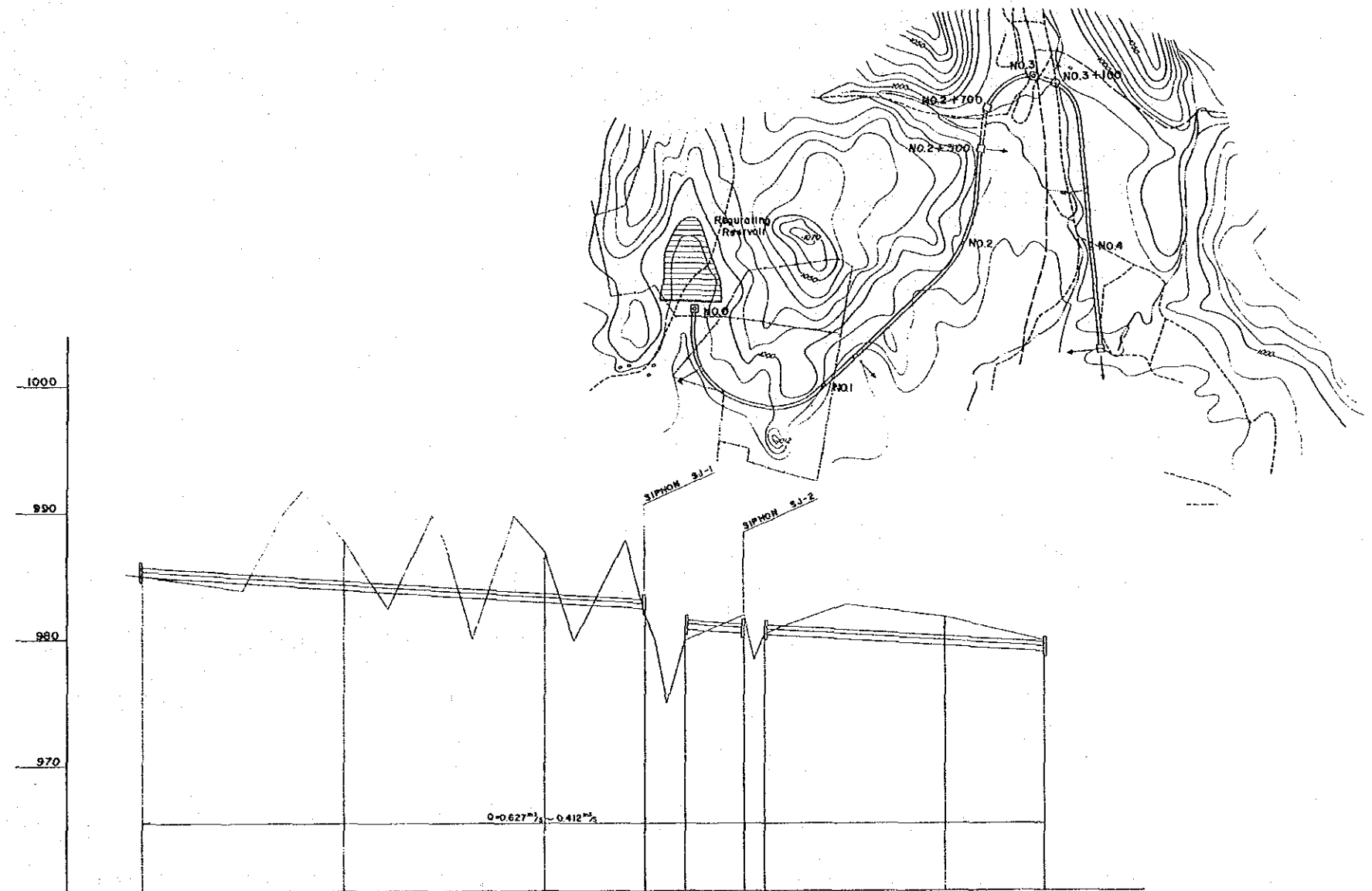


PLAN AND LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL SAN JUANCITO MAIN CANAL



SLOPE	1/1000 SIPHON 1/1000 SIPHON 1/1000									
DESIGN WATER LEVEL	985.45	984.40	983.45	982.95	981.25	980.95	979.95	979.45		
DESIGN CANAL BED	985.00	984.00	983.00	982.90	980.90	980.70	979.50	979.00		
GROUND LEVEL	985	988	987	982	982	982	982	980		
ACCUMULATED DISTANCE	0	1000	2000	2500	2700	3000	3100	4000		
STATION	NO.0	NO.1	NO.2	+500	+700	NO.3 +100	NO.4	+500		

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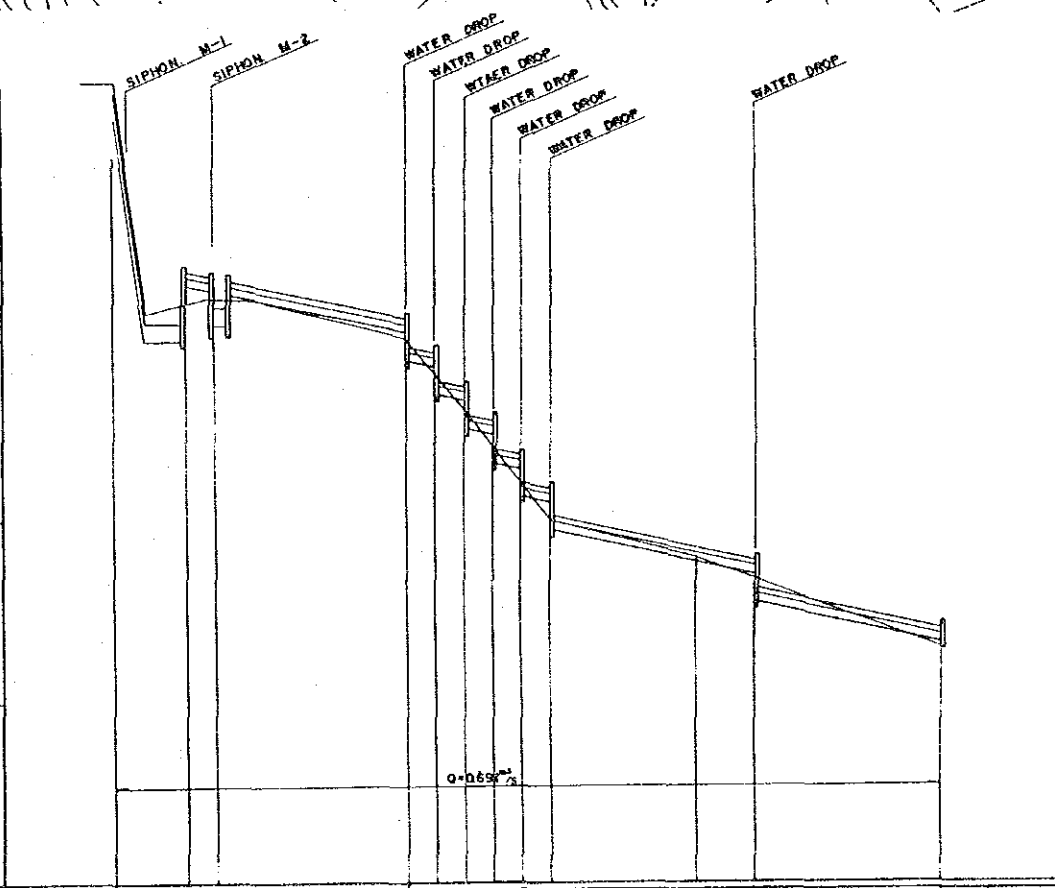
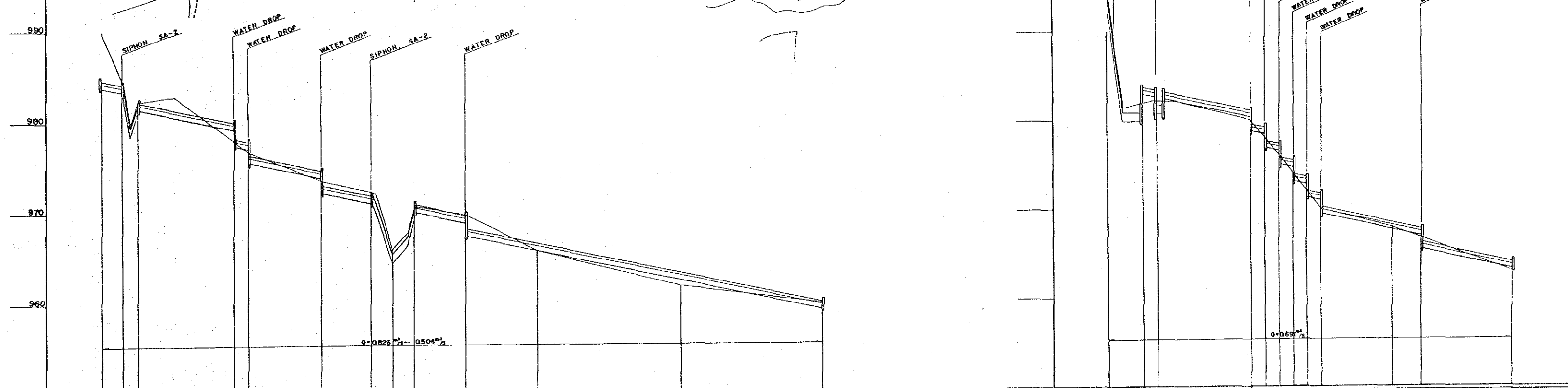
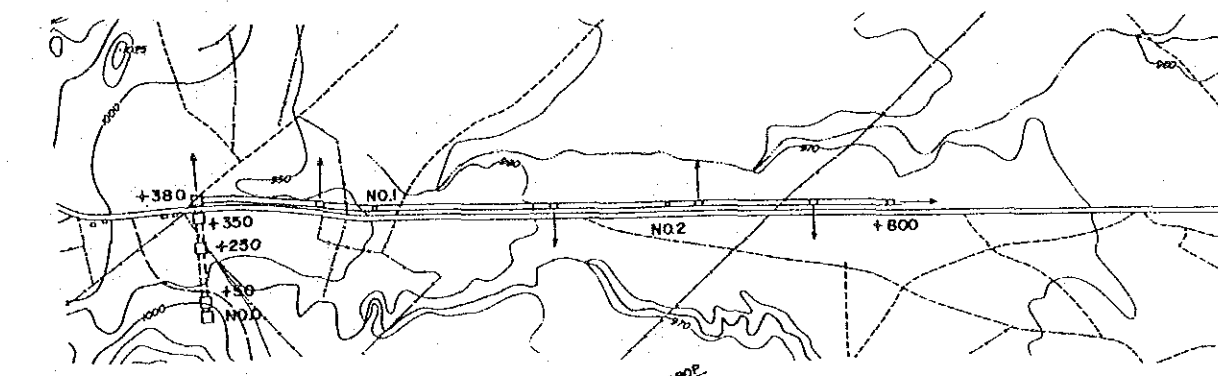
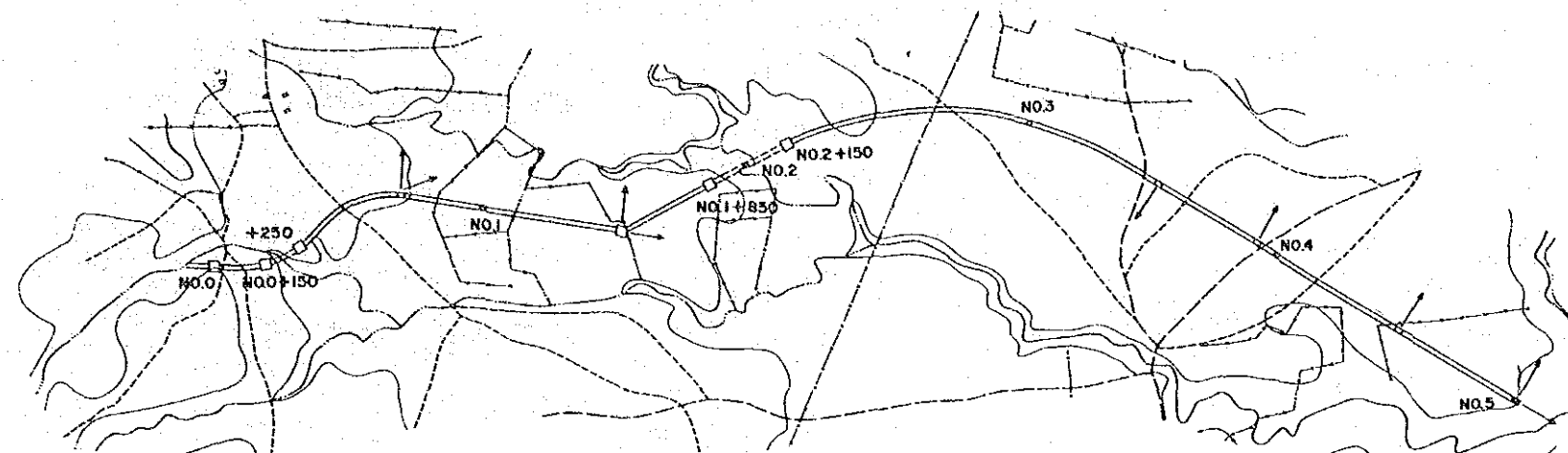
 THE MONJAS IRRIGATION PROJECT

 PLAN AND LONGITUDINAL PROFILE
 OF
 MAIN IRRIGATION CANAL
 SAN JUANCITO MAIN CANAL
 Fig. A.4.3.2-5 No.
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PLAN AND LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL

SALAMO MAIN CANAL

MONJAS MAIN CANAL

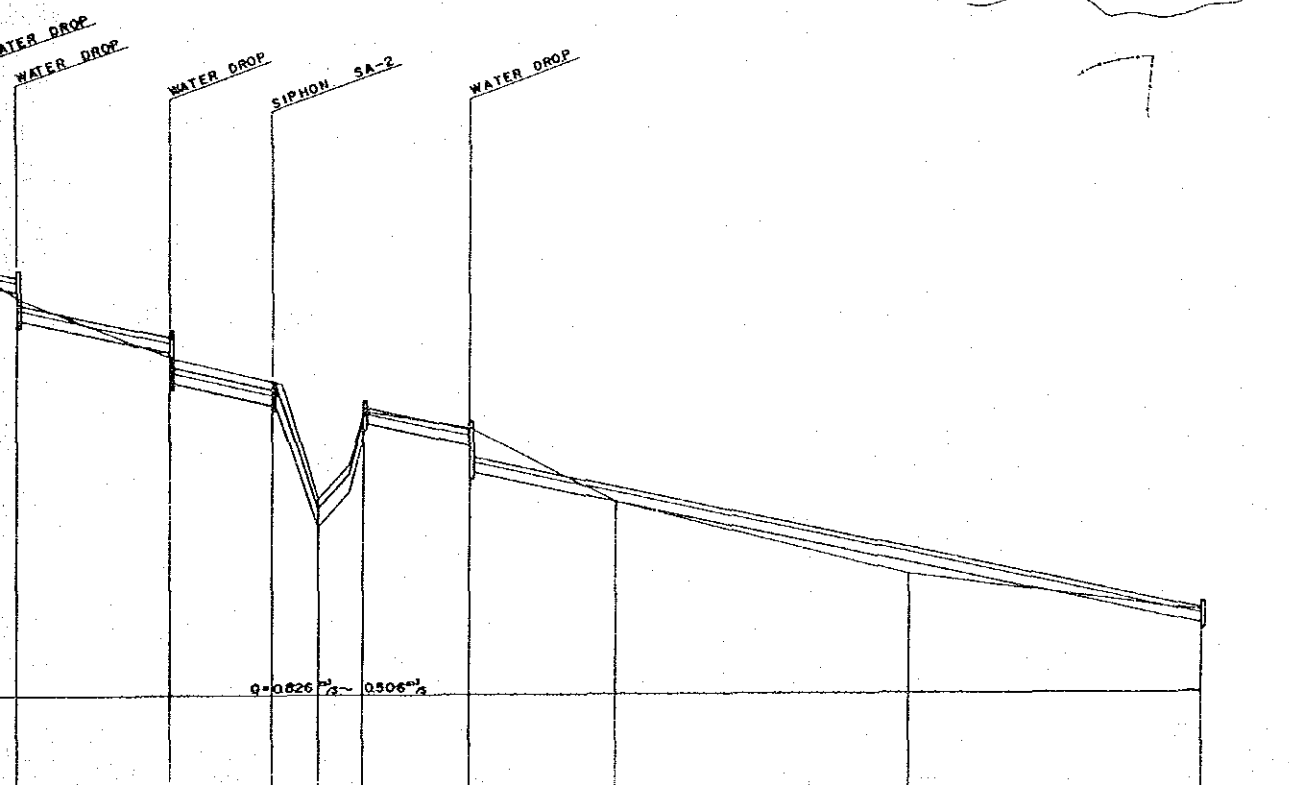
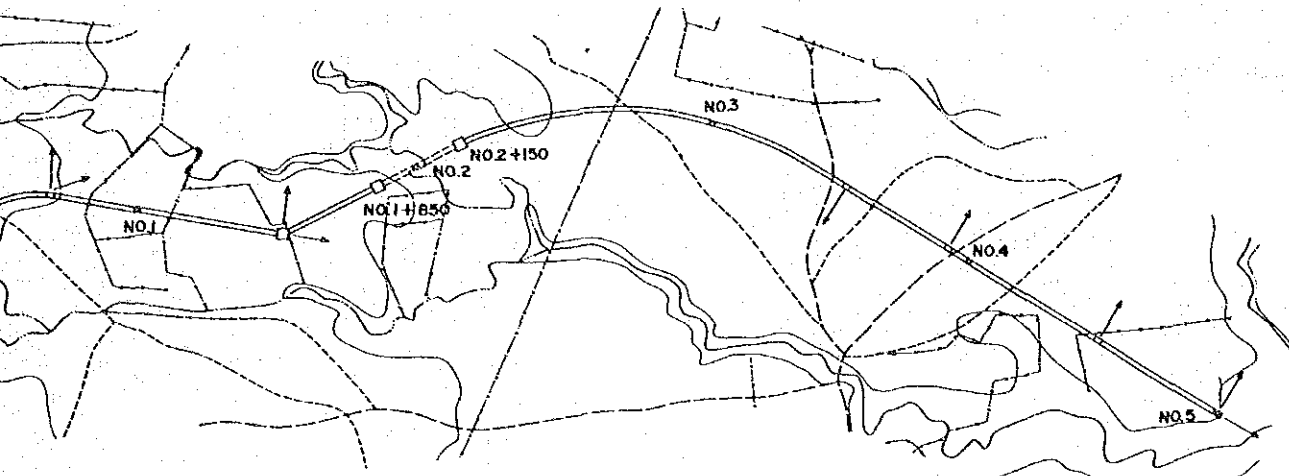


