Idejno rješenje lokalne ceste

Budanko, Tihana

SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

ZAVRŠNI RAD

Tihana Budanko

Split, 2017.

SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

IDEJNO RJEŠENJE LOKALNE CESTE

Završni rad

Split, 2017.

SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

Split, Matice hrvatske 15

STUDIJ: **PREDDIPLOMSKI SVEUČILIŠNI STUDIJ GRAĐEVINARSTVA**

KANDIDAT: **Tihana Budanko**

BROJ INDEKSA: **4262**

KATEDRA: **Katedra za prometnice**

PREDMET: **Ceste**

ZADATAK ZA ZAVRŠNI RAD

Tema: Idejno rješenje lokalne ceste

Opis zadatka: Uz pomoć programa za projektiranje cesta Autocad Civil 3D potrebno je izraditi idejno rješenje lokalne ceste između zadanih točaka A i B na situaciji koja je preuzeta iz programa iz kolegija Ceste.

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 1:200
7. Računalne ispise koordinatnih točaka osi
8. Proračun količina zemljanih radova
9. Proračun količine radova po presjecima

U Splitu, srpanj 2017.

Voditelj Završnog rada: Dr.sc. Dražen Cvitanić

Sažetak:
Uz pomoć programa za projektiranje cesta AUTOCAD CIVIL 3D izrađeno je idejno rješenje lokalne ceste na posebnoj geodetskoj podlozi prema zadatku iz kolegija Ceste. Cesta je projektirana za godišnji dnevni promet (PGDP) od 950 vozila na dan, na brdovitom terenu. Projektna brzina ceste iznosi 30km/h. Idejno rješenje izrađeno je prema Pravilniku o osnovnim uvjetima za projektiranje ceste.

Ključne riječi:

idejno rješenje, projektna brzina, os ceste, duljina prijelazne krivine, radijus krivine, niveleta, poprečni presjek, uzdužni presjek

Preliminary design of the road section

Abstract:

With the help of the road design software AUTOCAD CIVIL 3D, the conceptual solution of the local road was developed on a special geodetic basis according to the task from course Roads. The road is designed for annual average daily traffic (AADT) of 950 vehicles per day, on hilly terrain. The design speed of the road is 30 km / h. The conceptual solution has been developed according to the Regulations on the basic conditions for the design of public roads.

Keywords:

preliminary design, project speed, road axis, length of transition curve, curve radius, roadway, cross section, longitudinal section

Zahvaljujem se svom mentoru prof. dr. sc. Draženu Cvitaniću te asistentici Danieli Dumanić koji su svojim znanjem i savjetima pomogli pri izradi ovog završnog rada. Također, hvala svim kolegama i profesorima koji su mi kroz zajednički rad olakšali protekle godine studiranja te hvala prijateljima i obitelji na podršci.

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SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

Split, ak.god. 2016/2017.

Katedra za prometnice

Studij: Preddiplomski

Nastavni predmet: CESTE

Student: Tihana Budanko

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 i kota nivelete
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
10. Predmjer radova
11. Aproksimativni troškovnik

Predmetni nastavnik:

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

2. TEHNIČKI OPIS

OPĆENITO

Predmet projekta je dionica ceste od točke A(235) do točke B(215) (naznačenih na geodetskoj podlozi,u mjerilu 1:000). Teren na kojem se gradi cesta je brdovit. Prosječni godišnji dnevni promet ceste je 950 voz/dan, cesta je 5. kategorije. Zbog većih razlika u konfiguraciji terena predviđena projektna brzina iznosi
v_p = 30 km/h , a duljina trase je 312,50 m.

HORIZONTALNI ELEMENTI.

Za projektnu brzinu v_p = 30 km/h prema pravilniku minimalni radijus horizontalne krivine iznosi 25 m. Na projektnoj dionici predviđene su dvije dvije krivine, dvije prijelazice i tri pravca.

Primijenjeni radijusi i prijelaznice su:
1. krivina R = 65 m, L = 40 m.
2. krivina R = 30 m, L = 30 m
Krivine su konstruirane uz pomoć dvije prijelazne krivine oblika klotoide i jednog kružnog luka. Proširenje kružnih lukova za promet teretnih vozila sa priključkom u prvoj krivini iznosi 1,3 m a u drugoj krivini 2,8m.

VERTIKALNI ELEMENTI

Prema pravilniku maksimalni nagib nivelete za ceste 5. kategorije iznosi 12 %.Tok se sastoji od dva pravca i jedne konveksne krivine. Primijenjeni nagibi pravaca su 5,15 % i 8,05 %. Tangenta je dužine 40,60 m,a radijus konveksne krivine iznosi 2800 m.

POPREČNI PRESJEK

Cesta se sastoji od 2 prometna traka širine 2,75 m, s obje strane kolnika je rubni trak koji je izveden kao proširenje kolničke konstrukcije uz označavanje rubnom crtom širine 0,2 m istog poprečnog nagiba kao i kolnik. Strani ceste koja je u nasipu rubni trak nastavlja bankina širine 1 m i minimalnog poprečnog nagiba 4%. Strana ceste koja je u usjeku na rubni trak se nastavlja rigol koji služi za prikupljanje i odvodnju oborinske vode, također u usjeku izvedene su drenaže radi odvodnje podzemne vode. Predviđeni pokos nasipa 1:1.5, a pokos usjeka je 2:1. Cesta je svojim većim dijeom u zasjeku. Poprečni nagib ceste u pravcu iznosi 2,5 %, u 1. krivini 3,6% a u 2. krivini 6,2%.

