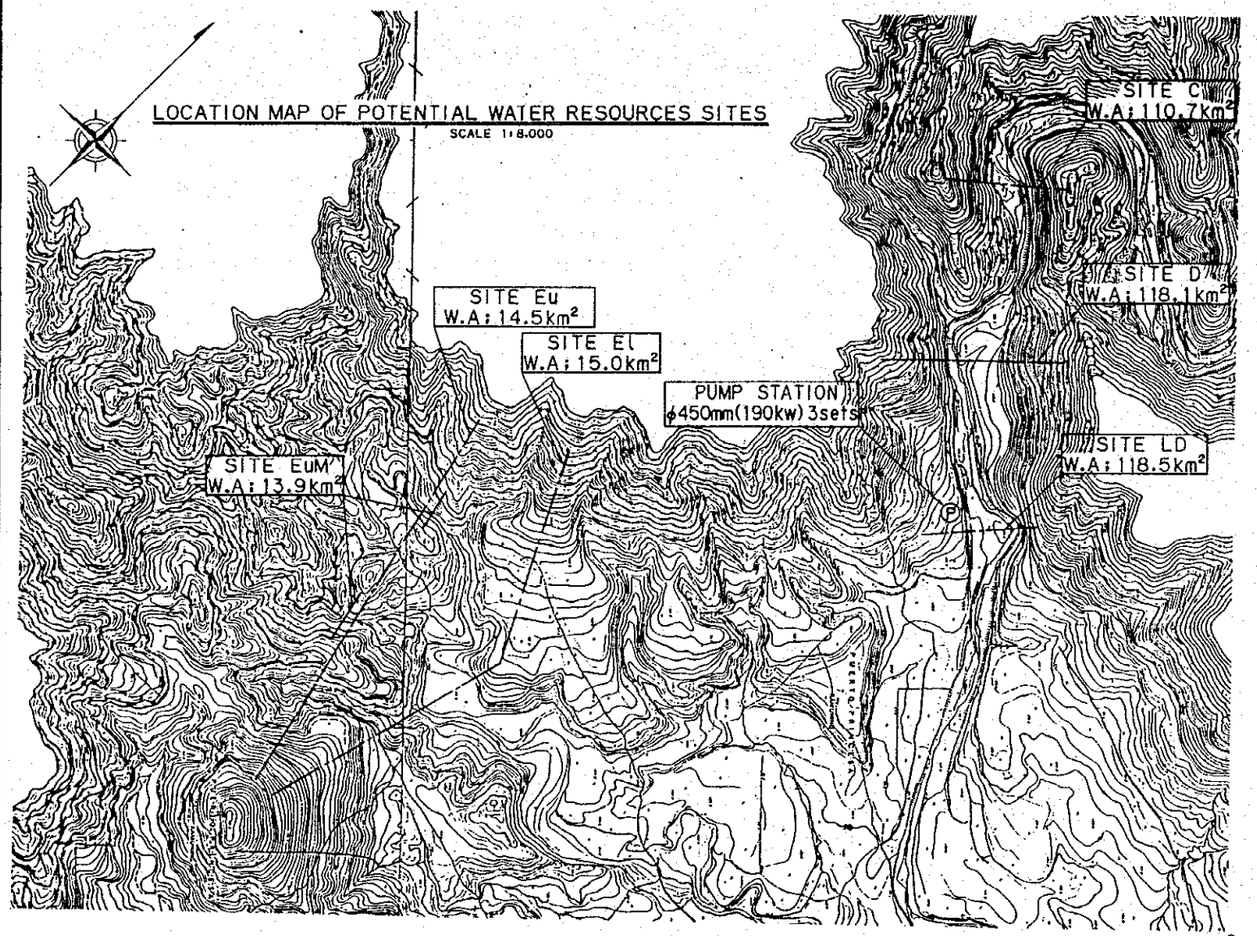
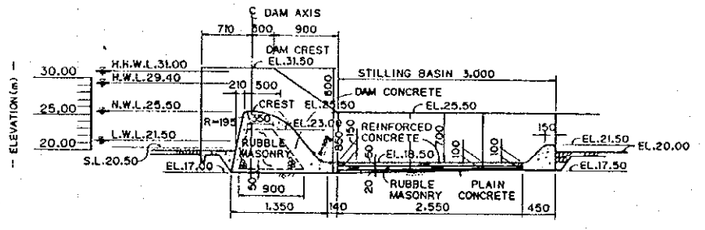
CHAPTER 9. DRAWINGS



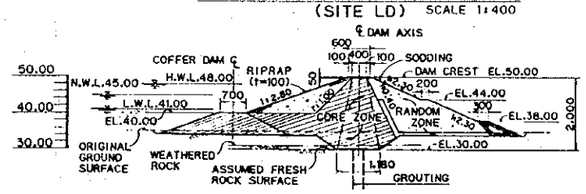
ALTERNATIVE PLAN OF WATER RESOURCES DEVELOPMENT

SITE		SITE Eu	SITE El	SITE D	SITE C	SITE EuM	SITE LD
(1) INTAKE TYPE		GRAVITY W/RESERVOIR					PUMP W/WEIR
(2) WATER SOURCE							
a) RIVER NAME		PINAGSALURAN	PINAGSALURAN	INAGAWAN	INAGAWAN	PINAGSALURAN	INAGAWAN
b) WATERSHED AREA	(km²)	14.5	15.0	118.1	110.7	13.9	118.5
c) RIVERBED ELEVATION	(m)	34.5	29.0	21.2	23.5	34.5	19.5
(3) RESERVOIR							
a) REQUIRED E.STORAGE	(MCM)	1.65	1.61	0.20	0.21	0.20	0.20
b) SEDIMENT VOLUME	(MCM)	0.44	0.45	2.36	2.21	0.11	—
c) DEAD WATER VOLUME	(MCM)	0.44	0.45	2.36	2.21	0.11	0.06
d) H.W.L (MSL)	(m)	54.00	46.50	40.00	42.50	45.00	25.50
e) L.W.L (MSL)	(m)	45.60	37.80	39.00	42.00	41.00	21.50
f) W.SURFACE AT N.W.L	(ha)	29	28	33	31	8	9
(4) MAJOR FEATURE OF DAM/WEIR							
a) DAM TYPE		FILLTYPE DAM	FILLTYPE DAM	CONCRETE DAM	CONCRETE DAM	FILLTYPE DAM	CONCRETE WEIR
b) DAM CREST ELEVATION (MSL)	(m)	58.00	50.50	44.00	47.00	50.00	31.50
c) DAM HEIGHT	(m)	28.0	25.5	46.0	30.0	20.0	14.5
d) DAM CREST LENGTH	(m)	875	868	355	155	239	221
e) DESIGN FLOOD DISCHARGE	(c.m.s)	430	440	1,600	1,550	420	990
f) INTAKE FOR PROJECT	(c.m.s)	0.84	0.84	0.84	0.84	0.84	—
INTAKE FOR E.PROJECT & R.	(c.m.s)	—	—	0.45	0.45	—	0.45
(5) MAJOR FEATURE OF PUMP							
a) TYPE OF PUMP		—	—	—	—	—	VERTICAL PUMP
b) DIAMETER	(m/m)	—	—	—	—	—	φ450×3units
c) DESIGN DISCHARGE	(c.m.s)	—	—	—	—	—	0.84
d) OUTPUT OF PUMP	(KW)	—	—	—	—	—	190×3

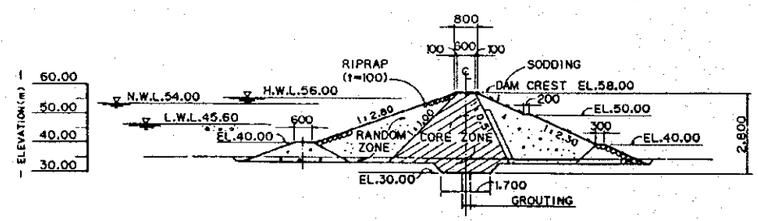
(NOTE) E.STORAGE : EFFECTIVE STORAGE
E.PROJECT & R. : EXISTING PROJECT AND RIVER MAINTENANCE



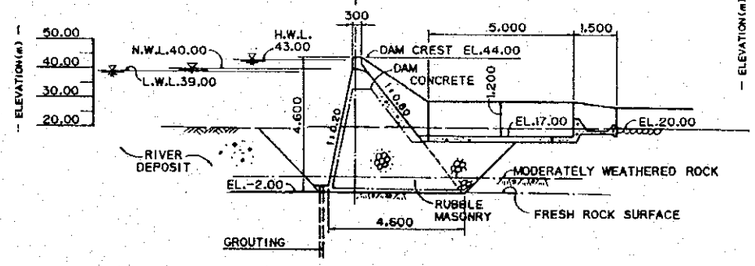
TYPICAL CROSS SECTION OF DAM
(SITE LD) SCALE 1:400



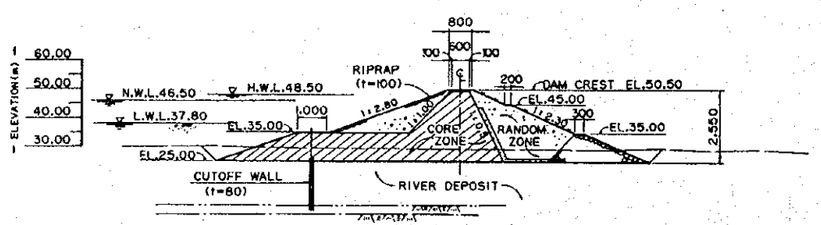
TYPICAL CROSS SECTION OF DAM
(SITE EuM) SCALE 1:800



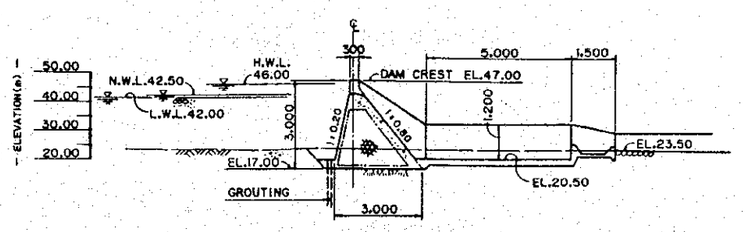
TYPICAL CROSS SECTION OF DAM
(SITE Eu) SCALE 1:1.000



TYPICAL CROSS SECTION OF DAM
(SITE D) SCALE 1:1.000



TYPICAL CROSS SECTION OF DAM
(SITE El) SCALE 1:1.000



TYPICAL CROSS SECTION OF DAM
(SITE C) SCALE 1:1.000

SCALE 1:800 0 20 40m
SCALE 1:400 0 10 20m
SCALE 1:8.000 0 200 400m
SCALE 1:1.000 0 10 20 30 40 50m

NOTE:

1. ALL DIMENSIONS ARE SHOWN IN CENTIMETER UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS ARE SHOWN IN METER (M.S.L.).
3. SITE D IS UNSUITABLE FOR DAM DUE TO DEEP RIVER DEPOSIT.
4. THE STUDY FOR SITE D.LD AND E IS MADE BASED ON TOPO-MAP SCALED 1:1.000.BUT SITE C.BASED ON TOPO-MAP SCALED 1:4.000.