STATION	ACCUMULATED DISTANCE		GROUND LEVEL	DESIGN CANAL BED	DESIGN WATER LEVEL	SLOPE
	Salamo	Monjas				
NO.0	0	0	980	983.50	984.00	SIPHON 1/300
+100	100	+50		983.40	983.95	
+250	250	+250		981.13	981.83	SIPHON 1/300
+400	400	+350		978.07	978.87	
NO.1	1000	1000	977	975.67	976.17	SIPHON 1/300
+300	1800	+1500	974	974.00	973.00	
+450	1900	+1650		971.33	971.83	SIPHON 1/300
NO.2	2000	2000	965	970.33	970.83	
+100	2100	+2100		969.17	968.17	SIPHON 1/300
+300	2500	+2500	970	966.00	966.50	
NO.3	3000	3000	968			SIPHON 1/300
+400	4000	+4000	962	962.67	963.17	
NO.4	4000	4000	960			SIPHON 1/300
+500	5000	+5000	960	959.33	959.83	
NO.5	6000	6000	960			SIPHON 1/300
+750	6750	+5750	1004	1004.00	1004.45	
+250	7000	6000	980	982.83	983.28	SIPHON 1/300
+350	7350	6350		982.40	982.85	
+400	7750	6800	980			SIPHON 1/300
NO.1	10000	9000	980	990.33	990.78	
+100	11000	10000		988.87	988.12	SIPHON 1/300
+200	12000	11000	976	978.87	978.12	
+300	13000	12000		975.00	974.25	SIPHON 1/300
+400	14000	13000	976	973.33	972.58	
+500	15000	14000		971.83	971.08	SIPHON 1/300
NO.2	20000	19000	976	973.83	973.08	
+100	21000	20000		973.83	973.08	SIPHON 1/300
+200	22000	21000	976	973.83	973.08	
+300	23000	22000		973.83	973.08	SIPHON 1/300
+400	24000	23000	976	973.83	973.08	
+500	25000	24000		973.83	973.08	SIPHON 1/300
NO.3	26000	25000	976	973.83	973.08	

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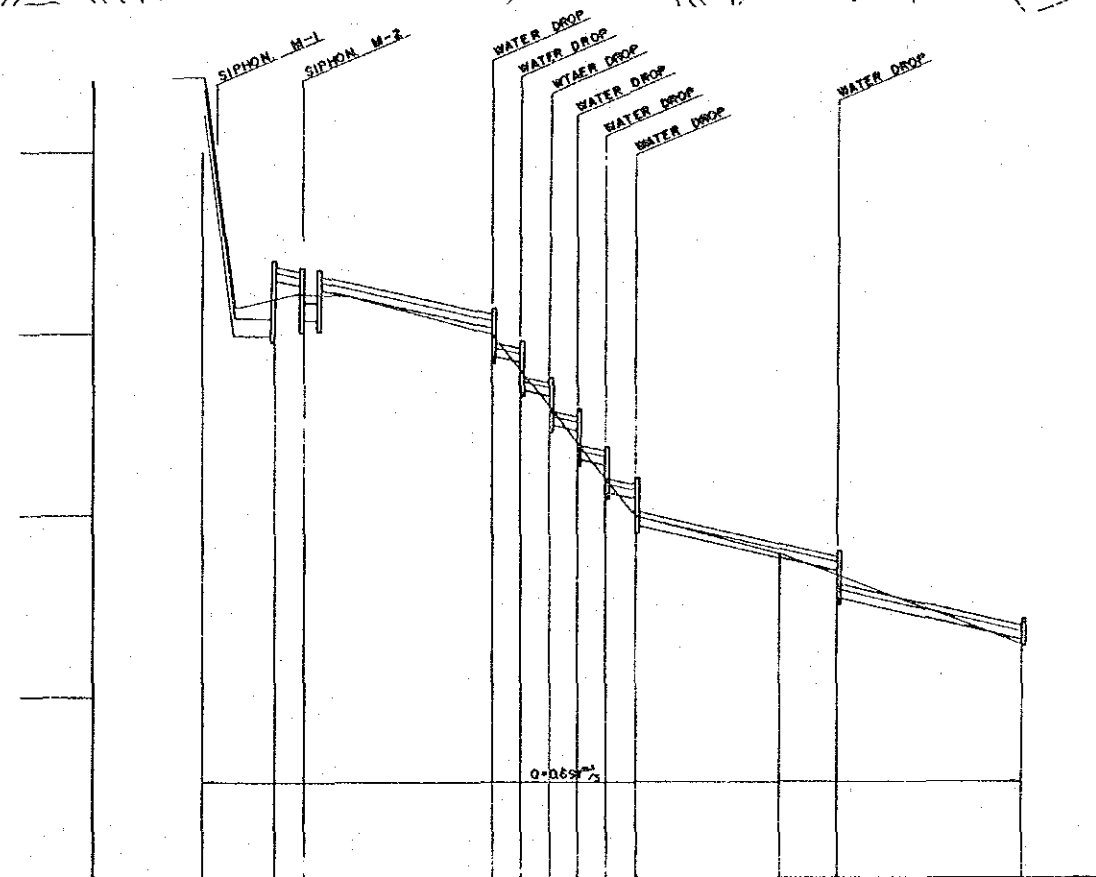
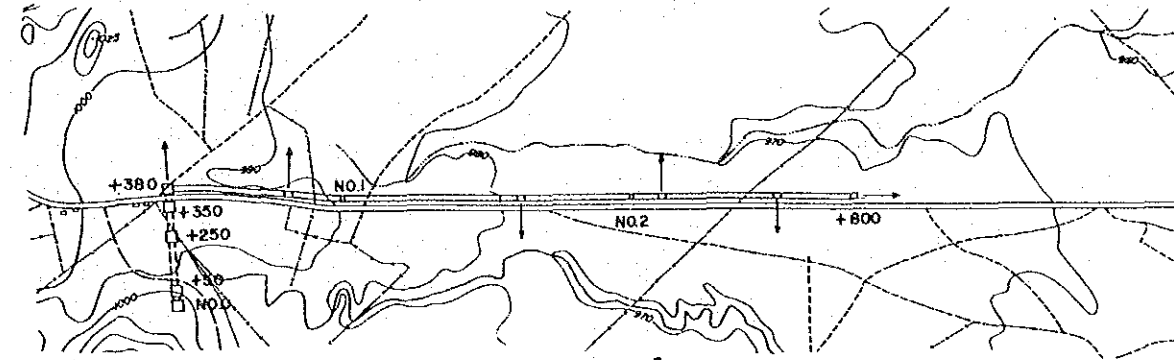
PLAN AND LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL

SALAMO MAIN CANAL



1000	1500	1800	2000	2150	2500	3000	4000	5000
977.07 976.17	974.00 973.00	971.83 970.83	969.67 968.17	968.00	965.17	962.67	959.33	956.83
977	974	968	967	966	962	960	959	956
NO.1	+850	+850	NO.2	+150	+300	NO.3	NO.4	NO.5

MONJAS MAIN CANAL



0	+250	+350	+380	1000	1100	1200	1300	1400	1500	2000	2200	2800
1004.45	992.83	992.50	992.40	990.33	980.79	979.87	978.45	977.79	976.29	973.33	972.83	974.28
1004	992	992	992	990	980	980	978	978	977	973	972	974
NO.1	+250	+350	+380	NO.1	+100	+200	+300	+400	+800	NO.2	+800	+800

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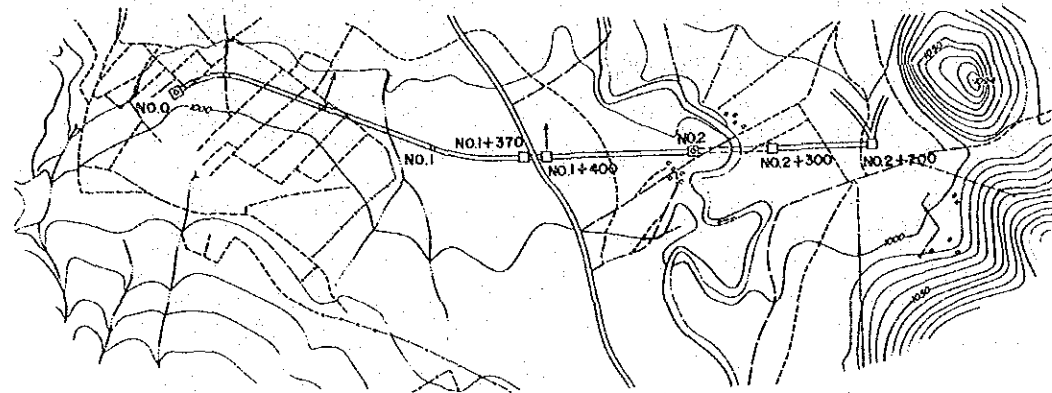
PLAN AND LONGITUDINAL PROFILE
 OF
 MAIN IRRIGATION CANAL
 SALAMO MAIN CANAL MONJAS MAIN CANAL

Fig. A.4.3.2-6 No.

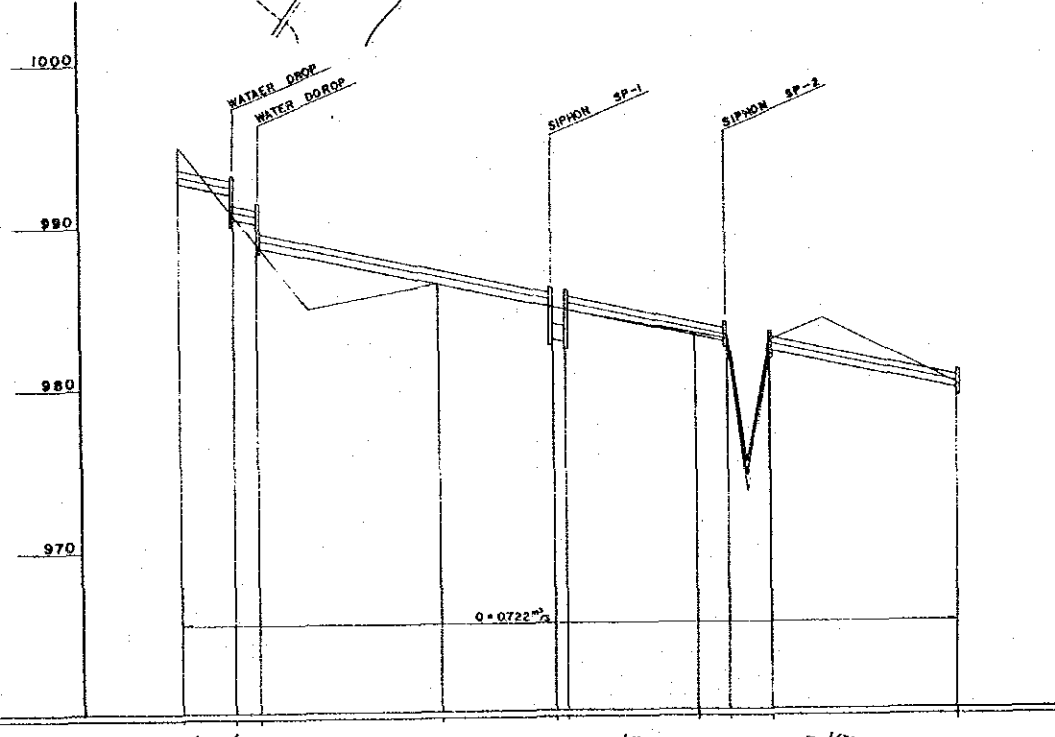
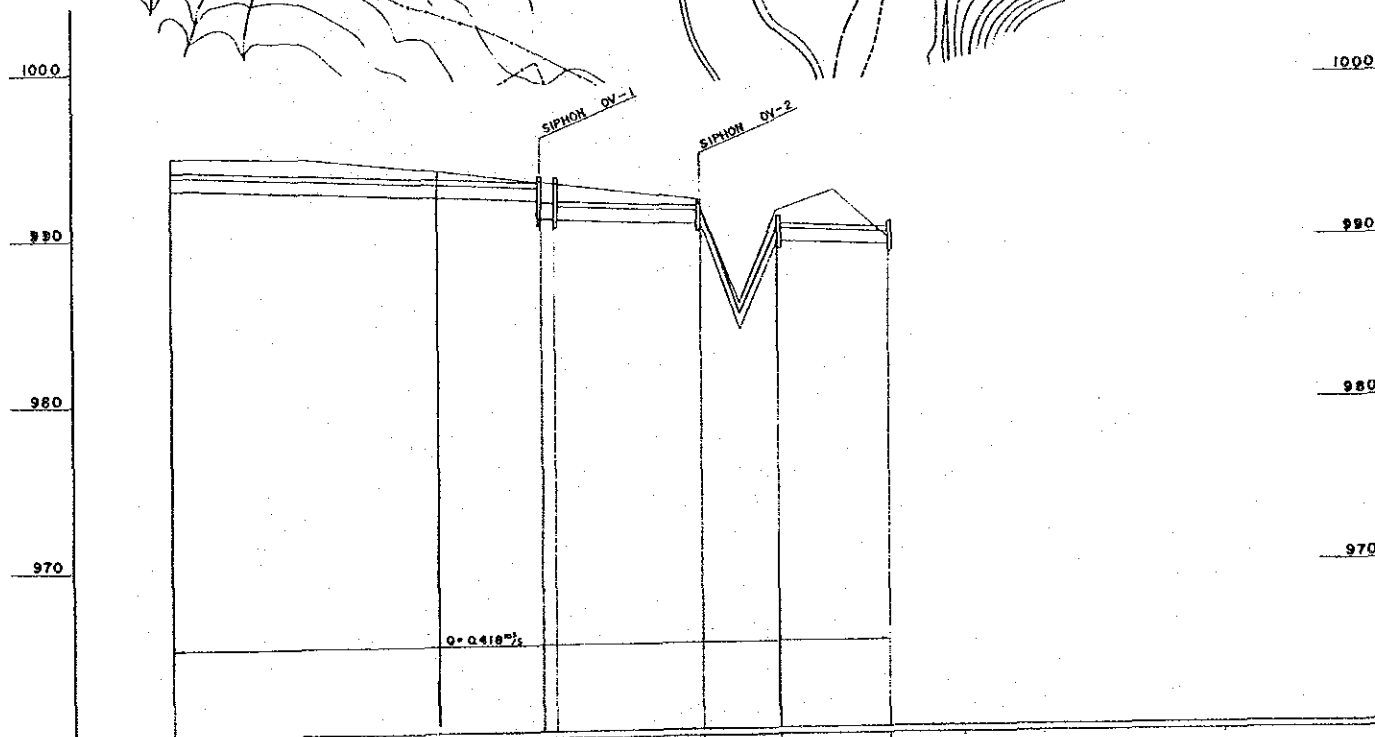
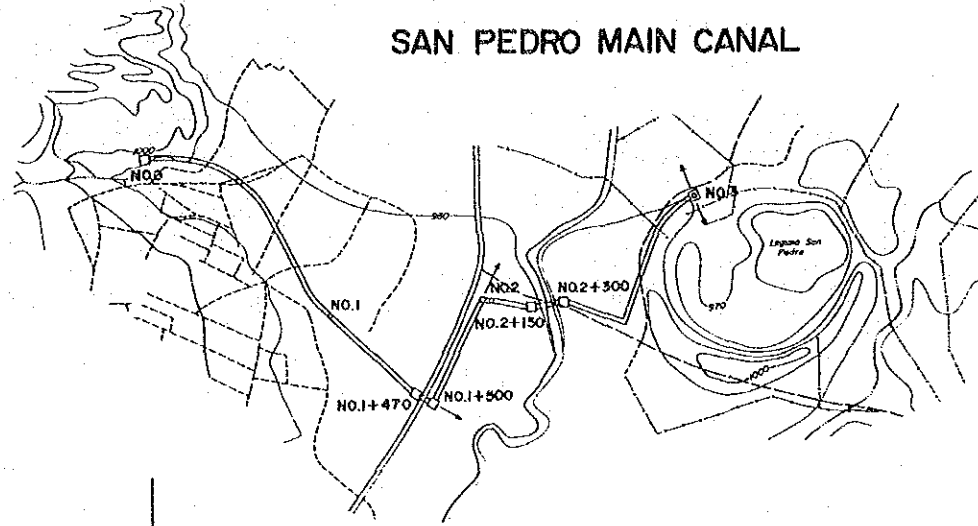
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PLAN AND LONGITUDINAL PROFILE OF MAIN IRRIGATION CANAL

OVEJERO MAIN CANAL



SAN PEDRO MAIN CANAL



SLOPE	1/2000						1/300										
DESIGN WATER LEVEL	983.25	993.00	992.87	991.85	991.55	990.40	989.55	987.42	985.85	983.56	983.06	967.75					
DESIGN CANAL BED	993.00	992.50	992.32	991.30	991.00	989.83	987.42	985.40	983.30	983.05	983.06	960.30					
GROUND LEVEL	995	994	994	990	990	989.83	987	985	983	983	983.06	980					
ACCUMULATED DISTANCE	0	1000	1370	1400	2000	2300	2700	3000	3300	3500	3800	4000					
STATION	NO.0	NO.1	+370	+400	NO.2	+300	+700	NO.0	+200	+300	NO.1	+470	+500	NO.2	+150	+300	NO.3

