

# Idejno rješenje lokalne ceste

---

**Strunje, Ante**

**Undergraduate thesis / Završni rad**

**2016**

*Degree Grantor / Ustanova koja je dodijelila akademski / stručni stupanj:*

**University of Split, Faculty of Civil Engineering, Architecture and Geodesy / Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije**

*Permanent link / Trajna poveznica:* <https://um.nsk.hr/um:nbn:hr:123:409422>

*Rights / Prava:* [In copyright](#)/[Zaštićeno autorskim pravom.](#)

*Download date / Datum preuzimanja:* **2024-12-01**



*Repository / Repozitorij:*

[FCEAG Repository - Repository of the Faculty of Civil Engineering, Architecture and Geodesy, University of Split](#)



UNIVERSITY OF SPLIT



**SVEUČILIŠTE U SPLITU**  
**FAKULTET GRAĐEVINE ARHITEKTURE I GEODEZIJE**

# **ZAVRŠNI RAD**

**Ante Strunje**

**Split, 2016.**

**SVEUČILIŠTE U SPLITU  
FAKULTET GRAĐEVINE ARHITEKTURE I GEODEZIJE**

**Ante Strunje**

**I d e j n o r j e š e n j e l o k a l n e c e s t e**

**Završni rad**

**Split, 2016**

**SVEUČILIŠTE U SPLITU  
FAKULTEG GRAĐEVINE ARHITEKTURE I GEODEZIJE**

Split, Matice hrvatske 15

STUDIJ: **PREDDIPLOMSKI STUDIJ GRAĐEVINARSTVA**  
KANDIDAT: **Ante Strunje**  
BROJ INDEKSA: **4086**  
KATEDRA: **Katedra za prometnice i geodeziju**  
PREDMET: **Ceste**

**ZADATAK ZA ZAVRŠNI RAD**

Tema: IDEJNO RJEŠENJE LOKALNE CESTE

Opis zadatka: Uz pomoć programa Autodesk AutoCAD Civil 3D potrebno je uraditi projekt ceste na geodetskoj podlozi koja je korištena za izradu programa u okviru predmeta ceste. Trasu treba položiti od točke A do točke B prema svim podacima iz programskog zadatka.

Zadatak treba sadržavati:

1. Kopiju programskog zadatka
2. Tehnički opis s prikazom korištenja programa Civil 3D
3. Građevinsku situaciju u M 1:1000
4. Uzdužni presjek u M 1:1000/100
5. Karakteristične poprečne presjeke u M 1:100
7. Računalne ispise koordinatnih tocaka osi
8. Proracun kolicina zemljanih radova
9. Proracun kolicine radova po presjecima

U Splitu, travanj 2016.

Voditelj Završnog rada:

Prof. dr.sc. Dražen Cvitanić

## **Idejno rješenje lokalne ceste**

### **Sažetak:**

Idejno rješenje lokalne ceste izrađeno je na geodetskoj podlozi, prema zadatku iz kolegija Ceste, koristeći se programom Autodesk AutoCAD Civil 3D. Cesta je projektirana za godišnji dnevni promet (PGDP) od 950 vozila na dan, na brdovitom terenu. Projektna brzina ceste iznosi 40 km/h. Idejno rješenje izrađeno je prema Pravilniku o osnovnim uvjetima za projektiranje ceste s elementima koji zadovoljavaju važeće propise, kao i sigurnosne i estetske kriterije.

### **Ključne riječi:**

idejno rješenje, lokalna cesta, projektna brzina, os ceste, niveleta, poprečni presjek

## **Preliminary design of local road**

### **Abstract:**

A preliminary design of local road, on a geodetic ground according to the task from course „Roads“, is made using software Autodesk AutoCAD Civil 3D. The road is designed for the annual average daily traffic (AADT) of 950 vehicles per day, on the hilly terrain. Design speed for the road is 40 km/h. Preliminary design of local road was created according to the Regulations on the basic conditions for the design of public roads with the elements that meet the applicable rules, as well as safety and aesthetic criteria.

**Keywords:**

preliminary design, local road, design speed, the road axis, niveleta, cross-section

Zahvaljujem se mentoru prof. dr. sc. Draženu Cvitaniću  
dipl. ing. građ. te asistentici doc. dr. sc. Deani Breški  
dipl. ing. građ. na pomoći i vodstvu prilikom izrade  
završnog rada.

Hvala svim kolegama i prijateljima s kojima su  
godine studiranja prošle ugodnije.

Najveća hvala mojim roditeljima na pruženoj  
podršci i razumijevanju tijekom studiranja.

## Sadržaj

<b>1. Kopija programskog zadatka .....</b>	<b>7</b>
<b>2. Tehnički opis .....</b>	<b>9</b>
<b>3. Građevinska situacija M 1:1000 .....</b>	<b>13</b>
<b>4. Uzdužni presjek M 1:1000/100 .....</b>	<b>15</b>
<b>5. Karakteristični poprečni presjeci M 1:100 .....</b>	<b>17</b>
<b>6. Obrada na računalu .....</b>	<b>29</b>
<b>7. Računalni ispis točaka osi.....</b>	<b>31</b>
<b>7.1. Koordinatni račun glavnih točaka osi.....</b>	<b>32</b>
<b>7.2. Koordinatni račun detaljnih točaka osi.....</b>	<b>48</b>
<b>7.3. Račun kota kolnika .....</b>	<b>52</b>
<b>7.4. Vertikalni tok trase.....</b>	<b>57</b>
<b>10. Proračun količina zemljanih radova .....</b>	<b>59</b>
<b>10. Proračun količine radova po presjecima.....</b>	<b>60</b>
<b>11. Literatura .....</b>	<b>61</b>



## **1. KOPIJA PROGRAMSKOG ZADATKA**

SVEUČILIŠTE U SPLITU  
GRAĐEVINSKO-ARHITEKTONSKI FAKULTET

Split, ak.god. 2008/2009.

Katedra za prometnice i geodeziju

Studij: Stručni

Nastavni predmet: CESTE

Student: .....

## ZADATAK

Treba izraditi idejni projekt dionice ceste između točaka A i B naznačenih na priloženoj geodetskoj podlozi u mjerilu 1:1000.

Zadano je:

- PGDP - prosječni godišnji dnevni promet: **950 voz/dan**,
- vrsta terena: **brdovit**.

Idejni projekt treba sadržavati:

1. Tehnički opis
2. Proračun horizontalne geometrije
3. Proračun proširenja kolnika u krivini
4. Proračun vertikalne geometrije
5. Proračun vitoperenja kolnika
6. Građevinska situacija MJ. 1:1000
7. Uzdužni presjek MJ. 1:1000/100
8. Normalni poprečni presjek MJ. 1:50
9. Karakteristični poprečni presjeci MJ. 1:100

Predmetni asistent:

  
dr.sc. Deana Breški, dipl.ing. građ.

## **2. TEHNIČKI OPIS**

## TEHNIČKI OPIS

### OPĆI PODACI:

Ovim idejnim rješenjem obuhvaćena je lokalna cesta na dionici od točke A (295 m.n.m ) do točke B (277 m.n.m ) u dužini od 413.86 m koja se proteže u smjeru zapad-istok na brdovitom terenu.

#### **Geodetska podloga:**

Za izradu idejnog rješenja korištena je katastarsko-topografska podloga u mjerilu 1:1000, prilog iz programa predmeta Ceste.

Situacija je priložena u mjerilu 1:1000.

### TEHNIČKI ELEMENTI IZGRADNJE :

#### **Opis trase:**

Početak prometnice je u točki A(295 m.n.m ) na stacionaži 0+000,00, a završava u točki B (277 m.n.m ) na stacionaži 0+413.86. Na prostorno vođenje prometnice utječu topografske karakteristike terena. Prometnica se nalazi na brdskom krškom terenu.

Temeljem «Pravilnika o osnovnim uvjetima kojima javne ceste izvan naselja i njihovi elementi moraju udovoljavati sa stajališta sigurnosti prometa», definirani su projektni elementi trase i elementi poprečnog profila.

U tablici 1.2, koja je sastavni dio Pravilnika, dani su elementi za definiciju kategorije prometnice.

Tabl. 1.2

Kategorija ceste	Društ. gospod. značenje (1.1.1.)	Vrsta prometa (1.1.2.)	Veličina prometa (1.1.3.)	Zadaća povezivanja (1.1.4.)	Srednja duljina putovanja (km)
AC	Državna	Prom. mot. vozila	>14000	Međudržavno i državno	>100
1. kat.	Državna	Prom. mot. vozila	>12000	Međudržavno i državno-regionalno	50-100
2. kat.	Državna	Prom. mot. v. mješoviti prom.	7000-12000	Državno i županijsko	20-50
3. kat.	Državna; županijska	Mješoviti promet	3000-7000	Međuopćinsko	5-50
4. kat.	Županijska; lokalna	Mješoviti promet	1000-3000	Općinsko	5-20
5. kat.	Lokalna	Mješoviti promet	<1000	Općinsko-lokalno	<5

U pravilu se usvaja najviša kategorija ceste koja se dobije primjenom kriterija iz tablice 1.2.

Predmetna cesta je lokalnog značaja s PGDP-om od 950 voz/dan što je svrstava u 5. kategoriju.

Prema tablici 1.3.1 iz Pravilnika, ceste 5. kategorije projektiraju se za projektne brzine 40-60 km/h ovisno o terenskim ograničenjima.

Tabl. 1.3.1. Projektne brzine i najveći nagibi nivelete

PROMETNO -TEHNIČKO RAZVRSTAVANJE		PROJEKTNNA BRZINA $V_p$ (km/h) / NAGIB $s_{max}$ (%)							
KAT.	Razina	120	100	90	80	70	60	50	40
	usluge	a.	b.	c.	d.	e.	f.	g.	h.
AC	C/D	$\geq 120/4^\circ$	100/5*	90/5.5**	80/6***				
1. kat.	D		100/5.5°	90/5.5*	80/6**	70/7***			
2. kat.	D		100/5.5°	90/5.5*	80/6*	70/7**	60/8***		
3. kat.	E				80/7°	70/7*	60/8**	50/9***	
4. kat.	E					70/8°	60/9°	50/10**	40/11***
5. kat.	E						60/10°	50/11*	40/12** 40(30)/12***

OZNAKE: ° BEZ OGRANIČENJA BO  
 \* UMJERENA OGRANIČENJA UO  
 \*\* ZNATNA OGRANIČENJA ZO  
 \*\*\* VELIKA OGRANIČENJA VO

Vrijednost u zagradi primjenjuje se iznimno

**Obzirom da se radi o brdovitom terenu sa znatnim ograničenjima za predmetnu prometnicu prema navedenoj tablici, projektna brzina je 40 km/h i max. uzdužni nagib je 12%.**

Iz odabrane projektne brzine proizlaze i projektne elementi horizontalne i vertikalne geometrije trase:

- minimalni radijus horizontalne krivine  $R=45$  m
- minimalna duljina klotoidne prelazne krivine  $L=30$  m
- maksimalni uzdužni nagib  $i=12$  %
- minimalni polumjer konkavnog zaobljenja nivelete (za 0%)  $R=200$  m
- minimalni polumjer konveksnog zaobljenja nivelete (za 0%)  $R=300$  m

#### Tlocrtni elementi trase:

Trasa ceste ima duljinu od 413.86m, sastoji se od tri pravca i tri krivine. Prva krivina ima radijus  $R=80$  m i duljinu prijelazne krivine  $L=40$  m, druga ima radijus  $R=120.00$  m i duljinu prijelazne krivine  $L=40$  m a treća ima radijus  $R=100.00$  m i duljinu prijelazne krivine  $L=40$  m. Duljina prvog pravca je 65.86 m, duljina drugog pravca je 13.93 m, duljina trećeg pravca je 4 m.

Krivine su konstruirane pomoću dvije prijelazne krivine oblika klotoide i kružnog luka.

**Vertikalni elementi trase:**

Vertikalni tok trase sastoji se od dva pravca i jedne konkavne krivine, radijus krivine je  $R=2500$  m i pripadajuća tangenta je duljine 48 m . Uzdužni nagibi nivelete iznose 4.95% i 2.76 %.

**Elementi poprečnog profila:**

Planirana prometnica predviđena je za dvosmjerni promet s po jednim voznim trakom za svaki smjer. Širina voznog traka poprečnog presjeka iznosi 2,75 m, širina rubnog traka 0.20 m. Bankine se izvode s nagibom 4% prema pokosu nasipa i širinom 1.00 m, širina rigola je 0.65 m.

Poprečni nagib ceste u pravcu iznosi **2.5%**, a u zavojima u ovisnosti od polumjera kružnog luka i usvojene računске brzine,  **$V_r = 40$  km/h** .

**Odvodnja:**

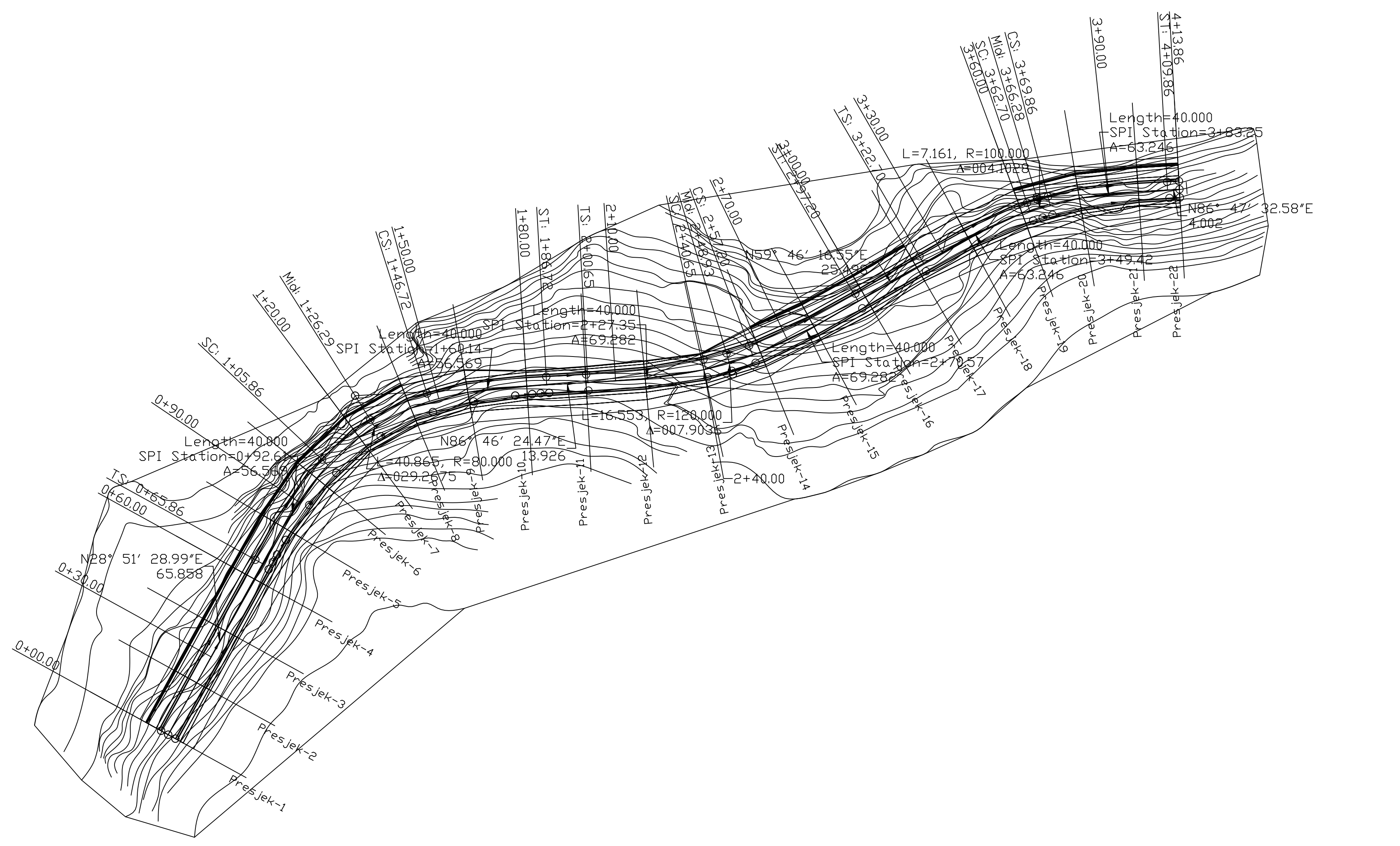
Odvodnja prometnice predviđa izvedbu otvorenog sustava odvodnje kojim se vrši prihvat voda s kolnika i pribrežnih voda izvedbom betonskih rigola. Uzdužnim i poprečnim nagibima kolnika vode se usmjeravaju u betonske rigole u koje se vrši i prihvat pribrežnih voda u usjecima i ispuštaju u teren.

