

DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES  
**LABORATÓRIO DE SISTEMAS DE TRANSPORTE**

# PROJETO PONTO DE PARTIDA

PARTE II

EDIÇÃO UFRGS 2021/1



Daniel Sergio Presta Garcia

Ângelo Cunha Turelly

Caroline da Luz Soares

Gabriel Warken

João Paulo Pinzon do Carmo

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Rafael Augusto da Silva

DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES

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**PARTIDA**

EDIÇÃO UFRGS 2021/1

PORTO ALEGRE

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

2022



**DADOS INTERNACIONAIS PARA CATALOGAÇÃO NA PUBLICAÇÃO (CIP)**

P964

Projeto Ponto de Partida : edição 2021/1 [e-book] / Daniel Sergio Presta Garcia [et al.] - Porto Alegre: UFRGS, 2022. v.2  
698 p. : il.

ISBN 978-65-5973-107-7 (v. 1)  
978-65-5973-108-4 (v. 2)

1. Rodovias. 2. Engenharia de transportes. 3. Ensino e aprendizagem. 4. Sistemas de transportes. I. Garcia, Daniel Sergio Presta. II. Turelly, Ângelo Cunha. III. Soares, Caroline da Luz. IV. Warken, Gabriel. V. Carmo, João Paulo Pinzon. VI. Bertoglio, Magno Vargas. VI. Silva, Rafael Augusto.

CDU 625.7

**CATALOGAÇÃO NA FONTE: AMANDA DE ABREU GULARTE CRB10/2500**



## CAPÍTULO II

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# RODOVISIONÁRIOS

João Francisco Dutra Dossin  
Thaís Machado Garay

Vinícius Steffens Wontroba  
Daniel Sergio Presta Garcia



**REPÚBLICA FEDERATIVA DO BRASIL**  
**UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL – UFRGS**  
**ESCOLA DE ENGENHARIA – EE**  
**DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES – DEPROT**  
**LABORATÓRIO DE SISTEMAS DE TRANSPORTE – PROGRAMA ProINFRA – PROJETO PONTO DE PARTIDA**

**PROJETO BÁSICO PARA IMPLANTAÇÃO DE TRECHO RODOVIÁRIO**  
**ENTRE ITAARA E SILVEIRA MARTINS**

Rodovia: PPP-2021/1 – LOTE 2  
Norma Técnica: DNER/1999  
Classe da rodovia: CLASSE III  
Região: MONTANHOSA  
Configuração: pista simples com acostamentos  
Classificação do solo: 1ª Categoria  
Faixa de exploração: 2 x 250m  
Extensão aproximada: 8,5 km em diretriz; 11,5 km em corpo estradal km

**VOLUME 2 – PROJETO EXECUTIVO**

**EQUIPE AA2 – RODOVISIONÁRIOS**  
**NOVEMBRO/2021**

**DADOS DE IDENTIFICAÇÃO**





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Instituição: **Universidade Federal do Rio Grande do Sul – UFRGS**

Unidade: **Escola de Engenharia – EE**

Departamento: **Departamento de Engenharia de Produção e Transportes – DEPROT**

Laboratório: **Laboratório de Sistemas de Transportes – LASTRAN**

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Programa: **Programa de Desenvolvimento Tecnológico em Infraestrutura de Transportes – ProINFRA**

Projeto: **Ponto de Partida (Trabalho de Graduação da Disciplina de Rodovias)**

Edição: **PPP UFRGS 2021/1**

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Ano: 2021

Semestre: 1

Disciplina: Rodovias

Turma: A

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Código da Equipe: AA2

Nome: Rodovisionários

Integrantes do grupo:

(assinatura)

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João Francisco Dutra Dossin

(assinatura)

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Thaís Machado Garay

(assinatura)

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Vinícius Steffens Wontroba

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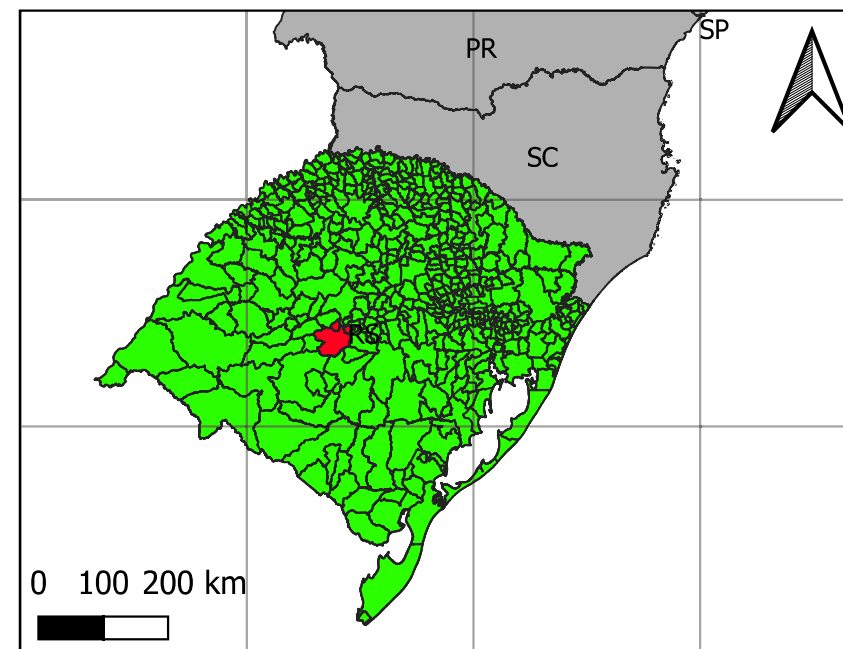
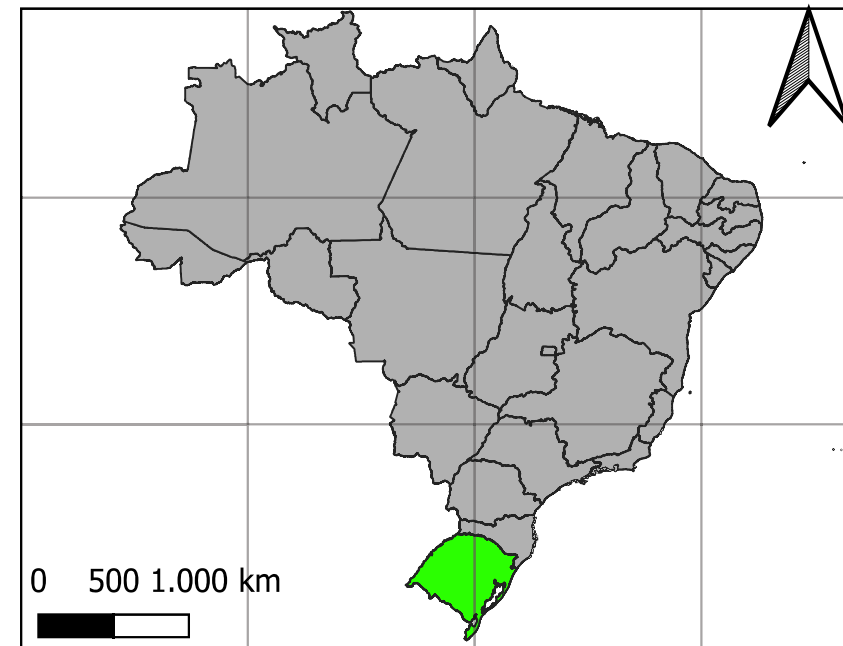
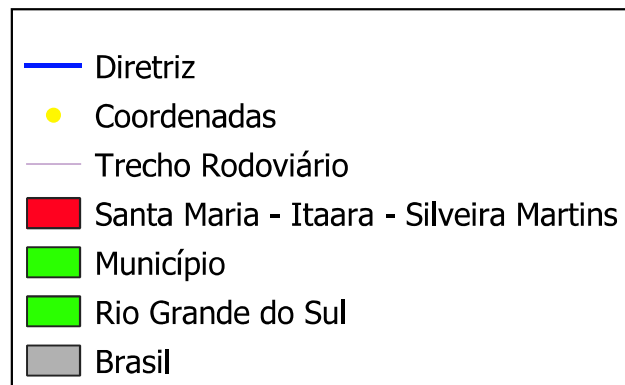
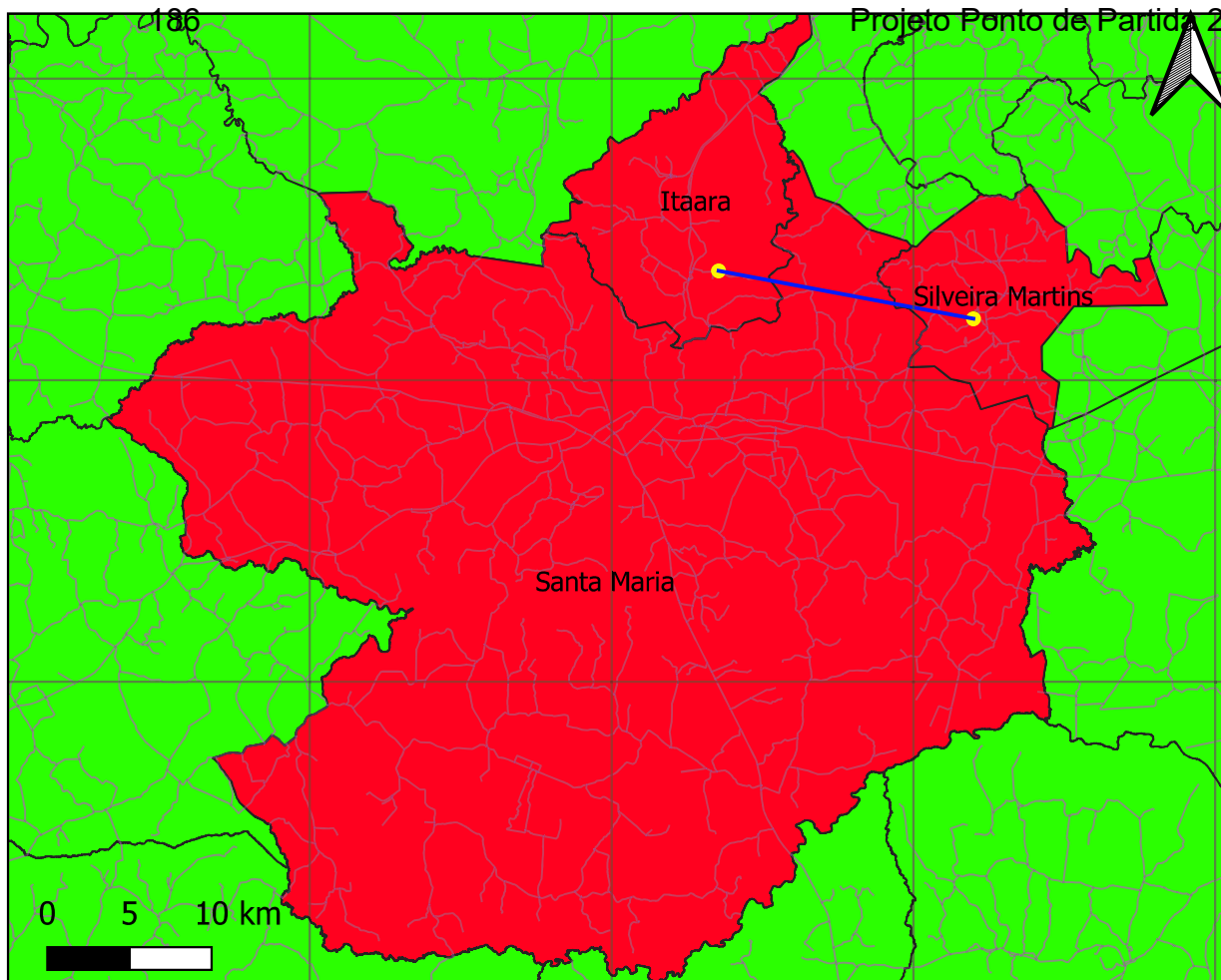


# APRESENTAÇÃO

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**1.1 Mapa de Situação**

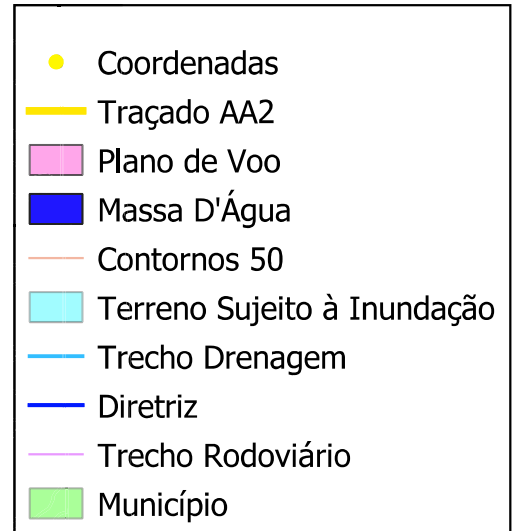
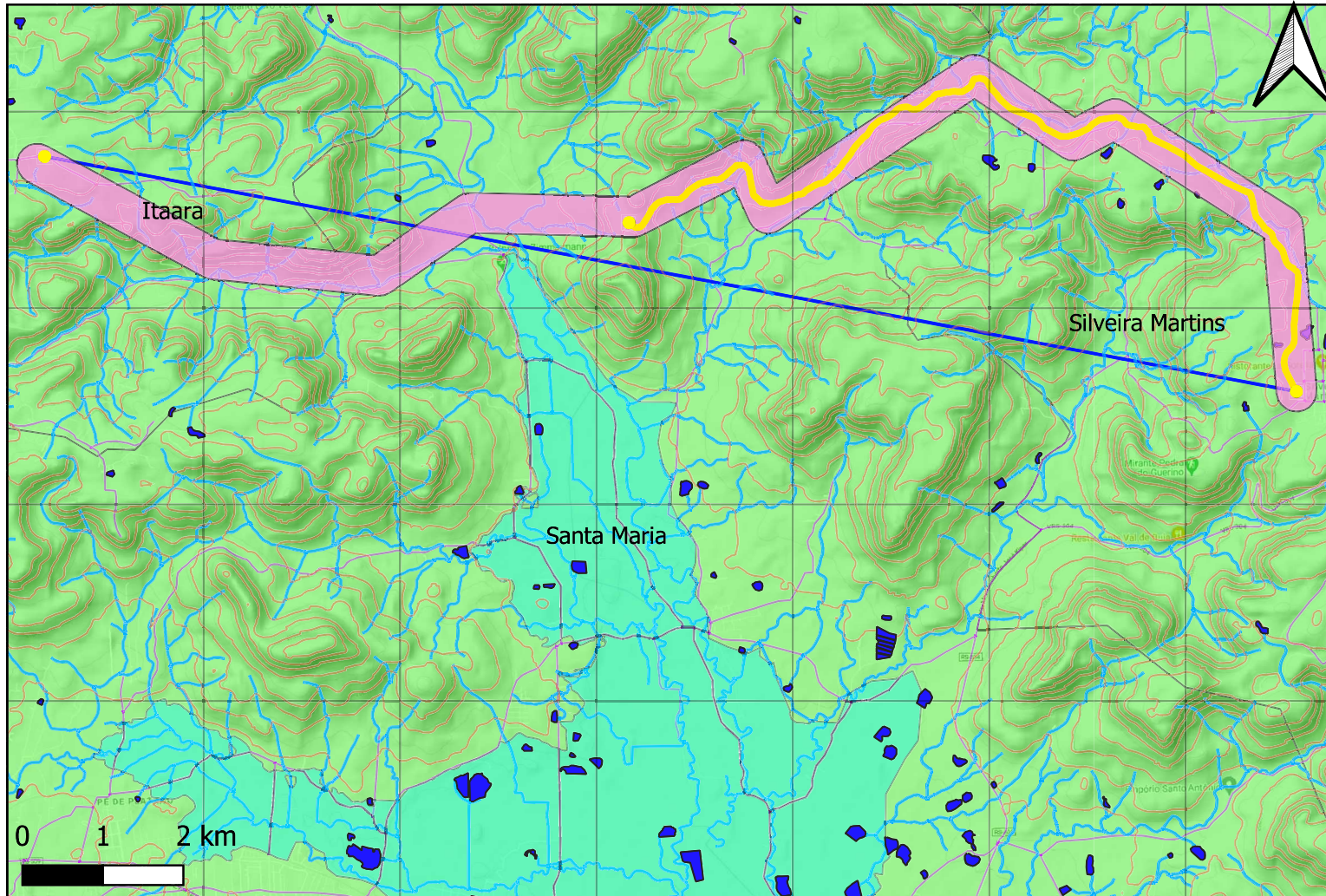




Base de Dados: IBGE, FEPAM  
 Autor: Projeto Ponto de Partida / Equipe AA2 - Rodovisionários  
 Sistema de Coordenadas Geográficas - Datum: SIRGAS 2000







Mapa de Situação  
 Base de Dados: IBGE, FEPAM  
 Autor: Projeto Ponto de Partida / Equipe  
 AA2 - Rodovisionários  
 Sistema de Coordenadas Geográficas -  
 Datum: SIRGAS 2000





Rodovia: Grupo de Eixos 1  
 Trecho: Eixo1  
 Segmento: km: 0+000,00 ao km: 11+448,04

## CARACTERÍSTICAS GERAIS

DE PROJETO		PLANALTIMÉTRICAS				SEÇÕES TRANSVERSAIS			
NORMA	DNIT	RAIO MIN. COM TRANS.	50,000	K MIN/DES CÔNCAVA	7 / 7	LARG. PISTA DE ROL.		PLATAFORMA ATERRO	
CLASSE DA RODOVIA	III	RAIO MIN. SIMPLES	300,000	K MIN/DES CONVEXA	5 / 5	LARG. ACOST. INT.		PLATAFORMA CORTE	
REGIÃO	Montanhosa	RAMPA MÁXIMA	8,000	DIST. VIS. PARADA		LARG. ACOST. EXT.		TALUDE ATERRO	
VELOCIDADE DIRETRIZ	40	RAMPA MÍNIMA	0,300	DIST. VIS. ULTRAP.		ABAUAMENTO		TALUDE CORTE 1ª CAT.	
		EXTENSÃO TOTAL	11448,038	FAIXA DOM. (LE/LD+OFF)	15 / 15 + 5	SUPERELEVÇÃO MÁX.		TALUDE CORTE 3ª CAT.	

## PLANIMETRIA

## DISTRIBUIÇÃO DE CURVAS

T	RAIOS (m)	FREQ.	Dc (m)	%	Lc1+Lc2 (m)	%
R	R mínimo = 300,000	1	171,156	1,50	140,000	1,22
A	300,000 < R ≤ 100,000					
N	100,000 < R ≤ 200,000					
S	200,000 < R ≤ 300,000					
I	300,000 < R ≤ 500,000	10	1963,072	17,15	1340,000	11,71
Ç	R > 500,000					
.	TOTAL EM TRANSIÇÃO	11	2134,228	18,64	1480,000	12,93
S	RAIOS (m)	FREQ.	Dc (m)	%		
I	R mínimo = 1000000,000					
M	1000000,00 < R ≤ 500,000					
P	500,000 < R ≤ 700,000					
L	700,000 < R ≤ 1000,000					
E	1000,000 < R ≤ 1500,000					
S	R > 1500,000					
	TOTAL SIMPLES					
	TOTAL EM CURVA	11	2134,228	18,64	5748,456	50,21

## EXTENSÃO DAS INTERTANGENTES

MÍNIMA		MÁXIMA		TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
106,038	0,93	1527,084	13,34	7833,810	68,43

## PARÂMETROS PLANIMÉTRICOS

TORTUOSIDADE		DISTÂNCIA EM DIRETRIZ	
TOTAL (°/m)	MÉDIA (°/m.km)	EXTENSÃO (m)	ACRÉSCIMO (%)
1,071	0,094	8445,788	35,547

## ALTIMETRIA

## VARIAÇÃO ALTIMÉTRICA

ACLIVES			NÍVEL		DECLIVES		
INTERVALO	EXTENSÃO (m)	%	EXTENSÃO	%	INTERVALO	EXTENSÃO (m)	%
0 < i ≤ 1	966,702	8,44			0 < i ≤ 1		
1 < i ≤ 2	1636,757	14,30			1 < i ≤ 2	28,468	0,25
2 < i ≤ 3					2 < i ≤ 3	578,803	5,06
3 < i ≤ 4	689,206	6,02			3 < i ≤ 4		
4 < i ≤ 5					4 < i ≤ 5		
5 < i ≤ 6	500,087	4,37			5 < i ≤ 6		
6 < i ≤ 7					6 < i ≤ 7	1336,149	11,67
7 < i ≤ 8	867,387	7,58			7 < i ≤ 8	2994,479	26,16
8 < i ≤ 9					8 < i ≤ 9		
9 < i ≤ 10					9 < i ≤ 10		
i > 10					i > 10		
TOTAL	4660,139	40,71			TOTAL	4937,899	43,13

## EXTENSÃO DOS ELEMENTOS VERTICAIS

RAMPA		CURVA CÔNCAVA		CURVA CONVEXA		CURVA TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
9598,038	83,84	800,000	6,99	1050,000	9,17	1850,000	16,16

## PARÂMETROS K MÍNIMOS ADOADOS

EM CURVA CÔNCAVA	18,456	EM CURVA CONVEXA	5,899
------------------	--------	------------------	-------

## PARÂMETROS ALTIMÉTRICOS

COMPRIMENTO VIRTUAL IDA		COMPRIMENTO VIRTUAL VOLTA		COMPRIMENTO VIRTUAL MÉDIO	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
20523,688	179,28	29094,464	254,14	24809,076	216,71

## CARACTERÍSTICAS OPERACIONAIS

ANO DE ABERTURA	VDM ABERTURA	PARÂMETRO
ANO FINAL DA VIDA ÚTIL	VDM FINAL	

# PROJETO GEOMÉTRICO

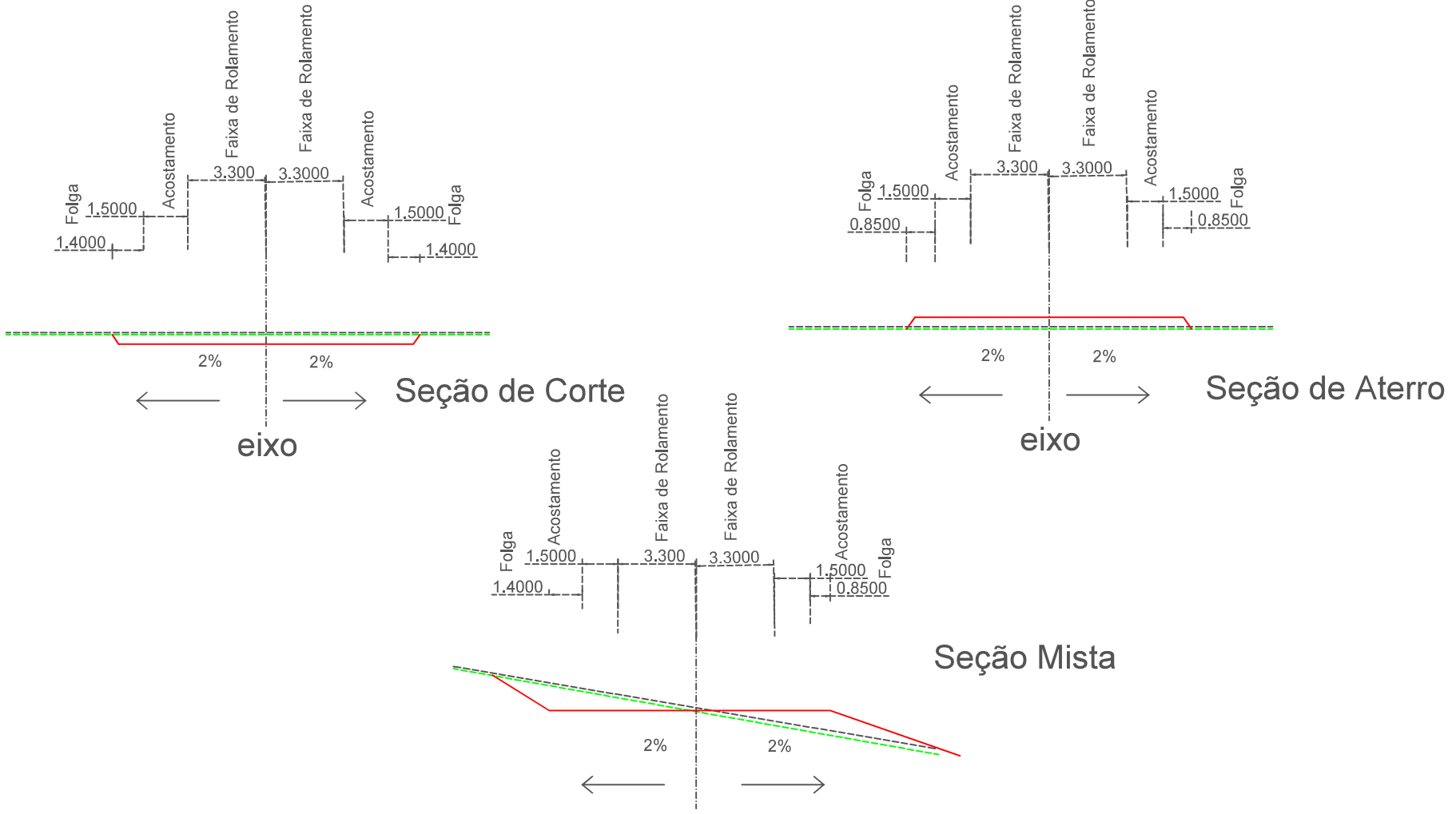
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**2.1 Seções Transversais Tipo**



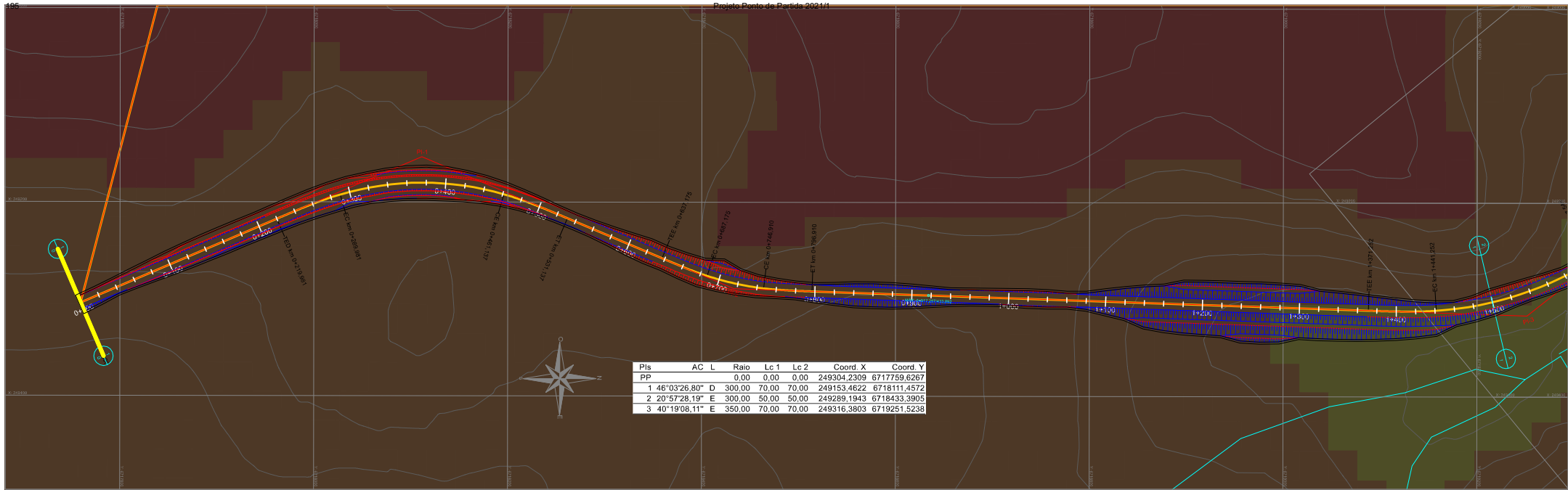
PRODUZIDO POR UMA VERSÃO DO AUTODESK PARA ESTUDANTES

PRODUZIDO POR UMA VERSÃO DO AUTODESK PARA ESTUDANTES



	Univesidade Federal do Rio Grande do Sul
	Rodovia: PPP-2021/1
	Trecho: Lote 2
	Data: 10/11/2021
Escala: sem escala	SEÇÕES TIPO

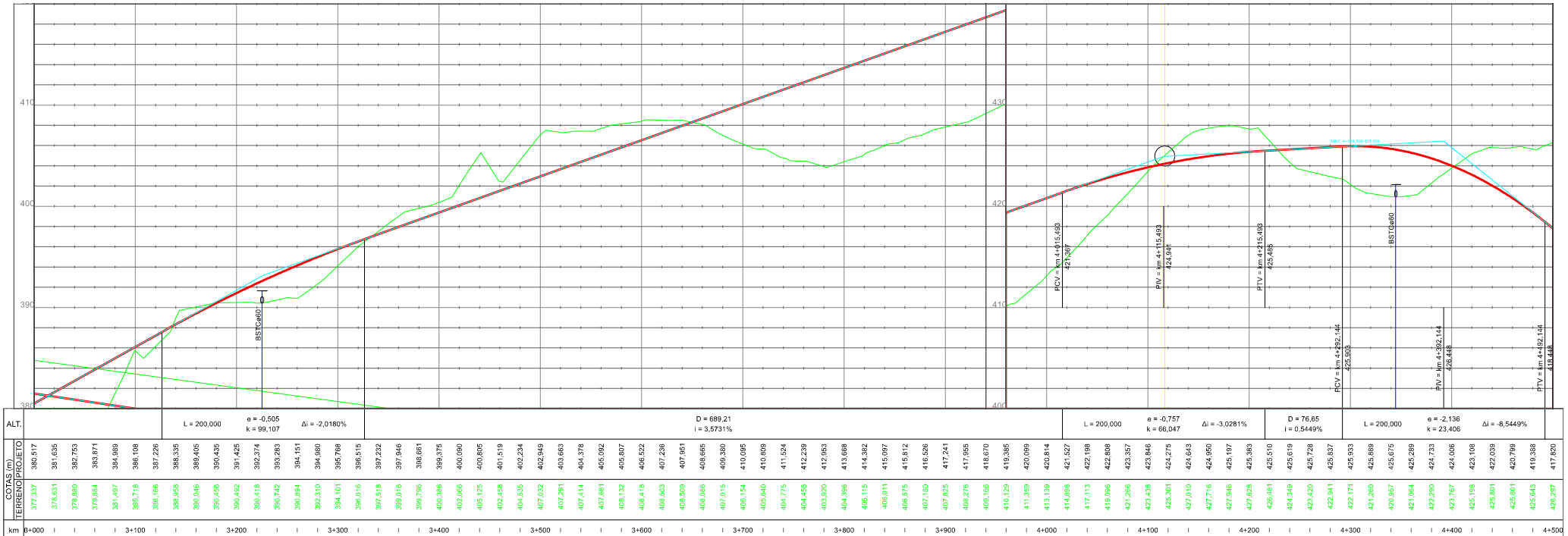
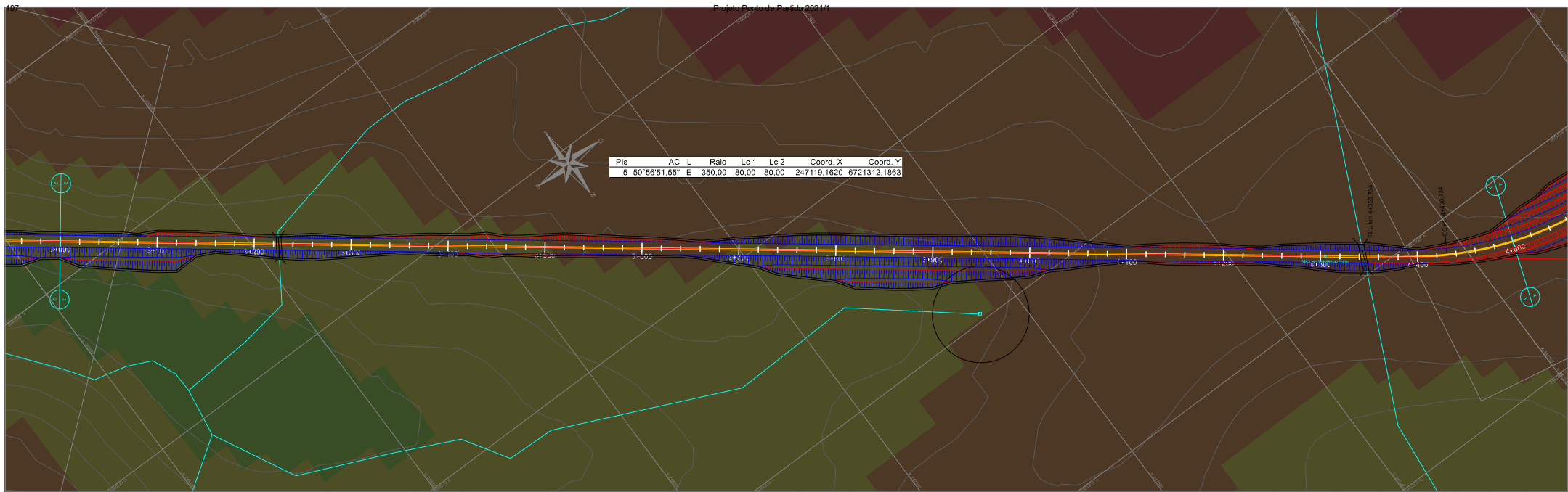




km	ALT (m)
0+000	426.416
0+100	426.516
0+200	426.581
0+300	426.681
0+400	426.746
0+500	426.746
0+600	426.746
0+700	426.746
0+800	426.746
0+900	426.746
1+000	426.746
1+100	426.746
1+200	426.746
1+300	426.746
1+400	426.746
1+500	426.746

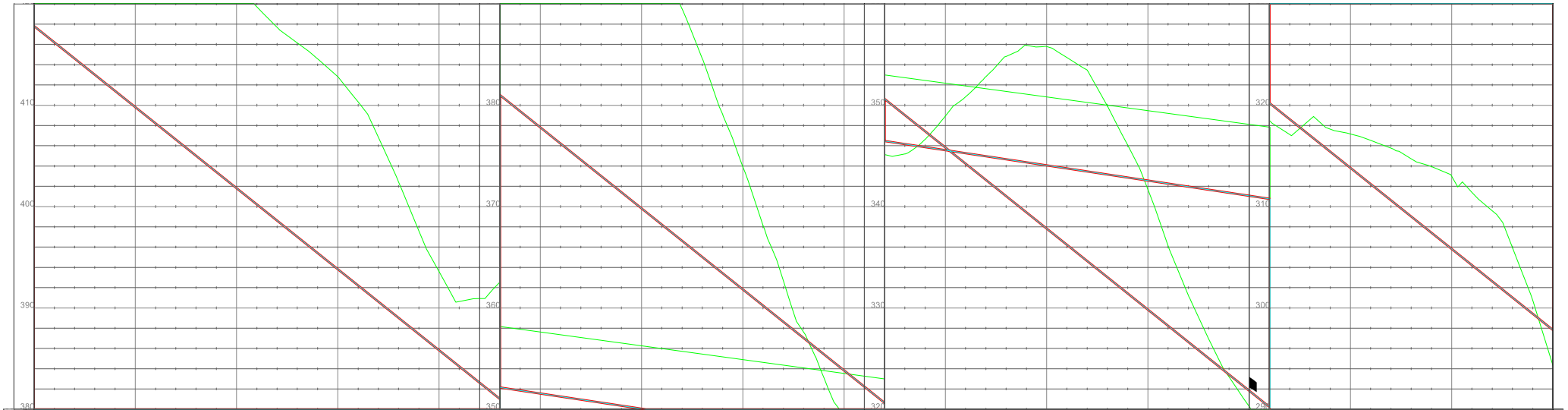
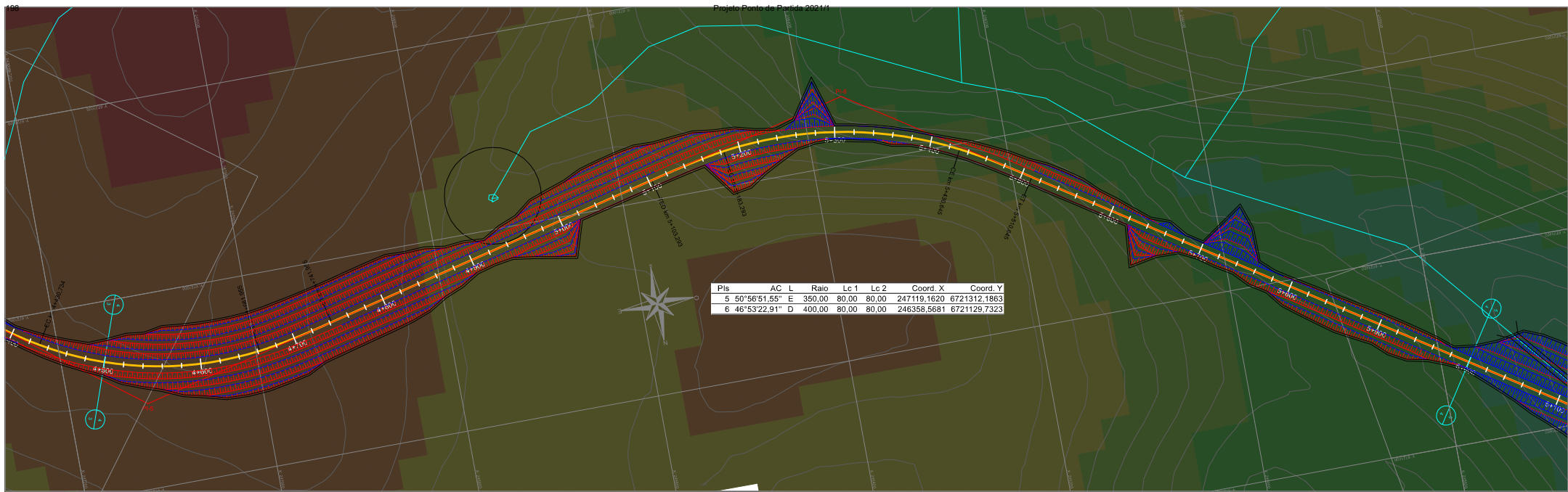
EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 0-1580 Data: 11/2021	
Escala:	1:2000	Código: PG-01
	<b>PROJETO GEOMÉTRICO</b>	





EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 2940-4560 Data: 11/2021	
Escala:	1:2000	Código: PG-03
	<b>PROJETO GEOMÉTRICO</b>	

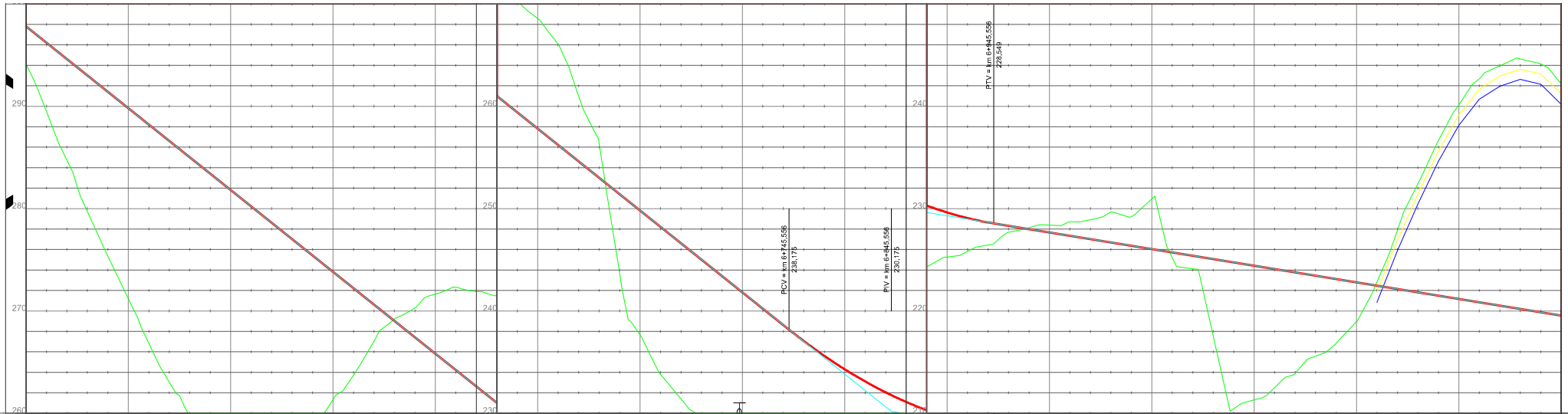
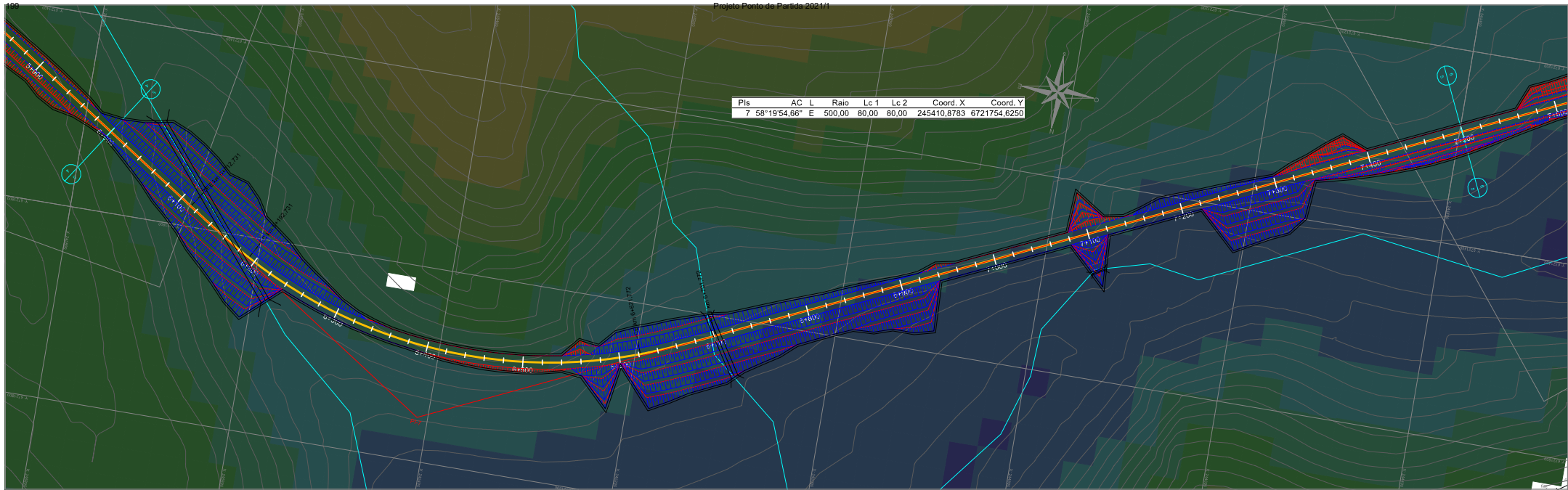




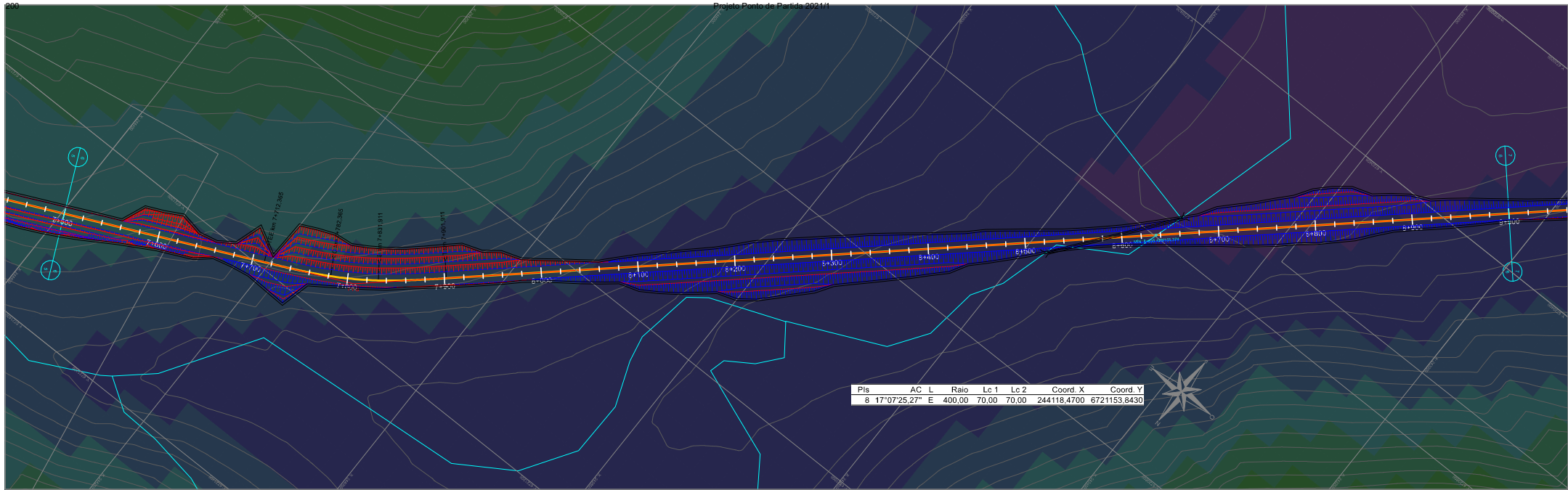
km	4+500	4+600	4+700	4+800	4+900	5+000	5+100	5+200	5+300	5+400	5+500	5+600	5+700	5+800	5+900	6+000																																																																																																																						
ALT. (m)	426,837	417,620	416,220	427,715	414,620	428,273	413,020	411,420	430,378	409,820	429,165	408,220	427,653	405,020	423,889	403,420	421,620	401,620	419,711	398,620	416,159	397,020	414,575	395,420	412,812	393,620	410,325	392,220	406,838	390,620	402,437	387,420	397,584	385,820	390,650	384,220	390,576	382,620	392,342	381,020	396,657	378,420	402,601	377,820	404,960	376,220	404,065	374,620	403,550	373,020	400,612	371,420	397,468	368,620	393,548	368,220	389,521	366,620	384,596	365,020	379,094	363,420	373,930	361,820	368,149	360,220	362,670	358,620	357,611	357,020	353,103	355,420	349,392	353,820	346,063	352,220	345,135	350,620	345,191	348,020	346,638	347,420	348,624	345,820	350,024	344,220	352,813	342,620	354,817	341,020	355,912	339,420	355,782	337,820	354,705	336,220	353,668	334,620	346,056	333,020	341,686	329,820	331,517	326,620	326,948	325,020	320,278	321,620	318,600	320,220	318,582	317,020	317,640	315,420	317,171	313,820	316,524	312,220	315,764	310,620	314,721	309,020	313,555	307,420	312,986	305,820	305,576	302,620	305,863	301,020	300,736	299,420	294,311	297,820

D = 2253,41  
i = -8,0000%

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN		
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 4400-6100 Data: 11/2021		
Escala:	1:2000	PROJETO GEOMÉTRICO	Código: PG-04



km	6+000	6+100	6+200	6+300	6+400	6+500	6+600	6+700	6+800	6+900	7+000	7+100	7+200	7+300	7+400	7+500
ALT (m)	284,311	297,620	286,220	298,477	294,620	293,020	291,420	271,205	289,620	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	279,729	293,020	288,220	271,205	289,620	286,620	283,420	271,020	289,620	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	275,344	291,420	286,620	268,624	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	271,205	289,620	286,620	266,095	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	266,624	288,220	286,620	263,035	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	259,150	283,420	286,620	259,699	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	254,443	280,220	286,620	254,443	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	255,089	278,620	286,620	255,089	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	255,089	277,020	286,620	255,089	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	258,300	275,420	286,620	258,300	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	261,333	273,620	286,620	261,333	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	263,777	272,220	286,620	263,777	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	267,042	270,620	286,620	267,042	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	269,204	268,020	286,620	269,204	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	270,289	267,420	286,620	270,289	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	271,641	265,620	286,620	271,641	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	272,309	264,220	286,620	272,309	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	271,689	262,620	286,620	271,689	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	271,654	261,020	286,620	271,654	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	270,280	259,420	286,620	270,280	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	268,655	257,620	286,620	268,655	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	266,066	256,220	286,620	266,066	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	260,893	254,620	286,620	260,893	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	256,373	253,020	286,620	256,373	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	243,683	251,420	286,620	243,683	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	237,663	248,620	286,620	237,663	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	233,807	246,220	286,620	233,807	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	231,387	246,620	286,620	231,387	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	229,697	245,020	286,620	229,697	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,761	243,420	286,620	228,761	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	229,757	241,820	286,620	229,757	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	229,451	240,220	286,620	229,451	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,658	238,620	286,620	228,658	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	227,742	237,053	286,620	227,742	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	227,076	235,609	286,620	227,076	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	226,988	234,292	286,620	226,988	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	225,672	233,103	286,620	225,672	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	225,303	232,041	286,620	225,303	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	224,622	231,107	286,620	224,622	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	224,296	230,300	286,620	224,296	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	225,272	229,620	286,620	225,272	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	225,807	229,068	286,620	225,807	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	226,430	228,644	286,620	226,430	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	227,684	228,314	286,620	227,684	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,122	227,989	286,620	228,122	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,377	227,663	286,620	228,377	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,708	227,338	286,620	228,708	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	228,917	227,013	286,620	228,917	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	229,665	226,687	286,620	229,665	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	229,223	226,362	286,620	229,223	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	230,943	226,037	286,620	230,943	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	225,202	225,712	286,620	225,202	286,620	283,420	280,220	277,220	269,204	286,620	283,420	280,220	275,420	271,020	268,620	264,220
ALT (m)	224,123	225,386	286,620	224,123	28											



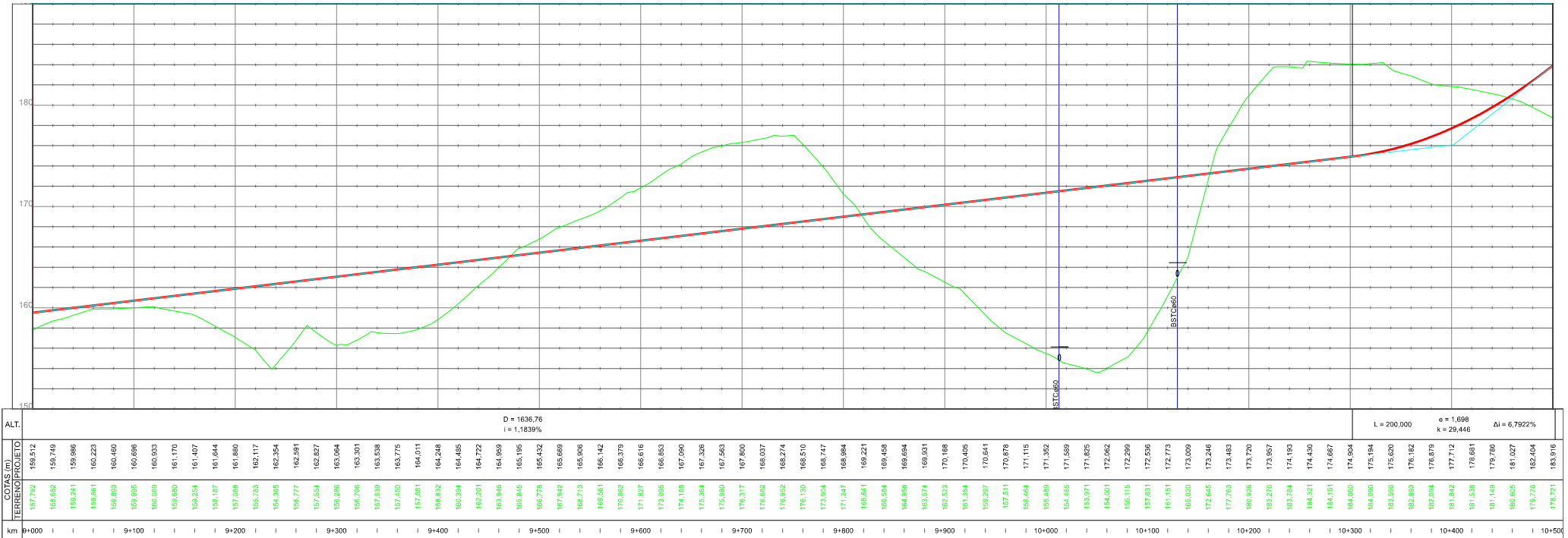
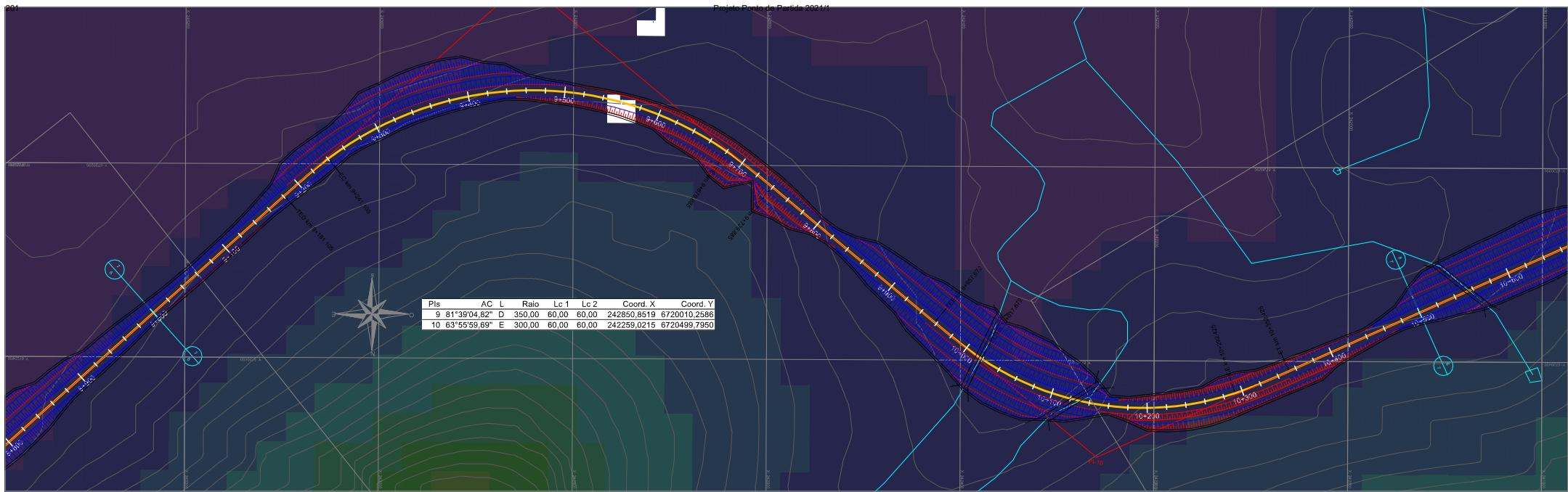
Pis	AC	L	Raio	Lc 1	Lc 2	Coord X	Coord Y
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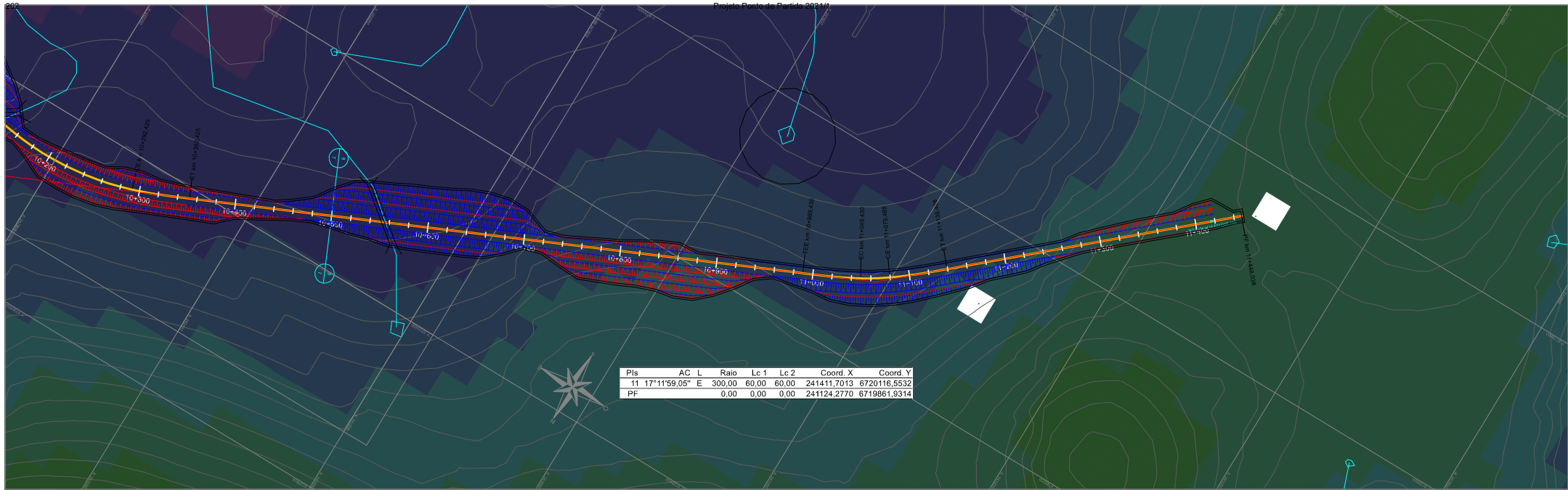
ALT	L = 200,000		e = -1,271 k = 39,346	Δi = -5,0831%	D = 741,07 i = -6,7095%	L = 200,000	e = 1,973 k = 25,337	Δi = 7,8935%
242,176	218,531	219,206	218,850	218,384	217,837	217,178	216,417	215,555
238,887	236,539	233,101	229,801	227,835	225,284	221,510	217,711	213,525
210,135	211,089	212,358	212,142	212,339	212,453	209,750	206,406	207,066
210,339	207,672	204,332	203,040	201,698	200,356	199,014	197,672	196,331
198,989	198,597	198,136	193,722	192,305	191,418	190,953	189,160	188,621
188,279	186,884	183,176	180,359	178,855	176,173	174,532	172,744	170,228
168,458	165,570	164,253	162,295	161,016	159,851	158,993	158,302	158,150
157,544	156,008	154,156	153,247	152,911	151,518	150,492	149,496	148,993
148,660	147,176	146,125	145,821	145,697	145,682	145,682	145,682	145,682
145,387	144,387	143,387	142,387	141,387	140,387	139,387	138,387	137,387
136,387	135,387	134,387	133,387	132,387	131,387	130,387	129,387	128,387
127,387	126,387	125,387	124,387	123,387	122,387	121,387	120,387	119,387
118,387	117,387	116,387	115,387	114,387	113,387	112,387	111,387	110,387
109,387	108,387	107,387	106,387	105,387	104,387	103,387	102,387	101,387
100,387	99,387	98,387	97,387	96,387	95,387	94,387	93,387	92,387
91,387	90,387	89,387	88,387	87,387	86,387	85,387	84,387	83,387
82,387	81,387	80,387	79,387	78,387	77,387	76,387	75,387	74,387
73,387	72,387	71,387	70,387	69,387	68,387	67,387	66,387	65,387
64,387	63,387	62,387	61,387	60,387	59,387	58,387	57,387	56,387
55,387	54,387	53,387	52,387	51,387	50,387	49,387	48,387	47,387
46,387	45,387	44,387	43,387	42,387	41,387	40,387	39,387	38,387
37,387	36,387	35,387	34,387	33,387	32,387	31,387	30,387	29,387
28,387	27,387	26,387	25,387	24,387	23,387	22,387	21,387	20,387
19,387	18,387	17,387	16,387	15,387	14,387	13,387	12,387	11,387
10,387	9,387	8,387	7,387	6,387	5,387	4,387	3,387	2,387
1,387	0,387	0,387	0,387	0,387	0,387	0,387	0,387	0,387

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVIOSNÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 7440-9060 Data: 11/2021	
Escala:	1:2000	Código: PG-06
	PROJETO GEOMÉTRICO	

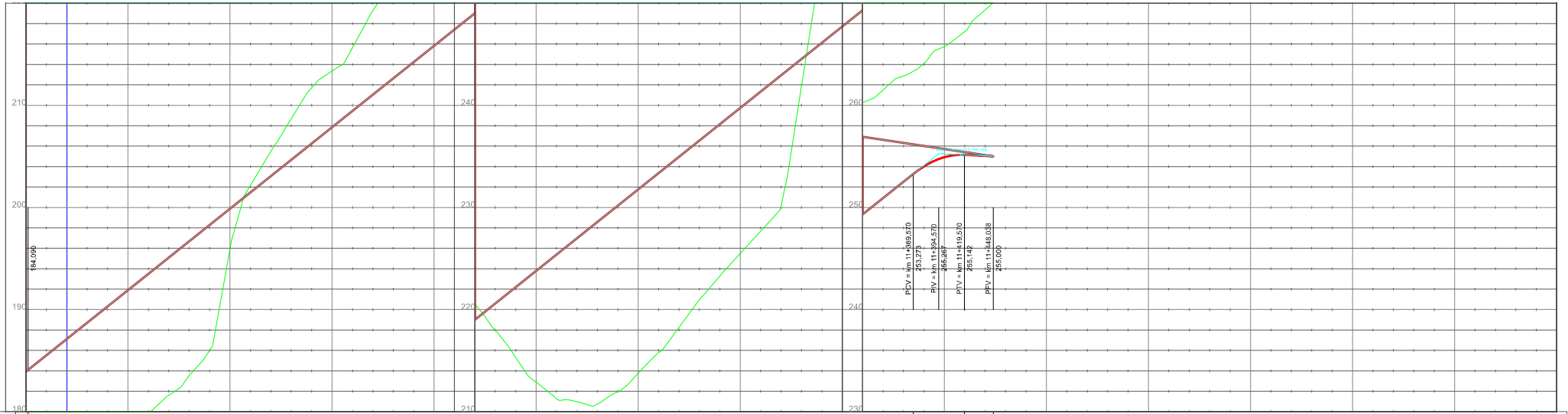




EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 8800-10660 Data: 11/2021	
Escala:	1:2000	Código: PG-07
	PROJETO GEOMÉTRICO	



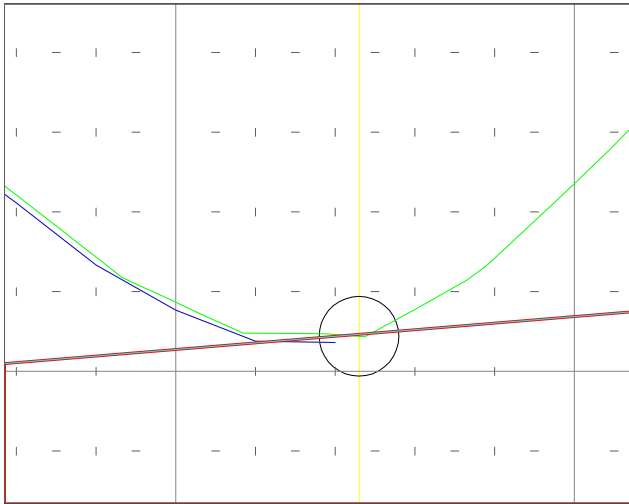
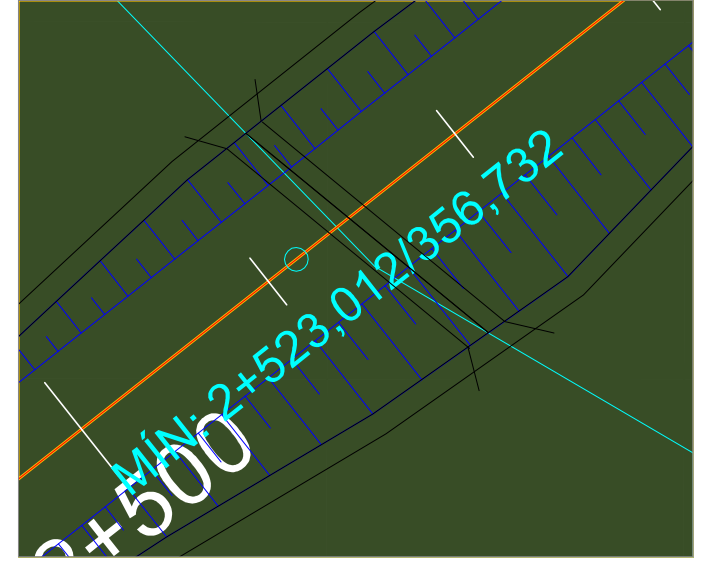
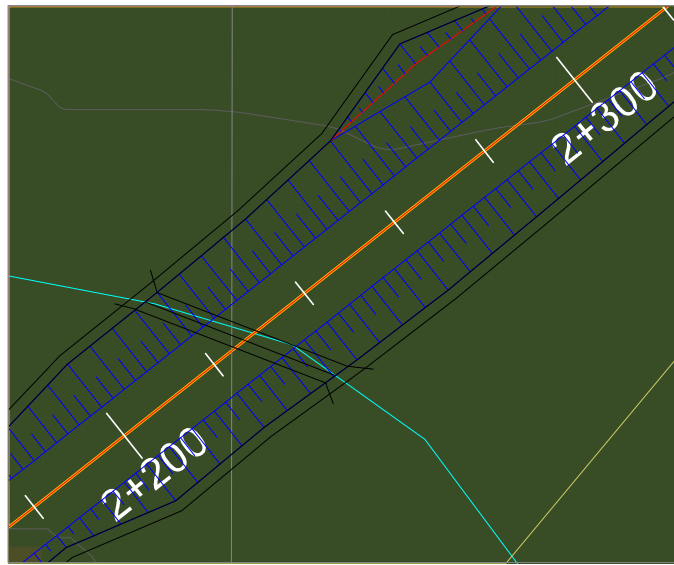
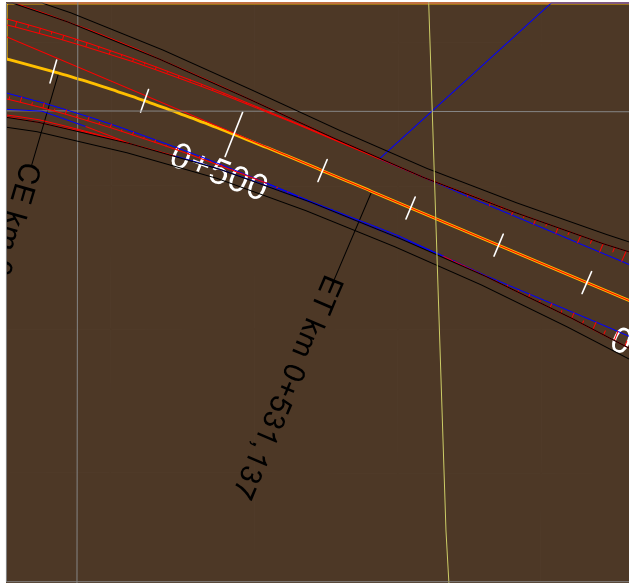
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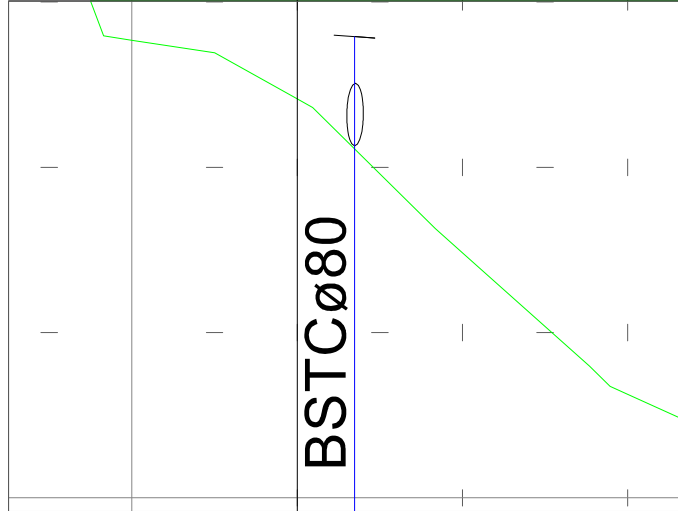
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			191,892
			193,487
			195,082
			196,677
			198,272
			199,868
			201,463
			203,059
			204,655
			206,249
			207,844
			209,439
			211,034
			212,629
			214,225
			215,820
			217,415
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			228,582
			230,177
			231,772
			233,367
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			241,343
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			244,534
			246,129
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			249,320
			250,915
			252,510
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			258,889
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			263,674
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			266,864
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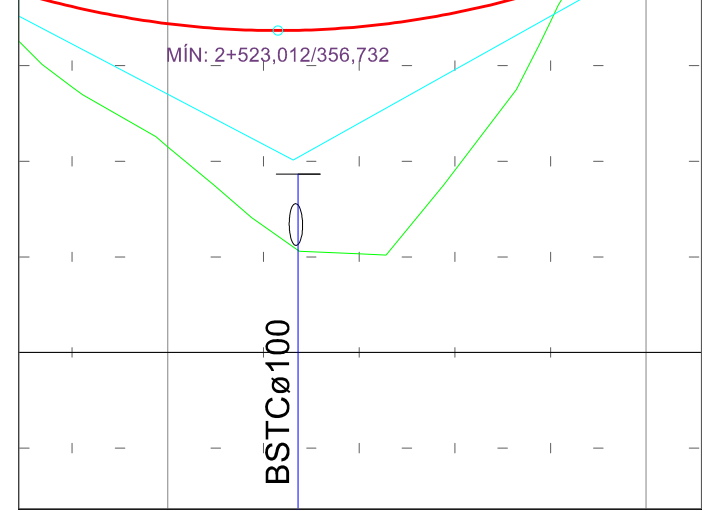




INTERSEÇÃO COM VIA EXISTENTE 1

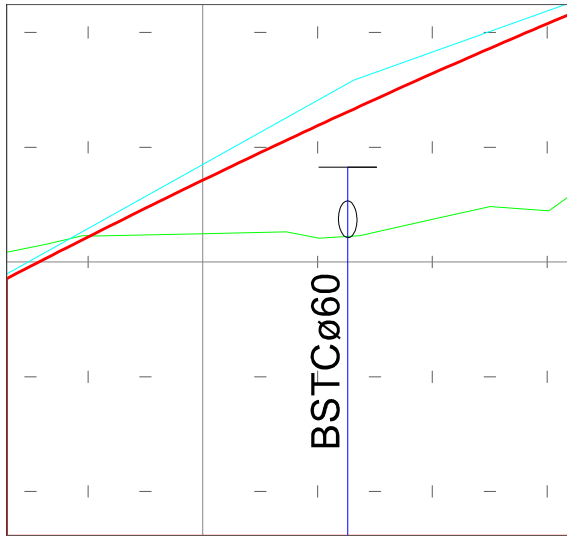
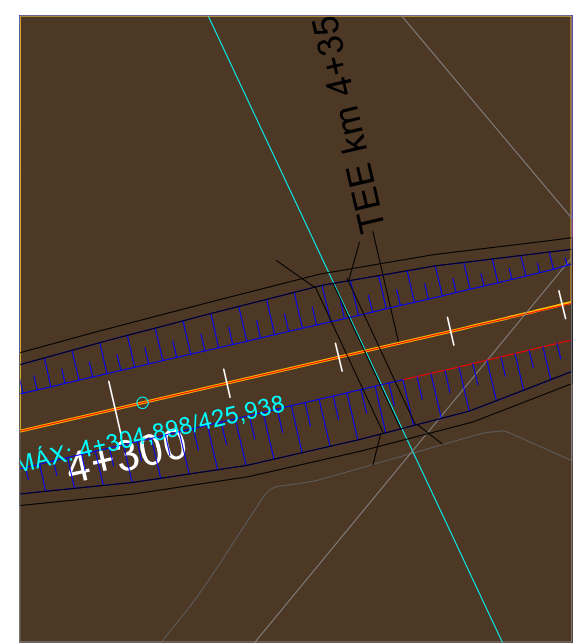
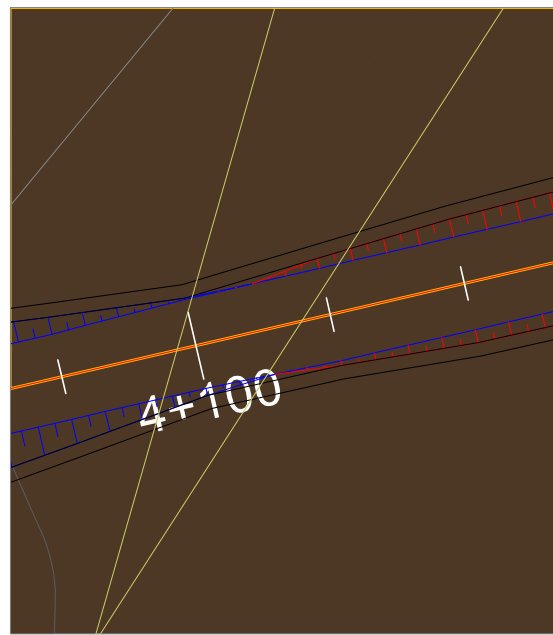
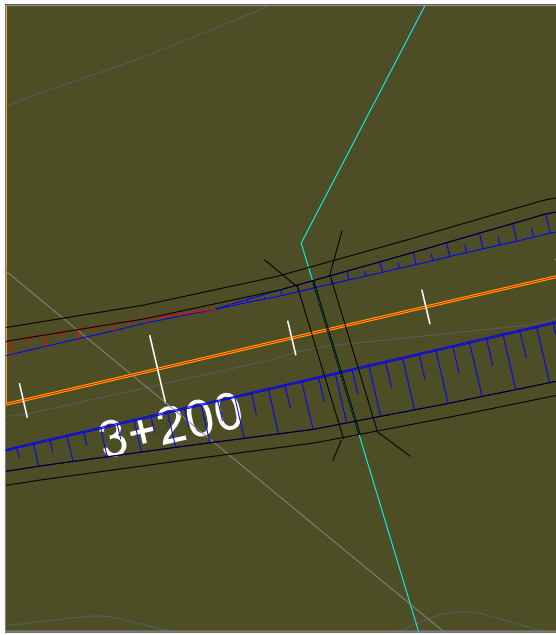


BUEIRO 1

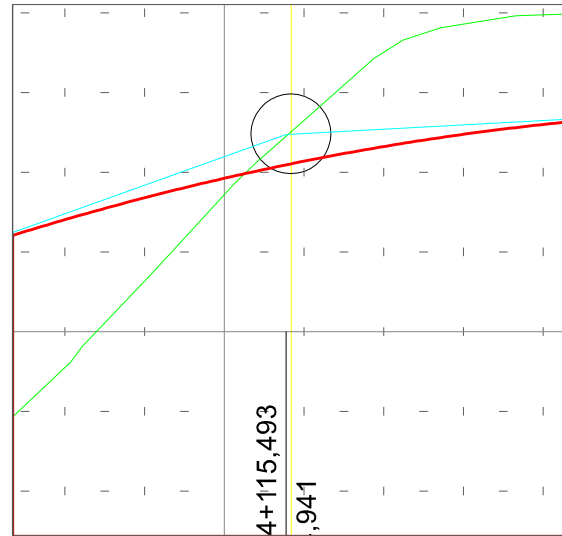


BUEIRO 2

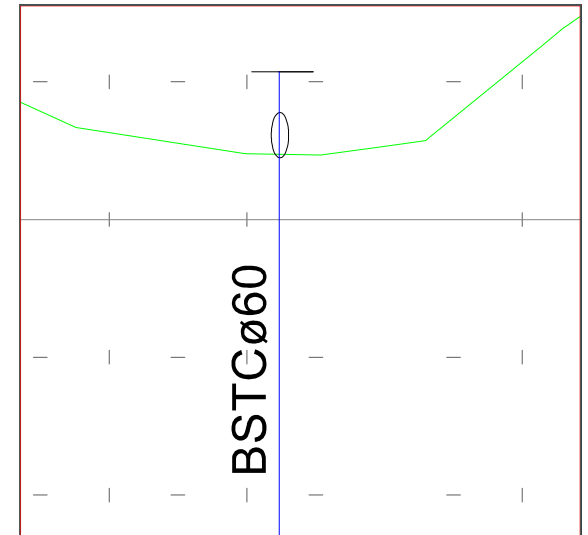
EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1	
Escala:	Data: 11/2021	Código:
SEM ESCALA	DETALHAMENTO	1/4



BUEIRO 3

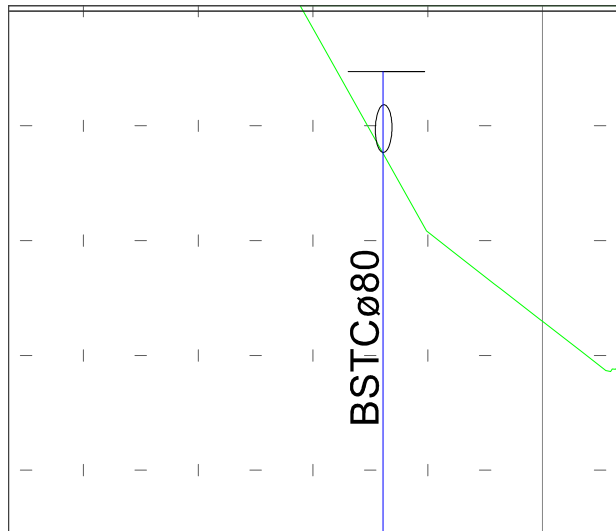
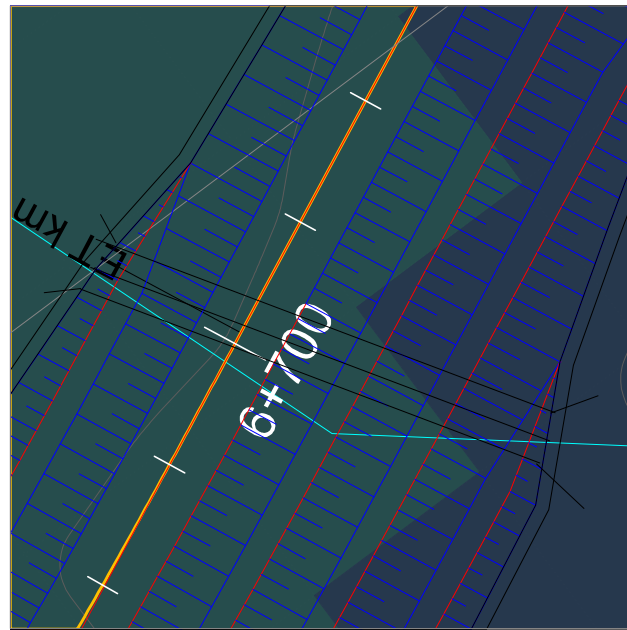
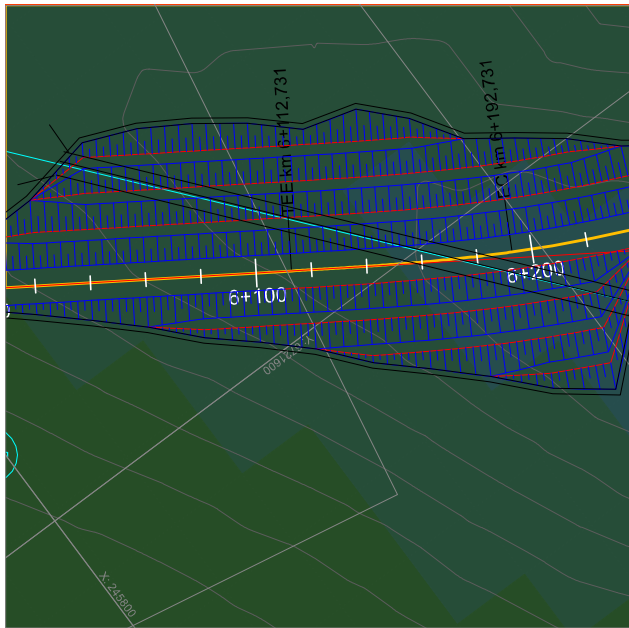


INTERSEÇÃO COM VIA EXISTENTE 2

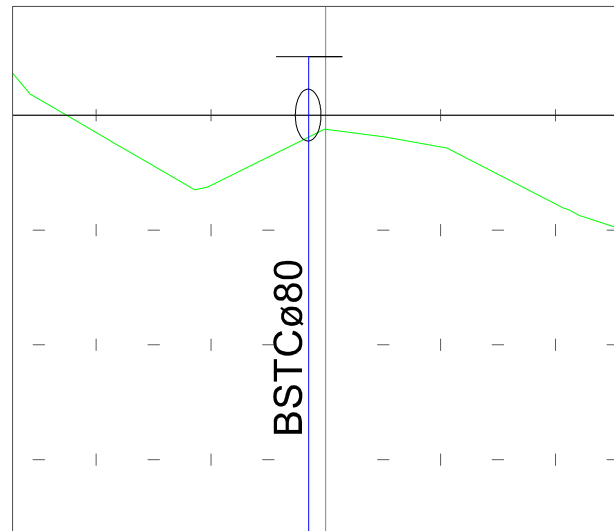


BUEIRO 4

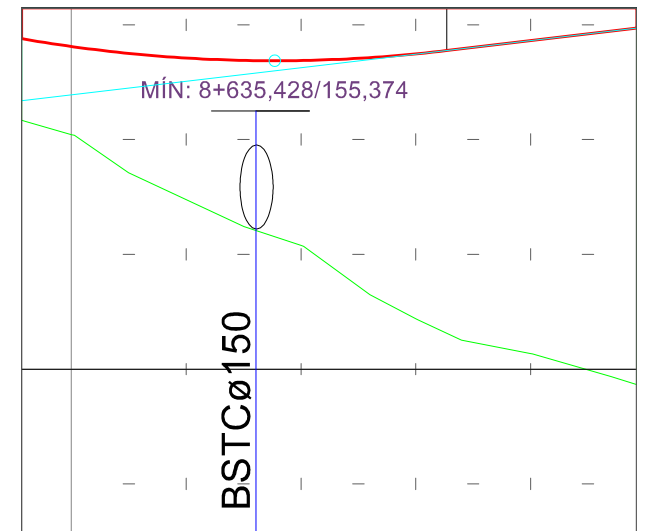
EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1	
Escala:	Data: 11/2021	Código:
SEM ESCALA	DETALHAMENTO	2/4



BUEIRO 5

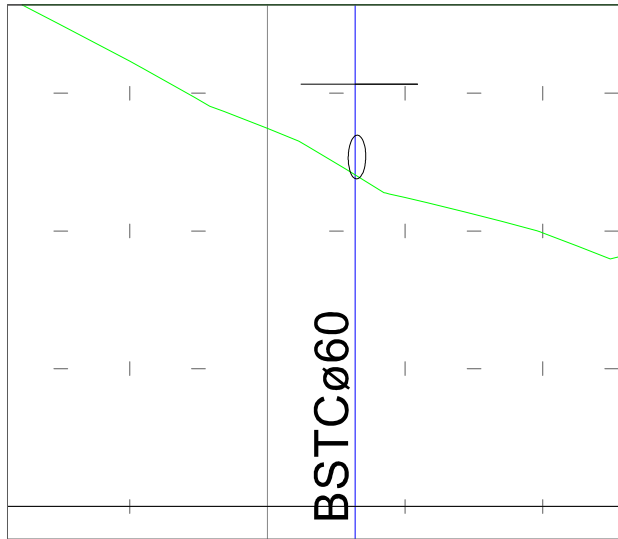
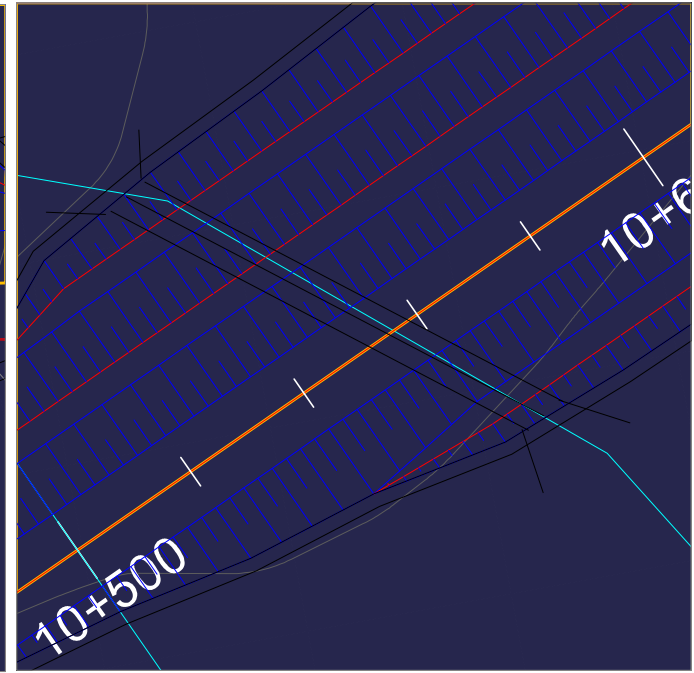
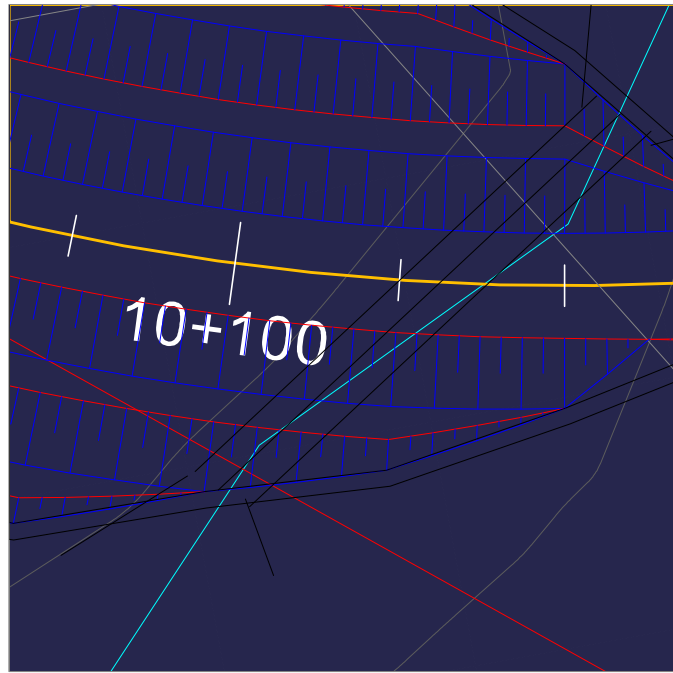
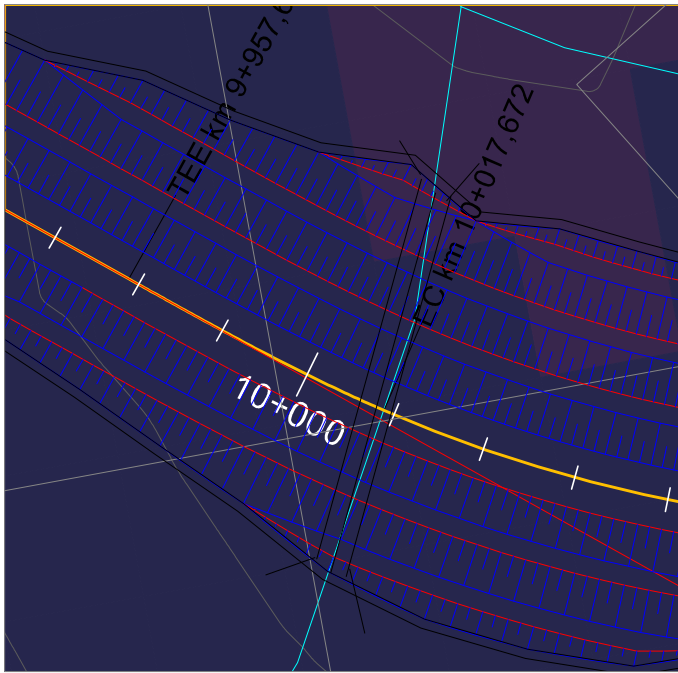


BUEIRO 6

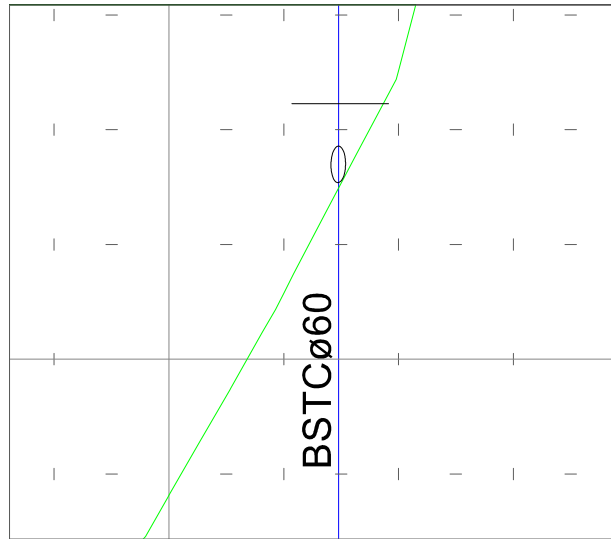


BUEIRO 7 E MÍNIMO

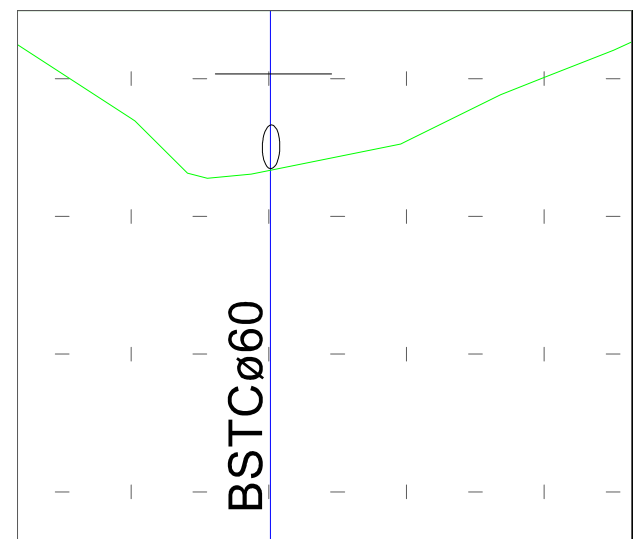
EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1	
Escala:	Data: 11/2021	Código:
SEM ESCALA	DETALHAMENTO	3/4



BUEIRO 8



BUEIRO 9

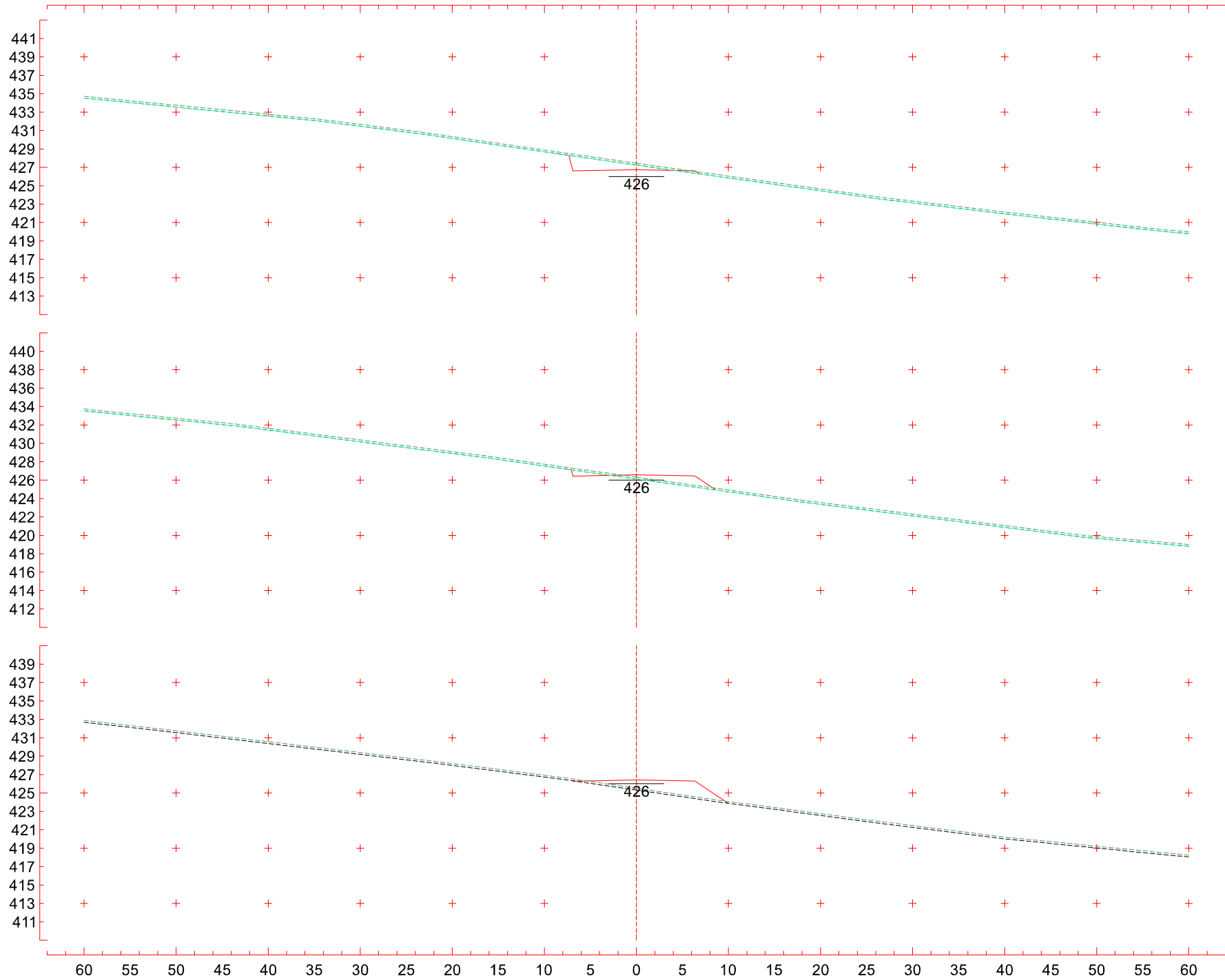


BUEIRO 10

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFGRS-2021/1	
Escala:	Data: 11/2021	Código:
SEM ESCALA	DETALHAMENTO	4/4