KOLNIČKA KONSTRUKCIJA

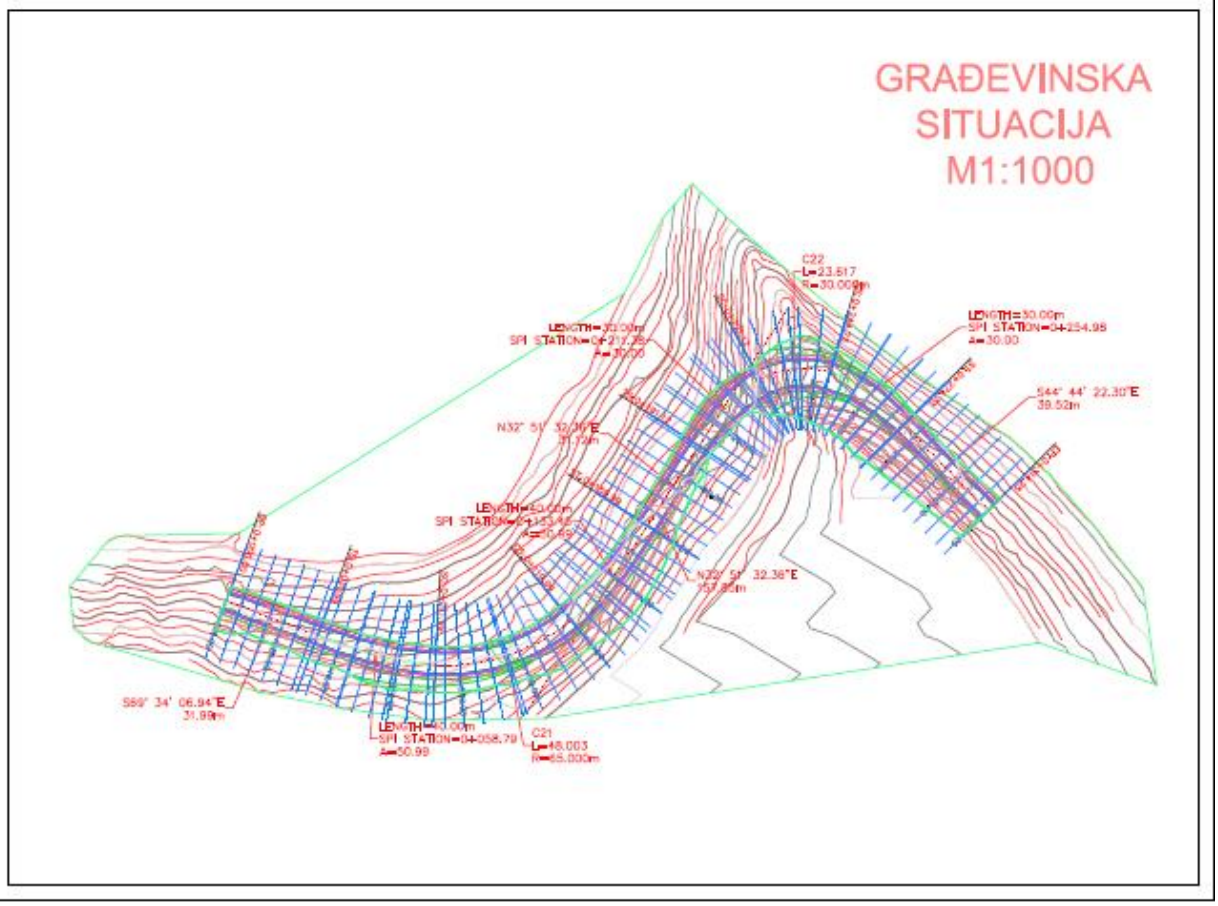
Projektom je predviđena kolnička konstrukcija sa sljedećim slojevima:

- Asfalt- beton habajući sloj- AB11 u debljini od 4cm
-Bitumenizirani nosivi sloj- BNS22 u debljini od 6cm
-Mehanički zbijeni nosivi sloj debljine 30cm.

ODVODNJA

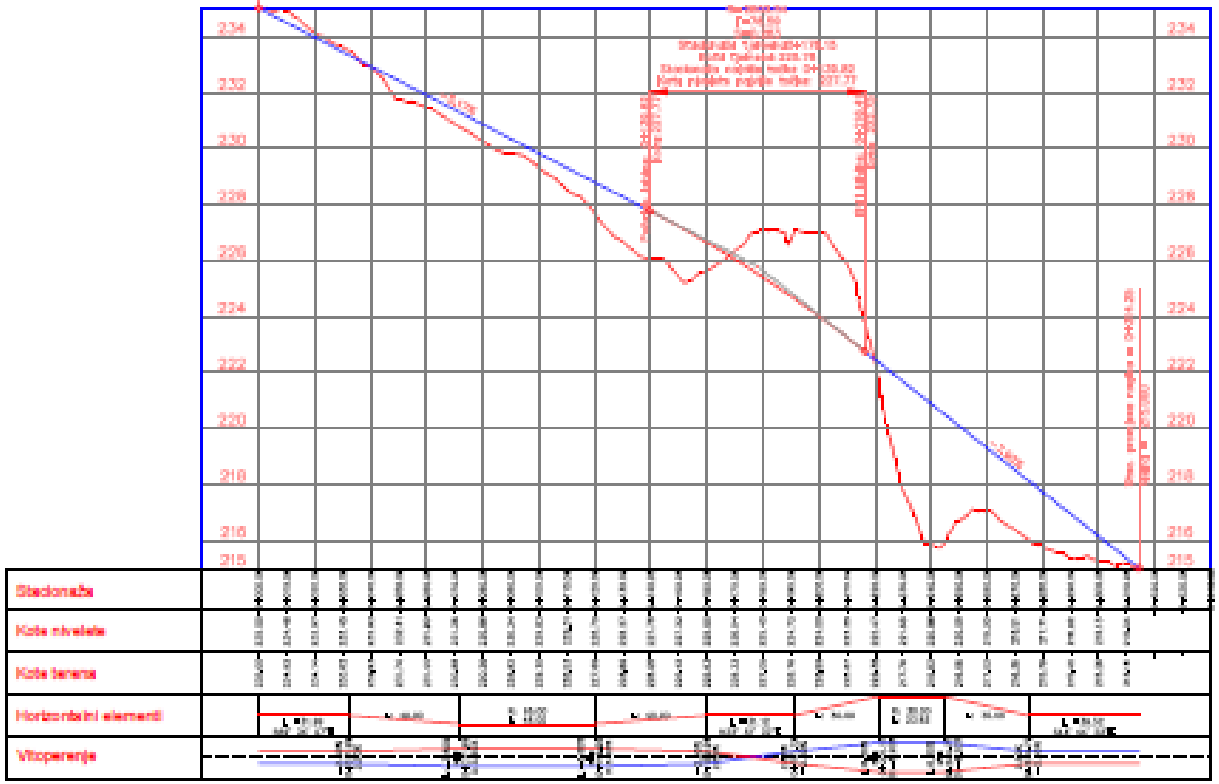
Odvodnja kolnika u zasjeku i usjeku predviđa se betonskim rigolima, na nasipu voda otječe preko bankine u okolni teren. Odvodnja podzemnih voda rješava se drenažom.

3. Građevinska situacija
M 1:1000


GRAĐEVINSKA
SITUACIJA
M1:1000
C22
L=23.617
R=30.000m
LENGTH=30.00m
SPI STATION=0+254.98
A=30.00
S44° 44' 22.30"E
38.52m
N32° 51' 32.36"E
37.74m
N32° 51' 32.36"E
S89° 34' 06.94"E
31.99m
LENGTH=43.00m
SPI STATION=0+058.79
A=30.99
C21
L=48.003
R=55.000m

