

**REPUBLIC OF CHILE MINISTRY OF AGRICULTURE**

**FEASIBILITY STUDY**  
**ON**  
**MAPOCHO RIVER BASIN**  
**AGRICULTURAL DEVELOPMENT PROJECT**

**VOLUME III: DRAWINGS**

**JULY 1986**

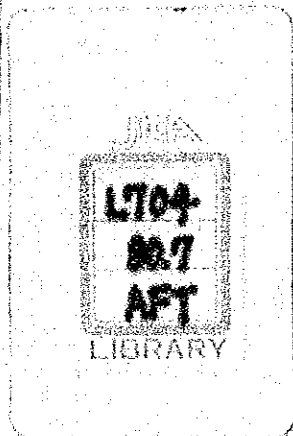
**JAPAN INTERNATIONAL COOPERATION AGENCY**  
**(JICA)**

FEASIBILITY STUDY ON MAPOCHO RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT


VOLUME III: DRAWINGS

JULY 1986

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**FEASIBILITY STUDY  
ON  
MAPOCHO RIVER BASIN  
AGRICULTURAL DEVELOPMENT PROJECT**

**VOLUME III: DRAWINGS**

**JULY 1986**

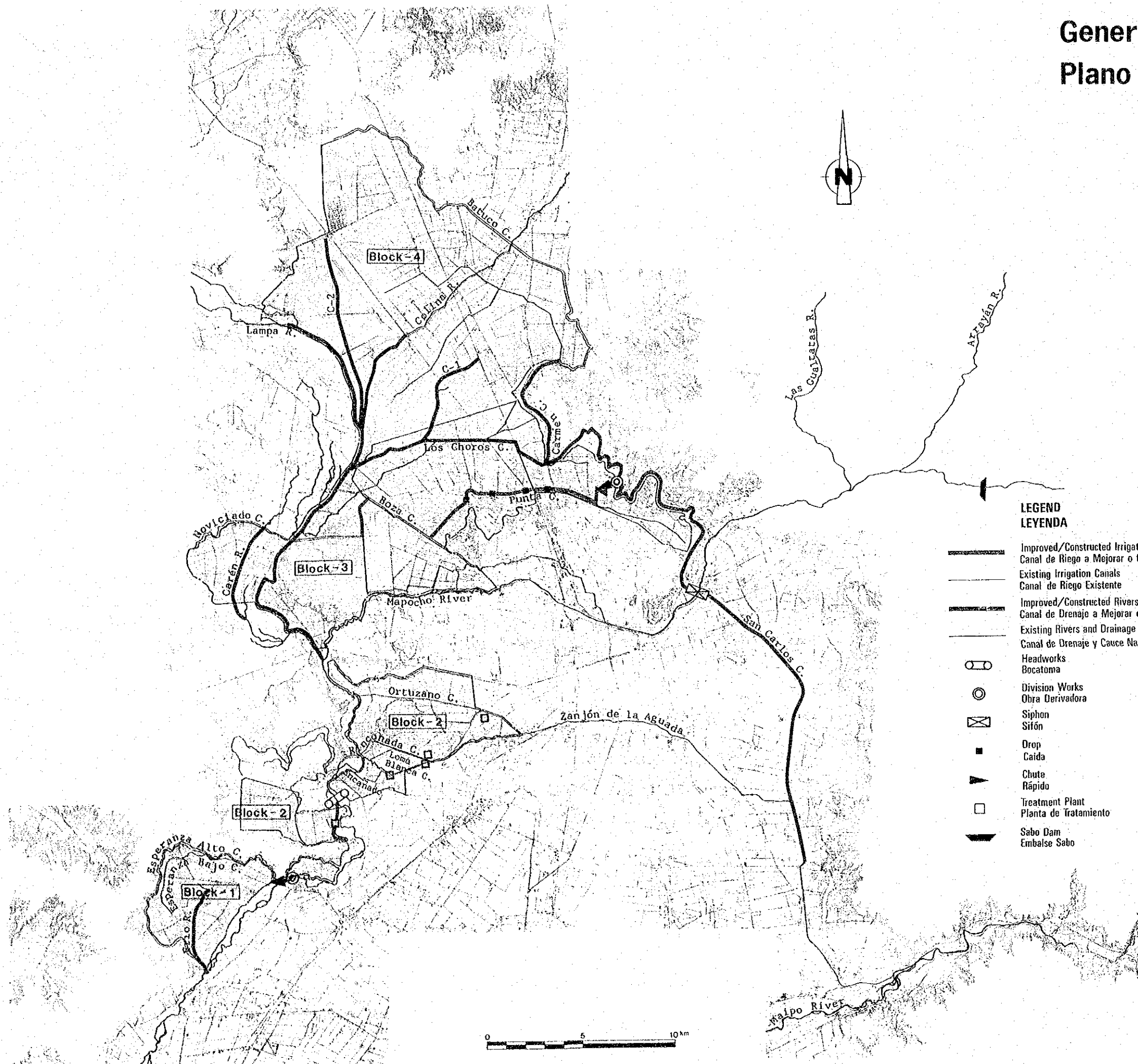
**JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)**

国際協力事業団	
受入 月日 '86.10.03	L704
登録No. 15460	80.7 AET












## LIST OF DRAWINGS

DWG. NO.	TITLE
1.	GENERAL PLAN
2.	PROFILE AND CROSS SECTION SAN CARLOS CANAL
3.	SABO DAM
4.	SECTION OF SABO DAM
5.	ESPERANZA HEADWORKS
6.	PROFILE AND CROSS SECTIONS ESPERANZA CANAL
7.	ESPERANZA TREATMENT PLANT
8.	ORTUZANO TREATMENT PLANT
9.	LOMA BLANCA TREATMENT PLANT
10.	ENCAÑADO TREATMENT PLANT
11.	RINCONADA TREATMENT PLANT
12.	DETAILS AERATOR AND CHLORINATOR
13.	DETAILS OUTLET WORKS
14.	SIPHON
15.	PROFILE AND CROSS SECTIONS CARMEN CANAL
16.	PROFILE AND CROSS SECTIONS PUNTA CANAL
17.	DROP
18.	CHUTE
19.	DIVISION WORKS
20.	PROFILE AND CROSS SECTIONS LAMPA RIVER
21.	GATE AND SLUICE
22.	PROFILE AND CROSS SECTIONS COLINA RIVER
23.	PROFILE AND CROSS SECTIONS FRIO RIVER
24.	PROFILE AND CROSS SECTIONS CAREN RIVER
25.	PROFILE AND CROSS SECTIONS CHOROS CANAL
26.	PROFILE AND CROSS SECTION C-1 DRAINAGE CANAL
27.	PROFILE AND CROSS SECTION C-2 DRAINAGE CANAL
28.	FARM ROAD NETWORK
29.	CROSS SECTION FARM ROADS
30.	BRIDGE (1)
31.	BRIDGE (2)

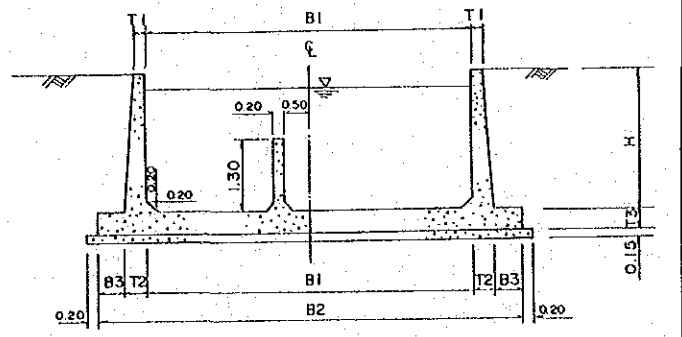
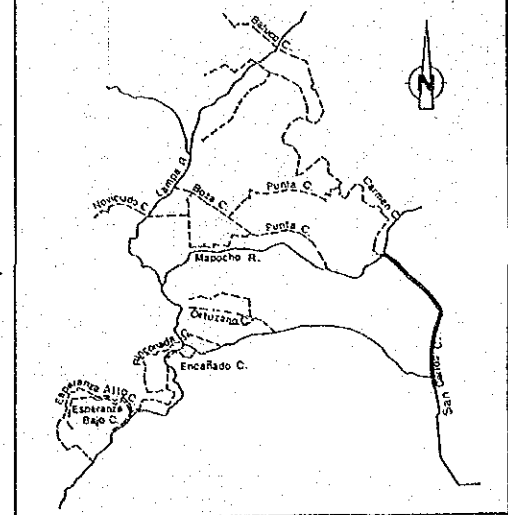
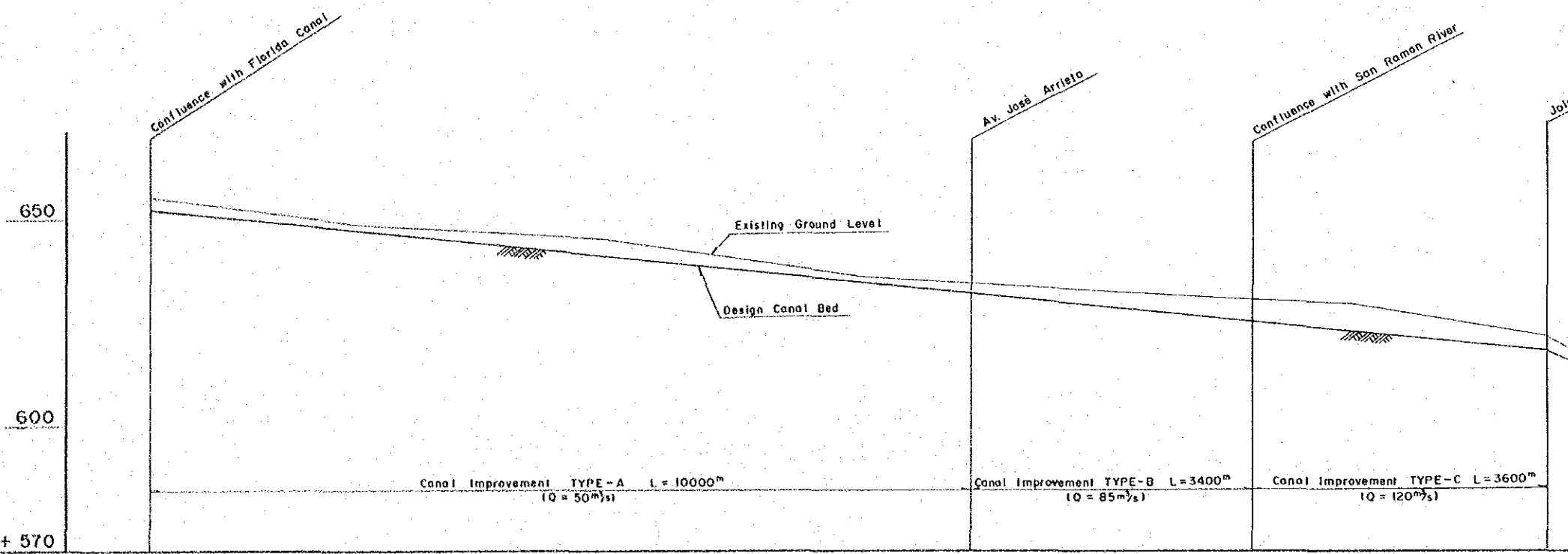
# General Plan Plano General



**LEGEND  
LEYENDA**

-  Improved/Constructed Irrigation Canals  
Canal de Riego a Mejorar o Construir
-  Existing Irrigation Canals  
Canal de Riego Existente
-  Improved/Constructed Rivers and Drainage Canals  
Canal de Drenaje a Mejorar o Construir
-  Existing Rivers and Drainage Canals  
Canal de Drenaje y Cauce Natural Existente
-  Headworks  
Bocatoma
-  Division Works  
Obra Derivadora
-  Siphon  
Sifón
-  Drop  
Caída
-  Chute  
Rápido
-  Treatment Plant  
Planta de Tratamiento
-  Sabo Dam  
Embalse Sabo

PROFILE AND CROSS SECTION SAN CARLOS CANAL



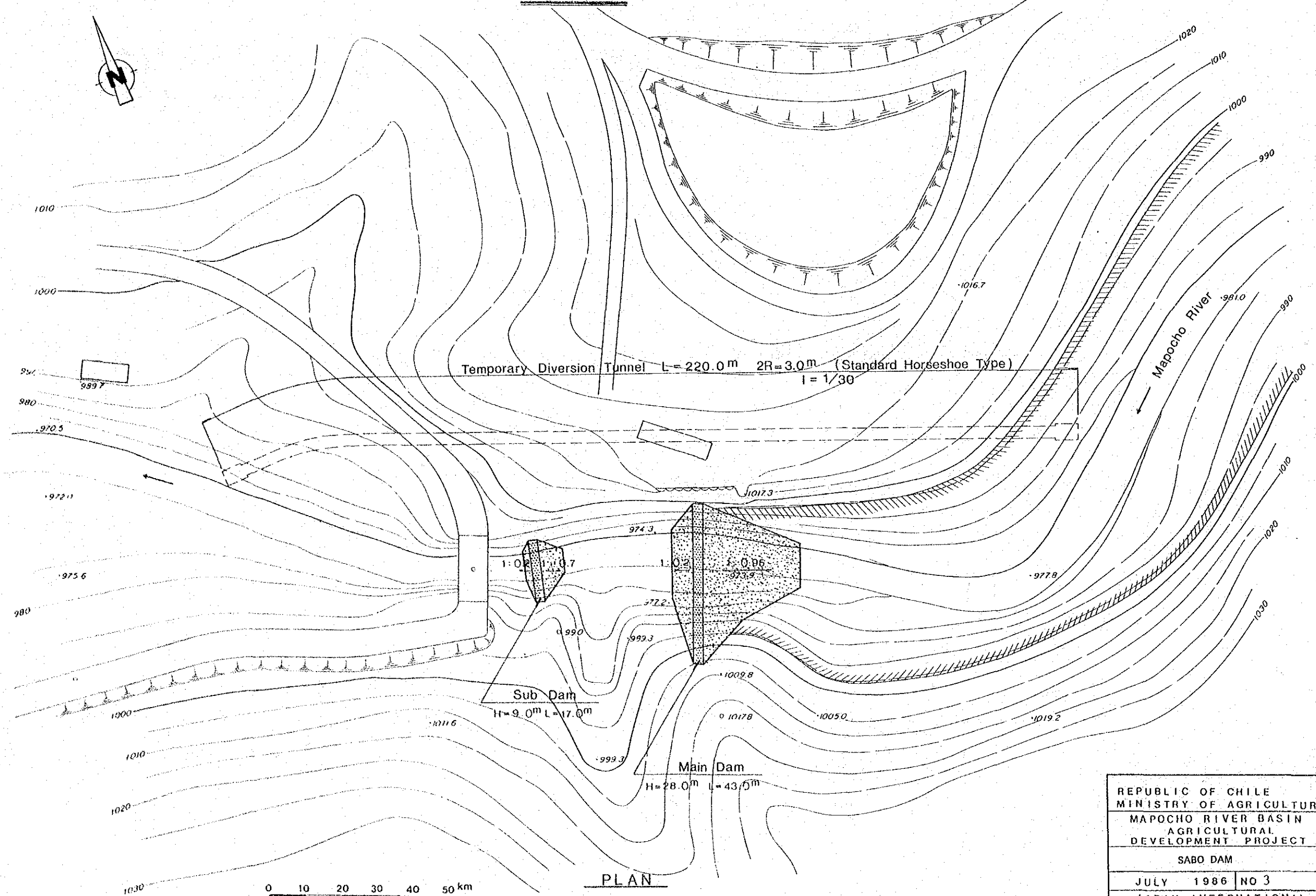
TYPICAL SECTION

LONGITUDINAL SLOPE	I = 1/500																		
DESIGN CANAL BED	653.0	651.0	649.0	647.0	645.0	643.0	641.0	639.0	637.0	635.0	633.0	631.0	629.0	627.0	626.2	625.0	623.0	621.0	619.0
GROUND LEVEL	656.0	653.0	650.5	648.0	647.0	646.0	644.0	641.0	638.1	636.0	634.9	633.8	632.5	631.5	631.3	631.0	629.0	625.6	622.1
ACCUMULATED DISTANCE	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	13400	14000	15000	16000	17000
STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	NO.7	NO.8	NO.9	NO.10	NO.11	NO.12	NO.13	NO.14	NO.15	NO.16	NO.17	

UNIT: m							
TYPE	H	B1	B2	B3	T1	T2	T3
A	2.50	6.00	7.60	0.40	0.20	0.40	0.40
B	3.00	7.00	8.60	0.40	0.20	0.40	0.40
C	4.00	7.50	9.10	0.40	0.20	0.40	0.40

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 DEVELOPMENT PROJECT  
 PROFILE AND CROSS SECTION  
 SAN CARLOS CANAL  
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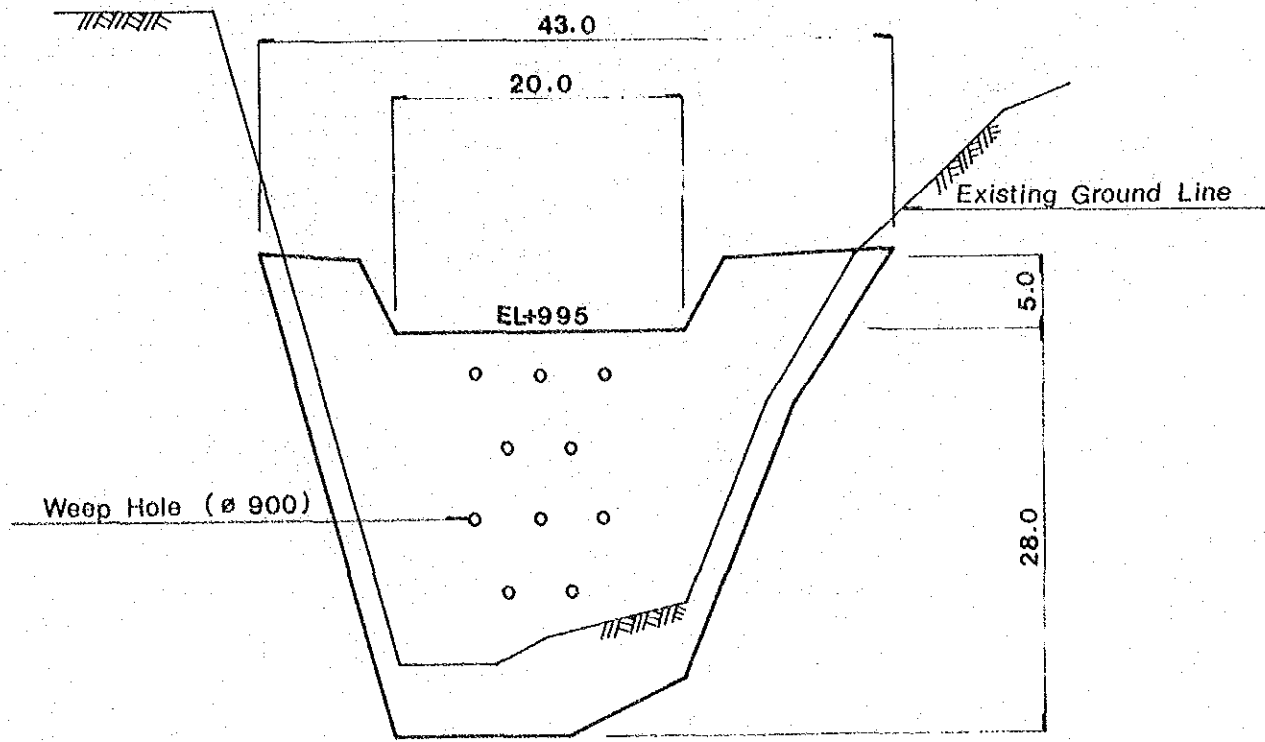
# SABO DAM



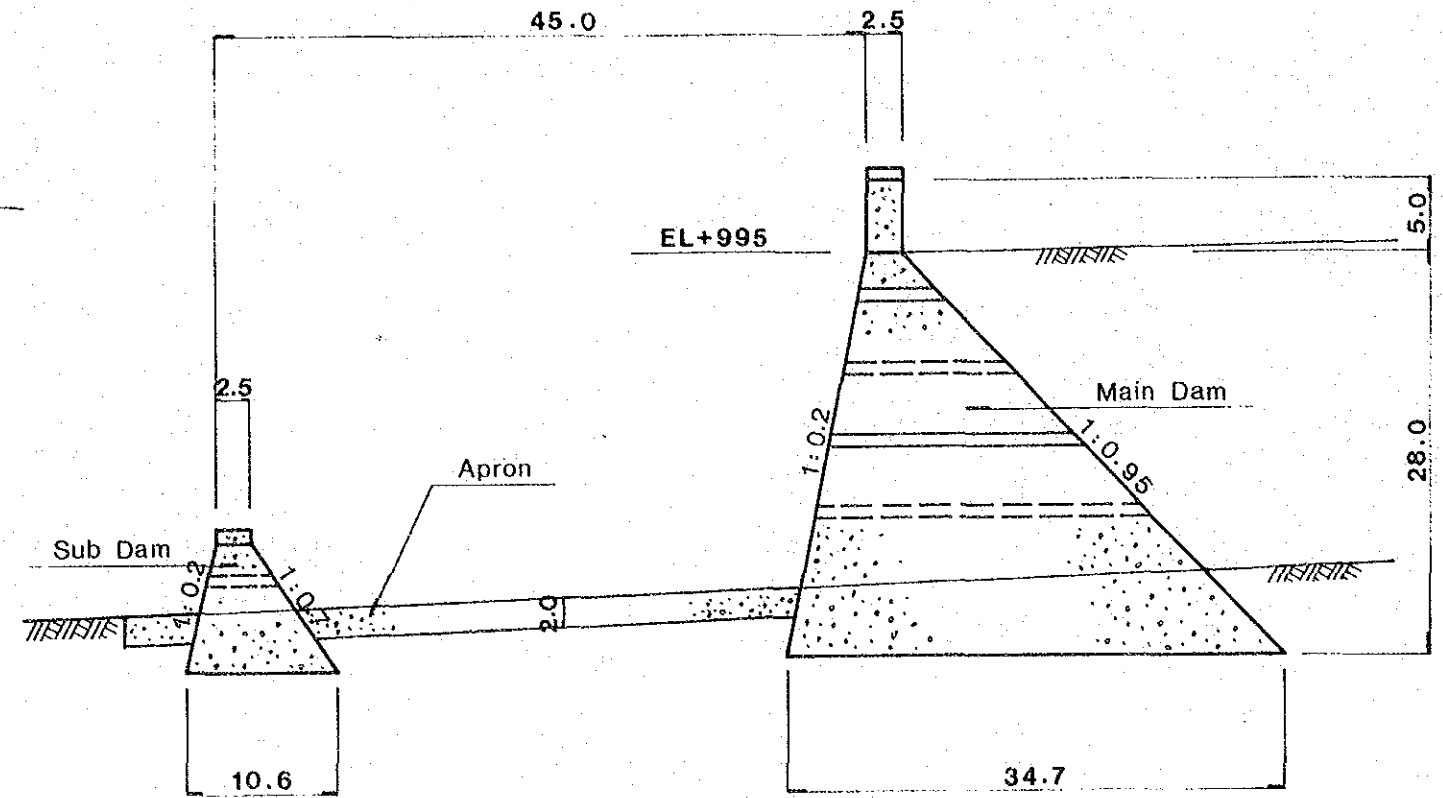
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DEVELOPMENT PROJECT	
SABO DAM	
JULY 1986	NO 3
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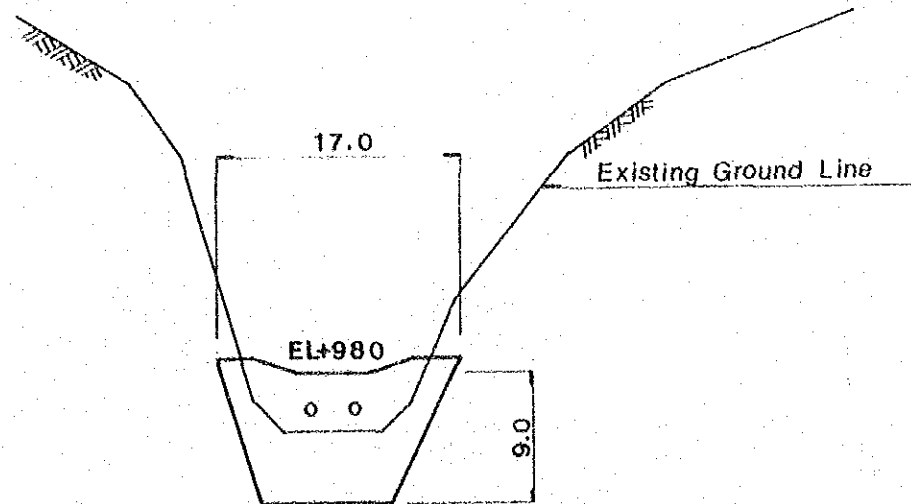
# SECTION OF SABO DAM



