

V-2 今後努力を要すべき事項

(1) 水道区の設定へ向けての努力

4地区の内、水道区設立へ向けてLWUAと協議に入ることを議決したのは、ダグパン市のみである。そのダグパン市を含め他の3地区も本件調査の最終報告の結果は如何と期待しているところである。

地方水道整備法の規定によれば、LWUAによる援助—経営上、資金上、技術上—は形式的には全て水道区が設立登記されてはじめて発動されることとなっている。

しかし、4地区共それぞれ諸種の懸案を内包しており、水道区設立までの間においても、当該水道事業体とLWUAは十分連絡を密にして、利用者の理解を深めるとともに、体制移行に係る準備を具体的に進める必要がある。

(2) 全計量制の維持

全計量制は水道区の健全な財政を支える基本要件である。ただし、量水器には精度保証上一定の耐用年数がある。従って、水道区は当初から量水器の修理・更新の計画を立て、そのための予算と要員の確保に努めるべきである。

(3) 人材の確保

現行4水道事業は、経営主体も実務上の水道事業の責任担当者の格も、従って職務権限も区々であるが、いずれも当該責任者から下の職位については人材の確保が極めて不十分である。水道区の設定を機に是非共有能で意欲のある人材を要所のポストにつけ、将来に向けての水道区の管理基盤を整備すべきである。

(4) 施設維持管理の充実

今回の計画によって新規に増設される施設についてはもとより、とくに既存施設のリハビリテーションとその後の維持管理には意を用い、常に施設が十二分にその能力を発揮できるよう体制の整備を行い、計画をたて、予算の確保につとめる必要がある。

(5) 将来水源の確保に関する準備

短期開発計画の目標となる1995年までは、4地区ともそれぞれ水源手当については何とかつく見込である。しかし、それ以降の水源手当については4地区それぞれ事情を異にする。比較的楽観的な状況にあると考え得るのは、カプヤオーサンタ・ロサービニャン地域とバヨンボン—ソラノ地域である。

前者は、今回増設水源井の候補地として考えている地域が、かつて首都圏上下水道公社の将来水源候補地の一つとして挙げられたこともあり、当分の間地下水開発の可能性についてはそのポテンシャルを期待してもよい。また、既存湧水水源（マタン・トゥビック湧泉）も引き続き良質の原水を供給し得るものと見られる。

後者については、現有湧水水源（ボロッボブ湧泉）の湧出量が乾季には減少するので、将来需要増を補う水源としては近傍を流れるマガット川の伏流水取水を考えている。マガット川は流量の面からは十分需要に応え得るものと見られる。

次に、アンヘレス市については1995年までの需要増にたいしては、何とか市の南部地域に新規の深井戸をさく井することにより対応は可能と見られる。ただし、それ以降の水源については、地下水水源の更なる開発の可能性、及び表流水源（ポーラック川）の開発可能性について十分時間をかけ調査研究を行う必要がある。

最後にダグパン市については、同市がリングエン湾に面しているところから、既存水源井の一部については既に塩水侵入の徴候が現れている。将来においては、既存水源井は数の上でも程度の上でも一層の塩水侵入の影響を受けることは免れ得ぬと考えられる。今回計画の新規増設水源井は、その位置を同市域外に求めたが、更に将来にわたっては、アグノ川等の表流水に求めることも念頭におき基礎的な調査をLWUAの援助を得つつとり進める必要がある。

短期開発計画案、長期開発計画案の概要をTABLE 1.1.1 に示す。

TABLE 1.1.1 SUMMARY OF PROPOSED PROJECT (Angeles City)

Description	Present (1986)	Phase I		Phase II
		Stage 1 (1990)	Stage 2 (1995)	(2010)
A. Population				
1. Total Population	224,290	247,750	274,570	363,740
2. Pop. in Service Area	158,800	173,250	189,380	239,330
% of Total Pop.	71	70	69	66
3. Served Population	27,600	37,050	101,940	168,200
% of Pop. in Service Area	17	21	54	70
% of Total Pop.	12	15	37	46
B. Served Area (ha)				
	340	340	750	1,590
C. Water Demand (cu.m/day)				
1. Domestic (Daily Ave.)	4,085	4,632	13,661	26,745
2. Commercial (Daily Ave.)	588	1,031	3,580	10,870
3. Institutional (Daily Ave.)	16	101	272	627
4. Industrial (Daily Ave.)	-	-	-	-
5. Total Water Demand				
a) Daily Ave.	11,545	9,608	25,019	47,814
b) Daily Max.	-	12,000	31,000	59,800
c) Peak Hour	-	20,400	49,600	89,700
D. Number of Connection				
1. Domestic (Individual)	3,539	7,128	19,678	33,571
2. Domestic (Public Faucet)	-	-	-	-
3. Commercial	586	937	2,753	6,393
4. Institutional	3	21	51	83
5. Industrial	-	-	-	-
6. Total	4,128	8,085	22,482	40,047
E. Water Sources and Treatment				
1. Existing Facility	12 wells	5 wells	5 wells	5 wells
(capacity: cu.m/day)	11,000	8,600	8,600	8,600
2. New Facility	-	2 wells	6 wells	10 wells
(capacity: cu.m/day)	-	5,800	17,400	29,000
F. Transmission Facility				
	-	-	ø200 - ø400 2,500m	ø200 - ø500 7,300m
G. Distribution Facility				
1. Reservoir	Elevated tank	Reservoir	-	Reservoir
(capacity: cu.m/day)	378	4,290		7,910
	x 1 unit			Elevated tank 460
				x 2 units
2. Main Pipeline	ø100 - ø150 14,670m	ø200 - ø700 12,030m	ø150 - ø350 2,100m	ø150 - ø700 12,560m
3. Internal Network	ø75 1,940m	ø150/ø100 11,190m	ø150/ø100 39,700m	ø150/ø100 59,760m
H. Number of Workers				
	37	46	72	112
I. Project Cost (Peso)				
1. Construction Cost				
a) Foreign Exchange	-	30,186,000	27,467,000	83,642,000
b) Local Currency	-	26,036,000	17,549,000	60,517,000
c) Total	-	56,222,000	45,016,000	144,159,000
2. O & M Cost (P/annum)	2,169,885 ^{1/}	2,989,000	6,916,000	12,115,000
J. Ave. Family Income of				
Low Income Group (P/month)	720	1,240	2,390	-
K. Water Rate (P/cu.m; 0-10cu.m)				
1. Domestic	1.4 (1/2")	3.0	7.75	-
2. Commercial	4.0 (1/2")	6.0	15.50	-
3. Institutional	6.4 (3/4")	3.0	7.75	-

TABLE 1.1.1 SUMMARY OF PROPOSED PROJECT (Dagupan City)

Description	Present (1986)	Phase I		Phase II (2010)
		Stage 1 (1990)	Stage 2 (1995)	
A. Population				
1. Total Population	110,850	118,730	128,610	159,880
2. Pop. in Service Area	65,520	70,340	79,430	112,610
% of Total Pop.	59	59	62	70
3. Served Population	23,430	32,910	48,840	90,130
% of Pop. in Service Area	36	47	61	80
% of Total Pop.	21	28	38	56
B. Served Area (ha)				
	711	711	740	1,042
C. Water Demand (cu.m/day)				
1. Domestic (Daily Ave.)	2,613	3,689	6,251	13,699
2. Commercial (Daily Ave.)	1,248	1,606	2,151	5,376
3. Institutional (Daily Ave.)	115	199	263	501
4. Industrial (Daily Ave.)	-	-	-	-
5. Total Water Demand				
a) Daily Ave.	3,976	9,160	12,380	24,470
b) Daily Max.	-	11,450	15,480	30,590
c) Peak Hour	-	19,920	26,160	49,250
D. Number of Connection				
1. Domestic (Individual)	3,060	5,124	8,737	16,385
2. Domestic (Public Faucet)	40	25	-	-
3. Commercial	1,124	1,339	1,537	2,829
4. Institutional	26	43	50	66
5. Industrial	-	-	-	-
6. Total	4,250	6,531	10,324	19,280
E. Water Sources and Treatment				
1. Existing Facility	15 wells	10 wells	10 wells	-
(capacity: cu.m/day)	11,760	6,550	6,550	-
2. New Facility				
Water Source	-	8 wells	7 wells 4 radial wells	
(capacity: cu.m/day)	-	4,800	4,200	21,600
Water Treatment Facility	-	-	-	Slow sand filter
F. Transmission Facility				
	-	ϕ150 - ϕ350 12,650m	ϕ150 - ϕ350 7,200m	ϕ300 & ϕ600 28,400m
G. Distribution Facility				
1. Reservoir (capacity: cu.m)	-	2,400	-	4,550
2. Main Pipeline	-	ϕ300 - ϕ700 3,540m	ϕ200 - ϕ350 5,940m	ϕ150 - ϕ250 11,640m
3. Internal Network	ϕ50 - ϕ150 25,290m	ϕ75/ϕ100 21,700m	ϕ75/ϕ100/ϕ150 3,800m	ϕ75/ϕ100/ϕ150 25,400m
H. Number of Workers				
	50	52	72	87
I. Project Cost (Peso)				
1. Construction Cost				
a) Foreign Exchange	-	33,480,000	13,145,000	79,150,000
b) Local currency	-	29,460,000	10,982,000	69,086,000
c) Total	-	62,940,000	24,227,000	148,236,000
2. O & M Cost (₱/annum)	2,528,177 ^{1/}	2,855,000	4,214,000	7,028,000
J. Ave. Family Income of				
Low Income Group (₱/month)	650	1,120	2,150	-
K. Water Rate (₱/cu.m; 0-10 cu.m)				
1. Domestic	1.4 (1/2")	3.75	8.0	-
2. Commercial	4.0 (1/2")	7.50	16.0	-
3. Institutional	3.2 (3/4")	3.75	8.0	-

1/ : 1985

TABLE 1.1.1 SUMMARY OF PROPOSED PROJECT (Cabuyao-Sta. Rosa-Biñan)

