

UNIVERSIDAD NACIONAL DE INGENIERIA
Facultad de Ingeniería Civil



**DISEÑO GEOMETRICO DE UN PROYECTO DE
CARRETERA USANDO EL PROGRAMA TOPO,
APLICADO EN EL TRAMO MATARANI - Ilo**

Tomo II

TESIS

**PARA OPTAR EL TITULO PROFESIONAL DE:
INGENIERO CIVIL**

PRESENTADO POR:

JOSE ARTURO LEYVA URPI

**LIMA - PERU
2001**

INDICE DE PLANOS

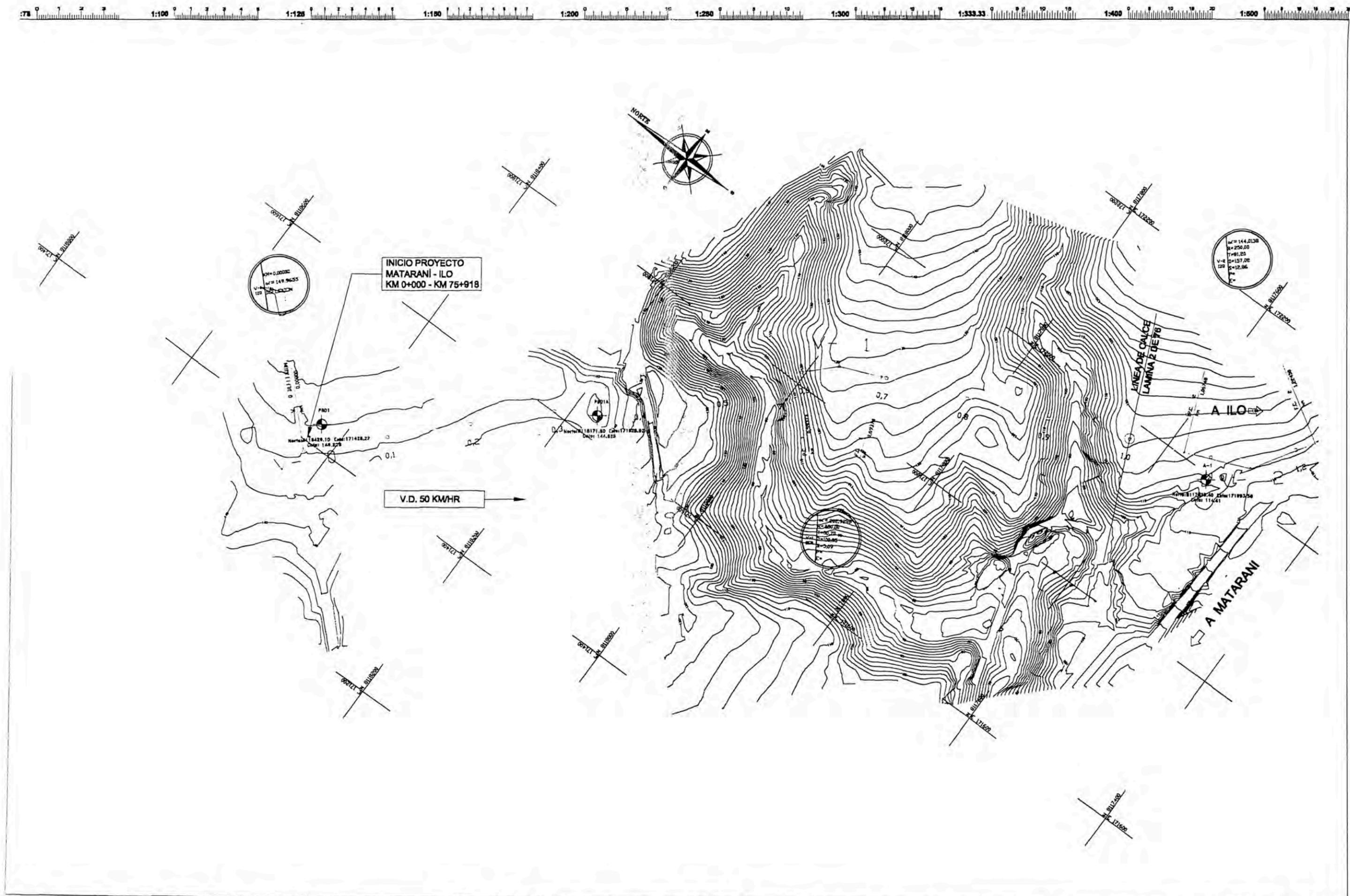
VARIANTE INICIO Planta y Perfil Longitudinal	Km 0+000 – Km 1+000
VARIANTE AGUA LIMA Planta y Perfil Longitudinal	Km 3+600 – Km 5+600
MATARANI-MOLLENDO Planta y Perfil Longitudinal	Km 0+000 – Km 9+000
Secciones Transversales	Km 0+000 – Km 9+000

VARIANTE INICIO

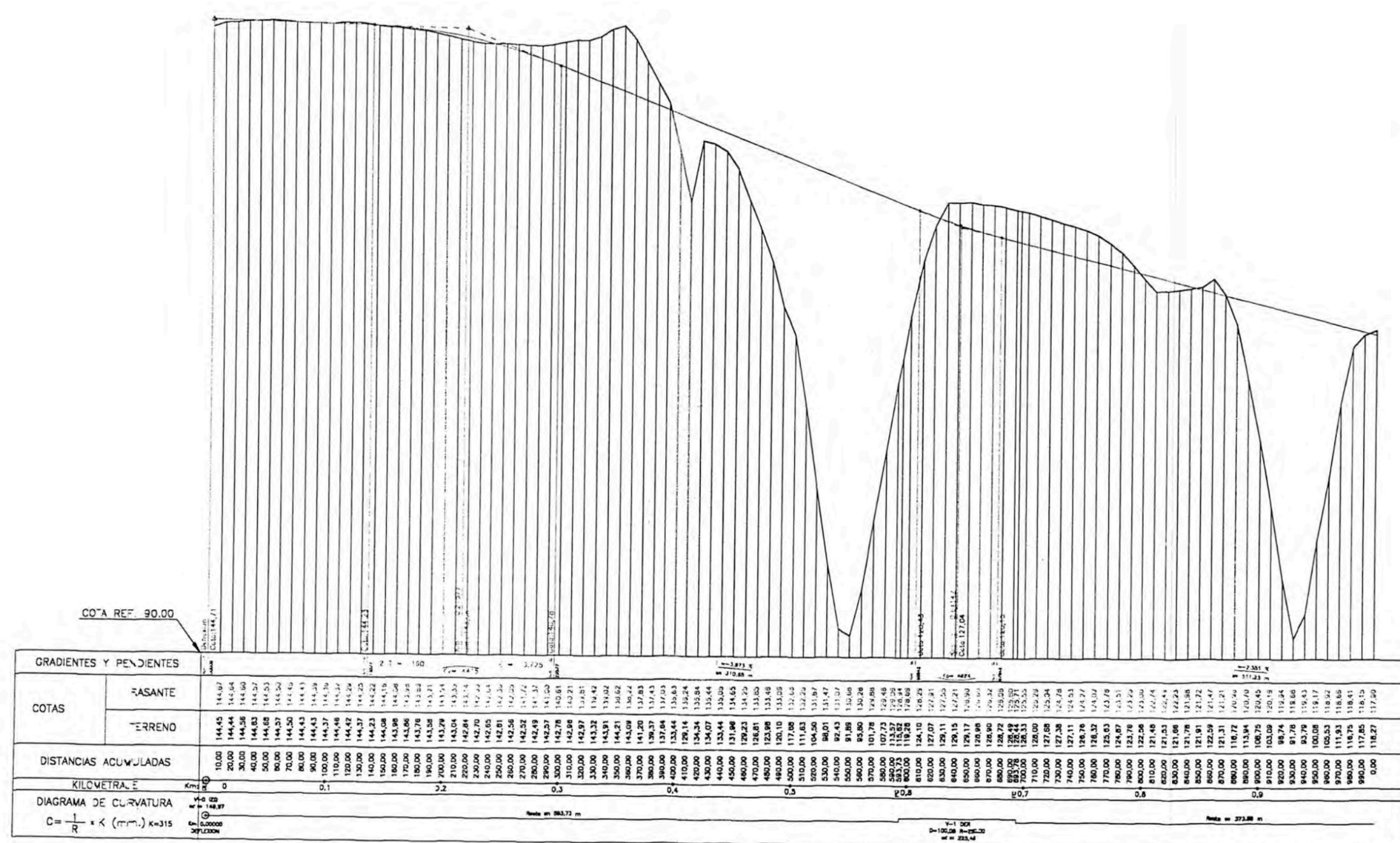
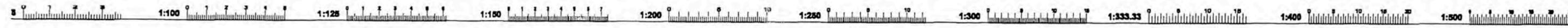


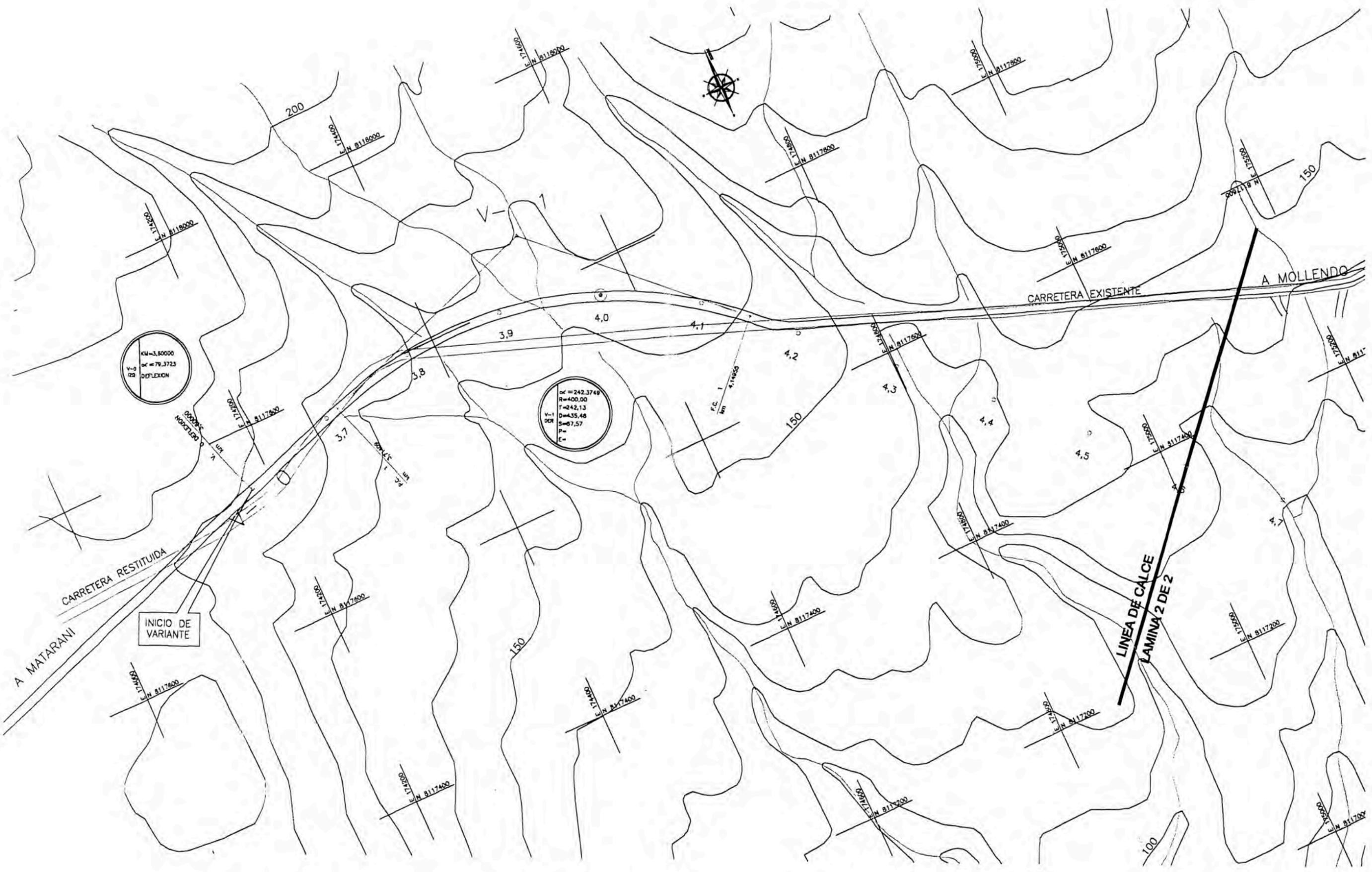
INICIO PROYECTO
MATARANI - ILO
KM 0+000 - KM 75+918

V.D. 50 KM/HR



REVISIONES		
N°	FECHA	DESCRIPCION





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 FACULTAD DE INGENIERIA CIVIL
 DEPARTAMENTO ACADEMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

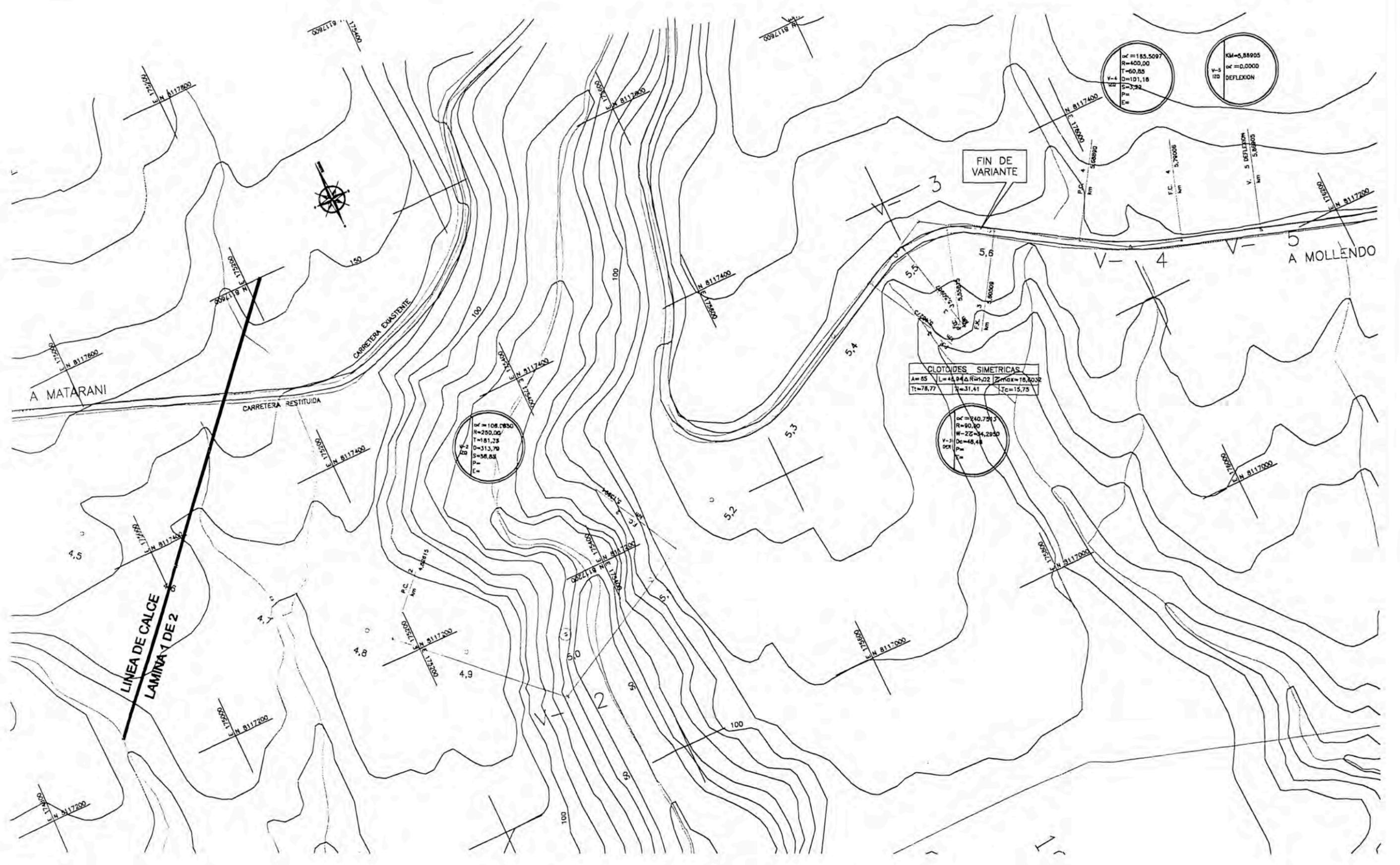
Diseñó: Bach. A. Laya U
 Dibujo: A.L.U.
 Verificó: Ing. G. Rosales B
 CIP 28841
 Presentó: Bach. A. Laya U

REVISIONES	
N°	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLENDO
 PLANO DE PLANTA
 KM 3+600 - KM 4+500

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PPV - 001



CLOTOS SIMETRICOS		
A=85	L=48.94	R=10.02
Tt=78.77	T=31.41	Tc=15.75

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Diseñó: Benh A Layon U
 Dibujó: ALJ
 Verificó: Pto. G. Braccini B
 Presentó: Benh A Layon U

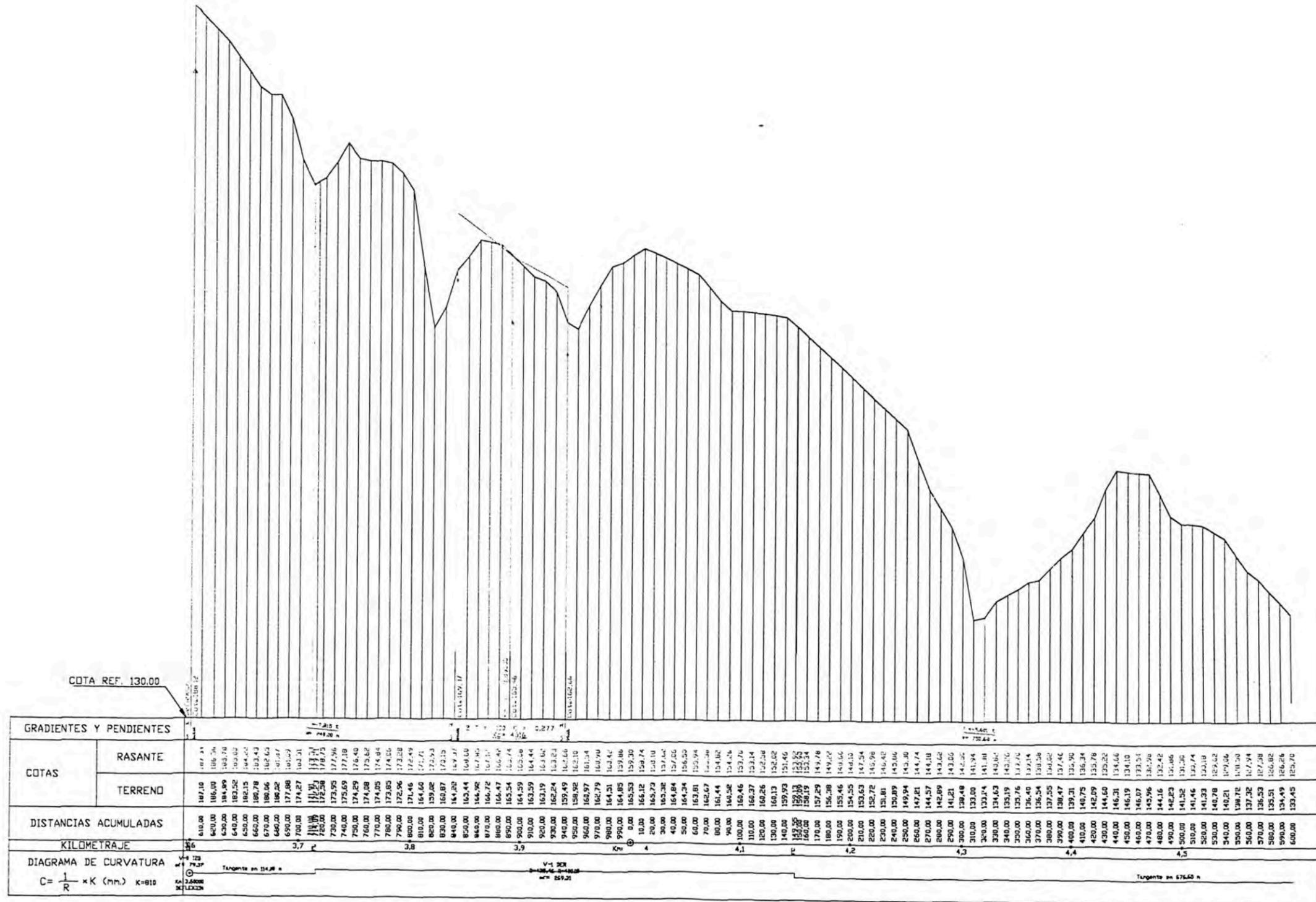
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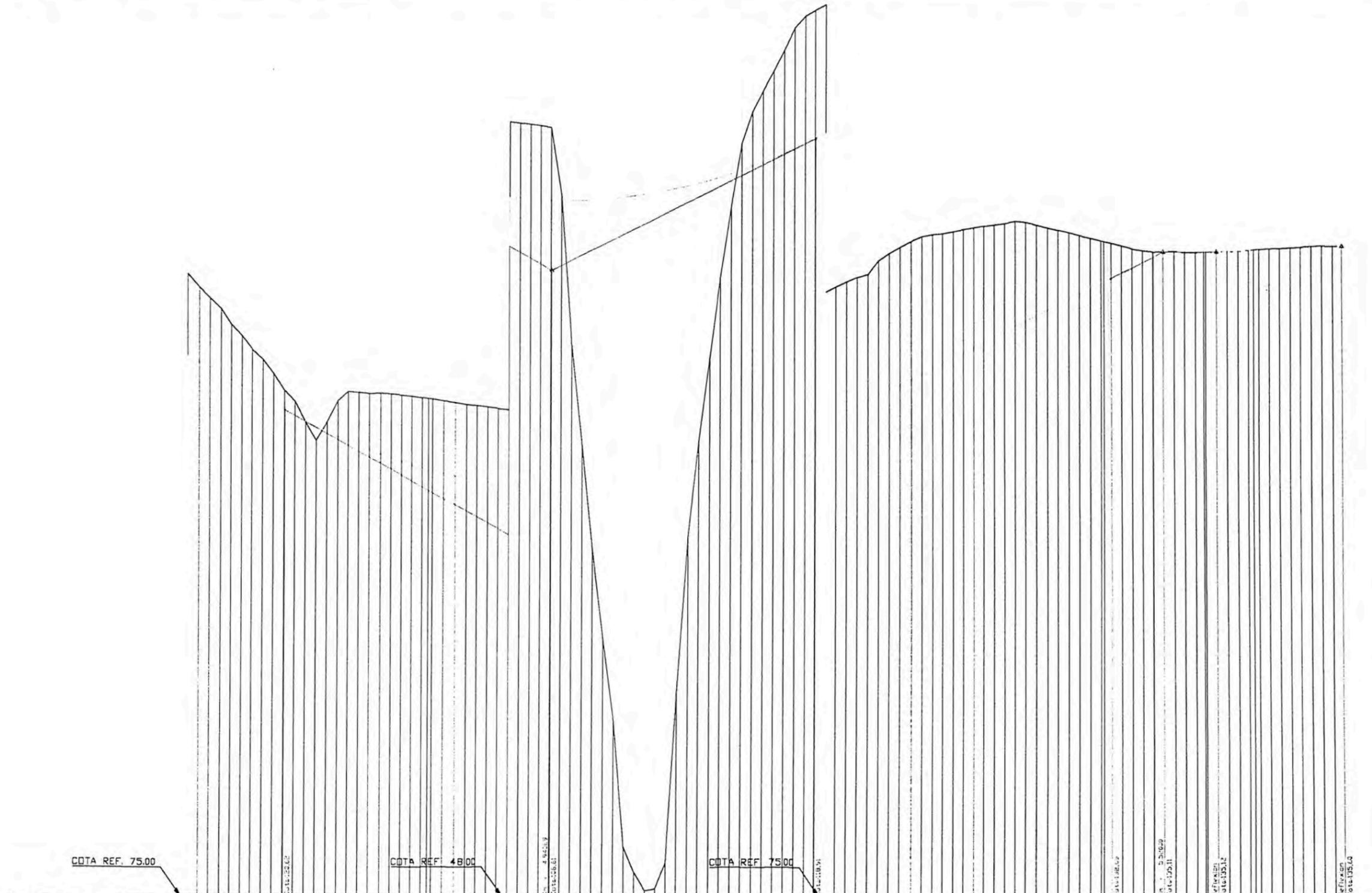
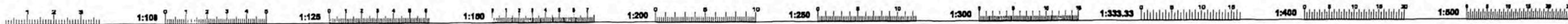
REVISIONES	
Nº	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLEDO
 PLANO DE PLANTA
 KM 4+600 - KM 5+600

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PPV - 002





GRADIENTES Y PENDIENTES		K = 4733		K = 5371	
COTAS	RASANTE	131.45	132.76	134.50	135.60
	TERRENO	131.45	132.76	134.50	135.60
DISTANCIAS ACUMULADAS		640.00	650.00	660.00	670.00
KILOMETRAJE		4.5	4.7	4.8	4.9
DIAGRAMA DE CURVATURA		$C = \frac{1}{R} \times K \text{ (mm.)} \quad K=810$			

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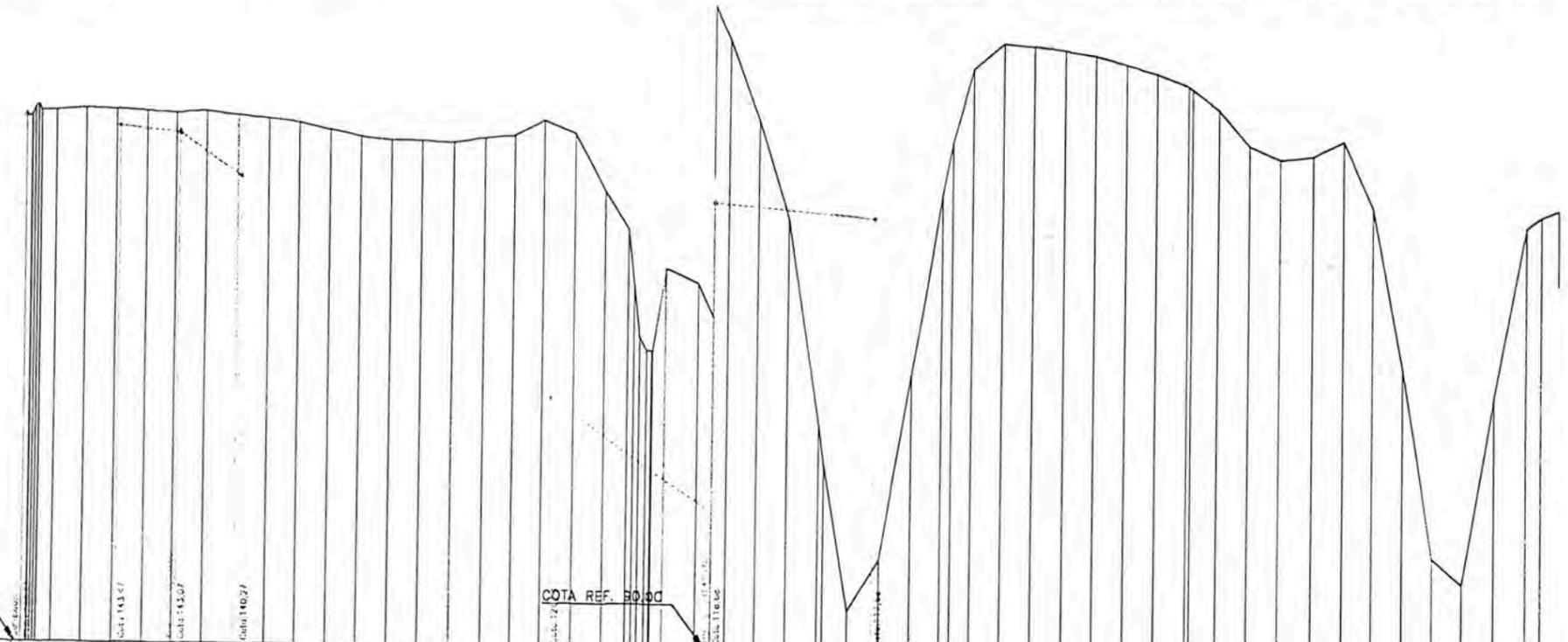
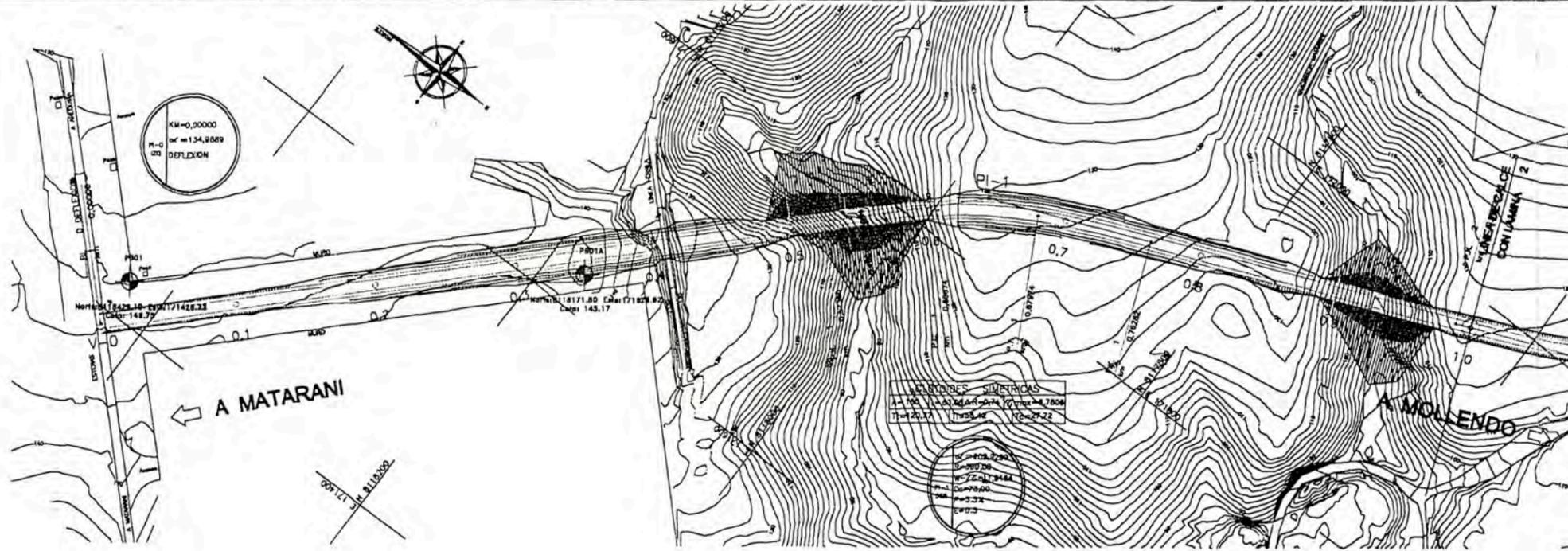
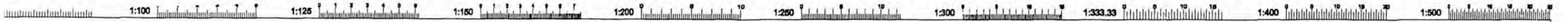
Diseñó: Smith, A. Lagos U
 Aprobó:
 Verificó: Ing. G. Barrantes S
 CIP 28951
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REVISIONES	
Nº	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLEDO
 PERFIL LONGITUDINAL
 KM 4+600 - KM 5+600

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PLV - 002



GRADIENTES Y PENDIENTES		2' = 100 m		1' = 200 m		1' = 150 m		1' = 100 m	
COTAS	RASANTE	114,27	112,20	113,34	112,25	111,67	110,49	110,20	109,56
	TERRENO	114,27	114,94	144,83	144,37	144,42	144,23	143,98	143,76
DISTANCIAS ACUMULADAS		0,00	40,00	80,00	120,00	160,00	200,00	240,00	280,00
KILOMETRAJE		0,00	0,1	0,2	0,3	0,4	0,5	0,6	0,7
DIAGRAMA DE CURVATURA		R=148,97		R=148,97		R=148,97		R=148,97	
C = 1/R * K (mm.) K=405		C=2,69		C=2,69		C=2,69		C=2,69	

LEYENDA DRENAJE	
	ALCANTARILLA
	LOSA
	CUNETA
	BADÉN
	CUNETA DE CORONACIÓN
	ZANJA DE DRENAJE
	SUBDREN

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 FACULTAD DE INGENIERIA CIVIL
 DEPARTAMENTO ACADEMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

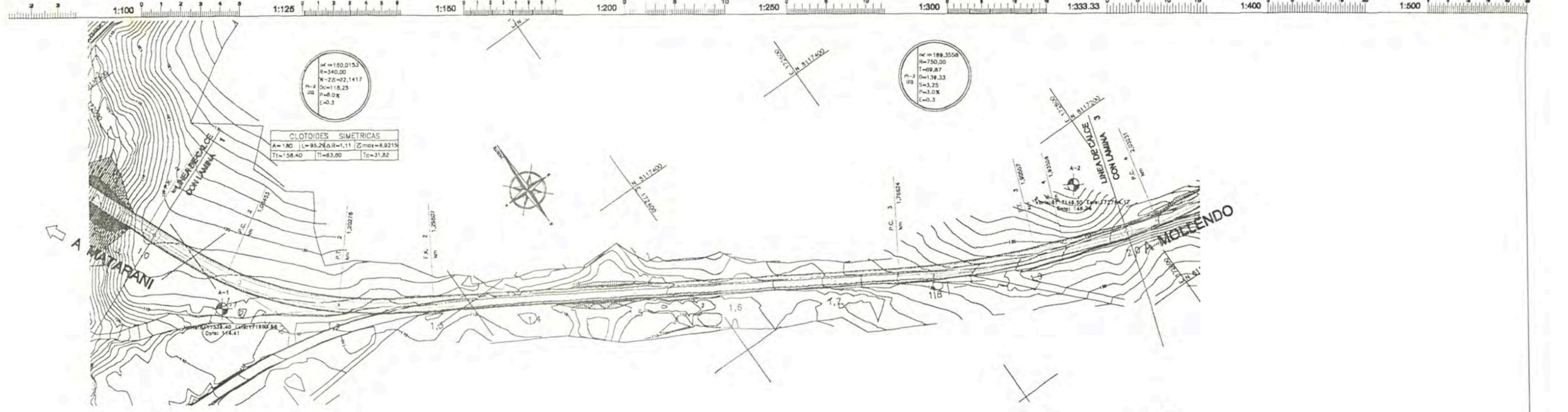
Diseño: Bach. A. Lopez U
 Dibujo: A.L.J
 Verificó: Ing. G. Bassani & CP 38891
 Presentó: Bach. A. Lopez U

REVISIONES	
Nº	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLEDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 0+000 - KM 1+000

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PP - 001



LEYENDA DRENAJE	
	ALCANTARILLA
	LOSA
	CUNETA
	BADÉN
	CUNETA DE CORONACIÓN
	ZANJA DE DRENAJE
	SUBDREN

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 DEPARTAMENTO ACADÉMICO E TOPOGRAFIA Y VIAS DE TRANSPORTE

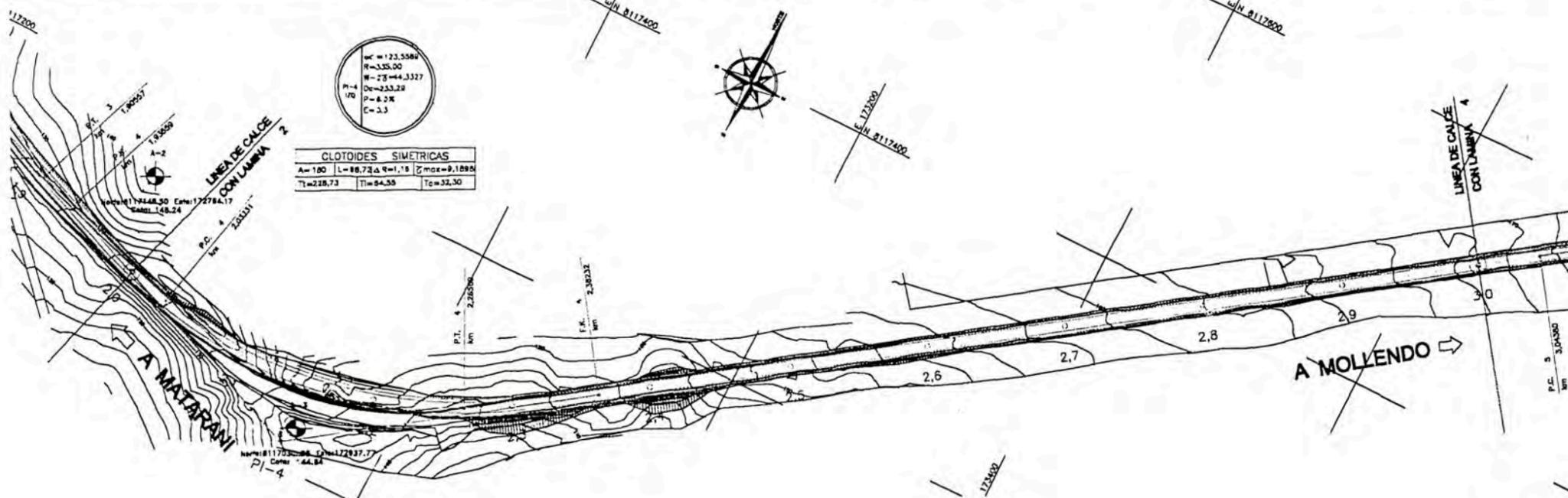
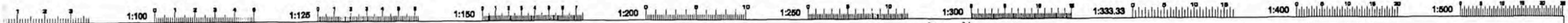
Diseño: Bach. A. Luján U
 Dibujo: A.L.U.
 Verificación: Ing. G. Benavente B
 CIP 388641
 Presentación: Bach. A. Luján U

REVISIONES	
Nº	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

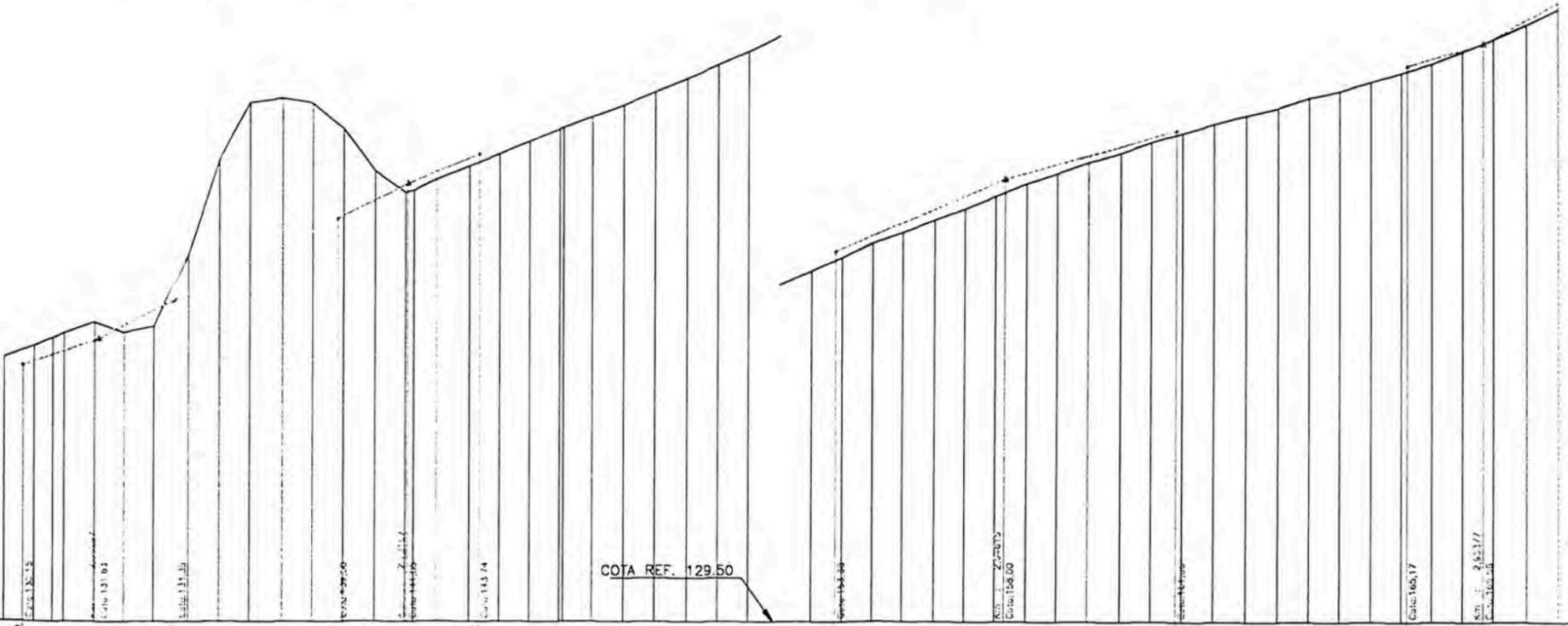
SECTOR: MATARANI - MOLLEDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 1+000 - KM 2+000

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PP - 002



$\pi = 123.5580$
 $R = 335.00$
 $W = 23 = 44.3327$
 $D_c = 233.28$
 $P = 4.3\%$
 $C = 3.3$

CLOTOIDES SIMÉTRICAS
 $A = 100$ $L = 86.73$ $d = 1.18$ $Z_{max} = 9.1899$
 $T_1 = 218.73$ $T_2 = 94.55$ $T_3 = 32.30$



GRADIENTES Y PENDIENTES		2+000	2+100	2+200	2+300	2+400	2+500	2+600	2+700	2+800	2+900	3+000
COTAS	RASANTE	129.71	132.39	133.12	133.82	134.51	135.20	135.89	136.58	137.27	137.96	138.65
	TERRENO	130.65	131.41	132.17	132.93	133.69	134.45	135.21	135.97	136.73	137.49	138.25
DISTANCIAS ACUMULADAS		0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00
KILOMETRAJE		2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
DIAGRAMA DE CURVATURA		$C = \frac{1}{R} \times K$ (mm.) $K = 403$ $D = 133.28$ $R = 335.00$ $\Delta = 1.18$ $Z_{max} = 9.1899$ $\Delta = 20$ $A = 100$ $L = 86.73$ $d = 1.18$ $Z_{max} = 9.1899$ $\Delta = 20$										

LEYENDA DRENAJE

- ALCANTARILLA
- LOSA
- CUNETA
- BADÉN
- CUNETA DE CORONACIÓN
- ZANJA DE DRENAJE
- SUBDREN

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Diseñó: Beat. A Layre U
 Dibujó: A.L.U.
 Verificó: Ing. G. Rosendo B. CIP 30841
 Presentó: Beat. A Layre U

Aprobó:

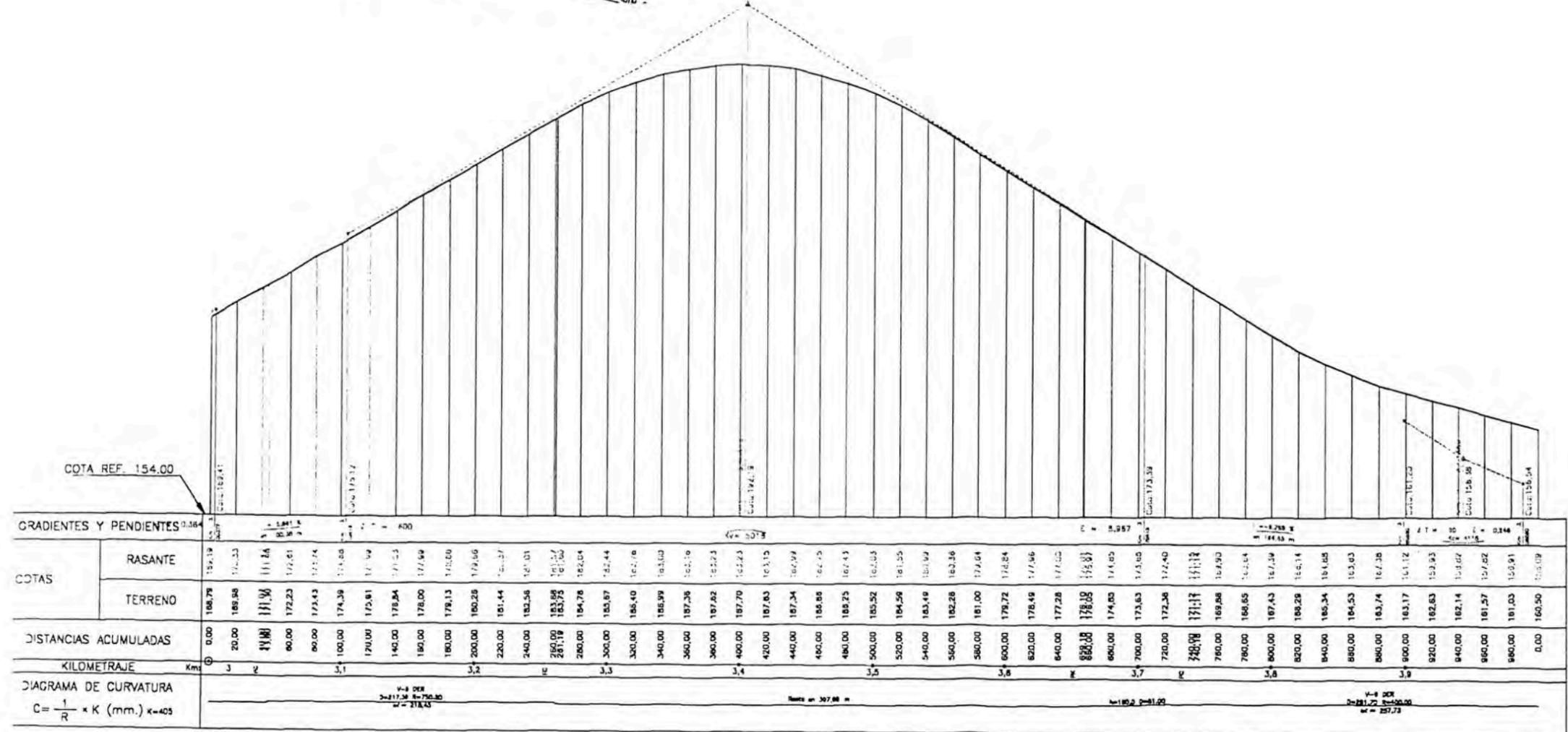
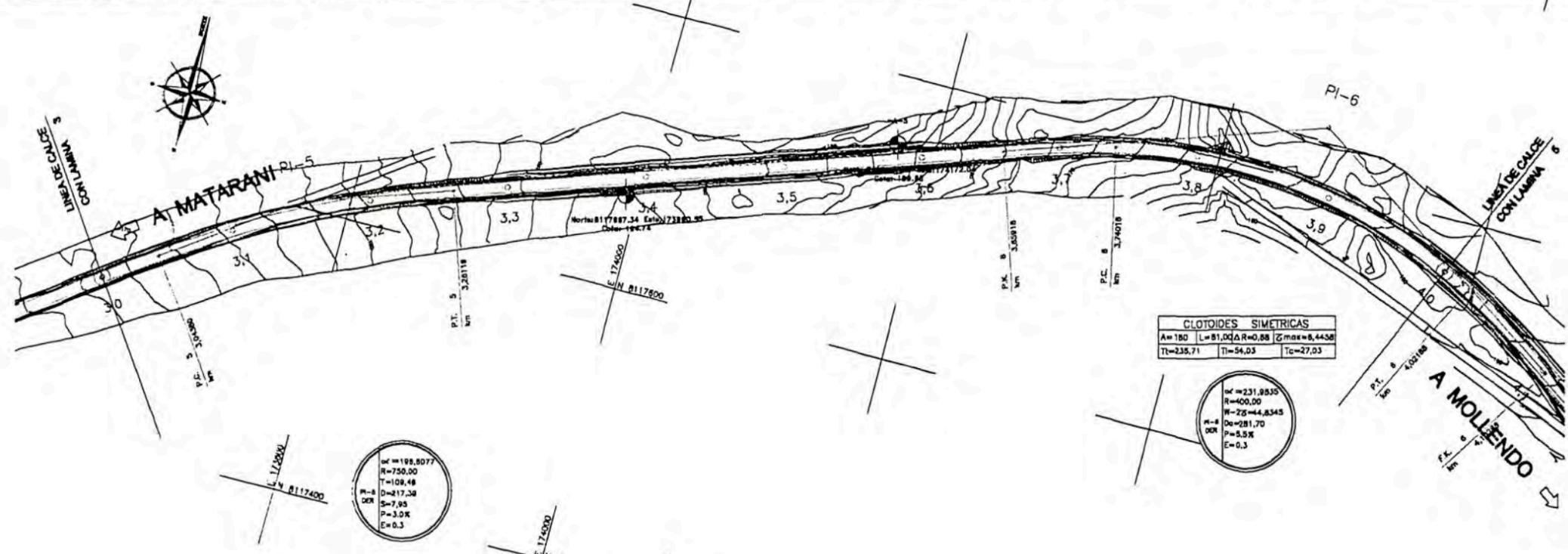
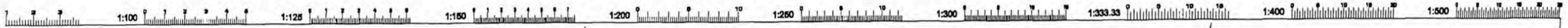
REVISIONES

Nº	FECHA	DESCRIPCIÓN

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLENDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 2+000 - KM 3+000

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
PP - 003



LEYENDA DRENAJE	
	ALCANTARILLA
	LOSA
	CUNETA
	BADÉN
	CUNETA DE CORONACIÓN
	ZANJA DE DRENAJE
	SUBDREN

UNIVERSIDAD NACIONAL DE INGENIERIA
 FACULTAD DE INGENIERIA CIVIL
 DEPARTAMENTO ACADEMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

Diseñó: Beth. A. Layre U
 Dibujó: A.L.U.
 Verificó: Ing. G. Rosado B
 CIP 20861
 Presentó: Beth. A. Layre U

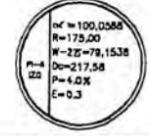
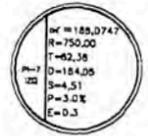
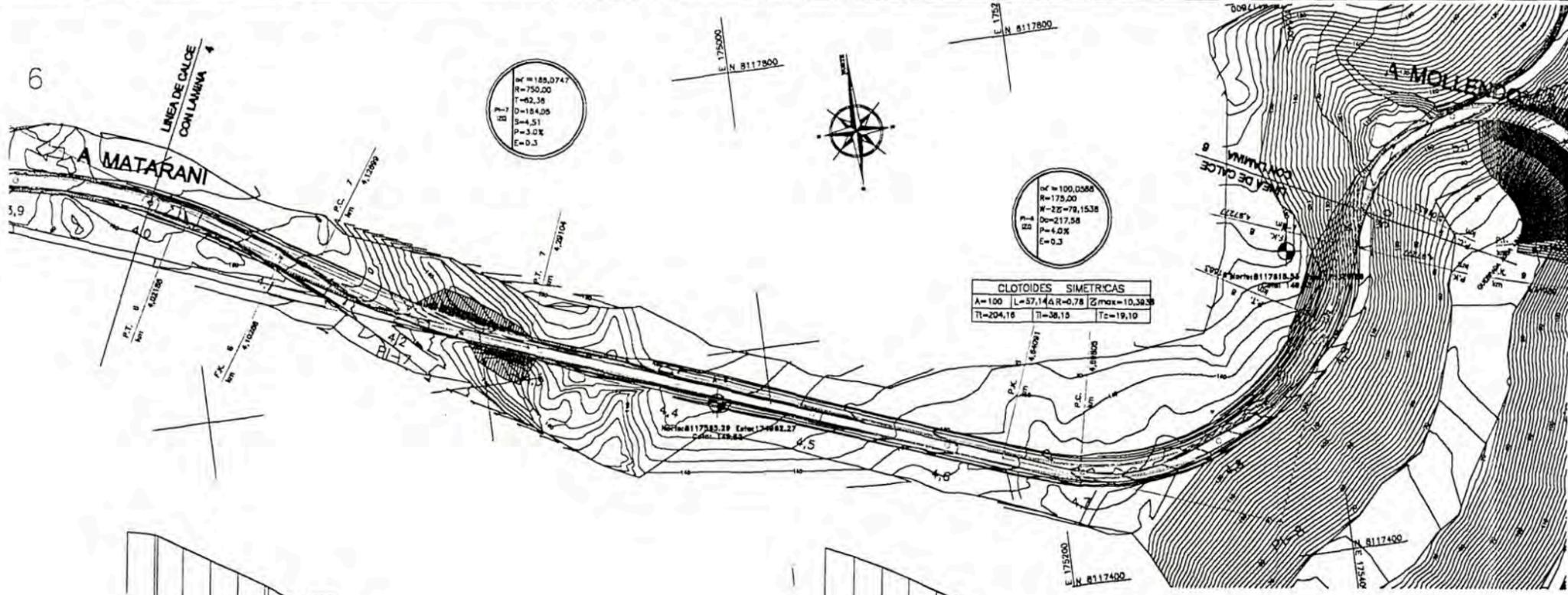
Aprobó:

REVISIONES		
Nº	FECHA	DESCRIPCION

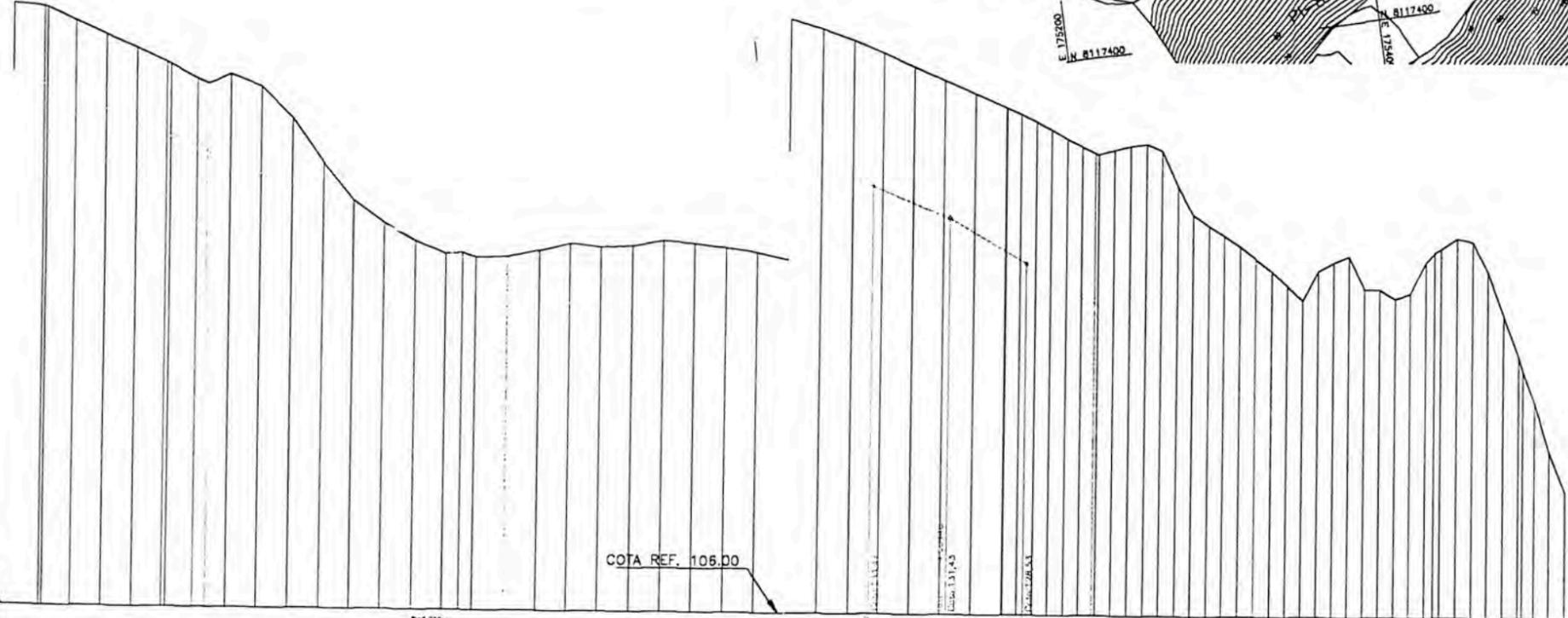
ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLENDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 3+000 - KM 4+000

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PP - 004



CLOTOIDES SIMÉTRICAS
 A=100 L=37,14 R=0,78 Zmax=10,38
 Tl=204,16 Tc=38,15 Tz=19,10



GRADIENTES Y PENDIENTES																							
COTAS	RASANTE	156,72	155,27	152,14	151,16	150,15	149,10	148,05	147,00	145,95	144,90	143,85	142,80	141,75	140,70	139,65	138,60	137,55	136,50	135,45	134,40	133,35	
	TERRENO	160,50	160,32	160,27	159,41	158,51	157,67	156,74	155,80	154,81	153,81	152,78	151,71	150,60	149,45	148,26	147,03	145,76	144,45	143,10	141,71	140,28	138,81
DISTANCIAS ACUMULADAS		0,00	20,00	41,86	64,00	87,00	110,00	133,00	156,00	179,00	202,00	225,00	248,00	271,00	294,00	317,00	340,00	363,00	386,00	409,00	432,00	455,00	478,00
KILÓMETRAJE		0,0	0,4	0,8	1,2	1,6	2,0	2,4	2,8	3,2	3,6	4,0	4,4	4,8	5,2	5,6	6,0	6,4	6,8	7,2	7,6	8,0	8,4
DIAGRAMA DE CURVATURA		C = \frac{1}{R} \times K (mm.) K=405																					

LEYENDA DRENAJE

- ALCANTARILLA
- LOSA
- CUNETA
- BADÉN
- CUNETA DE CORONACIÓN
- ZANJA DE DRENAJE
- SUBDREN

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 DEPARTAMENTO ACADÉMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

Diseñó: Bach. A. Laya U
 Dibujó: A.L.U
 Verificó: Ing. O. Ríos B
 Presentó: Bach. A. Laya U

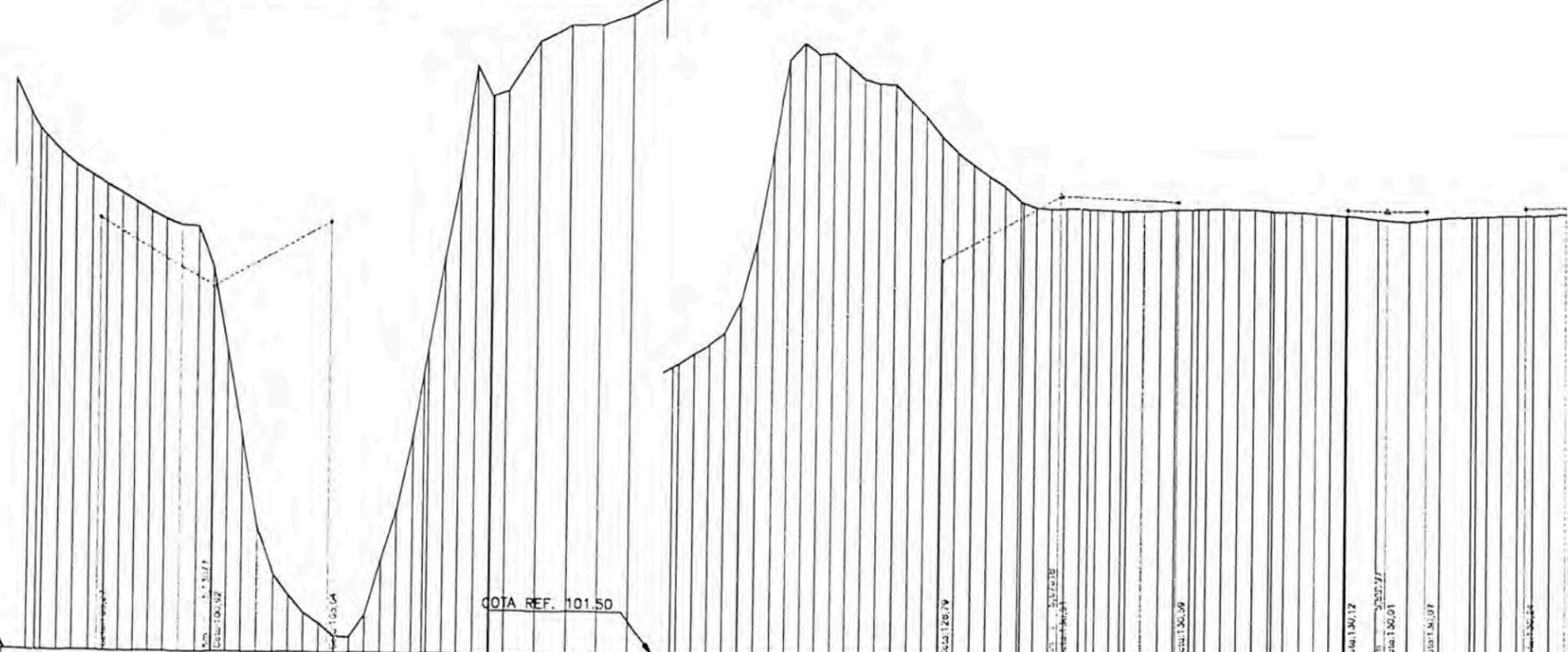
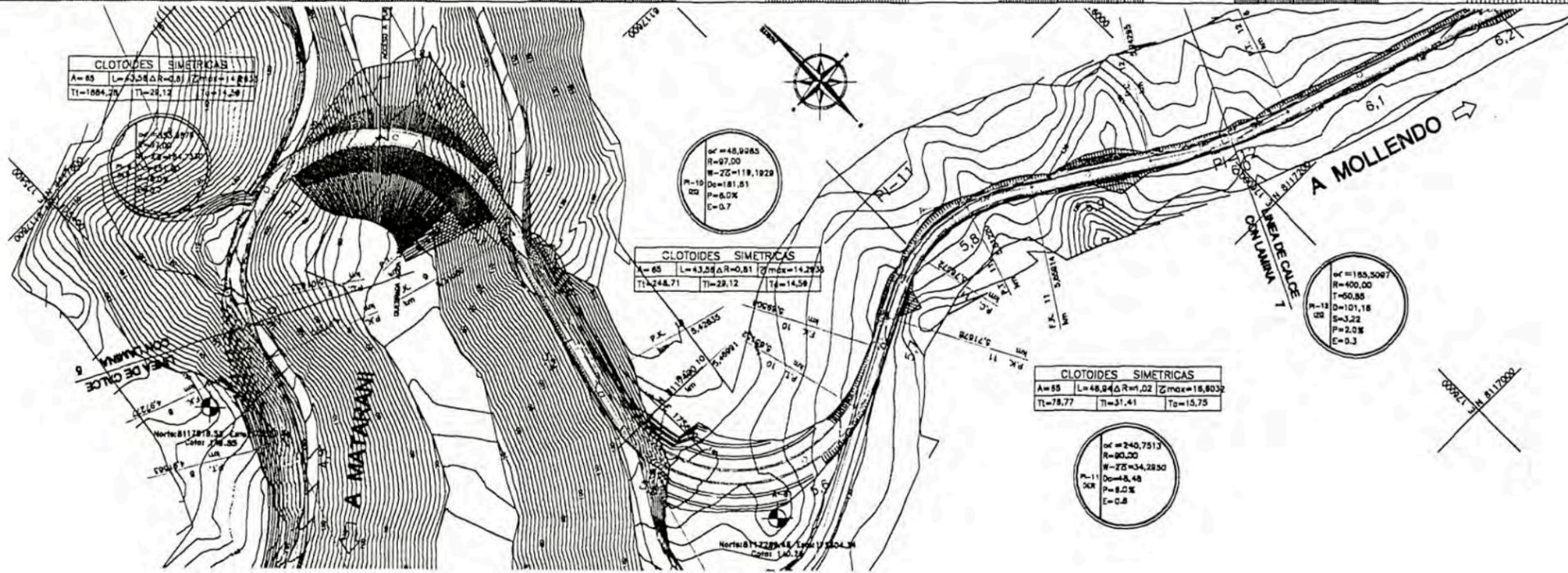
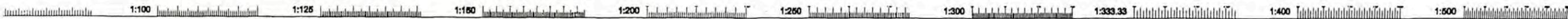
Aprobó:

REVISIONES		
Nº	FECHA	DESCRIPCIÓN

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLEDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 4+000 - KM 5+000

ESCALA: H=1:400 V=1:400
 FECHA: DICIEMBRE 2000
 PP - 005



GRADIENTES Y PENDIENTES		COTAS		DISTANCIAS ACUMULADAS		DIAGRAMA DE CURVATURA	
	RASANTE	TERRENO		KILOMETRAJE			
0.00	126.92	114.13	0.00	0.00			
10.00	127.77	115.26	10.00	10.00			
20.00	128.62	116.39	20.00	20.00			
30.00	129.47	117.52	30.00	30.00			
40.00	130.32	118.65	40.00	40.00			
50.00	131.17	119.78	50.00	50.00			
60.00	132.02	120.91	60.00	60.00			
70.00	132.87	122.04	70.00	70.00			
80.00	133.72	123.17	80.00	80.00			
90.00	134.57	124.30	90.00	90.00			
100.00	135.42	125.43	100.00	100.00			
110.00	136.27	126.56	110.00	110.00			
120.00	137.12	127.69	120.00	120.00			
130.00	137.97	128.82	130.00	130.00			
140.00	138.82	129.95	140.00	140.00			
150.00	139.67	131.08	150.00	150.00			
160.00	140.52	132.21	160.00	160.00			
170.00	141.37	133.34	170.00	170.00			
180.00	142.22	134.47	180.00	180.00			
190.00	143.07	135.60	190.00	190.00			
200.00	143.92	136.73	200.00	200.00			
210.00	144.77	137.86	210.00	210.00			
220.00	145.62	138.99	220.00	220.00			
230.00	146.47	140.12	230.00	230.00			
240.00	147.32	141.25	240.00	240.00			
250.00	148.17	142.38	250.00	250.00			
260.00	149.02	143.51	260.00	260.00			
270.00	149.87	144.64	270.00	270.00			
280.00	150.72	145.77	280.00	280.00			
290.00	151.57	146.90	290.00	290.00			
300.00	152.42	148.03	300.00	300.00			
310.00	153.27	149.16	310.00	310.00			
320.00	154.12	150.29	320.00	320.00			
330.00	154.97	151.42	330.00	330.00			
340.00	155.82	152.55	340.00	340.00			
350.00	156.67	153.68	350.00	350.00			
360.00	157.52	154.81	360.00	360.00			
370.00	158.37	155.94	370.00	370.00			
380.00	159.22	157.07	380.00	380.00			
390.00	160.07	158.20	390.00	390.00			
400.00	160.92	159.33	400.00	400.00			
410.00	161.77	160.46	410.00	410.00			
420.00	162.62	161.59	420.00	420.00			
430.00	163.47	162.72	430.00	430.00			
440.00	164.32	163.85	440.00	440.00			
450.00	165.17	164.98	450.00	450.00			
460.00	166.02	166.11	460.00	460.00			
470.00	166.87	167.24	470.00	470.00			
480.00	167.72	168.37	480.00	480.00			
490.00	168.57	169.50	490.00	490.00			
500.00	169.42	170.63	500.00	500.00			
510.00	170.27	171.76	510.00	510.00			
520.00	171.12	172.89	520.00	520.00			
530.00	171.97	174.02	530.00	530.00			
540.00	172.82	175.15	540.00	540.00			
550.00	173.67	176.28	550.00	550.00			
560.00	174.52	177.41	560.00	560.00			
570.00	175.37	178.54	570.00	570.00			
580.00	176.22	179.67	580.00	580.00			
590.00	177.07	180.80	590.00	590.00			
600.00	177.92	181.93	600.00	600.00			
610.00	178.77	183.06	610.00	610.00			
620.00	179.62	184.19	620.00	620.00			
630.00	180.47	185.32	630.00	630.00			
640.00	181.32	186.45	640.00	640.00			
650.00	182.17	187.58	650.00	650.00			
660.00	183.02	188.71	660.00	660.00			
670.00	183.87	189.84	670.00	670.00			
680.00	184.72	190.97	680.00	680.00			
690.00	185.57	192.10	690.00	690.00			
700.00	186.42	193.23	700.00	700.00			
710.00	187.27	194.36	710.00	710.00			
720.00	188.12	195.49	720.00	720.00			
730.00	188.97	196.62	730.00	730.00			
740.00	189.82	197.75	740.00	740.00			
750.00	190.67	198.88	750.00	750.00			
760.00	191.52	200.01	760.00	760.00			
770.00	192.37	201.14	770.00	770.00			
780.00	193.22	202.27	780.00	780.00			
790.00	194.07	203.40	790.00	790.00			
800.00	194.92	204.53	800.00	800.00			
810.00	195.77	205.66	810.00	810.00			
820.00	196.62	206.79	820.00	820.00			
830.00	197.47	207.92	830.00	830.00			
840.00	198.32	209.05	840.00	840.00			
850.00	199.17	210.18	850.00	850.00			
860.00	200.02	211.31	860.00	860.00			
870.00	200.87	212.44	870.00	870.00			
880.00	201.72	213.57	880.00	880.00			
890.00	202.57	214.70	890.00	890.00			
900.00	203.42	215.83	900.00	900.00			
910.00	204.27	216.96	910.00	910.00			
920.00	205.12	218.09	920.00	920.00			
930.00	205.97	219.22	930.00	930.00			
940.00	206.82	220.35	940.00	940.00			
950.00	207.67	221.48	950.00	950.00			
960.00	208.52	222.61	960.00	960.00			
970.00	209.37	223.74	970.00	970.00			
980.00	210.22	224.87	980.00	980.00			
990.00	211.07	226.00	990.00	990.00			
1000.00	211.92	227.13	1000.00	1000.00			

LEYENDA DRENAJE

- ALCANTARILLA
- LOSA
- CUNETA
- BADÉN
- CUNETA DE CORONACIÓN
- ZANJA DE DRENAJE
- SUBDREN

UNIVERSIDAD NACIONAL DE INGENIERIA
 FACULTAD DE INGENIERIA CIVIL
 DEPARTAMENTO ACADEMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

Diseñó: Bach. A. Lopez U
 CIP 88707
 Dibujó: A. L. U.
 Verificó: Ing. G. Barrantes B
 CIP 28861
 Presentó: Bach. A. Lopez U
 CIP 88707

