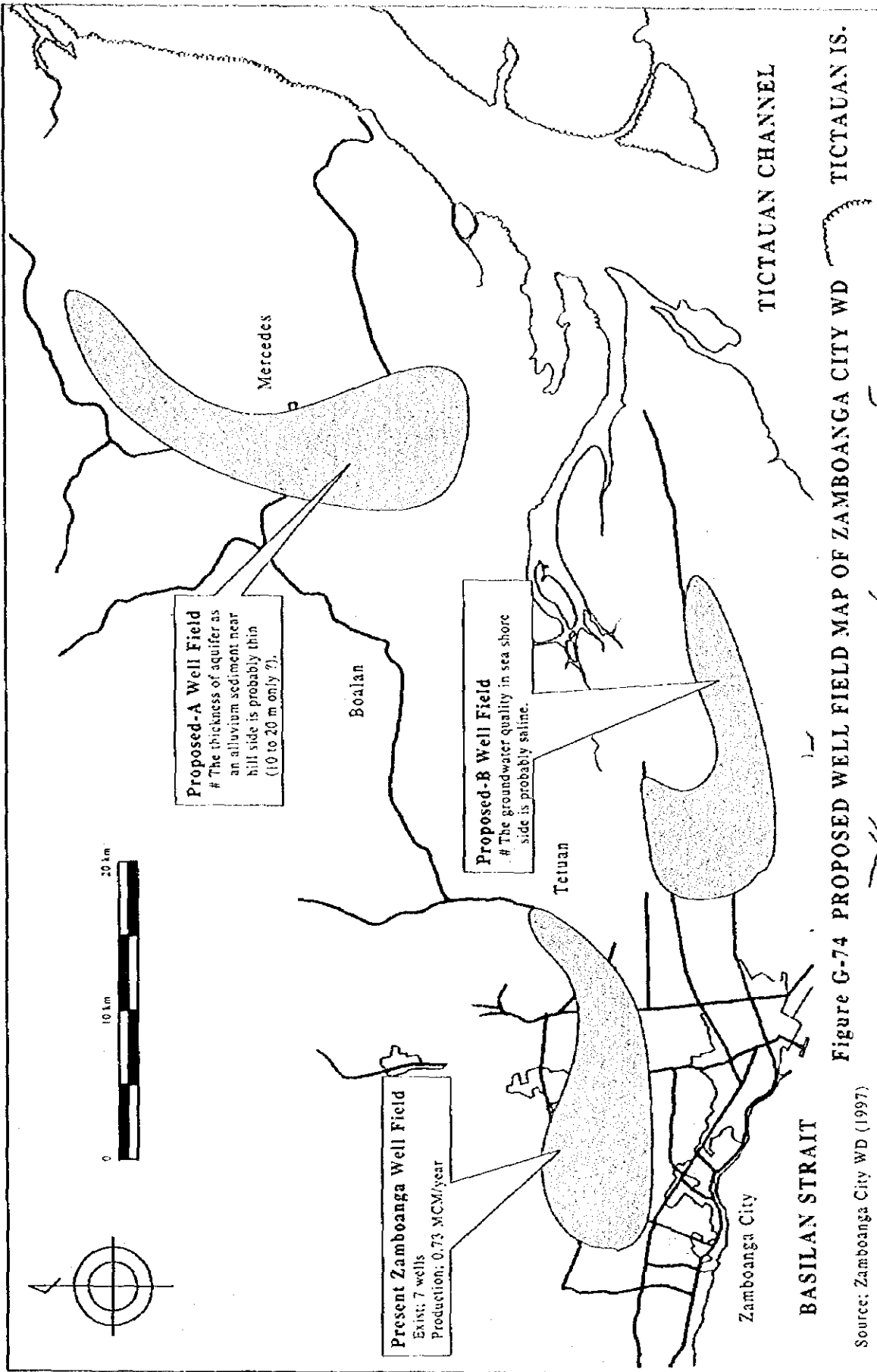


Figure G-74 PROPOSED WELL FIELD MAP OF ZAMBOANGA CITY WD TICTAUAN IS.

