

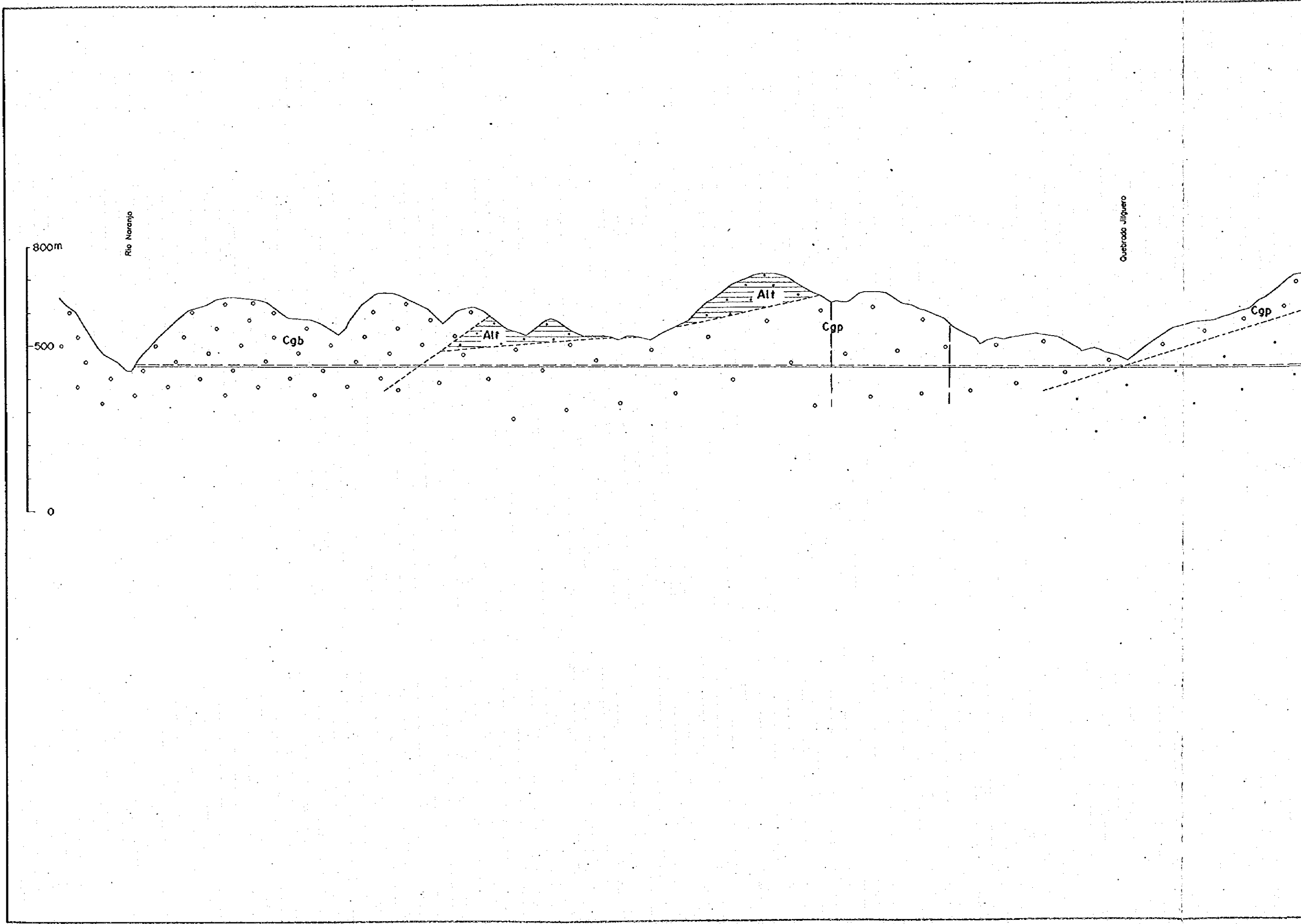
LEGEND

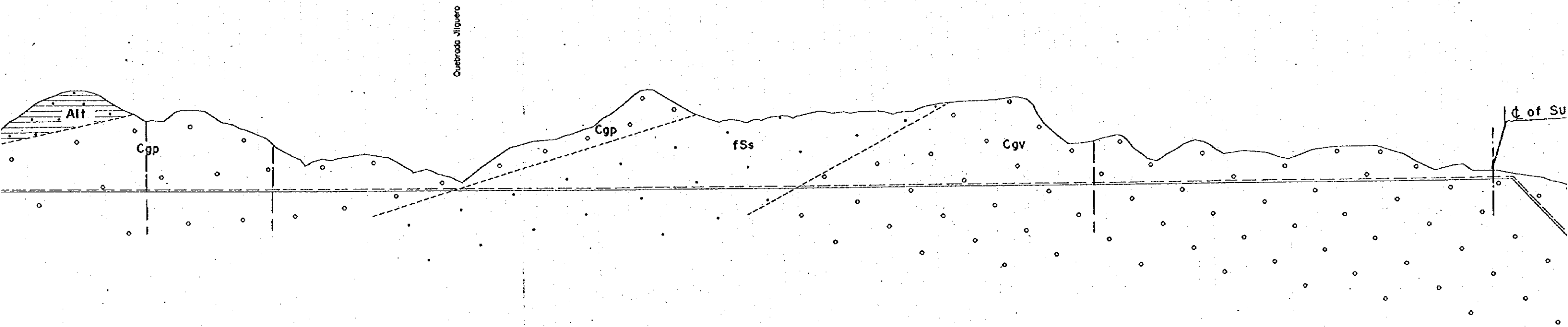
- Rv Riverbed Deposits
- △ Tl Talus Deposits
- Tr1 Terrace Deposits (Lower)
- Tr2 Terrace Deposits (Middle)
- Tr3 Terrace Deposits (Upper)
- m Ss Sandstone (Medium)
- Cgb Conglomerate (Boulder)
- Alt Alternation of Sandstone and Siltstone
- Cgp Conglomerate (Pebble)
- f Ss Sandstone (Fine)
- Cgv Conglomerate (Volcanic)
- Mr Mudstone (Marl)
- Ls Limestone
- Geologic boundary
- Strike and dip of bedding
- Fault
- ↑ ↓ Geologic Section



REPUBLIC OF COSTA RICA	
LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT	
GEOLOGIC PLAN OF WATERWAY ALIGNMENT ROUTE	
Fig. 7-8	Date:

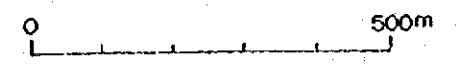
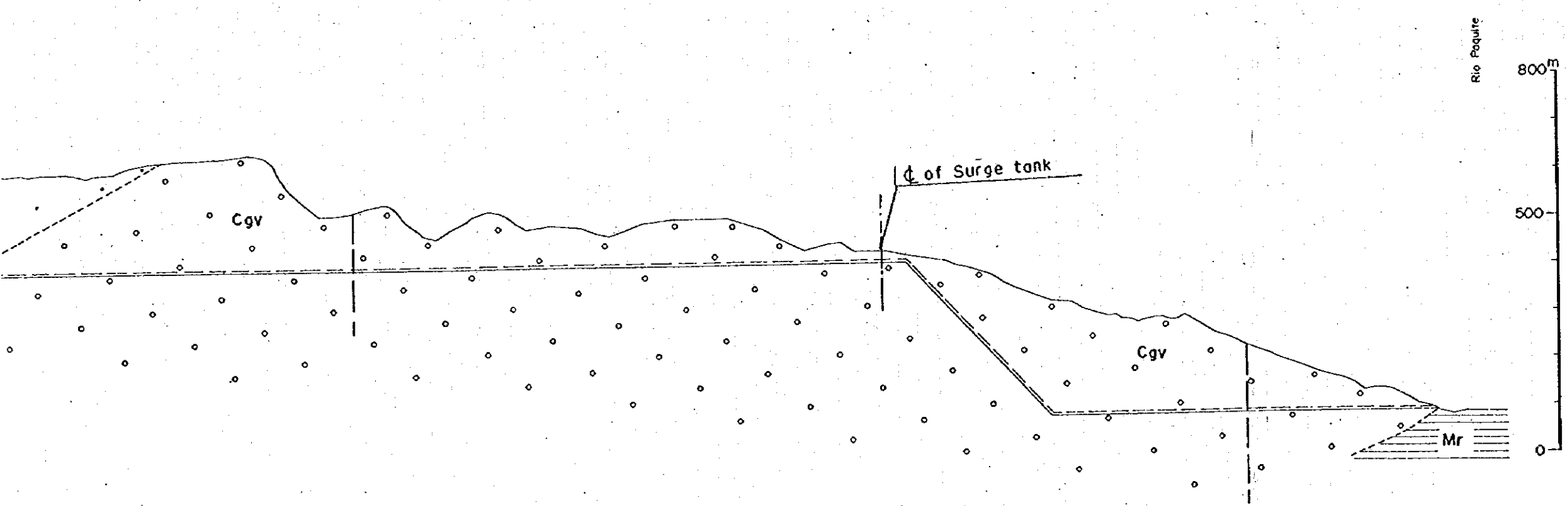
Data of geology of peripheral area were offered by ICE.



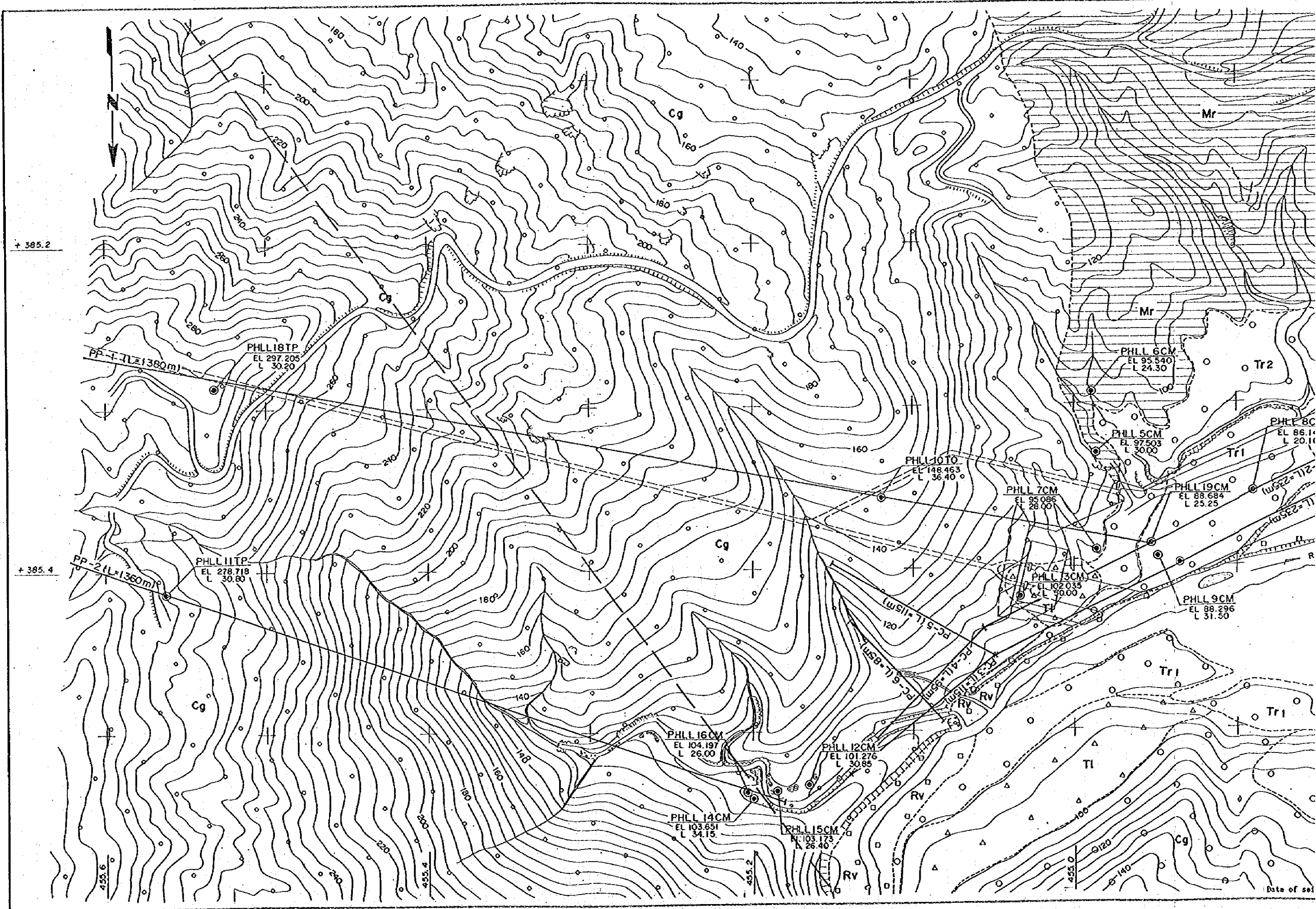


LEGEND

- Rv
d Riverbed Deposits
- Tl
△ Talus Deposits
- Trl
○ Terrace Deposits (Lower)
- Cgb
○ Conglomerate (Boulder)
- Alt Alternation of Sandstone and Siltstone
- Cgp
○ Conglomerate (Pebble)
- fSs Sandstone (Fine)
- Cgv
○ Conglomerate (Volcanic)
- Mr Mudstone (Marl)
- Geologic boundary
- | Lineament by aero-photo interpretation



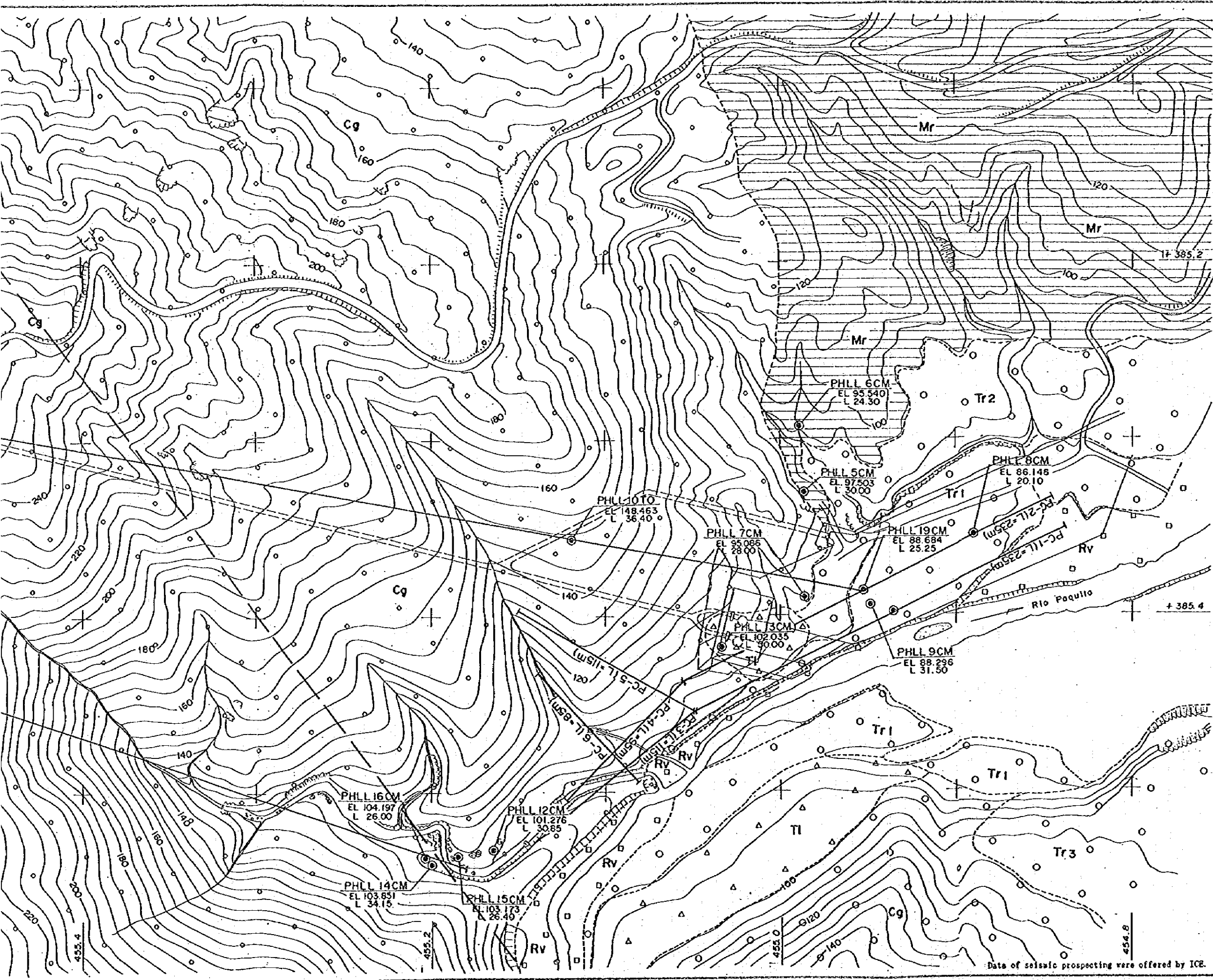
REPUBLIC OF COSTA RICA	
LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT	
GEOLOGIC SECTION ALONG HEADRACE TUNNEL ROUTE	
Fig. 7-9	Date:



+ 385.2

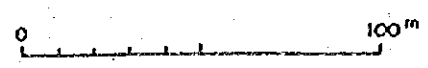
+ 385.4

Date of soil



LEGEND

- Riverbed Deposits
- Talus Deposits
- Terrace Deposits (Lower)
- Terrace Deposits (Middle)
- Terrace Deposits (Upper)
- Conglomerate
- Mudstone (Marl)
- Geologic boundary
- Lineament by aero-photo interpretation
- Strike and dip of bedding
- Drillhole
- Seismic Prospecting Traverse
- Geologic Section

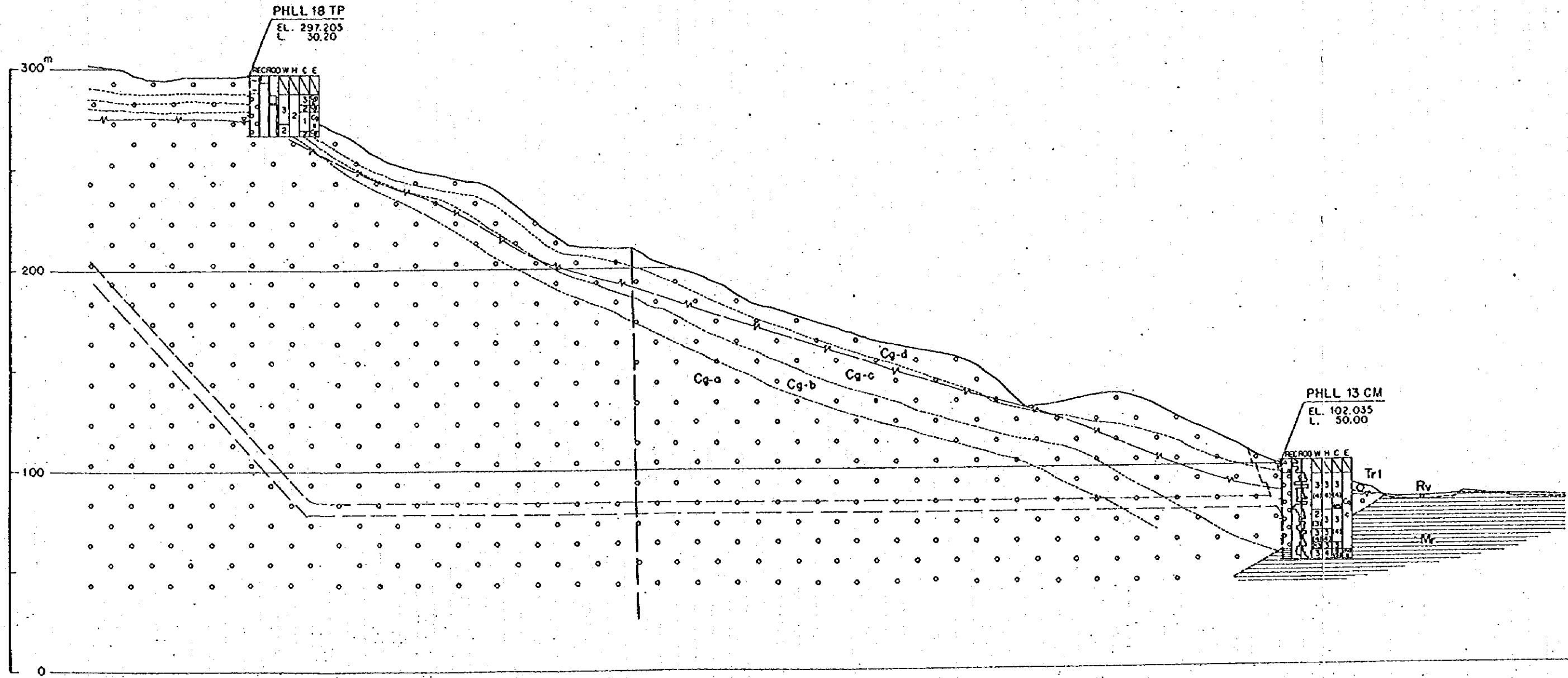


REPUBLIC OF COSTA RICA	
LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT	
GEOLOGIC PLAN OF PENSTOCK ROUTE AND POWER STATION SITE	
Fig. 7-10.	Date:

Data of seismic prospecting were offered by ICE.

B

B



LEGEND

- Riverbed Deposits
- Talus Deposits
- Terrace Deposits (Lower)
- Terrace Deposits (Middle)
- Conglomerate
- Mudstone (Marl)

B

- Geologic boundary
- Lineament by aero-photo interpretation
- Boundary of rock mass classification
- Ground water level

(Seismic Velocity Distribution)
 $\frac{2.4}{4.4}$ Velocity (km/s) and boundary of velocity layer

(Rock Mass Classification)
 See text

(Drillhole Log)

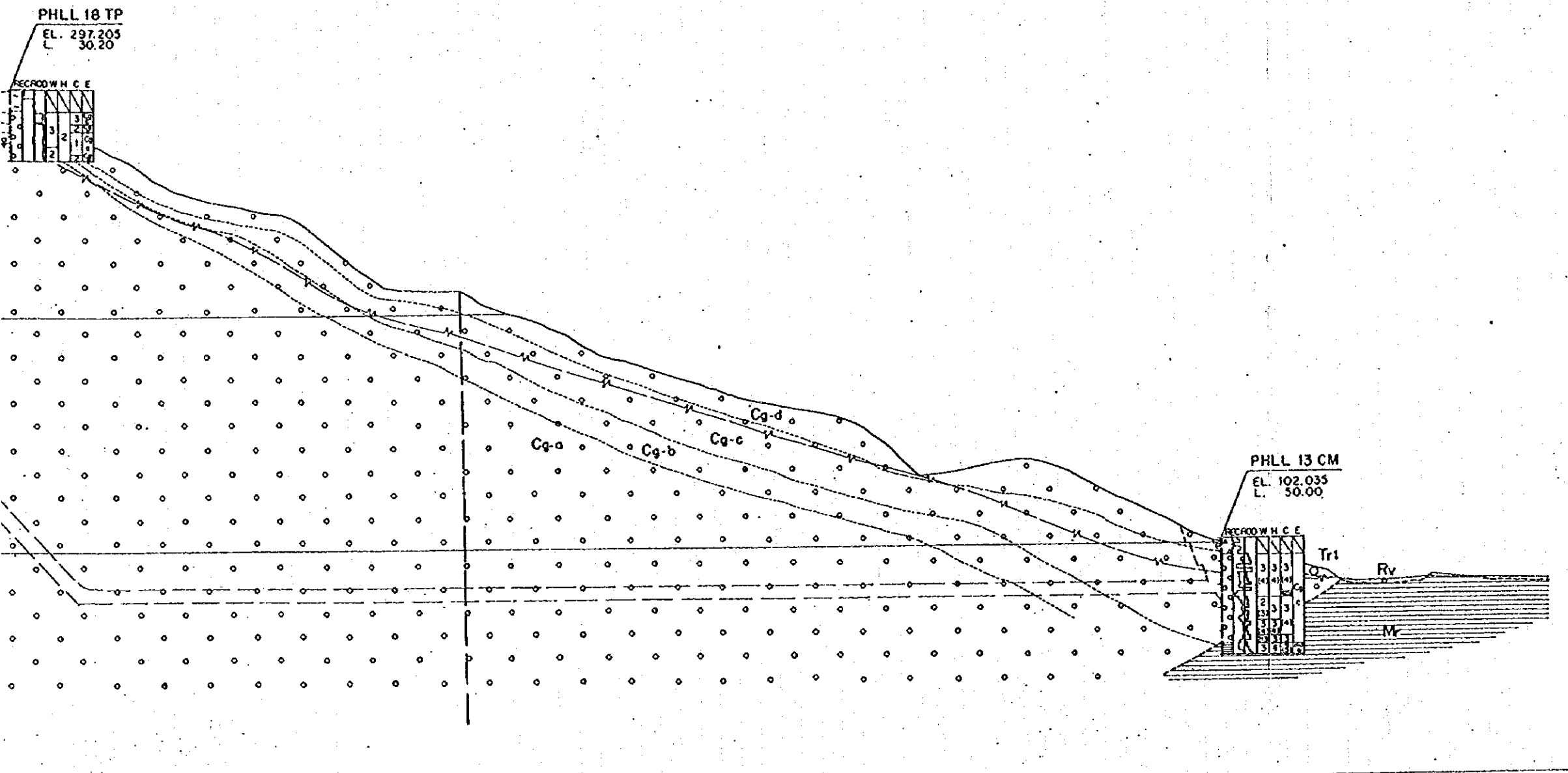
PHL 13 CM
 EL. 102.035
 L. 50.00

PHL 18 TP
 EL. 297.205
 L. 30.20

Legend for Drillhole Log:
 --- Hole number
 — Elevation of hole head (m)
 — Length drilled (m)

Legend for Log Columns:
 W: Weathering
 H: Hardness
 C: Interval of cracks

Legend for Log Rows:
 ROD (Rock Quality Designation)
 REC: Core Recovery
 Geologic log
 Depth (m)

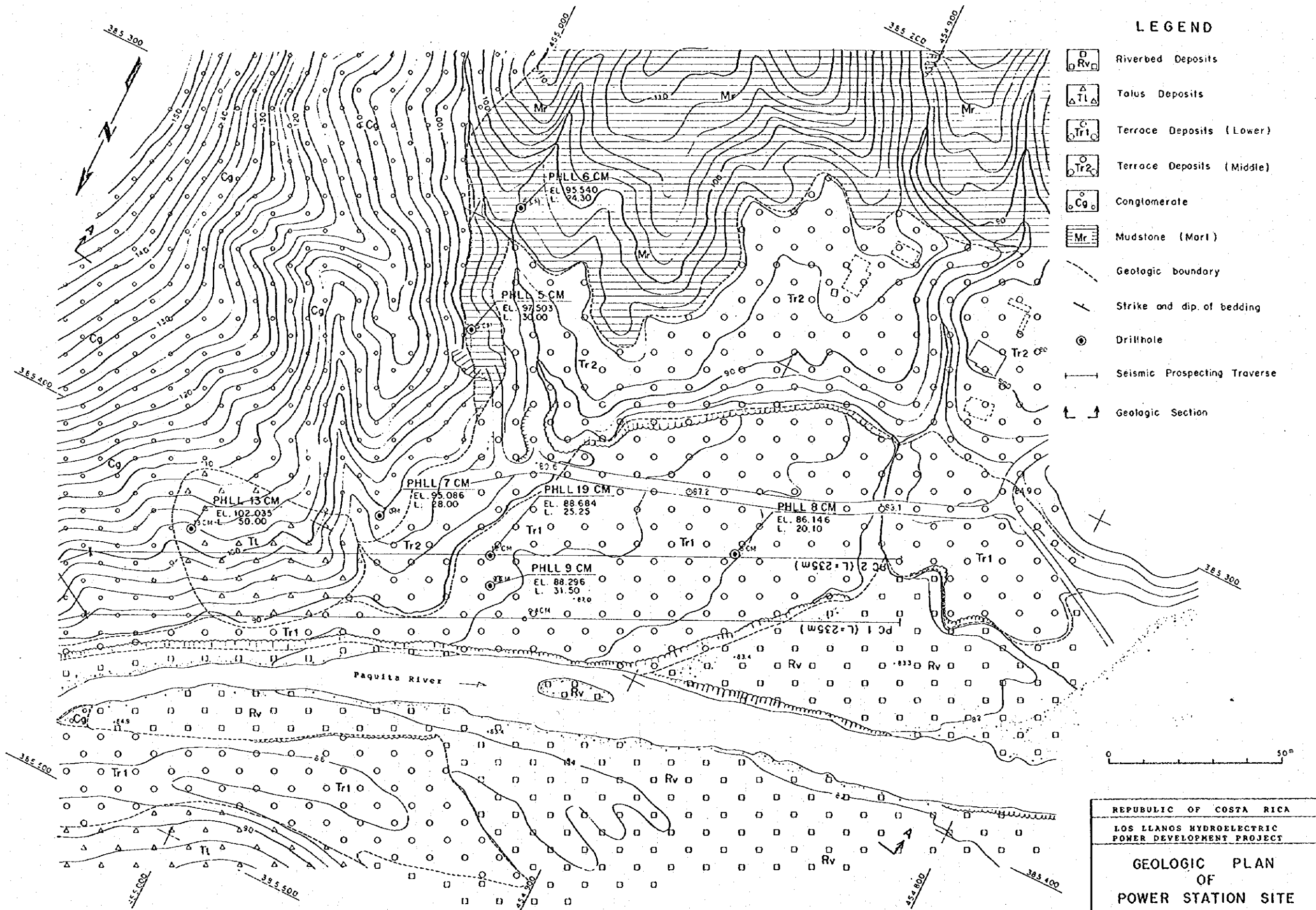


REPUBLIC OF COSTA RICA
 LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT

GEOLOGIC SECTION OF PENSTOCK ROUTE (SECTION B-B)

Fig. 7-12 Date:

Data of drillhole (REC and ROD) were offered by ICE.



LEGEND

- Riverbed Deposits
- Talus Deposits
- Terrace Deposits (Lower)
- Terrace Deposits (Middle)
- Conglomerate
- Mudstone (Marl)
- Geologic boundary
- Strike and dip of bedding
- Drillhole
- Seismic Prospecting Traverse
- Geologic Section

REPUBLIC OF COSTA RICA
 LOS LLANOS HYDROELECTRIC
 POWER DEVELOPMENT PROJECT











**GEOLOGIC PLAN
 OF
 POWER STATION SITE**

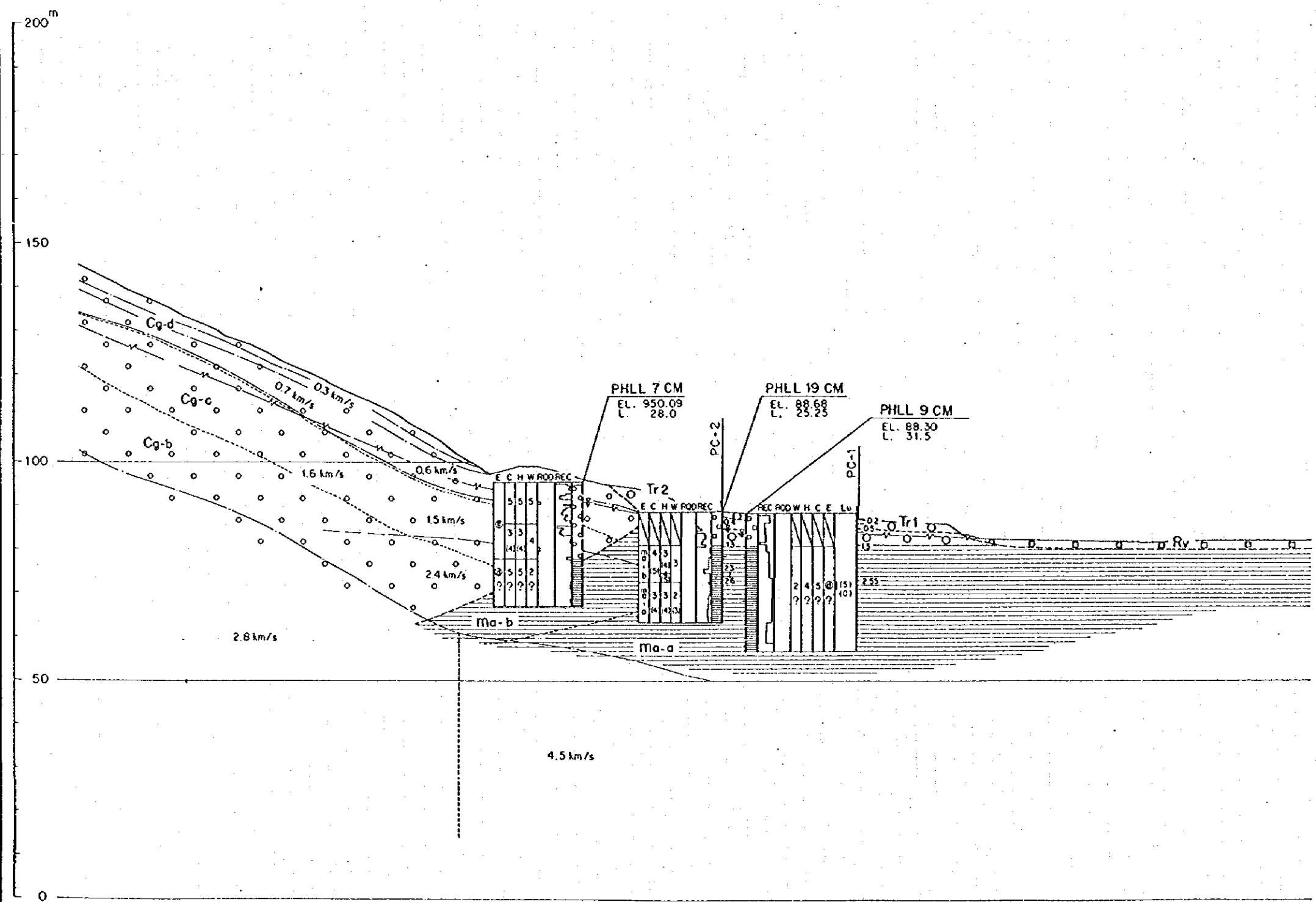
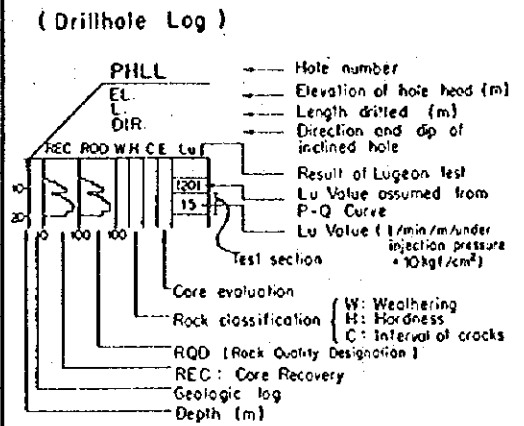
Date of seismic prospecting were offered by ICE.

Fig. 7-13

Los Llanos Power Plant Site

LEGEND

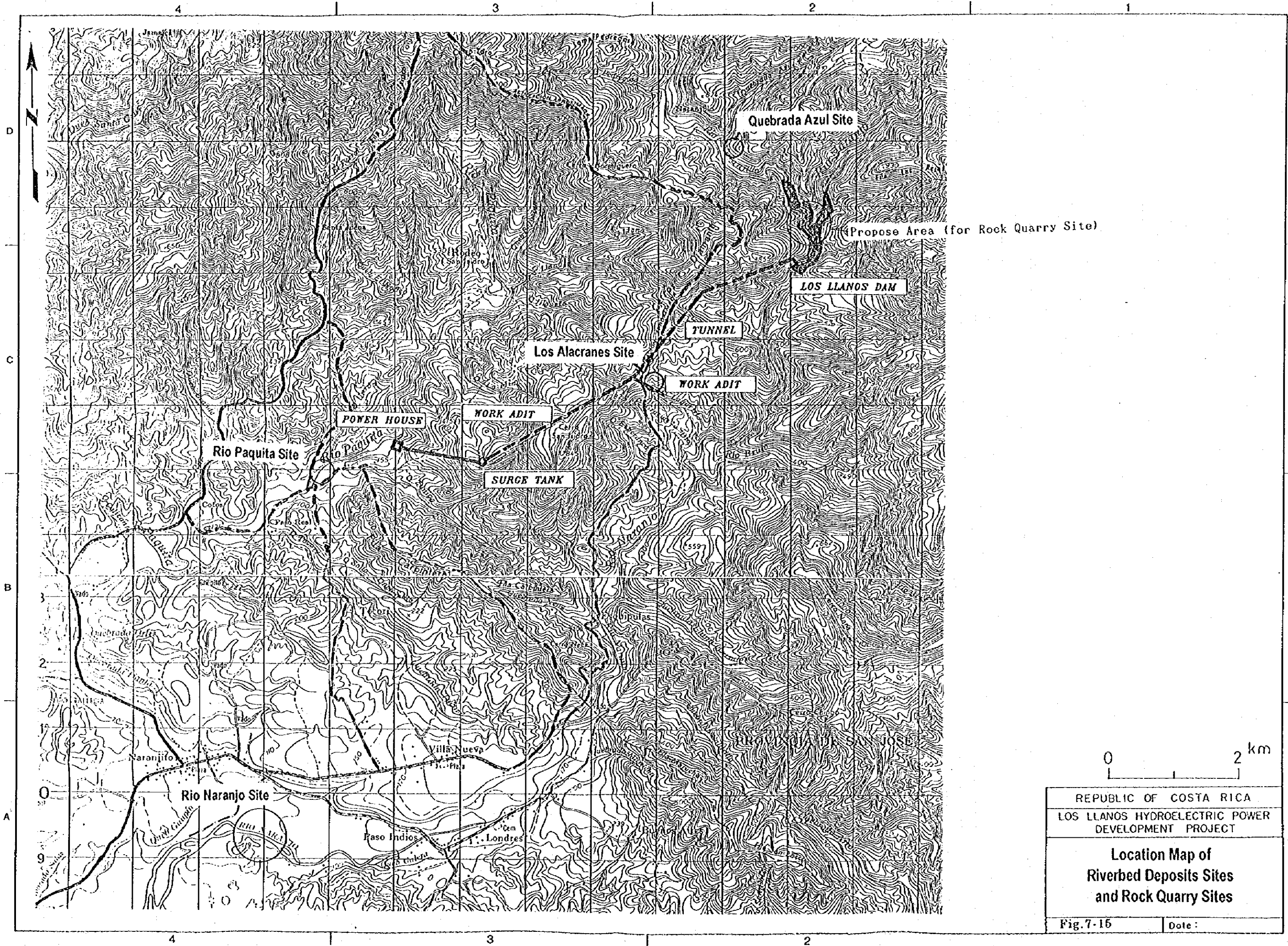
-  Riverbed Deposits
-  Terrace Deposits (Lower)
-  Terrace Deposits (Middle)
-  Conglomerate
-  Mudstone (Marl)
-  Geologic boundary
-  Boundary of rock mass classification
-  Ground water level
- (Seismic Velocity Distribution)
-  Velocity (km/s) and boundary of velocity layer
- (Rock Mass Classification)
-  See text



REPUBLIC OF COSTA RICA
 LOS LLANOS HYDROELECTRIC POWER
 DEVELOPMENT PROJECT

**GEOLOGIC SECTION
 OF
 POWER STATION SITE
 (section A-A)**

Data of drillhole (REC and RQD) were offered by ICE.

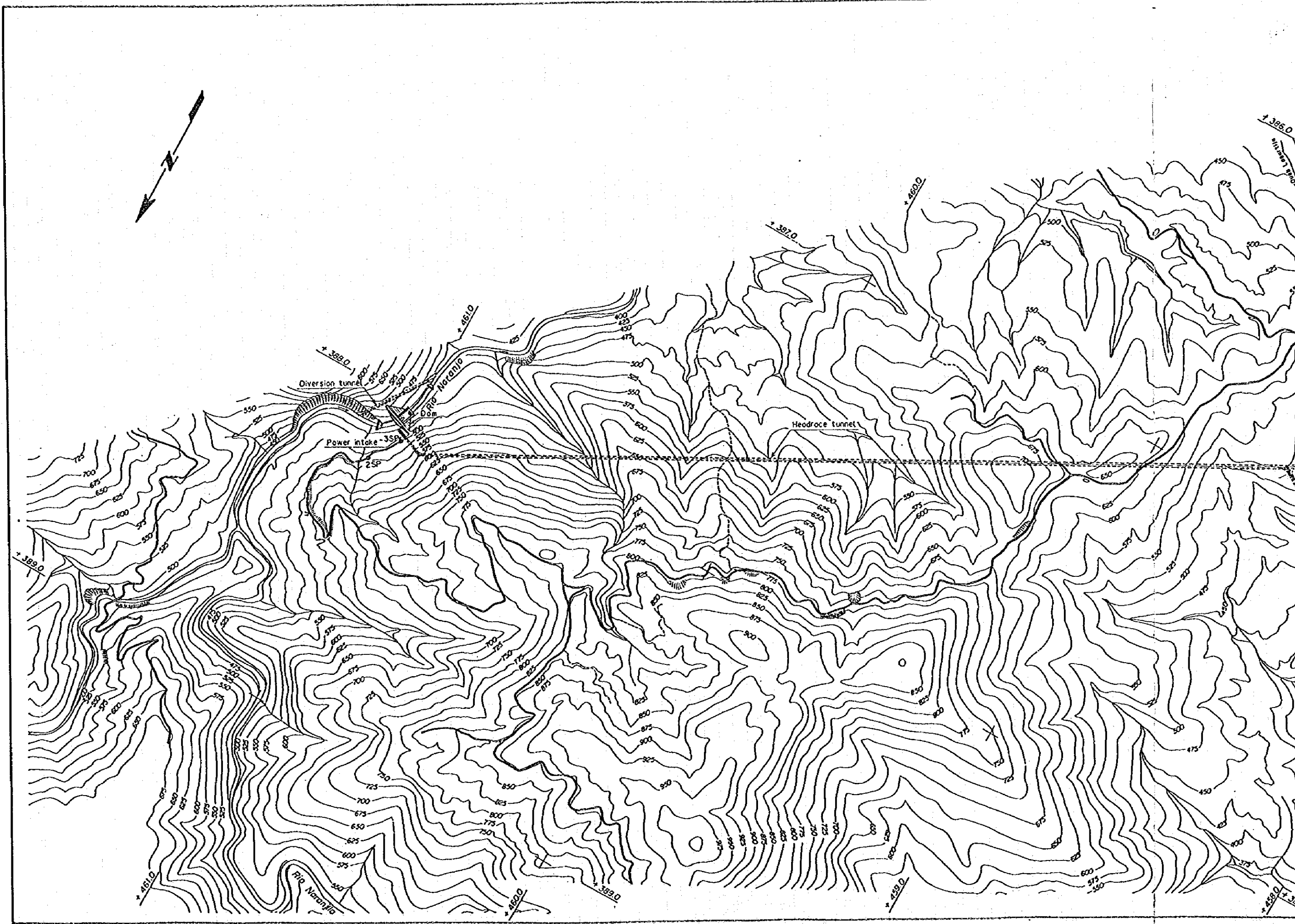


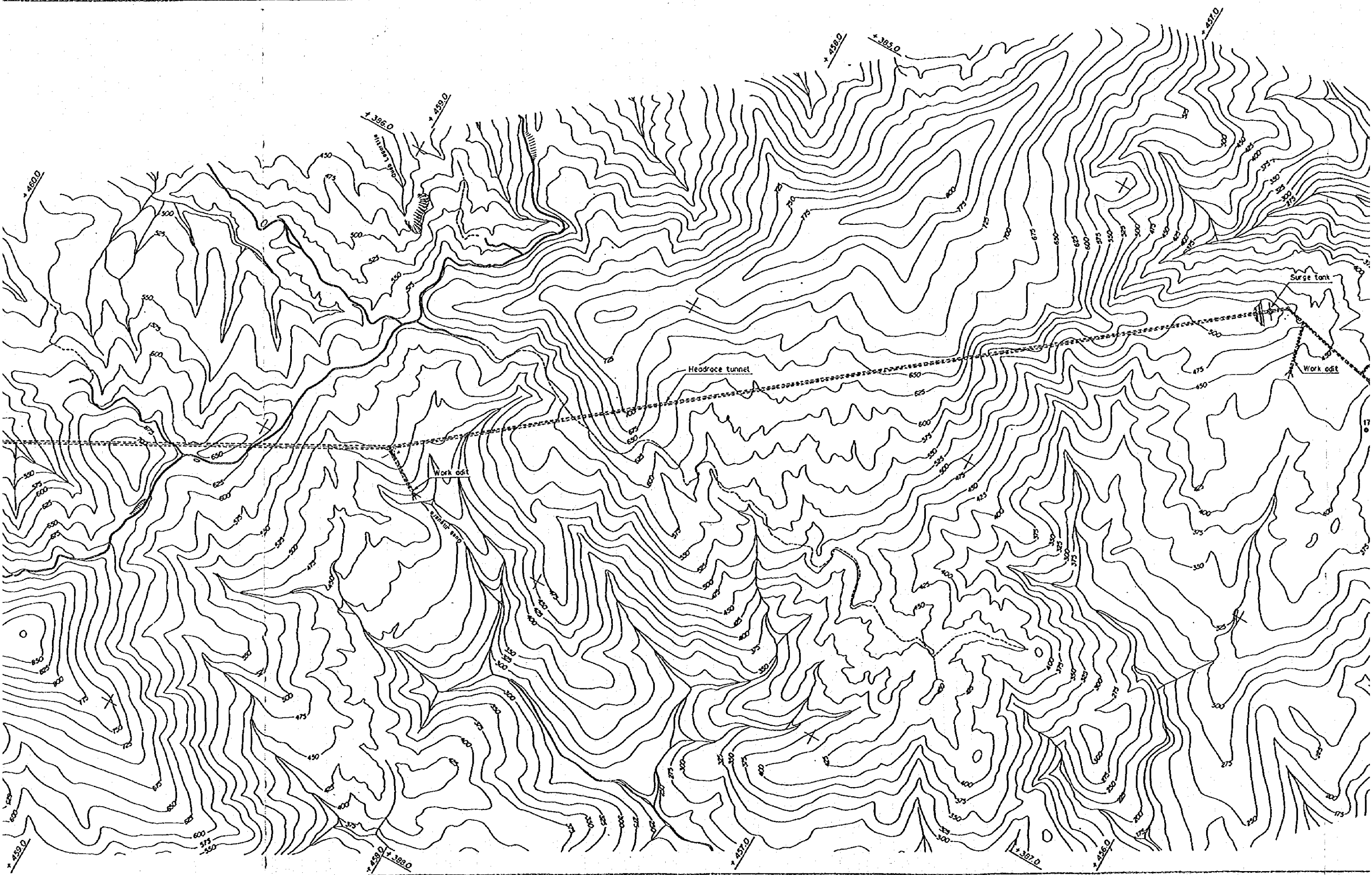
REPUBLIC OF COSTA RICA
 LOS LLANOS HYDROELECTRIC POWER
 DEVELOPMENT PROJECT

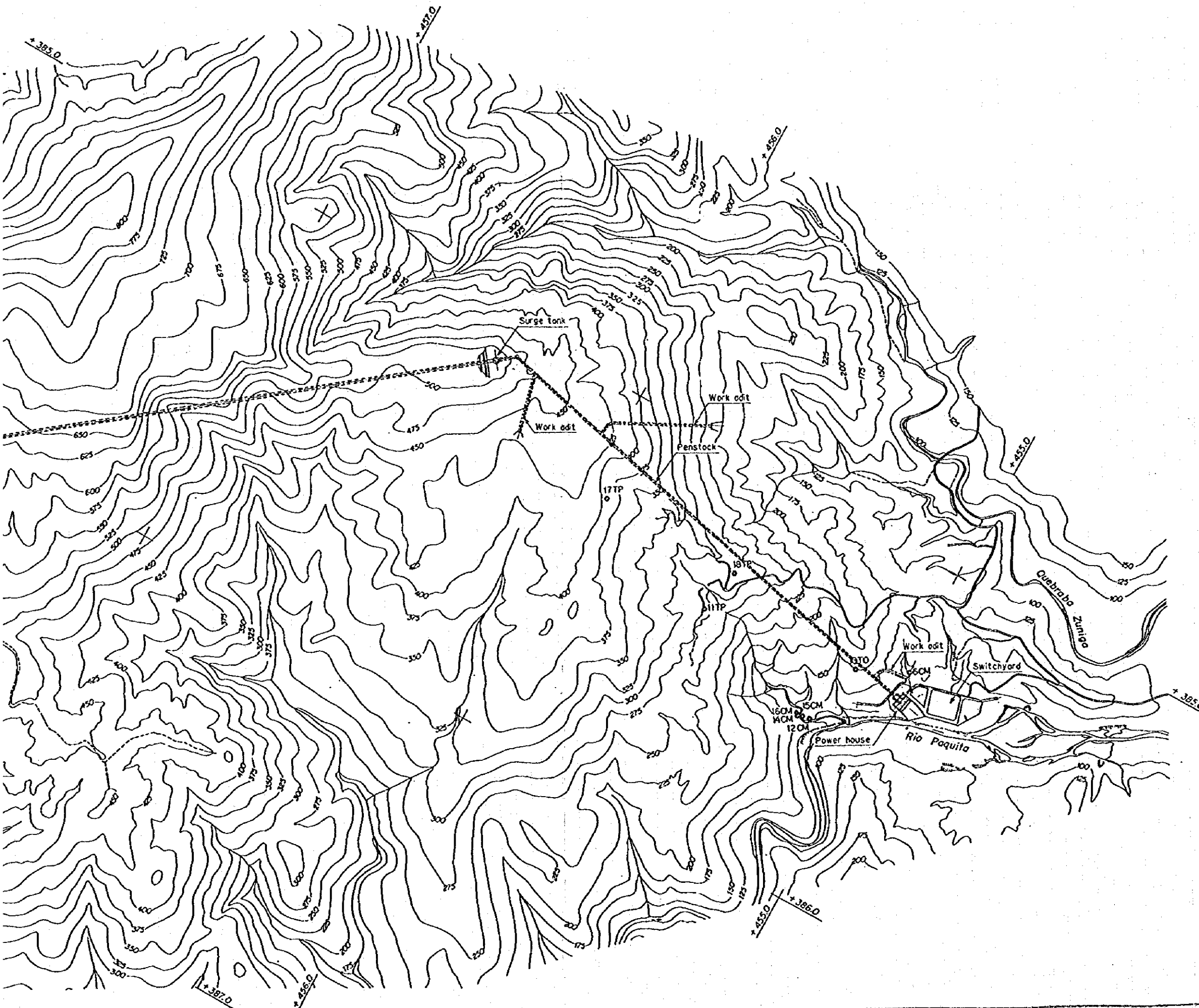
**Location Map of
 Riverbed Deposits Sites
 and Rock Quarry Sites**

Fig. 7-16

Date :

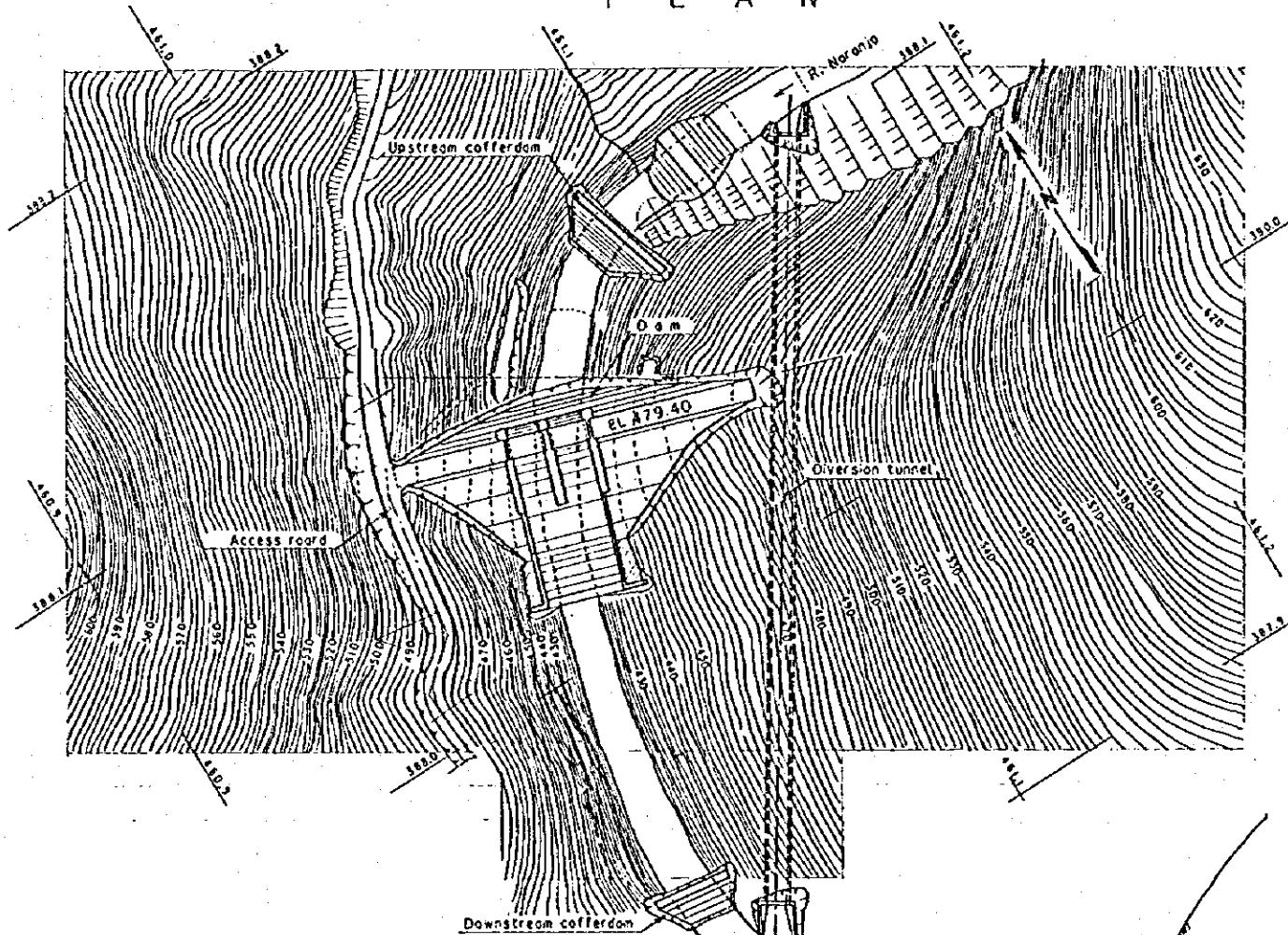




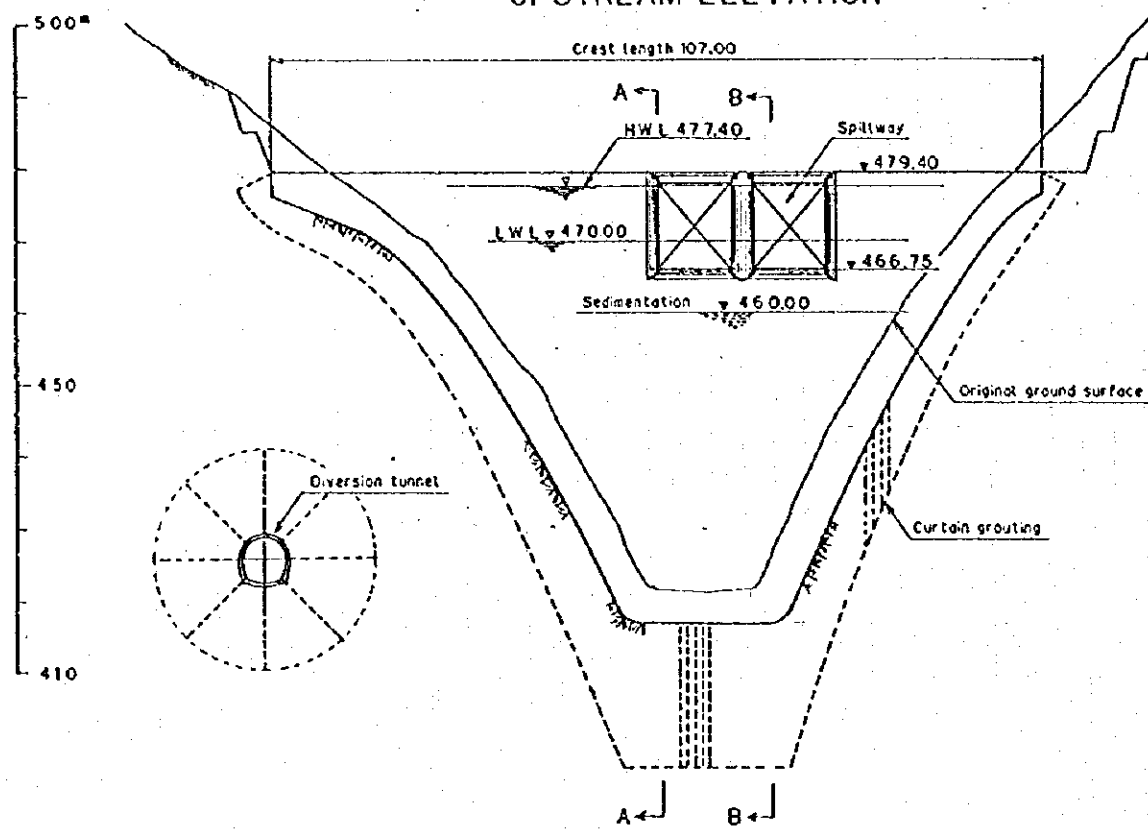


REPUBLIC OF COSTA RICA	
LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT	
GENERAL PLAN	
Fig. 9-13	Date:

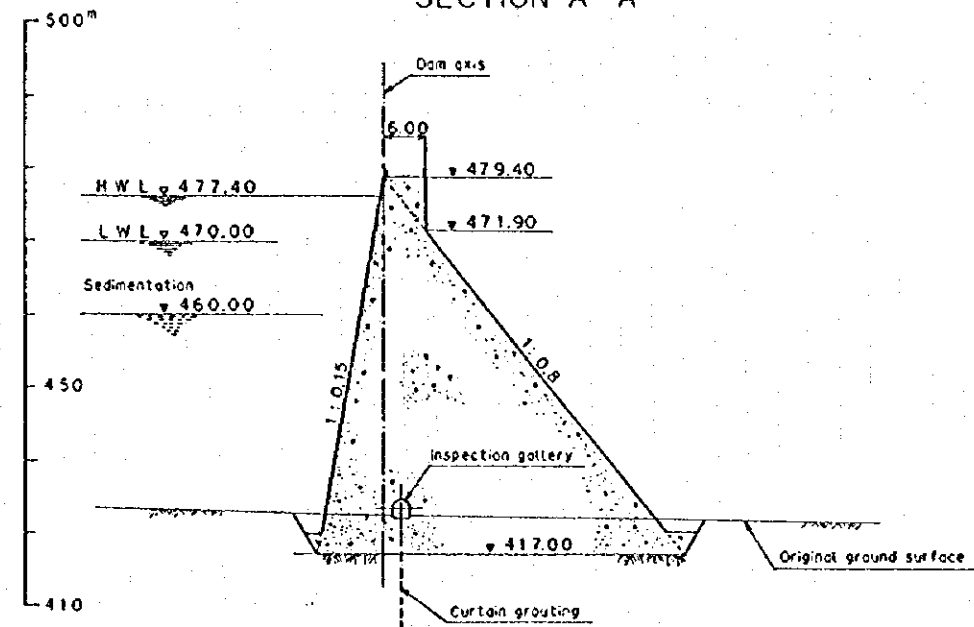
P L A N



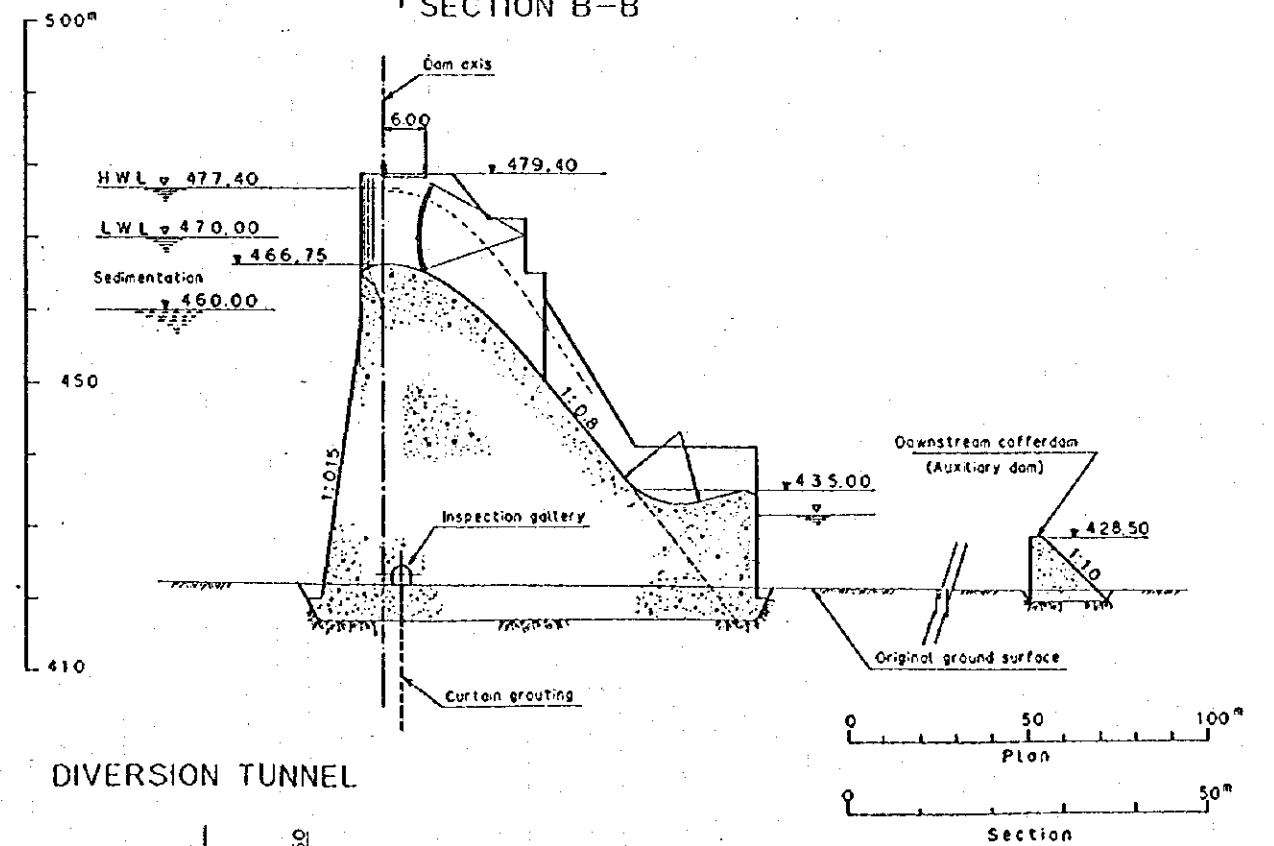
UPSTREAM ELEVATION



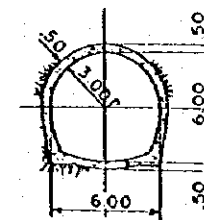
SECTION A--A



SECTION B--B



DIVERSION TUNNEL



REPUBLIC OF COSTA RICA
LOS LLANOS HYDROELECTRIC
POWER DEVELOPMENT PROJECT

Los Llanos Dam
Plan and Sections

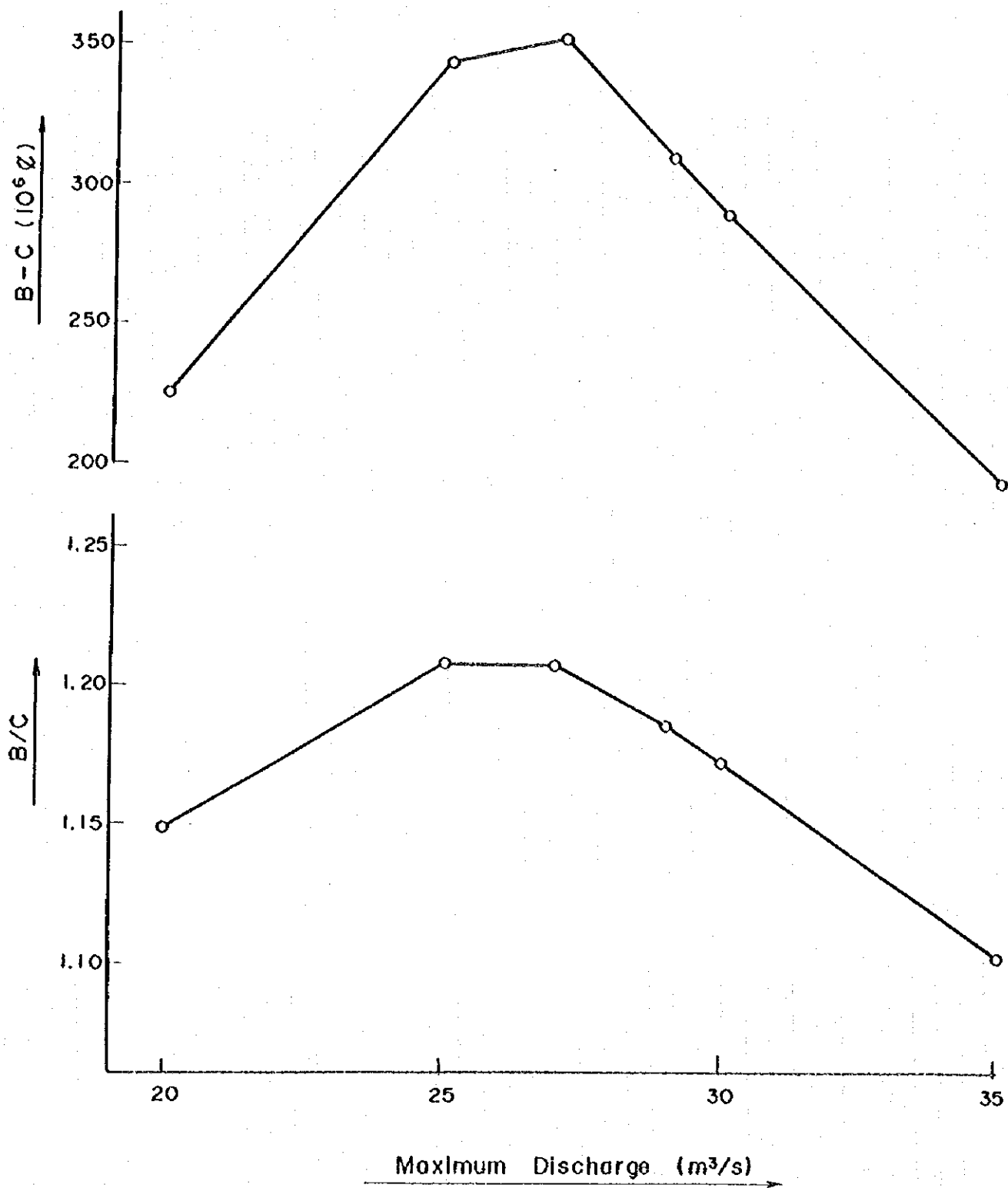


Fig. 9-15 Study on Maximum Discharge

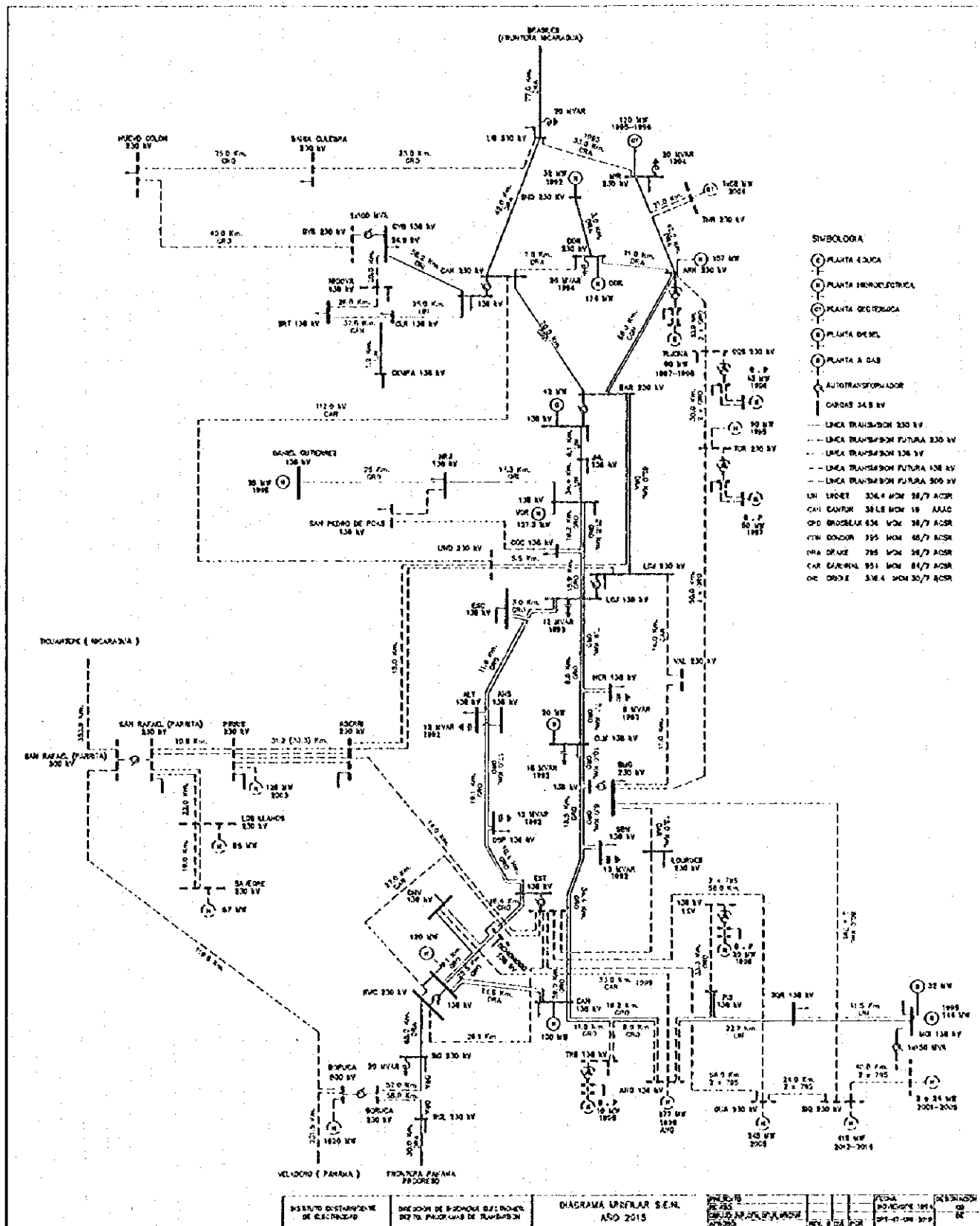
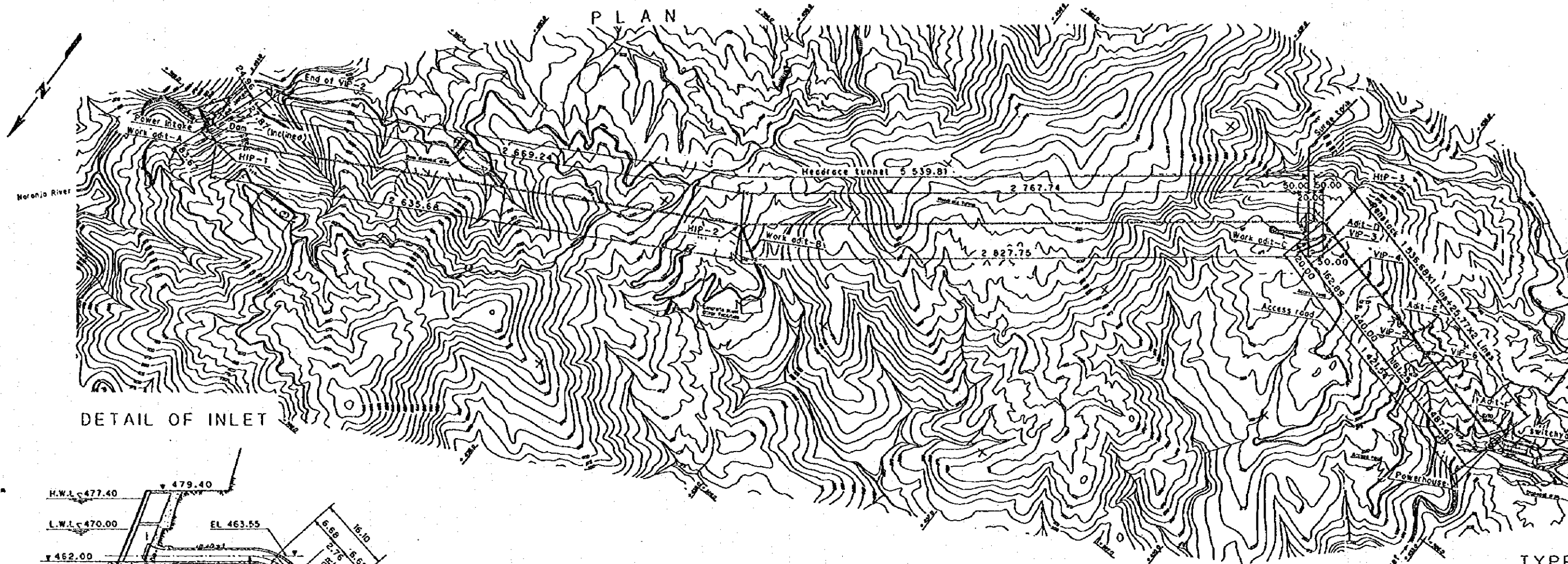
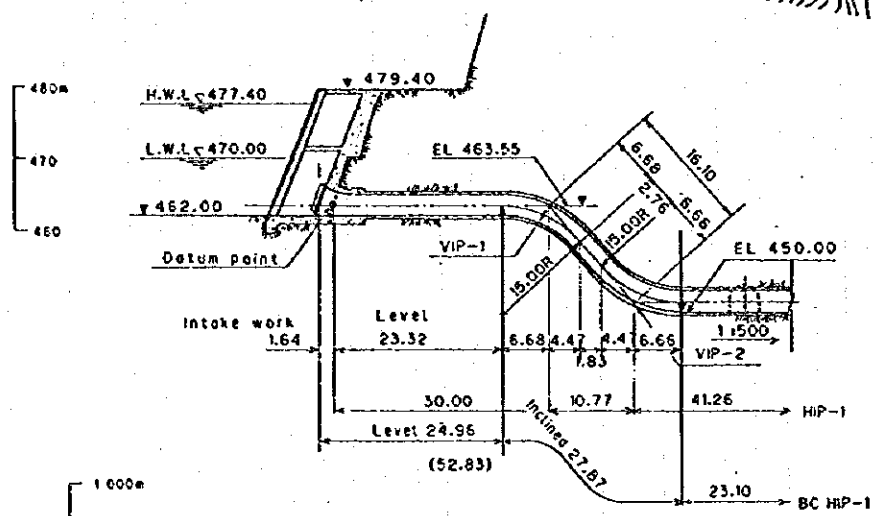


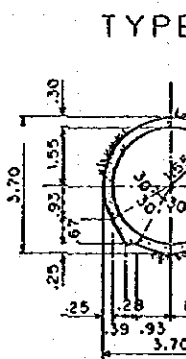
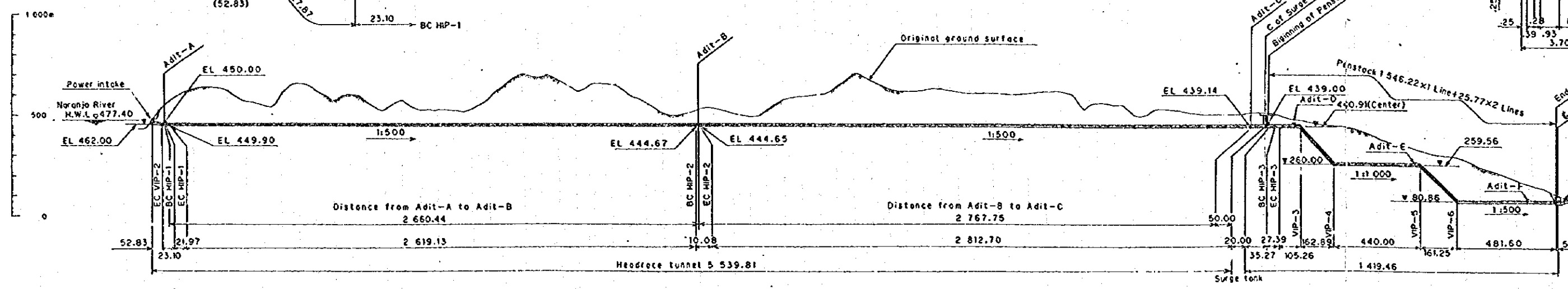
Fig. 10-1 Power Transmission System in Costa Rica



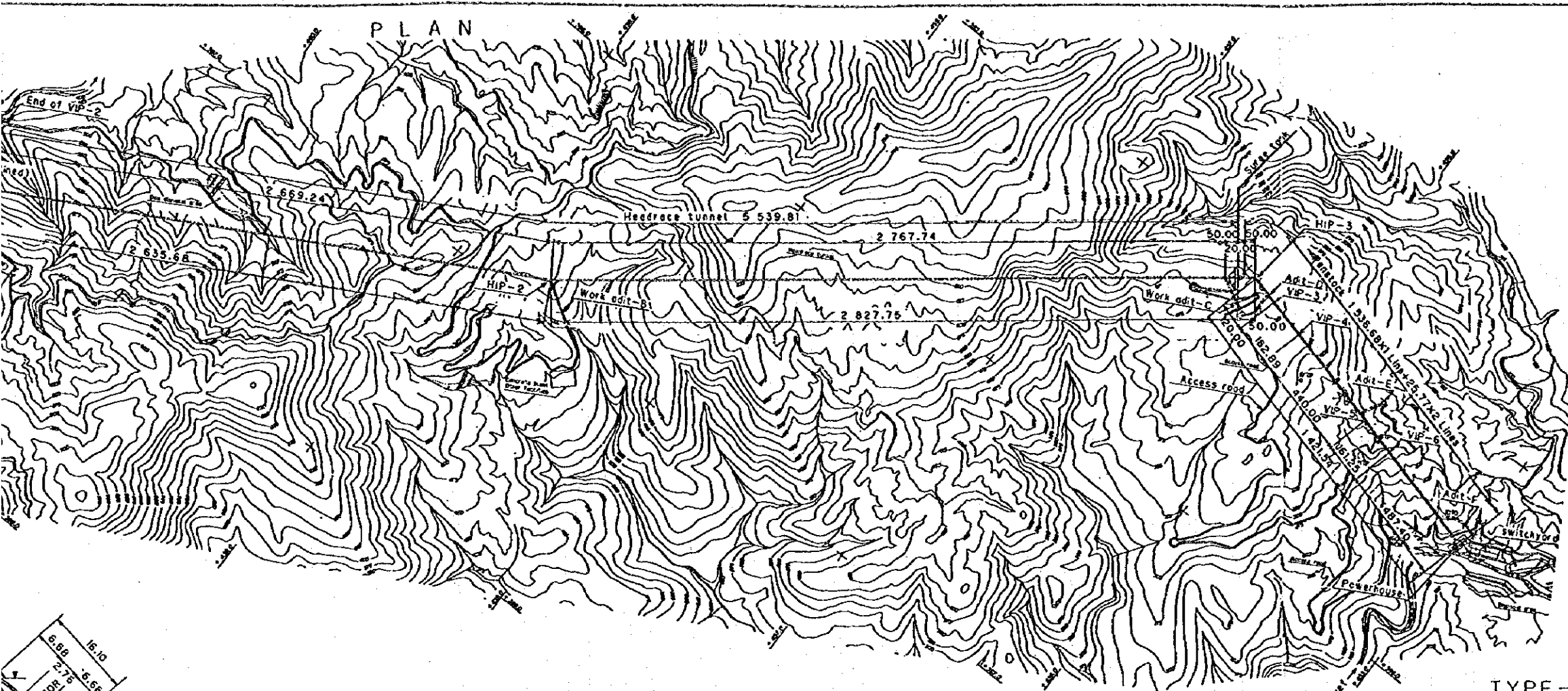
DETAIL OF INLET



PROFILE

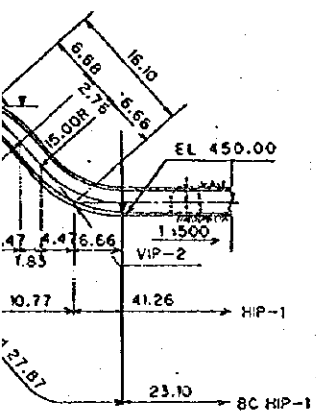


TYPE

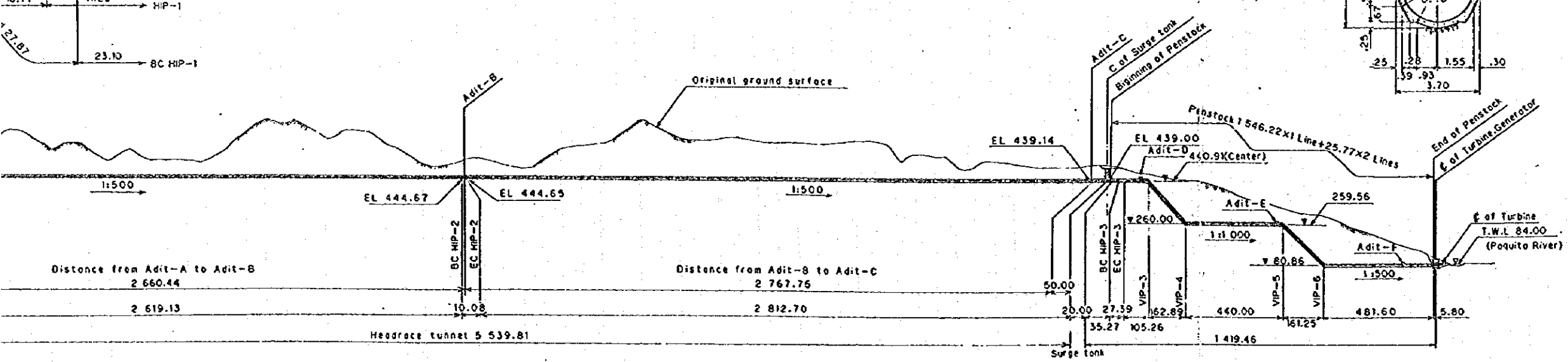


IP	Coordinate		Distance	Note
	X	Y		
Intake	-388 101.00	461 014.80		Datum point
HIP-1	388 120.00	460 935.00	82.03	
HIP-2	386 860.00	458 620.00	2 635.68	
Surge tank	385 112.09	456 397.17	2 627.75	C of S.T
HIP-3	385 075.00	456 350.00	60.00	

IP	IA	R	TL	CL
VIP-1	48°00'00"	15.00	6.68	12.57
VIP-2	47°53'07"	15.00	6.66	12.54
HIP-1	41°57'03"	30.00	11.50	21.97
HIP-2	9°37'16"	60.00	5.05	10.08
HIP-3	52°19'01"	30.00	14.74	27.39



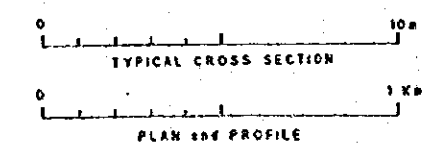
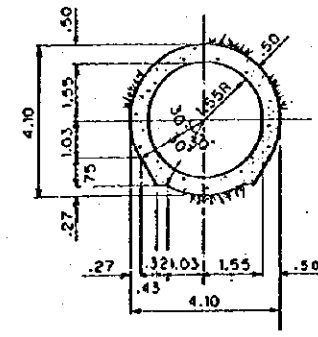
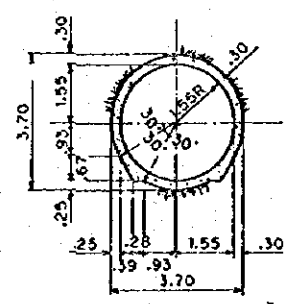
PROFILE



TYPICAL CROSS SECTION OF HEADRACE TUNNEL

TYPE-I

TYPE-II



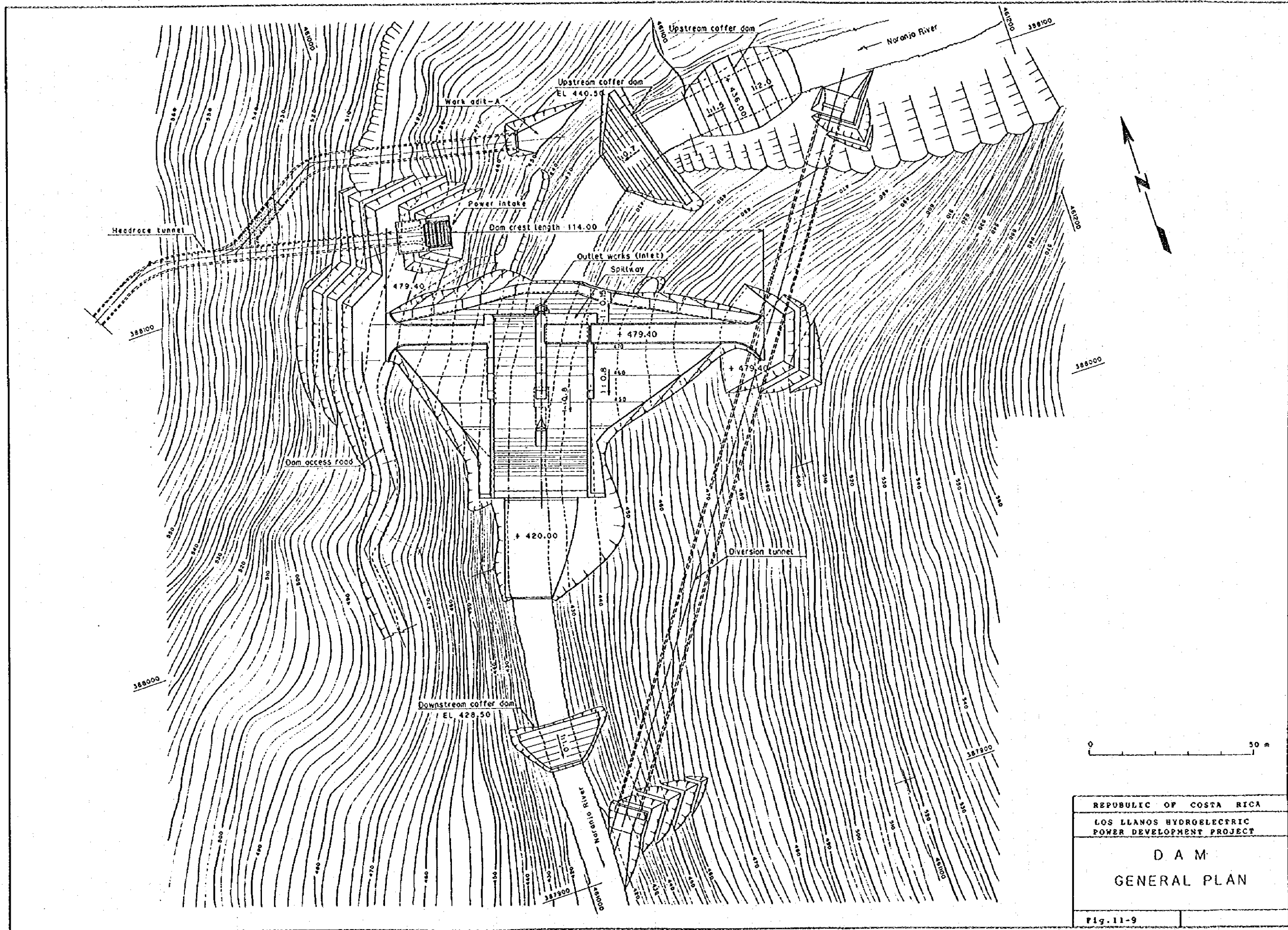
REPUBLIC OF COSTA RICA

LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT

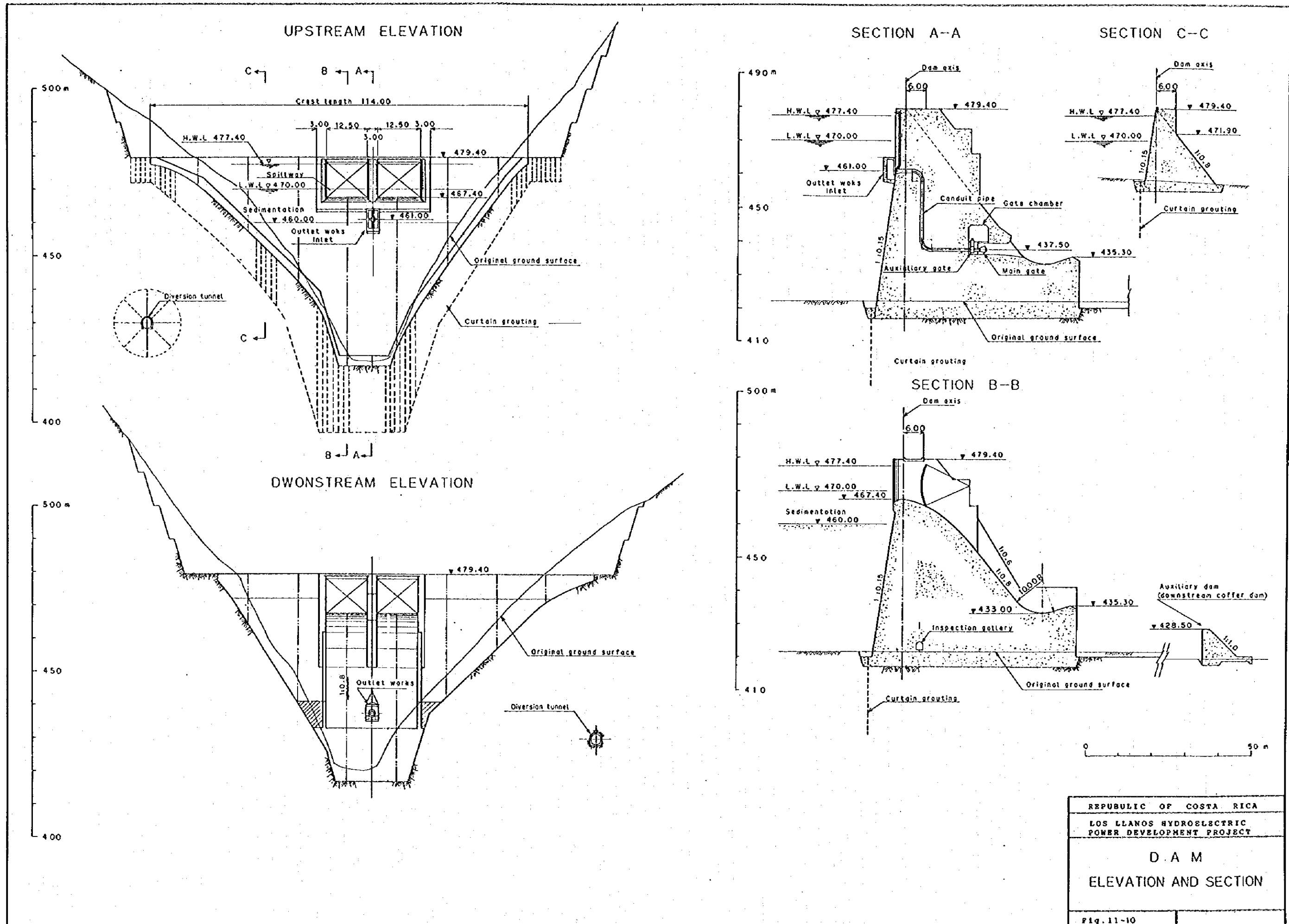
GENERAL PLAN

PROFILE AND SECTION

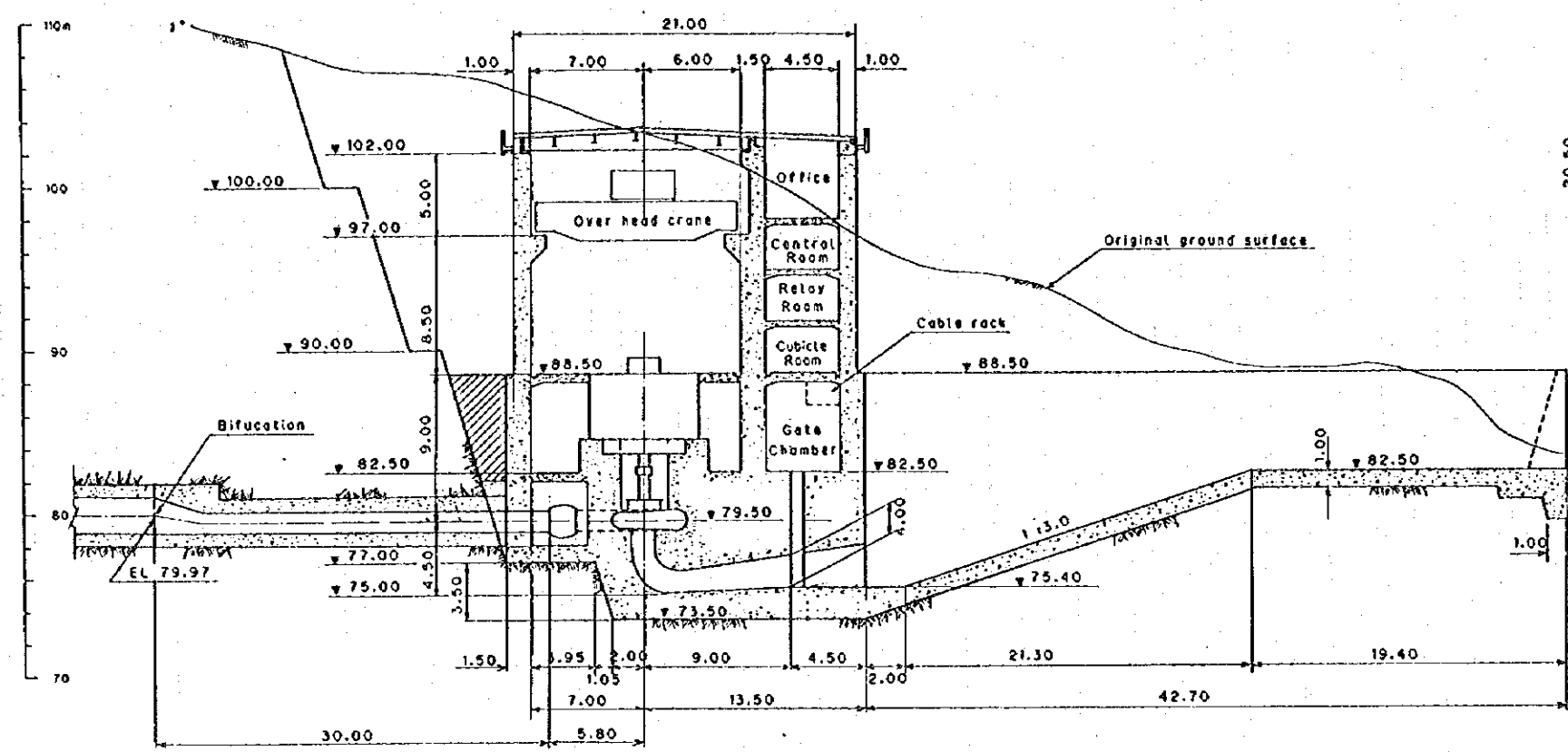
Fig. 11-7



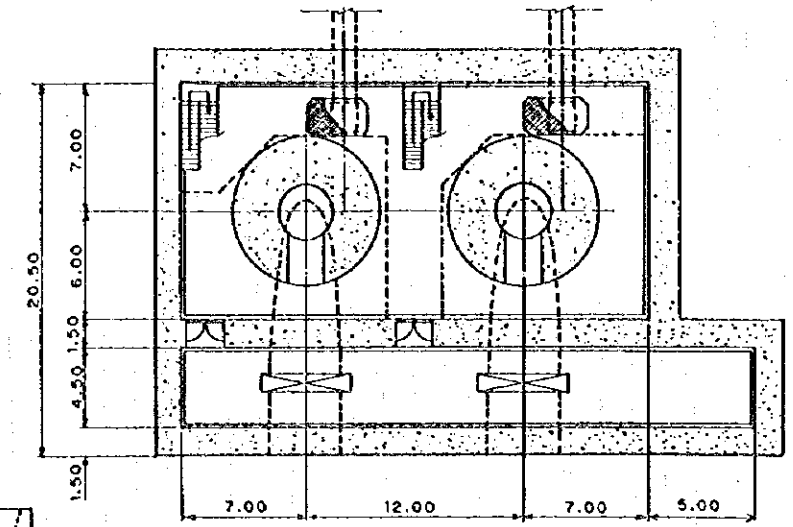
REPUBLIC OF COSTA RICA
LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT
D A M GENERAL PLAN
Fig. 11-9



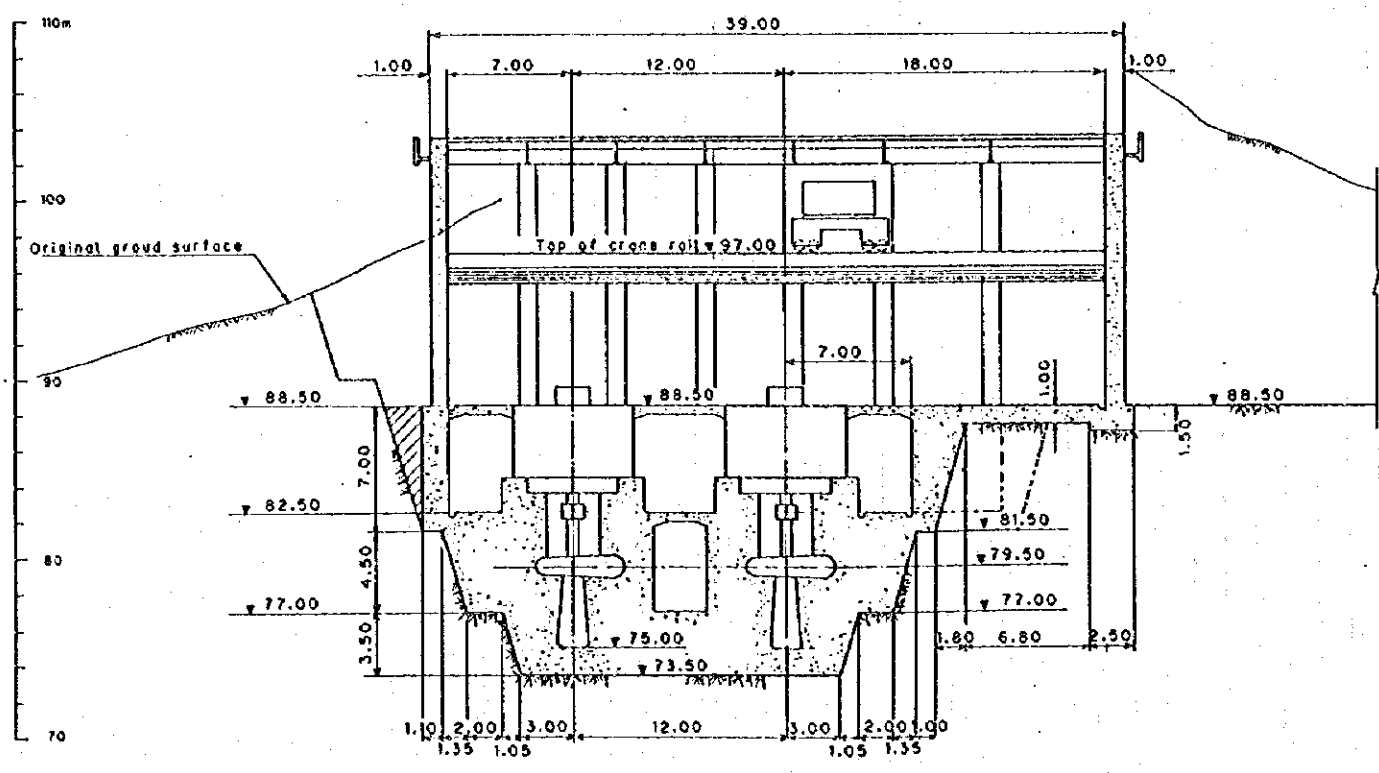
SECTION A-A



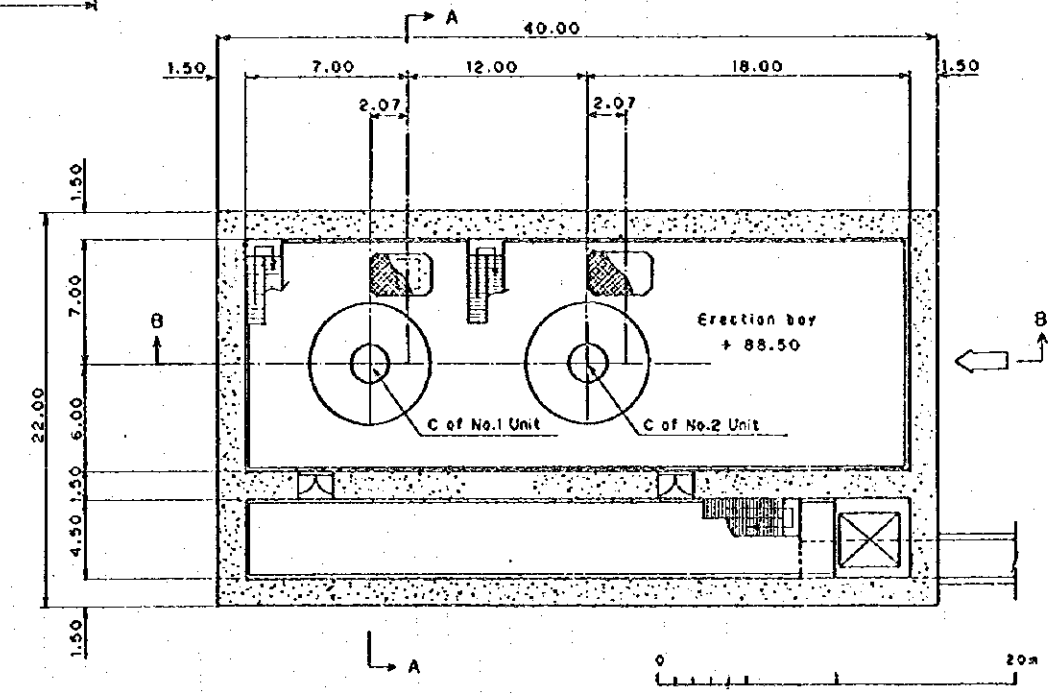
PLAN EL 82.50



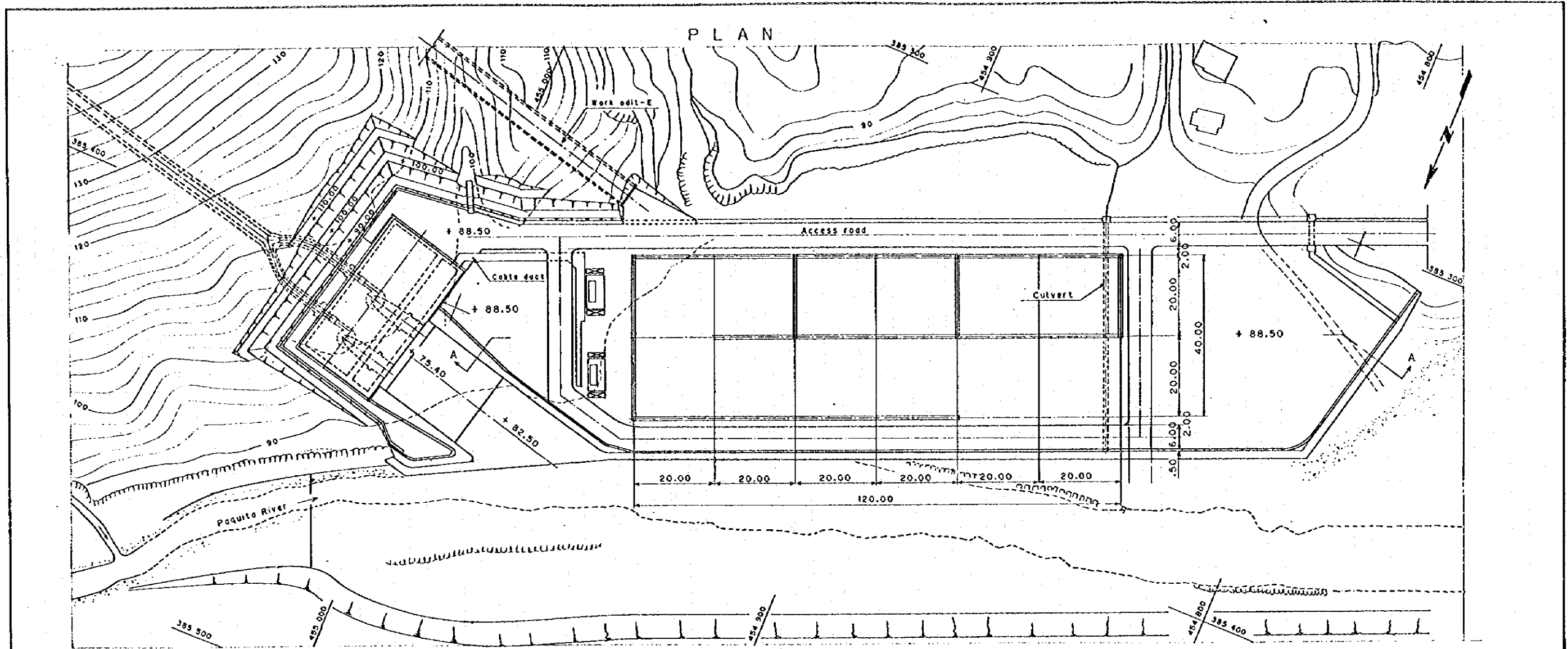
SECTION B-B



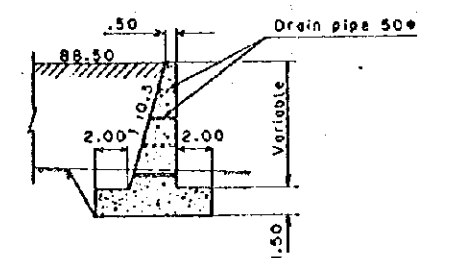
PLAN EL 88.50



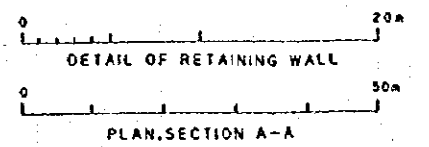
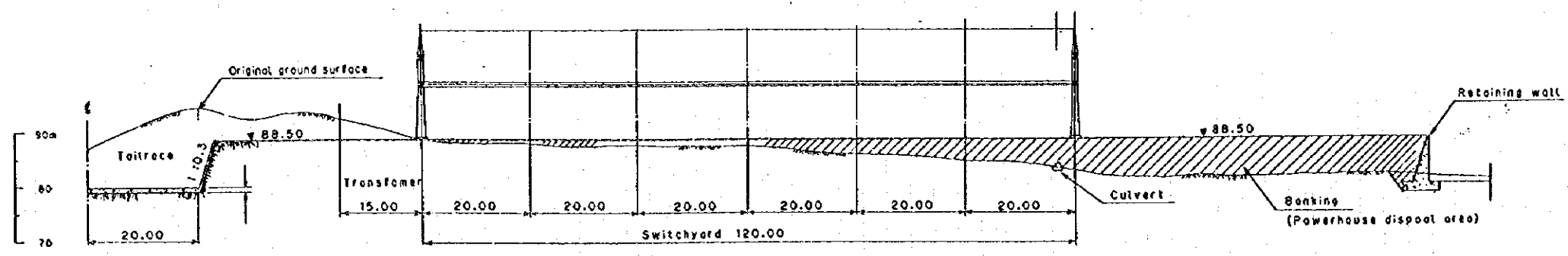
REPUBLIC OF COSTA RICA
 LOS LLANOS HYDROELECTRIC
 POWER DEVELOPMENT PROJECT
 POWER HOUSE
 PLAN AND SECTION
 Fig. 11-16



DETAIL OF RETAINING WALL



SECTION A-A



REPUBLIC OF COSTA RICA LOS LLANOS HYDROELECTRIC POWER DEVELOPMENT PROJECT
SWITCHYARD PLAN AND PROFILE
Fig. 11-17

Los Llanos Hydroelectric Power Development Project

Fig. 12-3 Construction Schedule

Item	Quantity	- 1 st					1 st					2 nd					3 rd					4 th					Remarks		
		2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2		4	6
Preparatory works and Camp Facilities																													
Road Construction	Dam 6.0 Km, Power plant 0.9 Km Headrace tunnel 7.2 Km																					Comencement of Construction							
Care of River	Diversion Tunnel Coffer-dam																					Diverting River							
Dam	D = 6.0 m, L = 225 m																					Ex. Conc.							
	Upstream h = 20.5 m, Conc. 3,430 m ³																												
	Downstream h = 11.5 m, Conc. 1,200 m ³																												
Dam	Excavation 58,030 m ³																												
	Height 62.4 m Crest length 114.0 m																					Concrete 89,200 m ³							
	Drilling & Grouting 3,100 m																												
Power Intake	Excavation 9,250 m ³ Concrete 1,000 m ³																												
Headrace Tunnel	D = 3.1 m L = 5,540 m (Maximum length 2,770 m)																					Adit							
Surge Tank	Shaft D = 8.0 m, h = 57.3 m Shaft Ex. 3,640 m ³ , Conc. 1,100 m ³																					Open Ex.							
Penstock	Horizontal tunnel ΣL=1,090 m																					Glory Ex. Shaft							
	Inclined tunnel ΣL= 508 m																					Conc. Shaft							
	After branch ΣL=26 m * 2																					Conc.							
Power-house & Switchyard	Excavation 69,500 m ³ Outdoor type Concrete 13,000 m ³																					Ex.							
Tailrace	Excavation 1,410 m ³ Concrete 2,210 m ³																					Conc. Architecture							
Hydraulic Equipment	Spillway Gate 10m * 12.5m * 2																												
	Outlet Gate & Coudit																												
	Intake Gate 4m * 4m * 1																												
	Draft Gate 2m * 4m * 2																												
	Penstock D=3.1 ~ 1.25 m, L=1,560 m																												
Electromechanical Equipment	No. 1 Unit																					Test							
	No. 2 Unit																					Test							
Switchyard																						Test							
Transmission Line																						Test							
Teleconunivation																						Test							
																						Land acquisition							
																						Comencement of Filling Reservoir							
																						Comencement of Power Operation							

Table 4-1 Installed Generating Capacity

As of end of 1994

	Plant Name	Type	No. of Machine	Capacity (MW)		Generation Engery (MWh)		Commission Year
				Installed	Dependable Available	Average	Firm	
ICE	La Garita	F	2	30	20	162	162	1958
	Rio Macho	P	5	120	90	501	396	1963
	Cachi	F	3	100	90	596	565	1966
	Arenal	F	3	156	156	601	601	1979
	Corobici	F	3	174	174	672	672	1982
	Ventanas Garita	F	2	100	70	434	361	1987
	Sandillal	K	2	32	32	124	124	1993
	Plantas Menores	-	6	74	37	261	180	--
	Generacion Privada	-	-	12	6	68	20	--
		Sub Total			798	675	3,419	3,081
Thermal	Colima	D	6	19.5	14.0	136.6	136.6	1956
	San Antonio	V-G	4	48.1	40.0	170.1	170.1	1954
	Barranca	Gas	2	41.6	30.0	109.3	109.3	1974
	Moin	D Gas	7	140.3	125.0	508.0	508.0	1977
	Pto. Jimenez	D	4	1.3	1.2	9.1	9.1	--
	Miravalles	Ge.	1	55	52.3	433.6	433.6	1994
		Sub Total			305.5	262.5	1,366.7	1,366.7
Another Company	ESPH	-	5	2.3	1.2	--	7.3	--
	JASEC	-	4	22.7	11.3	--	69.3	--
	CNFL	-	19	37.5	18.7	--	114.7	--
	Mata Moros	-	7	3.3	1.6	--	9.8	--
		Sub Total			65.8	32.8		201.1
Co. Gene.	Varias	T	1	4	2		12.2	
	Varias	M	4	4.5	2.3		19.7	
		Sub Total			8.5	4.3		31.9
	Total			1,177.8	974.6		4,680.7	

- P : Pelton
- F : Francis
- D : Diesel
- V-G : Vapor Gas
- Gas : Gas Turbine
- D Gas : Diesel Gas
- Ge : Geo Thermal
- T : Thermal
- M :

Table 4-2 Major Transmission Lines in Operation

As of end of 1994

	Voltage	Location (From ~ To)	Length (km)	Conductor	
Existing	230 kV	Peñas Blancas (Frontera Nicaragua) ~ Liberia	77.0	DRA	
		Liberia ~ Canas	42.0	DRA	
		Sandillal ~ Corobici	3.0	DRA	
		Miravalles ~ Arenal	42.0	DRA	
		Arenal ~ Corobici	11.0	DRA	
		Corobici ~ Canas	7.0	DRA	
		Canas ~ Barranca	70.0	GRO	
		Arenal ~ Barranca (2 cct)	68.0	CON	
		Arenal ~ Ciudad Quesada	83.0	2 x GRO	
		Ciudad Quesada ~ Toro	30.0	2 x GRO	
		Toro ~ San Miguel	50.0	2 x GRO	
		Barranca ~ La Caja (2 cct)	62.0	DRA	
		Rio Macho ~ San Isidro	65.0	DRA	
		San Isidro ~ Rio Claro	110.0	DRA	
		Rio Claro ~ Progreso (Panama)	30.0	DRA	
		Total	880.0		
	Existing	138 kV	Guayabal ~ Canas	58.2	ORI
			Canas ~ Colorado	25.0	LIN
			Canas ~ Santa Rita	32.0	CAN
			Canas ~ Cempa	1.2	LIN
			Barranca ~ Ventanas Garita	34.4	LIN
			Ventanas Garita ~ Naranjo	17.3	ORI
			Naranjo ~ Daniel Guetierrez	25.0	GRO
			Ventanas Garita ~ El Coco	19.2	GRO
			El Coco ~ La Caja	15.9	GRO
			Ventana Garita ~ La Caja	21.8	GRO
			La Caja ~ Heredia	7.9	GRO
			Heredia ~ Colima	7.1	GRO
			La Caja ~ Colima	8.5	GRO
			Colima ~ San Miguel	10.0	GRO
			San Miguel ~ SBN	6.0	GRO
			SBN ~ Cachi	19.2	GRO
			Colima ~ El Este	8.5	GRO
La Caja ~ El Este			18.5	GRO	
El Este ~ Cachi			29.0	GRO	
La Caja ~ Escazu			3.0	GRO	
Escazu ~ Desamparados			17.0	GRO	
Desamparados ~ El Este			10.4	GRO	
La Caja ~ Alajuelita			11.6	GRO	
Alajuelita ~ El Este			19.1	GRO	
El Este ~ Concavas			16.4	GRO	
Concavas ~ Rio Macho			9.1	GRO	
El Este ~ Rio Macho			25.5	GRO	
Rio Macho ~ Cachi (2 cct)			14.6	DRA	
Cachi ~ PIS	19.2	GRO			
Leesville ~ PIS	33.0	GRO			
PIS ~ Siquirres	20.0	GRO			
Siquirres ~ Moin (2 cct)	41.5	LIN			
Cachi ~ Siquirres	42.7	GRO			
	Total	703.9			

Table 5-1 Basic Data for Demand Forecast

(At the price levels and exchange rate of 1980)

Year	GDP US\$		Energy (Generation)		Population		GDP/Capita		Energy/Capita	
	(Million)	Rate (%)	(GWh)	Rate (%)	(Thousand)	Rate (%)	(US\$)	Rate (%)	(kWh)	Rate (%)
1980	4,482	0.81	2,144	12.25	2,296	3.02	1,952	-2.16	934	8.98
1981	4,380	-2.28	2,291	6.86	2,365	3.04	1,852	-5.12	969	3.75
1982	4,061	-7.28	2,292	0.04	2,437	3.04	1,666	-10.04	941	-2.89
1983	4,177	2.86	2,372	3.49	2,511	3.02	1,663	-0.12	945	0.43
1984	4,513	8.04	2,568	8.26	2,578	2.68	1,751	5.17	996	5.40
1985	4,545	0.71	2,708	5.45	2,646	2.61	1,718	-1.83	1,023	2.71
1986	4,796	5.53	2,968	9.60	2,713	2.53	1,768	2.91	1,094	6.94
1987	5,025	4.77	3,246	9.37	2,781	2.53	1,807	2.32	1,167	6.67
1988	5,198	3.44	3,324	2.40	2,851	2.55	1,823	2.71	1,166	-0.08
1989	5,492	5.66	3,493	5.08	2,941	3.13	1,867	0.00	1,188	1.89
1990	5,687	3.55	3,707	6.13	3,015	2.51	1,886	1.78	1,221	2.78
1991	5,816	2.27	3,827	3.24	3,086	2.35	1,885	2.96	1,240	1.56
1992	6,240	7.29	4,079	6.58	3,132	1.49	1,992	2.29	1,302	5.00
1993	6,615	6.01	4,382	7.43	3,199	2.14	2,068	2.84	1,370	5.22
1994	6,922	4.64	4,723	7.78	3,243	1.38	2,134	3.50	1,456	6.28

Table 5-2 Demand Forecast by ICE 1995 ~ 2015

Proyecciones de Demanda de Energia Eléctrica 1995-2015, Mayo, 1995

Year	High Case			Base Case (Middle Case)			Low Case			Population	
	Energy (GWh)	Power (MW)	L.f (%)	Energy (GWh)	Power (MW)	L.f (%)	Energy (GWh)	Power (MW)	L.f (%)	(Thousand)	Rate (%)
1995	5,089	925	62.8	5,046	917	62.8	5,020	912	62.8	3,651	2.2
1996	5,477	995	62.8	5,384	979	62.8	5,323	967	62.8	3,732	2.6
1997	5,883	1,069	62.8	5,729	1,041	62.8	5,627	1,024	62.8	3,829	2.3
1998	6,309	1,146	62.9	6,082	1,106	62.8	5,933	1,079	62.8	3,917	2.2
1999	6,707	1,216	63.0	6,439	1,171	62.8	6,239	1,135	62.8	4,005	2.4
2000	7,124	1,289	63.1	6,813	1,241	62.7	6,555	1,193	62.7	4,103	2.4
2001	7,561	1,368	63.1	7,201	1,311	62.7	6,890	1,254	62.7	4,202	2.6
2002	8,021	1,449	63.2	7,602	1,384	62.7	7,237	1,317	62.7	4,312	2.3
2003	8,497	1,532	63.3	8,017	1,459	62.7	7,600	1,382	62.8	4,412	2.0
2004	8,990	1,620	63.4	8,449	1,537	62.8	7,978	1,453	62.7	4,502	1.2
2005	9,504	1,712	63.4	8,885	1,618	62.7	8,359	1,522	62.7	4,558	0.6
2006	10,023	1,803	63.4	9,320	1,699	62.6	8,735	1,592	62.7	4,587	0.6
2007	10,556	1,898	63.5	9,764	1,778	62.7	9,117	1,660	62.7	4,614	0.8
2008	11,107	1,995	63.6	10,220	1,862	62.7	9,507	1,732	62.7	4,652	1.5
2009	11,670	2,093	63.6	10,681	1,947	62.6	9,898	1,804	62.6	4,723	1.5
2010	12,251	2,195	63.7	11,153	2,031	62.7	10,295	1,875	62.7	4,794	1.5
2011	12,862	2,302	63.8	11,647	2,122	62.7	10,710	1,951	62.7	4,866	1.5
2012	13,505	2,418	63.8	12,165	2,217	62.6	11,142	2,031	62.6	4,939	1.5
2013	14,182	2,536	63.8	12,705	2,316	62.6	11,591	2,110	62.7	5,013	1.5
2014	14,895	2,660	63.9	13,272	2,417	62.7	12,060	2,197	62.7	5,088	1.5
2015	15,647	2,795	63.9	13,866	2,526	62.7	12,550	2,287	62.6	5,165	1.5

Table 5-3 Demand Forecast by Macro Method

(At the price levels and exchange rate of 1980)

Year	GDP/Capita		Energy/Capita		Population		GDP (USA)		Energy Demand		Power (MW)
	(US\$)	Rate (%)	(KWh)	Rate (%)	(Thousand)	Rate (%)	(Million)	Rate (%)	(GWh)	Rate (%)	
1995	2,206	3.47	1,486	4.13	3,304	1.88	7,289	5.42	4,910	6.09	934
1996	2,282	3.44	1,547	4.10	3,378	2.22	7,709	5.76	5,226	6.43	994
1997	2,360	3.41	1,610	4.07	3,466	2.60	8,180	6.11	5,580	6.77	1,062
1998	2,439	3.38	1,673	3.91	3,545	2.29	8,646	5.70	5,931	6.29	1,128
1999	2,521	3.34	1,738	3.88	3,624	2.24	9,136	5.67	6,298	6.19	1,198
2000	2,604	3.30	1,804	3.80	3,713	2.45	9,669	5.83	6,698	6.35	1,274
2001	2,689	3.26	1,872	3.77	3,803	2.41	10,226	5.76	7,119	6.29	1,354
2002	2,776	3.22	1,942	3.74	3,902	2.61	10,832	5.93	7,578	6.45	1,442
2003	2,864	3.18	2,012	3.60	3,993	2.33	11,436	5.58	8,034	6.02	1,529
2004	2,954	3.14	2,083	3.53	4,075	2.05	12,038	5.26	8,488	5.65	1,615
2005	3,045	3.09	2,156	3.50	4,125	1.24	12,561	4.34	8,894	4.78	1,692
2006	3,138	3.04	2,230	3.43	4,151	0.63	13,026	3.70	9,257	4.08	1,761
2007	3,232	2.99	2,304	3.32	4,176	0.60	13,497	3.61	9,621	3.93	1,850
2008	3,327	2.94	2,379	3.26	4,210	0.81	14,007	3.78	10,016	4.11	1,906
2009	3,423	2.89	2,455	3.19	4,274	1.53	14,630	4.45	10,493	4.76	1,996
2010	3,520	2.84	2,532	3.14	4,339	1.50	15,273	4.40	10,986	4.70	2,090
2011	3,618	2.79	2,609	3.04	4,404	1.50	15,934	4.33	11,490	4.59	2,186
2012	3,717	2.74	2,687	2.99	4,470	1.50	16,615	4.27	12,011	4.53	2,285
2013	3,817	2.69	2,766	2.94	4,537	1.50	17,318	4.23	12,549	4.48	2,387
2014	3,918	2.63	2,845	2.86	4,605	1.50	18,042	4.18	13,101	4.40	2,493
2015	4,019	2.58	2,924	2.78	4,674	1.50	18,785	4.12	13,667	4.32	2,600

Table 5-4 Construction Schedule by ICE 1995 ~ 2015

Escenario de Demanda : Base (Abril 1995)
Escenario de Combustibles : Caso Base

Año	Energía (GWh)	Crecim. (%)	Pot. (MW)	Crecim. (%)	Proyectos de generación	Año	Mes
1994	4,723		858			1994	
1995	5,046	6.8	917	6.9	P.G. Boca del Pozo (5 MW)	1995	1
					P.H. Generación Privada (15 MW)		7
					P.H. Toro I (1° etapa, 12 MW)		9
					P.H. Daniel Gutiérrez (1° etapa, 14 MW)		11
1996	5,384	6.7	979	6.8	P.H. Toro I (2° etapa, 12 MW)	1996	1
					P.T. Gas (1 x 36 MW)		1
					P.H. Generación Privada (13 MW)		1
					P.H. Generación Privada (6 MW)		6
					P.H. Daniel Gutiérrez (2° etapa, 6 MW)		6
1997	5,729	6.4	1,041	6.3	P.H. Toro II (66 MW)	1997	1
					P.H. Generación Privada (30 MW)		1
					P.H. Generación Privada (20 MW)		1
1998	6,082	6.2	1,106	6.2	P.H. Generación Privada (27 MW)	1998	1
					P.E. Tejona (1 x 20 MW)		3
					P.G. Miravalles II (55 MW)		4
1999	6,439	5.9	1,171	5.9	P.G. Miravalles III (1 x 55 MW)	1999	1
					P.H. Angostura (177 MW)		6
2000	6,183	5.8	1,241	6.0	-----	2000	
2001	7,201	5.7	1,311	5.6	P.T. Ciclo Combinado (1 x 108 MW)	2001	1
2002	7,602	5.6	1,384	5.6	-----	2002	
2003	8,017	5.5	1,459	5.4	P.H. Pirrís (128 MW)	2003	1
2004	8,449	5.4	1,537	5.3	P.G. Tenorio (1 x 55 MW)	2004	1
					P.T. Gas (1 x 36 MW)		1
2005	8,885	5.2	1,618	5.3	P.H. Los Llanos (84 MW)	2005	1
2006	9,320	4.9	1,699	5.0	P.H. Ayil (127 MW)	2006	1
2007	6,764	4.8	1,778	4.6	P.H. Laguna Hule (66 MW)	2007	1
2008	10,220	4.7	1,862	4.7	P.H. Pacuare (156 MW)	2008	1
2009	10,681	4.5	1,947	4.6	P.T. Gas (1 x 36 MW)	2009	1
2010	11,153	4.4	2,031	4.3	P.T. Gas (2 x 36 MW)	2010	1
2011	11,647	4.4	2,122	4.5	P.H. Guayabo (234 MW)	2011	1
2012	12,165	4.6	2,217	4.5	P.H. Siquirres (1° etapa, 206 MW)	2012	1
2013	12,705	4.4	2,316	5.5	-----	2013	
2014	13,272	4.5	2,417	4.4	P.H. Siquirres (2° etapa, 206 MW)	2014	1
					P.T. Gas (3 x 36 MW)		1
2015	13,866	4.5	2,526	4.5	-----	2015	

- Período : 1995-2015
- Valor presente del plan de expansión : 1,447.32
(Milliones de dólares)
- Costo marginal de largo plazo (\$/MWh) : 58.59
- Nivel de precios : Diciembre 1994
- Año base : 1994
- Actualización a : Diciembre 1994
- Fecha : Agosto 1995

Table 5-8 Electric Power Development Schedule

Year	Plant Name					
	LOGOS		(HW)	by Demand Supply Program		(MW)
1995	Boca del pozo	P.G.	(5.0)	Boca del Pozo	P.G.	(5.0)
	Generación privada	P.H.	(15.0)	Generación privada	P.H.	(15.0)
	Toro (1°etapa)	P.H.	(12.0)	Toro (1°etapa)	P.H.	(12.0)
	Daniel Gutierrez (1°etapa)	P.H.	(14.0)	Daniel Gutierrez (1°etapa)	P.H.	(14.0)
1996	Toro I (2°etapa)	P.H.	(12.0)	Toro I (2°etapa)	P.H.	(12.0)
	Gas	P.T.	(36.0)	Gas	P.T.	(36.0)
	Generación Privada	P.H.	(13.0)	Generación Privada	P.H.	(13.0)
	Generación Privada	P.H.	(6.0)	Generación Privada	P.H.	(6.0)
	Daniel Gutierrez (2°etapa)	P.H.	(6.0)	Daniel Gutierrez (2°etapa)	P.H.	(6.0)
1997	Toro II	P.H.	(66.0)	Toro II	P.H.	(66.0)
	Generación Privada	P.H.	(30.0)	Generación Privada	P.H.	(30.0)
	Generación Privada	P.E.	(20.0)	Generación Privada	P.E.	(20.0)
1998	Generación Privada	P.H.	(27.0)	Generación Privada	P.H.	(27.0)
	Tejona	P.E.	(20.0)	Tejona	P.E.	(20.0)
	Miravalles	P.G.	(55.0)	Miravalles	P.G.	(55.0)
1999	Miravalles	P.G.	(55.0)	Miravalles	P.G.	(55.0)
	Angostura	P.H.	(177.0)	Angostura	P.H.	(177.0)
2000						
2001	Ciclo Combinado	P.T.	(108.0)	Ciclo Combinado	P.T.	(108.0)
2002						
2003	Pirris	P.T.	(128.0)	Pirris	P.H.	(128.0)
2004	Tenorio	P.G.	(55.0)	Tenorio	P.G.	(55.0)
	Gas	P.T.	(36.0)	Gas	P.T.	(36.0)
2005	Los Llanos	P.H.	(85.0)	Los Llanos	P.H.	(85.0)
2006	Ayil	P.H.	(127.0)	Ayil	P.H.	(127.0)
2007	Laguna Hule	P.H.	(66.0)	Laguna Hule	P.H.	(66.0)
				Motor baja	P.T.	(64.0)
2008	Pacuare	P.H.	(156.0)	Pacuare	P.H.	(156.0)
2009	Gas	P.T.	(36.9)	Gas	P.T.	(36.9)
2010	Gas	P.T.	(72.0)	Gas	P.T.	(72.0)
2011	Guayabo	P.H.	(234.0)	Guayabo	P.H.	(234.0)
2012	Siquirres (1°etapa)	P.H.	(206.0)	Siquirres (1°etapa)	P.H.	(206.0)
	Gas	P.H.	(108.0)	Gas	P.H.	(108.0)
2013						
2014	Siquirres (2°etapa)	P.H.	(206.0)	Siquirres (2°etapa)	P.H.	(206.0)
	Gas	P.T.	(108.0)	Gas	P.T.	(108.0)
2015						

Table 8-7 Maximum Accelerations for Six Return Periods**(Unit: gal)**

Attenuation Model	Return Period (Year)					
	50	100	200	500	1000	10000
(1) C. Oliveira	64.5	81.9	99.2	120.8	135.6	173.6
(2) R.K. McGuire	157.8	185.8	211.7	242.3	262.2	310.3
(3) Esteva & Rosenblueth	70.6	89.6	108.4	131.5	147.2	186.6
(4) T. Katayama	125.3	148.7	169.2	191.8	205.4	234.3

Table 14-5 FINANCIAL EVALUATION

(Unit: Thousand US dollars)

No.	YEAR	LOS LLANOS HYDRO PROJECT			(C)	(B)	(B) - (C)
		Construct. Cost	Transmssn Line Cost	O & M Cost	TOTAL COST	POWER SALES REVENUE	
-1	2000	14,000	0	0	14,000		-14,000
1	2001	27,788	1,055	0	28,843		-28,843
2	2002	37,040	2,456	0	39,496		-39,496
3	2003	42,559	1,176	0	43,735		-43,735
4	2004	10,681	588	0	11,269		-11,269
5	1 2005			1,190	1,190	22,863	21,672
6	2 2006			1,190	1,190	22,863	21,672
7	3 2007			1,190	1,190	22,863	21,672
8	4 2008			1,190	1,190	22,863	21,672
9	5 2009			1,190	1,190	22,863	21,672
10	6 2010			1,190	1,190	22,863	21,672
11	7 2011			1,190	1,190	22,863	21,672
12	8 2012			1,190	1,190	22,863	21,672
13	9 2013			1,190	1,190	22,863	21,672
14	10 2014			1,190	1,190	22,863	21,672
15	11 2015			1,190	1,190	22,863	21,672
16	12 2016			1,190	1,190	22,863	21,672
17	13 2017			1,190	1,190	22,863	21,672
18	14 2018			1,190	1,190	22,863	21,672
19	15 2019			1,190	1,190	22,863	21,672
20	16 2020			1,190	1,190	22,863	21,672
21	17 2021			1,190	1,190	22,863	21,672
22	18 2022			1,190	1,190	22,863	21,672
23	19 2023			1,190	1,190	22,863	21,672
24	20 2024			1,190	1,190	22,863	21,672
25	21 2025			1,190	1,190	22,863	21,672
26	22 2026			1,190	1,190	22,863	21,672
27	23 2027			1,190	1,190	22,863	21,672
28	24 2028			1,190	1,190	22,863	21,672
29	25 2029			1,190	1,190	22,863	21,672
30	26 2030			1,190	1,190	22,863	21,672
31	27 2031		1,055	1,190	2,246	22,863	20,617
32	28 2032		2,456	1,190	3,646	22,863	19,217
33	29 2033		1,176	1,190	2,366	22,863	20,497
34	30 2034		588	1,190	1,778	22,863	21,084
35	31 2035			1,190	1,190	22,863	21,672
36	32 2036	5,201		1,190	6,391	22,863	16,472
37	33 2037	8,669		1,190	9,860	22,863	13,003
38	34 2038	23,515		1,190	24,705	22,863	-1,843
39	35 2039	8,031		1,190	9,221	22,863	13,641
40	36 2040			1,190	1,190	22,863	21,672
41	37 2041			1,190	1,190	22,863	21,672
42	38 2042			1,190	1,190	22,863	21,672
43	39 2043			1,190	1,190	22,863	21,672
44	40 2044			1,190	1,190	22,863	21,672
45	41 2045			1,190	1,190	22,863	21,672
46	42 2046			1,190	1,190	22,863	21,672
47	43 2047			1,190	1,190	22,863	21,672
48	44 2048			1,190	1,190	22,863	21,672
49	45 2049			1,190	1,190	22,863	21,672
50	46 2050			1,190	1,190	22,863	21,672
51	47 2051			1,190	1,190	22,863	21,672
52	48 2052			1,190	1,190	22,863	21,672
53	49 2053			1,190	1,190	22,863	21,672
54	50 2054	-25,952	-1,053	1,190	-25,815	22,863	48,677
TOTAL		151,532	9,496	59,513	220,540	1,143,125	922,585
F.I.R.R.							12.4%

Table 15-1 Geologic/geotechnic Investigation Planning (1/4)

Site/Route	Investigation Methods	General Specifications	Remarks
1. Down-stream damsite	Detailed geologic mapping	<ul style="list-style-type: none"> ● To provide detailed engineering geologic maps to use detailed topographic maps. ● To cover the damsite and its vicinities 	Detailed topographic map: 1/1000 or more in scale.
	Core drilling and in-hole measurements/tests	<ul style="list-style-type: none"> ● Drillhole PHLL101SP (with all coring) <ul style="list-style-type: none"> - Location: Aprx. EL 490m on the left bank of the down-stream site. - Length: 50m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the full section. ● Drillhole PHLL102SP (with all coring) <ul style="list-style-type: none"> - Location: Aprx. EL 422m on the riverbed of the down-stream site. - Length: 30m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the full section. ● Drillhole PHLL103TA (with all coring) <ul style="list-style-type: none"> - Location: Aprx. EL 480m on the intake site of the down-stream damsite. - Length: 30m or more. - Water level measurements: During drilling at the full section. - Deformation tests: Two (2) points or more around the hole bottom. 	A unit length of Lugeon test: 5m or less.

Table 15-1 Geologic/geotechnic Investigation Planning (2/4)

Site/Route	Investigation Methods	General Specifications	Remarks
2. Headrace tunnel route	Detailed geologic mapping	<ul style="list-style-type: none"> - To provide detailed engineering geologic maps to use topographic maps in scale 1/5,000. - To cover the headrace tunnel route. - Special items to be made sure: To confirm aerophoto lineaments and regional joint patterns. 	
	Core drilling and in-hole measurements/tests	<ul style="list-style-type: none"> ● Drillhole PHL104LT (with all coring) <ul style="list-style-type: none"> - Location: Aprx. EL. 515m, a spot about 1500m down-stream side from the intake, on the bottom of a ravine. - Length: 80m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the full section. - Deformation tests: Two (2) points or more around the hole bottom. ● Drillhole PHL105LT (with all coring) <ul style="list-style-type: none"> - location: Aprx. EL 525m, a spot about 2500m down-stream side from the intake, on the bottom of a ravine. - Length: 90m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the full section. - Deformation tests: Two (2) points or more around the hole bottom. 	<p>A unit length of Lugeon test: 5m or less.</p>

Table 15-1 Geologic/geotechnic Investigation Planning (3/4)

Site/Route	Investigation Methods	General Specifications	Remarks
3. Penstock route and power station site	Detailed geologic mapping	<ul style="list-style-type: none"> • To provide detailed engineering geologic maps to use topographic maps 1/5,000 and/or 1/1,000 in scale. • To cover the surgetank site, penstock route and powerstation site and their vicinities. • Special items to be made sure; To confirm on aero photo lineament crossing the penstock route and the boundary of the conglomerate and marlstone around the powerstation site. 	
	Core drilling and in-hole measurements/tests	<ul style="list-style-type: none"> • Drillhole PHLL106TO (with all coring) - Location: Aprx. EL 510m, at the surge tank site. - Length: 70m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the lower 1/3 section. - Deformation tests: Two (2) points or more around the hole bottom. 	A unit length of Lugeon test: 5m or less
		<ul style="list-style-type: none"> • Drillhole PHLL107TP (with all coring) - Location: Aprx. EL 468m on the penstock route. - Length: 30m or more. - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the lower half section. - Deformation tests: Two (2) points or more around the hole bottom. 	

Table 15-1 Geologic/geotechnic Investigation Planning (4/4)

Site/Route	Investigation Methods	General Specifications	Remarks
3. Penstock route and power station site	(Core drilling and in-hole measurements/tests)	<ul style="list-style-type: none"> • Drillhole PHLL1081P (with all coring) - Location: Aprx. EL 304m on the penstock route. - Length: 50m or more - Water level measurements: During drilling at the full section. - Lugeon tests: Covering the lower half section. - Deformation tests: Two (2) points or more around the hole bottom. 	A unit length of Lugeon test: 5m or less.
4. Quarry site for concrete aggregates	Detailed geological mapping	<ul style="list-style-type: none"> • To provide detailed engineering geologic maps to use topographic maps 1/1,000 in scale. - To cover an area around the conjunction of Rio Naranjo and Rio Naranjillo, about 700m up-stream from the down-stream damsite. - Special items to be made sure: To confirm and trace "Layers of sandstone". 	
	Core drilling	<ul style="list-style-type: none"> • Two (2) drillholes with all coring. • Location: Each hole should be decided by the said geological mapping. • Length: 20m or more (each hole). 	
	Laboratory tests	<ul style="list-style-type: none"> • All necessary laboratory tests for concrete aggregates to use drilled cores. 	



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