Description	Present (1986)	Phase I		Phase II (2010)
		Stage 1 (1990)	Stage 2 (1995)	
A. Population				
1. Total Population	237,860	270,590	308,700	449,040
2. Pop. in Service Area	141,790	161,460	183,520	410,590
% of Total Pop.	60	60	59	91
3. Served Population	23,560	38,390	110,350	287,780
% of Pop. in Service Area	12	24	60	70
% of Total Pop.	6	14	36	64
B. Served Area (ha)				
	340	340	740	1,240
C. Water Demand (cu.m/day)				
1. Domestic (Daily Ave.)	3,487	4,567	14,125	43,739
2. Commercial (Daily Ave.)	75	920	3,704	17,495
3. Institutional (Daily Ave.)	22	377	501	1,276
4. Industrial (Daily Ave.)	134	150	150	150
5. Total Water Demand				
a) Daily Ave.	10,450	10,022	26,401	78,331
b) Daily Max.	-	12,500	33,000	94,000
c) Peak Hour	-	21,300	52,800	141,000
D. Number of Connection				
1. Domestic (Individual)	2,863	7,020	20,603	57,030
2. Domestic (Public Faucet)	-	-	-	-
3. Commercial	23	767	2,648	9,100
4. Institutional	16	82	94	168
5. Industrial	5	5	5	5
6. Total	2,907	7,874	23,350	66,303
E. Water Sources and Treatment				
1. Existing Facility				
(capacity: cu.m/day)	Spring	Spring	Spring	Spring
	9,300	9,300	9,300	9,300
	1 well	-	-	-
	1,350			
2. New Facility				
(capacity: cu.m/day)	-	1 well	4 wells	11 wells
		5,500	22,000	60,500
F. Transmission Facility				
	φ400 - φ100	φ250 - φ450	φ250	φ250 - φ700
	11,680m	3,500m	1,300m	12,200m
G. Distribution Facility				
1. Reservoir				
	1,350 cu.m	3,110 cu.m	-	2,530 cu.m
	x 1 unit	x 1 unit		x 1 unit
				12,430 cu.m
				x 1 unit
2. Main Pipeline				
	φ150 - φ250	φ250 - φ700	φ150 - φ500	φ150 - φ600
	26,500m	12,500m	9,300m	34,450m
3. Internal Network				
	φ50 - φ100	φ75 - φ100	φ75 - φ150	φ75 - φ150
	24,230m	4,160m	37,080m	67,280m
H. Number of Workers				
	31	33	81	141
I. Project Cost (Peso)				
1. Construction Cost				
a) Foreign Exchange	-	33,597,000	29,678,000	135,948,000
b) Local Currency	-	28,933,000	18,744,000	88,885,000
c) Total	-	62,530,000	48,422,000	224,833,000
2. O & M Cost (₱/annum)	879,566 ^{1/}	2,086,000	6,071,000	16,549,000
J. Ave. Family Income of				
Low Income Group (₱/month)	630	1,080	2,080	-
K. Water Rate (₱/cu.m; 0-10 cu.m)				
1. Domestic	1.0 (1/2")	3.25	6.75	-
2. Commercial	1.0 (1/2")	6.50	13.50	-
3. Institutional	1.0 (1/2")	3.25	6.75	-

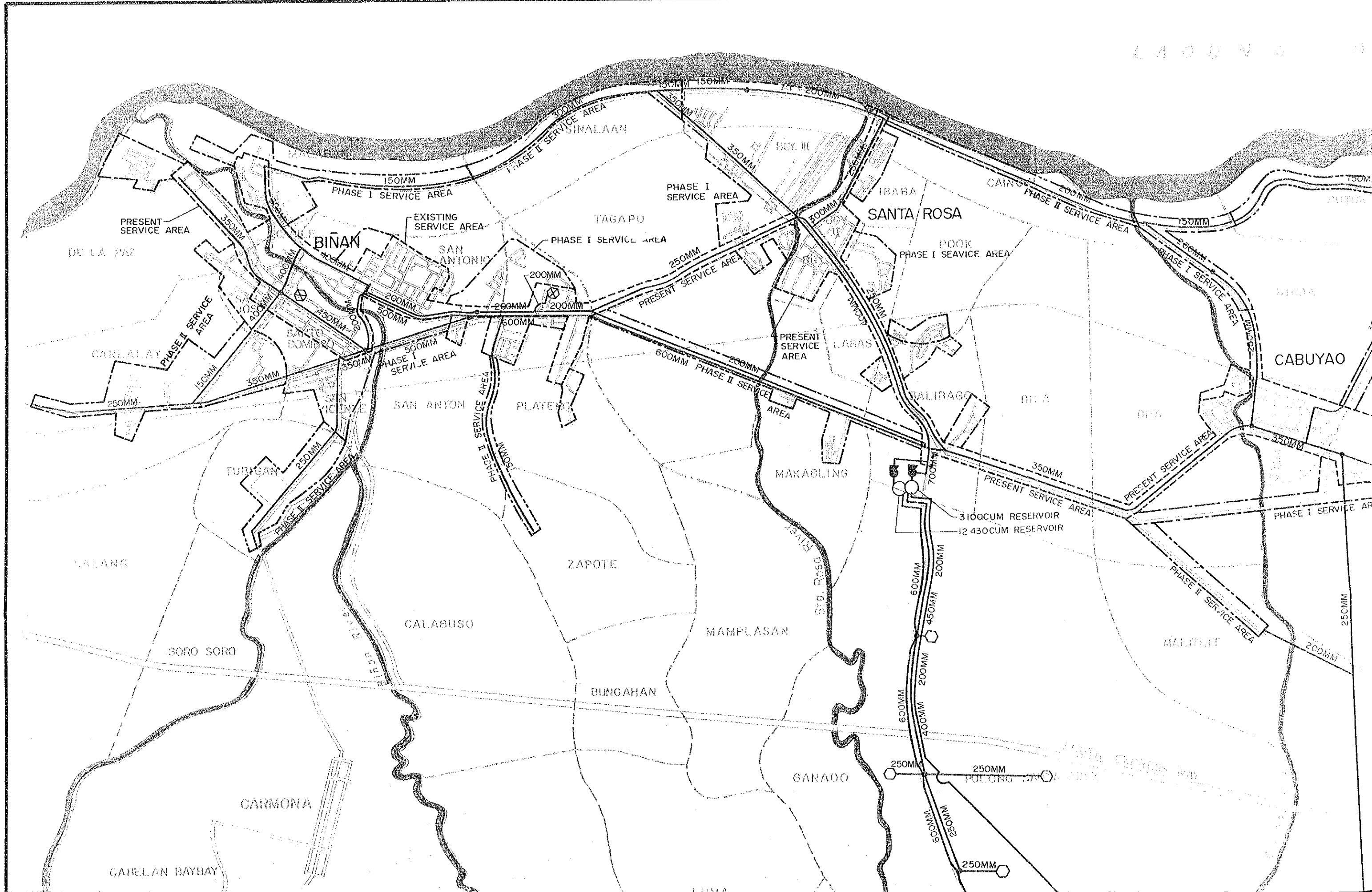
1/ : 1985

TABLE 1.1.1 SUMMARY OF PROPOSED PROJECT (Bayombong-Solano)

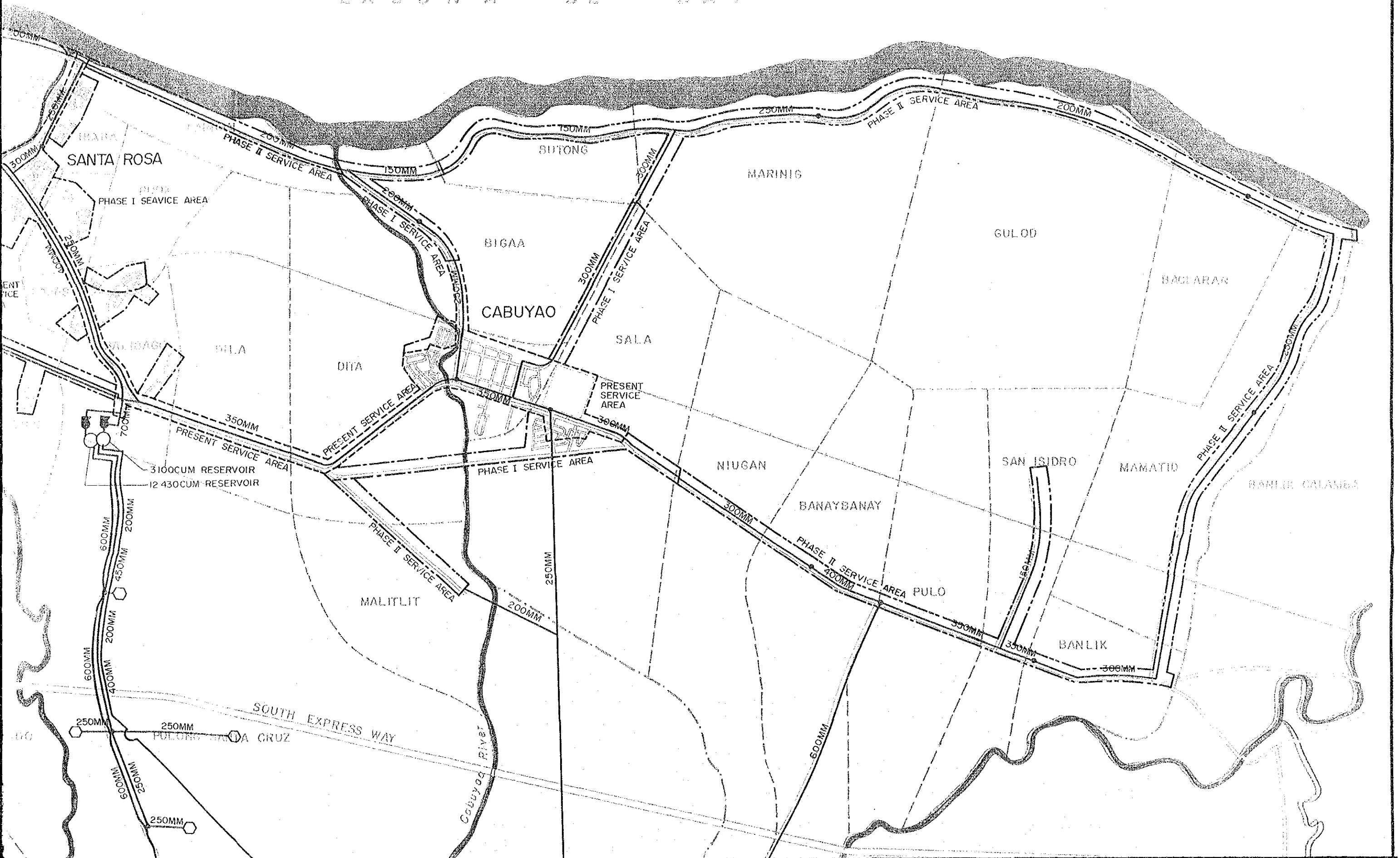
Description	Present (1986)	Phase I		Phase II (2010)
		Stage 1 (1990)	Stage 2 (1995)	
A. Population				
1. Total Population	76,757	82,520	89,720	111,330
2. Pop. in Service Area	51,149	56,280	62,240	80,780
% of Total Pop.	67	68	69	73
3. Served Population	10,414	14,460	36,020	62,910
% of Pop. in Service Area	20	26	58	78
% of Total Pop.	14	18	40	57
B. Served Area (ha)				
	322	322	497	560
C. Water Demand (cu.m/day)				
1. Domestic (Daily Ave.)	1,326	1,590	4,320	8,500
2. Commercial (Daily Ave.)	17	210	600	2,140
3. Institutional (Daily Ave.)	75	50	100	240
4. Others (Daily Ave.)	153	-	-	-
5. Total Water Demand				
a) Daily Ave.	1,571	3,080	7,170	13,600
b) Daily Max.	-	4,000	8,970	17,000
c) Peak Hour	-	7,400	15,500	28,200
D. Number of Connection				
1. Domestic (Individual)	1,299	2,834	7,171	13,323
2. Domestic (Public Faucet)	7	-	-	-
3. Commercial	10	160	431	1,070
4. Institutional	29	9	19	32
5. Industrial	-	-	-	-
6. Total	1,345	3,003	7,621	14,425
E. Water Sources and Treatment				
1. Existing Facility	Spring	Expansion	-	-
(capacity: cu.m/day)	(4,770)	(6,100 in dry & 11,000cu.m/d in rainy season)		
2. New Facility	-	-	Radial well	Radial well
(capacity: cu.m/day)			(Max. 12,900)	(Max. 12,900)
F. Transmission Facility				
	φ200 4,300m	φ250 4,300m	-	-
G. Distribution Facility				
1. Reservoir (cu.m)	1,900	-	-	-
2. Main Pipeline	φ200 - φ300 11,650m	φ100 - φ400 8,710m	φ150 - φ600 7,310m	φ150 - φ350 2,750m
3. Internal Network	φ100 9,100m	φ75/φ100 20,350m	φ75/φ100 12,550m	φ75/φ100 7,550m
H. Number of Workers				
	11	43	49	58
I. Project Cost (Peso)				
1. Construction Cost				
a) Foreign Exchange	-	14,204,000	11,614,000	22,440,000
b) Local Currency	-	12,269,000	7,865,000	10,414,000
c) Total	-	26,473,000	19,479,000	32,854,000
2. O & M Cost (₱/annum)	159,616 ^{1/}	1,107,000	2,073,000	3,756,000
J. Ave. Family Income of Low Income Group (₱/month)				
	628	1,080	2,080	-
K. Water Rate(₱/cu.m; 0-10 cu.m)				
1. Domestic	5-10 ₱/month	5.0	8.5	-
2. Commercial	53 ₱/month	10.0	17.0	-
3. Institutional	-	5.0	8.5	-