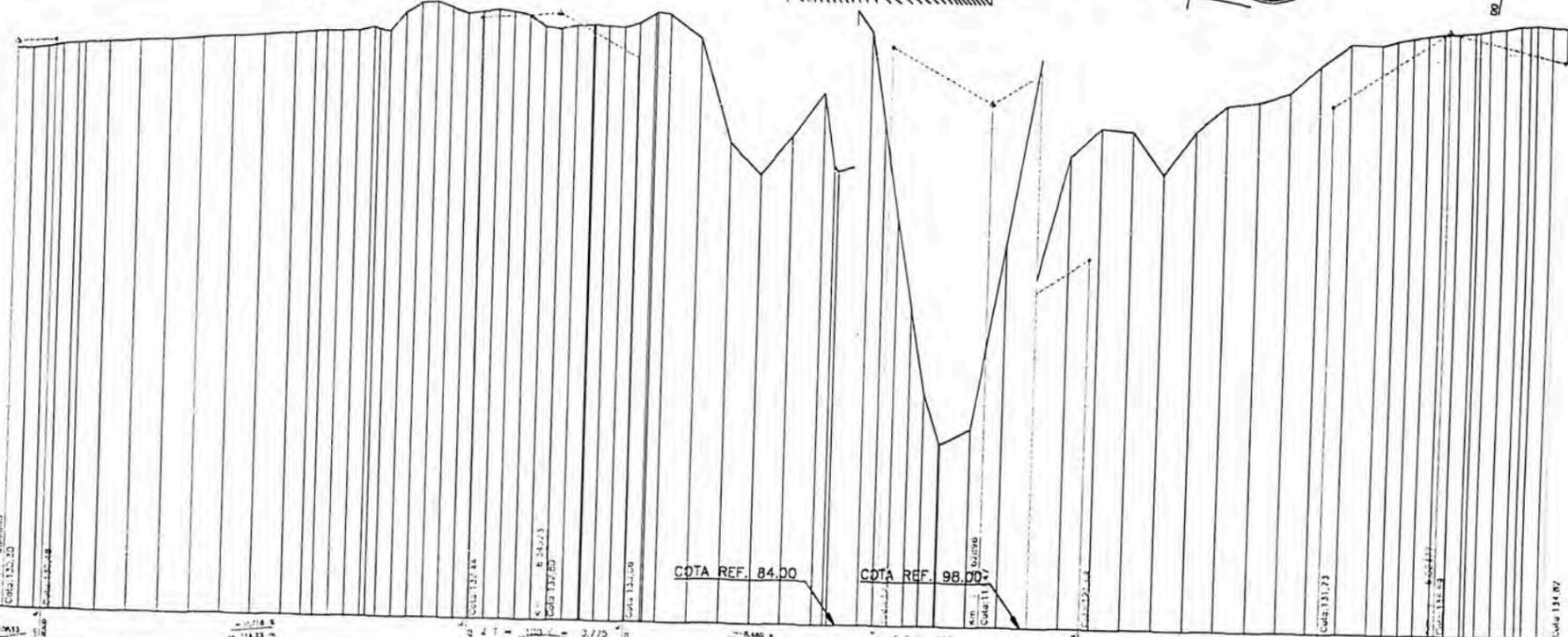
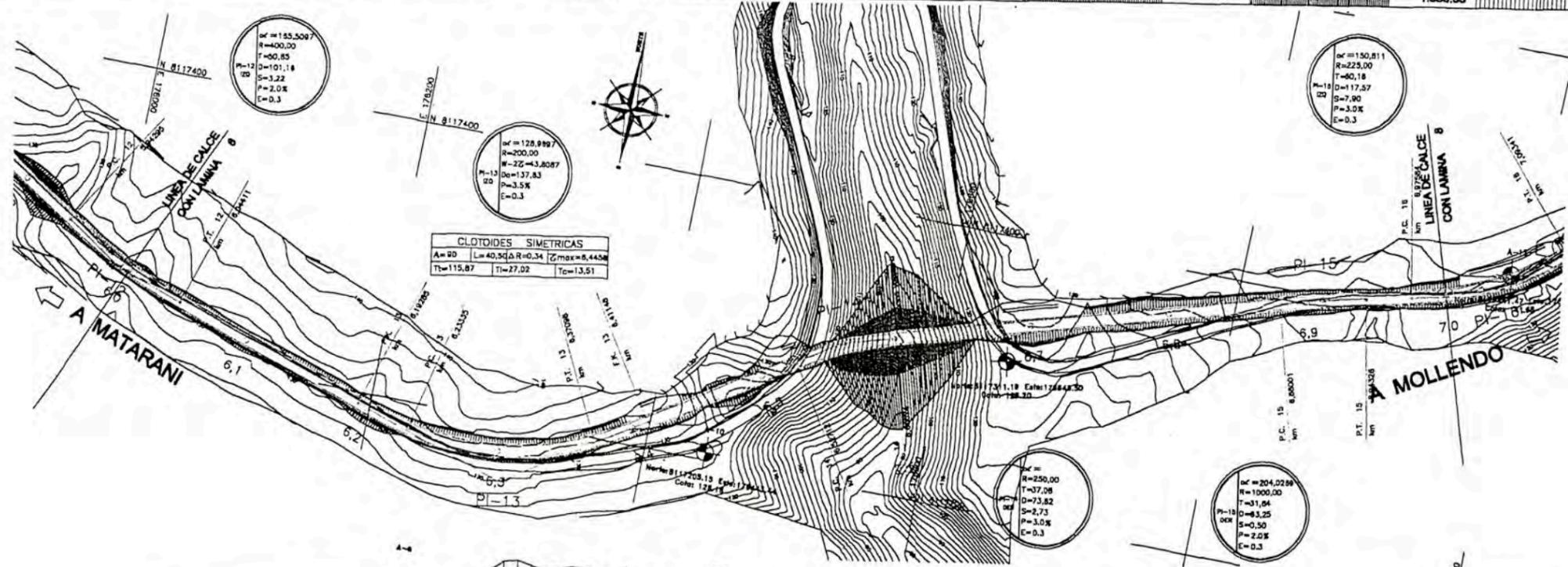
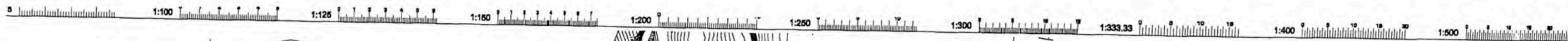
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Nº	FECHA	DESCRIPCION

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLENDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 5+000 - KM 6+000

ESCALA: H=1:4000 V=1:400
 FECHA: DICIEMBRE 2000
 PP - 006



GRADIENTES Y PENDIENTES		Kilómetros	
COTAS	RASANTE	6	6,1
	TERRENO	6,2	6,3
DISTANCIAS ACUMULADAS		6,4	6,5
KILOMETRAJE		6,6	6,7
DIAGRAMA DE CURVATURA		6,8	6,9

- LEYENDA DRENAJE**
- ALCANTARILLA
 - LOSA
 - CUNETA
 - BADÉN
 - CUNETA DE CORONACIÓN
 - ZANJA DE DRENAJE
 - SUBDREN

UNIVERSIDAD NACIONAL DE INGENIERIA
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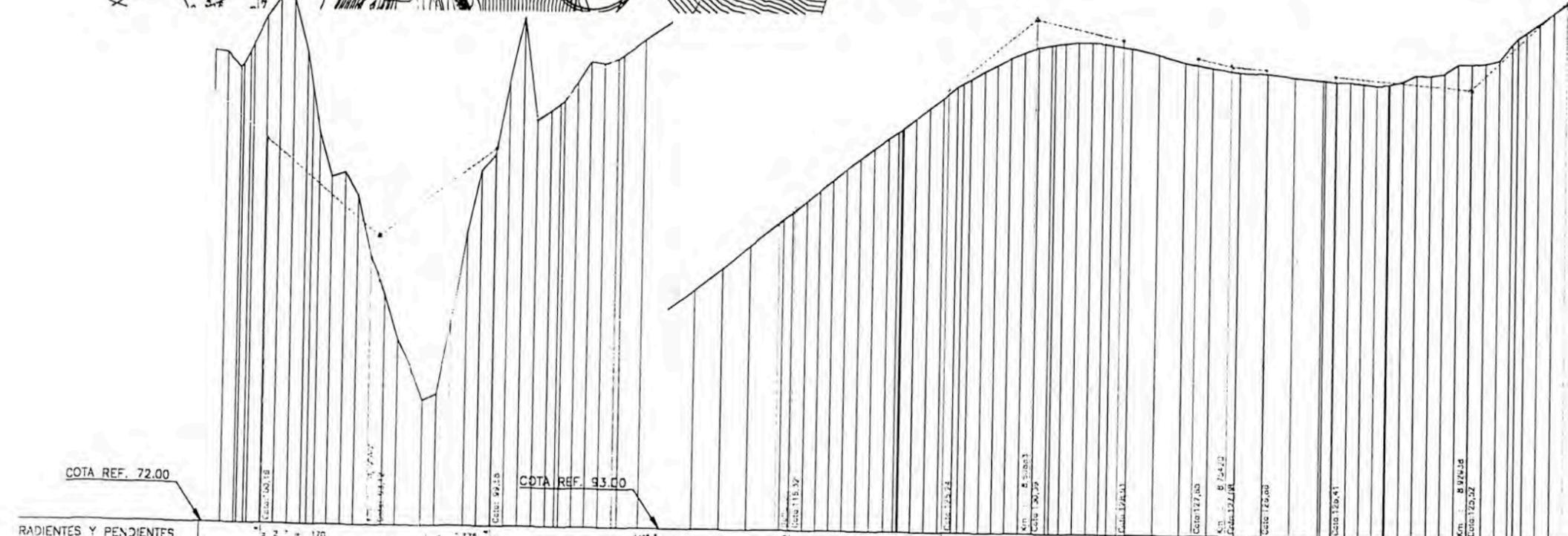
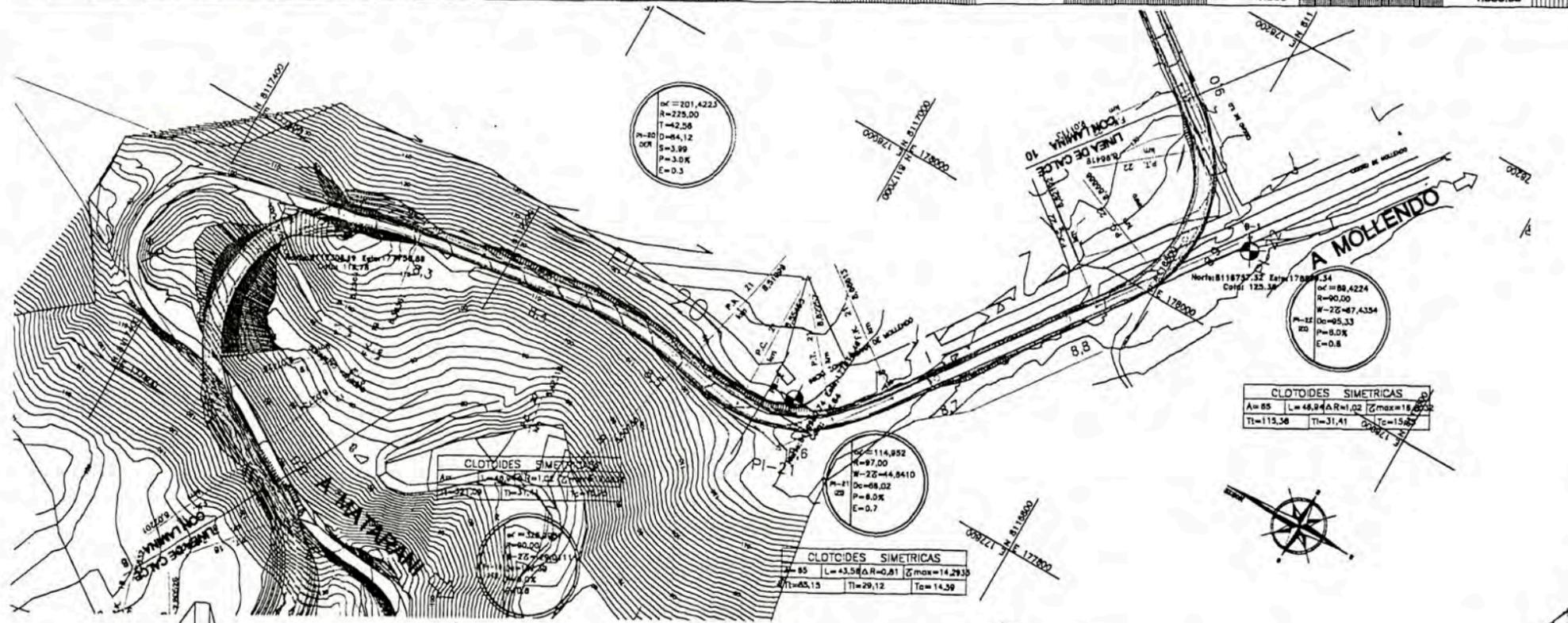
Diseño: **Rech. A Layre U**
 Dibujo: **A. L. U**
 Verificado: **Ing. O. Bernaldi B**
 CP 38841
 Presentado: **Rech. A Layre U**

REVISIONES	
Nº	FECHA

ESTUDIOS DE INGENIERIA
 PARA EL DISEÑO GEOMETRICO
 DE LA CARRETERA MATARANI - ILO

SECTOR: MATARANI - MOLLENDO
 PLANTA Y PERFIL LONGITUDINAL
 KM 6+000 - KM 7+000

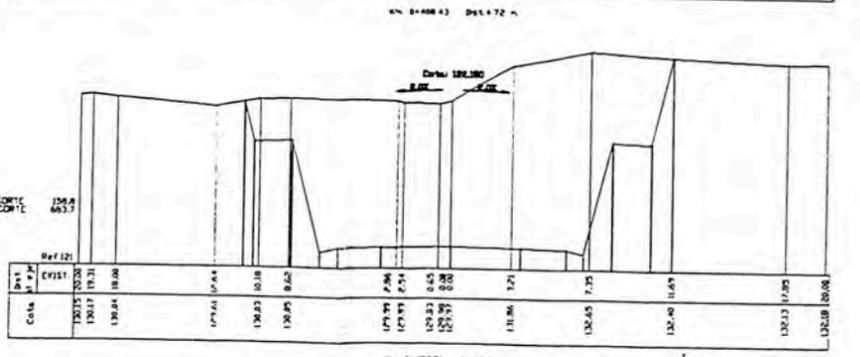
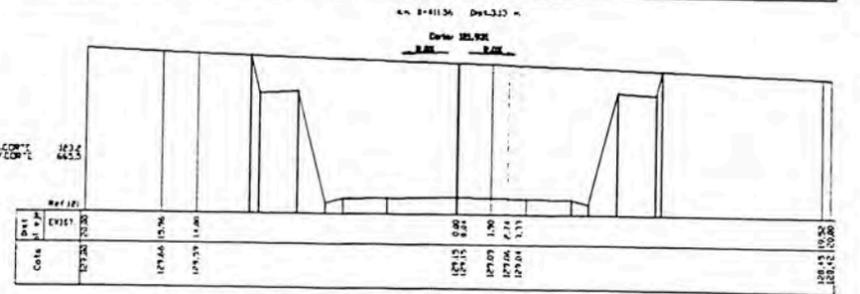
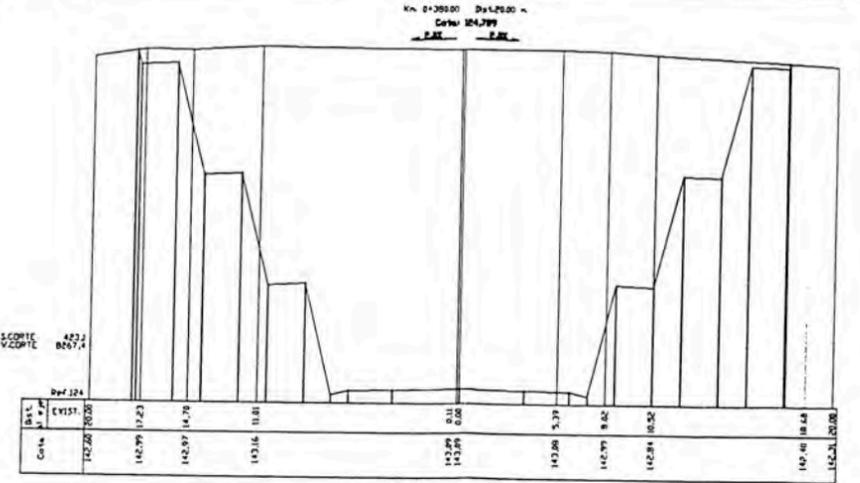
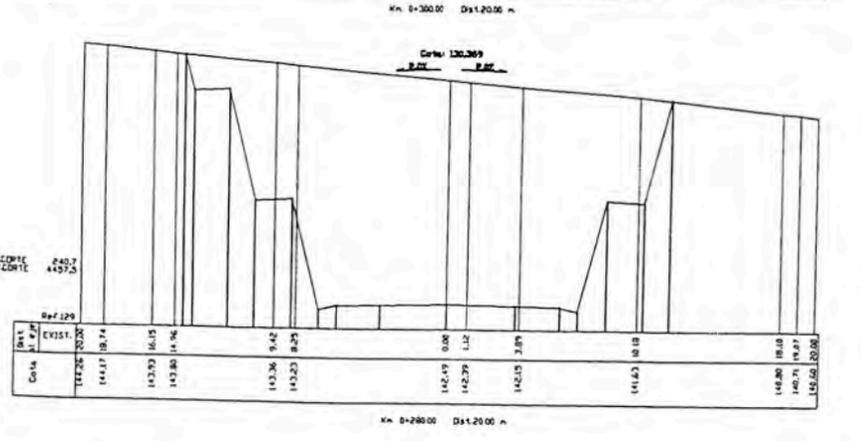
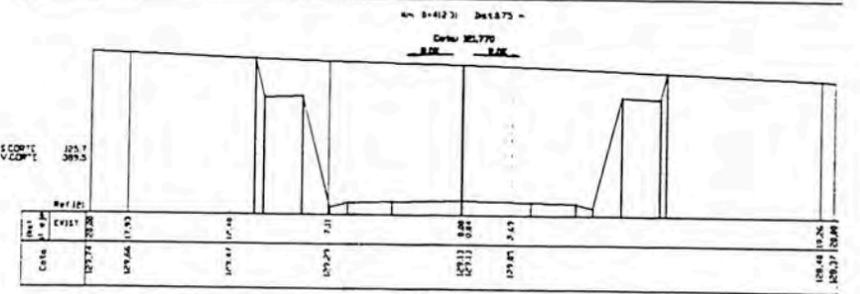
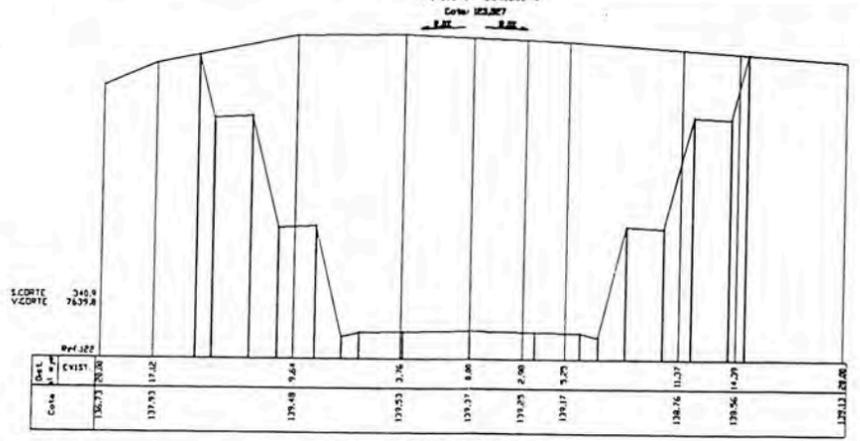
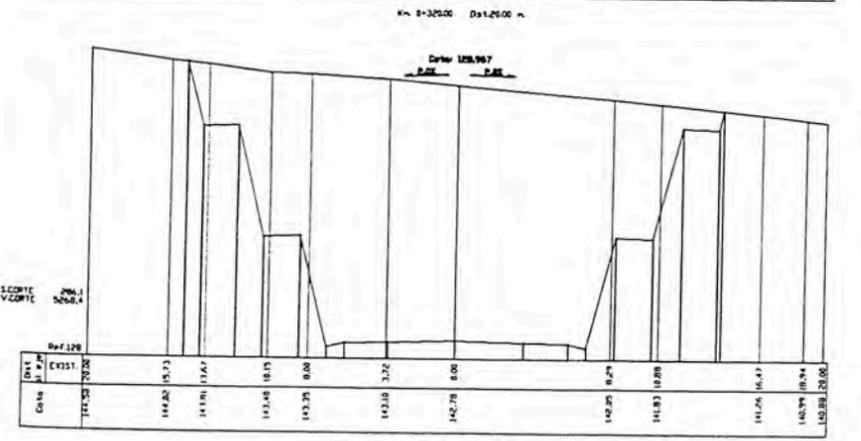
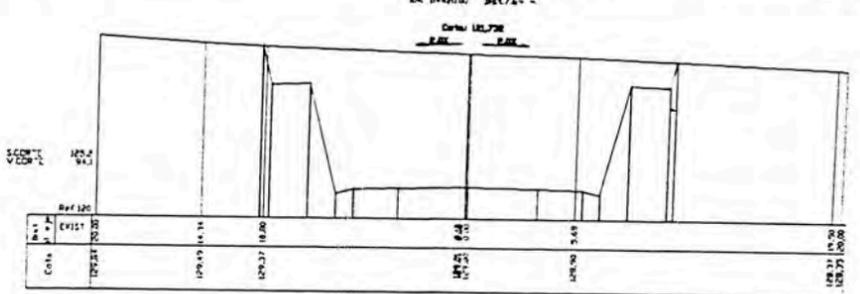
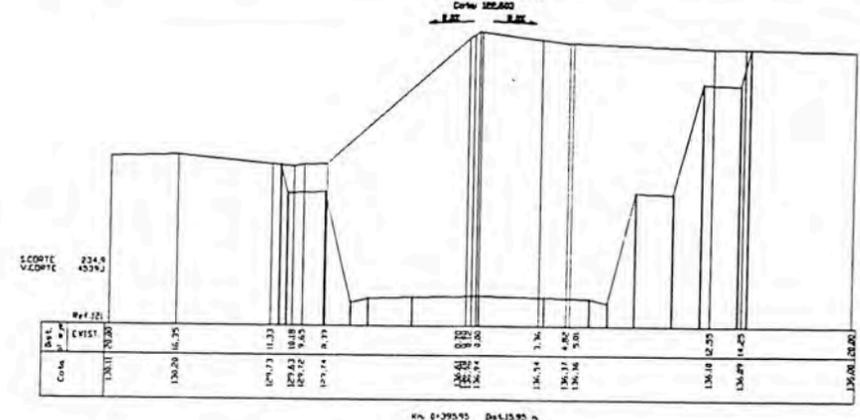
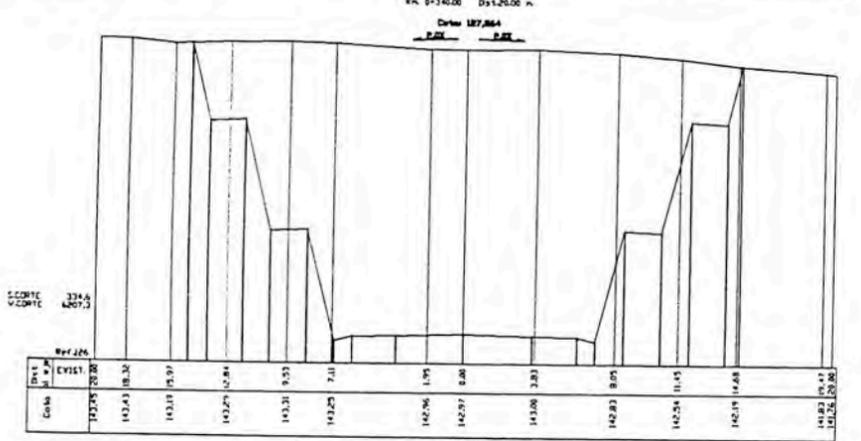
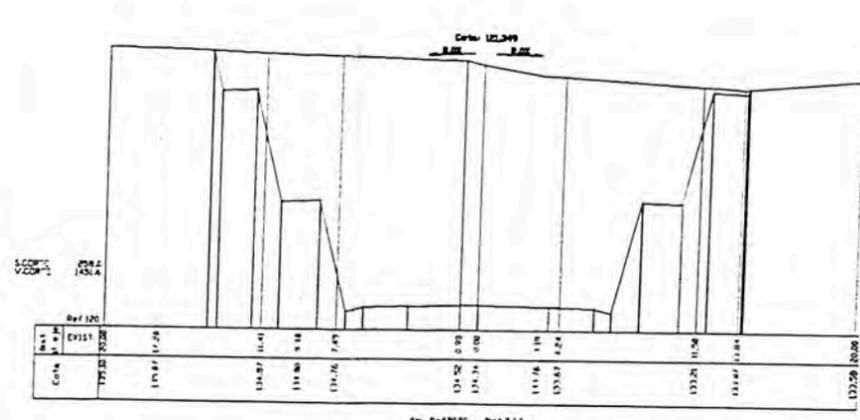
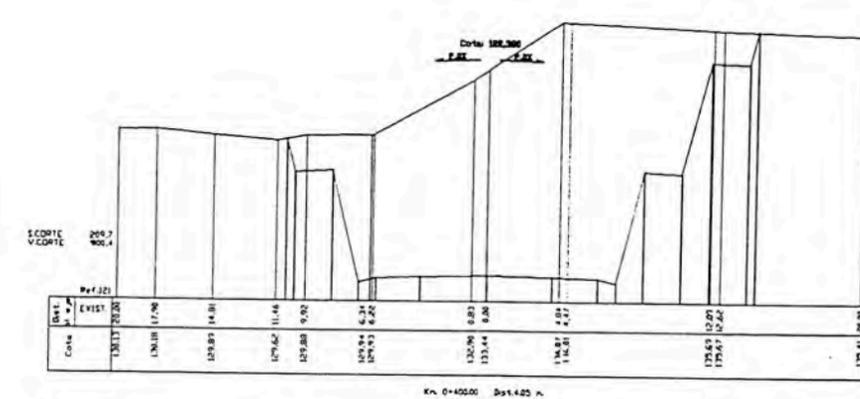
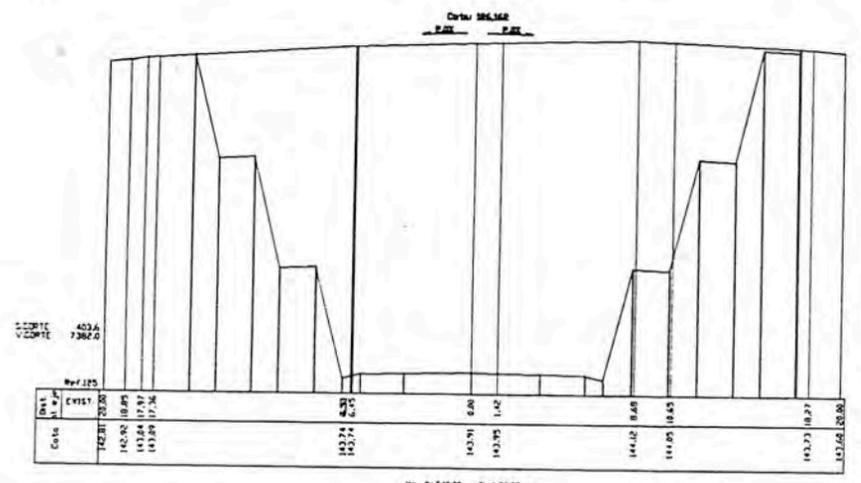
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 FECHA: DICIEMBRE 2000
 PP - 007

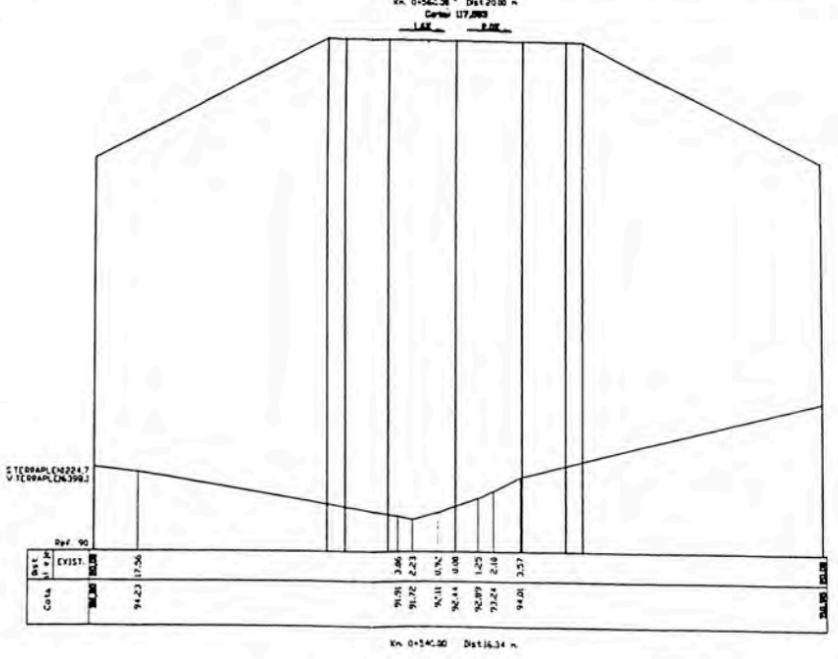
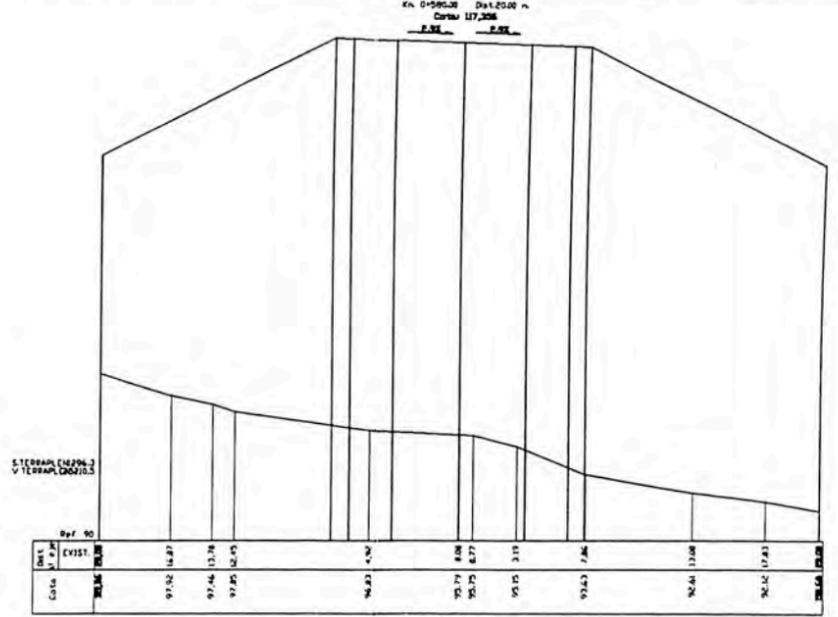
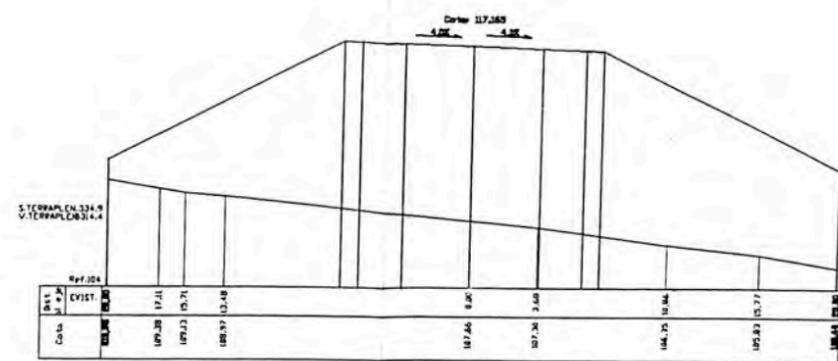
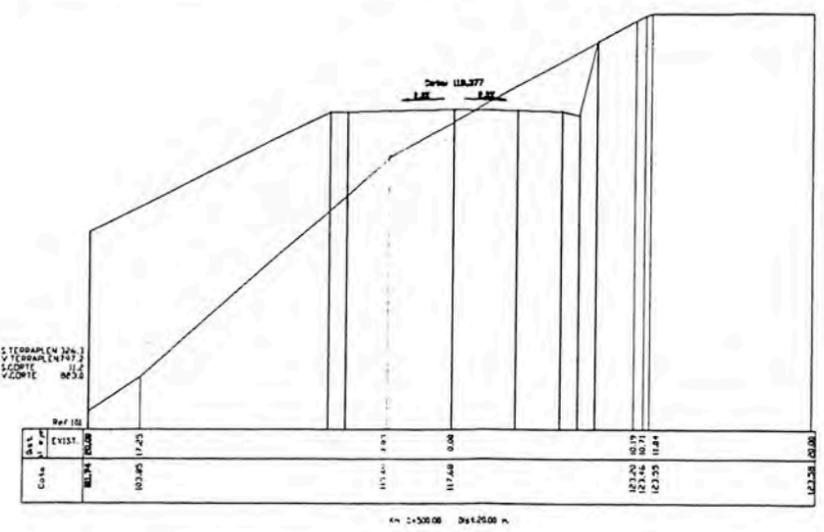
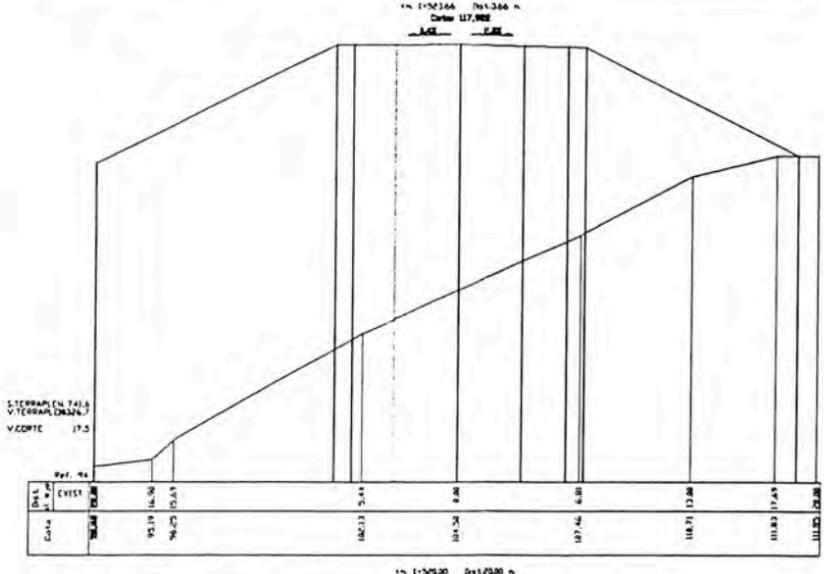
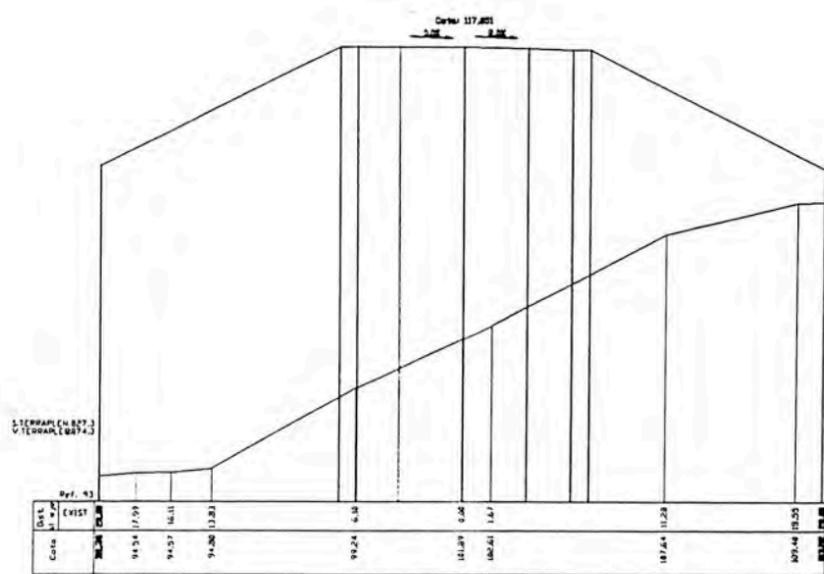
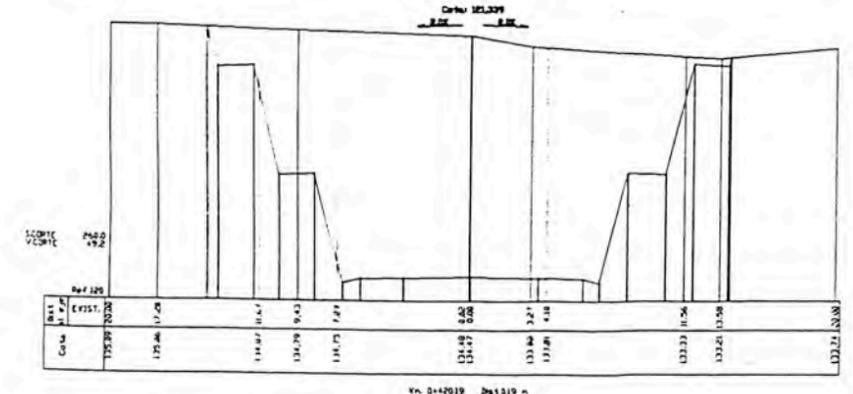
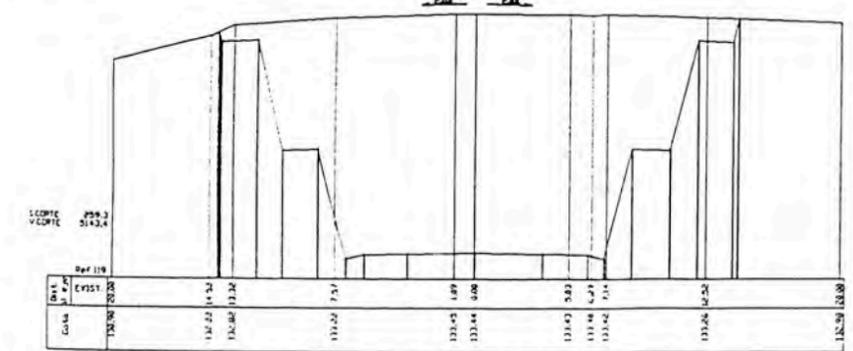
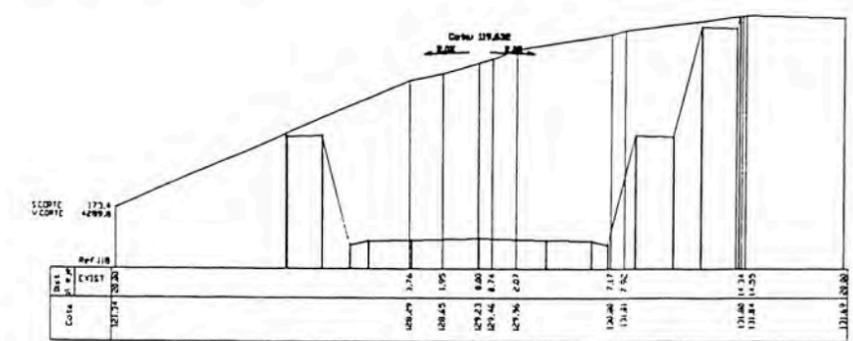
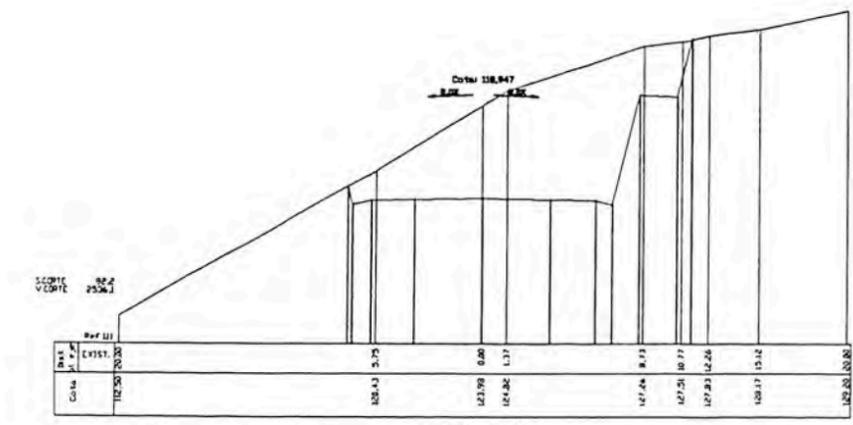


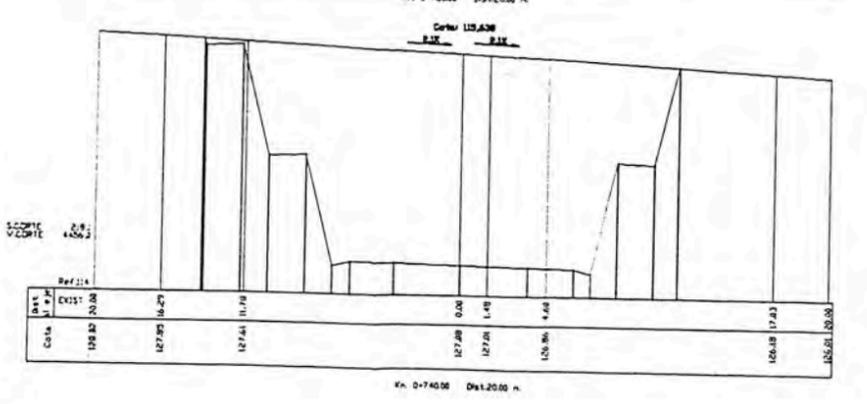
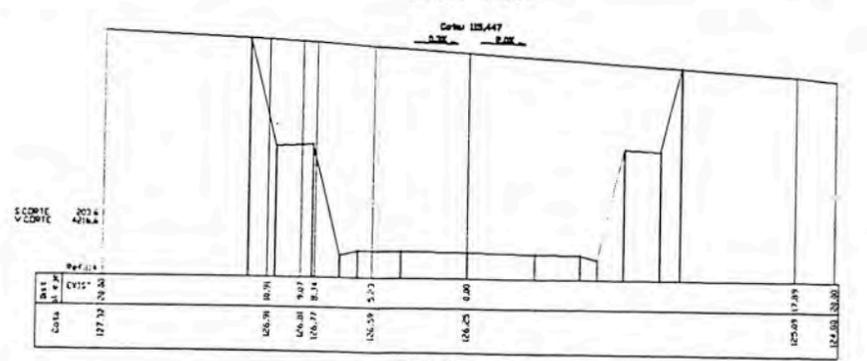
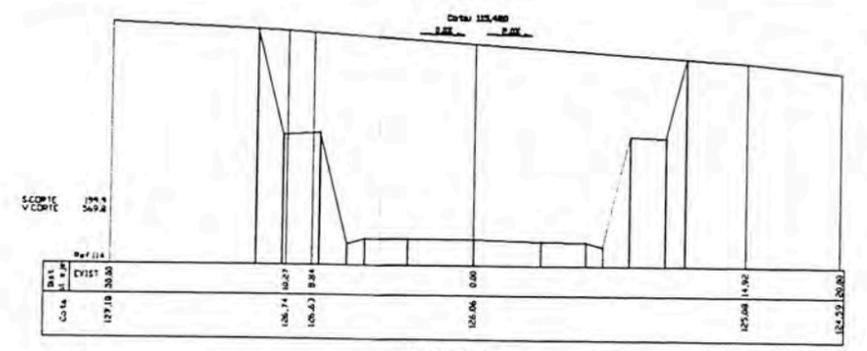
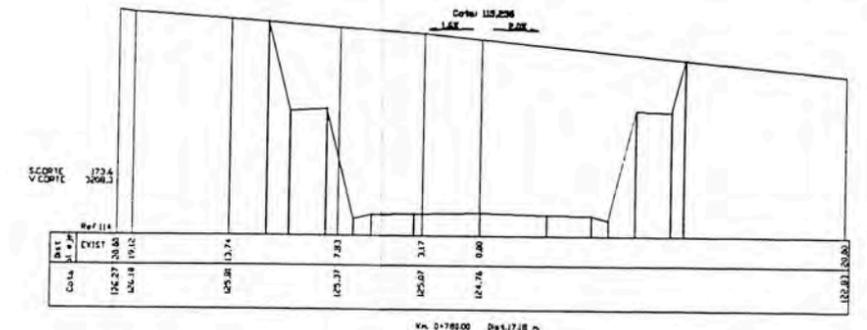
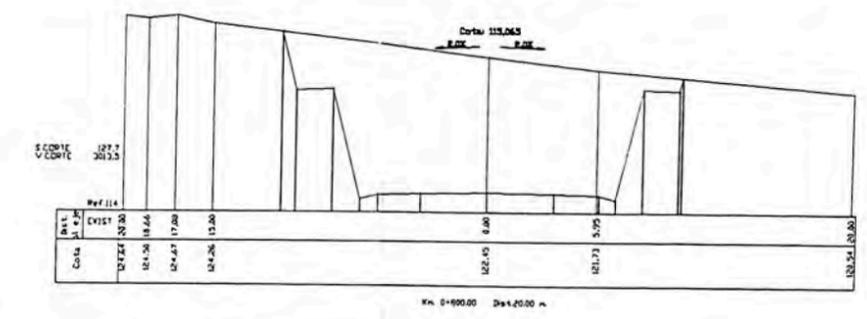
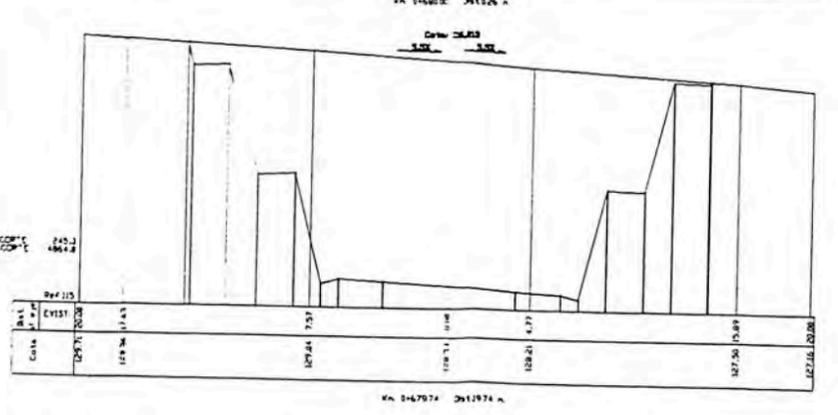
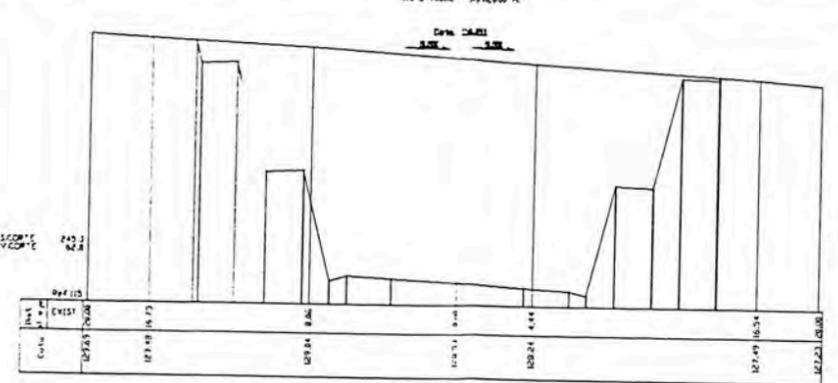
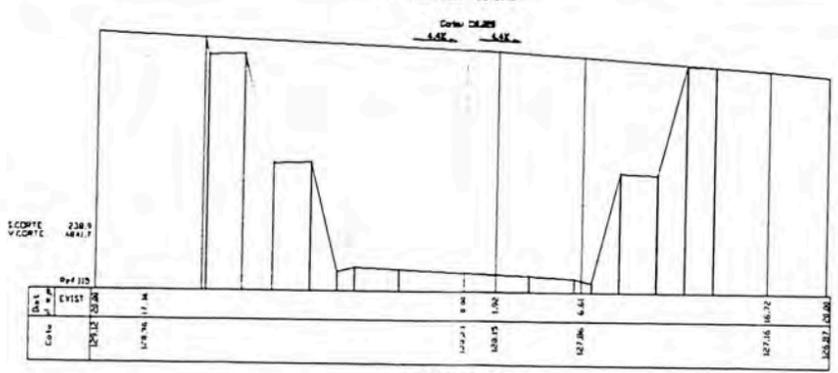
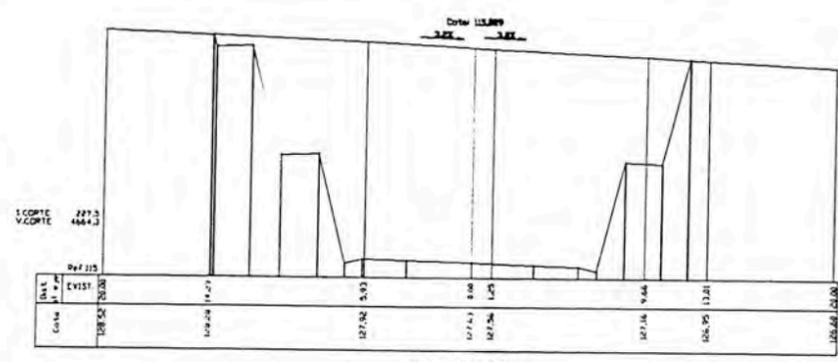
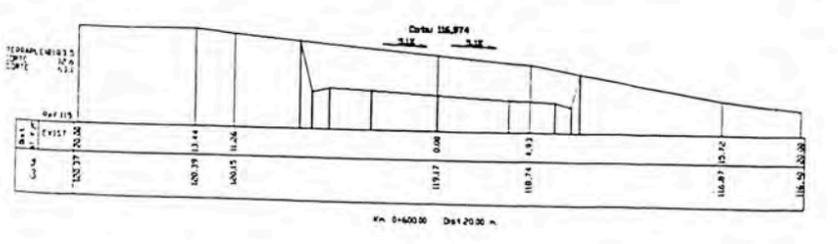
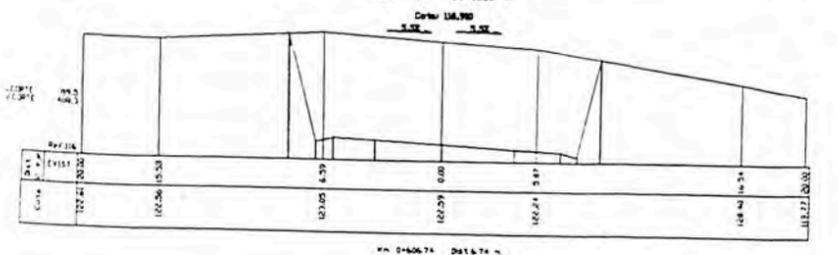
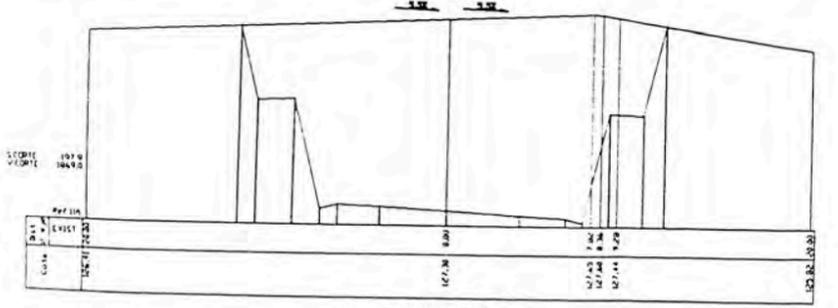
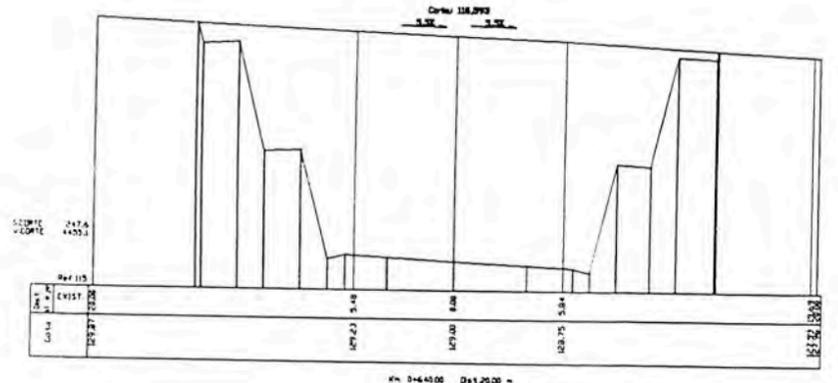
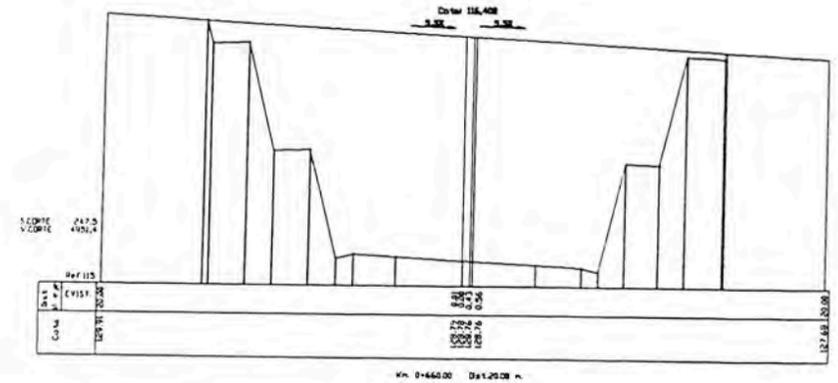
RADIANTES Y PENDIENTES		2' = 170		1:575		1:125		1:125		1:125		1:125		2' = 700		1:125		
DATAS	RASANTE	106.54	106.42	106.35	106.30	106.24	106.17	106.10	106.03	105.96	105.89	105.82	105.75	105.68	105.61	105.54	105.47	
	TERRENO	106.54	106.42	106.35	106.30	106.24	106.17	106.10	106.03	105.96	105.89	105.82	105.75	105.68	105.61	105.54	105.47	
DISTANCIAS ACUMULADAS	Kilómetros	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	
	Metros	0.00	100.00	200.00	300.00	400.00	500.00	600.00	700.00	800.00	900.00	1000.00	1100.00	1200.00	1300.00	1400.00	1500.00	
DIAGRAMA DE CURVATURA	Curvas	$\alpha = 201.422^\circ$ $R = 225.00$ $T = 42.06$ $D = 64.12$ $S = 3.89$ $P = 3.0\%$ $E = 0.3$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$ $\alpha = 114.952^\circ$ $R = 97.00$ $T = 22.44$ $D = 44.9410$ $S = 8.0\%$ $E = 0.7$																
	Equation	$C = \frac{1}{R} \times K$ (mm.) $K = 405$																

LEYENDA DRENAJE

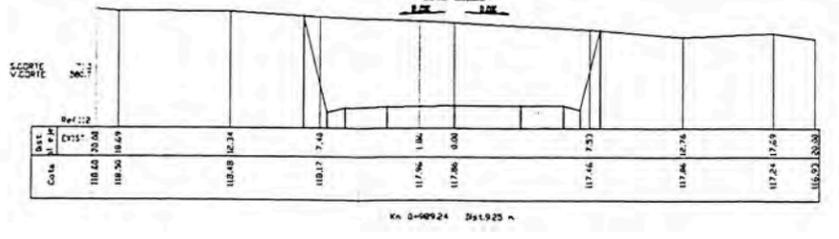
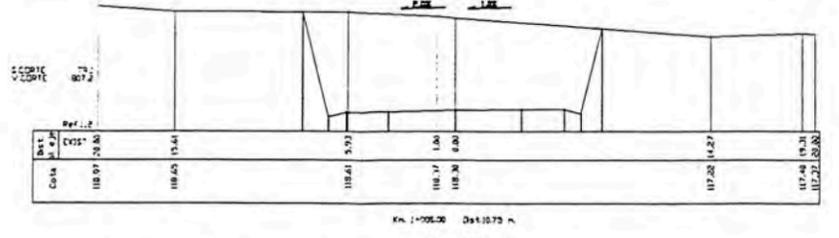
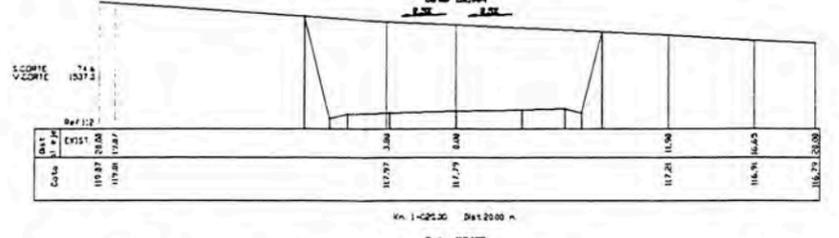
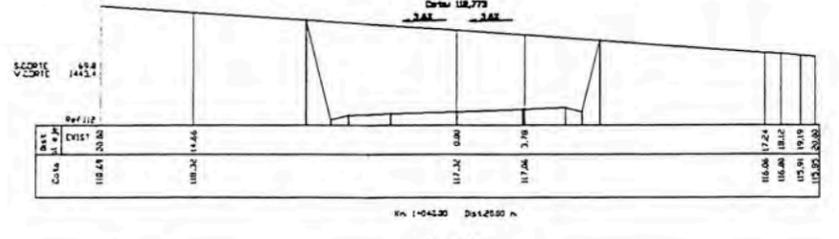
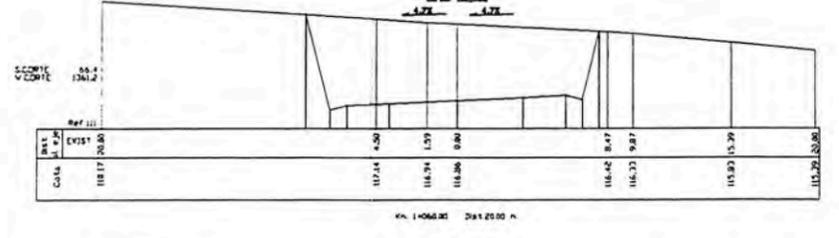
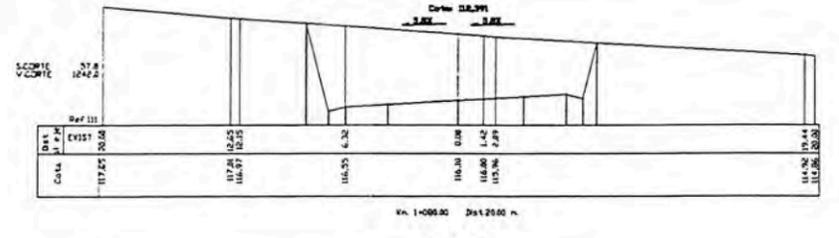
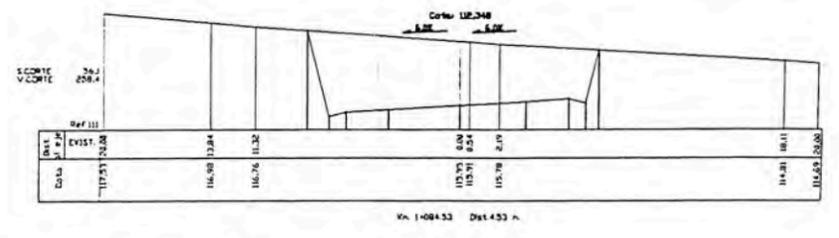
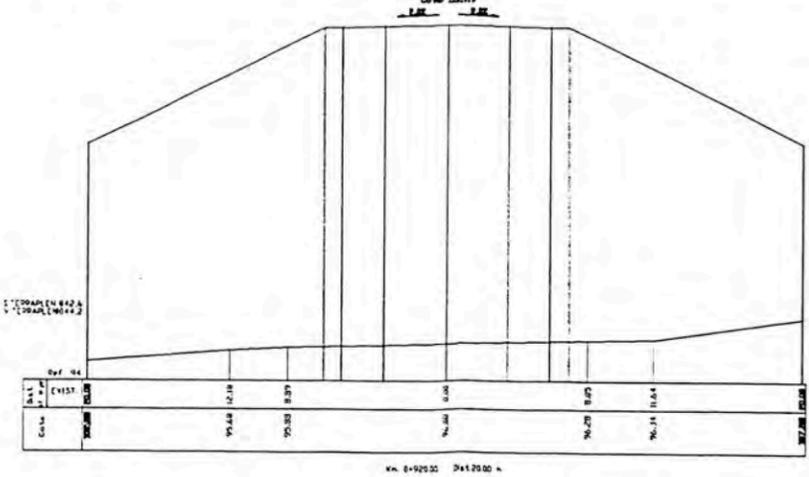
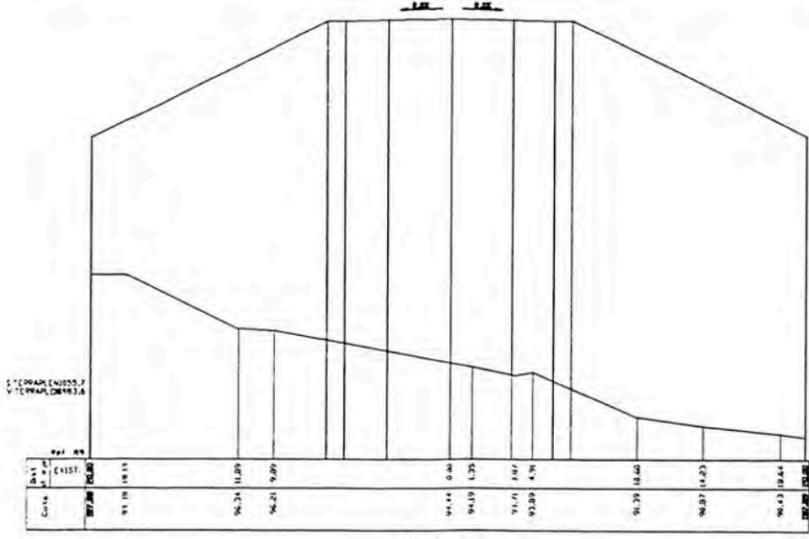
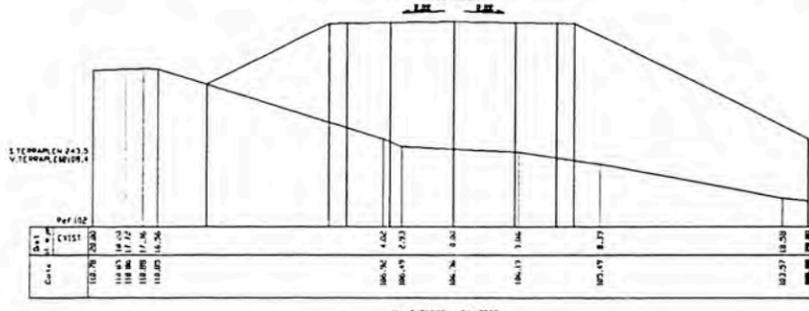
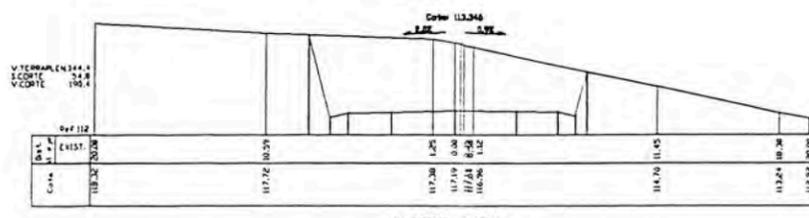
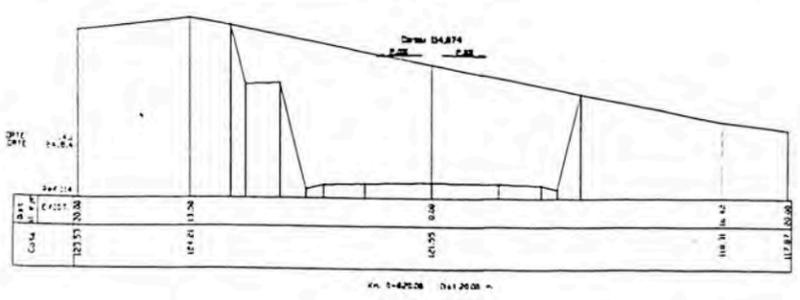
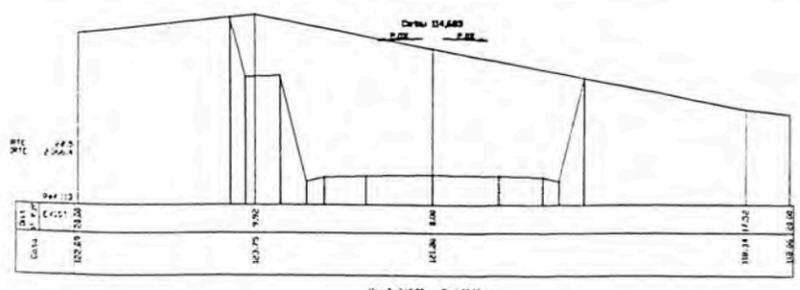
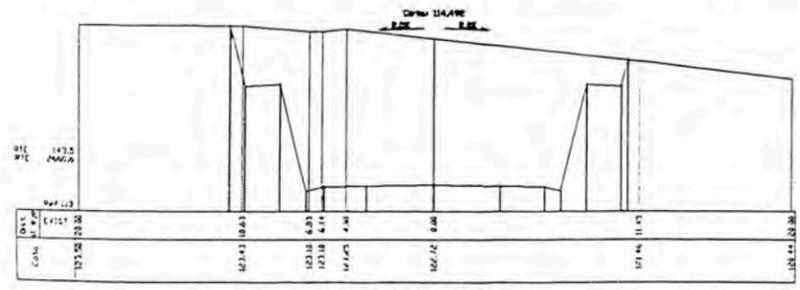
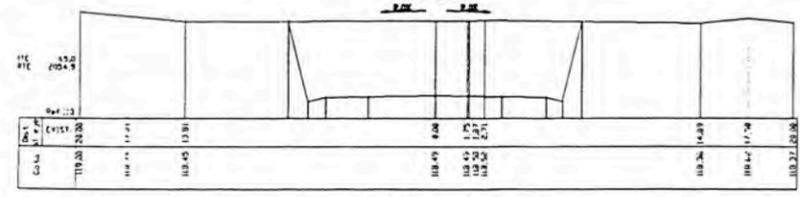
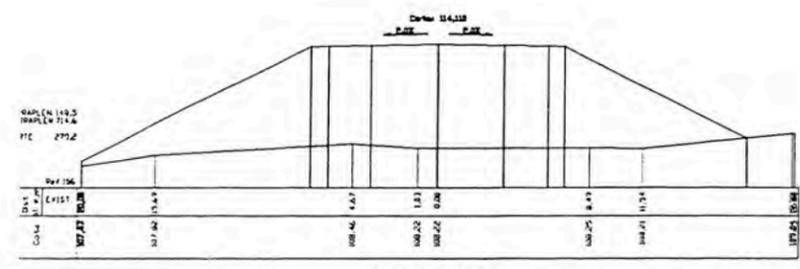
- ALCANTARILLA
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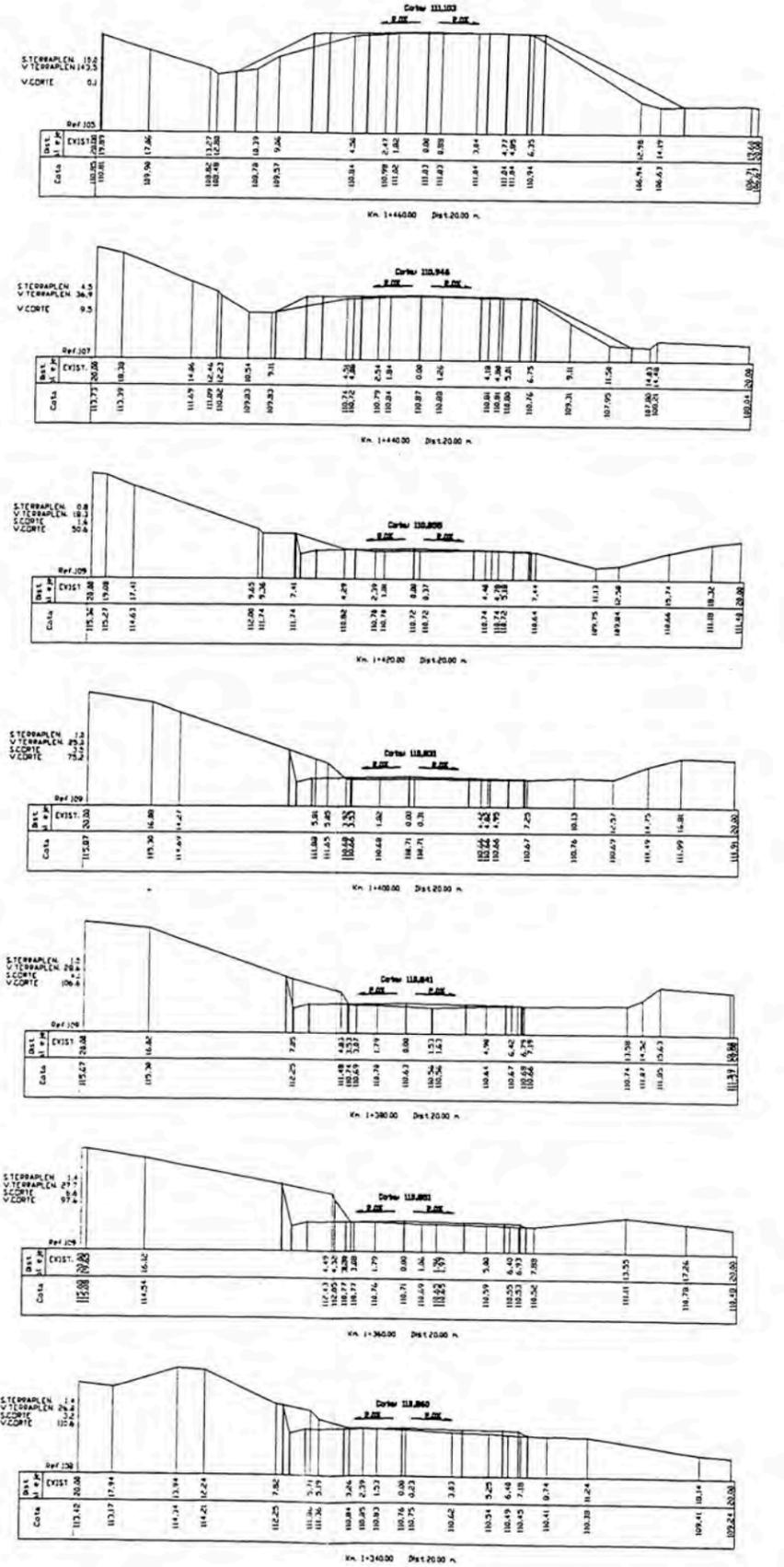
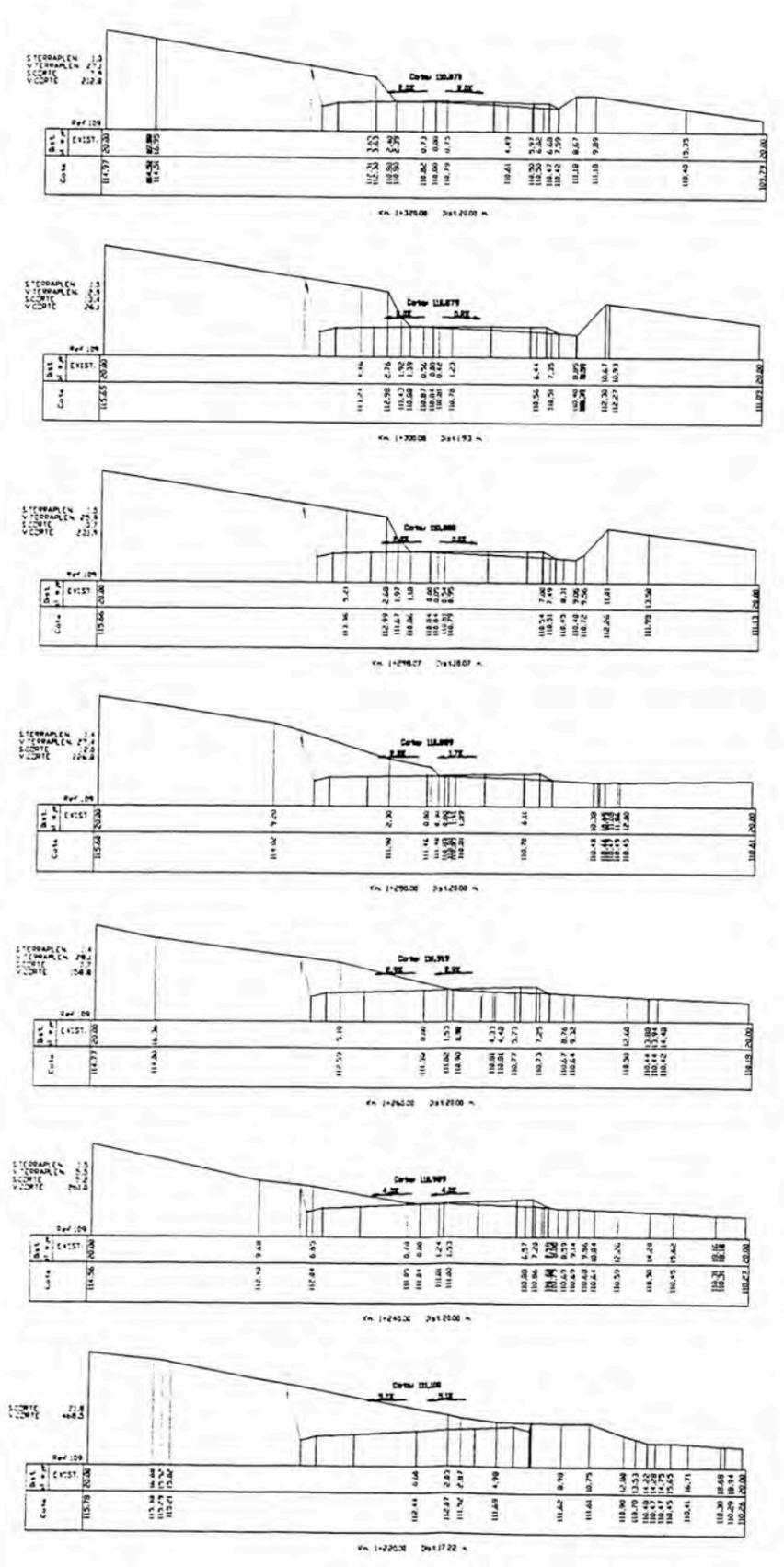
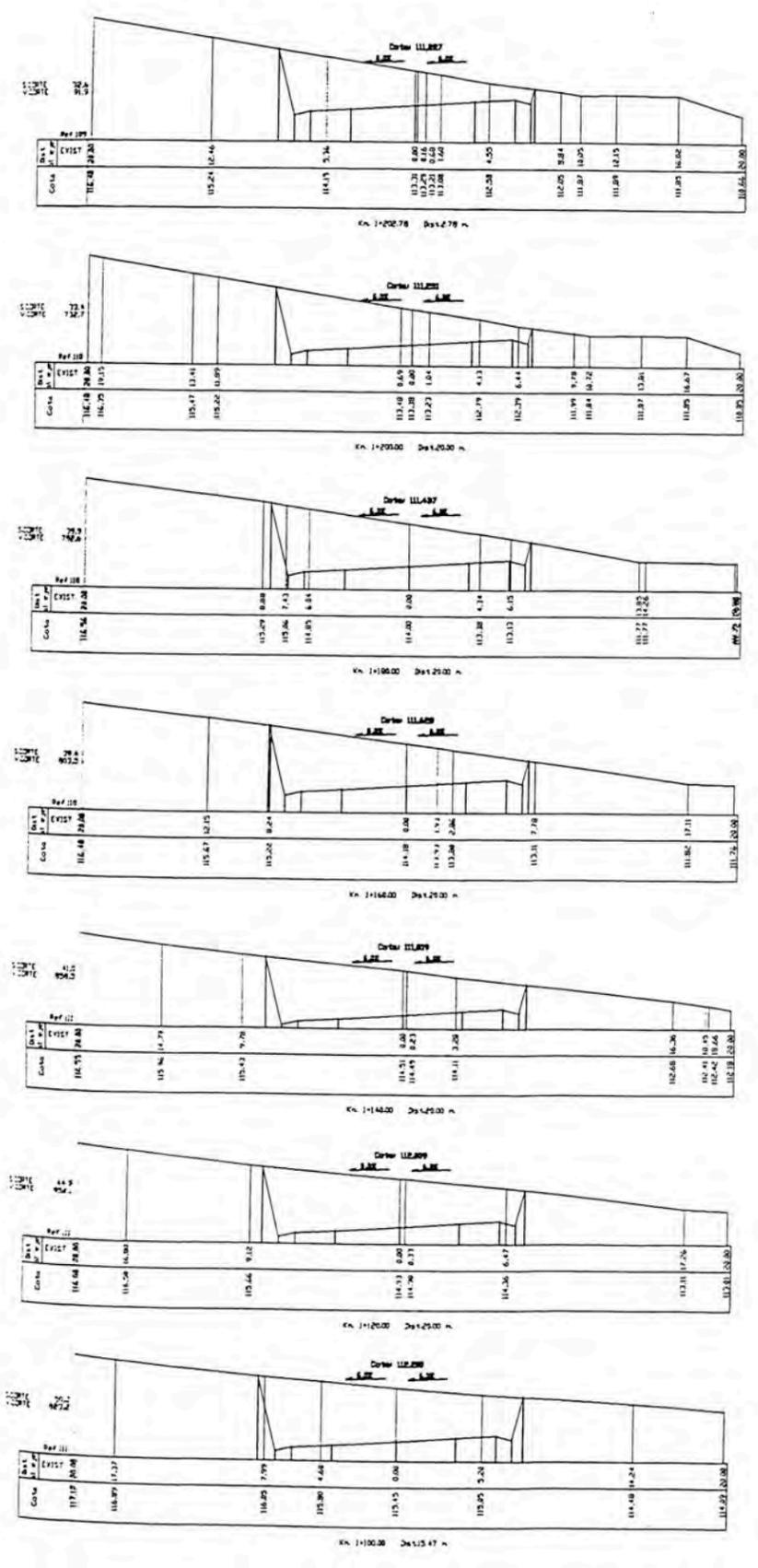