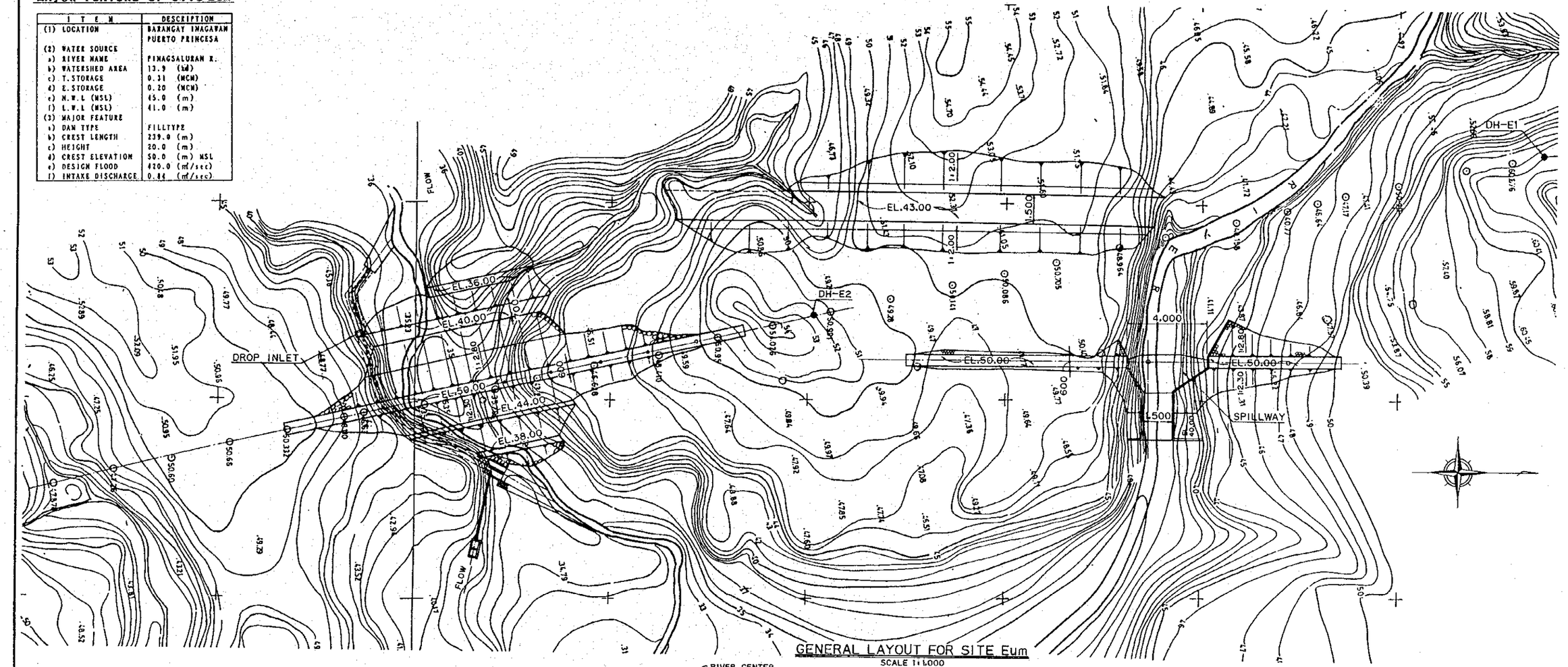
THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

WATER RESOURCES DEVELOPMENT
ALTERNATIVE WATER RESOURCES

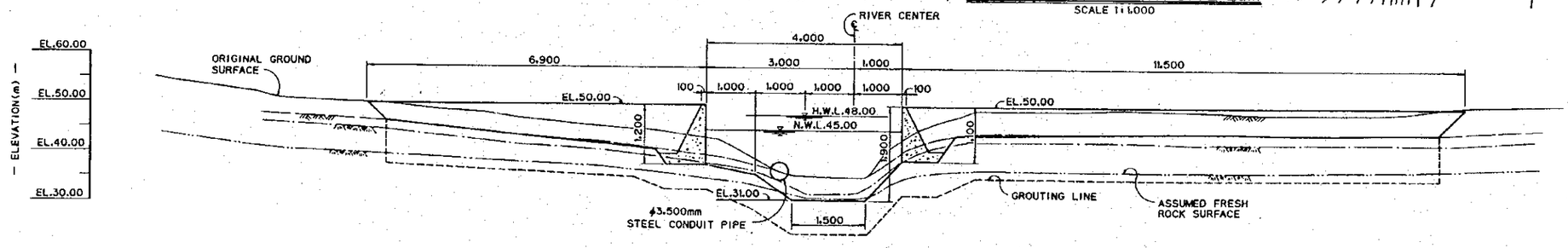
DAR
JAPAN INTERNATIONAL COOPERATION AGENCY

MAJOR FEATURE OF SITE EuM

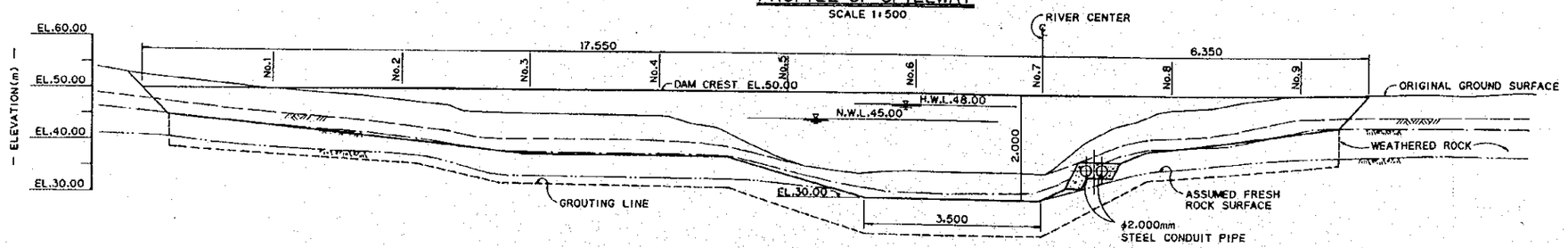
ITEM	DESCRIPTION
(1) LOCATION	BARANGAY INAGAWAN PUERTO PRINCESA
(2) WATER SOURCE	
a) RIVER NAME	PINAGSALURAN R.
b) WATERSHED AREA	13.9 (㎢)
c) T. STORAGE	0.31 (MCM)
d) E. STORAGE	0.20 (MCM)
e) N.W.L (MSL)	45.0 (m)
f) L.W.L (MSL)	41.0 (m)
(3) MAJOR FEATURE	
a) DAM TYPE	FILLTYPE
b) CREST LENGTH	239.0 (m)
c) HEIGHT	20.0 (m)
d) CREST ELEVATION	50.0 (m) MSL
e) DESIGN FLOOD	420.0 (m³/sec)
f) INTAKE DISCHARGE	0.86 (m³/sec)



GENERAL LAYOUT FOR SITE Eum
SCALE 1:1,000



PROFILE OF SPILLWAY
SCALE 1:500



PROFILE OF DAM
SCALE 1:500

NOTE:

1. ALL DIMENSIONS ARE SHOWN IN CENTIMETER UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS ARE SHOWN IN METER (M.S.L.).

SCALE 1:500
0 10 20 25m

SCALE 1:1,000
0 10 20 30 40 50m

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

WATER RESOURCES DEVELOPMENT
SITE EuM (1/2)

DAR

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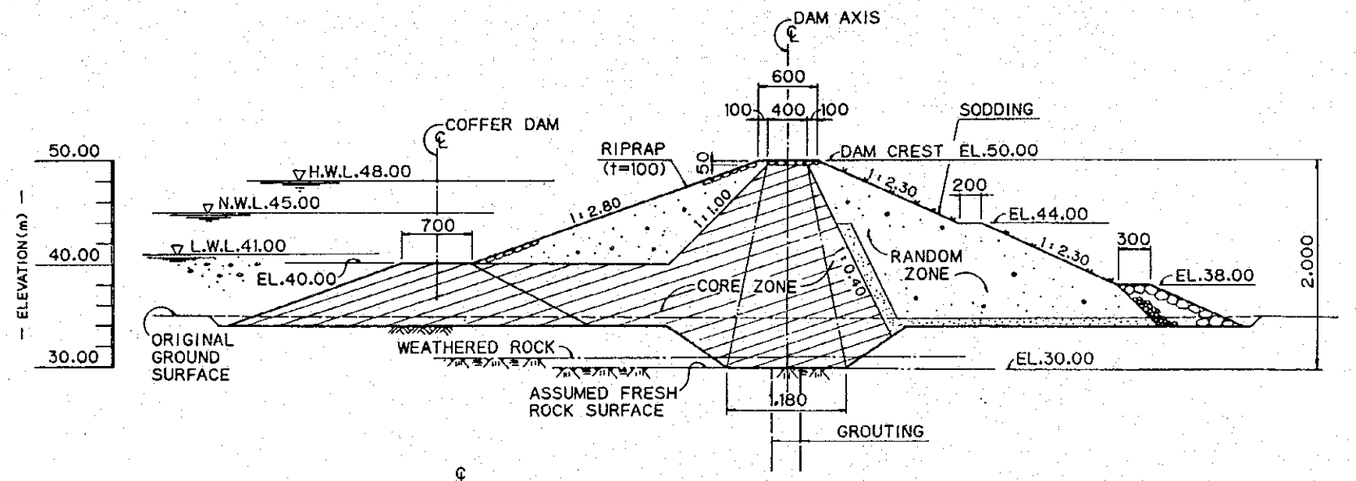
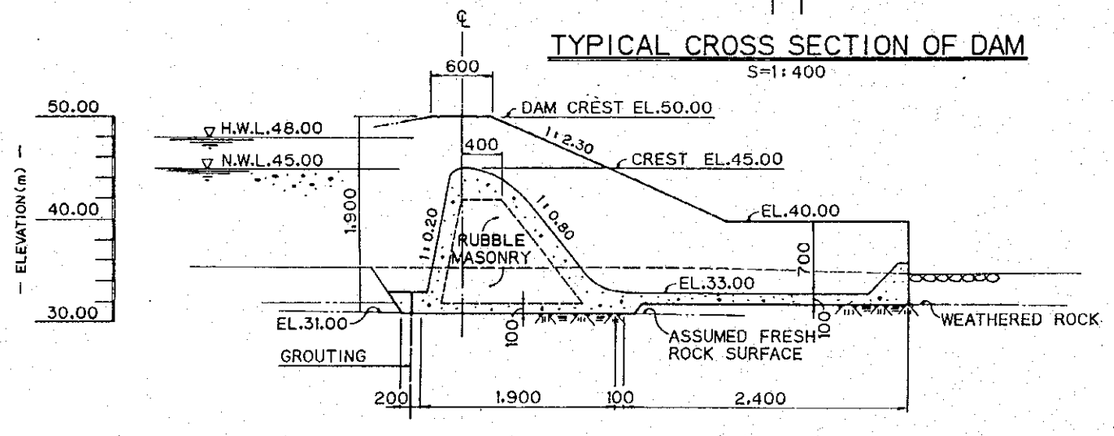
JAPAN INTERNATIONAL COOPERATION AGENCY