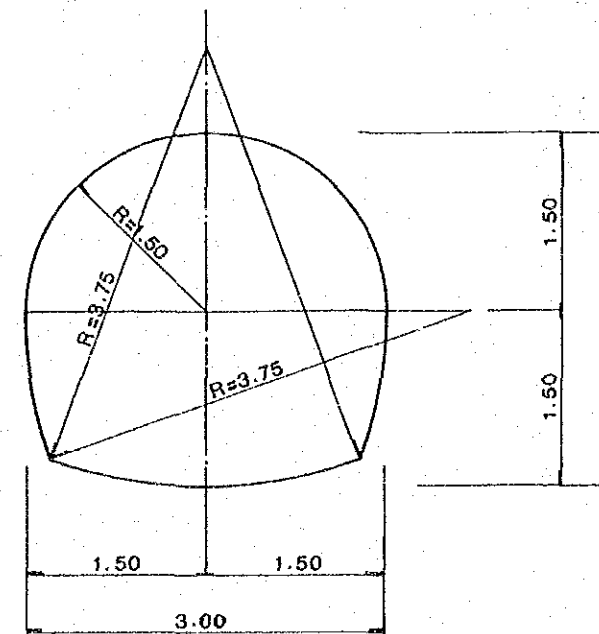
Main Dam



Longitudinal Section



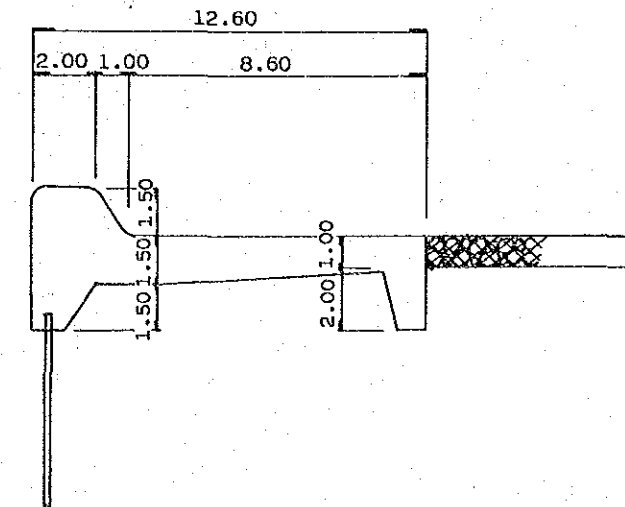
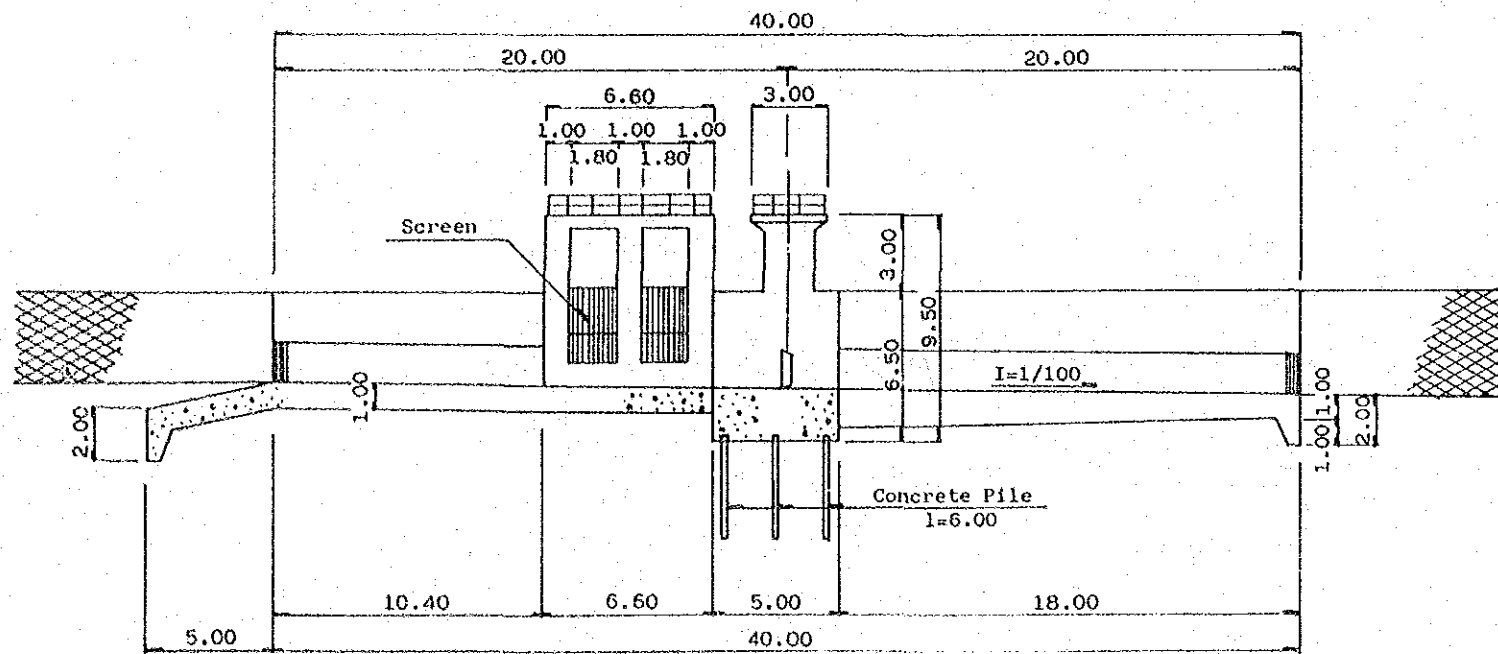
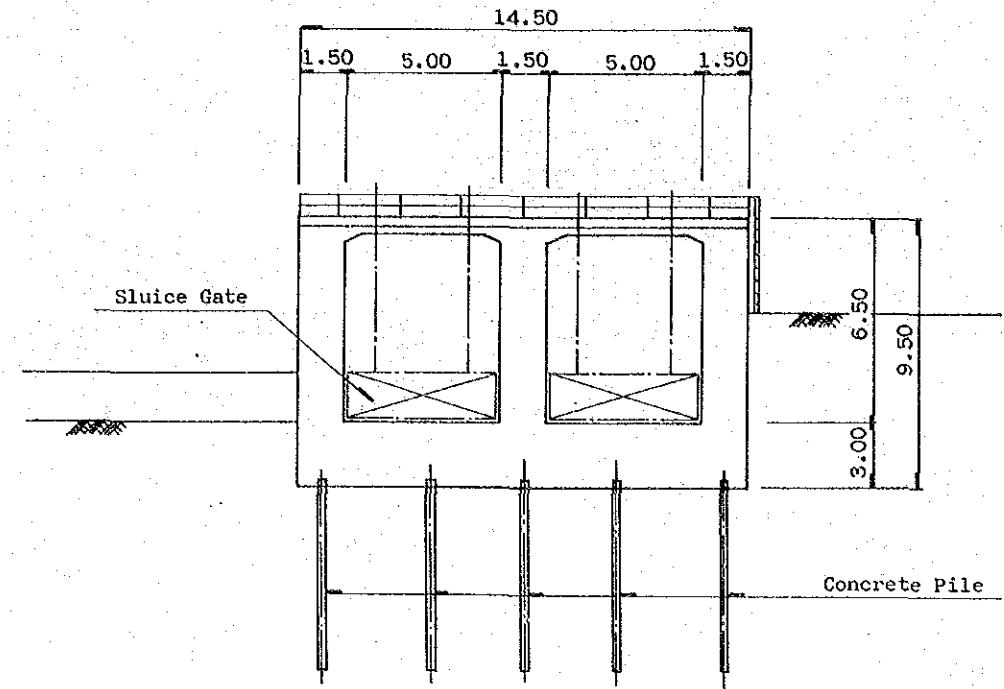
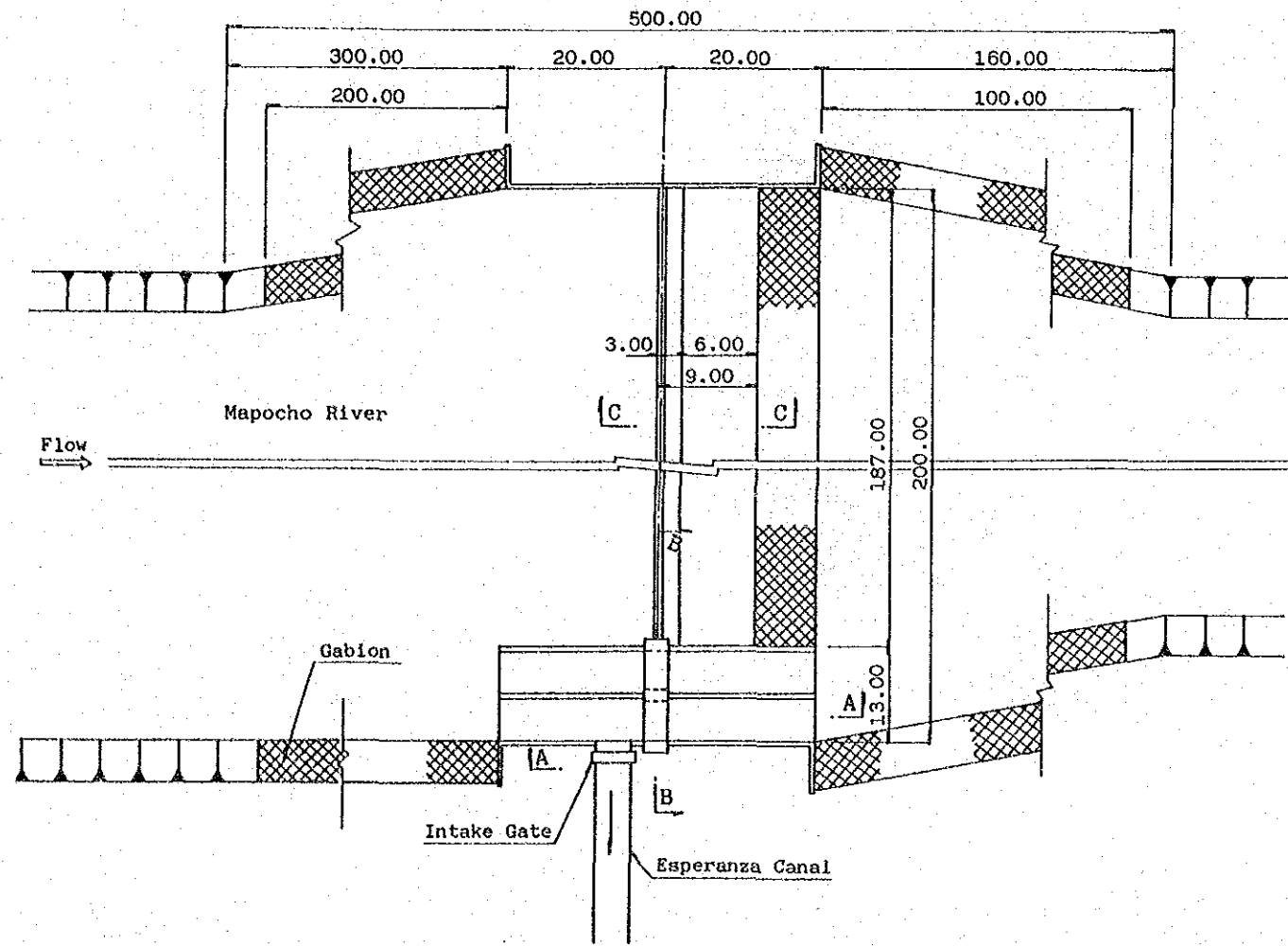
Sub Dam



Section of Temporary Diversion Tunnel

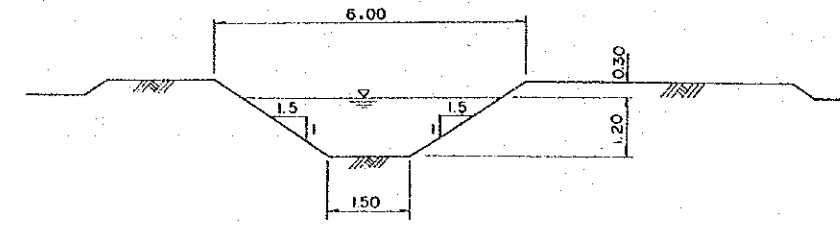
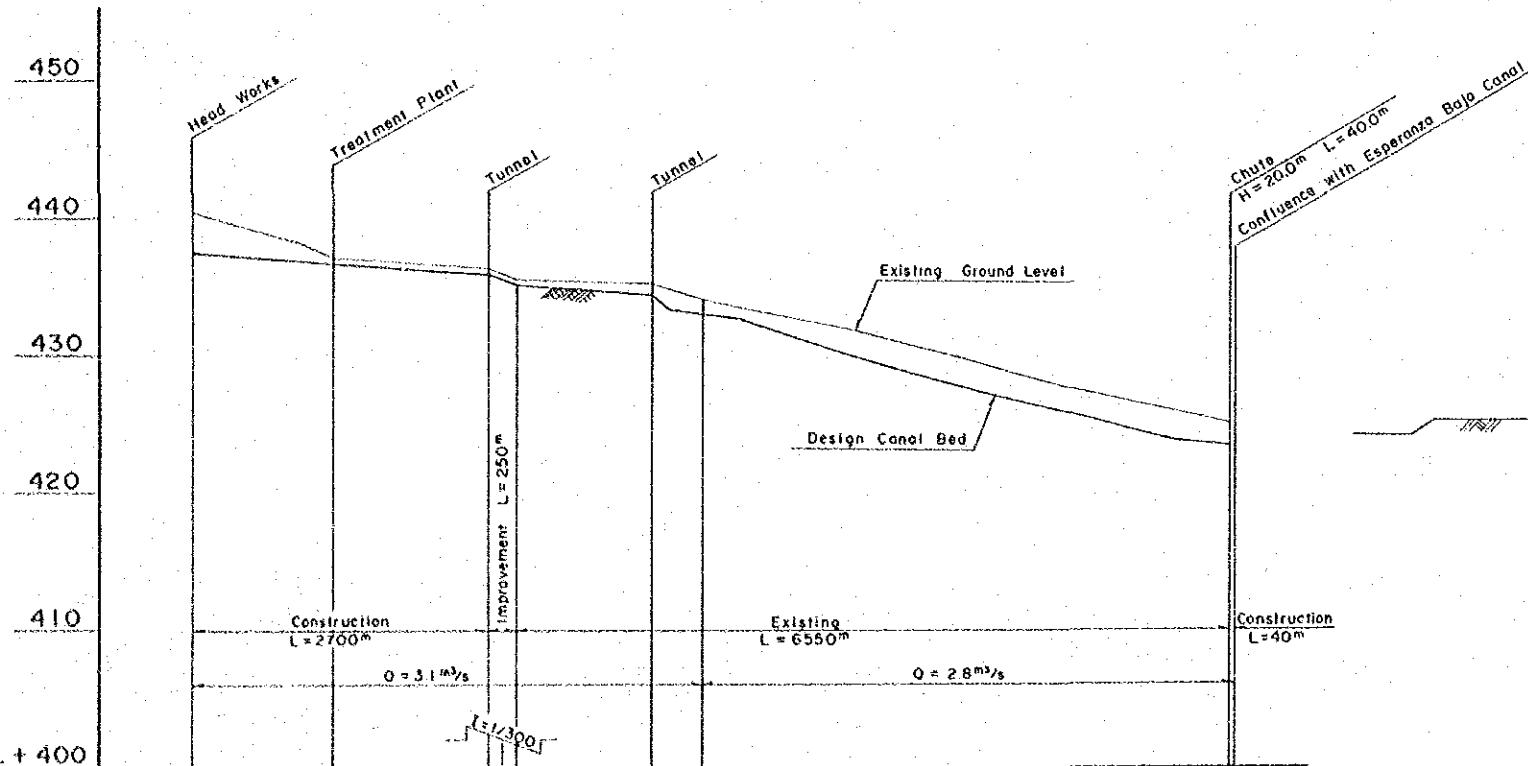
REPUBLIC OF CHILE	
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AGRICULTURAL	
DEVELOPMENT PROJECT	
SECTION OF SABO DAM	
JULY 1986	NO 4
JAPAN INTERNATIONAL COOPERATION AGENCY	

# ESPERANZA HEADWORKS

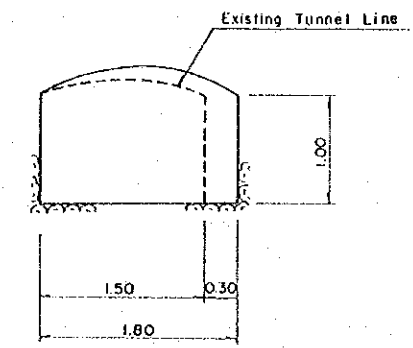


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DEVELOPMENT PROJECT	
ESPERANZA HEADWORKS	
JULY 1986	NO 5
JAPAN INTERNATIONAL COOPERATION AGENCY	

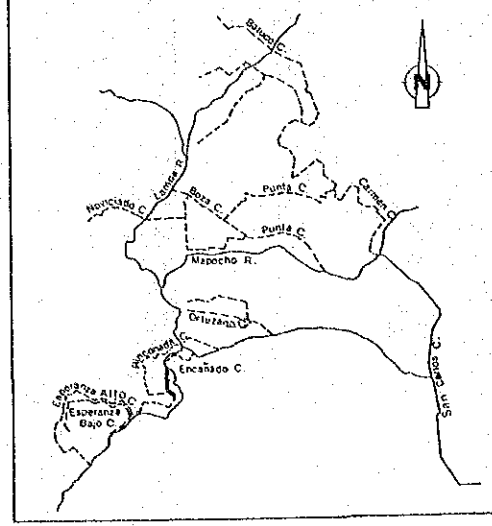
PROFILE AND CROSS SECTIONS ESPERANZA CANAL



TYPICAL SECTION



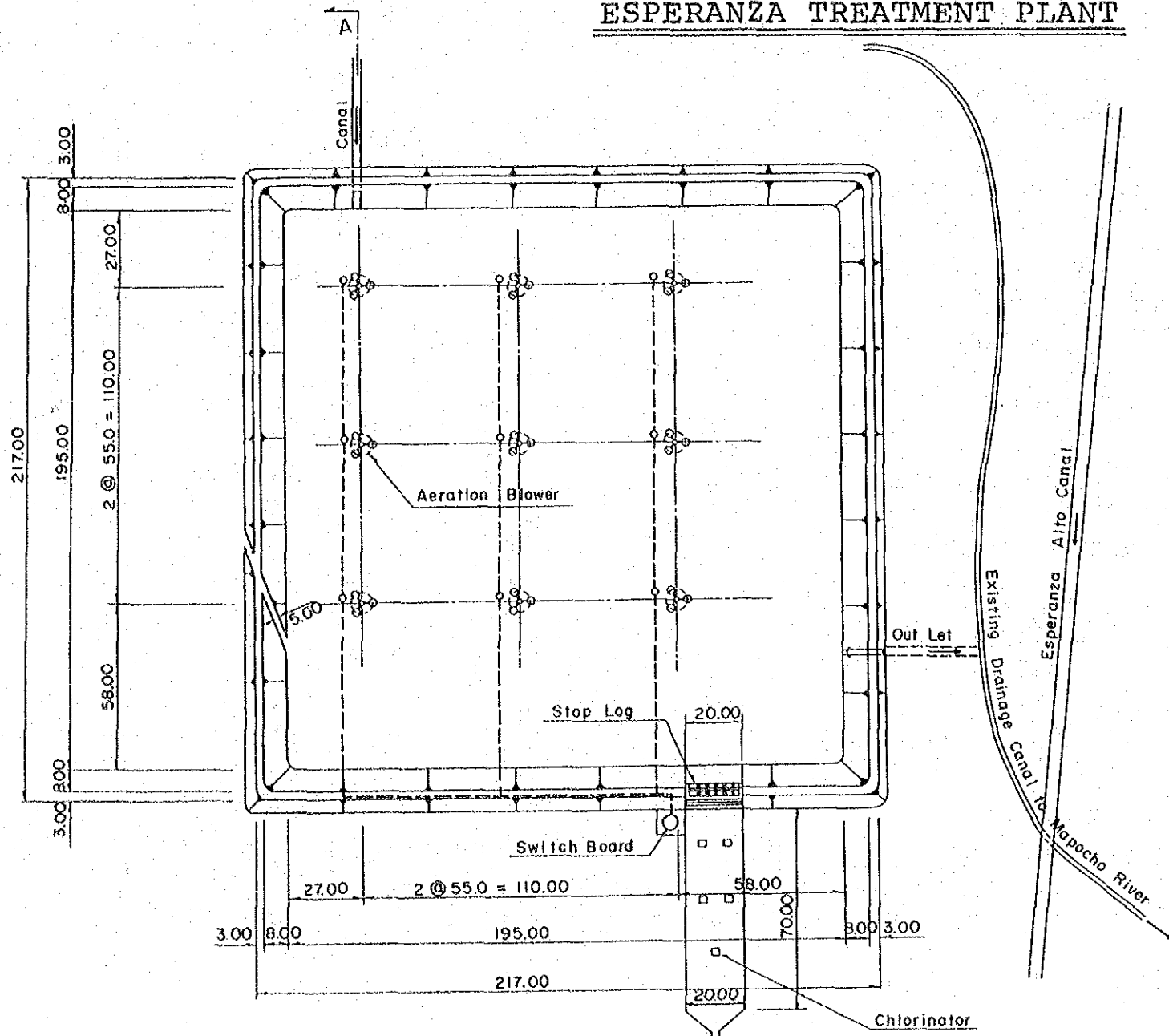
TYPICAL SECTION OF TUNNEL



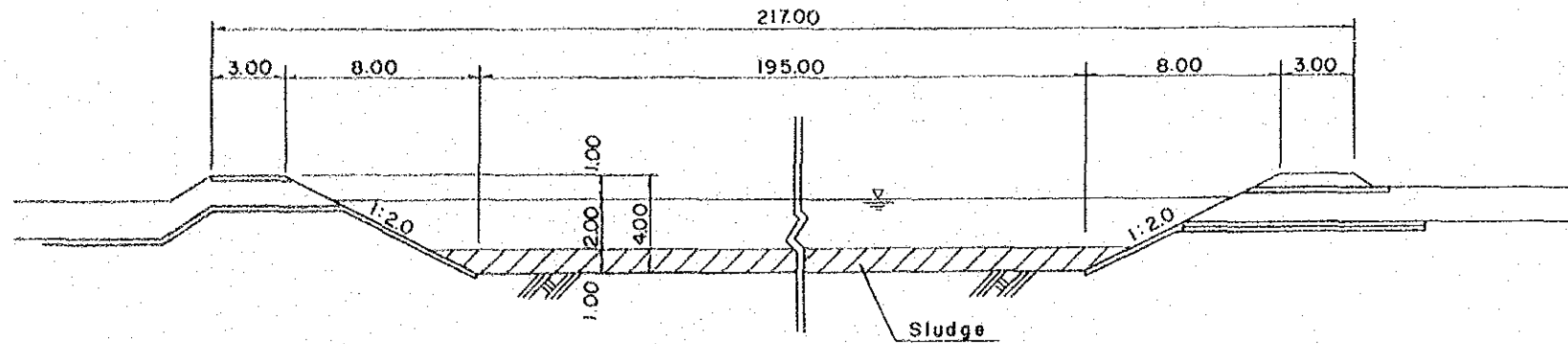
LONGITUDINAL SLOPE	1/1000																		
DESIGN CANAL BED	437.35	436.6	436.4	435.9	435.4	435.2	434.3	434.3	433.08	432.8	430.0	427.8	425.8	423.8	423.5				
GROUND LEVEL	440.5	438.0	437.0	436.7	436.3	435.5	435.3	435.2	434.5	434.0	433.0	432.0	430.0	427.5	426.0	425.0			
ACCUMULATED DISTANCE	0	1000	1300	2000	2700	2950	4000	4200	4350	4650	5000	6000	7000	8000	9000	9500			
STATION	NO.0	NO.1		NO.2		NO.3		NO.4		NO.5		NO.6		NO.7		NO.8		NO.9	

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 PROFILE AND CROSS SECTIONS  
 ESPERANZA CANAL  
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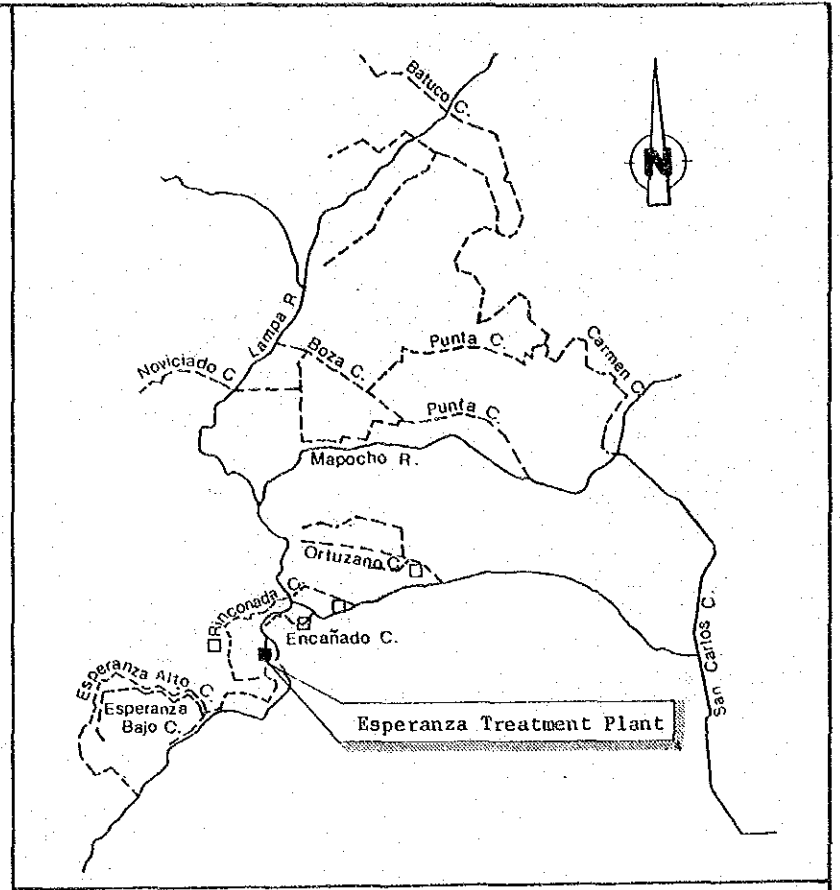
# ESPERANZA TREATMENT PLANT