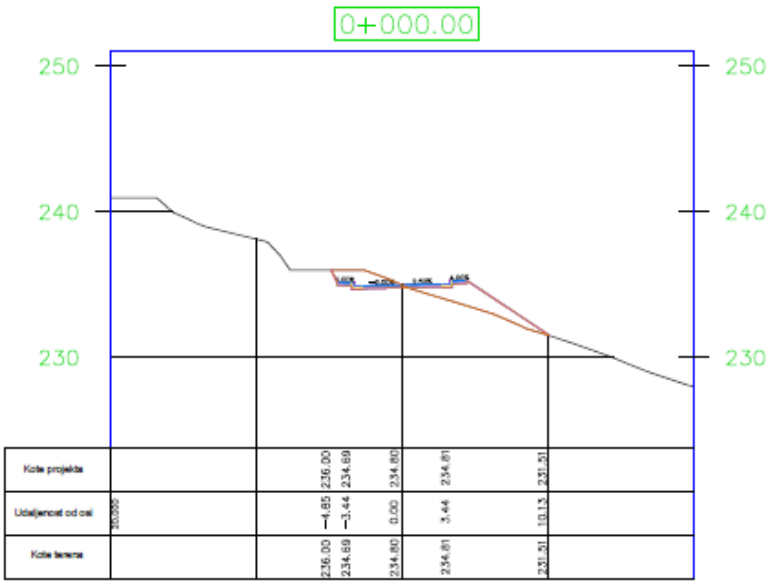
4. Uzdužni presjek
M1:1000/ 1:100

OS1 PROFILE

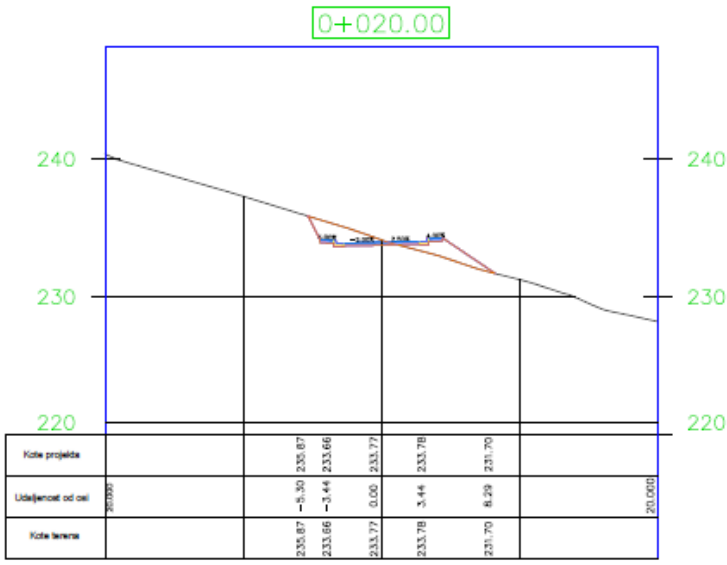


FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE SVEUČILIŠTA U SPLITU		
PREDMET	ZAVRŠNI RAD	Datum: srpanj 2017.
ZADATAK	IDEJNI PROJEKT CESTE	
SADRŽAJ LISTA	UZDOLŽNI PROFILI	M 1:1000 1:100
STUDENT	Thana Budanko	

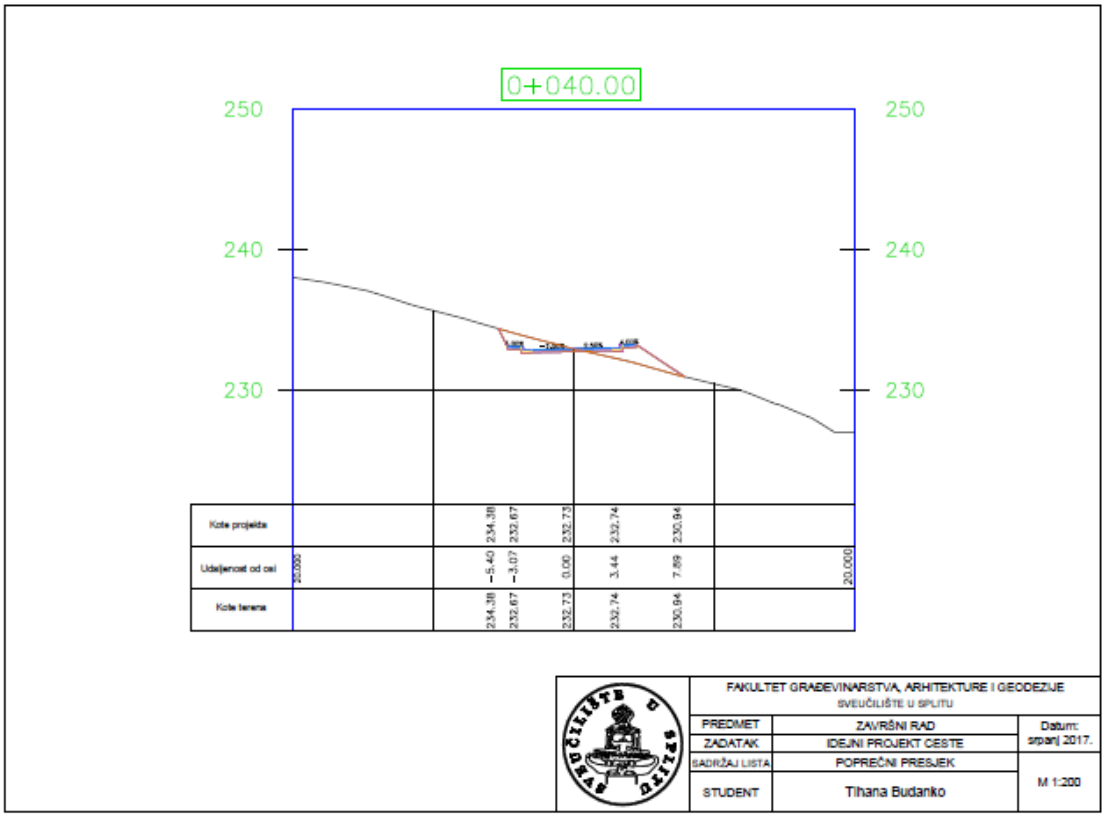
5. Karakteristični poprečni presjeci
M1:200



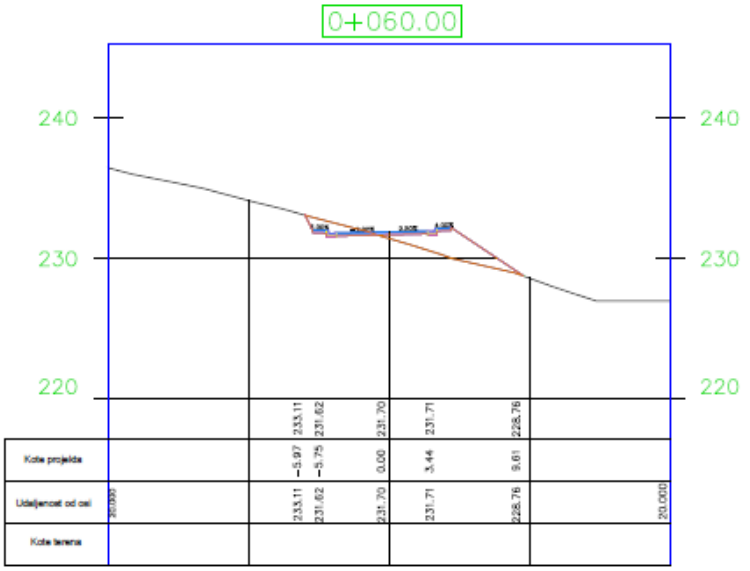
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE SVEUČILIŠTE U SPLITU			
PREDMET	ZAVRŠNI RAD		Datum: srpanj 2017.
ZADATAK	IDEJNI PROJEKT CESTE		
SADRŽAJ LISTA	POPREČNI PRESJEK		M 1:200
STUDENT	Tihana Budanko		



FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE SVEUČILIŠTE U SPLITU			
PREDMET	ZAVRŠNI RAD		Datum: srpanj 2017.
ZADATAK	IDEJNI PROJEKT CESTE		
SADRŽAJ LISTA	POPREČNI PRESJEK		M 1:200
STUDENT	Tihana Budanko		



FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE SVEUČILIŠTE U SPLITU		
PREDMET	ZAVRŠNI RAD	Datum: srpanj 2017.
ZADATAK	IDEJNI PROJEKT CESTE	
SADRŽAJ LISTA	POPREČNI PRESJEK	M 1:200
STUDENT	Tihana Budanko	



FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE SVEUČILIŠTE U SPLITU			
PREDMET	ZAVRŠNI RAD	Datum:	
ZADATAK	IDEJNI PROJEKT CESTE	srpanj 2017.	
SADRŽAJ LISTA	POPREČNI PRESJEK	M 1:200	
STUDENT	Tihana Budanko		