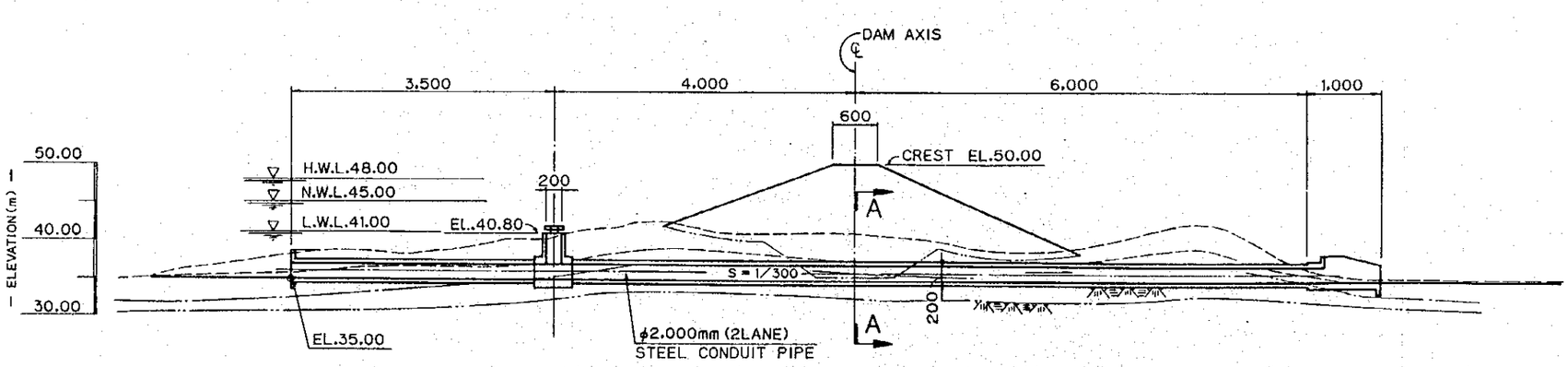
TYPICAL CROSS SECTION OF DAM

S=1:400



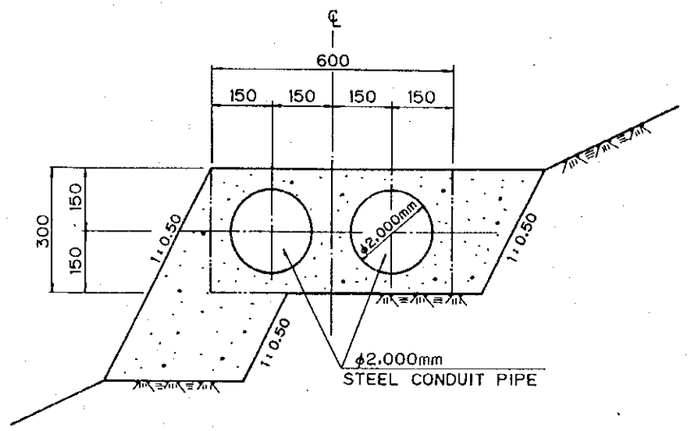
TYPICAL CROSS SECTION OF SPILLWAY

S=1:400



PROFILE OF INTAKE FACILITIES

S=1:500



SECTION A–A

S = 1:100

NOTE:

1. ALL DIMENSIONS ARE SHOWN IN CENTIMETER UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS ARE SHOWN IN METER (M.S.L.).

SCALE 1:400
0 10 20m

SCALE 1:500
0 10 20m

SCALE 1:1,000
0 10 20 30 40 50m

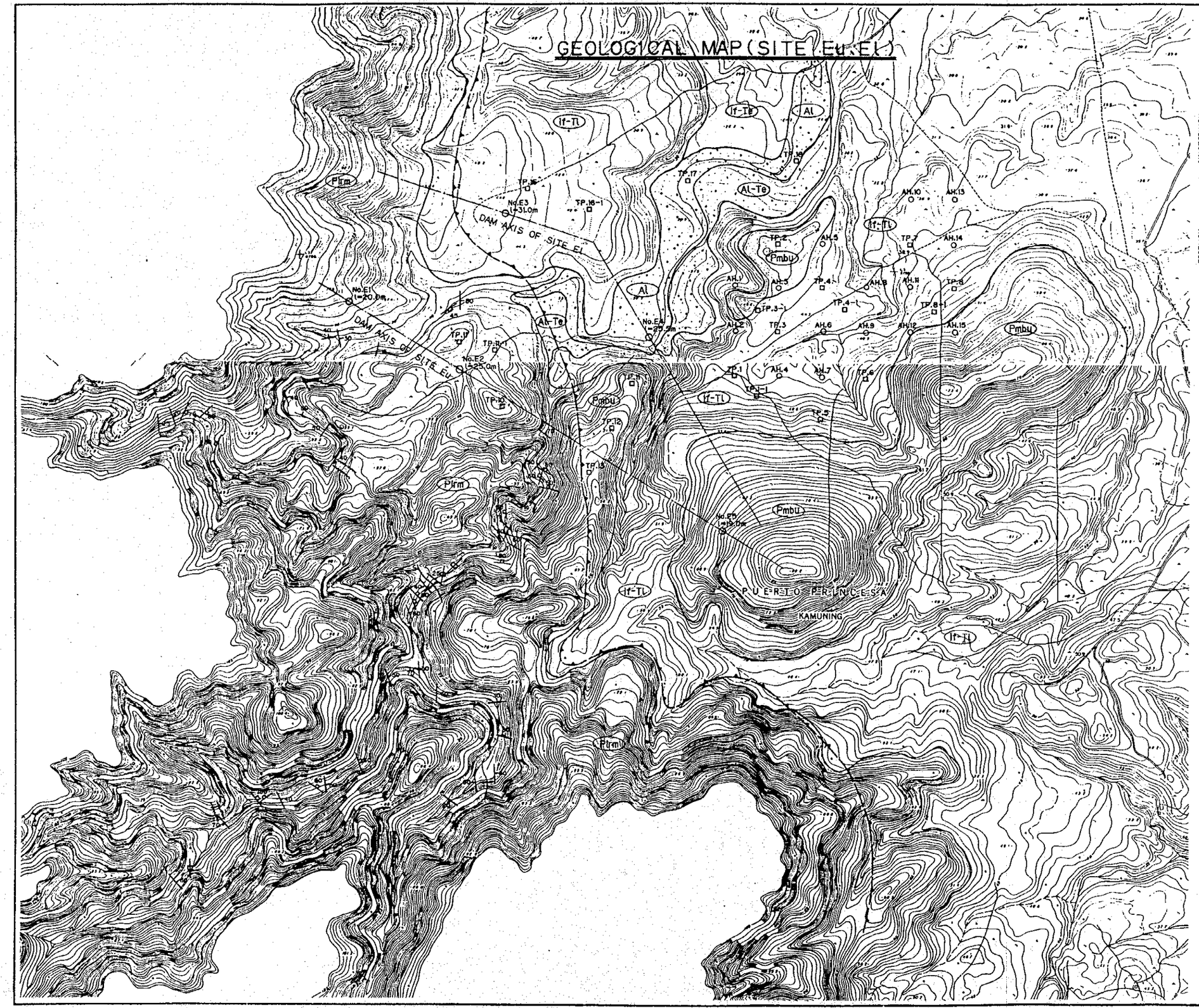
THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

WATER RESOURCES DEVELOPMENT
SITE EuM (2/2)

DAR

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

GEOLOGICAL MAP (SITE Eu, El)



LEGEND

QUARTERNARY	Al	HOLOCENE (ALLUVIAL)	ALLUVIAL DEPOSIT (RIVER DEPOSIT)
	Al-Te	HOLOCENE (ALLUVIAL)	ALLUVIAL TERRACE DEPOSIT
	lf-Tl	PLEISTOCENE (DILUVIAL)	DILUVIAL TALUS(FAN) DEPOSIT (IWAHIG FORMATION)
	lf-Te	PLEISTOCENE (DILUVIAL)	DILUVIAL TERRACE DEPOSIT (IWAHIG FORMATION)
TERTIARY	Plrm	EOCENE TO MIOCENE	INAGAWAN RIVER METAMORPHICS (SCHIST, AMPHIBOLITE etc.)
	Ppf	EOCENE	PANAS FORMATION (TURBIDITIC FORMATION)
	Pmbu	EOCENE	Mt. BEAUFORT ULTRAMAFICS (SERPENTINITED PERIDOTITE etc.)
	Psrg	EOCENE	STAVELY RANGE GABBRO

GEOLOGICAL SYMBOLS

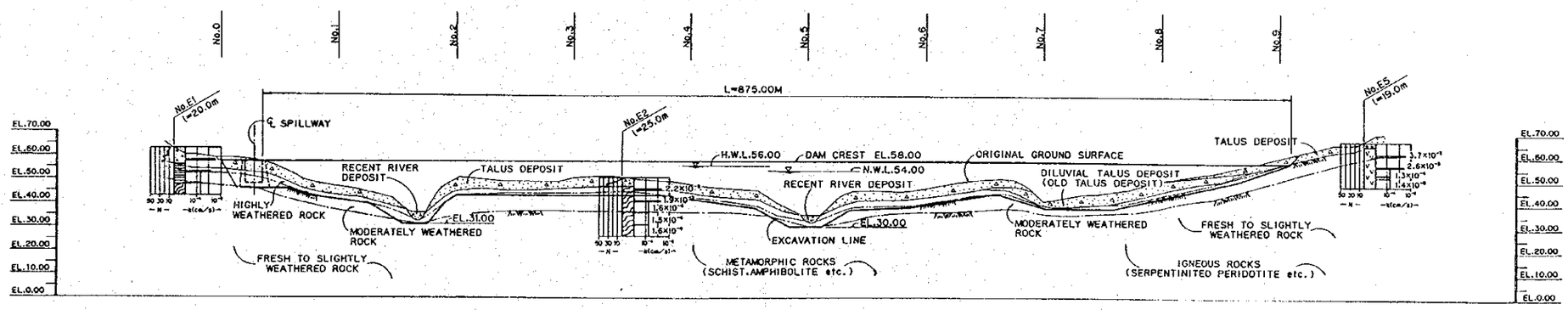
- 70 — STRIKE AND DIP OF BEDDING PLANE
- 60 — STRIKE AND DIP OF JOINT PLANE
- STRIKE OF VERTICAL JOINT PLANE
- 70 — STRIKE AND DIP OF SHEAR
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- SHEAR ZONE
- FORMATIONAL BOUNDARY
- ○ No.E3 — DRILLING LOCATION AND HOLE NUMBER
- □ TP.6 — TEST PIT LOCATION AND PIT NUMBER
- ○ AH.10 — AUGER HOLE LOCATION AND HOLE NUMBER

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

WATER RESOURCES DEVELOPMENT
GEOLOGICAL MAP (SITE Eu, El)

