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PRILOGA 1B - NASLOVNA STRAN NAČRTA

OSNOVNI PODATKI O GRADNI

naziv gradnje	**KAMNITA ZLOŽBA NAD CESTO LC 440541**
kratek opis gradnje	Ob rekonstrukciji lokalne ceste LC 440541 je potreben nov oporni ukrep – kamnita zložba..
Seznam objektov, ureditev površin in komunalnih naprav z navedbo vrste gradnje.	------
vrste gradnje	**novogradnja - novozgrajen objekt**
Označiti vse ustrezne vrste gradnje	**novogradnja - prizidava**
	rekonstrukcija
	sprememba namembnosti
	odstranitev
DOKUMENTACIJA	
vrsta dokumentacije	**PZI**
številka projekta	**CE 57/3/22C**
	sprememba dokumentacije
PODATKI O NAČRTU	
strokovno področje načrta	**2 - GRADBENIŠTVO**
številka načrta	**NK 82.2/4/22**
datum izdelave	**22.4.2022**
PODATKI O IZDELOVALCU NAČRTA	
ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja	**Vid Štukovnik, dipl.inž.grad.**
identifikacijska številka	**IZS PI G-4619**
podpis pooblaščenega arhitekta, pooblaščenega inženirja	VID ŠTUKOVNIK dipl.inž.grad. IZS PI G-4619
PODATKI O PROJEKTANTU	
projektant (naziv družbe)	**GHC-Projekt, d.o.o.**
naslov	**Pristova 8, 3204 Dobrna**
vodja projekta	**Vid Štukovnik, dipl.inž.grad.**
identifikacijska številka	**IZS PI G-4619**
podpis vodje projekta	VID ŠTUKOVNIK dipl.inž.grad. IZS PI G-4619
odgovorna oseba projektanta	**Vid Štukovnik, dipl.inž.grad.**

GHC PROJEKT

440541		**004.24205**	**S.1**	

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2.2.1	NASLOVNA STRAN S KLJUČNIMI PODATKI O NAČRTU

2 NAČRT S PODROČJA GRADBENIŠTVA

2.2 NAČRT KAMNITE ZLOŽBE

INVESTITOR:

Občina Makole, Makole 35, 2321 Makole

OBJEKT:

kamnita zložba

VRSTA PROJEKTNE DOKUMENTACIJE IN NJENA ŠTEVILKA

PZI, št. CE 57/3/22C

ZA GRADNJO:

novogradnja

PROJEKTANT:

GHC-Projekt, Projektiranje in inženiring d.o.o., Pristova 8, 3204 Dobrna

VODJA NAČRTA / POOBLAŠČENI INŽENIR:

Vid Štukovnik, dipl.inž.grad.. IZS PI G-4619

ŠTEVILKA NAČRTA IN IZVODA, KRAJ IN DATUM IZDELAVE NAČRTA:

NK 82.2/4/22, Dobrna, april 2022

1 2 3

VODJA PROJEKTA:

Vid Štukovnik, dipl.inž.grad.. IZS PI G-4619

440541		004.24205	S.1	

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2.2.2 KAZALO VSEBINE NAČRTA

PZI, št. načrta : NK 82.2/4/22

Načrt s področja gradbeništva, 2.1 Načrt kamnite zložbe

S	**SPLOŠNI DEL**	
2.2.1	S.1 Naslovna stran s ključnimi podatki o načrtu	
2.2.2	S.3.2 Kazalo vsebine načrta – ta stran	
T	**TEHNIČNI DEL**	
2.2.4	T.1.1. Tehnično poročilo	
2.2.5	T.2.1. Statični izračuni in dimenzioniranje	
2.2.6	T.3.1. Projektantski popis s predizmerami	
2.2.7	T.3.2. Predračun z rekapitulacijo stroškov	
G	**RISBE**	
2.2.8	G Risbe	Merilo / Listi
	Situacija	M 1:250 / G.1
	Vzdolžni prerez	M 1:200 / G.2
	Karakteristični prerez pilotne stene	M 1:100 / G.3
	Prečni prerez PR.1	M 1:100 / G.4
	Prečni prerez PR.2	M 1:100 / G.5
	Prečni prerez PR.3	M 1:100 / G.6

2.2.4	TEHNIČNO POROČILO

1. SPLOŠNO

Investitor Občina Makole namerava rekonstruirati lokalno cesto LC 440541 Mostečno – Savinsko, od km 0,008 do km 0,884 ter rekonstruirati kamnito zložbo na odseku od km 0,757 do km 0,819.

a. PROJEKTNA NALOGA

Izdelati je potrebno načrt konstrukcije kamnite zložbe.

b. UPORABLJENI STANDARDI

Pri interpretaciji in analizah so bili upoštevani sledeči pravilniki in standardi:

- Pravilnik o mehanski odpornosti in stabilnosti objektov, UL RS št. 101, 11.11.2005
- SIST EN 1990 EUROCODE 0
- Osnove projektiranja o SIST EN 1997 EUROCODE 7
- Geotehnično projektiranje o SIST EN 1998 EUROCODE 8
- Projektiranje potresno odpornih konstrukcij

2. OPIS OBJEKTA

Nad lokalno cesto je predvidena izvedba kamnite zložbe dolžine 64,5m, svetle višine 2,4m celotne višine 3,3m. Vrh zidu je na višini med 300,72m in 307,09m. Naklon temelja je med 2° in 6° , naklon sprednje stene zložbe je 2,1:1, zaledna stena je pod naklnom 6:1.

3. UPORABLJENI MATERIALI

Za izvedbo kamnite zložbe so predvideni sledeči materiali:
-Beton za izdelavo betonske posteljice C12/15

4. PODATKI O OBTEŽBAH

Stalne obtežbe so privzete po SIST EN 1998-1:2005. Lastna teža konstruktivnih elementov je dodana v izračun kot linijska obtežba. Nad kamnito zložbo smo prevzeli variabilno obtežbo 5kN/m^2.

Podatke o seizmičnosti terena smo povzeli po karti »POTRESNA NEVARNOST SLOVENIJE – PROJEKTNI POSPEŠEK TAL« za povratno dobo 475 let.

Projektni pospešek tal: 0,125 g

B – Zelo gost pesek, prod ali zelo toga glina, debeline vsaj nekaj deset metrov, pri katerih se mehanske lastnosti postopoma večajo z globino.

5. POSTOPEK IZVEDBE

1. Postavitev gradbene ograje; zakoličba glavnih osi objekta. Zakoličba se povzema iz arhitekture
2. Izkop po načrtih
3. Izvedba tamponskega nasutja (geomehanski nadzor preveri Evd>45MPa in tlačno trdnost, ki mora presegati 200Kpa)
4. Izvedba podložnega betona in mulde
5. Opaženje, armiranje in betoniranje temeljev
6. Vgradnja drenažne cevi
7. Vgradnja kamnitih blokov Dmin 50-100 cm z vezivom C20/25 v razmerju kamen beton 70:30 in fugiranje reg
8. Ob zlaganju kamenja je potreben sproten zasip iz obeh strani zložbe. Ob zložbi se vgradi drenažni pesek TD32-63. Z ostalim zasipom se loči z geotekstilom
9. Vrhnji del nasutja naj se vgradi glinen material, ki preprečuje vdor vode za konstrukcijo
10. Izdelava vozišče konstrukcije, postavitev varnostne ograje, humusiranje v debelini minimalno 20cm in zatravitev

6. GEOMEHANSKI NADZOR

V sklopu izvedbe AB zidu je predviden pregled planuma izkopa in meritve strižne ali tlačne trdnosti, in meritve Evd. Po vgrajenem tampon se preveri zbitost tampona, ki mora presegati Evd>45MPa.

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7. MONITORING OBJEKTA:

Med gradnjo se ob izkopu spremlja pomike brežin. Po izgrajenem AB zidu se letno vizualno pregledajo zid.

8. ZAKJUČEK

Na objekt je potrebna vgradnja varovalna ograja min. višine 1,2m.

Izvajalec del mora pred izvedbo detajlno pregledati načrt in v primeru neusklajenosti z ostalimi načrti izvedbenega projekta ali spremembi na gradbišču obvestiti projektanta.

Za vse postopke, opremo, materiale in detajle, ki niso posebej navedeni, veljajo splošni in posebni pogoji investitorja, ter ostale priznane tehnične norme, predpisi in standardi.

Izvajalec mora s svojo organizacijo del zagotoviti varnost pri delu (obdelati v elaboratu varstva pri delu), ter voditi vso s predpisi in tenderjem zahtevano tehnično dokumentacijo.

Drugačne razmere pri izvedbi izkopov, ki opisu v tem poročilu ne bi bile ustrezne, je potrebno ponovno pregledati, ugotoviti stanje in nosilnost temeljnih tal v delu, kjer jih predstavlja drugačen material od predvidenega

Pooblaščeni inženir
Vid Štukovnik, dipl.inž.grad.

2.2.5 IZRAČUNI IN DIMENZIONIRANJE

1. ANALIZA ZIDU:

Za analizo smo uporabili Mohr-Coulombove karakteristike materialov. Pri analizi smo nad opornim zidom upoštevali spremenljivo obremenitev 5kN/m2. V Sloveniji se z po nacionalnem dodatku Evrokoda 7 za globalno stabilnost uporablja projektni pristop 3 (PP3).

Preračun je izdelan po EC 7-1 (EN 1997-1:2003) (projektni pristop 3) (PP3) »(A1 ali A2) + M2 + R3«

Za analizo smo izračunali potresne učinke s pomočjo dveh spremenljivk, faktor horiozontalnega pospeška kh in kofeicent vertikalnega potresa Kv.
Koeficient vertikalnega potresa bodisi poveča (kv > 0) bodisi zmanjša (kv < 0) enotno maso tal.
Koeficient vodoravnega pospeška v analizi doda vodoravno silo, ki deluje v središču gravitacije ustreznega bloka z magnitudo Kh*wi, kjer je wi celotna teža bloka.
V našem primeru smo glede na potresno karto, preiskave določili kh = 0,0125 in kv = 0,0125.

a. Uporabljene karakteristike materialov v analizah

peščena glina srednje gnetne konsistence:

C = 5 kPa - kohezija
ϕ = 22° - strižni kot
γ = 17 kN/m3 - prostorninska teža

peščena glina težko gnetne do poltrdne konsistence z vložki proda:

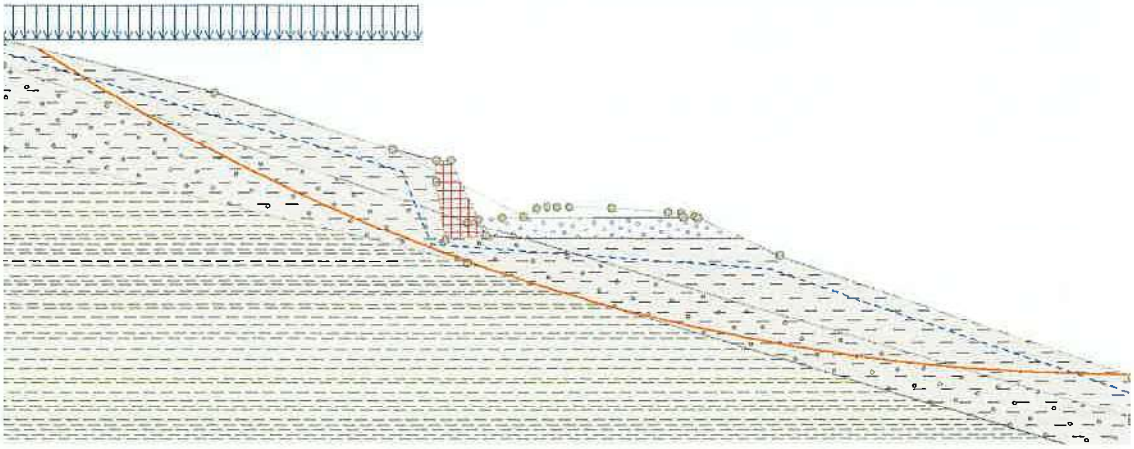
C = 15 kPa - kohezija
ϕ = 28° - strižni kot
γ = 20 kN/m3 - prostorninska teža

peščen lapor, pesek in prod:

C = 20 kPa - kohezija
ϕ = 35° - strižni kot
γ = 22 kN/m3 - prostorninska teža

tampon:

C = 1 kPa - kohezija
ϕ = 35° - strižni kot
γ = 20 kN/m3 - prostorninska teža



Prečni prerez PR1

2. Analiza v PR.1

Teren saniran s kamnito zložbo je stabilen.