Dio kolničkih voda preljeva se preko bankine niz pokose nasipa.

**Oprema ceste:**

Idejnim rješenjem predviđena je horizontalna signalizacija koja se sastoji od jedne pune razdjelne crte širine 10 cm koja se postavlja u osi prometnice i punih rubnih crta širine 10 cm koje se postavljaju na svaki od rubnih trakova. Na nasip se postavlja jednostrana zaštitna čelična ograda.

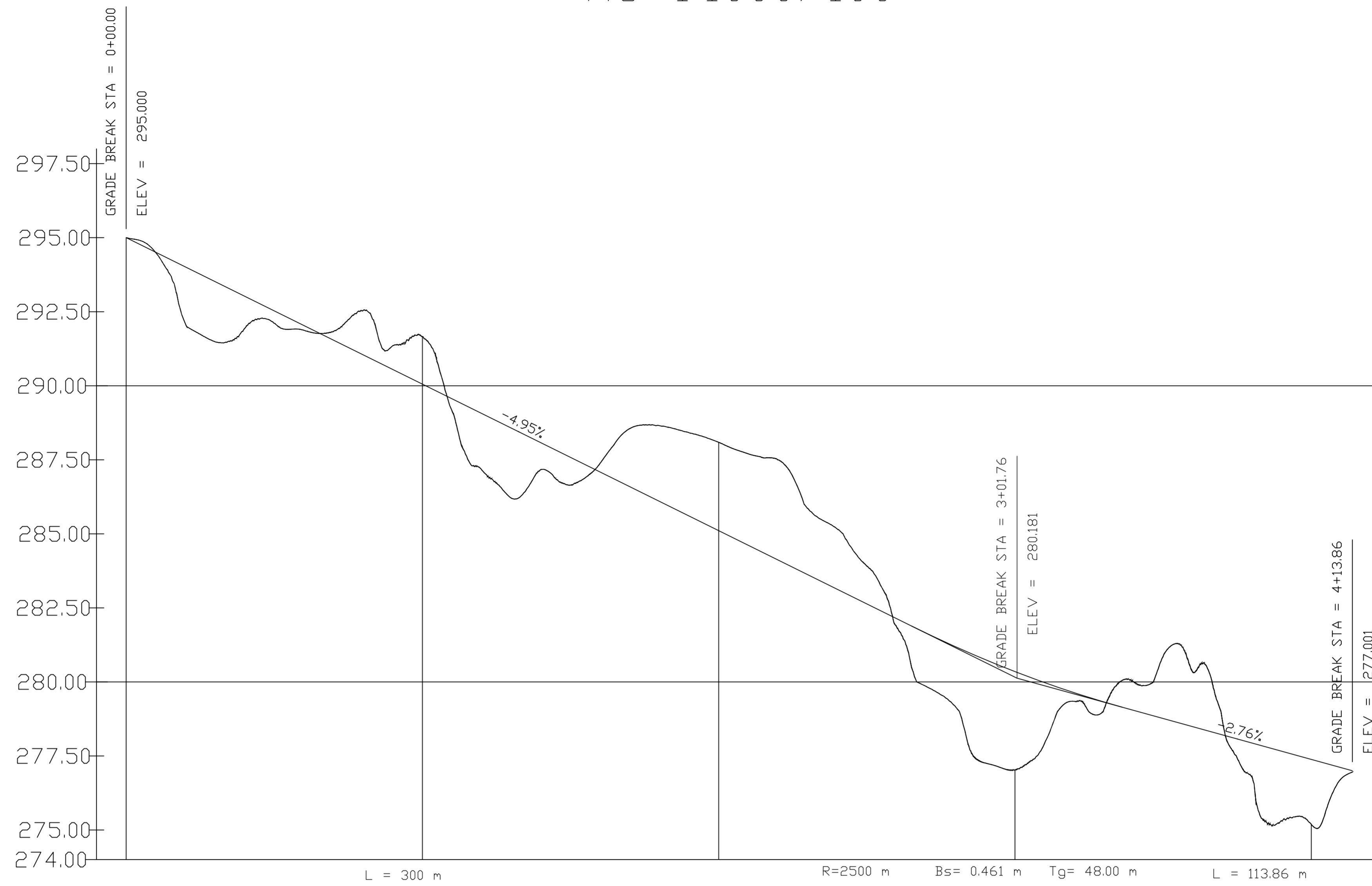
**3. GRAĐEVINSKA SITUACIJA  
M 1:1000**





**4. UZDUŽNI PRESJEK  
M 1:1000/100**

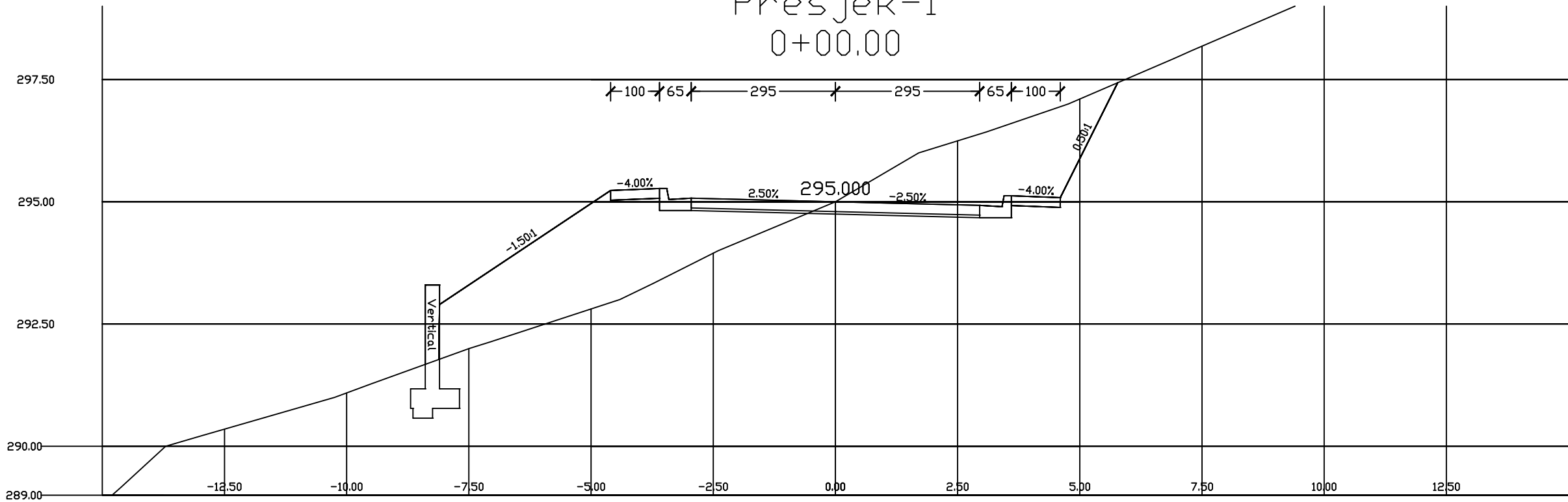
# Uzdužni presjek MJ 1:1000/100



Broj presjeka	Presjek 1 0+00.00	Presjek 2 0+20.00	Presjek 3 0+40.00	Presjek 4 0+60.00	Presjek 5 0+80.00	Presjek 6 1+00.00	Presjek 7 1+20.00	Presjek 8 1+40.00	Presjek 9 1+60.00	Presjek 10 1+80.00	Presjek 11 2+00.00	Presjek 12 2+20.00	Presjek 13 2+40.00	Presjek 14 2+60.00	Presjek 15 2+80.00	Presjek 16 3+00.00	Presjek 17 3+20.00	Presjek 18 3+40.00	Presjek 19 3+60.00	Presjek 20 3+80.00	Presjek 21 4+00.00	Presjek 22 4+13.86	
Kota terena	295.00	292.10	291.93	291.87	292.54	291.66	287.16	287.17	287.39	288.65	288.09	287.50	285.16	281.87	279.15	277.03	279.34	280.01	280.33	276.78	275.19	276.96	
Kota nivele	295.00	294.01	293.02	292.03	291.04	290.05	289.06	288.08	287.09	286.10	285.11	284.12	283.13	282.14	281.18	280.35	279.63	279.04	278.49	277.94	277.38	277.00	
Horizontalna geometrija	L=65.86		L=40.00		L=40.87 R=80.00		L=40.00		L=13.93		L=40.00 R=120.00		L=16.55 R=120.00		L=40.00		L=25.50		L=40.00 R=100.00		L=7.16 R=100.00		L=4.00
Stacionaza horizontalne geometrije	0+00.00			0+65.86		1+05.86		1+46.72		1+86.72	2+00.65		2+40.65	2+57.20		2+97.20	3+22.70		3+62.70	3+69.86		4+09.86	4+13.86
Vitoperenje				2.50%		4.70%		4.70%	2.50%			2.50%	3.60%	3.60%		2.50%		2.50%	4.10%	4.10%		2.50%	
				-2.50%		-4.70%		-4.70%	-2.50%			2.50%	3.60%	3.60%		2.50%		-2.50%	-4.10%	-4.10%		-2.50%	

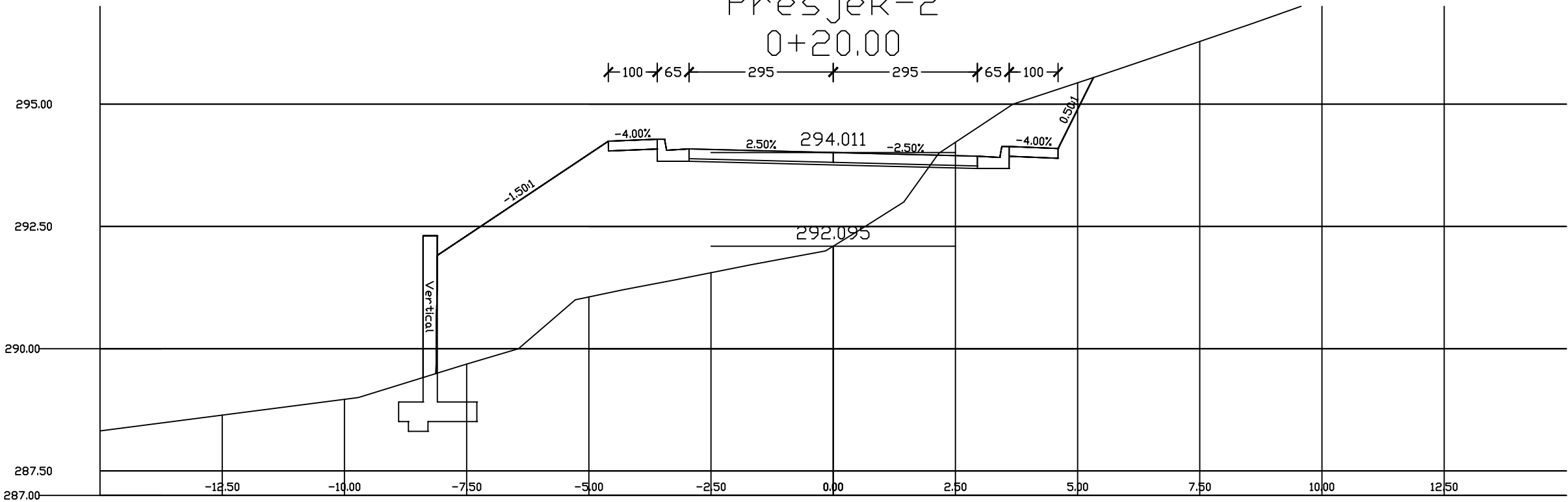
## **5. KARAKTERISTIČNI POPREČNI PRESJECI M 1:100**

### Presjek-1 0+00.00



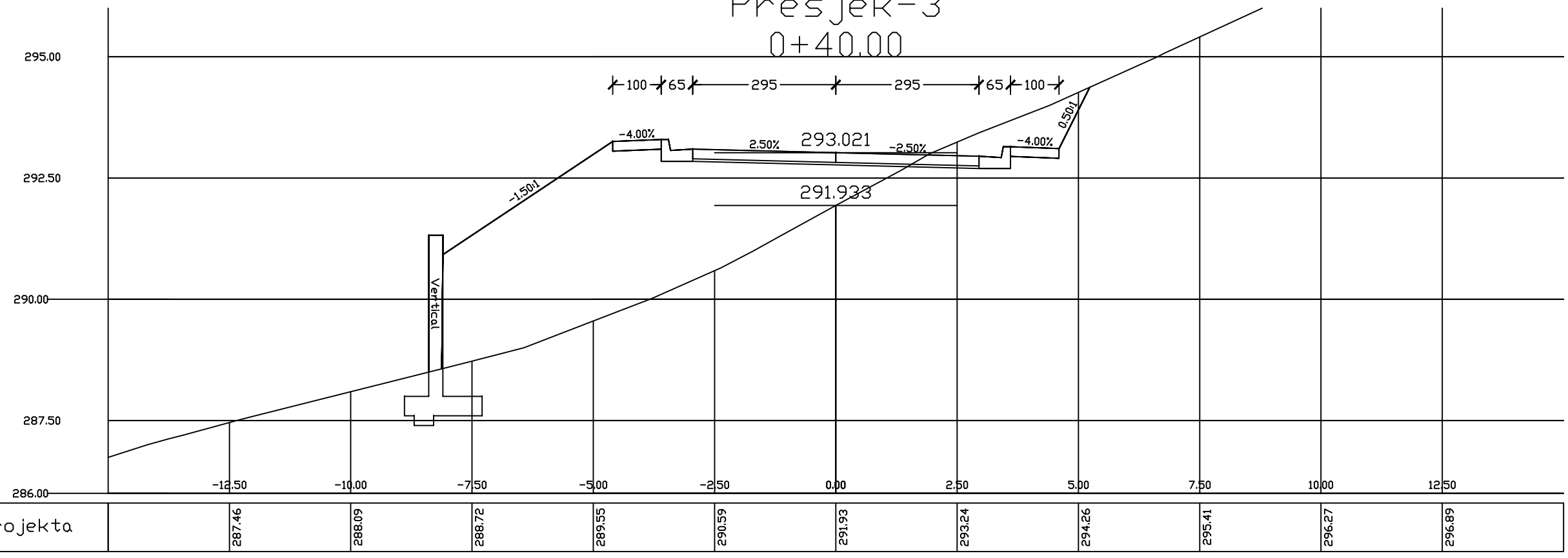
Kote projekta				293.30	294.96	295.06	295.00	294.94	295.88		
---------------	--	--	--	--------	--------	--------	--------	--------	--------	--	--