PLAN

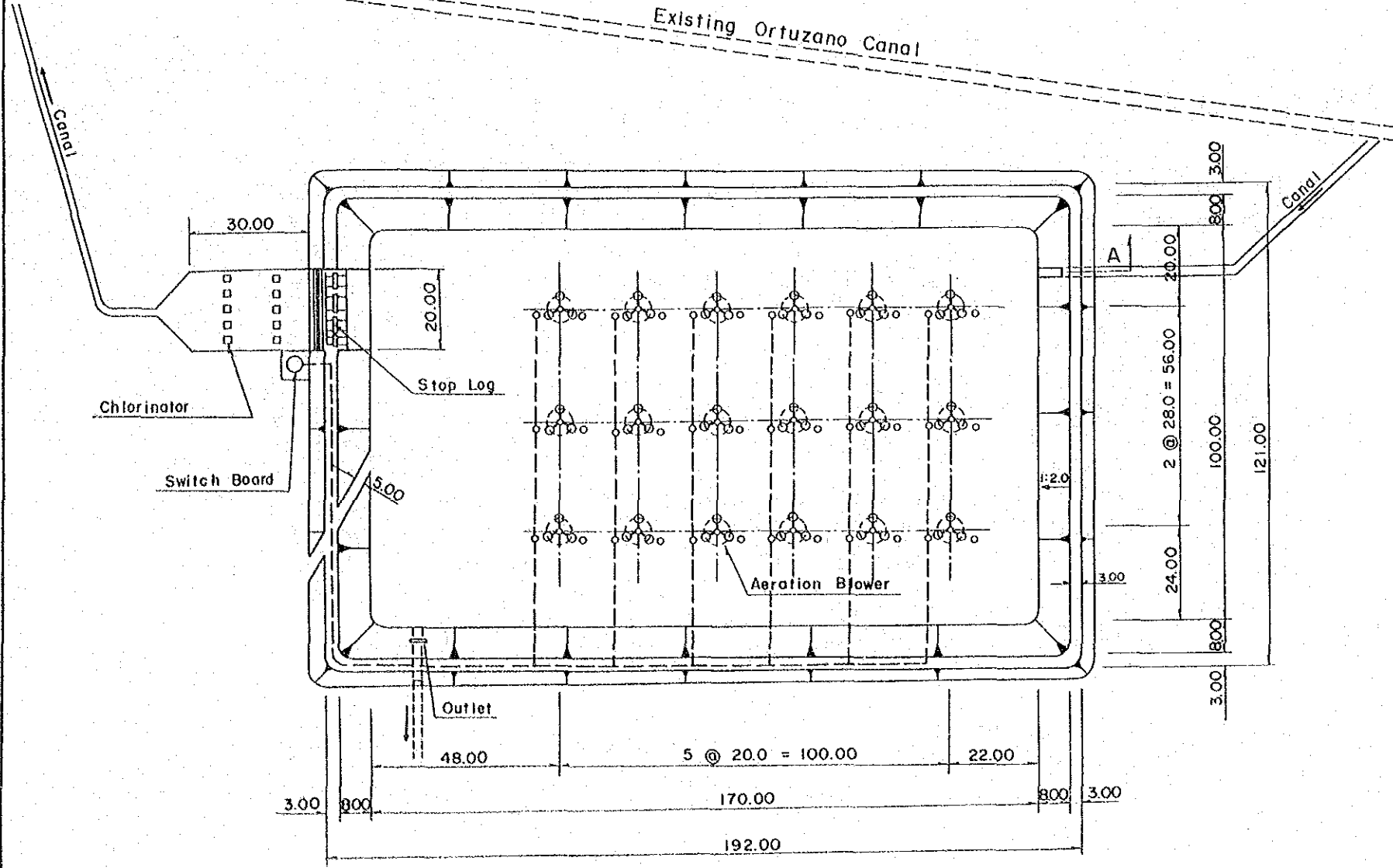


SECTION A - A

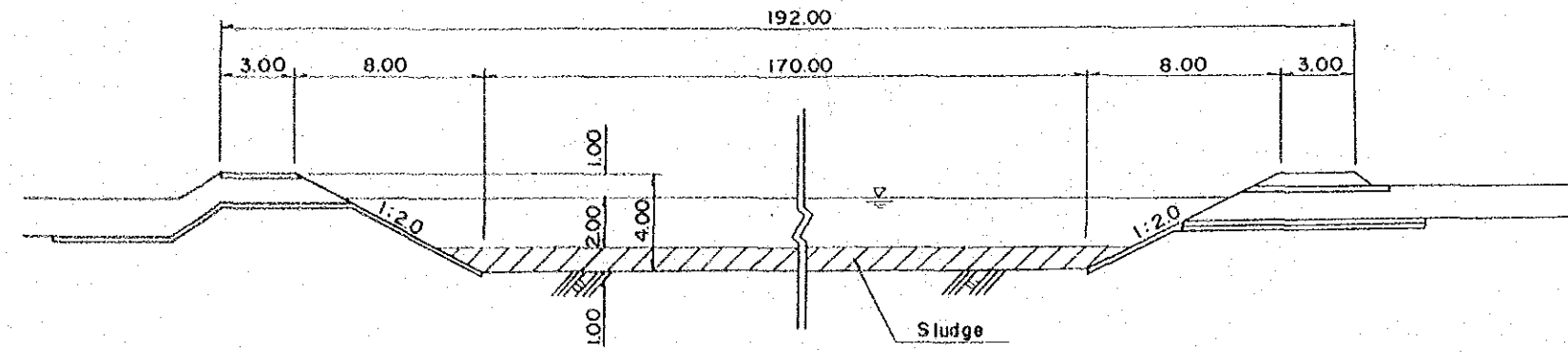


REPUBLIC OF CHILE MINISTRY OF AGRICULTURE MAPOCHO RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT ESPERANZA TREATMENT PLANT JULY 1986 NO 7 JAPAN INTERNATIONAL COOPERATION AGENCY
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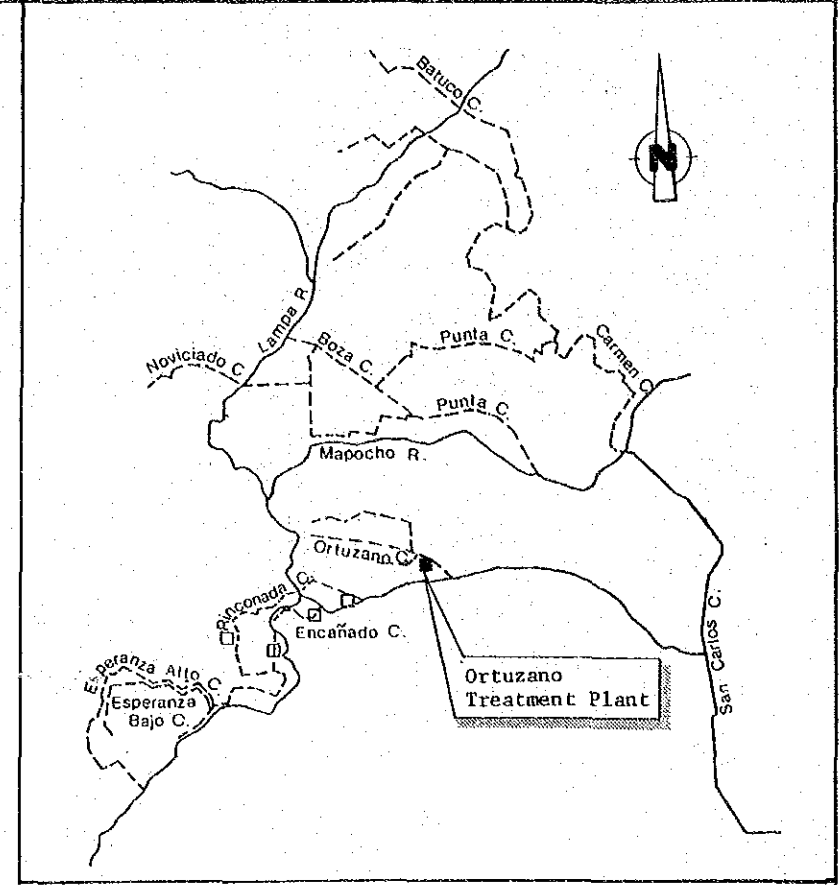
# ORTUZANO TREATMENT PLANT



PLAN

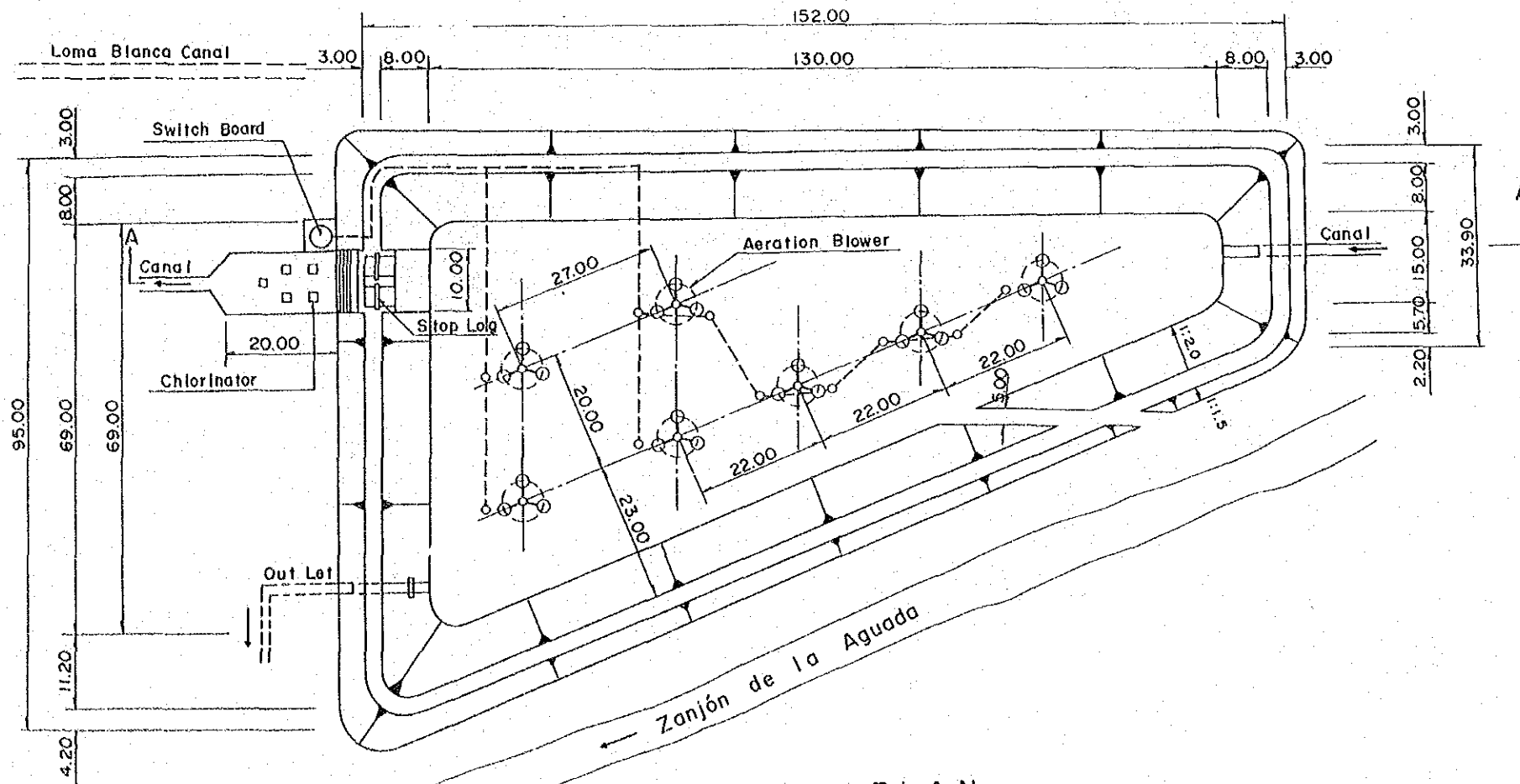


SECTION A - A

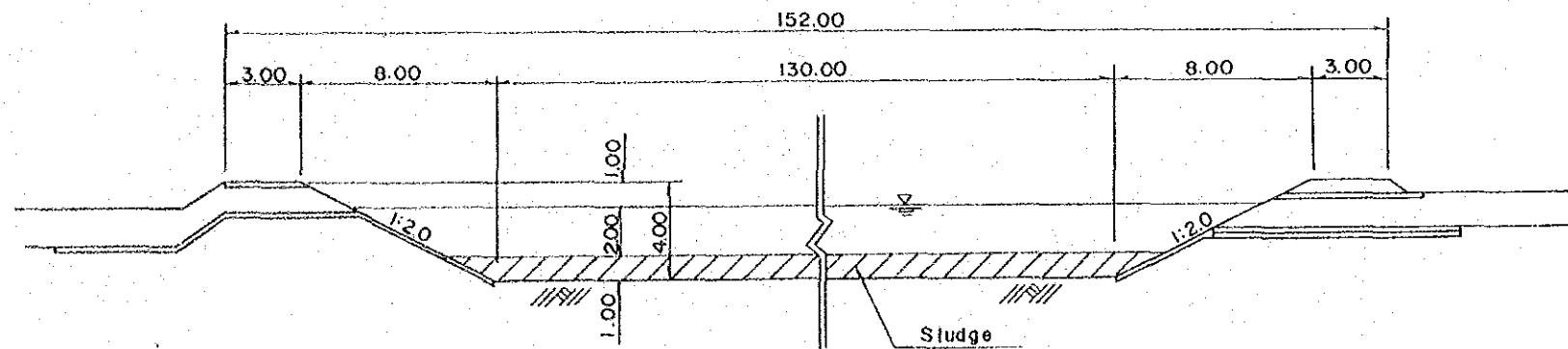


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ORTUZANO TREATMENT PLANT	
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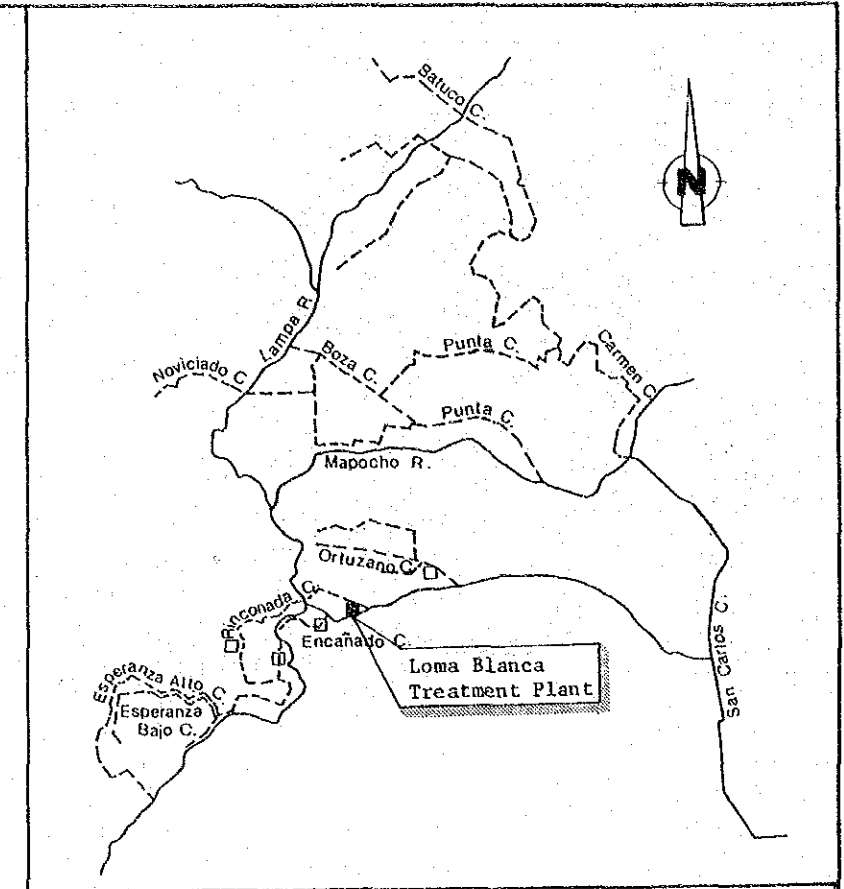
# LOMA BLANCA TREATMENT PLANT



PLAN

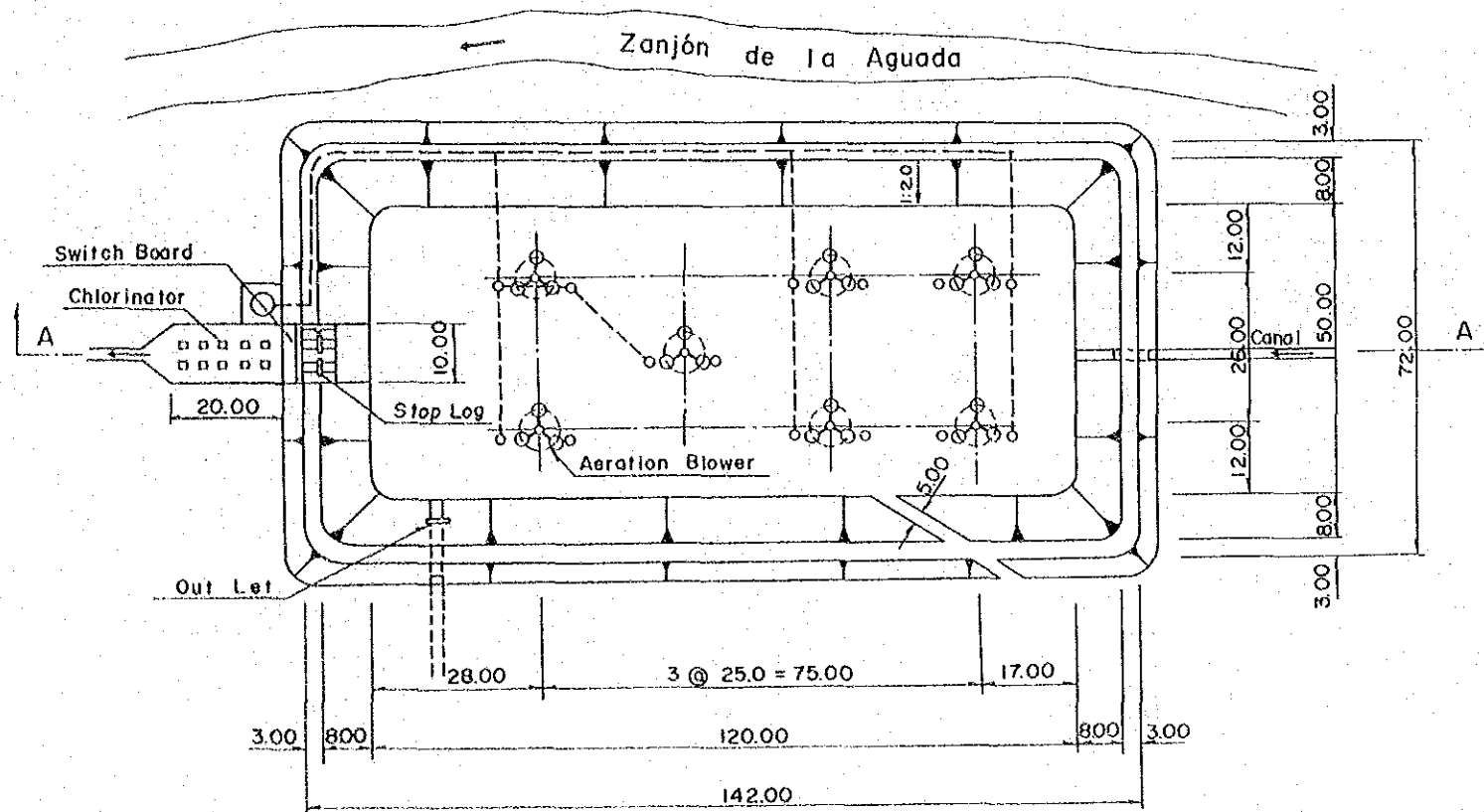


SECTION A - A

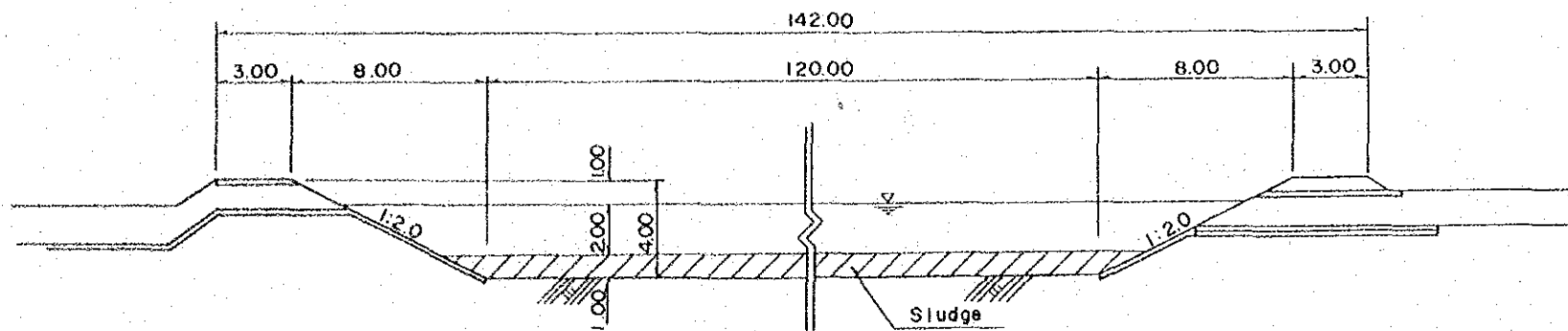


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LOMA BLANCA TREATMENT PLANT	
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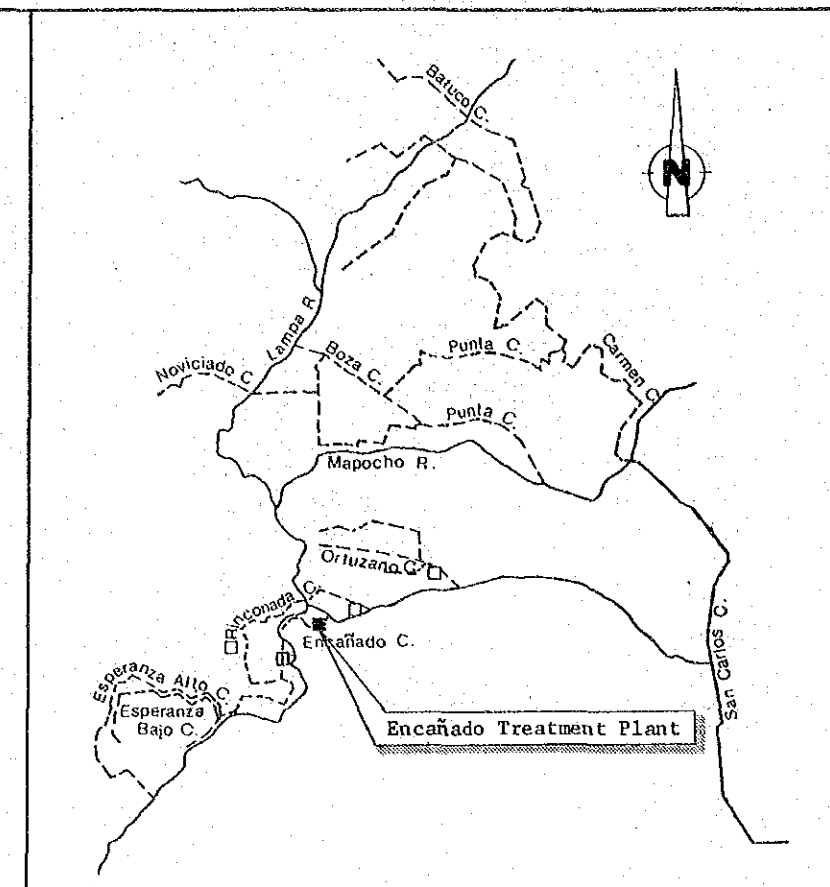
# ENCAÑADO TREATMENT PLANT



PLAN

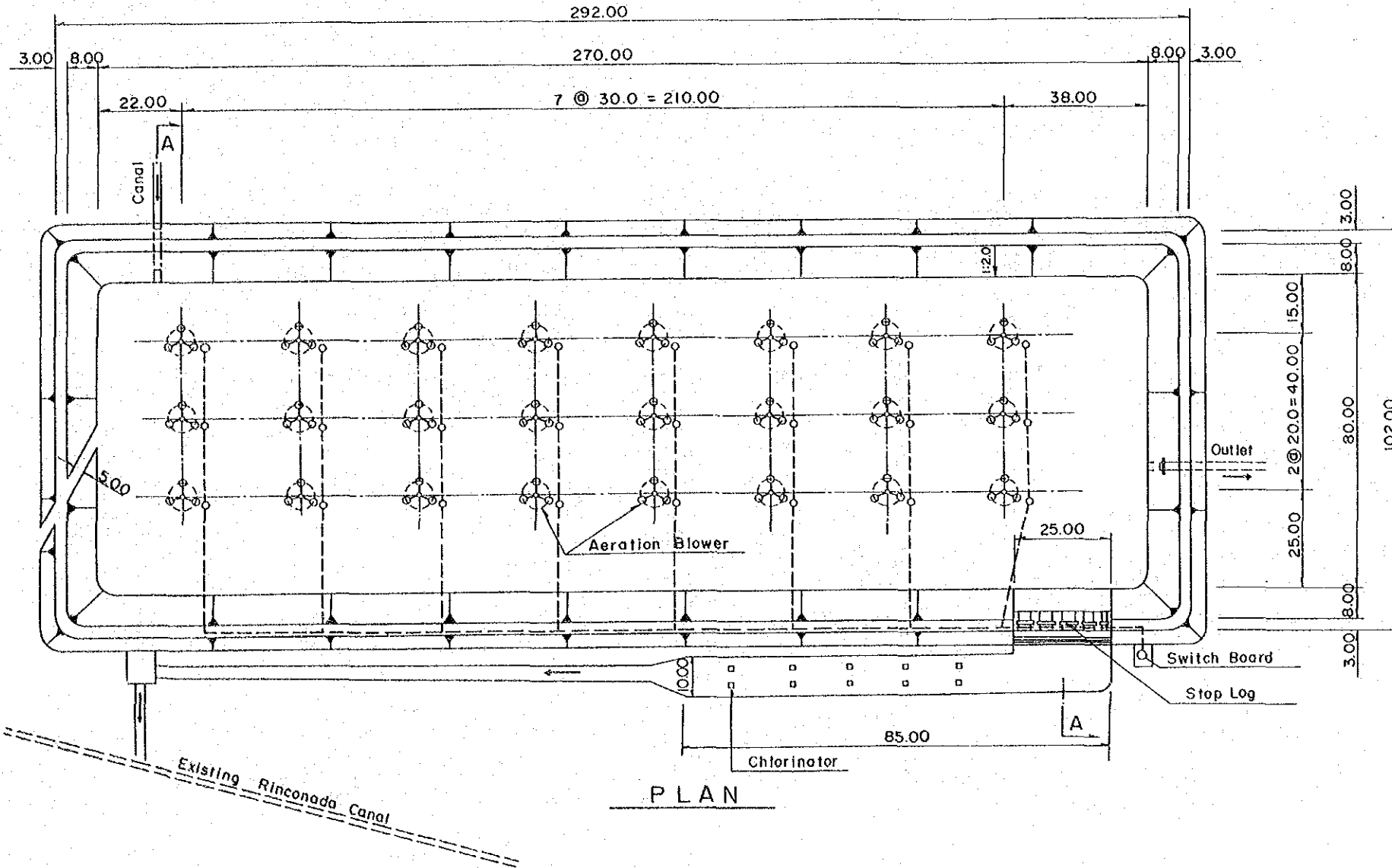


SECTION A-A

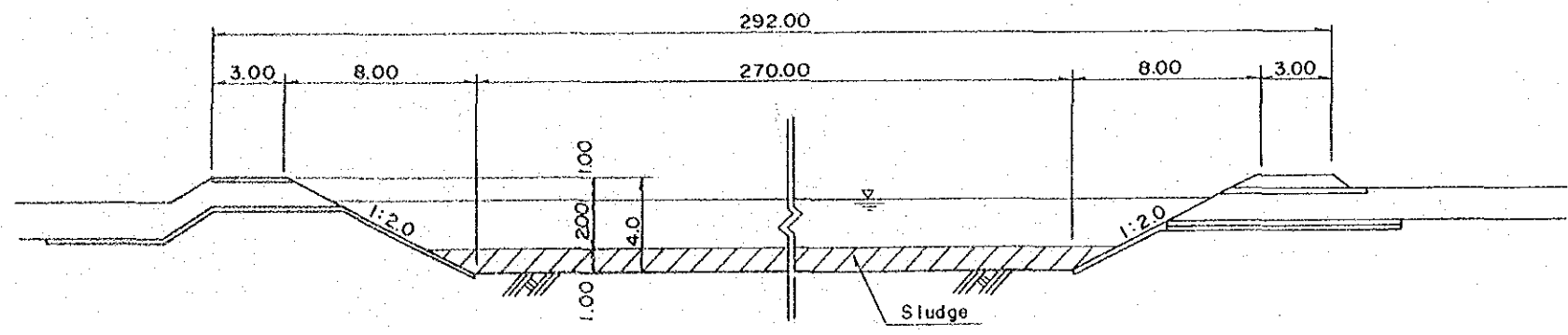


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ENCAÑADO TREATMENT PLANT	
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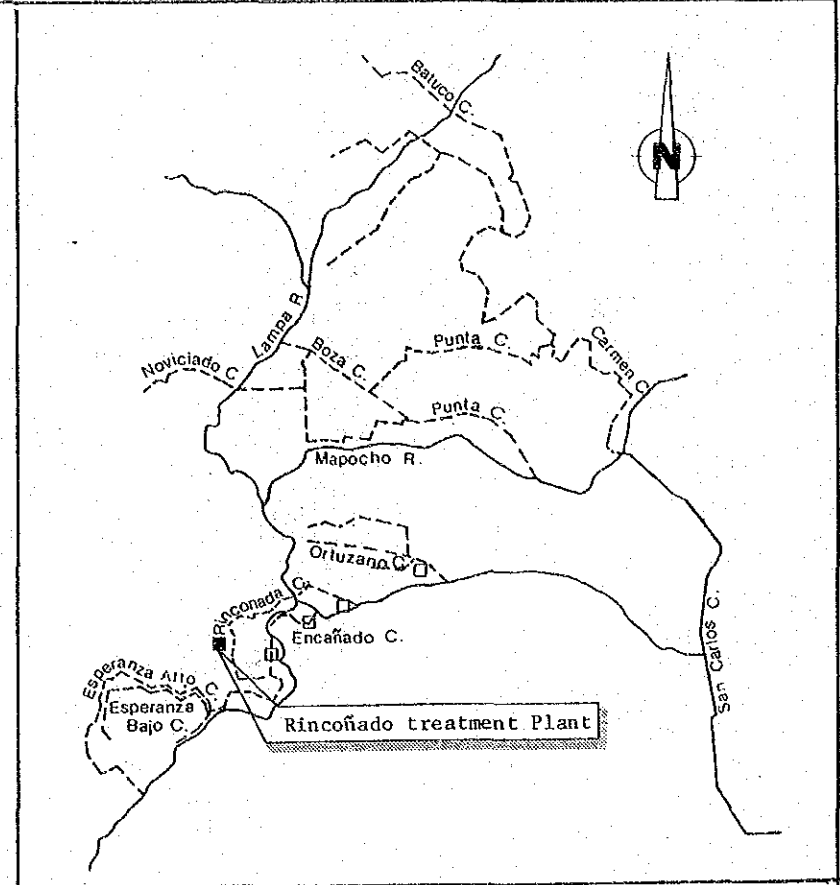
# RINCONADA TREATMENT PLANT



