CHAPTER 4. PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

"The Flood Mitigation Project in Ormoc City" is designed for the floods with a return period less than 50-year to avoid the same experience as "Ormoc Tragedy of 1991". After the completion of the Project, following positive effects are expected ;

(1) Flood damage mitigation to human lives and people's properties is assured.

(2) The conservation of Ormoc City without flood damage will generate great positive impacts and contribute to the development of the regional economy.

(3) The function of social infrastructures and lifeline facilities such as roads, bridges, drainage systems, water supply facilities and others will be well maintained, and the economic life of structures will also be longer.

(4) Traffic interruption and tardiness of people in attending to economic activities because of flood will be minimized.

(5) Land use and development activities in inland areas along rivers will be promoted.

(6) Waste disposal in river channels will be discouraged by river improvement works, and a hygienic and sound river environment will be realized.

(7) The river scenery will be improved.

4.2 Recommendations

Appropriate operation and maintenance of structures of the Flood Control Project, which consists of river improvement works, slit dams and bridges, are required. If they are not conscientiously taken, the useful life of structures will be shorter and they will also cause secondary damages at the time of floods.

Among the operation and maintenance items proposed in Section 3.2, Operation and Maintenance Plan, the most important item is the removal of rocks and floating logs at the slit dam sites. Besides the above flood control viewpoint, maintenance of sound river environment is also essential. Since the river is closely related with the daily life of the nearby residents, maintenance activities such as waste disposal, planting along the dike, and construction of river-front park are required.

FIGURES

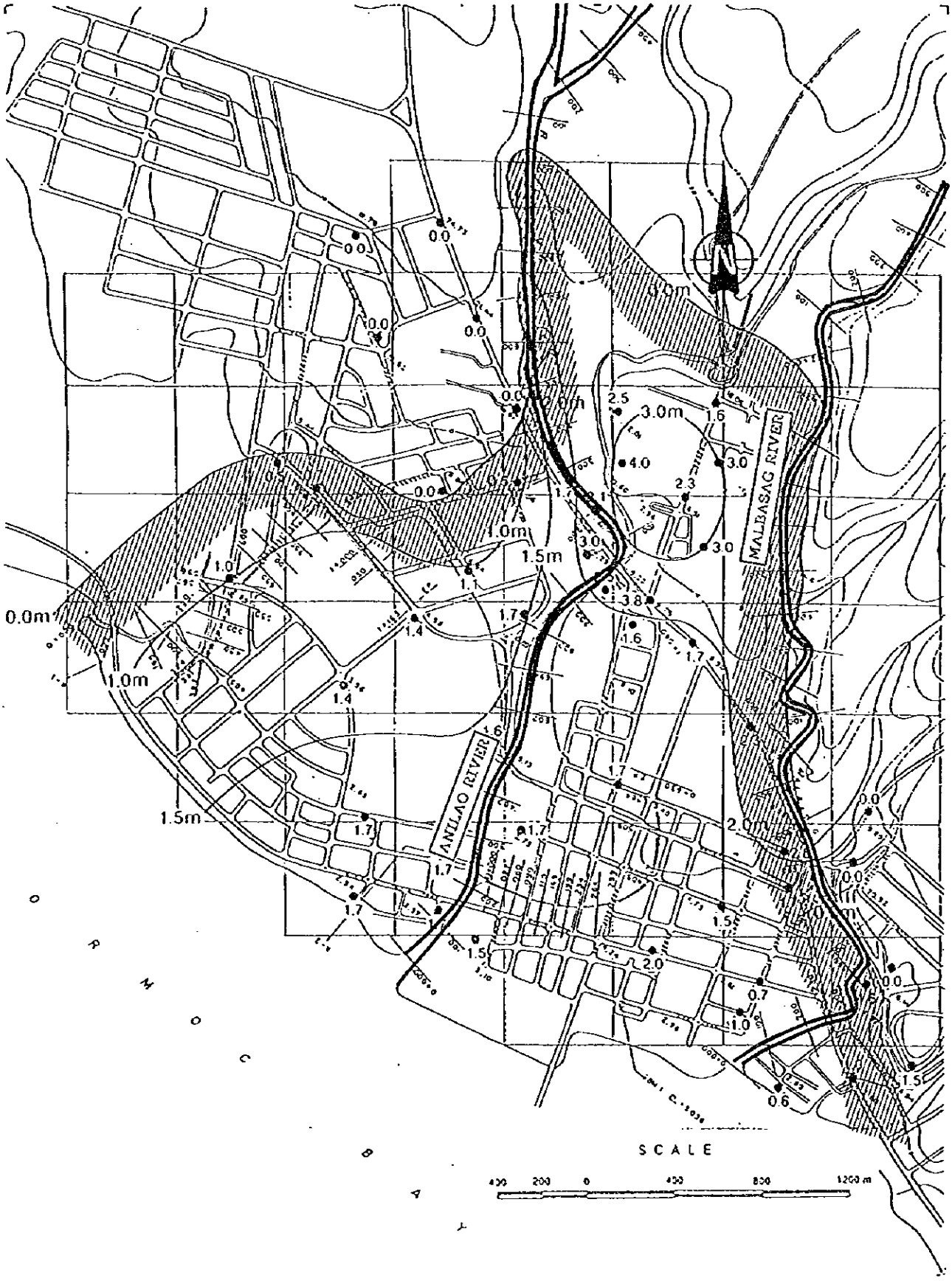
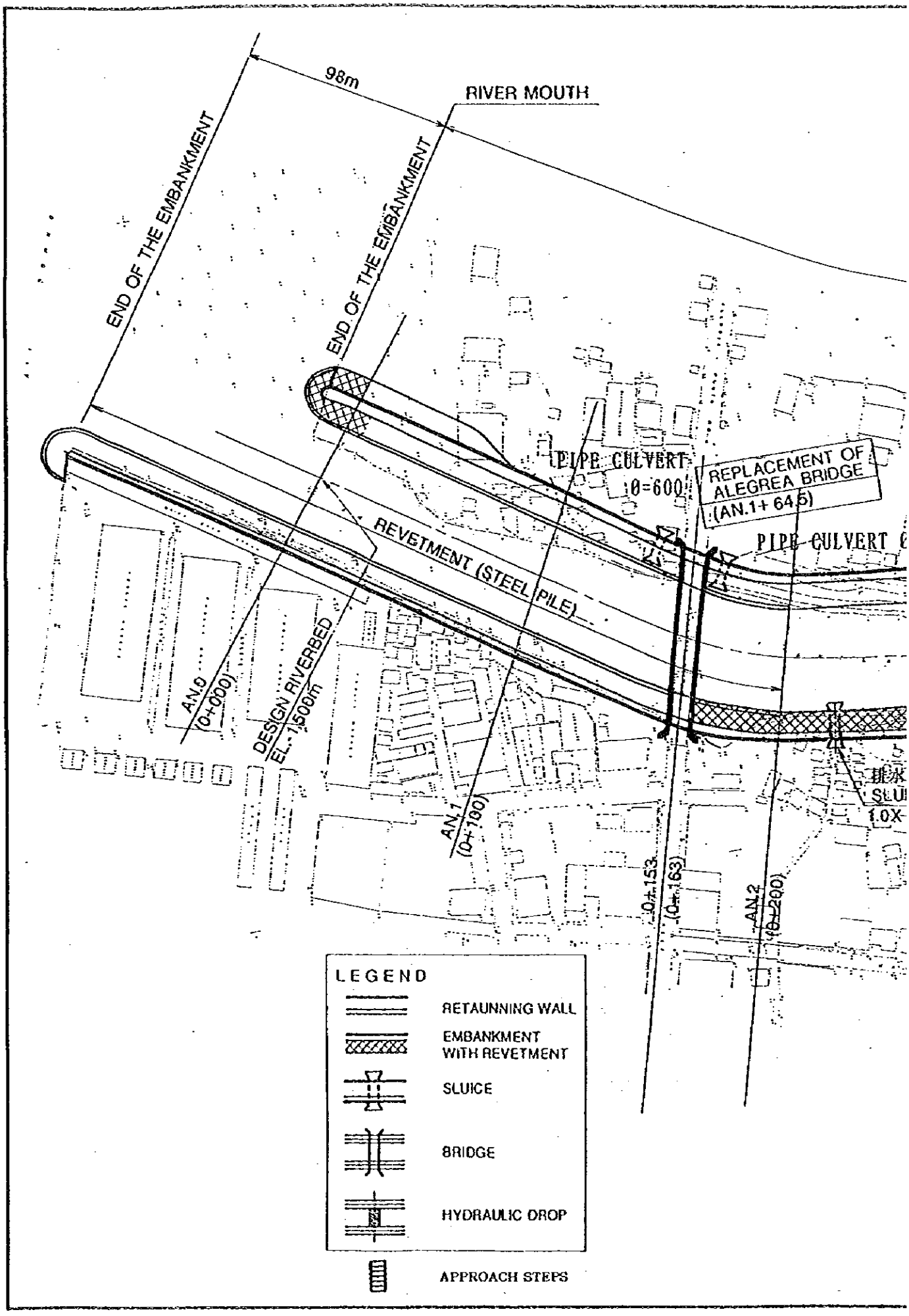
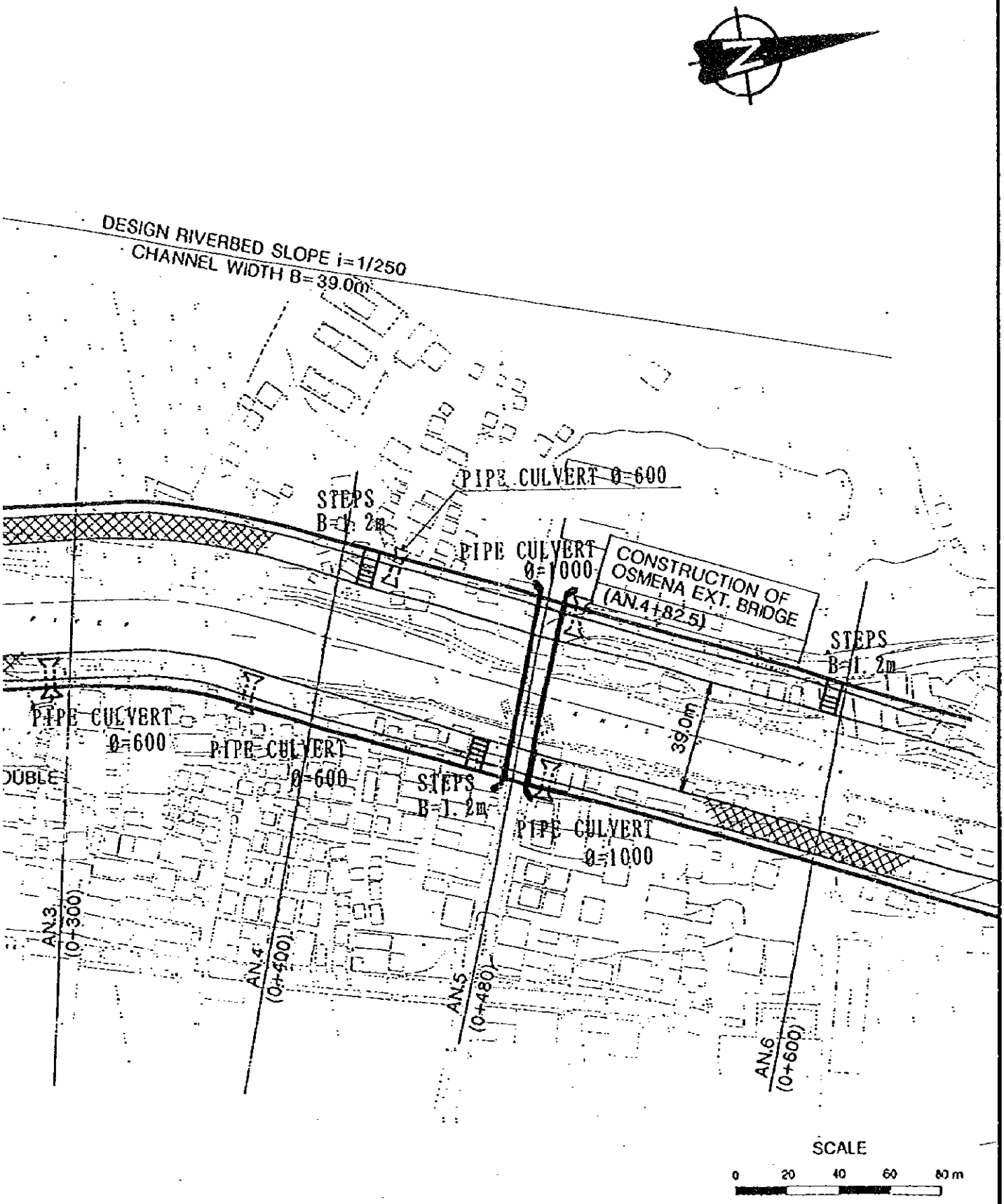
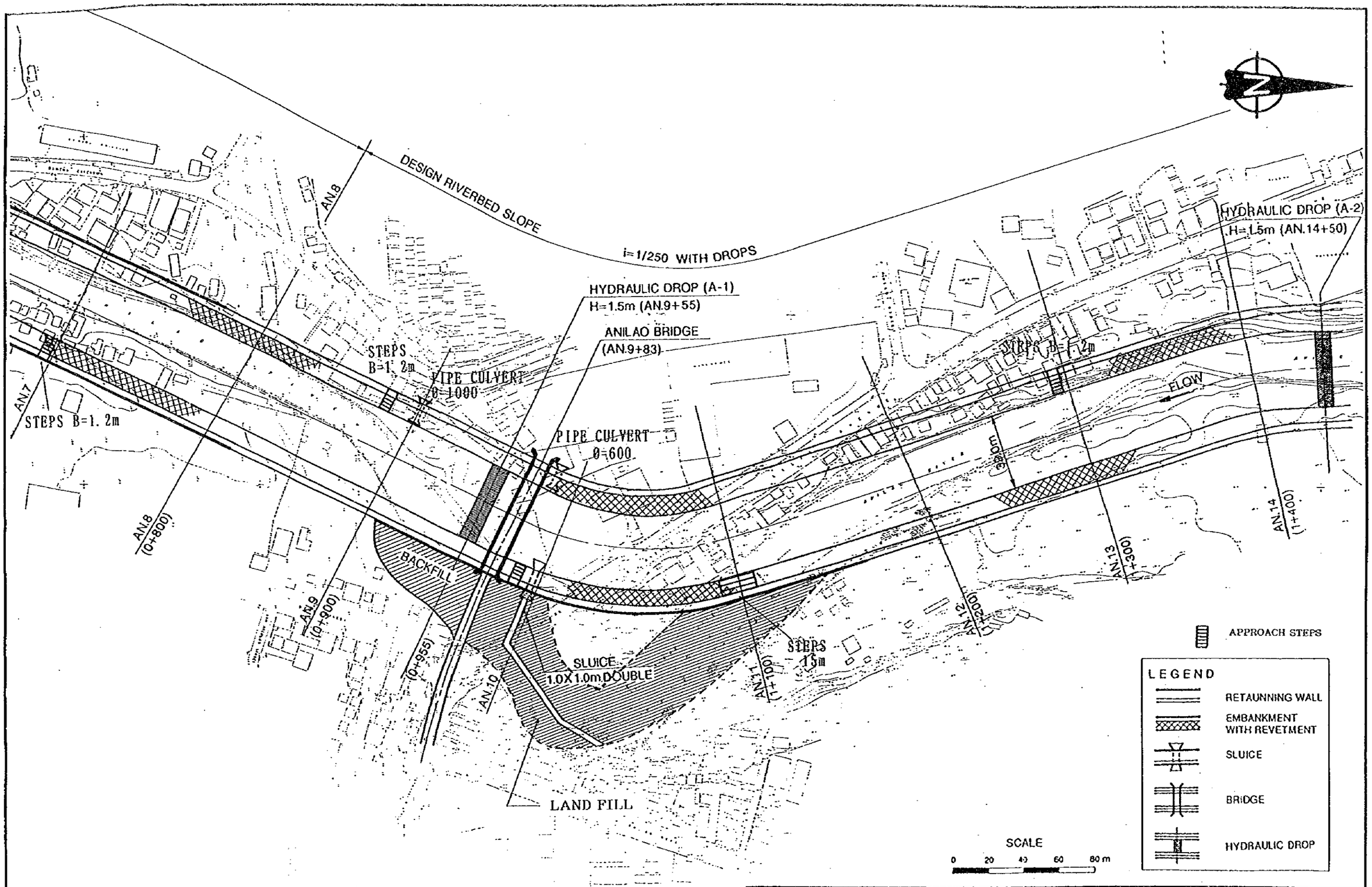


Fig. 2.2.1 FLOOD INUNDATION MAP (1991-FLOOD)

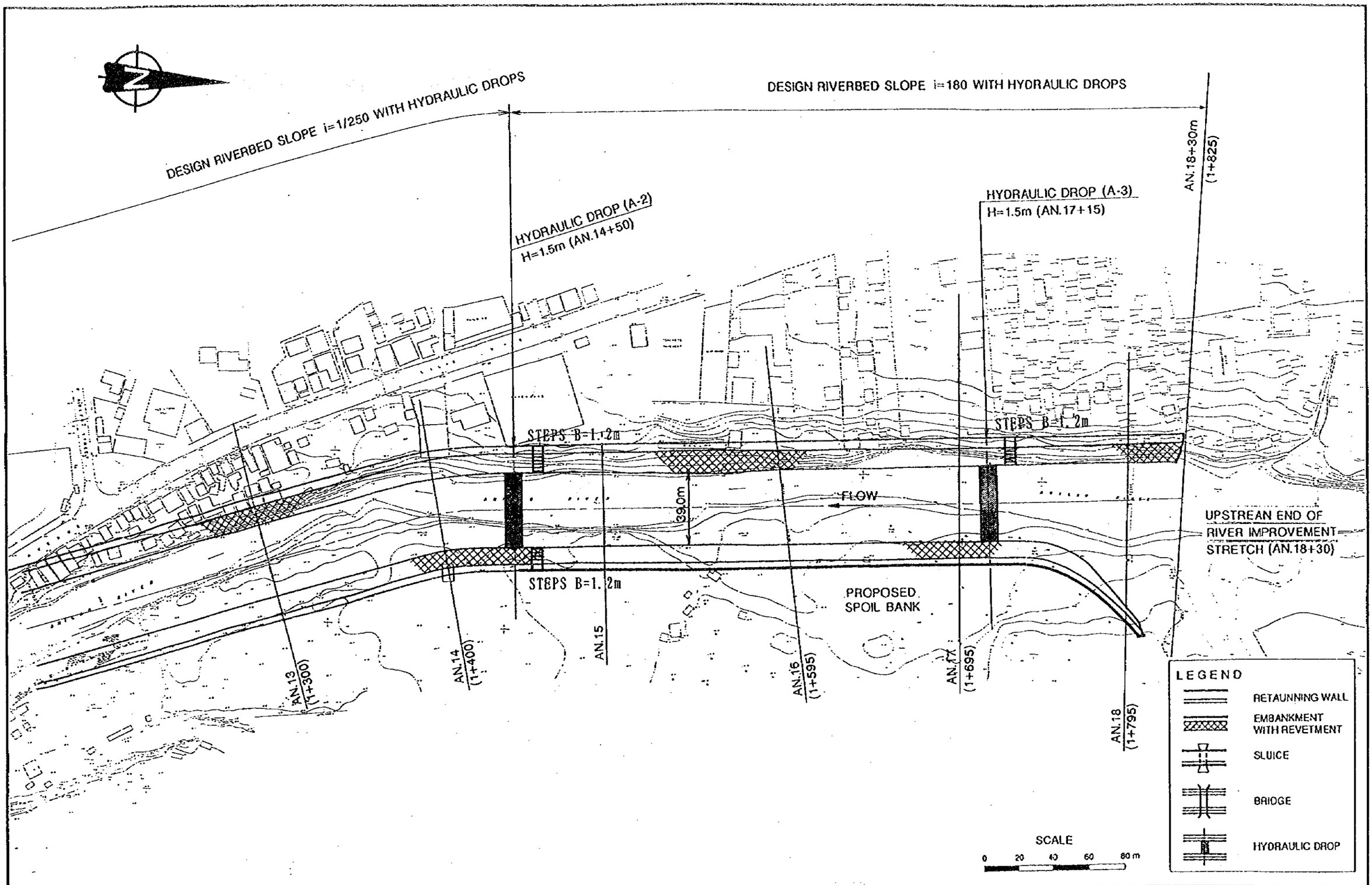

98m
RIVER MOUTH
END OF THE EMBANKMENT
END OF THE EMBANKMENT
PIPE CULVERT
Ø=600
REPLACEMENT OF
ALEGREA BRIDGE
(AN.1+ 64.5)
PIPE CULVERT
REVETMENT (STEEL PILE)
AN.0
(0+000)
DESIGN RIVERBED
EL.-1.500m
AN.1
(0+100)
0+153
(0+163)
AN.2
(0+200)
LEGEND
RETAUNNING WALL
EMBANKMENT
WITH REVETMENT
SLUICE
BRIDGE
HYDRAULIC DROP
APPROACH STEPS



THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 2.3.1 (1/3) PLAN OF ANILAO RIVER



THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY	Fig. 2.3.1 (2/3)
JAPAN INTERNATIONAL COOPERATION AGENCY	PLAN OF ANILAO RIVER

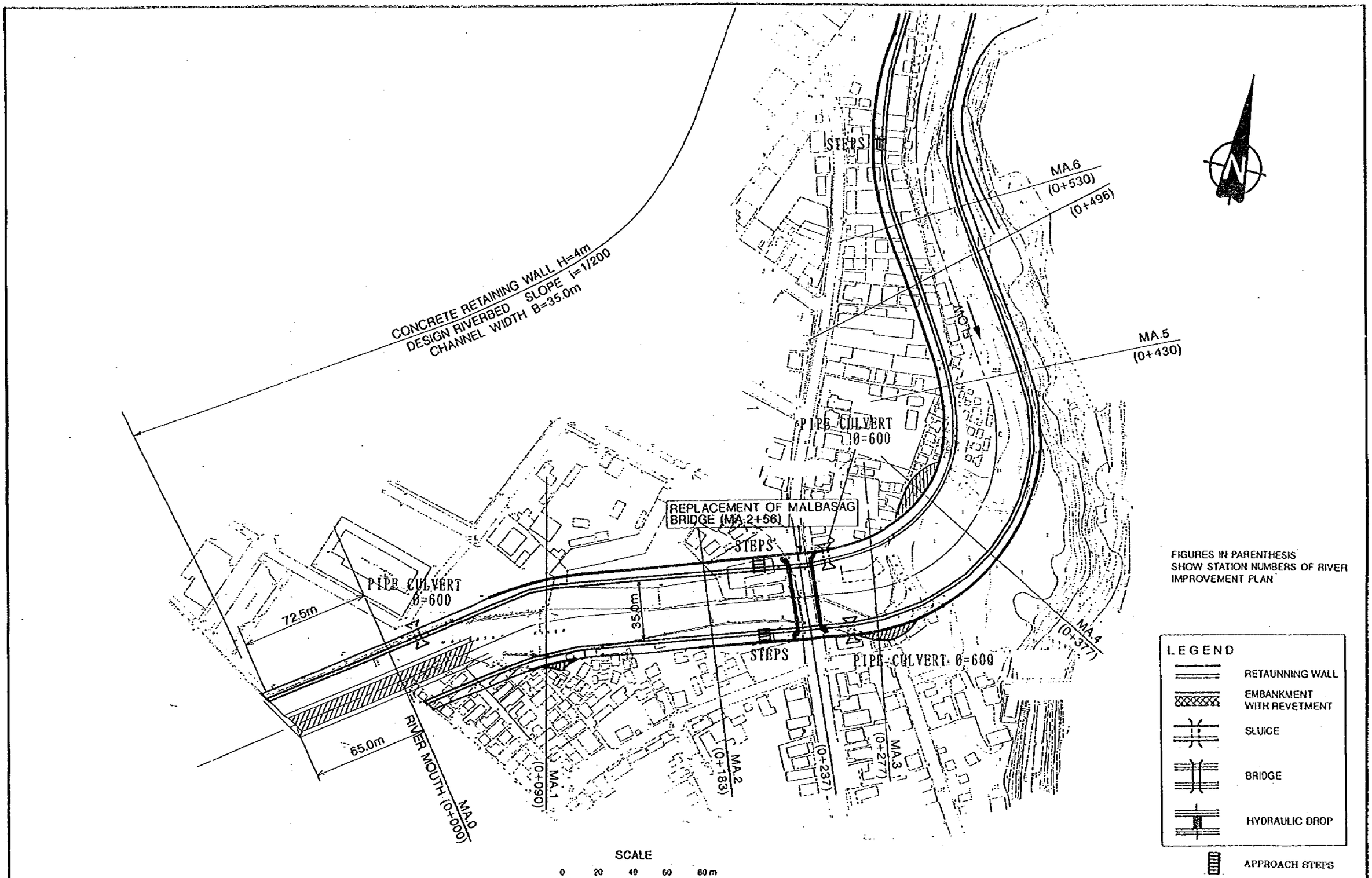


THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY

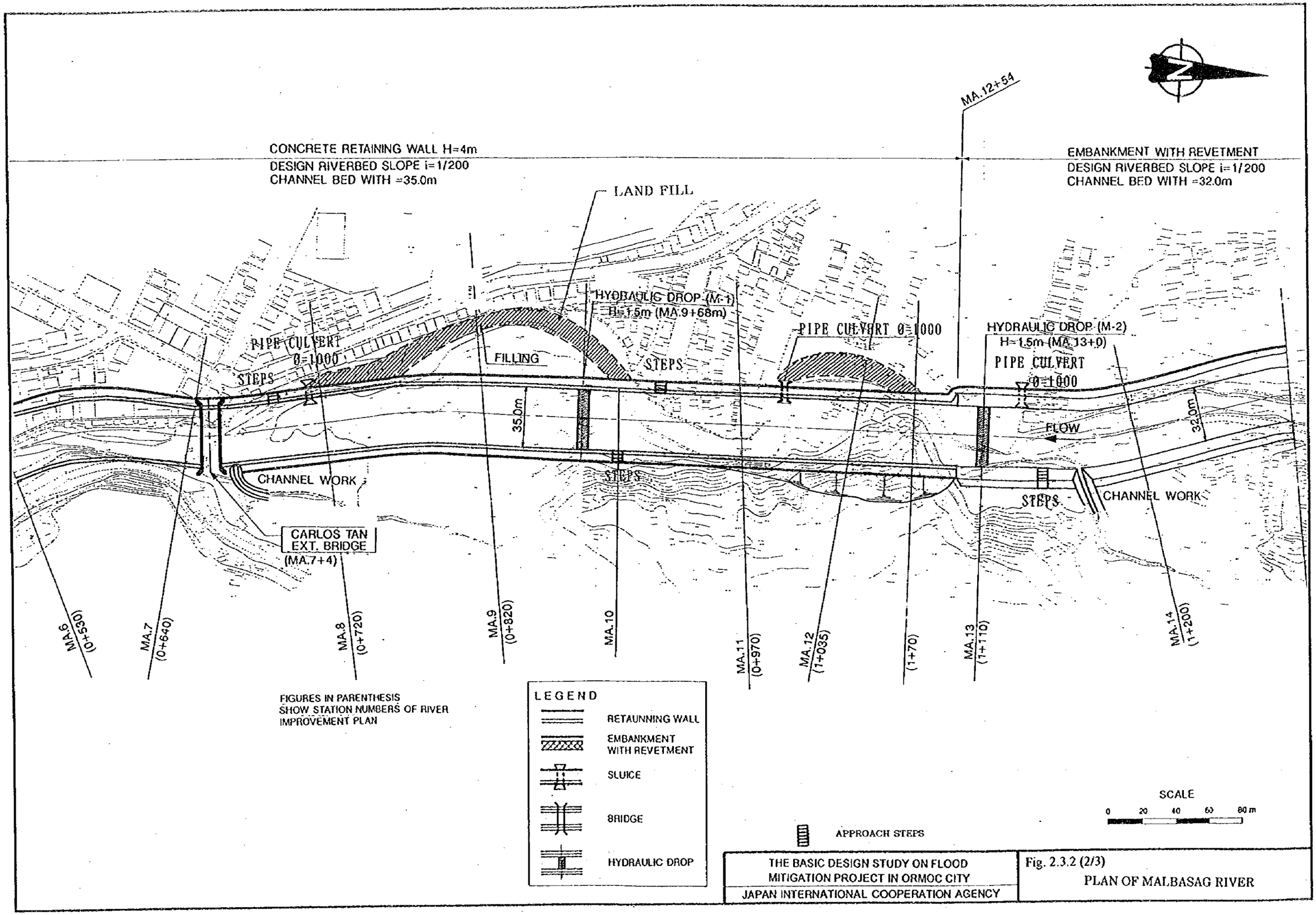
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.3.1 (3/3)