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 CATTLE AND FOOD RESOURCES

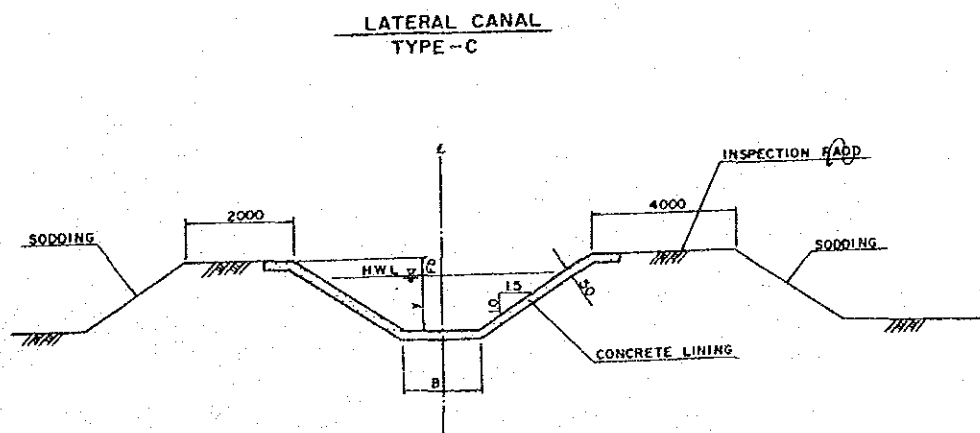
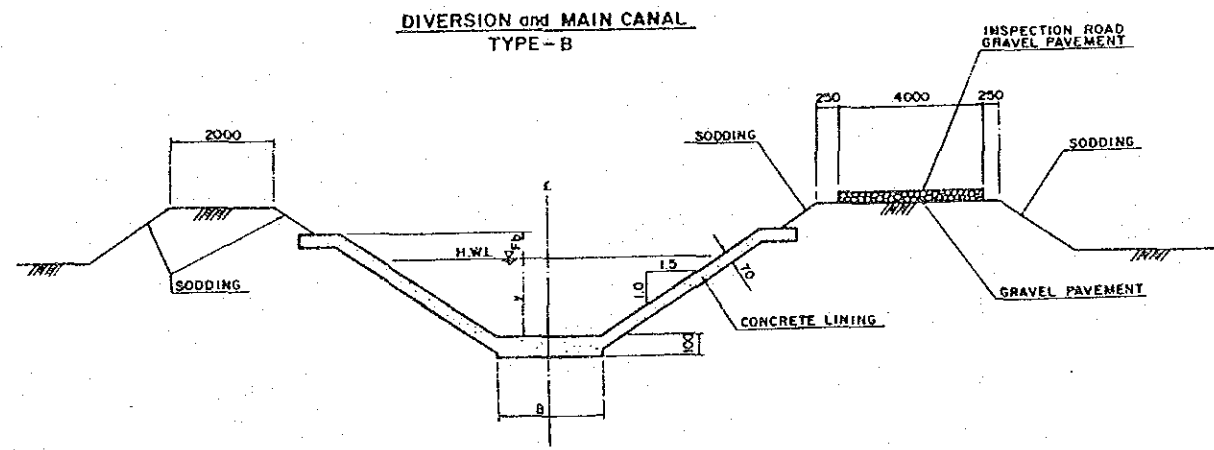
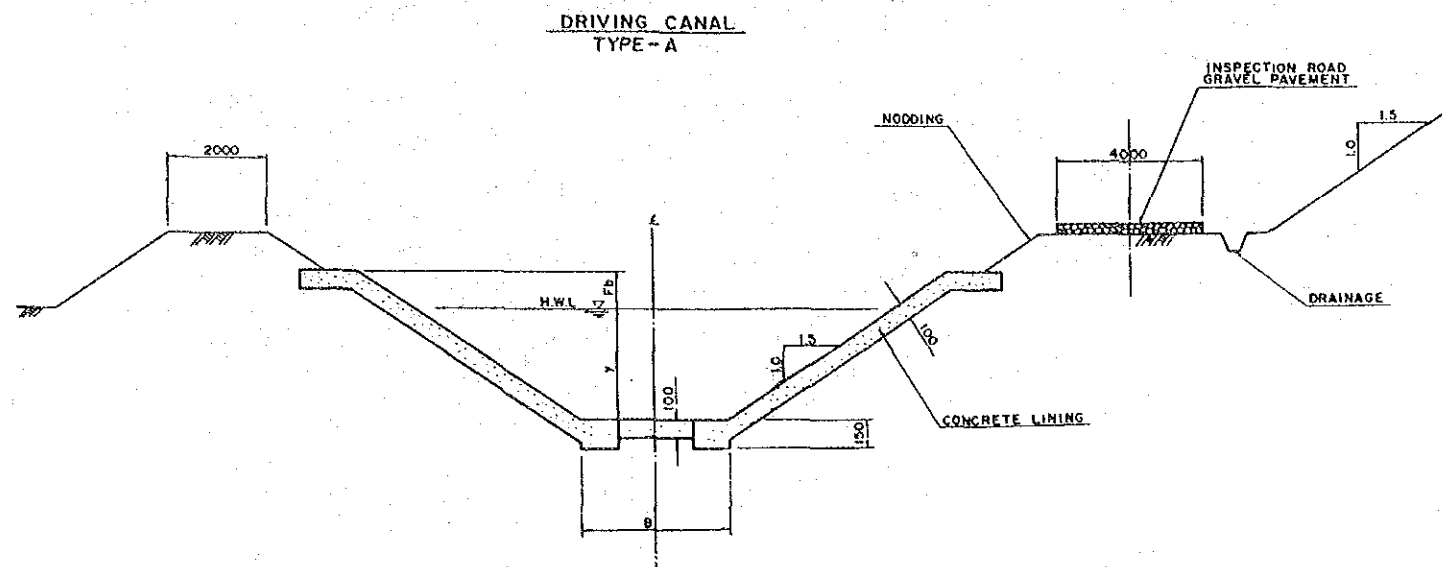
THE MONJAS IRRIGATION PROJECT

PLAN AND LONGITUDINAL PROFILE
 OF
 MAIN IRRIGATION CANAL
 OVEJERO MAIN CANAL SAN PEDRO MAIN CANAL

Fig. A.4.3.2-7 No.

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STANDARD CROSS SECTION OF IRRIGATION CANAL



DIMENSION OF CANALS

Canal Type		Q(m ³ /S)	SLOPE	B (m)	h (m)	F _b (in)	Remarks
TYPE-A	I	4000	1/4000	1.80	1.30	0.60	
	II	4000	1/3000	1.40	1.30	0.60	
TYPE-B	I	3280	1/2000	1.20	1.10	0.30	
	I	2227 - 2019	1/2000	1.00	0.95	1.00	0.30
	II	1526 - 1256	1/2000	0.80	0.80	0.85	0.30
	IV	0909	1/2000	0.60	0.80	0.30	
	V	0826 - 0.412	1/300 1/2000	0.50	0.35	0.55	0.30
TYPE-C		0257	1/1000	0.30	0.13	0.40	0.30

CANAL LENGTH AND CANAL TYPE

Name of Canal	Canal Length (m)	Slope	Canal Type	Total Length of siphon
Driving	1450	1/4000	TYPE-A-I	1615m
	6435	1/3000	TYPE-A-I	
South Diversion	500	1/2000	TYPE-B-I	375m
	1625	1/4000	TYPE-B-I	
	5500	1/3000	TYPE-B-IV	
North Diversion	3100	1/2000	TYPE-B-I	1100m
	5800	1/2000	TYPE-B-II	
	5200	1/2000	TYPE-B-V	
Ovejero Main	2370	1/2000	TYPE-B-V	330m
San Pedro Main	2820	1/300	TYPE-B-V	180m
Monjas Main	4600	1/300	TYPE-B-V	300m
Salama Main	4600	1/300	TYPE-B-V	400m
San Juanito Main	4200	1/1000	TYPE-B-V	300m
Ovejero Lateral OV-1	1000	1/1000	TYPE-C	
OV-2	1250	1/1000		
OV-3	1650	1/1000		100m
Sanpedro Lateral SP-1	1875	1/1000		
SP-2	1000	1/1000		
SP-3	3150	1/1000		100m
Hoyo Lateral HO-1	4150	1/1000		100m
HO-2	1000	1/1000		
HO-3	2450	1/1000		50m
Monjas Lateral M-1	1000	1/1000		
M-2	825	1/1000		50m
M-3	1000	1/1000		
Salama Lateral SA-1	1900	1/1000		100m
SA-2	273	1/1000		100m
SA-3	1900	1/1000		100m
San Juanito SJ-1	2400	1/1000		100m
Other Lateral	10775	1/1000		100m

Note: Canal length excludes total length of Siphons

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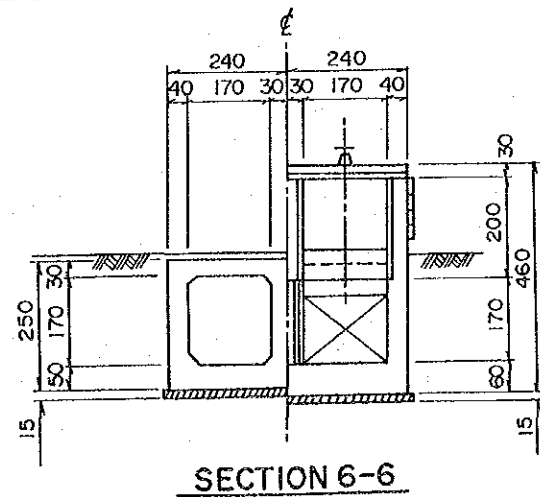
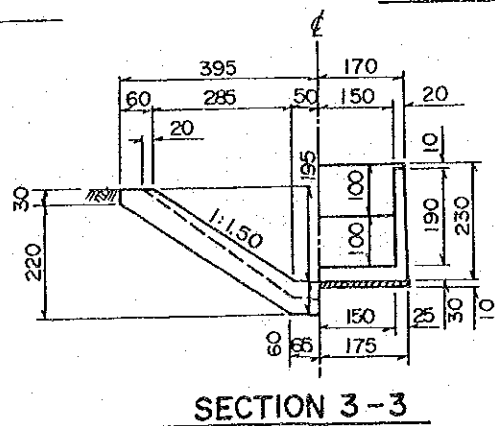
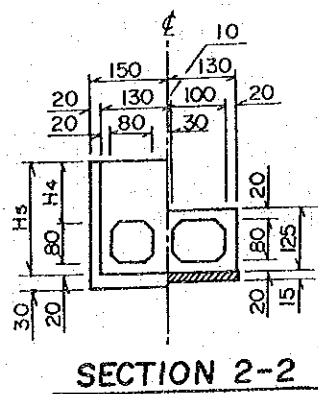
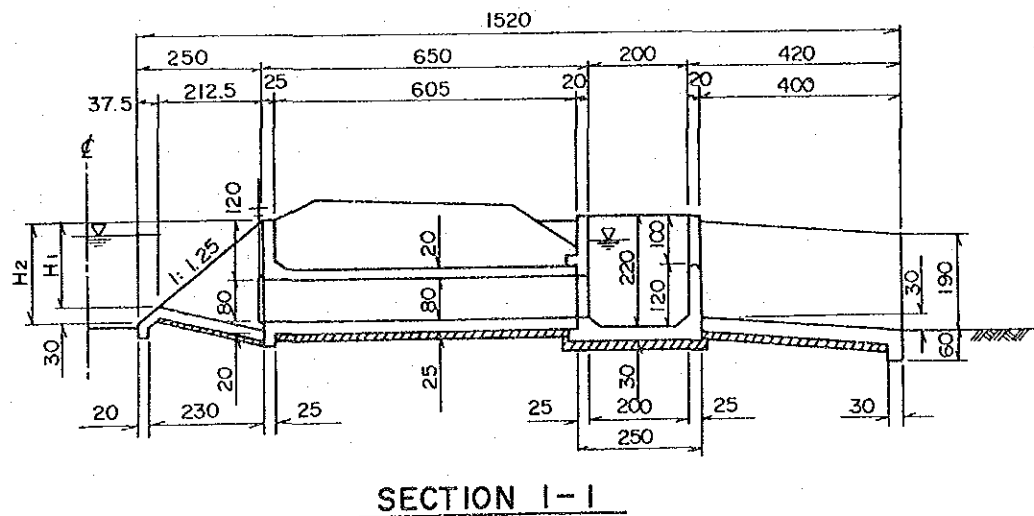
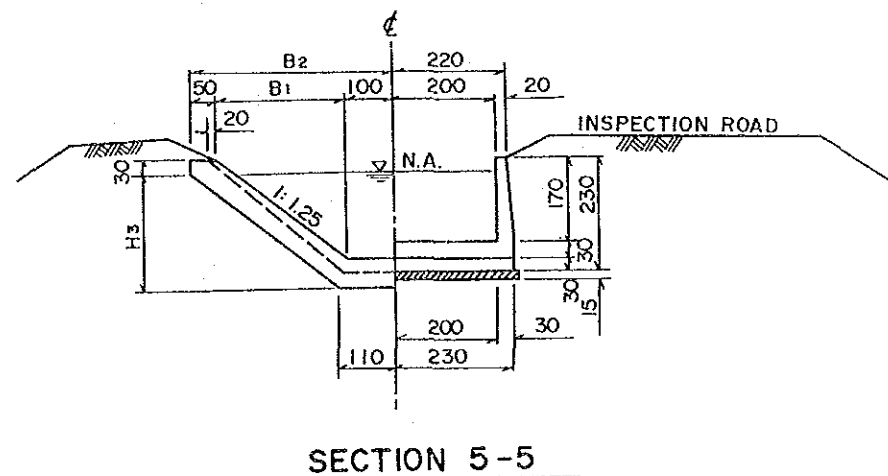
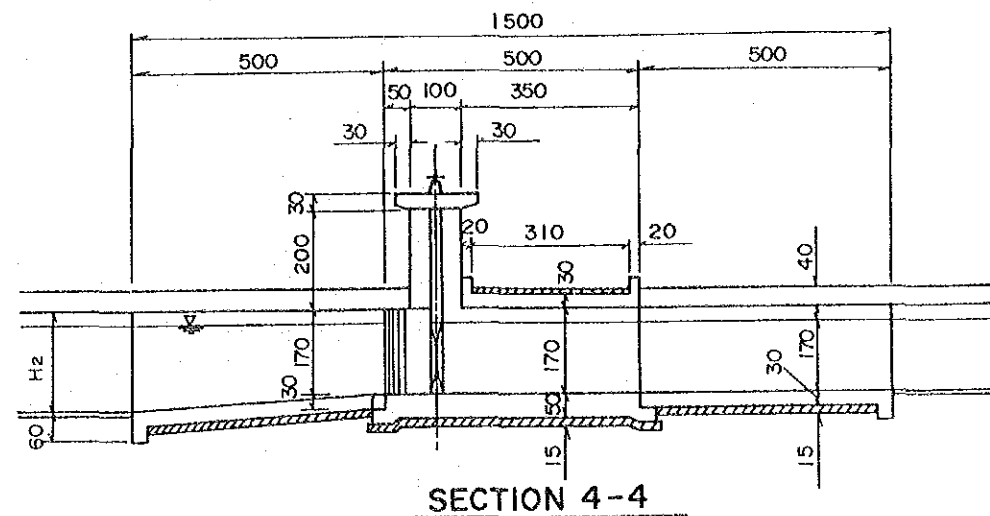
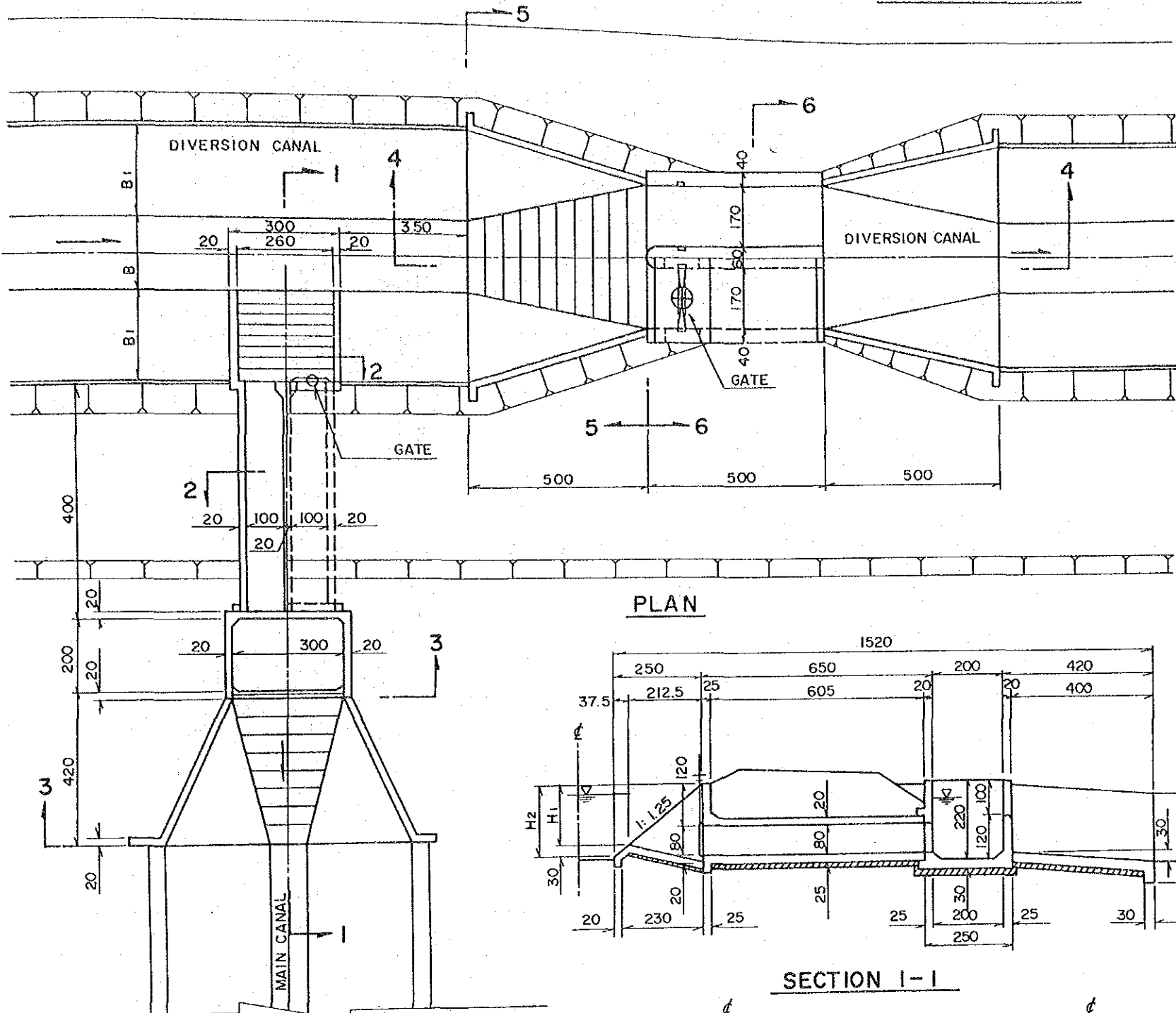
THE MONJAS IRRIGATION PROJECT

STANDARD CROSS SECTION
OF
IRRIGATION CANAL

Fig. A.4.3.2-8 No.

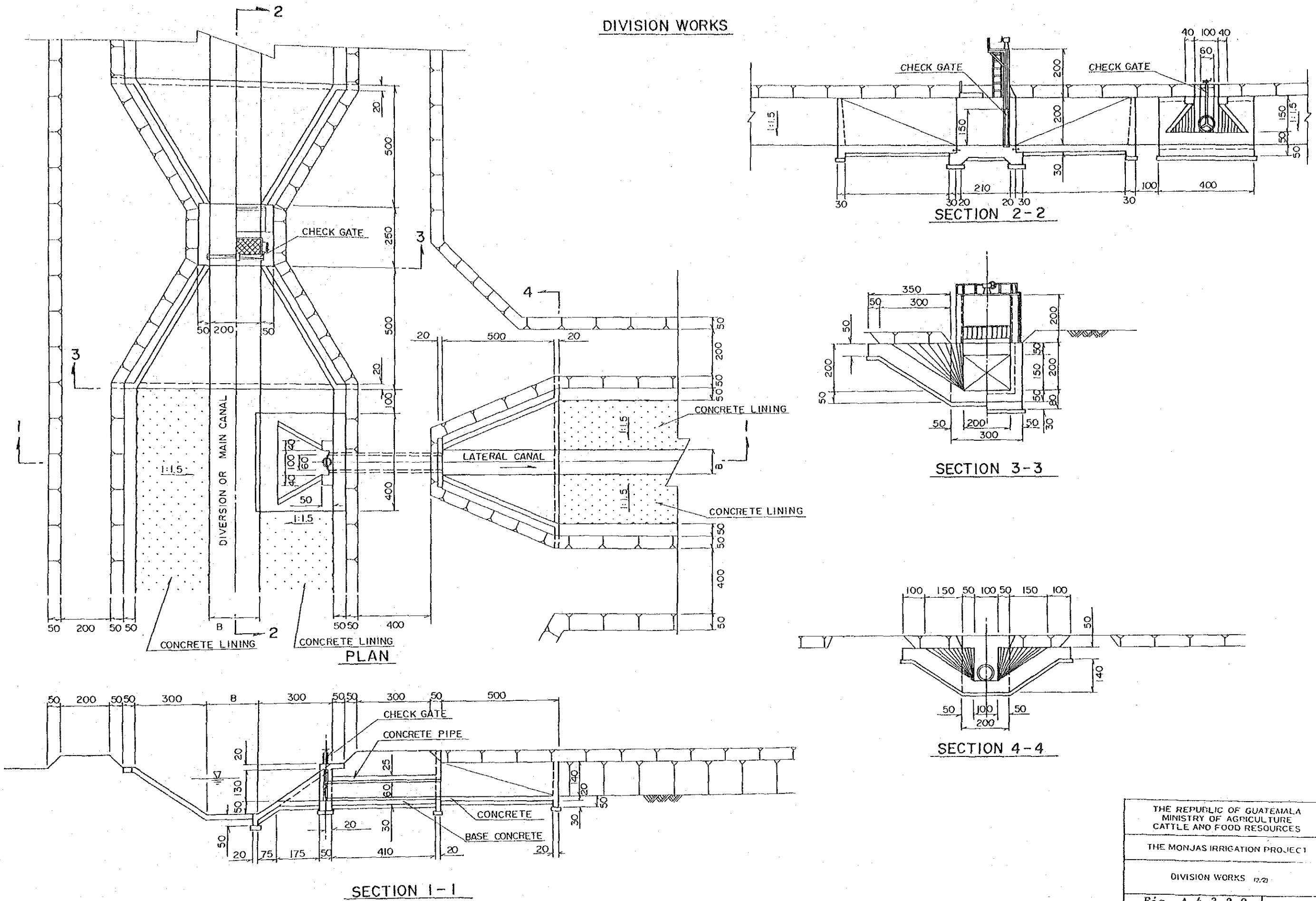
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DIVISION WORKS



THE REPUBLIC OF GUATEMALA MINISTRY OF AGRICULTURE CATTLE AND FOOD RESOURCES	
THE MONJAS IRRIGATION PROJECT	
DIVISION WORKS (1/2)	
Fig. A.4.3.2-9	No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	

DIVISION WORKS



THE REPUBLIC OF GUATEMALA MINISTRY OF AGRICULTURE CATTLE AND FOOD RESOURCES	
THE MONJAS IRRIGATION PROJECT	
DIVISION WORKS 12.21	
Fig. A.4.3.2-9	No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	

4.4 Construction Cost

4.4.1 Unit Cost

4.4.2 Compensation for Submerged Areas

4.4.3 Cost Estimation of Civil Works

Table A.4.4.3-1 Summary of Cost Estimation of
Civil Works

Table A.4.4.3-2 Cost Estimation of Civil Works

4.4.1 Unit Cost

The unit cost of construction works is estimated on the basis of the prevailing unit prices of labour and materials in Guatemala.