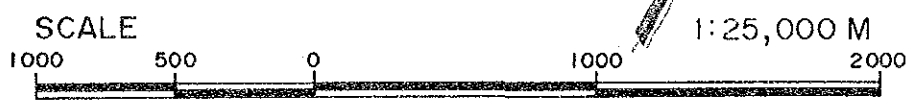
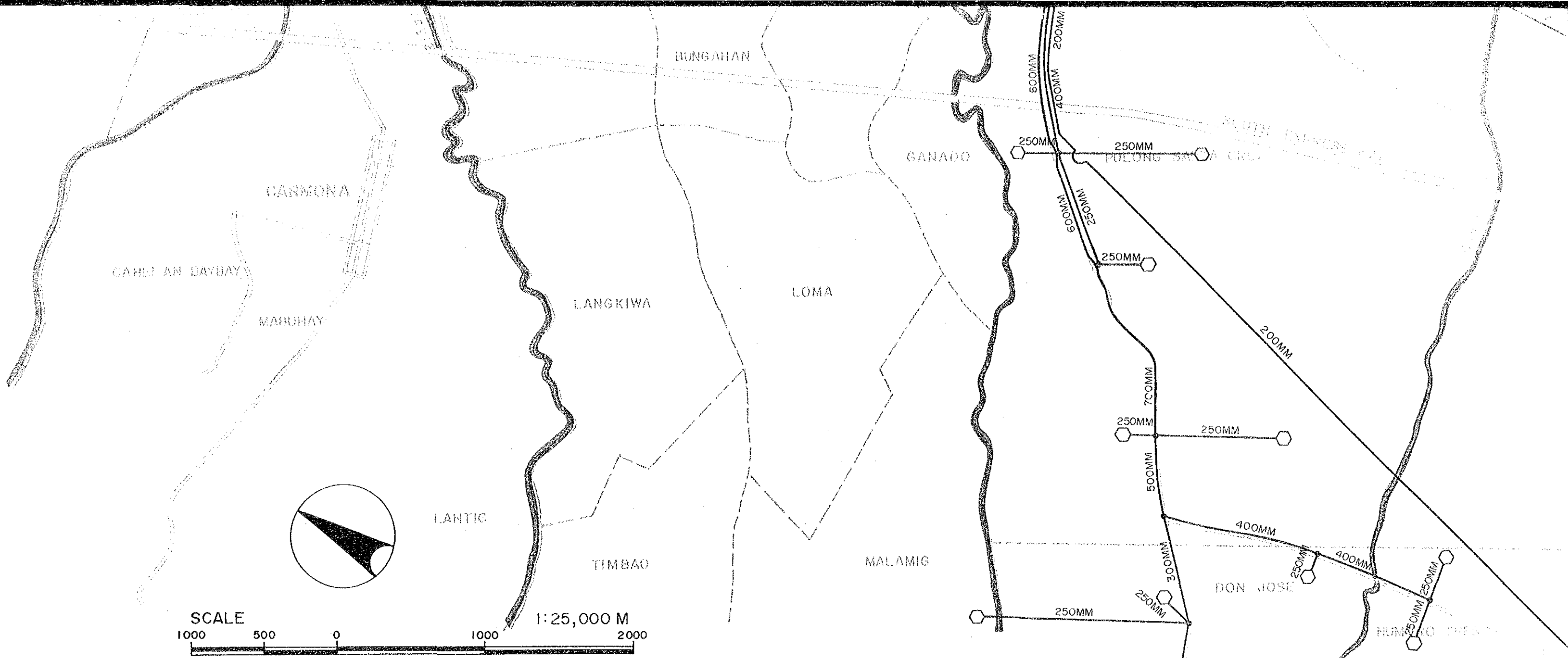
^{1/} : 1984

LAOUNA



LAGUNA DE BAY





LEGEND:

- MUNICIPAL BOUNDARY
- BARANGAY BOUNDARY

EXISTING SYSTEM





- ▲ SPRING
- RESERVOIR
- ⊠ WELL TO BE ABANDONED WITHIN PHASE I
- PIPELINE

PHASE I PROJECT





- ⬡ WELL (5500CUM/D/WELL)
- BOOSTER PUMP
- RESERVOIR
- PIPELINE

STO. DOMINGO







-  SPRING
-  RESERVOIR
-  WELL TO BE ABANDONED WITHIN PHASE I
-  PIPELINE




PHASE I PROJECT

-  WELL (5500CUM/D/WELL)
-  BOOSTER PUMP
-  RESERVOIR
-  PIPELINE

PHASE II PROJECT

-  WELL (5500CUM/D/WELL)
-  BOOSTER PUMP
-  RESERVOIR
-  PIPELINE

SERVICE AREA BOUNDARIES

-  PRESENT SERVICE AREA
-  PHASE I SERVICE AREA
-  PHASE II SERVICE AREA

STO. DOMINGO

PUTING KAHAY

FIGURE 8.2.1
 GENERAL LAYOUT OF THE RECOMMENDED WATER SUPPLY SY
 CABUYAO - STA. ROSA - BIÑAN, LAGUNA
 MARCH 1987

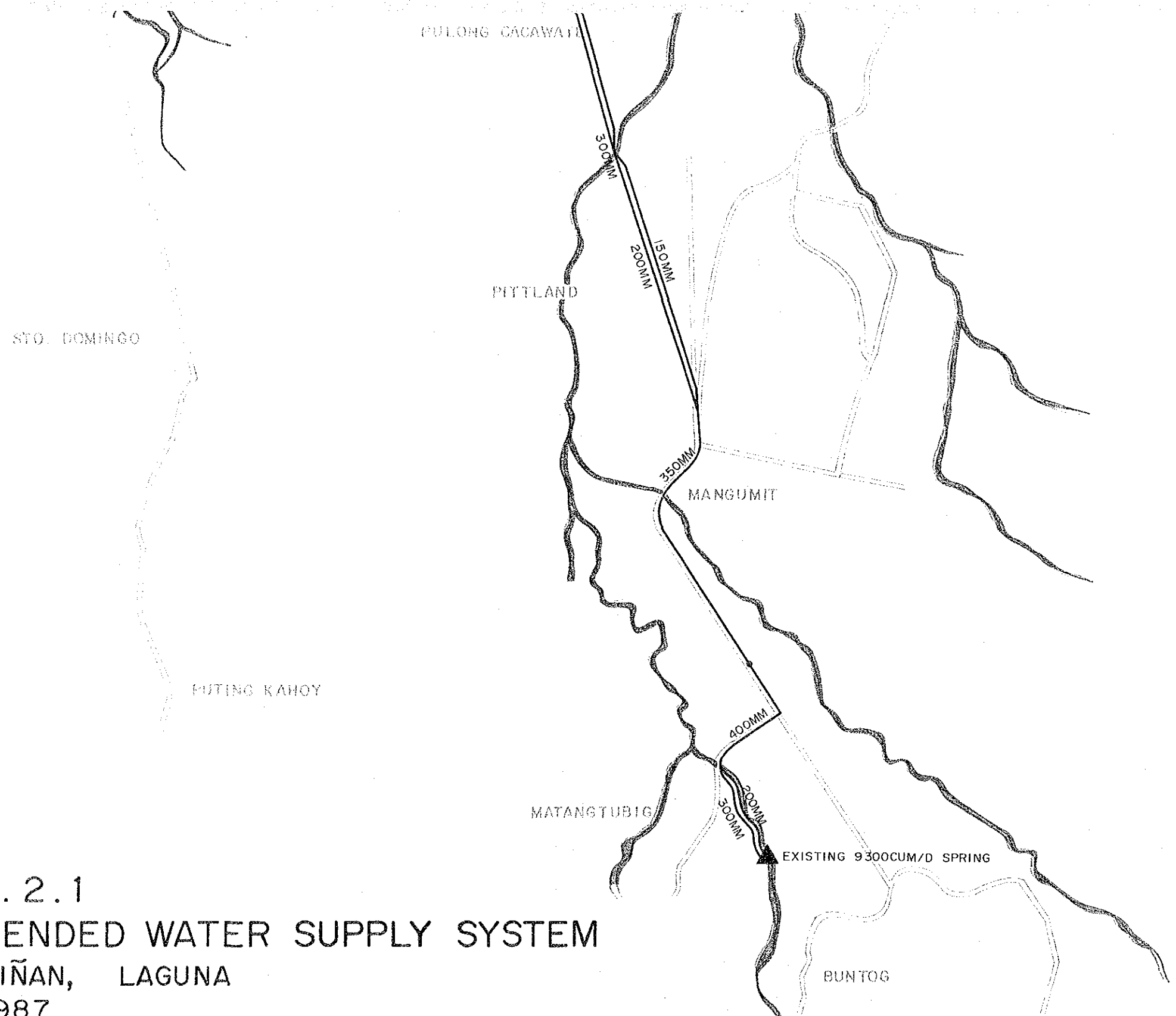
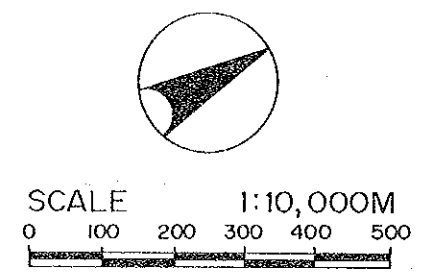
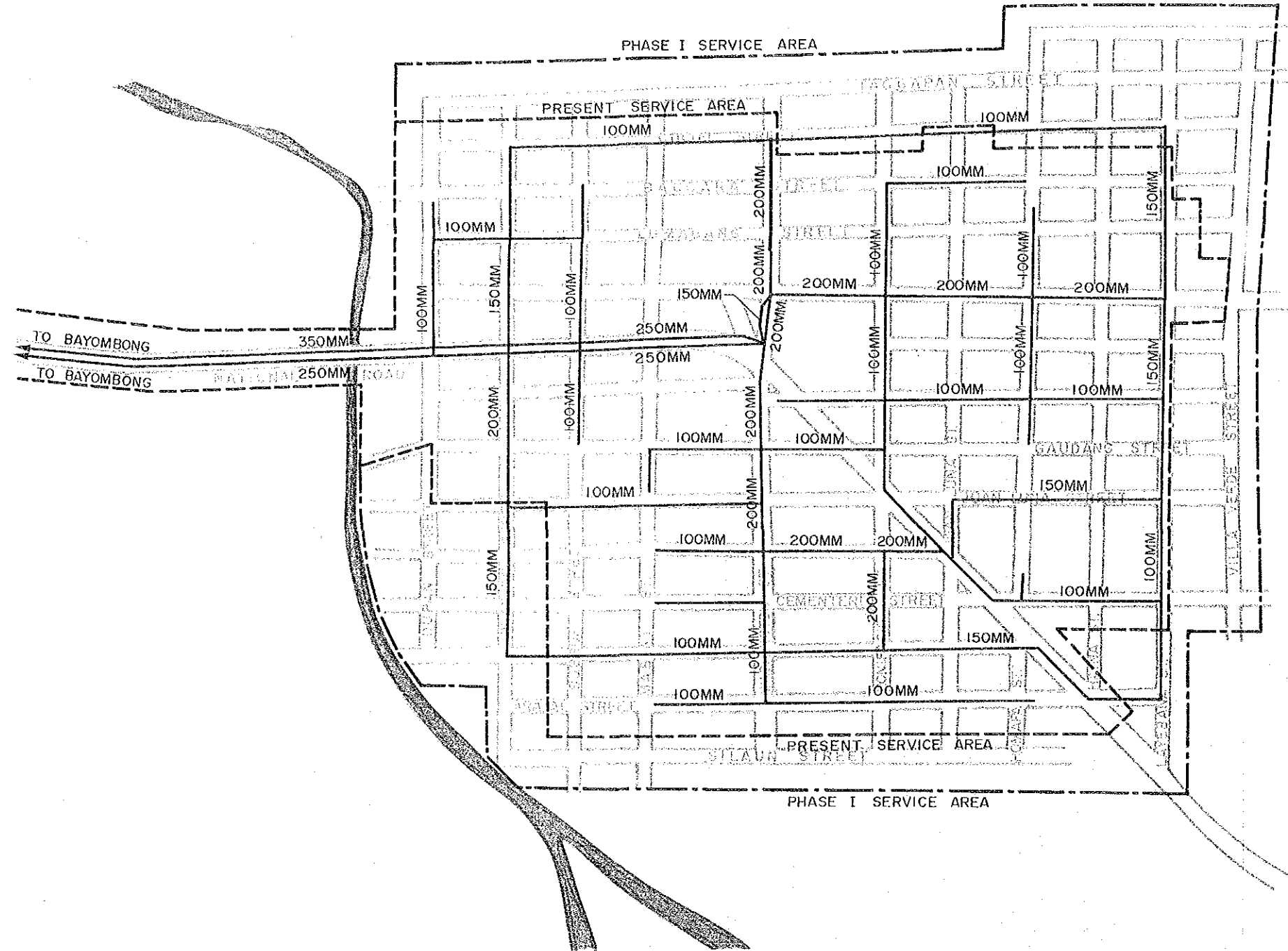
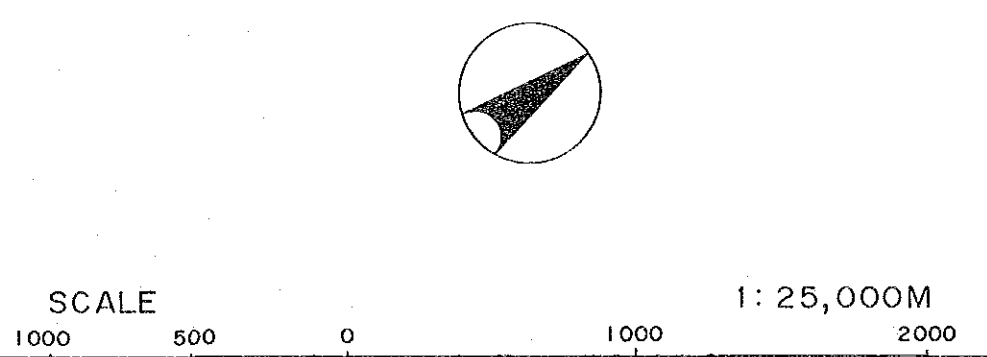
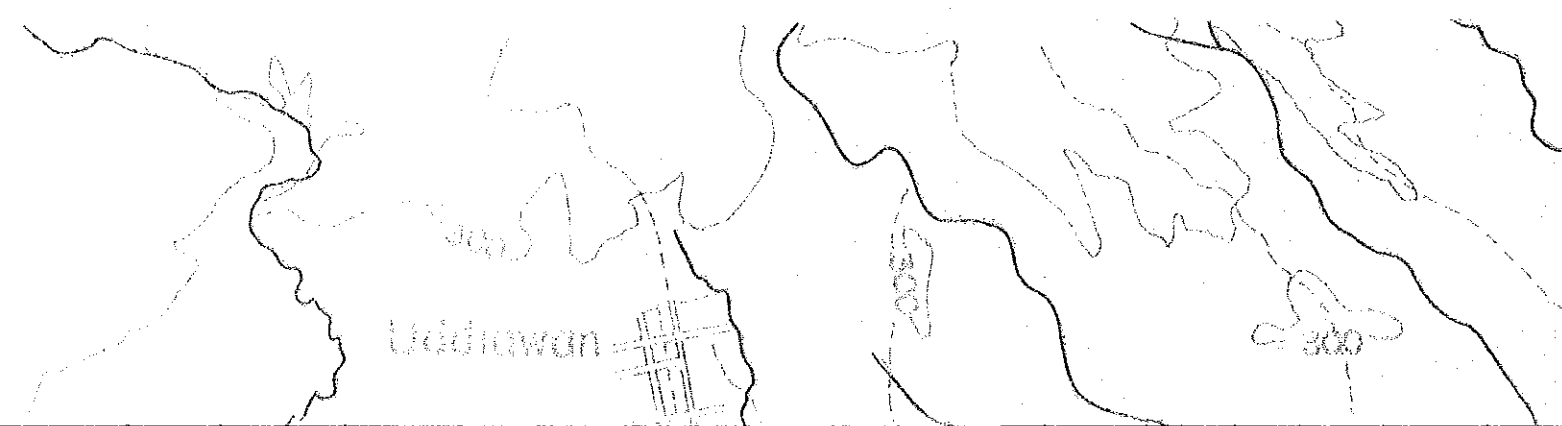
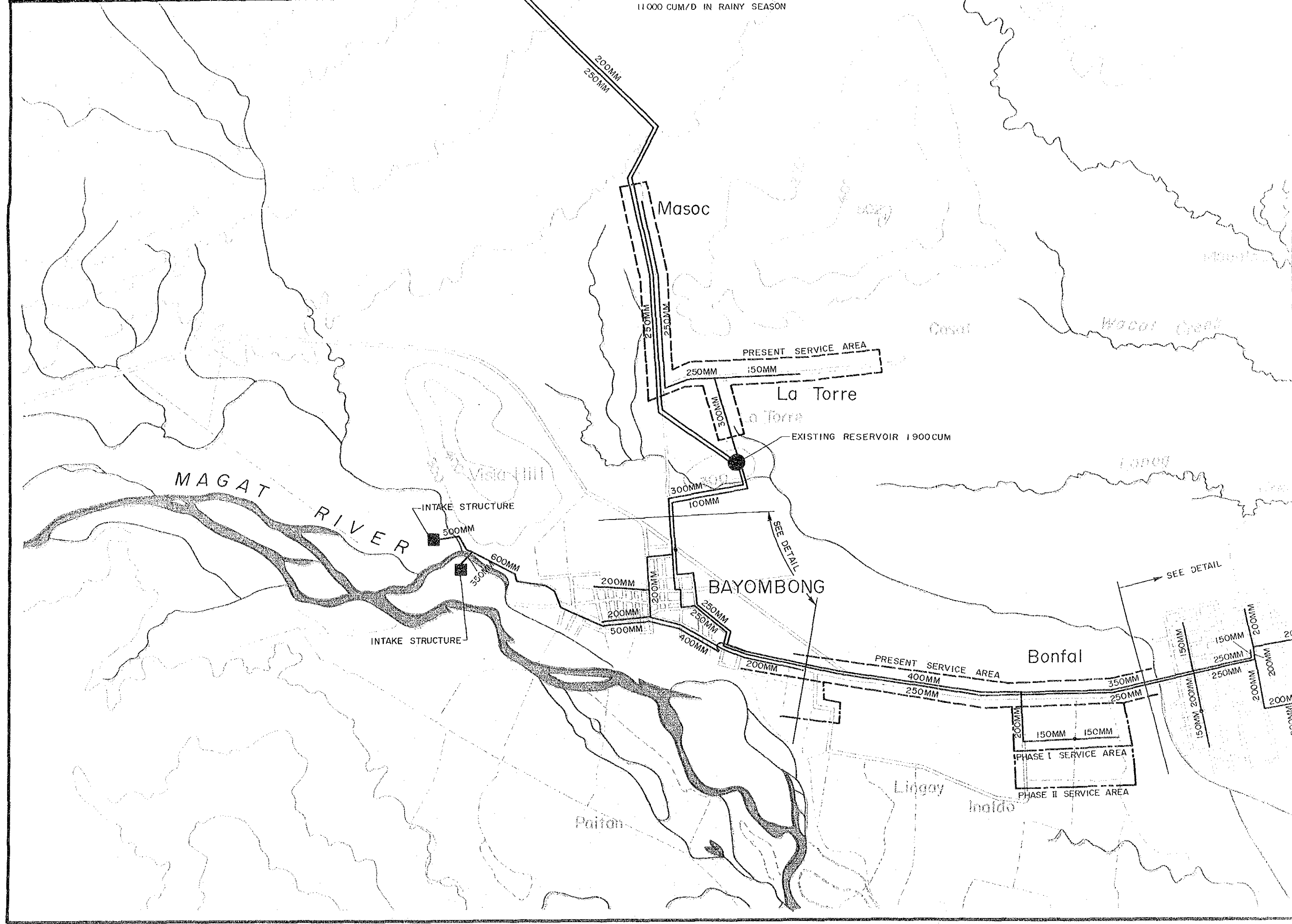