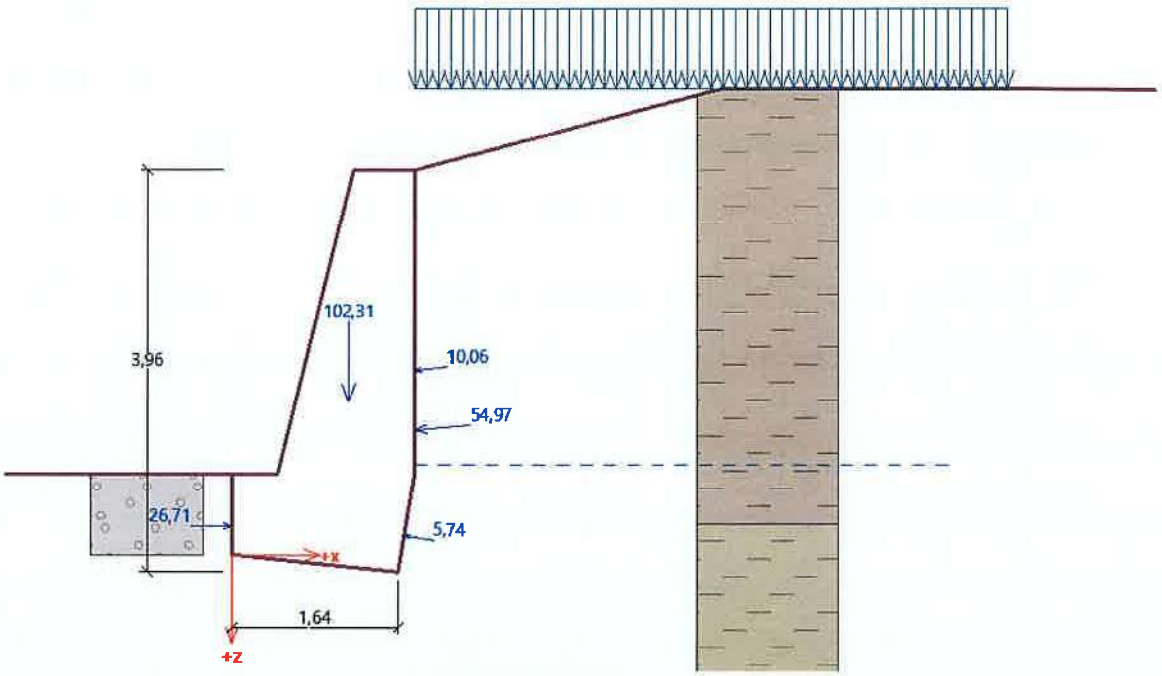
REZULTAT ANALIZE STABILNOSTI

Profil PR1	Izkoriščenost
Stanje s kamnito zložbo	44,5 %
Stanje s kamnito zložbo in vodo	56,2 %
Stanje s kamnito zložbo in obtežbo 5kN/m^2	58,8 %
Stanje s kamnito zložbo in potresom	45,9 %

3. ANALIZA ZIDU NA PREVRNITEV IN ZDRS

Za analizo smo obravnavali prerez zidu PR.1. Uporabljene so bile Mohr-Coulombove karakteristike materialov in obtežbe, ki smo jih uporabili v prejšnjem poglavju.

Analiza na prevernitev in zdrs



Prečni prerez PR1

	Izkoriščenost
prevernitev	53,7 %
zdrs	47,7 %

Podporna kamnita zložba je odporna na prevrnitev in zdrs.

Gravity wall analysis

Input data (Stage of construction 1)

Task : Analiza kamnite zložbe
Customer : Občina Makole
Author : Martin Škoflek
Date : 26. 10. 2023
Project ID : 82.2-4-22

Settings

Slovenia - EN 1997

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)
Coefficients EN 1992-1-1 : standard
Masonry (stone) wall : EN 1996-1-1 (EC6)

Wall analysis

Verification methodology : according to EN 1997
Active earth pressure calculation : Coulomb
Passive earth pressure calculation : Caquot-Kerisel
Earthquake analysis : Mononobe-Okabe
Shape of earth wedge : Calculate as skew
Allowable eccentricity : 0.333
Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)					
Permanent design situation					
		Unfavourable		Favourable	
Permanent actions :	γ_G =	1.35	[–]	1.00	[–]
Variable actions :	γ_Q =	1.50	[–]	0.00	[–]
Water load :	γ_w =	1.35	[–]		

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on overturning :	γ_{Rv} =	1.40	[–]
Partial factor on sliding resistance :	γ_{Rh} =	1.10	[–]
Partial factor on bearing capacity :	γ_{Re} =	1.40	[–]

Partial factors for variable actions			
Permanent design situation			
Factor for combination value :	ψ_0 =	0.70	[–]
Factor for frequent value :	ψ_1 =	0.50	[–]
Factor for quasi-permanent value :	ψ_2 =	0.30	[–]

Anchors

Verification methodology : Limit states (LSD)

Reduction coefficients			
Reduction. coeff of steel strength :	γ_s =	1.35	[–]
Reduction coefficient of pull out resistance (soil) :	γ_e =	1.35	[–]
Reduction coefficient of pull out resistance (grouting) :	γ_c =	1.35	[–]

Material of structure

Unit weight γ = 23.00 kN/m^3

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Analysis of concrete structures carried out according to the standard EN 1992-1-1 (EC2).

Concrete: C 20/25
Cylinder compressive strength f_{ck} = 20.00 MPa
Tensile strength f_{ctm} = 2.20 MPa

Longitudinal steel: B500B
Yield strength f_{yk} = 500.00 MPa

Geometry of structure

No.	Coordinate X [m]	Depth Z [m]
1	0.00	0.00
2	0.00	0.87
3	-0.39	3.25
4	-2.06	3.10
5	-0.61	0.00

The origin [0,0] is located at the most upper right point of the wall.
Wall section area = 3.86 m^2.

Basic soil parameters

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]	γ_{su} [kN/m^3]	δ [°]
1	peščena glina srednje gnetne konsistence		22.00	5.00	17.00	8.00	10.00
2	peščena glina težko gnetne do poltrdne konsistence z vložki proda		28.00	15.00	20.00	12.00	15.00
3	tampon		35.00	1.00	20.00	11.00	0.00

Soil parameters to compute pressure at rest

No.	Name	Pattern	Type calculation	φ_{ef} [°]	ν [–]	OCR [–]	K_r [–]
1	peščena glina srednje gnetne konsistence		cohesive	-	0.35	-	-
2	peščena glina težko gnetne do poltrdne konsistence z vložki proda		cohesive	-	0.30	-	-
3	tampon		cohesionless	35.00	-	-	-

Soil parameters

peščena glina srednje gnetne konsistence
Unit weight : γ = 17.00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 22.00 °
Cohesion of soil : c_{ef} = 5.00 kPa
Angle of friction struc.-soil : δ = 10.00 °
Soil : cohesive
Poisson's ratio : ν = 0.35
Saturated unit weight : γ_{sat} = 18.00 kN/m^3

peščena glina težko gnetne do poltrdne konsistence z vložki proda
Unit weight : γ = 20.00 kN/m^3
Stress-state : effective

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Angle of internal friction :	φ_{ef} =	28.00 °
Cohesion of soil :	c_{ef} =	15.00 kPa
Angle of friction struc.-soil :	δ =	15.00 °
Soil :		cohesive
Poisson's ratio :	ν =	0.30
Saturated unit weight :	γ_{sat} =	22.00 kN/m^3

tampon

Unit weight :	γ =	20.00 kN/m^3
Stress-state :		effective
Angle of internal friction :	φ_{ef} =	35.00 °
Cohesion of soil :	c_{ef} =	1.00 kPa
Angle of friction struc.-soil :	δ =	0.00 °
Soil :		cohesionless
Saturated unit weight :	γ_{sat} =	21.00 kN/m^3

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.00	0.00 .. 3.00	peščena glina srednje gnetne konsistence	
2	-	3.00 .. ∞	peščena glina težko gnetne do poltrdne konsistence z vložki proda	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2.48 (slope angle is 22.00 °).

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: passive
Soil on front face of the structure - tampon

Angle of friction struc.-soil	δ = 0.00 °
Soil thickness in front of structure	h = 0.72 m

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent
The wall is free to move. Active earth pressure is therefore assumed.
Reduction of soil/soil friction angle : do not reduce

Verification No. 1 (Stage of construction 1)

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.28	88.74	1.26	1.000	1.000	1.350
FF resistance	-9.40	-0.26	4.40	-0.21	1.000	1.000	1.350
Active pressure	36.77	-0.92	0.62	1.90	1.350	1.350	1.350

Verification of complete wall

Check for overturning stability

Resisting moment	M_{res} =	80.05 kNm/m
Overturning moment	M_{ovr} =	43.01 kNm/m

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Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 66.36 kN/m
Active horizontal force H_{act} = 31.67 kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 77.16 kPa

Bearing capacity of foundation soil (Stage of construction 1)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [–]	Stress [kPa]
1	-0.13	129.37	25.23	0.000	77.16
2	12.42	97.20	31.38	0.077	68.39

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	-0.10	95.83	18.69

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.077
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Bearing capacity of foundation soil R = 0.00 kPa
Partial factor on bearing capacity γ_{Rv} = 1.40
Max. stress at footing bottom σ = 77.16 kPa
Bearing capacity of foundation soil R_d = 0.00 kPa

Bearing capacity of foundation soil is NOT SATISFACTORY

Overall verification - bearing capacity of found. soil is NOT SATISFACTORY

Input data (Stage of construction 2)

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.00	0.00 .. 3.00	peščena glina srednje gnetne konsistence	
2	-	3.00 .. ∞	peščena glina težko gnetne do poltrdne konsistence z vložki proda	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2.48 (slope angle is 22.00 °).

Water influence

GWT behind the structure lies at a depth of 2.20 m

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Uplift in foot. bottom due to different pressures is not considered.

Resistance on front face of the structure

Resistance on front face of the structure: passive
Soil on front face of the structure - tampon
Angle of friction struc.-soil $\delta = 0.00$ °
Soil thickness in front of structure $h = 0.72$ m

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent
The wall is free to move. Active earth pressure is therefore assumed.
Reduction of soil/soil friction angle : do not reduce

Verification No. 1 (Stage of construction 2)

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.28	88.74	1.26	1.000	1.000	1.350
FF resistance	-9.40	-0.26	4.40	-0.21	1.000	1.000	1.350
Active pressure	34.51	-0.95	0.59	1.91	1.350	1.350	1.350
Water pressure	5.51	-0.20	-0.90	1.73	1.350	1.350	1.000
Uplift pressure	0.00	-3.10	0.00	2.06	1.000	1.000	1.350

Verification of complete wall

Check for overturning stability
Resisting moment $M_{res} = 78.49$ kNm/m
Overturning moment $M_{ovr} = 43.44$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force $H_{res} = 65.37$ kN/m
Active horizontal force $H_{act} = 36.15$ kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 77.40 kPa

Bearing capacity of foundation soil (Stage of construction 2)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [–]	Stress [kPa]
1	0.95	128.64	27.74	0.004	77.40
2	14.31	96.33	35.83	0.089	69.83

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	1.30	95.18	21.98

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force $e = 0.089$
Maximum allowable eccentricity $e_{alw} = 0.333$

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Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 0.00$ kPa
Partial factor on bearing capacity $\gamma_{Rv} = 1.40$
Max. stress at footing bottom $\sigma = 77.40$ kPa
Bearing capacity of foundation soil $R_d = 0.00$ kPa

Bearing capacity of foundation soil is NOT SATISFACTORY

Overall verification - bearing capacity of found. soil is NOT SATISFACTORY

Input data (Stage of construction 3)

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.00	0.00 .. 3.00	peščena glina srednje gnetne konsistence	
2	-	3.00 .. ∞	peščena glina težko gnetne do poltrdne konsistence z vložki proda	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2.48 (slope angle is 22.00 °).

Water influence

GWT behind the structure lies at a depth of 2.20 m
Uplift in foot. bottom due to different pressures is not considered.

Input surface surcharges

No.	Surcharge new	Surcharge change	Action	Mag.1 [kN/m²]	Mag.2 [kN/m²]	Ord.x x [m]	Length l [m]	Depth z [m]
1	Yes		variable	5.00				on terrain

Resistance on front face of the structure

Resistance on front face of the structure: passive
Soil on front face of the structure - tampon
Angle of friction struc.-soil $\delta = 0.00$ °
Soil thickness in front of structure $h = 0.72$ m

Terrain in front of structure is flat.

Settings of the stage of construction

Design situation : permanent
The wall is free to move. Active earth pressure is therefore assumed.
Reduction of soil/soil friction angle : do not reduce

Verification No. 1 (Stage of construction 3)

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.28	88.74	1.26	1.000	1.000	1.350
FF resistance	-9.40	-0.26	4.40	-0.21	1.000	1.000	1.350
Active pressure	34.51	-0.95	0.59	1.91	1.350	1.350	1.350
Water pressure	5.51	-0.20	-0.90	1.73	1.350	1.350	1.000
Uplift pressure	0.00	-3.10	0.00	2.06	1.000	1.000	1.350
Surch.1 - surface	10.23	-1.46	0.80	2.02	1.500	1.500	1.500

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Verification of complete wall

Check for overturning stability
Resisting moment M_{res} = 80.22 kNm/m
Overturning moment M_{ovr} = 65.82 kNm/m

Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force H_{res} = 60.62 kN/m
Active horizontal force H_{act} = 51.34 kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 105.20 kPa

Bearing capacity of foundation soil (Stage of construction 3)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [–]	Stress [kPa]
1	23.06	131.21	42.80	0.105	99.01
2	36.43	98.90	50.89	0.221	105.20

Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	16.05	96.90	32.02

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification
Max. eccentricity of normal force e = 0.221
Maximum allowable eccentricity e_{alw} = 0.333

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity
Bearing capacity of foundation soil R = 0.00 kPa
Partial factor on bearing capacity γ_{Rv} = 1.40
Max. stress at footing bottom σ = 105.20 kPa
Bearing capacity of foundation soil R_d = 0.00 kPa

Bearing capacity of foundation soil is NOT SATISFACTORY

Overall verification - bearing capacity of found. soil is NOT SATISFACTORY

Input data (Stage of construction 4)

Geological profile and assigned soils

No.	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	3.00	0.00 .. 3.00	peščena glina srednje gnetne konsistence	
2	-	3.00 .. ∞	peščena glina težko gnetne do poltrdne konsistence z vložki proda	

Foundation

Type of foundation : soil from geological profile

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Terrain profile

Terrain behind construction has the slope 1: 2.48 (slope angle is 22.00 °).