The construction works are considered to be carried out by a contract basis through the international competitive tender.

The unit prices used for estimation of the Project cost consists of the following items.

(1) Labour unit prices

Description	Unit	Price (Q)
Foreman	day	20.0
Skill labour	day	15.0
Common labour	day	8.0
Operator	day	20.0
Driver	day	15.0
Carpenter	day	12.0
Steel worker	day	12.0
Mason	day	12.0
Electrician	day	15.0

(2) Unit prices of materials

Description	Unit	Price (Q)
Portland cement	ton	108
White cement	bag	494
Cement for grouting	ton	194
Reinforcing bar	ton	1,167
Deformed bar	ton	1,850
Wood (soft)	m ³	356
Wood (hard)	m ³	847
Polywood for formwork		
t = 6.35 mm	No	27
t = 9.53	No	36
t = 12.7	No	47
t = 19.0	No	70
Steel formwork	ton	1,650
Crushed stone	cum	11
Gasoline	liter	0.77
Diesel oil	liter	0.45
Lubricating oil	liter	6.42
Dynamite	kg	11.25
Detonation cop	No	0.46
Asphalt	ton	1,296

(3) Proportion of foreign and local currencies

Proportion of the foreign and local currencies for the construction materials and equipment was applied as following table.

Description	Foreign currency(%)	Local currency(%)
Cement	0	100
Steel bar	100	0
Lumber	100	0
Fuel & oil	100	0
Labour	0	100
Explosive	100	0
Construction equipment		
Depreciation cost	100	0
Repair cost	80	20
Administrative cost	0	100

4.4.2 Compensation for Submerged Areas

When Guirila dam with gross capacity of reservoir 40.9 MCM is constructed, its water level becomes EL 1041.00 m and its reservoir area is 230 ha.

At the present time, conditions of land use in the submerged areas are as follows:

Cultivated land	62 ha
Pasture	46 ha
Non-Cultivated land	120 ha
Total	228 ha

House 17 nos
(Including resettlement caused by the construction of dam)

The above compensation is required by the construction of dam.
The compensation are as follows:

Cultivated land	62 ha	x 2,000 Q/ha	= 124,000 Q
Pasture	46 ha	x 1,500 Q/ha	= 69,000 Q
Non-Cultivated land	120 ha	x 500 Q/ha	= 60,000 Q
House	17 Nos	x 25,000 Q/No	= 425,000 Q

Total 678,000 Q

Table A.4.4.3-1 Summary of Cost Estimation of Civil Works

Description	Amount (Q'1000)		Total Amount (Q'1000)
	Foreign Currency	Local Currency	
1. Preparation	2,300	900	2,653.5
2. Diversion Tunnel	2,037	1,146	4,802.2
3. Foundation Treatment	2,477	2,327	18,855.1
4. Dam Body	13,367	5,488	5,768.6
5. Spillway	3,853	1,915	1,092.5
6. Intake Facilities	1,023	68	777.0
7. Maintenance Road	543	233	1,131.0
8. Regulating Reservoir	903	225	1,128
9. Diversion Dam	3,295	1,137	4,432
10. Driving Canal	2,462	2,574	5,036
11. Diversion Canal	3,174	2,656	5,830
12. Main Canal	2,192	1,971	4,163
13. Lateral Canal	2,925	1,670	4,595
14. Tertiary Canal	364	1,347	1,711
15. Land Reclamation	372	162	534
Total	41,287	23,919	65,206

Table A.4.4.3-2 Cost Estimation of Civil Works (1)

Description	Quantity	Unit	Unit Cost [Q]		Amount		[Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Foreign Currency	Local Currency	
(1) Preparatory Works		LS							3,200.0
(2) Diversion Tunnel									
(a) Excavation	25,500	cu.m	29.61	8.35	755.0	212.9		967.9	
Steel Support	480	No	700.00	-	336.0	-		336.0	
Concrete Lining	16,100	cu.m	12.43	43.56	200.1	701.3		901.4	
Steel Formwork	720	m	500.00	-	360.0	-		360.0	
Mortar Grout	1,700	cu.m	27.57	24.39	46.8	41.4		88.2	
					<u>1,697.9</u>	<u>955.6</u>		<u>2,653.5</u>	
Sub-total of (a)									
(b) Inlet & Outlet Works									
Excavation Earth	9,300	cu.m	2.63	1.05	24.4	9.7		34.1	
" Soft Rock	21,700	cu.m	3.68	1.45	79.8	31.4		111.2	
Reinforced Concrete	1,120	cu.m	12.43	43.56	13.9	48.7		62.6	
Reinforcing Bar	67	ton	1,190.34	92.00	79.7	6.1		85.8	
Formwork	1,980	sq.m	16.21	3.20	32.0	6.3		38.3	
					<u>229.8</u>	<u>102.2</u>		<u>332.0</u>	
Sub-total of (b)					<u>2,037.5</u>	<u>1,146.7</u>		<u>3,184.2</u>	
Total of (2)									
(3) Foundation Treatment									
(a) Foundation of Dam (Including Saddle Dam)									
Drilling Nipple Holes	2,214	m	45.29	8.02	100.2	17.7		117.9	
Setting of VP	2,214	No	27.91	2.20	61.7	4.8		66.5	
Drilling Pilot Holes	3,653	m	35.43	15.12	129.4	55.2		184.6	
Permeability Test	782	No	1.46	17.16	1.0	12.5		13.5	
Drilling Curtain Holes	40,590	m	26.42	4.52	1,072.3	183.4		1,255.7	

Table A.4.4.3-2 Cost Estimation of Civil Works (2)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount		Total	
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Foreign Currency	Local Currency
Injection	8,118	stage	18.50	101.00	150.1	819.9	970.0	
Drilling Test Holes	4,059	m	35.43	15.12	143.8	61.3	205.1	
Permeability Test	813	No	1.46	17.16	1.1	13.9	15.0	
Injection	669	stage	18.50	101.00	12.3	67.5	79.8	
Drilling Blanket Holes	3,790	m	26.42	4.52	100.1	17.1	117.2	
Injection	1,156	stage	18.50	101.00	28.0	153.1	181.1	
Cement	1,403	ton	-	194.00	-	272.1	272.1	
<u>Sub-total of (a)</u>					<u>1,800.0</u>	<u>1,678.5</u>	<u>3,478.5</u>	
(b) Foundation of Spillway								
Drilling Nipple Holes	198	m	45.29	8.02	8.9	1.5	10.4	
Setting of VP	198	No	27.91	2.20	5.5	0.4	5.9	
Drilling Pilot Holes	356	m	35.43	15.12	12.6	5.4	18.0	
Permeability Test	73	No	1.46	17.16	0.1	1.3	1.4	
Drilling Curtain Holes	3,960	m	26.41	4.52	104.6	17.9	122.5	
Injection	792	stage	18.50	101.00	14.6	80.0	94.6	
Drilling Test Holes	396	m	35.43	15.12	14.0	6.0	20.0	
Permeability Test	80	No	1.46	17.16	0.1	1.4	1.5	
Injection	99	stage	18.50	101.00	1.8	10.0	11.8	
Cement	131	ton	-	194.0	-	25.4	25.4	
<u>Sub-total of (b)</u>					<u>162.2</u>	<u>149.3</u>	<u>311.5</u>	
(c) Diversion Tunnel								
Drilling Pilot Holes	238	m	35.43	15.12	8.4	3.6	12.0	
Permeability Test	48	No	1.46	17.16	0.1	0.8	0.9	
Drilling Curtain Holes	2,640	m	26.41	4.52	69.7	11.9	81.6	
Injection	660	stage	18.50	101.00	12.2	66.6	78.8	

Table A.4.4.3-2 Cost Estimation of Civil Works (3)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q 1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Drilling Test Holes	264	m	35.43	15.12	9.3	4.0	13.3
Permeability Test	53	No	1.46	17.16	0.1	0.9	1.0
Injection	66	stage	18.50	101.00	0.1	6.7	6.8
Cement	87	ton	-	194.00	-	16.8	16.8
<u>Sub-total of (c)</u>					<u>99.9</u>	<u>111.3</u>	<u>211.2</u>
<u>Total of (3)</u>		LS			415.0	388.0	803.0
					<u>2,477.1</u>	<u>2,327.1</u>	<u>4,804.2</u>
(4) Dam Body (Including Saddle Dam)							
(a) Excavation Works							
(i) Main Dam							
Excavation Stripping	145,000	cu.m	2.02	0.81	292.9	117.4	410.3
" Earth	156,000	cu.m	2.02	0.81	315.1	126.4	441.5
" Soft Rock	39,000	cu.m	2.83	1.12	110.4	43.7	154.1
(ii) Saddle Dam							
Excavation Stripping	36,000	cu.m	2.02	0.81	72.7	29.2	101.9
" Earth	30,000	cu.m	2.02	0.81	60.6	24.3	84.9
" Soft Rock	7,000	cu.m	2.83	1.12	19.8	7.8	27.6
<u>Sub-total of (a)</u>					<u>871.5</u>	<u>348.8</u>	<u>1,220.3</u>
(b) Embankment							
(i) Main Dam							
Impervious Zone	683,000	cu.m	0.88	0.41	601.0	280.0	881.0
Filter Zone	307,000	cu.m	1.83	0.75	561.8	230.2	792.0
Random Zone	809,000	cu.m	0.46	0.23	372.1	186.0	558.1
Pervious Zone	838,000	cu.m	0.52	0.24	435.7	201.1	636.8

Table A.4.4.3-2 Cost Estimation of Civil Works (4)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q 1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
(ii) Saddle Dam							
Impervious Zone	98,500	cu.m	0.88	0.41	82.3	38.3	120.6
Filter Zone	49,000	cu.m	1.83	0.75	89.7	36.7	126.4
Random Zone	160,000	cu.m	0.46	0.23	73.6	36.8	110.4
Pervious Zone	98,000	cu.m	0.52	0.24	51.0	23.5	74.5
Sub-total of (b)					<u>2,267.2</u>	<u>1,032.6</u>	<u>3,299.8</u>
(c) Borrow Area Works							
Excavation Stripping	108,000	cu.m	2.14	0.91	231.1	98.3	329.4
" Earth	863,000	cu.m	2.36	0.98	2,036.7	845.7	2,882.4
Sub-total of (c)					<u>2,267.8</u>	<u>944.0</u>	<u>3,211.8</u>
(d) Random Material Works							
Excavation Stripping	115,000	cu.m	2.14	0.91	246.1	104.6	350.7
" Random Material	923,000	cu.m	2.36	0.93	2,178.3	858.4	3,036.7
Sub-total of (d)					<u>2,424.4</u>	<u>963.0</u>	<u>3,387.4</u>
(e) Pervious Works	780,000	cu.m	4.67	1.82	<u>3,642.6</u>	<u>1,419.6</u>	<u>5,062.2</u>
(f) Filter & Drain Materials Production	375,000	cu.m	3.84	1.53	<u>1,440.0</u>	<u>573.7</u>	<u>2,013.7</u>
(g) Miscellaneous		LS			<u>453.4</u>	<u>206.5</u>	<u>659.9</u>
Total of (4)					<u>13,366.9</u>	<u>5,488.2</u>	<u>18,855.1</u>
(5) Spillway Works							
(a) Excavation Earth	68,000	cu.m	2.63	1.05	178.8	71.4	250.2
" Soft Rock	102,000	cu.m	3.68	1.45	375.4	147.9	523.3
Sub-total of (a)					<u>554.2</u>	<u>219.3</u>	<u>773.5</u>

Table A.4.4.3-2 Cost Estimation of Civil Works (S)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
(b) Concrete Works							
Reinforced Concrete	24,000	cu.m	12.43	43.56	298.3	1,045.4	1,343.7
Reinforcing Bar	1,440	ton	1,190.34	92.00	1,714.1	132.5	1,846.6
Formwork	32,000	sq.m	16.21	3.20	518.7	102.4	621.1
Lean Concrete	700	cu.m	9.90	34.85	6.9	24.4	31.3
<u>Sub-total of (b)</u>					<u>2,538.0</u>	<u>1,304.7</u>	<u>3,842.7</u>
(c) Miscellaneous							
<u>Total of (5)</u>		LS			<u>761.0</u>	<u>391.4</u>	<u>1,152.4</u>
					<u>3,853.2</u>	<u>1,915.4</u>	<u>5,768.6</u>
(6) Intake Facilities							
(a) Earth Works are included in Diversion Tunnel Works							
(b) Concrete Works							
Reinforced Concrete	100	cu.m	12.43	43.56	1.2	4.4	5.6
Reinforcing Bar	6	ton	1,190.34	92.00	7.1	0.6	7.7
Formwork	150	sq.m	16.21	3.20	2.4	0.5	2.9
<u>Sub-total of (b)</u>					<u>10.7</u>	<u>5.5</u>	<u>16.2</u>
(c) Pipe Works							
φ 800mm	269	m	573.00	-	154.1	-	154.1
φ 400mm	19	m	270.00	-	5.1	-	5.1
Encasing Concrete	250	cu.m	12.43	43.56	3.1	10.9	14.0
<u>Sub-total of (c)</u>					<u>162.3</u>	<u>10.9</u>	<u>173.2</u>
(d) Gate							
Slide Gate (High Pressure)							
φ 400mm	1	No	-	-	136.0	-	136.0
φ 800mm	1	No	-	-	272.0	-	272.0

Table A.4.4.3-2 Cost Estimation of Civil Works (6)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Jet Flow Gate ϕ 400mm	1	No	-	-	272.0	-	272.0
<u>Sub-total of (d)</u>					<u>680.0</u>		<u>680.0</u>
(e) Gate House	205	sq.m	-	200.0	-	41.0	41.0
(f) Miscellaneous					170.0	11.0	181.0
<u>Total of (6)</u>					<u>1,023.0</u>	<u>68.4</u>	<u>1,091.4</u>
(7) Maintenance Road	2,220	m	245.00	105.00	543.9	233.1	777.0
<u>Total of (7)</u>					<u>543.9</u>	<u>233.1</u>	<u>777.0</u>
(8) Regulating Reservoir							
(a) No1 Regulating Reservoir							
Excavation	1,750	cu.m	2.02	0.81	3.5	1.4	4.9
Embankment	7,400	cu.m	5.40	2.31	40.0	17.1	57.1
Appurtenant Structures		LS			5.6	2.4	8.0
Miscellaneous		LS			10.3	3.7	14.0
<u>Sub-total of (a)</u>					<u>59.4</u>	<u>24.6</u>	<u>84.0</u>
(b) No2 Regulating Reservoir							
Excavation	2,850	cu.m	2.02	0.81	5.8	2.3	8.1
Embankment	13,000	cu.m	5.40	2.31	70.2	30.0	100.2
Appurtenant Structures		LS			5.8	1.4	7.2
Miscellaneous		LS			16.6	6.5	23.1
<u>Sub-total of (b)</u>					<u>98.4</u>	<u>40.2</u>	<u>138.6</u>
(b) No3 Regulating Reservoir							
Excavation	7,470	cu.m	2.02	0.81	15.0	6.0	21.0
Embankment	57,000	cu.m	5.40	2.31	307.8	131.7	439.5

Table A.4.4.3-2 Cost Estimation of Civil Works (7)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q 1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Appurtenant Structures		LS			10.6	2.6	13.2
Pump Facility		LS			340.0	-	340.0
Miscellaneous		LS			67.2	27.5	94.7
Sub-total of (c)					745.2	160.2	905.4
Total of (8)					903.0	225.0	1,128.0
(9) Diversion Dam							
(a) Diversion Dam							
Excavation	6.288	m ³	4.87	2.13	30.6	13.4	44.0
Spoiling	6.288	m ³	1.54	0.815	9.7	3.9	13.6
Reinforced Concrete	2.892	m ³	12.43	43.58	35.9	126.0	161.9
Concrete	6.175	m ³	15.10	38.10	93.2	235.3	328.5
Reinforce Bar	231	t	1,238.0	145.10	28.6	33.7	62.3
Rip Rip	2.653	m ³	7.06	9.60	18.7	25.5	44.2
Gabion	888	m ³	37.40	2.66	33.2	2.3	35.5
Concrete Block	563	m ³	13.20	33.00	7.4	18.6	26.0
Masonry (Wet)	1.839	m ³	11.62	36.30	21.3	66.8	88.1
Gate		LS			204.0	-	204.0
Temporary Work		LS			366.4	260.1	626.5
Sub-total of (a)					849.0	785.6	1,634.6
(b) Intake & Setting Basin							
Excavation	13.552	m ³	0.69	1.33	9.3	18.0	27.3
Backfill	1.852	m ³	2.15	5.20	4.0	9.6	13.6
Spoiling	11.726	m ³	1.64	2.64	19.2	31.0	50.2
Reinforced Concrete	1.528	m ³	12.43	43.56	19.0	66.6	85.6

Table A.4.4.3-2 Cost Estimation of Civil Works (8)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q, 1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Reinforce Bar	336	t	1,238.00	145.90	416.0	49.0	465.0
Gate		LS			820.0	-	820.0
Temporary Work		LS			637.3	86.2	723.5
<u>Sub-total of (b)</u>					<u>1,924.8</u>	<u>260.4</u>	<u>2,185.2</u>
(c) Miscellaneous		LS			521.2	91.0	612.2
<u>Total of (9)</u>					<u>3,295.0</u>	<u>1,137.0</u>	<u>4,432.0</u>
(10) Driving Canal							
(a) Earthworks		m ²					
Excavation	101,015	m ²	2.01	1.67	203.0	168.7	371.7
Embankment	15,015	m ²	7.01	2.41	105.3	36.2	141.5
Spoiling	86,000	m ²	1.64	2.64	141.0	227.0	368.0
<u>Sub-total of (a)</u>					<u>449.3</u>	<u>431.9</u>	<u>881.2</u>
(b) Concrete Lining	8,140	m ²	12.43	43.56	101.2	354.6	455.8
(c) Gravel Pavement	6,228	m ²	-	11.0	-	68.5	68.5
(d) Siphone	5	NOS			952.6	720.9	1,673.5
(e) Drops	2	NOS			12.0	8.0	20.0
(f) Temporary Works		LS			750.0	784.0	1,534.0
(g) Miscellaneous		LS			196.9	206.1	403.0
<u>Total of (10)</u>					<u>2,462.0</u>	<u>2,574.0</u>	<u>5,036.0</u>
(11) Diversion Canal							
(a) South Diversion Canal							
Excavation	42,606	m ²	2.01	1.67	85.6	71.2	156.8
Embankment	45,116	m ²	7.01	2.41	316.3	108.7	425.0

