

**REPUBLIC OF THE PHILIPPINES
NATIONAL IRRIGATION ADMINISTRATION**

***FEASIBILITY REPORT
ON
THE GUMAIN RIVER
IRRIGATION PROJECT***

***APPENDIXES VOLUME III
APPENDIX XII DRAWINGS***

FEBRUARY 1985

**JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN**

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REPUBLIC OF THE PHILIPPINES
NATIONAL IRRIGATION ADMINISTRATION

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ON
THE GUMAIN RIVER
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APPENDIX XII DRAWINGS

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JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

国際協力事業団	
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THE GUMAIN RIVER IRRIGATION PROJECT

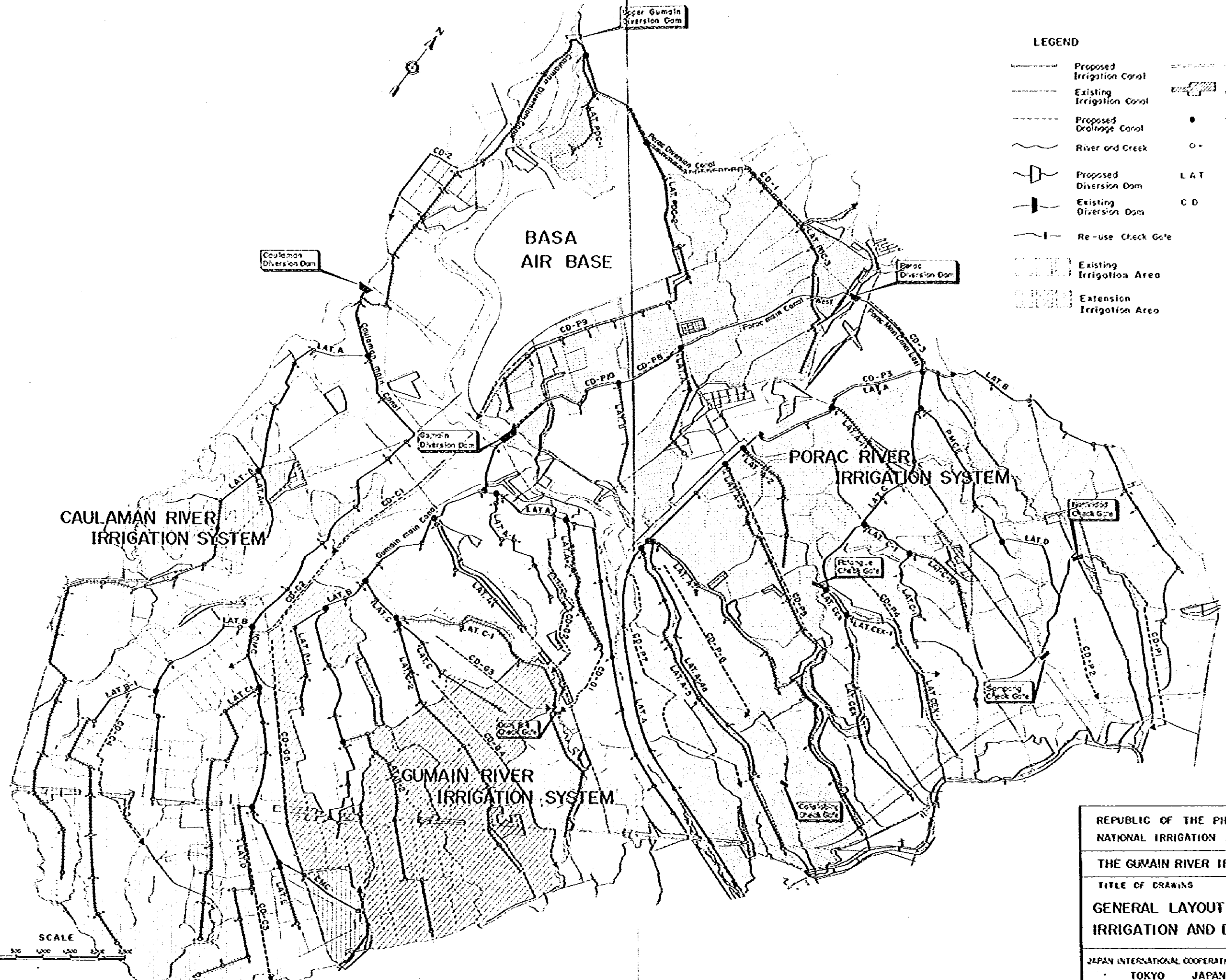
APPENDIX XII DRAWINGS

LIST OF DRAWINGS

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4	II-3	LAND CLASSIFICATION MAP FOR RICE LAND AND DUAL CLASS LAND
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23	VI-6	DIVISION WORK, TERMINAL STRUCTURE OF LATERAL CANAL AND DRAINAGE INLET

LEGEND

- Proposed Irrigation Canal
- Existing Irrigation Canal
- Proposed Drainage Canal
- River and Creek
- Proposed Diversion Dam
- Existing Diversion Dam
- Re-use Check Gate
- Existing Irrigation Area
- Extension Irrigation Area
- Road
- Town and Village
- Head Gate
- Turnout
- L.A.T. - Lateral Canal
- C.D. - Collector Drain

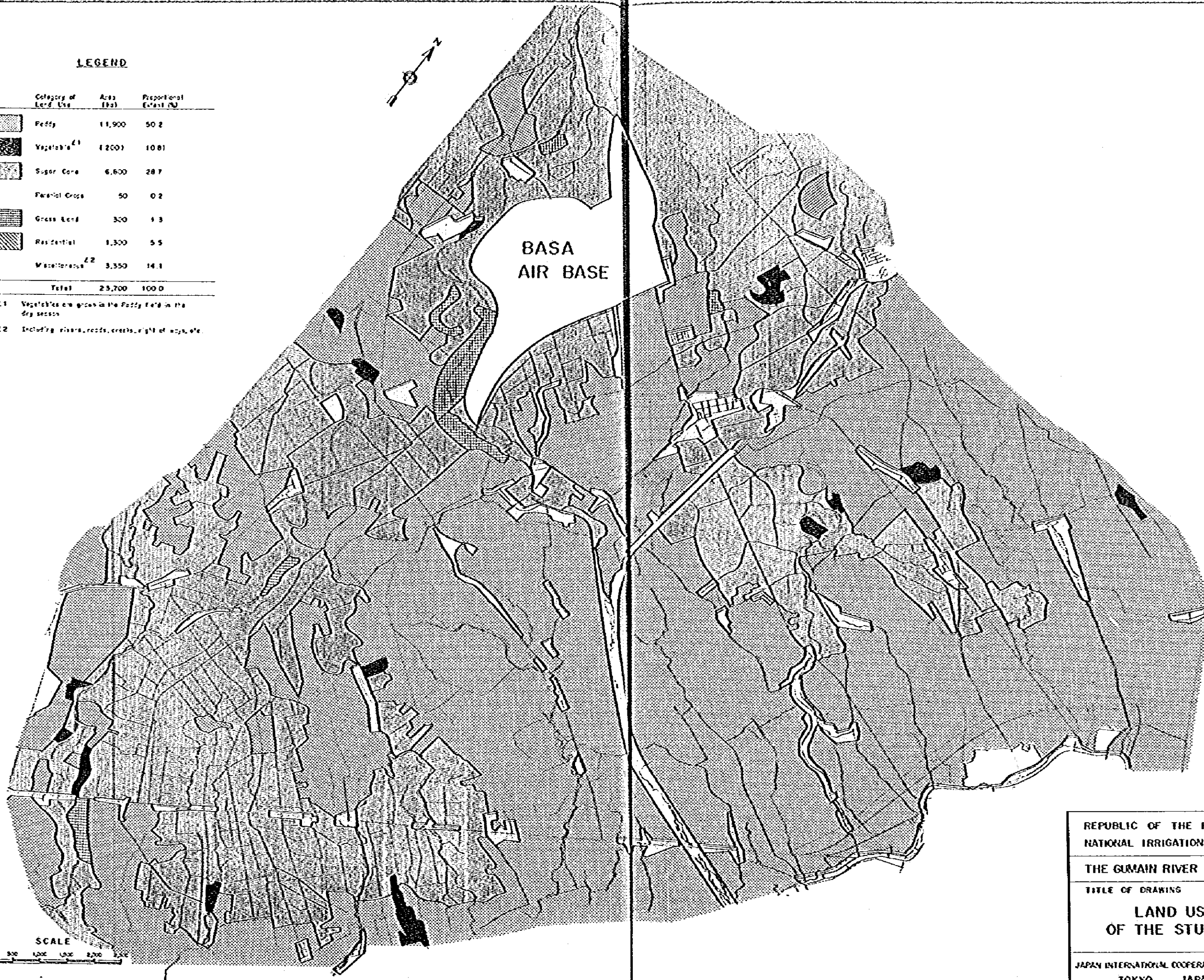


REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
 GENERAL LAYOUT OF PROPOSED
 IRRIGATION AND DRAINAGE SYSTEM
 JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN
 D.W.G. NO. 1-1

LEGEND

Category of Land Use	Area (Ha)	Proportional Extent (%)
Paddy	11,900	50.2
Vegetable ^{Z1}	1,200	10.81
Sugar Cane	6,600	28.7
Farmland Crops	50	0.2
Grass Land	300	1.3
Residential	1,300	5.5
Miscellaneous ^{Z2}	3,350	14.1
Total	23,700	100.0

Z1 Vegetables are grown in the Paddy field in the dry season
 Z2 Including rivers, roads, creeks, right of ways, etc



REPUBLIC OF THE PHILIPPINES NATIONAL IRRIGATION ADMINISTRATION	
THE GUMAIN RIVER IRRIGATION PROJECT	
TITLE OF DRAWING	
LAND USE MAP OF THE STUDY AREA	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG NO. II-1

LEGEND

II Soil Mapping Unit

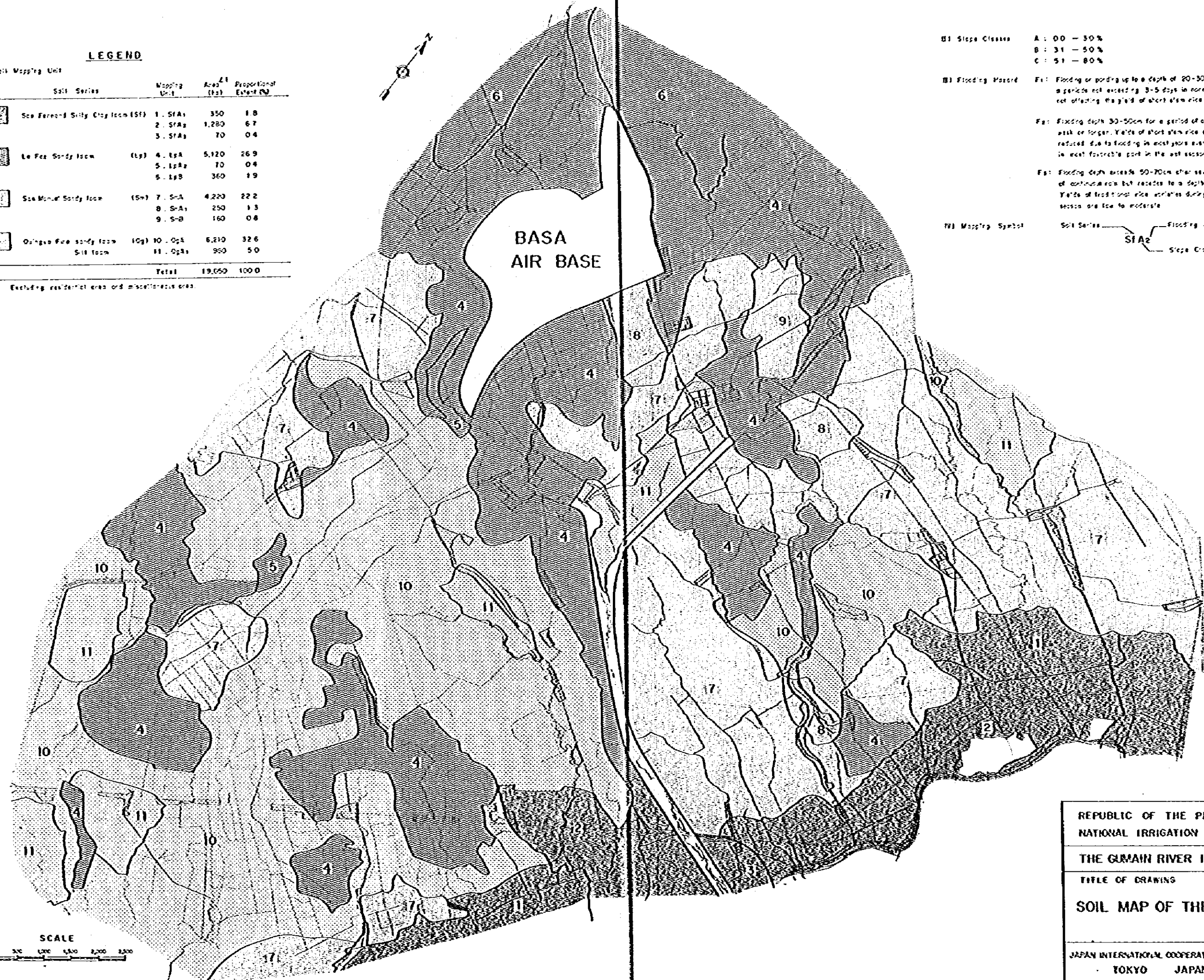
Soil Series	Mapping Unit	Area ¹ (ha)	Proportional Extent (%)
Sea Forest Silty Clay loam (Sf)	1. SFA ₁	350	1.8
	2. SFA ₂	1,280	6.7
	3. SFA ₃	70	0.4
La Paz Sandy loam	4. LPA	5,120	26.9
	5. LPA ₂	70	0.4
	5. LPB	360	1.9
Sea Mount Sandy loam	7. S-A	4,220	22.2
	8. S-A ₁	250	1.3
	9. S-B	160	0.8
Ongsa Fine sandy loam Silt loam	10. OPA	6,210	32.6
	11. OPA ₁	950	5.0
Total		19,050	100.0

¹ Excluding residential area and miscellaneous area.

III Slope Classes
 A : 00 - 30%
 B : 31 - 50%
 C : 51 - 80%

III Flooding Hazard
 Fa: Flooding or ponding up to a depth of 20-30cm for a period not exceeding 3-5 days in normal years not affecting the yield of short stem rice
 Fb: Flooding depth 30-50cm for a period of about one week or longer. Yields of short stem rice crops are reduced due to flooding in most years and planted in most favorable part in the wet season
 Fc: Flooding depth exceeds 50-70cm for several days of continuous rain but recedes to a depth of 30cm. Yields of traditional rice varieties during the wet season are low to moderate

III Mapping Symbol
 Soil Series: SFA₂
 Flooding Hazard: Fa
 Slope Class: A



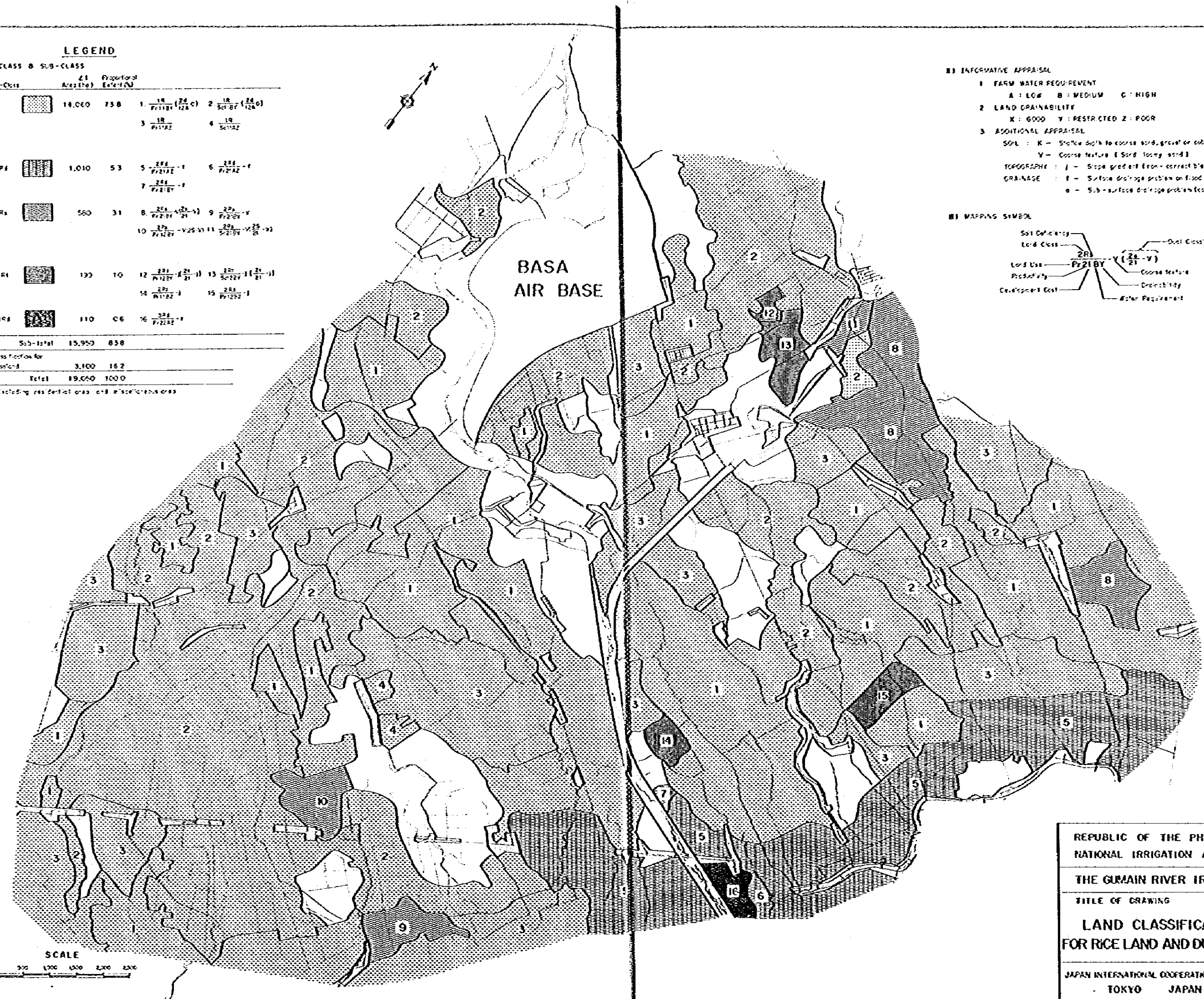
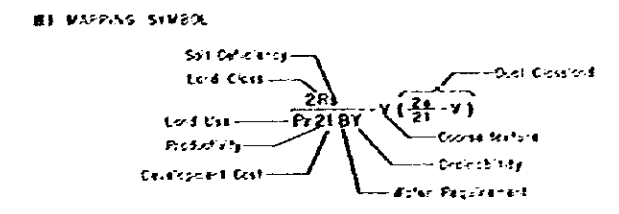
REPUBLIC OF THE PHILIPPINES NATIONAL IRRIGATION ADMINISTRATION	
THE GUMAIN RIVER IRRIGATION PROJECT	
TITLE OF DRAWING SOIL MAP OF THE STUDY AREA	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. NO. II - 2

LEGEND

II LAND CLASS & SUB-CLASS		Z1		Proportional Extent (%)	
Class	Sub-Class	Area (Ha)			
1R	-	18,060	75.8	1. $\frac{1R}{P111B1} (24-C)$	2. $\frac{1R}{S111B1} (24-C)$
				3. $\frac{1R}{P111A2}$	4. $\frac{1R}{S111A2}$
2R	2R1	1,010	5.3	5. $\frac{2R1}{P121A2} -1$	6. $\frac{2R1}{S121A2} -1$
				7. $\frac{2R1}{P121B1} -1$	
2R1		560	3.1	8. $\frac{2R1}{P121B1} (21-Y)$	9. $\frac{2R1}{S121B1} (21-Y)$
				10. $\frac{2R1}{P121B1} (21-Y)$	11. $\frac{2R1}{S121B1} (21-Y)$
2R1		130	1.0	12. $\frac{2R1}{P121B1} (21-Y)$	13. $\frac{2R1}{S121B1} (21-Y)$
				14. $\frac{2R1}{P121B1} -1$	15. $\frac{2R1}{S121B1} -1$
3R	3R1	110	0.6	16. $\frac{3R1}{P131A2} -1$	
Sub-Total		15,950	83.8		
Land Class for Dual Classland		3,100	18.2		
Total		19,050	100.0		