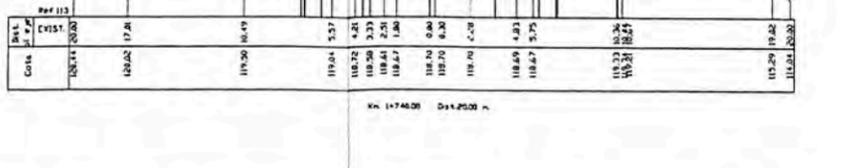
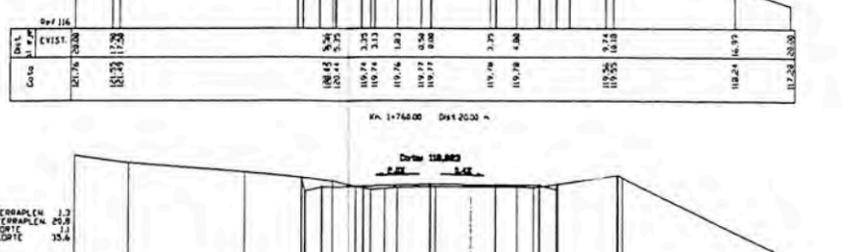
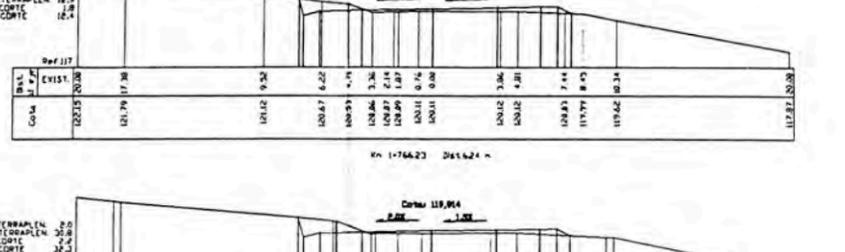
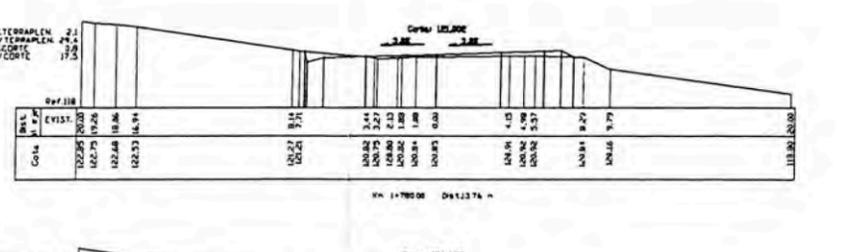
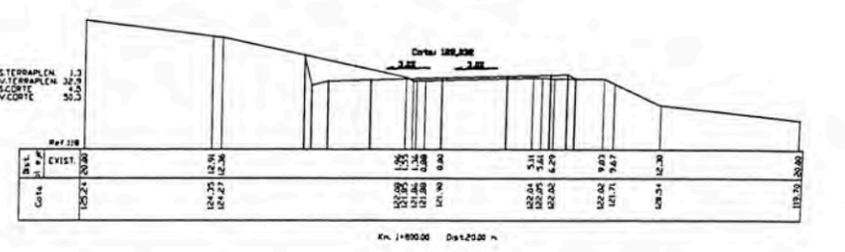
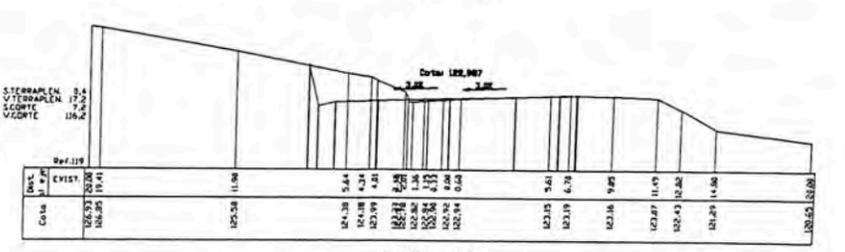
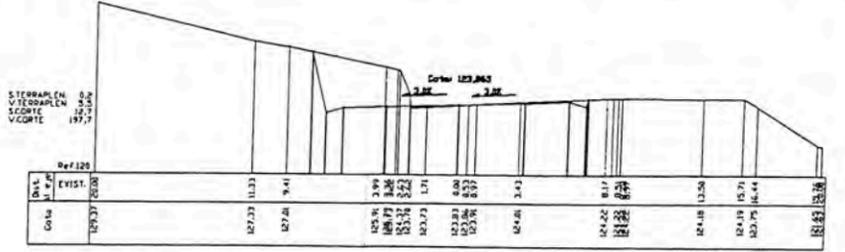
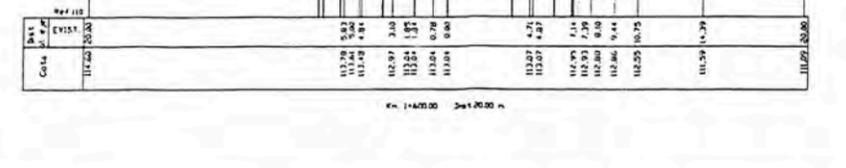
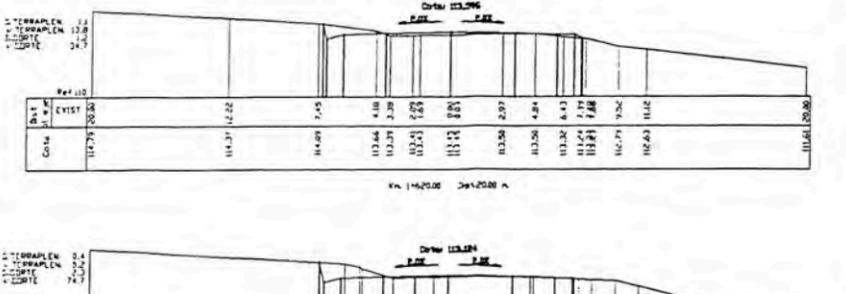
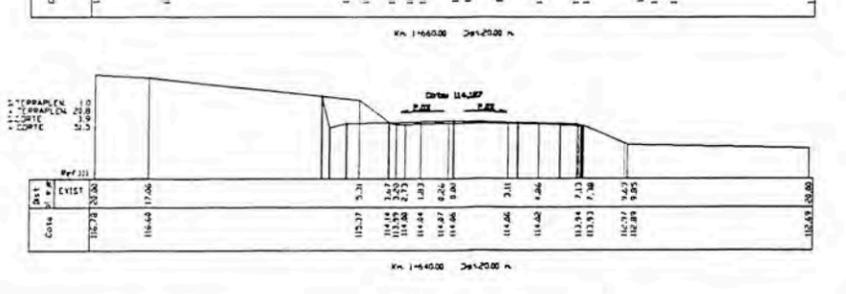
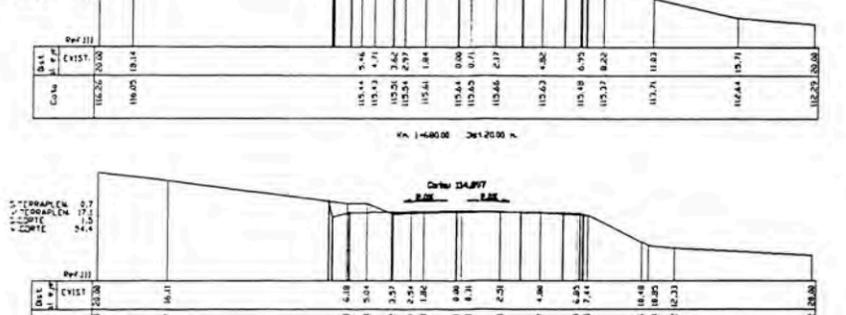
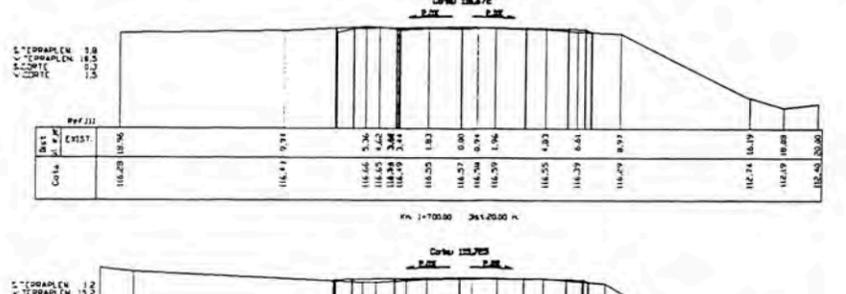
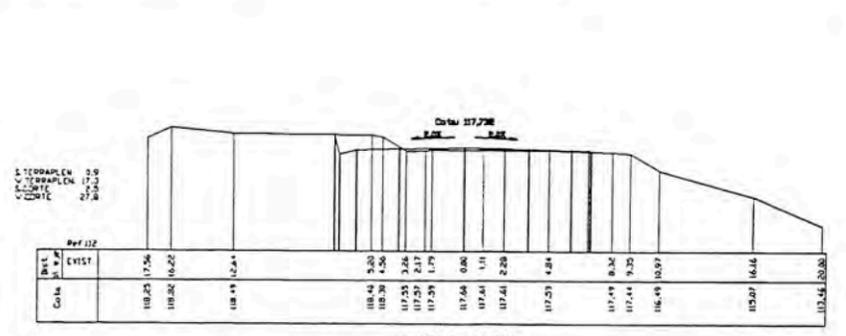
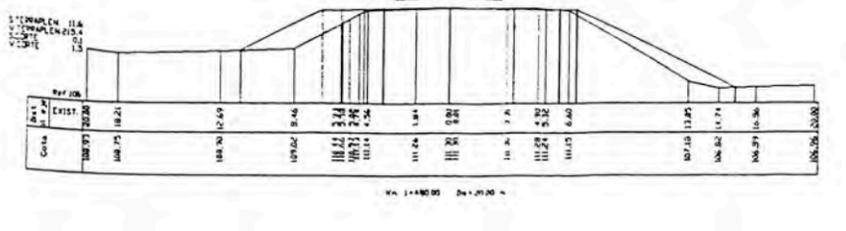
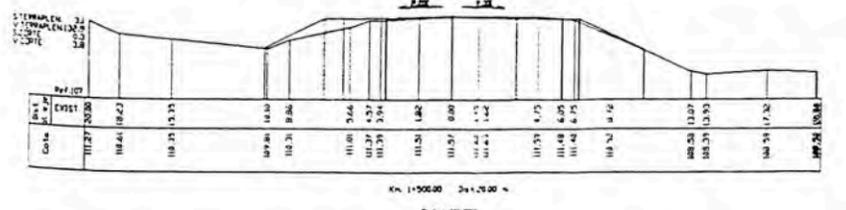
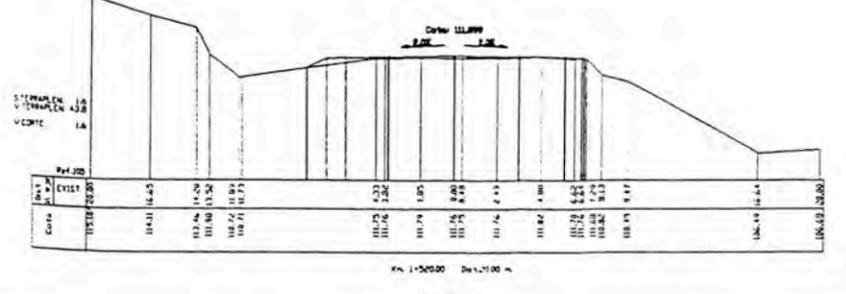
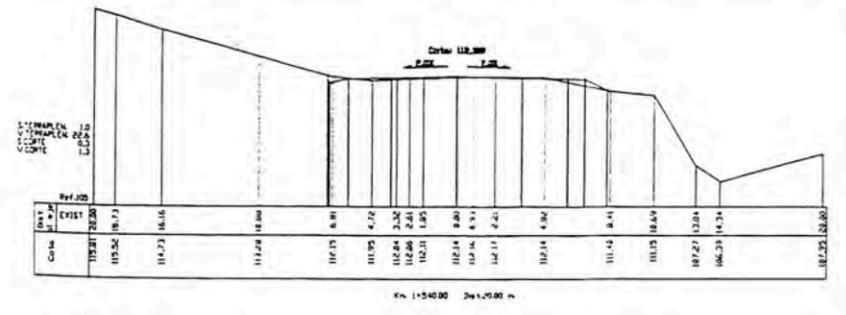
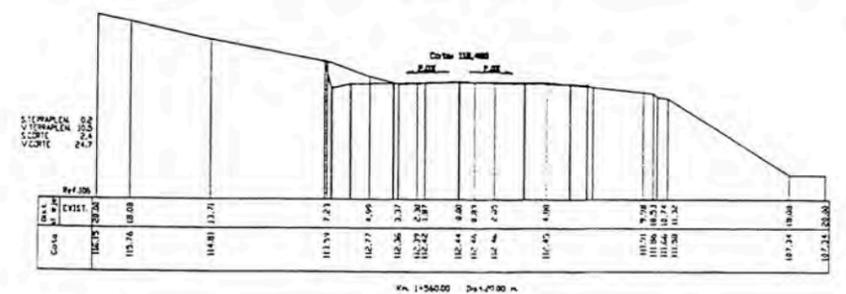
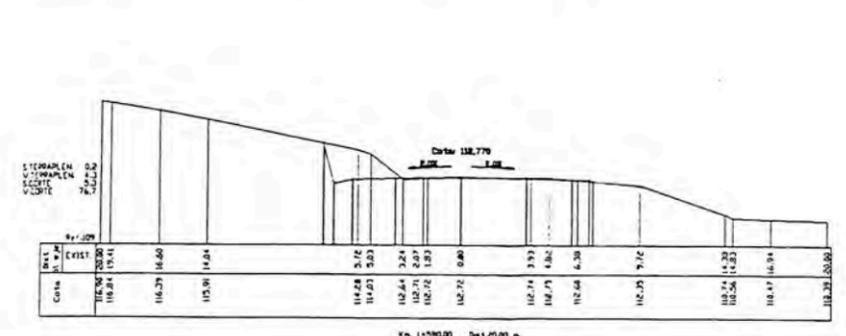


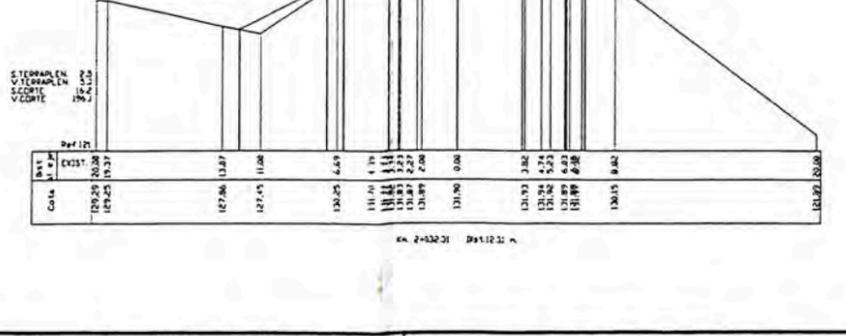
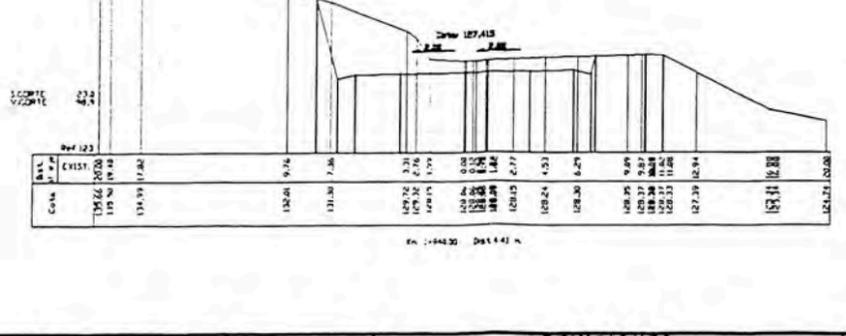
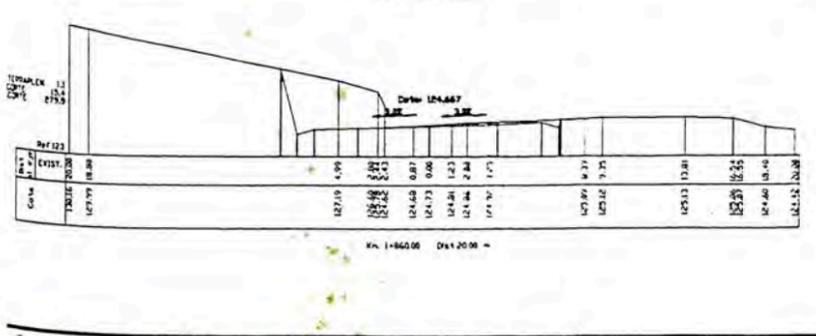
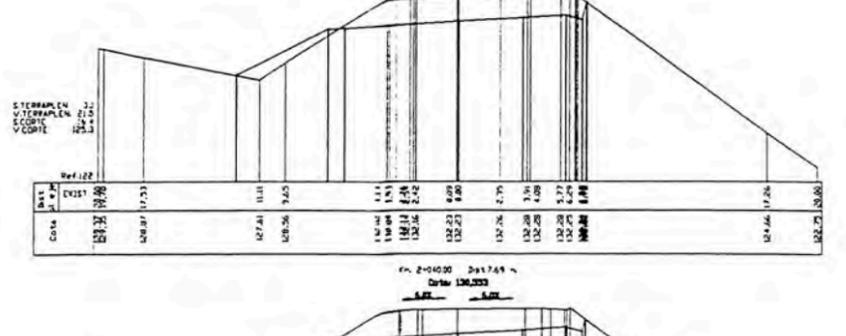
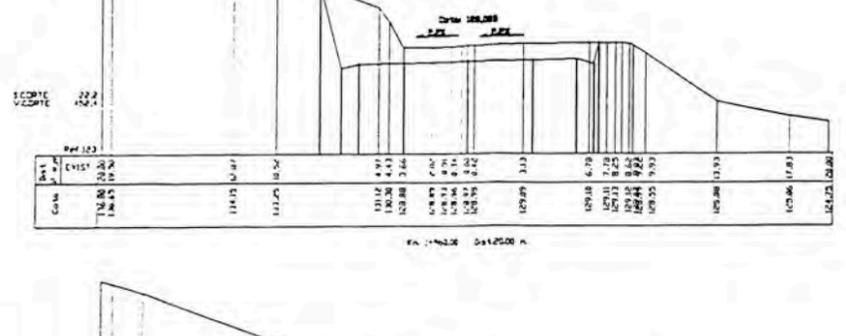
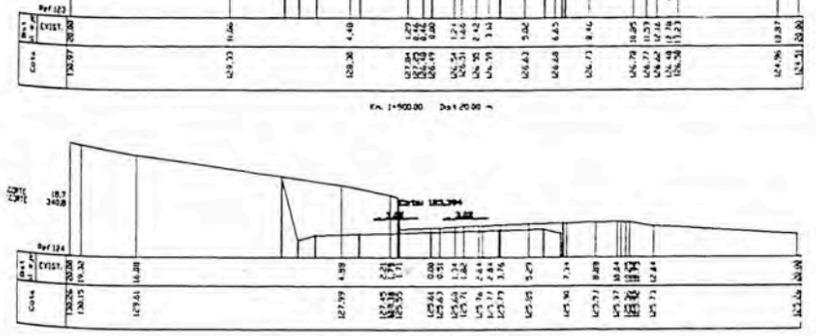
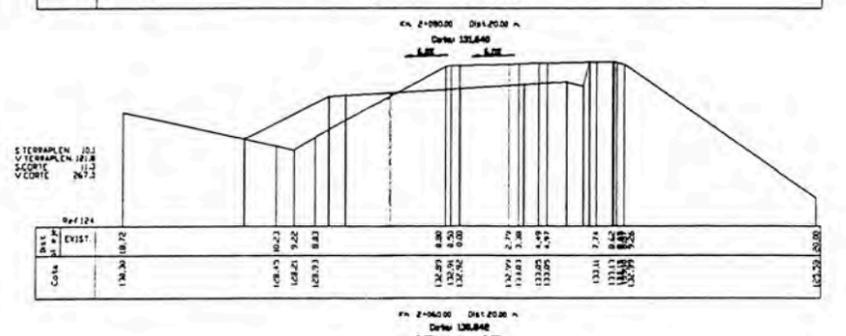
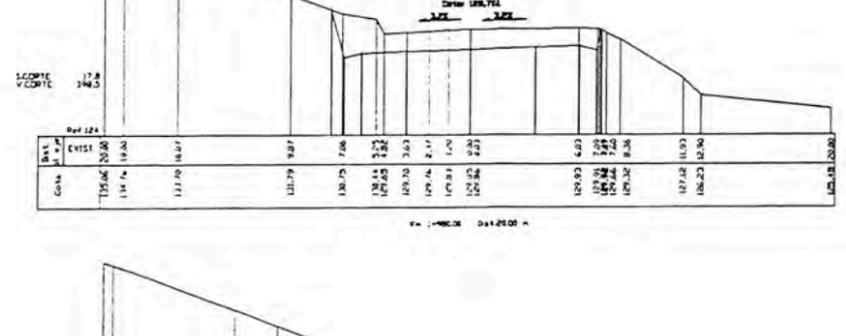
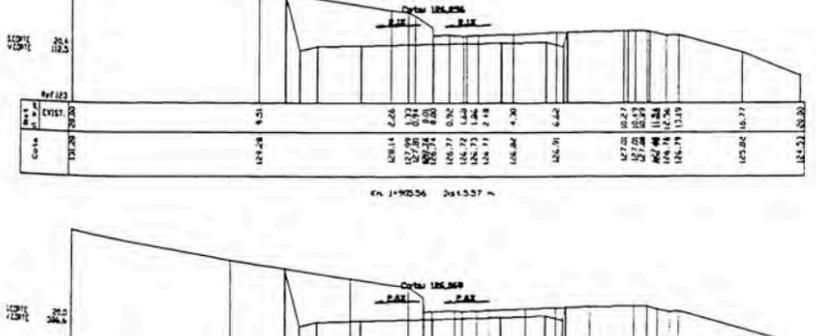
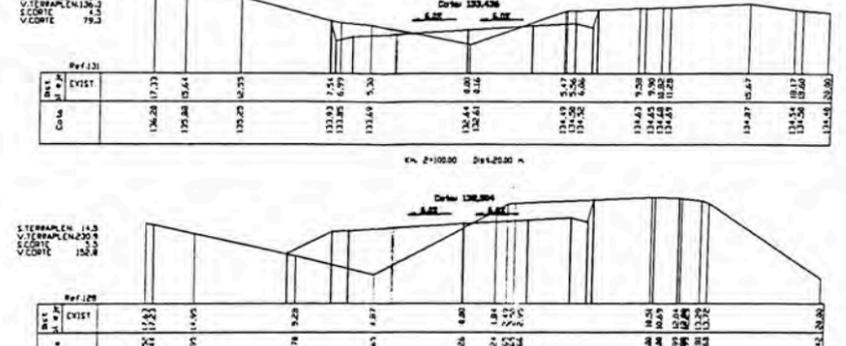
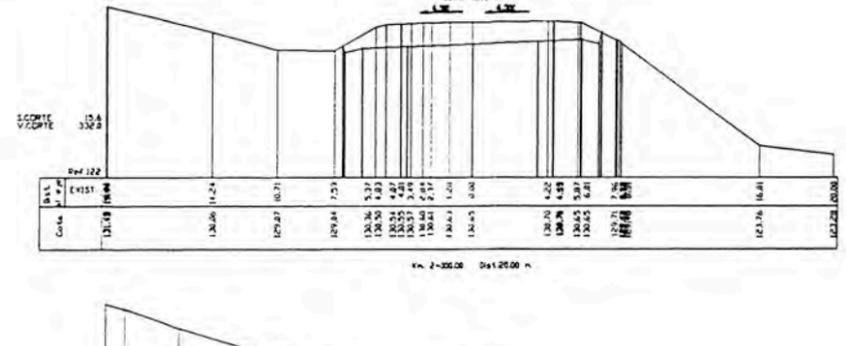
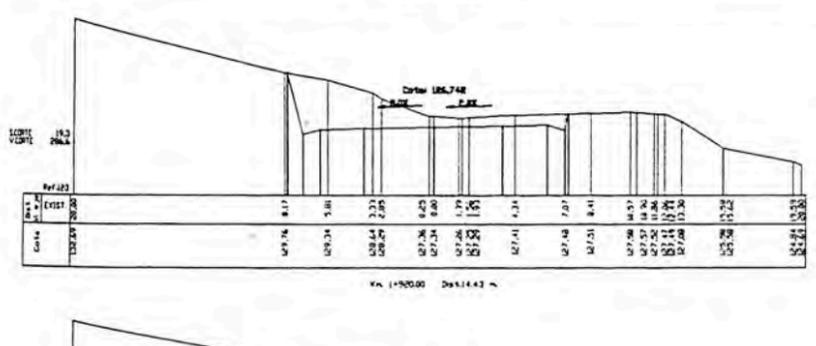
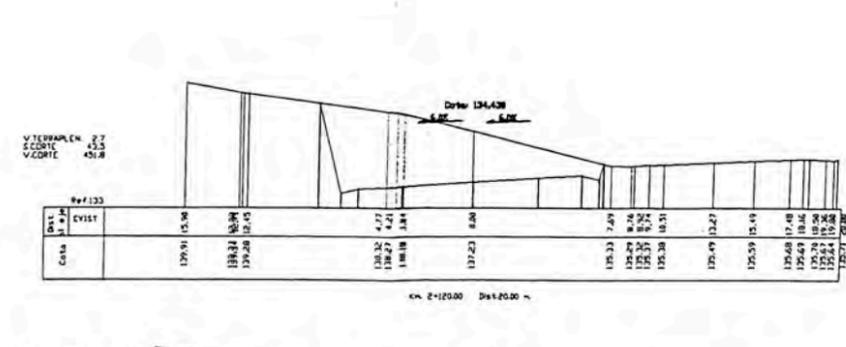
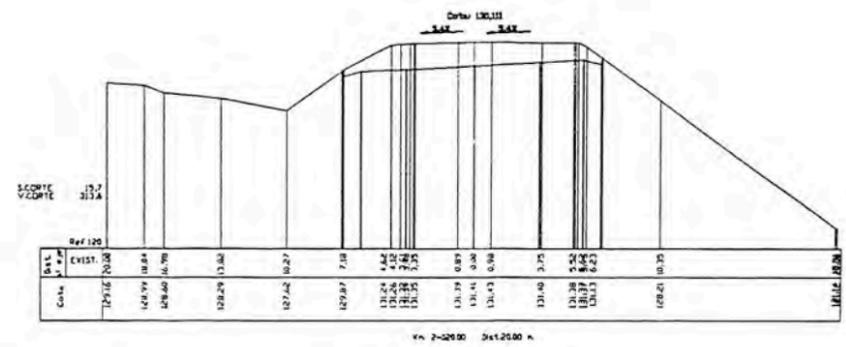
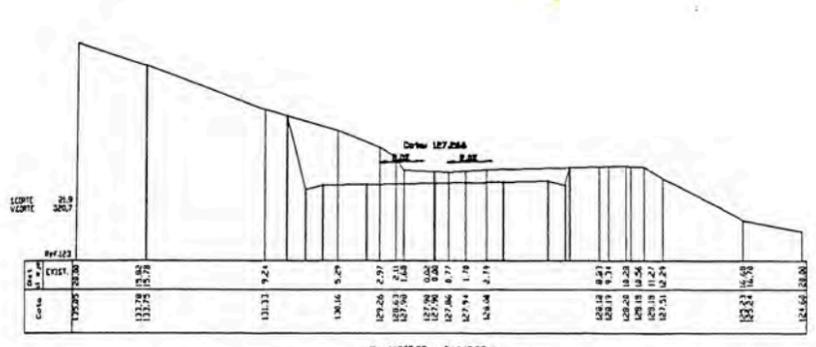
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Verificó:	Ing. G. Sotomayor B					
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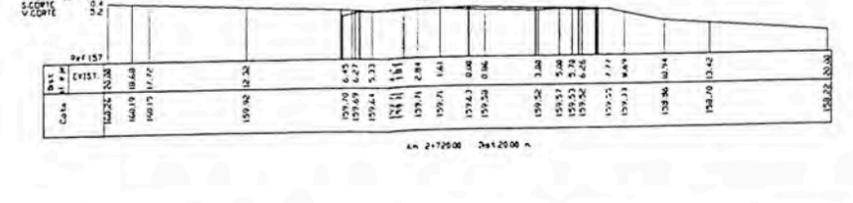
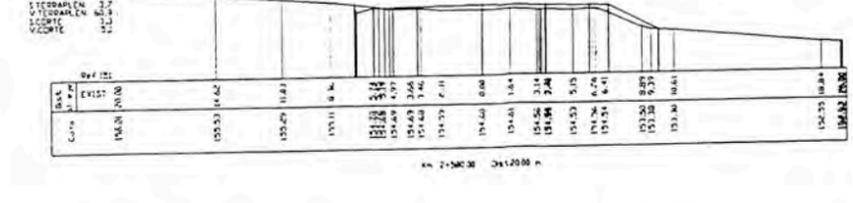
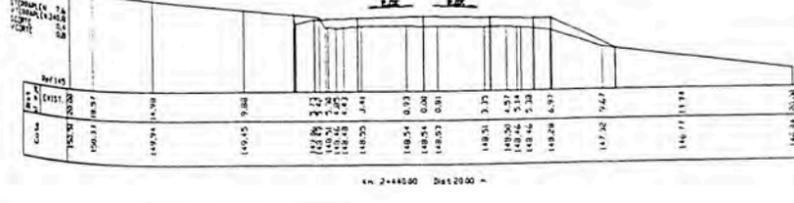
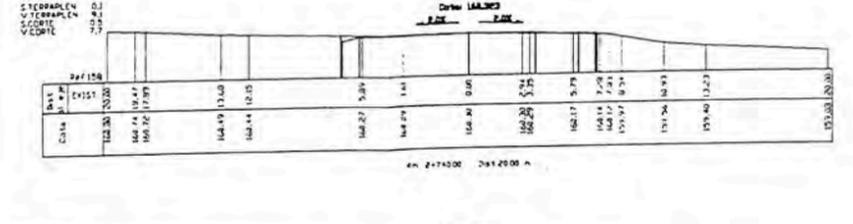
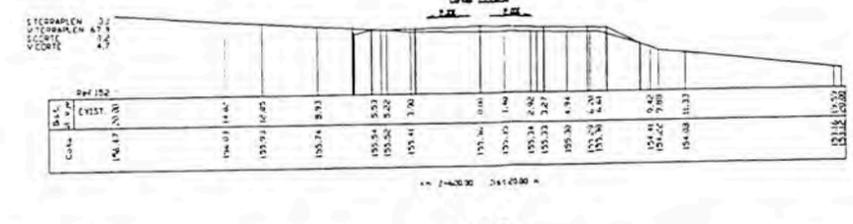
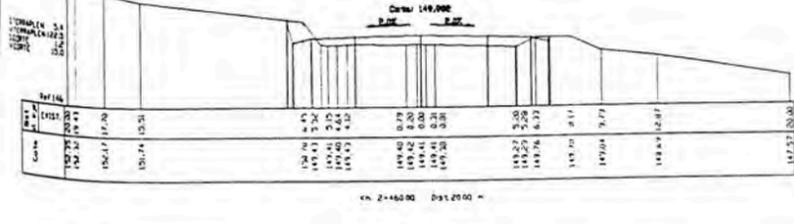
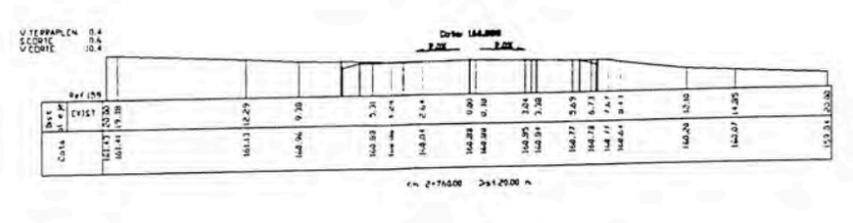
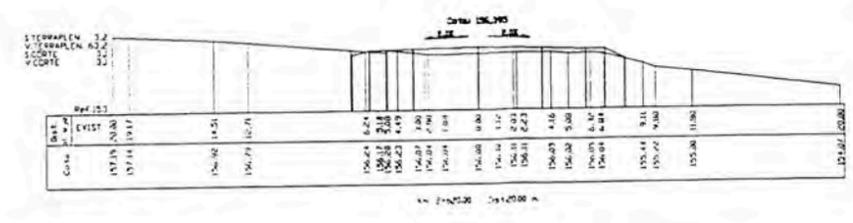
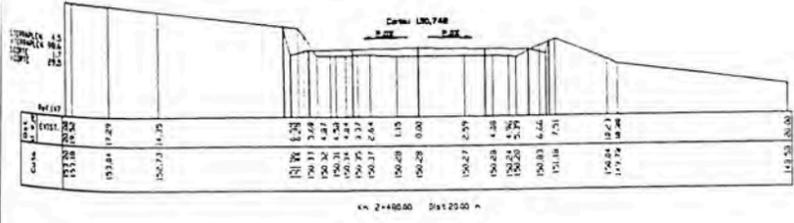
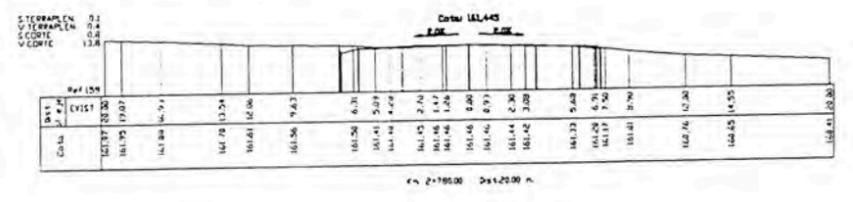
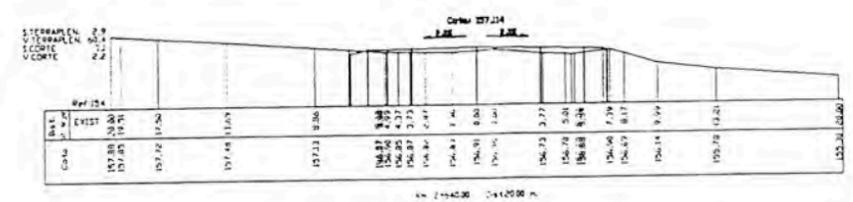
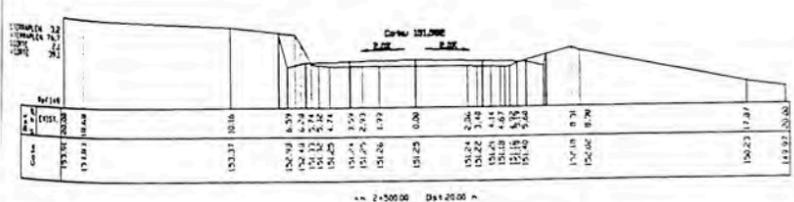
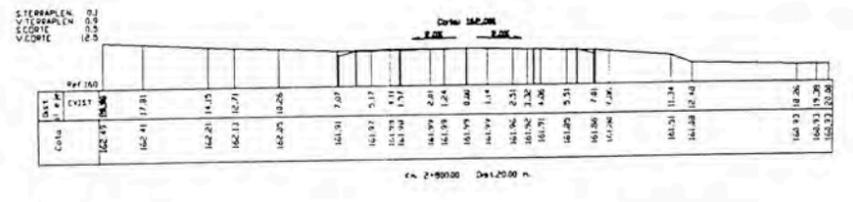
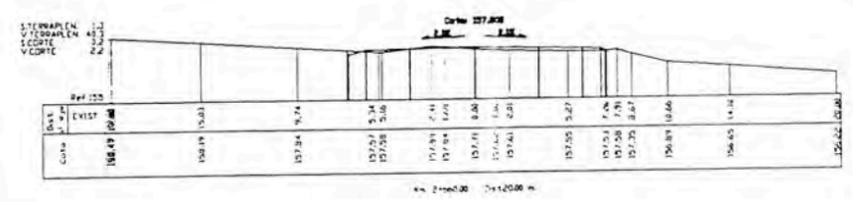
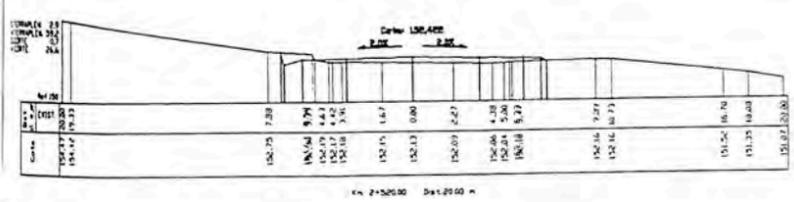
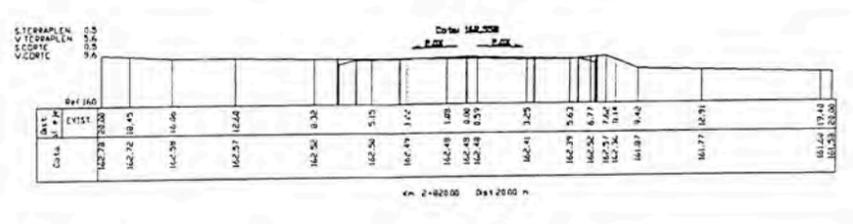
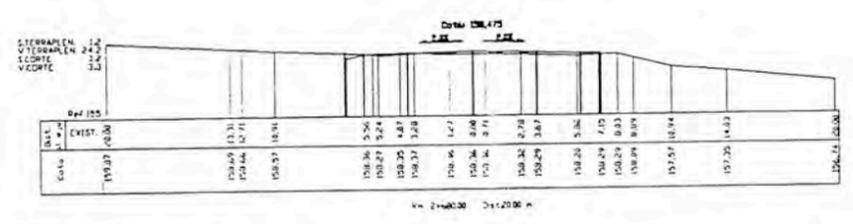
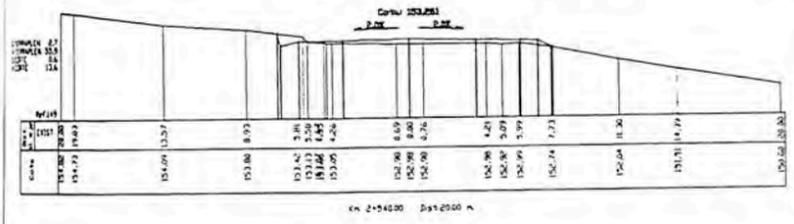
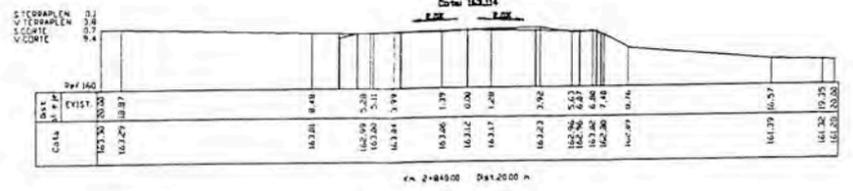
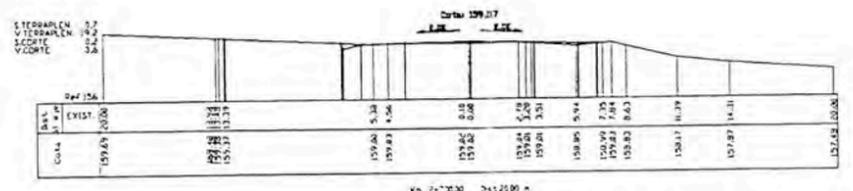
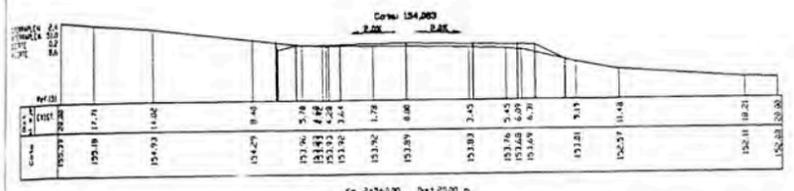




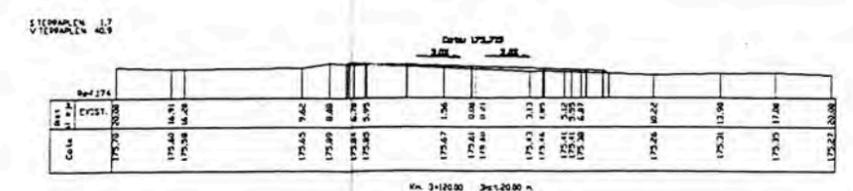
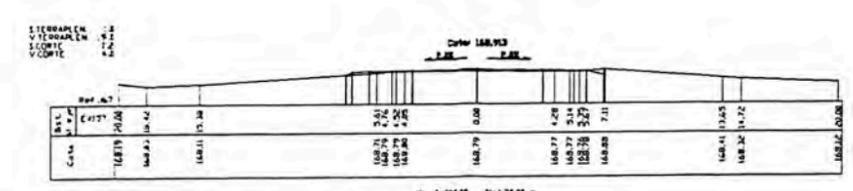
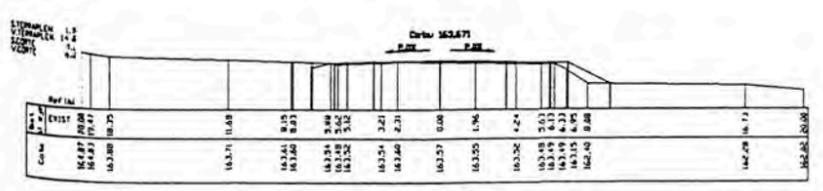
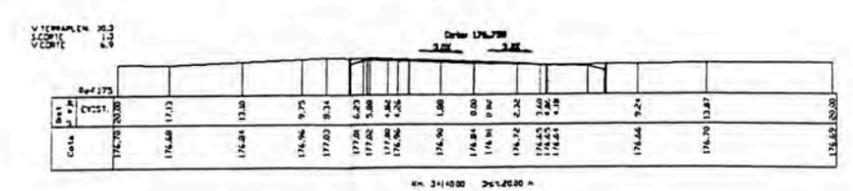
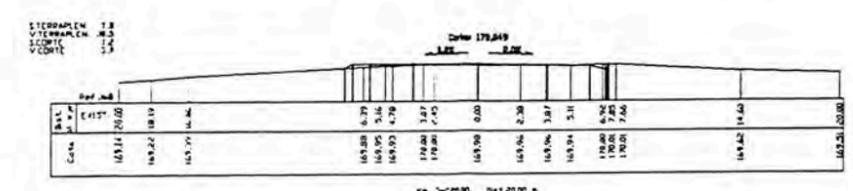
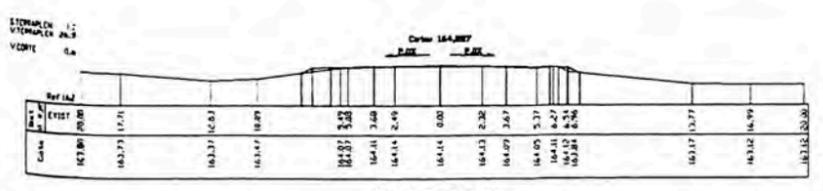
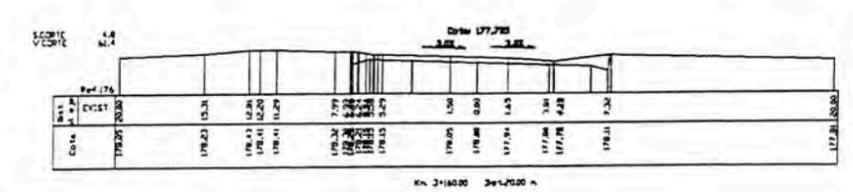
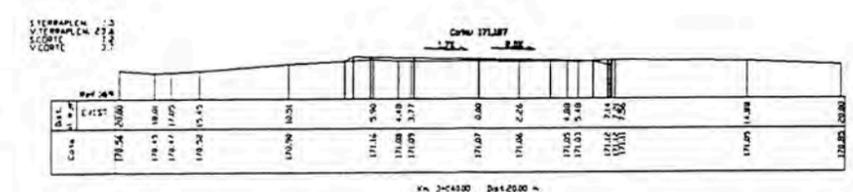
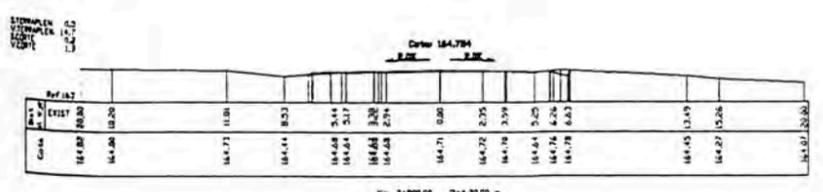
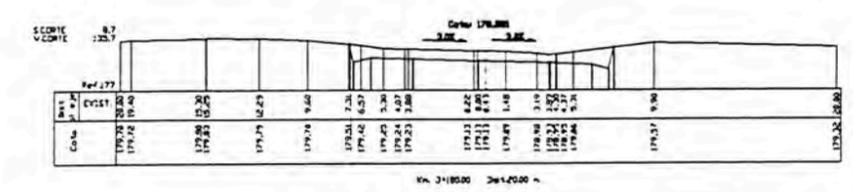
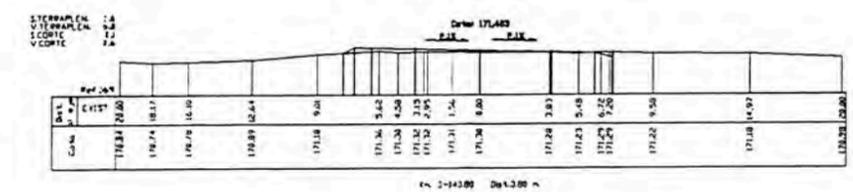
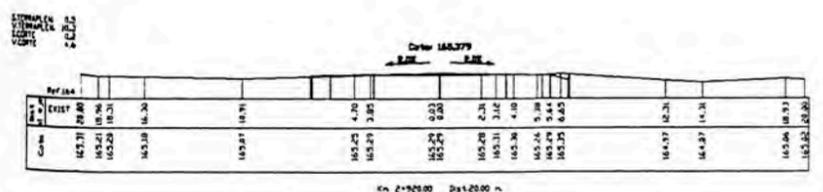
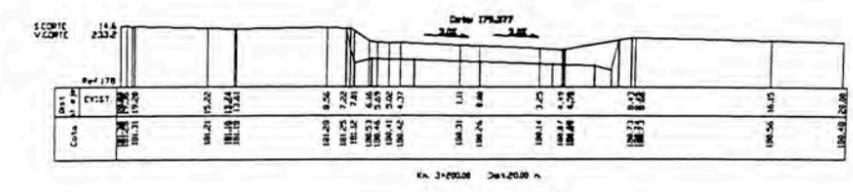
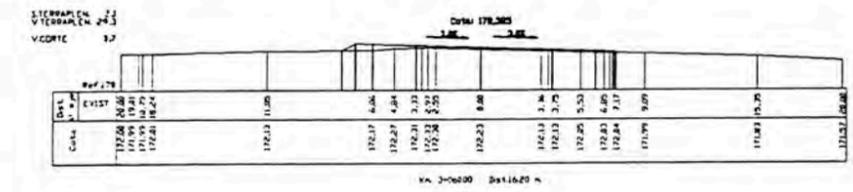
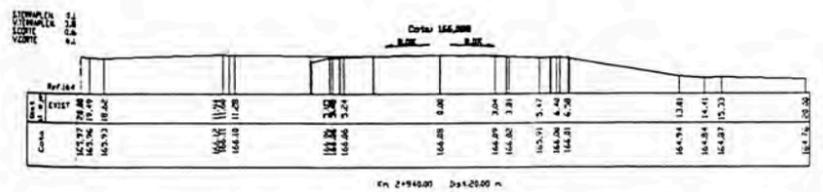
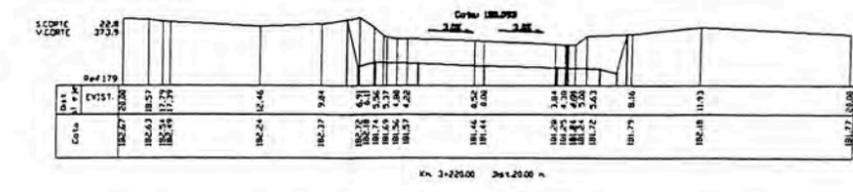
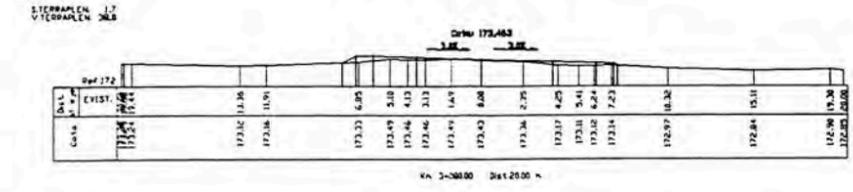
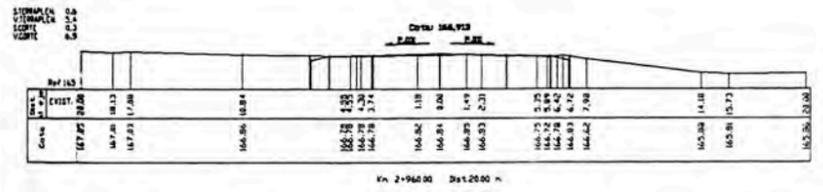
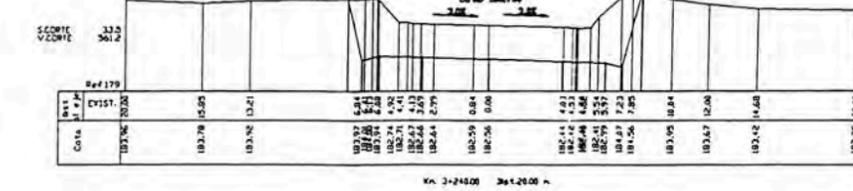
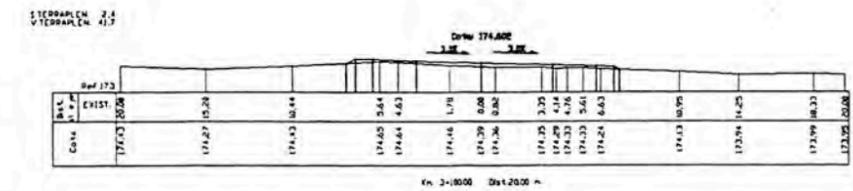
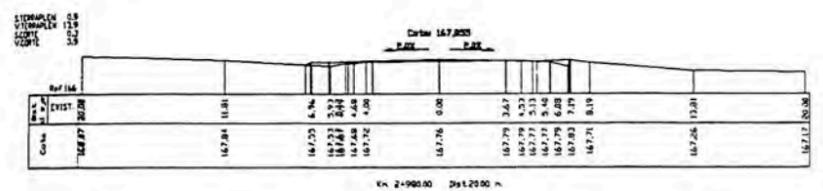
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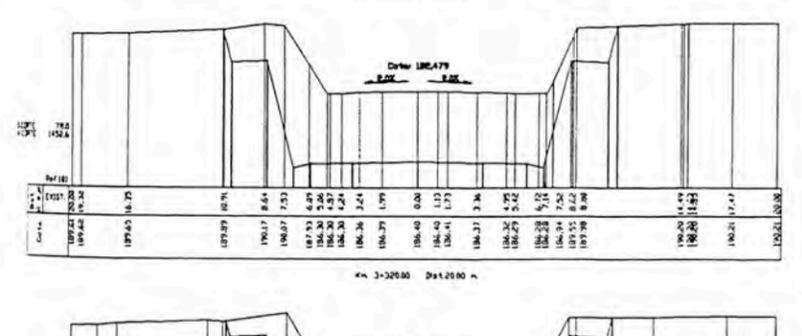
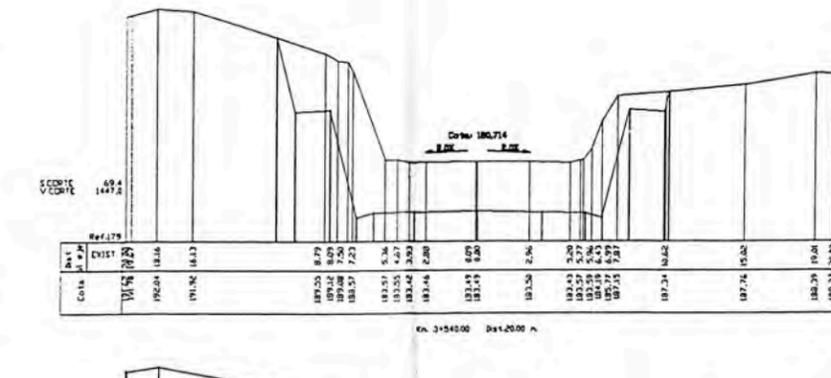
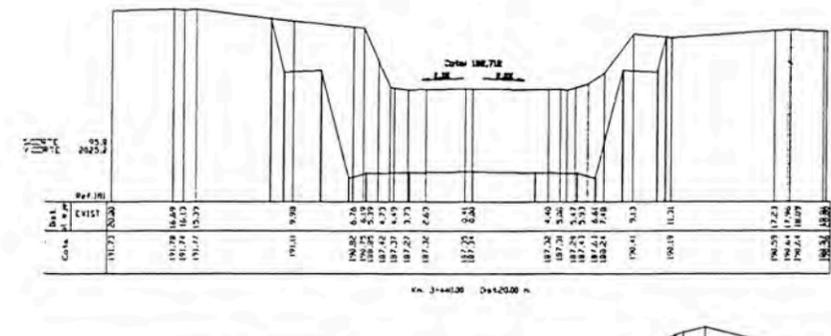
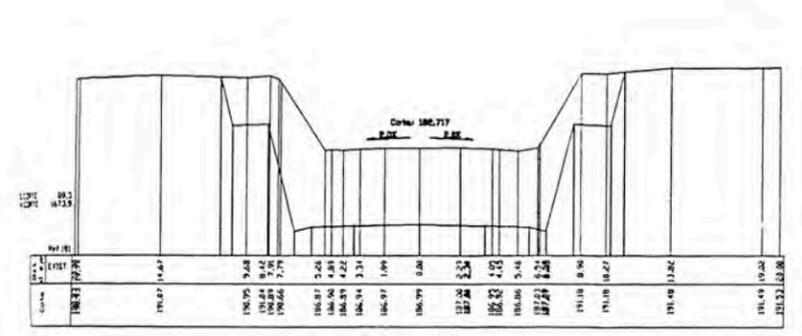


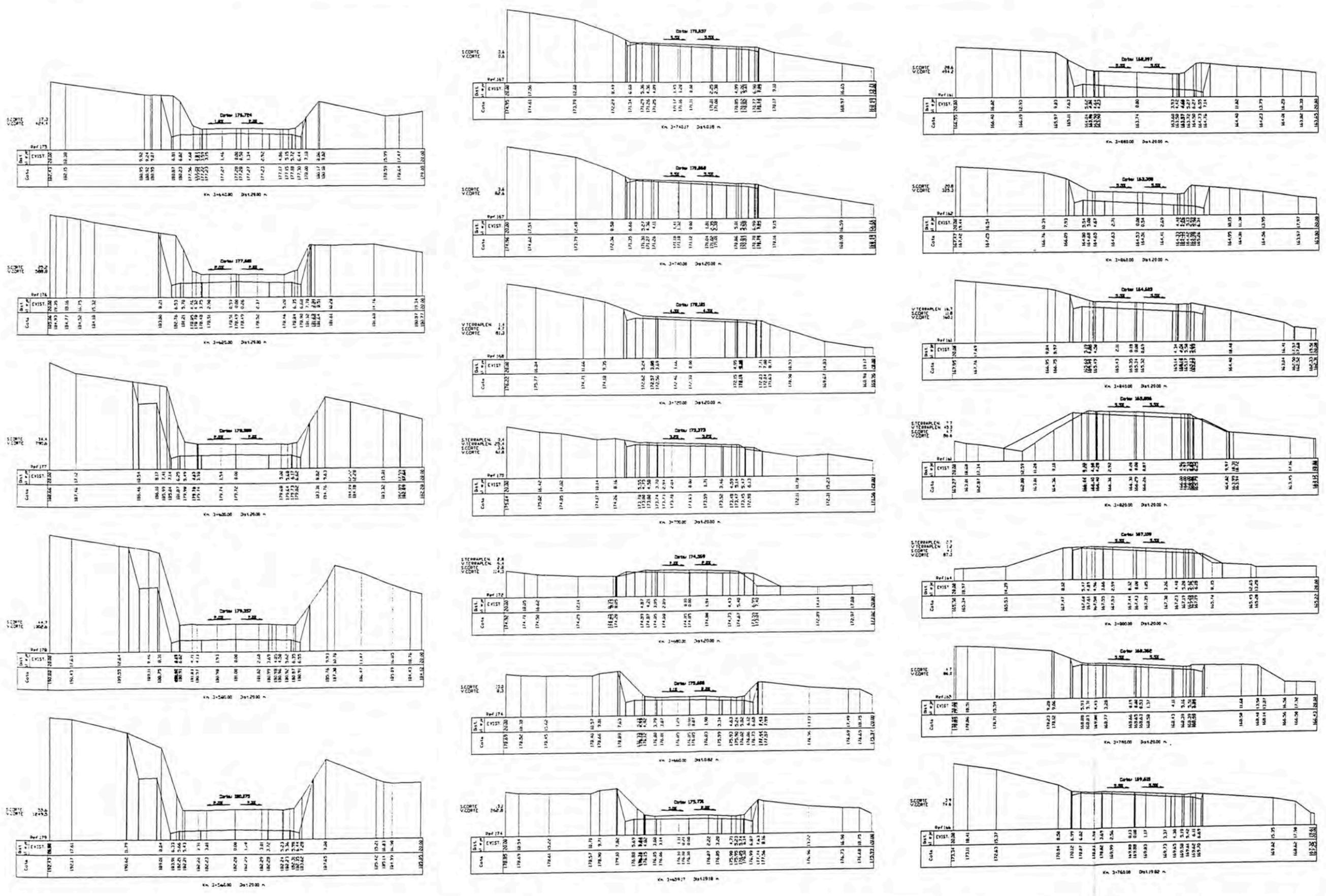


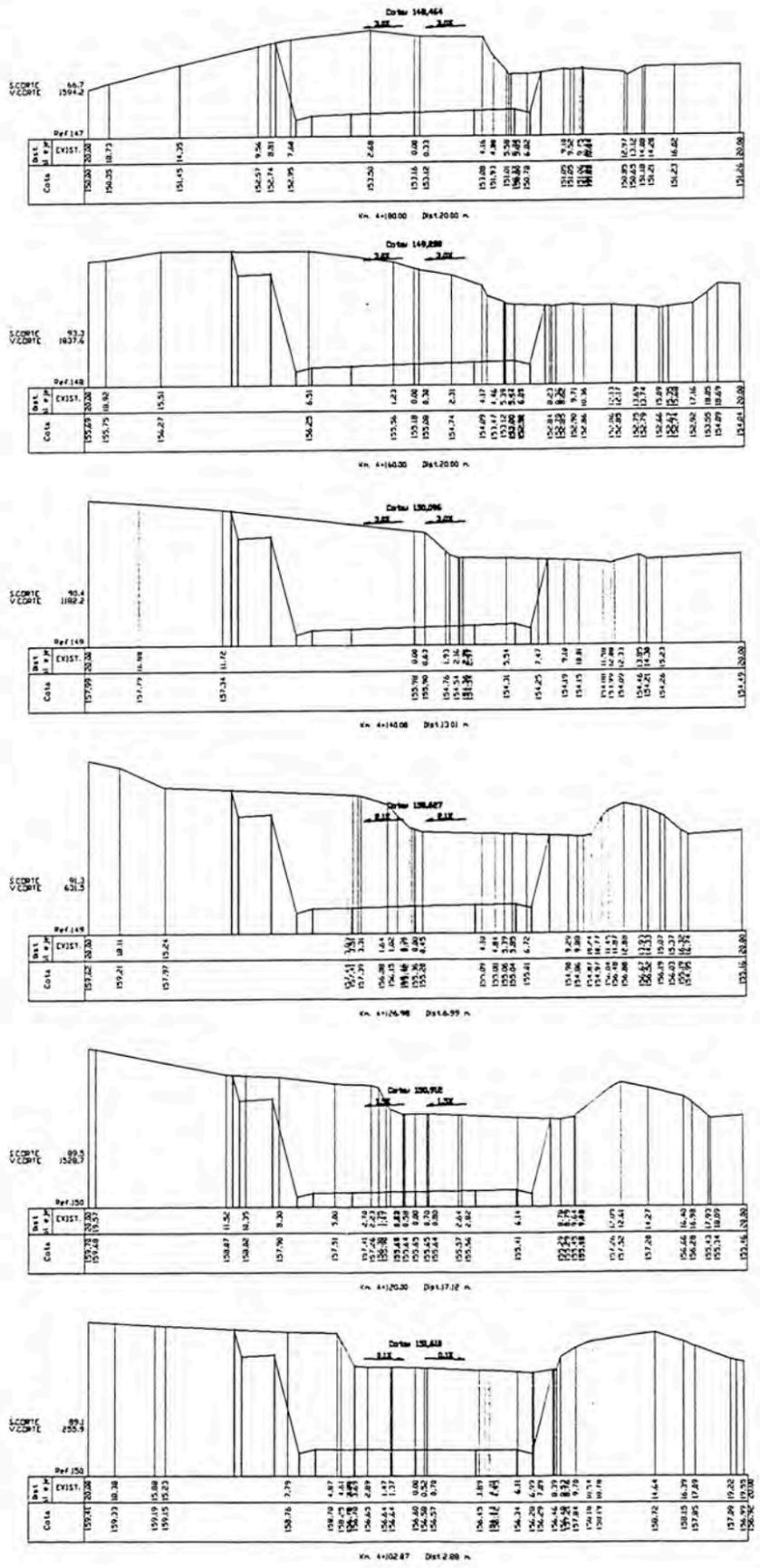
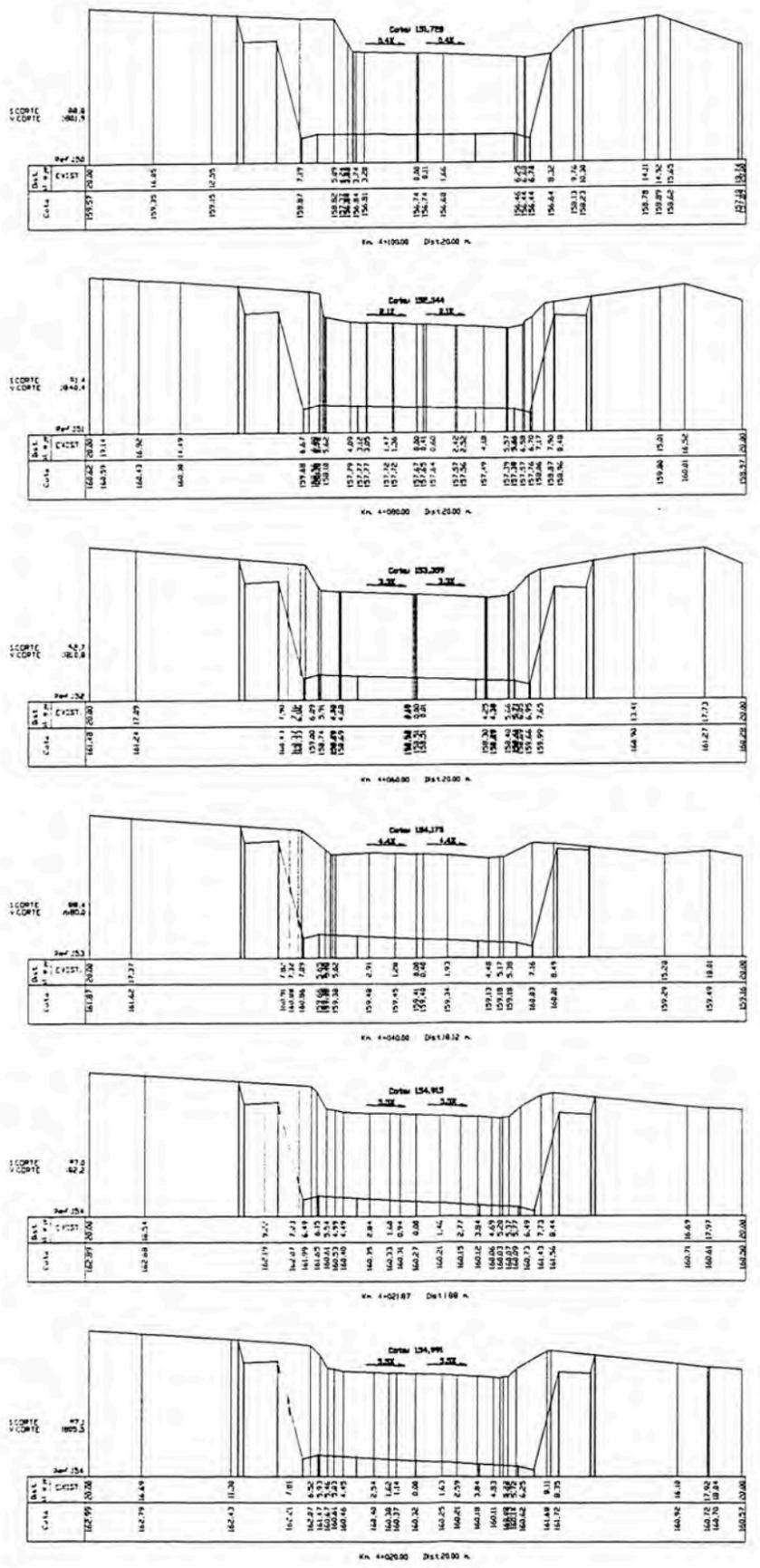
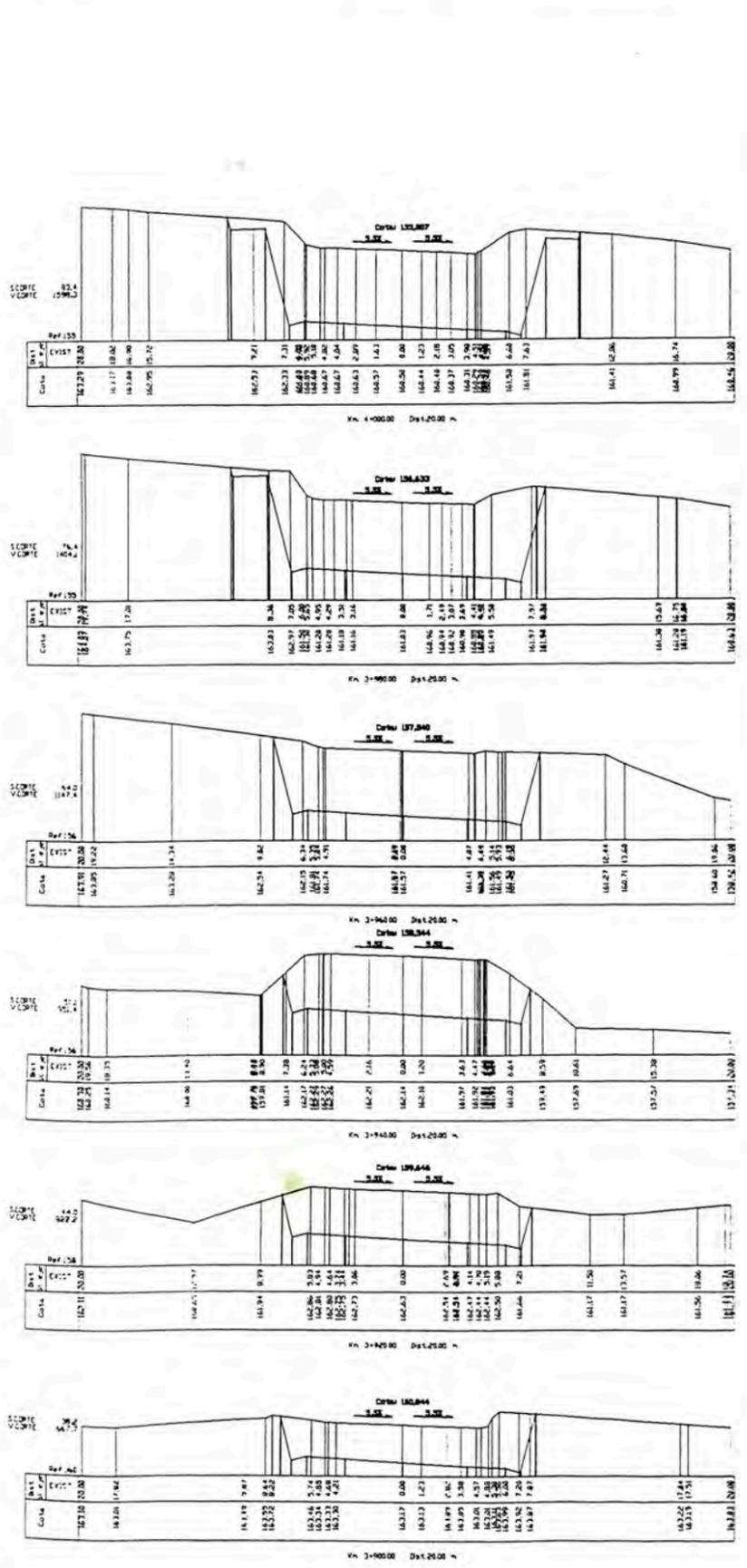