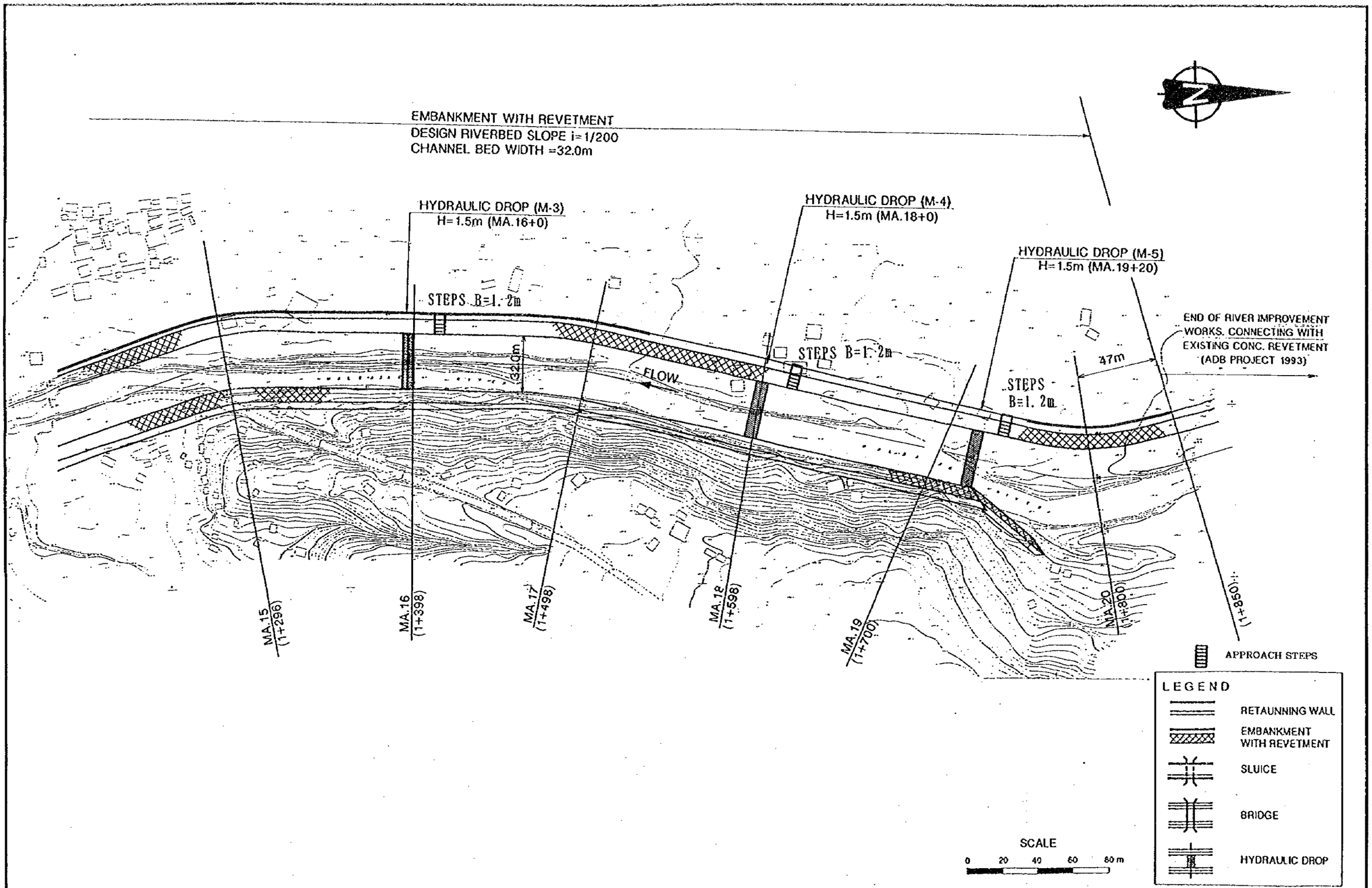
PLAN OF ANILAO RIVER



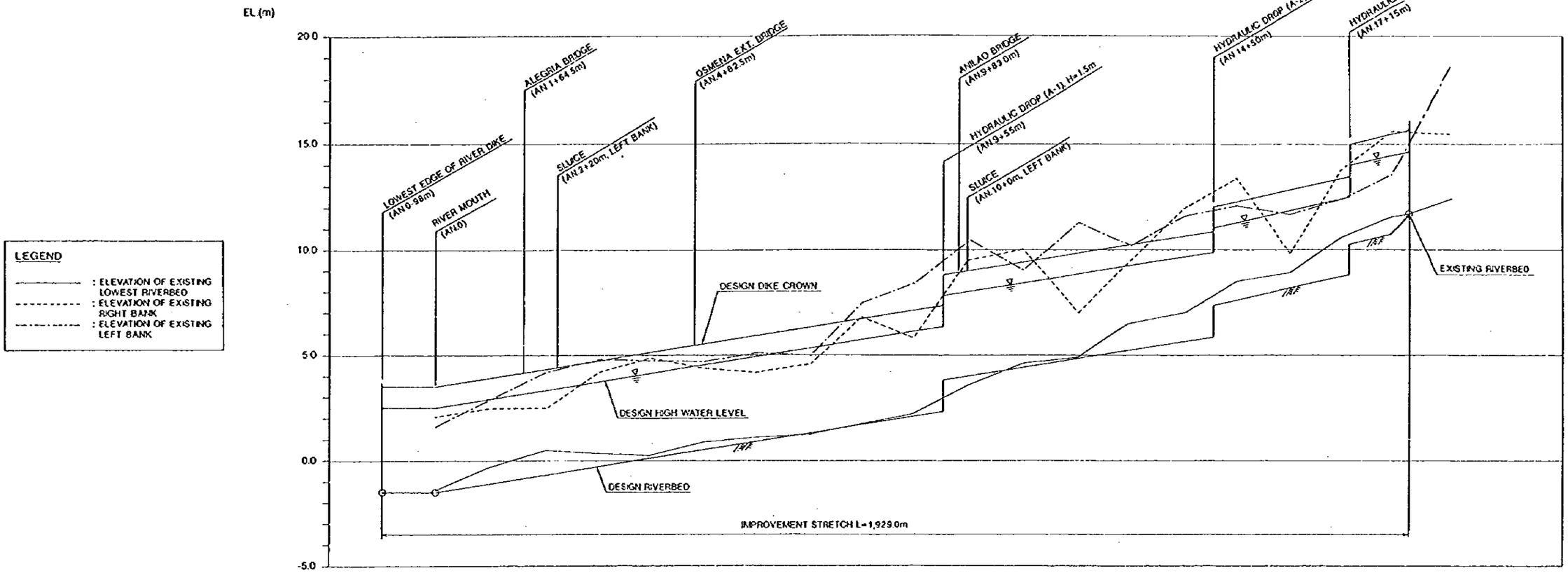
THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 2.3.2 (1/3) PLAN OF MALBASAG RIVER



THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 2.3.2 (2/3) PLAN OF MALBASAG RIVER

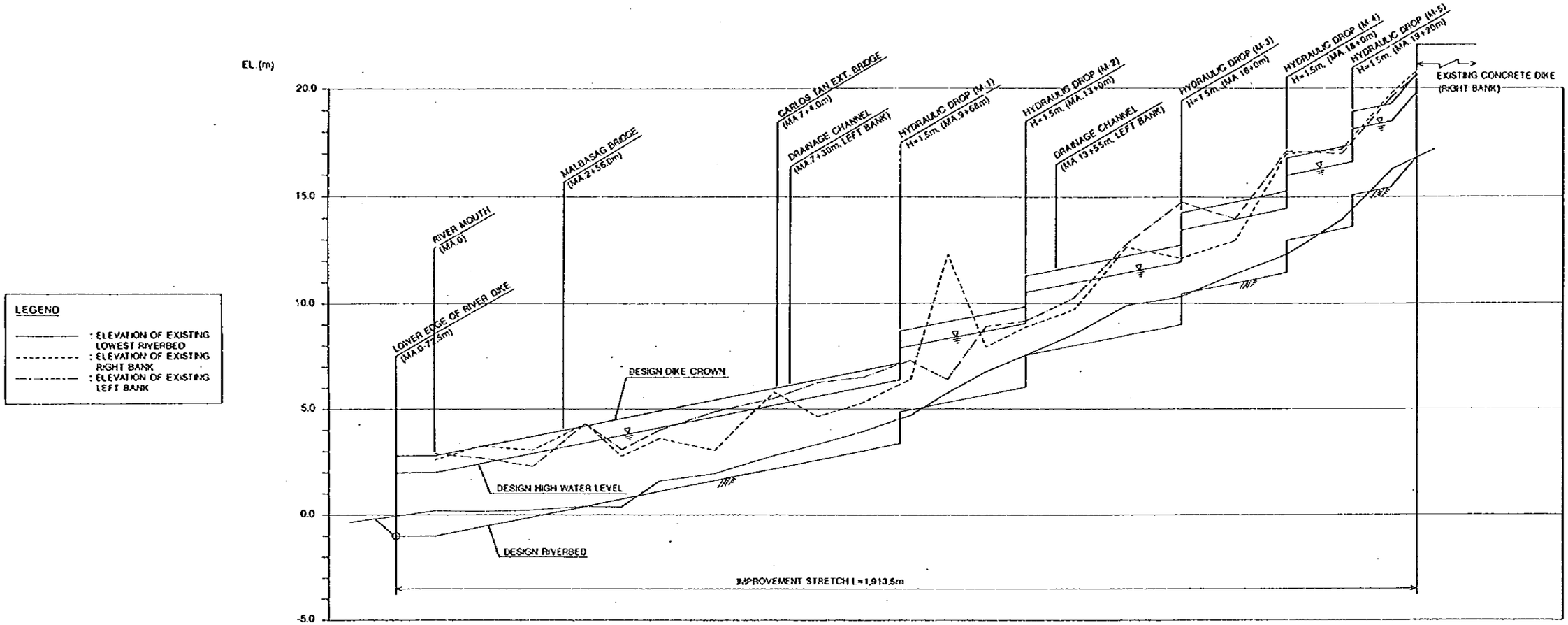


THE BASIC DESIGN STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY	Fig. 2.3.2 (3/3)
JAPAN INTERNATIONAL COOPERATION AGENCY	PLAN OF MALBASAG RIVER



DESIGN RIVERBED SLOPE		LEVEL ℓ=98.0m	-1.500				i=1/250 ℓ=952.0						2.308 3.808			i=1/250 ℓ=507.2m			5.837 7.337		i=1/180 ℓ=258.6m		8.773 10.273	i=1/180 ℓ=113.2m		
DESIGN ELEVATION	DIKE CROWN	3.500	3.500	3.894	4.318	4.718	5.114	5.514	5.913	6.306	6.706	7.088	7.308 8.808	8.988	9.388	9.837	10.237	10.637	10.837 12.037	12.285	12.851	13.390	13.473 14.973	15.436	15.602	
	HIGH WATER	2.500	2.500	2.894	3.318	3.718	4.114	4.514	4.913	5.300	5.706	6.088	6.308 7.808	7.988	8.388	8.837	9.237	9.637	9.837 11.037	11.285	11.851	12.390	12.473 13.973	14.436	14.602	
	RIVERBED	-1.500	-1.500	-1.106	-0.682	-0.282	0.114	0.514	0.913	1.306	1.706	2.088	2.308 3.808	3.988	4.388	4.837	5.237	5.637	5.837 7.337	7.585	8.151	8.690	8.773 10.273	10.736	11.700	
EXISTING ELEVATION	LOWEST RIVERBED		-1.40	-0.32	0.51	0.35	0.26	0.90	1.14	1.24	1.79	2.22		3.60	4.70	5.90	6.50	7.00		8.50	8.90	10.60		11.60		12.40
	LEFT BANK		1.60	2.86	4.19	4.80	4.74	4.70	5.10	5.00	7.46	8.38		10.50	9.00	11.30	10.20	11.60		12.10	11.70	12.40		13.60		18.60
	RIGHT BANK		2.10	2.48	2.51	4.20	4.88	4.40	4.22	4.60	6.80	5.81		9.50	10.00	7.10	9.50	12.00		13.40	9.80	13.80		15.60		15.40
DISTANCE	ACCUMULATED (m)		0.0	98.4	204.4	304.6	403.6	503.6	603.2	701.4	801.6	897.0	952.0	997.0	1,097.0	1,209.2	1,309.2	1,409.2	1,459.2	1,503.8	1,605.8	1,702.8	1,717.8	1,801.0	1,831.0	1,907.5
	PARTIAL (m)	-98.0	0.0	98.4	106.0	100.2	99.0	100.0	99.6	98.2	100.2	95.4	(55.0)	100.0	100.0	112.2	100.0	100.0	(50.0)	94.6	102.0	97.0	(15.0)	98.2	30.0	76.5
STATION NO.		AN.-1	AN.0	AN.1	AN.2	AN.3	AN.4	AN.5	AN.6	AN.7	AN.8	AN.9		AN.10	AN.11	AN.12	AN.13	AN.14		AN.15	AN.16	AN.17		AN.18		AN.19

Fig. 2.3.3 LONGITUDINAL PROFILE OF ANILAO RIVER



DESIGN RIVERBED SLOPE		LEVEL	-1.000	I=1/200 ℓ=875.0m								3.375 4.875
DESIGN ELEVATION	DIKE CROWN	2.800 2.800	2.800	3.234	3.722	4.205	4.555	4.922	5.427	5.982	6.403	6.835	7.175 8.675 8.766
	HIGH WATER	2.000 2.000	2.000	2.434	2.922	3.405	3.755	4.122	4.627	5.182	5.603	6.035	6.375 7.875 7.966
	RIVERBED	-1.000 -1.000	-1.000	-0.566	-0.078	0.405	0.755	1.122	1.627	2.182	2.603	3.035	3.375 4.875 4.966
EXISTING ELEVATION	LOWEST RIVERBED		0.20	0.17	0.23	0.40	0.38	1.60	1.95	2.80	3.36	3.94	4.70
	LEFT BANK		2.90	2.70	2.30	4.30	3.09	4.00	4.87	5.50	6.26	6.51	7.30
	RIGHT BANK		2.60	3.25	3.07	4.30	2.78	3.60	3.05	5.80	4.66	5.30	6.40
DISTANCE	ACCUMULATED (m)	72.5 65.0	0.0	86.8	184.4	281.0	351.0	424.4	525.4	636.4	720.6	807.0	875.0 893.2
	PARTIAL (m)	7.5 65.0	0.0	86.8	97.6	96.6	70.0	73.4	101.0	111.0	84.2	86.4	(68.0) 86.2
STATION NO.			MA.0	MA.1	MA.2	MA.3	MA.4	MA.5	MA.6	MA.7	MA.8	MA.9	MA.10

DESIGN RIVERBED SLOPE		I=1/200 ℓ=232.8m		6.039 7.539	I=1/200 ℓ=289.4m		8.986 10.486	I=1/200 ℓ=201.0m	11.491 12.991	I=1/200 124.4 13.613 15.113	I=1/200 71.2	
DESIGN ELEVATION	DIKE CROWN	9.117	9.467	9.839 11.339	11.786	12.274	12.786 14.286	14.787	15.201 16.791	17.313 17.413 18.913	19.269	20.500
	HIGH WATER	8.317	8.667	9.039 10.539	10.986	11.474	11.986 13.486	13.987	14.491 15.991	16.513 16.613 18.113	18.469	19.700
	RIVERBED	5.317	5.667	6.039 7.539	7.986	8.474	8.986 10.486	10.987	11.491 12.991	13.513 13.613 15.113	15.469	16.700
EXISTING ELEVATION	LOWEST RIVERBED	5.77	6.76	7.54	8.52	9.90	10.32	11.42	12.33	13.95	16.30	16.70
	LEFT BANK	6.41	8.89	9.15	10.26	12.80	14.76	14.00	17.11	17.00	19.60	
	RIGHT BANK	12.34	7.93	8.84	9.69	12.70	12.14	12.99	17.01	17.20	19.80	
DISTANCE	ACCUMULATED (m)	963.4	1,033.4	1,107.8	1,197.2	1,294.8	1,397.2	1,497.4	1,598.2	1,702.6 1,722.6	1,793.8	1,841.0
	PARTIAL (m)	70.2	70.0	74.4	89.4	97.6	102.4	100.2	100.8	104.4 (20.0)	91.2	47.2
STATION NO.		MA.11	MA.12	MA.13	MA.14	MA.15	MA.16	MA.17	MA.18	MA.19	MA.20	

Fig. 2.3.4 LONGITUDINAL PROFILE OF MALBASAG RIVER

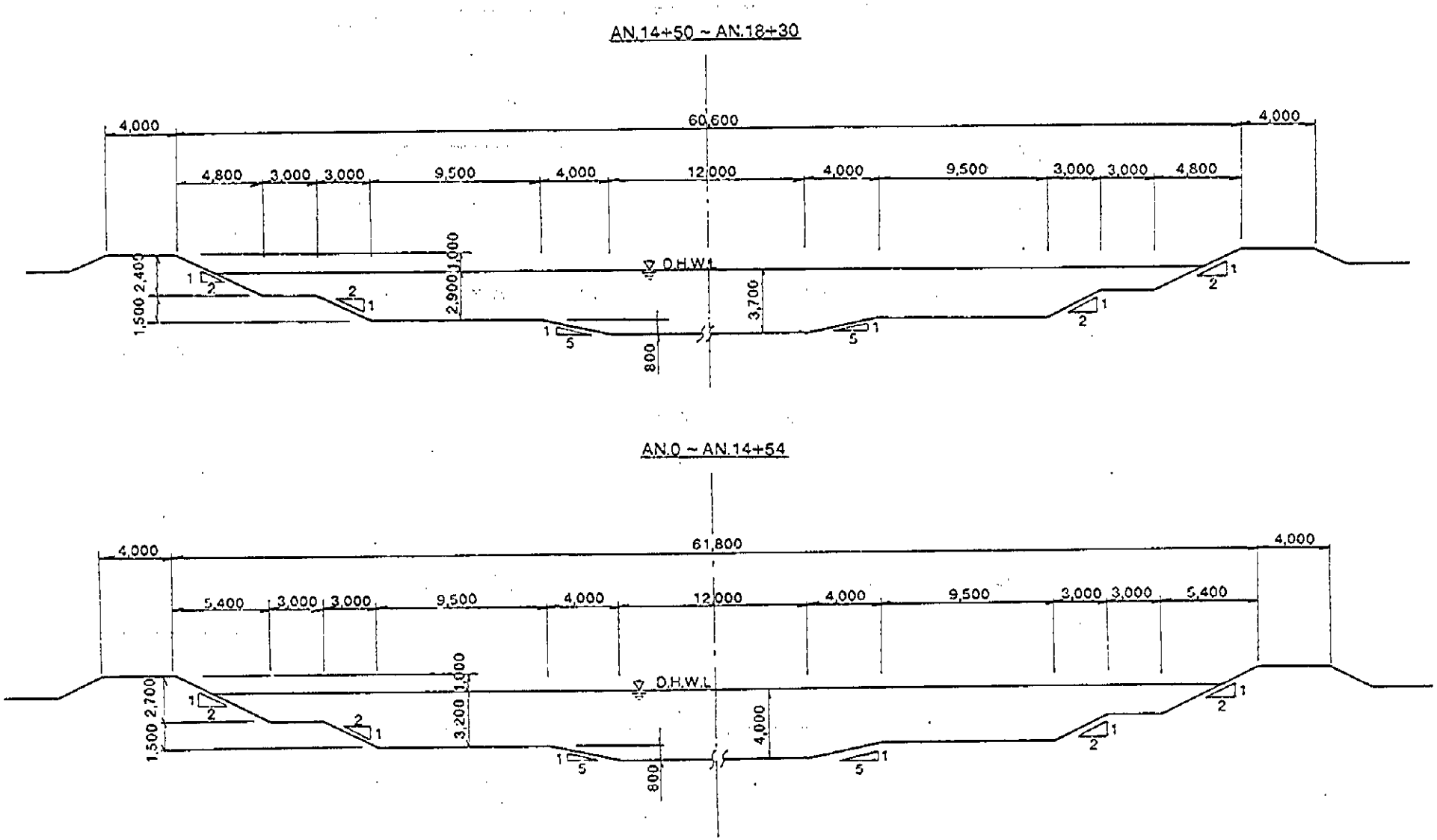
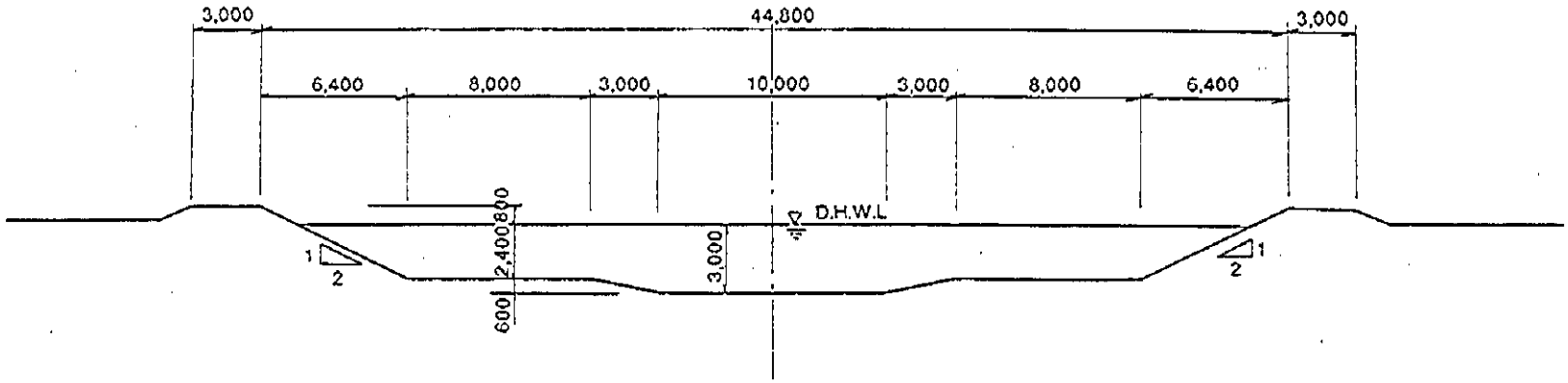


Fig. 2.3.5 STANDARD CROSS SECTION OF ANILAO RIVER

MA.12+54 ~ MA.20+47



MA.0 ~ MA.12+54

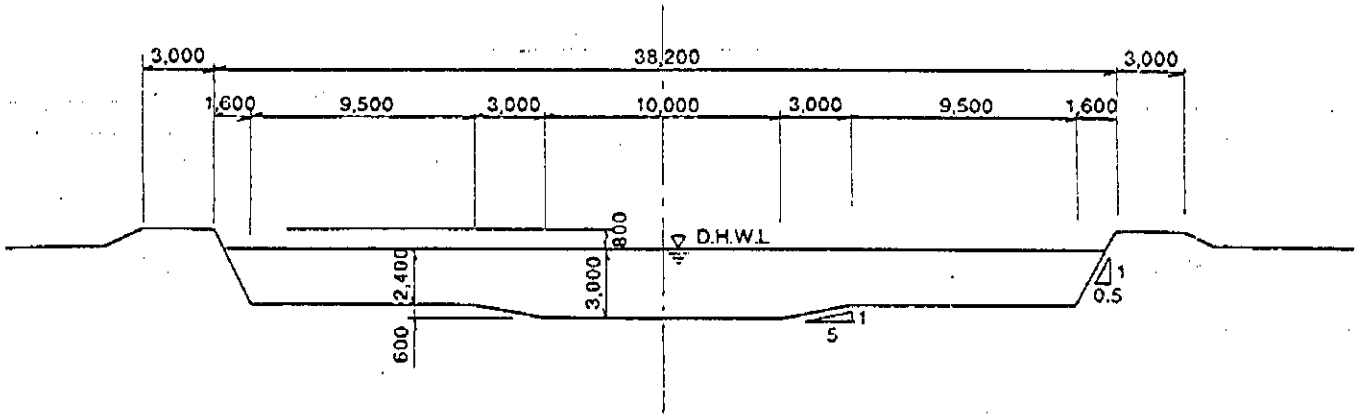


Fig. 2.3.6 STANDARD CROSS SECTION OF MALBASAG RIVER

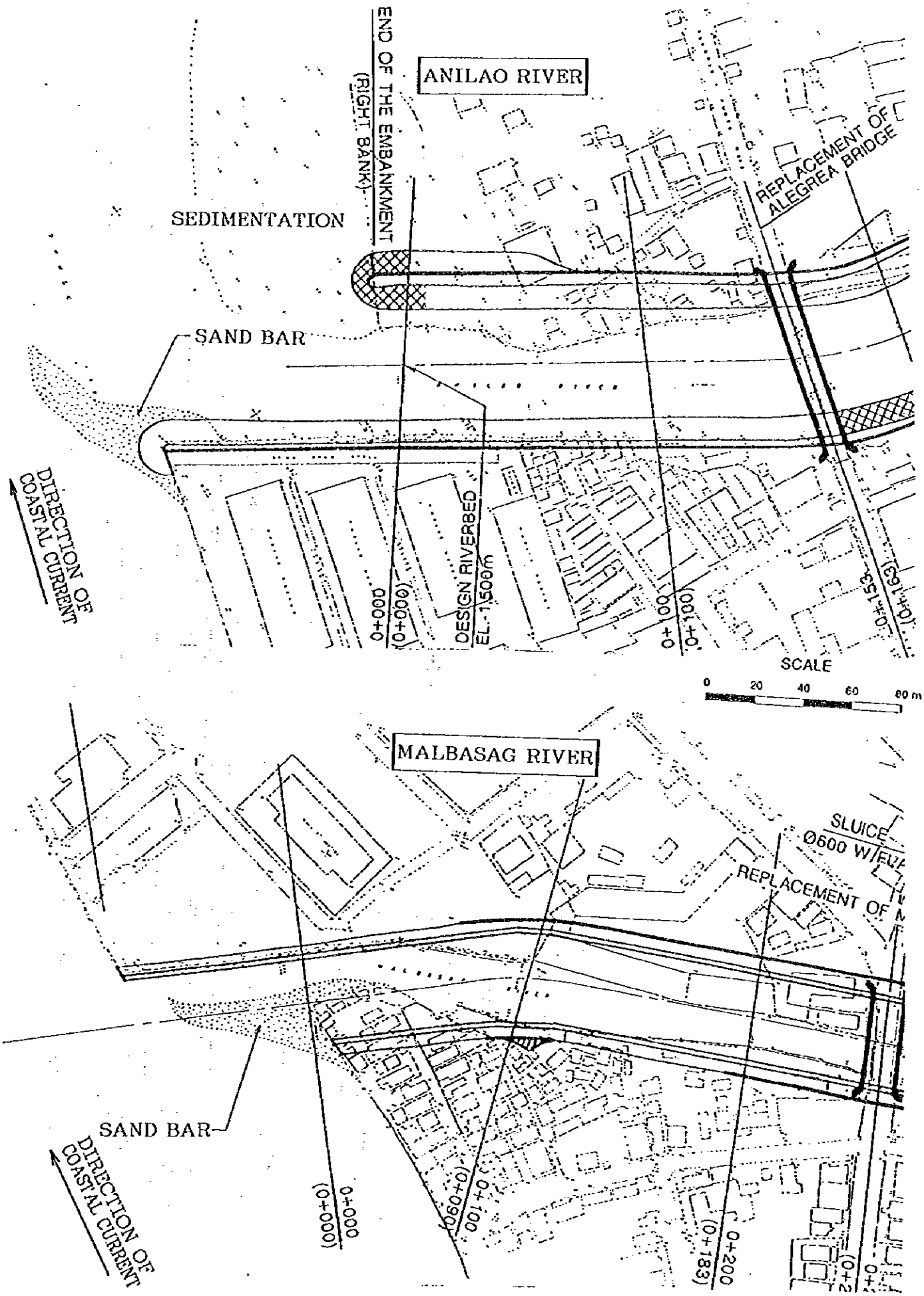
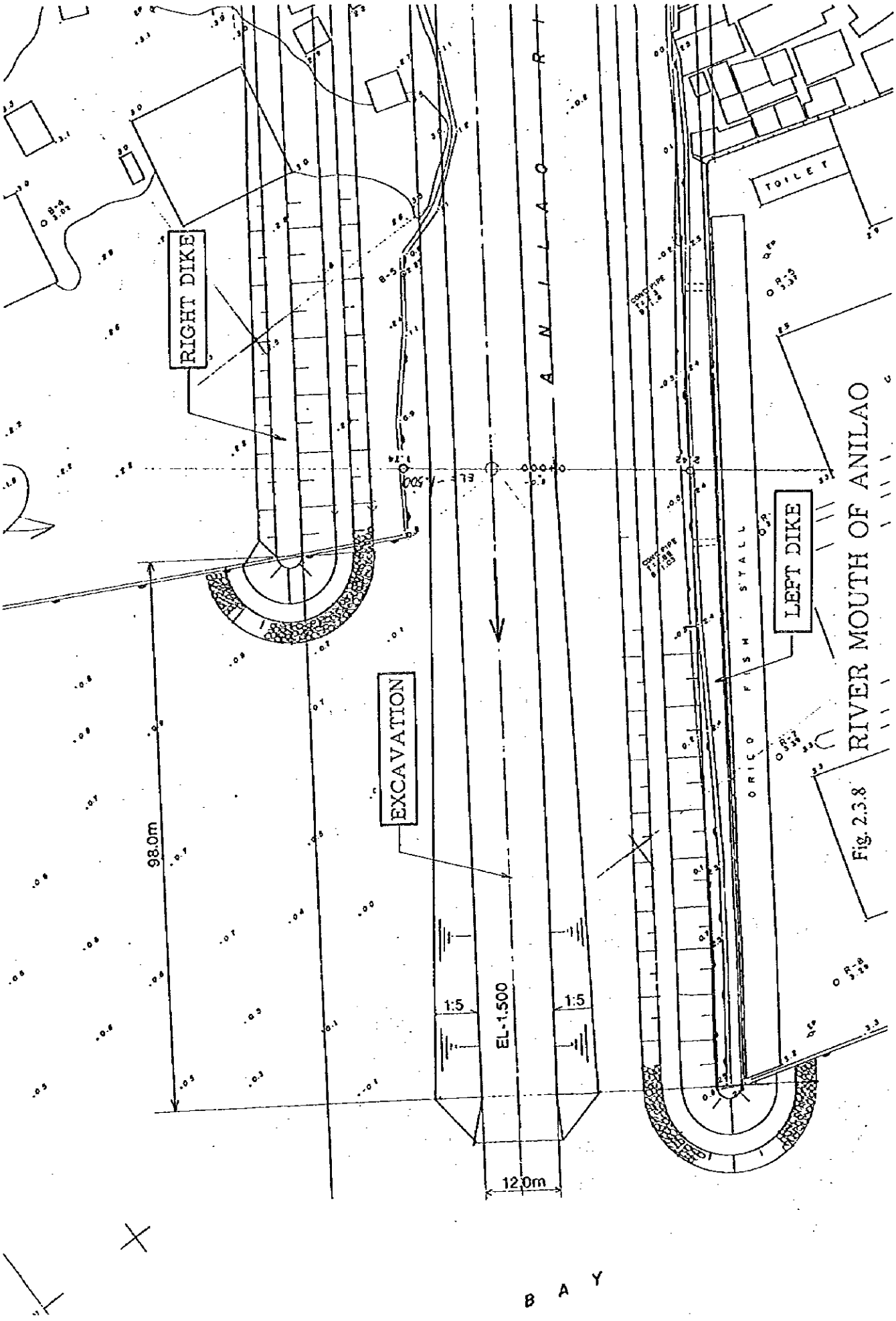


Fig. 2.3.7 SAND BARS AT RIVER MOUTH



RIVER MOUTH OF ANILAO

Fig. 2.3.8

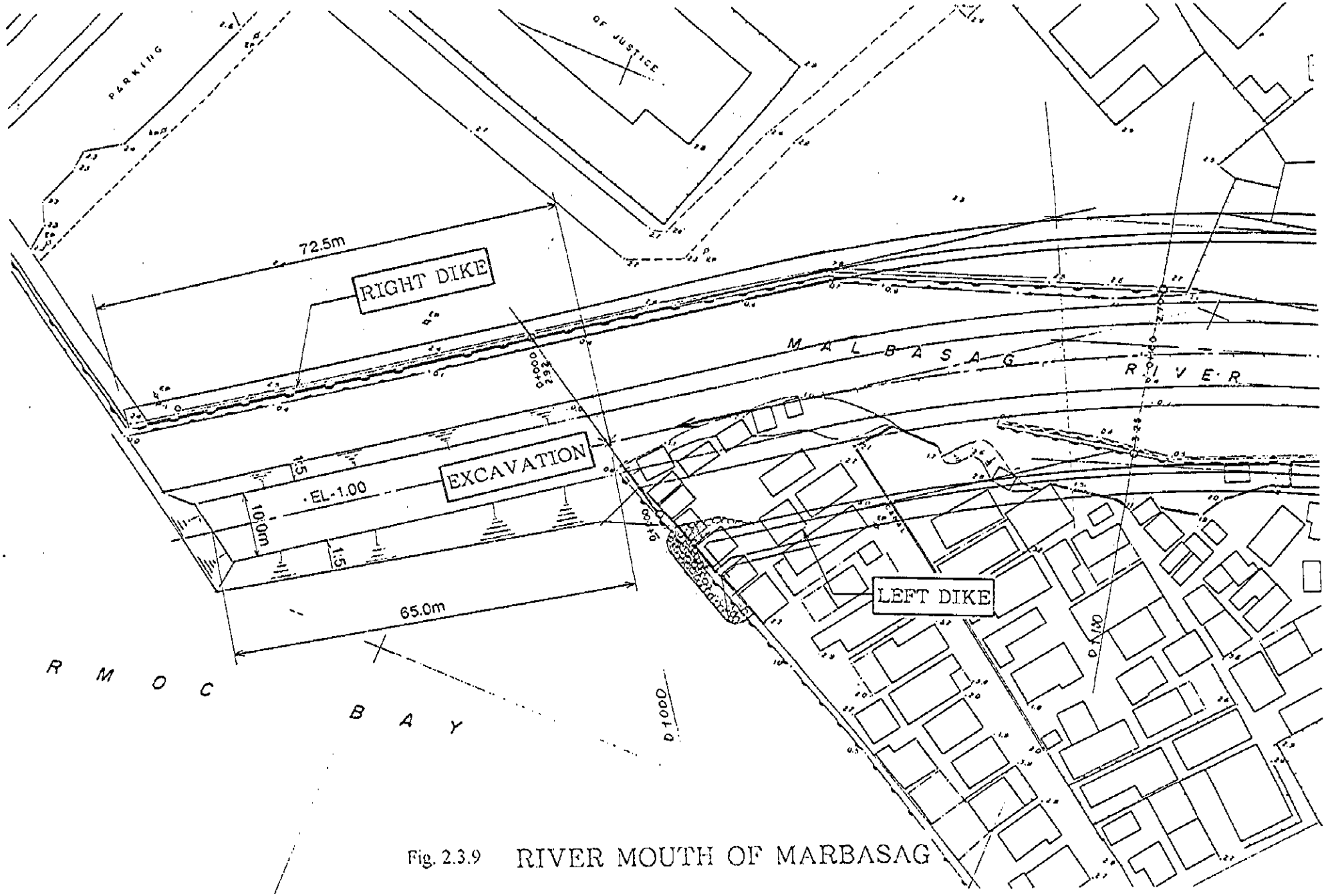
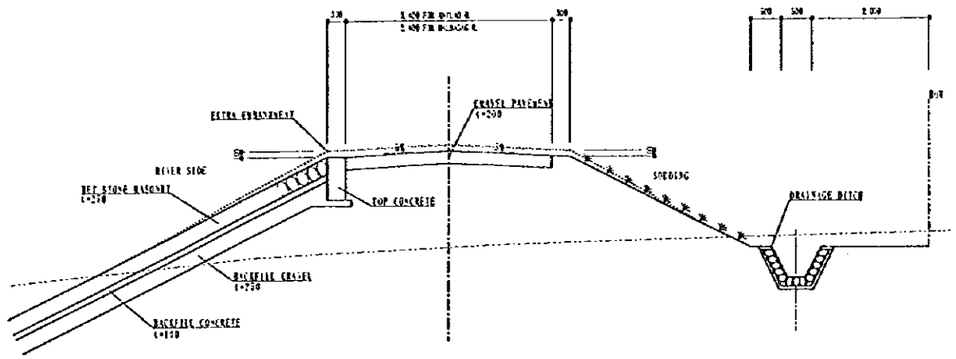
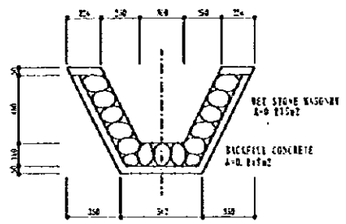