6. Obrada na računalu

OBRADA NA RAČUNALU

Prilikom izrade idejnog rješenja lokalne ceste korišten je softver za projektiranje cesta Autodesk AutoCAD Civil 3D. Postupak projektiranja trase u softveru sličan je ručnoj izradi rješenja, s prednošću što je cijeli postupak značajno brži i jednostavniji.
Prvi korak pri izradi idejnog rješenja na računalu je ubacivanje terena sa skenirane podloge na temelju zadanih slojnica. Unošenjem slojnica u obliku 3D polilinija te postupkom triangulacije na tim polilinijama dobije se model terena, tj. trodimenzionalni model postojećeg terena.
Nakon toga se definira os ceste tako da se postave tangente i 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 riješe geometrijski, sigurnosni elementi i odvodnja. Između tangenti interpolira se odgovarajuća vertikalna kružna krivina.
Poprečnim presjekom definirani su poprečni nagibi, širina kolnika i elementi kolnika. Izlazni podaci su računalni ispisi horizontalnog toka trase, vertikalnog toka trase, kote kolnika te volumeni iskopa, nasipa i skidanje humusa (količina zemljanih radova po presjeku).

7. Računalni ispis točaka osi

7.1. Koordinatni račun glavnih točaka osi

Alignment Station and Curve Report

Client: Client Company

Project Name: D:\Tihana (C)\Dokumenti\ZAVRŠNI RAD\Tihana_završni rad8.dwg

Project Description:

Report Date: 19.5.2017. 9:39:16

Prepared by: Preparer

Alignment: OS1
Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	7316.374	-16796.967
End:	0+31.990	7305.207	-16766.989

Tangent Data

Parameter	Value	Parameter	Value
Length:	31.990	Course:	S 69° 34' 06.9354" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+31.990	7305.207	-16766.989
SPI:		7295.851	-16741.875
SC:	0+71.990	7295.194	-16728.437

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.800
Radius:	65.000	S Tan:	13.455
Theta:	17° 37' 46.0942"	P:	1.022
X:	39.623	K:	19.937
Y:	4.075	A:	50.990
Chord:	39.832	Course:	S 75° 26' 25.3056" E

Curve Point Data

Description	Station	Northing	Easting
SC:	0+71.990	7295.194	-16728.437
RP:		7360.116	-16725.259
CS:	1+19.993	7309.969	-16683.904

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	42° 18' 48.5131"	Type:	LEFT
Radius:	65.000		
Length:	48.003	Tangent:	25.155
Mid-Ord:	4.381	External:	4.698
Chord:	46.920	Course:	N 71° 38' 42.7139" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+19.993	7309.969	-16683.904
SPI:		7318.529	-16673.524
ST:	1+59.993	7341.041	-16658.983

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.800
Radius:	65.000	S Tan:	13.455
Theta:	17° 37' 46.0942"	P:	1.022
X:	39.623	K:	19.937
Y:	4.075	A:	50.990
Chord:	39.832	Course:	N 38° 43' 50.7333" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+59.993	7341.041	-16658.983
End:	1+91.115	7367.184	-16642.097

Tangent Data

Parameter	Value	Parameter	Value
Length:	31.122	Course:	N 32° 51' 32.3631" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+91.115	7367.184	-16642.097
SPI:		7384.210	-16631.100
SC:	2+21.115	7389.097	-16622.096

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.268
Radius:	30.000	S Tan:	10.244
Theta:	28° 38' 52.4031"	P:	1.239
X:	29.259	K:	14.876
Y:	4.911	A:	30.000
Chord:	29.668	Course:	N 42° 23' 16.6308" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+21.115	7389.097	-16622.096
RP:		7362.731	-16607.784
CS:	2+44.732	7391.479	-16599.207

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	45° 06' 20.5275"	Type:	RIGHT
Radius:	30.000		
Length:	23.617	Tangent:	12.459
Mid-Ord:	2.294	External:	2.484
Chord:	23.012	Course:	N 84° 03' 35.0300" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+44.732	7391.479	-16599.207
SPI:		7388.550	-16589.391
ST:	2+74.732	7374.153	-16575.124

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.268
Radius:	30.000	S Tan:	10.244
Theta:	28° 38' 52.4031"	P:	1.239
X:	29.259	K:	14.876
Y:	4.911	A:	30.000
Chord:	29.668	Course:	S 54° 16' 06.5709" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+74.732	7374.153	-16575.124
End:	3+14.251	7346.082	-16547.308

Tangent Data

Parameter	Value	Parameter	Value
Length:	39.518	Course:	S 44° 44' 22.3031" E

7.2. Koordinatni račun detaljnih točaka osi

Client:
Client
Client Company
Address 1

Prepared by:
Preparer
Your Company Name
123 Main Street

Date: 19.5.2017. 9:43:35

Alignment Name: OS1
Description:
Station Range: Start: 0+000.00, End: 31+425.00
Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+000.00	7,316.3740m	-16,796.9666m	S69° 34' 07"E
0+020.00	7,309.3922m	-16,778.2248m	S69° 34' 07"E
0+040.00	7,302.4415m	-16,759.4716m	S70° 16' 32"E
0+060.00	7,296.7690m	-16,740.3099m	S78° 12' 48"E
0+080.00	7,295.2954m	-16,720.4320m	N85° 44' 27"E
0+100.00	7,299.8017m	-16,701.0271m	N68° 06' 41"E
0+120.00	7,309.9733m	-16,683.8984m	N50° 28' 55"E
0+140.00	7,324.5350m	-16,670.2540m	N37° 15' 47"E
0+160.00	7,341.0413m	-16,658.9827m	N32° 51' 32"E
0+180.00	7,357.8476m	-16,648.1273m	N32° 51' 32"E
0+200.00	7,374.5759m	-16,637.1677m	N35° 22' 19"E
0+220.00	7,388.5472m	-16,623.0660m	N59° 25' 01"E
0+240.00	7,392.4690m	-16,603.8299m	S82° 25' 32"E
0+260.00	7,384.1859m	-16,585.8990m	S51° 38' 53"E
0+280.00	7,370.4112m	-16,571.4162m	S44° 44' 22"E
0+300.00	7,356.2049m	-16,557.3385m	S44° 44' 22"E

7.3. Račun kota kolnika

Client:	**Prepared by:**
Client	Preparer
Client Company	Your Company Name
Address 1	123 Main Street

Date: 19.5.2017. 9:46:42

Corridor Name: corridorNOVI
Description:
Base Alignment Name: OS1
Station Range: Start: 0+000.00, End: 0+314.25

CHAINAGE 0+000.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,795.2729	7,320.9204	236.0000	-4.852m	Daylight
2	-16,795.4161	7,320.5362	235.1800	-4.442m	Ditch_In
3	-16,795.4164	7,320.5353	234.9800	-4.441m	EPS_Sub
4	-16,795.7652	7,319.5991	235.1400	-3.442m	Back_Curb
5	-16,795.8175	7,319.4586	235.1400	-3.292m	Top_Curb
6	-16,795.8321	7,319.4195	234.9150	-3.250m	Flowline_Gutter
7	-16,796.0066	7,318.9510	234.9450	-2.750m	Flange
8	-16,796.0066	7,318.9510	234.7450	-2.750m	ETW_SubBase
9	-16,797.9266	7,313.7970	234.8687	2.750m	ETW_SubBase
10	-16,797.9266	7,313.7970	235.0687	2.750m	Flange
11	-16,798.1011	7,313.3284	235.0387	3.250m	Flowline_Gutter
12	-16,798.1157	7,313.2893	235.2637	3.292m	Top_Curb
13	-16,798.1681	7,313.1488	235.2637	3.442m	Back_Curb
14	-16,798.5168	7,312.2126	235.1037	4.441m	EPS_Sub
15	-16,798.5171	7,312.2117	235.3037	4.442m	Hinge
16	-16,800.5036	7,306.8793	231.5102	10.132m	Daylight