Z1 Excluding residential areas and miscellaneous areas

- III INFORMATIVE APPRAISAL**
- FARM WATER REQUIREMENT
A : LOW B : MEDIUM C : HIGH
 - LAND DRAINABILITY
X : GOOD Y : RESTRICTED Z : POOR
 - ADDITIONAL APPRAISAL
SOIL : K - Shallow depth to coarse sand, gravel or cobble
Y - Coarse texture (Sand, loamy sand)
TOPOGRAPHY : J - Slope gradient (non-correctible)
DRAINAGE : F - Surface drainage problem on flooding hazard
G - Sub-surface drainage problem (correctible)



REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
**LAND CLASSIFICATION MAP
 FOR RICE LAND AND DUAL CLASS LAND**
 JAPAN INTERNATIONAL COOPERATION AGENCY D.W.G. NO.
 TOKYO JAPAN I-3

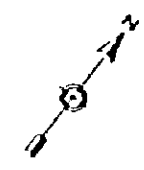
LEGEND

II LAND CLASS & SUB-CLASS

Class	Sub-Class	Area (ha)	Proportional Est. (%)	1	2	3	4	5
1		250	1.2	1	1	1	1	1
2	2a	1,760	9.2	2	2	2	2	2
	2b			4	4	4	4	4
2a1		60	0.4	6	6	6	6	6
	2a2			7	7	7	7	7
3	3a	830	4.4	9	9	9	9	9
				11	11	11	11	11
				13	13	13	13	13
3a1		60	0.3	14	14	14	14	
3a2		60	0.4	15	15	15	15	

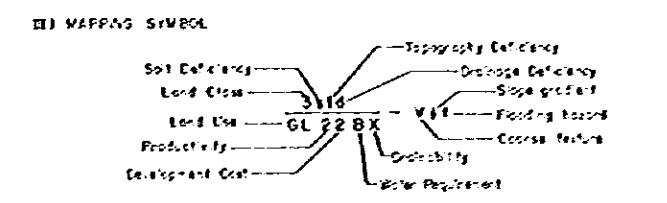
Sub-Total	3,100	66.2
Land Class Totals for Rice Land and Dual Cropland	15,950	83.8
Total	19,050	100.0

21 Excluding residential areas and miscellaneous areas



BASA AIR BASE

- III INFORMATIVE APPRAISAL**
- FARM WATER REQUIREMENT**
A: LOW B: MEDIUM C: HIGH
 - LAND DRAINABILITY**
X: GOOD Y: RESTRICTED Z: POOR
 - ADDITIONAL APPRAISAL**
SOIL: K - Shallow depth to coarse sand, gravel or cobbles
V - Coarse texture (Sand, loamy sand)
TOPOGRAPHY: J - Slope gradient (non-correctable)
DRAINAGE: F - Surface drainage problem on flooding hazard
W - Sub-surface drainage problem (correctable)



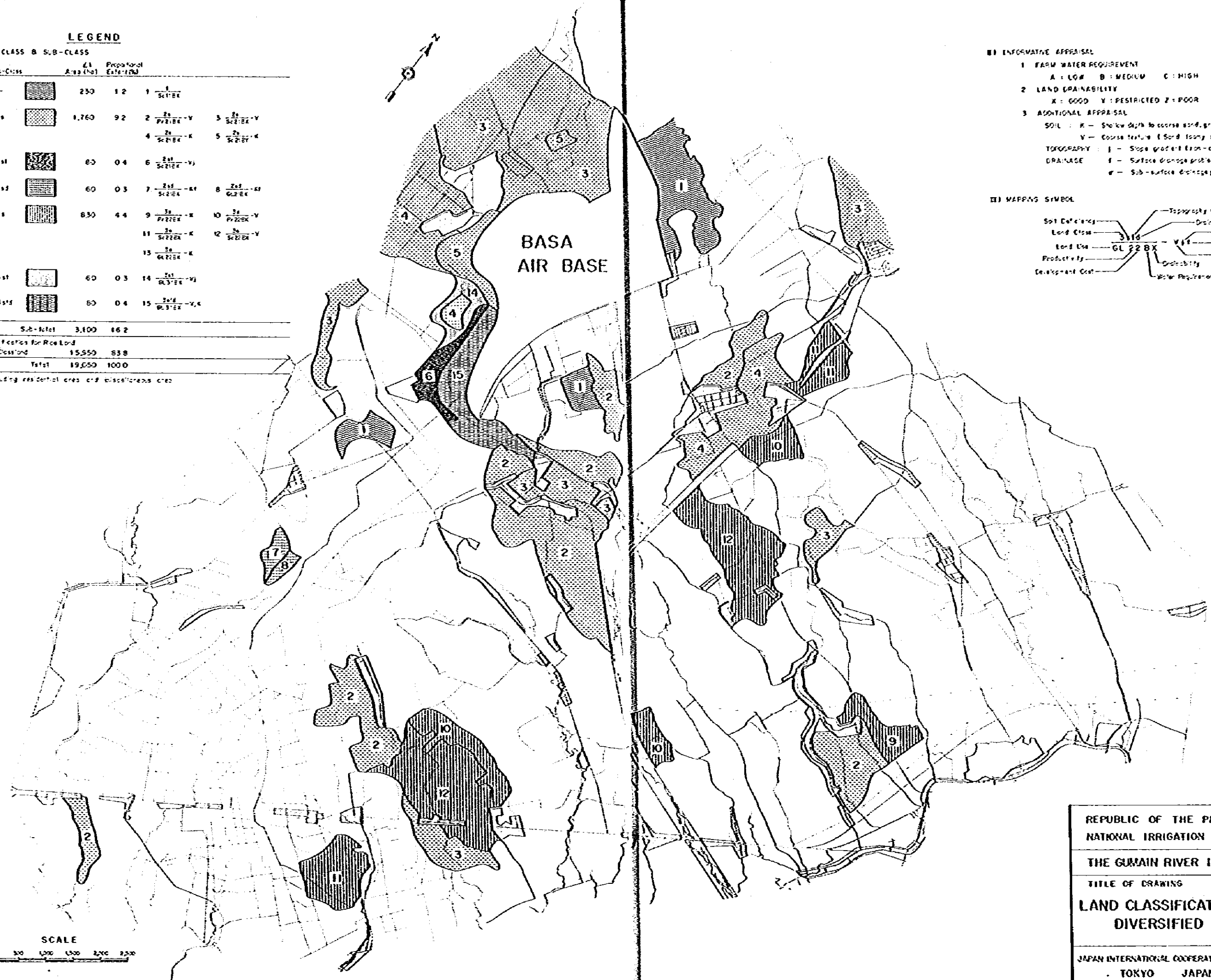
REPUBLIC OF THE PHILIPPINES
NATIONAL IRRIGATION ADMINISTRATION

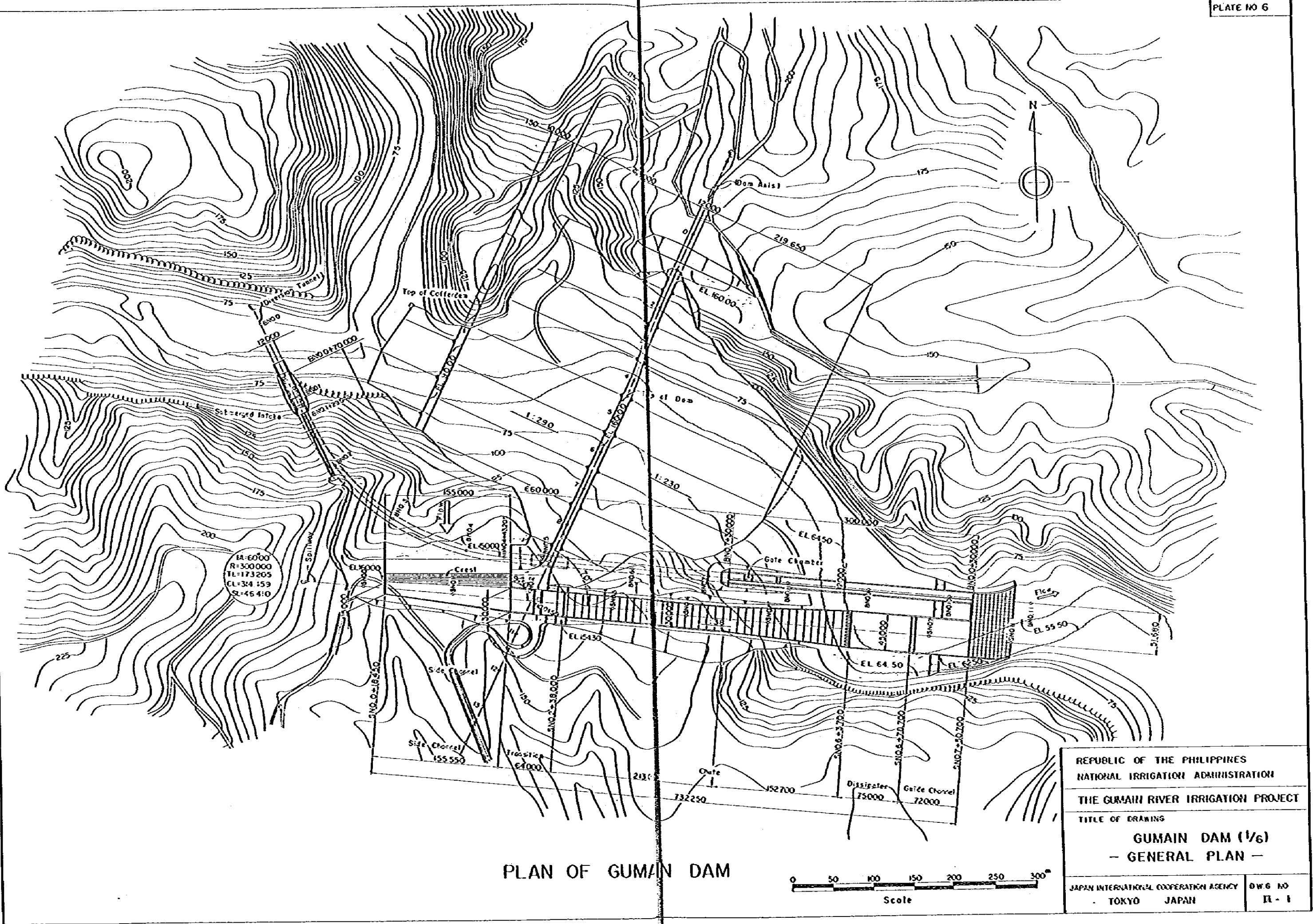
THE GUMAIN RIVER IRRIGATION PROJECT

TITLE OF DRAWING
LAND CLASSIFICATION MAP FOR DIVERSIFIED CROPLAND

JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN

DWG NO.
II-4





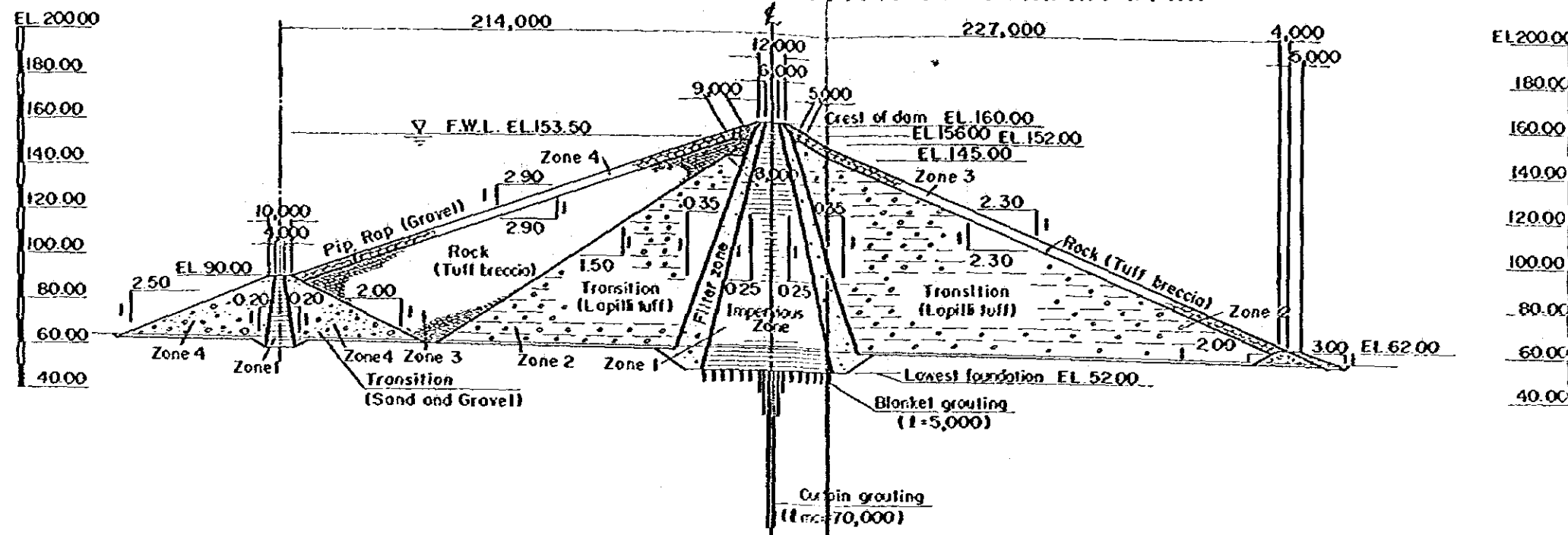
PLAN OF GUMAN DAM

REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING

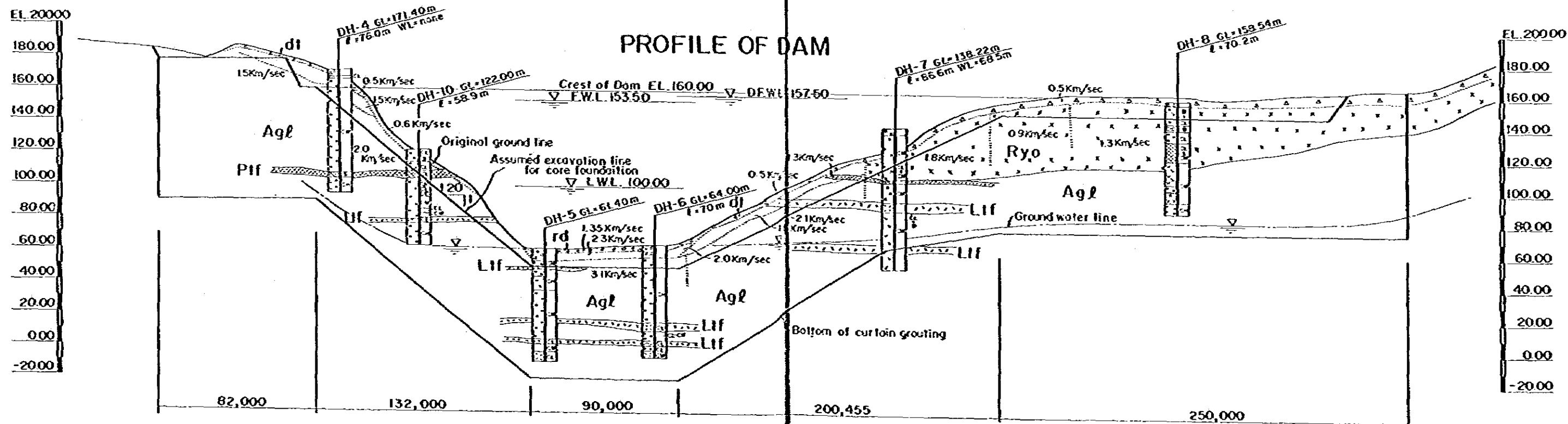
GUMAN DAM (1/6)
 - GENERAL PLAN -

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 DWG NO
 R-1

TYPICAL SECTION OF GUMAIN DAM

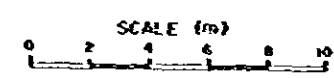


PROFILE OF DAM

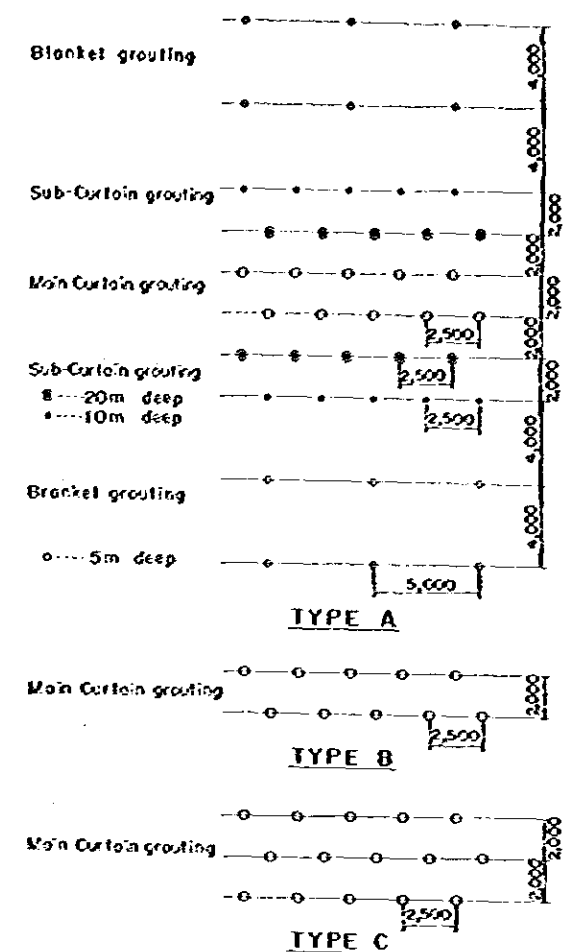
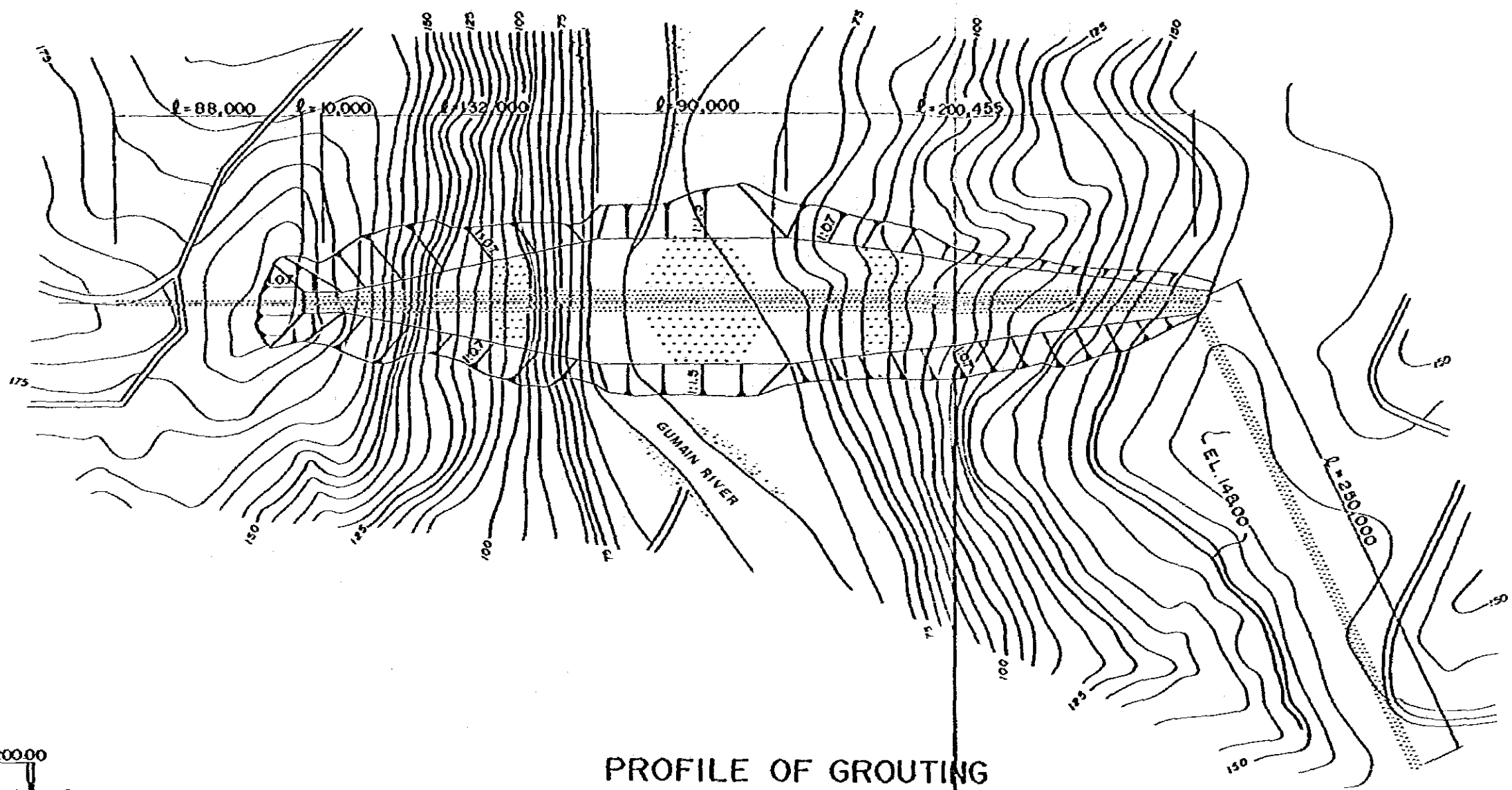