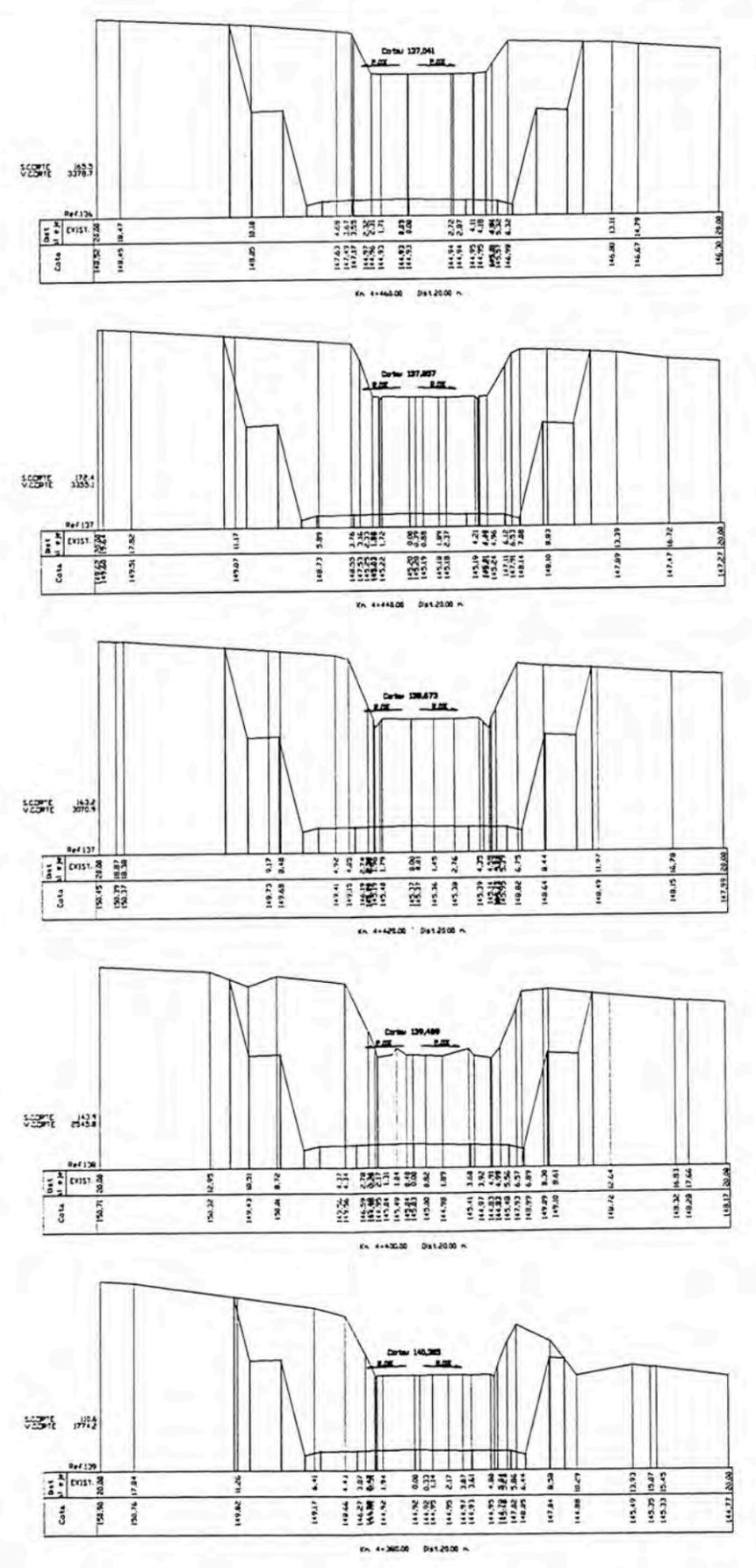
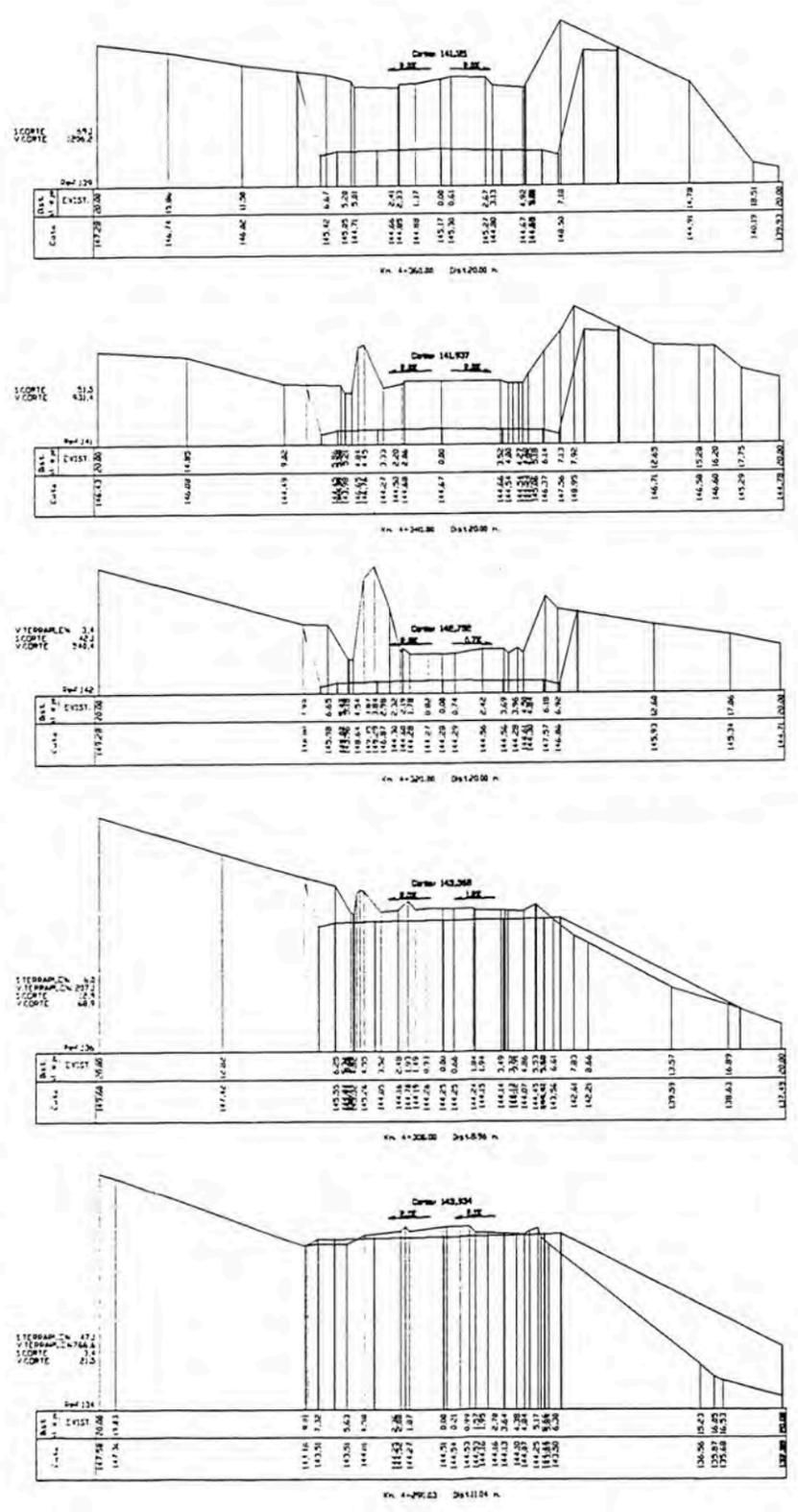
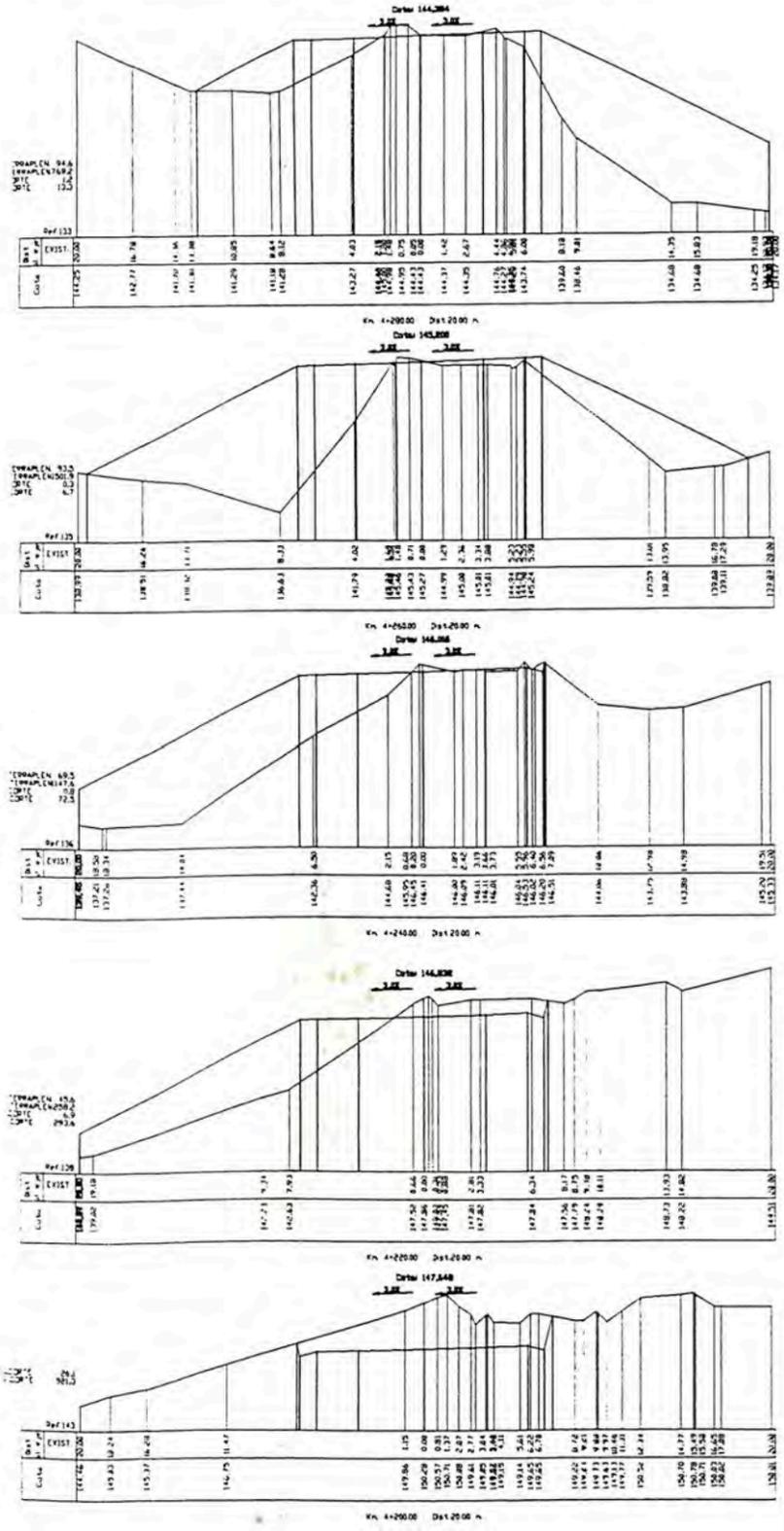
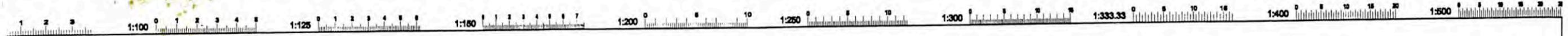
 UNIVERSIDAD NACIONAL DE INGENIERÍA FACULTAD DE INGENIERÍA CIVIL DEPARTAMENTO ACADÉMICO DE TOPOGRAFÍA Y VÍAS DE TRANSPORTE	Diseñó: Beth. A. Layre U Dibujó: A.L.U. Verificó: Ing. G. Brindley B. CIP 19991 Presentó: Beth. A. Layre U	Aprobó:	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">REVISIONES</th> </tr> <tr> <th style="width: 5%;">Nº</th> <th style="width: 10%;">FECHA</th> <th style="width: 85%;">DESCRIPCIÓN</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONES		Nº	FECHA	DESCRIPCIÓN							ESTUDIOS DE INGENIERÍA PARA EL DISEÑO GEOMÉTRICO DE LA CARRETERA MATARANI - ILO	SECTOR: MATARANI - MOLLEDO SECCIONES TRANSVERSALES km. 2+440.00 - km. 2+840.00	ESCALA: 1:400 FECHA: DICIEMBRE 2000 PT - 010
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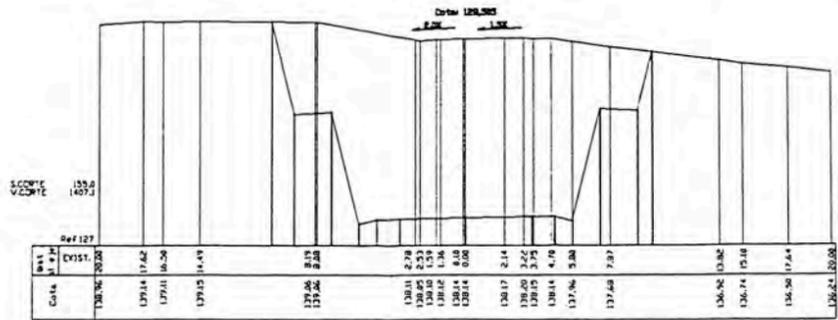
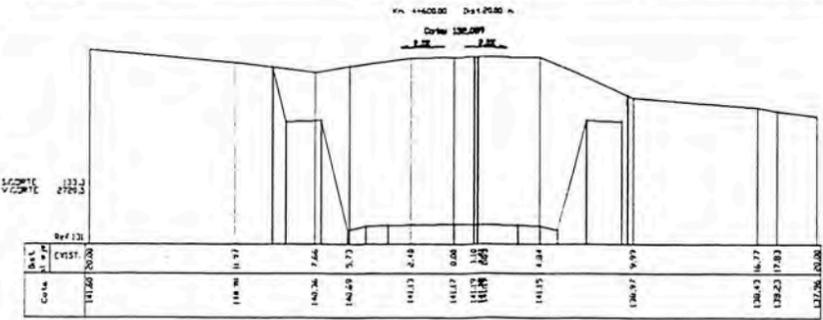
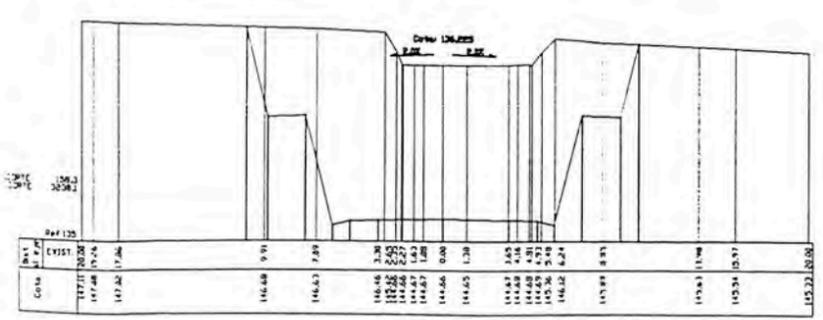
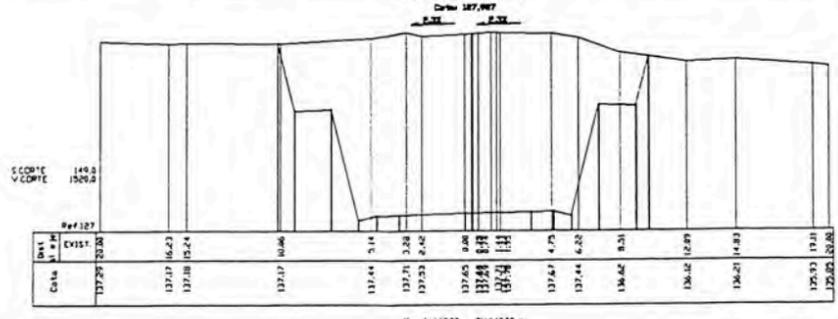
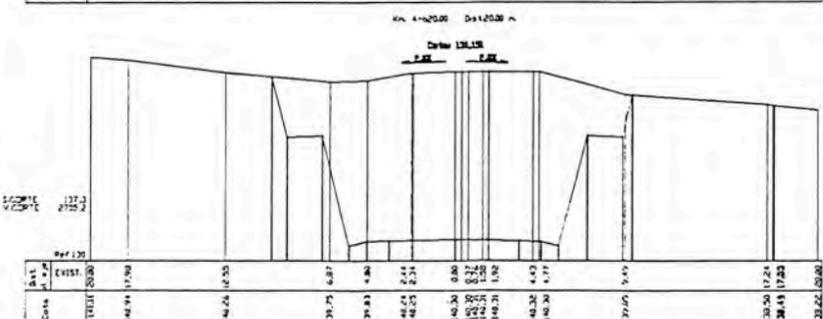
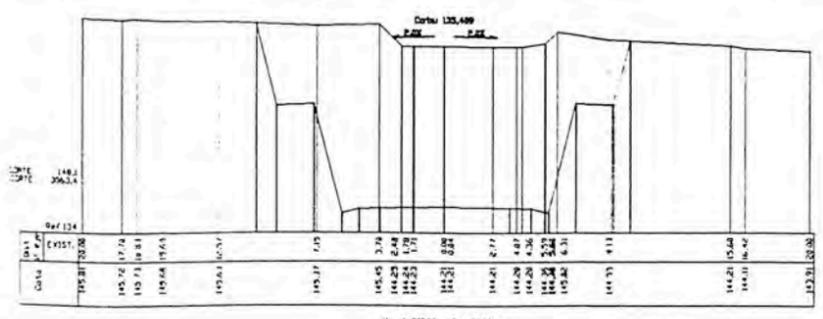
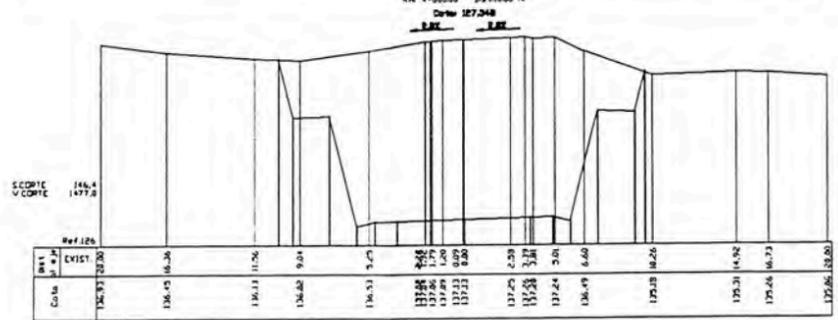
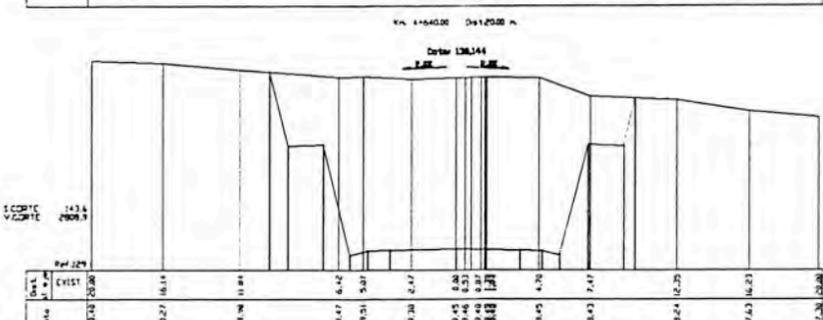
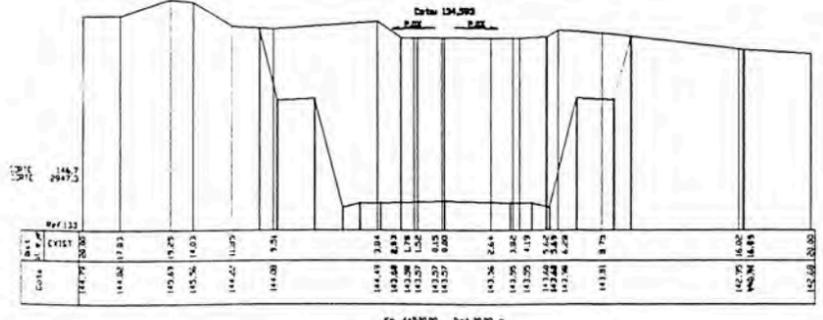
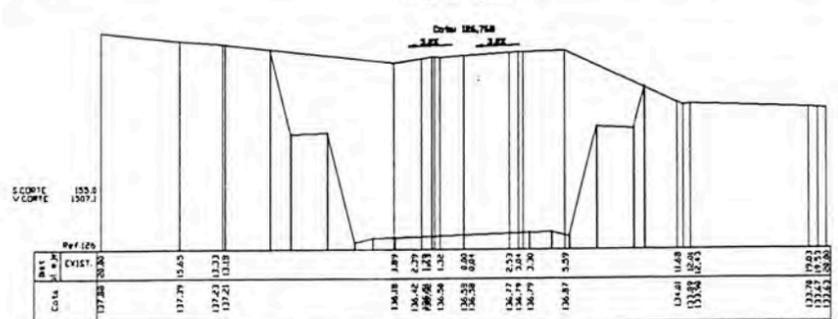
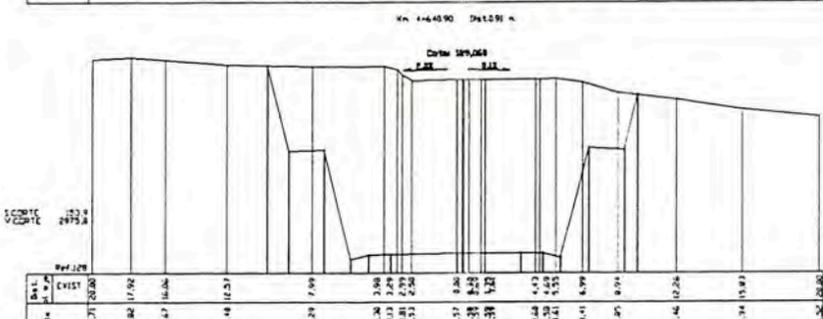
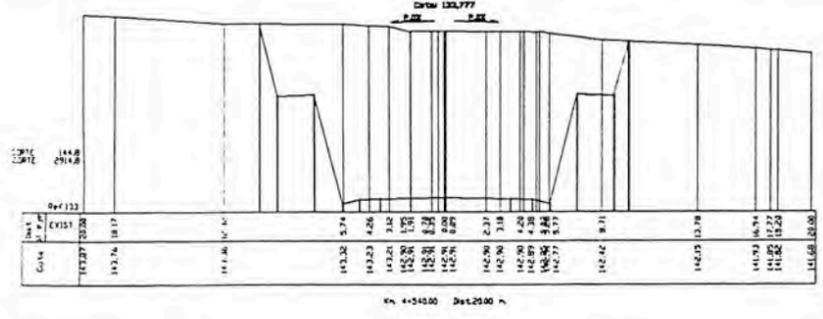
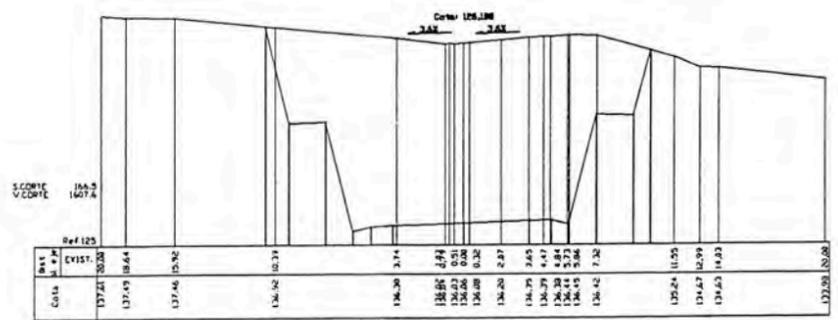
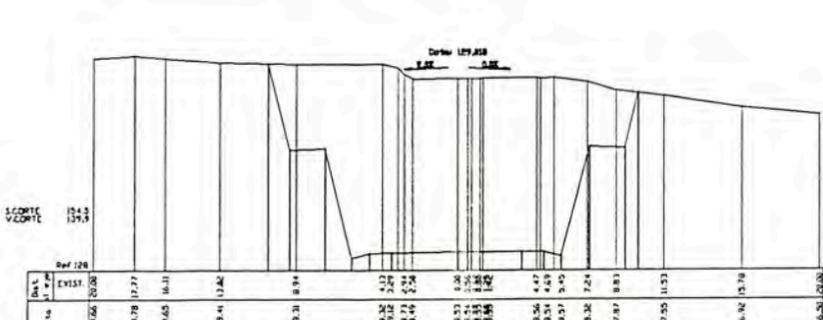
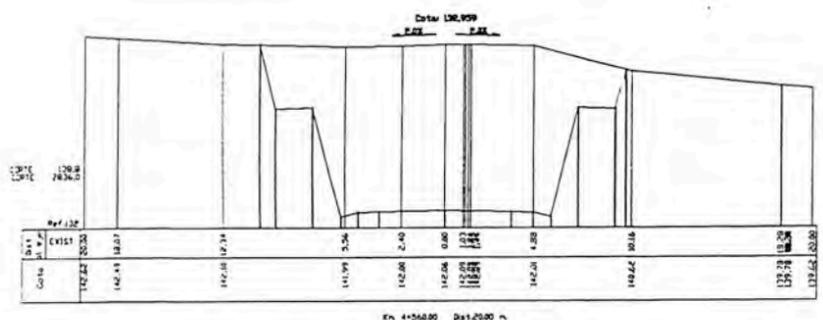




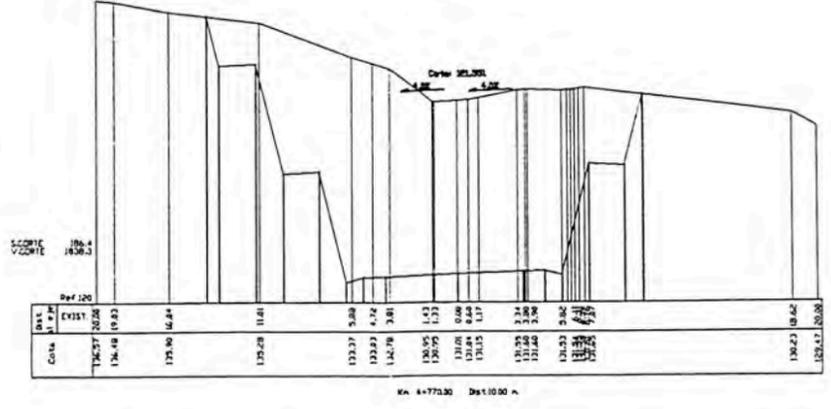
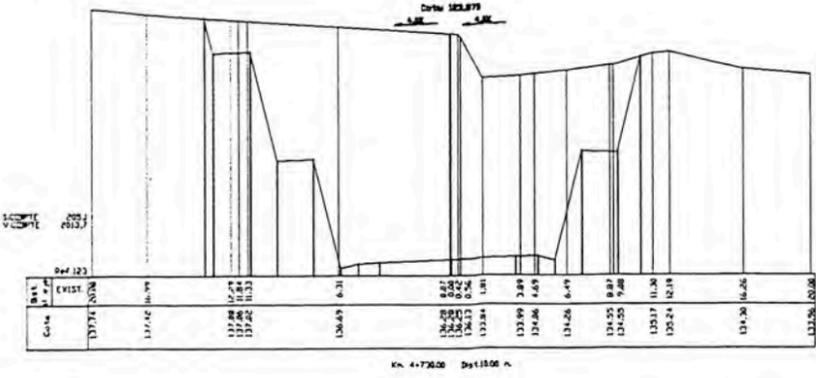
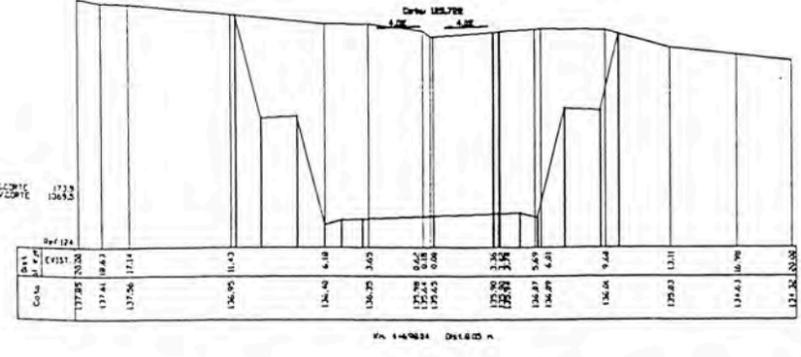
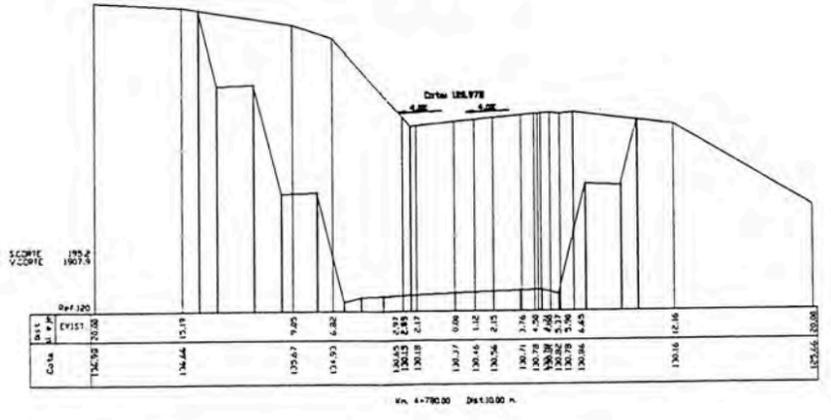
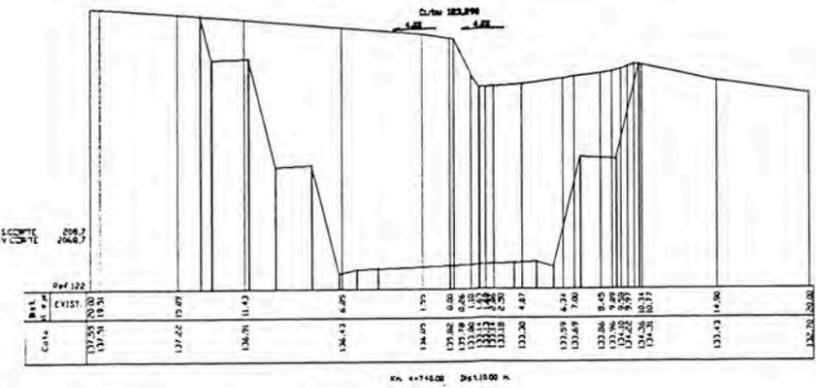
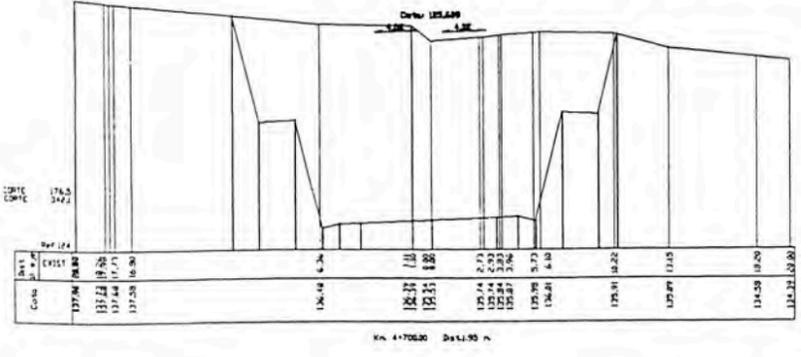
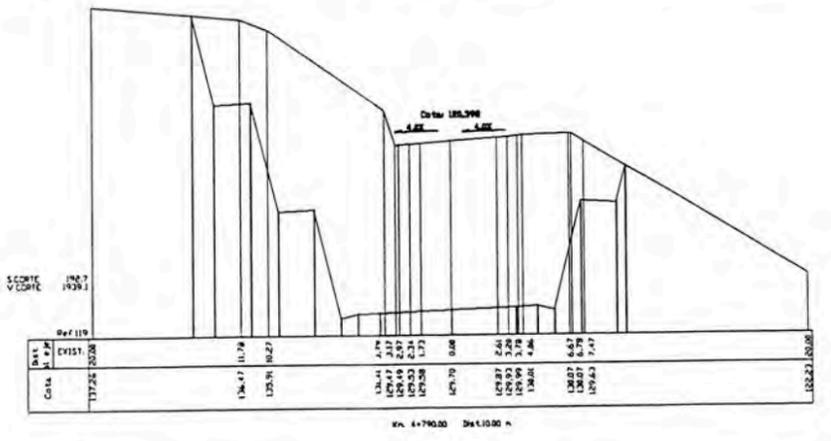
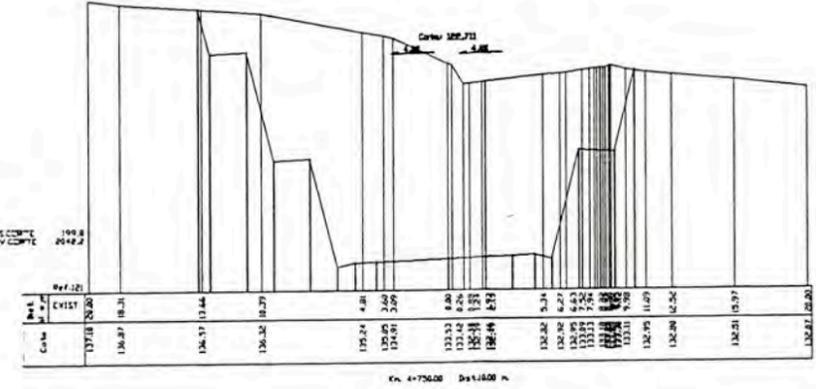
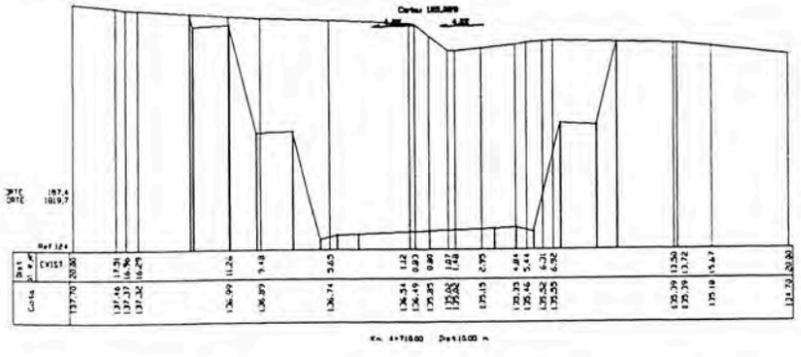
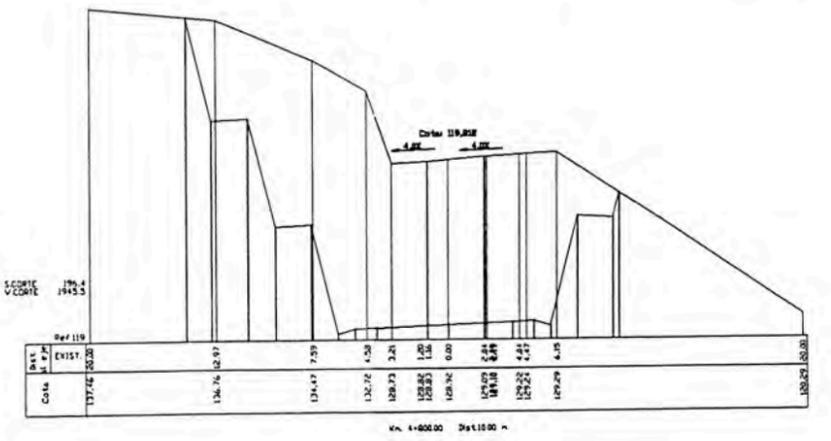
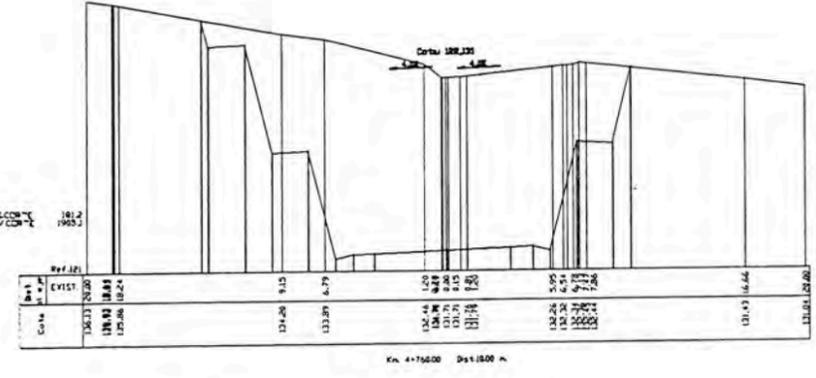
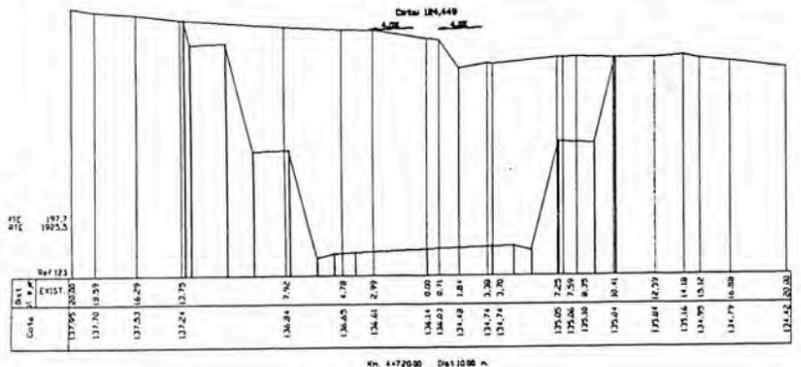


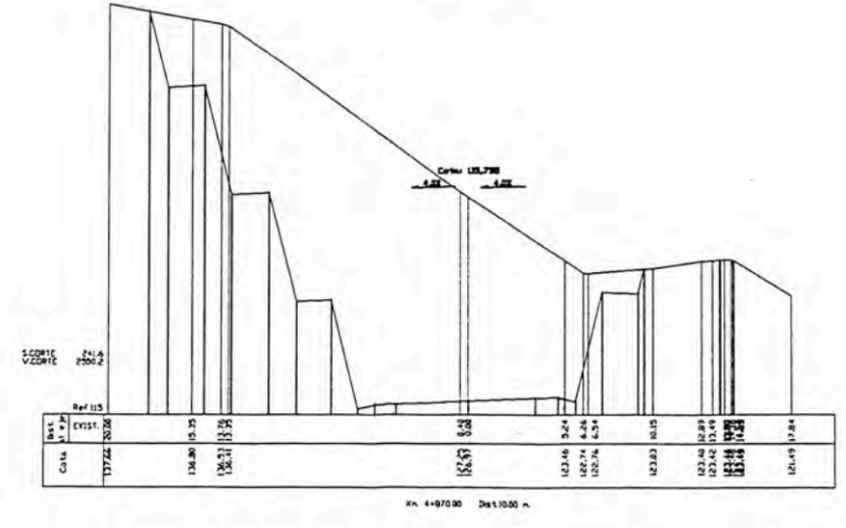
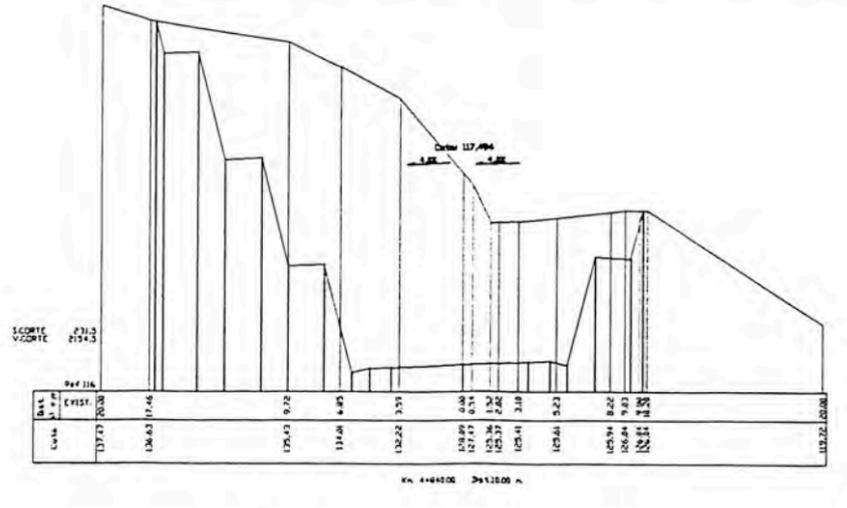
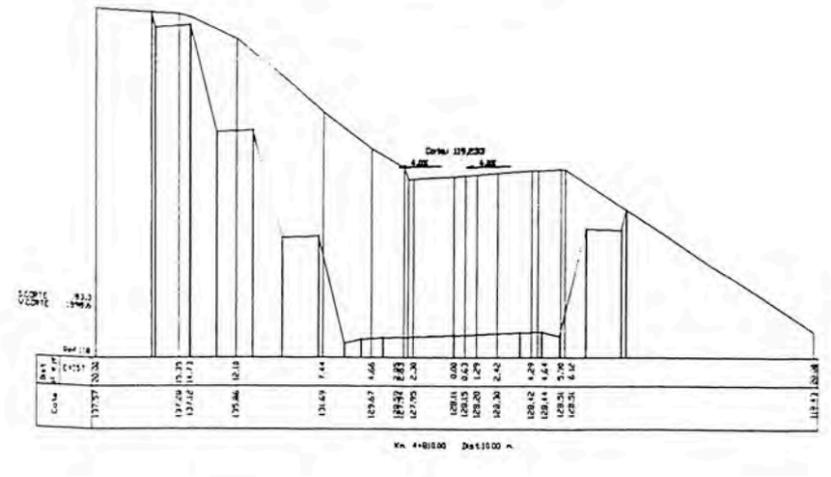
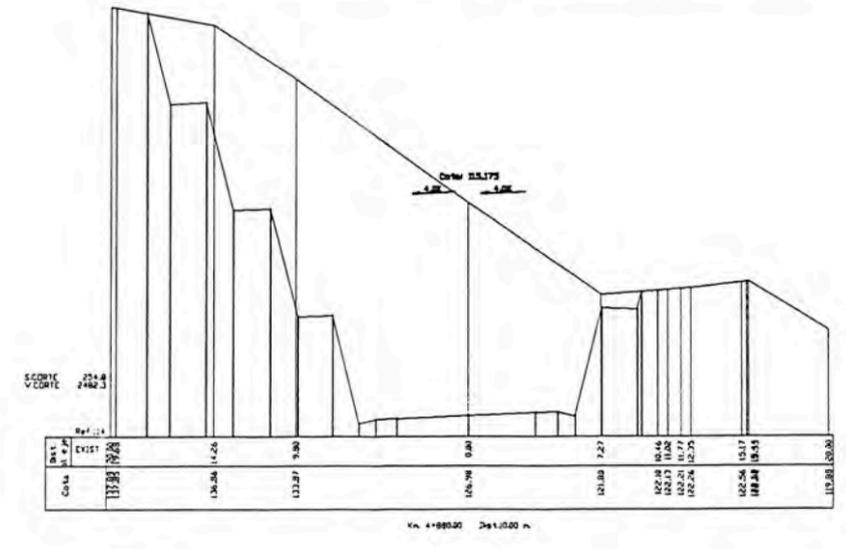
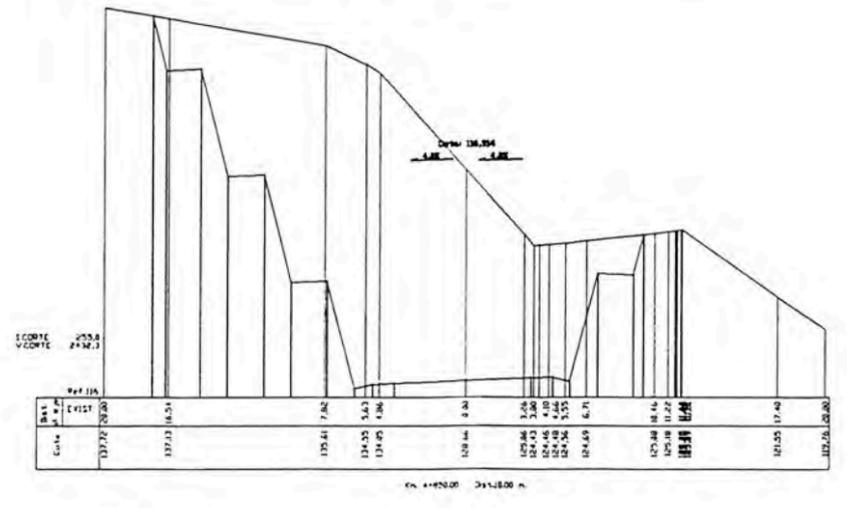
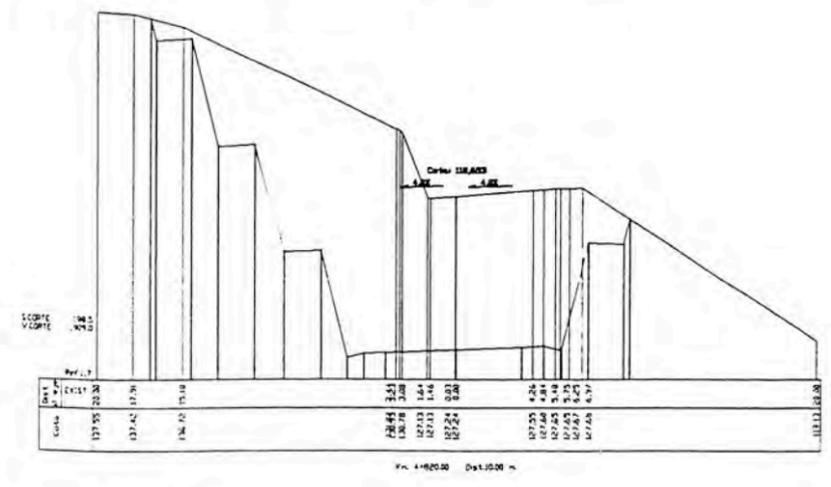
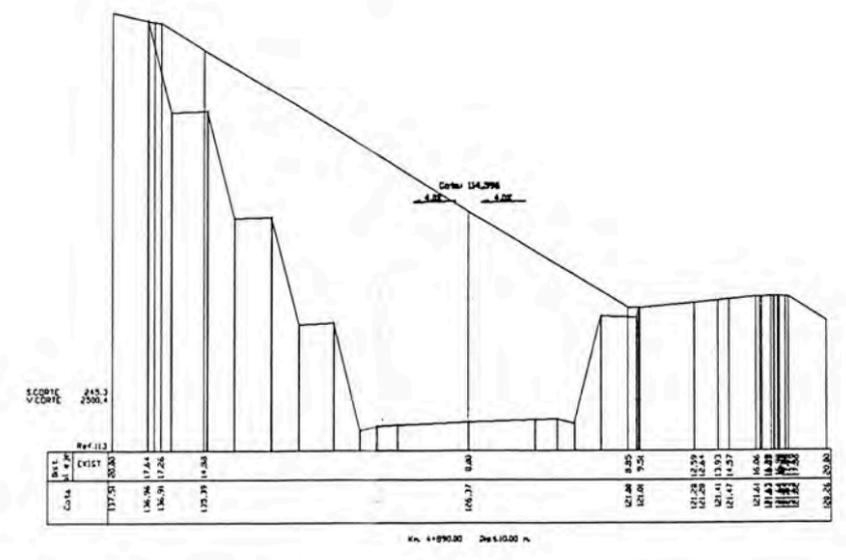
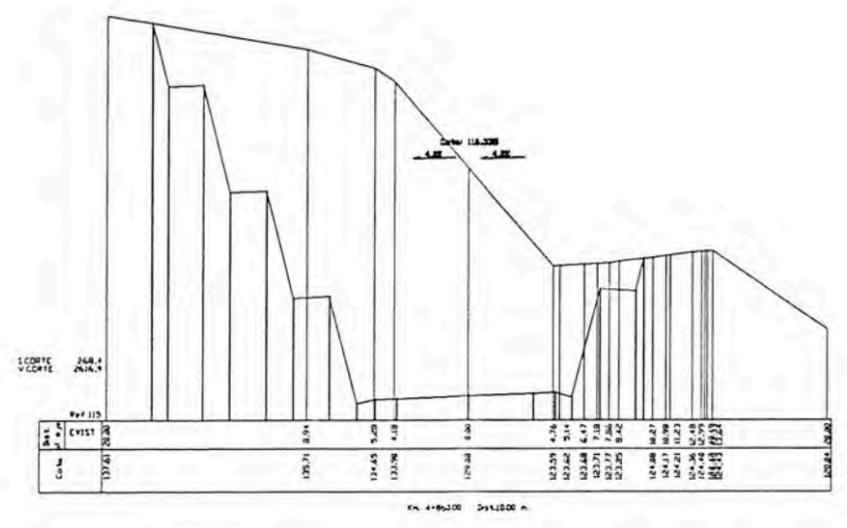
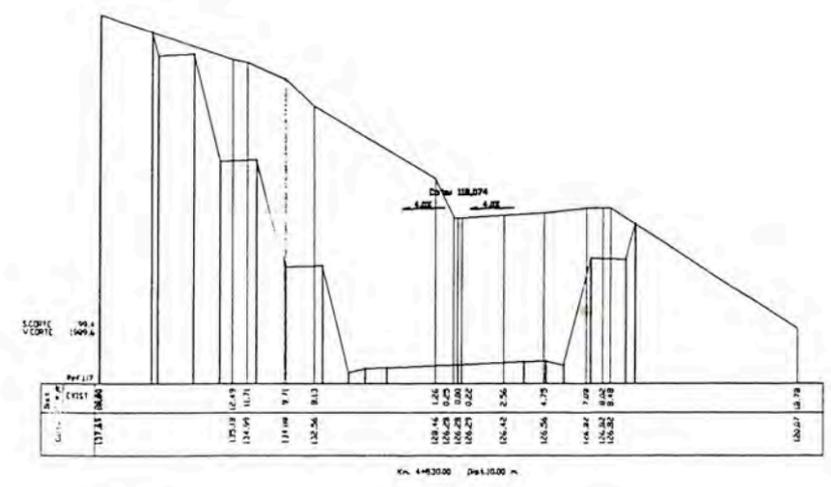


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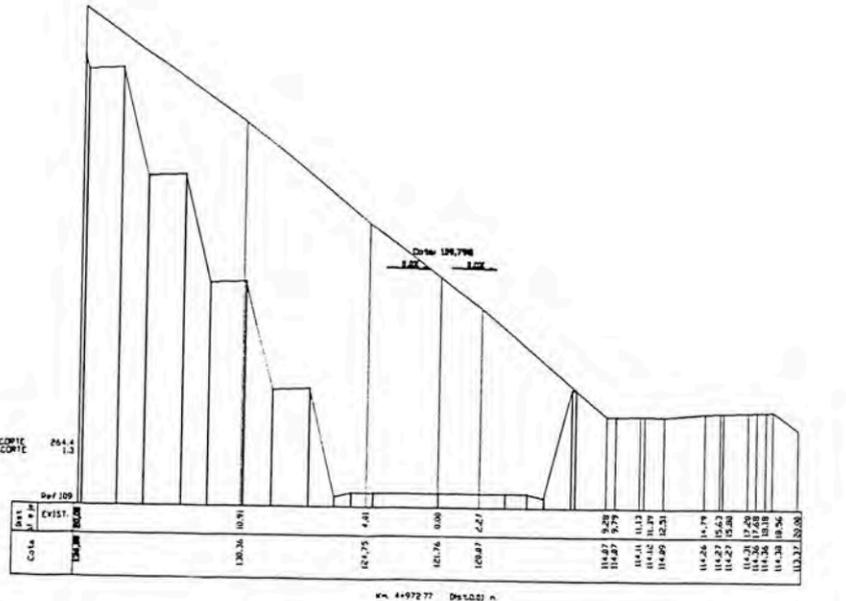
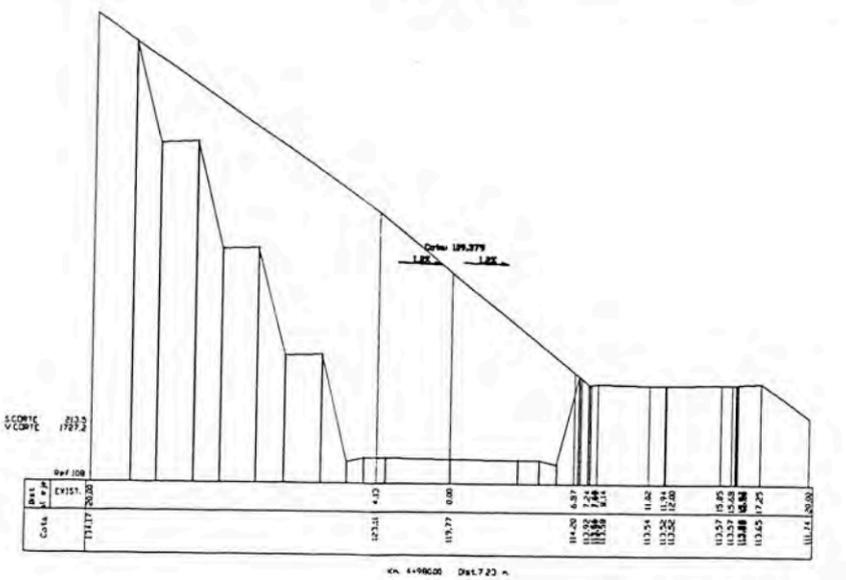
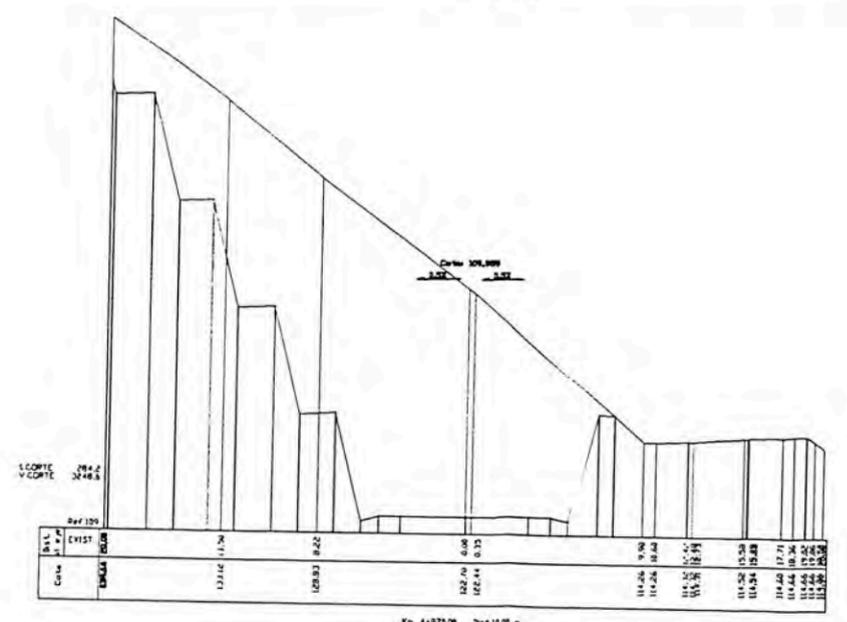
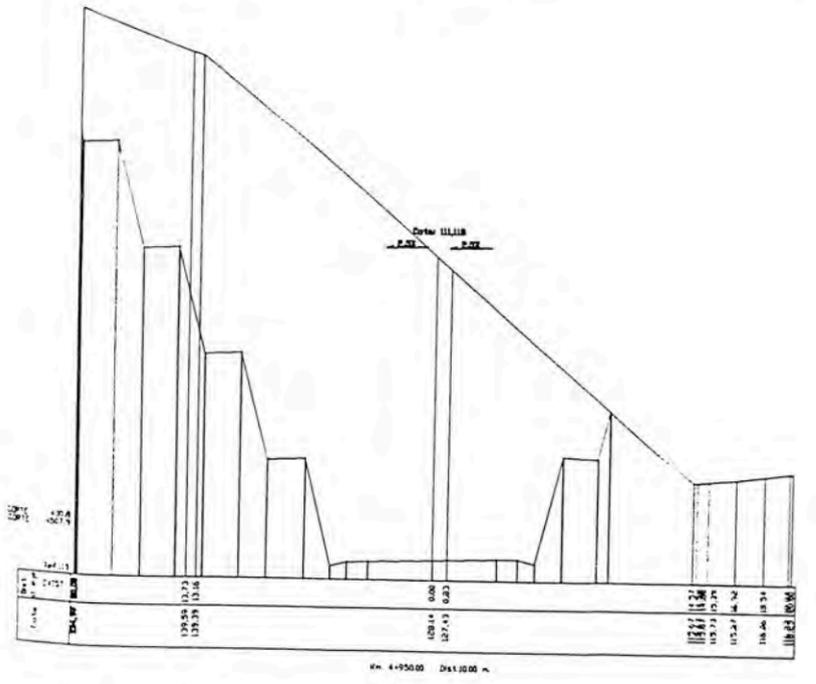
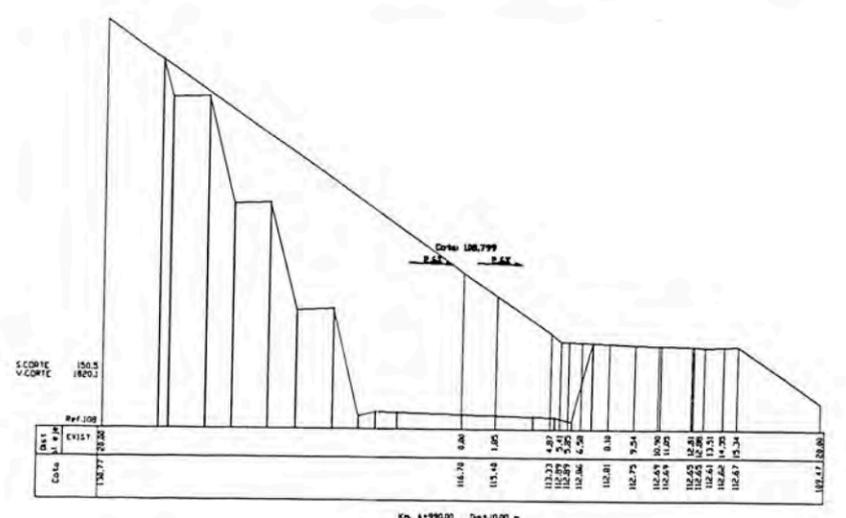
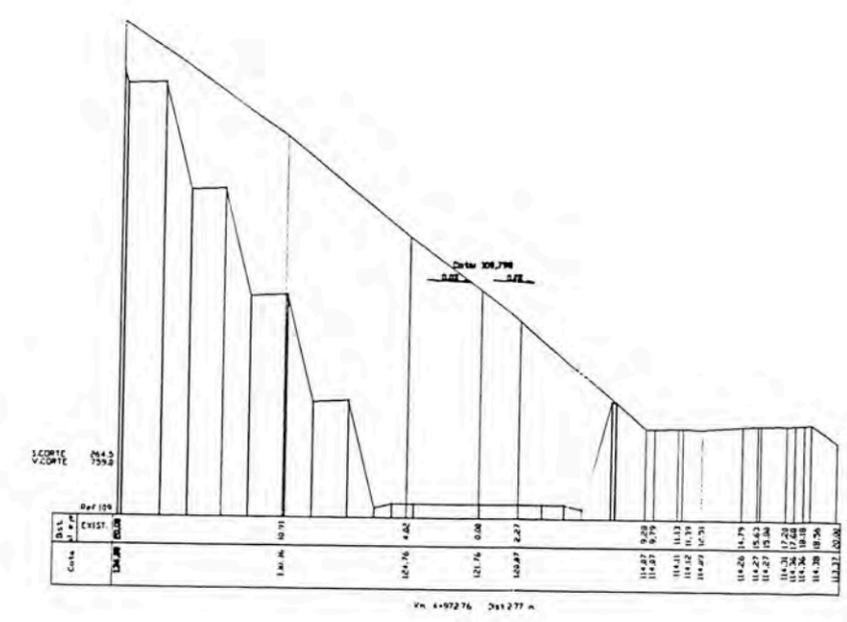
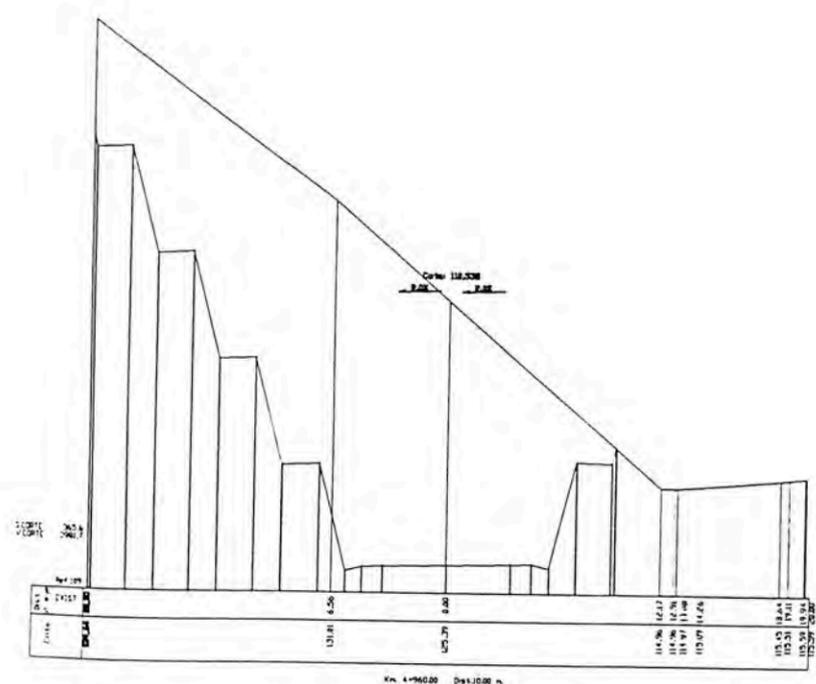


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UNIVERSIDAD NACIONAL DE INGENIERIA
 FACULTAD DE INGENIERIA CIVIL
 DEPARTAMENTO ACADÉMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

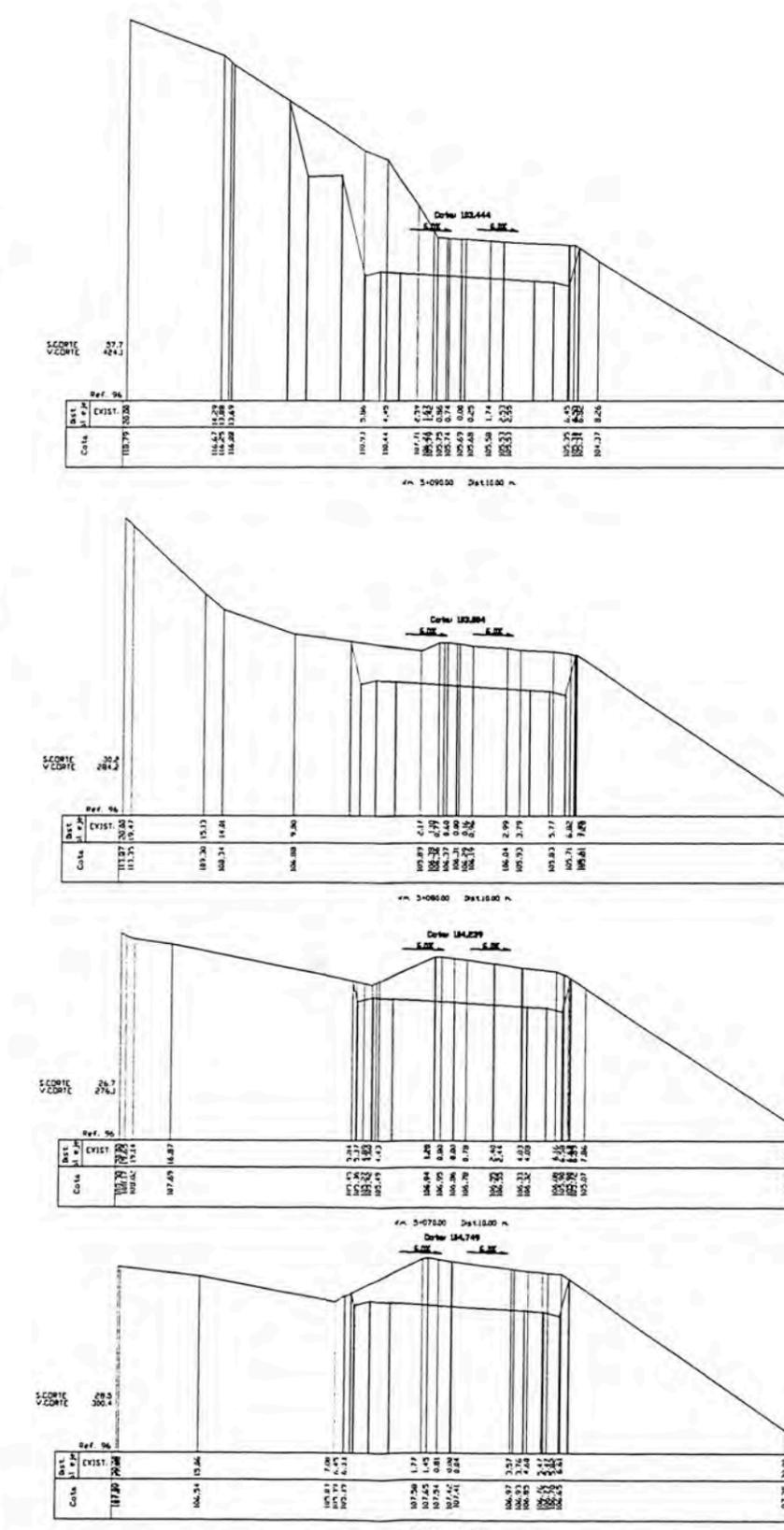
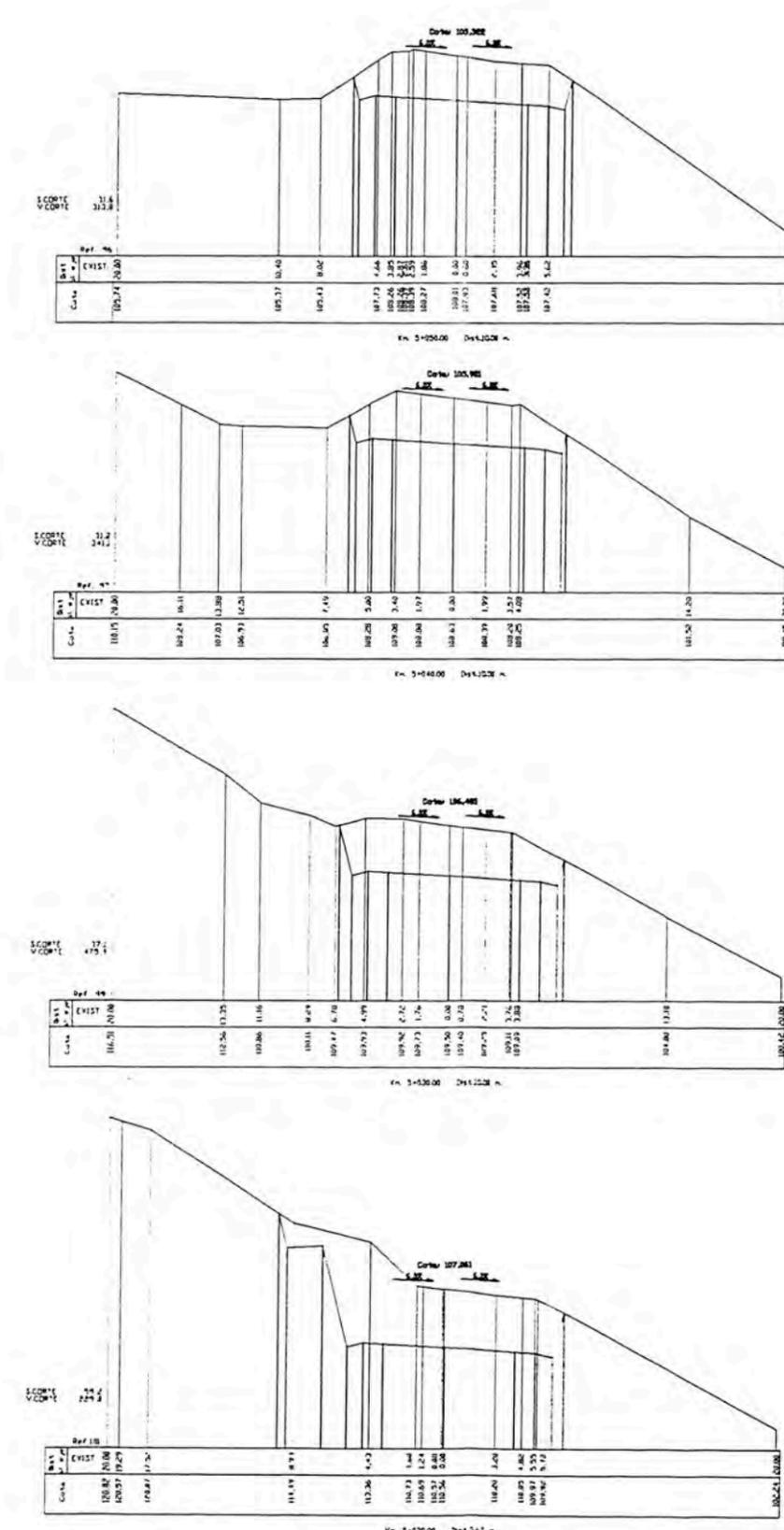
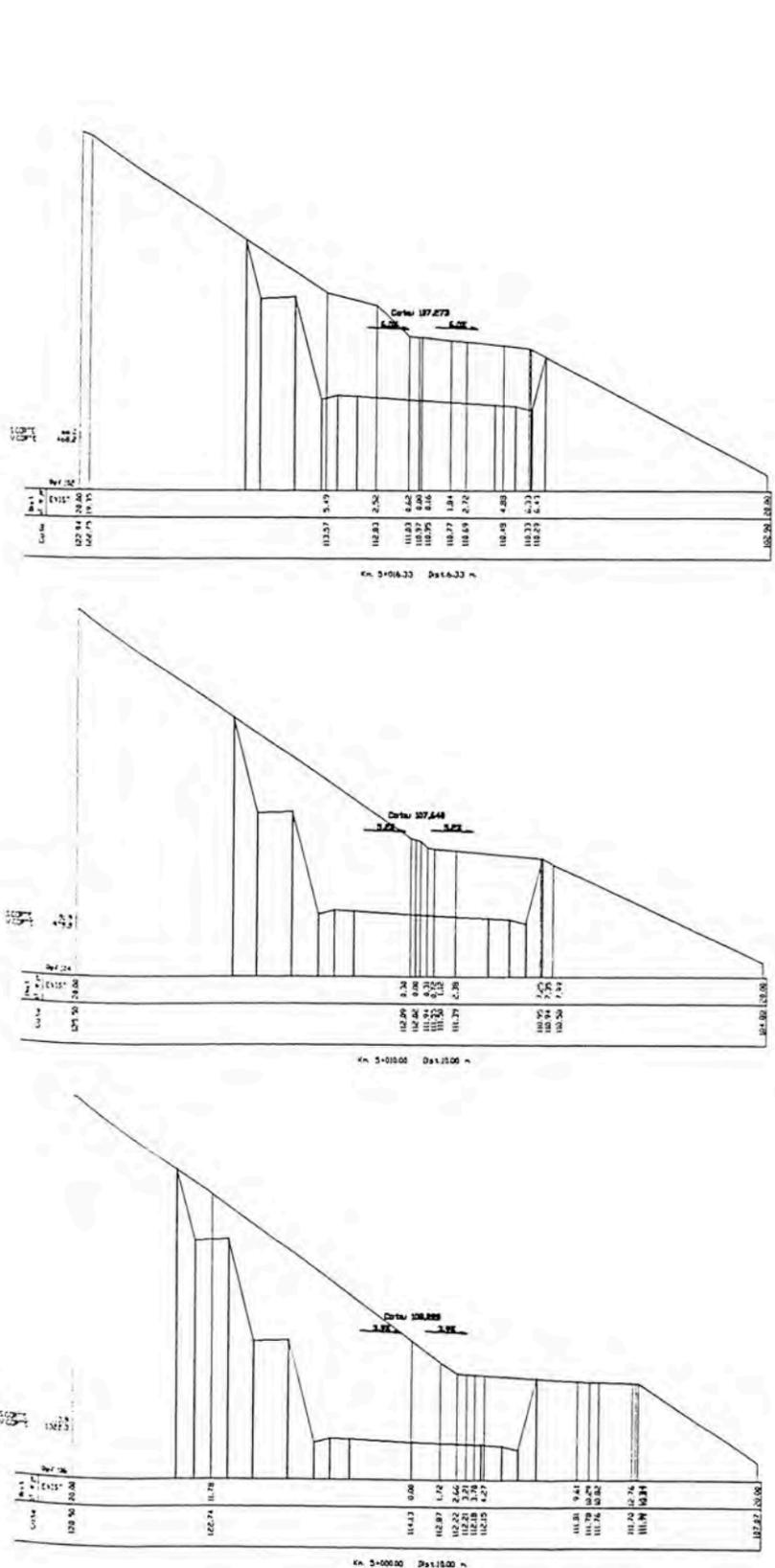
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 Dibujo: ALJU
 Verificó: Ing. G. Rosales B
 Presentó: Román A. López U