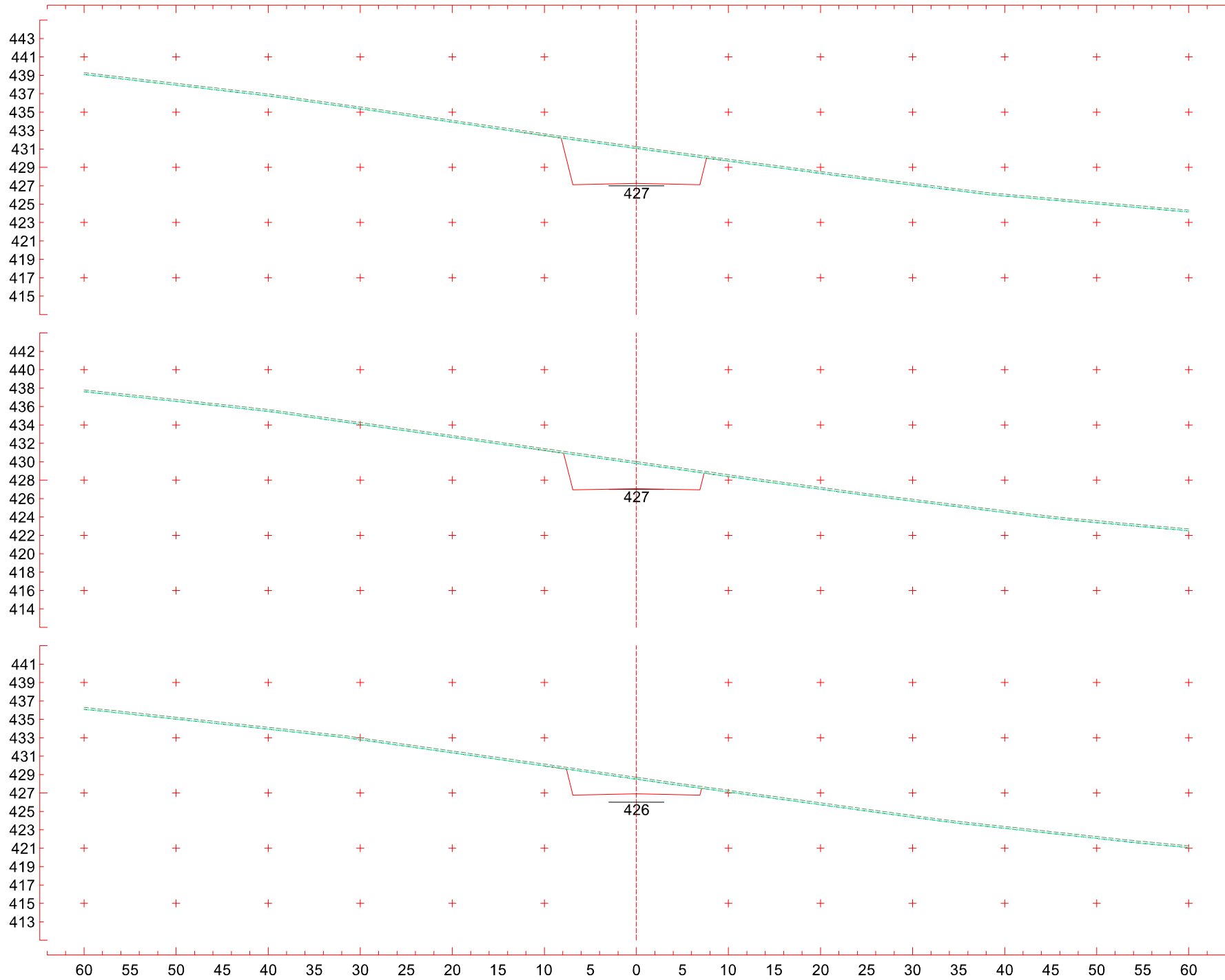


**0+040**  
CT 427,447 m  
CP 426,746 m

**0+020**  
CT 426,328 m  
CP 426,581 m

**0+000**  
CT 425,516 m  
CP 426,415 m

**Eixo1**  
Escala 1:400

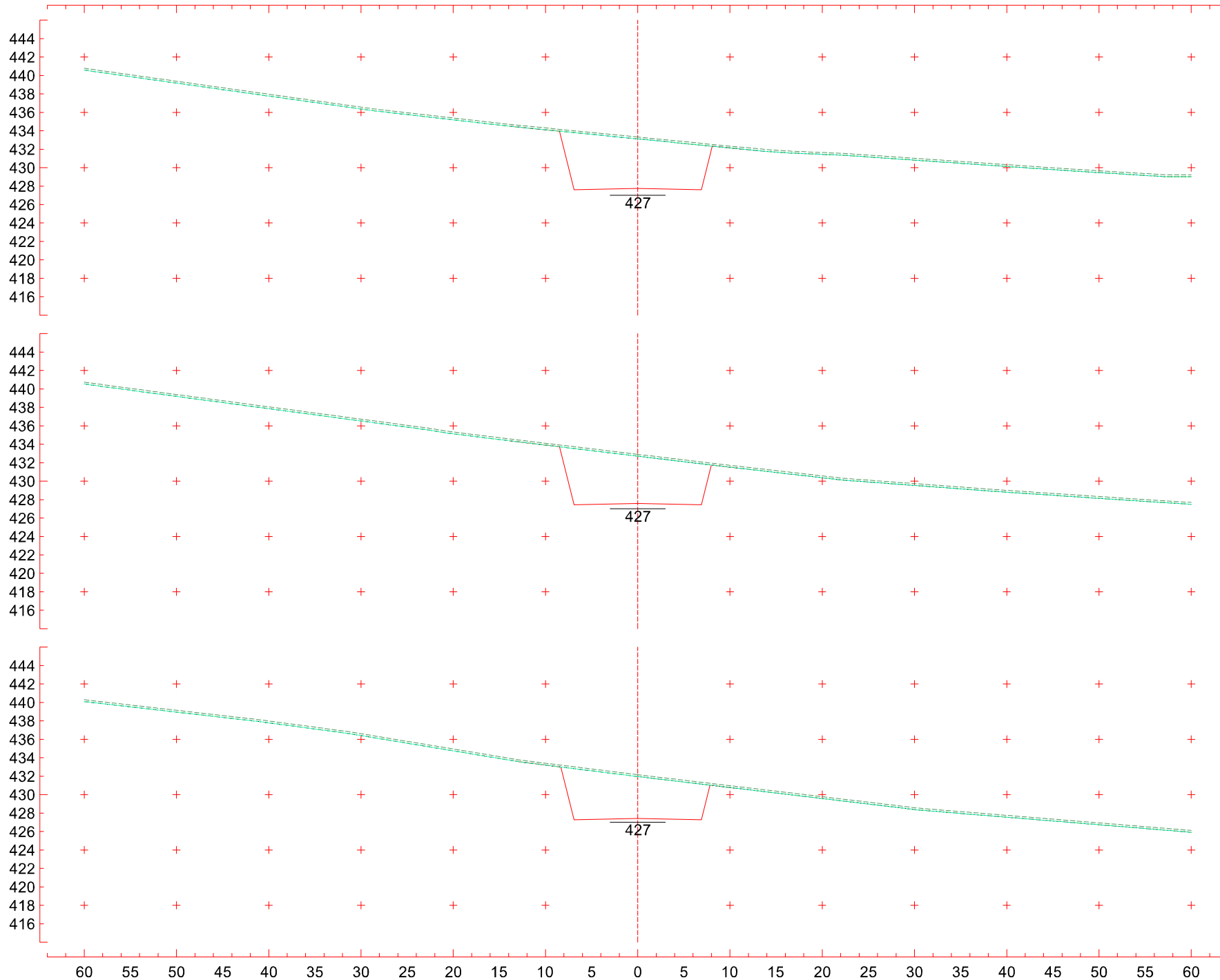


**0+100**  
CT 431,250 m  
CP 427,243 m

**0+080**  
CT 430,011 m  
CP 427,077 m

**0+060**  
CT 428,703 m  
CP 426,912 m

**Eixo1**  
Escala 1:400

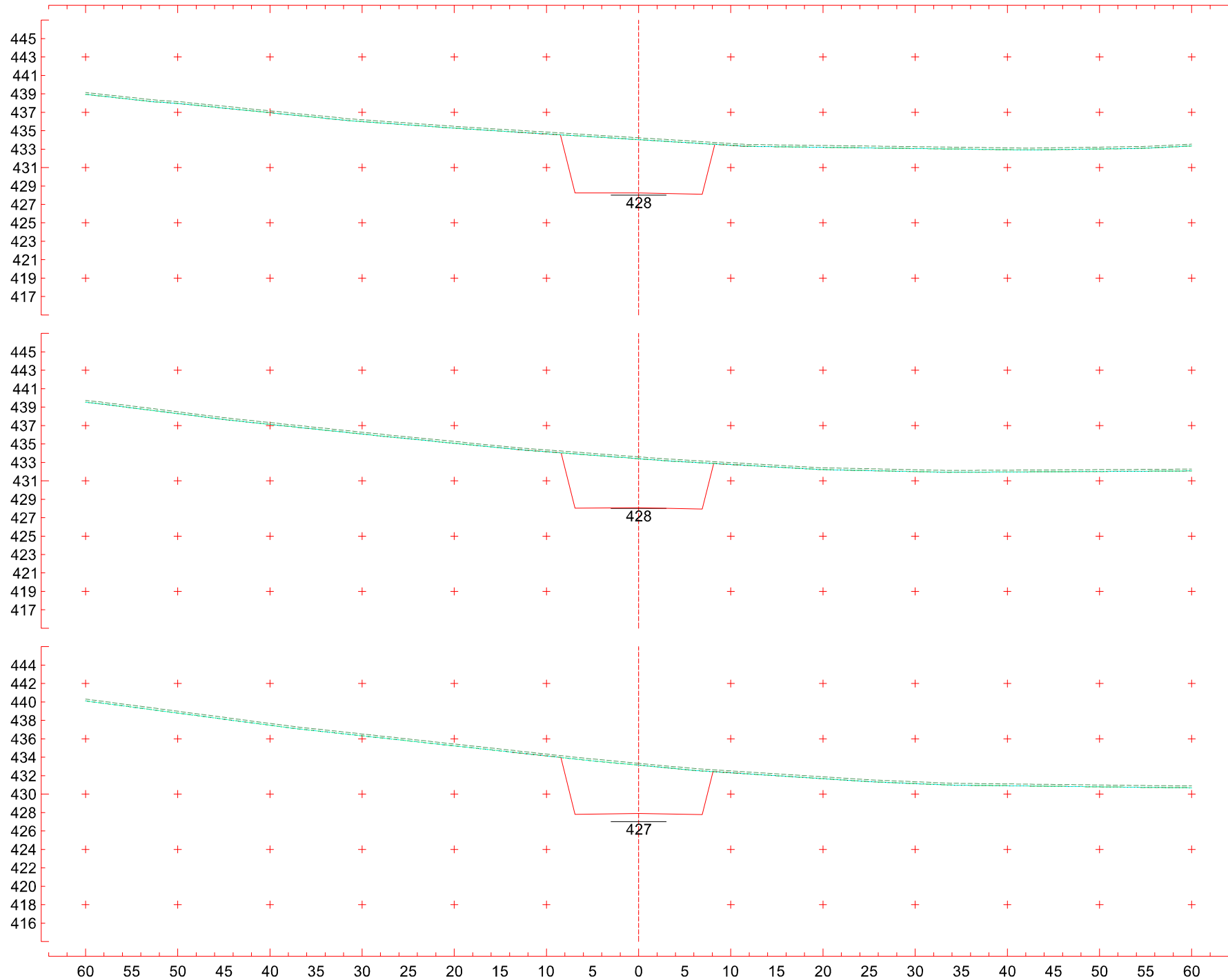


**0+160**  
CT 433,321 m  
CP 427,739 m

**0+140**  
CT 432,910 m  
CP 427,574 m

**0+120**  
CT 432,164 m  
CP 427,408 m

**Eixo1**  
Escala 1:400



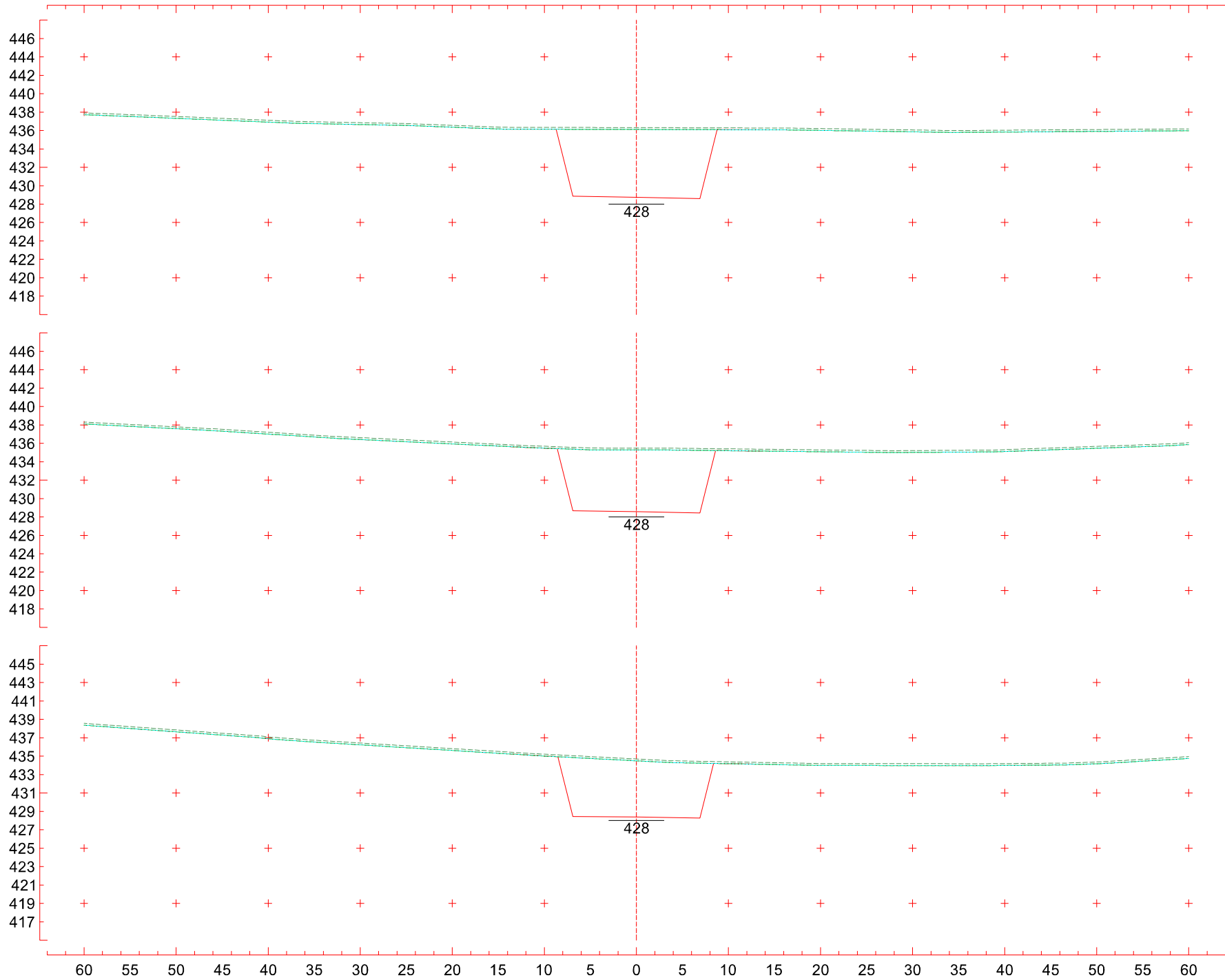
**0+220**  
CT 434,232 m  
CP 428,236 m

**0+200**  
CT 433,601 m  
CP 428,070 m

**0+180**  
CT 433,340 m  
CP 427,905 m

**Eixo01**  
Escala 1:400



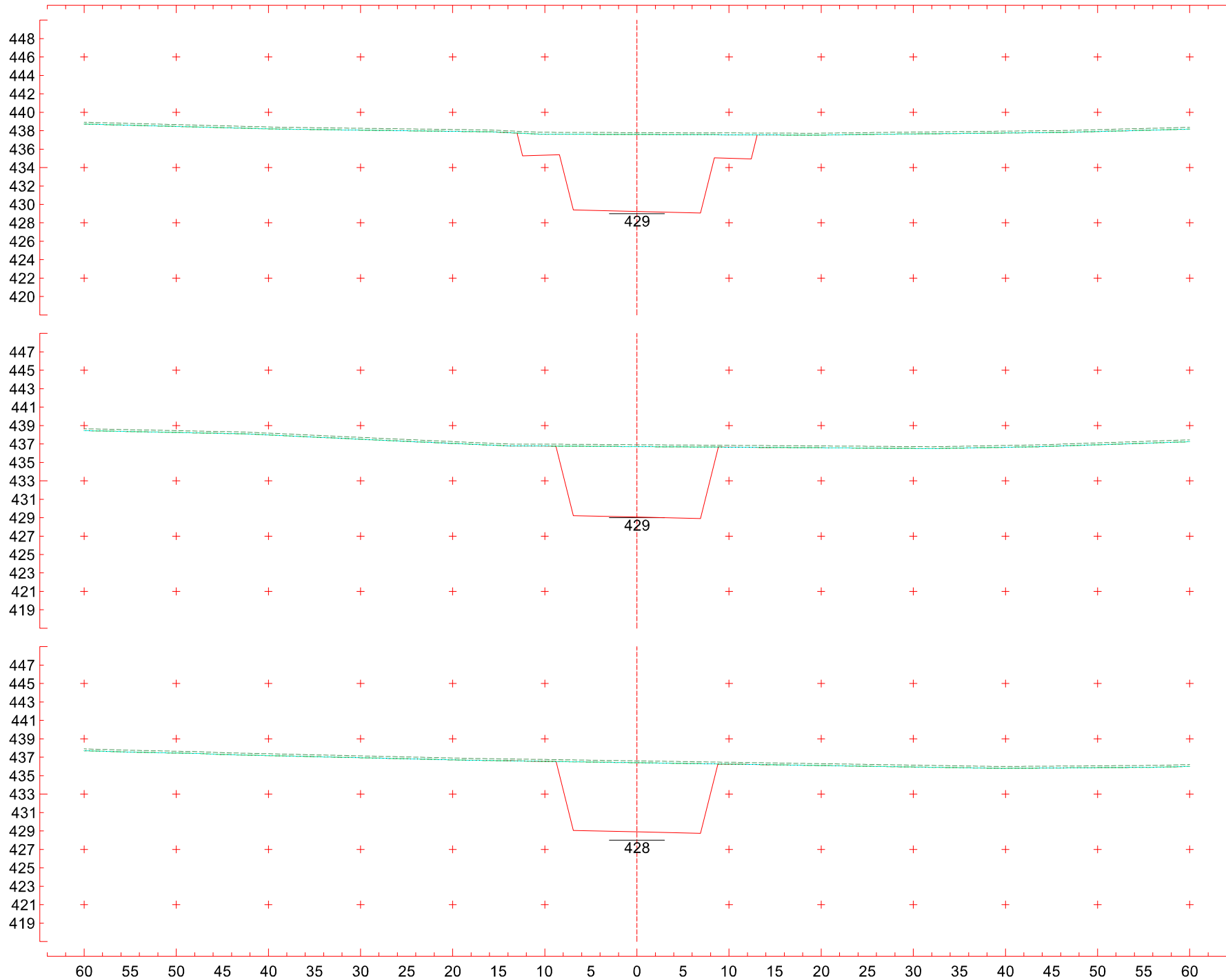


**0+280**  
CT 436,313 m  
CP 428,732 m

**0+260**  
CT 435,485 m  
CP 428,567 m

**0+240**  
CT 434,694 m  
CP 428,401 m

**Eixo1**  
Escala 1:400

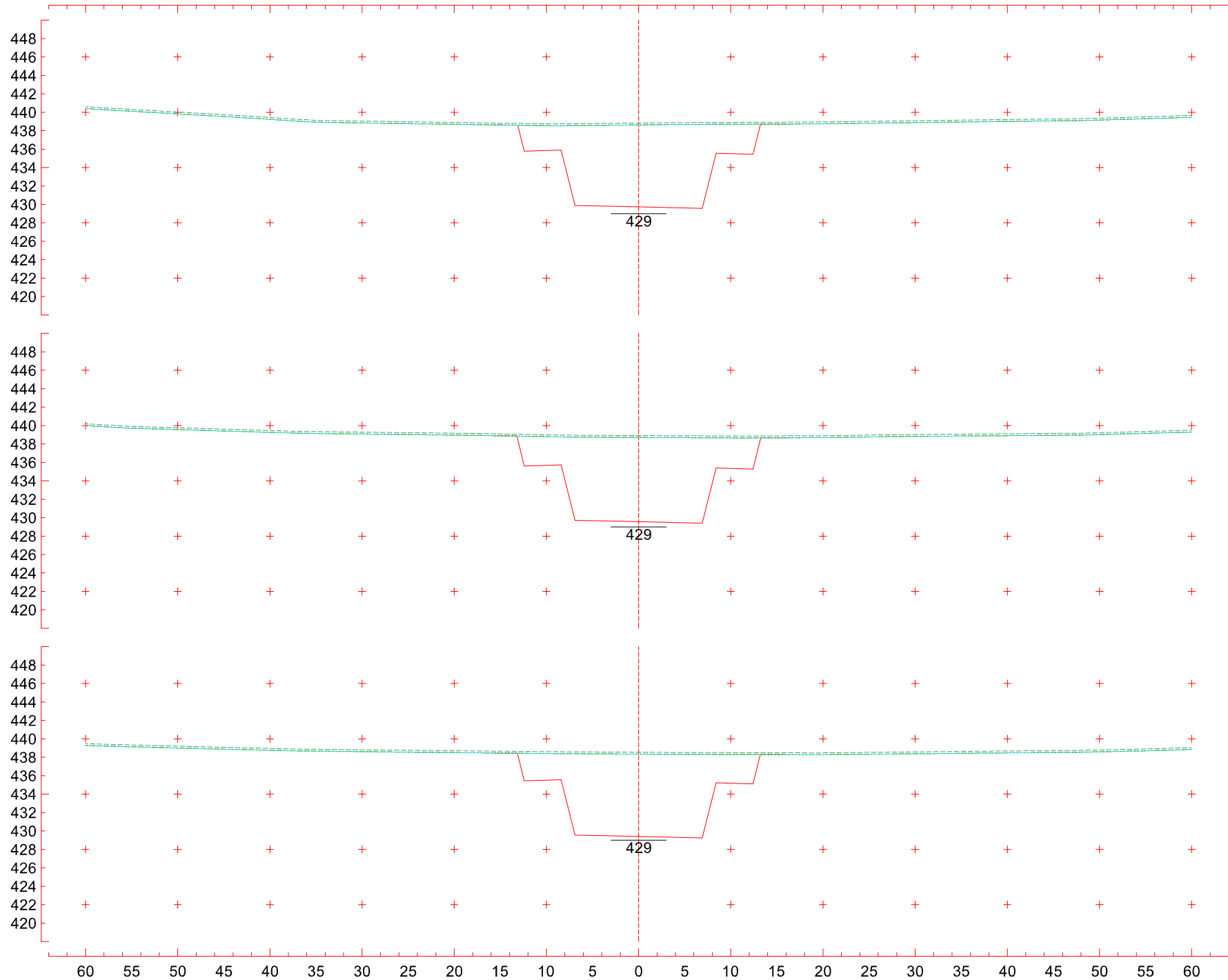


**0+340**  
CT 437,791 m  
CP 429,228 m

**0+320**  
CT 436,917 m  
CP 429,063 m

**0+300**  
CT 436,604 m  
CP 428,897 m

**Eixo1**  
Escala 1:400

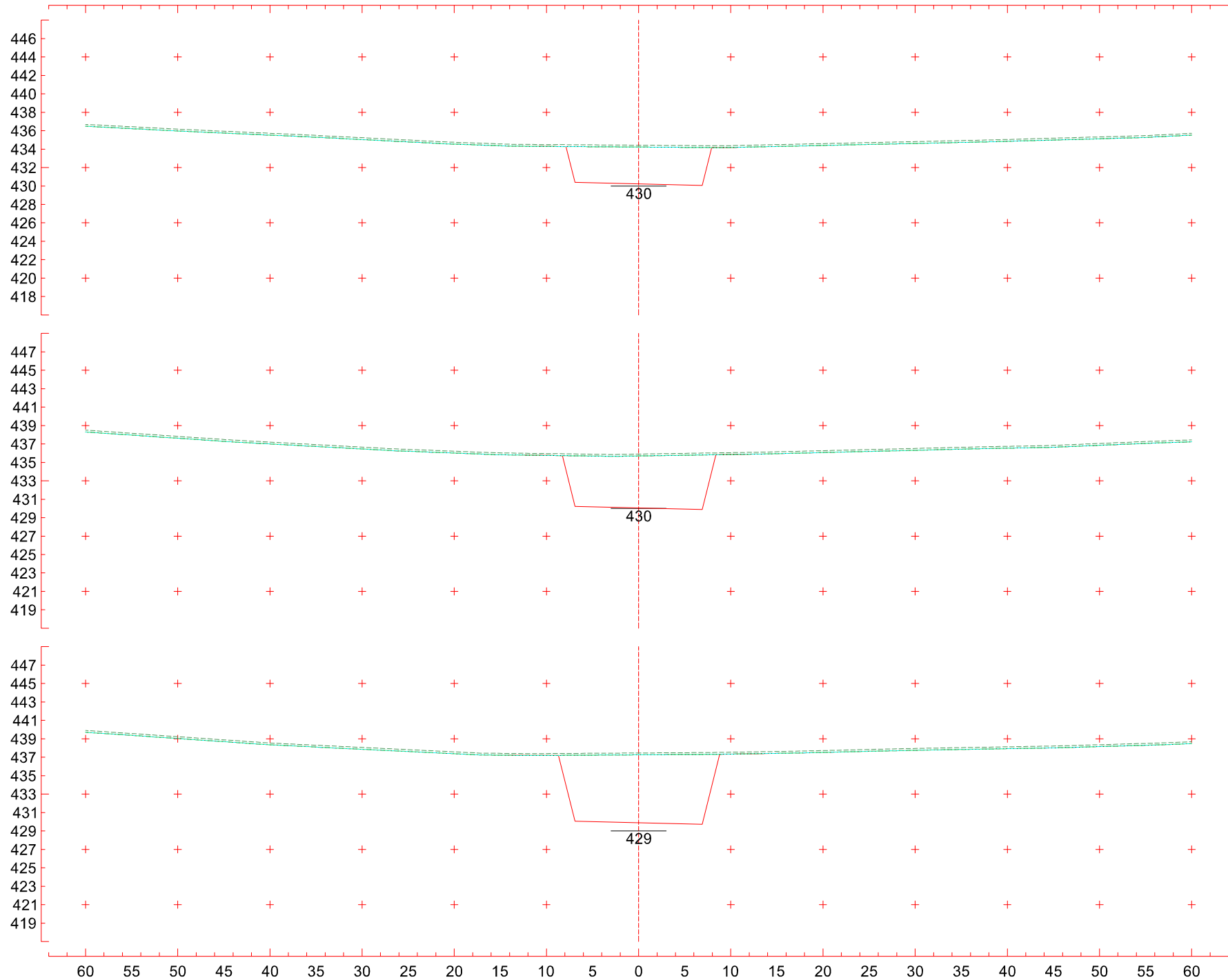


**0+400**  
CT 438,827 m  
CP 429,725 m

**0+380**  
CT 438,916 m  
CP 429,559 m

**0+360**  
CT 438,538 m  
CP 429,394 m

**Eixo1**  
Escala 1:400

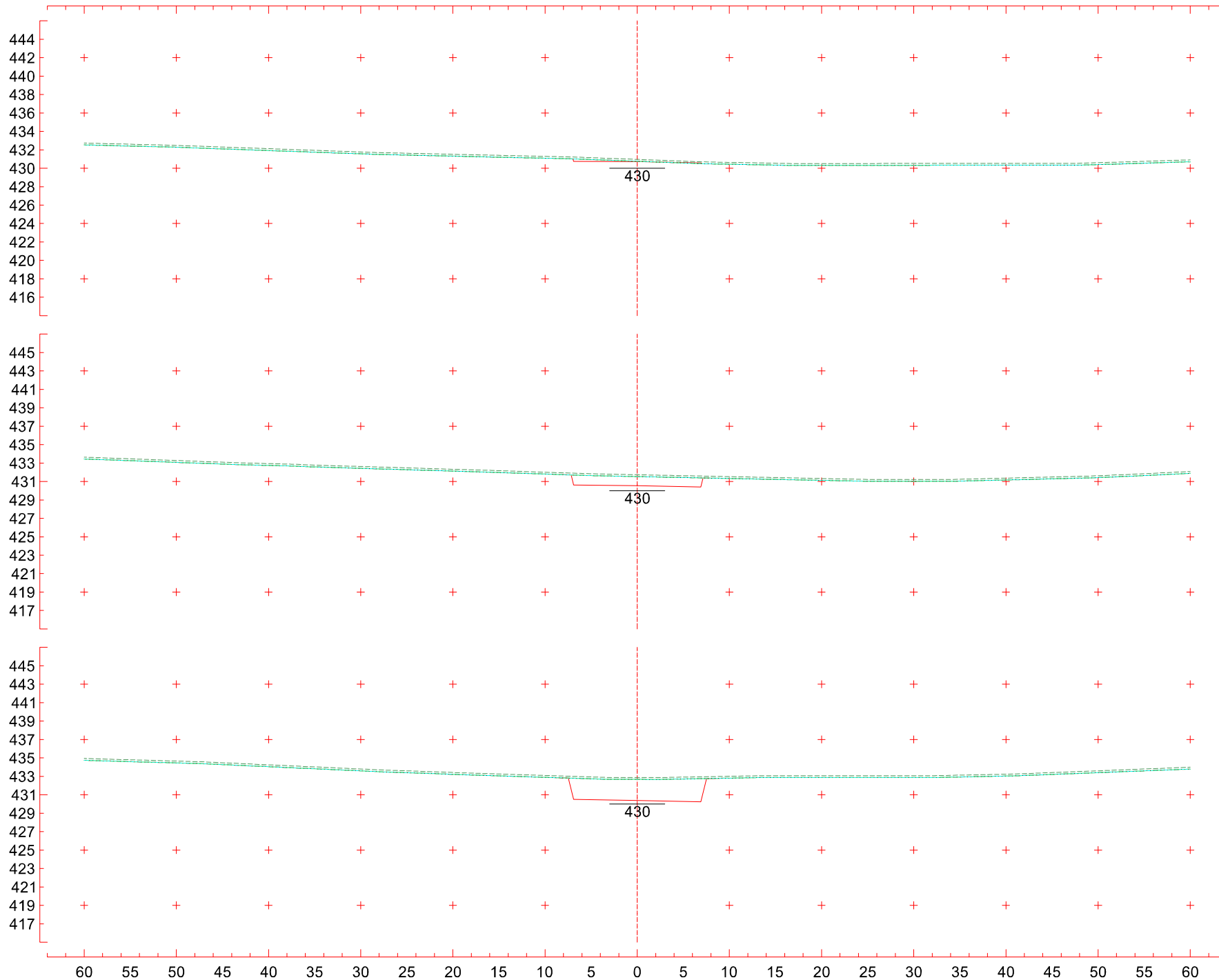


**0+460**  
CT 434,425 m  
CP 430,221 m

**0+440**  
CT 435,902 m  
CP 430,056 m

**0+420**  
CT 437,461 m  
CP 429,890 m

**Eixo1**  
Escala 1:400



**0+520**

CT 430,958 m  
CP 430,718 m

**0+500**

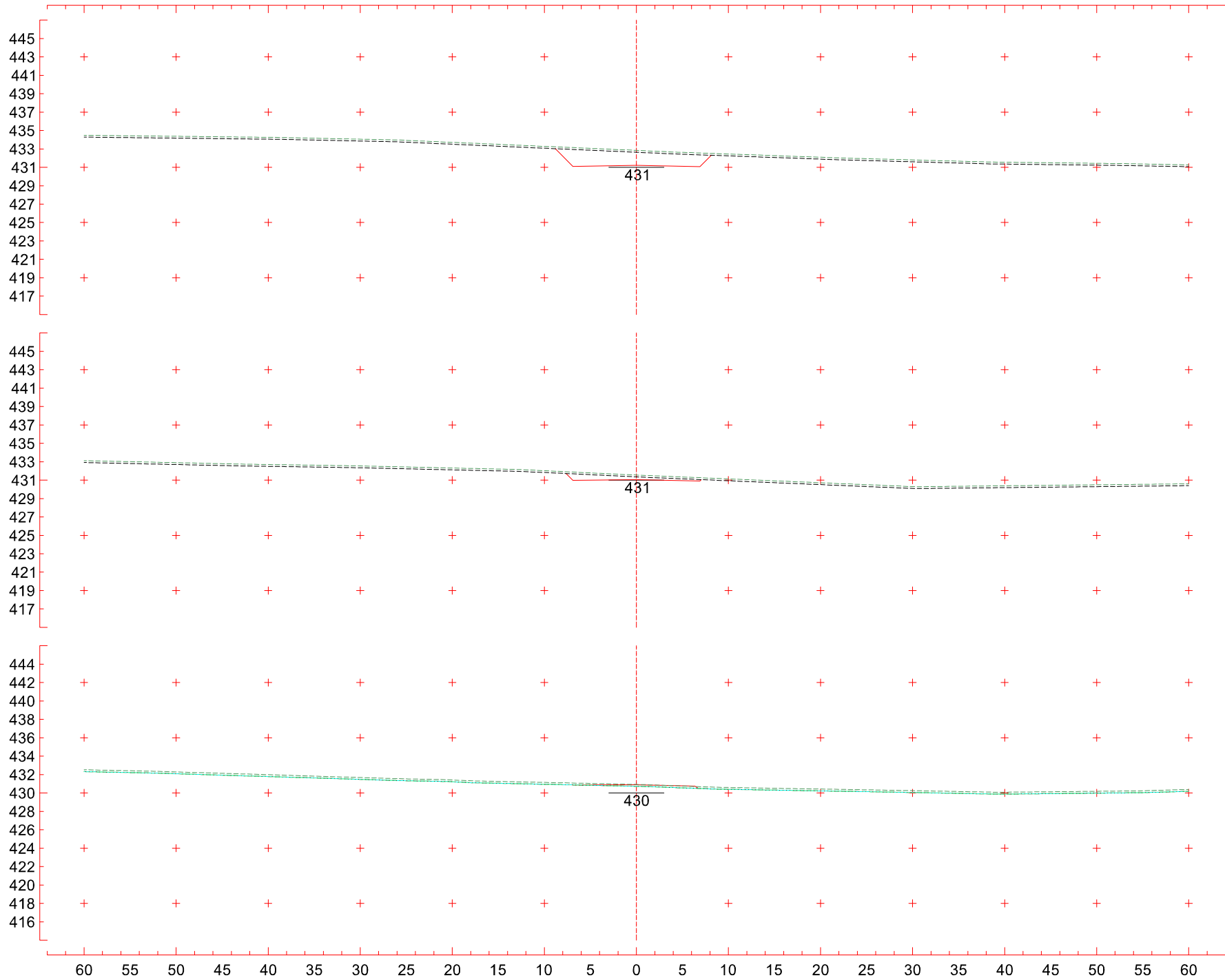
CT 431,735 m  
CP 430,552 m

**0+480**

CT 432,872 m  
CP 430,387 m

**Eixo1**

Escala 1:400



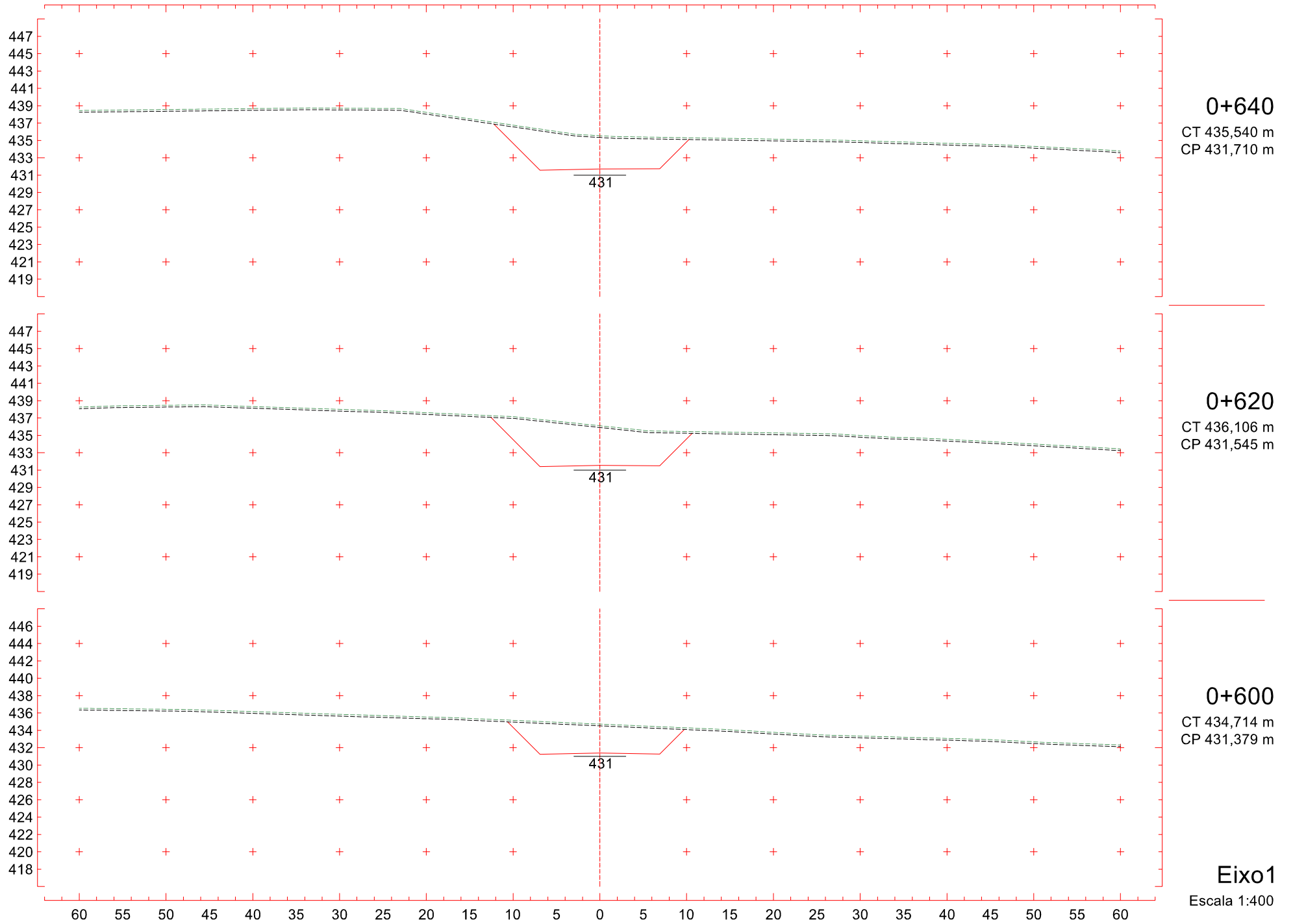
**0+580**  
CT 432,839 m  
CP 431,214 m

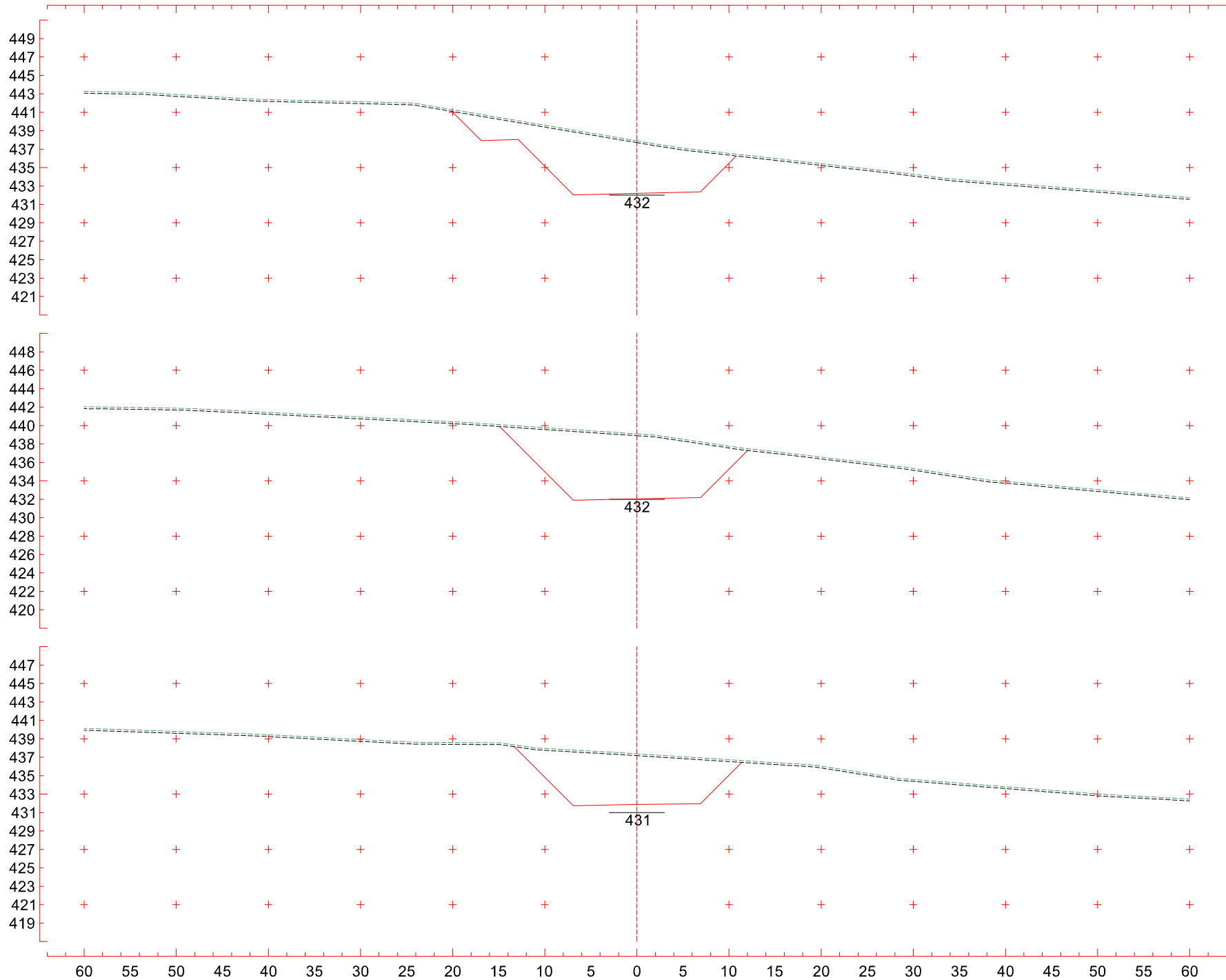
**0+560**  
CT 431,554 m  
CP 431,048 m

**0+540**  
CT 430,929 m  
CP 430,883 m

**Eixo01**  
Escala 1:400







**0+700**

CT 437,903 m  
CP 432,207 m

**0+680**

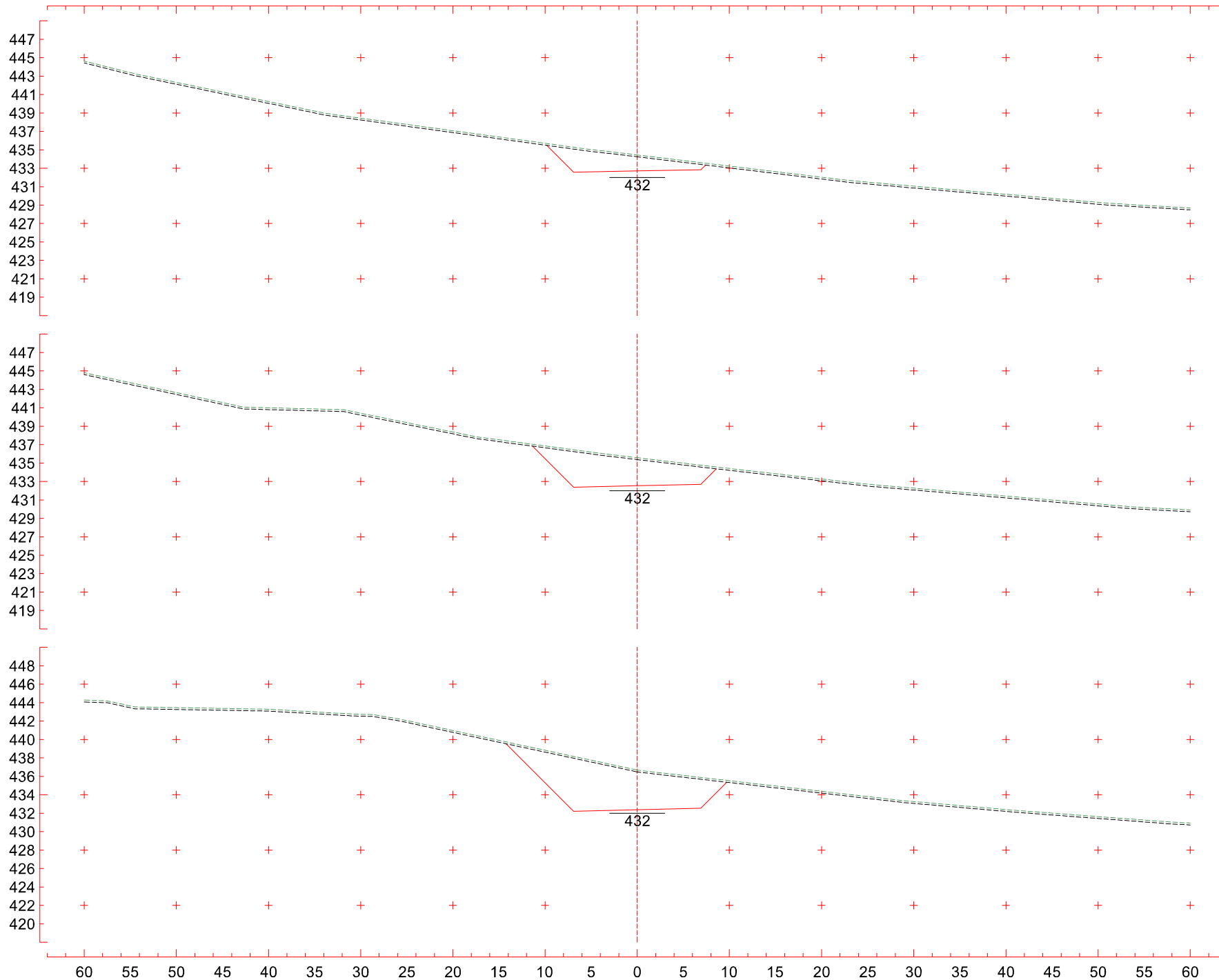
CT 439,095 m  
CP 432,041 m

**0+660**

CT 437,373 m  
CP 431,876 m

**Eixo1**

Escala 1:400

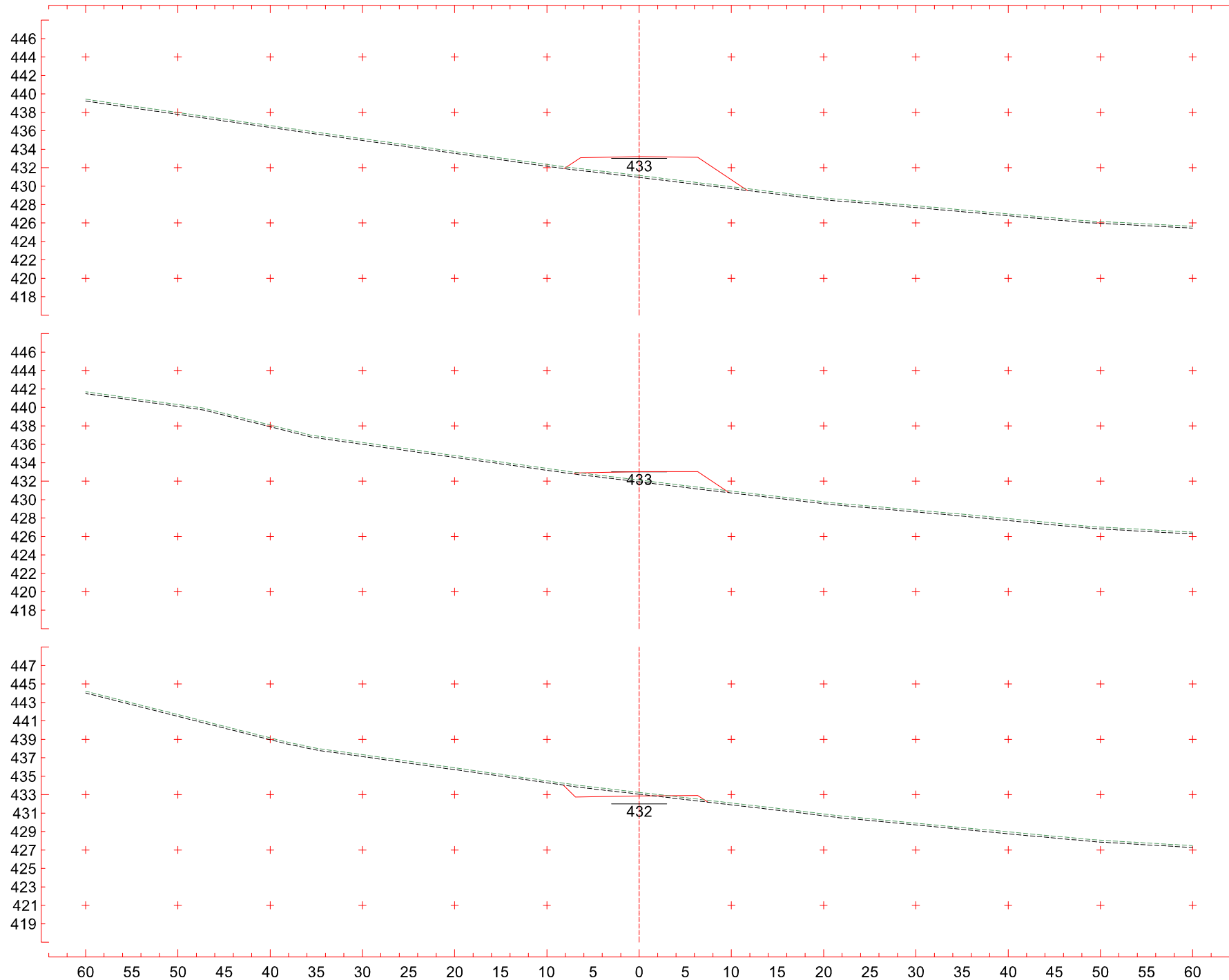


**0+760**  
CT 434,444 m  
CP 432,703 m

**0+740**  
CT 435,580 m  
CP 432,538 m

**0+720**  
CT 436,684 m  
CP 432,372 m

**Eixo1**  
Escala 1:400

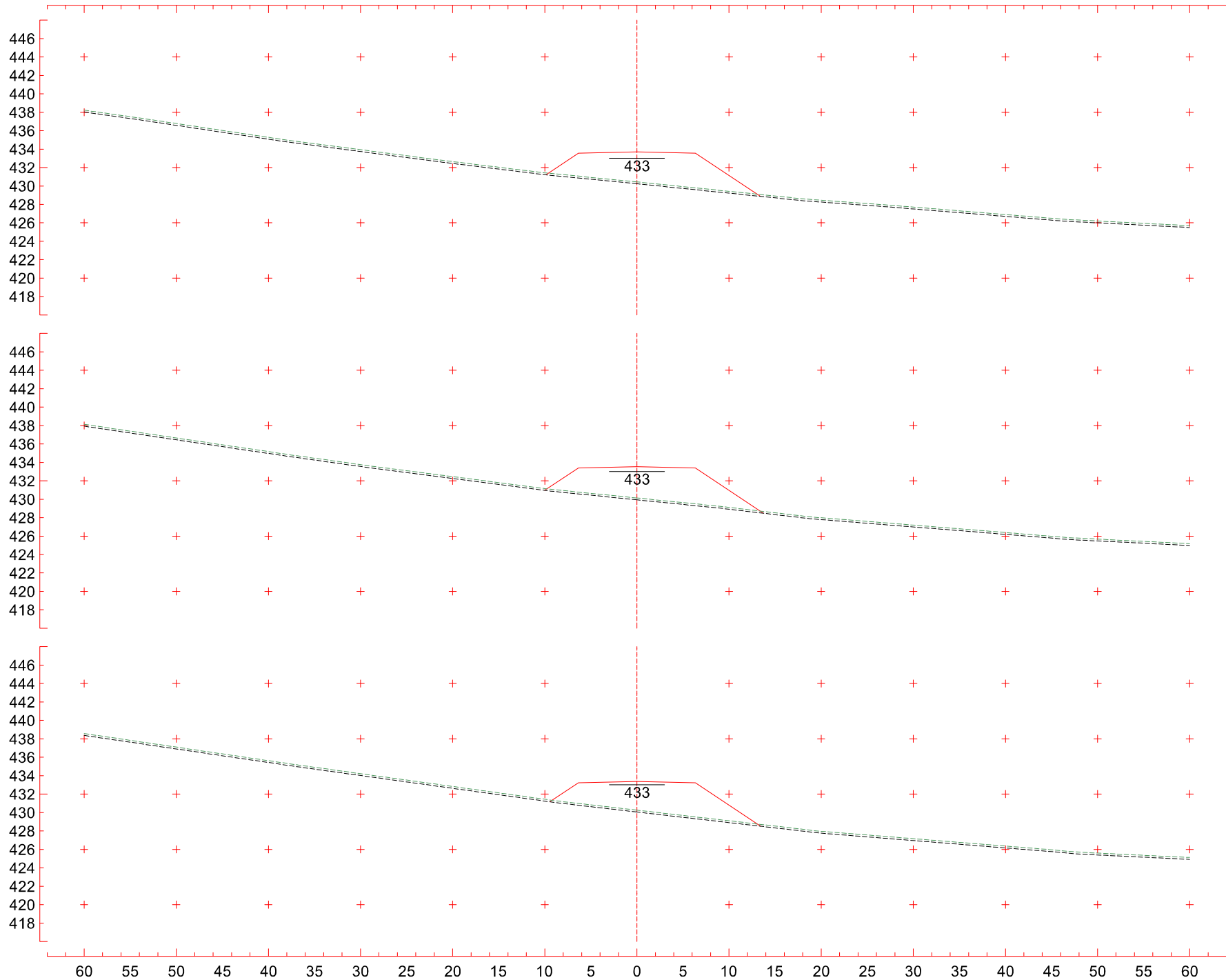


**0+820**  
CT 431,151 m  
CP 433,199 m

**0+800**  
CT 432,121 m  
CP 433,034 m

**0+780**  
CT 433,250 m  
CP 432,869 m

**Eixo1**  
Escala 1:400

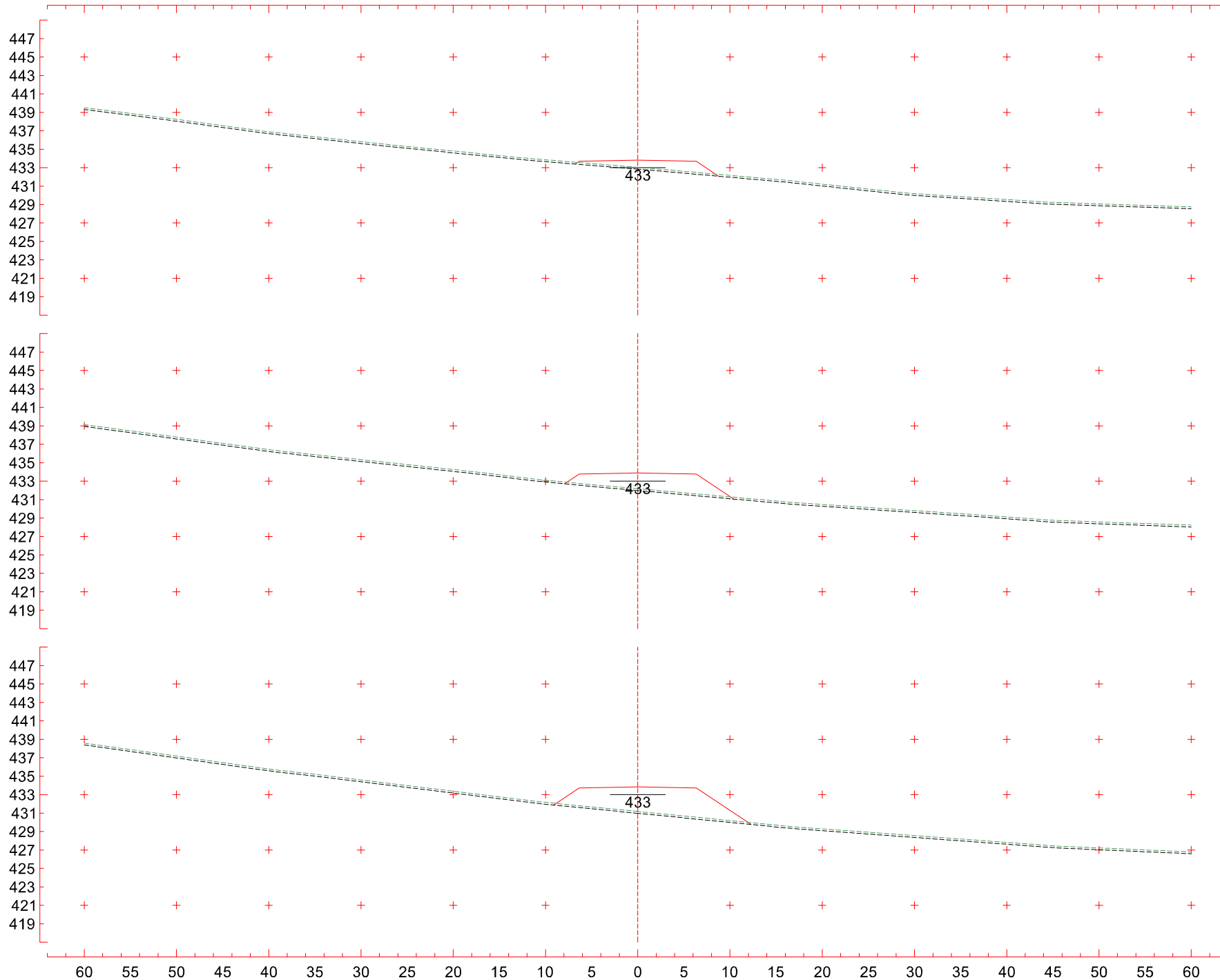


**0+880**  
CT 430,443 m  
CP 433,696 m

**0+860**  
CT 430,139 m  
CP 433,530 m

**0+840**  
CT 430,257 m  
CP 433,365 m

**Eixo1**  
Escala 1:400



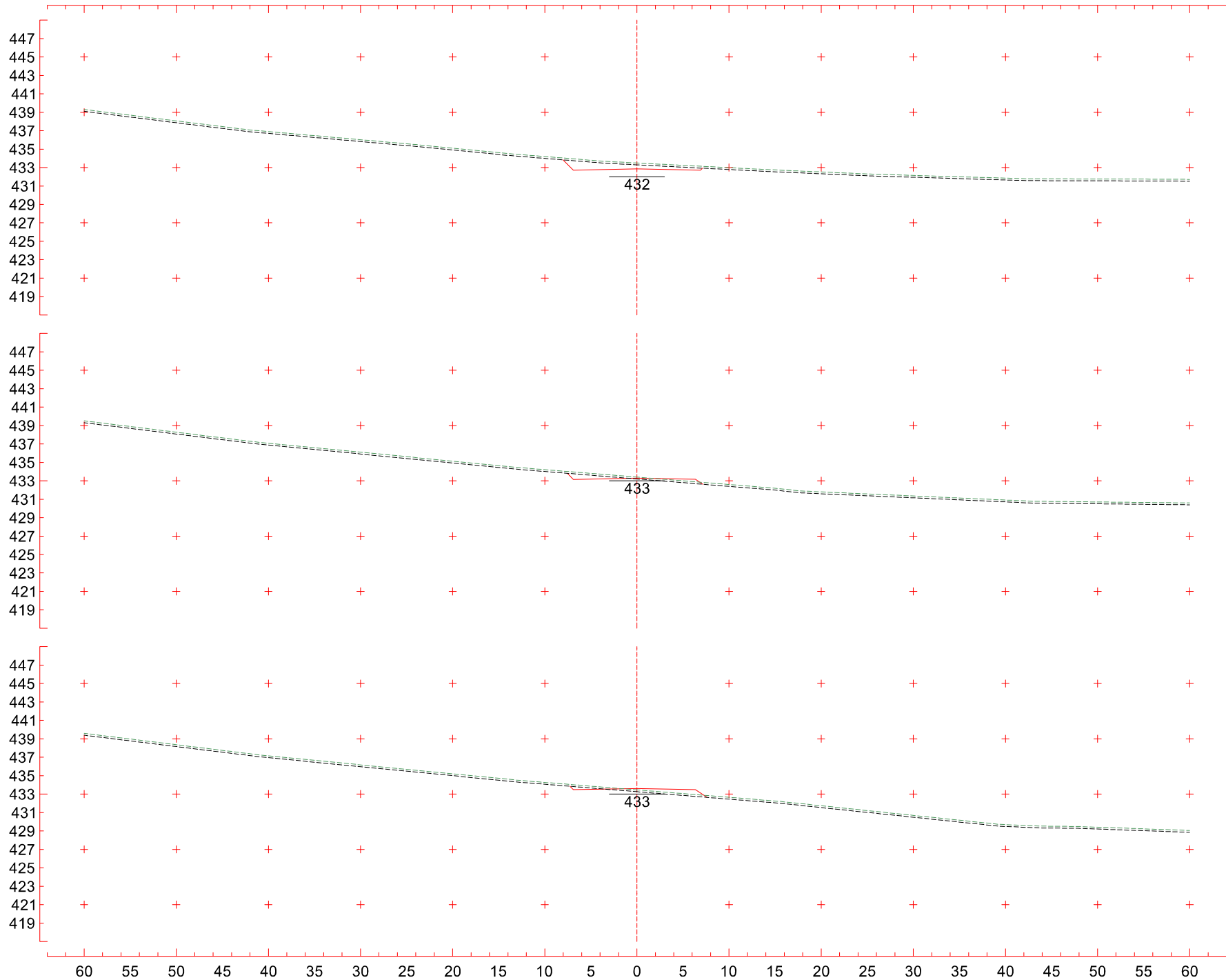
**0+940**  
CT 433,035 m  
CP 433,813 m

**0+920**  
CT 432,182 m  
CP 433,891 m

**0+900**  
CT 431,176 m  
CP 433,846 m

**Eixo1**  
Escala 1:400



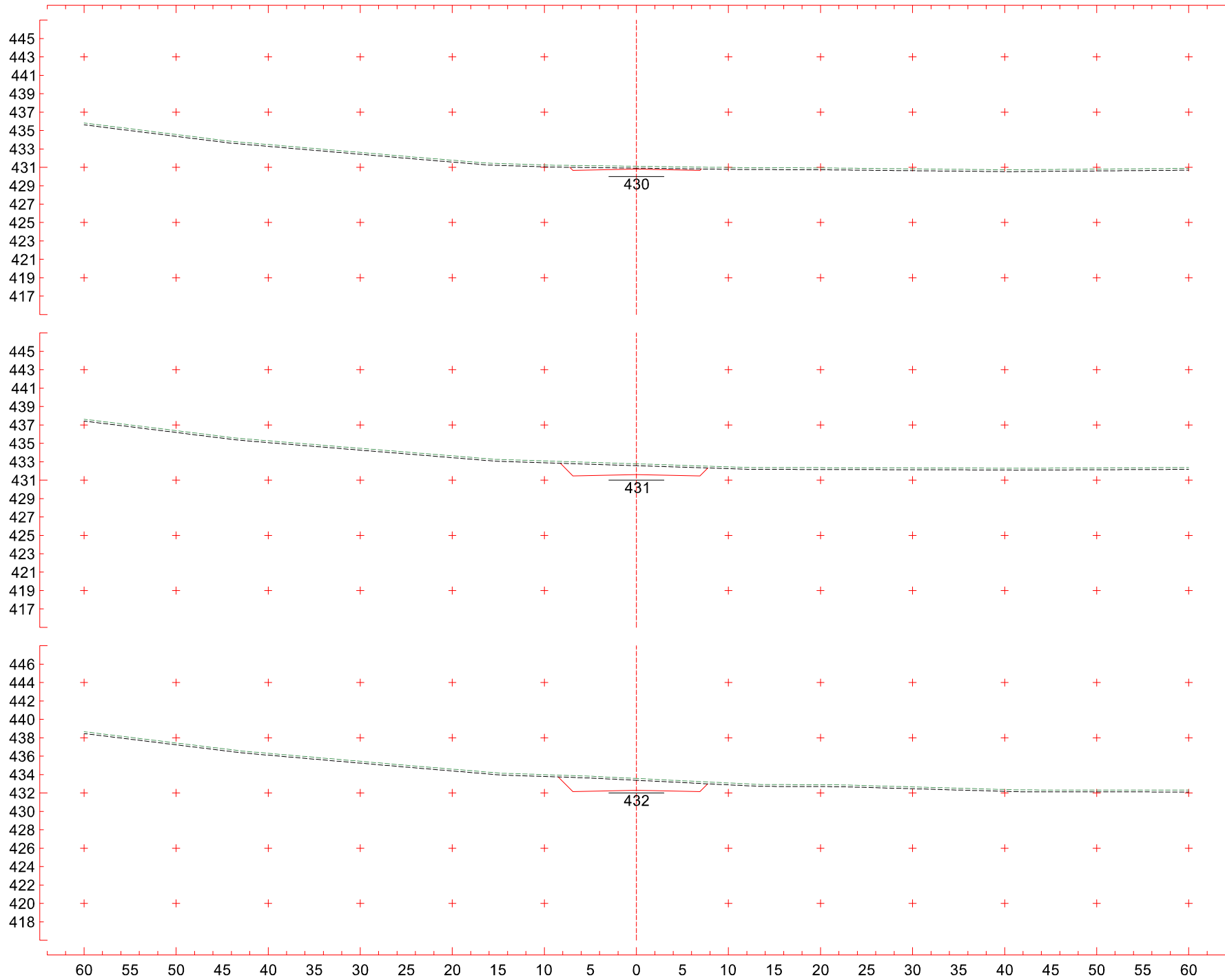


**1+000**  
CT 433,495 m  
CP 432,853 m

**0+980**  
CT 433,406 m  
CP 433,295 m

**0+960**  
CT 433,460 m  
CP 433,615 m

**Eixo1**  
Escala 1:400

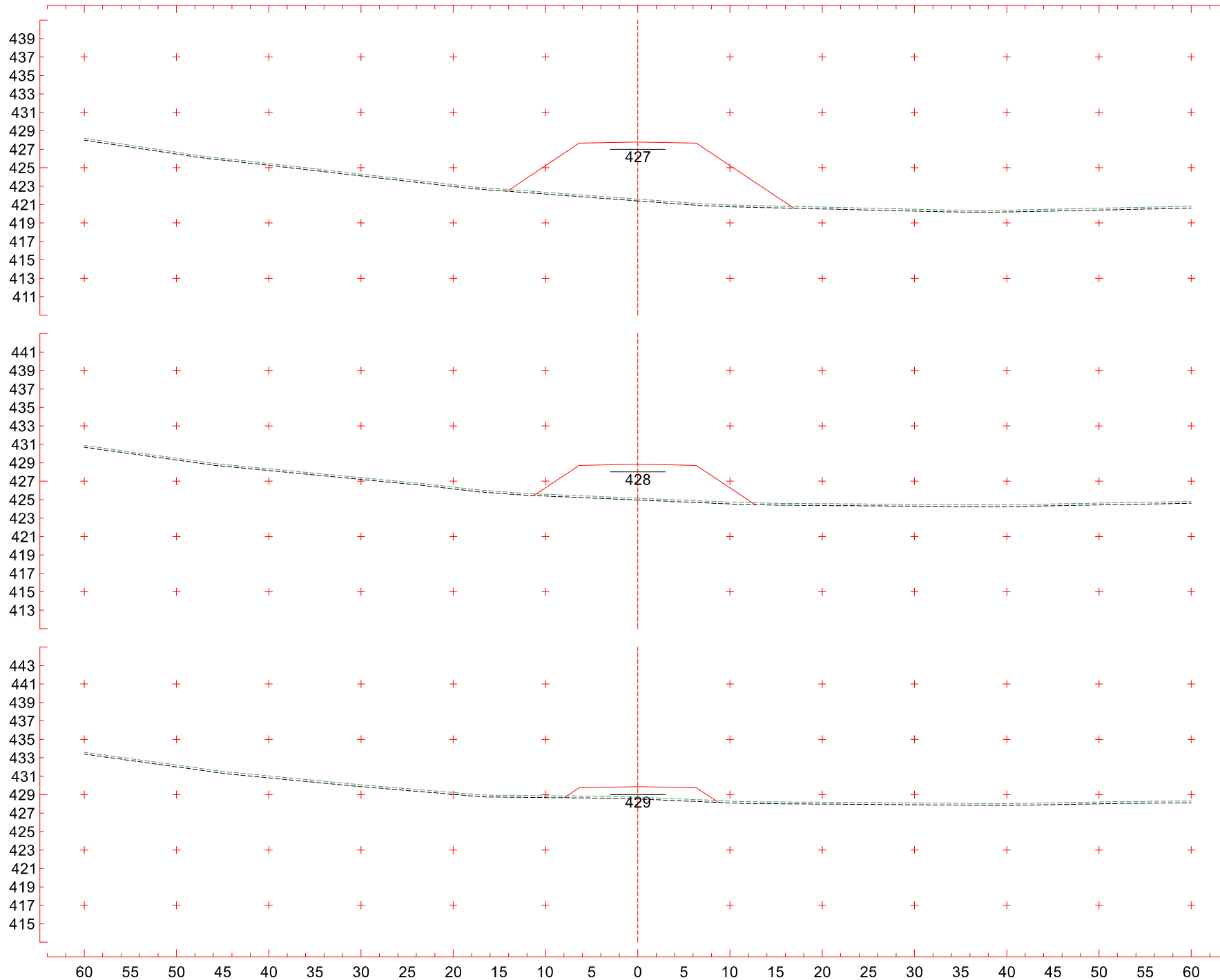


**1+060**  
CT 431,112 m  
CP 430,800 m

**1+040**  
CT 432,772 m  
CP 431,606 m

**1+020**  
CT 433,576 m  
CP 432,290 m

**Eixo 01**  
Escala 1:400

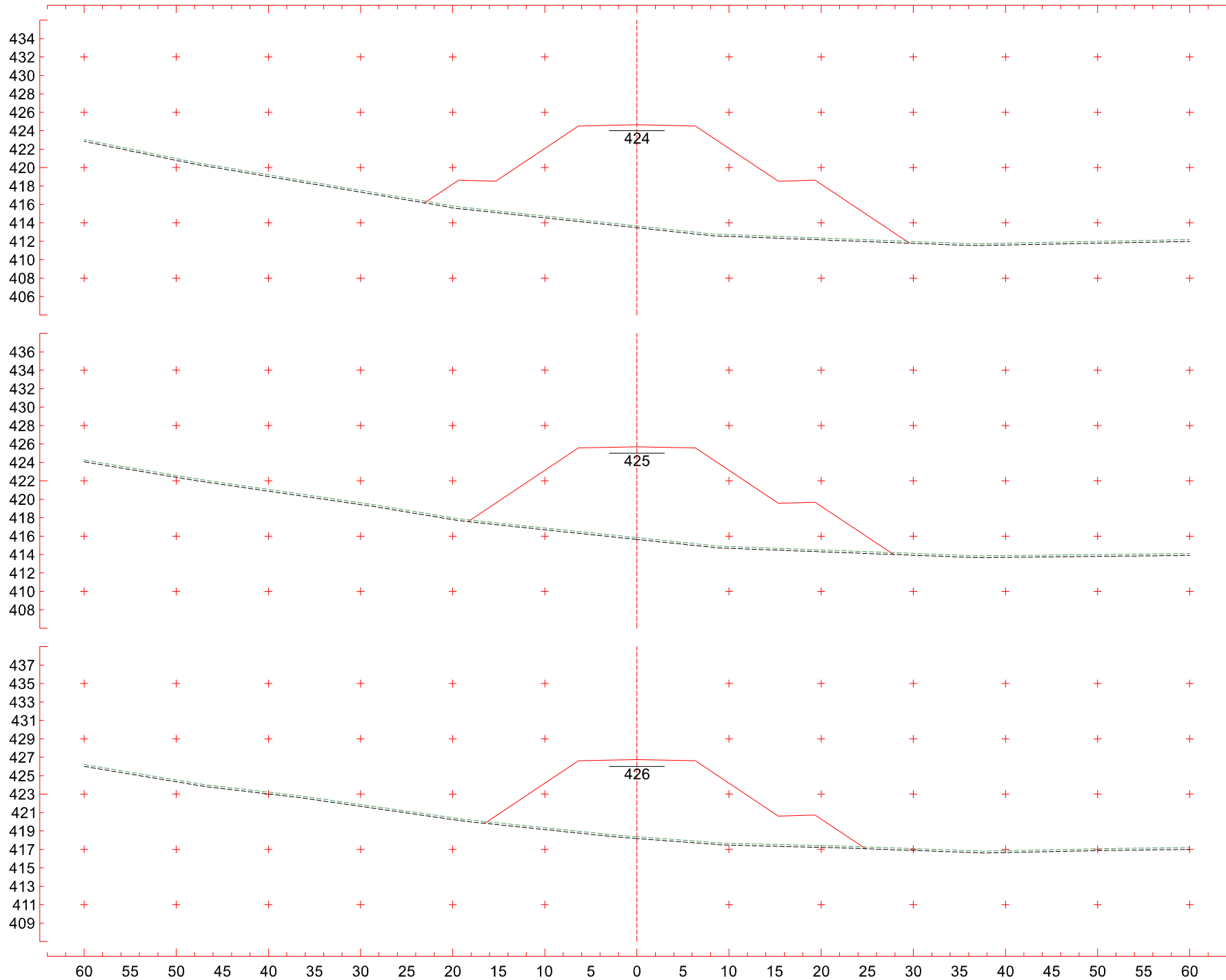


**1+120**  
CT 421,595 m  
CP 427,790 m

**1+100**  
CT 425,156 m  
CP 428,839 m

**1+080**  
CT 428,730 m  
CP 429,873 m

**Eixo1**  
Escala 1:400

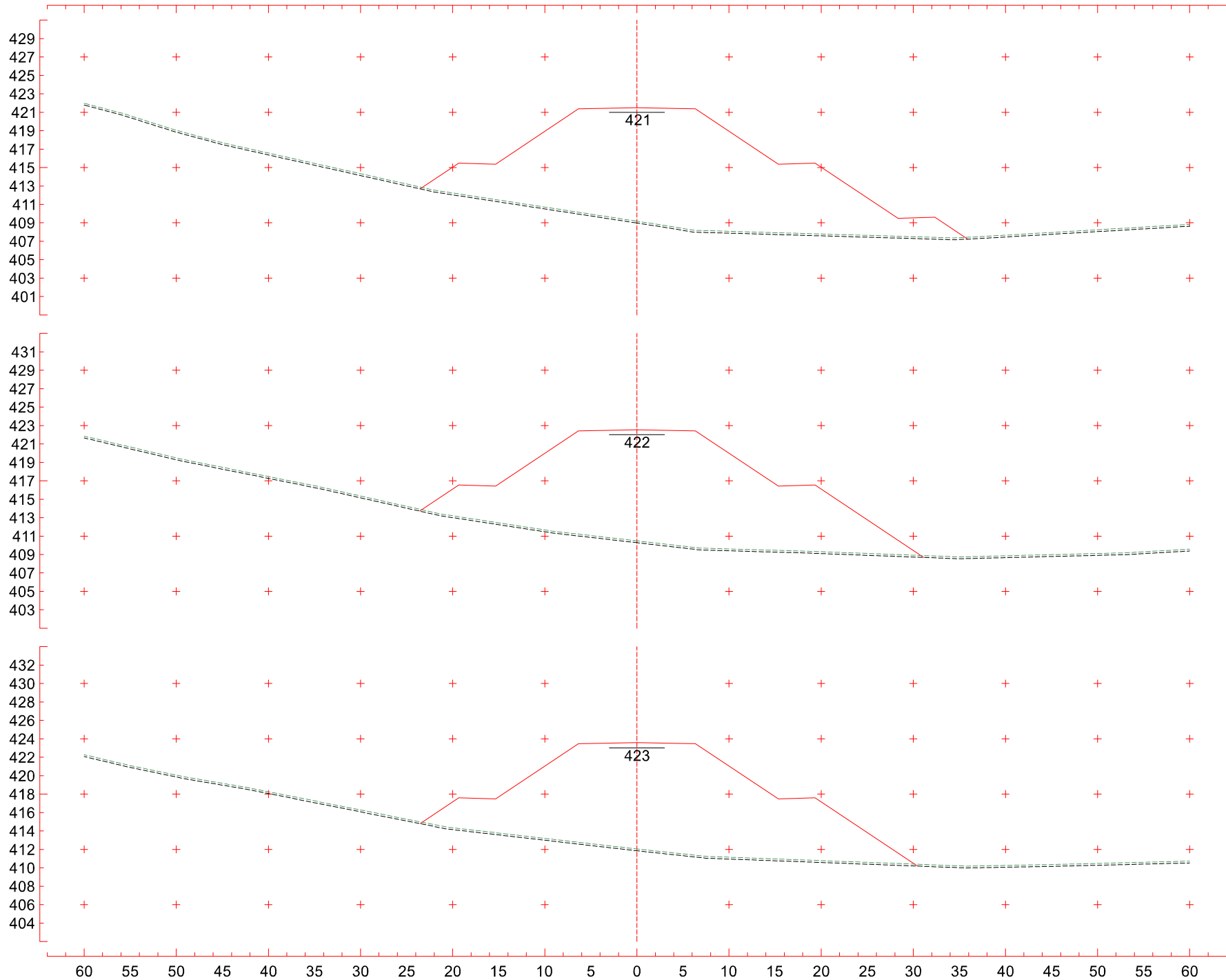


**1+180**  
CT 413,670 m  
CP 424,642 m

**1+160**  
CT 415,841 m  
CP 425,691 m

**1+140**  
CT 418,375 m  
CP 426,741 m

**Eixo1**  
Escala 1:400

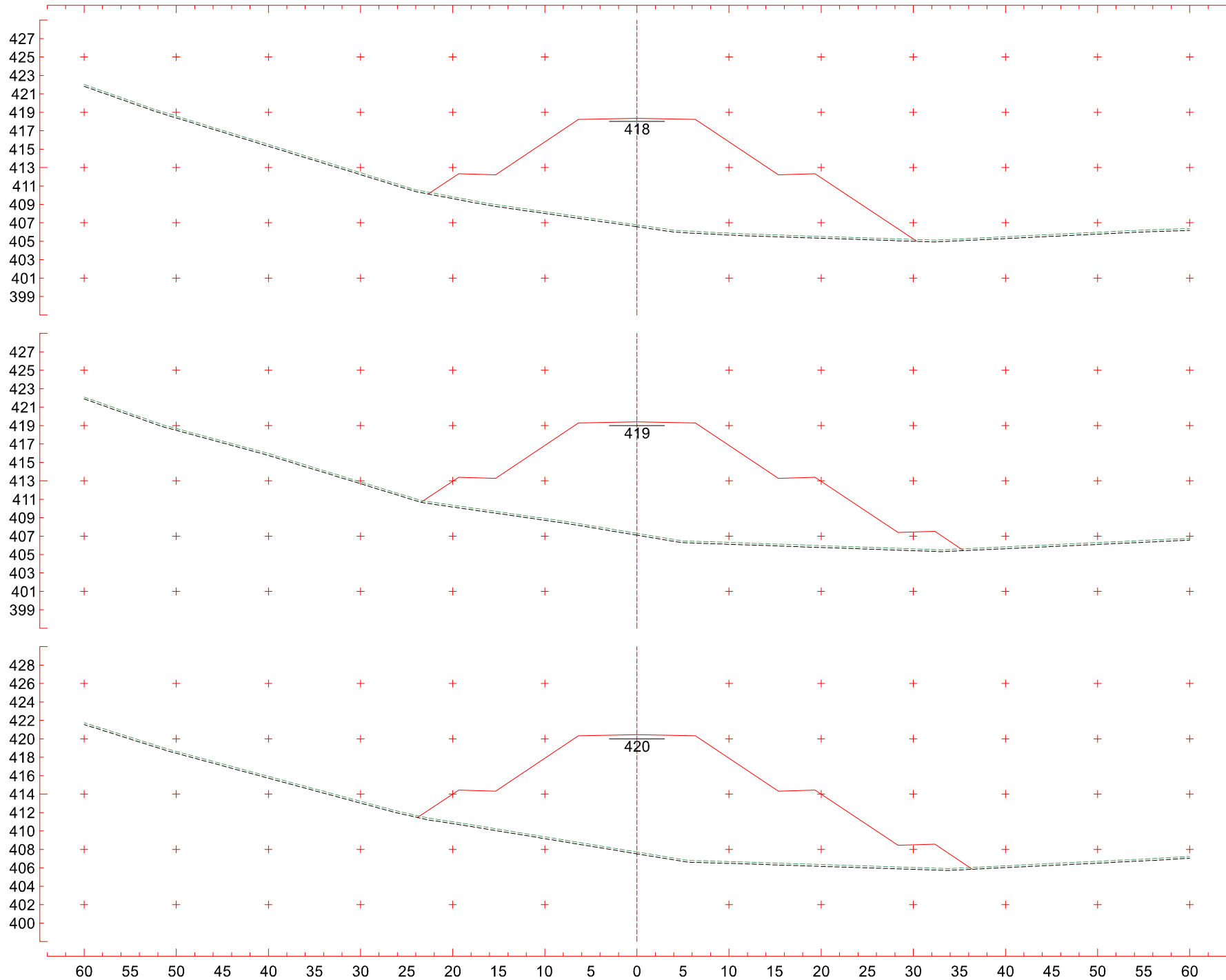


**1+240**  
CT 409,179 m  
CP 421,495 m

**1+220**  
CT 410,484 m  
CP 422,544 m

**1+200**  
CT 412,046 m  
CP 423,593 m

**Eixo1**  
Escala 1:400



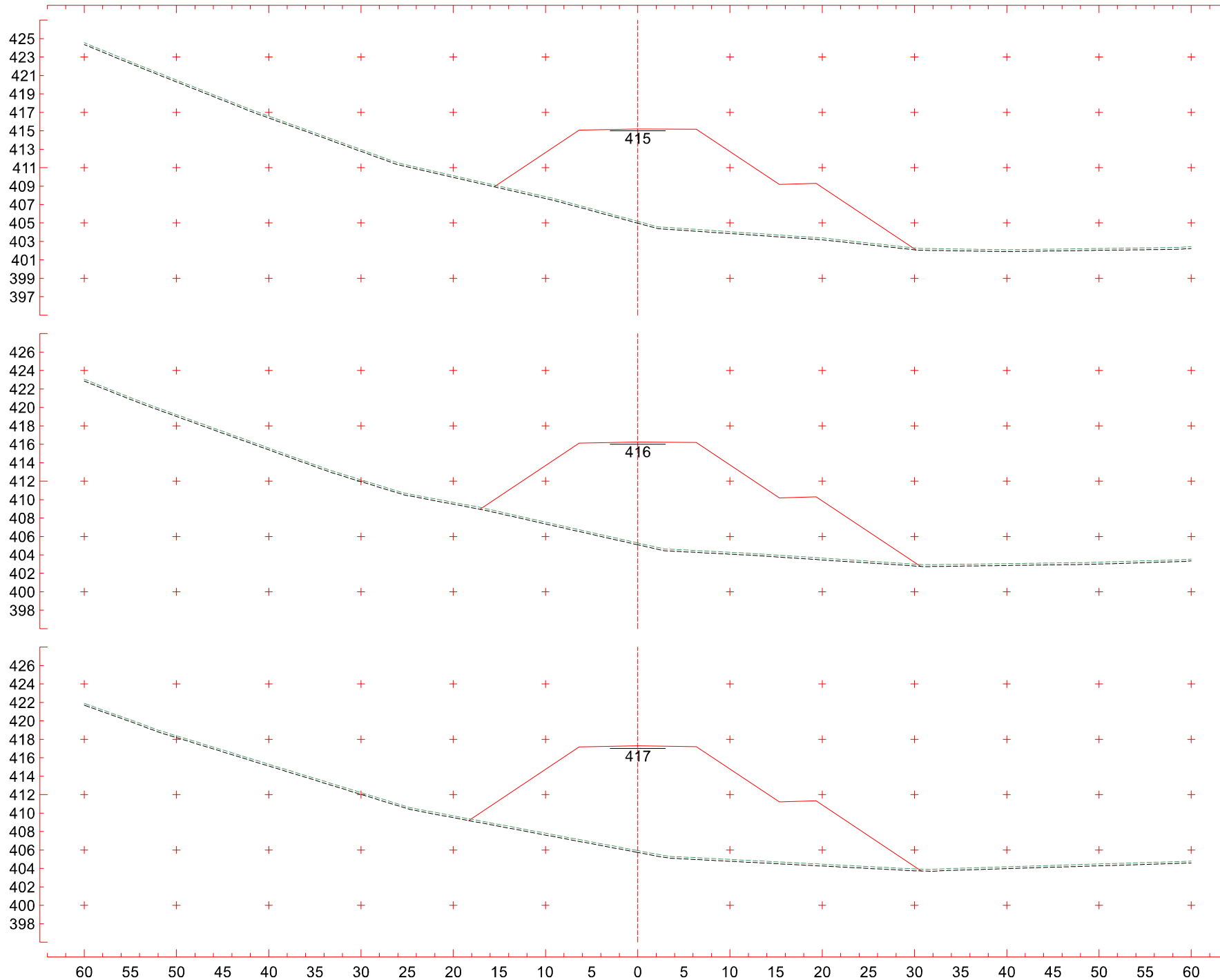
**1+300**  
CT 406,779 m  
CP 418,348 m

**1+280**  
CT 407,301 m  
CP 419,397 m

**1+260**  
CT 407,717 m  
CP 420,446 m

**Eixo1**  
Escala 1:400



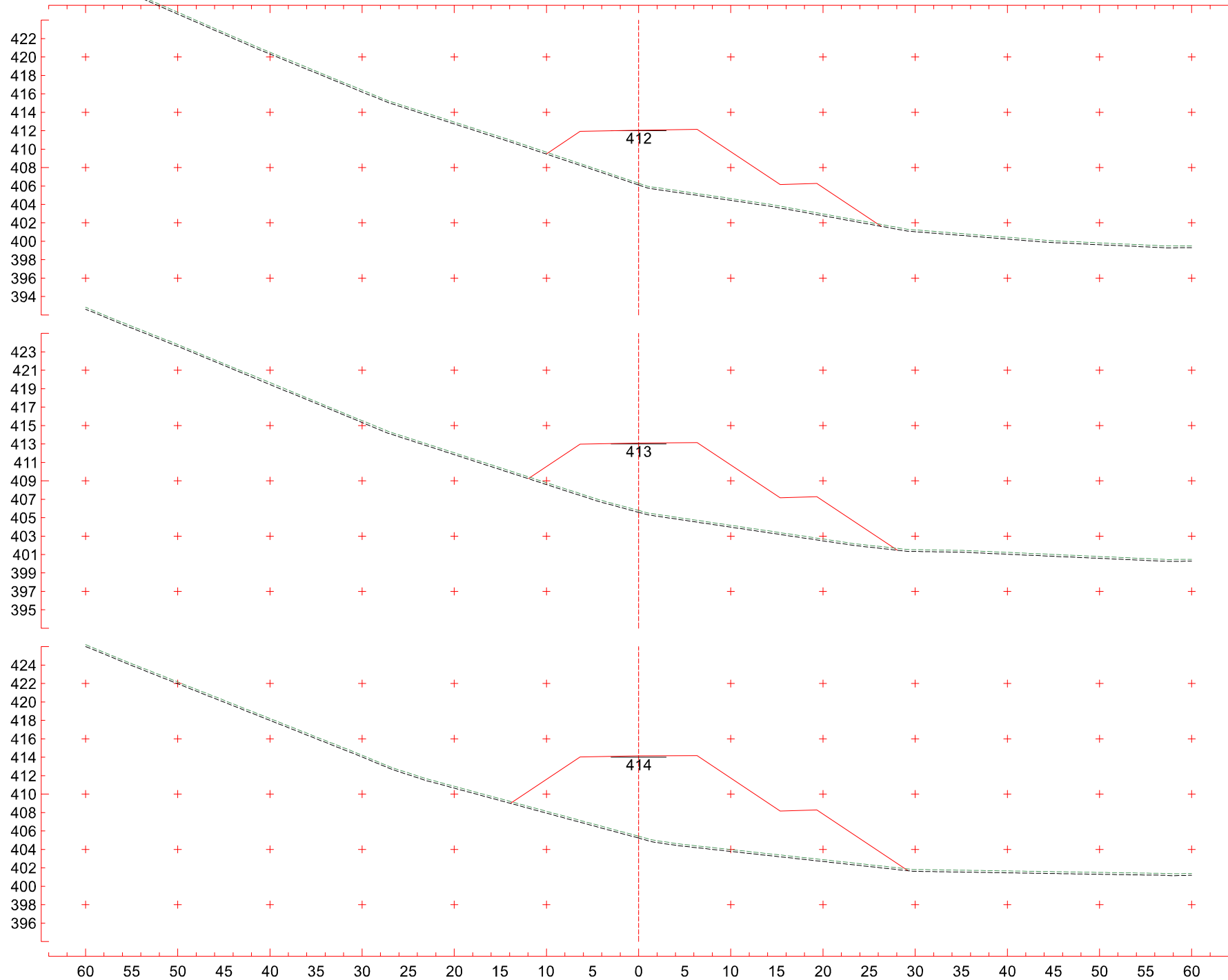


**1+360**  
CT 405,181 m  
CP 415,200 m

**1+340**  
CT 405,300 m  
CP 416,249 m

**1+320**  
CT 405,932 m  
CP 417,299 m

**Eixo1**  
Escala 1:400

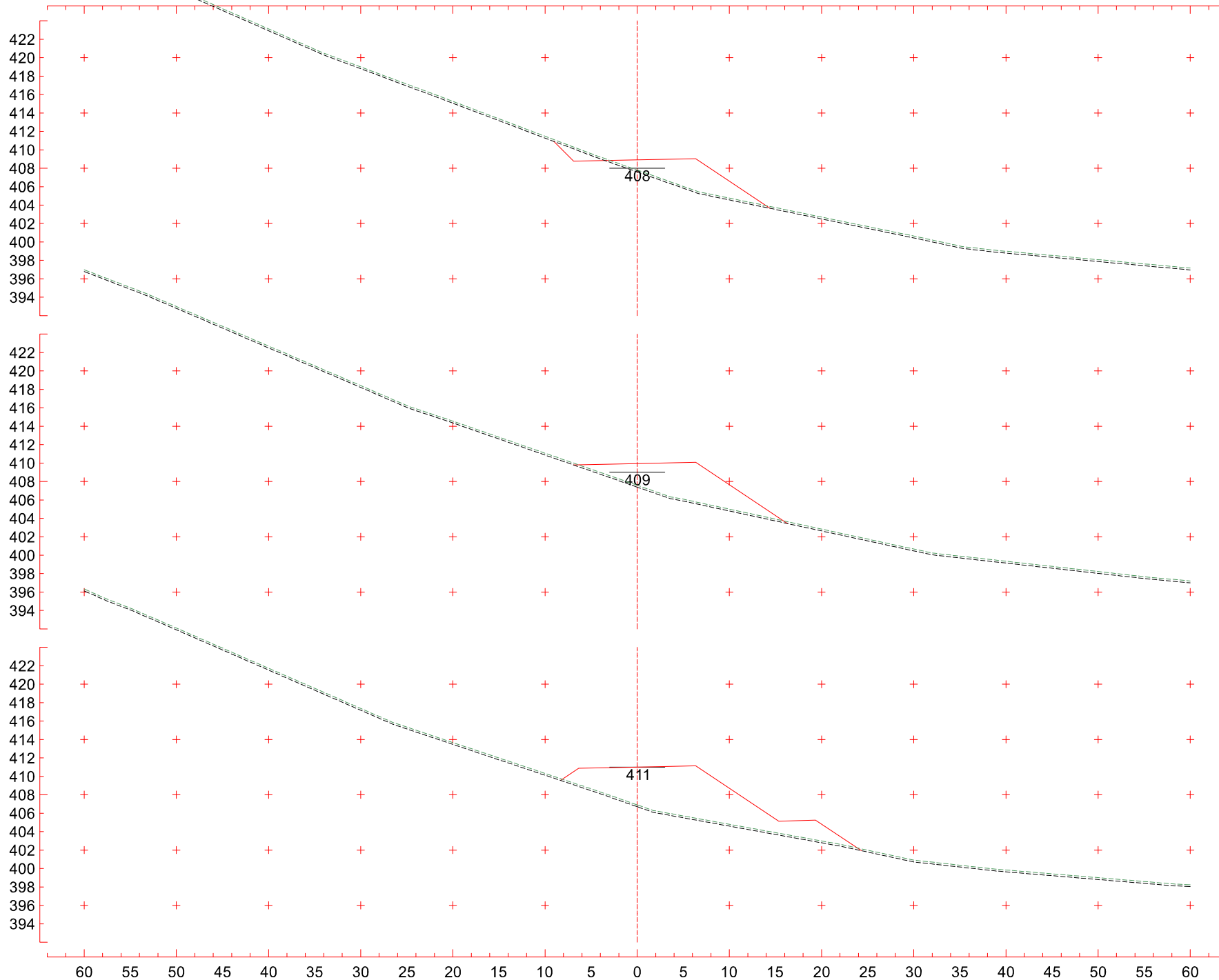


**1+420**  
CT 406,303 m  
CP 412,053 m

**1+400**  
CT 405,784 m  
CP 413,102 m

**1+380**  
CT 405,425 m  
CP 414,151 m

**Eixo1**  
Escala 1:400



**1+480**

CT 407,802 m  
CP 408,906 m

**1+460**

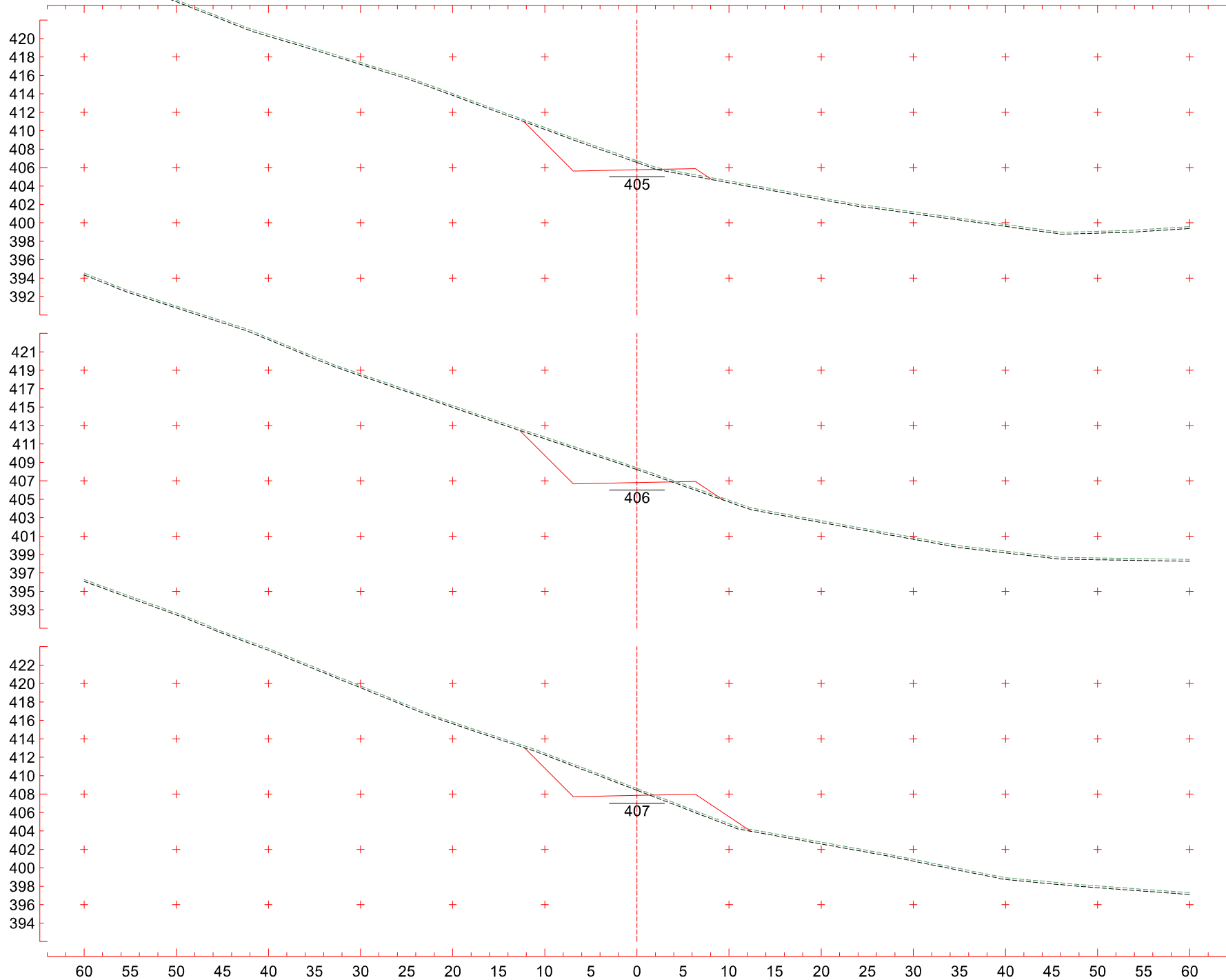
CT 407,592 m  
CP 409,955 m

**1+440**

CT 406,904 m  
CP 411,004 m

**Eixo1**

Escala 1:400

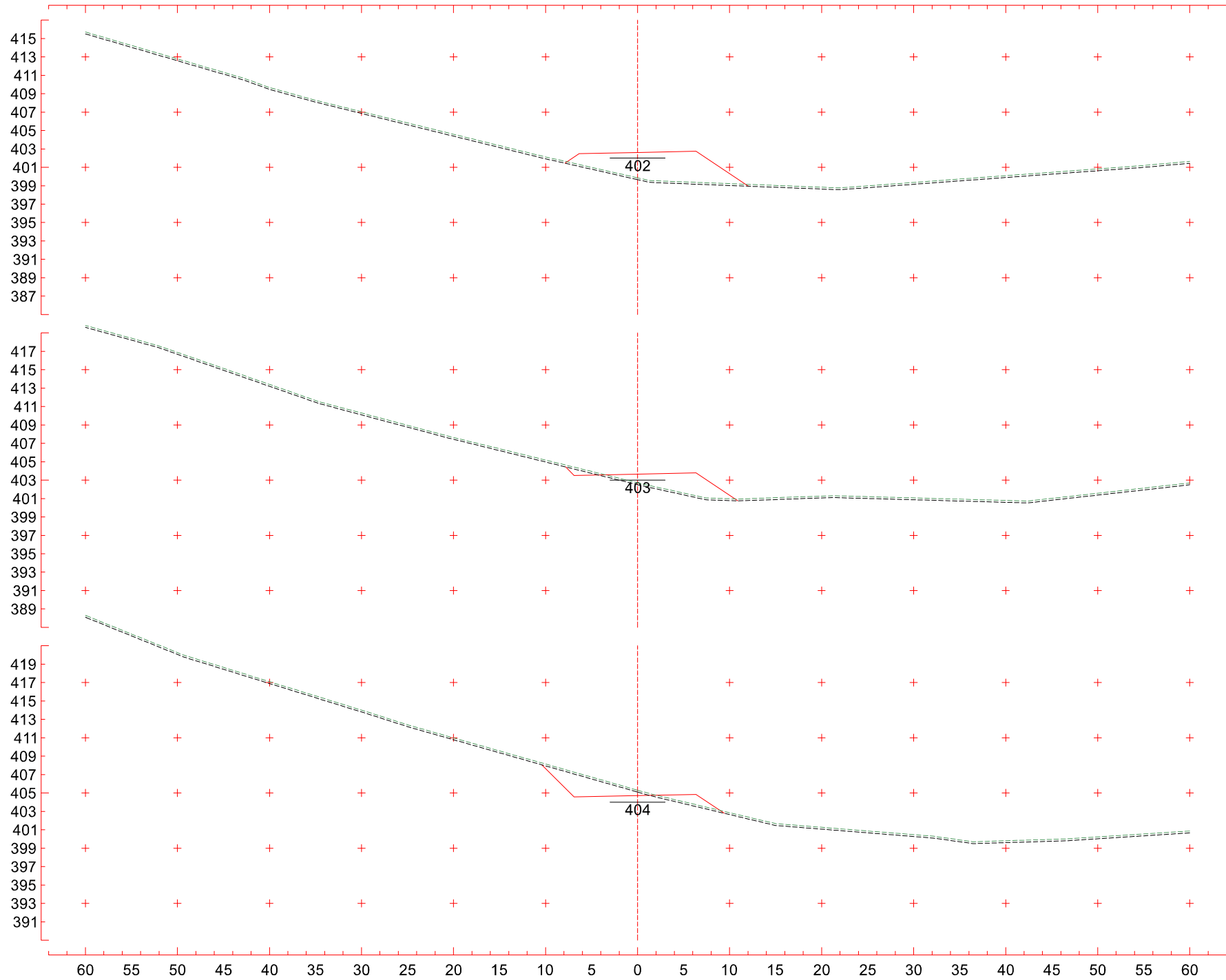


**1+540**  
CT 406,745 m  
CP 405,758 m

**1+520**  
CT 408,413 m  
CP 406,807 m

**1+500**  
CT 408,612 m  
CP 407,856 m

**Eixo1**  
Escala 1:400

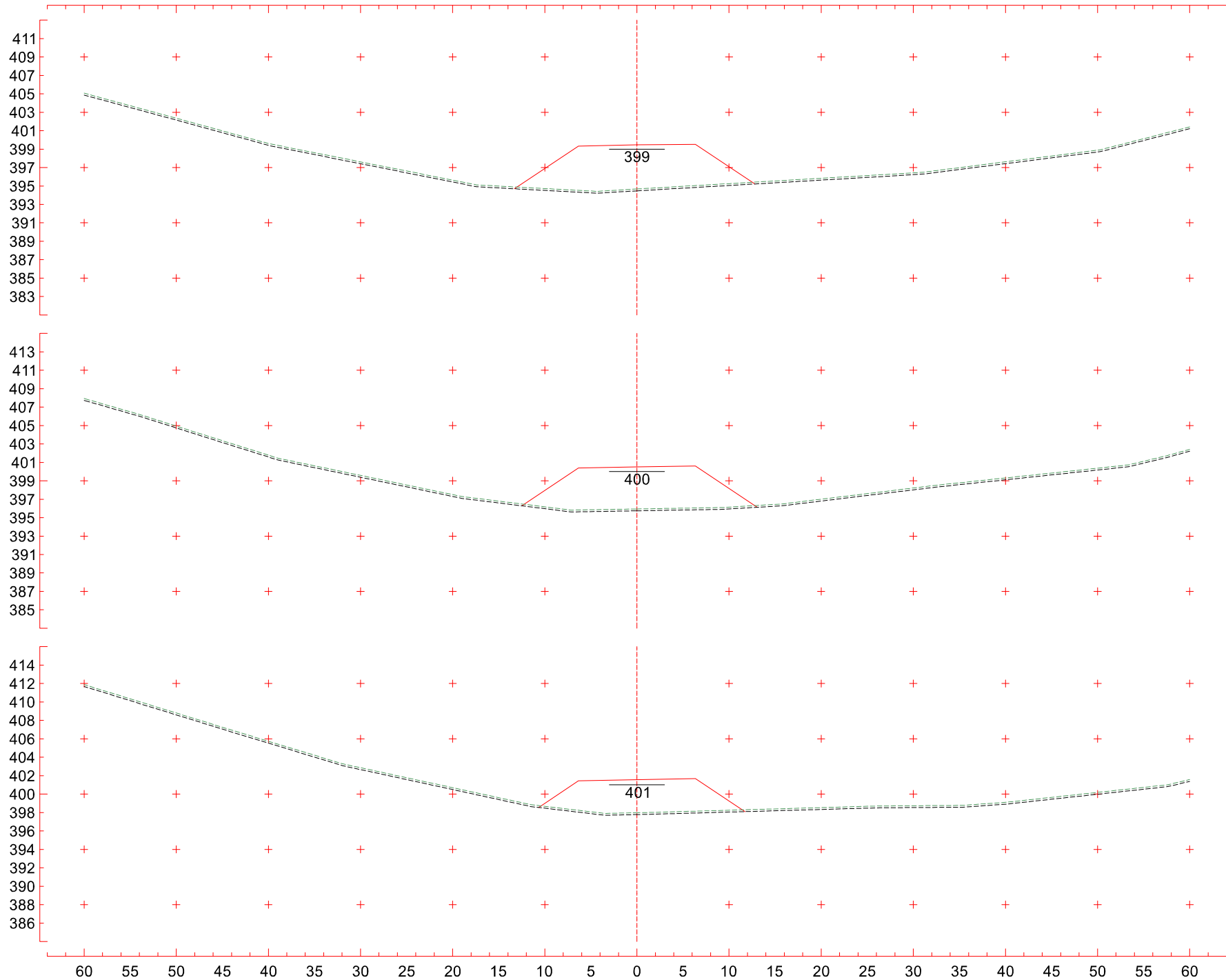


**1+600**  
CT 399,859 m  
CP 402,611 m

**1+580**  
CT 402,709 m  
CP 403,660 m

**1+560**  
CT 405,302 m  
CP 404,709 m

**Eixo1**  
Escala 1:400



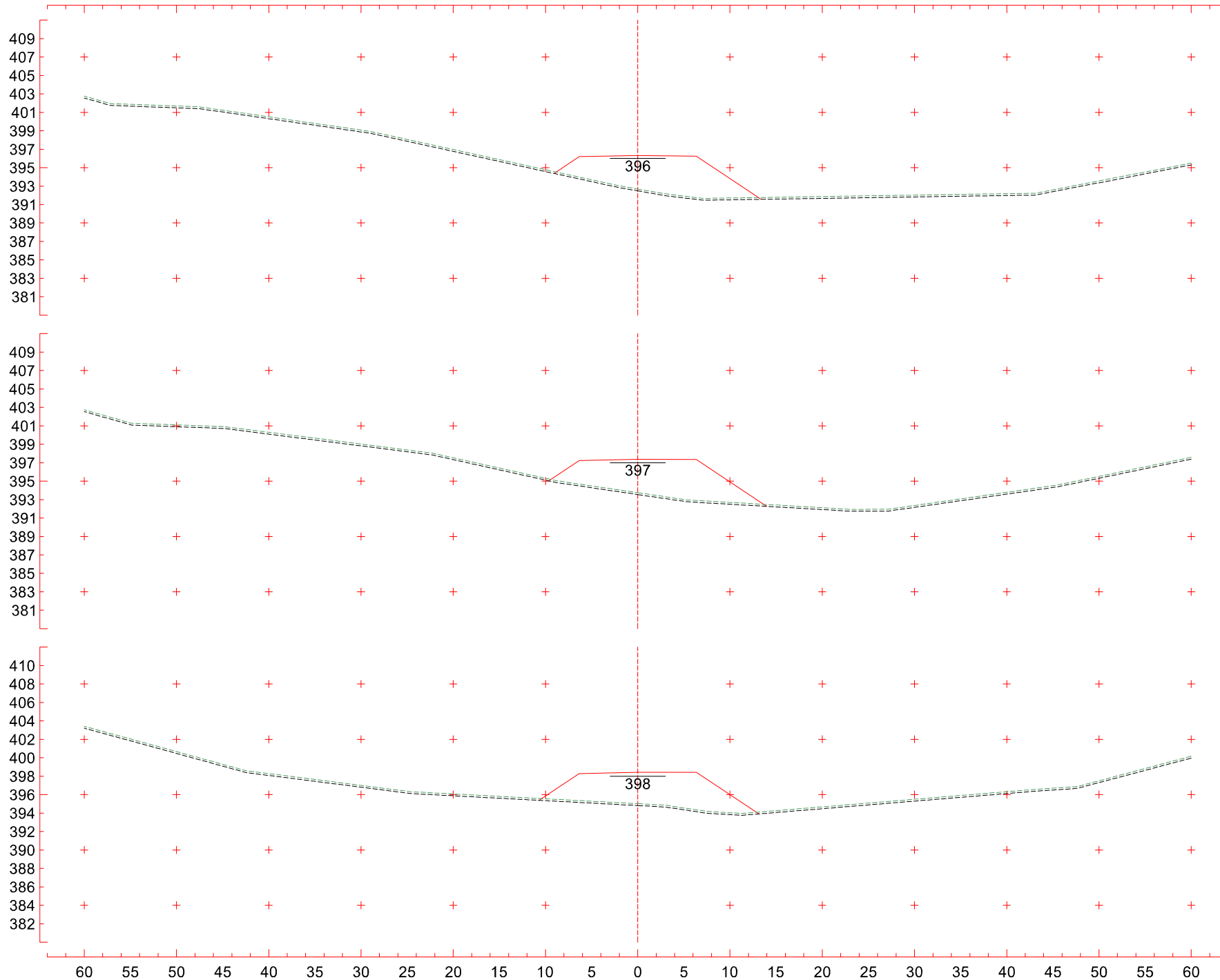
**1+660**  
CT 394,671 m  
CP 399,463 m

**1+640**  
CT 395,945 m  
CP 400,513 m

**1+620**  
CT 397,978 m  
CP 401,562 m

**Eixo1**  
Escala 1:400



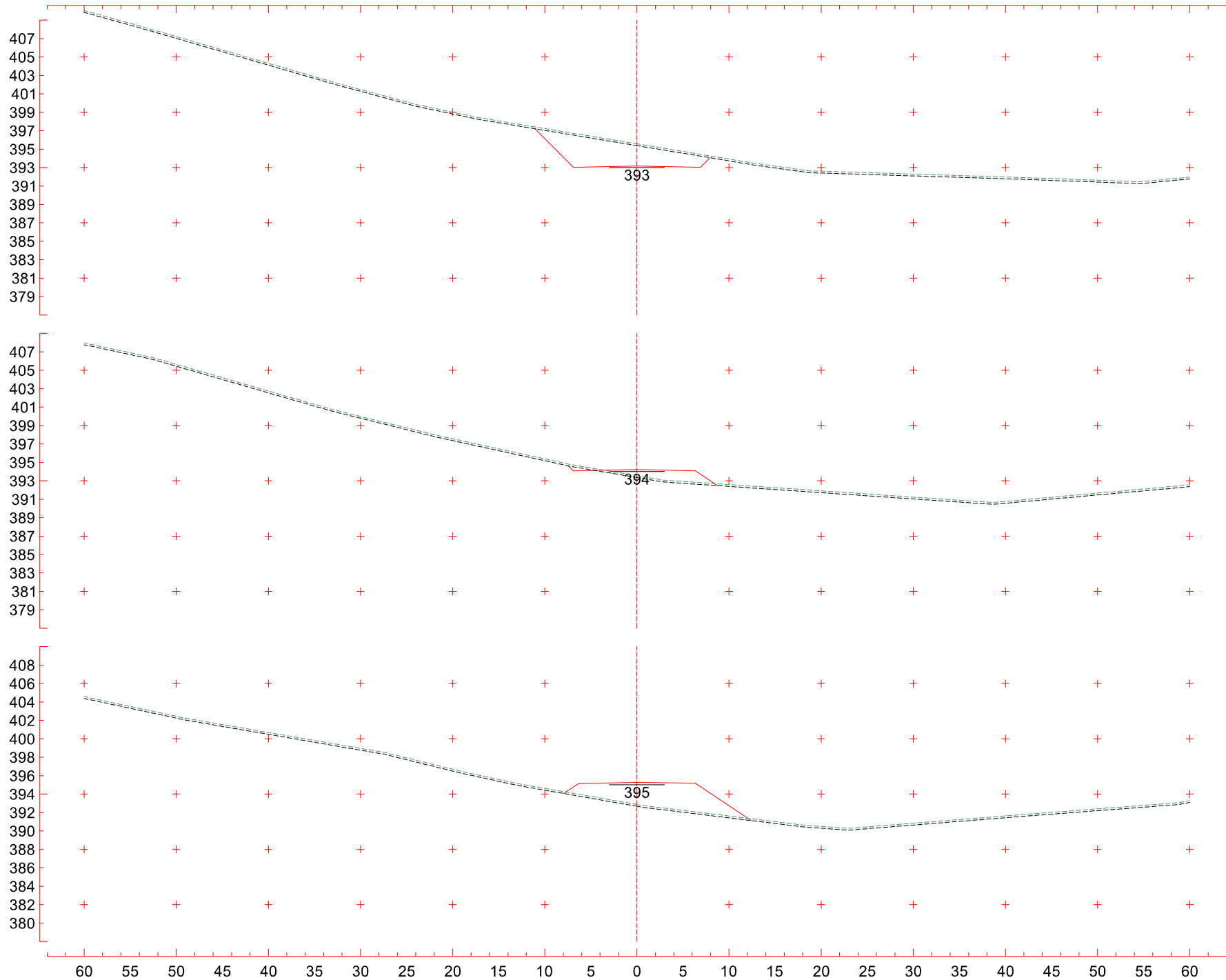


**1+720**  
CT 392,687 m  
CP 396,316 m

**1+700**  
CT 393,748 m  
CP 397,365 m

**1+680**  
CT 395,016 m  
CP 398,414 m

**Eixo1**  
Escala 1:400

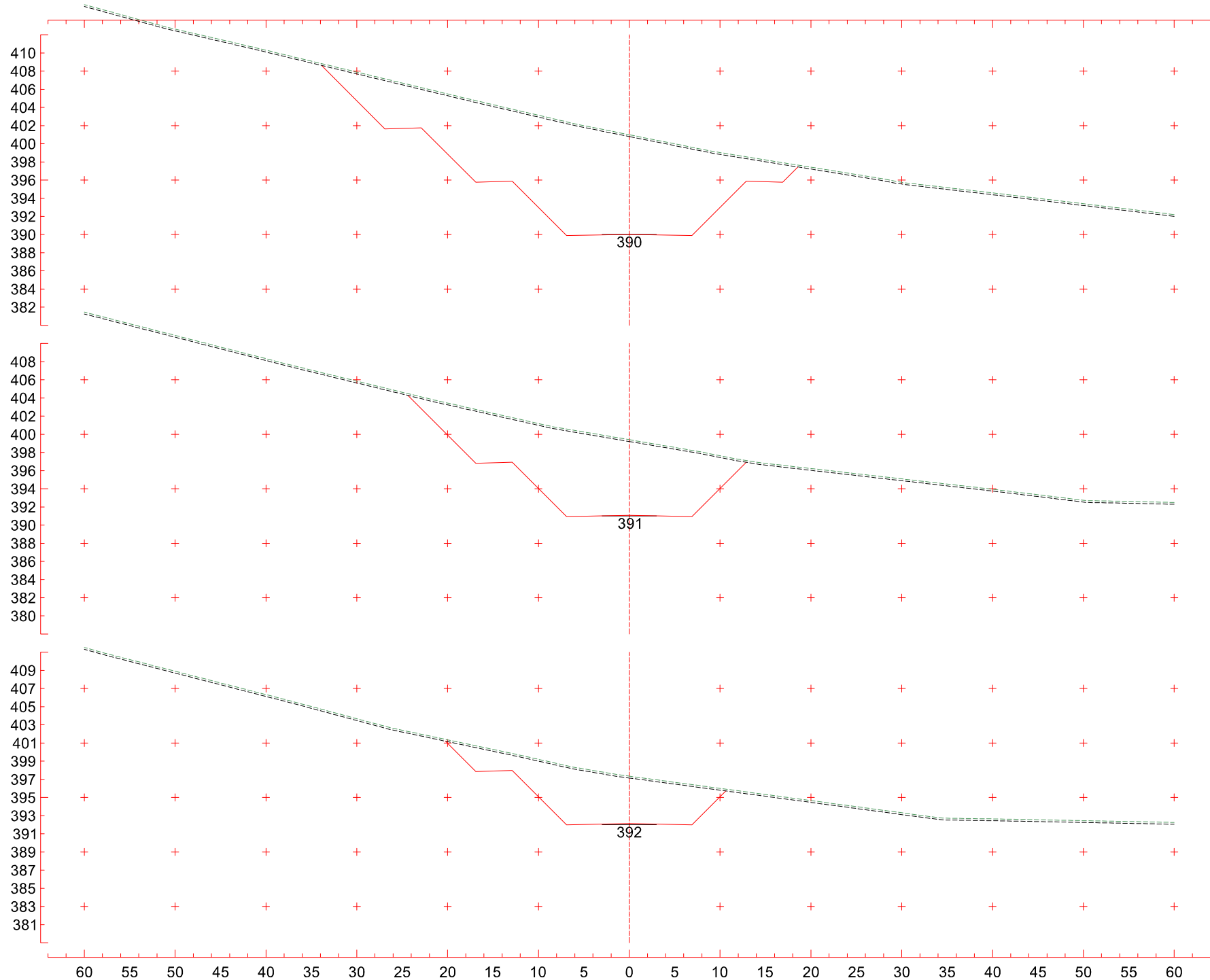


**1+780**  
CT 395,579 m  
CP 393,169 m

**1+760**  
CT 393,557 m  
CP 394,218 m

**1+740**  
CT 392,880 m  
CP 395,267 m