### Presjek-2 0+20.00

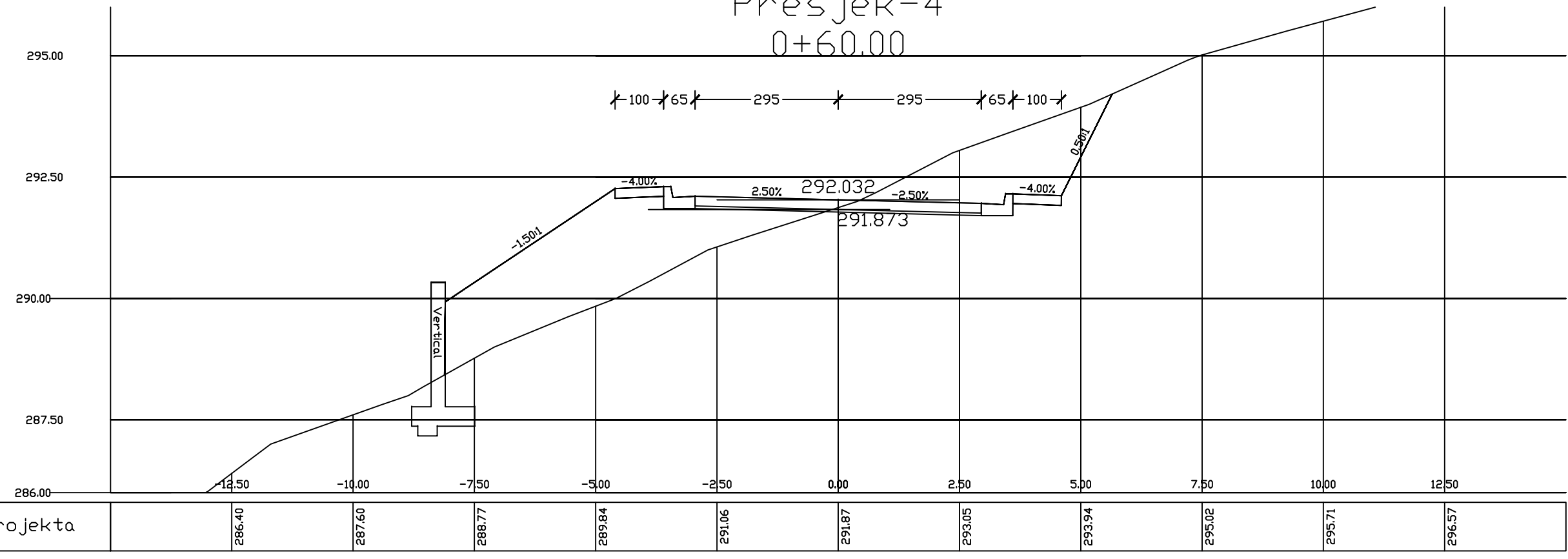


Kote projekta	288.64	288.96	289.69	291.06	291.55	292.10	294.22	295.44	296.28	297.21	298.37
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

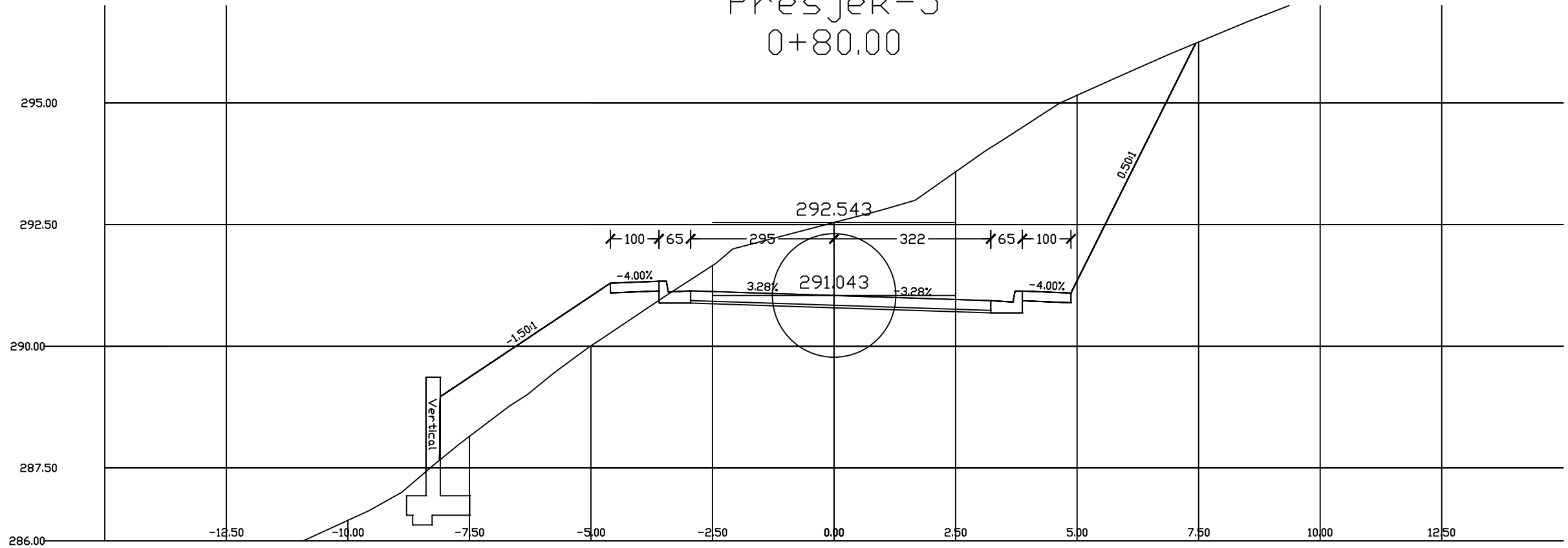
### Presjek-3 0+40.00



### Presjek-4 0+60.00



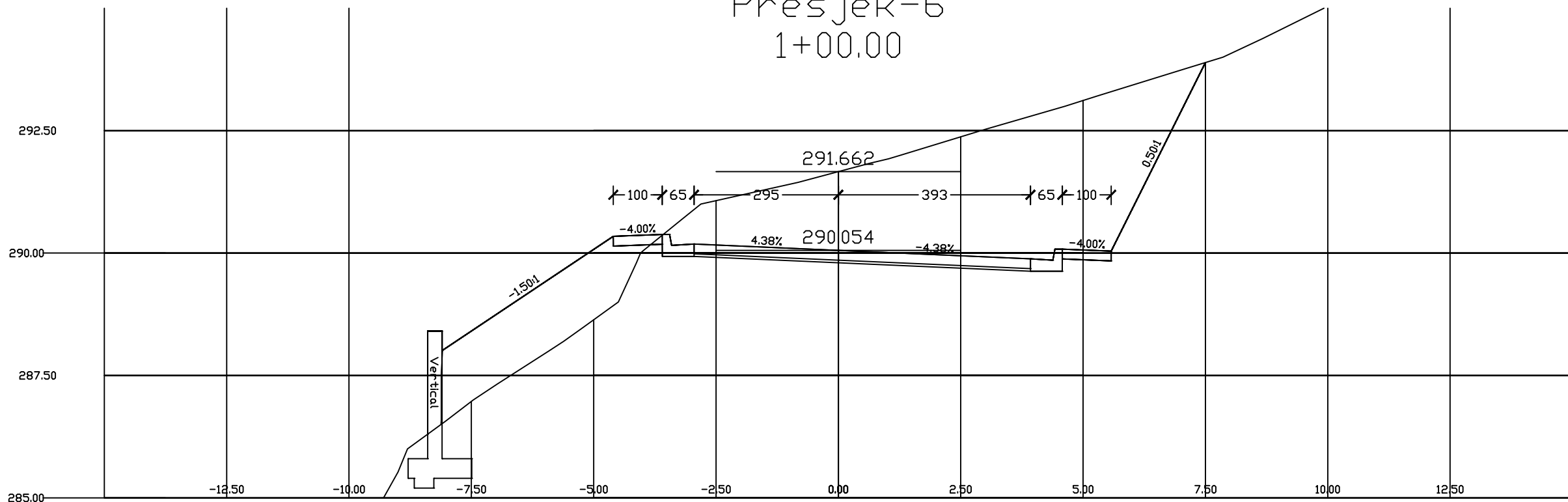
### Presjek-5 0+80.00



Kote projekta

284.91	286.42	288.15	290.01	291.66	292.54	293.58	295.16	296.25	297.35	298.55
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-6 1+00.00

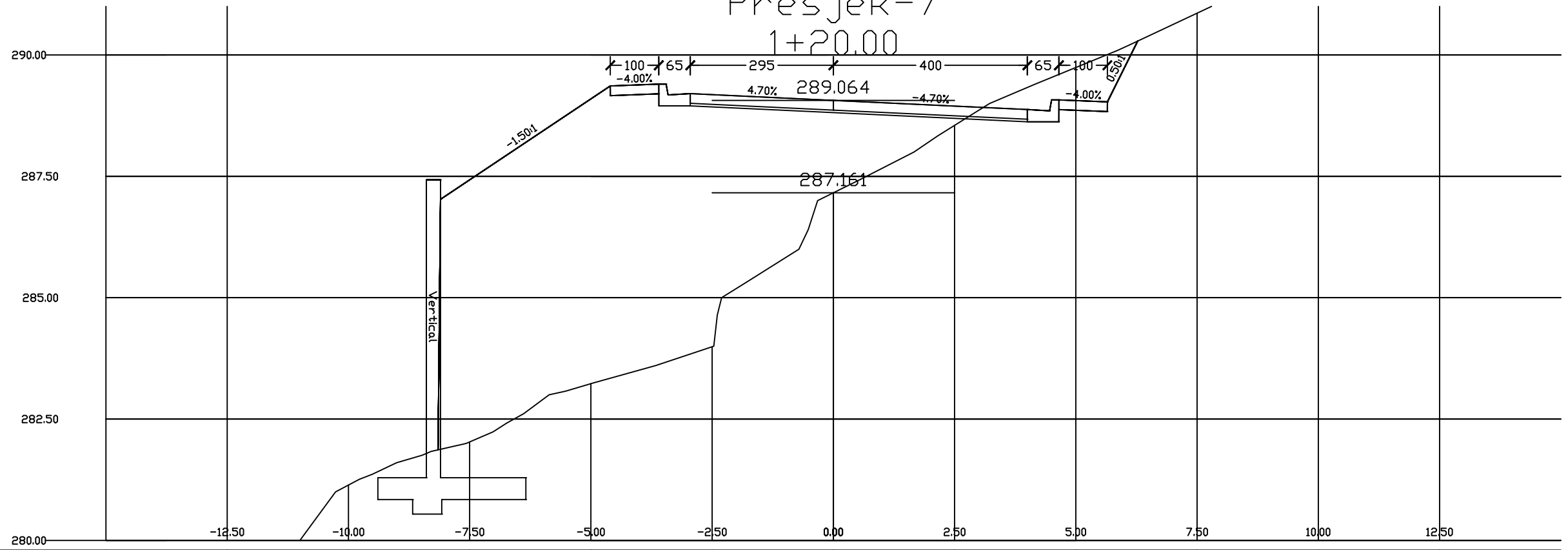


Kote projekta

281.31	284.54	286.97	288.64	291.07	291.66	292.37	293.12	293.89	295.03	295.75
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

# Presjek-7

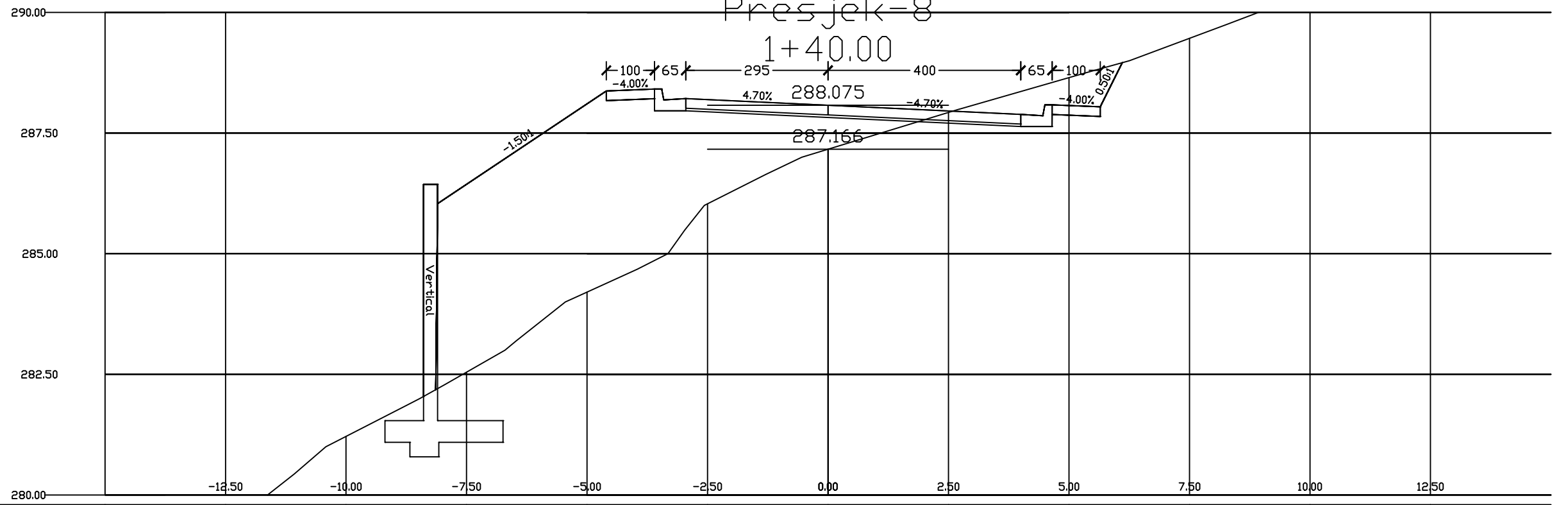
1+20.00



Kote projekta	278.75	281.14	282.03	283.23	283.99	287.16	288.55	289.74	290.86	291.81	293.02
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