PLAN



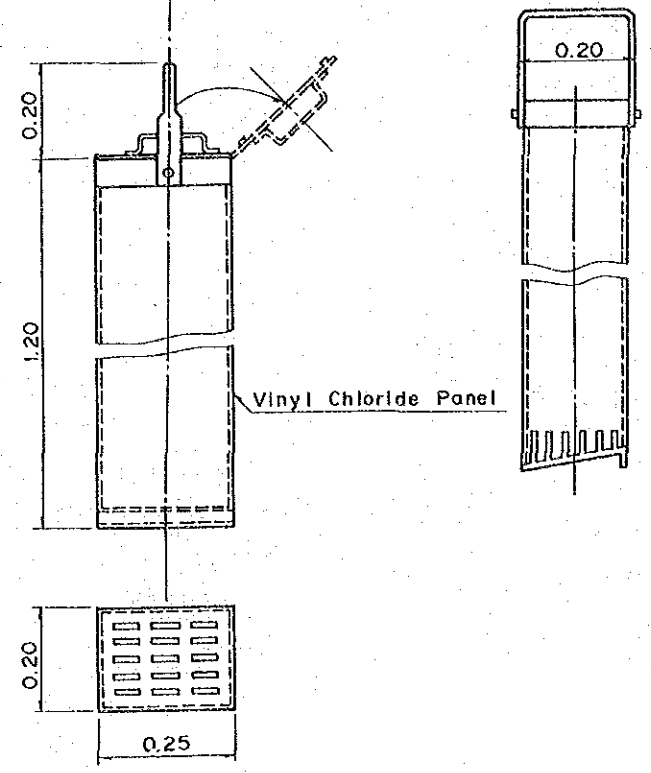
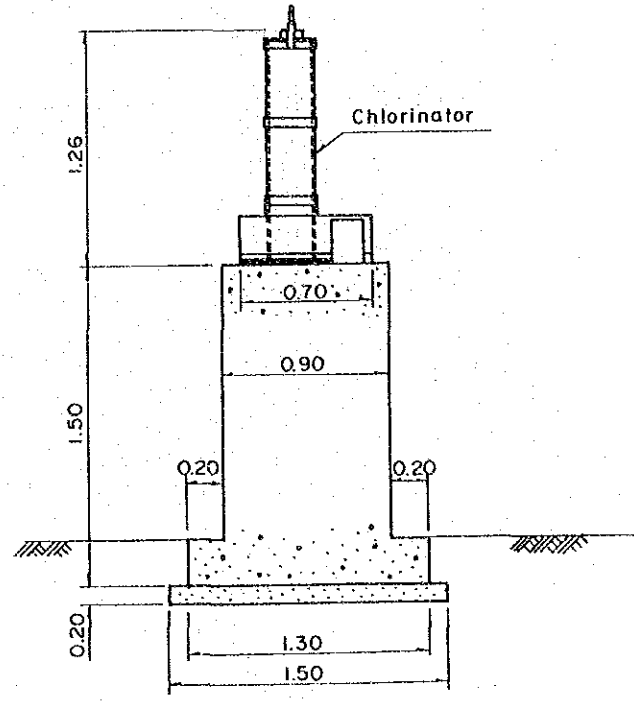
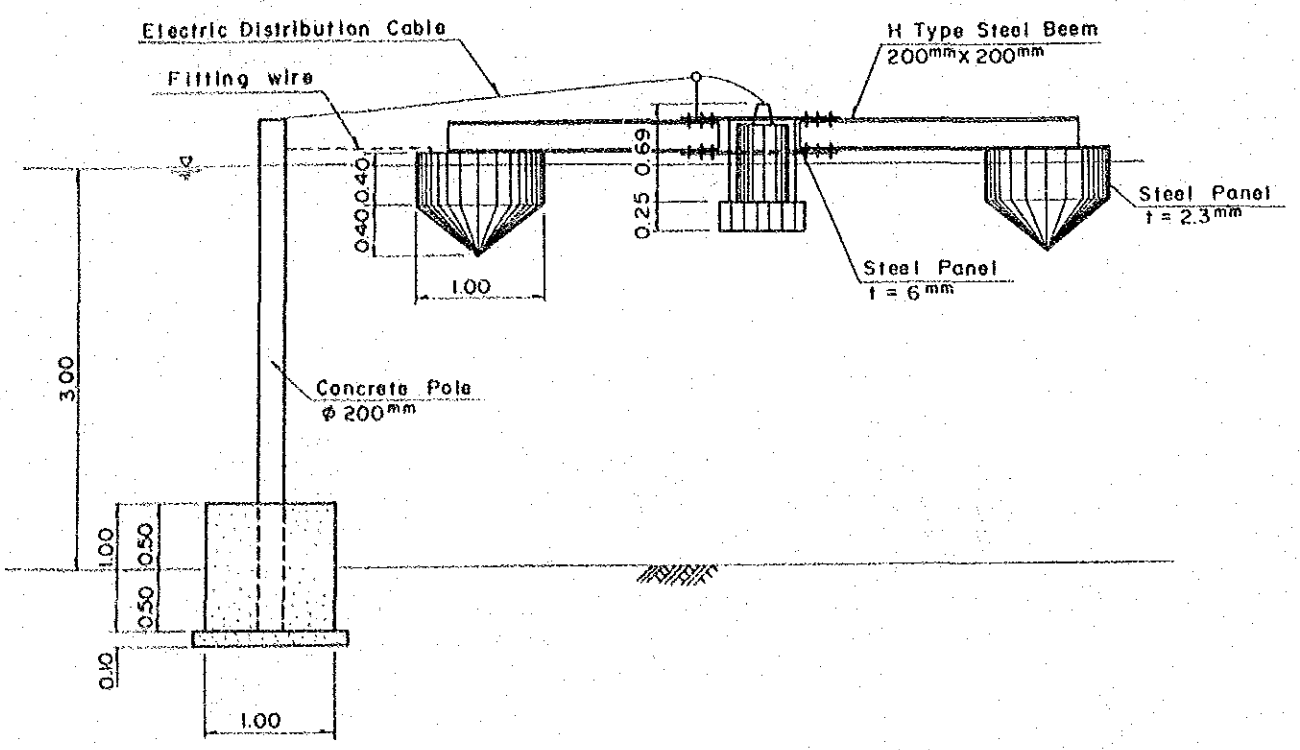
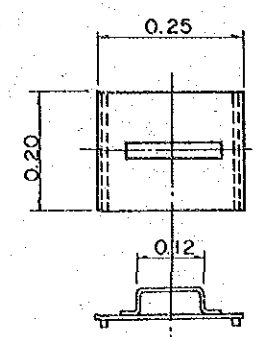
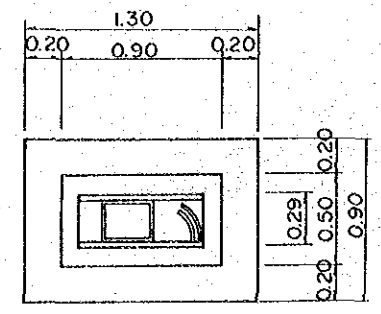
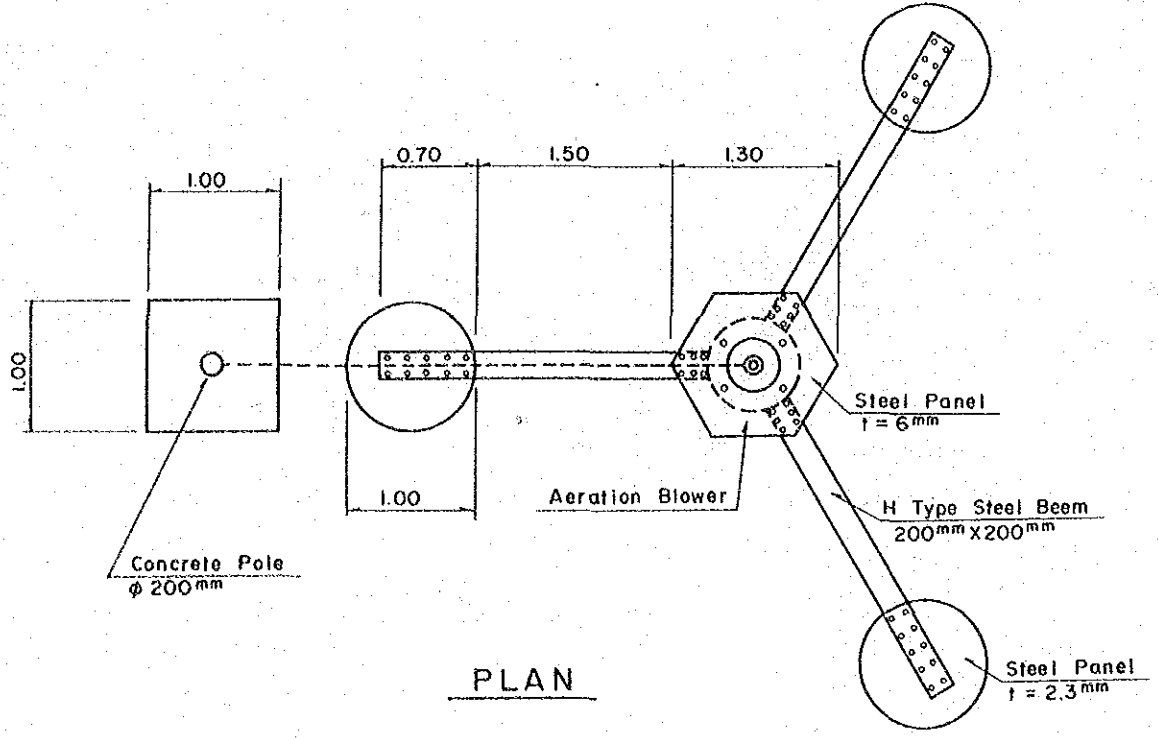
SECTION A - A



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RINCONADA TREATMENT PLANT
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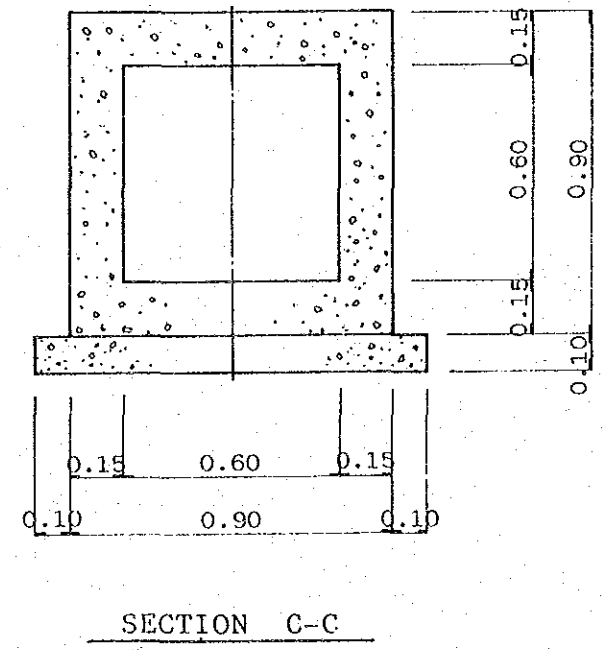
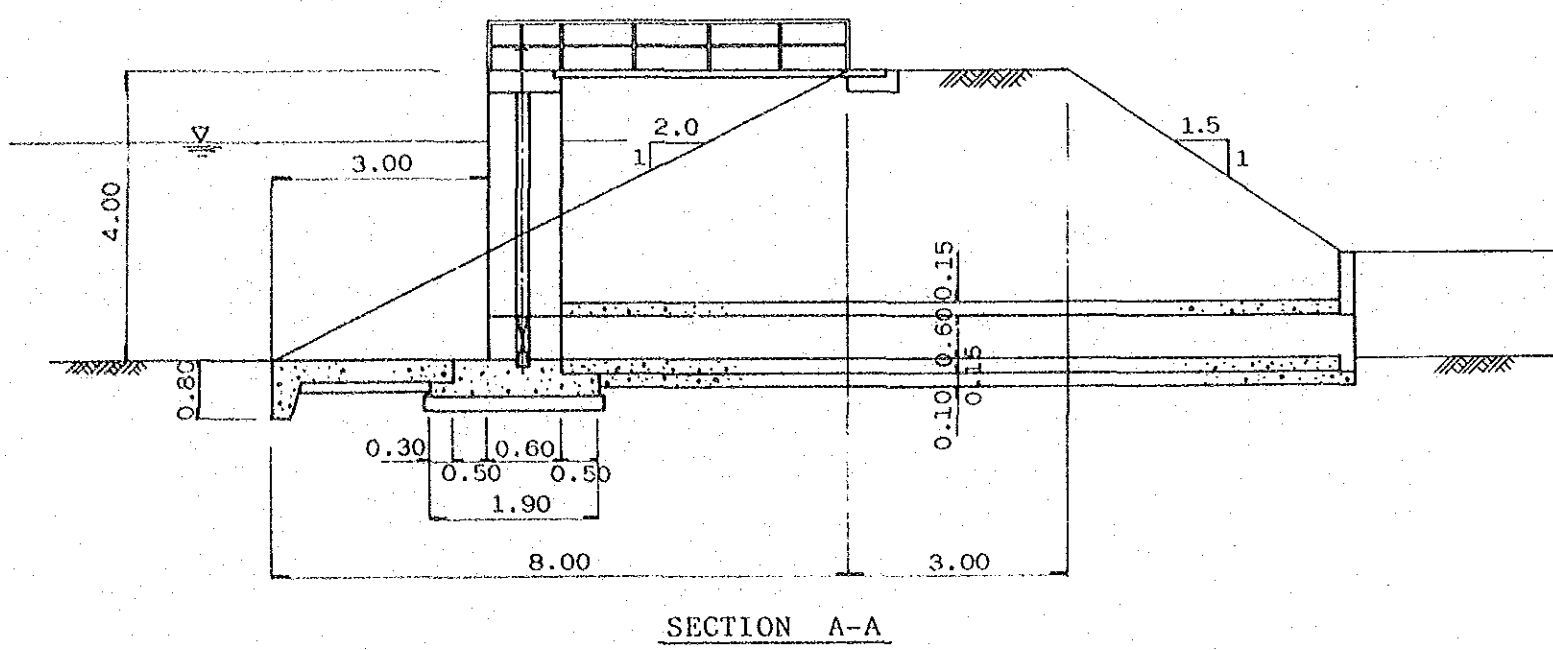
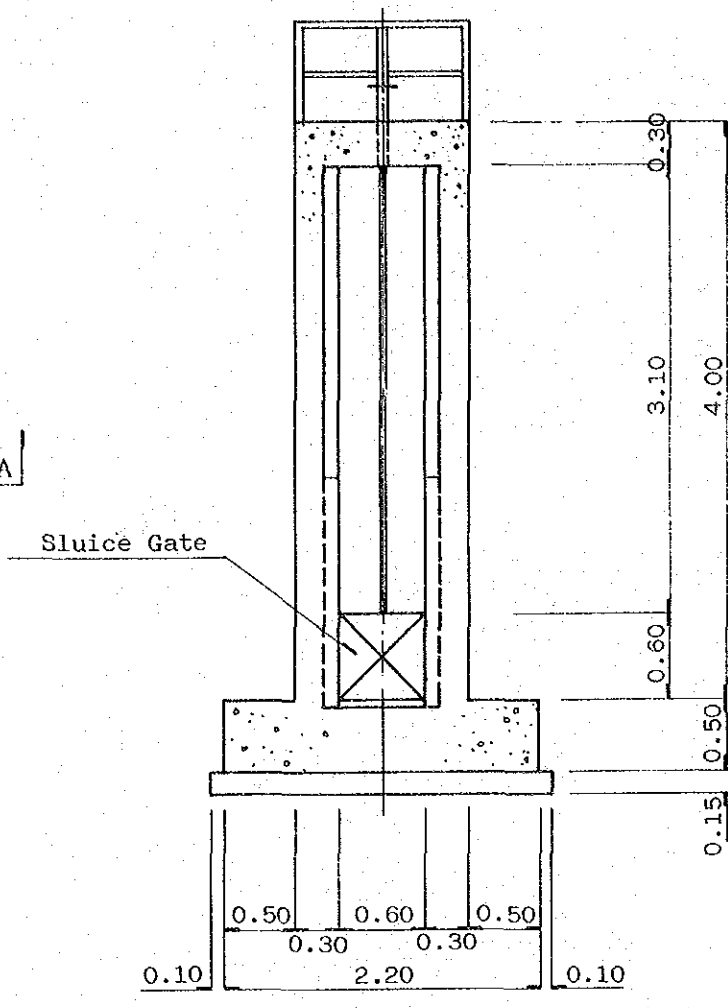
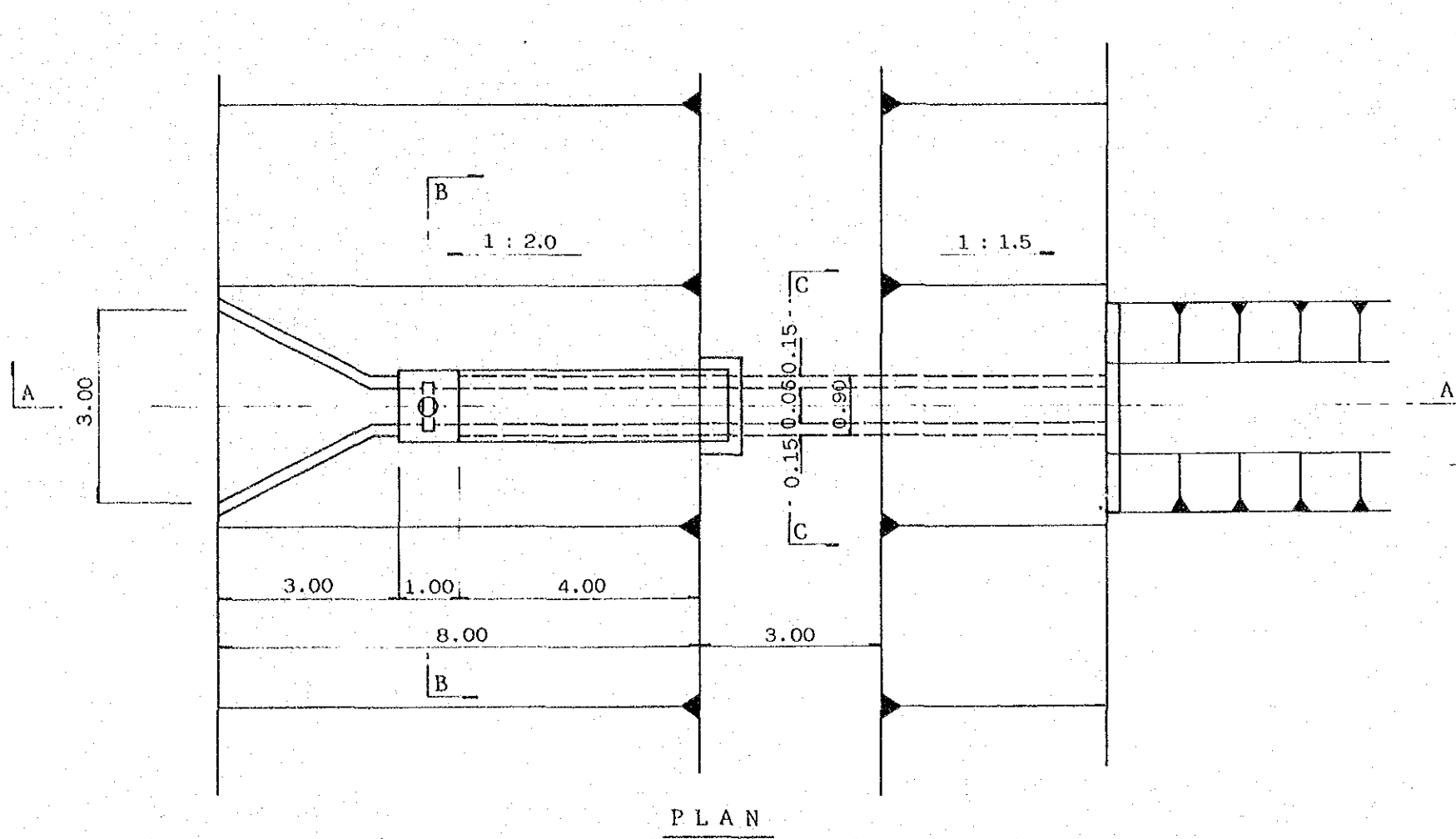