**Eixo1**  
Escala 1:400

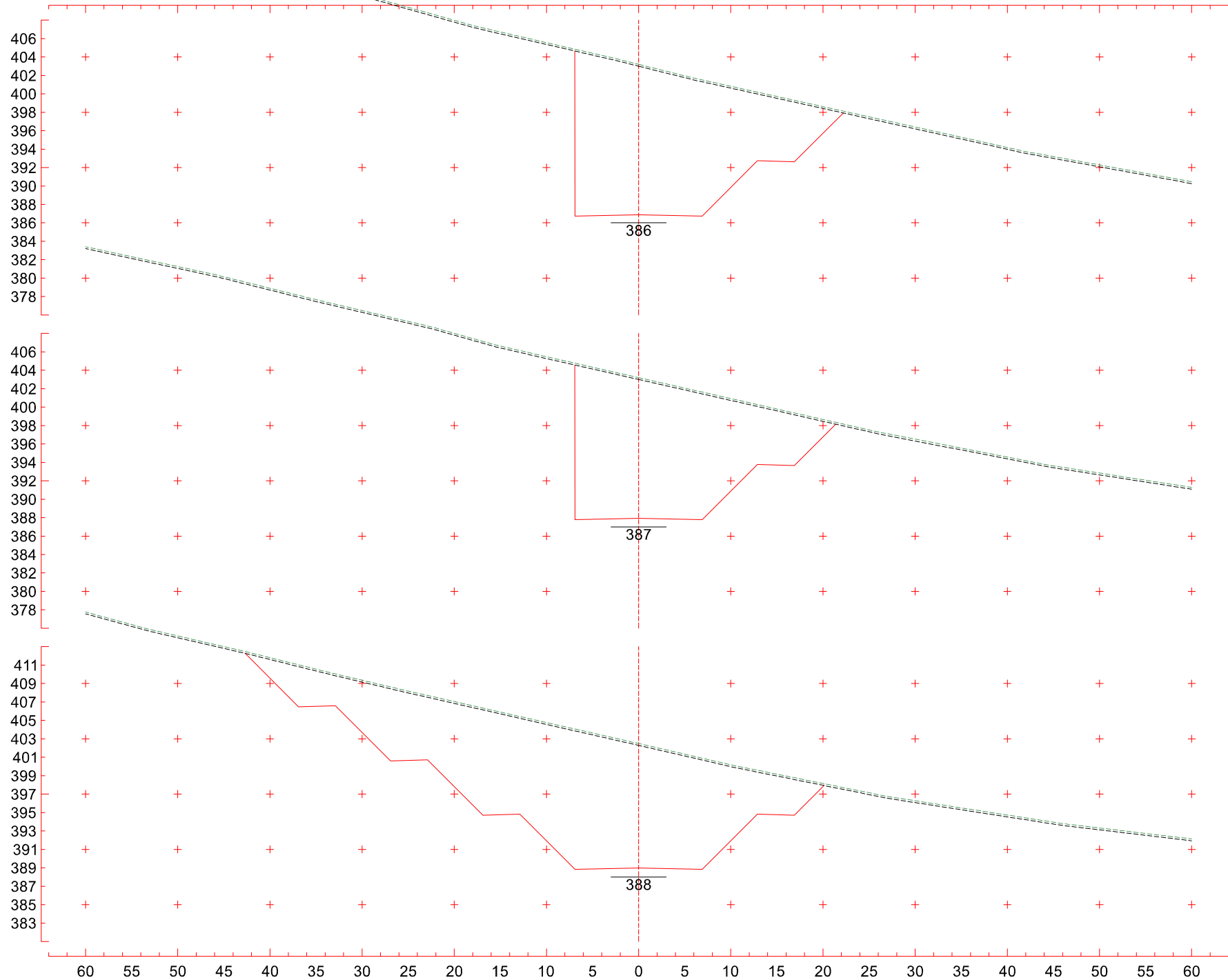


**1+840**  
CT 400,994 m  
CP 390,021 m

**1+820**  
CT 399,406 m  
CP 391,070 m

**1+800**  
CT 397,345 m  
CP 392,120 m

**Eixo1**  
Escala 1:400



**1+900**

CT 403,202 m  
CP 386,874 m

**1+880**

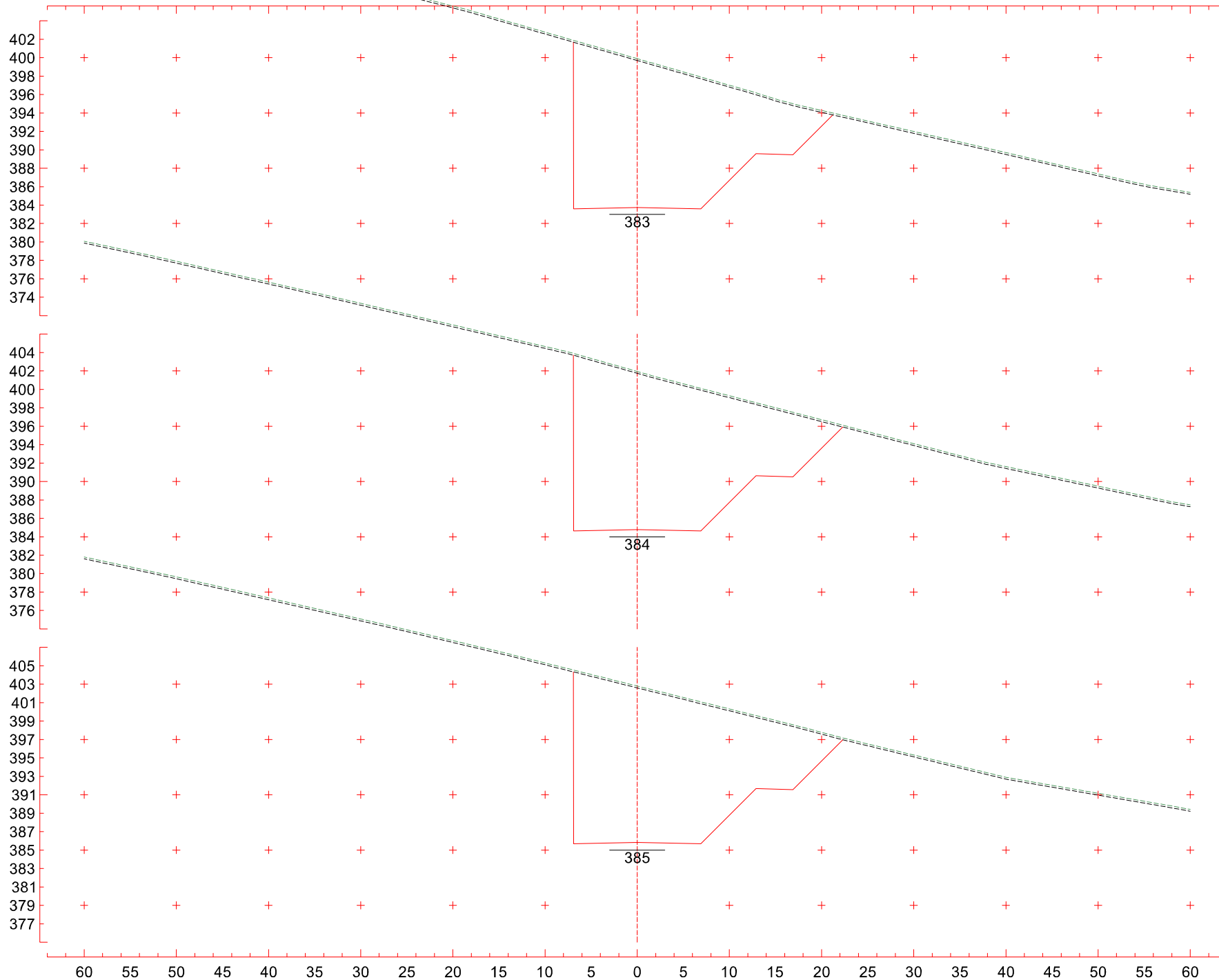
CT 403,197 m  
CP 387,923 m

**1+860**

CT 402,485 m  
CP 388,972 m

**Eixo1**

Escala 1:400

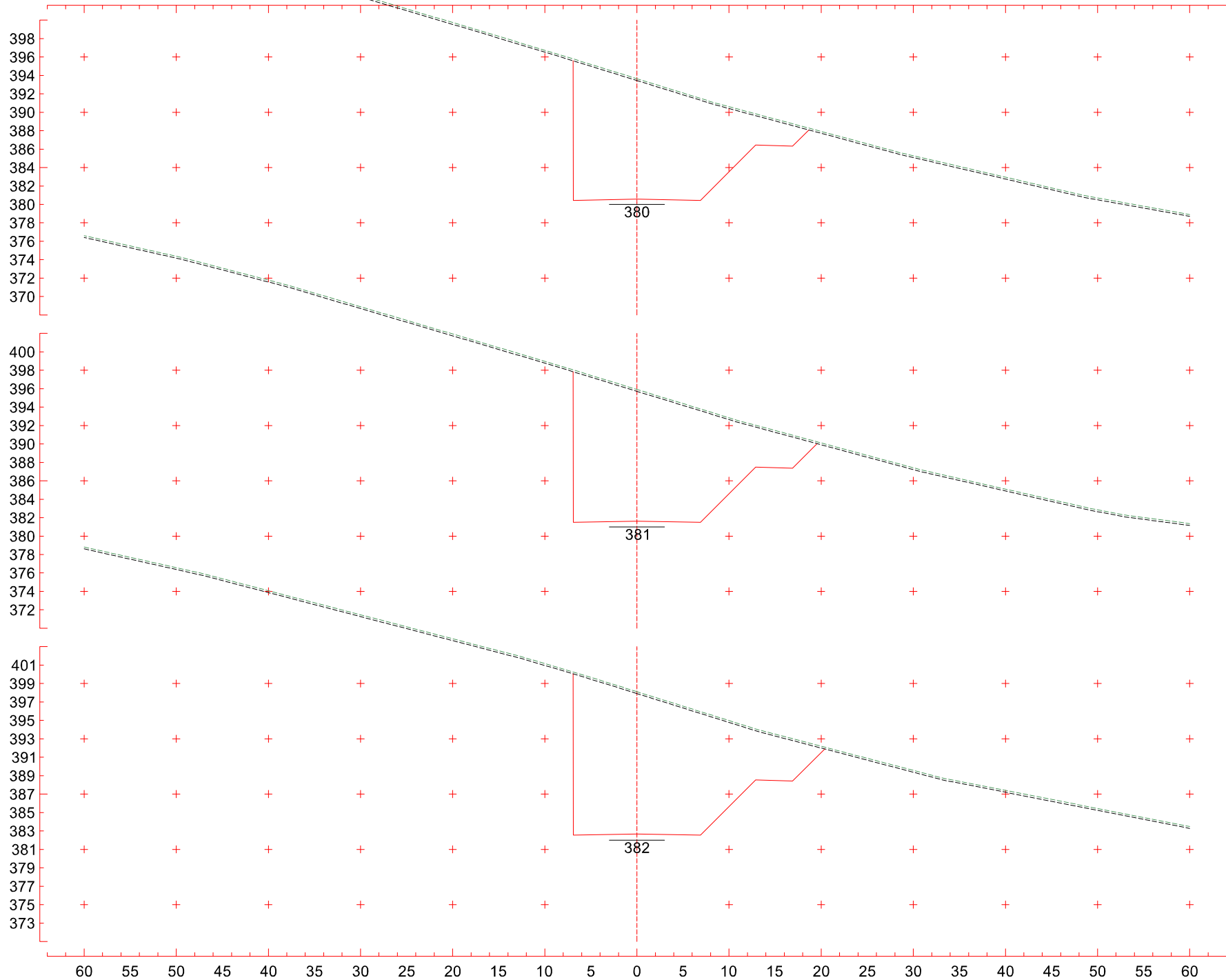


**1+960**  
CT 399,894 m  
CP 383,727 m

**1+940**  
CT 401,942 m  
CP 384,776 m

**1+920**  
CT 402,802 m  
CP 385,825 m

**Eixo1**  
Escala 1:400



**2+020**

CT 393,644 m  
CP 380,579 m

**2+000**

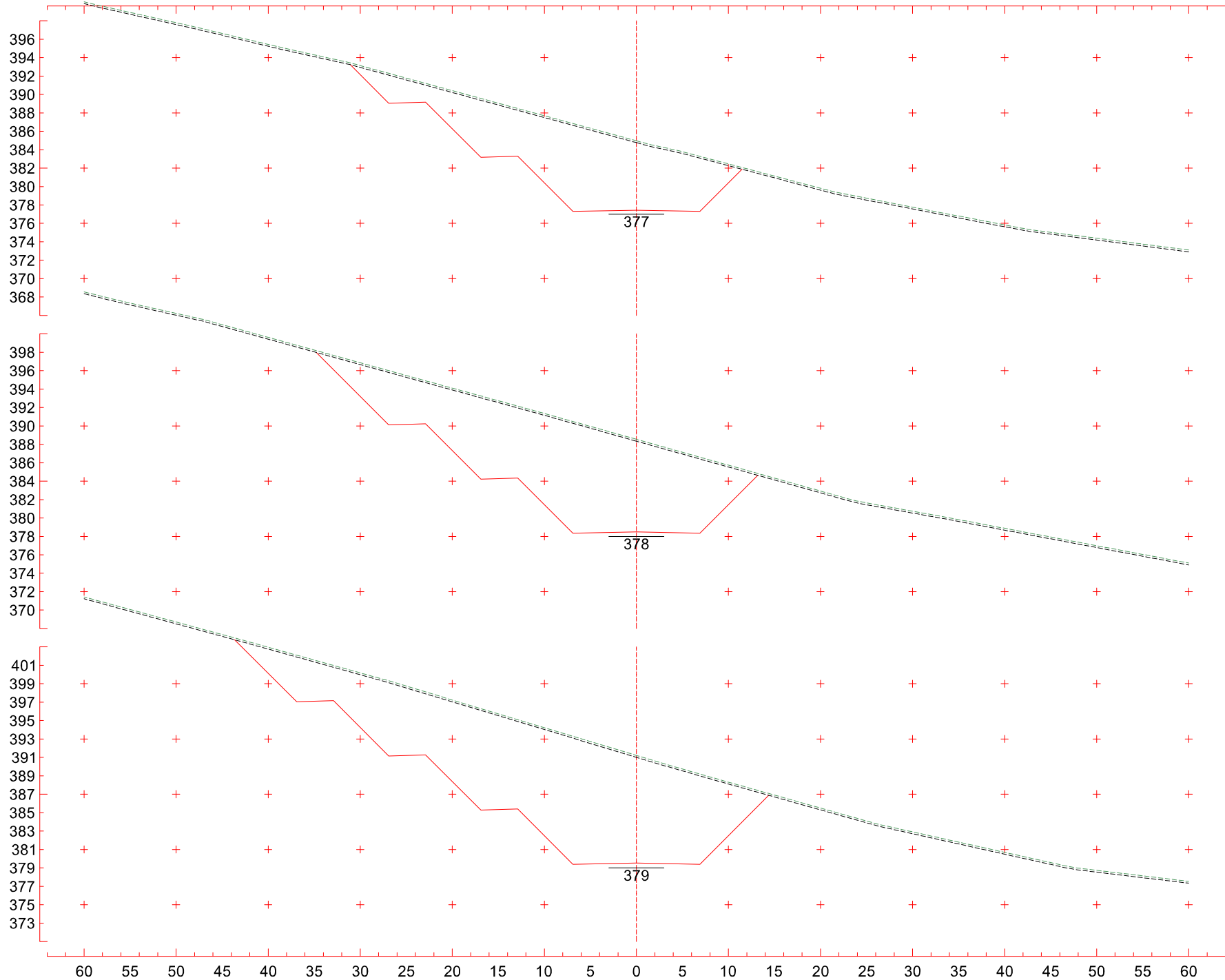
CT 395,917 m  
CP 381,628 m

**1+980**

CT 398,112 m  
CP 382,677 m

**Eixo1**

Escala 1:400



**2+080**

CT 384,969 m  
CP 377,432 m

**2+060**

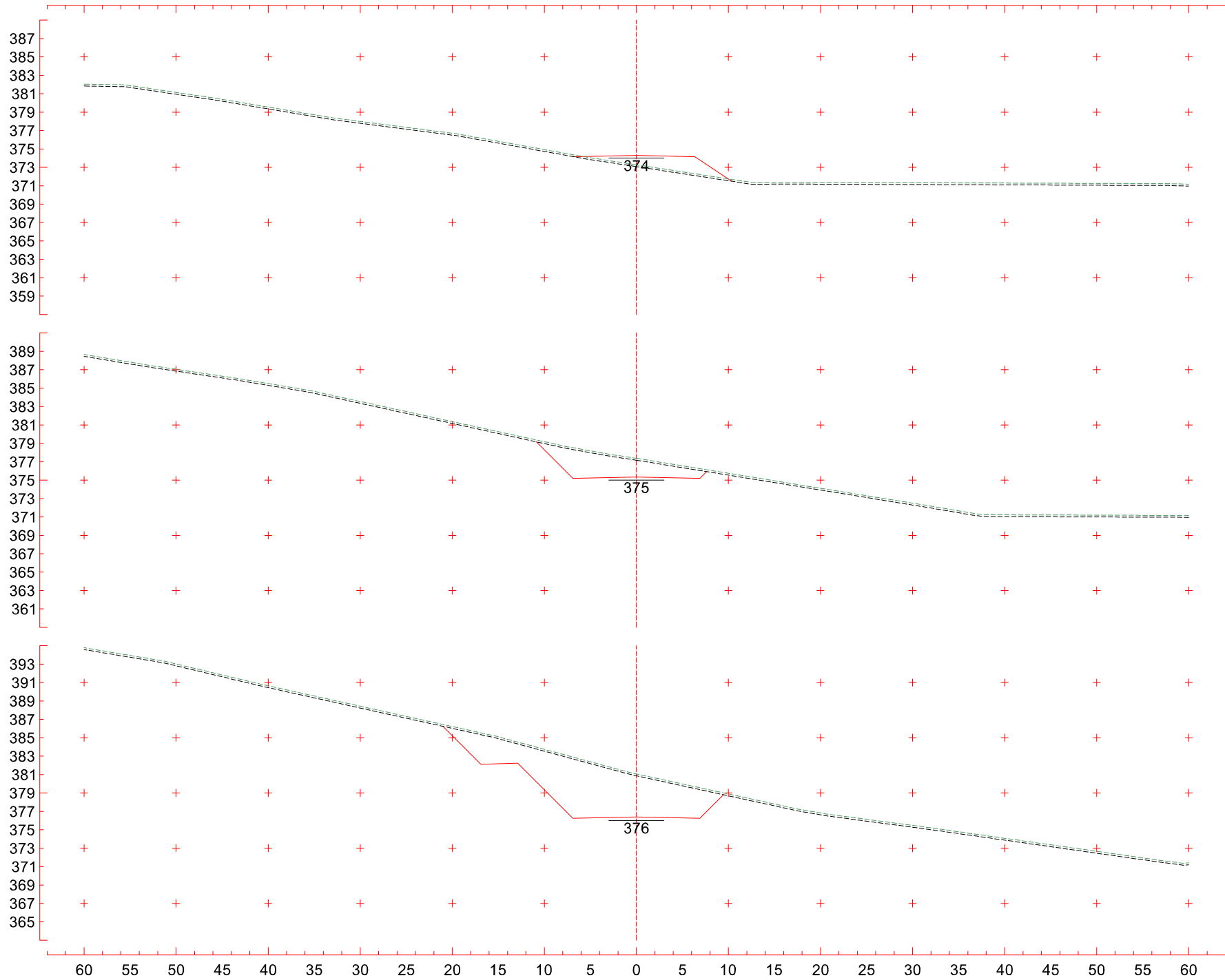
CT 388,545 m  
CP 378,481 m

**2+040**

CT 391,209 m  
CP 379,530 m

**Eixo1**

Escala 1:400



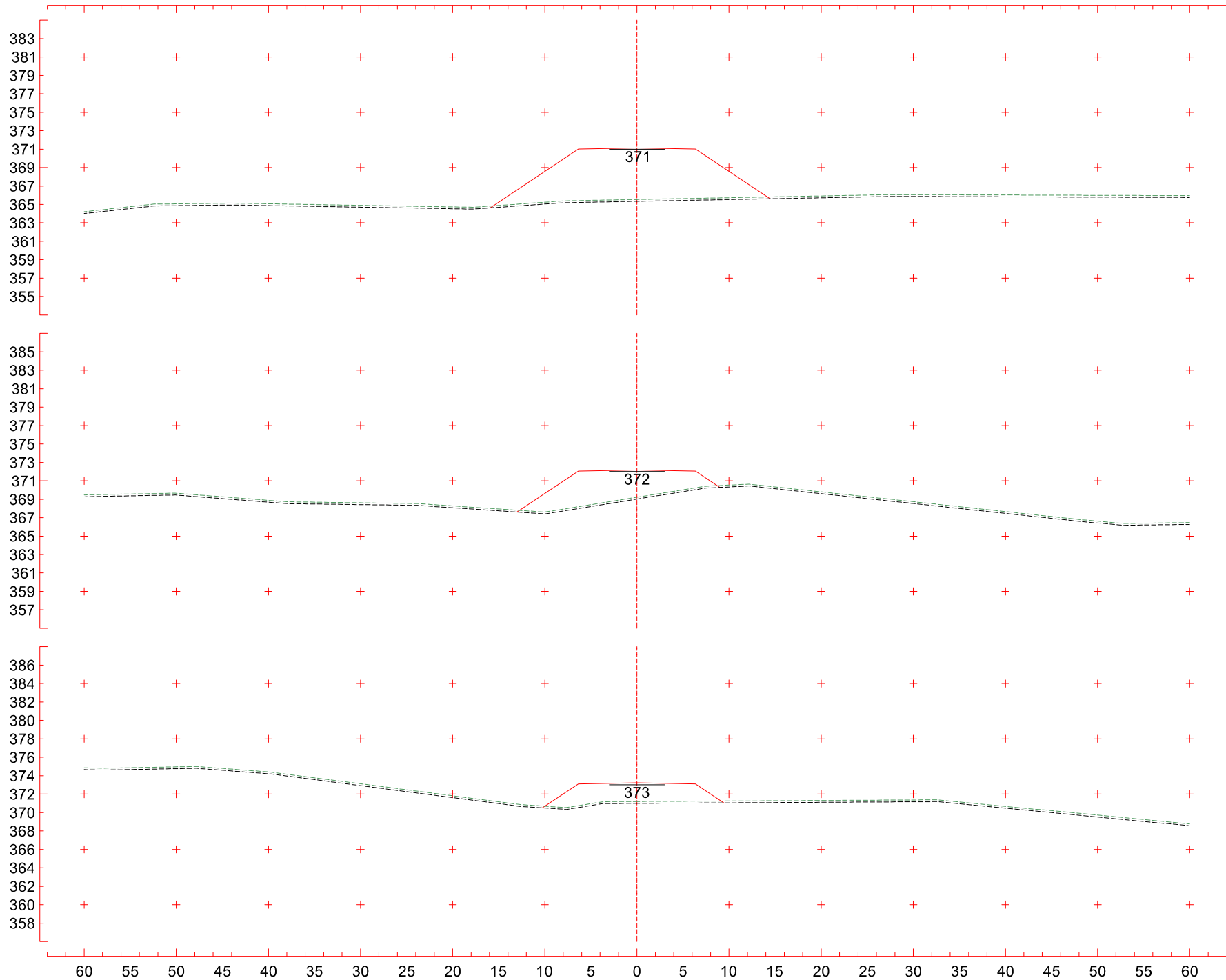
**2+140**  
CT 373,274 m  
CP 374,284 m

**2+120**  
CT 377,367 m  
CP 375,334 m

**2+100**  
CT 381,070 m  
CP 376,383 m

**Eixo1**  
Escala 1:400



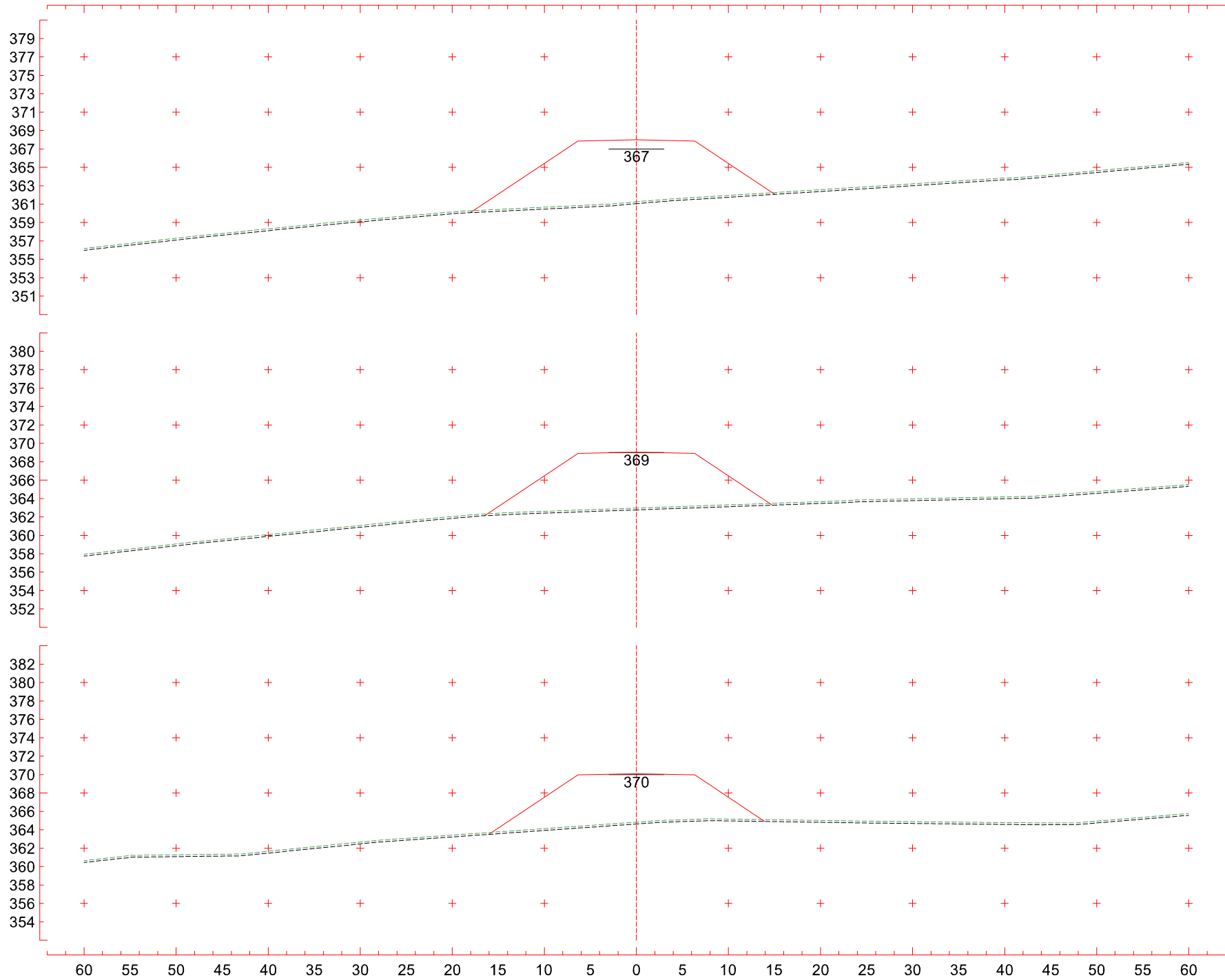


**2+200**  
CT 365,538 m  
CP 371,137 m

**2+180**  
CT 369,218 m  
CP 372,186 m

**2+160**  
CT 371,197 m  
CP 373,235 m

**Eixo1**  
Escala 1:400

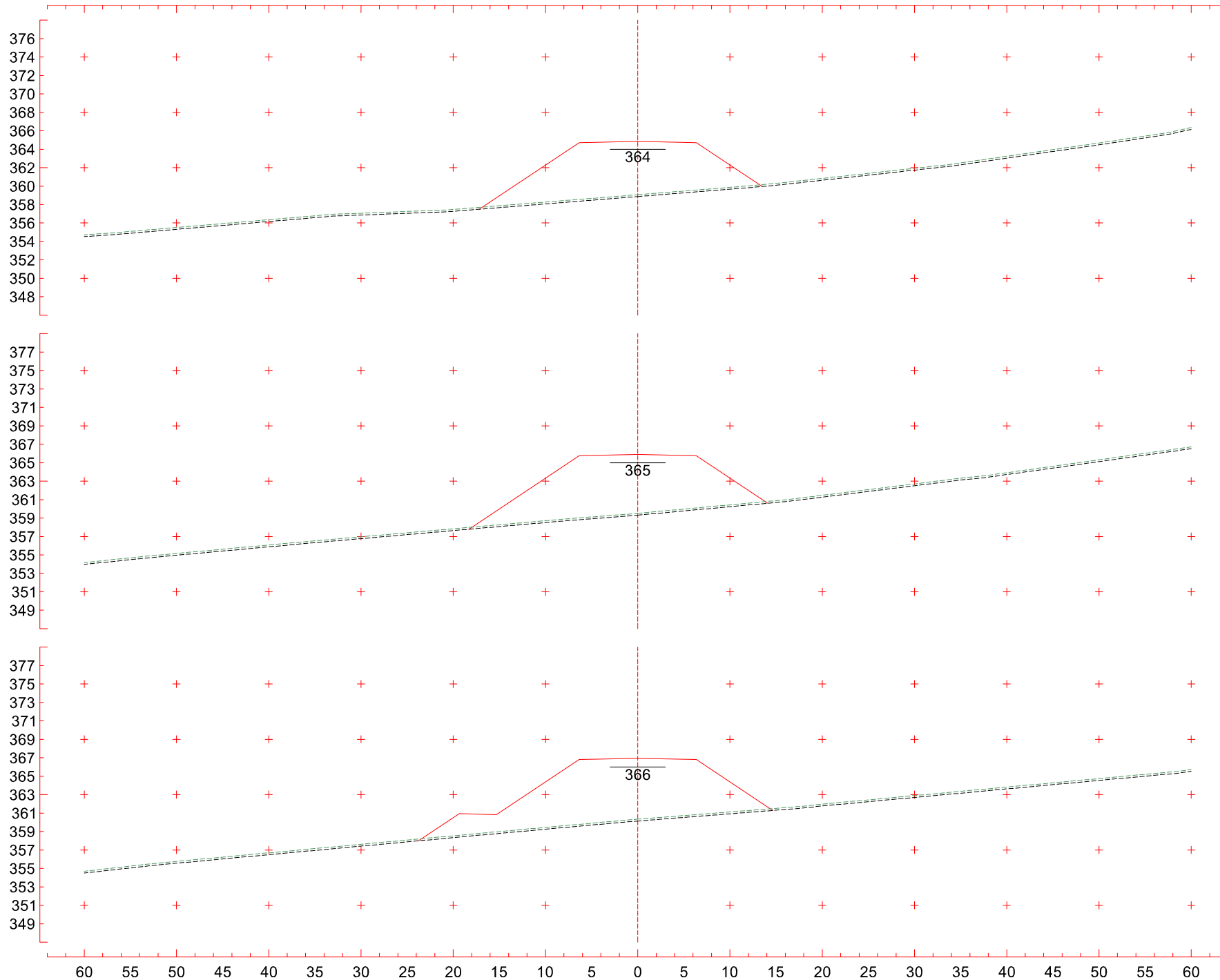


**2+260**  
CT 361,253 m  
CP 367,990 m

**2+240**  
CT 362,964 m  
CP 369,039 m

**2+220**  
CT 364,829 m  
CP 370,088 m

**Eixo01**  
Escala 1:400

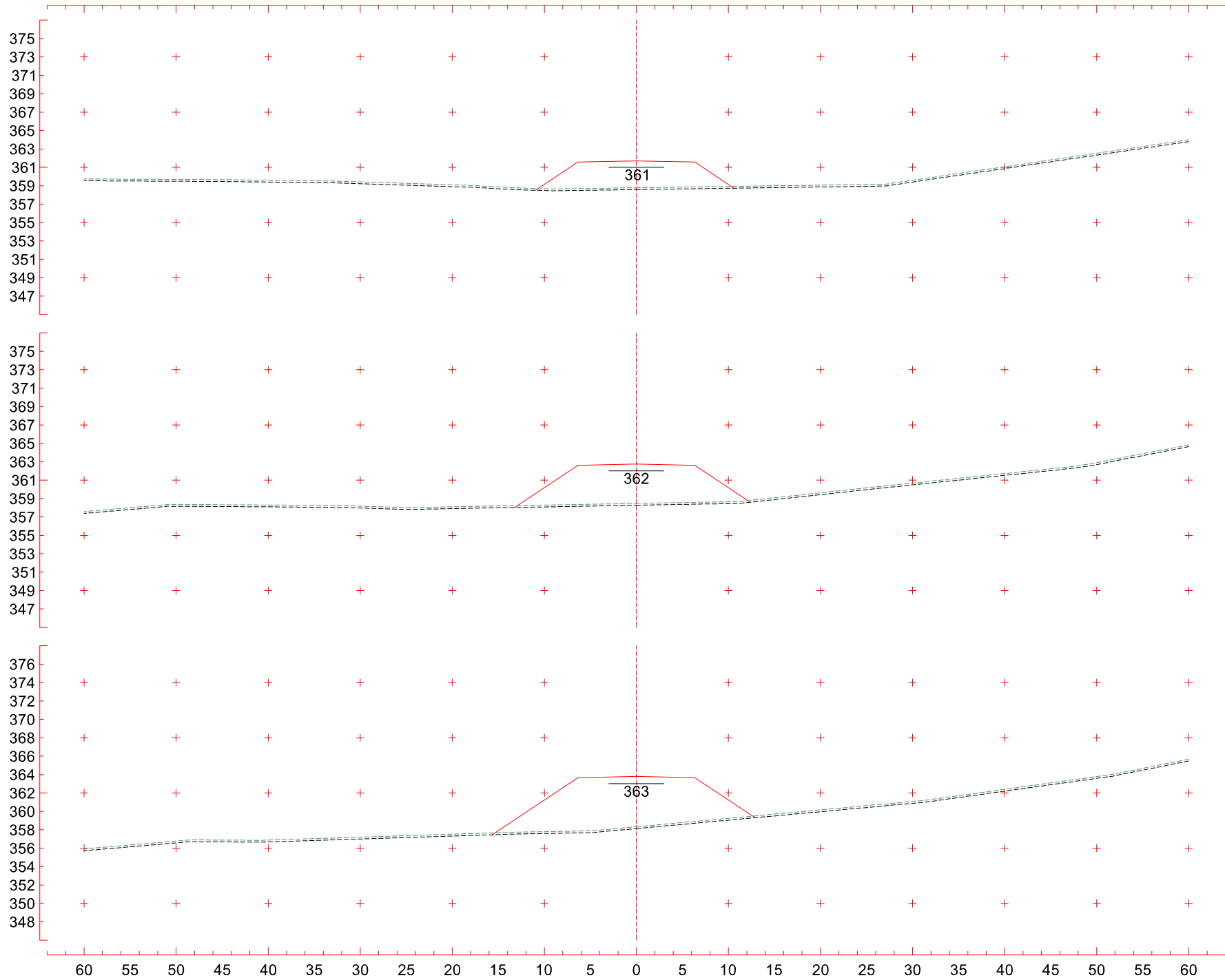


**2+320**  
CT 359,068 m  
CP 364,842 m

**2+300**  
CT 359,512 m  
CP 365,892 m

**2+280**  
CT 360,336 m  
CP 366,941 m

**Eixo1**  
Escala 1:400



**2+380**

CT 358,780 m  
CP 361,695 m

**2+360**

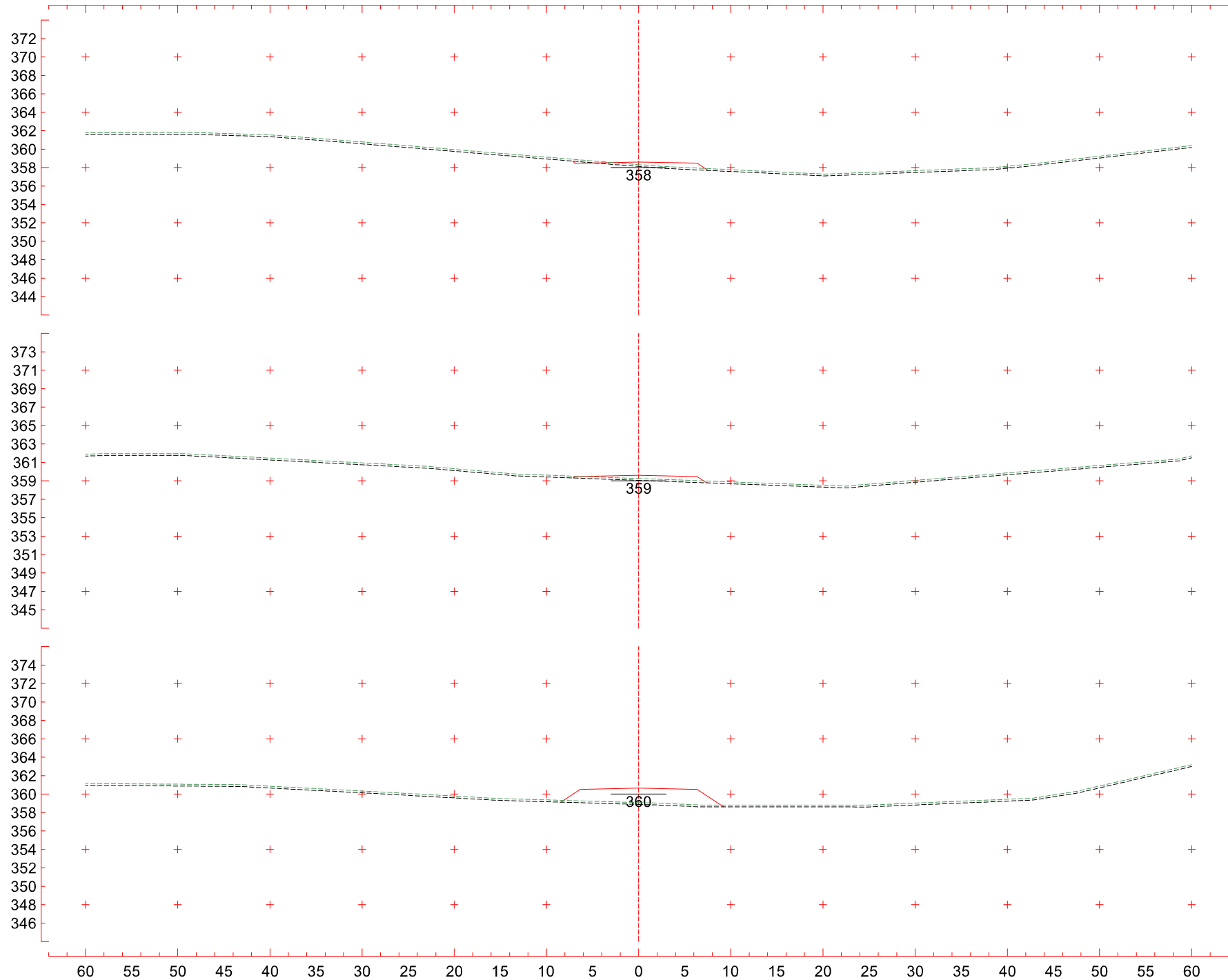
CT 358,473 m  
CP 362,744 m

**2+340**

CT 358,331 m  
CP 363,793 m

**Eixo1**

Escala 1:400

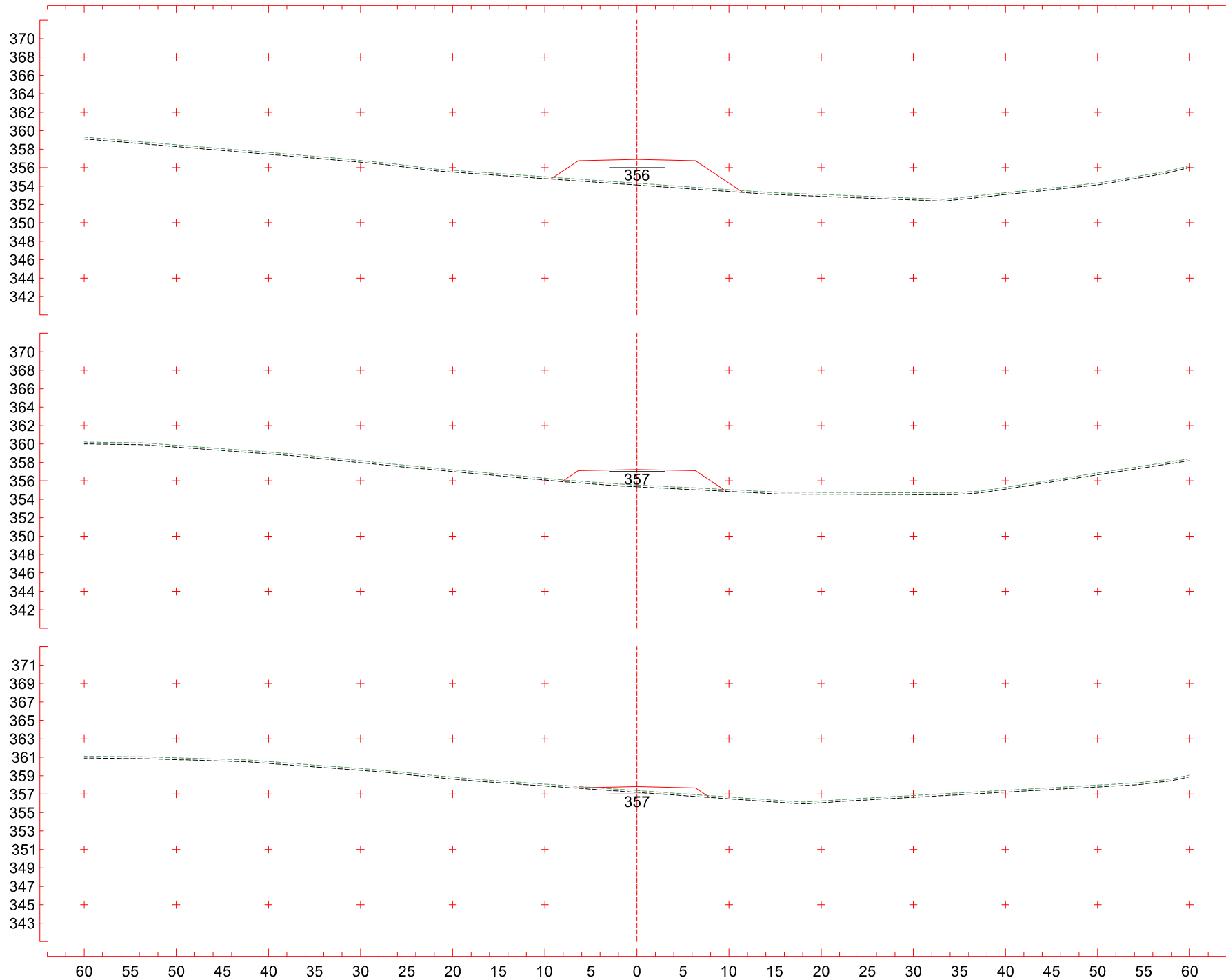


**2+440**  
CT 358,324 m  
CP 358,599 m

**2+420**  
CT 359,251 m  
CP 359,597 m

**2+400**  
CT 359,078 m  
CP 360,646 m

**Eixo1**  
Escala 1:400

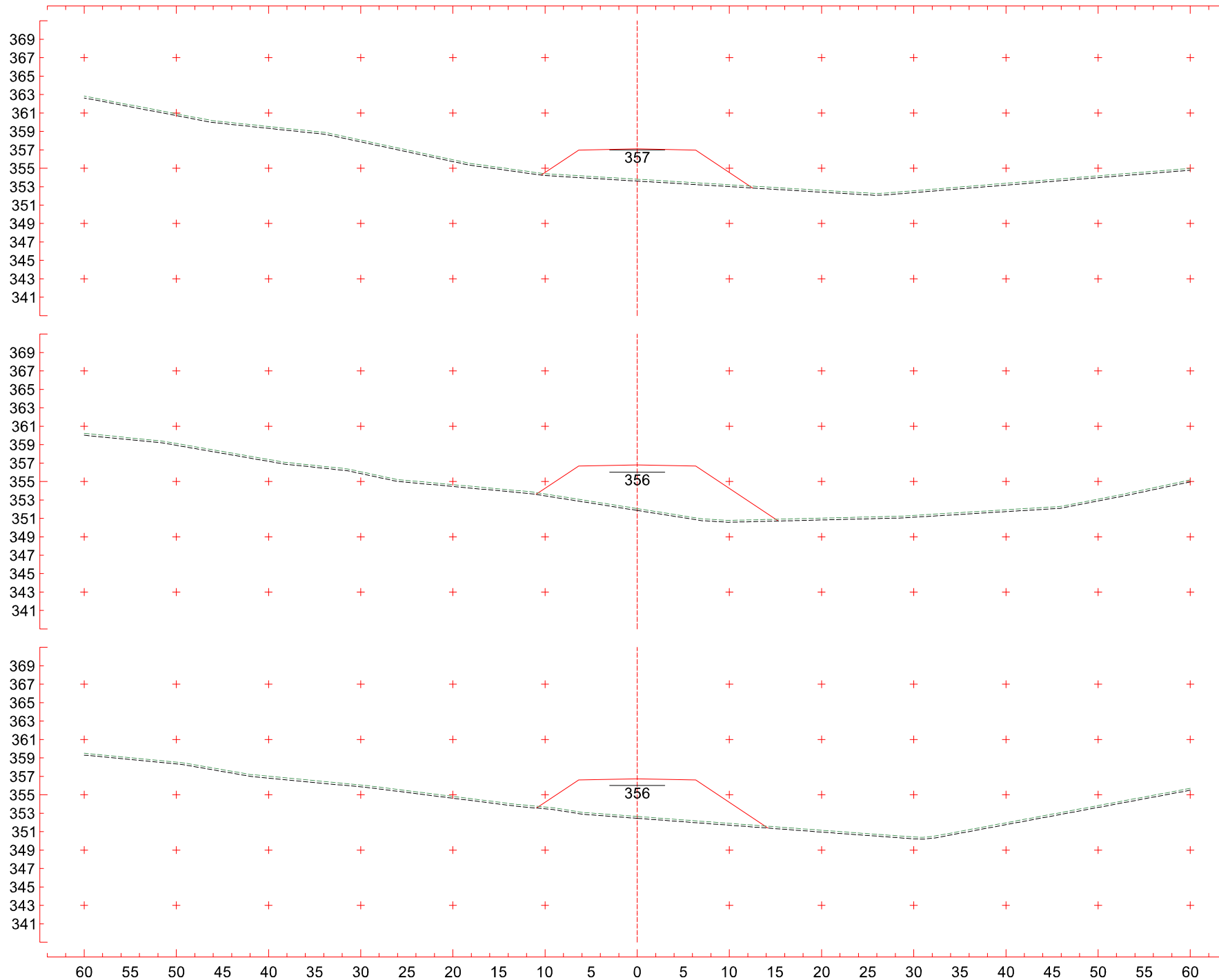


**2+500**  
CT 354,302 m  
CP 356,876 m

**2+480**  
CT 355,552 m  
CP 357,234 m

**2+460**  
CT 357,385 m  
CP 357,808 m

**Eixo1**  
Escala 1:400

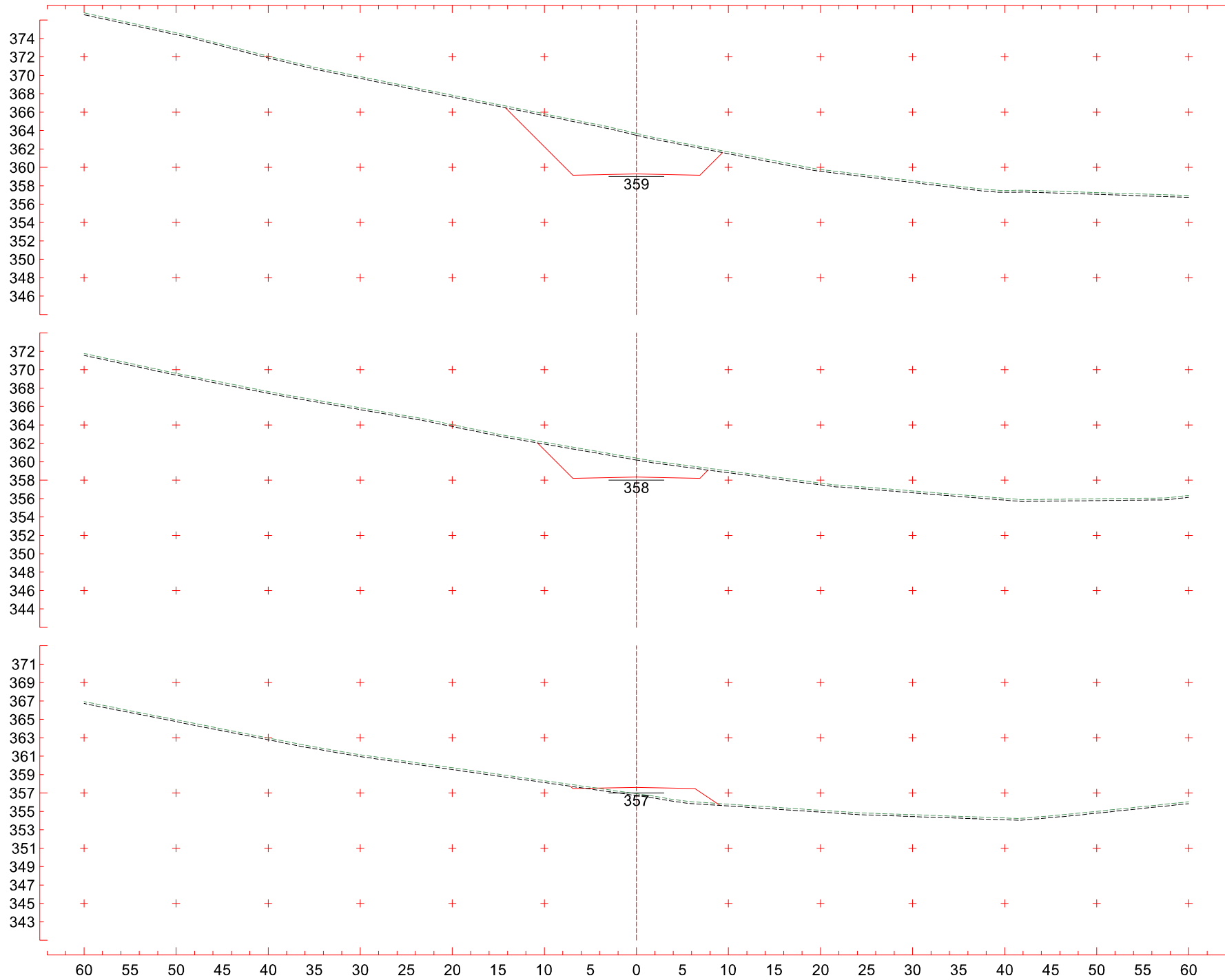


**2+560**  
CT 353,809 m  
CP 357,103 m

**2+540**  
CT 352,063 m  
CP 356,811 m

**2+520**  
CT 352,647 m  
CP 356,735 m

**Eixo1**  
Escala 1:400



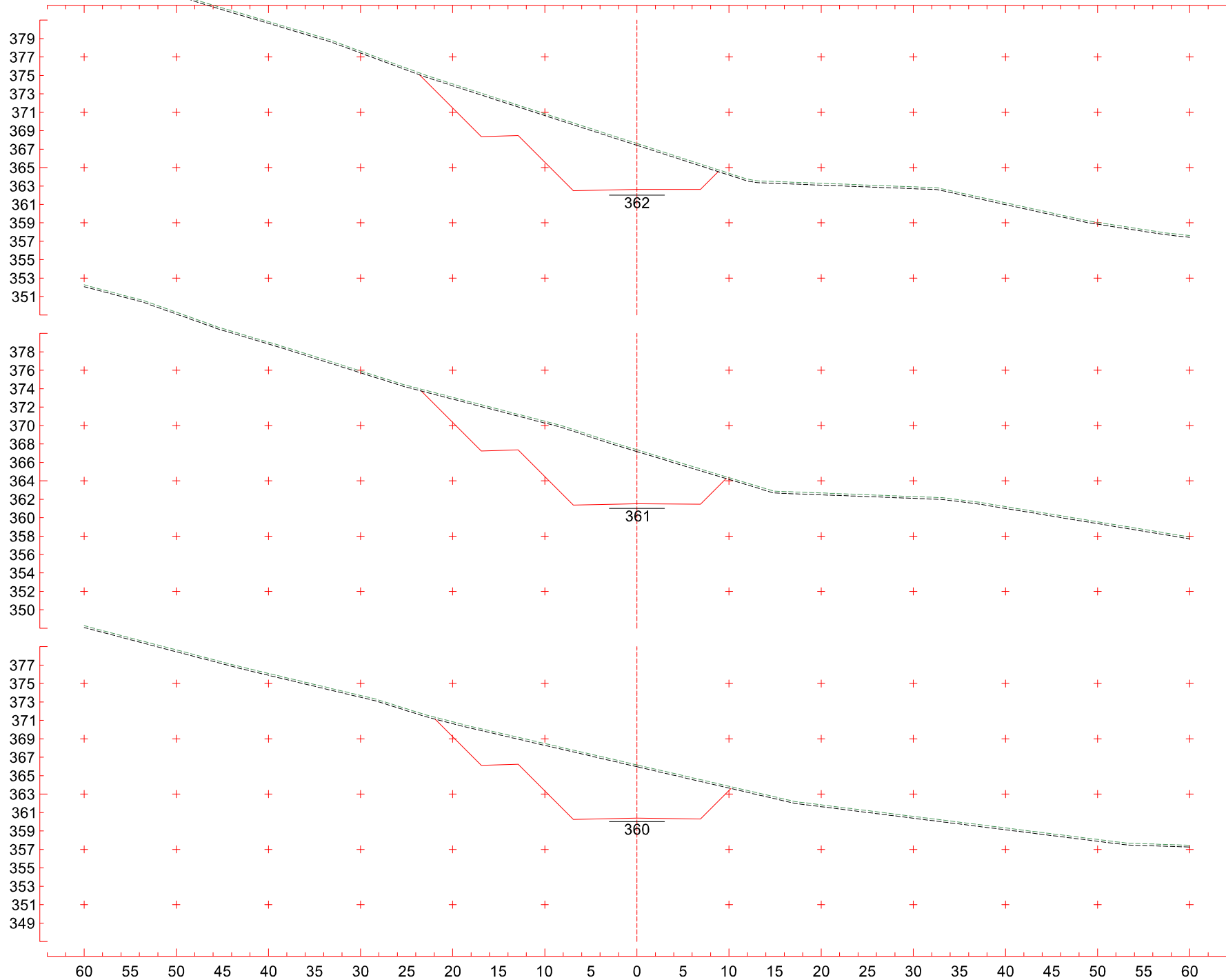
**2+620**  
CT 363,686 m  
CP 359,281 m

**2+600**  
CT 360,392 m  
CP 358,338 m

**2+580**  
CT 356,921 m  
CP 357,612 m

**Eixo1**  
Escala 1:400





**2+680**

CT 367,613 m  
CP 362,625 m

**2+660**

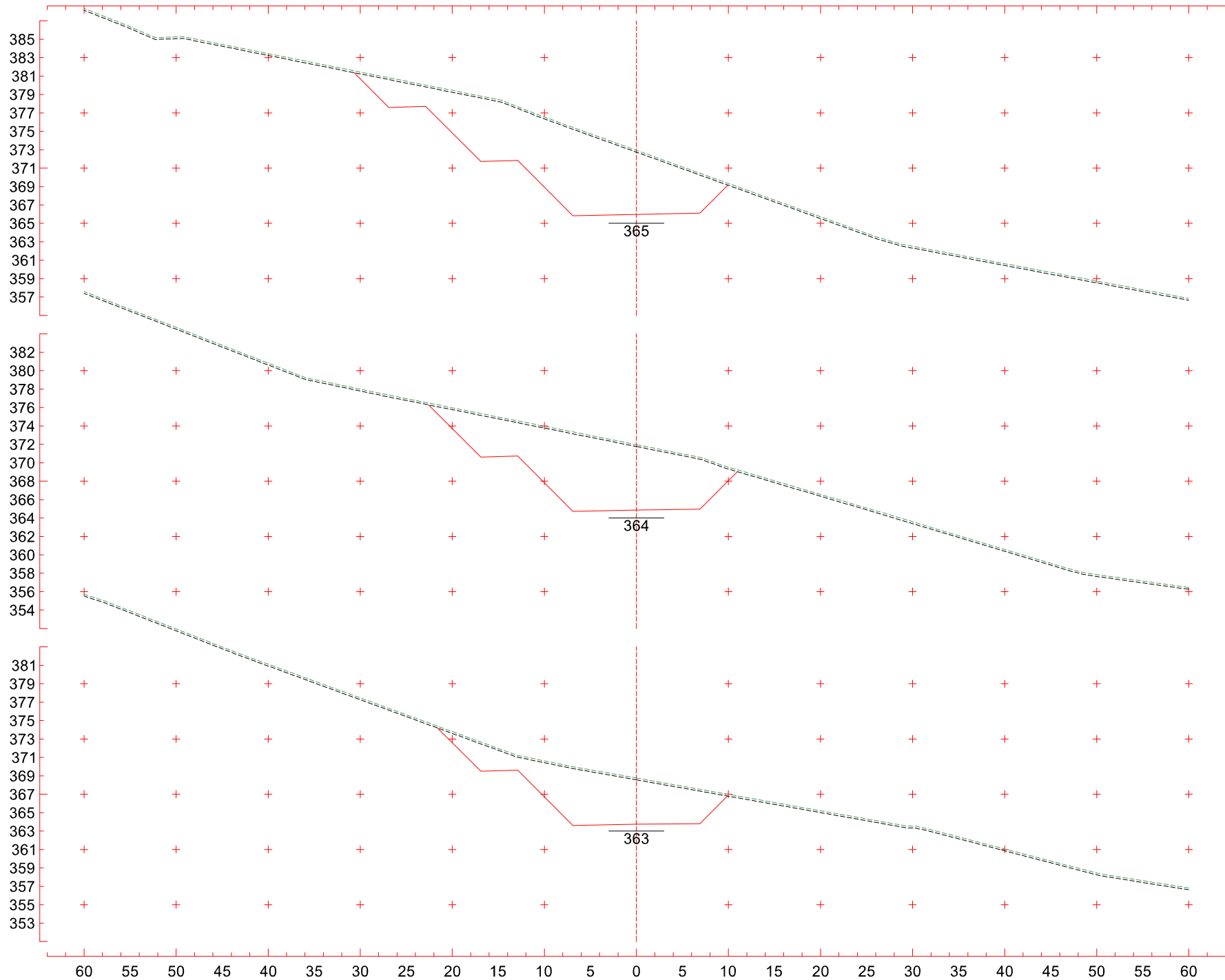
CT 367,376 m  
CP 361,507 m

**2+640**

CT 366,171 m  
CP 360,389 m

**Eixo1**

Escala 1:400

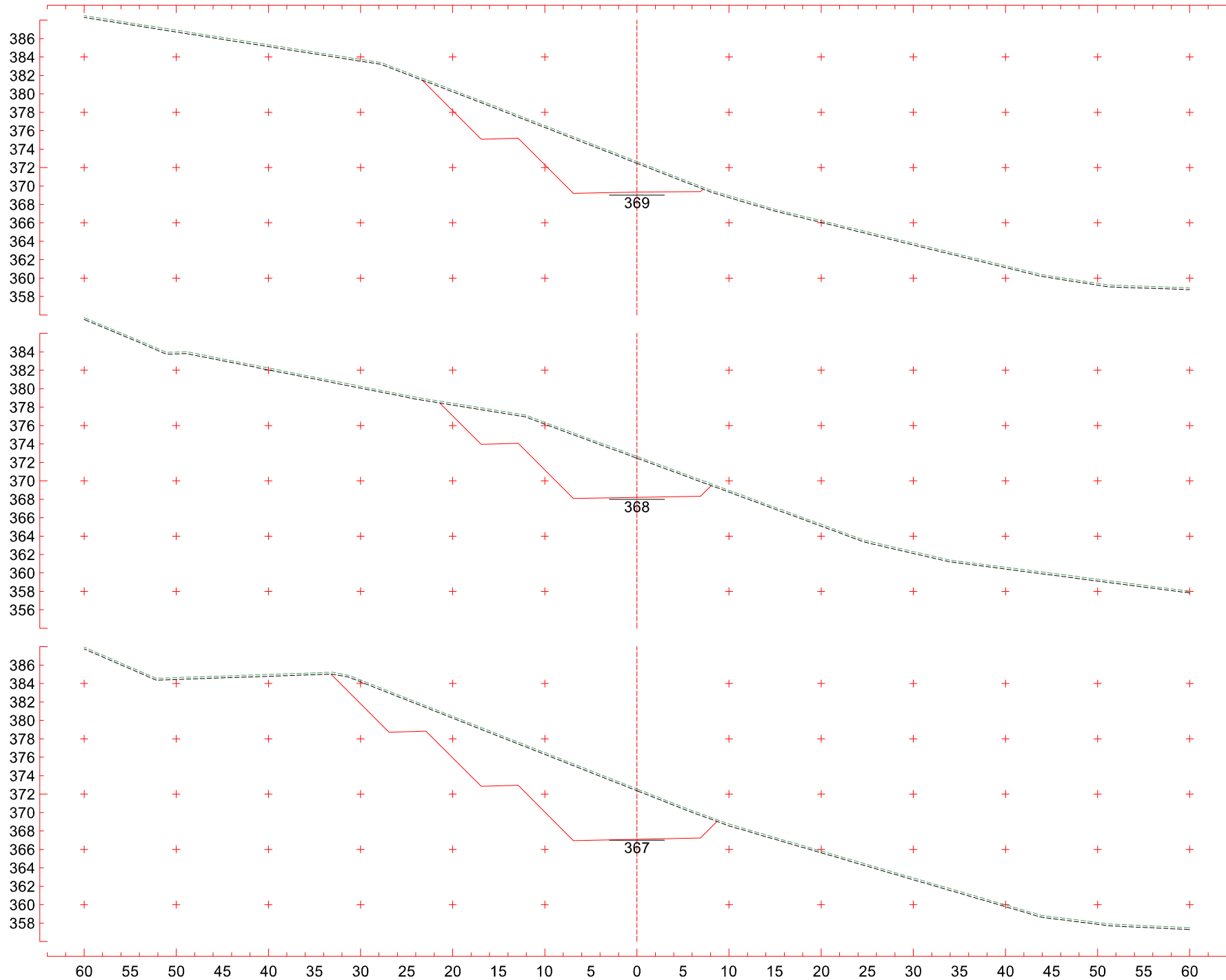


**2+740**  
CT 372,937 m  
CP 365,980 m

**2+720**  
CT 371,966 m  
CP 364,862 m

**2+700**  
CT 368,762 m  
CP 363,743 m

**Eixo1**  
Escala 1:400



2+800

CT 372,661 m  
CP 369,334 m

2+780

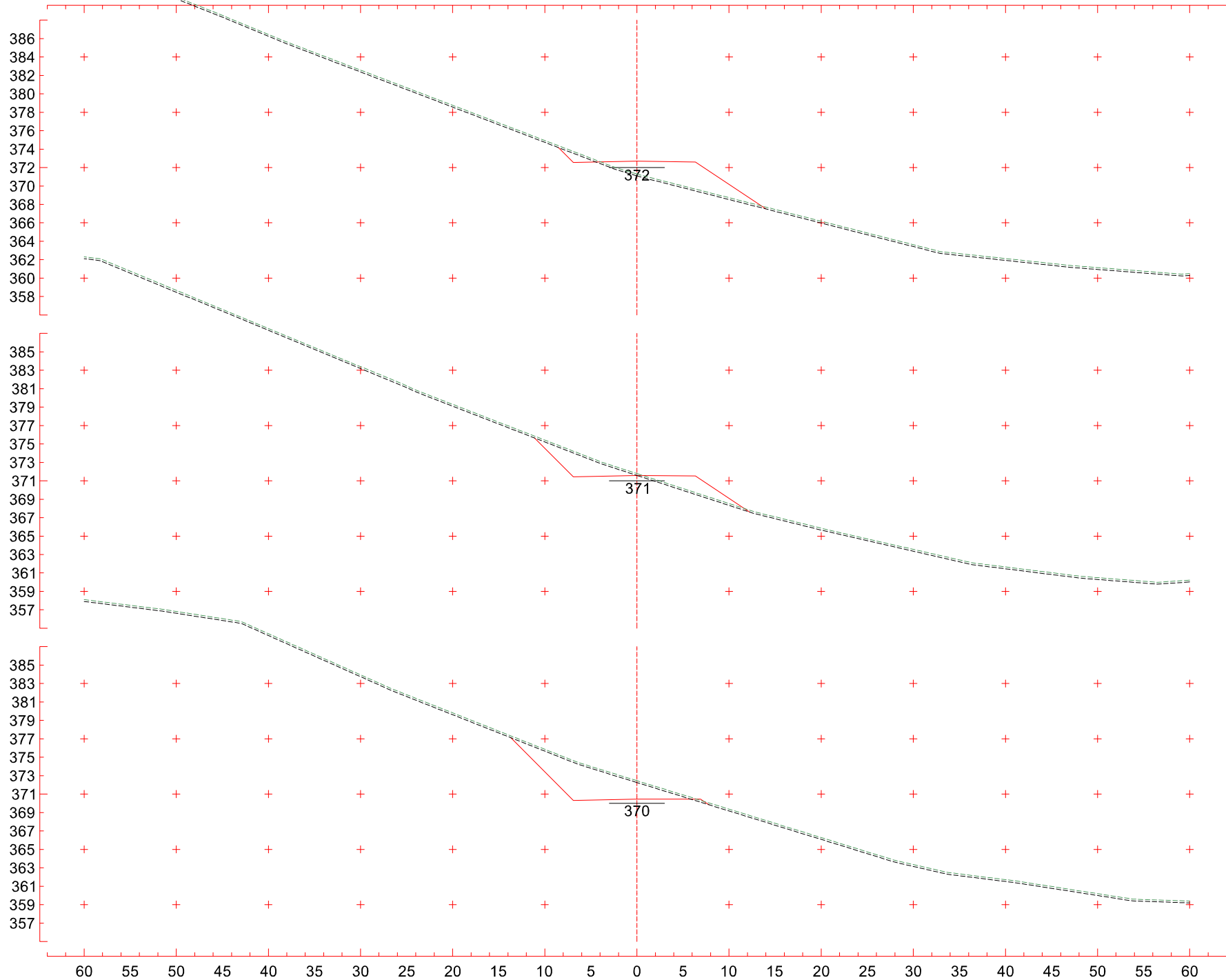
CT 372,656 m  
CP 368,216 m

2+760

CT 372,567 m  
CP 367,098 m

Eixo1

Escala 1:400



**2+860**

CT 371,300 m  
CP 372,689 m

**2+840**

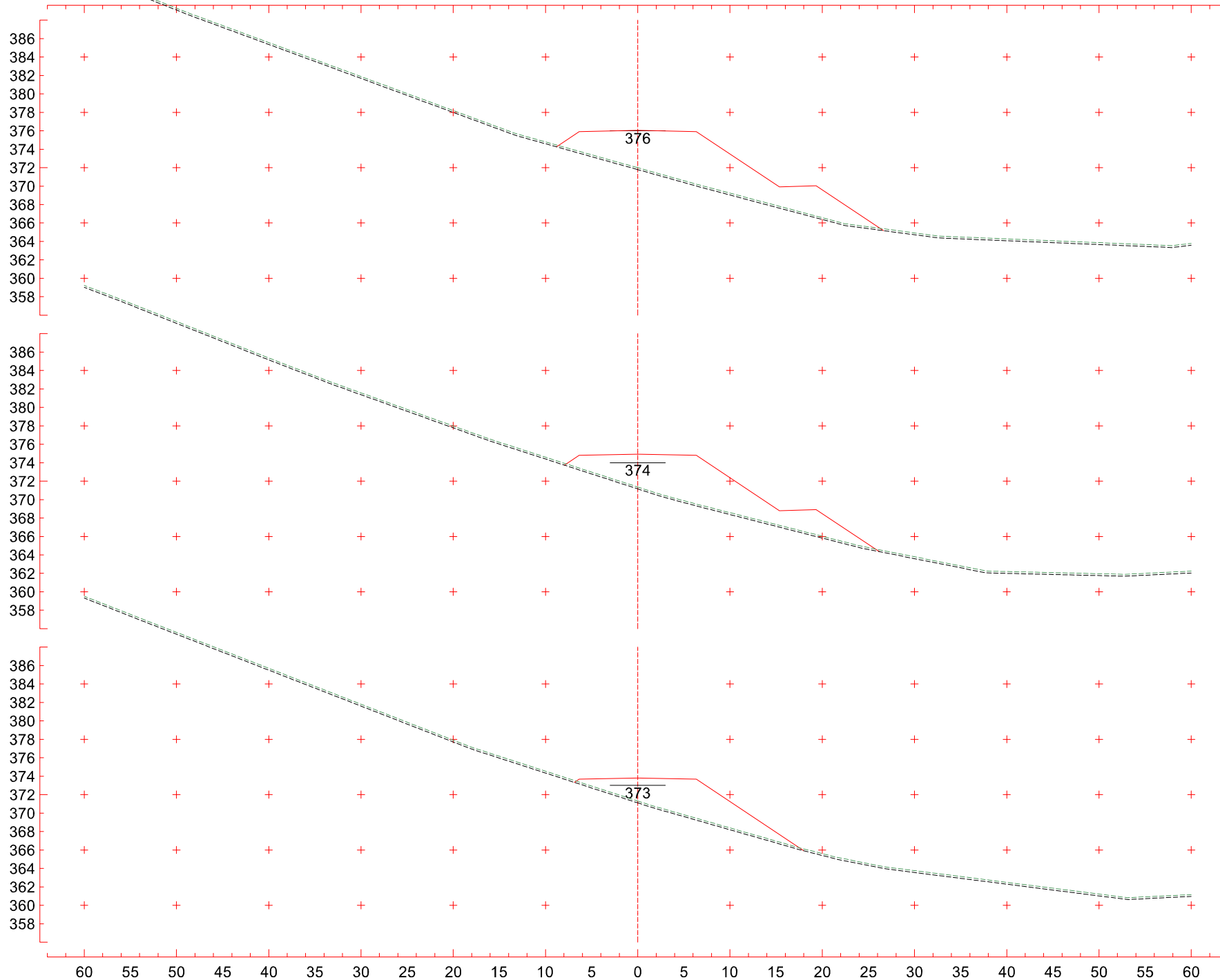
CT 371,786 m  
CP 371,571 m

**2+820**

CT 372,455 m  
CP 370,453 m

**Eixo01**

Escala 1:400



2+920

CT 371,991 m  
CP 376,044 m

2+900

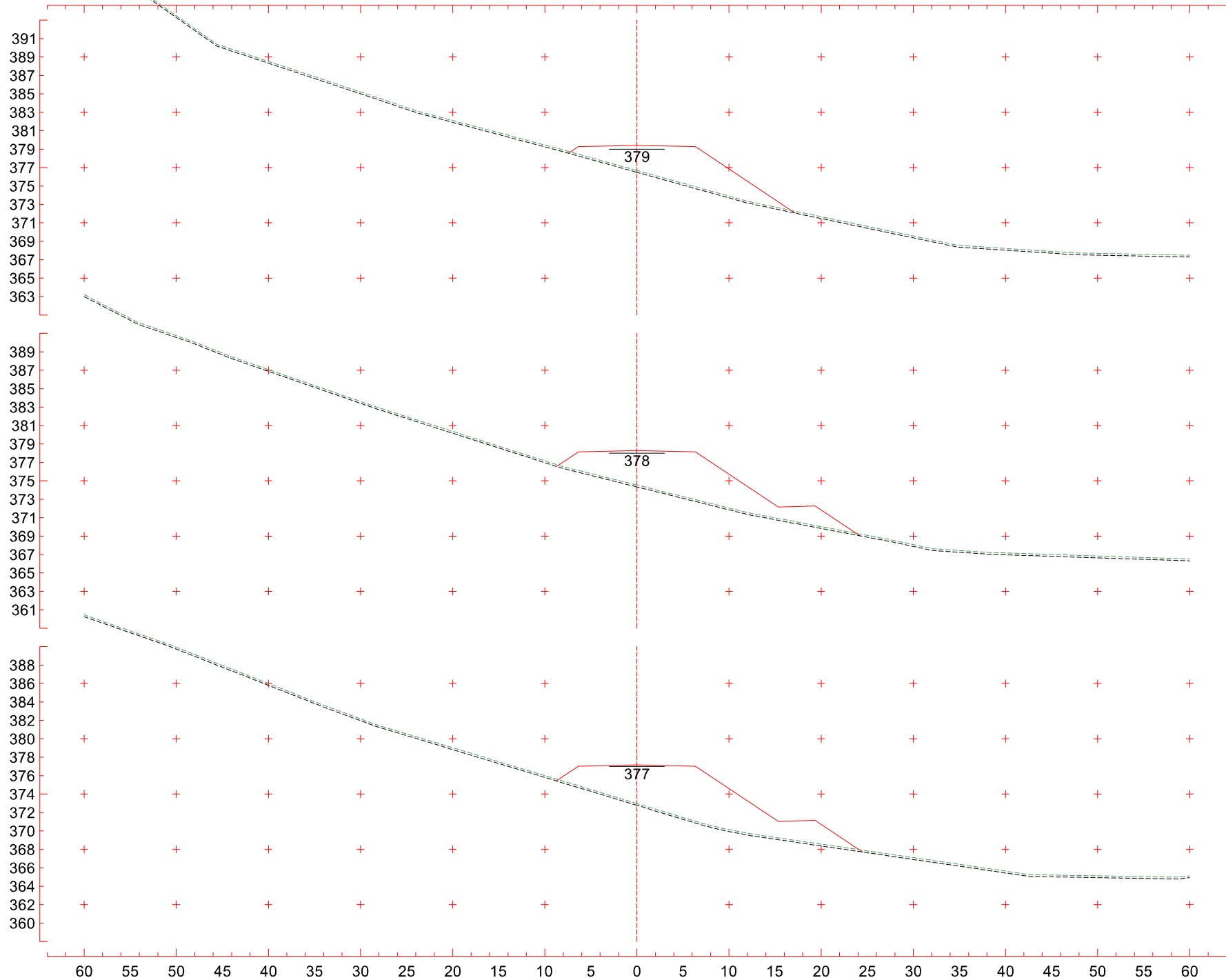
CT 371,362 m  
CP 374,925 m

2+880

CT 371,308 m  
CP 373,807 m

Eixo1

Escala 1:400

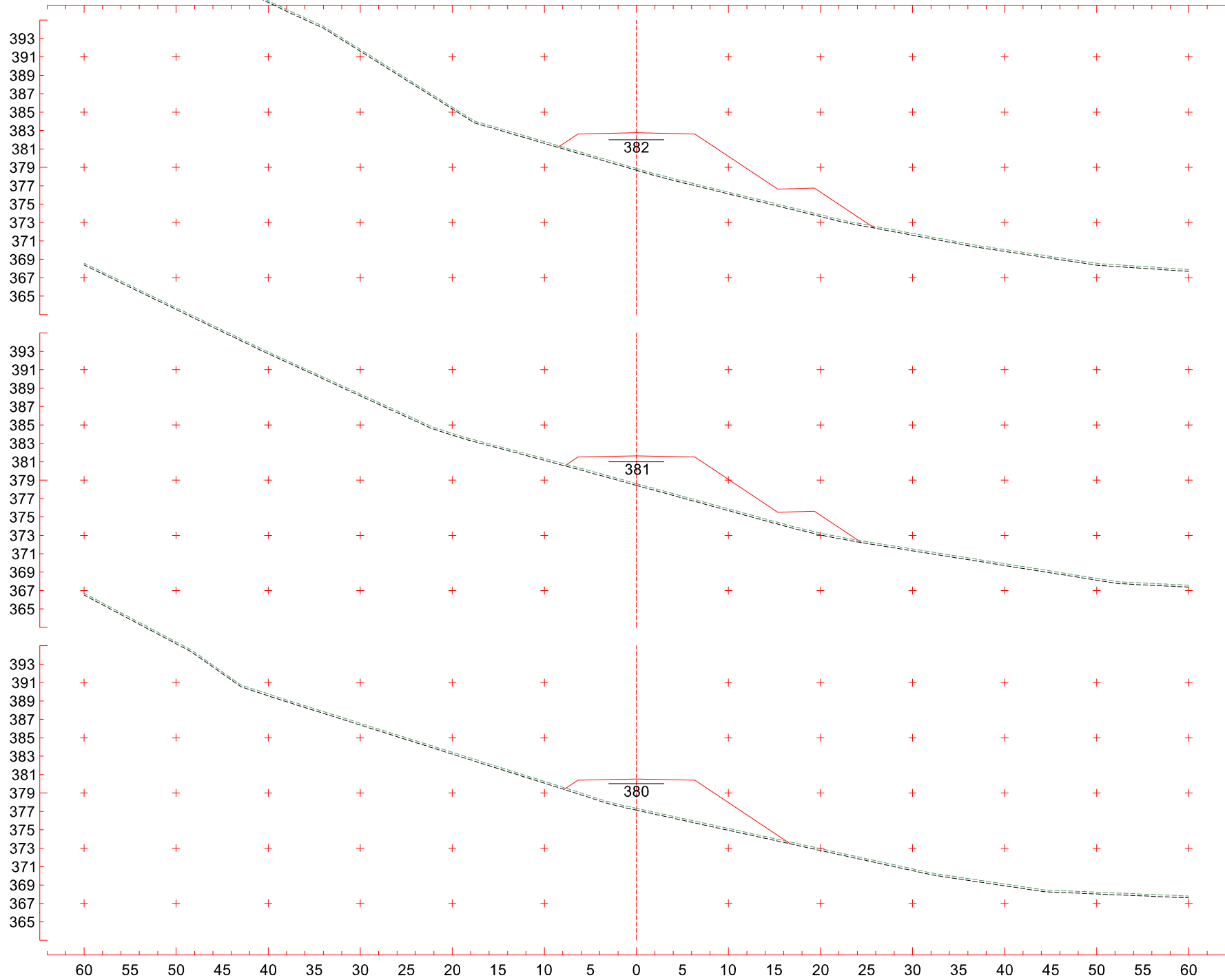


**2+980**  
CT 376,686 m  
CP 379,398 m

**2+960**  
CT 374,543 m  
CP 378,280 m

**2+940**  
CT 372,978 m  
CP 377,162 m

**Eixo1**  
Escala 1:400



**3+040**

CT 378,880 m  
CP 382,753 m

**3+020**

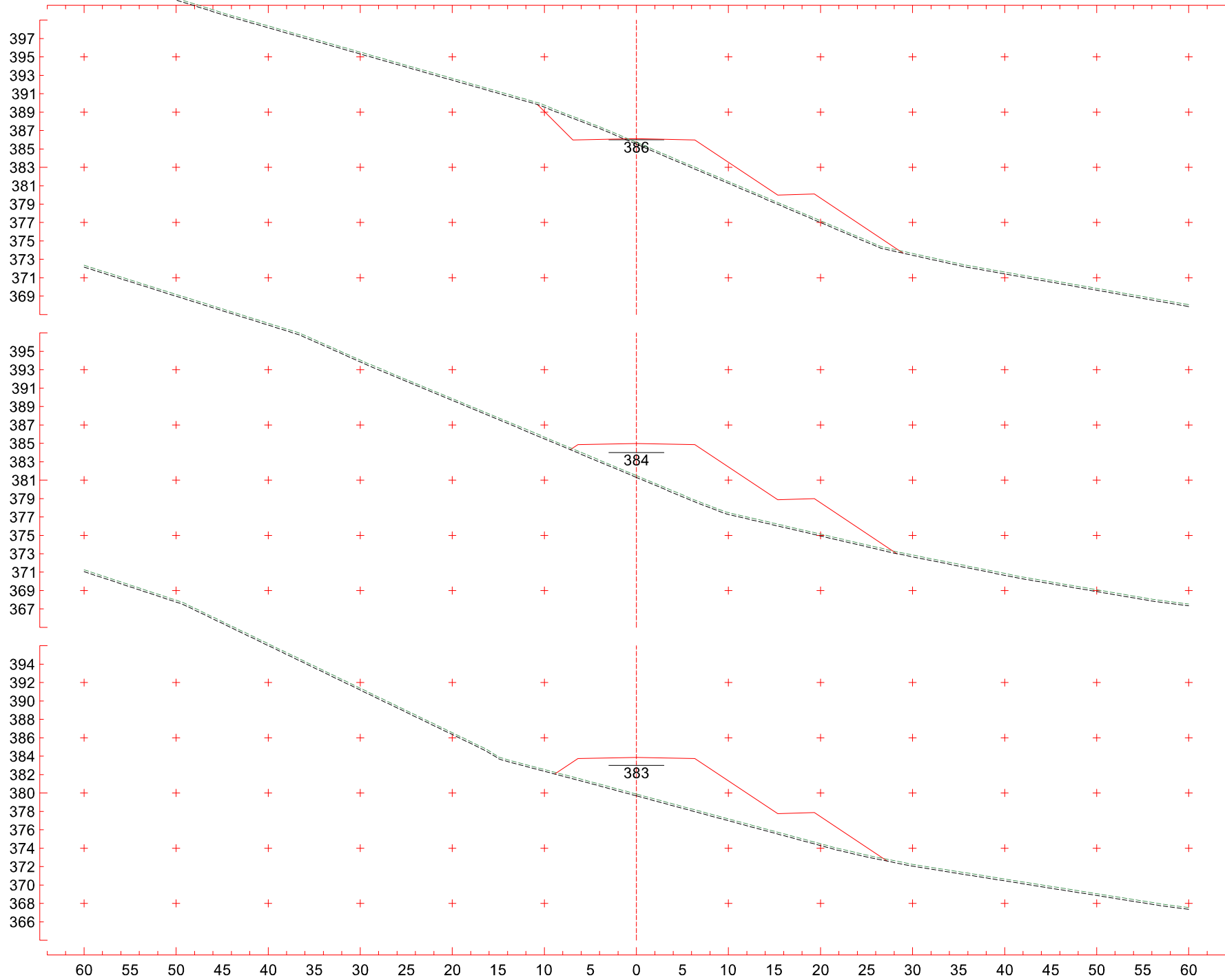
CT 378,631 m  
CP 381,635 m

**3+000**

CT 377,337 m  
CP 380,517 m

**Eixo1**

Escala 1:400



**3+100**

CT 385,718 m  
CP 386,108 m

**3+080**

CT 381,497 m  
CP 384,989 m

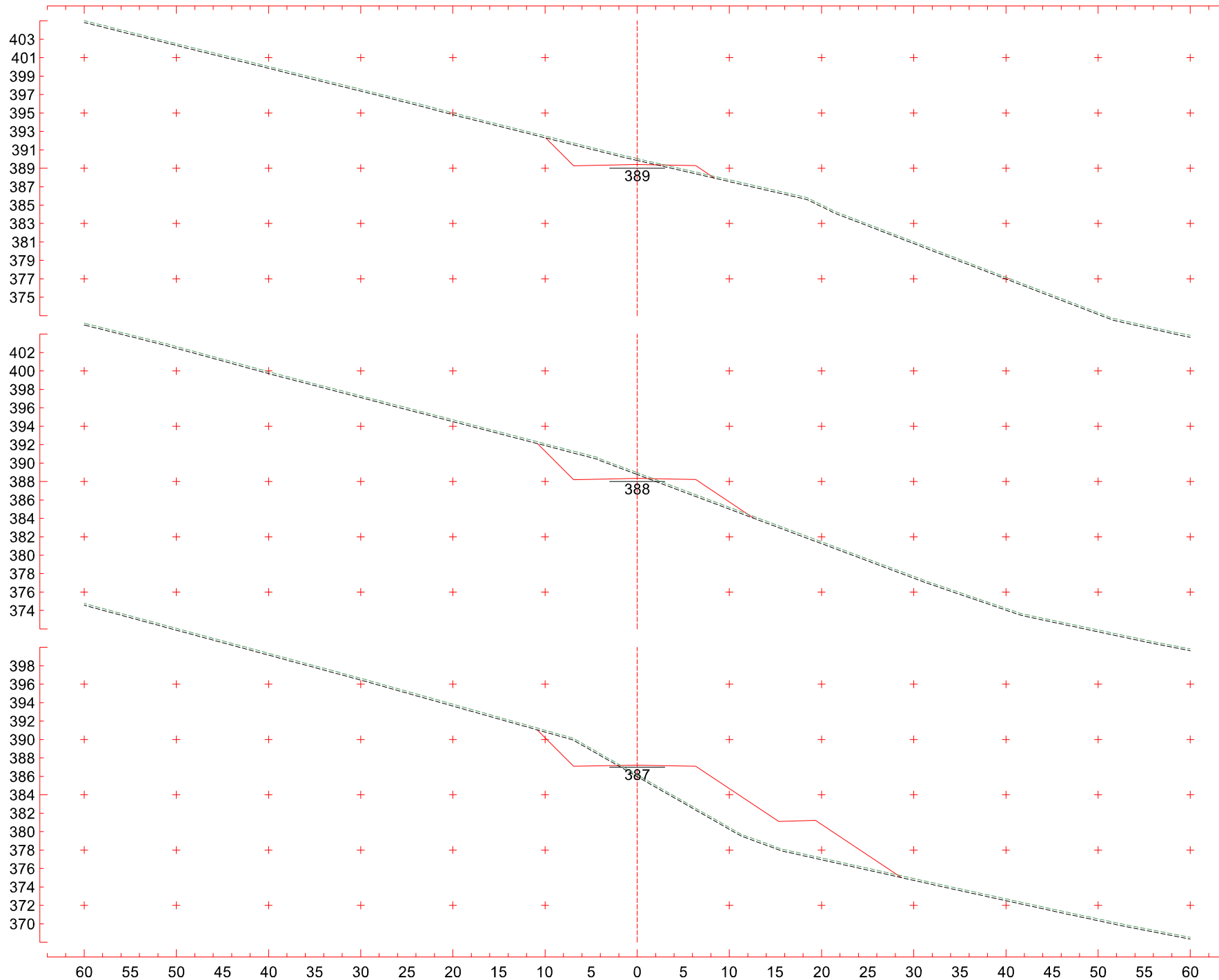
**3+060**

CT 379,884 m  
CP 383,871 m

**Eixo1**

Escala 1:400



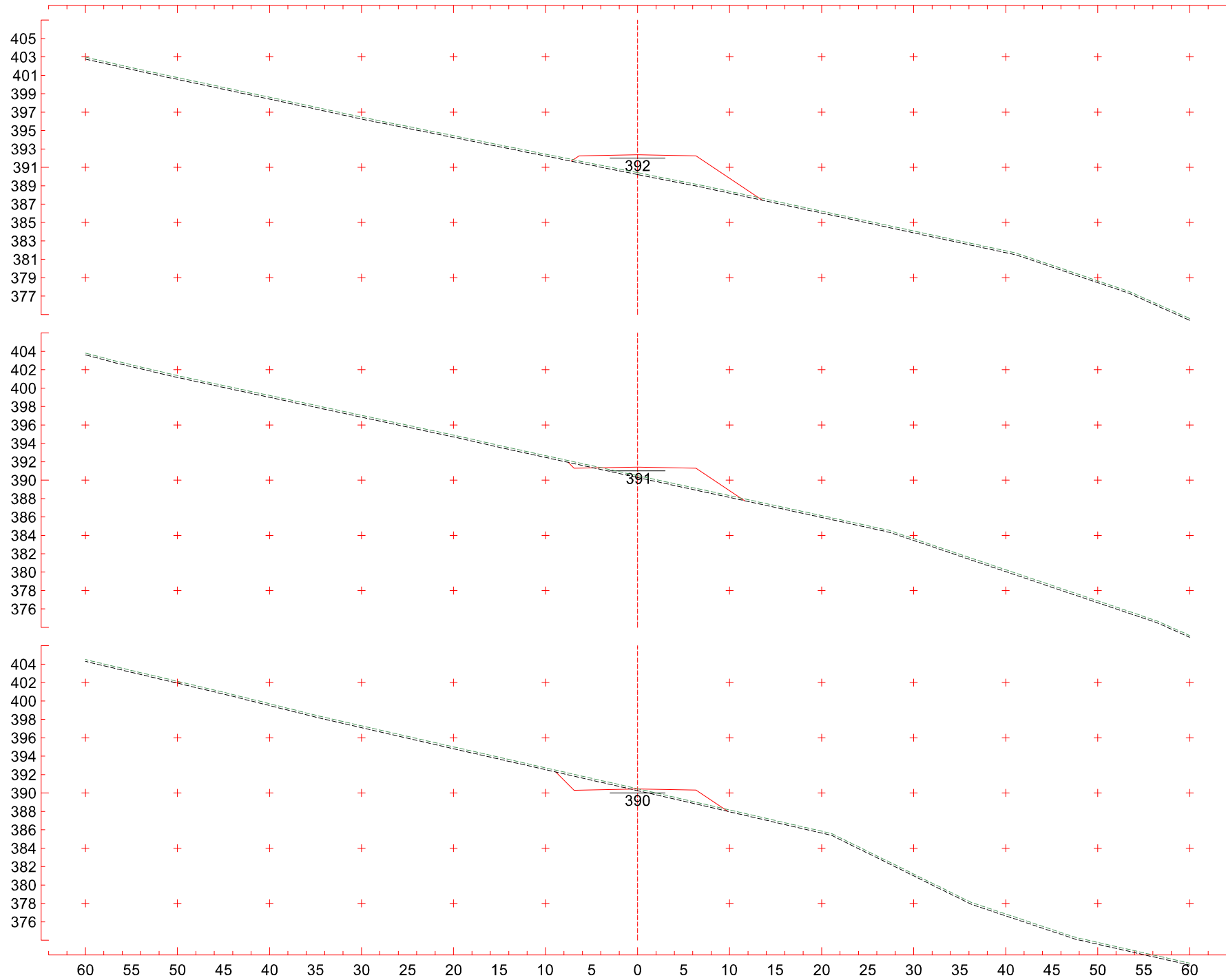


**3+160**  
CT 390,046 m  
CP 389,405 m

**3+140**  
CT 388,958 m  
CP 388,335 m

**3+120**  
CT 386,166 m  
CP 387,226 m

**Eixo1**  
Escala 1:400

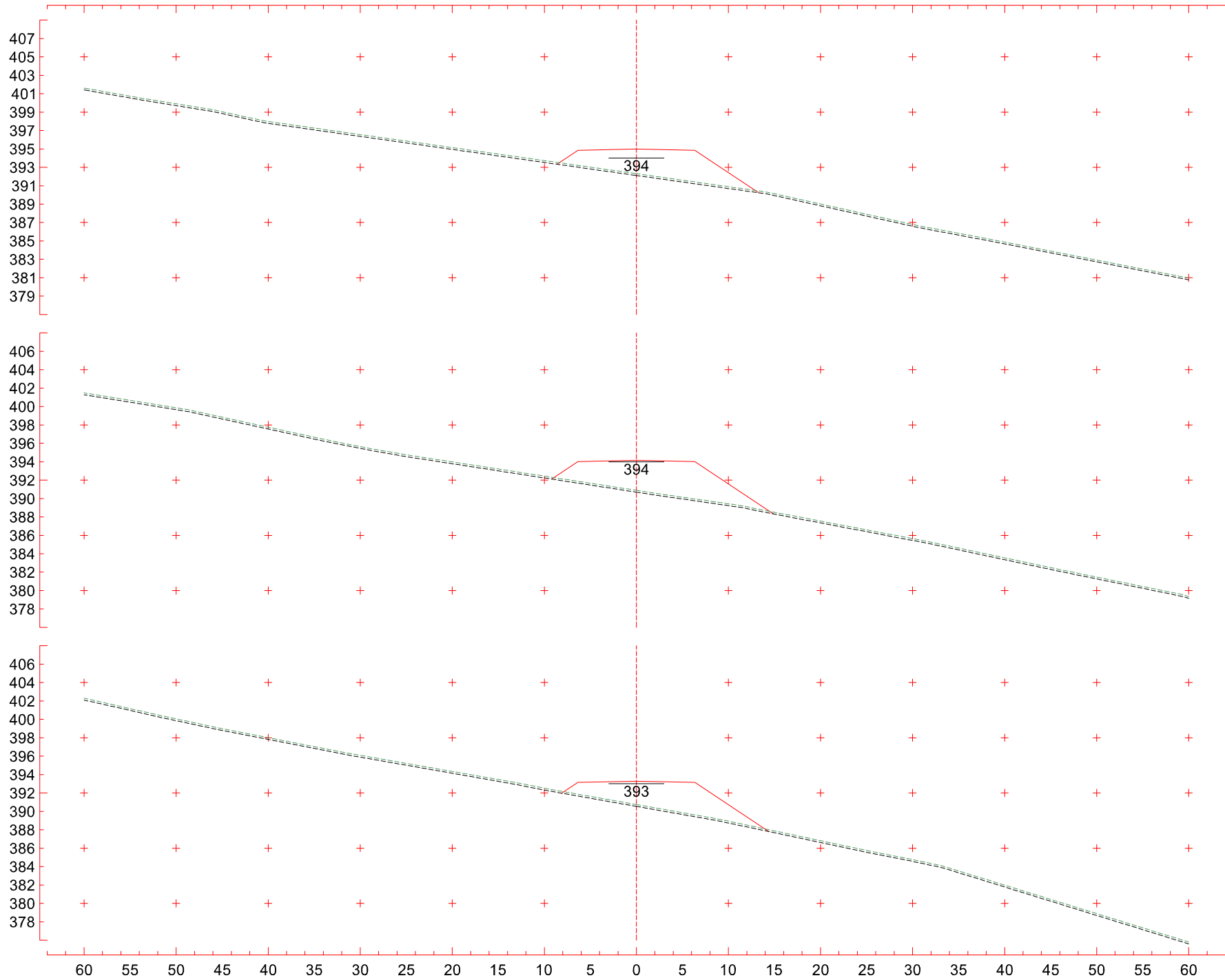


**3+220**  
CT 390,418 m  
CP 392,374 m

**3+200**  
CT 390,492 m  
CP 391,425 m

**3+180**  
CT 390,456 m  
CP 390,435 m

**Eixo1**  
Escala 1:400



**3+280**

CT 392,310 m  
CP 394,980 m

**3+260**

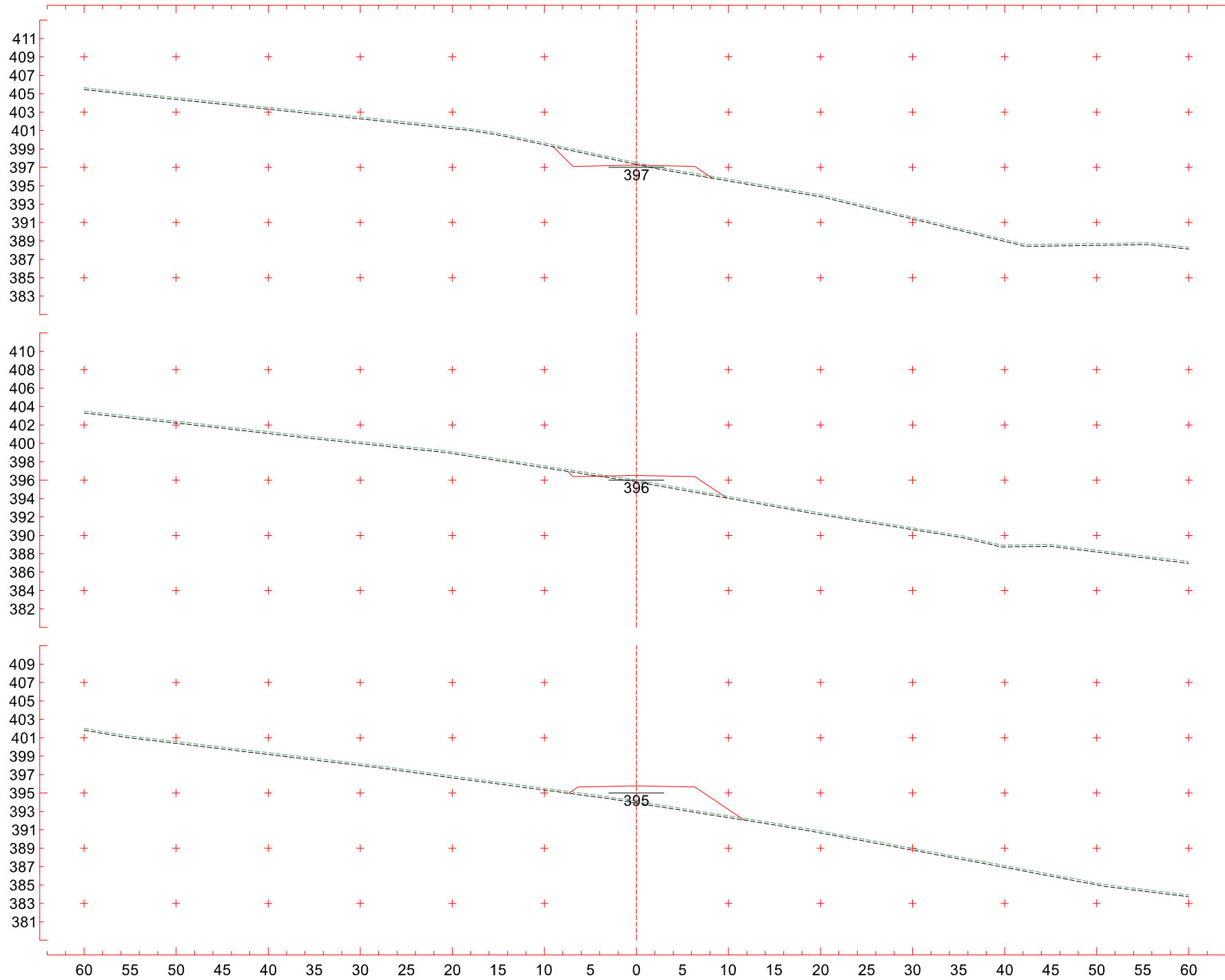
CT 390,894 m  
CP 394,151 m

**3+240**

CT 390,742 m  
CP 393,283 m

**Eixo1**

Escala 1:400



**3+340**

CT 397,518 m  
CP 397,232 m

**3+320**

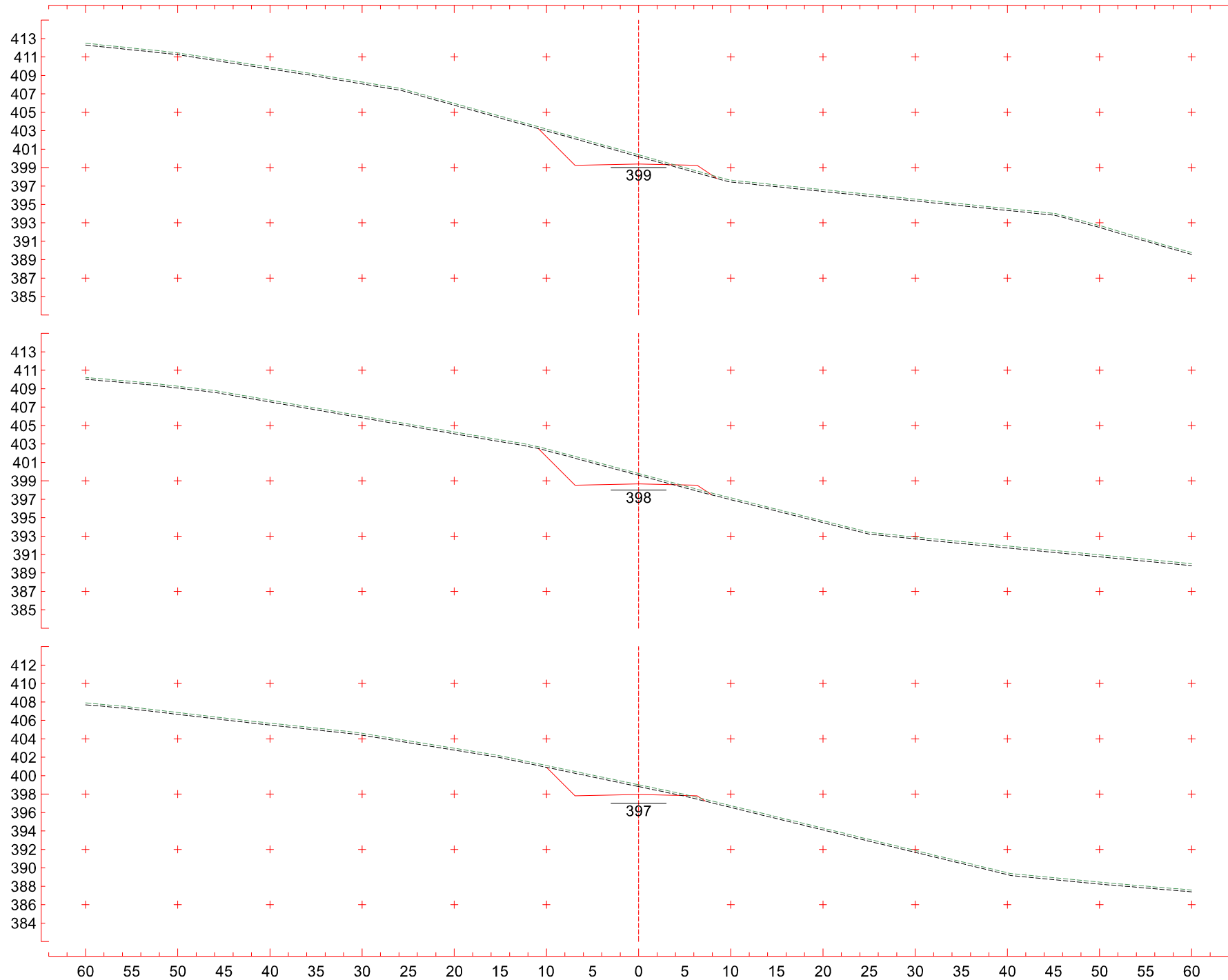
CT 396,016 m  
CP 396,515 m

**3+300**

CT 394,101 m  
CP 395,768 m

**Eixo1**

Escala 1:400

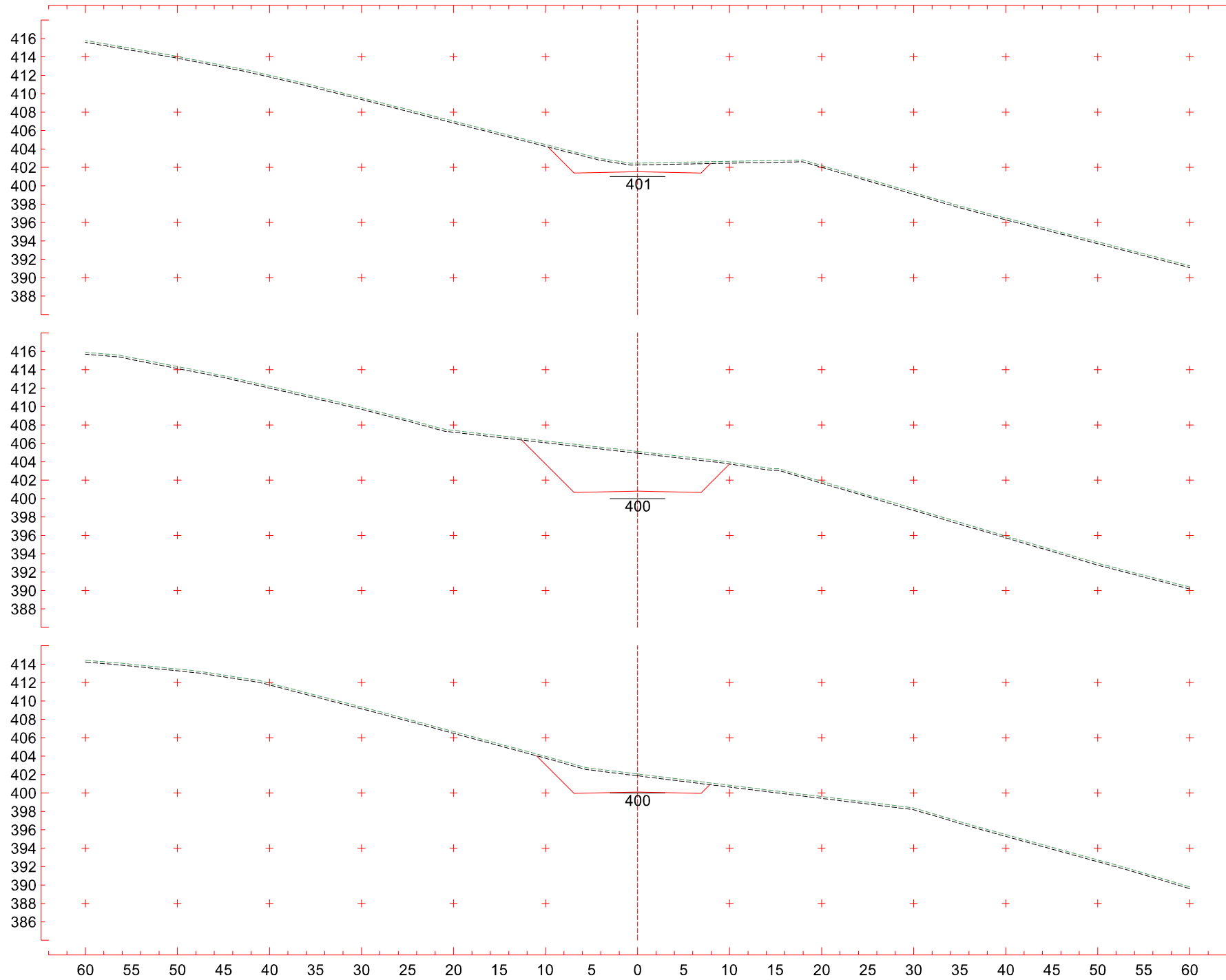


**3+400**  
CT 400,386 m  
CP 399,375 m

**3+380**  
CT 399,796 m  
CP 398,661 m

**3+360**  
CT 399,016 m  
CP 397,946 m

**Eixo1**  
Escala 1:400

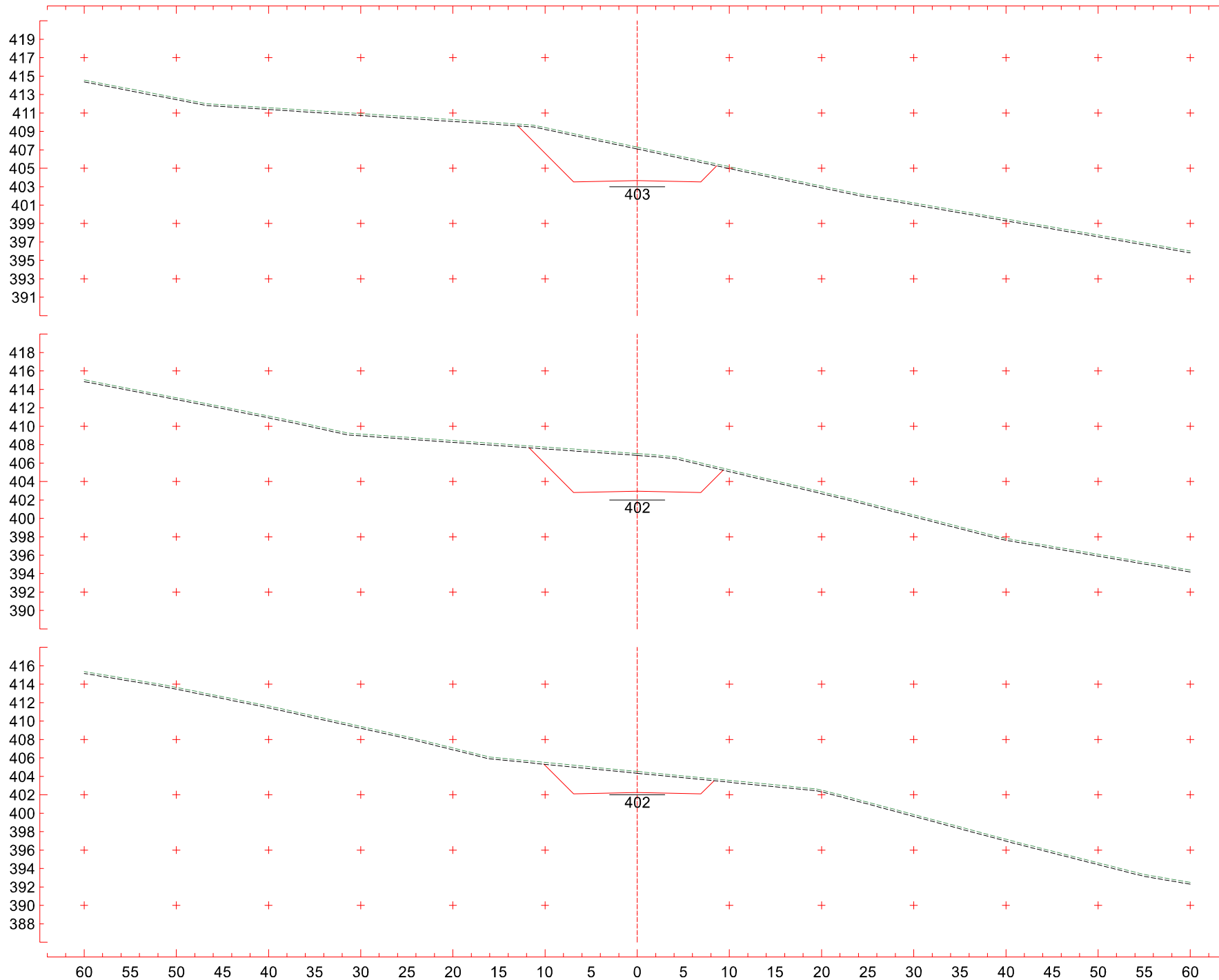


**3+460**  
CT 402,458 m  
CP 401,519 m

**3+440**  
CT 405,125 m  
CP 400,805 m

**3+420**  
CT 402,066 m  
CP 400,090 m

**Eixo1**  
Escala 1:400



**3+520**

CT 407,291 m  
CP 403,663 m

**3+500**

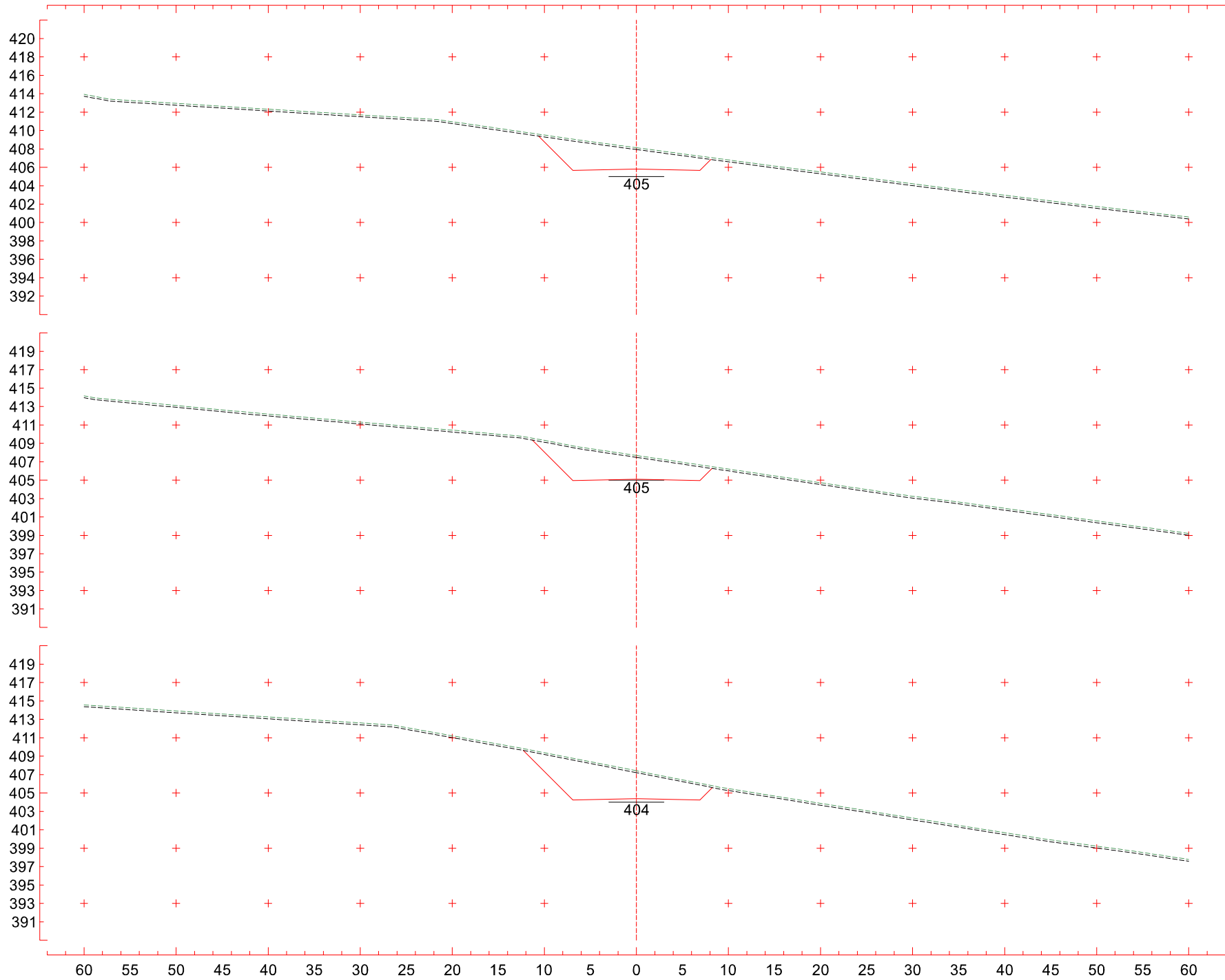
CT 407,032 m  
CP 402,949 m

**3+480**

CT 404,535 m  
CP 402,234 m

**Eixo1**

Escala 1:400



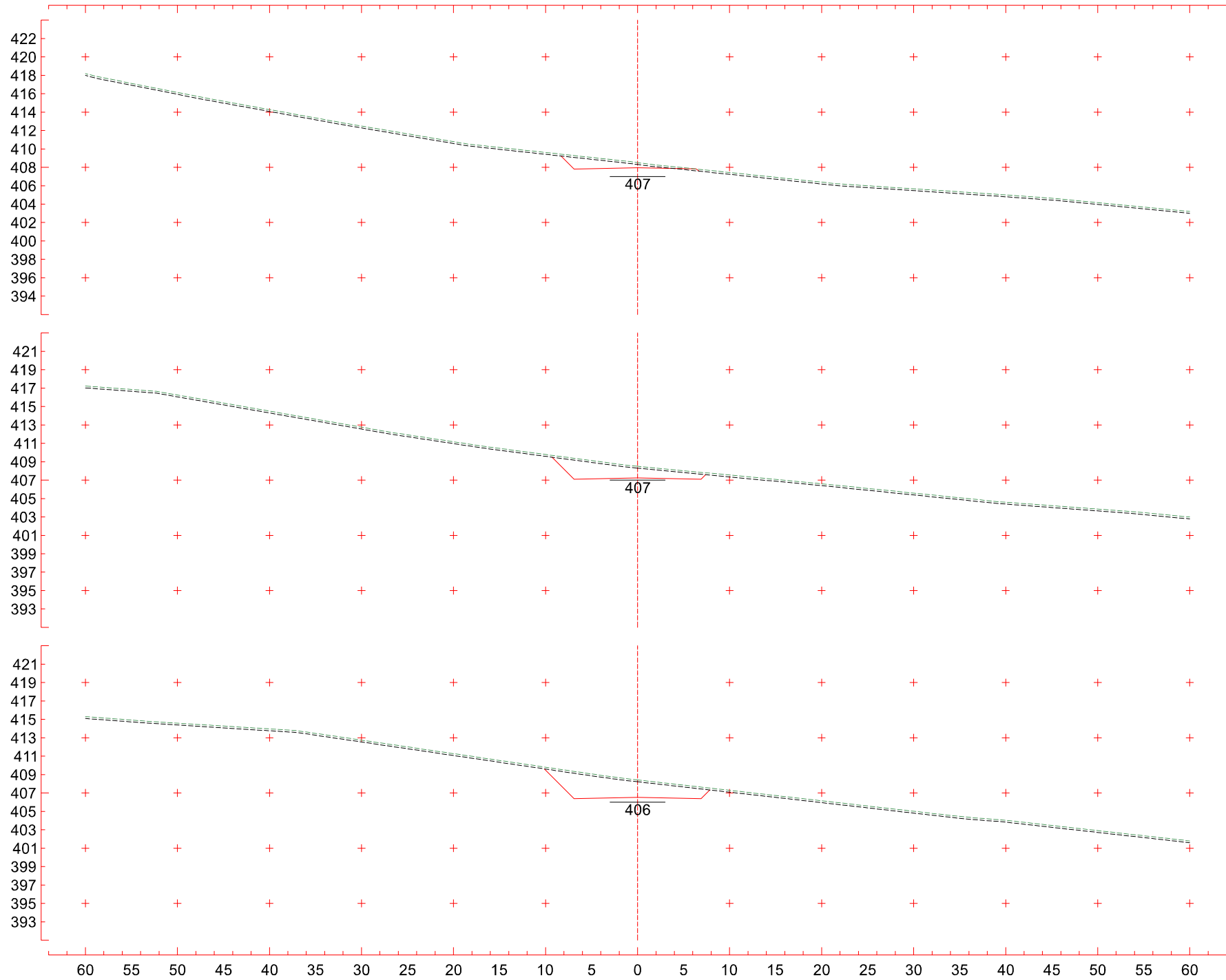
**3+580**  
CT 408,132 m  