FIGURE 8.2.1
 THE RECOMMENDED WATER SUPPLY SYSTEM
 - STA. ROSA - BIÑAN, LAGUNA
 MARCH 1987



DETAIL OF SOLANO TOWN PROPER





MAGAT RIVER

Masoc

La Torre

EXISTING RESERVOIR 1900CUM

BAYOMBONG

Bonfal

PHASE I SERVICE AREA

PHASE II SERVICE AREA

INTAKE STRUCTURE

INTAKE STRUCTURE

SEE DETAIL

SEE DETAIL

Paiton

Lidgay

Inaldo

Casal

Wagal Creek

Lidgay

200MM
250MM

250MM
250MM

250MM
150MM

300MM
100MM

200MM
200MM

500MM
250MM

250MM
250MM

400MM

PRESENT SERVICE AREA
400MM
250MM

350MM
250MM

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150MM
150MM

150MM
200MM

150MM
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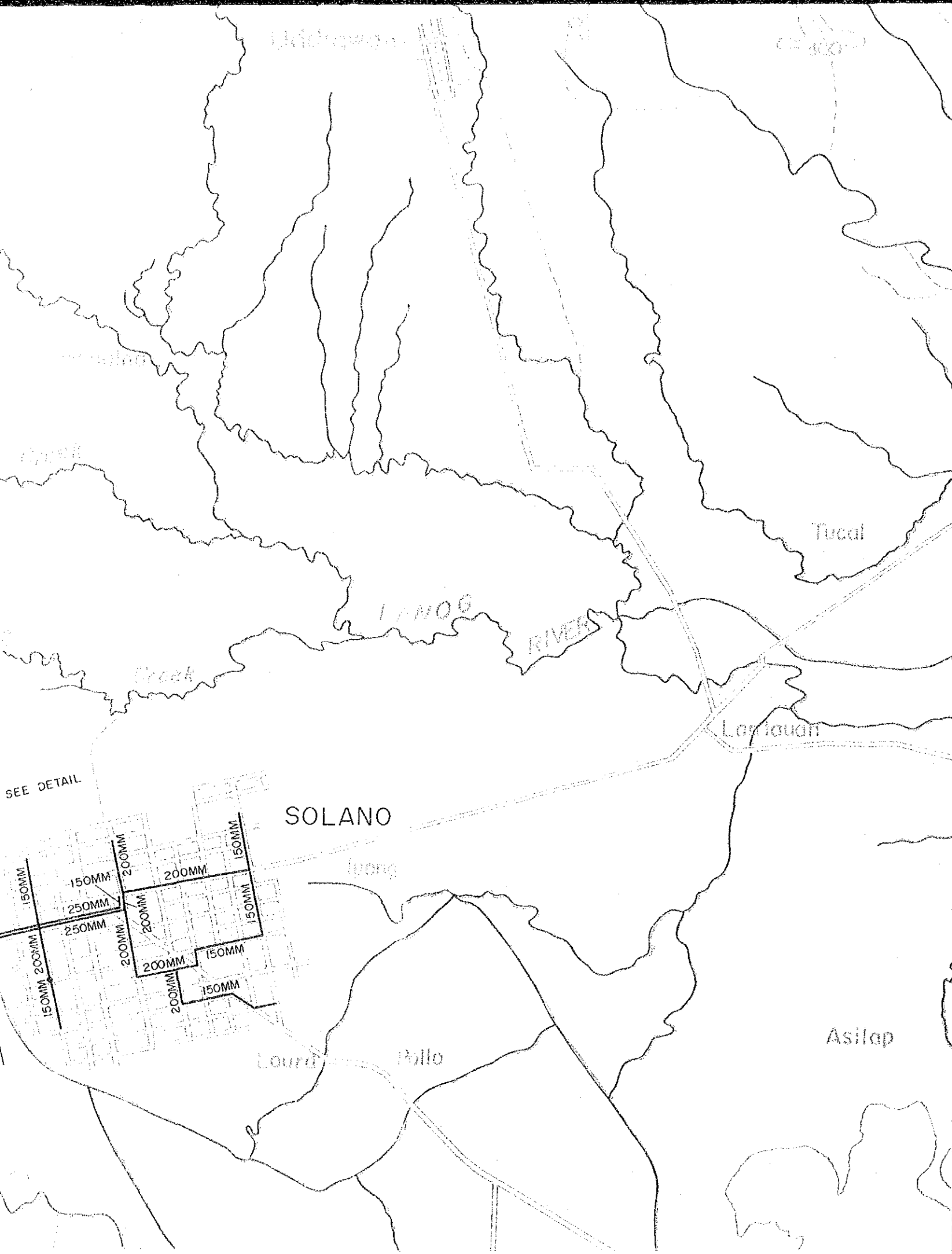
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LEGEND:

EXISTING SYSTEM

- ▲ SPRING
- RESERVOIR
- PIPELINE

PHASE I PROJECT

- INTAKE STRUCTURE
- PIPELINE

PHASE II PROJECT

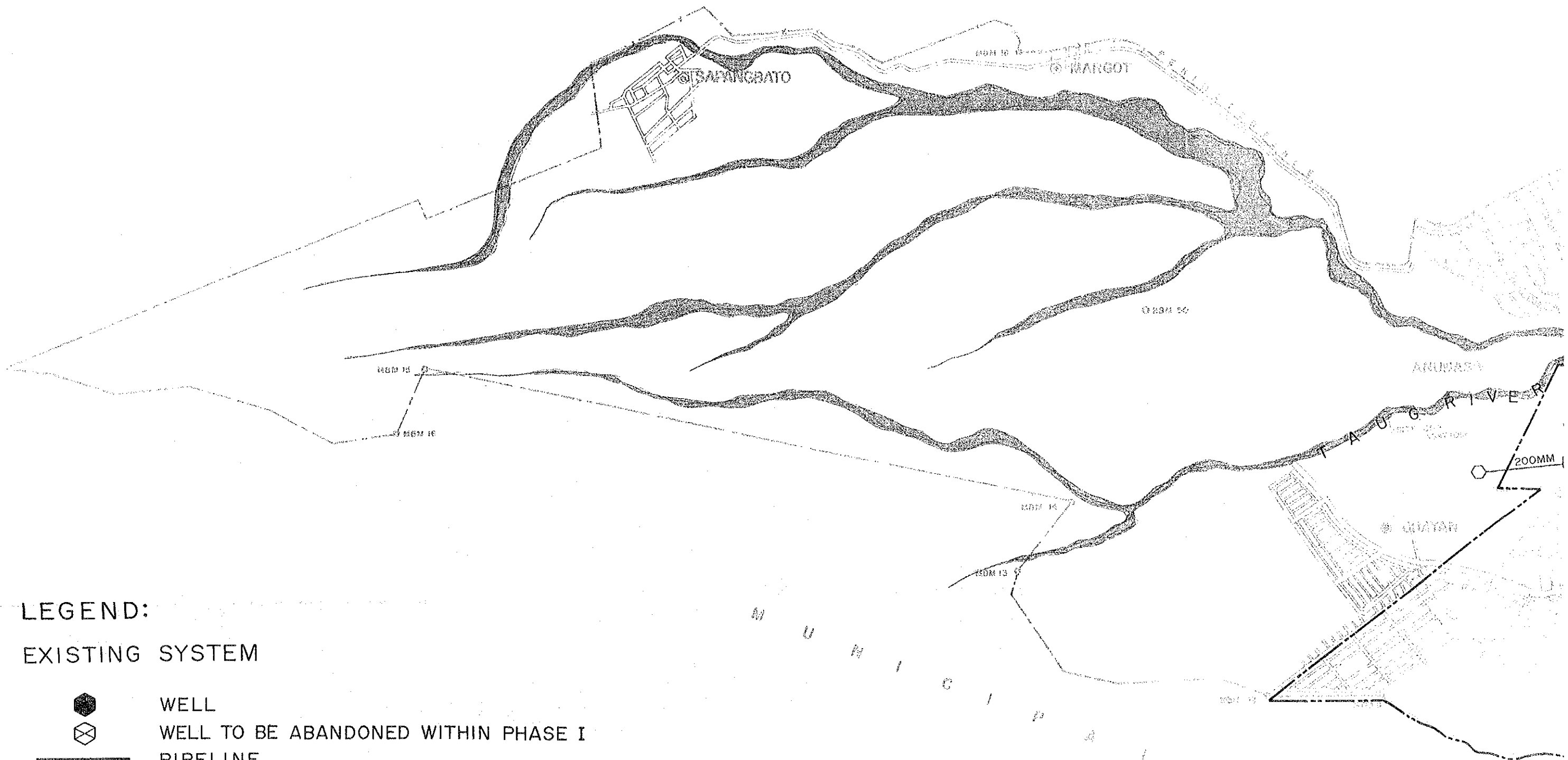
- INTAKE STRUCTURE
- PIPELINE

SERVICE AREA BOUNDARIES

- PRESENT SERVICE AREA
- - - - - PHASE I SERVICE AREA
- PHASE II SERVICE AREA

FIGURE 8.2.1
 GENERAL LAYOUT OF THE RECOMMENDED
 WATER SUPPLY SYSTEM
 BAYOMBONG - SOLANO, NUEVA VIZCAYA
 MARCH 1987

C L A R K A I R B A S E



LEGEND:

EXISTING SYSTEM



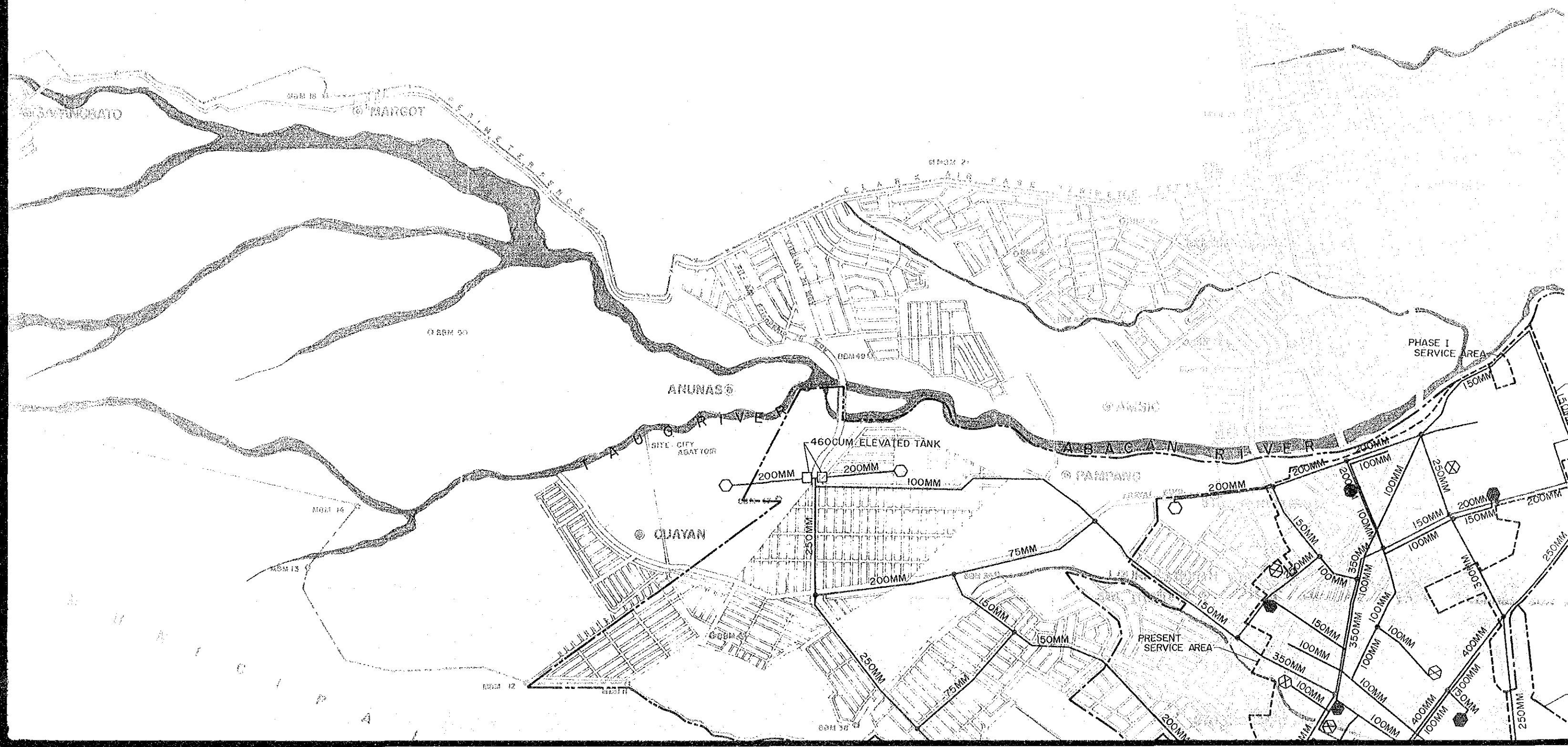
WELL



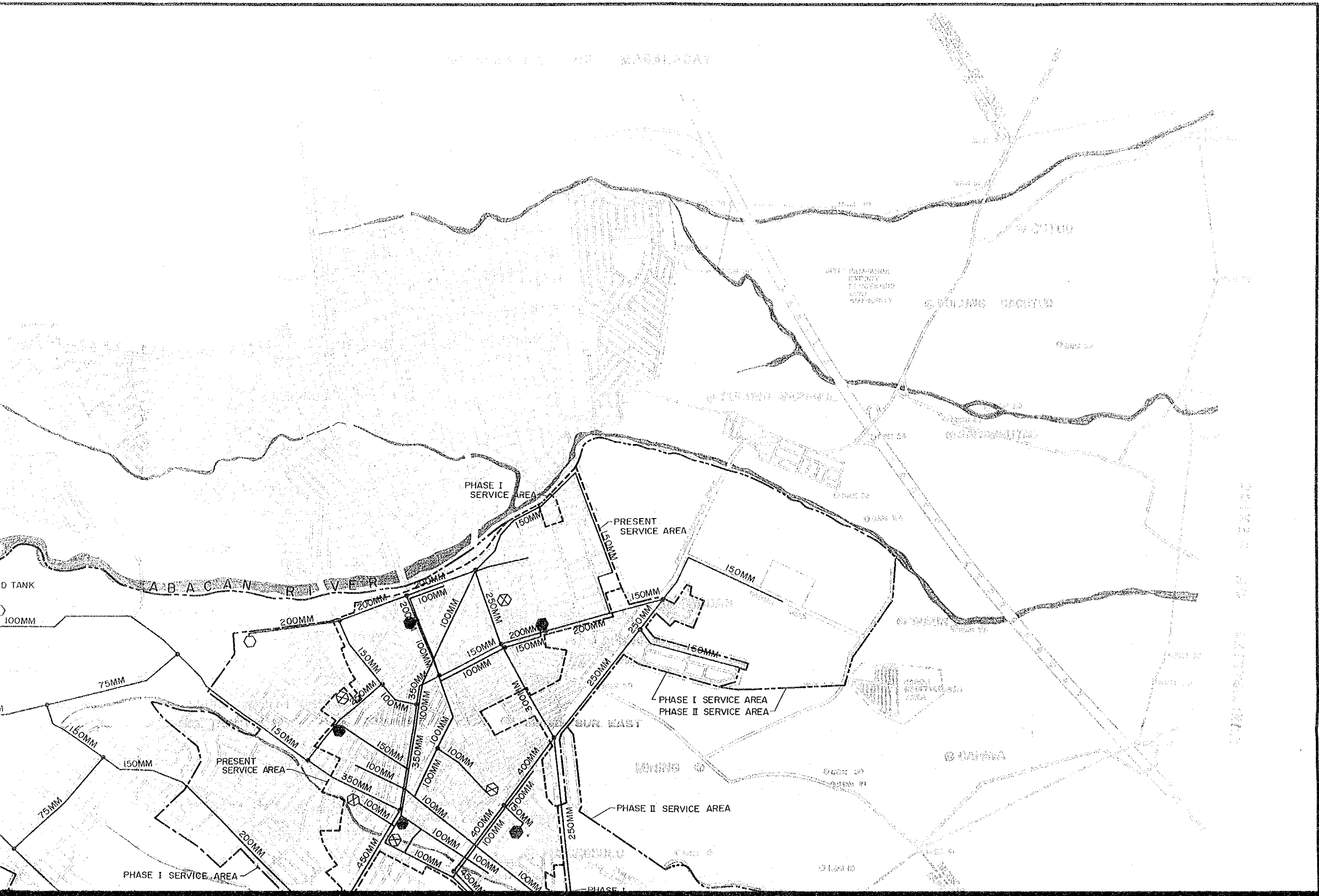
WELL TO BE ABANDONED WITHIN PHASE I

PIPELINE

A I R B A S E



MUNICIPALITY OF MARALAGAY







LEGEND:






EXISTING SYSTEM

-  WELL
-  WELL TO BE ABANDONED WITHIN PHASE I
-  PIPELINE




PHASE I PROJECT

-  WELL (2900CUM/D/WELL)
-  BOOSTER PUMP
-  RESERVOIR
-  PIPELINE

PHASE II PROJECT

-  WELL (2900CUM/D/WELL)
-  BOOSTER PUMP
-  RESERVOIR
-  ELEVATED TANK
-  PIPELINE

SERVICE AREA BOUNDARIES

-  PRESENT SERVICE AREA
-  PHASE I SERVICE AREA
-  PHASE II SERVICE AREA

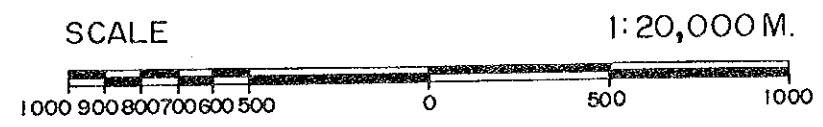
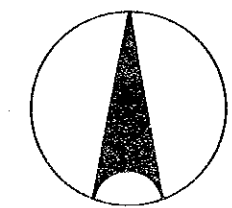
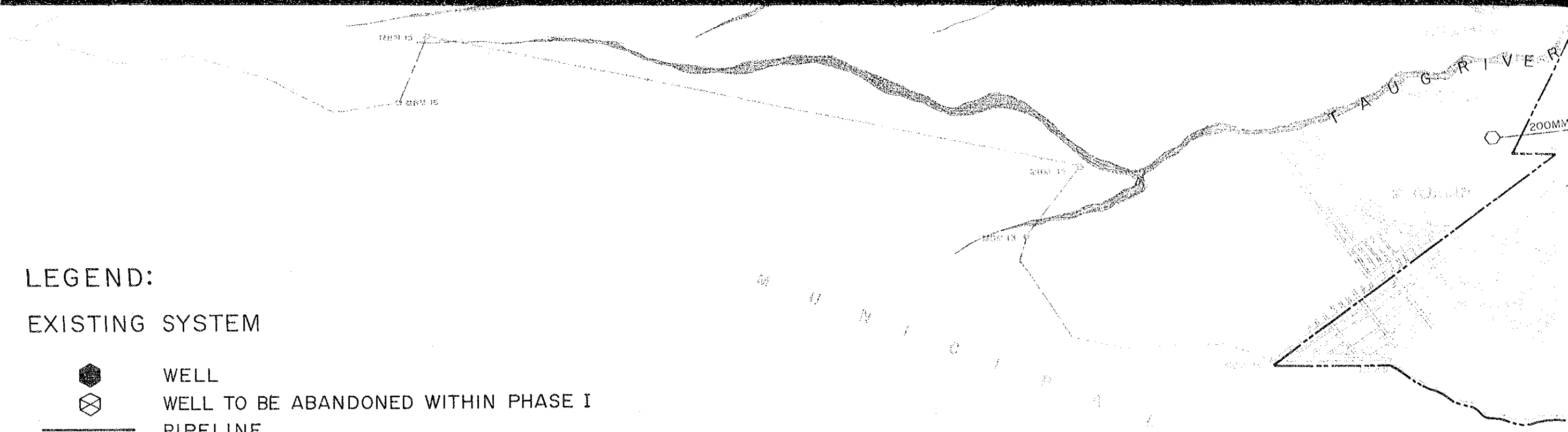


FIGURE 8.2.1
 GENERAL LAYOUT OF THE RECOMMENDED
 ANGELES CITY, PAMPA
 MARCH 1987

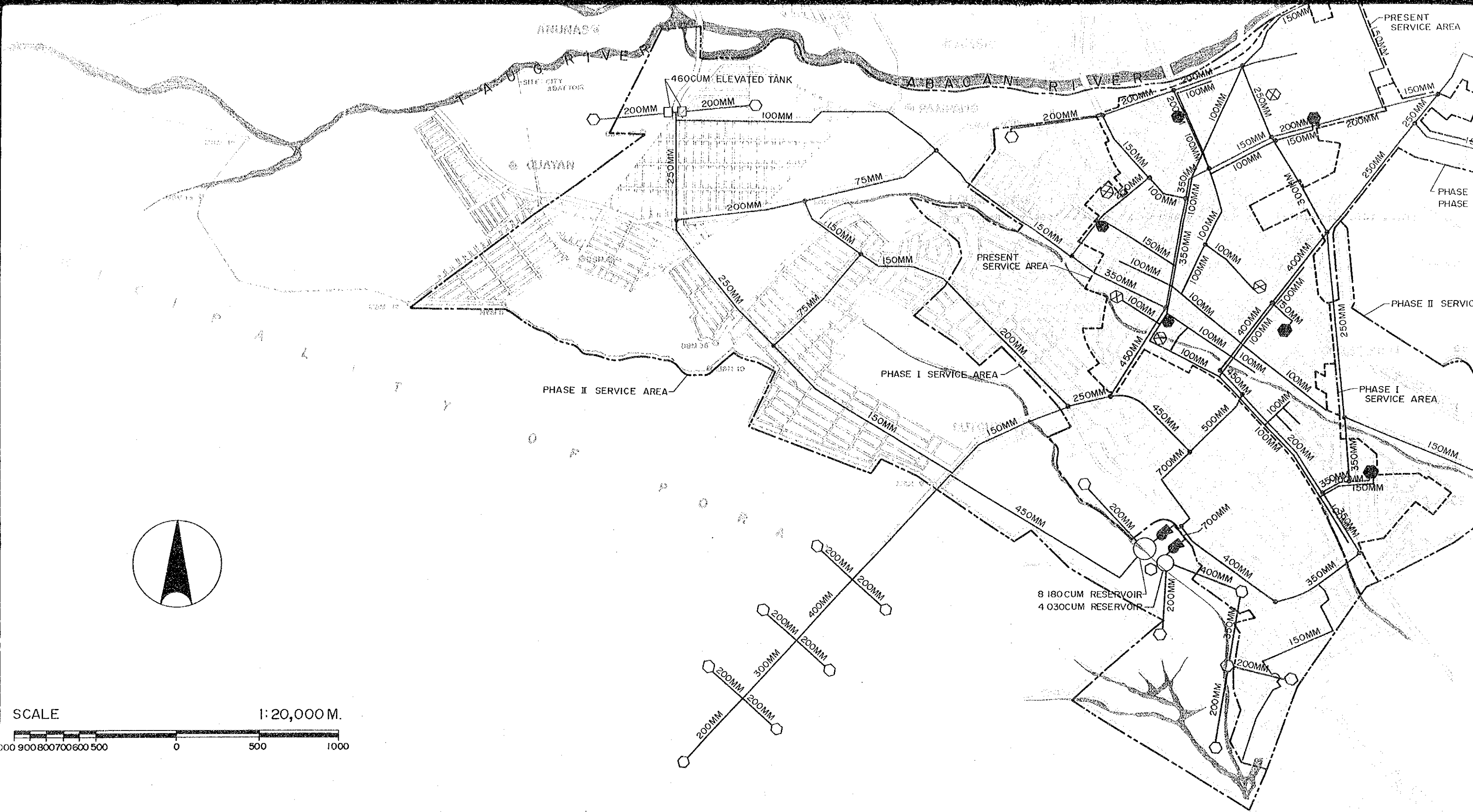
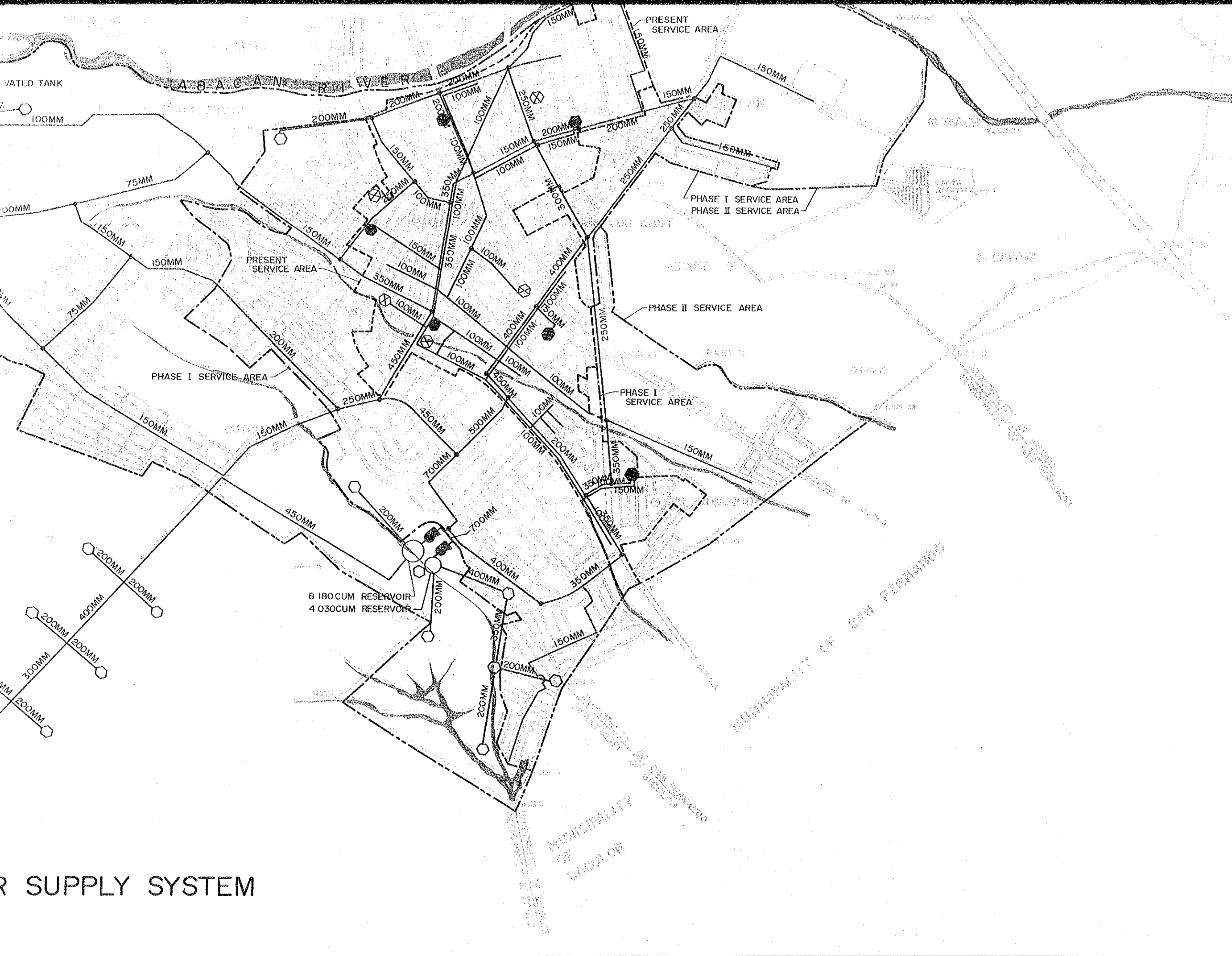


