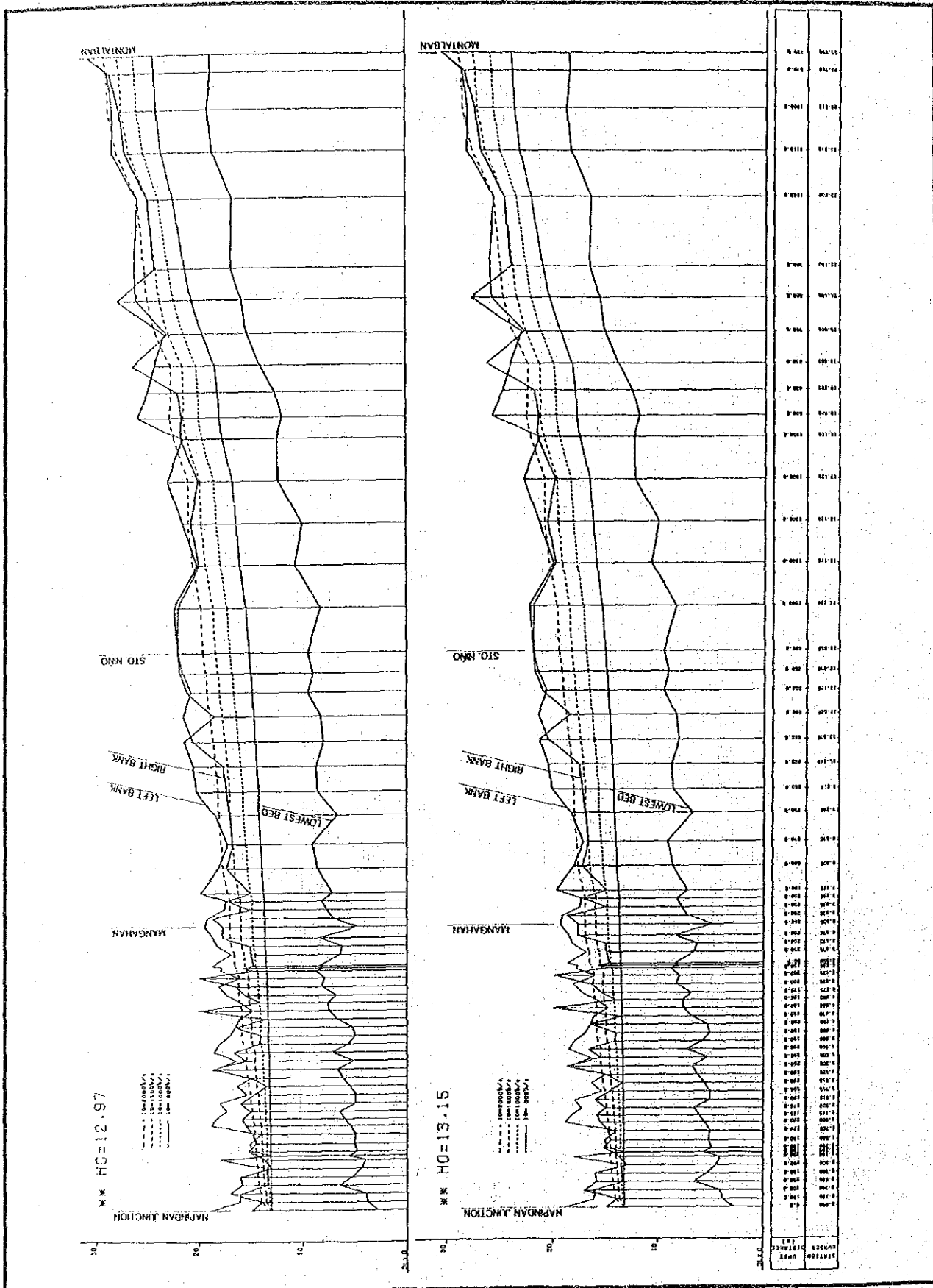


STATION NUMBER	UNIT (M)
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10.150	
10.145	
10.140	
10.135	
10.130	
10.125	
10.120	
10.115	
10.110	
10.105	
10.100	
10.095	
10.090	
10.085	
10.080	
10.075	
10.070	
10.065	
10.060	
10.055	
10.050	
10.045	
10.040	
10.035	
10.030	
10.025	
10.020	
10.015	
10.010	
10.005	
10.000	
9.995	
9.990	
9.985	
9.980	
9.975	
9.970	
9.965	
9.960	
9.955	
9.950	
9.945	
9.940	
9.935	
9.930	
9.925	
9.920	
9.915	
9.910	
9.905	
9.900	
9.895	
9.890	
9.885	
9.880	
9.875	
9.870	
9.865	
9.860	
9.855	
9.850	
9.845	
9.840	
9.835	
9.830	
9.825	
9.820	
9.815	
9.810	
9.805	
9.800	
9.795	
9.790	
9.785	
9.780	
9.775	
9.770	
9.765	
9.760	
9.755	
9.750	
9.745	
9.740	
9.735	
9.730	
9.725	
9.720	
9.715	
9.710	
9.705	
9.700	
9.695	
9.690	
9.685	
9.680	
9.675	
9.670	
9.665	
9.660	
9.655	
9.650	
9.645	
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9.515	
9.510	
9.505	
9.500	
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9.485	
9.480	
9.475	
9.470	
9.465	
9.460	
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9.420	
9.415	
9.410	
9.405	
9.400	
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9.385	
9.380	
9.375	
9.370	
9.365	
9.360	
9.355	
9.350	
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9.340	
9.335	
9.330	
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9.315	
9.310	
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9.300	
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9.120	
9.115	
9.110	
9.105	
9.100	
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9.090	
9.085	
9.080	
9.075	
9.070	
9.065	
9.060	
9.055	
9.050	
9.045	
9.040	
9.035	
9.030	
9.025	
9.020	
9.015	
9.010	
9.005	
9.000	

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES
JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY (PASIG RIVER)

Fig. 4-3-1(1/3)



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES

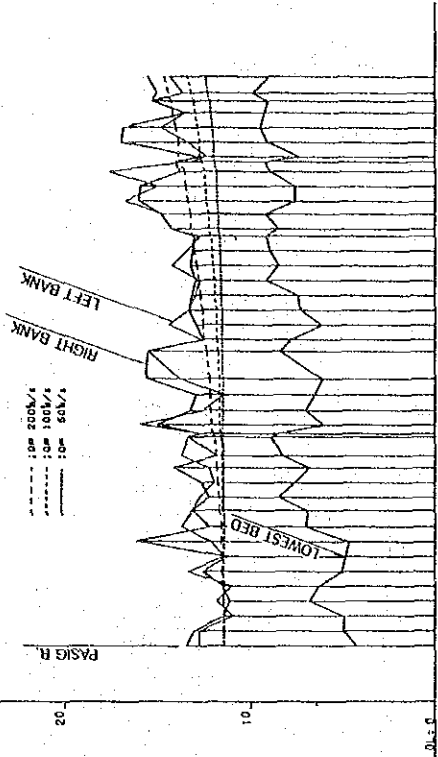
JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY (MARIKINA RIVER)

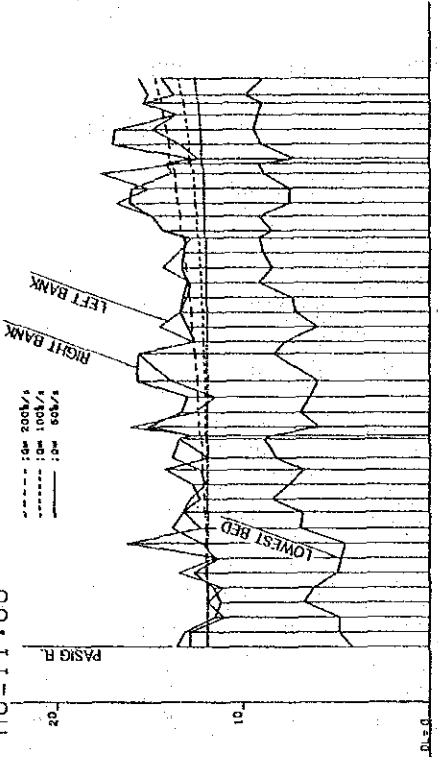
Fig. 4-3-1(2/3)

SAN JUAN RIVER

HO=11.48



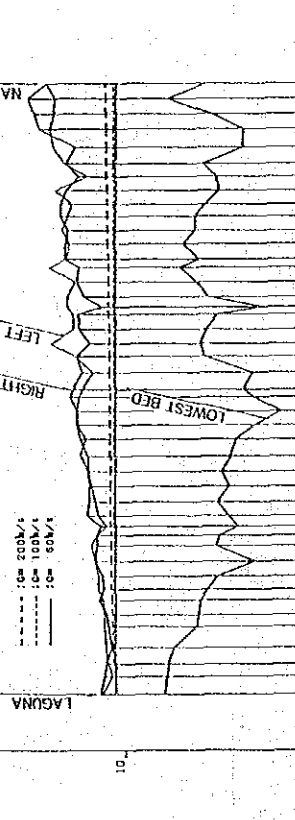
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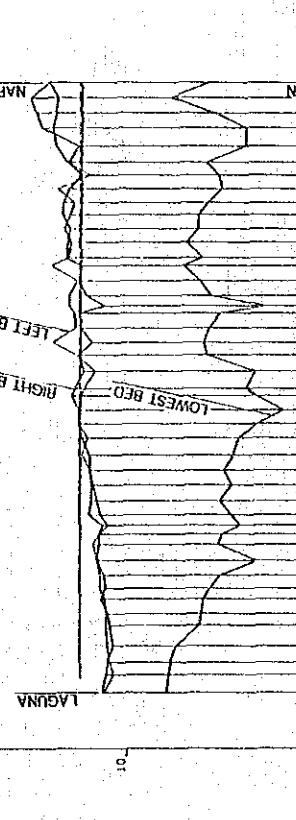
STATION UNIT	NUMBER	DISTANCE (M)
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0.100	0.100	0.100
0.200	0.200	0.200
0.300	0.300	0.300
0.400	0.400	0.400
0.500	0.500	0.500
0.600	0.600	0.600
0.700	0.700	0.700
0.800	0.800	0.800
0.900	0.900	0.900
1.000	1.000	1.000
1.100	1.100	1.100
1.200	1.200	1.200
1.300	1.300	1.300
1.400	1.400	1.400
1.500	1.500	1.500
1.600	1.600	1.600
1.700	1.700	1.700
1.800	1.800	1.800
1.900	1.900	1.900
2.000	2.000	2.000
2.100	2.100	2.100
2.200	2.200	2.200
2.300	2.300	2.300
2.400	2.400	2.400
2.500	2.500	2.500
2.600	2.600	2.600
2.700	2.700	2.700
2.800	2.800	2.800
2.900	2.900	2.900
3.000	3.000	3.000
3.100	3.100	3.100
3.200	3.200	3.200
3.300	3.300	3.300
3.400	3.400	3.400
3.500	3.500	3.500
3.600	3.600	3.600
3.700	3.700	3.700
3.800	3.800	3.800
3.900	3.900	3.900
4.000	4.000	4.000
4.100	4.100	4.100
4.200	4.200	4.200
4.300	4.300	4.300
4.400	4.400	4.400
4.500	4.500	4.500
4.600	4.600	4.600
4.700	4.700	4.700
4.800	4.800	4.800
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5.000	5.000	5.000
5.100	5.100	5.100
5.200	5.200	5.200
5.300	5.300	5.300
5.400	5.400	5.400
5.500	5.500	5.500
5.600	5.600	5.600
5.700	5.700	5.700
5.800	5.800	5.800
5.900	5.900	5.900
6.000	6.000	6.000
6.100	6.100	6.100
6.200	6.200	6.200
6.300	6.300	6.300
6.400	6.400	6.400
6.500	6.500	6.500
6.600	6.600	6.600
6.700	6.700	6.700
6.800	6.800	6.800
6.900	6.900	6.900
7.000	7.000	7.000
7.100	7.100	7.100
7.200	7.200	7.200
7.300	7.300	7.300
7.400	7.400	7.400
7.500	7.500	7.500
7.600	7.600	7.600
7.700	7.700	7.700
7.800	7.800	7.800
7.900	7.900	7.900
8.000	8.000	8.000
8.100	8.100	8.100
8.200	8.200	8.200
8.300	8.300	8.300
8.400	8.400	8.400
8.500	8.500	8.500
8.600	8.600	8.600
8.700	8.700	8.700
8.800	8.800	8.800
8.900	8.900	8.900
9.000	9.000	9.000
9.100	9.100	9.100
9.200	9.200	9.200
9.300	9.300	9.300
9.400	9.400	9.400
9.500	9.500	9.500
9.600	9.600	9.600
9.700	9.700	9.700
9.800	9.800	9.800
9.900	9.900	9.900
10.000	10.000	10.000

NAPINDAN RIVER

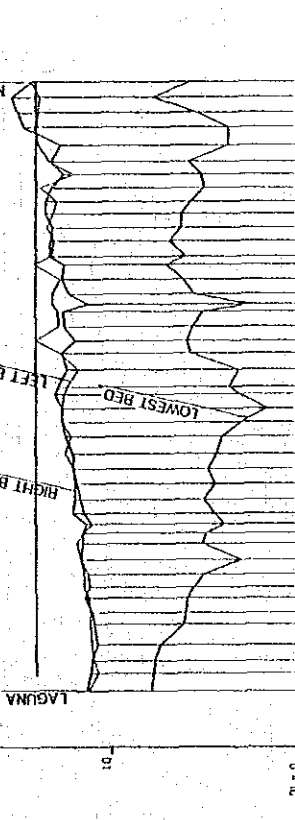
* HO=10.5



* HO=12.5



* HO=14.0



STATION UNIT	NUMBER	DISTANCE (M)
0.000	0.000	0.000
0.100	0.100	0.100
0.200	0.200	0.200
0.300	0.300	0.300
0.400	0.400	0.400
0.500	0.500	0.500
0.600	0.600	0.600
0.700	0.700	0.700
0.800	0.800	0.800
0.900	0.900	0.900
1.000	1.000	1.000
1.100	1.100	1.100
1.200	1.200	1.200
1.300	1.300	1.300
1.400	1.400	1.400
1.500	1.500	1.500
1.600	1.600	1.600
1.700	1.700	1.700
1.800	1.800	1.800
1.900	1.900	1.900
2.000	2.000	2.000
2.100	2.100	2.100
2.200	2.200	2.200
2.300	2.300	2.300
2.400	2.400	2.400
2.500	2.500	2.500
2.600	2.600	2.600
2.700	2.700	2.700
2.800	2.800	2.800
2.900	2.900	2.900
3.000	3.000	3.000
3.100	3.100	3.100
3.200	3.200	3.200
3.300	3.300	3.300
3.400	3.400	3.400
3.500	3.500	3.500
3.600	3.600	3.600
3.700	3.700	3.700
3.800	3.800	3.800
3.900	3.900	3.900
4.000	4.000	4.000
4.100	4.100	4.100
4.200	4.200	4.200
4.300	4.300	4.300
4.400	4.400	4.400
4.500	4.500	4.500
4.600	4.600	4.600
4.700	4.700	4.700
4.800	4.800	4.800
4.900	4.900	4.900
5.000	5.000	5.000
5.100	5.100	5.100
5.200	5.200	5.200
5.300	5.300	5.300
5.400	5.400	5.400
5.500	5.500	5.500
5.600	5.600	5.600
5.700	5.700	5.700
5.800	5.800	5.800
5.900	5.900	5.900
6.000	6.000	6.000
6.100	6.100	6.100
6.200	6.200	6.200
6.300	6.300	6.300
6.400	6.400	6.400
6.500	6.500	6.500
6.600	6.600	6.600
6.700	6.700	6.700
6.800	6.800	6.800
6.900	6.900	6.900
7.000	7.000	7.000
7.100	7.100	7.100
7.200	7.200	7.200
7.300	7.300	7.300
7.400	7.400	7.400
7.500	7.500	7.500
7.600	7.600	7.600
7.700	7.700	7.700
7.800	7.800	7.800
7.900	7.900	7.900
8.000	8.000	8.000
8.100	8.100	8.100
8.200	8.200	8.200
8.300	8.300	8.300
8.400	8.400	8.400
8.500	8.500	8.500
8.600	8.600	8.600
8.700	8.700	8.700
8.800	8.800	8.800
8.900	8.900	8.900
9.000	9.000	9.000
9.100	9.100	9.100
9.200	9.200	9.200
9.300	9.300	9.300
9.400	9.400	9.400
9.500	9.500	9.500
9.600	9.600	9.600
9.700	9.700	9.700
9.800	9.800	9.800
9.900	9.900	9.900
10.000	10.000	10.000

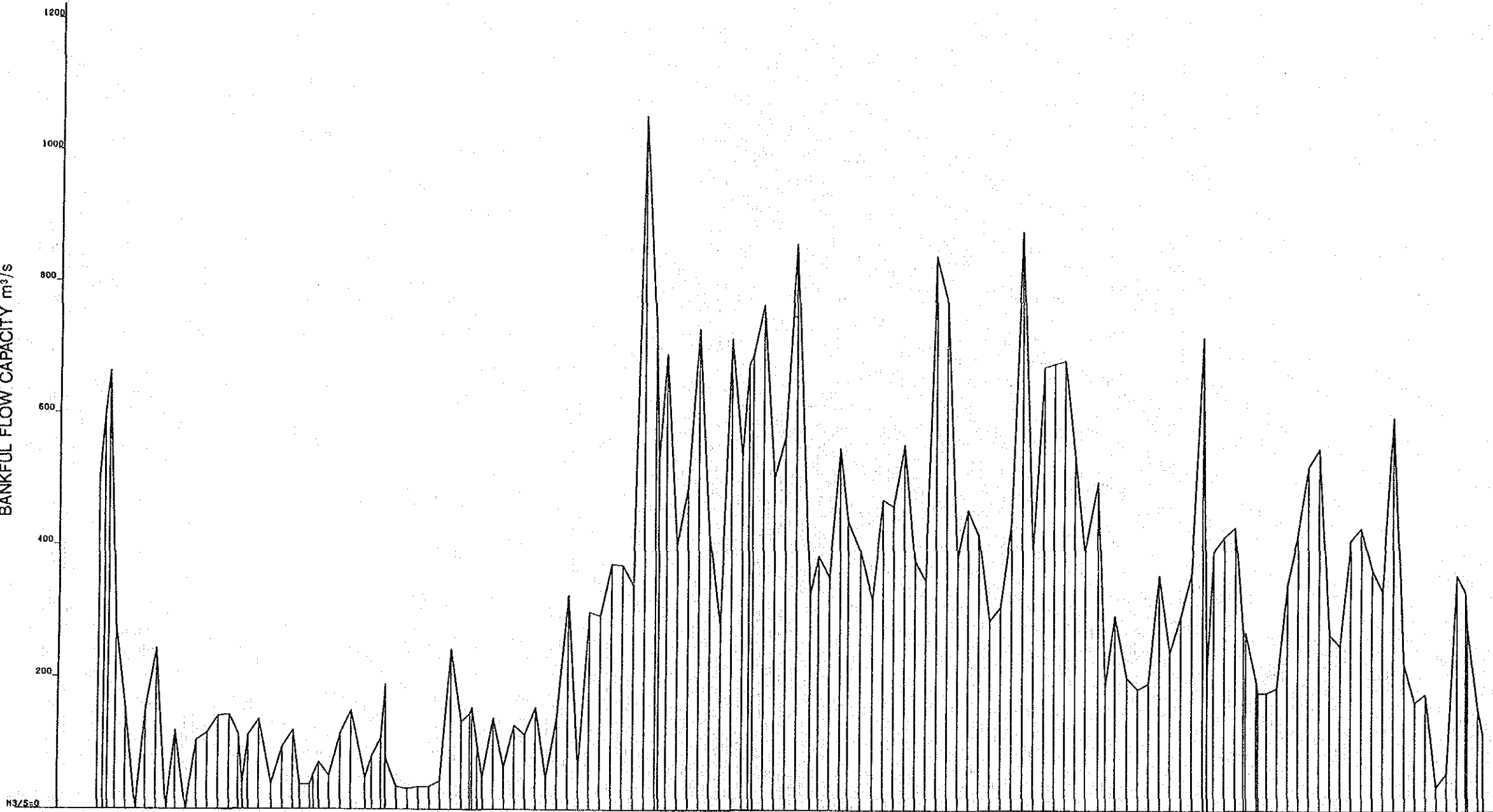
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY (SAN JUAN & NAPINDAN RIVER)

Fig. 4-3-1(3/3)