CP 405,807 m

**3+560**  
CT 407,681 m  
CP 405,092 m

**3+540**  
CT 407,414 m  
CP 404,378 m

**Eixo1**  
Escala 1:400



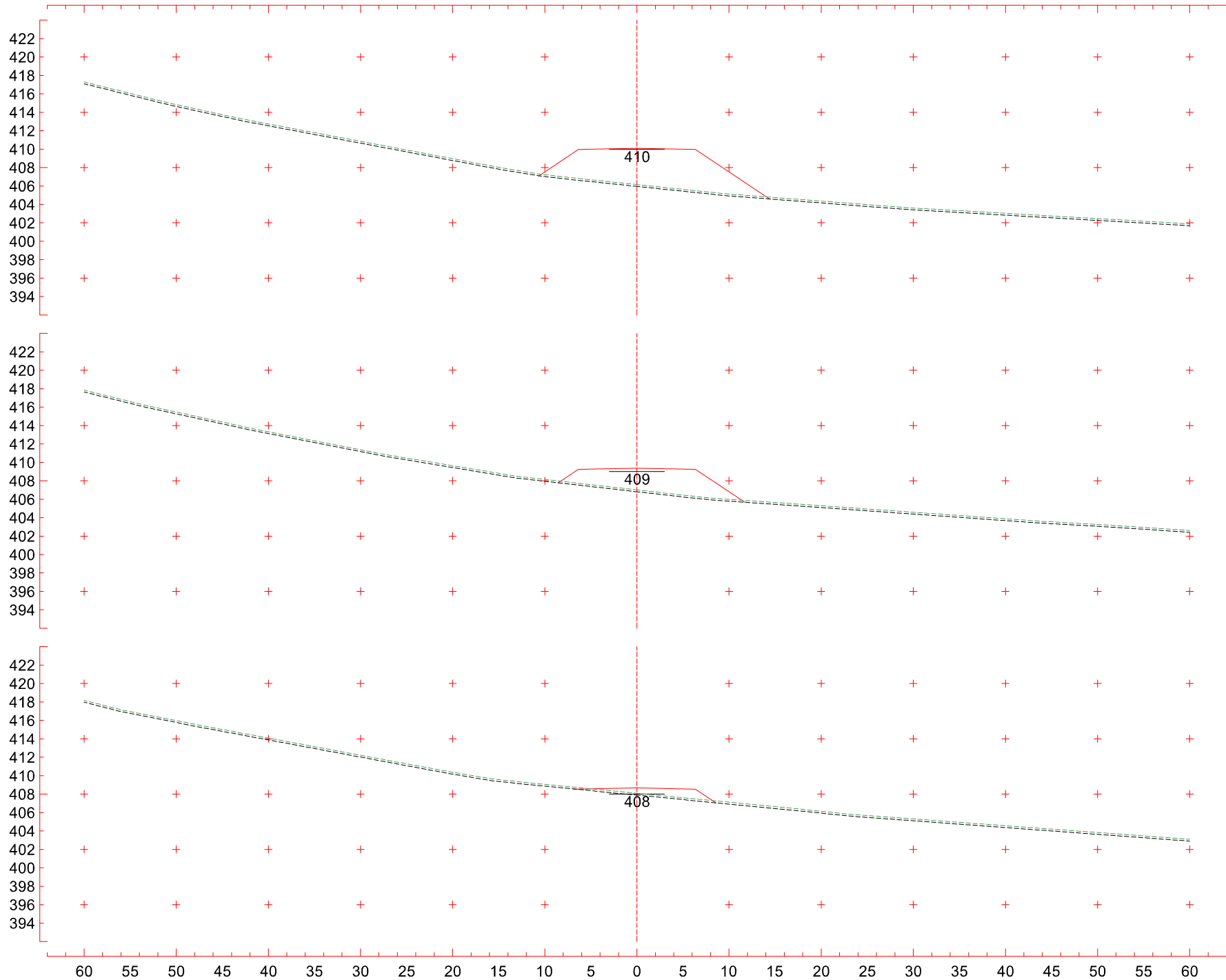


**3+640**  
CT 408,509 m  
CP 407,951 m

**3+620**  
CT 408,503 m  
CP 407,236 m

**3+600**  
CT 408,418 m  
CP 406,522 m

**Eixo1**  
Escala 1:400

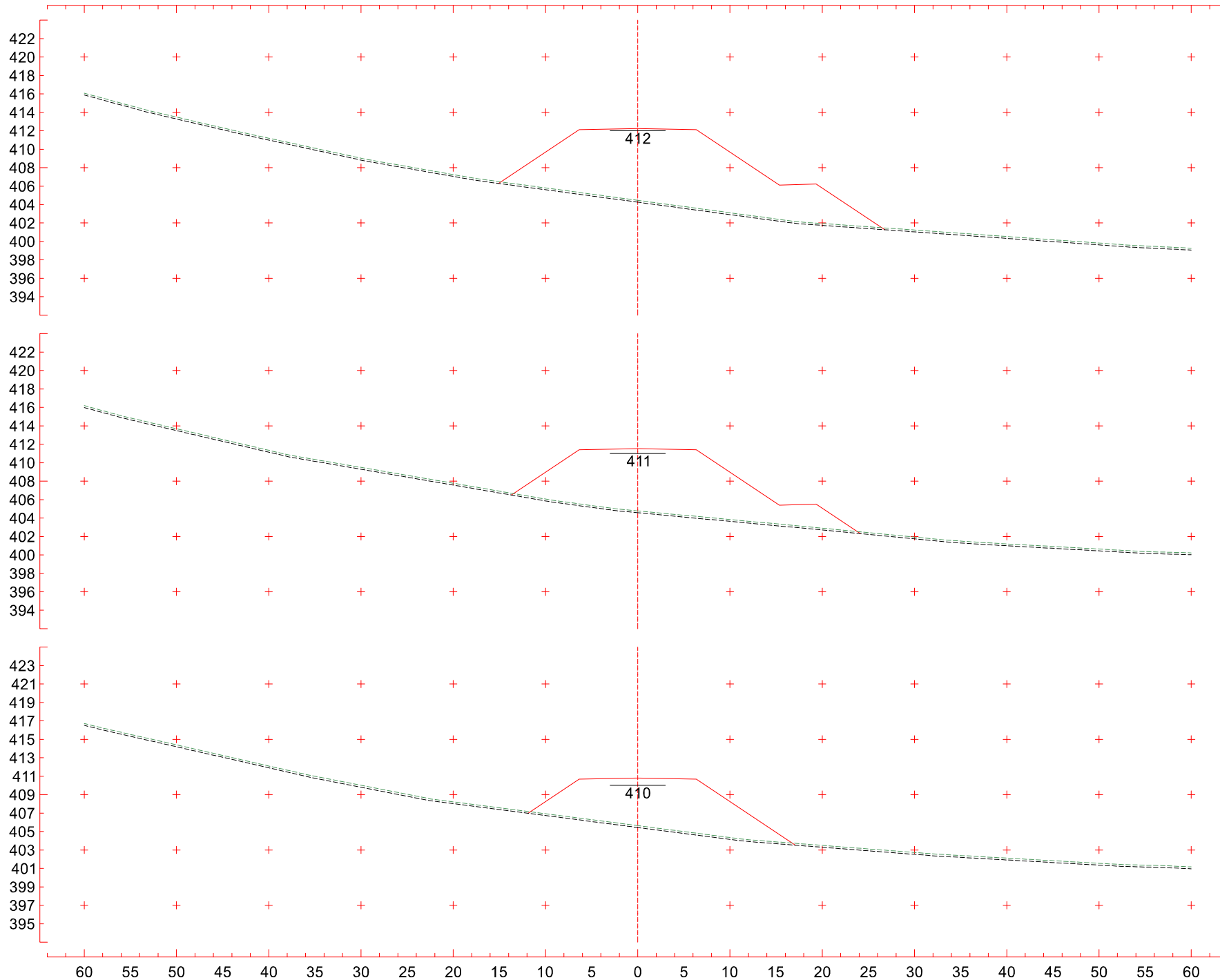


**3+700**  
CT 406,154 m  
CP 410,095 m

**3+680**  
CT 407,015 m  
CP 409,380 m

**3+660**  
CT 408,086 m  
CP 408,665 m

**Eixo1**  
Escala 1:400

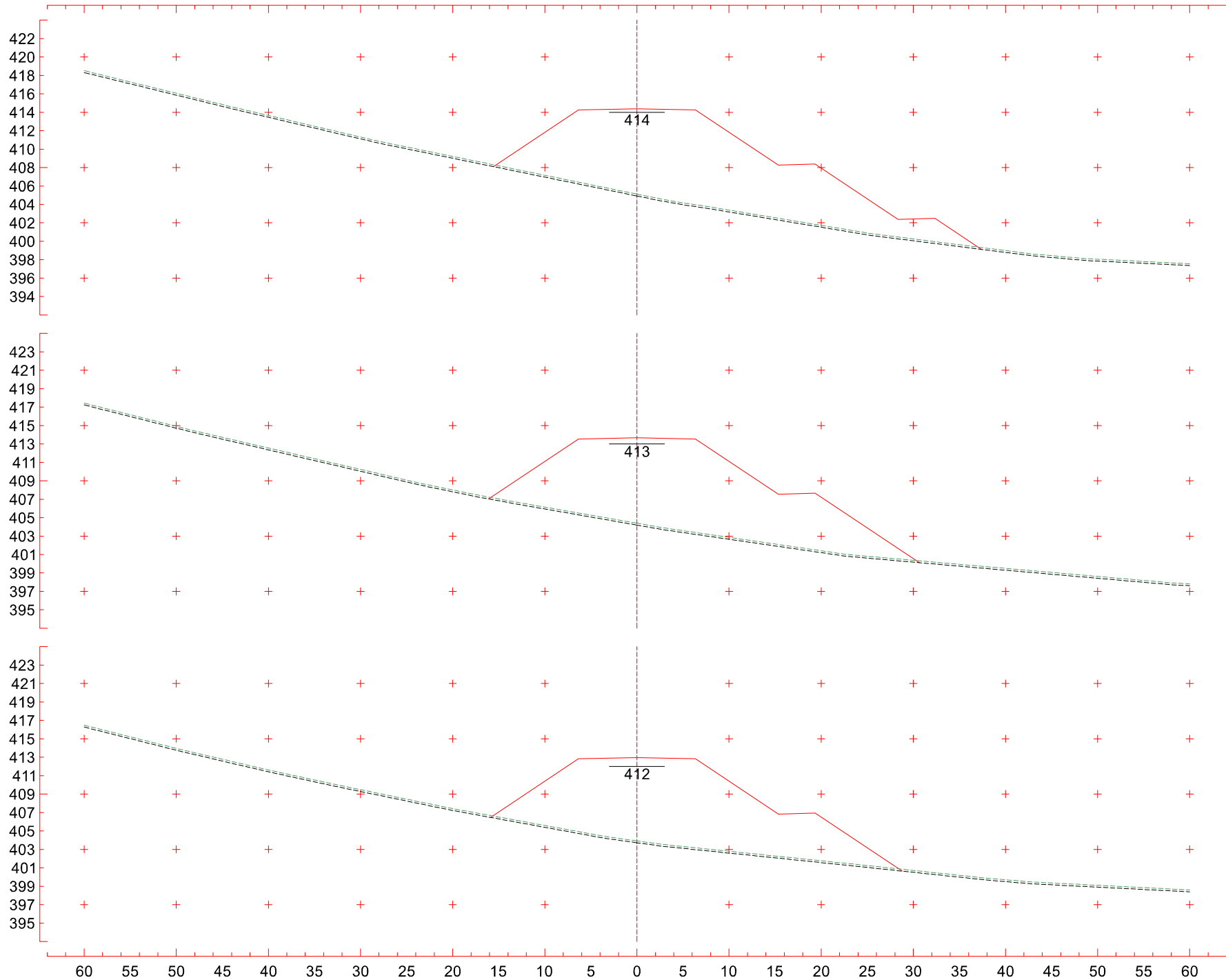


**3+760**  
CT 404,458 m  
CP 412,239 m

**3+740**  
CT 404,775 m  
CP 411,524 m

**3+720**  
CT 405,640 m  
CP 410,809 m

**Eixo1**  
Escala 1:400



**3+820**

CT 405,115 m  
CP 414,382 m

**3+800**

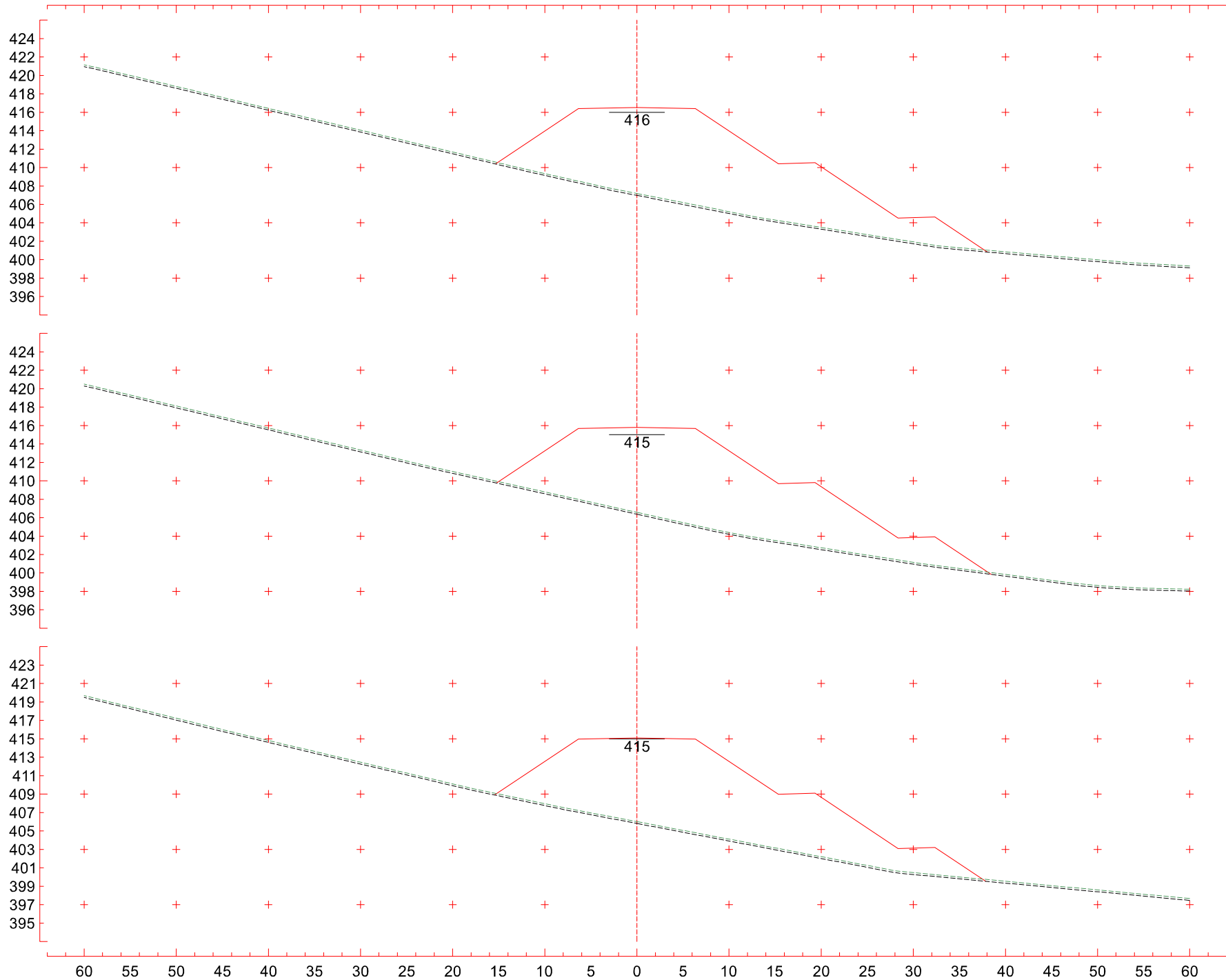
CT 404,396 m  
CP 413,668 m

**3+780**

CT 403,920 m  
CP 412,953 m

**Eixo1**

Escala 1:400



**3+880**

CT 407,180 m  
CP 416,526 m

**3+860**

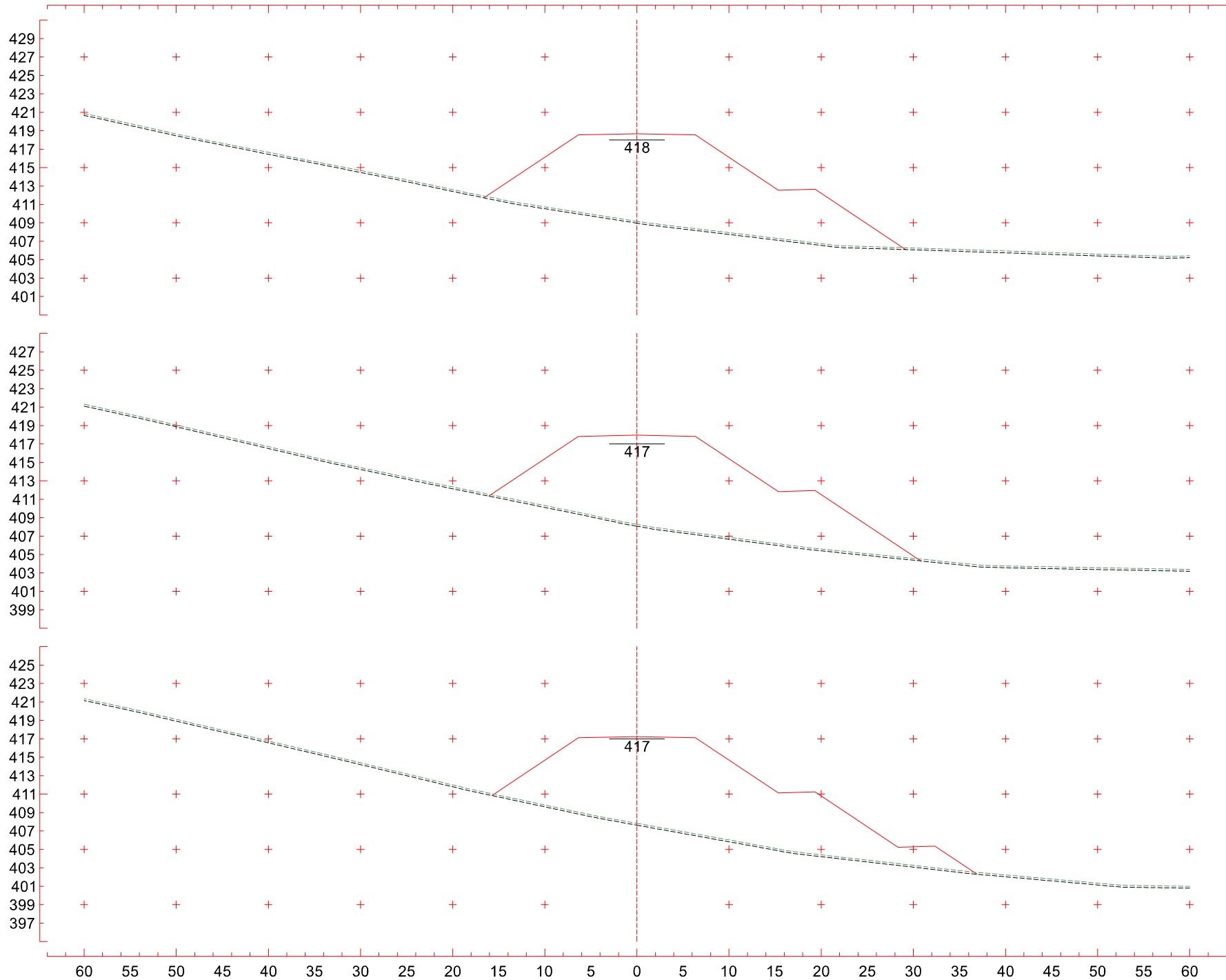
CT 406,575 m  
CP 415,812 m

**3+840**

CT 406,011 m  
CP 415,097 m

**Eixo1**

Escala 1:400



**3+940**

CT 409,166 m  
CP 418,670 m

**3+920**

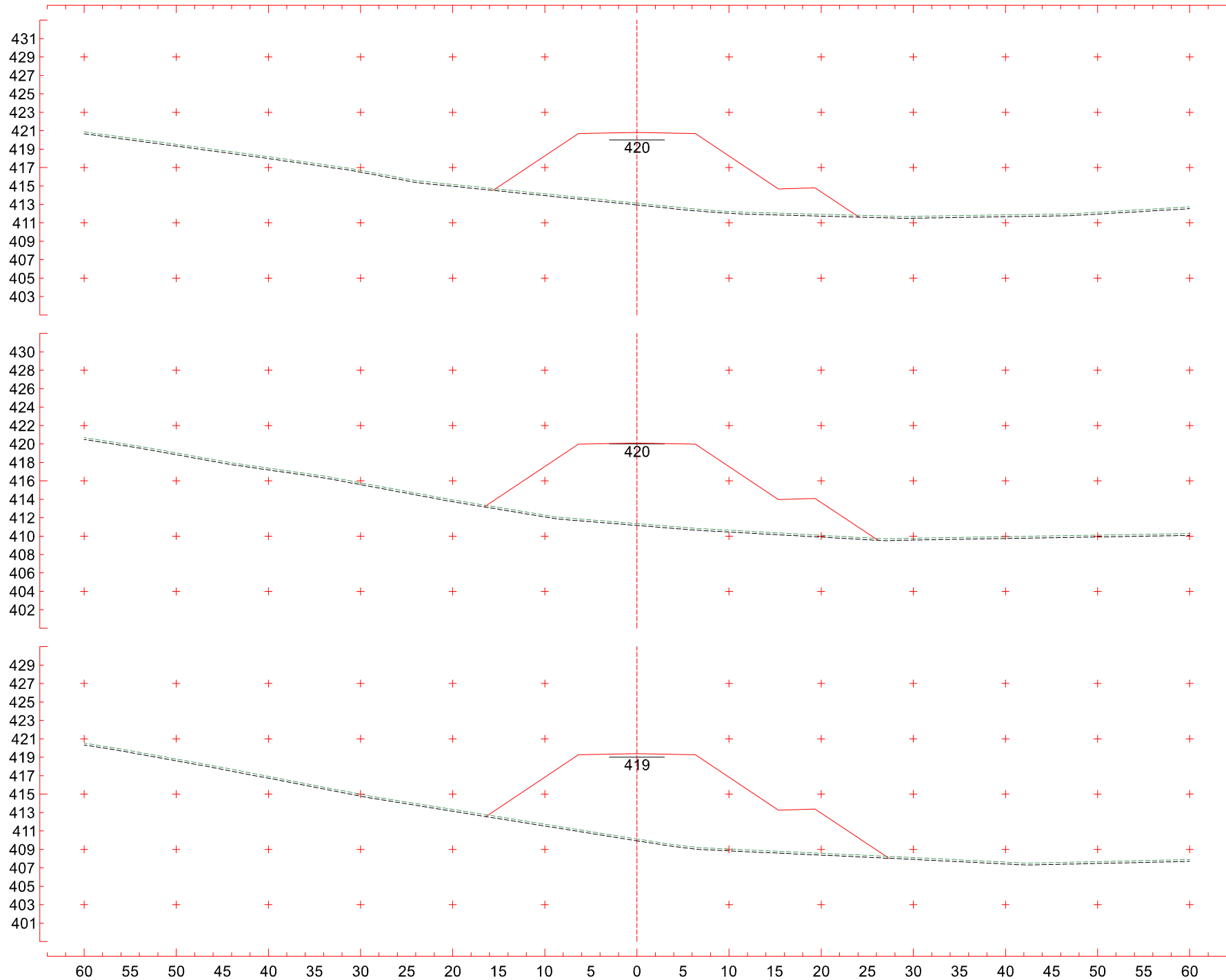
CT 408,276 m  
CP 417,955 m

**3+900**

CT 407,825 m  
CP 417,241 m

**Eixo1**

Escala 1:400

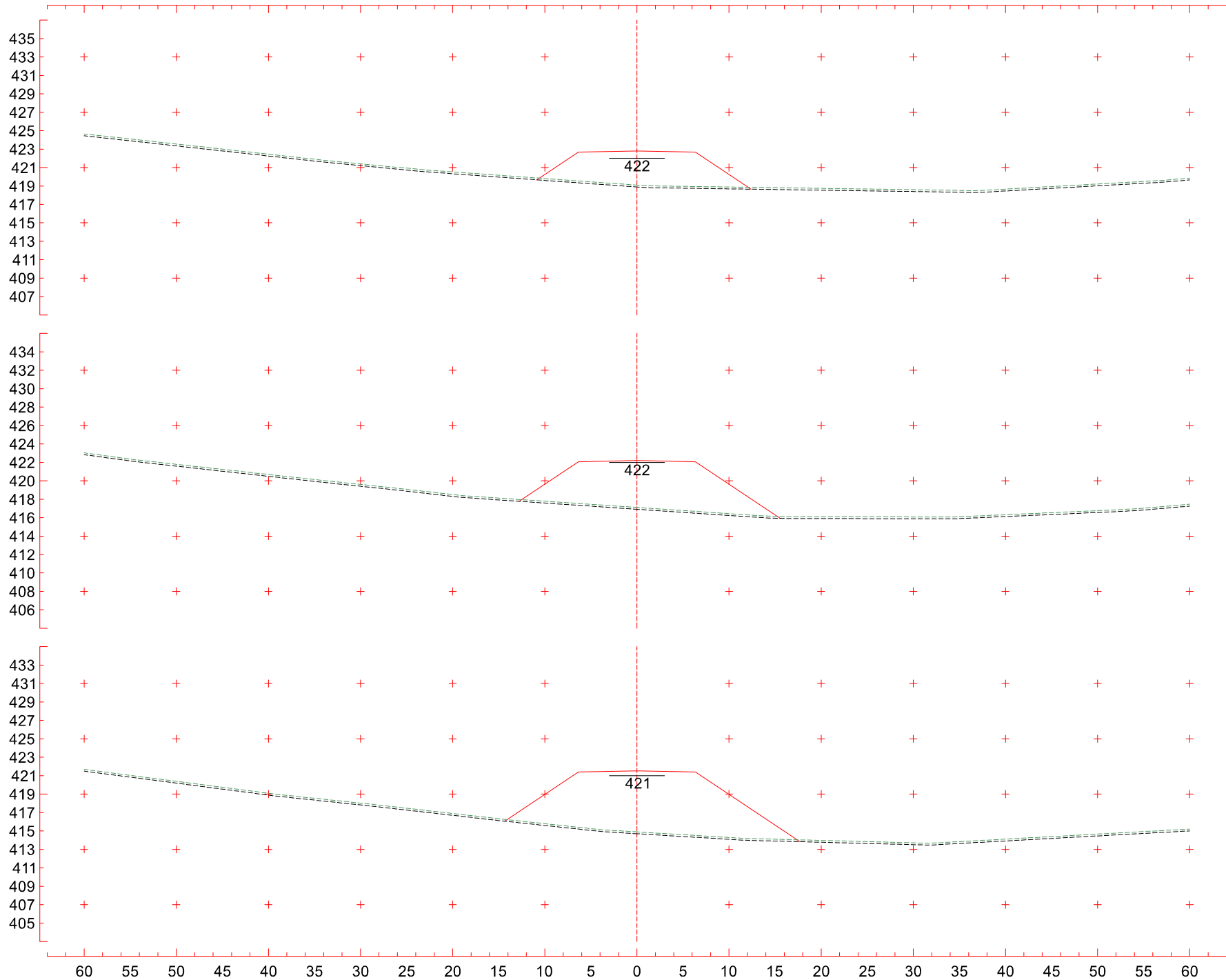


**4+000**  
CT 413,139 m  
CP 420,814 m

**3+980**  
CT 411,359 m  
CP 420,099 m

**3+960**  
CT 410,129 m  
CP 419,385 m

**Eixo1**  
Escala 1:400



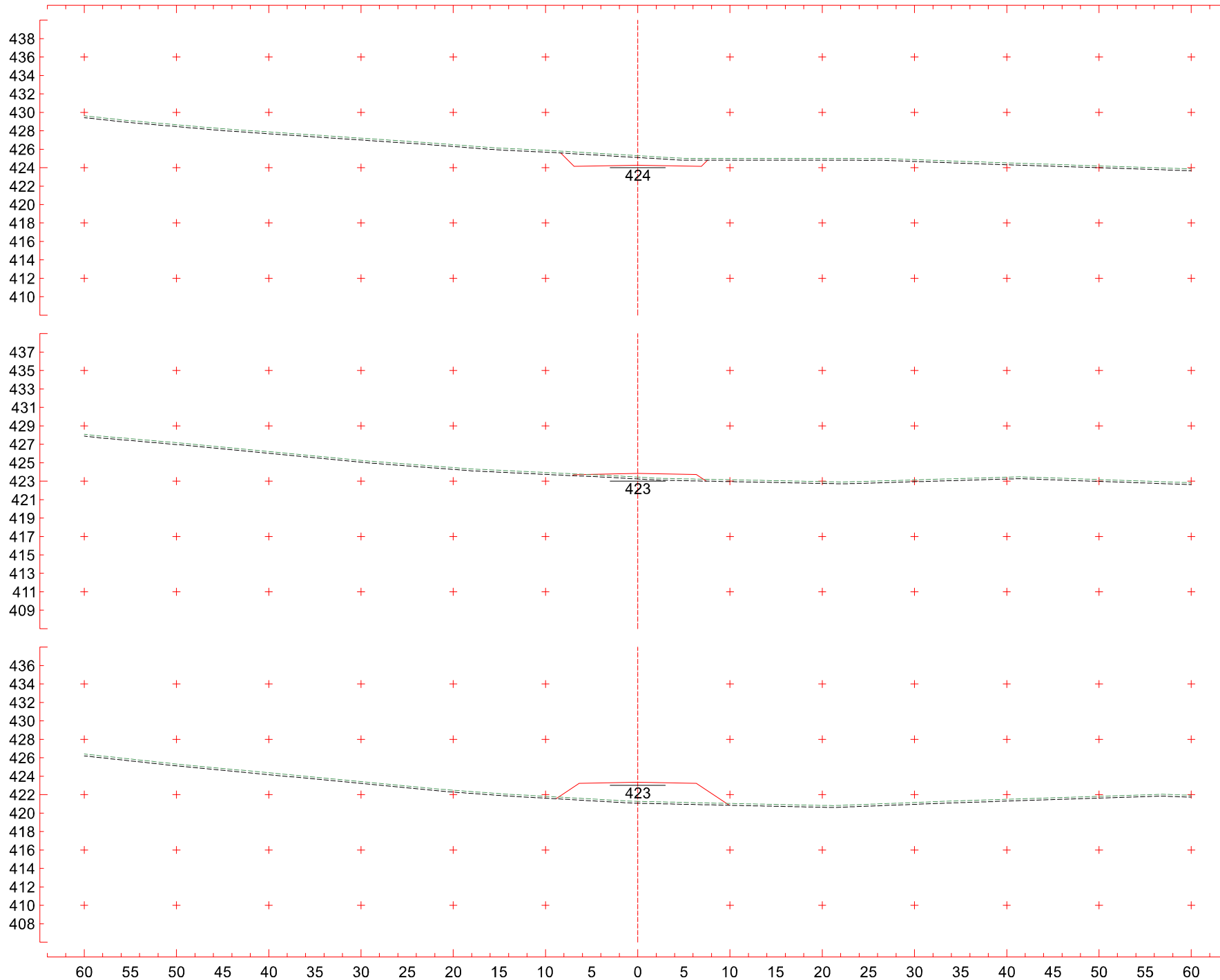
**4+060**  
CT 419,096 m  
CP 422,808 m

**4+040**  
CT 417,113 m  
CP 422,198 m

**4+020**  
CT 414,898 m  
CP 421,527 m

**Eixo1**  
Escala 1:400



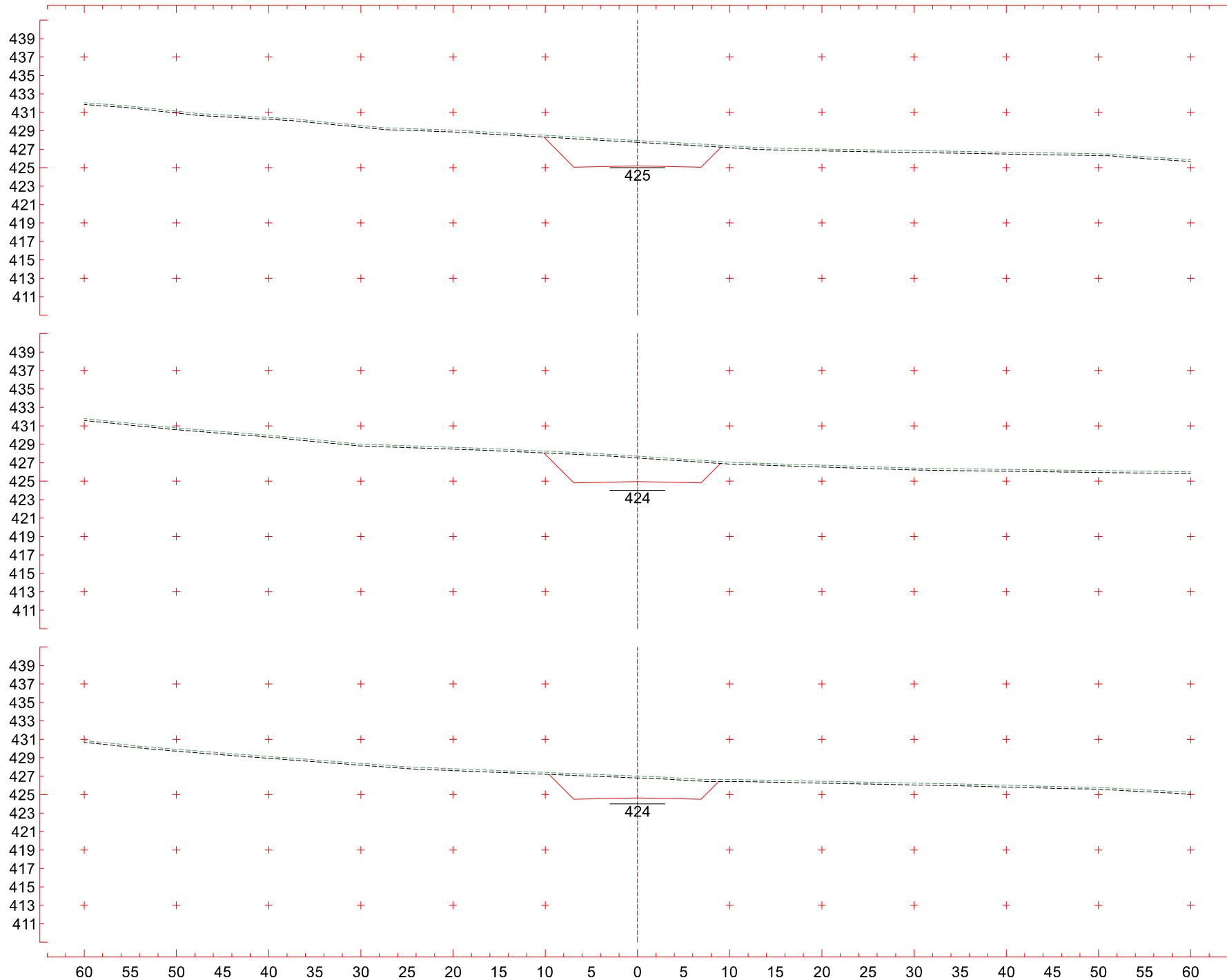


**4+120**  
CT 425,301 m  
CP 424,275 m

**4+100**  
CT 423,438 m  
CP 423,846 m

**4+080**  
CT 421,266 m  
CP 423,357 m

**Eixo 1**  
Escala 1:400



**4+180**

CT 427,946 m  
CP 425,197 m

**4+160**

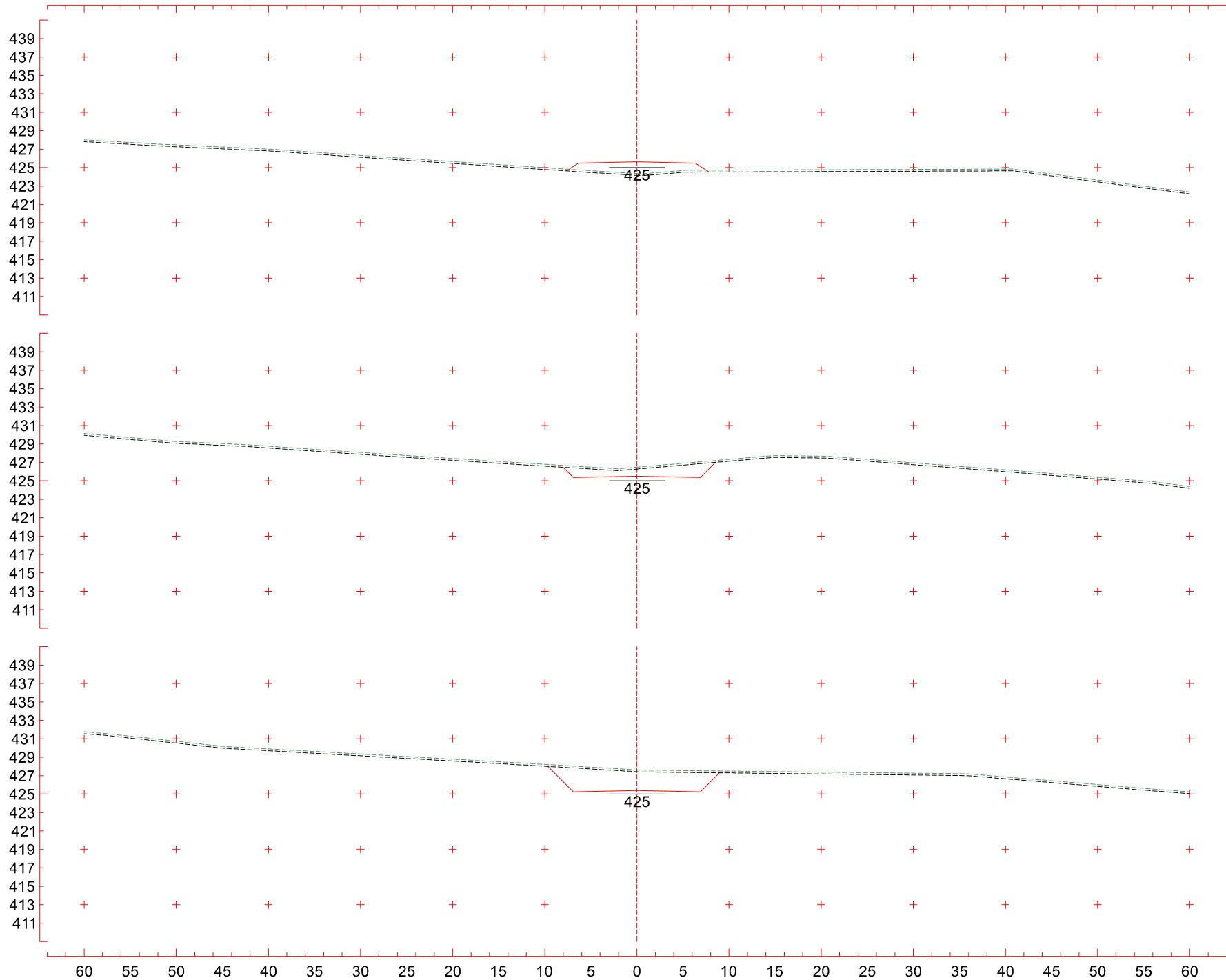
CT 427,716 m  
CP 424,950 m

**4+140**

CT 427,010 m  
CP 424,643 m

**Eixo1**

Escala 1:400

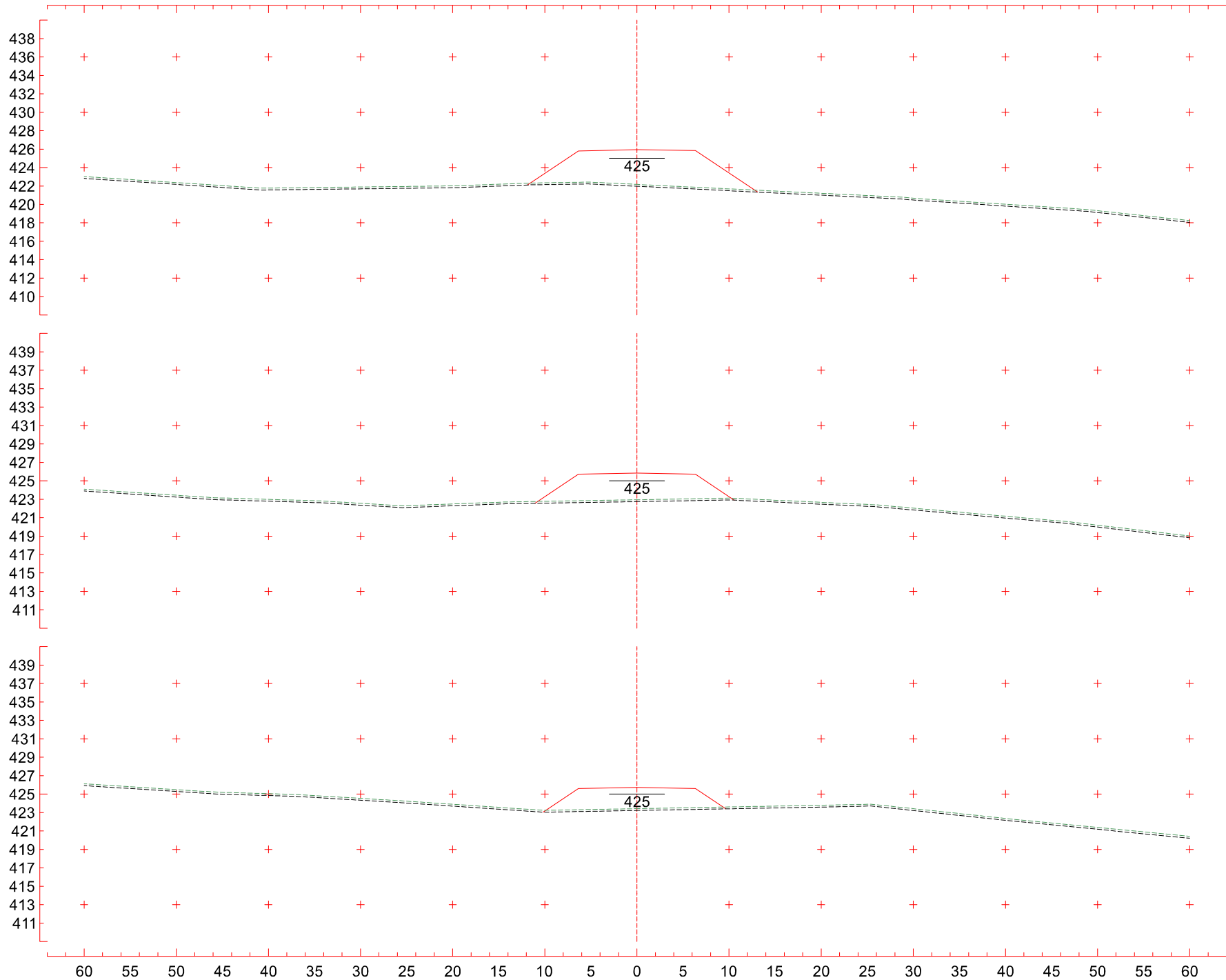


**4+240**  
CT 424,349 m  
CP 425,619 m

**4+220**  
CT 426,481 m  
CP 425,510 m

**4+200**  
CT 427,628 m  
CP 425,383 m

**Eixo1**  
Escala 1:400



4+300

CT 422,171 m  
CP 425,933 m

4+280

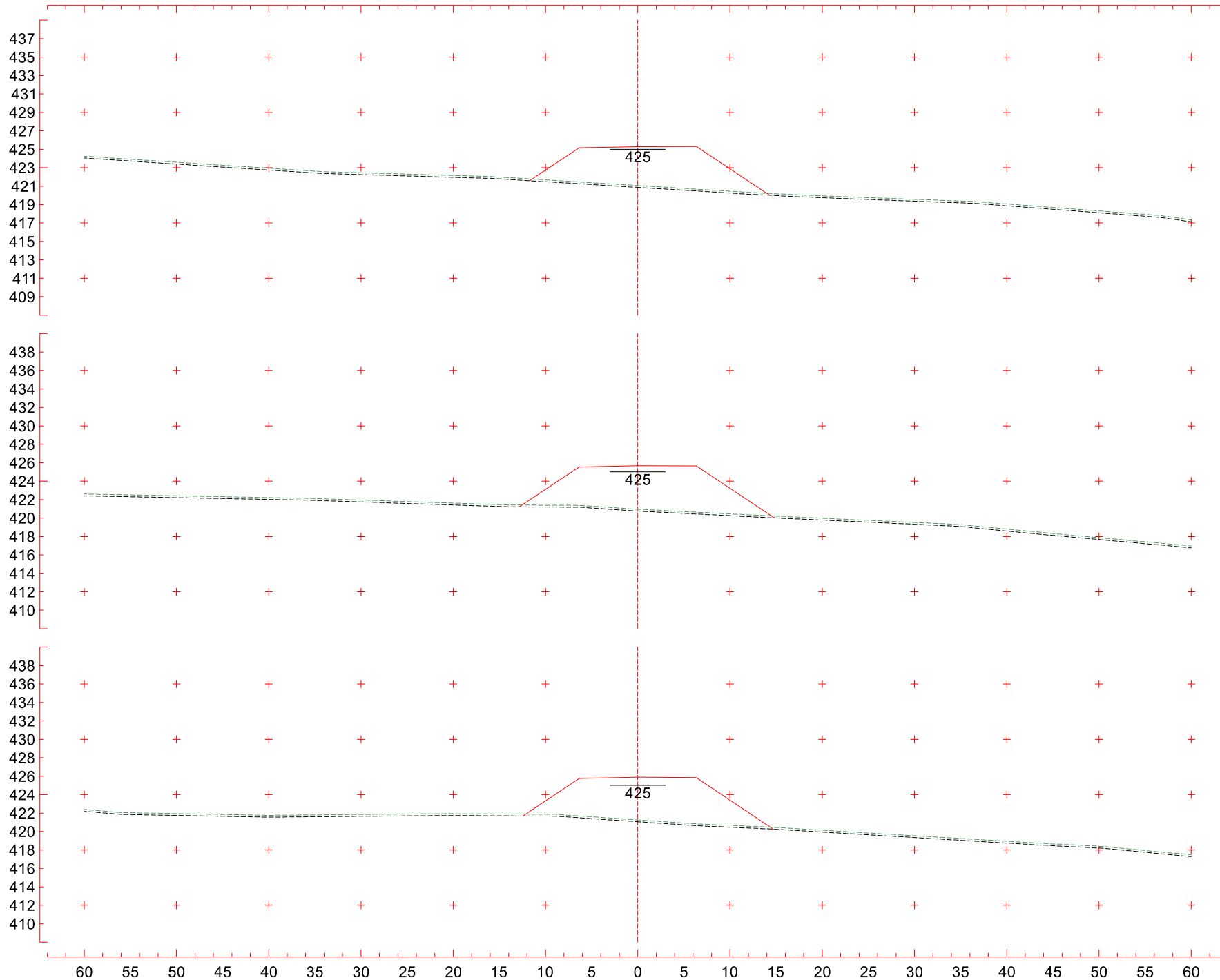
CT 422,941 m  
CP 425,837 m

4+260

CT 423,420 m  
CP 425,728 m

Eixo1

Escala 1:400



**4+360**

CT 421,064 m  
CP 425,289 m

**4+340**

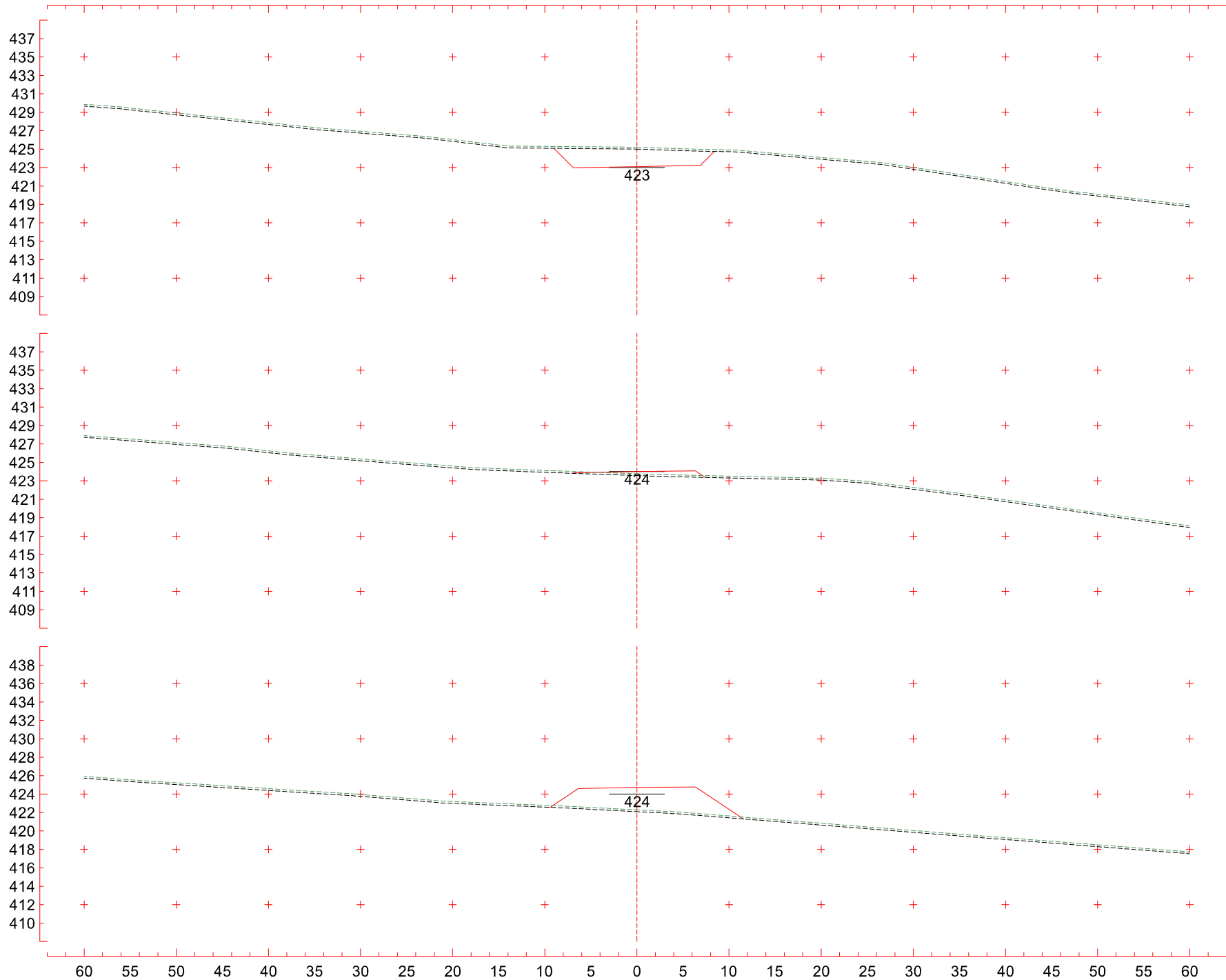
CT 420,957 m  
CP 425,675 m

**4+320**

CT 421,260 m  
CP 425,889 m

**Eixo1**

Escala 1:400



**4+420**

CT 425,198 m  
CP 423,108 m

**4+400**

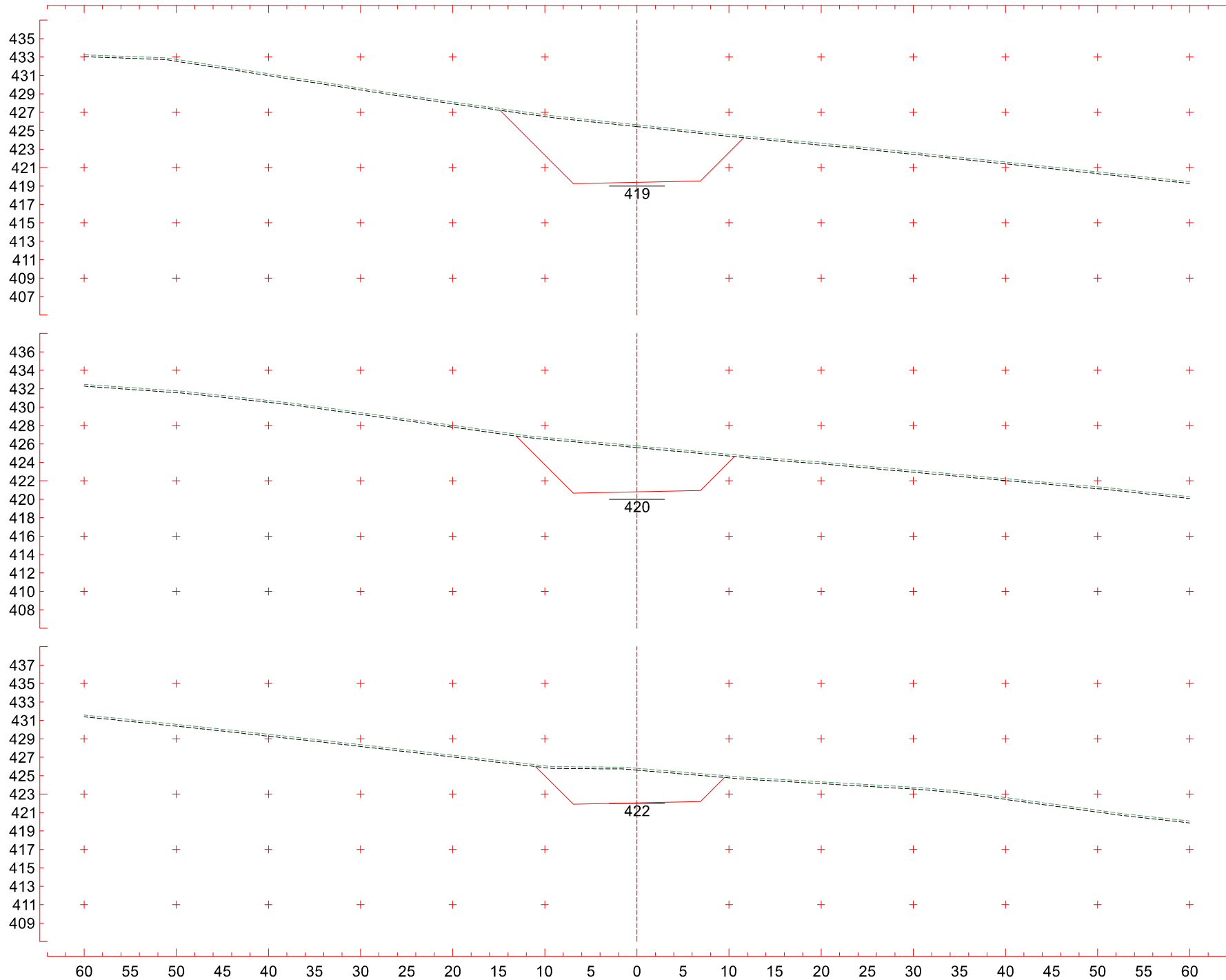
CT 423,767 m  
CP 424,006 m

**4+380**

CT 422,290 m  
CP 424,733 m

**Eixo1**

Escala 1:400

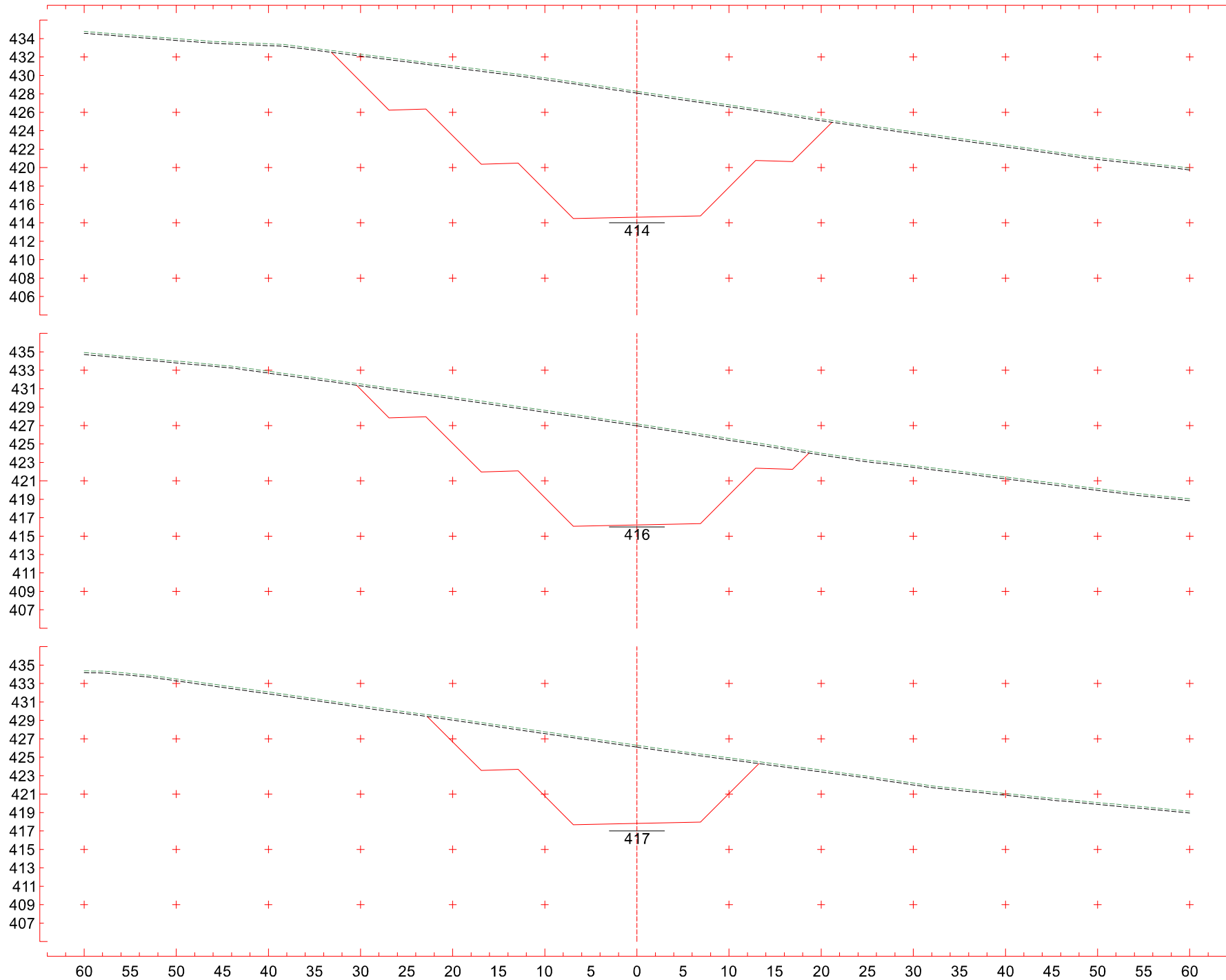


**4+480**  
CT 425,643 m  
CP 419,388 m

**4+460**  
CT 425,801 m  
CP 420,799 m

**4+440**  
CT 425,801 m  
CP 422,039 m

**Eixo1**  
Escala 1:400



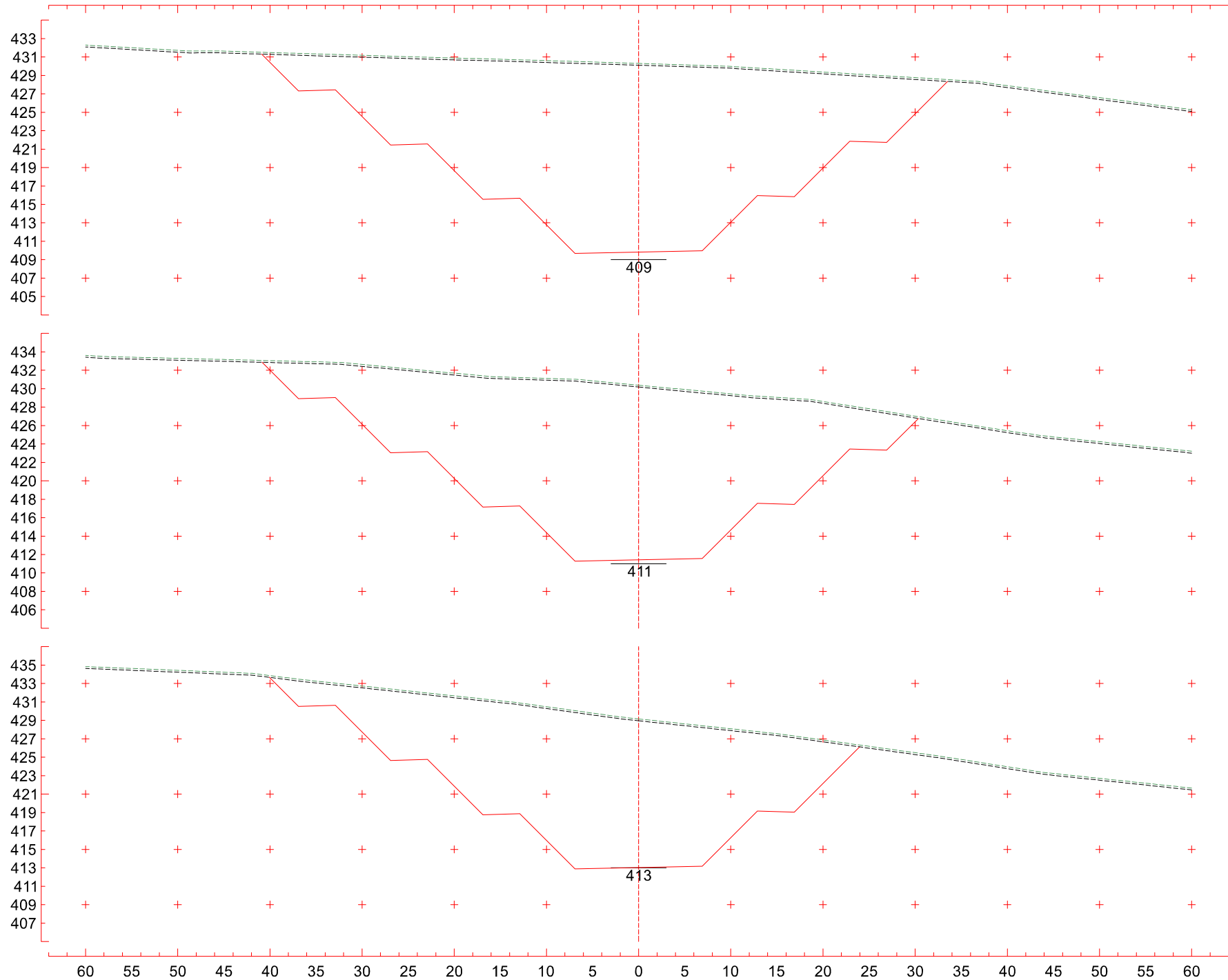
**4+540**  
CT 428,273 m  
CP 414,620 m

**4+520**  
CT 427,175 m  
CP 416,220 m

**4+500**  
CT 426,297 m  
CP 417,820 m

**Eixo1**  
Escala 1:400



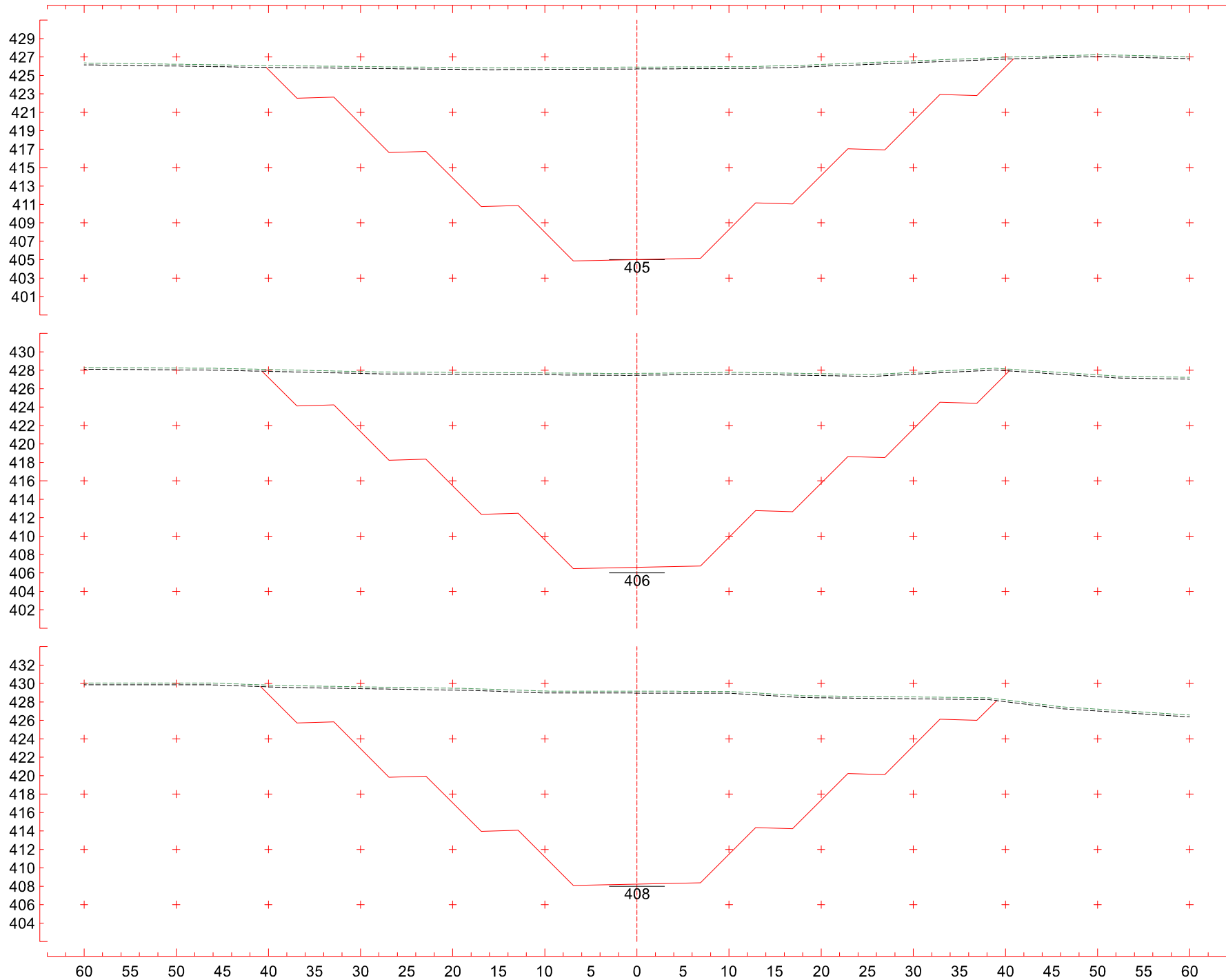


**4+600**  
CT 430,306 m  
CP 409,820 m

**4+580**  
CT 430,378 m  
CP 411,420 m

**4+560**  
CT 429,159 m  
CP 413,020 m

**Eixo1**  
Escala 1:400

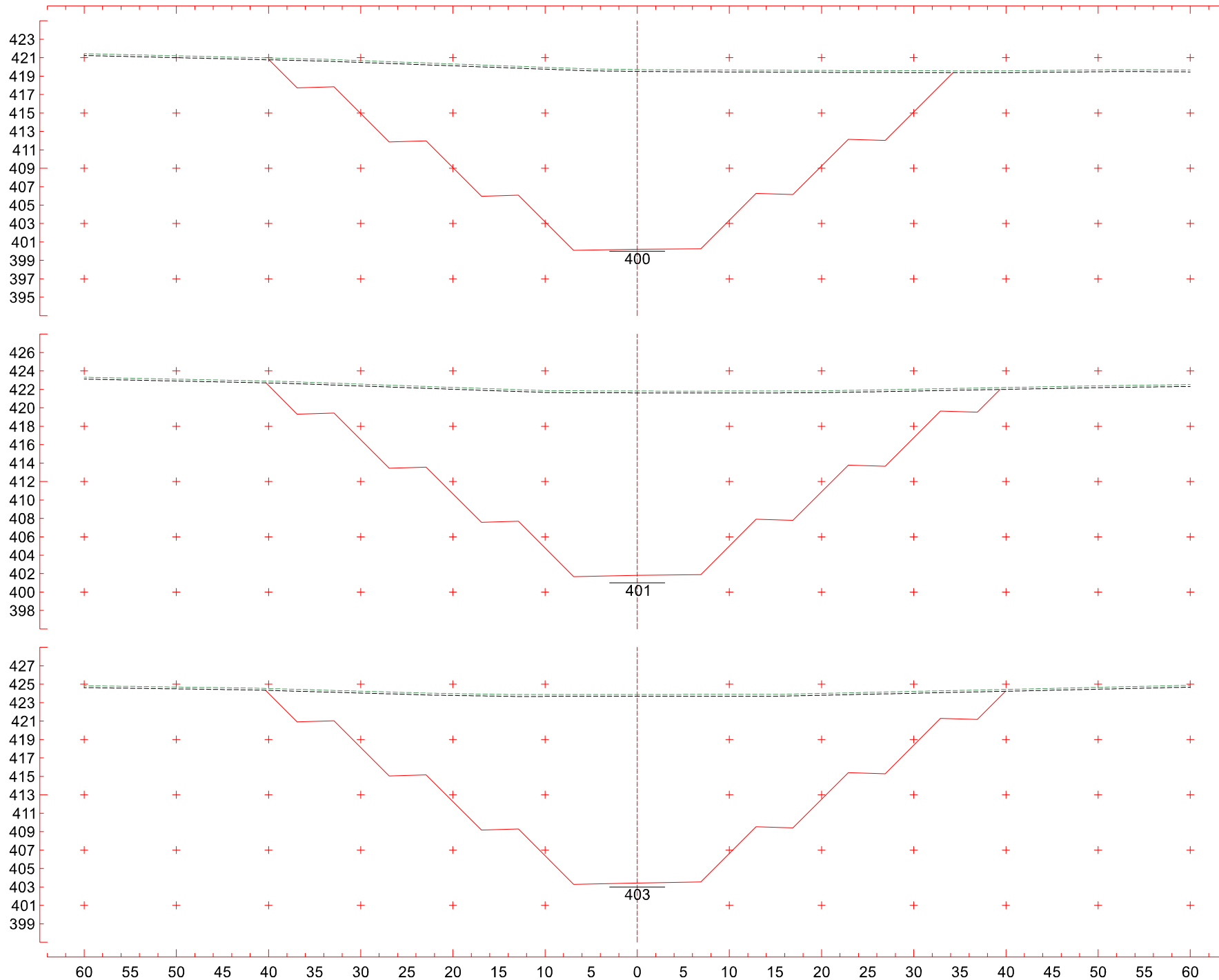


**4+660**  
CT 425,900 m  
CP 405,020 m

**4+640**  
CT 427,653 m  
CP 406,620 m

**4+620**  
CT 429,165 m  
CP 408,220 m

**Eixo1**  
Escala 1:400

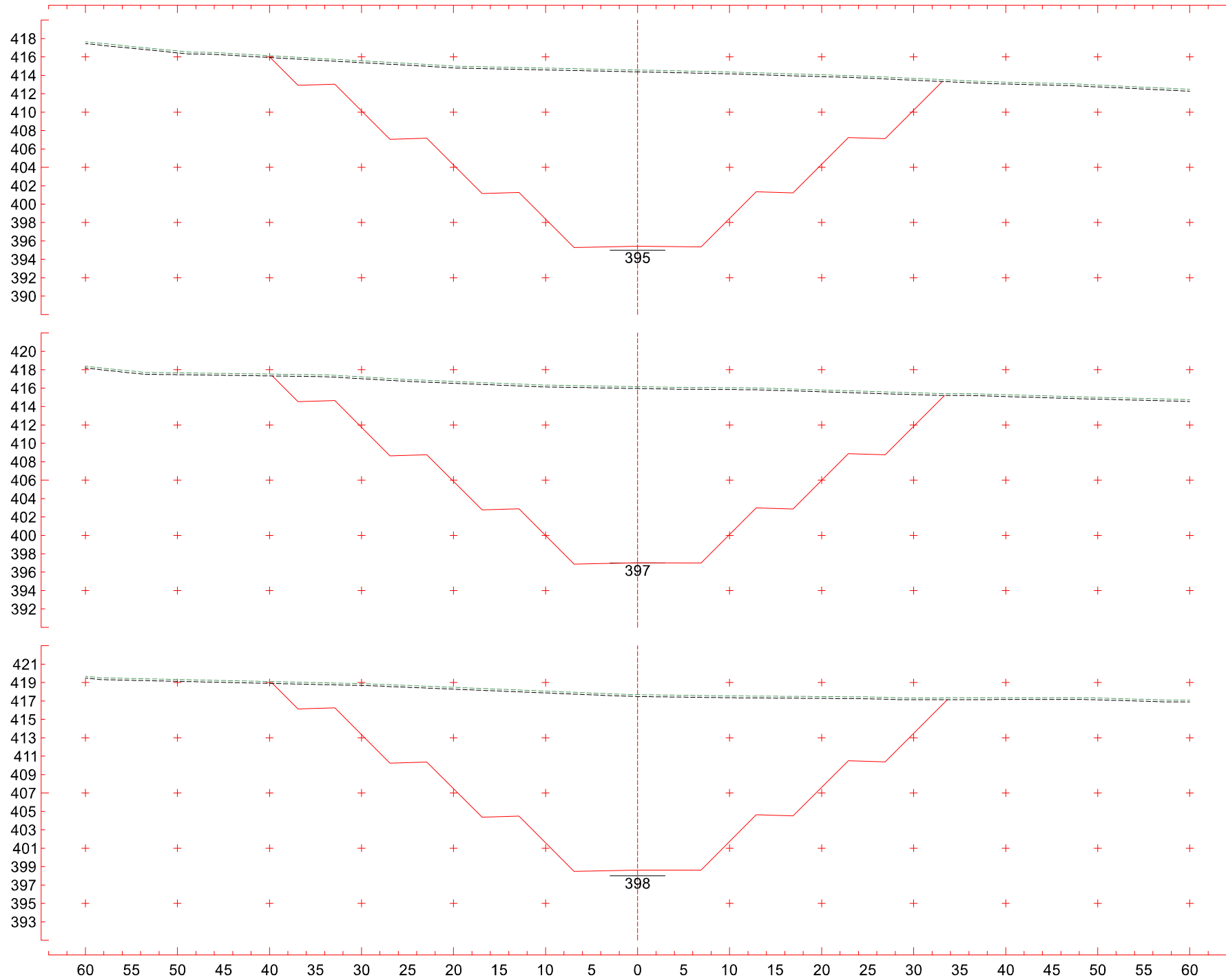


**4+720**  
CT 419,711 m  
CP 400,220 m

**4+700**  
CT 421,820 m  
CP 401,820 m

**4+680**  
CT 423,889 m  
CP 403,420 m

**Eixo1**  
Escala 1:400

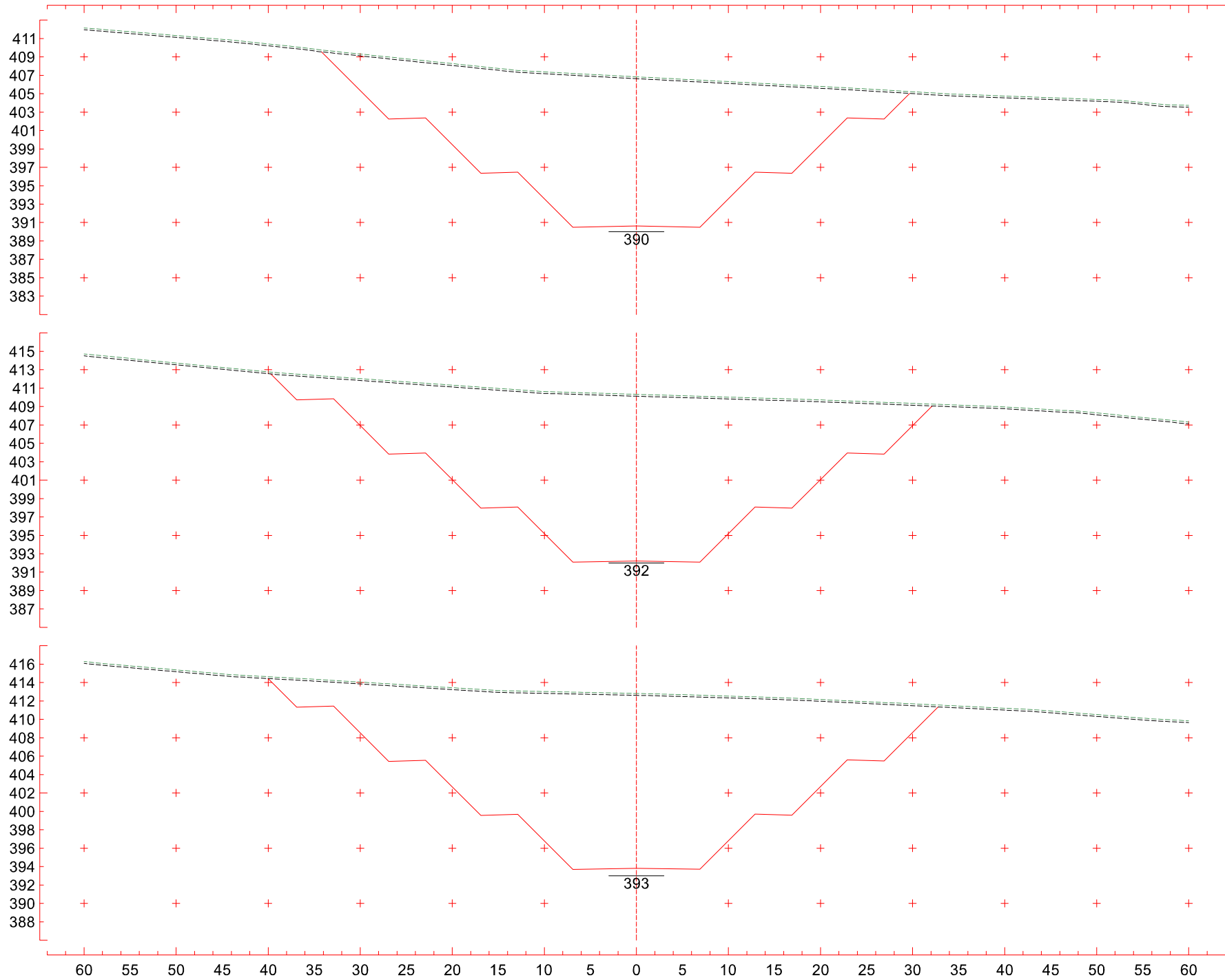


**4+780**  
CT 414,575 m  
CP 395,420 m

**4+760**  
CT 416,159 m  
CP 397,020 m

**4+740**  
CT 417,684 m  
CP 398,620 m

**Eixo1**  
Escala 1:400



**4+840**

CT 406,836 m  
CP 390,620 m

**4+820**

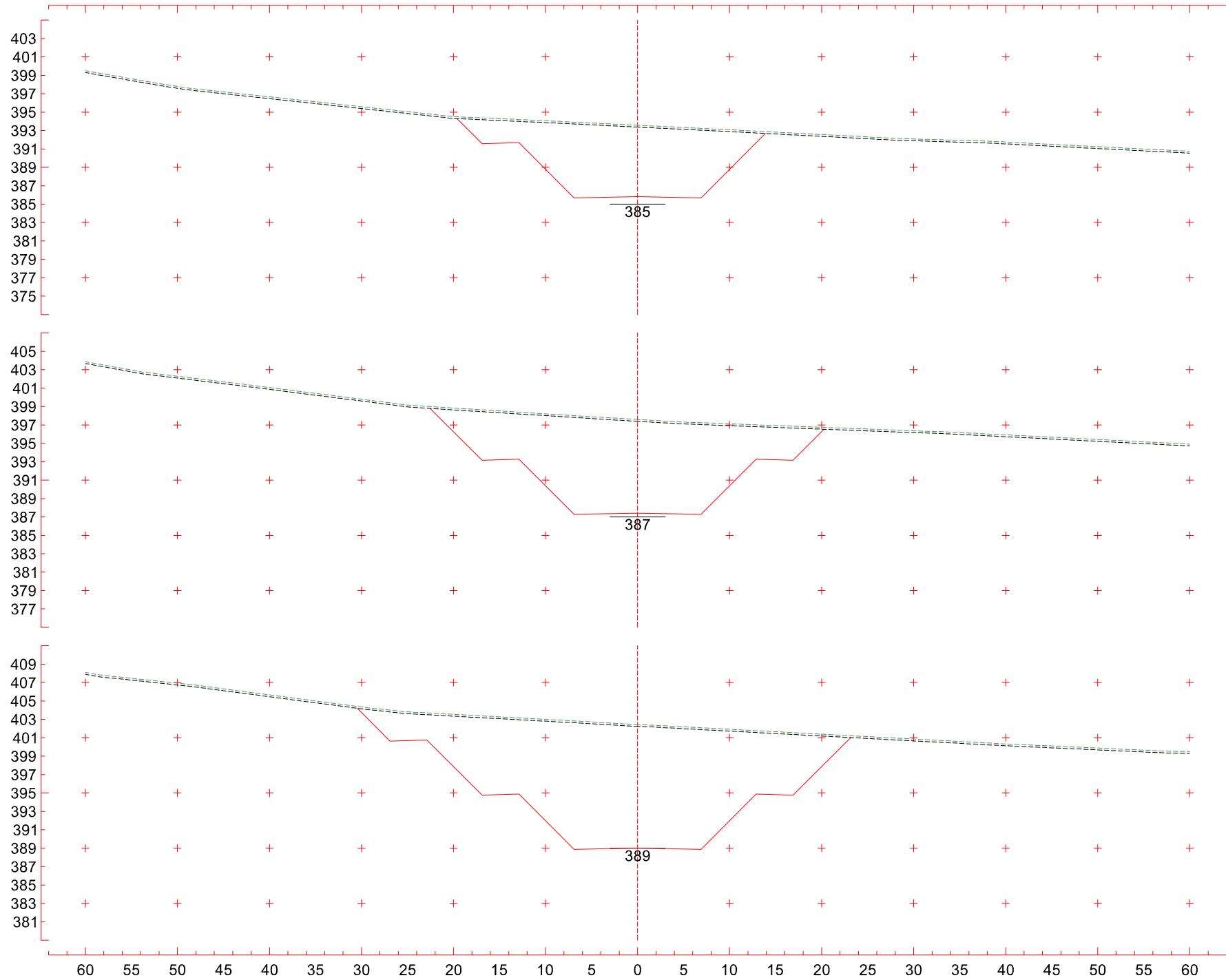
CT 410,325 m  
CP 392,220 m

**4+800**

CT 412,812 m  
CP 393,820 m

**Eixo1**

Escala 1:400

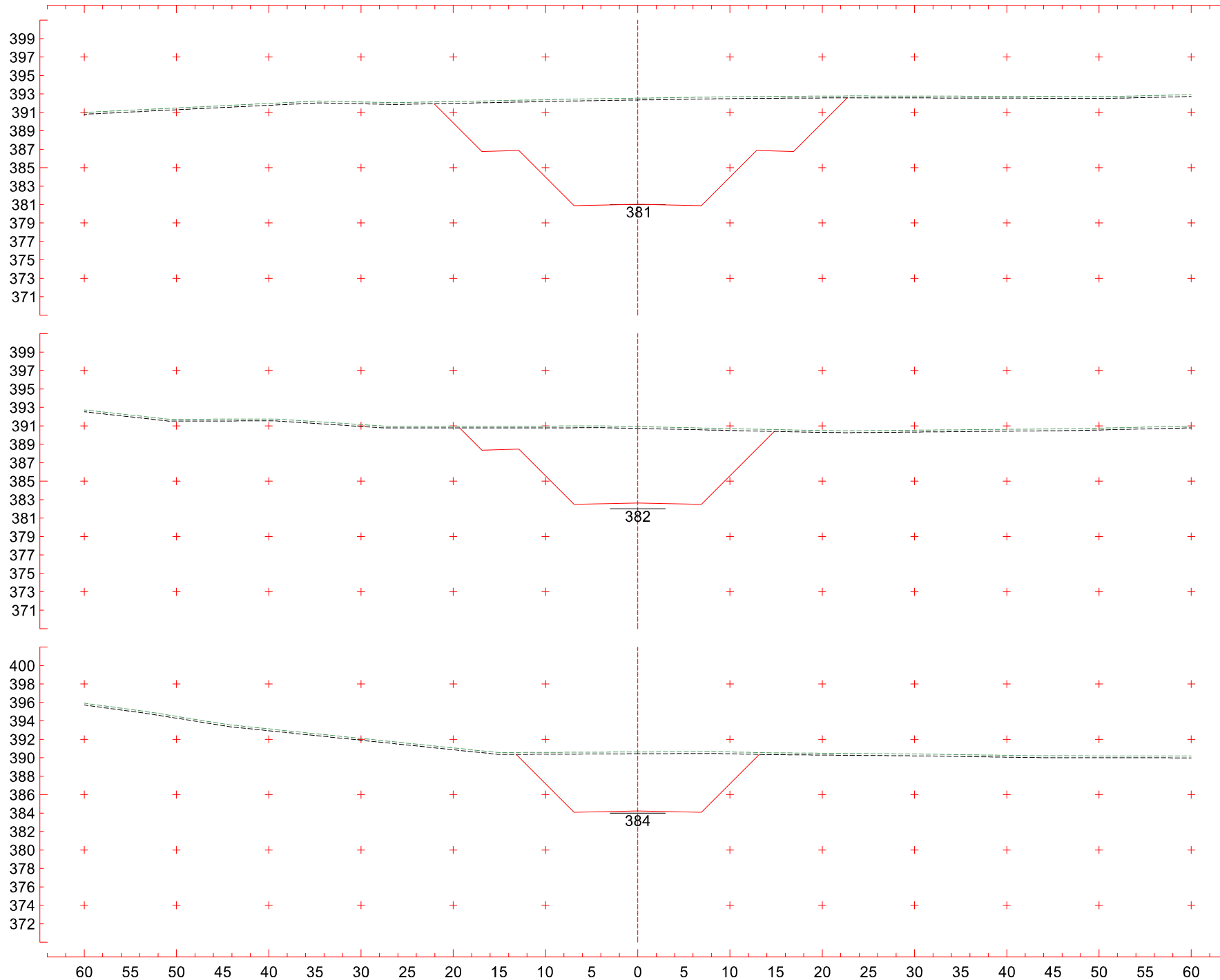


**4+900**  
CT 393,574 m  
CP 385,820 m

**4+880**  
CT 397,594 m  
CP 387,420 m

**4+860**  
CT 402,437 m  
CP 389,020 m

**Eixo1**  
Escala 1:400

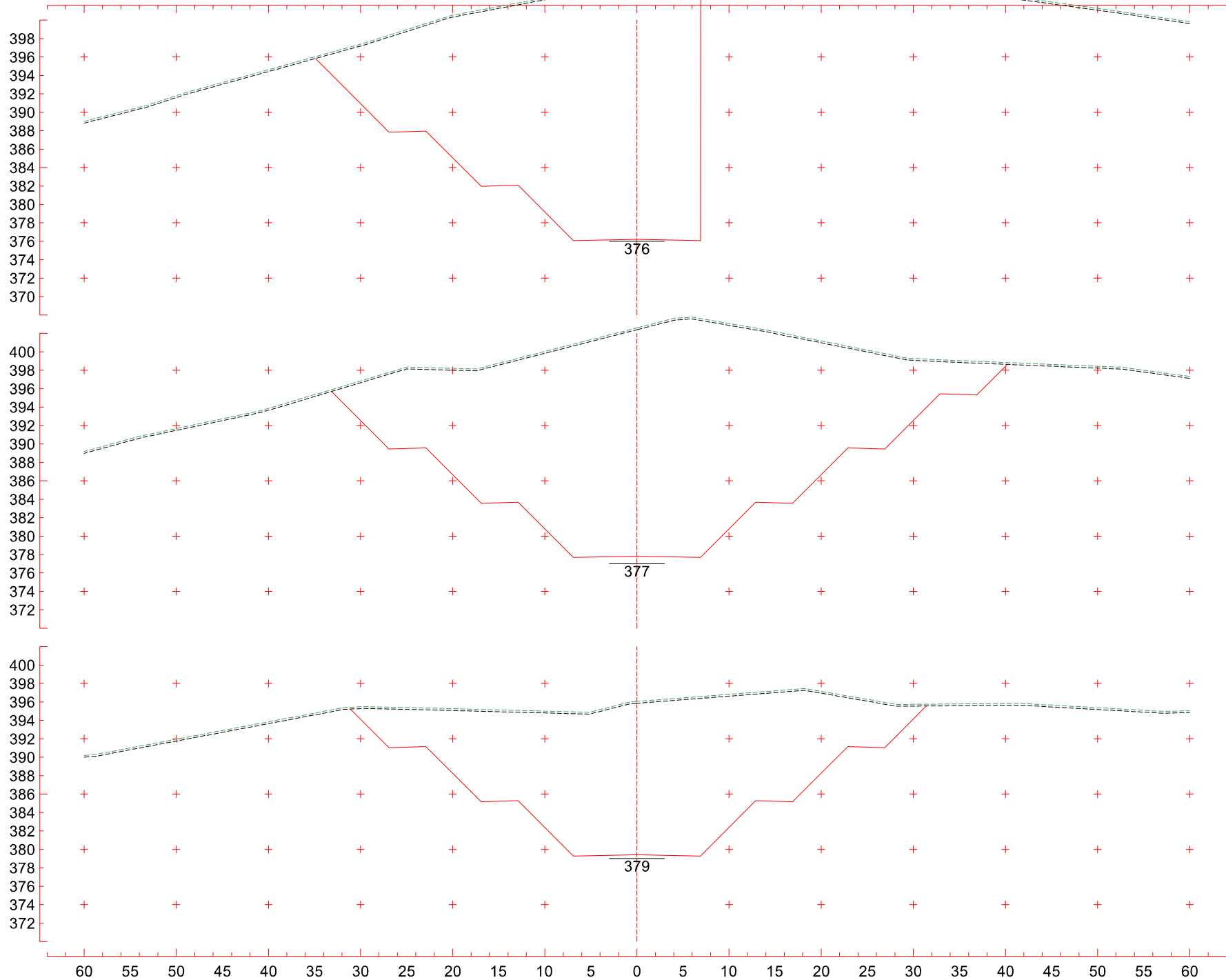


**4+960**  
CT 392,542 m  
CP 381,020 m

**4+940**  
CT 390,916 m  
CP 382,620 m

**4+920**  
CT 390,630 m  
CP 384,220 m

**Eixo1**  
Escala 1:400



**5+020**

CT 404,060 m  
CP 376,220 m

**5+000**

CT 402,601 m  
CP 377,820 m

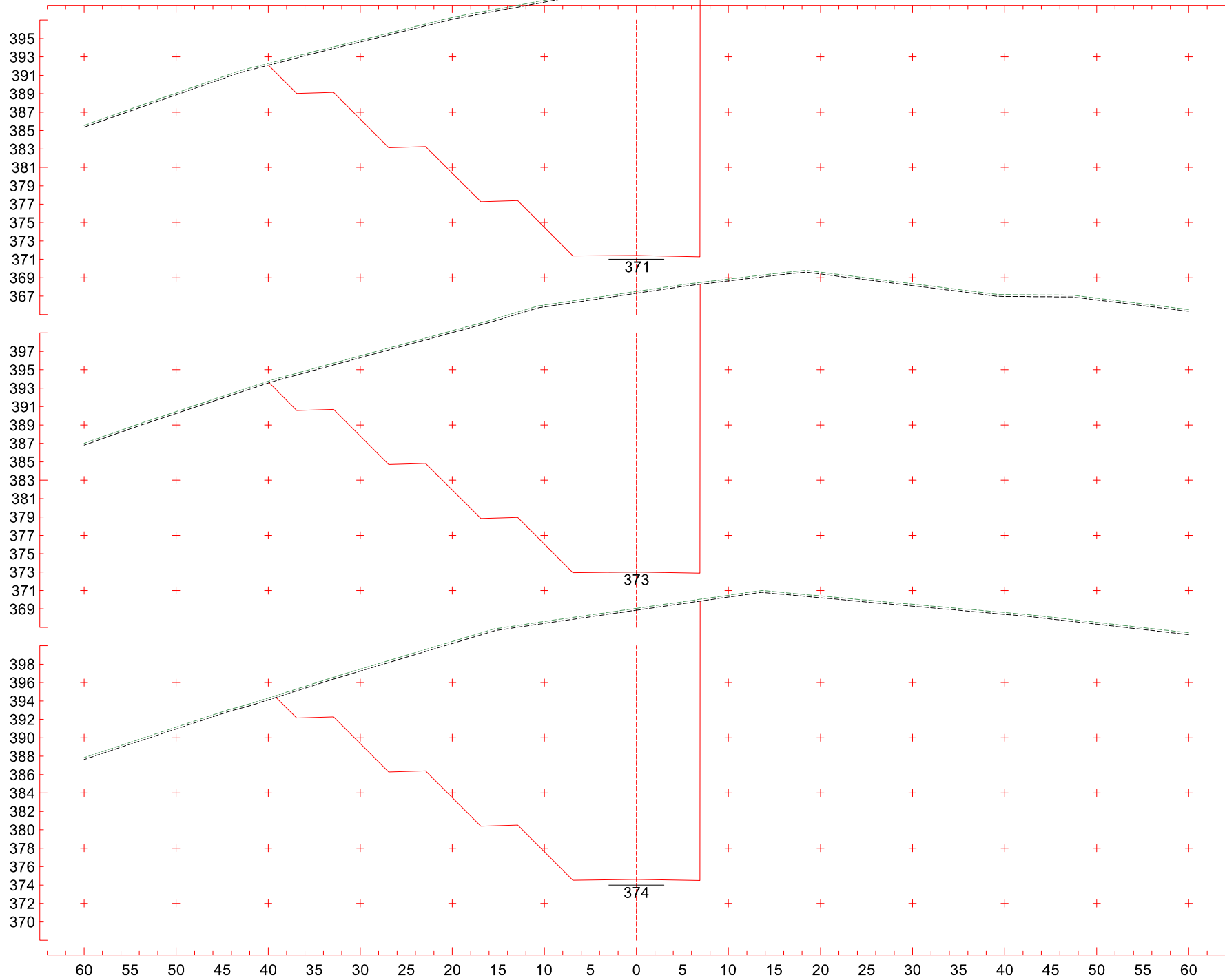
**4+980**

CT 396,057 m  
CP 379,420 m

**Eixo1**

Escala 1:400





5+080

CT 400,612 m  
CP 371,420 m

5+060

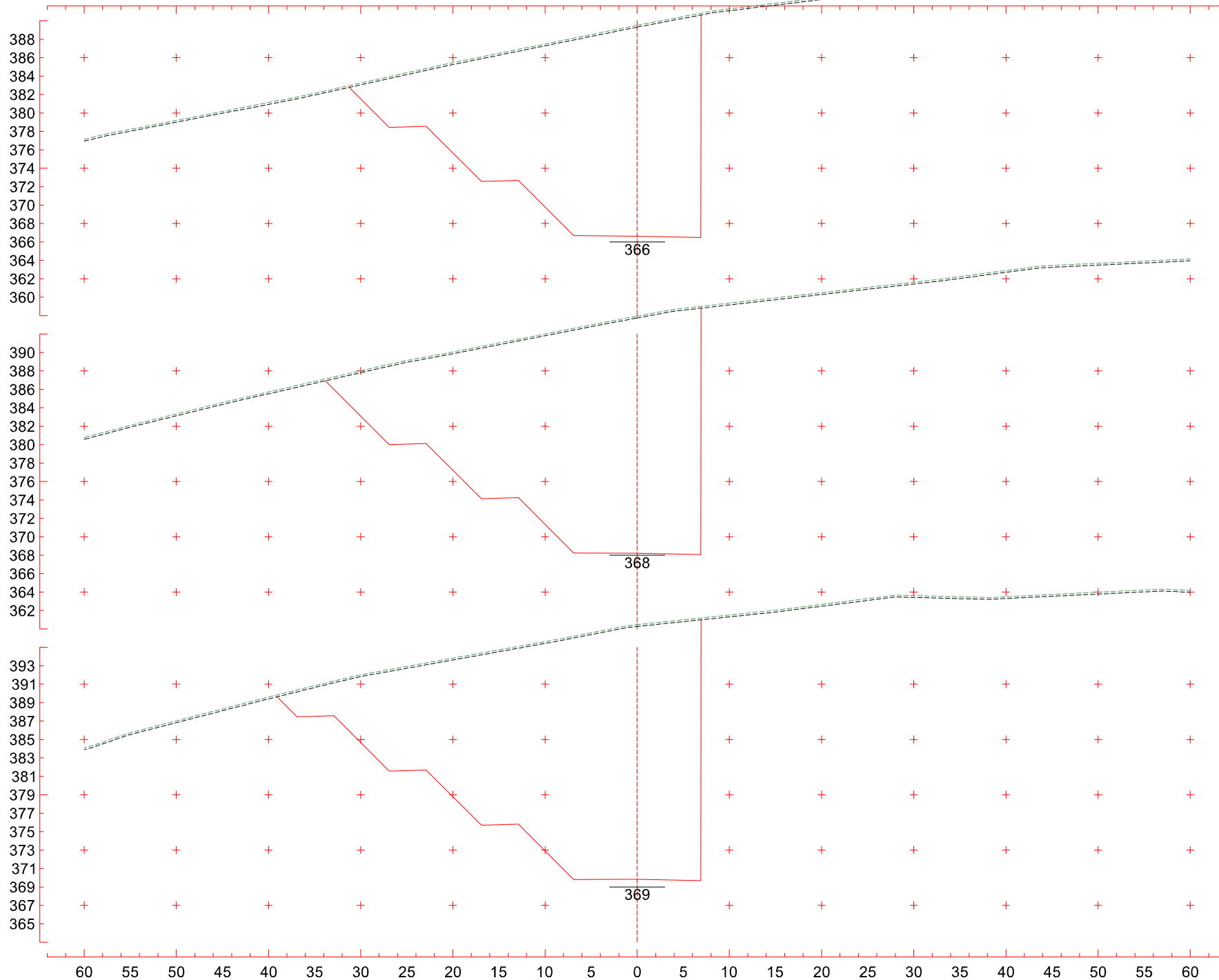
CT 403,509 m  
CP 373,020 m

5+040

CT 404,065 m  
CP 374,620 m

Eixo1

Escala 1:400

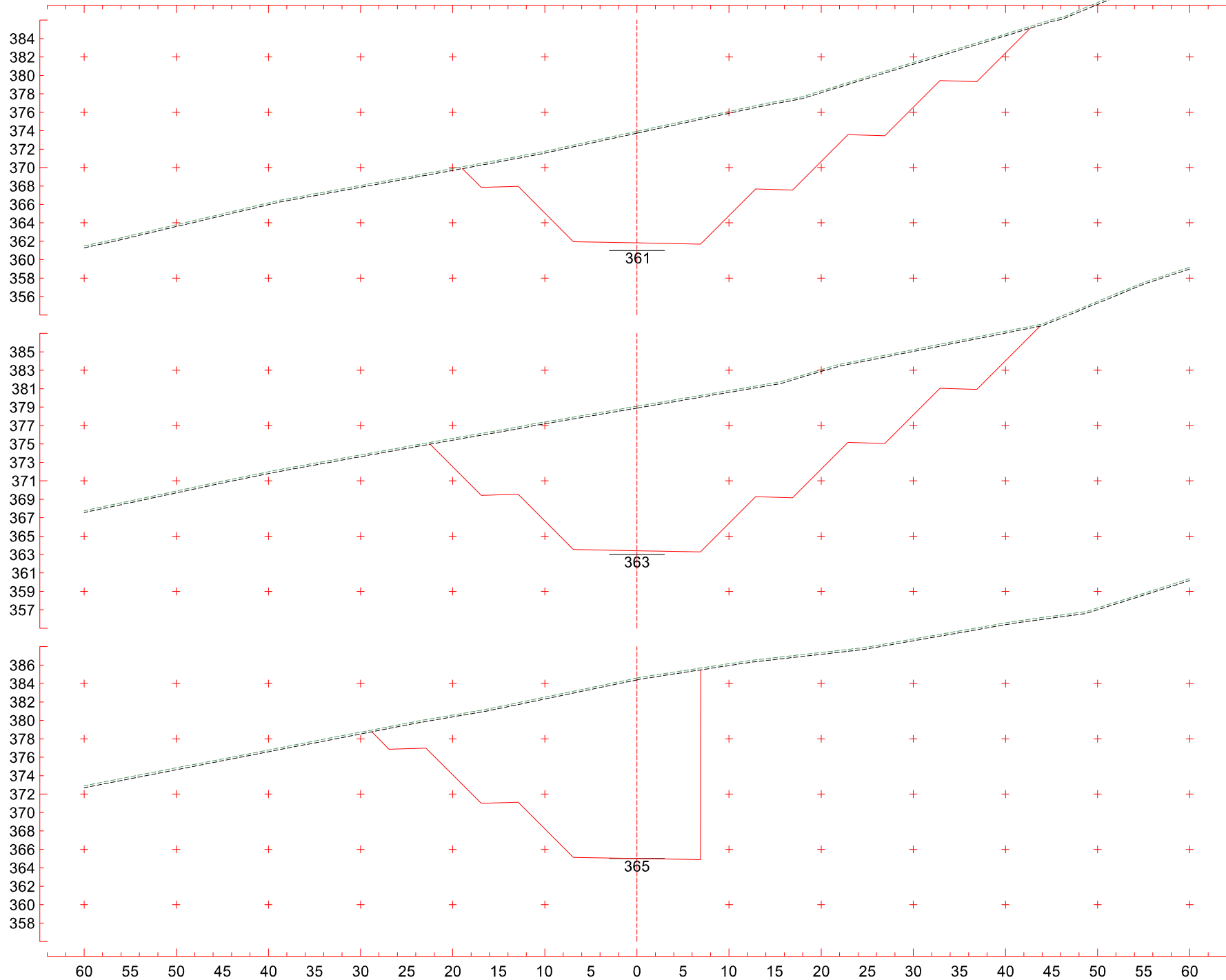


**5+140**  
CT 389,521 m  
CP 366,620 m

**5+120**  
CT 393,948 m  
CP 368,220 m

**5+100**  
CT 397,468 m  
CP 369,820 m

**Eixo1**  
Escala 1:400

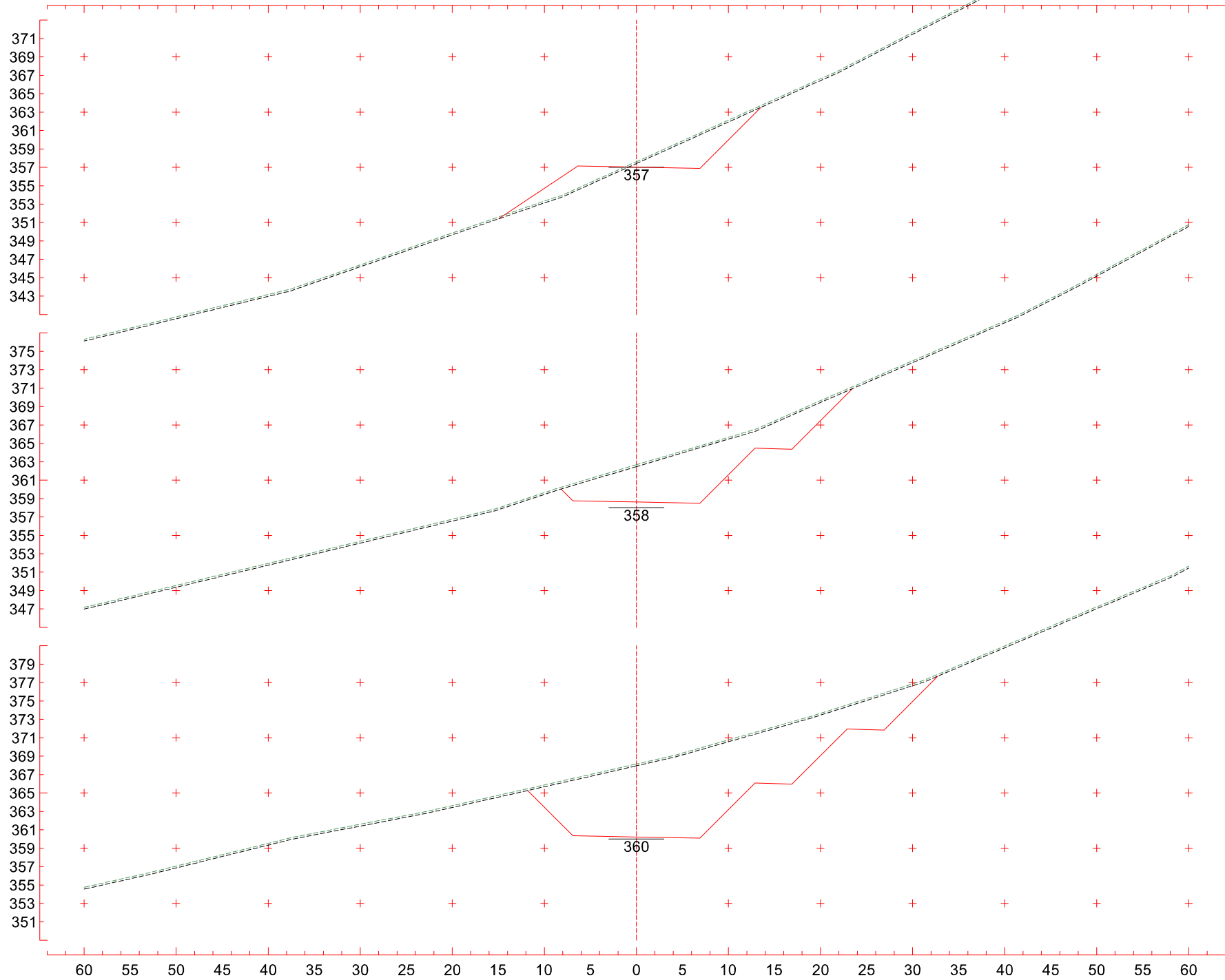


**5+200**  
CT 373,930 m  
CP 361,820 m

**5+180**  
CT 379,094 m  
CP 363,420 m

**5+160**  
CT 384,596 m  
CP 365,020 m

**Eixo1**  
Escala 1:400

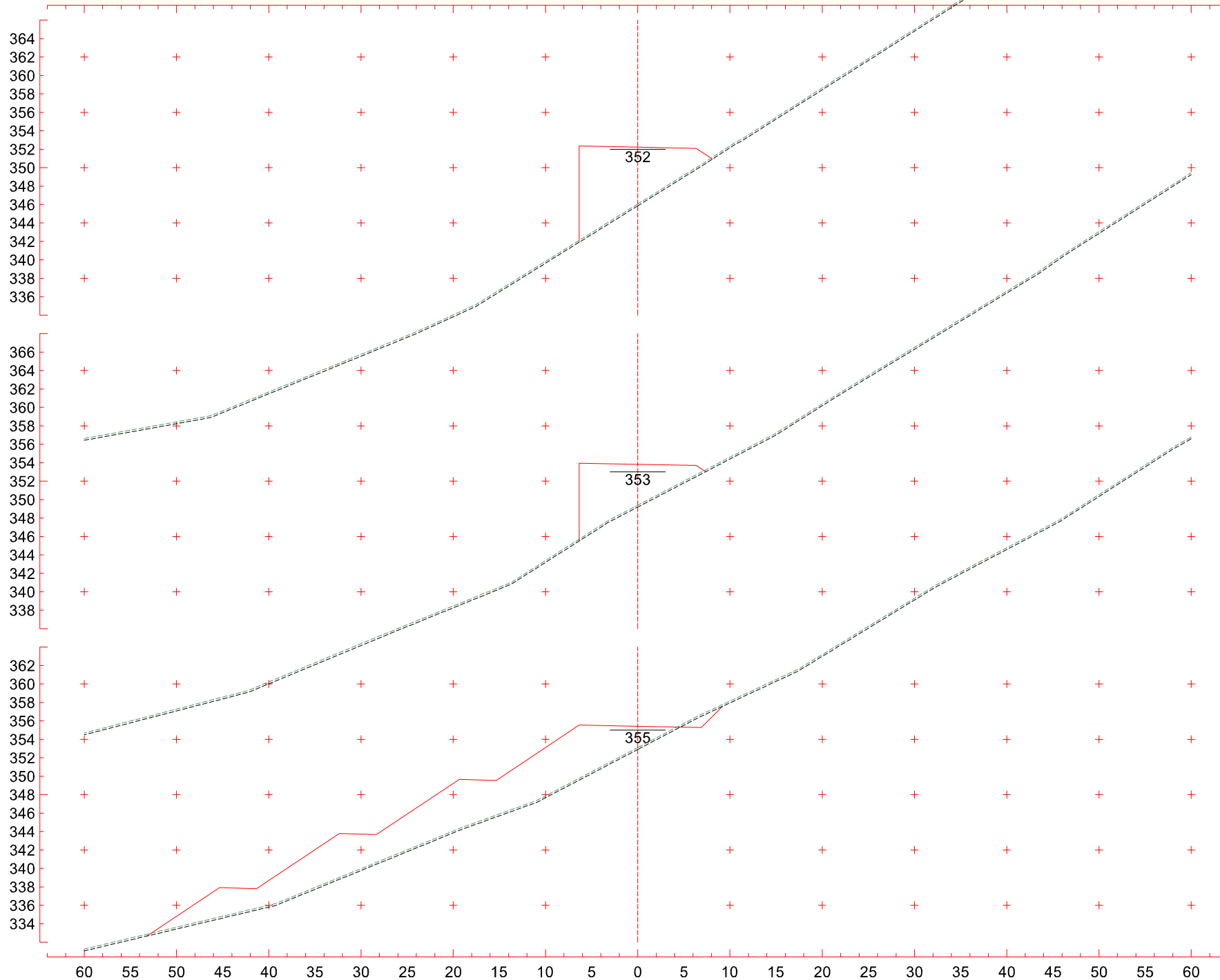


**5+260**  
CT 357,611 m  
CP 357,020 m

**5+240**  
CT 362,670 m  
CP 358,620 m

**5+220**  
CT 368,149 m  
CP 360,220 m

**Eixo1**  
Escala 1:400

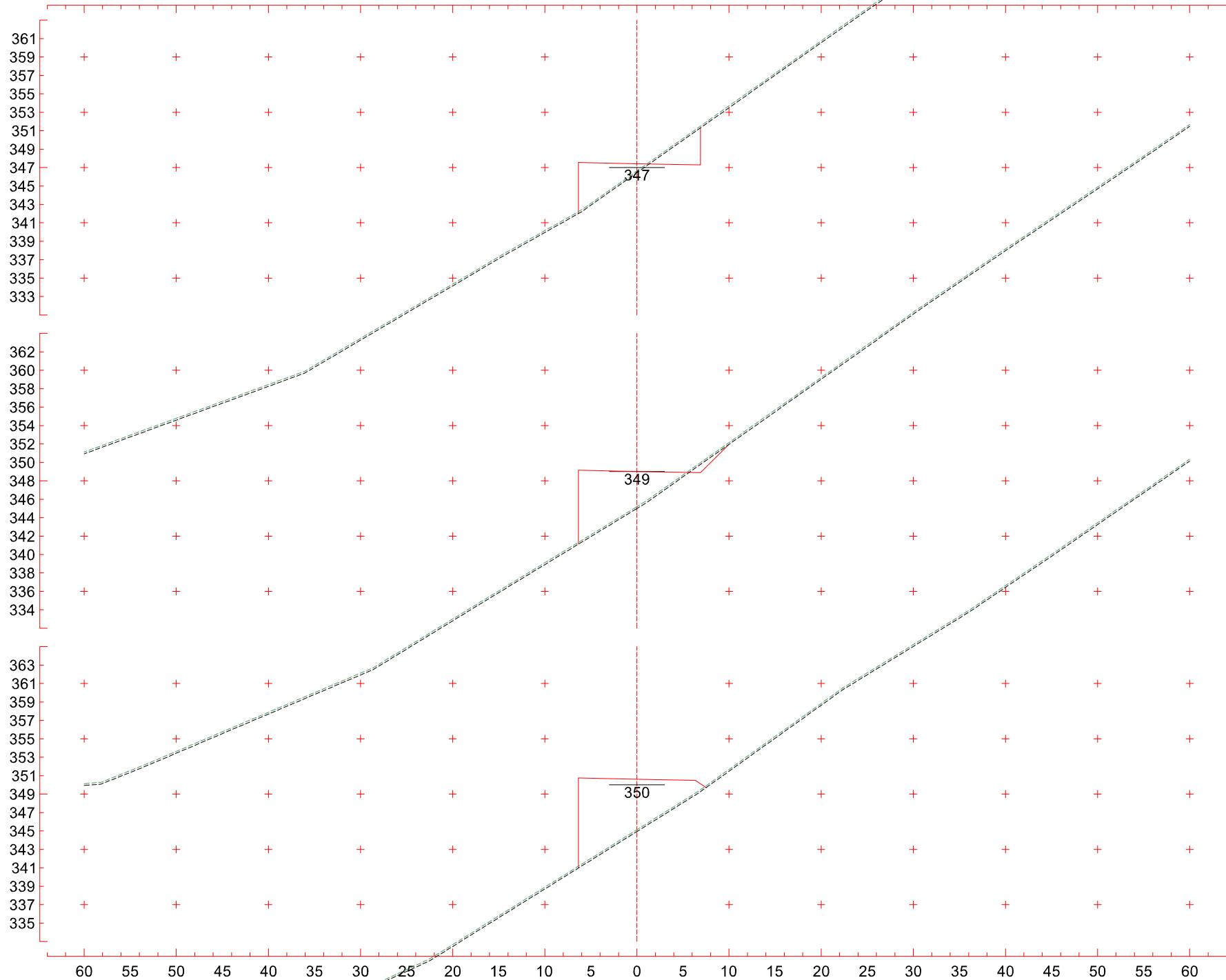


**5+320**  
CT 346,063 m  
CP 352,220 m

**5+300**  
CT 349,392 m  
CP 353,820 m

**5+280**  
CT 353,103 m  