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: passive
Soil on front face of the structure - tampon
Angle of friction struc.-soil $\delta = 0.00$ °
Soil thickness in front of structure $h = 0.72$ m

Terrain in front of structure is flat.

Earthquake

Factor of horizontal acceleration $K_h = 0.0125$
Factor of vertical acceleration $K_v = 0.0125$

Water below the GWT is restricted.

Settings of the stage of construction

Design situation : permanent
The wall is free to move. Active earth pressure is therefore assumed.
Reduction of soil/soil friction angle : do not reduce

Verification No. 1 (Stage of construction 4)

Forces acting on construction

Name	F_{hor} [kN/m]	App.Pt. z [m]	F_{vert} [kN/m]	App.Pt. x [m]	Coeff. overtur.	Coeff. sliding	Coeff. stress
Weight - wall	0.00	-1.28	88.74	1.26	1.000	1.000	1.350
Earthq.- constr.	1.11	-1.28	-1.11	1.26	1.000	1.000	1.000
FF resistance	-9.40	-0.26	4.40	-0.21	1.000	1.000	1.350
Earthq.- face	0.04	-0.48	-0.02	0.22	1.000	1.000	1.000
Active pressure	36.77	-0.92	0.62	1.90	1.350	1.350	1.350
Earthq.- act.pressure	12.13	-2.04	1.11	2.05	1.000	1.000	1.000

Verification of complete wall

Check for overturning stability
Resisting moment $M_{res} = 80.69$ kNm/m
Overturning moment $M_{ovr} = 69.25$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip
Resisting horizontal force $H_{res} = 59.67$ kN/m
Active horizontal force $H_{act} = 44.90$ kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 110.70 kPa
Warning - allowable range of input data exceeded during earthquake analysis!
The analysis is carried out with the modified value of terrain inclination β. (β=22.00°, β_{modif}=21.27°)

Bearing capacity of foundation soil (Stage of construction 4)

Design load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [–]	Stress [kPa]
1	26.21	130.54	38.35	0.120	102.37
2	38.76	98.37	44.51	0.236	110.70

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Service load acting at the center of footing bottom

No.	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	26.24	97.00	31.81

Verification of foundation soil

Stress in the footing bottom : rectangle

Eccentricity verification

Max. eccentricity of normal force $e = 0.236$
Maximum allowable eccentricity $e_{alw} = 0.333$

Eccentricity of the normal force is SATISFACTORY

Verification of bearing capacity

Bearing capacity of foundation soil $R = 0.00$ kPa
Partial factor on bearing capacity $\gamma_{Rv} = 1.40$
Max. stress at footing bottom $\sigma = 110.70$ kPa
Bearing capacity of foundation soil $R_d = 0.00$ kPa

Bearing capacity of foundation soil is NOT SATISFACTORY

Overall verification - bearing capacity of found. soil is NOT SATISFACTORY

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Slope stability analysis

Input data

Project

Task : Analiza stabilnosti
Customer : Občina Makole
Author : Martin Škoflek
Date : 27. 10. 2023
Project ID : NK 82.2-4-22
Project number : CE 57/3/22C

Settings

Slovenia - EN 1997

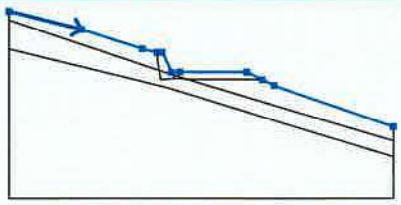
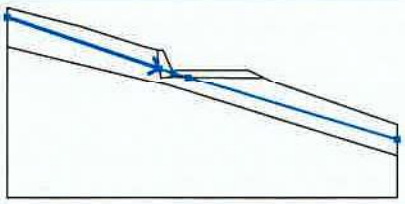
Stability analysis

Earthquake analysis : Standard
Verification methodology : according to EN 1997
Design approach : 3 - reduction of actions (GEO, STR) and soil parameters

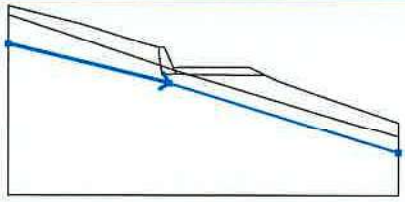
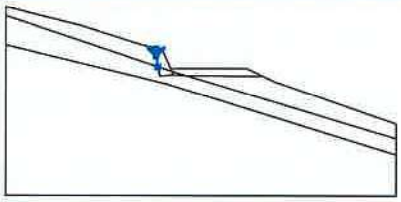
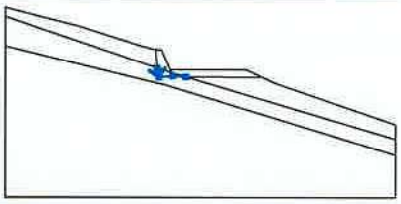
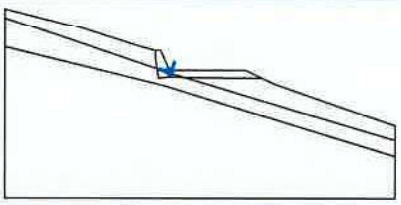
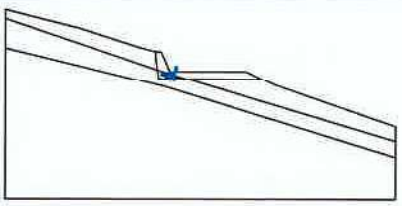
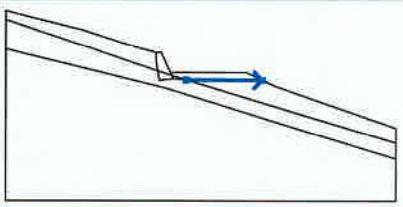
Partial factors on actions (A)									
Permanent design situation									
		State STR				State GEO			
		Unfavourable		Favourable		Unfavourable		Favourable	
Permanent actions :	γ_G =	1.00	[–]	1.00	[–]	1.00	[–]	1.00	[–]
Variable actions :	γ_Q =	1.50	[–]	0.00	[–]	1.30	[–]	0.00	[–]
Water load :	γ_w =					1.00	[–]		

Partial factors for soil parameters (M)			
Permanent design situation			
Partial factor on internal friction :	γ_ϕ =	1.25	[–]
Partial factor on effective cohesion :	γ_c =	1.25	[–]
Partial factor on undrained shear strength :	γ_{cu} =	1.40	[–]

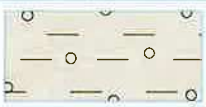
Interface

No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0.00	13.82	8.71	11.63	15.99	9.30
		17.76	8.85	18.37	8.85	19.48	6.47
		20.48	6.53	28.51	6.52	30.39	5.62
		31.84	4.92	46.14	0.00		
2		0.00	12.75	17.96	6.70	19.62	6.17
		21.37	5.64	46.14	-1.71		

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No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
3		0.00	9.29	19.04	4.65	46.14	-3.61
4		17.76	8.85	17.76	7.98	17.96	6.70
5		17.96	6.70	18.15	5.60	19.81	5.75
		21.37	5.64				
6		19.48	6.47	19.62	6.17		
7		19.62	6.17	19.81	5.75		
8		21.37	5.64	30.39	5.62		

Soil parameters - effective stress state

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]
1	peščena glina srednje gnetne konsistence		22.00	5.00	17.00
2	peščena glina težko gnetne do poltrdne konsistence z vložki proda		28.00	15.00	20.00

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No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]
3	peščen lapor, pesek in prod		35.00	20.00	22.00
4	tampon		35.00	1.00	20.00

Soil parameters - uplift

No.	Name	Pattern	γ_{sat} [kN/m^3]	γ_s [kN/m^3]	n [–]
1	peščena glina srednje gnetne konsistence		18.00		
2	peščena glina težko gnetne do poltrdne konsistence z vložki proda		20.50		
3	peščen lapor, pesek in prod		22.00		
4	tampon		20.50		

Soil parameters

peščena glina srednje gnetne konsistence

Unit weight : γ = 17.00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 22.00 °
Cohesion of soil : c_{ef} = 5.00 kPa
Saturated unit weight : γ_{sat} = 18.00 kN/m^3

peščena glina težko gnetne do poltrdne konsistence z vložki proda

Unit weight : γ = 20.00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 28.00 °
Cohesion of soil : c_{ef} = 15.00 kPa
Saturated unit weight : γ_{sat} = 20.50 kN/m^3

peščen lapor, pesek in prod

Unit weight : γ = 22.00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °
Cohesion of soil : c_{ef} = 20.00 kPa
Saturated unit weight : γ_{sat} = 22.00 kN/m^3

tampon

Unit weight : γ = 20.00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 35.00 °

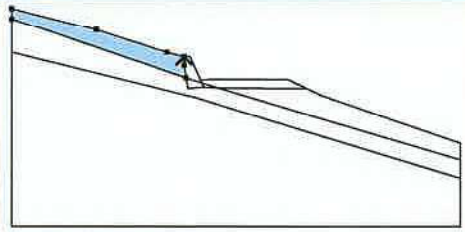
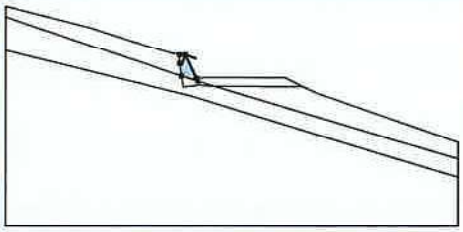
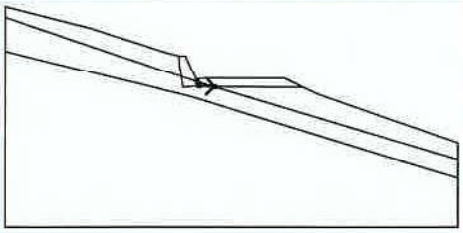
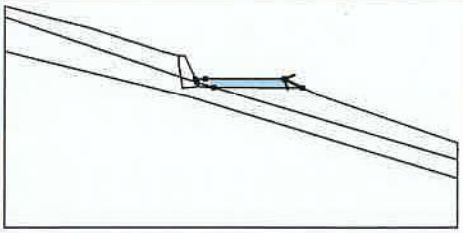
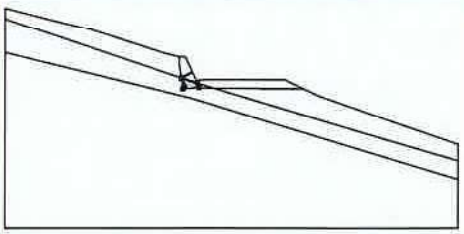
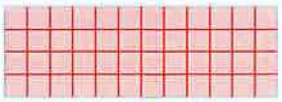
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Cohesion of soil : c_{ef} = 1.00 kPa
Saturated unit weight : γ_{sat} = 20.50 kN/m^3

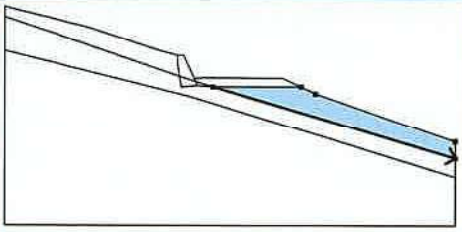
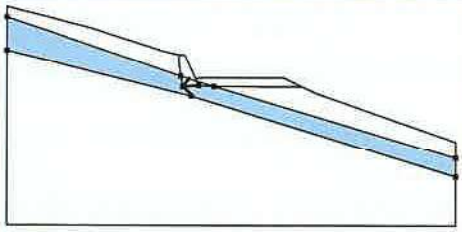
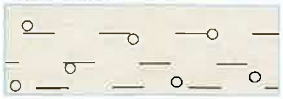
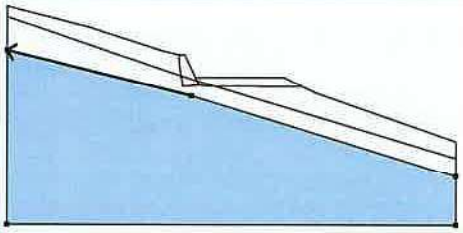
Rigid bodies