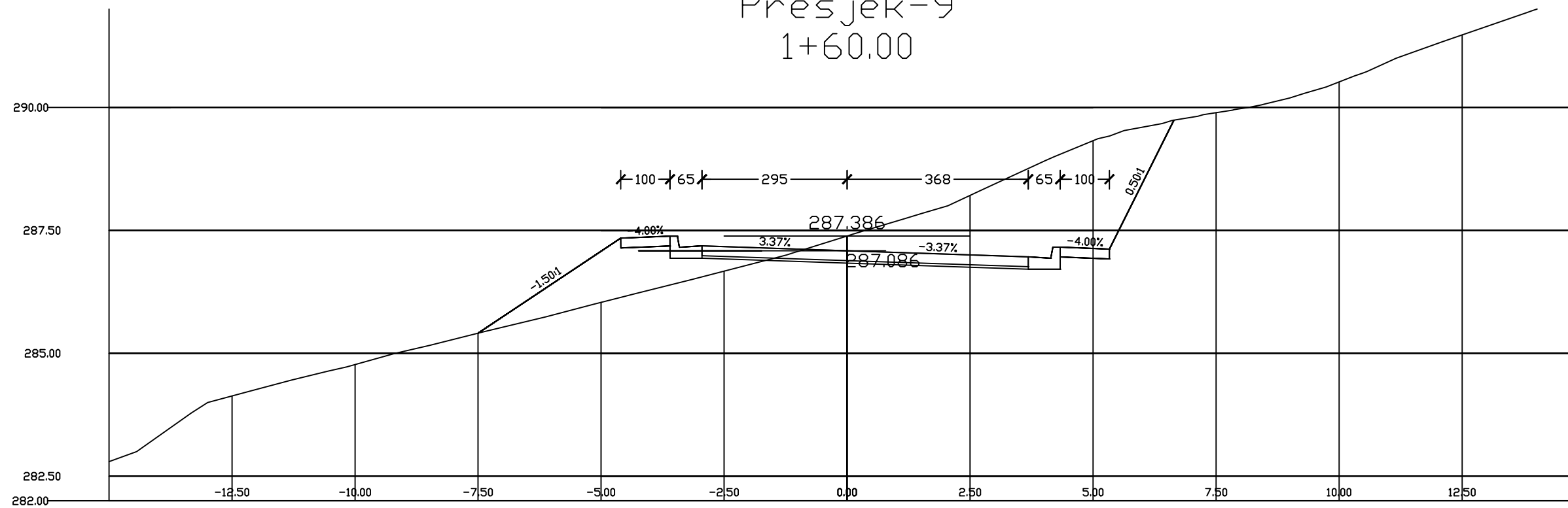
# Presjek-8

1+40.00



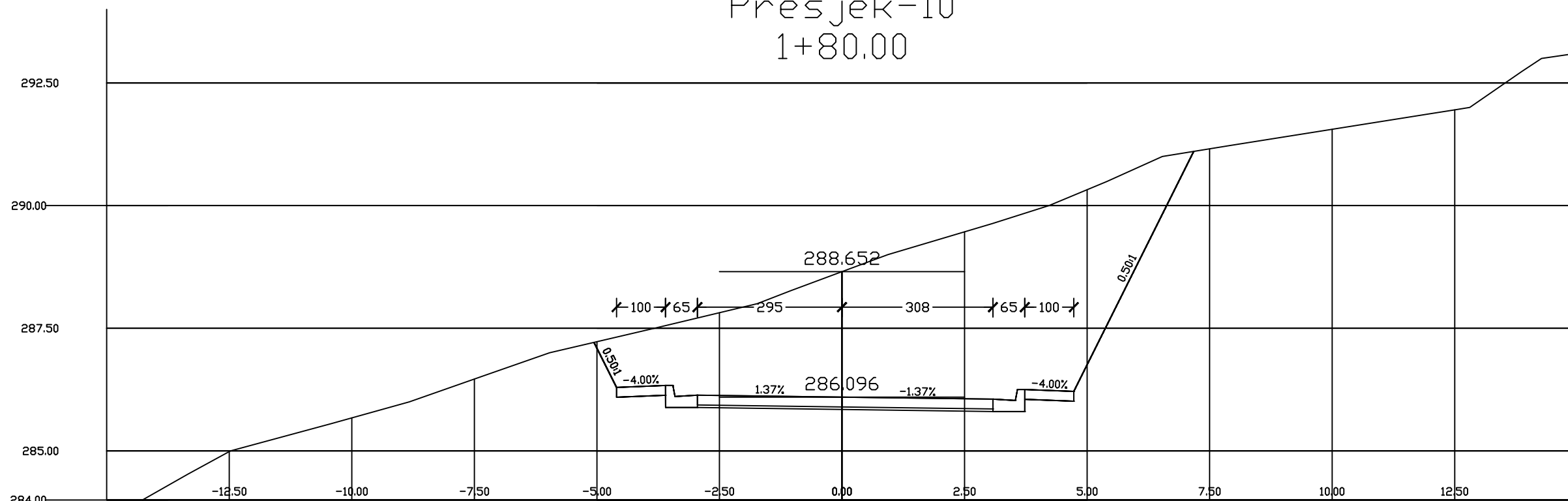
Kote projekta	279.14	281.21	282.54	284.20	286.03	287.17	287.93	288.65	289.46	290.50	291.32
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-9 1+60.00



Kote projekta		284.13	284.77	285.41	286.04	286.67	287.39	288.21	289.32	289.89	290.52	291.47
---------------	--	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

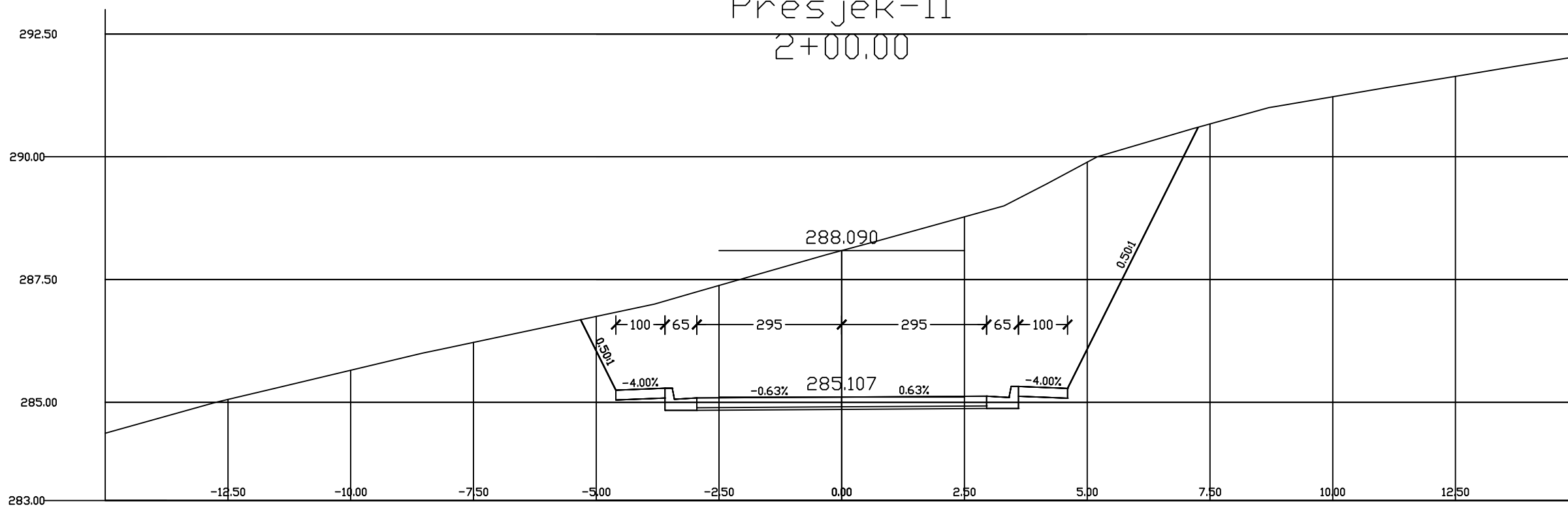
### Presjek-10 1+80.00



Kote projekta		284.99	285.67	286.47	287.23	287.82	288.65	289.46	290.32	291.16	291.55	291.95
---------------	--	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

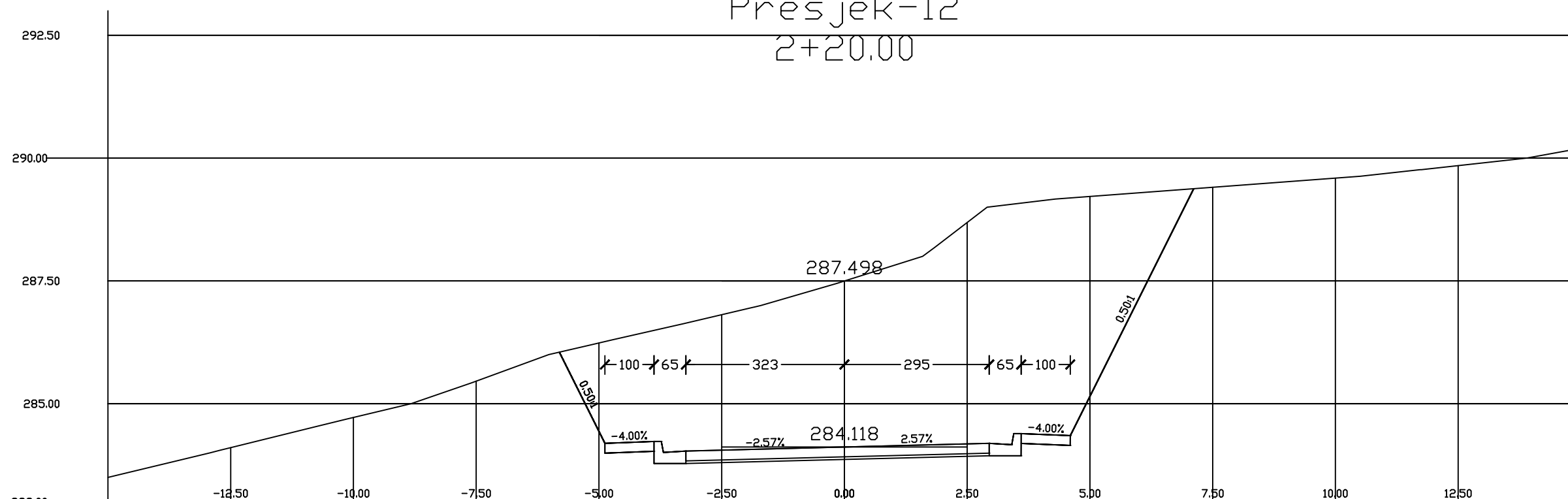


### Presjek-11 2+00.00



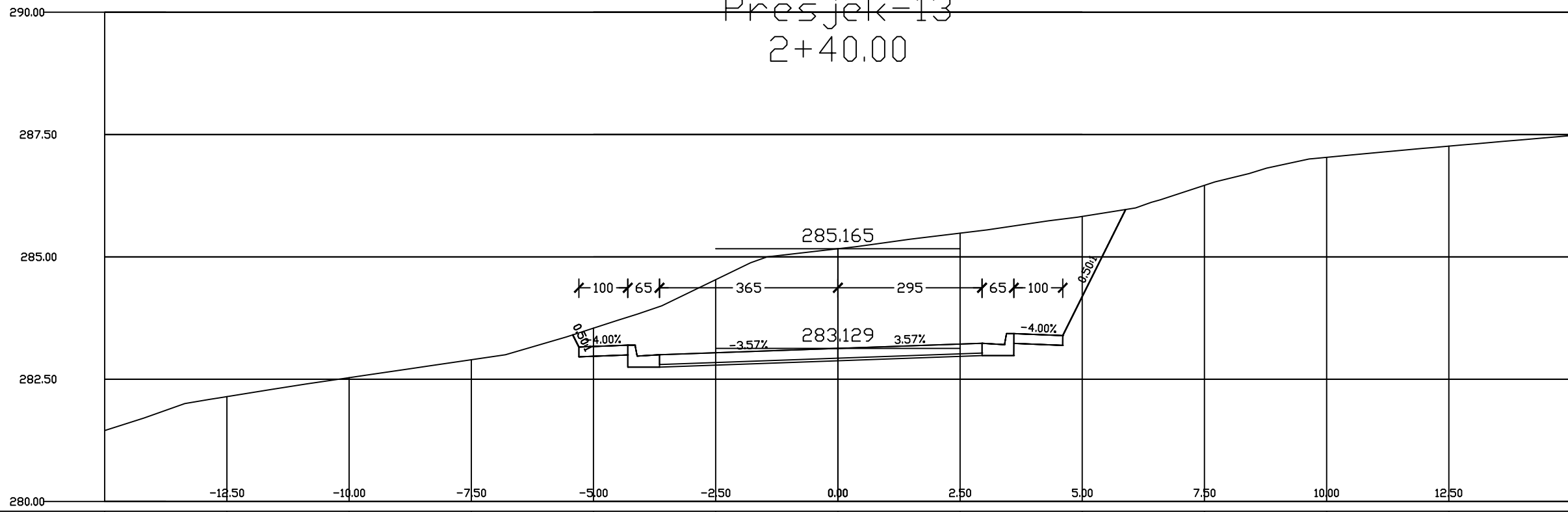
Kote projekta	285.06	285.65	286.22	286.75	287.38	288.09	288.78	289.89	290.67	291.22	291.64
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-12 2+20.00



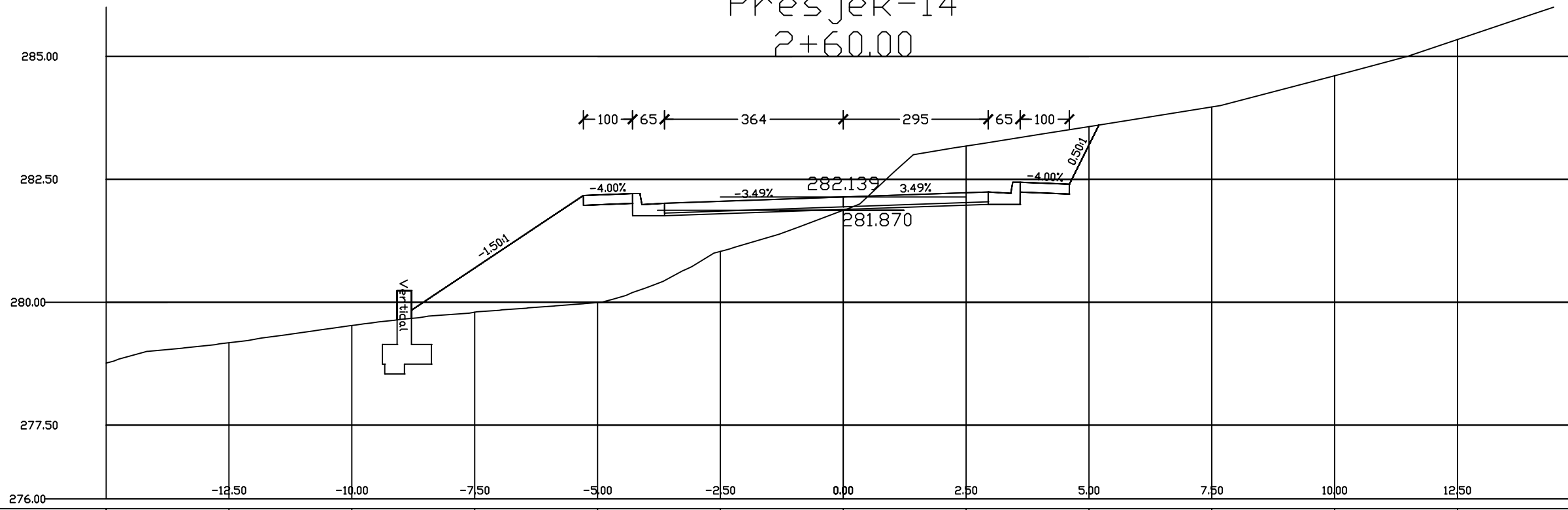
Kote projekta	284.10	284.72	285.46	286.24	286.81	287.50	288.69	289.22	289.41	289.59	289.85
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-13 2+40.00



Kote projekta	282.14	282.53	282.90	283.54	284.53	285.16	285.48	285.83	286.46	287.03	287.26
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