CHAINAGE 0+025.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,771.7156	7,312.5425	235.4519	-5.224m	Daylight
2	-16,771.9888	7,311.8091	233.8867	-4.442m	Ditch_In
3	-16,771.9891	7,311.8082	233.6867	-4.441m	EPS_Sub
4	-16,772.3379	7,310.8720	233.8467	-3.442m	Back_Curb
5	-16,772.3902	7,310.7314	233.8467	-3.292m	Top_Curb
6	-16,772.4048	7,310.6924	233.6217	-3.250m	Flowline_Gutter
7	-16,772.5793	7,310.2238	233.6517	-2.750m	Flange
8	-16,772.5793	7,310.2238	233.4517	-2.750m	ETW_SubBase
9	-16,774.4993	7,305.0698	233.5754	2.750m	ETW_SubBase

10	-16,774.4993	7,305.0698	233.7754	2.750m	Flange
11	-16,774.6739	7,304.6013	233.7454	3.250m	Flowline_Gutter
12	-16,774.6884	7,304.5622	233.9704	3.292m	Top_Curb
13	-16,774.7408	7,304.4216	233.9704	3.442m	Back_Curb
14	-16,775.0895	7,303.4855	233.8104	4.441m	EPS_Sub
15	-16,775.0899	7,303.4845	234.0104	4.442m	Hinge
16	-16,776.2412	7,300.3938	231.8116	7.740m	Daylight

CHAINAGE 0+050.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,748.3784	7,304.5849	233.3292	-5.550m	Daylight
2	-16,748.4872	7,304.2257	232.5786	-5.175m	Ditch_In
3	-16,748.4875	7,304.2248	232.3786	-5.174m	EPS_Sub
4	-16,748.7772	7,303.2687	232.5386	-4.175m	Back_Curb
5	-16,748.8207	7,303.1251	232.5386	-4.025m	Top_Curb
6	-16,748.8328	7,303.0852	232.3136	-3.983m	Flowline_Gutter
7	-16,748.9778	7,302.6067	232.3436	-3.483m	Flange
8	-16,748.9778	7,302.6067	232.1436	-3.483m	ETW_SubBase
9	-16,750.7852	7,296.6417	232.2820	2.749m	ETW_SubBase
10	-16,750.7852	7,296.6417	232.4820	2.749m	Flange
11	-16,750.9302	7,296.1632	232.4520	3.249m	Flowline_Gutter
12	-16,750.9423	7,296.1233	232.6770	3.291m	Top_Curb
13	-16,750.9858	7,295.9798	232.6770	3.441m	Back_Curb
14	-16,751.2755	7,295.0237	232.5170	4.440m	EPS_Sub
15	-16,751.2758	7,295.0227	232.7170	4.441m	Hinge
16	-16,752.7277	7,290.2310	229.3791	9.448m	Daylight

CHAINAGE 0+075.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,725.4118	7,301.1973	231.9531	-6.081m	Daylight
2	-16,725.4126	7,300.8578	231.2740	-5.742m	Ditch_In
3	-16,725.4126	7,300.8568	231.0740	-5.741m	EPS_Sub
4	-16,725.4152	7,299.8578	231.2340	-4.742m	Back_Curb
5	-16,725.4156	7,299.7078	231.2340	-4.592m	Top_Curb
6	-16,725.4157	7,299.6661	231.0090	-4.550m	Flowline_Gutter
7	-16,725.4170	7,299.1661	231.0390	-4.050m	Flange
8	-16,725.4170	7,299.1661	230.8390	-4.050m	ETW_SubBase
9	-16,725.4346	7,292.3661	230.9887	2.750m	ETW_SubBase
10	-16,725.4346	7,292.3661	231.1887	2.750m	Flange
11	-16,725.4359	7,291.8661	231.1587	3.250m	Flowline_Gutter
12	-16,725.4360	7,291.8244	231.3837	3.292m	Top_Curb

13	-16,725.4364	7,291.6744	231.3837	3.442m	Back_Curb
14	-16,725.4390	7,290.6754	231.2237	4.441m	EPS_Sub
15	-16,725.4390	7,290.6744	231.4237	4.442m	Hinge
16	-16,725.4504	7,286.2902	228.5009	8.826m	Daylight

CHAINAGE 0+100.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,703.2535	7,305.3431	230.4410	-5.972m	Daylight
2	-16,703.1676	7,305.1295	229.9806	-5.742m	Ditch_In
3	-16,703.1673	7,305.1285	229.7806	-5.741m	EPS_Sub
4	-16,702.7948	7,304.2016	229.9406	-4.742m	Back_Curb
5	-16,702.7389	7,304.0624	229.9406	-4.592m	Top_Curb
6	-16,702.7234	7,304.0237	229.7156	-4.550m	Flowline_Gutter
7	-16,702.5370	7,303.5597	229.7456	-4.050m	Flange
8	-16,702.5370	7,303.5597	229.5456	-4.050m	ETW_SubBase
9	-16,700.0019	7,297.2499	229.6954	2.750m	ETW_SubBase
10	-16,700.0019	7,297.2499	229.8954	2.750m	Flange
11	-16,699.8155	7,296.7860	229.8654	3.250m	Flowline_Gutter
12	-16,699.8000	7,296.7473	230.0904	3.292m	Top_Curb
13	-16,699.7441	7,296.6081	230.0904	3.442m	Back_Curb
14	-16,699.3716	7,295.6811	229.9304	4.441m	EPS_Sub
15	-16,699.3713	7,295.6802	230.1304	4.442m	Hinge
16	-16,697.5910	7,291.2491	226.9468	9.217m	Daylight

CHAINAGE 0+125.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,684.2504	7,317.5801	228.8560	-5.923m	Daylight
2	-16,684.1915	7,317.5183	228.6854	-5.838m	Ditch_In
3	-16,684.1908	7,317.5176	228.4854	-5.837m	EPS_Sub
4	-16,683.5013	7,316.7947	228.6454	-4.838m	Back_Curb
5	-16,683.3977	7,316.6862	228.6454	-4.688m	Top_Curb
6	-16,683.3690	7,316.6560	228.4204	-4.646m	Flowline_Gutter
7	-16,683.0238	7,316.2942	228.4504	-4.146m	Flange
8	-16,683.0238	7,316.2942	228.2504	-4.146m	ETW_SubBase
9	-16,678.2643	7,311.3048	228.4020	2.749m	ETW_SubBase
10	-16,678.2643	7,311.3048	228.6020	2.749m	Flange
11	-16,677.9192	7,310.9430	228.5720	3.249m	Flowline_Gutter
12	-16,677.8904	7,310.9128	228.7970	3.291m	Top_Curb
13	-16,677.7869	7,310.8043	228.7970	3.441m	Back_Curb
14	-16,677.0973	7,310.0814	228.6370	4.440m	EPS_Sub
15	-16,677.0966	7,310.0807	228.8370	4.441m	Hinge