CP 355,420 m

**Eixo 1**  
Escala 1:400

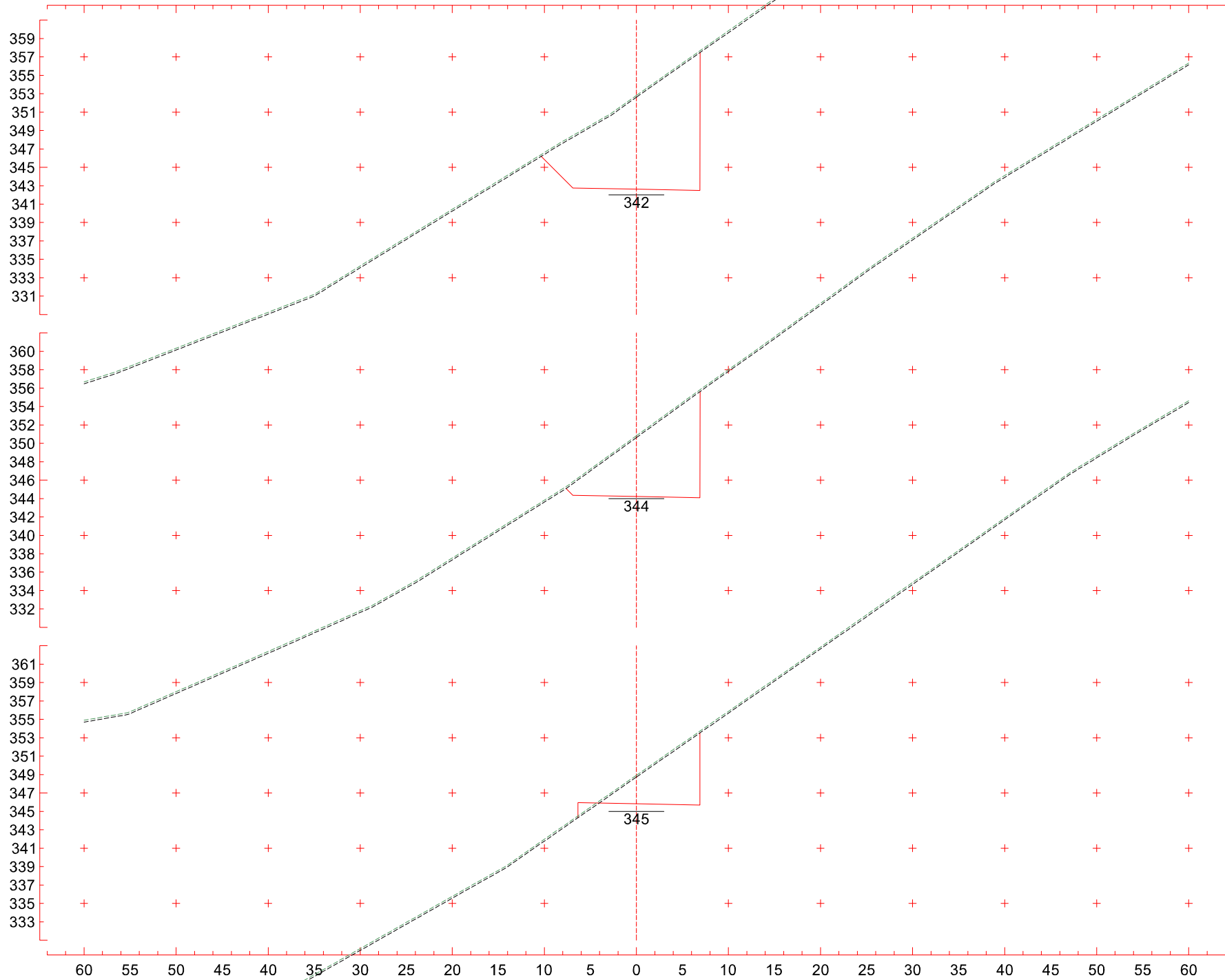


**5+380**  
CT 346,638 m  
CP 347,420 m

**5+360**  
CT 345,191 m  
CP 349,020 m

**5+340**  
CT 345,135 m  
CP 350,620 m

**Eixo1**  
Escala 1:400

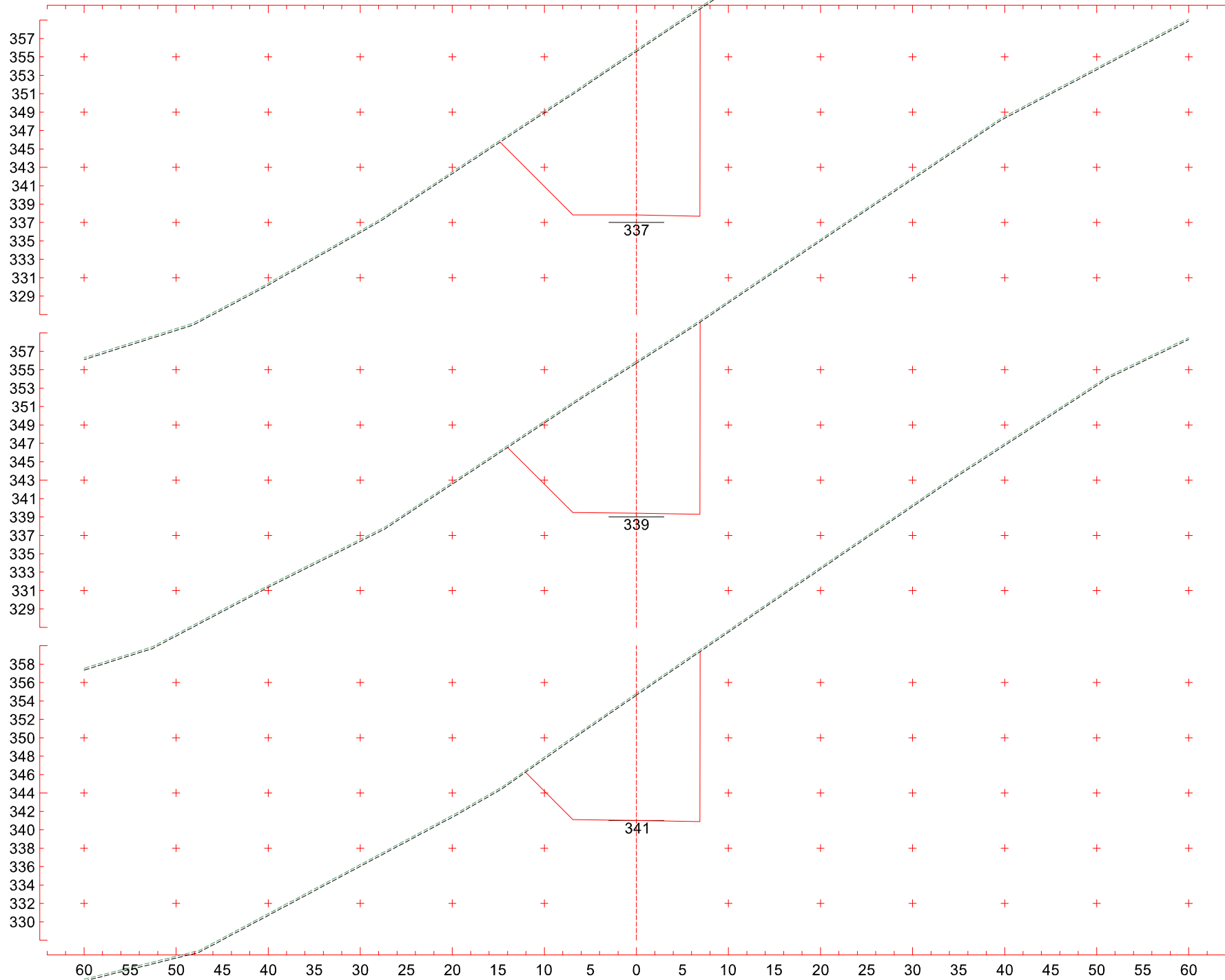


**5+440**  
CT 352,813 m  
CP 342,620 m

**5+420**  
CT 350,824 m  
CP 344,220 m

**5+400**  
CT 348,924 m  
CP 345,820 m

**Eixo1**  
Escala 1:400



**5+500**

CT 355,782 m  
CP 337,820 m

**5+480**

CT 355,912 m  
CP 339,420 m

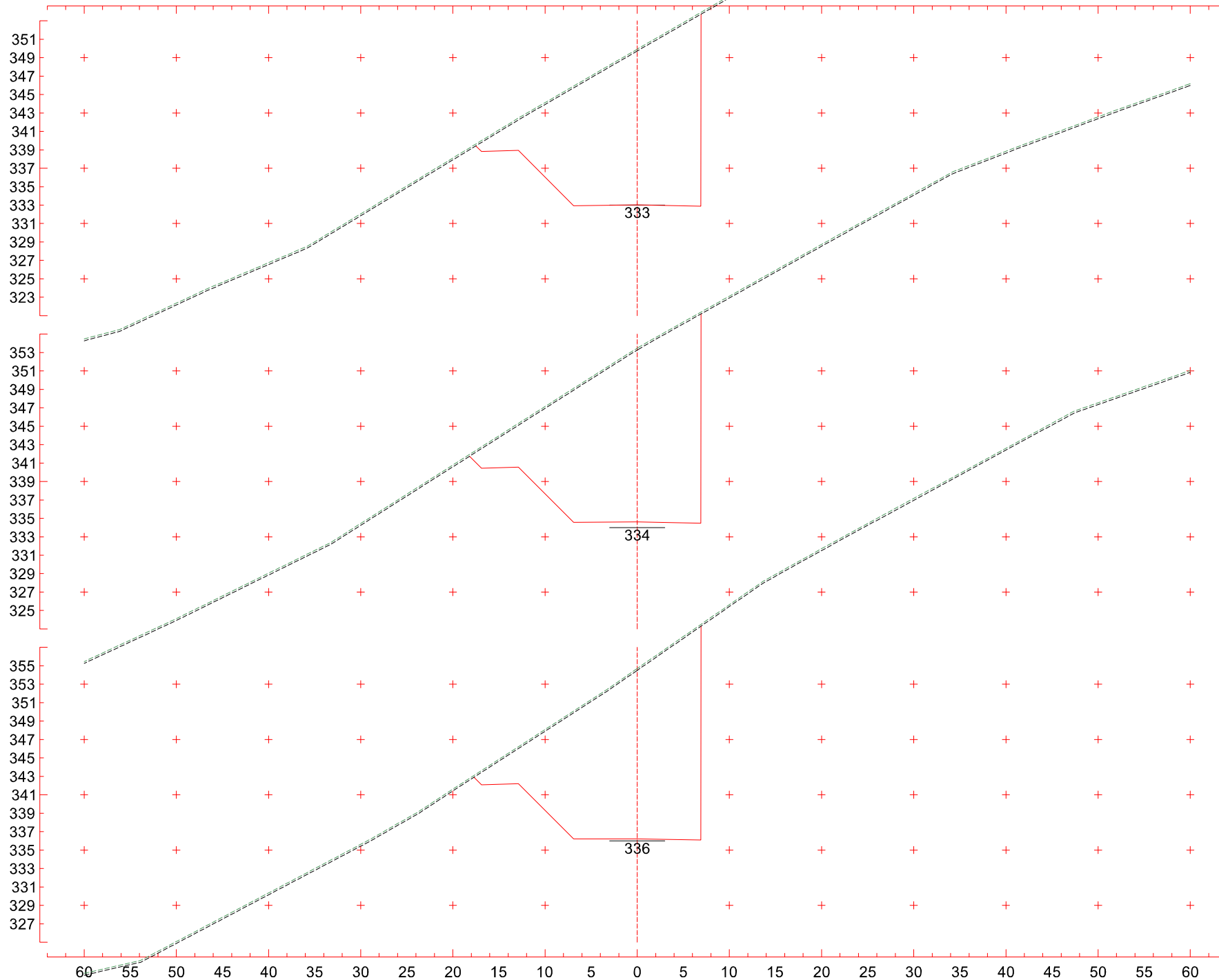
**5+460**

CT 354,817 m  
CP 341,020 m

**Eixo1**

Escala 1:400



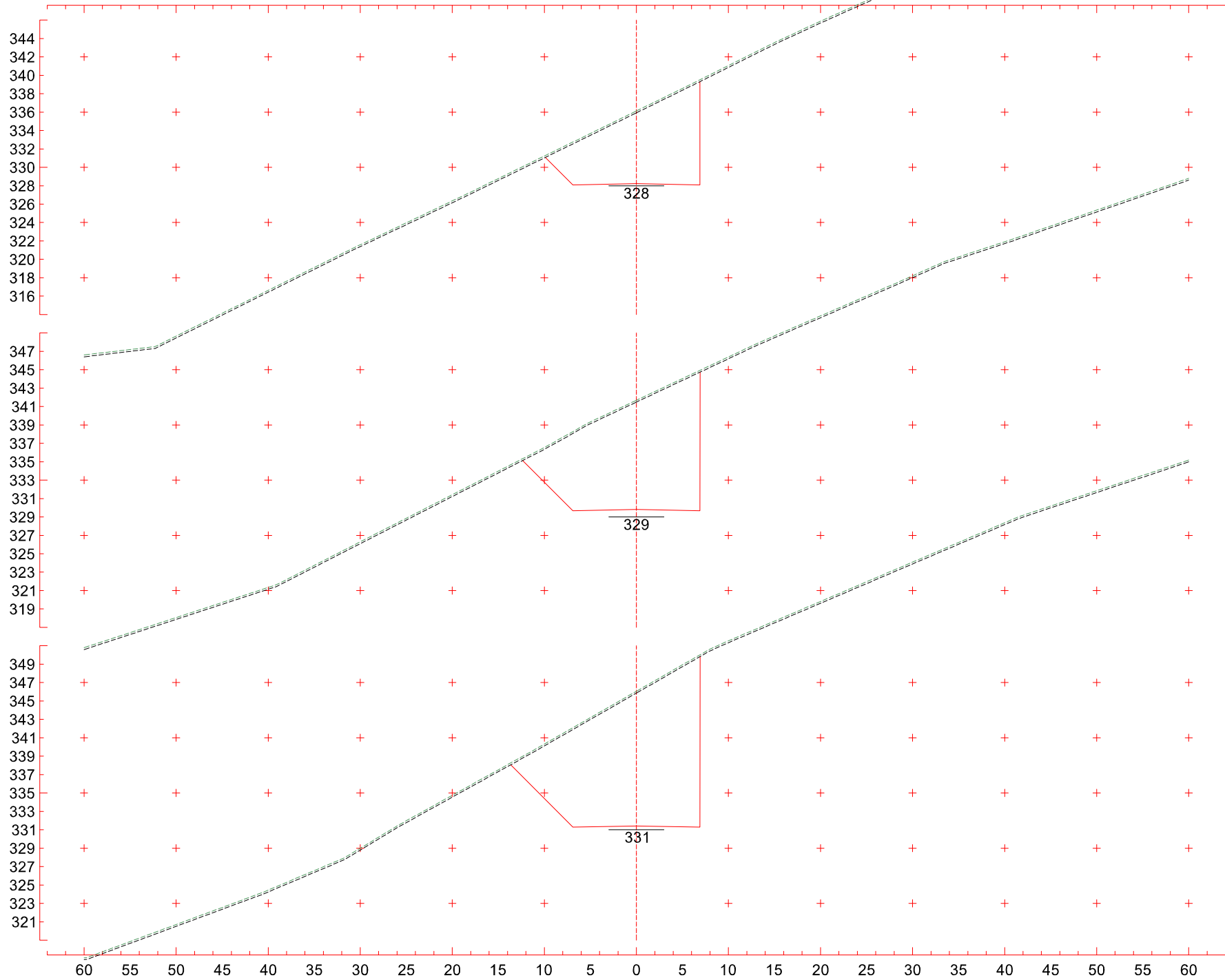


**5+560**  
CT 349,925 m  
CP 333,020 m

**5+540**  
CT 353,468 m  
CP 334,620 m

**5+520**  
CT 354,705 m  
CP 336,220 m

**Eixo1**  
Escala 1:400

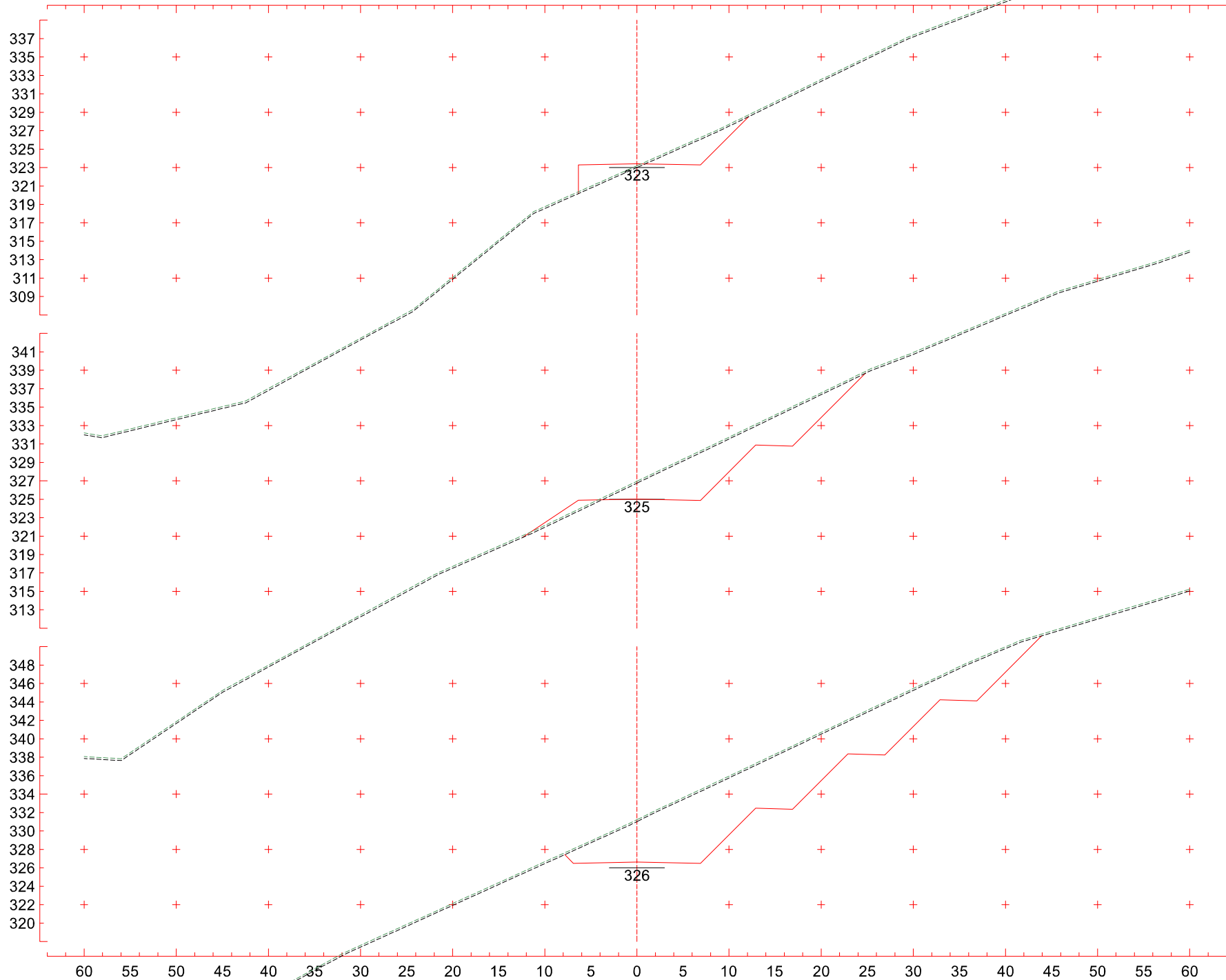


**5+620**  
CT 336,124 m  
CP 328,220 m

**5+600**  
CT 341,686 m  
CP 329,820 m

**5+580**  
CT 346,056 m  
CP 331,420 m

**Eixo1**  
Escala 1:400

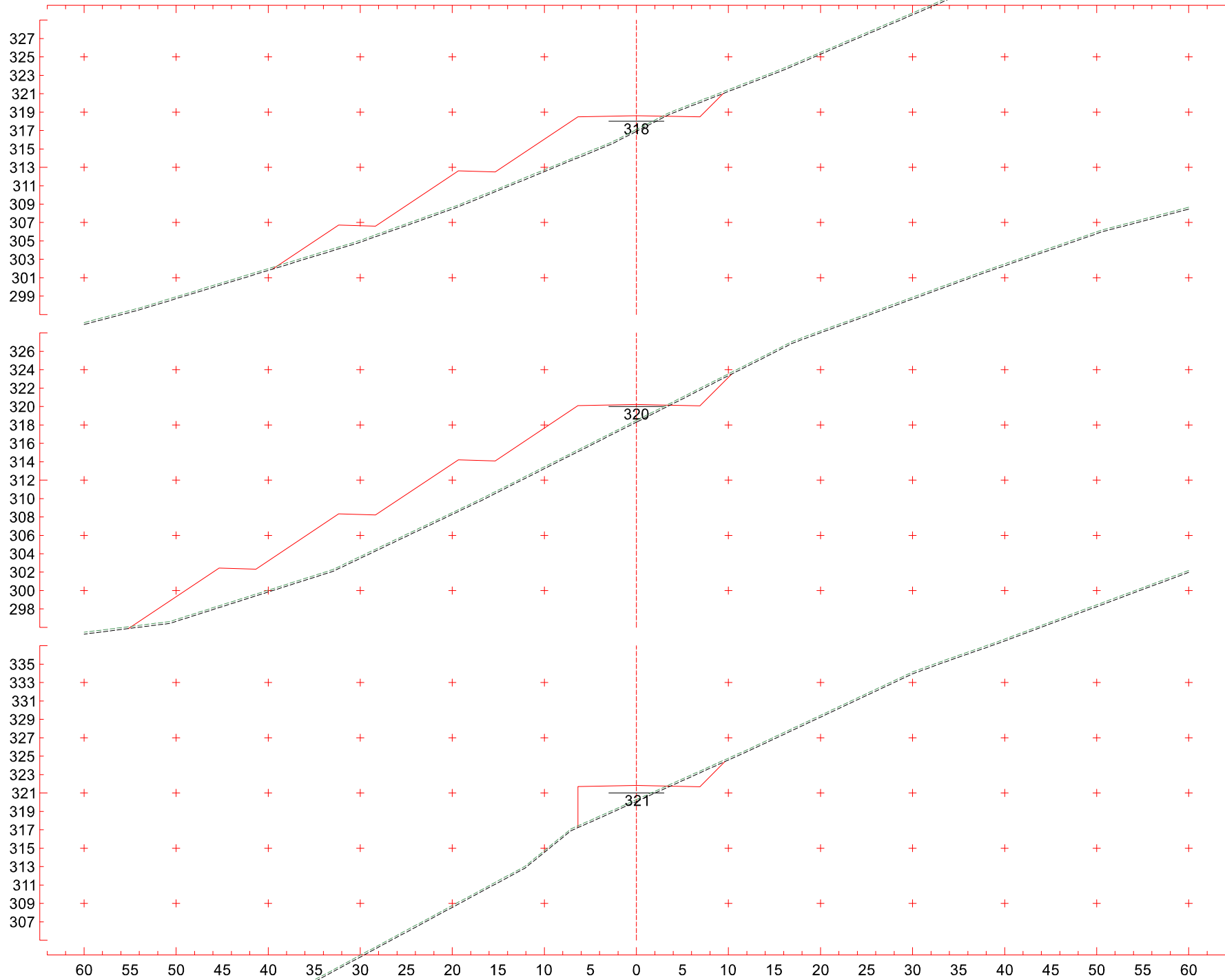


**5+680**  
CT 323,195 m  
CP 323,420 m

**5+660**  
CT 326,948 m  
CP 325,020 m

**5+640**  
CT 331,217 m  
CP 326,620 m

**Eixo1**  
Escala 1:400

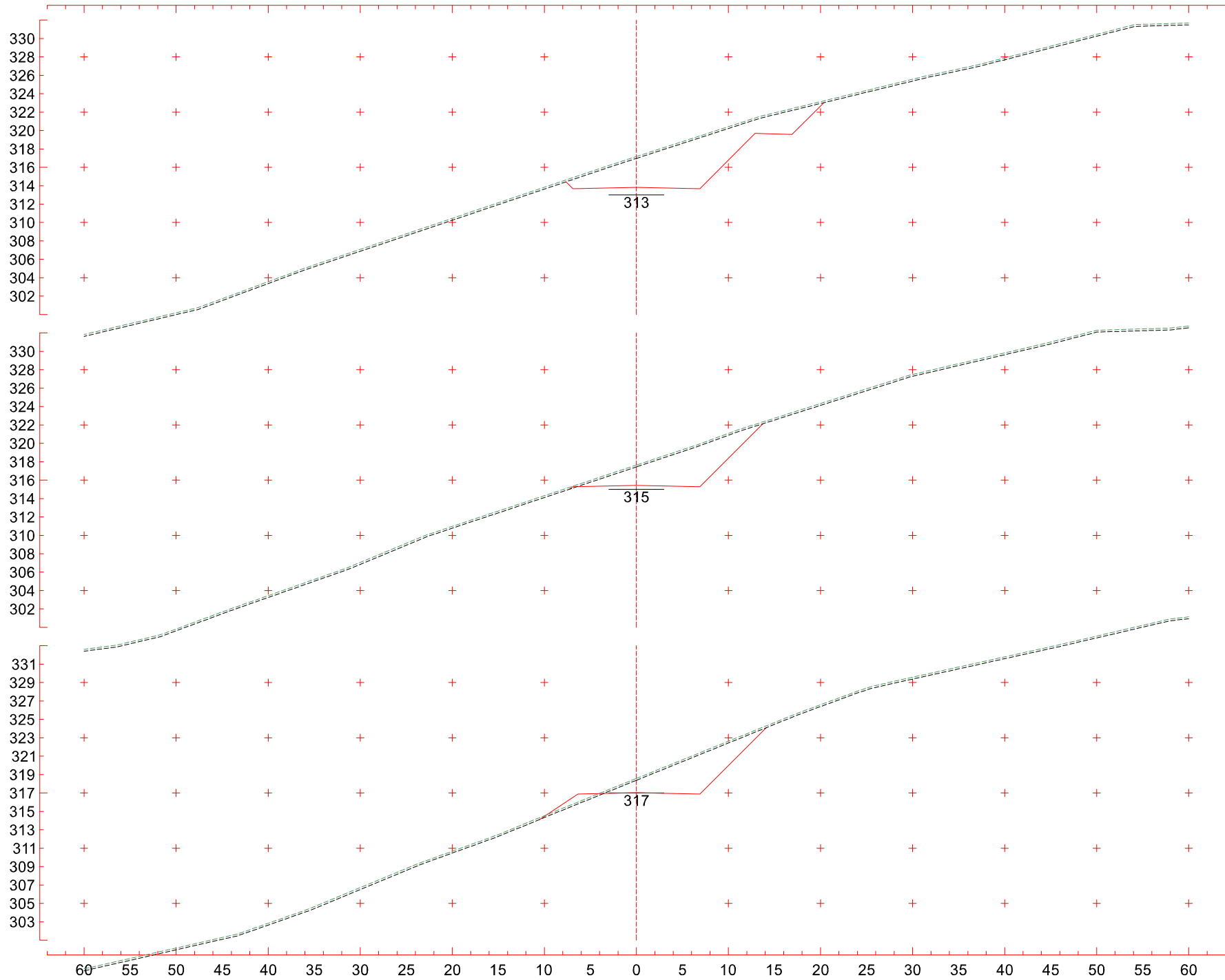


**5+740**  
CT 317,110 m  
CP 318,620 m

**5+720**  
CT 318,500 m  
CP 320,220 m

**5+700**  
CT 320,278 m  
CP 321,820 m

**Eixo1**  
Escala 1:400



**5+800**

CT 317,171 m  
CP 313,820 m

**5+780**

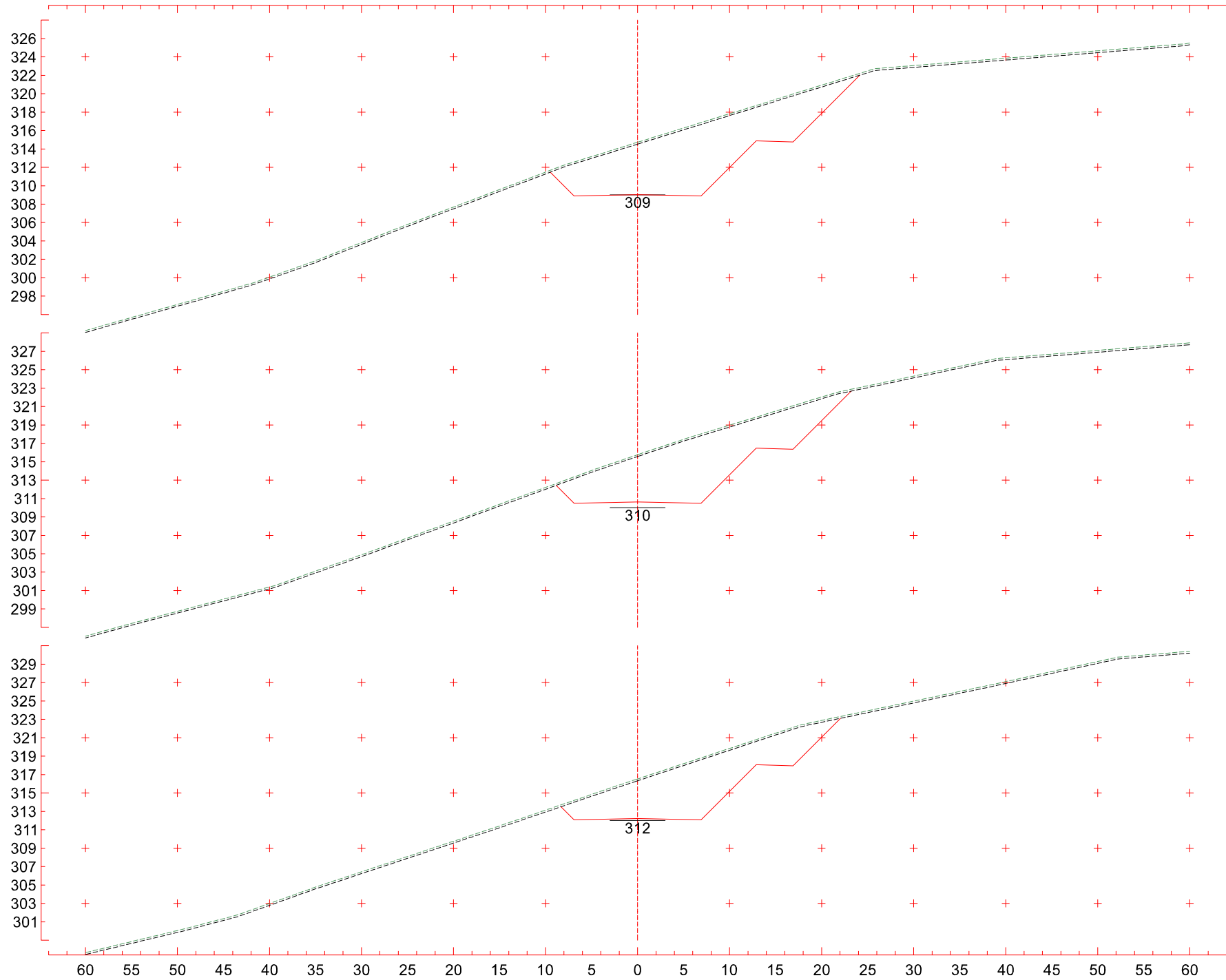
CT 317,640 m  
CP 315,420 m

**5+760**

CT 318,582 m  
CP 317,020 m

**Eixo1**

Escala 1:400



**5+860**

CT 314,721 m  
CP 309,020 m

**5+840**

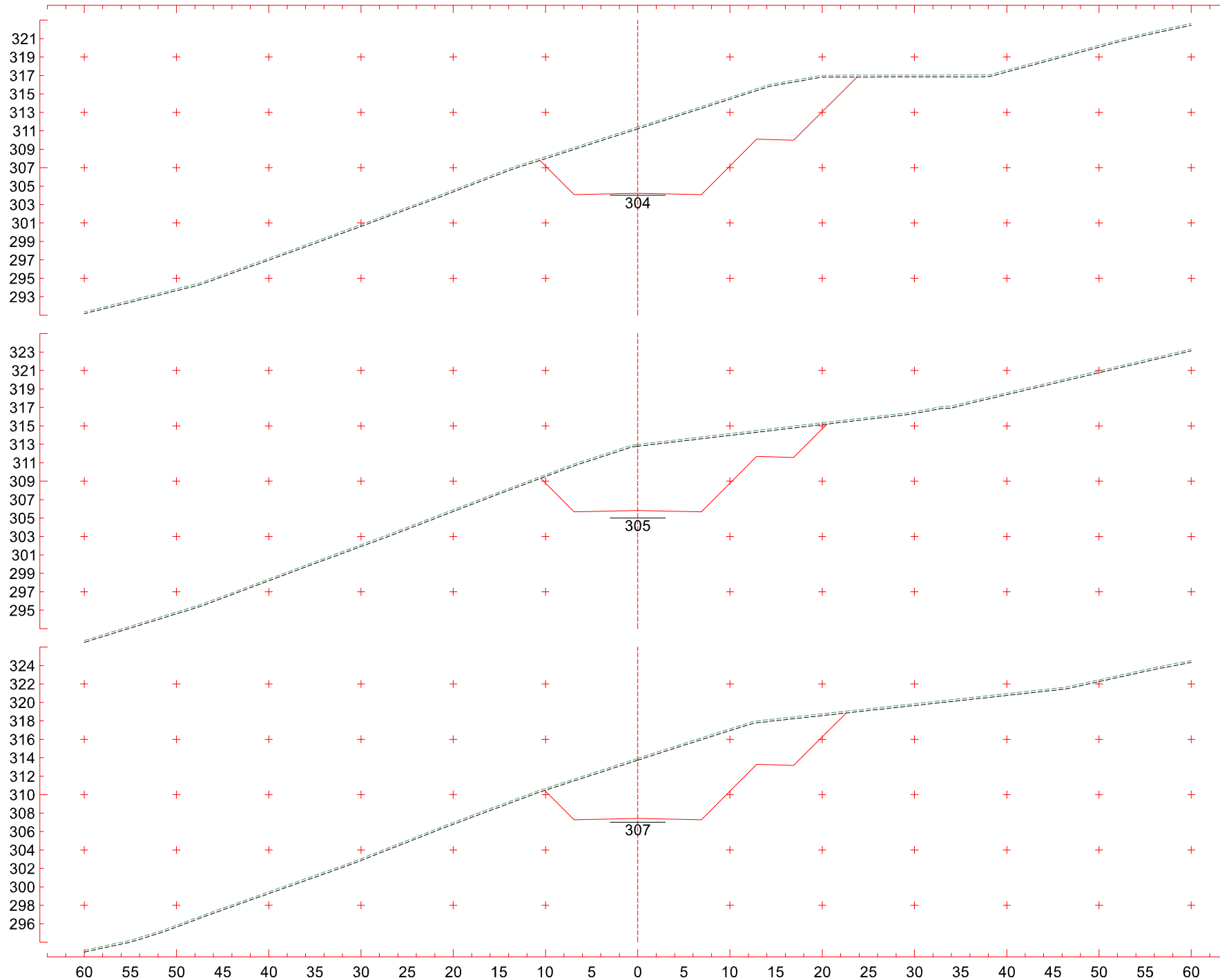
CT 315,764 m  
CP 310,620 m

**5+820**

CT 316,524 m  
CP 312,220 m

**Eixo1**

Escala 1:400

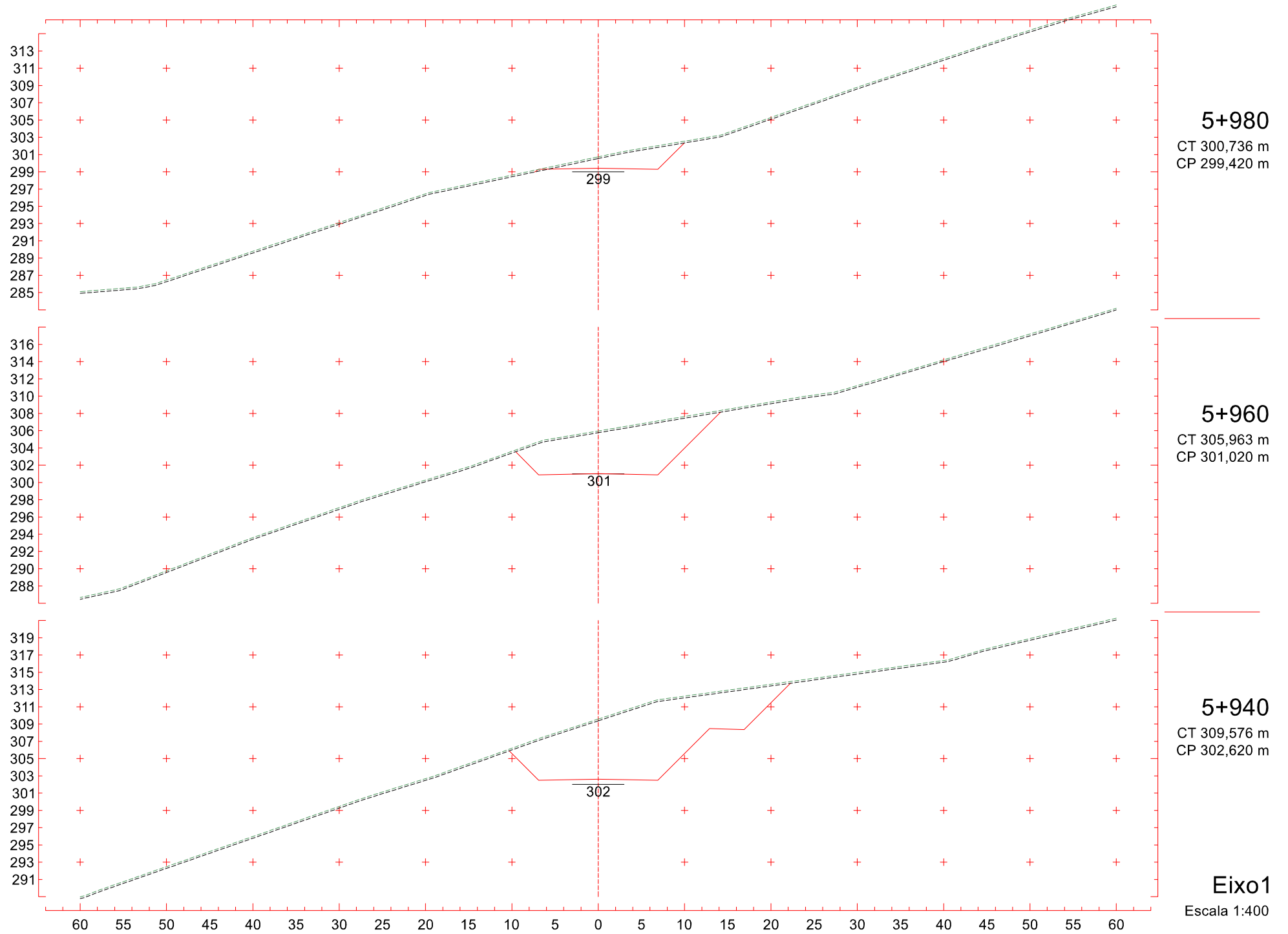


**5+920**  
CT 311,407 m  
CP 304,220 m

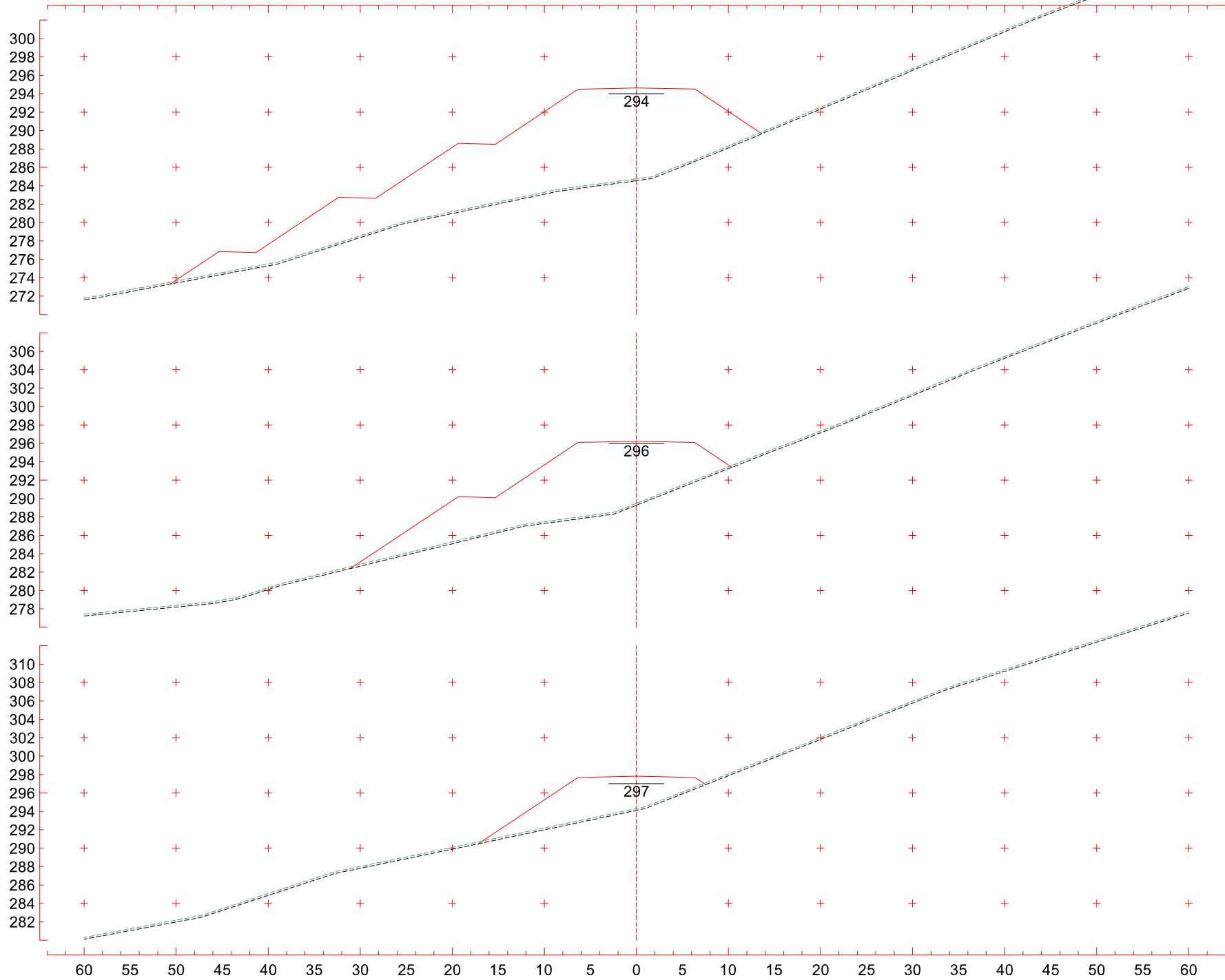
**5+900**  
CT 312,986 m  
CP 305,820 m

**5+880**  
CT 313,935 m  
CP 307,420 m

**Eixo1**  
Escala 1:400





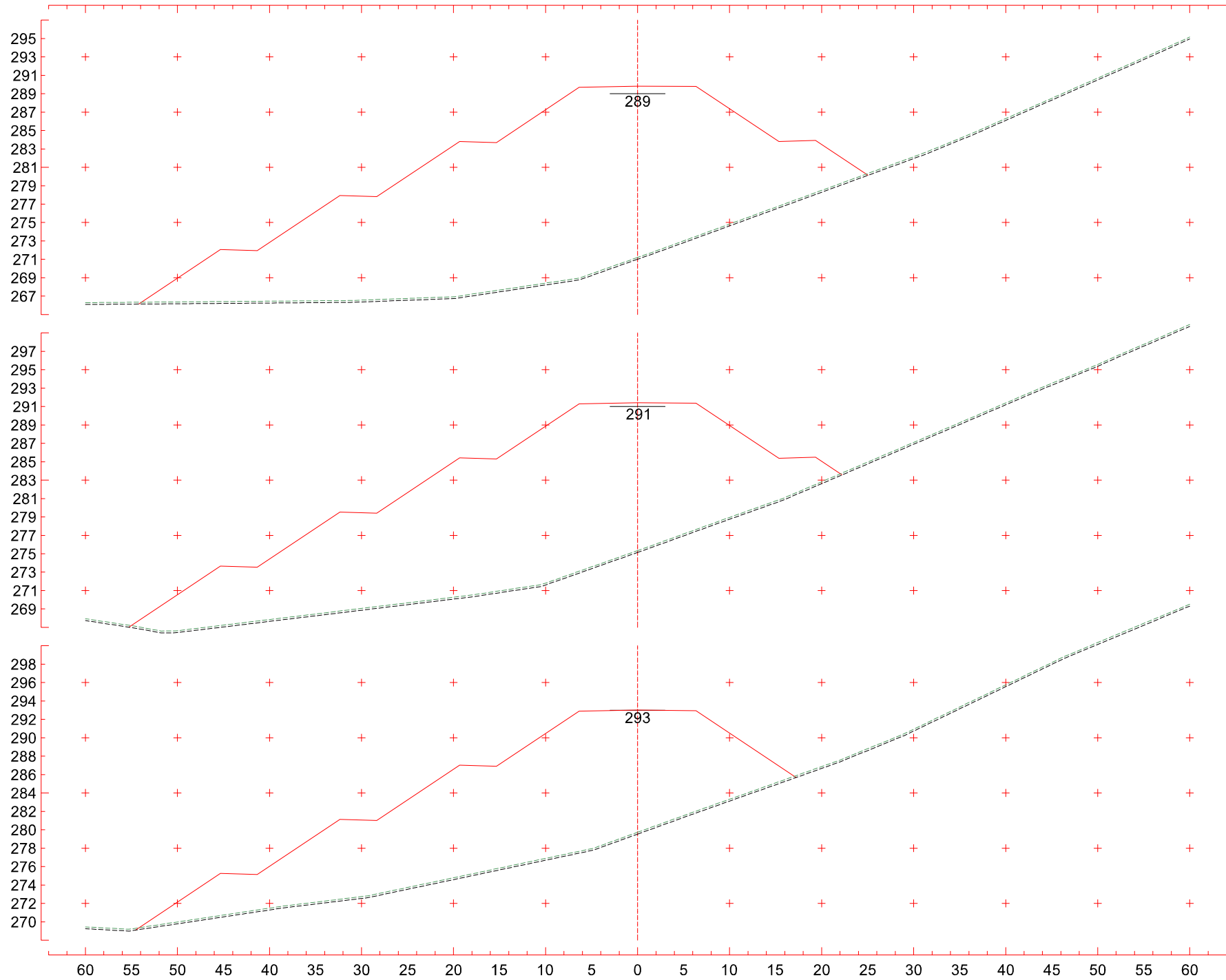


**6+040**  
CT 284,747 m  
CP 294,620 m

**6+020**  
CT 289,477 m  
CP 296,220 m

**6+000**  
CT 294,311 m  
CP 297,820 m

**Eixo1**  
Escala 1:400

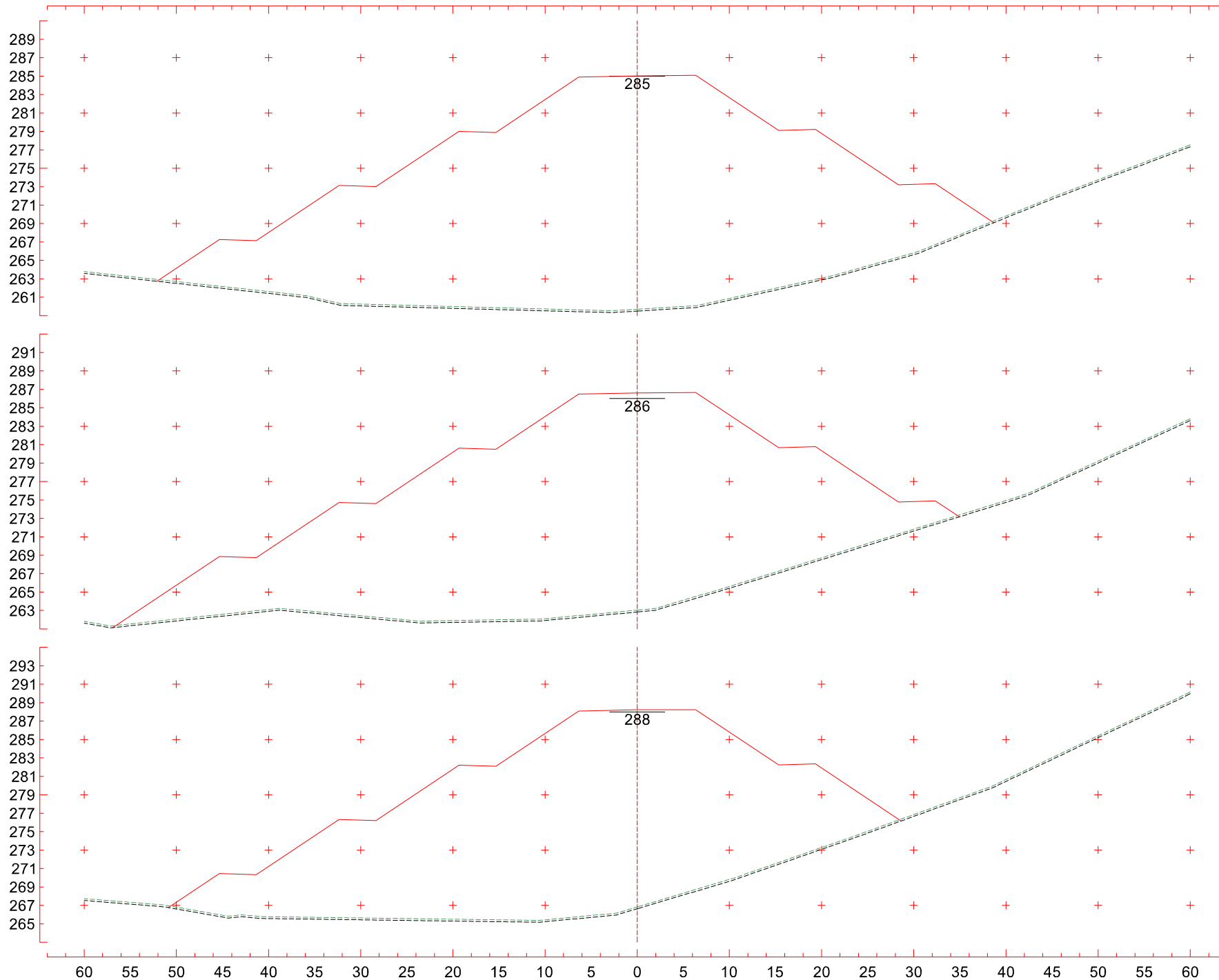


**6+100**  
CT 271,205 m  
CP 289,820 m

**6+080**  
CT 275,344 m  
CP 291,420 m

**6+060**  
CT 279,729 m  
CP 293,020 m

**Eixo1**  
Escala 1:400

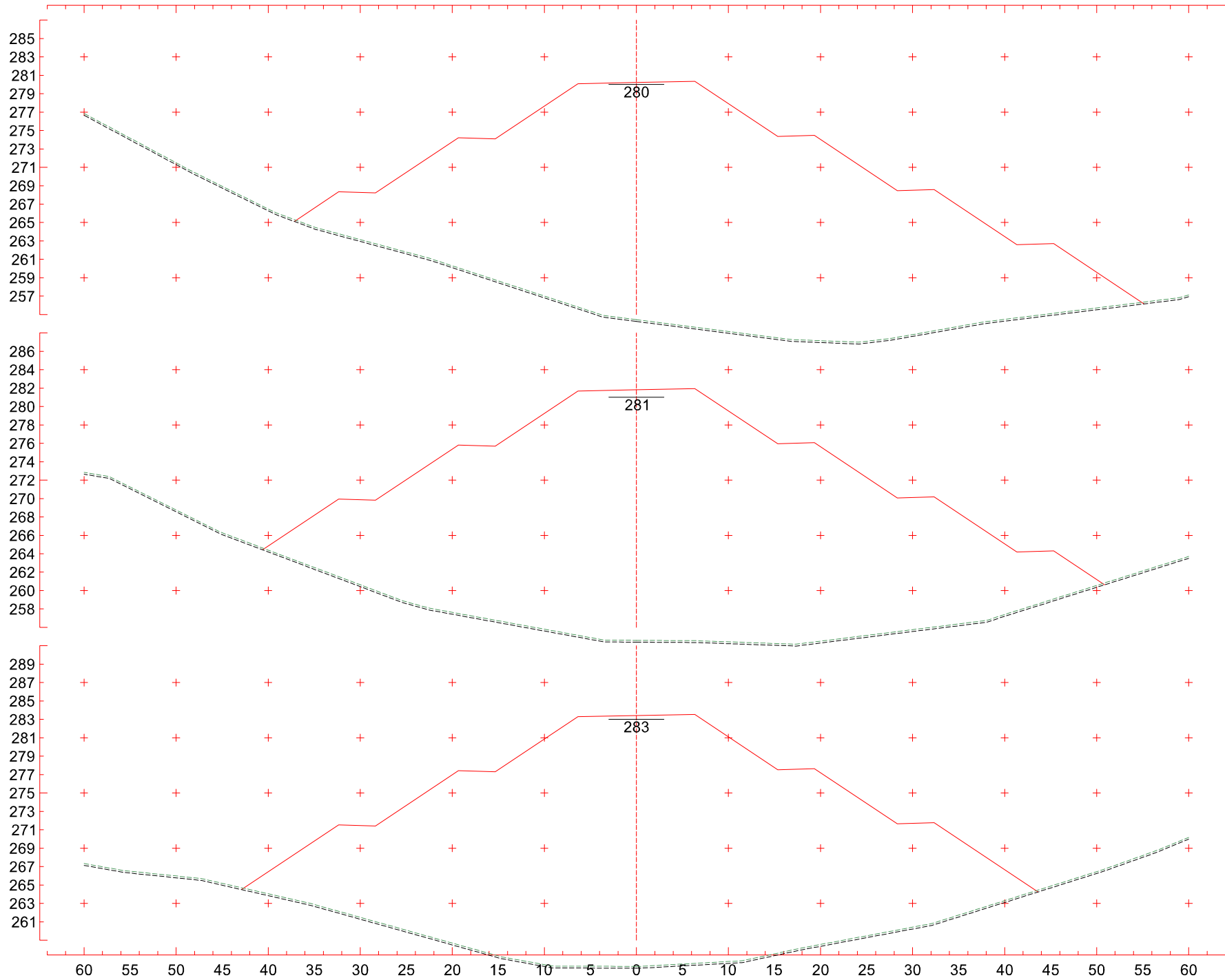


**6+160**  
CT 259,699 m  
CP 285,020 m

**6+140**  
CT 263,035 m  
CP 286,620 m

**6+120**  
CT 266,824 m  
CP 288,220 m

**Eixo1**  
Escala 1:400

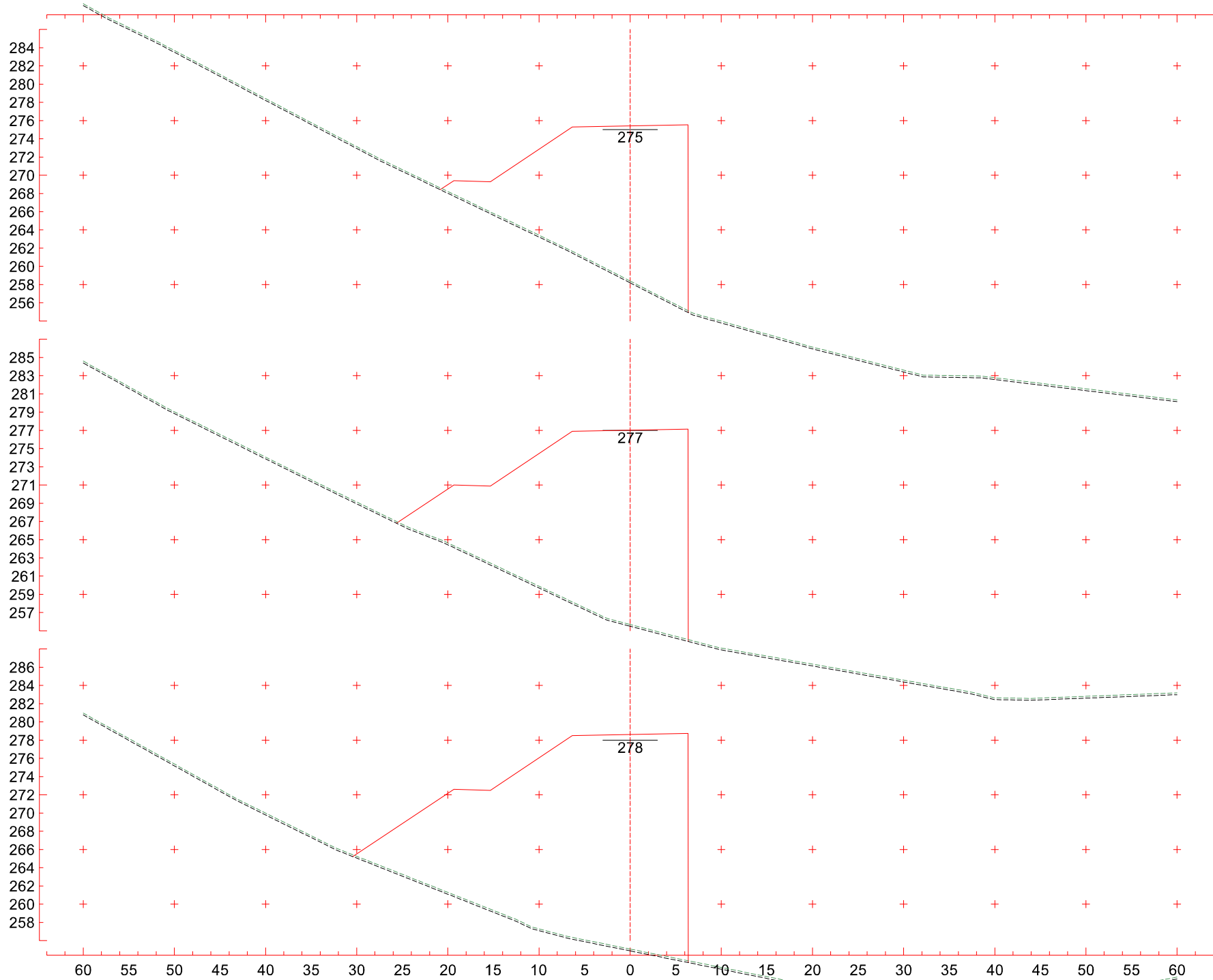


**6+220**  
CT 254,443 m  
CP 280,220 m

**6+200**  
CT 254,593 m  
CP 281,820 m

**6+180**  
CT 256,150 m  
CP 283,420 m

**Eixo1**  
Escala 1:400

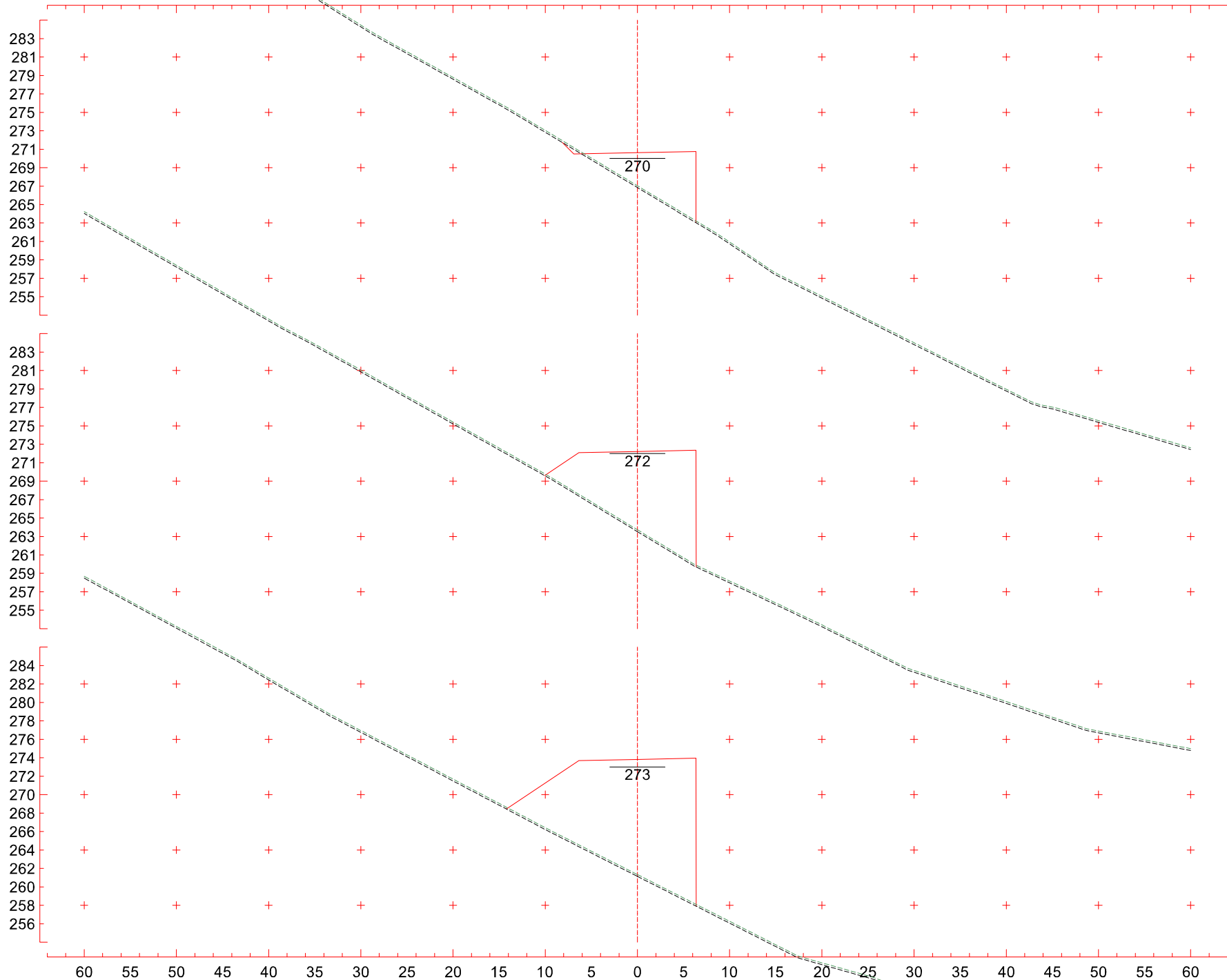


**6+280**  
CT 258,390 m  
CP 275,420 m

**6+260**  
CT 255,696 m  
CP 277,020 m

**6+240**  
CT 255,069 m  
CP 278,620 m

**Eixo1**  
Escala 1:400

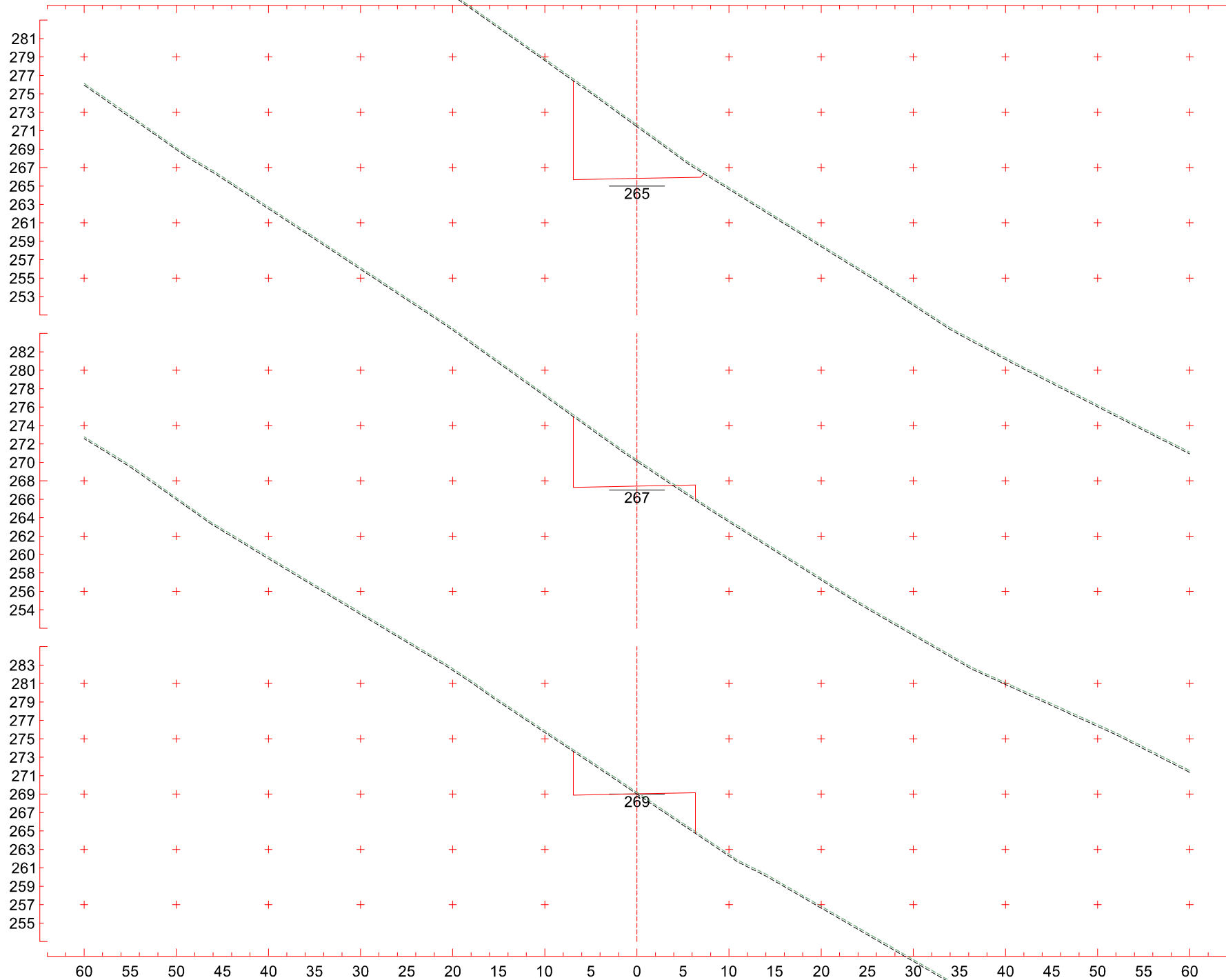


**6+340**  
CT 267,042 m  
CP 270,620 m

**6+320**  
CT 263,727 m  
CP 272,220 m

**6+300**  
CT 261,333 m  
CP 273,820 m

**Eixo1**  
Escala 1:400

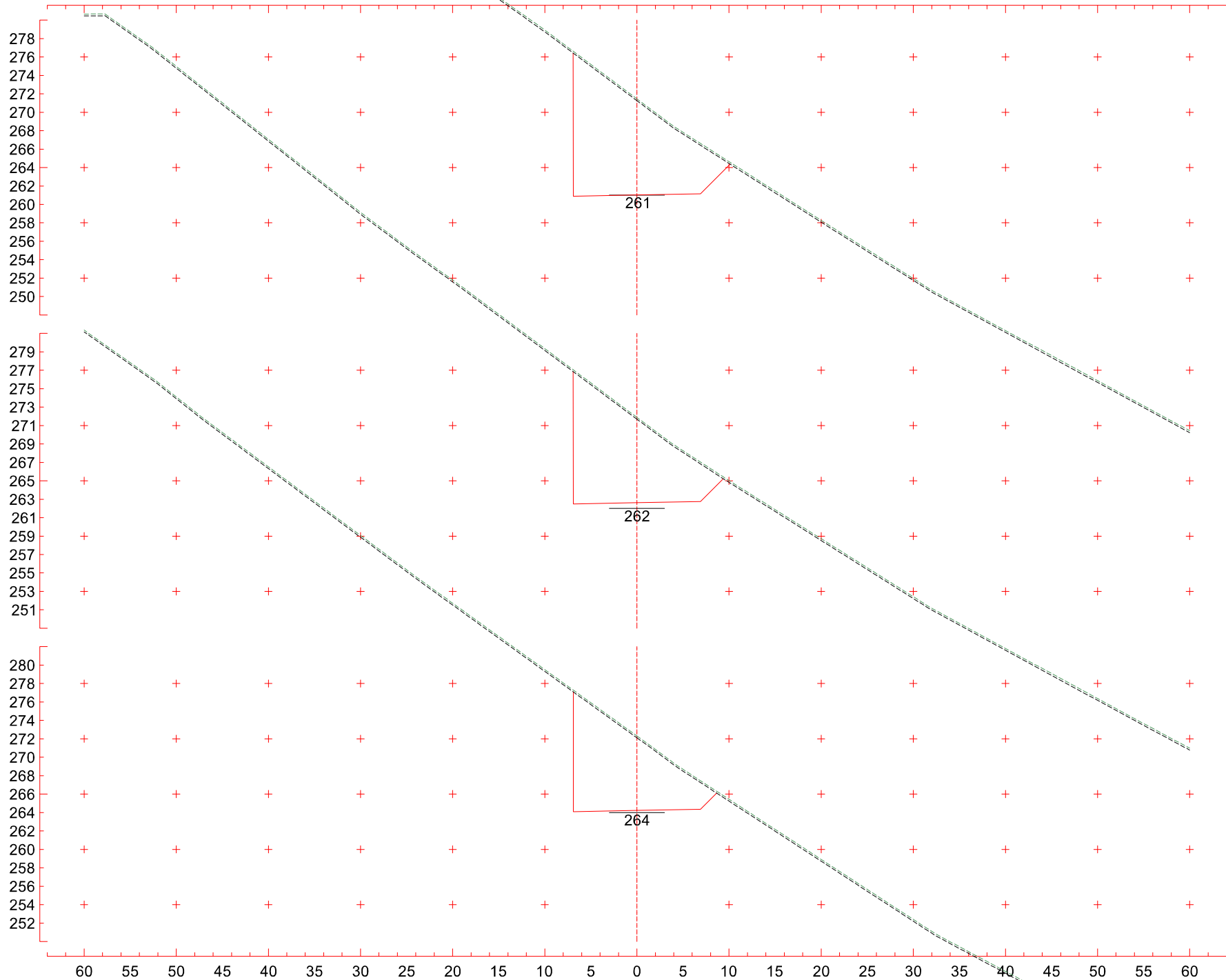


**6+400**  
CT 271,641 m  
CP 265,820 m

**6+380**  
CT 270,289 m  
CP 267,420 m

**6+360**  
CT 269,204 m  
CP 269,020 m

**Eixo1**  
Escala 1:400



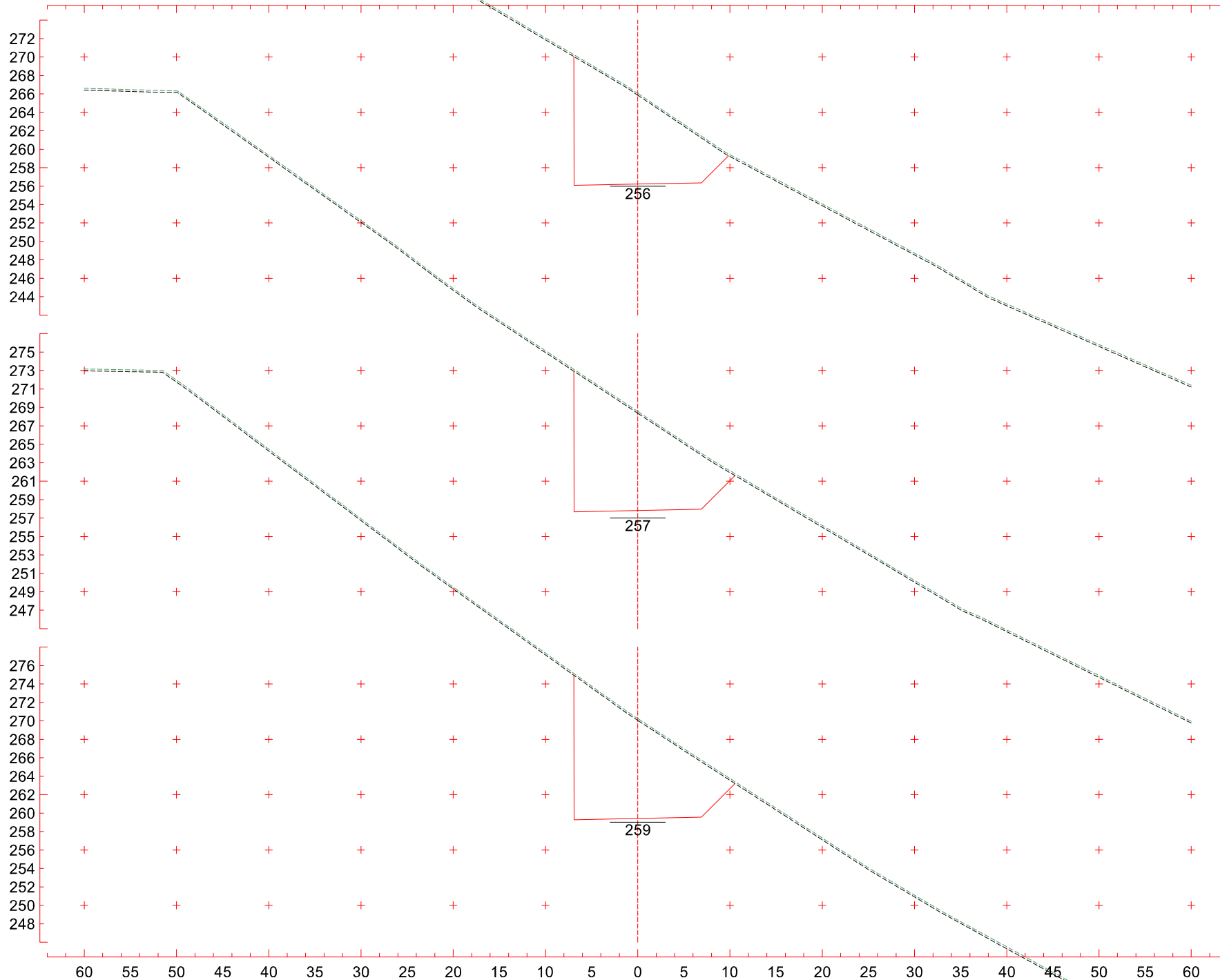
**6+460**  
CT 271,454 m  
CP 261,020 m

**6+440**  
CT 271,889 m  
CP 262,620 m

**6+420**  
CT 272,309 m  
CP 264,220 m

**Eixo1**  
Escala 1:400



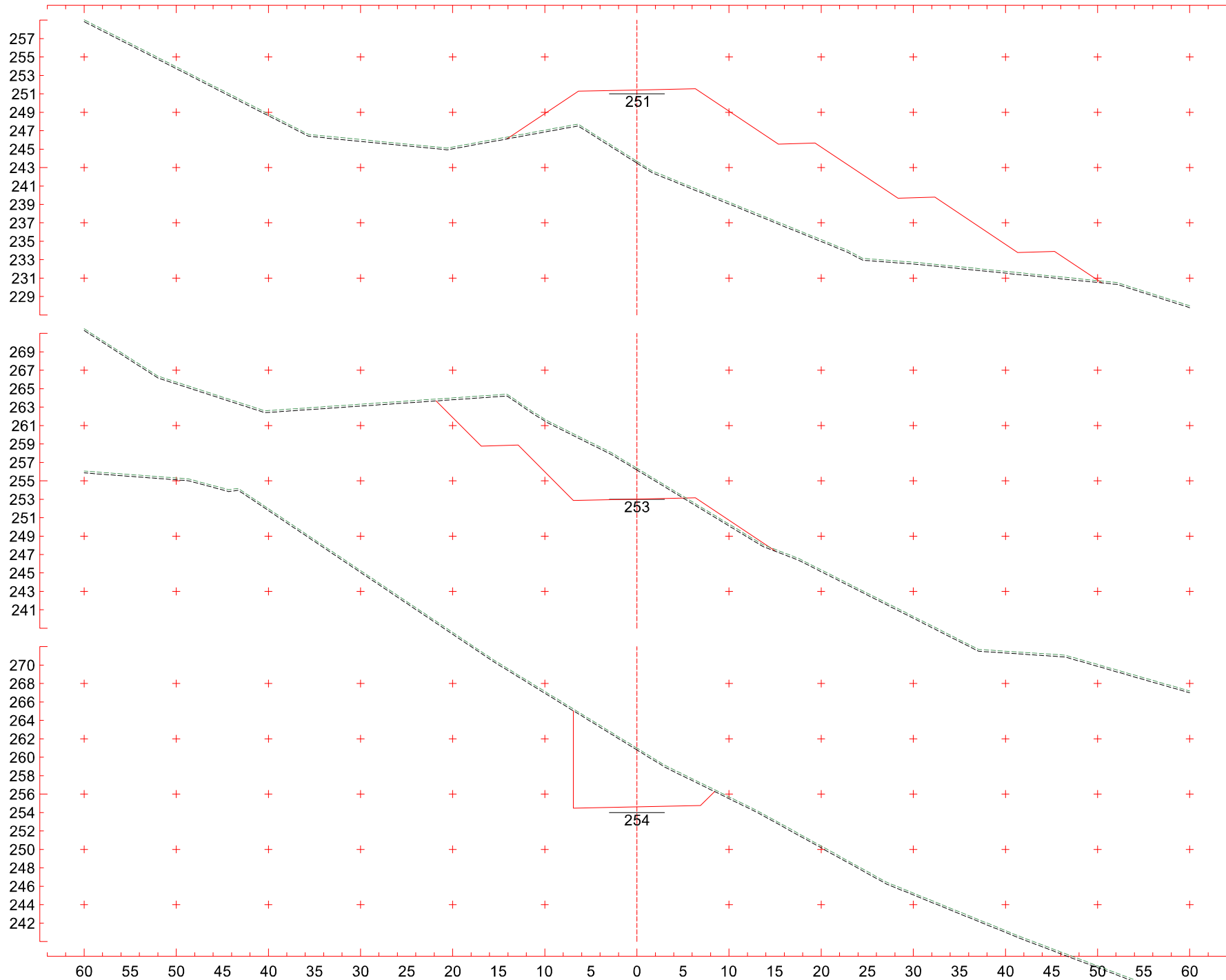


**6+520**  
CT 266,066 m  
CP 256,220 m

**6+500**  
CT 268,565 m  
CP 257,820 m

**6+480**  
CT 270,260 m  
CP 259,420 m

**Eixo1**  
Escala 1:400

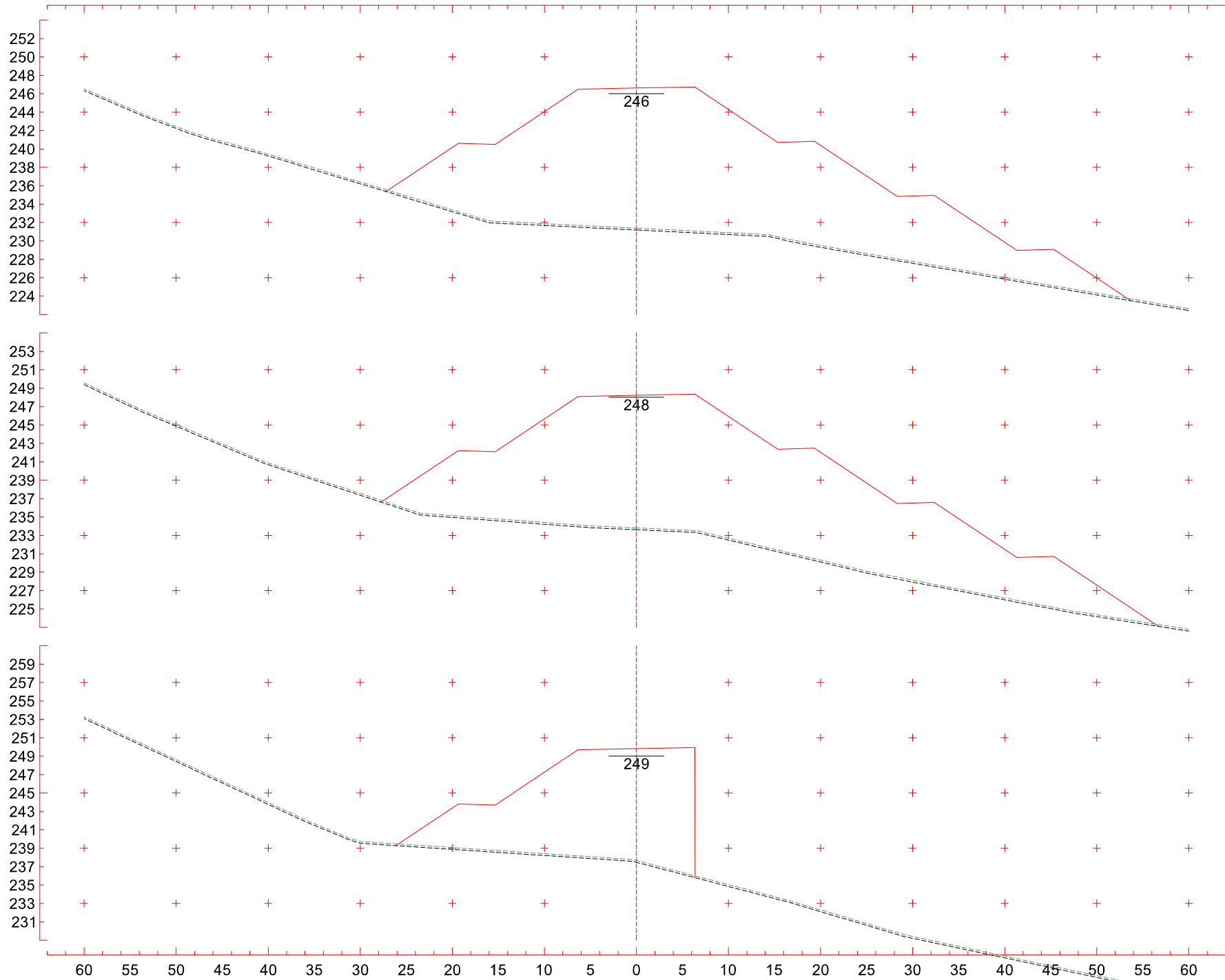


**6+580**  
CT 243,683 m  
CP 251,420 m

**6+560**  
CT 256,373 m  
CP 253,020 m

**6+540**  
CT 260,993 m  
CP 254,620 m

**Eixo1**  
Escala 1:400

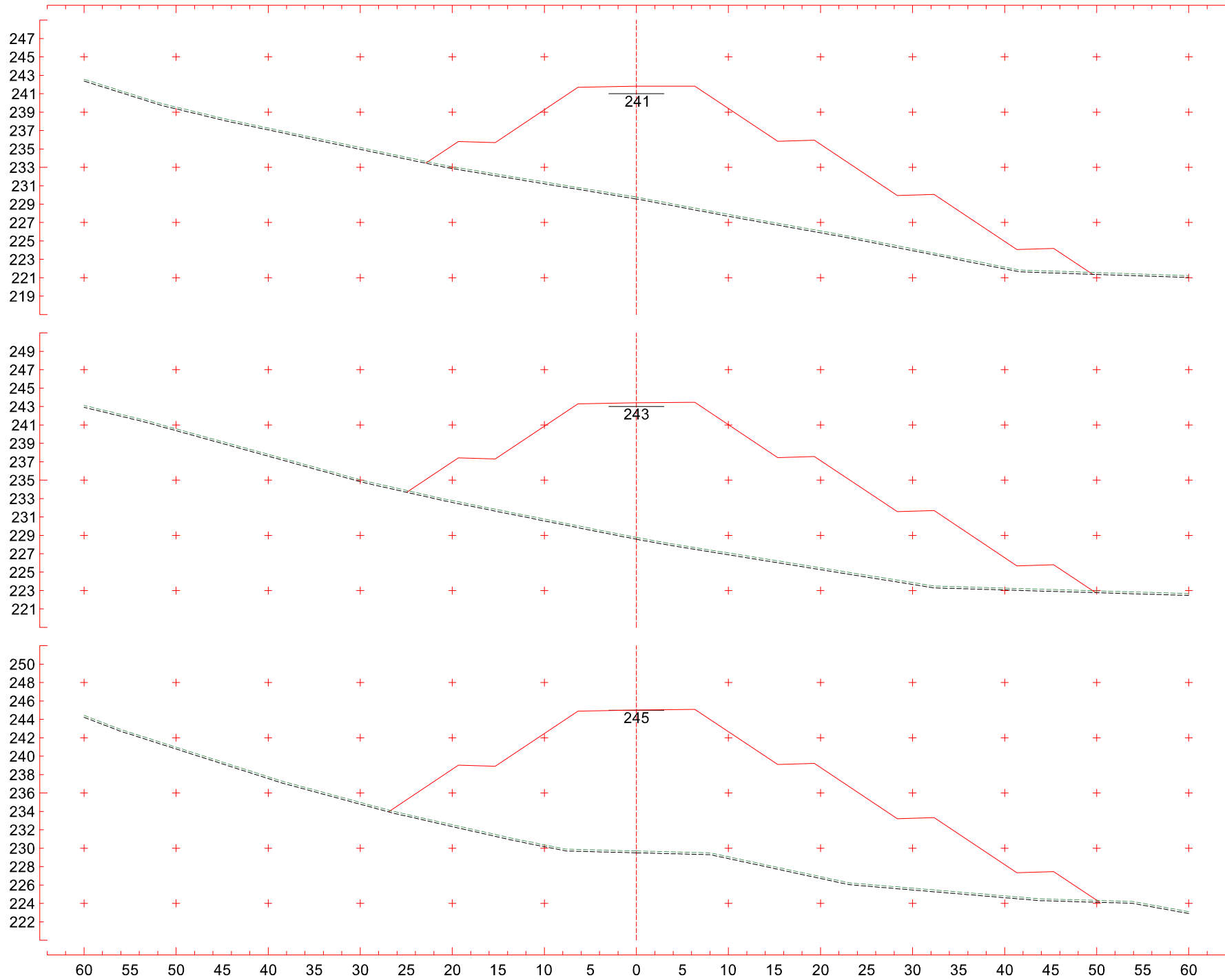


**6+640**  
CT 231,387 m  
CP 246,620 m

**6+620**  
CT 233,807 m  
CP 248,220 m

**6+600**  
CT 237,663 m  
CP 249,820 m

**Eixo1**  
Escala 1:400

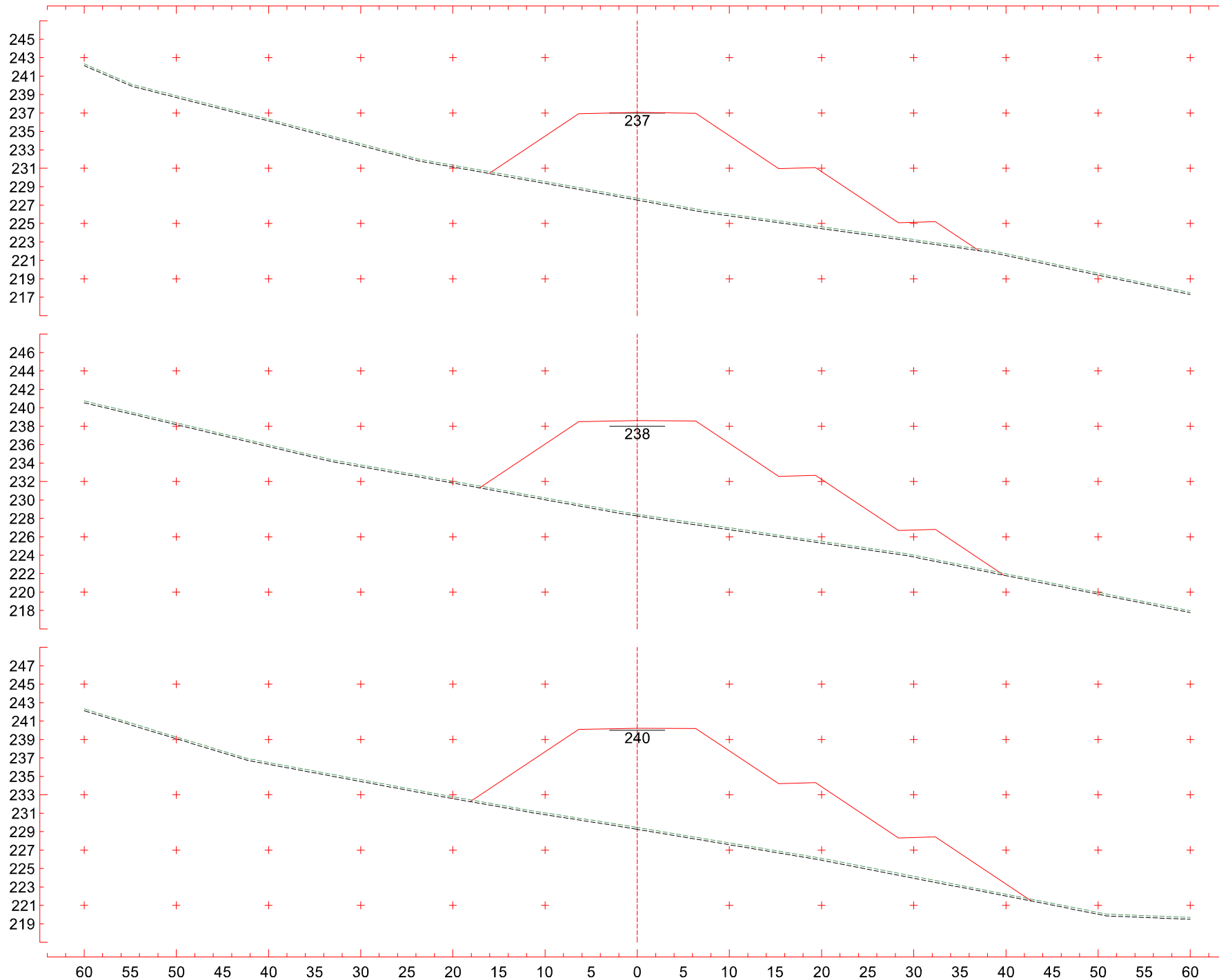


**6+700**  
CT 229,757 m  
CP 241,820 m

**6+680**  
CT 228,781 m  
CP 243,420 m

**6+660**  
CT 229,697 m  
CP 245,020 m

**Eixo1**  
Escala 1:400

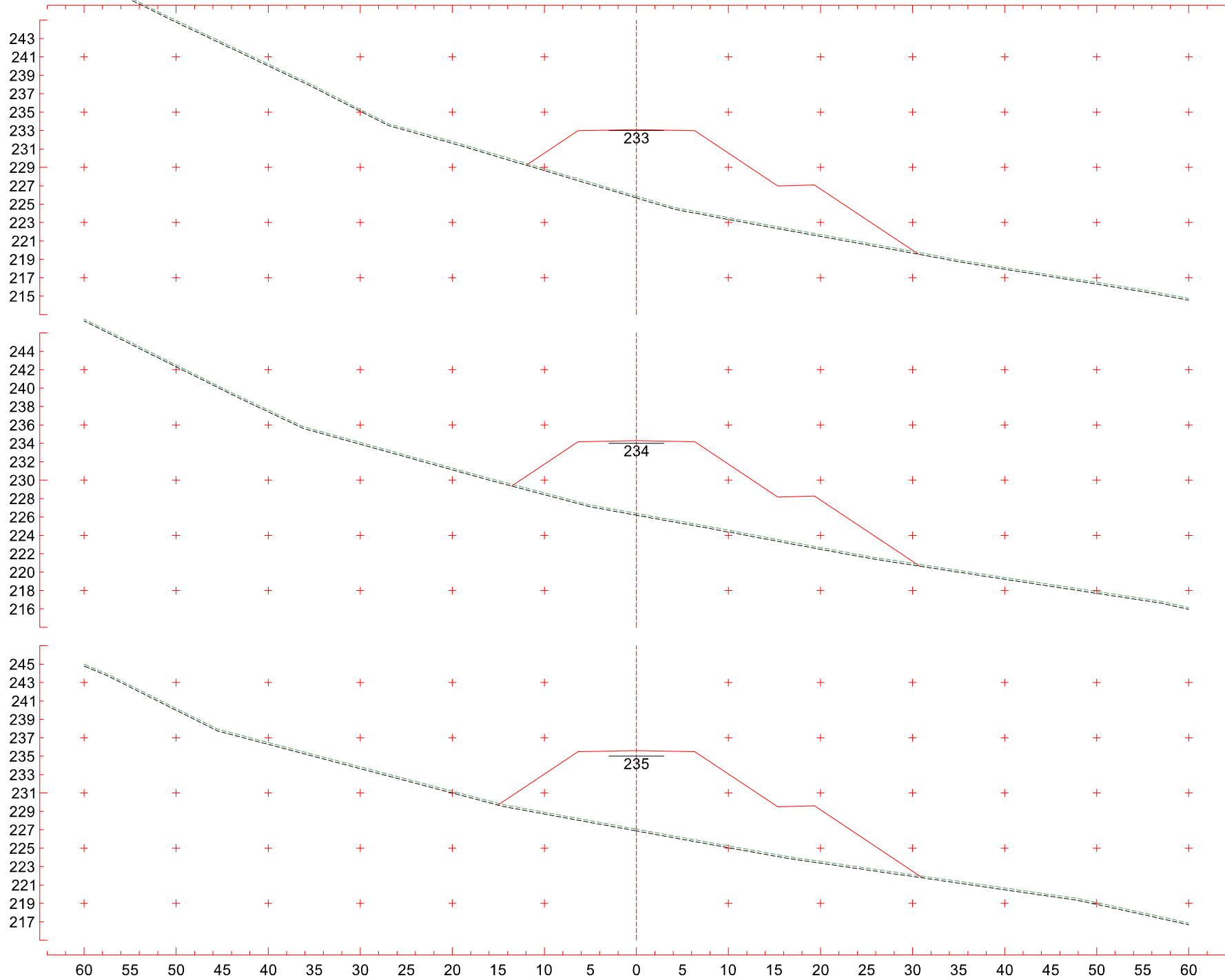


**6+760**  
CT 227,742 m  
CP 237,053 m

**6+740**  
CT 228,458 m  
CP 238,620 m

**6+720**  
CT 229,451 m  
CP 240,220 m

**Eixo1**  
Escala 1:400



**6+820**

CT 225,872 m  
CP 233,103 m

**6+800**

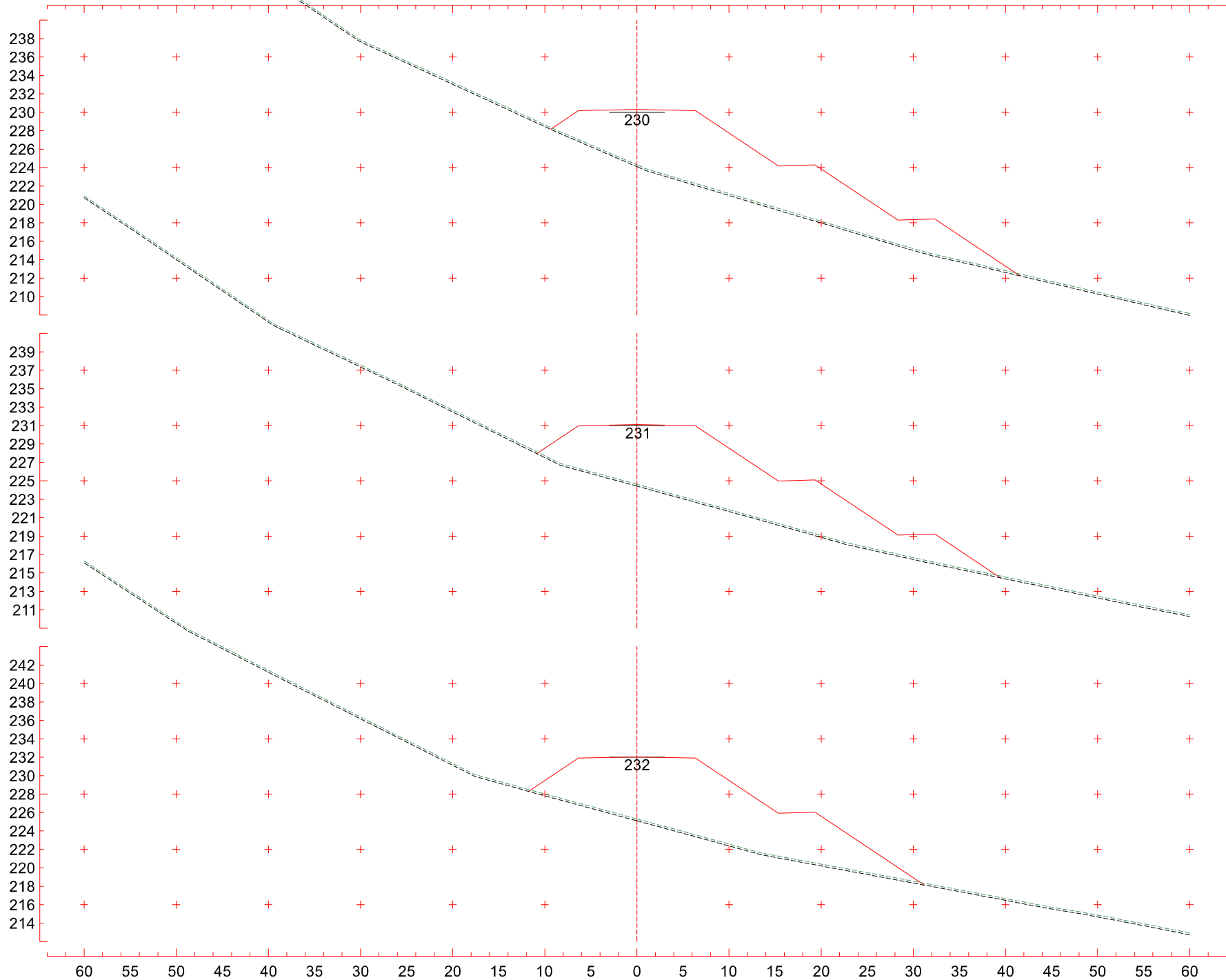
CT 226,388 m  
CP 234,292 m

**6+780**

CT 227,076 m  
CP 235,609 m

**Eixo1**

Escala 1:400

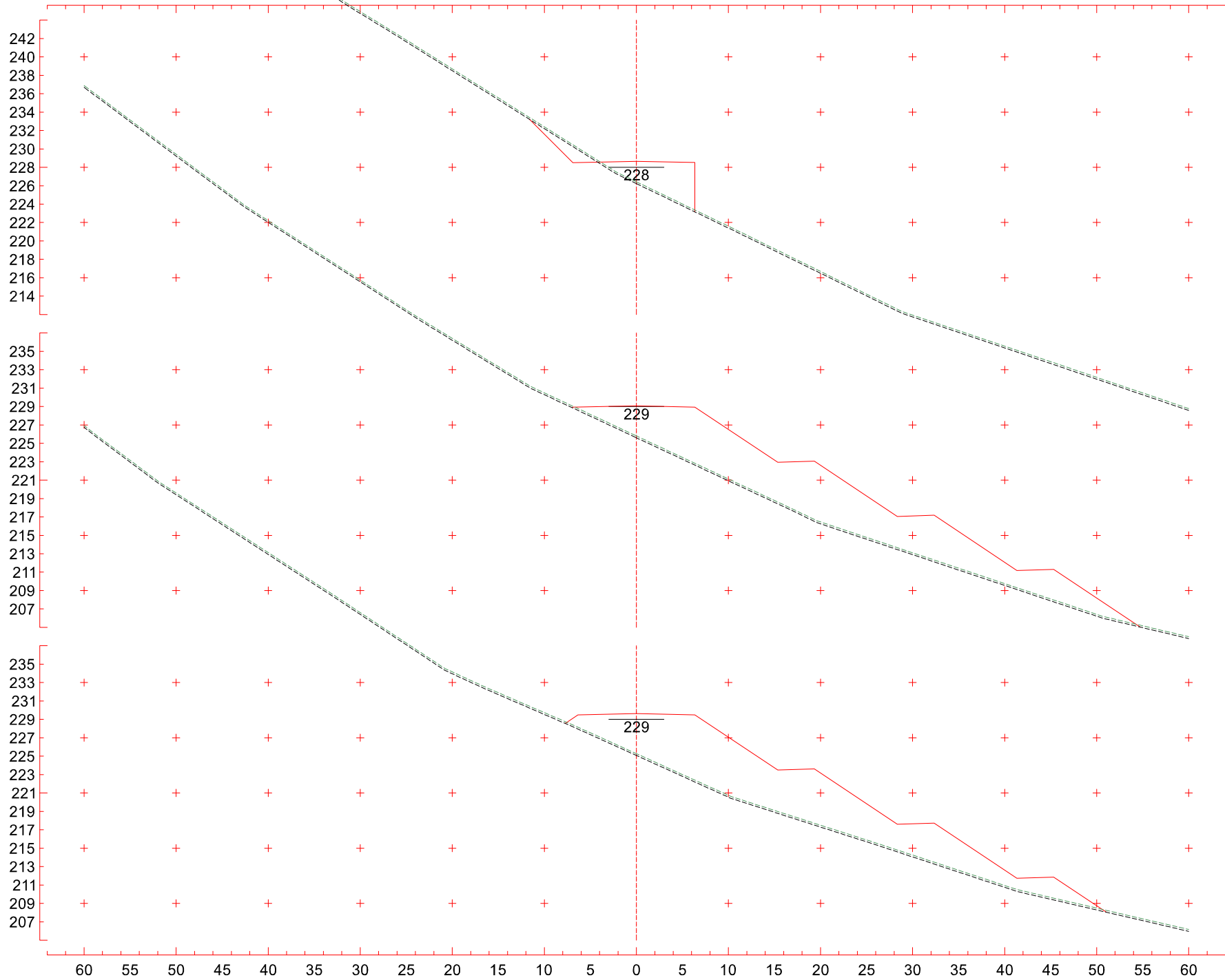


**6+880**  
CT 224,296 m  
CP 230,300 m

**6+860**  
CT 224,622 m  
CP 231,107 m

**6+840**  
CT 225,303 m  
CP 232,041 m

**Eixo1**  
Escala 1:400



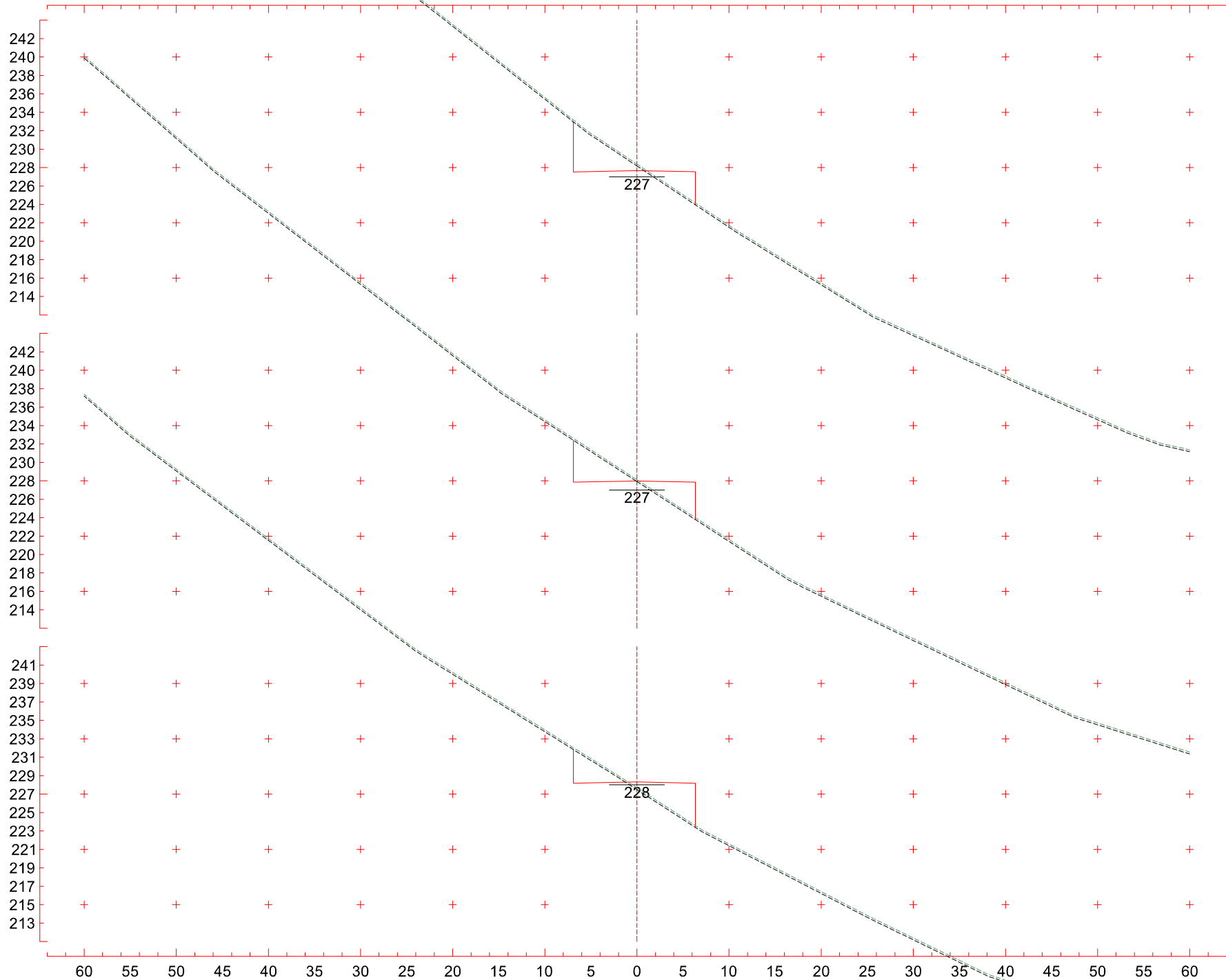
**6+940**  
CT 226,430 m  
CP 228,644 m

**6+920**  
CT 225,807 m  
CP 229,068 m

**6+900**  
CT 225,272 m  
CP 229,620 m

**Eixo1**  
Escala 1:400



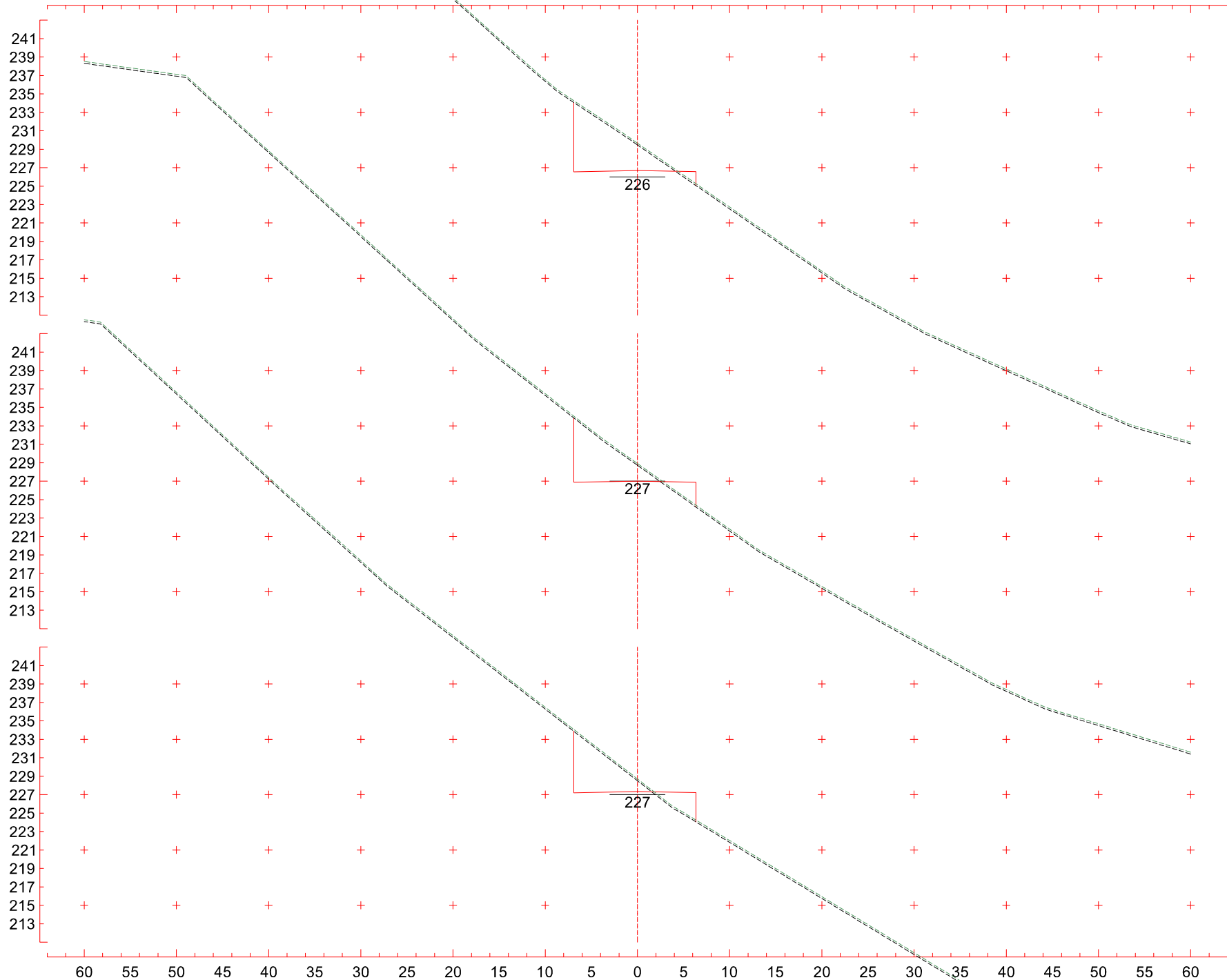


**7+000**  
CT 228,377 m  
CP 227,663 m

**6+980**  
CT 228,122 m  
CP 227,989 m

**6+960**  
CT 227,684 m  
CP 228,314 m

**Eixo1**  
Escala 1:400



**7+060**

CT 229,665 m  
CP 226,687 m

**7+040**

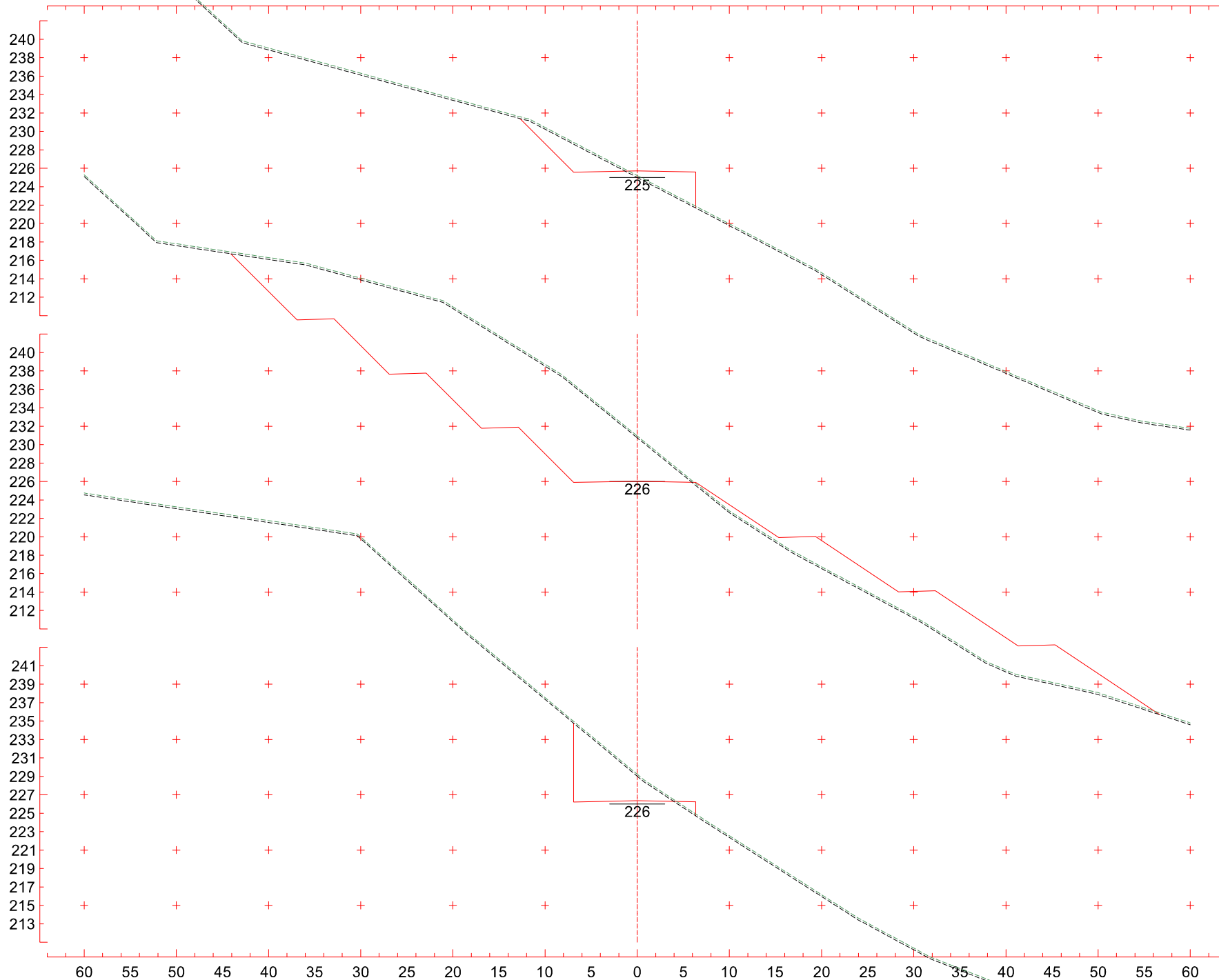
CT 228,917 m  
CP 227,013 m

**7+020**

CT 228,708 m  
CP 227,338 m

**Eixo1**

Escala 1:400

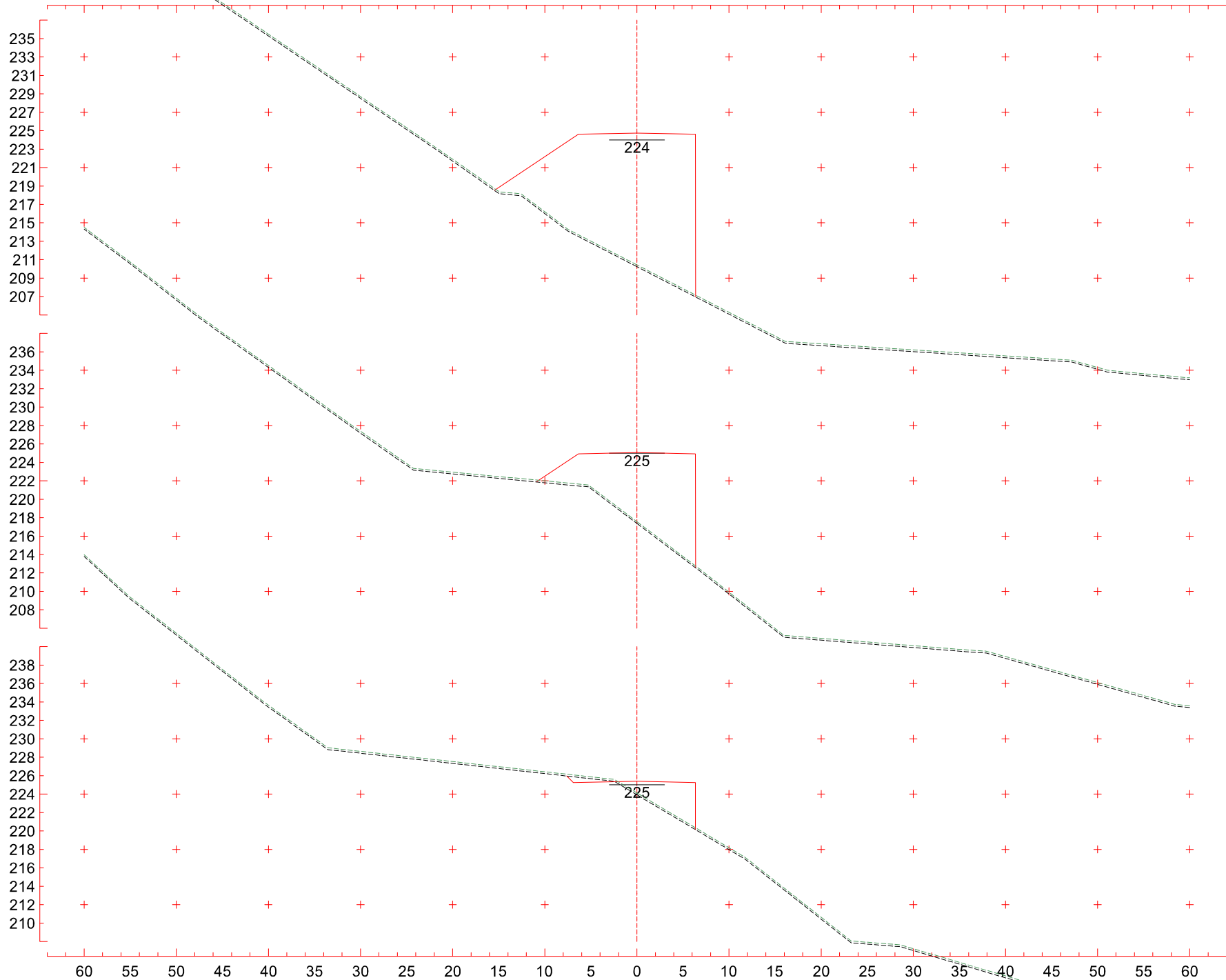


**7+120**  
CT 225,202 m  
CP 225,712 m

**7+100**  
CT 230,943 m  
CP 226,037 m