FIGURE 8.2.1.

GENERAL LAYOUT OF THE RECOMMENDED WATER SUPPLY SYSTEM

ANGELES CITY, PAMPANGA
MARCH 1987



WATER SUPPLY SYSTEM

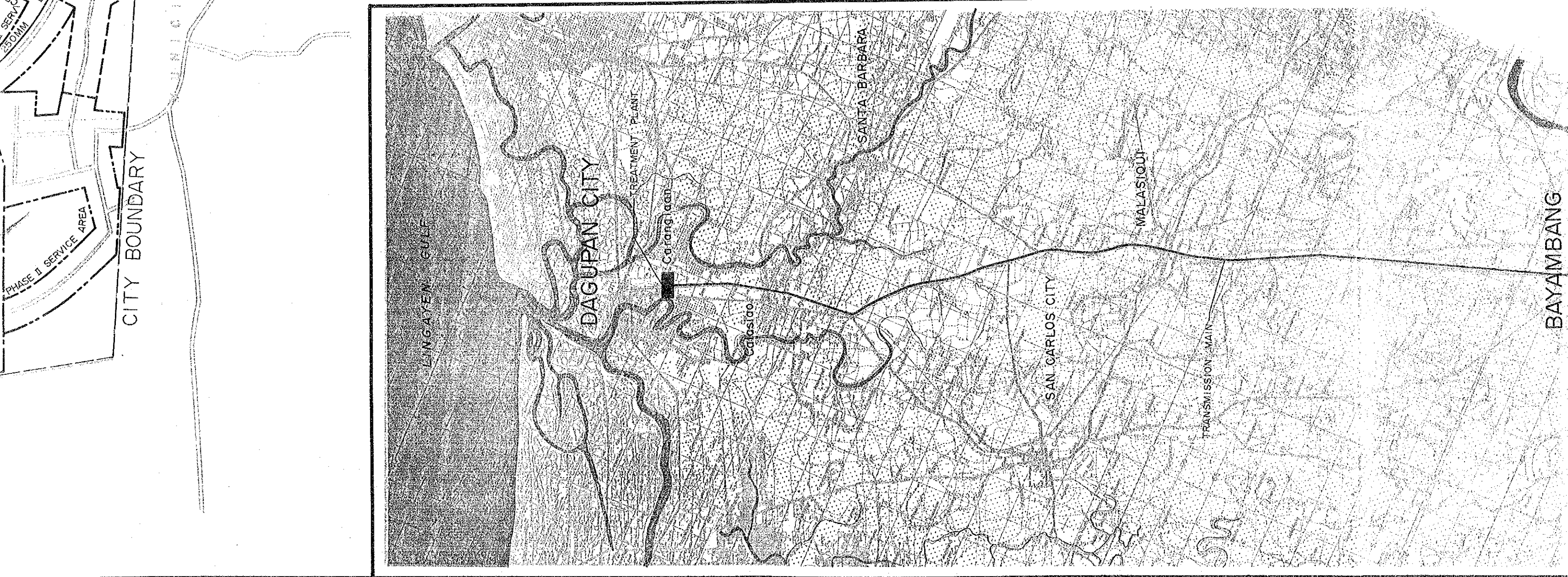
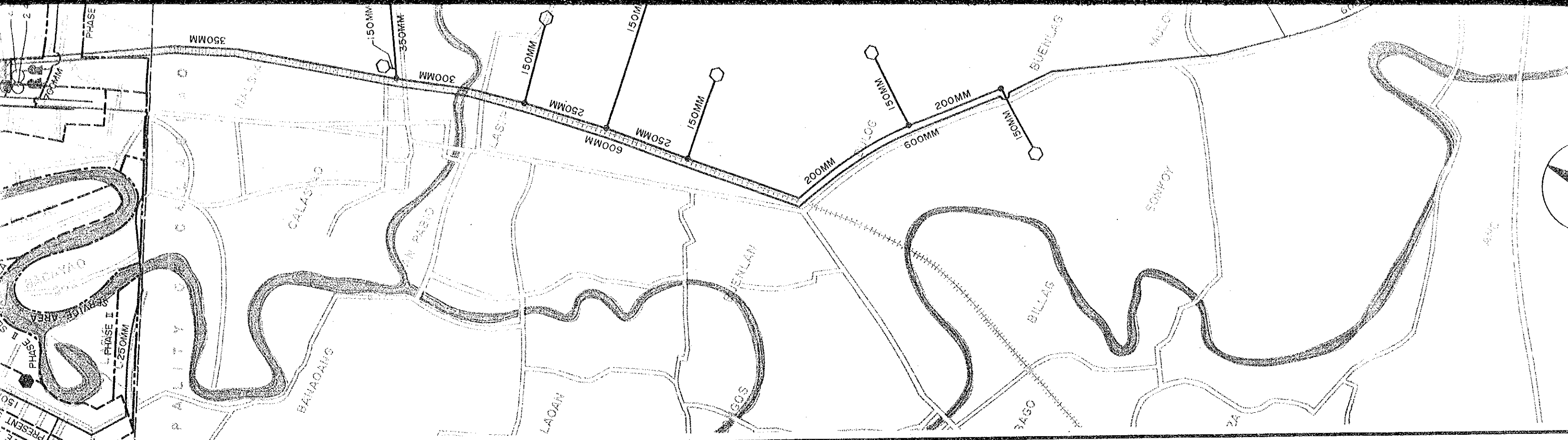
LINGAYEN