16	-16,672.0154	7,304.7540	223.9293	11.803m	Daylight

CHAINAGE 0+150.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,668.6633	7,335.5145	227.9009	-5.070m	Daylight
2	-16,668.4530	7,335.3729	227.3939	-4.817m	Ditch_In
3	-16,668.4522	7,335.3723	227.1939	-4.816m	EPS_Sub
4	-16,667.6236	7,334.8143	227.3539	-3.817m	Back_Curb
5	-16,667.4992	7,334.7305	227.3539	-3.667m	Top_Curb
6	-16,667.4646	7,334.7072	227.1289	-3.625m	Flowline_Gutter
7	-16,667.0499	7,334.4279	227.1589	-3.125m	Flange
8	-16,667.0499	7,334.4279	226.9589	-3.125m	ETW_SubBase
9	-16,662.1777	7,331.1466	227.0901	2.749m	ETW_SubBase
10	-16,662.1777	7,331.1466	227.2901	2.749m	Flange
11	-16,661.7630	7,330.8673	227.2601	3.249m	Flowline_Gutter
12	-16,661.7284	7,330.8440	227.4851	3.291m	Top_Curb
13	-16,661.6040	7,330.7602	227.4851	3.441m	Back_Curb
14	-16,660.7754	7,330.2022	227.3251	4.440m	EPS_Sub
15	-16,660.7745	7,330.2016	227.5251	4.441m	Hinge
16	-16,654.5176	7,325.9877	222.4960	11.985m	Daylight

CHAINAGE 0+175.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,655.4983	7,356.6563	228.1120	-5.545m	Daylight
2	-16,654.5712	7,356.0575	225.9048	-4.442m	Ditch_In
3	-16,654.5704	7,356.0570	225.7048	-4.441m	EPS_Sub
4	-16,653.7312	7,355.5150	225.8648	-3.442m	Back_Curb
5	-16,653.6052	7,355.4336	225.8648	-3.292m	Top_Curb
6	-16,653.5702	7,355.4109	225.6398	-3.250m	Flowline_Gutter
7	-16,653.1502	7,355.1397	225.6698	-2.750m	Flange
8	-16,653.1502	7,355.1397	225.4698	-2.750m	ETW_SubBase
9	-16,648.5301	7,352.1555	225.5936	2.750m	ETW_SubBase
10	-16,648.5301	7,352.1555	225.7936	2.750m	Flange
11	-16,648.1101	7,351.8842	225.7636	3.250m	Flowline_Gutter
12	-16,648.0751	7,351.8616	225.9886	3.292m	Top_Curb
13	-16,647.9491	7,351.7802	225.9886	3.442m	Back_Curb
14	-16,647.1099	7,351.2382	225.8286	4.441m	EPS_Sub
15	-16,647.1091	7,351.2376	226.0286	4.442m	Hinge
16	-16,645.0994	7,349.9395	224.4336	6.834m	Daylight

CHAINAGE 0+200.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,642.9070	7,378.6503	229.3798	-7.039m	Daylight
2	-16,640.7886	7,377.1464	224.1839	-4.441m	Hinge_Cut
3	-16,640.7878	7,377.1459	223.9839	-4.440m	EPS_Sub
4	-16,639.9732	7,376.5676	224.1439	-3.441m	Back_Curb
5	-16,639.8509	7,376.4807	224.1439	-3.291m	Top_Curb
6	-16,639.8168	7,376.4566	223.9189	-3.249m	Flowline_Gutter
7	-16,639.4091	7,376.1672	223.9489	-2.749m	ETW
8	-16,639.4091	7,376.1672	223.7489	-2.749m	ETW_SubBase
9	-16,634.2199	7,372.4832	224.0943	3.615m	ETW
10	-16,634.2199	7,372.4832	223.8943	3.615m	ETW_SubBase
11	-16,633.8122	7,372.1938	224.0643	4.115m	Flowline_Gutter
12	-16,633.7782	7,372.1696	224.2893	4.157m	Top_Curb
13	-16,633.6559	7,372.0828	224.2893	4.307m	Back_Curb
14	-16,632.8413	7,371.5045	224.1293	5.306m	EPS_Sub
15	-16,632.8405	7,371.5039	224.3293	5.307m	Hinge_Cut
16	-16,632.6004	7,371.3334	224.9182	5.601m	Daylight

CHAINAGE 0+225.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,621.0029	7,397.0348	220.7043	-6.763m	Daylight
2	-16,620.1684	7,394.8691	222.2516	-4.442m	Hinge
3	-16,620.1680	7,394.8681	222.0516	-4.441m	EPS_Sub
4	-16,619.8088	7,393.9359	222.2116	-3.442m	Back_Curb
5	-16,619.7549	7,393.7960	222.2116	-3.292m	Top_Curb
6	-16,619.7399	7,393.7571	221.9866	-3.250m	Flowline_Gutter
7	-16,619.5601	7,393.2905	221.8166	-2.750m	ETW_SubBase
8	-16,619.5601	7,393.2905	222.0166	-2.750m	ETW
9	-16,616.5757	7,385.5456	222.2103	5.550m	Flange
10	-16,616.5757	7,385.5456	222.0103	5.550m	ETW_SubBase
11	-16,616.3959	7,385.0790	222.1803	6.050m	Flowline_Gutter
12	-16,616.3809	7,385.0401	222.4053	6.092m	Top_Curb
13	-16,616.3270	7,384.9002	222.4053	6.242m	Back_Curb
14	-16,615.9678	7,383.9680	222.2453	7.241m	EPS_Sub
15	-16,615.9674	7,383.9670	222.4453	7.242m	Hinge
16	-16,613.1952	7,376.7726	217.3053	14.952m	Daylight

CHAINAGE 0+250.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,591.4156	7,395.5458	218.8020	-6.645m	Daylight
2	-16,592.3741	7,393.5621	220.2708	-4.441m	Hinge

3	-16,592.3745	7,393.5612	220.0708	-4.440m	EPS_Sub
4	-16,592.8092	7,392.6617	220.2308	-3.441m	Back_Curb
5	-16,592.8744	7,392.5266	220.2308	-3.291m	Top_Curb
6	-16,592.8926	7,392.4891	220.0058	-3.250m	Flowline_Gutter
7	-16,593.1101	7,392.0389	219.8358	-2.750m	ETW_SubBase
8	-16,593.1101	7,392.0389	220.0358	-2.750m	ETW
9	-16,596.6422	7,384.7291	220.2250	5.369m	Flange
10	-16,596.6422	7,384.7291	220.0250	5.369m	ETW_SubBase
11	-16,596.8598	7,384.2789	220.1950	5.869m	Flowline_Gutter
12	-16,596.8779	7,384.2413	220.4200	5.910m	Top_Curb
13	-16,596.9432	7,384.1063	220.4200	6.060m	Back_Curb
14	-16,597.3778	7,383.2068	220.2600	7.059m	EPS_Sub
15	-16,597.3782	7,383.2059	220.4600	7.060m	Hinge
16	-16,602.1331	7,373.3655	213.1740	17.989m	Daylight