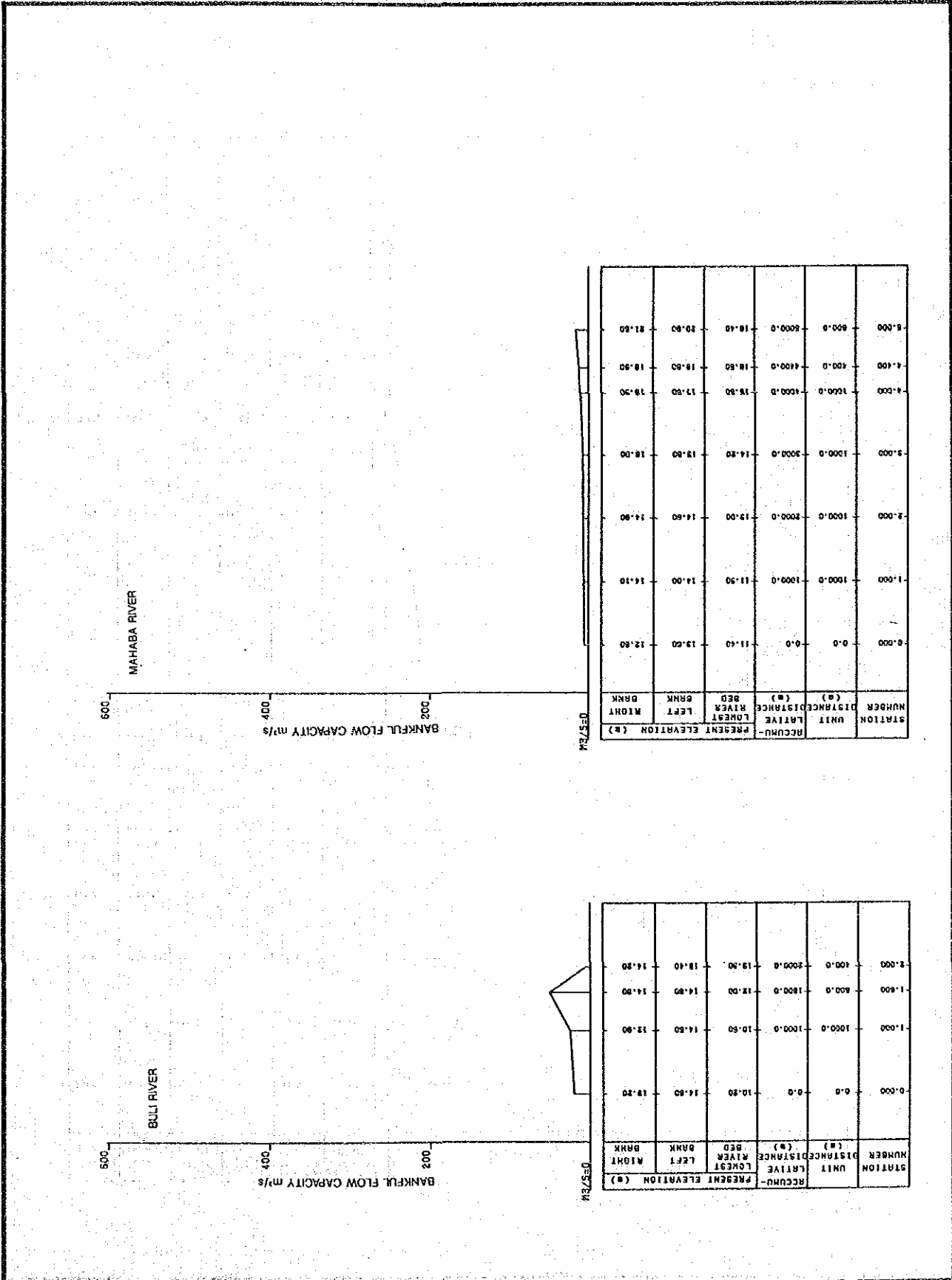
BANKFUL FLOW CAPACITY m³/s



STATION NUMBER	UNIT DISTANCE (m)	ACCUMULATIVE DISTANCE (m)	PRESENT ELEVATION (m) RIVER BED	LEFT BANK	RIGHT BANK
10+000	0.0	0.0	11.90	12.70	11.80
10+100	100.0	100.0	11.90	12.70	11.80
10+200	200.0	200.0	11.90	12.70	11.80
10+300	300.0	300.0	11.90	12.70	11.80
10+400	400.0	400.0	11.90	12.70	11.80
10+500	500.0	500.0	11.90	12.70	11.80
10+600	600.0	600.0	11.90	12.70	11.80
10+700	700.0	700.0	11.90	12.70	11.80
10+800	800.0	800.0	11.90	12.70	11.80
10+900	900.0	900.0	11.90	12.70	11.80
11+000	1000.0	1000.0	11.90	12.70	11.80
11+100	1100.0	1100.0	11.90	12.70	11.80
11+200	1200.0	1200.0	11.90	12.70	11.80
11+300	1300.0	1300.0	11.90	12.70	11.80
11+400	1400.0	1400.0	11.90	12.70	11.80
11+500	1500.0	1500.0	11.90	12.70	11.80
11+600	1600.0	1600.0	11.90	12.70	11.80
11+700	1700.0	1700.0	11.90	12.70	11.80
11+800	1800.0	1800.0	11.90	12.70	11.80
11+900	1900.0	1900.0	11.90	12.70	11.80
12+000	2000.0	2000.0	11.90	12.70	11.80
12+100	2100.0	2100.0	11.90	12.70	11.80
12+200	2200.0	2200.0	11.90	12.70	11.80
12+300	2300.0	2300.0	11.90	12.70	11.80
12+400	2400.0	2400.0	11.90	12.70	11.80
12+500	2500.0	2500.0	11.90	12.70	11.80
12+600	2600.0	2600.0	11.90	12.70	11.80
12+700	2700.0	2700.0	11.90	12.70	11.80
12+800	2800.0	2800.0	11.90	12.70	11.80
12+900	2900.0	2900.0	11.90	12.70	11.80
13+000	3000.0	3000.0	11.90	12.70	11.80
13+100	3100.0	3100.0	11.90	12.70	11.80
13+200	3200.0	3200.0	11.90	12.70	11.80
13+300	3300.0	3300.0	11.90	12.70	11.80
13+400	3400.0	3400.0	11.90	12.70	11.80
13+500	3500.0	3500.0	11.90	12.70	11.80
13+600	3600.0	3600.0	11.90	12.70	11.80
13+700	3700.0	3700.0	11.90	12.70	11.80
13+800	3800.0	3800.0	11.90	12.70	11.80
13+900	3900.0	3900.0	11.90	12.70	11.80
14+000	4000.0	4000.0	11.90	12.70	11.80
14+100	4100.0	4100.0	11.90	12.70	11.80
14+200	4200.0	4200.0	11.90	12.70	11.80
14+300	4300.0	4300.0	11.90	12.70	11.80
14+400	4400.0	4400.0	11.90	12.70	11.80
14+500	4500.0	4500.0	11.90	12.70	11.80
14+600	4600.0	4600.0	11.90	12.70	11.80
14+700	4700.0	4700.0	11.90	12.70	11.80
14+800	4800.0	4800.0	11.90	12.70	11.80
14+900	4900.0	4900.0	11.90	12.70	11.80
15+000	5000.0	5000.0	11.90	12.70	11.80
15+100	5100.0	5100.0	11.90	12.70	11.80
15+200	5200.0	5200.0	11.90	12.70	11.80
15+300	5300.0	5300.0	11.90	12.70	11.80
15+400	5400.0	5400.0	11.90	12.70	11.80
15+500	5500.0	5500.0	11.90	12.70	11.80
15+600	5600.0	5600.0	11.90	12.70	11.80
15+700	5700.0	5700.0	11.90	12.70	11.80
15+800	5800.0	5800.0	11.90	12.70	11.80
15+900	5900.0	5900.0	11.90	12.70	11.80
16+000	6000.0	6000.0	11.90	12.70	11.80
16+100	6100.0	6100.0	11.90	12.70	11.80
16+200	6200.0	6200.0	11.90	12.70	11.80
16+300	6300.0	6300.0	11.90	12.70	11.80
16+400	6400.0	6400.0	11.90	12.70	11.80
16+500	6500.0	6500.0	11.90	12.70	11.80
16+600	6600.0	6600.0	11.90	12.70	11.80
16+700	6700.0	6700.0	11.90	12.70	11.80
16+800	6800.0	6800.0	11.90	12.70	11.80
16+900	6900.0	6900.0	11.90	12.70	11.80
17+000	7000.0	7000.0	11.90	12.70	11.80
17+100	7100.0	7100.0	11.90	12.70	11.80
17+200	7200.0	7200.0	11.90	12.70	11.80
17+300	7300.0	7300.0	11.90	12.70	11.80
17+400	7400.0	7400.0	11.90	12.70	11.80
17+500	7500.0	7500.0	11.90	12.70	11.80
17+600	7600.0	7600.0	11.90	12.70	11.80
17+700	7700.0	7700.0	11.90	12.70	11.80
17+800	7800.0	7800.0	11.90	12.70	11.80
17+900	7900.0	7900.0	11.90	12.70	11.80
18+000	8000.0	8000.0	11.90	12.70	11.80
18+100	8100.0	8100.0	11.90	12.70	11.80
18+200	8200.0	8200.0	11.90	12.70	11.80
18+300	8300.0	8300.0	11.90	12.70	11.80
18+400	8400.0	8400.0	11.90	12.70	11.80
18+500	8500.0	8500.0	11.90	12.70	11.80
18+600	8600.0	8600.0	11.90	12.70	11.80
18+700	8700.0	8700.0	11.90	12.70	11.80
18+800	8800.0	8800.0	11.90	12.70	11.80
18+900	8900.0	8900.0	11.90	12.70	11.80
19+000	9000.0	9000.0	11.90	12.70	11.80

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY
 (MALABON-TULLAHAN RIVER)
 Fig.4-3-2(1/5)

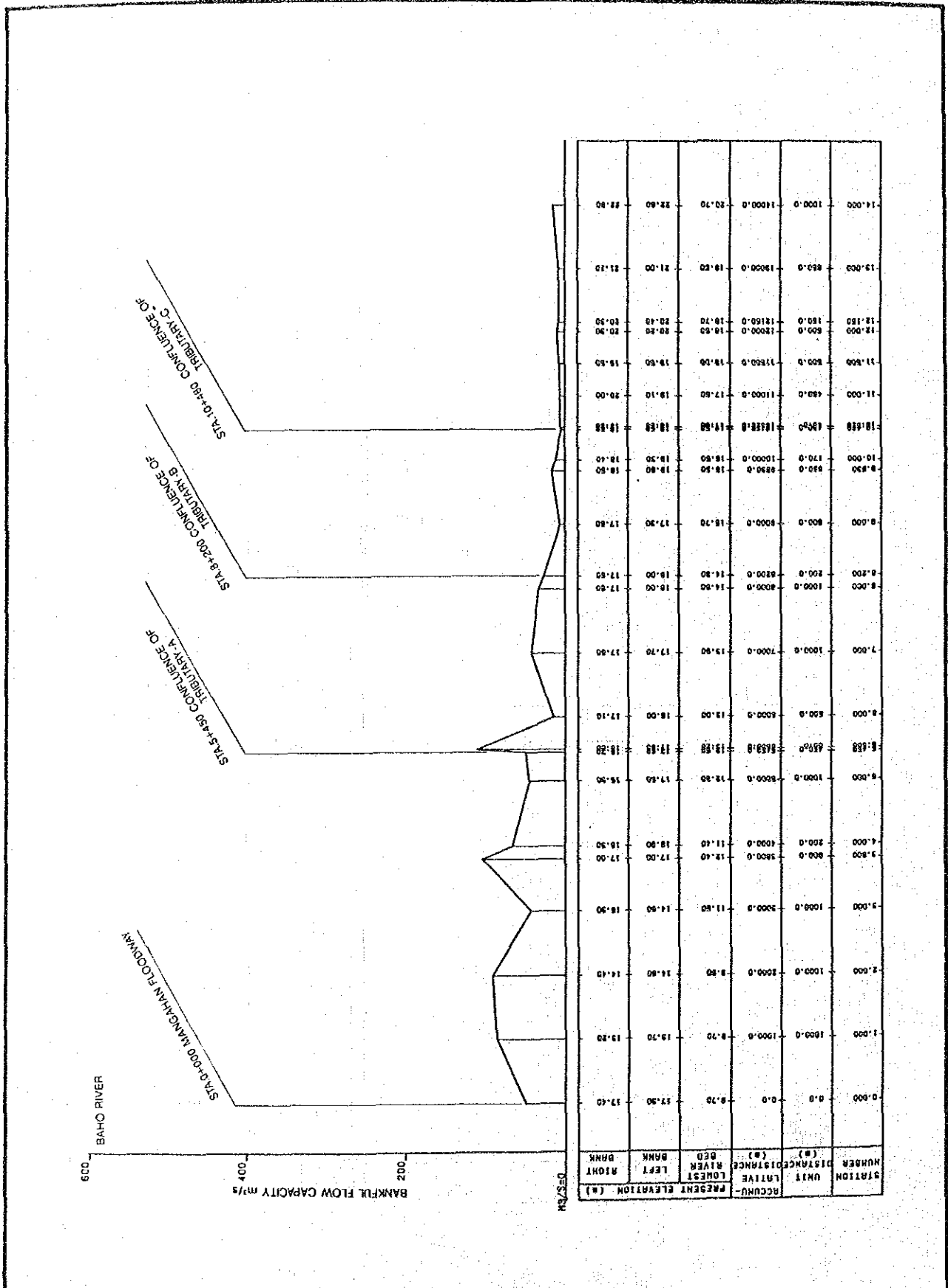


STATION NUMBER	UNIT DISTANCE (m)	ACCUMULATIVE DISTANCE (m)	PRESENT ELEVATION (m)	LOWEST RIVER BED (m)	LEFT BANK (m)	RIGHT BANK (m)
0.000	0.0	0.0	11.50	13.00	12.50	12.50
1.000	1000.0	1000.0	11.90	14.00	14.10	14.10
2.000	1000.0	2000.0	13.00	14.50	14.90	14.90
3.000	1000.0	3000.0	14.20	15.00	16.00	16.00
4.000	1000.0	4000.0	15.30	15.50	18.30	18.30
4.400	400.0	4400.0	16.50	16.00	18.50	18.50
4.800	400.0	4800.0	17.40	16.50	18.80	18.80
5.000	200.0	5000.0	18.00	17.00	19.30	19.30
8.000	3000.0	8000.0	20.40	20.00	21.50	21.50

STATION NUMBER	UNIT DISTANCE (m)	ACCUMULATIVE DISTANCE (m)	PRESENT ELEVATION (m)	LOWEST RIVER BED (m)	LEFT BANK (m)	RIGHT BANK (m)
0.000	0.0	0.0	10.20	14.50	13.20	13.20
1.000	1000.0	1000.0	10.50	14.50	13.90	13.90
1.600	600.0	1600.0	12.00	14.90	14.90	14.90
2.000	400.0	2000.0	13.30	15.10	15.20	15.20

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY (BULI AND MAHABA RIVERS)
 Fig.4-3-2(2/5)

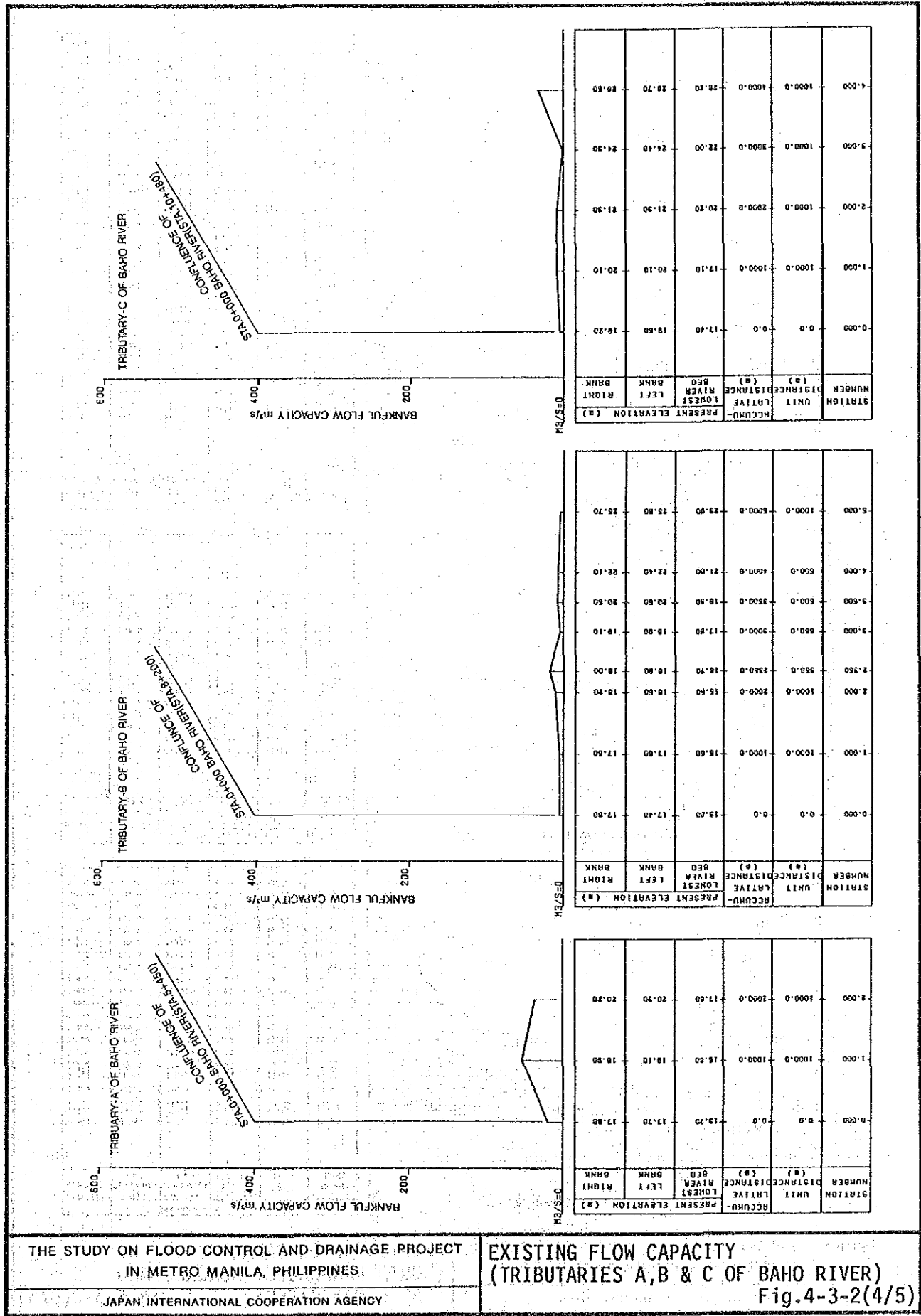


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY
(BAHO RIVER)

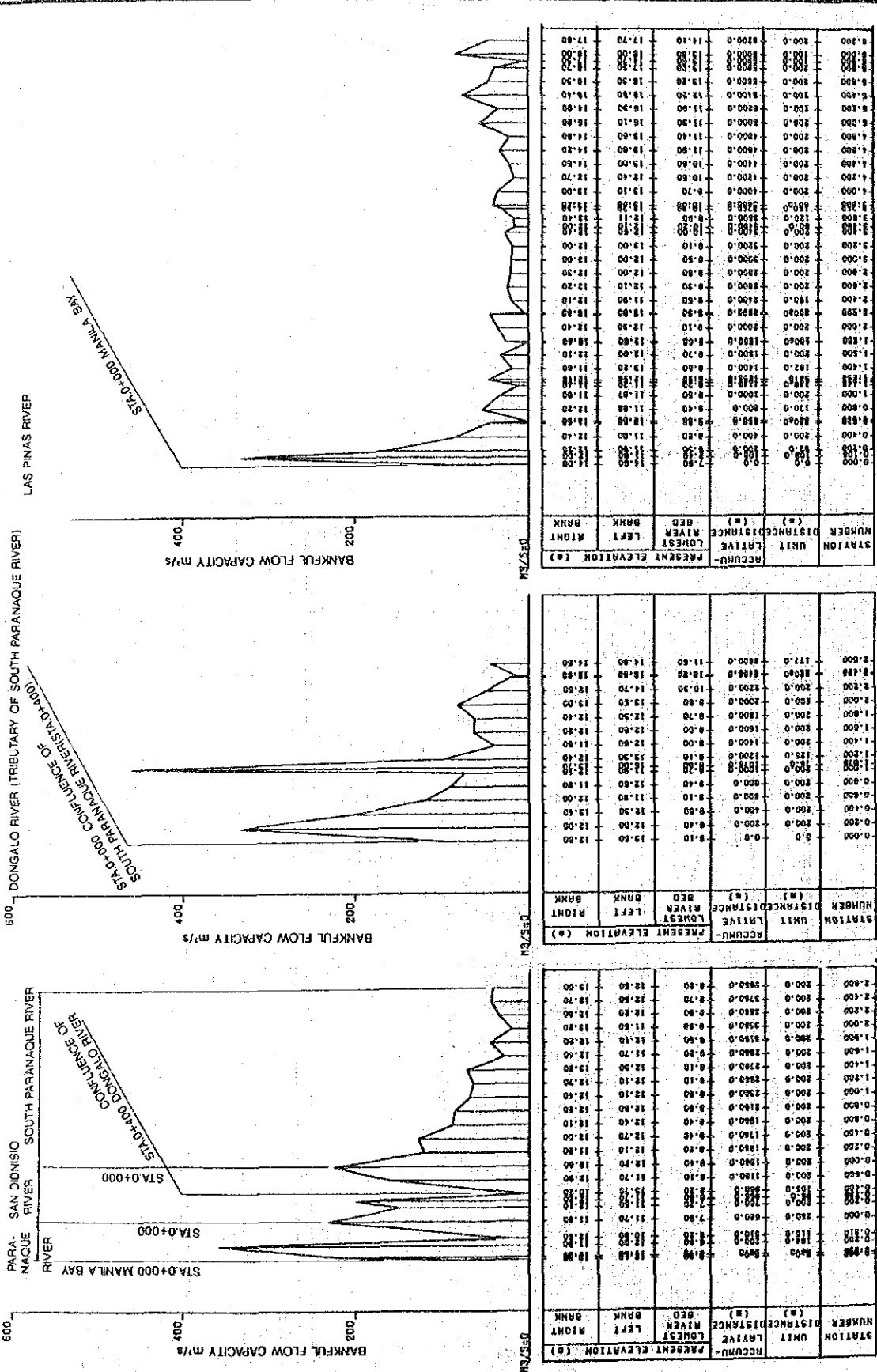
Fig.4-3-2(3/5)



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES

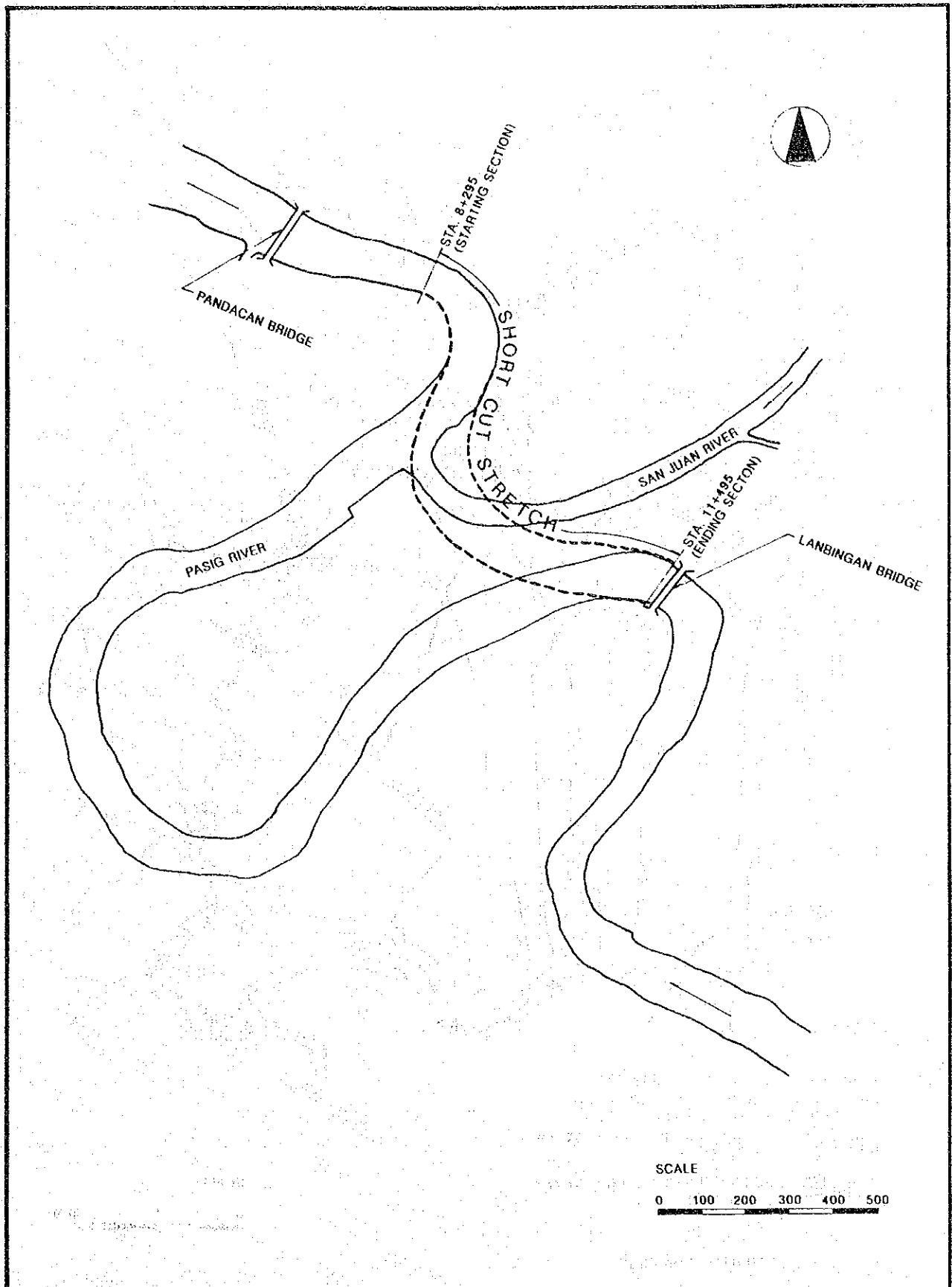
JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY
 (TRIBUTARIES A, B & C OF BAHO RIVER)
 Fig.4-3-2(4/5)



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

EXISTING FLOW CAPACITY
 (SOUTH PARANAQUE, DONGALO AND
 LAS PINAS RIVERS) Fig.4-3-2(5/5)

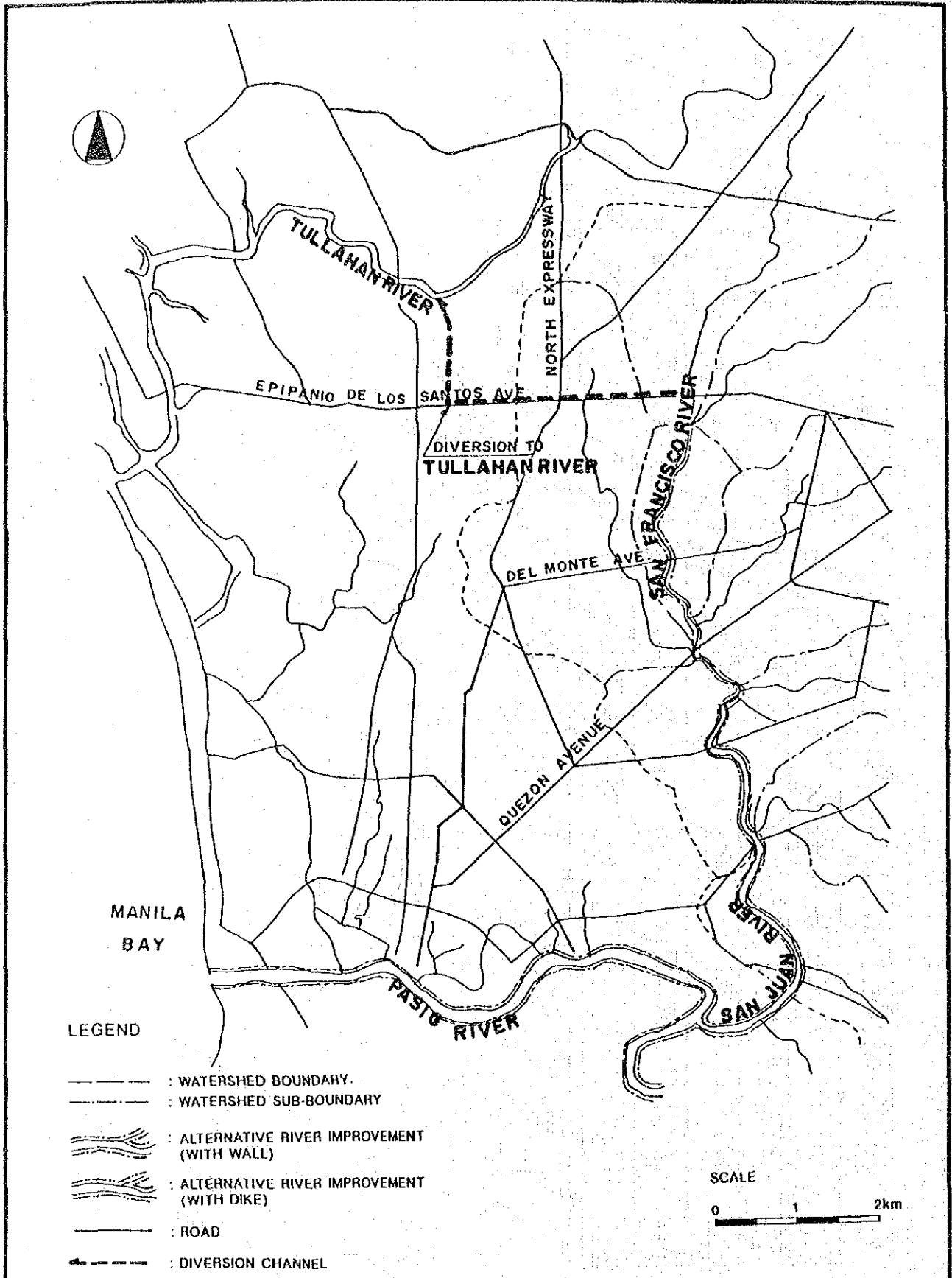


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

LOCATION OF SHORT-CUT STRETCH

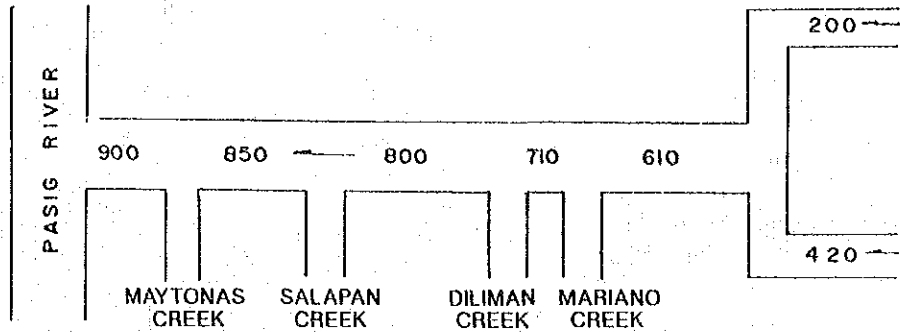
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4-3-3