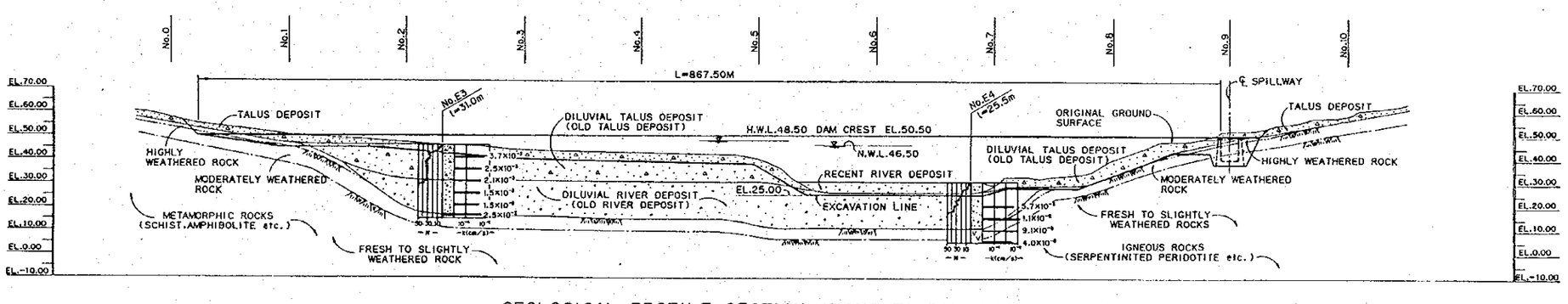
DAR

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY



GEOLOGICAL PROFILE SECTION ALONG Eu DAM AXIS

SCALE V=1:1.000, H=1:2.000



GEOLOGICAL PROFILE SECTION ALONG El DAM AXIS

SCALE V=1:1.000, H=1:2.000

LEGEND

- RIVER DEPOSIT, TALUS DEPOSIT — ALLUVIAL DEPOSIT (HOLOCENE)
- OLD RIVER DEPOSIT (DILUVIAL RIVER DEPOSIT), OLD TALUS DEPOSIT (DILUVIAL TALUS DEPOSIT) — IWAHIG FORMATION (PLEISTOCENE)
- IGNEOUS ROCKS (SERPENTINITED PERIDOTITE etc.) — MT.BEAUFORT ULTAMAFICS (EOCENE)
- METAMORPHIC ROCKS (SCHIST.AMPHIBOLITE etc.) — INAGAWAN RIVER METAMORPHICS (EOCENE~MIOCENE)
- STAVELY RANGE GABBRO — STAVELY RANGE GABBRO
- ASSUMED MODERATELY WEATHERED ROCK LINE
- ASSUMED SLIGHTLY WEATHERED TO FRESH ROCK LINE
- THRUST FAULT

NOTE:

1. ALL DIMENSIONS ARE SHOWN IN METER UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS ARE SHOWN IN METER (M.S.L.).

SCALE 1:1,000
0 20 40 60m

SCALE 1:2,000
0 40 80 120m

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

WATER RESOURCES DEVELOPMENT
GEOLOGICAL PROFILE SECTION
(SITE Eu, El)

DAR

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

General Plan of Irrigation and Drainage and Farm to Market Road System

OUTLINE OF CANAL SYSTEM

Main Canal				
NAME	Q m3/s	L (km)	B (m)	H (m)
M-1	0.843	0.80	1.20	1.00
M-2	0.758	1.09	1.20	0.90
M-3	0.737	0.71	1.20	0.90
M-4	0.647	0.64	1.20	0.90
M-5	0.574	0.33	1.00	0.80
M-6	0.312	0.84	0.80	0.70
Total		4.21		
Laterl-A				
A-1	0.085	0.44	0.50	0.50
A-2	0.066	0.96	0.40	0.50
A-3	0.021	0.98	0.30	0.40
Total		2.38		
Laterl-B				
B-1	0.073	1.43	0.30	0.60
B-2	0.069	0.87	0.30	0.60
B-3	0.066	0.78	0.30	0.60
B-4	0.025	0.46	0.30	0.50
B-5	0.024	0.42	0.30	0.50
B-6	0.016	0.27	0.30	0.40
Total		4.23		

Lateral-C				
NAME	Q m3/s	L (km)	B (m)	H (m)
C-1	0.202	0.02	0.70	0.70
C-2	0.126	0.48	0.60	0.60
C-3	0.117	0.59	0.60	0.60
C-4	0.046	0.33	0.50	0.50
Total		1.42		
Laterl-D				
D-1	0.071	0.34	0.50	0.50
D-2	0.060	0.15	0.50	0.50
Total		0.49		
Laterl-E				
E-1	0.218	0.80	0.80	0.70
E-2	0.181	0.27	0.70	0.70
E-3	0.126	0.42	0.80	0.70
E-4	0.049	0.51	0.50	0.50
Total		2.00		

LEGEND

- MAIN ROAD (M. R)
- LATERAL ROAD (L. R)
- MAIN CANAL
- LATERAL CANAL
- MAIN DRAINAGE
- TURN OUT

LATERAL CANAL-A L=2.38km

LATERAL CANAL-B L=4.23km

MAIN CANAL L=4.21km

MAIN DRAINGE-B L=0.70km

LATERAL CANAL-C L=1.42km

MAIN DRAINGE-A L=1.10km

LATERAL CANAL-D L=0.49km

LATERAL CANAL-E L=2.00km

M.R-1

M.R-2

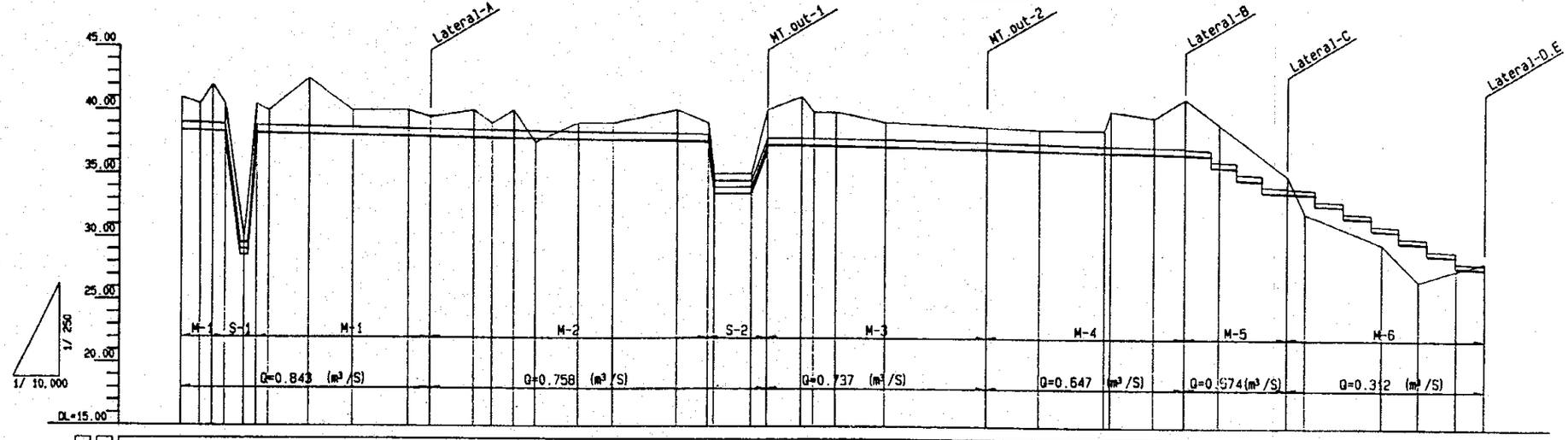
M.R-3

M.R-4

0 Scale 500m

9-6

PROFILE OF MAIN CANAL



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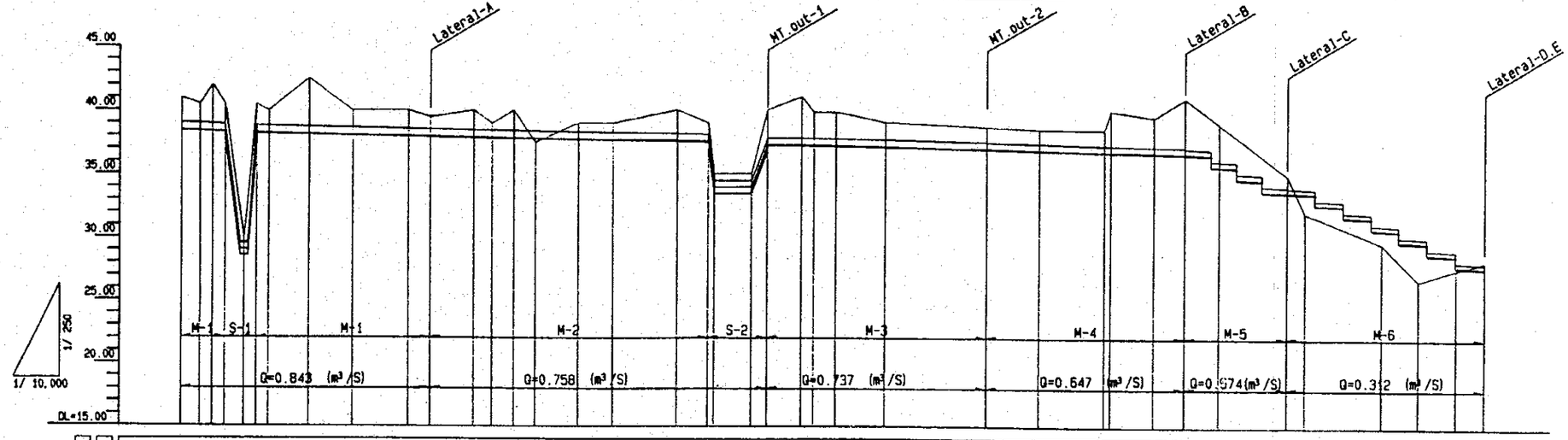
PROFILE OF MAIN CANAL



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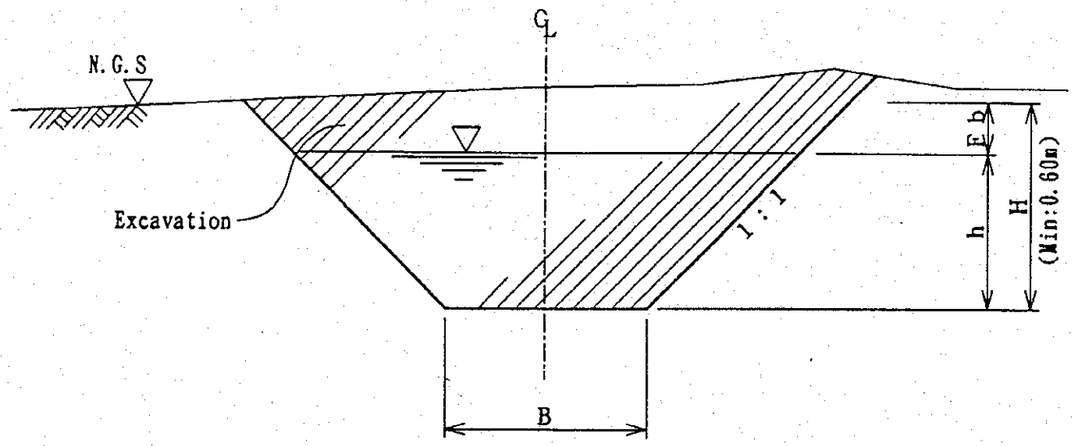
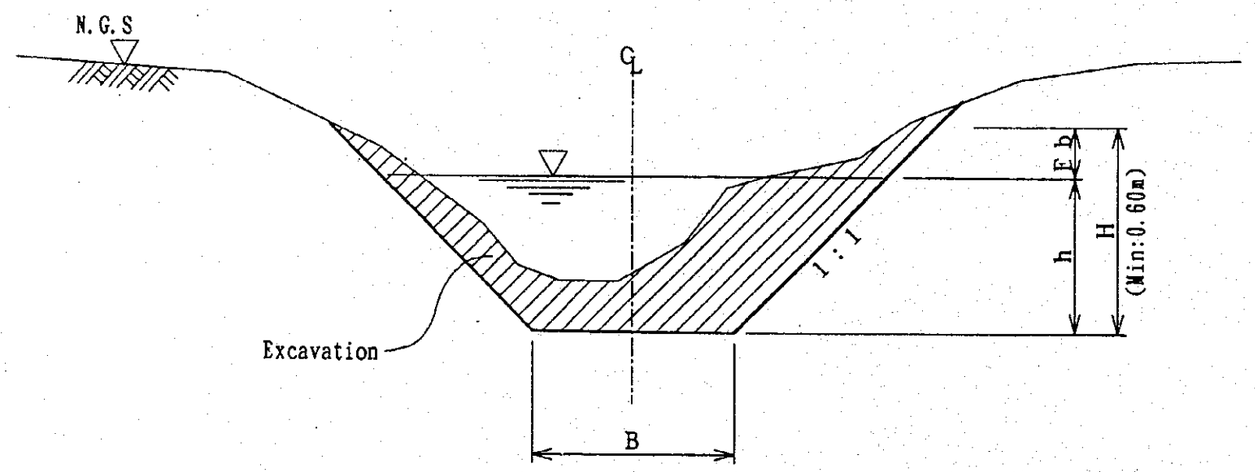