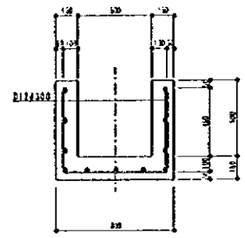
Fig. 2.3.9 RIVER MOUTH OF MARBASAG



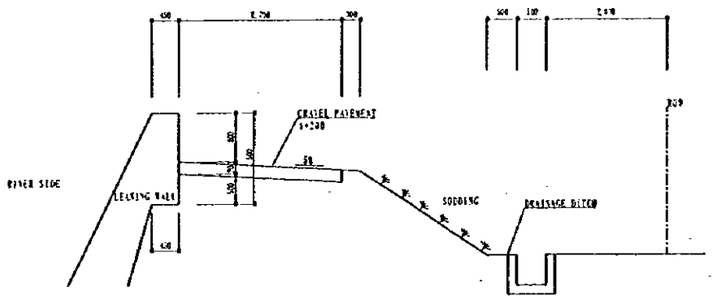
TYPICAL CROSS-SECTION OF EARTH DIKE
SCALE A



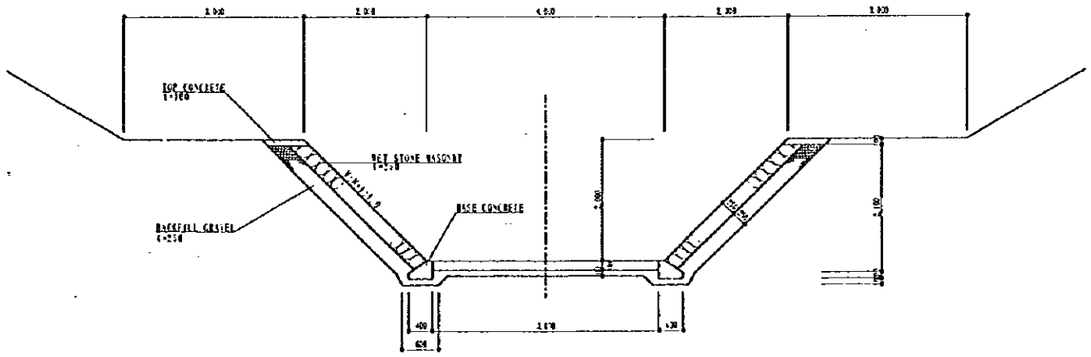
TYPICAL CROSS-SECTION OF
DRAINAGE DITCH FOR EARTH DIKE
SCALE B



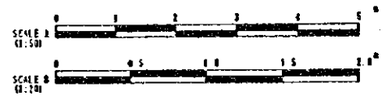
TYPICAL CROSS-SECTION OF
DRAINAGE DITCH FOR LEANING WALL
SCALE B



TYPICAL CROSS-SECTION OF LEANING WALL
SCALE A

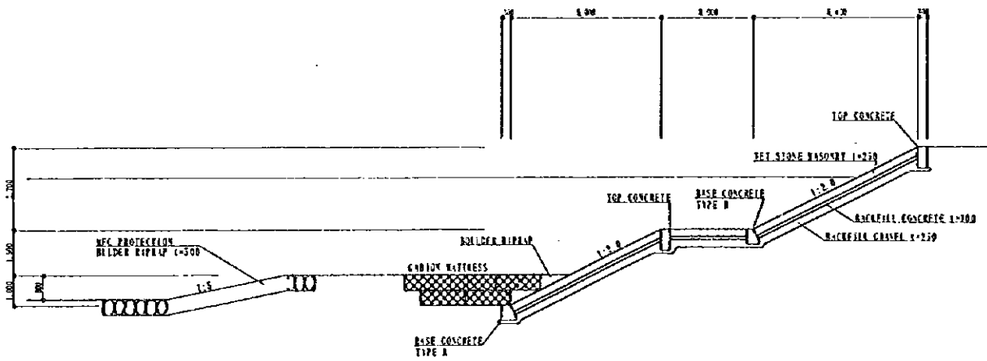


TYPICAL CROSS-SECTION OF DRAINAGE DITCH FOR
CONNECTING CHANNEL TO ANILAO SLUICE
SCALE A

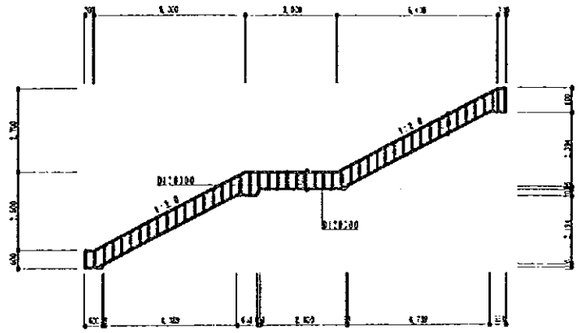


THE REPUBLIC OF THE PHILIPPINES	
FLOOD MITIGATION PROJECT IN ORMOC CITY	
DETAIL OF DIKE CREST AND DRAINAGE DITCHES	
DATE	D. W. G. NO
JAPAN INTERNATIONAL COOPERATION AGENCY	

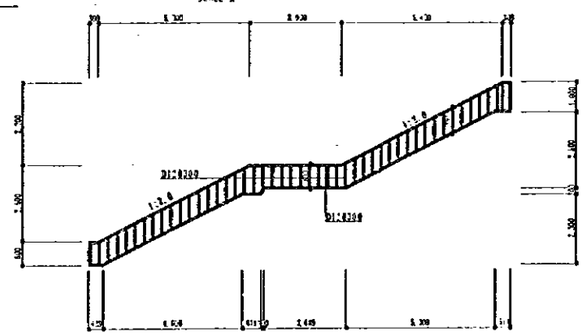
Fig. 2.3.10



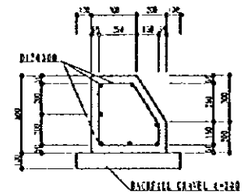
STANDERD CROSS-SECTION
SCALE A



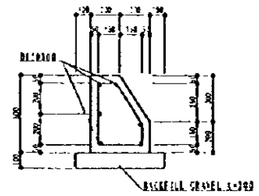
PARTITION WALL
SCALE A



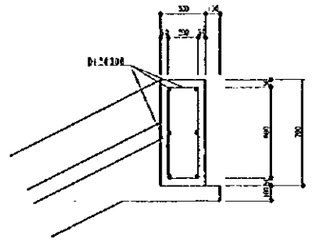
END WALL
SCALE A



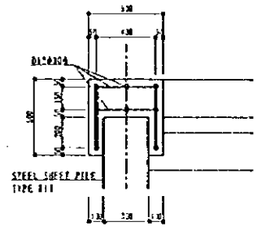
BASE CONCRETE TYPE A
SCALE B



BASE CONCRETE TYPE A
SCALE B

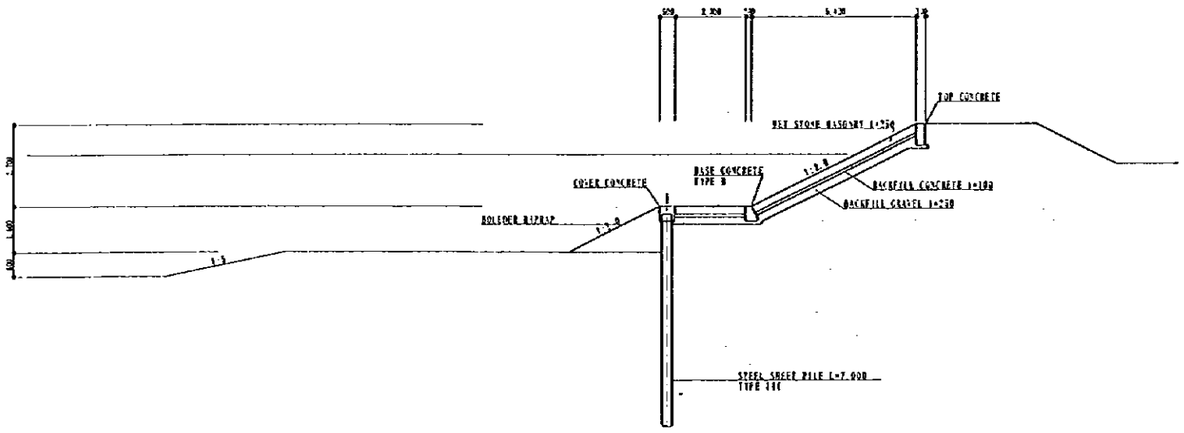


TOP CONCRETE
SCALE B

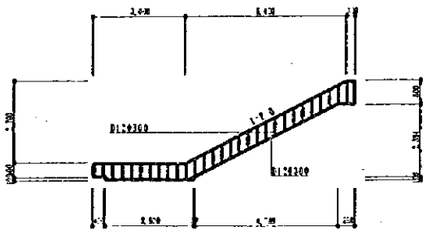


COVER CONCRETE
SCALE B

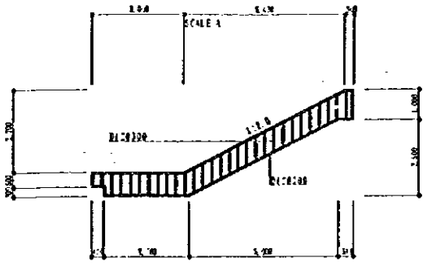
REVETMENT TYPE I FOR ANILAORIVER



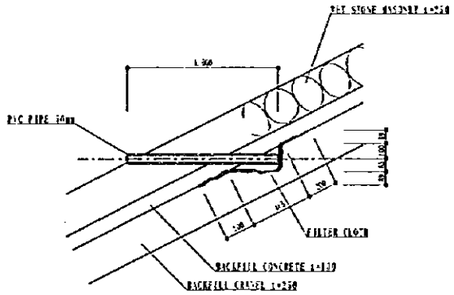
STANDERD CROSS-SECTION
SCALE A



PARTITION WALL
SCALE A

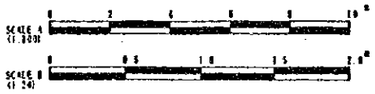


END WALL
SCALE A



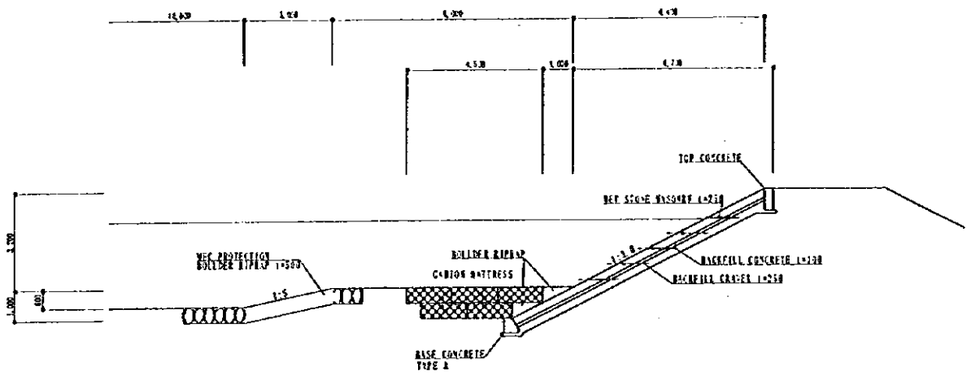
DETAIL OF PVC PIPE DRAIN
SCALE B

REVETMENT TYPE II FOR ANILAORIVER

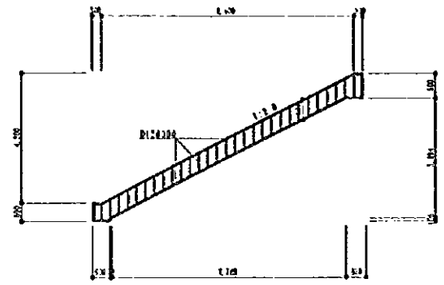


THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
REVETMENT FOR ANILAO RIVER			
DATE		D. W. G. NO	
JAPAN INTERNATIONAL COOPERATION AGENCY			

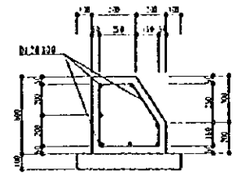
Fig. 2.3.11



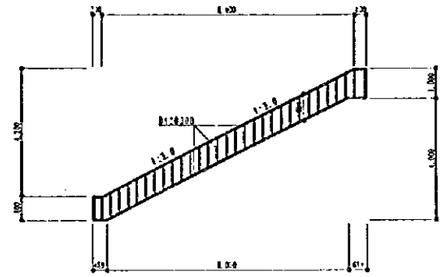
STANDERD CROSS-SECTION
SCALE A



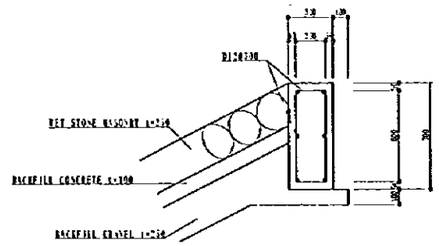
PARTITION WALL
SCALE A



BASE CONCRETE TYPE A
SCALE B

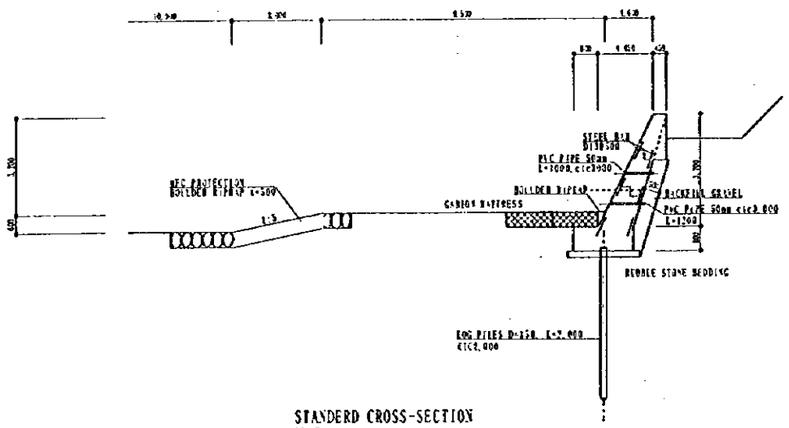


END WALL
SCALE A

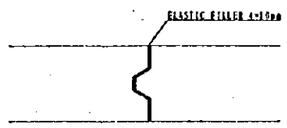


TOP CONCRETE
SCALE B

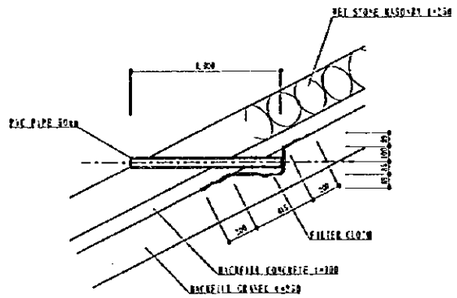
REVETMENT FOR MALBASAG RIVER



STANDERD CROSS-SECTION
SCALE A

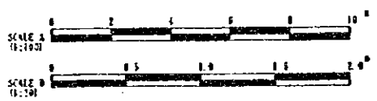


DETAIL OF JOINT FOR LEANING WALL
SCALE B



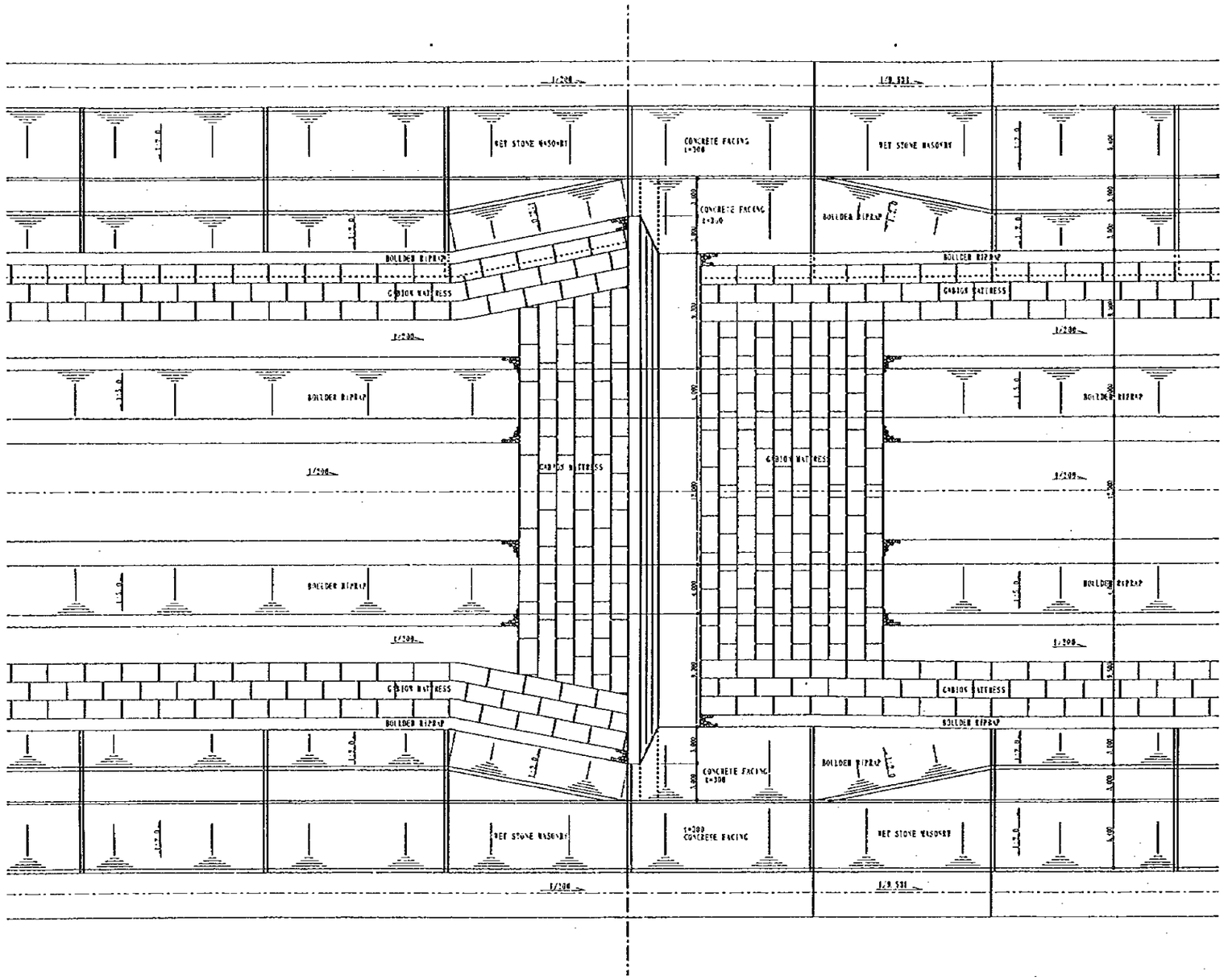
DETAIL OF PVC PIPE DRAIN
SCALE B

LEANING WALL FOR MALBASAG RIVER

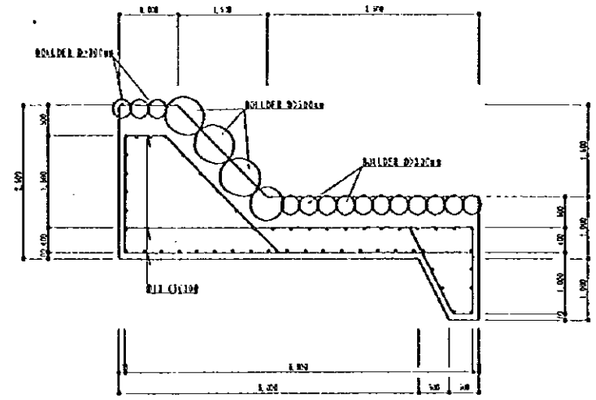


THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
REVETMENT AND LEANING WALL FOR MALBASAG RIVER			
DATE		D. W. G. NO.	
JAPAN INTERNATIONAL COOPERATION AGENCY			

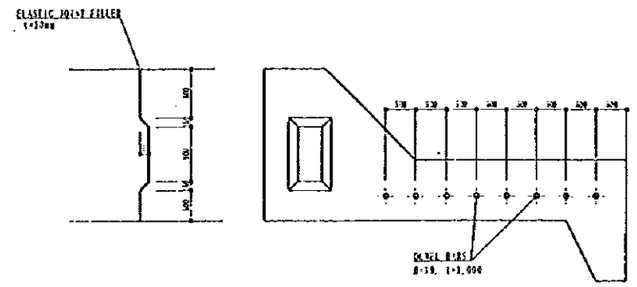
Fig. 2.3.12



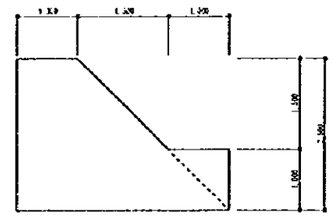
PLAN
SCALE A



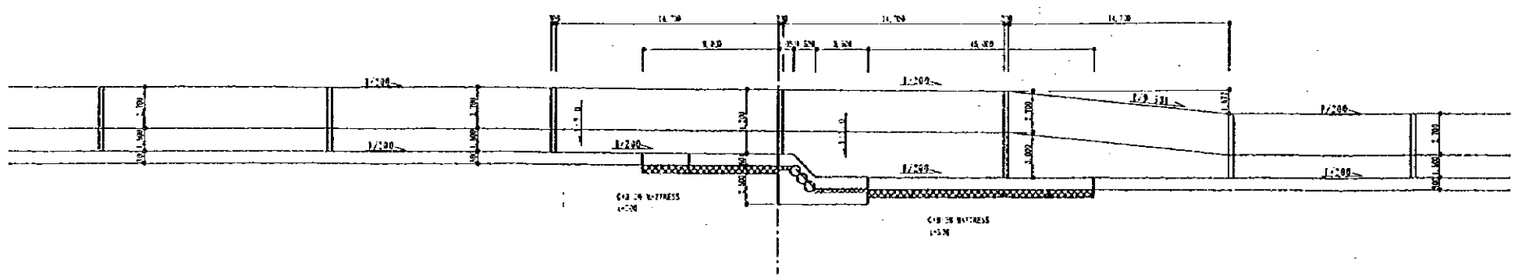
SECTION OF MAIN BODY
SCALE B



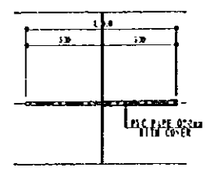
DETAIL OF JOINT
SCALE B



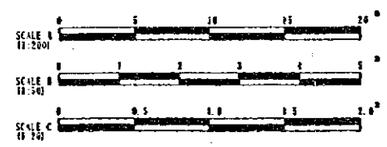
SECTION A-A
SCALE B



PROFILE
SCALE A

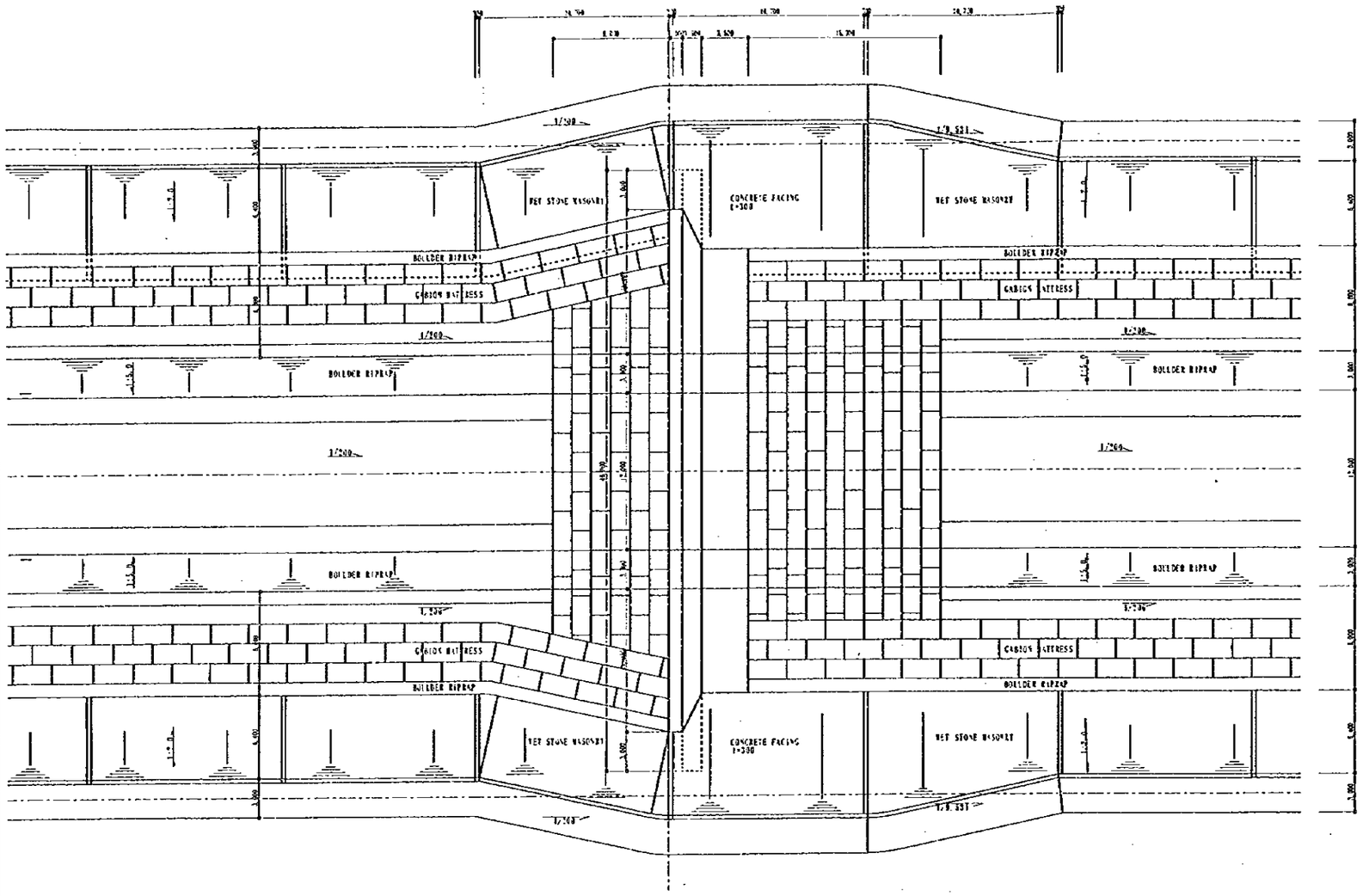


DETAIL OF DOWEL BAR
SCALE C

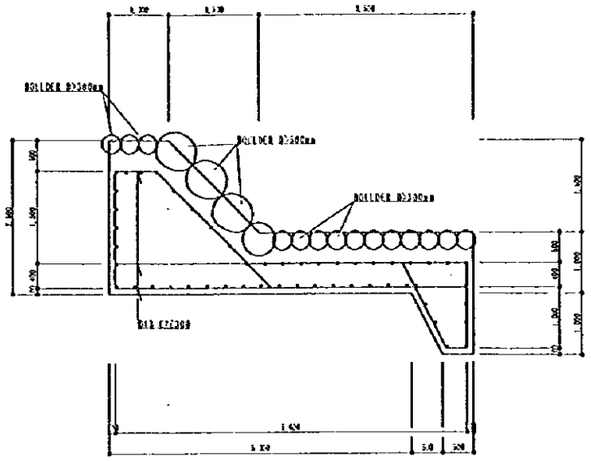


THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
HYDRAULIC DROPS, ANILAO RIVER GENERAL DRAWING			
DATE		D. W. G. NO	
JAPAN INTERNATIONAL COOPERATION AGENCY			