DETAILS AERATOR AND CHLORINATOR



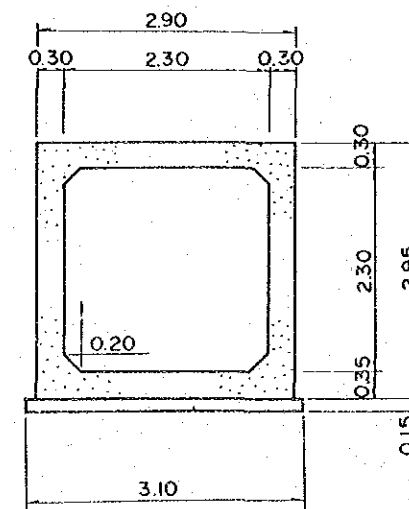
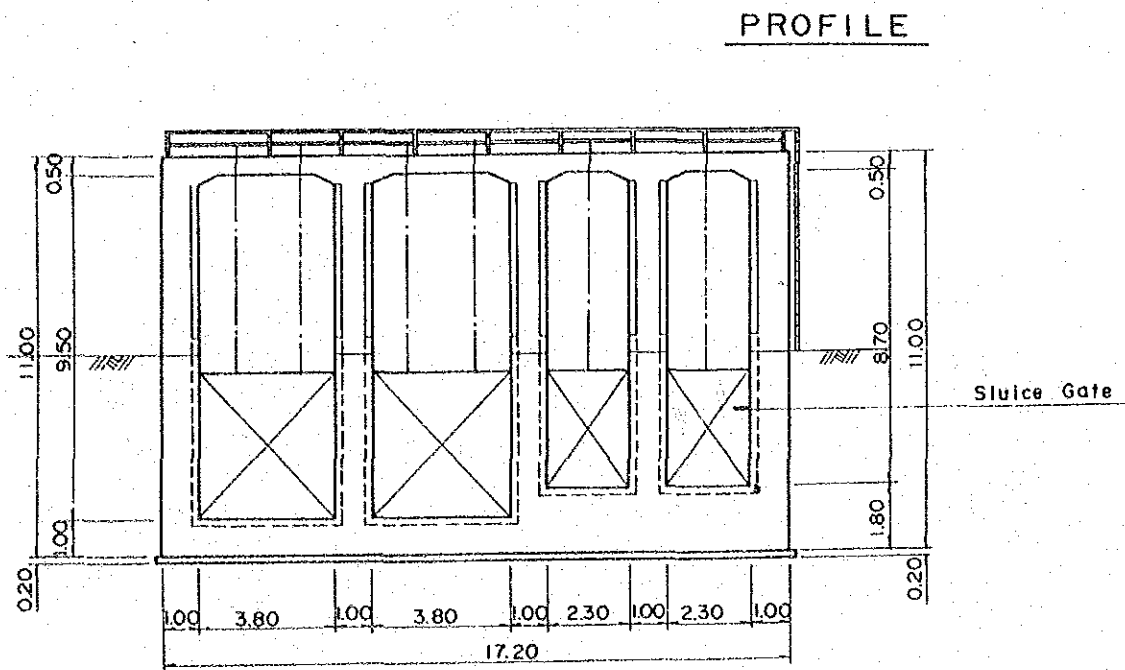
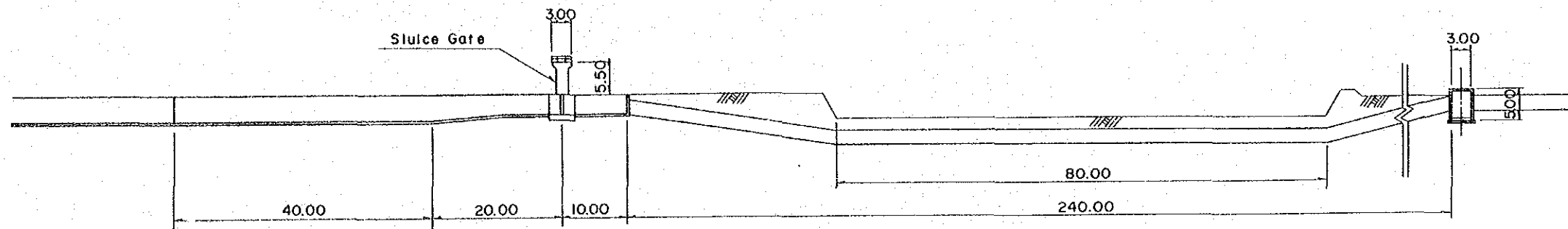
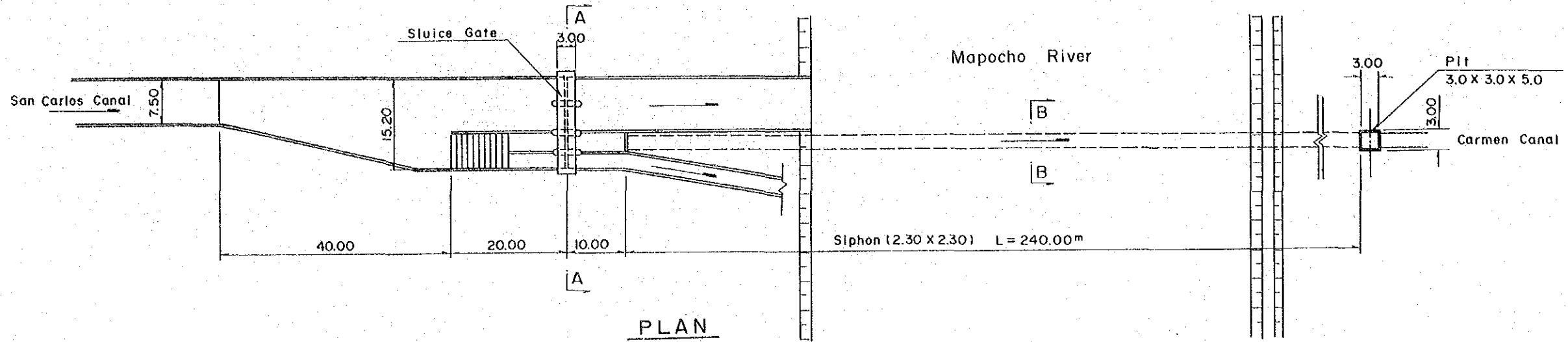
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DEVELOPMENT PROJECT	
DETAILS AERATOR AND	
CHLORINATOR	
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DETAILS OUTLET WORKS



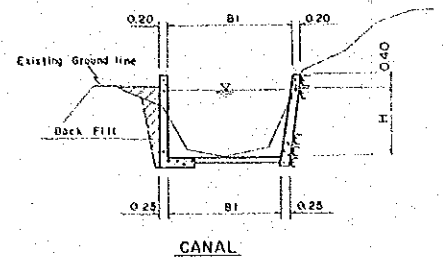
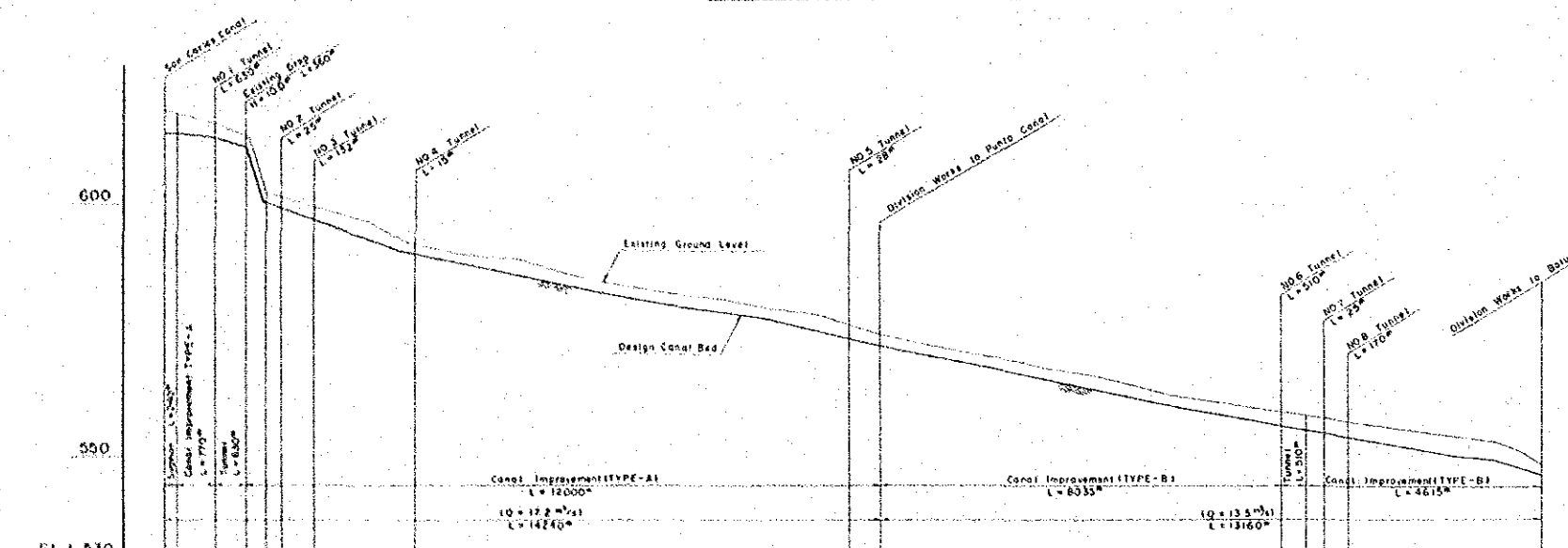
REPUBLIC OF CHILE
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DEVELOPMENT PROJECT
DETAILS OUTLET WORKS
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# SIPHON

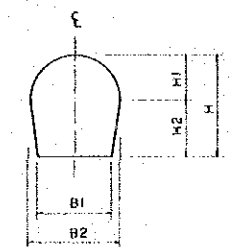


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SIPHON	
JULY 1986	NO 14
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PROFILE AND CROSS SECTIONS CARMEN CANAL



TYPE	(UNIT: m)		
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A	3.00	3.22	1.80
B	3.20	3.44	2.00

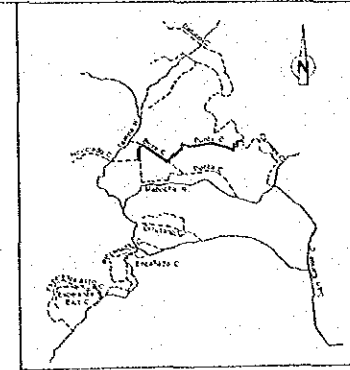
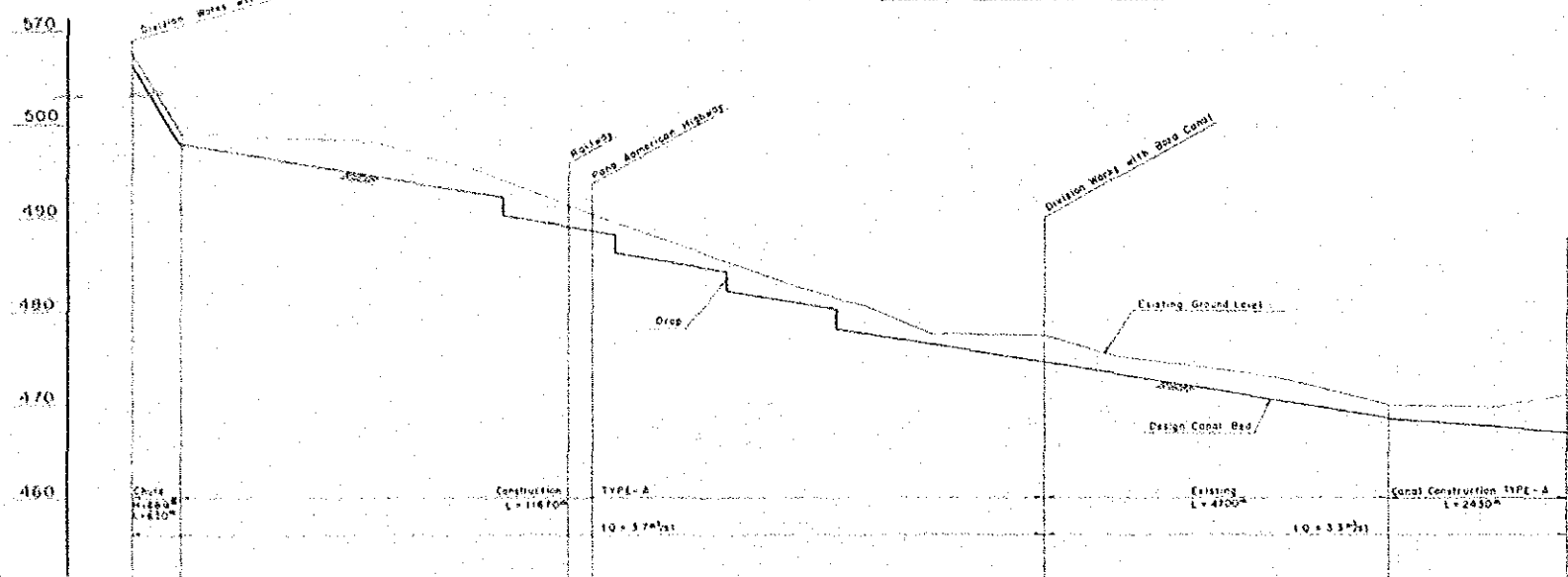


TUNNEL	(UNIT: m)				
	B1	B2	H1	H2	H
NO.1	1.20	1.80	0.90	1.20	2.10
NO.2,3,4,5	2.00	2.40	1.20	1.50	2.70
NO.6,7,8	1.50	2.20	1.20	1.20	2.40

STATION	ACCUMULATED DISTANCE	GROUND LEVEL	DESIGN CANAL BED	LONGITUDINAL SLOPE
NO.0	0	614.3	614.0	1:1500
NO.1	230	614.0	613.2	
NO.2	1010	613.2	611.2	
NO.3	1640	612.3	609.3	
NO.4	2318	607.4	606.6	
NO.5	3000	596.5	593.0	
NO.6	4000	592.0	590.0	
NO.7	5000	589.75	587.75	
NO.8	6000	588.0	585.9	
NO.9	7000	586.2	583.8	
NO.10	8000	584.0	581.7	
NO.11	10000	582.0	580.1	
NO.12	11000	581.0	578.5	
NO.13	12000	579.7	577.2	
NO.14	13000	577.8	574.7	
NO.15	13620	575.4	573.0	
NO.16	14000	574.1	572.2	
NO.17	14240	573.9	571.7	
NO.18	15000	571.9	570.1	
NO.19	16000	570.2	568.1	
NO.20	17000	568.2	566.2	
NO.21	18000	566.4	564.1	
NO.22	19000	564.8	562.2	
NO.23	20000	562.4	560.2	
NO.24	21000	560.6	558.3	
NO.25	22000	558.1	556.5	
NO.26	22275	558.0	556.2	
NO.27	22785	558.1	555.3	
NO.28	23000	557.8	554.8	
NO.29	23105	557.6	554.6	
NO.30	23500	556.9	554.0	
NO.31	24000	556.3	553.1	
NO.32	25000	555.0	551.6	
NO.33	26000	553.6	549.9	
NO.34	26500	553.0	549.4	
NO.35	27000	551.4	547.9	
NO.36	27400	548.6	546.4	

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 CARMEN CANAL  
 JULY 1986 NO. 15  
 JAPAN INTERNATIONAL  
 COOPERATION AGENCY

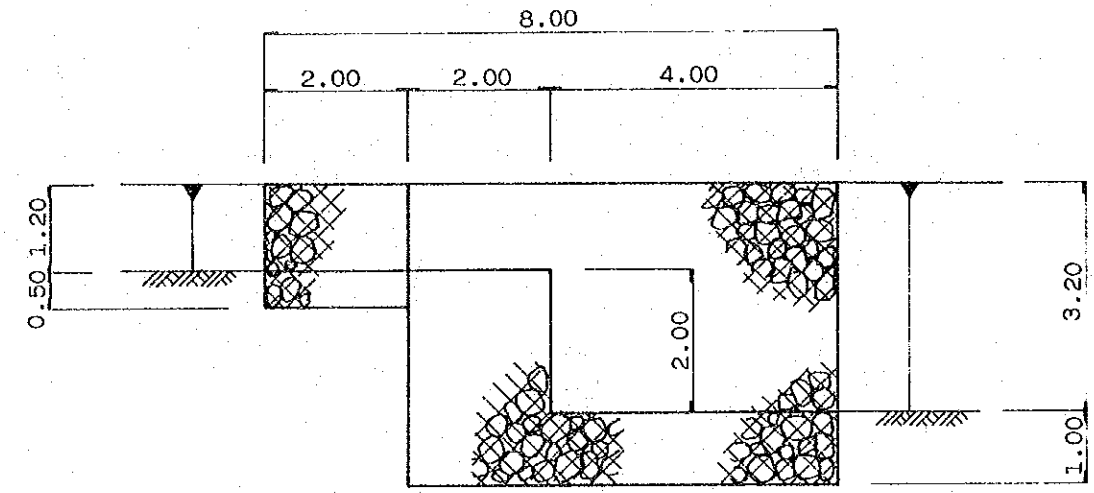
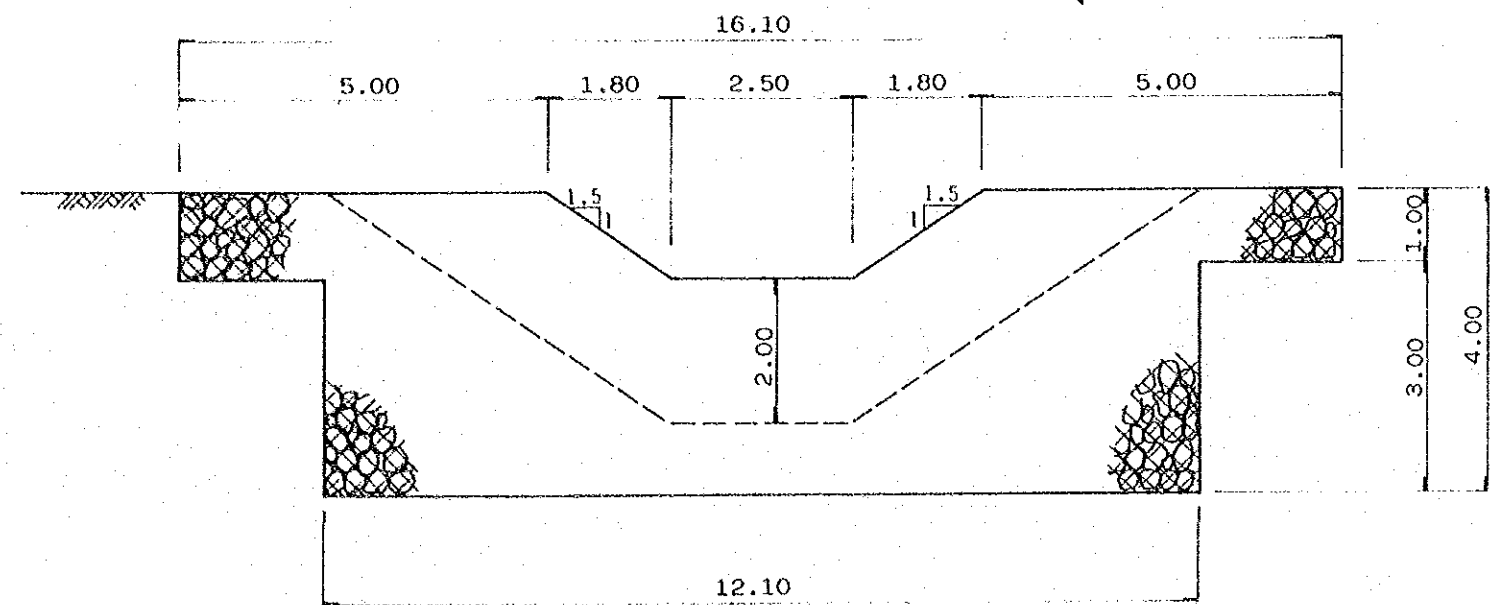
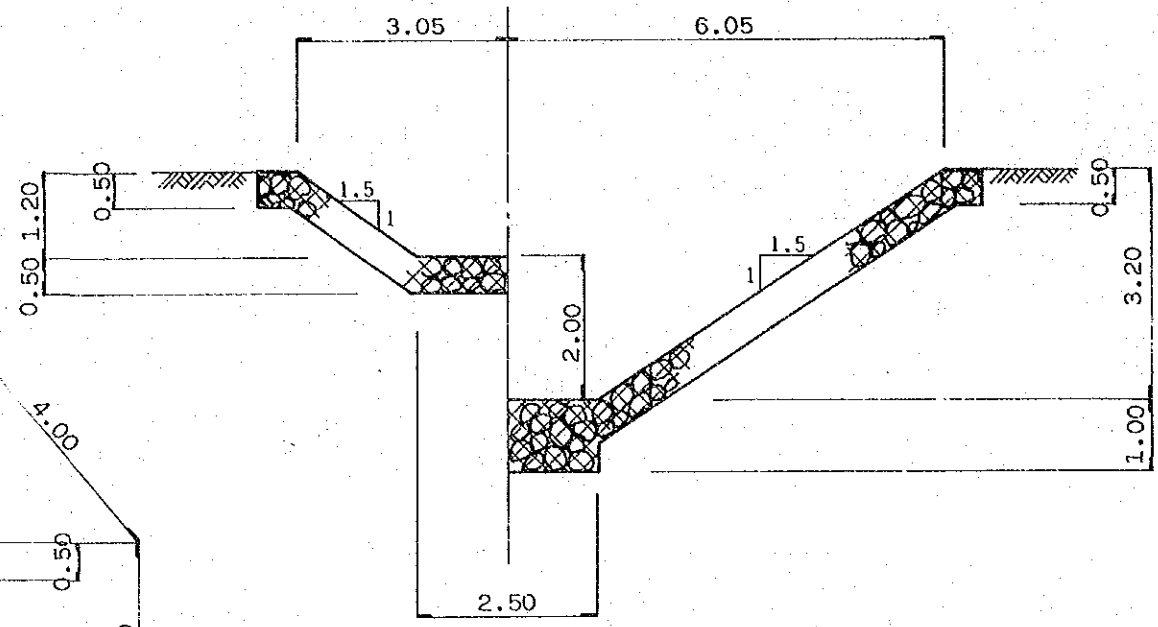
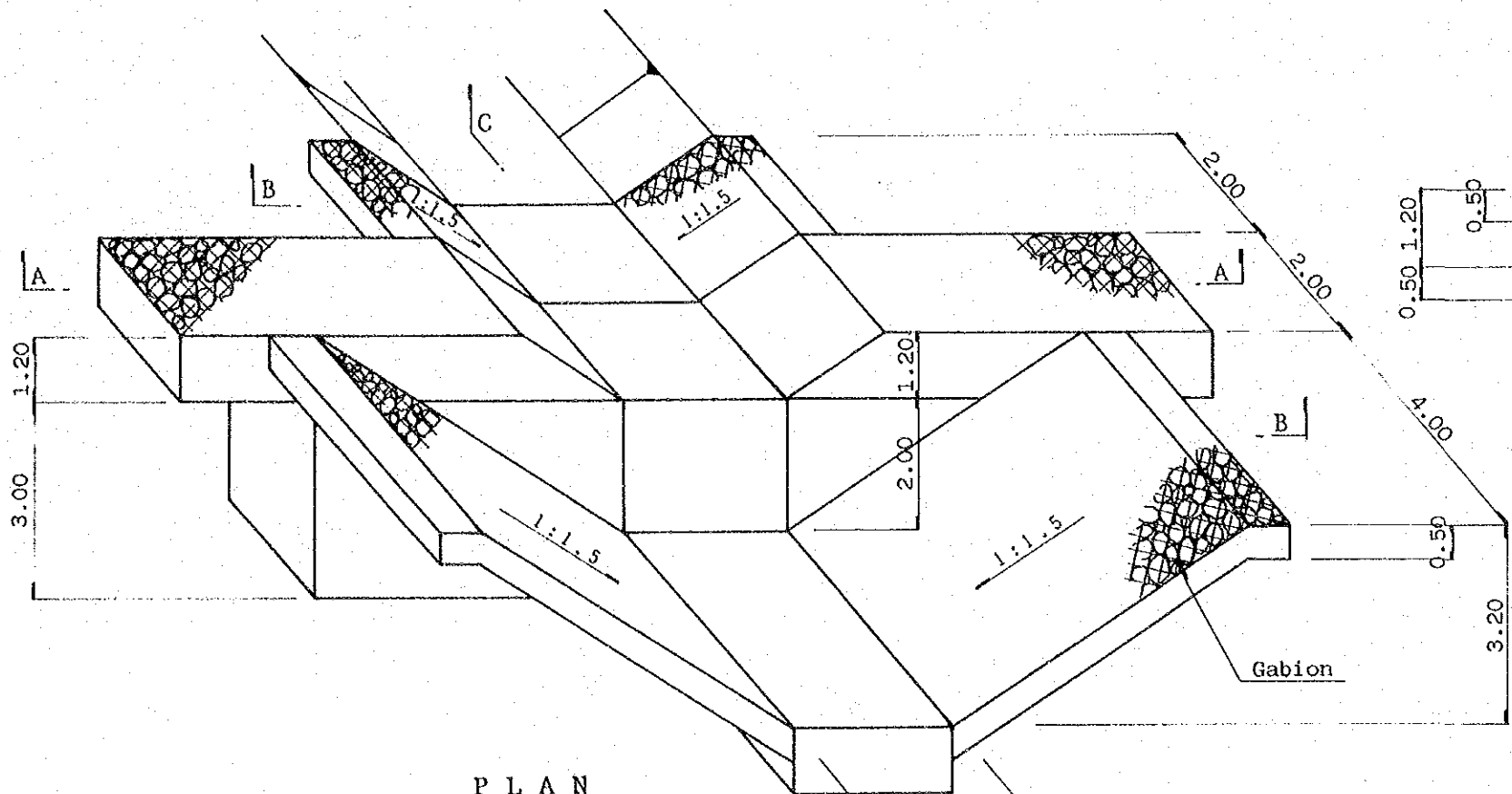
PROFILE AND CROSS SECTIONS PUNTA CANAL



STATION	ACCUMULATED DISTANCE	GROUND LEVEL	DESIGN CANAL BED	CONVENTIONAL SLOPE
NO. 0	0	568.0	566.5	10 = 3.7%
NO. 1	633	499.1	497.9	
NO. 2	1000	500.2	497.4	
NO. 3	2000	503.8	496.2	
NO. 4	3000	498.9	494.9	
NO. 5	4000	497.5	494.6	
NO. 6	5000	494.4	493.7	
NO. 7	6000	492.9	492.9	
NO. 8	7000	492.4	492.4	
NO. 9	8000	489.2	488.5	
NO. 10	9000	488.2	487.7	
NO. 11	10000	482.4	481.4	
NO. 12	11000	480.2	478.2	
NO. 13	12000	477.5	476.0	
NO. 14	13000	477.5	475.7	
NO. 15	14000	477.6	474.4	
NO. 16	15000	477.7	474.1	
NO. 17	16000	475.6	473.2	
NO. 18	17000	474.4	471.9	
NO. 19	18000	473.3	470.7	
	19000	472.5	470.1	
	20000	472.0	469.4	
	21000	473.0	488.2	
	22000	469.9	467.5	
	23000	469.6	467.0	
	24000	471.2	466.6	

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 PUNTA CANAL  
 JULY 1966 NO 16  
 JAPAN INTERNATIONAL  
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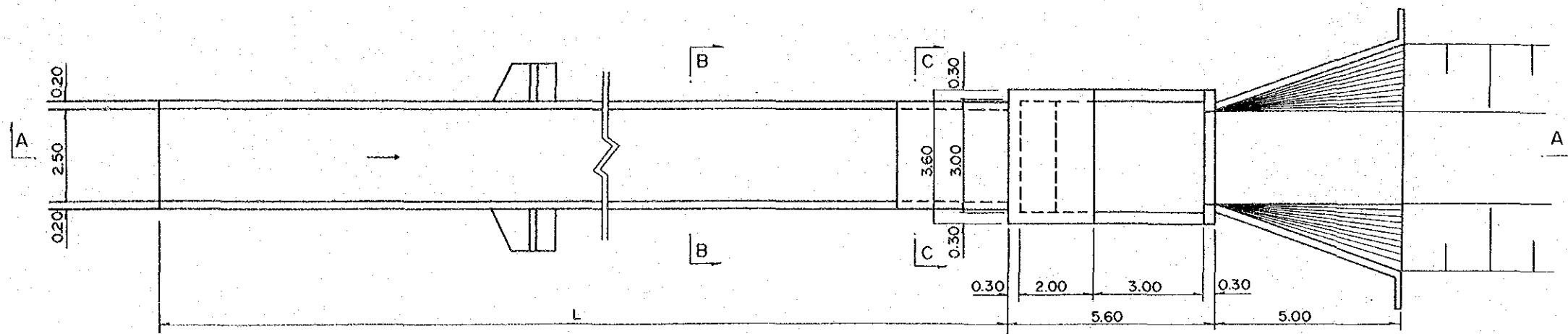
D R O P



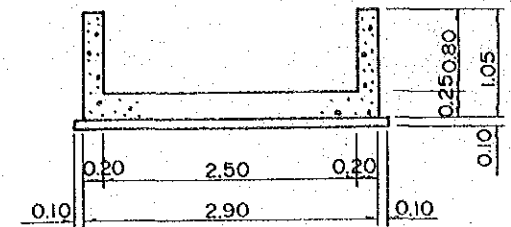
NOTE : Surface of gabions shall be lined with lean concrete.