**7+080**  
CT 229,223 m  
CP 226,362 m

**Eixo1**  
Escala 1:400



**7+180**

CT 210,437 m  
CP 224,736 m

**7+160**

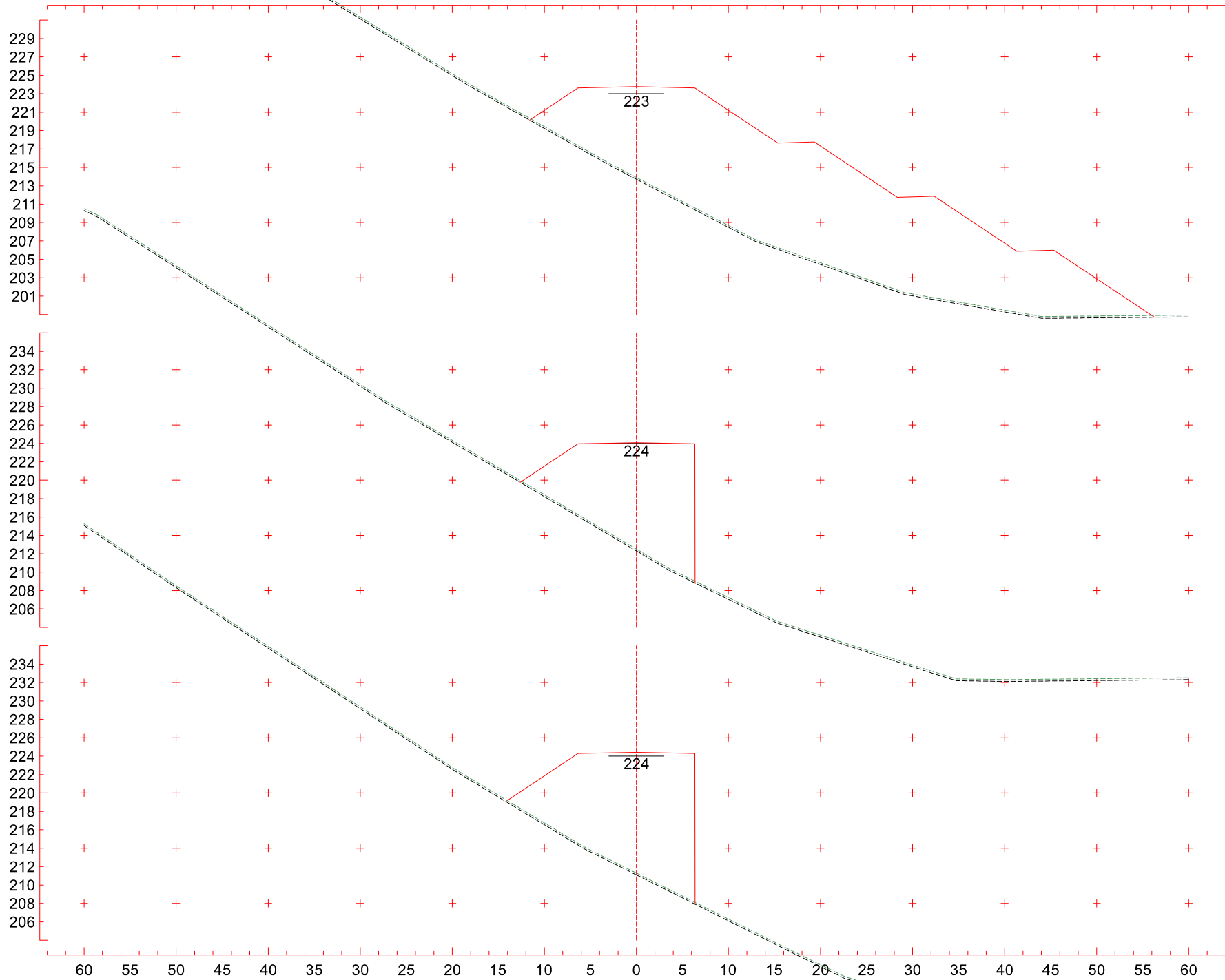
CT 217,571 m  
CP 225,061 m

**7+140**

CT 224,123 m  
CP 225,386 m

**Eixo1**

Escala 1:400



**7+240**

CT 213,901 m  
CP 223,760 m

**7+220**

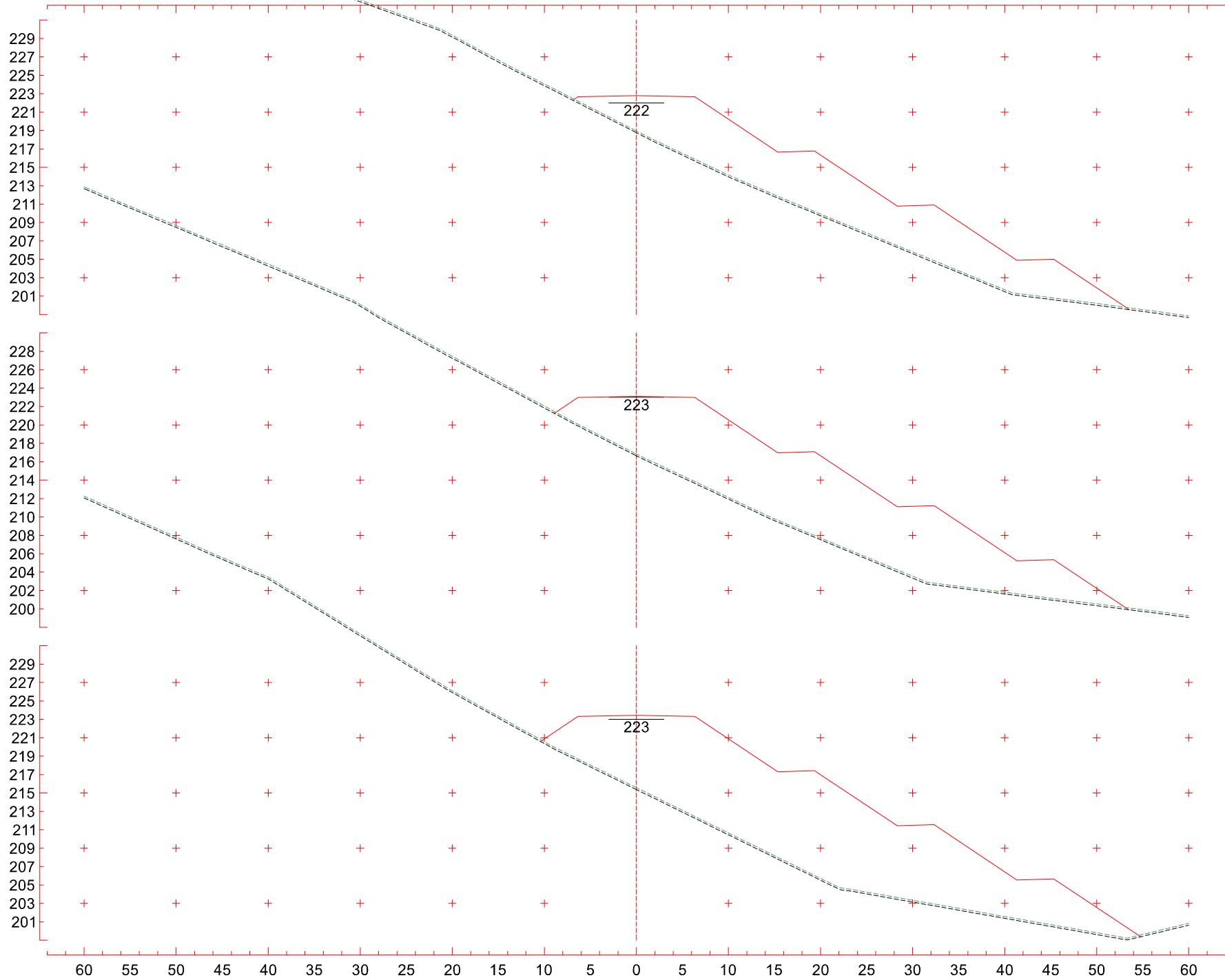
CT 212,504 m  
CP 224,085 m

**7+200**

CT 211,298 m  
CP 224,410 m

**Eixo1**

Escala 1:400



**7+300**

CT 218,959 m  
CP 222,784 m

**7+280**

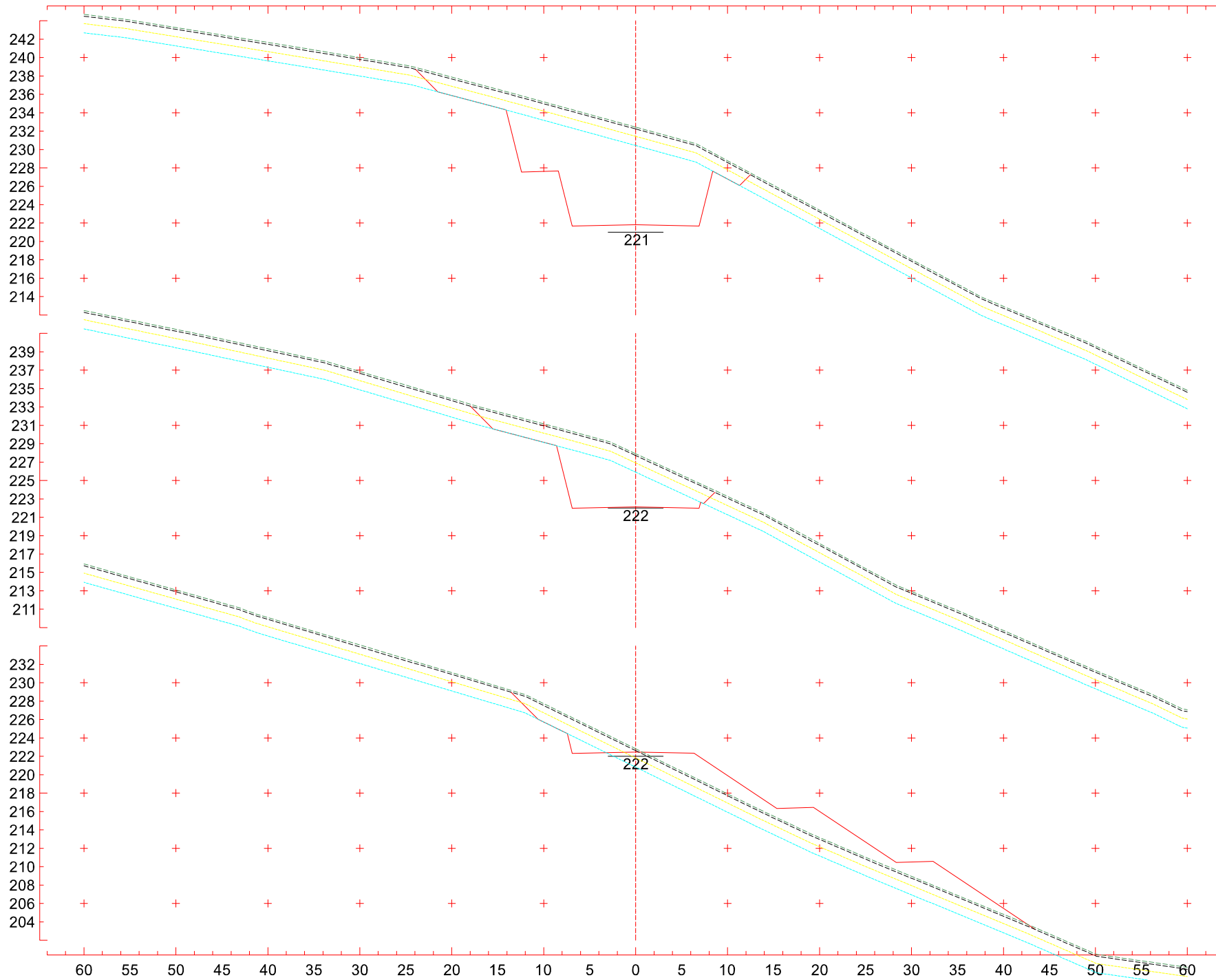
CT 216,839 m  
CP 223,109 m

**7+260**

CT 215,575 m  
CP 223,435 m

**Eixo1**

Escala 1:400

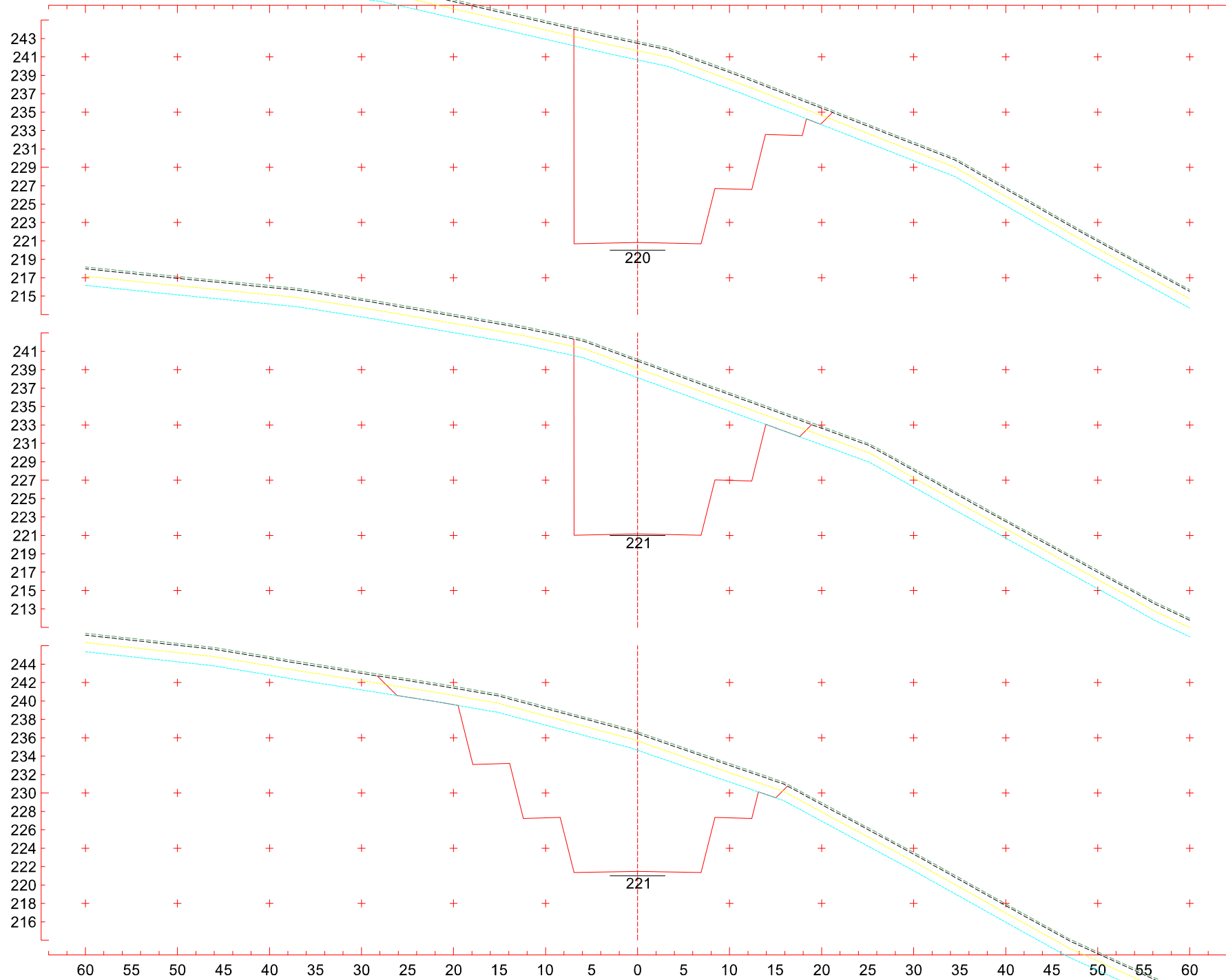


**7+360**  
CT 232,434 m  
CP 221,808 m

**7+340**  
CT 227,912 m  
CP 222,133 m

**7+320**  
CT 222,825 m  
CP 222,459 m

**Eixo 1**  
Escala 1:400



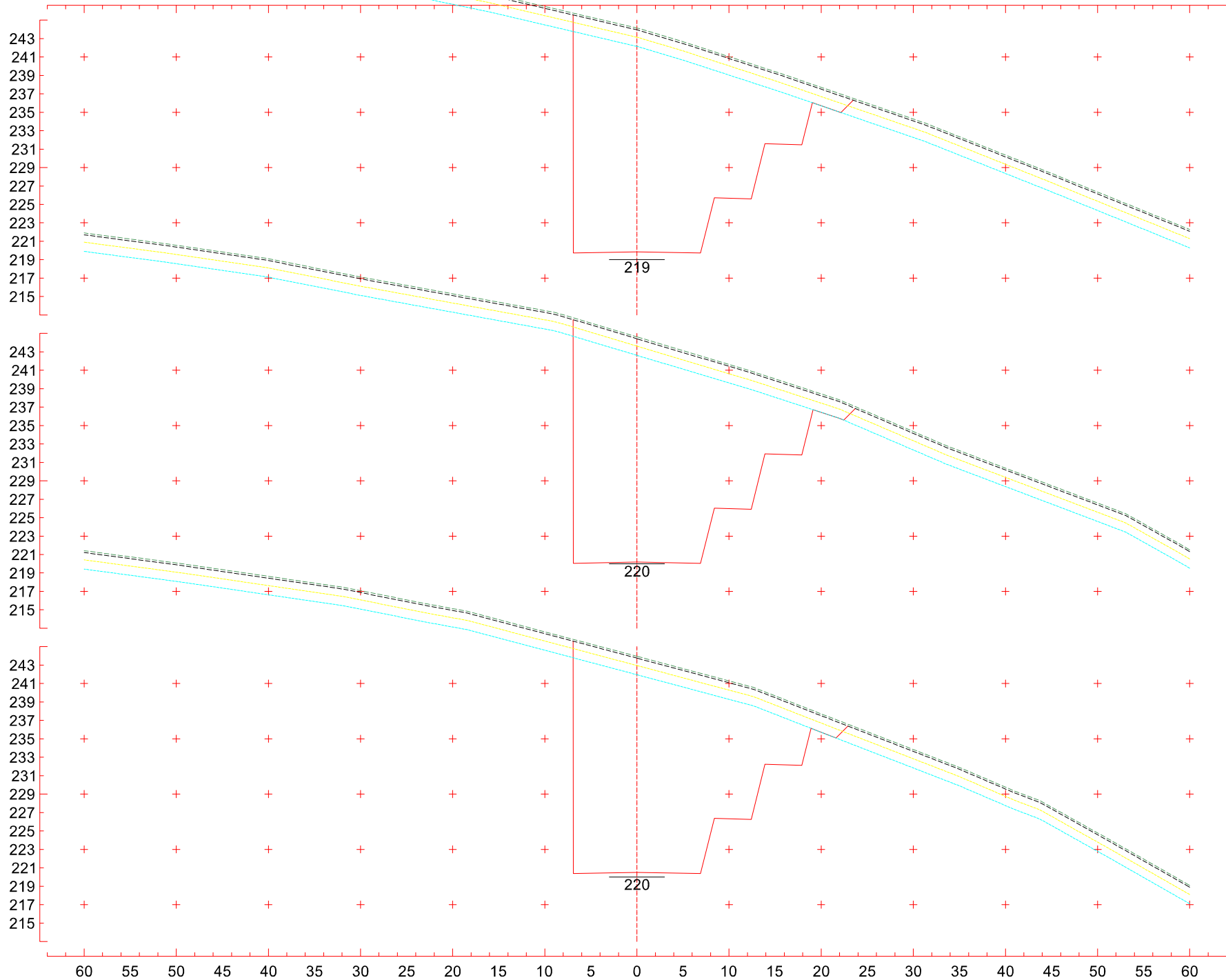
**7+420**  
CT 242,678 m  
CP 220,832 m

**7+400**  
CT 240,139 m  
CP 221,158 m

**7+380**  
CT 236,644 m  
CP 221,483 m

**Eixo1**  
Escala 1:400



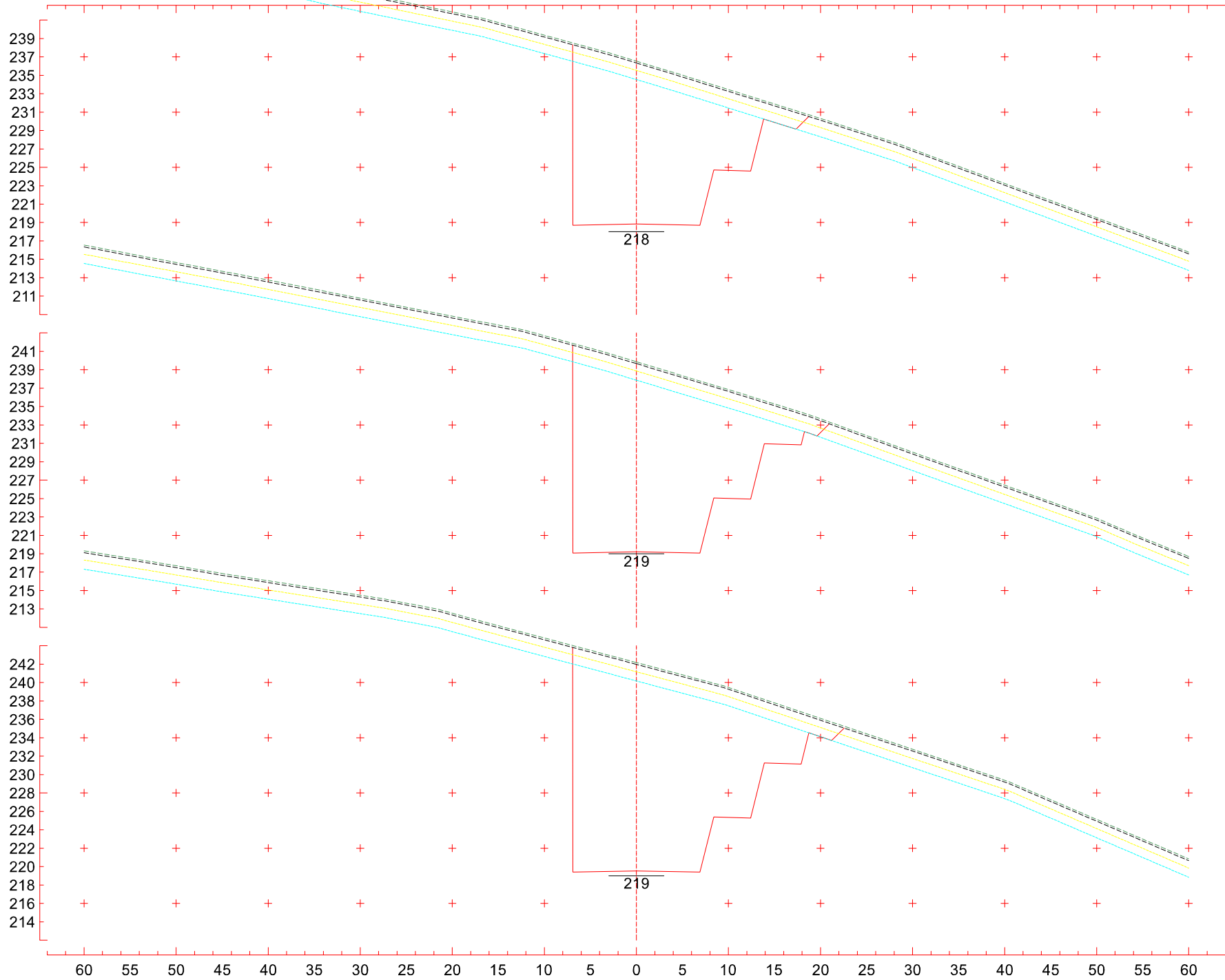


**7+480**  
CT 244,145 m  
CP 219,856 m

**7+460**  
CT 244,619 m  
CP 220,182 m

**7+440**  
CT 243,956 m  
CP 220,507 m

**Eixo1**  
Escala 1:400

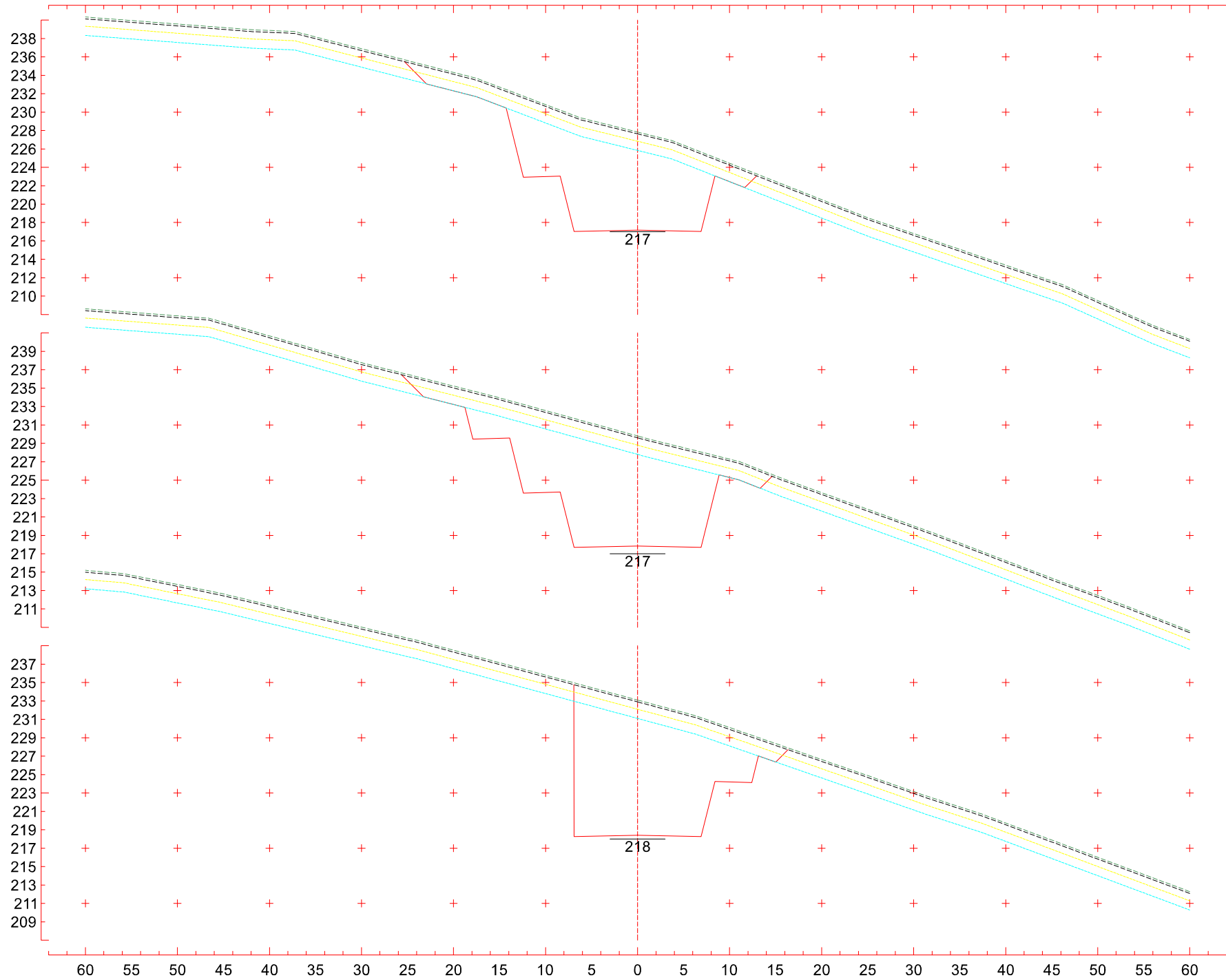


**7+540**  
CT 236,539 m  
CP 218,850 m

**7+520**  
CT 239,867 m  
CP 219,206 m

**7+500**  
CT 242,176 m  
CP 219,531 m

**Eixo1**  
Escala 1:400



**7+600**

CT 227,835 m  
CP 217,178 m

**7+580**

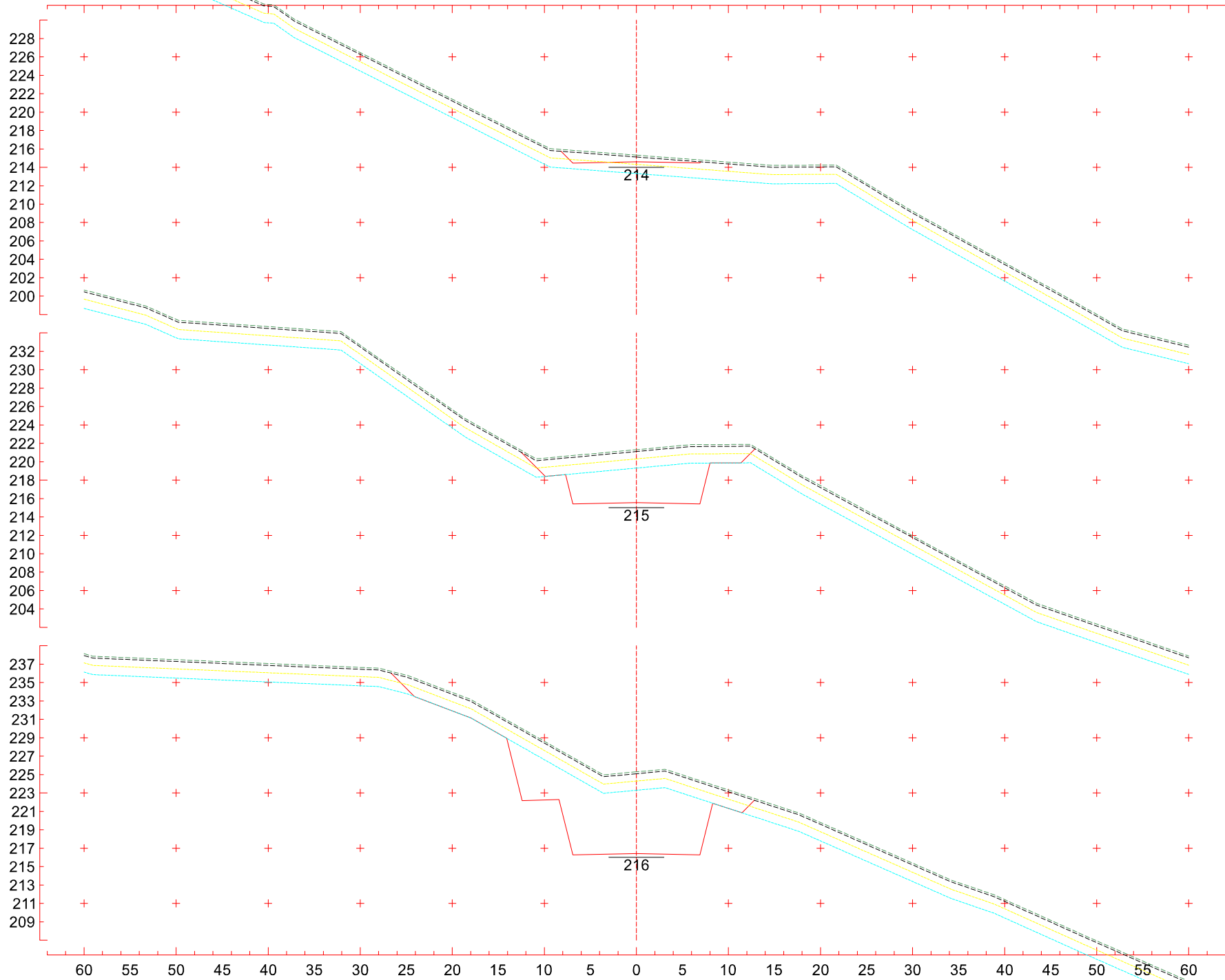
CT 229,801 m  
CP 217,837 m

**7+560**

CT 233,101 m  
CP 218,394 m

**Eixo1**

Escala 1:400

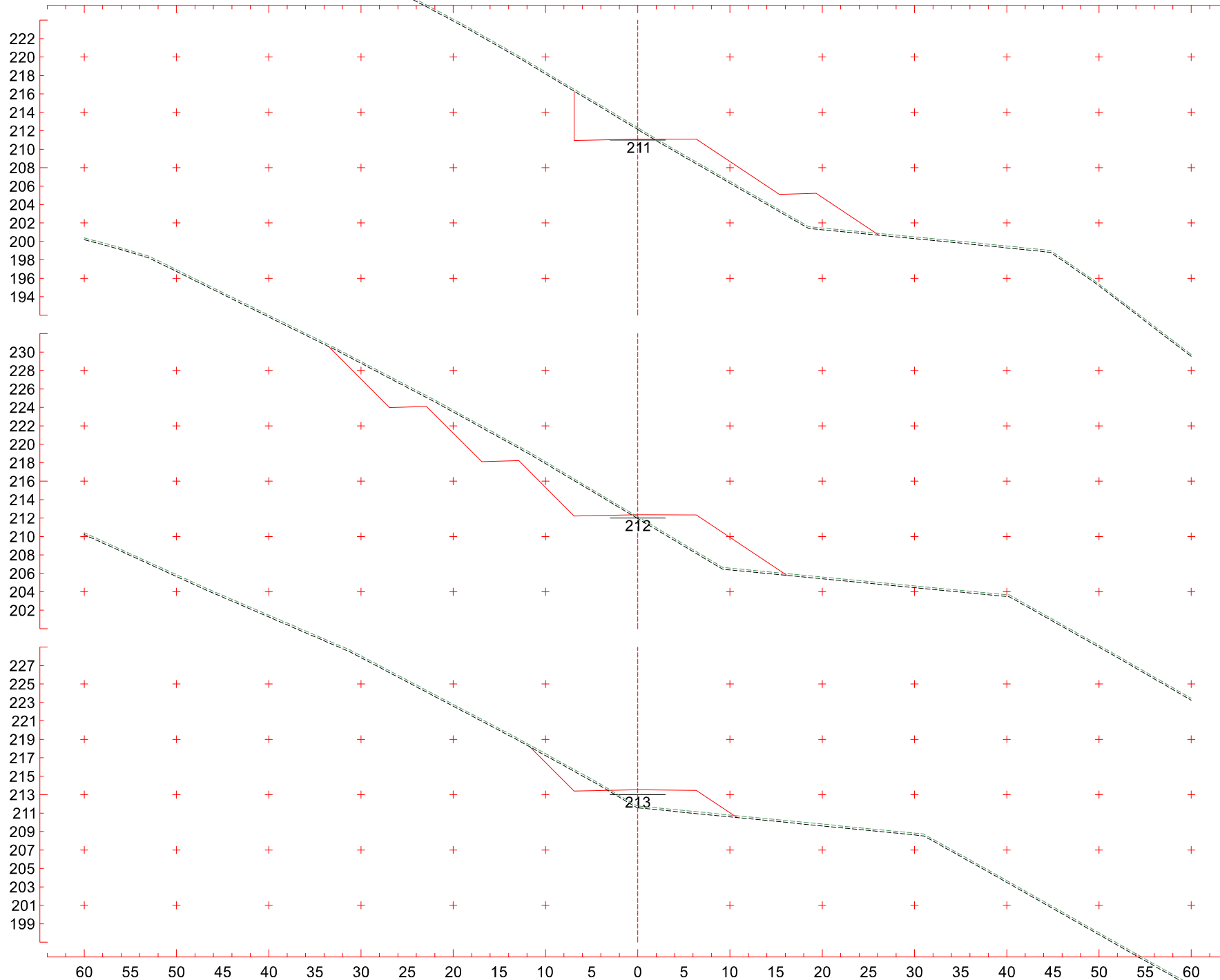


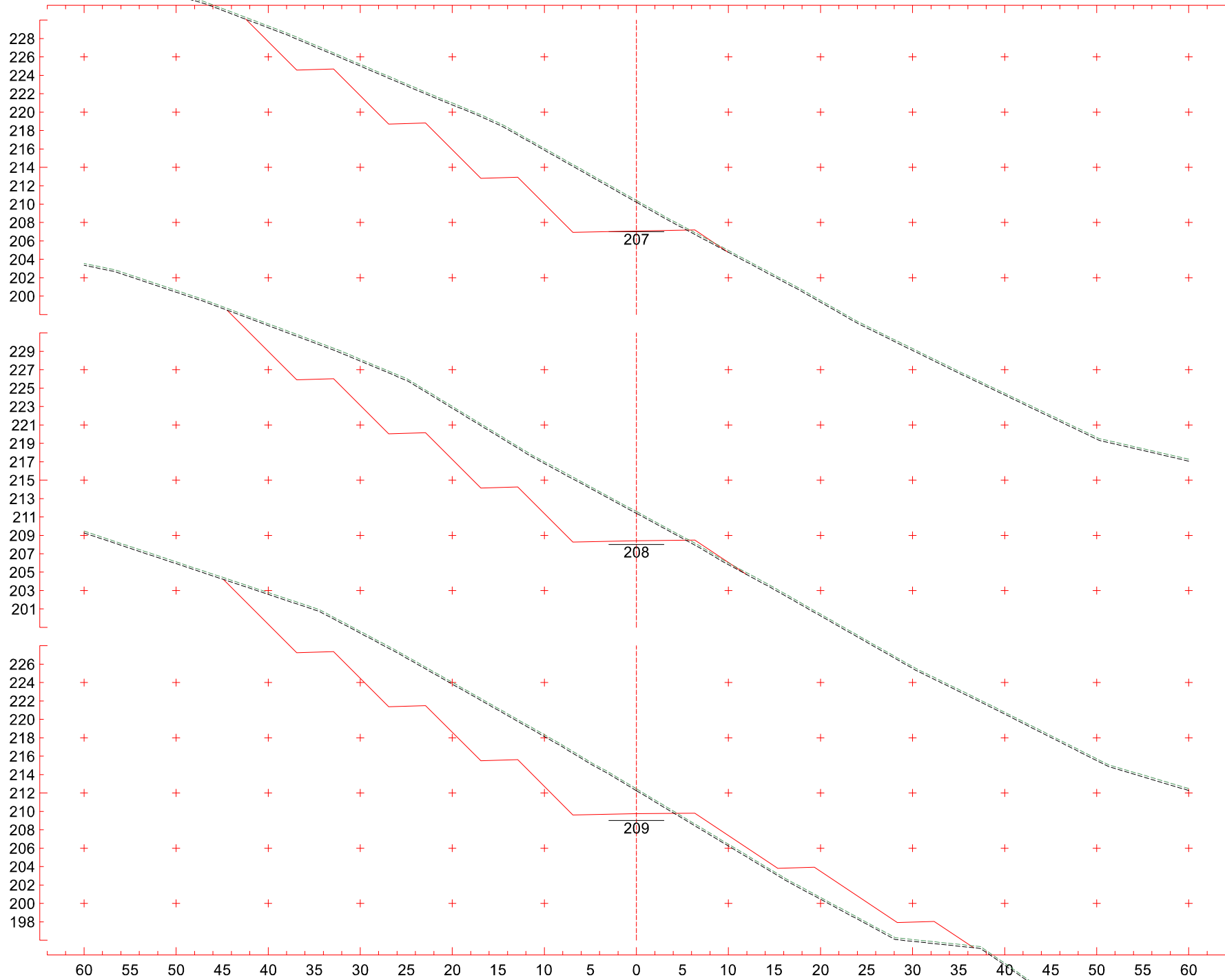
**7+660**  
CT 215,322 m  
CP 214,591 m

**7+640**  
CT 221,310 m  
CP 215,555 m

**7+620**  
CT 225,294 m  
CP 216,417 m

**Eixo 01**  
Escala 1:400





**7+780**

CT 210,405 m  
CP 207,066 m

**7+760**

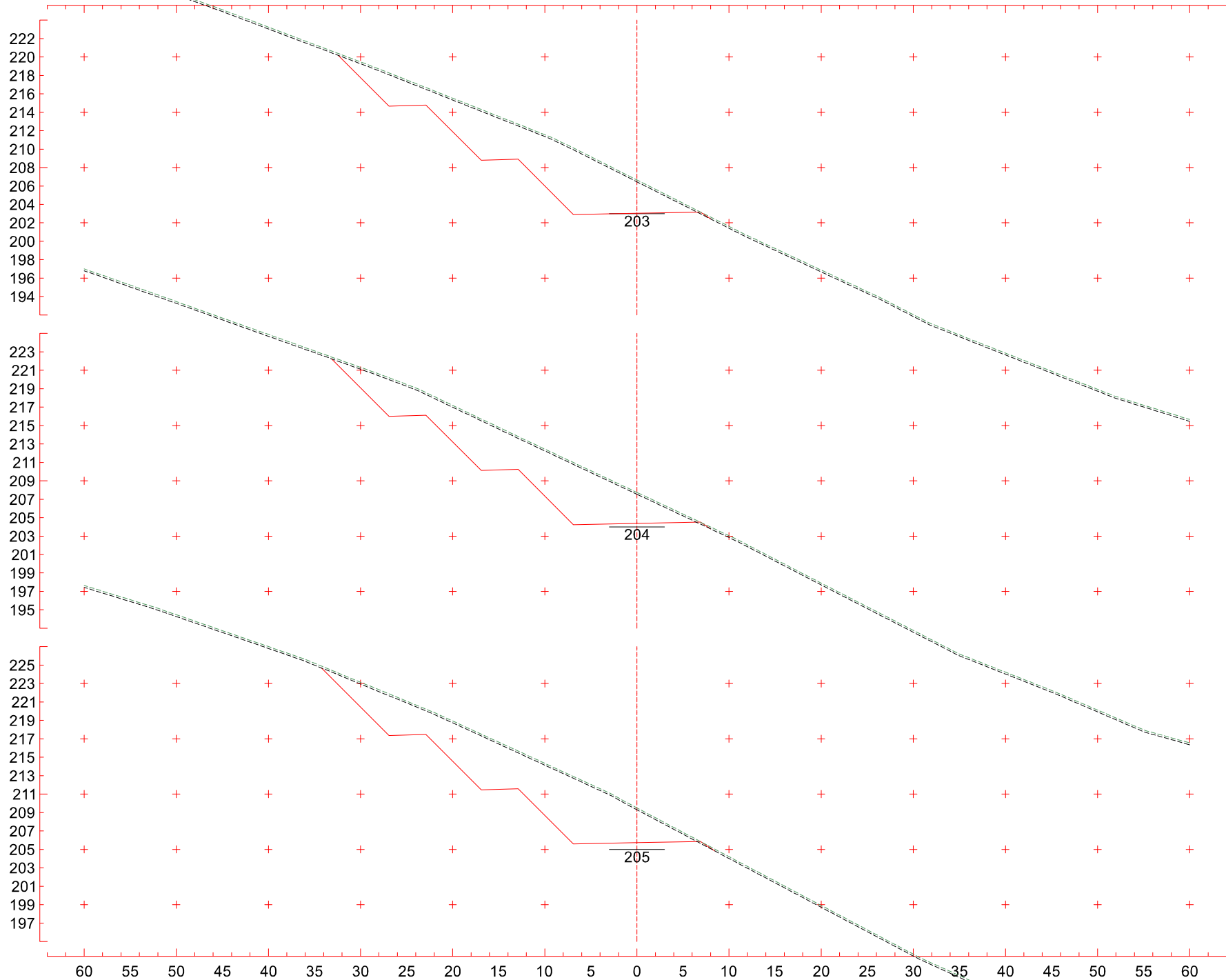
CT 211,589 m  
CP 208,408 m

**7+740**

CT 212,453 m  
CP 209,750 m

**Eixo1**

Escala 1:400



**7+840**

CT 206,654 m  
CP 203,040 m

**7+820**

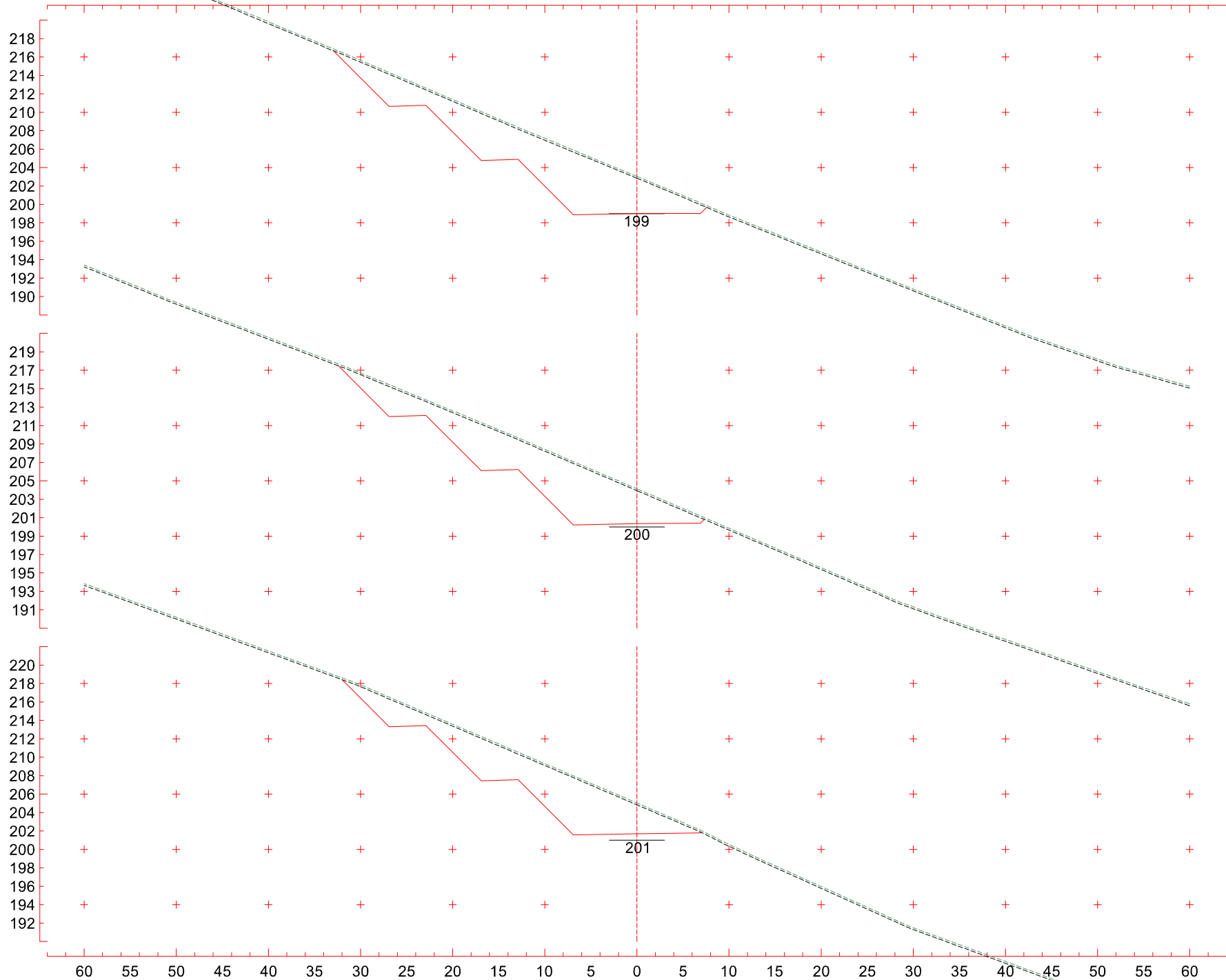
CT 207,744 m  
CP 204,382 m

**7+800**

CT 209,499 m  
CP 205,724 m

**Eixo1**

Escala 1:400



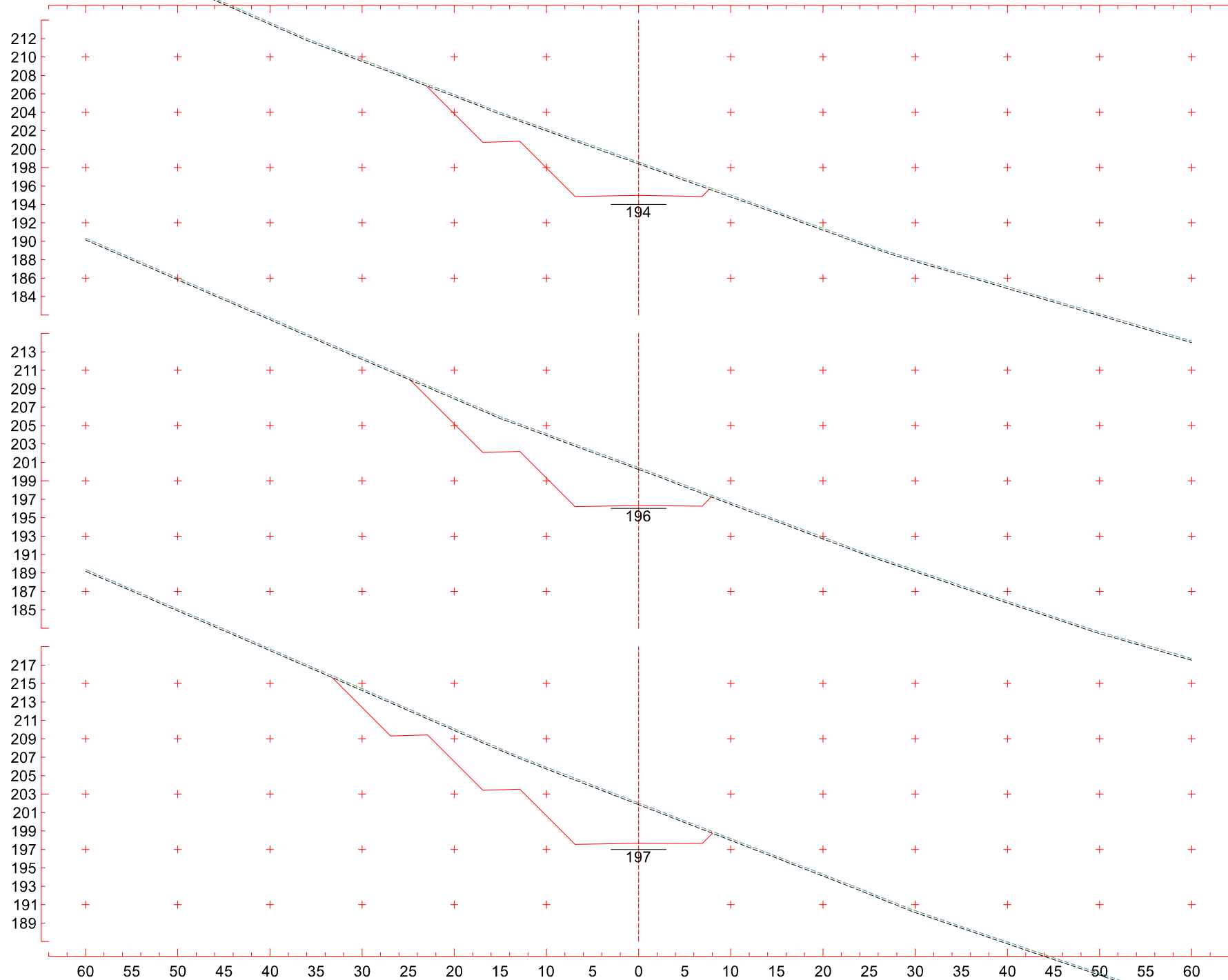
**7+900**  
CT 203,039 m  
CP 199,014 m

**7+880**  
CT 204,135 m  
CP 200,356 m

**7+860**  
CT 205,035 m  
CP 201,698 m

**Eixo1**  
Escala 1:400



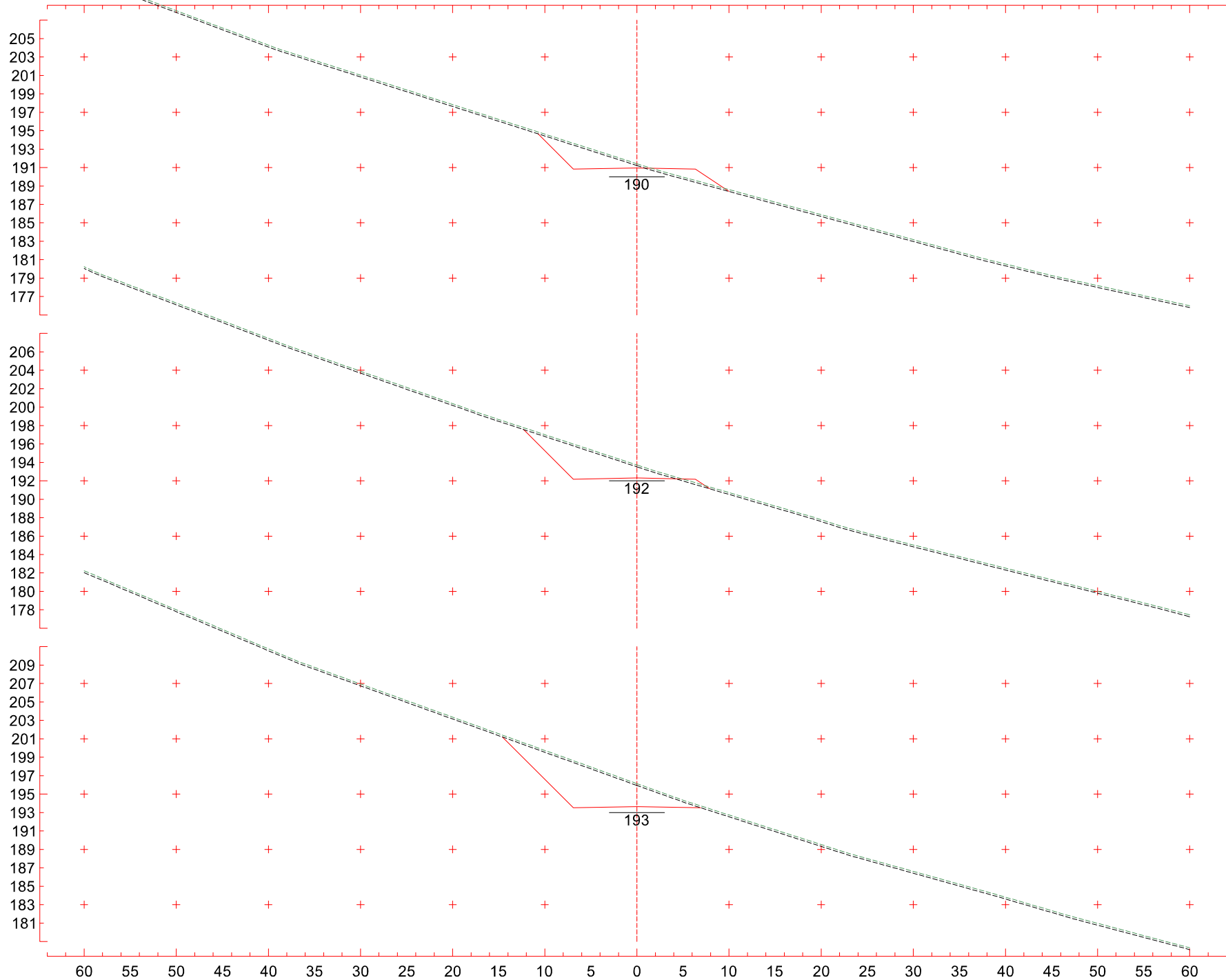


**7+960**  
CT 198,597 m  
CP 194,989 m

**7+940**  
CT 200,429 m  
CP 196,331 m

**7+920**  
CT 202,050 m  
CP 197,672 m

**Eixo1**  
Escala 1:400

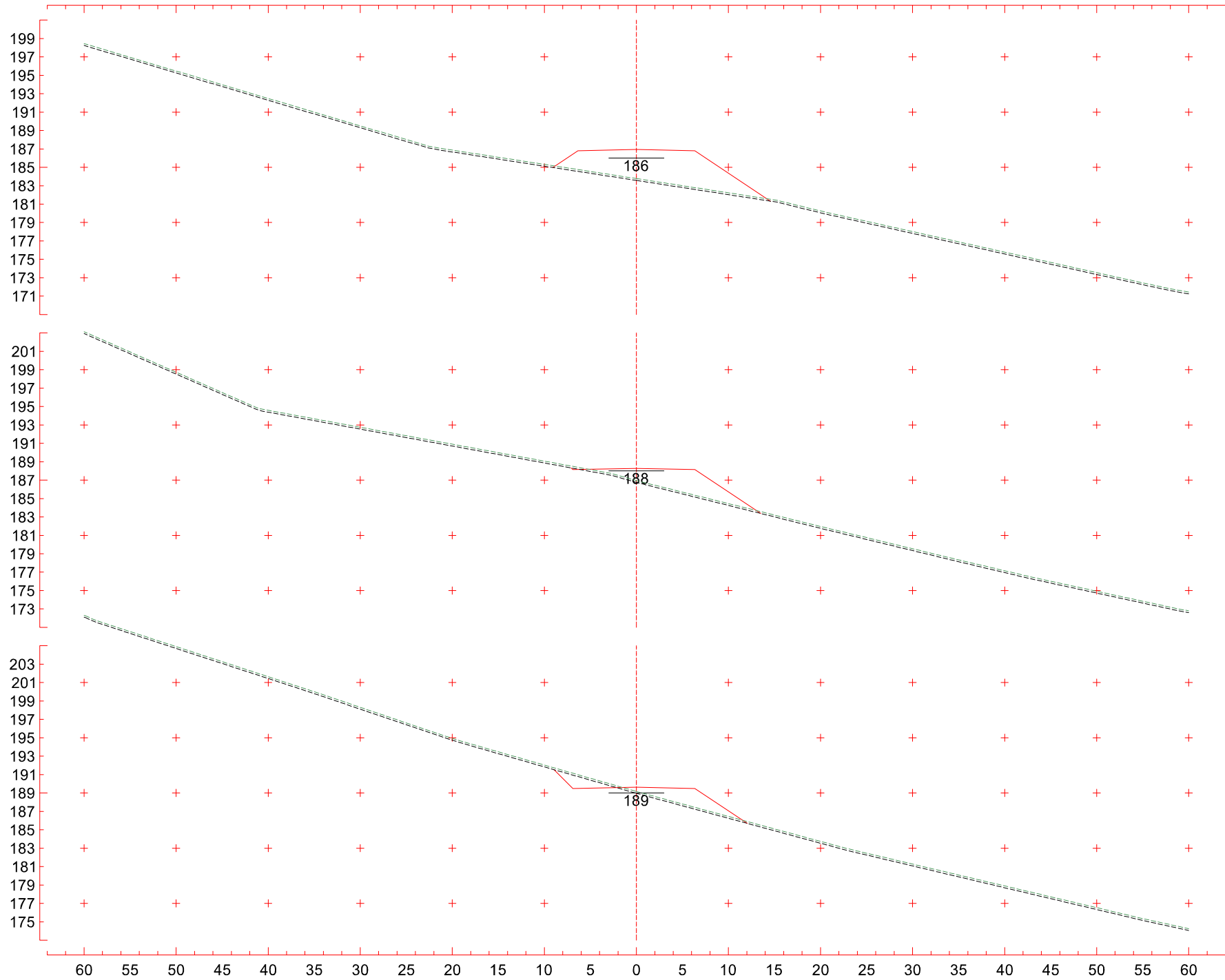


**8+020**  
CT 191,418 m  
CP 190,963 m

**8+000**  
CT 193,722 m  
CP 192,305 m

**7+980**  
CT 196,136 m  
CP 193,647 m

**Eixo1**  
Escala 1:400

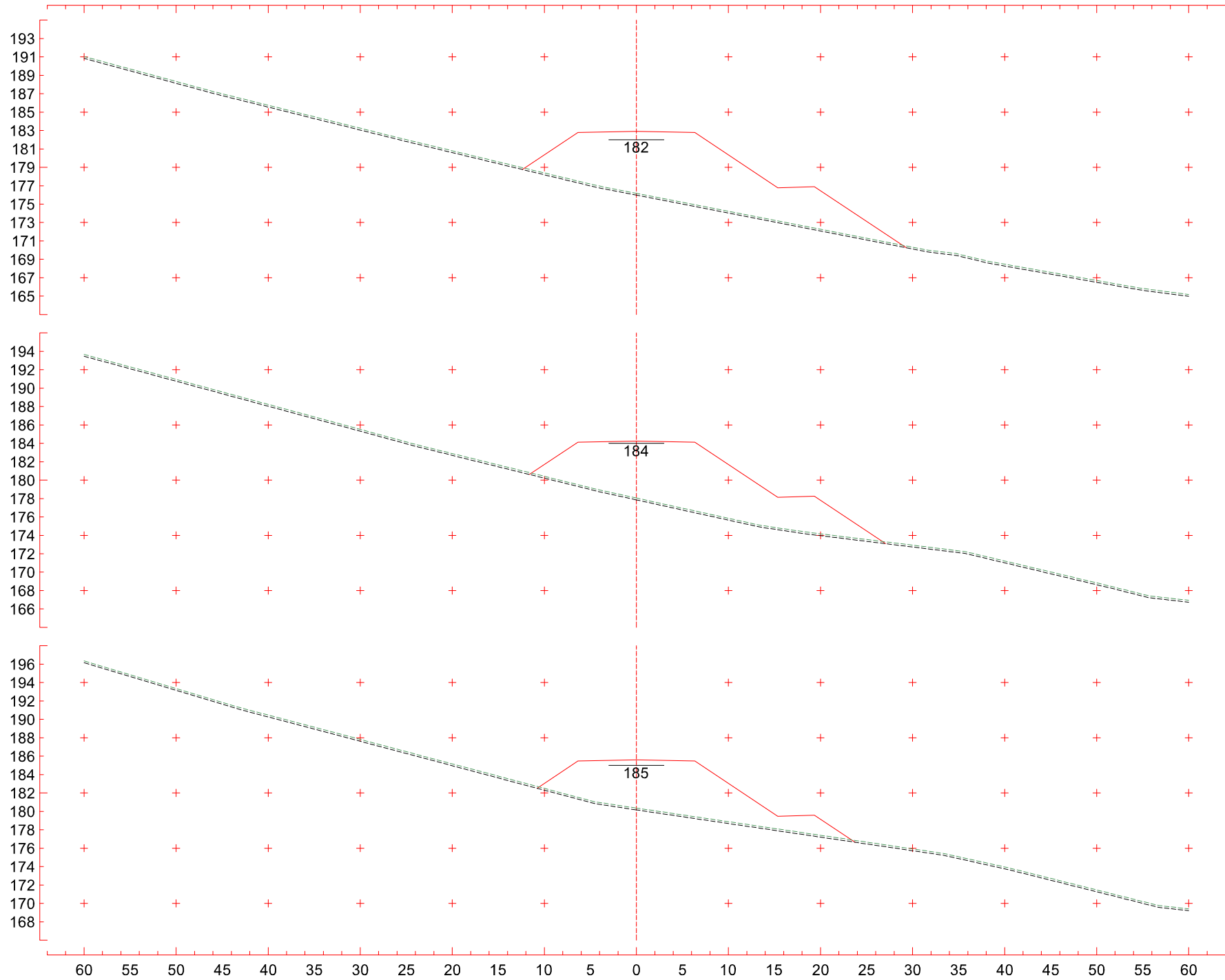


**8+080**  
CT 183,776 m  
CP 186,937 m

**8+060**  
CT 186,964 m  
CP 188,279 m

**8+040**  
CT 189,160 m  
CP 189,621 m

**Eixo1**  
Escala 1:400

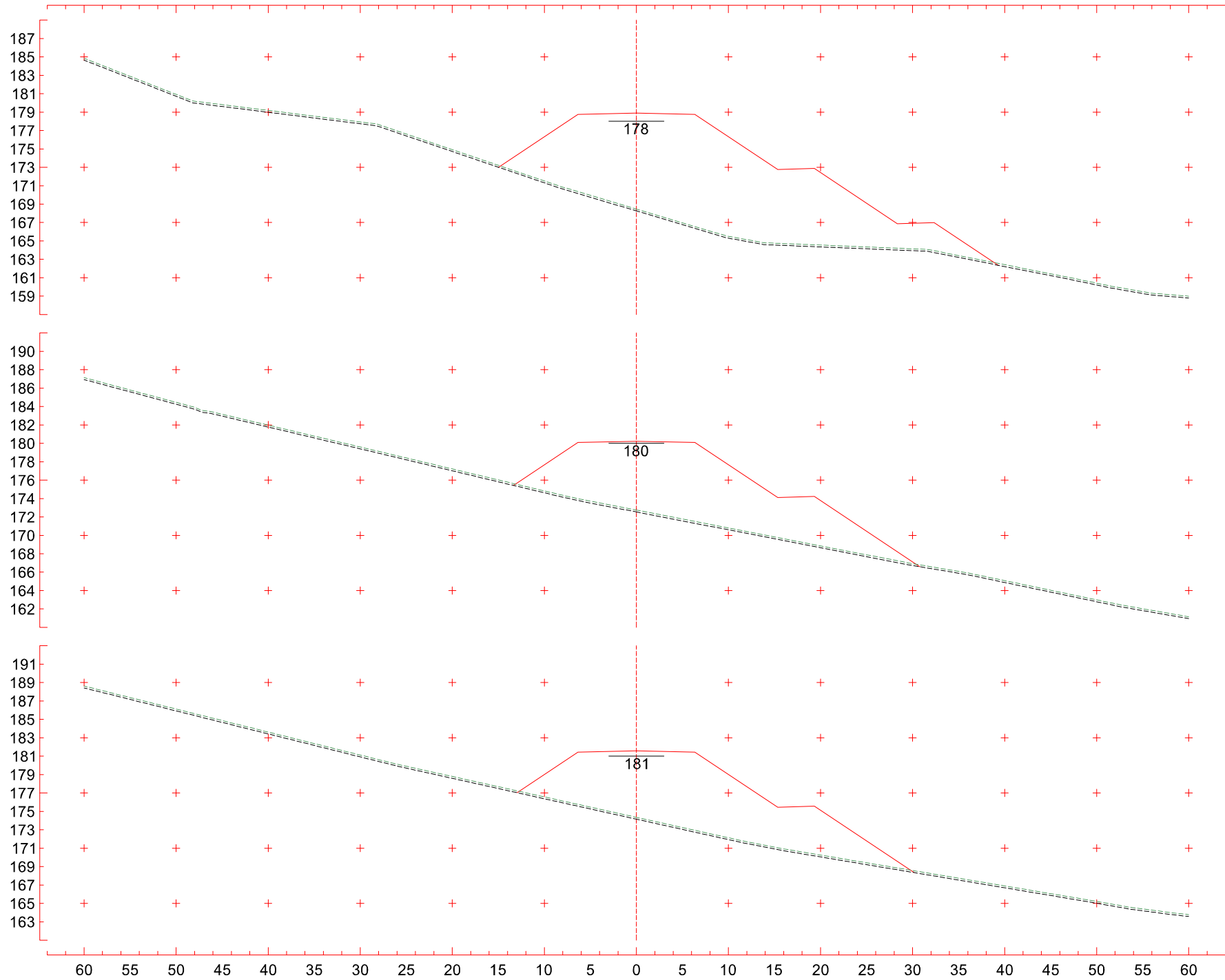


**8+140**  
CT 176,173 m  
CP 182,911 m

**8+120**  
CT 178,055 m  
CP 184,253 m

**8+100**  
CT 180,359 m  
CP 185,595 m

**Eixo1**  
Escala 1:400

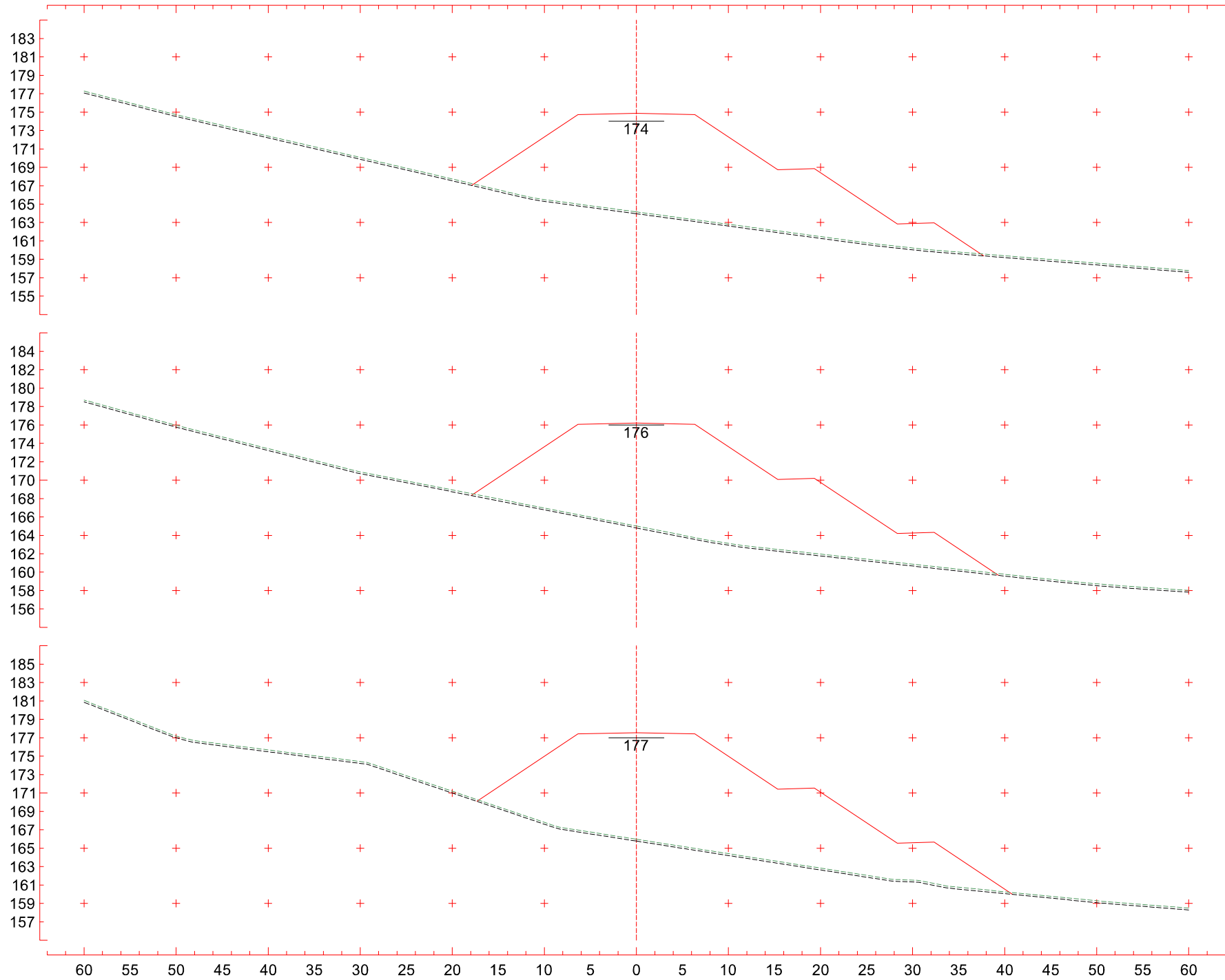


**8+200**  
CT 168,458 m  
CP 178,886 m

**8+180**  
CT 172,744 m  
CP 180,228 m

**8+160**  
CT 174,352 m  
CP 181,570 m

**Eixo1**  
Escala 1:400

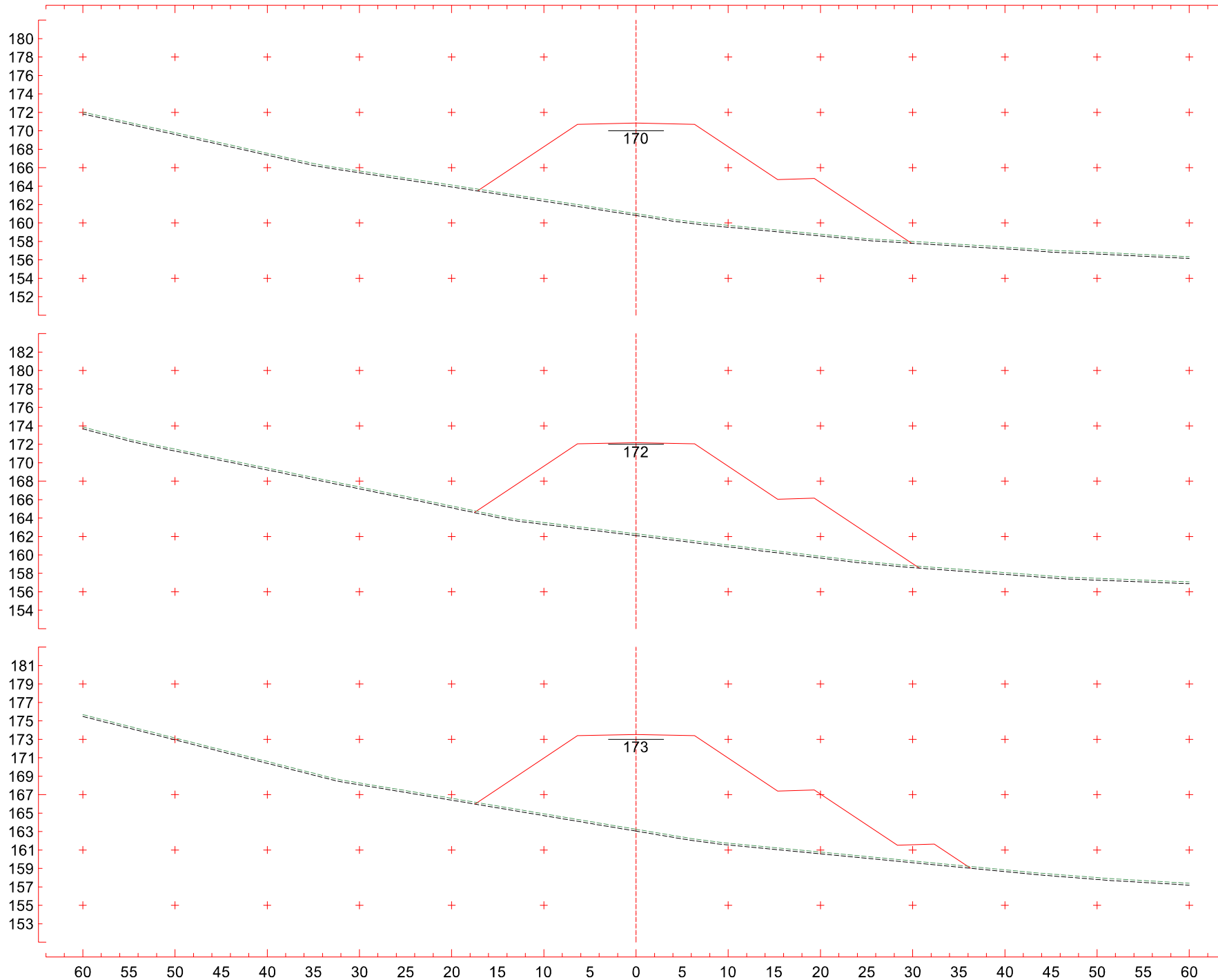


**8+260**  
CT 164,156 m  
CP 174,860 m

**8+240**  
CT 165,008 m  
CP 176,202 m

**8+220**  
CT 165,970 m  
CP 177,544 m

**Eixo1**  
Escala 1:400

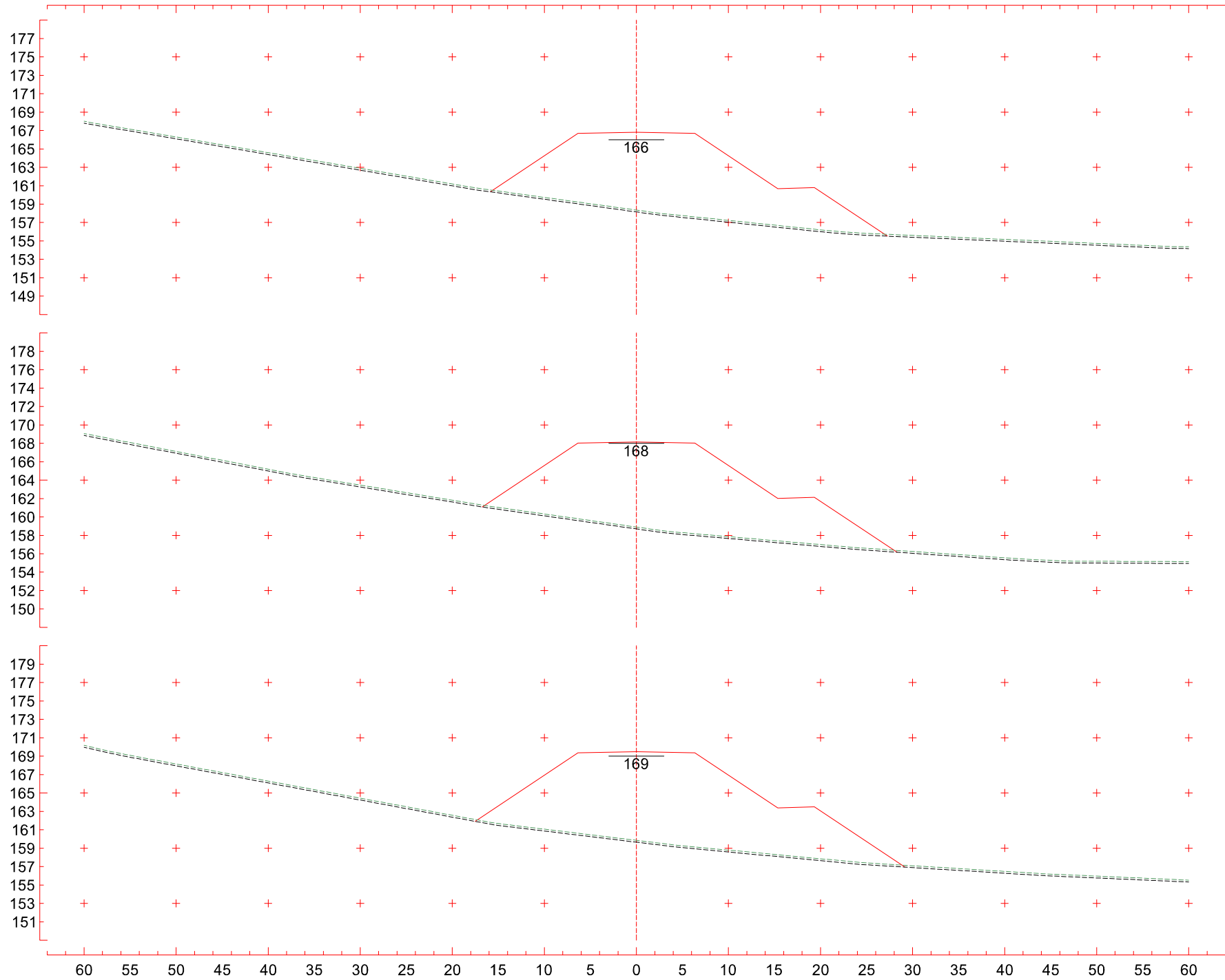


**8+320**  
CT 161,016 m  
CP 170,834 m

**8+300**  
CT 162,296 m  
CP 172,176 m

**8+280**  
CT 163,247 m  
CP 173,518 m

**Eixo1**  
Escala 1:400



**8+380**

CT 158,351 m  
CP 166,809 m

**8+360**

CT 158,902 m  
CP 168,150 m

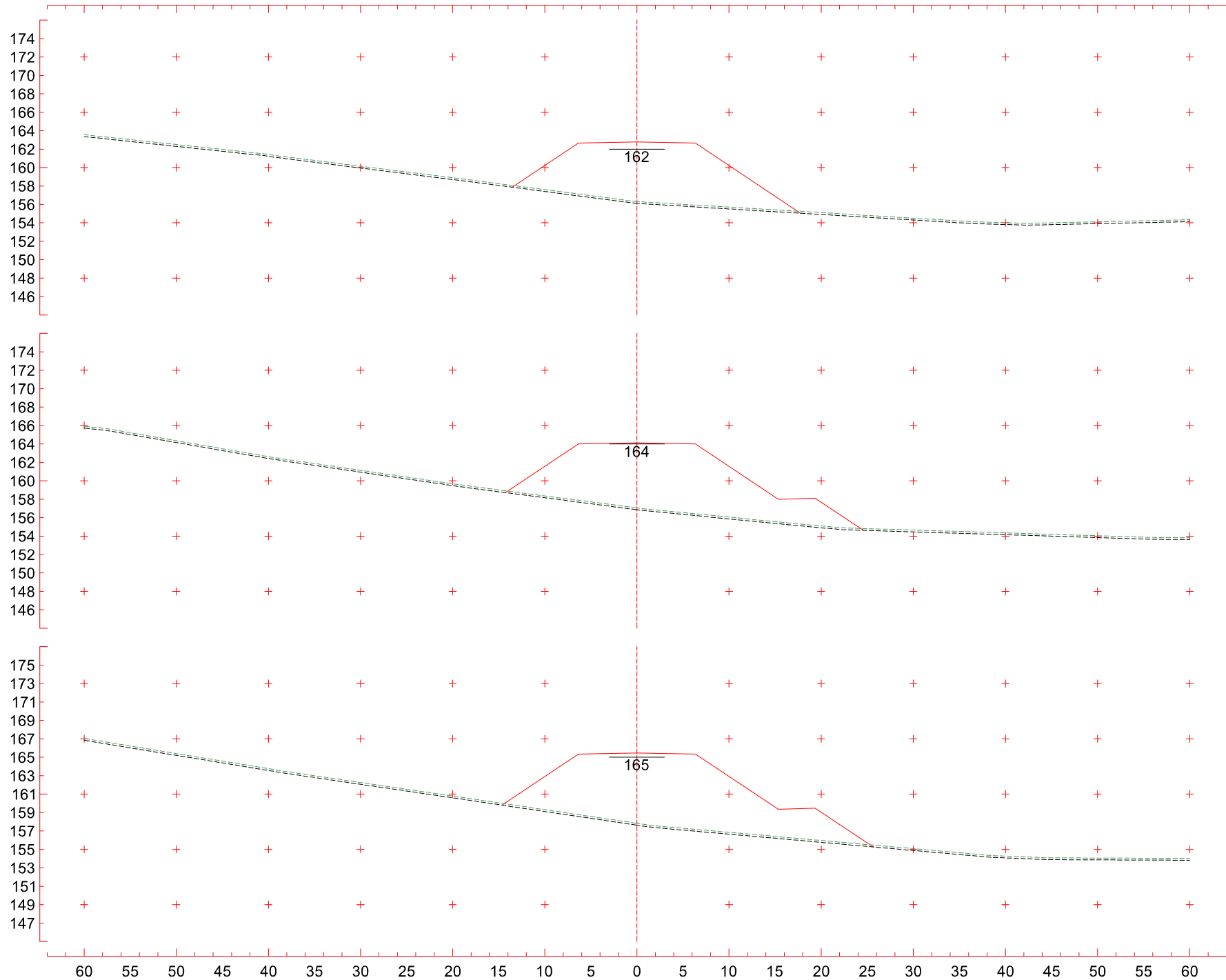
**8+340**

CT 159,851 m  
CP 169,492 m

**Eixo1**

Escala 1:400



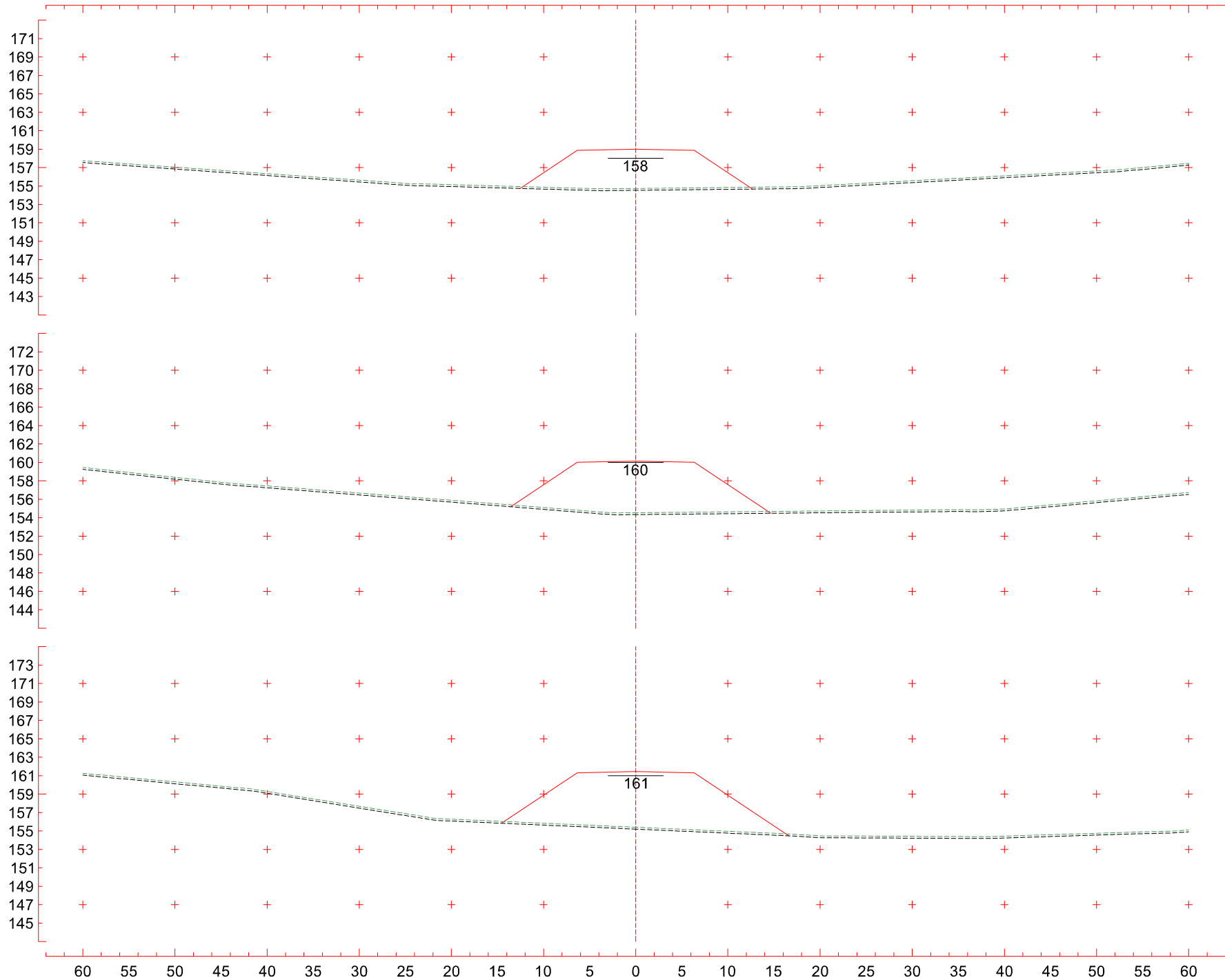


**8+440**  
CT 156,321 m  
CP 162,783 m

**8+420**  
CT 157,061 m  
CP 164,125 m

**8+400**  
CT 157,824 m  
CP 165,467 m

**Eixo1**  
Escala 1:400



**8+500**

CT 154,731 m  
CP 158,993 m

**8+480**

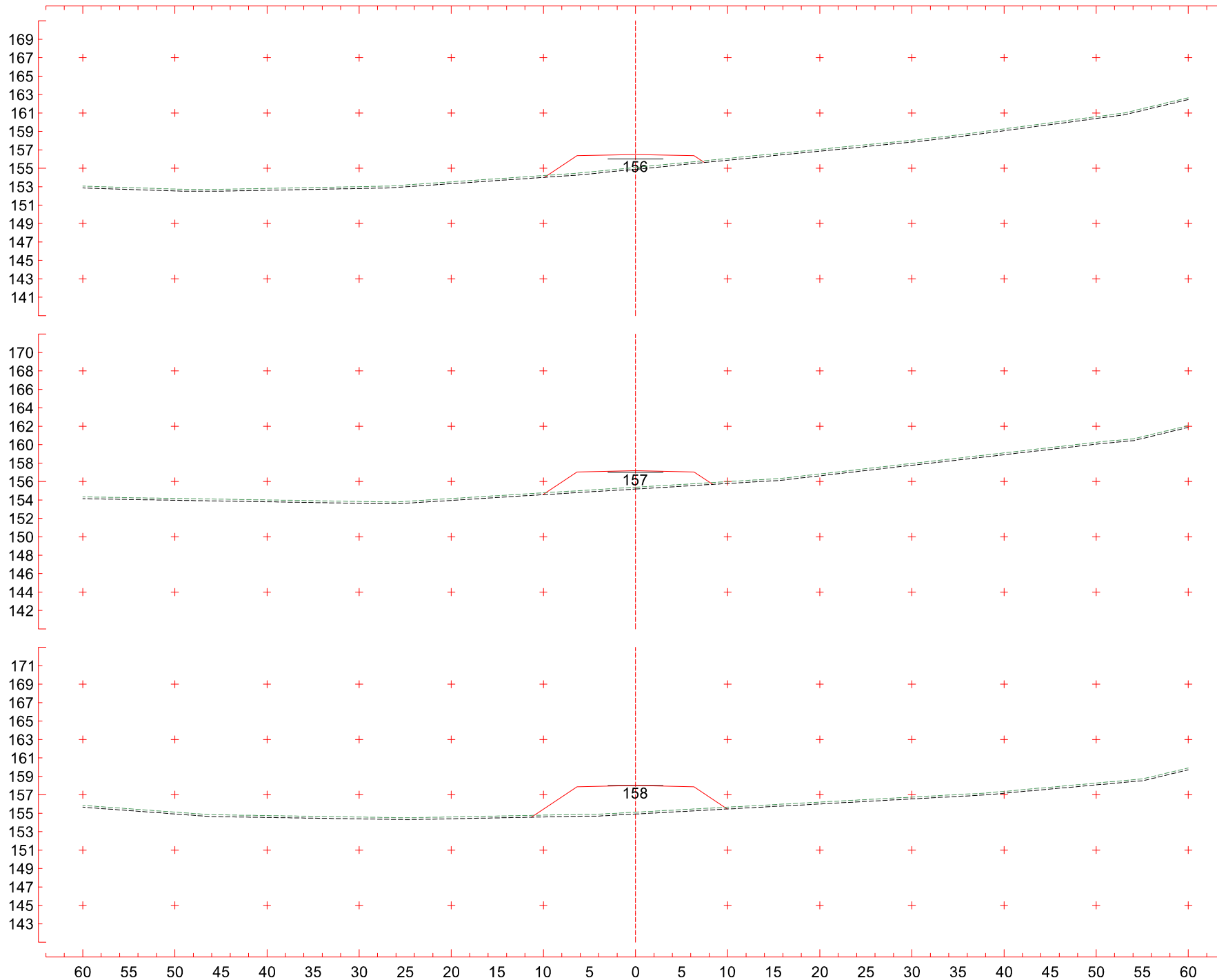
CT 154,534 m  
CP 160,141 m

**8+460**

CT 155,399 m  
CP 161,441 m

**Eixo1**

Escala 1:400

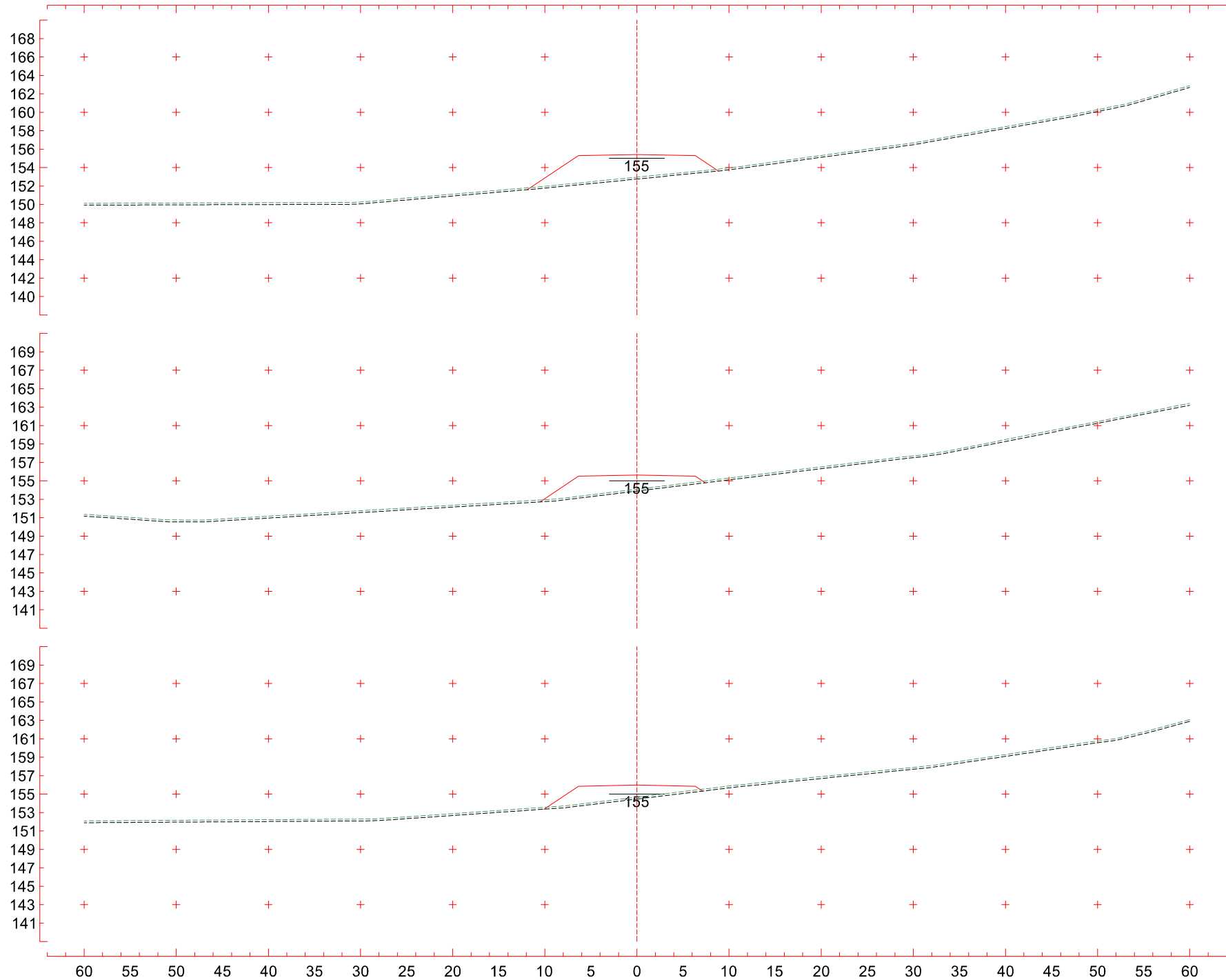


**8+560**  
CT 155,082 m  
CP 156,496 m

**8+540**  
CT 155,380 m  
CP 157,171 m

**8+520**  
CT 155,111 m  
CP 158,003 m

**Eixo1**  
Escala 1:400

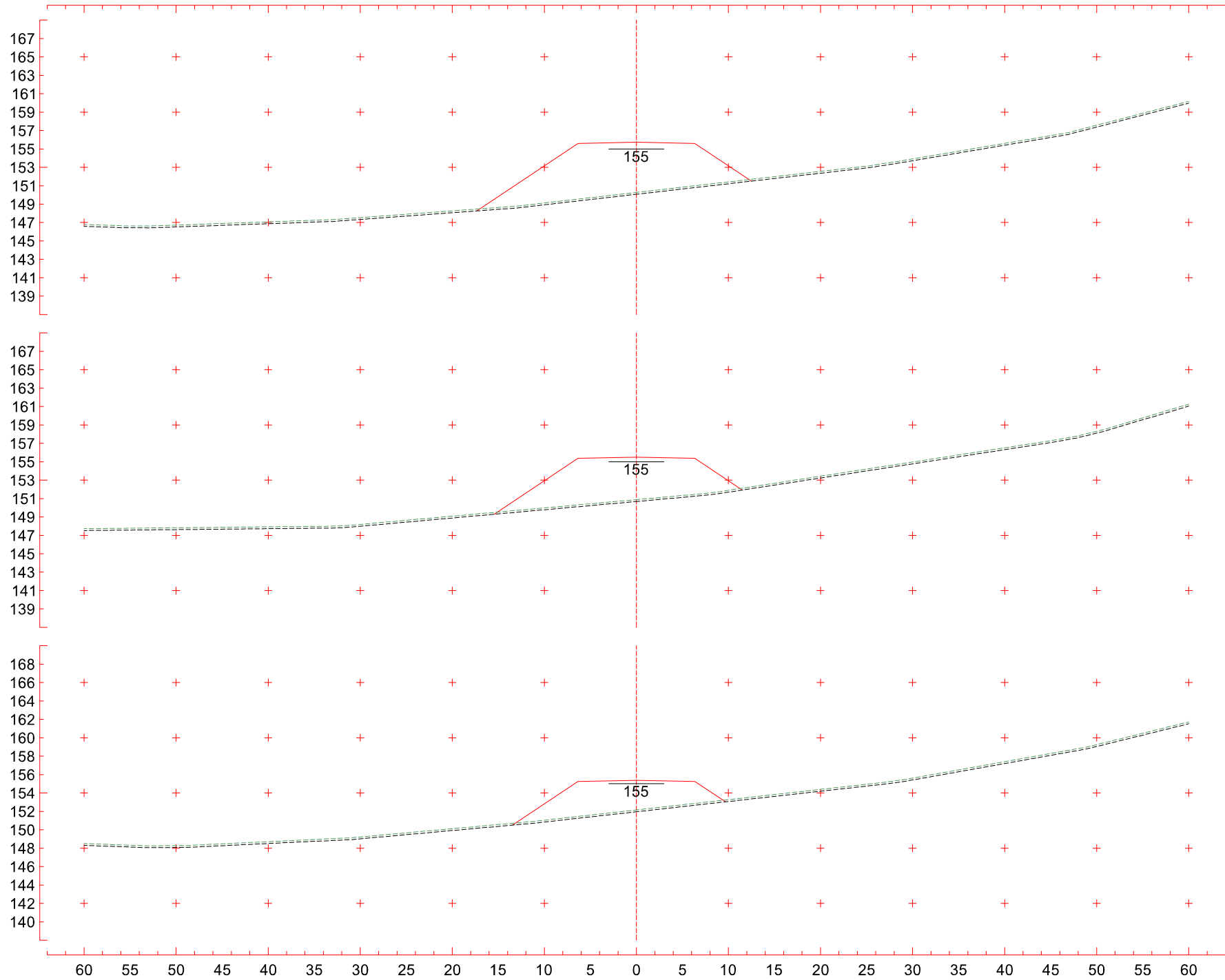


**8+620**  
CT 152,952 m  
CP 155,421 m

**8+600**  
CT 154,087 m  
CP 155,621 m

**8+580**  
CT 154,665 m  
CP 155,980 m

**Eixo1**  
Escala 1:400

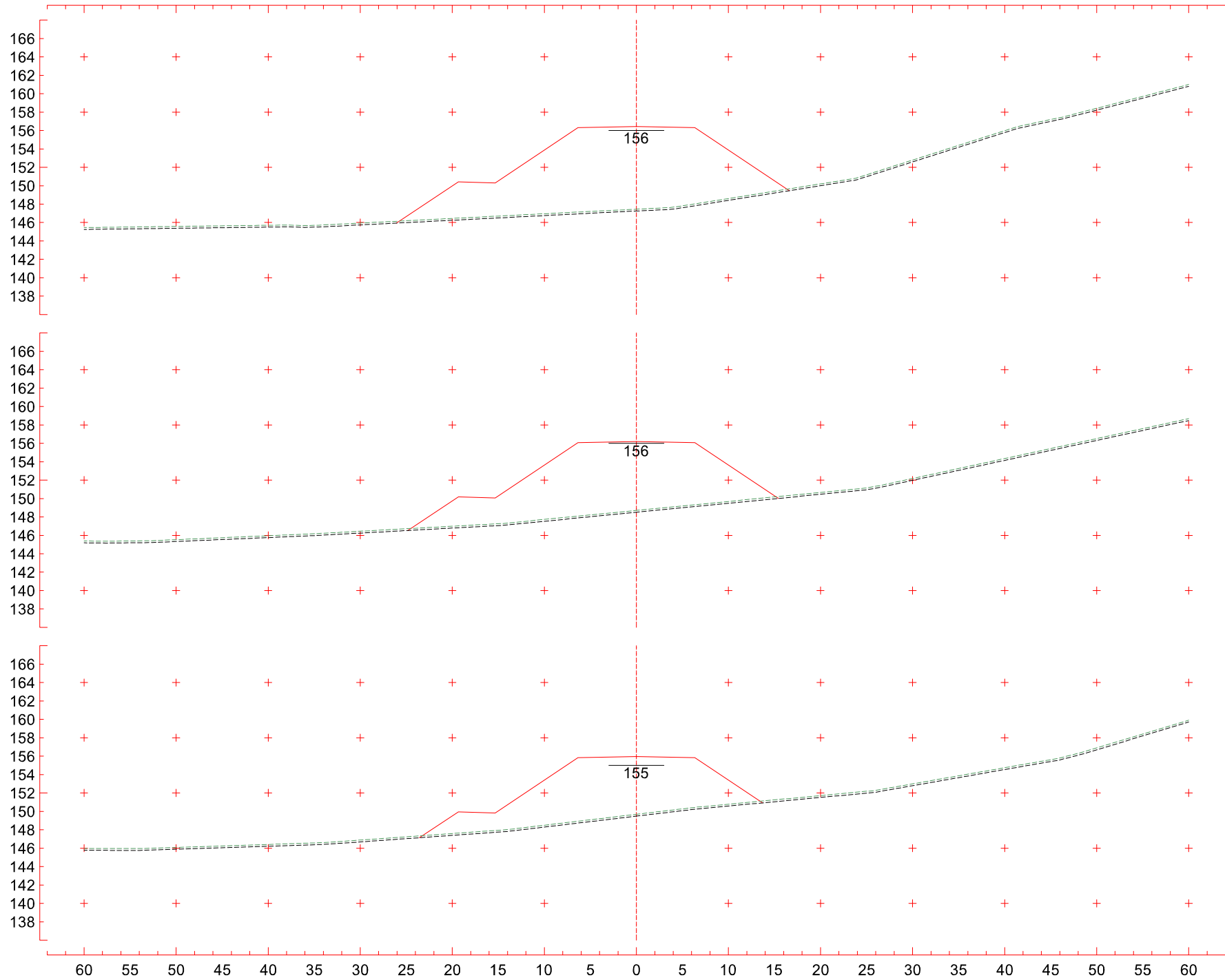


**8+680**  
CT 150,270 m  
CP 155,724 m

**8+660**  
CT 150,880 m  
CP 155,493 m

**8+640**  
CT 152,156 m  
CP 155,378 m

**Eixo1**  
Escala 1:400



**8+740**

CT 147,449 m  
CP 156,434 m

**8+720**

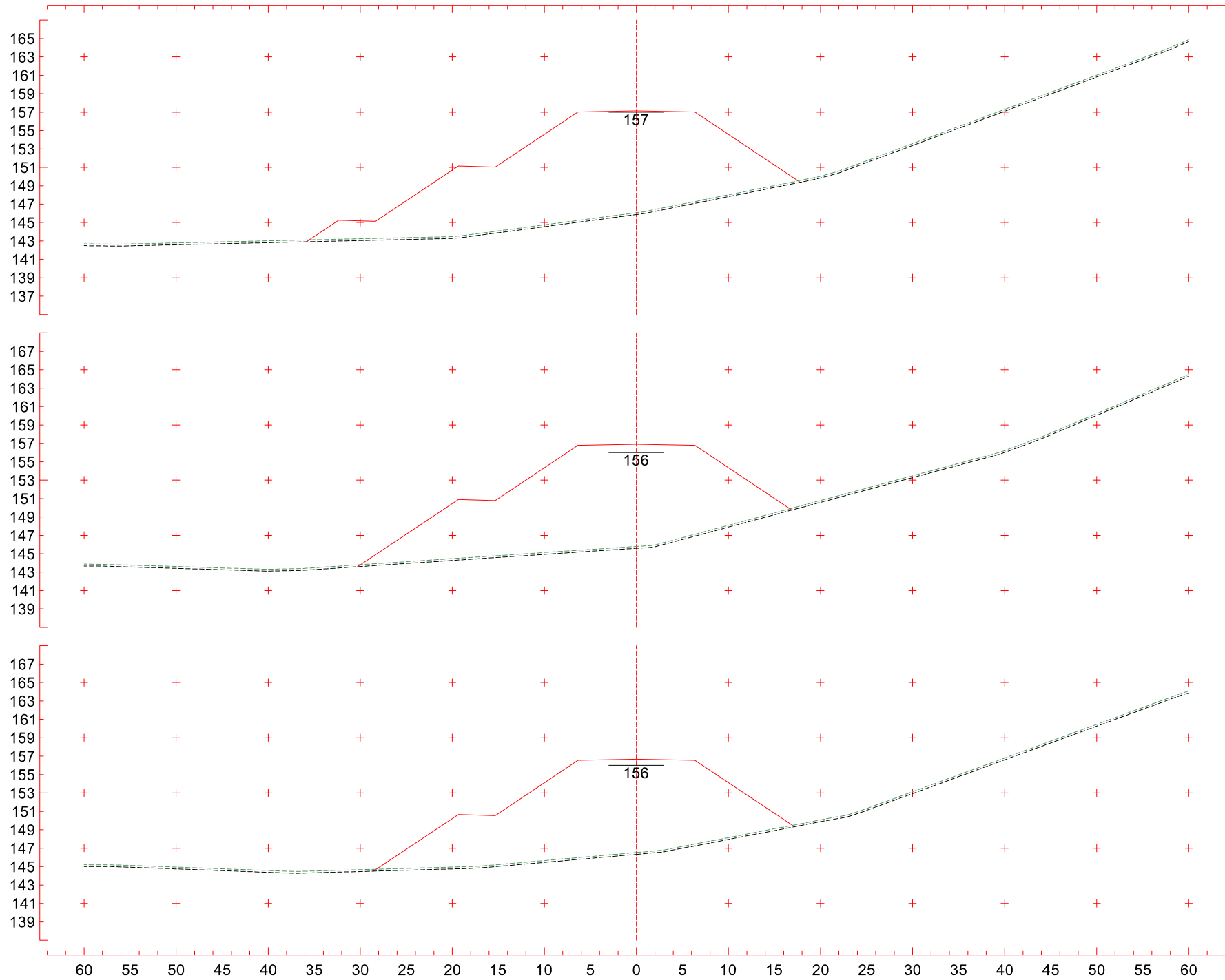
CT 148,710 m  
CP 156,197 m

**8+700**

CT 149,682 m  
CP 155,961 m

**Eixo1**

Escala 1:400



**8+800**

CT 146,068 m  
CP 157,145 m

**8+780**

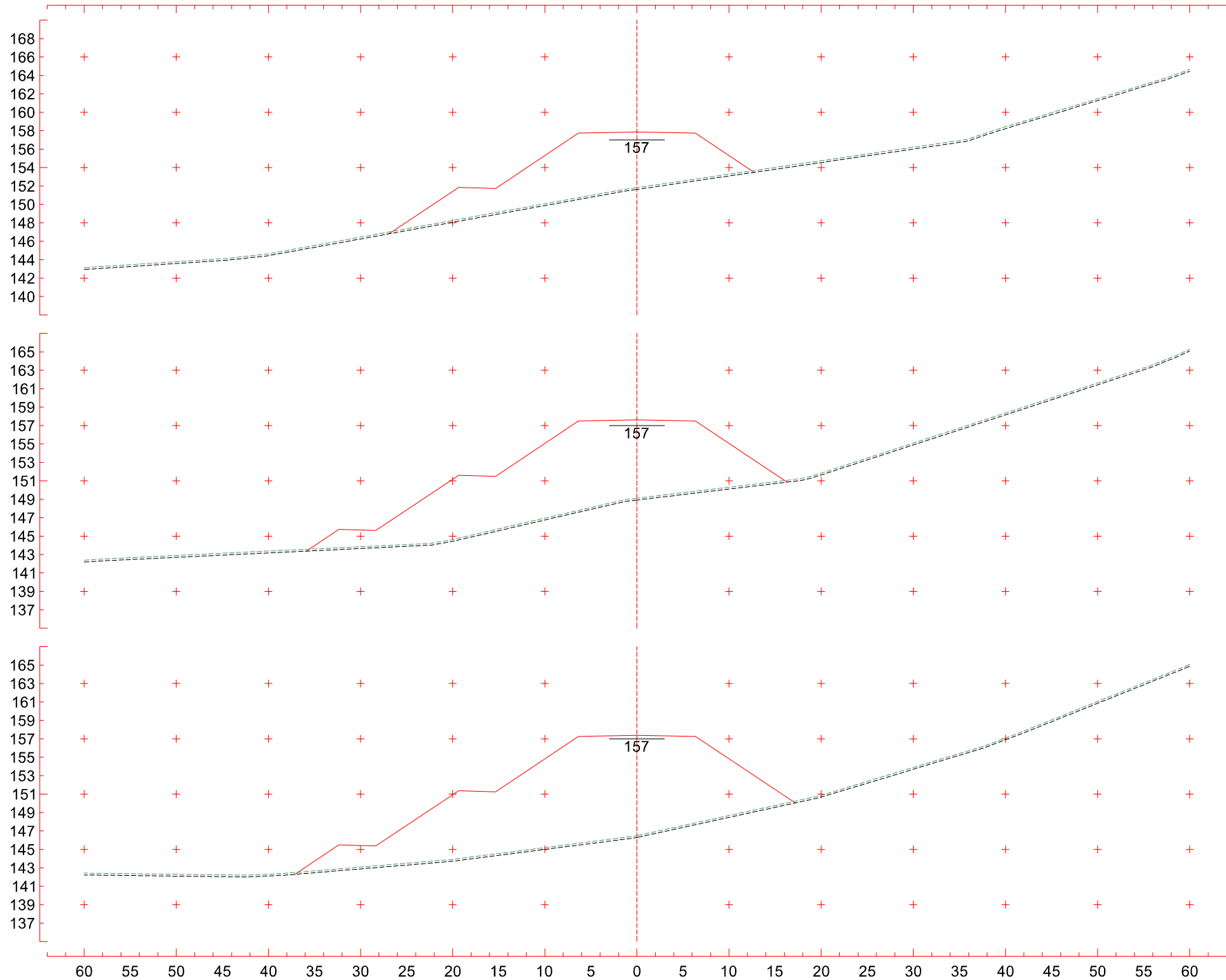
CT 145,791 m  
CP 156,908 m

**8+760**

CT 146,530 m  
CP 156,671 m

**Eixo1**

Escala 1:400



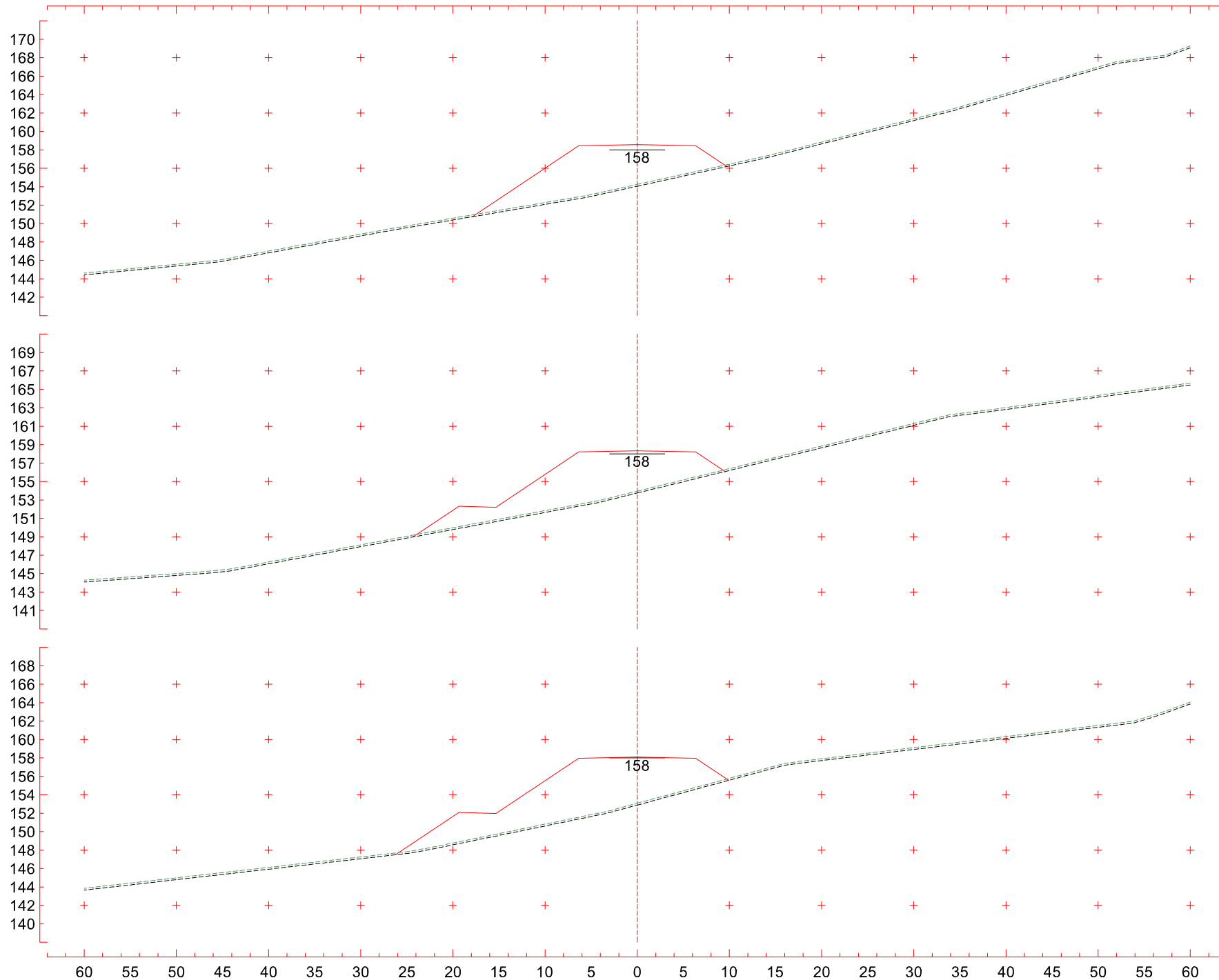
**8+860**  
CT 151,823 m  
CP 157,855 m

**8+840**  
CT 149,112 m  
CP 157,618 m

**8+820**  
CT 146,494 m  
CP 157,381 m

**Eixo1**  
Escala 1:400



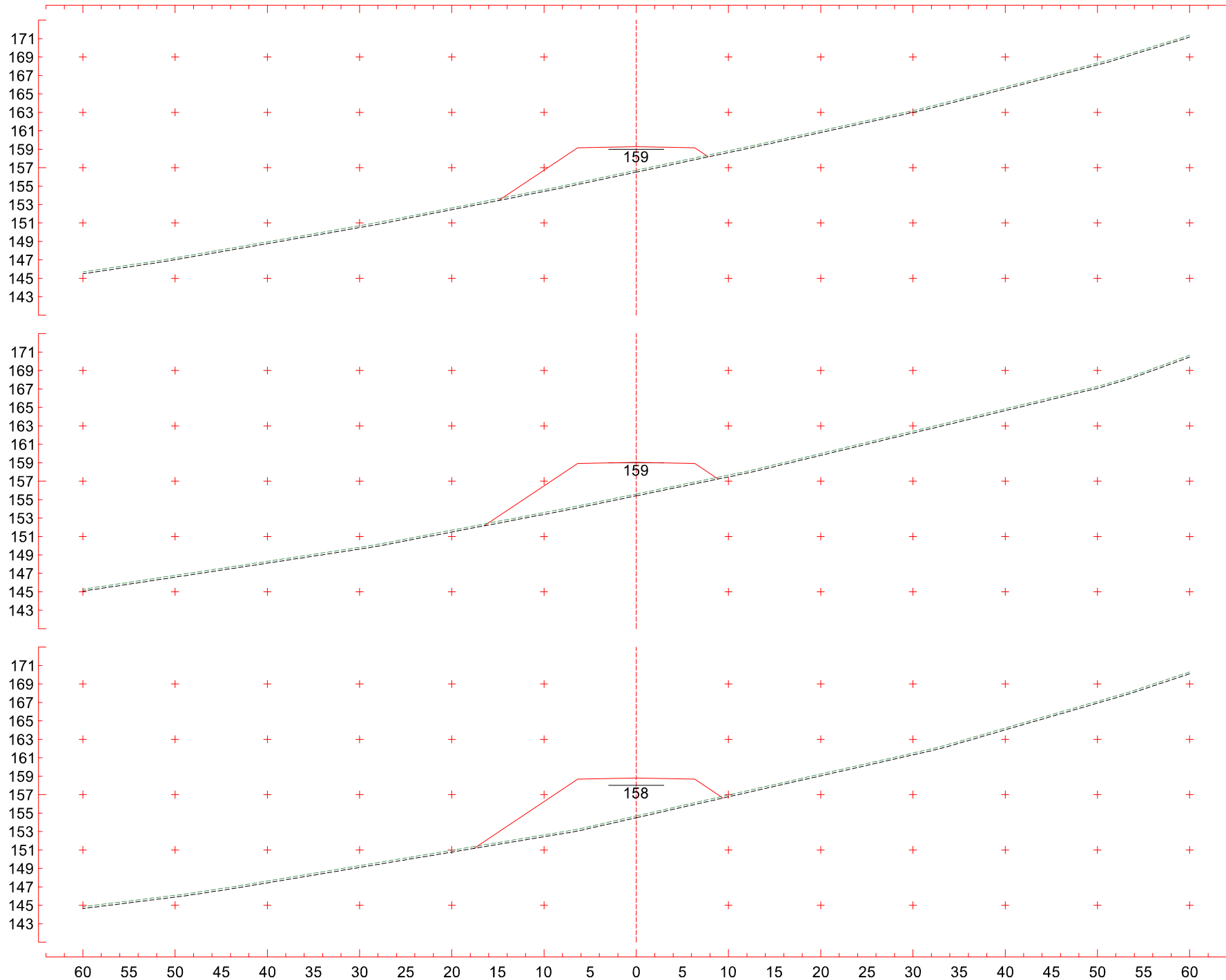


**8+920**  
CT 154,245 m  
CP 158,565 m

**8+900**  
CT 153,950 m  
CP 158,328 m

**8+880**  
CT 153,083 m  