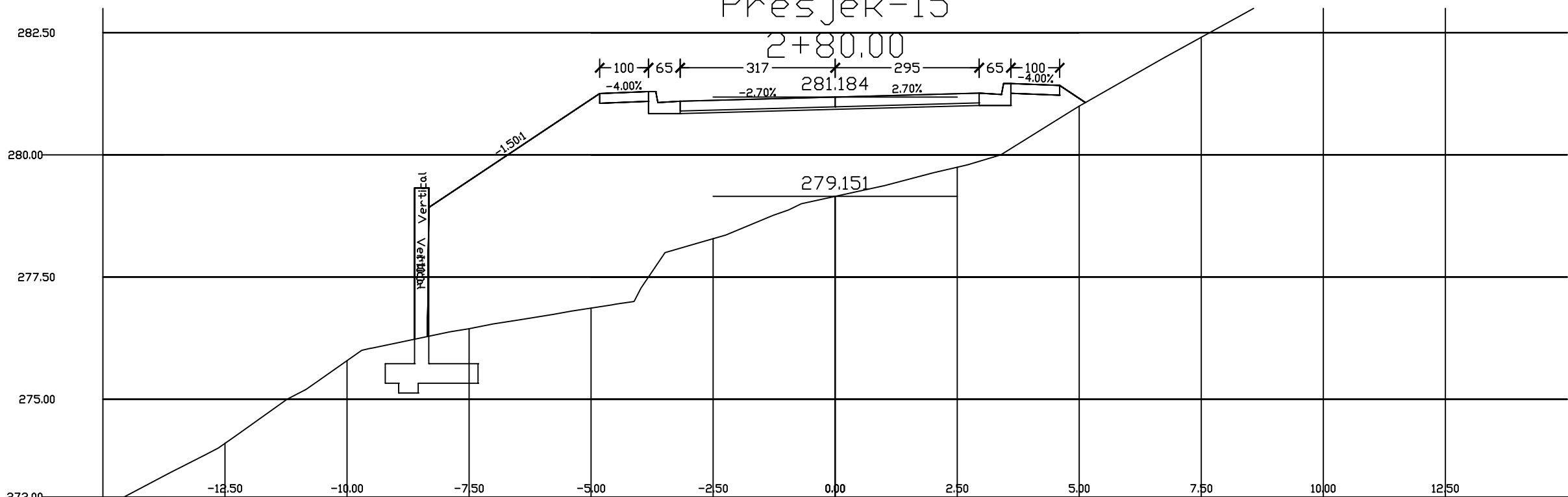
### Presjek-14 2+60.00



Kote projekta	279.18	279.53	279.80	279.99	281.03	281.87	283.18	283.57	283.97	284.61	285.34
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-15

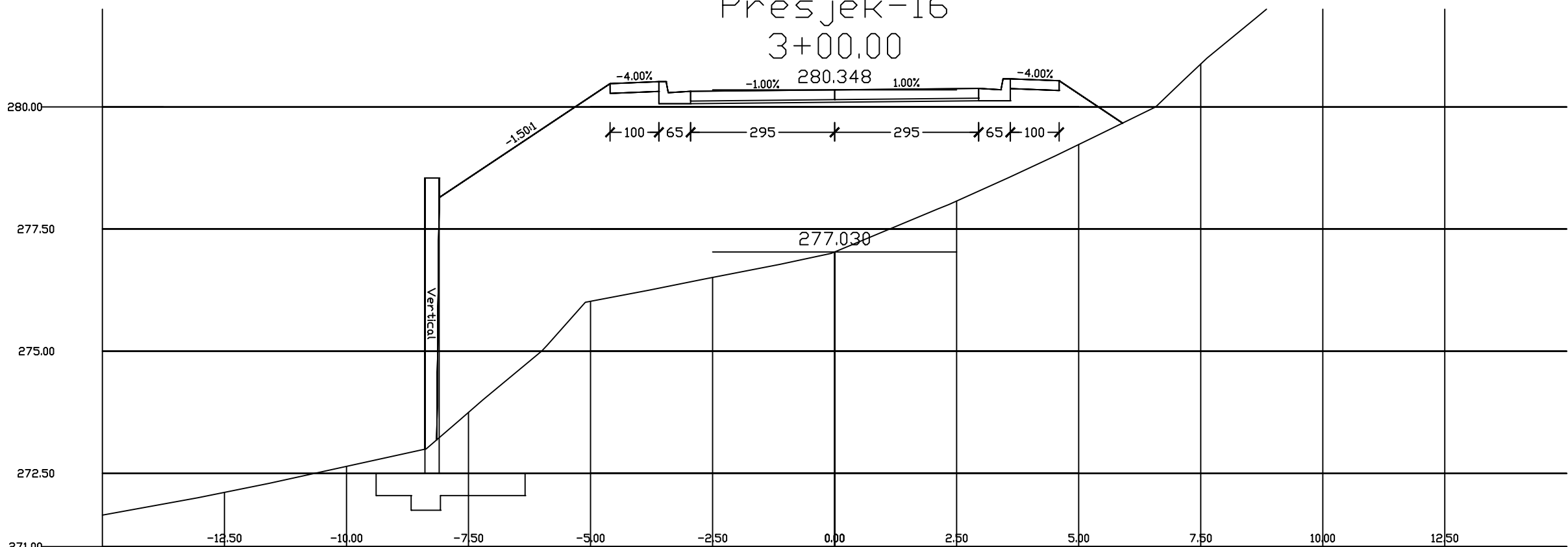
2+80.00



Kote projekta	274.10	275.79	276.44	276.87	278.29	279.15	279.75	281.00	282.41	283.30	283.80
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

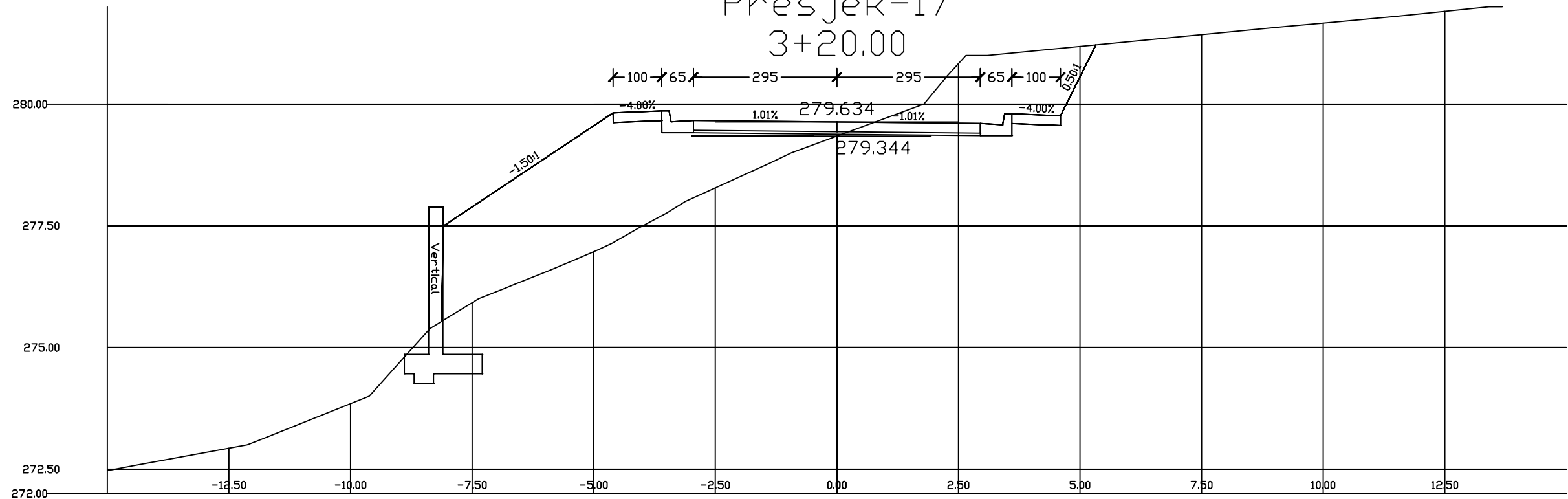
### Presjek-16

3+00.00



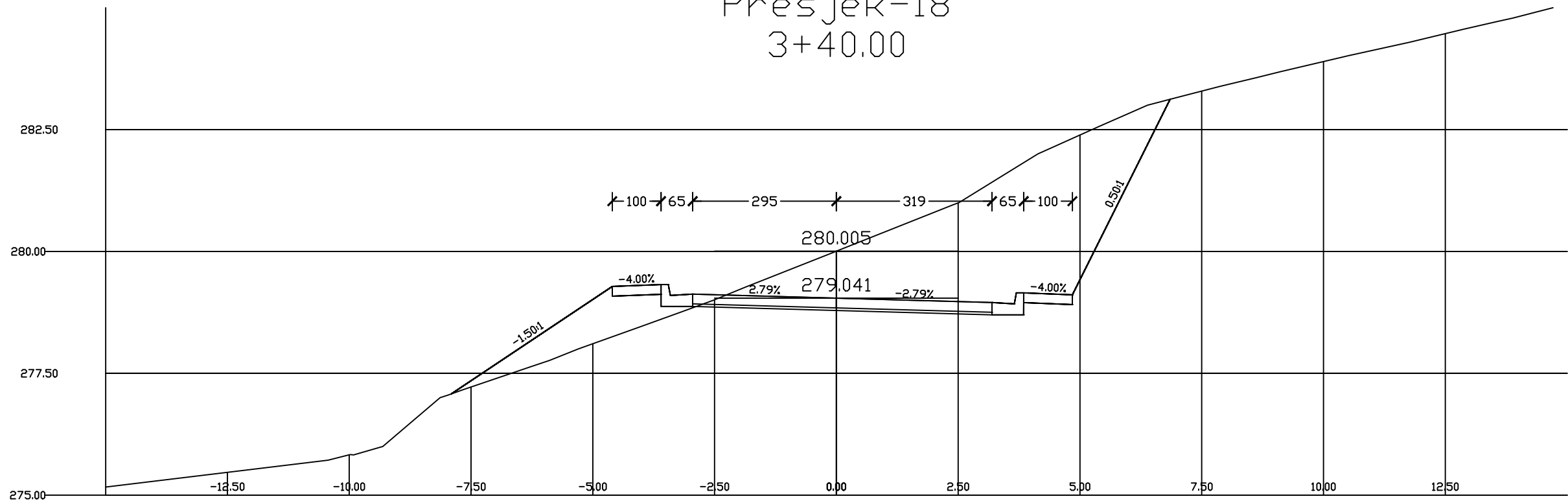
Kote projekta	272.11	272.64	273.75	276.02	276.51	277.03	278.07	279.23	280.88	282.22	282.67
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-17 3+20.00



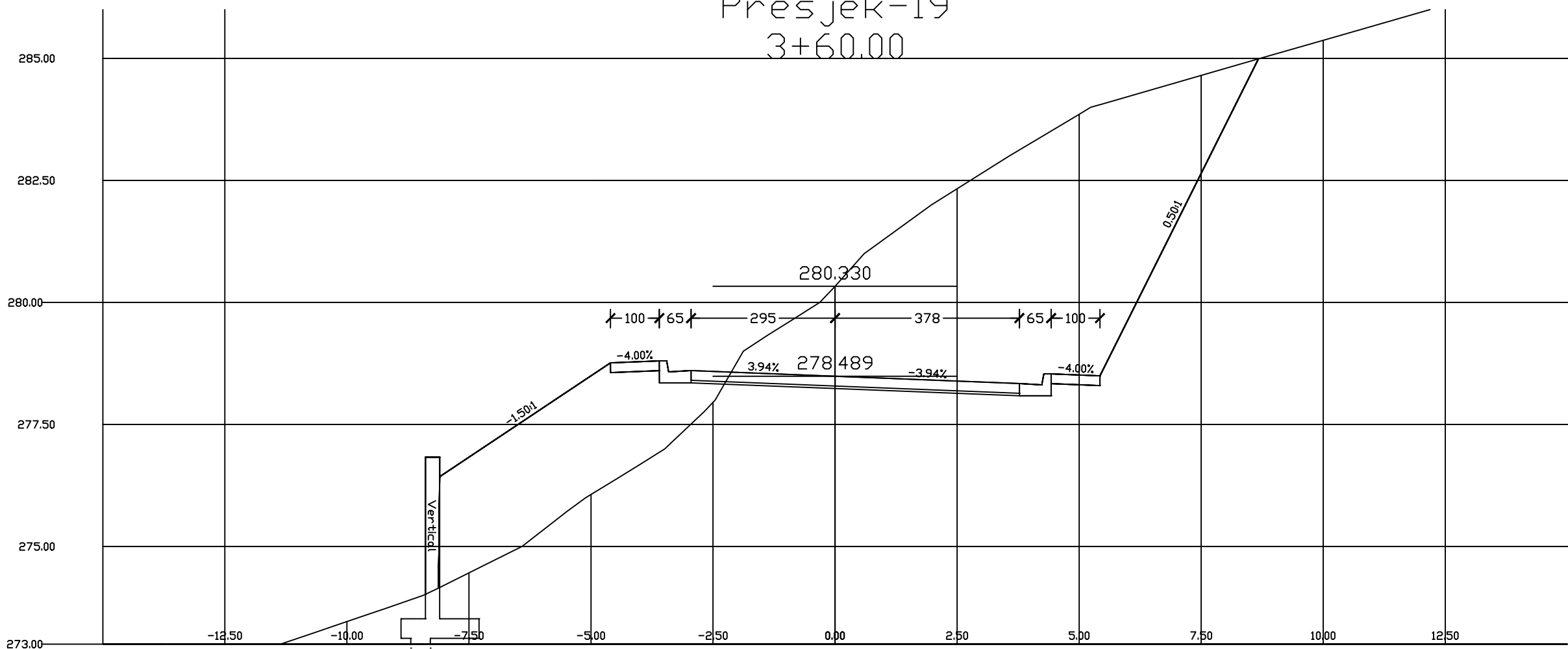
Kote projekta	272.93	273.85	275.92	276.97	278.28	279.34	280.83	281.18	281.43	281.66	281.91
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-18 3+40.00



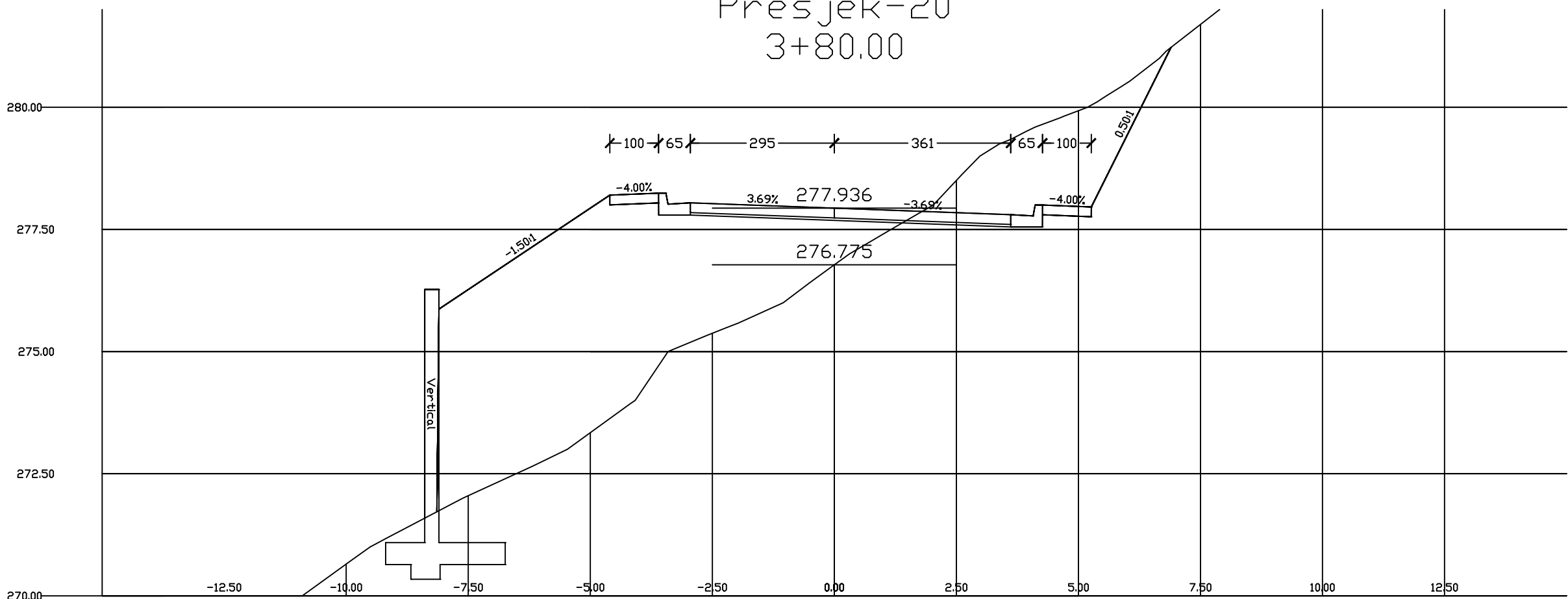
Kote projekta	275.47	275.83	277.22	278.11	279.01	280.01	281.00	282.39	283.29	283.90	284.47
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-19 3+60.00