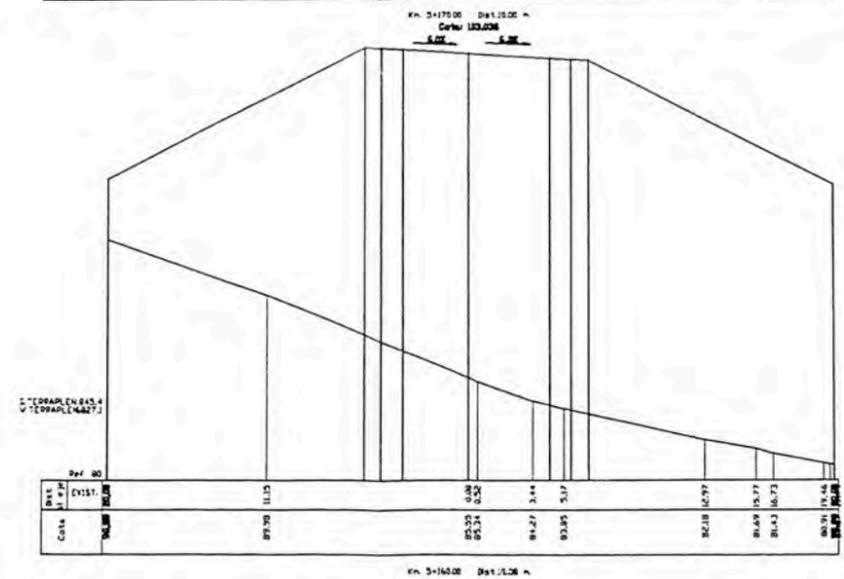
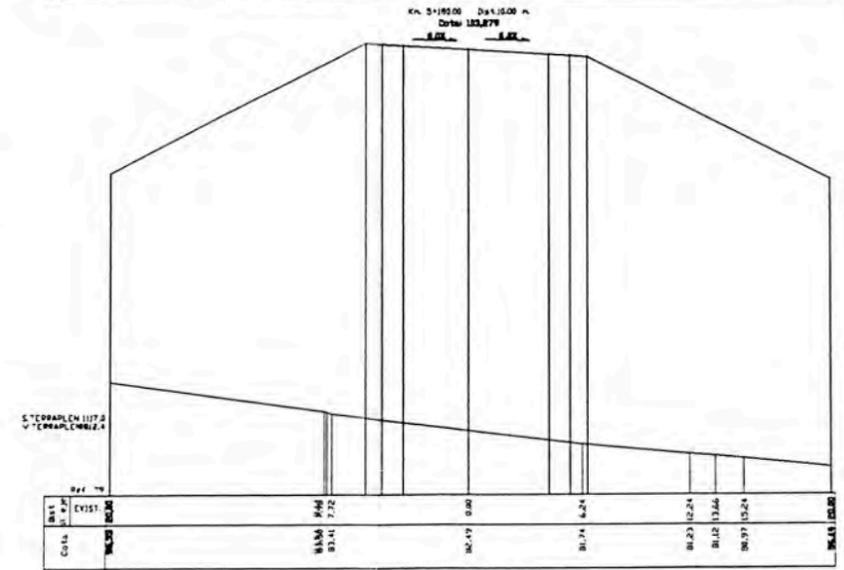
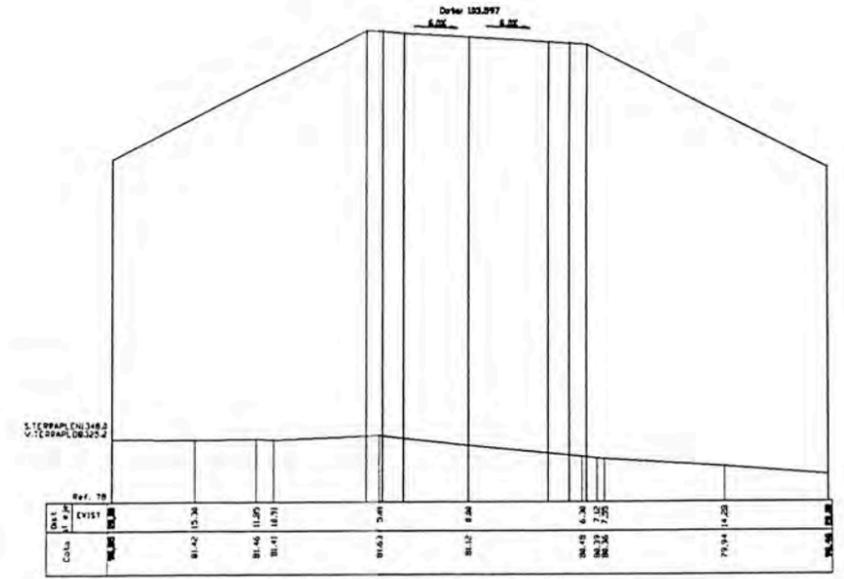
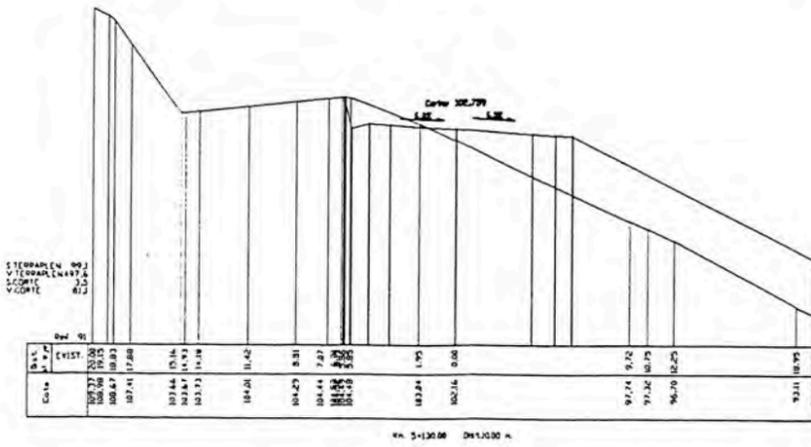
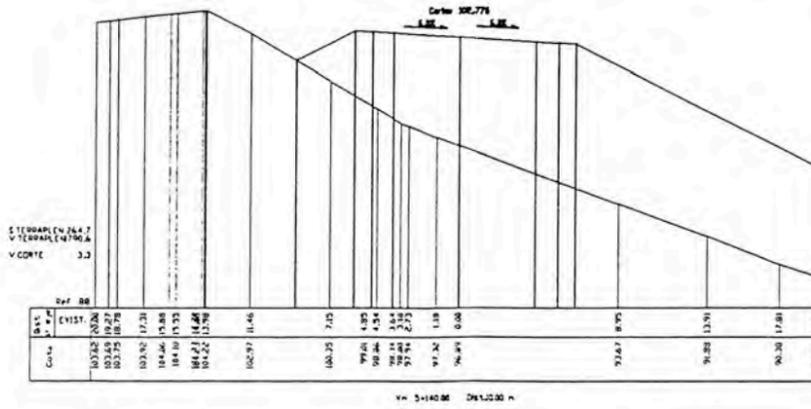
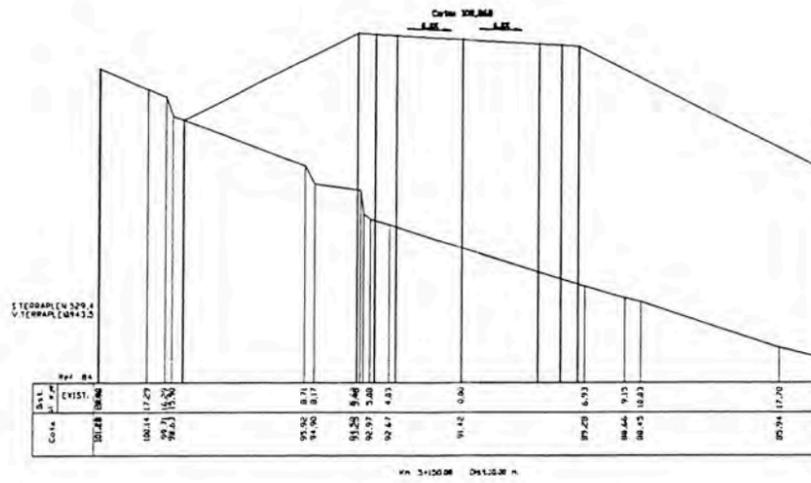
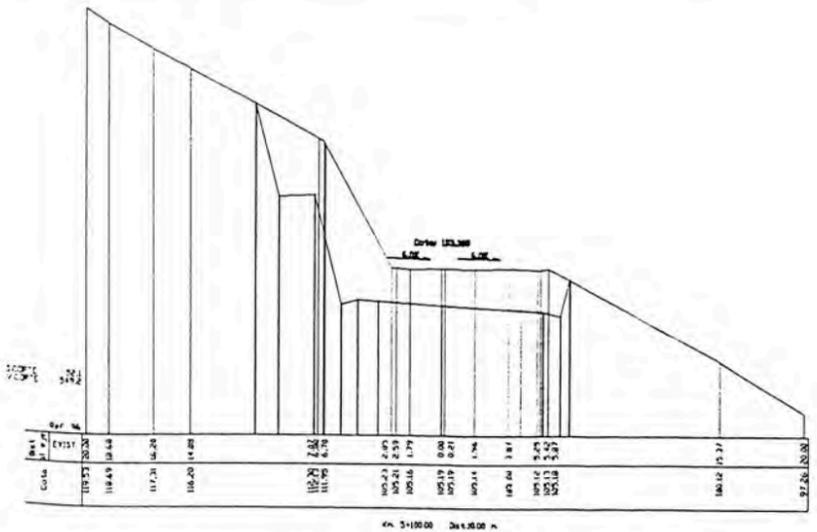
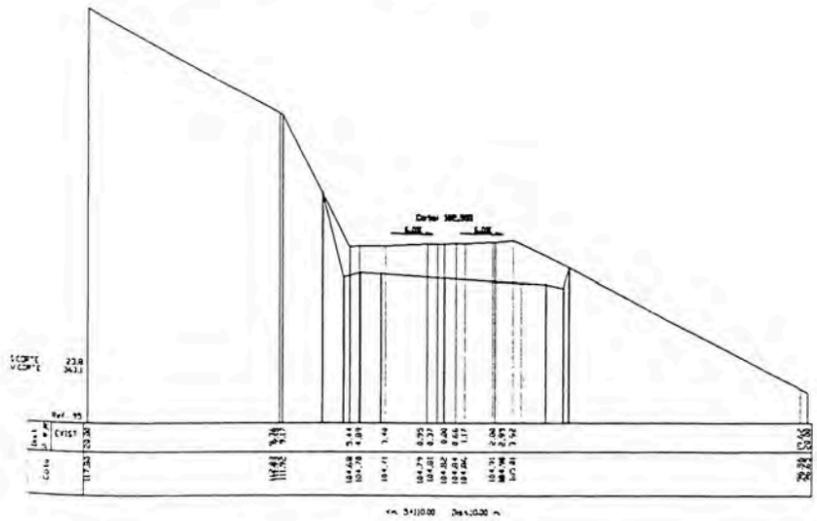
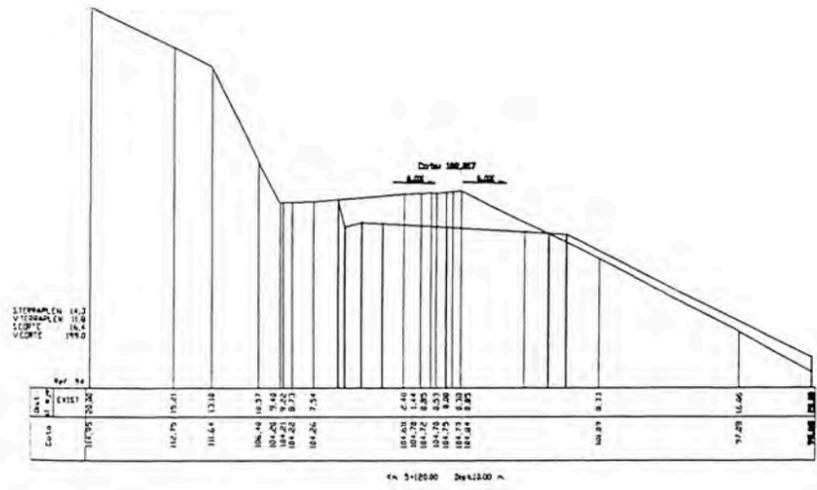
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ESTUDIOS DE INGENIERIA
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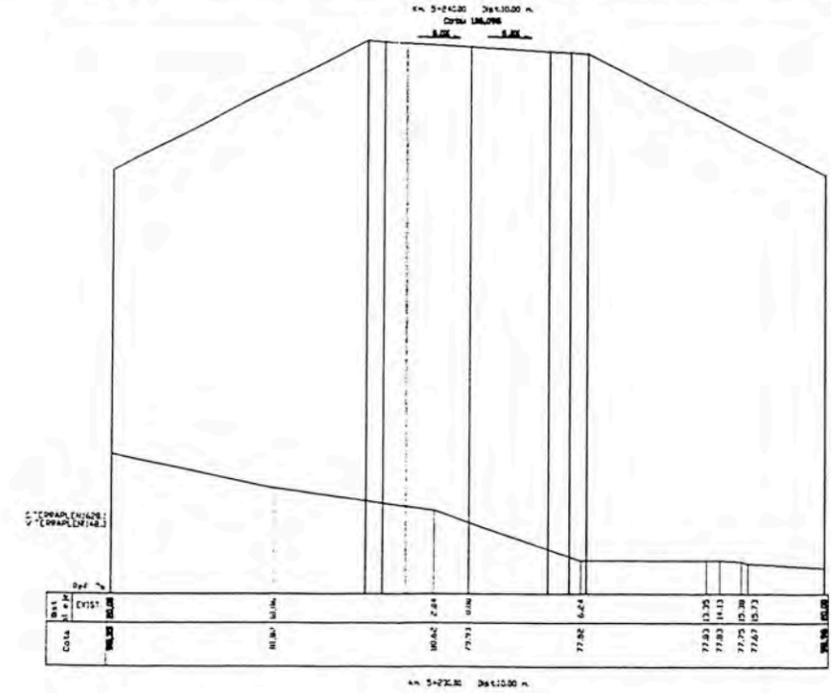
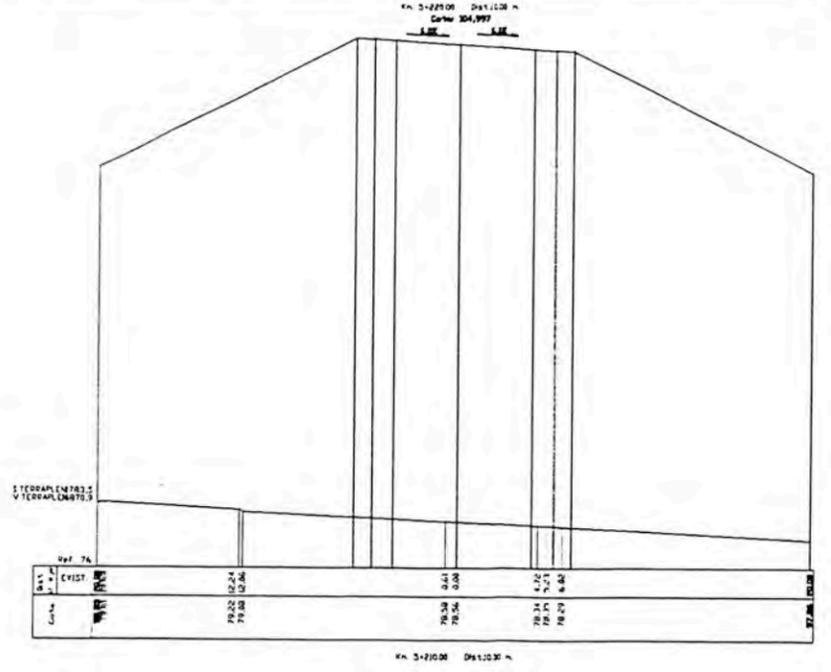
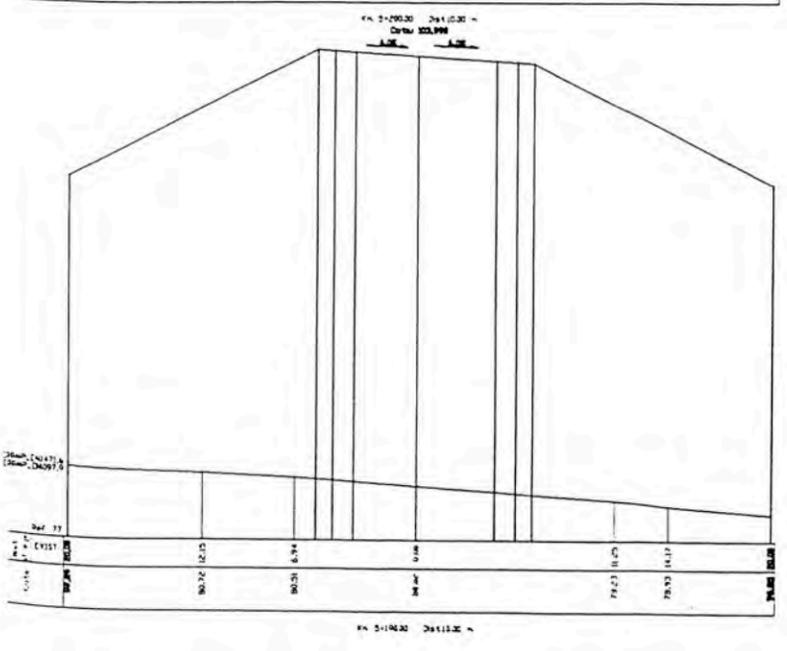
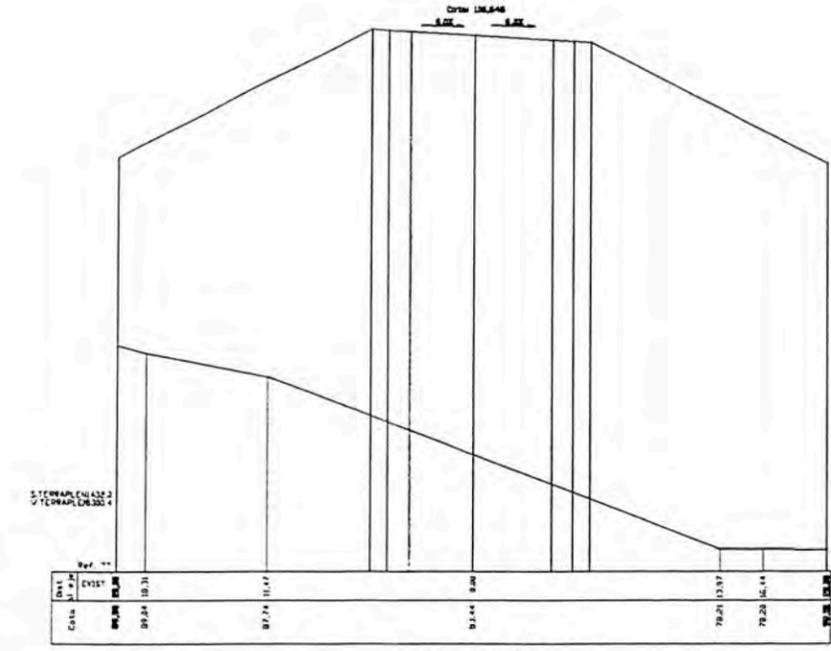
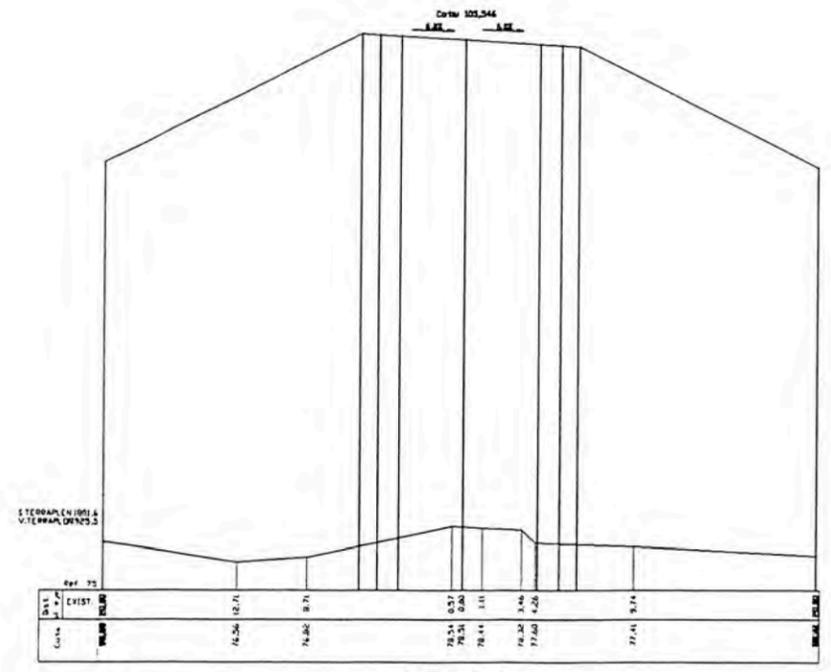
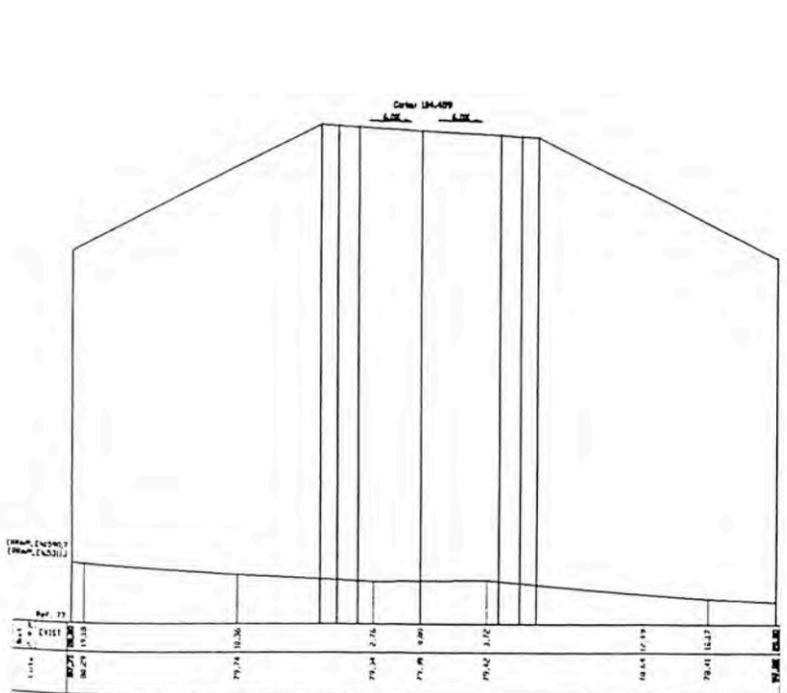
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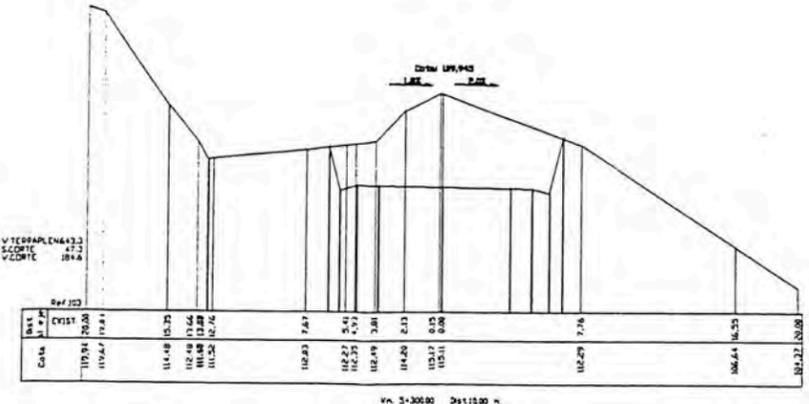
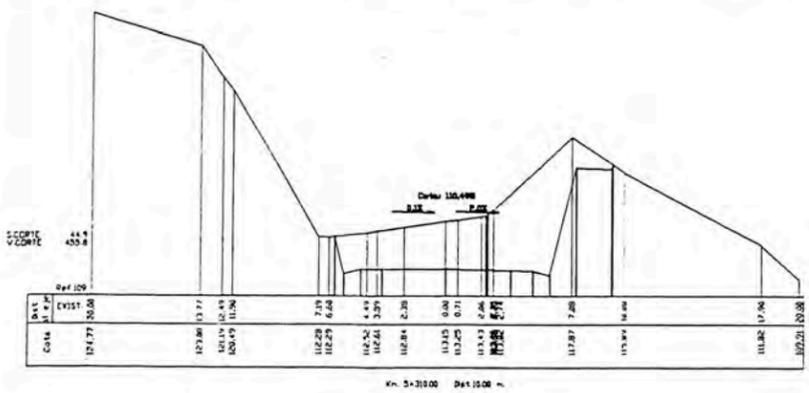
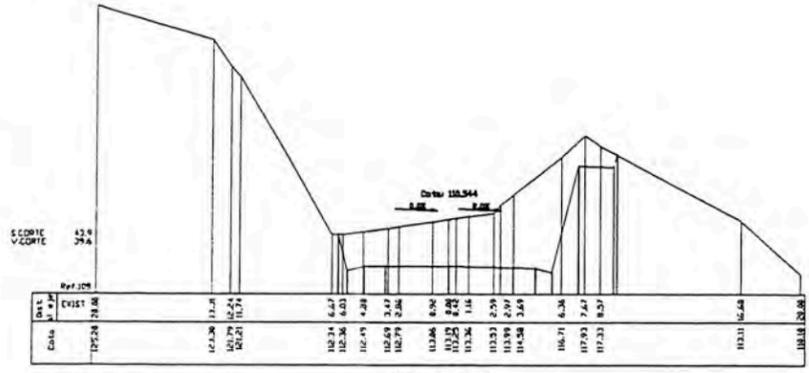
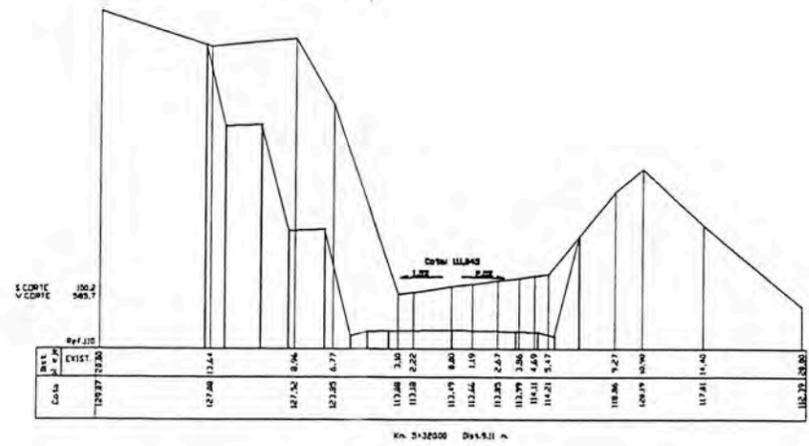
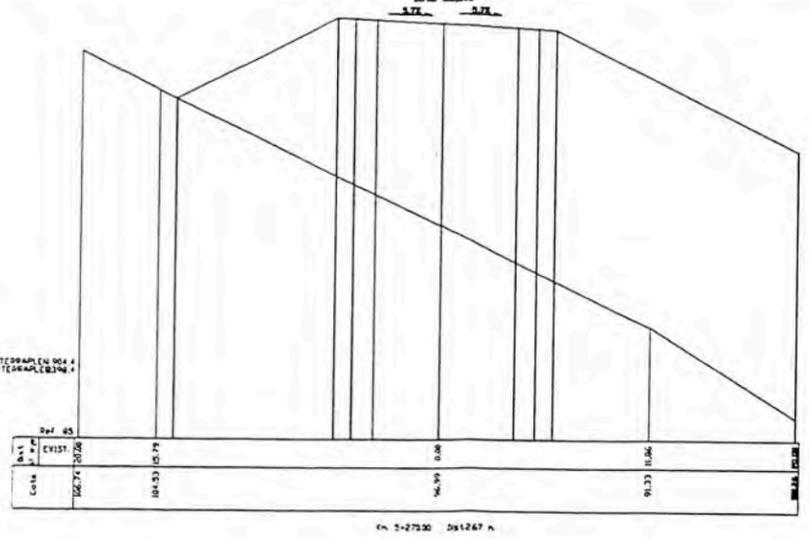
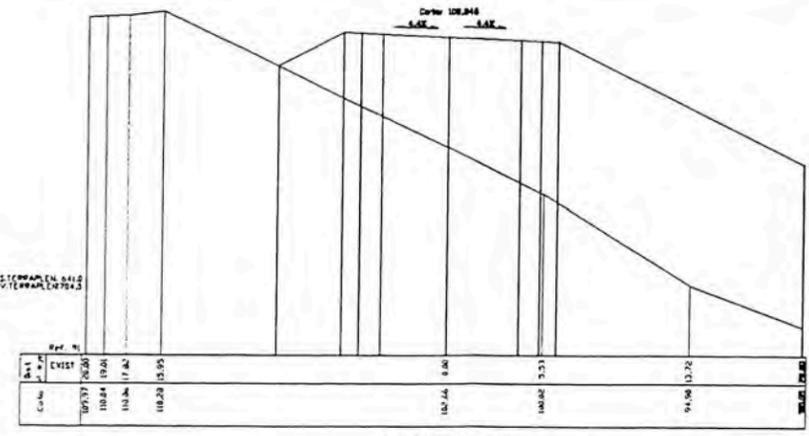
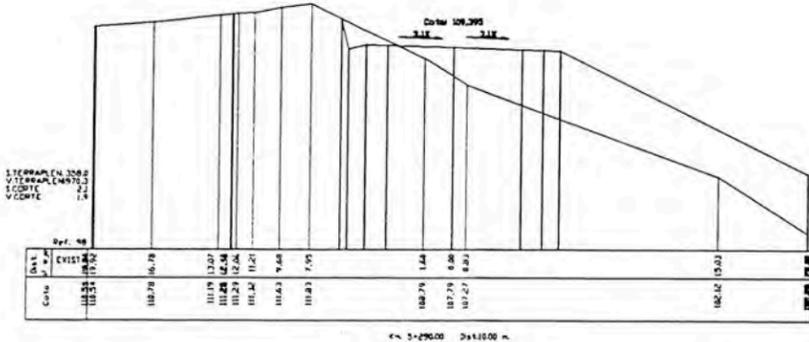
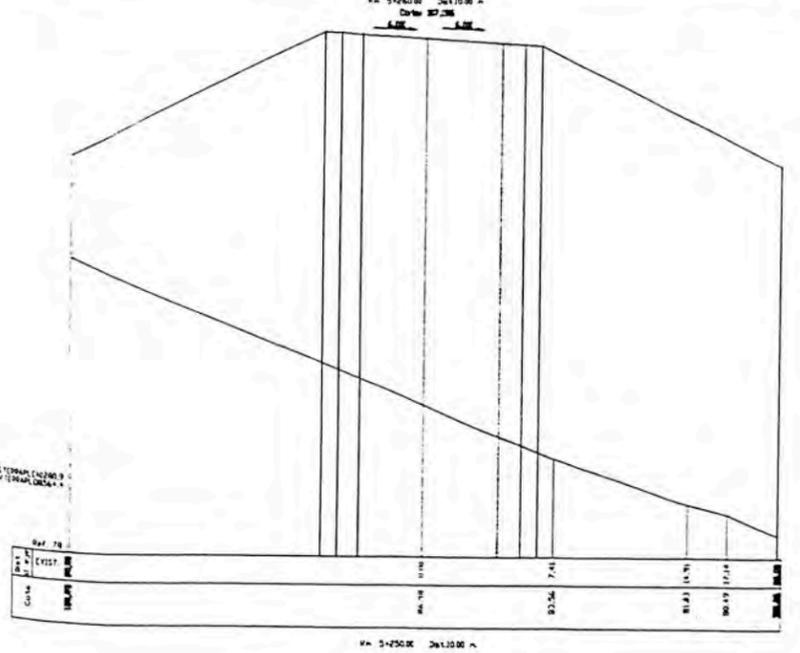
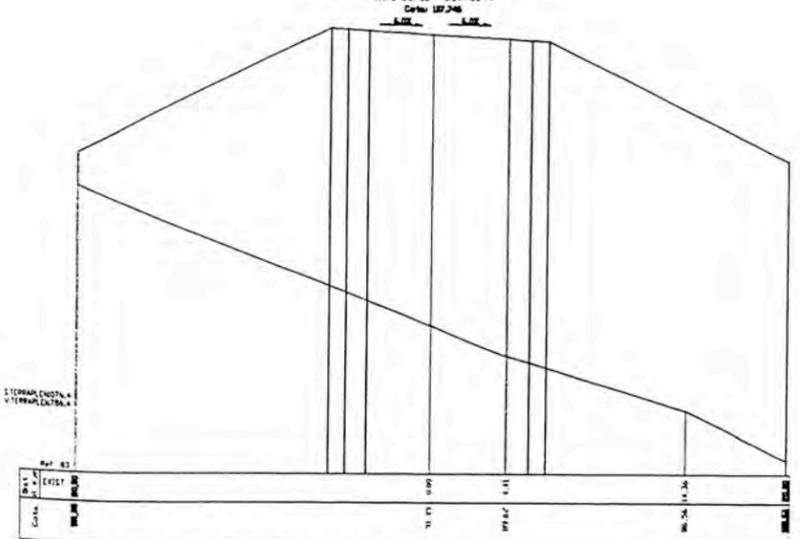
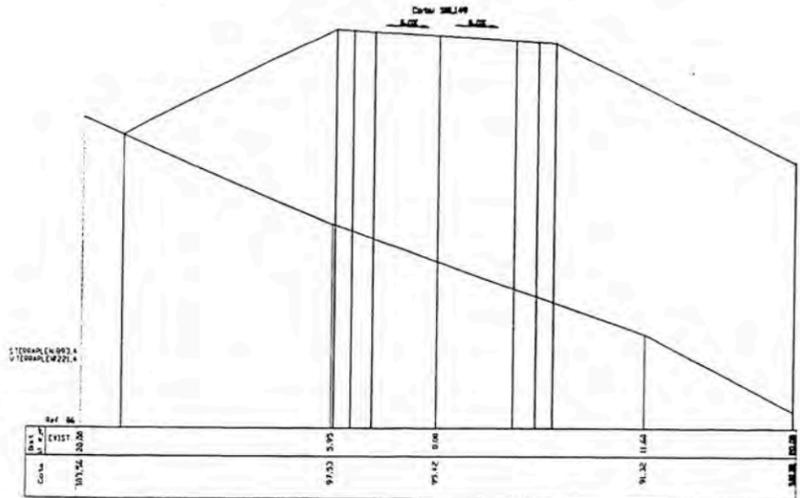
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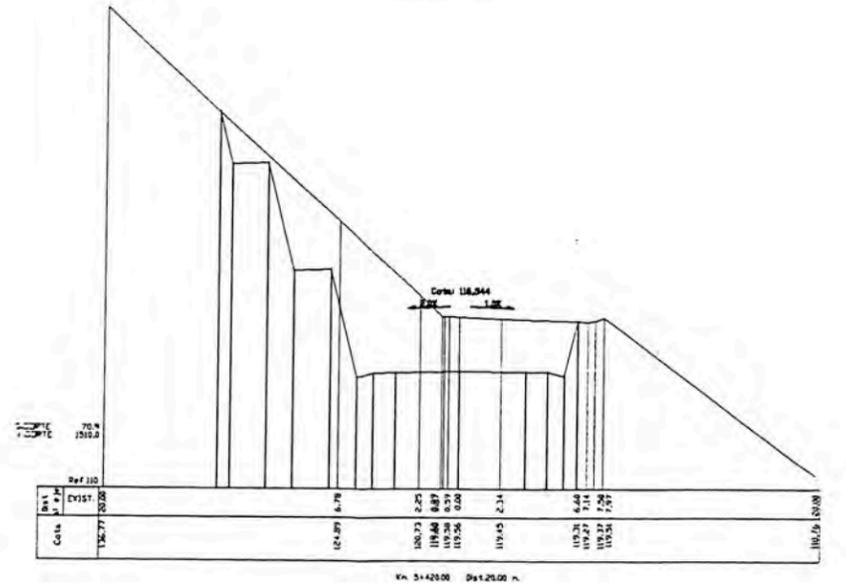
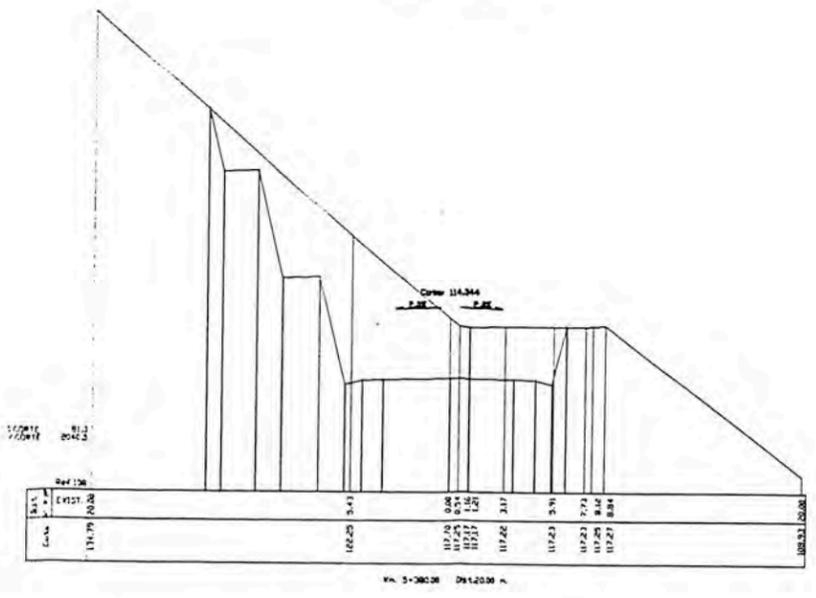
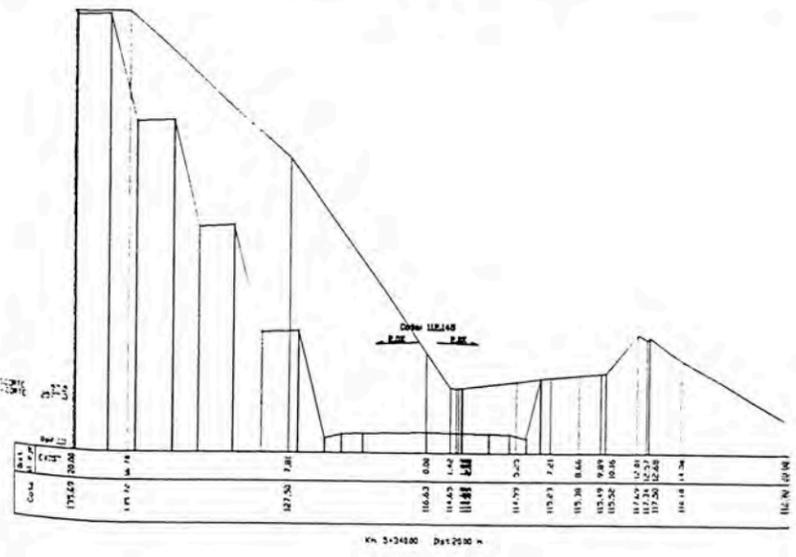
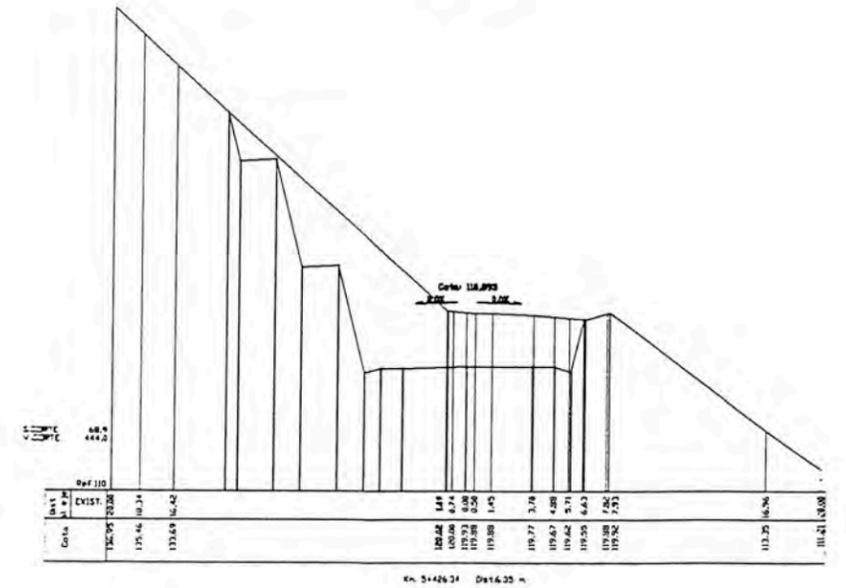
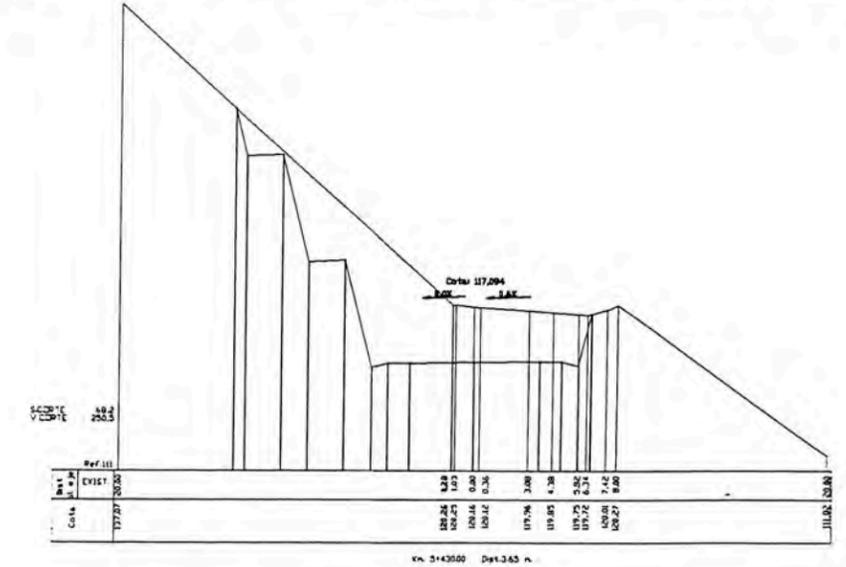
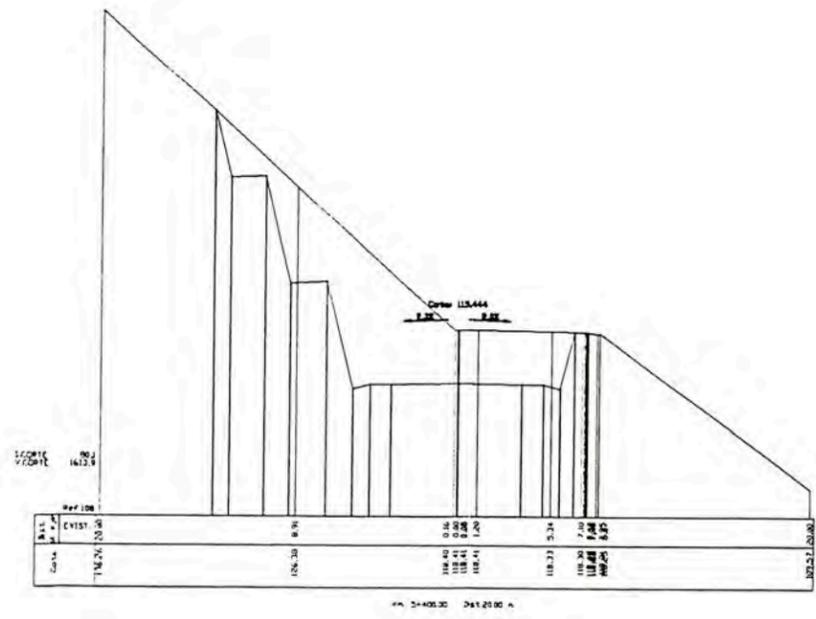
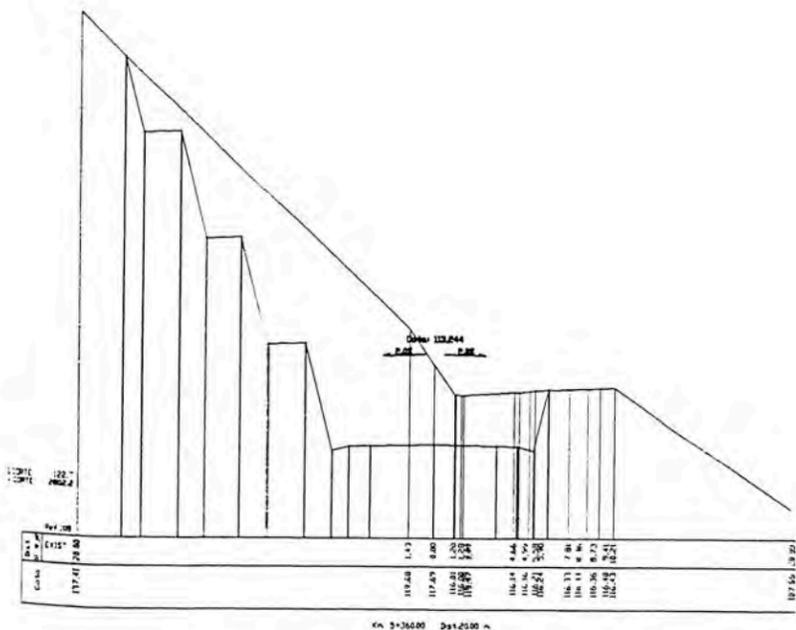


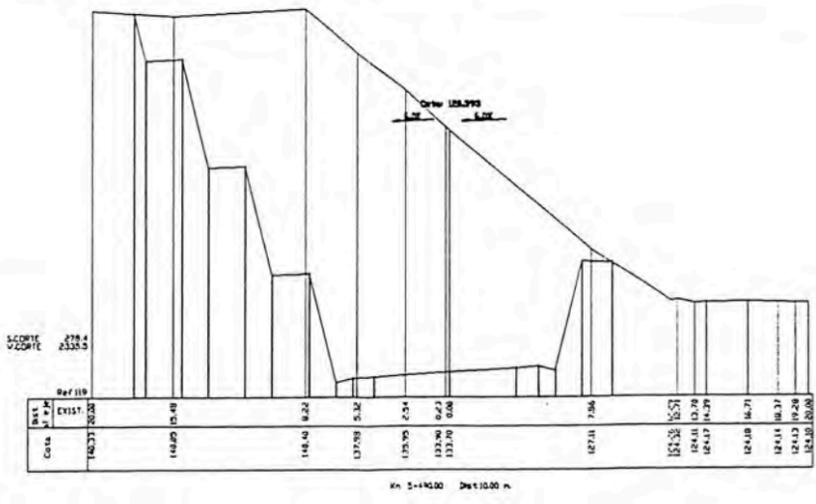
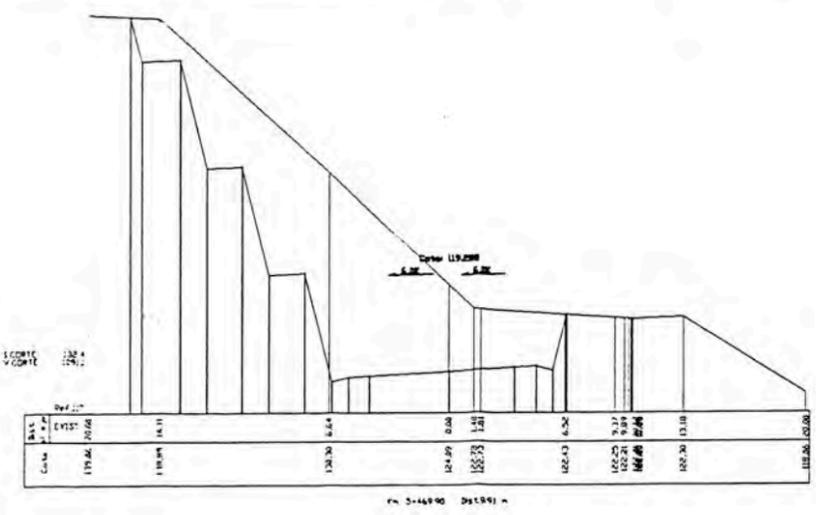
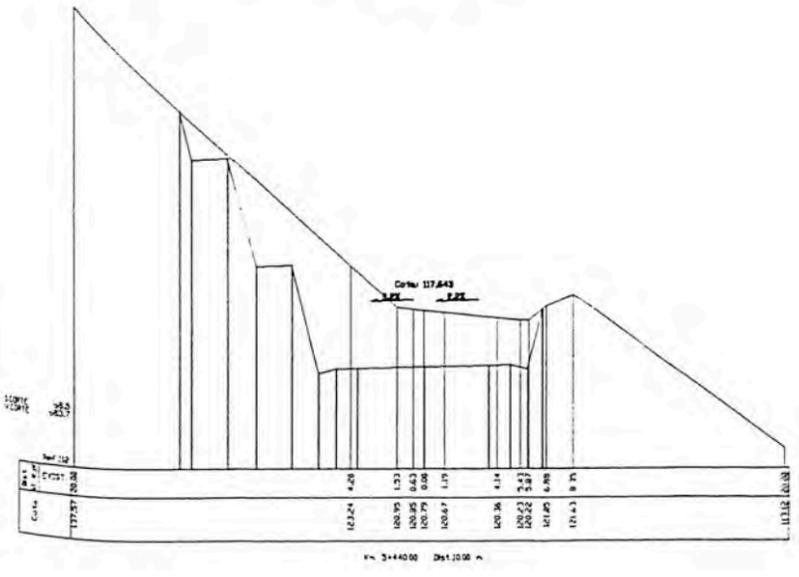
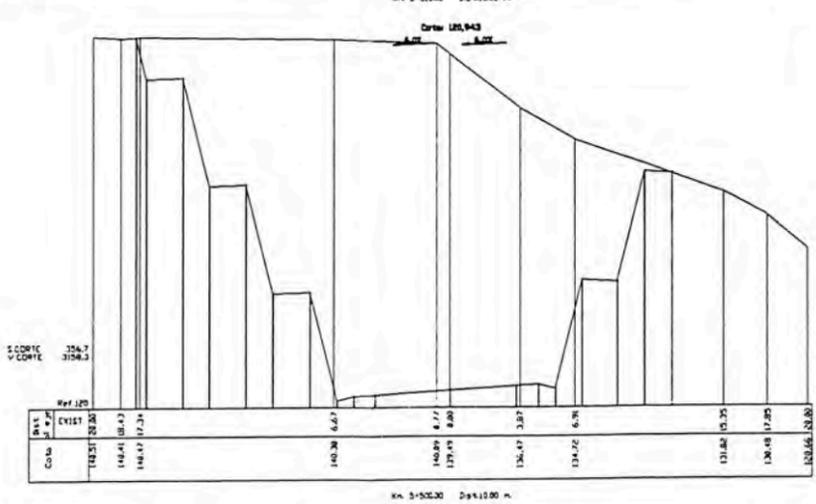
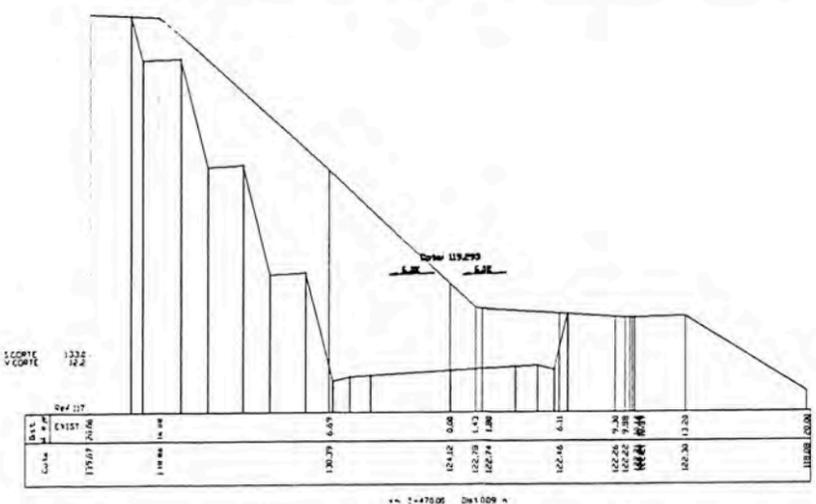
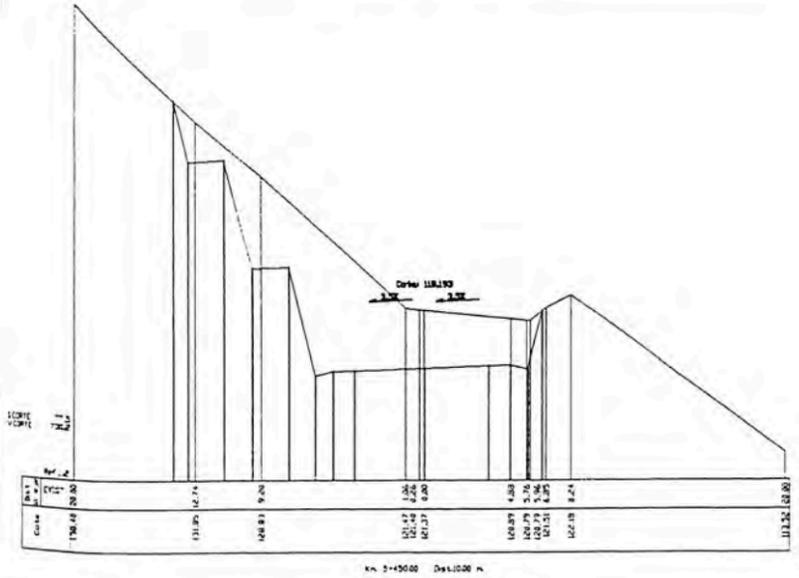
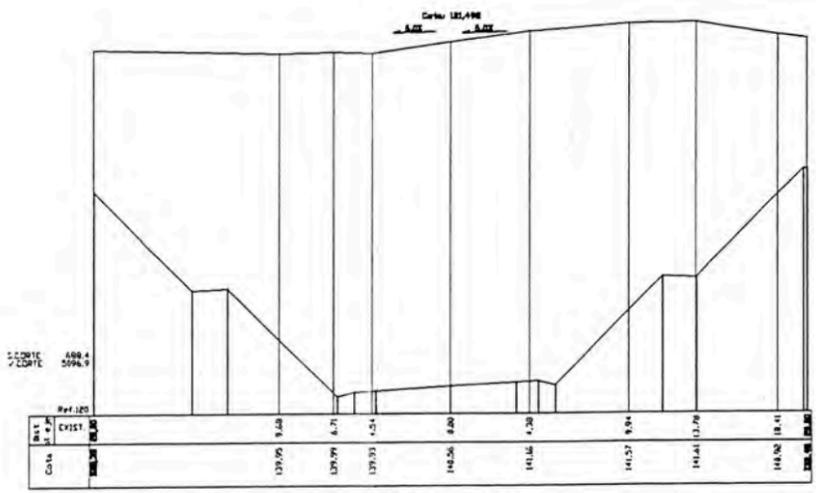
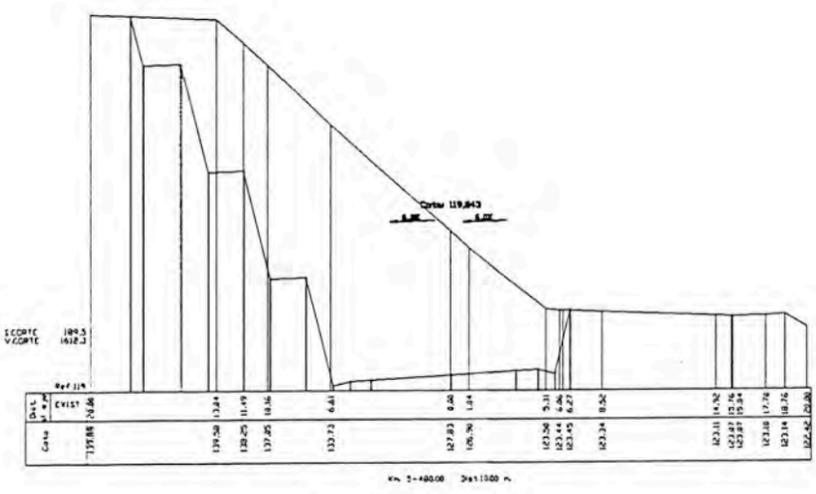
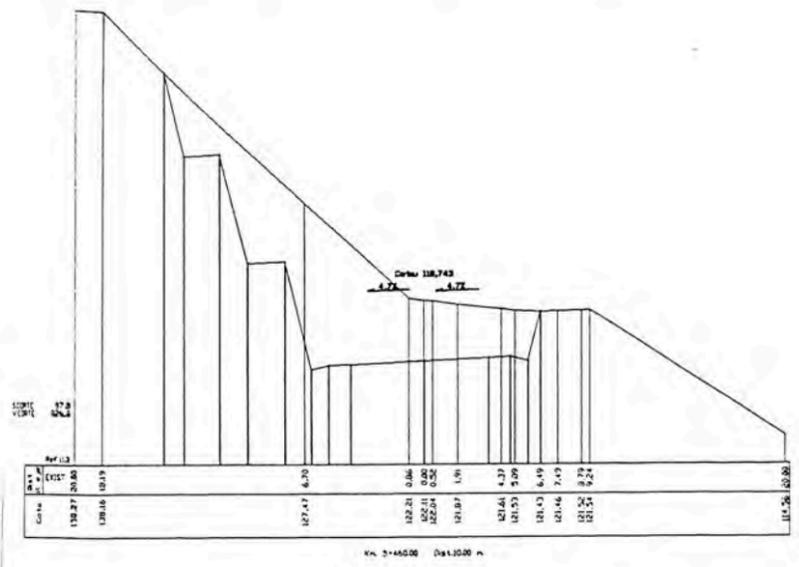
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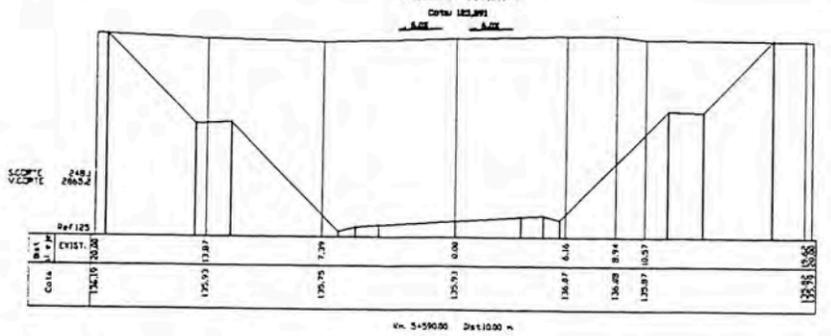
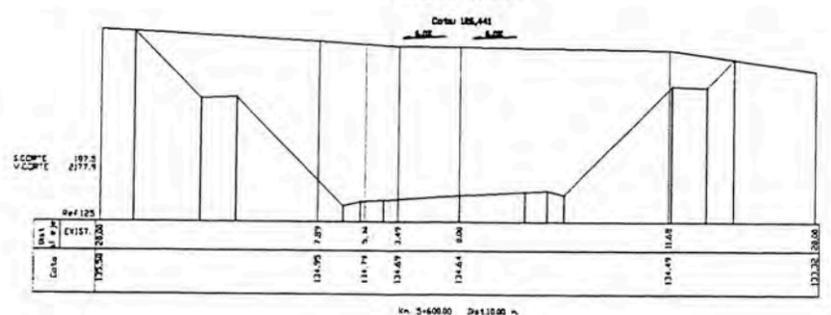
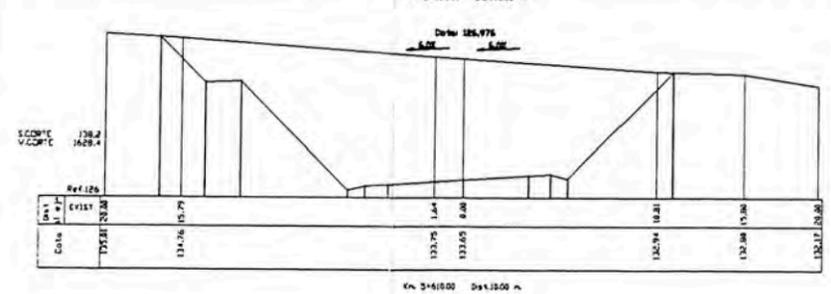
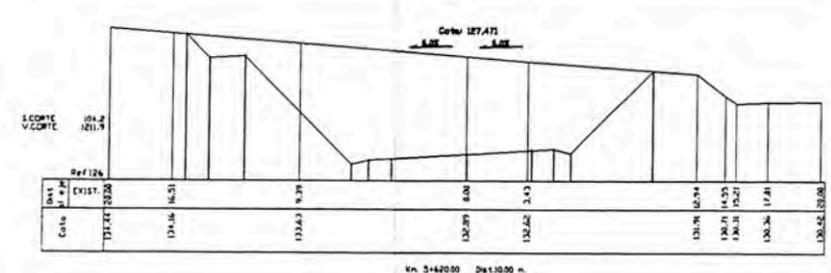
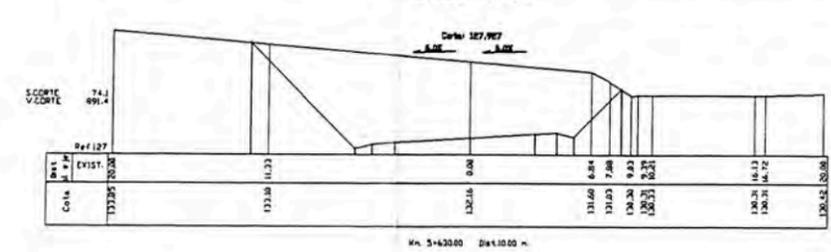
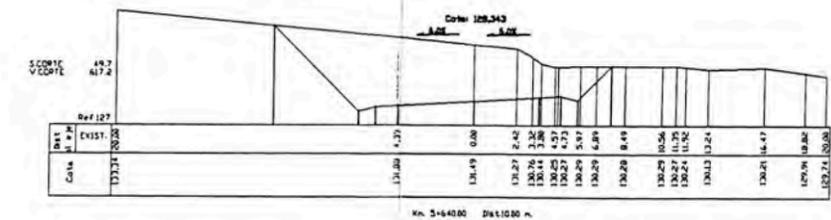
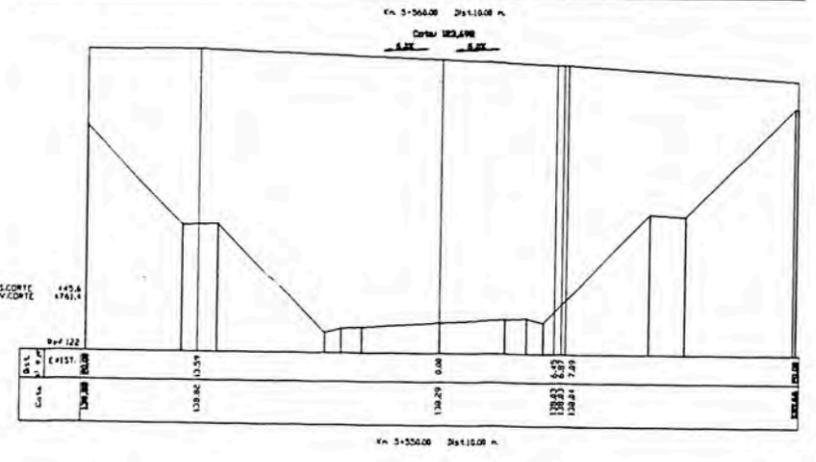
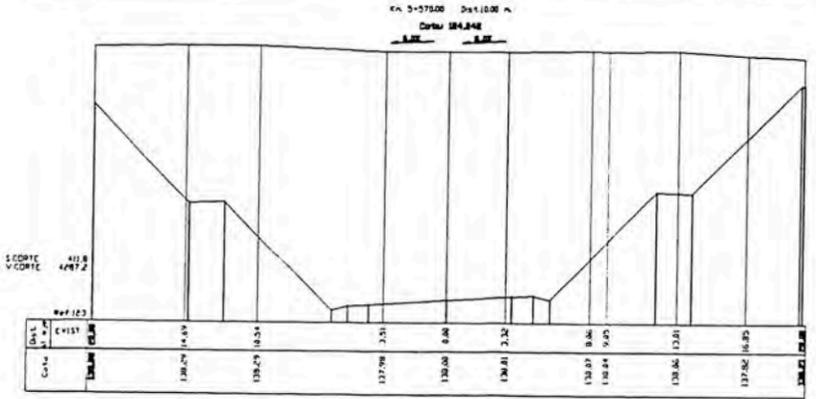
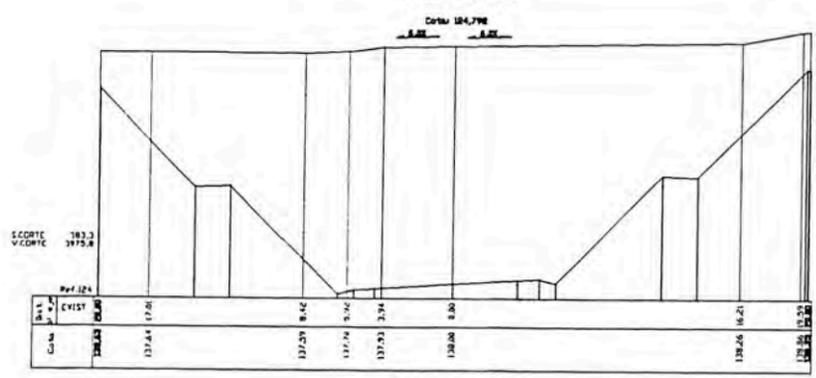
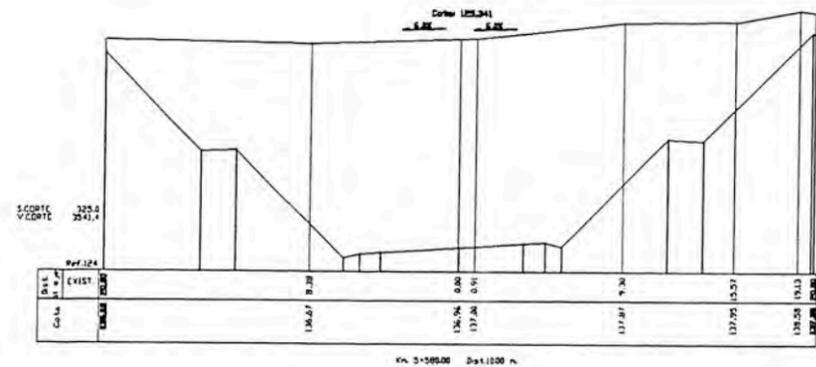
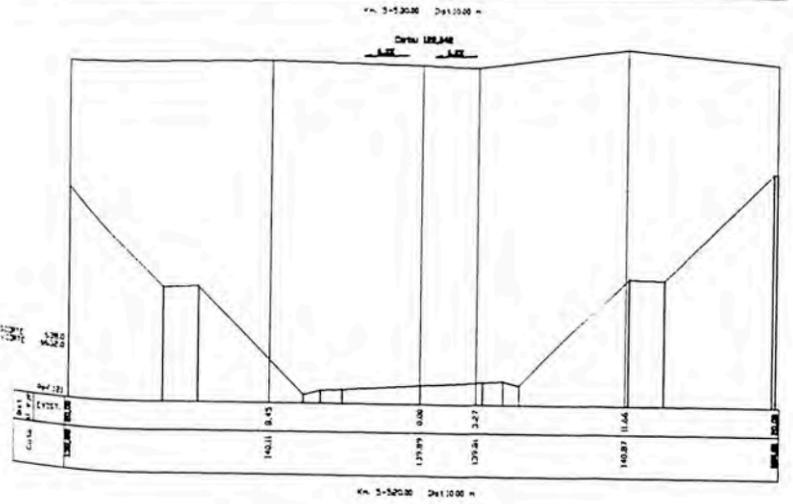
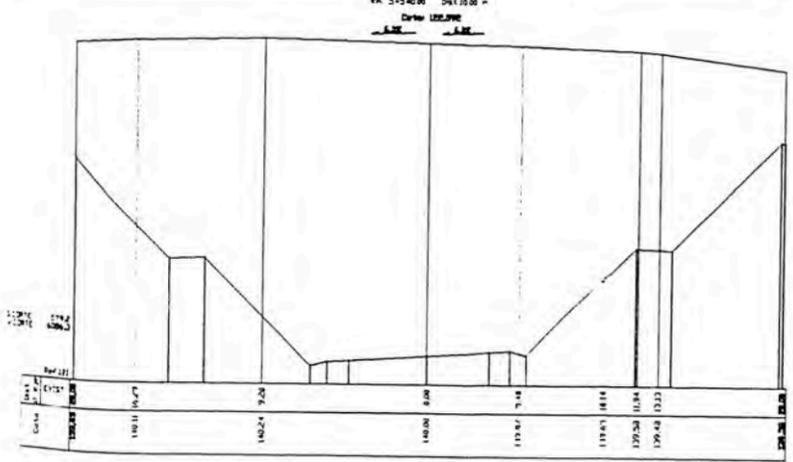
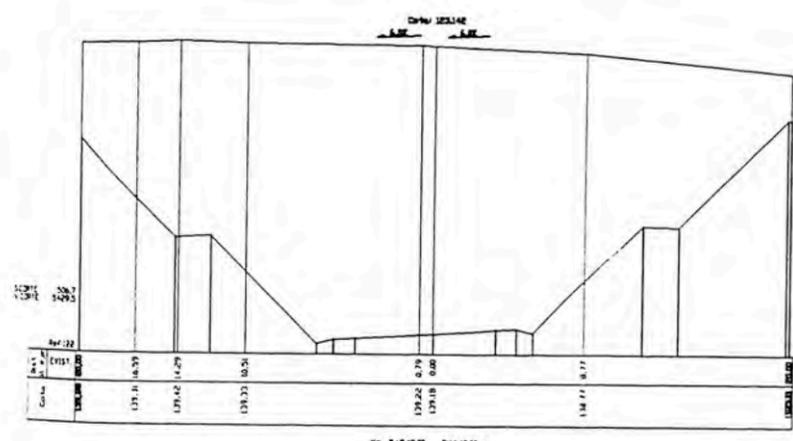