Table A.4.4.3-2 Cost Estimation of Civil Works (9)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount		[Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Concrete	5,791	m ³	12.43	43.56	39.8	139.3		179.1	
Gravel Pavement	11,840	m ²	-	11.00	-	67.1		67.1	
Siphone	1	NOS			139.1	95.6		234.7	
Temporary Work		LS			287.5	238.6		526.1	
<u>Sub-total of (a)</u>					<u>868.3</u>	<u>720.5</u>		<u>1,588.8</u>	
(b) North Diversion Canal									
Excavation	78,605	m ³	2.01	1.67	158.0	131.3		289.3	
Embankment	78,075	m ³	7.01	2.41	547.3	188.2		735.5	
Concrete	5,791	m ³	12.43	43.56	72.0	252.3		324.3	
Gravel Pavement	11,840	m ²	-	11.00	-	130.2		130.2	
Siphone	9	NOS			499.4	308.3		807.7	
Temporary Work		LS			632.0	500.0		1,132.0	
<u>Sub-total of (b)</u>					<u>1,908.7</u>	<u>1,510.3</u>		<u>3,419.0</u>	
(c) Irrigation Structure									
Division Work	22	NOS			155.3	232.9		388.2	
(d) Miscellaneous		LS			241.7	192.3		434.0	
<u>Total of (11)</u>					<u>3,174.0</u>	<u>2,656.0</u>		<u>5,830.0</u>	
(12) Main Canal									
(a) Ovejero Main Canal									
Excavation	10,428	m ³	2.01	1.67	21.0	17.4		38.4	
Embankment	8,532	m ³	7.01	2.41	59.8	20.6		80.4	
Concrete Lining	728	m ²	12.43	43.56	9.0	31.7		40.7	
Gravel Pavement	2,160	m ²	-	11.00	-	23.8		23.8	
Siphone	2	NOS			131.6	84.1		215.7	

Table A.4.4.3-2 Cost Estimation of Civil Works (10)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
Temporary Work		LS			109.6	87.9	197.5
<u>Sub-total of (a)</u>					<u>331.0</u>	<u>265.5</u>	<u>596.5</u>
(b) San Pedro Main Canal		m					
Excavation	12,408	m	2.01	1.67	24.9	20.7	45.6
Embankment	10,152	m	7.01	2.41	71.2	24.5	95.7
Concrete Lining	866	m	12.43	43.56	10.8	37.7	48.5
Gravel Pavement	1,680	m	-	11.0	-	18.5	18.5
Siphone	2	NOS			81.5	45.9	127.4
Temporary Work		LS			93.2	72.9	166.1
<u>Sub-total of (b)</u>					<u>281.6</u>	<u>220.2</u>	<u>501.8</u>
(c) Monjas Main Canal		m					
Excavation	7,718	m	2.01	1.67	15.5	12.9	28.4
Embankment	5,448	m	7.01	2.41	38.2	13.1	51.3
Concrete Lining	697	m	12.43	43.56	8.7	30.4	39.1
Gravel Pavement	-	m	-	-	-	-	-
Siphone		NOS			98.3	58.6	156.9
Temporary Work		LS			79.5	58.9	138.4
<u>Sub-total of (c)</u>					<u>240.2</u>	<u>171.9</u>	<u>412.1</u>
(d) Sotano Main Canal		m					
Excavation	20,240	m	2.01	1.67	40.7	33.8	74.5
Embankment	16,560	m	7.01	2.41	116.1	39.9	156.0
Concrete	1,412	m	12.43	43.56	17.6	61.5	79.1
Gravel Pavement	4,000	m	-	11.00	-	44.0	44.0
Siphone		NOS			155.3	102.0	257.3
Temporary Work		LS			163.2	139.2	302.4

Table A.4.4.3-2 Cost Estimation of Civil Works (11)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
<u>Sub-total of (d)</u>							
(e) San Juancito Main Canal							
Excavation	18,480	m	2.01	1.67	37.1	30.9	68.0
Embankment	15,120	m	7.01	2.41	106.0	36.4	142.4
Concrete Lining	1,289	m	12.43	43.56	16.0	56.1	72.1
Gravel Pavement	3,600	m	-	11.00	-	39.6	39.6
Siphone		NOS			122.0	76.5	198.5
Temporary Work		LS			139.2	118.6	257.8
<u>Sub-total of (e)</u>							
(f) Irrigation Structure							
Division Work	27	NOS			130.0	195.0	325.0
Drops	10	NOS			60.0	90.0	150.0
Temporary Work		LS			61.2	91.9	153.1
<u>Sub-total of (f)</u>							
(g) Miscellaneous							
<u>Total of (12)</u>							
					174.8	158.2	333.0
					2,192.0	1,971.0	4,163.0
<u>(13) Lateral Canal</u>							
(a) Canal							
Excavation	4,680	m	2.01	1.67	9.4	7.8	17.2
Embankment	107,100	m	7.01	2.41	750.8	258.1	1,008.9
Concrete Lining	4,800	m	12.43	43.56	59.7	209.1	268.8
<u>Sub-total of (a)</u>							
(b) Siphone	20	NOS			819.9	475.0	1,294.9
(c) Division Work	69	NOS			631.1	315.2	946.3
					138.0	207.0	345.0

Table A.4.4.3-2 Cost Estimation of Civil Works (12)

(cont'd)

Description	Quantity	Unit	Unit Cost [Q]		Amount [Q'1000]		Total
			Foreign Currency	Local Currency	Foreign Currency	Local Currency	
(d) Drops	35	NOS			13.1	9.3	22.4
(e) Cross Works	18	NOS			79.7	44.3	124.0
(f) Pump Station		LS			324.0	54.0	378.0
(g) Temporary Works		LS			711.6	435.6	1,147.2
(h) Miscellaneous		LS			207.6	129.6	337.2
<u>Total of (13)</u>					<u>2,925.0</u>	<u>1,670.0</u>	<u>4,595.0</u>
(14) Tertiary Canal		m					
Embankment	118,800	m	0.24	1.24	28.5	147.3	175.8
Concrete Lining	17,226	m	12.43	43.56	214.1	750.4	964.5
Temporary Work		LS			92.2	341.1	433.3
Miscellaneous		LS			29.2	108.2	137.4
<u>Total of (14)</u>					<u>364.0</u>	<u>1,347.0</u>	<u>1,711.0</u>
(15) Land Reclamation		ha					
Temporary Work	450	LS		239.5	248.0	107.8	355.8
Miscellaneous		LS			94.2	41.0	135.2
<u>Total of (15)</u>					<u>372.0</u>	<u>162.0</u>	<u>534.0</u>
Grand Total							

**5 . PROJECT IMPLEMENTATION,
OPERATION AND MAINTENANCE PLAN**

5. PROJECT IMPLEMENTATION, OPERATION AND MAINTENANCE PLAN

Fig. A.5-1 Implementation Schedule

Table A.5-1 Operation and Maintenance Cost

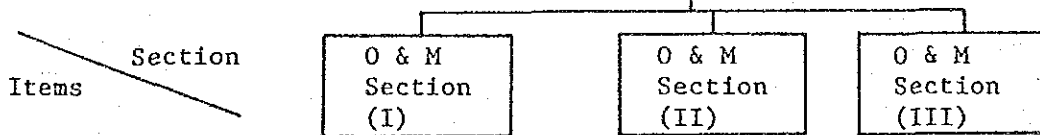
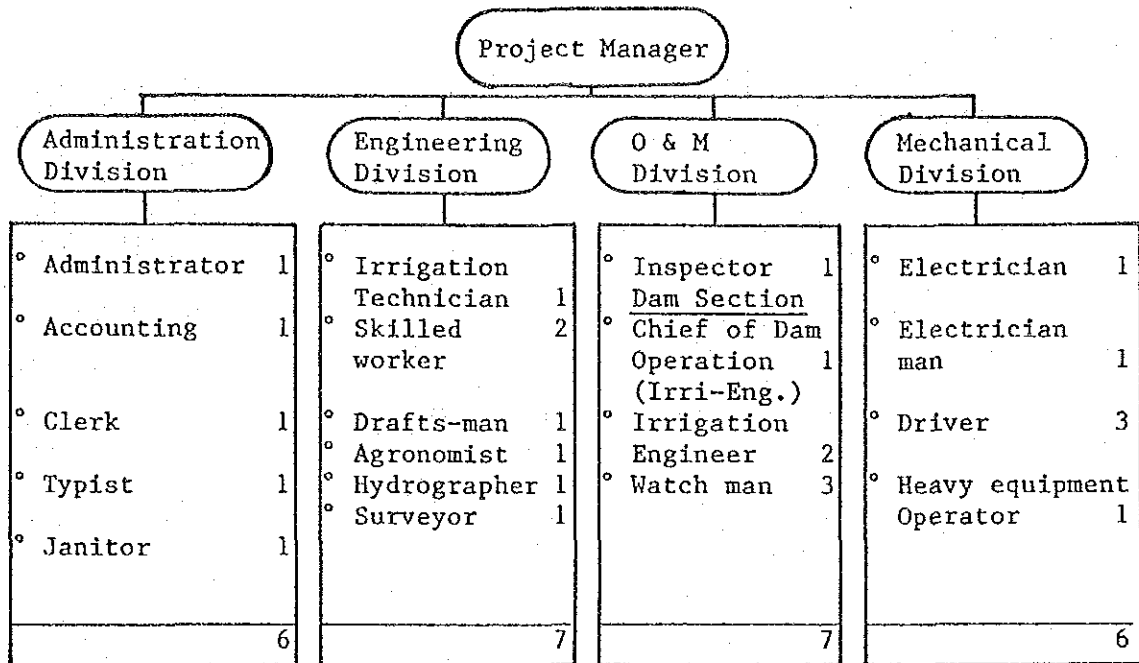
MONJAS IRRIGATION PROJECT IMPLEMENTATION SCHEDULE

Description	1987	1988	1989	1990	1991	1992	1993	1994	1995	Remarks
Feasibility Study	██████████									
Pre-Engineering		██████████								
Detailed Design		██████████								
Tendering			██████████							
Construction				██████████						
1 Land Acquisition and Compensation				██████████						
2 Project Facilities					██████████					
3 Project Administration						██████████				
4 Consulting Services							██████████			
5 Civil Works										
5.1 Preparatory Works					██████████					
5.2 Dam						██████████				
(a) Diversion Tunnel							██████████			
(b) Foundation Treatment								██████████		
(c) Dam Body									██████████	
(d) Spillway								██████████		
(e) Intake Facilities									██████████	
(f) Maintenance Road										██████████
5.3 Regulating Reservoir							██████████			
5.4 Diversion System										
(a) Diversion Dam							██████████			
(b) Driving Canal								██████████		
5.5 Canal Network Syst										
(a) Diversion Canal								██████████		
(b) Main Canal									██████████	
(c) Lateral Canal										██████████
(d) Tertiary Canal										██████████
5.6 Land Reclamation										██████████

Fig. A.5-1 Implementation Schedule

(1) Staff and Facility of Operation and Maintenance for
Monjas Irrigation Project

1) O & M Staff



* Facility	H.W and Driving canal (70 ha)	North Main canal (2,560 ha)	South Main canal (2,170 ha)	<u>Total</u>
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* Staff				
1. Construction Eng. (Water Master)	1	1	1	3
2. Zone Man (1/2,500 ha)	-	2	1	3
3. Canal Tender (1/500 ha)	2	6	5	13
4. Driver	1	1	1	3
5. Labor	5	10	10	25
<u>Total</u>	<u>9</u>	<u>20</u>	<u>18</u>	<u>47</u>

2) Transportation and Equipment

	<u>O & M Section (I)</u>	<u>O & M Section (II)</u>	<u>O & M Section (III)</u>	<u>For Division</u>	<u>Total</u>
* Transportation					
Vehicle Station Wagon	1	-	-	1	2
Pick up	-	1	1	2	4
Motor Cycle (125 cc)	2	6	5	2	15
* Equipment					
Backhoe Excavator (0.15 m ³)	-	-	-	1	1
Grader (3.7 m)	-	-	-	1	1
Dump Truck (6 ton)	-	-	-	1	1
Dick up Car (1 ton)	-	-	-	2	2
Submergible pump (50 mm)	-	-	-	1	1

(2) Calculation of O & M Cost

Table A.5-1 Operation and Maintenance Cost

<u>Items</u>	<u>O & M Cost</u>
	Q
- Salary and Wages	479,050
- Equipment	94,127
- Material and Supplies	18,700
- Administration and General Expenditure	71,857
<u>Total</u>	<u>663,734</u>

Unit cost 663,734/4,800

138 Q/ha

1) Salaries and Wages*

	Description	No. person	Annual Salary (Q)	Total (Q)
1	Manager	1	15,600	<u>15,600</u>
2	Administration Division			
-	Administrator	1	13,000	13,000
-	Accounting	1	6,500	6,500
-	Clerk	1	6,500	6,500
-	Typist	1	4,550	4,550
-	Janitor	1	3,900	3,900
	<u>Sub Total</u>	<u>5</u>		<u>50,050</u>
3	Engineering Division			
-	Irrigation Engineer	1	15,600	15,600
-	Skilled Worker	2	6,500	13,000
-	Drafts man	1	5,200	5,200
-	Agronomist	1	7,150	7,150
-	Hydrographer	1	7,150	7,150
-	Surveyor	1	7,150	7,150
	<u>Sub Total</u>	<u>7</u>		<u>55,250</u>
4	Mechanical Division			
-	Electrician	1	15,600	15,600
-	Electric man	1	7,150	7,150
-	Driver	3	5,200	15,600
-	Heavy equipment Operator	1	6,500	6,500
	<u>Sub Total</u>	<u>6</u>		<u>44,850</u>

* Salaries and Wages includes "Aguinaldo" (dependent allowance)

** 12 month + 1 month (Bonus)

Description	No.	Annual Salary (Q)	Total (Q)
5 O & M Division			
- Chief O/M Division (Irr. Eng.)	Q 1,200 (12+1)	1	15,600
- Inspector Dam Operation (Civ. Eng.)	Q 1,200 (")	2	15,600
- Assistant Inspector	Q 550 (")	2	7,150
- Watch man	Q 400 (")	3	5,200
* O & M Section			
- Construction Eng. (Water Master)	Q 1,000 (12+1)	3	13,000
- Zone Man	Q 550 (")	3	7,150
- Canal Tender	Q 450 (")	13	5,850
- Driver	Q 450 (")	3	5,850
- Labor	Q 350 (")	25	4,550
<u>Sub Total</u>		<u>54</u>	<u>328,900</u>
<u>Total</u>		<u>73</u>	<u>479,050</u>

2) Equipment for O & M

1 Depreciation Cost

	Quantity	Rate(Q)	Cost	Cost (10%)
- Backhoe Excavator (0.15 m ³)	1	130,000	130,000	13,000
- Gradere (3.7 m)	1	260,000	260,000	26,000
- Dump Track (6 ton)	1	80,000	80,000	8,000
- Submergible Pump (50 mm)	1	4,000	4,000	400
- Vehicle Station Wagon	2	40,000	80,000	8,000
- Vehicle Pick up (1 ton)	6	25,000	150,000	15,000
- Motor cycle (125 cc)	15	5,000	75,000	7,500
<u>Sub Total</u>				<u>77,900</u>

6 . PROJECT EVALUATION

6. PROJECT EVALUATION

6.1 Economic Evaluation Policy

6.2 Project Benefit

Table A.6.2-1 Irrigated Area during Gestation Period

6.3 Economic Evaluation

Table A.6.3-1 Price Structure of Agricultural Products

Table A.6.3-2 Farm-gate Prices of Agricultural Products

Table A.6.3-3 Operation and Maintenance Cost

Table A.6.3-4 Crop Production Cost with Project (Economic Price)

Table A.6.3-5 Crop Production Cost without Project (Economic Price)

Table A.6.3-6 Production Value with Project (Economic Price)

Table A.6.3-7 Production Value without Project (Economic Price)

Table A.6.3-8 Economic Internal Rate of Return (EIRR)

Table A.6.3-9 Sensitivity Analysis (Increase of Construction Cost 10%)

Table A.6.3-10 Sensitivity Analysis (Decrease of Benefit 10%)

Table A.6.3-11 Sensitivity Analysis (Delay of Benefit Outcoming 1 year)

Table A.6.3-12 Annual Disbursement Schedule (Economic Price)

6.4 Financial Evaluation

Table A.6.4-1 Crop Production Cost with Project (Financial Price)

Table A.6.4-2 Crop Production Cost without Project (Financial Price)

Table A.6.4-3 Production Value with Project (Financial Price)

Table A.6.4-4 Production Value without Project (Financial Price)

Table A.6.4-5 Financial Internal Rate of Return (FIRR)(Government's Share of Project Cost 0 %)

Table A.6.4-6 Financial Internal Rate of Return (FIRR)(Government's Share of Project Cost 20 %)

Table A.6.4-7 Financial Internal Rate of Return (FIRR)(Government's Share of Project Cost 40 %)

Table A.6.4-8 Financial Internal Rate of Return (FIRR)(Government's Share of Project Cost 60 %)

6.5 Socio-economic Evaluation

Table A.6.5-1 Expansion of Foreign Currency Holdings

Table A.6.5-2 Employment

Table A.6.2-1 Irrigated Area during Gestation Period

(Unit : ha)

Crop		Full Benefit Period	Gestation Period
Maize	(W)	2.850	1.223
	(D)	1.200	60
Kidney beans	(W)	1.950	435
	(D)	450	23
Tobacco	(W)	450	225
Tomato	(W)	1.200	600
	(D)	1.200	60
Broccoli	(D)	1.200	60
Onion	(D)	750	38
Total		11.250	2.724

Table A.6.3-1 Price Structure of Agricultural Products

(Unit : Q/t)

Crop	Onion	Broccoli	Tomato	Tobacco
1. FOB Price	1)			
Puerto Santo Tomas de Castilla		665		4.718
San Cristobal Frontera	463		361	
2. Adjusted with Shadow Exchange Rate	2)	710	390	5.095
3. Port Handling Charge				
Puerto Santo Tomas de Castilla		82		82
San Cristobal Frontera	10		10	
4. Transport				
Puerto Santo Tomas de Castilla- Monjas		65	3)	79
San Cristobal Frontera - Monjas	30		30	
5. Economic Price at Farm - gate	460	563	350	4.934

Note : 1) Average in 1986~1987, Exportaciones e Importaciones, DIGESA

2) SER = 1.08

3) With Container

Table A.6.3-2 Farm-gate Prices of Agricultural Products

(Unit : Q/l)

Product	Economic Price	Financial Price
Maize	400	400
Kidney beans	1.090	1.090
Tobacco	4.930	4.460
Tomato	350	260
Broccoli	560	500
Onion	460	590