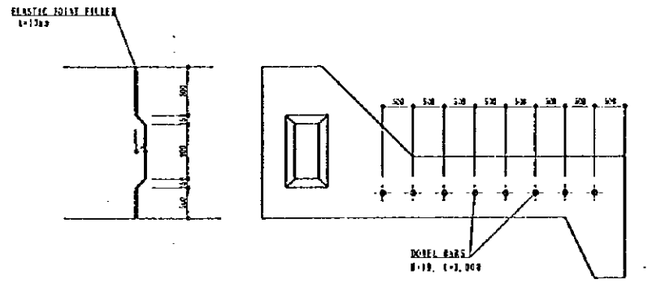
Fig. 2.3.13



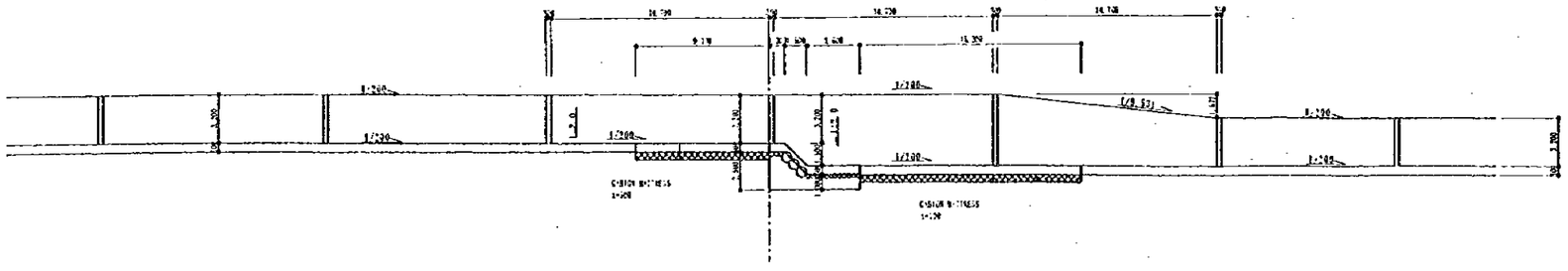
PLAN



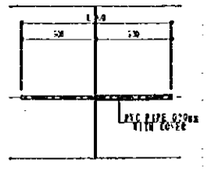
SECTION OF MAIN BODY



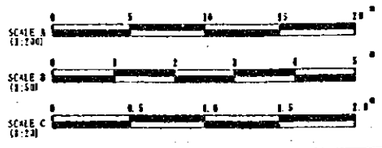
DETAIL OF JOINT



PROFILE

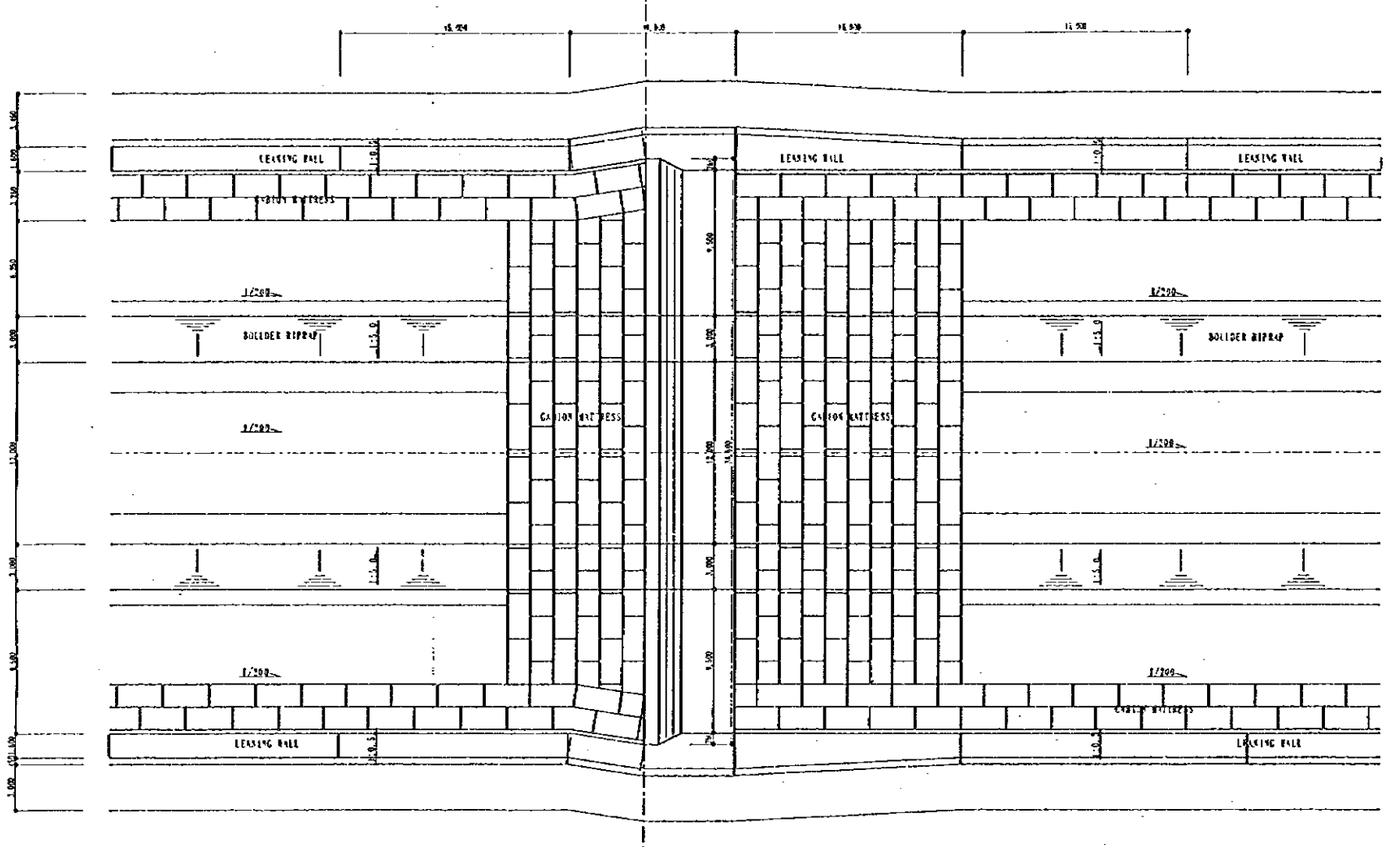


DETAIL OF DOWEL BAR



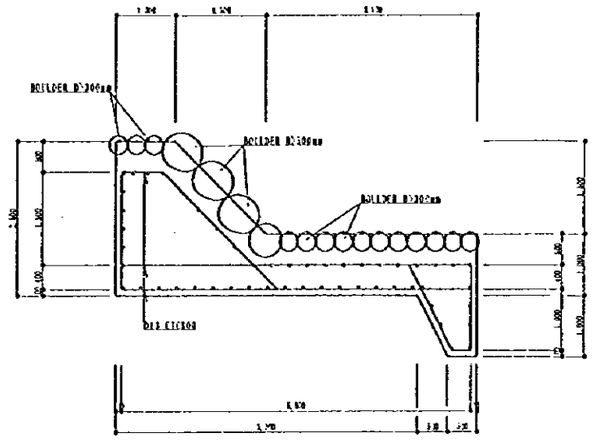
THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
HYDRAULIC DROPS, MALBASAG RIVER TYPE 1 GENERAL DRAWING			
DATE		D. W. G. NO	
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.14



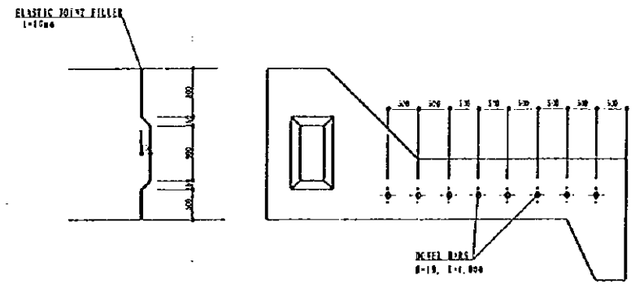
PLAN

SCALE 1



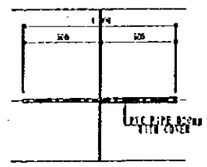
SECTION OF MAIN BODY

SCALE 1



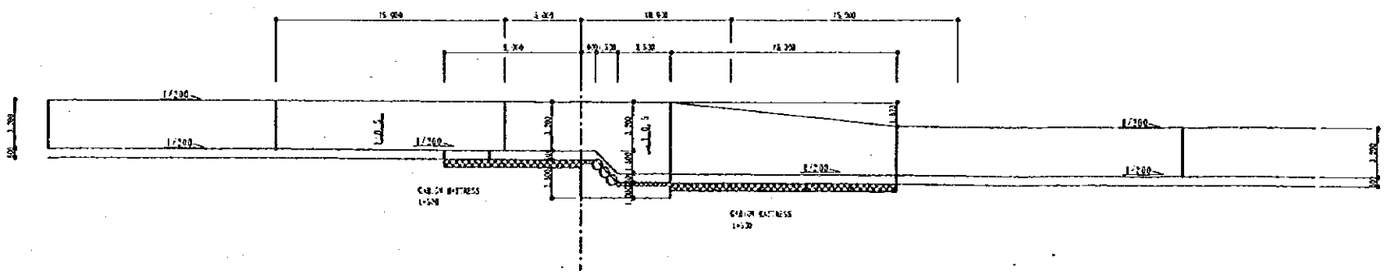
DETAIL OF JOINT

SCALE 1



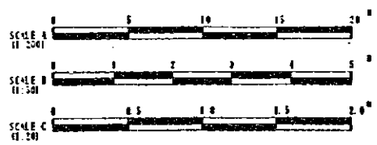
DETAIL OF DOWEL BAR

SCALE C



PROFILE

SCALE 1



THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
HYDRAULIC DROPS, MALBASAG RIVER TYPE 2 GENERAL DRAWING			
DATE		D. W. G. NO	
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.15

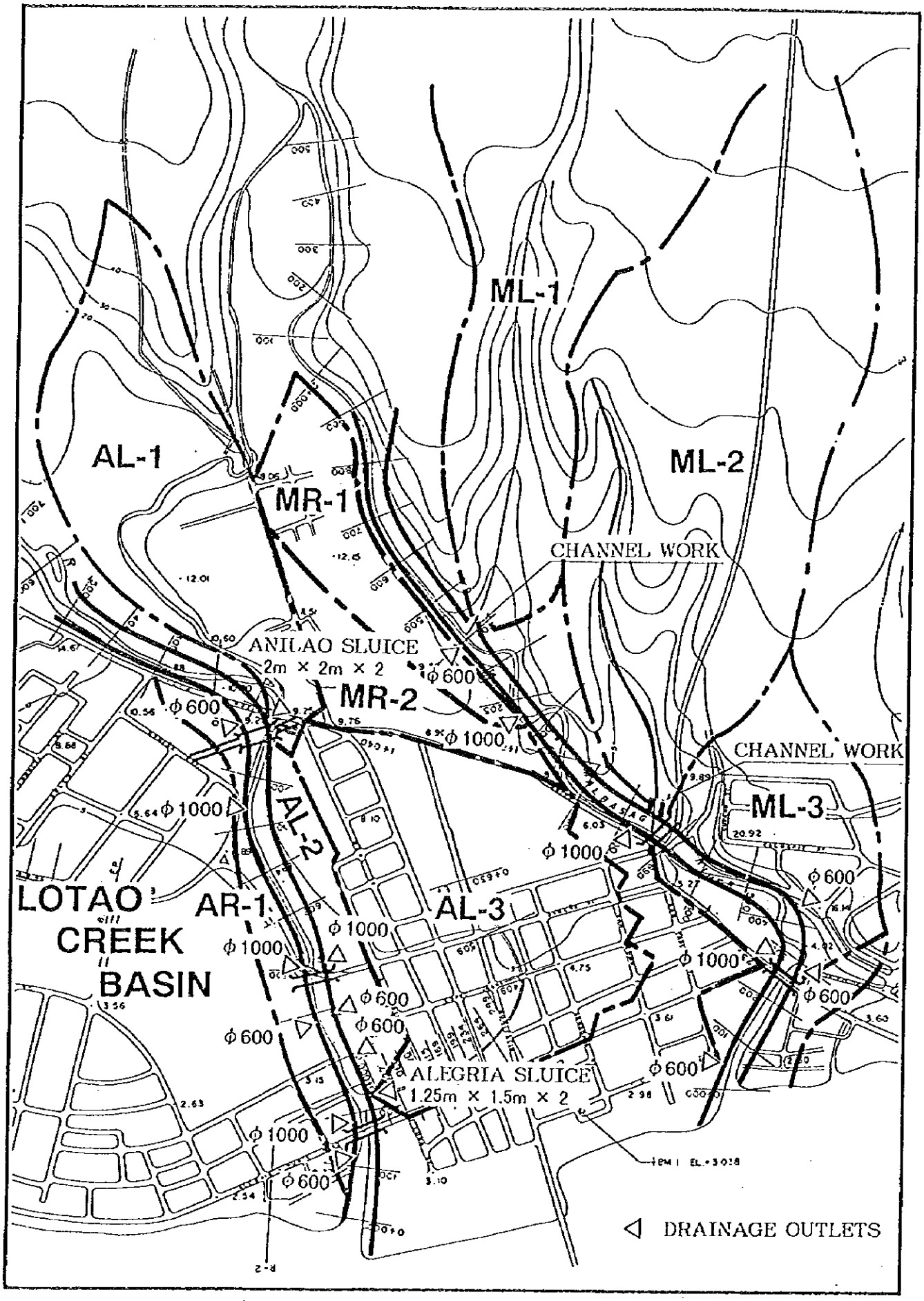
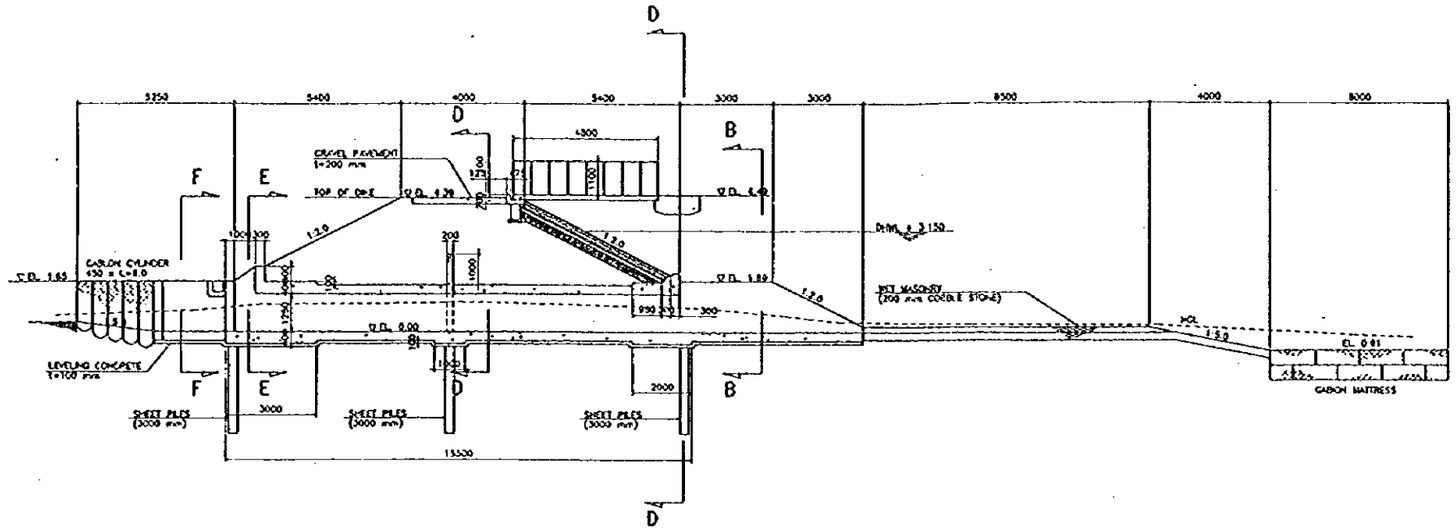
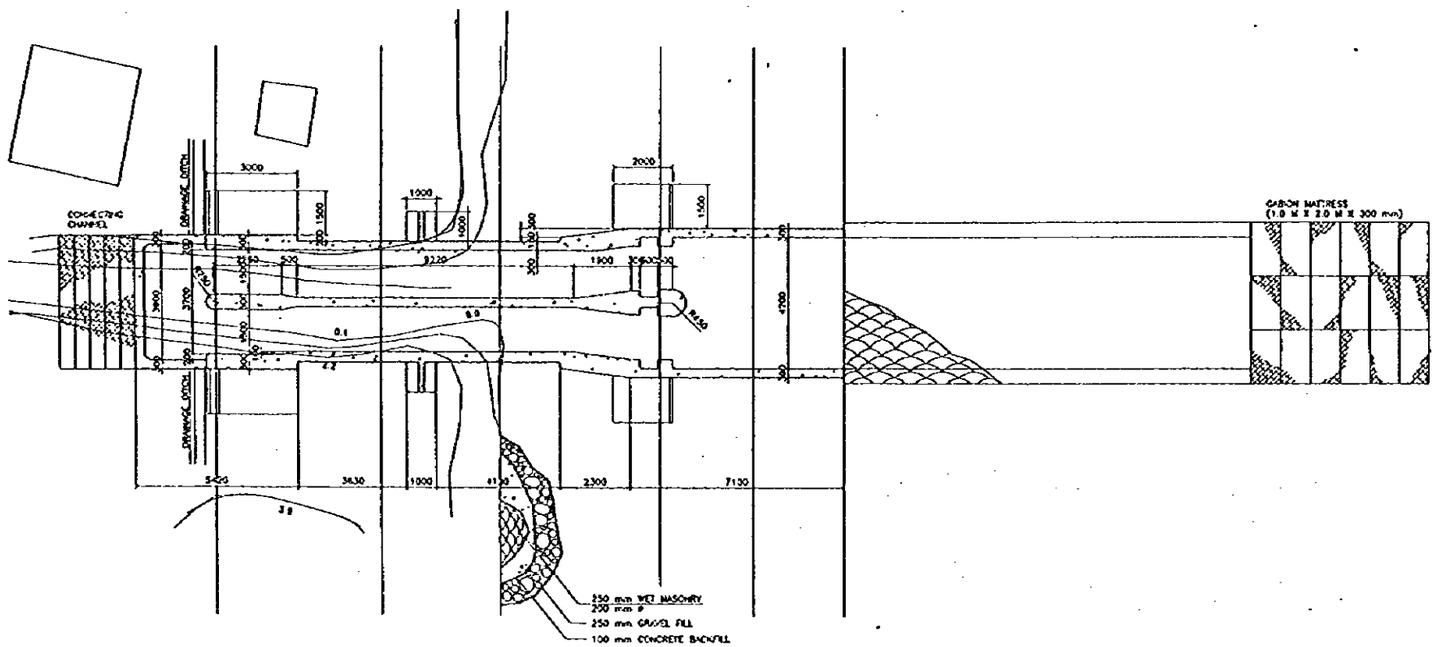


Fig. 2.3.16 DRAINAGE BASINS AND OUTLETS IN PROJECT AREA



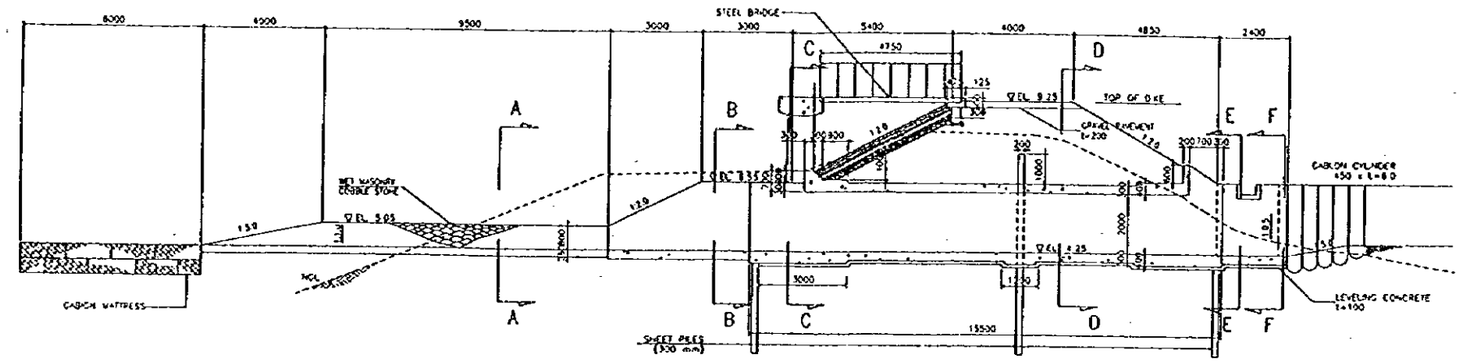
PROFILE
SCALE 1:100



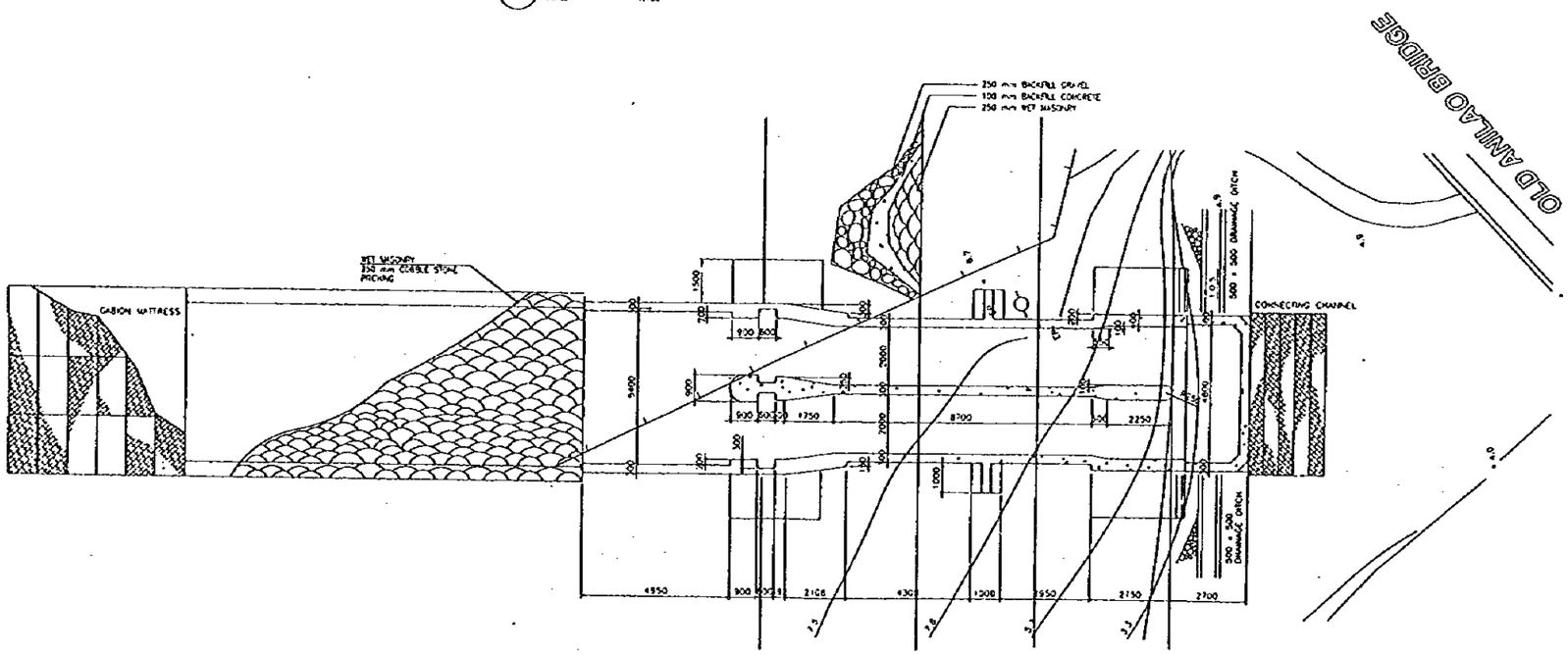
PLAN
SCALE 1:100

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ALEGRIA SLUICE PLAN & PROFILE			
DATE	1/20/97	D.W.G. NO.	C-12
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.17



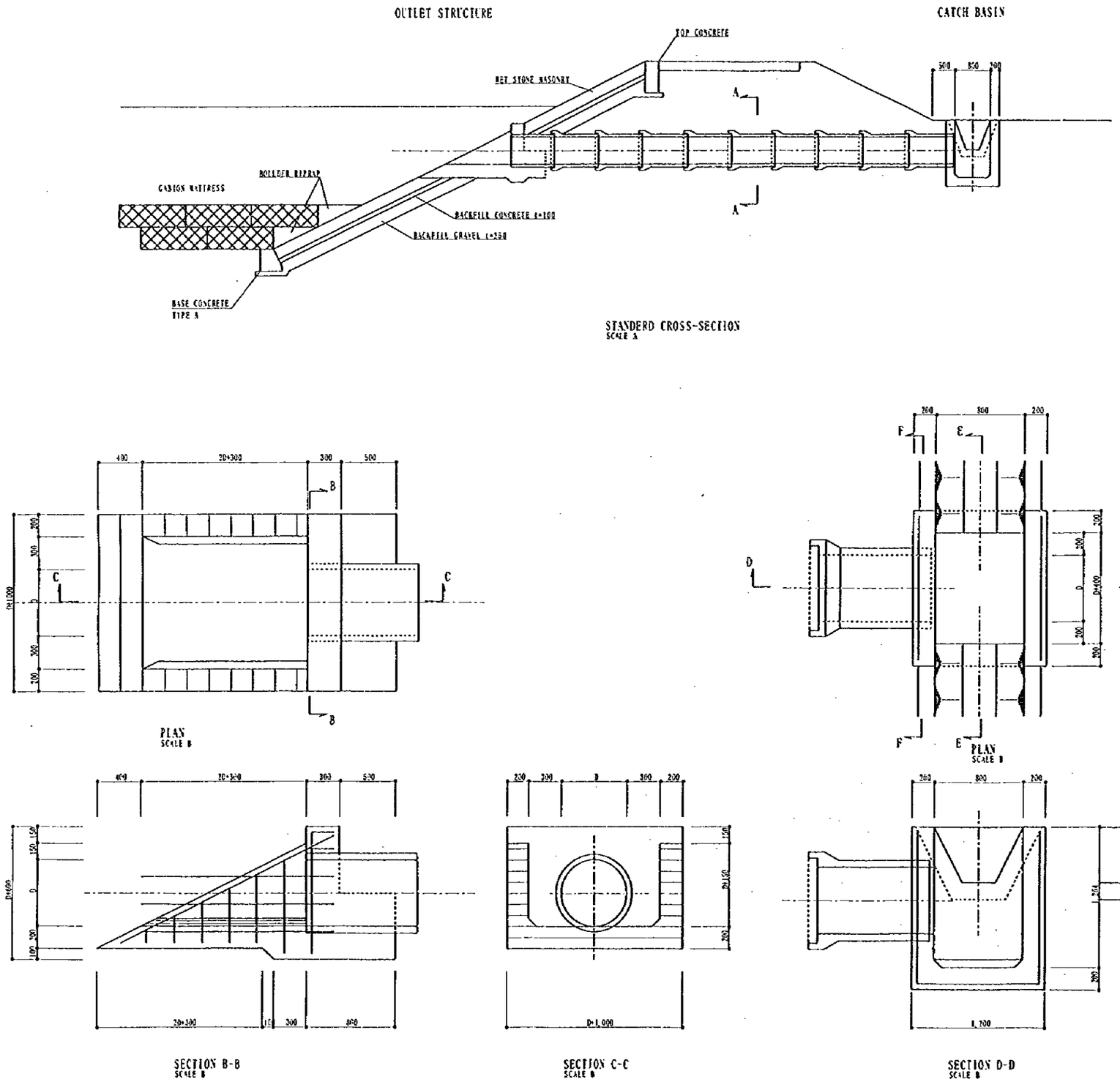
PROFILE
SCALE 1:100

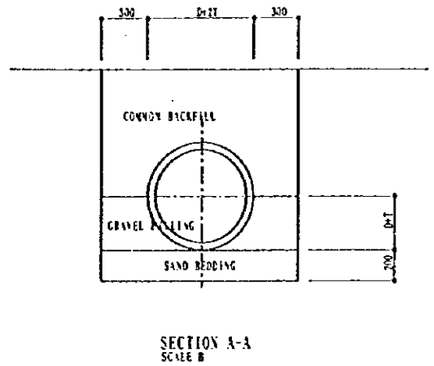


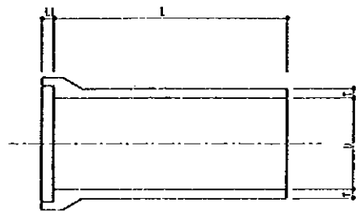
PLAN
SCALE 1:100

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ANILAO SLUICE PLAN & PROFILE			
DATE	1/20/97	D.W.G. NO.	CC-V1
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.18

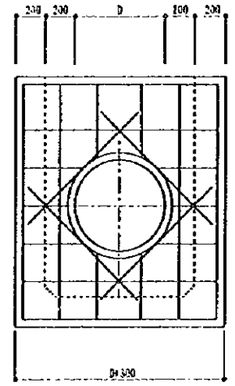






DIA/mm	T	L	W
600	62	1000	83
800	75	2000	110
1000	90	2000	120

DETAIL OF RC PIPE



SECTION F-F
SCALE B

THE REPUBLIC OF THE PHILIPPINES

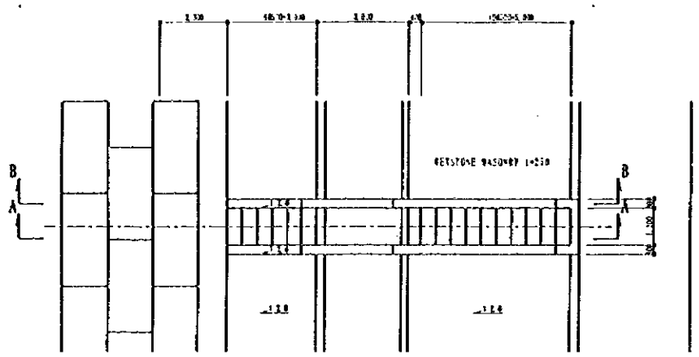
FLOOD MITIGATION PROJECT IN ORMOC CITY

GENERAL DRAWING
PIPE CULVERT

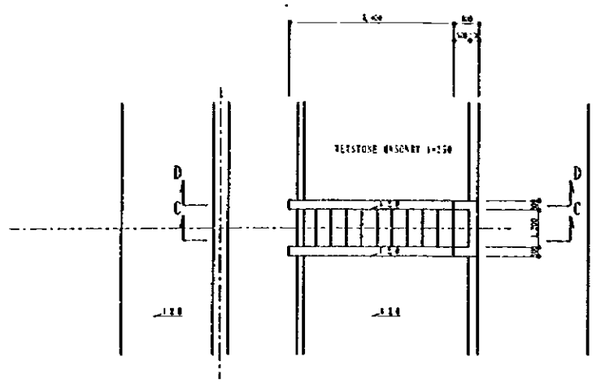
DATE		D. W. G. NO.	