Typical Section of New Canal

NAME	L (km)	Q (m3/s)	V (m/s)	B (m)	h (m)	H (m)	Fb (m)
A-1	0.36	0.165	0.48	0.50	0.39	0.60	0.21
A-2	0.58	0.275	0.58	0.60	0.45	0.60	0.15
A-3	0.16	0.635	0.70	1.00	0.57	0.80	0.23
B-1	0.30	0.155	0.98	0.30	0.28	0.60	0.32
B-2	0.38	0.335	0.79	0.60	0.42	0.60	0.18



Typical Section of Excavated Creek

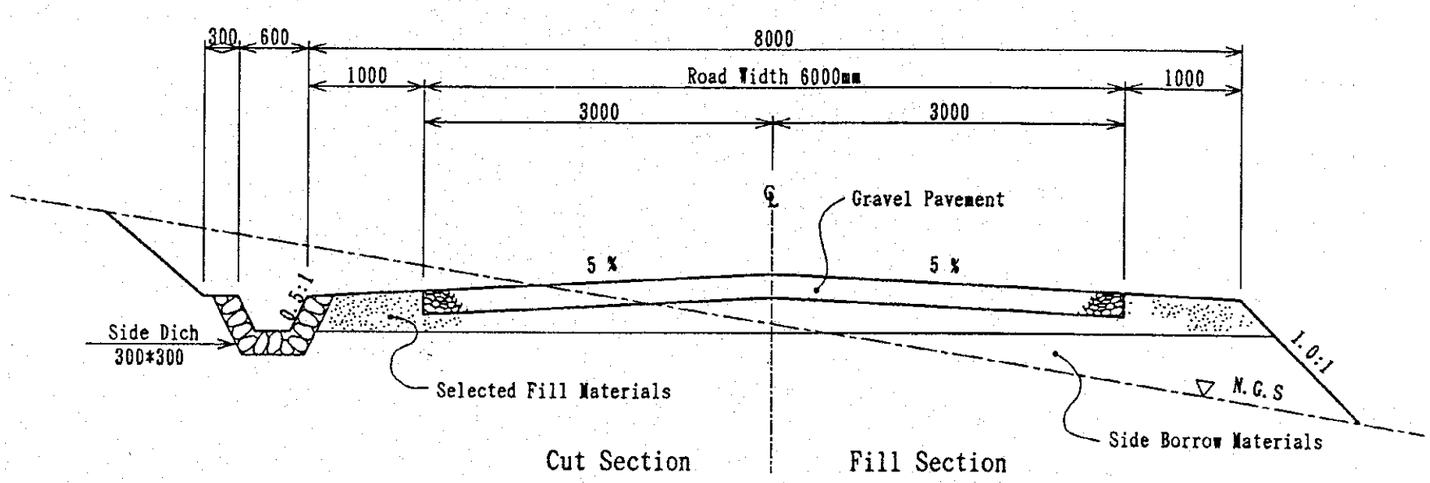
THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Typical Drainage Canal Section

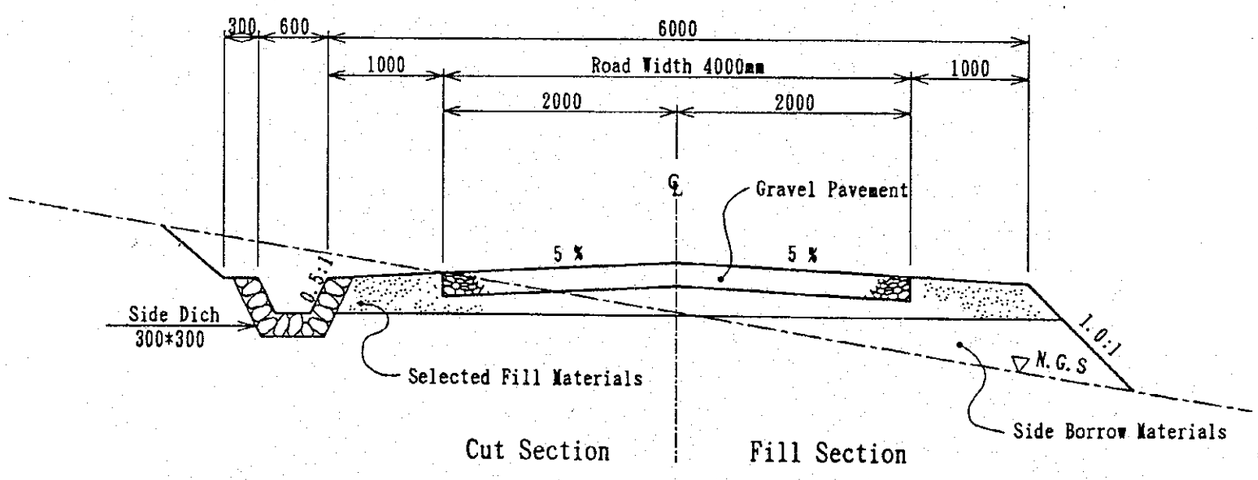
DAR

JAPAN INTERNATIONAL COOPERATION AGENCY

TYPICAL CROSS SECTION OF FARM TO MARKET ROAD



MAIN ROAD (M.R)



LATERAL ROAD (L.R)

OUTLIN OF ROAD SYSTEM

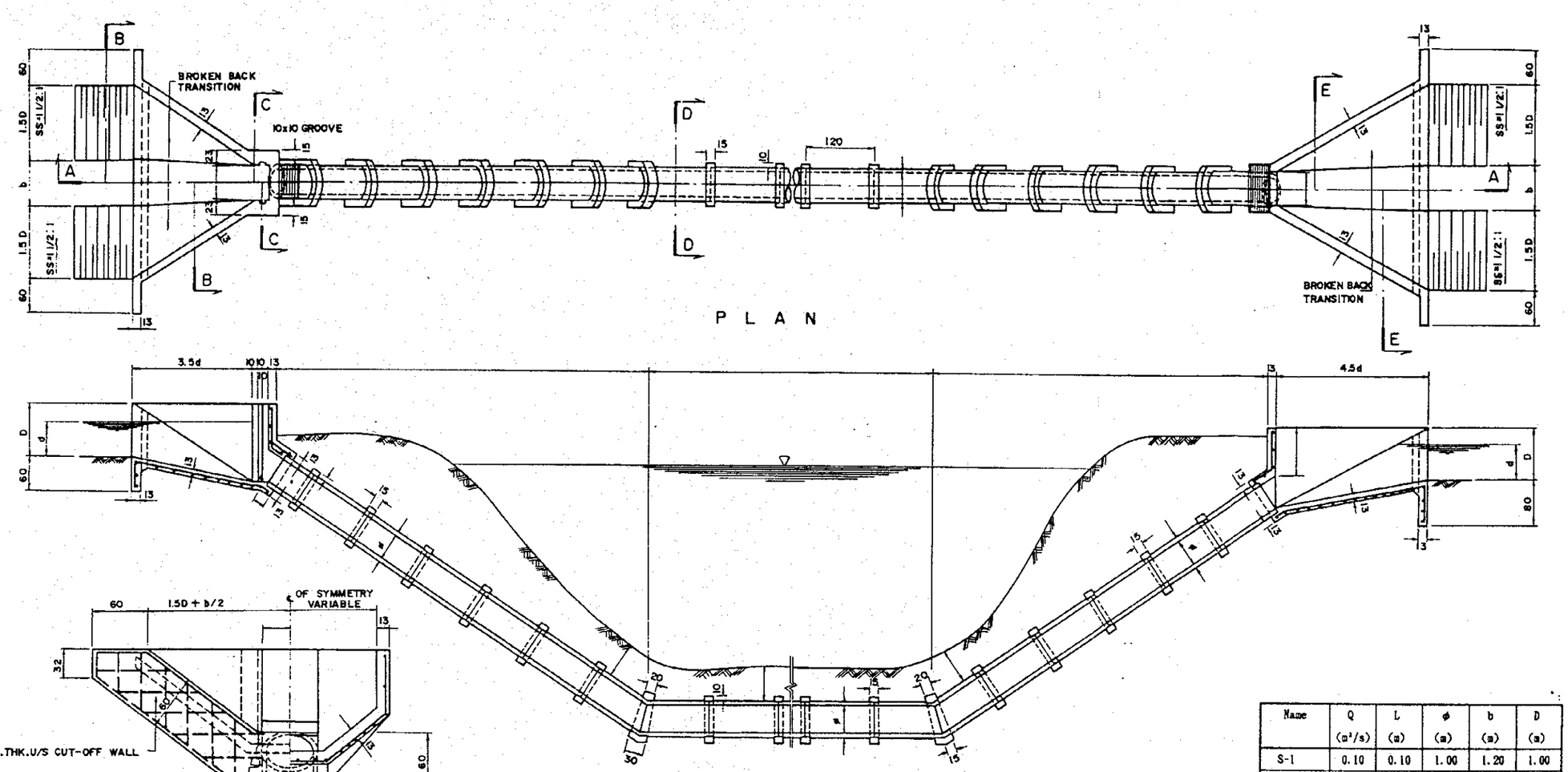
NAME	Length (km)	Total Width (m)	Effective Width (m)
Main Load			
M.R-1	3.50	8.00	6.00
-2	1.28	8.00	6.00
-3	3.50	8.00	6.00
-4	3.50	8.00	6.00
Total	11.78		
Lateral Load			
L.R-1	1.74	6.00	4.00
-2	1.79	6.00	4.00
-3	1.67	6.00	4.00
-4	2.00	6.00	4.00
-5	1.00	6.00	4.00
-6	1.26	6.00	4.00
-7	0.70	6.00	4.00
-8	3.50	6.00	4.00
-9	1.90	6.00	4.00
-10	1.70	6.00	4.00
-11	1.40	6.00	4.00
-12	1.15	6.00	4.00
-13	0.94	6.00	4.00
-14	1.60	6.00	4.00
-15	1.80	6.00	4.00
-16	0.56	6.00	4.00
-17	1.20	6.00	4.00
-18	1.90	6.00	4.00
-19	1.35	6.00	4.00
Total	29.16		