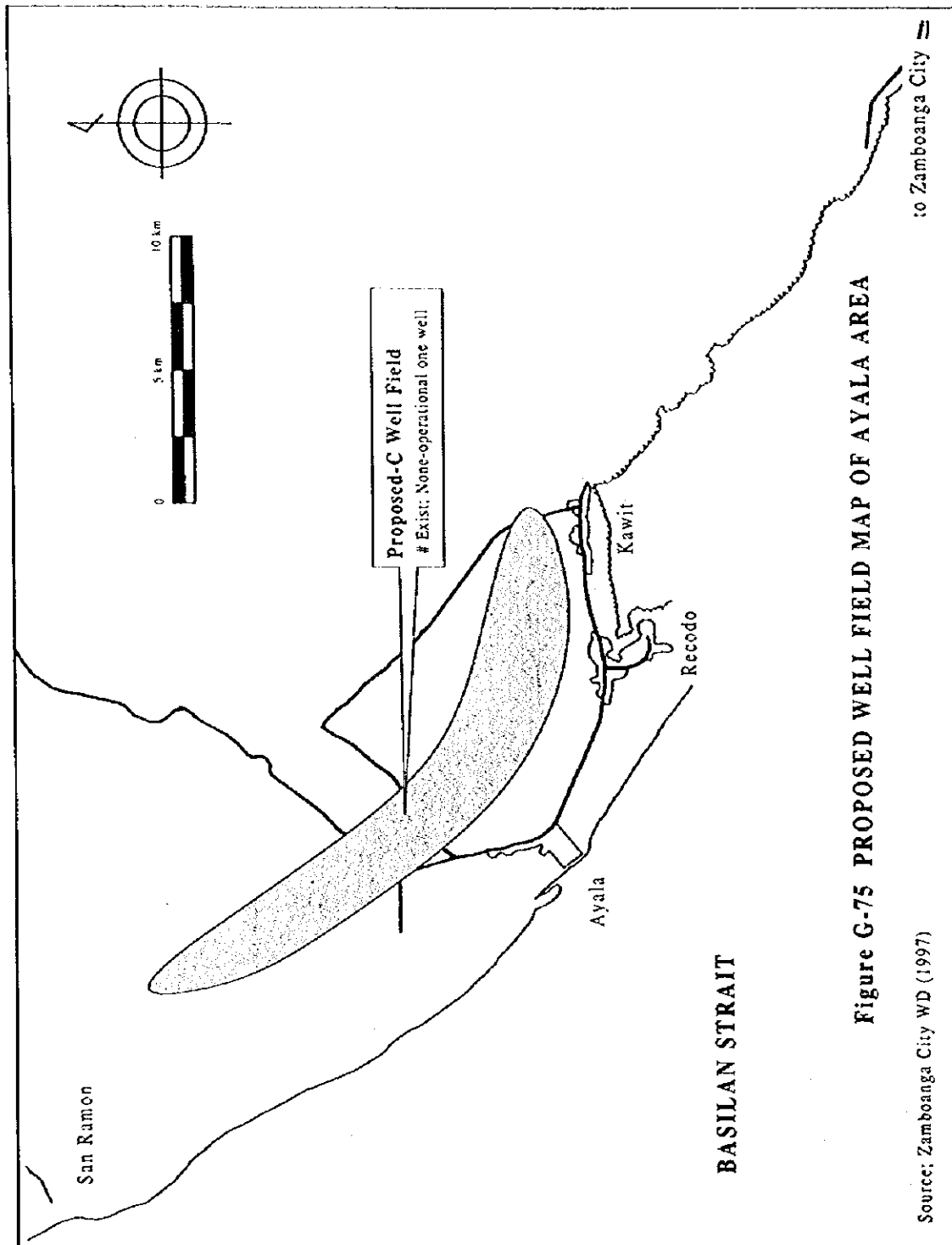


Figure G-75 PROPOSED WELL FIELD MAP OF AYALA AREA

Source: Zamboanga City WD (1997)