CHAINAGE 0+275.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,571.4585	7,377.4084	217.9876	-4.895m	Daylight
2	-16,571.7807	7,377.0892	218.2899	-4.442m	Hinge
3	-16,571.7814	7,377.0885	218.0899	-4.441m	EPS_Sub
4	-16,572.4910	7,376.3853	218.2499	-3.442m	Back_Curb
5	-16,572.5975	7,376.2797	218.2499	-3.292m	Top_Curb
6	-16,572.6271	7,376.2503	218.0249	-3.250m	Flowline_Gutter
7	-16,572.9823	7,375.8984	217.8549	-2.750m	ETW_SubBase
8	-16,572.9823	7,375.8984	218.0549	-2.750m	ETW
9	-16,576.8890	7,372.0270	218.1787	2.750m	Flange
10	-16,576.8890	7,372.0270	217.9787	2.750m	ETW_SubBase
11	-16,577.2442	7,371.6751	218.1487	3.250m	Flowline_Gutter
12	-16,577.2738	7,371.6457	218.3737	3.292m	Top_Curb
13	-16,577.3803	7,371.5402	218.3737	3.442m	Back_Curb
14	-16,578.0900	7,370.8370	218.2137	4.441m	EPS_Sub
15	-16,578.0907	7,370.8363	218.4137	4.442m	Hinge
16	-16,587.0552	7,361.9529	210.0000	17.062m	Daylight

CHAINAGE 0+300.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	-16,553.9753	7,359.5377	216.8954	-4.735m	Daylight
2	-16,554.1835	7,359.3313	216.3091	-4.442m	Ditch_In
3	-16,554.1842	7,359.3306	216.1091	-4.441m	EPS_Sub
4	-16,554.8939	7,358.6274	216.2691	-3.442m	Back_Curb
5	-16,555.0004	7,358.5218	216.2691	-3.292m	Top_Curb

6	-16,555.0300	7,358.4925	216.0441	-3.250m	Flowline_Gutter
7	-16,555.3852	7,358.1406	216.0741	-2.750m	Flange
8	-16,555.3852	7,358.1406	215.8741	-2.750m	ETW_SubBase
9	-16,559.2919	7,354.2692	215.9979	2.750m	ETW_SubBase
10	-16,559.2919	7,354.2692	216.1979	2.750m	Flange
11	-16,559.6471	7,353.9172	216.1679	3.250m	Flowline_Gutter
12	-16,559.6767	7,353.8879	216.3929	3.292m	Top_Curb
13	-16,559.7832	7,353.7823	216.3929	3.442m	Back_Curb
14	-16,560.4928	7,353.0791	216.2329	4.441m	EPS_Sub
15	-16,560.4935	7,353.0784	216.4329	4.442m	Hinge
16	-16,567.3216	7,346.3122	210.0244	14.054m	Daylight

7.4. Vertikalni tok trase

Client:	**Prepared by:**
Client	Preparer
Client Company	Your Company Name
Address 1	123 Main Street

Date: 19.5.2017. 9:47:32

Vertical Alignment: NIVELETA
Description:
Station Range: Start: 0+000.00, End: 0+000.00

PVI	Station	Grade Out	Curve Length

Vertical Alignment: NIVELETA (1)
Description:
Station Range: Start: 0+000.00, End: 31+425.00

PVI	Station	Grade Out	Curve Length
0.00	0+000.00	-5.17%	
1.00	0+178.15	-7.92%	76.594m
	Vertical Curve Information:(crest curve)		
	PVC Station: 0+139.82 Elevation: 227.767m		
	PVI Station: 0+178.15 Elevation: 225.784m		
	PVT Station: 0+216.41 Elevation: 222.752m		
	High Point: 0+139.82 Elevation: 227.767m		
	Grade in: -5.17% Grade out: -7.92%		
	Change: 2.75% K:		
	Curve Length: 76.594m		
	Passing Distance: Stopping Distance:		
2.00	0+314.25		

8. Proračun količina zemljanih radova za troškovnik

Cut/Fill Report

Generated: 2017-05-19 09:55:27

By user: Tihana

Drawing: D:\Tihana (C)\Dokumenti\ZAVRŠNI RAD\D:\Tihana (C)\Dokumenti\ZAVRŠNI RAD\Tihana_završni rad8.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Surface3	full	1.000	1.000	5227.75	1613.01	6527.32	4914.31<Fill>

Totals

	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total	5227.75	1613.01	6527.32	4914.31<Fill>

* Value adjusted by cut or fill factor other than 1.0

9. Proračun količine radova po presjecima

Project: C:\Users\Tihana\appdata\local\temp\Tihana_završni rad8_1_1_4742.sv$
Alignment: OS1
Sample Line Group: Presjeci
Start Sta: 0+000.000
End Sta: 0+314.251

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+000.000	4.30	0.00	0.00	7.78	0.00	0.00	0.00	0.00	0.00
0+005.000	6.17	26.17	26.17	7.16	37.35	26.17	26.17	37.35	-11.18
0+010.000	7.63	34.48	34.48	2.91	25.17	60.65	60.65	62.52	-1.87
0+015.000	7.04	36.66	36.66	3.36	15.65	97.31	97.31	78.17	19.14
0+020.000	5.88	32.30	32.30	4.49	19.61	129.61	129.61	97.78	31.83
0+025.000	5.20	27.71	27.71	3.90	20.98	157.32	157.32	118.77	38.56
0+030.000	5.25	26.14	26.14	4.32	20.56	183.46	183.46	139.33	44.13
0+031.990	5.33	10.53	10.53	4.20	8.48	193.99	193.99	147.81	46.18
0+031.990	5.33	0.00	0.00	4.20	0.00	193.99	193.99	147.81	46.18
0+035.000	5.40	16.15	16.15	4.26	12.74	210.14	210.14	160.55	49.59
0+040.000	4.32	24.31	24.31	4.20	21.16	234.45	234.45	181.72	52.73
0+045.000	2.03	15.67	15.67	7.04	28.61	250.12	250.12	210.33	39.79
0+045.323	1.96	0.64	0.64	7.42	2.34	250.76	250.76	212.66	38.10
0+050.000	2.10	9.27	9.27	11.08	44.39	260.03	260.03	257.06	2.97
0+055.000	2.93	12.18	12.18	11.13	57.43	272.21	272.21	314.49	-42.28
0+058.656	3.10	10.62	10.62	10.60	41.44	282.83	282.83	355.93	-73.10
0+060.000	3.34	4.32	4.32	10.02	13.85	287.16	287.16	369.78	-82.63
0+065.000	3.50	16.28	16.28	7.43	45.89	303.43	303.43	415.68	-112.24
0+070.000	2.88	15.03	15.03	7.84	40.38	318.46	318.46	456.06	-137.60
0+071.989	2.90	5.38	5.38	8.70	17.50	323.85	323.85	473.56	-149.72
0+071.990	2.90	0.00	0.00	8.70	0.00	323.85	323.85	473.57	-149.72
0+075.000	2.30	7.32	7.32	9.10	28.57	331.17	331.17	502.15	-170.97
0+080.000	1.67	9.28	9.28	9.46	49.41	340.45	340.45	551.55	-211.11
0+085.000	1.45	7.29	7.29	9.08	49.23	347.73	347.73	600.78	-253.05
0+090.000	1.50	6.90	6.90	7.33	43.51	354.63	354.63	644.30	-289.66
0+095.000	2.16	8.58	8.58	7.95	40.73	363.21	363.21	685.03	-321.81
0+095.991	2.13	2.12	2.12	8.21	8.01	365.34	365.34	693.04	-327.70
0+100.000	1.69	7.17	7.17	8.91	36.69	372.51	372.51	729.73	-357.23
0+105.000	0.83	5.89	5.89	10.05	50.62	378.40	378.40	780.35	-401.95
0+110.000	1.57	5.60	5.60	13.38	62.76	384.00	384.00	843.11	-459.11
0+115.000	1.74	7.68	7.68	12.78	70.05	391.68	391.68	913.16	-521.48
0+119.993	0.99	6.31	6.31	16.13	76.91	397.99	397.99	990.07	-592.08
0+119.993	0.99	0.00	0.00	16.13	0.01	397.99	397.99	990.08	-592.09
0+120.000	0.99	0.00	0.00	16.13	0.11	398.00	398.00	990.19	-592.19
0+125.000	0.26	2.89	2.89	22.80	103.16	400.89	400.89	1093.35	-692.46
0+130.000	0.03	0.66	0.66	28.66	135.71	401.55	401.55	1229.06	-827.51
0+133.326	0.02	0.07	0.07	30.19	102.77	401.62	401.62	1331.83	-930.21
0+135.000	0.07	0.08	0.08	30.40	50.71	401.70	401.70	1382.54	-980.84
0+139.819	0.31	0.89	0.89	29.07	149.07	402.58	402.58	1531.62	-1129.03
0+140.000	0.33	0.06	0.06	28.98	5.27	402.64	402.64	1536.88	-