No.	Name	Sample	γ [kN/m^3]
1	kamnita zložba		25.00

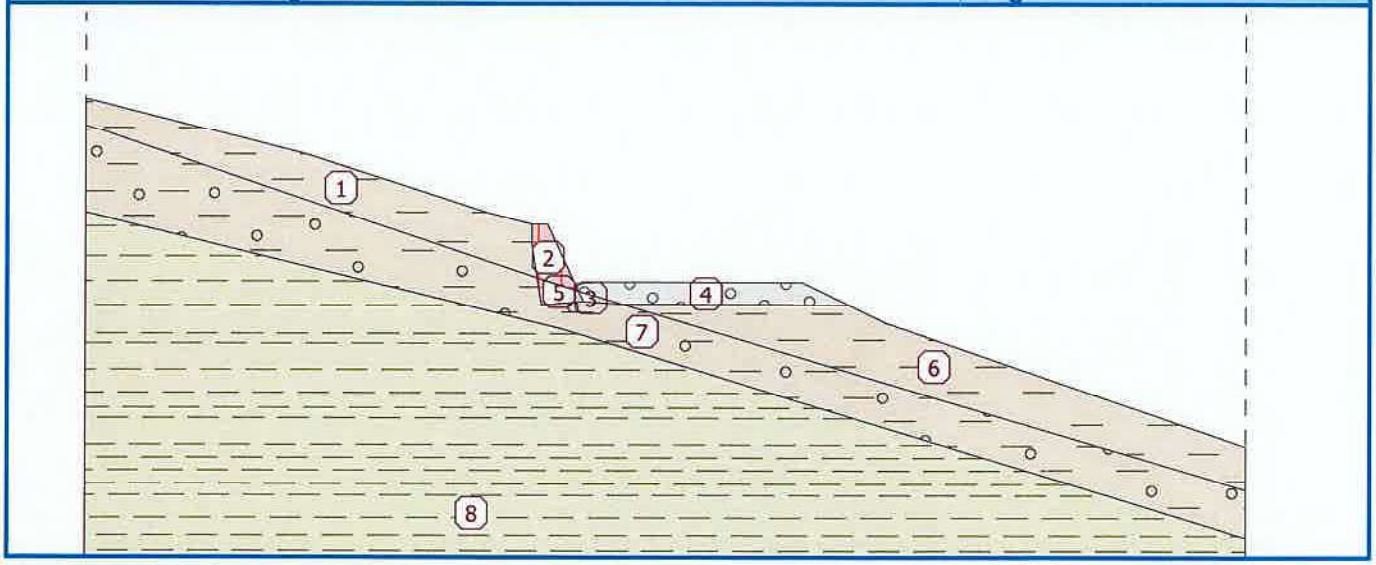
Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		17.76	7.98	17.76	8.85	peščena glina srednje gnetne konsistence
		15.99	9.30	8.71	11.63	
		0.00	13.82	0.00	12.75	
		17.96	6.70			
2		19.48	6.47	18.37	8.85	kamnita zložba
		17.76	8.85	17.76	7.98	
		17.96	6.70	19.62	6.17	
3		19.81	5.75	21.37	5.64	tampon
		19.62	6.17			
						
4		30.39	5.62	28.51	6.52	tampon
		20.48	6.53	19.48	6.47	
		19.62	6.17	21.37	5.64	
5		19.62	6.17	17.96	6.70	kamnita zložba
		18.15	5.60	19.81	5.75	
						

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No.	Surface position	Coordinates of surface points [m] x	z	x	z	Assigned soil
6		21.37	5.64	46.14	-1.71	peščena glina srednje gnetne konsistence
		46.14	0.00	31.84	4.92	
		30.39	5.62			
7		19.81	5.75	18.15	5.60	peščena glina težko gnetne do poltrdne konsistence z vložki proda
		17.96	6.70	0.00	12.75	
		0.00	9.29	19.04	4.65	
		46.14	-3.61	46.14	-1.71	
		21.37	5.64			
8		19.04	4.65	0.00	9.29	peščen lapor, pesek in prod
		0.00	-8.61	46.14	-8.61	
		46.14	-3.61			

Name : Soils and assignment **Stage : 1**



Water

Water type : No water

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

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Results (Stage of construction 1)

Analysis 1 (stage 1)

Circular slip surface

Slip surface parameters							
Center :	x =	46.14	[m]	Angles :	α_1 =	-33.35	[°]
	z =	81.27	[m]		α_2 =	-0.14	[°]
Radius :	R =	81.20	[m]				
The slip surface after optimization.							

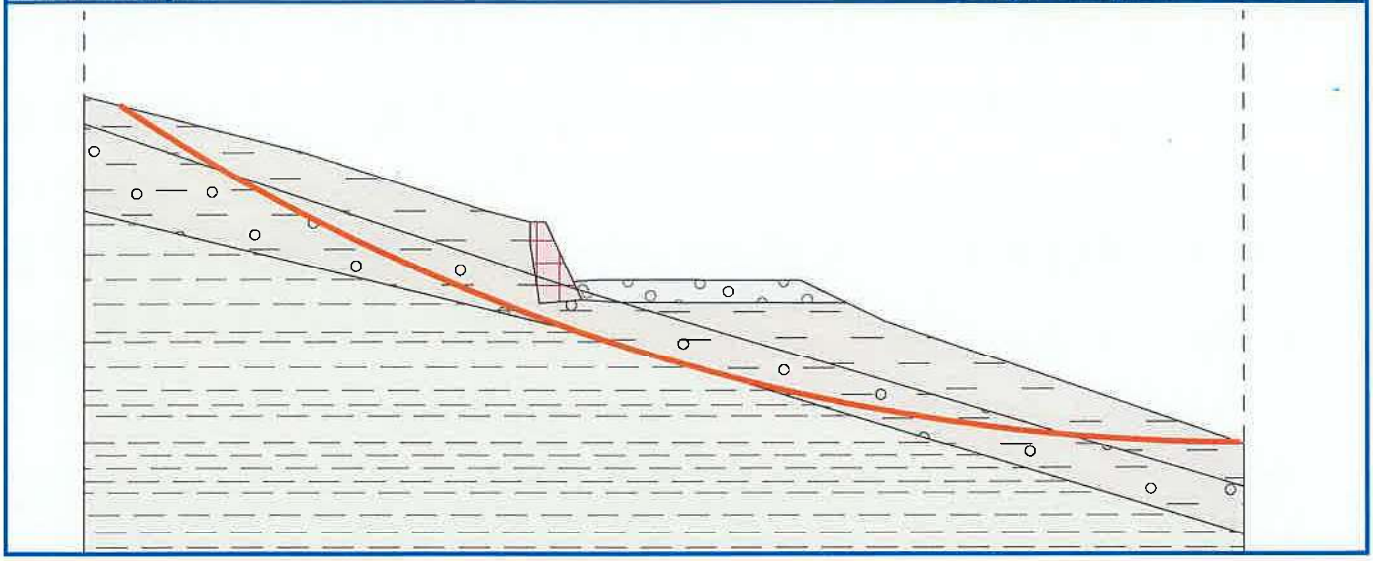
Slope stability verification (Bishop)

Sum of active forces : F_a = 586.05 kN/m
Sum of passive forces : F_p = 1318.09 kN/m

Sliding moment : M_a = 47587.19 kNm/m
Resisting moment : M_p = 107028.61 kNm/m
Utilization : 44.5 %

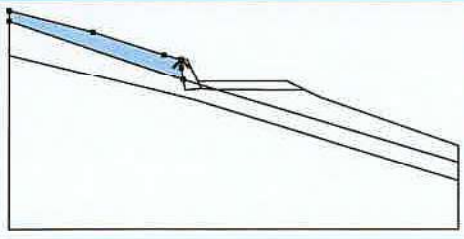
Slope stability ACCEPTABLE

Name : Analysis — Stage - analysis : 1 - 1

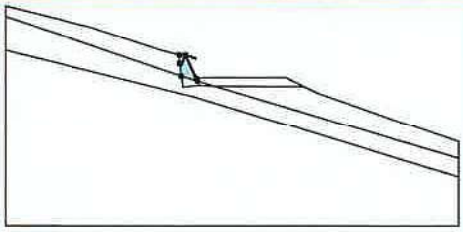
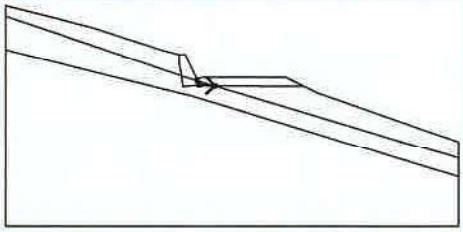
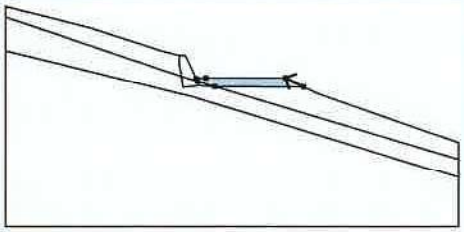
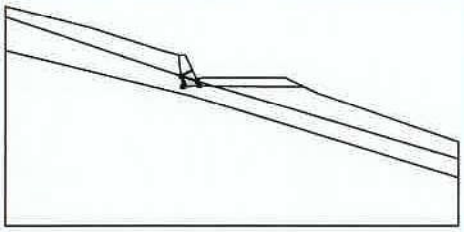
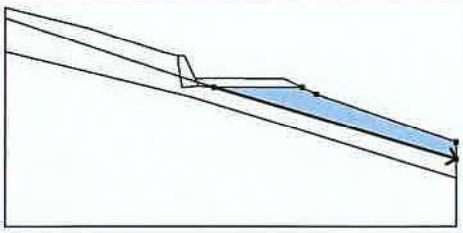
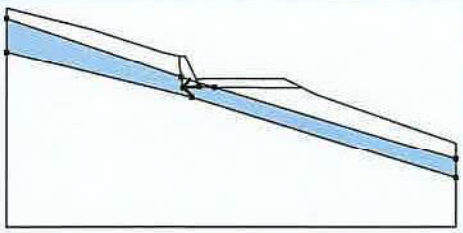


Input data (Stage of construction 2)

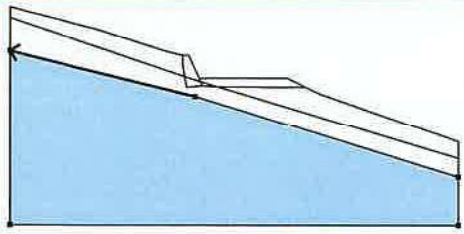
Assigning and surfaces

No.	Surface position	Coordinates of surface points [m] x	z	x	z	Assigned soil
1		17.76	7.98	17.76	8.85	peščena glina srednje gnetne konsistence
		15.99	9.30	8.71	11.63	
		0.00	13.82	0.00	12.75	
		17.96	6.70			

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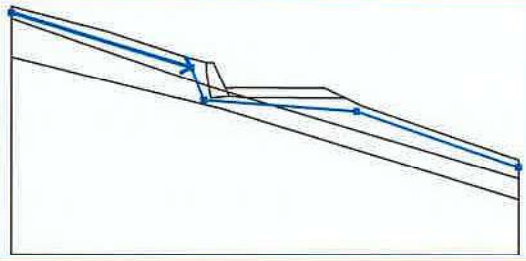
No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		19.48	6.47	18.37	8.85	kamnita zložba
		17.76	8.85	17.76	7.98	
		17.96	6.70	19.62	6.17	
3		19.81	5.75	21.37	5.64	tampon
		19.62	6.17			
4		30.39	5.62	28.51	6.52	tampon
		20.48	6.53	19.48	6.47	
		19.62	6.17	21.37	5.64	
5		19.62	6.17	17.96	6.70	kamnita zložba
		18.15	5.60	19.81	5.75	
6		21.37	5.64	46.14	-1.71	peščena glina srednje gnetne konsistence
		46.14	0.00	31.84	4.92	
		30.39	5.62			
7		19.81	5.75	18.15	5.60	peščena glina težko gnetne do poltrdne konsistence z vložki proda
		17.96	6.70	0.00	12.75	
		0.00	9.29	19.04	4.65	
		46.14	-3.61	46.14	-1.71	
		21.37	5.64			

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No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
8		19.04	4.65	0.00	9.29	peščen lapor, pesek in prod
		0.00	-8.61	46.14	-8.61	
		46.14	-3.61			

Water

Water type : GWT

No.	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1		0.00	13.27	16.39	8.40	17.55	5.40
		31.42	4.39	46.14	-0.69		

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 2)

Analysis 1 (stage 2)

Circular slip surface

Slip surface parameters							
Center :	x =	46.14	[m]	Angles :	α_1 =	-33.35	[°]
	z =	81.27	[m]		α_2 =	-0.14	[°]
Radius :	R =	81.20	[m]				
The slip surface after optimization.							