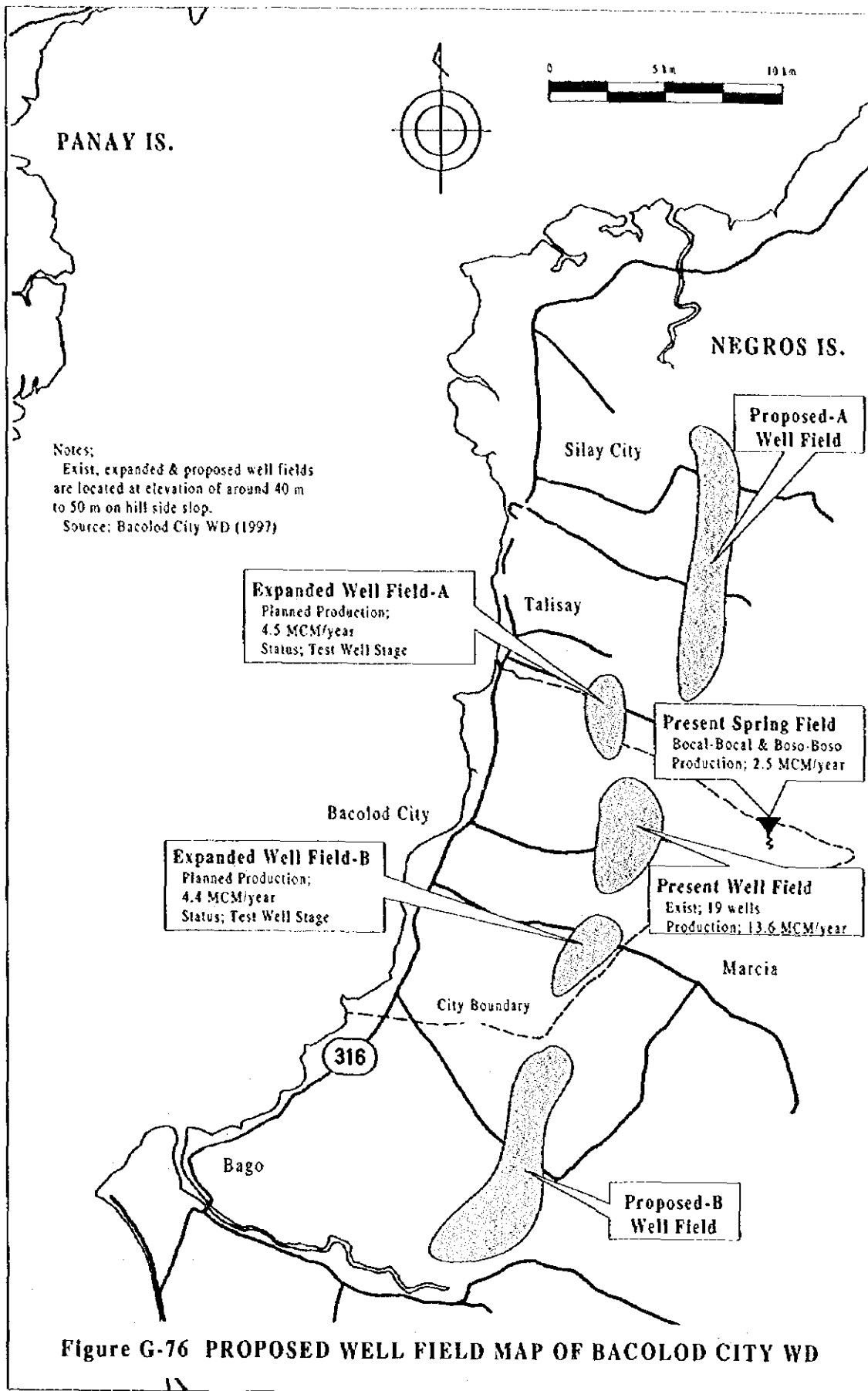


Figure G-76 PROPOSED WELL FIELD MAP OF BACOLOD CITY WD