Source : Table 4.4.1-6 , A.6.3-1

Table A.6.3-3 Operation and Maintenance Cost

(Unit : Q)

Description	Economic Price	Financial Price
1. Personnel	479.050	479.050
2. Depreciation of Facilities	0	94.127
3. Materials and Equipments	17.477	18.700
4. Miscellaneous	67.156	71.857
Total	563.683	663.734

Table A.6.3-4 Crop Production Cost with Project (Economic Price)

(Unit : Q/ha)

Item	Maize (W)	Maize (D)	K. bean (W)	K. bean (D)	Tobacco (W)	Tomate (W)	Tomato (D)	Broccoli (D)	Onion (D)	Pasture
1. Direct Cost										
A. Fixed Cost	114.28	114.28	71.43	71.43	142.84	114.28	114.28	128.56	114.28	0
B. Variable Cost	178.25	196.73	161.77	165.89	661.45	515.02	515.02	792.63	666.13	75.20
C. Labour Cost	283.50	337.50	202.50	292.50	1,156.50	718.71	835.71	785.57	1,281.85	54.00
D. Other Cost	0	0	0	0	1,536.02	0	0	0	0	0
Total	576.03	648.51	435.70	529.82	3,496.81	1,348.01	1,465.01	1,706.76	2,062.26	129.20
2. Indirect Cost										
Total	129.08	139.77	109.60	122.82	582.37	265.84	282.09	325.11	370.29	38.44
Grand Total	705.11	788.28	545.30	652.64	4,079.18	1,613.85	1,747.10	2,031.87	2,432.55	167.64

Table A.6.3-5 Crop Production Cost without Project (Economic Price)

(Unit : Q/ha)

Item	Maize (W)	Maize (D)	K. bean (W)	K. bean (D)	Tobacco (W)	Tomate (W)	Tomato (D)	Broccoli (D)	Onion (D)	Pasture
1. Direct Cost										
A. Fixed Cost	114.28	114.28	71.43	71.43	142.84	114.28	114.28	128.56	114.28	0
B. Variable Cost	133.29	141.90	104.59	97.21	601.45	383.62	383.62	630.60	574.01	75.20
C. Labour Cost	256.50	369.00	180.00	310.50	1,102.50	664.71	840.21	308.07	1,295.35	54.00
D. Other Cost	0	0	0	0	1,536.02	0	0	0	0	0
Total	504.70	625.18	356.02	479.14	3,442.81	1,162.61	1,338.11	1,567.23	1,983.64	129.20
2. Indirect Cost										
Total	108.77	138.39	87.80	117.15	565.52	226.78	263.65	303.83	359.93	38.44
Grand Total	612.84	763.57	443.82	596.29	4,008.33	1,389.39	1,601.76	1,871.06	2,343.57	167.64

Table A.6.3-6 Production Value with Project (Economic Price)

Crop		Area	Yield	Farm-gate	Gross Produc.	Produc.Cost	Net Produc.	Total Net
		(ha)	(t/ha)	Price (Q /t)	Value (Q /ha)	(Q /ha)	Value (Q /ha)	Produc. Value (10 ³ Q /ha)
Maize	(W)	2.850	3.8	400	1.520	705	815	2.323
	(D)	1.200	4.1	400	1.640	788	852	1.022
Kidney beans	(W)	1.950	1.8	1.090	1.962	545	1.417	2.763
	(D)	450	2.0	1.090	2.180	653	1.527	687
Tobacco	(W)	450	1.9	4.930	9.367	4.079	5.288	2.380
Tomato	(W)	1.200	24.0	350	8.400	1.614	6.786	8.143
	(D)	1.200	26.0	350	9.100	1.747	7.353	8.824
Broccoli	(D)	1.200	10.5	560	5.880	2.032	3.848	4.618
Onion	(D)	750	12.0	460	5.520	2.433	3.087	2.315
Pasture		550	598/Q 61/kg	0.5/Q 2.86/kg	474	168	306	168
Total		11.800						33.243

Note : With Project - Without Project = 23.901.000

Table A.6.3-7 Production Value without Project (Economic Price)

Crop		Area	Yield	Farm-gate	Gross Produc.	Produc.Cost	Net Produc.	Total Net
		(ha)	(t/ha)	Price (Q /t)	Value (Q /ha)	(Q /ha)	Value (Q /ha)	Produc. Value (10 ³ Q /ha)
Maize	(W)	3.110	2.8	400	1.120	613	507	1.578
	(D)	24	3.4	400	1.360	764	596	14
kidney beans	(W)	600	1.2	1.090	1.308	444	864	518
	(D)	57	1.5	1.090	1.635	596	1.039	59
Tobacco	(W)	480	1.4	4.930	6.902	4.008	2.894	1.389
Tomato	(W)	610	17.9	350	6.265	1.389	4.876	2.974
	(D)	259	19.4	350	6.790	1.602	5.188	1.344
Broccoli	(D)	340	8.3	560	4.648	1.871	2.777	944
Onion	(D)	130	8.7	460	4.002	2.344	1.658	216
Pasture		1.000	598/Q 61/kg	0.5/Q 2.86/kg	474	168	306	306
Total		6.610						9.342

Table A.6.3-8 Economic Internal Rate of Return (EIRR)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	2390.0	0.0	0.0	2390.0	0.0	1.0000	2390.0	0.0
2	3672.0	0.0	0.0	3672.0	0.0	.8929	3278.6	0.0
3	8206.0	0.0	0.0	8206.0	0.0	.7972	6541.8	0.0
4	21467.0	0.0	0.0	21467.0	0.0	.7118	15279.8	0.0
5	29068.0	0.0	0.0	29068.0	0.0	.6355	18473.2	0.0
6	17553.0	141.0	0.0	17694.0	4994.0	.5674	10040.1	2833.7
7	7520.0	141.0	0.0	7661.0	4994.0	.5066	3881.3	2530.1
8	0.0	564.0	0.0	564.0	19977.0	.4523	255.1	9036.6
9	0.0	564.0	0.0	564.0	22474.0	.4039	227.8	9076.9
10	0.0	564.0	0.0	564.0	24972.0	.3606	203.4	9005.2
11	0.0	564.0	0.0	564.0	24972.0	.3220	181.6	8040.3
12	0.0	564.0	0.0	564.0	24972.0	.2875	162.1	7178.9
13	0.0	564.0	0.0	564.0	24972.0	.2567	144.8	6409.7
14	0.0	564.0	0.0	564.0	24972.0	.2292	129.3	5722.9
15	0.0	564.0	0.0	564.0	24972.0	.2046	115.4	5109.8
16	0.0	564.0	0.0	564.0	24972.0	.1827	103.0	4562.3
17	0.0	564.0	841.0	1405.0	24972.0	.1631	229.2	4073.5
18	0.0	564.0	0.0	564.0	24972.0	.1456	82.1	3637.0
19	0.0	564.0	0.0	564.0	24972.0	.1300	73.3	3247.3
20	0.0	564.0	0.0	564.0	24972.0	.1161	65.5	2899.4
21	0.0	564.0	0.0	564.0	24972.0	.1037	58.5	2588.8
22	0.0	564.0	0.0	564.0	24972.0	.0926	52.2	2311.4
23	0.0	564.0	0.0	564.0	24972.0	.0826	46.6	2063.7
24	0.0	564.0	0.0	564.0	24972.0	.0738	41.6	1842.6
25	0.0	564.0	0.0	564.0	24972.0	.0659	37.2	1645.2
26	0.0	564.0	0.0	564.0	24972.0	.0588	33.2	1468.9
27	0.0	564.0	1190.0	1754.0	24972.0	.0525	92.1	1311.5
28	0.0	564.0	0.0	564.0	24972.0	.0469	26.4	1171.0
29	0.0	564.0	0.0	564.0	24972.0	.0419	23.6	1045.6
30	0.0	564.0	0.0	564.0	24972.0	.0374	21.1	933.5
31	0.0	564.0	0.0	564.0	24972.0	.0334	18.8	833.5
32	0.0	564.0	0.0	564.0	24972.0	.0298	16.8	744.2
33	0.0	564.0	0.0	564.0	24972.0	.0266	15.0	664.5
34	0.0	564.0	0.0	564.0	24972.0	.0238	13.4	593.3
35	0.0	564.0	0.0	564.0	24972.0	.0212	12.0	529.7
36	0.0	564.0	0.0	564.0	24972.0	.0189	10.7	473.0
37	0.0	564.0	841.0	1405.0	24972.0	.0169	23.8	422.3
38	0.0	564.0	0.0	564.0	24972.0	.0151	8.5	377.0
39	0.0	564.0	0.0	564.0	24972.0	.0135	7.6	336.6
40	0.0	564.0	0.0	564.0	24972.0	.0120	6.8	300.6
41	0.0	564.0	0.0	564.0	24972.0	.0107	6.1	268.4
42	0.0	564.0	0.0	564.0	24972.0	.0096	5.4	239.6
43	0.0	564.0	0.0	564.0	24972.0	.0086	4.8	213.9
44	0.0	564.0	0.0	564.0	24972.0	.0076	4.3	191.0
45	0.0	564.0	0.0	564.0	24972.0	.0068	3.9	170.6
46	0.0	564.0	0.0	564.0	24972.0	.0061	3.4	152.3
47	0.0	564.0	1190.0	1754.0	24972.0	.0054	9.5	136.0
48	0.0	564.0	0.0	564.0	24972.0	.0049	2.7	121.4
49	0.0	564.0	0.0	564.0	24972.0	.0043	2.4	108.4
50	0.0	564.0	0.0	564.0	24972.0	.0039	2.2	96.8
51	0.0	564.0	0.0	564.0	24972.0	.0035	2.0	86.4
52	0.0	564.0	0.0	564.0	24972.0	.0031	1.7	77.1
53	0.0	564.0	0.0	564.0	24972.0	.0028	1.6	68.9
54	0.0	564.0	0.0	564.0	24972.0	.0025	1.4	61.5
55	0.0	564.0	0.0	564.0	24972.0	.0022	1.2	54.9
56	0.0	564.0	0.0	564.0	24972.0	.0020	1.1	49.0
57	0.0	564.0	841.0	1405.0	24972.0	.0018	2.5	43.8
58	0.0	564.0	0.0	564.0	24972.0	.0016	.9	39.1
59	0.0	564.0	0.0	564.0	24972.0	.0014	.8	34.9
60	0.0	564.0	0.0	564.0	24972.0	.0012	.7	31.2
	89876.0	30174.0	4903.0	124953.0	1326011.0		62481.9	107265.7

$$B / C = 1.71674936793$$

$$B - C = 44783.8509263$$

6-7

$$E I R R = 12$$

Table A.6.3-9 Sensitivity Analysis (Increase of Construction Cost 10%)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	2629.0	0.0	0.0	2629.0	0.0	1.0000	2629.0	0.0
2	4039.2	0.0	0.0	4039.2	0.0	.8532	3446.1	0.0
3	9026.6	0.0	0.0	9026.6	0.0	.7279	6570.5	0.0
4	23613.7	0.0	0.0	23613.7	0.0	.6210	14664.7	0.0
5	31974.8	0.0	0.0	31974.8	0.0	.5298	16941.5	0.0
6	19308.3	155.1	0.0	19463.4	4994.0	.4520	8798.3	2257.5
7	8272.0	155.1	0.0	8427.1	4994.0	.3857	3250.1	1926.0
8	0.0	620.4	0.0	620.4	19977.0	.3290	204.1	6573.3
9	0.0	620.4	0.0	620.4	22474.0	.2807	174.2	6309.1
10	0.0	620.4	0.0	620.4	24972.0	.2395	148.6	5981.1
11	0.0	620.4	0.0	620.4	24972.0	.2043	126.8	5102.9
12	0.0	620.4	0.0	620.4	24972.0	.1743	108.2	4353.6
13	0.0	620.4	0.0	620.4	24972.0	.1487	92.3	3714.4
14	0.0	620.4	0.0	620.4	24972.0	.1269	78.7	3169.0
15	0.0	620.4	0.0	620.4	24972.0	.1083	67.2	2703.7
16	0.0	620.4	0.0	620.4	24972.0	.0924	57.3	2306.7
17	0.0	620.4	925.1	1545.5	24972.0	.0788	121.8	1968.0
18	0.0	620.4	0.0	620.4	24972.0	.0672	41.7	1679.1
19	0.0	620.4	0.0	620.4	24972.0	.0574	35.6	1432.5
20	0.0	620.4	0.0	620.4	24972.0	.0489	30.4	1222.2
21	0.0	620.4	0.0	620.4	24972.0	.0418	25.9	1042.7
22	0.0	620.4	0.0	620.4	24972.0	.0356	22.1	889.6
23	0.0	620.4	0.0	620.4	24972.0	.0304	18.9	759.0
24	0.0	620.4	0.0	620.4	24972.0	.0259	16.1	647.6
25	0.0	620.4	0.0	620.4	24972.0	.0221	13.7	552.5
26	0.0	620.4	0.0	620.4	24972.0	.0189	11.7	471.4
27	0.0	620.4	1309.0	1929.4	24972.0	.0161	31.1	402.2
28	0.0	620.4	0.0	620.4	24972.0	.0137	8.5	343.1
29	0.0	620.4	0.0	620.4	24972.0	.0117	7.3	292.7
30	0.0	620.4	0.0	620.4	24972.0	.0100	6.2	249.7
31	0.0	620.4	0.0	620.4	24972.0	.0085	5.3	213.1
32	0.0	620.4	0.0	620.4	24972.0	.0073	4.5	181.8
33	0.0	620.4	0.0	620.4	24972.0	.0062	3.9	155.1
34	0.0	620.4	0.0	620.4	24972.0	.0053	3.3	132.3
35	0.0	620.4	0.0	620.4	24972.0	.0045	2.8	112.9
36	0.0	620.4	0.0	620.4	24972.0	.0039	2.4	96.3
37	0.0	620.4	925.1	1545.5	24972.0	.0033	5.1	82.2
38	0.0	620.4	0.0	620.4	24972.0	.0028	1.7	70.1
39	0.0	620.4	0.0	620.4	24972.0	.0024	1.5	59.8
40	0.0	620.4	0.0	620.4	24972.0	.0020	1.3	51.0
41	0.0	620.4	0.0	620.4	24972.0	.0017	1.1	43.5
42	0.0	620.4	0.0	620.4	24972.0	.0015	.9	37.1
43	0.0	620.4	0.0	620.4	24972.0	.0013	.8	31.7
44	0.0	620.4	0.0	620.4	24972.0	.0011	.7	27.0
45	0.0	620.4	0.0	620.4	24972.0	.0009	.6	23.1
46	0.0	620.4	0.0	620.4	24972.0	.0008	.5	19.7
47	0.0	620.4	1309.0	1929.4	24972.0	.0007	1.3	15.8
48	0.0	620.4	0.0	620.4	24972.0	.0006	.4	14.3
49	0.0	620.4	0.0	620.4	24972.0	.0005	.3	12.2
50	0.0	620.4	0.0	620.4	24972.0	.0004	.3	10.4
51	0.0	620.4	0.0	620.4	24972.0	.0004	.2	8.9
52	0.0	620.4	0.0	620.4	24972.0	.0003	.2	7.6
53	0.0	620.4	0.0	620.4	24972.0	.0003	.2	6.5
54	0.0	620.4	0.0	620.4	24972.0	.0002	.1	5.5
55	0.0	620.4	0.0	620.4	24972.0	.0002	.1	4.7
56	0.0	620.4	0.0	620.4	24972.0	.0002	.1	4.0
57	0.0	620.4	925.1	1545.5	24972.0	.0001	.2	3.4
58	0.0	620.4	0.0	620.4	24972.0	.0001	.1	2.9
59	0.0	620.4	0.0	620.4	24972.0	.0001	.1	2.5
60	0.0	620.4	0.0	620.4	24972.0	.0001	.1	2.1
	98963.6	33191.4	5393.3	137448.3	1326011.0		57788.2	57788.4

B / C = 1.00000368199

B - C = .212775330401

E I R R = 17.2098

Table A.6.3-10 Sensitivity Analysis (Decrease of Benefit 10%)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	2390.0	0.0	0.0	2390.0	0.0	1.0000	2390.0	0.0
2	3672.0	0.0	0.0	3672.0	0.0	.8541	3136.4	0.0
3	8206.0	0.0	0.0	8206.0	0.0	.7296	5986.7	0.0
4	21467.0	0.0	0.0	21467.0	0.0	.6231	13377.0	0.0
5	29068.0	0.0	0.0	29068.0	0.0	.5323	15471.5	0.0
6	17553.0	141.0	0.0	17694.0	4494.6	.4546	8044.0	2043.3
7	7520.0	141.0	0.0	7661.0	4494.6	.3883	2974.8	1745.3
8	0.0	564.0	0.0	564.0	17979.3	.3317	187.1	5963.2
9	0.0	564.0	0.0	564.0	20226.6	.2833	159.8	5730.0
10	0.0	564.0	0.0	564.0	22474.8	.2420	136.5	5438.2
11	0.0	564.0	0.0	564.0	22474.8	.2057	116.6	4645.0
12	0.0	564.0	0.0	564.0	22474.8	.1765	99.6	3967.5
13	0.0	564.0	0.0	564.0	22474.8	.1508	85.0	3388.8
14	0.0	564.0	0.0	564.0	22474.8	.1288	72.6	2894.5
15	0.0	564.0	0.0	564.0	22474.8	.1100	62.0	2472.3
16	0.0	564.0	0.0	564.0	22474.8	.0940	53.0	2111.7
17	0.0	564.0	841.0	1405.0	22474.8	.0803	112.8	1803.7
18	0.0	564.0	0.0	564.0	22474.8	.0685	38.7	1540.6
19	0.0	564.0	0.0	564.0	22474.8	.0585	33.0	1315.9
20	0.0	564.0	0.0	564.0	22474.8	.0500	28.2	1124.0
21	0.0	564.0	0.0	564.0	22474.8	.0427	24.1	960.0
22	0.0	564.0	0.0	564.0	22474.8	.0365	20.6	820.0
23	0.0	564.0	0.0	564.0	22474.8	.0312	17.6	700.4
24	0.0	564.0	0.0	564.0	22474.8	.0265	15.0	598.2
25	0.0	564.0	0.0	564.0	22474.8	.0227	12.8	511.0
26	0.0	564.0	0.0	564.0	22474.8	.0194	11.0	436.4
27	0.0	564.0	1190.0	1754.0	22474.8	.0166	29.1	372.8
28	0.0	564.0	0.0	564.0	22474.8	.0142	8.0	318.4
29	0.0	564.0	0.0	564.0	22474.8	.0121	6.8	272.0
30	0.0	564.0	0.0	564.0	22474.8	.0103	5.8	232.3
31	0.0	564.0	0.0	564.0	22474.8	.0088	5.0	198.4
32	0.0	564.0	0.0	564.0	22474.8	.0075	4.3	169.5
33	0.0	564.0	0.0	564.0	22474.8	.0064	3.6	144.8
34	0.0	564.0	0.0	564.0	22474.8	.0055	3.1	123.6
35	0.0	564.0	0.0	564.0	22474.8	.0047	2.7	105.6
36	0.0	564.0	0.0	564.0	22474.8	.0040	2.3	90.2
37	0.0	564.0	841.0	1405.0	22474.8	.0034	4.8	77.0
38	0.0	564.0	0.0	564.0	22474.8	.0029	1.7	65.8
39	0.0	564.0	0.0	564.0	22474.8	.0025	1.4	56.2
40	0.0	564.0	0.0	564.0	22474.8	.0021	1.2	48.0
41	0.0	564.0	0.0	564.0	22474.8	.0018	1.0	41.0
42	0.0	564.0	0.0	564.0	22474.8	.0016	.9	35.0
43	0.0	564.0	0.0	564.0	22474.8	.0013	.8	29.9
44	0.0	564.0	0.0	564.0	22474.8	.0011	.6	25.6
45	0.0	564.0	0.0	564.0	22474.8	.0010	.5	21.8
46	0.0	564.0	0.0	564.0	22474.8	.0008	.5	18.6
47	0.0	564.0	1190.0	1754.0	22474.8	.0007	1.2	15.9
48	0.0	564.0	0.0	564.0	22474.8	.0006	.3	13.6
49	0.0	564.0	0.0	564.0	22474.8	.0005	.3	11.6
50	0.0	564.0	0.0	564.0	22474.8	.0004	.2	9.9
51	0.0	564.0	0.0	564.0	22474.8	.0004	.2	8.5
52	0.0	564.0	0.0	564.0	22474.8	.0003	.2	7.2
53	0.0	564.0	0.0	564.0	22474.8	.0003	.2	6.2
54	0.0	564.0	0.0	564.0	22474.8	.0002	.1	5.3
55	0.0	564.0	0.0	564.0	22474.8	.0002	.1	4.5
56	0.0	564.0	0.0	564.0	22474.8	.0002	.1	3.9
57	0.0	564.0	841.0	1405.0	22474.8	.0001	.2	3.3
58	0.0	564.0	0.0	564.0	22474.8	.0001	.1	2.8
59	0.0	564.0	0.0	564.0	22474.8	.0001	.1	2.4
60	0.0	564.0	0.0	564.0	22474.8	.0001	.1	2.1
	89876.0	30174.0	4903.0	124953.0	1193409.9		52753.7	52753.8