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AGRICULTURAL	
DEVELOPMENT PROJECT	
DROP	
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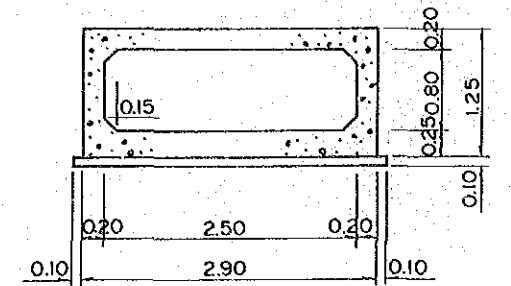
# CHUTE



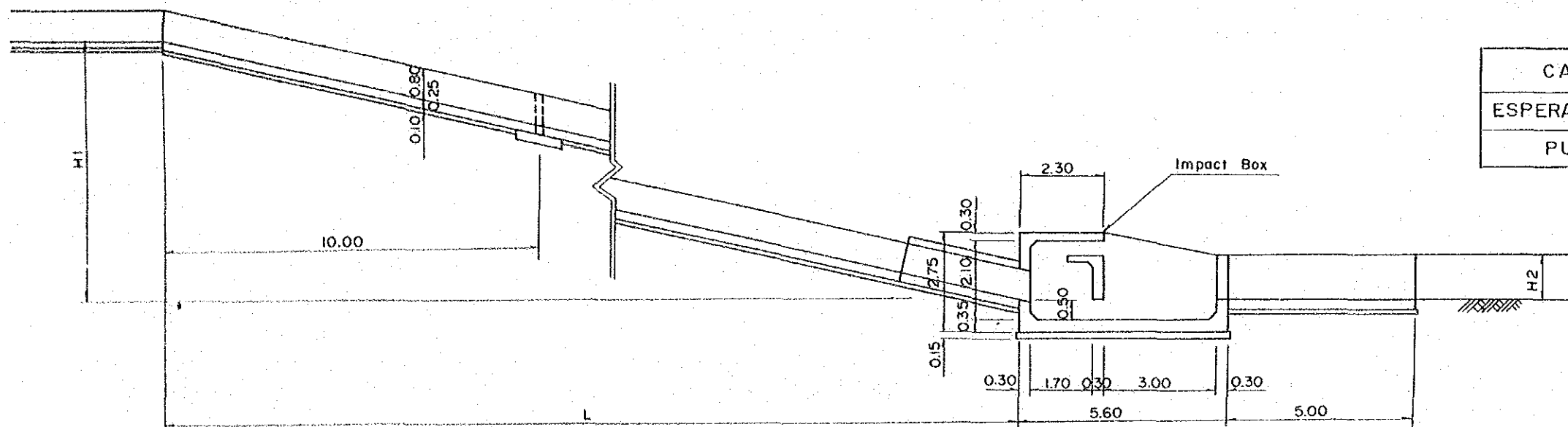
PLAN



SECTION B-B



SECTION C-C



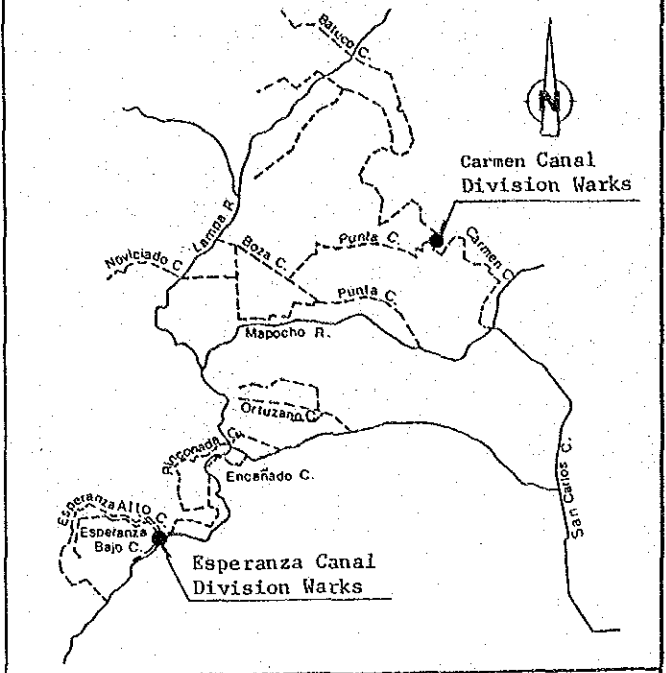
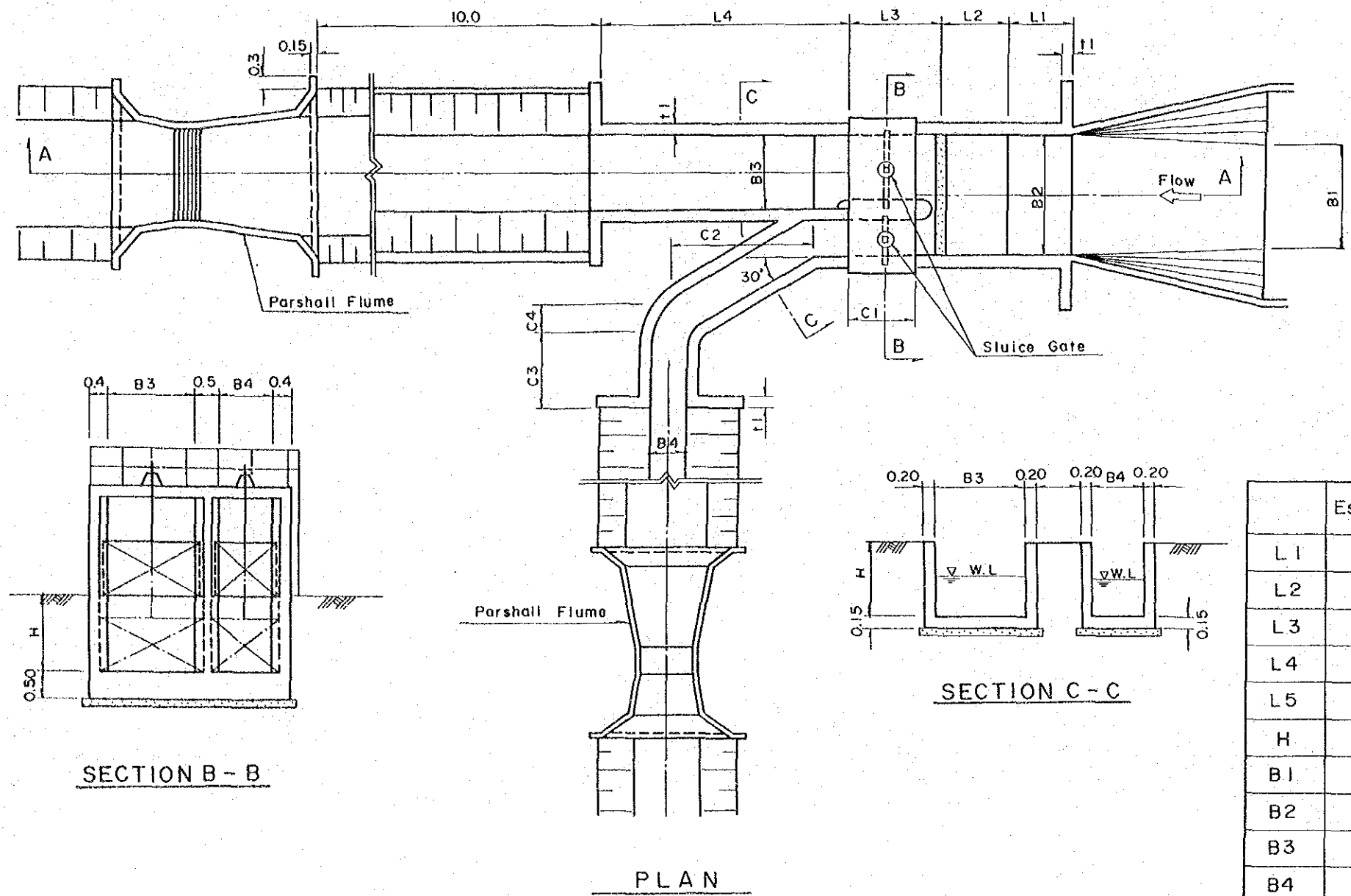
SECTION A-A

(UNIT: m)

CANAL	H1	H2	L
ESPERANZA BAJO	20.00	1.40	40.00
PUNTA	69.00	1.20	630.00

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# DIVISION WORKS



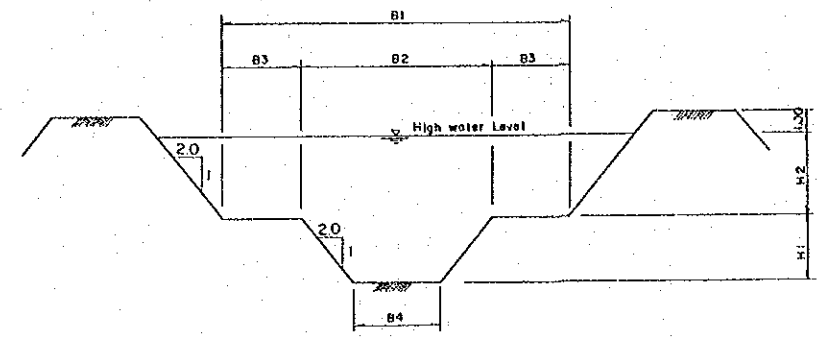
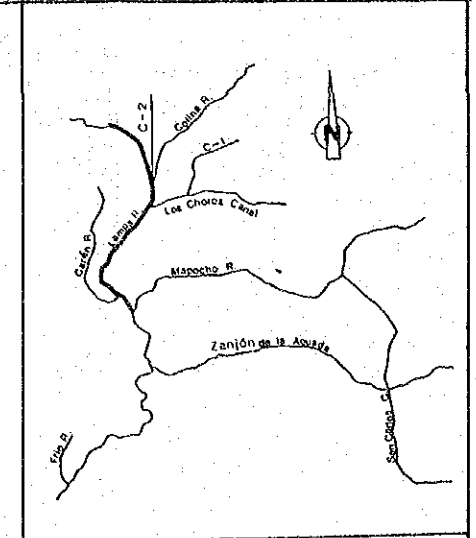
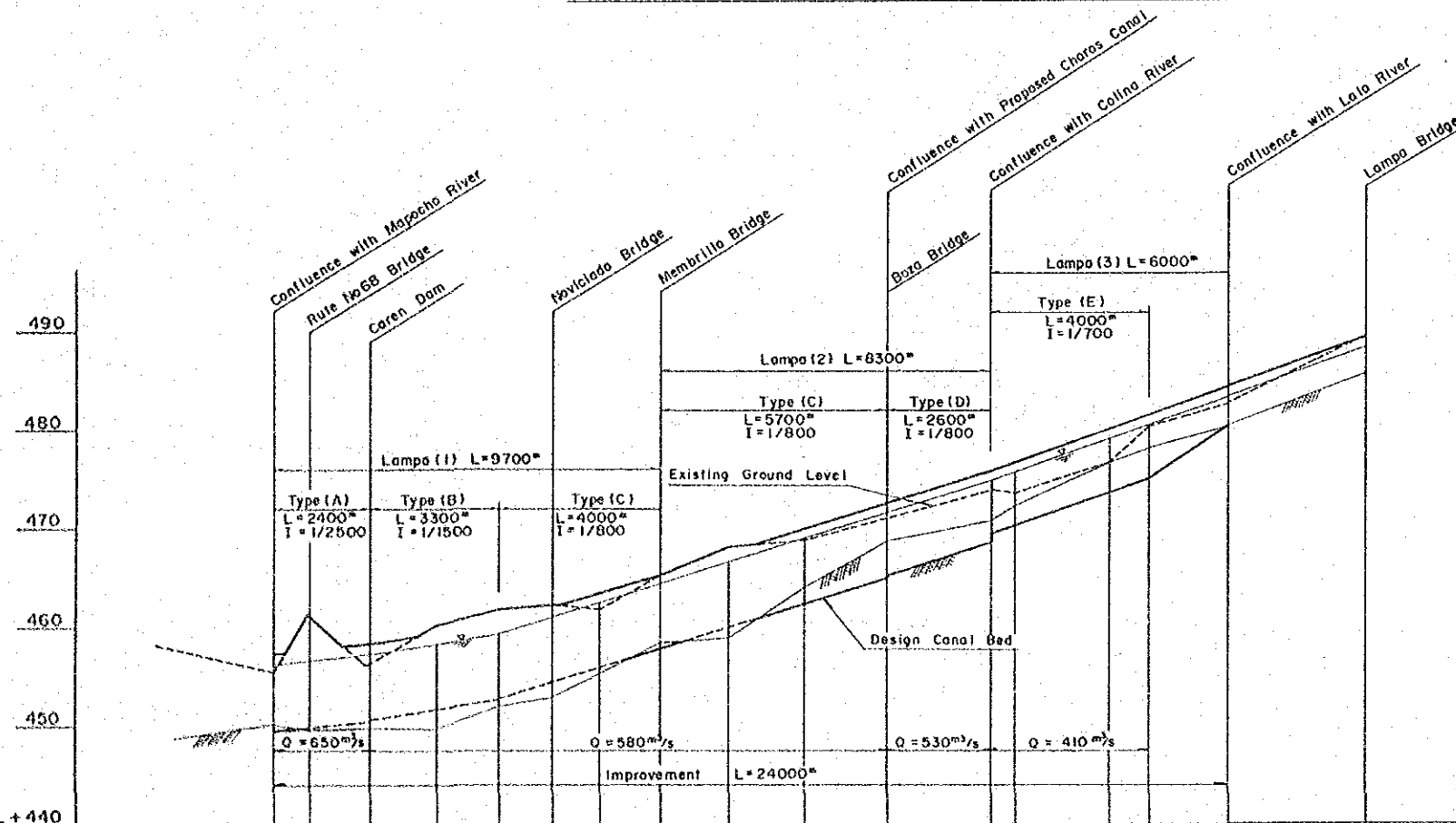
(UNIT: m)

	Esperanza Canal	Carmen Canal
L 1	1.40	1.60
L 2	1.50	1.50
L 3	2.00	2.00
L 4	5.00	5.00
L 5	9.90	10.10
H	1.70	2.40
B 1	1.50	3.20
B 2	3.10	4.90
B 3	1.70	3.90
B 4	1.40	1.10
t 1	0.20	0.25
C 1	0.90	1.00
C 2	3.60	4.00
C 3	1.60	1.70
C 4	0.50	0.60

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PROFILE AND CROSS SECTIONS LAMPA RIVER



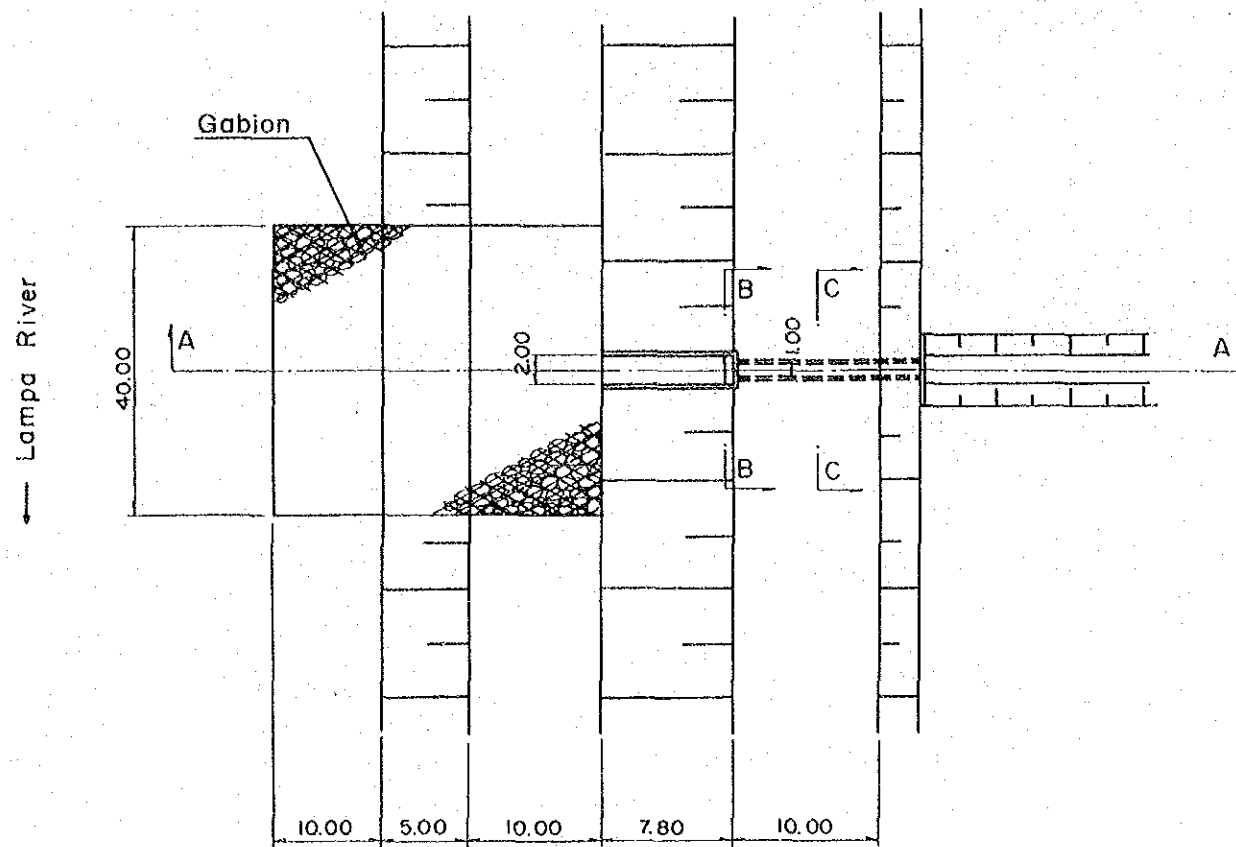
TYPICAL SECTION

	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	20000	21000	22000	23000	24000	25000	26000	27000	28000		
ELEVATION OF DESIGN WATER LEVEL	456.30	456.96	457.26	458.39	458.99	459.46	461.03	462.58	464.46	464.84	466.59	468.96	471.09	471.59	474.84	475.69	477.70	479.12	480.55	483.41	484.84	488.41									
ELEVATION OF DESIGN CANAL BED	449.50	449.60	449.80	449.80	451.00	452.00	452.80	455.20	457.86	458.24	459.10	462.36	464.49	464.95	468.44	470.29	472.30	473.72	475.15	480.50	481.44	485.80									
ELEVATION OF GROUND LEVEL	455.5	451.4	455.0	460.5	461.2	461.8	461.0	462.0	465.2	465.8	466.2	469.0	470.5	471.0	474.0	473.6	475.5	476.7	480.6	482.5	484.7	489.5									
ELEVATION OF RIVER BED	450.2	445.6	449.9	448.9	451.0	452.0	452.8	455.2	458.4	458.5	459.1	464.0	468.0	468.7	470.8	472.4	474.9	476.7	478.2	480.5	482.0	485.8									
ACCUMULATED DISTANCE	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	20000	21000	22000	23000	24000	25000	26000	27000	28000		
STATION	NO.0				NO.1						NO.2						NO.3										NO.4			NO.5	

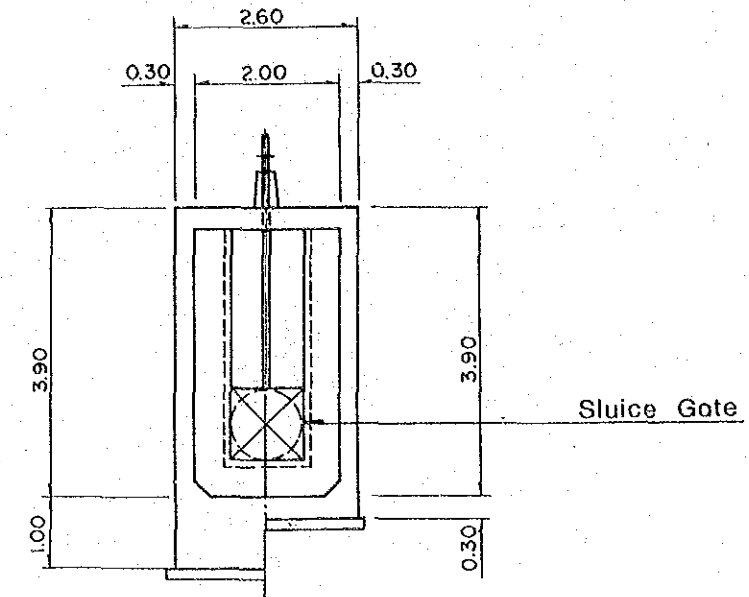
TYPE	UNIT: m						REMARK
	B1	B2	B3	B4	H1	H2	
A	77.0	37.0	20.0	25.0	3.0	3.8	Lampa (1)
B	55.0	27.0	14.0	15.0	3.0	3.7	"
C	40.0	22.0	9.0	10.0	3.0	3.6	Lampa (1)(2)
D	40.0	22.0	9.0	10.0	3.0	3.4	Lampa (2)
E	40.0	20.0	10.0	10.0	2.5	2.9	Lampa (3)

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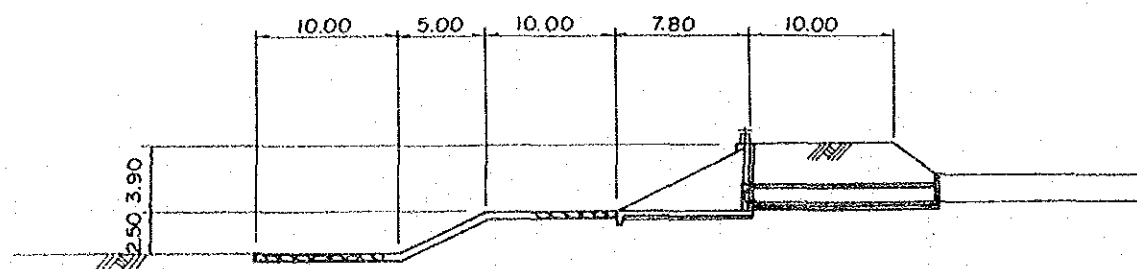
# GATE AND SLUICE



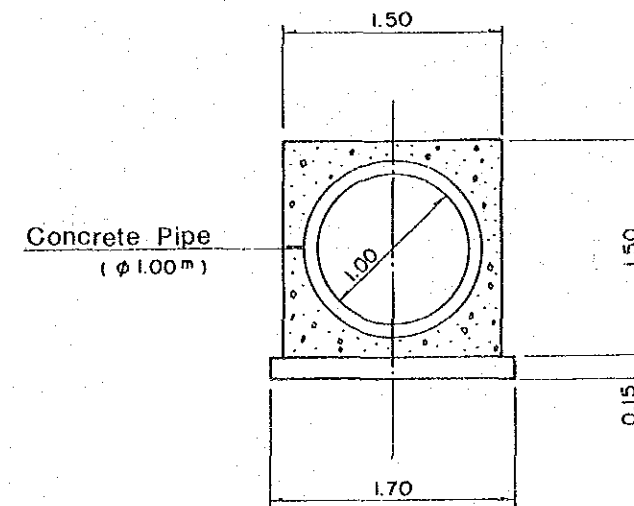
PLAN



SECTION B-B



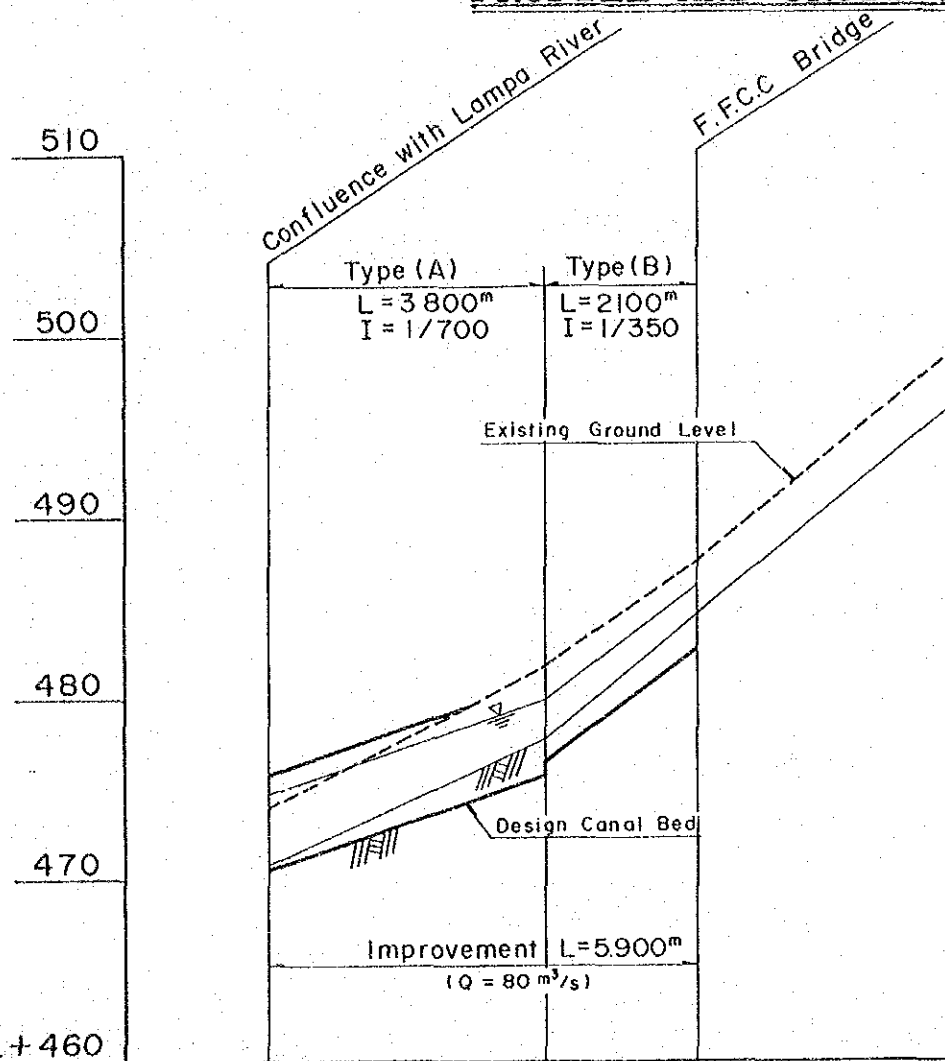
SECTION A-A



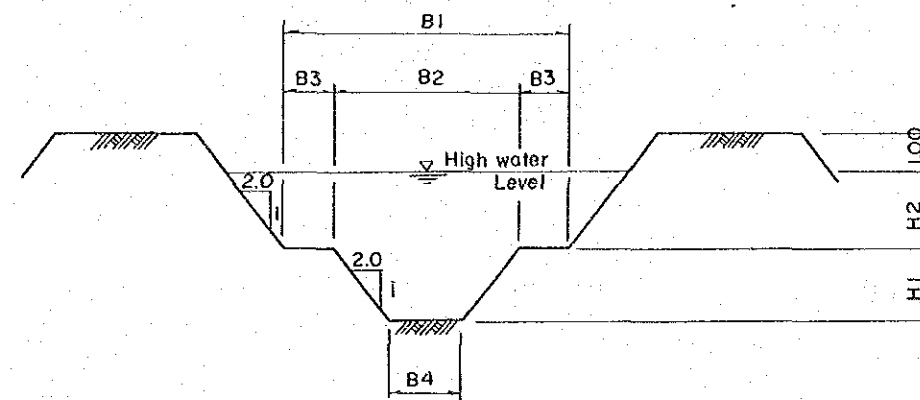
SECTION C-C

REPUBLIC OF CHILE	
MINISTRY OF AGRICULTURE	
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GATE AND SLUICE	
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# PROFILE AND CROSS SECTIONS COLINA RIVER