JAPAN INTERNATIONAL COOPERATION AGENCY

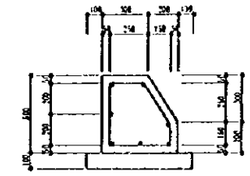
Fig. 2.3.19



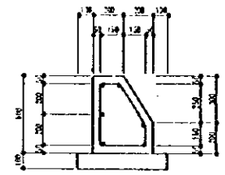
PLAN FOR REVETMENT TYPE I
SCALE A



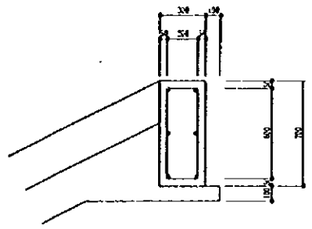
PLAN FOR REVETMENT TYPE II
SCALE A



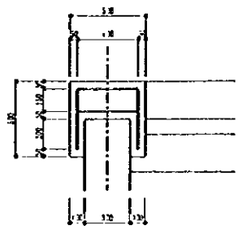
BASE CONCRETE TYPE A
SCALE B



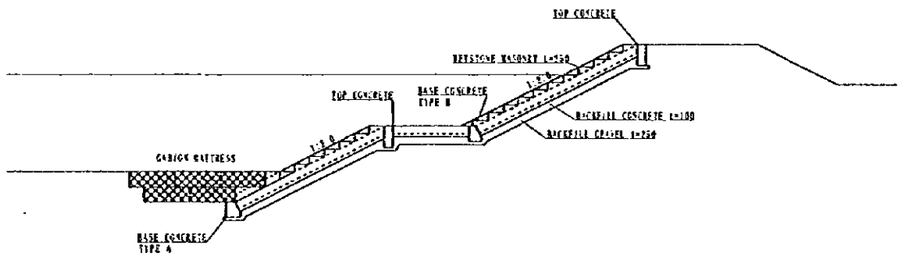
BASE CONCRETE TYPE B
SCALE B



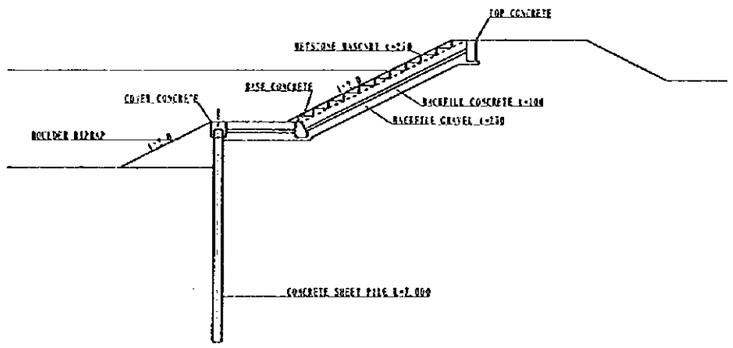
TOP CONCRETE
SCALE B



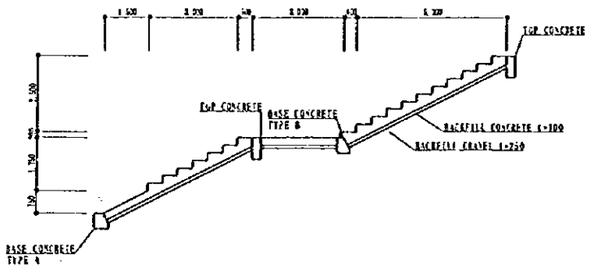
COVER CONCRETE
SCALE B



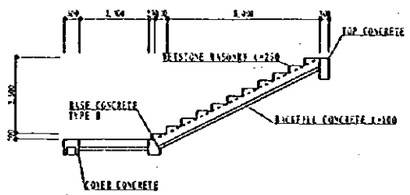
STANDERD CROSS-SECTION
FOR REVETMENT TYPE I
SCALE A



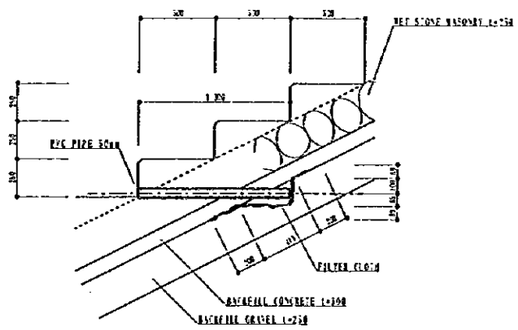
STANDERD CROSS-SECTION
FOR REVETMENT TYPE II
SCALE A



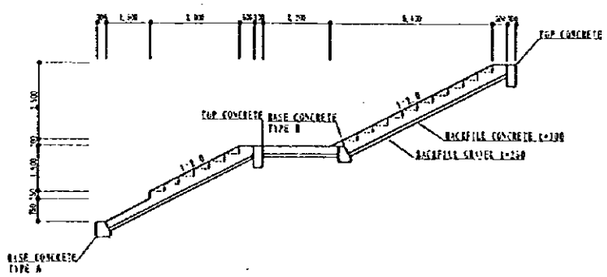
SECTION A-A
SCALE A



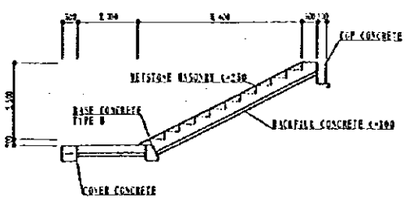
SECTION C-C
SCALE A



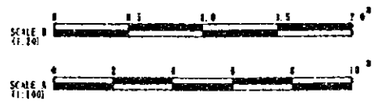
DETAIL OF PVC PIPE DRAIN
SCALE B



SECTION B-B
SCALE A

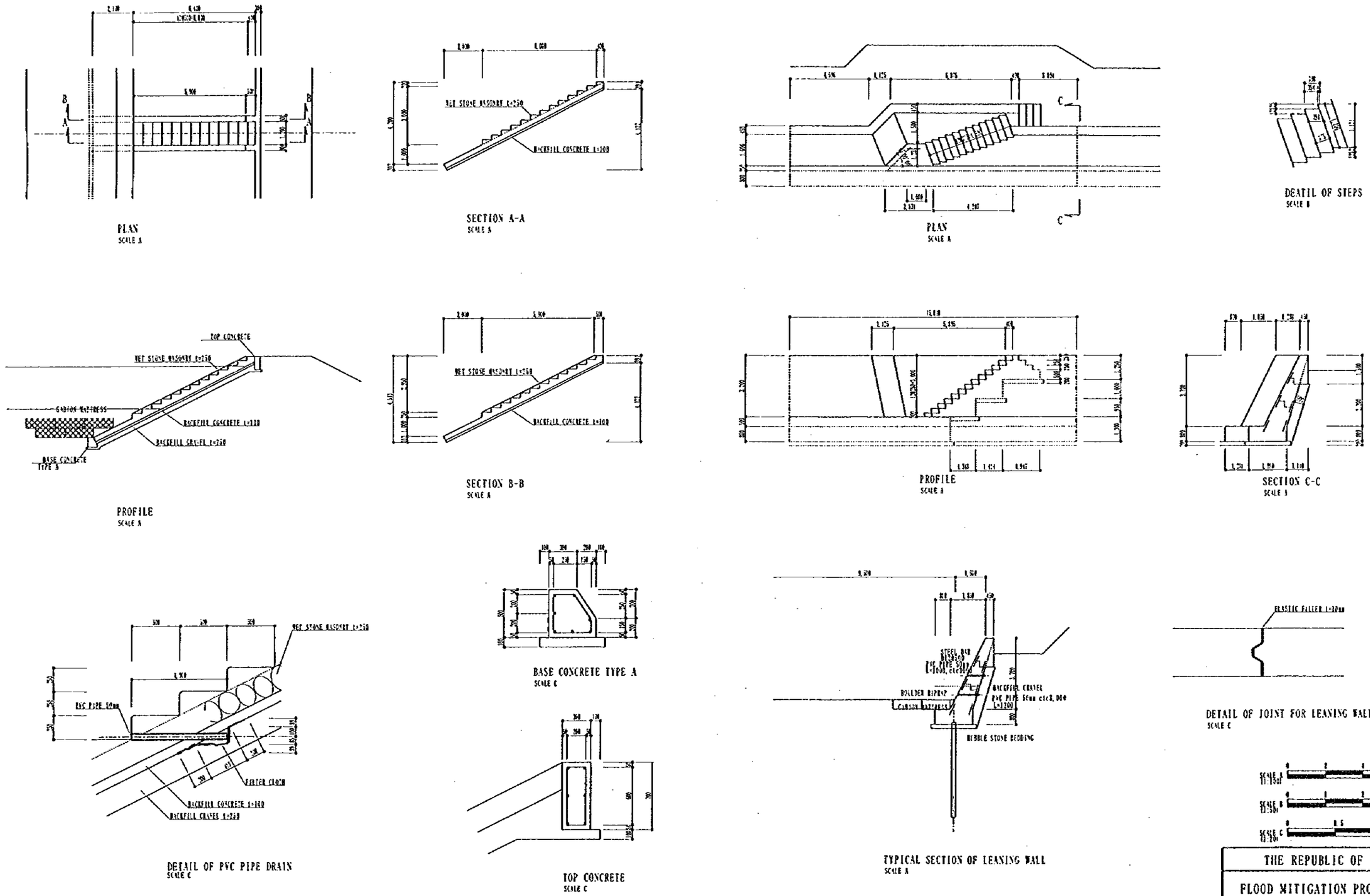


SECTION D-D
SCALE A



THE REPUBLIC OF THE PHILIPPINES	
FLOOD MITIGATION PROJECT IN ORMOC CITY	
APPROACH STEPS FOR ANILAO RIVER	
DATE	D. W. G. NO
JAPAN INTERNATIONAL COOPERATION AGENCY	

Fig. 2.3.20



THE REPUBLIC OF THE PHILIPPINES	
FLOOD MITIGATION PROJECT IN ORMOC CITY	
REVETMENT FOR MALBASAG RIVER	
DATE	D. W. G. NO.
JAPAN INTERNATIONAL COOPERATION AGENCY	

Fig. 2.3.21

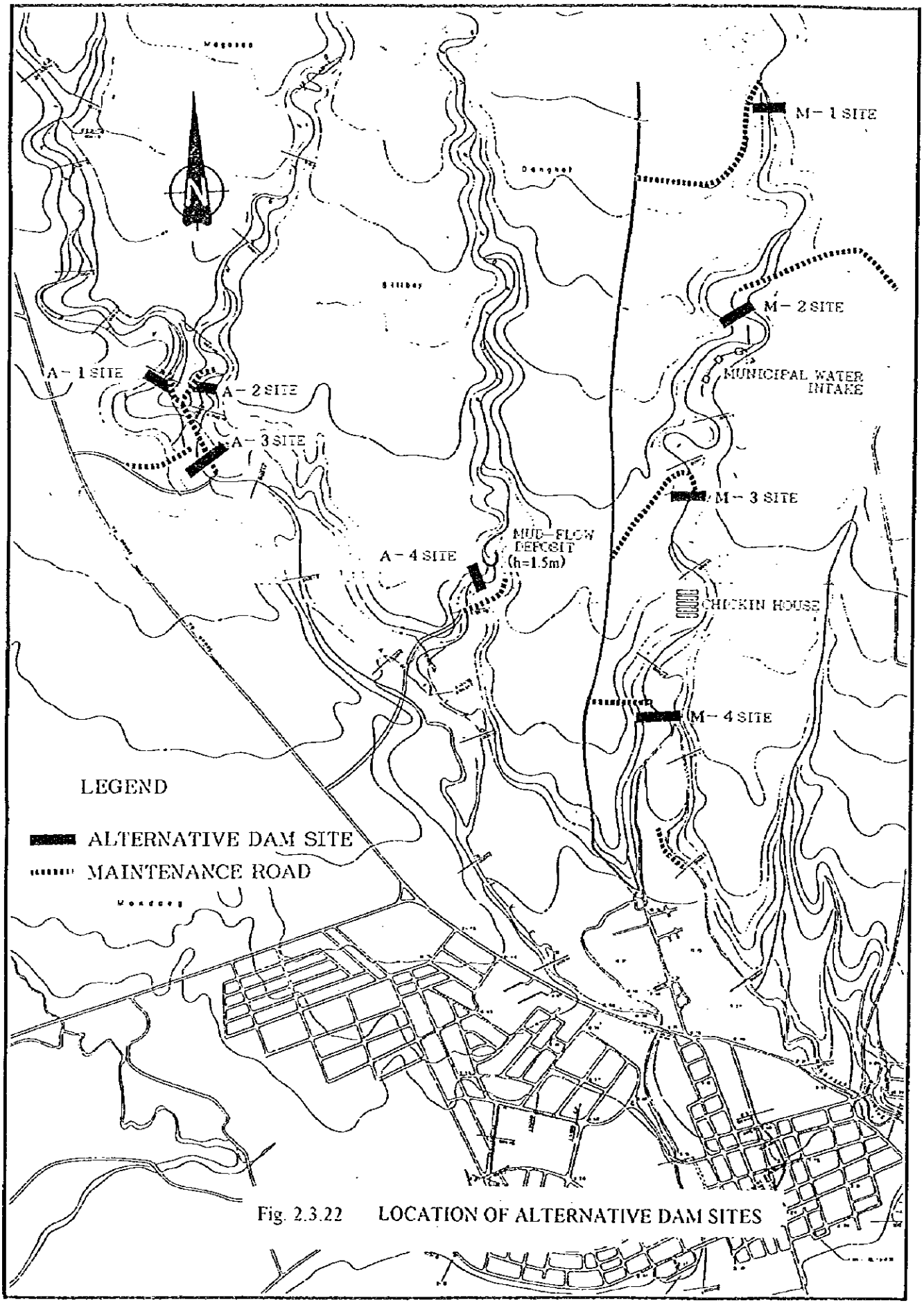
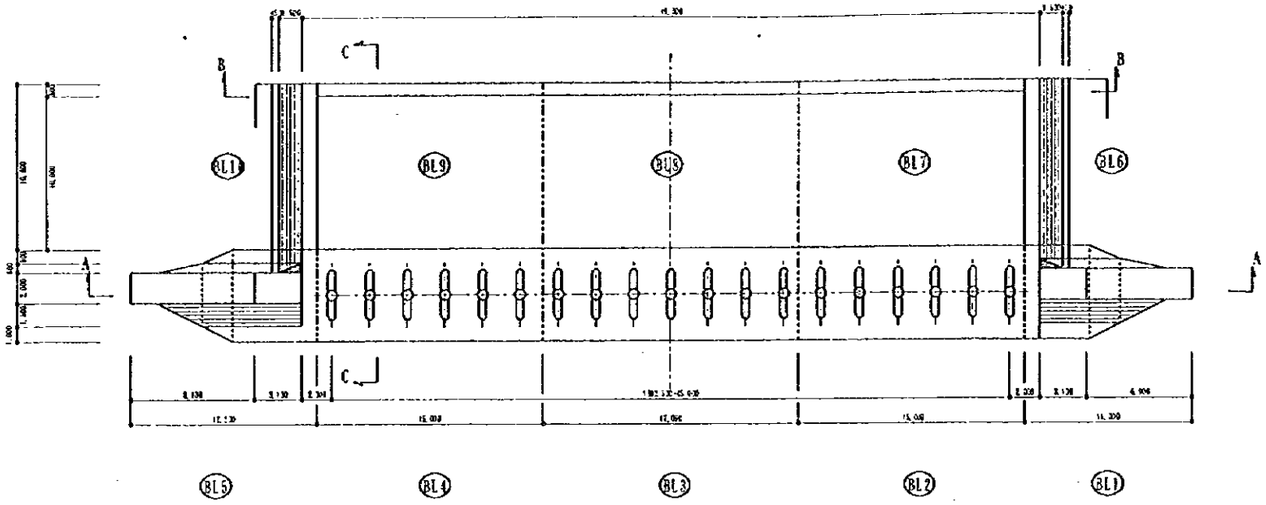
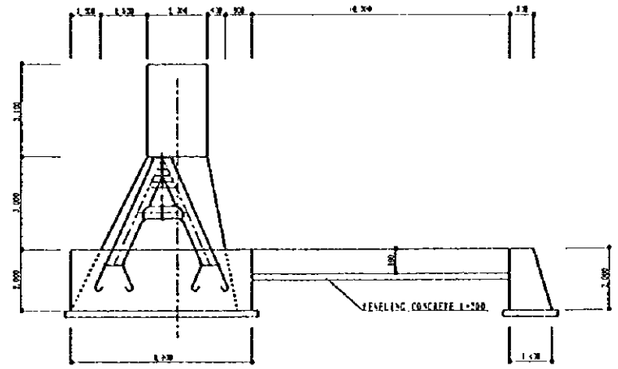


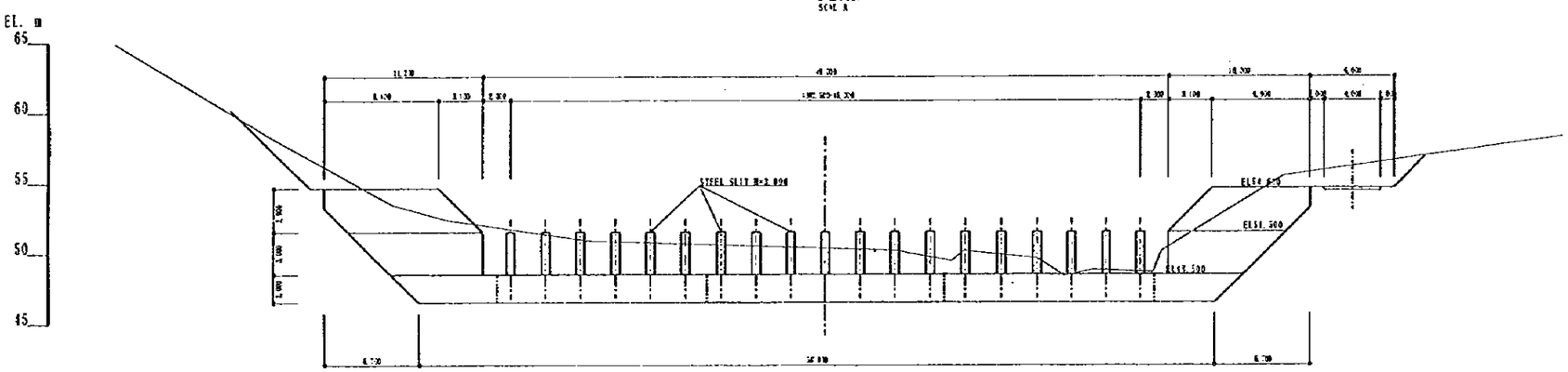
Fig. 2.3.22 LOCATION OF ALTERNATIVE DAM SITES



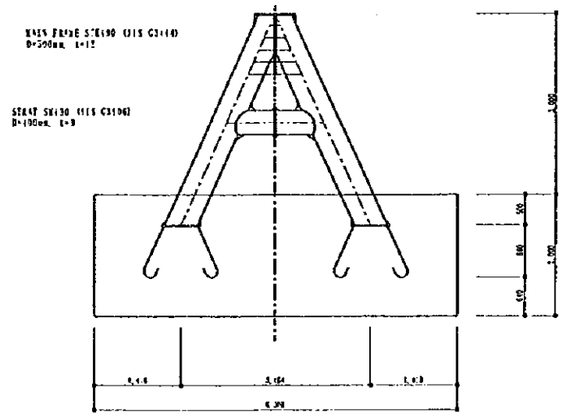
PLAN
SCALE A



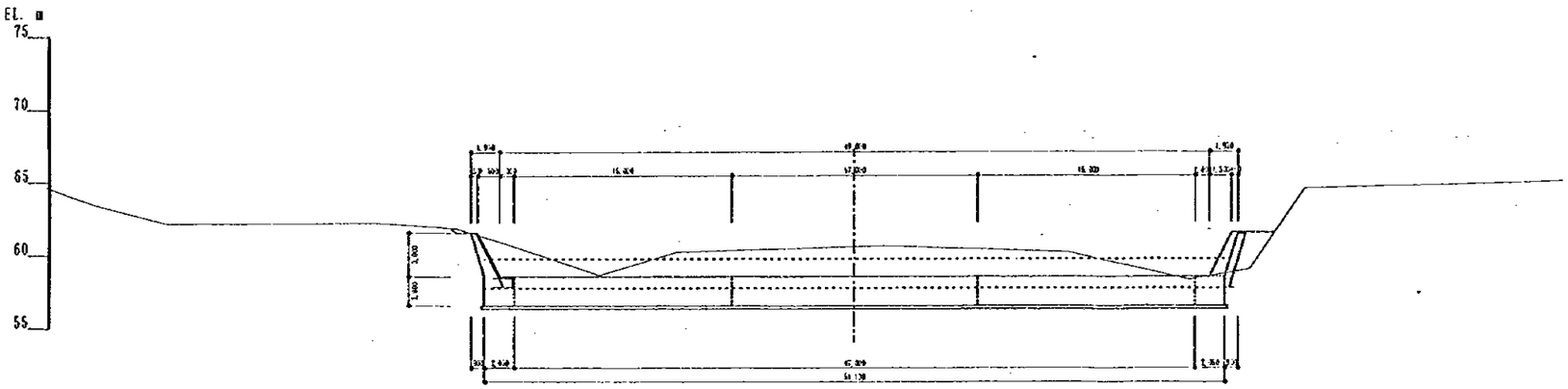
SECTION C-C
SCALE B



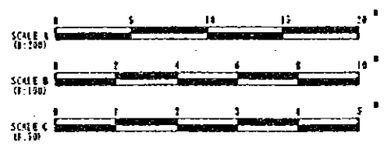
SECTION A-A
SCALE A



DETAIL OF STEEL SLIT
SCALE C



SECTION B-B
SCALE A



THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ANILAO SLIT DAM GENERAL DRAWING			
DATE		D. W. G. NO.	
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.23

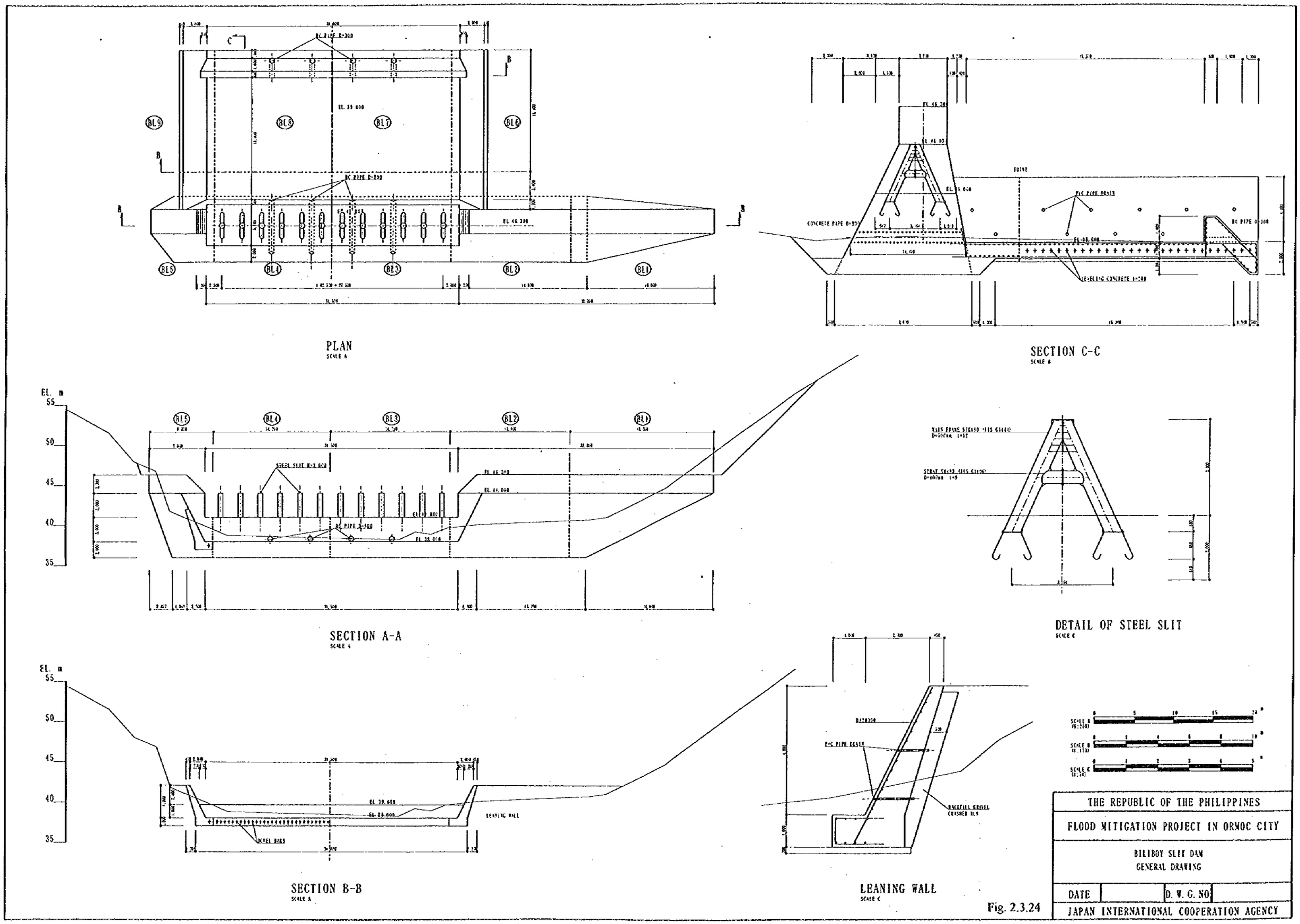
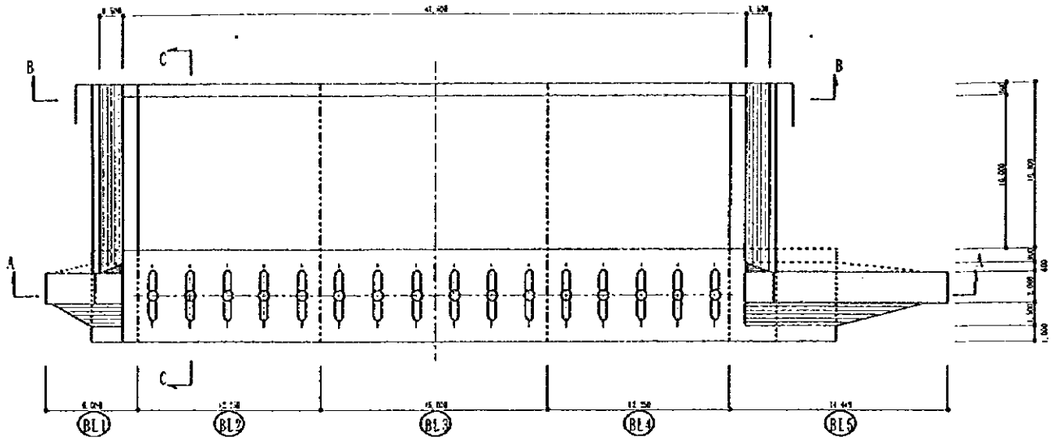
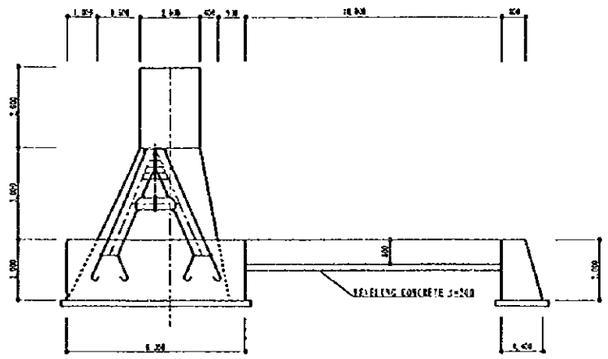

PLAN
SCALE A
SECTION C-C
SCALE B
SECTION A-A
SCALE A
DETAIL OF STEEL SLIT
SCALE C
SECTION B-B
SCALE A
LEANING WALL
SCALE C
THE REPUBLIC OF THE PHILIPPINES
FLOOD MITIGATION PROJECT IN ORMOC CITY
BILIBOY SLIT DAM
GENERAL DRAWING
DATE
D. W. G. NO.
JAPAN INTERNATIONAL COOPERATION AGENCY

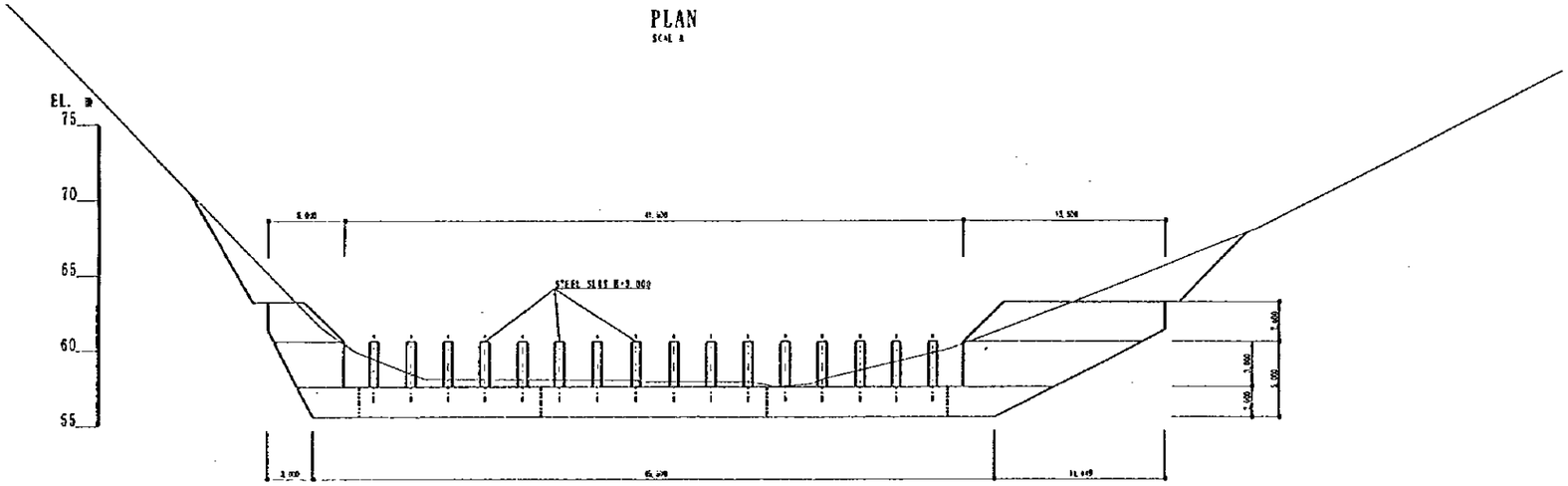
Fig. 2.3.24



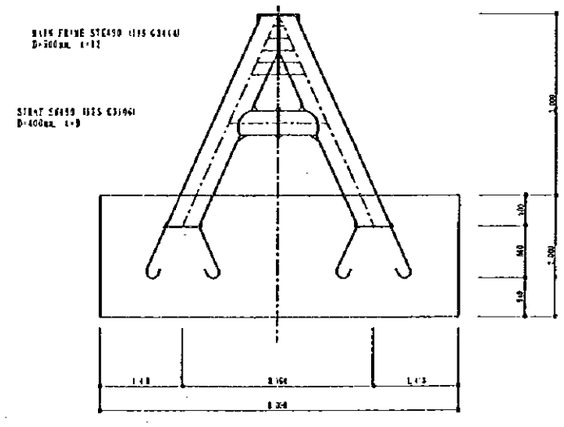
PLAN



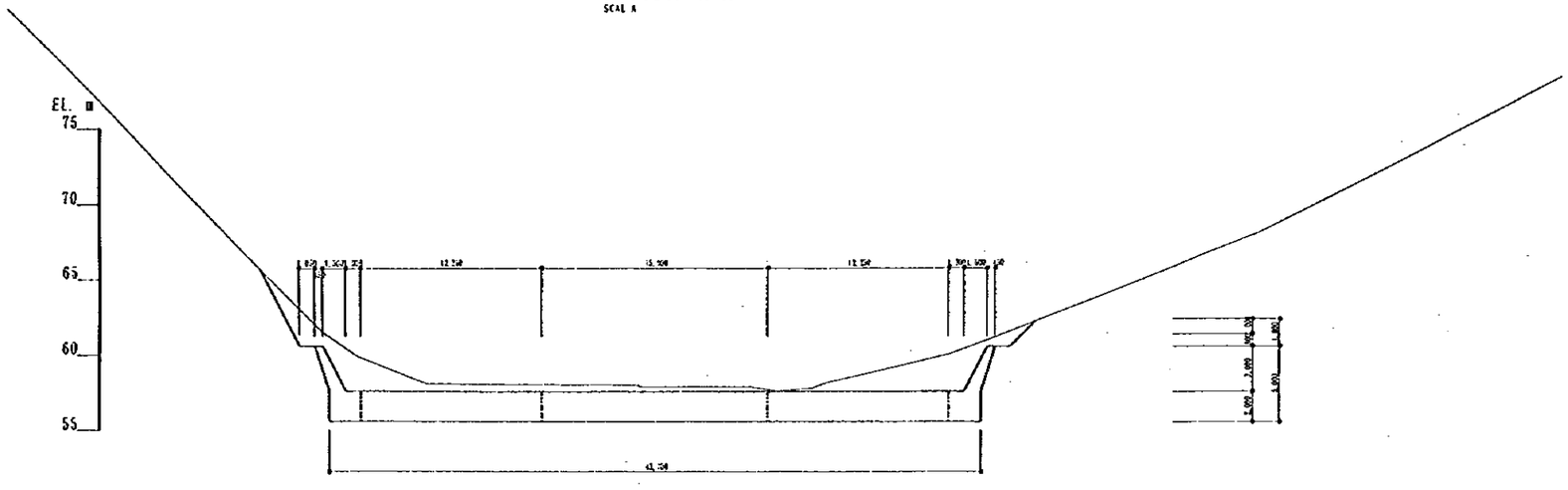
SECTION C-C



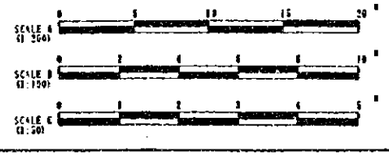
SECTION A-A



DETAIL OF STEEL SLIT



SECTION B-B



THE REPUBLIC OF THE PHILIPPINES	
FLOOD MITIGATION PROJECT IN ORMOC CITY	
MALBASAG SLIT DAM GENERAL DRAWING	
DATE	D. W. G. NO
JAPAN INTERNATIONAL COOPERATION AGENCY	