B / C = 1.00000211572

B - C = .111612269277

E I R R = 17.0768

Table A.6.3-11 Sensitivity Analysis (Delay of Benefit Outcoming 1 year)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	2390.0	0.0	0.0	2390.0	0.0	1.0000	2390.0	0.0
2	3572.0	0.0	0.0	3572.0	0.0	.8586	3152.9	0.0
3	8206.0	0.0	0.0	8206.0	0.0	.7373	6050.0	0.0
4	21467.0	0.0	0.0	21467.0	0.0	.6330	13589.5	0.0
5	29068.0	0.0	0.0	29068.0	0.0	.5436	15800.1	0.0
6	17553.0	141.0	0.0	17694.0	0.0	.4667	8258.1	0.0
7	7520.0	141.0	0.0	7661.0	4994.0	.4007	3070.1	2001.3
8	0.0	564.0	0.0	564.0	4994.0	.3441	194.1	1718.4
9	0.0	564.0	0.0	564.0	19977.0	.2955	166.6	5902.2
10	0.0	564.0	0.0	564.0	22474.0	.2537	143.1	5701.4
11	0.0	564.0	0.0	564.0	24972.0	.2178	122.9	5439.5
12	0.0	564.0	0.0	564.0	24972.0	.1870	105.5	4670.6
13	0.0	564.0	0.0	564.0	24972.0	.1606	90.6	4010.4
14	0.0	564.0	0.0	564.0	24972.0	.1379	77.8	3443.5
15	0.0	564.0	0.0	564.0	24972.0	.1184	66.8	2956.7
16	0.0	564.0	0.0	564.0	24972.0	.1017	57.3	2538.7
17	0.0	564.0	841.0	1405.0	24972.0	.0873	122.6	2179.9
18	0.0	564.0	0.0	564.0	24972.0	.0750	42.3	1871.7
19	0.0	564.0	0.0	564.0	24972.0	.0644	36.3	1607.1
20	0.0	564.0	0.0	564.0	24972.0	.0553	31.2	1379.9
21	0.0	564.0	0.0	564.0	24972.0	.0474	26.8	1184.9
22	0.0	564.0	0.0	564.0	24972.0	.0407	23.0	1017.4
23	0.0	564.0	0.0	564.0	24972.0	.0350	19.7	873.6
24	0.0	564.0	0.0	564.0	24972.0	.0300	16.9	750.1
25	0.0	564.0	0.0	564.0	24972.0	.0258	14.5	644.0
26	0.0	564.0	0.0	564.0	24972.0	.0221	12.5	553.0
27	0.0	564.0	1190.0	1754.0	24972.0	.0190	33.4	474.8
28	0.0	564.0	0.0	564.0	24972.0	.0163	9.2	407.7
29	0.0	564.0	0.0	564.0	24972.0	.0140	7.9	350.1
30	0.0	564.0	0.0	564.0	24972.0	.0120	6.8	300.6
31	0.0	564.0	0.0	564.0	24972.0	.0103	5.8	258.1
32	0.0	564.0	0.0	564.0	24972.0	.0089	5.0	221.6
33	0.0	564.0	0.0	564.0	24972.0	.0076	4.3	190.3
34	0.0	564.0	0.0	564.0	24972.0	.0065	3.7	163.4
35	0.0	564.0	0.0	564.0	24972.0	.0056	3.2	140.3
36	0.0	564.0	0.0	564.0	24972.0	.0048	2.7	120.5
37	0.0	564.0	841.0	1405.0	24972.0	.0041	5.8	103.4
38	0.0	564.0	0.0	564.0	24972.0	.0036	2.0	88.8
39	0.0	564.0	0.0	564.0	24972.0	.0031	1.7	76.3
40	0.0	564.0	0.0	564.0	24972.0	.0026	1.5	65.5
41	0.0	564.0	0.0	564.0	24972.0	.0023	1.3	56.2
42	0.0	564.0	0.0	564.0	24972.0	.0019	1.1	48.3
43	0.0	564.0	0.0	564.0	24972.0	.0017	.9	41.4
44	0.0	564.0	0.0	564.0	24972.0	.0014	.8	35.6
45	0.0	564.0	0.0	564.0	24972.0	.0012	.7	30.6
46	0.0	564.0	0.0	564.0	24972.0	.0011	.6	26.2
47	0.0	564.0	1190.0	1754.0	24972.0	.0009	1.6	22.5
48	0.0	564.0	0.0	564.0	24972.0	.0008	.4	19.3
49	0.0	564.0	0.0	564.0	24972.0	.0007	.4	16.6
50	0.0	564.0	0.0	564.0	24972.0	.0006	.3	14.3
51	0.0	564.0	0.0	564.0	24972.0	.0005	.3	12.2
52	0.0	564.0	0.0	564.0	24972.0	.0004	.2	10.5
53	0.0	564.0	0.0	564.0	24972.0	.0004	.2	9.0
54	0.0	564.0	0.0	564.0	24972.0	.0003	.2	7.8
55	0.0	564.0	0.0	564.0	24972.0	.0003	.2	6.7
56	0.0	564.0	0.0	564.0	24972.0	.0002	.1	5.7
57	0.0	564.0	841.0	1405.0	24972.0	.0002	.3	4.9
58	0.0	564.0	0.0	564.0	24972.0	.0002	.1	4.2
59	0.0	564.0	0.0	564.0	24972.0	.0001	.1	3.6
60	0.0	564.0	0.0	564.0	24972.0	.0001	.1	3.1
	89876.0	30174.0	4903.0	124953.0	1301039.0		53783.9	53784.4

B / C = 1.00000997897

B - C = .536707567211

E I R R = 16.4633

Table A.6.3-12 Annual Disbursement Schedule (Economic Price)

Base Year 1987 Cost Unit 1000 Q'

Item	1989		1990		1991		1992	
	F.C	L.C	F.C	L.C	F.C	L.C	F.C	L.C
1. Civil Works								
1-1. Preparatory Works								
1-2. Dam								
(a) Diversion Tunnel								
(b) Foundation Treatment								
(c) Dam Body								
(d) Spillway								
(e) Intake Facility								
(f) Maintenance Road								
Sub-Total [1-2.]								
1-3. Regulating Reservoir								
1-4. Diversion System								
(a) Diversion dam								
(b) Driving Canal								
Sub-Total [1-4.]								
1-5. Canal Network System								
(a) Diversion Canal								
(b) Main Canal								
(c) Lateral Canal								
(d) Tertiary Canal								
Sub-Total [1-5.]								
1-6. Land Reclamation								
Sub-Total [1.]								
2. Land Acquisition & Compensation								
3. Project Facilities								
4. Project Administration								
5. Pre-engineering								
5. Consulting Services								
Sub-Total [1. to 6.]								
7. Physical Contingency (10% of 1+2)								
Grand Total								

Table A.6.3-12 Annual Disbursement Schedule (Economic Price)

Base Year 1987 Cost Unit 1000 Q'

Item	1993			1994			1995			Grand Total		
	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total
1. Civil Works												
1-1. Preparatory Works												
1-2. Dam												
(a) Diversion Tunnel												
(b) Foundation Treatment	1230	1059	2299									
(c) Dam Body	5774	1940	7714	5774	1940	7714	2455	825	3280	14436	4851	19287
(d) Spillway	2372	1017	3389	415	179	595				4161	1785	5946
(e) Intake Facility							1105	68	1173	1105	68	1173
(f) Maintenance Road				586	233	819				586	233	819
Sub-Total [1-2.]	9376	4026	13402	6776	2352	9128	3560	893	4453	25163	10325	35488
1-3. Regulating Reservoir												
1-4. Diversion System	292	64	356							975	216	1191
(a) Diversion dam	1494	449	1943							3559	1071	4630
(b) Driving Canal	1116	1016	2132							2859	2420	5079
Sub-Total [1-4.]	2610	1465	4075							6218	3491	9709
1-5. Canal Network System												
(a) Diversion Canal	1714	1286	3000	583	437	1020				3428	2571	5999
(b) Main Canal	947	766	1713	781	631	1412				2367	1914	4281
(c) Lateral Canal	979	502	1481	979	502	1481	538	275	813	3159	1619	4778
(d) Tertiary Canal	122	397	519	122	397	519	66	219	285	393	1282	1575
Sub-Total [1-5.]	3762	2951	6713	2465	1957	4432	604	494	1098	9347	7386	16733
1-6. Land Reclamation												
Sub-Total [1.]	16040	8506	24546	9611	4467	14078	4196	1400	5596	44589	22477	67055
2. Land Acquisition & Compensation												
3. Project Facilities												
4. Project Administration												
5. Pre-engineering												
6. Consulting Services	1893	74	1967	1893	74	1967	1235	45	1280	12876	500	13376
Sub-Total [1. to 6.]	17933	8680	26613	11504	4641	16145	5431	1529	6960	59241	23927	83168
7. Physical Contingency (10% of 1+2)	1604	851	2455	961	447	1408	420	140	560	4460	2248	6708
Grand Total	19537	9531	29068	12465	5088	17553	5851	1669	7520	63701	26175	89876

Table A.6.4-1 Crop Production Cost with Project (Financial Price)

(Unit : Q/ha)

Item	Maize (W)	Maize (D)	K. bean (W)	K. bean (D)	Tobacco (W)	Tomato (W)	Tomato (D)	Broccoli (D)	Onion (D)	Pasture
1. Direct Cost										
a. Fixed Cost	399.99	399.99	357.14	357.14	674.55	542.85	542.85	557.13	542.85	143.00
b. Variable Cost	247.57	273.23	224.68	230.40	918.68	715.30	715.30	1,100.88	925.18	104.45
c. Labour Cost	315.00	375.00	225.00	325.00	1,265.00	798.57	928.57	872.86	1,424.28	60.00
d. Other Cost	0	0	0	0	1,706.69	0	0	0	0	0
Total	1,032.56	1,118.22	876.82	982.54	4,658.92	2,126.72	2,256.72	2,600.87	2,962.34	307.45
2. Indirect Cost										
Total	182.42	197.54	154.90	173.58	823.08	303.38	398.68	442.15	523.34	70.72
Grand Total	1,145.98	1,245.76	961.72	1,086.12	5,412.00	2,360.10	2,585.40	2,973.02	3,415.65	378.17

Table A.6.4-2 Crop Production Cost without Project (Financial Price)

(Unit : Q/ha)

Item	Maize (W)	Maize (D)	K. bean (W)	K. bean (D)	Tobacco (W)	Tomato (W)	Tomato (D)	Broccoli (D)	Onion (D)	Pasture
1. Direct Cost										
a. Fixed Cost	399.99	399.99	357.14	357.14	678.55	542.85	542.85	557.13	542.85	143.00
b. Variable Cost	185.13	197.09	145.26	135.02	918.68	532.80	532.80	875.84	797.24	104.45
c. Labour Cost	285.00	410.00	200.00	345.00	1,225.00	738.57	933.57	897.86	1,439.28	60.00
d. Other Cost	0	0	0	0	1,706.69	0	0	0	0	0
Total	870.12	1,107.08	702.40	937.16	4,528.92	1,814.22	2,109.22	2,430.83	2,879.37	307.45
2. Indirect Cost										
Total	153.72	195.58	124.09	165.57	799.51	320.51	372.63	413.20	508.69	70.72
Grand Total	1,023.84	1,202.66	826.49	1,002.73	5,328.43	2,134.73	2,381.85	2,744.03	3,288.06	378.17

Table A.6.4-3 Production Value with Project (Financial Price)

Crop		Area	Yield	Farm-gate	Gross Produc.	Produc.Cost	Net Produc.	Total Net
		(ha)	(t/ha)	Price (Q / t)	Value (Q / ha)	(Q / ha)	Value (Q / ha)	Produc. Value (10 ³ Q / ha)
Maize	(W)	2.850	3.8	400	1.520	1.145	375	1.069
	(D)	1.200	4.1	400	1.640	1.246	394	473
Kidney beans	(W)	1.950	1.8	1.090	1.962	962	1,000	1,950
	(D)	450	2.0	1.090	2.180	1.086	1.094	492
Tobacco	(W)	450	1.9	4.460	8.474	5.412	3,062	1,378
Tomato	(W)	1.200	24.0	260	6.240	2.360	3,880	4,656
	(D)	1.200	26.0	260	6.760	2.585	4,175	5,010
Broccoli	(D)	1.200	10.5	500	5.250	2,973	2,277	2,732
Onion	(D)	750	12.0	590	7.080	3.416	3,664	2,748
Pasture		550	598/0 61/kg	0.5/0 2.86/kg	474	378	96	53
Total		11.800						20.561

Note : With Project - Without Project = 16.453

Table A.6.4-4 Production Value without Project (Financial Price)

Crop		Area	Yield	Farm-gate	Gross Produc.	Produc.Cost	Net Produc.	Total Net
		(ha)	(t/ha)	Price (Q / t)	Value (Q / ha)	(Q / ha)	Value (Q / ha)	Produc. Value (10 ³ Q / ha)
Maize	(W)	3.110	2.8	400	1.120	1.024	96	299
	(D)	24	3.4	400	1.360	1.203	157	4
kidney beans	(W)	600	1.2	1.090	1.308	826	482	289
	(D)	57	1.5	1.090	1.635	1.003	632	30
Tobacco	(W)	480	1.4	4.460	6.244	5.328	916	440
Tomato	(W)	610	17.9	260	4.654	2.135	2,519	1,537
	(D)	259	19.4	260	5.044	2.382	2,662	689
Broccoli	(D)	340	8.3	500	4.150	2,744	1,406	478
Onion	(D)	130	8.7	590	5.133	3,288	1,845	240
Pasture		1.000	598/0 61/kg	0.5/0 2.86/kg	474	378	96	96
Total		6.610						4,108

Table A.6.4-5 Financial Internal Rate of Return
(Government's Share of Project Cost 0 %)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	2382.0	0.0	0.0	2382.0	0.0	1.0000	2382.0	0.0
2	4814.0	0.0	0.0	4814.0	0.0	.8929	4298.2	0.0
3	9535.0	0.0	0.0	9535.0	0.0	.7972	7601.2	0.0
4	27233.0	0.0	0.0	27233.0	0.0	.7118	19383.9	0.0
5	38626.0	0.0	0.0	38626.0	0.0	.6355	24547.5	0.0
6	24109.0	166.0	0.0	24275.0	3291.0	.5674	13774.3	1867.4
7	10425.0	166.0	0.0	10591.0	3291.0	.5066	5365.7	1667.3
8	0.0	664.0	0.0	664.0	13162.0	.4523	300.4	5953.8
9	0.0	664.0	0.0	664.0	14808.0	.4039	268.2	5980.7
10	0.0	664.0	0.0	664.0	16453.0	.3606	239.4	5933.1
11	0.0	664.0	0.0	664.0	16453.0	.3220	213.8	5297.4
12	0.0	664.0	0.0	664.0	16453.0	.2875	190.9	4729.8
13	0.0	664.0	0.0	664.0	16453.0	.2567	170.4	4223.1
14	0.0	664.0	0.0	664.0	16453.0	.2292	152.2	3770.6
15	0.0	664.0	0.0	664.0	16453.0	.2046	135.9	3366.6
16	0.0	664.0	0.0	664.0	16453.0	.1827	121.3	3005.9
17	0.0	664.0	779.0	1443.0	16453.0	.1631	235.4	2683.8
18	0.0	664.0	0.0	664.0	16453.0	.1456	96.7	2396.3
19	0.0	664.0	0.0	664.0	16453.0	.1300	86.3	2139.5
20	0.0	664.0	0.0	664.0	16453.0	.1161	77.1	1910.3
21	0.0	664.0	0.0	664.0	16453.0	.1037	68.8	1705.6
22	0.0	664.0	0.0	664.0	16453.0	.0926	61.5	1522.9
23	0.0	664.0	0.0	664.0	16453.0	.0826	54.9	1359.7
24	0.0	664.0	0.0	664.0	16453.0	.0738	49.0	1214.0
25	0.0	664.0	0.0	664.0	16453.0	.0659	43.7	1084.0
26	0.0	664.0	0.0	664.0	16453.0	.0588	39.1	967.8
27	0.0	664.0	1102.0	1766.0	16453.0	.0525	92.8	864.1
28	0.0	664.0	0.0	664.0	16453.0	.0469	31.1	771.5
29	0.0	664.0	0.0	664.0	16453.0	.0419	27.8	688.9
30	0.0	664.0	0.0	664.0	16453.0	.0374	24.8	615.1
31	0.0	664.0	0.0	664.0	16453.0	.0334	22.2	549.2
32	0.0	664.0	0.0	664.0	16453.0	.0298	19.8	490.3
33	0.0	664.0	0.0	664.0	16453.0	.0266	17.7	437.8
34	0.0	664.0	0.0	664.0	16453.0	.0238	15.8	390.9
35	0.0	664.0	0.0	664.0	16453.0	.0212	14.1	349.0
36	0.0	664.0	0.0	664.0	16453.0	.0189	12.6	311.6
37	0.0	664.0	779.0	1443.0	16453.0	.0169	24.4	278.2
38	0.0	664.0	0.0	664.0	16453.0	.0151	10.0	248.4
39	0.0	664.0	0.0	664.0	16453.0	.0135	9.0	221.8
40	0.0	664.0	0.0	664.0	16453.0	.0120	8.0	198.0
41	0.0	664.0	0.0	664.0	16453.0	.0107	7.1	176.8
42	0.0	664.0	0.0	664.0	16453.0	.0096	6.4	157.9
43	0.0	664.0	0.0	664.0	16453.0	.0086	5.7	141.0
44	0.0	664.0	0.0	664.0	16453.0	.0076	5.1	125.9
45	0.0	664.0	0.0	664.0	16453.0	.0068	4.5	112.4
46	0.0	664.0	0.0	664.0	16453.0	.0061	4.0	100.3
47	0.0	664.0	1102.0	1766.0	16453.0	.0054	9.6	89.6
48	0.0	664.0	0.0	664.0	16453.0	.0049	3.2	80.0
49	0.0	664.0	0.0	664.0	16453.0	.0043	2.9	71.4
50	0.0	664.0	0.0	664.0	16453.0	.0039	2.6	63.8
51	0.0	664.0	0.0	664.0	16453.0	.0035	2.3	56.9
52	0.0	664.0	0.0	664.0	16453.0	.0031	2.1	50.8
53	0.0	664.0	0.0	664.0	16453.0	.0028	1.8	45.4
54	0.0	664.0	0.0	664.0	16453.0	.0025	1.6	40.5
55	0.0	664.0	0.0	664.0	16453.0	.0022	1.5	36.2
56	0.0	664.0	0.0	664.0	16453.0	.0020	1.3	32.3
57	0.0	664.0	779.0	1443.0	16453.0	.0018	2.5	28.8
58	0.0	664.0	0.0	664.0	16453.0	.0016	1.0	25.8
59	0.0	664.0	0.0	664.0	16453.0	.0014	.9	23.0
60	0.0	664.0	0.0	664.0	16453.0	.0012	.8	20.5
	117124.0	35524.0	4541.0	157189.0	873655.0		80354.9	70673.9