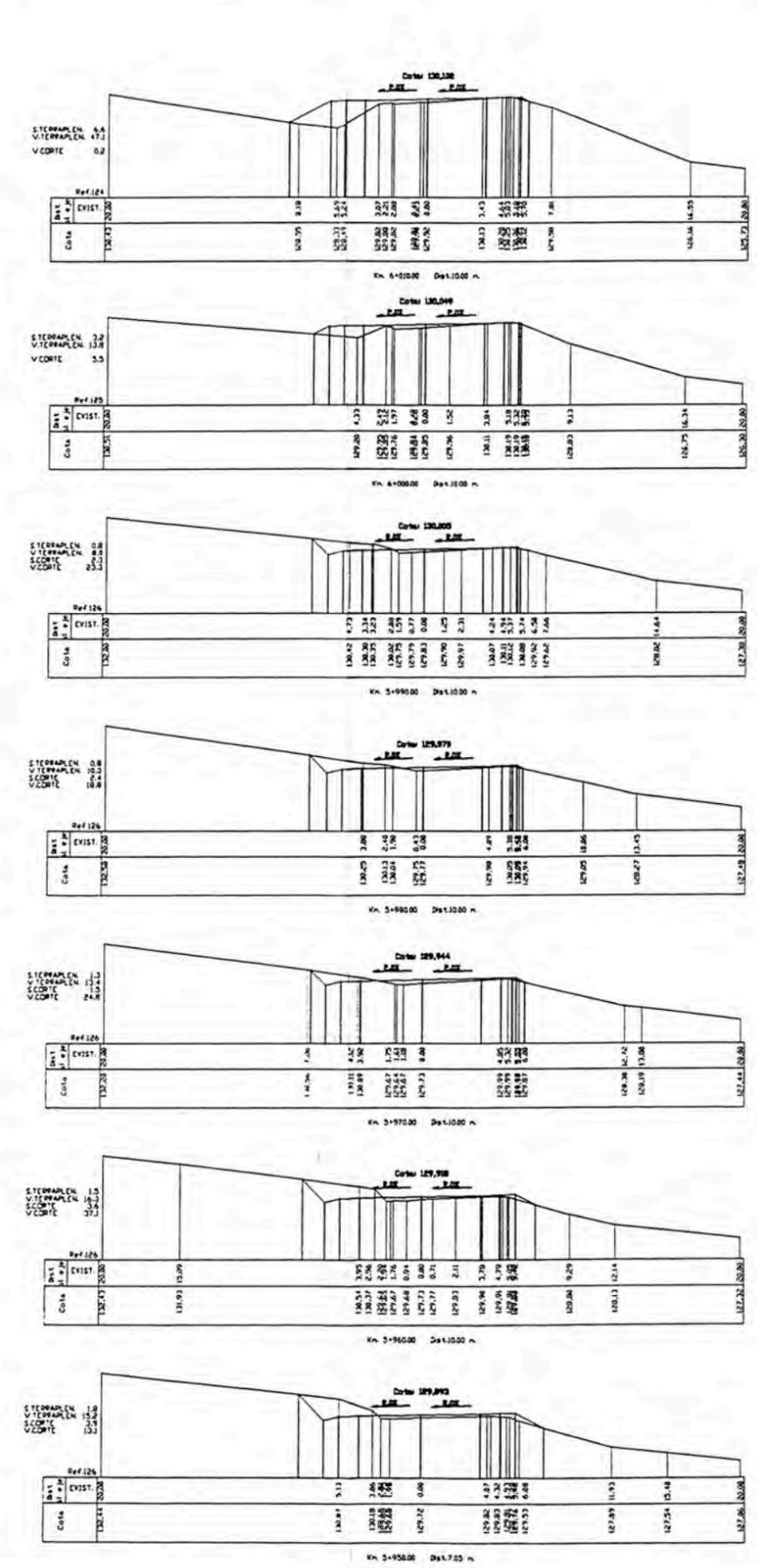
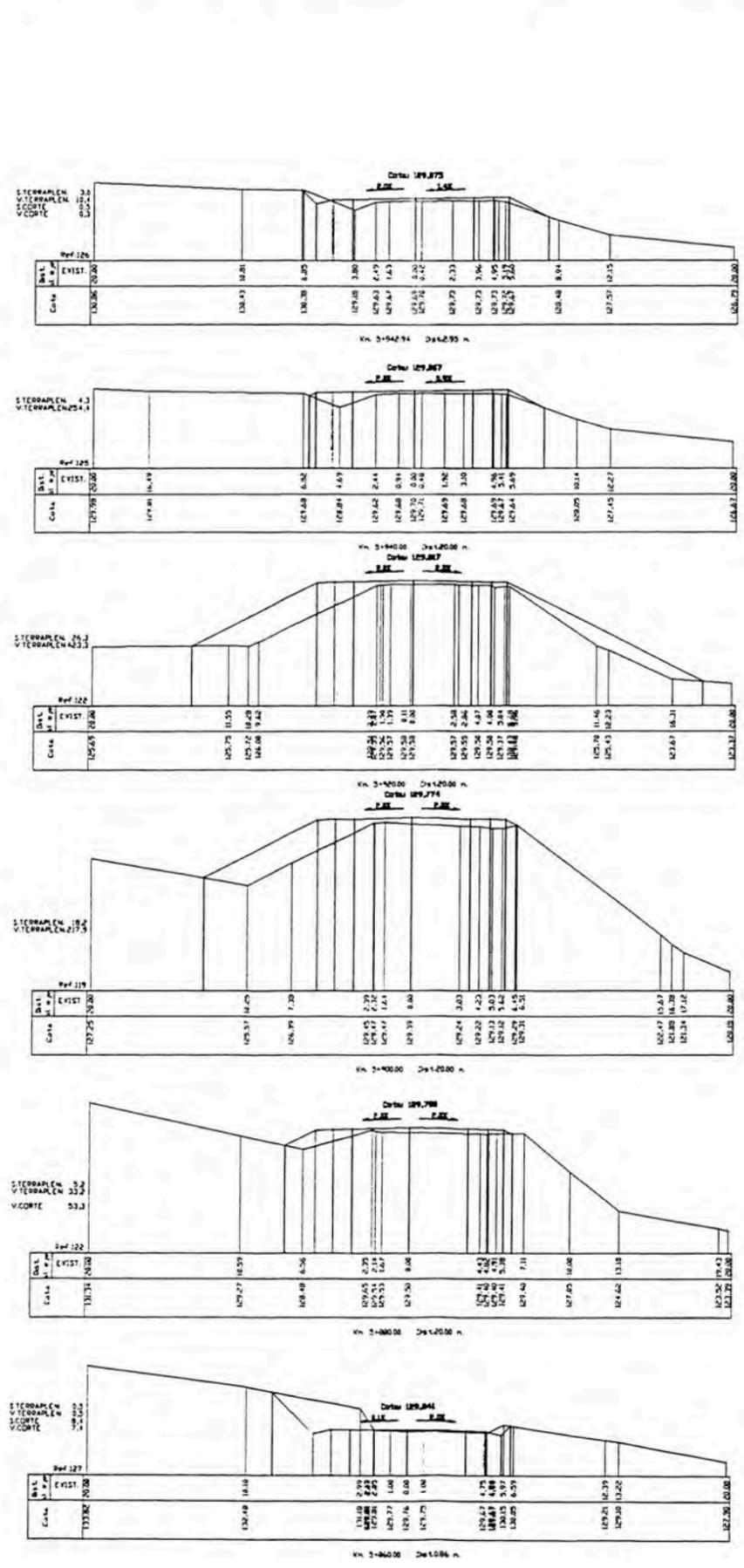
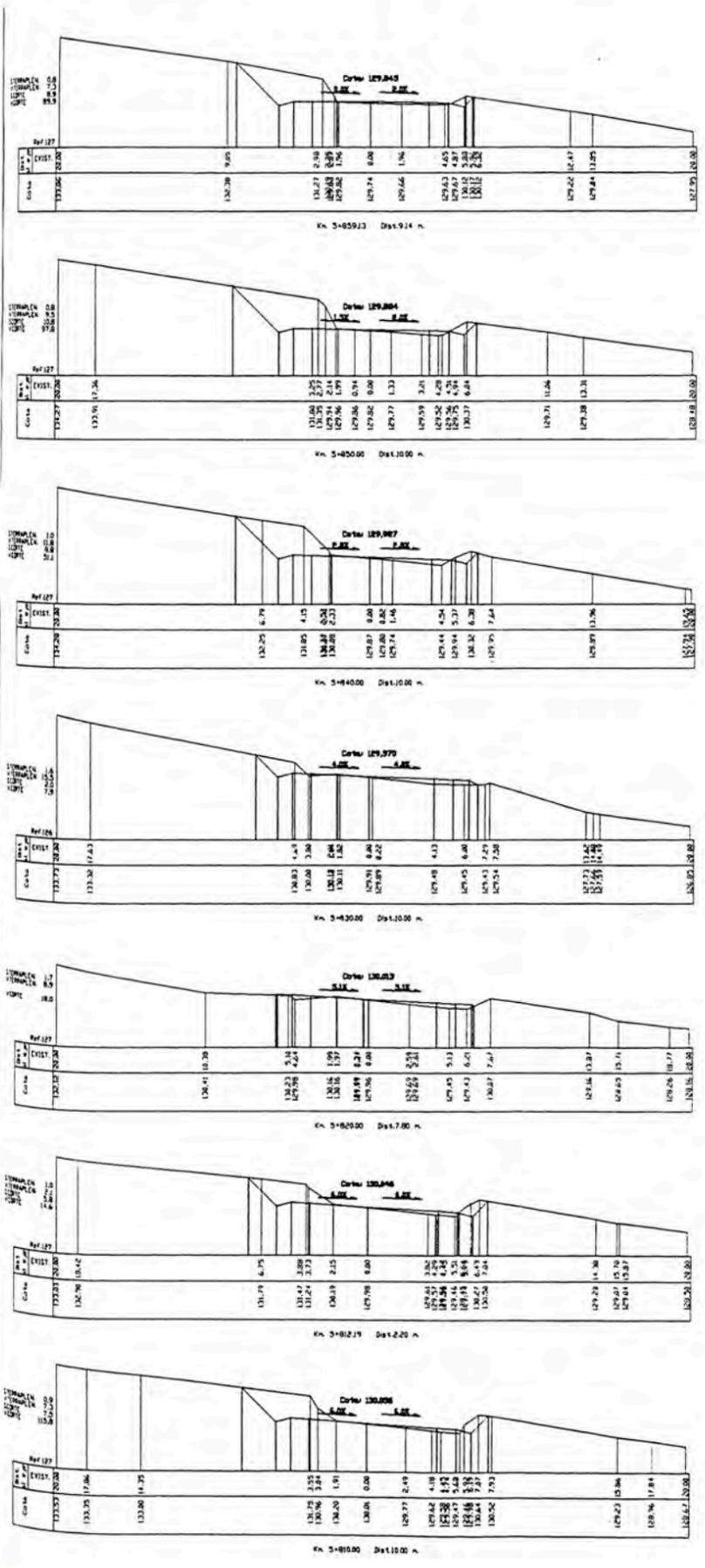
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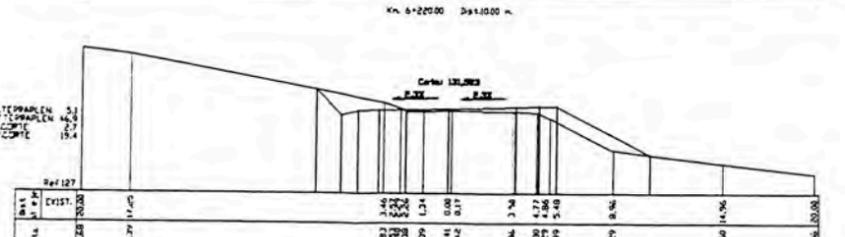
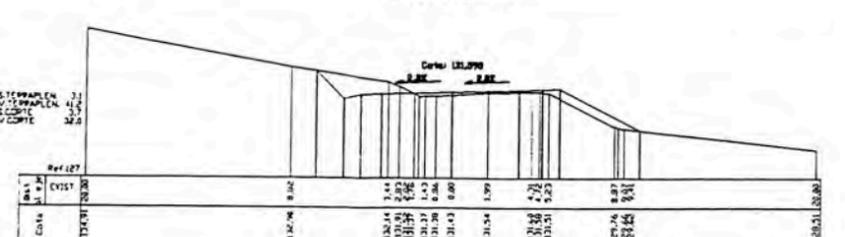
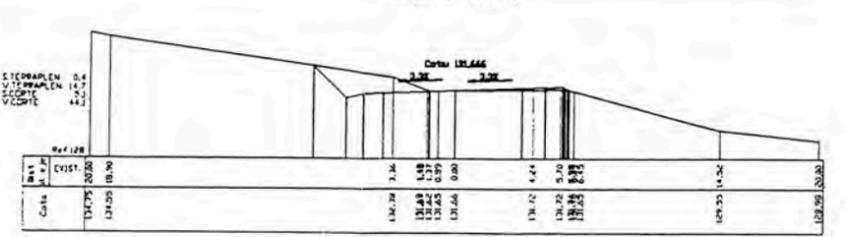
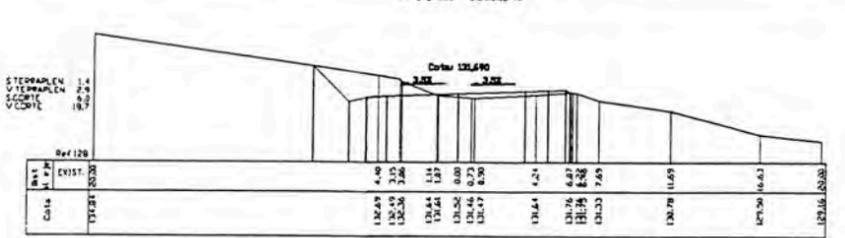
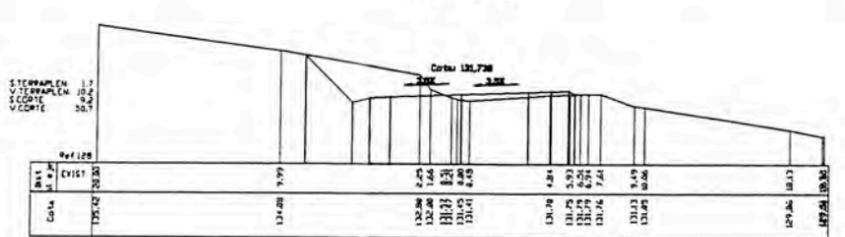
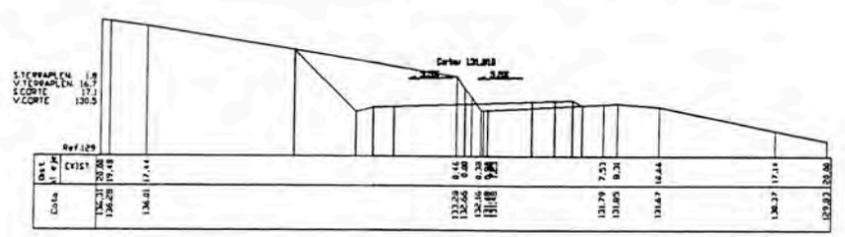
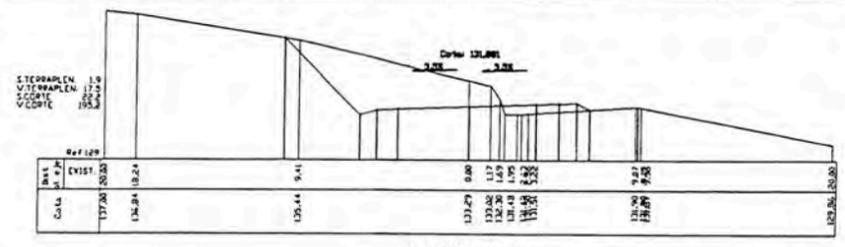
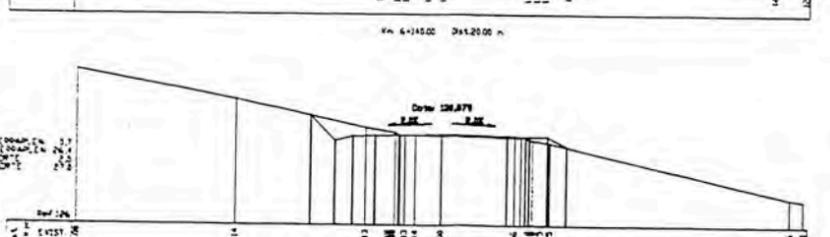
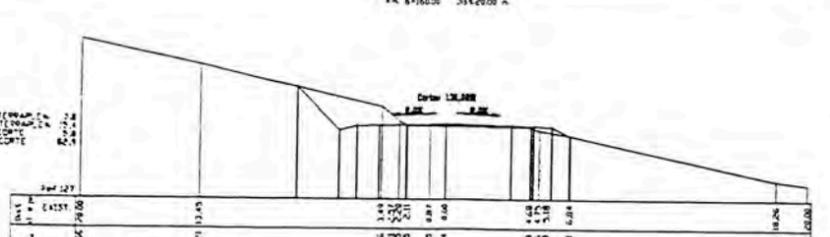
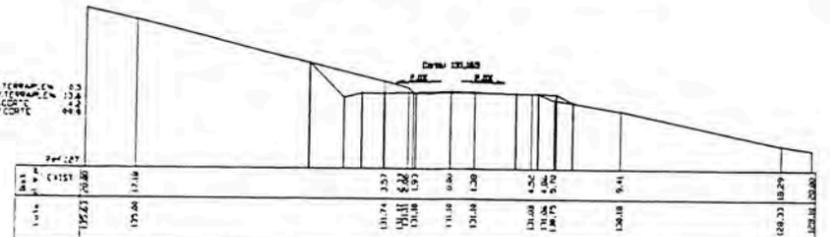
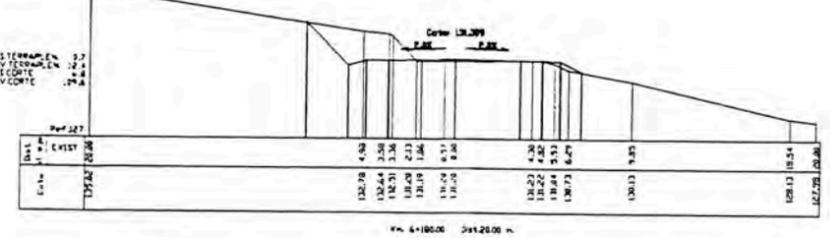
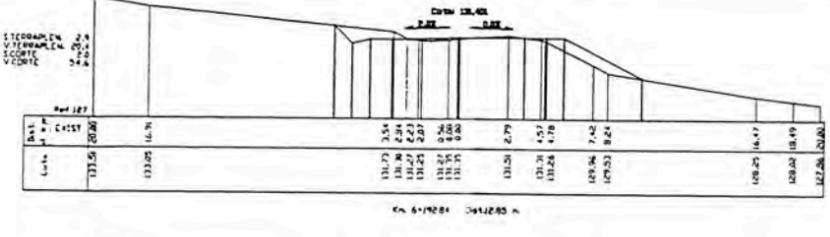
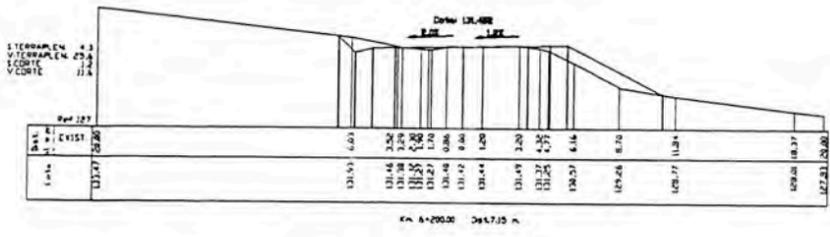
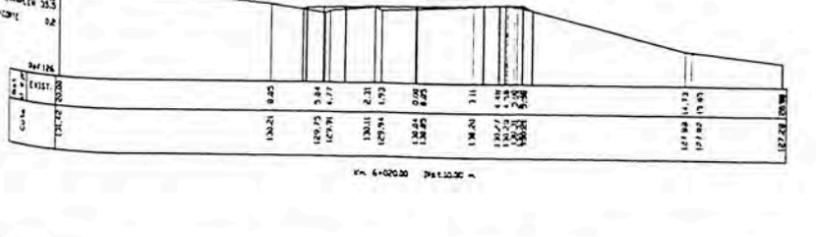
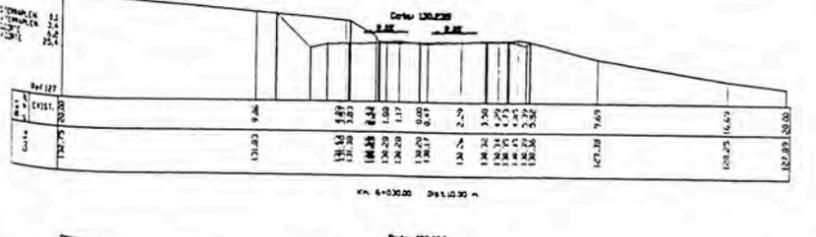
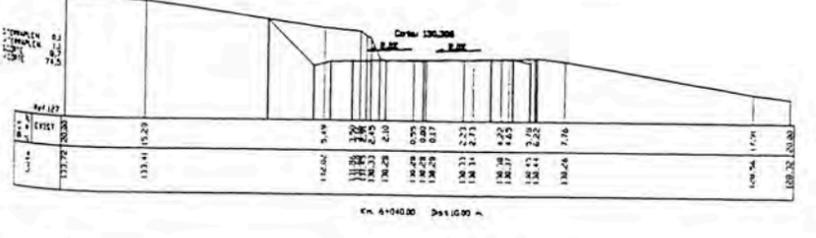
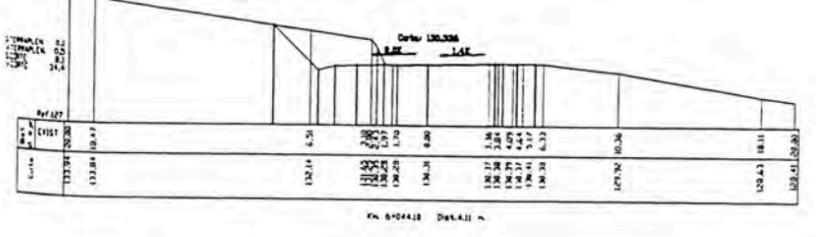
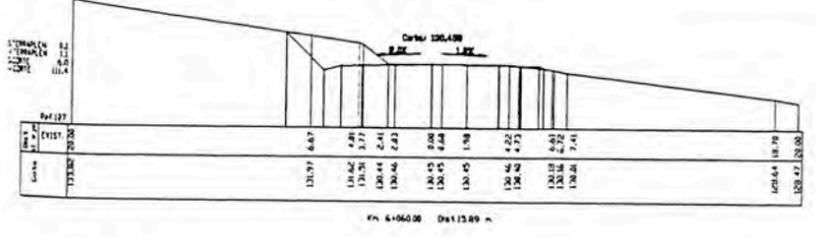
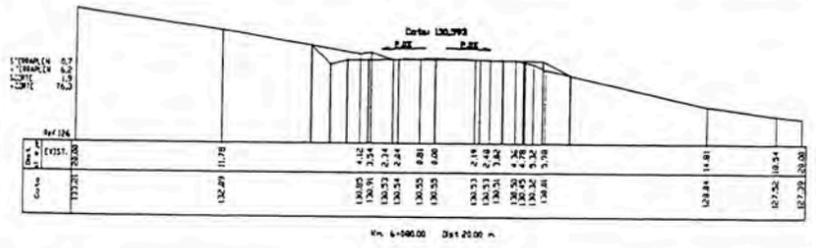
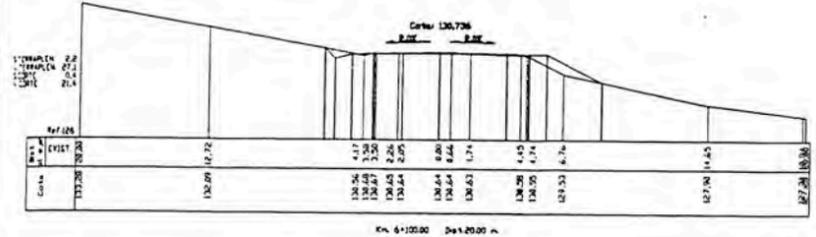




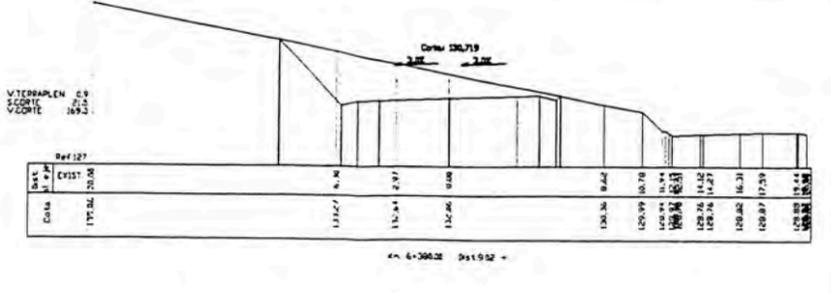
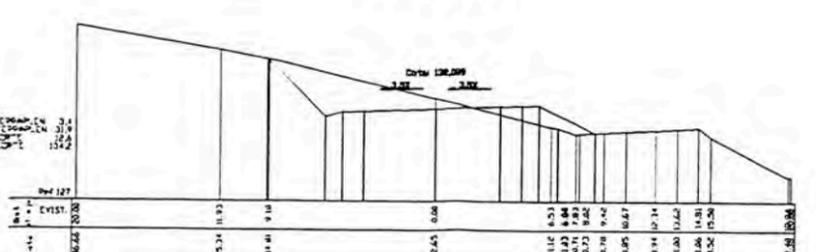
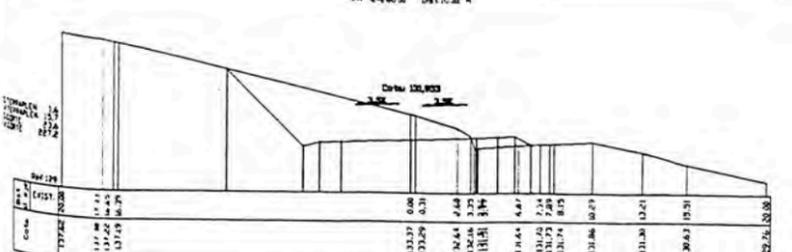
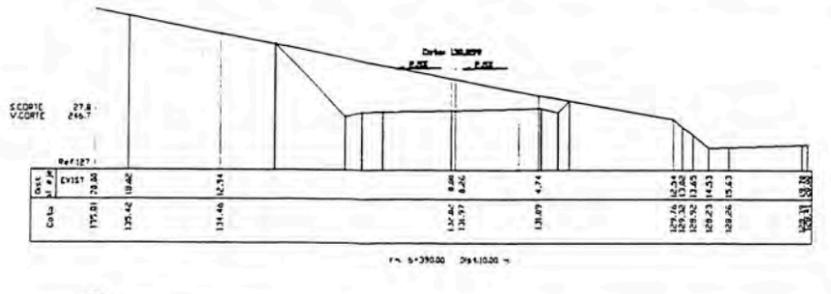
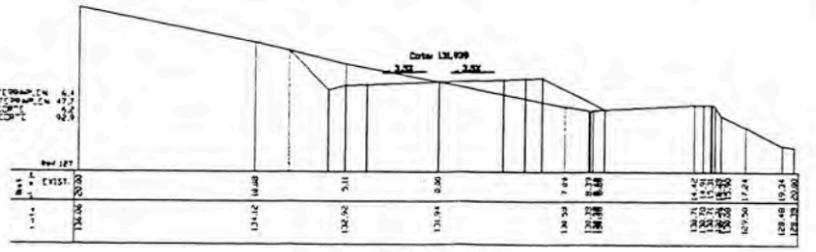
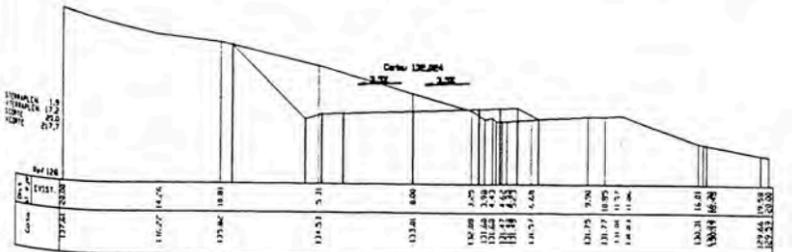
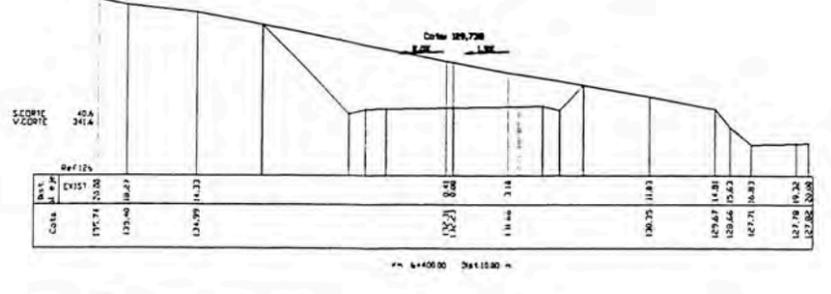
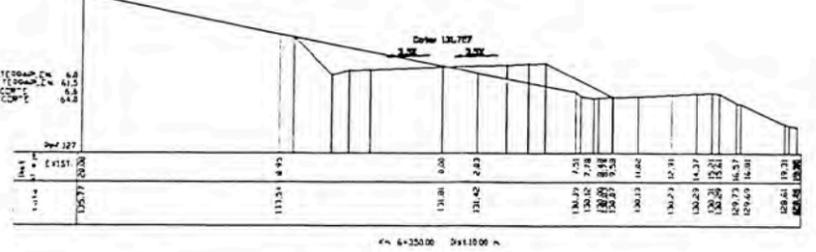
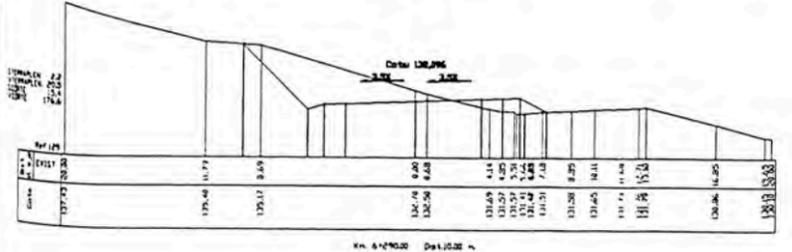
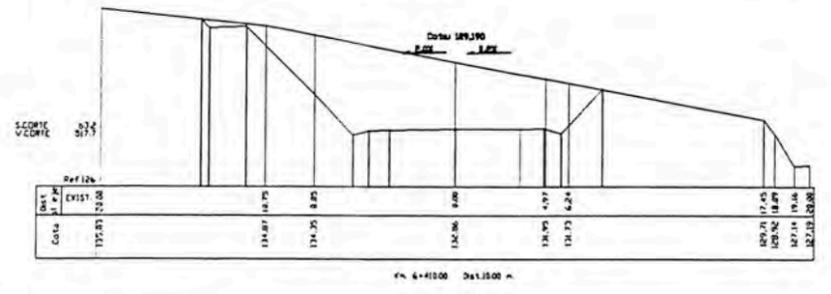
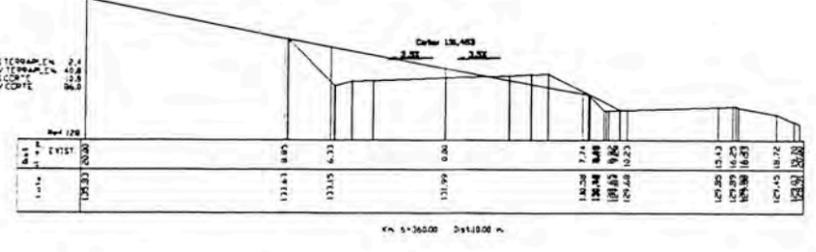
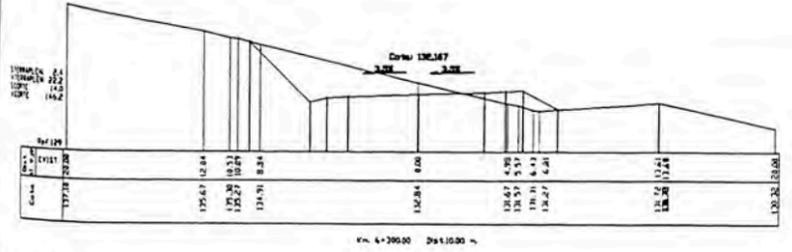
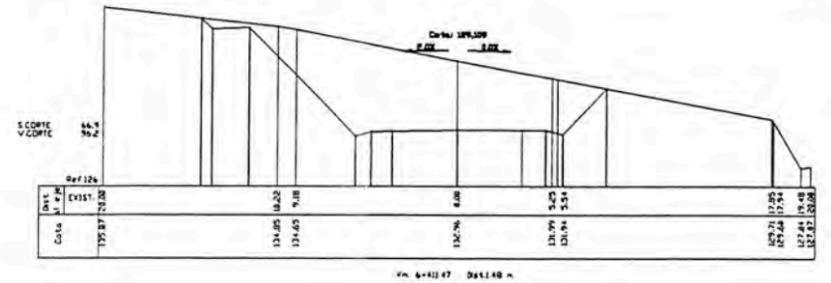
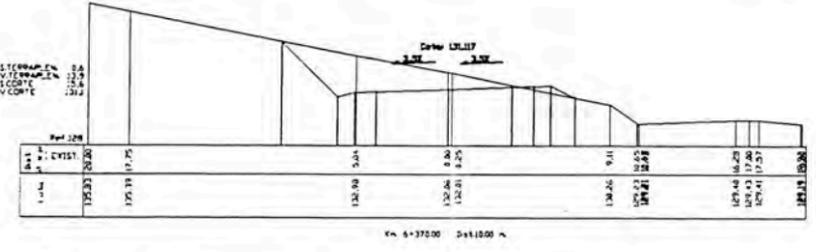
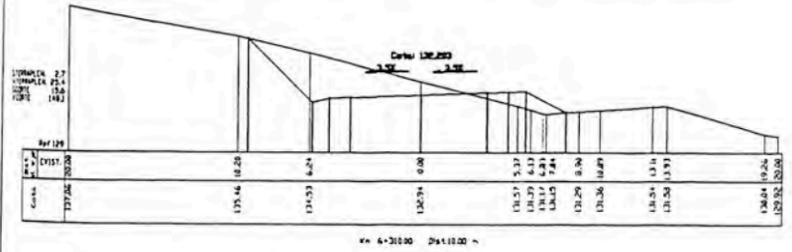
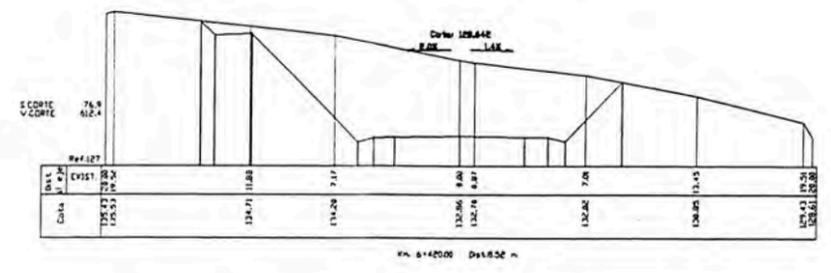
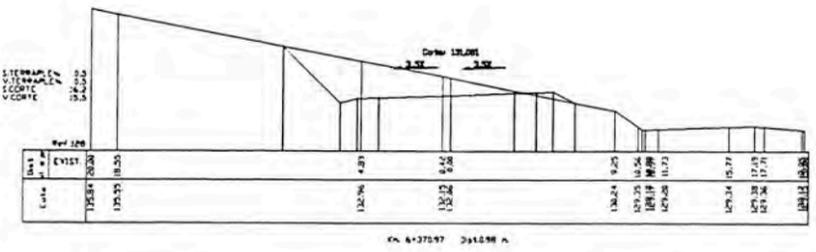
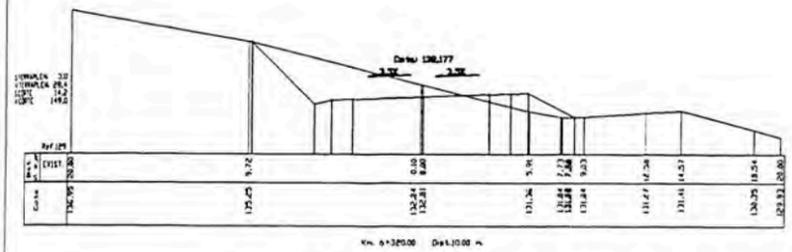
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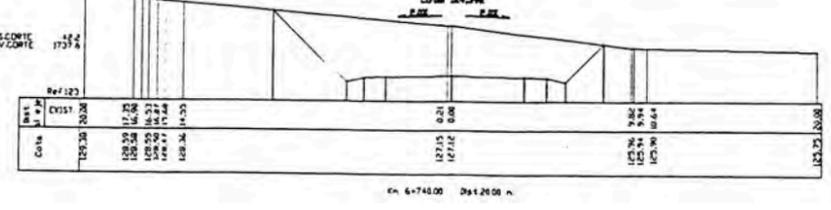
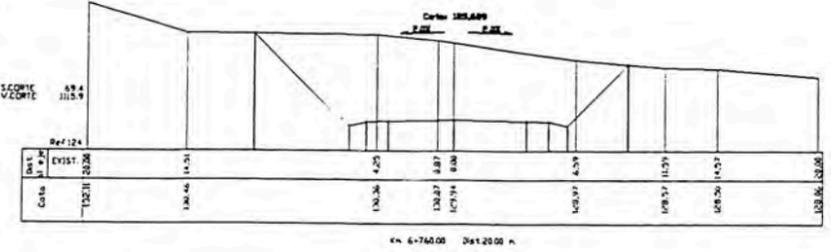
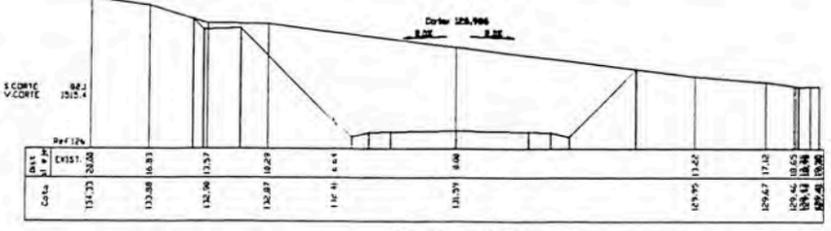
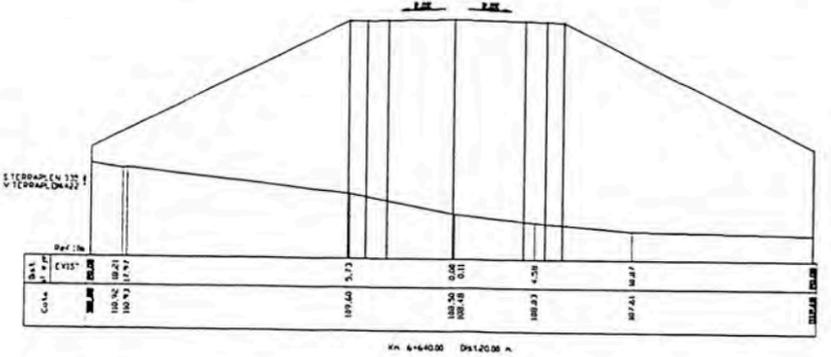
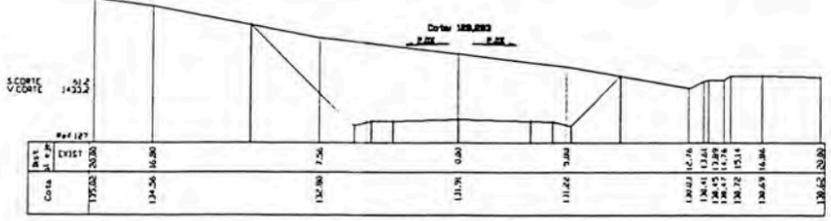
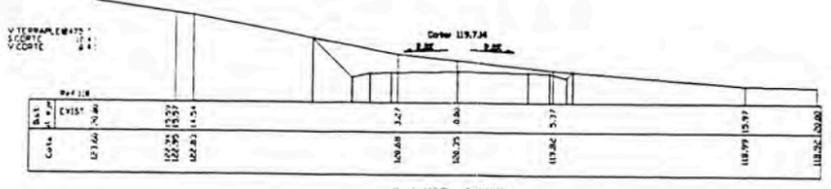
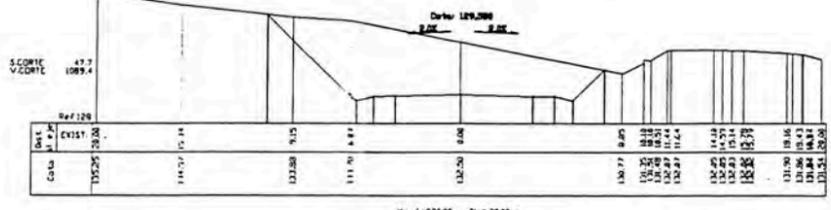
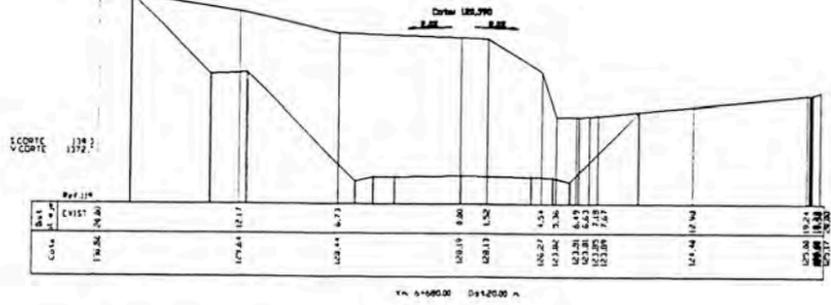
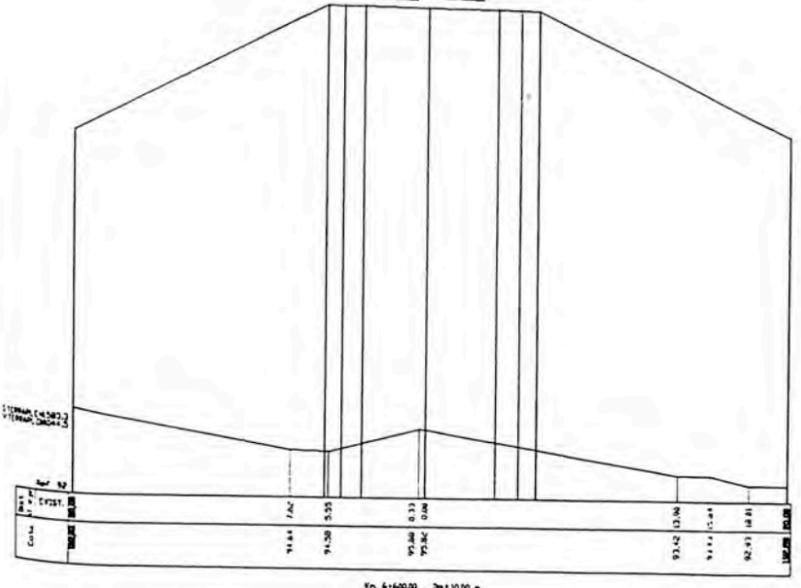
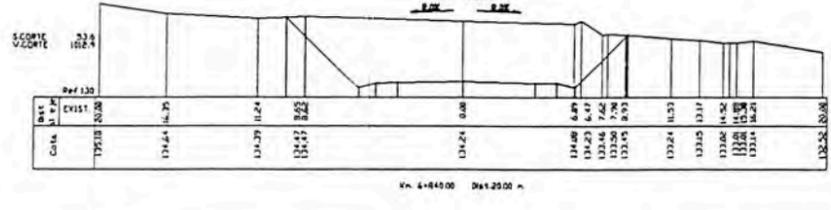
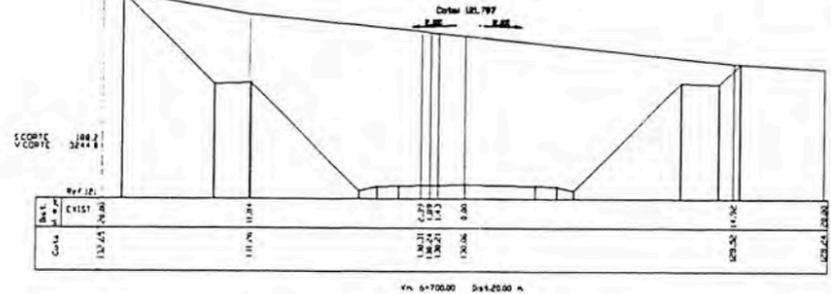
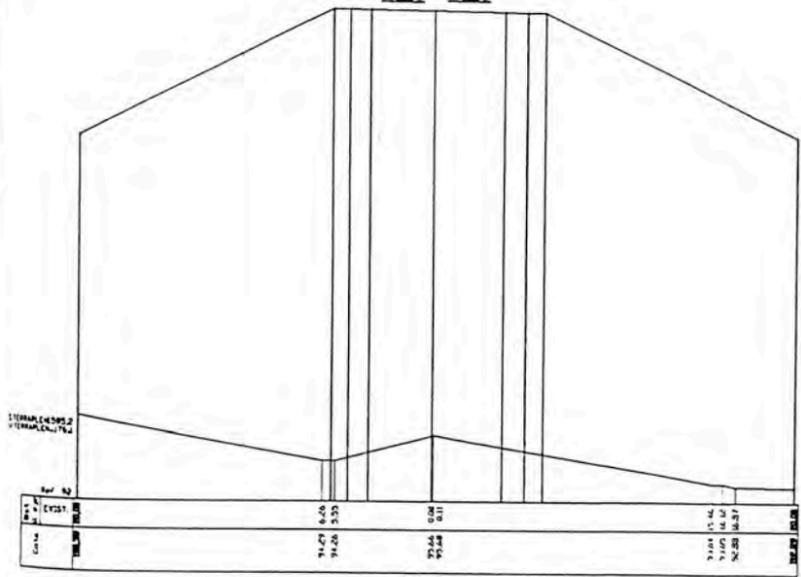
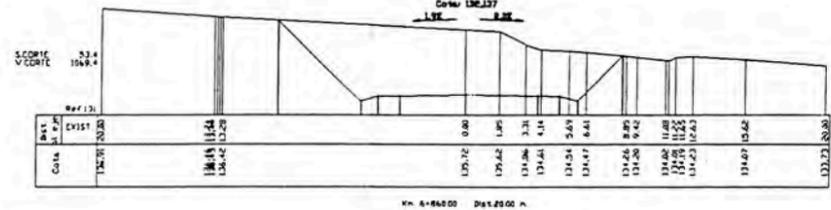
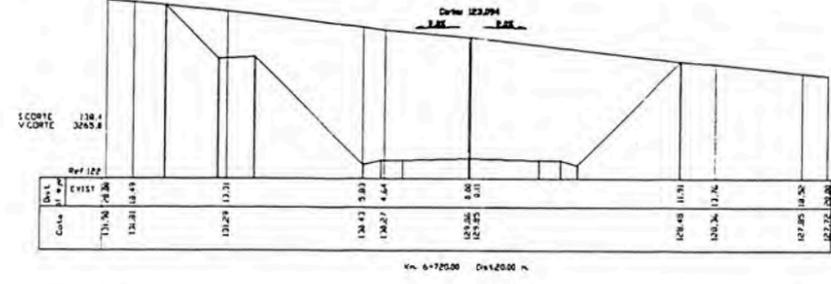
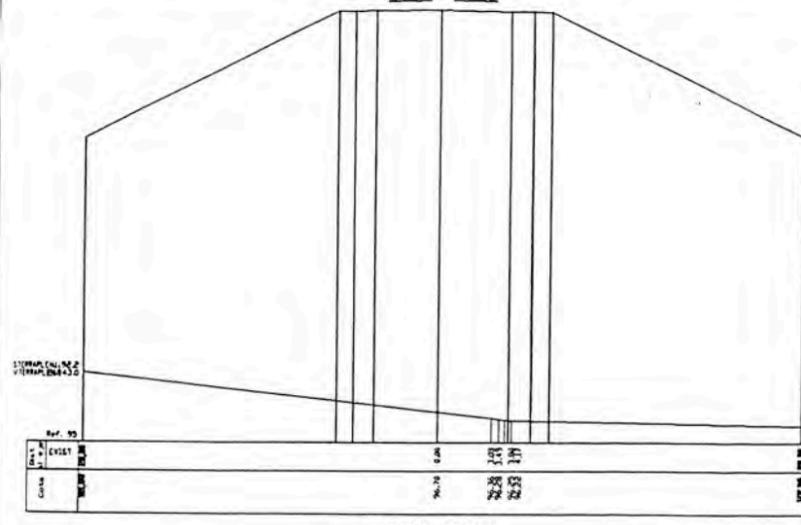


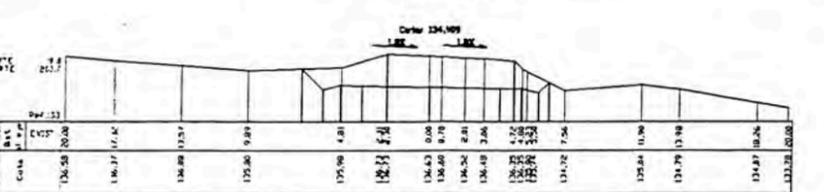
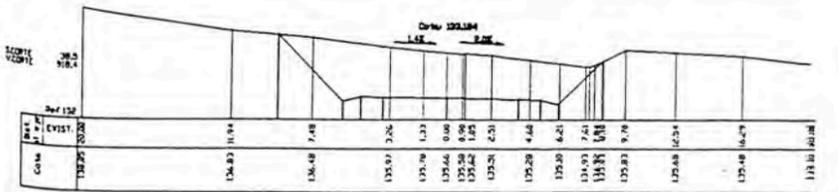
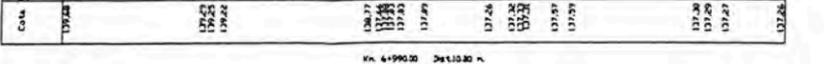
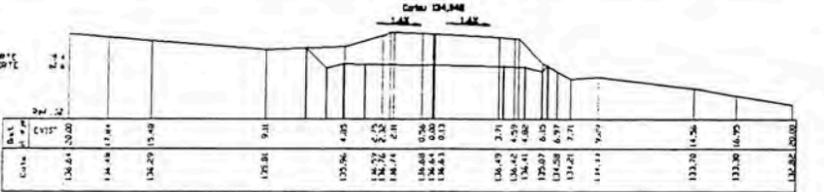
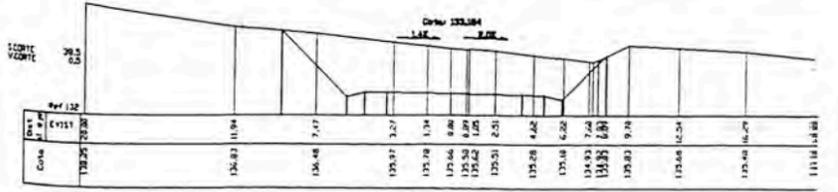
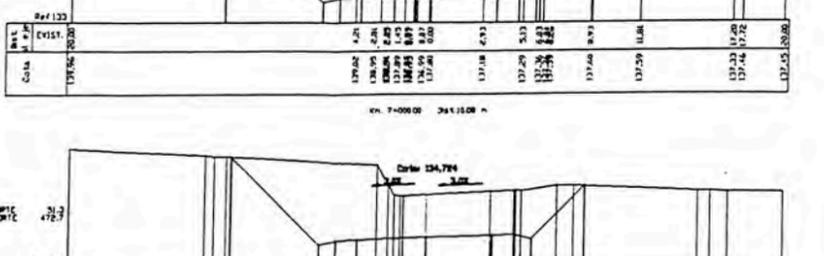
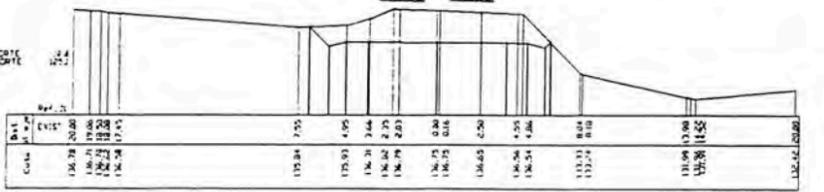
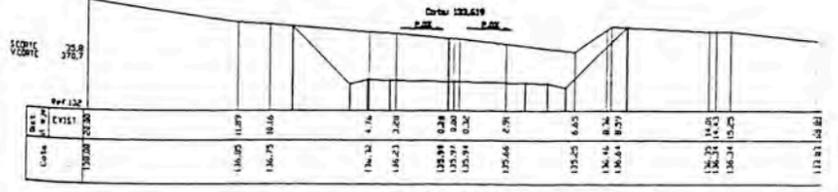
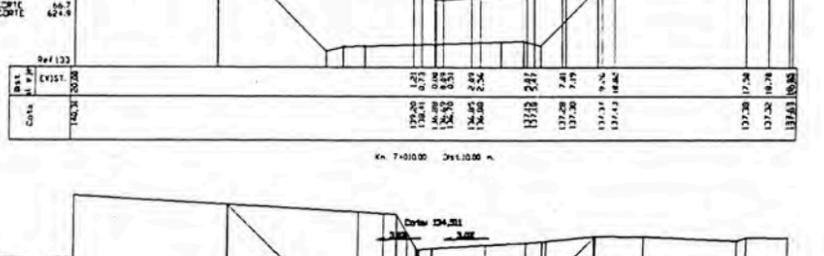
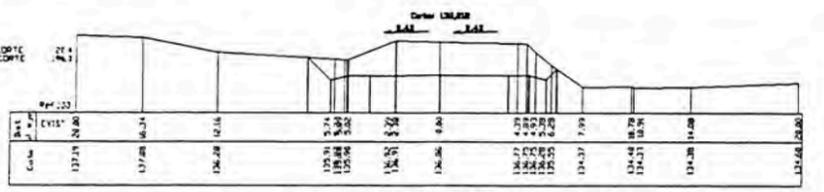
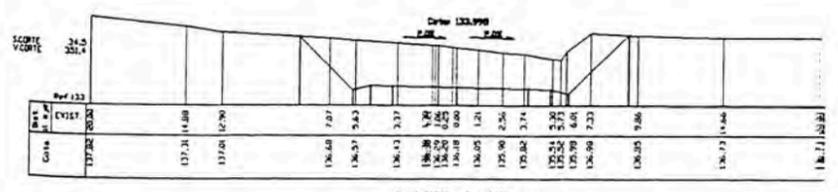
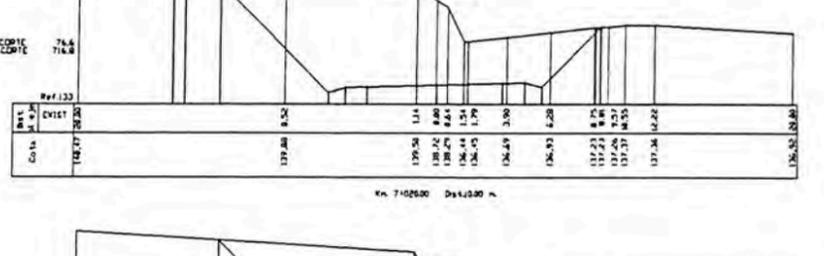
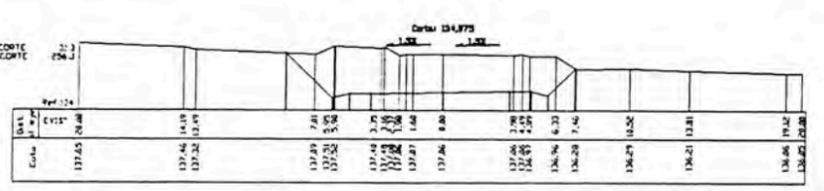
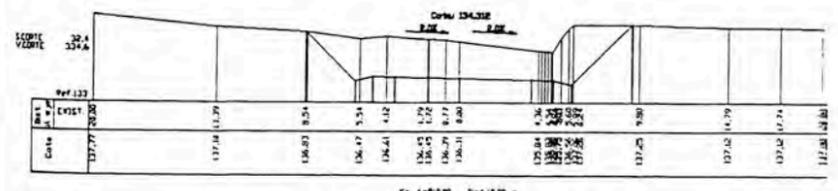
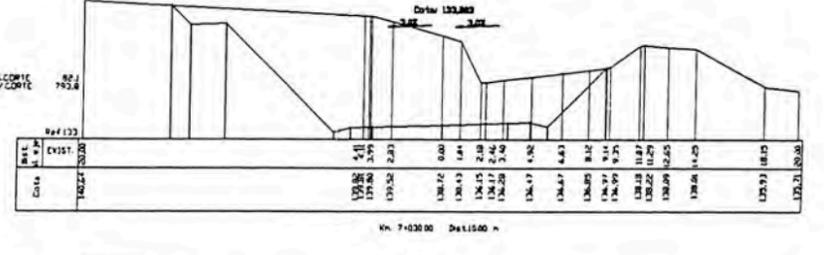
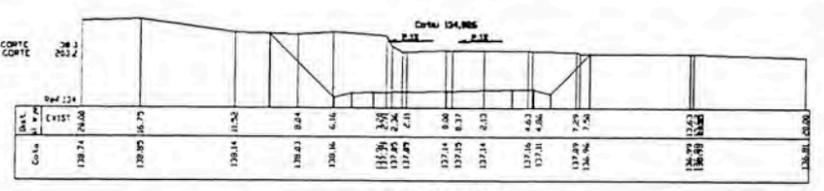
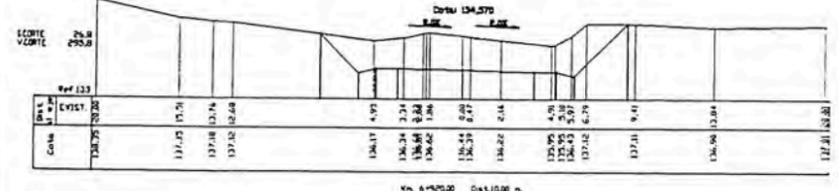
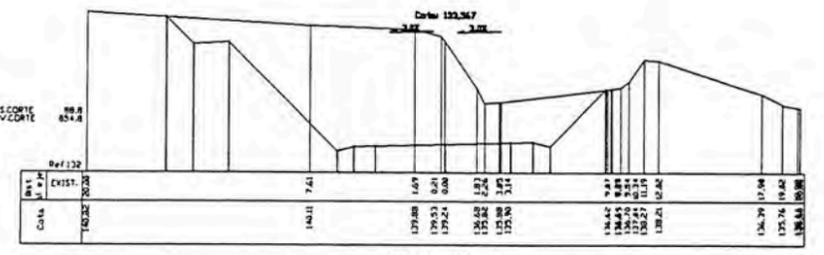
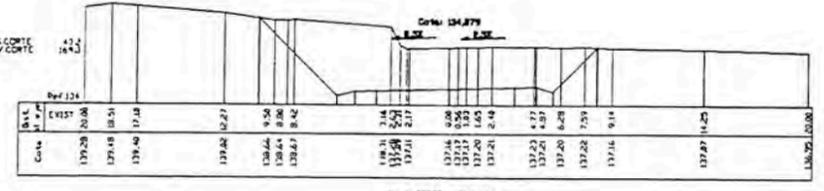
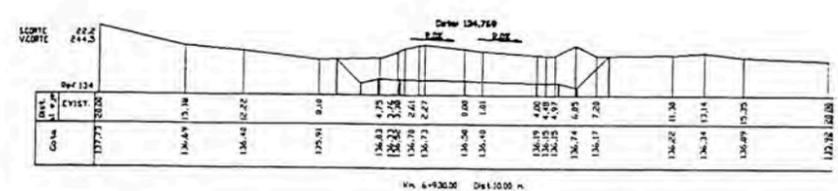