MUNICIPALITY OF BINMATEY

CITY BOUNDARY

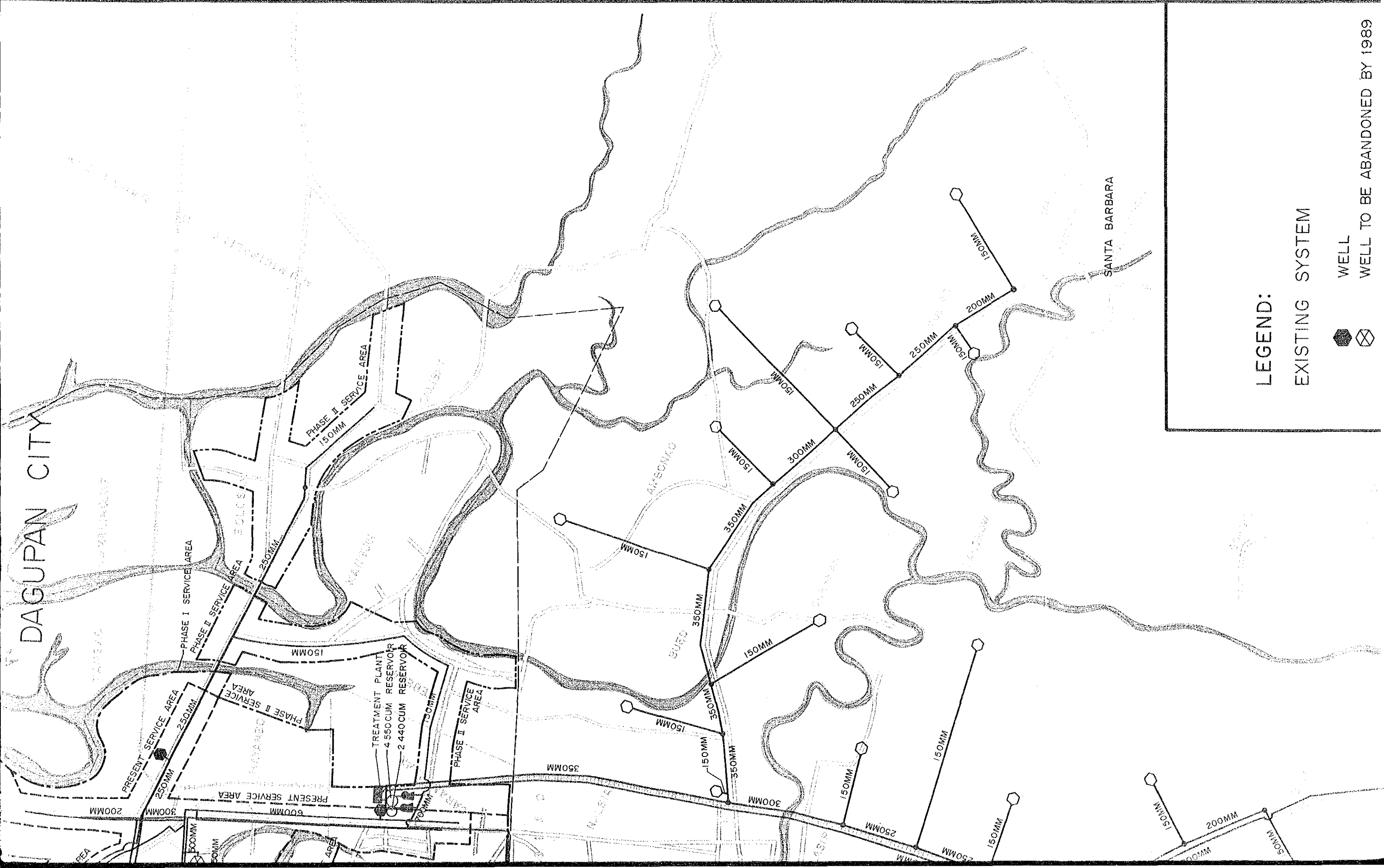




CITY BOUNDARY

BAYAMBANG

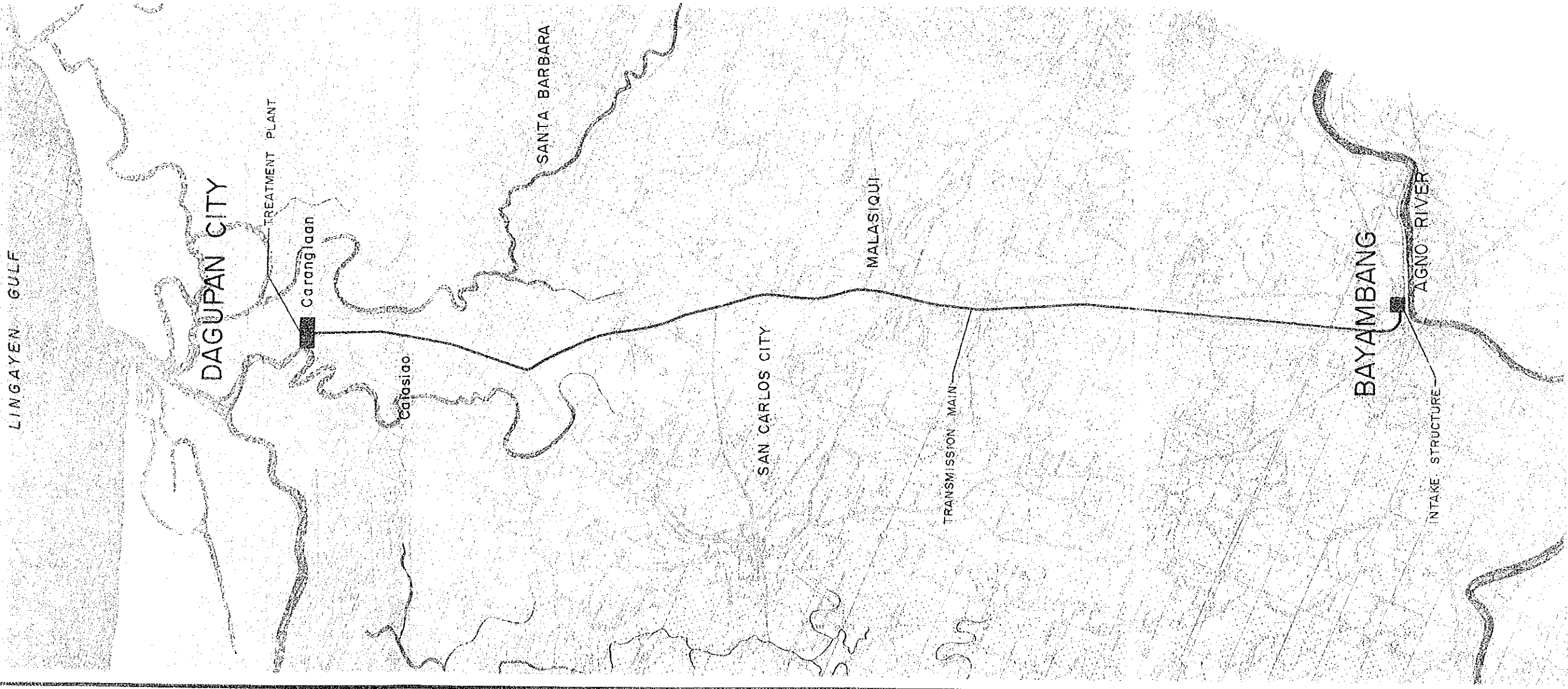
DAGUPAN CITY



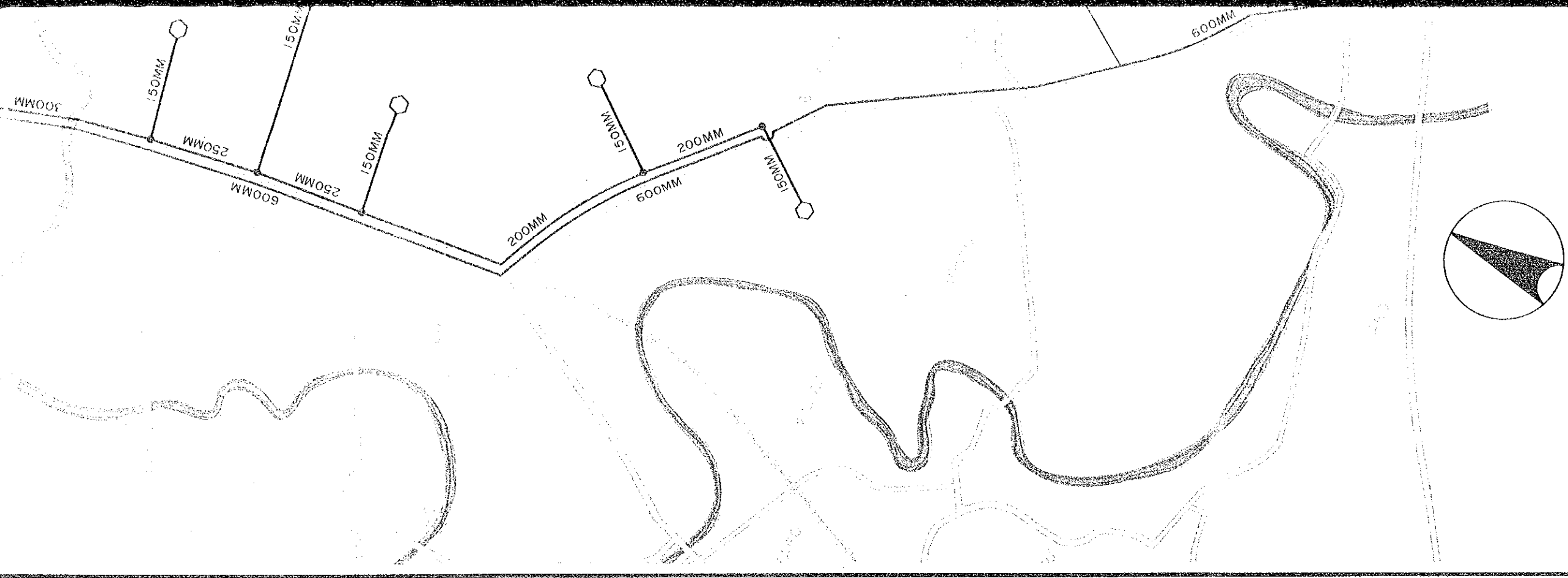
LEGEND:

EXISTING SYSTEM

- WELL
- WELL TO BE ABANDONED BY 1989



NOTE: THE SYSTEM SHOWN ABOVE IS FOR PHASE II



GENERAL LAYOUT

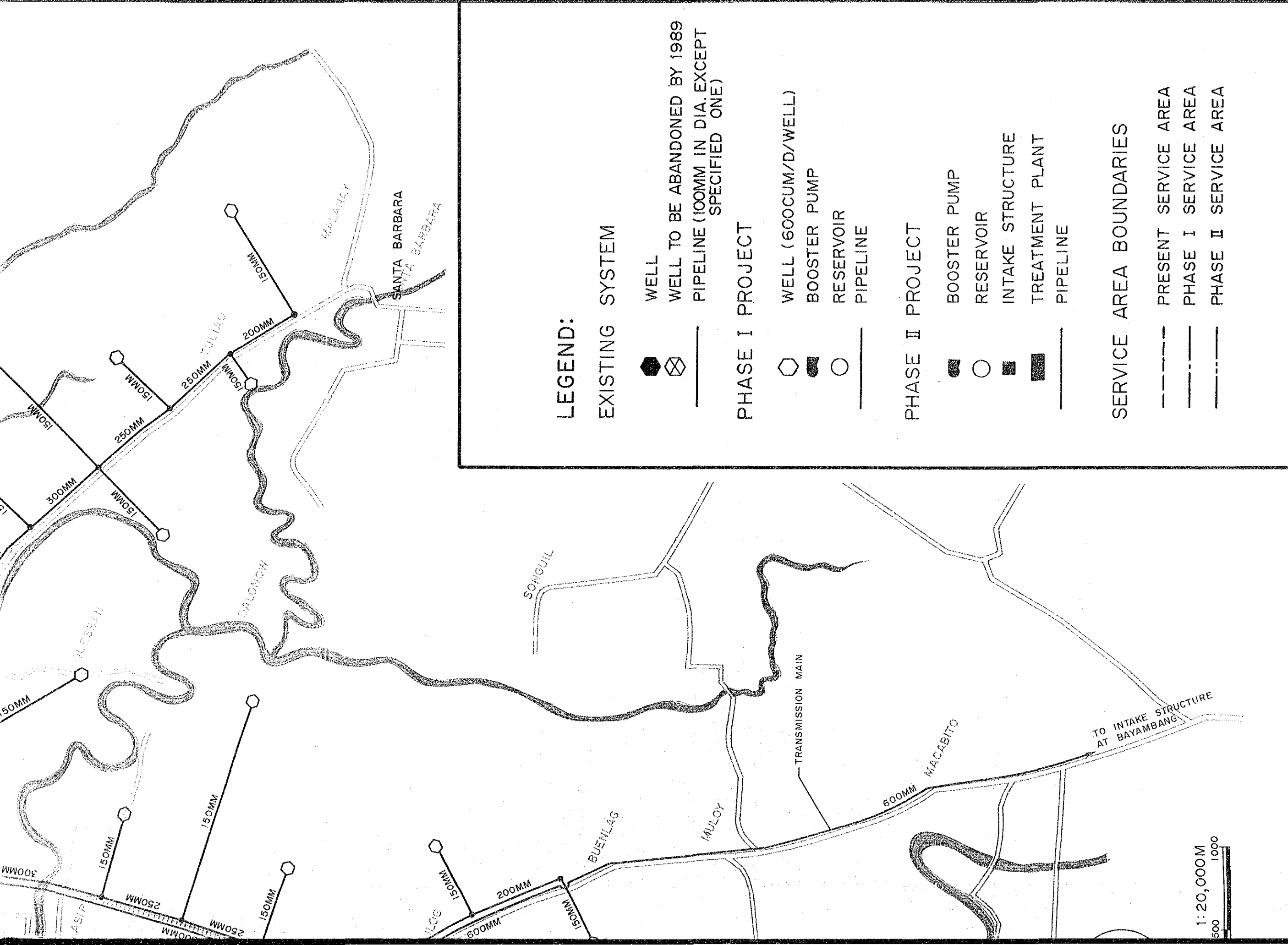


FIGURE 8.2.1
 RAL LAYOUT OF THE RECOMMENDED WATER SUPPLY SYSTEM
 DAGPAN CITY, PANGASINAN
 MARCH 1987

JICA