CP 158,092 m

**Eixo1**  
Escala 1:400



**8+980**

CT 156,718 m  
CP 159,276 m

**8+960**

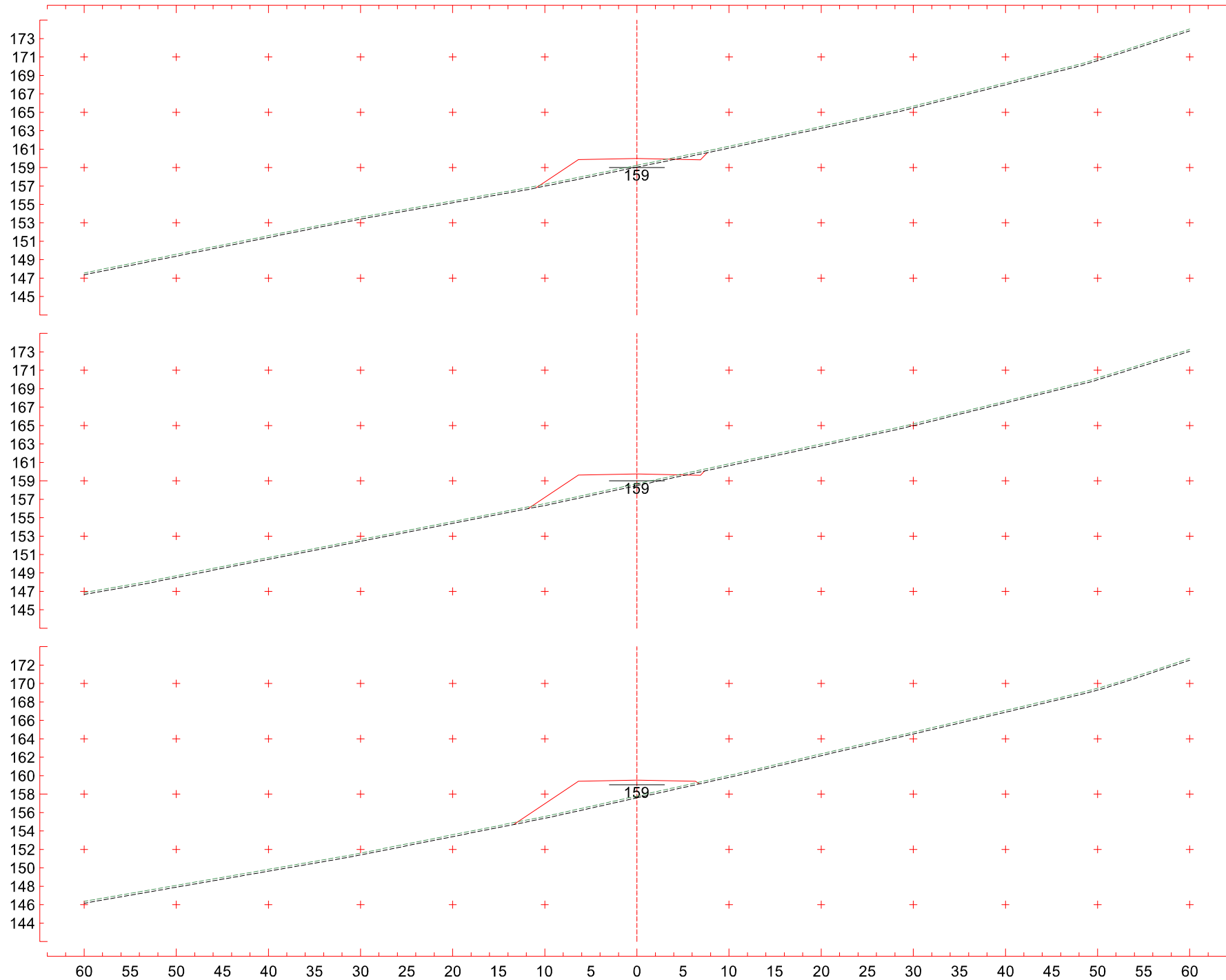
CT 155,612 m  
CP 159,039 m

**8+940**

CT 154,694 m  
CP 158,802 m

**Eixo1**

Escala 1:400



**9+040**

CT 159,241 m  
CP 159,986 m

**9+020**

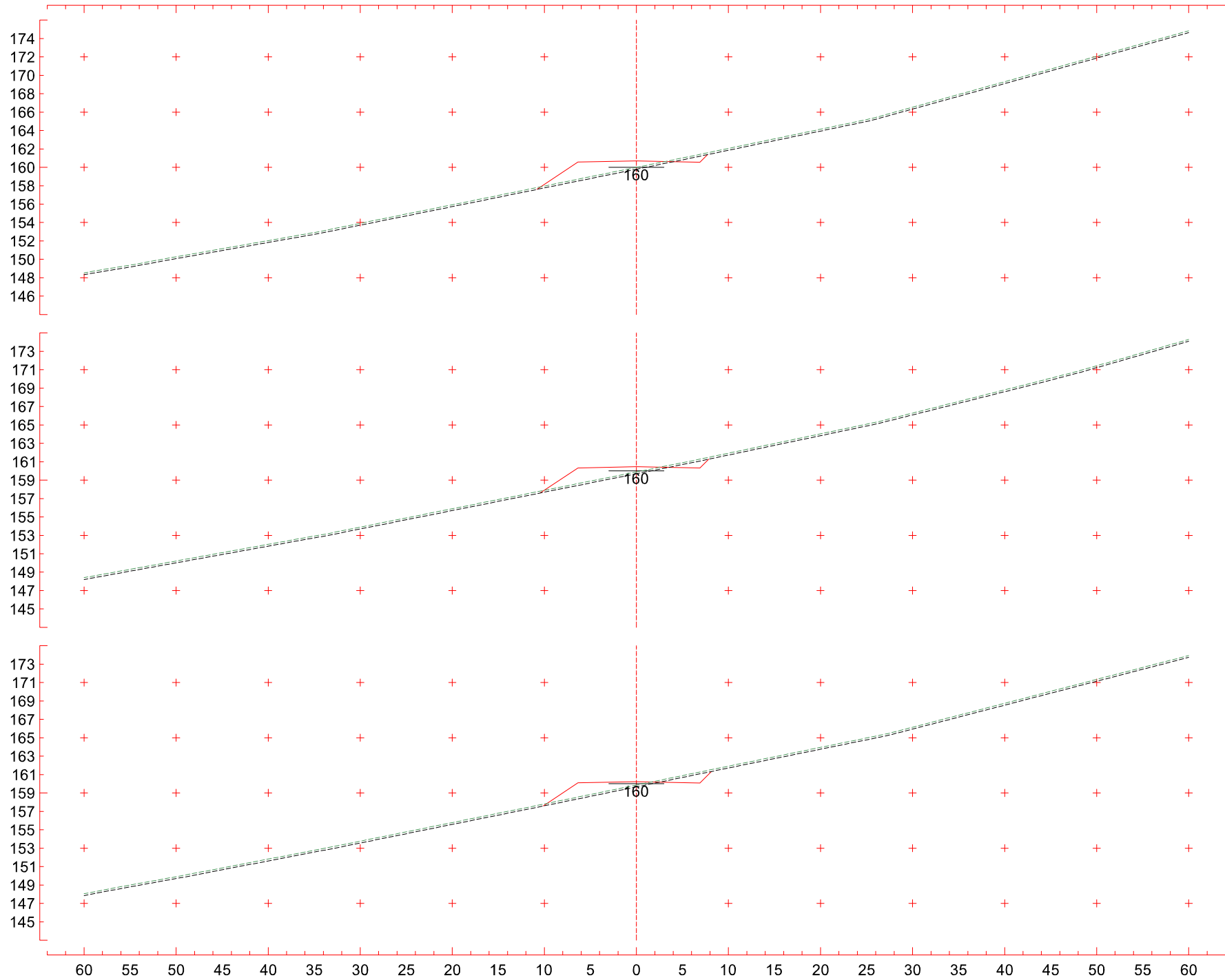
CT 158,682 m  
CP 159,749 m

**9+000**

CT 157,792 m  
CP 159,512 m

**Eixo1**

Escala 1:400

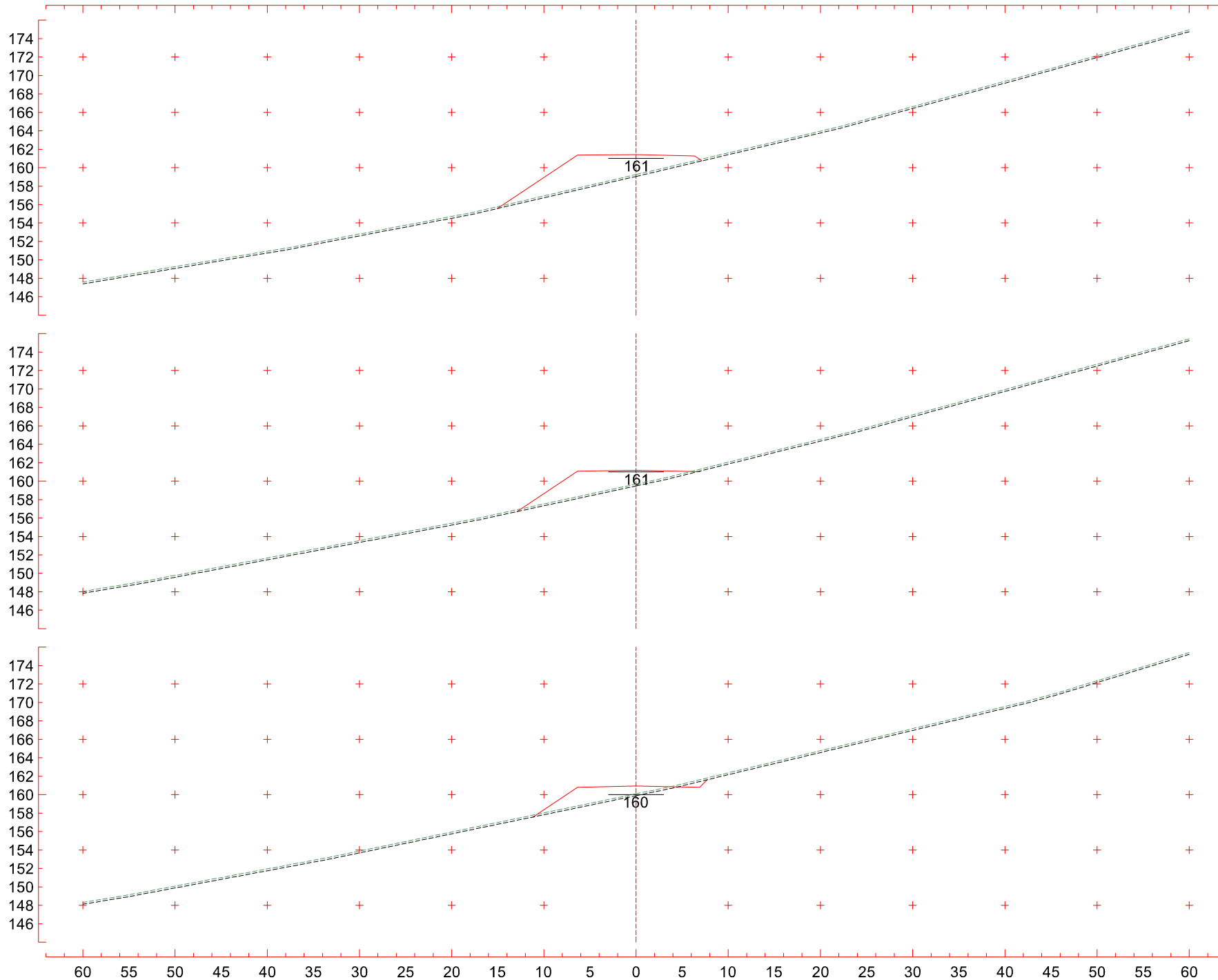


**9+100**  
CT 159,995 m  
CP 160,696 m

**9+080**  
CT 159,893 m  
CP 160,460 m

**9+060**  
CT 159,861 m  
CP 160,223 m

**Eixo1**  
Escala 1:400

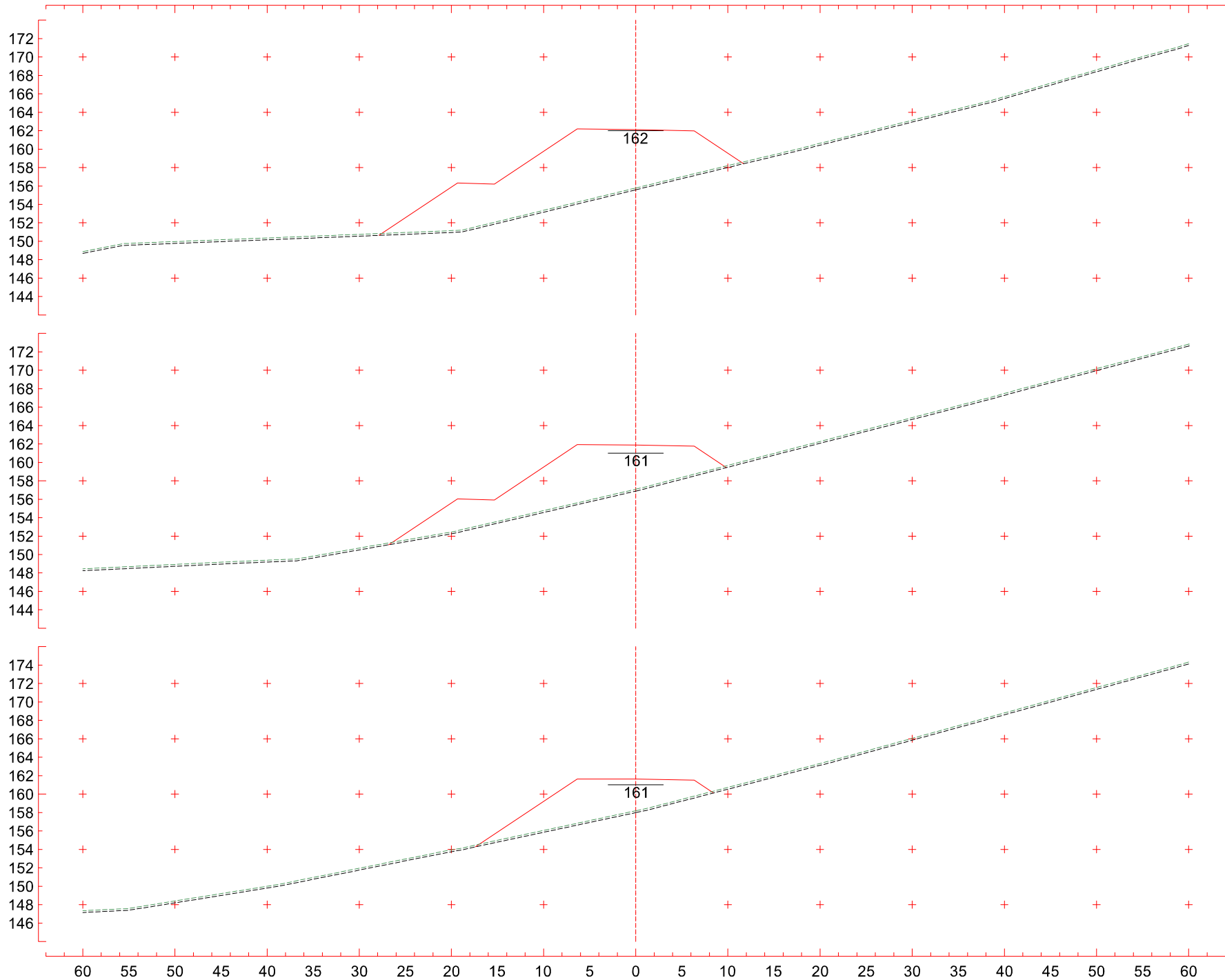


**9+160**  
CT 159,254 m  
CP 161,407 m

**9+140**  
CT 159,680 m  
CP 161,170 m

**9+120**  
CT 160,089 m  
CP 160,933 m

**Eixo01**  
Escala 1:400



**9+220**

CT 155,783 m  
CP 162,117 m

**9+200**

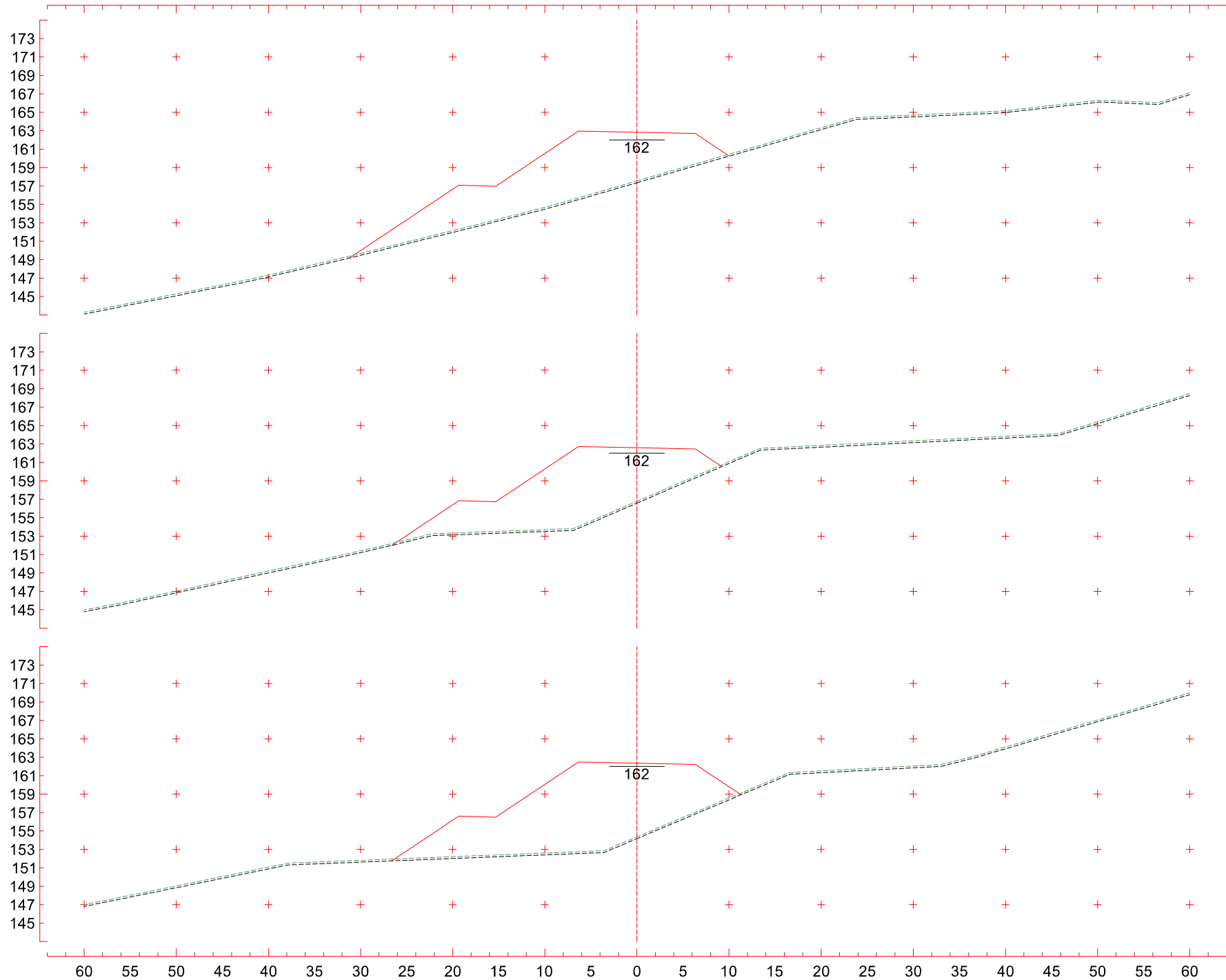
CT 157,088 m  
CP 161,880 m

**9+180**

CT 158,187 m  
CP 161,644 m

**Eixo1**

Escala 1:400

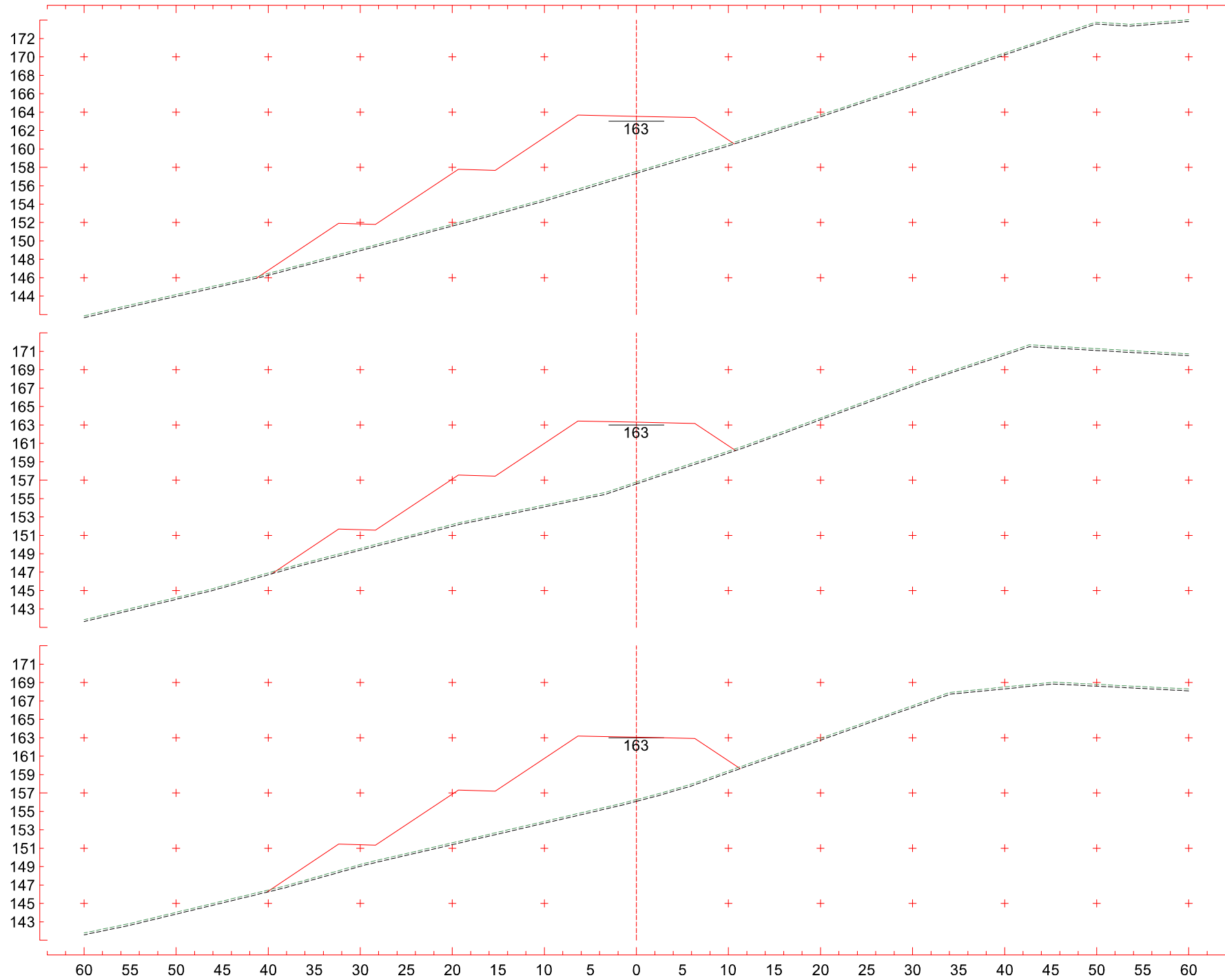


**9+280**  
CT 157,554 m  
CP 162,827 m

**9+260**  
CT 156,777 m  
CP 162,591 m

**9+240**  
CT 154,365 m  
CP 162,354 m

**Eixo1**  
Escala 1:400



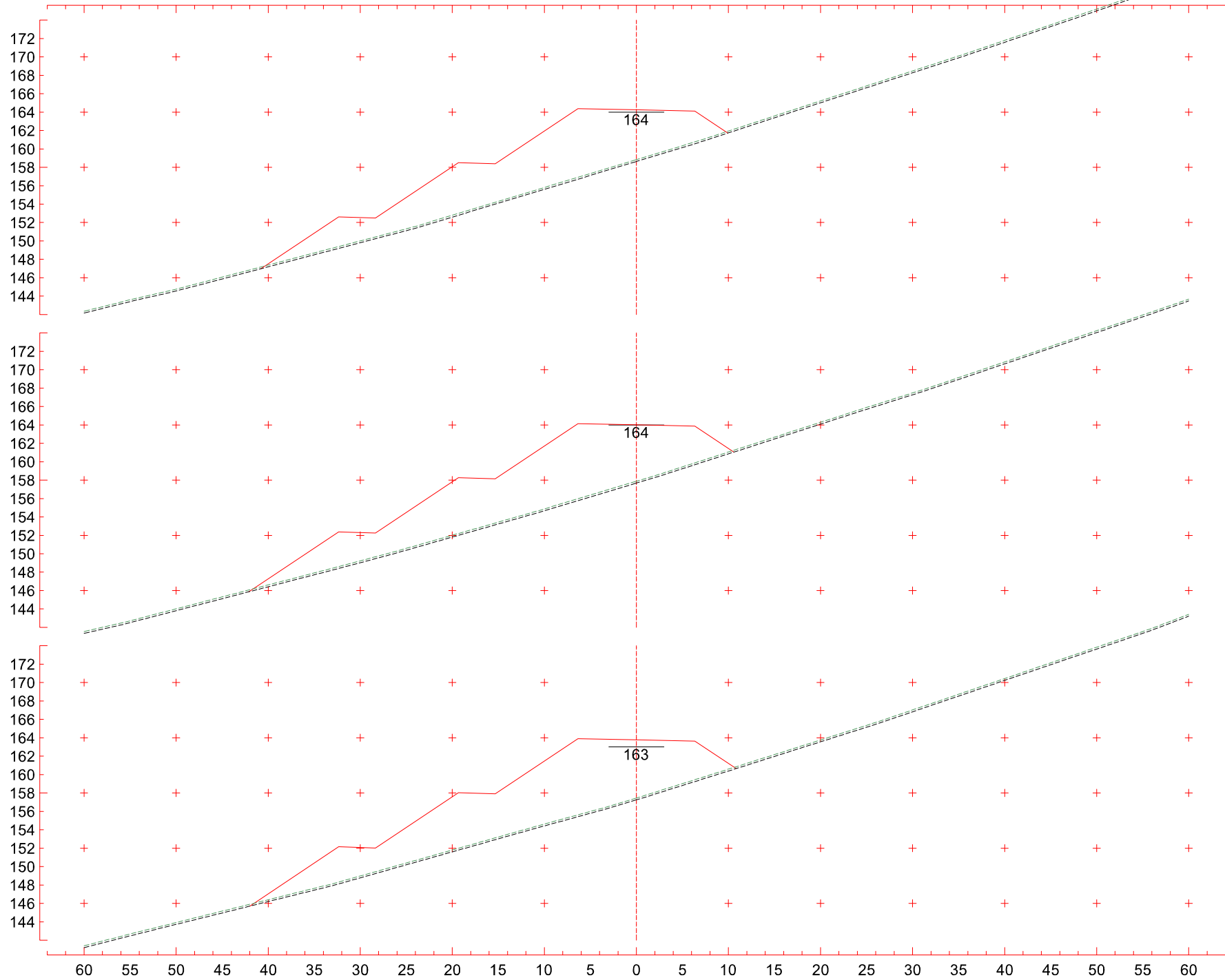
**9+340**  
CT 157,539 m  
CP 163,538 m

**9+320**  
CT 156,796 m  
CP 163,301 m

**9+300**  
CT 156,286 m  
CP 163,064 m

**Eixo1**  
Escala 1:400





**9+400**

CT 158,832 m  
CP 164,248 m

**9+380**

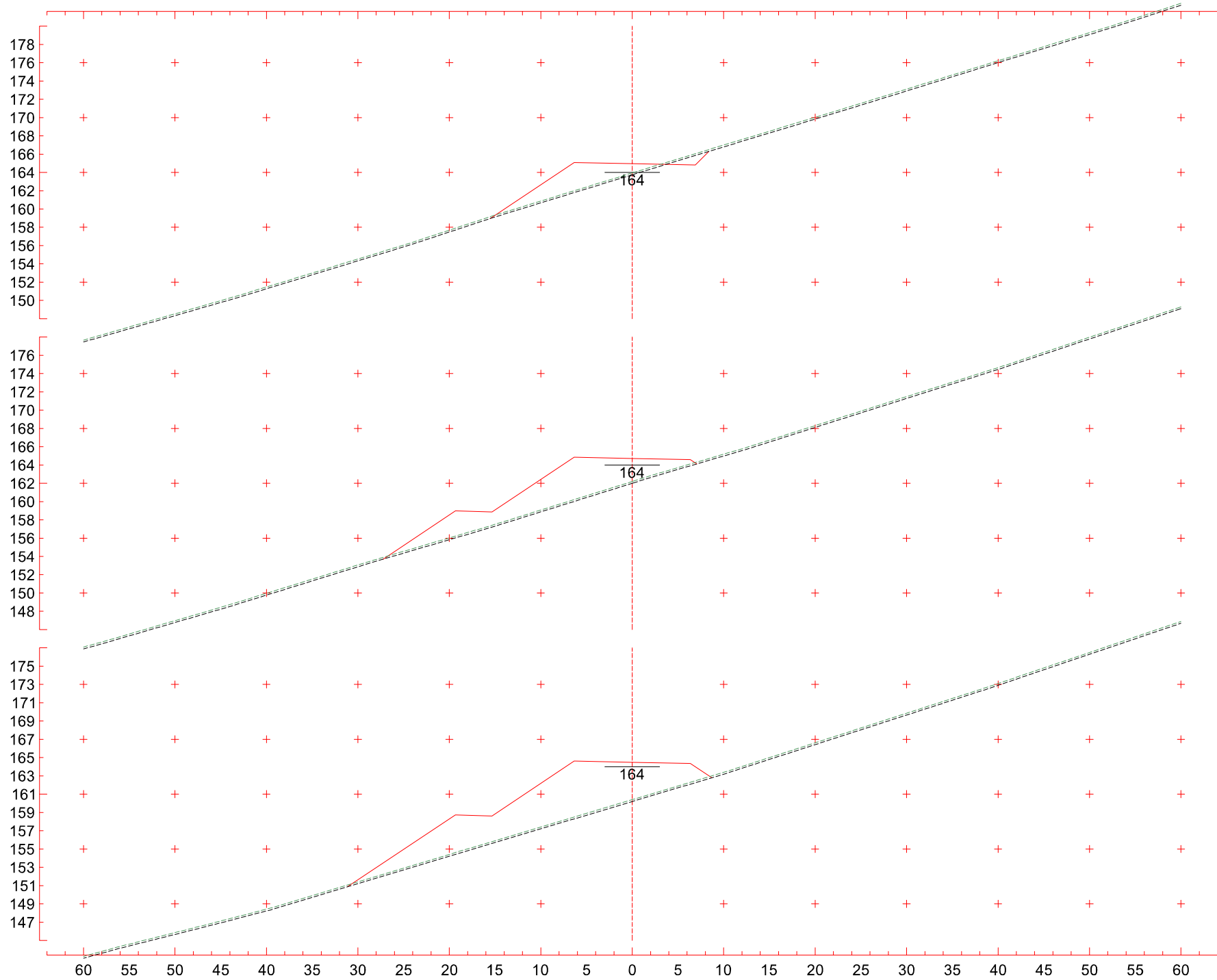
CT 157,881 m  
CP 164,011 m

**9+360**

CT 157,450 m  
CP 163,775 m

**Eixo01**

Escala 1:400

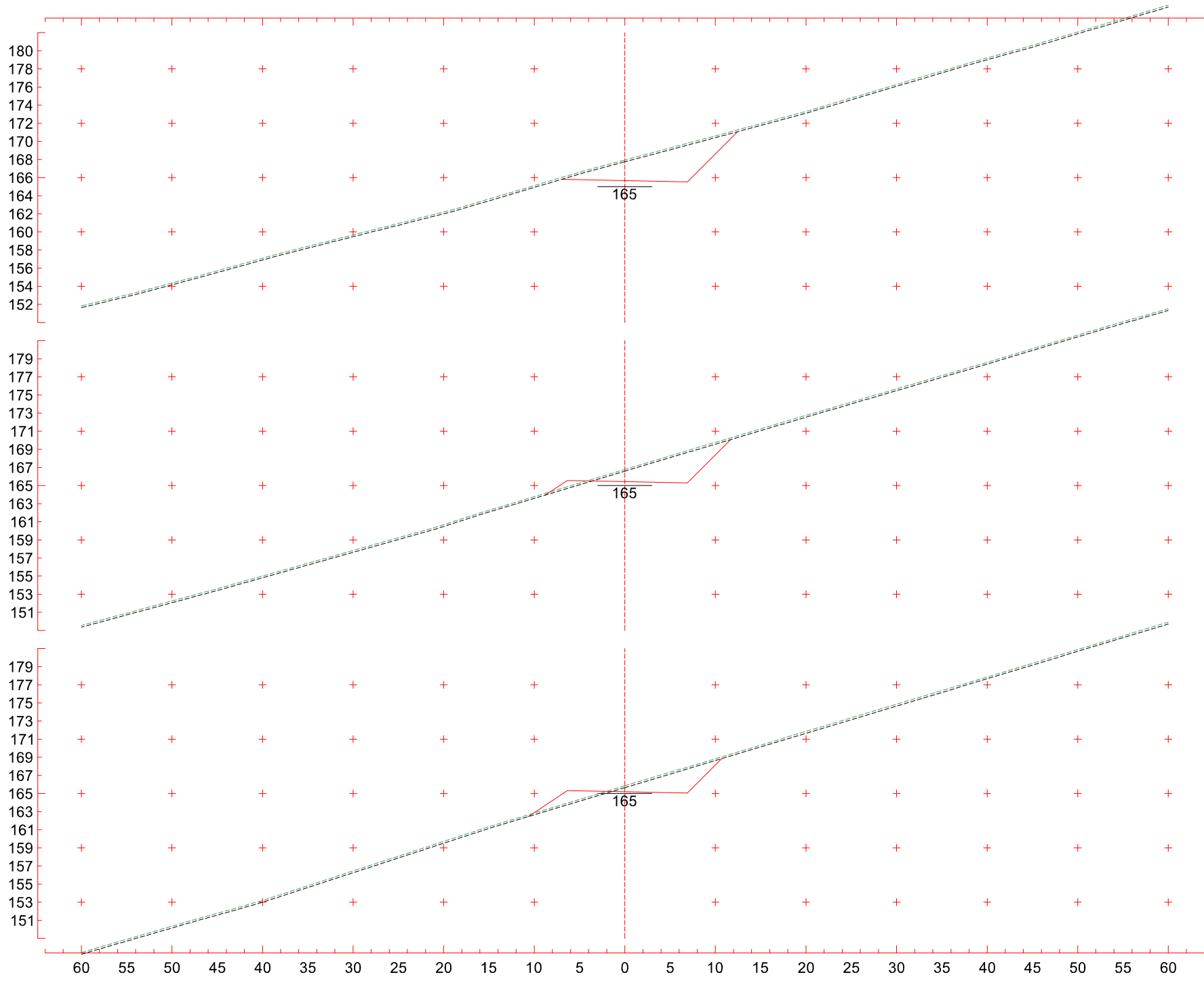


**9+460**  
CT 163,946 m  
CP 164,959 m

**9+440**  
CT 162,201 m  
CP 164,722 m

**9+420**  
CT 160,394 m  
CP 164,485 m

**Eixo1**  
Escala 1:400

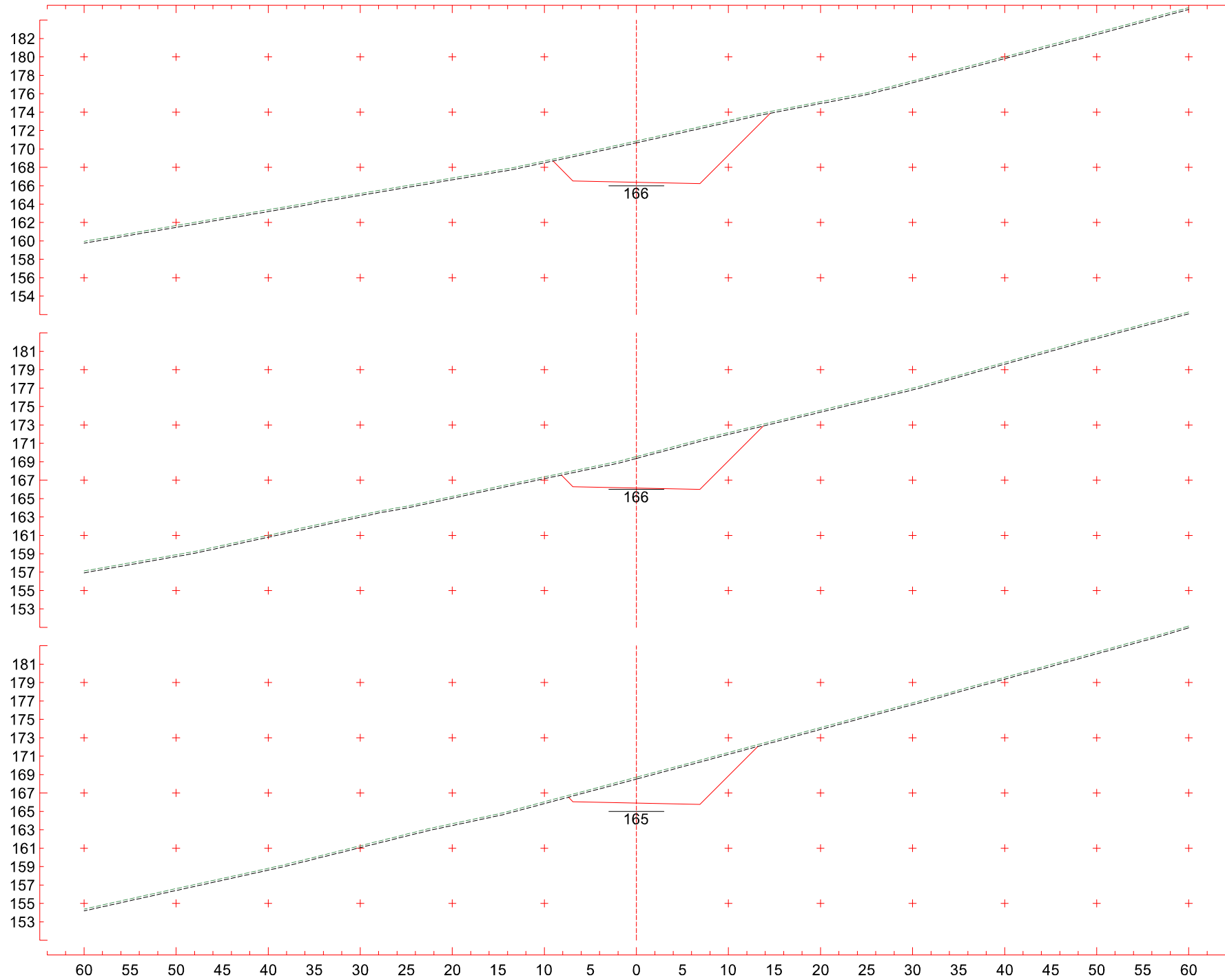


**9+520**  
CT 167,942 m  
CP 165,669 m

**9+500**  
CT 166,778 m  
CP 165,432 m

**9+480**  
CT 165,845 m  
CP 165,195 m

**Eixo1**  
Escala 1:400



**9+580**

CT 170,862 m  
CP 166,379 m

**9+560**

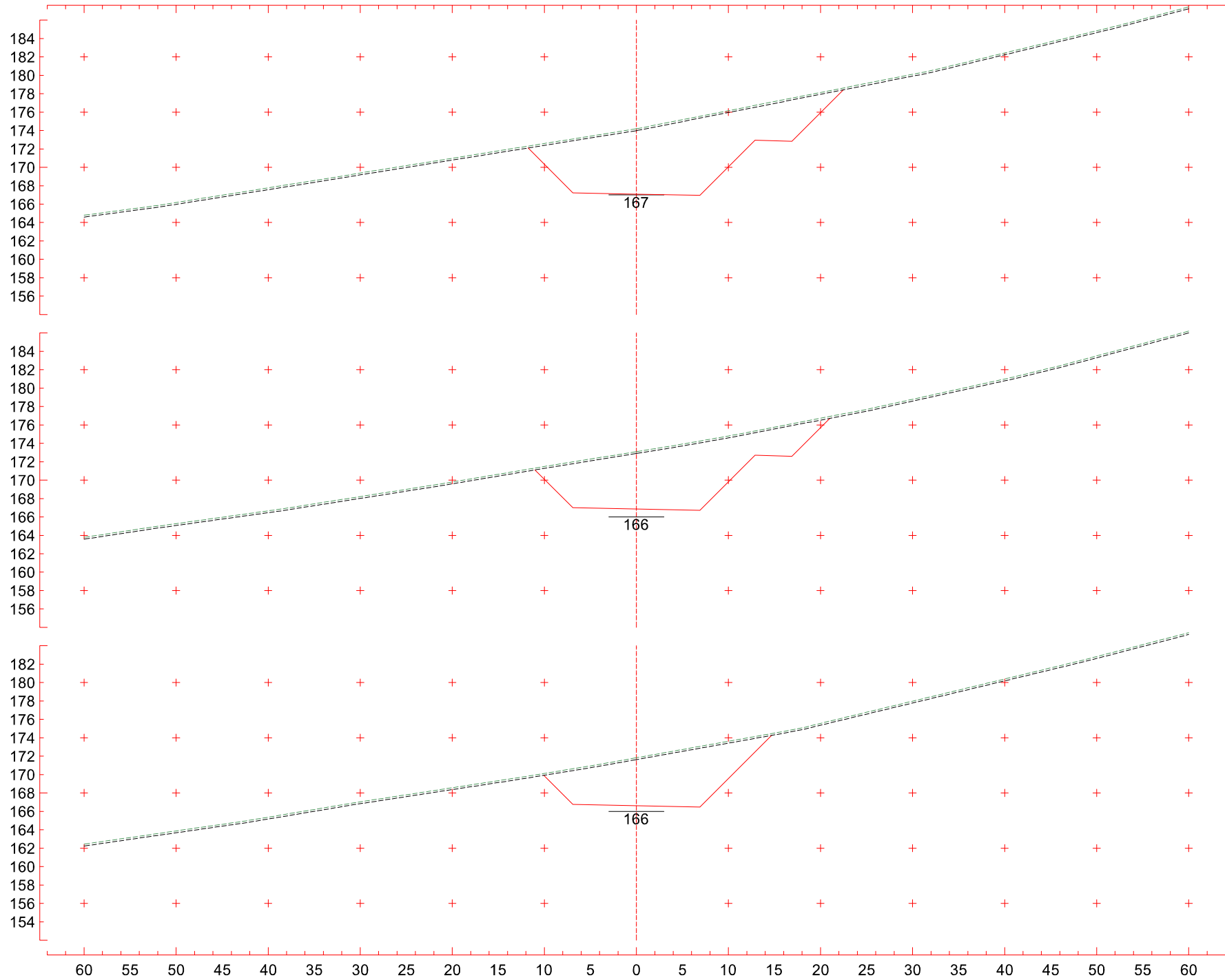
CT 169,561 m  
CP 166,142 m

**9+540**

CT 168,713 m  
CP 165,906 m

**Eixo1**

Escala 1:400

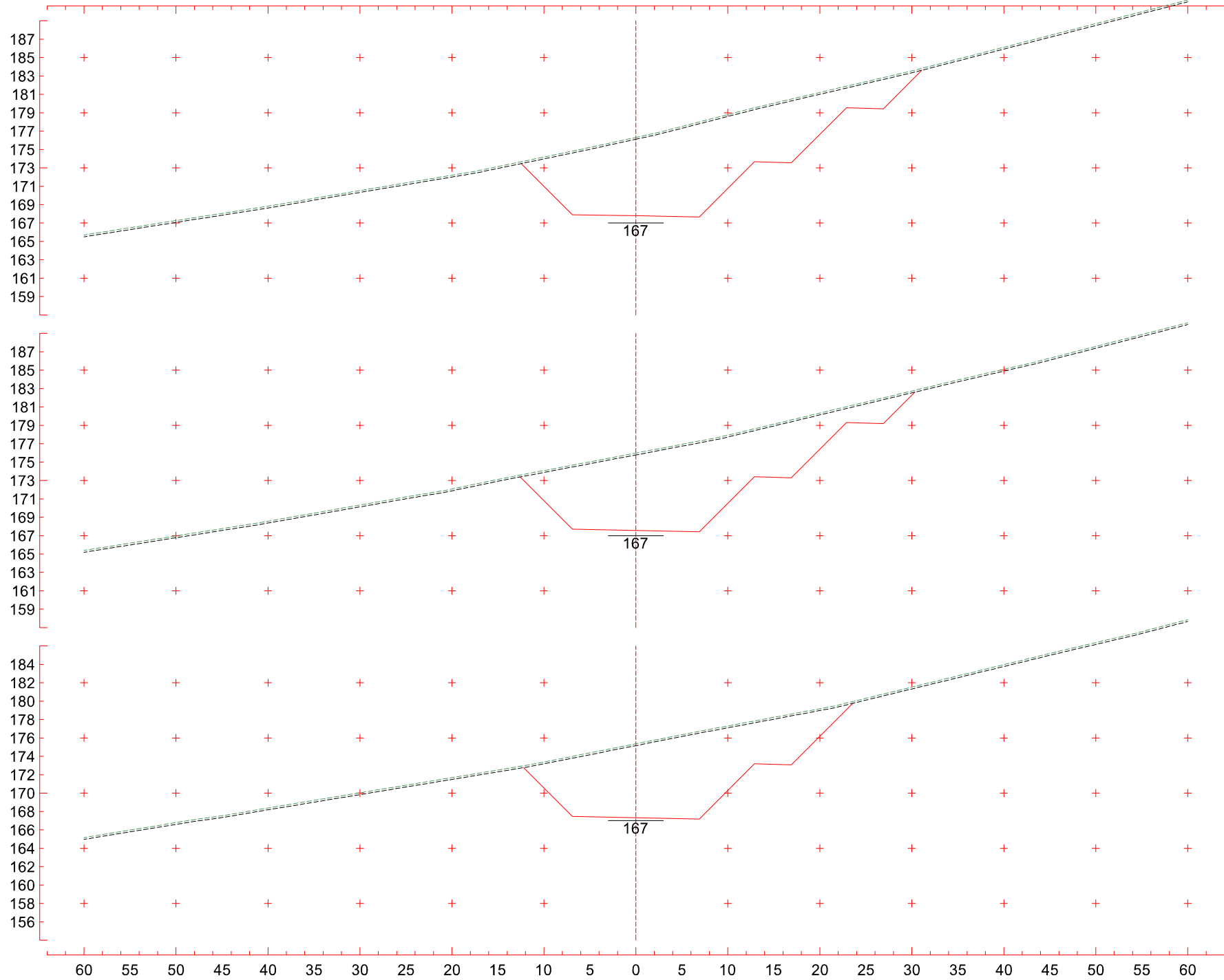


**9+640**  
CT 174,188 m  
CP 167,090 m

**9+620**  
CT 173,095 m  
CP 166,853 m

**9+600**  
CT 171,827 m  
CP 166,616 m

**Eixo1**  
Escala 1:400

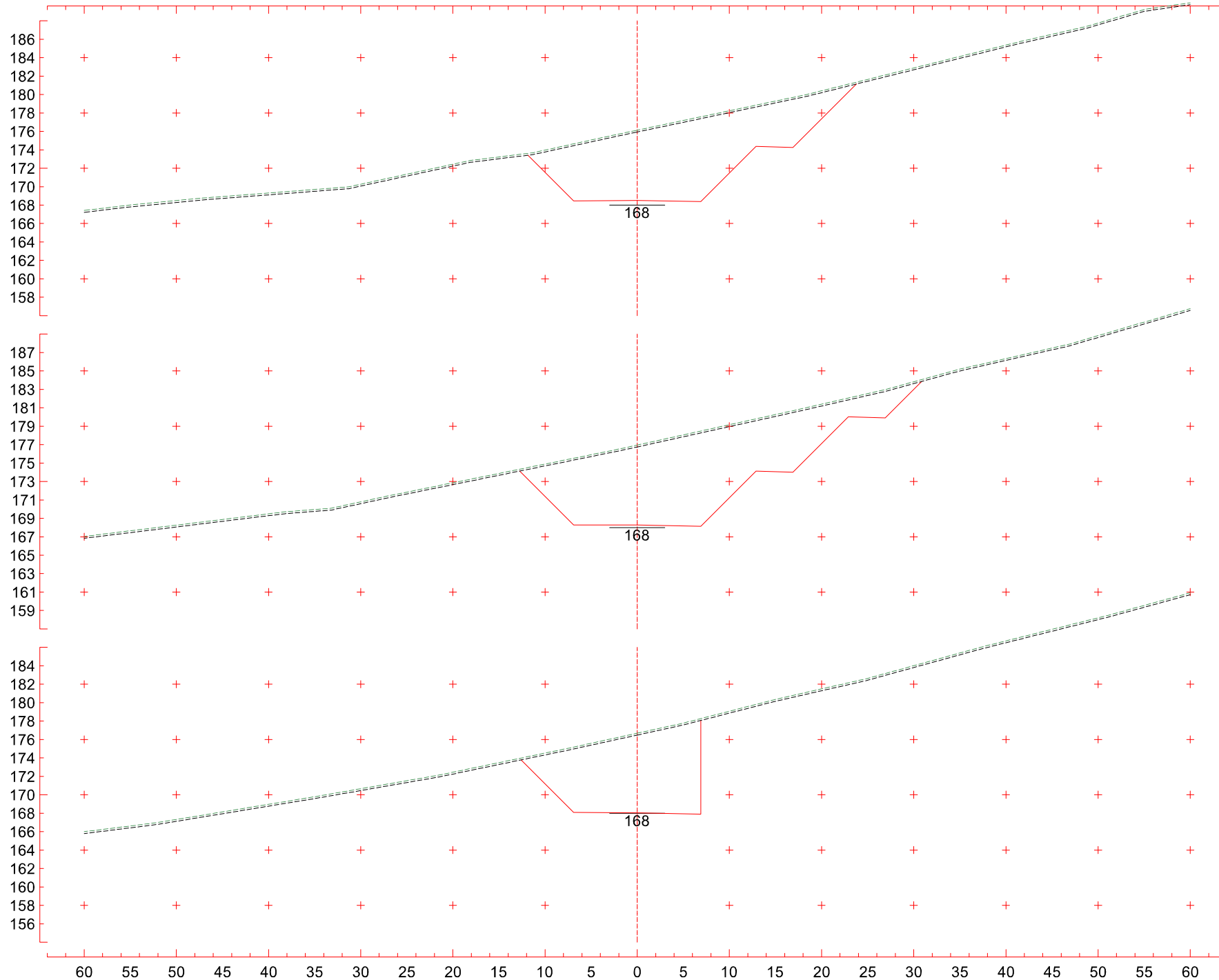


**9+700**  
CT 176,317 m  
CP 167,800 m

**9+680**  
CT 175,980 m  
CP 167,563 m

**9+660**  
CT 175,364 m  
CP 167,326 m

**Eixo1**  
Escala 1:400

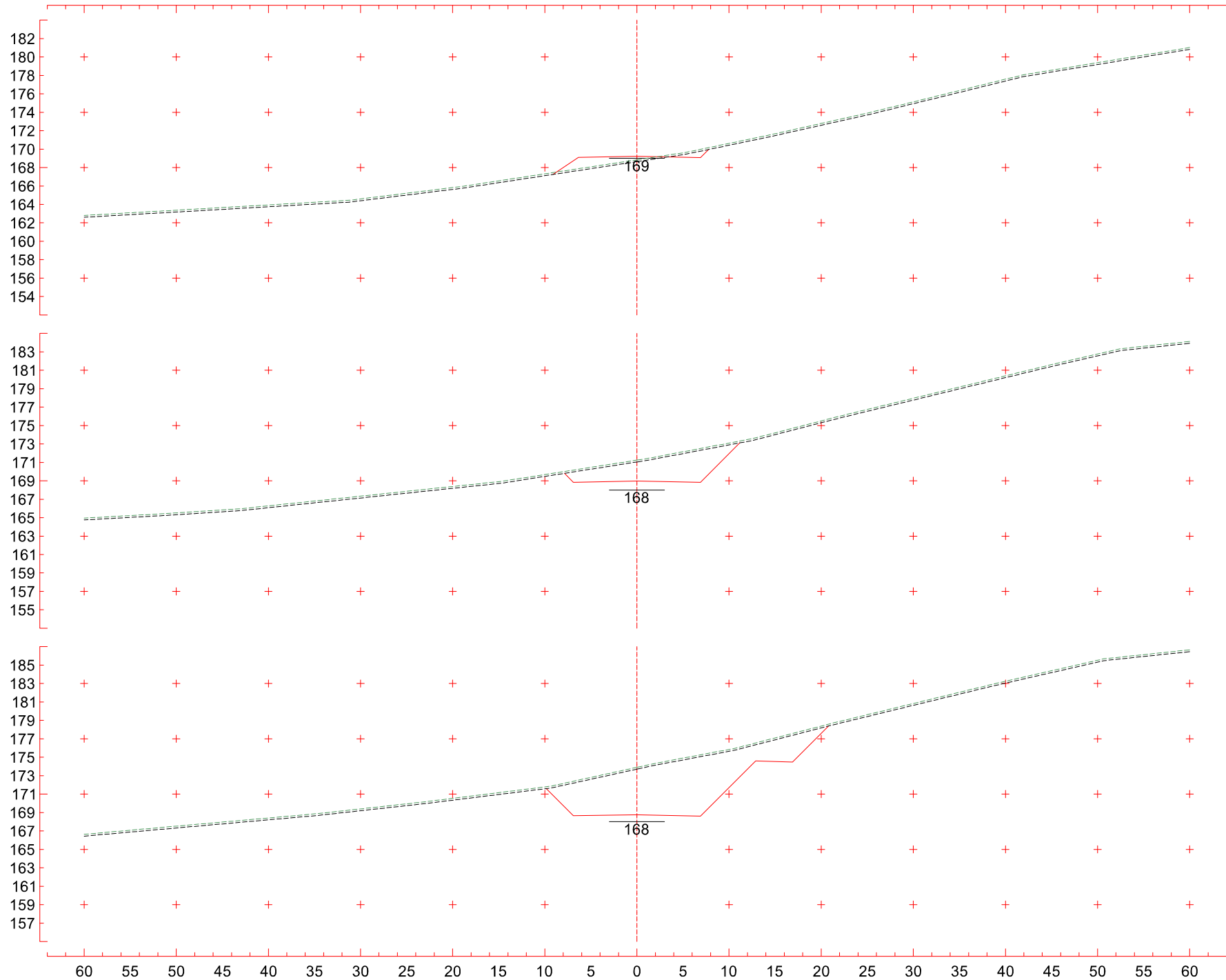


**9+760**  
CT 176,130 m  
CP 168,510 m

**9+740**  
CT 176,952 m  
CP 168,274 m

**9+720**  
CT 176,682 m  
CP 168,037 m

**Eixo1**  
Escala 1:400



**9+820**

CT 168,841 m  
CP 169,221 m

**9+800**

CT 171,247 m  
CP 168,984 m

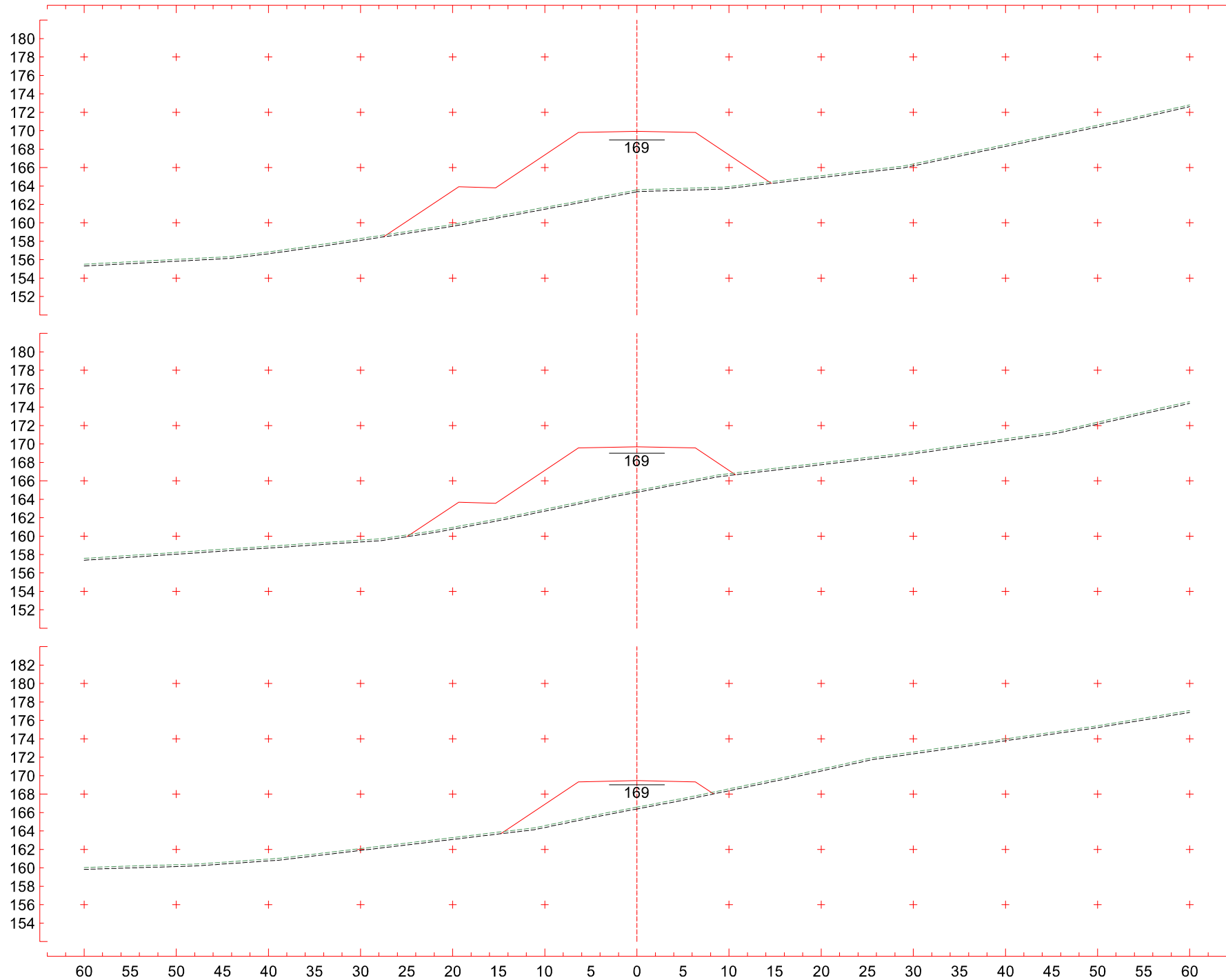
**9+780**

CT 173,904 m  
CP 168,747 m

**Eixo1**

Escala 1:400



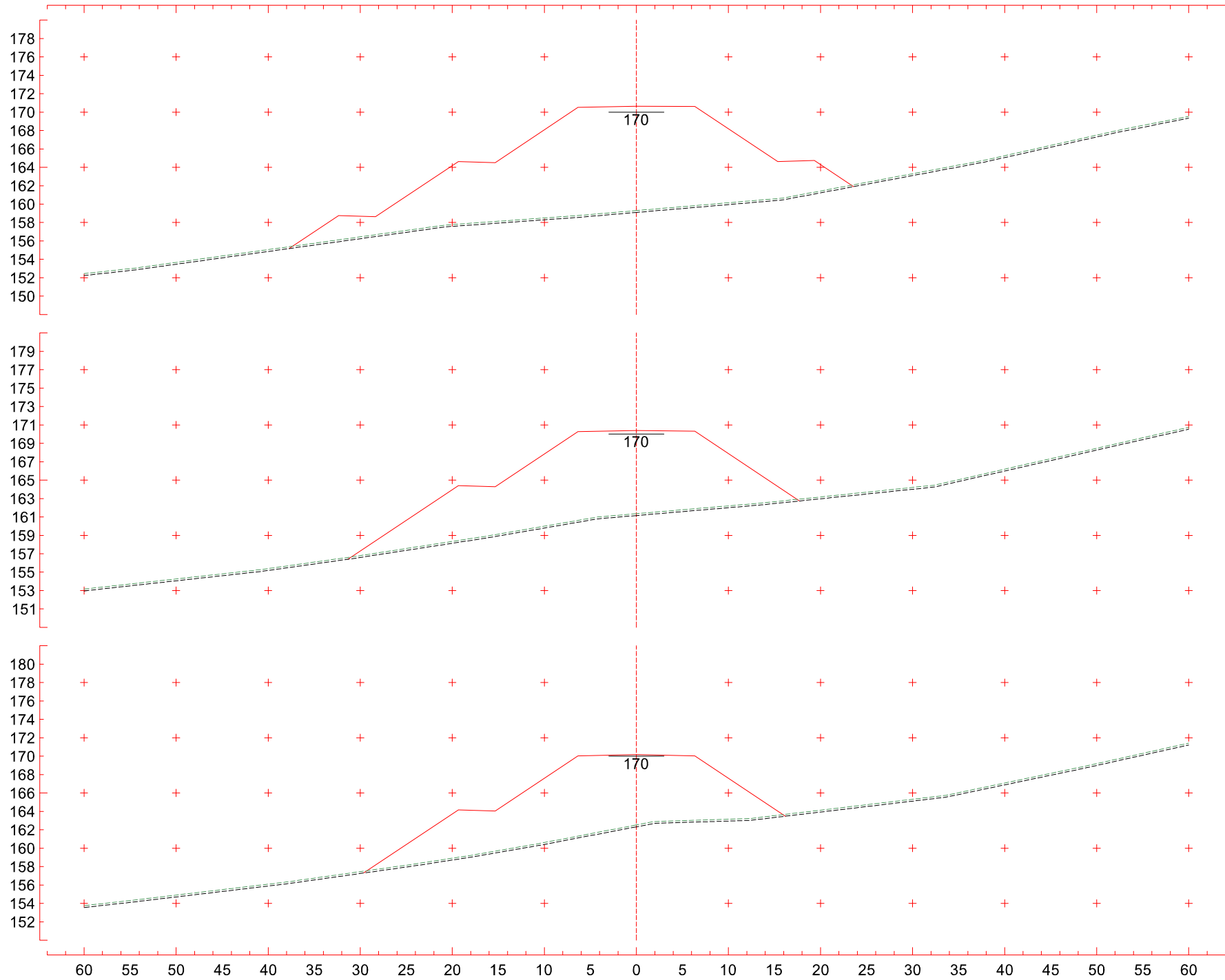


**9+880**  
CT 163,574 m  
CP 169,931 m

**9+860**  
CT 164,958 m  
CP 169,694 m

**9+840**  
CT 166,584 m  
CP 169,458 m

**Eixo1**  
Escala 1:400

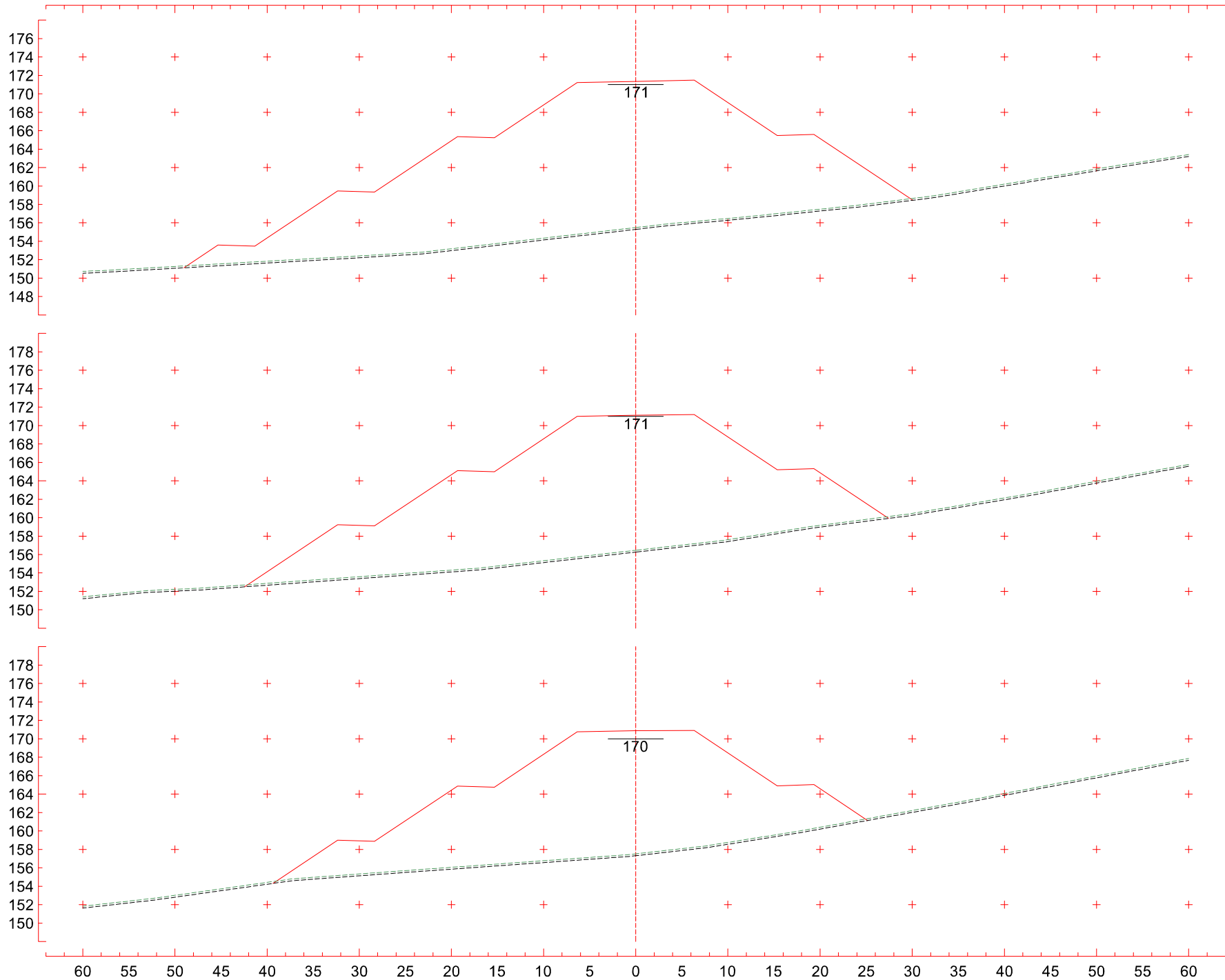


**9+940**  
CT 159,297 m  
CP 170,641 m

**9+920**  
CT 161,354 m  
CP 170,405 m

**9+900**  
CT 162,523 m  
CP 170,168 m

**Eixo1**  
Escala 1:400

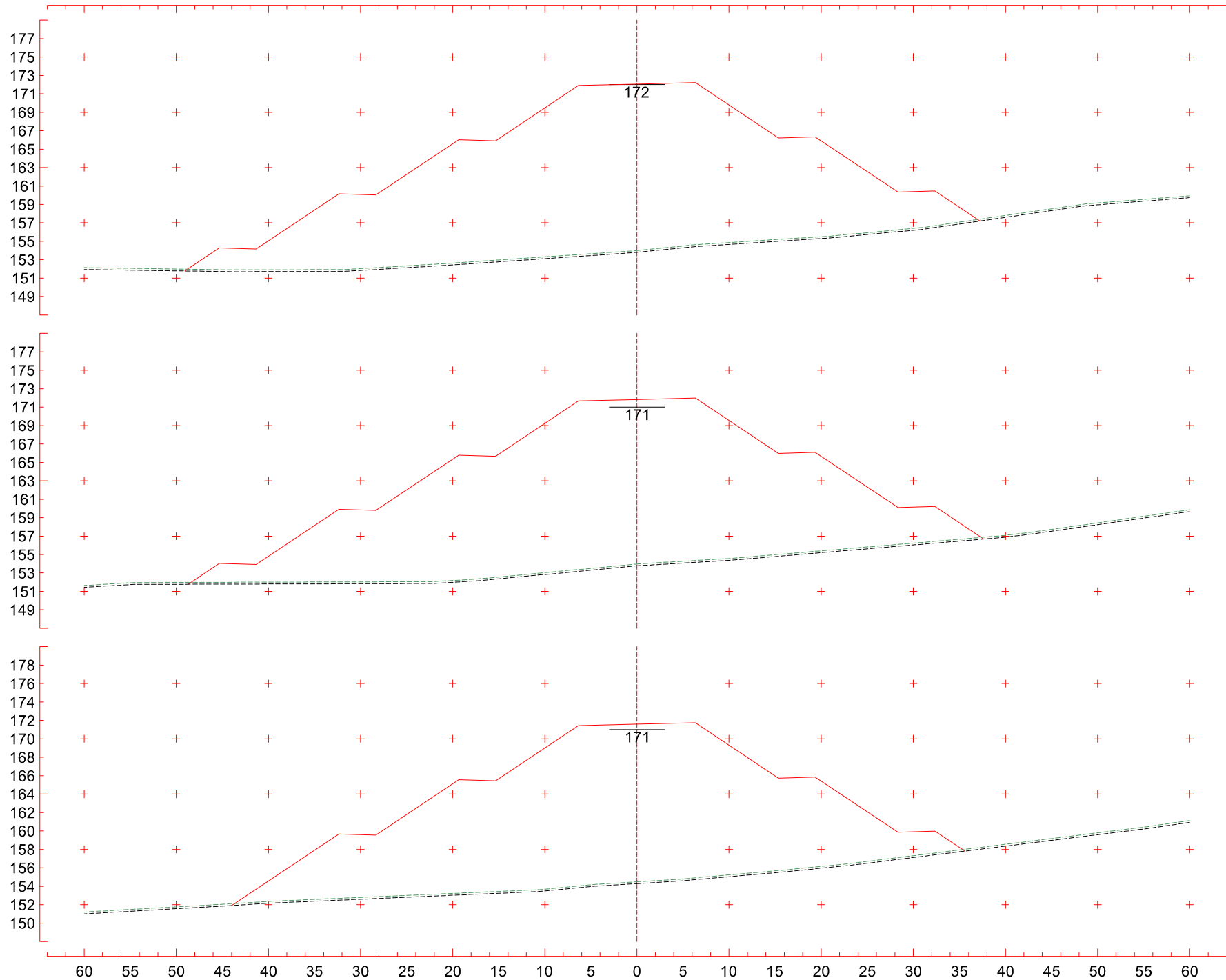


**10+000**  
CT 155,489 m  
CP 171,352 m

**9+980**  
CT 156,464 m  
CP 171,115 m

**9+960**  
CT 157,511 m  
CP 170,878 m

**Eixo1**  
Escala 1:400

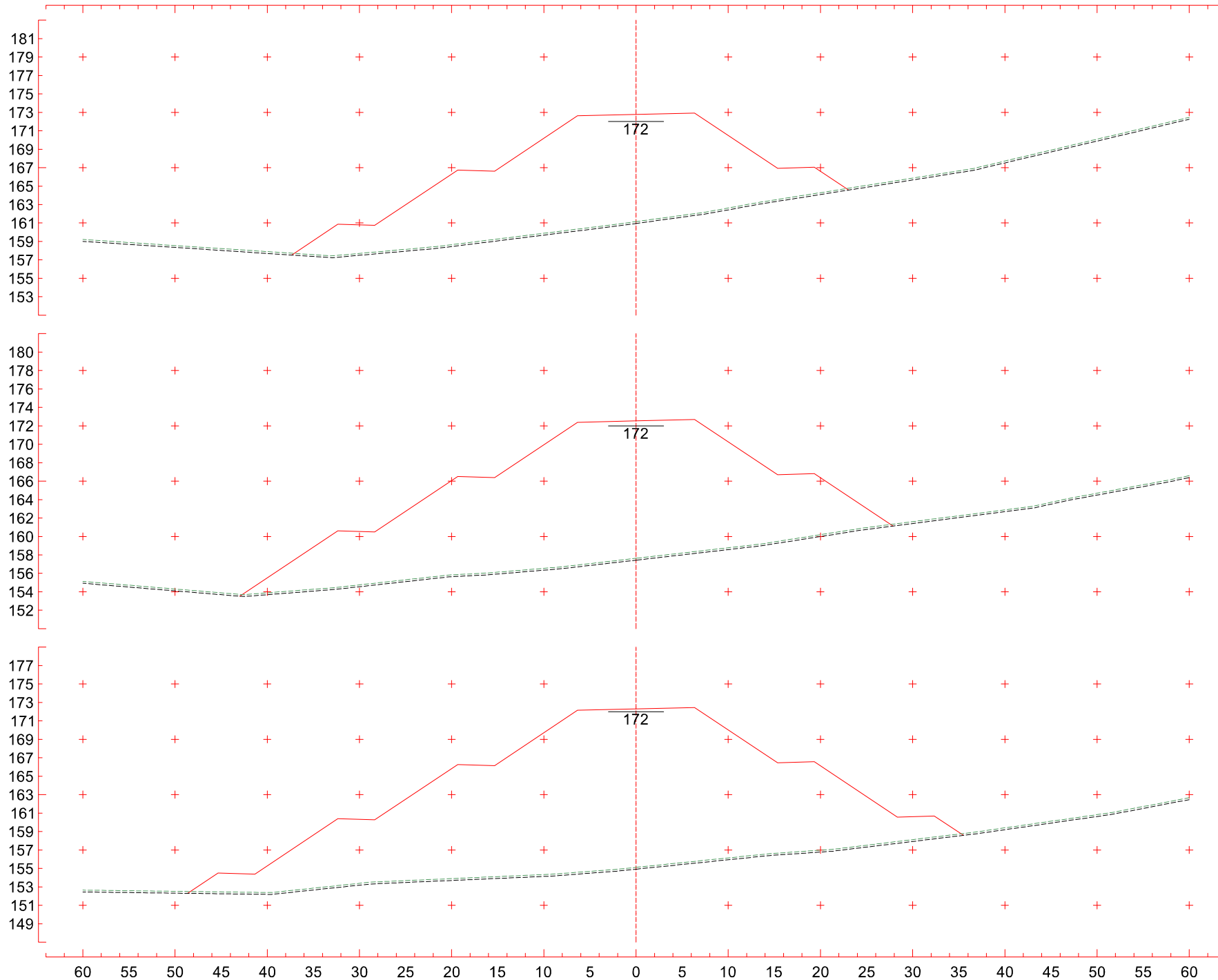


**10+060**  
CT 154,001 m  
CP 172,062 m

**10+040**  
CT 153,971 m  
CP 171,825 m

**10+020**  
CT 154,485 m  
CP 171,589 m

**Eixo1**  
Escala 1:400



10+120

CT 161,151 m  
CP 172,773 m

10+100

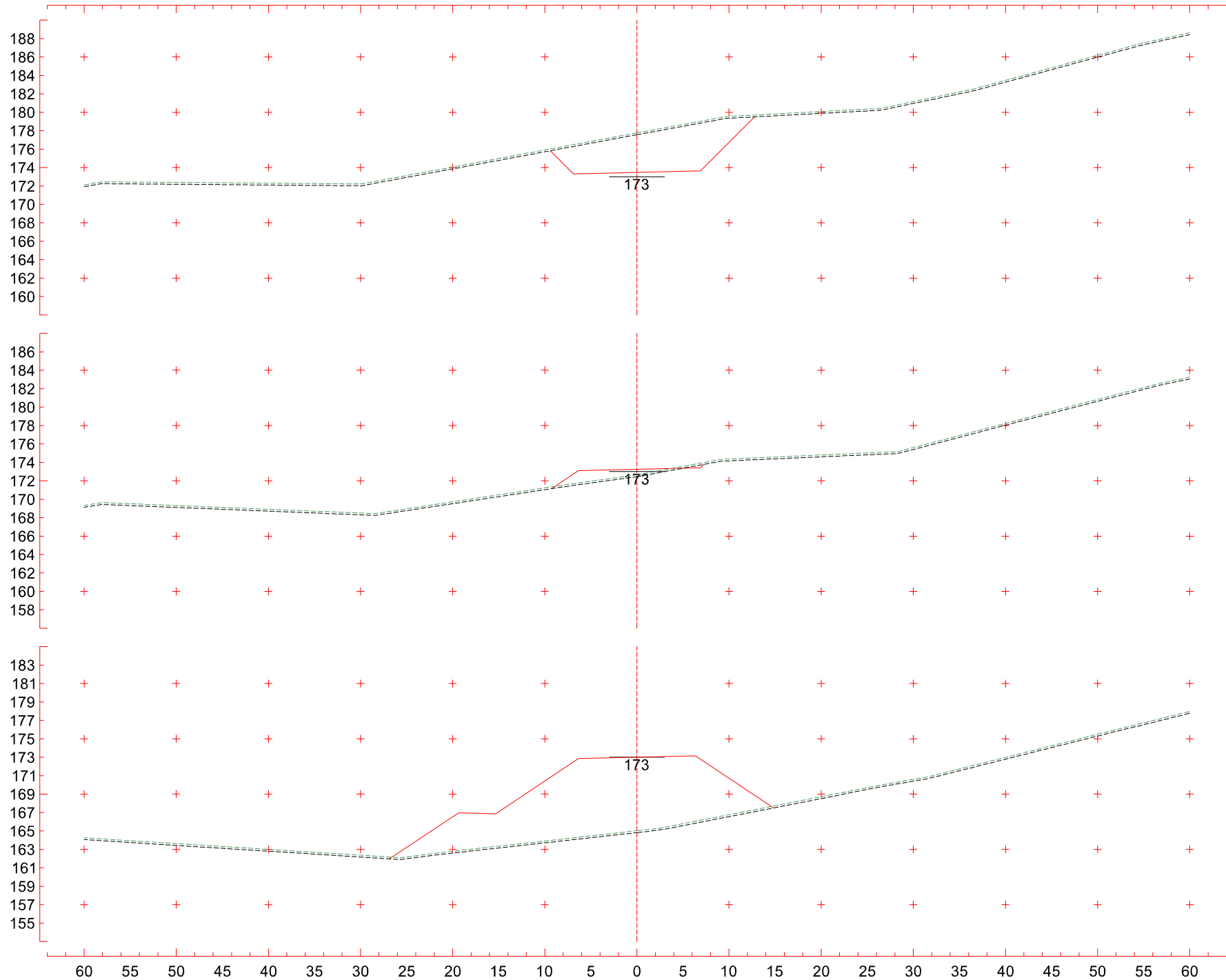
CT 157,631 m  
CP 172,536 m

10+080

CT 155,115 m  
CP 172,299 m

Eixo1

Escala 1:400

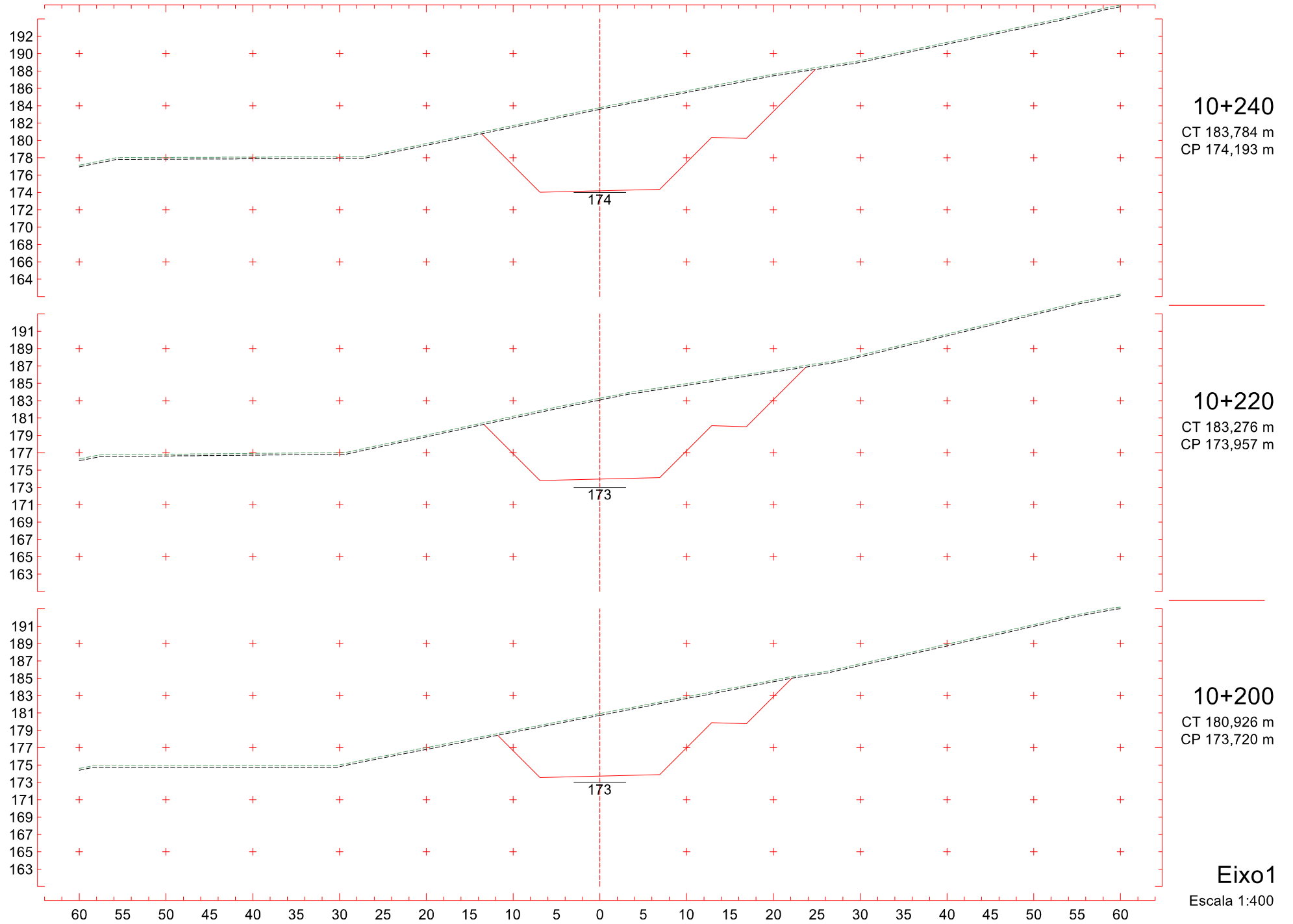


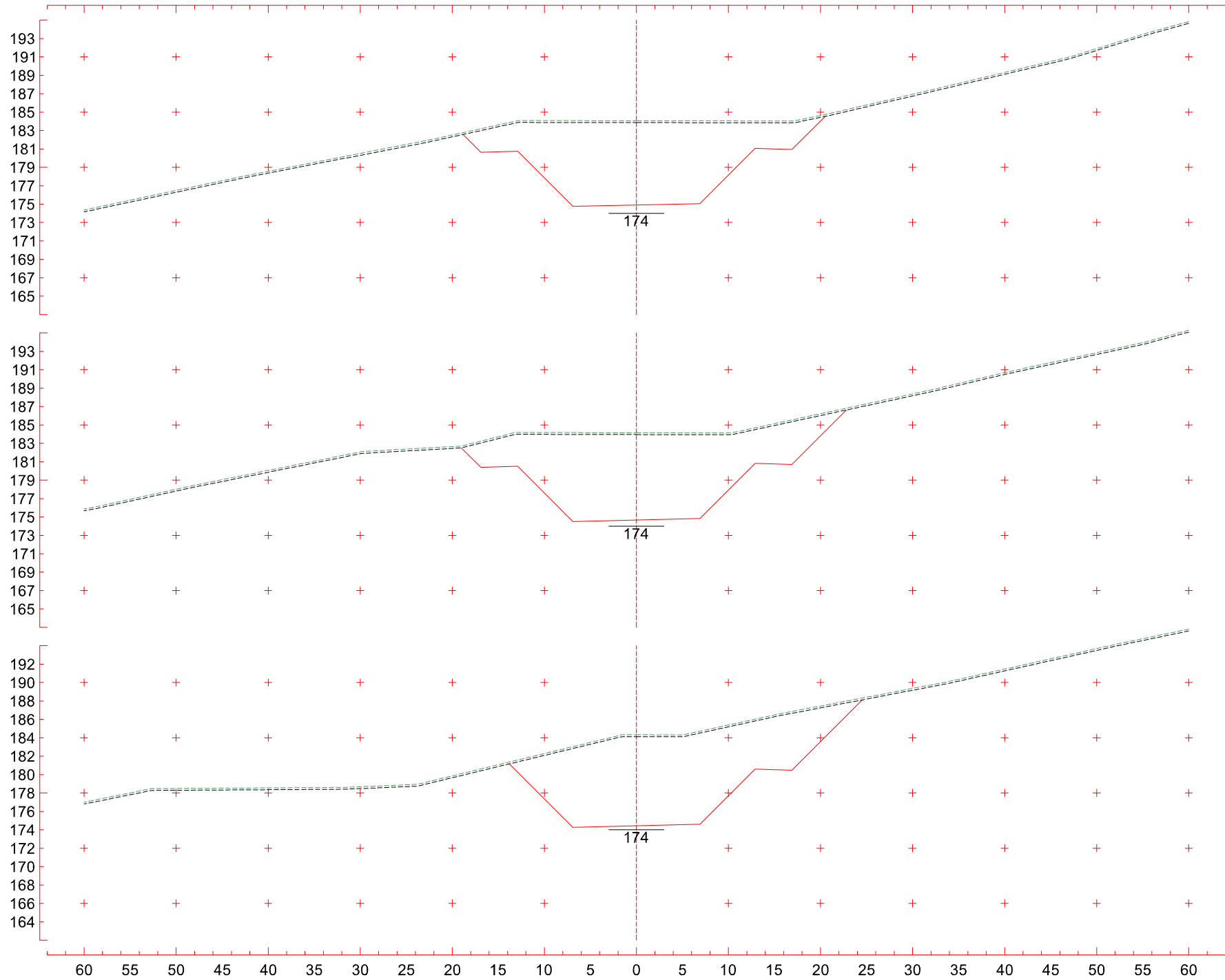
**10+180**  
CT 177,763 m  
CP 173,483 m

**10+160**  
CT 172,645 m  
CP 173,246 m

**10+140**  
CT 165,020 m  
CP 173,009 m

**Eixo1**  
Escala 1:400





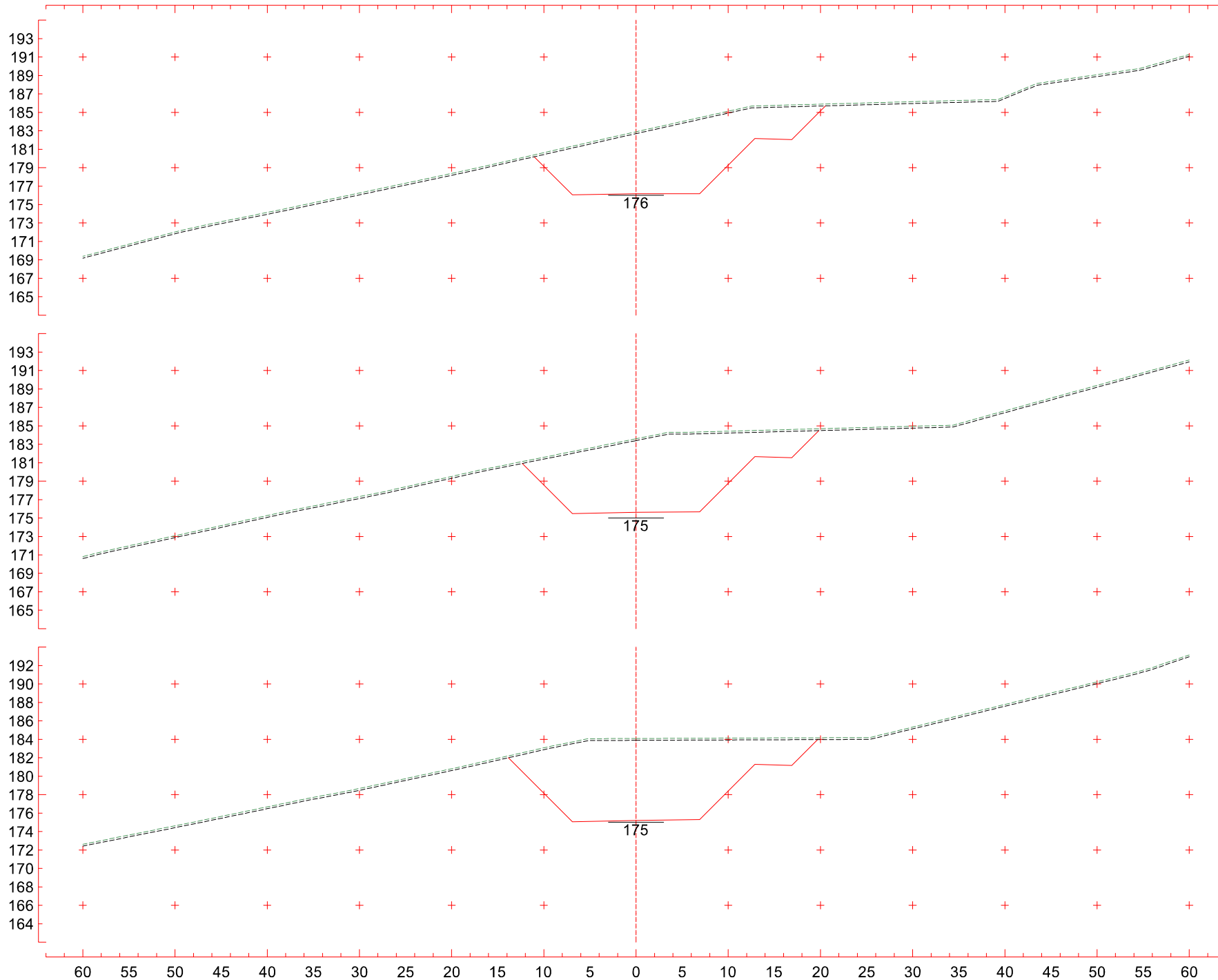
**10+300**  
CT 184,060 m  
CP 174,904 m

**10+280**  
CT 184,151 m  
CP 174,667 m

**10+260**  
CT 184,321 m  
CP 174,430 m

**Eixo1**  
Escala 1:400





**10+360**

CT 182,893 m  
CP 176,182 m

**10+340**

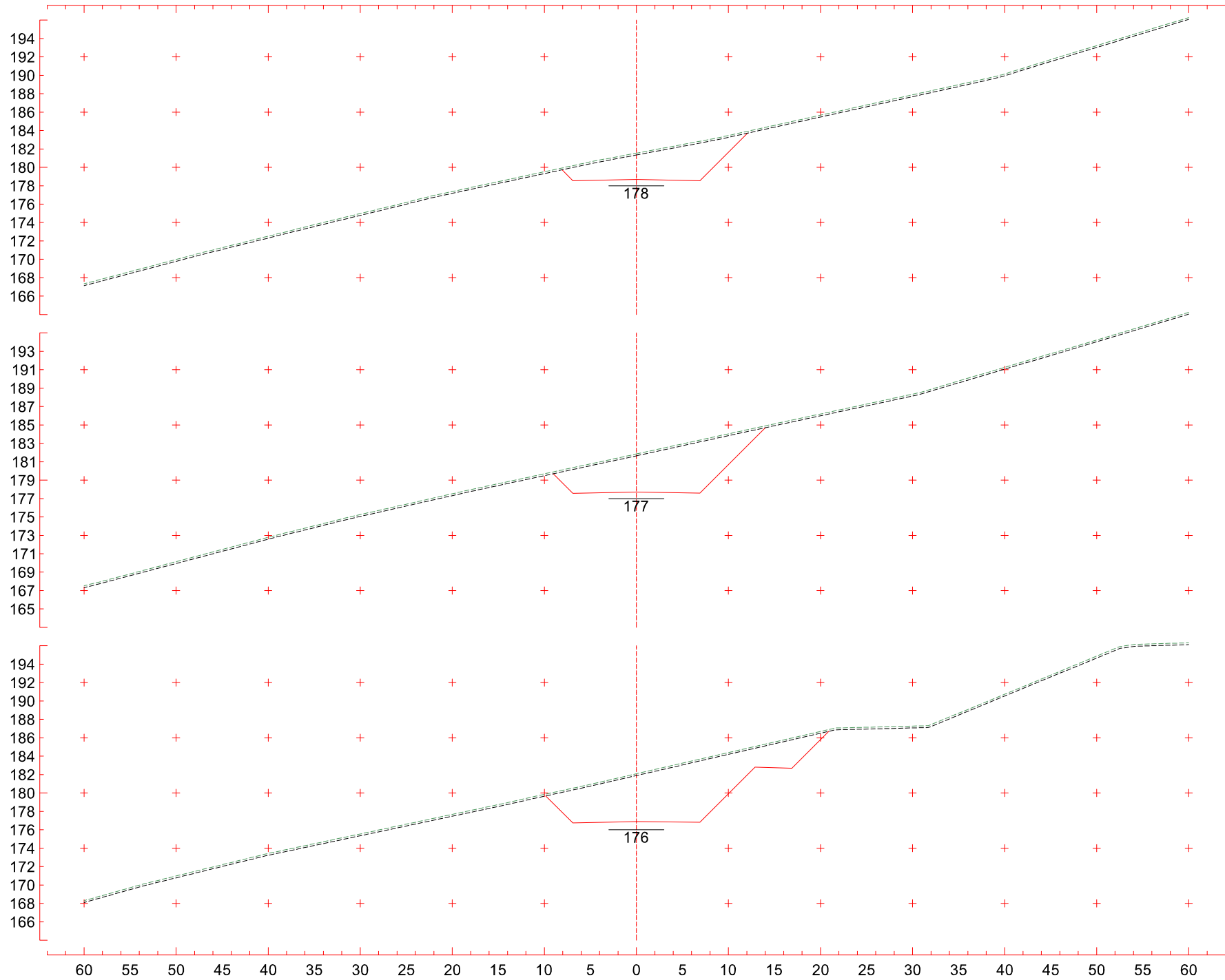
CT 183,596 m  
CP 175,620 m

**10+320**

CT 184,090 m  
CP 175,194 m

**Eixo1**

Escala 1:400

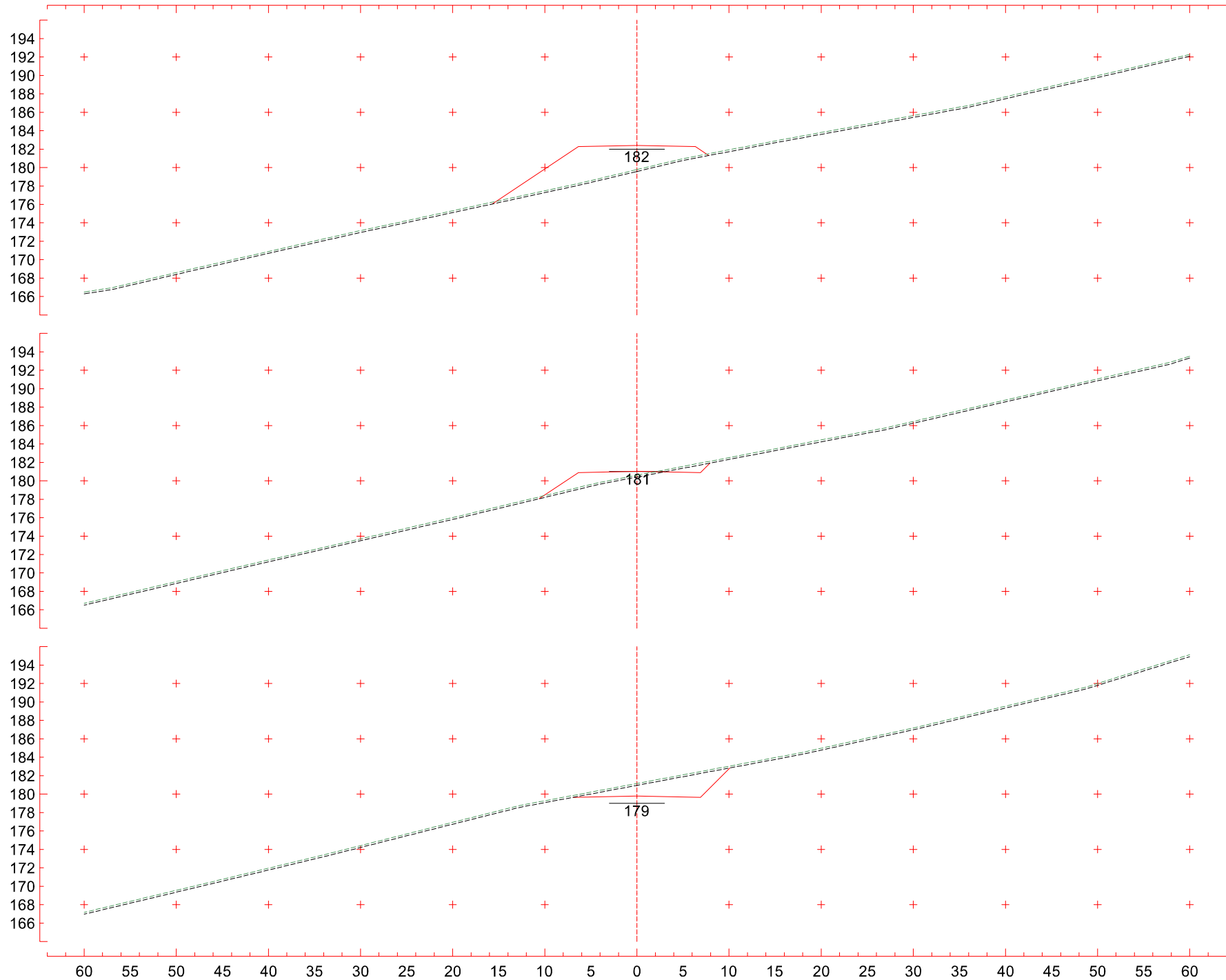


**10+420**  
CT 181,538 m  
CP 178,681 m

**10+400**  
CT 181,842 m  
CP 177,712 m

**10+380**  
CT 182,094 m  
CP 176,879 m

**Eixo1**  
Escala 1:400

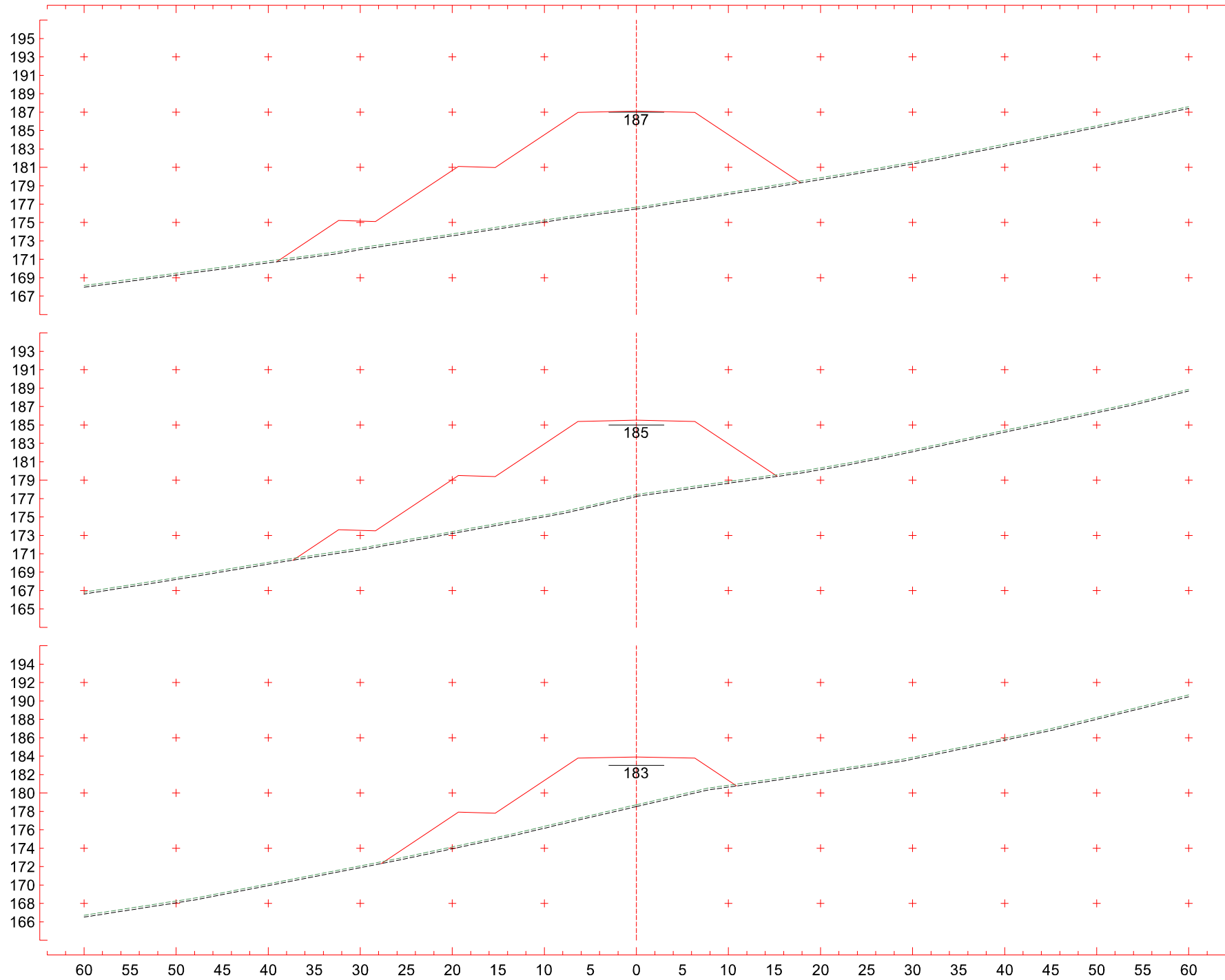


**10+480**  
CT 179,776 m  
CP 182,404 m

**10+460**  
CT 180,605 m  
CP 181,027 m

**10+440**  
CT 181,149 m  
CP 179,786 m

**Eixo1**  
Escala 1:400

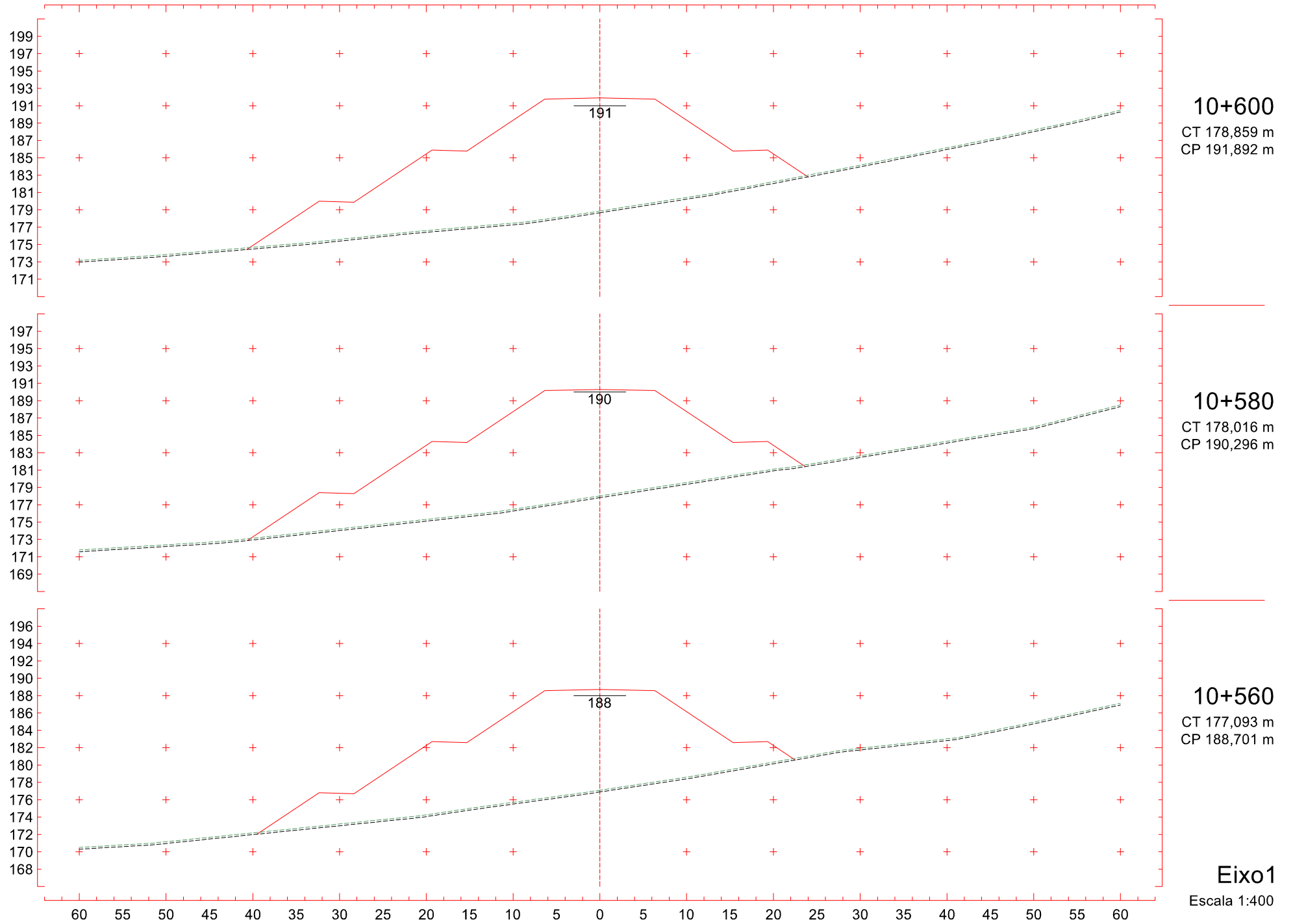


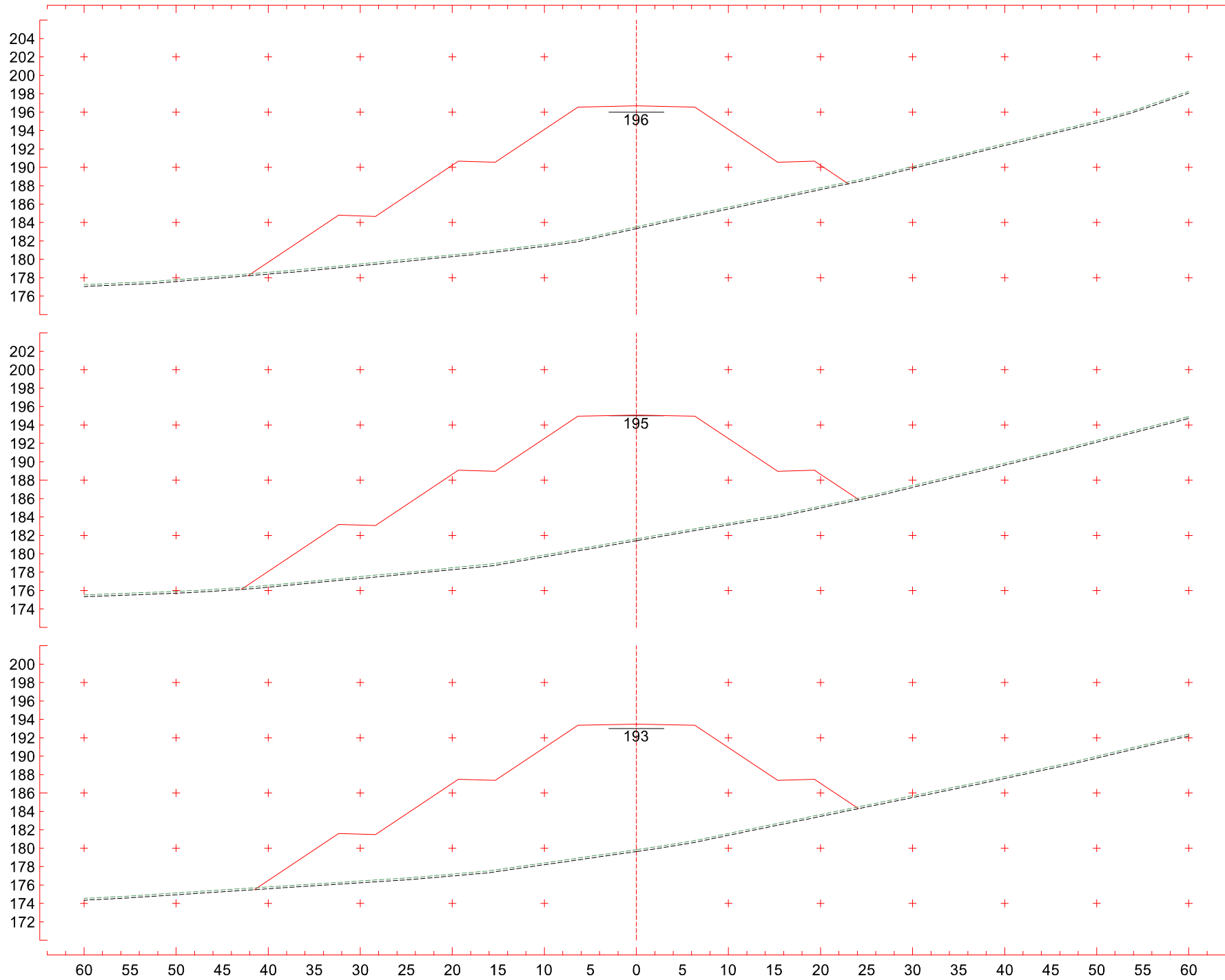
**10+540**  
CT 176,665 m  
CP 187,106 m

**10+520**  
CT 177,423 m  
CP 185,511 m

**10+500**  
CT 178,721 m  
CP 183,916 m

**Eixo1**  
Escala 1:400



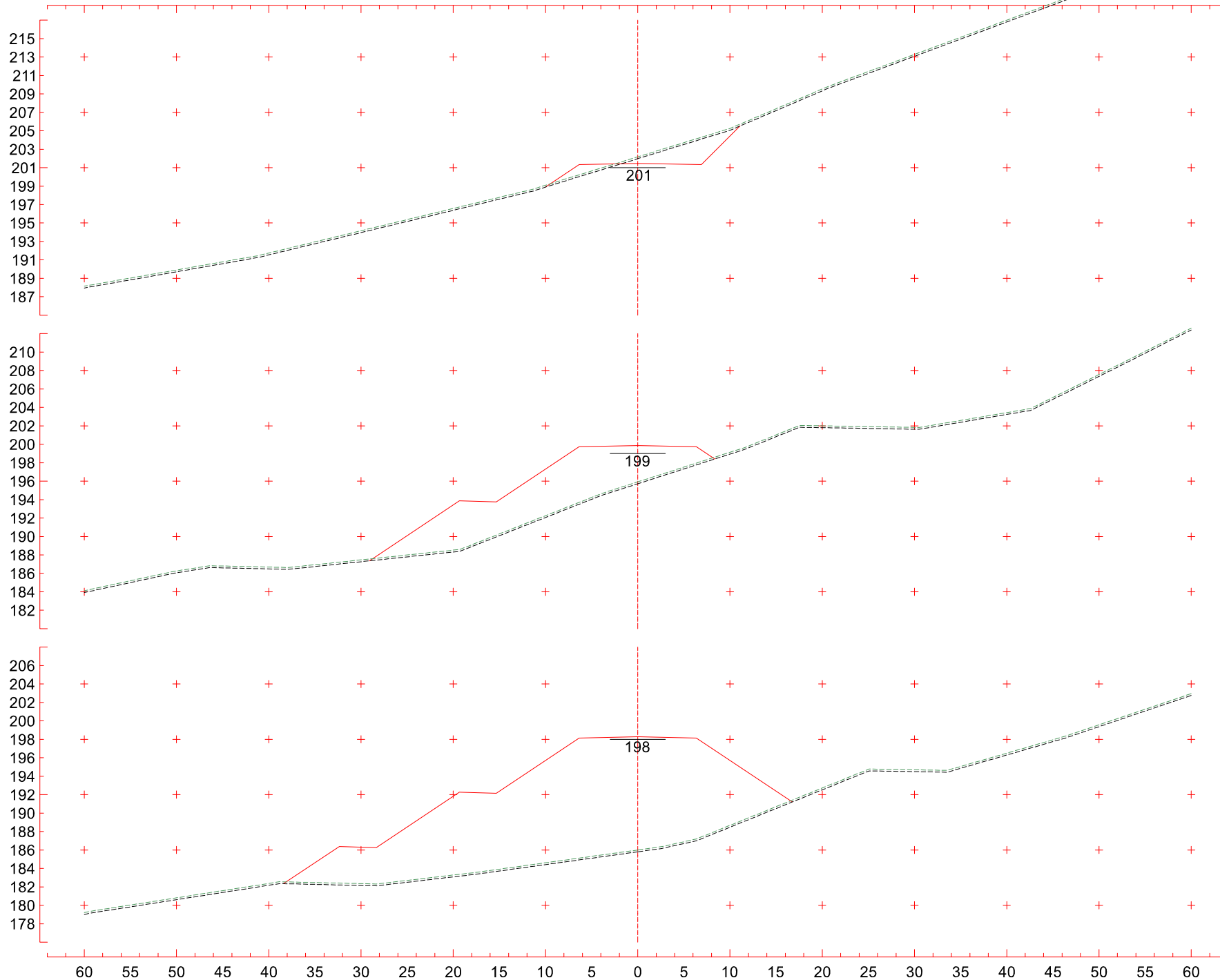


**10+660**  
CT 183,535 m  
CP 196,677 m

**10+640**  
CT 181,618 m  
CP 195,082 m

**10+620**  
CT 179,837 m  
CP 193,487 m

**Eixo1**  
Escala 1:400

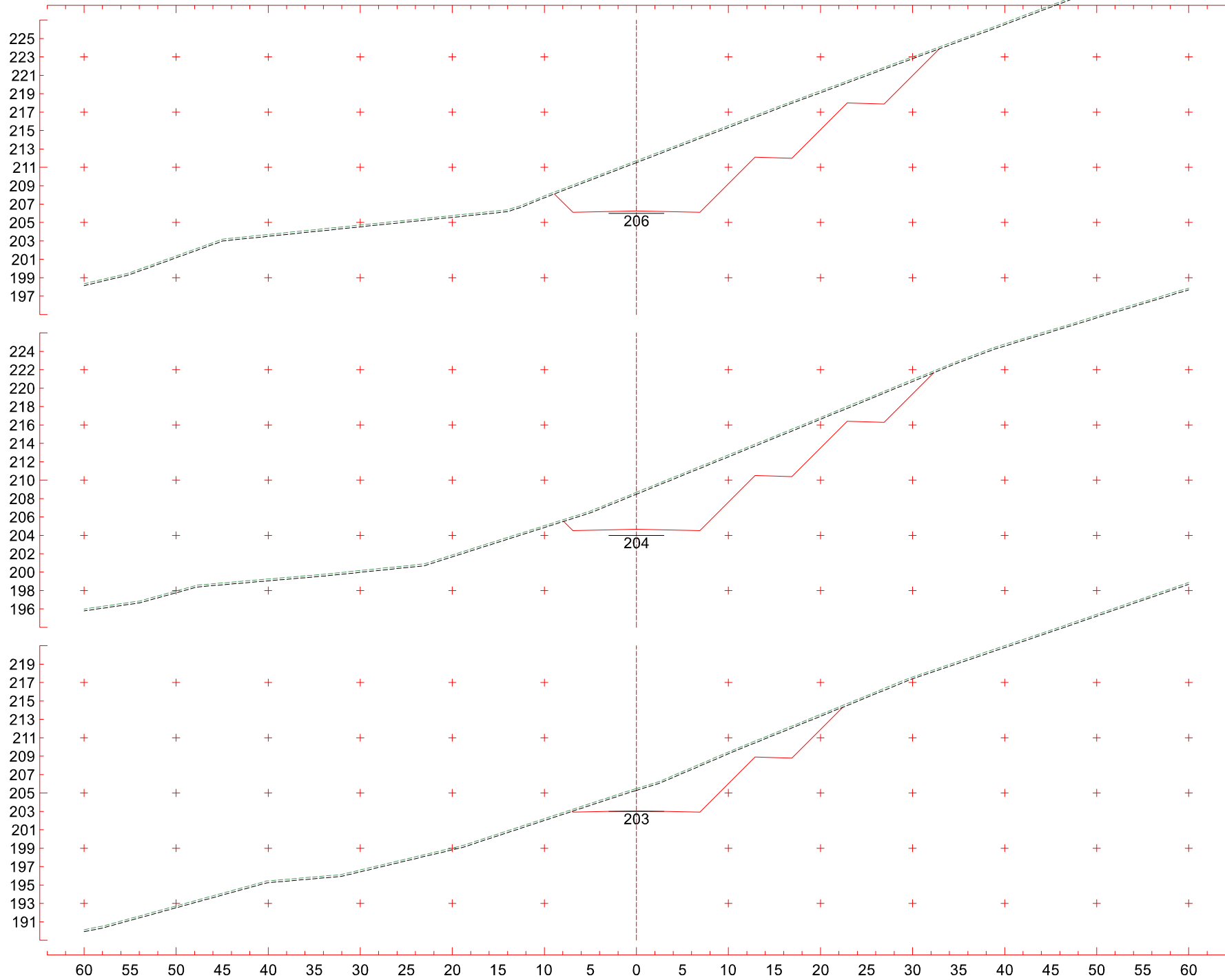


**10+720**  
CT 202,175 m  
CP 201,463 m

**10+700**  
CT 195,920 m  
CP 199,868 m

**10+680**  
CT 185,999 m  
CP 198,272 m

**Eixo1**  
Escala 1:400



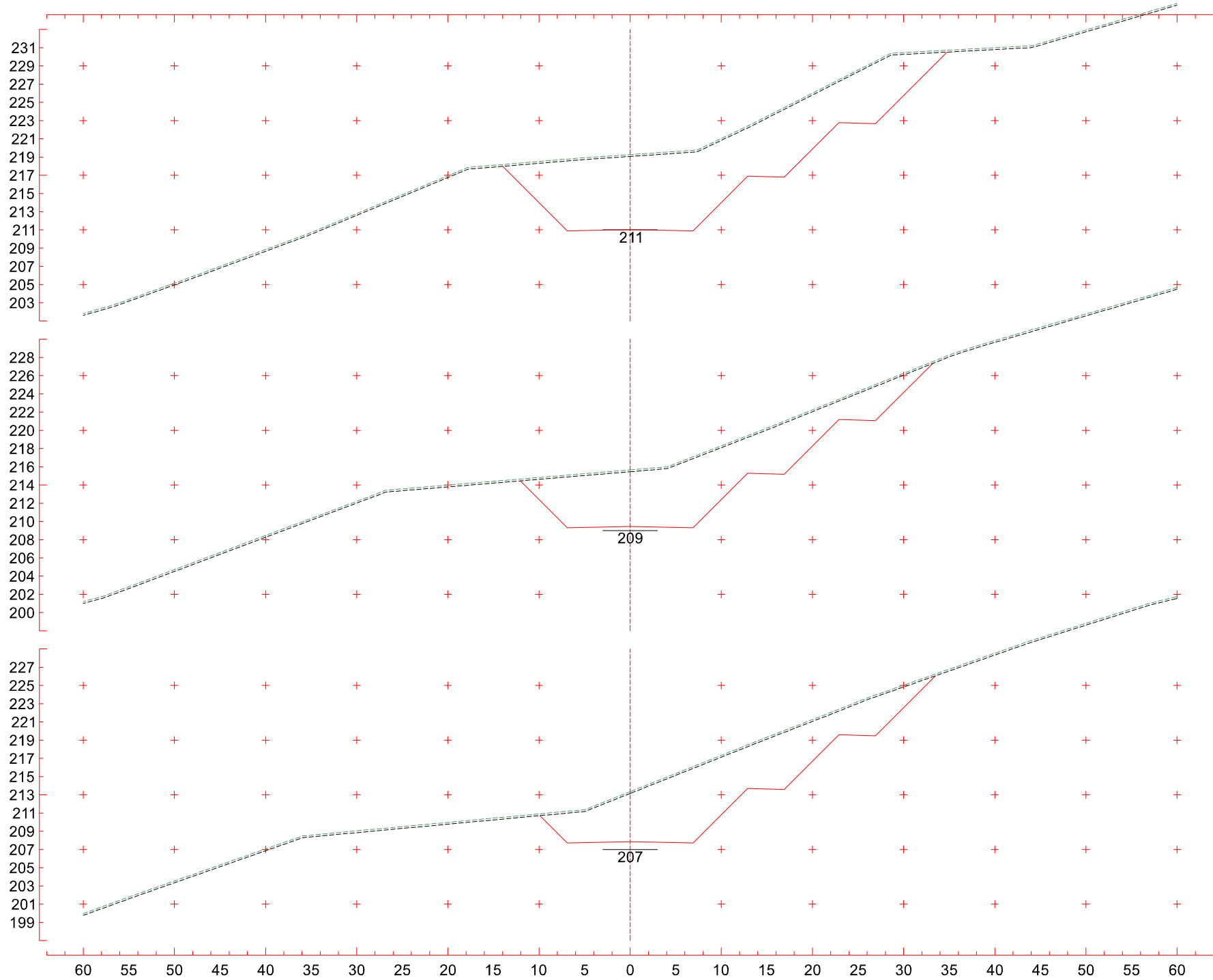
**10+780**  
CT 211,713 m  
CP 206,249 m