Slope stability verification (Bishop)

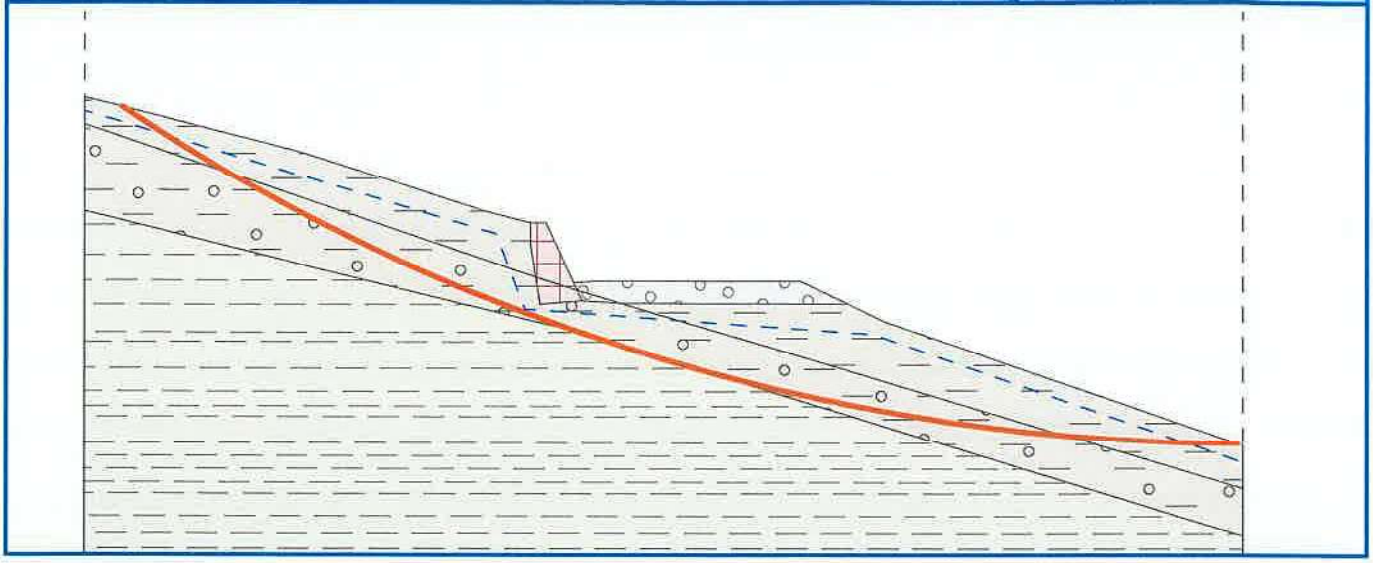
Sum of active forces : F_a = 598.88 kN/m
Sum of passive forces : F_p = 1066.35 kN/m

Sliding moment : M_a = 48629.37 kNm/m
Resisting moment : M_p = 86587.99 kNm/m
Utilization : 56.2 %

Slope stability ACCEPTABLE

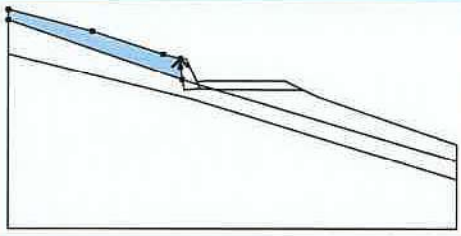
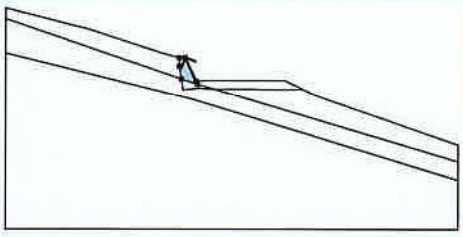
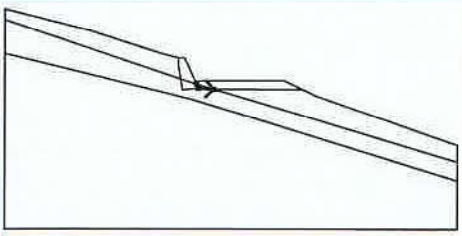
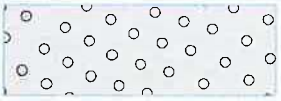
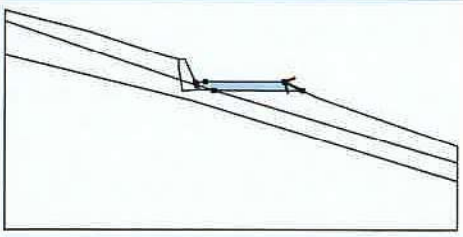
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Name : Analysis	Stage - analysis : 2 - 1

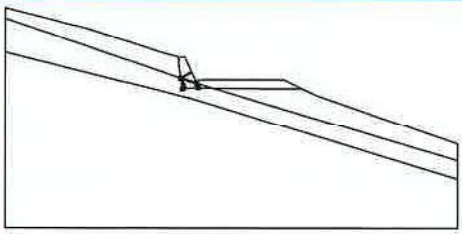
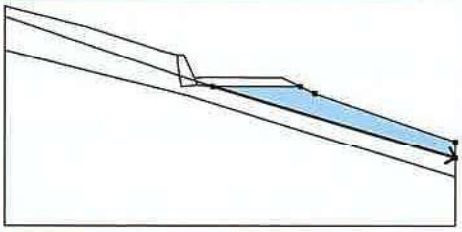
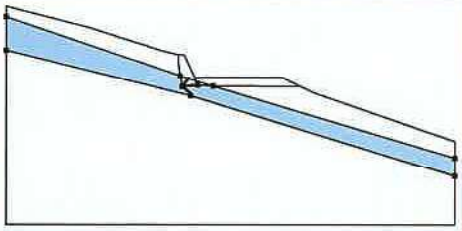
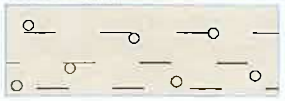
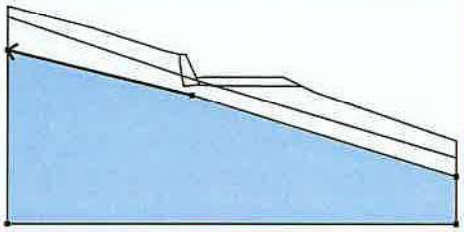


Input data (Stage of construction 3)

Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		17.76	7.98	17.76	8.85	peščena glina srednje gnetne konsistence
		15.99	9.30	8.71	11.63	
		0.00	13.82	0.00	12.75	
		17.96	6.70			
2		19.48	6.47	18.37	8.85	kamnita zložba
		17.76	8.85	17.76	7.98	
		17.96	6.70	19.62	6.17	
3		19.81	5.75	21.37	5.64	tampon
		19.62	6.17			
4		30.39	5.62	28.51	6.52	tampon
		20.48	6.53	19.48	6.47	
		19.62	6.17	21.37	5.64	

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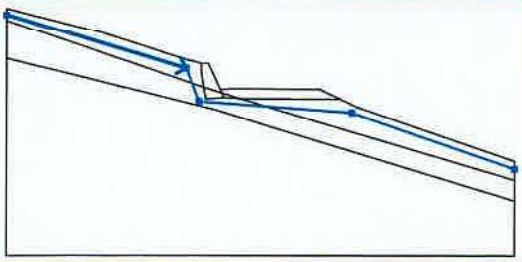
No.	Surface position	Coordinates of surface points [m] x	z	x	z	Assigned soil
5		19.62	6.17	17.96	6.70	kamnita zložba
		18.15	5.60	19.81	5.75	
6		21.37	5.64	46.14	-1.71	peščena glina srednje gnetne konsistence
		46.14	0.00	31.84	4.92	
		30.39	5.62			
7		19.81	5.75	18.15	5.60	peščena glina težko gnetne do poltrdne konsistence z vložki proda
		17.96	6.70	0.00	12.75	
		0.00	9.29	19.04	4.65	
		46.14	-3.61	46.14	-1.71	
		21.37	5.64			
8		19.04	4.65	0.00	9.29	peščen lapor, pesek in prod
		0.00	-8.61	46.14	-8.61	
		46.14	-3.61			

Surcharge

No.	Surcharge new	Surcharge change	Type	Type of action	Location z [m]	Origin x [m]	Length l [m]	Width b [m]	Slope α [°]	Magnitude q, q_1, f, F	Magnitude q_2	Magnitude unit
1	Yes		strip	variable	on terrain	x = 0.00	l = 17.00		0.00	5.00		kN/m²

Water

Water type : GWT

No.	GWT location	Coordinates of GWT points [m] x	z	x	z	x	z
1		0.00	13.27	16.39	8.40	17.55	5.40
		31.42	4.39	46.14	-0.69		

Tensile crack

Tensile crack not input.

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Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 3)

Analysis 1 (stage 3)

Circular slip surface

Slip surface parameters							
Center :	x =	46.12	[m]	Angles :	α_1 =	-33.37	[°]
	z =	81.19	[m]		α_2 =	-0.13	[°]
Radius :	R =	81.12	[m]				
The slip surface after optimization.							

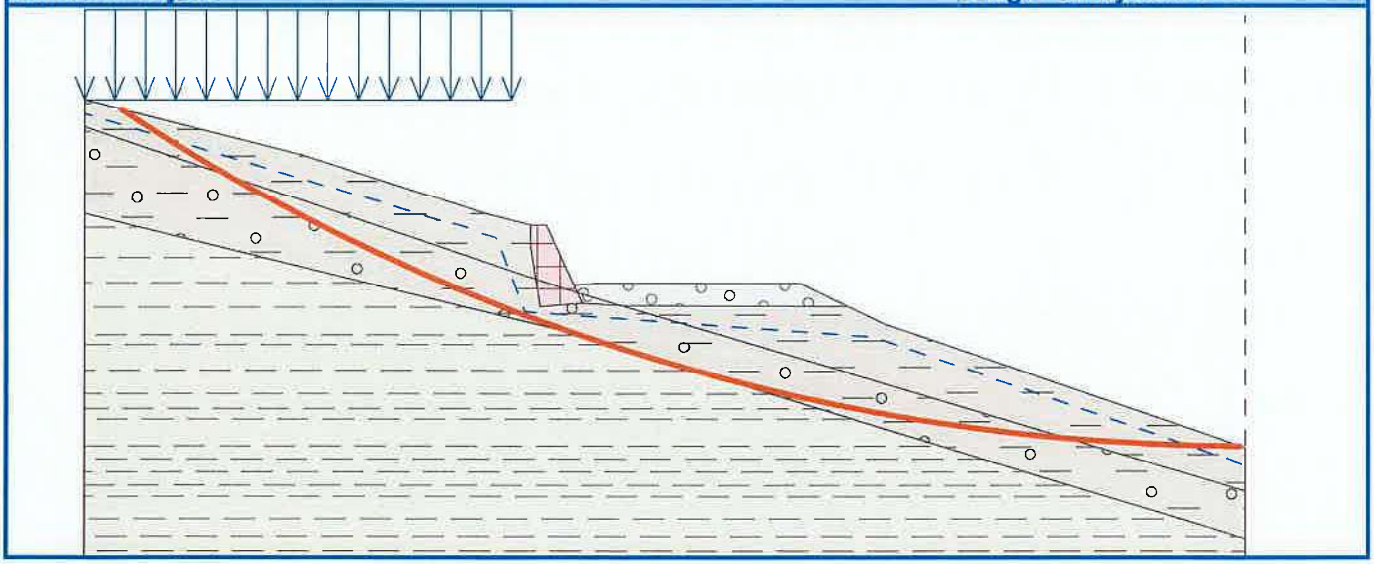
Slope stability verification (Bishop)

Sum of active forces : F_a = 651.94 kN/m
Sum of passive forces : F_p = 1109.19 kN/m

Sliding moment : M_a = 52885.29 kNm/m
Resisting moment : M_p = 89977.32 kNm/m
Utilization : 58.8 %

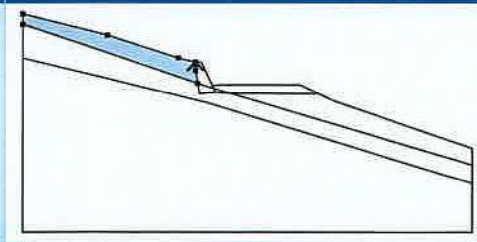
Slope stability ACCEPTABLE

Name : Analysis — Stage - analysis : 3 - 1

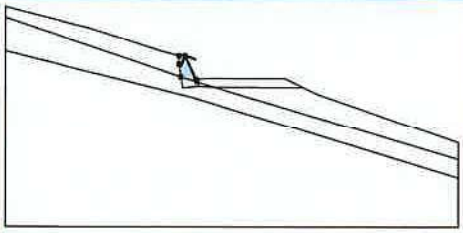
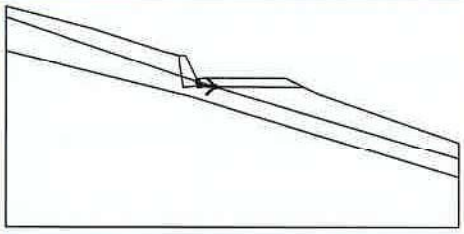
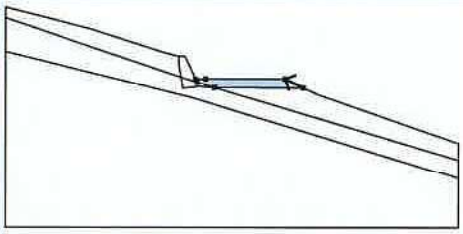
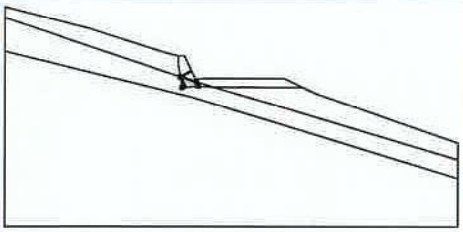
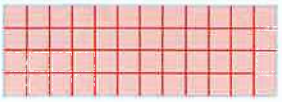
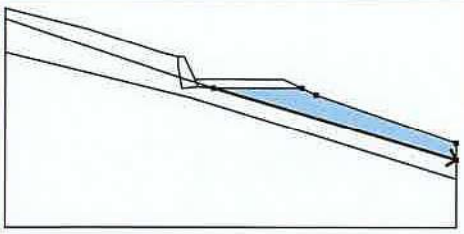
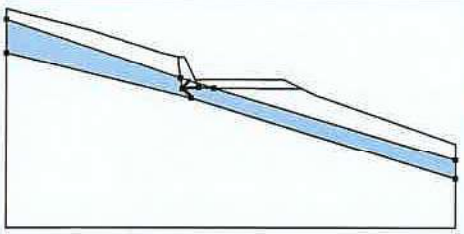