B / C = .879522805016

B - C = -9680.92702638

Table A.6.4-6 Financial Internal Rate of Return
(Government's Share of Project Cost 20 %)

(1,000 0)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	1905.6	0.0	0.0	1905.6	0.0	1.0000	1905.6	0.0
2	3851.2	0.0	0.0	3851.2	0.0	.8929	3438.6	0.0
3	7628.0	0.0	0.0	7628.0	0.0	.7972	6081.0	0.0
4	21786.4	0.0	0.0	21786.4	0.0	.7118	15507.1	0.0
5	30900.8	0.0	0.0	30900.8	0.0	.6355	19638.0	0.0
6	19287.2	166.0	0.0	19453.2	3291.0	.5674	11038.3	1867.4
7	8340.0	166.0	0.0	8506.0	3291.0	.5066	4309.4	1667.3
8	0.0	664.0	0.0	664.0	13162.0	.4523	300.4	5953.8
9	0.0	664.0	0.0	664.0	14808.0	.4039	268.2	5980.7
10	0.0	664.0	0.0	664.0	16453.0	.3606	239.4	5933.1
11	0.0	664.0	0.0	664.0	16453.0	.3220	213.8	5297.4
12	0.0	664.0	0.0	664.0	16453.0	.2875	190.9	4729.8
13	0.0	664.0	0.0	664.0	16453.0	.2567	170.4	4223.1
14	0.0	664.0	0.0	664.0	16453.0	.2292	152.2	3770.6
15	0.0	664.0	0.0	664.0	16453.0	.2046	135.9	3366.6
16	0.0	664.0	0.0	664.0	16453.0	.1827	121.3	3005.9
17	0.0	664.0	779.0	1443.0	16453.0	.1631	235.4	2683.8
18	0.0	664.0	0.0	664.0	16453.0	.1456	96.7	2396.3
19	0.0	664.0	0.0	664.0	16453.0	.1300	86.3	2139.5
20	0.0	664.0	0.0	664.0	16453.0	.1161	77.1	1910.3
21	0.0	664.0	0.0	664.0	16453.0	.1037	68.8	1705.6
22	0.0	664.0	0.0	664.0	16453.0	.0926	61.5	1522.9
23	0.0	664.0	0.0	664.0	16453.0	.0826	54.9	1359.7
24	0.0	664.0	0.0	664.0	16453.0	.0738	49.0	1214.0
25	0.0	664.0	0.0	664.0	16453.0	.0659	43.7	1084.0
26	0.0	664.0	0.0	664.0	16453.0	.0588	39.1	967.8
27	0.0	664.0	1102.0	1766.0	16453.0	.0525	92.8	864.1
28	0.0	664.0	0.0	664.0	16453.0	.0469	31.1	771.5
29	0.0	664.0	0.0	664.0	16453.0	.0419	27.8	688.9
30	0.0	664.0	0.0	664.0	16453.0	.0374	24.8	615.1
31	0.0	664.0	0.0	664.0	16453.0	.0334	22.2	549.2
32	0.0	664.0	0.0	664.0	16453.0	.0298	19.8	490.3
33	0.0	664.0	0.0	664.0	16453.0	.0266	17.7	437.8
34	0.0	664.0	0.0	664.0	16453.0	.0238	15.8	390.9
35	0.0	664.0	0.0	664.0	16453.0	.0212	14.1	349.0
36	0.0	664.0	0.0	664.0	16453.0	.0189	12.6	311.6
37	0.0	664.0	779.0	1443.0	16453.0	.0169	24.4	278.2
38	0.0	664.0	0.0	664.0	16453.0	.0151	10.0	248.4
39	0.0	664.0	0.0	664.0	16453.0	.0135	9.0	221.8
40	0.0	664.0	0.0	664.0	16453.0	.0120	8.0	198.0
41	0.0	664.0	0.0	664.0	16453.0	.0107	7.1	176.8
42	0.0	664.0	0.0	664.0	16453.0	.0096	6.4	157.9
43	0.0	664.0	0.0	664.0	16453.0	.0086	5.7	141.0
44	0.0	664.0	0.0	664.0	16453.0	.0076	5.1	125.9
45	0.0	664.0	0.0	664.0	16453.0	.0068	4.5	112.4
46	0.0	664.0	0.0	664.0	16453.0	.0061	4.0	100.3
47	0.0	664.0	1102.0	1766.0	16453.0	.0054	9.6	89.6
48	0.0	664.0	0.0	664.0	16453.0	.0049	3.2	80.0
49	0.0	664.0	0.0	664.0	16453.0	.0043	2.9	71.4
50	0.0	664.0	0.0	664.0	16453.0	.0039	2.6	63.8
51	0.0	664.0	0.0	664.0	16453.0	.0035	2.3	56.9
52	0.0	664.0	0.0	664.0	16453.0	.0031	2.1	50.8
53	0.0	664.0	0.0	664.0	16453.0	.0028	1.8	45.4
54	0.0	664.0	0.0	664.0	16453.0	.0025	1.6	40.5
55	0.0	664.0	0.0	664.0	16453.0	.0022	1.5	36.2
56	0.0	664.0	0.0	664.0	16453.0	.0020	1.3	32.3
57	0.0	664.0	779.0	1443.0	16453.0	.0018	2.5	28.8
58	0.0	664.0	0.0	664.0	16453.0	.0016	1.0	25.8
59	0.0	664.0	0.0	664.0	16453.0	.0014	.9	23.0
60	0.0	664.0	0.0	664.0	16453.0	.0012	.8	20.5
	93699.2	35524.0	4541.0	133764.2	873655.0		64919.9	70673.9

B / C = 1.08863219653

B - C = 5753.99581285

F I R R = 12

Table A.6.4-7 Financial Internal Rate of Return
(Government's Share of Project Cost 40 %)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	O/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	1429.2	0.0	0.0	1429.2	0.0	1.0000	1429.2	0.0
2	2888.4	0.0	0.0	2888.4	0.0	.8929	2578.9	0.0
3	5721.0	0.0	0.0	5721.0	0.0	.7972	4560.7	0.0
4	16339.8	0.0	0.0	16339.8	0.0	.7118	11630.3	0.0
5	23175.6	0.0	0.0	23175.6	0.0	.6355	14728.5	0.0
6	14465.4	166.0	0.0	14631.4	3291.0	.5674	8302.2	1867.4
7	6255.0	166.0	0.0	6421.0	3291.0	.5066	3253.1	1667.3
8	0.0	664.0	0.0	664.0	13162.0	.4523	300.4	5953.8
9	0.0	664.0	0.0	664.0	14808.0	.4039	268.2	5980.7
10	0.0	664.0	0.0	664.0	16453.0	.3606	239.4	5933.1
11	0.0	664.0	0.0	664.0	16453.0	.3220	213.8	5297.4
12	0.0	664.0	0.0	664.0	16453.0	.2875	190.9	4729.8
13	0.0	664.0	0.0	664.0	16453.0	.2567	170.4	4223.1
14	0.0	664.0	0.0	664.0	16453.0	.2292	152.2	3770.6
15	0.0	664.0	0.0	664.0	16453.0	.2046	135.9	3366.6
16	0.0	664.0	0.0	664.0	16453.0	.1827	121.3	3005.9
17	0.0	664.0	779.0	1443.0	16453.0	.1631	235.4	2683.8
18	0.0	664.0	0.0	664.0	16453.0	.1456	96.7	2396.3
19	0.0	664.0	0.0	664.0	16453.0	.1300	86.3	2139.5
20	0.0	664.0	0.0	664.0	16453.0	.1161	77.1	1910.3
21	0.0	664.0	0.0	664.0	16453.0	.1037	68.8	1705.6
22	0.0	664.0	0.0	664.0	16453.0	.0926	61.5	1522.9
23	0.0	664.0	0.0	664.0	16453.0	.0826	54.9	1359.7
24	0.0	664.0	0.0	664.0	16453.0	.0738	49.0	1214.0
25	0.0	664.0	0.0	664.0	16453.0	.0659	43.7	1084.0
26	0.0	664.0	0.0	664.0	16453.0	.0588	39.1	967.8
27	0.0	664.0	1102.0	1766.0	16453.0	.0525	92.8	864.1
28	0.0	664.0	0.0	664.0	16453.0	.0469	31.1	771.5
29	0.0	664.0	0.0	664.0	16453.0	.0419	27.8	688.9
30	0.0	664.0	0.0	664.0	16453.0	.0374	24.8	615.1
31	0.0	664.0	0.0	664.0	16453.0	.0334	22.2	549.2
32	0.0	664.0	0.0	664.0	16453.0	.0298	19.8	490.3
33	0.0	664.0	0.0	664.0	16453.0	.0266	17.7	437.8
34	0.0	664.0	0.0	664.0	16453.0	.0238	15.8	390.9
35	0.0	664.0	0.0	664.0	16453.0	.0212	14.1	349.0
36	0.0	664.0	0.0	664.0	16453.0	.0189	12.6	311.6
37	0.0	664.0	779.0	1443.0	16453.0	.0169	24.4	278.2
38	0.0	664.0	0.0	664.0	16453.0	.0151	10.0	248.4
39	0.0	664.0	0.0	664.0	16453.0	.0135	9.0	221.8
40	0.0	664.0	0.0	664.0	16453.0	.0120	8.0	199.0
41	0.0	664.0	0.0	664.0	16453.0	.0107	7.1	176.8
42	0.0	664.0	0.0	664.0	16453.0	.0096	6.4	157.9
43	0.0	664.0	0.0	664.0	16453.0	.0086	5.7	141.0
44	0.0	664.0	0.0	664.0	16453.0	.0076	5.1	125.9
45	0.0	664.0	0.0	664.0	16453.0	.0068	4.5	112.4
46	0.0	664.0	0.0	664.0	16453.0	.0061	4.0	100.3
47	0.0	664.0	1102.0	1766.0	16453.0	.0054	9.6	89.6
48	0.0	664.0	0.0	664.0	16453.0	.0049	3.2	80.0
49	0.0	664.0	0.0	664.0	16453.0	.0043	2.9	71.4
50	0.0	664.0	0.0	664.0	16453.0	.0039	2.6	63.8
51	0.0	664.0	0.0	664.0	16453.0	.0035	2.3	56.9
52	0.0	664.0	0.0	664.0	16453.0	.0031	2.1	50.8
53	0.0	664.0	0.0	664.0	16453.0	.0028	1.8	45.4
54	0.0	664.0	0.0	664.0	16453.0	.0025	1.6	40.5
55	0.0	664.0	0.0	664.0	16453.0	.0022	1.5	36.2
56	0.0	664.0	0.0	664.0	16453.0	.0020	1.3	32.3
57	0.0	664.0	779.0	1443.0	16453.0	.0018	2.5	28.8
58	0.0	664.0	0.0	664.0	16453.0	.0016	1.0	25.8
59	0.0	664.0	0.0	664.0	16453.0	.0014	.9	23.0
60	0.0	664.0	0.0	664.0	16453.0	.0012	.8	20.5
	70274.4	35524.0	4541.0	110339.4	873655.0		49485.0	70673.9

B / C = 1.42819867261

B - C = 21188.9186521

Table A.6.4-8 Financial Internal Rate of Return
(Government's Share of Project Cost 60 %)

(1,000 Q)

YEAR IN ORDER	C O S T				PRESENT VALUE			
	CONST. COST	D/M COST	REPLACE MENT	TOTAL	BENEFIT	DISCOUNT RATE	COST	BENEFIT
1	952.8	0.0	0.0	952.8	0.0	1.0000	952.8	0.0
2	1925.6	0.0	0.0	1925.6	0.0	.8929	1719.3	0.0
3	3814.0	0.0	0.0	3814.0	0.0	.7972	3040.5	0.0
4	10893.2	0.0	0.0	10893.2	0.0	.7118	7753.6	0.0
5	15450.4	0.0	0.0	15450.4	0.0	.6355	9819.0	0.0
6	9643.6	166.0	0.0	9809.6	3291.0	.5674	5566.2	1867.4
7	4170.0	166.0	0.0	4336.0	3291.0	.5066	2196.8	1667.3
8	0.0	664.0	0.0	664.0	13162.0	.4523	300.4	5953.8
9	0.0	664.0	0.0	664.0	14808.0	.4039	268.2	5980.7
10	0.0	664.0	0.0	664.0	16453.0	.3606	239.4	5933.1
11	0.0	664.0	0.0	664.0	16453.0	.3220	213.8	5297.4
12	0.0	664.0	0.0	664.0	16453.0	.2875	190.9	4729.8
13	0.0	664.0	0.0	664.0	16453.0	.2567	170.4	4223.1
14	0.0	664.0	0.0	664.0	16453.0	.2292	152.2	3770.6
15	0.0	664.0	0.0	664.0	16453.0	.2046	135.9	3366.6
16	0.0	664.0	0.0	664.0	16453.0	.1827	121.3	3005.9
17	0.0	664.0	779.0	1443.0	16453.0	.1631	235.4	2683.8
18	0.0	664.0	0.0	664.0	16453.0	.1456	96.7	2396.3
19	0.0	664.0	0.0	664.0	16453.0	.1300	86.3	2139.5
20	0.0	664.0	0.0	664.0	16453.0	.1161	77.1	1910.3
21	0.0	664.0	0.0	664.0	16453.0	.1037	68.8	1705.6
22	0.0	664.0	0.0	664.0	16453.0	.0926	61.5	1522.9
23	0.0	664.0	0.0	664.0	16453.0	.0826	54.9	1359.7
24	0.0	664.0	0.0	664.0	16453.0	.0738	49.0	1214.0
25	0.0	664.0	0.0	664.0	16453.0	.0659	43.7	1084.0
26	0.0	664.0	0.0	664.0	16453.0	.0588	39.1	967.8
27	0.0	664.0	1102.0	1766.0	16453.0	.0525	92.8	864.1
28	0.0	664.0	0.0	664.0	16453.0	.0469	31.1	771.5
29	0.0	664.0	0.0	664.0	16453.0	.0419	27.8	688.9
30	0.0	664.0	0.0	664.0	16453.0	.0374	24.8	615.1
31	0.0	664.0	0.0	664.0	16453.0	.0334	22.2	549.2
32	0.0	664.0	0.0	664.0	16453.0	.0298	19.8	490.3
33	0.0	664.0	0.0	664.0	16453.0	.0266	17.7	437.8
34	0.0	664.0	0.0	664.0	16453.0	.0238	15.8	390.9
35	0.0	664.0	0.0	664.0	16453.0	.0212	14.1	349.0
36	0.0	664.0	0.0	664.0	16453.0	.0189	12.6	311.6
37	0.0	664.0	779.0	1443.0	16453.0	.0169	24.4	278.2
38	0.0	664.0	0.0	664.0	16453.0	.0151	10.0	248.4
39	0.0	664.0	0.0	664.0	16453.0	.0135	9.0	221.8
40	0.0	664.0	0.0	664.0	16453.0	.0120	8.0	198.0
41	0.0	664.0	0.0	664.0	16453.0	.0107	7.1	176.8
42	0.0	664.0	0.0	664.0	16453.0	.0096	6.4	157.9
43	0.0	664.0	0.0	664.0	16453.0	.0086	5.7	141.0
44	0.0	664.0	0.0	664.0	16453.0	.0076	5.1	125.9
45	0.0	664.0	0.0	664.0	16453.0	.0068	4.5	112.4
46	0.0	664.0	0.0	664.0	16453.0	.0061	4.0	100.3
47	0.0	664.0	1102.0	1766.0	16453.0	.0054	9.6	89.6
48	0.0	664.0	0.0	664.0	16453.0	.0049	3.2	80.0
49	0.0	664.0	0.0	664.0	16453.0	.0043	2.9	71.4
50	0.0	664.0	0.0	664.0	16453.0	.0039	2.6	63.8
51	0.0	664.0	0.0	664.0	16453.0	.0035	2.3	56.9
52	0.0	664.0	0.0	664.0	16453.0	.0031	2.1	50.8
53	0.0	664.0	0.0	664.0	16453.0	.0028	1.8	45.4
54	0.0	664.0	0.0	664.0	16453.0	.0025	1.6	40.5
55	0.0	664.0	0.0	664.0	16453.0	.0022	1.5	36.2
56	0.0	664.0	0.0	664.0	16453.0	.0020	1.3	32.3
57	0.0	664.0	779.0	1443.0	16453.0	.0018	2.5	28.8
58	0.0	664.0	0.0	664.0	16453.0	.0016	1.0	25.8
59	0.0	664.0	0.0	664.0	16453.0	.0014	.9	23.0
60	0.0	664.0	0.0	664.0	16453.0	.0012	.8	20.5
	46849.6	35524.0	4541.0	86914.6	873655.0		34050.1	70673.9

B / C = 2.07558745966

B - C = 36623.8414913

F I R R = 12

Table A.6.5-1 Expansion of Foreign Currency Holdings

Tobacco	855 t × 80% × Q 4.718/t (FOB) = Q	3.227.112
Tomato	6.000 t × 80% × Q 361/t (FOB) = Q	1.732.800
Broccoli	12.600t × 80% × Q 665/t (FOB) = Q	6.703.200
Onion	9.000t × 80% × Q 463/t (FOB) = Q	3.333.600
Total		Q 14.996.712

$$Q\ 14.996.712 \div Q\ 2.5/US\$ = US\$ 5.998.685$$

Table A.6.5-2 Employment

(Unit : man/day)

Item	Skilled Labour	Unskilled Labour
1-1 Preparation Works	360	900
1-2 Main Dam		
(a) Diversion Tunnel	6.250	31.800
(b) Foundation Treatment	210	630
(c) Dam Body	148.500	156.000
(d) Spillway	18.800	18.100
(e) Intake Facility	55	36
(f) Maintenance Road	60	110
1-3 Regulation Reservoir	2.360	1.550
1-4 Diversion System		
(a) Diversion Dam	11.090	7.880
(b) Driving Canal	31.070	23.580
1-5 Canal Network System		
(a) Diversion Canal	14.000	14.400
(b) Main Canal	9.850	9.260
(c) Lateral Canal	8.900	6.070
(d) Tertiary Canal	7.200	3.550
1-6 Land Reclamation	200	100
Total	258.905	273.946

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