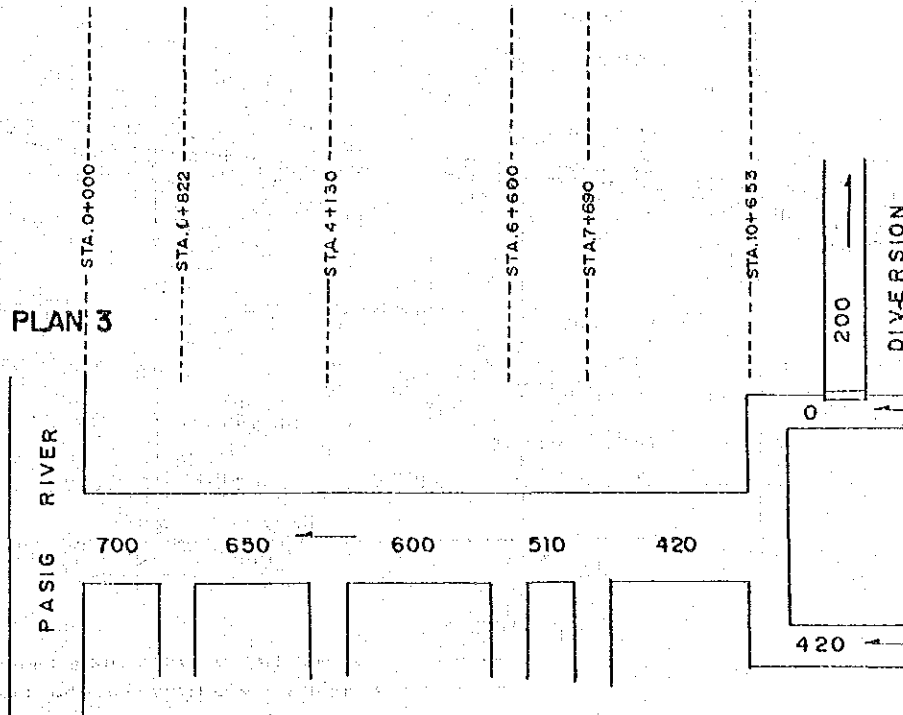


<p>THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT IN METRO MANILA, PHILIPPINES</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>ALTERNATIVE PLAN FOR SAN JUAN RIVER</p> <p>Fig. 4-3-4</p>
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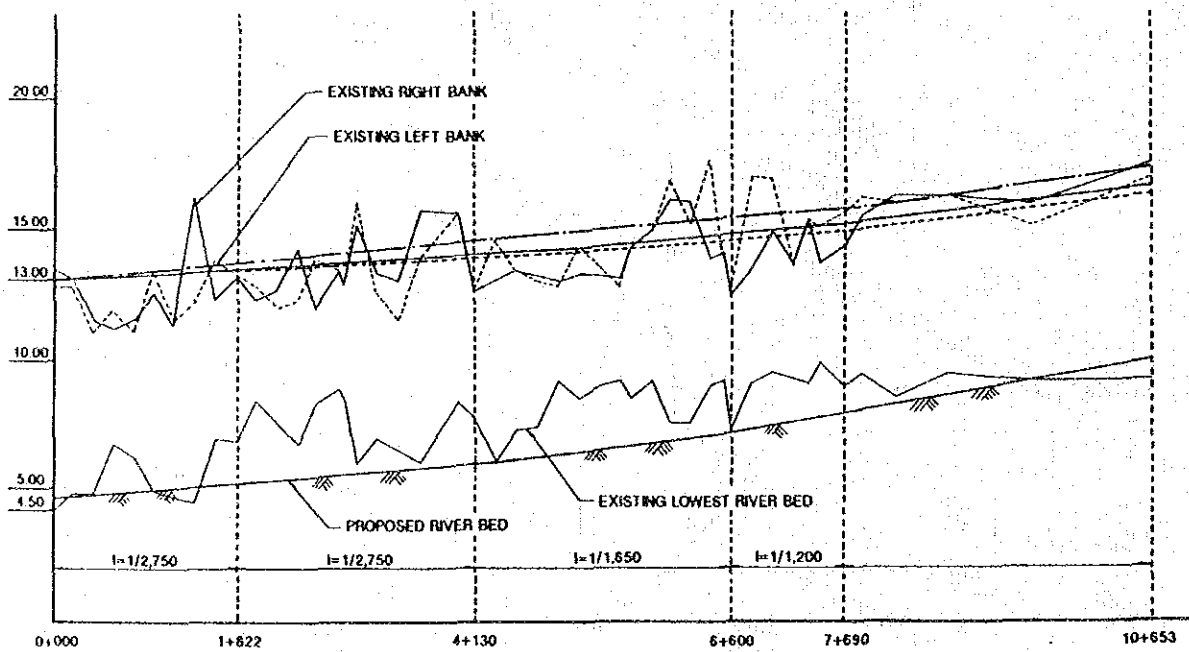
ALTERNATIVE PLAN 1 & 2



ALTERNATIVE PLAN 3



NOTE : FIGURES INDICATE THE DISCHARGE DISTRIBUTION m^3/s , OF WHICH THE RUN-OFF DISCHARGE IS CONFINED IN THE CHANNEL.



LEGEND

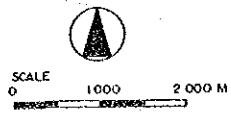
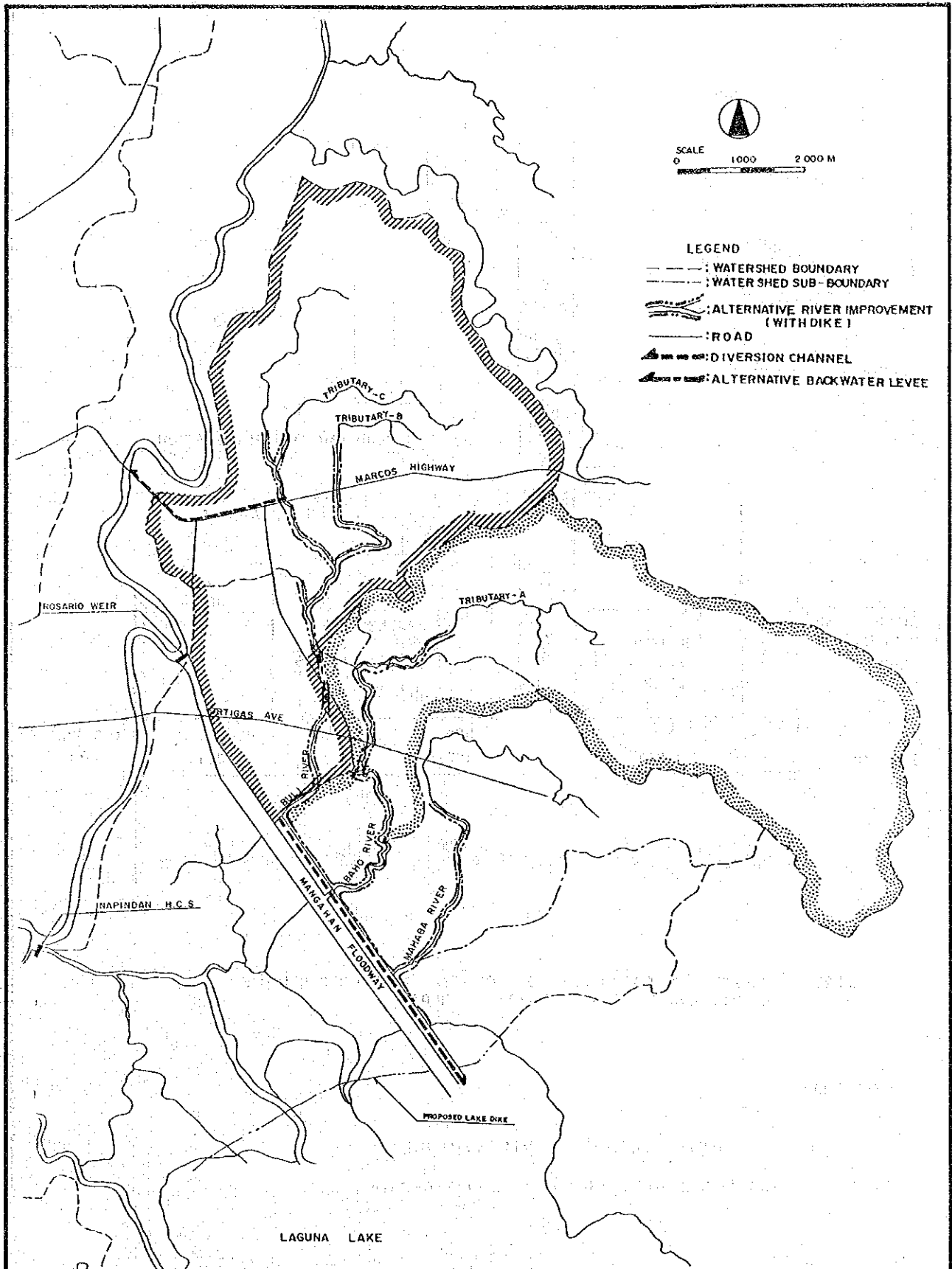
- : HIGH WATER STAGE OF PLAN 1 (Expanding Channel Width, $Q=900m^3/s$)
- : HIGH WATER STAGE OF PLAN 2 (Existing Channel Width, $Q=900m^3/s$)
- : HIGH WATER STAGE OF PLAN 3 (Existing Channel Width, $Q=700m^3/s$)
- : LONGITUDINAL GRADIENT OF RIVER BED

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

HIGH WATER STAGE OF ALTERNATIVE PLAN OF
SAN JUAN RIVER

Fig. 4-3-6

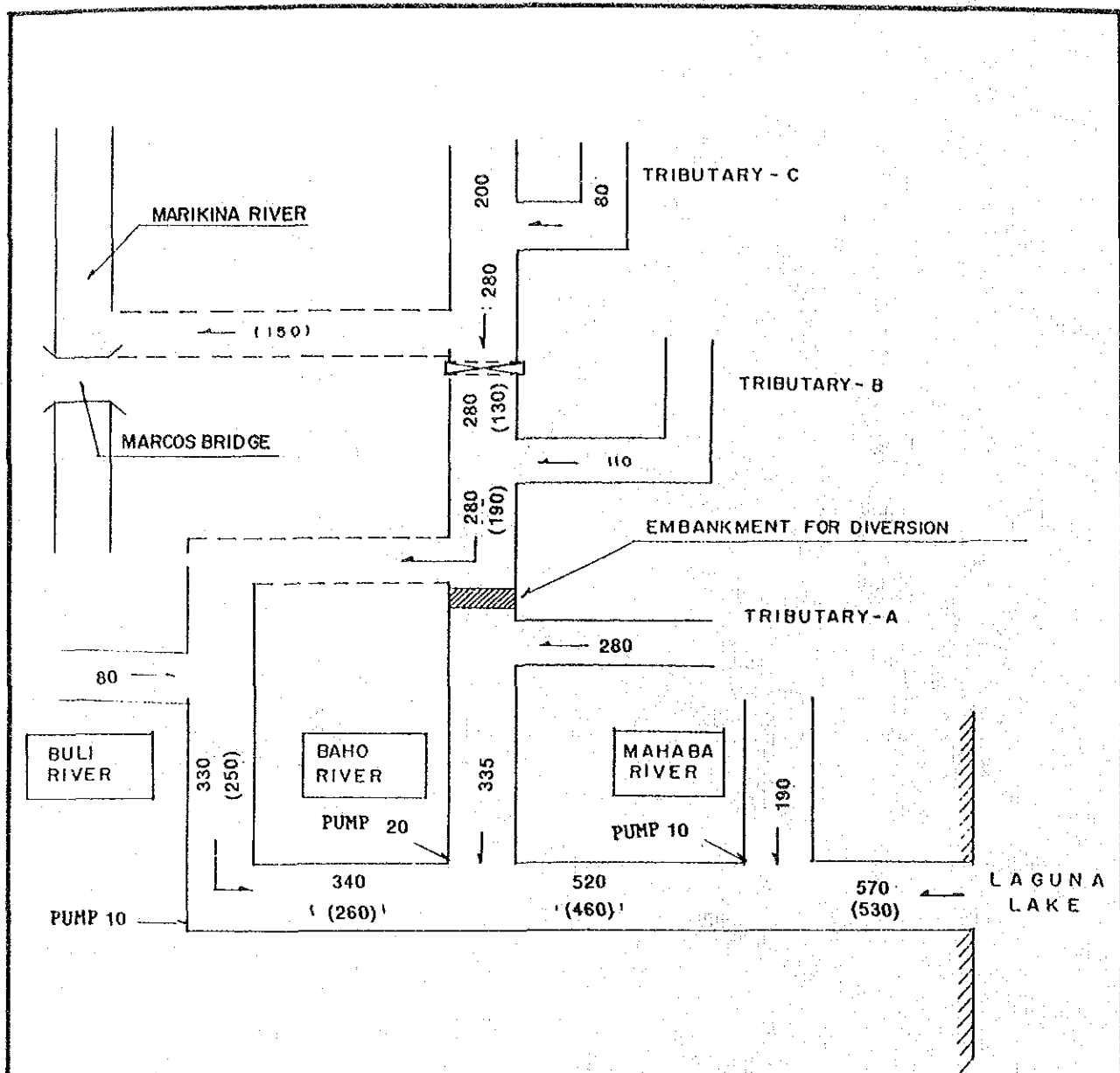


- LEGEND
- : WATERSHED BOUNDARY
 - - - : WATERSHED SUB-BOUNDARY
 - ▨ : ALTERNATIVE RIVER IMPROVEMENT (WITH DIKE)
 - : ROAD
 - ▴ : DIVERSION CHANNEL
 - ▬ : ALTERNATIVE BACKWATER LEVEE

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES
JAPAN INTERNATIONAL COOPERATION AGENCY

ALTERNATIVE PLANS IN BAHO AND BULI
RIVERS

Fig. 4-3-7



NOTE : FIGURES IN PARENTHESES PRESENT THE DISCHARGES IN THE CASE OF ALTERNATIVE PLAN

LEGEND

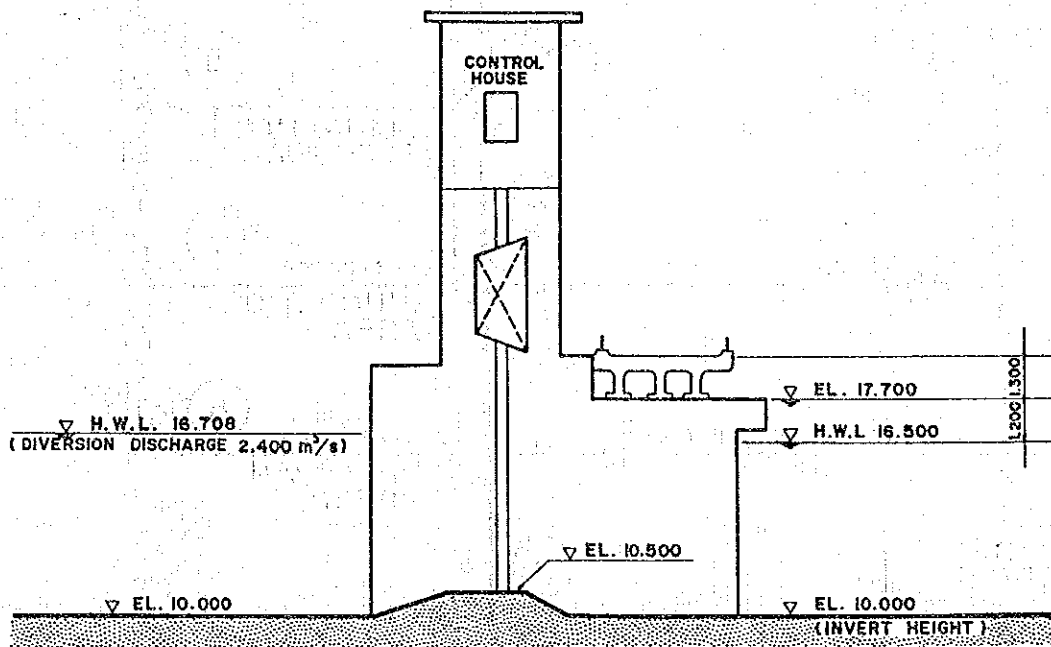
- : DIVERSION CHANNEL / INTERCEPTOR
- ⊗ : CONTROL GATE FOR MARCOS INTERCEPTOR

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

DESIGN DISCHARGE DISTRIBUTION DIAGRAM OF
BAHO-BULI-MAHABA RIVERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4-3-8

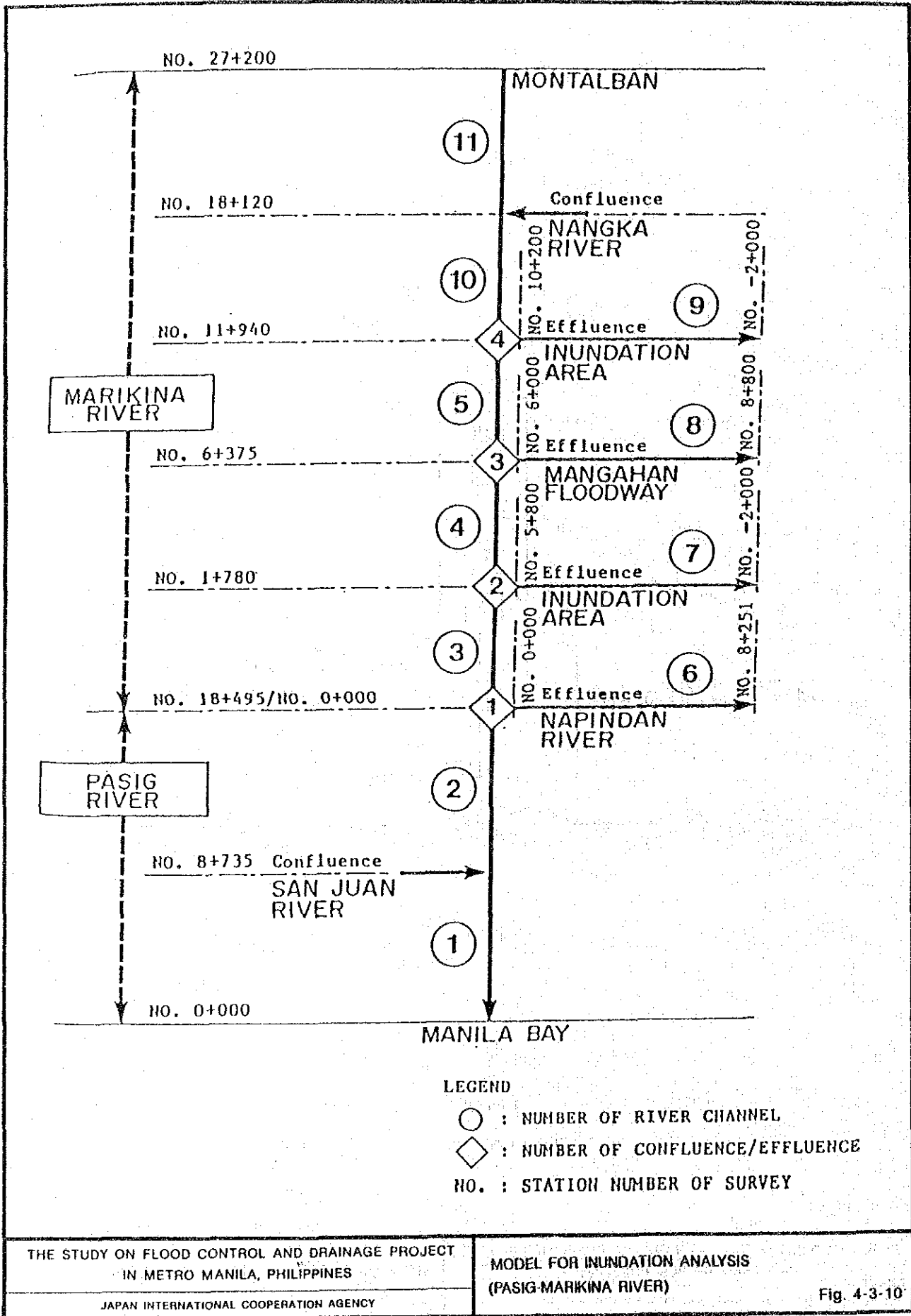


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

STRUCTURAL FEATURES OF ROSARIO WEIR

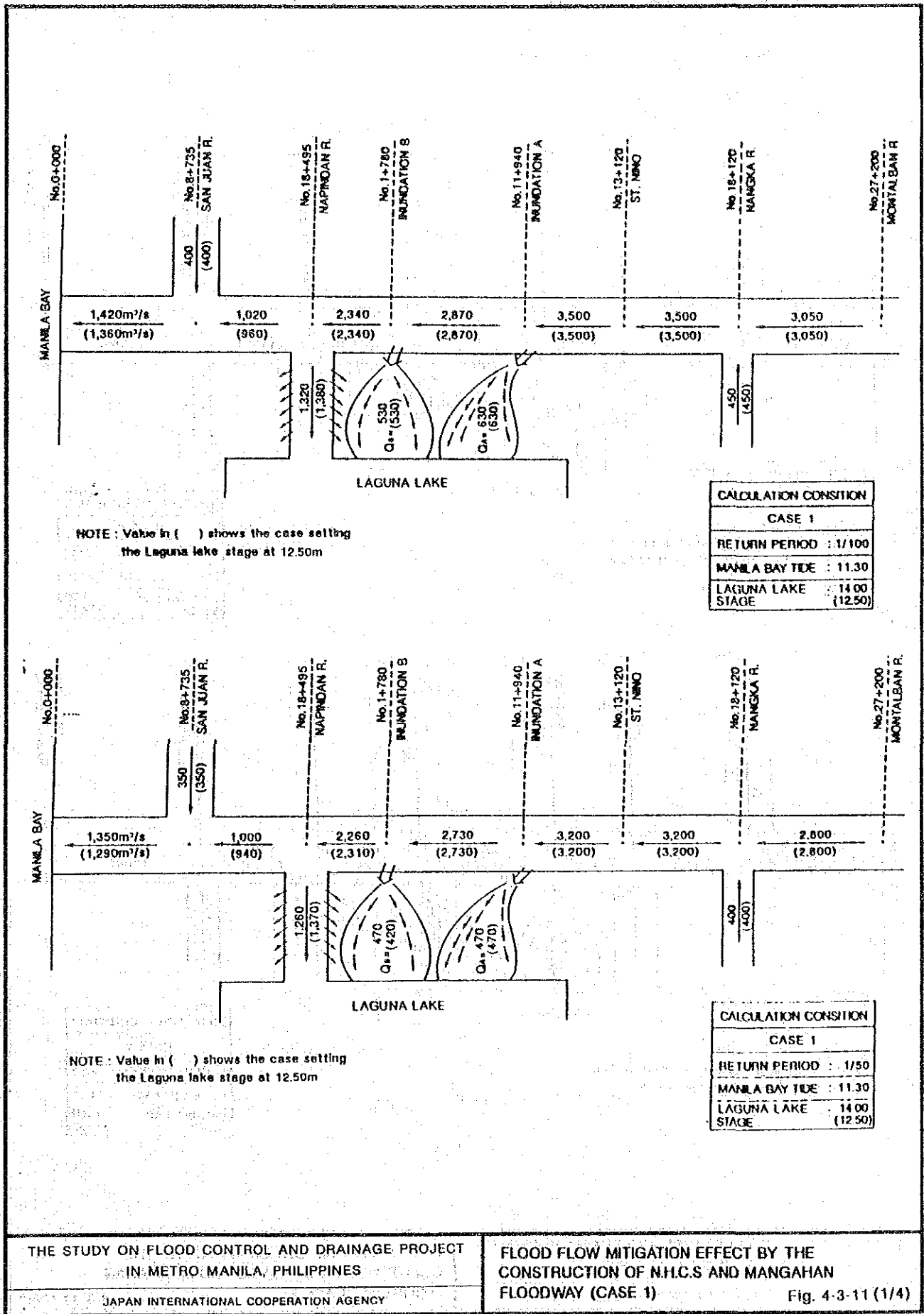
Fig. 4-3-9



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

MODEL FOR INUNDATION ANALYSIS
 (PASIG-MARIKINA RIVER)

Fig. 4-3-10

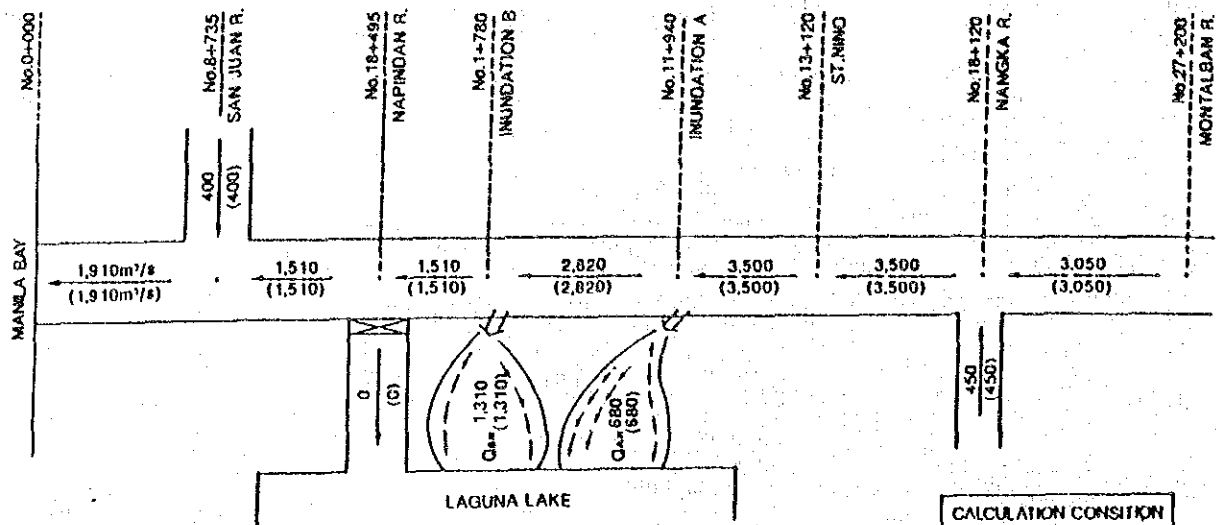


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

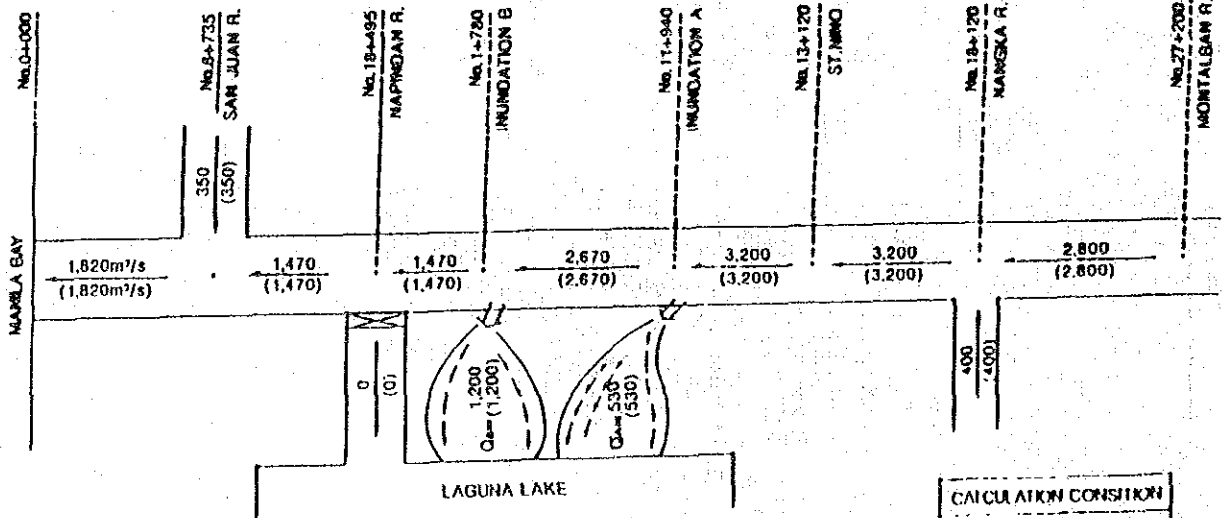
FLOOD FLOW MITIGATION EFFECT BY THE
CONSTRUCTION OF N.H.C.S AND MANGAHAN
FLOODWAY (CASE 1)

Fig. 4-3-11 (1/4)



NOTE: Value in () shows the case setting the Laguna lake stage at 12.50m

CALCULATION CONDITION	
CASE 2	
RETURN PERIOD :	1/100
MANILA BAY TIDE :	11.30
LAGUNA LAKE STAGE :	14.00 (12.50)



NOTE: Value in () shows the case setting the Laguna lake stage at 12.50 m

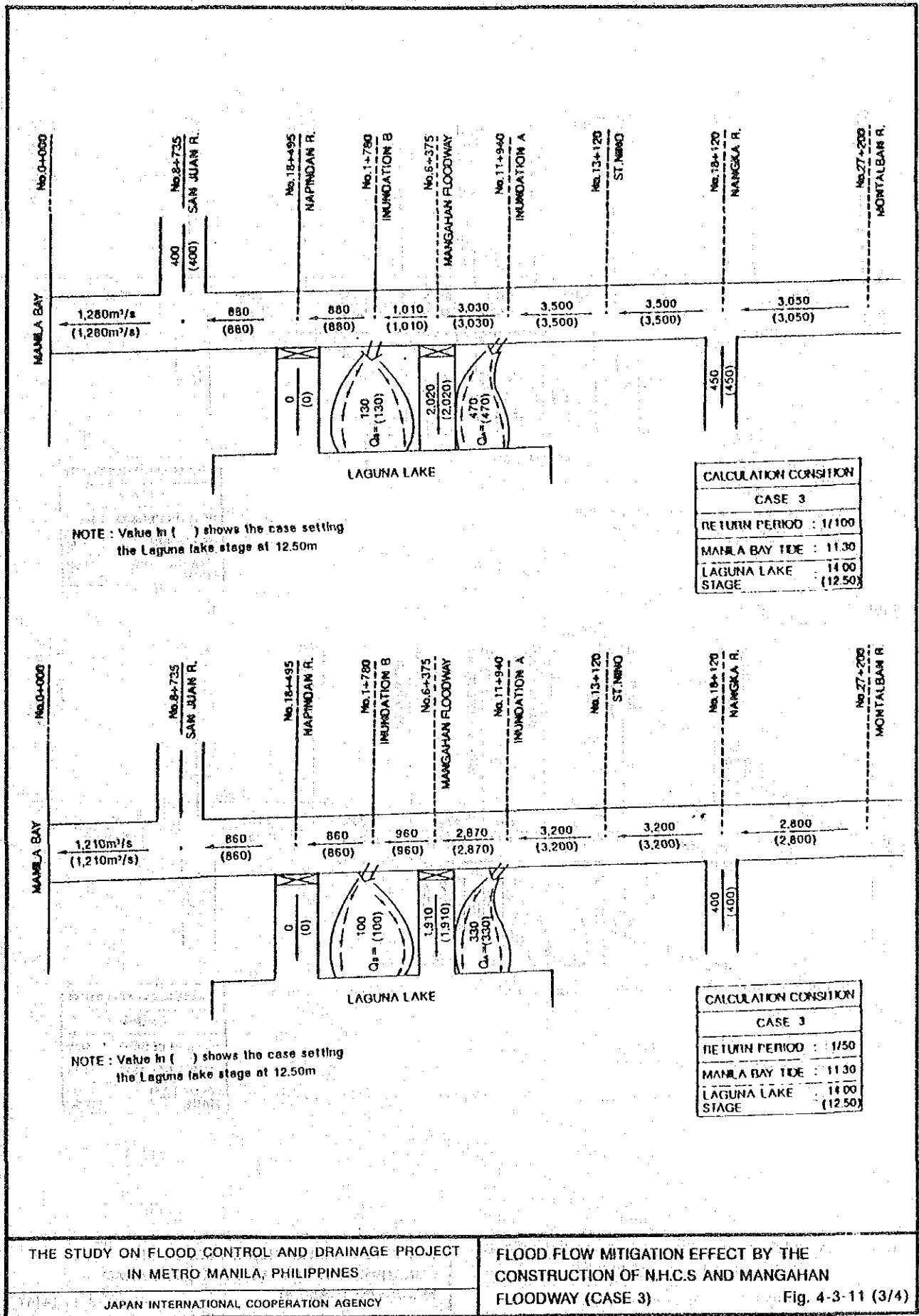
CALCULATION CONDITION	
CASE 2	
RETURN PERIOD :	1/50
MANILA BAY TIDE :	11.30
LAGUNA LAKE STAGE :	14.00 (12.50)

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

FLOOD FLOW MITIGATION EFFECT BY THE
CONSTRUCTION OF N.H.C.S AND MANGAHAN
FLOODWAY (CASE 2)

Fig. 4-3-11 (2/4)

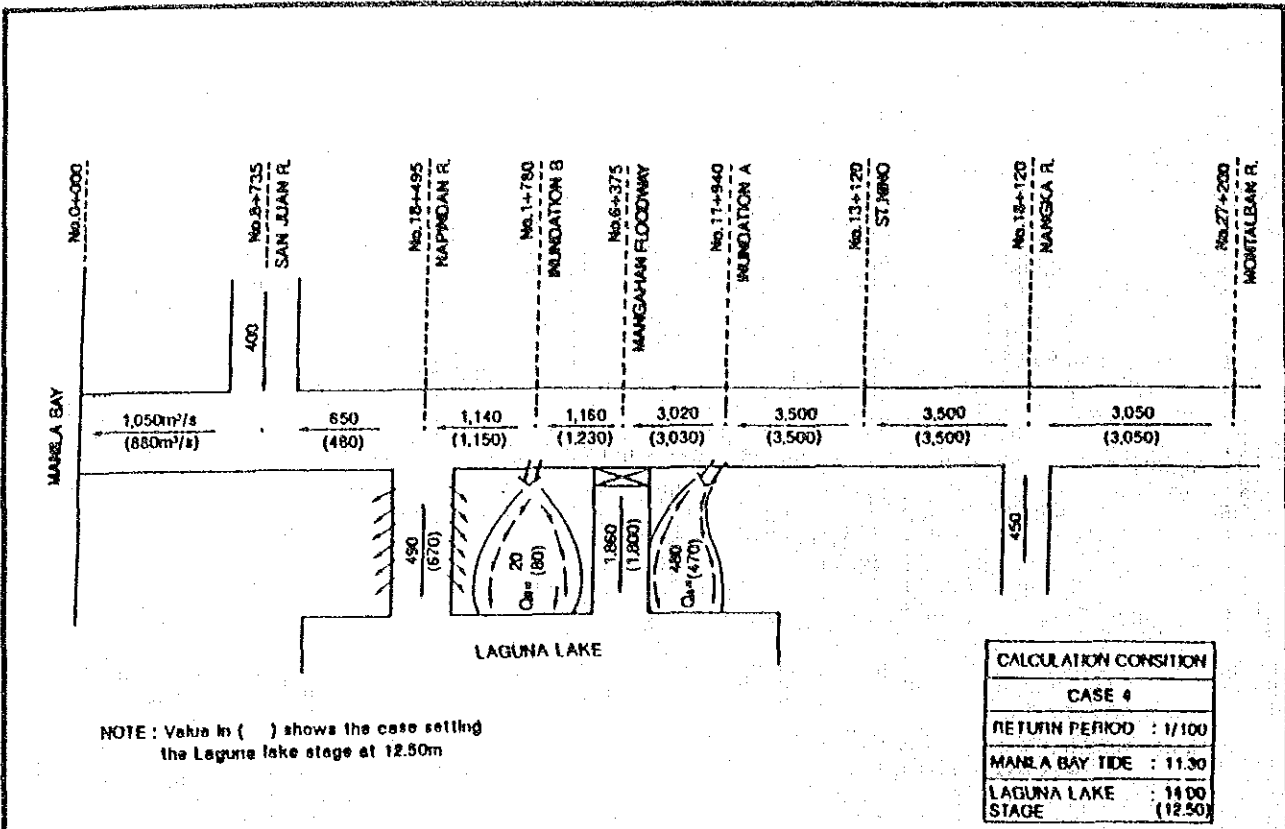


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

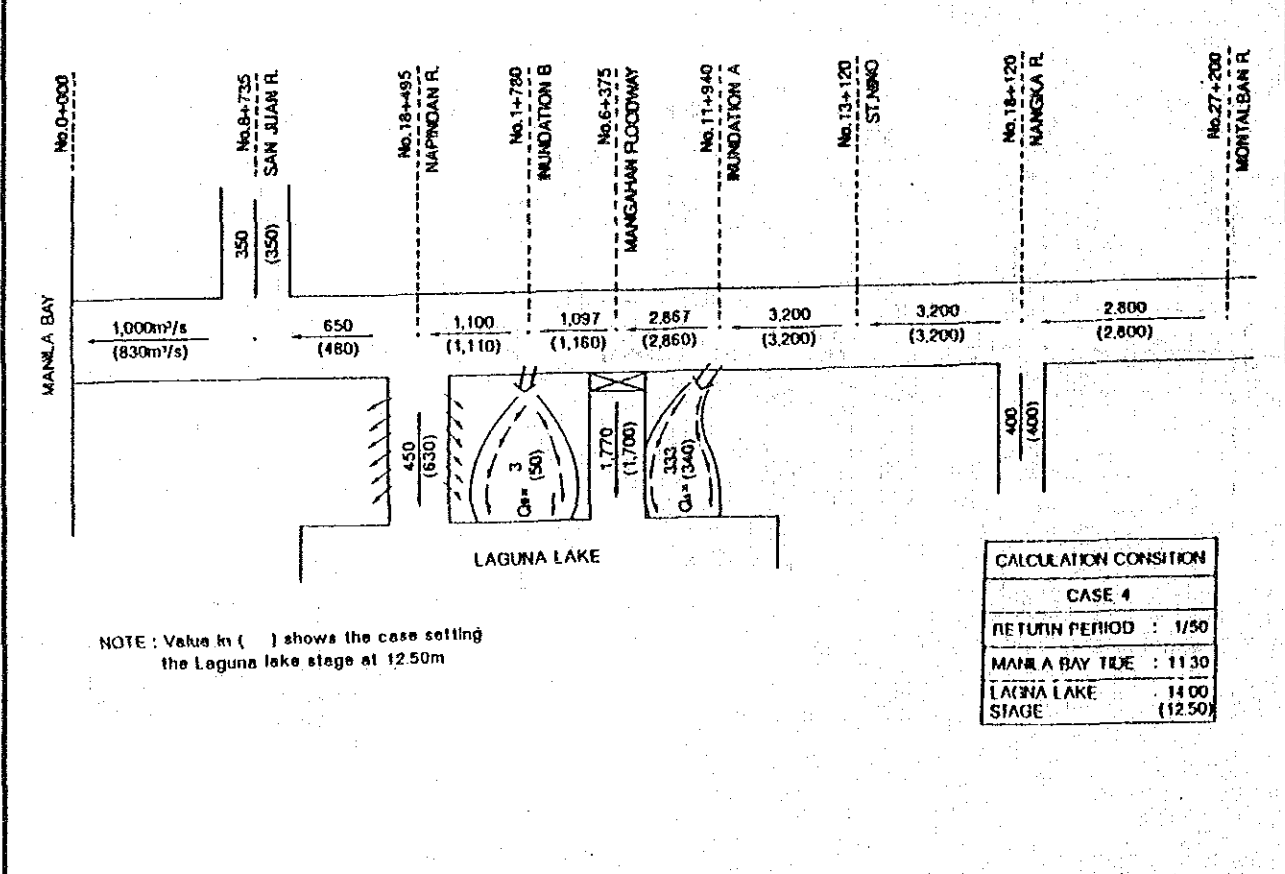
JAPAN INTERNATIONAL COOPERATION AGENCY

FLOOD FLOW MITIGATION EFFECT BY THE
CONSTRUCTION OF N.H.C.S AND MANGAHAN
FLOODWAY (CASE 3)

Fig. 4-3-11 (3/4)

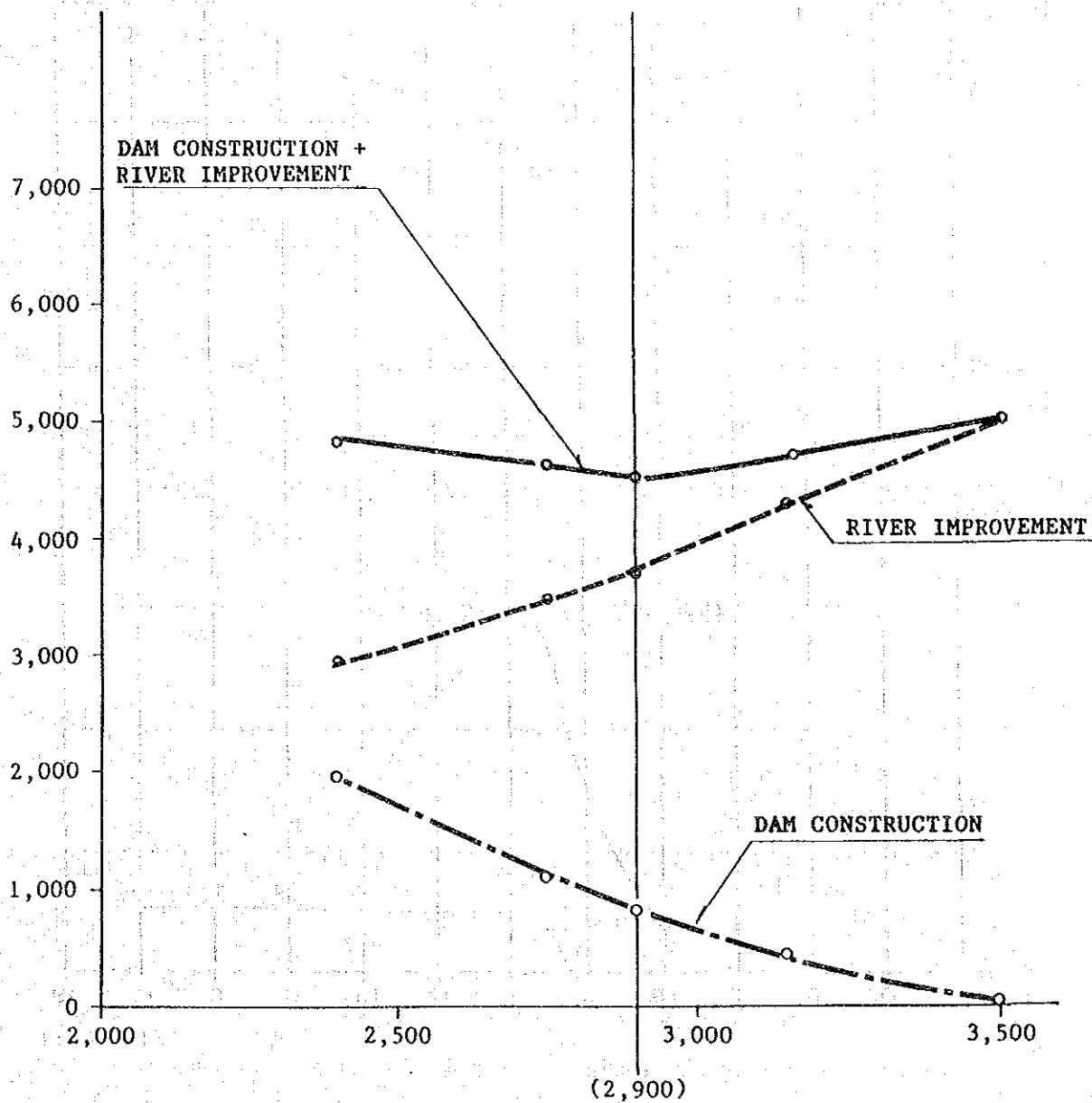


CALCULATION CONDITION	
CASE 4	
RETURN PERIOD	: 1/100
MANILA BAY TIDE	: 11.30
LAGUNA LAKE STAGE	: 12.50



CALCULATION CONDITION	
CASE 4	
RETURN PERIOD	: 1/50
MANILA BAY TIDE	: 11.30
LAGUNA LAKE STAGE	: 12.50

CONSTRUCTION COST
(MILLION PESO)



MAXIMUM DISCHARGE TO BE CONFINED BY THE MARIKINA RIVER (m³/s)

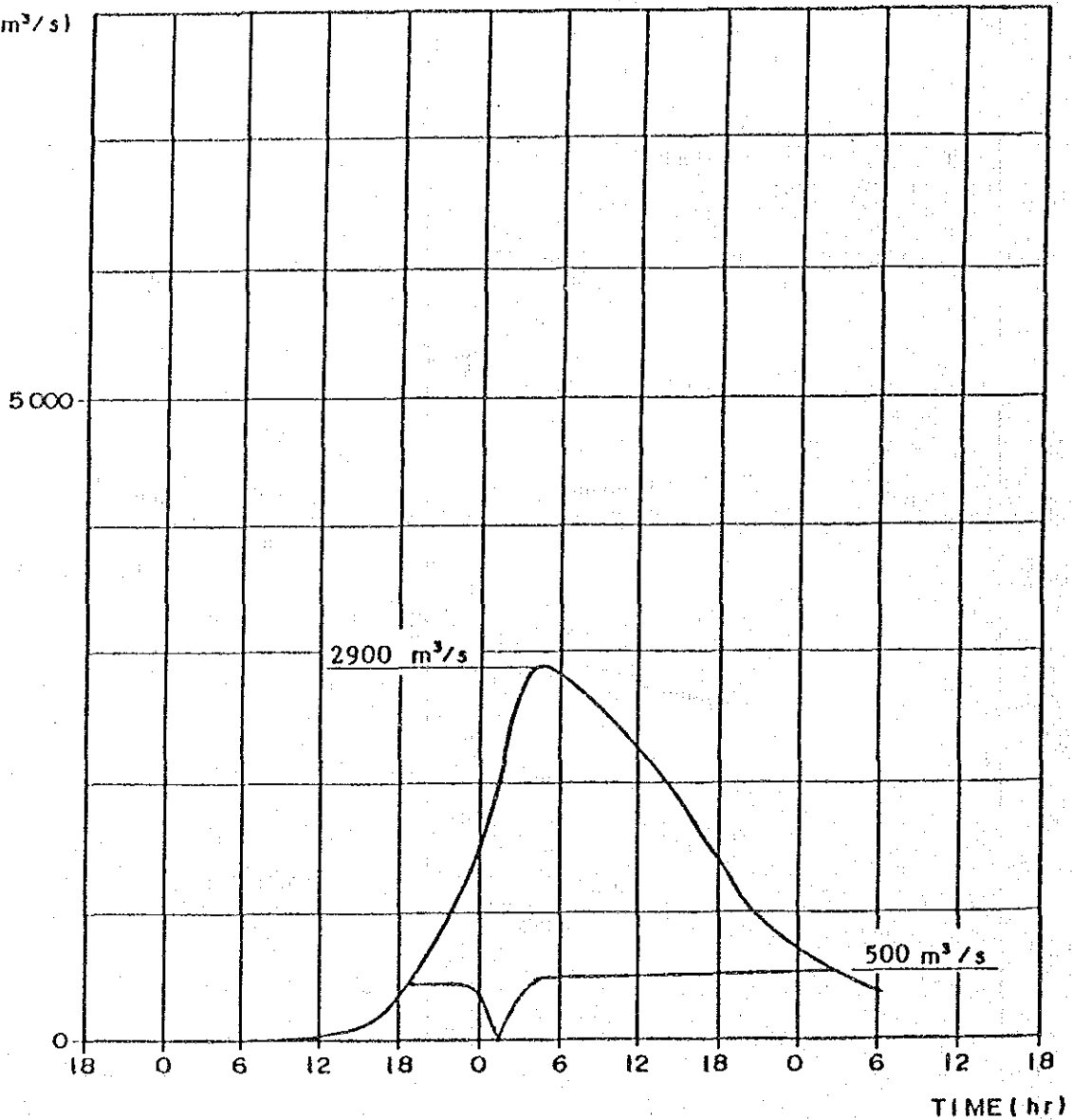
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

COST ALLOCATION BETWEEN MARIKINA DAM
AND RIVER IMPROVEMENT

Fig.4-3-12

DISCHARGE
(m³/s)

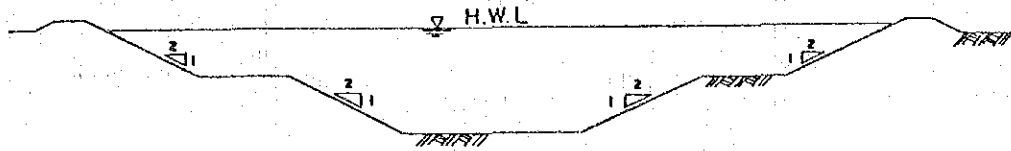


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

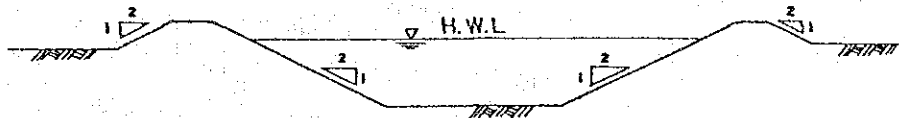
JAPAN INTERNATIONAL COOPERATION AGENCY

COMPARISON OF ACTUAL FLOOD AND
ANALYSIS RESULT

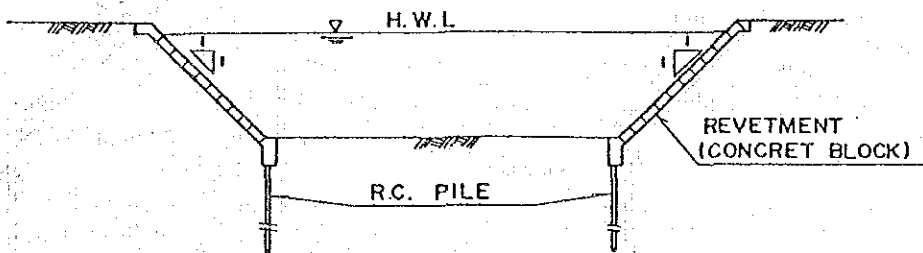
Fig. 4-3-13



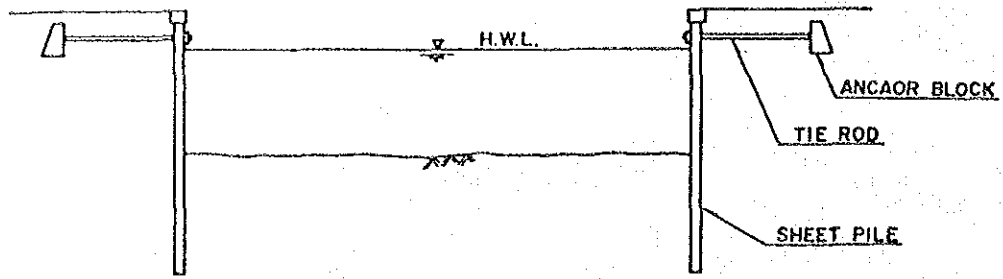
COMPOUND CROSS SECTION
(FOR UPPER REACH OF THE UPPER MARIKNA RIVER)



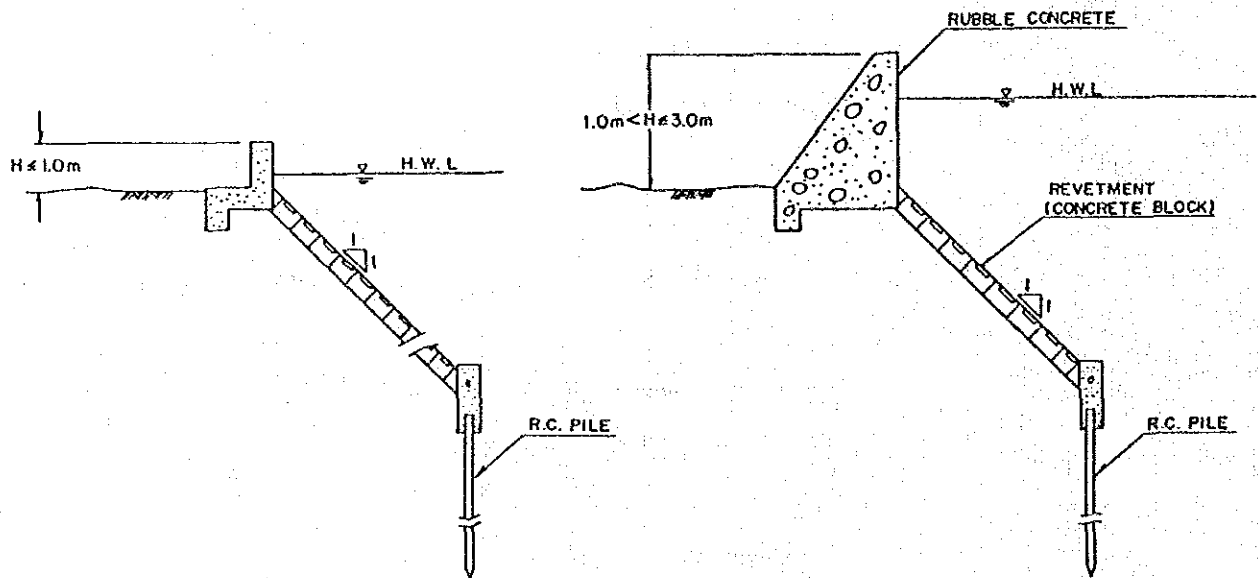
SINGLE CROSS SECTION
(FOR ORDINARY RIVERS)