Fig. 2.3.25

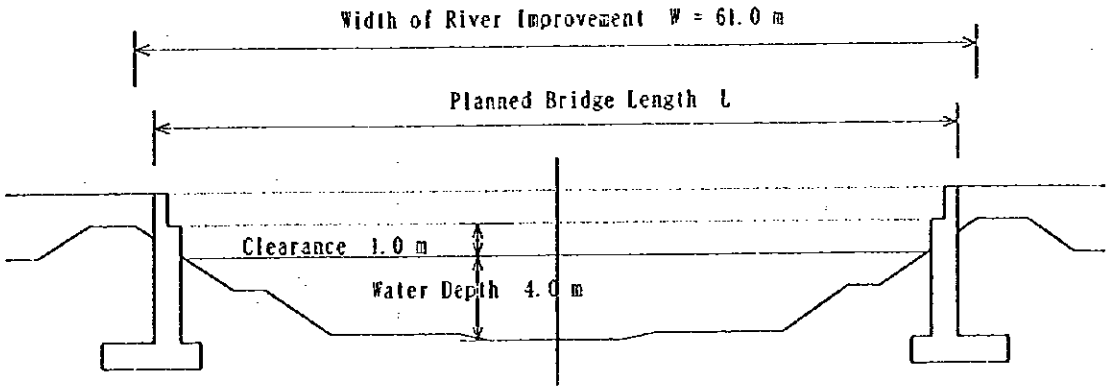


Fig. 2.3.26 Planned Bridge Length on Anilao River

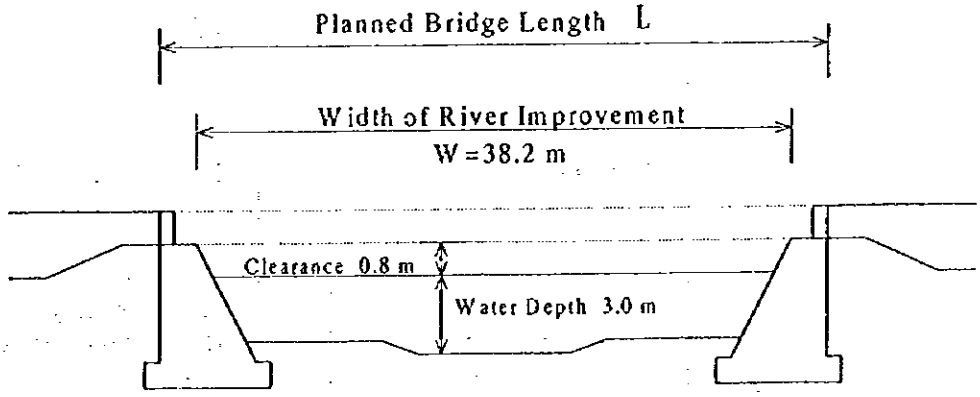
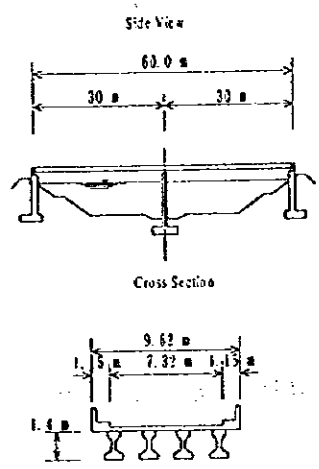
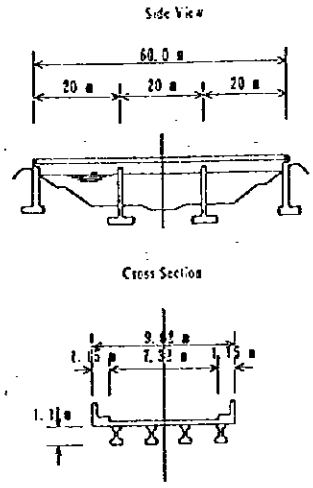


Fig. 2.3.27 Planned Bridge Length on Malbasag River

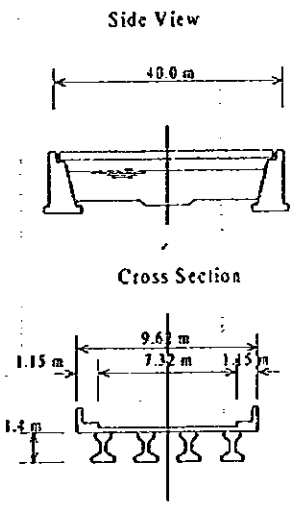
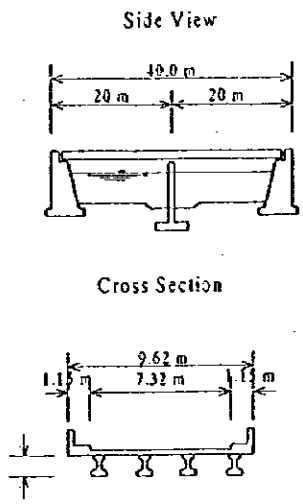
Fig. 2.3.28 (1/2) Comparison of Superstructure Type (Anilao River)

		First Alternative PC Composite I-Girder, Two Spans		Second Alternative PC Composite I-Girder, Three Spans	
Drawings					
Comparison of Characteristics	Economic Evaluation	¢	• A little inferior	›	• Preferable
	Construction	¢	• Main girders are heavy • Large size machinery is required for erection of girders • Transportation of main girder is difficult (Fabrication in situ) •	›	• Main girders are light • Small size machinery can erect girders • Transportation of Main girders are easy (Fabrication in factory is possible)
	Safety	›	Influence to flow area is little • Safe for drifting wood in the river	›	• Influence to flow area is relatively large • Possible to Deal with drifting wood in the river
	Maintenance	›	Easy	›	• Easy
	Selection	¢	Synthetically a little inferior	›	• Synthetically preferable, especially in economic aspect and works

: Good

¢ : Normal

Fig. 2.3.28 (2/2) Comparison of Superstructure Type (Malbasag River)

		First Alternative PC Composite I-Girder, One Span		Second Alternative PC Composite I-Girder, Two Spans	
Drawings					
Comparison of Characteristics	Economic Evaluation	¢	• A little inferior	›	• Preferable
	Construction	¢	• Main girders are heavy • Large size machinery is required for erection of girders • Transportation of main girder is difficult (Fabrication in situ) •	›	• Main girders are light • Small size machinery can erect girders • Transportation of Main girders are easy (Fabrication in factory is possible)
	Safety	›	Influence to flow area is little • Safe for drifting wood in the river	›	• Influence to flow area is relatively large • Possible to Deal with drifting wood in the river
	Maintenance	›	Easy	›	• Easy
	Selection	¢	Synthetically a little inferior	›	• Synthetically preferable, especially in economic aspect and works

: Good

¢ : Normal

Fig. 2.3.29 Selection of Type of Abutments

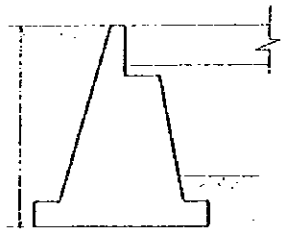
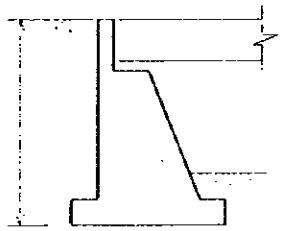
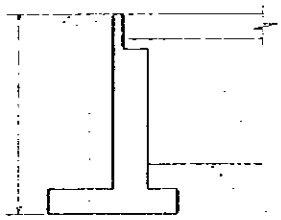
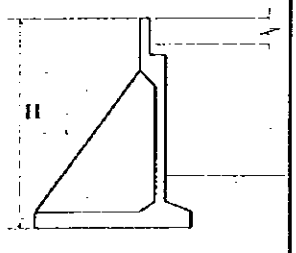
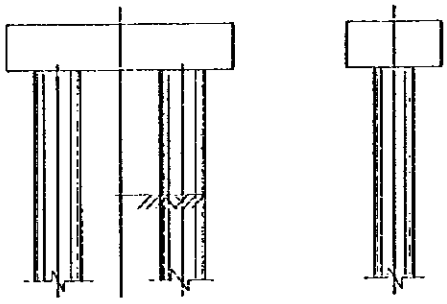
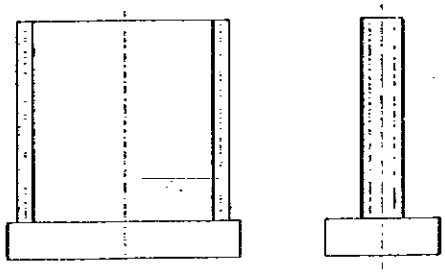
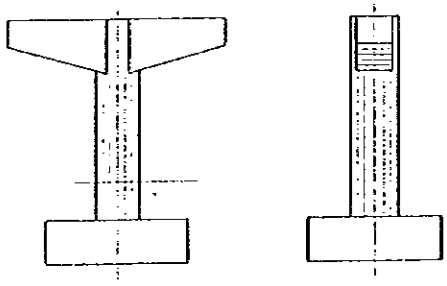
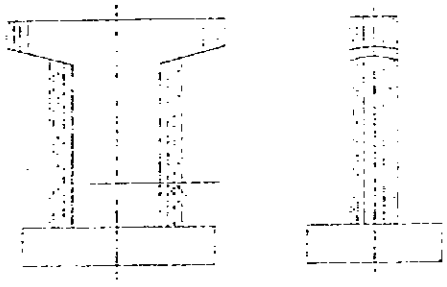
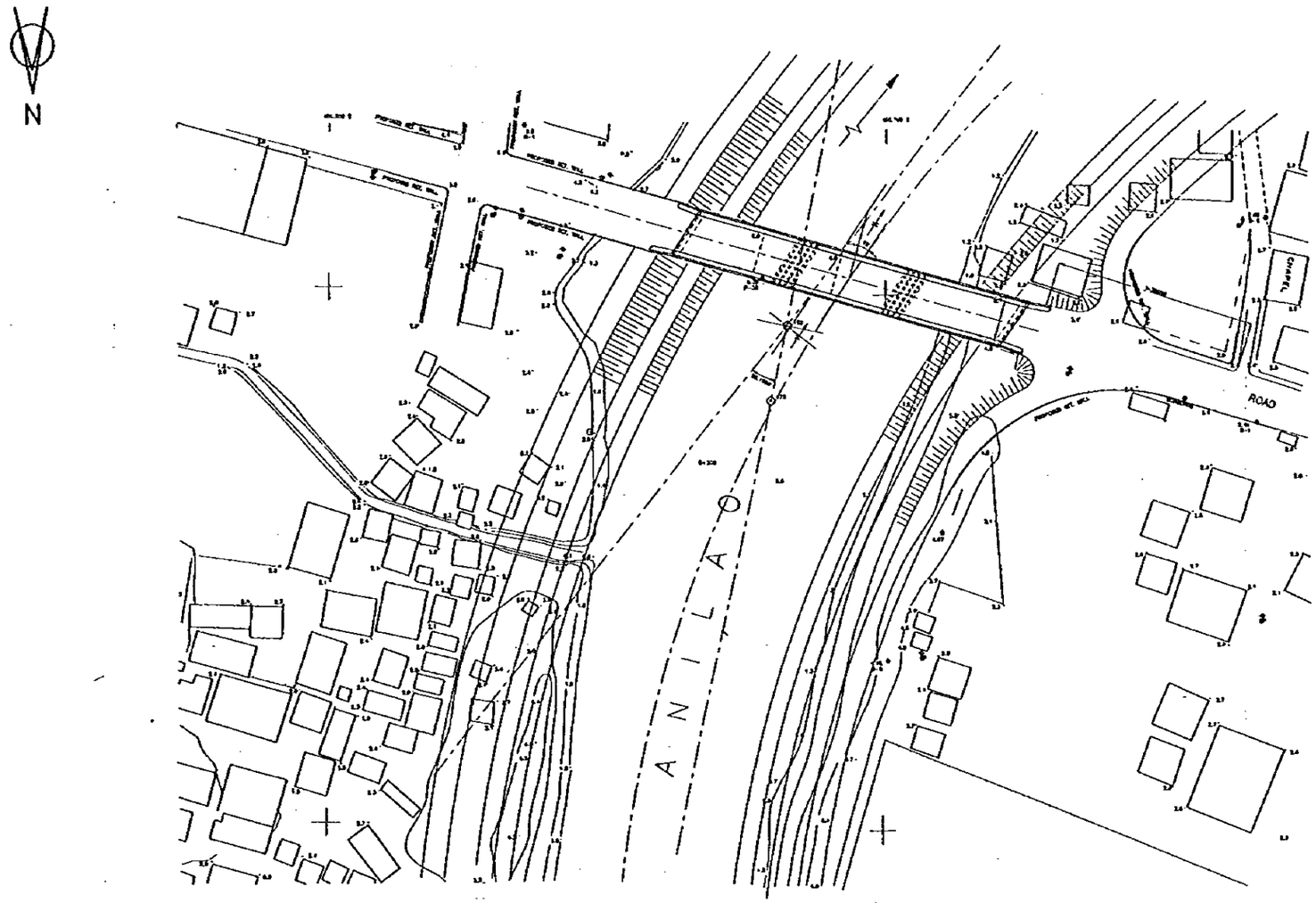
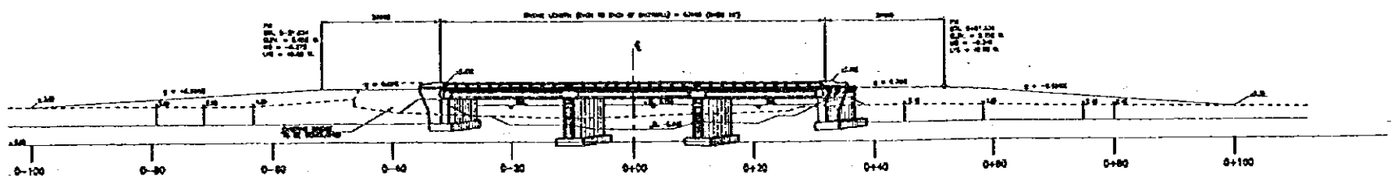
	Form of Abutments	Height	Structural Character
Gravity Type			● Weight of body shall be heavy and the body shall be influenced only by compressive stress. ● The structure and construction method is simple, but heavy weight of body gives much influence on the foundation ground.
Semi-Gravity Type			● This type is similar to the gravity type and installed reinforcing bar for tensile stress on the body. So this type is designed to be smaller and lighter than the gravity type.
Converted T Type			● For high abutments, RC has more structural advantage than simple concrete. ● The upside of footing is fixed and the body is designed to be the form of converted T of RC that corresponds to axle stress and bending moment in unit space.
Buttressed Type			● For high structure buttressed type is more economic than the converted T type. ● In front wall continuous beam shall be used and in the counterfort T type beam be used. ● Concrete shall be installed discretely because the volume reinforcing bar is much more for the section.

Fig. 2.3.30 Selection of Pier Type

	Pier Form	Structural Character
Pile Bent Type		● Rigid frame connected to the top of piles with beam ● Reinforcing marginal parts is structurally difficult. ● The parts connected with superstructure shall have sufficient space for the prevention of fall because this type is flexible to the axle direction.
Converted T Wall Type		● General type. Reinforcing bar shall treat the compressed stress to the body.
Column with cantilever beam Type		● Cantilever beam type is used with frequency in the rectangular direction to axle of bridge. ● This type is useful for the mediation of distance in complicated current of river and in high bridge on intersection.
Wall with cantilever beam Type		● Cantilever beam type is used with frequency in the rectangular direction to axle of bridge. ● This type is useful for the river which current is direct.



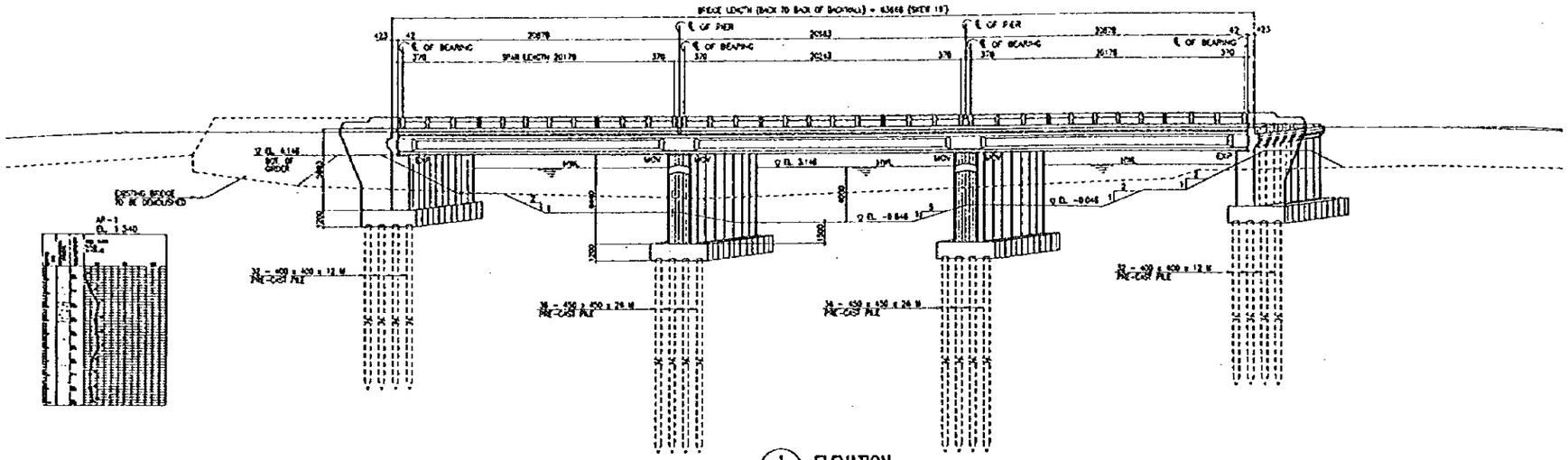
SITE DEVELOPMENT PLAN
SCALE 1:500



PROFILE
SCALE 1:500

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ALEGRIA BRIDGE SITE DEVELOPMENT PLAN & PROFILE			
DATE	1/18/97	D.W.G. NO.	C-3
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.31



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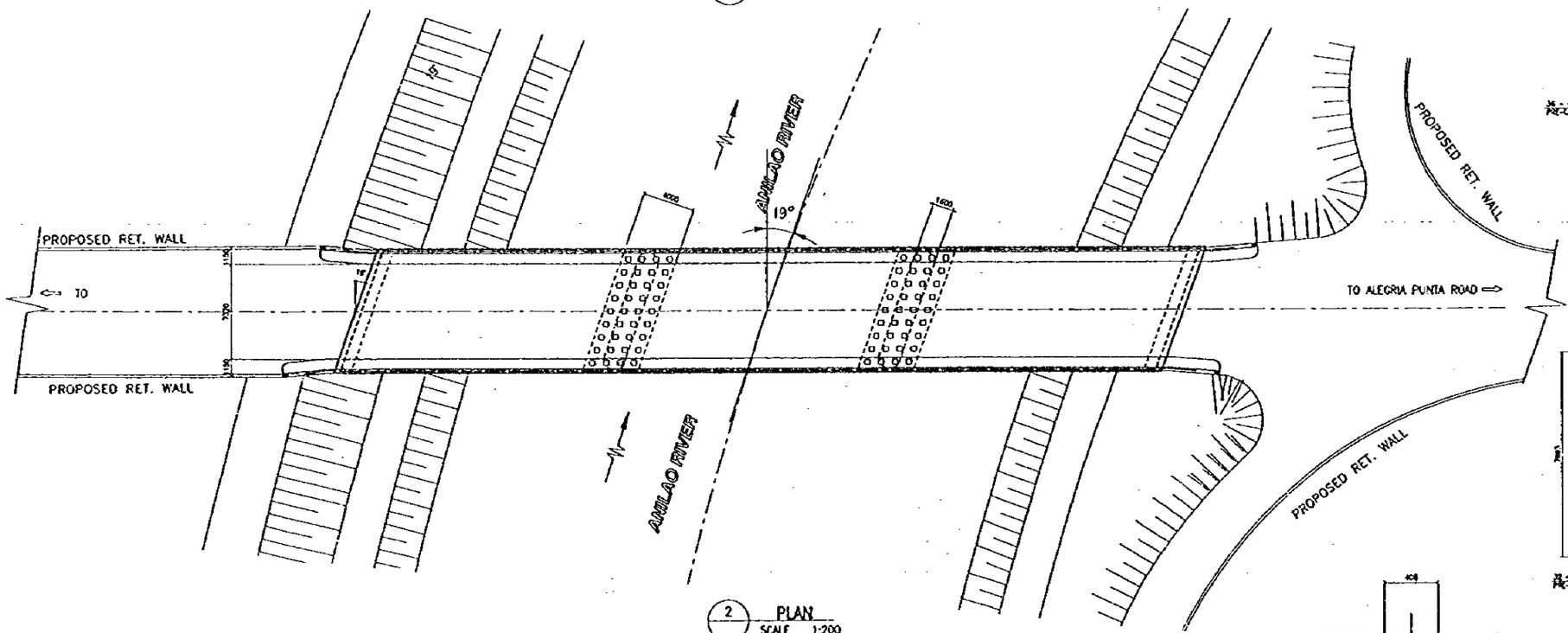
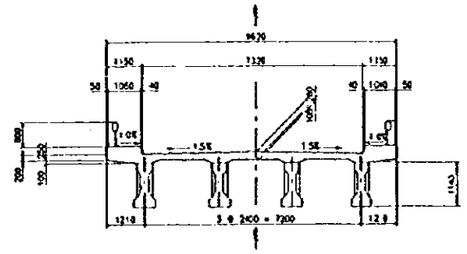


2 PLAN
SCALE 1:200



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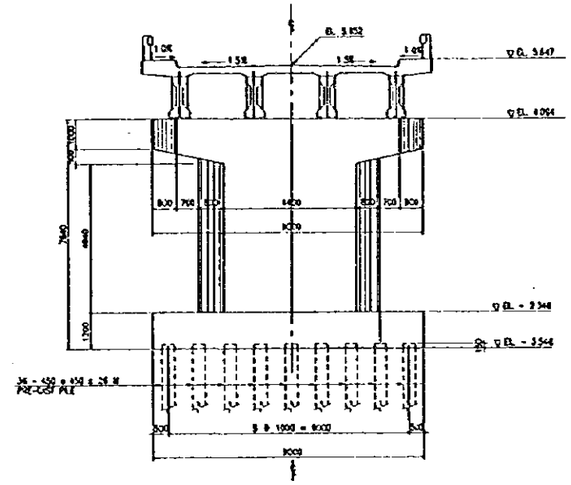
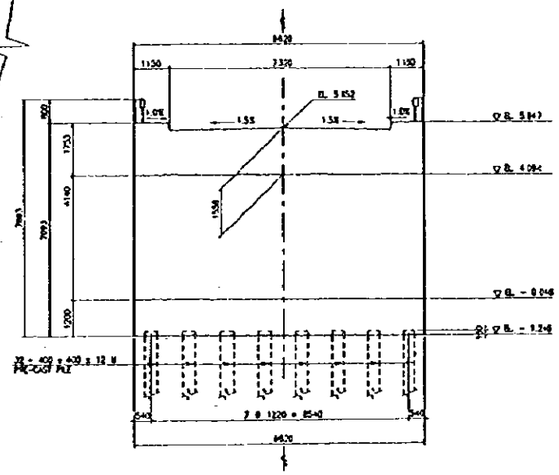


4 NORMAL SECTION @ PIER
SCALE 1:100



5 NORMAL SECTION @ ABUTMENT
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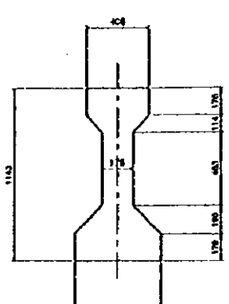


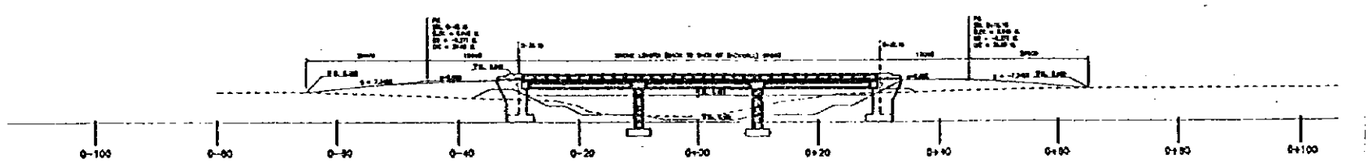
SECTION

6 GIRDER DETAIL
SCALE 1:20

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ALEGRIA BRIDGE PLAN, ELEVATION & SECTIONS			
DATE	1/17/97	D.W.G. NO.	C-4
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.32

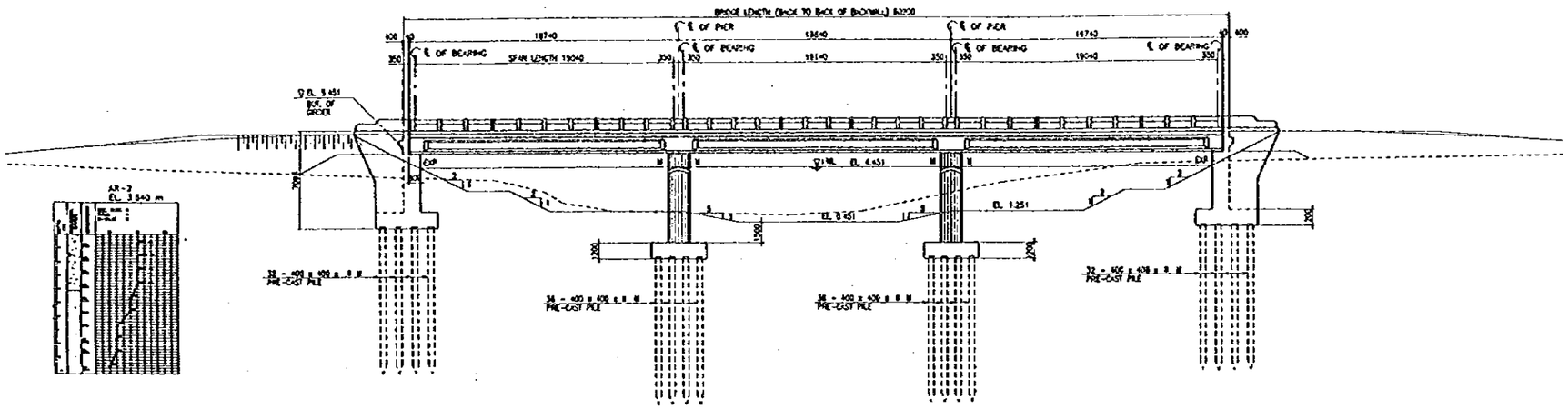
SITE DEVELOPMENT PLAN
SCALE 1:500



PROFILE
SCALE 1:500

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
OSMENA BRIDGE SITE DEVELOPMENT PLAN & PROFILE			
DATE	1/20/97	D.W.G. NO.	6-9
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.33



1 ELEVATION
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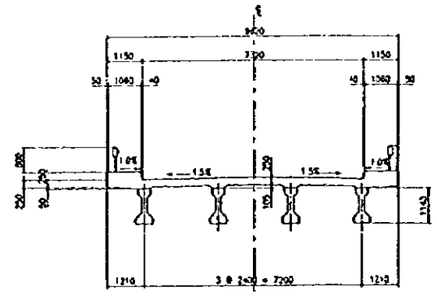

3 TYPICAL CROSS SECTION
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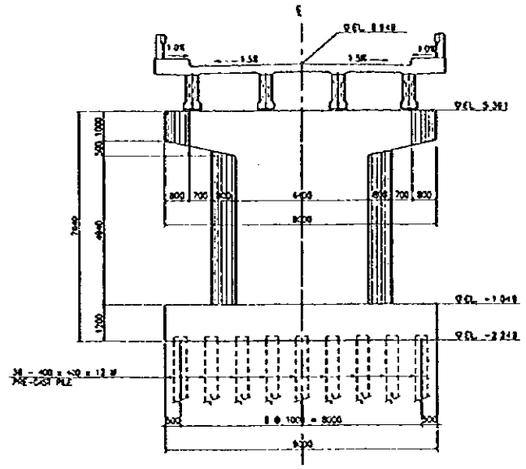

4 CROSS SECTION @ PIER
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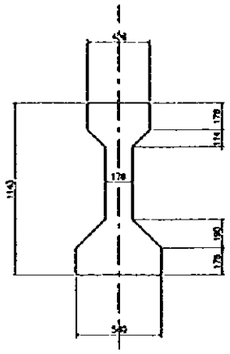
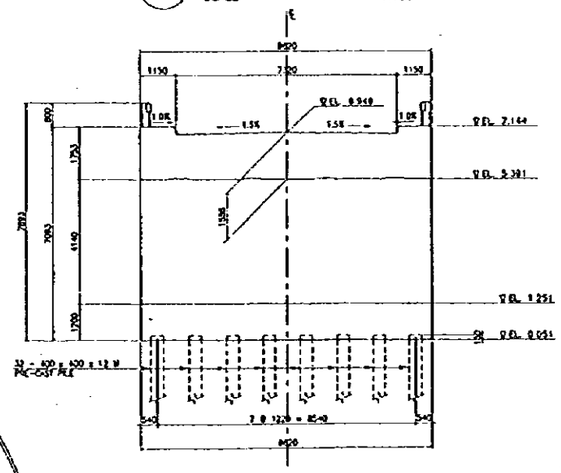


6 GIRDER SECTION
SCALE 1:20



5 CROSS SECTION @ ABUTMENT
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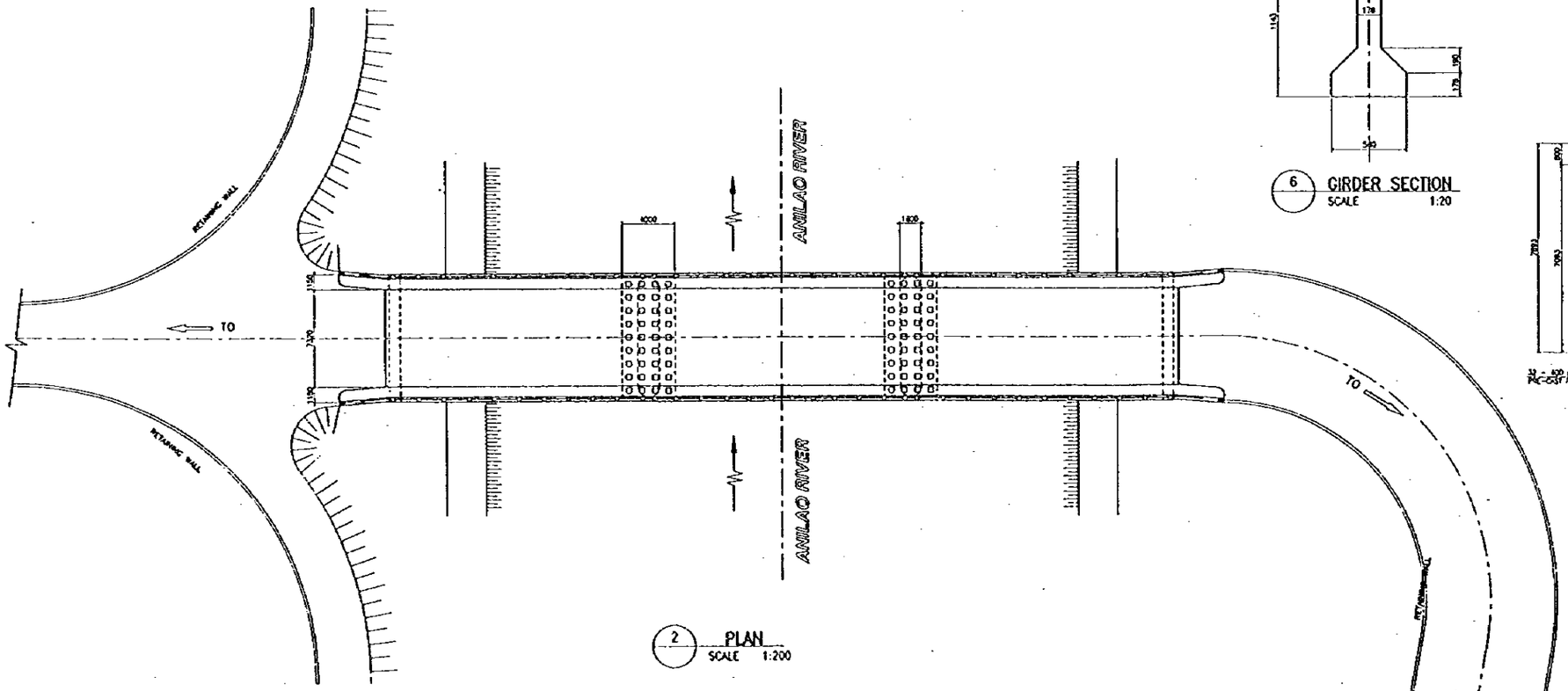

2 PLAN
SCALE 1:200

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
OSMENA BRIDGE PLAN, ELEVATION & SECTIONS			
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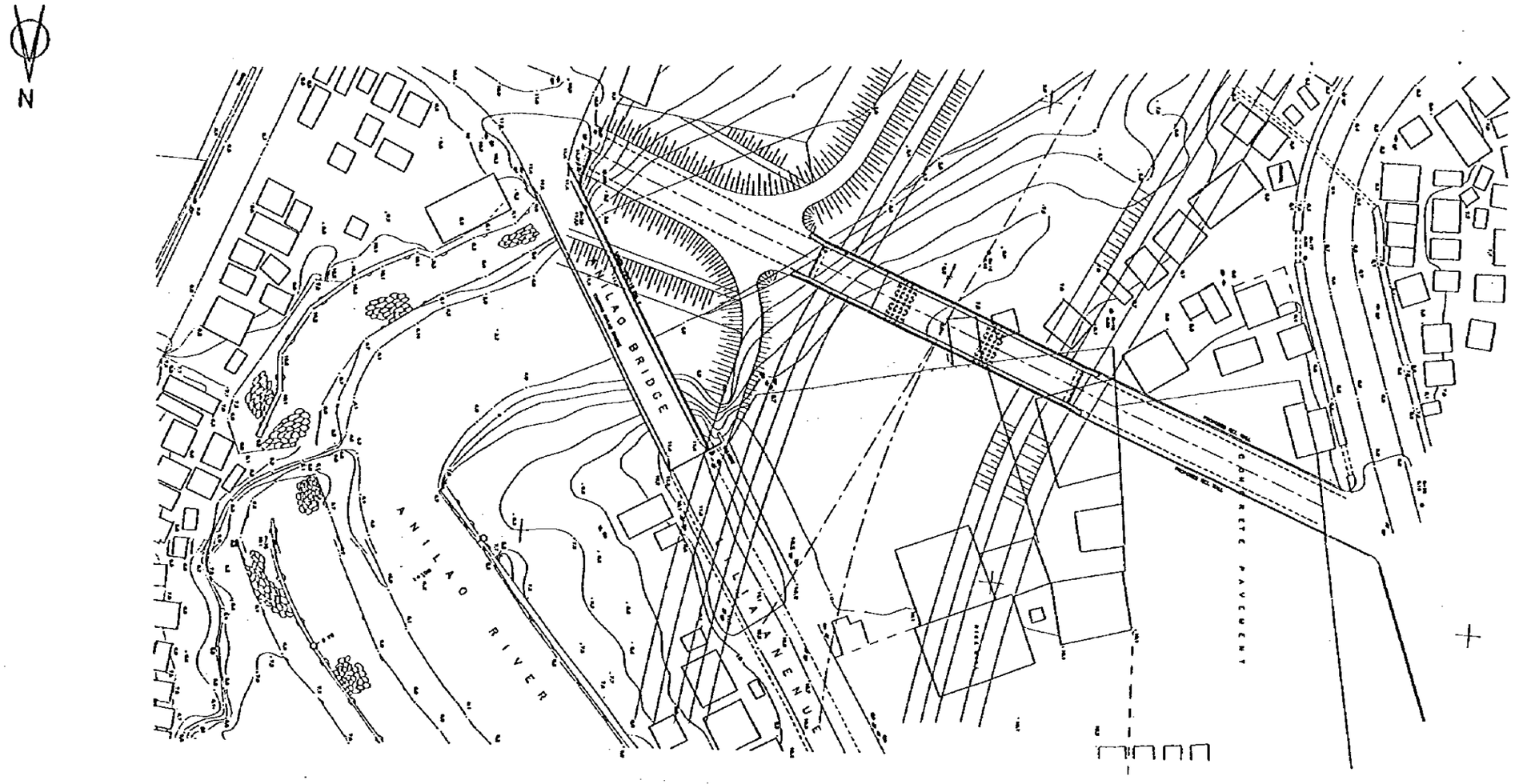
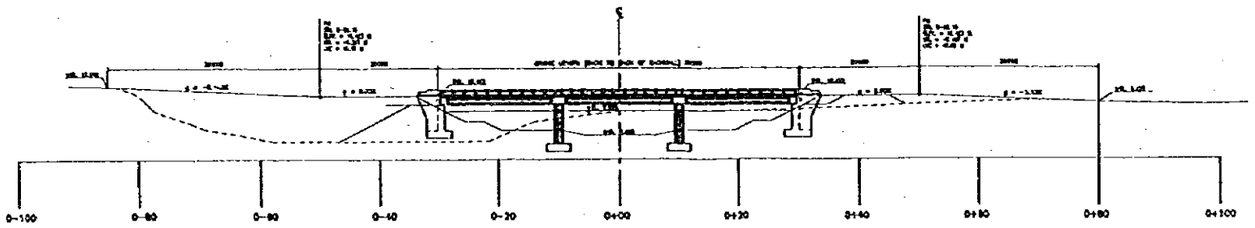
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.34