**10+760**  
CT 208,676 m  
CP 204,653 m

**10+740**  
CT 205,479 m  
CP 203,058 m

**Eixo1**  
Escala 1:400



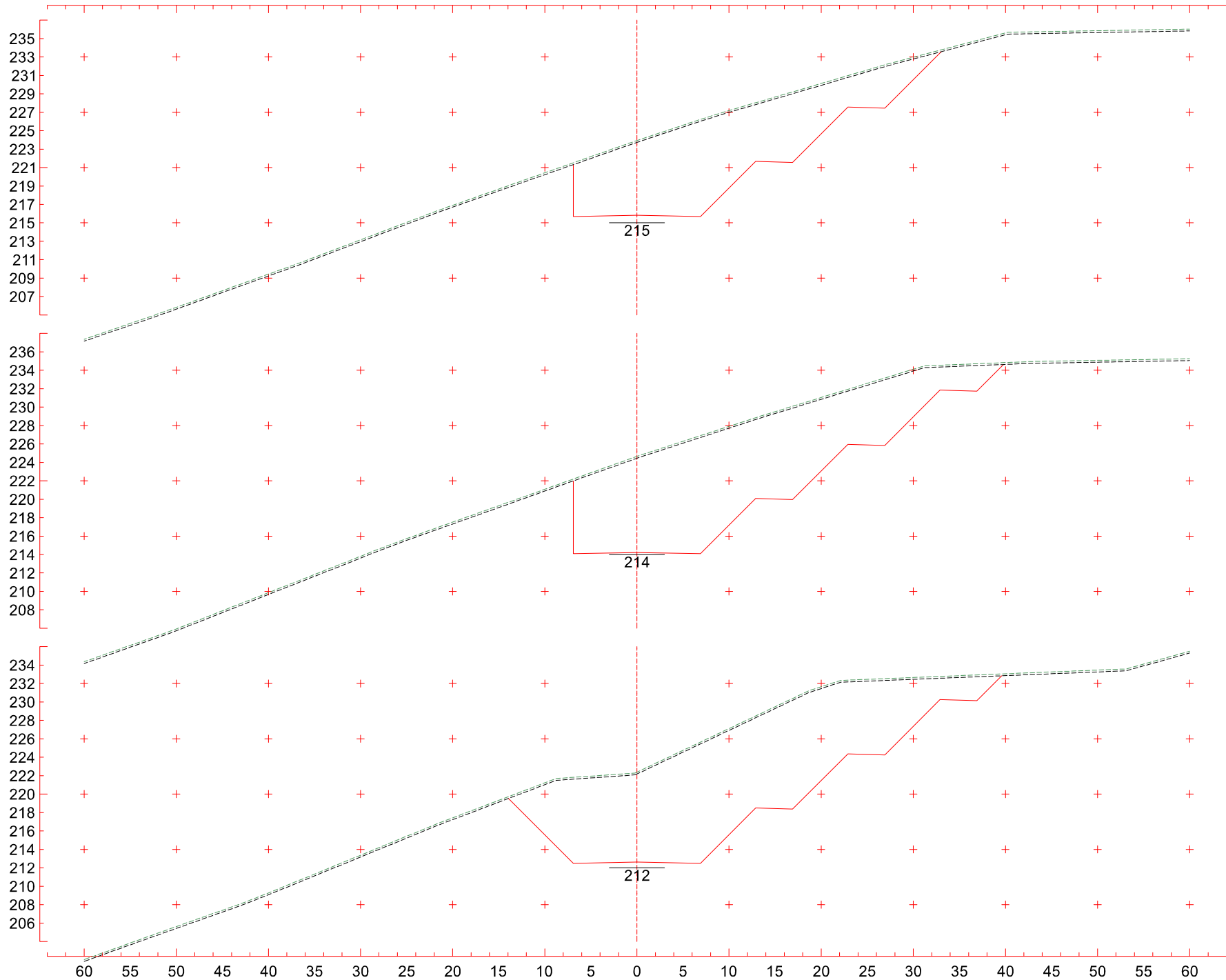


**10+840**  
CT 219,263 m  
CP 211,034 m

**10+820**  
CT 215,658 m  
CP 209,439 m

**10+800**  
CT 213,348 m  
CP 207,844 m

**Eixo1**  
Escala 1:400



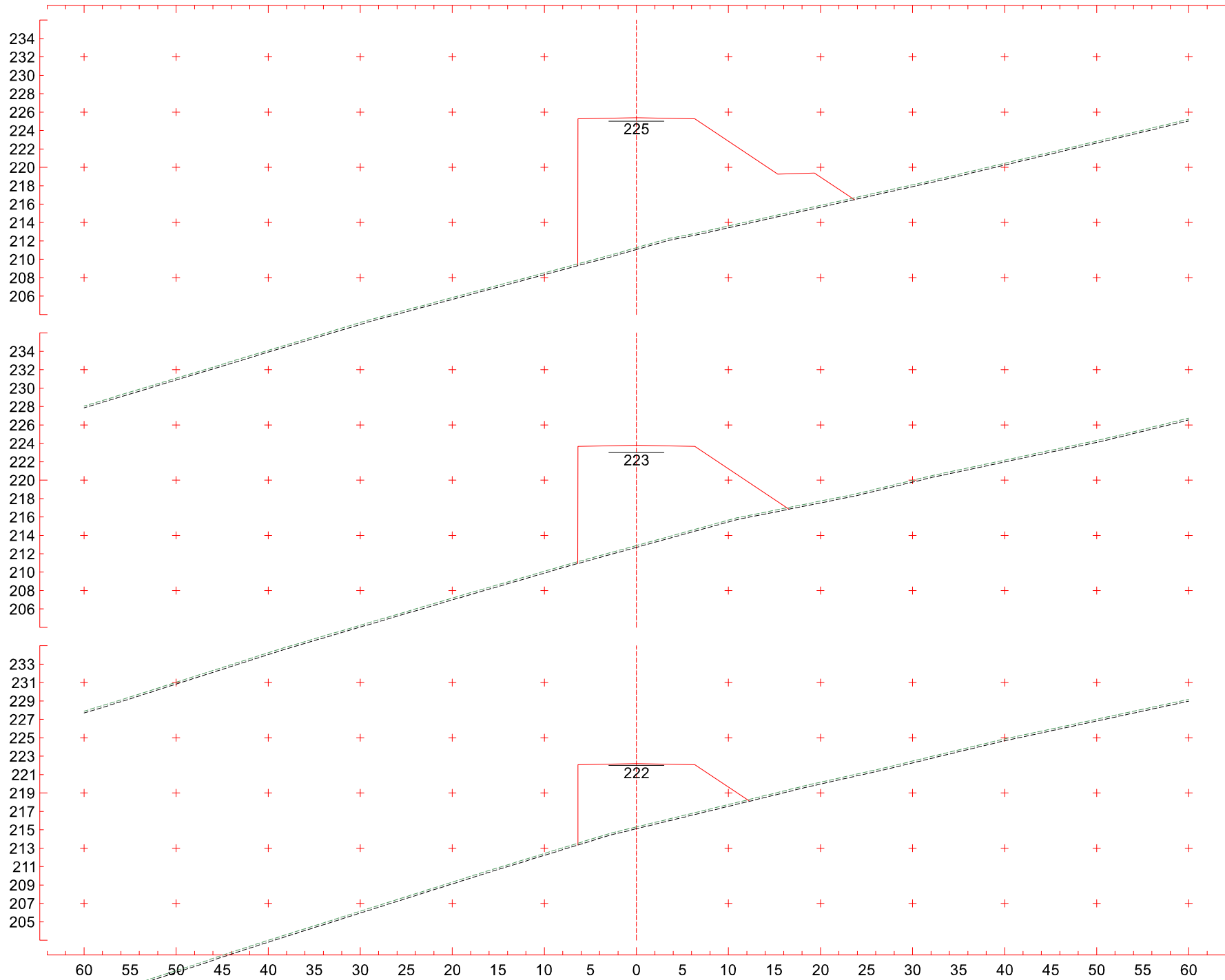
**10+900**  
CT 223,927 m  
CP 215,820 m

**10+880**  
CT 224,655 m  
CP 214,225 m

**10+860**  
CT 222,377 m  
CP 212,629 m

**Eixo1**  
Escala 1:400



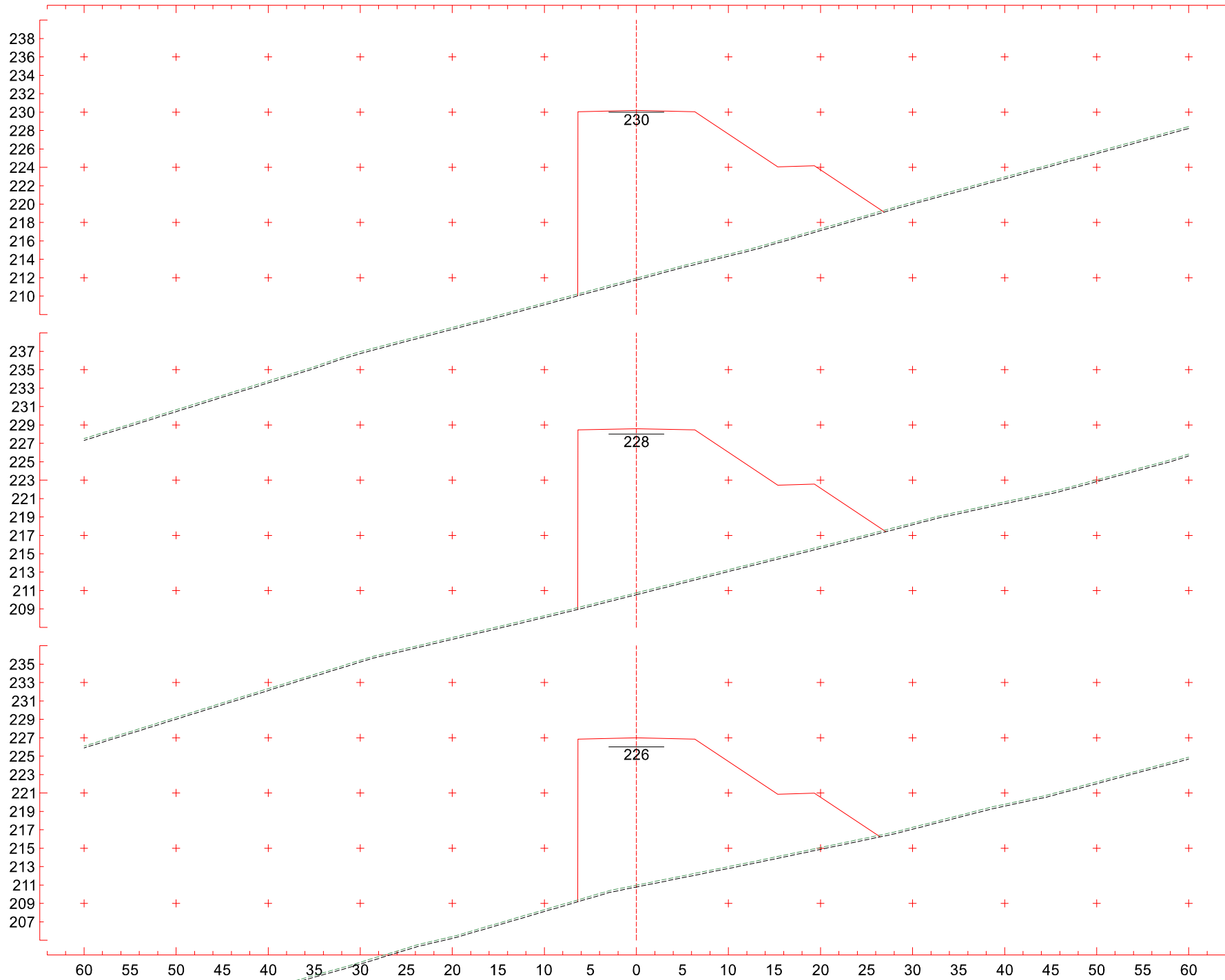


**11+020**  
CT 211,265 m  
CP 225,391 m

**11+000**  
CT 212,894 m  
CP 223,796 m

**10+980**  
CT 215,312 m  
CP 222,201 m

**Eixo1**  
Escala 1:400

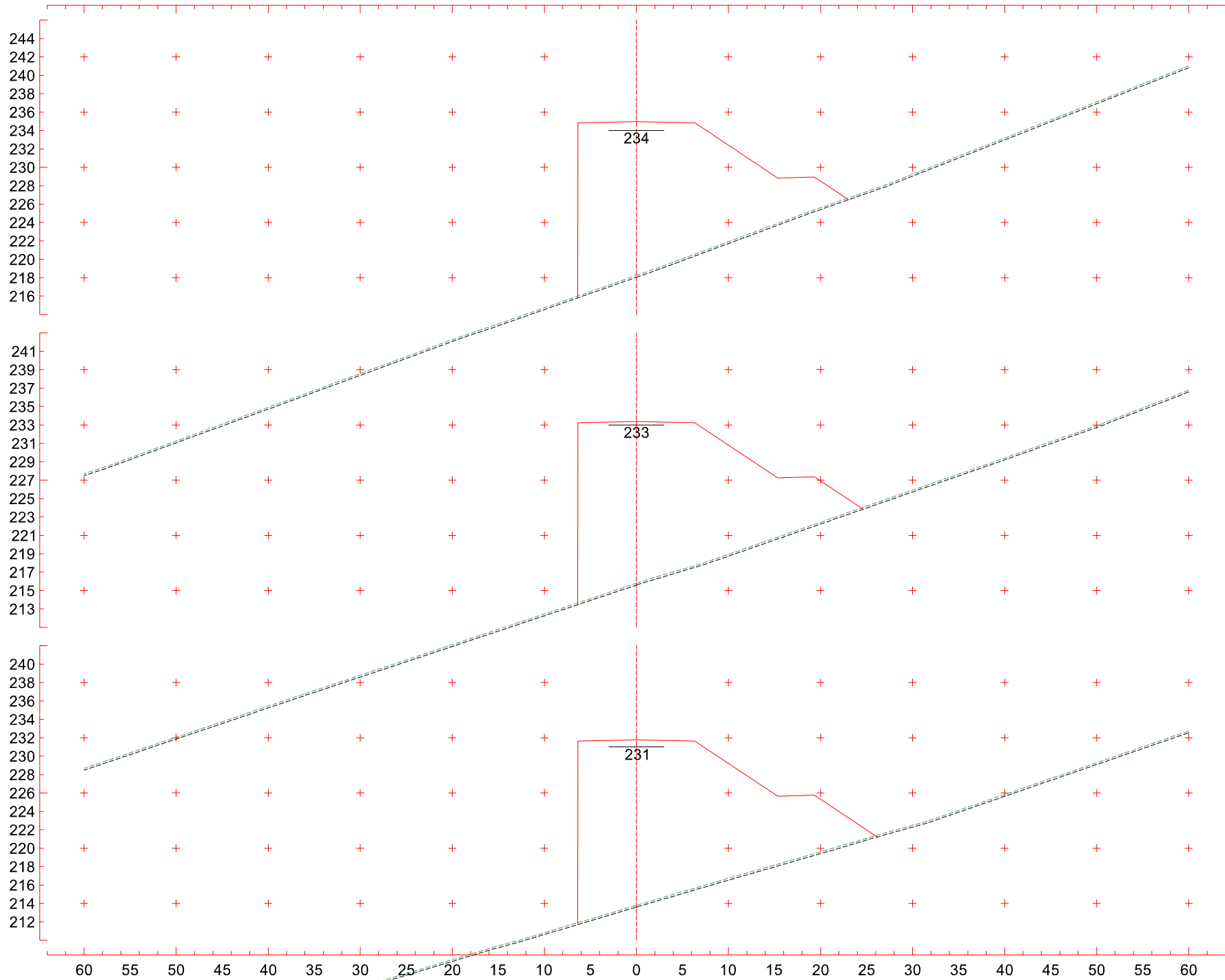


**11+080**  
CT 211,953 m  
CP 230,177 m

**11+060**  
CT 210,748 m  
CP 228,582 m

**11+040**  
CT 210,979 m  
CP 226,986 m

**Eixo1**  
Escala 1:400

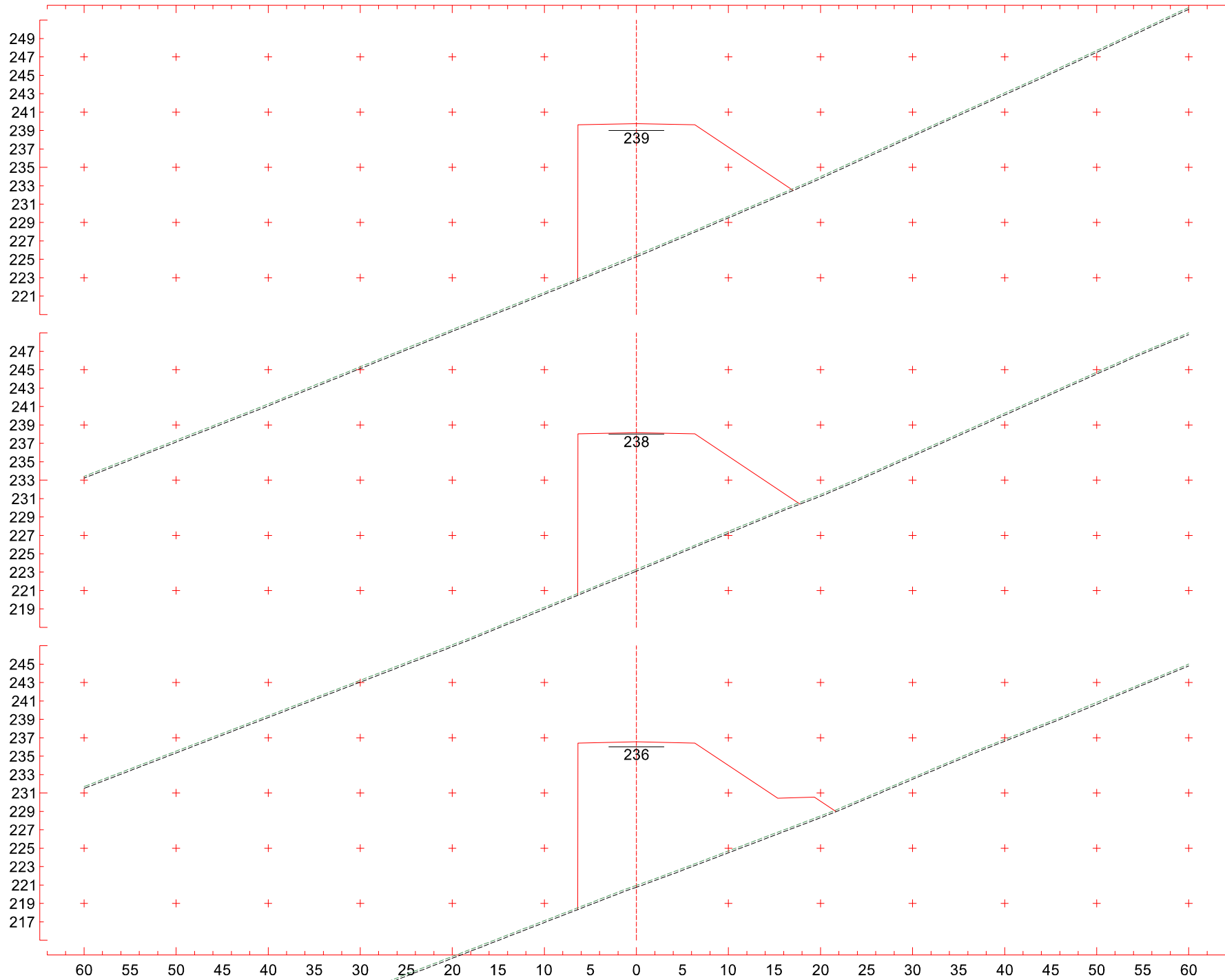


**11+140**  
CT 218,251 m  
CP 234,963 m

**11+120**  
CT 215,787 m  
CP 233,367 m

**11+100**  
CT 213,786 m  
CP 231,772 m

**Eixo1**  
Escala 1:400

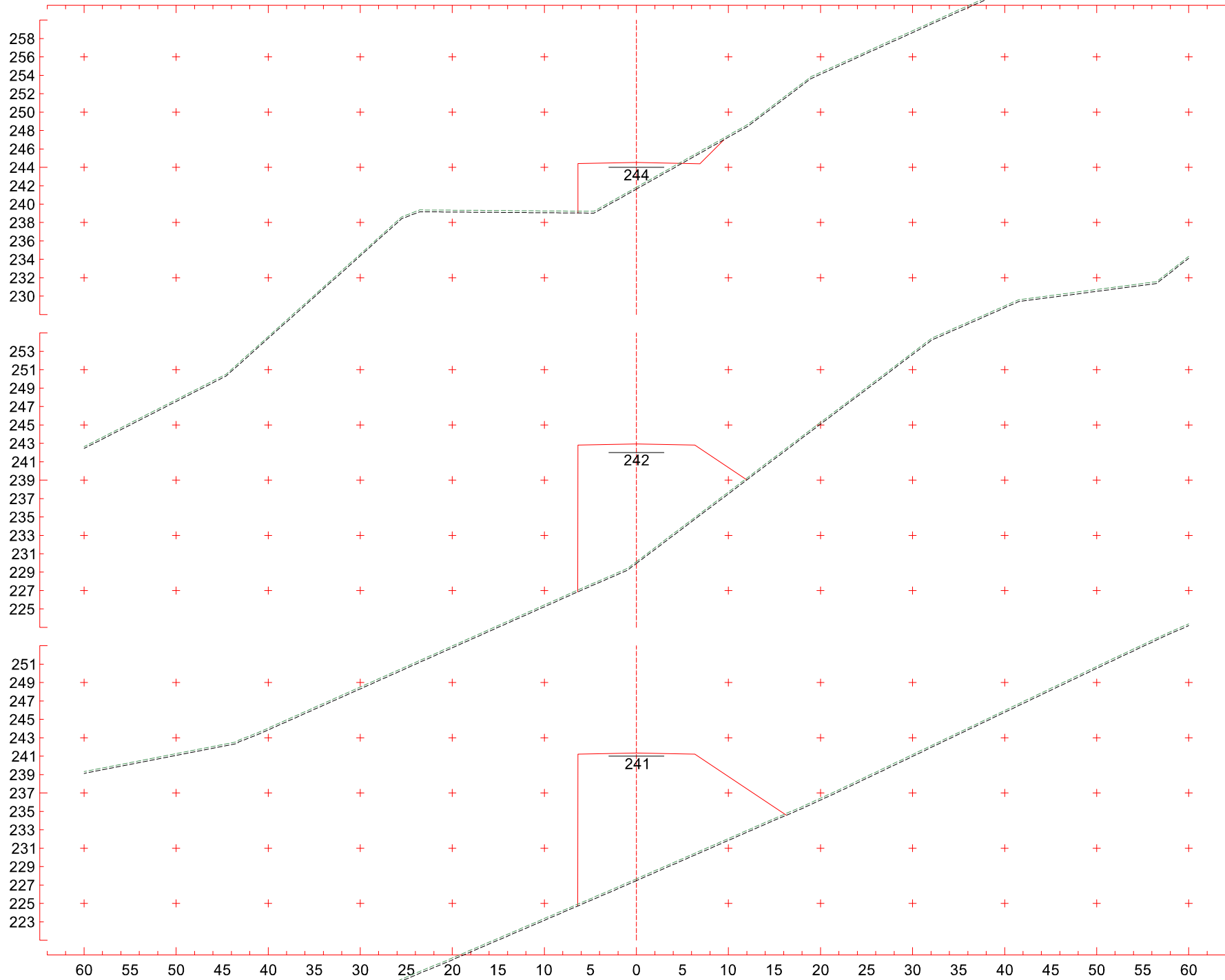


**11+200**  
CT 225,481 m  
CP 239,748 m

**11+180**  
CT 223,308 m  
CP 238,153 m

**11+160**  
CT 220,961 m  
CP 236,558 m

**Eixo 1**  
Escala 1:400



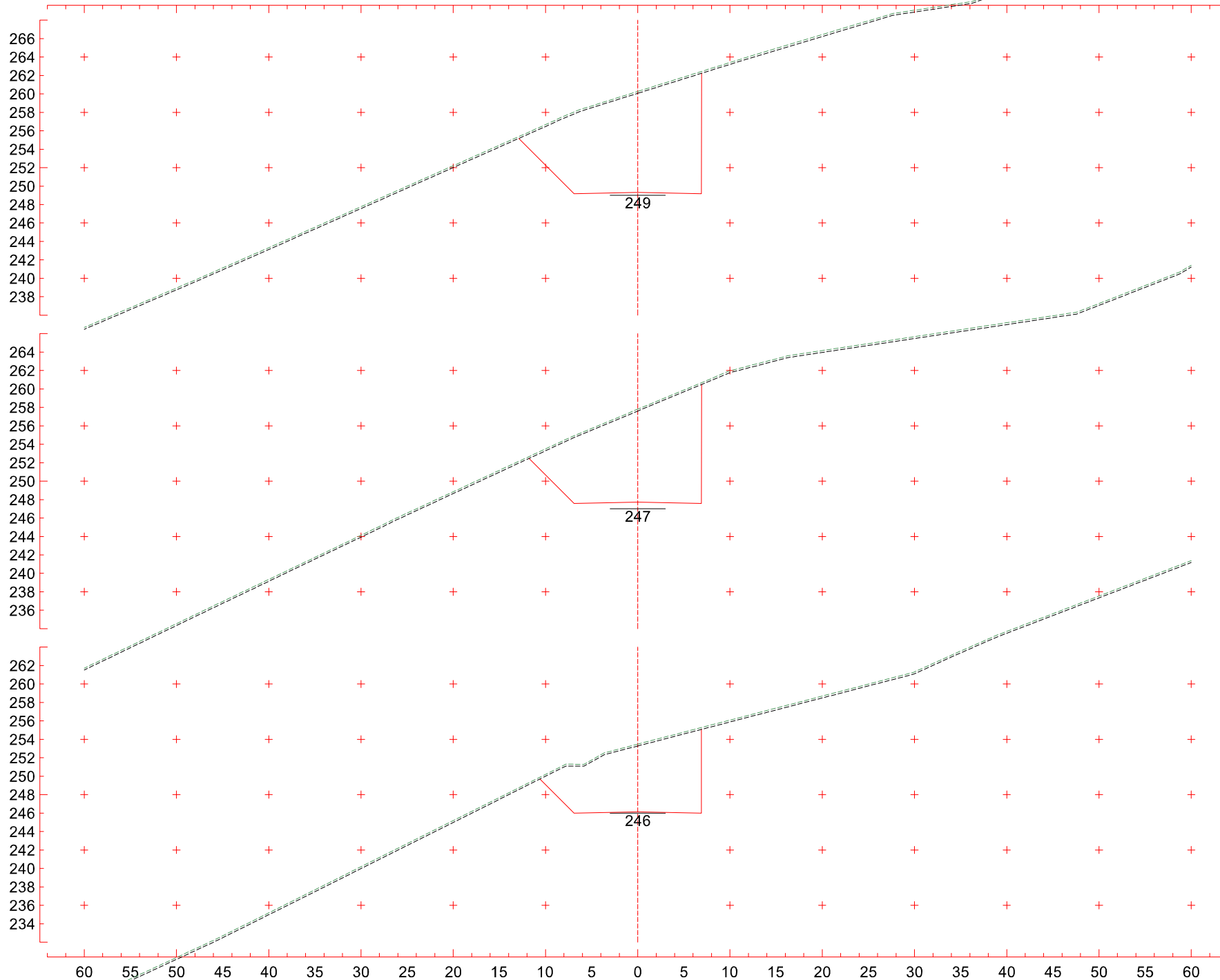
**11+260**  
CT 241,831 m  
CP 244,534 m

**11+240**  
CT 230,146 m  
CP 242,939 m

**11+220**  
CT 227,671 m  
CP 241,343 m

**Eixo1**  
Escala 1:400





**11+320**

CT 260,267 m  
CP 249,320 m

**11+300**

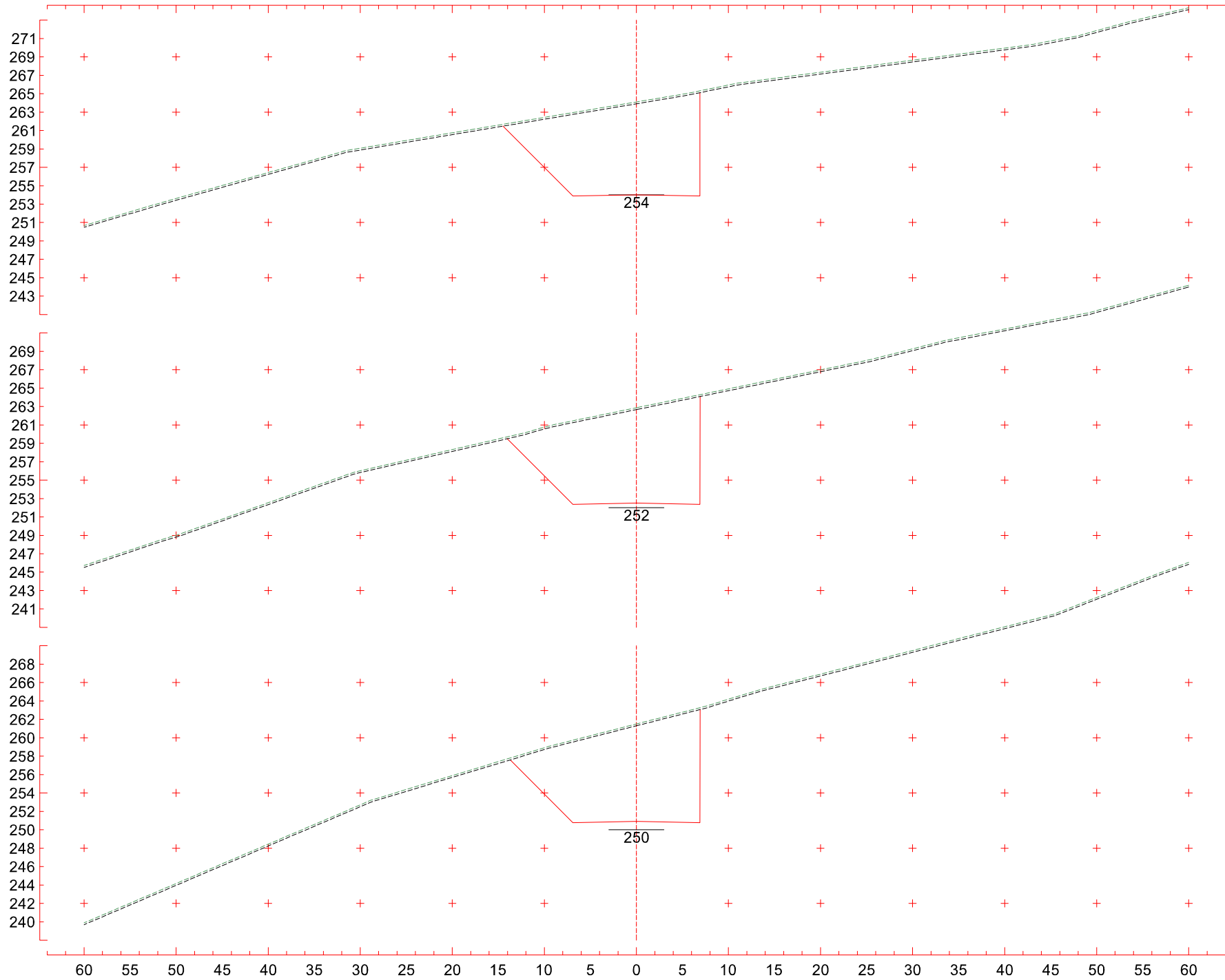
CT 257,805 m  
CP 247,724 m

**11+280**

CT 253,479 m  
CP 246,129 m

**Eixo1**

Escala 1:400

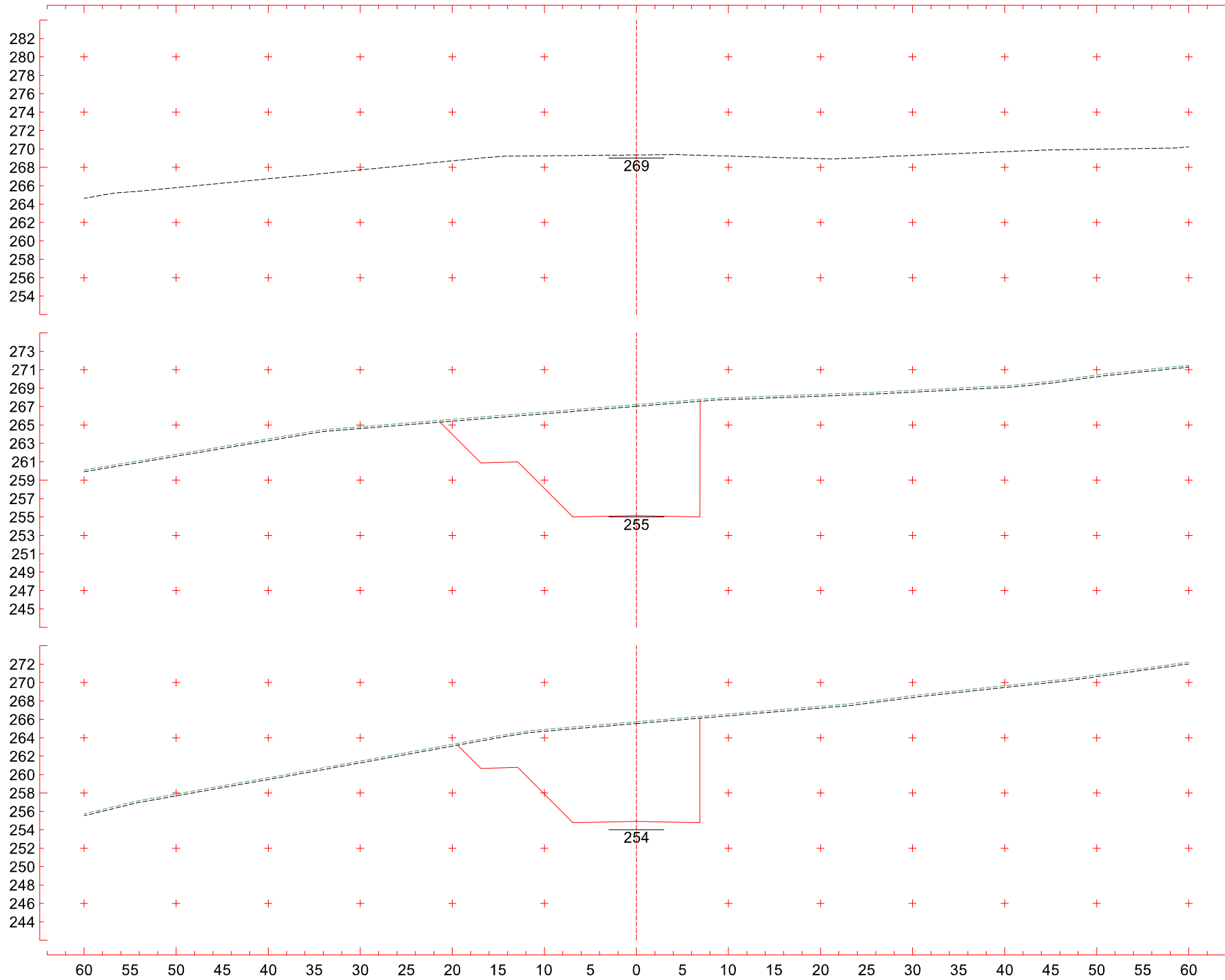


**11+380**  
CT 264,104 m  
CP 254,013 m

**11+360**  
CT 262,869 m  
CP 252,510 m

**11+340**  
CT 261,500 m  
CP 250,915 m

**Eixo1**  
Escala 1:400



11+440  
CT 269,342 m

11+420  
CT 267,218 m  
CP 255,140 m

11+400  
CT 265,748 m  
CP 254,916 m

Eixo 1  
Escala 1:400

## **PROJETO DE TERRAPLENAGEM**

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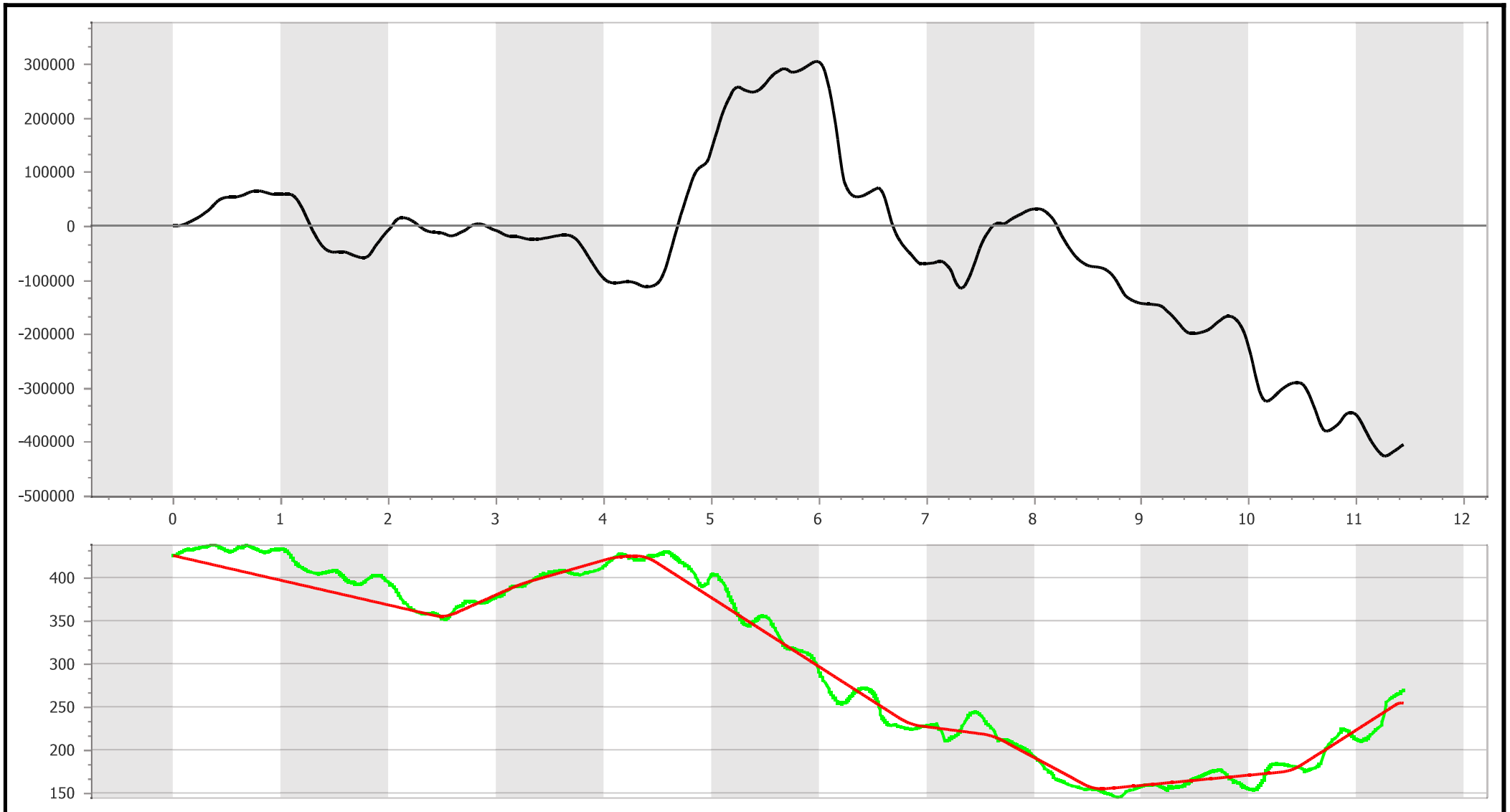
### 3.1 Diagrama de Massa

**DIAGRAMA DE MASSAS (BR CKNER)**

Rodovia: Grupo de Eixos 1  
 Trecho: Eixo1  
 Segmento: km: 0+000,00 ao km: 11+448,04

Homogeneizaçõ:  
 Aterro Camada Superior: 1,000  
 Aterro Camada Inferior : 1,000

Corte 1ª Categoria: 1,300  
 Corte 2ª Categoria: 1,000  
 Corte 3ª Categoria: 0,800





Rodovia: Grupo de Eixos 1 Homogeneidade: Corte 1ª Categoria: 1,300 Vo. transp. : 1639162,40m³  
 Trecho: Eixo1 Aterro Camada Superior: 1,000 Corte 2ª Categoria: 1,000 Momento tot.: 1675058,86m³.m  
 Segmento: km: 0+000,00 ao km: 11+448,04 Aterro Camada Inferior : 1,000 Corte 3ª Categoria: 0,800 DMT : 1,022km

ORIGEM							DESTINO							TRANSPORTE			OBSERVAÇÕES				
IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUMES (m³)			IDENTIFICAÇÃO			LOCALIZAÇÃO					VOLUME	DIST. TRANSP.	VOL. COMP.	MOM. DE TRANSP.
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO			DM (km)	GEO.	OMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO			DM (km)	GEO.					
ID	TIPO	OMO.	INÍCIO	CM	FIM	(km)	TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM	FIM	(km)	TOTAL		(km)	(m³)	(m³.km)	
Empr	sti	mo	C1ª	1,30	10+400	10+500	10+800	0,320	530000,00	407692,31											
									103441,54	A 014	AI	8+010	8+670	9+510		202706,00	2,150	134474,00	289119,100		
									29506,00	A 014	AS	7+990	8+730	9+510		29506,00	2,090	38357,80	80167,802		
									146167,00	A 015	AI	9+810	10+020	10+170		146167,00	0,800	190017,10	152013,680		
									11854,00	A 015	AS	9+810	10+000	10+170		11854,00	0,820	15410,20	12636,364		
									82536,00	A 016	AI	10+450	10+600	10+730		82536,00	0,420	107296,80	45064,656		
									7926,00	A 016	AS	10+450	10+590	10+730		7926,00	0,410	10303,80	4224,558		
									26261,77	A 017	AI	10+950	11+100	11+270		77033,00	0,920	34140,30	31409,076		
C 001	C3ª	0,80	0+010	0+290	0+530		42758,00	53447,50													
									119,00	A 001	AI	0+000	0+010	0+030		119,00	0,280	95,20	26,656		
									201,00	A 001	AS	0+000	0+010	0+050		201,00	0,280	160,80	45,024		
									40,00	A 002	AS	0+510	0+530	0+550		40,00	0,240	32,00	7,680		
									4794,00	A 003	AI	0+790	0+860	0+970		4794,00	0,570	3835,20	2186,064		
									2000,00	A 003	AS	0+770	0+870	0+990		2000,00	0,580	1600,00	928,000		
									46293,50	A 004	AI	1+070	1+300	1+770		106747,00	1,010	37034,80	37405,148		
C 002	C1ª	1,30	0+550	0+670	0+790		15298,00	11767,69													
									11767,69	A 004	AI	1+070	1+300	1+770			0,630	15298,00	9637,740		
C 003	C1ª	1,30	0+950	1+020	1+070		922,00	709,23													
									709,23	A 004	AI	1+070	1+300	1+770			0,280	922,00	258,160		
C 004	C1ª	1,30	1+470	1+520	1+590		1975,00	1519,23													
									1519,23	A 004	AI	1+070	1+300	1+770			0,220	1975,00	434,500		
C 005	C1ª	1,30	1+750	1+940	2+130		97370,00	74900,00													
									46457,35	A 004	AI	1+070	1+300	1+770			0,640	60394,55	38652,512		
									13148,00	A 004	AS	1+070	1+350	1+770		13148,00	0,590	17092,40	10084,516		
									15294,65	A 005	AI	2+130	2+320	2+590		28004,00	0,380	19883,05	7555,559		
C 006	C1ª	1,30	2+430	2+440	2+450		6,00	4,62													
									4,62	A 005	AI	2+130	2+320	2+590			0,120	6,00	0,720		
C 007	C1ª	1,30	2+570	2+710	2+870		29629,00	22791,54													
									12704,73	A 005	AI	2+130	2+320	2+590			0,390	16516,15	6441,299		
									6195,00	A 005	AS	2+130	2+340	2+590		6195,00	0,370	8053,50	2979,795		
									3891,81	A 006	AI	2+830	3+030	3+350		23407,00	0,320	5059,35	1618,992		
C 008	C1ª	1,30	3+090	3+130	3+210		1234,00	949,23													
									949,23	A 006	AI	2+830	3+030	3+350			0,100	1234,00	123,400		
C 009	C1ª	1,30	3+310	3+490	3+650		11063,00	8510,00													
									8510,00	A 006	AI	2+830	3+030	3+350			0,460	11063,00	5088,980		
C 010	C1ª	1,30	4+110	4+170	4+230		3764,00	2895,38													
									2895,38	A 006	AI	2+830	3+030	3+350			1,140	3764,00	4290,960		
C 011	C1ª	1,30	4+410	4+840	5+290		483474,00	371903,08													
									7160,58	A 006	AI	2+830	3+030	3+350			1,810	9308,75	16848,838		
									4,00	A 006	AI	3+390	3+400	3+410			1,440	5,20	7,488		
									7057,00	A 006	AS	2+810	3+060	3+410		7057,00	1,780	9174,10	16329,898		
									79220,00	A 007	AI	3+650	3+870	4+110		79220,00	0,970	102986,00	99896,420		



Rodovia: Grupo de Eixos 1

Homogeneização:

Corte 1ª Categoria: 1,300

Vo. transp. : 1639162,40m³

Trecho: Eixo1

Aterro Camada Superior: 1,000

Corte 2ª Categoria: 1,000

Momento tot.: 1675058,86m³.m

Segmento: km: 0+000,00 ao km: 11+448,04

Aterro Camada Inferior : 1,000

Corte 3ª Categoria: 0,800

DMT : 1,022km

ORIGEM						DESTINO						TRANSPORTE			OBSERVAÇÕES				
IDENTIFICAÇÃO			LOCALIZAÇÃO			VOLUMES (m³)			IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUME	DIST. TRANSP.	VOL. COMP.	MOM. DE TRANSP.
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO		DM	GEO.	OMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO		DM	GEO.					
ID	TIPO	OMO.	INÍCIO	CM	FIM	(km)	TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM	FIM		(km)	TOTAL	(km)	(m³)
								10058,00		A 007	AS	3+630	3+870	4+110		10058,00	0,970	13075,40	12683,138
								7996,00		A 008	AI	4+230	4+320	4+410		7996,00	0,520	10394,80	5405,296
								2230,00		A 008	AS	4+230	4+310	4+410		2230,00	0,530	2899,00	1536,470
								8840,00		A 009	AI	5+250	5+300	5+410		8840,00	0,460	11492,00	5286,320
								1574,00		A 009	AS	5+250	5+300	5+410		1574,00	0,460	2046,20	941,252
								5902,00		A 010	AI	5+650	5+720	5+770		5902,00	0,880	7672,60	6751,888
								1523,00		A 010	AS	5+650	5+720	5+790		1523,00	0,880	1979,90	1742,312
								239574,00		A 011	AI	5+990	6+160	6+390		239574,00	1,320	311446,20	411108,984
								764,50		A 011	AS	5+970	6+140	6+390		12410,00	1,300	993,85	1292,005
C 012	C1ª	1,30	5+350	5+640	5+990		84478,00	64983,08											
								11645,50		A 011	AS	5+970	6+140	6+390			0,500	15139,15	7569,575
								53337,58		A 012	AI	6+550	6+850	7+330		178763,00	1,210	69338,85	83900,009
C 013	C1ª	1,30	6+330	6+470	6+570		23626,00	18173,85											
								18173,85		A 012	AI	6+550	6+850	7+330			0,380	23626,00	8977,880
C 014	C1ª	1,30	6+930	7+070	7+150		11223,00	8633,08											
								8633,08		A 012	AI	6+550	6+850	7+330			0,220	11223,00	2469,060
C 015	C1ª	1,30	7+310	7+770	8+070		48438,00	37260,00											
								37260,00		A 012	AI	6+550	6+850	7+330			0,920	48438,00	44562,960
C 015	C2ª	1,00	7+310	7+480	7+670		9697,00	9697,00											
								9697,00		A 012	AI	6+550	6+850	7+330			0,630	9697,00	6109,110
C 015	C3ª	0,80	7+310	7+470	7+650		84118,00	105147,50											
								51661,50		A 012	AI	6+550	6+850	7+330			0,620	41329,20	25624,104
								18285,00		A 012	AS	6+550	6+880	7+330		18285,00	0,590	14628,00	8630,520
								2418,00		A 013	AI	7+670	7+710	7+750		2418,00	0,240	1934,40	464,256
								1077,00		A 013	AS	7+670	7+720	7+850		1077,00	0,250	861,60	215,400
								31706,00		A 014	AI	8+010	8+670	9+510			1,200	25364,80	30437,760
C 016	C1ª	1,30	9+010	9+070	9+130		162,00	124,62											
								124,62		A 014	AI	8+010	8+670	9+510			0,400	162,00	64,800
C 017	C1ª	1,30	9+450	9+670	9+830		42392,00	32609,23											
								32609,23		A 014	AI	8+010	8+670	9+510			1,000	42392,00	42392,000
C 018	C1ª	1,30	10+150	10+280	10+470		45272,00	34824,62											
								34824,62		A 014	AI	8+010	8+670	9+510			1,610	45272,00	72887,920
C 019	C1ª	1,30	10+710	10+840	10+950		45641,00	35108,46											
								35108,46		A 017	AI	10+950	11+100	11+270			0,260	45641,00	11866,660
C 020	C1ª	1,30	11+250	11+350	11+430		28214,00	21703,08											
								15662,77		A 017	AI	10+950	11+100	11+270			0,250	20361,60	5090,400
								4816,00		A 017	AS	10+930	11+100	11+270		4816,00	0,250	6260,80	1565,200

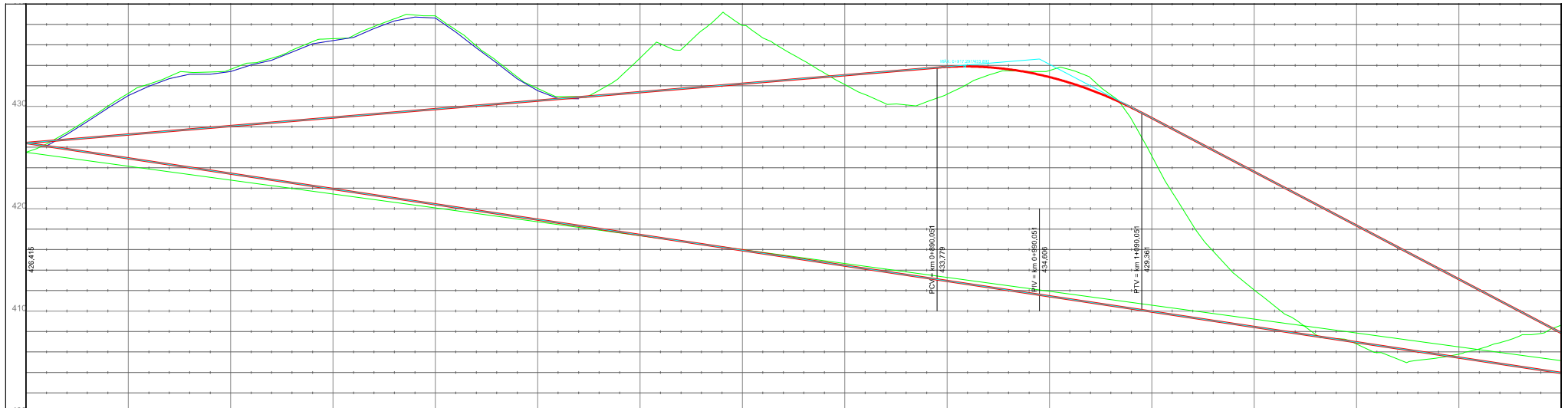
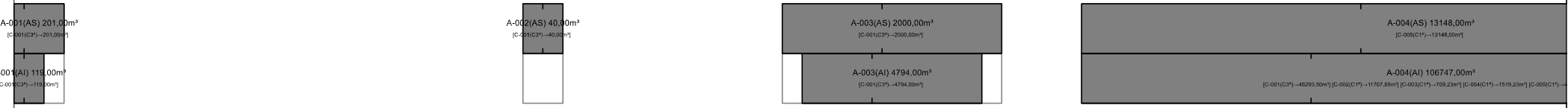
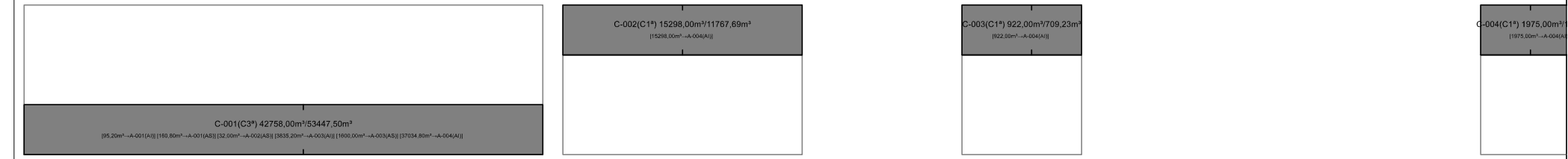
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## QUADRO DE ORIENTAÇÃO DA TERRAPLENAGEM

Rodovia: Grupo de Eixos 1	Homogeneização:	Corte 1ª Categoria: 1,300	Vo. transp. : 1639162,40m³
Trecho: Eixo1	Aterro Camada Superior: 1,000	Corte 2ª Categoria: 1,000	Momento tot.: 1675058,86m³.m
Segmento: km: 0+000,00 ao km: 11+448,04	Aterro Camada Inferior : 1,000	Corte 3ª Categoria: 0,800	DMT : 1,022km

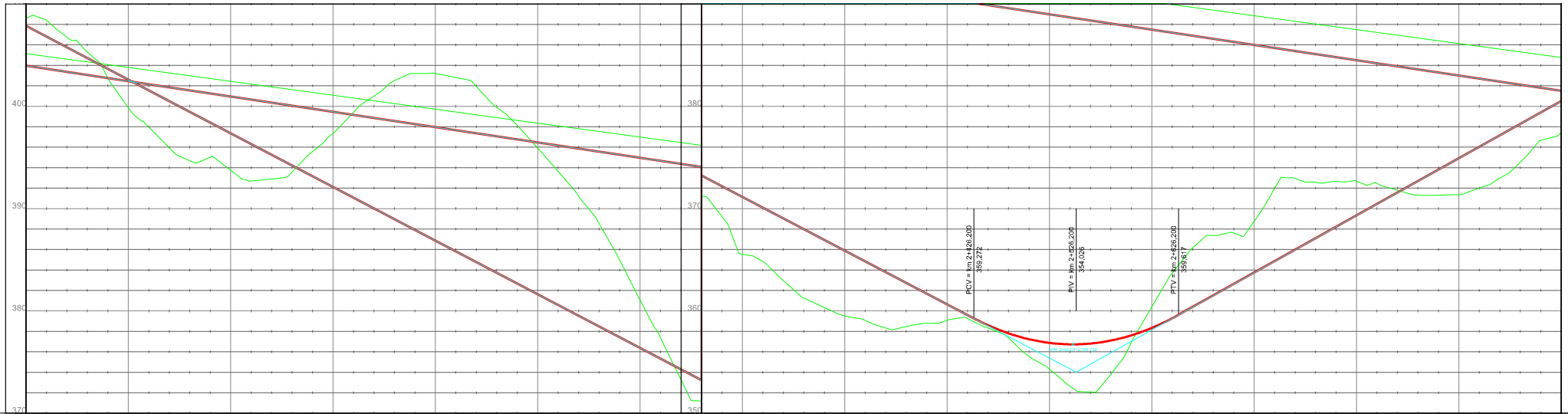
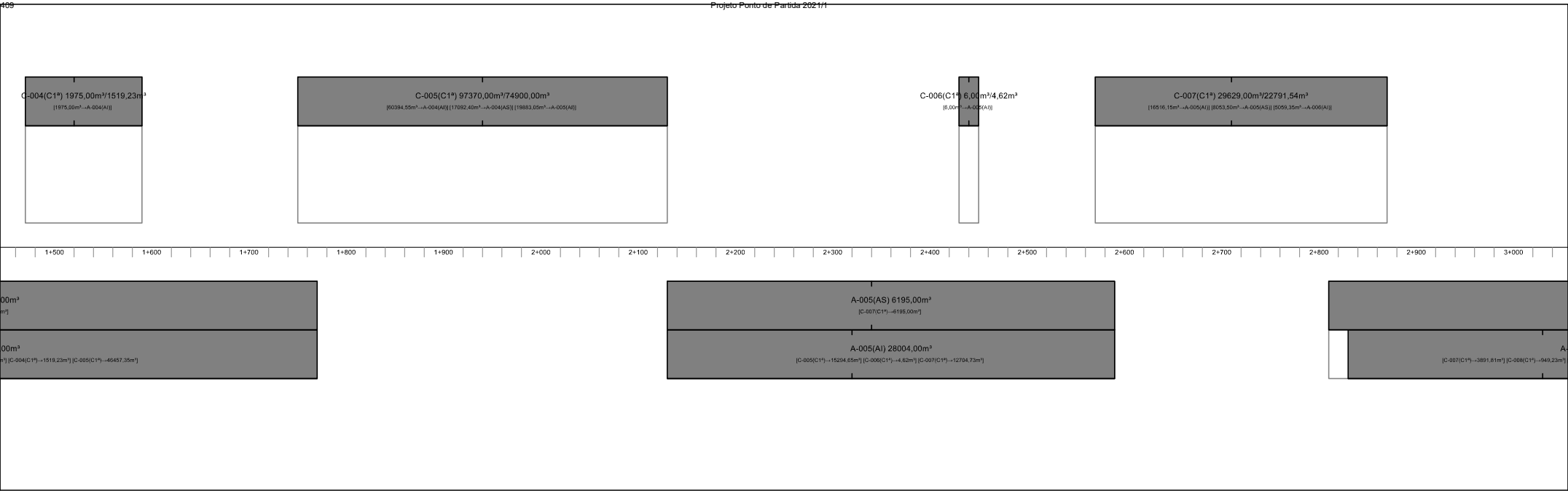
ORIGEM						DESTINO						TRANSPORTE			OBSERVAÇÕES				
IDENTIFICAÇÃO			LOCALIZAÇÃO			VOLUMES (m³)			IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUME	DIST. TRANSP.	VOL. COMP.	MOM. DE TRANSP.
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO		DM	GEO.	OMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO		DM	GEO.		(km)	(m)	(m km)	
ID	TIPO	OMO.	INÍCIO	CM	FIM	(km)	TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM	FIM		(km)	TOTAL	(km)	(m)

### 3.3 Esquema Linear de Distribuição dos Materiais



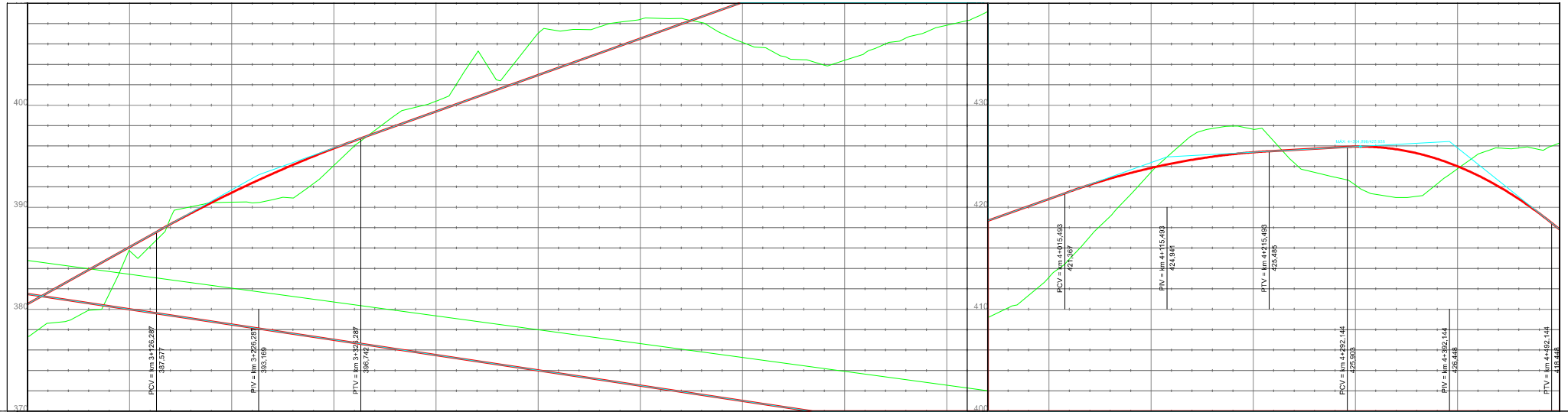
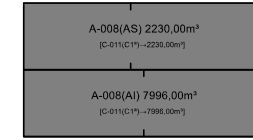
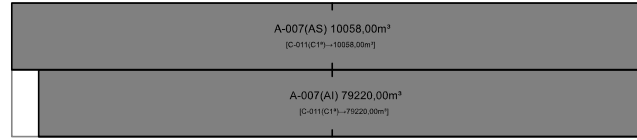
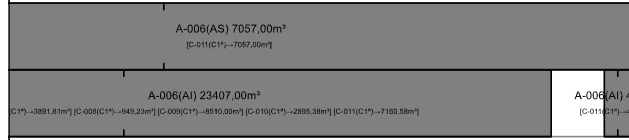
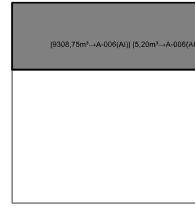
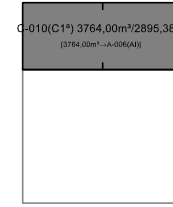
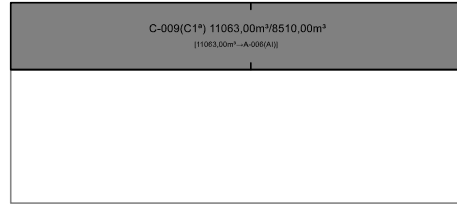
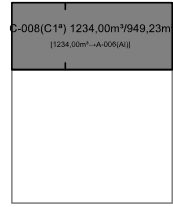
km	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	1+500
ALT (m)	425,516	426,581	427,647	428,712	429,778	430,843	431,908	432,973	434,038	435,103	436,168	437,233	438,298	439,363	440,428	441,493
TERRENO PROJEITO	425,516	426,581	427,647	428,712	429,778	430,843	431,908	432,973	434,038	435,103	436,168	437,233	438,298	439,363	440,428	441,493

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN		
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 0-1500 Data: 11/2021		
Escala:	1:2000	PROJ. TERRAPLENAGEM	Código: PT-01



km	ALT.	TERRENO	PROJETO
1+500	408,612	407,686	
	408,413	406,807	
	406,745	405,759	
	405,302	404,709	
	402,709	403,660	
	399,659	402,611	
	397,578	401,562	
	395,545	400,513	
	394,671	399,463	
	395,016	398,414	
	393,748	397,365	
	392,687	396,316	
	392,680	395,267	
	393,557	394,218	
	395,579	393,169	
	397,545	392,120	
	399,405	391,070	
	400,994	390,021	
	402,465	388,972	
	403,197	387,923	
	403,202	386,874	
	402,602	385,825	
	401,542	384,776	
	399,894	383,727	
	398,112	382,677	
	395,917	381,628	
	393,644	380,579	
	391,209	379,530	
	388,545	378,481	
	384,869	377,432	
	381,070	376,383	
	377,597	375,334	
	373,274	374,284	
	371,197	373,235	
	369,218	372,186	
	365,538	371,137	
	364,629	370,088	
	362,684	369,039	
	361,453	367,990	
	360,336	366,941	
	359,512	365,892	
	359,068	364,842	
	358,331	363,793	
	358,723	362,744	
	358,780	361,695	
	359,078	360,646	
	359,251	359,597	
	358,324	358,549	
	357,385	357,500	
	355,552	357,234	
	354,302	356,876	
	352,547	356,735	
	352,063	356,811	
	353,609	357,103	
	356,021	357,612	
	360,392	358,339	
	363,686	359,281	
	366,171	360,389	
	367,376	361,507	
	367,613	362,625	
	368,762	363,743	
	371,066	364,862	
	372,537	365,980	
	372,567	367,098	
	372,655	368,216	
	372,661	369,334	
	372,555	370,453	
	371,766	371,571	
	371,300	372,689	
	371,308	373,807	
	371,562	374,925	
	371,991	376,044	
	372,978	377,162	
	374,543	378,280	
	376,686	379,398	
	377,537	380,517	

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 1500-3000 Data: 11/2021	
Escala:	1:2000	Código: PT-02



km	ALT (m)	TERRENO (m)	PROJEITO (m)
3+000	377.837	380.517	377.837
	378.631	381.635	378.631
	378.880	382.753	378.880
	379.884	383.871	379.884
	381.697	384.989	381.697
	385.718	386.108	385.718
	386.166	387.226	387.226
	388.659	388.335	388.659
	390.046	389.405	390.046
	390.456	390.435	390.456
	390.622	391.425	390.622
	390.418	392.374	390.418
	390.742	393.283	390.742
	390.984	394.151	390.984
	392.310	394.980	392.310
	394.101	395.768	394.101
	396.016	396.515	396.016
	397.518	397.232	397.518
	397.946	397.946	397.946
	399.796	398.661	399.796
	400.386	399.375	400.386
	402.066	400.060	402.066
	405.125	400.885	405.125
	402.658	401.519	402.658
	404.535	402.234	404.535
	407.632	402.949	407.632
	407.291	403.663	407.291
	407.414	404.378	407.414
	407.981	405.092	407.981
	408.132	405.807	408.132
	408.418	406.522	408.418
	408.503	407.236	408.503
	408.609	407.951	408.609
	408.086	408.665	408.086
	407.015	409.380	407.015
	406.154	410.095	406.154
	405.640	410.809	405.640
	404.775	411.524	404.775
	403.920	412.239	403.920
	404.658	412.953	404.658
	404.396	413.668	404.396
	405.115	414.382	405.115
	406.011	415.097	406.011
	406.675	415.812	406.675
	407.180	416.526	407.180
	407.825	417.241	407.825
	408.276	417.955	408.276
	409.166	418.670	409.166
	410.120	419.385	410.120
	411.359	420.099	411.359
	413.139	420.814	413.139
	414.889	421.527	414.889
	417.113	422.198	417.113
	419.696	422.868	419.696
	421.286	423.587	421.286
	423.619	424.275	423.619
	424.643	424.944	424.643
	427.010	425.619	427.010
	427.716	426.289	427.716
	427.628	426.958	427.628
	426.481	427.628	426.481
	424.349	428.299	424.349
	423.420	428.978	423.420
	422.941	429.647	422.941
	422.171	430.316	422.171
	421.260	430.985	421.260
	420.957	431.654	420.957
	421.064	432.323	421.064
	422.290	432.992	422.290
	423.767	433.661	423.767
	425.198	434.330	425.198
	425.901	435.000	425.901
	425.801	435.669	425.801
	425.643	436.338	425.643
	426.297	437.007	426.297

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 3000-4500 Data: 11/2021	
Escala:	1:2000	Código: PT-03
	PROJ. TERRAPLENAGEM	

<p>C-011(C1*) 483474,00m³/371903,08m³</p> <p>68,75m³--A-006(AI) [5,20m³--A-006(AI)] [9174,10m³--A-006(AI)] [102895,00m³--A-007(AI)] [13075,40m³--A-007(AI)] [110364,80m³--A-008(AI)] [2899,00m³--A-008(AI)] [11492,00m³--A-009(AI)] [2046,20m³--A-009(AI)] [7672,60m³--A-010(AI)] [1979,90m³--A-010(AI)] [311448,20m³--A-011(AI)] [993,85m³--A-011(AI)]</p>
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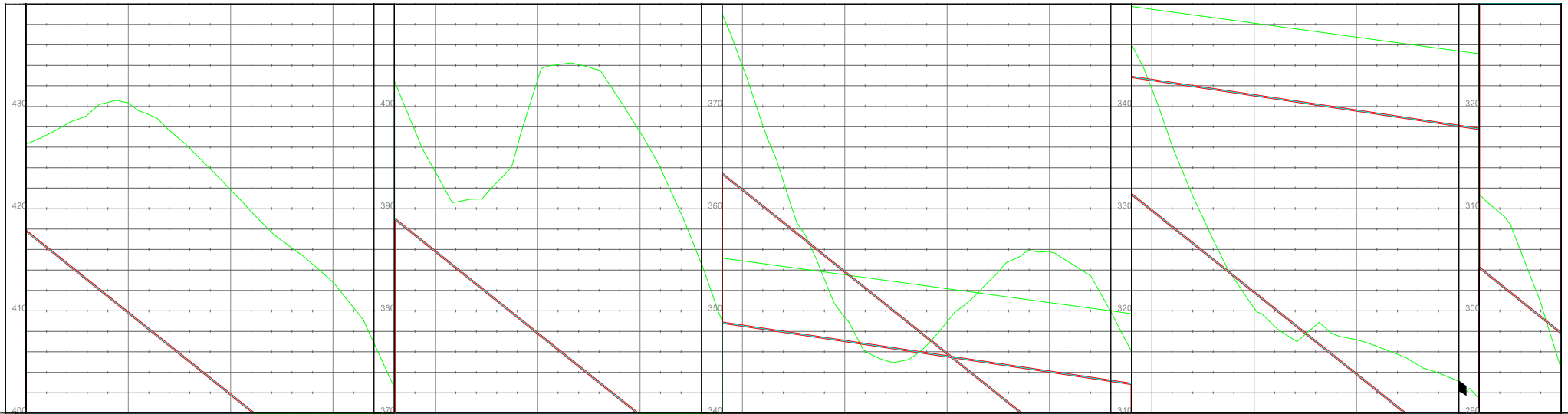
<p>C-012(C1*) 84478,00m³/64983,08m³</p> <p>[15139,15m³--A-011(AI)] [65338,85m³--A-012(AI)]</p>
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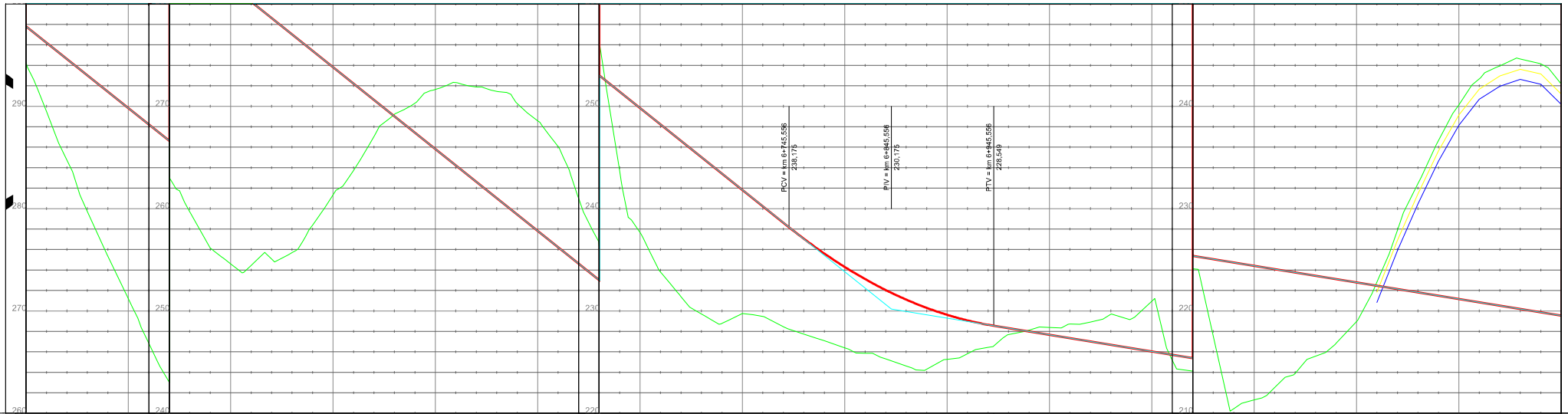
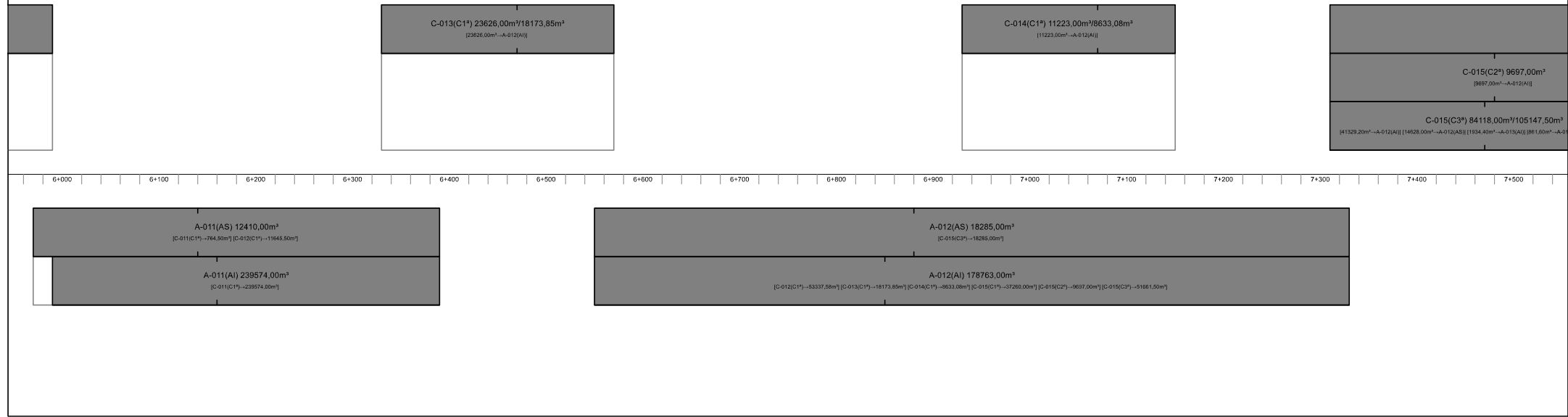
<p>A-009(AS) 1574,00m³</p> <p>[C-011(C1*)--1574,00m³]</p>
<p>A-009(AI) 8840,00m³</p> <p>[C-011(C1*)--8840,00m³]</p>

<p>A-010(AS) 1523,00m³</p> <p>[C-011(C1*)--1523,00m³]</p>
<p>A-010(AI) 5902,00m³</p> <p>[C-011(C1*)--5902,00m³]</p>

<p>A-010(AS) 1523,00m³</p> <p>[C-011(C1*)--1523,00m³]</p>
<p>A-010(AI) 5902,00m³</p> <p>[C-011(C1*)--5902,00m³]</p>



ALT.	426,837	417,620	416,220	414,620	413,020	411,420	409,820	408,220	406,620	405,020	403,420	397,020	401,620	400,220	398,620	397,020	395,420	393,820	392,220	390,620	389,020	387,420	385,820	384,220	382,620	381,020	379,420	377,820	376,220	374,620	373,020	371,420	369,820	368,220	366,620	365,020	363,420	361,820	360,220	358,620	357,020	355,420	353,820	352,220	350,620	349,020	347,420	345,820	344,220	342,620	341,020	339,420	337,820	336,220	334,620	333,020	331,420	329,820	328,220	326,620	325,020	323,420	321,820	320,220	318,620	317,020	315,420	313,820	312,220	310,620	309,020	307,420	305,820	304,220	302,620	301,020	299,420	297,820	296,220	294,620	293,020	291,420	289,820	288,220	286,620	285,020	283,420	281,820	280,220	278,620	277,020	275,420	273,820	272,220	270,620	269,020	267,420	265,820	264,220	262,620	261,020	259,420	257,820	256,220	254,620	253,020	251,420	249,820	248,220	246,620	245,020	243,420	241,820	240,220	238,620	237,020	235,420	233,820	232,220	230,620	229,020	227,420	225,820	224,220	222,620	221,020	219,420	217,820	216,220	214,620	213,020	211,420	209,820	208,220	206,620	205,020	203,420	201,820	200,220	198,620	197,020	195,420	193,820	192,220	190,620	189,020	187,420	185,820	184,220	182,620	181,020	179,420	177,820	176,220	174,620	173,020	171,420	169,820	168,220	166,620	165,020	163,420	161,820	160,220	158,620	157,020	155,420	153,820	152,220	150,620	149,020	147,420	145,820	144,220	142,620	141,020	139,420	137,820	136,220	134,620	133,020	131,420	129,820	128,220	126,620	125,020	123,420	121,820	120,220	118,620	117,020	115,420	113,820	112,220	110,620	109,020	107,420	105,820	104,220	102,620	101,020	99,420	97,820	96,220	94,620	93,020	91,420	89,820	88,220	86,620	85,020	83,420	81,820	80,220	78,620	77,020	75,420	73,820	72,220	70,620	69,020	67,420	65,820	64,220	62,620	61,020	59,420	57,820	56,220	54,620	53,020	51,420	49,820	48,220	46,620	45,020	43,420	41,820	40,220	38,620	37,020	35,420	33,820	32,220	30,620	29,020	27,420	25,820	24,220	22,620	21,020	19,420	17,820	16,220	14,620	13,020	11,420	9,820	8,220	6,620	5,020	3,420	1,820	0,220	-1,380	-2,980	-4,580	-6,180	-7,780	-9,380	-10,980	-12,580	-14,180	-15,780	-17,380	-18,980	-20,580	-22,180	-23,780	-25,380	-26,980	-28,580	-30,180	-31,780	-33,380	-34,980	-36,580	-38,180	-39,780	-41,380	-42,980	-44,580	-46,180	-47,780	-49,380	-50,980	-52,580	-54,180	-55,780	-57,380	-58,980	-60,580	-62,180	-63,780	-65,380	-66,980	-68,580	-70,180	-71,780	-73,380	-74,980	-76,580	-78,180	-79,780	-81,380	-82,980	-84,580	-86,180	-87,780	-89,380	-90,980	-92,580	-94,180	-95,780	-97,380	-98,980	-100,580	-102,180	-103,780	-105,380	-106,980	-108,580	-110,180	-111,780	-113,380	-114,980	-116,580	-118,180	-119,780	-121,380	-122,980	-124,580	-126,180	-127,780	-129,380	-130,980	-132,580	-134,180	-135,780	-137,380	-138,980	-140,580	-142,180	-143,780	-145,380	-146,980	-148,580	-150,180	-151,780	-153,380	-154,980	-156,580	-158,180	-159,780	-161,380	-162,980	-164,580	-166,180	-167,780	-169,380	-170,980	-172,580	-174,180	-175,780	-177,380	-178,980	-180,580	-182,180	-183,780	-185,380	-186,980	-188,580	-190,180	-191,780	-193,380	-194,980	-196,580	-198,180	-199,780	-201,380	-202,980	-204,580	-206,180	-207,780	-209,380	-210,980	-212,580	-214,180	-215,780	-217,380	-218,980	-220,580	-222,180	-223,780	-225,380	-226,980	-228,580	-230,180	-231,780	-233,380	-234,980	-236,580	-238,180	-239,780	-241,380	-242,980	-244,580	-246,180	-247,780	-249,380	-250,980	-252,580	-254,180	-255,780	-257,380	-258,980	-260,580	-262,180	-263,780	-265,380	-266,980	-268,580	-270,180	-271,780	-273,380	-274,980	-276,580	-278,180	-279,780	-281,380	-282,980	-284,580	-286,180	-287,780	-289,380	-290,980	-292,580	-294,180	-295,780	-297,380	-298,980	-300,580	-302,180	-303,780	-305,380	-306,980	-308,580	-310,180	-311,780	-313,380	-314,980	-316,580	-318,180	-319,780	-321,380	-322,980	-324,580	-326,180	-327,780	-329,380	-330,980	-332,580	-334,180	-335,780	-337,380	-338,980	-340,580	-342,180	-343,780	-345,380	-346,980	-348,580	-350,180	-351,780	-353,380	-354,980	-356,580	-358,180	-359,780	-361,380	-362,980	-364,580	-366,180	-367,780	-369,380	-370,980	-372,580	-374,180	-375,780	-377,380	-378,980	-380,580	-382,180	-383,780	-385,380	-386,980	-388,580	-390,180	-391,780	-393,380	-394,980	-396,580	-398,180	-399,780	-401,380	-402,980	-404,580	-406,180	-407,780	-409,380	-410,980	-412,580	-414,180	-415,780	-417,380	-418,980	-420,580	-422,180	-423,780	-425,380	-426,980	-428,580	-430,180	-431,780	-433,380	-434,980	-436,580	-438,180	-439,780	-441,380	-442,980	-444,580	-446,180	-447,780	-449,380	-450,980	-452,580	-454,180	-455,780	-457,380	-458,980	-460,580	-462,180	-463,780	-465,380	-466,980	-468,580	-470,180	-471,780	-473,380	-474,980	-476,580	-478,180	-479,780	-481,380	-482,980	-484,580	-486,180	-487,780	-489,380	-490,980	-492,580	-494,180	-495,780	-497,380	-498,980	-500,580	-502,180	-503,780	-505,380	-506,980	-508,580	-510,180	-511,780	-513,380	-514,980	-516,580	-518,180	-519,780	-521,380	-522,980	-524,580	-526,180	-527,780	-529,380	-530,980	-532,580	-534,180	-535,780	-537,380	-538,980	-540,580	-542,180	-543,780	-545,380	-546,980	-548,580	-550,180	-551,780	-553,380	-554,980	-556,580	-558,180	-559,780	-561,380	-562,980	-564,580	-566,180	-567,780	-569,380	-570,980	-572,580	-574,180	-575,780	-577,380	-578,980	-580,580	-582,180	-583,780	-585,380	-586,980	-588,580	-590,180	-591,780	-593,380	-594,980	-596,580	-598,180	-599,780	-601,380	-602,980	-604,580	-606,180	-607,780	-609,380	-610,980	-612,580	-614,180	-615,780	-617,380	-618,980	-620,580	-622,180	-623,780	-625,380	-626,980	-628,580	-630,180	-631,780	-633,380	-634,980	-636,580	-638,180	-639,780	-641,380	-642,980	-644,580	-646,180	-647,780	-649,380	-650,980	-652,580	-654,180	-655,780	-657,380	-658,980	-660,580	-662,180	-663,780	-665,380	-666,980	-668,580	-670,180	-671,780	-673,380	-674,980	-676,580	-678,180	-679,780	-681,380	-682,980	-684,580	-686,180	-687,780	-689,380	-690,980	-692,580	-694,180	-695,780	-697,380	-698,980	-700,580	-702,180	-703,780	-705,380	-706,980	-708,580	-710,180	-711,780	-713,380	-714,980	-716,580	-718,180	-719,780	-721,380	-722,980	-724,580	-726,180	-727,780	-729,380	-730,980	-732,580	-734,180	-735,780	-737,380	-738,980	-740,580	-742,180	-743,780	-745,380	-746,980	-748,580	-750,180	-751,780	-753,380	-754,980	-756,580	-758,180	-759,780	-761,380	-762,980	-764,580	-766,180	-767,780	-769,380	-770,980	-772,580	-774,180	-775,780	-777,380	-778,980	-780,580	-782,180	-783,780	-785,380	-786,980	-788,580	-790,180	-791,780	-793,380	-794,980	-796,580	-798,180	-799,780	-801,380	-802,980	-804,580	-806,180	-807,780	-809,380	-810,980	-812,580	-814,180	-815,780	-817,380	-818,980	-820,580	-822,180	-823,780	-825,380	-826,980	-828,580	-830,180	-831,780	-833,380	-834,980	-836,580	-838,180	-839,780	-841,380	-842,980	-844,580	-846,180	-847,780	-849,380	-850,980	-852,580	-854,180	-855,780	-857,380	-858,980	-860,580	-862,180	-863,780	-865,380	-866,980	-868,580	-870,180	-871,780	-873,380	-874,980	-876,580	-878,180	-879,780	-881,380	-882,980	-884,580	-886,180	-887,780	-889,380	-890,980	-892,580	-894,180	-895,780	-897,380	-898,980	-900,580	-902,180	-903,780	-905,380	-906,980	-908,580	-910,180	-911,780	-913,380	-914,980	-916,580	-918,180	-919,780	-921,380	-922,980	-924,580	-926,180	-927,780	-929,380	-930,980	-932,580	-934,180	-935,780	-937,380	-938,980	-940,580	-942,180	-943,780	-945,380	-946,980	-948,580	-950,180	-951,780	-953,380	-954,980	-956,580	-958,180	-959,780	-961,380	-962,980	-964,580	-966,180	-967,780	-969,380	-970,980	-972,580	-974,180	-975,780	-977,380	-978,980	-980,580	-982,180	-983,780	-985,380	-986,980	-988,580	-990,180	-991,780	-993,380	-994,980	-996,580	-998,180	-999,780	-1001,380	-1002,980	-1004,580	-1006,180	-1007,780	-1009,380	-1010,980	-1012,580	-1014,180	-1015,780	-1017,380	-1018,980	-1020,580	-1022,180	-1023,780	-1025,380	-1026,980	-1028,580	-1030,180	-1031,780	-1033,380	-1034,980	-1036,580	-1038,180	-1039,780	-1041,380	-1042,980	-1044,580	-1046,180	-1047,780	-1049,380	-1050,980	-1052,580	-1054,180	-1055,780	-1057,380	-1058,980	-1060,580	-1062,180	-1063,780	-1065,380	-1066,980	-1068,580	-1070,180	-1071,780	-1073,380	-10
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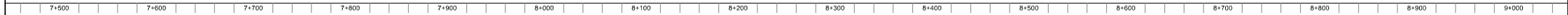
km	ALT (m)
6+000	284,311
6+010	284,311
6+020	284,311
6+030	284,311
6+040	284,311
6+050	284,311
6+060	284,311
6+070	284,311
6+080	284,311
6+090	284,311
6+100	284,311
6+110	284,311
6+120	284,311
6+130	284,311
6+140	284,311
6+150	284,311
6+160	284,311
6+170	284,311
6+180	284,311
6+190	284,311
6+200	284,311
6+210	284,311
6+220	284,311
6+230	284,311
6+240	284,311
6+250	284,311
6+260	284,311
6+270	284,311
6+280	284,311
6+290	284,311
6+300	284,311
6+310	284,311
6+320	284,311
6+330	284,311
6+340	284,311
6+350	284,311
6+360	284,311
6+370	284,311
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6+390	284,311
6+400	284,311
6+410	284,311
6+420	284,311
6+430	284,311
6+440	284,311
6+450	284,311
6+460	284,311
6+470	284,311
6+480	284,311
6+490	284,311
6+500	284,311
6+510	284,311
6+520	284,311
6+530	284,311
6+540	284,311
6+550	284,311
6+560	284,311
6+570	284,311
6+580	284,311
6+590	284,311
6+600	284,311
6+610	284,311
6+620	284,311
6+630	284,311
6+640	284,311
6+650	284,311
6+660	284,311
6+670	284,311
6+680	284,311
6+690	284,311
6+700	284,311
6+710	284,311
6+720	284,311
6+730	284,311
6+740	284,311
6+750	284,311

<b>EMPRESA</b>	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
<b>RODOVISIONÁRIOS</b>	Rodovia: PPP-UFRGS-2021/1 Trecho: 6000-7500 Data: 11/2021	
<b>Escala:</b> 1:2000	<b>PROJ. TERRAPLENAGEM</b>	<b>Código:</b> PT-05



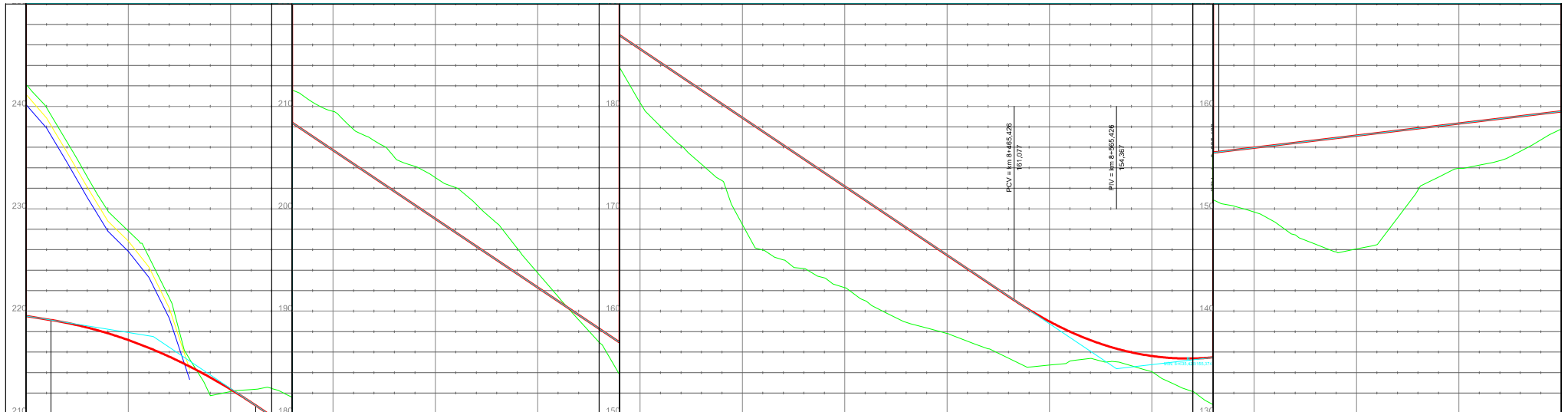
C-015(C1*) 48438,00m³/37260,00m³ <small>(48438,00m³ → A-012(A))</small>
C-015(C2*) 9697,00m³ <small>[9697,00m³ → A-012(A)]</small>
*) 84118,00m³/105147,50m³ <small>*) [1034,40m³ → A-013(A)] [81,60m³ → A-013(AS)] [25364,80m³ → A-014(A)]</small>

C-016(C1*) 1162,0
----------------------

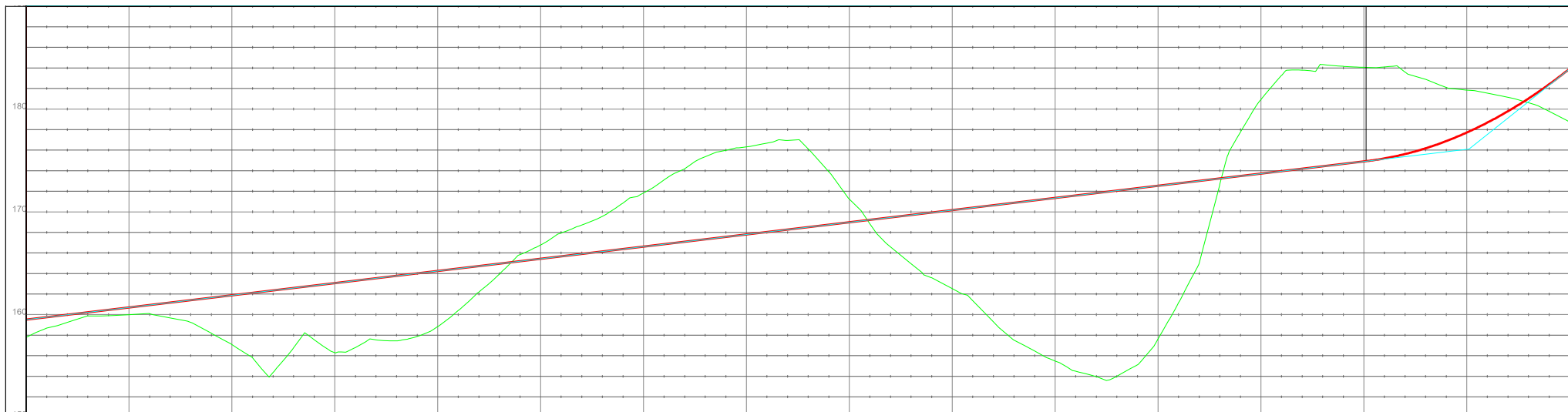
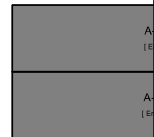
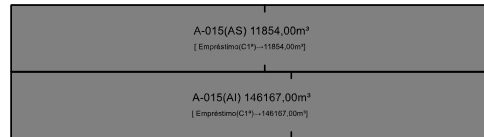
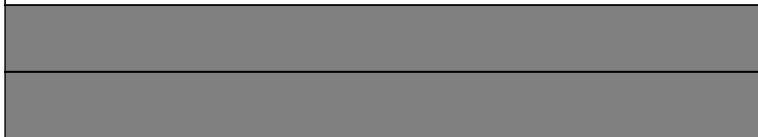
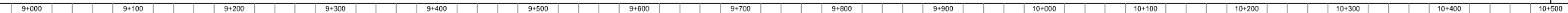
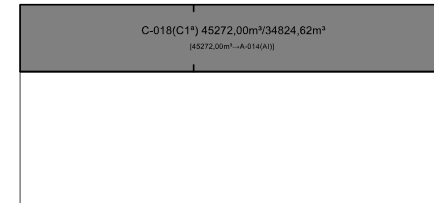
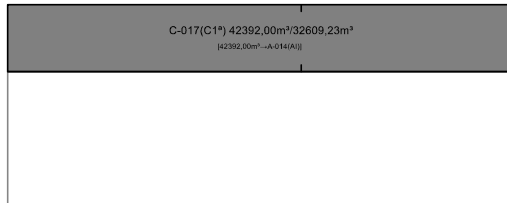
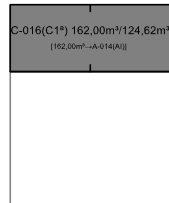


A-013(AS) 1077,00m³ <small>[C-015(C2*) → 1077,00m³]</small>
A-013(AI) 2418,00m³ <small>[C-015(C2*) → 2418,00m³]</small>

A-014(AS) 29506,00m³ <small>[Emprestimo(C1*) → 29506,00m³]</small>
A-014(AI) 202706,00m³ <small>[C-015(C2*) → 31706,00m³] [C-016(C1*) → 124,62m³] [C-017(C1*) → 32609,23m³] [C-019(C1*) → 34824,62m³] [Emprestimo(C1*) → 103441,54m³]</small>



ALT	L = 200,000		e = -1,271 k = 39,346	Δi = -5,0831%	D = 741,07 i = -6,7095%	L = 200,000	e = 1,973 k = 25,337	Δi = 7,8935%
COTAS (m)	242,176	218,531	219,206	218,850	218,531	218,531	218,531	218,531
TERRENO/PROJETO	238,987	219,206	218,850	218,531	218,531	218,531	218,531	218,531
	236,539	218,531	218,531	218,531	218,531	218,531	218,531	218,531
	233,101	217,837	217,837	217,837	217,837	217,837	217,837	217,837
	229,801	217,178	217,178	217,178	217,178	217,178	217,178	217,178
	227,635	216,417	216,417	216,417	216,417	216,417	216,417	216,417
	225,284	215,655	215,655	215,655	215,655	215,655	215,655	215,655
	221,510	214,891	214,891	214,891	214,891	214,891	214,891	214,891
	211,771	213,529	213,529	213,529	213,529	213,529	213,529	213,529
	212,142	212,388	212,388	212,388	212,388	212,388	212,388	212,388
	212,339	211,089	211,089	211,089	211,089	211,089	211,089	211,089
	212,453	209,790	209,790	209,790	209,790	209,790	209,790	209,790
	211,569	208,408	207,066	205,724	204,382	203,040	201,698	200,356
	209,499	207,144	205,802	204,460	203,118	201,776	200,434	199,092
	207,744	206,654	205,312	203,970	202,628	201,286	199,944	198,602
	206,654	205,035	203,693	202,351	201,009	199,667	198,325	196,983
	204,135	200,356	199,014	197,672	196,330	194,988	193,646	192,304
	203,039	199,672	198,330	196,988	195,646	194,304	192,962	191,620
	202,650	199,672	198,330	196,988	195,646	194,304	192,962	191,620
	200,429	198,331	196,989	195,647	194,305	192,963	191,621	190,279
	198,897	194,989	193,647	192,305	190,963	189,621	188,279	186,937
	196,136	193,647	192,305	190,963	189,621	188,279	186,937	185,595
	193,722	192,305	190,963	189,621	188,279	186,937	185,595	184,253
	191,418	189,621	188,279	186,937	185,595	184,253	182,911	181,569
	189,160	188,279	186,937	185,595	184,253	182,911	181,569	180,227
	186,864	186,937	185,595	184,253	182,911	181,569	180,227	178,885
	183,176	185,595	184,253	182,911	181,569	180,227	178,885	177,543
	180,359	184,253	182,911	181,569	180,227	178,885	177,543	176,201
	178,655	182,911	181,569	180,227	178,885	177,543	176,201	174,859
	176,173	181,569	180,227	178,885	177,543	176,201	174,859	173,517
	174,332	180,227	178,885	177,543	176,201	174,859	173,517	172,175
	172,744	178,885	177,543	176,201	174,859	173,517	172,175	170,833
	168,458	177,543	176,201	174,859	173,517	172,175	170,833	169,491
	165,970	176,201	174,859	173,517	172,175	170,833	169,491	168,149
	165,008	175,444	174,660	173,876	173,092	172,308	171,524	170,740
	164,156	174,660	173,876	173,092	172,308	171,524	170,740	169,956
	163,247	173,876	173,092	172,308	171,524	170,740	169,956	169,172
	162,295	173,092	172,308	171,524	170,740	169,956	169,172	168,388
	161,016	172,308	171,524	170,740	169,956	169,172	168,388	167,604
	159,851	171,524	170,740	169,956	169,172	168,388	167,604	166,820
	158,902	170,740	169,956	169,172	168,388	167,604	166,820	166,036
	158,351	170,034	169,250	168,466	167,682	166,898	166,114	165,330
	157,824	169,492	168,708	167,924	167,140	166,356	165,572	164,788
	157,061	168,150	167,366	166,582	165,798	165,014	164,230	163,446
	156,321	167,411	166,627	165,843	165,059	164,275	163,491	162,707
	155,399	166,141	165,357	164,573	163,789	163,005	162,221	161,437
	154,634	165,141	164,357	163,573	162,789	162,005	161,221	160,437
	154,731	164,357	163,573	162,789	162,005	161,221	160,437	159,653
	155,111	163,573	162,789	162,005	161,221	160,437	159,653	158,869
	155,080	162,789	162,005	161,221	160,437	159,653	158,869	158,085
	155,682	162,005	161,221	160,437	159,653	158,869	158,085	157,301
	154,685	161,221	160,437	159,653	158,869	158,085	157,301	156,517
	154,687	160,437	159,653	158,869	158,085	157,301	156,517	155,733
	152,682	159,653	158,869	158,085	157,301	156,517	155,733	154,949
	152,156	158,869	158,085	157,301	156,517	155,733	154,949	154,165
	150,880	158,085	157,301	156,517	155,733	154,949	154,165	153,381
	150,270	157,301	156,517	155,733	154,949	154,165	153,381	152,597
	149,882	156,517	155,733	154,949	154,165	153,381	152,597	151,813
	148,710	155,733	154,949	154,165	153,381	152,597	151,813	151,029
	147,448	154,949	154,165	153,381	152,597	151,813	151,029	150,245
	146,530	154,165	153,381	152,597	151,813	151,029	150,245	149,461
	145,791	153,381	152,597	151,813	151,029	150,245	149,461	148,677
	146,668	152,597	151,813	151,029	150,245	149,461	148,677	147,893
	146,494	151,813	151,029	150,245	149,461	148,677	147,893	147,109
	146,112	151,029	150,245	149,461	148,677	147,893	147,109	146,325
	145,823	150,245	149,461	148,677	147,893	147,109	146,325	145,541
	145,083	149,461	148,677	147,893	147,109	146,325	145,541	144,757
	143,950	148,677	147,893	147,109	146,325	145,541	144,757	143,973
	144,245	147,893	147,109	146,325	145,541	144,757	143,973	143,189
	144,694	147,109	146,325	145,541	144,757	143,973	143,189	142,405
	144,688	146,325	145,541	144,757	143,973	143,189	142,405	141,621
	144,684	145,541	144,757	143,973	143,189	142,405	141,621	140,837
	144,680	144,757	143,973	143,189	142,405	141,621	140,837	140,053
	144,676	143,973	143,189	142,405	141,621	140,837	140,053	139,269
	144,672	143,189	142,405	141,621	140,837	140,053	139,269	138,485
	144,668	142,405	141,621	140,837	140,053	139,269	138,485	137,701
	144,664	141,621	140,837	140,053	139,269	138,485	137,701	136,917
	144,660	140,837	140,053	139,269	138,485	137,701	136,917	136,133
	144,656	140,053	139,269	138,485	137,701	136,917	136,133	135,349
	144,652	139,269	138,485	137,701	136,917	136,133	135,349	134,565
	144,648	138,485	137,701	136,917	136,133	135,349	134,565	133,781
	144,644	137,701	136,917	136,133	135,349	134,565	133,781	133,000
	144,640	136,917	136,133	135,349	134,565	133,781	133,000	132,216
	144,636	136,133	135,349	134,565	133,781	133,000	132,216	131,432
	144,632	135,349	134,565	133,781	133,000	132,216	131,432	130,648
	144,628	134,565	133,781	133,000	132,216	131,432	130,648	129,864
	144,624	133,781	133,000	132,216	131,432	130,648	129,864	129,080
	144,620	133,000	132,216	131,432	130,648	129,864	129,080	128,296
	144,616	132,216	131,432	130,648	129,864	129,080	128,296	127,512
	144,612	131,432	130,648	129,864	129,080	128,296	127,512	126,728
	144,608	130,648	129,864	129,080	128,296	127,512	126,728	125,944
	144,604	129,864	129,080	128,296	127,512	126,728	125,944	125,160
	144,600	129,080	128,296	127,512	126,728	125,944	125,160	124,376
	144,596	128,296	127,512	126,728	125,944	125,160	124,376	123,592
	144,592	127,512	126,728	125,944	125,160	124,376	123,592	122,808
	144,588	126,728	125,944	125,160	124,376	123,592	122,808	122,024
	144,584	125,944	125,160	124,376	123,592			



D = 1636,76  
i = 1,1839%

L = 200,000  
e = 1,698  
k = 29,446  
Δi = 6,7922%

km	COTAS (m)	TERRENO	PROJEITO
9+000	157,732	158,512	159,749
	158,662	159,749	159,986
	159,241	159,986	160,223
	159,861	160,223	160,460
	159,693	160,460	160,696
	159,695	160,696	160,933
	160,089	160,933	161,170
	159,660	161,170	161,407
	159,254	161,407	161,644
	159,187	161,644	161,880
	157,668	161,880	162,117
	155,723	162,117	162,354
	154,385	162,354	162,591
	156,777	162,591	162,827
	157,554	162,827	163,064
	156,286	163,064	163,301
	156,796	163,301	163,538
	157,539	163,538	163,775
	157,450	163,775	164,011
	157,881	164,011	164,248
	158,832	164,248	164,485
	160,394	164,485	164,722
	162,201	164,722	164,959
	163,946	164,959	165,195
	165,845	165,195	165,432
	166,778	165,432	165,669
	167,942	165,669	165,906
	168,713	165,906	166,142
	169,561	166,142	166,379
	170,882	166,379	166,616
	171,827	166,616	166,853
	173,095	166,853	167,090
	174,188	167,090	167,326
	175,364	167,326	167,563
	175,680	167,563	167,800
	176,917	167,800	168,037
	176,682	168,037	168,274
	176,652	168,274	168,510
	176,130	168,510	168,747
	173,904	168,747	168,984
	171,247	168,984	169,221
	168,841	169,221	169,458
	166,584	169,458	169,694
	164,658	169,694	169,931
	163,574	169,931	170,168
	162,223	170,168	170,405
	161,354	170,405	170,641
	159,297	170,641	170,878
	157,511	170,878	171,115
	156,664	171,115	171,352
	155,689	171,352	171,589
	154,463	171,589	171,825
	153,971	171,825	172,062
	155,115	172,062	172,299
	157,631	172,299	172,536
	161,151	172,536	172,773
	165,020	172,773	173,009
	172,645	173,009	173,246
	180,226	173,246	173,483
	183,784	173,483	173,720
	182,276	173,957	174,193
	180,226	173,720	174,430
	183,784	174,193	174,667
	184,321	174,430	174,904
	184,151	174,667	175,141
	184,060	174,904	175,378
	184,050	175,141	175,615
	183,996	175,378	175,852
	182,893	176,182	176,579
	182,094	176,879	177,112
	181,942	177,712	178,149
	181,538	178,681	179,186
	181,149	179,786	180,223
	180,605	181,027	180,605
	179,776	182,404	181,027
	178,721	183,916	181,510

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 9000-10500 Data: 11/2021	
Escala:	1:2000	Código: 11/2021
	PROJ. TERRAPLENAGEM	

115  
 Empréstimo(0,320km) 530000,00m³/407692,31m³  
 97,80m³ → A-016(AS) | 190017,10m³ → A-016(AI) | 15410,20m³ → A-015(AS) | 107286,80m³ → A-016(AI) | 10303,80m³ → A-016(AS) | 34140,30m³ → A-017(AI)

C-019(C1\*) 45641,00m³/35108,46m³  
 [45641,00m³ → A-017(AI)]

C-020(C1\*) 28214,00m³/21703,08m³

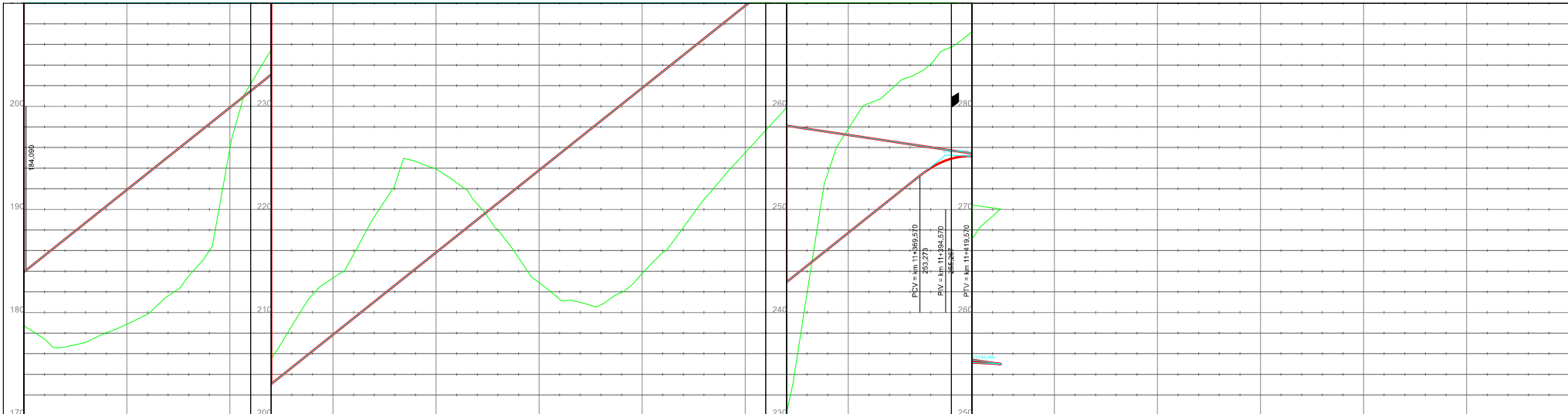
10+500 | 10+600 | 10+700 | 10+800 | 10+900 | 11+000 | 11+100 | 11+200 | 11+300 | 11+400 | 11+500 | 11+600 | 11+700 | 11+800 | 11+900 | 12+000

A-016(AS) 7926,00m³  
 [Empréstimo(C1\*) → 7926,00m³]

A-016(AI) 82536,00m³  
 [Empréstimo(C1\*) → 82536,00m³]

A-017(AS) 4816,00m³  
 [C-020(C1\*) → 4816,00m³]

A-017(AI) 77033,00m³  
 [Empréstimo(C1\*) → 28214,77m³] [C-019(C1\*) → 35108,46m³] [C-020(C1\*) → 15662,77m³]



km	COTAS (m)	ALT.
9+500	178,721	183,916
	177,723	185,511
	176,695	187,106
	177,693	188,701
	178,016	190,296
	178,659	191,892
	179,637	193,487
	181,018	195,082
	183,535	196,677
	185,999	198,272
	189,520	199,868
	202,175	201,463
	205,479	203,058
	208,676	204,653
	211,713	206,249
	213,348	207,844
	215,669	209,439
	218,283	211,034
	222,377	212,629
	224,655	214,225
	223,927	215,820
	222,586	217,415
	220,512	219,010
	217,589	220,606
	215,312	222,201
	212,694	223,796
	211,285	225,391
	210,079	226,986
	210,748	228,582
	211,693	230,177
	213,766	231,772
	215,927	233,367
	218,251	234,963
	220,981	236,558
	223,308	238,153
	225,481	239,748
	227,671	241,343
	230,146	242,939
	241,831	244,534
	253,479	246,129
	257,695	247,724
	260,267	249,320
	261,500	250,915
	262,669	252,510
	264,104	254,103
	265,748	254,916
	267,218	255,140
	269,342	255,040

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
RODOVISIONÁRIOS	Rodovia: PPP-UFRGS-2021/1 Trecho: 10500-12000 Data: 11/2021	
Escala: 1:2000	PROJ. TERRAPLENAGEM	Código: PT-08

12-000

EMPRESA	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
LOGO	Rodovia: Trecho: Data:	
Escala: 1:2000	PROJETO GEOMÉTRICO	Código: XXX/XXX