Kote projekta	272.78	273.46	274.46	276.07	277.95	280.33	282.33	283.86	284.65	285.37	286.09
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

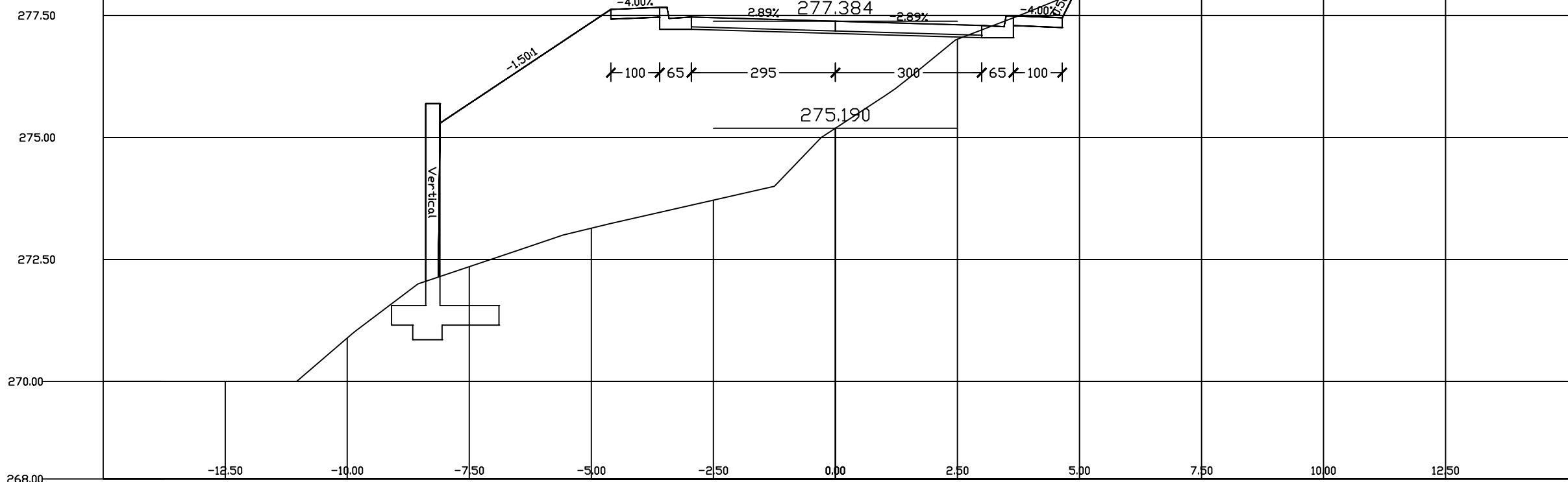
### Presjek-20 3+80.00



Kote projekta	270.00	270.65	272.05	273.34	275.37	276.78	278.50	279.93	281.69	283.20	285.00
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-21

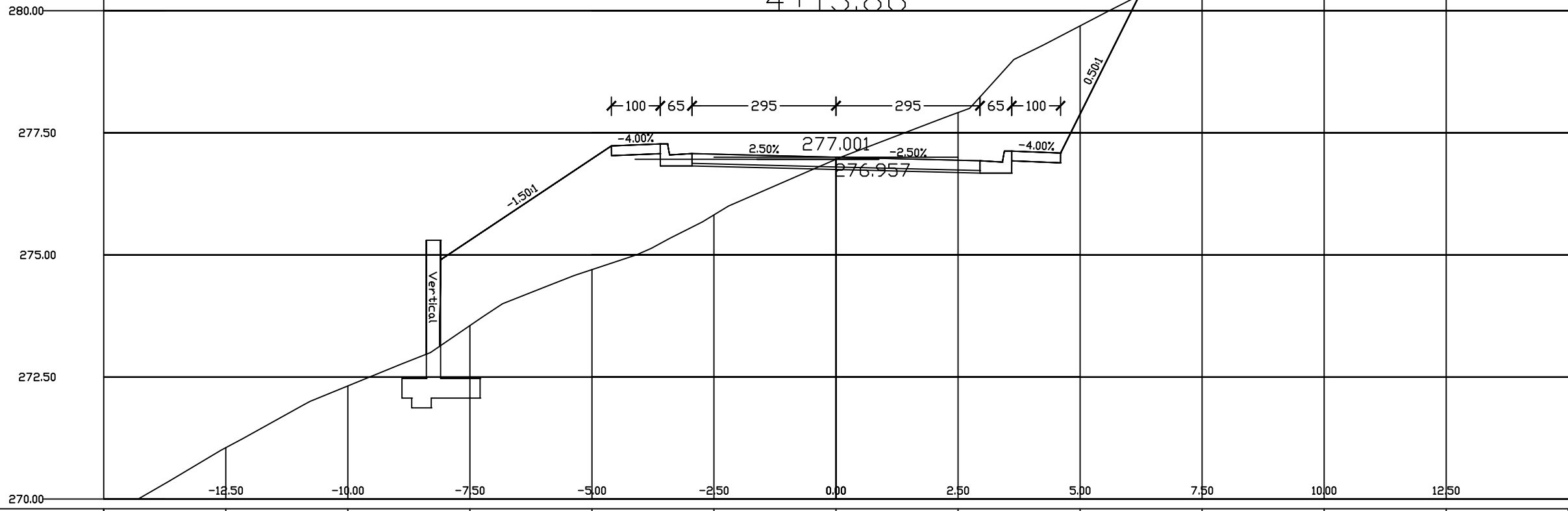
4+00.00



Kote projekta	270.00	270.89	272.35	273.14	273.72	275.19	277.01	278.00	279.54	280.84	281.99
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

### Presjek-22

4+13.86



Kote projekta	271.05	272.32	273.55	274.70	275.82	276.96	277.91	279.69	280.96	281.77	282.76
---------------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

## **6. OBRADA NA RAČUNALU**

## OBRADA NA RAČUNALU

Prilikom izrade predmetnog zadatka korišteno je računalo uz odgovarajući softver Autodesk AutoCAD Civil 3D. Postupak projektiranja trase na računalu sličan je ručnoj izradi rješenja. Radu na računalu prethodi definiranje problema, uočavanje nedostataka te određivanje načina na koje bi se idejno rješenje kvalitetno izradilo.

Prvi korak pri izradi idejnog rješenja na računalu je digitaliziranje terena na temelju zadanih slojnica. Unošenjem slojnica u obliku polilinja te izrada točaka na tim polilinjama dobije se model terena, tj. trodimenzionalni model terena postojećeg stanja na području obuhvaćenim predmetnim zadatkom.

Nakon toga se unose koordinate točaka tangenti (po dvije za svaku tangentu) koje ih definiraju na terenu, ubacuju se odgovarajući kružni lukovi i prijelazne krivine čime se dobiju horizontalni elementi ceste. Sljedeći korak je izrada uzdužnog presjeka ceste. Niveleta se postavlja tako da se u konačnici riješe geometrijski i sigurnosni elementi i odvodnja. Između tangenti interpolira se odgovarajuća kružna krivina.

Poprečnim presjekom definirani su: poprečni nagib i širina kolnika. Kao izlazni podaci dobiju se računalni ispisi koordinatnih točaka osi i količina zemljanih radova po presjeku



## **7. RAČUNALNI ISPIS TOČKA OSI**

## **7.1. KOORDINATNI RAČUN GLAVIH TOČKA OSI**

**Alignment Station and Curve Report****Project Name:**

C:\Users\Strunje\Desktop\završni\završni2\_recoverplot.dwg

**Report Date:** 11.9.2016. 18:04:33**Client:** Client  
Company**Project  
Description:****Prepared by:**  
Preparer**Alignment: Os****Description:**Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	215.155	211.915
End:	0+65.858	272.835	243.701

Tangent Data

Parameter	Value	Parameter	Value
Length:	65.858	Course:	N 28° 51' 28.9873" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+65.858	272.835	243.701
SPI:		296.267	256.614
SC:	1+05.858	306.047	265.793

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.754
Radius:	80.000	S Tan:	13.413
Theta:	14° 19' 26.2016"	P:	0.831
X:	39.751	K:	19.958
Y:	3.318	A:	56.569
Chord:	39.889	Course:	N 33° 37' 48.6127" E

Curve Point Data

Description	Station	Northing	Easting
SC:	1+05.858	306.047	265.793
RP:		251.302	324.127
CS:	1+46.723	327.578	300.004

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	29° 16' 03.0757"	Type:	RIGHT
Radius:	80.000		
Length:	40.865	Tangent:	20.889

Mid-Ord: 2.595 External: 2.682  
 Chord: 40.422 Course: N 57° 48' 56.7266" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+46.723	327.578	300.004
SPI:		331.623	312.793
ST:	1+86.723	333.129	339.505

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.754
Radius:	80.000	S Tan:	13.413
Theta:	14° 19' 26.2016"	P:	0.831
X:	39.751	K:	19.958
Y:	3.318	A:	56.569
Chord:	39.889	Course:	N 82° 00' 04.8406" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+86.723	333.129	339.505
End:	2+00.649	333.912	353.408

Tangent Data

Parameter	Value	Parameter	Value
Length:	13.926	Course:	N 86° 46' 24.4660" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	2+00.649	333.912	353.408
SPI:		335.415	380.072
SC:	2+40.649	338.372	393.109

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.706
Radius:	120.000	S Tan:	13.369
Theta:	09° 32' 57.4677"	P:	0.555
X:	39.889	K:	19.981
Y:	2.218	A:	69.282
Chord:	39.951	Course:	N 83° 35' 28.0066" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+40.649	338.372	393.109
RP:		455.401	366.573
CS:	2+57.202	343.132	408.950

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 54' 12.9763"	Type:	LEFT
Radius:	120.000		
Length:	16.553	Tangent:	8.290
Mid-Ord:	0.285	External:	0.286
Chord:	16.540	Course:	N 73° 16' 20.5102" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+57.202	343.132	408.950
SPI:		347.853	421.457
ST:	2+97.202	361.298	444.531

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.706
Radius:	120.000	S Tan:	13.369
Theta:	09° 32' 57.4677"	P:	0.555
X:	39.889	K:	19.981
Y:	2.218	A:	69.282
Chord:	39.951	Course:	N 62° 57' 13.0137" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+97.202	361.298	444.531
End:	3+22.700	374.135	466.562

Tangent Data

Parameter	Value	Parameter	Value
Length:	25.498	Course:	N 59° 46' 16.5543" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	3+22.700	374.135	466.562
SPI:		387.589	489.651
SC:	3+62.700	391.896	502.324

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.723
Radius:	100.000	S Tan:	13.384
Theta:	11° 27' 32.9612"	P:	0.666
X:	39.840	K:	19.973
Y:	2.659	A:	63.246
Chord:	39.929	Course:	N 63° 35' 22.8805" E

Curve Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

SC:	3+62.700	391.896	502.324
RP:		297.214	534.500
CS:	3+69.861	393.955	509.180

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	04° 06' 10.1064"	Type:	RIGHT
Radius:	100.000		
Length:	7.161	Tangent:	3.582
Mid-Ord:	0.064	External:	0.064
Chord:	7.159	Course:	N 73° 16' 54.5688" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	3+69.861	393.955	509.180
SPI:		397.344	522.128
ST:	4+09.861	398.839	548.809

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.723
Radius:	100.000	S Tan:	13.384
Theta:	11° 27' 32.9612"	P:	0.666
X:	39.840	K:	19.973
Y:	2.659	A:	63.246
Chord:	39.929	Course:	N 82° 58' 26.2571" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	4+09.861	398.839	548.809
End:	4+13.863	399.063	552.805

Tangent Data

Parameter	Value	Parameter	Value
Length:	4.002	Course:	N 86° 47' 32.5833" E

**Alignment: Os-Left-2.750-Left-0.000****Description:**Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	216.482	209.507
End:	0+65.858	274.162	241.292

Tangent Data

Parameter	Value	Parameter	Value
-----------	-------	-----------	-------

Length: 65.858 Course: N 28° 51' 28.9873" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+65.858	274.162	241.292
SPI:		297.896	254.372
SC:	1+06.546	307.929	263.787

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.688	L Tan:	27.211
Radius:	82.750	S Tan:	13.641
Theta:	14° 05' 09.3614"	P:	0.832
X:	40.442	K:	20.303
Y:	3.320	A:	58.025
Chord:	40.574	Course:	N 33° 40' 13.9711" E

Curve Point Data

Description	Station	Northing	Easting
SC:	1+06.546	307.929	263.787
RP:		251.302	324.127
CS:	1+48.816	330.200	299.174

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	29° 16' 03.0757"	Type:	RIGHT
Radius:	82.750		
Length:	42.270	Tangent:	21.607
Mid-Ord:	2.684	External:	2.774
Chord:	41.812	Course:	N 57° 48' 56.7266" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+48.816	330.200	299.174
SPI:		334.349	312.293
ST:	1+89.503	335.874	339.350

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.688	L Tan:	27.211
Radius:	82.750	S Tan:	13.641
Theta:	14° 05' 09.3614"	P:	0.832
X:	40.442	K:	20.303
Y:	3.320	A:	58.025
Chord:	40.574	Course:	N 81° 57' 39.4822" E

Tangent Data

Description	PT Station	Northing	Easting
-------------	------------	----------	---------

Start: 1+89.503 335.874 339.350  
 End: 2+02.970 336.632 352.795

Tangent Data

Parameter	Value	Parameter	Value
Length:	13.467	Course:	N 86° 46' 24.4660" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+02.970	336.632	352.795
RP:		606.204	337.599
PT:	2+07.395	336.917	357.211

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	00° 56' 20.2543"	Type:	LEFT
Radius:	270.000		
Length:	4.425	Tangent:	2.212
Mid-Ord:	0.009	External:	0.009
Chord:	4.425	Course:	N 86° 18' 14.3389" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+07.395	336.917	357.211
End:	2+12.845	337.313	362.647

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.450	Course:	N 85° 50' 04.2117" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+12.845	337.313	362.647
RP:		536.785	348.119
CS:	2+42.900	341.736	392.346