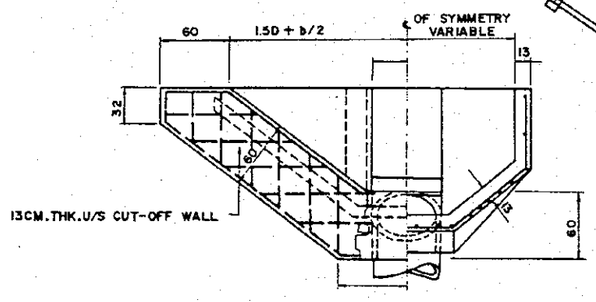
THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Typical Farm to Market Road Section

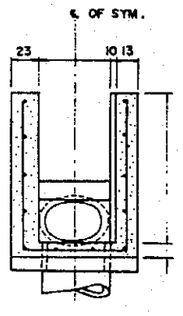
DAR

JICA JAPAN INTERNATIONAL COOPERATION AGENCY

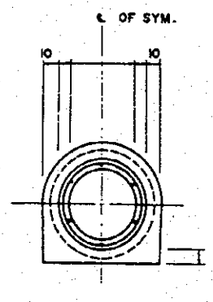




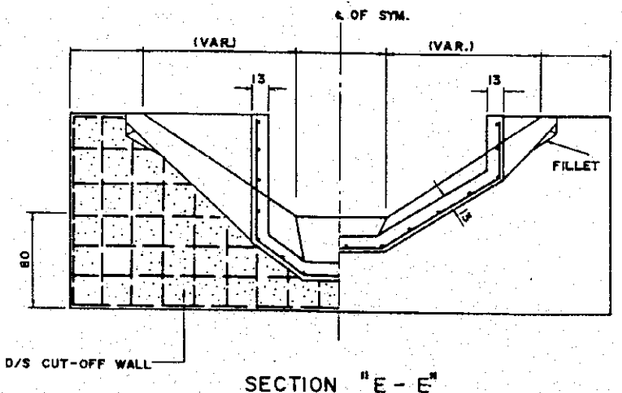
SECTION "B – B"



SECTION "C – C"



SECTION "D – D"



SECTION "E – E"

Name	Q (m³/s)	L (m)	ϕ (m)	b (m)	D (m)
S-1	0.10	0.10	1.00	1.20	1.00
S-2	0.10	0.19	1.00	1.20	0.90

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Canal R.C. Pipe Siphon

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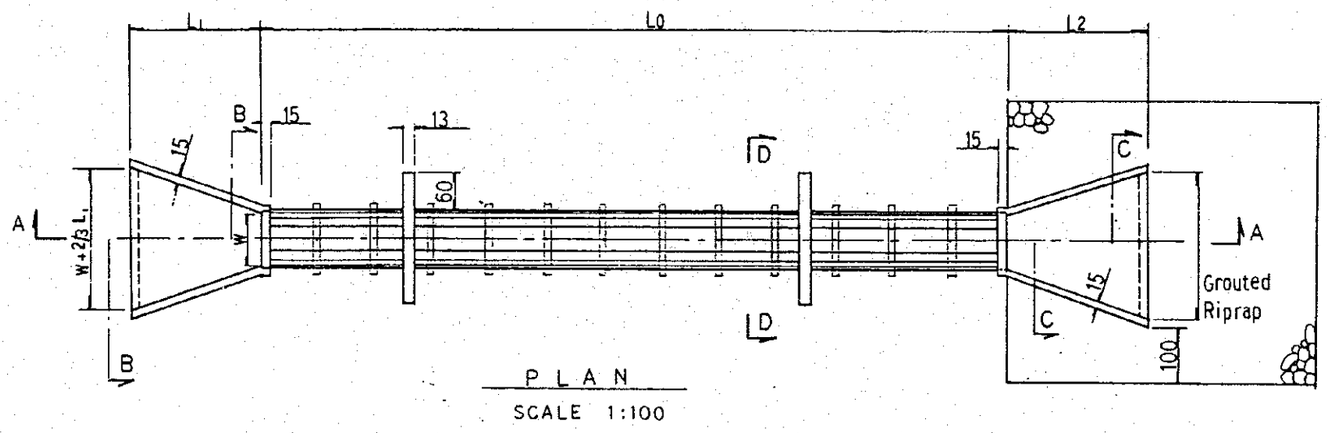
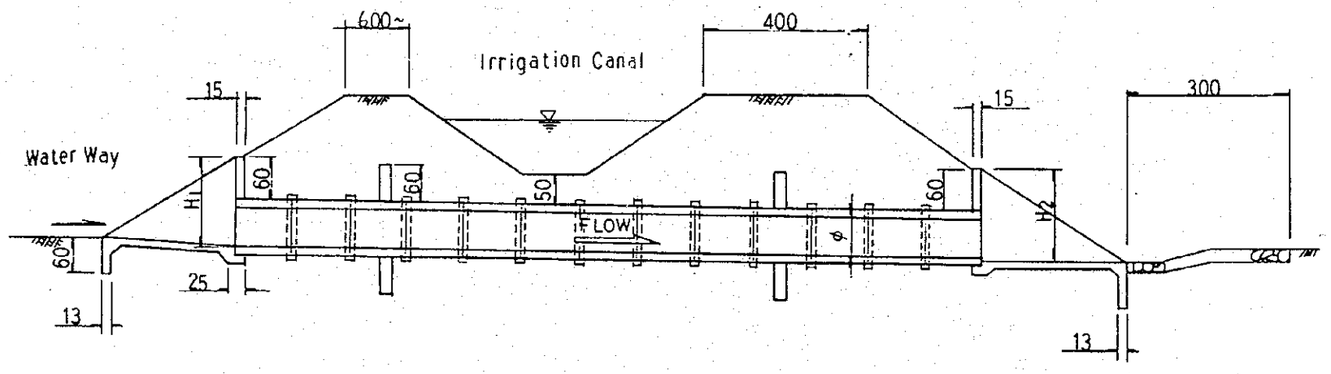


PLAN

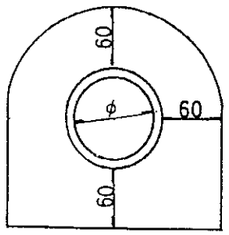
SCALE 1:100

Discharge (m³/sec)	φ (m)	L0 (m)	L1, L2 (m)	H1, H2 (m)	W (m)
0~0.30	0.60		1.95	1.30	0.80
~0.60	0.80		2.25	1.50	1.00
~1.1	1.00		2.55	1.70	1.30
~2.2	1.00*2		2.55	1.70	2.50



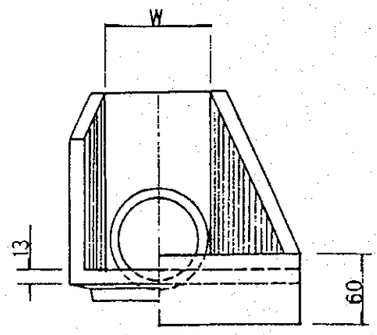
SECTION A-A

SCALE 1:100



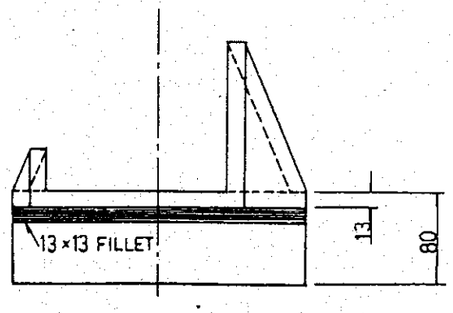
SECTION D-D

SCALE 1:60



SECTION B-B

SCALE 1:60



SECTION C-C

SCALE 1:60

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Drainage Crossing

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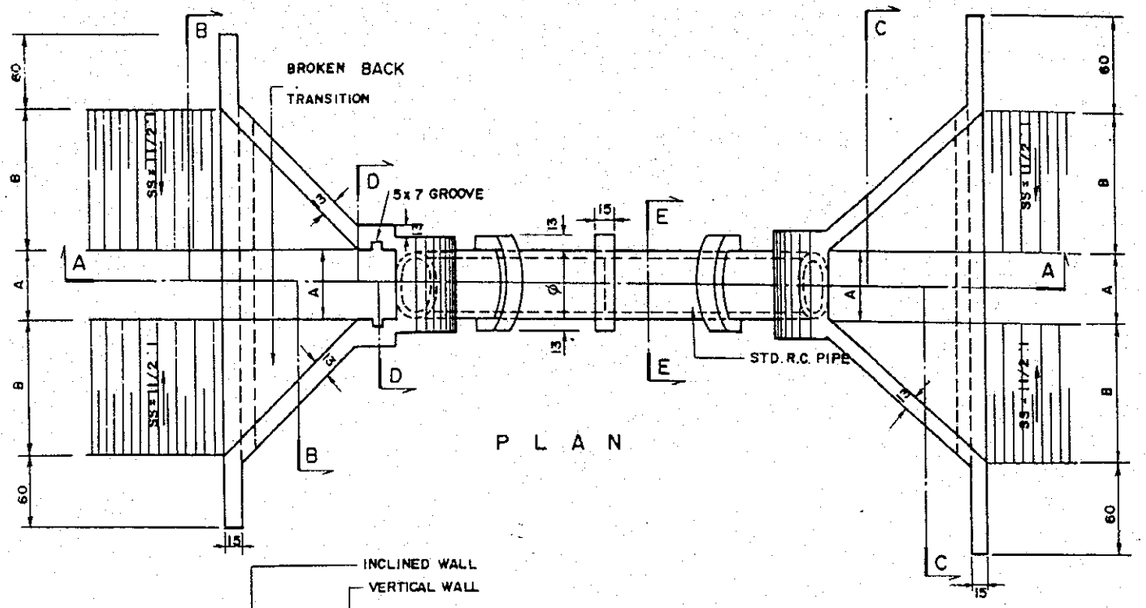
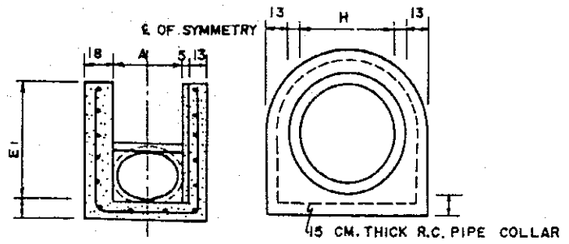
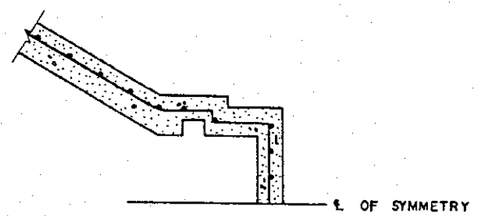