SINGLE CROSS SECTION W/ REVETMENT
(FOR THE PASIG RIVER AND RIVER STRETCHES IN CONGESTED AREAS)



RECTANGULAR TYPE WITH SHEET PILES



PARAPET WALL WITH REVETMENT

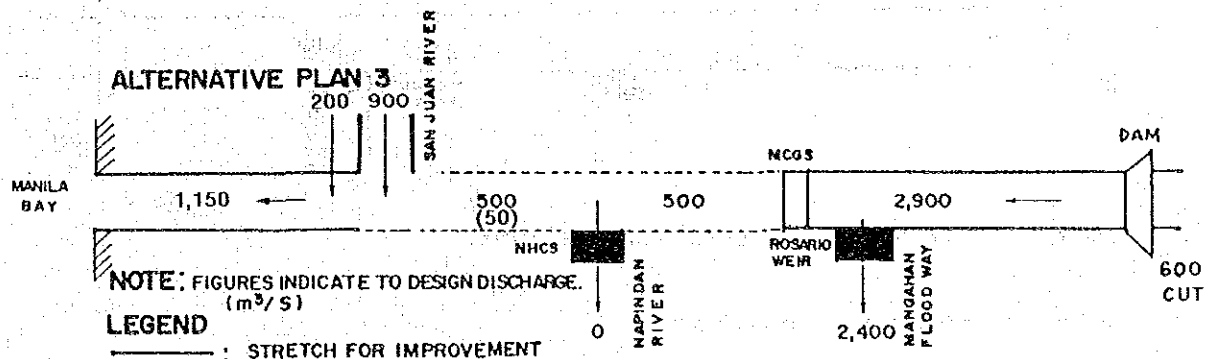
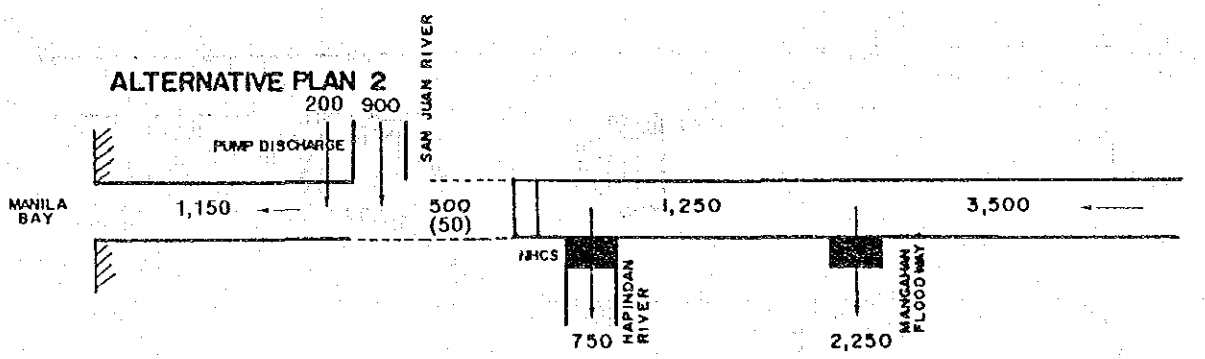
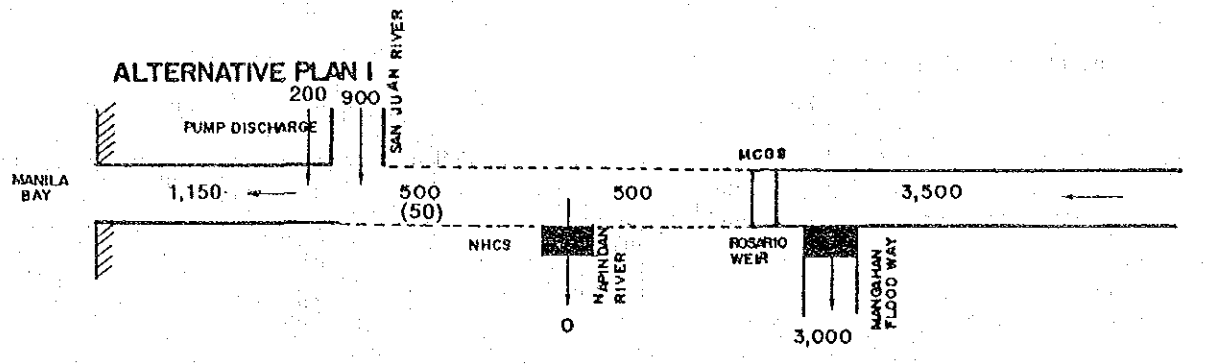
RIVER WALL WITH REVETMENT

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

TYPICAL STRUCTURES FOR RIVER CROSS
SECTION WITHOUT SUFFICIENT FLOW
CAPACITY

Fig. 4-5-2



NOTE: FIGURES INDICATE TO DESIGN DISCHARGE. (m³/s)

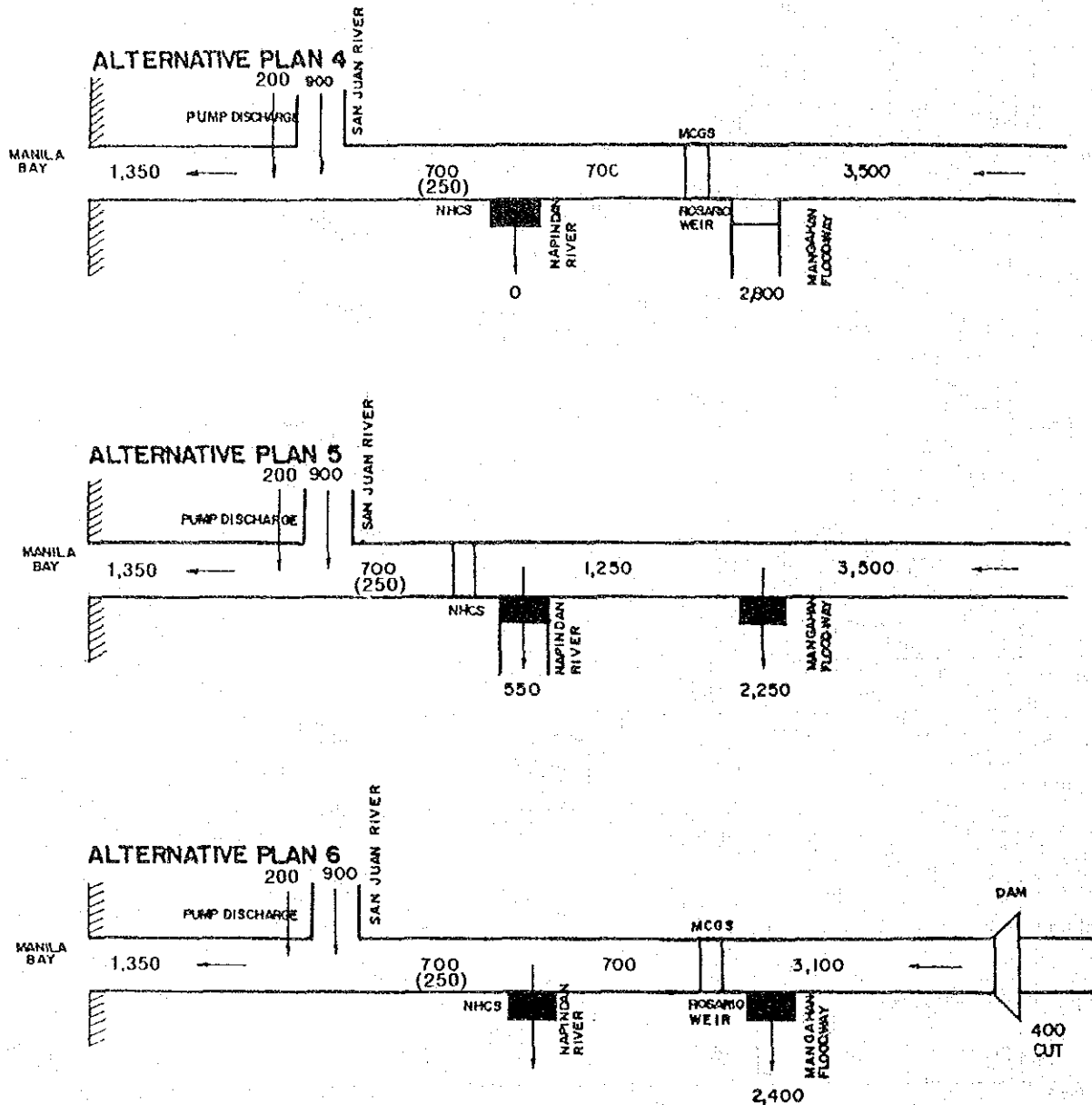
- LEGEND**
- : STRETCH FOR IMPROVEMENT
 - - - : EXISTING CHANNEL
 - : PROPOSED STRUCTURE
 - : EXISTING STRUCTURE

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

DESIGN DISCHARGE DISTRIBUTION
DIAGRAM OF PASIG-MARIKINA RIVER

Fig. 4-5-3 (1/3)



NOTE: FIGURES INDICATE THE DESIGN DISCHARGE. (M³/S)

LEGEND

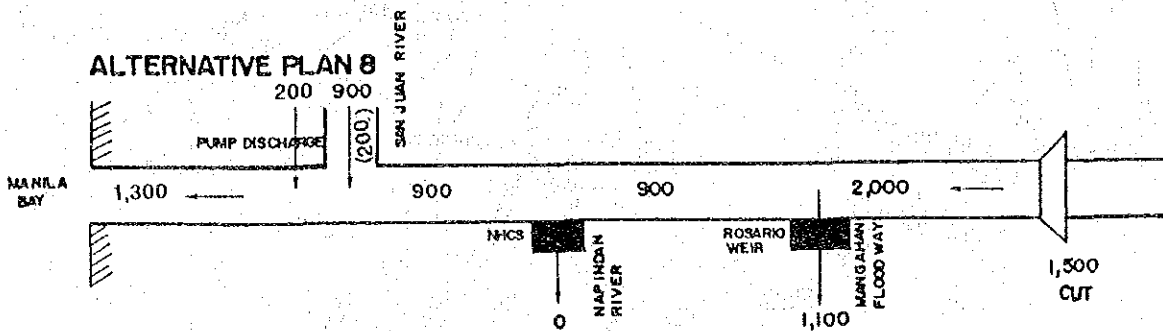
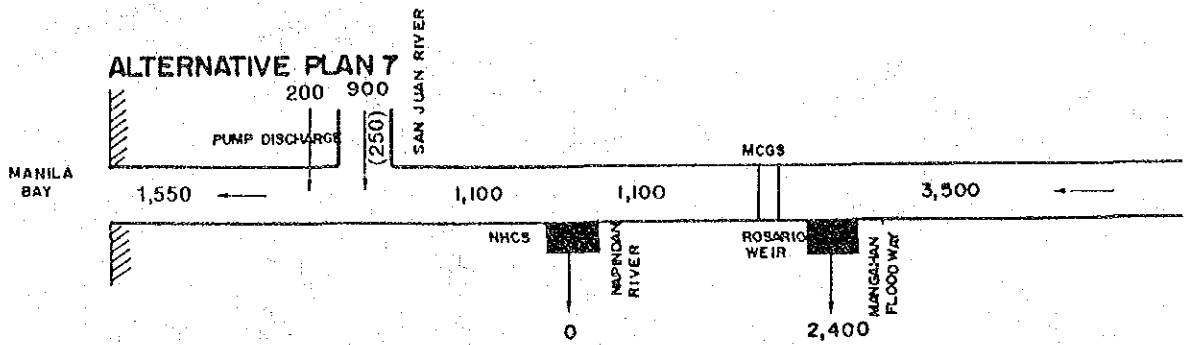
- : STRETCH FOR IMPROVEMENT
- : PROPOSED STRUCTURE
- : EXISTING STRUCTURE

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

DESIGN DISCHARGE DISTRIBUTION
DIAGRAM OF PASIG-MARIKINA RIVER

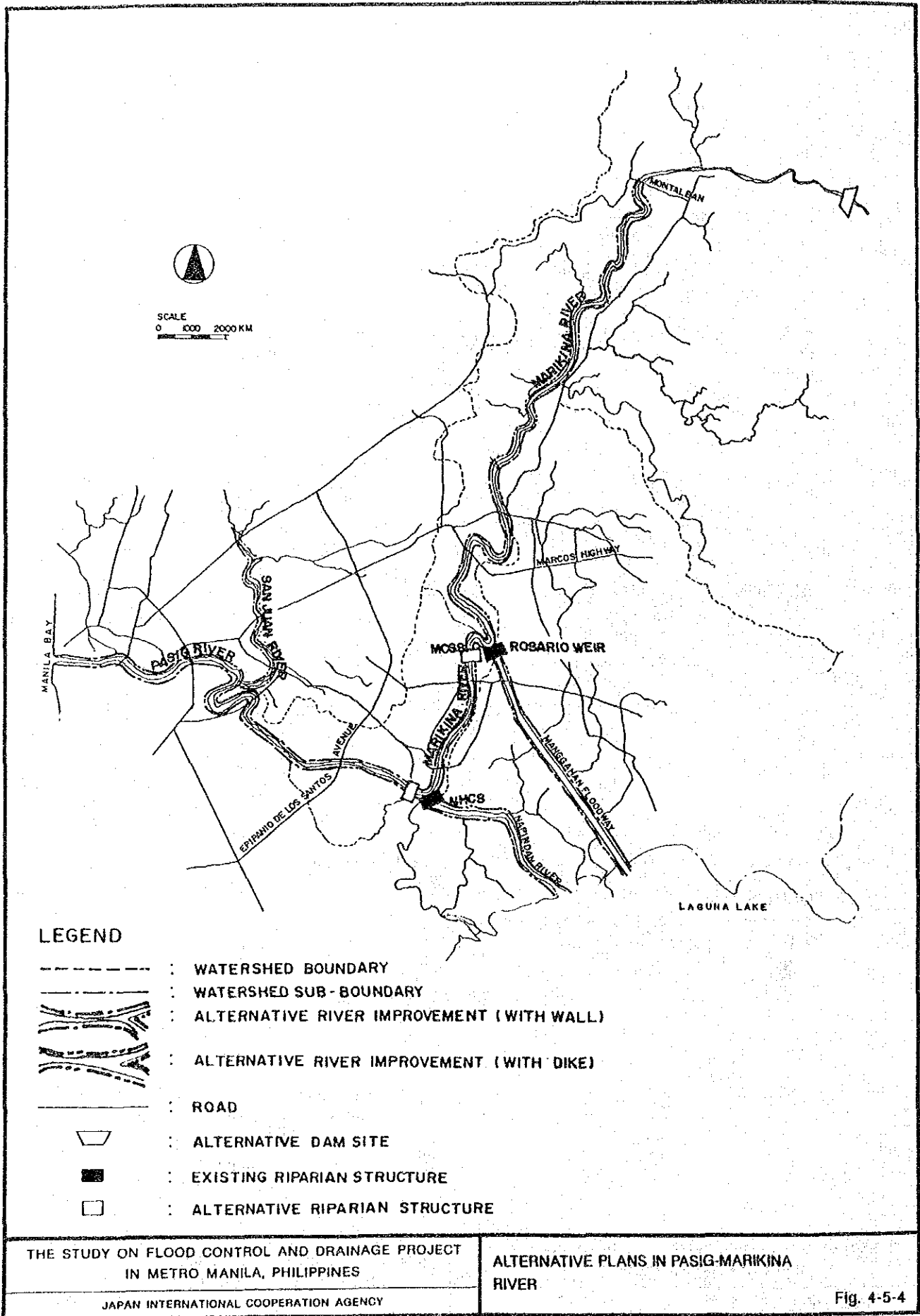
Fig. 4-5-3 (2/3)

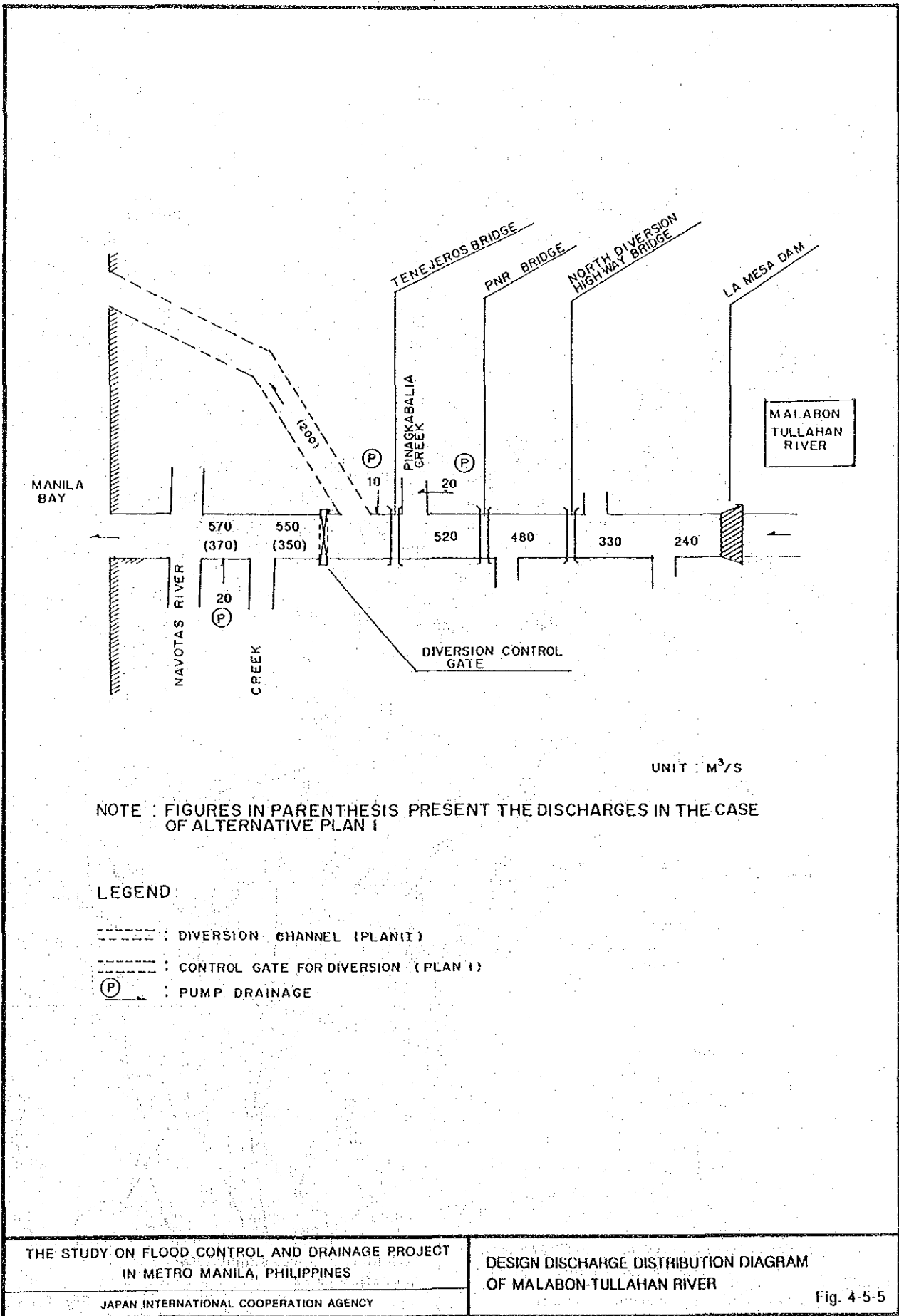


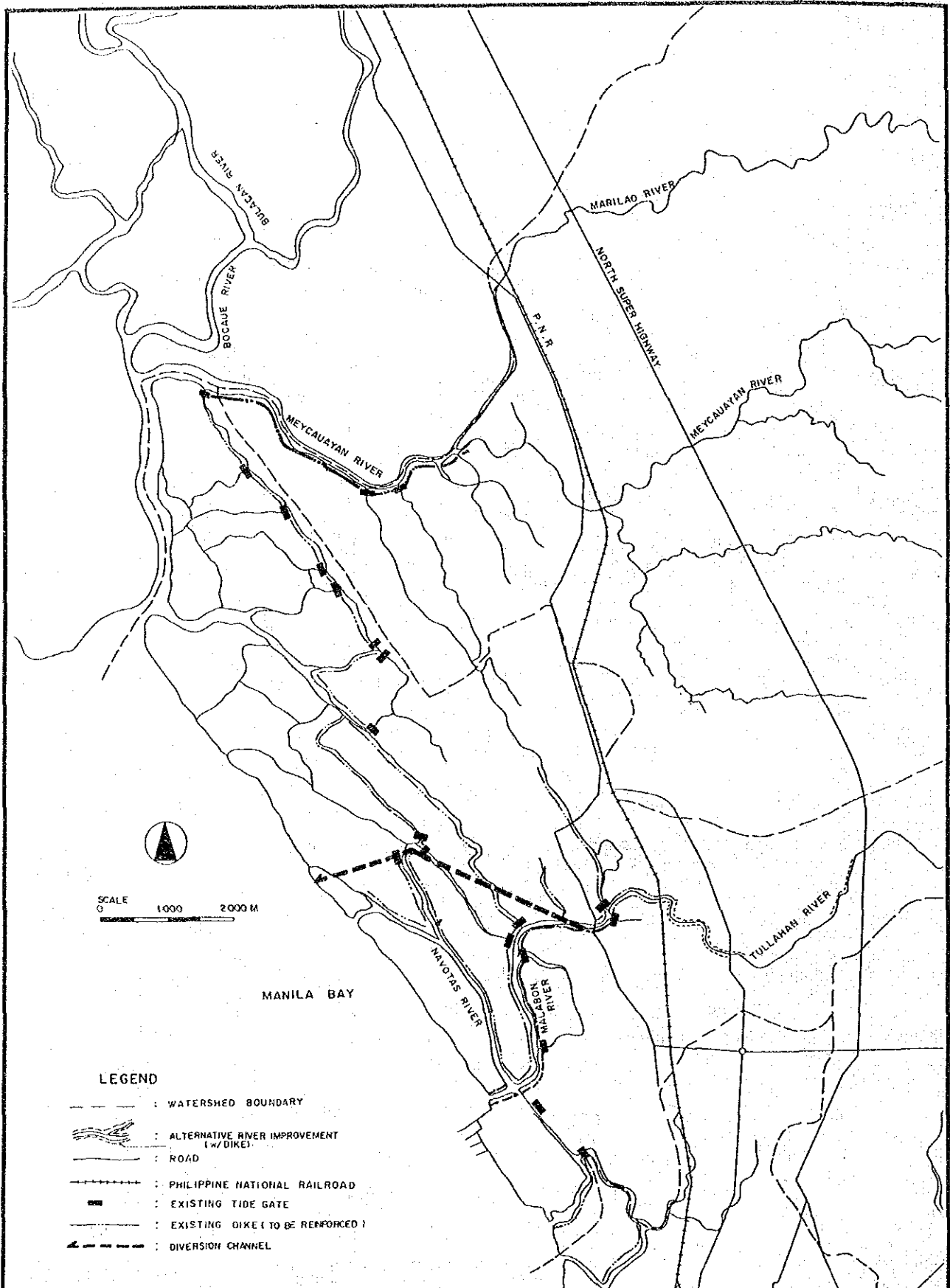
NOTE: FIGURES INDICATE THE DESIGN DISCHARGE (M^3/S)