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	08° 36' 36.3737"	Type:	LEFT
Radius:	200.000		
Length:	30.055	Tangent:	15.056
Mid-Ord:	0.564	External:	0.566
Chord:	30.027	Course:	N 81° 31' 46.0249" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+42.900	341.736	392.346
SPI:		341.736	392.346
SC:	2+42.900	341.736	392.346



Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	0.000	L Tan:	0.000
Radius:	116.550	S Tan:	0.000
Theta:	00° 00' 00.8397"	P:	0.000
X:	0.000	K:	0.000
Y:	0.000	A:	66.316
Chord:	0.000	Course:	N 77° 13' 27.4185" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+42.900	341.736	392.346
RP:		455.401	366.573
PCC:	2+58.978	346.360	407.731

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 54' 12.9763"	Type:	LEFT
Radius:	116.550		
Length:	16.077	Tangent:	8.051
Mid-Ord:	0.277	External:	0.278
Chord:	16.065	Course:	N 73° 16' 20.5102" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+58.978	346.360	407.731
RP:		533.474	337.103
PT:	2+89.035	359.044	434.950

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	08° 36' 38.8390"	Type:	LEFT
Radius:	200.000		
Length:	30.057	Tangent:	15.057
Mid-Ord:	0.564	External:	0.566
Chord:	30.029	Course:	N 65° 00' 54.6025" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+89.035	359.044	434.950
End:	2+94.485	361.710	439.703

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.450	Course:	N 60° 42' 35.1831" E

Curve Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

PC:	2+94.485	361.710	439.703
RP:		597.191	307.610
PT:	2+98.908	363.905	443.543

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	00° 56' 18.6287"	Type:	LEFT
Radius:	270.000		
Length:	4.423	Tangent:	2.211
Mid-Ord:	0.009	External:	0.009
Chord:	4.423	Course:	N 60° 14' 25.8687" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+98.908	363.905	443.543
End:	3+23.947	376.511	465.177

Tangent Data

Parameter	Value	Parameter	Value
Length:	25.040	Course:	N 59° 46' 16.5543" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	3+23.947	376.511	465.177
SPI:		390.104	488.505
SC:	3+64.497	394.499	501.439

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.550	L Tan:	27.089
Radius:	102.750	S Tan:	13.567
Theta:	11° 18' 20.9143"	P:	0.666
X:	40.392	K:	20.249
Y:	2.660	A:	64.549
Chord:	40.478	Course:	N 63° 36' 56.1931" E

Curve Point Data

Description	Station	Northing	Easting
SC:	3+64.497	394.499	501.439
RP:		297.214	534.500
CS:	3+71.855	396.615	508.484

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	04° 06' 10.1064"	Type:	RIGHT
Radius:	102.750		
Length:	7.358	Tangent:	3.680
Mid-Ord:	0.066	External:	0.066
Chord:	7.356	Course:	N 73° 16' 54.5688" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	3+71.855	396.615	508.484
SPI:		400.074	521.699
ST:	4+12.405	401.585	548.655

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.550	L Tan:	27.089
Radius:	102.750	S Tan:	13.567
Theta:	11° 18' 20.9143"	P:	0.666
X:	40.392	K:	20.249
Y:	2.660	A:	64.549
Chord:	40.478	Course:	N 82° 56' 52.9445" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	4+12.405	401.585	548.655
End:	4+16.407	401.809	552.651

Tangent Data

Parameter	Value	Parameter	Value
Length:	4.002	Course:	N 86° 47' 32.5833" E

**Alignment: Os-Right-2.750-Left-0.000-Left-0.000**

**Description:**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	213.827	214.324
End:	0+65.170	270.905	245.777

Tangent Data

Parameter	Value	Parameter	Value
Length:	65.170	Course:	N 28° 51' 28.9873" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+65.170	270.905	245.777
RP:		184.029	403.425
PT:	0+70.925	275.899	248.635

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	01° 49' 54.4964"	Type:	RIGHT

Radius:	180.000	Tangent:	2.878
Length:	5.755	External:	0.023
Mid-Ord:	0.023	Course:	N 29° 46' 26.2355" E
Chord:	5.755		

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+70.925	275.899	248.635
End:	0+76.666	280.837	251.565

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.741	Course:	N 30° 41' 23.4837" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+76.666	280.837	251.565
RP:		214.486	363.358
CS:	1+05.009	303.446	268.563

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	12° 29' 29.9613"	Type:	RIGHT
Radius:	130.000		
Length:	28.343	Tangent:	14.228
Mid-Ord:	0.772	External:	0.776
Chord:	28.287	Course:	N 36° 56' 08.4643" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+05.009	303.446	268.563
SPI:		303.447	268.563
SC:	1+05.009	303.447	268.564

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	0.001	L Tan:	0.000
Radius:	76.200	S Tan:	0.000
Theta:	00° 00' 01.7439"	P:	0.000
X:	0.001	K:	0.000
Y:	0.000	A:	52.586
Chord:	0.001	Course:	N 43° 10' 54.3169" E

Curve Point Data

Description	Station	Northing	Easting
SC:	1+05.009	303.447	268.564
RP:		251.302	324.127
PCC:	1+43.934	323.955	301.150

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	29° 16' 03.0757"	Type:	RIGHT
Radius:	76.200		
Length:	38.924	Tangent:	19.897
Mid-Ord:	2.472	External:	2.555
Chord:	38.502	Course:	N 57° 48' 56.7266" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	1+43.934	323.955	301.150
RP:		200.006	340.351
PT:	1+72.279	329.500	328.890

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	12° 29' 34.4767"	Type:	RIGHT
Radius:	130.000		
Length:	28.346	Tangent:	14.229
Mid-Ord:	0.772	External:	0.776
Chord:	28.289	Course:	N 78° 41' 45.5028" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+72.279	329.500	328.890
End:	1+78.020	330.006	334.609

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.741	Course:	N 84° 56' 32.7412" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+78.020	330.006	334.609
RP:		150.707	350.477
PT:	1+83.772	330.422	340.346

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	01° 49' 51.7249"	Type:	RIGHT
Radius:	180.000		
Length:	5.752	Tangent:	2.876
Mid-Ord:	0.023	External:	0.023
Chord:	5.752	Course:	N 85° 51' 28.6036" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+83.772	330.422	340.346

End: 1+97.011 331.167 353.563

Tangent Data

Parameter	Value	Parameter	Value
Length:	13.238	Course:	N 86° 46' 24.4660" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+97.011	331.167	353.563
SPI:		332.683	380.456
SC:	2+37.469	335.690	393.717

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.458	L Tan:	27.011
Radius:	122.750	S Tan:	13.521
Theta:	09° 26' 32.3841"	P:	0.555
X:	40.349	K:	20.211
Y:	2.218	A:	70.472
Chord:	40.408	Course:	N 83° 34' 23.0715" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+37.469	335.690	393.717
RP:		455.401	366.573
CS:	2+54.401	340.560	409.921

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 54' 12.9763"	Type:	LEFT
Radius:	122.750		
Length:	16.933	Tangent:	8.480
Mid-Ord:	0.292	External:	0.293
Chord:	16.919	Course:	N 73° 16' 20.5102" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+54.401	340.560	409.921
SPI:		345.362	422.643
ST:	2+94.860	358.922	445.916

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.458	L Tan:	27.011
Radius:	122.750	S Tan:	13.521
Theta:	09° 26' 32.3841"	P:	0.555
X:	40.349	K:	20.211
Y:	2.218	A:	70.472
Chord:	40.408	Course:	N 62° 58' 17.9488" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+94.860	358.922	445.916
End:	3+19.730	371.443	467.404

Tangent Data

Parameter	Value	Parameter	Value
Length:	24.870	Course:	N 59° 46' 16.5543" E

Curve Point Data

Description	Station	Northing	Easting
PC:	3+19.730	371.443	467.404
RP:		181.358	578.164
PT:	3+21.630	372.393	469.050

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	00° 29' 41.8434"	Type:	RIGHT
Radius:	220.000		
Length:	1.900	Tangent:	0.950
Mid-Ord:	0.002	External:	0.002
Chord:	1.900	Course:	N 60° 01' 07.4760" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	3+21.630	372.393	469.050
End:	3+27.237	375.173	473.918

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.606	Course:	N 60° 15' 58.3977" E

Curve Point Data

Description	Station	Northing	Easting
PC:	3+27.237	375.173	473.918
RP:		227.556	558.233
CS:	3+59.634	388.472	503.407

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	10° 55' 08.6310"	Type:	RIGHT
Radius:	170.000		
Length:	32.398	Tangent:	16.248
Mid-Ord:	0.771	External:	0.775
Chord:	32.349	Course:	N 65° 43' 32.7133" E

Spiral Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

CS:	3+59.634	388.472	503.407
SPI:		388.484	503.443
SC:	3+59.710	388.497	503.479

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	0.076	L Tan:	0.038
Radius:	96.410	S Tan:	0.038
Theta:	00° 02' 42.4868"	P:	0.000
X:	0.076	K:	0.000
Y:	0.000	A:	59.874
Chord:	0.076	Course:	N 71° 12' 28.2445" E

Curve Point Data

Description	Station	Northing	Easting
SC:	3+59.710	388.497	503.479
RP:		297.214	534.500
PCC:	3+66.533	390.462	510.011

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	04° 03' 17.0384"	Type:	RIGHT
Radius:	96.410		
Length:	6.823	Tangent:	3.413
Mid-Ord:	0.060	External:	0.060
Chord:	6.821	Course:	N 73° 15' 28.0348" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	3+66.533	390.462	510.011
RP:		226.037	553.192
PT:	3+99.877	395.724	542.883

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 14' 16.7116"	Type:	RIGHT
Radius:	170.000		
Length:	33.344	Tangent:	16.726
Mid-Ord:	0.817	External:	0.821
Chord:	33.290	Course:	N 80° 54' 14.9097" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	3+99.877	395.724	542.883
End:	4+05.403	396.059	548.399

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.526	Course:	N 86° 31' 23.2655" E



Curve Point Data

Description	Station	Northing	Easting
PC:	4+05.403	396.059	548.399
RP:		176.464	561.741
PT:	4+06.437	396.120	549.431

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	00° 16' 09.3177"	Type:	RIGHT
Radius:	220.000		
Length:	1.034	Tangent:	0.517
Mid-Ord:	0.001	External:	0.001
Chord:	1.034	Course:	N 86° 39' 27.9244" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	4+06.437	396.120	549.431
End:	4+09.971	396.317	552.959

Tangent Data

Parameter	Value	Parameter	Value
Length:	3.534	Course:	N 86° 47' 32.5833" E

## **7.2. KOORDINATNI RAČUN DETALJNIH TOČKA OSI**

**Client:**

Client

Client Company

Address 1

Date: 11.9.2016. 18:05:45

**Prepared by:**

Preparer

Your Company Name

123 Main Street

Alignment Name: Os

Description:

Station Range: Start: 0+00.00, End: 413+86.00

Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+00.00	215.1547m	211.9151m	N28° 51' 28.99"E
0+20.00	232.6711m	221.5679m	N28° 51' 28.99"E
0+40.00	250.1875m	231.2208m	N28° 51' 28.99"E
0+60.00	267.7038m	240.8736m	N28° 51' 28.99"E
0+80.00	285.1479m	250.6547m	N30° 38' 54.49"E
1+00.00	301.6394m	261.9358m	N39° 17' 37.06"E
1+20.00	315.4525m	276.3290m	N53° 18' 37.23"E
1+40.00	325.2837m	293.6860m	N67° 38' 03.43"E
1+60.00	330.6348m	312.9128m	N80° 22' 48.65"E
1+80.00	332.7343m	332.7929m	N86° 22' 07.62"E
2+00.00	333.8758m	352.7603m	N86° 46' 24.47"E
2+20.00	335.2525m	372.7115m	N84° 32' 18.89"E
2+40.00	338.2299m	392.4759m	N77° 31' 53.63"E
2+60.00	344.1500m	411.5555m	N68° 01' 53.38"E
2+80.00	352.7913m	429.5803m	N61° 32' 14.68"E
3+00.00	362.7069m	446.9483m	N59° 46' 16.55"E
3+20.00	372.7759m	464.2288m	N59° 46' 16.55"E
3+40.00	382.6574m	481.6157m	N61° 54' 52.90"E
3+60.00	390.9931m	499.7786m	N69° 44' 07.73"E
3+80.00	396.0637m	519.0940m	N80° 24' 22.23"E
4+00.00	398.2476m	538.9660m	N86° 05' 45.42"E

Alignment Name: Os-Left-2.750-Left-0.000

Description:

Station Range: Start: 0+00.00, End: 416+41.00

Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
---------	----------	---------	----------------------

0+00.00	216.4820m	209.5066m	N28° 51' 28.99"E
0+20.00	233.9984m	219.1594m	N28° 51' 28.99"E
0+40.00	251.5147m	228.8123m	N28° 51' 28.99"E
0+60.00	269.0311m	238.4651m	N28° 51' 28.99"E
0+80.00	286.3416m	248.1657m	N30° 35' 18.51"E
1+00.00	302.9204m	259.4329m	N38° 56' 38.20"E
1+20.00	316.9498m	273.7498m	N52° 29' 51.82"E
1+40.00	327.0994m	290.9266m	N66° 20' 44.34"E
1+60.00	332.9332m	310.1542m	N79° 14' 31.46"E
1+80.00	335.3036m	329.9873m	N85° 59' 31.46"E
2+00.00	336.4650m	349.8302m	N86° 46' 24.47"E
2+20.00	337.9605m	369.7721m	N83° 47' 05.07"E
2+40.00	341.1155m	389.5132m	N78° 03' 18.59"E
2+60.00	346.7235m	408.6866m	N69° 01' 39.76"E
2+80.00	354.8029m	426.9730m	N63° 17' 53.28"E
3+00.00	364.4551m	444.4864m	N59° 46' 16.55"E
3+20.00	374.5242m	461.7669m	N59° 46' 16.55"E
3+40.00	384.3821m	479.0163m	N61° 34' 01.57"E
3+60.00	392.9433m	497.1618m	N68° 49' 46.42"E
3+80.00	398.4001m	516.5196m	N79° 28' 27.68"E
4+00.00	400.8207m	536.3912m	N85° 43' 11.89"E

Alignment Name: Os-Right-2.750-Left-0.000-Left-0.000

Description:

Station Range: Start: 0+00.00, End: 409+97.00

Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+00.00	213.8275m	214.3236m	N28° 51' 28.99"E
0+20.00	231.3438m	223.9764m	N28° 51' 28.99"E
0+40.00	248.8602m	233.6293m	N28° 51' 28.99"E
0+60.00	266.3766m	243.2821m	N28° 51' 28.99"E
0+80.00	283.6815m	253.3034m	N32° 09' 33.20"E
1+00.00	299.7289m	265.2068m	N40° 58' 26.24"E
1+20.00	313.3016m	279.8276m	N54° 27' 12.97"E
1+40.00	322.6725m	297.4315m	N69° 29' 30.72"E
1+60.00	327.8419m	316.7283m	N79° 31' 50.21"E
1+80.00	330.1698m	336.5820m	N85° 34' 21.75"E
2+00.00	331.3341m	356.5165m	N86° 43' 16.77"E
2+20.00	332.8649m	376.3741m	N83° 41' 24.64"E
2+40.00	336.2749m	396.1800m	N76° 02' 33.75"E

