Table 5.31
Construction Equipment for Access Road

Description	Spec.	Required Number
1. Earthwork		
Bulldozer	21 ton	3
Bulldozer w/ripper	32 ton	4
Tractor shovel	2.2 m^3	10
Dump truck	11 ton	23
Bulldozer	11 ton	2
Tramping roller	20 ton	4
Motor grader	3.7 m	2
Water sprinkler	5.5 kl	3
2. Concrete work		
Agitator truck	3 m^3	1
Concrete bucket	1 m^3	1
Truck crane	30 ton	1
Portable mixer	0.2 m^3	5
Vibrator	55 mm	15

5.6.9 Construction Plant and Equipment

As the result of the study of construction method and the calculation of required number of equipment, the major construction plant and equipment to be used for the Package 2: Construction is summarized in Table 5.32.

Table 5.32
Major Construction Equipment, Package 2

Description	Spec.	Required Number
Bulldozer with ripper	32 ton	5
Bulldozer	21 ton	6
Bulldozer	11 ton	8
Tractor shovel	2.2 m^3	12
Tractor shovel	1.2 m^3	5
Backhoe	0.6 m^3	3
Backhoe	0.3 m^3	3
Dump truck	11 ton	43
Dump truck	8 ton	5
Crawler drill	7 m^3/min	2
Crawler drill	10 m^3/min	4
Air compressor	10 m^3/min	2
Air compressor	13.5 m^3/min	4
Tamping roller	20 ton	4
Vibrating roller	10 ton	4
Vibrating roller	4 ton	2

Table 5.32 (Cont'd)
Major Construction Equipment, Package 2

Description	Spec.	Required Number
Vibrating roller	1 ton	4
Concrete plant	0.75m^3 x 2	2
Concrete plant	0.75m^3	1
Agitator truck	3 m^3	28
Concrete bucket	1.0 m^3	3
Concrete bucket	0.5 m^3	4
Concrete pump car	45 m^3/hr	1
Truck crane	30 ton	2
Truck crane	20 ton	2
Tower crane	1 ton	2
Trailer	20 ton	1
Compactor	100 kg	10
Concrete vibrator	55 mm	20
Arm type tunneling machine	110 kW	5
Muck loader, inclined	0.4 m^3	3
Muck car	4.5 m^3	24
Muck car	3 m^3	16
Battery locomotive	8 ton	6
Battery locomotive	6 ton	4
Air compressor	16 m^3/min	5
Vent fan	300 m^3/min	34
Vent fan	100 m^3/min	10
Winch	150 kW	2
Winch	100 kW	3
Leg hammer	2.7 m^3/min	10
Jack hammer	2.4 m^3/min	6
Stopper drill	2.7 m^3/min	10
Shotcrete spray gun	10 m^3/hr	5
Concrete placer	6 m^3	6
Concrete placer	4.5 m^3	4
Battery locomotive	6 ton	10
Agitator car	4.5 m^3	10
Concrete vibrator	55 mm	20
Sliding form, 3.5 m dia., 12 m long		3
Sliding form, 2.5 m dia., 12 m long		2
Boring machine	5.5 kW	6
Grout pump	11 kW	6
Grout mixer	200 x 2	6
Diesel generator	300 kVA	8
Diesel generator	150 kVA	2
Diesel generator	100 kVA	2
Diesel generator	50 kVA	1
Diesel generator	30 kVA	3
Motor grader	3.7 m	2
Macadam roller	10 ton	2
Tire roller	20 ton	2
Water sprinkler	5.5 klit	3

ANNEX I

CONSTRUCTION LAYOUT

JUNIN

Río Chimetete

Río Mancha Grande

Río Chico

Río Anderaes

Río Carrizal

Río Grande

Río Bejuco

Río El Ají

Quiroga

La Esperanza

Los Delicias

Piedra Azul

Los Mercedes

Los Cuyuyes

Buenaventura

Presa La Esperanza
La Esperanza Dam

Embalse
Reservoir

Oficina Sucursal
Branch Office
(CRM/SPVN)

Oficina Principal
Campamento del Constr.
Edificaciones Provisionales
Main Office
Contractor's Camp
Temp. Building

Ventana de Acceso en Membrillo
Membrillo Work Adit

Camino de Acceso a Membrillo
Membrillo Access Road

Salida a Membrillo
Membrillo Outlet

Campamento del Constructor
Edificaciones Temporales
Contractor's Camp
Temp. Buildings

Estacion de Bombeo Severino
Severino Pumping Station

Bancos de Desechos
Spoil Banks

Subestacion Severino
Severino Substation

Tanque de Carga Severino
Severino Head Tank

Entrada Caño Dulce
Caño Dulce Inlet

Canal Abierto Severino
Severino Open Channel
L = 6,395m

Camino de Acceso Severino
Severino Access Road

Oficina Principal
Campamento Base
Main Office
Base Camp
(CRM/SPVN)

Línea de Transmision Doule Peripa - Severino
Doule Peripa - Severino Transmission Line

Salida Mancha Grande
Mancha Grande Outlet

Ventana de Acceso Pasa Honda
Pasa Honda Work Adit

Presa Pasa Honda
Pasa Honda Dam

Camino de Acceso Pasa Honda
Pasa Honda Access Road

Entrada Pasa Honda
Pasa Honda Inlet

Túnel de Derivación Pasa Honda Mancha Grande
Pasa Honda-Mancha Grande Diversion Tunnel
L = 4,093 m

Túnel de Derivación La Esperanza - Pasa Honda
La Esperanza - Pasa Honda Diversion Tunnel, (L =), 417m

Camino de Acceso a Los Cuyuyes
Los Cuyuyes Access Road

Salida Los Cuyuyes
Los Cuyuyes Outlet

Ventana de Acceso en Los Cuyuyes
Los Cuyuyes Work Adit

Ventana de Acceso en La Seca
La Seca Work Adit

Camino de Acceso a La Seca
La Seca Access Road

Río Pasa de Pajaro

Camino de Acceso Caño Dulce
Caño Dulce Access Road

Oficina Principal
Campamento Base del Constr.
Edificaciones Provisionales
Main Office
Contractor's Base Camp
Temp. Buildings

ESCALA
SCALE
0 5 km

REV. Nº	REVISADO	APROBADO	FECHA

CRM
CENTRO DE REHABILITACION DE MANABI

I-1

Río Caricel
Río Grande
Río Pichindé
Río Cajambre
Río Dagua
Río Anchicayá
Río Escalerete
Río Pepe de Pajaro
Río Chico
Río Bajito
Río Bolsa
Río El Ají
Río Memeria
Río Sereno
Río Dauie

Buenaventura
La Esperanza
Quiroga
Las Delicias
Piedra Azul
Membrillo

Presa La Esperanza
La Esperanza Dam

Embalse
Reservoir

Oficina Sucursal
Branch Office
(CRM/SPVN)

Oficina Principal
Campamento del Constr.
Edificaciones Provicionales
Main Office
Contractor's Camp
Temp. Building

Ventana de Acceso en Membrillo
Membrillo Work Adit

Camino de Acceso a Membrillo
Membrillo Access Road

Salida a Membrillo
Membrillo Outlet

Camino de Acceso a Conguillo
Conguillo Access Road

Est. Piedra de Plata

Ventana de Acceso en Cong.
Conguillo Work Adit

Bancos de Desechos
Spoil Banks

Entrada Conguillo
Conguillo Inlet

Camino de Acceso a El Guasmo
El Guasmo Access Road

Ventana de Acceso a El Guasmo
El Guasmo Work Adit

Tunel de Derivacion Doule Peripa-La Esperanza
Doule Peripa-La Esperanza Diversion Tunnel L=8,296m

Est. cañales

Oficina Sucursal
Branch Office
(CRM/SPVN)

Campamento del Constructor
Edificaciones Provicionales
Contractor's Camp
Temp. Buildings

Campamento del Constructor
Edificaciones Temporales
Contractor's Camp
Temp. Buildings

Estacion de Bombeo Severina
Severina Pumping Station

Bancos de Desechos
Spoil Banks

Subestacion Severina
Severina Substation

Tanque de Carga Severina
Severina Head Tank

Entrada Caño Dulce
Caño Dulce Inlet

Est. Caño Dulce

Bancos de Desechos
Spoil Banks

Canal Abierto Severina
Severina Open Channel
L = 6,395m

Oficina Principal
Campamento Base
Main Office
Base Camp
(CRM/SPVN)

Camino de Acceso Severina
Severina Access Road

Oficina Principal
Campamento Base del Constr.
Edificaciones Provicionales
Main Office
Contractor's Base Camp
Temp. Buildings

Camino de Acceso Caño Dulce
Caño Dulce Acces Road

Linea de Transmision Doule Peripa-Severina
Doule Peripa-Severina Transmission Line

Embalse Daule-Peripa
Daule-Peripa Reservoir

Doule Peripa H/P

ESCALA
SCALE
0 5 km

REV. Nº	REVISADO	APROBADO	FECHA

CRM
CENTRO DE REHABILITACION DE MANABI

Estudio de Diseño Detallado de los Trasvases de Agua para las Cuencas de Los Ríos Chone-Portoviejo
The Detailed Design Study on the Water Transfers Schemes for Chone-Portoviejo River Basins

REPUBLICA DEL ECUADOR

TITULO:

IMPLANTACION GENERAL
GENERAL LAYOUT

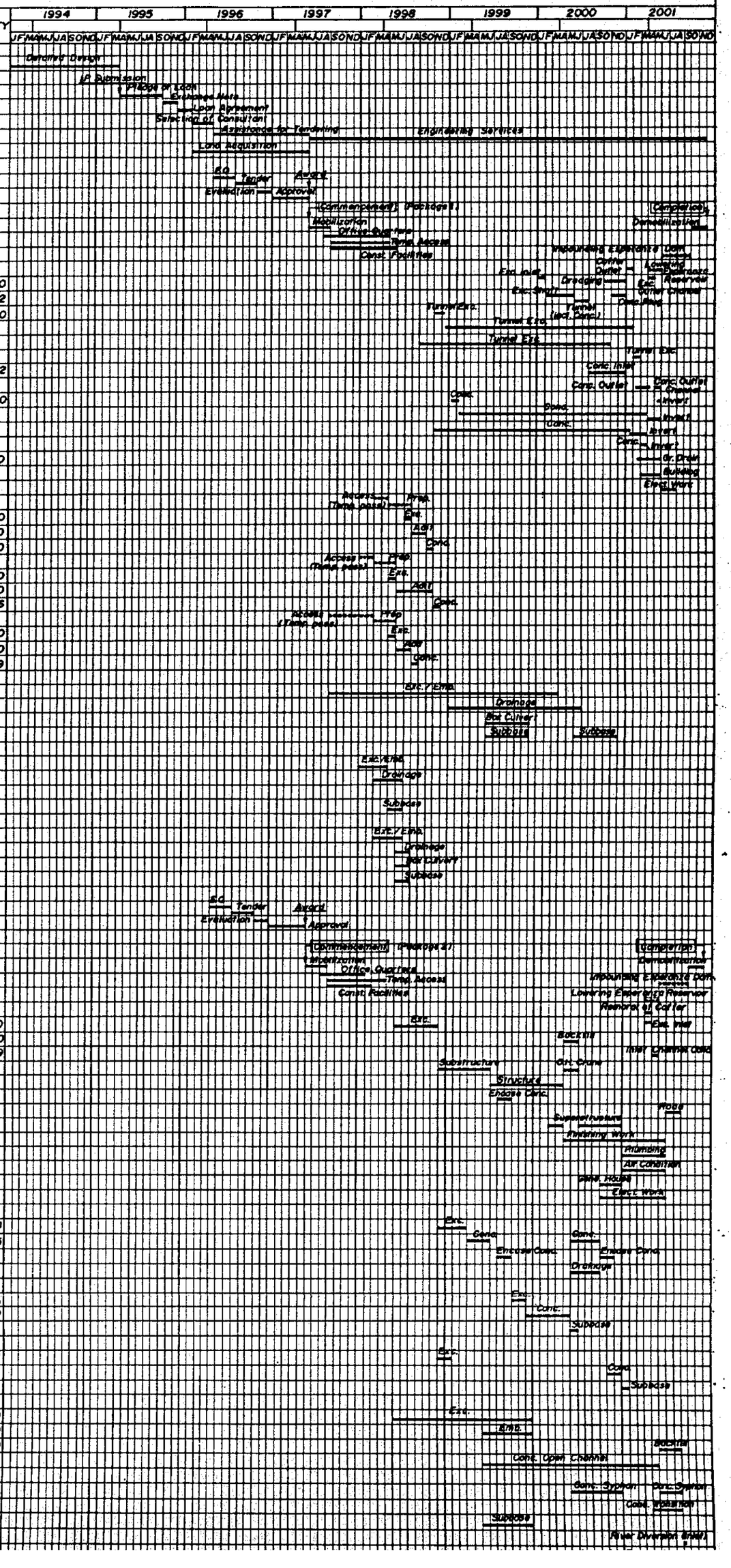
LEVANTO:	APROBADO:
DIBUJO:	FECHA:
DISEÑO:	DIBUJO Nº
REVISO:	1-GE-003
ENTREGO:	
FECHA:	

ANNEX II

CONSTRUCTION SCHEDULE

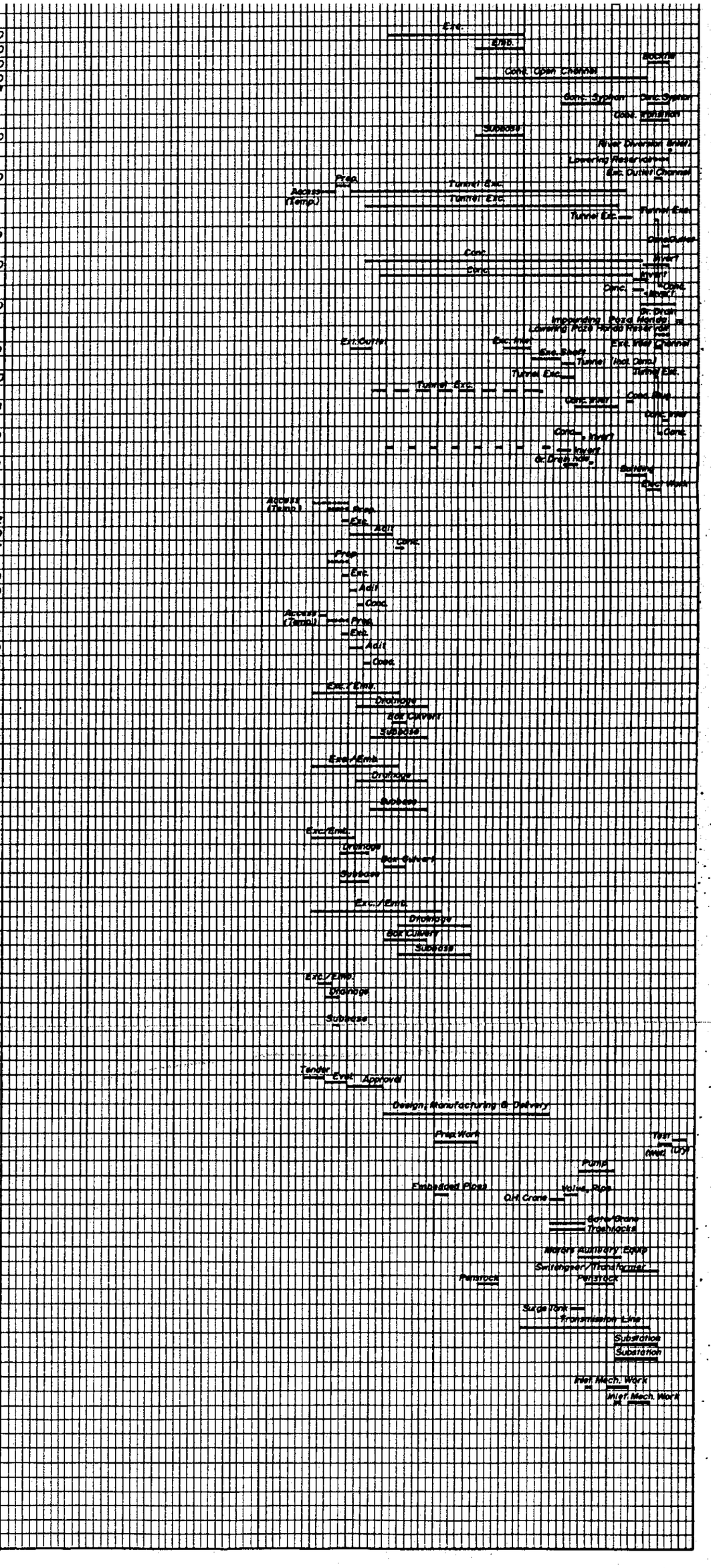
CONSTRUCTION SCHEDULE

DESCRIPTION	UNIT	QUANTITY
1. Engineering Services for Detailed Design		
2. Loan Arrangement		
3. Engineering Services for Construction		
4. Land Acquisition and Compensation		
5. Civil Works for Daule Peripa–La Esperanza Transbasin (Package1)		
5.1. Preparatory Works		
Mobilization		
Temporary Building, Construction Facilities		
5.2. Daule Peripa–La Esperanza Div. Tunnel		
Coffering Work		
Excavation, Open, Inlet Outlet	m^3	33,600
Excavation, Shaft and Tunnel for Inlet		9,012
Tunnel Excavation, Sta. 0 – Sta. 166	m^3	Tot. 154,600
Sta. 166 – Sta. 3,000		
Sta. 3,000 – Sta. 8,170		
Sta. 8,170 – Sta. 8,305		
Concrete, Intake Structure and Inlet Tunnel	m^3	4,102
Concrete, Outlet Structure and Channel		
Tunnel Lining, Sta. 0 – Sta. 166	m^3	Tot. 50,650
Sta. 166 – Sta. 3,000		
Sta. 3,000 – Sta. 8,170		
Sta. 8,170 – Sta. 8,295		
Grouting and Drain Hole	m	6,310
Building Work		
Electrical Work		
5.3. Conguillo Work Adit		
Excavation, Open	m^3	14,440
Tunnel Excavation	m^3	3,560
Concrete Work	m^3	550
5.4. El Guasmo Work Adit		
Excavation, Open	m^3	11,420
Tunnel Excavation	m^3	6,560
Concrete Work	m^3	556
5.5. Membrillo Work Adit		
Excavation, Open	m^3	6,810
Tunnel Excavation	m^3	2,550
Concrete Work	m^3	549
5.6. Conguillo Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
5.7. El Guasmo Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
5.8. Membrillo Outlet Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (Bridge, box culvert)		
Subgrade, Subbase		
6. Civil Works for La Esperanza – Poza Honda Transbasin and Poza Honda – Mancha Grande Transbasin (Package 2)		
6.1. Preparatory Works		
Mobilization		
Temporary Buildings, Construction Facilities		
6.2. Severino Pumping Station		
Coffering Work		
Excavation, Open	m^3	328,140
Fill and Backfill	m^3	28,640
Concrete, Inlet Portion	m^3	Total 31,129
Substructure (foundation)		
Structure (wall, column, Slab)		
Encasing of Penstock Pipe		
Road Work (asphalt pavement)		
Building Work, Architectural Work		
Finishing Work		
Plumbing Work		
Air Conditioning Work		
Diesel Generator House		
Electrical Work		
6.3. Severino Penstock		
Excavation, Open, fill and Backfill	m^3	12,780
Concrete, Bottom Slab and Saddle Block	m^3	Total 2,025
Encasing of Penstock Pipe		
Structure and Drainage		
6.4. Severino Head Tank		
Excavation, Open, fill and Backfill	m^3 / m^3	Exc. 18,580 / Fill 5,130
Concrete, Head Tank Structure	m^3	3,760
Road Work, Subbase		
6.5. Severino Substation		
Excavation, Open, Fill and Backfill	m^3 / m^3	Exc. 10,895 / Fill 1,170
Concrete, Foundation, Drainage	m^3	658
Road Work, Subbase		
6.6. Severino Open Channel		
Excavation, Spoil	m^3	299,960
Embankment for Open Channel	m^3	209,900
Backfill for Structure	m^3	9,790
Concrete, Open Channel Lining	m^3	9,390
Pedestrian Bridge	m^3	Struct. Total 11,145
Syphon Structure		
Transition Structure		
Road Work, Subbase	m^3	3,420
6.7. La Esperanza – Poza Honda Div. Tunnel		
Coffering Work		



Excavation, Open	m	Open
Tunnel Excavation	m^3	2,550
Concrete Work	m^3	549
5.6. Conguillo Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
5.7. El Guasmo Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Sugrade, Subbase		
5.8. Membrillo Outlet Access Road		
Enbankment and Spoil		
Drainage Work		
Structural Work (Bridge, box culvert)		
Subgrade, Subbase		
6. Civil Works for La Esperanza - Poza Honda Transbasin and Poza Honda - Mancha Grande Transbasin (Package 2)		
6.1. Preparatory Works		
Mobilization		
Temporary Buildings, Construction Facilities		
6.2. Severino Pumping Station		
Coffering Work		
Excavation, Open	m^3	328,140
Fill and Backfill	m^3	28,540
Concrete, Inlet Portion	m^3	Total 31,129
Substructure (foundation)		
Structure (wall, column, Slab)		
Encasing of Penstock Pipe		
Road Work (asphalt pavement)		
Building Work, Architectural Work		
Finishing Work		
Plumbing Work		
Air Conditioning Work		
Diesel Generator House		
Electrical Work		
6.3. Severino Penstock		
Excavation, Open, fill and Backfill	m^3	12,780
Concrete, Bottom Slab and Saddle Block	m^3	Total 2,025
Encasing of Penstock Pipe		
Structure and Drainage		
6.4. Severino Head Tank		
Excavation, Open, fill and Backfill	m^3 / m^3	Exc. 16,530 / Fill 5,130
Concrete, Head Tank Structure	m^3	3,760
Road Work, Subbase		
6.5. Severino Substation		
Excavation, Open, Fill and Backfill	m^3 / m^3	Exc. 10,830 / Fill 1,170
Concrete, Foundation, Drainage	m^3	658
Road Work, Subbase		
6.6. Severino Open Channel		
Excavation, Spoil	m^3	299,960
Embankment for Open Channel	m^3	209,900
Backfill for Structure	m^3	9,790
Concrete, Open Channel Lining	m^3	9,390
Pedestrian Bridge	m^3	Struct. Total 11,145
Syphon Structure		
Transition Structure		
Road Work, Subbase	m^3	3,420
6.7. La Esperanza - Poza Honda Div. Tunnel		
Coffering Work		
Excavation, Open, Inlet and Outlet	m^3	24,960
Tunnel Excavation, Sta. 0 - Sta. 7,500		
Sta. 7,500 - Sta. 11,244		
Sta. 11,244 - Sta. 11,417		
Concrete, Inlet Channel	m^3	859
Concrete, Outlet Channel		
Tunnel Lining, Sta. 0 - Sta. 7500		Tot. 65,880
Sta. 7,500 - Sta. 11,240		
Sta. 11,244 - Sta. 11,417		
Grouting and Drain Hole	m	8,680
6.8. Poza Honda - Mancha Grande Div. Tunnel		
Coffering Work		
Excavation, Open, Inlet and Outlet	m^3	110,600
Excavation, Shaft and Tunnel for Inlet	m^3	7,615
Tunnel Excavation, Sta. 0 - Sta. 300	m^3	Tot. 43,580
Sta. 300 - Sta. 4,095		
Concrete, Intake Structure, Inlet Tunnel	m^3	3,718
Concrete, Outlet Structure		
Tunnel Lining, Sta. 0 - Sta. 300	m^3	17,220
Sta. 300 - Sta. 4,095		
Grouting and Drain Hole	m	3,110
Building Work		
Electrical Work		
6.9. La Seca Work Adit		
Excavation, Open	m^3	4,962
Tunnel Excavation	m^3	9,590
Concrete Works	m^3	577
6.10. Los Cuyuyes Work Adit		
Excavation, Open	m^3	5,140
Tunnel Excavation	m^3	2,680
Concrete Work	m^3	544
6.11. Poza Honda Work Adit		
Excavation, Open	m^3	5,806
Tunnel Excavation	m^3	3,340
Concrete Work	m^3	570
6.12. Severino Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.13. Coña Dulce Inlet Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.14. La Seca Access Road		

Road Work, Subbase		
6.6. Severino Open Channel		
Excavation, Spoil	m^3	299,960
Embankment for Open Channel	m^3	209,900
Backfill for Structure	m^3	9,790
Concrete, Open Channel Lining	m^3	9,390
Pedestrian Bridge	m^3	Struct. Total 14,145
Syphon Structure		
Transition Structure		
Road Work, Subbase	m^3	3,420
6.7. La Esperanza - Paza Honda Div. Tunnel		
Coffering Work		
Excavation, Open, Inlet and Outlet	m^3	24,960
Tunnel Excavation, Sta. 0 - Sta. 7,500		
Sta. 7,500 - Sta. 11,244		
Sta. 11,244 - Sta. 11,417		
Concrete, Inlet Channel	m^3	859
Concrete, Outlet Channel		
Tunnel Lining, Sta. 0 - Sta. 7500		Tot. 65,880
Sta. 7,500 - Sta. 11,240		
Sta. 11,244 - Sta. 11,417		
Grouting and Drain Hole	m	8,680
6.8. Paza Honda - Mancha Grande Div. Tunnel		
Coffering Work		
Excavation, Open, Inlet and Outlet	m^3	110,800
Excavation, Shaft and Tunnel for Inlet	m^3	7,615
Tunnel Excavation, Sta. 0 - Sta. 300	m^3	Tot. 43,580
Sta. 300 - Sta. 4,095		
Concrete, Intake Structure, Inlet Tunnel	m^3	3,718
Concrete, Outlet Structure		
Tunnel Lining, Sta. 0 - Sta. 300	m^3	17,220
Sta. 300 - Sta. 4,095		
Grouting and Drain Hole	m	3,110
Building Work		
Electrical Work		
6.9. La Seca Work Adit		
Excavation, Open	m^3	4,962
Tunnel Excavation	m^3	9,590
Concrete Works	m^3	577
6.10. Las Cuyuyes Work Adit		
Excavation, Open	m^3	5,140
Tunnel Excavation	m^3	2,680
Concrete Work	m^3	544
6.11. Paza Honda Work Adit		
Excavation, Open	m^3	5,806
Tunnel Excavation	m^3	3,340
Concrete Work	m^3	570
6.12. Severino Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.13. Caña Dulce Inlet Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.14. La Seca Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.15. Las Cuyuyes Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
6.16. Paza Honda Inlet Access Road		
Embankment and Spoil		
Drainage Work		
Structural Work (bridge, box culvert)		
Subgrade, Subbase		
7. Electrical and Mechanical Works for Daule Peripa – La Esperanza, La Esperanza – Paza Honda and Paza Honda - Mancha Grande Transbasins (Package 3)		
Section-1 Severino Pumping Station, Severino Penstock, Severino Substation and Daule Peripa Severino Transmission Line		
Pumping Station		
Main Pumps		
Valves and Pipes		
O H Crane		
Intake Gate & Gantry Crane		
Transhracks		
Electric Motors & Auxiliary		
Switchgears and Transformer		
Penstock		
Steel Penstock		
Surge Tank		
138 KV Transmission Line		
Substation		
Severino Substation		
Daule Peripa Substation		
Section-2 Conguillo Inlet		
Section-3 Paza Honda Inlet		



ANNEX III

LAND ACQUISITION AREA

Land Acquisition and Compensation

Description		Acquired Area (ha)
A.Land acquisition		
1.Package 1 Civil works for Daule Peripa-La Esperanza Transbasin		
1.General(Preparatory works)	Office,camp,plant,storage, motor pool,etc.	1.4
2.Conguillo inlet	Construction area	0.4
	Temp.area,storage,etc.	0.3
3.Diversion tunnel	Spoil area(Conguillo)	2.4
	Spoil area(El Guasmo)	1.4
	Spoil area(Membrillo)	1.6
4.Membrillo outlet	Construction area	0.4
	Temp.area,storage,etc.	0.7
5.Conguillo work adit	Temp.area,portal	0.3
6.El Guasmo work adit	Construction area,portal	0.3
	Temp.area,storage,etc.	0.3
7.Membrillo work adit	Construction area,portal	0.3
8.Conguillo access road	Road reserve	75.0
9.Guasmo access road	Road reserve	4.0
10.Membrillo outlet access road	Road reserve	3.0
11.Others (10%)		9.2
Total(Package 1)		101.0
2.Package 2 Civil works for La Esperanza-Poza Honda Transbasin and Poza Honda-Mancha Grande Transbasin		
1.General(Preparatory works)	Office,camp,plant,storage, motor pool,etc.	3.2
2.Severino pumping station, penstock,head tank,sub-station	Construction area	3.2
	Temp.area,storage,etc.	1.2
3.Severino open channel	Construction area	20.1
	Temp.area,storage,etc.	0.5
	Spoil area(Severino site)	13.1
4.Cana Dulce inlet	Construction area	0.3
	Temp.area,storage,etc.	0.2
5.Diversion tunnel,Esperanza-Poza Honda	Spoil area(Cana Dulce)	2.0
	Spoil area(La Seca)	1.6
	Spoil area(Los cuyuyes)	1.9
6.Los Cuyuyes outlet	Construction area	0.2
	Temp.area,storage,etc.	0.2

Land Acquisition and Compensation

Description		Acquired Area (ha)
7.Poza Honda inlet	Construction area	0.3
	Temp.area,storage,etc.	0.3
8.Diversion tunnel,Poza Honda-Mancha Grande	Spoil area(Poza Honda)	1.5
	Spoil area(Mancha Grande)	2.3
9.Mancha Grande outlet	Construction area	0.9
	Temp.area,storage,etc.	0.2
10.La Seca work adit	Construction area,portal	0.2
	Temp.area,storage,etc.	0.4
11.Los Cuyuyes work adit	Construction area,portal	0.2
	Temp.area,storage,etc.	0.3
12.Poza Honda work adit	Construction area,portal	0.3
13.Severino access road	Road reserve	19.0
14.Cana Dulce access road	Road reserve	8.0
15.La Seca access road	Road reserve	10.0
16.Los Cuyuyes access road	Road reserve	26.0
17.Poza Honda access road	Road reserve	10.0
18.Others (10%)		12.8
Total(Package 2)		140.4
3.Package 3		
Electrical and mechanical works	Area is included in the above.	
Power transmission line	T/L route,access road,etc.	66.0
Total(Package 3)		66.0
Total A		307.4
B.Compensation(Housing)	57nos.	

ANNEX IV

NUMBER OF RAINY DAY AND WORKABLE DAY

Chone Portoviejo,Dos Bocas

Workable Day

Number of Rainy Day

Year	Rainfall	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ave. 8yrs	0 - 1	0.8	0.4	0.9	0.8	0.5	0.1	0.3	0.3	0.1	0.5	0.1	0.4
	1 - 3	0.1	0.0	0.8	0.1	0.0	0.0	0.4	0.1	0.0	0.3	0.0	0.3
	3 - 5	0.3	0.3	0.5	0.6	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.8
	5 - 10	1.6	2.4	2.0	1.4	1.1	0.9	0.1	0.3	0.3	0.1	0.0	1.0
	10 - 30	5.4	6.0	4.0	4.6	1.6	0.4	0.1	0.3	0.0	0.1	0.1	2.5
	30 - 50	1.9	3.0	2.0	2.3	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.6
	More 50	0.8	2.0	1.4	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Suspended Day		
Workable Day															
Excavation													Excavation		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.8	1.2	1.0	0.7	0.6	0.5	0.1	0.2	0.2	0.1	0.0	0.5	0.5		
10 - 30	5.4	6.0	4.0	4.6	1.6	0.4	0.1	0.3	0.0	0.1	0.1	2.5	1.0		
30 - 50	2.9	4.5	3.0	3.5	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.9	1.5		
More 50	1.2	3.0	2.1	1.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.5		
Total	10.3	14.7	10.1	10.3	3.5	1.0	0.2	0.5	0.2	0.3	0.1	3.9	(Total)	54.85	25.8
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	15.8	6.3	15.9	15.8	21.5	24.0	25.9	25.6	24.9	23.7	23.9	19.1	(Total)	242.2	20.2
Earthfill(Core)													Earthfill		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.2	0.2	0.3	0.3	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.4	0.5		
5 - 10	1.6	2.4	2.0	1.4	1.1	0.9	0.1	0.3	0.3	0.1	0.0	1.0	1.0		
10 - 30	8.1	9.0	6.0	6.9	2.4	0.6	0.2	0.5	0.0	0.2	0.2	3.8	1.5		
30 - 50	3.8	6.0	4.0	4.6	1.8	0.2	0.0	0.0	0.0	0.0	0.0	1.2	2.0		
More 50	1.6	4.0	2.8	2.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	2.0		
Total	15.3	21.6	15.1	15.2	5.3	1.9	0.3	0.8	0.3	0.5	0.2	6.4	(Total)	82.55	23.5
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	10.7	(0.6)	11.0	10.8	19.7	23.1	25.8	25.2	24.7	23.6	23.9	16.7	(Total)	214.5	17.9

Rockfill (Inner)

													Rockfill (Inner),(Random)		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.8	1.2	1.0	0.7	0.6	0.5	0.1	0.2	0.2	0.1	0.0	0.5	0.5		
10 - 30	5.4	6.0	4.0	4.6	1.6	0.4	0.1	0.3	0.0	0.1	0.1	2.5	1.0		
30 - 50	2.9	4.5	3.0	3.5	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.9	1.5		
More 50	1.2	3.0	2.1	1.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.5		
Total	10.3	14.7	10.1	10.3	3.5	1.0	0.2	0.5	0.2	0.3	0.1	3.9	(Total)	54.85	25.8
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	15.8	6.3	15.9	15.8	21.5	24.0	25.9	25.6	24.9	23.7	23.9	19.1	(Total)	242.2	20.2

Rockfill (Outer)

													Rockfill (Outer)		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
10 - 30	5.4	6.0	4.0	4.6	1.6	0.4	0.1	0.3	0.0	0.1	0.1	2.5	1.0		
30 - 50	2.9	4.5	3.0	3.5	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.9	1.5		
More 50	1.2	3.0	2.1	1.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	1.5		
Total	9.5	13.5	9.1	9.6	3.0	0.6	0.1	0.3	0.0	0.3	0.1	3.4	(Total)	49.25	26.3
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	16.6	7.5	16.9	16.5	22.1	24.5	25.9	25.7	25.0	23.8	23.9	19.6	(Total)	247.8	20.6