LEGEND

- : STRETCH FOR IMPROVEMENT
- : PROPOSED STRUCTURE
- : EXISTING STRUCTURE





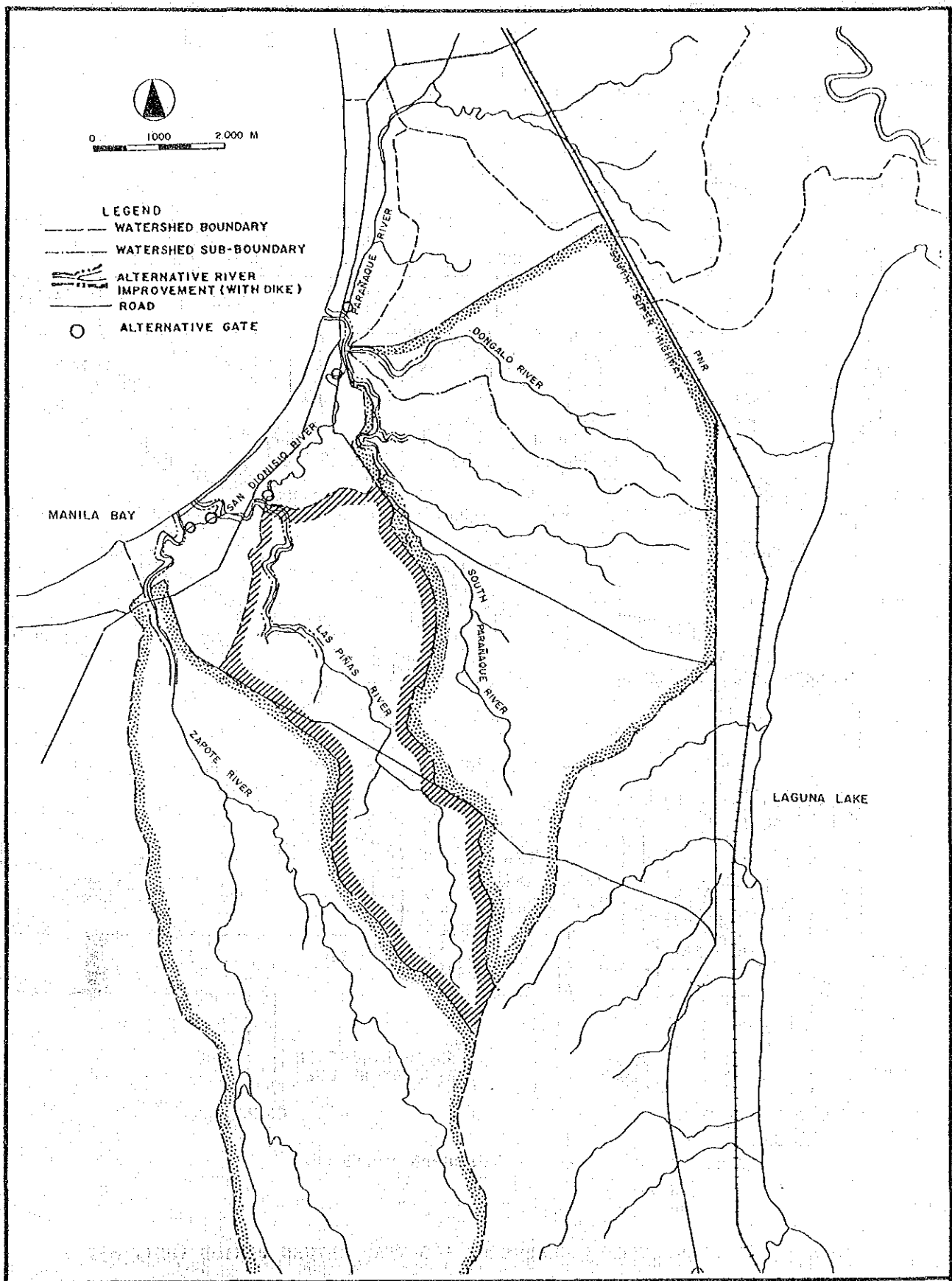


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

ALTERNATIVE PLANS IN MALABON
- TULLAHAN RIVER

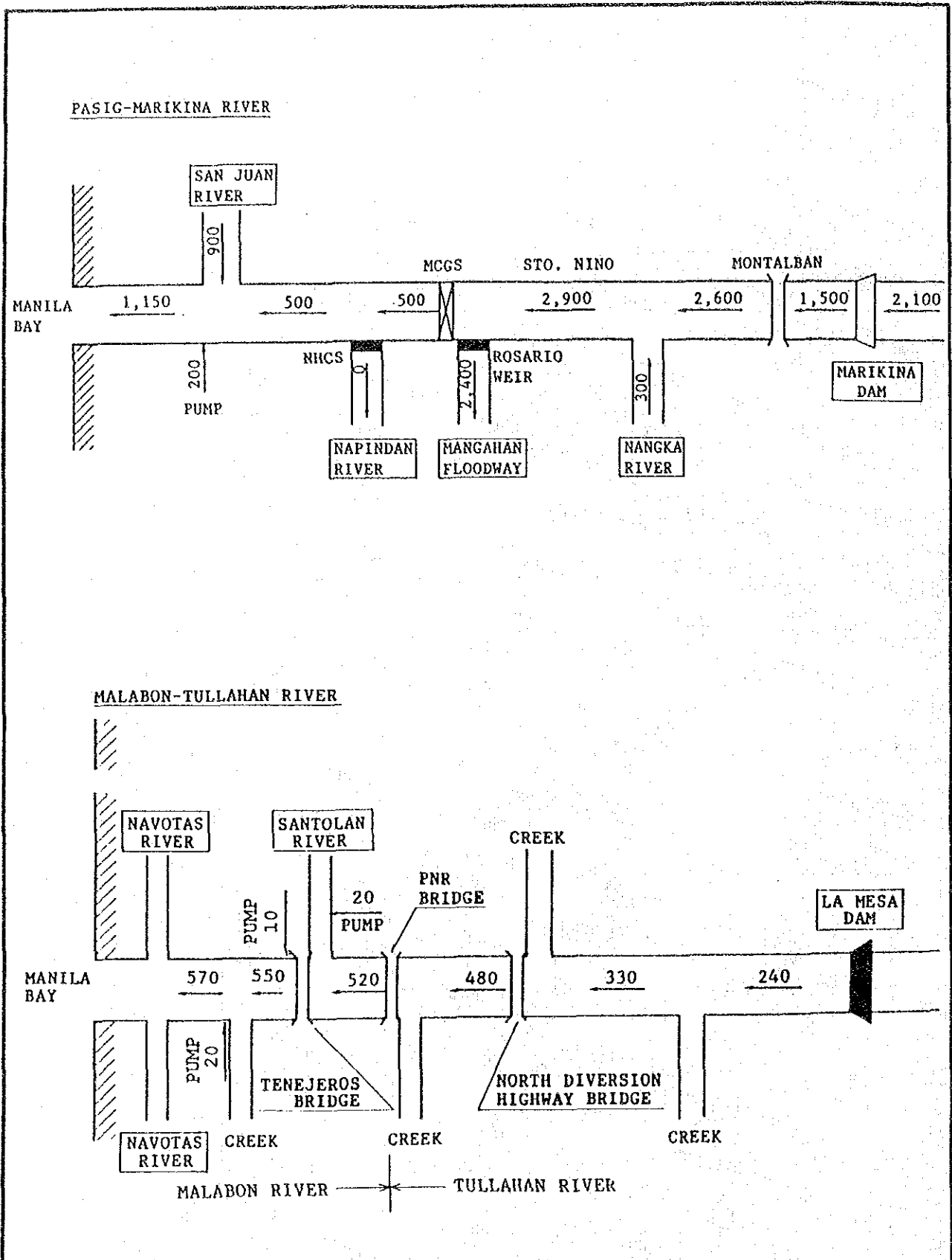
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Fig. 4-5-6



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

ALTERNATIVE PLANS IN PARANAQUE-LAS
 PINAS RIVER
 Fig. 4-5-7

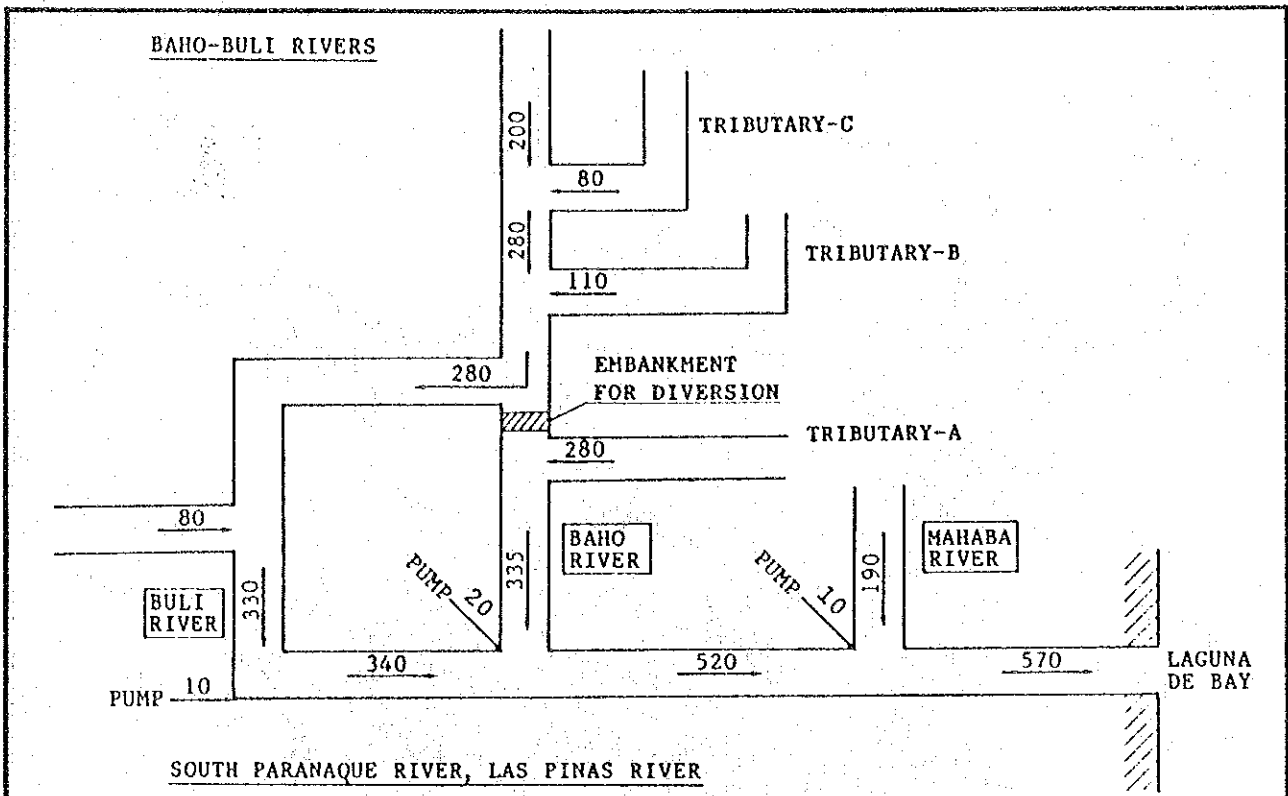


NOTE: FIGURES SHOW PEAK DISCHARGE OF 100-YEAR RETURN PERIOD (UNIT: m^3/s)

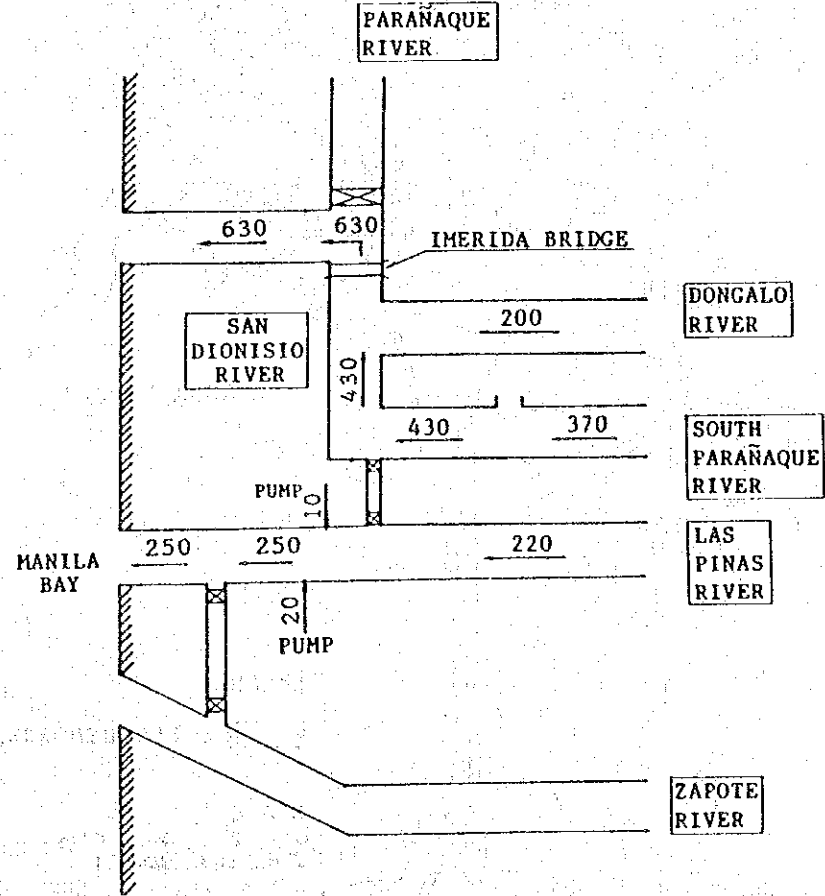
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

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DESIGN DISCHARGE OF RIVERS FOR THE
FRAMEWORK PLAN (PASIG-MARIKINA AND
MALABON-TULLAHAN RIVERS) Fig. 4-5-8(1/2)

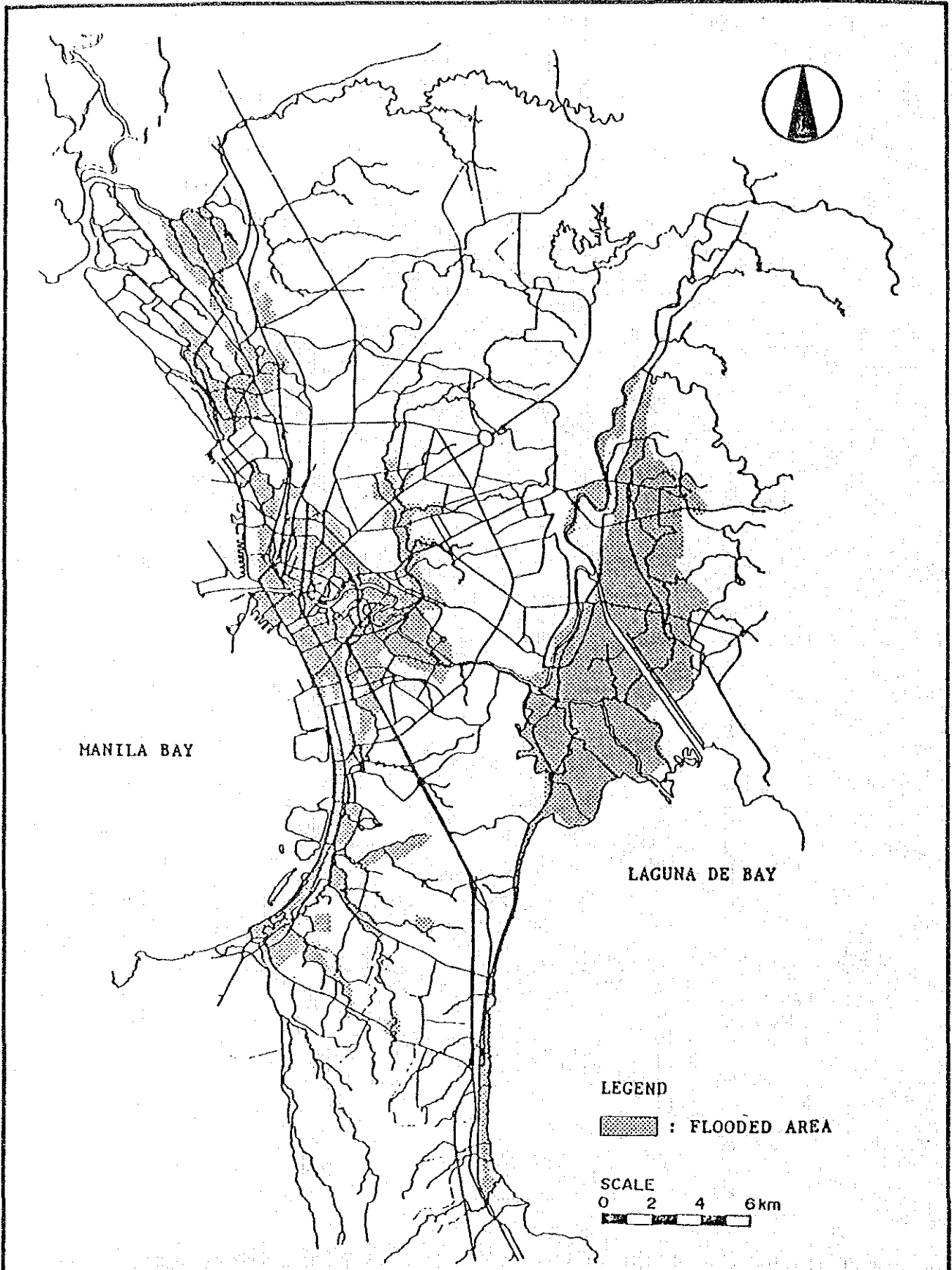


SOUTH PARANAQUE RIVER, LAS PINAS RIVER



NOTE: FIGURES SHOW PEAK DISCHARGE OF 100-YEAR RETURN PERIOD (UNIT: m^3/s)

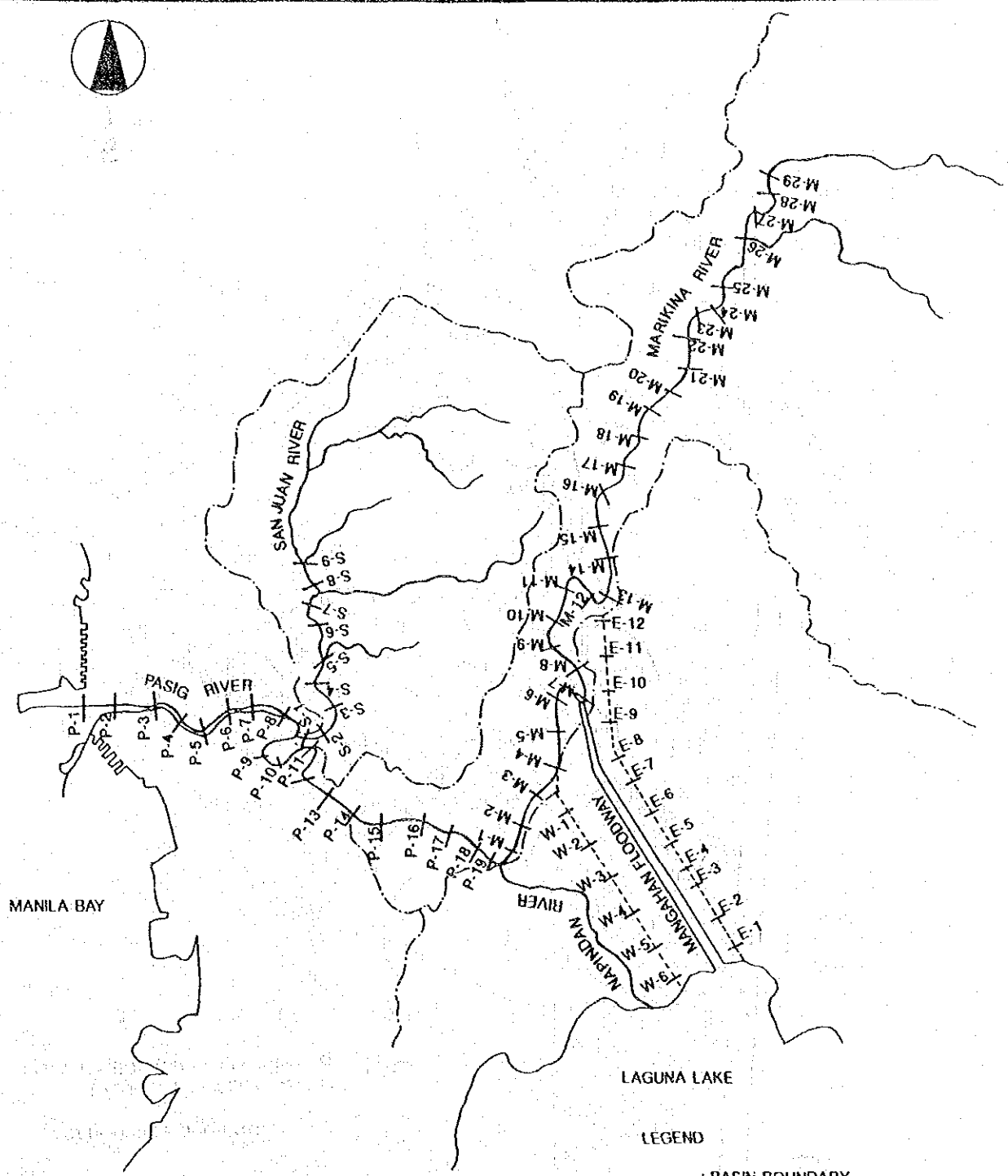
<p>THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT IN METRO MANILA, PHILIPPINES</p>	<p>DESIGN DISCHARGE OF RIVERS FOR THE FRAMEWORK PLAN (BULI,BAHO,MAHABA,SOUTH PARANAQUE AND LAS PINAS) Fig. 4-5-8(2/2)</p>
<p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES
 JAPAN INTERNATIONAL COOPERATION AGENCY

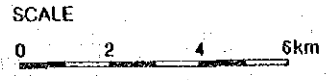
FLOOD AREA IN 1986

Fig. 4-6-1



LEGEND
 - - - : BASIN BOUNDARY
 + + + : SECTION FOR FLOOD INUNDATION ANALYSIS (1.0km INTERVAL APPROX.)

NOTE : STATION NUMBER OF EACH SECTION IS REFERED TO TABLE

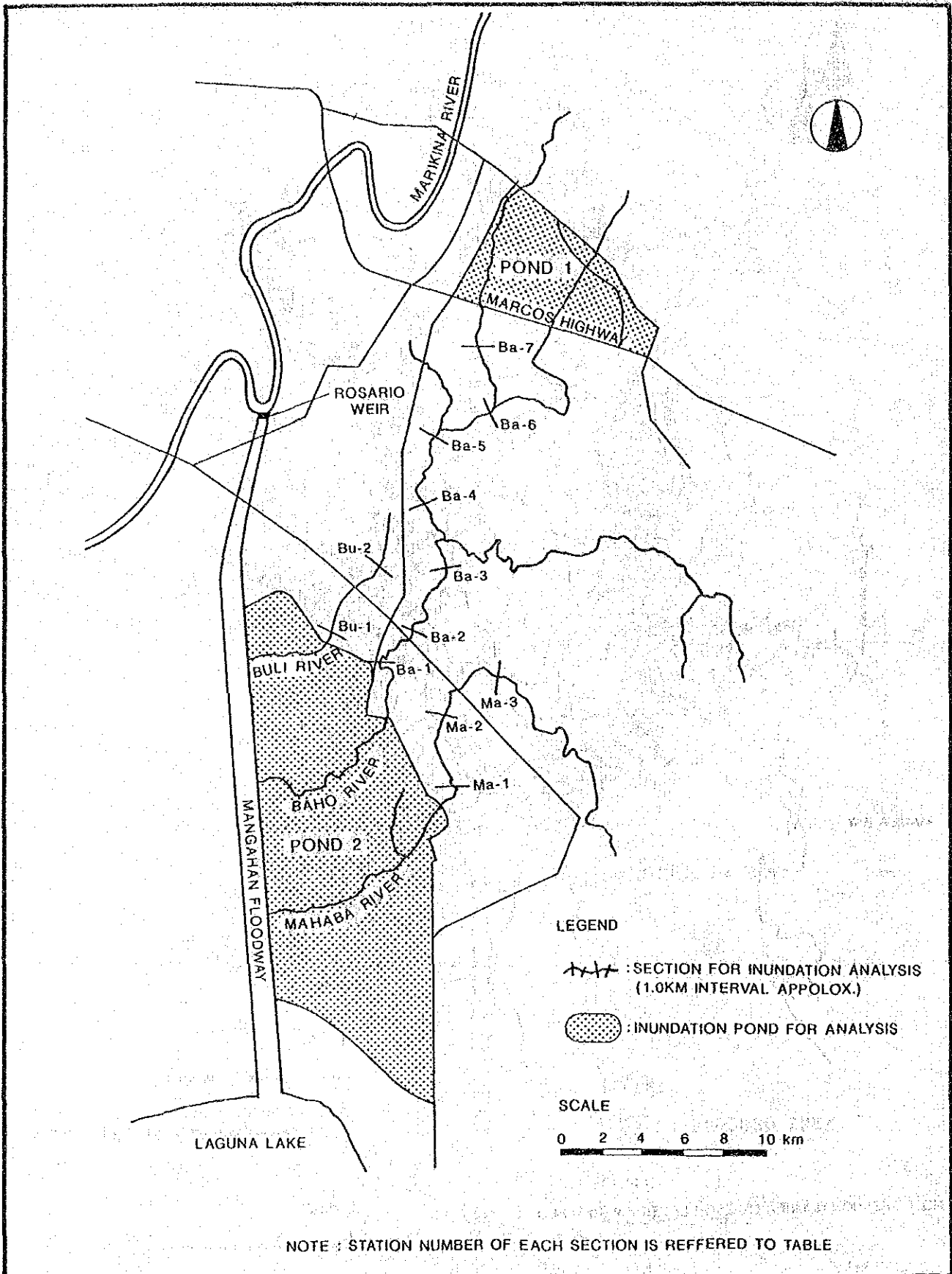


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES

LOCATION MAP OF SECTION FOR FLOOD
 INUNDATION ANALYSIS (PASIG-MARIKINA
 AND SAN JUAN RIVER)

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Fig. 4-6-2 (1/4)