ELEVATION OF DESIGN WATER LEVEL	474.84	480.27	483.70	486.27		
ELEVATION OF DESIGN CANAL BED	471.44	476.07	480.20	482.77		
ELEVATION OF GROUND LEVEL	470.4	481.5	485.4	487.5	499.0	503.6
ELEVATION OF RIVER BED	470.8	477.6	481.8	484.7	496.1	500.5
ACCUMULATED DISTANCE	0.000	3.800	5.000	5.900	9.400	10.000
STATION	NO.0		NO.1			NO.2



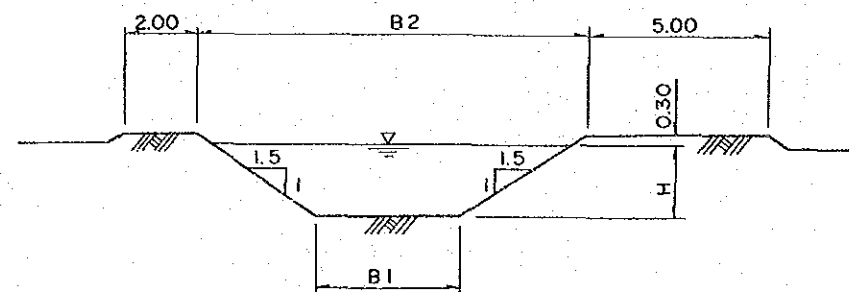
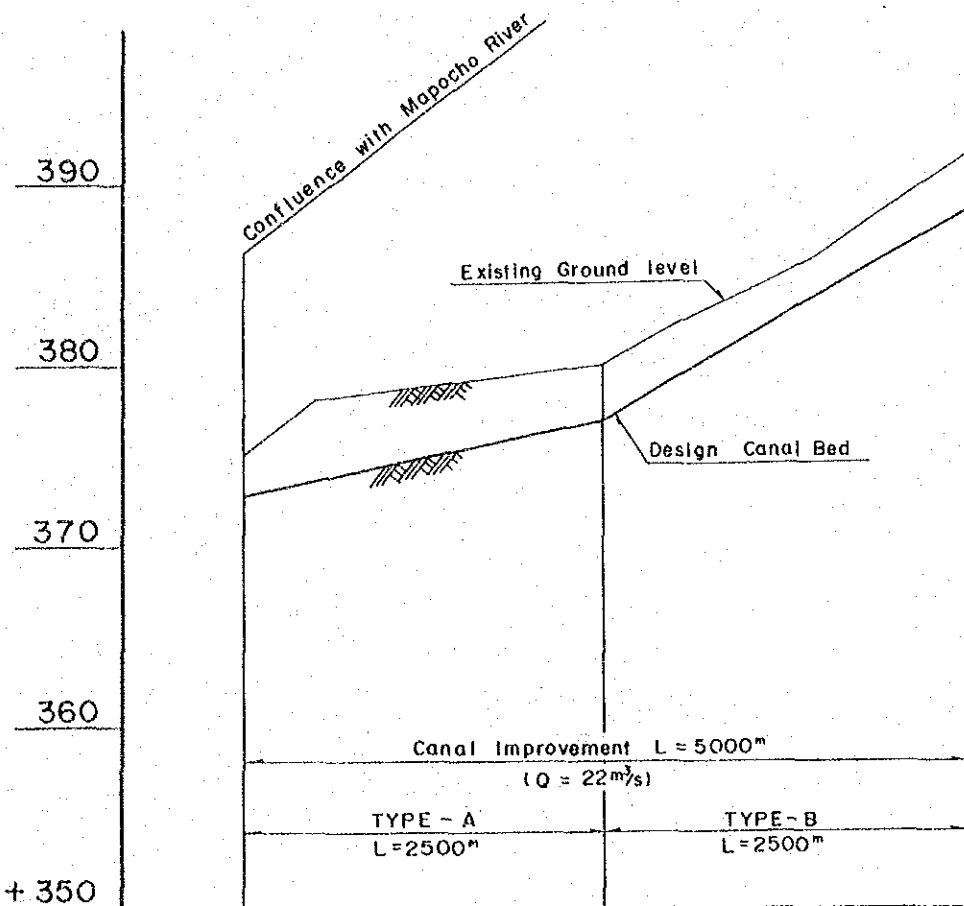
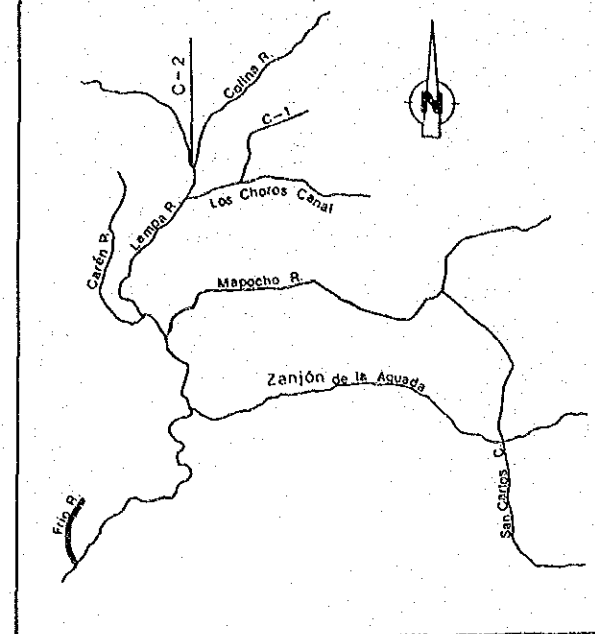
TYPICAL SECTION

(UNIT: m)

TYPE	B1	B2	B3	B4	H1	H2
A	200	13.0	3.5	5.0	2.0	2.2
B	200	13.0	3.5	5.0	2.0	1.5

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 COLINA RIVER  
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## PROFILE AND CROSS SECTIONS FRIO RIVER



TYPICAL SECTION

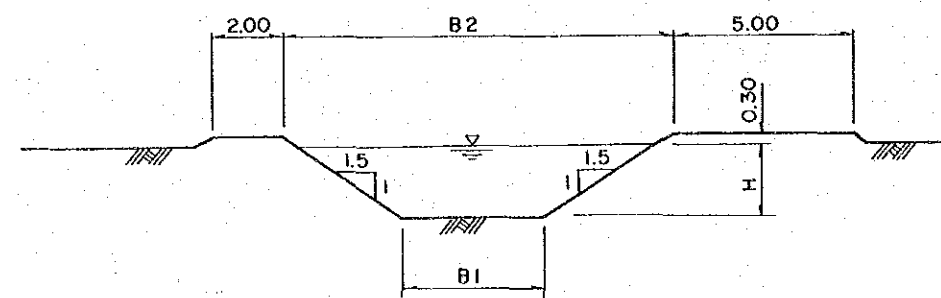
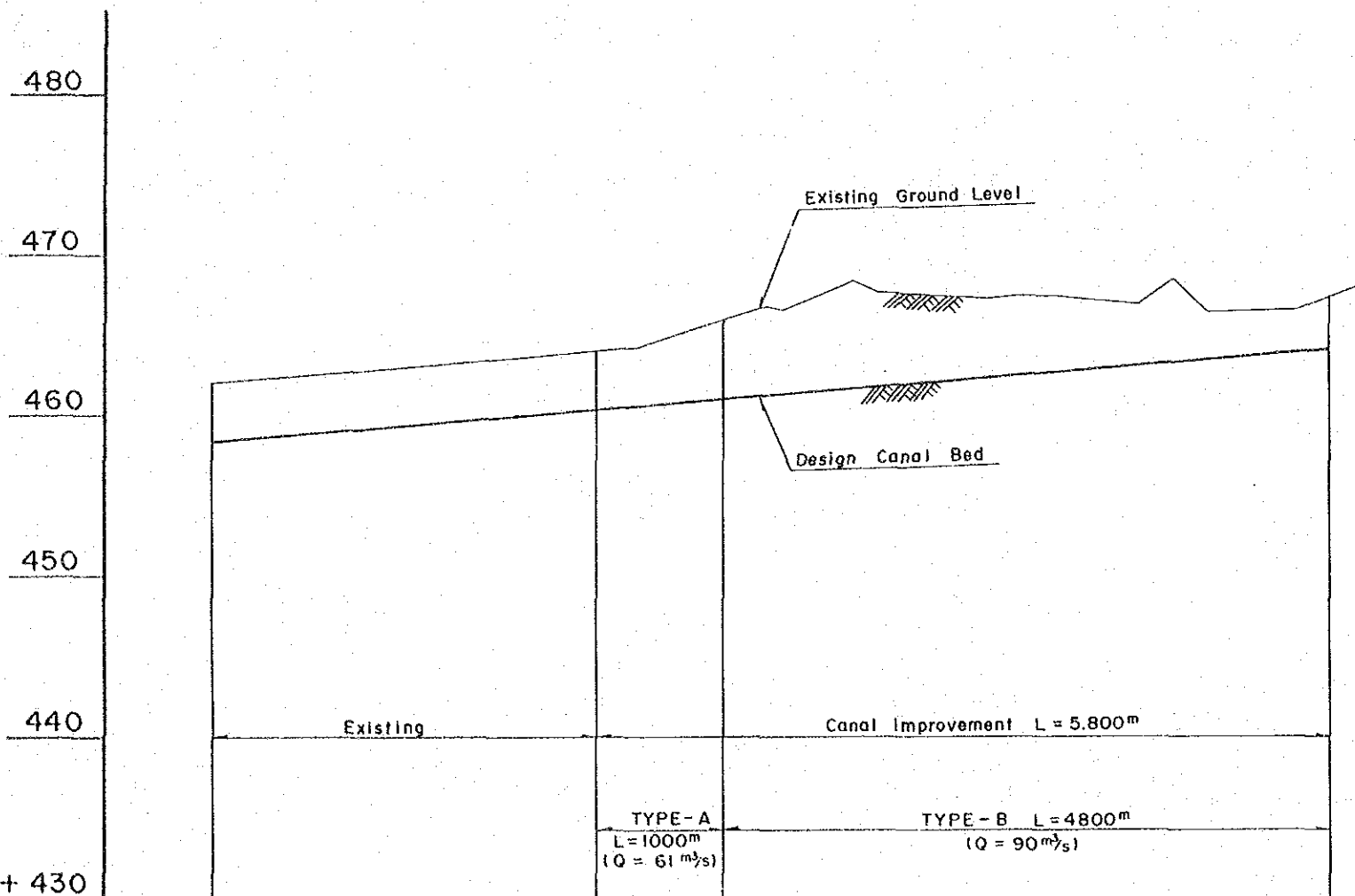
(UNIT: m)

TYPE	B1	B2	H
A	4.00	10.90	2.00
B	2.00	8.90	2.00

LONGITUDINAL SLOPE	$I = 1/600$		$I = 1/200$				
DESIGN CANAL BED	372.7	374.4	376.0	376.9	379.4	384.4	389.4
GROUND LEVEL	375.0	328.4	379.4	380.0	382.1	386.1	391.6
ACCUMULATED DISTANCE	0	1000	2000	2500	3000	4000	5000
STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	

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# PROFILE AND CROSS SECTIONS CAREN RIVER

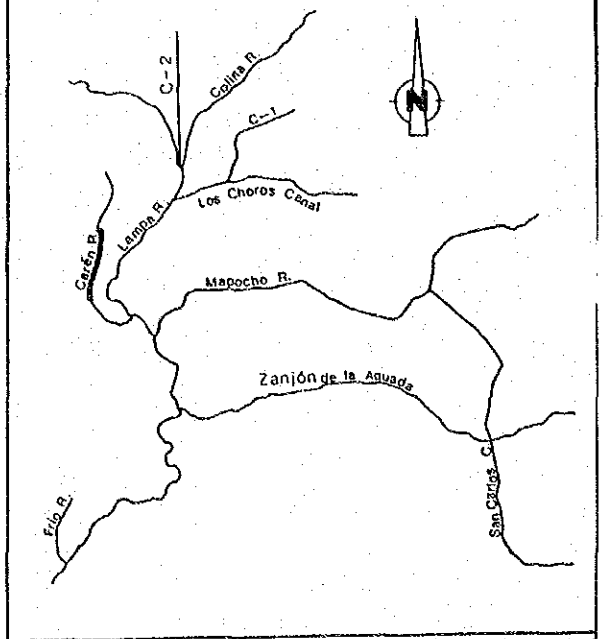


TYPICAL SECTION

LONGITUDINAL SLOPE	$I = 1/1500$										
DESIGN CANAL BED	458.4	459.1	459.7	460.4	461.1	461.7	462.4	463.1	463.7	463.0	464.4
GROUND LEVEL	462.2	461.6	462.4	464.0	465.8	468.4	467.4	467.2	466.5	463.0	468.2
ACCUMULATED DISTANCE	0	1000	2000	3000	4000	5000	6000	7000	8000	8800	9000
STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	NO.7	NO.8	NO.9	

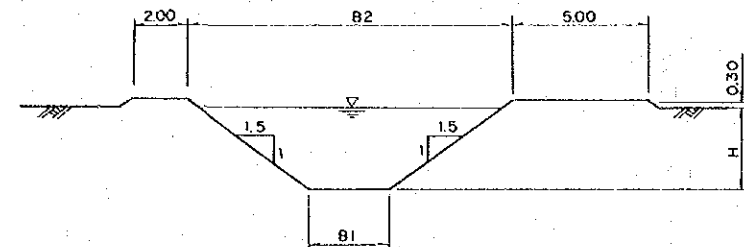
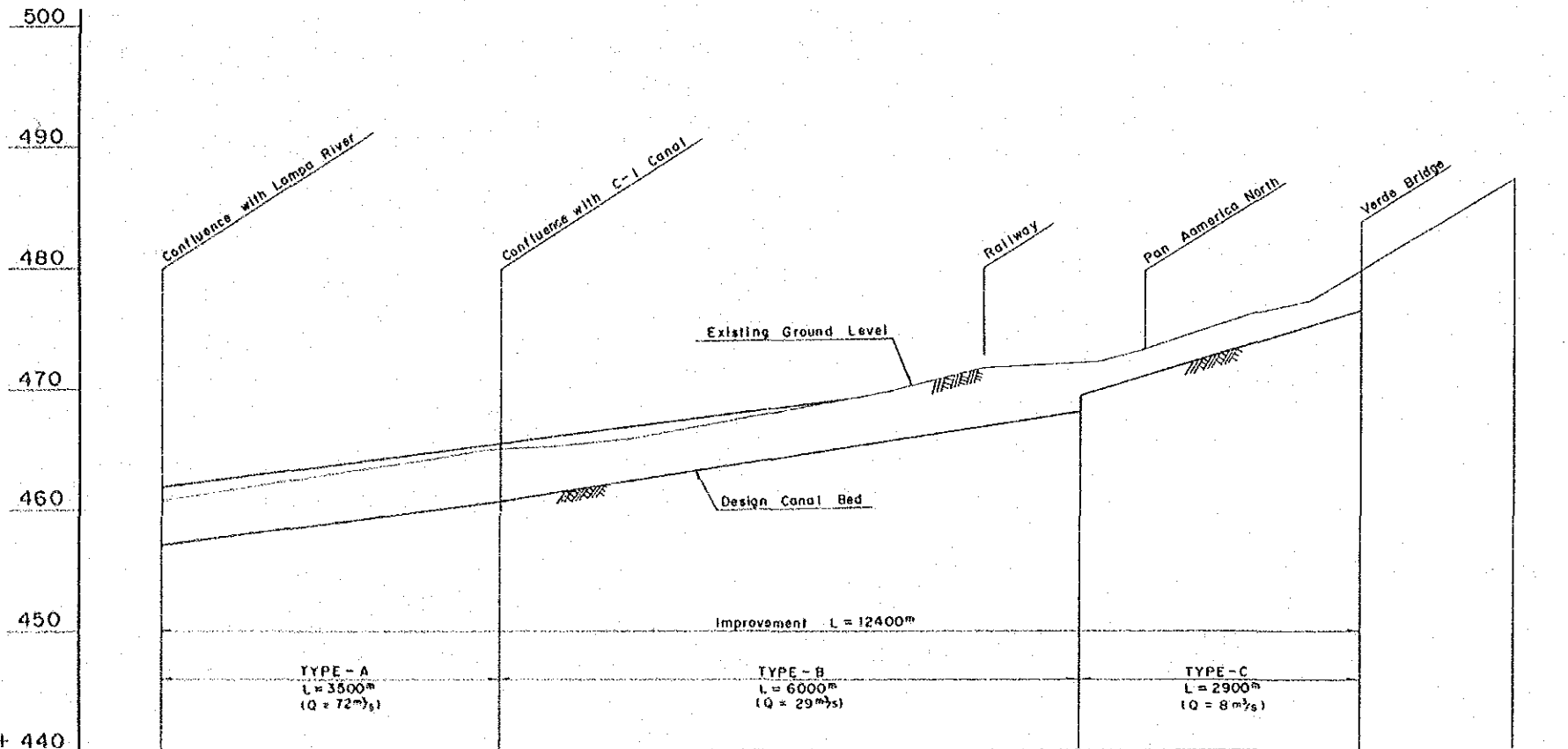
(UNIT: m)

TYPE	B1	B2	H
A	11.50	22.90	3.50
B	7.00	18.40	3.50



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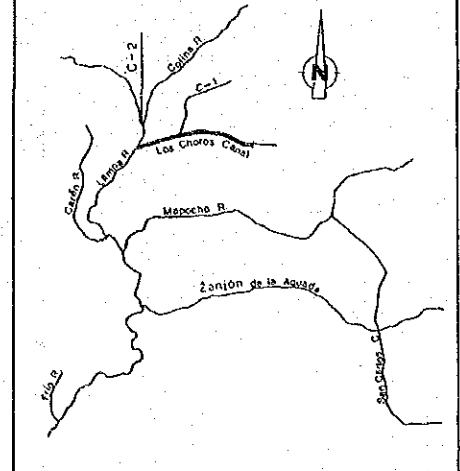
**PROFILE AND CROSS SECTIONS CHOROS CANAL**



**TYPICAL SECTION**

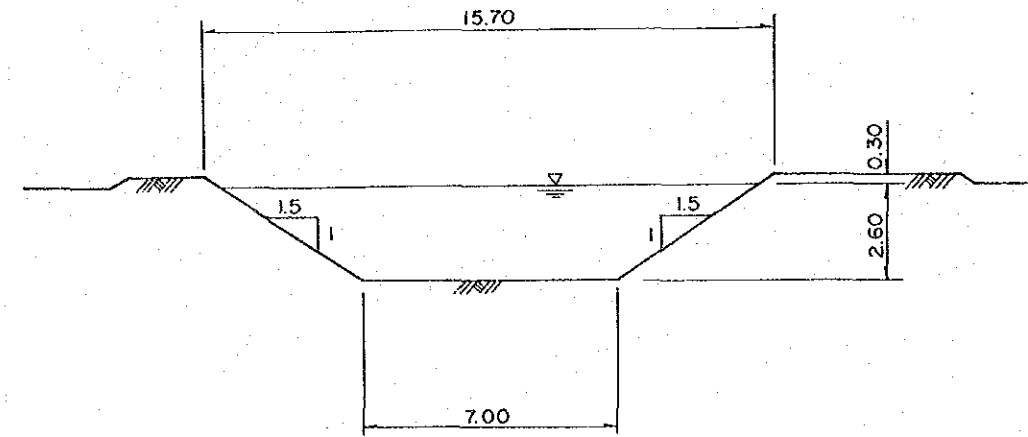
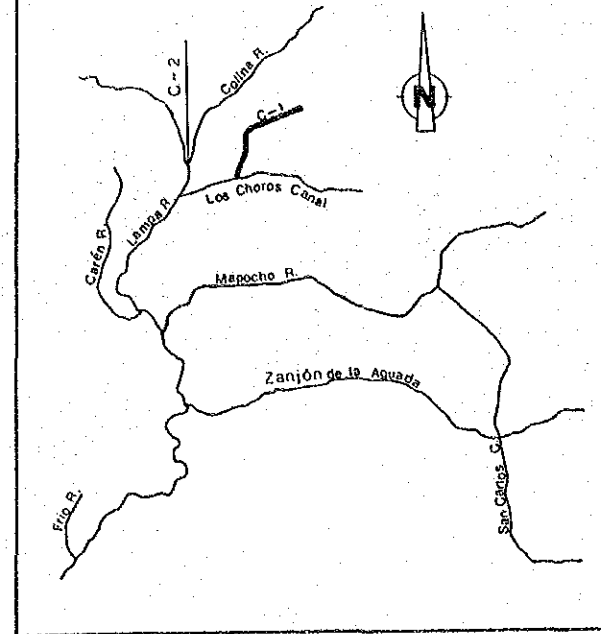
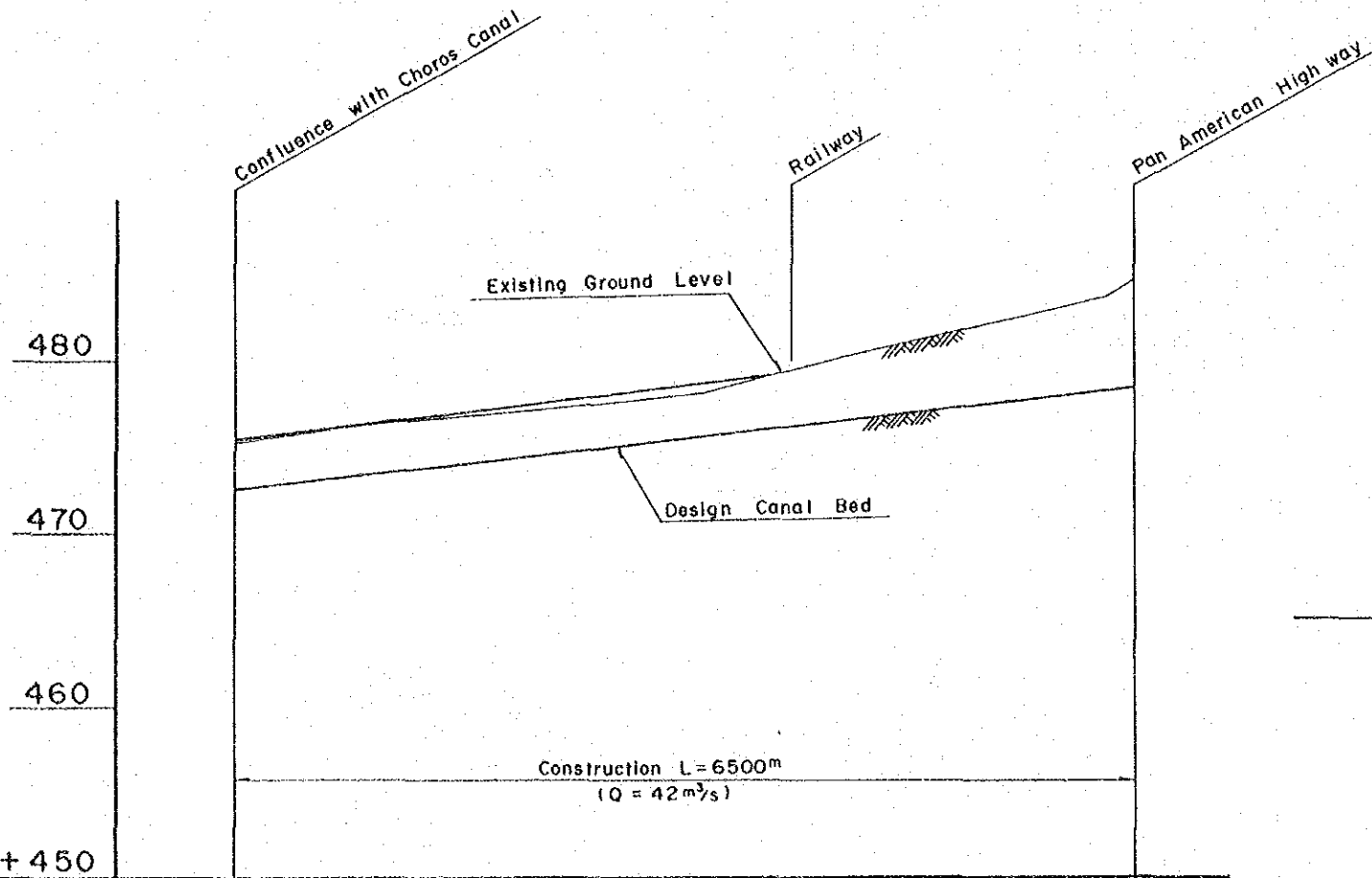
TYPE	UNIT: m		
	B1	B2	H
A	3.00	17.40	4.50
B	3.00	12.90	3.00
C	2.00	7.40	1.50

STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	NO.7	NO.8	NO.9	NO.10	NO.11	NO.12	NO.13	NO.14	
ACCUMULATED DISTANCE		1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	12400	13000	14000
GROUND LEVEL	471.0	471.6	473.3	474.5	475.3	476.1	477.6	479.0	480.8	482.1	483.1	485.7	488.1	482.4	497.6	
DESIGN CANAL BED	467.1	468.1	469.1	470.1	470.6	471.2	472.5	473.7	475.0	476.2	477.5	478.1 479.6	480.9	483.4	485.9	486.9
LONGITUDINAL SLOPE	1:1000			1:800						1:400						



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## PROFILE AND CROSS SECTION C-1 DRAINAGE CANAL

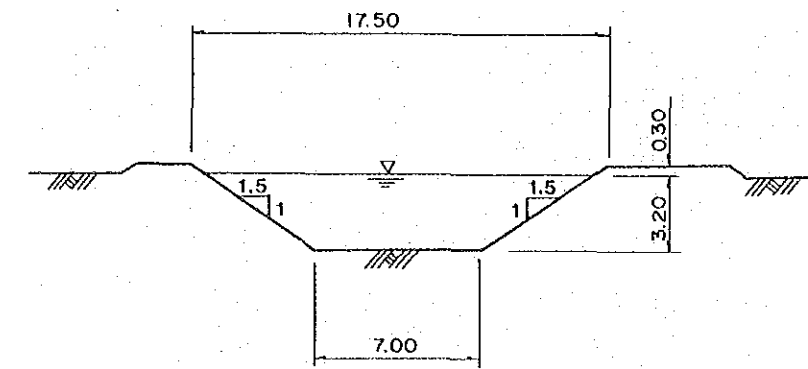
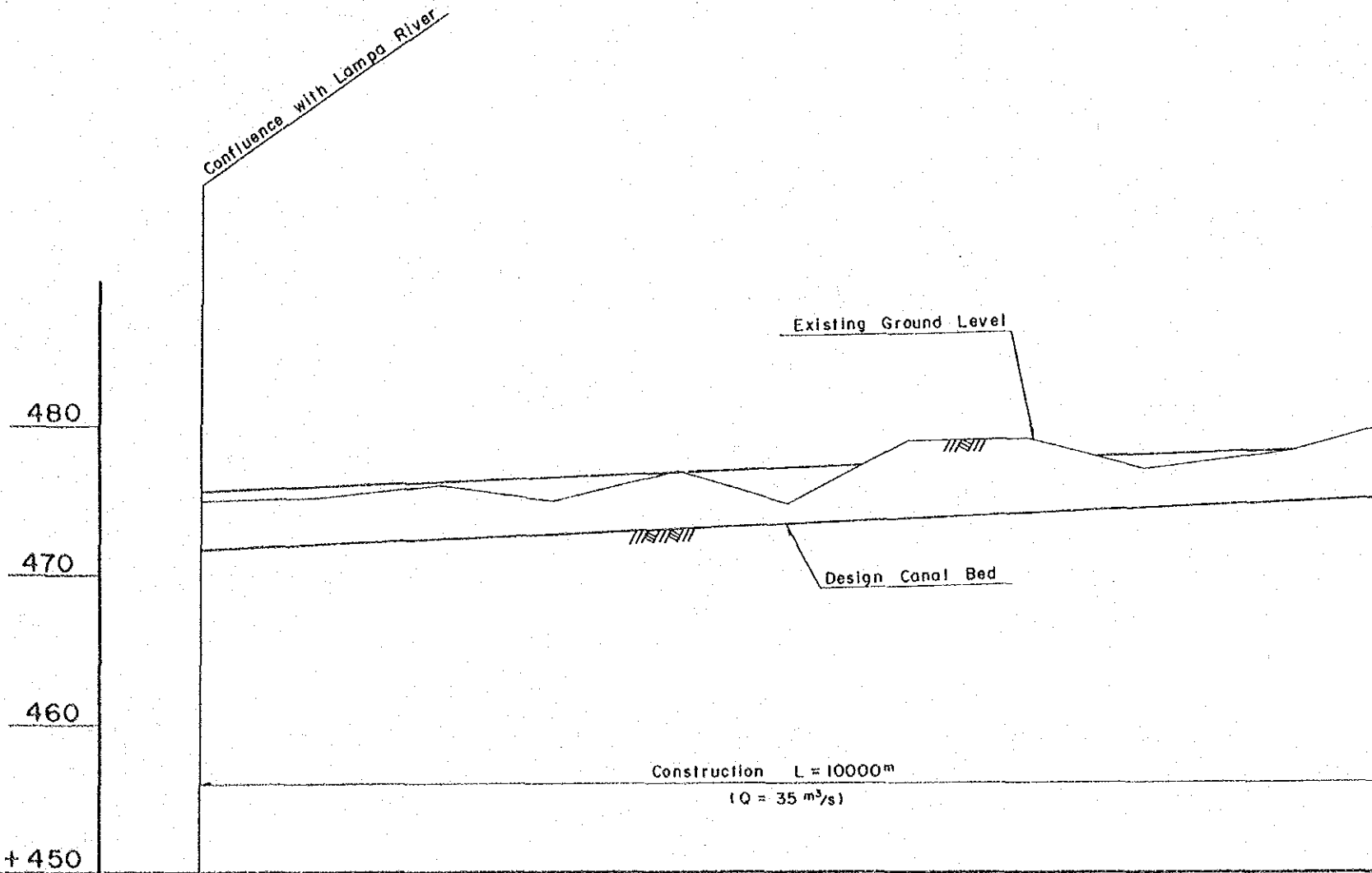


TYPICAL SECTION

LONGITUDINAL SLOPE	$I = 1/1000$							
DESIGN CANAL BED	472.2	473.2	474.2	475.2	476.2	477.2	478.2	481.6
GROUND LEVEL	475.1	476.1	476.8	477.6	479.4	481.4	483.3	484.5
ACCUMULATED DISTANCE	0	1000	2000	3000	4000	5000	6000	6500
STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	

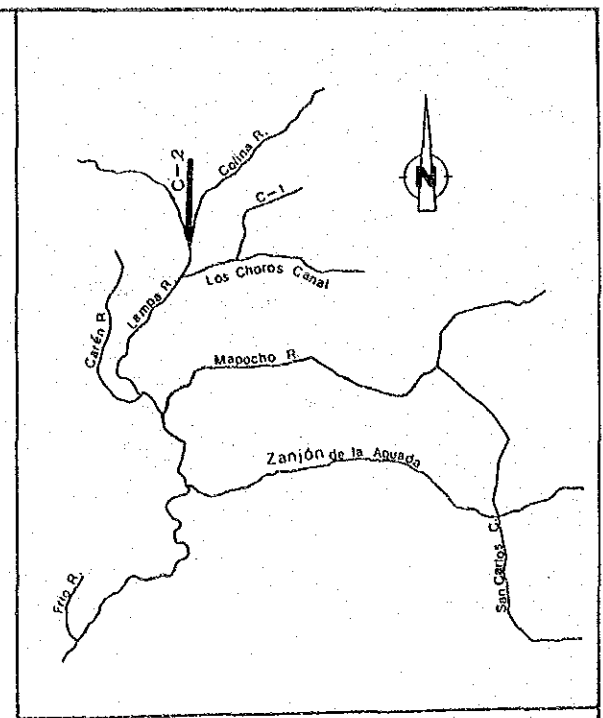
REPUBLIC OF CHILE	
MINISTRY OF AGRICULTURE	
MAPOCHO RIVER BASIN	
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DEVELOPMENT PROJECT	
PROFILE AND CROSS SECTION	
C-1 DRAINAGE CANAL	
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# PROFILE AND CROSS SECTION C-2 DRAINAGE CANAL



TYPICAL SECTION

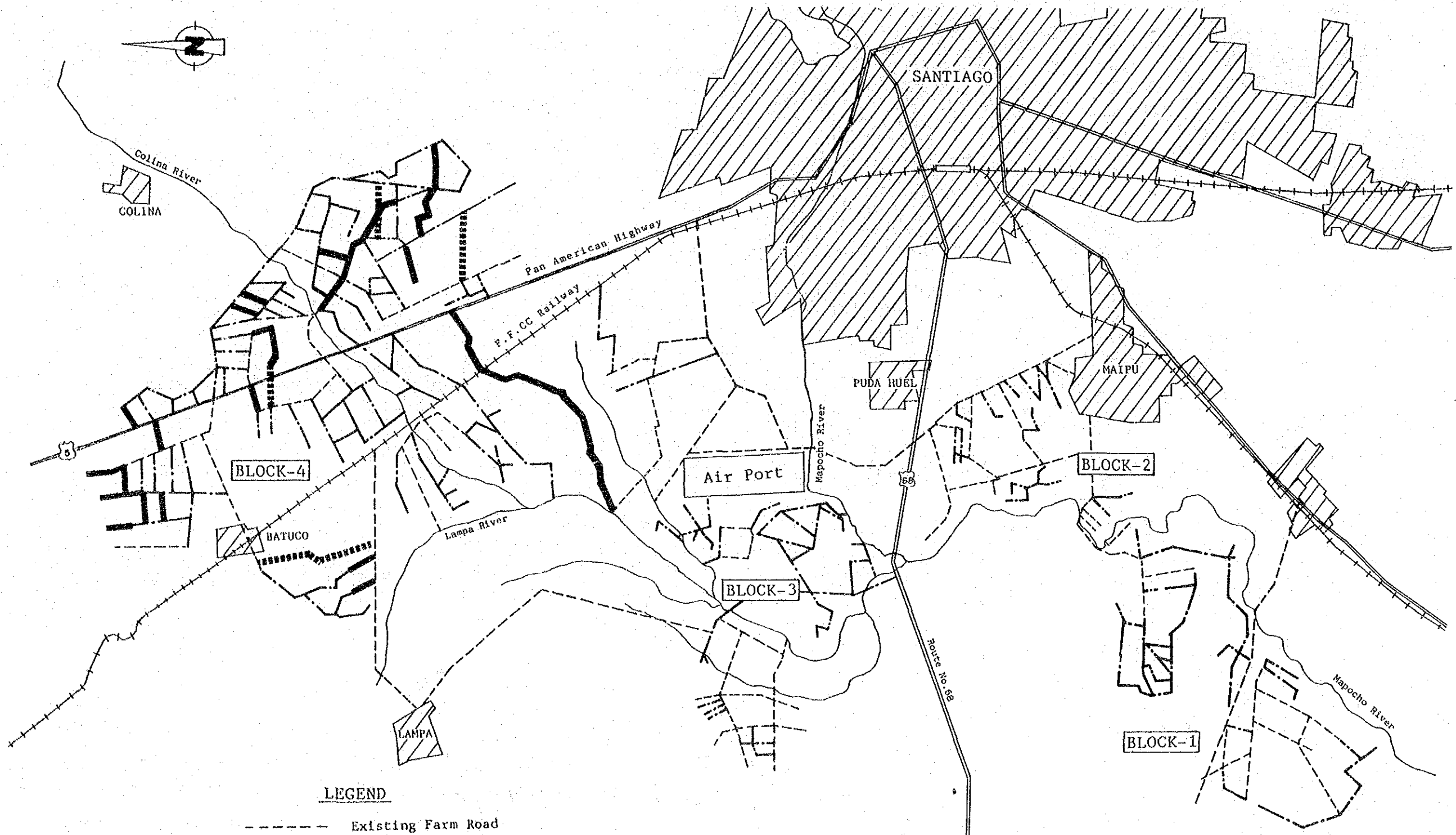
LONGITUDINAL SLOPE	$I = 1/3000$										
DESIGN CANAL BED	471.8	472.1	472.5	472.8	473.1	473.4	473.8	474.1	474.5	474.8	475.1
GROUND LEVEL	475.0	475.0	476.0	475.0	477.0	475.0	479.0	479.0	477.0	478.0	480.0
ACCUMULATED DISTANCE	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
STATION	NO.0	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	NO.7	NO.8	NO.9	NO.10



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 C-2 DRAINAGE CANAL  
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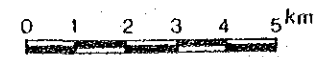


# FARM ROAD NETWORK



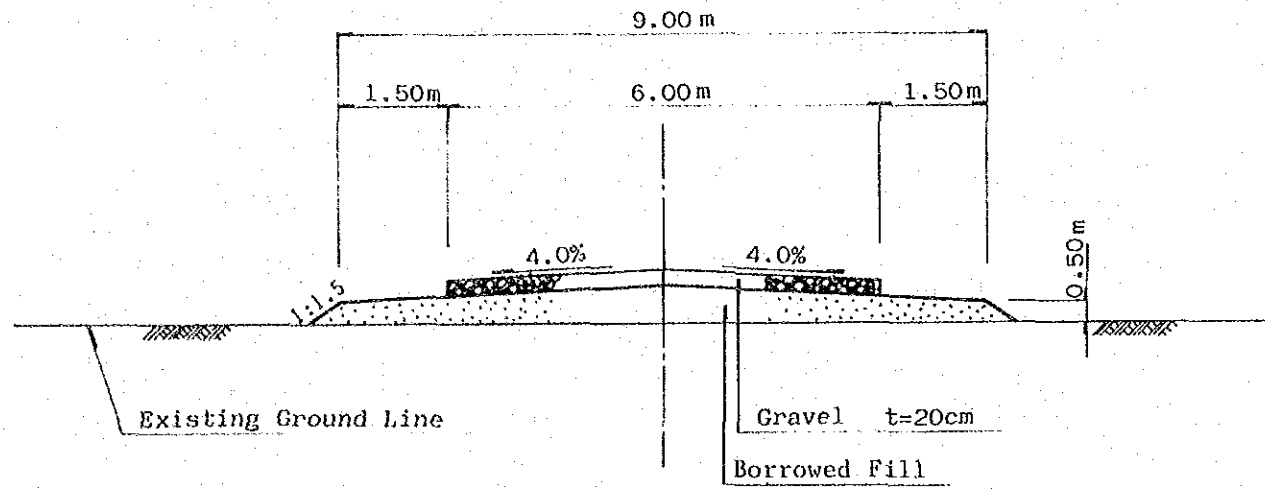
### LEGEND

- Existing Farm Road Type A (125.5km)
- Existing Farm Road Type B (290.6km)
- ..... Proposed Farm Road Type A (17.3km)
- Proposed Farm Road Type B (34.7km)

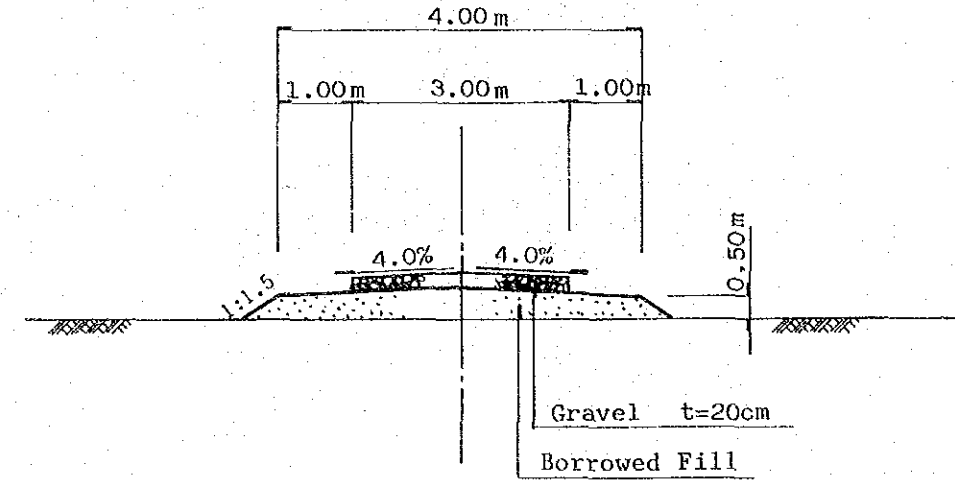


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FARM ROAD NETWORK	
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CROSS SECTION FARM ROADS



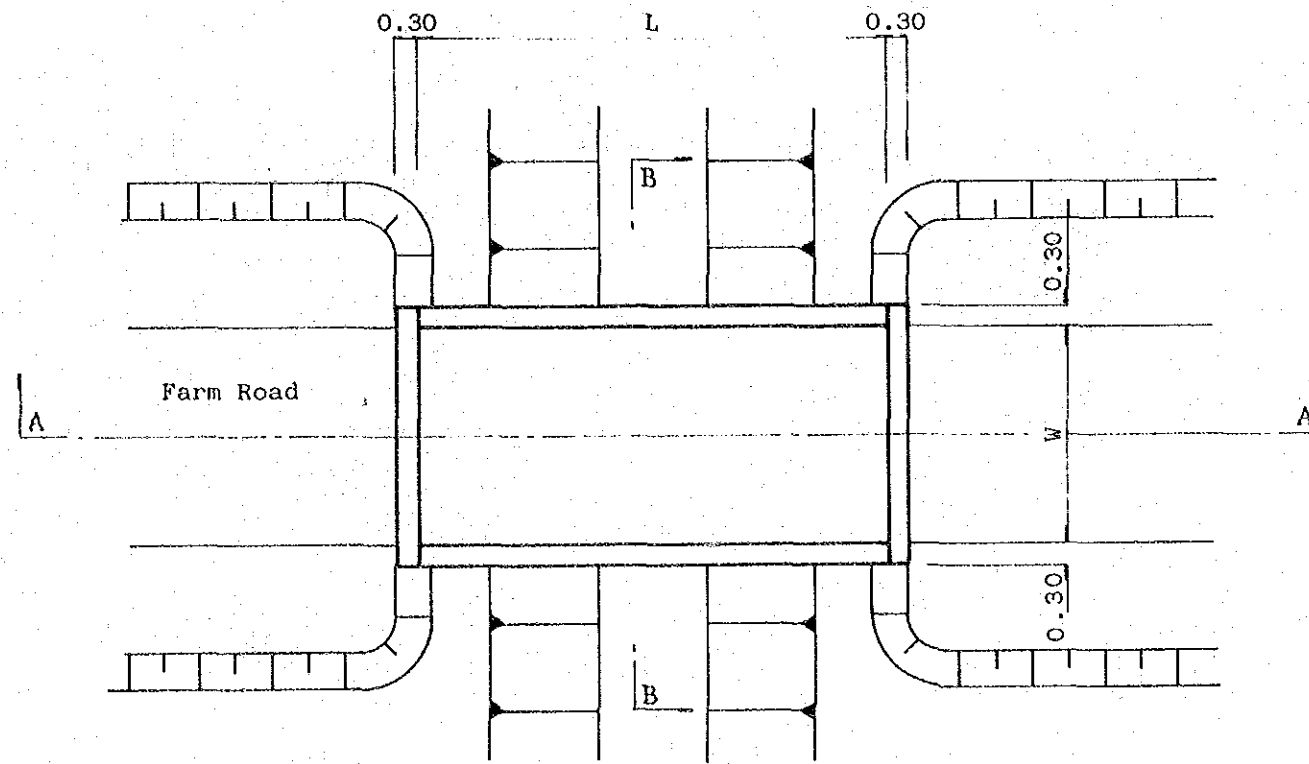
FARM ROAD TYPE-A



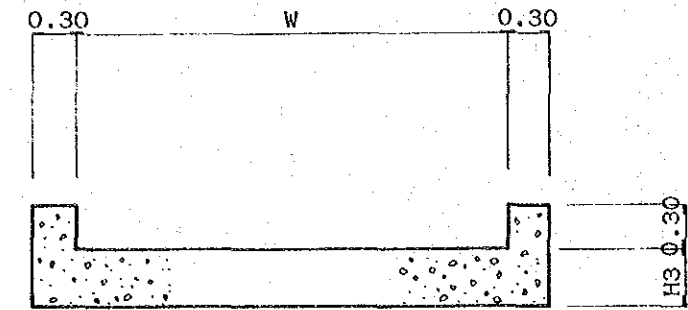
FARM ROAD TYPE-B

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CROSS SECTION FARM ROADS	
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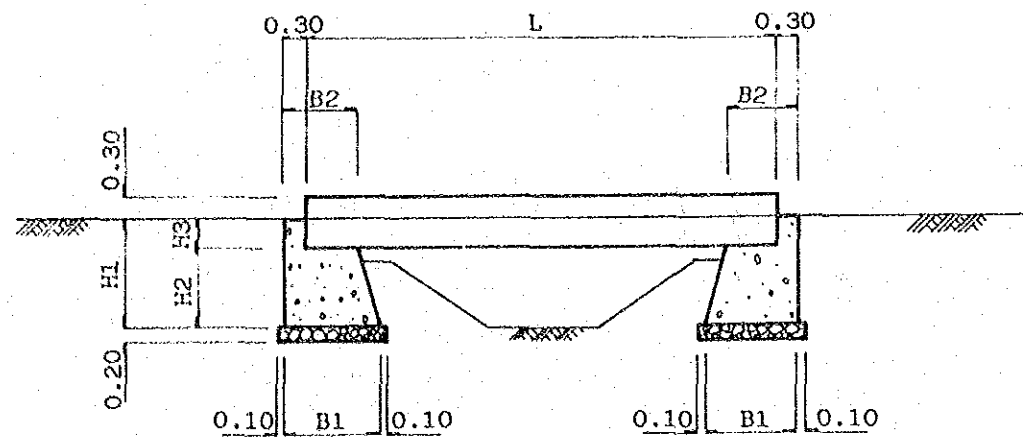
BRIDGE (1)



PLAN



SECTION B-B



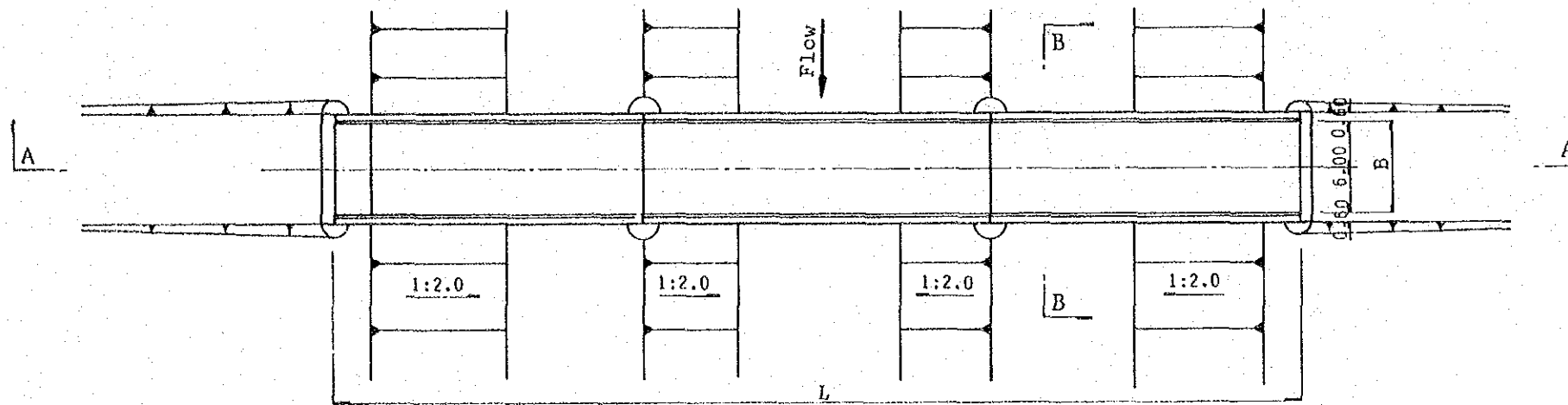
SECTION A-A

(UNIT:m)

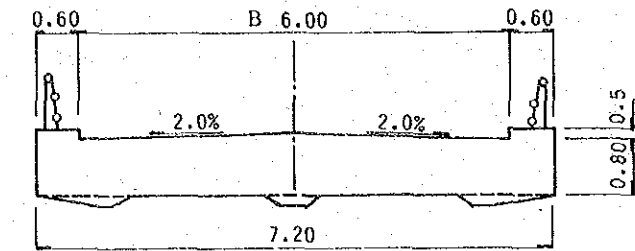
TYPE	L	W	B1	B2	H1	H2	H3
A	8.0	6.0	1.5	1.1	1.7	1.2	0.5
B	6.5	3.0	1.3	1.0	1.5	1.1	0.4
C	4.2	2.5	1.0	0.8	1.2	0.9	0.3

REPUBLIC OF CHILE	
MINISTRY OF AGRICULTURE	
MAPOCHO RIVER BASIN	
AGRICULTURAL	
DEVELOPMENT PROJECT	
BRIDGE (1)	
JULY 1986	NO 30
JAPAN INTERNATIONAL	
COOPERATION AGENCY	

# BRIDGE (2)



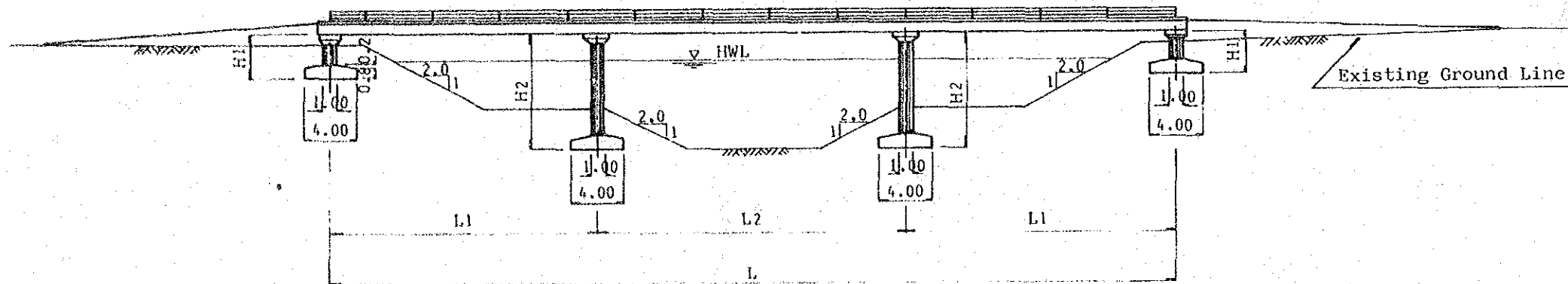
P L A N



SECTION B-B

UNIT: (m)

Name	L	B	L1	L2	H1	H2	Remarks
Noviciado	80.0	6.0	26.0	28.0	3.20	8.50	Lampa River
Membrillo	70.0	6.0	23.0	24.0	3.20	6.5	Lampa River
Boza	60.0	6.0	20.0	20.0	3.20	4.5	Lampa river
Casique Colin	40.0	6.0	13.0	14.0	3.20	5.5	Colina River
Primavera	40.0	6.0	13.0	14.0	3.20	5.5	Colina river



SECTION A-A

REPUBLIC OF CHILE MINISTRY OF AGRICULTURE MAPOCHO RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT
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