Concrete,Grout

													Concrete,Grout		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
10 - 30	5.4	6.0	4.0	4.6	1.6	0.4	0.1	0.3	0.0	0.1	0.1	2.5	1.0		
30 - 50	1.9	3.0	2.0	2.3	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.6	1.0		
More 50	0.8	2.0	1.4	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.0		
Total	8.1	11.0	7.4	7.9	2.5	0.5	0.1	0.3	0.0	0.2	0.1	3.1	(Total)	41.2	27.0
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	17.9	10.0	18.6	18.1	22.5	24.5	25.9	25.7	25.0	23.8	23.9	19.9	(Total)	255.8	21.3

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Jan	1(New Year)	Oct	9(Independance of Guayaquil
Feb	26,27,28(Carnaval)		12(Race Day)
Mar	Portoviejo's Day		18(Independance of Portoviejo)
May	1(Labor Day) 24(Pichincha War)	Nov	2(All-souls' Day)
Jun	25(Manabi's Day		3(Independence of Cuenca)
Jul	24(Simon Boliver's Birthday	Dec	6(Independence of Quito)
			24(Cristmas Eve)
			25(Crithmas Day)
		**	31 & New Year

Chone Portoviejo,Poza Honda
Workable Day

Number of Rainy Day

Year	Rainfall	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ave.	0 - 1	4.3	4.0	4.3	4.7	5.8	3.7	3.0	1.2	1.3	1.7	0.8	3.6
9yrs	1 - 3	3.0	2.7	4.2	3.9	2.4	1.1	0.9	0.3	0.3	0.9	0.3	1.3
	3 - 5	3.0	2.6	2.3	1.9	0.9	0.2	0.1	0.3	0.0	0.2	0.0	0.3
	5 - 10	3.7	3.9	2.2	3.3	1.9	0.7	0.2	0.0	0.2	0.0	0.0	1.0
	10 - 30	5.3	6.6	5.7	5.7	2.3	0.3	0.0	0.1	0.1	0.1	0.0	0.9
	30 - 50	1.1	1.1	1.8	1.6	0.4	0.1	0.0	0.1	0.1	0.0	0.1	0.1
	More 50	0.4	0.7	0.8	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Workable Day

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Suspended Day		
Excavation													Excavation		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	1.9	2.0	1.1	1.7	1.0	0.4	0.1	0.0	0.1	0.0	0.0	0.5	0.5		
10 - 30	5.3	6.6	5.7	5.7	2.3	0.3	0.0	0.1	0.1	0.1	0.0	0.9	1.0		
30 - 50	1.7	1.7	2.7	2.4	0.6	0.2	0.0	0.2	0.2	0.0	0.2	0.2	1.5		
More 50	0.6	1.1	1.2	1.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.5		
Total	9.4	11.3	10.7	11.0	4.3	1.0	0.1	0.3	0.4	0.1	0.2	1.6	(Total)	50.05	26.2
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	16.6	9.8	15.3	15.1	20.7	24.1	25.9	25.8	24.7	23.9	23.9	21.5	(Total)	247.0	20.6

Earthfill(Core)													Earthfill		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	1.5	1.3	1.2	1.0	0.5	0.1	0.1	0.2	0.0	0.1	0.0	0.2	0.5		
5 - 10	3.7	3.9	2.2	3.3	1.9	0.7	0.2	0.0	0.2	0.0	0.0	1.0	1.0		
10 - 30	8.0	9.9	8.6	8.6	3.5	0.5	0.0	0.2	0.2	0.2	0.0	1.4	1.5		
30 - 50	2.2	2.2	3.6	3.2	0.8	0.2	0.0	0.2	0.2	0.0	0.2	0.2	2.0		
More 50	0.8	1.4	1.6	1.6	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0		
Total	16.2	18.7	17.1	17.6	7.2	1.7	0.3	0.5	0.6	0.3	0.2	2.7	(Total)	82.85	23.5
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	9.8	2.3	8.9	8.4	17.8	23.4	25.8	25.5	24.5	23.8	23.8	20.3	(Total)	214.2	17.8

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC			
Rockfill (Inner)													Rockfill (Inner),(Random)		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	1.9	2.0	1.1	1.7	1.0	0.4	0.1	0.0	0.1	0.0	0.0	0.5	0.5		
10 - 30	5.3	6.6	5.7	5.7	2.3	0.3	0.0	0.1	0.1	0.1	0.0	0.9	1.0		
30 - 50	1.7	1.7	2.7	2.4	0.6	0.2	0.0	0.2	0.2	0.0	0.2	0.2	1.5		
More 50	0.6	1.1	1.2	1.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.5		
Total	9.4	11.3	10.7	11.0	4.3	1.0	0.1	0.3	0.4	0.1	0.2	1.6	(Total)	50.05	26.2
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	16.6	9.8	15.3	15.1	20.7	24.1	25.9	25.8	24.7	23.9	23.9	21.5	(Total)	247.0	20.6

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC			
Rockfill (Outer)													Rockfill (Outer)		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
10 - 30	5.3	6.6	5.7	5.7	2.3	0.3	0.0	0.1	0.1	0.1	0.0	0.9	1.0		
30 - 50	1.7	1.7	2.7	2.4	0.6	0.2	0.0	0.2	0.2	0.0	0.2	0.2	1.5		
More 50	0.6	1.1	1.2	1.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.5		
Total	7.6	9.3	9.6	9.3	3.4	0.6	0.0	0.3	0.3	0.1	0.2	1.1	(Total)	41.5	27.0
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	18.5	11.7	16.4	16.7	21.7	24.4	26.0	25.8	24.8	23.9	23.9	22.0	(Total)	255.5	21.3

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC			
Concrete,Grout													Concrete,Grout		
0 - 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1 - 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3 - 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5 - 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
10 - 30	5.3	6.6	5.7	5.7	2.3	0.3	0.0	0.1	0.1	0.1	0.0	0.9	1.0		
30 - 50	1.1	1.1	1.8	1.6	0.4	0.1	0.0	0.1	0.1	0.0	0.1	0.1	1.0		
More 50	0.4	0.7	0.8	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0		
Total	6.8	8.4	8.3	8.1	3.0	0.5	0.0	0.2	0.2	0.1	0.1	1.0	(Total)	36.7	27.4
Calender	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0		365.0	
Holiday	1.0	3.0	1.0	0.0	2.0	1.0	1.0	1.0	1.0	3.0	2.0	4.0		20.0	
Sunday	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		48.0	
Workable	19.2	12.6	17.7	17.9	22.0	24.5	26.0	25.8	24.8	23.9	23.9	22.0	(Total)	260.3	21.7

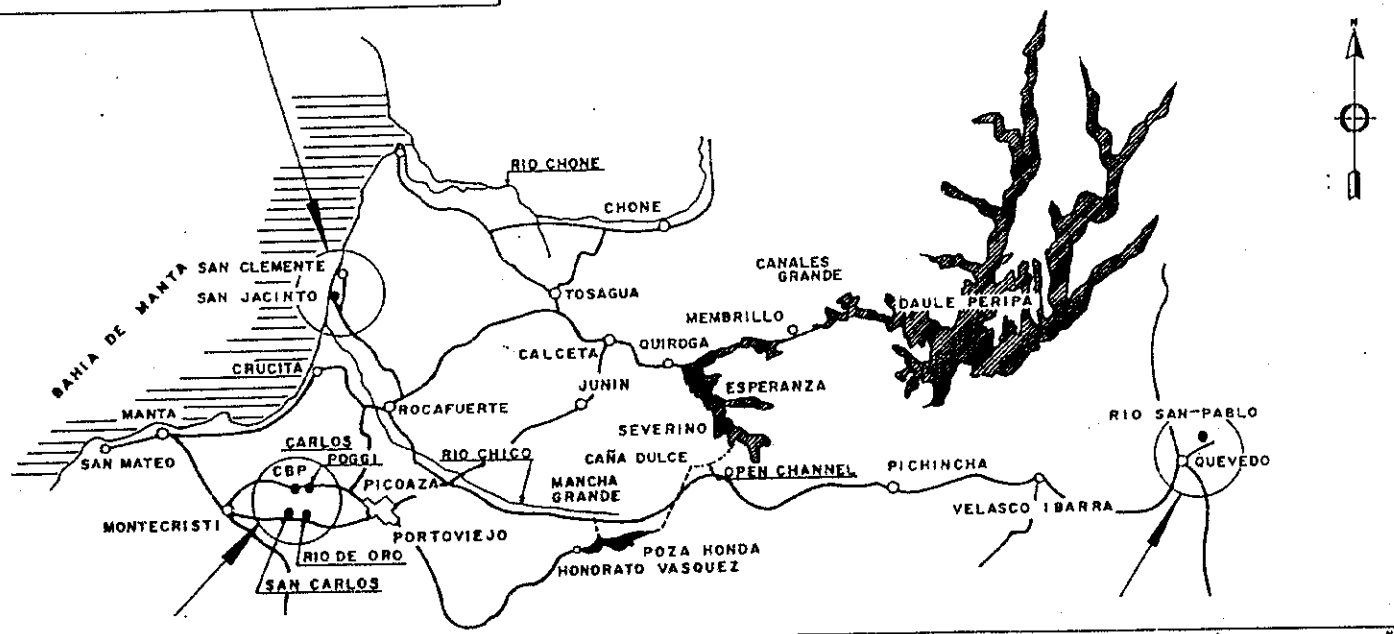
ANNEX V

LOCATION OF CONCRETE AGGREGATE

From	To	via	Km
San Jacinto	Poza Honda Inlet	Portoviejo	95
	Poza Honda Outlet	Portoviejo	108
(Sea Sand)	Mancha Grande Outlet	Rocafuerte	63
	Membrillo Outlet	Calceta	118
	Canales Grande Inlet	Calceta	132
	Severino Pump station	R. fuerte/Delicias	126
	Open Channel	R. fuerte/Delicias	121

ESCALA 1:200,000

0 10 20 30 km.



From	To	via	Km
CBP/C. Poggi	Poza Honda Inlet	Portoviejo	72
S. Carlos	Poza Honda Outlet	Portoviejo	59
	Mancha Grande Outlet	Rodeo	47
(Quarry)	Membrillo Outlet	R. fuerte/Calceta	104
	Canales Grande Inlet	R. fuerte/Calceta	107
	Severino P. Station	Rodeo/Delicias	79
	Open Channel	Rodeo/Delicias	74

From	To	via	Km
Quevedo	Poza Honda Inlet	Portoviejo	185
R.S. Pablo	Poza Honda Outlet	Portoviejo	193
	Mancha Grande Outlet	Pichincha	110
(River Sand)	Membrillo Outlet	Rocafuerte/Calceta	223
	Canales Grande Inlet	Rocafuerte/Calceta	237
	Severino Pump station	Delicias	95
	Open Channel	Delicias	100

V-1

REV. Nº	REVISADO	APROBADO	FECHA

CRM CENTRO DE REHABILITACION DE MANABI

Estudio de Diseño Detallado de los Trasvases de Aguas entre los Cauces de Los Ríos Chone - Portoviejo
Un Detailed Design Study on the Water Transfer Schemes for Chone - Portoviejo River Basins

REPUBLICA DEL ECUADOR

TITULO:
DISTANCIA DE TRANSPORTE PARA LOS AGREGADOS DE HORMIGON
TRANSPORT DISTANCE FOR CONCRETE AGGREGATE

LEVANTO:	APROBADO:
DIBUJO:	FECHA:
DISEÑO:	DIBUJO Nº
REVISO:	2-GE-019
ENTREGO:	
FECHA:	