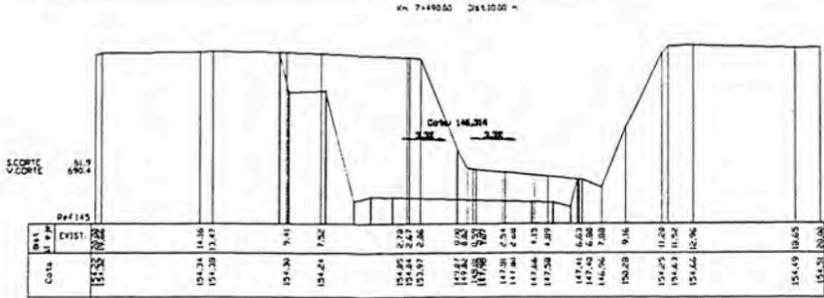
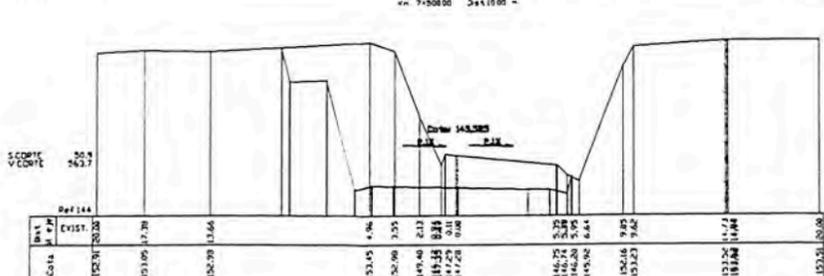
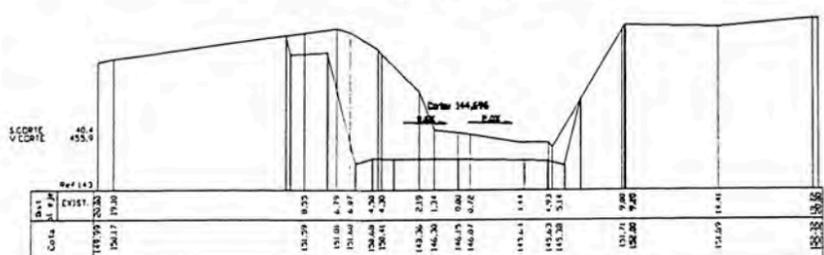
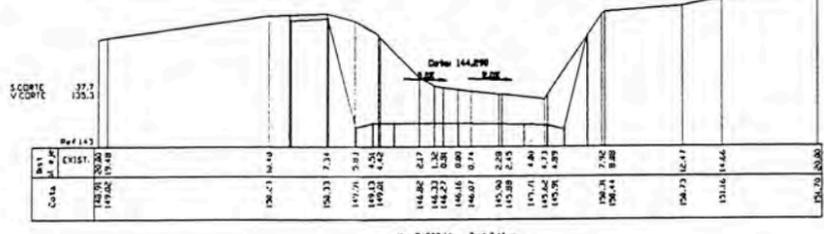
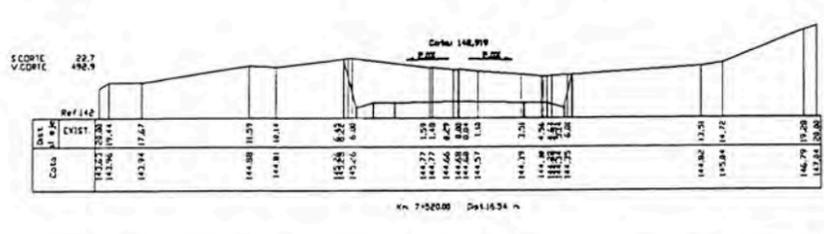
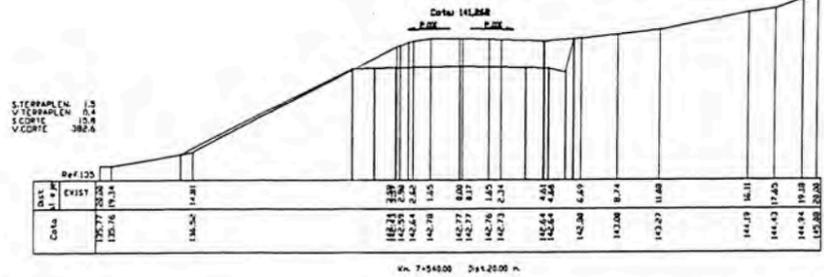
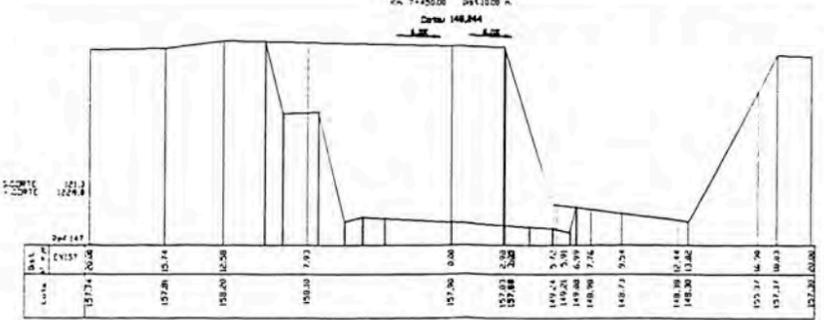
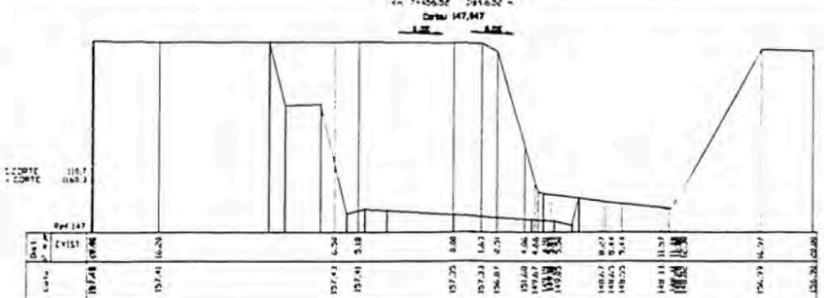
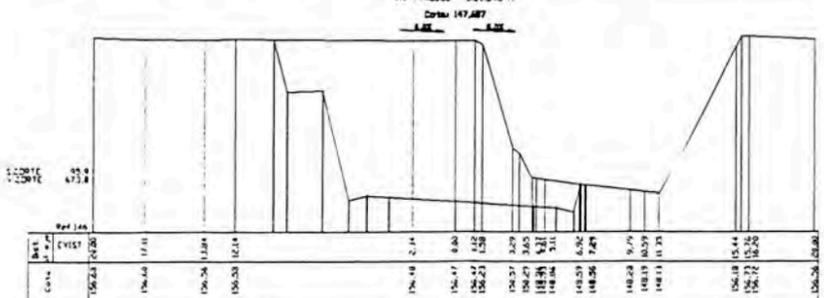
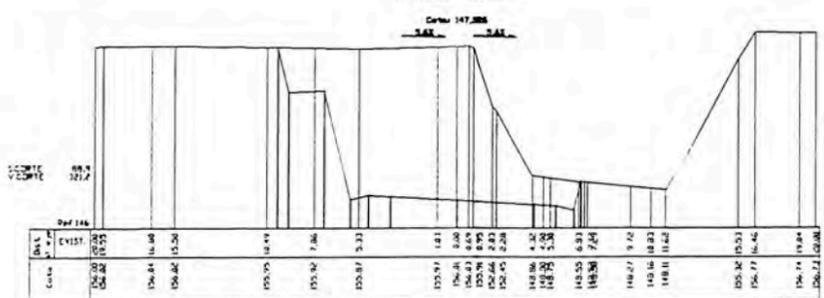
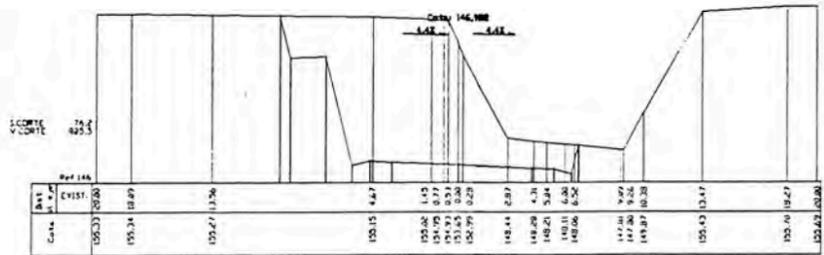
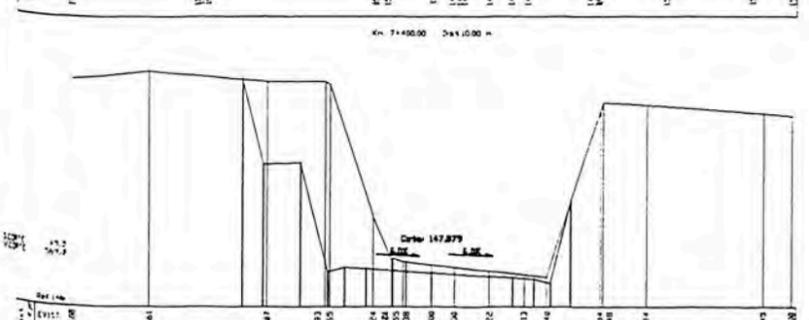
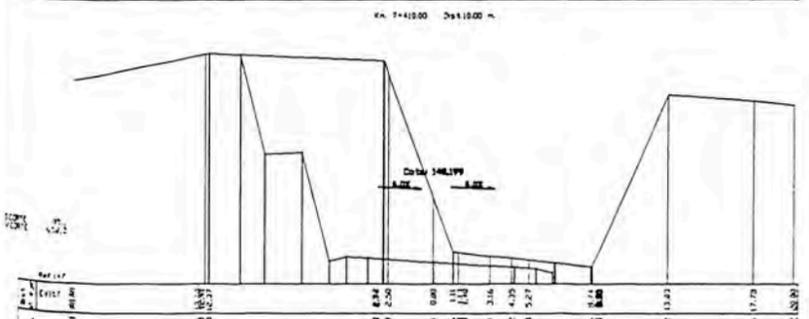
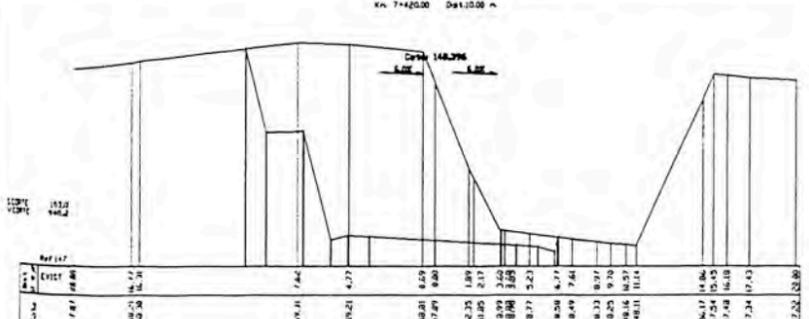
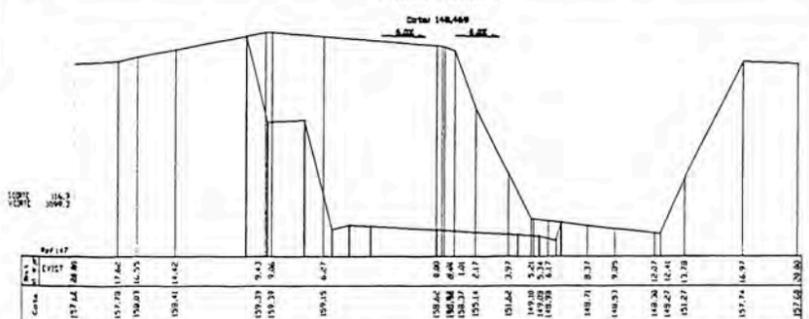
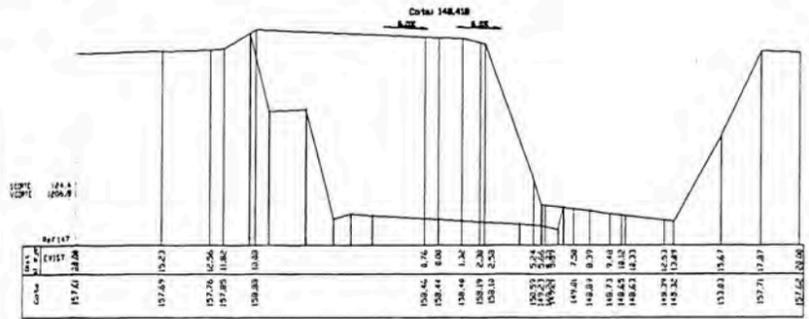
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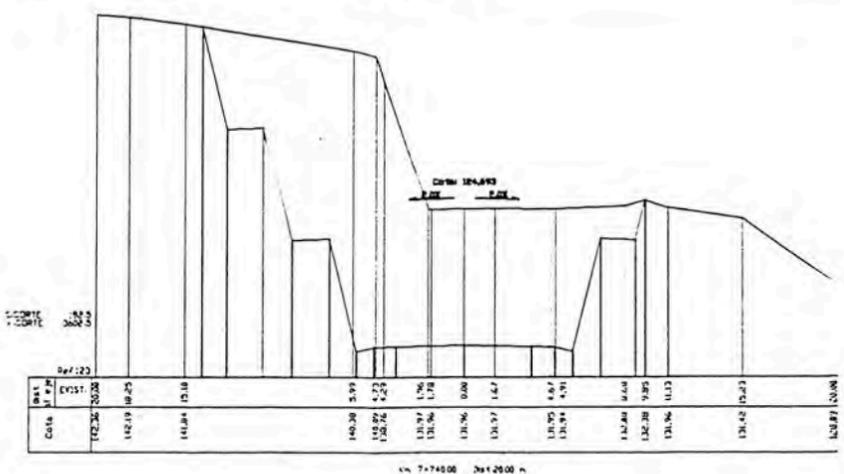
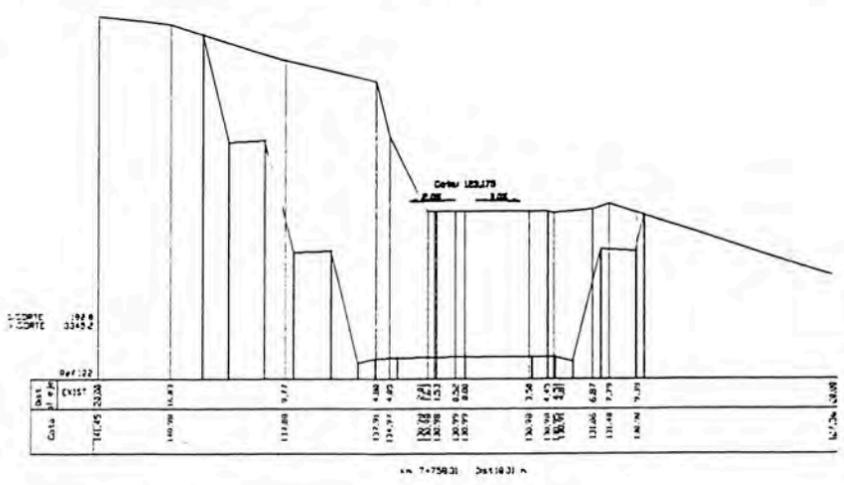
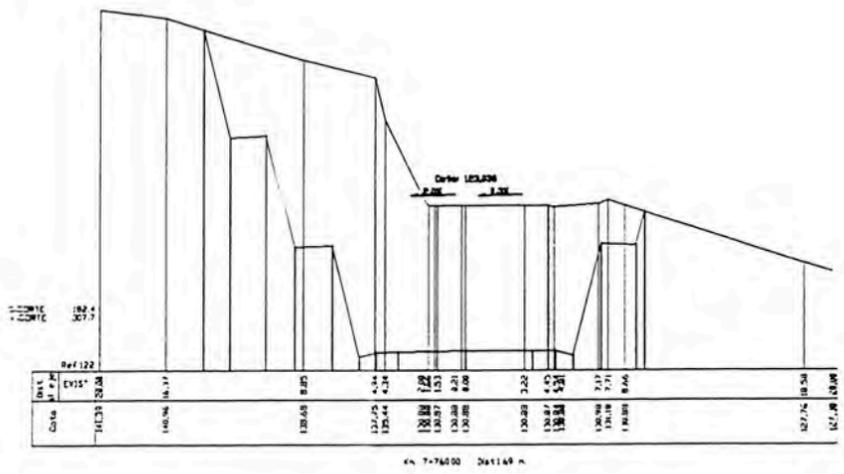
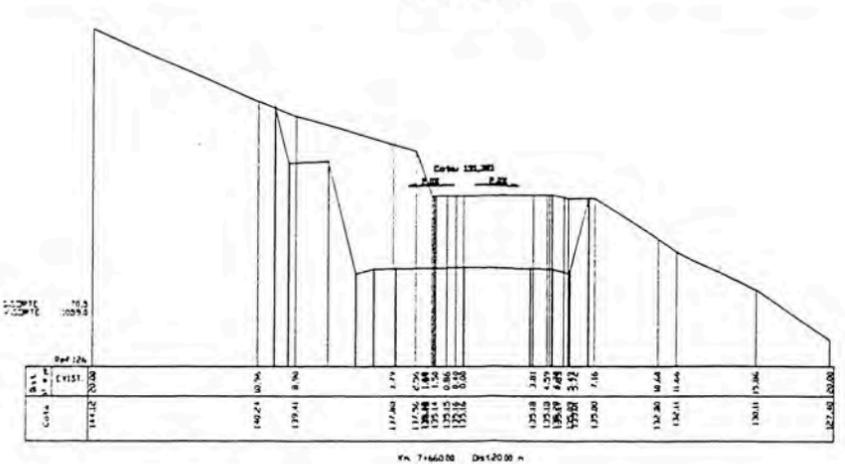
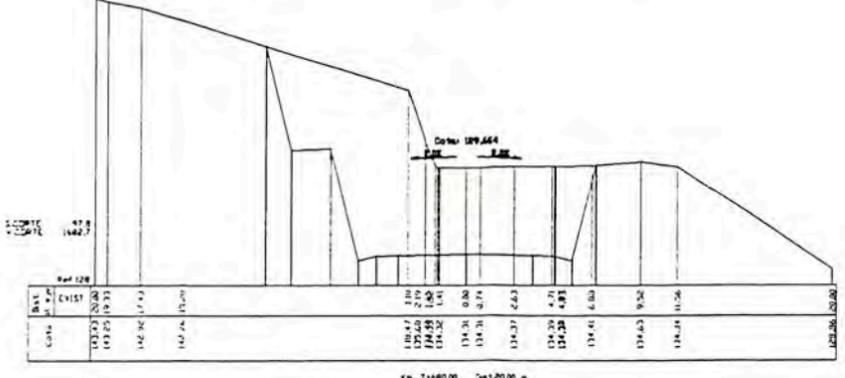
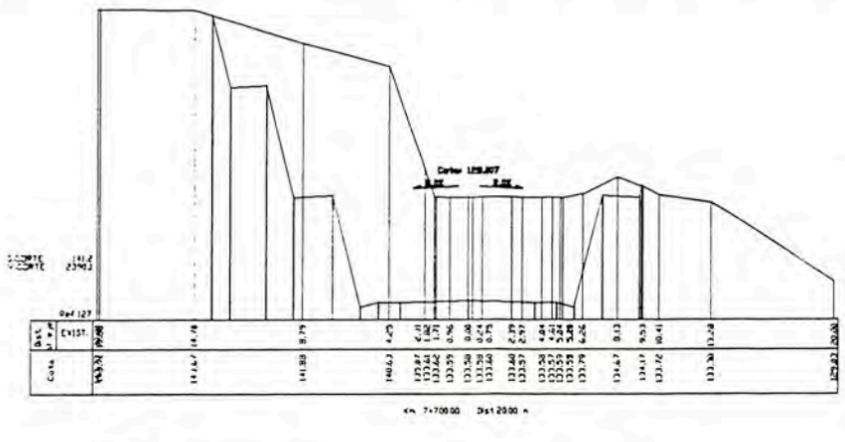
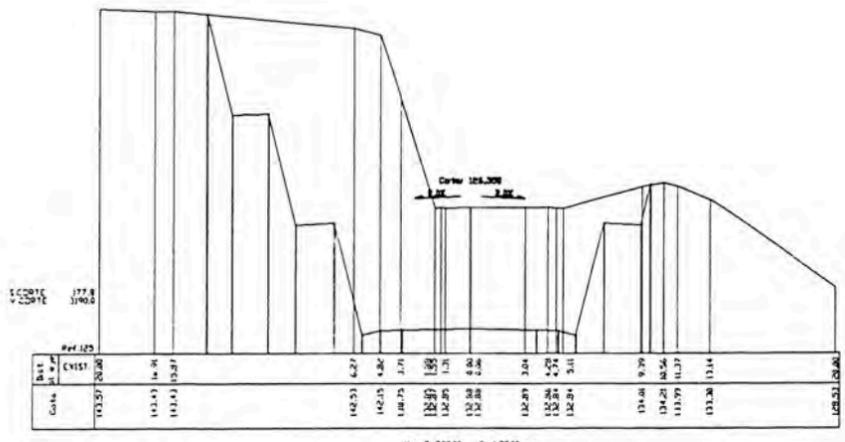
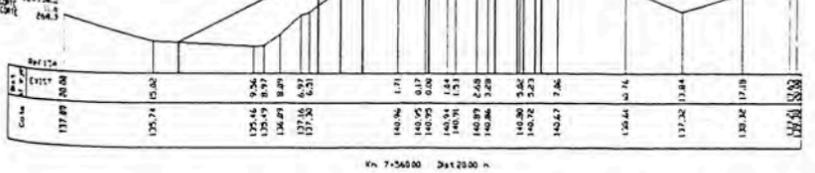
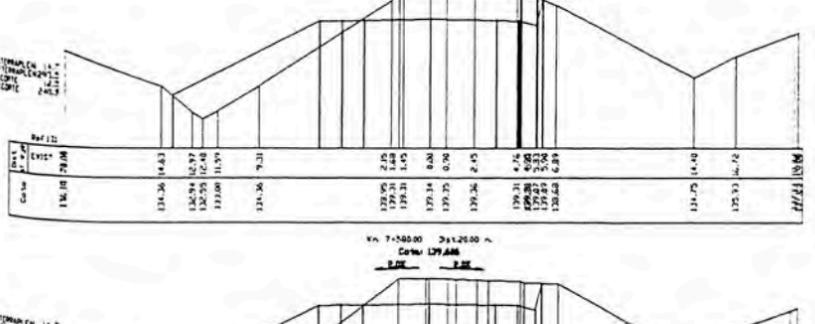
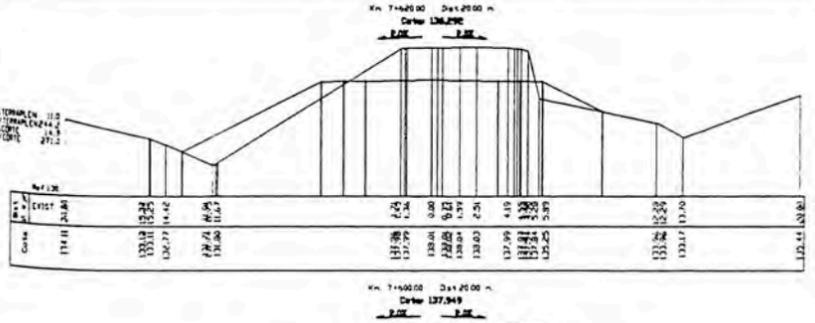
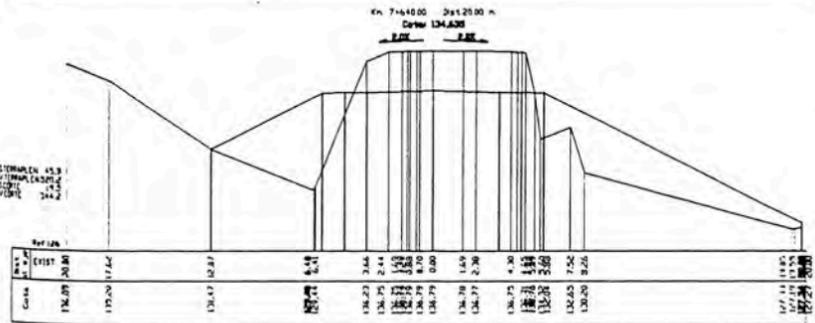
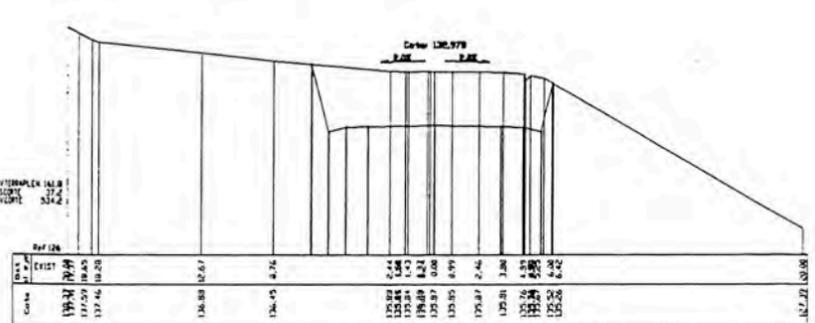


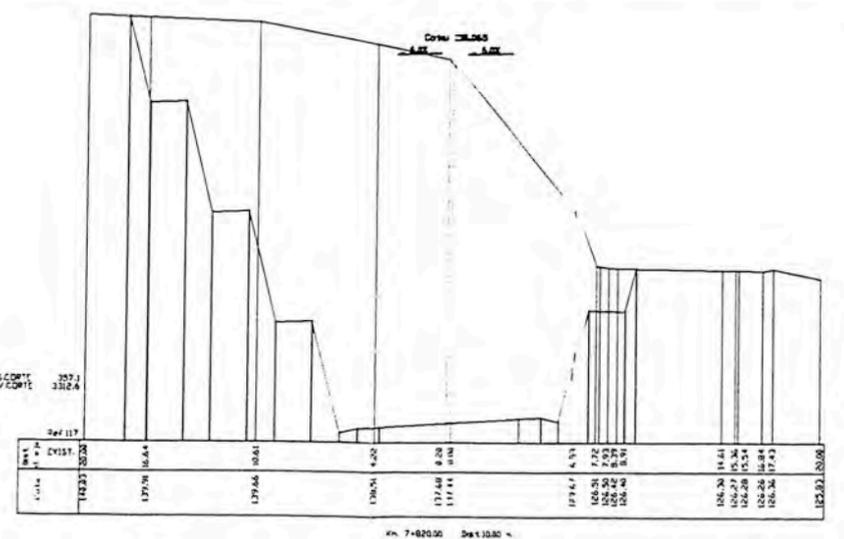
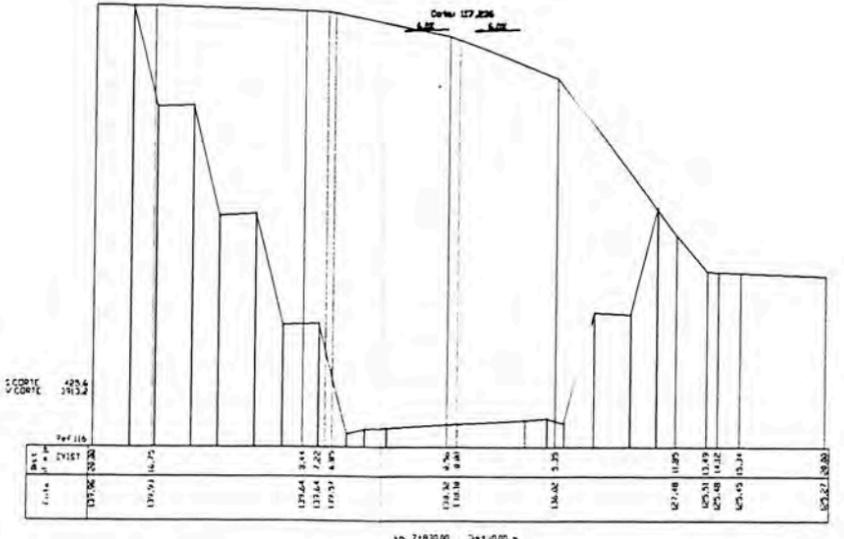
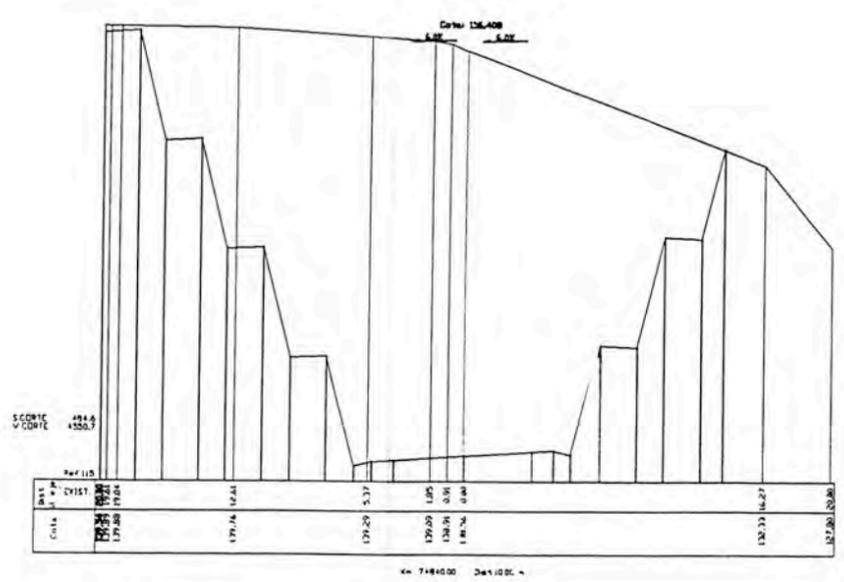
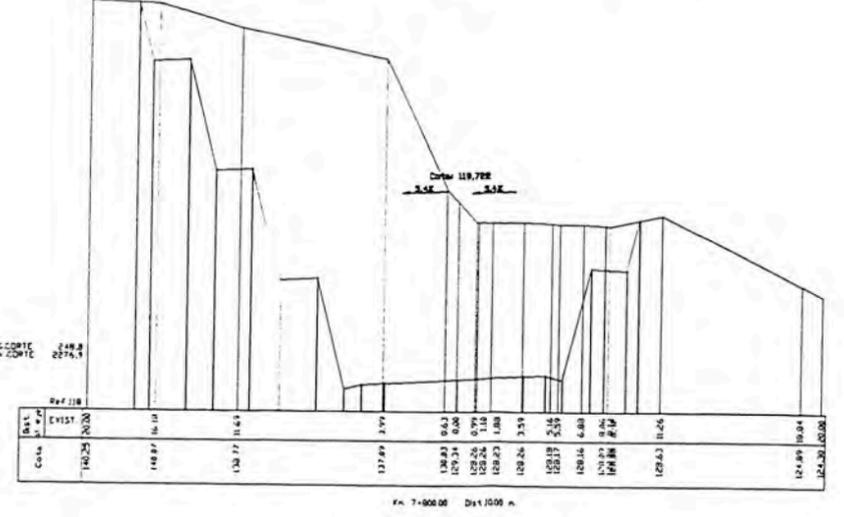
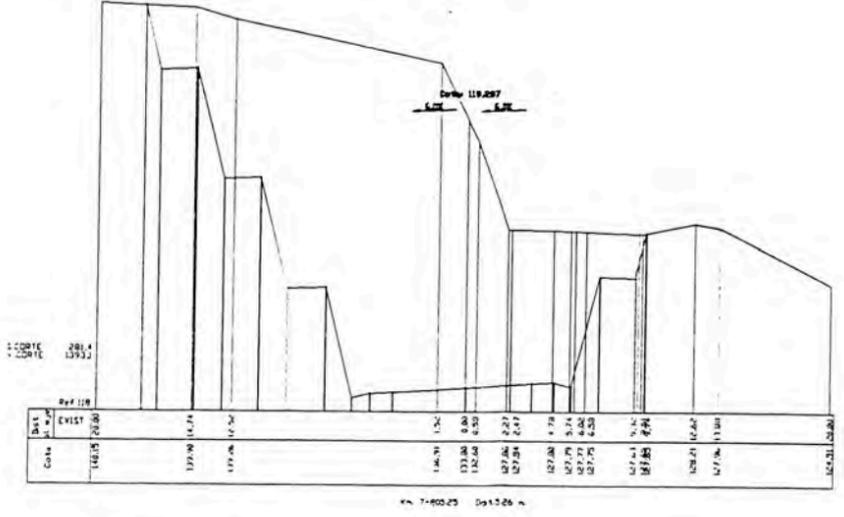
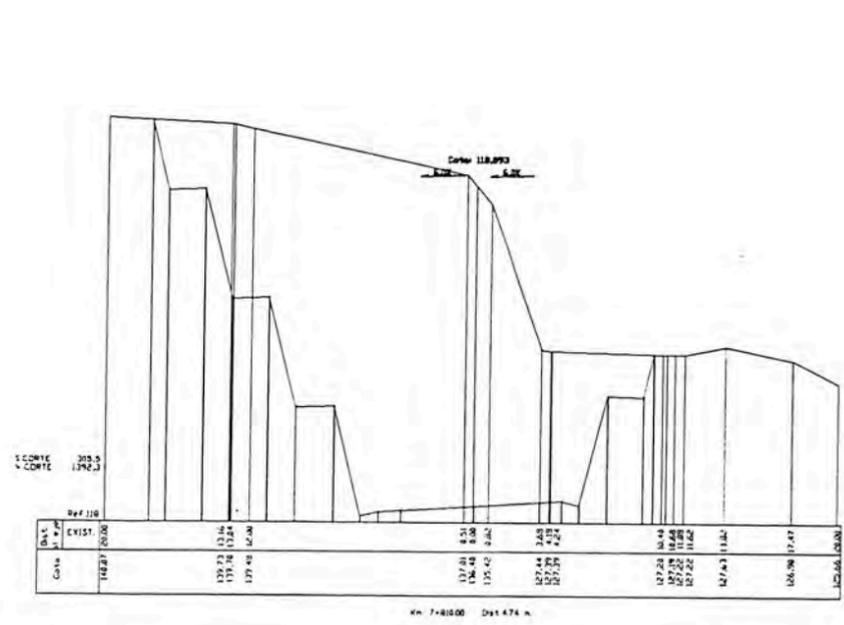
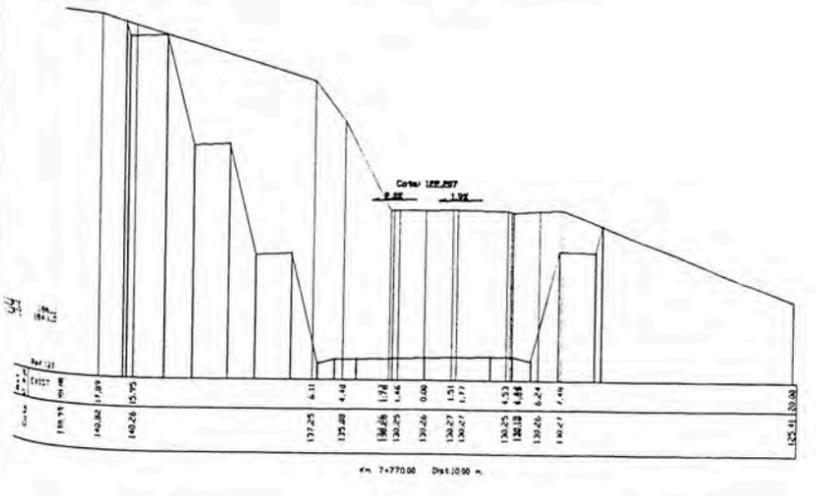
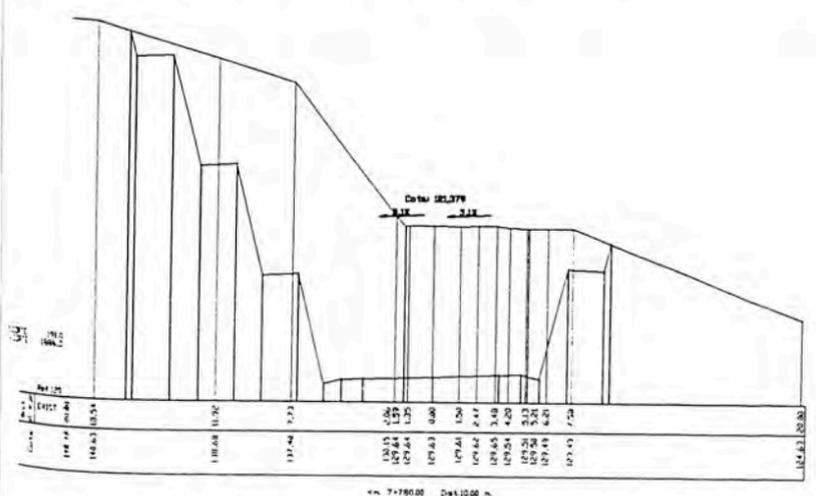
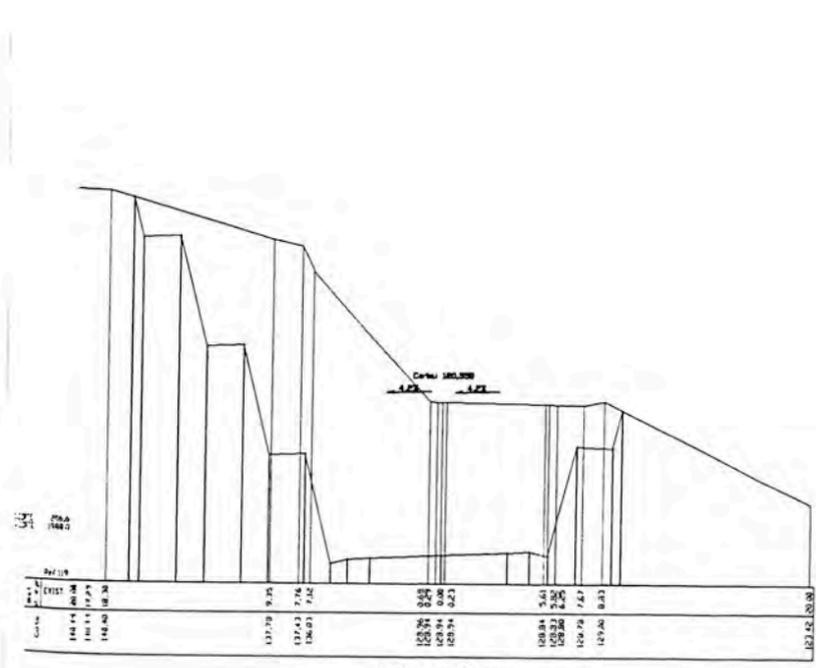


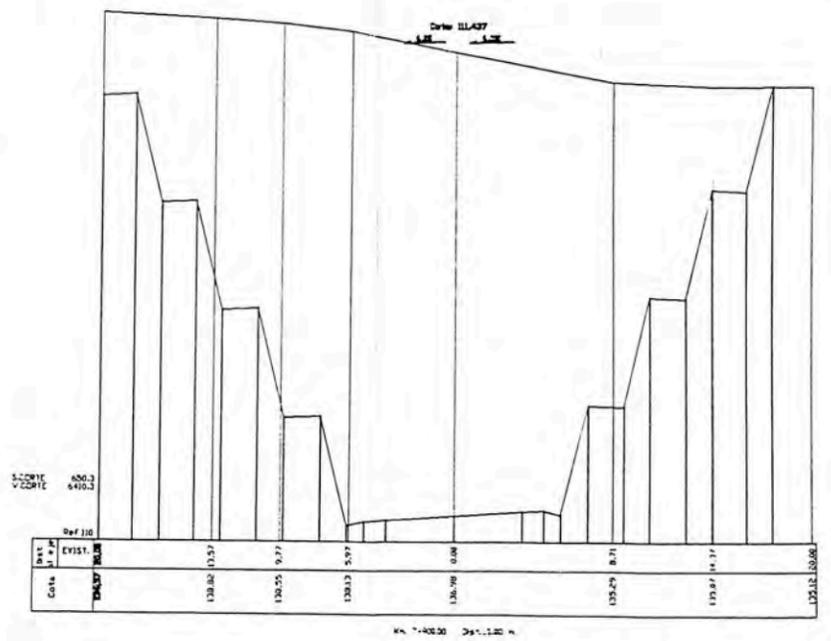
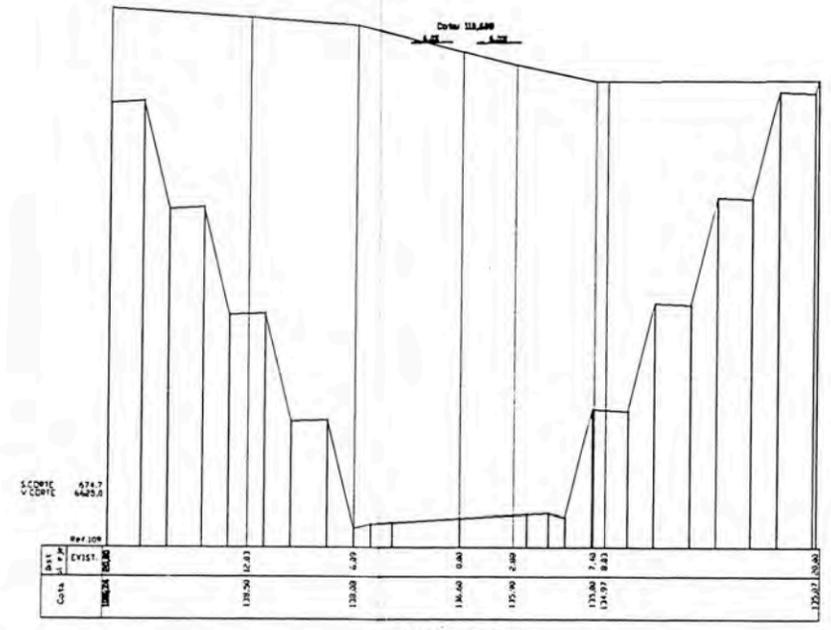
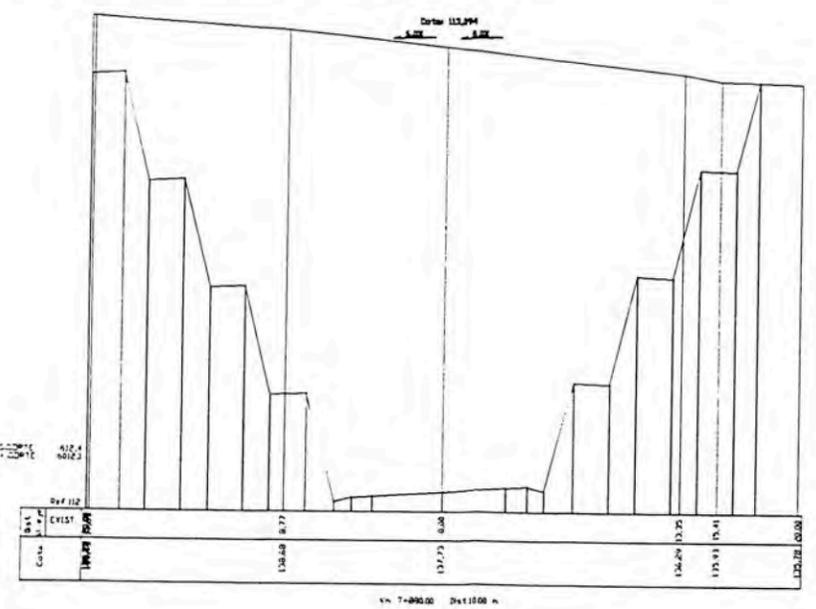
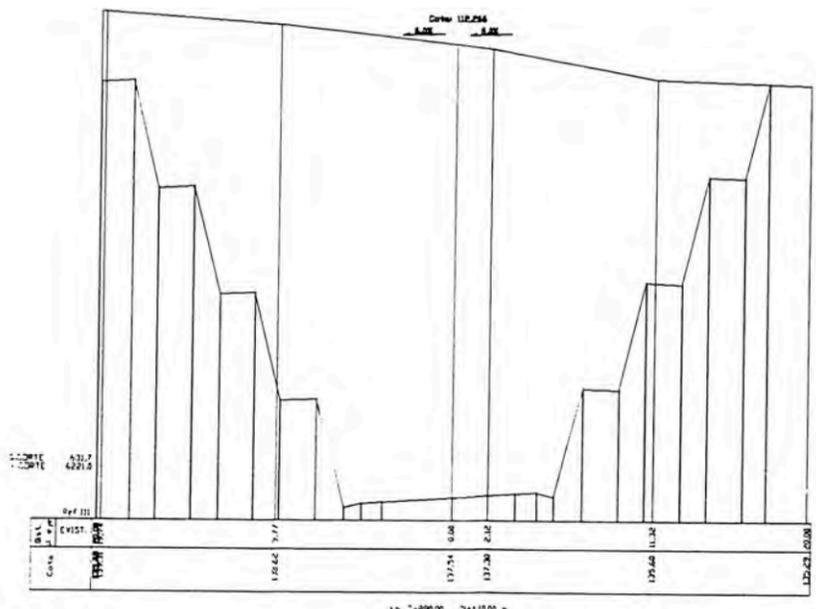
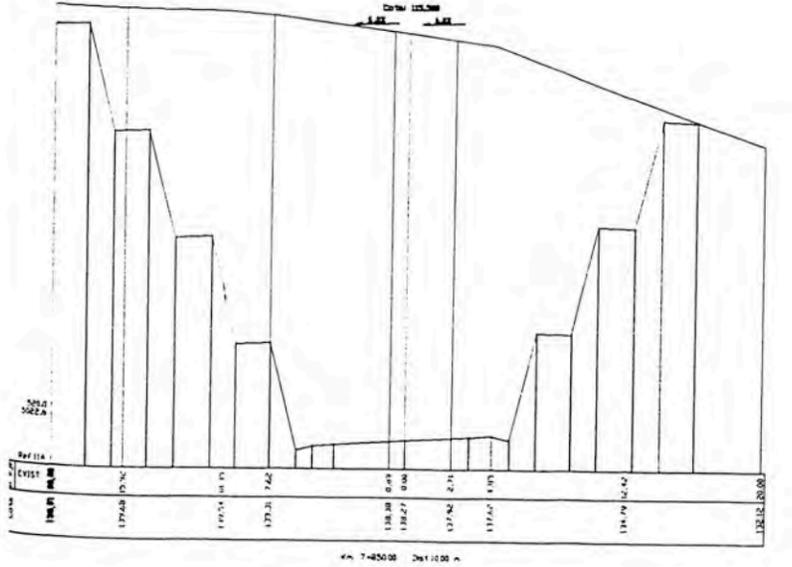
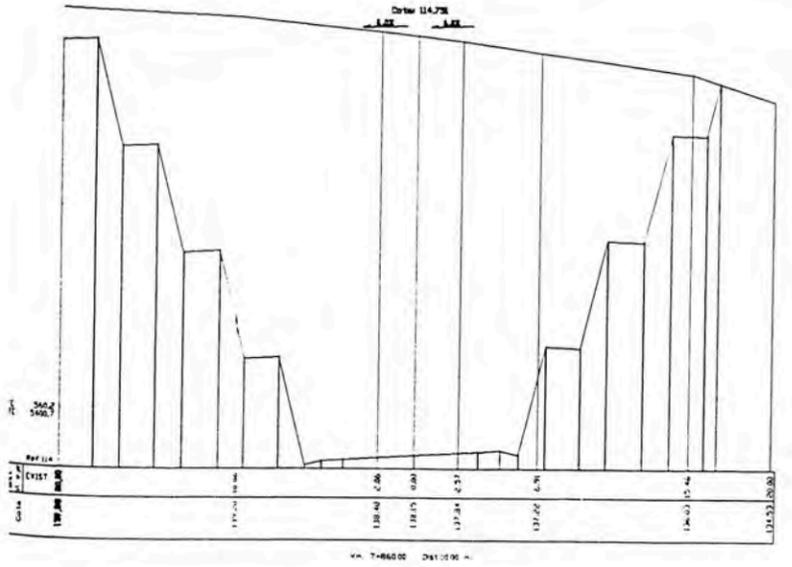
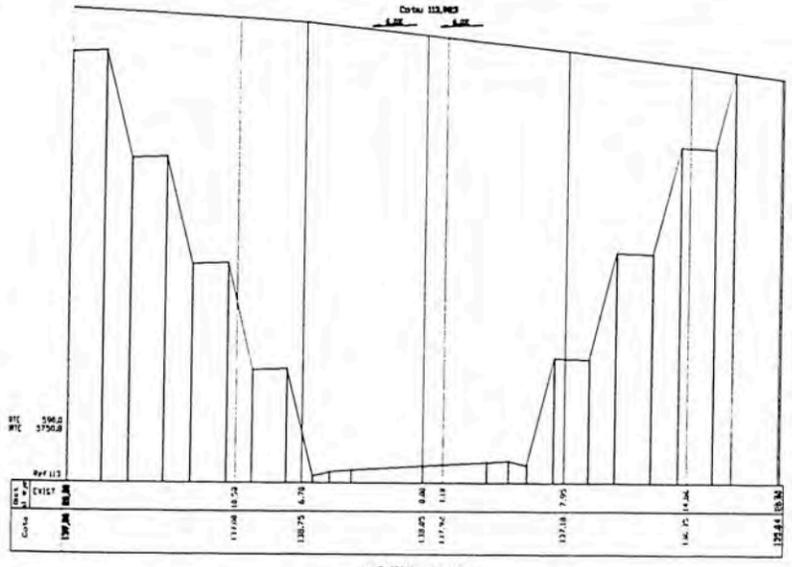


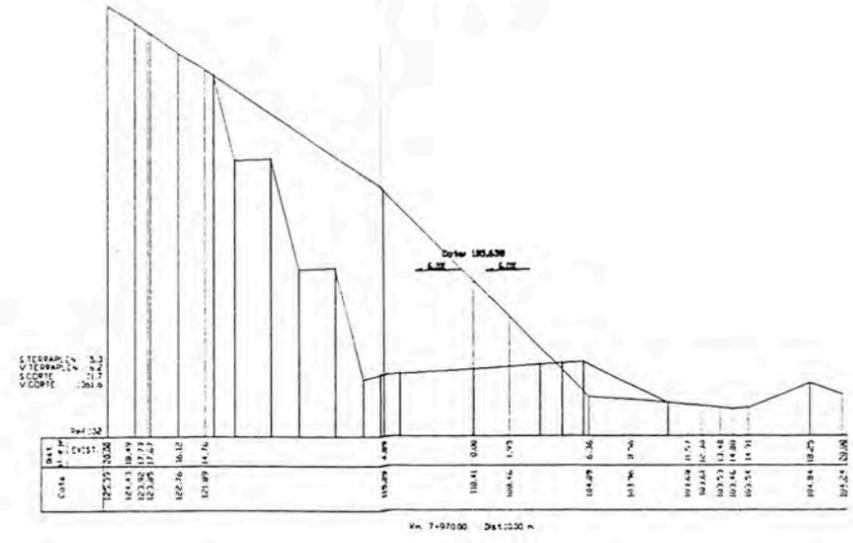
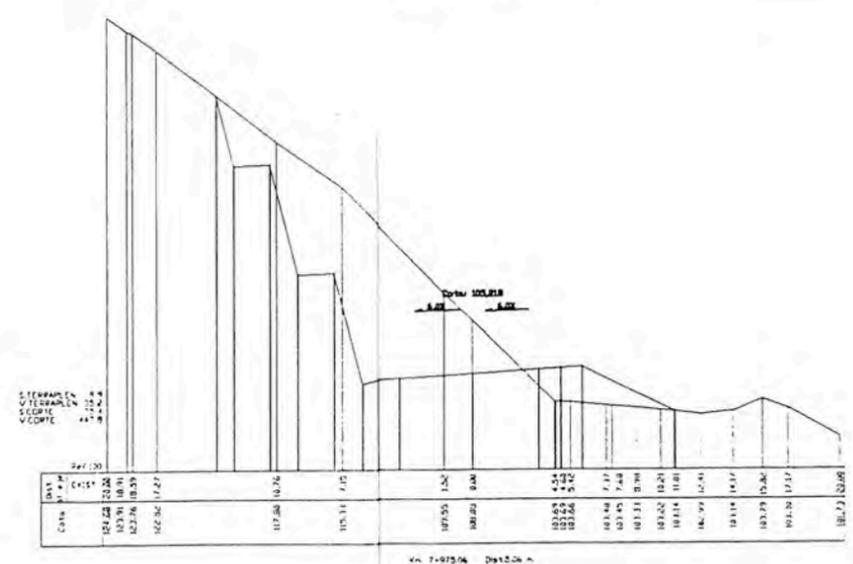
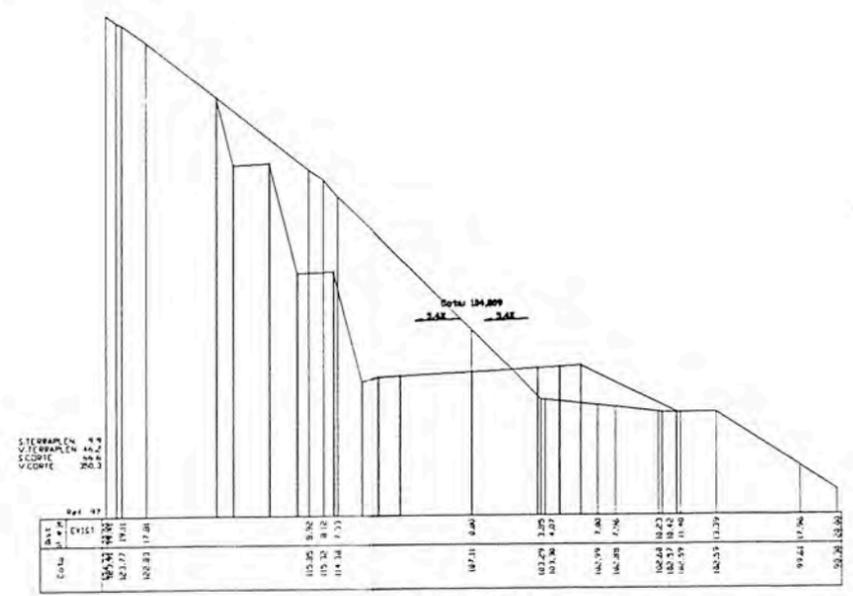
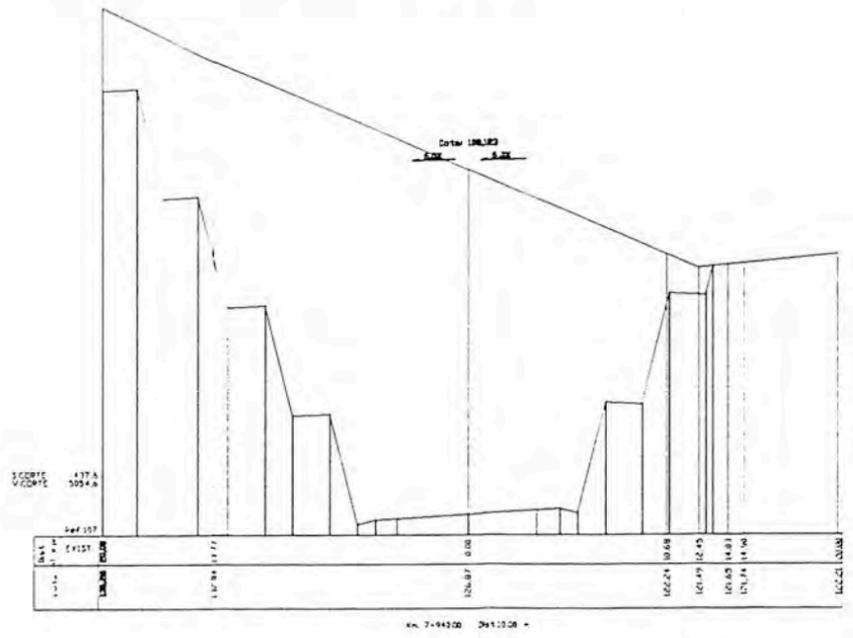
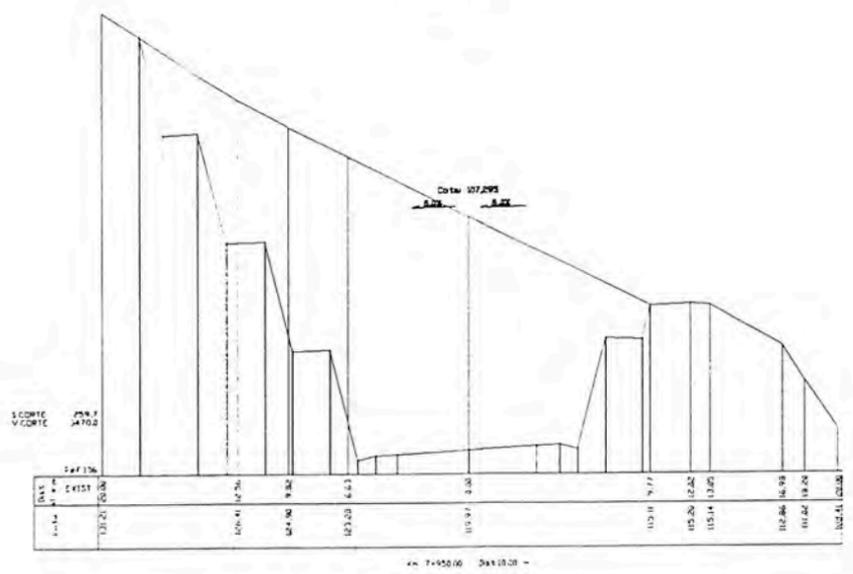
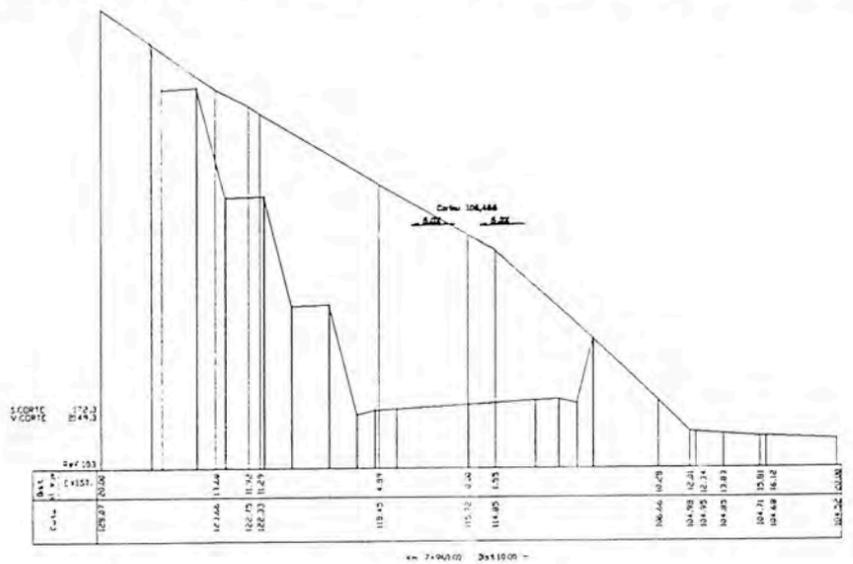
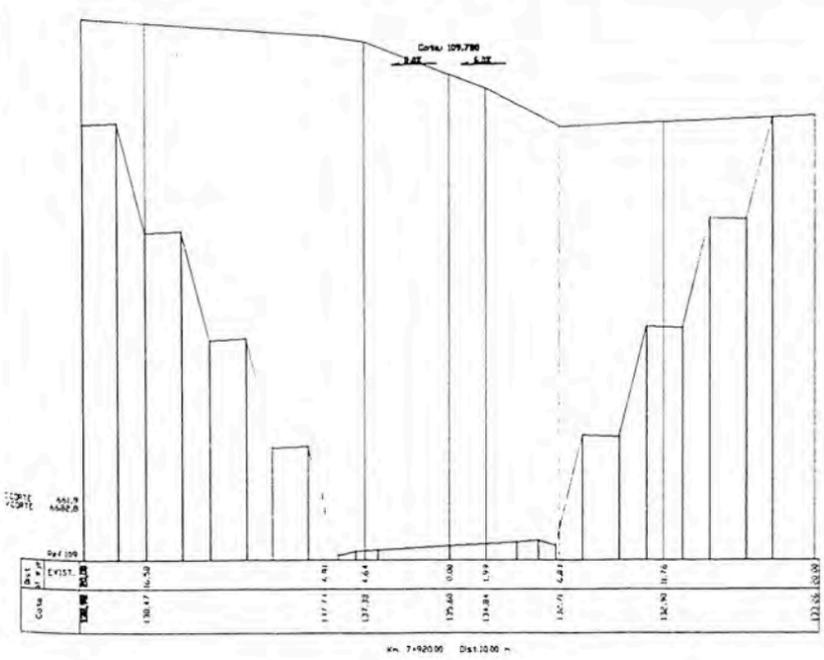
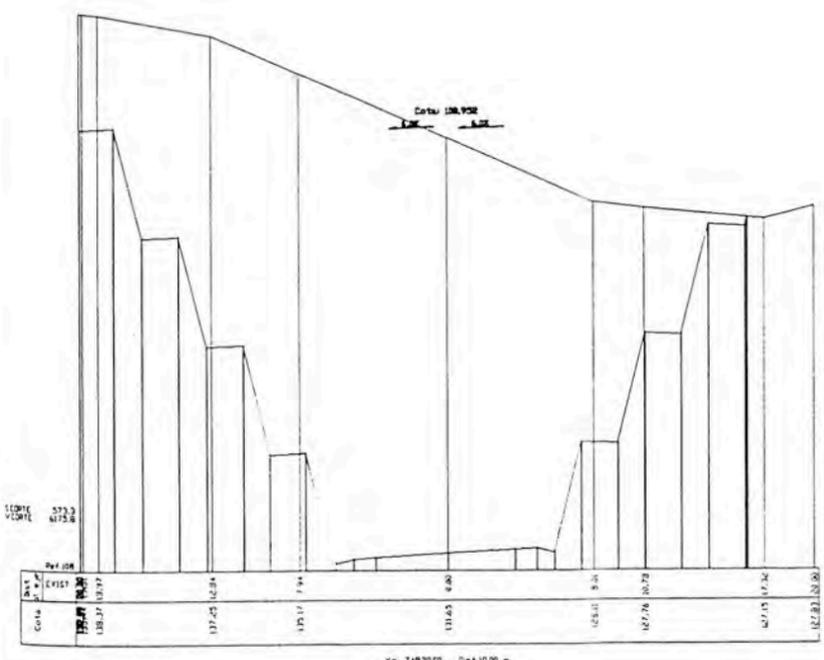
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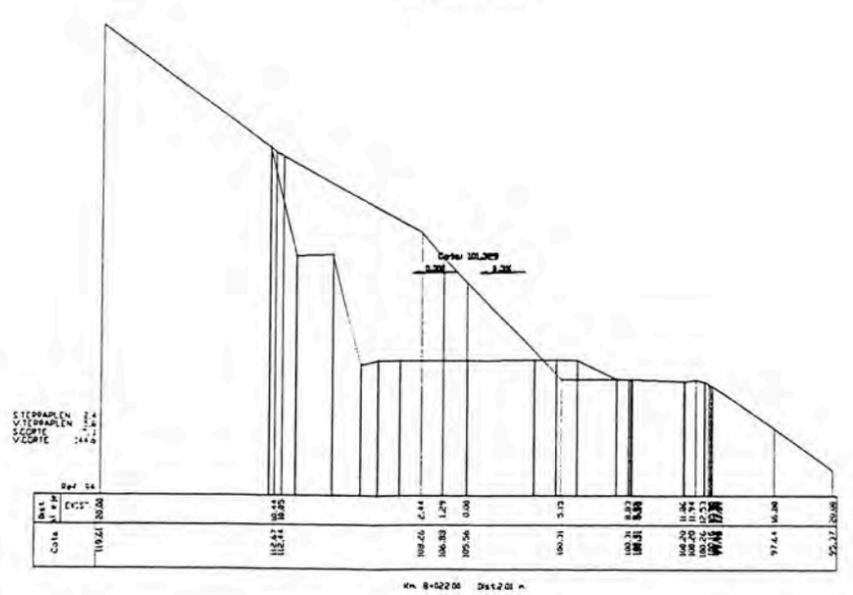
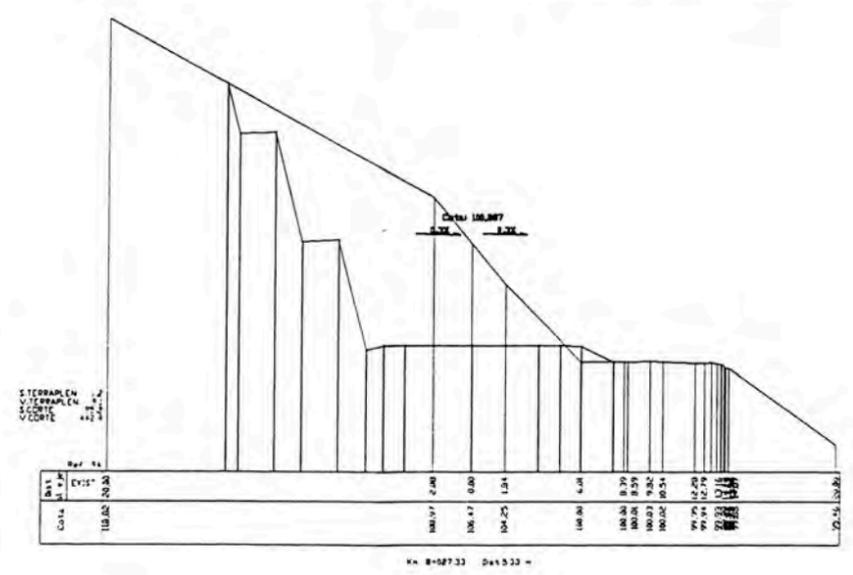
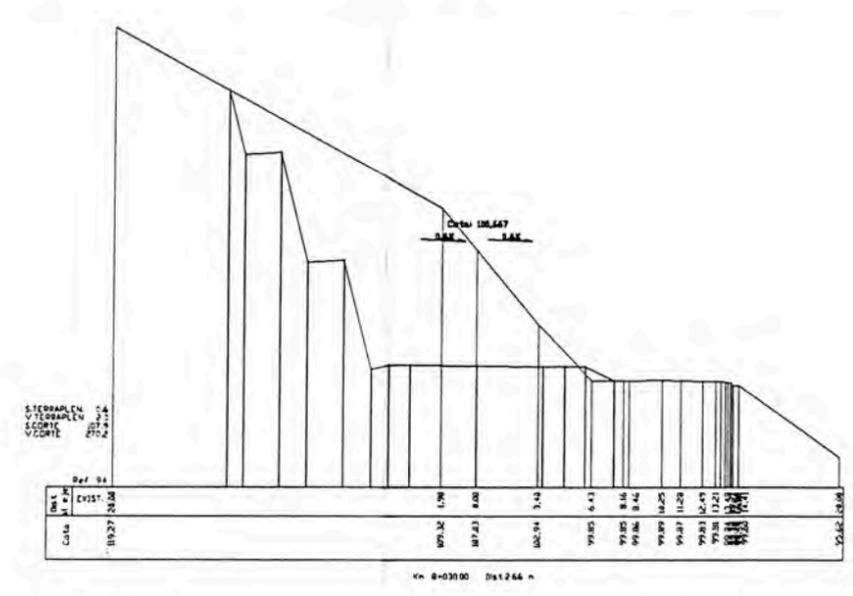
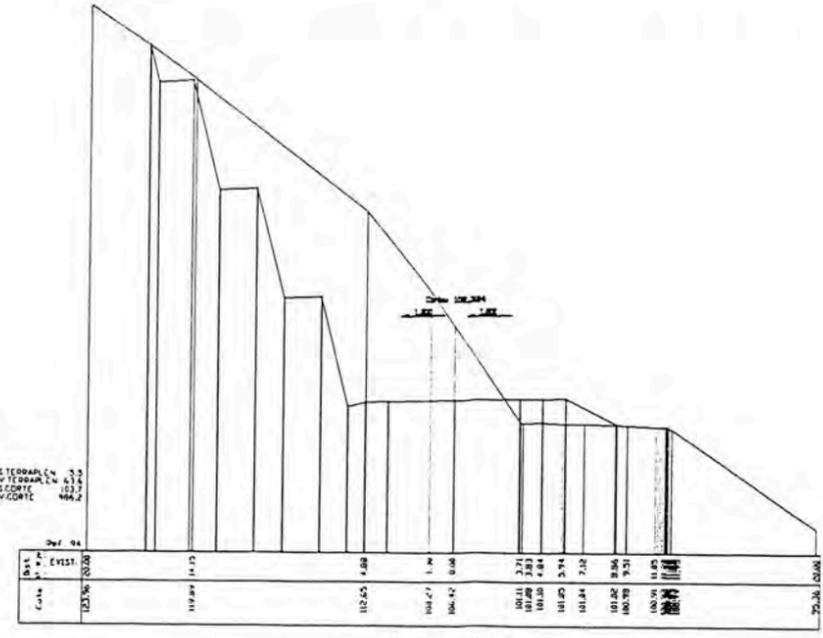
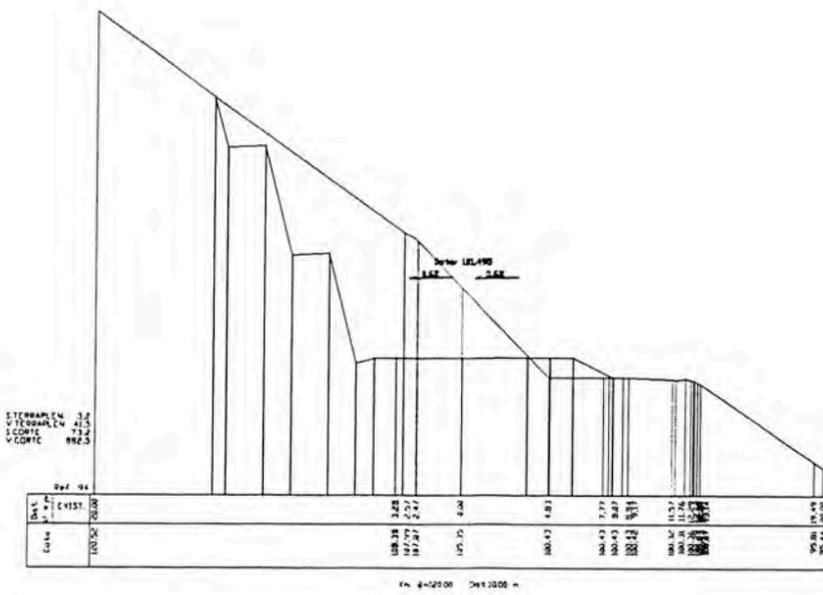
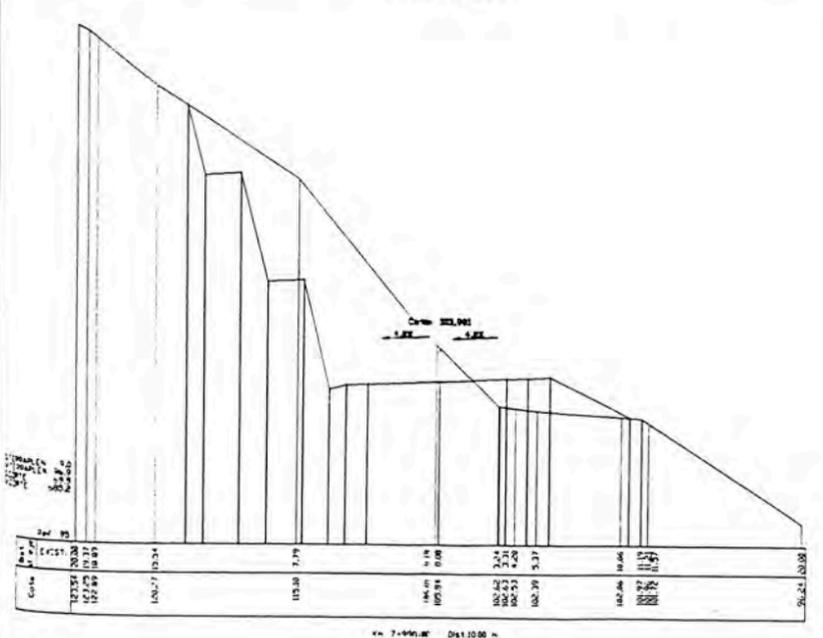
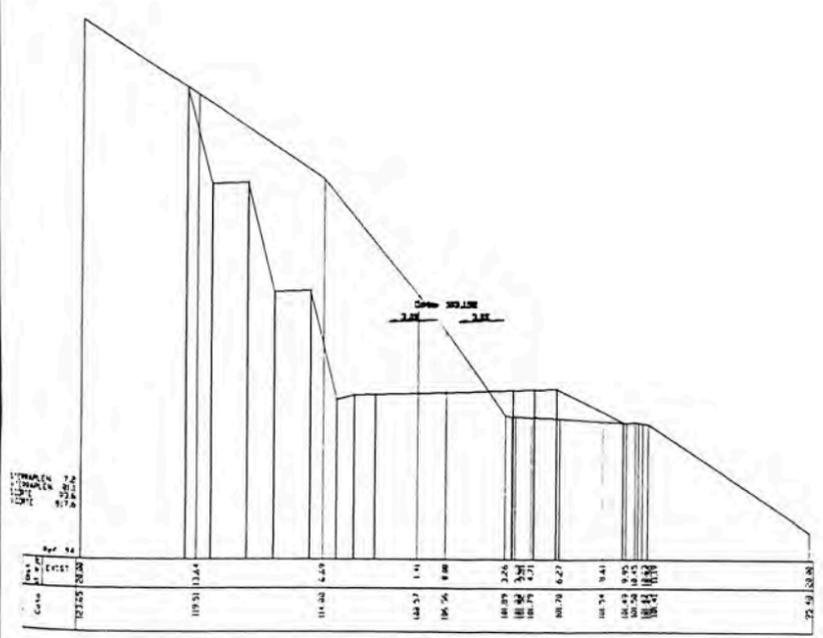
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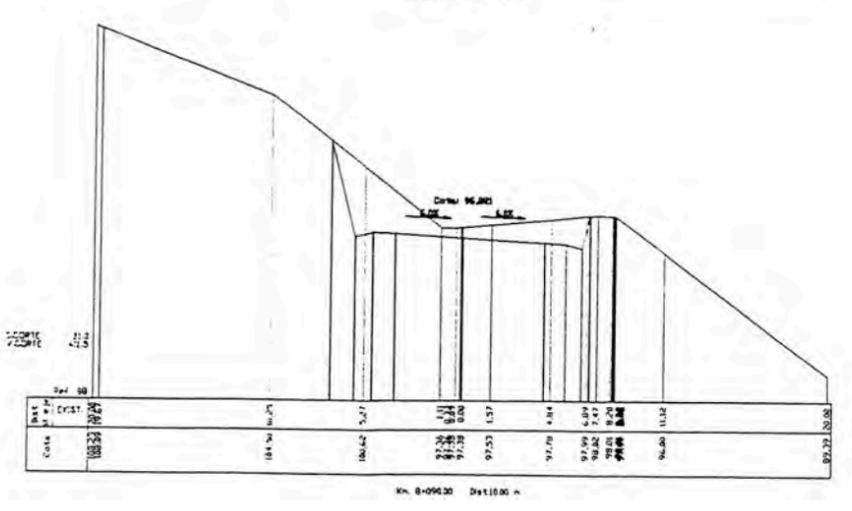
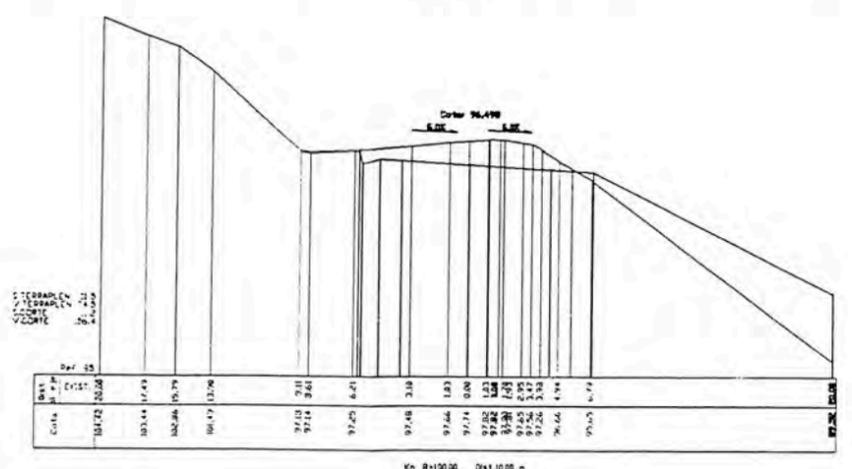
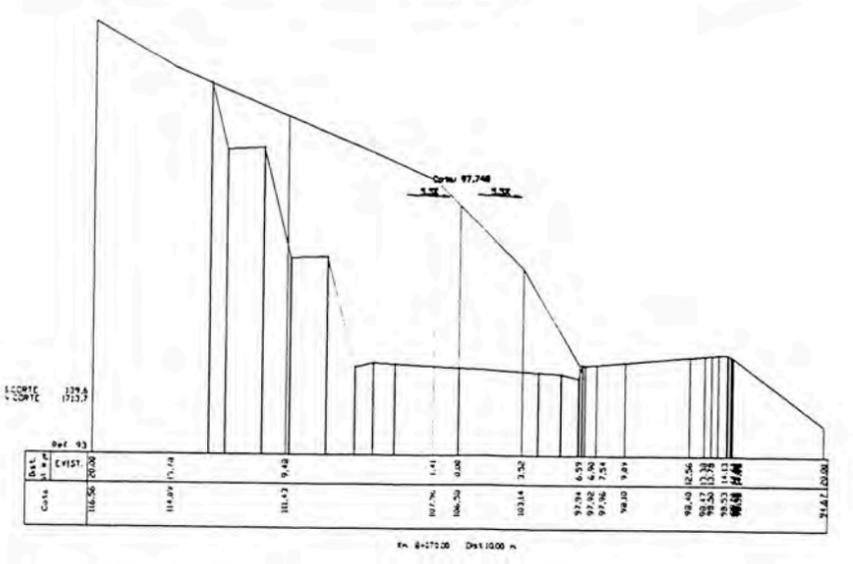
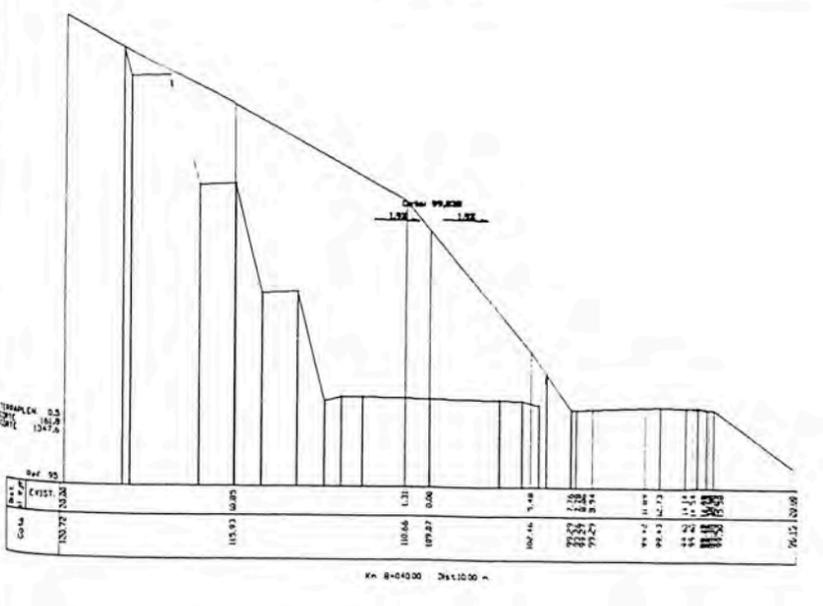
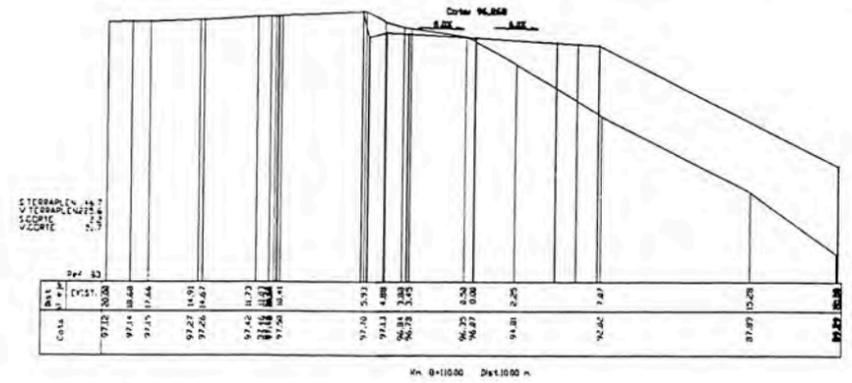
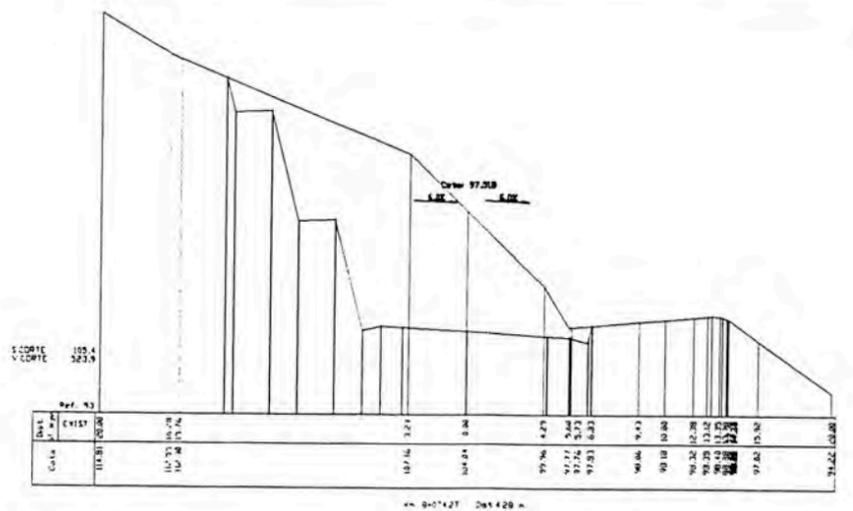
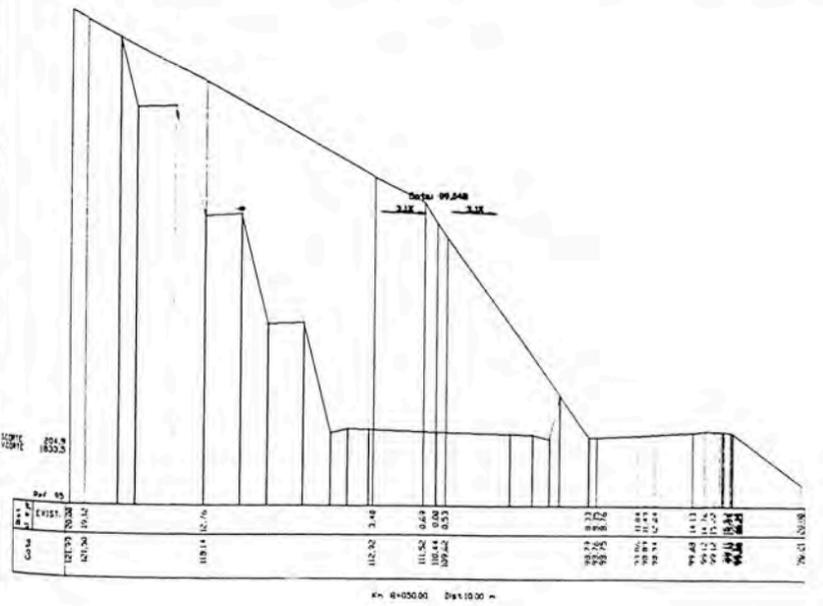
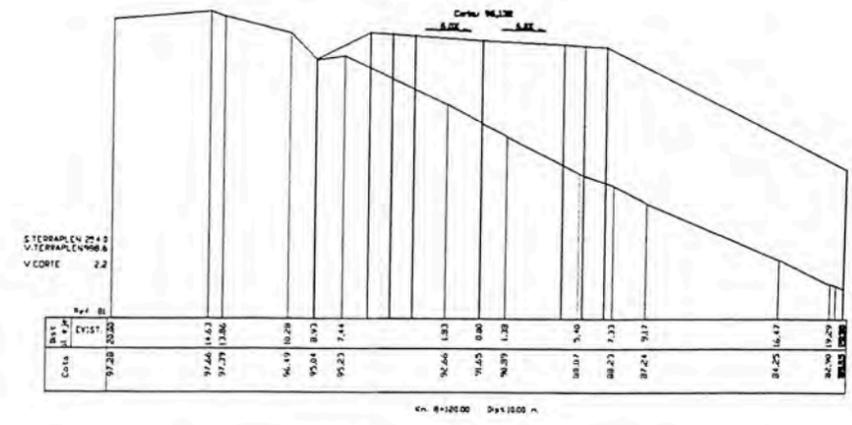
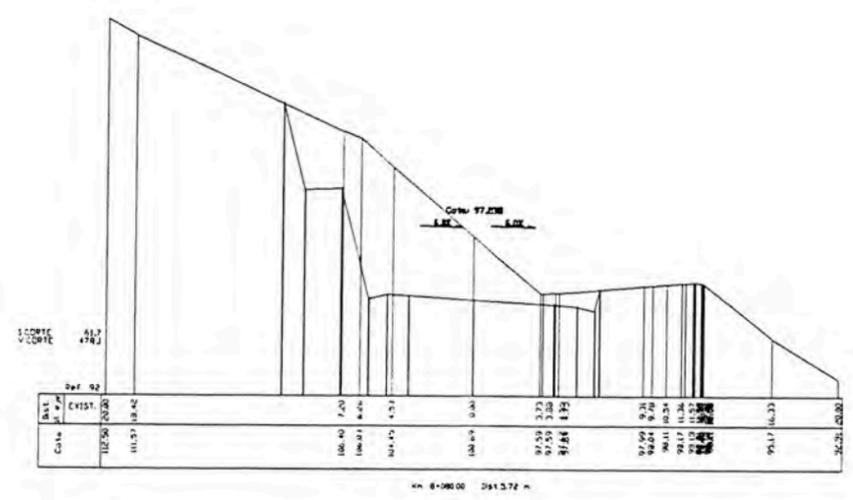
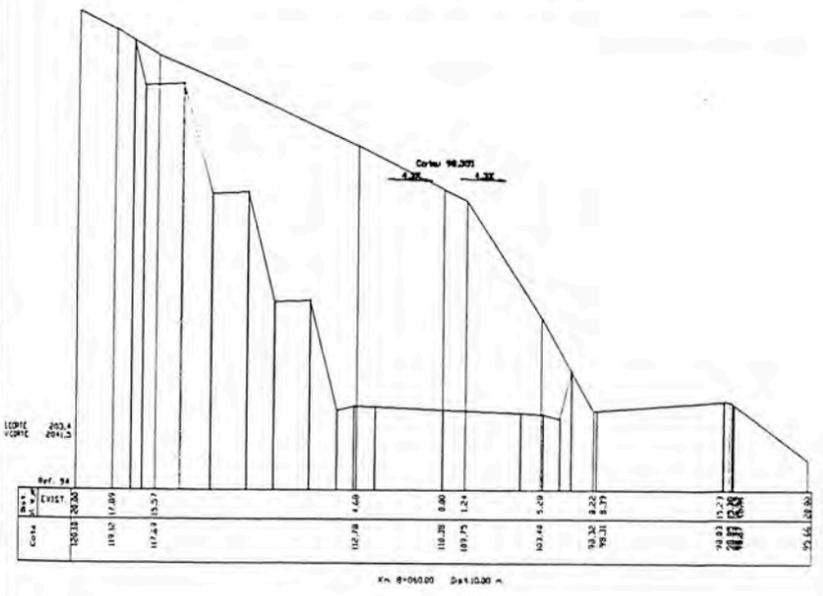