Input data (Stage of construction 4)

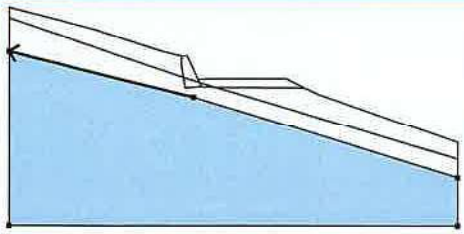
Assigning and surfaces

No.	Surface position	Coordinates of surface points [m] x	z	x	z	Assigned soil
1		17.76	7.98	17.76	8.85	peščena glina srednje gnetne konsistence
		15.99	9.30	8.71	11.63	
		0.00	13.82	0.00	12.75	
		17.96	6.70			

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No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		19.48	6.47	18.37	8.85	kamnita zložba
		17.76	8.85	17.76	7.98	
		17.96	6.70	19.62	6.17	
3		19.81	5.75	21.37	5.64	tampon
		19.62	6.17			
4		30.39	5.62	28.51	6.52	tampon
		20.48	6.53	19.48	6.47	
		19.62	6.17	21.37	5.64	
5		19.62	6.17	17.96	6.70	kamnita zložba
		18.15	5.60	19.81	5.75	
6		21.37	5.64	46.14	-1.71	peščena glina srednje gnetne konsistence
		46.14	0.00	31.84	4.92	
		30.39	5.62			
7		19.81	5.75	18.15	5.60	peščena glina težko gnetne do poltrdne konsistence z vložki proda
		17.96	6.70	0.00	12.75	
		0.00	9.29	19.04	4.65	
		46.14	-3.61	46.14	-1.71	
		21.37	5.64			

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No.	Surface position	Coordinates of surface points [m] x	z	x	z	Assigned soil
8		19.04	4.65	0.00	9.29	peščen lapor, pesek in prod
		0.00	-8.61	46.14	-8.61	
		46.14	-3.61			

Water

Water type : No water

Tensile crack

Tensile crack not input.

Earthquake

Horizontal seismic coefficient : K_h = 0.01
Vertical seismic coefficient : K_v = 0.01

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 4)

Analysis 1 (stage 4)

Circular slip surface

Slip surface parameters							
Center :	x =	46.14	[m]	Angles :	α_1 =	-33.35	[°]
	z =	81.27	[m]		α_2 =	-0.14	[°]
Radius :	R =	81.20	[m]				
The slip surface after optimization.							

Slope stability verification (Bishop)

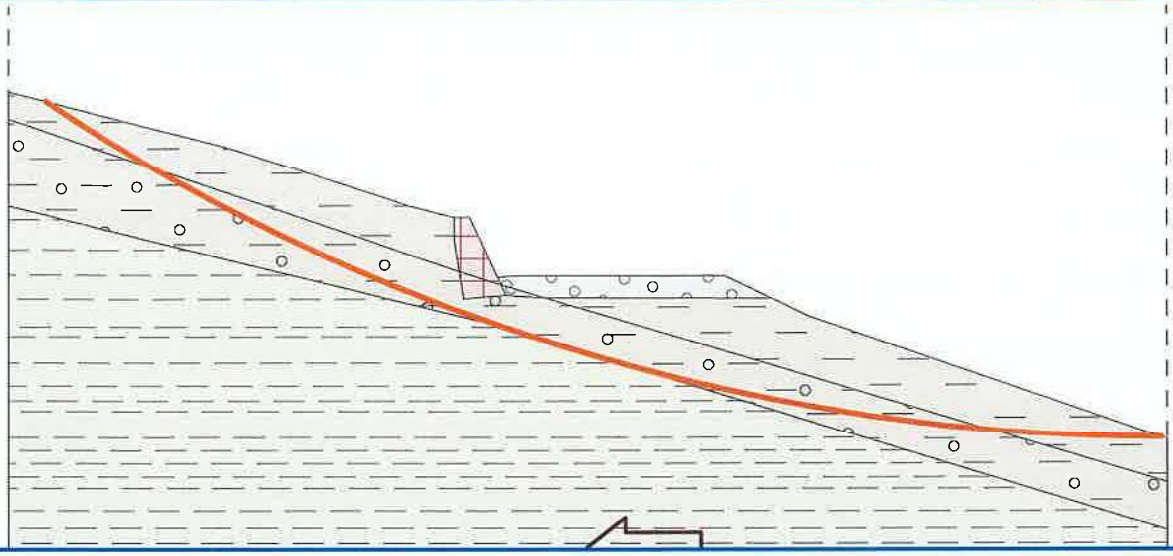
Sum of active forces : F_a = 599.90 kN/m
Sum of passive forces : F_p = 1307.10 kN/m

Sliding moment : M_a = 48711.58 kNm/m
Resisting moment : M_p = 106136.85 kNm/m
Utilization : 45.9 %

Slope stability ACCEPTABLE

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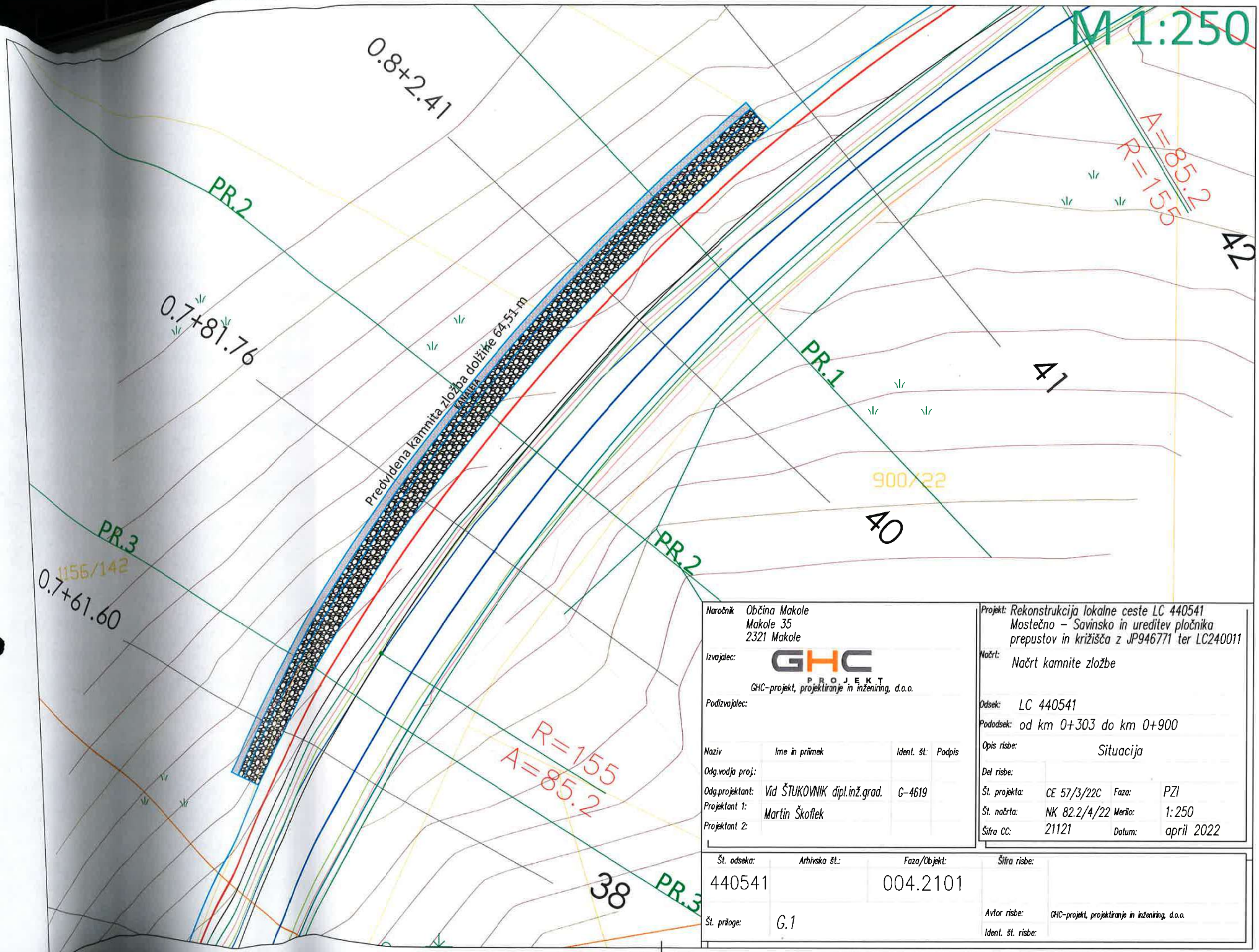
Name : Analysis	Stage - analysis : 4 - 1



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2.2.8	**GRAFIKE**

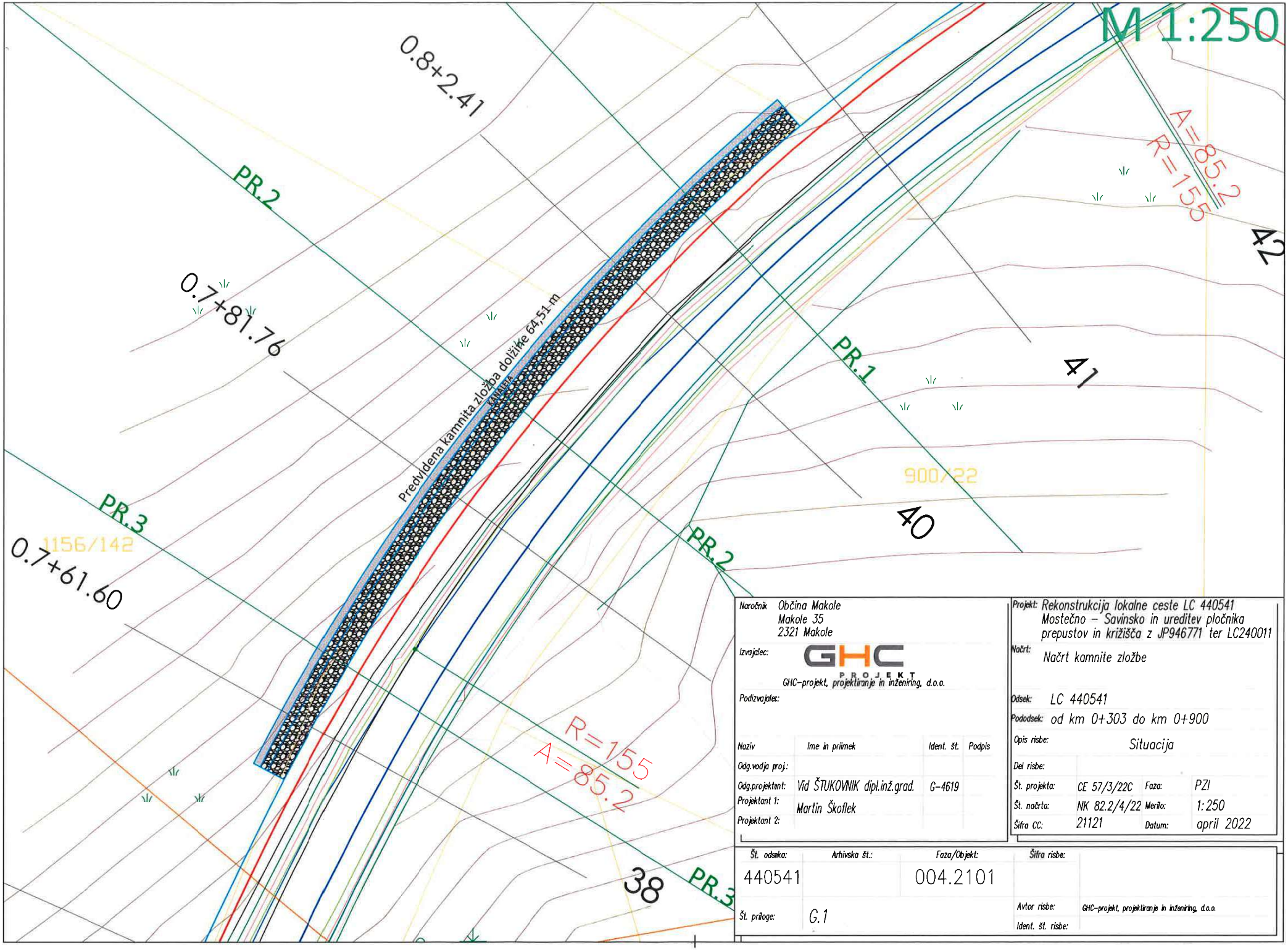
M 1:250



Naročnik:	Občina Makole Makole 35 2321 Makole		
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.		
Podizvajalec:			
Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Situacija
Del risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:250
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	
Št. priloge:	G.1	Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	