SITE DEVELOPMENT PLAN
SCALE 1:500



PROFILE
SCALE 1:500

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ANILAO BRIDGE SITE DEVELOPMENT PLAN & PROFILE			
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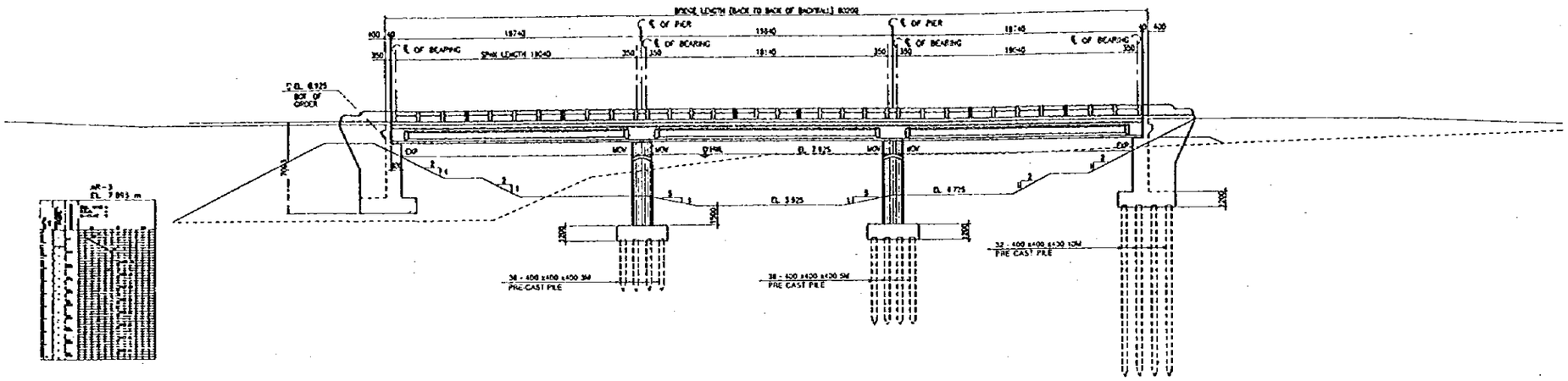
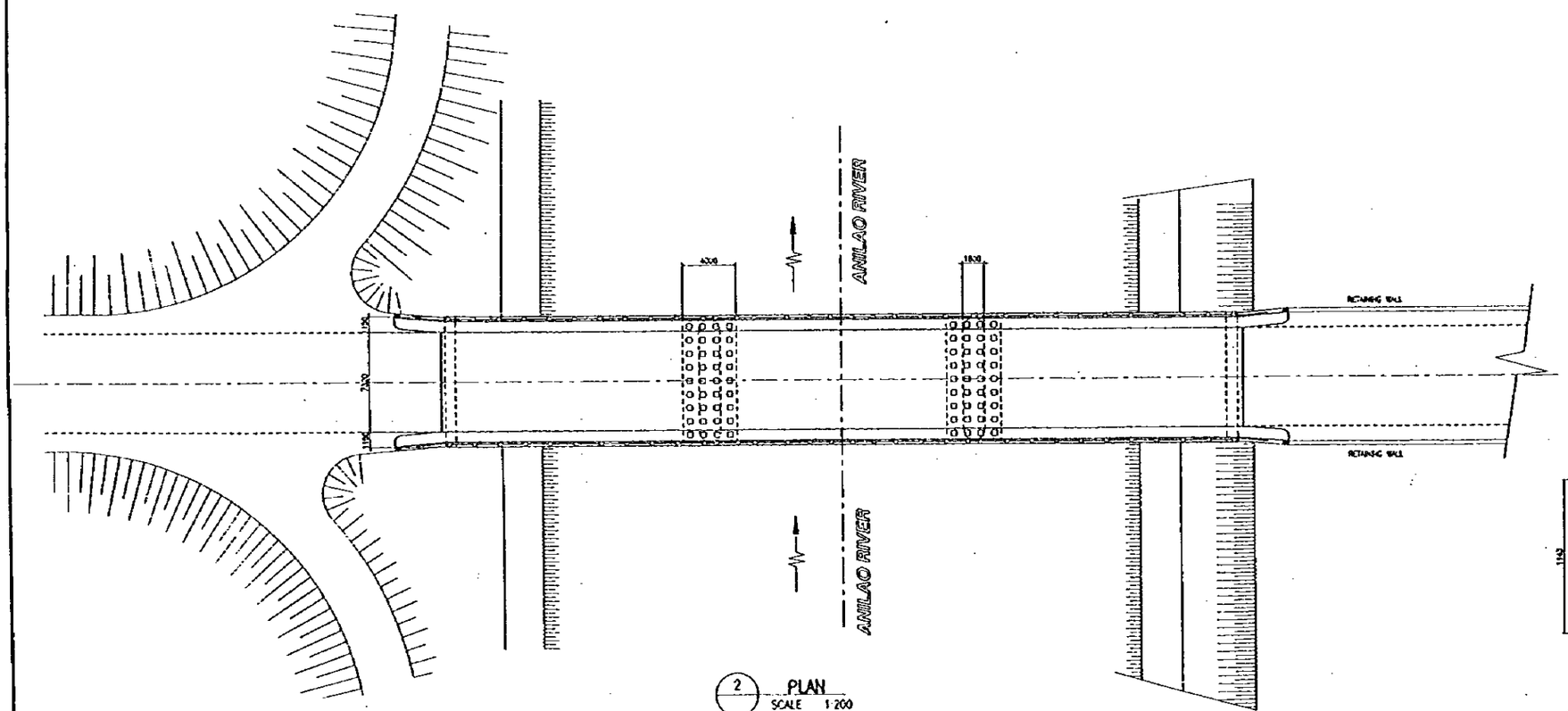
JAPAN INTERNATIONAL COOPERATION AGENCY			

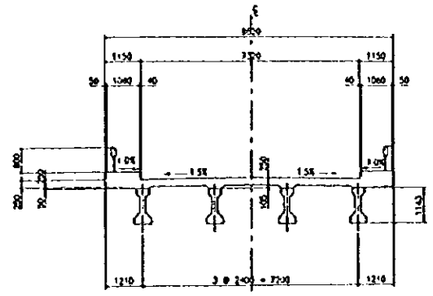
Fig. 2.3.35



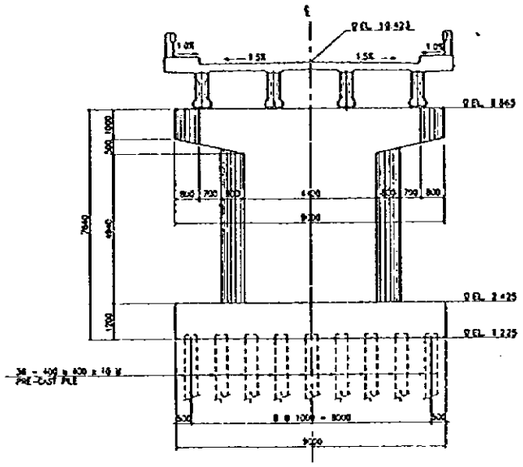
1 ELEVATION
SCALE 1:200



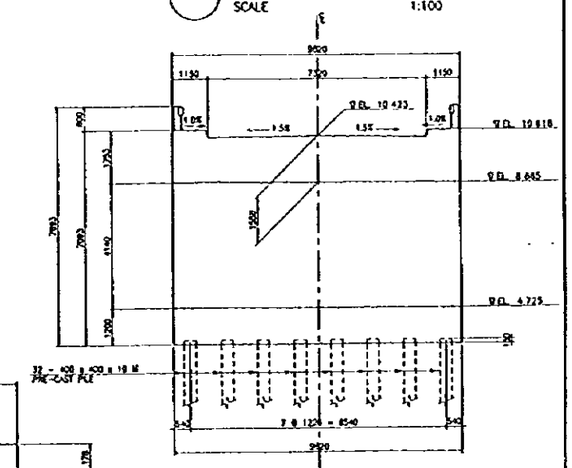
2 PLAN
SCALE 1:200



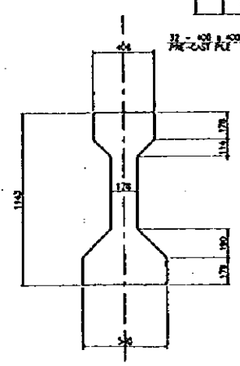
3 TYPICAL CROSS SECTION
SCALE 1:100



4 CROSS SECTION @ PIER
SCALE 1:100



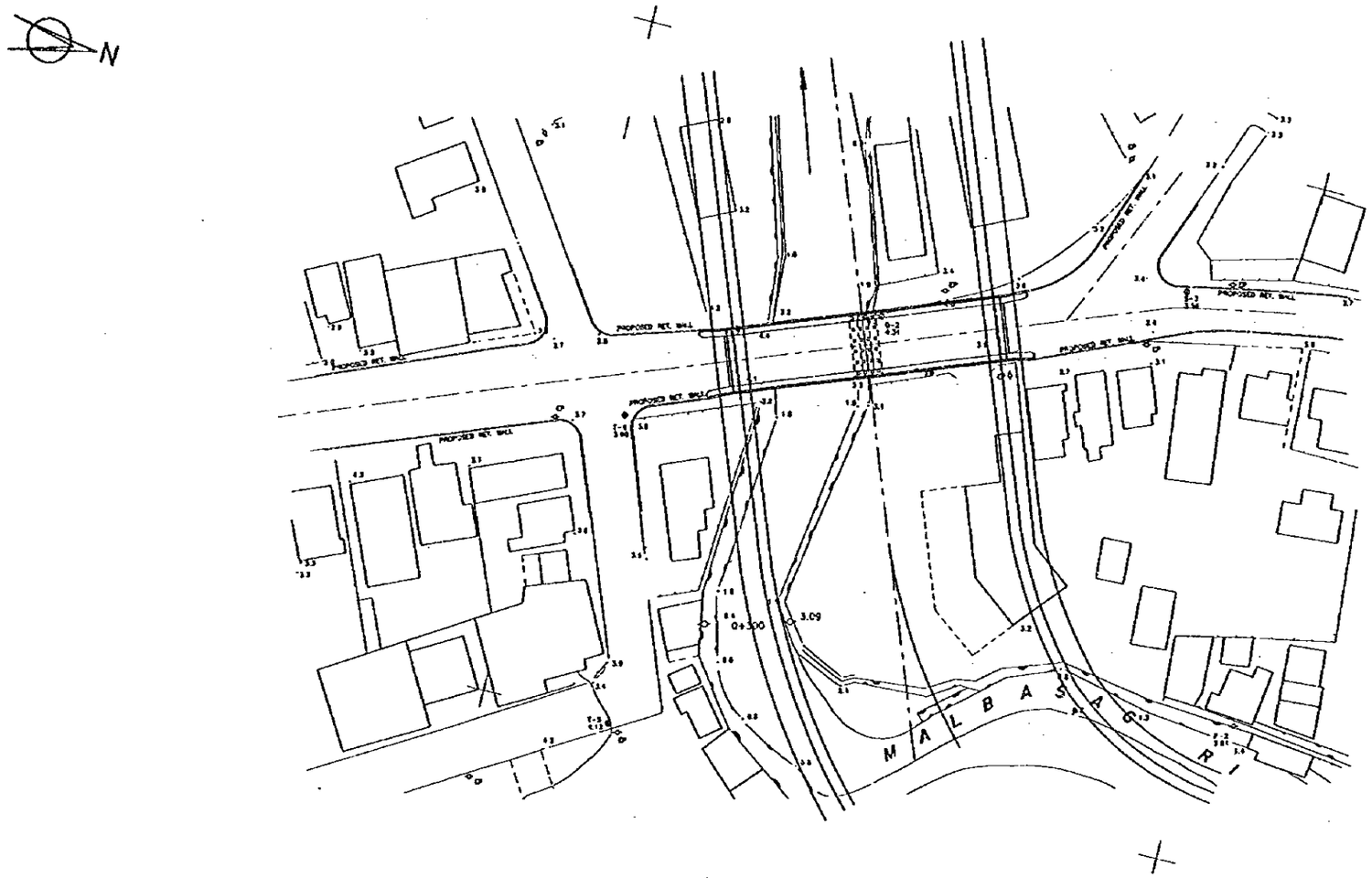
5 CROSS SECTION @ ABUTMENT
SCALE 1:100



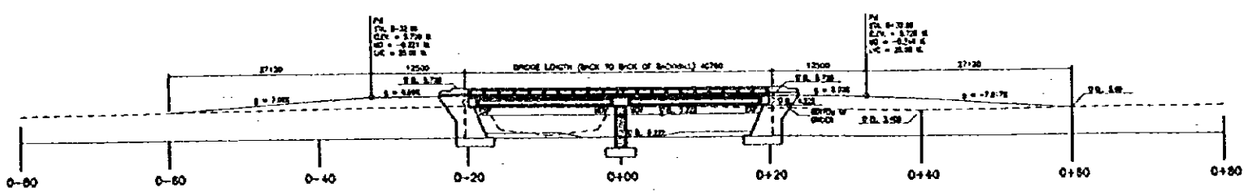
6 GIRDER SECTION
SCALE 1:20

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
ANILAO BRIDGE PLAN, ELEVATION & SECTIONS			
DATE	1/17/97	D.W.G. NO.	C-2
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.36



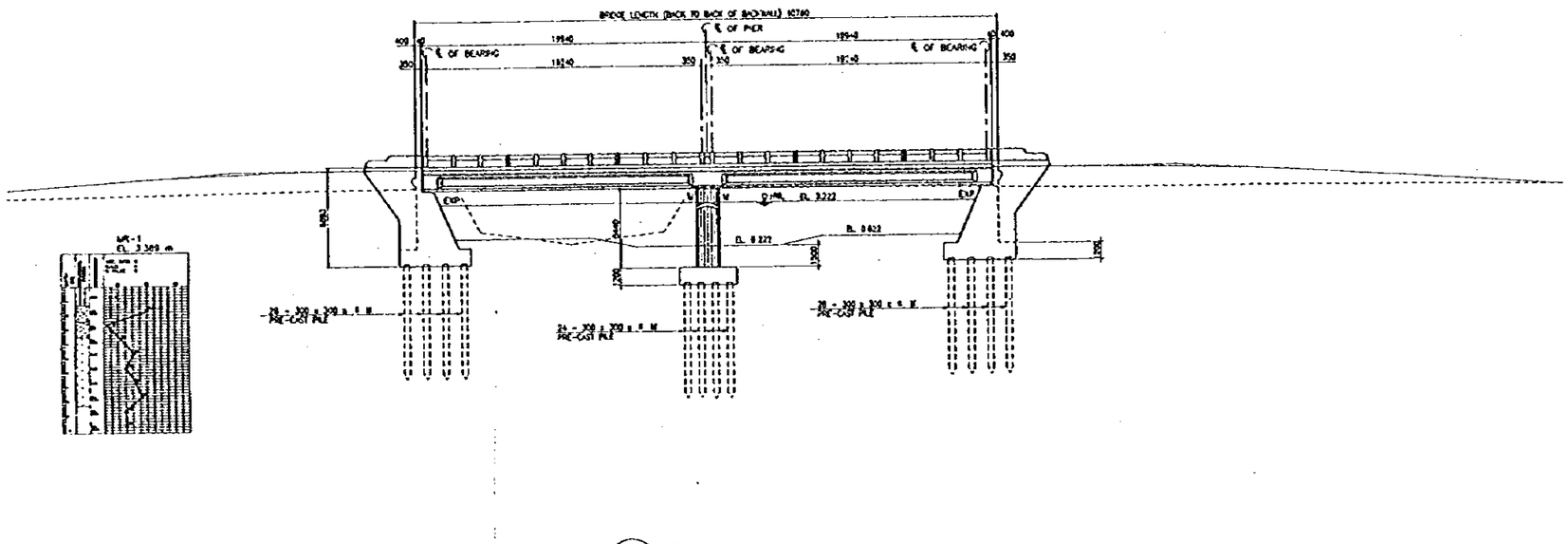
SITE DEVELOPMENT PLAN
SCALE 1:400



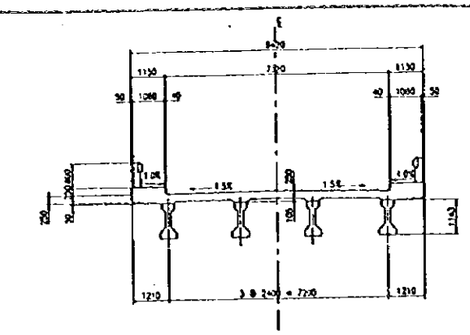
PROFILE
SCALE 1:400

Fig. 2.3.37

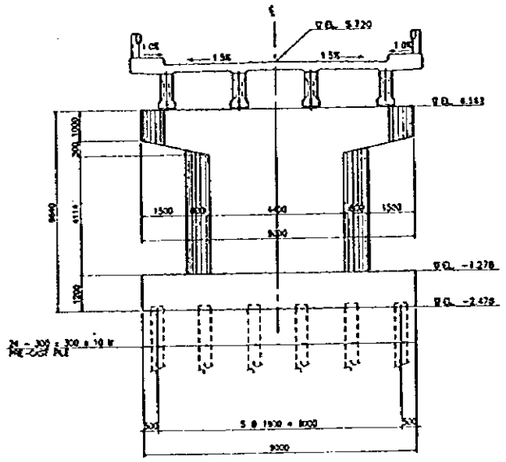
THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
MALBASAG BRIDGE SITE DEVELOPMENT PLAN & PROFILE			
DATE	1/20/97	D.W.G. NO.	C-5
JAPAN INTERNATIONAL COOPERATION AGENCY			



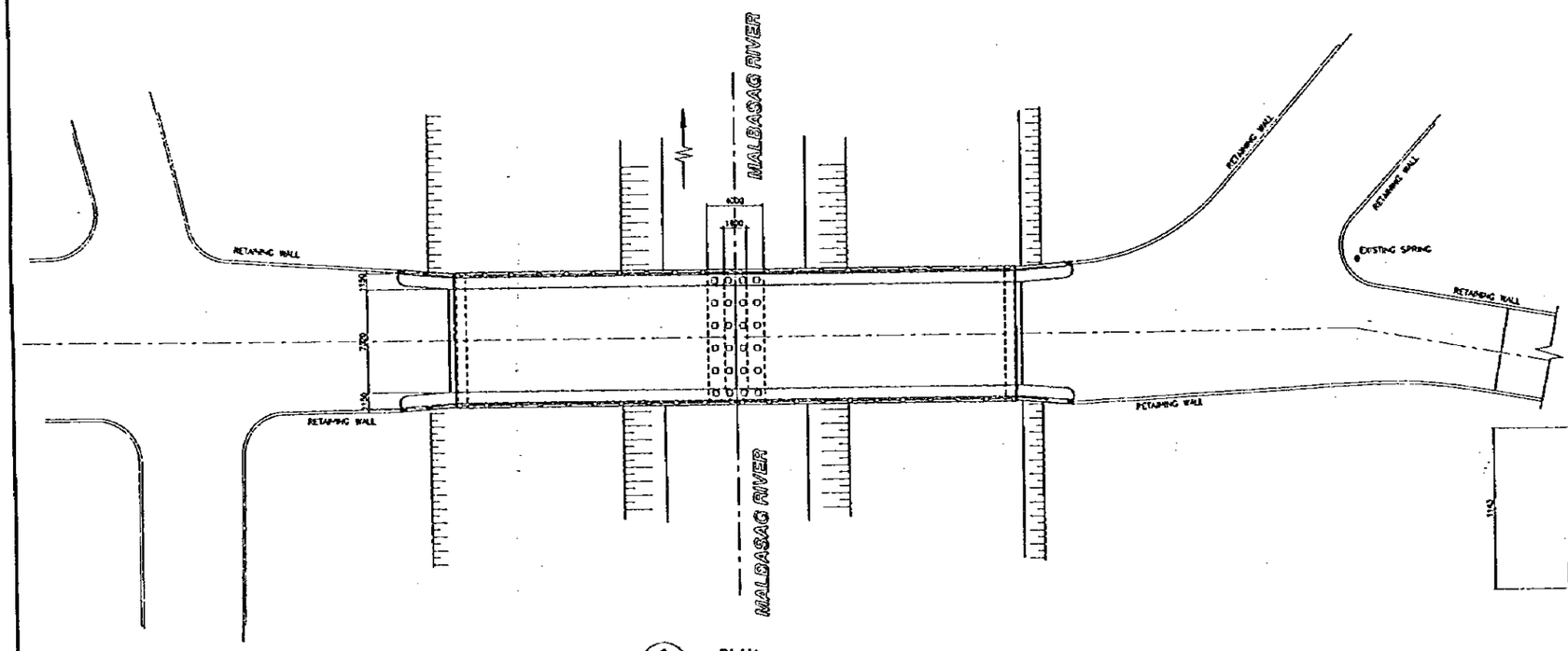
1 ELEVATION
SCALE 1:200



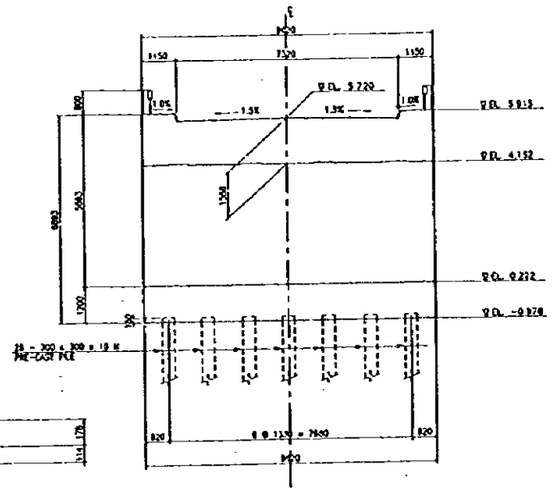
3 TYPICAL CROSS SECTION
SCALE 1:100



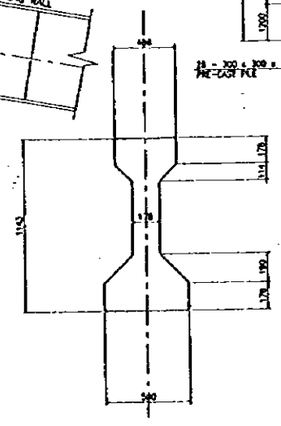
4 CROSS SECTION ⊙ PIER
SCALE 1:100



2 PLAN
SCALE 1:200



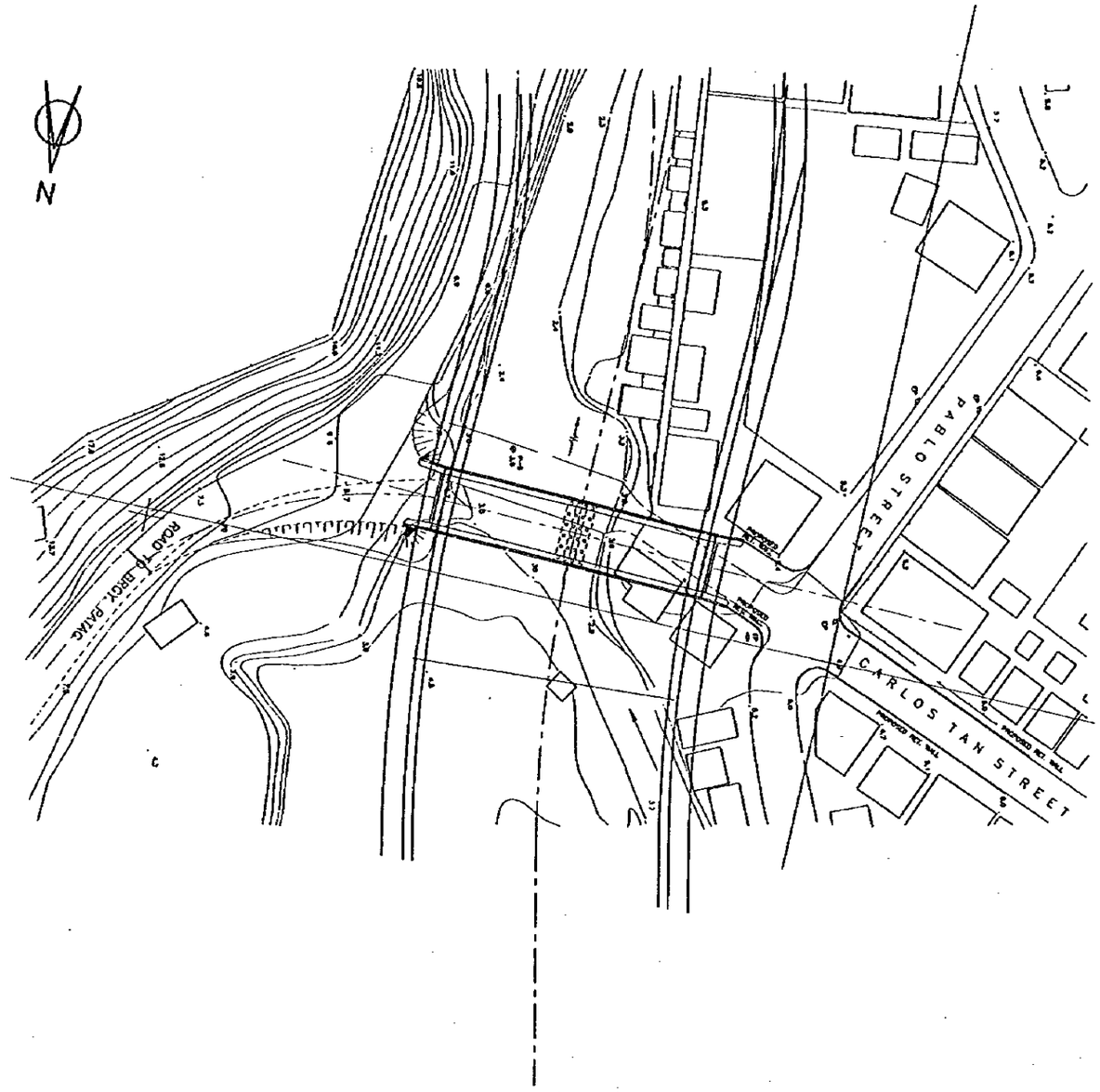
5 CROSS SECTION ⊙ ABUTMENT
SCALE 1:100



6 GIRDER SECTION
SCALE 1:20

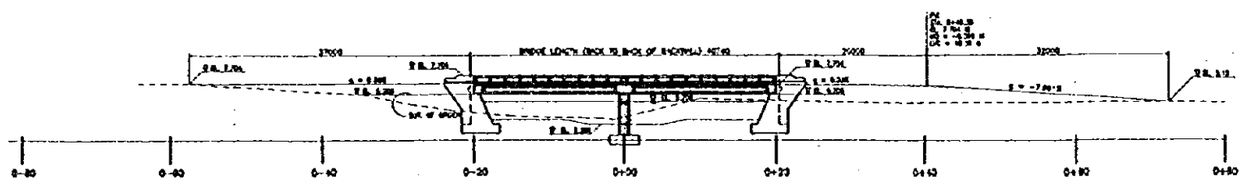
THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
MALBASAG BRIDGE PLAN, ELEVATION & SECTIONS			
DATE	1/17/97	D.W.G. NO.	C-6
JAPAN INTERNATIONAL COOPERATION AGENCY			