2+60.00	342.6715m	415.1640m	N66° 51' 38.15"E
2+80.00	351.5908m	433.1133m	N61° 03' 34.06"E
3+00.00	361.5102m	450.3568m	N59° 46' 16.55"E
3+20.00	371.5791m	467.6374m	N59° 50' 29.70"E
3+40.00	381.0819m	485.2283m	N64° 34' 04.54"E
3+60.00	388.5894m	503.7533m	N71° 24' 09.70"E
3+80.00	393.3631m	523.1581m	N79° 49' 26.48"E
4+00.00	395.7318m	543.0057m	N86° 31' 23.27"E

### **7.3. RAČUN KOTA KOLNIKA**

**Client:**

Client

Client Company

Address 1

Date: 11.9.2016. 18:06:44

**Prepared by:**

Preparer

Your Company Name

123 Main Street

Corridor Name: koridor ceste

Description:

Base Alignment Name: Os

Station Range: Start: 0+00.00, End: 4+13.86

## CHAINAGE 0+00.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	204.3025	219.3498	291.1750	-8.692m	RW_Outside
2	204.3025	219.3498	290.7750	-8.692m	RWall_B1
3	204.3463	219.3257	290.5750	-8.642m	RWall_K1
4	204.3463	219.3257	290.7750	-8.642m	RWall_B2
5	204.5652	219.2051	293.2979	-8.392m	RW_Back
6	204.5652	219.2051	291.6750	-8.392m	RW_Hinge
7	204.6966	219.1327	290.5750	-8.242m	RWall_K2
8	204.6966	219.1327	290.7750	-8.242m	RWall_B3
9	204.8112	219.0695	291.7761	-8.111m	Daylight
10	204.8210	219.0641	292.8979	-8.100m	Hinge
11	204.8210	219.0641	293.2979	-8.100m	RW_Top
12	205.1783	218.8672	291.1750	-7.692m	RW_Inside
13	205.1783	218.8672	290.7750	-7.692m	RWall_B4
14	207.8863	217.3749	295.2313	-4.600m	Hinge
15	207.8872	217.3744	295.0313	-4.599m	EPS_Sub
16	208.7622	216.8922	295.2713	-3.600m	Back_Curb
17	208.8935	216.8198	295.2713	-3.450m	Top_Curb
18	208.9301	216.7997	295.0463	-3.408m	Flowline_Gutter
19	209.3314	216.5785	295.0738	-2.950m	Flange
20	211.9151	215.1547	295.0000	0.000m	t
21	214.4988	213.7309	294.9263	2.950m	t
22	214.4988	213.7309	294.9263	2.950m	Flange
23	214.9002	213.5097	294.8988	3.408m	Flowline_Gutter
24	214.9367	213.4896	295.1238	3.450m	Top_Curb
25	215.0680	213.4172	295.1238	3.600m	Back_Curb
26	215.9430	212.9351	294.8838	4.599m	EPS_Sub
27	215.9439	212.9346	295.0838	4.600m	Ditch_In
28	216.9730	212.3674	297.4339	5.775m	Daylight

## CHAINAGE 0+25.00

CHAINAGE 0+50.00

CHAINAGE 0+75.00

CHAINAGE 1+00.00

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	255.1319	307.2070	285.8006	-8.791m	RW_Outside
2	255.1319	307.2070	285.4006	-8.791m	RWall_B1
3	255.2287	307.1279	285.2006	-8.666m	RWall_K1
4	255.2287	307.1279	285.4006	-8.666m	RWall_B2
5	255.4415	306.9537	288.4069	-8.391m	RW_Back
6	255.4415	306.9537	286.3006	-8.391m	RW_Hinge
7	255.5382	306.8746	285.2006	-8.266m	RWall_K2
8	255.5382	306.8746	285.4006	-8.266m	RWall_B3
9	255.6558	306.7783	286.5021	-8.115m	Daylight
10	255.6675	306.7688	288.0069	-8.099m	Hinge
11	255.6675	306.7688	288.4069	-8.099m	RW_Top
12	256.1380	306.3838	285.8006	-7.491m	RW_Inside
13	256.1380	306.3838	285.4006	-7.491m	RWall_B4
14	258.3762	304.5523	290.3402	-4.599m	Hinge
15	258.3769	304.5516	290.1402	-4.598m	EPS_Sub
16	259.1501	303.9190	290.3802	-3.599m	Back_Curb
17	259.2662	303.8240	290.3802	-3.449m	Top_Curb
18	259.2984	303.7976	290.1552	-3.408m	Flowline_Gutter
19	259.6531	303.5073	290.1827	-2.949m	Flange
20	261.9358	301.6394	290.0536	0.000m	t
21	264.9736	299.1535	289.8817	3.925m	t
22	265.3283	298.8633	289.8542	4.384m	Flowline_Gutter
23	265.3606	298.8369	290.0792	4.425m	Top_Curb
24	265.4767	298.7419	290.0792	4.575m	Back_Curb
25	266.2498	298.1092	289.8392	5.574m	EPS_Sub
26	266.2506	298.1086	290.0392	5.575m	Ditch_In
27	267.7409	296.8891	293.8906	7.501m	Daylight

CHAINAGE 1+25.00

CHAINAGE 1+50.00

CHAINAGE 1+75.00

CHAINAGE 2+00.00

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	352.4610	339.1850	286.6813	-5.318m	Daylight
2	352.5014	338.4685	285.2460	-4.600m	Hinge



3	352.5014	338.4675	285.0460	-4.599m	EPS_Sub
4	352.5576	337.4701	285.2860	-3.600m	Back_Curb
5	352.5661	337.3203	285.2860	-3.450m	Top_Curb
6	352.5684	337.2787	285.0610	-3.408m	Flowline_Gutter
7	352.5942	336.8211	285.0885	-2.950m	Flange
8	352.7603	333.8758	285.1072	0.000m	t
9	352.9263	330.9304	285.1258	2.950m	Flange
10	352.9521	330.4729	285.0983	3.408m	Flowline_Gutter
11	352.9544	330.4312	285.3233	3.450m	Top_Curb
12	352.9629	330.2815	285.3233	3.600m	Back_Curb
13	353.0191	329.2841	285.0833	4.599m	EPS_Sub
14	353.0192	329.2831	285.2833	4.600m	EPS
15	353.1689	326.6280	290.6019	7.259m	Daylight

CHAINAGE 2+25.00

CHAINAGE 2+50.00

CHAINAGE 2+75.00

CHAINAGE 3+00.00

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	442.2199	370.8218	272.0443	-9.392m	RWall_B1
2	442.2199	370.8218	272.4943	-9.392m	RW_Outside
3	442.5807	370.2025	271.7443	-8.675m	RWall_K1
4	442.5807	370.2025	272.0443	-8.675m	RWall_B2
5	442.7234	369.9577	272.9943	-8.392m	RW_Hinge
6	442.7234	369.9577	278.5428	-8.392m	RW_Back
7	442.8454	369.7483	273.1865	-8.150m	Daylight
8	442.8704	369.7054	278.1428	-8.100m	Hinge
9	442.8704	369.7054	278.5428	-8.100m	RW_Top
10	442.8828	369.6841	272.0443	-8.075m	RWall_B3
11	442.8828	369.6841	271.7443	-8.075m	RWall_K2
12	443.7554	368.1865	272.0443	-6.342m	RWall_B4
13	443.7554	368.1865	272.4943	-6.342m	RW_Inside
14	444.6325	366.6814	280.4761	-4.600m	EPS
15	444.6330	366.6805	280.2761	-4.599m	EPS_Sub
16	445.1359	365.8173	280.5161	-3.600m	Back_Curb
17	445.2114	365.6877	280.5161	-3.450m	Top_Curb
18	445.2324	365.6517	280.2911	-3.408m	Flowline_Gutter
19	445.4632	365.2557	280.3186	-2.950m	Flange
20	446.9483	362.7069	280.3480	0.000m	t
21	448.4335	360.1580	280.3773	2.950m	t

22	448.6643	359.7620	280.3498	3.408m	Flowline_Gutter
23	448.6853	359.7260	280.5748	3.450m	Top_Curb
24	448.7608	359.5964	280.5748	3.600m	Back_Curb
25	449.2637	358.7332	280.3348	4.599m	EPS_Sub
26	449.2642	358.7324	280.5348	4.600m	Hinge
27	449.9186	357.6093	279.6683	5.900m	Daylight

CHAINAGE 3+25.00

CHAINAGE 3+50.00

CHAINAGE 3+75.00

CHAINAGE 4+00.00

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	538.3470	407.3181	271.5536	-9.092m	RW_Outside
2	538.3470	407.3181	271.1536	-9.092m	RWall_B1
3	538.3765	406.8857	270.8536	-8.658m	RWall_K1
4	538.3765	406.8857	271.1536	-8.658m	RWall_B2
5	538.3947	406.6197	275.6934	-8.392m	RW_Back
6	538.3947	406.6197	272.0536	-8.392m	RW_Hinge
7	538.4124	406.3598	272.1408	-8.131m	Daylight
8	538.4145	406.3284	275.2934	-8.100m	Hinge
9	538.4145	406.3284	275.6934	-8.100m	RW_Top
10	538.4174	406.2871	271.1536	-8.058m	RWall_B3
11	538.4174	406.2871	270.8536	-8.058m	RWall_K2
12	538.4968	405.1232	271.5536	-6.892m	RW_Inside
13	538.4968	405.1232	271.1536	-6.892m	RWall_B4
14	538.6528	402.8365	277.6268	-4.600m	Hinge
15	538.6529	402.8355	277.4268	-4.599m	EPS_Sub
16	538.7209	401.8388	277.6668	-3.600m	Back_Curb
17	538.7311	401.6891	277.6668	-3.450m	Top_Curb
18	538.7340	401.6475	277.4418	-3.408m	Flowline_Gutter
19	538.7652	401.1903	277.4693	-2.950m	Flange
20	538.9660	398.2476	277.3839	0.000m	t
21	539.1701	395.2573	277.2972	2.997m	t
22	539.2013	394.8000	277.2697	3.456m	Flowline_Gutter
23	539.2041	394.7584	277.4947	3.497m	Top_Curb
24	539.2143	394.6088	277.4947	3.647m	Back_Curb
25	539.2824	393.6121	277.2547	4.646m	EPS_Sub
26	539.2824	393.6111	277.4547	4.647m	Ditch_In
27	539.2996	393.3597	277.9587	4.899m	Daylight

## **7.4. VERTIKALNI TOK TRASE**

**Client:**

Client

Client Company

Address 1

Date: 11.9.2016. 18:07:31

**Prepared by:**

Preparer

Your Company Name

123 Main Street

Vertical Alignment: Niveleta (1)

Description:

Station Range: Start: 0+00.00, End: 413+86.00

PVI	Station	Grade Out	Curve Length
0.00	0+00.00	-4.95%	
1.00	3+00.68	-2.76%	71.255m
Vertical Curve Information:(sag curve)----- PVC Station: 2+65.06 Elevation: 281.889m PVI Station: 3+00.68 Elevation: 280.127m PVT Station: 3+36.32 Elevation: 279.143m Low Point: 3+36.32 Elevation: 279.143m Grade in: -4.95% Grade out: -2.76% Change: 2.18% K: Curve Length: 71.255m Headlight Distance:			
2.00	4+13.86		

## 8.PRORACUN KOLICINA ZEMLJANIH RADOVA ZA TROŠKOVNIK

### Cut/Fill Report

**Generated:** 2016-09-12 06:26:15  
**By user:** Strunje  
**Drawing:** C:\Users\Strunje\Desktop\ZAVRSNII\C:\Users\Strunje\Desktop\ZAVRSNII\zavrsni2\_recoverplot.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Surface8	fill	1.000	1.000	5754.03	5426.08	6255.87	829.79<Fill>
Totals							
				2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total				5754.03	5426.08	6255.87	829.79<Fill>

\* Value adjusted by cut or fill factor other than 1.0

## 9.PRORAČUN KOLIČINE RADOVA PO PRESJECIMA

## Volume Report

Project: C:\Users\Strunje\appdata\local\temp\završni2\_recoverplot\_1\_1\_2844.sv\$

Alignment: Os

Sample Line Group: Presjek-2

Start Sta: 0+00.000

End Sta: 4+13.863

Station	Cut Area (Sq.m.)	Cut Volume (Cu.m.)	Reusable Volume (Cu.m.)	Fill Area (Sq.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Reusable Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)	Cum. Net Vol. (Cu.m.)
0+00.000	7.40	0.00	0.00	9.93	0.00	0.00	0.00	0.00	0.00
0+20.000	2.82	102.21	102.21	22.23	321.67	102.21	102.21	321.67	-219.46
0+40.000	2.40	52.23	52.23	20.96	431.91	154.44	154.44	753.59	-599.15
0+60.000	5.97	83.77	83.77	10.23	311.90	238.21	238.21	1065.49	-827.27
0+80.000	23.03	288.74	288.74	4.47	148.31	526.96	526.96	1213.80	-686.84
1+00.000	23.05	451.59	451.59	5.52	104.61	978.55	978.55	1318.41	-339.86
1+20.000	2.29	244.93	244.93	41.08	491.46	1223.48	1223.48	1809.86	-586.38
1+40.000	2.32	43.53	43.53	23.80	684.88	1267.01	1267.01	2494.74	-1227.72
1+60.000	10.22	120.40	120.40	3.21	284.51	1387.41	1387.41	2779.25	-1391.84
1+80.000	31.26	410.34	410.34	0.00	32.85	1797.76	1797.76	2812.10	-1014.34
2+00.000	35.99	672.48	672.48	0.00	0.00	2470.24	2470.24	2812.10	-341.86
2+20.000	42.29	784.57	784.57	0.00	0.00	3254.81	3254.81	2812.10	442.71
2+40.000	21.27	639.36	639.36	0.00	0.00	3894.17	3894.17	2812.10	1082.07
2+60.000	4.82	263.41	263.41	9.21	88.35	4157.58	4157.58	2900.45	1257.13
2+80.000	0.00	48.97	48.97	31.36	397.30	4206.55	4206.55	3297.74	908.80
3+00.000	0.00	0.00	0.00	43.43	744.47	4206.55	4206.55	4042.22	164.33
3+20.000	5.12	51.24	51.24	13.06	564.84	4257.79	4257.79	4607.05	-349.27
3+40.000	16.19	211.98	211.98	2.51	157.13	4469.77	4469.77	4764.18	-294.42
3+60.000	34.59	495.89	495.89	11.61	146.59	4965.66	4965.66	4910.77	54.88
3+80.000	6.98	401.01	401.01	27.44	408.75	5366.67	5366.67	5319.52	47.15
4+00.000	0.65	74.62	74.62	31.08	597.62	5441.28	5441.28	5917.14	-475.86
4+13.863	7.97	59.72	59.72	11.26	293.54	5501.00	5501.00	6210.68	-709.68

## 10. LITERATURA

### Literatura

- 1) Prof. dr. sc. Željko Korlaet, "Uvod u projektiranje i građenje cesta", Građevinski Fakultet Sveučilišta u Zagrebu, Zagreb, 1995.
- 2) Ministarstvo pomorstva, prometa i veza, "Pravilnik o osnovnim uvjetima kojima javne ceste izvan naselja i njihovi elementi moraju udovoljavati sa stajališta sigurnosti prometa", Narodne novine, Zagreb, 30. studenoga 2001.
- 3) Hrvatske ceste – Hrvatske autoceste, „Opći tehnički uvjeti za radove na cestama“, Institut građevinarstva Hrvatske, Zagreb, prosinac 2001.
- 4) Ministarstvo mora, turizma, prometa i razvitka, "Pravilnik o prometnim znakovima, signalizaciji i opremi na cestama", Narodne novine, Zagreb, 03. ožujka 2005