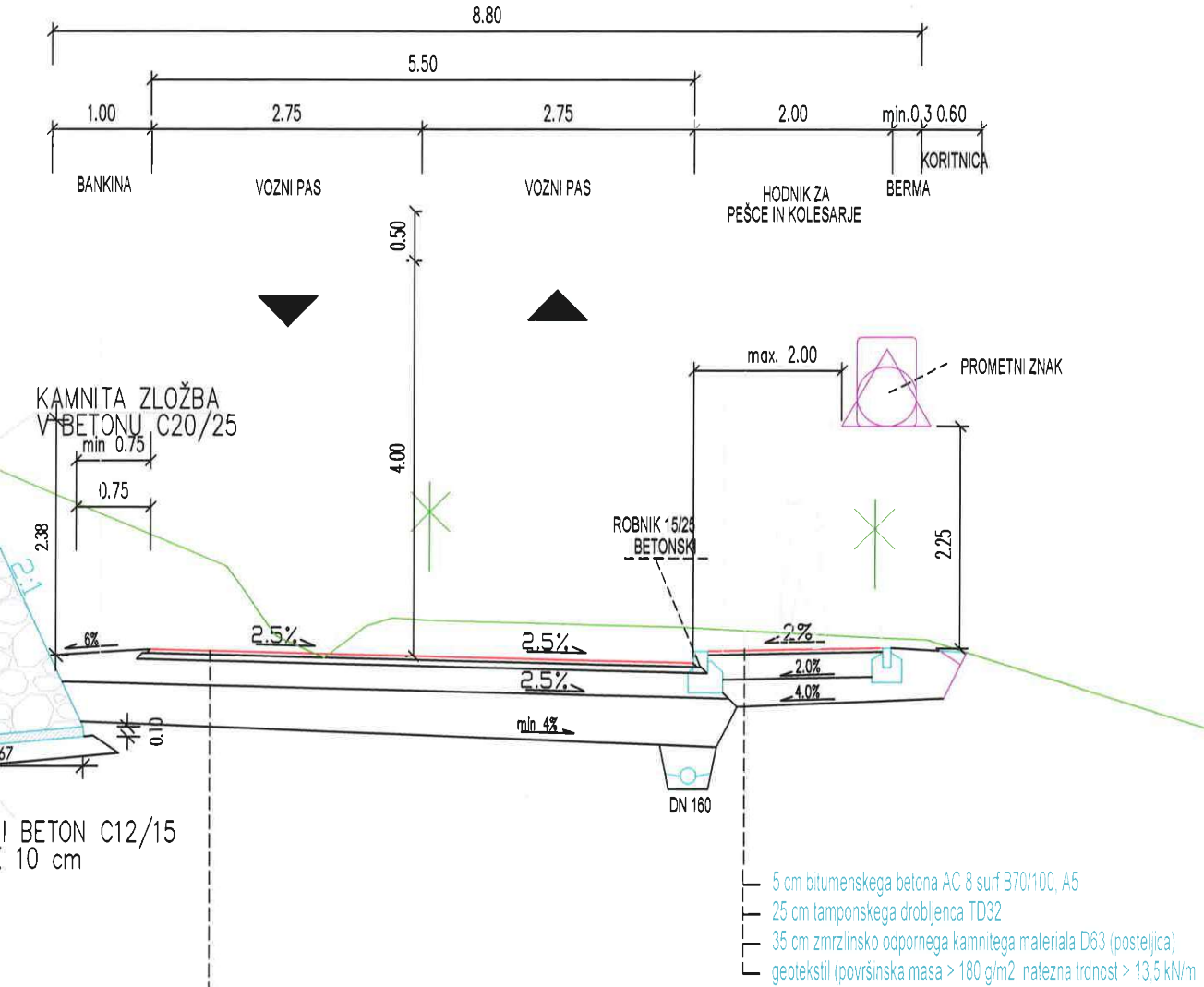


Naročnik	Občina Makole Makole 35 2321 Makole		
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.		
Podizvajalec:			
Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Situacija
Del risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:250
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	
Št. priloge:	G.1	Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	

M 1:100

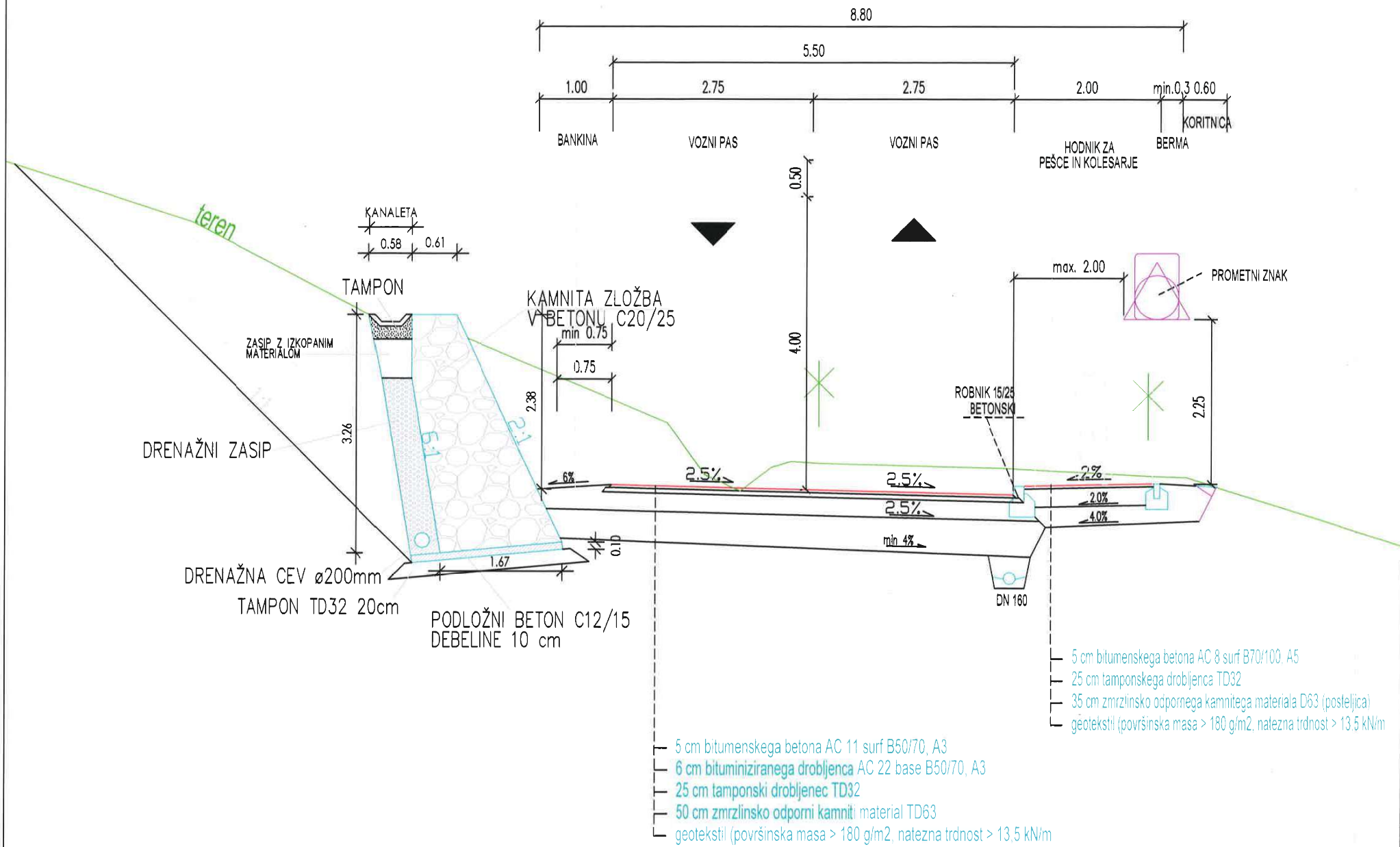


Naročnik:	Občina Makole Makole 35 2321 Makole
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.
Podizvajalec:	

Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Karakteristični prerez pilotne stene
Del risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:100
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	
Št. priloge:	G.3	Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	



Naročnik

Izvajalec:

Podizvajalec:

Naziv

Odg.vodja proj.:

Odg.projektant:

Projektant 1:

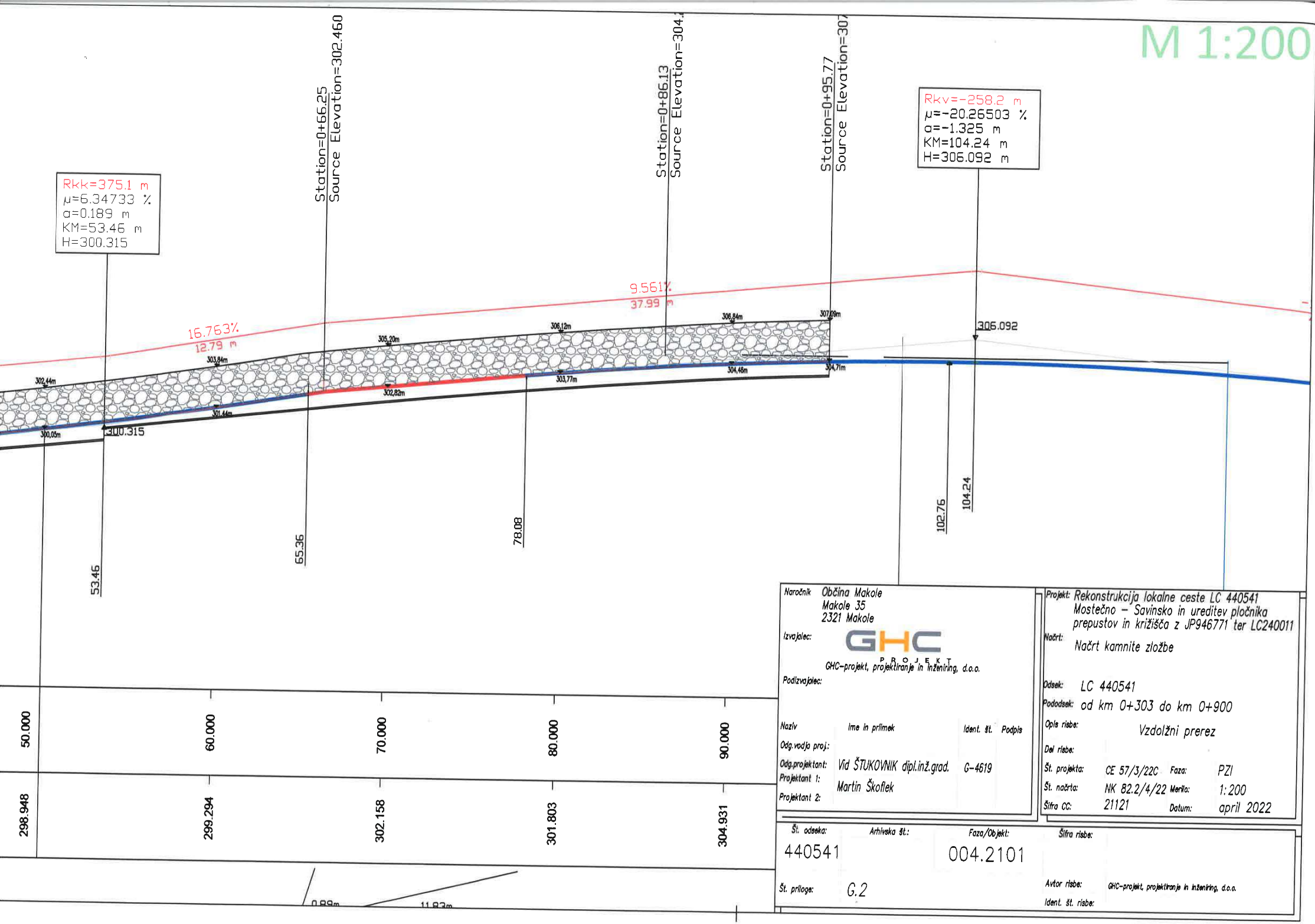
Projektant 2:

Št. odseka:

44054

Št. priloge:

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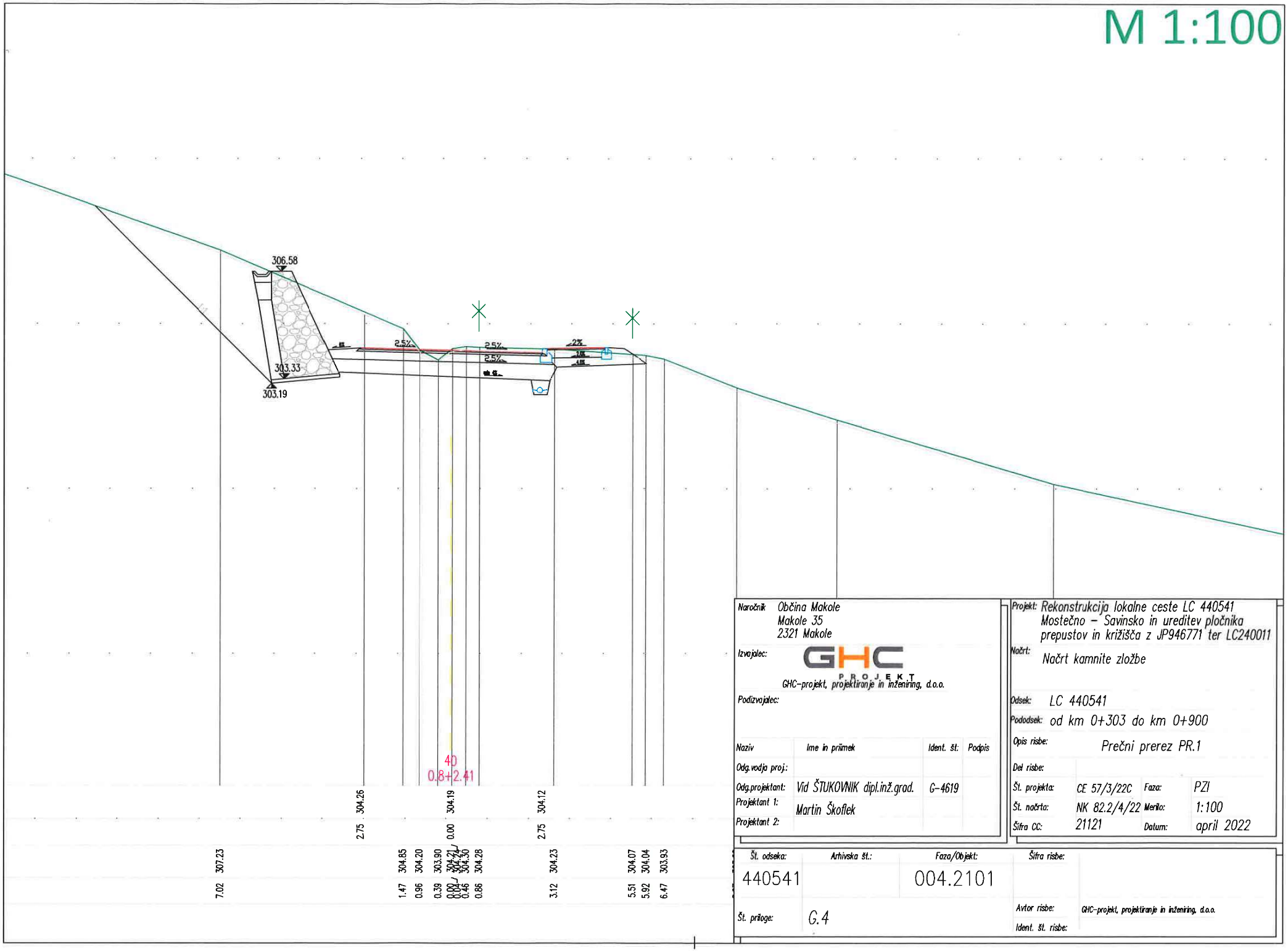


Naročnik:	Občina Makole Makole 35 2321 Makole	Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.	Načrt:	Načrt kamnite zložbe
Podizvajalec:		Odsek:	LC 440541
		Pododsek:	od km 0+303 do km 0+900
Naziv / Ime in priimek / Ident. št. / Podpis		Opis risbe:	Vzdolžni prerez
Odg.vodja proj.:		Del risbe:	
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad. G-4619	Št. projekta:	CE 57/3/22C Faza: PZI
Projektant 1:	Martin Škoflek	Št. načrta:	NK 82.2/4/22 Merilo: 1:200
Projektant 2:		Šifra CC:	21121 Datum: april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	
Št. priloge: G.2		Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	

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μ=6.34733 %
a=0.189 m
KM=53.46 m
H=300.315
Station=0+33.70
Source Elevation=301.589
Station=0+43.22
Source Elevation=300.870
Station=0+66.25
Source Elevation=302.460
Station=0+86.13
Station=0+95.77
78.08
65.36
53.46
41.55
9.561%
37.99 m
15.763%
12.79 m
10.416%
48.35 m
90.000
80.000
70.000
60.000
50.000
40.000
30.000
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301.803
302.158
299.294
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Naročnik
Izvajalec:
Podizvajalec:
Naziv
Odg.vodja proj.:
Odg.projektant:
Projektant 1:
Projektant 2:
Št. odseka:
44054
Št. priloge:

M 1:100



Naročnik:	Občina Makole Makole 35 2321 Makole
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.
Podizvajalec:	

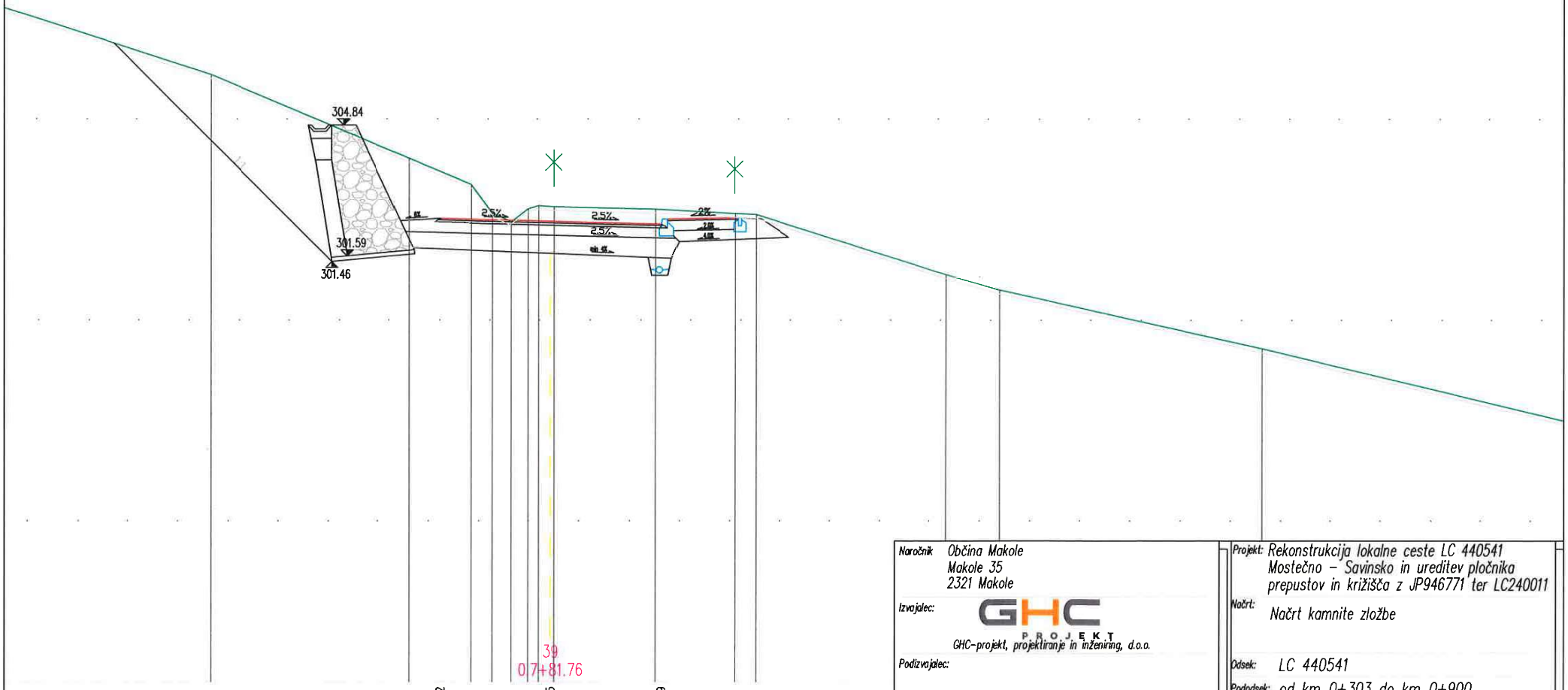
Naziv	Ime in priimek	Ident. št:	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Prečni prerez PR.1
Del risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:100
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	

Št. priloge:	G.4	Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	

M 1:100



Naročnik:	Občina Makole Makole 35 2321 Makole
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.
Podizvajalec:	

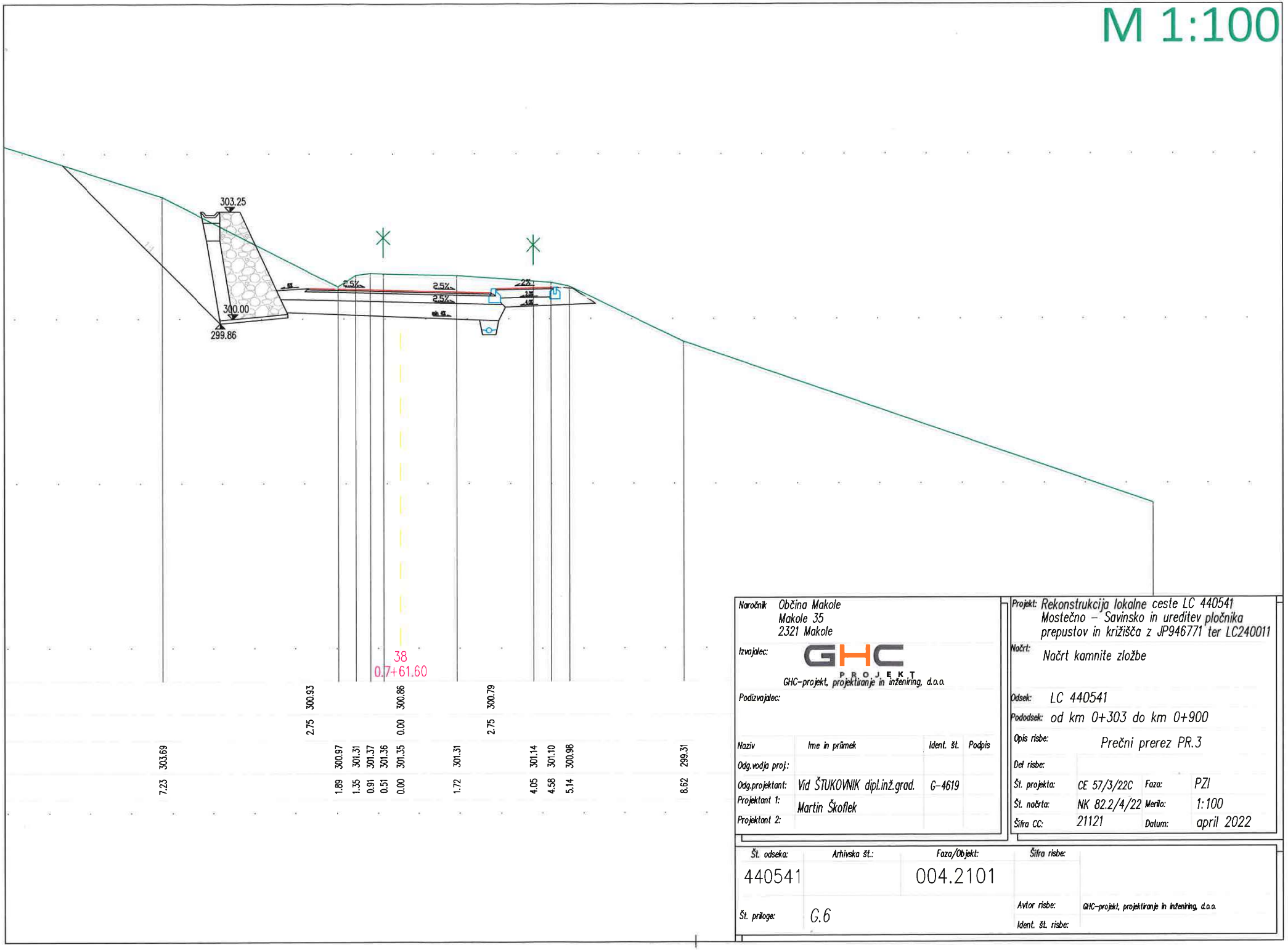
Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Prečni prerez PR.2
Del risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:100
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	

Št. priloge:	G.5
Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
Ident. št. risbe:	

M 1:100



Naročnik	Občina Makole Makole 35 2321 Makole		
Izvajalec:	GHC PROJEKT GHC-projekt, projektiranje in inženiring, d.o.o.		
Podizvajalec:			
Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Odg.projektant:	Vid ŠTUKOVNIK dipl.inž.grad.	G-4619	
Projektant 1:	Martin Škoflek		
Projektant 2:			

Projekt:	Rekonstrukcija lokalne ceste LC 440541 Mostečno – Savinsko in ureditev pločnika prepustov in križišča z JP946771 ter LC240011
Načrt:	Načrt kamnite zložbe
Odsek:	LC 440541
Pododsek:	od km 0+303 do km 0+900
Opis risbe:	Prečni prerez PR.3
Det risbe:	
Št. projekta:	CE 57/3/22C
Faza:	PZI
Št. načrta:	NK 82.2/4/22
Merilo:	1:100
Šifra CC:	21121
Datum:	april 2022

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
440541		004.2101	
Št. priloge:	G.6	Avtor risbe:	GHC-projekt, projektiranje in inženiring, d.o.o.
		Ident. št. risbe:	