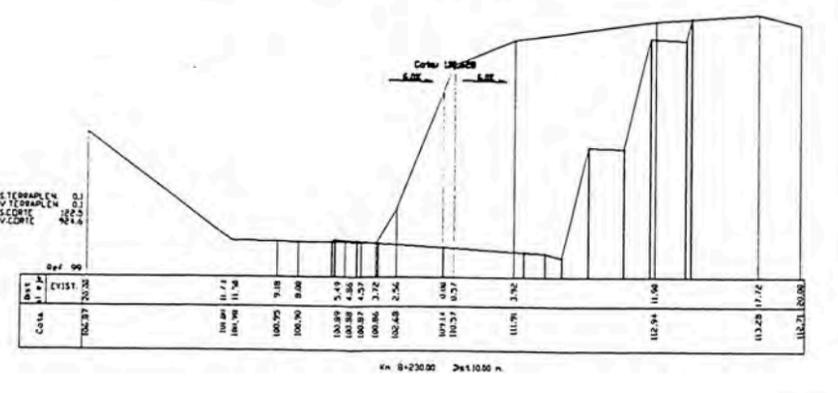
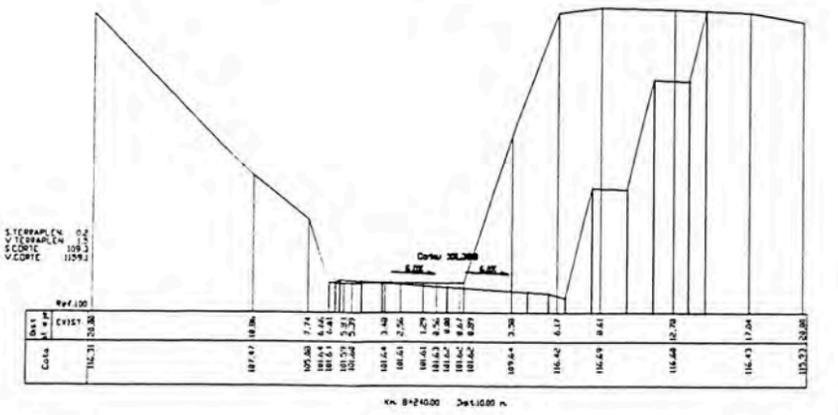
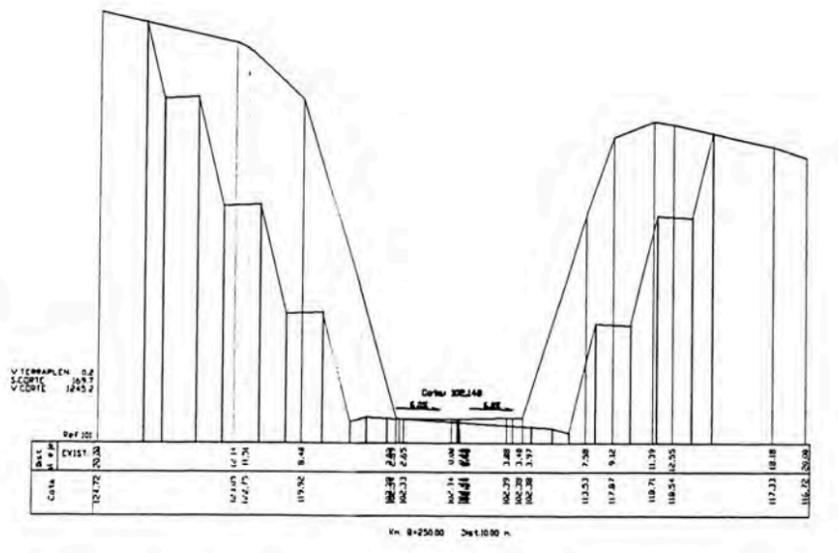
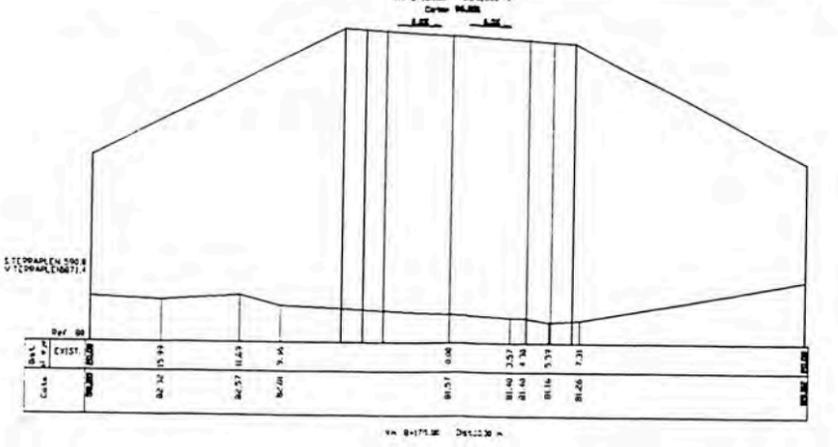
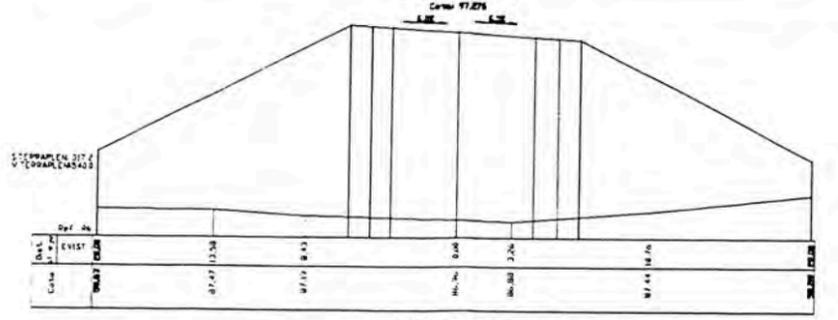
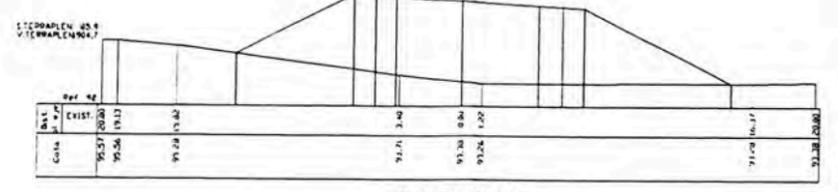
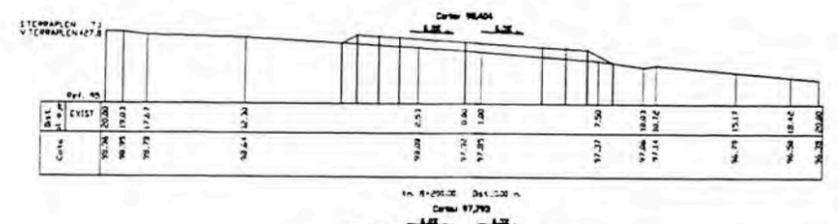
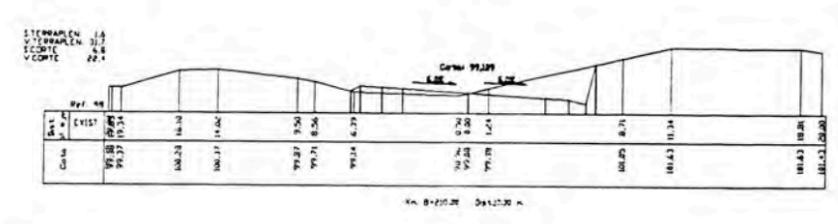
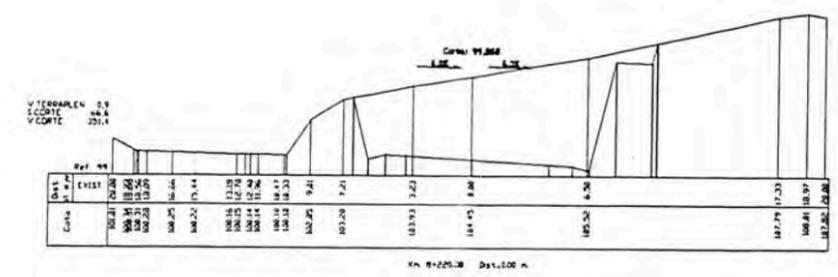
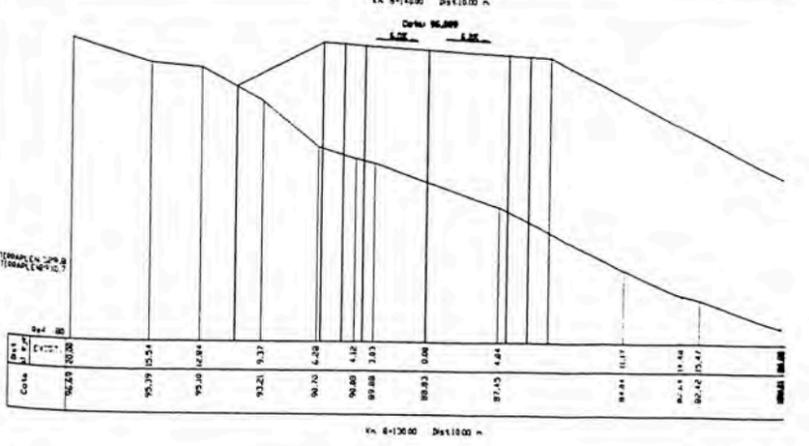
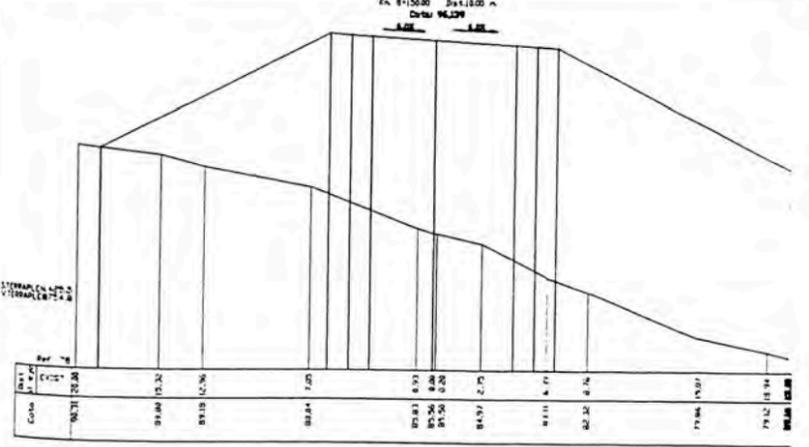
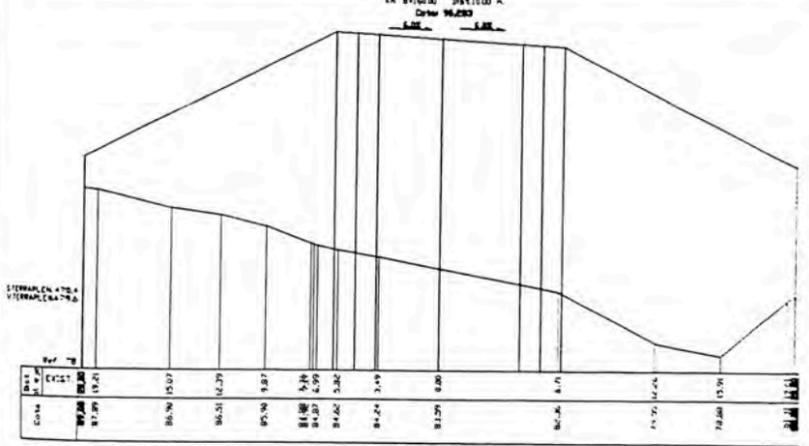
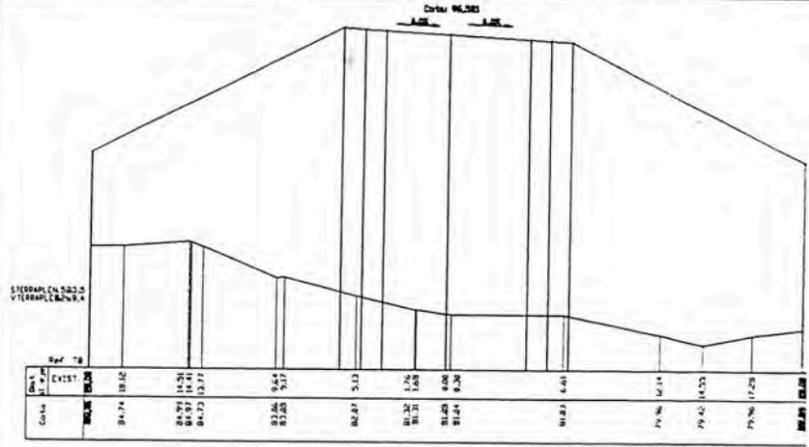




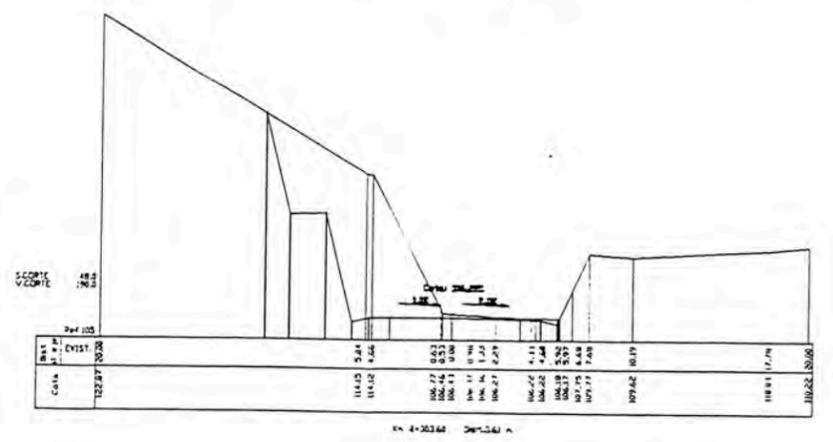
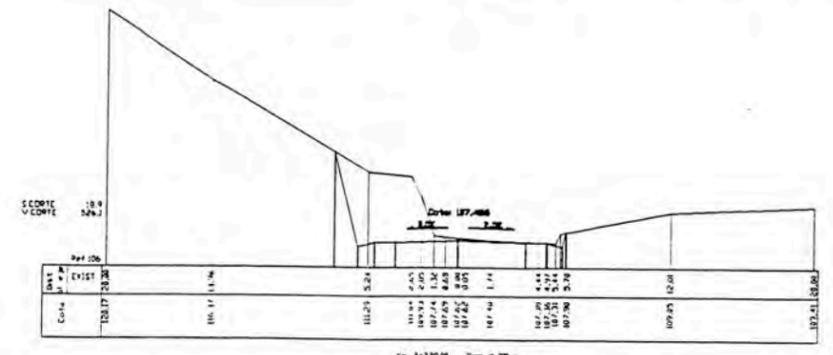
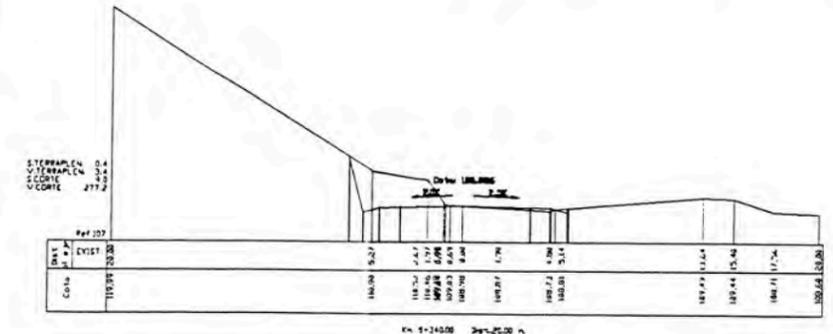
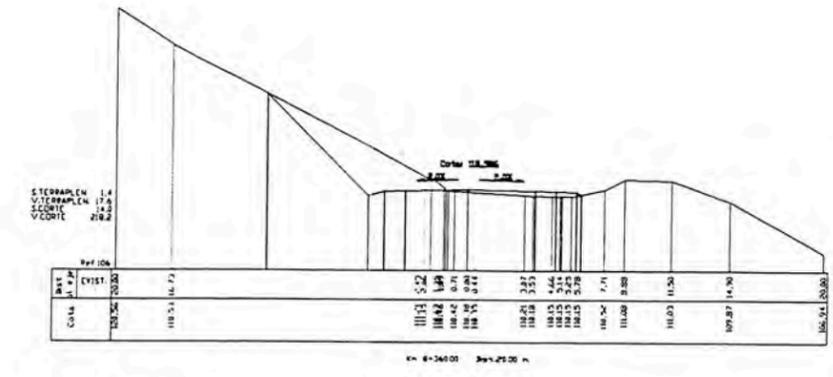
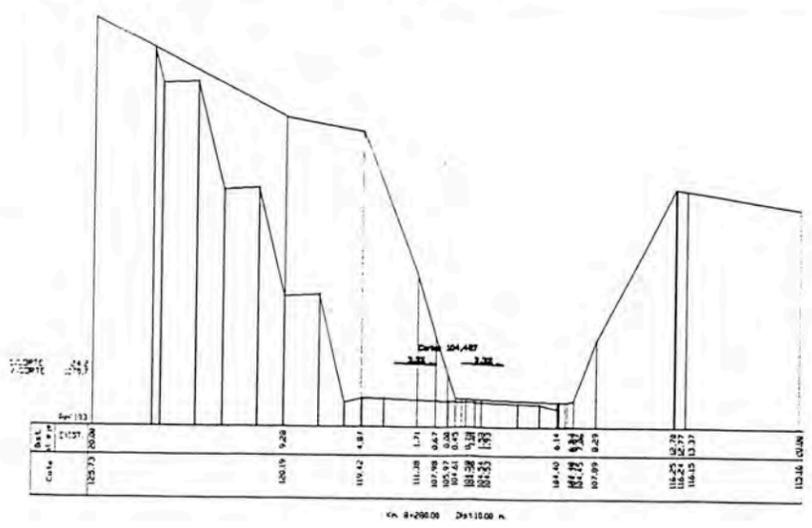
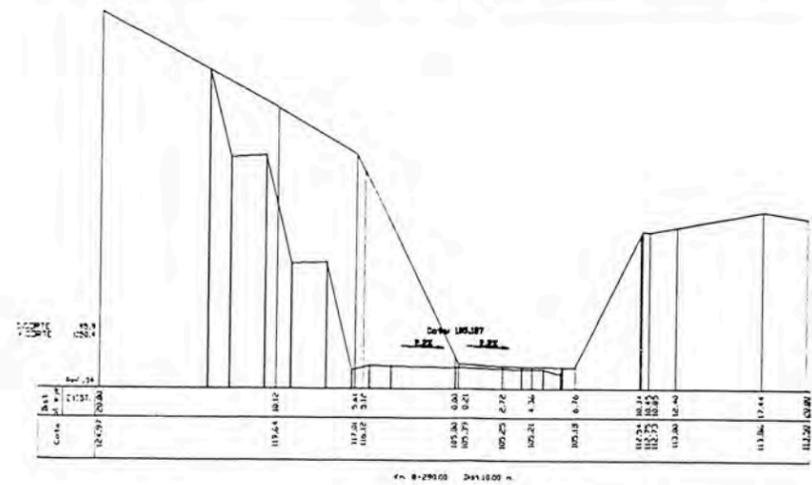
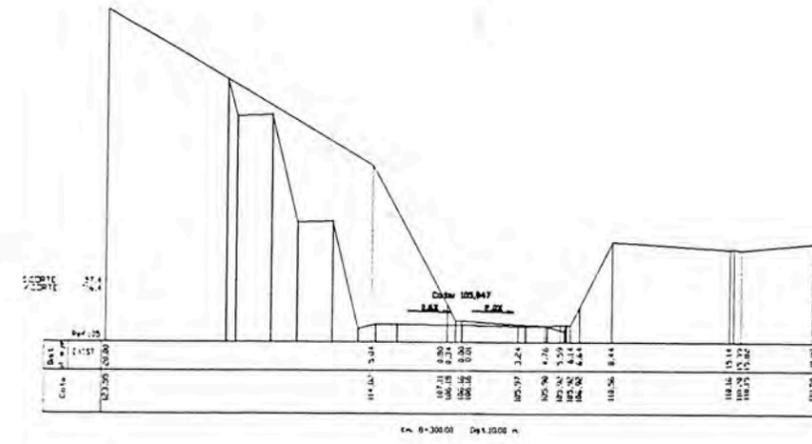
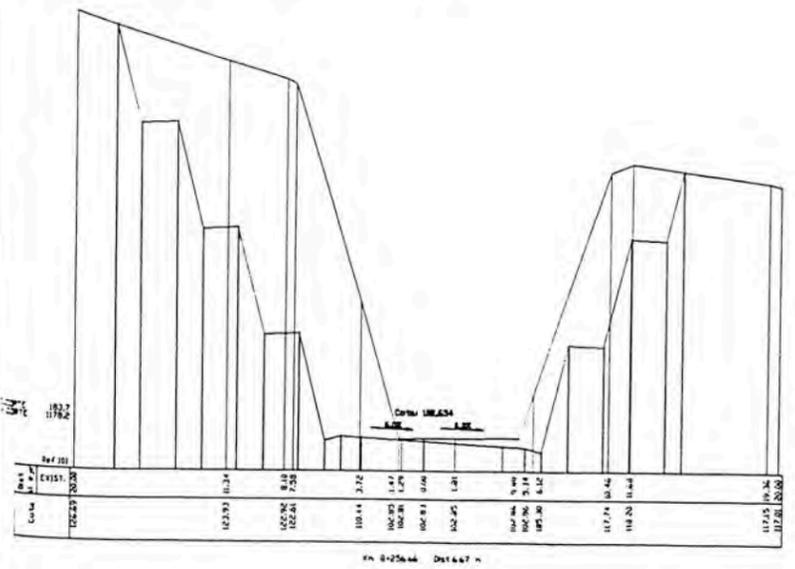
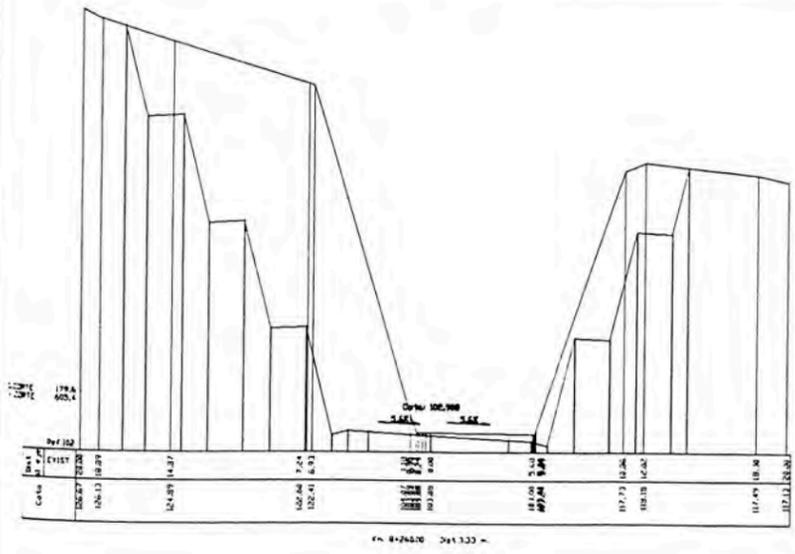
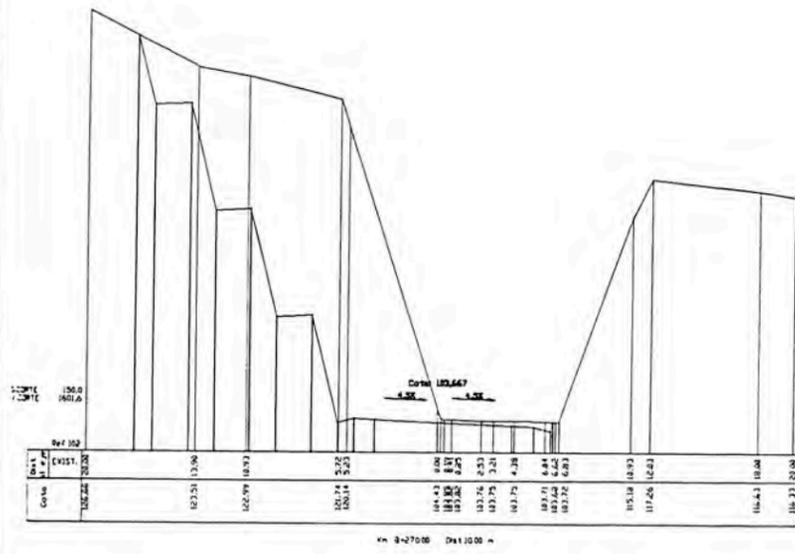


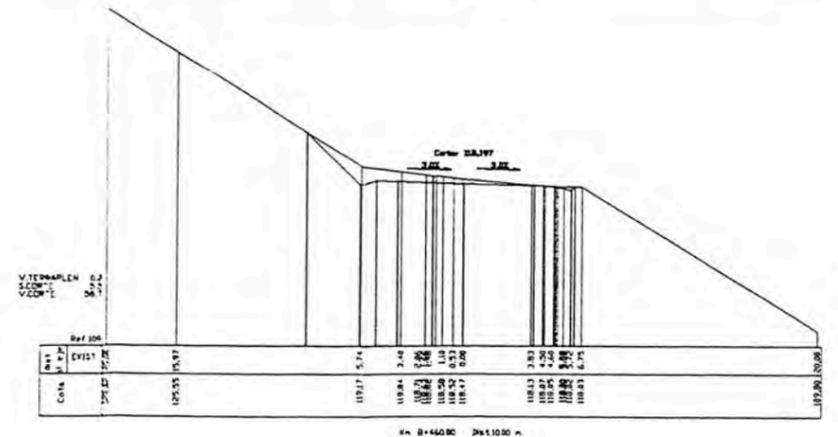
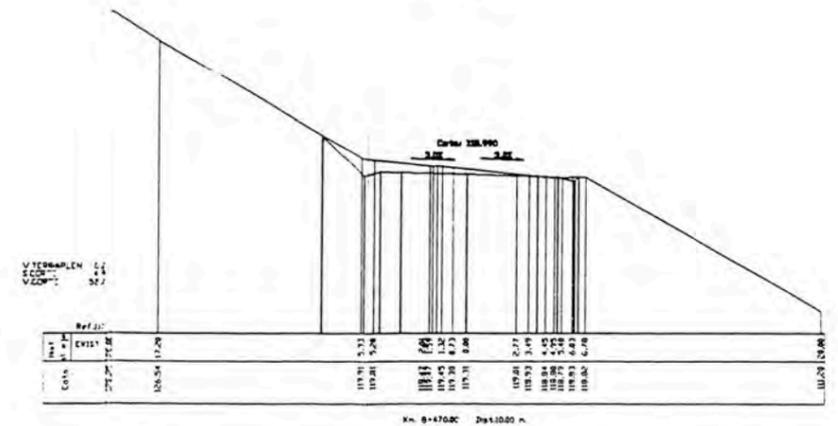
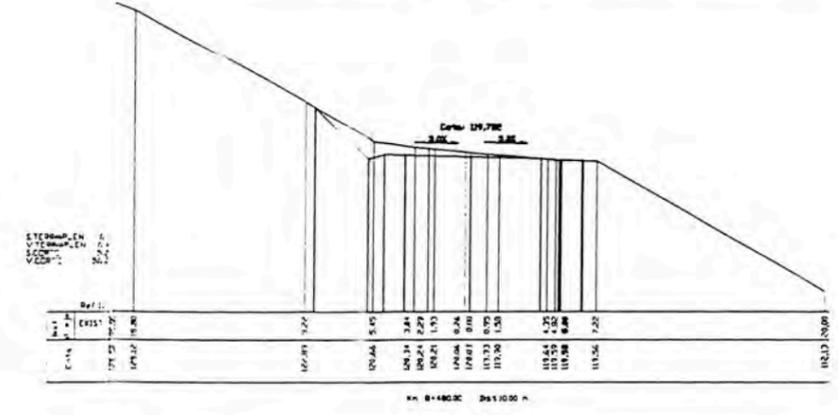
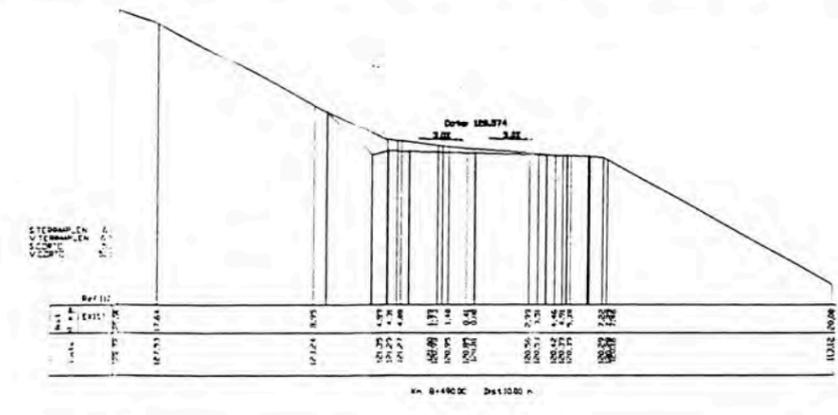
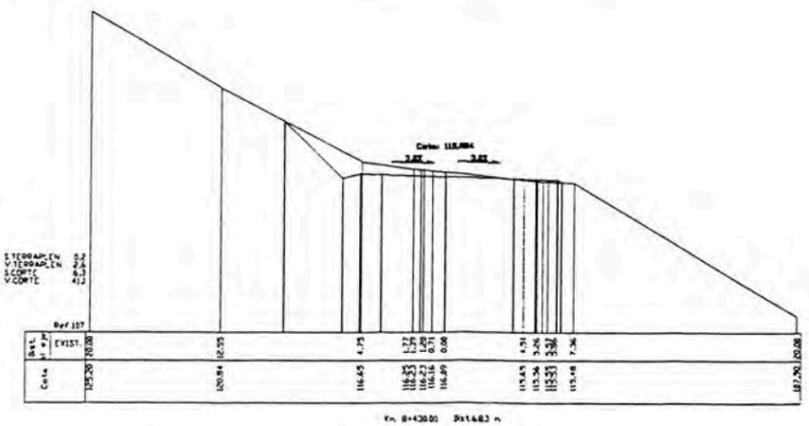
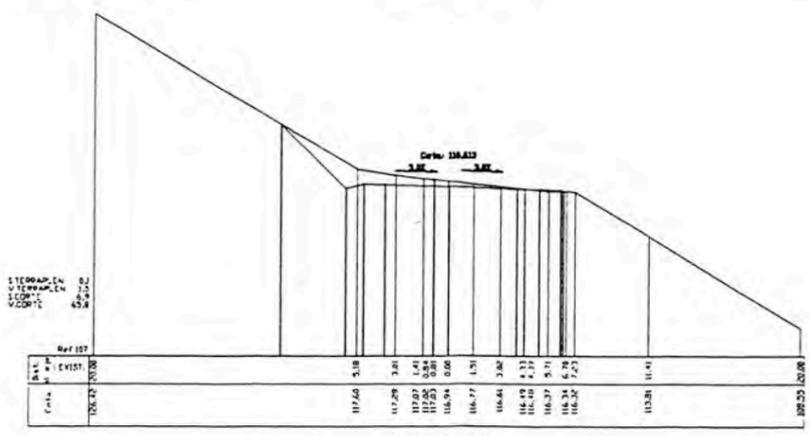
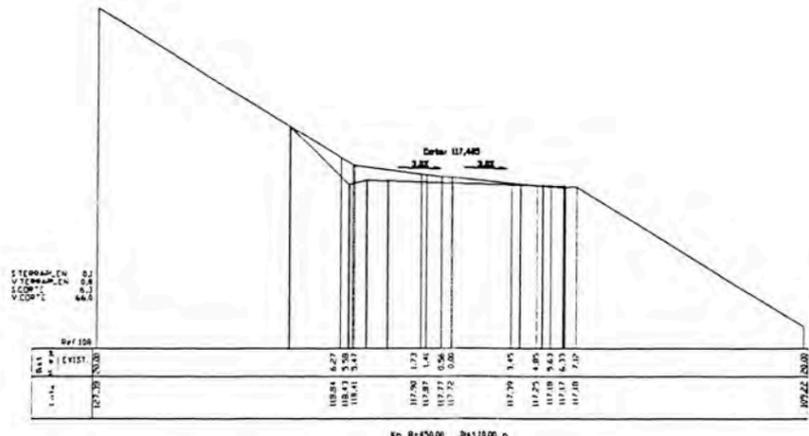
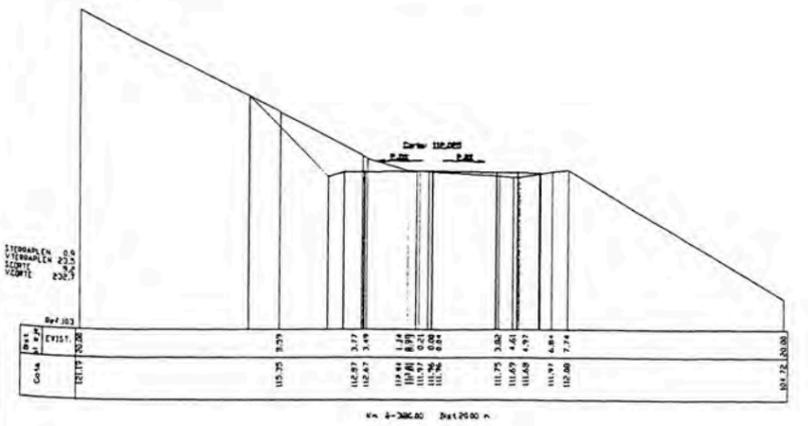
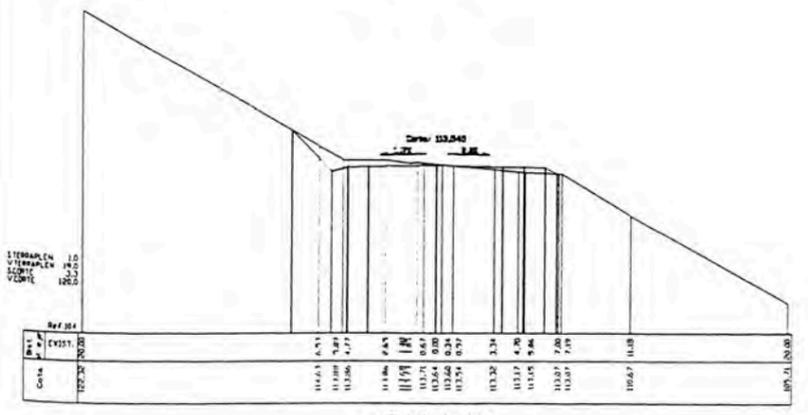
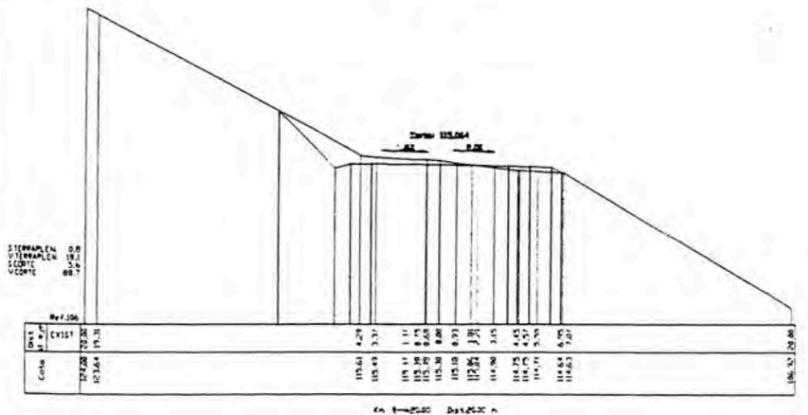
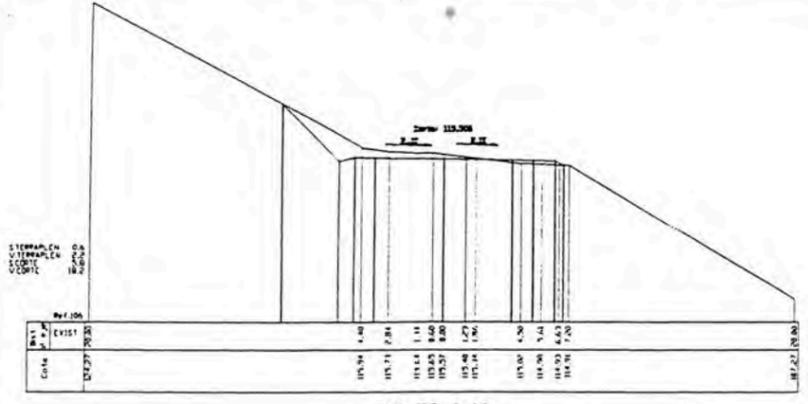




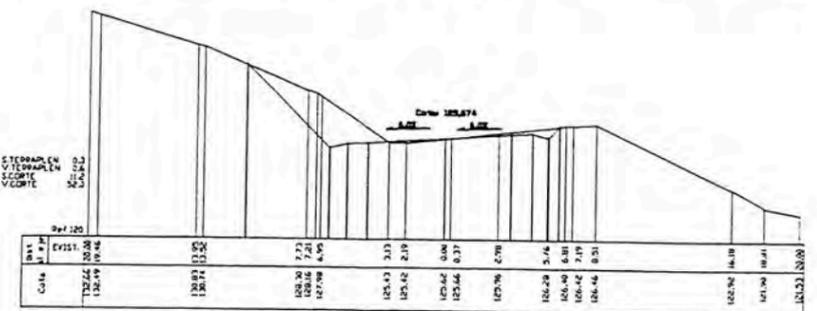
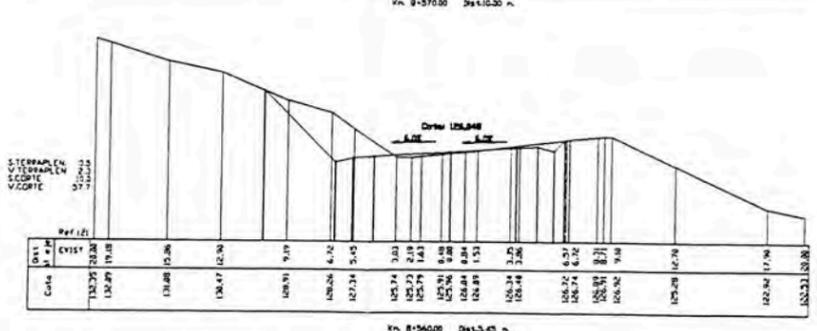
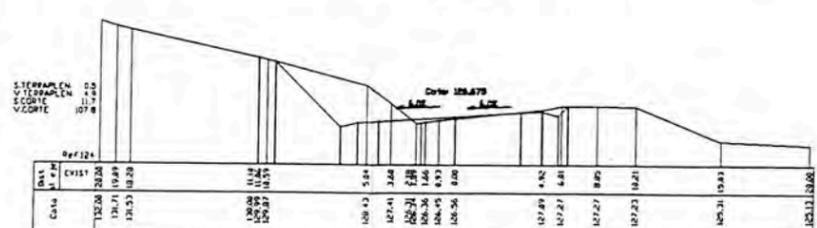
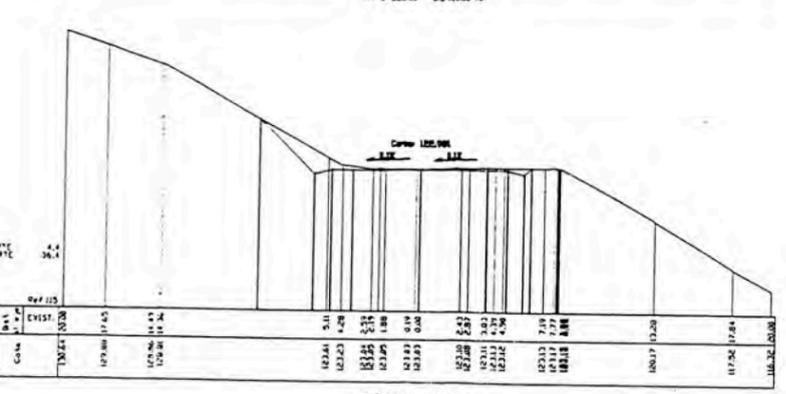
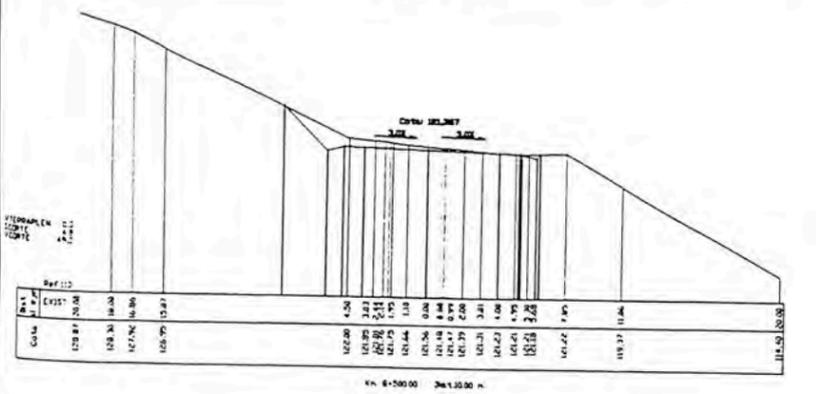
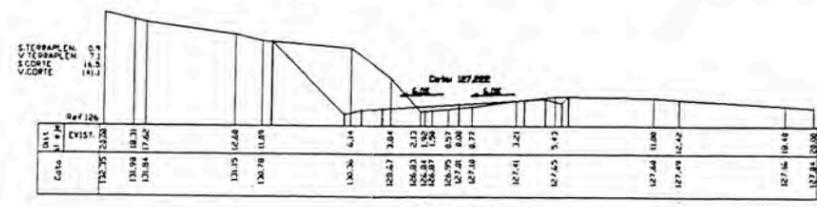
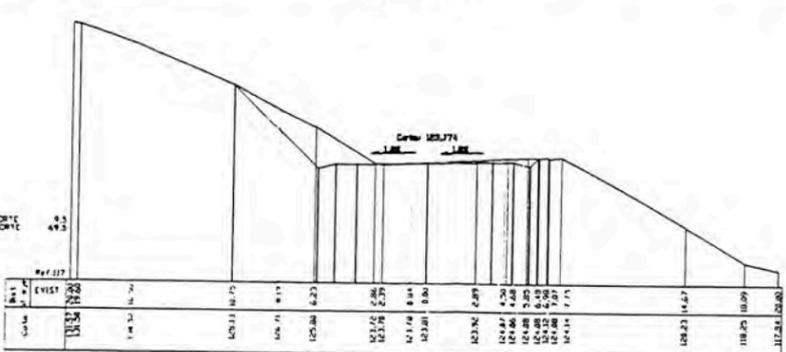
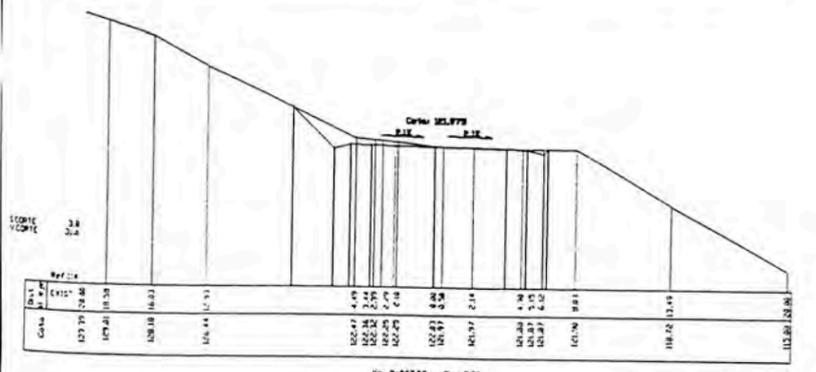
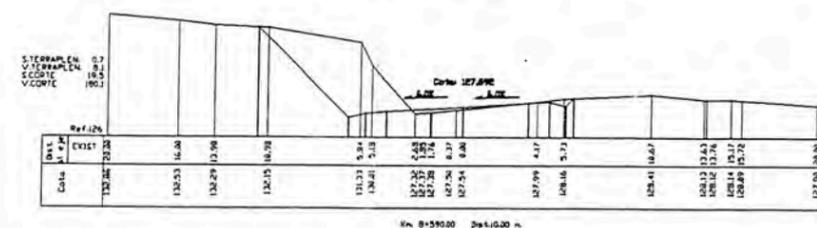
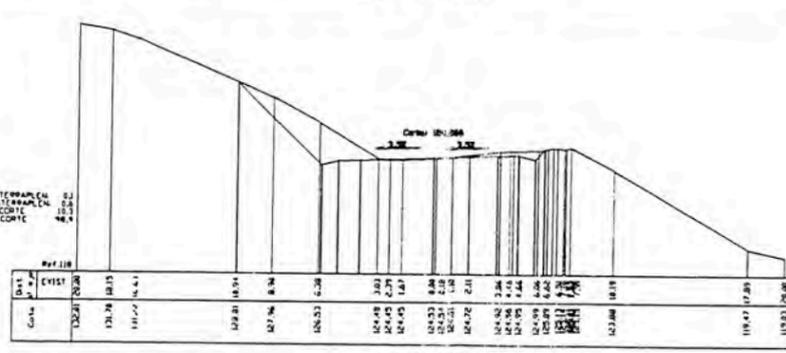
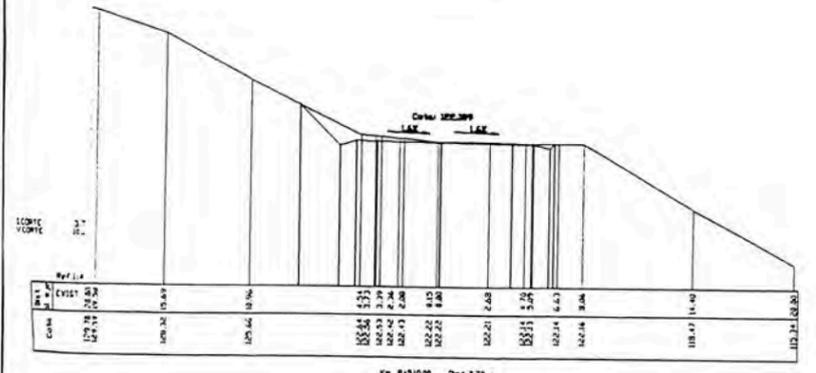
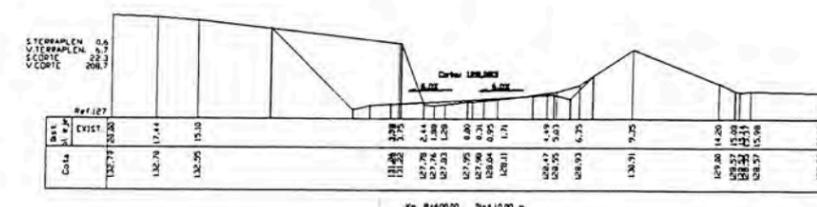
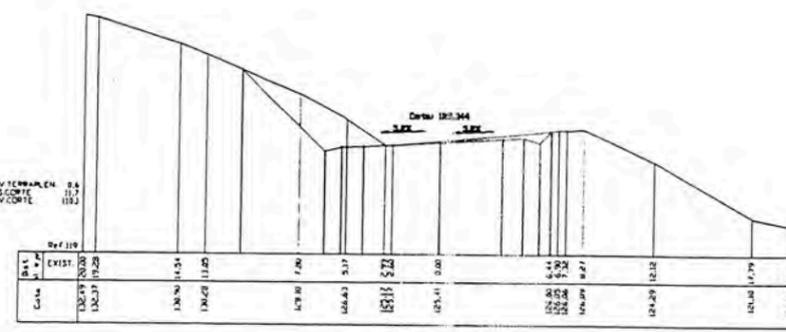
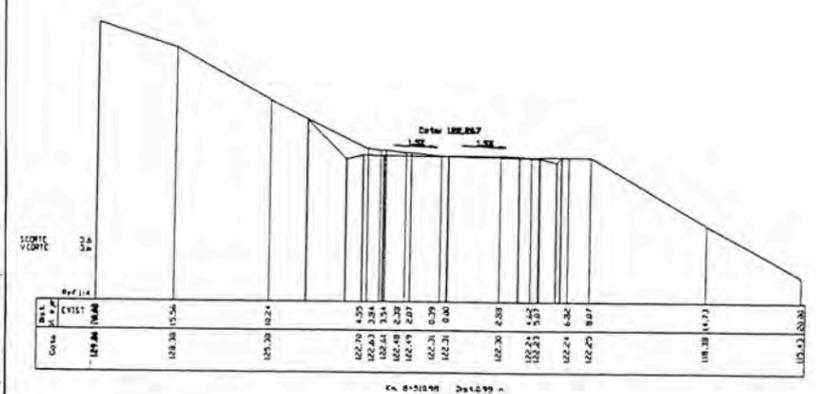


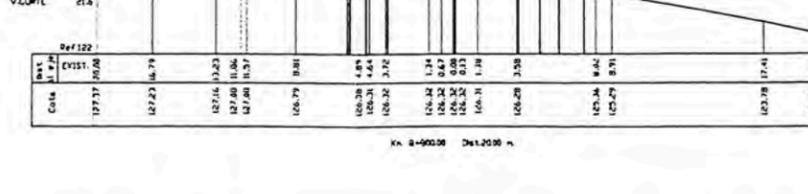
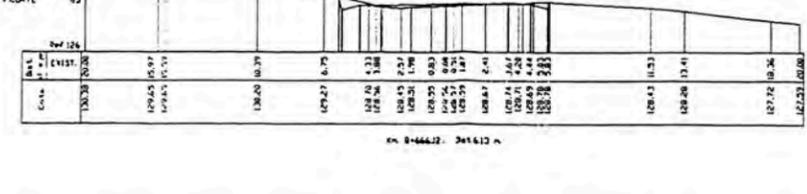
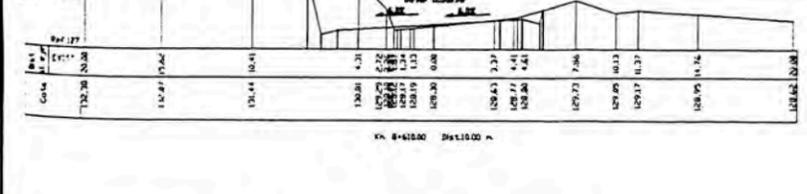
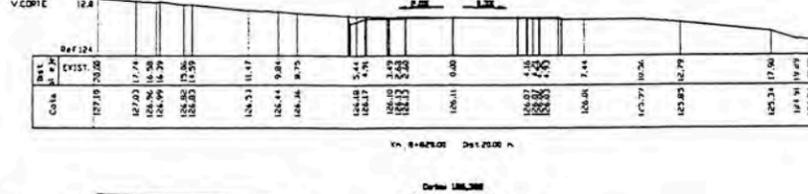
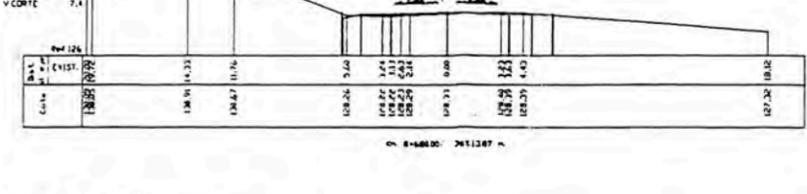
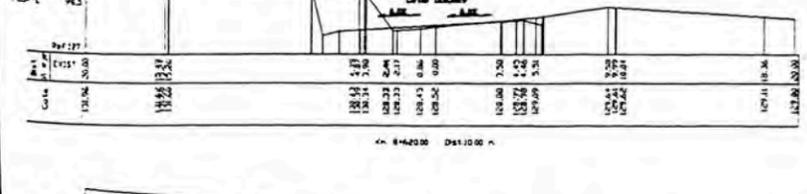
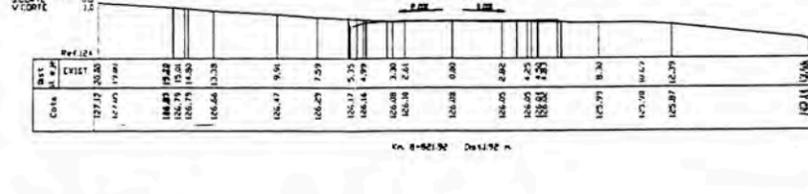
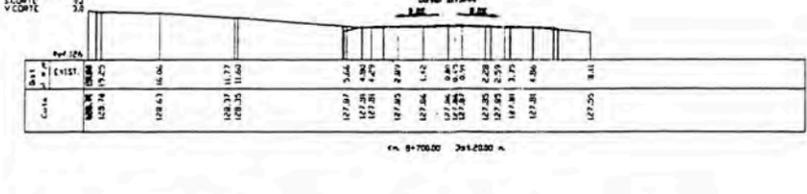
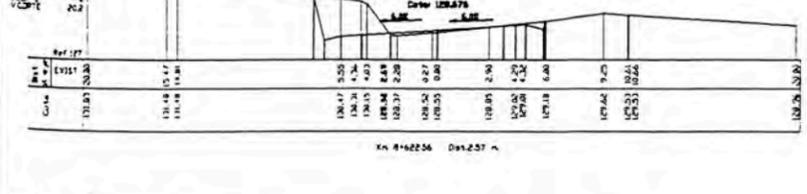
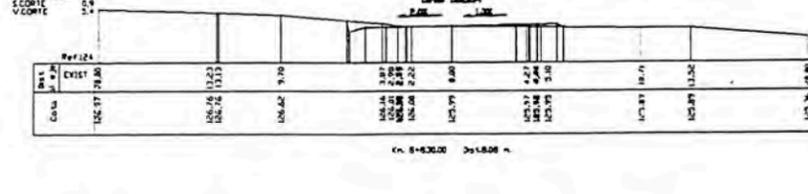
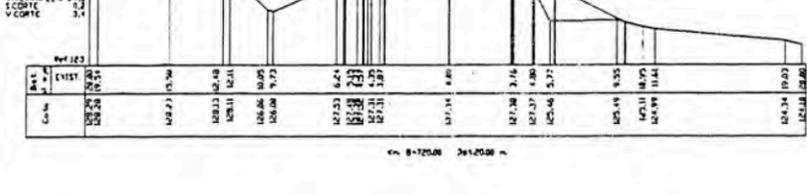
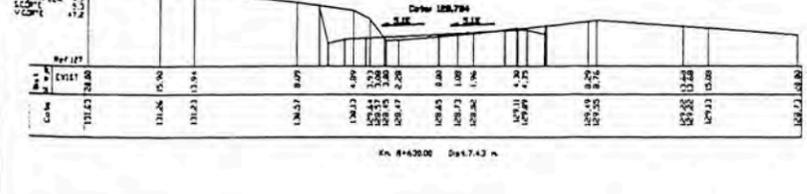
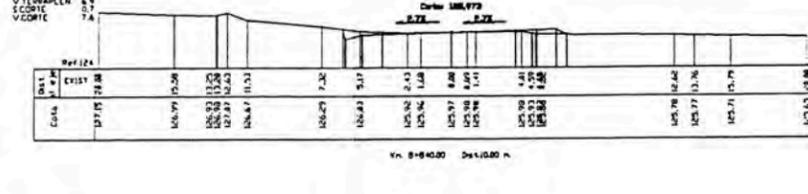
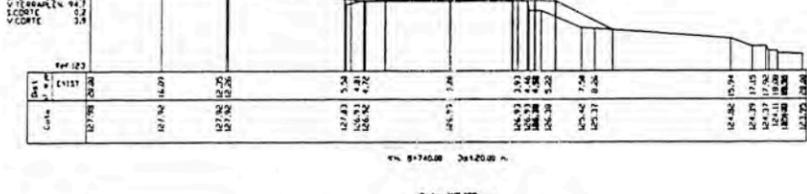
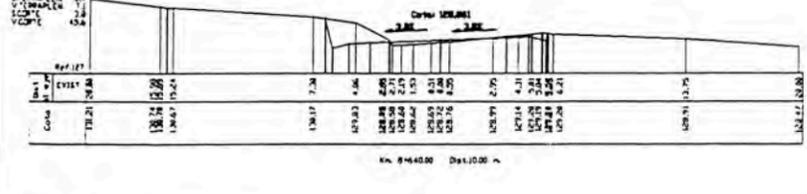
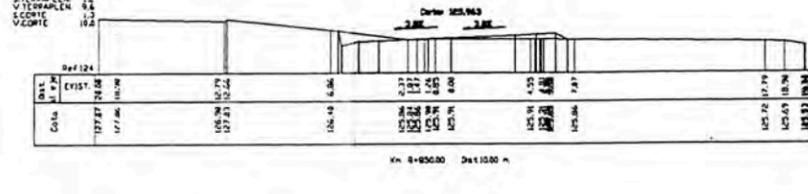
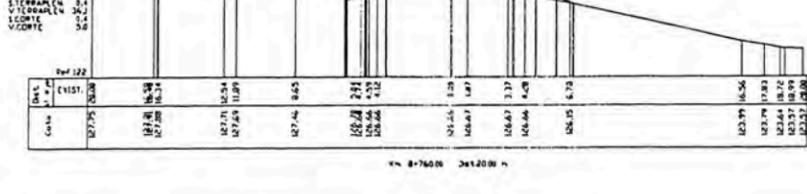
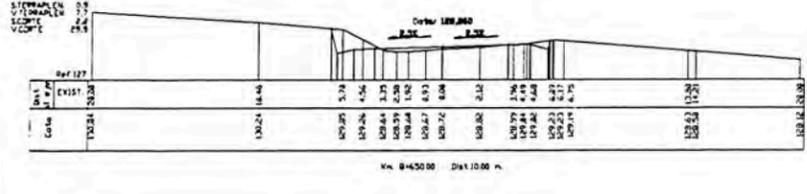
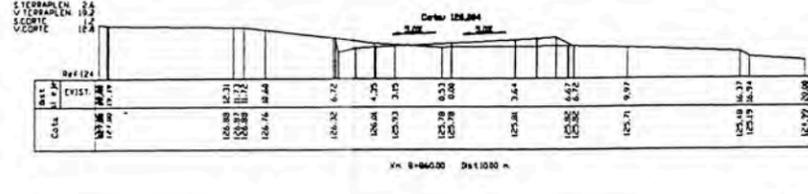
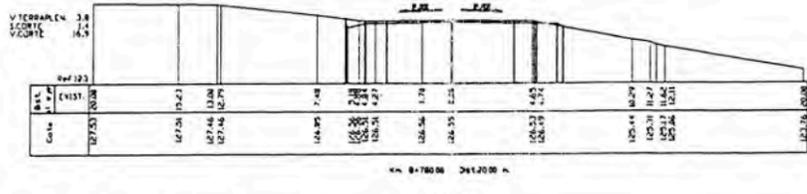
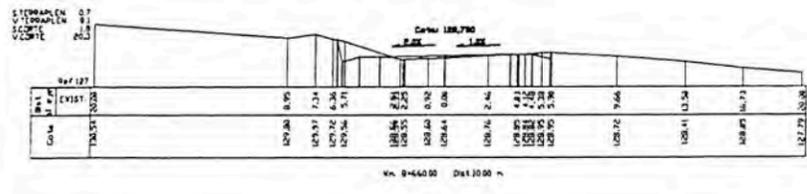
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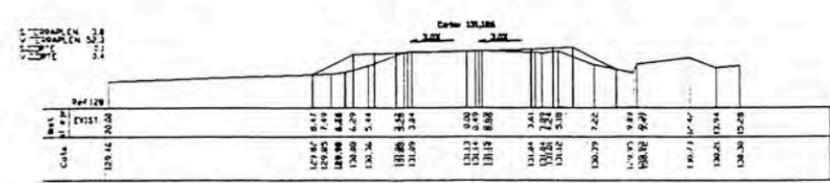
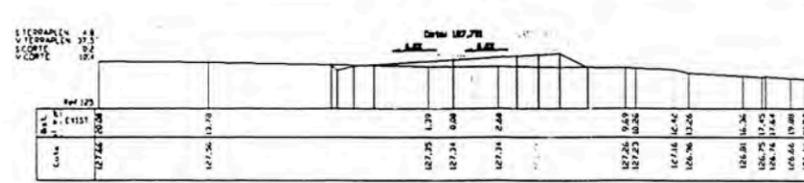
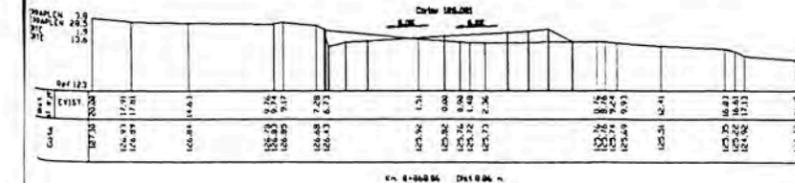
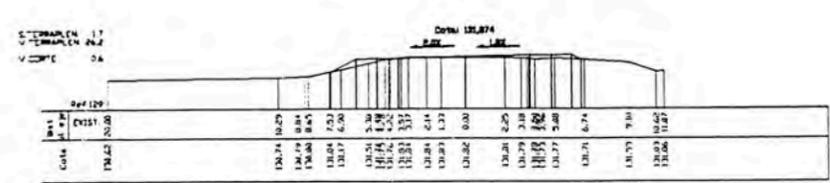
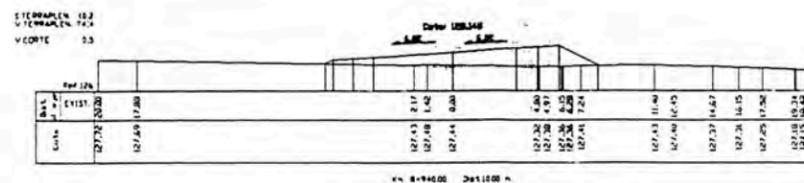
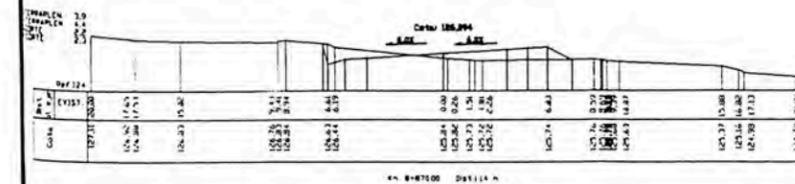
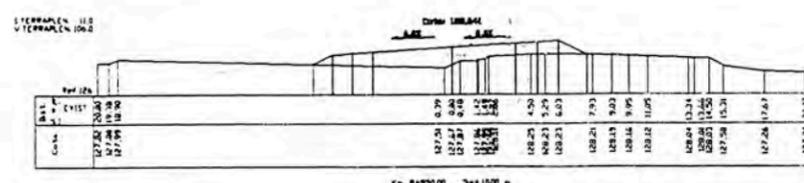
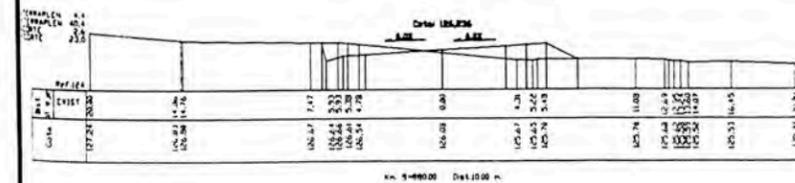
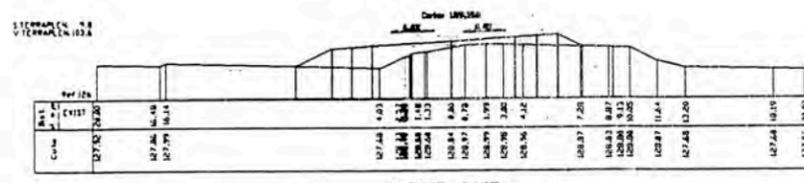
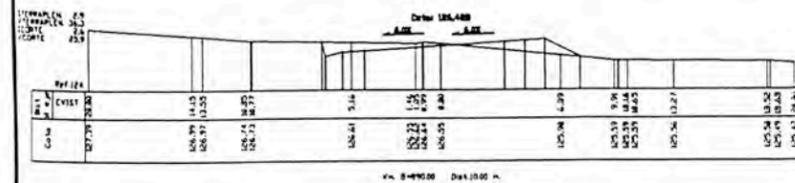
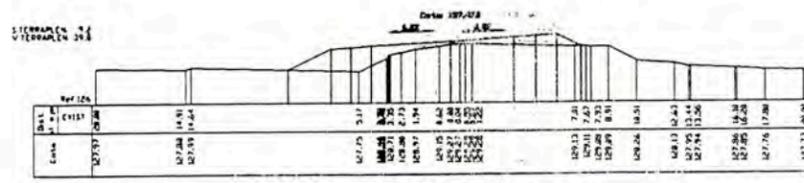
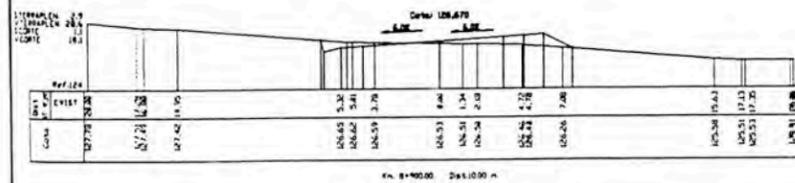
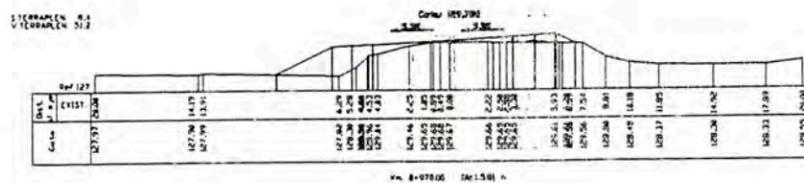
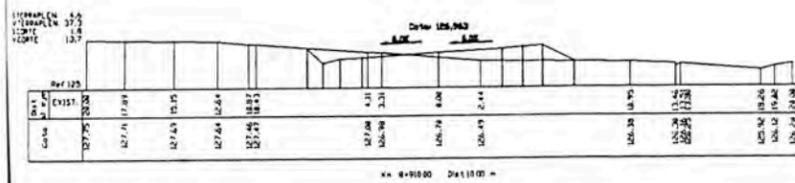
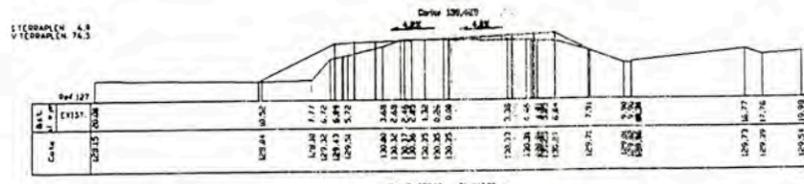
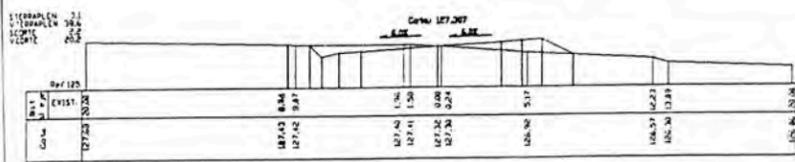
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FACULTAD DE INGENIERIA CIVIL
DEPARTAMENTO ACADEMICO DE TOPOGRAFIA Y VIAS DE TRANSPORTE

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Aprobó:

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