LEGEND

- rd ALLUVIAL DEPOSIT
- dl TALUS DEPOSIT
- Ryo RHYOLITIC FACIES
- LII LAPILLI TUFF
- PII PUMICE TUFF
- Agl AGGLOMERATE
- VOLCANIC BRECCIA
- TUFF BRECCIA

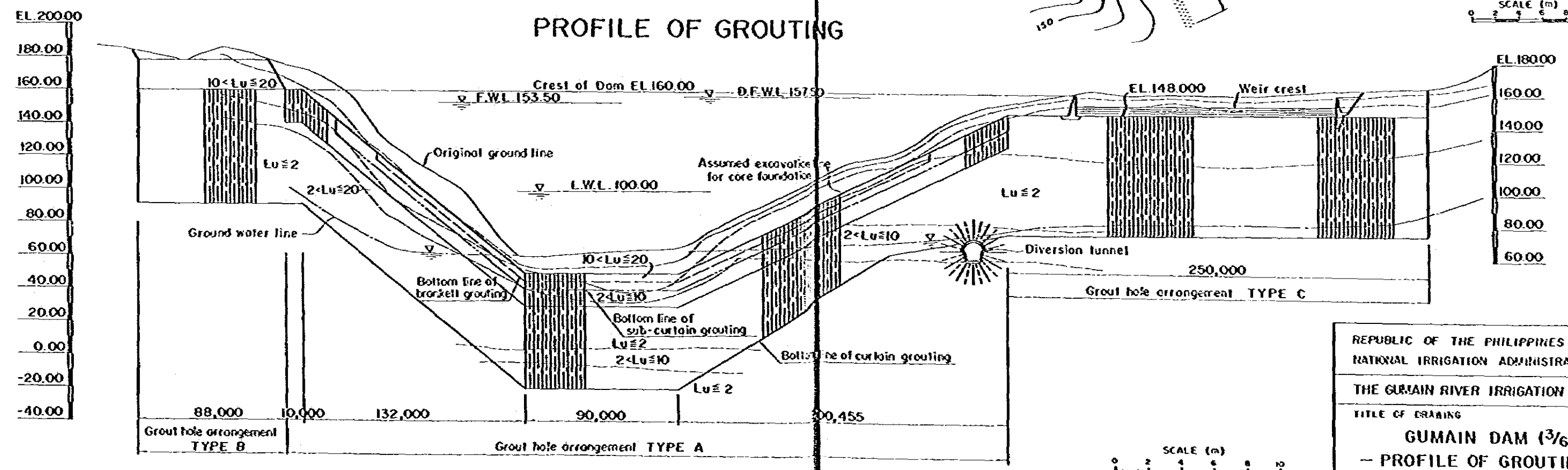


REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
GUMAIN DAM (2/6)
 - TYPICAL SECTION AND PROFILE -
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 DWG NO.
 III - 2

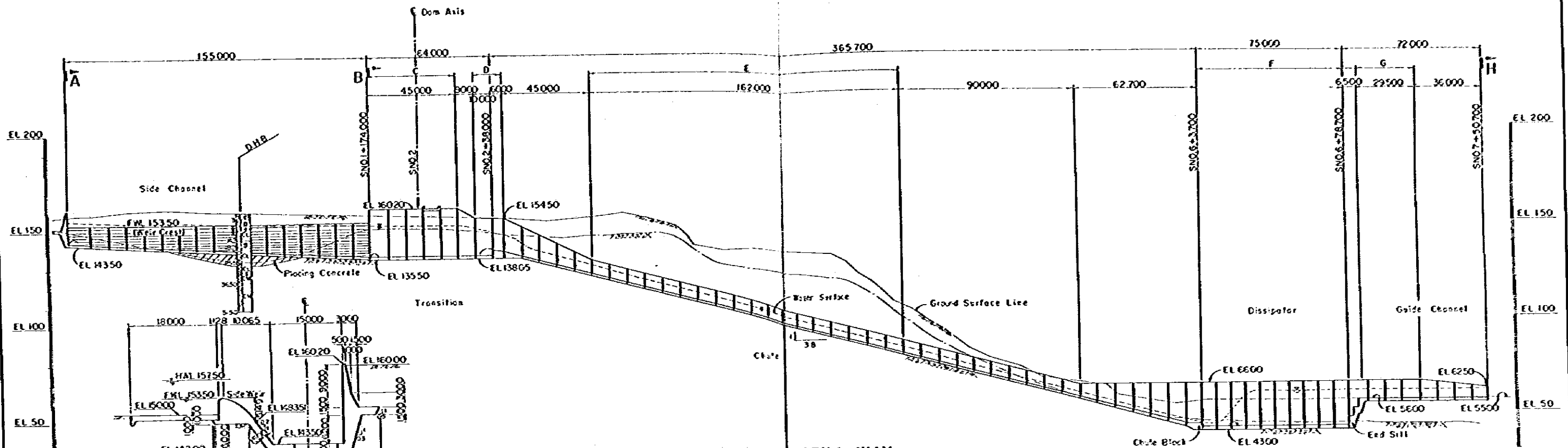


GROUT HOLE ARRANGEMENT
SCALE (m)
0 2 4 6 8 10

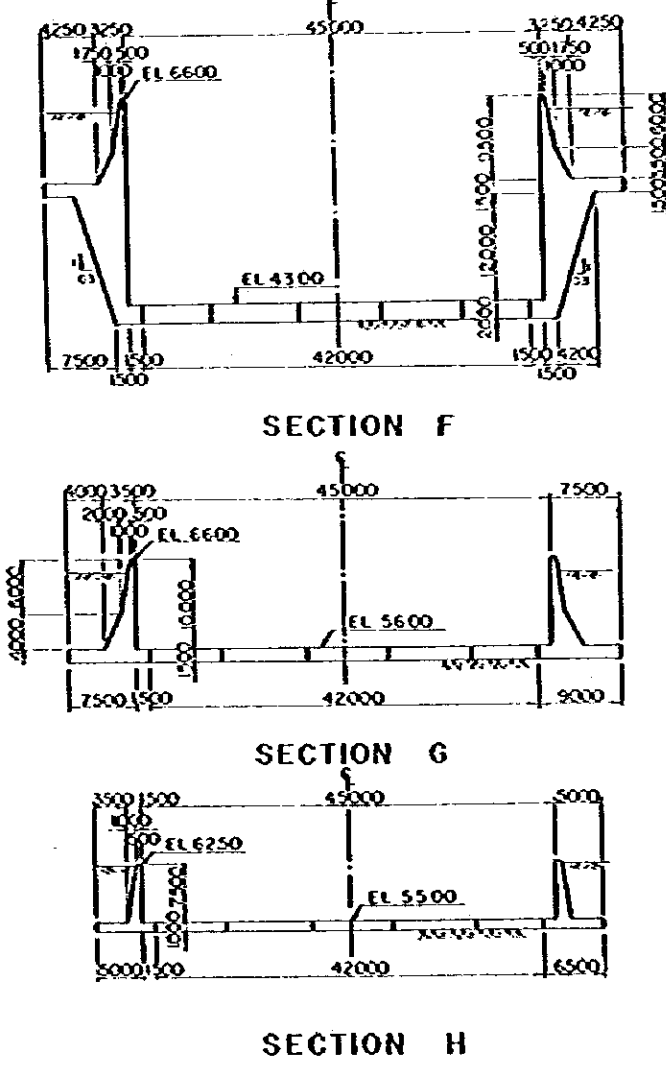
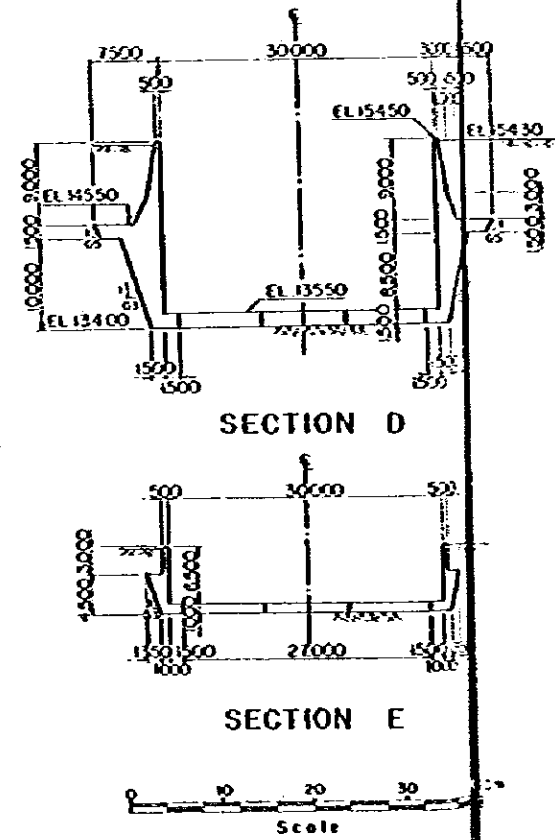
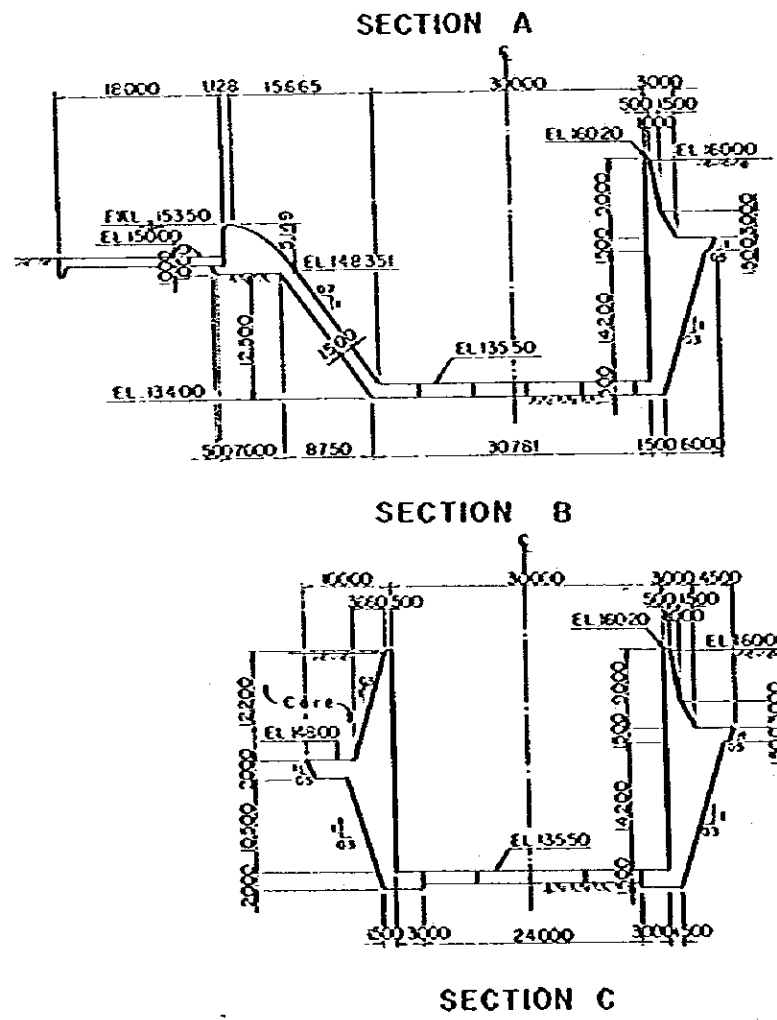
PROFILE OF GROUTING



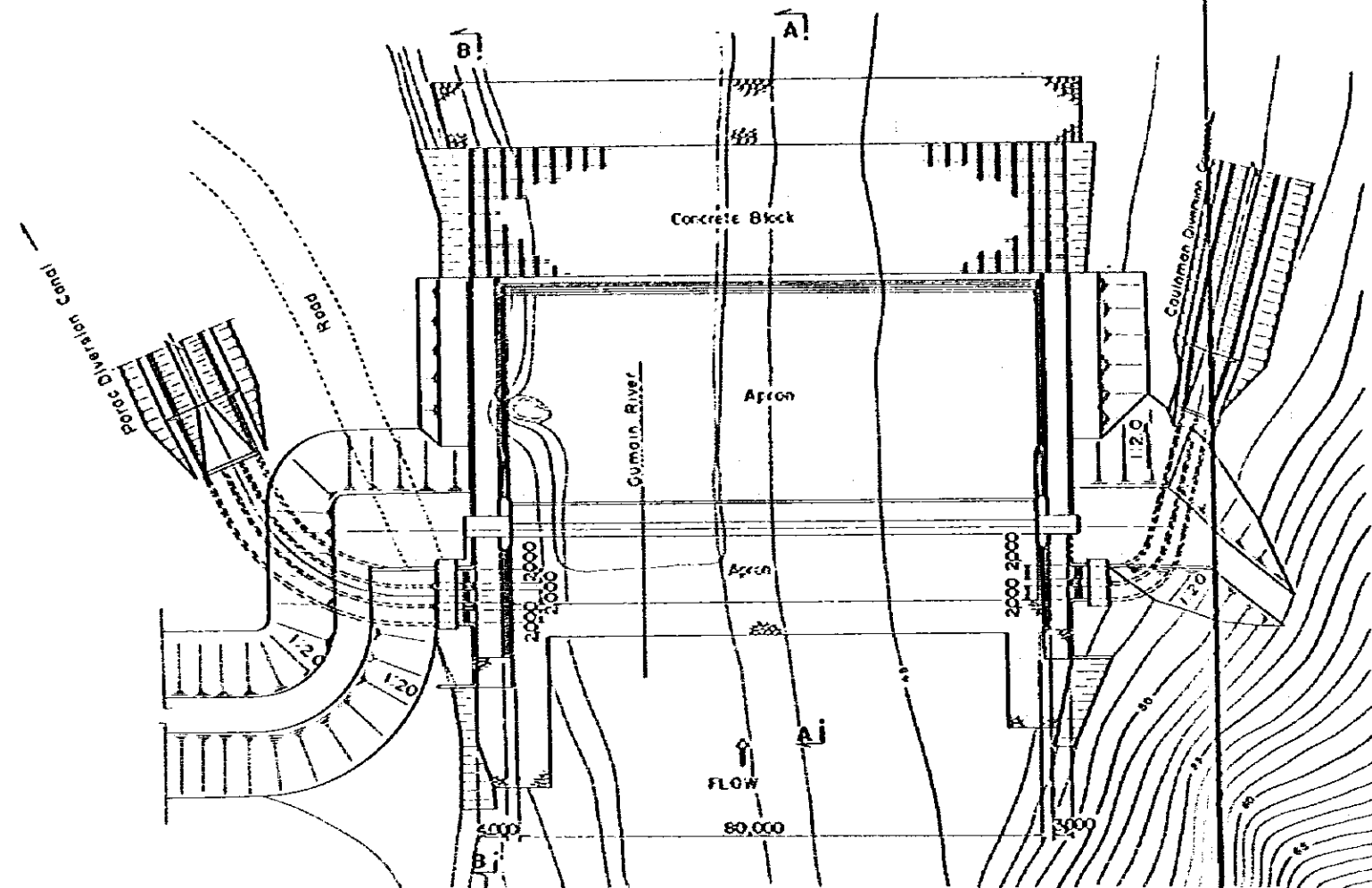
REPUBLIC OF THE PHILIPPINES
NATIONAL IRRIGATION ADMINISTRATION
THE GUMAIN RIVER IRRIGATION PROJECT
TITLE OF DRAWING
GUMAIN DAM (3/6)
— PROFILE OF GROUTING —
JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO JAPAN
D.W.G. NO
III - 3



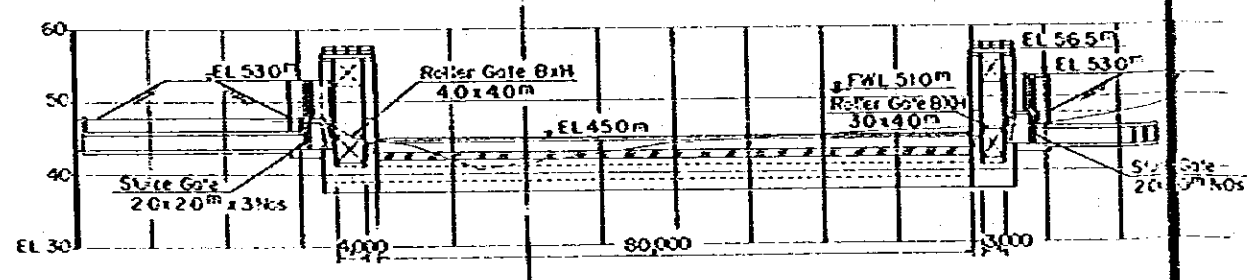
LONGITUDINAL SECTION OF SPILL WAY



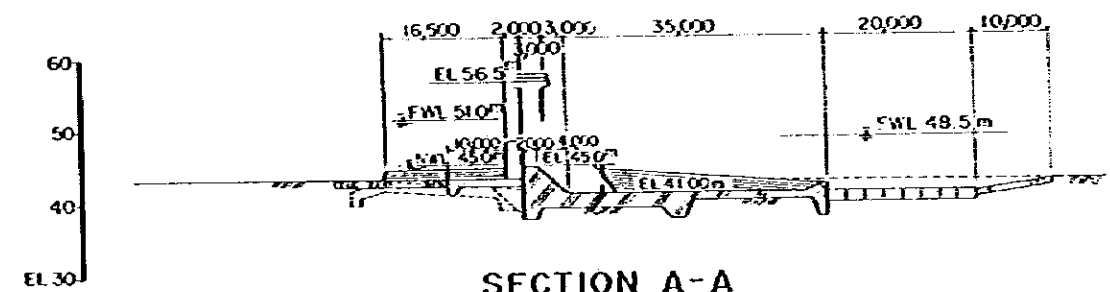
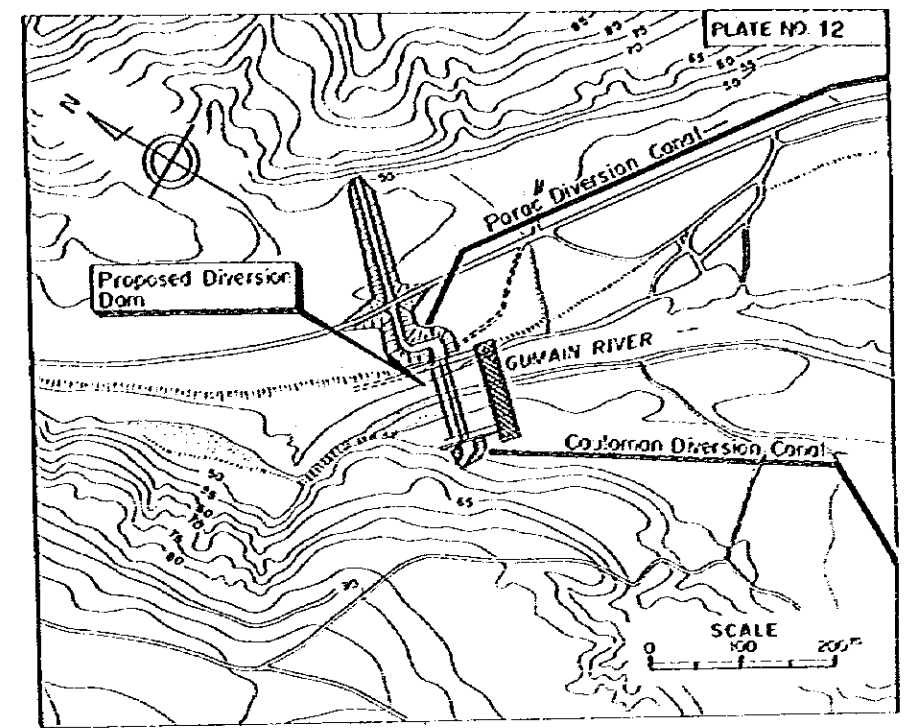
REPUBLIC OF THE PHILIPPINES	
NATIONAL IRRIGATION ADMINISTRATION	
THE GUMAIN RIVER IRRIGATION PROJECT	
TITLE OF DRAWING	
GUMAIN DAM (4/6)	
- SPILL WAY -	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG. NO.
TOKYO JAPAN	III - 4



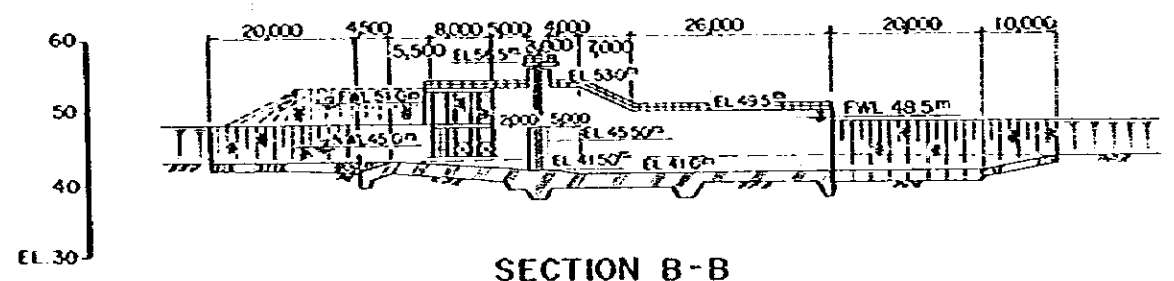
PLAN



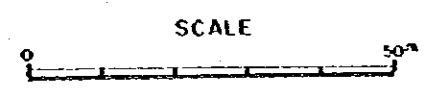
ELEVATION



SECTION A-A

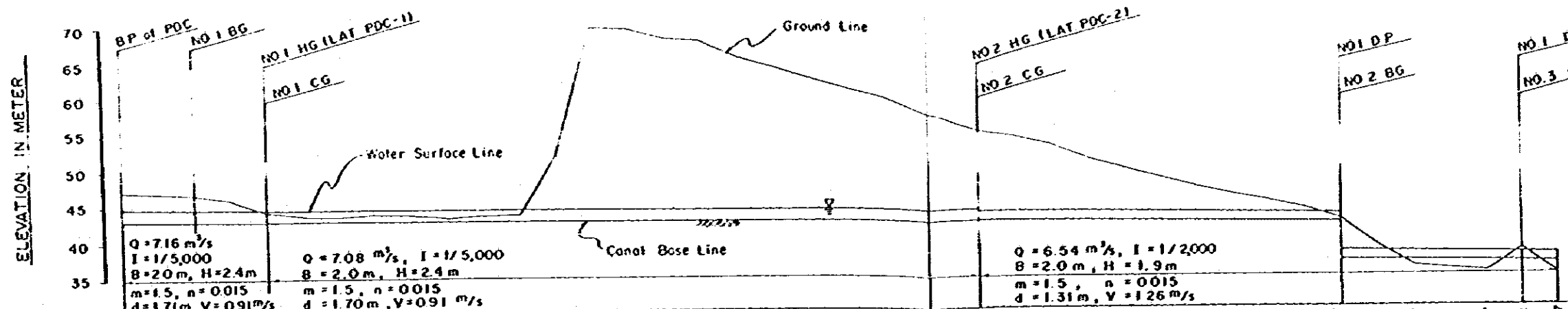


SECTION B-B



REPUBLIC OF THE PHILIPPINES	
NATIONAL IRRIGATION ADMINISTRATION	
THE GUMAIN RIVER IRRIGATION PROJECT	
TITLE OF DRAWING	
UPPER GUMAIN DIVERSION DAM	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG NO
TOKYO JAPAN	IV - 1

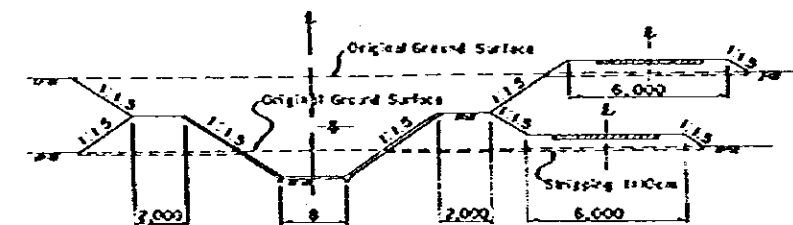
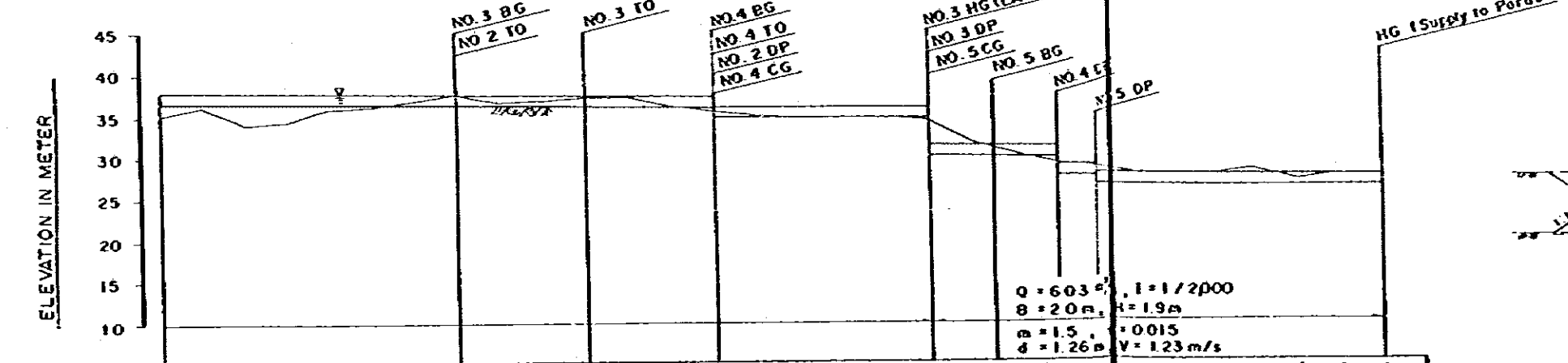
PORAC DIVERSION CANAL



LEGEND

- Q : Design Discharge (m³/s)
- I : Hydraulic Gradient
- B : Canal Base Width (m)
- m : Canal Side Slope
- n : Manning Coefficient
- H : Canal Height (m)
- d : Water Depth (m)
- V : Velocity (m/s)
- TO : Turnout
- HG : Head Gate
- CV : Culvert
- CD : Cross Drain
- BG : Bridge
- DP : Drop
- CG : Check Gate
- SH : Syphon
- AQ : Aqueduct
- WW : Waste Way
- SW : Spill Way

CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE	DISTANCE	STATION	HORIZONTAL CURVE
43.19	44.90	47.4	0.0	0.0	NO. 0	
43.17	44.88	47.0	100.0	100.0	NO. 1	
43.13	44.88	46.9	200.0	200.0	NO. 2	
43.11	44.82	46.3	300.0	300.0	NO. 3	
43.02	44.72	45.4	400.0	400.0	NO. 4	
42.99	44.70	45.9	500.0	500.0	NO. 5	
42.97	44.68	45.8	600.0	600.0	NO. 6	
42.95	44.66	44.0	700.0	700.0	NO. 7	
42.93	44.64	43.9	800.0	800.0	NO. 8	
42.91	44.62	43.5	900.0	900.0	NO. 9	
42.89	44.60	43.7	1,000.0	1,000.0	NO. 10	
42.87	44.58	43.8	1,100.0	1,100.0	NO. 11	
42.85	44.56	42.0	1,200.0	1,200.0	NO. 12	
42.83	44.54	70.0	1,300.0	1,300.0	NO. 13	
42.81	44.52	69.8	1,400.0	1,400.0	NO. 14	
42.79	44.50	68.0	1,500.0	1,500.0	NO. 15	
42.77	44.48	68.0	1,600.0	1,600.0	NO. 16	
42.75	44.46	68.8	1,700.0	1,700.0	NO. 17	
42.73	44.44	64.2	1,800.0	1,800.0	NO. 18	
42.71	44.42	62.7	1,900.0	1,900.0	NO. 19	
42.69	44.40	61.4	2,000.0	2,000.0	NO. 20	
42.67	44.38	60.4	2,100.0	2,100.0	NO. 21	
42.65	44.36	58.8	2,200.0	2,200.0	NO. 22	
42.63	44.34	57.0	2,300.0	2,300.0	NO. 23	
42.61	44.32	55.5	2,400.0	2,400.0	NO. 24	
42.59	44.30	54.5	2,500.0	2,500.0	NO. 25	
42.57	44.28	53.2	2,600.0	2,600.0	NO. 26	
42.55	44.26	51.4	2,700.0	2,700.0	NO. 27	
42.53	44.24	50.0	2,800.0	2,800.0	NO. 28	
42.51	44.22	48.8	2,900.0	2,900.0	NO. 29	
42.49	44.20	47.1	3,000.0	3,000.0	NO. 30	
42.47	44.18	46.1	3,100.0	3,100.0	NO. 31	
42.45	44.16	45.3	3,200.0	3,200.0	NO. 32	
42.43	44.14	44.1	3,300.0	3,300.0	NO. 33	
42.41	44.12	42.9	3,400.0	3,400.0	NO. 34	
42.39	44.10	41.4	3,500.0	3,500.0	NO. 35	
42.37	44.08	36.0	3,600.0	3,600.0	NO. 36	
42.35	44.06	35.7	3,700.0	3,700.0	NO. 37	
42.33	44.04	35.0	3,800.0	3,800.0	NO. 38	
42.31	44.02	36.1	3,900.0	3,900.0	NO. 39	
42.29	44.00	35.0	4,000.0	4,000.0	NO. 40	

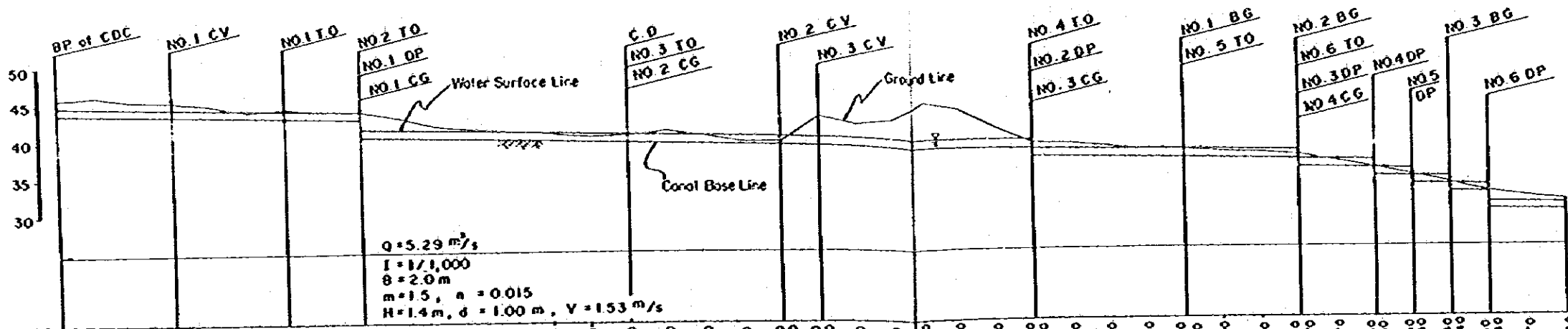


CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE	DISTANCE	STATION	HORIZONTAL CURVE
36.67	37.98	35.0	4,000.0	4,000.0	NO. 40	
36.62	37.93	36.1	4,100.0	4,100.0	NO. 41	
36.57	37.88	34.0	4,200.0	4,200.0	NO. 42	
36.52	37.83	34.5	4,300.0	4,300.0	NO. 43	
36.47	37.78	35.8	4,400.0	4,400.0	NO. 44	
36.42	37.73	36.0	4,500.0	4,500.0	NO. 45	
36.37	37.68	36.6	4,600.0	4,600.0	NO. 46	
36.32	37.63	37.0	4,700.0	4,700.0	NO. 47	
36.27	37.58	37.0	4,800.0	4,800.0	NO. 48	
36.22	37.53	36.6	4,900.0	4,900.0	NO. 49	
36.17	37.48	36.9	5,000.0	5,000.0	NO. 50	
36.12	37.43	37.0	5,100.0	5,100.0	NO. 51	
36.07	37.38	37.0	5,200.0	5,200.0	NO. 52	
36.02	37.33	37.0	5,300.0	5,300.0	NO. 53	
35.97	37.28	36.1	5,400.0	5,400.0	NO. 54	
35.92	37.23	36.4	5,500.0	5,500.0	NO. 55	
35.87	37.18	36.4	5,600.0	5,600.0	NO. 56	
35.82	37.13	36.6	5,700.0	5,700.0	NO. 57	
35.77	37.08	34.5	5,800.0	5,800.0	NO. 58	
35.72	37.03	34.0	5,900.0	5,900.0	NO. 59	
35.67	36.98	31.6	6,000.0	6,000.0	NO. 60	
35.62	36.93	31.2	6,100.0	6,100.0	NO. 61	
35.57	36.88	29.2	6,200.0	6,200.0	NO. 62	
35.52	36.83	28.7	6,300.0	6,300.0	NO. 63	
35.47	36.78	28.4	6,400.0	6,400.0	NO. 64	
35.42	36.73	27.8	6,500.0	6,500.0	NO. 65	
35.37	36.68	28.1	6,600.0	6,600.0	NO. 66	
35.32	36.63	27.0	6,700.0	6,700.0	NO. 67	
35.27	36.58	27.0	6,800.0	6,800.0	NO. 68	
35.22	36.53	27.0	6,900.0	6,900.0	NO. 69	
35.17	36.48	27.0	7,000.0	7,000.0	NO. 70	

REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
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 TITLE OF DRAWING
 PROFILE OF PORAC DIVERSION CANAL
 JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN
 O.W.G. NO. V-1

CAULAMAN DIVERSION CANAL

ELEVATION IN METER



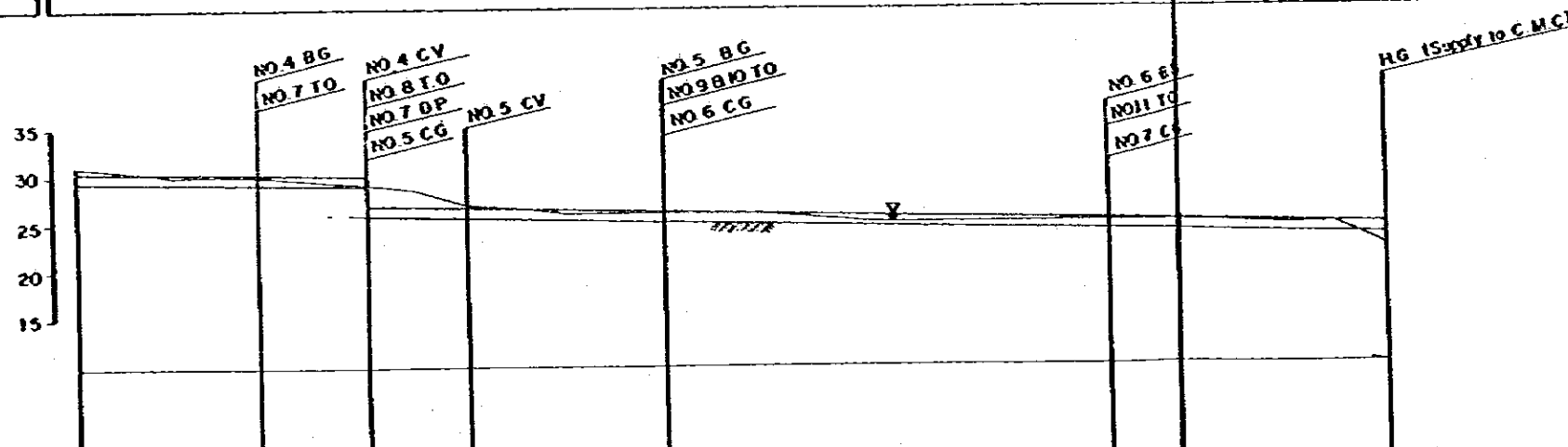
LEGEND

- Q : Design Discharge (m³/s)
- I : Hydraulic Gradient
- B : Canal Base Width (m)
- m : Canal Side Slope
- n : Manning Coefficient
- H : Canal Height (m)
- d : Water Depth (m)
- V : Velocity (m/s)

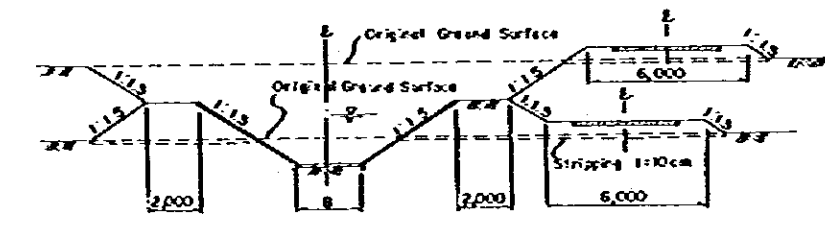
CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE	DISTANCE	STATION	HORIZONTAL CURVE
43.96	44.90	46.0	0.0	0.0	NO. 0	
43.89	44.80	46.4	100.0	100.0	NO. 1	
43.70	44.70	45.6	200.0	200.0	NO. 2	
43.60	44.60	45.4	300.0	300.0	NO. 3	
43.50	44.50	45.0	400.0	400.0	NO. 4	
43.40	44.40	44.0	500.0	500.0	NO. 5	
43.30	44.30	44.1	600.0	600.0	NO. 6	
43.20	44.20	44.5	700.0	700.0	NO. 7	
43.10	44.10	44.0	800.0	800.0	NO. 8	
43.00	44.00	44.0	900.0	900.0	NO. 9	
40.60	41.50	42.0	1,000.0	1,000.0	NO. 10	
40.50	41.40	41.9	1,100.0	1,100.0	NO. 11	
40.40	41.30	41.2	1,200.0	1,200.0	NO. 12	
40.30	41.20	41.2	1,300.0	1,300.0	NO. 13	
40.20	41.10	40.9	1,400.0	1,400.0	NO. 14	
40.10	41.00	40.0	1,500.0	1,500.0	NO. 15	
39.90	40.90	40.7	1,600.0	1,600.0	NO. 16	
39.80	40.80	41.3	1,700.0	1,700.0	NO. 17	
39.60	40.70	40.5	1,800.0	1,800.0	NO. 18	
39.50	40.60	39.7	1,900.0	1,900.0	NO. 19	
39.40	40.50	39.7	2,000.0	2,000.0	NO. 20	
39.30	40.40	43.0	2,100.0	2,100.0	NO. 21	
39.20	40.30	42.0	2,200.0	2,200.0	NO. 22	
39.10	40.20	42.0	2,300.0	2,300.0	NO. 23	
38.90	40.10	41.0	2,400.0	2,400.0	NO. 24	
38.80	40.00	41.0	2,500.0	2,500.0	NO. 25	
38.70	39.90	41.3	2,600.0	2,600.0	NO. 26	
38.60	39.80	39.3	2,700.0	2,700.0	NO. 27	
38.50	39.70	38.6	2,800.0	2,800.0	NO. 28	
38.40	39.60	38.0	2,900.0	2,900.0	NO. 29	
38.30	39.50	38.0	3,000.0	3,000.0	NO. 30	
38.20	39.40	37.8	3,100.0	3,100.0	NO. 31	
38.10	39.30	37.5	3,200.0	3,200.0	NO. 32	
38.00	39.20	37.5	3,300.0	3,300.0	NO. 33	
37.90	39.10	37.3	3,400.0	3,400.0	NO. 34	
37.80	39.00	36.4	3,500.0	3,500.0	NO. 35	
37.70	38.90	35.5	3,600.0	3,600.0	NO. 36	
37.60	38.80	34.5	3,700.0	3,700.0	NO. 37	
37.50	38.70	33.4	3,800.0	3,800.0	NO. 38	
37.40	38.60	32.1	3,900.0	3,900.0	NO. 39	
37.30	38.50	31.5	4,000.0	4,000.0	NO. 40	

- TO : Turnout
- H.G : Head Gate
- CV : Culvert
- C.O : Cross Drain
- BG : Bridge
- DP : Drop
- CG : Check Gate
- SH : Syphon
- AQ : Aqueduct
- WW : Waste Way
- SW : Spill Way

ELEVATION IN METER

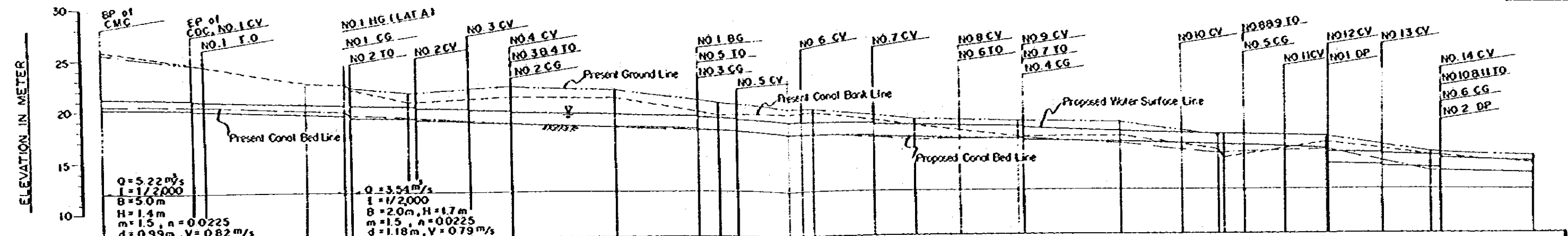


CANAL BASE ELEVATION	WATER SURFACE ELEVATION	GROUND SURFACE ELEVATION	REDUCED DISTANCE	DISTANCE	STATION	HORIZONTAL CURVE
29.80	30.80	31.0	4,000.0	4,000.0	NO. 40	
29.90	30.90	30.5	4,100.0	4,100.0	NO. 41	
29.40	30.40	30.0	4,200.0	4,200.0	NO. 42	
29.30	30.30	30.0	4,300.0	4,300.0	NO. 43	
29.20	30.20	29.9	4,400.0	4,400.0	NO. 44	
29.10	30.10	29.5	4,500.0	4,500.0	NO. 45	
29.00	30.00	29.0	4,600.0	4,600.0	NO. 46	
28.90	29.90	28.9	4,700.0	4,700.0	NO. 47	
28.80	29.80	28.5	4,800.0	4,800.0	NO. 48	
28.70	29.70	28.9	4,900.0	4,900.0	NO. 49	
28.60	29.60	28.5	5,000.0	5,000.0	NO. 50	
28.50	29.50	28.0	5,100.0	5,100.0	NO. 51	
28.40	29.40	28.0	5,200.0	5,200.0	NO. 52	
28.30	29.30	28.0	5,300.0	5,300.0	NO. 53	
28.20	29.20	28.0	5,400.0	5,400.0	NO. 54	
28.10	29.10	28.0	5,500.0	5,500.0	NO. 55	
28.00	29.00	28.0	5,600.0	5,600.0	NO. 56	
27.90	28.90	28.0	5,700.0	5,700.0	NO. 57	
27.80	28.80	28.0	5,800.0	5,800.0	NO. 58	
27.70	28.70	28.0	5,900.0	5,900.0	NO. 59	
27.60	28.60	28.0	6,000.0	6,000.0	NO. 60	
27.50	28.50	28.0	6,100.0	6,100.0	NO. 61	
27.40	28.40	28.0	6,200.0	6,200.0	NO. 62	
27.30	28.30	28.0	6,300.0	6,300.0	NO. 63	
27.20	28.20	28.0	6,400.0	6,400.0	NO. 64	
27.10	28.10	28.0	6,500.0	6,500.0	NO. 65	
27.00	28.00	28.0	6,600.0	6,600.0	NO. 66	
26.90	27.90	28.0	6,700.0	6,700.0	NO. 67	

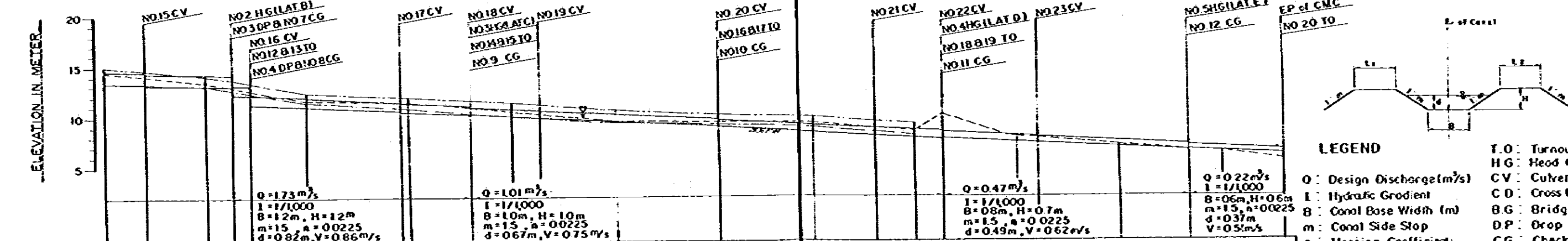


REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
PROFILE OF CAULAMAN DIVERSION CANAL
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 D.W.G NO
 V - 2

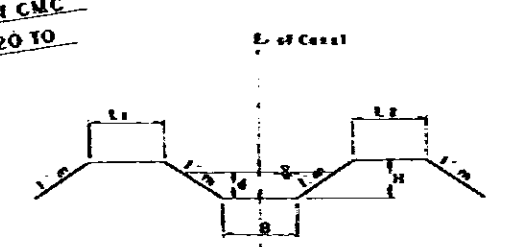
CAULAMAN MAIN CANAL



PROPOSED CANAL BED ELEVATION	20.31	20.09	19.71	19.61	19.18	18.92	18.73	18.38	18.16	17.71	17.43	17.23	17.12	16.88	16.38	16.26	16.23	16.13	15.82	15.28	15.42
PROPOSED WATER SURFACE ELEVATION	21.30	21.08	20.70	20.60	20.34	20.11	19.91	19.56	19.34	18.89	18.61	18.41	18.30	18.06	17.56	17.46	17.41	17.31	17.01	16.47	16.60
PRESENT CANAL BANK ELEVATION	25.74	24.38	22.70	22.04	21.73	21.73	22.29	21.90	20.58	20.05	19.83	19.93	18.93	18.83	18.43	17.31	17.38	17.15	17.15	15.94	15.00
PRESENT CANAL BED ELEVATION	20.37	20.40	20.13	19.91	19.37	19.37	18.75	18.28	17.93	17.63	18.31	18.91	17.06	16.93	16.43	15.01	16.03	15.80	15.80	13.78	13.02
GROUND SURFACE ELEVATION	25.88	24.38	22.70	22.04	20.80	21.23	21.23	21.12	19.43	19.75	18.31	18.31	17.20	17.20	17.20	15.02	15.02	16.49	15.20	14.00	14.00
REDUCED DISTANCE	0.0	440.0	1000.0	1900.0	2800.0	3400.0	4000.0	5000.0	6000.0	7400.0	8000.0	9000.0	10200.0	11000.0	12000.0	13400.0	14000.0	15000.0	16000.0	17000.0	18000.0
DISTANCE	0.0	440.0	900.0	1340.0	1800.0	2240.0	2640.0	3140.0	3640.0	4140.0	4640.0	5140.0	5640.0	6140.0	6640.0	7140.0	7640.0	8140.0	8640.0	9140.0	9640.0
STATION	0	440	900	1340	1800	2240	2640	3140	3640	4140	4640	5140	5640	6140	6640	7140	7640	8140	8640	9140	9640



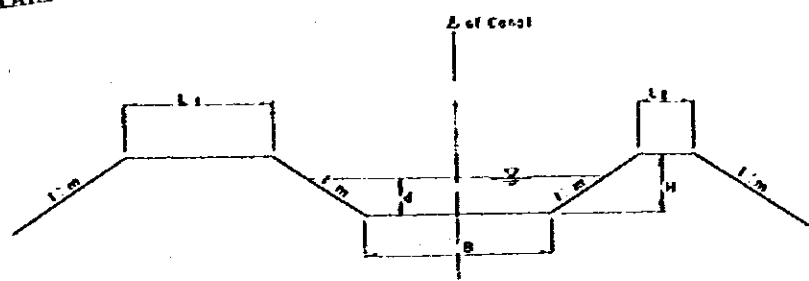
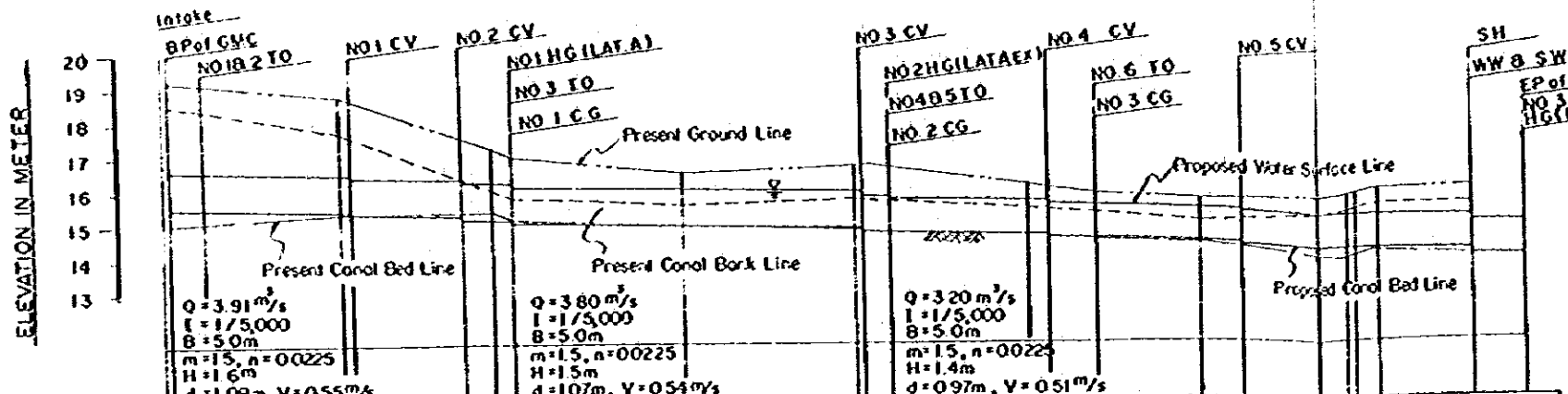
PROPOSED CANAL BED ELEVATION	13.42	13.32	13.07	13.00	12.24	11.08	10.42	10.15	9.98	9.43	9.10	8.12	7.88	7.46	7.06	6.83	6.83	6.13	6.30	6.30	6.30
PROPOSED WATER SURFACE ELEVATION	14.60	14.40	14.25	14.18	13.08	11.90	11.44	11.00	10.70	10.15	9.80	8.79	8.55	8.00	7.60	7.36	7.31	7.40	7.06	7.06	7.06
PRESENT CANAL BANK ELEVATION	15.00	14.08	13.11	12.39	11.99	11.39	10.82	10.58	10.14	9.80	9.10	8.10	7.84	7.31	6.91	6.80	6.80	6.91	6.30	6.30	6.30
PRESENT CANAL BED ELEVATION	13.82	13.11	11.40	10.82	10.82	9.98	9.43	9.43	9.24	8.50	8.50	8.10	8.10	7.31	7.00	6.80	6.80	6.91	6.30	6.30	6.30
GROUND SURFACE ELEVATION	14.00	13.00	11.63	11.44	10.82	10.56	9.56	9.56	9.42	8.50	8.50	8.50	8.50	7.90	7.00	6.80	6.80	6.91	6.30	6.30	6.30
REDUCED DISTANCE	7000.0	7200.0	7500.0	7630.0	7740.0	8370.0	9000.0	9600.0	10000.0	10500.0	11000.0	11600.0	12200.0	12800.0	13400.0	14000.0	14600.0	15200.0	15800.0	16400.0	17000.0
DISTANCE	900.0	200.0	300.0	130.0	80.0	437.0	630.0	600.0	300.0	500.0	500.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
STATION	14	200	300	430	510	947	1577	2177	2477	2977	3477	4077	4677	5277	5877	6477	7077	7677	8277	8877	9477



- LEGEND**
- O : Design Discharge (m³/s)
 - I : Hydraulic Gradient
 - B : Canal Base Width (m)
 - m : Canal Side Slope
 - n : Manning Coefficient
 - H : Canal Height (m)
 - d : Water Depth (m)
 - V : Velocity (m/s)
 - T.O. : Turnout
 - H.G. : Head Gate
 - CV : Culvert
 - C.D. : Cross Drain
 - B.G. : Bridge
 - D.P. : Drop
 - CG : Check Gate
 - SH : Syphon
 - AD : Aqueduct
 - WW : Waste Way
 - SW : Spill Way

REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE CAULAMAN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
PROFILE OF CAULAMAN MAIN CANAL
 JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 DW.G NO.
 V-4

GUMAIN MAIN CANAL



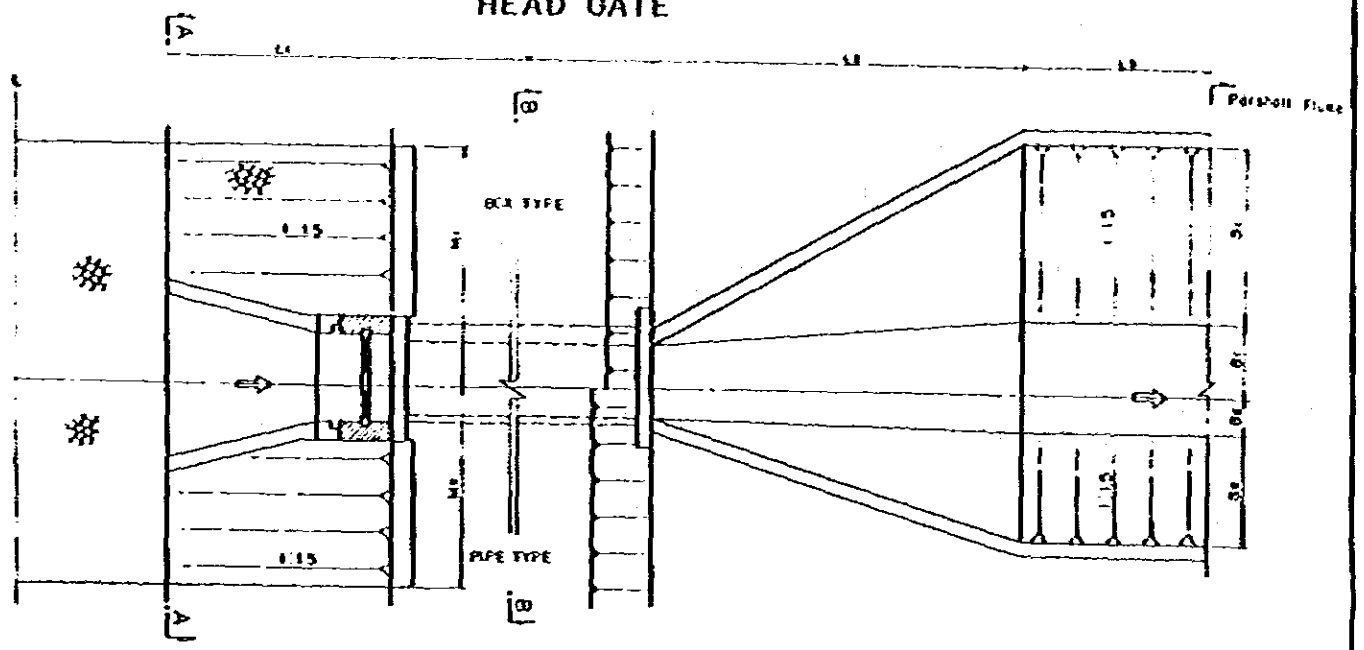
PROPOSED CANAL BED ELEVATION	16.51	15.49	15.41	15.24	15.11	15.02	14.92	14.72	14.72	14.50	14.22	14.22	14.17	13.97	13.84
PROPOSED WATER SURFACE ELEVATION	16.60	16.58	16.50	16.33	16.23	16.20	16.10	16.00	15.80	15.76	15.50	15.29	15.14	14.94	14.81
PRESENT CANAL BANK ELEVATION	16.20	16.74	16.74	17.20	16.99	16.99	16.49	16.49	16.06	15.78	15.66	15.74	15.84	15.84	15.84
PRESENT CANAL BED ELEVATION	15.02	15.34	15.36	15.16	15.16	14.97	14.97	14.75	14.62	14.44	14.33	13.92	14.17	13.96	13.96
GROUND SURFACE ELEVATION	18.50	17.70	17.70	15.80	15.80	15.60	15.60	15.70	15.40	15.44	15.00	15.30	15.50	15.50	15.50
REDUCED DISTANCE	0.0	100.0	200.0	327.5	440.0	560.0	680.0	800.0	920.0	1040.0	1160.0	1280.0	1400.0	1520.0	1640.0
DISTANCE	0.0	100.0	225.0	327.5	440.0	560.0	680.0	800.0	920.0	1040.0	1160.0	1280.0	1400.0	1520.0	1640.0
STATION	NO. 0	+	NO. 1	+	NO. 2	+	NO. 3	+	NO. 4	+	NO. 5	+	NO. 6	+	NO. 7

LEGEND

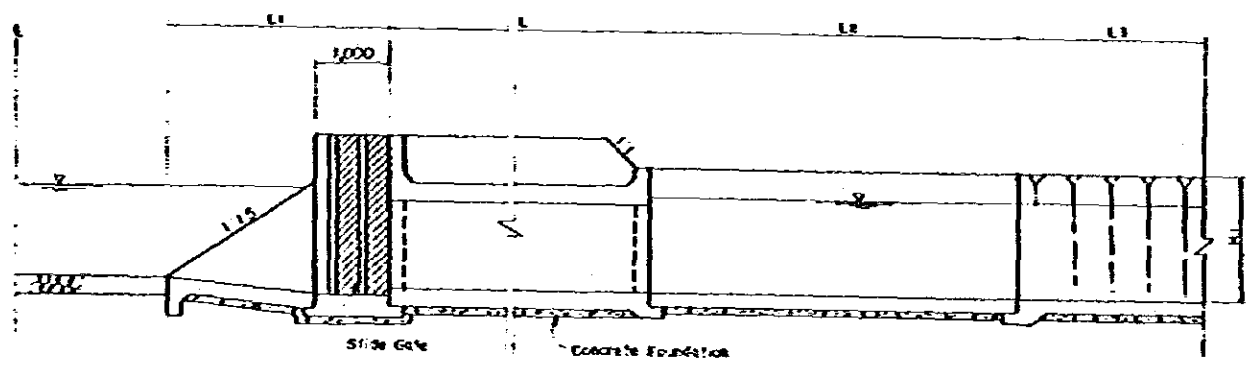
- Q : Design Discharge (m³/s)
- I : Hydraulic Gradient
- B : Canal Base Width (m)
- m : Canal Side Slope
- n : Manning Coefficient
- H : Canal Height (m)
- d : Water Depth (m)
- V : Velocity (m/s)
- T.O. : Turnout
- H.G. : Head Gate
- C.V. : Culvert
- C.D. : Cross Drain
- B.G. : Bridge
- D.P. : Drop
- C.G. : Check Gate
- S.H. : Syphon
- A.O. : Aqueduct
- W.W. : Waste Way
- S.W. : Spill Way

REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
 PROFILE OF GUMAIN MAIN CANAL
 JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN
 D.W.G. NO. V-5

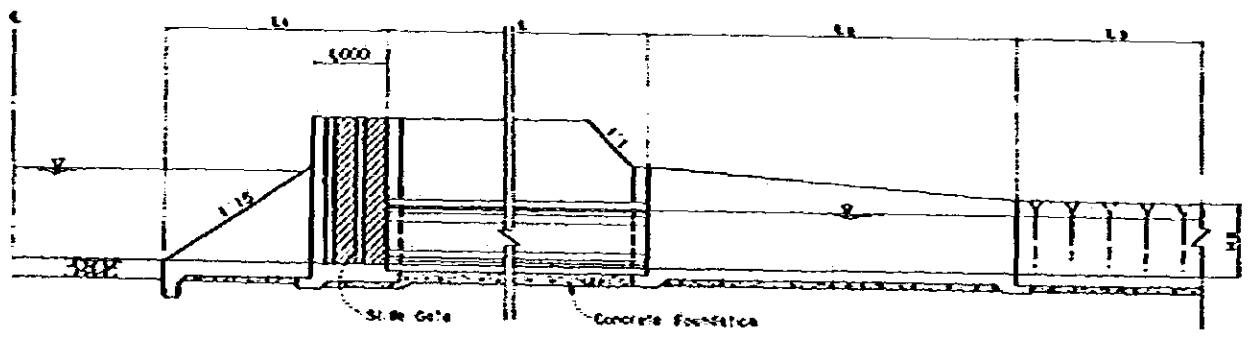
HEAD GATE



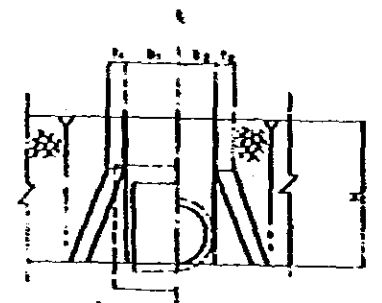
PLAN



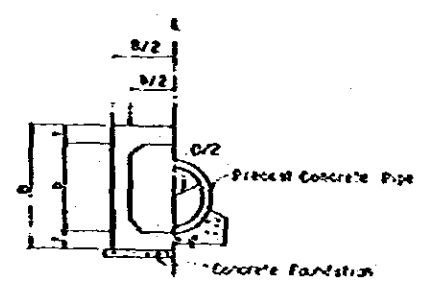
PROFILE (BOX TYPE)



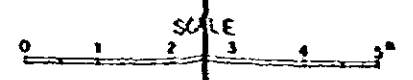
PROFILE (PIPE TYPE)



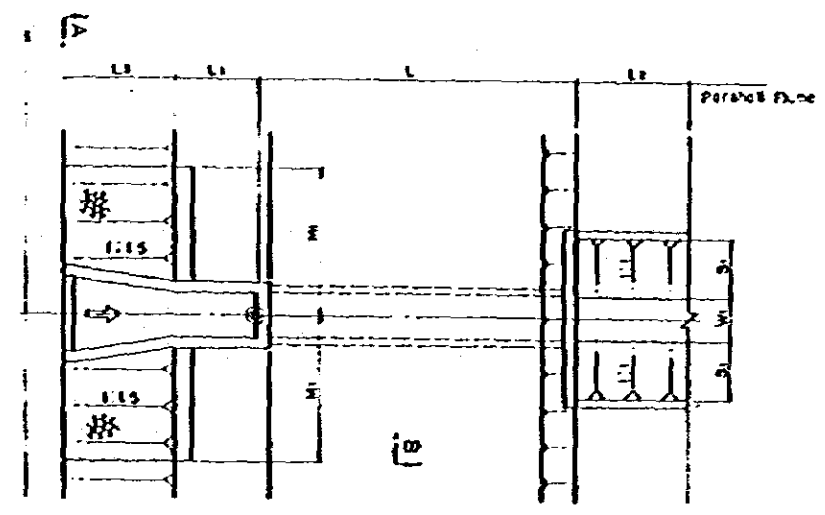
SECTION A-A



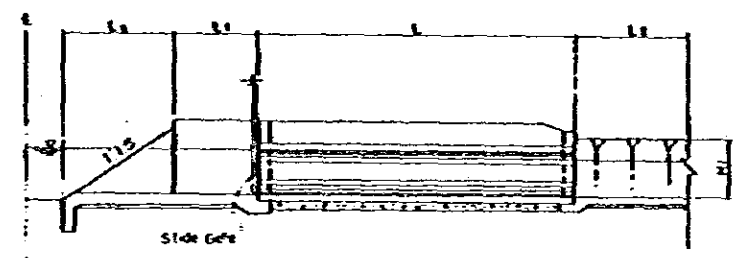
SECTION B-B



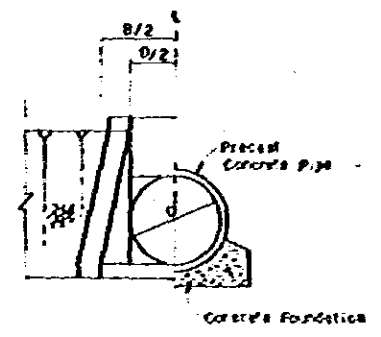
TURNOUT



PLAN

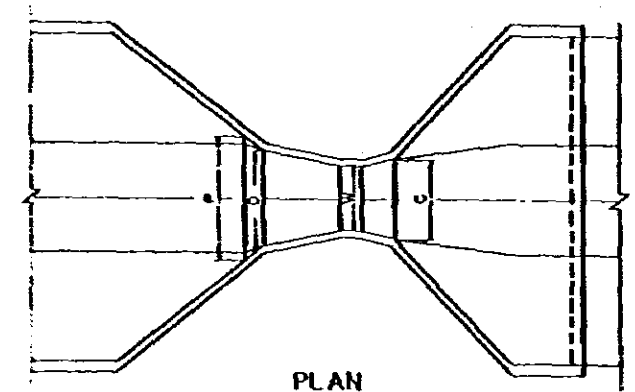


PROFILE

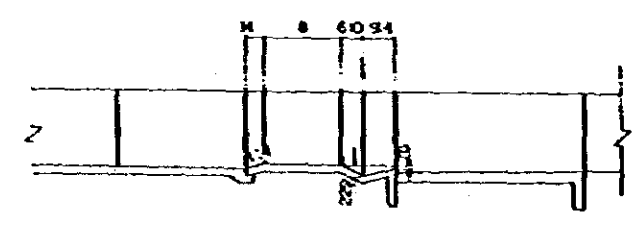


SECTION A-B

PARSHALL FLUME



PLAN



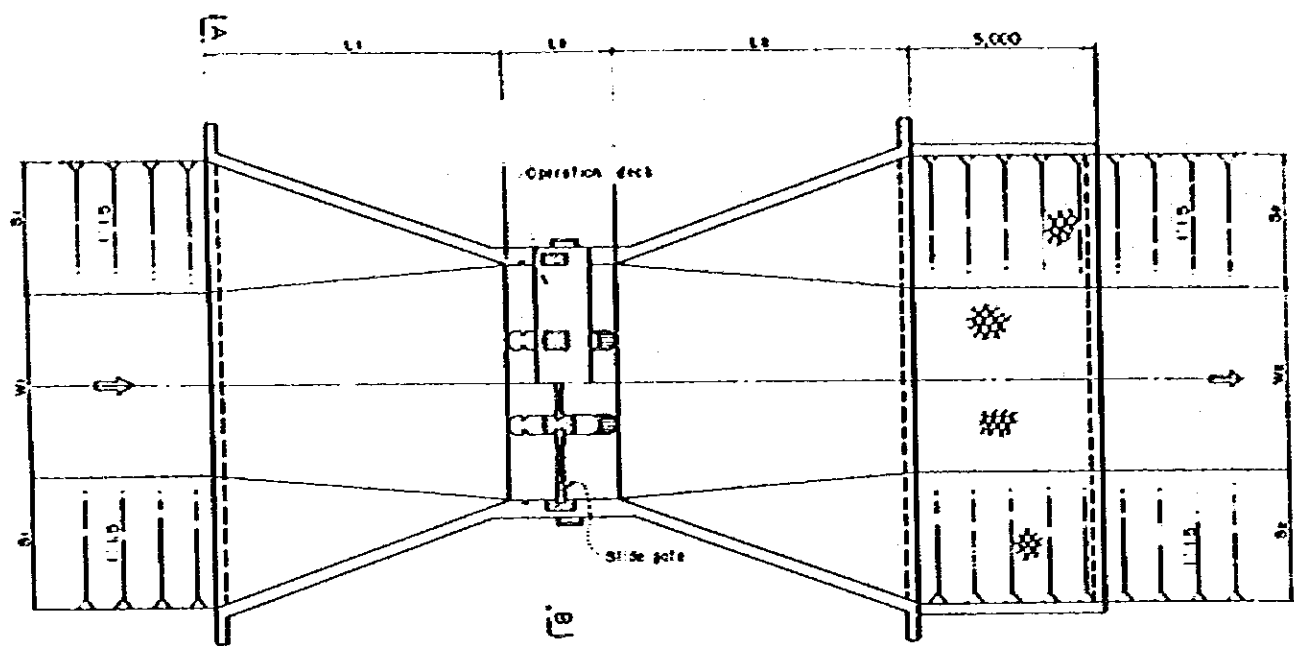
PROFILE

DIMENSION TABLE

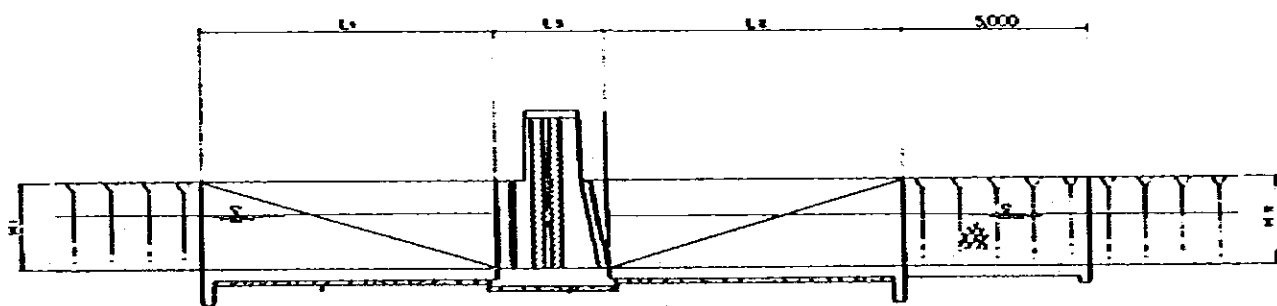
DISCHARGE (m ³ /sec)	W	B	C	D	K	P
0 - 0.2	30.48	134.3	61.0	54.5	38.1	149.2
0.2 - 0.4	45.72	141.9	76.2	102.6	-	167.6
0.4 - 0.6	60.96	149.5	91.4	120.7	-	165.4
0.6 - 1.0	91.44	164.5	121.9	157.2	-	222.3
1.0 - 2.93	182.88	209.2	213.4	266.7	45.7	344.2
2.93 - 5.44	213.36	224.42	243.8	303.2	-	1381.0

REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
HEAD GATE AND TURNOUT
 JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN
 D.W.G. NO. VI-1

CHECK

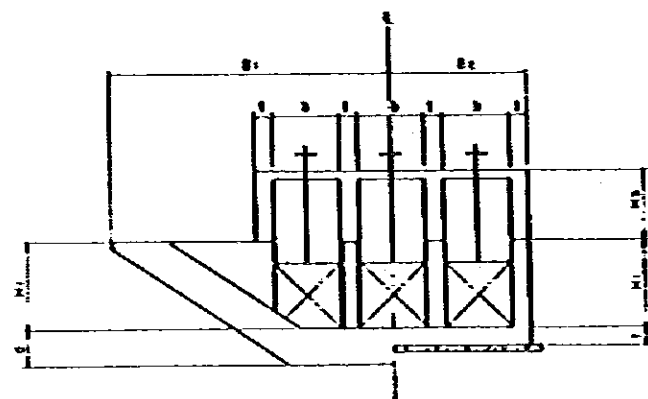


PLAN



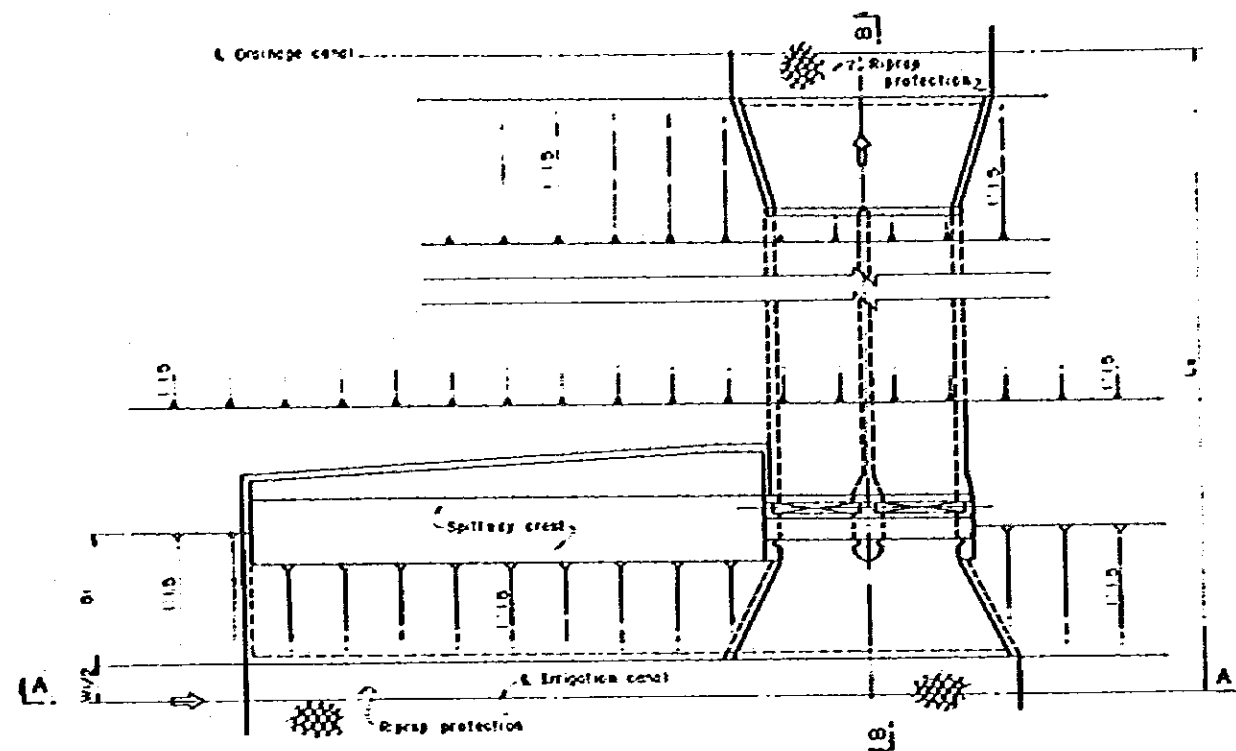
Concrete foundation

PROFILE

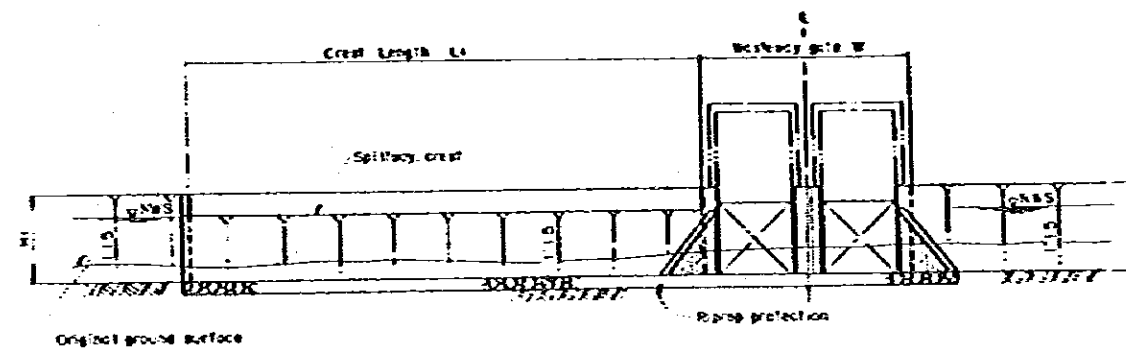


SECTION A-B

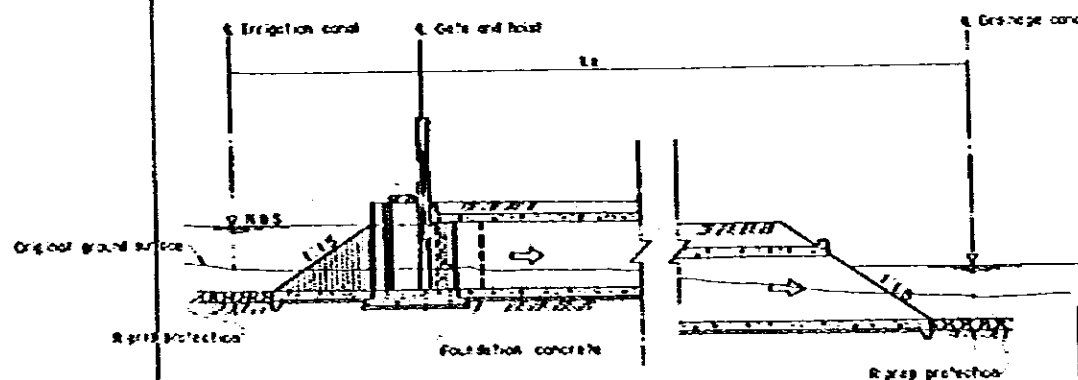
SPILLWAY AND WASTEWAY



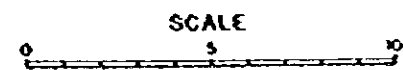
PLAN



SECTION A-A



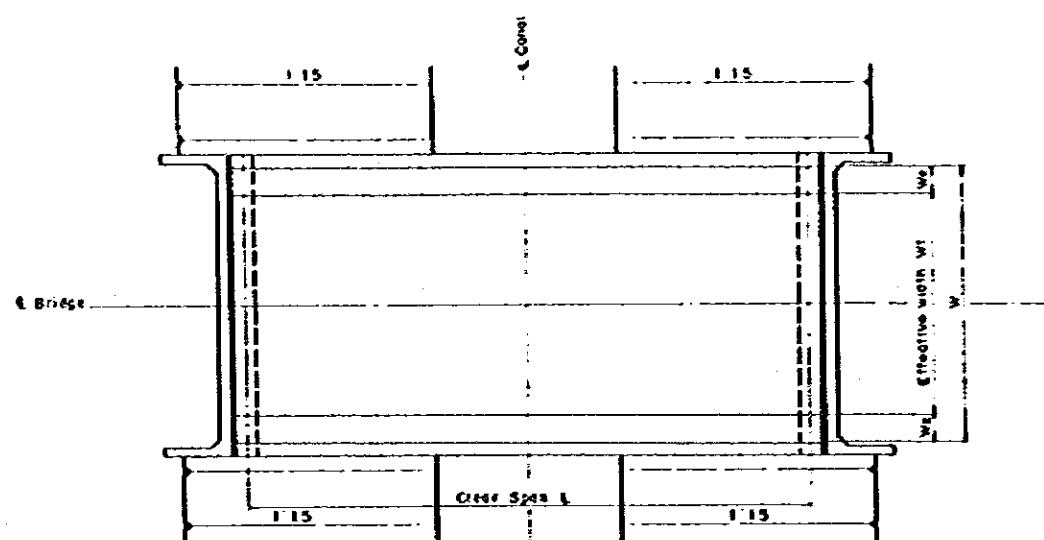
SECTION B-B



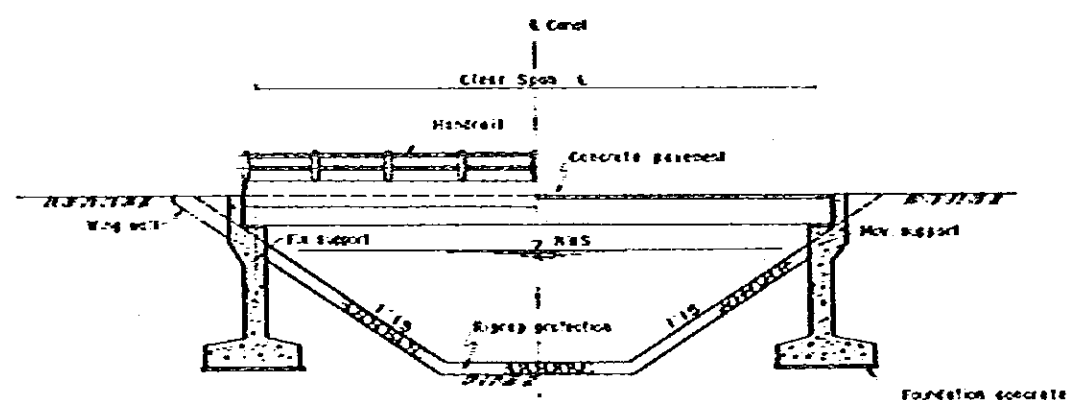
REPUBLIC OF THE PHILIPPINES
 NATIONAL IRRIGATION ADMINISTRATION
 THE GUMAIN RIVER IRRIGATION PROJECT
 TITLE OF DRAWING
 CHECK AND SPILLWAY AND WASTEWAY

JAPAN INTERNATIONAL COOPERATION AGENCY
 TOKYO JAPAN
 D.W.6 NO.
 VI - 2

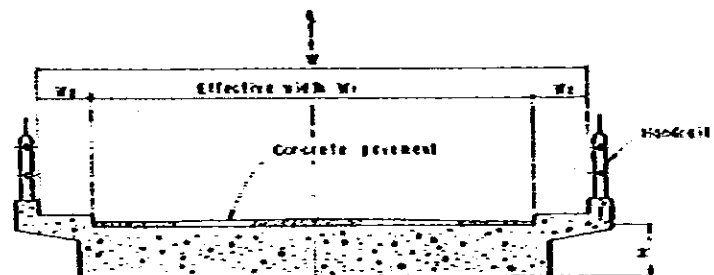
BRIDGE



PLAN
SCALE : A

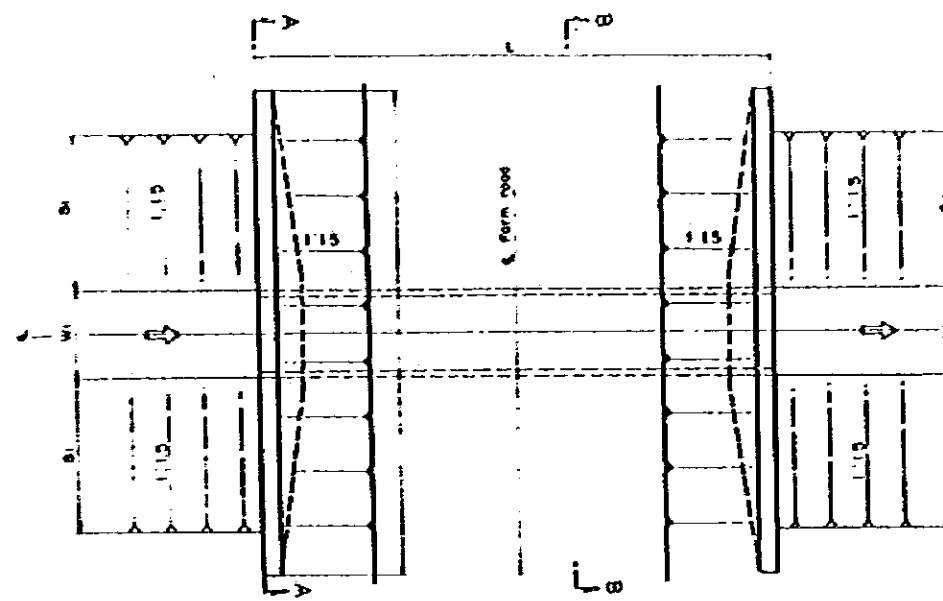


PROFILE
SCALE : A

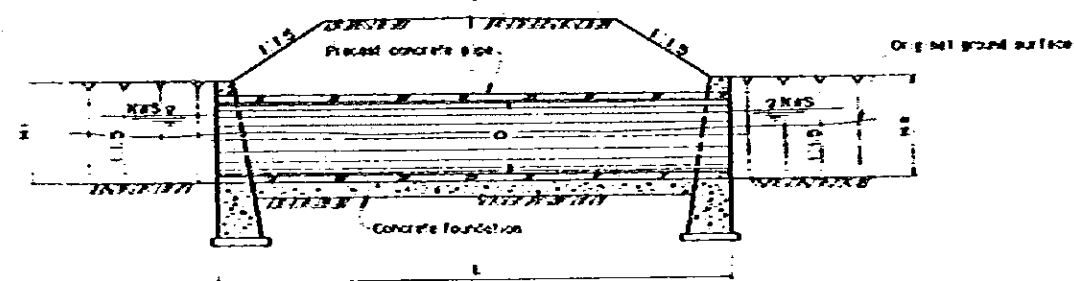


TYPICAL SECTION OF SLAB
SCALE : B

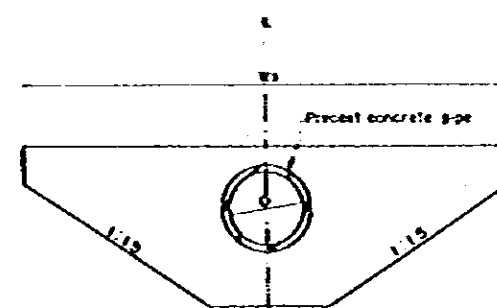
CULVERT



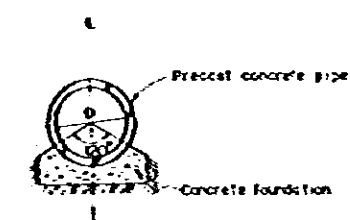
PLAN
SCALE : B



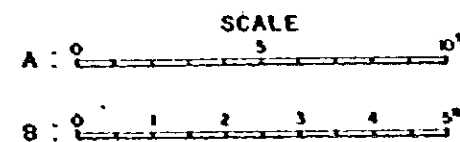
PROFILE
SCALE : B



SECTION A-A
SCALE : B

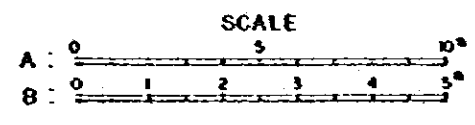
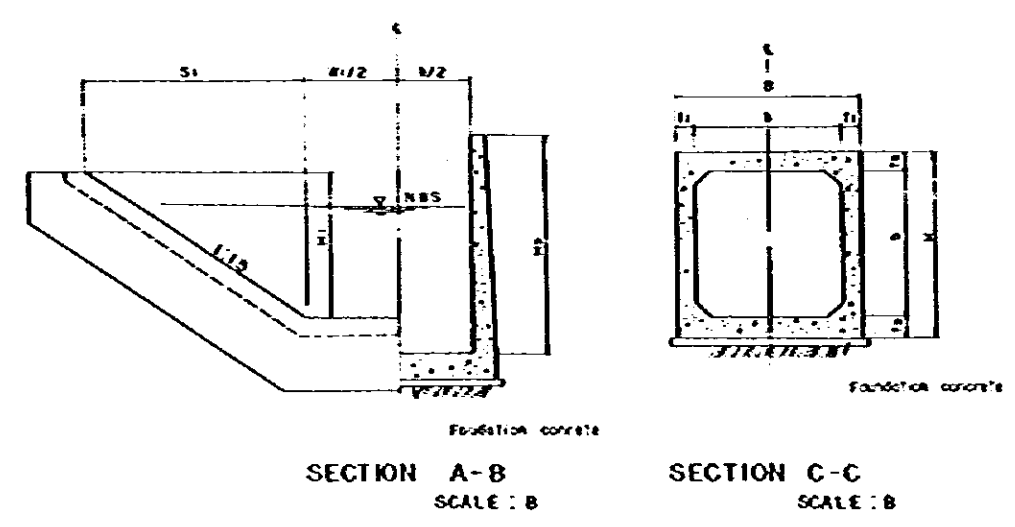
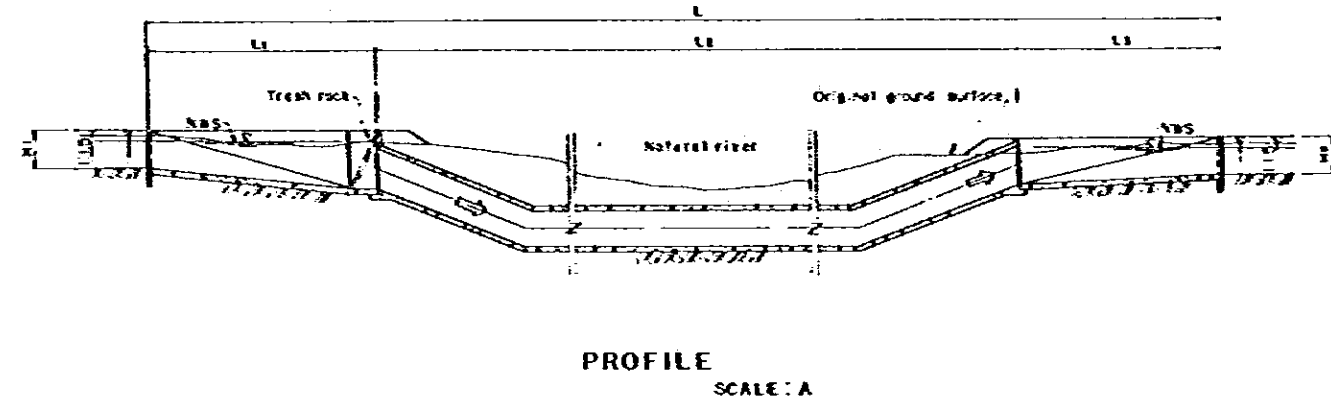
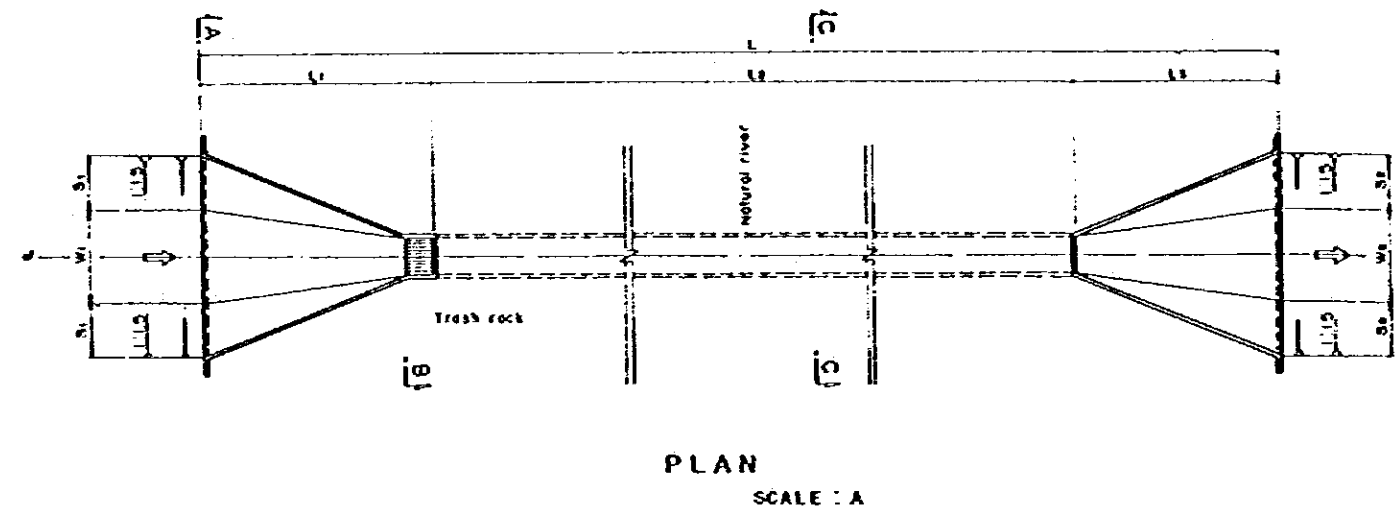


SECTION B-B
SCALE : B

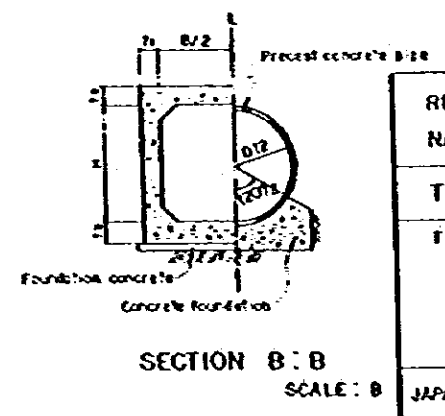
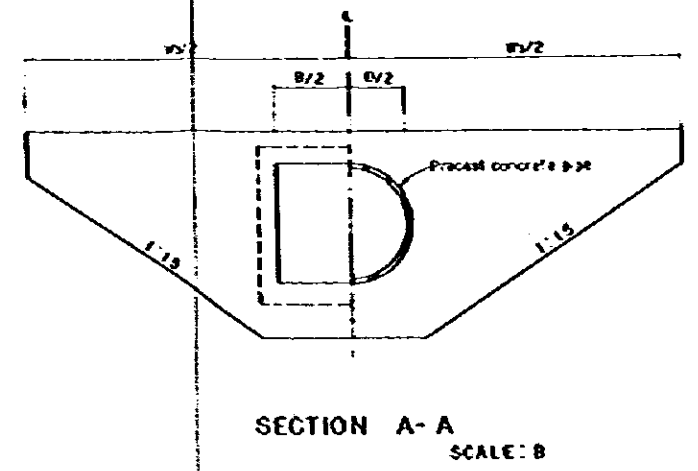
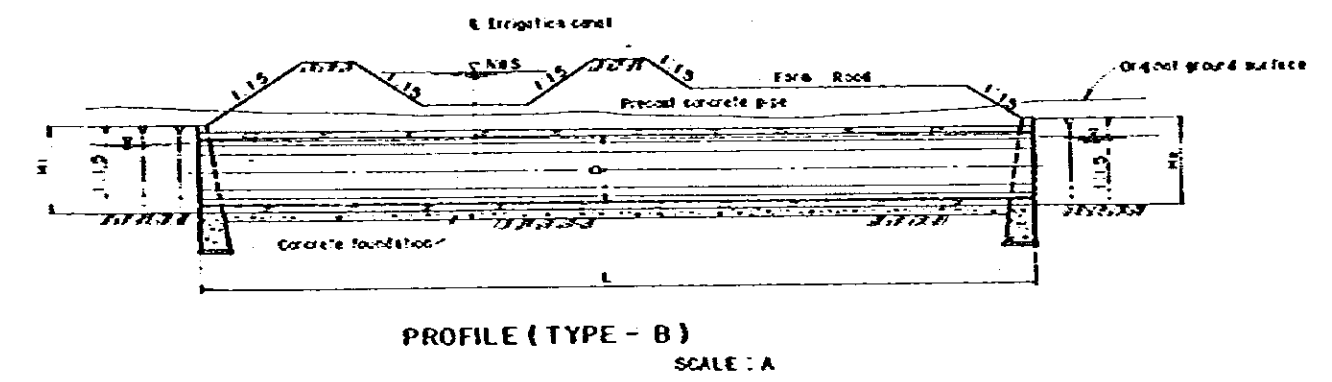
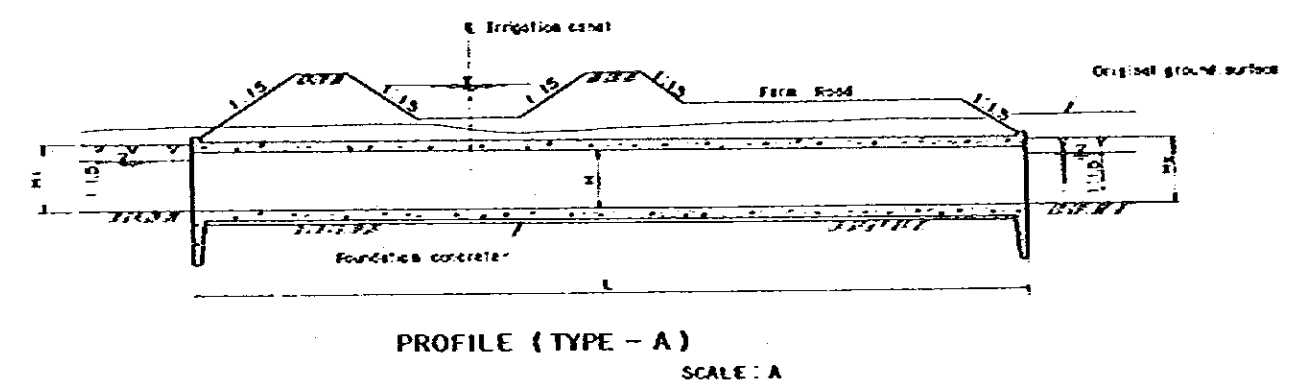
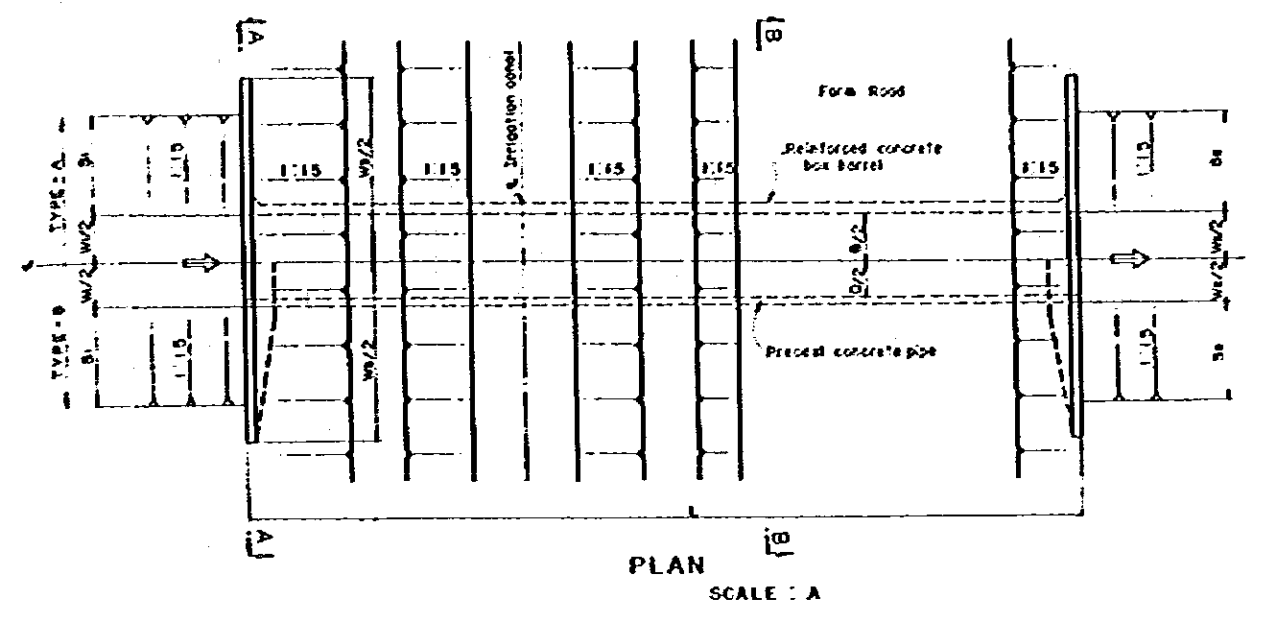


REPUBLIC OF THE PHILIPPINES NATIONAL IRRIGATION ADMINISTRATION	
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JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	DWG. NO. VI - 3