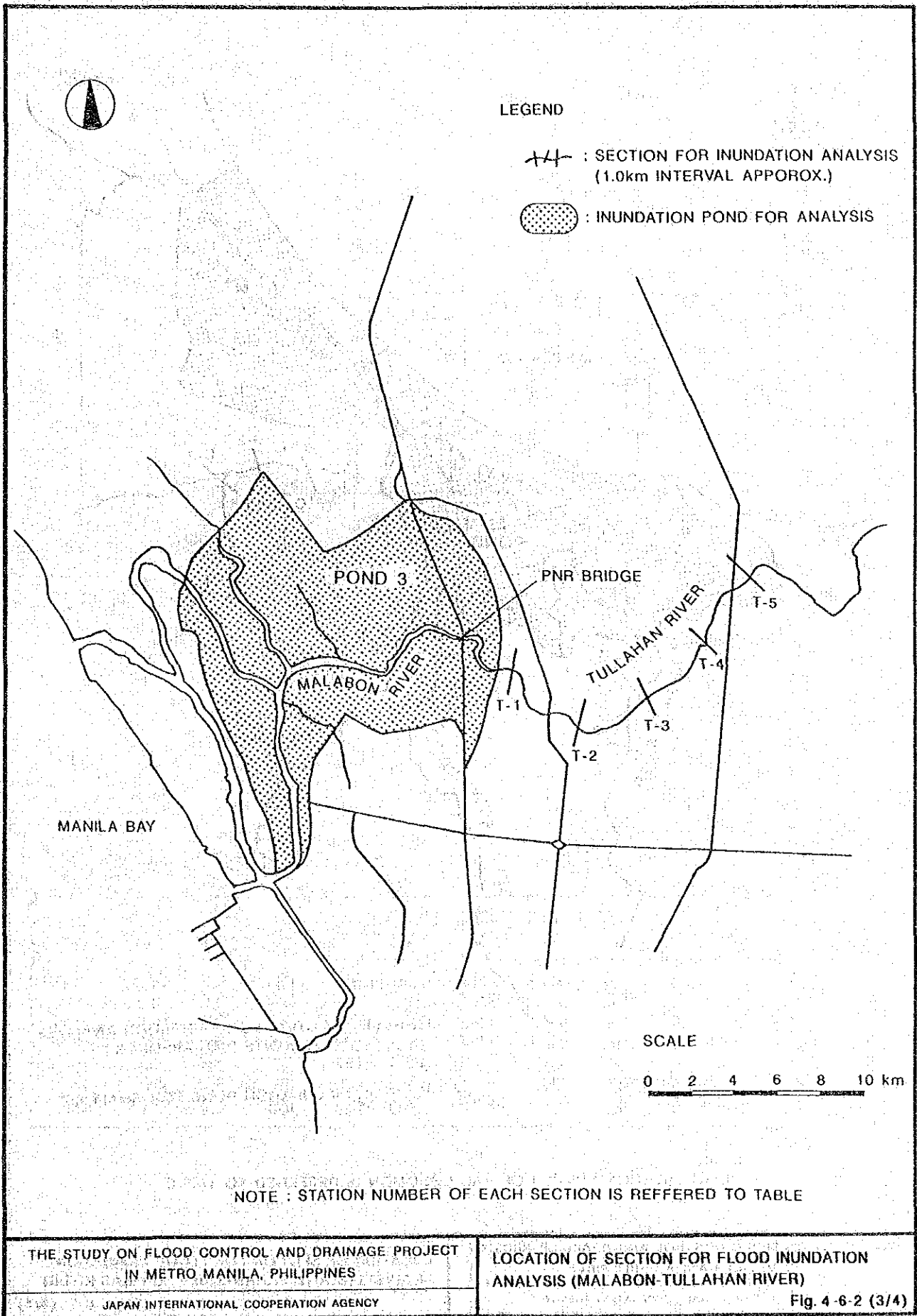


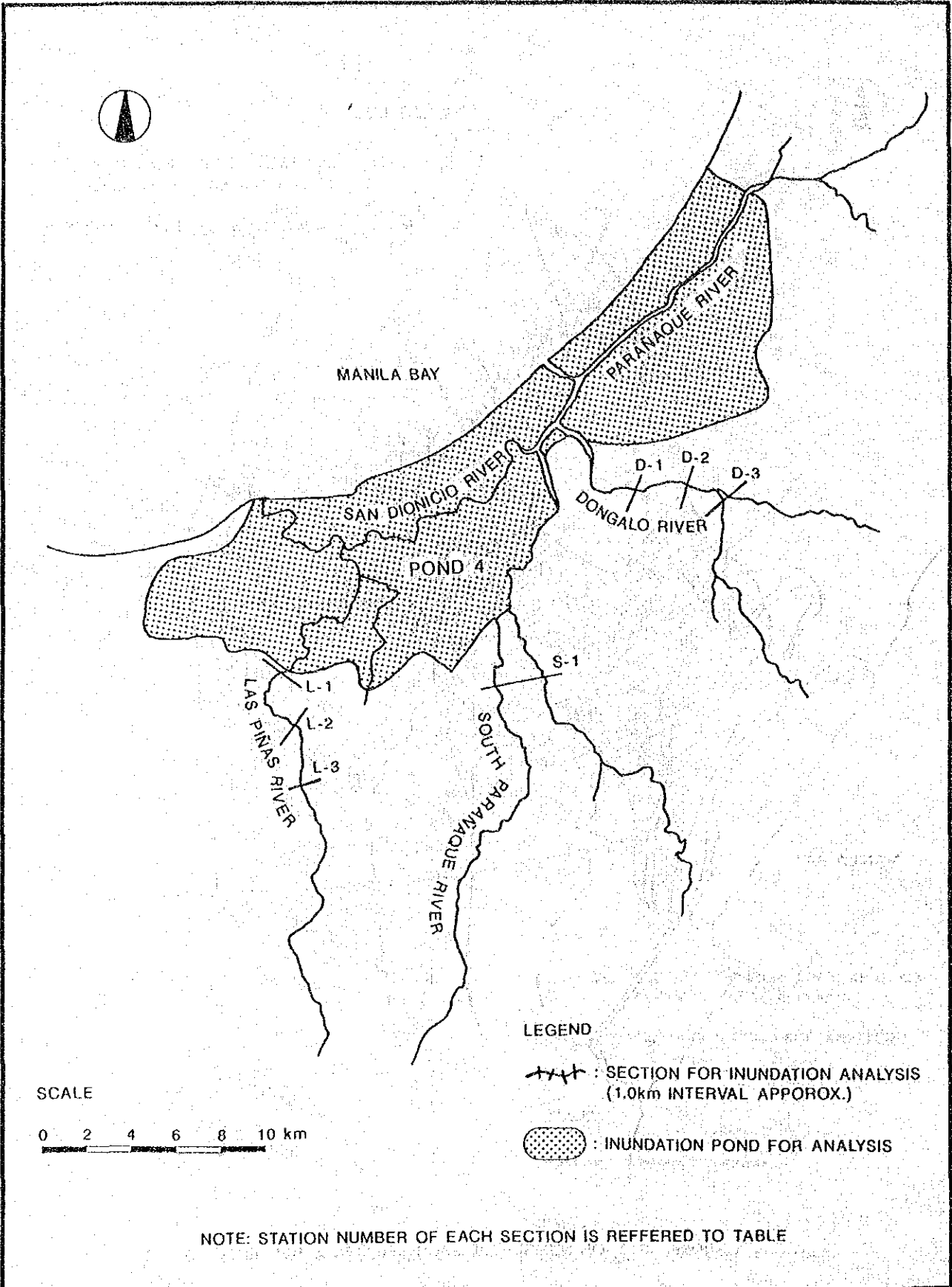
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

LOCATION OF SECTION FOR FLOOD INUNDATION
ANALYSIS (BULI-BAHO-MAHABA RIVER)

Fig. 4-6-2 (2/4)





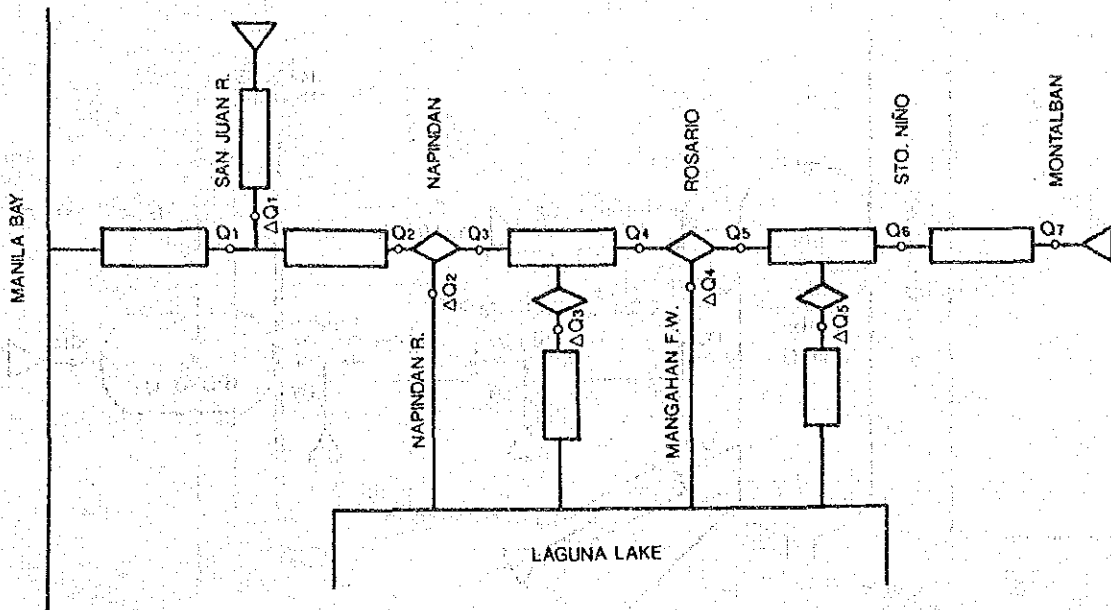
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY




LOCATION OF SECTION FOR FLOOD INUNDATION
 ANALYSIS (SOUTH PARAÑAQUE-LAS PIÑAS RIVER)

Fig. 4-6-2 (4/4)

MODEL



LEGEND

-  : RETARDING RIVER
-  : EFFLUENCE/OVER TOPPING
-  : CATCHMENT BASIN

DISCHARGE DISTRIBUTION

Return Period	DISCHARGE DISTRIBUTION (m ³ /s)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q1	Q2	Q3	Q4	Q5
100-Yr.	1,280	880	880	1,010	3,030	3,500	3,050	400	0	130	2,020	470
50-Yr.	1,210	860	860	960	2,870	2,800	2,800	350	0	100	1,910	330
30-Yr.	1,130	830	830	890	2,700	2,900	2,500	300	0	60	1,810	200
20-Yr.	1,110	810	810	860	2,620	2,800	2,400	300	0	50	1,760	180
10-Yr.	1,030	780	780	780	2,400	2,400	2,100	250	0	0	1,620	0
5-Yr.	920	670	670	670	2,050	2,050	1,750	250	0	0	1,380	0
2-Yr.	770	520	520	520	1,600	1,600	1,400	250	0	0	1,080	0

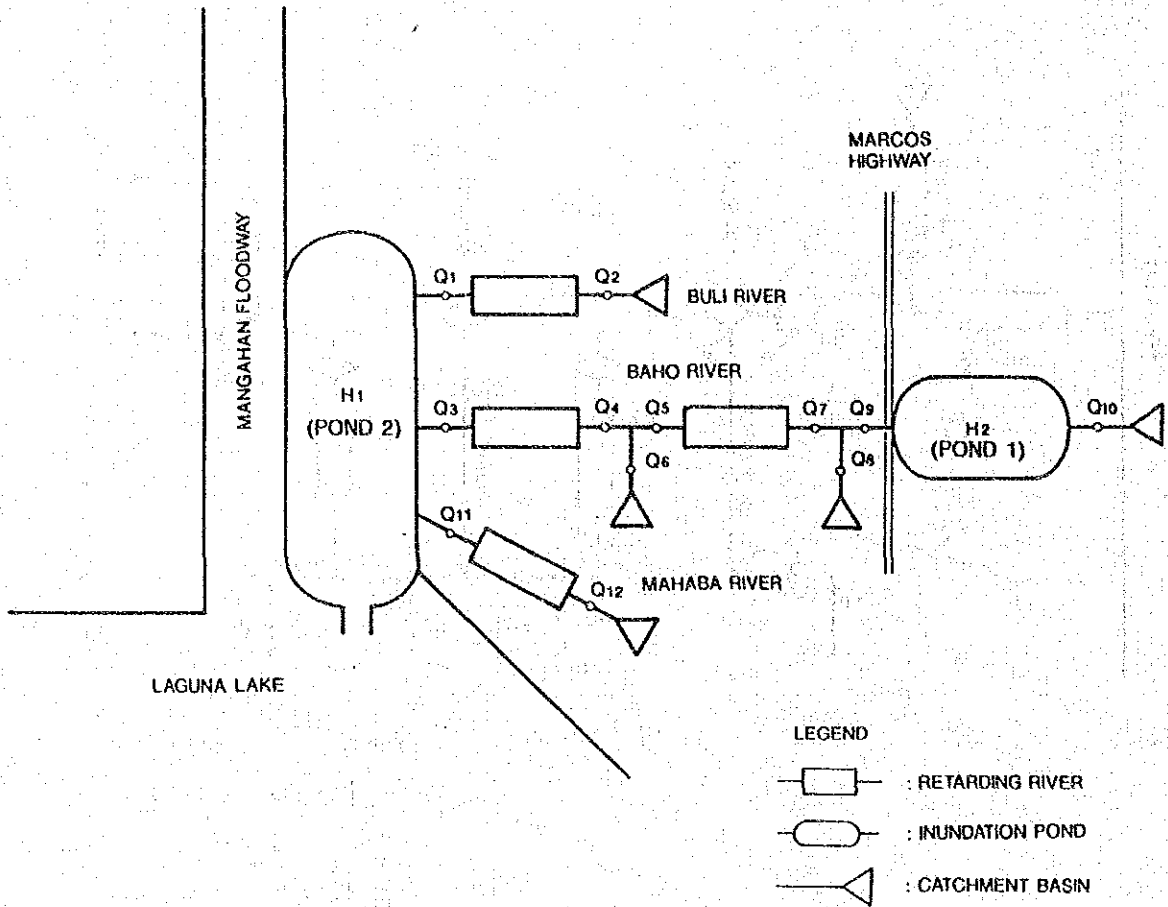
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

INUNDATION MODEL AND DISCHARGE
DISTRIBUTION (PASIG-MARIKINA RIVER)

Fig. 4-6-3 (1/4)

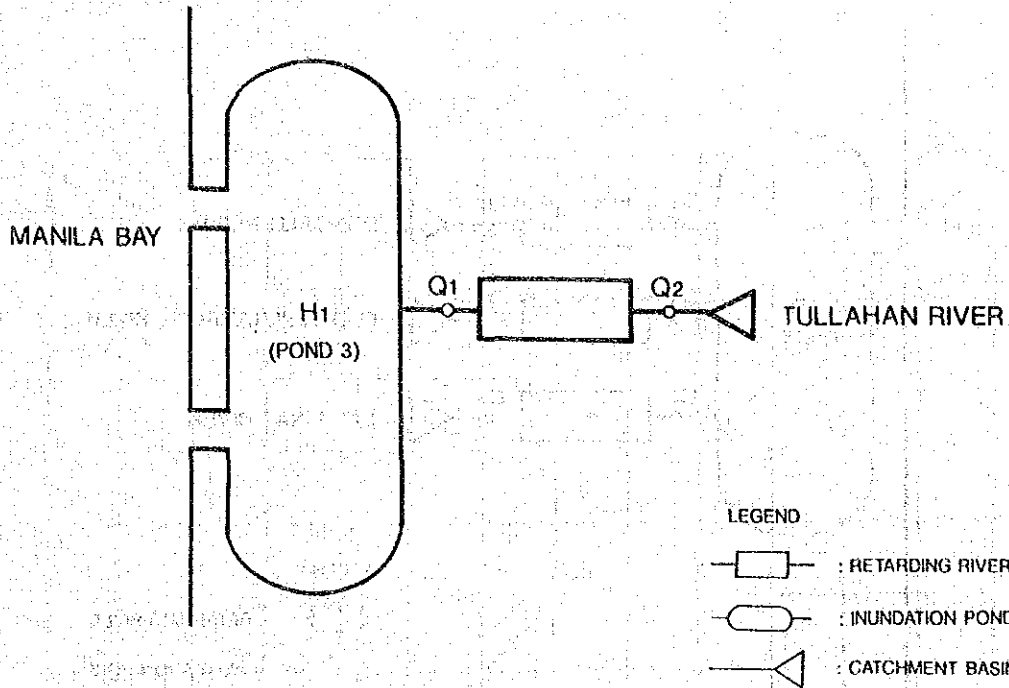
MODEL



DISCHARGE DISTRIBUTION

Return Period	DISCHARGE DISTRIBUTION (m ³ /s)											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
100-Yr.	72	116	207	365	97	272	317	109	208	279	99	183
50-Yr.	65	104	193	334	90	247	294	98	196	252	91	166
30-Yr.	60	96	181	308	84	227	279	91	189	232	93	151
20-Yr.	58	93	177	300	82	220	274	88	186	225	90	147
10-Yr.	55	89	168	284	77	208	266	84	183	168	83	139
5-Yr.	50	82	157	259	71	189	254	77	177	196	74	128
2-Yr.	43	73	142	226	63	163	240	69	171	175	72	113

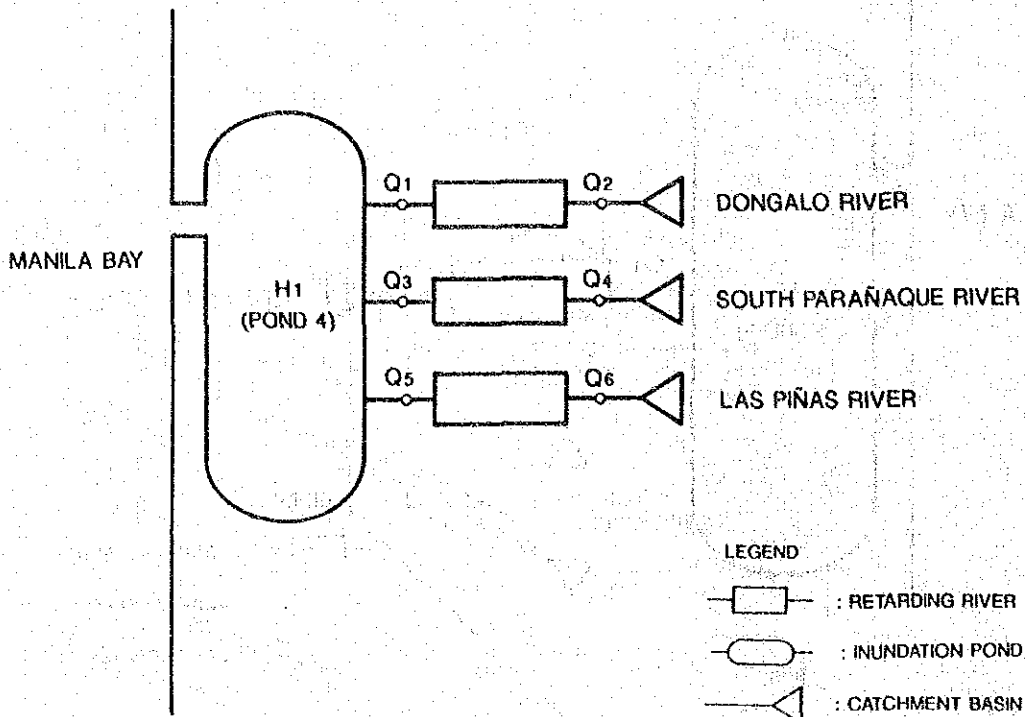
MODEL



DISCHARGE DISTRIBUTION

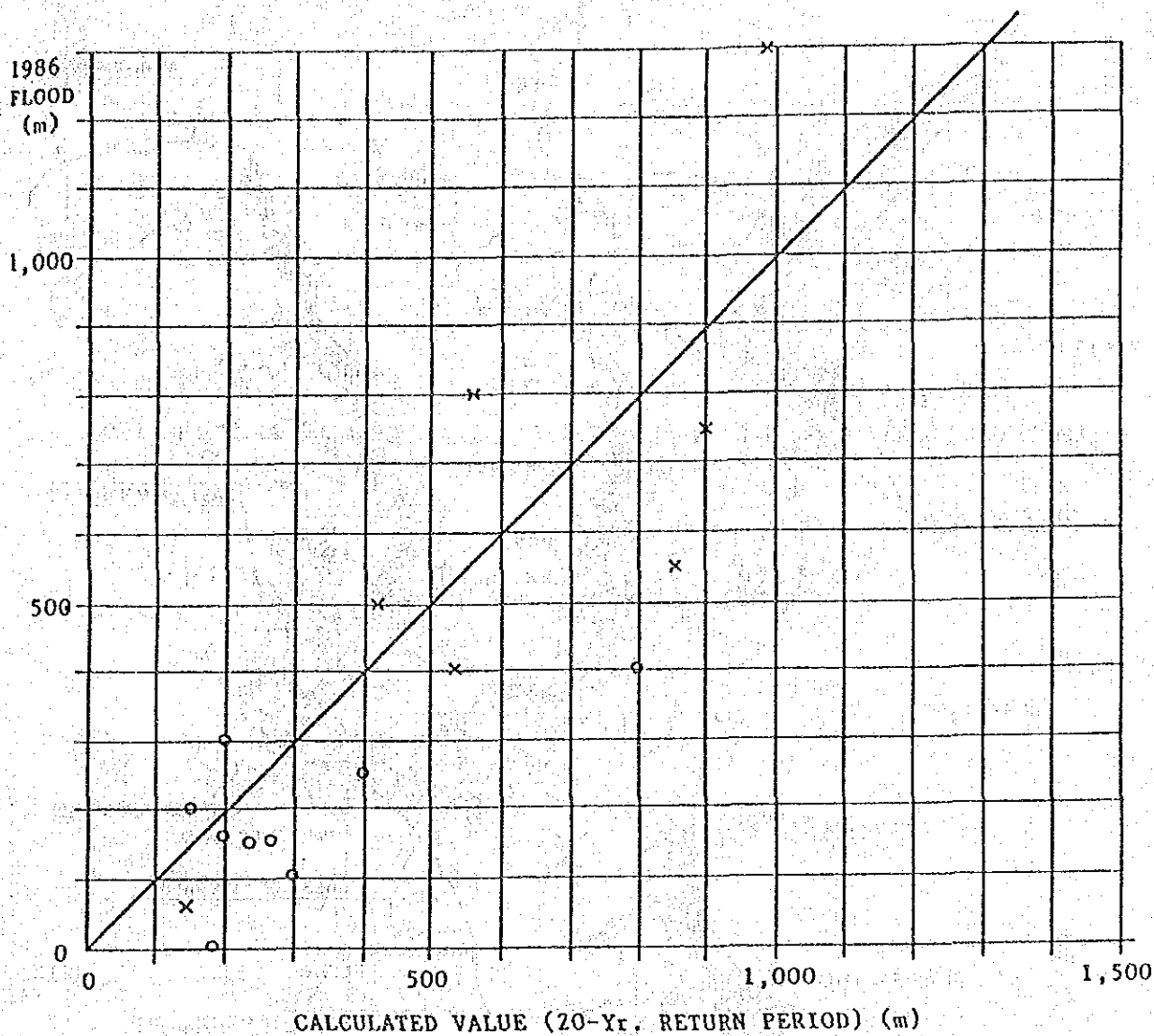
Return Period	DISCHARGE DISTRIBUTION (m ³ /s)	
	Q1	Q2
100-Yr.	383	512
50-Yr.	347	466
30-Yr.	329	445
20-Yr.	305	411
10-Yr.	267	354
5-Yr.	243	313
2-Yr.	207	242

MODEL



DISCHARGE DISTRIBUTION

Return Period	DISCHARGE DISTRIBUTION (m ³ /s)					
	Q1	Q2	Q3	Q4	Q5	Q6
100-Yr.	132	198	251	424	147	212
50-Yr.	120	176	230	378	137	192
30-Yr.	113	163	216	349	130	178
20-Yr.	107	153	206	328	124	168
10-Yr.	97	137	188	293	114	151
5-Yr.	86	118	167	255	102	131
2-Yr.	73	99	144	214	89	110



LEGEND

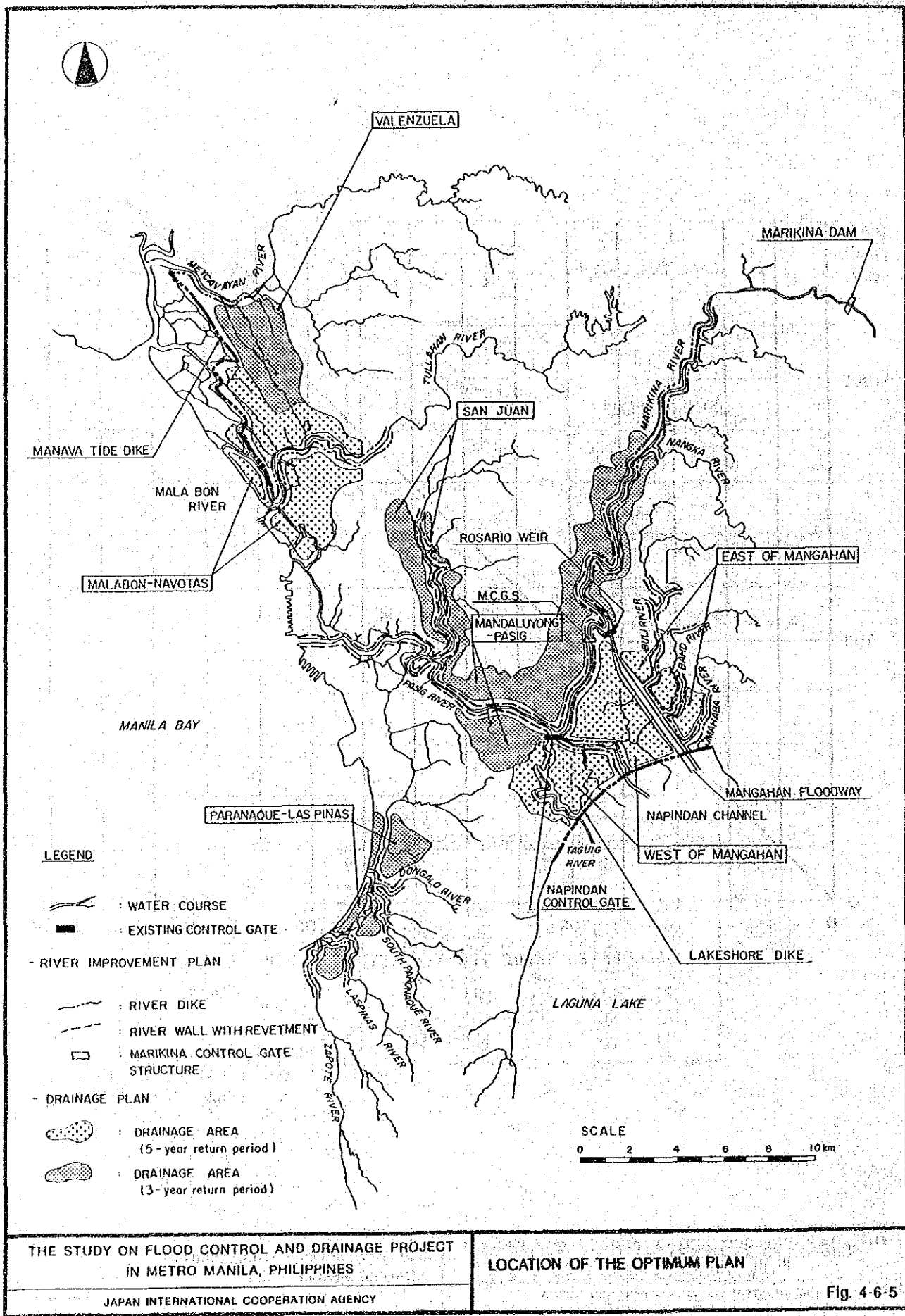
- : MARIKINA RIVER
- × : SAN JUAN RIVER

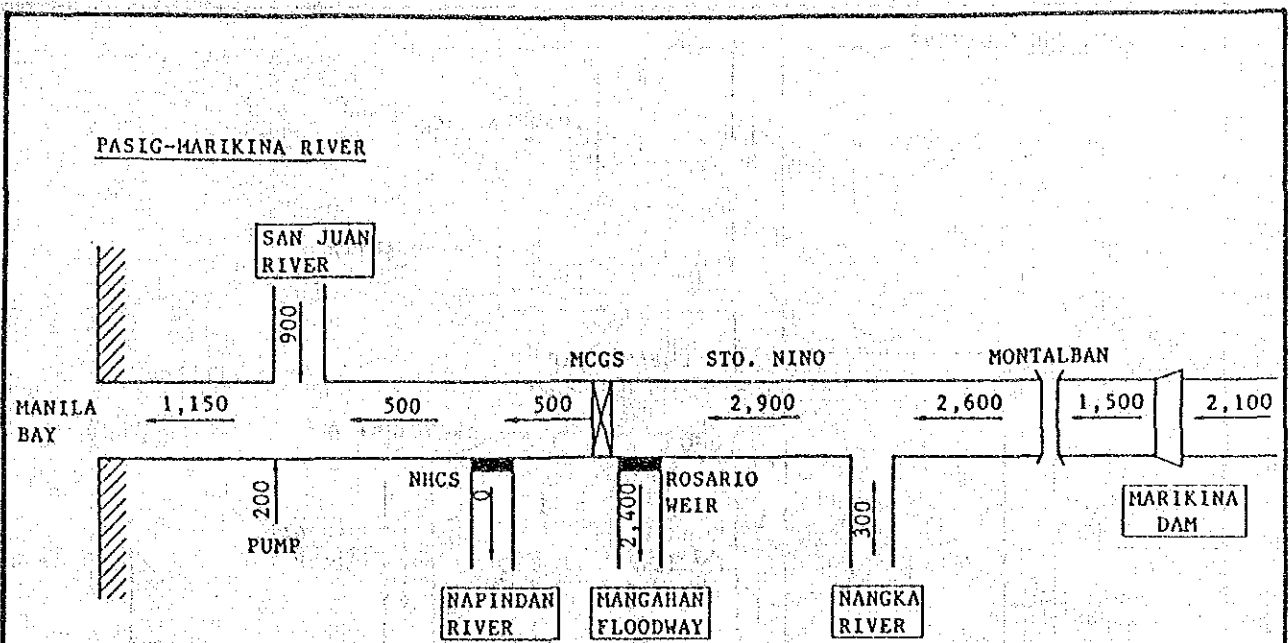
THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES

JAPAN INTERNATIONAL COOPERATION AGENCY

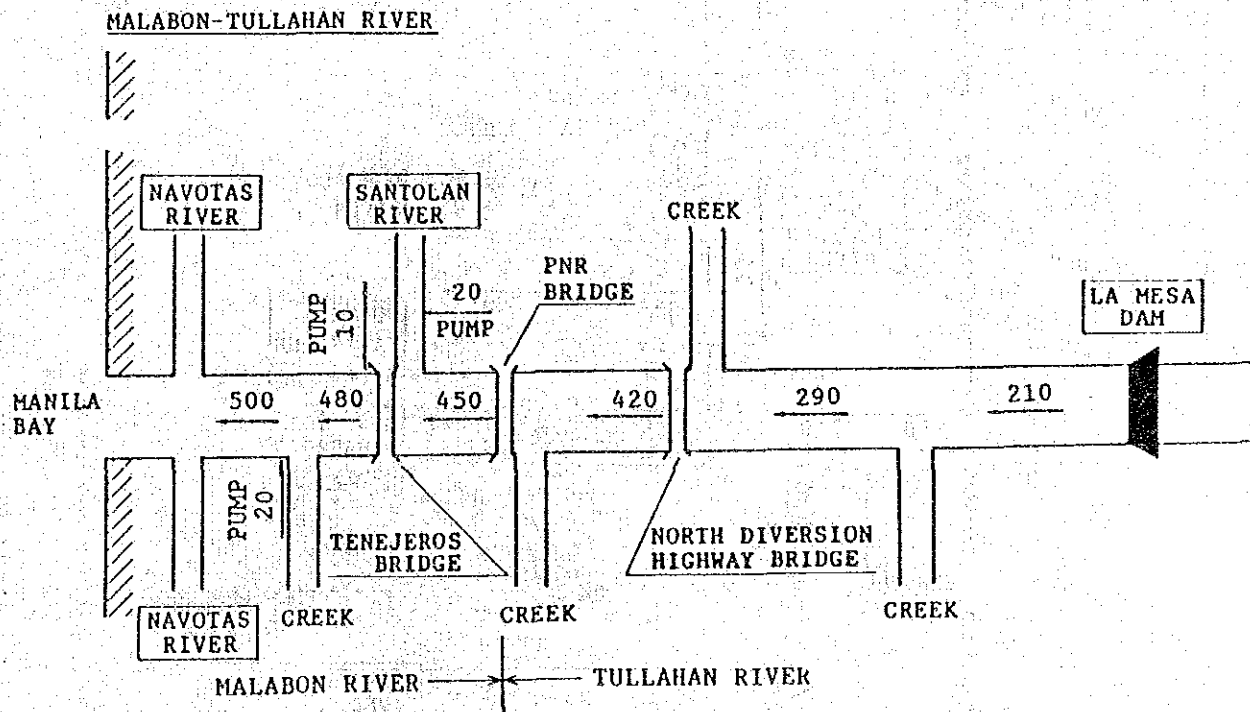
COMPARISON OF ACTUAL FLOOD AND
ANALYSIS RESULT

Fig. 4-6-4





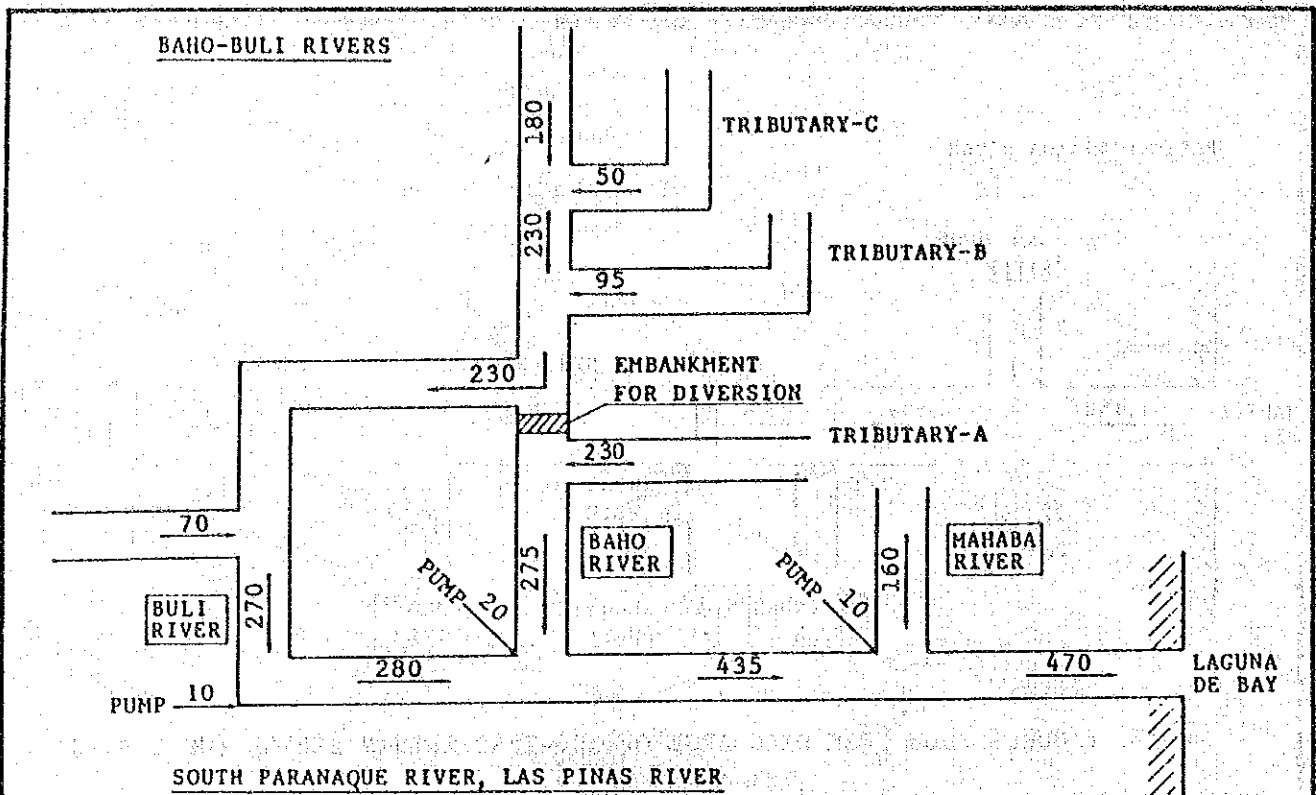
NOTE: FIGURES SHOW PEAK DISCHARGE OF 100-YEAR RETURN PERIOD (UNIT:M³/S)



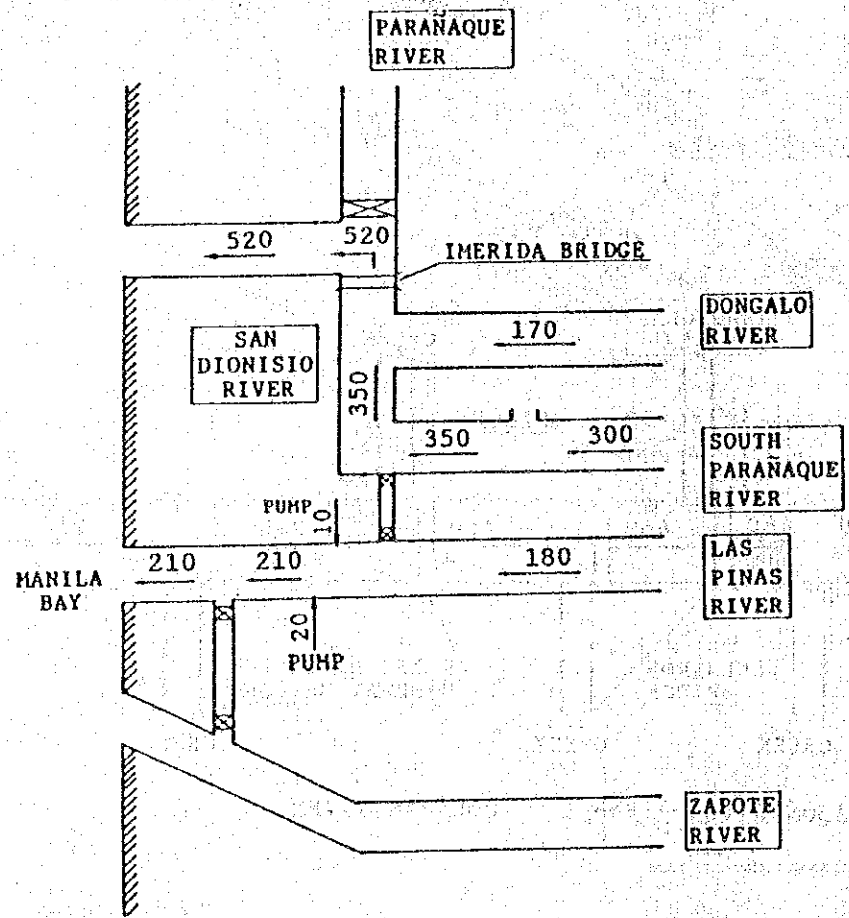
NOTE: FIGURES SHOW PEAK DISCHARGE OF 30-YEAR RETURN PERIOD (UNIT:m³/s)

THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
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DISCHARGE DISTRIBUTION FOR RIVER
IMPROVEMENT (PASIG-MARIKINA AND
MALABON-TULLAHAN) Fig.4-6-6(1/2)

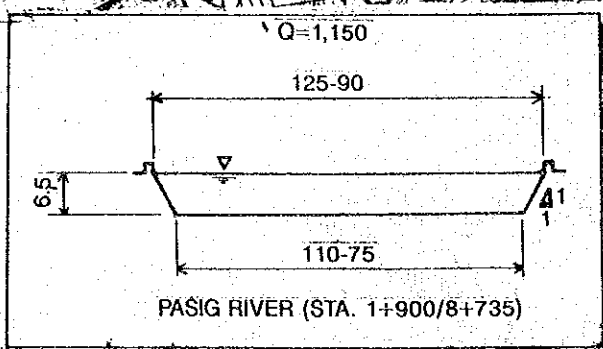
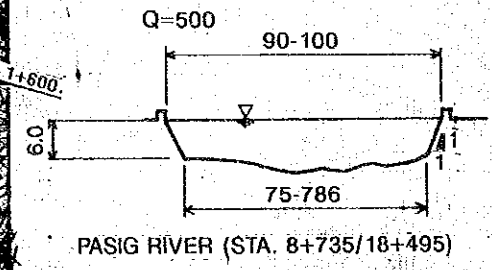
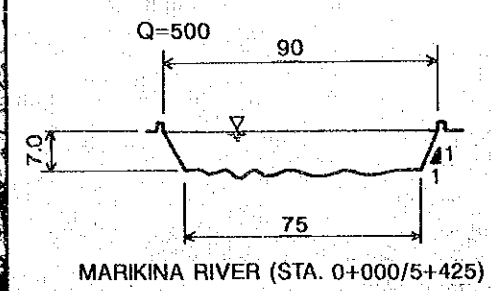
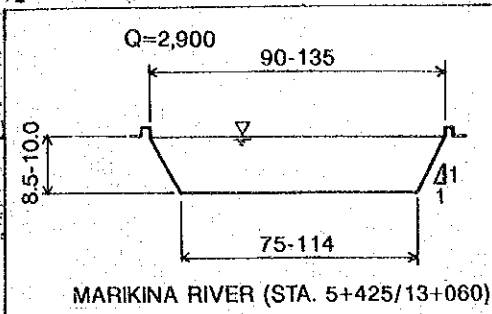
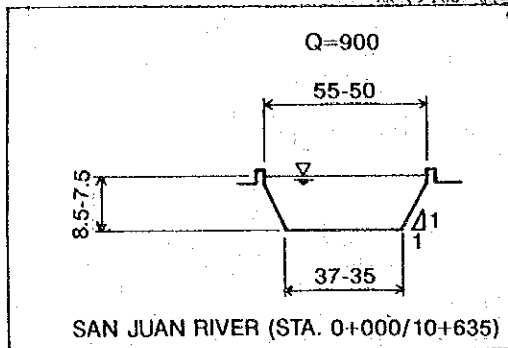
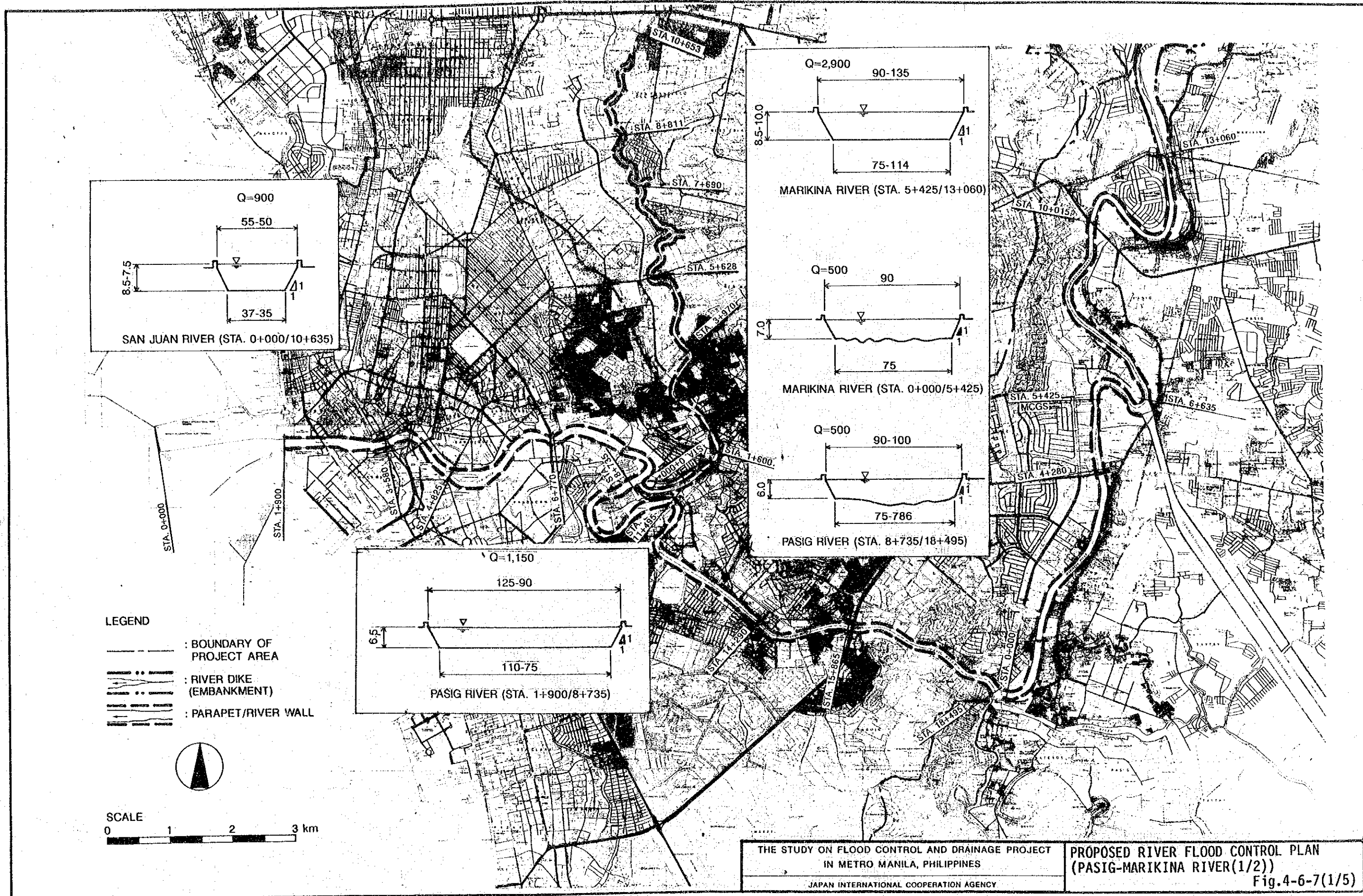


SOUTH PARANAQUE RIVER, LAS PINAS RIVER

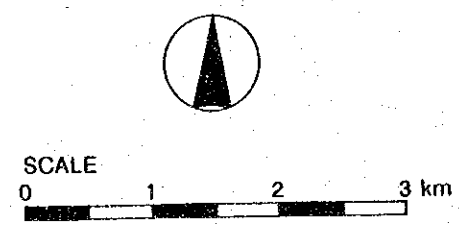


NOTE: FIGURES SHOW PEAK DISCHARGE OF 30-YEAR RETURN PERIOD. (UNIT: m³/s)

<p>THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT IN METRO MANILA, PHILIPPINES</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>DISCHARGE DISTRIBUTION FOR RIVER IMPROVEMENT (BULI, BAHO, MAHABA, SOUTH PARANAQUE & LAS PINAS) Fig.4-6-6(2/2)</p>
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- LEGEND
- : BOUNDARY OF PROJECT AREA
 - : RIVER DIKE (EMBANKMENT)
 - : PARAPET/RIVER WALL

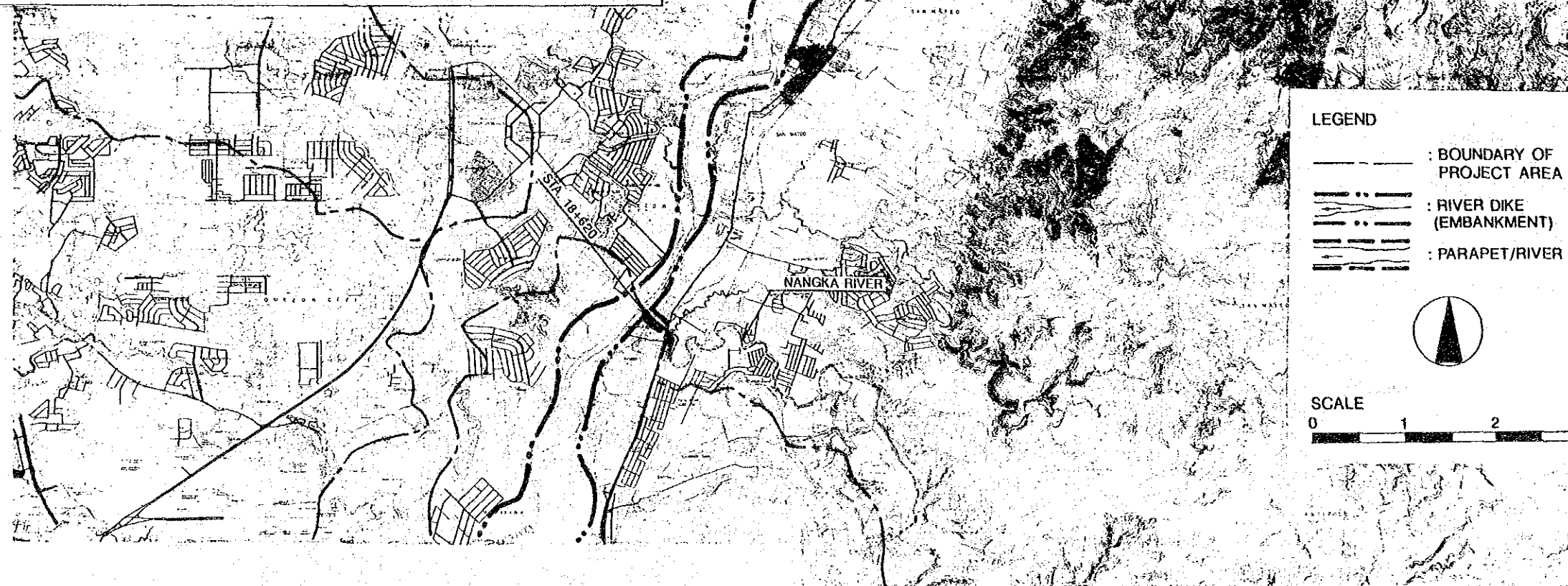
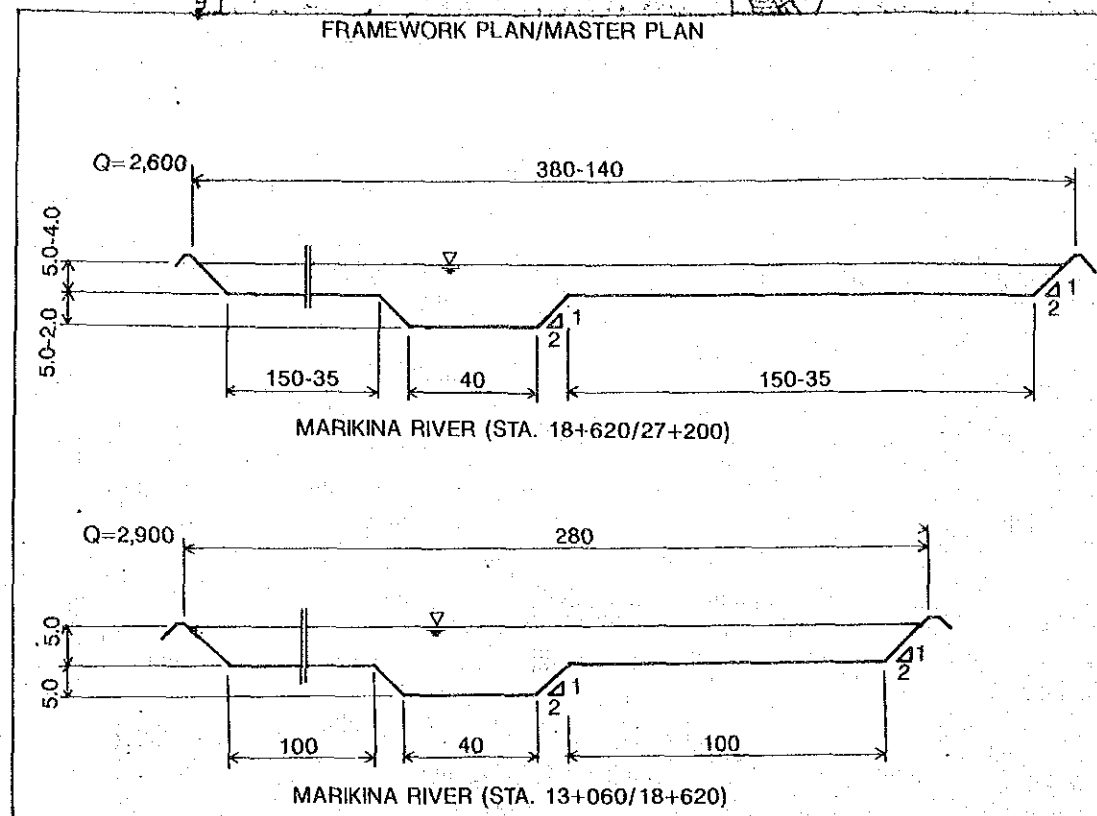


THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
 IN METRO MANILA, PHILIPPINES

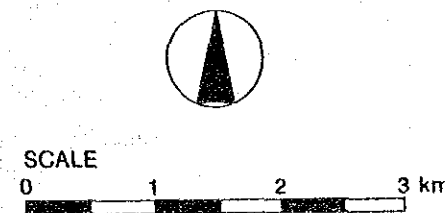
PROPOSED RIVER FLOOD CONTROL PLAN
 (PASIG-MARIKINA RIVER(1/2))

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Fig.4-6-7(1/5)



- LEGEND
- : BOUNDARY OF PROJECT AREA
 - · — : RIVER DIKE (EMBANKMENT)
 - · — · — : PARAPET/RIVER WALL



THE STUDY ON FLOOD CONTROL AND DRAINAGE PROJECT
IN METRO MANILA, PHILIPPINES
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PROPOSED RIVER FLOOD CONTROL PLAN
(PASIG-MARIKINA RIVER(2/2))
Fig.4-6-7(2/5)