Fig. 2.3.38



SITE DEVELOPMENT PLAN

SCALE 1:400

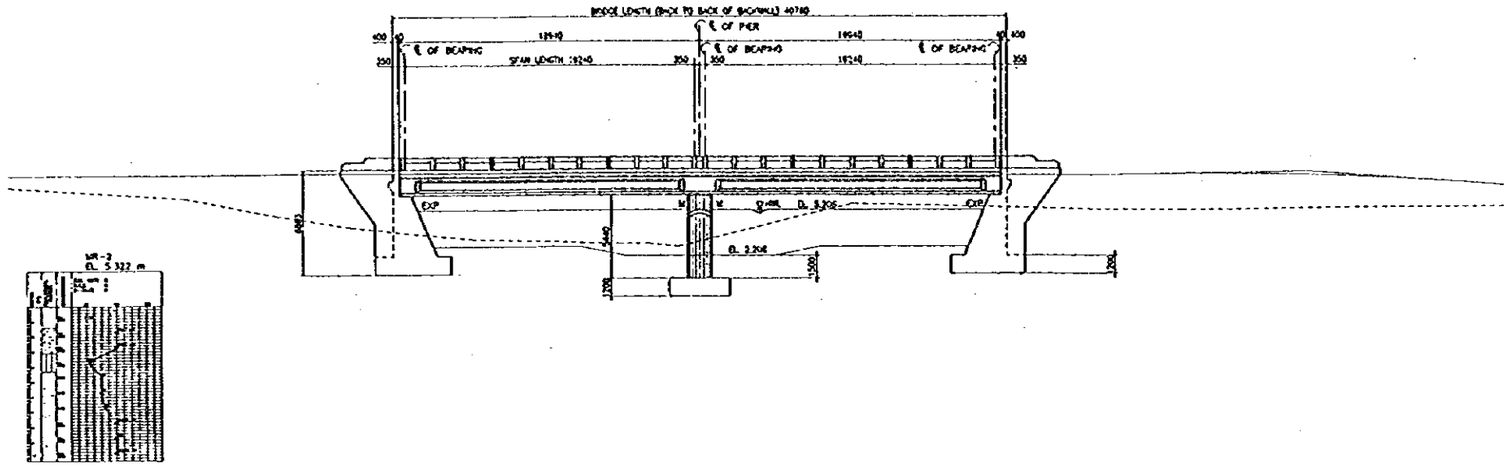


PROFILE

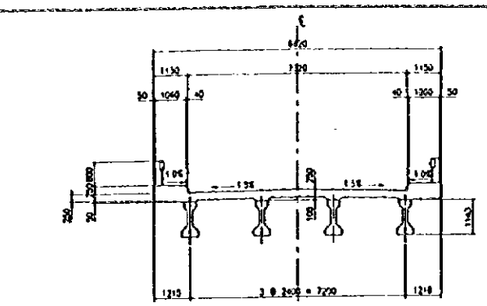
SCALE 1:400

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
CARLOS TAN BRIDGE SITE DEVELOPMENT PLAN & PROFILE			
DATE	1/18/97	D.W.G. NO.	C-7
JAPAN INTERNATIONAL COOPERATION AGENCY			

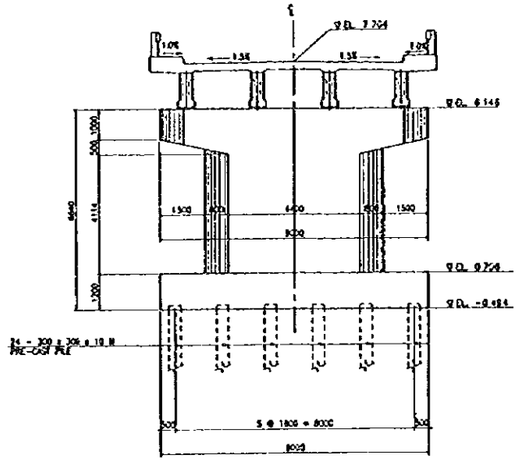
Fig. 2.3.39



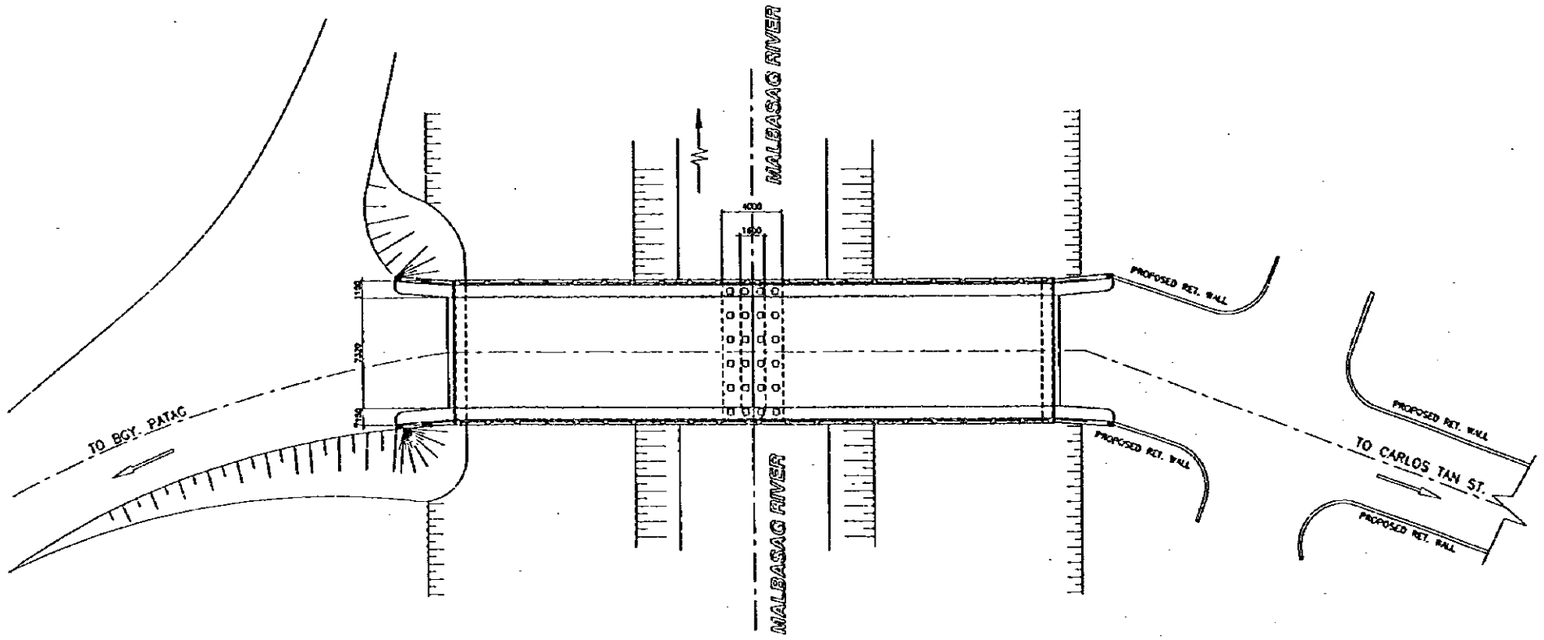
1 ELEVATION
SCALE 1:200



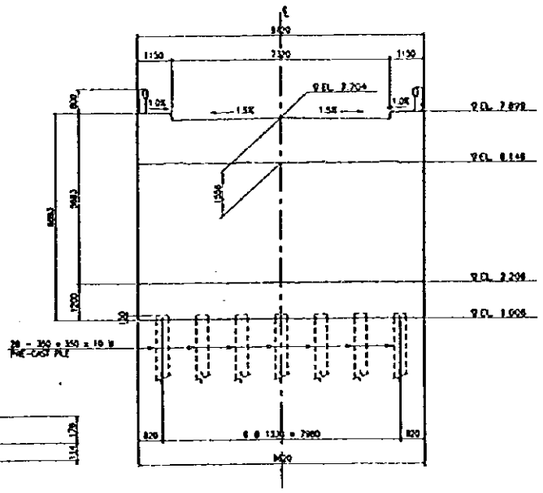
3 TYPICAL CROSS SECTION
SCALE 1:100



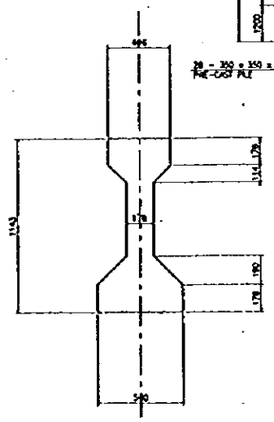
4 CROSS SECTION @ PIER
SCALE 1:100



2 PLAN
SCALE 1:200



5 CROSS SECTION @ ABUTMENT
SCALE 1:100



6 GIRDER SECTION
SCALE 1:20

Fig. 2.3.40

THE REPUBLIC OF THE PHILIPPINES			
FLOOD MITIGATION PROJECT IN ORMOC CITY			
CARLOS TAN BRIDGE PLAN, ELEVATION & SECTIONS			
DATE	1/17/97	D.W.G. NO.	C-8
JAPAN INTERNATIONAL COOPERATION AGENCY			

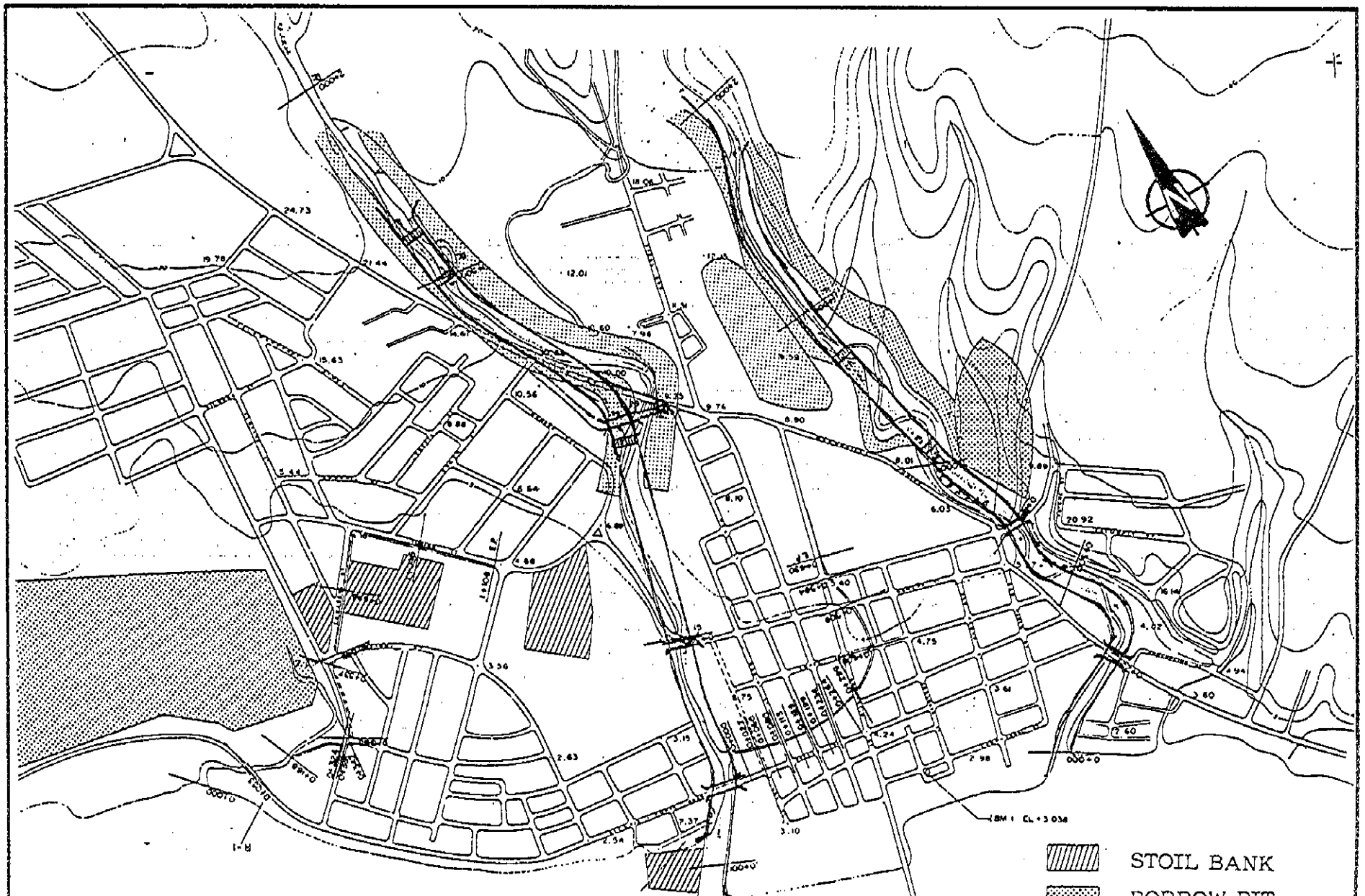
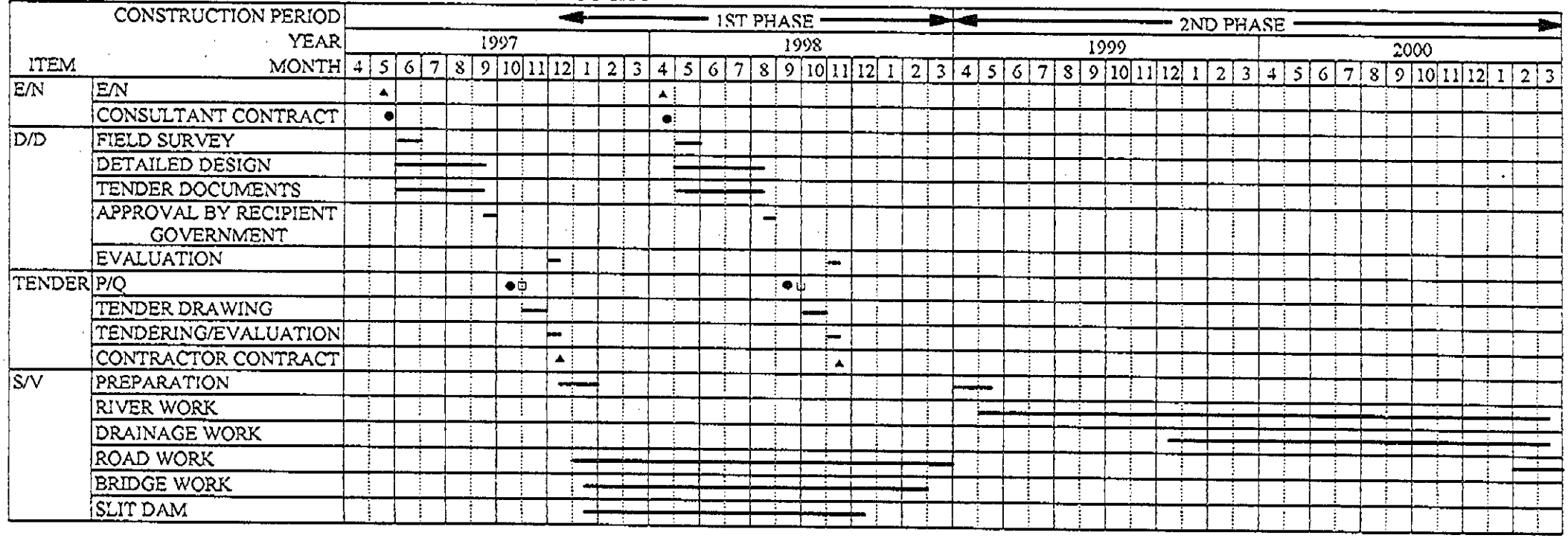


Fig. 3.1.1 LOCATION OF BORROW PIT AND SPOIL BANK

Fig. 3.1.2 IMPLEMENTATION SCHEDULE OF THE PROJECT

THE BASIC STUDY ON FLOOD MITIGATION PROJECT IN ORMOC CITY



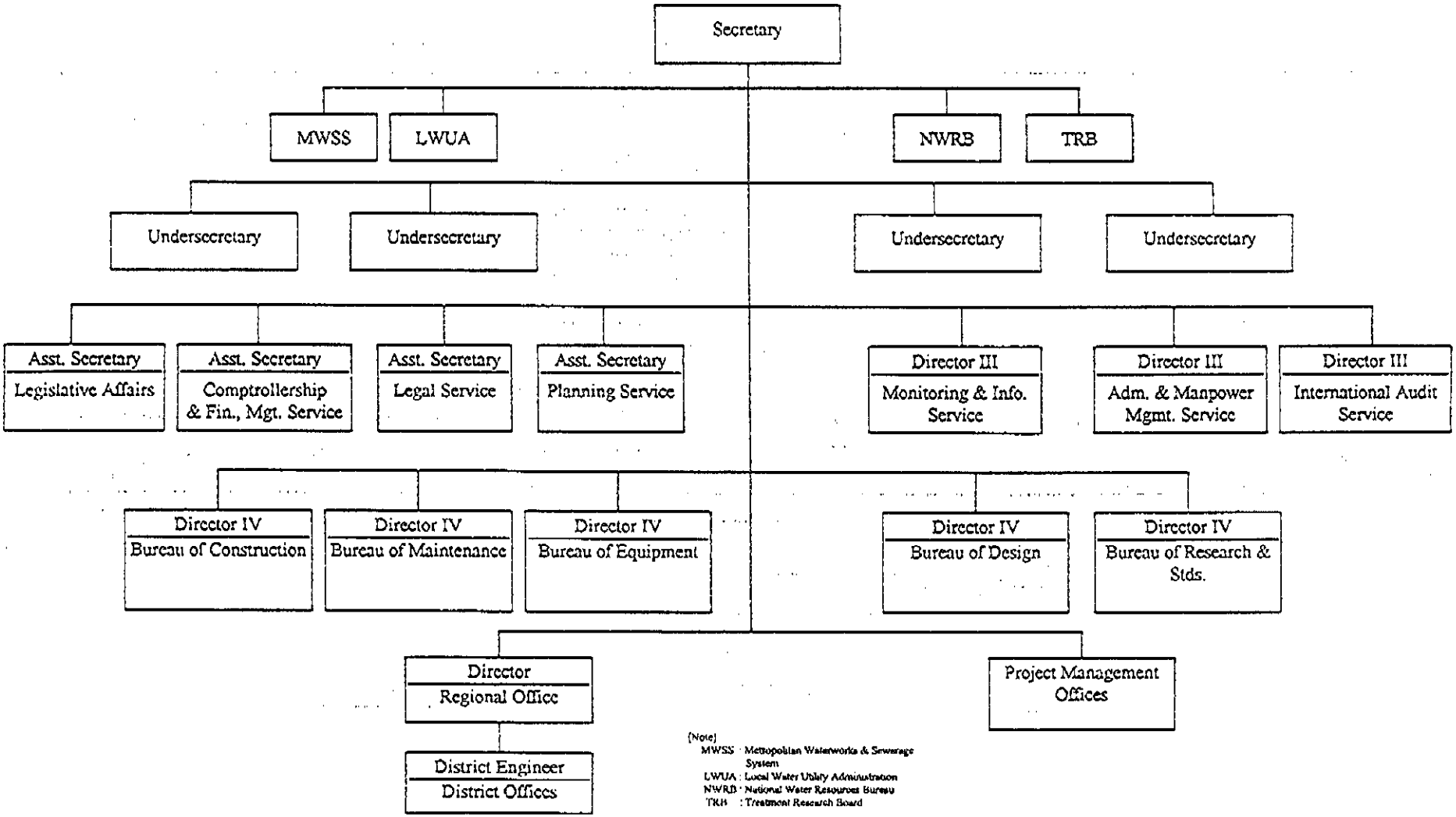


Fig. 3.2.1 ORGANIZATIONAL CHART OF DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)

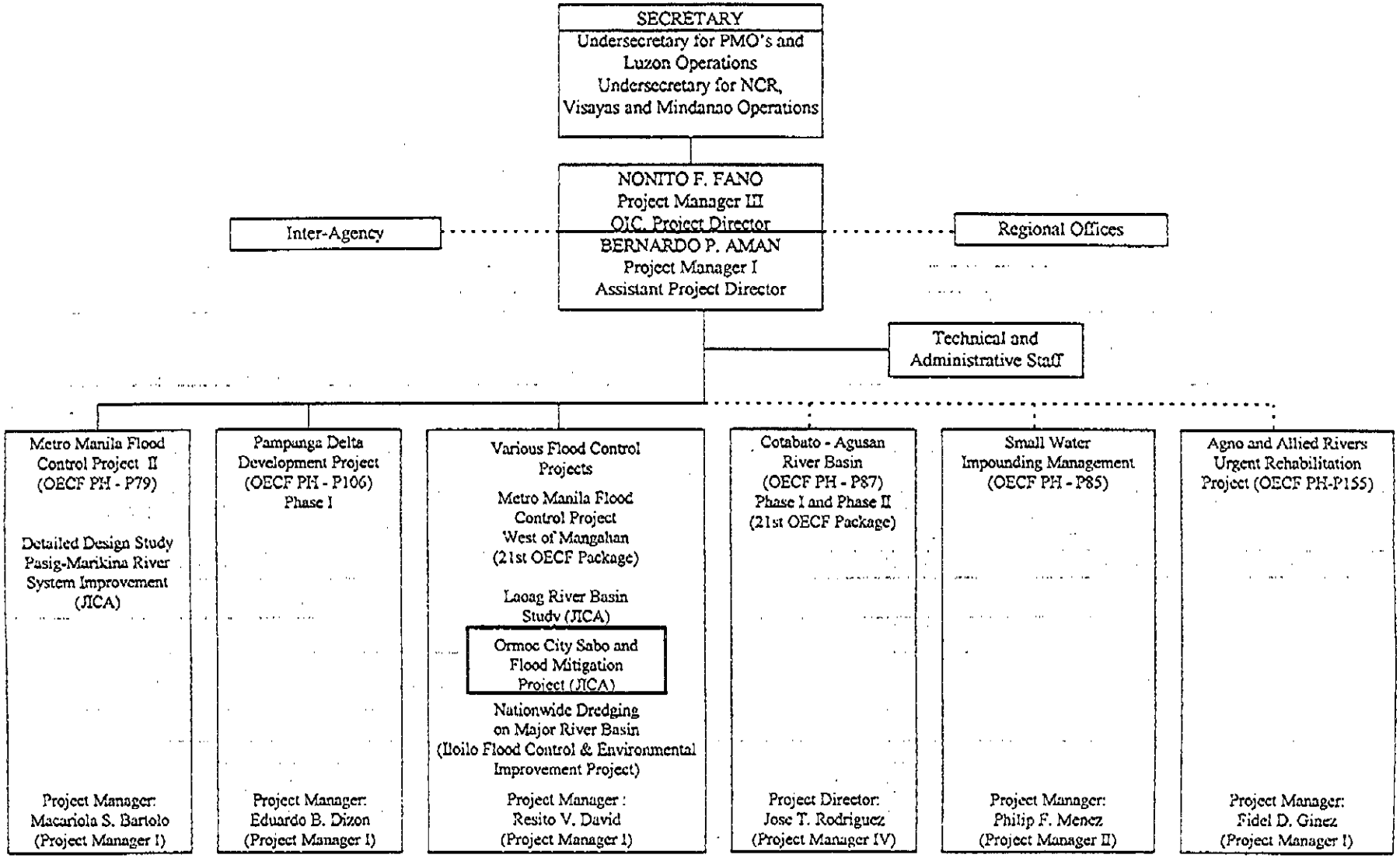


Fig. 3.2.2 ORGANIZATIONAL CHART MAJOR FLOOD CONTROL AND DRAINAGE PROJECTS CLUSTER DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

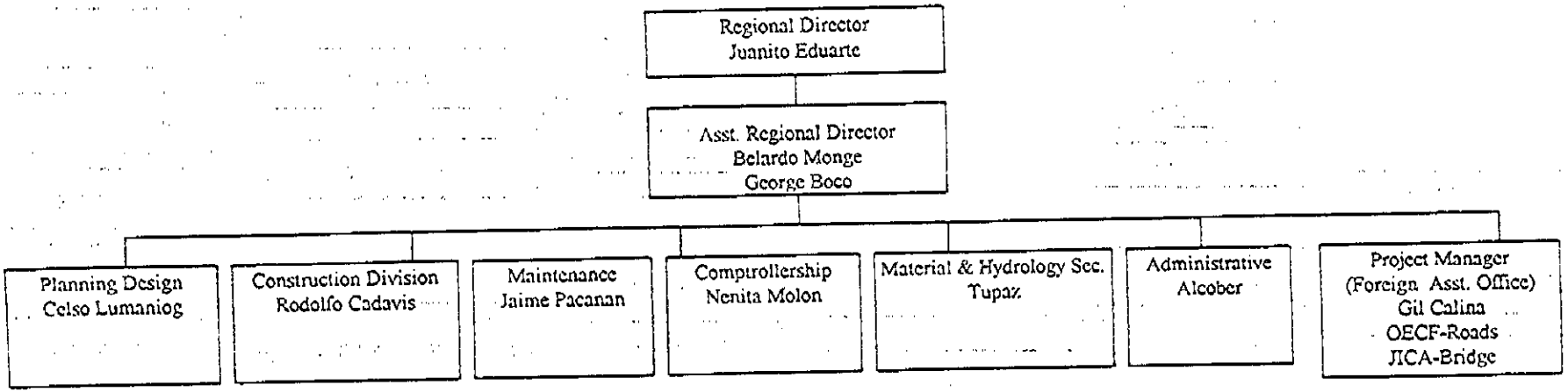


Fig. 3.2.3 ORGANIZATIONAL CHART OF REGIONAL OFFICE (REGION VIII,DPWH)

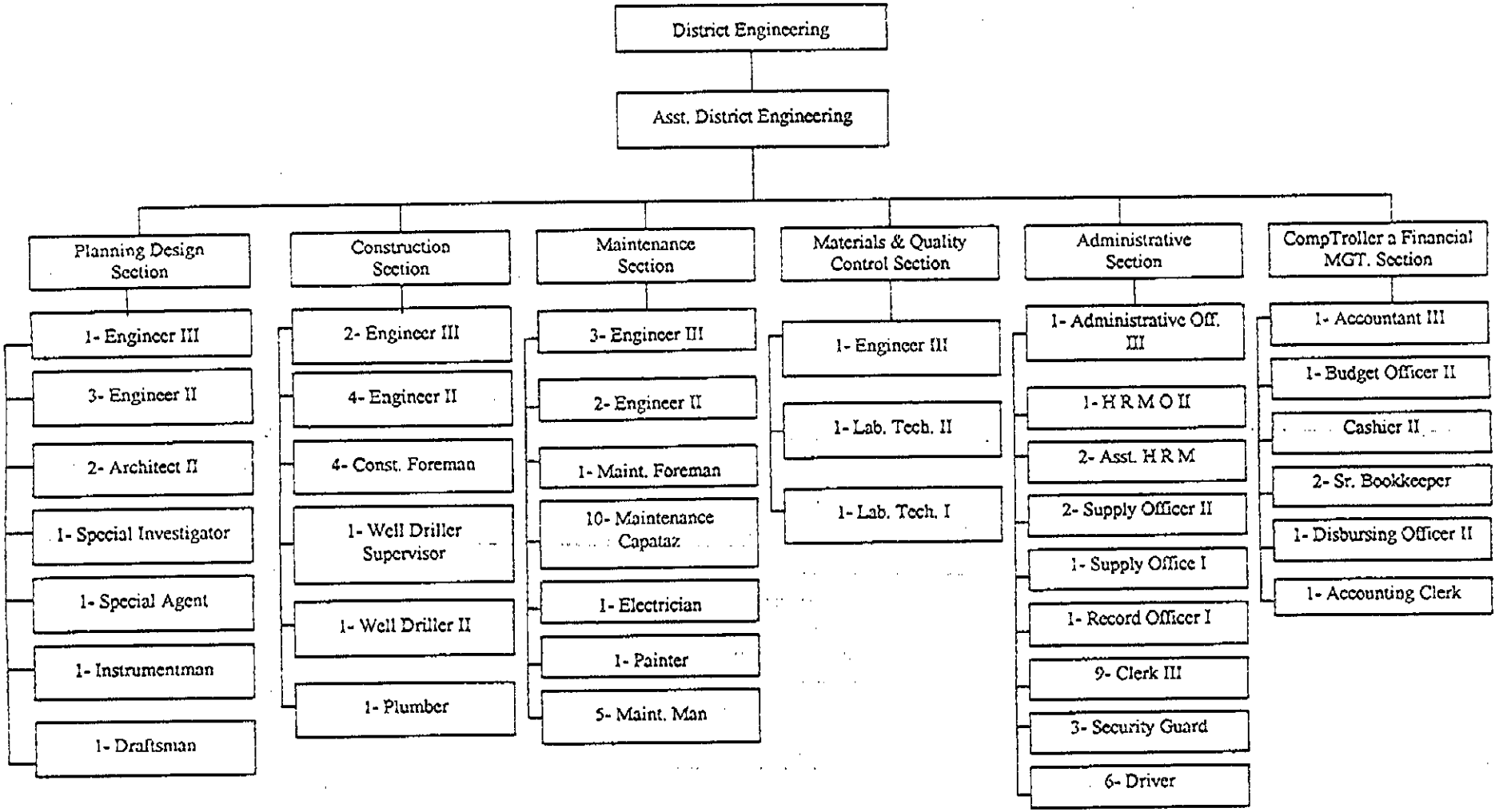


Fig. 3.2.4 ORGANIZATIONAL CHART FOR DISTRICT ENGINEERING OFFICE, (DISTRICT 2, REGION VII, DPWH)

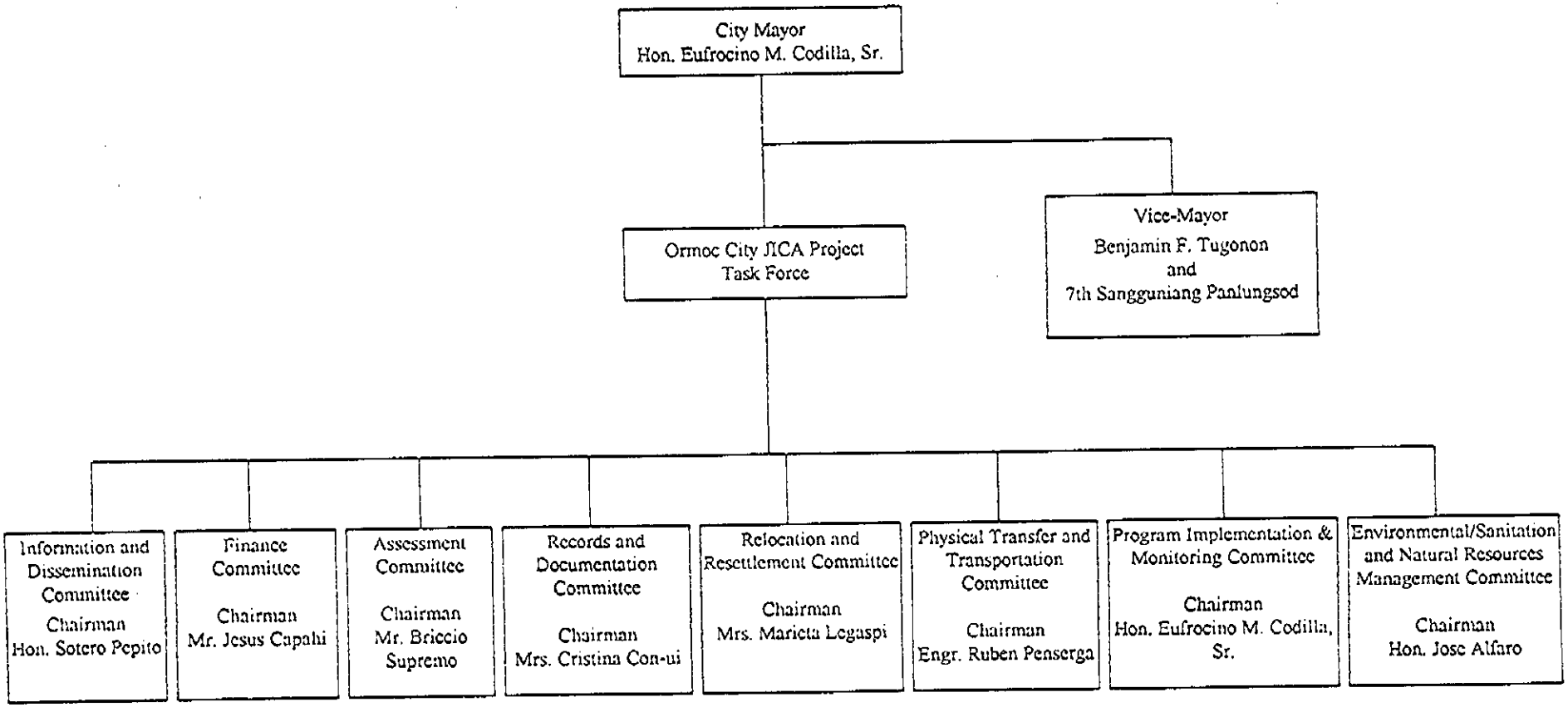


Fig. 3.2.5 ORGANIZATIONAL CHART FOR FLOOD MITIGATION PROJECT ORMOC CITY