									1134.24
0+145.000	0.52	2.04	2.04	26.80	143.85	404.69	404.69	1680.73	-1276.04
0+146.659	0.51	0.85	0.85	26.50	44.22	405.53	405.53	1724.95	-1319.41
0+150.000	0.70	2.01	2.01	26.09	87.83	407.54	407.54	1812.78	-1405.24
0+155.000	0.11	2.02	2.02	23.18	123.16	409.56	409.56	1935.94	-1526.38
0+159.990	0.49	1.50	1.50	15.49	96.47	411.06	411.06	2032.42	-1621.35
0+159.993	0.49	0.00	0.00	15.48	0.04	411.06	411.06	2032.46	-1621.40
0+160.000	0.50	0.00	0.00	15.47	0.11	411.07	411.07	2032.57	-1621.50
0+165.000	3.31	9.52	9.52	8.57	60.10	420.59	420.59	2092.67	-1672.09
0+170.000	6.70	25.02	25.02	5.51	35.19	445.61	445.61	2127.86	-1682.25
0+175.000	10.80	43.75	43.75	1.84	18.36	489.36	489.36	2146.22	-1656.86
0+180.000	14.57	63.45	63.45	1.73	8.92	552.80	552.80	2155.14	-1602.33
0+185.000	18.31	82.21	82.21	0.96	6.72	635.01	635.01	2161.85	-1526.84
0+190.000	23.15	103.65	103.65	0.02	2.46	738.66	738.66	2164.31	-1425.65
0+191.115	25.65	27.20	27.20	0.00	0.01	765.86	765.86	2164.32	-1398.46
0+191.120	25.65	0.13	0.13	0.00	0.00	765.99	765.99	2164.32	-1398.33
0+195.000	29.46	106.91	106.91	0.00	0.00	872.90	872.90	2164.32	-1291.42
0+200.000	35.92	165.06	165.06	0.00	0.00	1037.96	1037.96	2164.32	-1126.36
0+201.115	36.86	40.58	40.58	0.00	0.00	1078.54	1078.54	2164.32	-1085.78
0+205.000	34.75	141.67	141.67	0.00	0.00	1220.21	1220.21	2164.32	-944.11
0+210.000	28.98	163.10	163.10	0.00	0.00	1383.31	1383.31	2164.32	-781.01
0+211.115	28.00	32.60	32.60	0.01	0.00	1415.91	1415.91	2164.33	-748.42
0+215.000	17.12	90.72	90.72	1.87	2.98	1506.63	1506.63	2167.31	-660.68
0+216.413	12.00	21.61	21.61	4.77	3.71	1528.24	1528.24	2171.02	-642.78
0+220.000	2.28	27.25	27.25	14.77	27.51	1555.49	1555.49	2198.53	-643.03
0+221.115	0.36	1.61	1.61	19.33	14.82	1557.10	1557.10	2213.35	-656.25
0+221.115	0.36	0.00	0.00	19.33	0.00	1557.10	1557.10	2213.35	-656.26
0+225.000	0.00	0.78	0.78	41.44	98.71	1557.88	1557.88	2312.07	-754.18
0+230.000	0.00	0.00	0.00	71.59	249.55	1557.88	1557.88	2561.62	-1003.74
0+232.924	0.00	0.00	0.00	86.49	205.83	1557.88	1557.88	2767.45	-1209.56
0+235.000	0.00	0.00	0.00	97.83	171.31	1557.88	1557.88	2938.76	-1380.87

0+240.000	0.00	0.00	0.00	108.84	459.76	1557.88	1557.88	3398.52	-1840.64
0+244.732	0.00	0.00	0.00	98.15	419.42	1557.88	1557.88	3817.94	-2260.06
0+244.733	0.00	0.00	0.00	98.15	0.05	1557.88	1557.88	3817.98	-2260.10
0+245.000	0.00	0.00	0.00	96.96	26.07	1557.88	1557.88	3844.05	-2286.17
0+250.000	0.00	0.00	0.00	79.39	367.19	1557.88	1557.88	4211.24	-2653.36
0+254.732	0.00	0.00	0.00	65.69	290.54	1557.88	1557.88	4501.78	-2943.90
0+255.000	0.00	0.00	0.00	65.43	17.54	1557.88	1557.88	4519.33	-2961.45
0+260.000	0.00	0.00	0.00	58.13	271.36	1557.88	1557.88	4790.69	-3232.80
0+264.732	0.00	0.00	0.00	54.87	244.83	1557.88	1557.88	5035.52	-3477.64
0+265.000	0.00	0.00	0.00	54.93	14.70	1557.88	1557.88	5050.22	-3492.34
0+270.000	0.00	0.00	0.00	51.74	253.54	1557.88	1557.88	5303.76	-3745.87
0+274.730	0.00	0.00	0.00	42.47	222.79	1557.88	1557.88	5526.54	-3968.66
0+274.732	0.00	0.00	0.00	42.47	0.10	1557.88	1557.88	5526.64	-3968.76
0+275.000	0.00	0.00	0.00	42.59	11.38	1557.88	1557.88	5538.03	-3980.14
0+280.000	0.00	0.00	0.00	40.88	208.69	1557.88	1557.88	5746.71	-4188.83
0+285.000	0.00	0.00	0.00	35.10	189.96	1557.88	1557.88	5936.67	-4378.79
0+290.000	0.00	0.01	0.01	30.24	163.36	1557.90	1557.90	6100.03	-4542.13
0+295.000	0.00	0.02	0.02	23.55	134.49	1557.92	1557.92	6234.52	-4676.60
0+300.000	1.01	2.53	2.53	19.83	108.45	1560.45	1560.45	6342.96	-4782.52
0+305.000	2.60	9.03	9.03	14.09	84.80	1569.48	1569.48	6427.77	-4858.29
0+310.000	3.97	16.44	16.44	10.32	61.03	1585.91	1585.91	6488.80	-4902.89
0+314.251	5.72	20.60	20.60	6.77	36.31	1606.52	1606.52	6525.11	-4918.60

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