TYPICAL SECTION FOR LAYING PRE-CAST R.C. PIPE

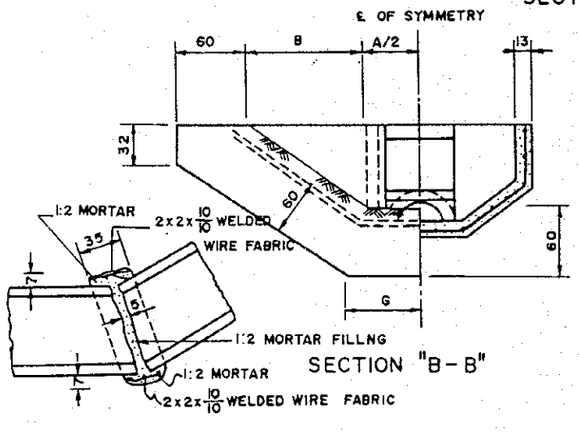


SECTION "D-D" SECTION "E - E"

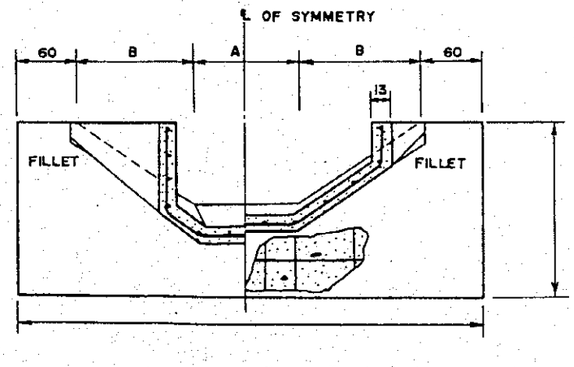


HALF SECTION "F - F"

Discharge (m³/sec)	ϕ (m)	L (m)	A (m)	B (m)	C (m)
0~0.20	0.30				
~0.40	0.45				
~0.60	0.60				
~0.90	0.80				



ALTERNATE PIPE COLLARS



SECTION "C - C"

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Road Crossing

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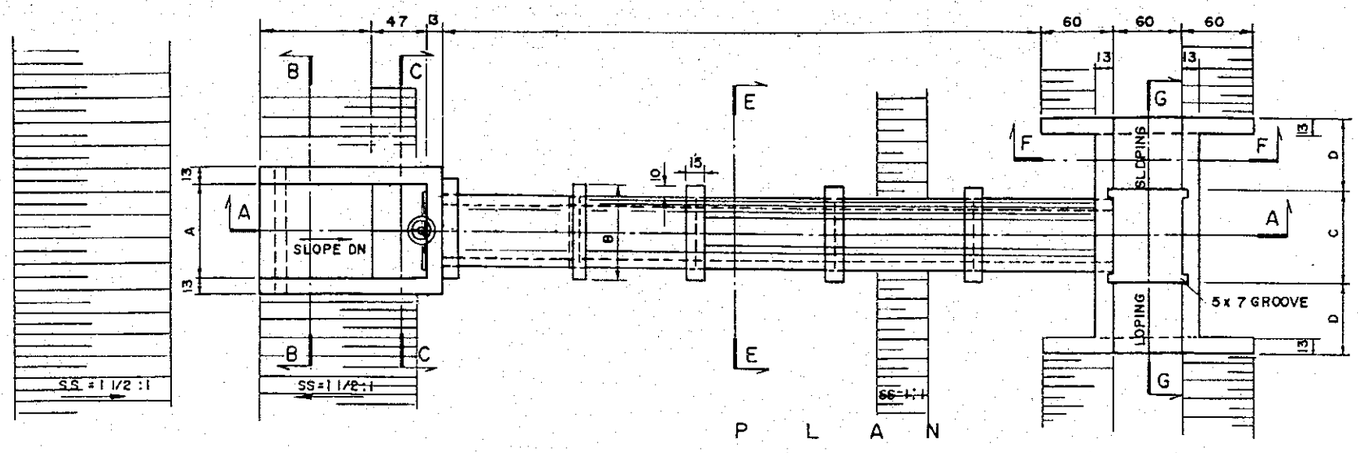
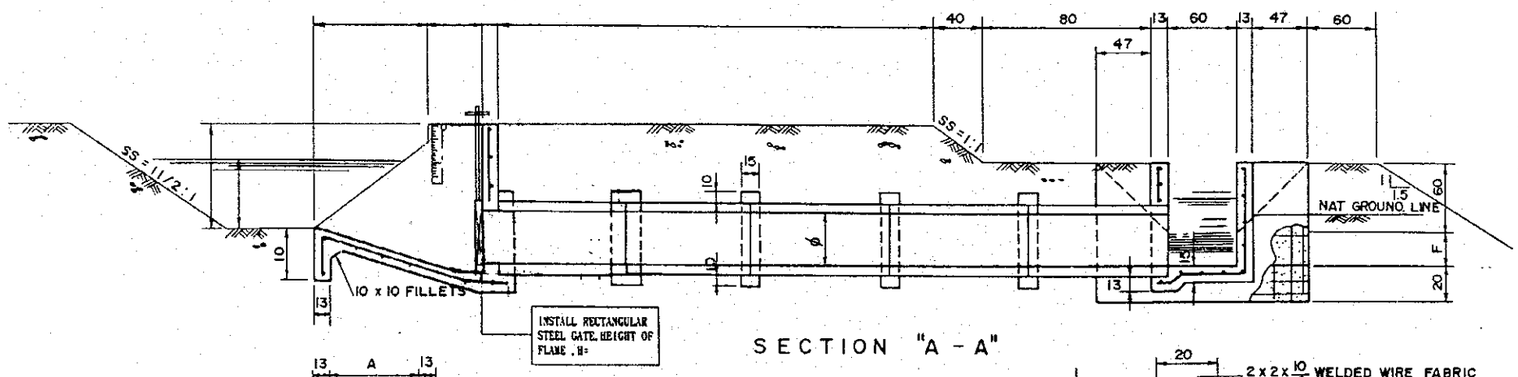
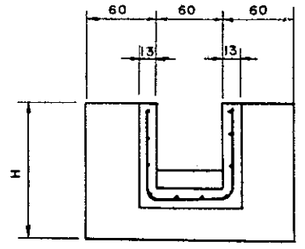


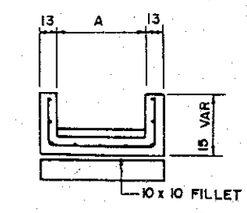
Discharge (m³/sec)	ϕ (m)	A (m)	B (m)	C (m)	D (m)
0~0.064	0.30	0.80	0.60		
~0.150	0.45	0.80	0.78		
~0.250	0.60	0.80	0.96		



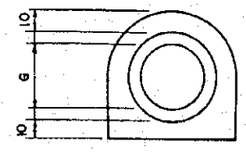
SECTION "A - A"



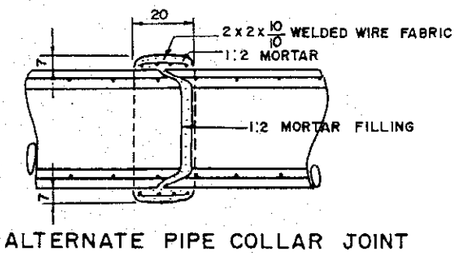
SECTION "F - F"



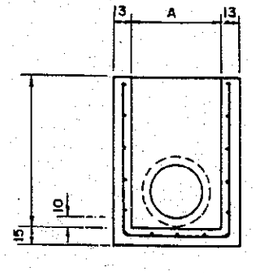
SECTION "B - B"



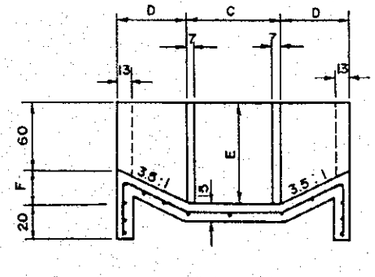
SECTION "E - E"



ALTERNATE PIPE COLLAR JOINT



SECTION "C-C"



SECTION "G - G"

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Diversion/Turnouts

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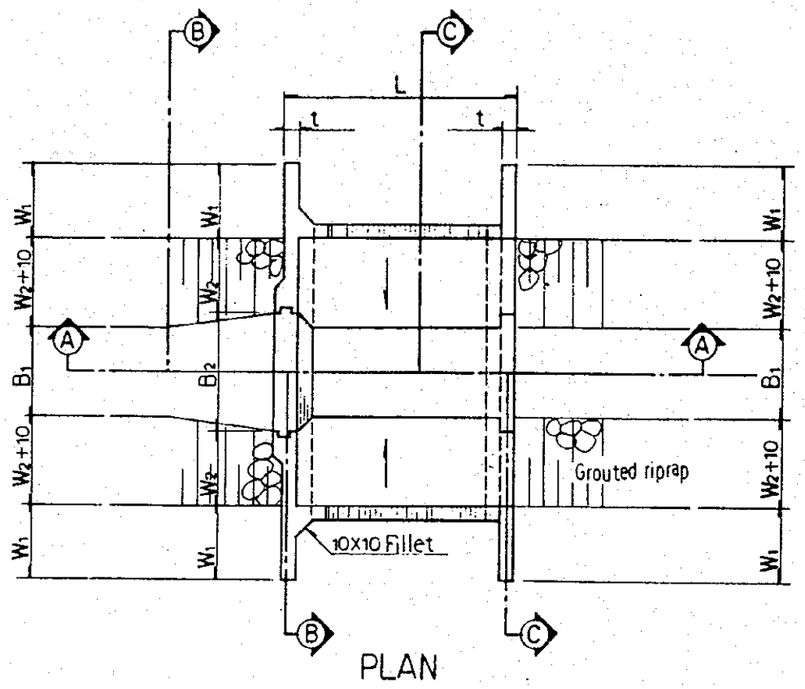
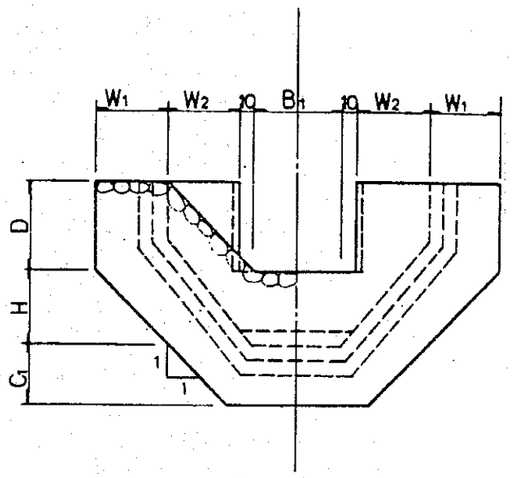


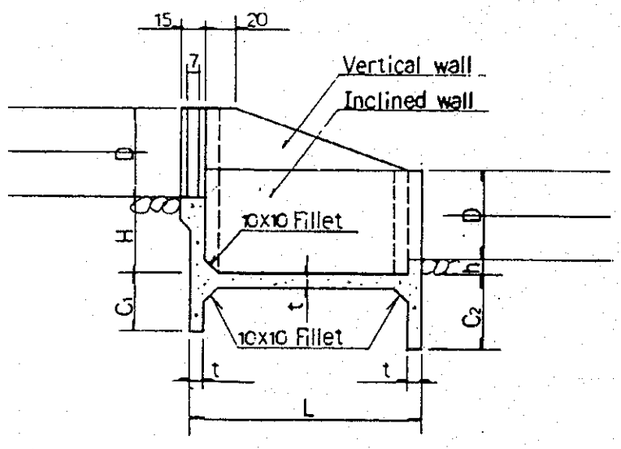
PLAN



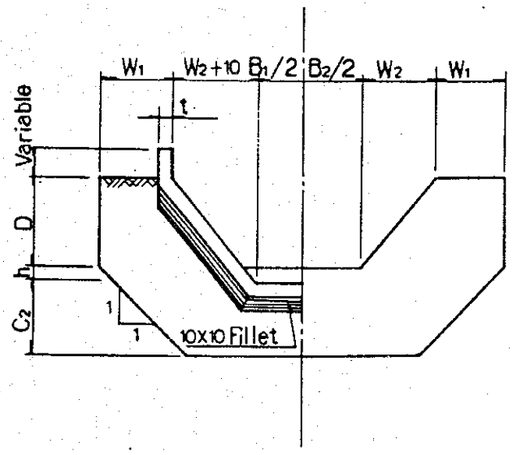
SECTION "B-B"