SYPHON

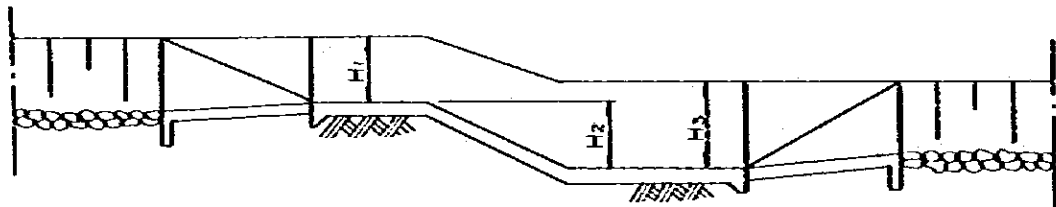
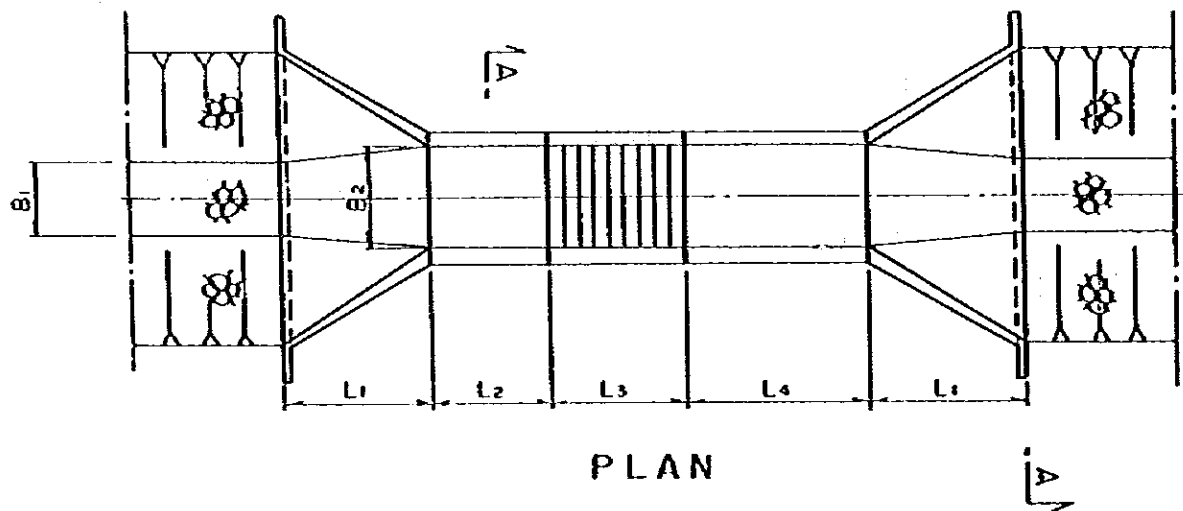


CROSS DRAIN

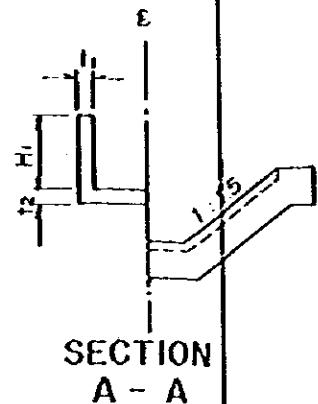
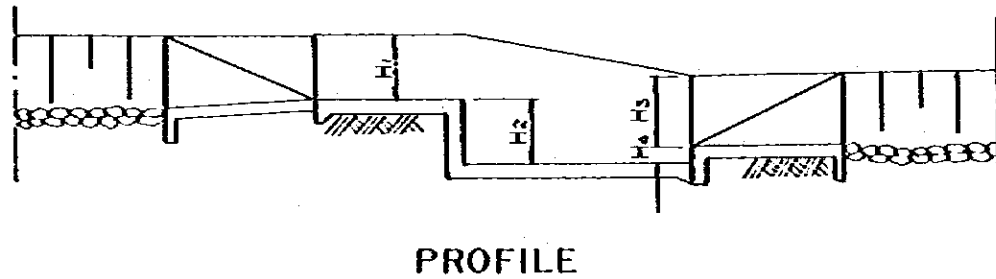
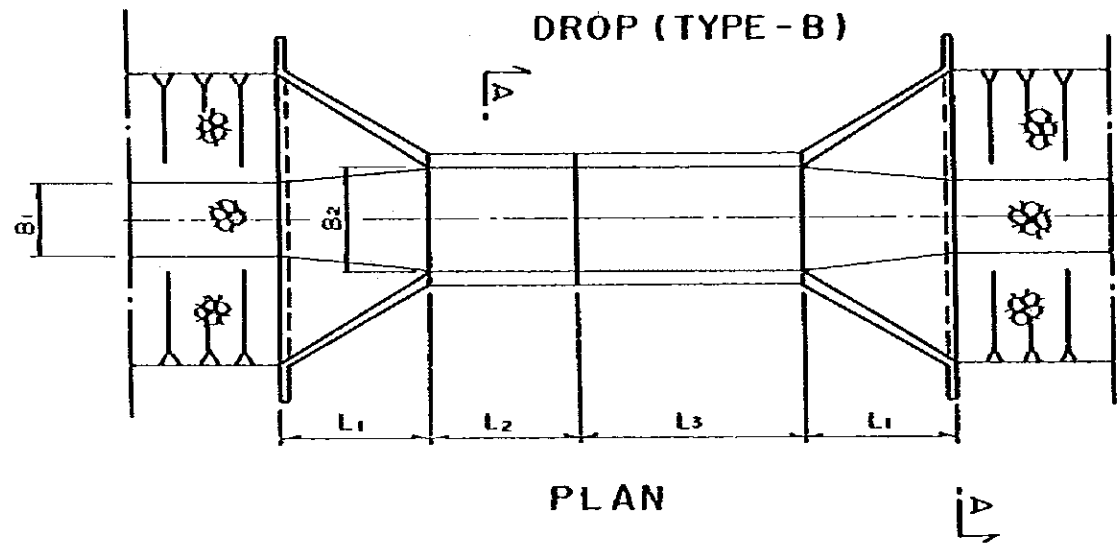


REPUBLIC OF THE PHILIPPINES NATIONAL IRRIGATION ADMINISTRATION	
THE GUMAIN RIVER IRRIGATION PROJECT	
TITLE OF DRAWING	
SYPHON, AND CROSS DRAIN	
JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	D.W.G. NO. VI - 4

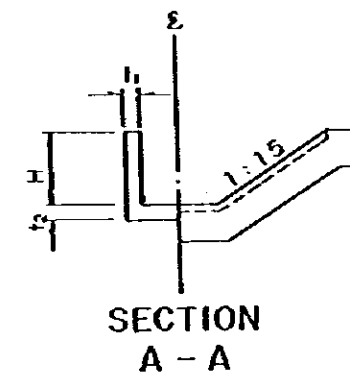
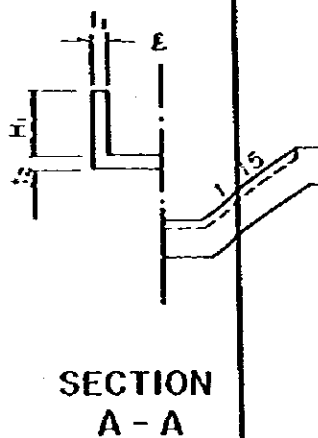
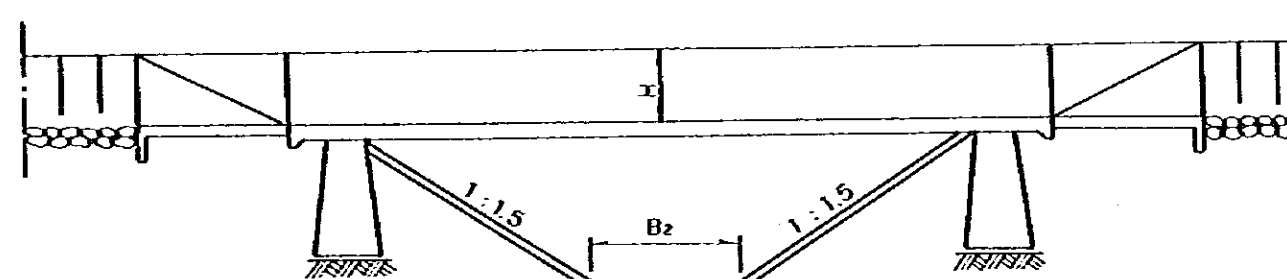
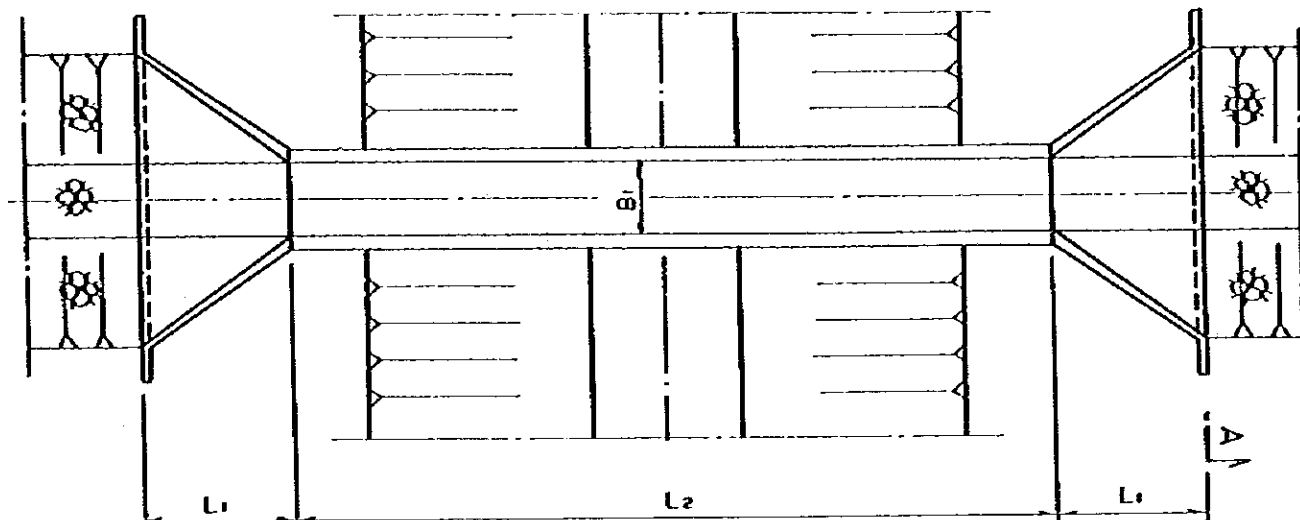
DROP (TYPE - A)



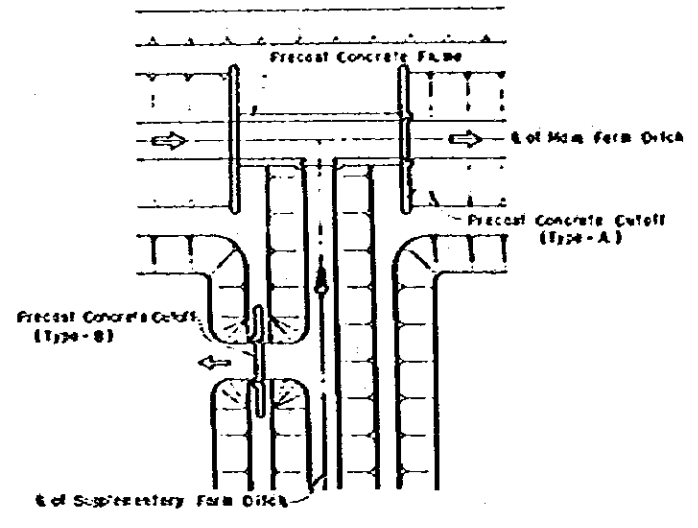
DROP (TYPE - B)



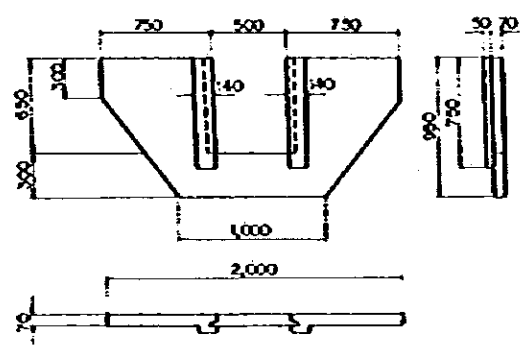
AQUEDUCT



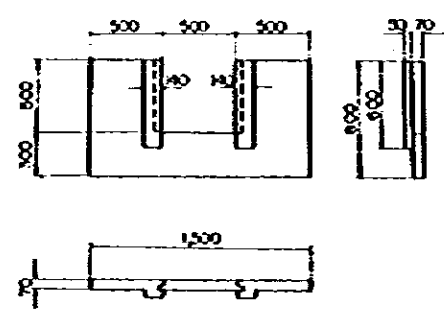
DIVISION WORK



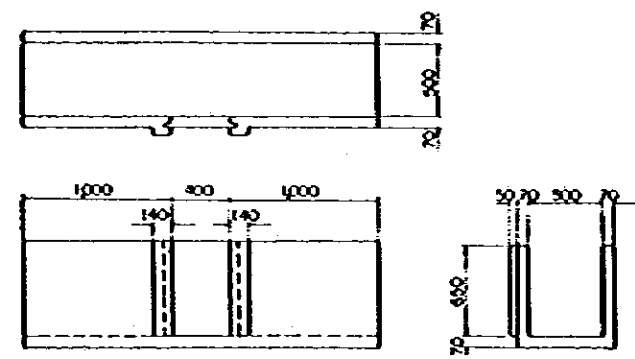
PLAN SCALE: A



PRECAST CONCRETE CUTOFF (TYPE-A)

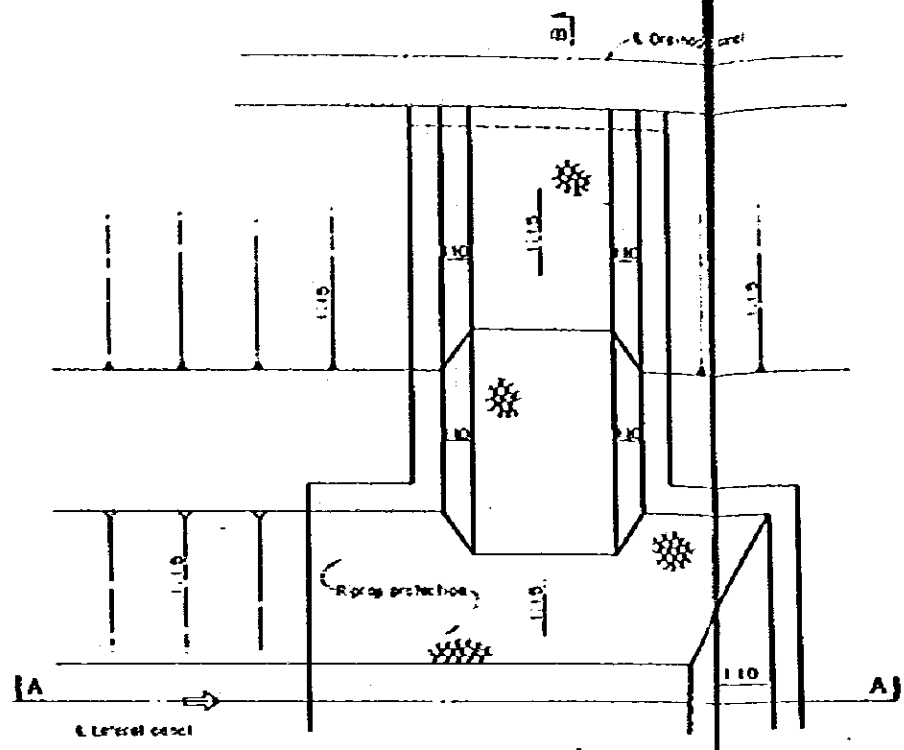


PRECAST CONCRETE CUTOFF (TYPE-B)

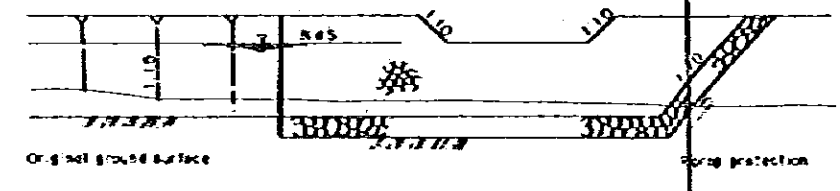


PRECAST CONCRETE FLUME

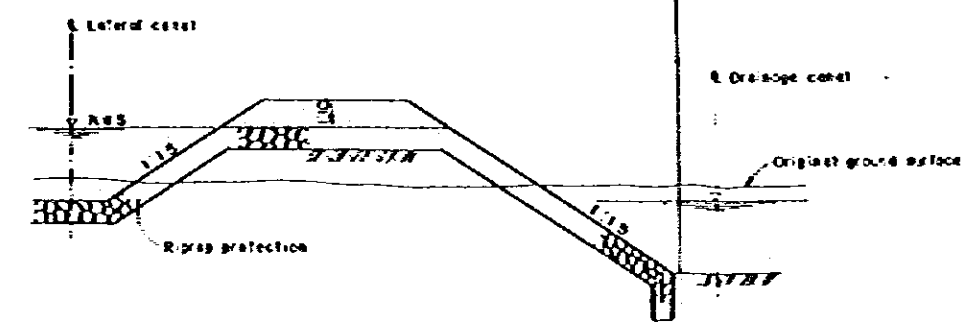
TERMINAL STRUCTURE OF LATERAL CANAL



PLAN SCALE: A

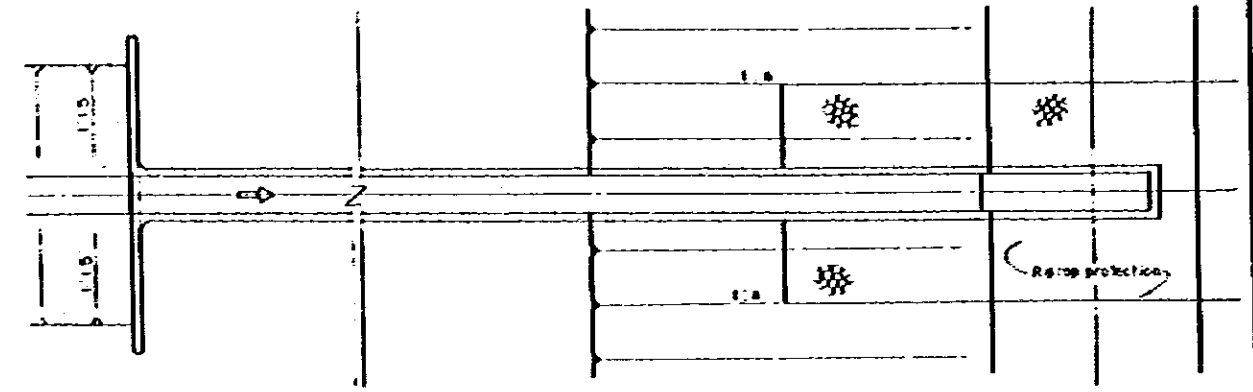


SECTION A-A SCALE: A

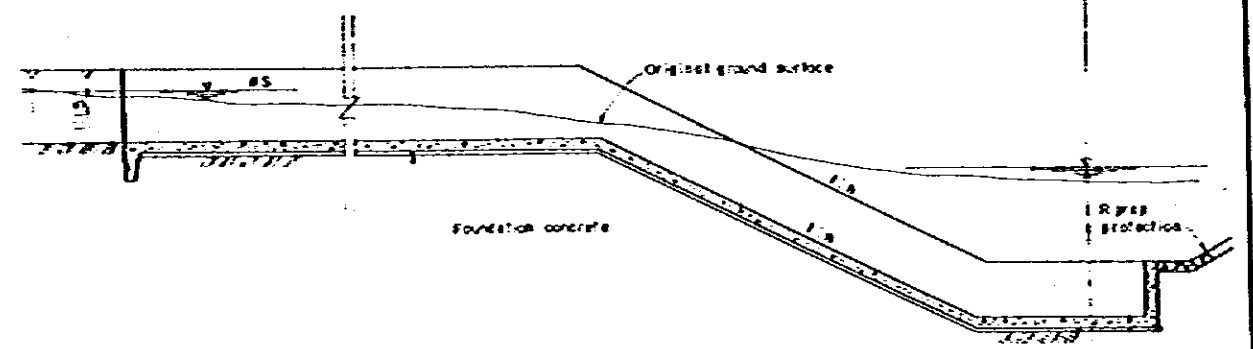


SECTION B-B SCALE: A

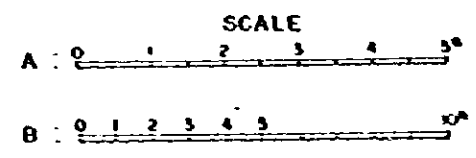
DRAINAGE INLET



PLAN SCALE: B



PROFILE SCALE: B



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JAPAN INTERNATIONAL COOPERATION AGENCY TOKYO JAPAN	D.W.G. NO. VI-6

JICA