Name	H (m)	h (m)	L (m)	B1 (m)	B2 (m)
Type-1	1.00	0.10	3.10		0.80
Type-2	0.90	0.10	2.80		0.60

Name	t (m)	W1 (m)	W1 (m)	C1 (m)	C2 (m)
Type-1	0.10	0.50		0.40	0.45
Type-2	0.10	0.50		0.40	0.45



SECTION "A-A"



SECTION "C-C"

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

Drop

DAR

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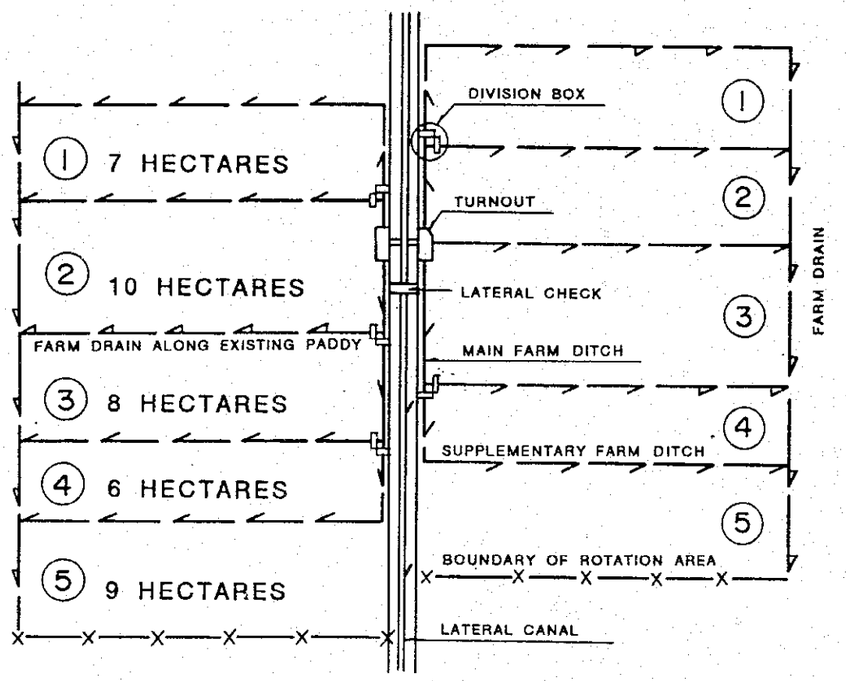
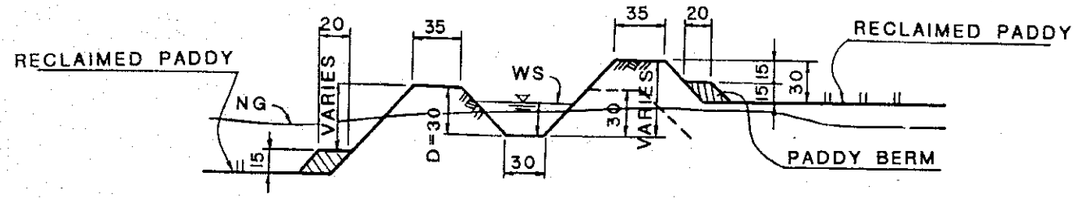
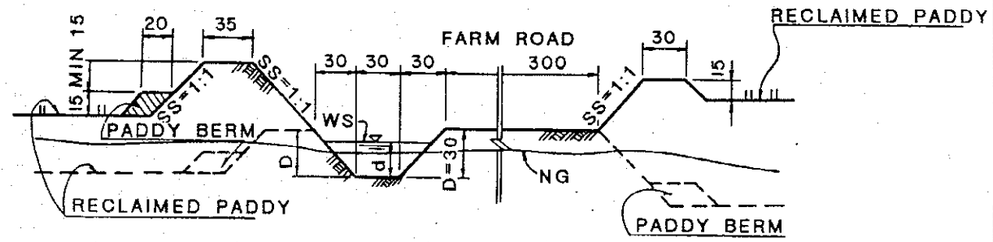


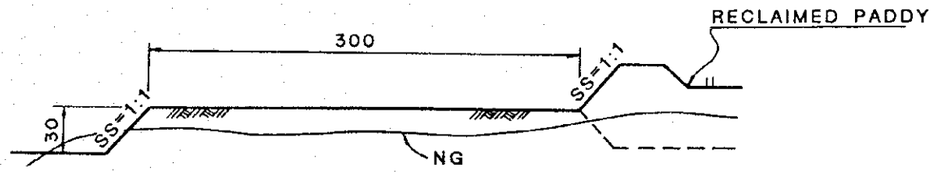
LAYOUT OF TWO ROTATION AREAS



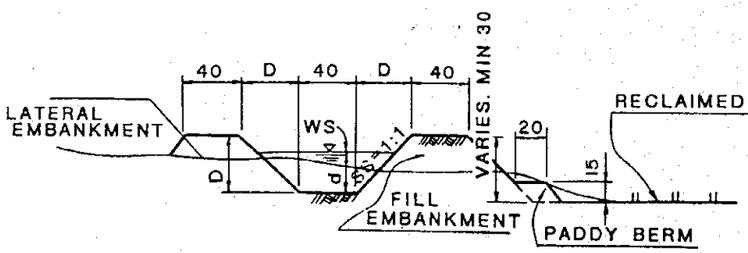
SUPPLEMENTARY FARM DITCH IN THE RECLAIMED AREA



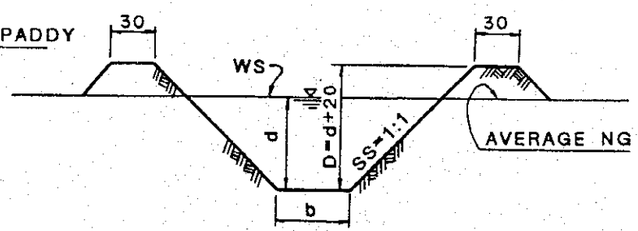
SUPPLEMENTARY FARM DITCH AND FARM ROAD



FARM ROAD



MAIN FARM DITCH ADJACENT TO LATERAL



FARM DRAIN

THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN

TYPICAL LAYOUT AND DESIGN OF ON-FARM FACILITIES

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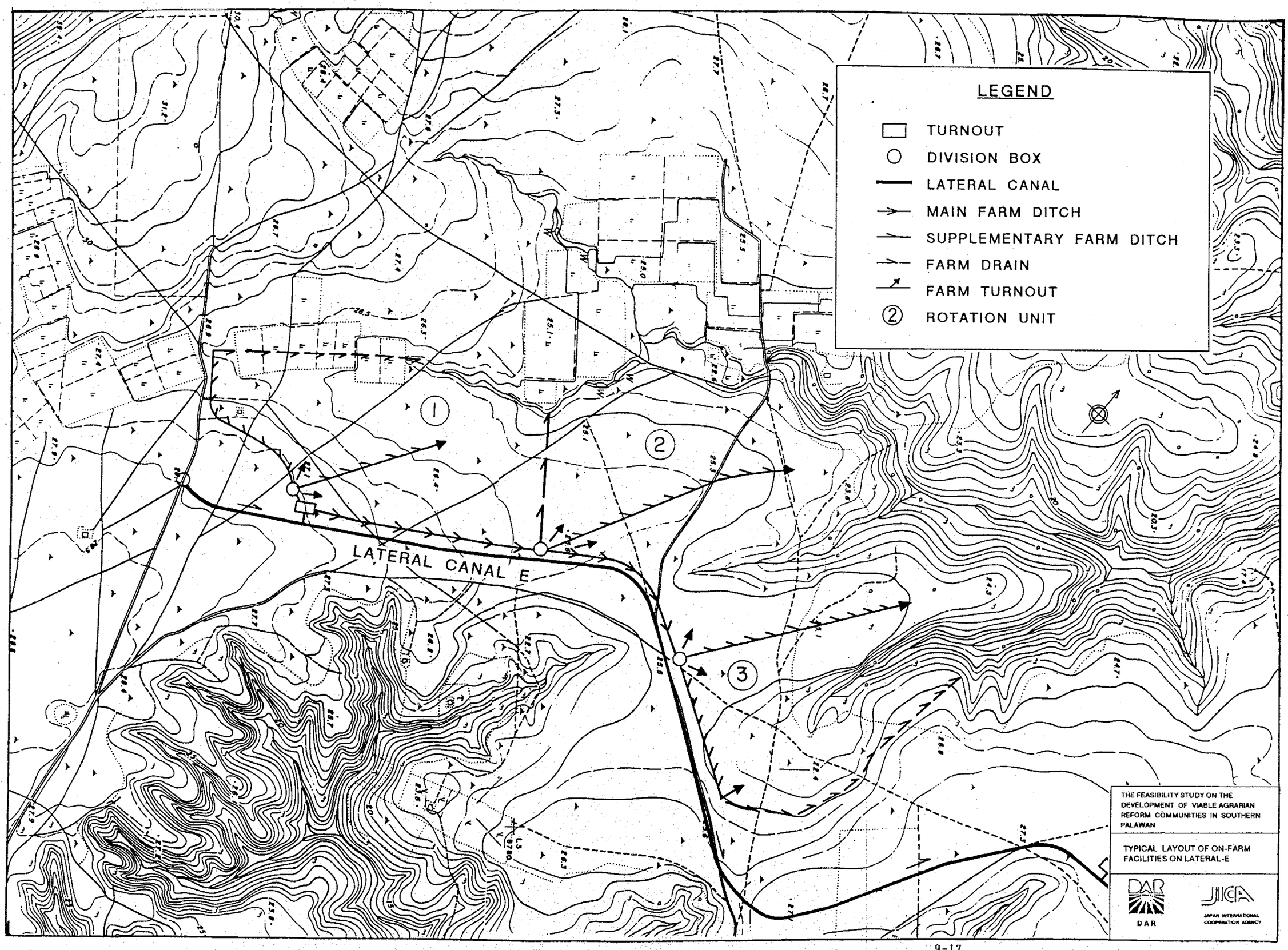
LEGEND
TURNOUT
DIVISION BOX
LATERAL CANAL
MAIN FARM DITCH
SUPPLEMENTARY FARM DITCH
FARM DRAIN
FARM TURNOUT
ROTATION UNIT
LATERAL CANAL E
1
2
3
THE FEASIBILITY STUDY ON THE DEVELOPMENT OF VIABLE AGRARIAN REFORM COMMUNITIES IN SOUTHERN PALAWAN
TYPICAL LAYOUT OF ON-FARM FACILITIES ON LATERAL-E
DAR
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY