

1 NASLOVNA STRAN

Naziv gradnje: **Kolesarska povezava Selca - Dolenja vas – Ševlje, ob R2-403/1076 Češnjica – Škofja Loka med km 2,607 in km 4,675**

Številčna oznaka in vrsta načrta: **2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)**

Investitor: **Občina Železniki
Češnjica 48, 4228 Železniki**

Vrsta projektne dokumentacije: **PZI – Projektna dokumentacija za izvedbo gradnje**

Številka projekta: **2024/27 (PIZ d.o.o.)**

Številka načrta: **119/2026**

Vrsta gradnje: **Novogradnja**

Projektant načrta: **Tempos, okoljsko gradbeništvo, d.o.o.
Tehnološki park 21, 1000 Ljubljana
Direktor: dr. Jošt Sodnik, univ.dipl.inž.grad.**

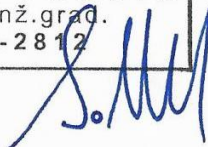
 **Tempos d.o.o.**



Vodja projektiranja: **mag. Simon Kovačič, dipl.inž.grad.** **IZS G-3712**

Pooblaščen inženir načrta: **Dr. Jošt SODNIK, univ.dipl.inž.grad.** **IZS G-2812**

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Kraj in datum izdelave projektne dokumentacije: **Ljubljana, marec 2026
(po recenziji: april 2026)**

Številka izvoda: **Digitalni izvod**

NASLOVNA STRAN NAČRTA

2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)

PODATKI O GRADNJI

naziv gradnje

Kolesarska povezava Selca - Dolenja vas – Ševlje, ob R2-403/1076
Češnjica – Škofja Loka med km 2,607 in km 4,675

kratek opis gradnje

V sklopu projekta izgradnje deniveliranih površin za pešce in kolesarje je med profiloma 87 in 93 potrebno izvesti cca 110,5m dolg oporni zid iz kamna v betonu. Zid bo spremenljive višine (do 6,7m svetle višine), s prilagajanjem zalednemu terenu.

VRSTE GRADNJE



NOVOGRADNJA - NOVOZGRAJEN OBJEKT

označiti vse ustrezne vrste gradnje



NOVOGRADNJA - PRIZIDAVA



REKONSTRUKCIJA



SPREMEMBA NAMEMBOSTI



ODSTRANITEV CELOTNEGA OBJEKTA



LEGALIZACIJA



VZDRŽEVALNA DELA V JAVNO KORIST

PODATKI O PROJEKTNI DOKUMENTACIJI

vrsta dokumentacije

PZI (projektna dokumentacija za izvedbo gradnje)

številka projekta

2024/27 (PIZ d.o.o.)

PODATKI O NAČRTU

strokovno področje načrta

2 Načrt s področja gradbeništva

naziv načrta

2.1 Načrt opornih konstrukcij
(med cestnima profiloma 87 in 93)

številka načrta

119/2026

datum izdelave

marec 2026

datum spremembe

april 2026 (po recenziji)

PODATKI O PROJEKTANTU NAČRTA

projektant načrta (naziv družbe)

Tempos d.o.o.

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odgovorna oseba projektanta načrta

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podpis odgovorne osebe

projektanta načrta



Tempos d.o.o.

PODATKI O IZDELOVALCU NAČRTA

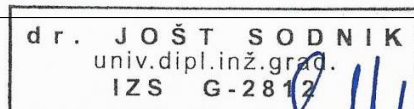
ime in priimek pooblaščenega arhitekta, pooblaščenega inženirja

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podpis pooblaščenega arhitekta, pooblaščenega inženirja



2 KAZALO VSEBINE NAČRTA

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| 1 | Naslovna stran |
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| 2 | Kazalo vsebine načrta |
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| 3 | Seznam strokovnih sodelavcev |
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| 4 | Izjava projektanta načrta in pooblaščenega strokovnjaka |
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| 5 | Tehnično poročilo |
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| 6 | Kontrola mehanske odpornosti in stabilnosti |
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| 7 | Popis del |
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| 8 | Grafični prikazi |
|---|------------------|
-

3 SEZNAM STROKOVNIH SODELAVCEV

Aleš Oblak, mag. inž. grad.
Nina Gognjavec, univ. dipl. inž. geol. (RG-0234)

4 IZJAVA PROJEKTANTA NAČRTA IN POOBLAŠČENEGA STROKOVNJAKA

Priloga 2C

PRILOGA 2C

**IZJAVA PROJEKTANTA NAČRTA
IN POOBLAŠČENEGA STOKOVNJAKA,
KI JE IZDELAL NAČRT V PZI IN PID**

PROJEKTANT NAČRTA

projektant načrta (naziv družbe)	Tempos d.o.o.
naslov	Tehnološki park 21, 1000 Ljubljana
odgovorna oseba projektanta načrta	dr. Jošt Sodnik

IN POOBLAŠČENI STROKOVNJAK, KI JE IZDELAL NAČRT

pooblaščen strokovnjak	dr. Jošt Sodnik, univ.dipl.inž.grad.
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IZJAVLJAVA:

da načrt

vrsta dokumentacije	PZI (projektna dokumentacija za izvedbo gradnje)
strokovno področje načrta	2 Načrt s področja gradbeništva
naziv načrta	2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)
številka načrta	119/2026
datum izdelave	marec 2026 / april 2026 (po recenziji)

upošteva relevantne predpise in druge normativne dokumente ter da so upoštevane ustrezne bistvene in druge zahteve.

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odgovorna oseba projektanta načrta	dr. Jošt Sodnik
podpis odgovorne osebe projektanta načrta	

 **Tempos d.o.o.**

5 TEHNIČNO POROČILO

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2 SPLOŠNI OPISI IN PROBLEMATIKA

V okviru izgradnje kolesarske povezave na relaciji Dolenja vas – Ševlje, ob R2-403/1076 Češnjica – Škofja Loka med km 2,607 in km 4,675, je potrebno zgraditi oporni zid ob kolesarski povezavi v Dolenji vasi med profiloma 87 in 93, ki je obdelan v tem načrtu.

Pred izvedbo načrta opornega zidu je bil izdelan geološko-geomehanski elaborat (118/2026, Tempos d.o.o., marec 2026). GG elaborat je predstavljal osnovo za načrtovanje oporne konstrukcije.

Naročnik projekta je Občina Železniki (Češnjica 48, 4228 Železniki).

Slika 1 in 2 prikazujeta obravnavano lokacijo na makro in mikro nivoju, pri čemer je na drugi sliki označena tudi okvirna lokacija predvidene podporne konstrukcije.



Slika 1: Pregledna situacija z označenim območjem obdelave (vir: iObčina).



Slika 2: Situacija z označenim območjem preiskav in predvideno lokacijo podporne konstrukcije (vir: Atlas voda).

Opis obstoječega stanja

Predvideni oporni zid bo umeščen ob novo kolesarsko povezavo na prometni povezavi Češnjica–Škofja Loka v Dolenji vasi med objektoma Dolenja vas 49 in Dolenja vas 121, predvidena dolžina zidu je 110 m.

V obstoječem stanju območje predstavlja zelena brežina, ki je mestoma utrjena s kamnito zložbo ter deloma z zidom iz kamna v betonu. Med obema utrditvama se nahaja kapelica. Naklon brežine v najstrmejšem delu dosega do 50°. Površje je pretežno travniško. Za izvedbo opornega zidu bo potreben več metrski vkop v strmo brežino.

Približno 40 m jugozahodno od obstoječega cestišča teče reka Selška Sora, medtem ko se približno 65 m jugovzhodno od predvidene lokacije zidu nahaja neimenovan vodotok.

Po javno dostopnih podatkih na mestu predvidenega zidu ni GJI infrastrukture, vendar lastniki okoliških parcel opozarjajo, da **del obstoječih vodov ni evidentiran** v uradnih prikazih.

Spodnje slike prikazujejo obstoječe stanje na terenu (9.3.2026).



Slika 3: Pogled na cestišče in kapelico



Slika 4: Kapelica med obstoječim zidom in zložbo



Slika 5: Obstoječa kamnita zložba



Slika 6: Obstoječ zid kamen v betonu



Slika 7: Pogled na konec obstoječega zidu

3 OSNOVE ZA PROJEKTIRANJE UREDITEV

3.1 KONCEPT UREDITEV

Zaradi izvedbe kolesarske povezave in širitve v brežino v Dolenji vasi, je potrebno izvesti oporni zid dolžine 110,5 m.

Oporna konstrukcija je predvidena med cestnima profiloma 87 in 93. Predvidi se zid kamen v betonu z manjšo peto naprej, s čimer se nekoliko zmanjša potrebe izkopov v zaledju, kjer se nahaja strma brežina. Predviden zid bo spremenljive višine, predvsem zaradi spremenljivega poteka terena v zaledju, medtem ko niveleta ceste oziroma kolesarske steze na obravnavenem odseku le blago narašča oziroma pada (1-2%). Zaradi spremenljive višine (do maksimalno 8,1m oz. do maksimalno 6,8m svetle višine zidu) je zid zasnovan v treh različnih geometrijah, pri čemer se spreminja širina krone in sicer če je svetla višina $H_{\text{svetla}} > 5,0\text{m}$ širina krone znaša 1,0m, če je $5,0\text{m} > H_{\text{svetla}} > 3,0\text{m}$ je širina krone enaka 0,8 m in če je $H_{\text{svetla}} < 3,0\text{m}$ širina krone znaša 0,7 m. Temelj zidu je s sprednje strani zasnovan kot 0,5m široka peta (pomembno je, da se ob gradnji pete uporabi večje skalne bloke, $d > 0,8\text{ m}$, ki segajo vsaj 30-40 cm preko vertikalne ravnine stika lica in temeljne pete). Na najvišjem delu zidu je dno temelja široko

2,70 m. Za zidom se izvede zasip iz ustreznega prepustnega materiala (drobljenec 0/125), ob dnu izkopa pa tudi izvede vzdolžno drenažo z odtokom v predvidene jaške v sklopu meteorne odvodnje kolesarske steze. Dodatno se v zid vgradi serijo odcednic, iz katerih se morebitna zaledna voda steka na betonsko muldo ob zidu privzeto iz načrta ceste/kolesarske steze. Nad zidom se predlaga izvedbo lesene varovalne ograje, višine 1,2m, pri čemer se njena izvedba in oblika prilagodi dogovoru med naročnikom projektne dokumentacije in lastnikom zalednih zemljišč (znotraj te projektne dokumentacije je ograja všteta v popis del, ni pa projektno obdelana). V obstoječem stanju se na lokaciji nahaja manjši kamnitobetonski zid s strmo zaledno brežino, kjer varovalne ograje ni.

Umestitev zidu sledi trasi predvidenih deniveliranih površin za pešce in kolesarje, ki so detailneje obdelane v ločenem načrtu (Kolesarska povezava Selca - Dolenja vas – Ševlje, ob R2-403/1076 Češnjica – Škofja Loka med km 2,607 in km 4,675, PIZ d.o.o., november 2025). Skladno z omenjeno dokumentacijo se je zid v spodnji točki od robu mešane površine za pešce in kolesarje odmaknil za 70 cm (40cm betonska mulda in 30cm betonska berma).

Po javno dostopnih podatkih na mestu predvidenega zidu ni vodov gospodarske javne infrastrukture, pri čemer pa smo bili ob izvedbi geološko geomehanskih del na terenu obveščeni s strani lastnikov zalednih zemljišč, da preko brežine v bližini obstoječe kapelice poteka elektro vod in na mestu uvoza dostopne poti manjše vodno zajetje s priključnimi cevmi. Pred izvedbo del je potrebno vse vode ustrezno označiti, zavarovati in prestaviti skladno s predvidenimi ureditvami prostora. Opazka na tem delu služi kot varnostno opozorilo med gradnjo, ki pa na sam zid nima bistvenih posledic in se ga izvede skladno s pripravljeno projektno dokumentacijo.

3.2 GEODETSKI POSNETEK

Za potrebe priprave projektne dokumentacije je bil izveden geodetski posnetek **print_GN_236-2025.dwg**, prejeto 23.2.2026, s strani naročnika oz. vodje projektiranja.

Zaradi boljše preglednosti in same izvedbe predvidenih ureditev je zid izrisan za enake profile kot so obdelani v načrtu ceste, z razliko, da se je vzdolžni prerez raztegnilo v nepopačeno merilo.

3.3 POVZETEK GG ELABORATA z obravnavanega območja

Za potrebe projektiranja opornega zidu, je bil izdelan GG elaborat (118/2026, Tempos d.o.o., marec 2026), v sklopu katerega se je izdelalo 4 sondažne vrtine, SPT teste in laboratorijske preiskave vzorcev.

Na podlagi terenskega ogleda in GG elaborata, so bila temeljna tla razdeljena v 5 značilnih slojev in predpostavljene naslednje karakteristike slojev:

0. **Umetni nasip:** uvrščamo ga med mešane, srednje prepustne zemljine. Sega do največ globine 1,3 m.

- Prostorninska teža: $\gamma = 20\text{-}22 \text{ kN/m}^3$
- Strižni kot: $\varphi = 35\text{-}37^\circ$
- Kohezija: $c = 0 - 1 \text{ kPa}$
- Deformacijski modul: $Me = 15\text{-}25 \text{ MPa}$

I. **Glinast/ meljast prod in grušč s peskom:** Uvrščamo ga v mešane, slabo prepustne zemljine.

- Prostorninska teža: $\gamma = 19\text{-}21 \text{ kN/m}^3$
- Nedrenirana strižna trdnost: $c_u = 75\text{-}85 \text{ kPa}$
- Strižni kot: $\varphi = 30\text{-}32^\circ$ (Kombinacija strižnega kota in kohezije naj bo obratno sorazmerna. Višji strižni kot - nižja kohezija, in obratno.)
- Kohezija: $c = 0\text{-}2 \text{ kPa}$
- Modul stisljivosti: $Me = 6\text{-}15 \text{ MPa}$

II. **Melj s peskom:** predstavlja ga močno prekonsolidiran material, s srednjo vodoprepustnostjo.

- Prostorninska teža: $\gamma = 18,5\text{-}20,5 \text{ kN/m}^3$ (laboratorij)
- Strižni kot: $\varphi = 28\text{-}30^\circ$
- Kohezija: $c = 0\text{-}3 \text{ kPa}$ (Kombinacija strižnega kota in kohezije naj bo obratno sorazmerna. Višji strižni kot - nižja kohezija, in obratno.)
- Nedrenirana strižna trdnost: $c_u = 50\text{-}60 \text{ kPa}$
- Modul stisljivosti: $Me = 10\text{-}18 \text{ MPa}$

III. Glina (s peskom): je srednje gnetne konsistence, pod vplivom vode je lahko tudi v židkem stanju. Uvrščamo jo v mešane, slabo prepustne zemljine. Izkopan material ni primeren za vgrajevanje v nasipe.

- Prostorninska teža: $\gamma = 19,0-20,0 \text{ kN/m}^3$ (laboratorij)
- Strižni kot: $\varphi = 26-34^\circ$ (laboratorij - pri izvedbi geostatičnih izračunov se naj uporabijo karakteristike bližje spodnji meji vrednosti.) (Kombinacija strižnega kota in kohezije naj bo obratno sorazmerna. Višji strižni kot - nižja kohezija, in obratno.)
- Kohezija: $c = 1-3 \text{ kPa}$ (laboratorij)
- Nedrenirana strižna trdnost: $c_u = 40-50 \text{ kPa}$
- Modul stisljivosti: $Me = 5-8 \text{ MPa}$

IV. Pretrta matična podlaga: s preiskavami smo kamninsko podlago dosegli med globino med 4,1 in 7,6 m. Ocenjujemo, da trdnost in homogenost kamnine z globino narašča.

- Prostorninska teža: $\gamma = 20-22 \text{ kN/m}^3$
- Strižni kot: $\varphi = 32-38^\circ$ (Kombinacija strižnega kota in kohezije naj bo obratno sorazmerna. Višji strižni kot - nižja kohezija, in obratno.)
- Kohezija: $c = 20 - 30 \text{ kPa}$
- Enosna tlačna trdnost: $q_u = < 1 \text{ MPa}$
- Modul stisljivosti: $Me = > 30$

Karakteristike materiala za zasip/voziščno konstrukcijo smo privzeli enake kot za sloj umetnega nasipa.

Za potrebe določitve zadostne mehanske odpornosti in stabilnosti predvidenih ukrepov smo izdelali geostatične analize s programskim orodjem GEO5 2020 – Gravity Wall in Slope Stability, s katerima smo preverili vsa potrebna mejna stanja in opravili dimenzioniranje zidu.

Geostatične analize so bile izdelane v skladu s standardom SIST EN 1997-1. V sklopu geostatične analize smo preverili notranjo stabilnost opornega zidu skladno s projektnim pristopom 2 (A1 + M1 + R2). Oporni zid je bil preverjen v najbolj neugodnih prečnih prerezi. Stabilnostne analize so bile izdelane po projektnem pristopu 3 (A1/A2 + M2 + R3).

Pri analizi opornega zidu smo za zadnji del zidu upoštevali tudi vpliv morebitne prometne obtežbe (kmetijska mehanizacija na dostopni poti), s čimer smo predpostavili najneugodnejši scenarij. Obtežba je bila privzeta kot trakasta vertikalna obtežba $q=17 \text{ kN/m}^2$ v širini 3m, tik nad zidom.

Stabilnost konstrukcij oz. izpis stabilnostnega izračuna je podan v prilogi »6 KONTROLA MEHANSKE ODPORNOSTI IN STABILNOSTI«. Pri izkopih in gradnji mora biti prisoten geomehanski nadzor. V kolikor se izkaže, da so v načrtu uporabljene napačne karakteristike zemljine, je potreben ponoven preračun na dejanske karakteristike. Predvsem je pomembno, da se zid temelji na ustrezni podlagi z zagotovljeno zadostno zbitostjo ($E_{vd}>40 \text{ MPa}$). V izračunih smo sicer upoštevali, da kompaktnejša podlaga ni dosežena, s čimer smo na varni strani. Kljub temu pa na podlagi izvedenih preiskav obstaja možnost, da bo temelj segal povsem do kompaktne podlage, kar je bilo iz izvedenih preiskav zaradi težjega dostopa in s tem varne izvedbe preiskav težko določiti/oceniti.

4 PREDVIDENE UREDITVE

4.1 RUŠITVE IN ODSTRANITVE OBSTOJEČIH OBJEKTOV

Za izvedbo predvidenega opornega zidu se odstrani obstoječ kamnitobetonski zid v dolžini cca 50 m (severovzhodno od kapelice, Slika 6) in zložbo kamen v suho v dolžini cca 12 m (jugozahodno od kapelice, Slika 5).

Sakralno znamenje (kapelica na Slika 4) se demontira in prestavi nekoliko severovzhodneje, izven območja zidu – detajlneje obdelano v načrtu ceste.

V sklopu rušitvenih in odstranitvenih del se predvidi tudi odstranitev večjega drevesa na skrajnem koncu predvidenega zidu.

4.2 PREDVIDENE KONSTRUKCIJE

Oporni zid (med cestnima profiloma 87 in 93)

Oporna konstrukcija se nahaja na območju cestnih profilov 88 in 92 (med 87 in 93) oziroma med stacionažama km 4.3+26.86 in km 4.4+37.16, kar v osi ceste predstavlja dolžino 110,3 m (110,4 m v osi zidu). Oporna konstrukcija poteka vzdolž trase ceste in je zasnovana kot težnostni zid kamen v betonu z manjšo peto naprej pod bermo in muldo denivelirane površine za pešce in kolesarje. Zid je spremenljive višine od cca 1,9 m do 8,1 m, prav tako je spremenljiva širina temelja od 1,1 m do 2,7 m. V osnovi je geometrija zidu zasnovana na način, da je dno temeljne ploskve nagnjeno pod kotom 1:15, prav tako tudi zaledna stena (naklon 15:1) do 1,0 m pod vrhom krone. Širina krone je odvisna od višine zidu in je definirana na sledeč način: če je svetla višina $H_{\text{svetla}} > 5,0\text{m}$ širina krone znaša 1,0m, če je $5,0\text{m} > H_{\text{svetla}} > 3,0\text{m}$ je širina krone enaka 0,8 m in če je $H_{\text{svetla}} < 3,0\text{m}$ širina krone znaša 0,7 m. Sprednje lice do temeljne pete je pod naklonom 4:1. Temeljna peta je debeline 1,0m, nad katero pa se nahaja 20 cm debela betonska mulda in berma, torej je kota temeljenja na sprednji strani 1,2 m pod koto robu površin za pešce in kolesarje. Skladno z zasnovo geometrije za stabilnost zidu smo na priložene grafike dodali enačbo za izračun minimalne potrebne širine temelja ($\check{s}_{\text{temelja}} = \frac{3 \cdot (300 \cdot \check{s}_{\text{krona}} + 55 \cdot H_{\text{svetla}} + 146)}{904}$), kjer je $\check{s}_{\text{temelja}}$ širina temelja, $\check{s}_{\text{krona}}$ širina krone in H_{svetla} svetla višina zidu).

Za zid se uporabi beton C25/30, XC2 in skale lomljenca/klesanca lokalnega izvora d=40-80 cm (tudi 100-120 cm v temelju in spodnjem delu zidu), v razmerju 60:40. Na zaledno stran zidu in na dnu temelja se položi armaturne mreže Q785 z minimalno 10 cm prekrivnega sloja betona. Pomembno je, da se temelj zidu izdelava na kvalitetno pripravljeno podlago, z utrditvijo temeljnih tal na $E_{vd} > 45 \text{ MPa}$ (v primeru ne doseganja pogoja, se temeljna tla v širini 0,4m izven konture temelja in v debelini 0,5m nadomesti z drobljencem 0/125 z utrditvijo do predpisane vrednosti). V primeru situacije, da del temelja nalega na hribinsko podlago, del pa v zemljinu, se slednjo odstrani do skalne osnove, temelj pa podbetonira, s čimer se zagotovi enake razmere pod kontaktno ploskvijo temelja. Na zaledni strani se ob temelju zidu položi drenažno cev $\Phi 200 \text{ mm}$ z obsutjem z drenažnim drobljencem 16/32. Drenažno cev se vgradi v kadunjasto oblikovan podložni beton. Dodatno se skozi zid predvidi serijo odcednic v dveh(treh) vrstah na medosni razdalji 2,0 m. Generalno se odcednice vgradi na višini 0,2 in 2,0 m nad muldo pred zidom, na mestu najvišjega zidu (geometrija TIP3) pa je predvidena še tretja vrsta na svetli višini cca 4,0 m. Za odcednice se uporabi cevi iz trde plastike v betonsko sivi barvi, vgradnja le-teh pa je potopljena in ne izstopa iz ravnine skal zidu. Na mestu vgradnje odcednic se na zaledni strani v radiju 30 cm vgradi drenažni drobljenec 16/32.

Za zaledni zasip konstrukcije (s sprednje strani se uporabi zasip definiran za voziščno konstrukcijo (kamnita greda, tamponski drobljenec) – obdelano v načrtu ceste) se uporabi drobljenec 0/125, ki se ga sproti utruje po plasteh 20-30 cm. Na vrhu zasipa se razprostre odrinjen humus v debelini 20cm in zatravi. Na zadnjem delu zidu, kjer se v zaledju nahaja dostopna pot za kmetijsko mehanizacijo, se le-to povrne v obstoječe stanje. Zasip zidu se izvaja sproti z gradnjo zidu, s čimer se sproti podpira strme in visoke vkopne površine (delo je nujno potrebno izvajati po kampadah).

Nad zidom se predlaga izvedbo lesene varovalne ograje, višine 1,2m, pri čemer se njena izvedba in oblika prilagodi dogovoru med naročnikom projektne dokumentacije in lastnikom zalednih zemljišč.

4.3 POGOJI IN TEHNOLOGIJA GRADNJE

4.3.1 Izkop in izvedba zidu

Izvedbo zidu se predvidi v strmem vkopu (3:2), saj zaledni materiali izkazujejo določeno stopnjo nedrenirane strižne trdnosti za strmejše izkope, kar je prikazano tudi z izračuni globalne stabilnosti začasnega stanja med gradnjo.

Kljub temu je predvideno, da se izkop izvaja v kampadah do 6m, ob prisotnosti geomehanskega nadzora, ki po potrebi odredi dodatne tehnične ukrepe. Eden od možnih ukrepov bi bila izvedba položnejšega naklona (do 1:1) z vmesnimi bermami, kar sicer bistveno poveča količine izkopa in zasipa, ali izvedba zaščite iz brizganega betona ($d=10\text{cm}$), armaturnimi mrežami (Q385) in pasivnimi sidri ($L=6\text{m}$, $1\text{kom}/4\text{m}^2$) – slednje smo dodali tudi v popis del. Dela se prilagaja razmeram na terenu, predvsem v primeru odstopanja od privzetih karakteristik iz GG elaborata.

Izkopne površine je potrebno zaščititi pred padavinsko vodo, rob brežine na vrhu pa jasno označiti in zavarovati z ograjo oz. skladno z varnostnim načrtom in ureditvijo gradbišča. Odlaganje materiala na rob brežine ni dopustno.

Z višanjem višine zidu se na delih, kjer ne bo možno nadaljevati z gradnjo od spodaj, po potrebi razširiti izkop in urediti dostopno pot z vrha. Sočasno z gradnjo zidu se za zidom izdeluje tudi zasip, ki bo omogočal dostop za mehanizacijo in s tem izvedbo višjega dela zidu.

4.3.2 Temeljenje

Temeljna tla mora pred vgradnjo (podložnega) betona pod temelje opornih zidov pregledati geomehanski nadzor in po potrebi, glede na geomehanske razmere določiti dodatne ukrepe (zamenjavo temeljnih tal, itd) za zagotovitev ustreznih razmer za temeljenje obravnavanih zidov. Naravni raščen teren oziroma temeljna tla pod zidom morajo biti utrjena do minimalno $E_{vd}=45\text{MPa}$ (V kolikor pogoju ni zadoščeno se izvede zamenjava z drobljencem 0/125 v širini 0,4m izven temelja zidu in v debelini 0,5m oz. do spodnje podlage (sloj IV.) s primerno komprimacijo, da je zahtevi zadoščeno). V primeru delnega naleganja dna temelja na hribinsko osnovo in zemljino, se slednjo odstrani do hribinske osnove, temelj pa podbetonira, s čimer se zagotavlja enakomerno podlago pod celotnim temeljem.

4.3.3 Zasip

Ob temeljih predvidenih konstrukcij se skladno s priloženimi grafikami izvede drenažno cev DN200 in odcednice DN100, katere se obsuje z drobljencem 16/32. Sicer se za zasip konstrukcij uporabi drobljenec 0/125. Zasip se utrjuje po plasteh 30-40 cm.

Zasip z izkopanim materialom ni ustrezen (izjemoma ob širšem izkopu ali ob izkopu z bermo, se za zasipni material uporabi izkopani material v zalednem delu, ob zidu pa na širini vsaj 2m

izvedba zasipa iz drobljenca 0/125. S sprednje strani se zid zasuje skladno z izvedbo voziščne konstrukcije po Načrtu ceste.

OPOMBA: Sam potek zidov (prerezi in dolžine izvedenih odsekov) se lahko prilagodijo na terenu v kolikor po zakoličbi ceste pride do kakšnih odstopanj. Vse spremembe oz. morebitna opažanja odstopanj od razmer predvidenih v tem poročilu morajo biti potrjene s strani geomehanskega nadzora in projektanta.

4.4 DOSTOPNE IN ZAČASNE TRANSPORTNE POTI

Dostop do ureditev je predviden z državne ceste R2-403/1076 Češnjica – Škofja Loka.

Dela se izvajajo skladno z ureditvijo gradbišča za celostno izvedbo deniveliranih površin za pešce in kolesarje. Po končanih delih se material od izdelanih poti odpelje na ustrezno deponijo, površino splanira ter zatravi.

4.5 PREČKANJA KOMUNALNIH VODOV

Pred izvedbo mora naročnik naročiti zakoličbo vseh vodov, da se jih označi in ustrezno zavaruje. Na mestu predvidenega zidu po javno dostopnih podatkih ni gospodarske javne infrastrukture, kar pa po pričevanju lastnikov zalednih zemljišč ni povsem tako. Pred fazo gradnje je potrebno zakoličiti vso GJI na obravnavanem območju.

4.6 OBMOČJE POSEGA

Območje opornega zidu posega na zemljišča: *48/1, 68/4, 659/4, 659/5, 659/9, 659/17 in 659/18 (vse k.o. 2066 Dolenja vas).

4.7 VARNOSTNI UKREPI (splošno)

Poleg običajnih varnostnih ukrepov je potrebno upoštevati še možnost vsipanja manjših količin zemljine iz zgornjega roba izkopa. Delavci morajo biti na takšno možnost opozorjeni in ustrezno zaščiteni.

Meje gradbišča morajo biti ustrezno zaščitene z ograjami in opozorilnimi tablam.

Pred izvedbo sanacije je treba odstraniti tudi vsa drevesa in višje predmete (kandelabre, itd.) v bližnji okolici izvajanja posegov, ki bi utegnili s padcem poškodovati delovno osebje ali stroje med sanacijo.

4.8 STROŠKOVNA OCENA

Popis del s stroškovno oceno izvedbe opornega zidu je podan v prilogi »7 POPIS DEL S PROJEKTANTSKIM PREDRAČUNOM«

5 ZAKLJUČKI

Smernice in opozorila (za izvajalca):

- Pred pričetkom gradnje je potrebna izvedba začnih dovoznih cest oz. ramp (odstranitev humusa, nasip tampona, utrjevanje itd.); po končanju del jih je potrebno odstraniti ter vzpostaviti predhodno oz. čim bolj ekološko ustrezno stanje.
- Pred pričetkom gradnje (pri zakoličbi) je potrebno **označiti in zavarovati vse komunalne napeljave** oz. vode, ki se nahajajo na območju gradnje in dostopov, tako da med izvajanjem del ne bi prišlo do poškodb; v primeru potrebe po prestavitvi oz. prilagoditvi poteka napeljave, se je potrebno predhodno dogovoriti s projektantom ter obvestiti upravljavca napeljave.
- Nujno je potrebno zagotoviti vse potrebne varnostne ukrepe in organizirati gradbišče tako, da bo preprečeno onesnaženje okolja, ki bo nastalo zaradi transporta, skladiščenja in uporabe tekočih goriv in drugih nevarnih snovi oz. v primeru nezgod zagotoviti takojšnje ukrepanje za to usposobljenih delavcev. Vsa začasna skladišča in pretakališča goriv, olj in maziv ter drugih nevarnih snovi morajo biti zaščiteni pred možnostjo izliva v okolje. Nujno je potrebno preprečiti kakršnokoli onesnaženje okolja (predvsem voda) s cementnim mlekom, mazivi ali gorivom.
- V primeru, da se pri izvedbi oz. gradnji pojavi potreba po spremembi projektne rešitve, je potreben dogovor z odgovornim projektantom, ki po potrebi dopolni ali spremeni načrt. Sprememba mora biti potrjena s strani odgovornega projektanta (navedba in podpis v gradbenem dnevniku). Vse spremembe mora odobriti in potrditi tudi nadzornik investitorja.
- Po končanju del je potrebno prizadete površine izravnati, zatraviti ter vzpostaviti čim bolj ekološko ustrezno stanje.
- Gradbene odpadke se odlaga na ustrezno deponijo (v skladu z zakonskimi in podzakonskimi akti s področja ravnanja z odpadki), za kar mora izvajalec ob tehničnem pregledu predložiti ustrezno dokazilo in evidenčni list klasifikacije odpadkov. Po končani gradnji je treba odstraniti vse ostanke gradbenih materialov iz začnih deponij.
- Vse z gradnjo prizadete površine je treba krajinsko ustrezno urediti, tako da bo preprečena erozija oz. vzpostaviti prvotno stanje.

Vegetacija, poseki:

- Pred pričetkom gradnje je potrebno izvesti selektivni posek vegetacije:

- posek naj bo minimalen oz. v najmanjši možni meri;
 - poseka naj se le vegetacijo, ki se nahaja na območju gradbenih posegov, vegetacijo, ki neposredno ovira gradnjo ali dostop oz. dovoz;
 - ostalo vegetacijo naj se ohrani in po potrebi tudi zavaruje pred poškodbami med gradnjo;
 - če je na območju gradnje prisotna posebno bujna vegetacija invazivnih vrst (na primer japonski dresnik), naj se to vegetacijo v celoti poseka ter skupaj s koreninami odpelje v posebno deponijo; izkopni material okužen z deli invazivnih vrst se ne sme uporabljati za zasipavanje oz. nasipe itd.
- Po končanju gradbenih del je potrebno izvesti vsa zaključna zasaditvena dela (zatravitev, sadnja potaknjencev), kot je predvideno v projektu.
 - V primeru dovažanja nasipnega ali humusnega materiala na gradbišče od drugod je potrebno preveriti izvor oz. morebitno okuženost z deli invazivnih rastlinskih vrst – nujno je potrebno preprečevati širjenje invazivnih vrst vegetacije (na primer japonski dresnik).

Ljubljana, marec 2026

(dopolnjeno april 2026)

Sestavili:

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Nina Gognjavec, univ. dipl. inž. geol.

dr. Jošt Sodnik, univ. dipl. inž. grad.

6 KONTROLA MEHANSKE ODPORNOSTI IN STABILNOSTI

- Kontrole zidu $H_{\text{svetla}} > 5,0\text{m}$
- Kontrole zidu $3,0\text{m} < H_{\text{svetla}} < 5,0\text{m}$
- Kontrole zidu $H_{\text{svetla}} < 3,0\text{m}$
- Globalna stabilnost v prerezu A-A'
- Globalna stabilnost v prerezu 90
- Globalna stabilnost v prerezu A-A' (nedrenirano stanje, začasni izkop)

Gravity wall analysis

Input data (Stage of construction 1)

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija - H=8,1m
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

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 : Consider always vertical
 Allowable eccentricity : 0,333
 Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]
Water load :	$\gamma_w =$	1,00 [-]	

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on overturning :	$\gamma_{Rv} =$	1,40 [-]	
Partial factor on sliding resistance :	$\gamma_{Rh} =$	1,10 [-]	
Partial factor on bearing capacity :	$\gamma_{Re} =$	1,40 [-]	

Partial factors for variable actions			
Permanent design situation			
Factor for combination value :	$\psi_0 =$	0,70 [-]	
Factor for frequent value :	$\psi_1 =$	0,50 [-]	
Factor for quasi-permanent value :	$\psi_2 =$	0,30 [-]	

Anchors

Verification methodology : Limit states (LSD)

Reduction coefficients			
Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]	

Reduction coefficients

Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35	[-]
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35	[-]

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

Masonry : Category I

Mortar origin : Prescribed mortar

Masonry strength $f_b = 25,00 \text{ MPa}$ Mortar strength $f_m = 10,00 \text{ MPa}$

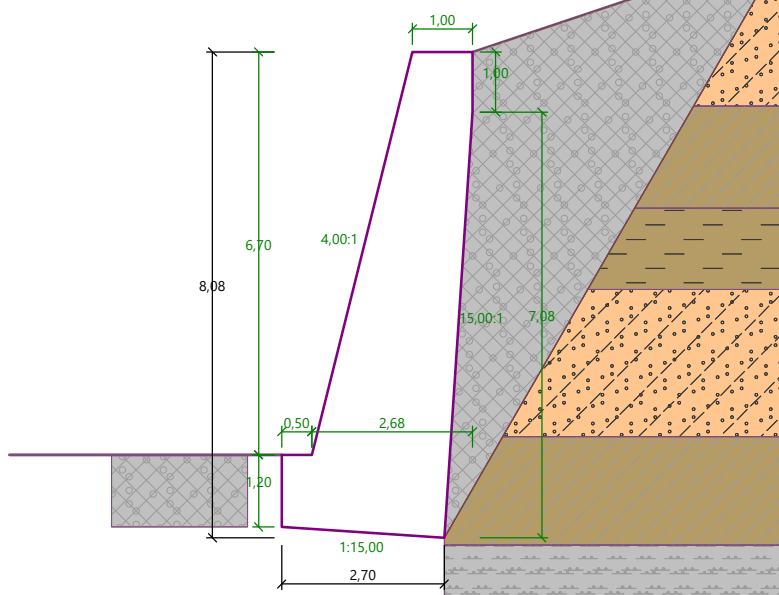
Parameters

Compressive strength $f_k = 8,55 \text{ MPa}$ Shear strength $f_{vko} = 0,10 \text{ MPa}$ Flexural tensile strength $f_{xk} = 0,10 \text{ MPa}$ Partial factor $\gamma_M = 2,20$

Geometry of structure

Name : Geometry

Stage - analysis : 1 - 0



Soil parameters

[1] ClGr / SiGr

Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$

Stress-state : effective

Internal friction angle : $\varphi_{ef} = 30,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{ef} = 1,00 \text{ [kPa]}$ Friction angle structure-soil : $\delta = 20,00 \text{ [}^\circ\text{]}$

Pressure at rest

Pressure at rest : cohesive soil
 Poisson's ratio : $\nu = 0,35$ [-]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,50$ [kN/m³]

View

Sample :

**[2] Si (s peskom)**Basic data

Unit weight : $\gamma = 18,50$ [kN/m³]
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 28,00$ [°]
 Cohesion : $c_{\text{ef}} = 2,00$ [kPa]
 Friction angle structure-soil : $\delta = 18,50$ [°]

Pressure at rest

Pressure at rest : cohesive soil
 Poisson's ratio : $\nu = 0,30$ [-]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 18,50$ [kN/m³]

View

Sample :

**[3] CIL/CIM**Basic data

Unit weight : $\gamma = 19,50$ [kN/m³]
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 26,50$ [°]
 Cohesion : $c_{\text{ef}} = 2,50$ [kPa]
 Friction angle structure-soil : $\delta = 17,50$ [°]

Pressure at rest

Pressure at rest : cohesive soil
 Poisson's ratio : $\nu = 0,35$ [-]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00$ [kN/m³]

View

Sample :

**[4] podlaga**Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 32,00$ [°]
 Cohesion : $c_{\text{ef}} = 25,00$ [kPa]
 Friction angle structure-soil : $\delta = 20,00$ [°]

Pressure at rest

Pressure at rest : cohesive soil
 Poisson's ratio : $\nu = 0,25$ [-]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50$ [kN/m³]

View

Sample :

**UN (drobljenec)**Basic data

Unit weight : $\gamma = 20,00$ [kN/m³]
 Stress-state : effective
 Internal friction angle : $\phi_{\text{ef}} = 36,00$ [°]
 Cohesion : $c_{\text{ef}} = 0,00$ [kPa]
 Friction angle structure-soil : $\delta = 24,00$ [°]

Pressure at rest

Pressure at rest : cohesionless soil

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50$ [kN/m³]

View

Sample :

**Backfill**

Assigned soil : UN (drobljenec)
 Slope = $60,00^\circ$

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	[1] ClGr / SiGr	
2	1,70	0,90 .. 2,60	[2] Si (s peskom)	
3	1,35	2,60 .. 3,95	[3] CIL/CIM	
4	2,45	3,95 .. 6,40	[1] ClGr / SiGr	
5	1,80	6,40 .. 8,20	[2] Si (s peskom)	
6	-	8,20 .. ∞	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2,99 (slope angle is $18,50^\circ$).

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure $h = 1,20 \text{ m}$

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	-3,27	354,69	1,94	1,000	1,000	1,350
FF resistance	-5,94	-0,40	0,00	0,00	1,000	1,000	1,350
Active pressure	161,85	-2,52	59,70	2,88	1,350	1,350	1,350

Verification of complete wall**Check for overturning stability**

Resisting moment $M_{res} = 657,82 \text{ kNm/m}$

Overturning moment $M_{ovr} = 548,20 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 219,80 \text{ kN/m}$

Active horizontal force $H_{act} = 183,13 \text{ kN/m}$

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 269,78 kPa

Bearing capacity of foundation soil (Stage of construction 1)**Design load acting at the center of footing bottom**

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	160,47	572,19	171,95	0,104	266,37
2	234,70	448,46	182,25	0,194	269,78

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	118,87	423,85	127,37

Spread footing verification

Input data

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on vertical bearing capacity :		$\gamma_{Rvs} =$	1,40 [-]
Partial factor on sliding resistance :		$\gamma_{Rhs} =$	1,10 [-]

Soil parameters

[1] CIGr / SiGr

Basic data

Unit weight : $\gamma = 19,00$ [kN/m³]Internal friction angle : $\phi_{ef} = 30,00$ [°]Cohesion : $c_{ef} = 1,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35$ [-]Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{oed} = 8,00$ [MPa]

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{sat} = 19,50$ [kN/m³]

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight : $\gamma = 18,50 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{ef} = 28,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 2,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,30 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 12,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 18,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**[3] CIL/CIM****Basic data**

Unit weight : $\gamma = 19,50 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{ef} = 26,50 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 2,50 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 6,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,00 \text{ [kN/m}^3\text{]}$

View

Sample :

**[4] podlaga****Basic data**

Unit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{ef} = 32,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 25,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 80,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 21,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**UN (drobljenec)**

Basic data

Unit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{ef} = 36,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 0,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 20,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**Foundation****Foundation type: strip footing**

Depth from original ground surface $h_z = 8,08 \text{ m}$
 Depth of footing bottom $d = 1,20 \text{ m}$
 Incl. of finished grade $s_1 = 0,00 \text{ }^\circ$
 Incl. of footing bottom $s_2 = 3,81 \text{ }^\circ$

Overburden

Type: input unit weight
 Unit weight of soil above foundation = $18,50 \text{ kN/m}^3$

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = $15,00 \text{ m}$
 Strip footing width (x) = $2,70 \text{ m}$
 Column width in the direction of x = $0,10 \text{ m}$

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = $3,24 \text{ m}^3/\text{m}$
 Volume of excavation = $3,24 \text{ m}^3/\text{m}$
 Volume of fill = $0,00 \text{ m}^3/\text{m}$

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

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

Concrete: C 20/25

Cylinder compressive strength $f_{ck} = 20,00 \text{ MPa}$
 Tensile strength $f_{ctm} = 2,20 \text{ MPa}$
 Elasticity modulus $E_{cm} = 30000,00 \text{ MPa}$

Longitudinal reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Transverse reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	[1] ClGr / SiGr	
2	1,70	0,90 .. 2,60	[2] Si (s peskom)	
3	1,35	2,60 .. 3,95	[3] CIL/CIM	
4	2,45	3,95 .. 6,40	[1] ClGr / SiGr	
5	1,80	6,40 .. 8,20	[2] Si (s peskom)	
6	-	8,20 .. ∞	[4] podlaga	

Load

Number	Load new	Load change	Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
1	Yes		LC 1	Design	494,35	-45,87	-171,95
2	Yes		LC 2	Design	370,62	15,99	-182,25
3	Yes		LC 3	Service	346,00	-33,98	-127,37

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1

Load case verification

Name	Self w. in favor	e _x [m]	e _y [m]	σ [kPa]	R _d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,28	0,00	267,12	696,45	38,35	Yes
LC 1	No	-0,28	0,00	267,12	696,45	38,35	Yes
LC 2	Yes	-0,52	0,00	270,76	483,00	56,06	Yes
LC 2	No	-0,52	0,00	270,76	483,00	56,06	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation G = 77,85 kN/m

Computed weight of overburden Z = 0,00 kN/m

Vertical bearing capacity check

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface z_{sp} = 4,58 mLength of slip surface l_{sp} = 14,28 m

Design bearing capacity of found. soil $R_d = 483,00 \text{ kPa}$

Extreme contact stress $\sigma = 270,76 \text{ kPa}$

Bearing capacity in the vertical direction is SATISFACTORY

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,194 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,194 < 0,333$

Eccentricity of load is SATISFACTORY

Horizontal bearing capacity check

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 7,07 \text{ kN}$

Horizontal bearing capacity $R_{dh} = 226,21 \text{ kN}$

Extreme horizontal force $H = 182,25 \text{ kN}$

Bearing capacity in the horizontal direction is SATISFACTORY

Bearing capacity of foundation is SATISFACTORY

Verification No. 1

Settlement and rotation of foundation - input data

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 77,85 \text{ kN/m}$

Computed weight of overburden $Z = 0,00 \text{ kN/m}$

Settlement of mid point of longitudinal edge $= 2,6 \text{ mm}$

Settlement of mid point of transverse edge 1 $= 5,3 \text{ mm}$

Settlement of mid point of transverse edge 2 $= 2,9 \text{ mm}$

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results

Foundation stiffness:

Computed weighted average modulus of deformation $E_{def} = 64,41 \text{ MPa}$

Foundation in the longitudinal direction is rigid ($k=40,75$)

Foundation in the direction of width is rigid ($k=804,81$)

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,104 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,104 < 0,333$

Eccentricity of load is SATISFACTORY

Overall settlement and rotation of foundation:

Foundation settlement $= 4,7 \text{ mm}$

Depth of influence zone $= 5,16 \text{ m}$

Rotation in direction of width $= 0,892 \text{ (tan*1000); (5,1E-02 } ^\circ)$

Input data (Stage of construction 2)**Geological profile and assigned soils**

Number	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	[1] ClGr / SiGr	
2	1,70	0,90 .. 2,60	[2] Si (s peskom)	
3	1,35	2,60 .. 3,95	[3] CIL/CIM	
4	2,45	3,95 .. 6,40	[1] ClGr / SiGr	
5	1,80	6,40 .. 8,20	[2] Si (s peskom)	
6	-	8,20 .. ∞	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2,99 (slope angle is 18,50 °).

Water influence

GWT behind the structure lies at a depth of 6,30 m

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: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure $h = 1,20$ 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	-3,27	354,69	1,94	1,000	1,000	1,350
FF resistance	-5,94	-0,40	0,00	0,00	1,000	1,000	1,350
Active pressure	158,12	-2,57	58,33	2,89	1,350	1,350	1,350
Water pressure	15,85	-0,41	-1,06	2,74	1,000	1,000	1,000
Uplift pressure	0,00	-7,90	0,00	3,18	1,000	1,000	1,000

Verification of complete wall**Check for overturning stability**Resisting moment $M_{res} = 652,13$ kNm/m

Overturning moment $M_{ovr} = 552,68 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 218,66 \text{ kN/m}$

Active horizontal force $H_{act} = 194,11 \text{ kN/m}$

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 276,39 kPa

Bearing capacity of foundation soil (Stage of construction 2)

Design load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	169,96	570,01	182,88	0,110	269,81
2	244,19	446,28	193,19	0,202	276,39

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	128,34	422,23	139,57

Spread footing verification

Input data

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)

Permanent design situation

Partial factor on vertical bearing capacity :	$\gamma_{Rvs} =$	1,40	[-]
Partial factor on sliding resistance :	$\gamma_{Rhs} =$	1,10	[-]

Soil parameters

[1] ClGr / SiGr

Basic data

Unit weight :	$\gamma = 19,00 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 30,00 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 1,00 \text{ [kPa]}$

Settlement - oedometric modulus

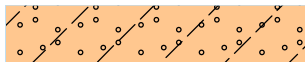
Poisson's ratio :	$\nu = 0,35 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 8,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation :	standard
Unit weight of saturated soil :	$\gamma_{sat} = 19,50 \text{ [kN/m}^3\text{]}$

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight :	$\gamma = 18,50 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 28,00 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 2,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio :	$\nu = 0,30 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 12,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation :	standard
Unit weight of saturated soil :	$\gamma_{sat} = 18,50 \text{ [kN/m}^3\text{]}$

View

Sample :



[3] CIL/CIM

Basic data

Unit weight :	$\gamma = 19,50 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 26,50 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 2,50 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio :	$\nu = 0,35 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 6,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00 \text{ [kN/m}^3\text{]}$ View

Sample :

**[4] podlaga**Basic dataUnit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$ Internal friction angle : $\varphi_{\text{ef}} = 32,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{\text{ef}} = 25,00 \text{ [kPa]}$ Settlement - oedometric modulusPoisson's ratio : $\nu = 0,25 \text{ [-]}$ Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{\text{oed}} = 80,00 \text{ [MPa]}$ Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50 \text{ [kN/m}^3\text{]}$ View

Sample :

**UN (drobljenec)**Basic dataUnit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$ Internal friction angle : $\varphi_{\text{ef}} = 36,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{\text{ef}} = 0,00 \text{ [kPa]}$ Settlement - oedometric modulusPoisson's ratio : $\nu = 0,25 \text{ [-]}$ Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{\text{oed}} = 20,00 \text{ [MPa]}$ Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50 \text{ [kN/m}^3\text{]}$ View

Sample :

**Foundation****Foundation type: strip footing**Depth from original ground surface $h_z = 8,08 \text{ m}$ Depth of footing bottom $d = 1,20 \text{ m}$ Incl. of finished grade $s_1 = 0,00 \text{ }^\circ$ Incl. of footing bottom $s_2 = 3,81 \text{ }^\circ$ **Overburden**

Type: input unit weight

Unit weight of soil above foundation = $18,50 \text{ kN/m}^3$

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = 15,00 m

Strip footing width (x) = 2,70 m

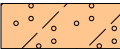
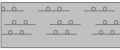
Column width in the direction of x = 0,10 m

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = 3,24 m³/mVolume of excavation = 3,24 m³/mVolume of fill = 0,00 m³/m**Material of structure**Unit weight $\gamma = 24,00$ kN/m³

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

Concrete: C 20/25Cylinder compressive strength $f_{ck} = 20,00$ MPaTensile strength $f_{ctm} = 2,20$ MPaElasticity modulus $E_{cm} = 30000,00$ MPa**Longitudinal reinforcement: B500B**Yield strength $f_{yk} = 500,00$ MPa**Transverse reinforcement: B500B**Yield strength $f_{yk} = 500,00$ MPa**Geological profile and assigned soils**

Number	Thickness of layer t [m]	Depth z [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	[1] ClGr / SiGr	
2	1,70	0,90 .. 2,60	[2] Si (s peskom)	
3	1,35	2,60 .. 3,95	[3] CIL/CIM	
4	2,45	3,95 .. 6,40	[1] ClGr / SiGr	
5	1,80	6,40 .. 8,20	[2] Si (s peskom)	
6	-	8,20 .. ∞	[4] podlaga	

Load

Number	Load		Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
	new	change					
1	Yes		LC 1	Design	524,60	-49,50	-182,88
2	Yes		LC 2	Design	400,87	12,36	-193,19
3	Yes		LC 3	Service	376,82	-39,14	-139,57

Ground water table

The ground water table is at a depth of 6,30 m from the original terrain.

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1**Load case verification**

Name	Self w. in favor	e_x [m]	e_y [m]	σ [kPa]	R_d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,30	0,00	270,58	484,50	55,85	Yes
LC 1	No	-0,30	0,00	270,58	484,50	55,85	Yes
LC 2	Yes	-0,55	0,00	277,42	330,49	83,94	Yes
LC 2	No	-0,55	0,00	277,42	330,49	83,94	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation $G = 45,41$ kN/mComputed weight of overburden $Z = 0,00$ kN/m**Vertical bearing capacity check**

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface $z_{sp} = 4,58$ mLength of slip surface $l_{sp} = 14,28$ mDesign bearing capacity of found. soil $R_d = 330,49$ kPaExtreme contact stress $\sigma = 277,42$ kPa**Bearing capacity in the vertical direction is SATISFACTORY****Verification of load eccentricity**Max. eccentricity in direction of base length $e_x = 0,202 < 0,333$ Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$ Max. overall eccentricity $e_t = 0,202 < 0,333$ **Eccentricity of load is SATISFACTORY****Horizontal bearing capacity check**

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 3,25$ kNHorizontal bearing capacity $R_{dh} = 221,60$ kNExtreme horizontal force $H = 193,19$ kN**Bearing capacity in the horizontal direction is SATISFACTORY****Bearing capacity of foundation is SATISFACTORY****Verification No. 1****Settlement and rotation of foundation - input data**

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 45,41 \text{ kN/m}$

Computed weight of overburden $Z = 0,00 \text{ kN/m}$

Settlement of mid point of longitudinal edge = 3,2 mm

Settlement of mid point of transverse edge 1 = 6,4 mm

Settlement of mid point of transverse edge 2 = 3,8 mm

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results

Foundation stiffness:

Computed weighted average modulus of deformation $E_{\text{def}} = 64,65 \text{ MPa}$

Foundation in the longitudinal direction is rigid ($k=40,60$)

Foundation in the direction of width is rigid ($k=801,86$)

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,112 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,112 < 0,333$

Eccentricity of load is SATISFACTORY

Overall settlement and rotation of foundation:

Foundation settlement = 5,6 mm

Depth of influence zone = 6,80 m

Rotation in direction of width = 0,948 ($\tan \cdot 1000$); ($5,4E-02^\circ$)

Gravity wall analysis

Input data (Stage of construction 1)

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija - H=6,4m
 Description : (kontrola zidu med svetlo višino 3m do 5m)
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

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 : Consider always vertical
 Allowable eccentricity : 0,333
 Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]
Water load :	$\gamma_w =$	1,00 [-]	

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on overturning :	$\gamma_{Rv} =$	1,40 [-]	
Partial factor on sliding resistance :	$\gamma_{Rh} =$	1,10 [-]	
Partial factor on bearing capacity :	$\gamma_{Re} =$	1,40 [-]	

Partial factors for variable actions			
Permanent design situation			
Factor for combination value :	$\psi_0 =$	0,70 [-]	
Factor for frequent value :	$\psi_1 =$	0,50 [-]	
Factor for quasi-permanent value :	$\psi_2 =$	0,30 [-]	

Anchors

Verification methodology : Limit states (LSD)

Reduction coefficients

Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]
Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35 [-]
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35 [-]

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

Masonry : Category I

Mortar origin : Prescribed mortar

Masonry strength $f_b = 25,00 \text{ MPa}$ Mortar strength $f_m = 10,00 \text{ MPa}$

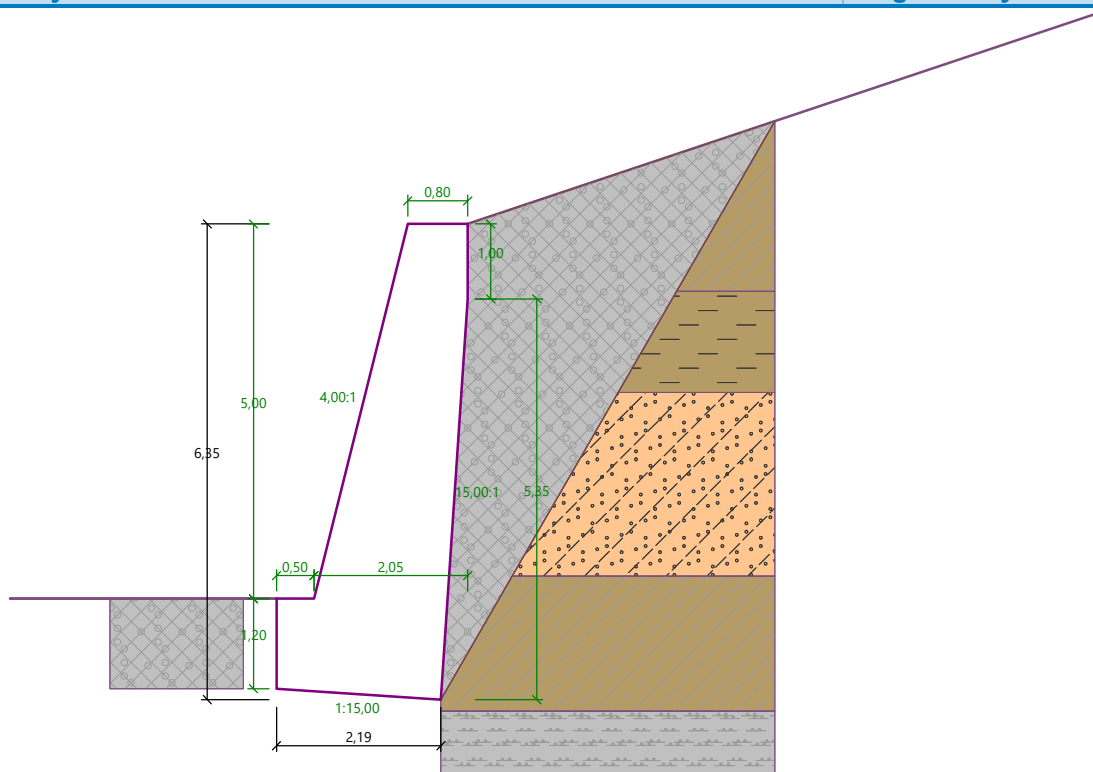
Parameters

Compressive strength $f_k = 8,55 \text{ MPa}$ Shear strength $f_{vko} = 0,10 \text{ MPa}$ Flexural tensile strength $f_{xk} = 0,10 \text{ MPa}$ Partial factor $\gamma_M = 2,20$

Geometry of structure

Name : Geometry

Stage - analysis : 1 - 0



Soil parameters

[1] ClGr / SiGr

Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$

Stress-state : effective

Internal friction angle : $\varphi_{ef} = 30,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{ef} = 1,00 \text{ [kPa]}$

Friction angle structure-soil : $\delta = 20,00$ [°]Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,35$ [-]Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,50$ [kN/m³]View

Sample :

**[2] Si (s peskom)**Basic dataUnit weight : $\gamma = 18,50$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 28,00$ [°]Cohesion : $c_{\text{ef}} = 2,00$ [kPa]Friction angle structure-soil : $\delta = 18,50$ [°]Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,30$ [-]Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 18,50$ [kN/m³]View

Sample :

**[3] CIL/CIM**Basic dataUnit weight : $\gamma = 19,50$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 26,50$ [°]Cohesion : $c_{\text{ef}} = 2,50$ [kPa]Friction angle structure-soil : $\delta = 17,50$ [°]Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,35$ [-]Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00$ [kN/m³]View

Sample :

**[4] podlaga**Basic dataUnit weight : $\gamma = 21,00$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 32,00$ [°]Cohesion : $c_{\text{ef}} = 25,00$ [kPa]Friction angle structure-soil : $\delta = 20,00$ [°]

Pressure at rest

Pressure at rest : cohesive soil
 Poisson's ratio : $\nu = 0,25$ [-]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50$ [kN/m³]

View

Sample :

**UN (drobljenec)**Basic data

Unit weight : $\gamma = 20,00$ [kN/m³]
 Stress-state : effective
 Internal friction angle : $\phi_{\text{ef}} = 36,00$ [°]
 Cohesion : $c_{\text{ef}} = 0,00$ [kPa]
 Friction angle structure-soil : $\delta = 24,00$ [°]

Pressure at rest

Pressure at rest : cohesionless soil

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50$ [kN/m³]

View

Sample :

**Backfill**

Assigned soil : UN (drobljenec)
 Slope = $60,00^\circ$

Geological profile and assigned soils**Position information**

Terrain elevation = -1,70 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	-1,70 .. -2,60	[2] Si (s peskom)	
2	1,35	0,90 .. 2,25	-2,60 .. -3,95	[3] CIL/CIM	
3	2,45	2,25 .. 4,70	-3,95 .. -6,40	[1] ClGr / SiGr	
4	1,80	4,70 .. 6,50	-6,40 .. -8,20	[2] Si (s peskom)	
5	-	6,50 .. ∞	-8,20 .. -	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2,99 (slope angle is $18,50^\circ$).

Water influence

Ground water table is located below the structure.

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure $h = 1,20 \text{ m}$

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	-2,54	226,67	1,56	1,000	1,000	1,350
FF resistance	-5,94	-0,40	0,00	0,00	1,000	1,000	1,350
Active pressure	99,94	-1,98	36,94	2,34	1,350	1,350	1,350

Verification of complete wall**Check for overturning stability**

Resisting moment $M_{res} = 335,39 \text{ kNm/m}$

Overturning moment $M_{ovr} = 264,44 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 140,15 \text{ kN/m}$

Active horizontal force $H_{act} = 110,30 \text{ kN/m}$

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 200,55 kPa

Bearing capacity of foundation soil (Stage of construction 1)**Design load acting at the center of footing bottom**

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	70,12	363,54	102,44	0,088	200,55
2	107,65	284,52	109,77	0,172	197,34

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	51,94	269,29	75,88

Spread footing verification

Input data

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on vertical bearing capacity :		$\gamma_{Rvs} =$	1,40 [-]
Partial factor on sliding resistance :		$\gamma_{Rhs} =$	1,10 [-]

Soil parameters

[1] CIGr / SiGr

Basic data

Unit weight : $\gamma = 19,00$ [kN/m³]Internal friction angle : $\phi_{ef} = 30,00$ [°]Cohesion : $c_{ef} = 1,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35$ [-]Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{oed} = 8,00$ [MPa]

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{sat} = 19,50$ [kN/m³]

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight : $\gamma = 18,50 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{\text{ef}} = 28,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,30 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{\text{oed}} = 12,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 18,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**[3] CIL/CIM****Basic data**

Unit weight : $\gamma = 19,50 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{\text{ef}} = 26,50 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,50 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{\text{oed}} = 6,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00 \text{ [kN/m}^3\text{]}$

View

Sample :

**[4] podlaga****Basic data**

Unit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{\text{ef}} = 32,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 25,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{\text{oed}} = 80,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**UN (drobljenec)**

Basic data

Unit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$
 Internal friction angle : $\varphi_{ef} = 36,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 0,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25 \text{ [-]}$
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 20,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,50 \text{ [kN/m}^3\text{]}$

View

Sample :

**Foundation****Foundation type: strip footing**

Depth from original ground surface $h_z = 6,35 \text{ m}$
 Depth of footing bottom $d = 1,20 \text{ m}$
 Incl. of finished grade $s_1 = 0,00 \text{ }^\circ$
 Incl. of footing bottom $s_2 = 3,81 \text{ }^\circ$

Overburden

Type: input unit weight
 Unit weight of soil above foundation = $18,50 \text{ kN/m}^3$

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = $60,00 \text{ m}$
 Strip footing width (x) = $2,19 \text{ m}$
 Column width in the direction of x = $0,10 \text{ m}$

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = $2,63 \text{ m}^3/\text{m}$
 Volume of excavation = $2,63 \text{ m}^3/\text{m}$
 Volume of fill = $0,00 \text{ m}^3/\text{m}$

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

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

Concrete: C 20/25

Cylinder compressive strength $f_{ck} = 20,00 \text{ MPa}$
 Tensile strength $f_{ctm} = 2,20 \text{ MPa}$
 Elasticity modulus $E_{cm} = 30000,00 \text{ MPa}$

Longitudinal reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Transverse reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geological profile and assigned soils**Position information**

Terrain elevation = $-1,70 \text{ m}$

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	-1,70 .. -2,60	[2] Si (s peskom)	
2	1,35	0,90 .. 2,25	-2,60 .. -3,95	[3] CIL/CIM	
3	2,45	2,25 .. 4,70	-3,95 .. -6,40	[1] ClGr / SiGr	
4	1,80	4,70 .. 6,50	-6,40 .. -8,20	[2] Si (s peskom)	
5	-	6,50 .. ∞	-8,20 .. -	[4] podlaga	

Load

Number	Load		Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
	new	change					
1	Yes		LC 1	Design	300,36	-52,82	-102,44
2	Yes		LC 2	Design	221,34	-24,08	-109,77
3	Yes		LC 3	Service	206,11	-39,12	-75,88

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1**Load case verification**

Name	Self w. in favor	e _x [m]	e _y [m]	σ [kPa]	R _d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,19	0,00	201,09	669,51	30,04	Yes
LC 1	No	-0,19	0,00	201,09	669,51	30,04	Yes
LC 2	Yes	-0,38	0,00	198,01	486,04	40,74	Yes
LC 2	No	-0,38	0,00	198,01	486,04	40,74	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation G = 63,18 kN/m

Computed weight of overburden Z = 0,00 kN/m

Vertical bearing capacity check

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface z_{sp} = 3,72 mLength of slip surface l_{sp} = 11,59 mDesign bearing capacity of found. soil R_d = 486,04 kPa

Extreme contact stress σ = 198,01 kPa

Bearing capacity in the vertical direction is SATISFACTORY**Verification of load eccentricity**Max. eccentricity in direction of base length $e_x = 0,172 < 0,333$ Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$ Max. overall eccentricity $e_t = 0,172 < 0,333$ **Eccentricity of load is SATISFACTORY****Horizontal bearing capacity check**

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 7,07 \text{ kN}$ Horizontal bearing capacity $R_{dh} = 146,56 \text{ kN}$ Extreme horizontal force $H = 109,77 \text{ kN}$ **Bearing capacity in the horizontal direction is SATISFACTORY****Bearing capacity of foundation is SATISFACTORY****Verification No. 1****Settlement and rotation of foundation - input data**

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 63,18 \text{ kN/m}$ Computed weight of overburden $Z = 0,00 \text{ kN/m}$ Settlement of mid point of longitudinal edge $= 1,7 \text{ mm}$ Settlement of mid point of transverse edge 1 $= 3,5 \text{ mm}$ Settlement of mid point of transverse edge 2 $= 2,0 \text{ mm}$

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results**Foundation stiffness:**Computed weighted average modulus of deformation $E_{def} = 63,17 \text{ MPa}$ Foundation in the longitudinal direction is rigid ($k=77,75$)Foundation in the direction of width is rigid ($k=820,70$)**Verification of load eccentricity**Max. eccentricity in direction of base length $e_x = 0,088 < 0,333$ Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$ Max. overall eccentricity $e_t = 0,088 < 0,333$ **Eccentricity of load is SATISFACTORY****Overall settlement and rotation of foundation:**Foundation settlement $= 3,7 \text{ mm}$ Depth of influence zone $= 5,01 \text{ m}$ Rotation in direction of width $= 0,665 (\tan^*1000); (3,8E-02^\circ)$

Input data (Stage of construction 2)**Geological profile and assigned soils****Position information**

Terrain elevation = -1,70 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	-1,70 .. -2,60	[2] Si (s peskom)	
2	1,35	0,90 .. 2,25	-2,60 .. -3,95	[3] CIL/CIM	
3	2,45	2,25 .. 4,70	-3,95 .. -6,40	[1] ClGr / SiGr	
4	1,80	4,70 .. 6,50	-6,40 .. -8,20	[2] Si (s peskom)	
5	-	6,50 .. ∞	-8,20 .. -	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Terrain behind construction has the slope 1: 2,99 (slope angle is 18,50 °).

Water influence

GWT behind the structure lies at a depth of 4,60 m

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: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure h = 1,20 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. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-2,54	226,67	1,56	1,000	1,000	1,350
FF resistance	-5,94	-0,40	0,00	0,00	1,000	1,000	1,350
Active pressure	96,35	-2,04	35,63	2,34	1,350	1,350	1,350
Water pressure	15,25	-0,44	-1,02	2,23	1,000	1,000	1,000
Uplift pressure	0,00	-6,20	0,00	2,55	1,000	1,000	1,000

Verification of complete wall**Check for overturning stability**Resisting moment M_{res} = 330,93 kNm/m

Overturning moment $M_{ovr} = 268,98 \text{ kNm/m}$

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 139,02 \text{ kN/m}$

Active horizontal force $H_{act} = 120,87 \text{ kN/m}$

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 205,23 kPa

Bearing capacity of foundation soil (Stage of construction 2)

Design load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	78,59	361,44	112,96	0,099	204,95
2	116,12	282,42	120,29	0,187	205,23

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	60,52	267,73	87,62

Spread footing verification

Input data

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)

Permanent design situation

Partial factor on vertical bearing capacity :	$\gamma_{Rvs} =$	1,40	[-]
Partial factor on sliding resistance :	$\gamma_{Rhs} =$	1,10	[-]

Soil parameters

[1] ClGr / SiGr

Basic data

Unit weight :	$\gamma = 19,00 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 30,00 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 1,00 \text{ [kPa]}$

Settlement - oedometric modulus

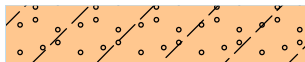
Poisson's ratio :	$\nu = 0,35 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 8,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation :	standard
Unit weight of saturated soil :	$\gamma_{sat} = 19,50 \text{ [kN/m}^3\text{]}$

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight :	$\gamma = 18,50 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 28,00 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 2,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio :	$\nu = 0,30 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 12,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation :	standard
Unit weight of saturated soil :	$\gamma_{sat} = 18,50 \text{ [kN/m}^3\text{]}$

View

Sample :



[3] CIL/CIM

Basic data

Unit weight :	$\gamma = 19,50 \text{ [kN/m}^3\text{]}$
Internal friction angle :	$\varphi_{ef} = 26,50 \text{ [}^\circ\text{]}$
Cohesion :	$c_{ef} = 2,50 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio :	$\nu = 0,35 \text{ [-]}$
Modulus type :	input E_{oed}
Modulus :	constant
Oedometric modulus :	$E_{oed} = 6,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00 \text{ [kN/m}^3\text{]}$ View

Sample :

**[4] podlaga**Basic dataUnit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$ Internal friction angle : $\varphi_{\text{ef}} = 32,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{\text{ef}} = 25,00 \text{ [kPa]}$ Settlement - oedometric modulusPoisson's ratio : $\nu = 0,25 \text{ [-]}$ Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{\text{oed}} = 80,00 \text{ [MPa]}$ Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50 \text{ [kN/m}^3\text{]}$ View

Sample :

**UN (drobljenec)**Basic dataUnit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$ Internal friction angle : $\varphi_{\text{ef}} = 36,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{\text{ef}} = 0,00 \text{ [kPa]}$ Settlement - oedometric modulusPoisson's ratio : $\nu = 0,25 \text{ [-]}$ Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{\text{oed}} = 20,00 \text{ [MPa]}$ Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50 \text{ [kN/m}^3\text{]}$ View

Sample :

**Foundation****Foundation type: strip footing**Depth from original ground surface $h_z = 6,35 \text{ m}$ Depth of footing bottom $d = 1,20 \text{ m}$ Incl. of finished grade $s_1 = 0,00 \text{ }^\circ$ Incl. of footing bottom $s_2 = 3,81 \text{ }^\circ$ **Overburden**

Type: input unit weight

Unit weight of soil above foundation = $18,50 \text{ kN/m}^3$

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = 60,00 m
 Strip footing width (x) = 2,19 m
 Column width in the direction of x = 0,10 m

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = 2,63 m³/m
 Volume of excavation = 2,63 m³/m
 Volume of fill = 0,00 m³/m

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

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

Concrete: C 20/25

Cylinder compressive strength $f_{ck} = 20,00 \text{ MPa}$
 Tensile strength $f_{ctm} = 2,20 \text{ MPa}$
 Elasticity modulus $E_{cm} = 30000,00 \text{ MPa}$

Longitudinal reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Transverse reinforcement: B500B

Yield strength $f_{yk} = 500,00 \text{ MPa}$

Geological profile and assigned soils**Position information**

Terrain elevation = -1,70 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	0,90	0,00 .. 0,90	-1,70 .. -2,60	[2] Si (s peskom)	
2	1,35	0,90 .. 2,25	-2,60 .. -3,95	[3] CIL/CIM	
3	2,45	2,25 .. 4,70	-3,95 .. -6,40	[1] ClGr / SiGr	
4	1,80	4,70 .. 6,50	-6,40 .. -8,20	[2] Si (s peskom)	
5	-	6,50 .. ∞	-8,20 .. -	[4] podlaga	

Load

Number	Load		Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
	new	change					
1	Yes		LC 1	Design	324,59	-56,97	-112,96
2	Yes		LC 2	Design	245,57	-28,23	-120,29
3	Yes		LC 3	Service	230,88	-44,62	-87,62

Ground water table

The ground water table is at a depth of 4,60 m from the original terrain.

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1**Load case verification**

Name	Self w. in favor	e_x [m]	e_y [m]	σ [kPa]	R_d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,22	0,00	205,51	453,79	45,29	Yes
LC 1	No	-0,22	0,00	205,51	453,79	45,29	Yes
LC 2	Yes	-0,41	0,00	205,96	319,90	64,38	Yes
LC 2	No	-0,41	0,00	205,96	319,90	64,38	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation $G = 36,85 \text{ kN/m}$ Computed weight of overburden $Z = 0,00 \text{ kN/m}$ **Vertical bearing capacity check**

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface $z_{sp} = 3,72 \text{ m}$ Length of slip surface $l_{sp} = 11,59 \text{ m}$ Design bearing capacity of found. soil $R_d = 319,90 \text{ kPa}$ Extreme contact stress $\sigma = 205,96 \text{ kPa}$ **Bearing capacity in the vertical direction is SATISFACTORY****Verification of load eccentricity**Max. eccentricity in direction of base length $e_x = 0,187 < 0,333$ Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$ Max. overall eccentricity $e_t = 0,187 < 0,333$ **Eccentricity of load is SATISFACTORY****Horizontal bearing capacity check**

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 3,25 \text{ kN}$ Horizontal bearing capacity $R_{dh} = 141,96 \text{ kN}$ Extreme horizontal force $H = 120,29 \text{ kN}$ **Bearing capacity in the horizontal direction is SATISFACTORY****Bearing capacity of foundation is SATISFACTORY****Verification No. 1****Settlement and rotation of foundation - input data**

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 36,85 \text{ kN/m}$

Computed weight of overburden $Z = 0,00 \text{ kN/m}$

Settlement of mid point of longitudinal edge = 2,2 mm

Settlement of mid point of transverse edge 1 = 4,5 mm

Settlement of mid point of transverse edge 2 = 2,8 mm

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results

Foundation stiffness:

Computed weighted average modulus of deformation $E_{\text{def}} = 63,63 \text{ MPa}$

Foundation in the longitudinal direction is rigid ($k=77,18$)

Foundation in the direction of width is rigid ($k=814,68$)

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,103 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,103 < 0,333$

Eccentricity of load is SATISFACTORY

Overall settlement and rotation of foundation:

Foundation settlement = 4,6 mm

Depth of influence zone = 7,06 m

Rotation in direction of width = 0,799 ($\tan^*1000$); ($4,6\text{E-}02^\circ$)

Gravity wall analysis

Input data (Stage of construction 1)

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija - "H=4m; brez naklona temelja-varna stran izračuna"
 Description : kontrola zidu za svetlo višino pod 3m
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

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 : Consider always vertical
 Allowable eccentricity : 0,333
 Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]
Water load :	$\gamma_w =$	1,00 [-]	

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on overturning :	$\gamma_{Rv} =$	1,40 [-]	
Partial factor on sliding resistance :	$\gamma_{Rh} =$	1,10 [-]	
Partial factor on bearing capacity :	$\gamma_{Re} =$	1,40 [-]	

Partial factors for variable actions			
Permanent design situation			
Factor for combination value :	$\psi_0 =$	0,70 [-]	
Factor for frequent value :	$\psi_1 =$	0,50 [-]	
Factor for quasi-permanent value :	$\psi_2 =$	0,30 [-]	

Anchors

Verification methodology : Limit states (LSD)

Reduction coefficients

Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]
Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35 [-]
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35 [-]

Material of structure

Unit weight $\gamma = 24,00 \text{ kN/m}^3$

Masonry : Category I

Mortar origin : Prescribed mortar

Masonry strength $f_b = 25,00 \text{ MPa}$ Mortar strength $f_m = 10,00 \text{ MPa}$

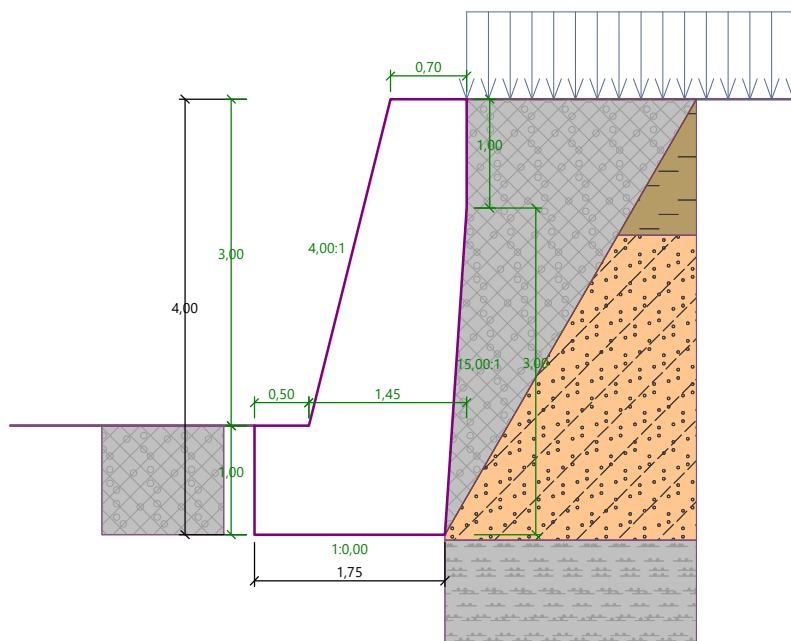
Parameters

Compressive strength $f_k = 8,55 \text{ MPa}$ Shear strength $f_{vko} = 0,10 \text{ MPa}$ Flexural tensile strength $f_{xk} = 0,10 \text{ MPa}$ Partial factor $\gamma_M = 2,20$

Geometry of structure

Name : Geometry

Stage - analysis : 1 - 0



Soil parameters

[1] ClGr / SiGr

Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$

Stress-state : effective

Internal friction angle : $\phi_{ef} = 30,00 \text{ [}^\circ\text{]}$ Cohesion : $c_{ef} = 1,00 \text{ [kPa]}$

Friction angle structure-soil : $\delta = 20,00$ [°]

Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,35$ [-]

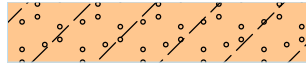
Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,50$ [kN/m³]

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight : $\gamma = 18,50$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 28,00$ [°]

Cohesion : $c_{\text{ef}} = 2,00$ [kPa]

Friction angle structure-soil : $\delta = 18,50$ [°]

Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,30$ [-]

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 18,50$ [kN/m³]

View

Sample :



[3] CIL/CIM

Basic data

Unit weight : $\gamma = 19,50$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 26,50$ [°]

Cohesion : $c_{\text{ef}} = 2,50$ [kPa]

Friction angle structure-soil : $\delta = 17,50$ [°]

Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,35$ [-]

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00$ [kN/m³]

View

Sample :



[4] podlaga

Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]

Stress-state : effective

Internal friction angle : $\varphi_{\text{ef}} = 32,00$ [°]

Cohesion : $c_{\text{ef}} = 25,00$ [kPa]

Friction angle structure-soil : $\delta = 20,00$ [°]

Pressure at rest

Pressure at rest : cohesive soil

Poisson's ratio : $\nu = 0,25$ [-]Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50$ [kN/m³]View

Sample :

**UN (drobljenec)**Basic dataUnit weight : $\gamma = 20,00$ [kN/m³]

Stress-state : effective

Internal friction angle : $\phi_{\text{ef}} = 36,00$ [°]Cohesion : $c_{\text{ef}} = 0,00$ [kPa]Friction angle structure-soil : $\delta = 24,00$ [°]Pressure at rest

Pressure at rest : cohesionless soil

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50$ [kN/m³]View

Sample :

**Backfill**

Assigned soil : UN (drobljenec)

Slope = $60,00^\circ$ **Geological profile and assigned soils****Position information**

Terrain elevation = -0,95 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	1,25	0,00 .. 1,25	-0,95 .. -2,20	[3] CIL/CIM	
2	2,80	1,25 .. 4,05	-2,20 .. -5,00	[1] ClGr / SiGr	
3	-	4,05 .. ∞	-5,00 .. -	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Number	Coordinates x [m]	Depth z [m]
1	0,00	0,00
2	3,00	0,00
3	6,00	-2,00

Tempos	Dolenja vas - kolesarska steza
Oporna konstrukcija - "H=4m; brez naklona temelja-varna stran izračuna"	

Number	Coordinates x [m]	Depth z [m]
4	7,00	-2,00

Origin [0,0] is located in upper right edge of construction.
Positive coordinate +z has downward direction.

Water influence

Ground water table is located below the structure.

Input surface surcharges

Number	Surcharge		Action	Mag.1 [kN/m ²]	Mag.2 [kN/m ²]	Ord.x x [m]	Length l [m]	Depth z [m]
	new	change						
1	Yes		variable	17,00		0,00	3,00	on terrain

Number	Name
1	cesta

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure $h = 1,00$ 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. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-1,68	117,00	1,19	1,000	1,000	1,350
FF resistance	-4,12	-0,33	0,00	0,00	1,000	1,000	1,350
Active pressure	31,64	-1,34	11,79	1,84	1,350	1,350	1,350
cesta	14,64	-1,98	5,65	1,88	1,500	1,500	1,500

Verification of complete wall

Check for overturning stability

Resisting moment $M_{res} = 132,09$ kNm/m

Overturning moment $M_{ovr} = 99,50$ kNm/m

Wall for overturning is SATISFACTORY

Check for slip

Resisting horizontal force $H_{res} = 75,32$ kN/m

Active horizontal force $H_{act} = 60,55$ kN/m

Wall for slip is SATISFACTORY

Overall check - WALL is SATISFACTORY

Maximum stress in footing bottom : 123,33 kPa

Bearing capacity of foundation soil (Stage of construction 1)

Design load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	24,75	182,35	59,10	0,078	123,33
2	38,30	141,40	60,55	0,155	117,03

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	15,74	134,45	42,15

Spread footing verification

Input data

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on vertical bearing capacity :	$\gamma_{Rvs} =$	1,40 [-]	
Partial factor on sliding resistance :	$\gamma_{Rhs} =$	1,10 [-]	

Soil parameters

[1] CIGr / SiGr

Basic data

Unit weight : $\gamma = 19,00$ [kN/m³]

Internal friction angle : $\varphi_{ef} = 30,00$ [°]

Cohesion : $c_{ef} = 1,00$ [kPa]

Settlement - oedometric modulus

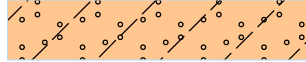
Poisson's ratio : $\nu = 0,35$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 8,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 19,50$ [kN/m³]

View

Sample :

**[2] Si (s peskom)**Basic data

Unit weight : $\gamma = 18,50$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 28,00$ [°]
 Cohesion : $c_{ef} = 2,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,30$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 12,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 18,50$ [kN/m³]

View

Sample :

**[3] CIL/CIM**Basic data

Unit weight : $\gamma = 19,50$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 26,50$ [°]
 Cohesion : $c_{ef} = 2,50$ [kPa]

Settlement - oedometric modulus

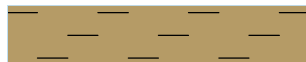
Poisson's ratio : $\nu = 0,35$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 6,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,00$ [kN/m³]

View

Sample :

**[4] podlaga**Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 32,00$ [°]
 Cohesion : $c_{ef} = 25,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{\text{oed}} = 80,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50$ [kN/m³]

View

Sample :

**UN (drobljenec)**Basic data

Unit weight : $\gamma = 20,00$ [kN/m³]
 Internal friction angle : $\phi_{\text{ef}} = 36,00$ [°]
 Cohesion : $c_{\text{ef}} = 0,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{\text{oed}} = 20,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50$ [kN/m³]

View

Sample :

**Foundation****Foundation type: strip footing**

Depth from original ground surface $h_z = 4,00$ m
 Depth of footing bottom $d = 1,00$ m
 Incl. of finished grade $s_1 = 0,00$ °
 Incl. of footing bottom $s_2 = 0,00$ °

Overburden

Type: input unit weight
 Unit weight of soil above foundation = $19,00$ kN/m³

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = $12,00$ m
 Strip footing width (x) = $1,75$ m
 Column width in the direction of x = $0,10$ m

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = $1,75$ m³/m
 Volume of excavation = $1,75$ m³/m
 Volume of fill = $0,00$ m³/m

Material of structure

Unit weight $\gamma = 24,00$ kN/m³

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

Elasticity modulus

E_{cm} = 30000,00 MPa

Longitudinal reinforcement: B500B

Yield strength

f_{yk} = 500,00 MPa

Transverse reinforcement: B500B

Yield strength

f_{yk} = 500,00 MPa

Geological profile and assigned soils

Position information

Terrain elevation = -0,95 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	1,25	0,00 .. 1,25	-0,95 .. -2,20	[3] CIL/CIM	
2	2,80	1,25 .. 4,05	-2,20 .. -5,00	[1] ClGr / SiGr	
3	-	4,05 .. ∞	-5,00 .. -	[4] podlaga	

Load

Number	Load		Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
	new	change					
1	Yes		LC 1	Design	140,35	-34,35	-59,10
2	Yes		LC 2	Design	99,40	-22,25	-60,55
3	Yes		LC 3	Service	92,45	-26,41	-42,15

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1

Load case verification

Name	Self w. in favor	e _x [m]	e _y [m]	σ [kPa]	R _d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,14	0,00	123,33	705,24	17,49	Yes
LC 1	No	-0,14	0,00	123,33	705,24	17,49	Yes
LC 2	Yes	-0,27	0,00	117,03	536,83	21,80	Yes
LC 2	No	-0,27	0,00	117,03	536,83	21,80	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation G = 42,00 kN/m

Computed weight of overburden Z = 0,00 kN/m

Vertical bearing capacity check

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface $z_{sp} = 2,97 \text{ m}$

Length of slip surface $l_{sp} = 9,28 \text{ m}$

Design bearing capacity of found. soil $R_d = 536,83 \text{ kPa}$

Extreme contact stress $\sigma = 117,03 \text{ kPa}$

Bearing capacity in the vertical direction is SATISFACTORY

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,155 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,155 < 0,333$

Eccentricity of load is SATISFACTORY

Horizontal bearing capacity check

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 4,75 \text{ kN}$

Horizontal bearing capacity $R_{dh} = 79,63 \text{ kN}$

Extreme horizontal force $H = 60,55 \text{ kN}$

Bearing capacity in the horizontal direction is SATISFACTORY

Bearing capacity of foundation is SATISFACTORY

Verification No. 1

Settlement and rotation of foundation - input data

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 42,00 \text{ kN/m}$

Computed weight of overburden $Z = 0,00 \text{ kN/m}$

Settlement of mid point of longitudinal edge $= 0,6 \text{ mm}$

Settlement of mid point of transverse edge 1 $= 1,3 \text{ mm}$

Settlement of mid point of transverse edge 2 $= 0,8 \text{ mm}$

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results

Foundation stiffness:

Computed weighted average modulus of deformation $E_{def} = 64,93 \text{ MPa}$

Foundation in the longitudinal direction is rigid ($k=86,21$)

Foundation in the direction of width is rigid ($k=462,04$)

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,067 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,067 < 0,333$

Eccentricity of load is SATISFACTORY

Overall settlement and rotation of foundation:

Foundation settlement = 1,2 mm

Depth of influence zone = 2,80 m

Rotation in direction of width = 0,280 (tan*1000); (1,6E-02 °)

Input data (Stage of construction 2)**Geological profile and assigned soils****Position information**

Terrain elevation = -0,95 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	1,25	0,00 .. 1,25	-0,95 .. -2,20	[3] CIL/CIM	
2	2,80	1,25 .. 4,05	-2,20 .. -5,00	[1] ClGr / SiGr	
3	-	4,05 .. ∞	-5,00 .. -	[4] podlaga	

Foundation

Type of foundation : soil from geological profile

Terrain profile

Number	Coordinates x [m]	Depth z [m]
1	0,00	0,00
2	3,00	0,00
3	6,00	-2,00
4	7,00	-2,00

Origin [0,0] is located in upper right edge of construction.

Positive coordinate +z has downward direction.

Water influence

GWT behind the structure lies at a depth of 2,60 m

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

Input surface surcharges

Number	Surcharge		Action	Mag.1 [kN/m ²]	Mag.2 [kN/m ²]	Ord.x x [m]	Length l [m]	Depth z [m]
	new	change						
1	No	No	variable	17,00		0,00	3,00	on terrain

Number	Name
1	cesta

Resistance on front face of the structure

Resistance on front face of the structure: at rest

Soil on front face of the structure - UN (drobljenec)

Soil thickness in front of structure h = 1,00 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. overturn.	Coeff. sliding	Coeff. stress
Weight - wall	0,00	-1,68	117,00	1,19	1,000	1,000	1,350
FF resistance	-4,12	-0,33	0,00	0,00	1,000	1,000	1,350
Active pressure	29,79	-1,40	11,11	1,84	1,350	1,350	1,350
Water pressure	9,80	-0,47	-0,65	1,78	1,000	1,000	1,000
Uplift pressure	0,00	-4,00	0,00	1,95	1,000	1,000	1,000
cesta	14,64	-1,98	5,65	1,88	1,500	1,500	1,500

Verification of complete wall**Check for overturning stability**Resisting moment $M_{res} = 130,09 \text{ kNm/m}$ Overturning moment $M_{ovr} = 102,92 \text{ kNm/m}$ **Wall for overturning is SATISFACTORY****Check for slip**Resisting horizontal force $H_{res} = 74,42 \text{ kN/m}$ Active horizontal force $H_{act} = 67,85 \text{ kN/m}$ **Wall for slip is SATISFACTORY****Overall check - WALL is SATISFACTORY**

Maximum stress in footing bottom : 127,08 kPa

Bearing capacity of foundation soil (Stage of construction 2)**Design load acting at the center of footing bottom**

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]	Eccentricity [-]	Stress [kPa]
1	29,60	180,78	66,40	0,094	127,08
2	43,14	139,83	67,85	0,176	123,43

Service load acting at the center of footing bottom

Number	Moment [kNm/m]	Norm. force [kN/m]	Shear Force [kN/m]
1	20,67	133,12	50,10

Spread footing verification**Input data****Settings**

Slovenia - EN 1997, gamma water=1.0 (2)

Materials and standards

Concrete structures : EN 1992-1-1 (EC2)

Coefficients EN 1992-1-1 : standard

Settlement

Analysis method : Analysis using oedometric modulus

Restriction of influence zone : by percentage of Sigma, Or

Coeff. of restriction of influence zone : 10,0 [%]

Spread Footing

Verification methodology : according to EN 1997

Analysis for drained conditions : EC 7-1 (EN 1997-1:2003)

Analysis of uplift : Standard

Allowable eccentricity : 0,333

Design approach : 2 - reduction of actions and resistances

Partial factors on actions (A)			
Permanent design situation			
		Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,35 [-]	1,00 [-]

Partial factors for resistances (R)			
Permanent design situation			
Partial factor on vertical bearing capacity :	$\gamma_{Rvs} =$	1,40 [-]	
Partial factor on sliding resistance :	$\gamma_{Rhs} =$	1,10 [-]	

Soil parameters

[1] CIGr / SiGr

Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$

Internal friction angle : $\varphi_{ef} = 30,00 \text{ [}^\circ\text{]}$

Cohesion : $c_{ef} = 1,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35 \text{ [-]}$

Modulus type : input E_{oed}

Modulus : constant

Oedometric modulus : $E_{oed} = 8,00 \text{ [MPa]}$

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{sat} = 19,50 \text{ [kN/m}^3\text{]}$

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight : $\gamma = 18,50 \text{ [kN/m}^3\text{]}$

Internal friction angle : $\varphi_{ef} = 28,00 \text{ [}^\circ\text{]}$

Cohesion : $c_{ef} = 2,00 \text{ [kPa]}$

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,30 \text{ [-]}$

Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 12,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 18,50$ [kN/m³]

View

Sample :

**[3] CIL/CIM**Basic data

Unit weight : $\gamma = 19,50$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 26,50$ [°]
 Cohesion : $c_{ef} = 2,50$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,35$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 6,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,00$ [kN/m³]

View

Sample :

**[4] podlaga**Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 32,00$ [°]
 Cohesion : $c_{ef} = 25,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25$ [-]
 Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 80,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 21,50$ [kN/m³]

View

Sample :

**UN (drobljenec)**Basic data

Unit weight : $\gamma = 20,00$ [kN/m³]
 Internal friction angle : $\varphi_{ef} = 36,00$ [°]
 Cohesion : $c_{ef} = 0,00$ [kPa]

Settlement - oedometric modulus

Poisson's ratio : $\nu = 0,25$ [-]

Modulus type : input E_{oed}
 Modulus : constant
 Oedometric modulus : $E_{oed} = 20,00$ [MPa]

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,50$ [kN/m³]

View

Sample :

**Foundation****Foundation type: strip footing**

Depth from original ground surface $h_z = 4,00$ m
 Depth of footing bottom $d = 1,00$ m
 Incl. of finished grade $s_1 = 0,00$ °
 Incl. of footing bottom $s_2 = 0,00$ °

Overburden

Type: input unit weight
 Unit weight of soil above foundation = 19,00 kN/m³

Geometry of structure**Foundation type: strip footing**

Overall strip footing length = 12,00 m
 Strip footing width (x) = 1,75 m
 Column width in the direction of x = 0,10 m

Inserted loading is considered per unit length of continuous footing span.

Volume of strip footing = 1,75 m³/m
 Volume of excavation = 1,75 m³/m
 Volume of fill = 0,00 m³/m

Material of structure

Unit weight $\gamma = 24,00$ kN/m³
 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
 Elasticity modulus $E_{cm} = 30000,00$ MPa

Longitudinal reinforcement: B500B

Yield strength $f_{yk} = 500,00$ MPa

Transverse reinforcement: B500B

Yield strength $f_{yk} = 500,00$ MPa

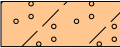
Geological profile and assigned soils**Position information**

Terrain elevation = -0,95 m

Geological profile and assigned soils

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
1	1,25	0,00 .. 1,25	-0,95 .. -2,20	[3] CIL/CIM	

Tempos	Dolenja vas - kolesarska steza
Oporna konstrukcija - "H=4m; brez naklona temelja-varna stran izračuna"	

Number	Thickness of layer t [m]	Depth z [m]	Elevation [m]	Assigned soil	Pattern
2	2,80	1,25 .. 4,05	-2,20 .. -5,00	[1] ClGr / SiGr	
3	-	4,05 .. ∞	-5,00 .. -	[4] podlaga	

Load

Number	Load		Name	Type	N [kN/m]	M _y [kNm/m]	H _x [kN/m]
	new	change					
1	Yes		LC 1	Design	156,28	-36,81	-66,40
2	Yes		LC 2	Design	115,33	-24,70	-67,85
3	Yes		LC 3	Service	108,62	-29,43	-50,10

Ground water table

The ground water table is at a depth of 2,60 m from the original terrain.

Global settings

Type of analysis : analysis for drained conditions

Settings of the stage of construction

Design situation : permanent

Verification No. 1

Load case verification

Name	Self w. in favor	e _x [m]	e _y [m]	σ [kPa]	R _d [kPa]	Utilization [%]	Is satisfactory
LC 1	Yes	-0,16	0,00	127,08	491,93	25,83	Yes
LC 1	No	-0,16	0,00	127,08	491,93	25,83	Yes
LC 2	Yes	-0,31	0,00	123,43	357,07	34,57	Yes
LC 2	No	-0,31	0,00	123,43	357,07	34,57	Yes

Analysis carried out with automatic selection of the most unfavourable load cases.

Computed self weight of strip foundation G = 24,50 kN/m

Computed weight of overburden Z = 0,00 kN/m

Vertical bearing capacity check

Shape of contact stress : rectangle

Most unfavorable load case No. 2. (LC 2)

Parameters of slip surface below foundation:

Depth of slip surface z_{sp} = 2,97 m

Length of slip surface l_{sp} = 9,28 m

Design bearing capacity of found. soil R_d = 357,07 kPa

Extreme contact stress σ = 123,43 kPa

Bearing capacity in the vertical direction is SATISFACTORY

Verification of load eccentricity

Max. eccentricity in direction of base length e_x = 0,176 < 0,333

Max. eccentricity in direction of base width e_y = 0,000 < 0,333

Max. overall eccentricity $e_t = 0,176 < 0,333$

Eccentricity of load is SATISFACTORY

Horizontal bearing capacity check

Most unfavorable load case No. 2. (LC 2)

Earth resistance: at rest

Design magnitude of earth resistance $S_{pd} = 2,38 \text{ kN}$

Horizontal bearing capacity $R_{dh} = 76,58 \text{ kN}$

Extreme horizontal force $H = 67,85 \text{ kN}$

Bearing capacity in the horizontal direction is SATISFACTORY

Bearing capacity of foundation is SATISFACTORY

Verification No. 1

Settlement and rotation of foundation - input data

Analysis carried out with automatic selection of the most unfavourable load cases.

Analysis carried out with accounting for coefficient κ_1 (influence of foundation depth).

Stress at the footing bottom considered from the finished grade.

Computed self weight of strip foundation $G = 24,50 \text{ kN/m}$

Computed weight of overburden $Z = 0,00 \text{ kN/m}$

Settlement of mid point of longitudinal edge $= 0,9 \text{ mm}$

Settlement of mid point of transverse edge 1 $= 1,8 \text{ mm}$

Settlement of mid point of transverse edge 2 $= 1,1 \text{ mm}$

(1-max.compressed edge; 2-min.compressed edge)

Settlement and rotation of foundation - results

Foundation stiffness:

Computed weighted average modulus of deformation $E_{def} = 65,20 \text{ MPa}$

Foundation in the longitudinal direction is rigid ($k=85,86$)

Foundation in the direction of width is rigid ($k=460,14$)

Verification of load eccentricity

Max. eccentricity in direction of base length $e_x = 0,089 < 0,333$

Max. eccentricity in direction of base width $e_y = 0,000 < 0,333$

Max. overall eccentricity $e_t = 0,089 < 0,333$

Eccentricity of load is SATISFACTORY

Overall settlement and rotation of foundation:

Foundation settlement $= 1,6 \text{ mm}$

Depth of influence zone $= 4,03 \text{ m}$

Rotation in direction of width $= 0,363 (\tan^*1000); (2,1E-02^\circ)$

Slope stability analysis

Input data (Construction stage 1 - obstoječe stanje)

Project

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija
 Description : Globalna stabilnost v prerezu A-A'
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Stability analysis

Verification methodology : according to EN 1997

Earthquake analysis : Standard

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 :	$\gamma_G =$	1,35 [-]	1,00 [-]	1,00 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]	1,30 [-]	0,00 [-]
Water load :	$\gamma_w =$			1,00 [-]	

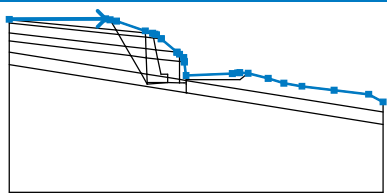
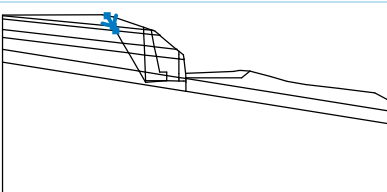
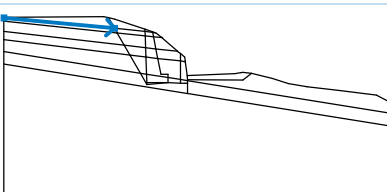
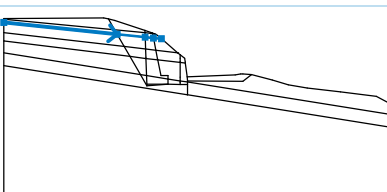
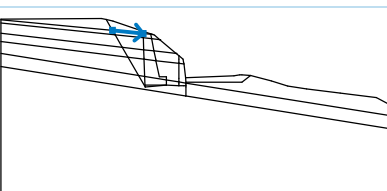
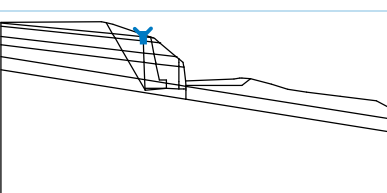
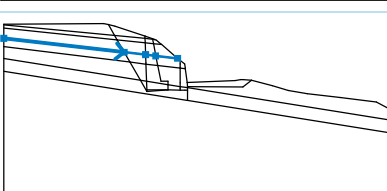
Partial factors for soil parameters (M)			
Permanent design situation			
Partial factor on internal friction :	$\gamma_\phi =$	1,25 [-]	
Partial factor on effective cohesion :	$\gamma_c =$	1,25 [-]	
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1,40 [-]	

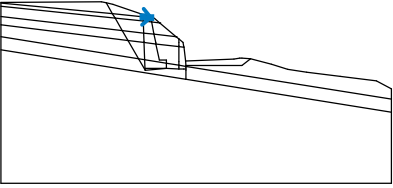
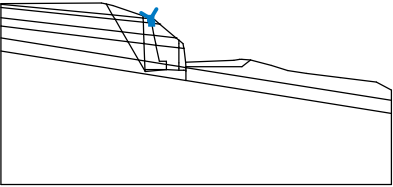
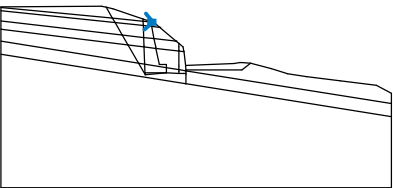
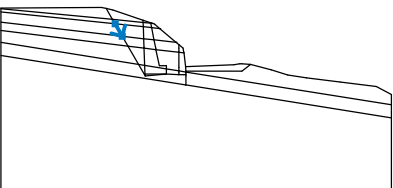
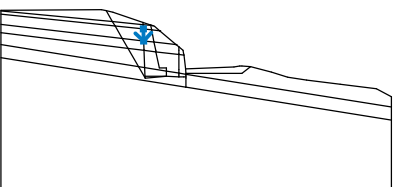
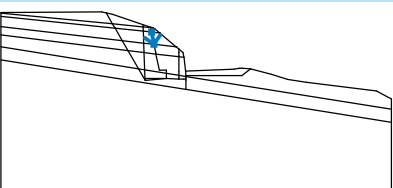
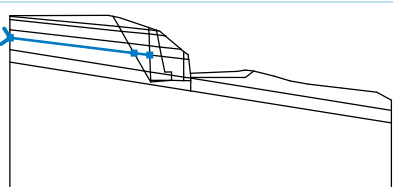
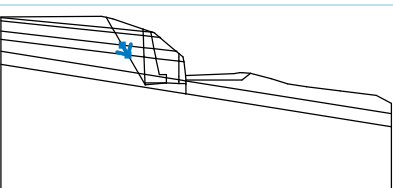
Anchors

Verification methodology : Limit states (LSD)

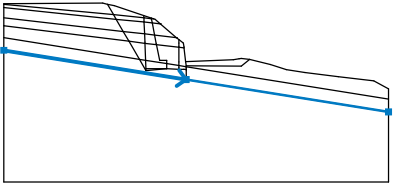
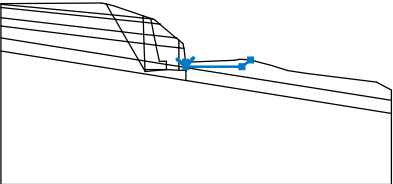
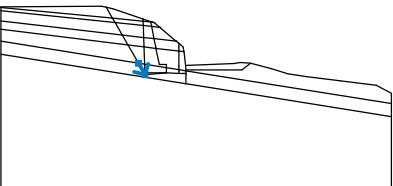
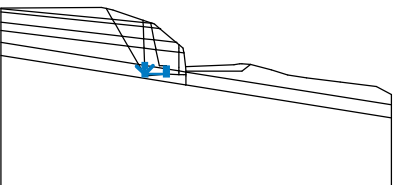
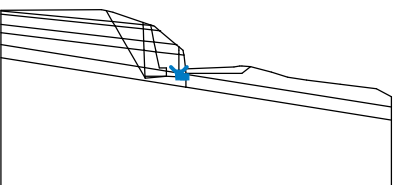
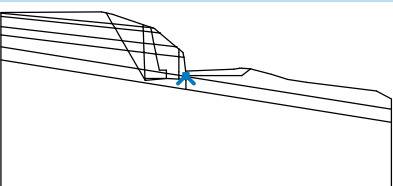
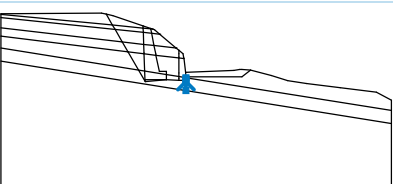
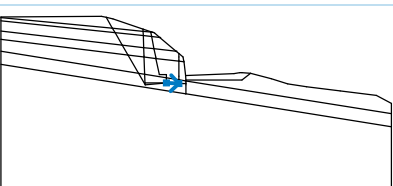
Reduction coefficients			
Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]	
Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35 [-]	
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35 [-]	

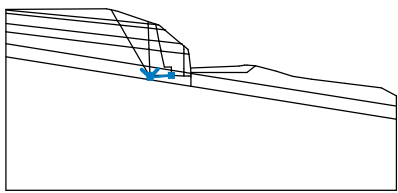
Interface

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	25,04	14,16	25,11	14,84	24,97
		15,77	24,77	20,02	23,34	21,09	22,98
		21,42	22,87	21,65	22,78	22,37	22,17
		22,38	22,16	24,67	20,20	24,68	20,19
		25,05	19,90	25,67	19,42	25,75	18,87
		25,77	18,73	26,01	16,77	32,82	17,04
		33,61	17,17	33,93	17,20	35,15	17,09
		38,11	16,33	40,40	15,63	43,06	15,19
		47,80	14,62	52,87	14,01	55,00	12,88
2		14,84	24,97	15,71	23,47	16,08	22,82
3		0,00	24,95	15,71	23,47		
4		0,00	24,50	16,08	22,82	20,06	22,41
		21,24	22,28	22,37	22,17		
5		15,71	23,47	20,03	23,02		
6		20,02	23,34	20,03	23,02	20,06	22,41
7		0,00	23,03	17,08	21,07	20,12	20,72
		21,56	20,55	24,67	20,20		

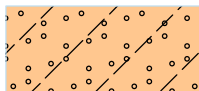
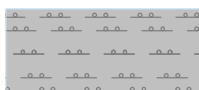
Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
8		20,03	23,02	21,11	22,90		
9		21,09	22,98	21,11	22,90	21,24	22,28
10		21,11	22,90	21,42	22,87		
11		16,08	22,82	17,08	21,07		
12		20,06	22,41	20,12	20,72		
13		21,24	22,28	21,56	20,55		
14		0,00	21,88	0,05	21,87	17,89	19,67
		20,16	19,38				
15		17,08	21,07	17,89	19,67		

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
16		20,12	20,72	20,16	19,55	20,16	19,38
		20,26	16,95				
17		21,56	20,55	21,80	19,35	21,84	19,18
		22,30	16,94	23,30	16,94	23,30	16,47
18		0,00	20,19	19,39	17,08	20,26	16,95
		23,30	16,47	25,05	16,20	26,06	16,04
		55,00	11,40				
19		25,05	19,90	25,05	19,42	25,05	18,95
		25,05	18,83	25,05	16,71	25,05	16,20
20		17,89	19,67	19,39	17,08		
21		20,16	19,38	21,84	19,18		
22		21,84	19,18	25,05	18,83		
23		25,05	18,83	25,77	18,73		

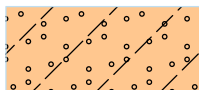
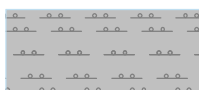
Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
24		0,00	18,38	26,02	14,22	26,06	14,21
		55,00	9,58				
25		26,01	16,77	26,06	16,16	33,95	16,14
		35,15	17,09				
26		19,39	17,08	20,31	15,49		
27		20,26	16,95	20,30	15,74	23,30	15,74
		23,30	16,47				
28		25,05	16,20	25,05	15,94	25,05	15,67
		25,73	15,67	26,06	15,67		
29		26,06	16,04	26,06	16,16		
30		26,06	14,21	26,06	15,47	26,06	15,67
		26,06	15,90	26,06	16,04		
31		23,30	15,74	25,05	15,67		

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
32		20,30	15,74	20,31	15,49	23,30	15,74

Soil parameters - effective stress state

Number	Pattern	Soil name	γ [kN/m ³]	ϕ_{ef} [°]	c_{ef} [kPa]
1		[1] CI/Gr / SiGr	19,00	30,00	1,00
2		[2] Si (s peskom)	18,50	28,00	2,00
3		[3] CIL/CIM	19,50	26,50	2,50
4		[4] podlaga	21,00	32,00	25,00
5		UN (drobljenec)	20,00	36,00	0,00

Soil parameters - uplift

Number	Pattern	Soil name	γ_{sat} [kN/m ³]	γ_s [kN/m ³]	n [-]
1		[1] CI/Gr / SiGr	19,50		
2		[2] Si (s peskom)	19,00		
3		[3] CIL/CIM	20,00		
4		[4] podlaga	21,50		
5		UN (drobljenec)	20,50		

Soil parameters**[1] CIGr / SiGr**Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 30,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 1,00 \text{ [kPa]}$

Uplift pressure

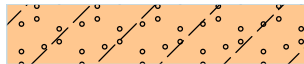
Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :

**[2] Si (s peskom)**Basic data

Unit weight : $\gamma = 18,50 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 28,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,00 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :

**[3] CIL/CIM**Basic data

Unit weight : $\gamma = 19,50 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 26,50 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,50 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :



[4] podlaga

Basic data

Unit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 32,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 25,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 21,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :



UN (drobljenec)

Basic data

Unit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 36,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 0,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :

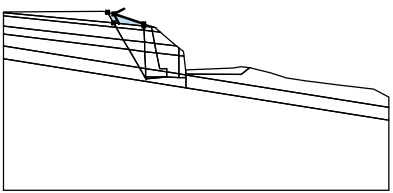
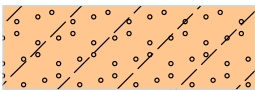
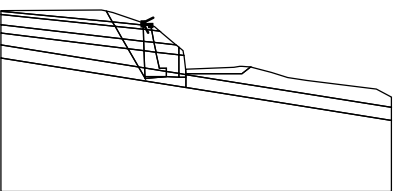
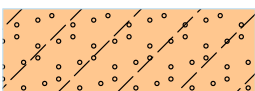
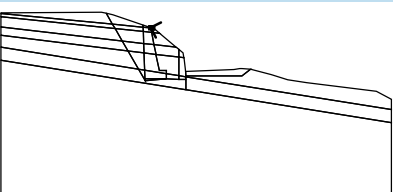
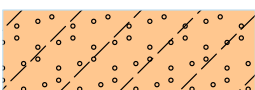
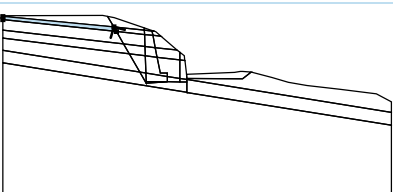
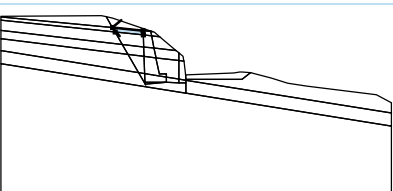
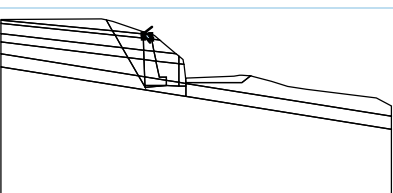
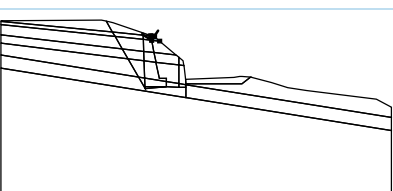
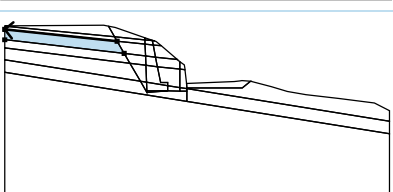


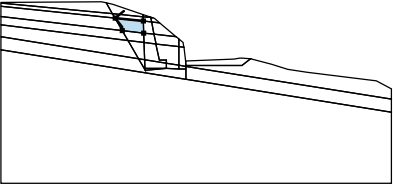
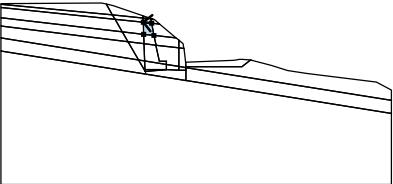
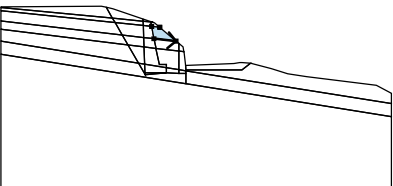
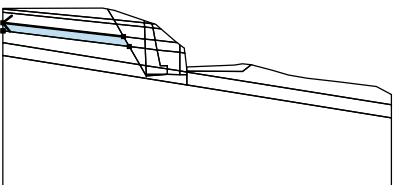
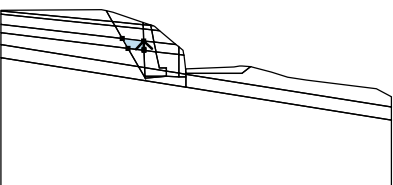
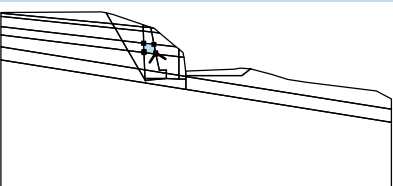
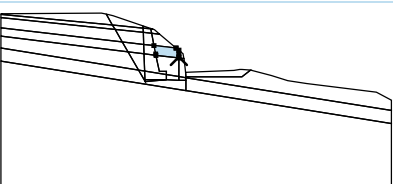
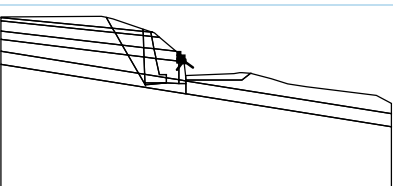
Rigid Bodies

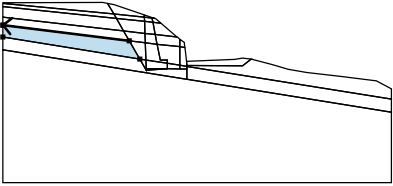
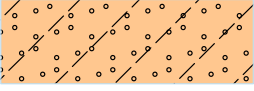
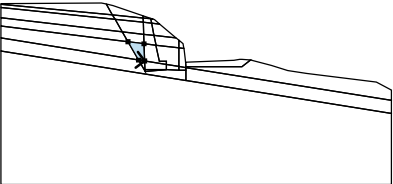
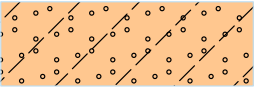
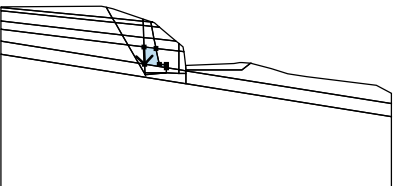
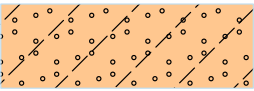
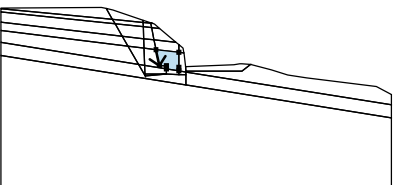
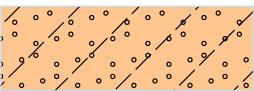
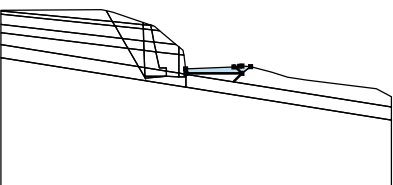
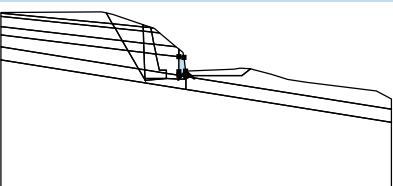
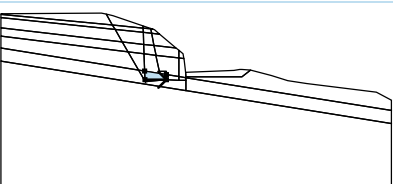
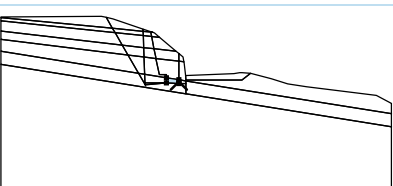
Number	Sample	Soil name	γ [kN/m ³]
1		KVB	24,00

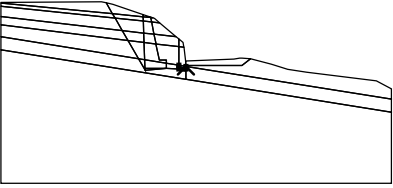
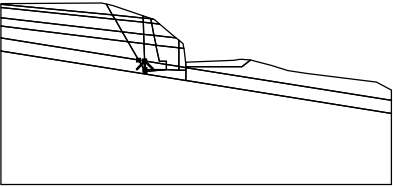
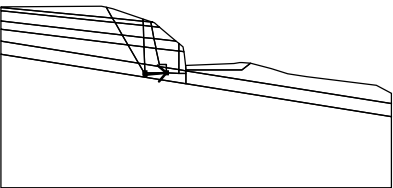
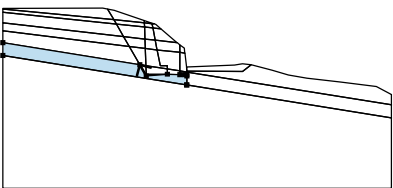
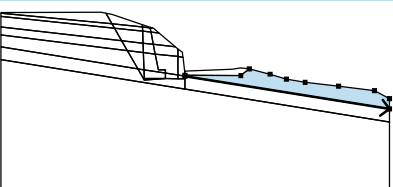
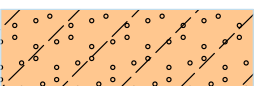
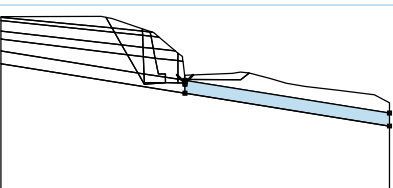
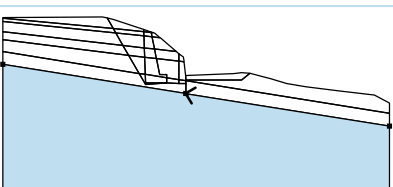
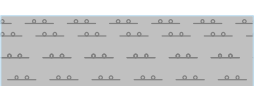
Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		15,71	23,47	14,84	24,97	[1] ClGr / SiGr
		14,16	25,11	0,00	25,04	
		0,00	24,95			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		20,02	23,34	15,77	24,77	[1] ClGr / SiGr 
		14,84	24,97	15,71	23,47	
		20,03	23,02			
3		21,09	22,98	20,02	23,34	[1] ClGr / SiGr 
		20,03	23,02	21,11	22,90	
4		21,42	22,87	21,09	22,98	[1] ClGr / SiGr 
		21,11	22,90			
5		16,08	22,82	15,71	23,47	[2] Si (s peskom) 
		0,00	24,95	0,00	24,50	
6		20,03	23,02	15,71	23,47	[2] Si (s peskom) 
		16,08	22,82	20,06	22,41	
7		21,11	22,90	20,03	23,02	[2] Si (s peskom) 
		20,06	22,41	21,24	22,28	
8		21,11	22,90	21,24	22,28	[2] Si (s peskom) 
		22,37	22,17	21,65	22,78	
		21,42	22,87			
9		16,08	22,82	0,00	24,50	[2] Si (s peskom) 
		0,00	23,03	17,08	21,07	

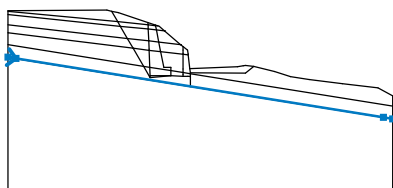
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
10		20,06	22,41	16,08	22,82	[2] Si (s peskom)
		17,08	21,07	20,12	20,72	
11		21,24	22,28	20,06	22,41	[2] Si (s peskom)
		20,12	20,72	21,56	20,55	
12		21,56	20,55	24,67	20,20	[2] Si (s peskom)
		22,38	22,16	22,37	22,17	
		21,24	22,28			
13		17,08	21,07	0,00	23,03	[3] CIL/CIM
		0,00	21,88	0,05	21,87	
		17,89	19,67			
14		20,16	19,55	20,12	20,72	[3] CIL/CIM
		17,08	21,07	17,89	19,67	
		20,16	19,38			
15		21,84	19,18	21,80	19,35	[3] CIL/CIM
		21,56	20,55	20,12	20,72	
		20,16	19,55	20,16	19,38	
16		25,05	18,83	25,05	18,95	[3] CIL/CIM
		25,05	19,42	25,05	19,90	
		24,68	20,19	24,67	20,20	
		21,56	20,55	21,80	19,35	
		21,84	19,18			
17		25,77	18,73	25,75	18,87	KVB
		25,67	19,42	25,05	19,90	
		25,05	19,42	25,05	18,95	
		25,05	18,83			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
18		17,89	19,67	0,05	21,87	[1] ClGr / SiGr 
		0,00	21,88	0,00	20,19	
		19,39	17,08			
19		19,39	17,08	20,26	16,95	[1] ClGr / SiGr 
		20,16	19,38	17,89	19,67	
20		20,16	19,38	20,26	16,95	[1] ClGr / SiGr 
		23,30	16,47	23,30	16,94	
		22,30	16,94	21,84	19,18	
21		21,84	19,18	22,30	16,94	[1] ClGr / SiGr 
		23,30	16,94	23,30	16,47	
		25,05	16,20	25,05	16,71	
		25,05	18,83			
22		26,06	16,16	33,95	16,14	UN (drobljenec) 
		35,15	17,09	33,93	17,20	
		33,61	17,17	32,82	17,04	
		26,01	16,77			
23		26,06	16,16	26,01	16,77	KVB 
		25,77	18,73	25,05	18,83	
		25,05	16,71	25,05	16,20	
		26,06	16,04			
24		20,30	15,74	23,30	15,74	[2] Si (s peskom) 
		23,30	16,47	20,26	16,95	
25		25,05	15,67	25,05	15,94	[2] Si (s peskom) 
		25,05	16,20	23,30	16,47	
		23,30	15,74			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
26		26,06	15,90	26,06	16,04	KVB 
		25,05	16,20	25,05	15,94	
		25,05	15,67	25,73	15,67	
		26,06	15,67			
27		20,30	15,74	20,26	16,95	[2] Si (s peskom) 
		19,39	17,08	20,31	15,49	
28		20,31	15,49	23,30	15,74	[2] Si (s peskom) 
		20,30	15,74			
29		20,31	15,49	19,39	17,08	[2] Si (s peskom) 
		0,00	20,19	0,00	18,38	
		26,02	14,22	26,06	14,21	
		26,06	15,47	26,06	15,67	
		25,73	15,67	25,05	15,67	
		23,30	15,74			
30		26,06	16,04	55,00	11,40	[1] ClGr / SiGr 
		55,00	12,88	52,87	14,01	
		47,80	14,62	43,06	15,19	
		40,40	15,63	38,11	16,33	
		35,15	17,09	33,95	16,14	
		26,06	16,16			
31		26,06	15,90	26,06	15,67	[2] Si (s peskom) 
		26,06	15,47	26,06	14,21	
		55,00	9,58	55,00	11,40	
		26,06	16,04			
32		26,06	14,21	26,02	14,22	[4] podlaga 
		0,00	18,38	0,00	-0,42	
		55,00	-0,42	55,00	9,58	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	18,41	1,14	18,23	53,66	9,80
		55,00	9,58				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 1 - obstoječe stanje)

Analysis 1 (stage 1)

Circular slip surface

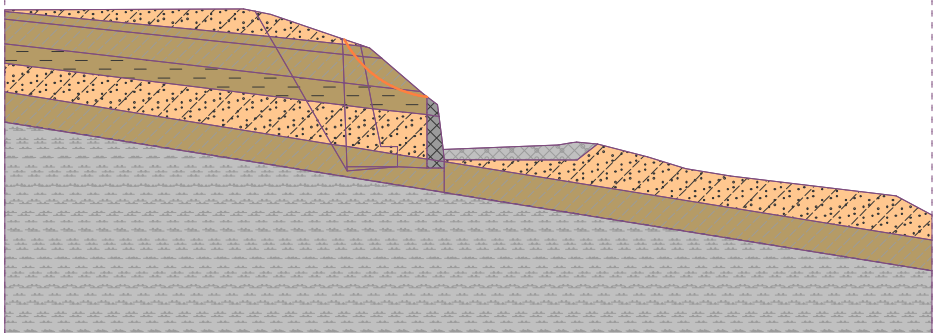
Slip surface parameters					
Center :	x =	25,85 [m]	Angles :	$\alpha_1 =$	-62,43 [°]
	z =	26,28 [m]		$\alpha_2 =$	-7,00 [°]
Radius :	R =	6,44 [m]			
The slip surface after optimization.					

Total weight of soil above the slip surface: 78,77 kN/m

Slope stability verification (Morgenstern-Price)

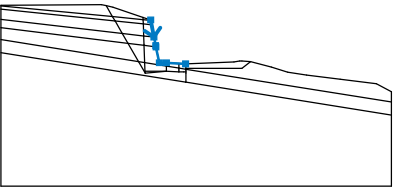
Utilization : 109,1 %

Slope stability NOT ACCEPTABLE

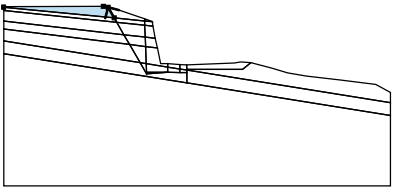
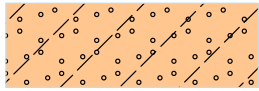
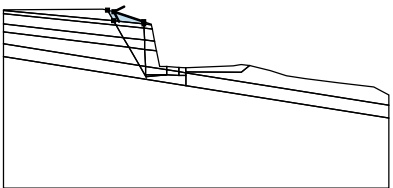
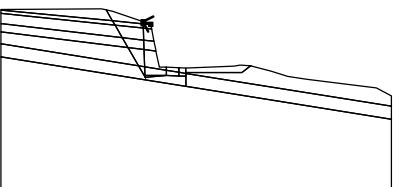
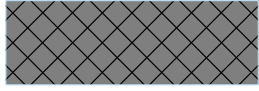
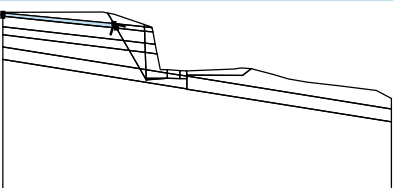
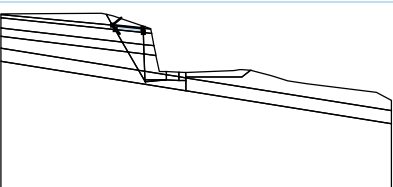
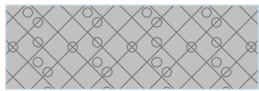
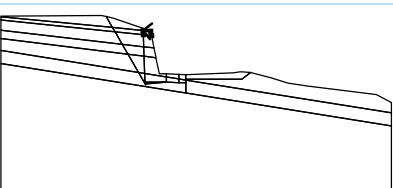
Name : obstoječe stanje	Stage - analysis : 1 - 1
Description : Slika prikazuje kritično drsino za privzete materialne karakteristike zalednih zemljin. Po EC-7 (PP3) obstoječa konstrukcija/brežina ne izpolnjuje zadostne varnost.	
	

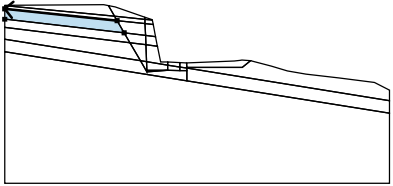
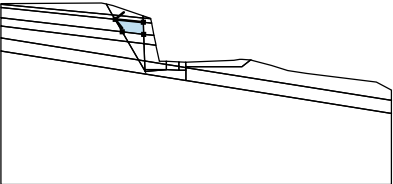
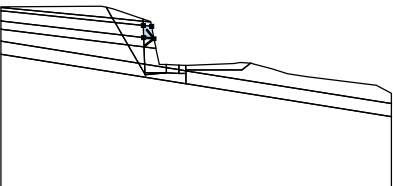
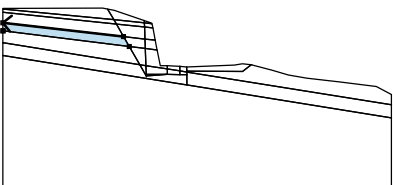
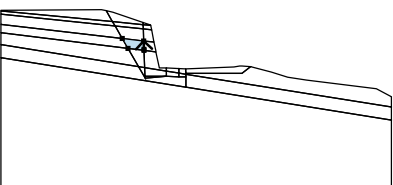
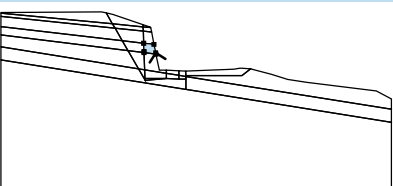
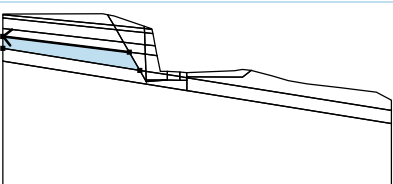
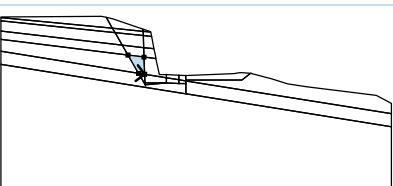
Input data (Construction stage 2 - predvideno stanje)

Earth cut

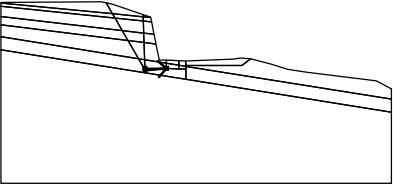
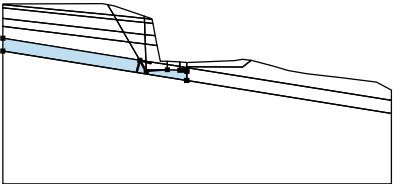
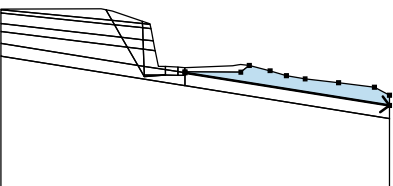
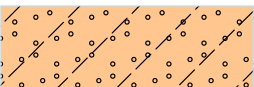
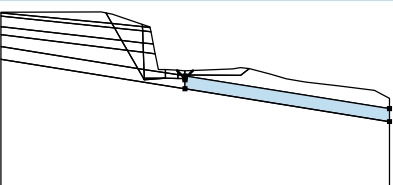
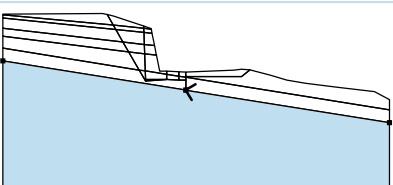
Number	Cut location	Coordinates of cut points [m]					
		x	z	x	z	x	z
1		21,09	22,98	21,56	20,55	21,80	19,35
		21,84	19,18	22,30	16,94	23,30	16,94
		26,01	16,77				

Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		15,71	23,47	14,84	24,97	[1] CIGr / SiGr 
		14,16	25,11	0,00	25,04	
		0,00	24,95			
2		20,02	23,34	15,77	24,77	UN (drobljenec) 
		14,84	24,97	15,71	23,47	
		20,03	23,02			
3		21,09	22,98	20,02	23,34	KVB 
		20,03	23,02	21,11	22,90	
4		16,08	22,82	15,71	23,47	[2] Si (s peskom) 
		0,00	24,95	0,00	24,50	
5		20,03	23,02	15,71	23,47	UN (drobljenec) 
		16,08	22,82	20,06	22,41	
6		21,11	22,90	20,03	23,02	KVB 
		20,06	22,41	21,23	22,28	

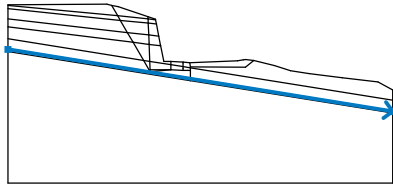
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
7		16,08	22,82	0,00	24,50	[2] Si (s peskom)
		0,00	23,03	17,08	21,07	
8		20,06	22,41	16,08	22,82	UN (drobljenec)
		17,08	21,07	20,12	20,72	
9		20,12	20,72	21,56	20,55	KVB
		21,23	22,28	20,06	22,41	
10		17,08	21,07	0,00	23,03	[3] CIL/CIM
		0,00	21,88	0,05	21,87	
		17,89	19,67			
11		20,16	19,55	20,12	20,72	UN (drobljenec)
		17,08	21,07	17,89	19,67	
		20,16	19,38			
12		21,84	19,18	21,80	19,35	KVB
		21,56	20,55	20,12	20,72	
		20,16	19,55	20,16	19,38	
13		17,89	19,67	0,05	21,87	[1] ClGr / SiGr
		0,00	21,88	0,00	20,19	
		19,39	17,08			
14		19,39	17,08	20,26	16,95	UN (drobljenec)
		20,16	19,38	17,89	19,67	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
15		23,30	16,94	22,30	16,94	KVB
		21,84	19,18	20,16	19,38	
		20,26	16,95	23,30	16,47	
16		25,05	16,71	25,05	16,83	UN (drobljenec)
		23,30	16,94	23,30	16,47	
		25,05	16,20			
17		26,06	16,16	33,95	16,14	UN (drobljenec)
		35,15	17,09	33,93	17,20	
		33,61	17,17	32,82	17,04	
		26,01	16,77			
18		26,06	16,16	26,01	16,77	UN (drobljenec)
		25,05	16,83	25,05	16,71	
		25,05	16,20	26,06	16,04	
19		20,30	15,74	23,30	15,74	KVB
		23,30	16,47	20,26	16,95	
20		25,05	15,67	25,05	15,94	UN (drobljenec)
		25,05	16,20	23,30	16,47	
		23,30	15,74			
21		26,06	15,90	26,06	16,04	UN (drobljenec)
		25,05	16,20	25,05	15,94	
		25,05	15,67	25,73	15,67	
		26,06	15,67			
22		20,30	15,74	20,26	16,95	UN (drobljenec)
		19,39	17,08	20,31	15,49	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
23		20,31	15,49	23,30	15,74	KVB 
		20,30	15,74			
24		20,31	15,49	19,39	17,08	[2] Si (s peskom) 
		0,00	20,19	0,00	18,38	
		26,02	14,22	26,06	14,21	
		26,06	15,47	26,06	15,67	
		25,73	15,67	25,05	15,67	
		23,30	15,74			
25		26,06	16,04	55,00	11,40	[1] ClGr / SiGr 
		55,00	12,88	52,87	14,01	
		47,80	14,62	43,06	15,19	
		40,40	15,63	38,11	16,33	
		35,15	17,09	33,95	16,14	
		26,06	16,16			
26		26,06	15,90	26,06	15,67	[2] Si (s peskom) 
		26,06	15,47	26,06	14,21	
		55,00	9,58	55,00	11,40	
		26,06	16,04			
27		26,06	14,21	26,02	14,22	[4] podlaga 
		0,00	18,38	0,00	-0,42	
		55,00	-0,42	55,00	9,58	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]			
		x	z	x	z
1099981523		0,00	18,66	55,00	9,81

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 2 - predvideno stanje)**Analysis 1 (stage 2)****Circular slip surface**

Slip surface parameters					
Center :	x =	23,33 [m]	Angles :	α_1 =	-88,85 [°]
	z =	25,31 [m]		α_2 =	34,91 [°]
Radius :	R =	10,26 [m]			
The slip surface after optimization.					

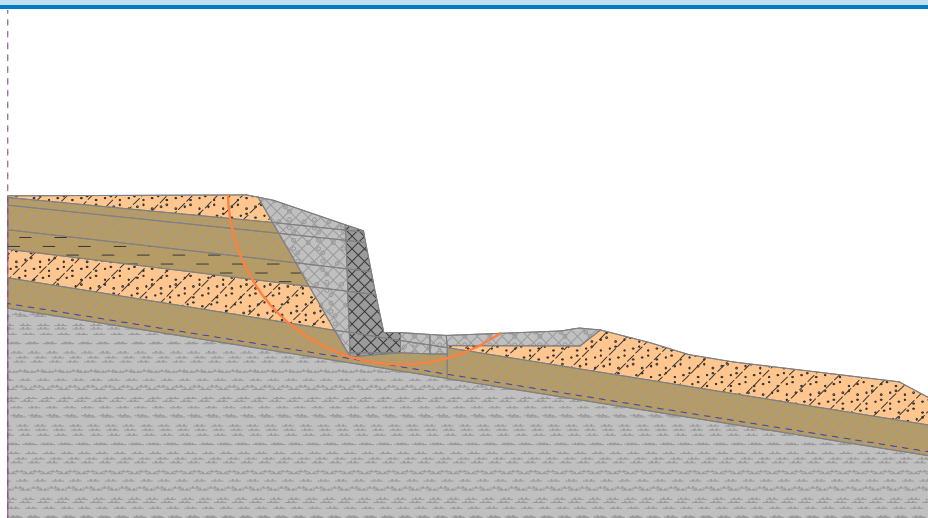
Total weight of soil above the slip surface: 1333,12 kN/m

Slope stability verification (Morgenstern-Price)

Utilization : 89,6 %

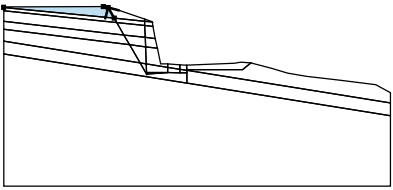
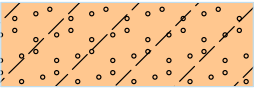
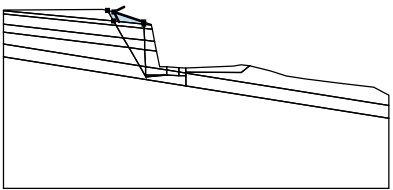
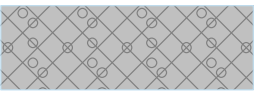
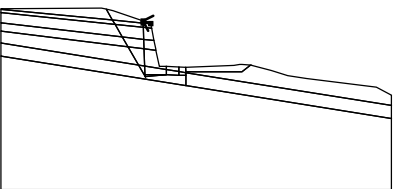
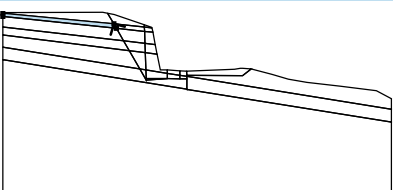
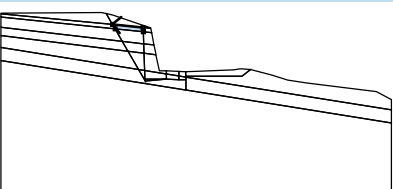
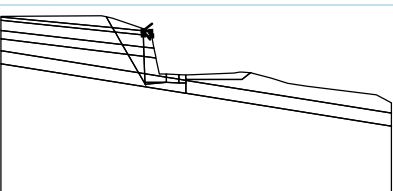
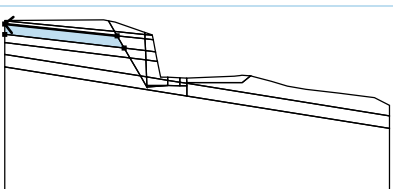
Slope stability ACCEPTABLE

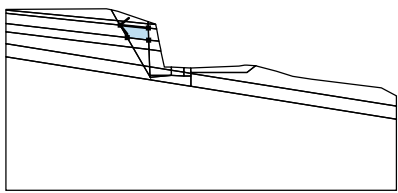
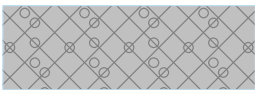
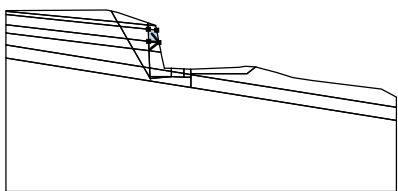
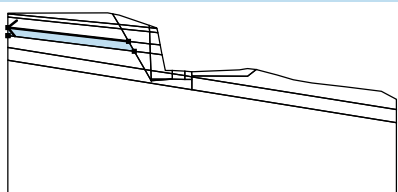
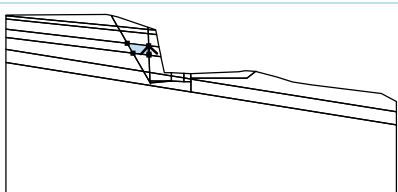
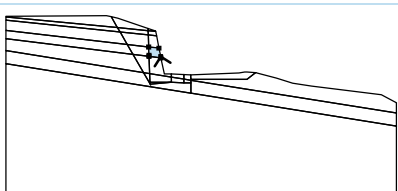
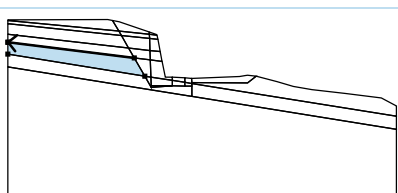
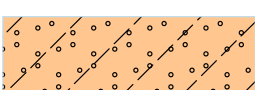
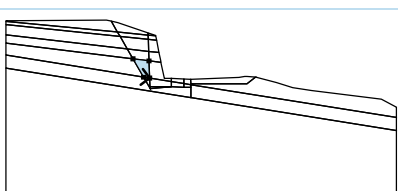
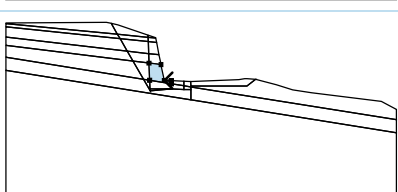
Name : predvideno stanje (nizek vodostaj)	Stage - analysis : 2 - 1
Description : Predvidena konstrukcija z enakimi materialnimi karakteristikami zalednih zemljin; zadostna varnost po PP3.	

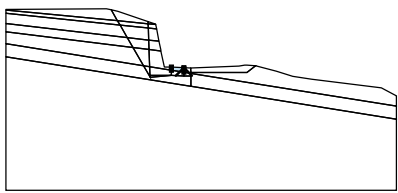
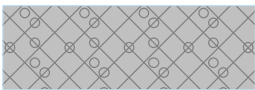
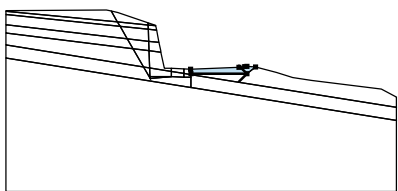
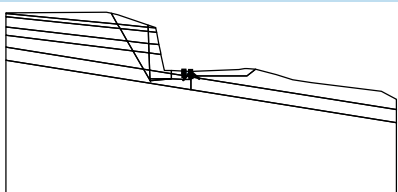
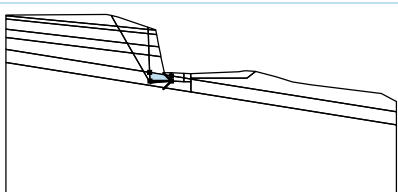
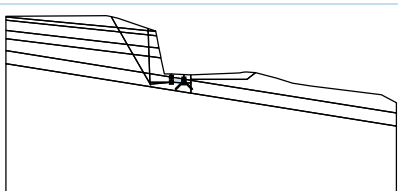
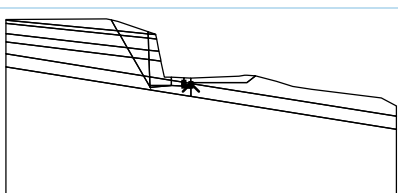
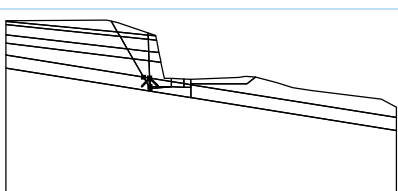
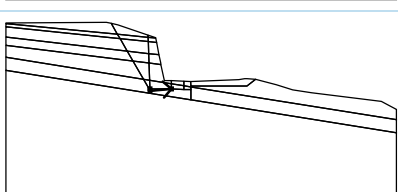


Input data (Construction stage 3 - predvideno stanje (višji vodostaj))

Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		15,71	23,47	14,84	24,97	[1] CIGr / SiGr 
		14,16	25,11	0,00	25,04	
		0,00	24,95			
2		20,02	23,34	15,77	24,77	UN (drobljenec) 
		14,84	24,97	15,71	23,47	
		20,03	23,02			
3		21,09	22,98	20,02	23,34	KVB 
		20,03	23,02	21,11	22,90	
4		16,08	22,82	15,71	23,47	[2] Si (s peskom) 
		0,00	24,95	0,00	24,50	
5		20,03	23,02	15,71	23,47	UN (drobljenec) 
		16,08	22,82	20,06	22,41	
6		21,11	22,90	20,03	23,02	KVB 
		20,06	22,41	21,23	22,28	
7		16,08	22,82	0,00	24,50	[2] Si (s peskom) 
		0,00	23,03	17,08	21,07	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
8		20,06	22,41	16,08	22,82	UN (drobljenec) 
		17,08	21,07	20,12	20,72	
9		20,12	20,72	21,56	20,55	KVB 
		21,23	22,28	20,06	22,41	
10		17,08	21,07	0,00	23,03	[3] CIL/CIM 
		0,00	21,88	0,05	21,87	
		17,89	19,67			
11		20,16	19,55	20,12	20,72	UN (drobljenec) 
		17,08	21,07	17,89	19,67	
		20,16	19,38			
12		21,84	19,18	21,80	19,35	KVB 
		21,56	20,55	20,12	20,72	
		20,16	19,55	20,16	19,38	
13		17,89	19,67	0,05	21,87	[1] ClGr / SiGr 
		0,00	21,88	0,00	20,19	
		19,39	17,08			
14		19,39	17,08	20,26	16,95	UN (drobljenec) 
		20,16	19,38	17,89	19,67	
15		23,30	16,94	22,30	16,94	KVB 
		21,84	19,18	20,16	19,38	
		20,26	16,95	23,30	16,47	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
16		25,05	16,71	25,05	16,83	UN (drobljenec) 
		23,30	16,94	23,30	16,47	
		25,05	16,20			
17		26,06	16,16	33,95	16,14	UN (drobljenec) 
		35,15	17,09	33,93	17,20	
		33,61	17,17	32,82	17,04	
		26,01	16,77			
18		26,06	16,16	26,01	16,77	UN (drobljenec) 
		25,05	16,83	25,05	16,71	
		25,05	16,20	26,06	16,04	
19		20,30	15,74	23,30	15,74	KVB 
		23,30	16,47	20,26	16,95	
20		25,05	15,67	25,05	15,94	UN (drobljenec) 
		25,05	16,20	23,30	16,47	
		23,30	15,74			
21		26,06	15,90	26,06	16,04	UN (drobljenec) 
		25,05	16,20	25,05	15,94	
		25,05	15,67	25,73	15,67	
		26,06	15,67			
22		20,30	15,74	20,26	16,95	UN (drobljenec) 
		19,39	17,08	20,31	15,49	
23		20,31	15,49	23,30	15,74	KVB 
		20,30	15,74			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
24		20,31	15,49	19,39	17,08	[2] Si (s peskom)
		0,00	20,19	0,00	18,38	
		26,02	14,22	26,06	14,21	
		26,06	15,47	26,06	15,67	
		25,73	15,67	25,05	15,67	
		23,30	15,74			
25		26,06	16,04	55,00	11,40	[1] ClGr / SiGr
		55,00	12,88	52,87	14,01	
		47,80	14,62	43,06	15,19	
		40,40	15,63	38,11	16,33	
		35,15	17,09	33,95	16,14	
		26,06	16,16			
26		26,06	15,90	26,06	15,67	[2] Si (s peskom)
		26,06	15,47	26,06	14,21	
		55,00	9,58	55,00	11,40	
		26,06	16,04			
27		26,06	14,21	26,02	14,22	[4] podlaga
		0,00	18,38	0,00	-0,42	
		55,00	-0,42	55,00	9,58	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	20,72	19,93	17,52	20,22	16,30
		55,00	10,60				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 3 - predvideno stanje (višji vodostaj))

Analysis 1 (stage 3)

Circular slip surface

Slip surface parameters							
Center :	x =	23,50	[m]	Angles :	α_1 =	-89,19	[°]
	z =	25,25	[m]		α_2 =	35,60	[°]
Radius :	R =	10,26	[m]				
The slip surface after optimization.							

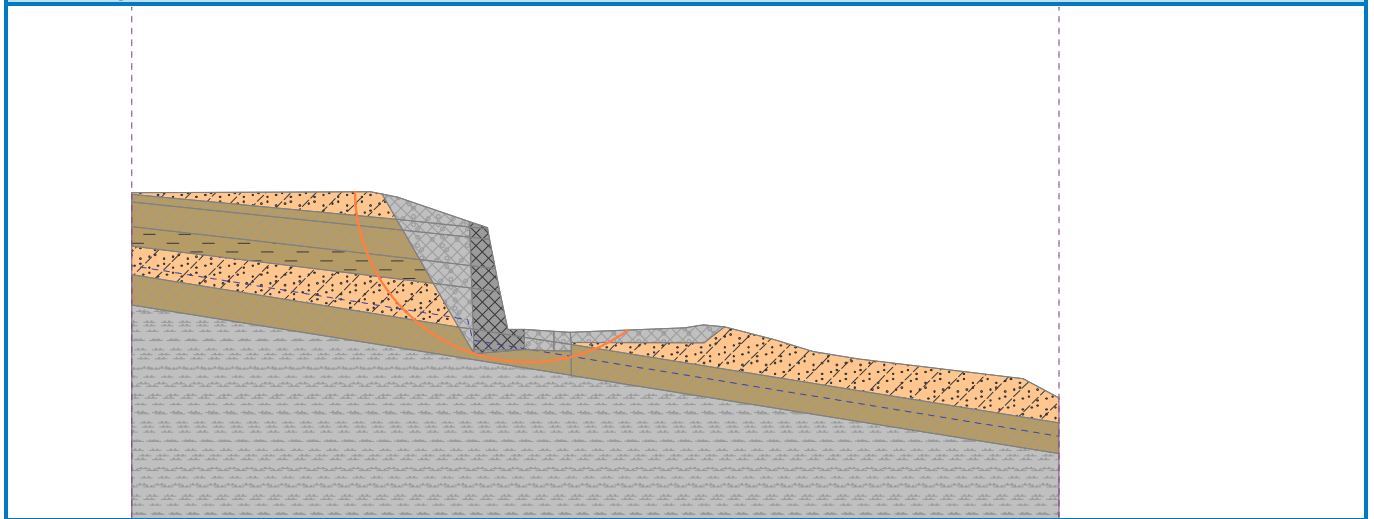
Total weight of soil above the slip surface: 1328,38 kN/m

Slope stability verification (Morgenstern-Price)

Utilization : 95,4 %

Slope stability ACCEPTABLE

Name : predvideno stanje (višji vodostaj)	Stage - analysis : 3 - 1
Description : Predvidena konstrukcija z enakimi materialnimi karakteristikami zalednih zemljin; zadostna varnost po PP3.	



Slope stability analysis

Input data (Construction stage 1 - obstoječe stanje)

Project

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija
 Description : Globalna stabilnost v profilu 90
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Stability analysis

Verification methodology : according to EN 1997

Earthquake analysis : Standard

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 :	$\gamma_G =$	1,35 [-]	1,00 [-]	1,00 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]	1,30 [-]	0,00 [-]
Water load :	$\gamma_w =$			1,00 [-]	

Partial factors for soil parameters (M)		
Permanent design situation		
Partial factor on internal friction :	$\gamma_\phi =$	1,25 [-]
Partial factor on effective cohesion :	$\gamma_c =$	1,25 [-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1,40 [-]

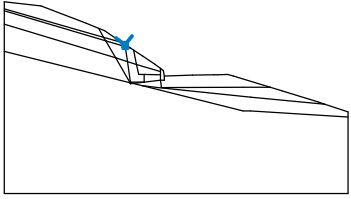
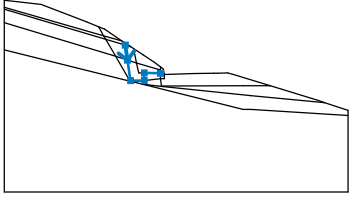
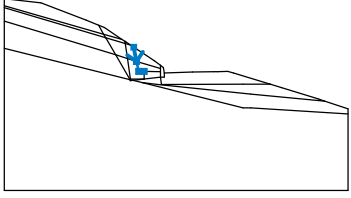
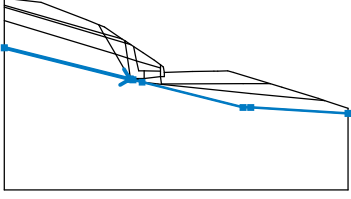
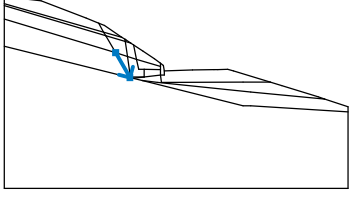
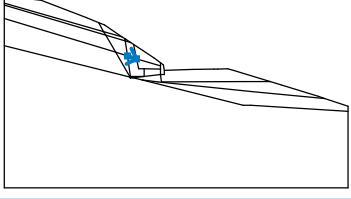
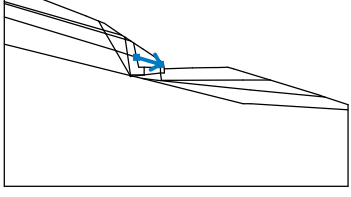
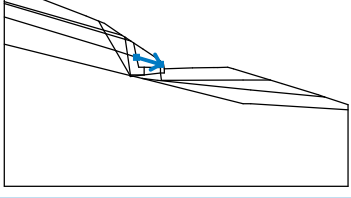
Anchors

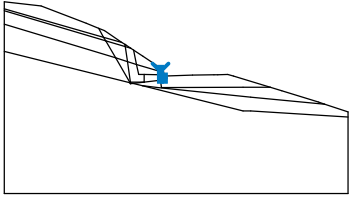
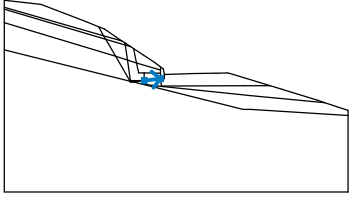
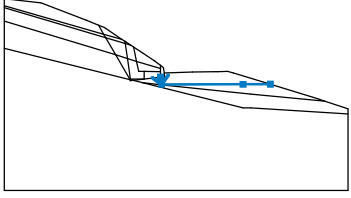
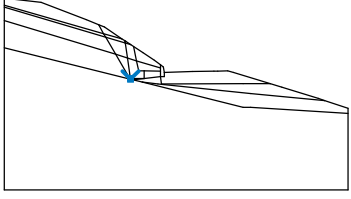
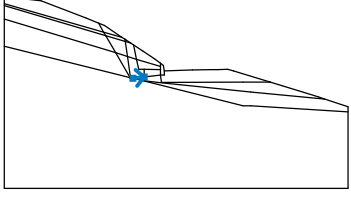
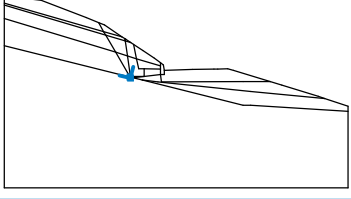
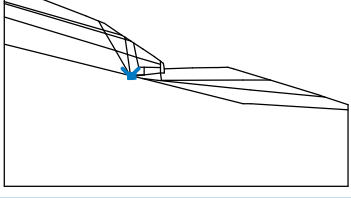
Verification methodology : Limit states (LSD)

Reduction coefficients		
Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]
Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35 [-]
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35 [-]

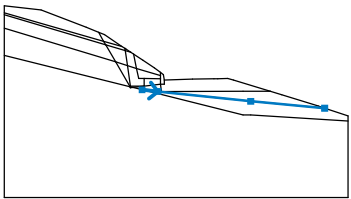
Interface

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	21,47	4,81	20,92	10,71	18,65
		12,35	17,99	13,11	17,69	15,40	16,16
		15,79	15,91	15,91	15,83	16,56	15,40
		16,95	15,13	18,15	14,34	19,65	13,34
		20,45	12,76	20,82	12,48	20,97	11,77
		24,65	11,86	27,46	11,92	27,94	11,94
		29,25	11,96	30,00	11,76	34,83	10,30
		36,32	9,84	41,11	8,34	41,93	8,07
		45,00	7,07				
2		0,00	20,53	13,01	16,84	15,40	16,16
3		0,00	20,30	13,28	16,37	15,84	15,61
		16,56	15,40				
4		0,00	18,53	14,57	14,13	16,14	13,65
5		12,35	17,99	13,01	16,84		
6		13,01	16,84	13,28	16,37		
7		13,28	16,37	14,57	14,13		

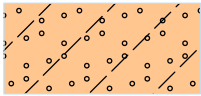
Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
8		15,79	15,91	15,80	15,83	15,84	15,61
9		15,84	15,61	16,14	13,65	16,53	10,95
		18,33	10,95	18,33	11,95	20,45	11,90
10		16,95	15,13	17,32	13,27	17,58	11,95
		18,33	11,95				
11		0,00	14,99	16,45	10,88	16,53	10,86
		16,85	10,78	18,04	10,48	31,25	7,17
12		32,25	7,17	45,00	6,38		
13		14,57	14,13	16,45	10,88		
14		16,14	13,65	17,32	13,27		
14		17,32	13,27	20,45	12,33		

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
15		20,45	12,76	20,45	12,33	20,45	11,90
		20,45	11,20	20,96	11,20	20,97	11,77
16		18,33	10,95	20,45	11,20		
17		20,45	11,20	20,59	10,26	31,25	10,27
		34,83	10,30				
18		16,53	10,95	16,53	10,86		
19		16,85	10,78	18,33	10,95		
20		16,45	10,88	16,53	10,75		
21		16,53	10,86	16,53	10,75	16,85	10,78

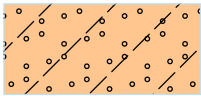
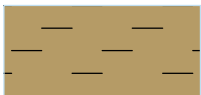
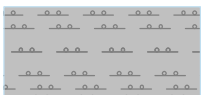
Tempos	Dolenja vas - kolesarska steza Oporna konstrukcija
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Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
22		18,04	10,48	20,11	10,26	32,25	8,97
		41,93	8,07				

Soil parameters - effective stress state

Number	Pattern	Soil name	Y [kN/m ³]	Φ _{ef} [°]	C _{ef} [kPa]
1		[1] CIGr / SiGr	19,00	30,00	1,00
2		[2] Si (s peskom)	18,50	28,00	2,00
3		[3] CIL/CIM	19,50	26,50	2,50
4		[4] podlaga	21,00	32,00	25,00
5		UN (drobljenec)	20,00	36,00	0,00

Soil parameters - uplift

Number	Pattern	Soil name	Y _{sat} [kN/m ³]	Y _s [kN/m ³]	n [-]
1		[1] CIGr / SiGr	19,50		
2		[2] Si (s peskom)	19,00		
3		[3] CIL/CIM	20,00		
4		[4] podlaga	21,50		
5		UN (drobljenec)	20,50		

Soil parameters**[1] CIGr / SiGr**Basic data

Unit weight : $\gamma = 19,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 30,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 1,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :

**[2] Si (s peskom)**Basic data

Unit weight : $\gamma = 18,50 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 28,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 19,00 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :

**[3] CIL/CIM**Basic data

Unit weight : $\gamma = 19,50 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{\text{ef}} = 26,50 \text{ [}^\circ\text{]}$
 Cohesion : $c_{\text{ef}} = 2,50 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{\text{sat}} = 20,00 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :



[4] podlaga

Basic data

Unit weight : $\gamma = 21,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{ef} = 32,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 25,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 21,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

Sample :



UN (drobljenec)

Basic data

Unit weight : $\gamma = 20,00 \text{ [kN/m}^3\text{]}$
 Shear strength : Mohr-Coulomb
 Stress-state : effective
 Internal friction angle : $\varphi_{ef} = 36,00 \text{ [}^\circ\text{]}$
 Cohesion : $c_{ef} = 0,00 \text{ [kPa]}$

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 20,50 \text{ [kN/m}^3\text{]}$

Foliation

Soil foliation : not consider

View

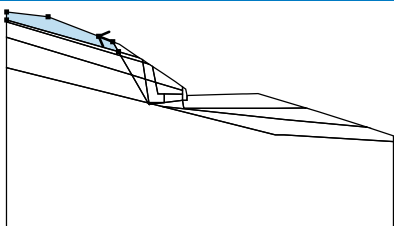
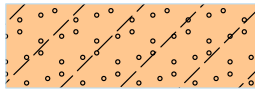
Sample :



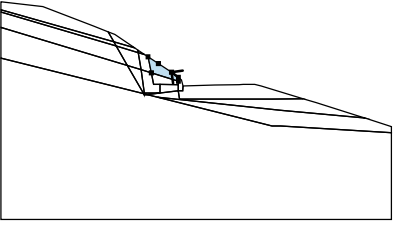
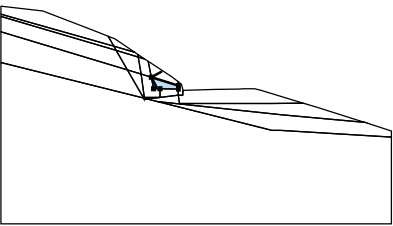
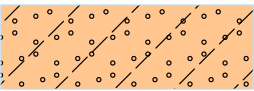
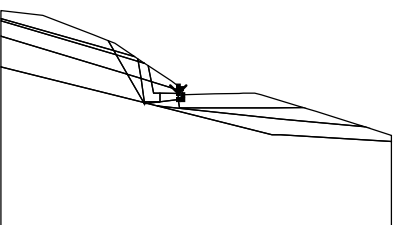
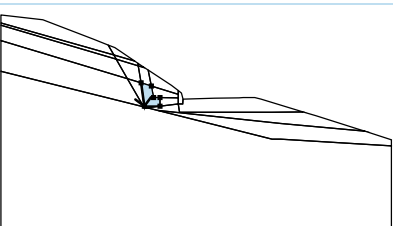
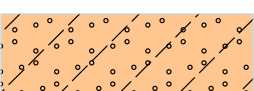
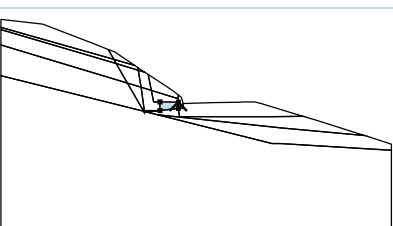
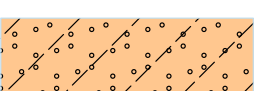
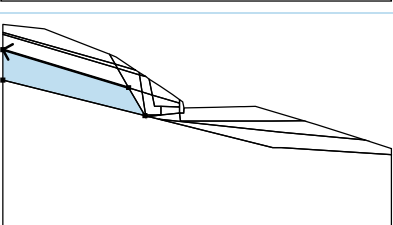
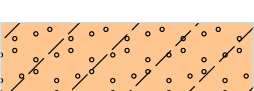
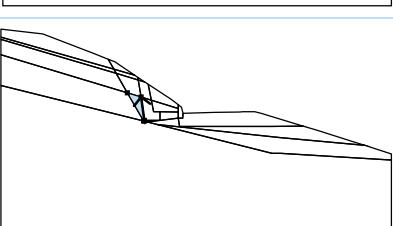
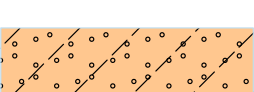
Rigid Bodies

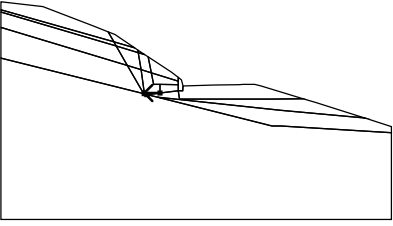
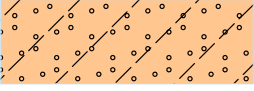
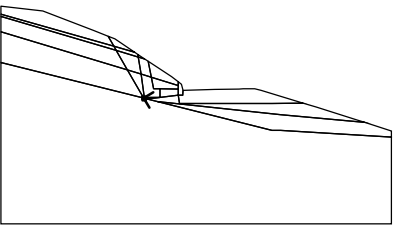
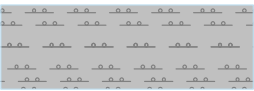
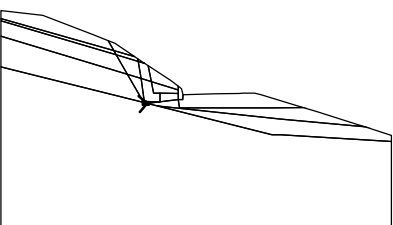
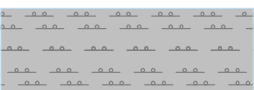
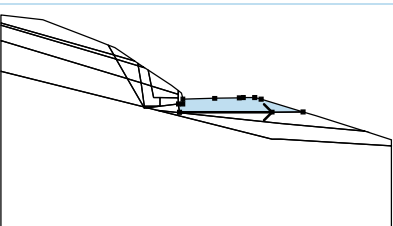
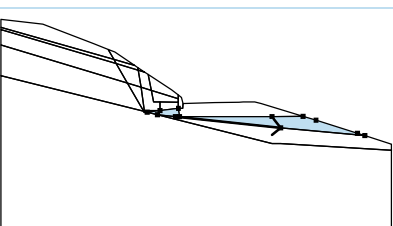
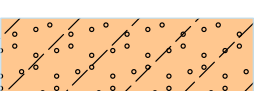
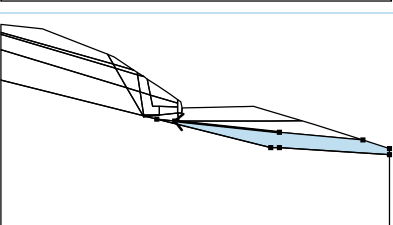
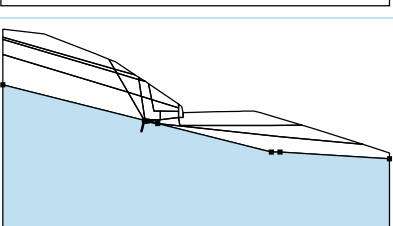
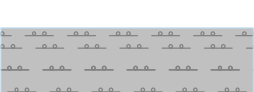
Number	Sample	Soil name	γ [kN/m ³]
1		KVB	24,00

Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		12,35	17,99	10,71	18,65	[1] ClGr / SiGr 
		4,81	20,92	0,00	21,47	
		0,00	20,53	13,01	16,84	

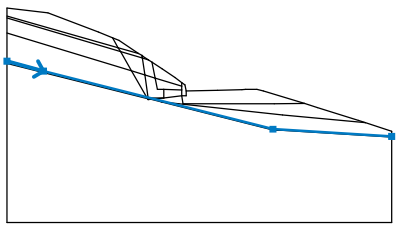
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		13,01	16,84	0,00	20,53	[2] Si (s peskom)
		0,00	20,30	13,28	16,37	
3		13,01	16,84	15,40	16,16	[1] ClGr / SiGr
		13,11	17,69	12,35	17,99	
4		15,80	15,83	15,79	15,91	[2] Si (s peskom)
		15,40	16,16	13,01	16,84	
		13,28	16,37	15,84	15,61	
5		15,80	15,83	15,84	15,61	[2] Si (s peskom)
		16,56	15,40	15,91	15,83	
		15,79	15,91			
6		13,28	16,37	0,00	20,30	[3] CIL/CIM
		0,00	18,53	14,57	14,13	
7		15,84	15,61	13,28	16,37	[3] CIL/CIM
		14,57	14,13	16,14	13,65	
8		17,32	13,27	16,95	15,13	[3] CIL/CIM
		16,56	15,40	15,84	15,61	
		16,14	13,65			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
9		20,45	12,76	19,65	13,34	[3] CIL/CIM 
		18,15	14,34	16,95	15,13	
		17,32	13,27	20,45	12,33	
10		20,45	12,33	17,32	13,27	[1] ClGr / SiGr 
		17,58	11,95	18,33	11,95	
		20,45	11,90			
11		20,45	12,33	20,45	11,90	KVB 
		20,45	11,20	20,96	11,20	
		20,97	11,77	20,82	12,48	
		20,45	12,76			
12		16,14	13,65	16,53	10,95	[1] ClGr / SiGr 
		18,33	10,95	18,33	11,95	
		17,58	11,95	17,32	13,27	
13		20,45	11,20	20,45	11,90	[1] ClGr / SiGr 
		18,33	11,95	18,33	10,95	
14		14,57	14,13	0,00	18,53	[1] ClGr / SiGr 
		0,00	14,99	16,45	10,88	
15		16,53	10,95	16,14	13,65	[1] ClGr / SiGr 
		14,57	14,13	16,45	10,88	
		16,53	10,86			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
16		18,33	10,95	16,53	10,95	[1] CIGr / SiGr 
		16,53	10,86	16,85	10,78	
17		16,53	10,86	16,45	10,88	[4] podlaga 
		16,53	10,75			
18		16,53	10,75	16,85	10,78	[4] podlaga 
		16,53	10,86			
19		20,59	10,26	31,25	10,27	UN (drobljenec) 
		34,83	10,30	30,00	11,76	
		29,25	11,96	27,94	11,94	
		27,46	11,92	24,65	11,86	
		20,97	11,77	20,96	11,20	
		20,45	11,20			
20		20,11	10,26	32,25	8,97	[1] CIGr / SiGr 
		41,93	8,07	41,11	8,34	
		36,32	9,84	34,83	10,30	
		31,25	10,27	20,59	10,26	
		20,45	11,20	18,33	10,95	
		16,85	10,78	18,04	10,48	
21		32,25	8,97	20,11	10,26	[2] Si (s peskom) 
		18,04	10,48	31,25	7,17	
		32,25	7,17	45,00	6,38	
		45,00	7,07	41,93	8,07	
22		16,53	10,75	16,45	10,88	[4] podlaga 
		0,00	14,99	0,00	-3,62	
		45,00	-3,62	45,00	6,38	
		32,25	7,17	31,25	7,17	
		18,04	10,48	16,85	10,78	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	15,24	4,28	14,09	31,12	7,30
		45,00	6,46				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 1 - obstoječe stanje)**Analysis 1 (stage 1)****Circular slip surface**

Slip surface parameters					
Center :	x =	23,67 [m]	Angles :	$\alpha_1 =$	-47,51 [°]
	z =	38,45 [m]		$\alpha_2 =$	-7,07 [°]
Radius :	R =	25,91 [m]			
The slip surface after optimization.					

Total weight of soil above the slip surface: 553,37 kN/m

Slope stability verification (Morgenstern-Price)

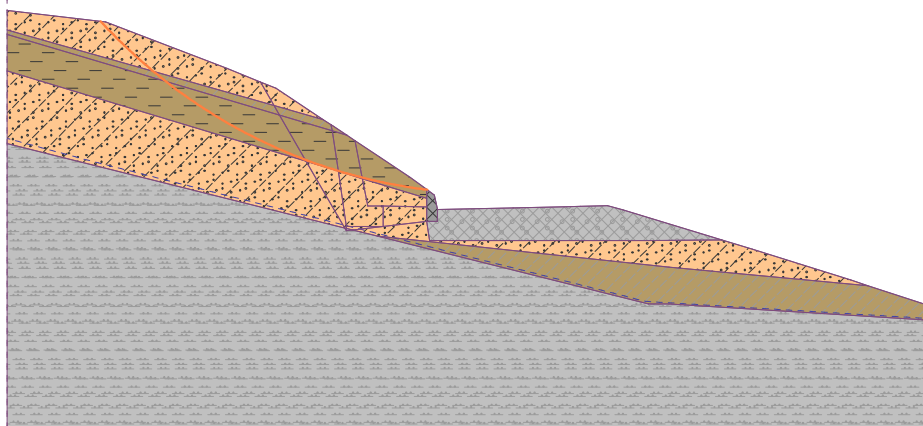
Utilization : 102,0 %

Slope stability NOT ACCEPTABLE

Name : obstoječe stanje

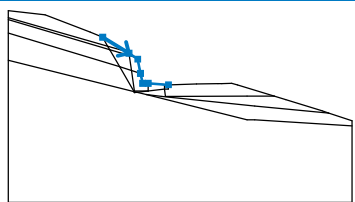
Stage - analysis : 1 - 1

Description : Slika prikazuje kritično drsino za privzete materialne karakteristike zalednih zemljin. Po EC-7 (PP3) obstoječa konstrukcija/brežina ne izpolnjuje zadostne varnost

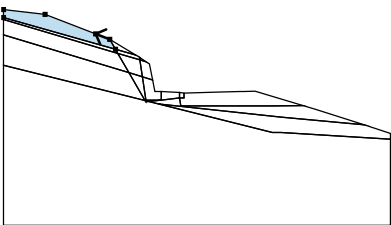
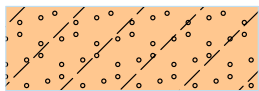
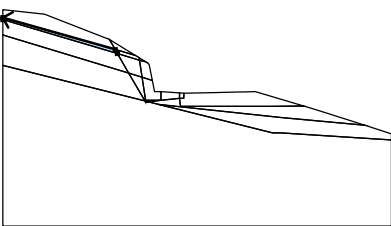
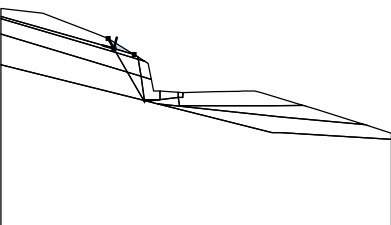
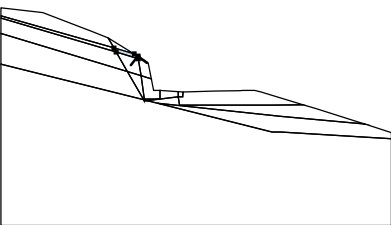
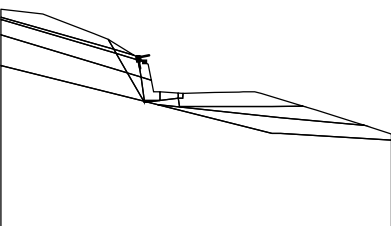


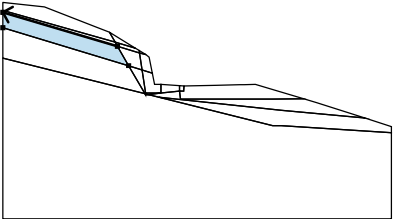
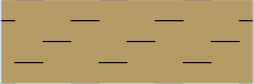
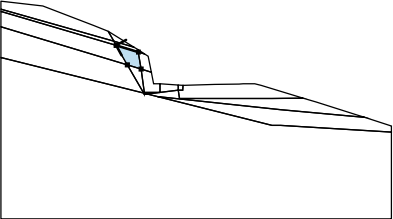
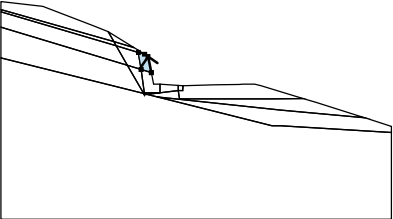
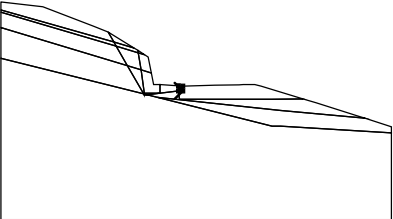
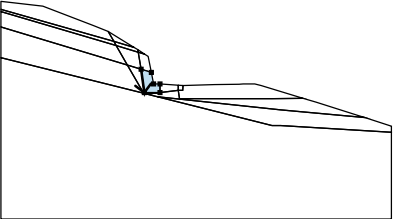
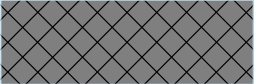
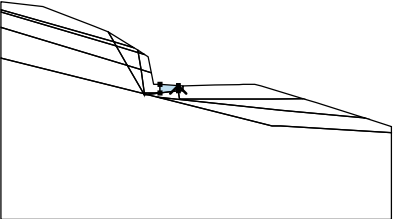
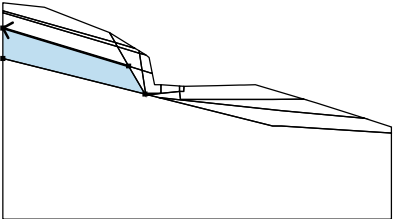
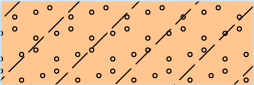
Input data (Construction stage 2 - predvideno stanje)

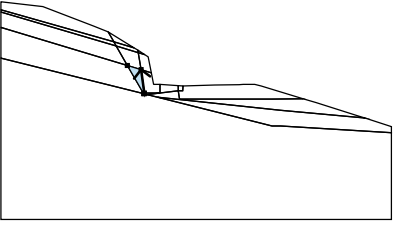
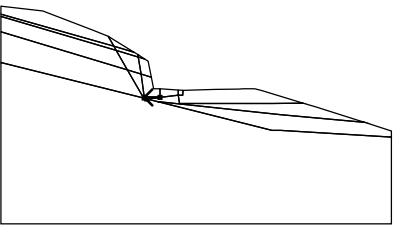
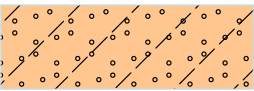
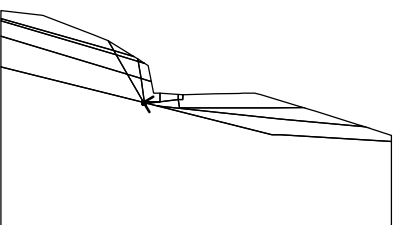
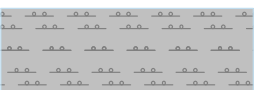
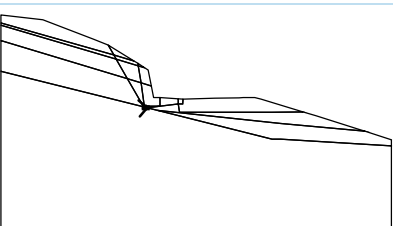
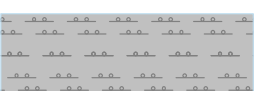
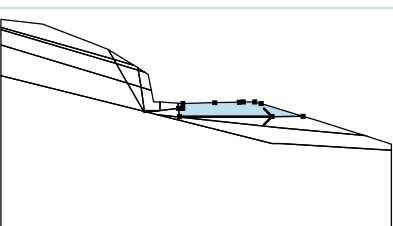
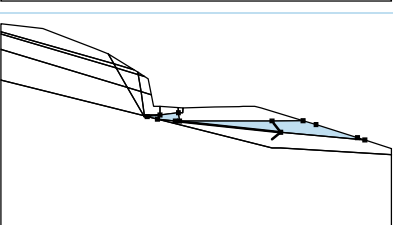
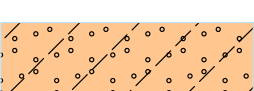
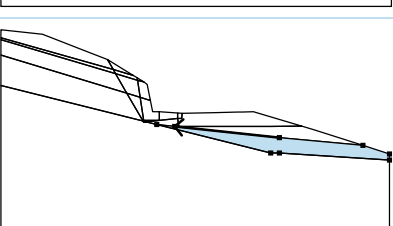
Earth cut

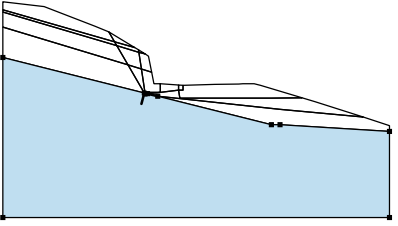
Number	Cut location	Coordinates of cut points [m]					
		x	z	x	z	x	z
1		12,35	17,99	15,79	15,91	16,95	15,13
		17,32	13,27	17,58	11,95	18,33	11,95
		20,97	11,77				

Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		12,35	17,99	10,71	18,65	[1] ClGr / SiGr 
		4,81	20,92	0,00	21,47	
		0,00	20,53	13,01	16,84	
2		13,01	16,84	0,00	20,53	[2] Si (s peskom) 
		0,00	20,30	13,28	16,37	
3		12,35	17,99	13,01	16,84	UN (drobljenec) 
		15,36	16,17			
4		15,80	15,83	15,79	15,91	UN (drobljenec) 
		15,36	16,17	13,01	16,84	
		13,28	16,37	15,84	15,61	
5		15,91	15,83	15,79	15,91	KVB 
		15,80	15,83	15,84	15,61	
		16,56	15,40			

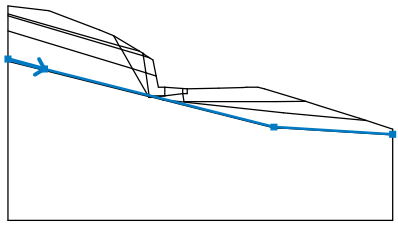
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
6		13,28	16,37	0,00	20,30	[3] CIL/CIM 
		0,00	18,53	14,57	14,13	
7		15,84	15,61	13,28	16,37	UN (drobljenec) 
		14,57	14,13	16,14	13,65	
8		17,32	13,27	16,95	15,13	KVB 
		16,56	15,40	15,84	15,61	
		16,14	13,65			
9		20,45	11,20	20,96	11,20	UN (drobljenec) 
		20,97	11,77	20,45	11,81	
10		16,14	13,65	16,53	10,95	KVB 
		18,33	10,95	18,33	11,95	
		17,58	11,95	17,32	13,27	
11		20,45	11,20	20,45	11,81	UN (drobljenec) 
		18,33	11,95	18,33	10,95	
12		14,57	14,13	0,00	18,53	[1] ClGr / SiGr 
		0,00	14,99	16,45	10,88	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
13		16,53	10,95	16,14	13,65	UN (drobljenec) 
		14,57	14,13	16,45	10,88	
		16,53	10,86			
14		18,33	10,95	16,53	10,95	[1] ClGr / SiGr 
		16,53	10,86	16,85	10,78	
15		16,53	10,86	16,45	10,88	[4] podlaga 
		16,53	10,75			
16		16,53	10,75	16,85	10,78	[4] podlaga 
		16,53	10,86			
17		20,59	10,26	31,25	10,27	UN (drobljenec) 
		34,83	10,30	30,00	11,76	
		29,25	11,96	27,94	11,94	
		27,46	11,92	24,65	11,86	
		20,97	11,77	20,96	11,20	
		20,45	11,20			
18		20,11	10,26	32,25	8,97	[1] ClGr / SiGr 
		41,93	8,07	41,11	8,34	
		36,32	9,84	34,83	10,30	
		31,25	10,27	20,59	10,26	
		20,45	11,20	18,33	10,95	
		16,85	10,78	18,04	10,48	
19		32,25	8,97	20,11	10,26	[2] Si (s peskom) 
		18,04	10,48	31,25	7,17	
		32,25	7,17	45,00	6,38	
		45,00	7,07	41,93	8,07	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
20		16,53	10,75	16,45	10,88	[4] podlaga
		0,00	14,99	0,00	-3,62	
		45,00	-3,62	45,00	6,38	
		32,25	7,17	31,25	7,17	
		18,04	10,48	16,85	10,78	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	15,24	4,28	14,09	31,12	7,30
		45,00	6,46				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 2 - predvideno stanje)

Analysis 1 (stage 2)

Circular slip surface

Slip surface parameters					
Center :	x =	18,15 [m]	Angles :	$\alpha_1 =$	-82,18 [°]
	z =	21,12 [m]		$\alpha_2 =$	25,44 [°]
Radius :	R =	10,31 [m]			
The slip surface after optimization.					

Total weight of soil above the slip surface: 906,31 kN/m

Slope stability verification (Morgenstern-Price)

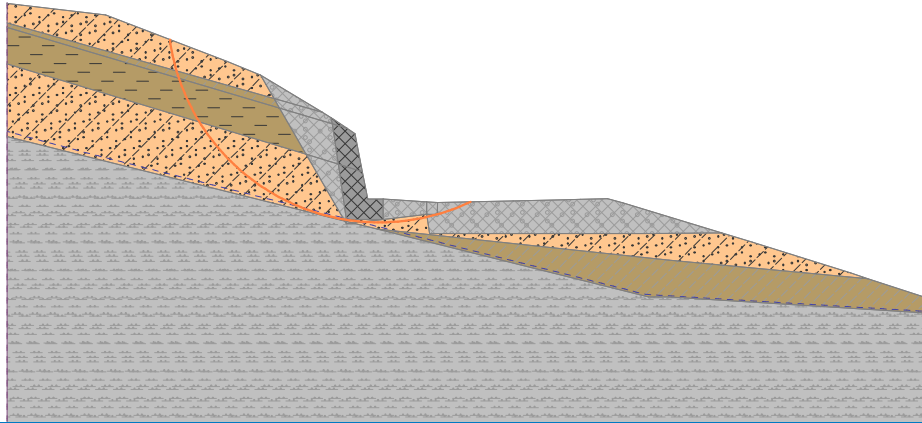
Utilization : 91,0 %

Slope stability ACCEPTABLE

Name : predvideno stanje (nizek vodostaj)

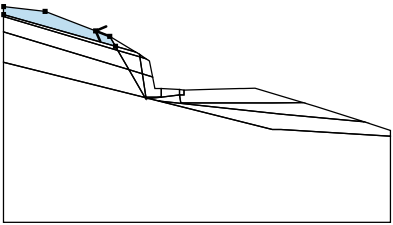
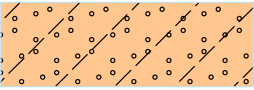
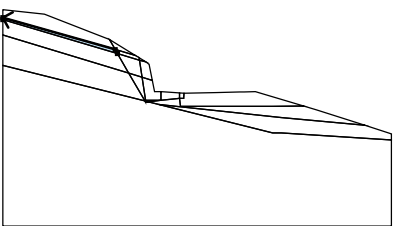
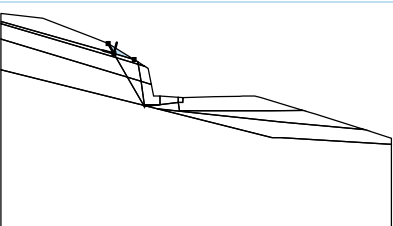
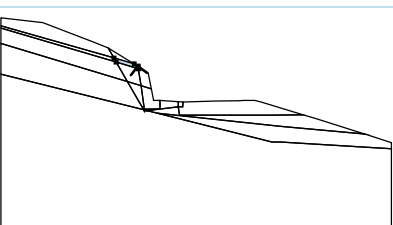
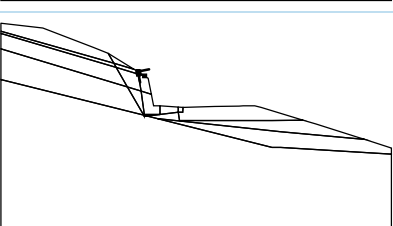
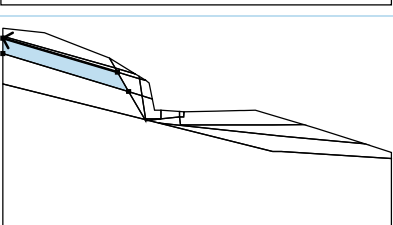
Stage - analysis : 2 - 1

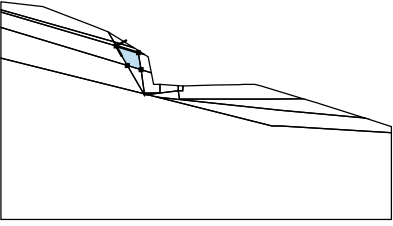
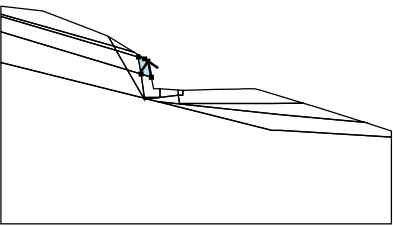
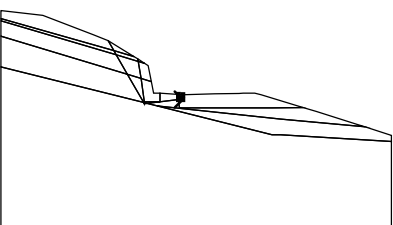
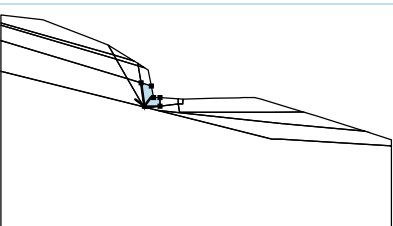
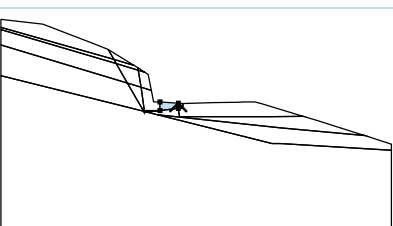
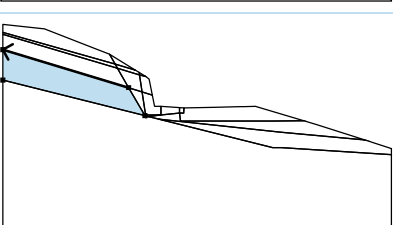
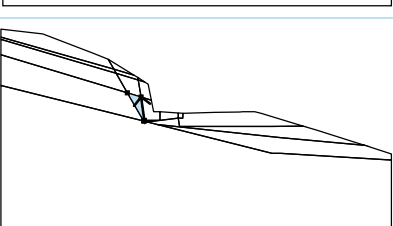
Description : Predvidena konstrukcija z enakimi materialnimi karakteristikami zalednih zemljin; zadostna varnost po PP3.

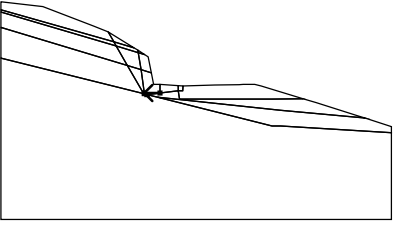
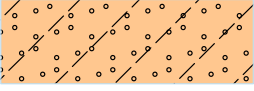
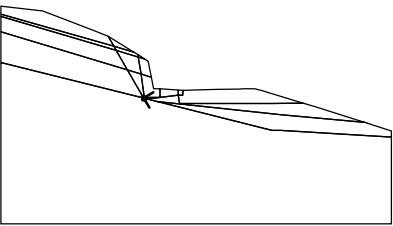
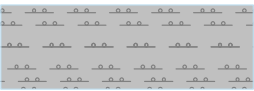
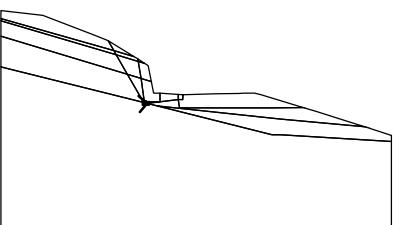
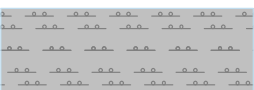
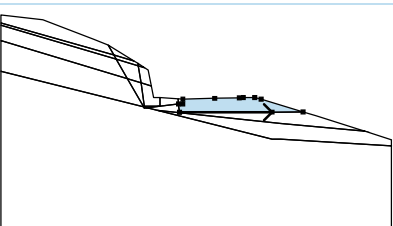
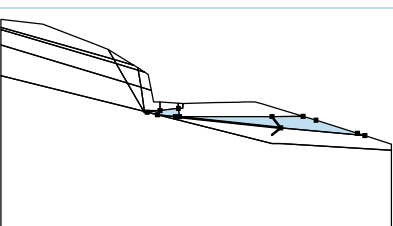
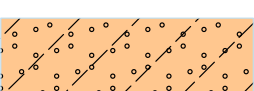
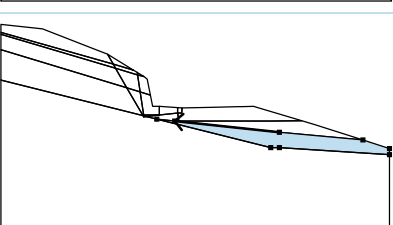
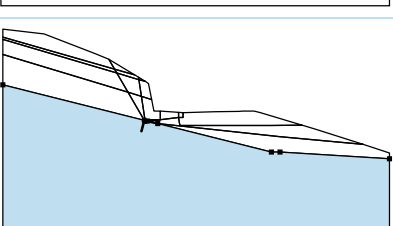
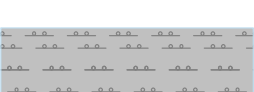


Input data (Construction stage 3 - predvideno stanje (višji vodostaj))

Assigning and surfaces

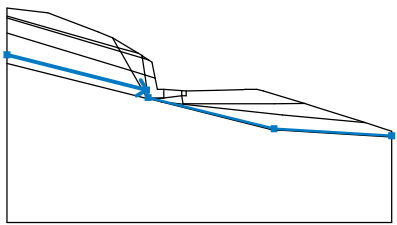
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		12,35	17,99	10,71	18,65	[1] ClGr / SiGr 
		4,81	20,92	0,00	21,47	
		0,00	20,53	13,01	16,84	
2		13,01	16,84	0,00	20,53	[2] Si (s peskom) 
		0,00	20,30	13,28	16,37	
3		12,35	17,99	13,01	16,84	UN (drobljenec) 
		15,36	16,17			
4		15,80	15,83	15,79	15,91	UN (drobljenec) 
		15,36	16,17	13,01	16,84	
		13,28	16,37	15,84	15,61	
5		15,91	15,83	15,79	15,91	KVB 
		15,80	15,83	15,84	15,61	
		16,56	15,40			
6		13,28	16,37	0,00	20,30	[3] CIL/CIM 
		0,00	18,53	14,57	14,13	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
7		15,84	15,61	13,28	16,37	UN (drobljenec)
		14,57	14,13	16,14	13,65	
8		17,32	13,27	16,95	15,13	KVB
		16,56	15,40	15,84	15,61	
		16,14	13,65			
9		20,45	11,20	20,96	11,20	UN (drobljenec)
		20,97	11,77	20,45	11,81	
10		16,14	13,65	16,53	10,95	KVB
		18,33	10,95	18,33	11,95	
		17,58	11,95	17,32	13,27	
11		20,45	11,20	20,45	11,81	UN (drobljenec)
		18,33	11,95	18,33	10,95	
12		14,57	14,13	0,00	18,53	[1] ClGr / SiGr
		0,00	14,99	16,45	10,88	
13		16,53	10,95	16,14	13,65	UN (drobljenec)
		14,57	14,13	16,45	10,88	
		16,53	10,86			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
14		18,33	10,95	16,53	10,95	[1] CIGr / SiGr 
		16,53	10,86	16,85	10,78	
15		16,53	10,86	16,45	10,88	[4] podlaga 
		16,53	10,75			
16		16,53	10,75	16,85	10,78	[4] podlaga 
		16,53	10,86			
17		20,59	10,26	31,25	10,27	UN (drobljenec) 
		34,83	10,30	30,00	11,76	
		29,25	11,96	27,94	11,94	
		27,46	11,92	24,65	11,86	
		20,97	11,77	20,96	11,20	
		20,45	11,20			
18		20,11	10,26	32,25	8,97	[1] CIGr / SiGr 
		41,93	8,07	41,11	8,34	
		36,32	9,84	34,83	10,30	
		31,25	10,27	20,59	10,26	
		20,45	11,20	18,33	10,95	
		16,85	10,78	18,04	10,48	
19		32,25	8,97	20,11	10,26	[2] Si (s peskom) 
		18,04	10,48	31,25	7,17	
		32,25	7,17	45,00	6,38	
		45,00	7,07	41,93	8,07	
20		16,53	10,75	16,45	10,88	[4] podlaga 
		0,00	14,99	0,00	-3,62	
		45,00	-3,62	45,00	6,38	
		32,25	7,17	31,25	7,17	
		18,04	10,48	16,85	10,78	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	15,99	16,32	11,89	16,52	11,00
		31,24	7,35	45,00	6,52		

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 3 - predvideno stanje (višji vodostaj))**Analysis 1 (stage 3)****Circular slip surface**

Slip surface parameters					
Center :	x =	18,45 [m]	Angles :	α_1 =	-83,99 [°]
	z =	20,35 [m]		α_2 =	27,26 [°]
Radius :	R =	9,60 [m]			
The slip surface after optimization.					

Total weight of soil above the slip surface: 815,57 kN/m

The restrictions of points of circular slip surface

Minimal weight of soil above the slip surface. = 500,00 kN/m

Slope stability verification (Morgenstern-Price)

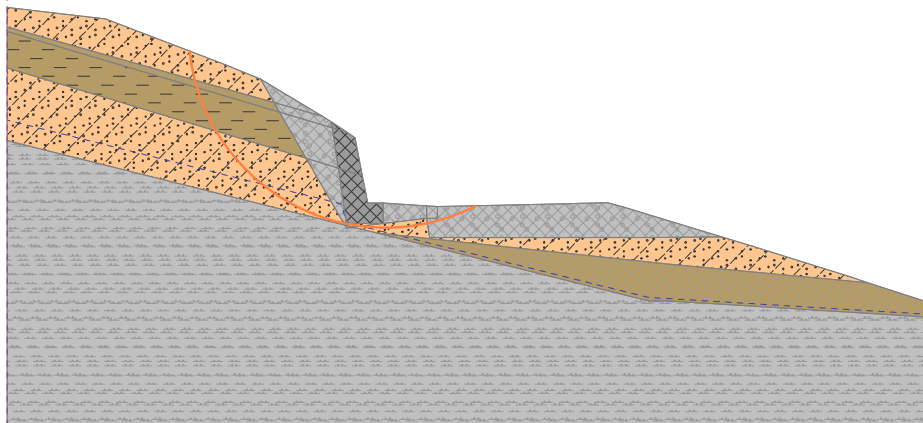
Utilization : 94,0 %

Slope stability ACCEPTABLE

Name : predvideno stanje (višji vodostaj)

Stage - analysis : 3 - 1

Description : Predvidena konstrukcija z enakimi materialnimi karakteristikami zalednih zemljin; zadostna varnost po PP3.



Slope stability analysis

Input data (Construction stage 1 - obstoječe stanje (nedrenirano))

Project

Project : Dolenja vas - kolesarska steza
 Part : Oporna konstrukcija
 Description : Globalna stabilnost v prerezu A-A' (nedrenirano stanje)
 Author : Tempos
 Date : 24/03/2026
 Project ID : 119/2026

Settings

Slovenia - EN 1997, gamma water=1.0 (2)

Stability analysis

Verification methodology : according to EN 1997

Earthquake analysis : Standard

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 :	$\gamma_G =$	1,35 [-]	1,00 [-]	1,00 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]	1,30 [-]	0,00 [-]
Water load :	$\gamma_w =$			1,00 [-]	

Partial factors for soil parameters (M)		
Permanent design situation		
Partial factor on internal friction :	$\gamma_\phi =$	1,25 [-]
Partial factor on effective cohesion :	$\gamma_c =$	1,25 [-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1,40 [-]

Partial factors on actions (A)					
Transient design situation					
		State STR		State GEO	
		Unfavourable	Favourable	Unfavourable	Favourable
Permanent actions :	$\gamma_G =$	1,00 [-]	1,00 [-]	1,00 [-]	1,00 [-]
Variable actions :	$\gamma_Q =$	1,50 [-]	0,00 [-]	1,30 [-]	0,00 [-]
Water load :	$\gamma_w =$			1,00 [-]	

Partial factors for soil parameters (M)		
Transient design situation		
Partial factor on internal friction :	$\gamma_\phi =$	1,15 [-]
Partial factor on effective cohesion :	$\gamma_c =$	1,15 [-]
Partial factor on undrained shear strength :	$\gamma_{cu} =$	1,15 [-]

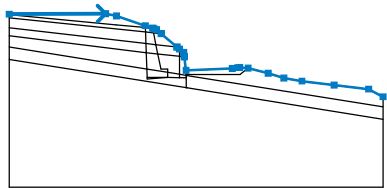
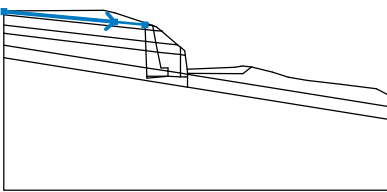
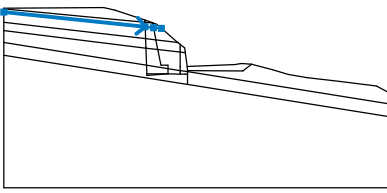
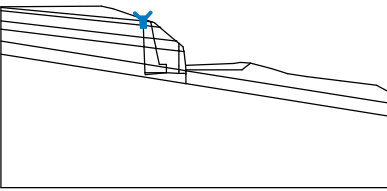
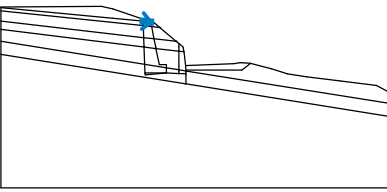
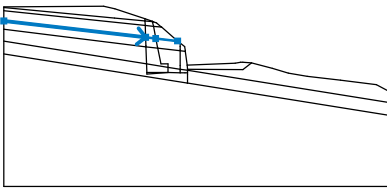
Anchors

Verification methodology : Limit states (LSD)

Reduction coefficients

Reduction. coeff of steel strength :	$\gamma_s =$	1,35 [-]
Reduction coefficient of pull out resistance (soil) :	$\gamma_e =$	1,35 [-]
Reduction coefficient of pull out resistance (grouting) :	$\gamma_c =$	1,35 [-]

Interface

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	25,04	14,16	25,11	15,77	24,77
		20,02	23,34	21,09	22,98	21,28	22,91
		21,65	22,78	22,37	22,17	22,38	22,16
		24,67	20,20	24,68	20,19	25,05	19,90
		25,67	19,42	25,75	18,87	25,77	18,73
		26,01	16,77	32,82	17,04	33,61	17,17
		33,93	17,20	35,15	17,09	38,11	16,33
		40,40	15,63	43,06	15,19	47,80	14,62
		52,87	14,01	55,00	12,88		
2		0,00	24,95	15,71	23,47	20,03	23,06
3		0,00	24,50	20,06	22,41	21,24	22,28
		22,37	22,17				
4		20,02	23,34	20,03	23,06	20,06	22,41
5		20,03	23,06	21,10	22,93		
6		0,00	23,03	20,12	20,72	21,56	20,55
		24,67	20,20				

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
7		21,09	22,98	21,10	22,93	21,24	22,28
8		21,10	22,93	21,28	22,91		
9		20,06	22,41	20,12	20,72		
10		21,24	22,28	21,56	20,55		
11		0,00	21,88	0,05	21,87	20,16	19,38
12		20,12	20,72	20,16	19,55	20,16	19,38
		20,26	16,95				
13		21,56	20,55	21,80	19,35	21,84	19,18
		22,30	16,94	23,30	16,94	23,30	16,47
14		0,00	20,19	20,26	16,95	23,30	16,47
		25,05	16,20	26,06	16,04	55,00	11,40

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
15		25,05	19,90	25,05	19,42	25,05	18,95
		25,05	18,83	25,05	16,71	25,05	16,20
16		20,16	19,38	21,84	19,18		
17		21,84	19,18	25,05	18,83		
18		25,05	18,83	25,77	18,73		
19		0,00	18,38	26,02	14,22	26,06	14,21
		55,00	9,58				
20		26,01	16,77	26,06	16,16	33,95	16,14
		35,15	17,09				
21		20,26	16,95	20,30	15,74	23,30	15,74
		23,30	16,47				
22		25,05	16,20	25,05	15,94	25,05	15,67
		25,73	15,67	26,06	15,67		

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
23		26,06	16,04	26,06	16,16		
24		26,06	14,21	26,06	15,47	26,06	15,67
		26,06	15,90	26,06	16,04		
25		23,30	15,74	25,05	15,67		
26		20,30	15,74	20,31	15,49	23,30	15,74

Soil parameters - effective stress state

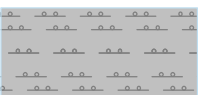
Number	Pattern	Soil name	γ [kN/m ³]	ϕ_{ef} [°]	c_{ef} [kPa]
1		UN (drobljenec)	20,00	36,00	0,00

Soil parameters - uplift

Number	Pattern	Soil name	γ_{sat} [kN/m ³]	γ_s [kN/m ³]	n [-]
1		UN (drobljenec)	20,50		

Soil parameters - total stress state

Number	Pattern	Soil name	c_u [kPa]	γ [kN/m ³]
1		[1] ClGr / SiGr	75,00	19,00

Number	Pattern	Soil name	c_u [kPa]	γ [kN/m ³]
2		[2] Si (s peskom)	50,00	18,50
3		[3] CIL/CIM	40,00	19,50
4		[4] podlaga	300,00	22,00

Soil parameters

[1] CIGr / SiGr

Basic data

Unit weight : $\gamma = 19,00$ [kN/m³]
 Shear strength : Mohr-Coulomb
 Stress-state : total
 Cohesion : $c_u = 75,00$ [kPa]
 Strength with depth : constant

View

Sample :



[2] Si (s peskom)

Basic data

Unit weight : $\gamma = 18,50$ [kN/m³]
 Shear strength : Mohr-Coulomb
 Stress-state : total
 Cohesion : $c_u = 50,00$ [kPa]
 Strength with depth : constant

View

Sample :



[3] CIL/CIM

Basic data

Unit weight : $\gamma = 19,50$ [kN/m³]
 Shear strength : Mohr-Coulomb
 Stress-state : total
 Cohesion : $c_u = 40,00$ [kPa]
 Strength with depth : constant

View

Sample :



[4] podlaga

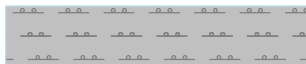
Basic data

Unit weight : $\gamma = 22,00$ [kN/m³]
 Shear strength : Mohr-Coulomb
 Stress-state : total

Cohesion : $c_u = 300,00$ [kPa]
Strength with depth : constant

View

Sample :



UN (drobljenec)

Basic data

Unit weight : $\gamma = 20,00$ [kN/m³]
Shear strength : Mohr-Coulomb
Stress-state : effective
Internal friction angle : $\phi_{ef} = 36,00$ [°]
Cohesion : $c_{ef} = 0,00$ [kPa]

Uplift pressure

Uplift calculation : standard
Unit weight of saturated soil : $\gamma_{sat} = 20,50$ [kN/m³]

Foliation

Soil foliation : not consider

View

Sample :

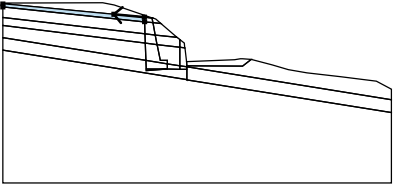
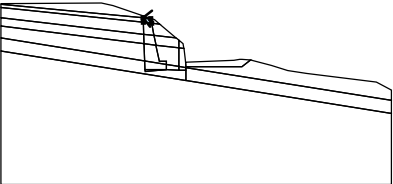
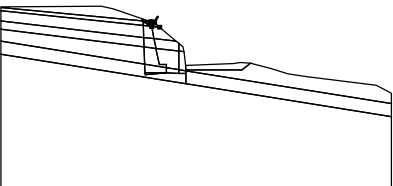
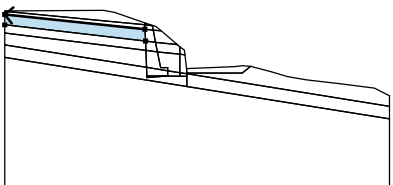
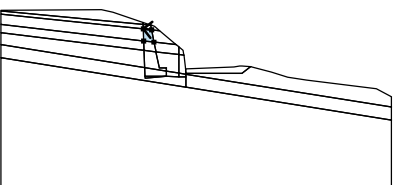
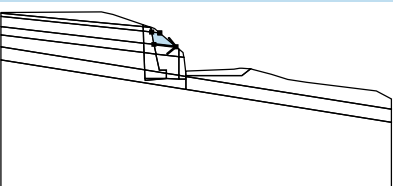
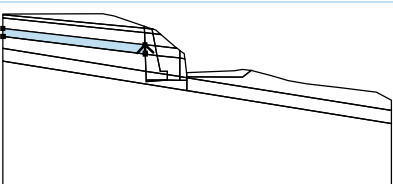
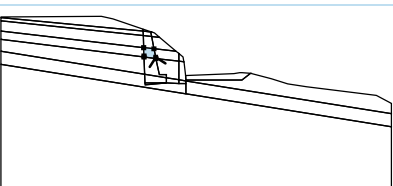


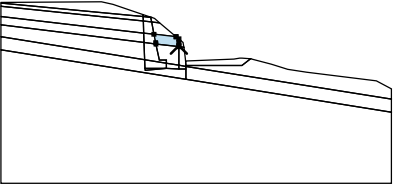
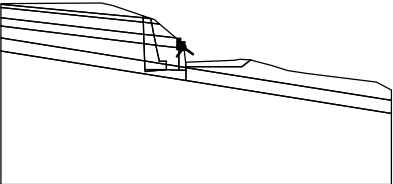
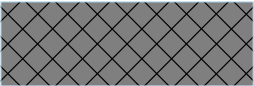
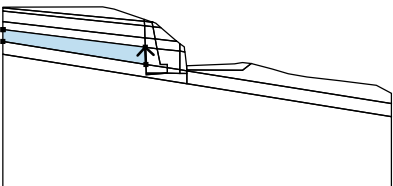
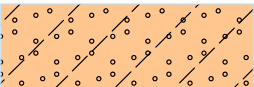
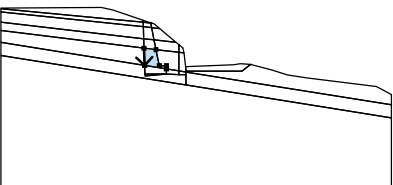
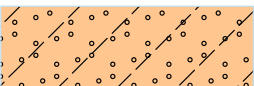
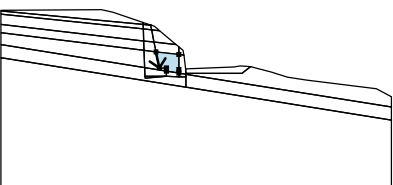
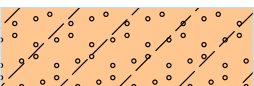
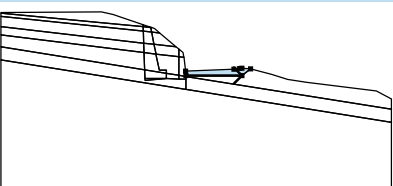
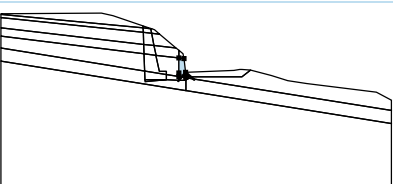
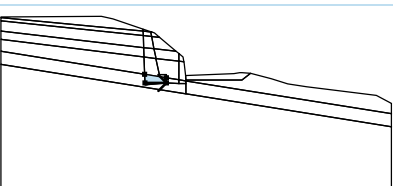
Rigid Bodies

Number	Sample	Soil name	γ [kN/m ³]
1		KVB	24,00

Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		20,02	23,34	15,77	24,77	[1] ClGr / SiGr
		14,16	25,11	0,00	25,04	
		0,00	24,95	15,71	23,47	
		20,03	23,06			
2		21,09	22,98	20,02	23,34	[1] ClGr / SiGr
		20,03	23,06	21,10	22,93	
3		21,28	22,91	21,09	22,98	[1] ClGr / SiGr
		21,10	22,93			

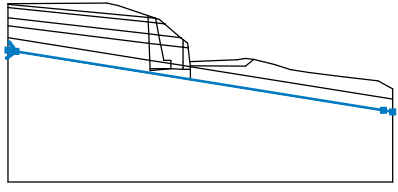
Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
4		20,03	23,06	15,71	23,47	[2] Si (s peskom) 
		0,00	24,95	0,00	24,50	
		20,06	22,41			
5		21,10	22,93	20,03	23,06	[2] Si (s peskom) 
		20,06	22,41	21,24	22,28	
6		21,10	22,93	21,24	22,28	[2] Si (s peskom) 
		22,37	22,17	21,65	22,78	
		21,28	22,91			
7		20,06	22,41	0,00	24,50	[2] Si (s peskom) 
		0,00	23,03	20,12	20,72	
8		21,24	22,28	20,06	22,41	[2] Si (s peskom) 
		20,12	20,72	21,56	20,55	
9		21,56	20,55	24,67	20,20	[2] Si (s peskom) 
		22,38	22,16	22,37	22,17	
		21,24	22,28			
10		20,16	19,55	20,12	20,72	[3] CIL/CIM 
		0,00	23,03	0,00	21,88	
		0,05	21,87	20,16	19,38	
11		21,84	19,18	21,80	19,35	[3] CIL/CIM 
		21,56	20,55	20,12	20,72	
		20,16	19,55	20,16	19,38	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
12		25,05	18,83	25,05	18,95	[3] CIL/CIM 
		25,05	19,42	25,05	19,90	
		24,68	20,19	24,67	20,20	
		21,56	20,55	21,80	19,35	
		21,84	19,18			
13		25,77	18,73	25,75	18,87	KVB 
		25,67	19,42	25,05	19,90	
		25,05	19,42	25,05	18,95	
		25,05	18,83			
14		20,26	16,95	20,16	19,38	[1] ClGr / SiGr 
		0,05	21,87	0,00	21,88	
		0,00	20,19			
15		20,16	19,38	20,26	16,95	[1] ClGr / SiGr 
		23,30	16,47	23,30	16,94	
		22,30	16,94	21,84	19,18	
16		21,84	19,18	22,30	16,94	[1] ClGr / SiGr 
		23,30	16,94	23,30	16,47	
		25,05	16,20	25,05	16,71	
		25,05	18,83			
17		26,06	16,16	33,95	16,14	UN (drobljenec) 
		35,15	17,09	33,93	17,20	
		33,61	17,17	32,82	17,04	
		26,01	16,77			
18		26,06	16,16	26,01	16,77	KVB 
		25,77	18,73	25,05	18,83	
		25,05	16,71	25,05	16,20	
		26,06	16,04			
19		20,30	15,74	23,30	15,74	[2] Si (s peskom) 
		23,30	16,47	20,26	16,95	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
20		25,05	15,67	25,05	15,94	[2] Si (s peskom)
		25,05	16,20	23,30	16,47	
		23,30	15,74			
21		26,06	15,90	26,06	16,04	KVB
		25,05	16,20	25,05	15,94	
		25,05	15,67	25,73	15,67	
		26,06	15,67			
22		20,31	15,49	23,30	15,74	[2] Si (s peskom)
		20,30	15,74			
23		20,31	15,49	20,30	15,74	[2] Si (s peskom)
		20,26	16,95	0,00	20,19	
		0,00	18,38	26,02	14,22	
		26,06	14,21	26,06	15,47	
		26,06	15,67	25,73	15,67	
		25,05	15,67	23,30	15,74	
24		26,06	16,04	55,00	11,40	[1] ClGr / SiGr
		55,00	12,88	52,87	14,01	
		47,80	14,62	43,06	15,19	
		40,40	15,63	38,11	16,33	
		35,15	17,09	33,95	16,14	
		26,06	16,16			
25		26,06	15,90	26,06	15,67	[2] Si (s peskom)
		26,06	15,47	26,06	14,21	
		55,00	9,58	55,00	11,40	
		26,06	16,04			
26		26,06	14,21	26,02	14,22	[4] podlaga
		0,00	18,38	0,00	-0,42	
		55,00	-0,42	55,00	9,58	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	18,41	1,14	18,23	53,66	9,80
		55,00	9,58				

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Construction stage 1 - obstoječe stanje (nedrenirano))**Analysis 1 (stage 1)****Circular slip surface**

Slip surface parameters					
Center :	x =	22,25 [m]	Angles :	$\alpha_1 =$	-70,46 [°]
	z =	30,08 [m]		$\alpha_2 =$	28,17 [°]
Radius :	R =	14,95 [m]			
The slip surface after optimization.					

Total weight of soil above the slip surface: 2181,68 kN/m

Slope stability verification (Morgenstern-Price)

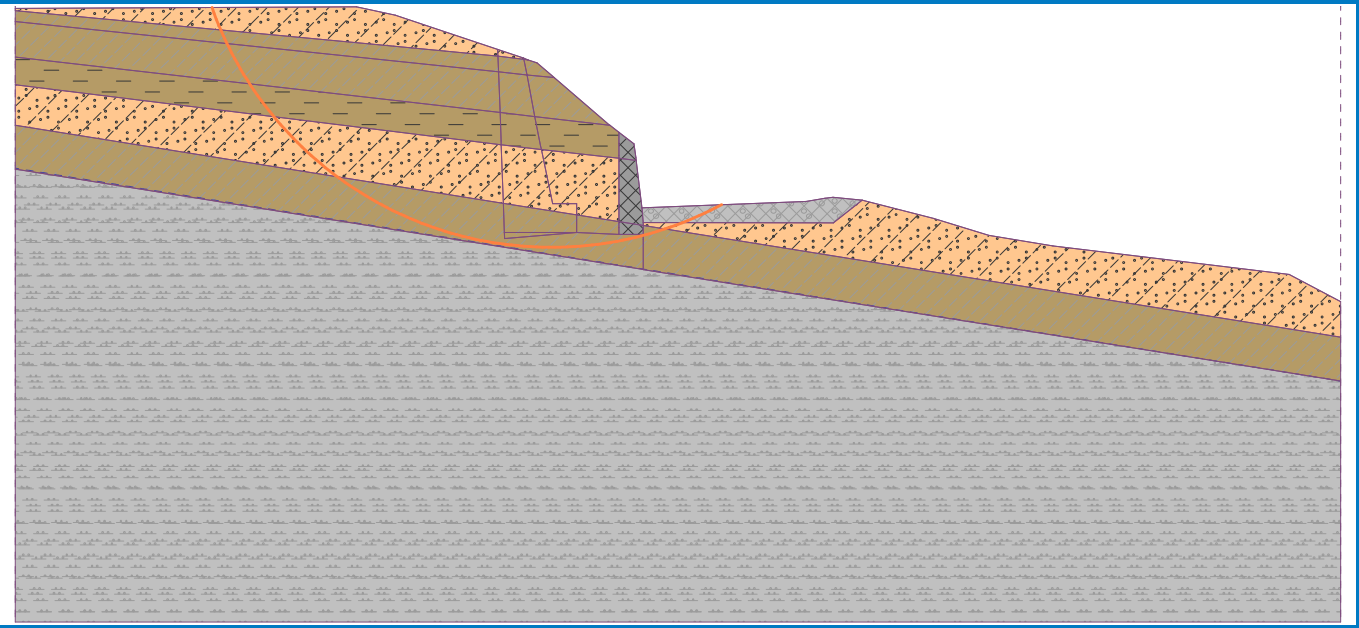
Utilization : 67,6 %

Slope stability ACCEPTABLE

Name : obstoječe stanje

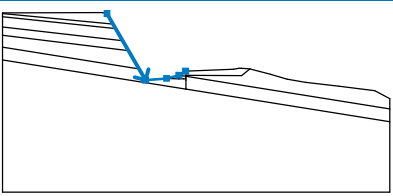
Stage - analysis : 1 - 1

Description : (nedrenirane karakteristike)

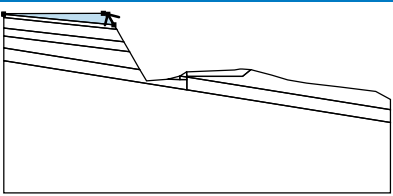
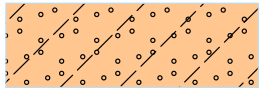
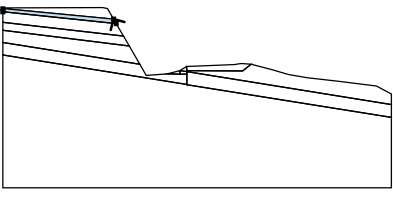
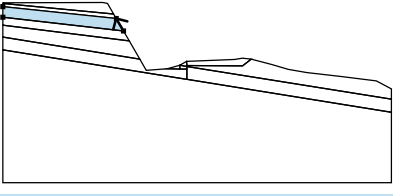
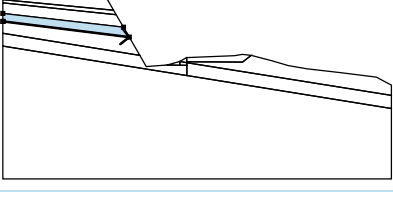
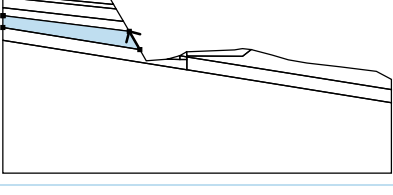
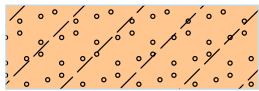
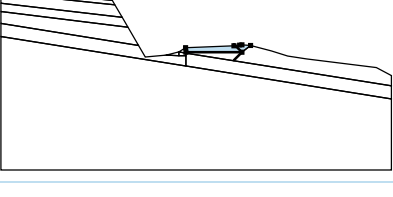


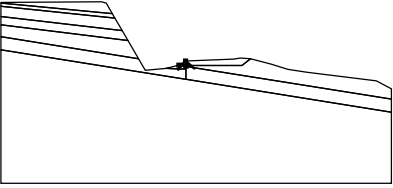
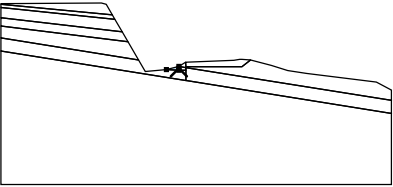
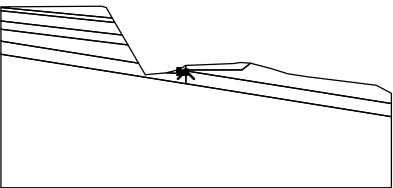
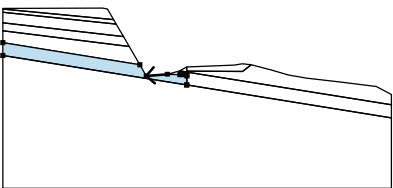
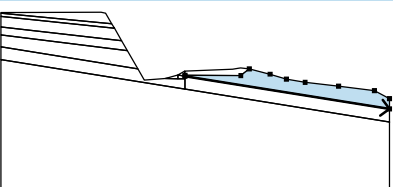
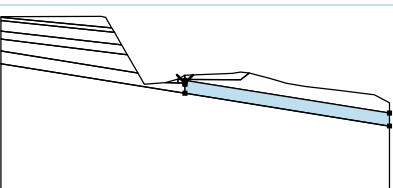
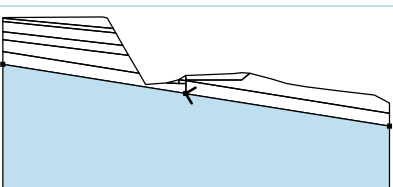
Input data (Construction stage 2 - Izkop v naklonu 3:2 (nedrenirano))

Earth cut

Number	Cut location	Coordinates of cut points [m]					
		x	z	x	z	x	z
1		14,83	24,96	20,31	15,49	23,30	15,74
		25,05	16,20	26,01	16,77		

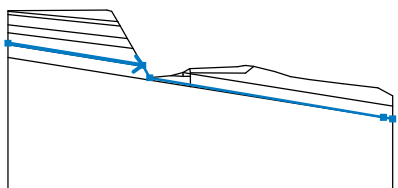
Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		15,69	23,47	14,83	24,96	[1] ClGr / SiGr 
		14,16	25,11	0,00	25,04	
		0,00	24,95			
2		16,06	22,83	15,69	23,47	[2] Si (s peskom) 
		0,00	24,95	0,00	24,50	
3		17,08	21,07	16,06	22,83	[2] Si (s peskom) 
		0,00	24,50	0,00	23,03	
4		0,05	21,87	17,90	19,66	[3] CIL/CIM 
		17,08	21,07	0,00	23,03	
		0,00	21,88			
5		19,38	17,09	17,90	19,66	[1] ClGr / SiGr 
		0,05	21,87	0,00	21,88	
		0,00	20,19			
6		26,06	16,16	33,95	16,14	UN (drobljenec) 
		35,15	17,09	33,93	17,20	
		33,61	17,17	32,82	17,04	
		26,01	16,77			

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
7		26,06	16,16	26,01	16,77	KVB
		25,05	16,20	26,06	16,04	
8		25,05	15,67	25,05	15,94	[2] Si (s peskom)
		25,05	16,20	23,30	15,74	
9		26,06	15,90	26,06	16,04	KVB
		25,05	16,20	25,05	15,94	
		25,05	15,67	25,73	15,67	
		26,06	15,67			
10		23,30	15,74	20,31	15,49	[2] Si (s peskom)
		19,38	17,09	0,00	20,19	
		0,00	18,38	26,02	14,22	
		26,06	14,21	26,06	15,47	
		26,06	15,67	25,73	15,67	
		25,05	15,67			
11		26,06	16,04	55,00	11,40	[1] ClGr / SiGr
		55,00	12,88	52,87	14,01	
		47,80	14,62	43,06	15,19	
		40,40	15,63	38,11	16,33	
		35,15	17,09	33,95	16,14	
		26,06	16,16			
12		26,06	15,90	26,06	15,67	[2] Si (s peskom)
		26,06	15,47	26,06	14,21	
		55,00	9,58	55,00	11,40	
		26,06	16,04			
13		26,06	14,21	26,02	14,22	[4] podlaga
		0,00	18,38	0,00	-0,42	
		55,00	-0,42	55,00	9,58	

Water

Water type : GWT

Number	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1099981523		0,00	20,39	19,25	17,24	20,27	15,45
		53,66	9,80	55,00	9,58		

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : transient

Results (Construction stage 2 - Izkop v naklonu 3:2 (nedrenirano))

Analysis 1 (stage 2)

Circular slip surface

Slip surface parameters						
Center :	x =	19,43 [m]	Angles :	$\alpha_1 =$	-68,31	[°]
	z =	30,69 [m]		$\alpha_2 =$	3,30	[°]
Radius :	R =	15,22 [m]				
The slip surface after optimization.						

Total weight of soil above the slip surface: 1513,90 kN/m

Slope stability verification (Morgenstern-Price)

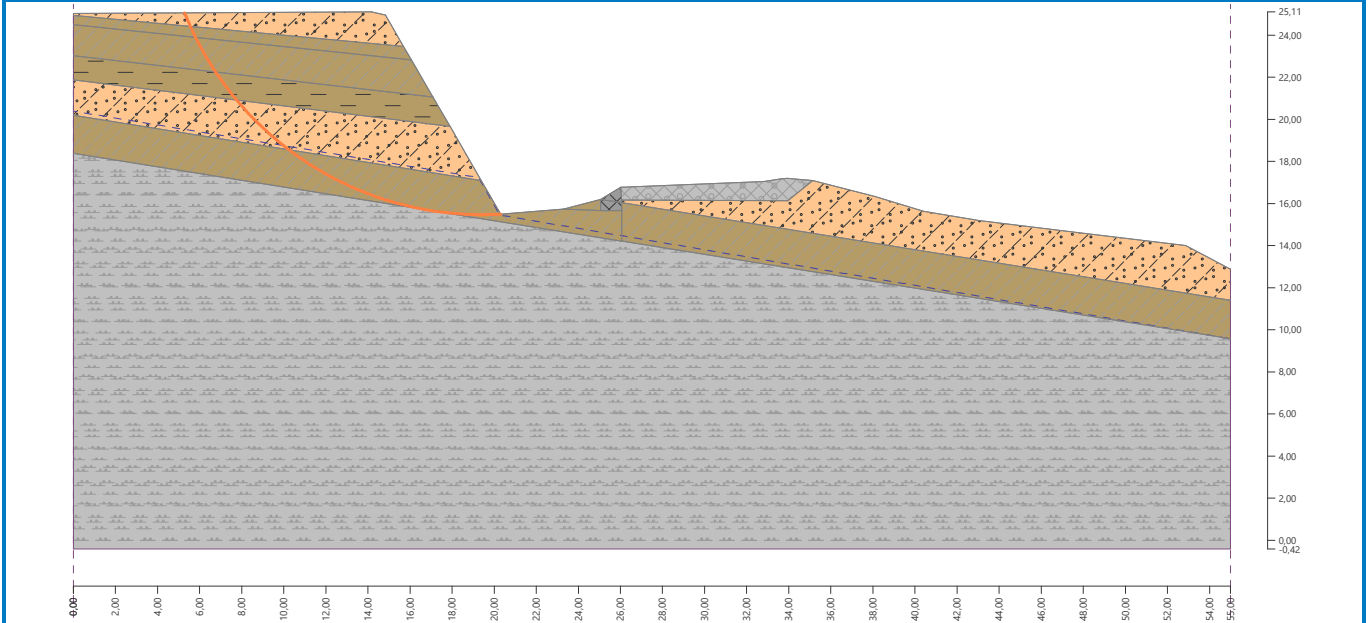
Utilization : 72,3 %

Slope stability ACCEPTABLE

Name : predvideno stanje (izkop)

Stage - analysis : 2 - 1

Description : (nedrenirane karakteristike in višji vodostaj (majhna verjetnost med gradnjo))



7 POPIS DEL S PROJEKTANTSKIM PREDRAČUNOM

**Kolesarska povezava Selca - Dolenja vas – Ševlje, ob R2-
403/1076 Češnjica – Škofja Loka med km 2,607 in km 4,675****OPORNA KONSTRUKCIJA - ZID kamen v betonu****PROJEKTANTSKI PREDRAČUN****Oporni zid**

1 Pripravljalna dela	0,00 €
2 Zemeljska dela in temeljenje	0,00 €
3 Gradbena in obrtniška dela	
3.1 Tesarska dela	0,00 €
3.2 Dela z jeklom za ojačitev	0,00 €
3.3 Dela s cementnim betonom	0,00 €
3.4 Zidarska in kamnoseška dela	0,00 €
3.5 Ključavničarska dela	0,00 €
3.6 Hidroizolacije	0,00 €
3.7 Detajli AB elementov	0,00 €
4 Voziščna konstrukcija	0,00 €
5 Odvodnavanje	0,00 €
6 Zavarovalna dela v strugi	0,00 €
7 Ostalo	0,00 €
8 Tuje storitve	0,00 €

13032	0,00 €
DDV 22%	0,00 €
SKUPAJ Z DDV	0,00 €

SPLOŠNI POGOJI

V končno ceno mora biti zajeto sledeče:

1.	Dela v bližini obstoječih objektov je potrebno izvajati po kampadah, s takšno mehanizacijo, da ne bo prišlo do morebitnih poškodb objektov. Pri delu v bližini objektov je potreben geomehanski nadzor med gradnjo.
2.	Organizacija in oprema gradbišča skladno z varnostnim načrtom in veljavno zakonodajo, vključno z izdelavo elaborata zapore ceste, pridobitve soglasja zapore ceste, postavitve in vzdrževanje cestne zapore, postavitve varovalnih gradbiščnih ograj.
3.	Dnevna vzpostavitev prevoznosti ceste in neoviranega dostopa do objektov, vključno z varovalnimi ograjami in prometno signalizacijo.
4.	Vzpostavitev začasnih obvozov in začasnih deponij za potrebe gradnje.
5.	Izdelava poročila o ravnanju z gradbenimi odpadki v skladu z zakonodajo, vključno z vsemi stroški in taksami ločenega zbiranja.
6.	Sortiranja in evidentiranja gradbenih odpadkov in zemeljskega izkopa, kot tudi stroški odvozi in predelava le teh, po določilih zakonodaje.
7.	Postavitev gradbiščne table skladno s trenutno veljavnimi predpisi.
8.	Stroški vseh potrebnih ukrepov, ki so predpisani in določeni z veljavnimi predpisi o varstvu pri delu in varstvu pred požarom, ki jih mora izvajalec obvezno upoštevati.
9.	Škoda na objektih in zemljiščih ob gradbišču, ki jo povzroči izvajalec.
10.	Ponovna vzpostavitev odstranjenih mejnikov, ki jih je izvajalec odstranil izven delovnega pasu.
11.	Stroški vseh predpisanih kontrol materialov, meritev, atestov in garancij za vgrajene materiale.
12.	Vsi stroški trajnega deponiranja gradbenega materiala.
13.	Sanacija oz. povrnitev v prvotno stanje vseh dostopnih poti, ki jih bo izvajalec uporabljal za vso gradbiščno logistiko.
14.	Vsi stroški, povezani z izvajanjem ukrepov skladno z Uredbo o preprečevanju in zmanjševanju emisije delcev iz gradbišč (Ur.list RS, št. 21/2011) ter izdelava elaborata preprečevanja in zmanjševanja emisije delcev iz gradbišča.
15.	Vsi stroški električne energije, vode, TK priključkov, razsvetljave, ogrevanja...
16.	Vsi stroški zavarovanja opreme v času izvedbe del in delavcev ter materiala na gradbišču v času izvajanja del, od začetka do primopredaje objekta.
17.	Vsi stroški transporta, raztovarjanja, skladiščenja na gradbišču, takse, zavarovanja, manipulativni in ostali lokalni stroški, ki se nanašajo na pridobitev ustreznih dovoljenj za izvedbo del predmetnega razpisa in primopredajo objekta s strani izvajalca.
18.	V ceni mora biti zajet tudi ves droben potrošni material.
19.	Cena na enoto za več in manj dela se ne spreminja.
20.	V cenah je potrebno zajeti vse manipulativne stroške.
21.	Ponudnik mora pri izvajanju del upoštevati vso veljavno zakonodajo, ki definira izvajanje gradbenih del na gradbišču.

22.	Stroški zaključnih del na gradbišču z odvozom odvečnega materiala in vzpostavitev v prvotno stanje.
23.	Obračun zemeljskih del je v raščenem stanju.
24.	Vse dimenzije, prikazane v načrtih, je potrebno pred izvajanjem del preveriti na mestu izvedbe del, v primeru nejasnosti se posvetovati s projektantom.
25.	Izdelava dokazila o zanesljivosti objekta in vseh ostalih potrebnih dokumentov za pridobitev uporabnega dovoljenja.
26.	Geomehanske meritve posameznih nasipnih slojev, z vpisom meritev v gradbeni dnevnik in izdelavo poročila o meritvah.
27.	Fotografiranje cestnih, krajinskih, stavbnih in drugih detajlov na območju gradnje, pomembnih za ugotovitev stanja pred gradnjo. Foto elaborat je potrebno izdelati v dveh izvodih. Razpoke na objektih, poškodbe in druge neobičajne podrobnosti morajo biti evidentirane.
28.	Obveščanje javnosti, predvsem prebivalcev na tem območju glede poteka gradbenih del, predvidenih cestnih zapor, obvoznih poti....
29.	Uporaba varovalnega opaža pri izkopih za katere določi geomehanik potrebnost uporabe le teh.

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
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Oporni zid

1 Pripravljalna dela	0,00 €
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1.1 Geodetska dela	0,00 €
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001	Postavitev in zavarovanje profilov za zakoličbo objekta s površino nad 100 m ²	Zakoličbo objekta se izvaja skupaj z zakoličbo kolesarske steze	KOS	1,00		0,00 €
002	Zakoličba obstoječih vodov na območju izvajanja del: <u>elektro, vodovod</u> . Obračun po dejanskih stroških.	Po javno dostopnih podatkih in prejetem geodetskem posnetku na območju izvedbe zidu ni GJI vodov, pri čemer se po pričevanju lastnika zalednih zemljišč v bližini kapelice in spodjega dela dostopne poti nahajajo posamezni vodi. Postavka je namenjena opozorilu med gradnjo! Pred pričetkom del je potrebno izvesti zakoličbo morebitnih vodov.	KOS	2,00		0,00 €

1.2 Čiščenje terena	0,00 €
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003	Rušenje kamnitobetnoskih zložb in zidov. Nalaganje na kamion in odvoz na deponijo. Vključno s stroški deponije.	Groba ocena na podlagi geodetskega posnetka in terenskega ogleda. Ponovna uporaba čistih kosov lomljenca.	M3	97,00		0,00 €
004	Rušenje zložb in zidov iz kamna v suho. Nalaganje na kamion in odvoz na deponijo. Vključno s stroški deponije.	Groba ocena na podlagi geodetskega posnetka in terenskega ogleda. Ponovna uporaba čistih kosov lomljenca.	M3	47,00		0,00 €
005	Posek dreves fi nad 50cm in odstranjevanje panjev, razrez in odvoz na deponijo. Vključno s stroški deponije.	Drevo na uvozu dostopne poti.	KOS	1,00		0,00 €
006	Odstranitev obstoječega znamenja (kapelice), z odvozom na začasno deponijo za kasnejšo ponovno namestitev na novo lokacijo.	Ves material, ki se ne ohraniza vgradnjo na novi lokaciji se trajno deponira (npr. Betonski okruški, itd.) V kolikor je postavka obračunana v sklopu izvedbe deniveliranih površin za pešce in kolesarje (načrt ceste), se tu ne obračuna.	KOS	1,00		0,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
1.3 Ostala pred dela						0,00 €
Op.: Dela naj se izvajajo v sušnem obdobju. Ob možnosti povečanja padavin se brežine izkopa ustrezno zaščiti.						
007	Organizacija gradbišča (postavitve in odstranitve začasnih objektov, sanitarije, selitev mehanizacije, gradbiščni provizoriji, gradbiščna ograja, pribor, orodje, priključki elektrike in vode), zapora ceste, začasen obvoz,...	vključno s postavitvijo začasnih deponij (na stik plodne zemlje položitev geosintetikov (filc), tamponsko nasutje iz drobljenca, odstranitve po končanih delih)	KOS	1,00		0,00 €
008	Postavitve polovične zapore državne ceste - dolžina 120m.	Po potrebi obračunano v načrtu ceste/kolesarske steze	DAN	0,00		0,00 €
009	MOREBITNA DODATNA DELA V PRIMERU NEUGODNIH (DRUGAČNIH) RAZMER iz GG elaborata in PZI dokumentacije Zavarovanje delovnega izkopa z brizganim betonom (d=10cm), armaturnih mrež Q385, in pasivnih sider (L=6m, 1kom/4m2)	Po potrebi izvedba dodatnih ukrepov varovanja delovnega izkopa, zaradi drugačnih razmer temeljnih tal v zaledju na gradbišču kot so bile privzete iz GG elaborata in upoštevane v PZI dokumentaciji.	M2	350,00		0,00 €
2 Zemeljska dela in temeljenje						0,00 €
010	Površinski izkop plodne zemljine – 1. kategorije – strojno z nakladanjem/odrivom do 50 m (odriv in ponovna vgradnja humusa)	Odriv sloja humusa, lokalno deponiranje in ponovna uporaba pri humuziranju.	M3	150,00		0,00 €
011	Izkop zemljine 3/(4.) kategorije - strojno z nakladanjem in transport na trajno deponijo IZKOP ZA ZID		M3	3056,00		0,00 €
012	Ureditev planuma temeljnih tal zrnate zemljine 3/4. kategorije E _{vd} >40(45)MPa	planum pod temelji, ustrezna utrditev	M2	235,00		0,00 €
013	Zasip z drobljencem 0-126mm oz. ekvivalentnim vodoprepustnim in zmrzlinosko odpornim materialom s sprotnim utrjevanjem in planiranjem po plasteh. Dobava in vgradnja. Vključno s transportom po gradbišču (npr. terenski demper)	Zasip z izkopanim materialom ni ustrezen! Dobava, vgradnja drobljenca po plasteh do 20-30cm s sprotnim utrjevanjem. Zasip se izvaja sproti z zidanjem zidu.	M3	1325		0,00 €
014	Vgradnja drenažnega drobljenca 16-32mm ob vtoke v odcednice in drenažne cevi v zaledju zidov KVB	V sferi radija cca 30cm ob odcednicah. (0,14m3/odcednico)	M3	16,38		0,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
015	Vgradnja drenažnega drobljenca 16-32mm ob vzdolžno drenažo.	A=0,35 m ³ /m.	M3	40,60		0,00 €
016	Odlaganje odpadne zemljine in kamnine na stalno deponijo. Prevoz na razdaljo > 5000m, stroški deponije.	nakladanje in prevoz sta všteta že v postavki izkopa zemljine	T	5500,80		0,00 €
017	Planiranje in humuziranje brežin v debelini 20cm z lokano deponiranim materialom, ustreznost utrditev brežin in zatravitev s semenom. Vključno z nego do popolne ozelenitve.		M2	440,00		0,00 €

3 Gradbena in obrtniška dela

3.1 Tesarska dela 0,00 €

Op.: Pri vseh postavkah opaženja je vključena demontaža in čiščenje opaža. V ceno so vračunani vsi potrebni podporni elementi, ograja.

018	Izdelava enostranskega opaža za zid iz kamna v betonu. VB0.	Zidovi KVB. (Za hitrejšo izvedbo pri višjih (>5m) delovnih izkopih je možna uporaba slepega opaža)	M2	580,00		0,00 €
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3.2 Dela z jeklom za ojačitev 0,00 €

019	Dobava in postavitve mreže iz vlečene jeklene žice (S500 B), s premerom > od 4 in < od 12 mm, masa nad 12,34 kg/m ² (Q785)	mreže na zaledni strani zidu in po dnu temelja, minimalni prekrivni sloj armature je 10cm, minimalni preklopi mrež 50cm 60kos (zaledna stena) + 20kos (temelj)	KG	13032,00		0,00 €
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3.3 Dela s cementnim betonom 0,00 €

020	Dobava in vgraditev cementnega betona C12/15 v debelini do 15cm	podložni beton 10cm kadunjast odtok pod drenažno cevjo	M3	4,64		0,00 €
021	Dobava in vgraditev cementnega betona C20/25 v debelini do 15cm	betoniranje stika med zidom in muldo. Metlanje površine in padec (min 2%) proti muldi	M3	5,50		0,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
3.4 Zidarska in kamnoseška dela						0,00 €
022	Zidanje s kamnom v betonu, na eno lice - dobava, prevoz, 1x premet, 90% strojno, 10% ročno zidanje (izvedba na kroni), uporaba klesanega kamna za izvedbo ravne ploskve z minimalno površino betona, beton C25/30, XC2, razmerje kamen:beton=60:40. Obdelava reg s cementno malto oziroma sprotno zagladitvijo svežega betona (ročna obdelava)	Zid KVB. Zaradi velike višine zidu se po potrebi zid na najnižjem odseku izvede najprej od spodaj, nato pa izven dosega roke mehanizacije, se le-ta prestavi nad zid in dela potekajo z zgornje brežine. Sproti z izvedbo zidu se izvaja utrjen zaledni zasip.	M3	880,00		0,00 €

3.5 Ključavničarska dela						0,00 €
023	Dobava in vgraditev lesene ograje (tip ograje za pešce in kolesarje, npr. P-LKO-1300, trasa - Petrič). Vključno z vsemi elementi, potrebnimi za namestitve. Predvidena vgradnja 0,5m za zidom z zabijanjem stebrov v temeljna tla/nasutje)	Izvedba in oblika ograje v dogovoru med naročnikom dokumentacije in lastniki zalednih zemljišč!	M	110,00		0,00 €

3.6 Hidroizolacije						0,00 €
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3.7 Detajli AB elementov						0,00 €
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4 Voziščna konstrukcija						0,00 €
Op.: Izvedba deniveliranih površin pred zidom, vključno z zasipom temelja zidu s sprednje strani oz. ureditvijo voziščne konstrukcije je zajeto v načrtu						

5 Odvodnavanje						0,00 €
024	Izdelava odcednice iz trde plastične cevi, premera 10 cm, dolžine do 250 cm. Betonsko sive barve in potopljene v zid	spodnja vrsta: 55kom (L do 250cm) srednja vrsta: 49kom (L do 200cm) zgornja vrsta: 13kom (L do 150cm) - na lokaciji geometrije zidu TIP3	KOS	117,00		0,00 €
025	Izdelava vzdolžne drenaže, na podložni plasti iz podložnega betona, s perforiranimi cevmi iz umetnih mas premera 20 cm. Navezava na jaške meteorne kanalizacije po načrtu ceste/kolesarske steze	Drenažna cev je razdeljena na dva dela - odtok proti SZ (L=42m) in odtok proti JV (L=74m)	M	116,00		0,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
6 Zavarovalna dela v strugi						0,00 €

7 Ostalo						0,00 €
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8 Tuje storitve						0,00 €
026	Projektantski nadzor.		URA	10,00		0,00 €
027	Geotehnični nadzor.		URA	20,00		0,00 €
028	Izdelava projektne dokumentacije za projekt izvedenih del		KOS	1,00		0,00 €
029	Nepredvidena dela 10%					0,00 €

SKUPAJ						0,00 €
DDV						0,00 €
SKUPAJ Z DDV						0,00 €

**Kolesarska povezava Selca - Dolenja vas – Ševlje, ob R2-
403/1076 Češnjica – Škofja Loka med km 2,607 in km 4,675****OPORNA KONSTRUKCIJA - ZID kamen v betonu****PROJEKTANTSKI PREDRAČUN****Oporni zid**

1 Pripravljalna dela	11.970,00 €
2 Zemeljska dela in temeljenje	61.262,86 €
3 Gradbena in obrtniška dela	
3.1 Tesarska dela	23.200,00 €
3.2 Dela z jeklom za ojačitev	22.154,40 €
3.3 Dela s cementnim betonom	912,60 €
3.4 Zidarska in kamnoseška dela	105.600,00 €
3.5 Ključavničarska dela	14.300,00 €
3.6 Hidroizolacije	0,00 €
3.7 Detajli AB elementov	0,00 €
4 Voziščna konstrukcija	0,00 €
5 Odvodnavanje	5.235,00 €
6 Zavarovalna dela v strugi	0,00 €
7 Ostalo	0,00 €
8 Tuje storitve	6.100,00 €

13032	250.734,86 €
DDV 22%	55.161,67 €
SKUPAJ Z DDV	305.896,53 €

SPLOŠNI POGOJI

V končno ceno mora biti zajeto sledeče:

1.	Dela v bližini obstoječih objektov je potrebno izvajati po kampadah, s takšno mehanizacijo, da ne bo prišlo do morebitnih poškodb objektov. Pri delu v bližini objektov je potreben geomehanski nadzor med gradnjo.
2.	Organizacija in oprema gradbišča skladno z varnostnim načrtom in veljavno zakonodajo, vključno z izdelavo elaborata zapore ceste, pridobitve soglasja zapore ceste, postavitve in vzdrževanje cestne zapore, postavitve varovalnih gradbiščnih ograj.
3.	Dnevna vzpostavitev prevoznosti ceste in neoviranega dostopa do objektov, vključno z varovalnimi ograjami in prometno signalizacijo.
4.	Vzpostavitev začasnih obvozov in začasnih deponij za potrebe gradnje.
5.	Izdelava poročila o ravnanju z gradbenimi odpadki v skladu z zakonodajo, vključno z vsemi stroški in taksami ločenega zbiranja.
6.	Sortiranja in evidentiranja gradbenih odpadkov in zemeljskega izkopa, kot tudi stroški odvozi in predelava le teh, po določilih zakonodaje.
7.	Postavitev gradbiščne table skladno s trenutno veljavnimi predpisi.
8.	Stroški vseh potrebnih ukrepov, ki so predpisani in določeni z veljavnimi predpisi o varstvu pri delu in varstvu pred požarom, ki jih mora izvajalec obvezno upoštevati.
9.	Škoda na objektih in zemljiščih ob gradbišču, ki jo povzroči izvajalec.
10.	Ponovna vzpostavitev odstranjenih mejnikov, ki jih je izvajalec odstranil izven delovnega pasu.
11.	Stroški vseh predpisanih kontrol materialov, meritev, atestov in garancij za vgrajene materiale.
12.	Vsi stroški trajnega deponiranja gradbenega materiala.
13.	Sanacija oz. povrnitev v prvotno stanje vseh dostopnih poti, ki jih bo izvajalec uporabljal za vso gradbiščno logistiko.
14.	Vsi stroški, povezani z izvajanjem ukrepov skladno z Uredbo o preprečevanju in zmanjševanju emisije delcev iz gradbišč (Ur.list RS, št. 21/2011) ter izdelava elaborata preprečevanja in zmanjševanja emisije delcev iz gradbišča.
15.	Vsi stroški električne energije, vode, TK priključkov, razsvetljave, ogrevanja...
16.	Vsi stroški zavarovanja opreme v času izvedbe del in delavcev ter materiala na gradbišču v času izvajanja del, od začetka do primopredaje objekta.
17.	Vsi stroški transporta, raztovarjanja, skladiščenja na gradbišču, takse, zavarovanja, manipulativni in ostali lokalni stroški, ki se nanašajo na pridobitev ustreznih dovoljenj za izvedbo del predmetnega razpisa in primopredajo objekta s strani izvajalca.
18.	V ceni mora biti zajet tudi ves droben potrošni material.
19.	Cena na enoto za več in manj dela se ne spreminja.
20.	V cenah je potrebno zajeti vse manipulativne stroške.
21.	Ponudnik mora pri izvajanju del upoštevati vso veljavno zakonodajo, ki definira izvajanje gradbenih del na gradbišču.

22.	Stroški zaključnih del na gradbišču z odvozom odvečnega materiala in vzpostavitev v prvotno stanje.
23.	Obračun zemeljskih del je v raščenem stanju.
24.	Vse dimenzije, prikazane v načrtih, je potrebno pred izvajanjem del preveriti na mestu izvedbe del, v primeru nejasnosti se posvetovati s projektantom.
25.	Izdelava dokazila o zanesljivosti objekta in vseh ostalih potrebnih dokumentov za pridobitev uporabnega dovoljenja.
26.	Geomehanske meritve posameznih nasipnih slojev, z vpisom meritev v gradbeni dnevnik in izdelavo poročila o meritvah.
27.	Fotografiranje cestnih, krajinskih, stavbnih in drugih detajlov na območju gradnje, pomembnih za ugotovitev stanja pred gradnjo. Foto elaborat je potrebno izdelati v dveh izvodih. Razpoke na objektih, poškodbe in druge neobičajne podrobnosti morajo biti evidentirane.
28.	Obveščanje javnosti, predvsem prebivalcev na tem območju glede poteka gradbenih del, predvidenih cestnih zapor, obvoznih poti....
29.	Uporaba varovalnega opaža pri izkopih za katere določi geomehanik potrebnost uporabe le teh.

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
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Oporni zid

1 Pripravljalna dela	11.970,00 €
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1.1 Geodetska dela	600,00 €
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001	Postavitev in zavarovanje profilov za zakoličbo objekta s površino nad 100 m ²	Zakoličbo objekta se izvaja skupaj z zakoličbo kolesarske steze	KOS	1,00	400,00	400,00 €
002	Zakoličba obstoječih vodov na območju izvajanja del: <u>elektro, vodovod</u> . Obračun po dejanskih stroških.	Po javno dostopnih podatkih in prejetem geodetskem posnetku na območju izvedbe zidu ni GJI vodov, pri čemer se po pričevanju lastnika zalednih zemljišč v bližini kapelice in spodjega dela dostopne poti nahajajo posamezni vodi. Postavka je namenjena opozorilu med gradnjo! Pred pričetkom del je potrebno izvesti zakoličbo morebitnih vodov.	KOS	2,00	100,00	200,00 €

1.2 Čiščenje terena	5.370,00 €
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003	Rušenje kamnitobetnoskih zložb in zidov. Nalaganje na kamion in odvoz na deponijo. Vključno s stroški deponije.	Groba ocena na podlagi geodetskega posnetka in terenskega ogleda. Ponovna uporaba čistih kosov lomljenca.	M3	97,00	40,00	3.880,00 €
004	Rušenje zložb in zidov iz kamna v suho. Nalaganje na kamion in odvoz na deponijo. Vključno s stroški deponije.	Groba ocena na podlagi geodetskega posnetka in terenskega ogleda. Ponovna uporaba čistih kosov lomljenca.	M3	47,00	20,00	940,00 €
005	Posek dreves fi nad 50cm in odstranjevanje panjev, razrez in odvoz na deponijo. Vključno s stroški deponije.	Drevo na uvozu dostopne poti.	KOS	1,00	100,00	100,00 €
006	Odstranitev obstoječega znamenja (kapelice), z odvozom na začasno deponijo za kasnejšo ponovno namestitev na novo lokacijo.	Ves material, ki se ne ohranja vgradnjo na novi lokaciji se trajno deponira (npr. Betonski okruški, itd.) V kolikor je postavka obračunana v sklopu izvedbe deniveliranih površin za pešce in kolesarje (načrt ceste), se tu ne obračuna.	KOS	1,00	450,00	450,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
1.3 Ostala preddela						6.000,00 €
Op.: Dela naj se izvajajo v sušnem obdobju. Ob možnosti povečanja padavin se brežine izkopa ustrezno zaščititi.						
007	Organizacija gradbišča (postavitve in odstranitve začasnih objektov, sanitarije, selitev mehanizacije, gradbiščni provizoriji, gradbiščna ograja, pribor, orodje, priključki elektrike in vode), zapora ceste, začasen obvoz,...	vključno s postavitvijo začasnih deponij (na stik plodne zemlje položitev geosintetikov (filc), tamponsko nasutje iz drobljenca, odstranitve po končanih delih)	KOS	1,00	6000,00	6.000,00 €
008	Postavitve polovične zapore državne ceste - dolžina 120m.	Po potrebi obračunano v načrtu ceste/kolesarske steze	DAN	0,00	150,00	0,00 €
009	MOREBITNA DODATNA DELA V PRIMERU NEUGODNIH (DRUGAČNIH) RAZMER iz GG elaborata in PZI dokumentacije Zavarovanje delovnega izkopa z brizganim betonom (d=10cm), armaturnih mrež Q385, in pasivnih sider (L=6m, 1kom/4m2)	Po potrebi izvedba dodatnih ukrepov varovanja delovnega izkopa, zaradi drugačnih razmer temeljnih tal v zaledju na gradbišču kot so bile privzete iz GG elaborata in upoštevane v PZI dokumentaciji.	M2	100,00	180,00	18.000,00 €

2 Zemeljska dela in temeljenje						61.262,86 €
010	Površinski izkop plodne zemljine – 1. kategorije – strojno z nakladanjem/odrivom do 50 m (odriv in ponovna vgradnja humusa)	Odriv sloja humusa, lokalno deponiranje in ponovna uporaba pri humuziranju.	M3	150,00	8,00	1.200,00 €
011	Izkop zemljine 3/(4.) kategorije - strojno z nakladanjem in transport na trajno deponijo IZKOP ZA ZID		M3	3056,00	6,00	18.336,00 €
012	Ureditve planuma temeljnih tal zrnate zemljine 3/4. kategorije E _{vd} >40(45)MPa	planum pod temelji, ustrezna utrditev	M2	235,00	4,00	940,00 €
013	Zasip z drobljencem 0-126mm oz. ekvivalentnim vodoprepustnim in zmrzlinosko odpornim materialom s sprotnim utrjevanjem in planiranjem po plasteh. Dobava in vgradnja. Vključno s transportom po gradbišču (npr. terenski demper)	Zasip z izkopanim materialom ni ustrezen! Dobava, vgradnja drobljenca po plasteh do 20-30cm s sprotnim utrjevanjem. Zasip se izvaja sproti z zidanjem zidu.	M3	1325	18,00	23.850,36 €
014	Vgradnja drenažnega drobljenca 16-32mm ob vtoke v odcednice in drenažne cevi v zaledju zidov KVB	V sferi radija cca 30cm ob odcednicah. (0,14m3/odcednico)	M3	16,38	25,00	409,50 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
015	Vgradnja drenažnega drobljenca 16-32mm ob vzdolžno drenažo.	A=0,35 m ³ /m.	M3	40,60	25,00	1.015,00 €
016	Odlaganje odpadne zemljine in kamnine na stalno deponijo. Prevoz na razdaljo > 5000m, stroški deponije.	nakladanje in prevoz sta všteta že v postavki izkopa zemljine	T	5500,80	2,50	13.752,00 €
017	Planiranje in humuziranje brežin v debelini 20cm z lokano deponiranim materialom, ustreznost utrditev brežin in zatravitev s semenom. Vključno z nego do popolne ozelenitve.		M2	440,00	4,00	1.760,00 €

3 Gradbena in obrtniška dela

3.1 Tesarska dela

23.200,00 €

Op.: Pri vseh postavkah opaženja je vključena demontaža in čiščenje opaža. V ceno so vračunani vsi potrebni podporni elementi, ograja.

018	Izdelava enostranskega opaža za zid iz kamna v betonu. VB0.	Zidovi KVB. (Za hitrejšo izvedbo pri višjih (>5m) delovnih izkopih je možna uporaba slepega opaža)	M2	580,00	40,00	23.200,00 €
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3.2 Dela z jeklom za ojačitev

22.154,40 €

019	Dobava in postavitve mreže iz vlečene jeklene žice (S500 B), s premerom > od 4 in < od 12 mm, masa nad 12,34 kg/m ² (Q785)	mreže na zaledni strani zidu in po dnu temelja, minimalni prekrivni sloj armature je 10cm, minimalni preklopi mrež 50cm 60kos (zaledna stena) + 20kos (temelj)	KG	13032,00	1,70	22.154,40 €
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3.3 Dela s cementnim betonom

912,60 €

020	Dobava in vgraditev cementnega betona C12/15 v debelini do 15cm	podložni beton 10cm kadunjast odtok pod drenažno cevjo	M3	4,64	90,00	417,60 €
021	Dobava in vgraditev cementnega betona C20/25 v debelini do 15cm	betoniranje stika med zidom in muldo. Metlanje površine in padec (min 2%) proti muldi	M3	5,50	90,00	495,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
3.4 Zidarska in kamnoseška dela						105.600,00 €
022	Zidanje s kamnom v betonu, na eno lice - dobava, prevoz, 1x premet, 90% strojno, 10% ročno zidanje (izvedba na kroni), uporaba klesanega kamna za izvedbo ravne ploskve z minimalno površino betona, beton C25/30, XC2, razmerje kamen:beton=60:40. Obdelava reg s cementno malto oziroma sprotno zagladitvijo svežega betona (ročna obdelava)	Zid KVB. Zaradi velike višine zidu se po potrebi zid na najnižjem odseku izvede najprej od spodaj, nato pa izven dosega roke mehanizacije, se le-ta prestavi nad zid in dela potekajo z zgornje brežine. Sproti z izvedbo zidu se izvaja utrjen zaledni zasip.	M3	880,00	120,00	105.600,00 €

3.5 Ključavničarska dela						14.300,00 €
023	Dobava in vgraditev lesene ograje (tip ograje za pešce in kolesarje, npr. P-LKO-1300, trasa - Petrič). Vključno z vsemi elementi, potrebnimi za namestitve. Predvidena vgradnja 0,5m za zidom z zabitjem stebrov v temeljna tla/nasutje)	Izvedba in oblika ograje v dogovoru med naročnikom dokumentacije in lastniki zalednih zemljišč!	M	110,00	130,00	14.300,00 €

3.6 Hidroizolacije						0,00 €
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3.7 Detajli AB elementov						0,00 €
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4 Voziščna konstrukcija						0,00 €
Op.: Izvedba deniveliranih površin pred zidom, vključno z zasipom temelja zidu s sprednje strani oz. ureditvijo voziščne konstrukcije je zajeto v načrtu						

5 Odvodnavanje						5.235,00 €
024	Izdelava odcednice iz trde plastične cevi, premera 10 cm, dolžine do 250 cm. Betonsko sive barve in potopljene v zid	spodnja vrsta: 55kom (L do 250cm) srednja vrsta: 49kom (L do 200cm) zgornja vrsta: 13kom (L do 150cm) - na lokaciji geometrije zidu TIP3	KOS	117,00	15,00	1.755,00 €
025	Izdelava vzdolžne drenaže, na podložni plasti iz podložnega betona, s perforiranimi cevmi iz umetnih mas premera 20 cm. Navezava na jaške meteorne kanalizacije po načrtu ceste/kolesarske steze	Drenažna cev je razdeljena na dva dela - odtok proti SZ (L=42m) in odtok proti JV (L=74m)	M	116,00	30,00	3.480,00 €

zap. št.	Opis postavke	Opomba postavke	Enota	kol.	cena/enoto	Cena brez DDV
6 Zavarovalna dela v strugi						0,00 €

7 Ostalo						0,00 €
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8 Tuje storitve						6.100,00 €
026	Projektantski nadzor.		URA	10,00	70,00	700,00 €
027	Geotehnični nadzor.		URA	20,00	70,00	1.400,00 €
028	Izdelava projektne dokumentacije za projekt izvedenih del		KOS	1,00	4000,00	4.000,00 €
029	Nepredvidena dela					

SKUPAJ						250.734,86 €
DDV						55.161,67 €
SKUPAJ Z DDV						305.896,53 €

8 GRAFIČNI PRIKAZI

G.0 Pregledna situacija

G.1.1 Gradbena situacija

G.1.2 Zakoličbena situacija

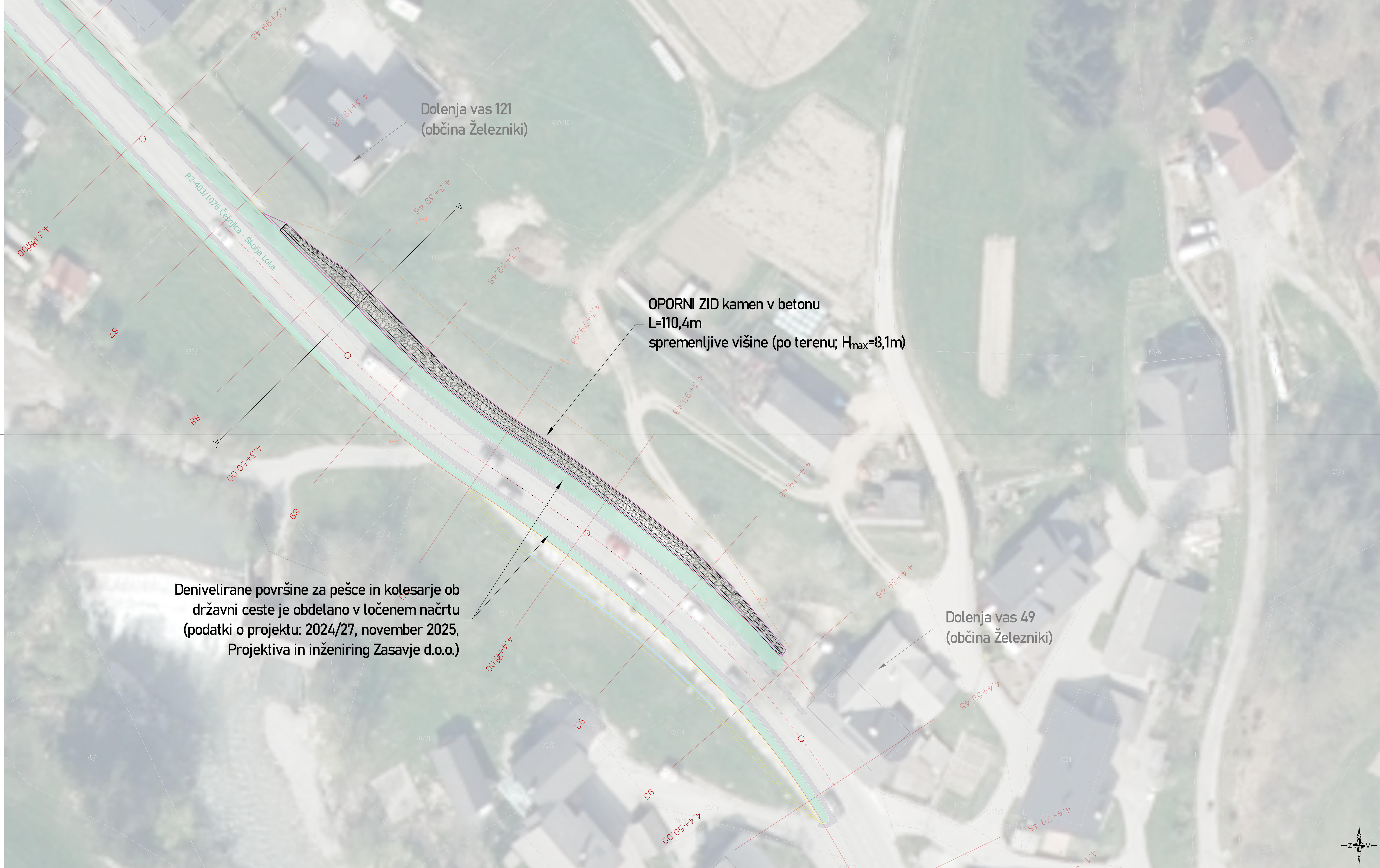
G.2.1 Prečni prerezi - P1 do P3 (cestni profili 88 do 90)

G.2.2 Prečni prerezi – P4 do P6 (cestni profili 91 do 93)

G.2.3 Prečni prerezi – A-A' (kritični prerez za stabilnostno analizo)

G.3 Vzдолžni prerez

G.4 Karakteristični prečni prerez



LEGENDA:

- ZID kamen v betonu (KVB)
- konture predvidenih ureditev
- Površine za pešce/kolesarje
- Mulda ob zidu

Investitor:

Občina Železniki
Češnjica 48
4228 Železniki

Vodire projektant:

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PROJEKCIJSKI INŽENIRING ZASAVJE d.o.o.
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Vodja projekta:

mag. Simon Kovačič, dipl. inž. grad.

Poskuševalni inženir:

dr. Jošt Sodnik, univ. dipl. inž. grad.

Sodelavci račita:

Alen Oblok, mag. inž. grad.
Nina Gognjavec, univ. dipl. inž. geol.

Naziv gradnje:

Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675

Naziv:

2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)

Vrsta projektnih dokumentacije:

PZI

Št. projekta:

2024/27

Št. načrta:

119/2026

Vredna grafičnega prikaza:

PREGLEDNA SITUACIJA

Datum:

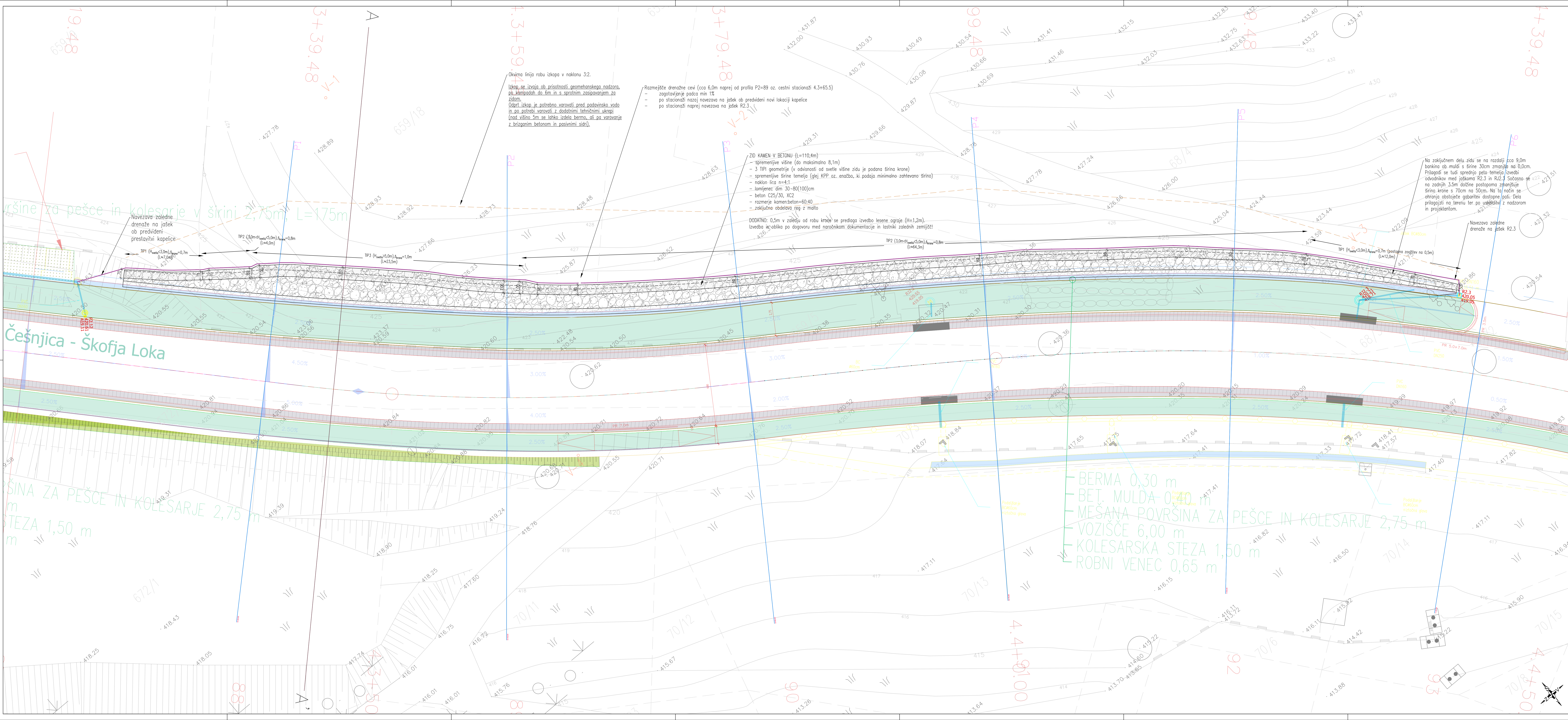
Marec 2026

Merilo:

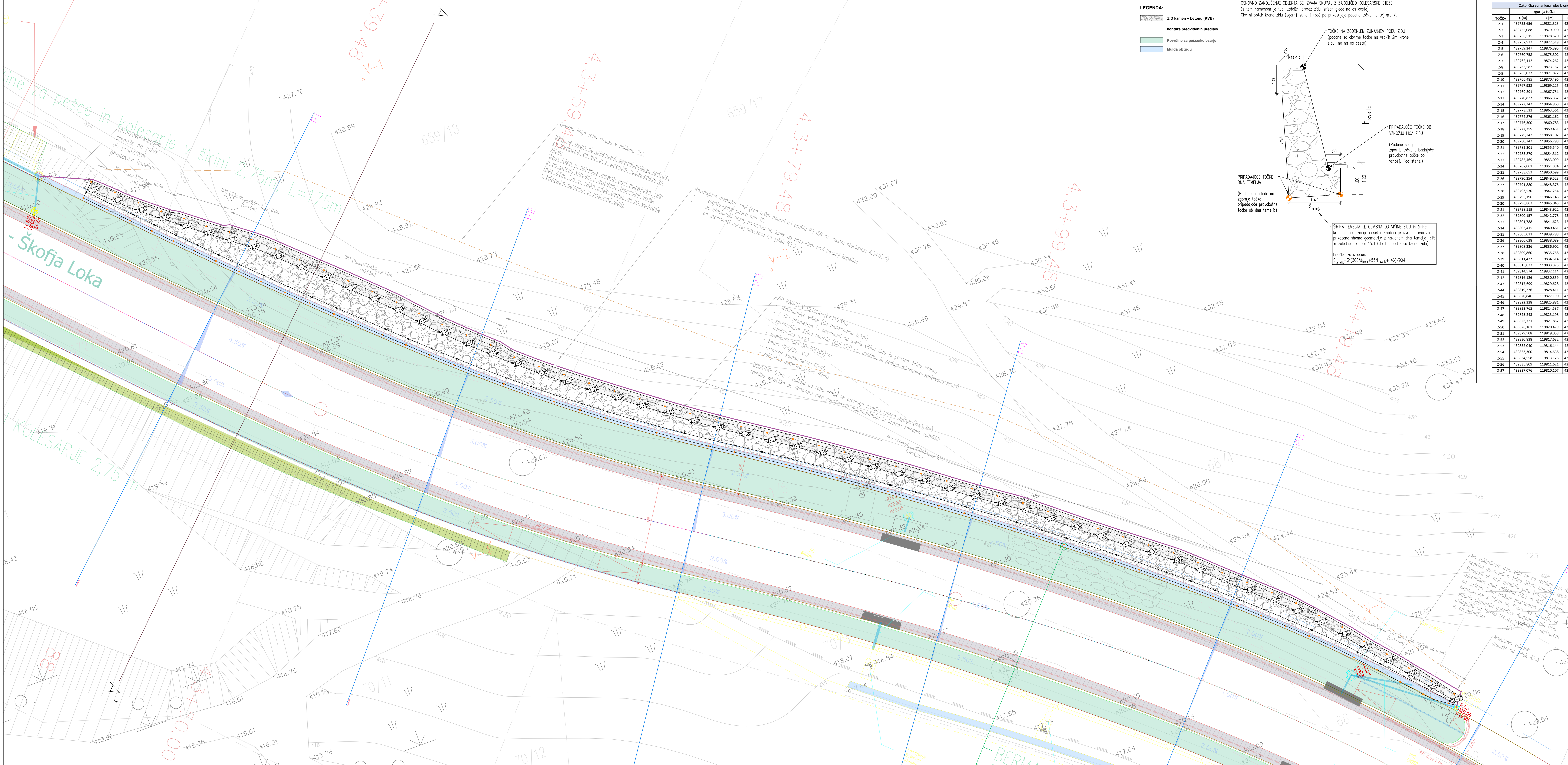
1:250

Št. razpisne:

G.O

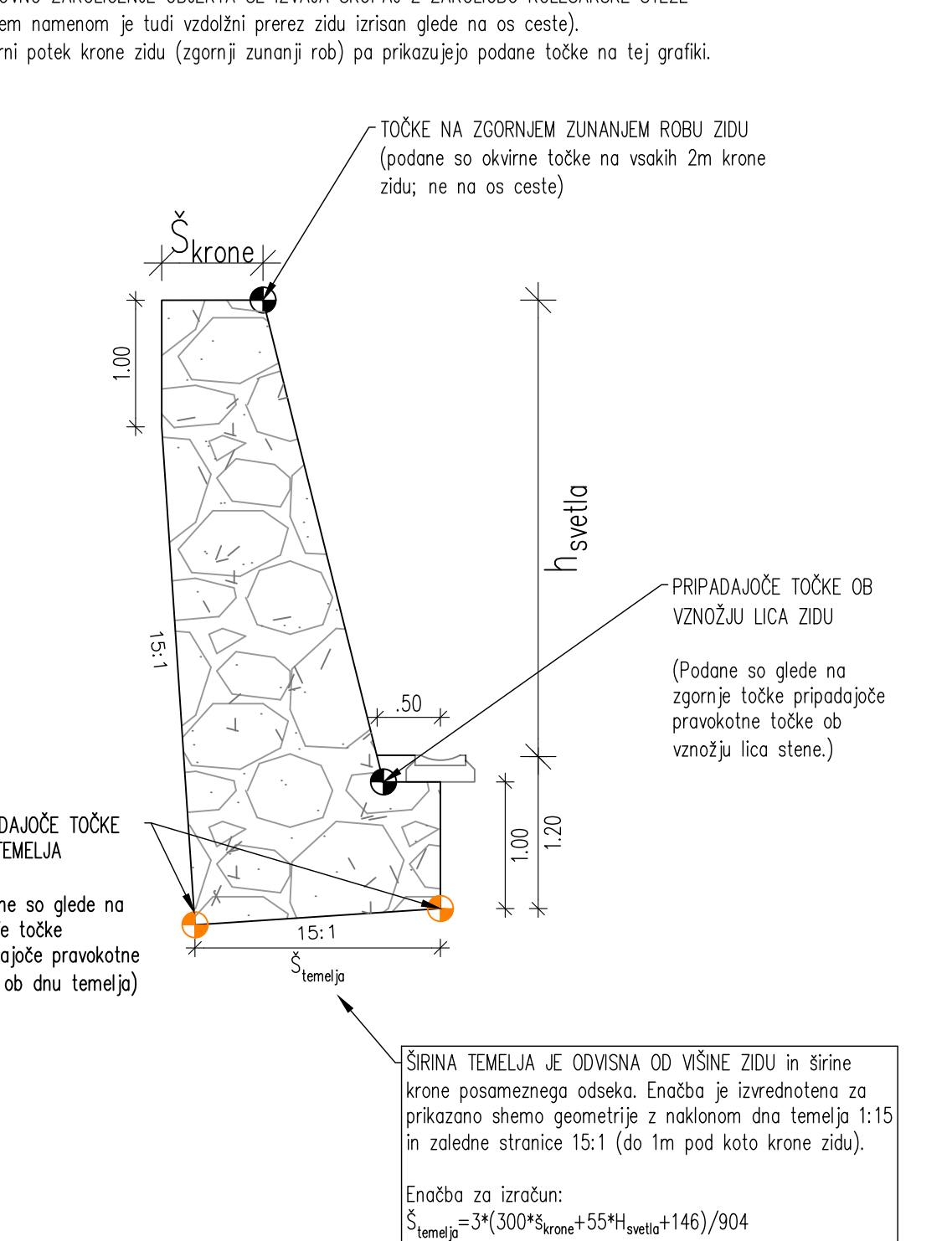


Investitor: Občina Železniki Češnjica 48 4228 Železniki		Navedba: Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675	
Vrednotenje: PROJEKTIŠKA IN INŽENIRSKA ZAGRAJE d.o.o. Opis: 12.403.1076 T: 010 3970 332 527 M: 010 3970 332 527		Naziv projekta: 2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner: Tempos okrajško gradbeništvo		Vrednotenje dokumentacije: PZI	
Navedba projekta: mag. Simon Kovačič, dipl.inž.grad.		Št. projekta: 2024/27	
Podpis projekta: dr. Jože Sodnik, univ.dipl.inž.grad.		Št. datuma: 119/2026	
Odobreno načrt: Aleš Oblik, mag.inž.grad. Nina Gogljavec, univ.dipl.inž.geol.		Vrednotenje projekta: GRABERNA SITUACIJA	
Datum: Marec 2026		Merna 1:100	
Št. izdaje: G.1.0		Datum: Marec 2026	



LEGENDA:

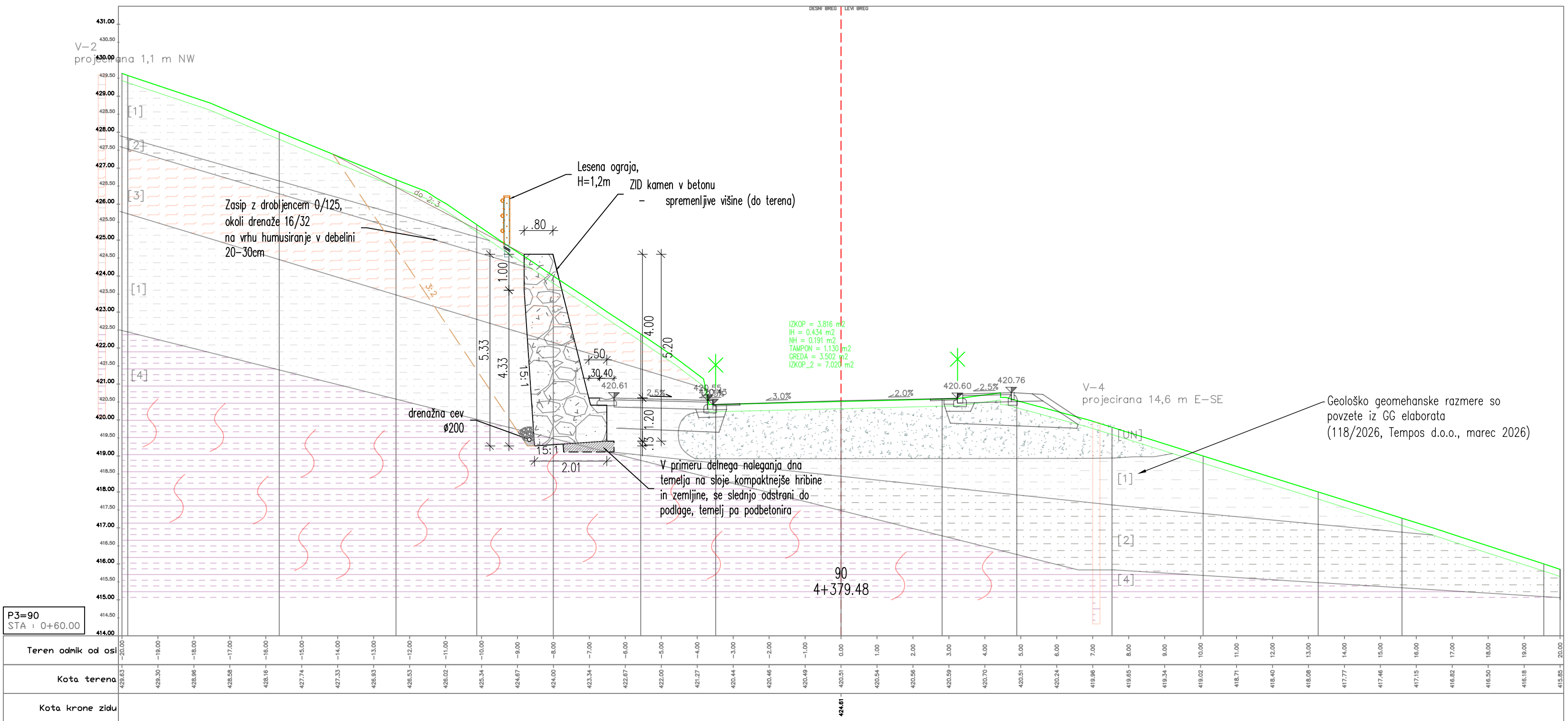
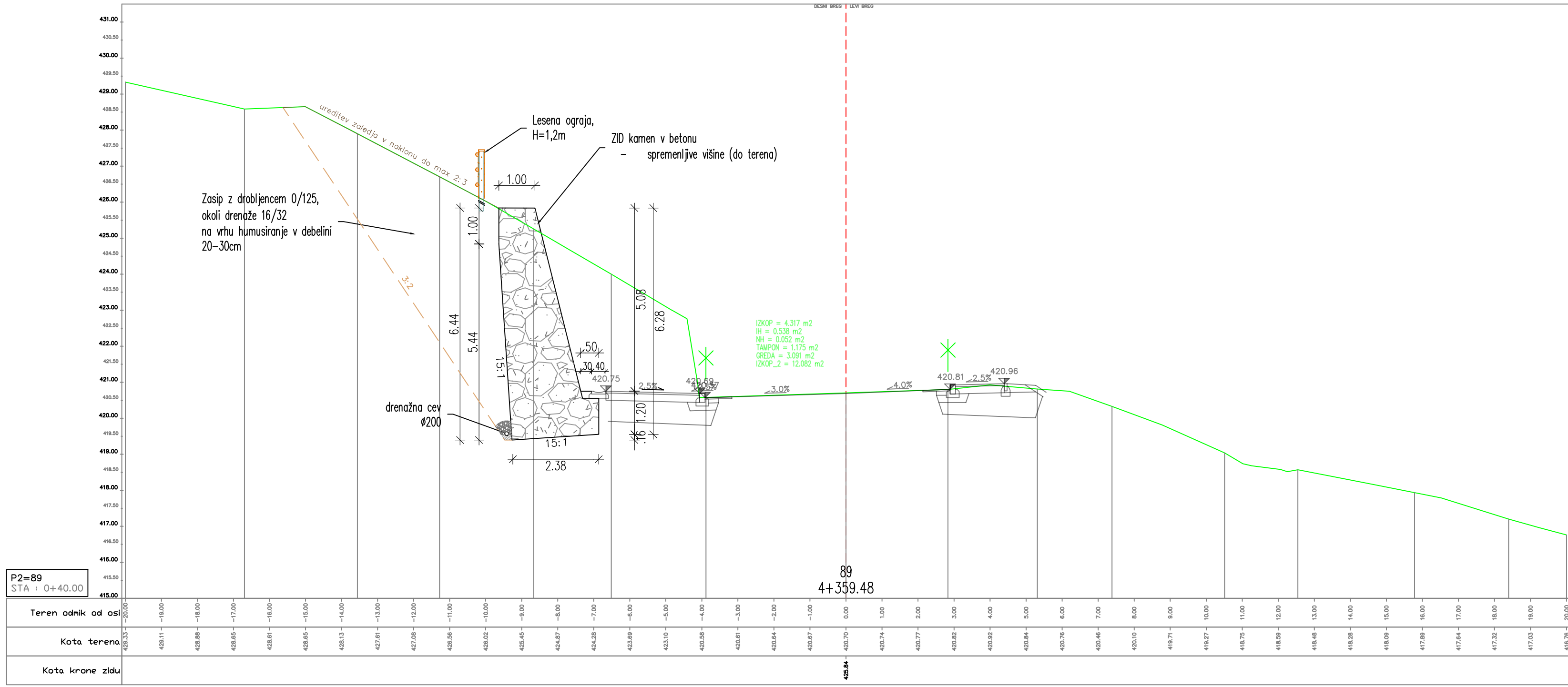
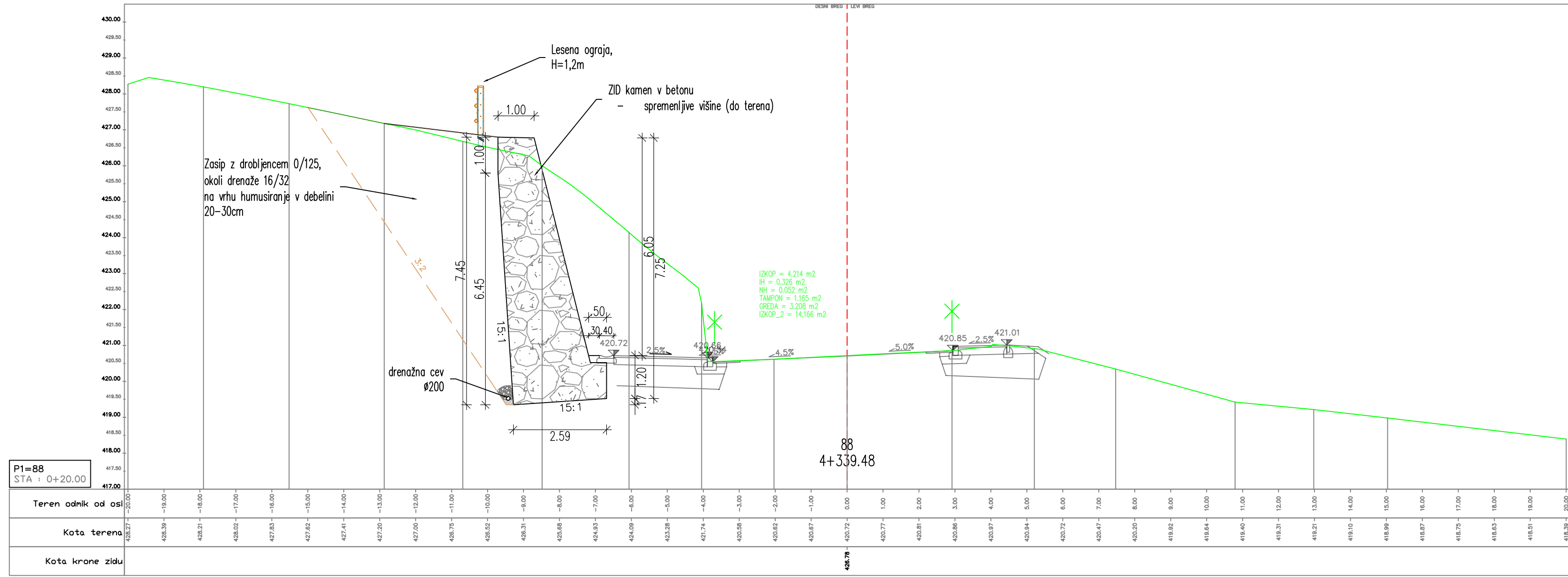
- Zid kamen v betonu (KVB)
- konture predvidenih ureditev
- Površine za pešce/kolesarje
- Mulda ob zidu



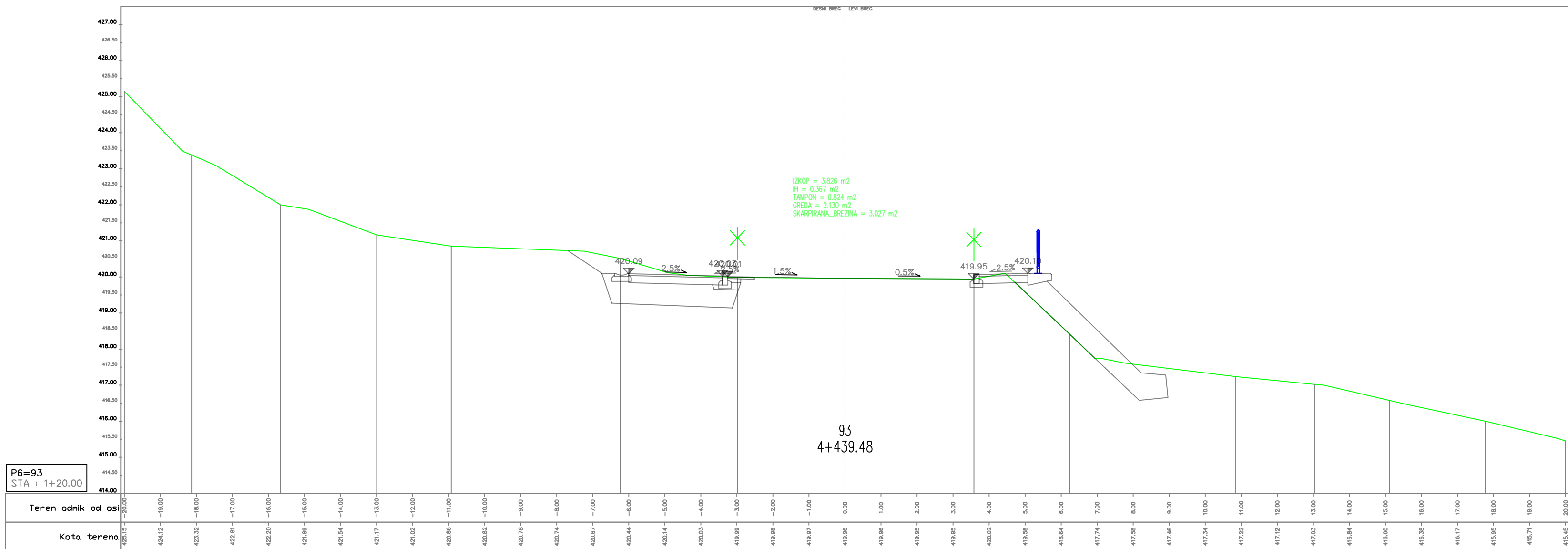
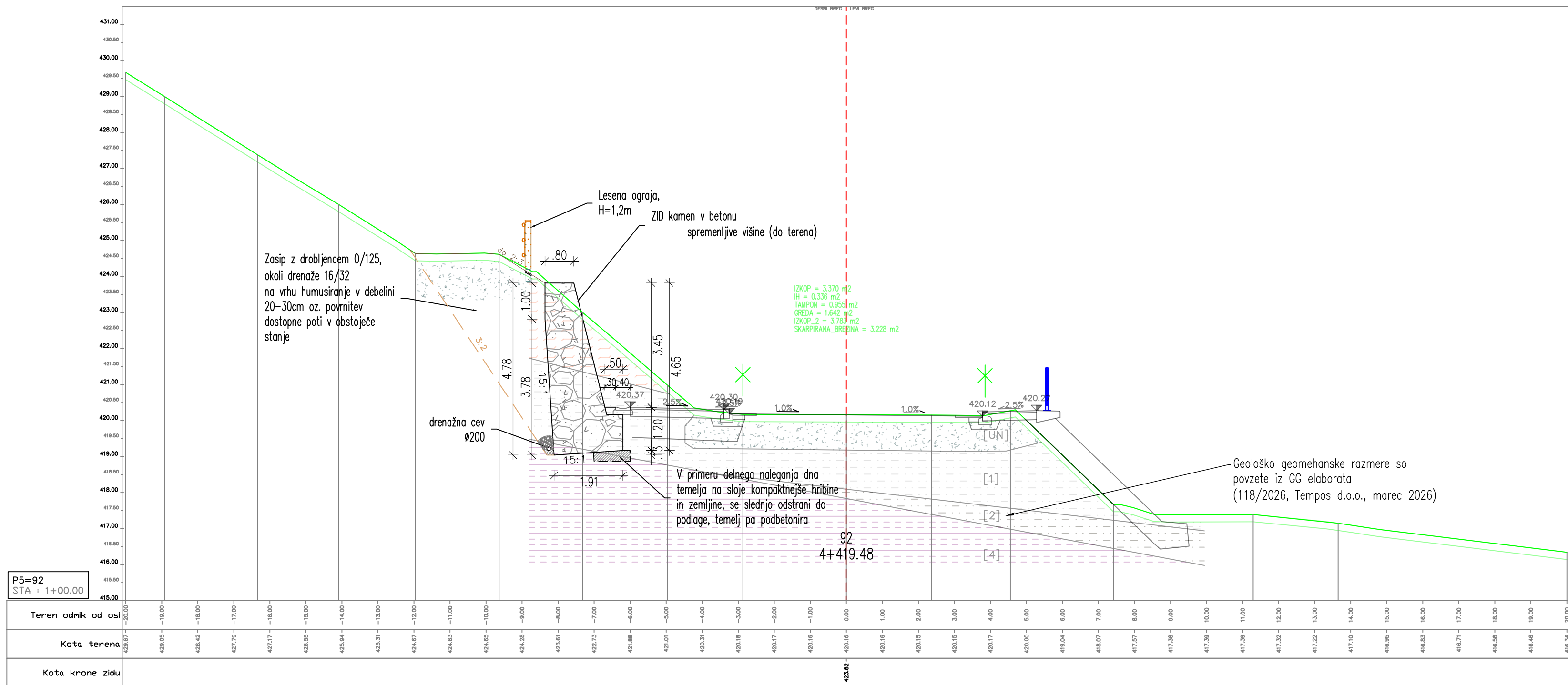
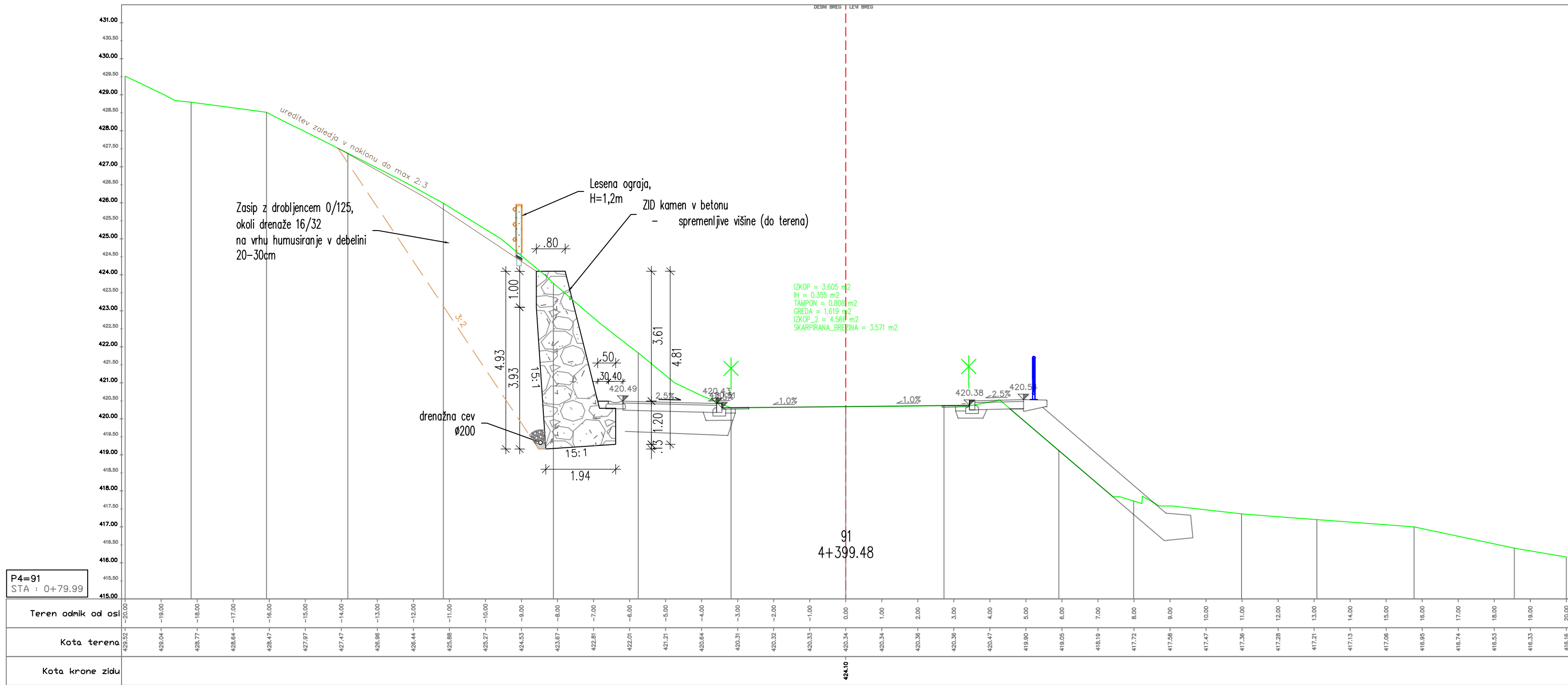
OSNOVNO ZAKLJUČENJE OBJEKTA SE IZJAVJA SKUPAJ Z ZAKLJUČNO KOLESARSKO STEZO (s tem namenom je tudi vzdolžni prerez zidu izrisan glede na os ceste). Okvirni potek krone zidu (zgornji zunanji rob) po prikazanih podane točke na tej grafiki.

Zaključba zunanjega robu krone zidu in pripadajoče pravokotne točke ob vznožju srednjega lica									
TOČKA	X [m]	Y [m]	Z [m]	X [m]	Y [m]	Z [m]	H _{max}	mini	δ
2-1	439753.656	119881.323	421.620	439753.495	119881.164	420.515	0.91	1.35	
2-2	439755.088	119879.990	422.031	439754.856	119879.759	420.521	1.31	1.43	
2-3	439756.515	119878.070	422.459	439756.213	119878.869	420.525	1.70	1.50	
2-4	439757.932	119877.519	423.244	439757.486	119877.075	420.527	2.52	1.65	
2-5	439759.347	119876.395	424.101	439758.749	119875.800	420.527	3.37	1.90	
2-6	439760.758	119875.302	425.005	439759.999	119874.548	420.526	4.28	2.07	
2-7	439762.112	119874.262	425.877	439761.200	119873.309	420.524	5.15	2.43	
2-8	439763.582	119873.152	426.848	439762.585	119872.085	420.522	6.13	2.60	
2-9	439765.037	119871.872	427.284	439763.914	119870.681	420.537	6.55	2.68	
2-10	439766.485	119870.496	427.381	439765.341	119869.294	420.544	6.64	2.70	
2-11	439767.938	119869.125	427.473	439766.783	119867.900	420.548	6.73	2.71	
2-12	439769.391	119867.751	427.526	439768.231	119866.517	420.552	6.77	2.72	
2-13	439770.827	119866.362	427.453	439769.683	119865.139	420.554	6.70	2.71	
2-14	439772.247	119864.968	427.292	439771.134	119863.772	420.556	6.54	2.68	
2-15	439773.532	119863.561	426.680	439772.525	119862.473	420.557	5.93	2.57	
2-16	439774.876	119862.162	425.213	439773.854	119861.157	420.557	5.46	2.48	
2-17	439776.300	119860.783	425.951	439775.431	119859.818	420.556	5.20	2.43	
2-18	439777.759	119859.431	425.747	439776.925	119858.501	420.551	5.00	2.40	
2-19	439779.242	119858.102	425.557	439778.447	119857.197	420.542	4.81	2.16	
2-20	439780.747	119856.798	425.380	439779.965	119855.934	420.525	4.45	2.14	
2-21	439782.301	119855.540	425.348	439781.552	119854.652	420.502	4.65	2.13	
2-22	439783.879	119854.312	425.367	439783.147	119853.400	420.491	4.68	2.14	
2-23	439785.469	119853.099	425.348	439784.748	119852.181	420.481	4.67	2.14	
2-24	439787.061	119851.894	425.244	439786.349	119850.987	420.469	4.58	2.12	
2-25	439788.652	119850.699	425.045	439787.941	119849.826	420.452	4.39	2.09	
2-26	439790.254	119849.523	424.823	439789.529	119848.681	420.434	4.19	2.05	
2-27	439791.880	119848.375	424.631	439791.251	119847.561	420.414	4.02	2.02	
2-28	439793.530	119847.234	424.480	439792.909	119846.459	420.395	3.89	2.00	
2-29	439795.196	119846.148	424.446	439794.544	119845.355	420.383	3.86	1.99	
2-30	439796.863	119845.043	424.466	439796.202	119844.247	420.371	3.89	2.00	
2-31	439798.519	119843.922	424.462	439797.952	119843.128	420.360	3.90	2.00	
2-32	439800.157	119842.778	424.392	439799.594	119841.999	420.350	3.84	1.99	
2-33	439801.788	119841.623	424.325	439801.228	119840.860	420.339	3.79	1.98	
2-34	439803.415	119840.461	424.276	439802.856	119839.709	420.328	3.75	1.97	
2-35	439805.033	119839.288	424.226	439804.475	119838.548	420.318	3.71	1.96	
2-36	439806.628	119838.089	424.089	439806.084	119837.378	420.307	3.58	1.94	
2-37	439808.236	119836.902	424.071	439807.698	119836.195	420.296	3.58	1.94	
2-38	439809.860	119835.758	424.284	439809.272	119835.011	420.285	3.80	1.98	
2-39	439811.477	119834.614	424.532	439810.843	119833.821	420.274	4.06	2.03	
2-40	439813.093	119833.373	424.372	439812.417	119832.613	420.262	3.91	2.00	
2-41	439814.574	119832.114	424.172	439813.983	119831.394	420.251	3.72	1.97	
2-42	439816.126	119830.859	424.065	439815.545	119830.162	420.239	3.63	1.95	
2-43	439817.699	119829.628	424.139	439817.100	119828.919	420.227	3.71	1.96	
2-44	439819.276	119828.411	424.315	439818.642	119827.670	420.215	3.90	2.00	
2-45	439820.846	119827.190	424.517	439820.172	119826.413	420.203	4.11	2.04	
2-46	439822.328	119825.981	424.287	439821.680	119825.152	420.192	3.89	2.00	
2-47	439823.765	119824.537	423.932	439823.167	119823.880	420.180	3.55	1.93	
2-48	439825.243	119823.198	423.799	439824.651	119822.576	420.165	3.43	1.91	
2-49	439826.721	119821.852	423.742	439826.128	119821.245	420.148	3.39	1.91	
2-50	439828.200	119820.479	423.600	439827.606	119819.901	420.131	3.29	1.89	
2-51	439829.658	119819.058	423.212	439829.096	119818.560	420.115	2.90	1.77	
2-52	439831.038	119817.632	422.772	439830.389	119817.206	420.099	2.47	1.64	
2-53	439832.040	119816.144	422.193	439831.659	119815.849	420.071	1.92	1.44	
2-54	439833.300	119814.638	421.874	439832.975	119814.387	420.035	1.64	1.39	
2-55	439834.518	119813.128	421.540	439834.207	119812.932	420.089	1.24	1.17	
2-56	439835.809	119811.621	421.193	439835.605	119811.463	419.962	1.03	1.18	
2-57	439837.076	119810.107	420.872	439836.928	119809.993	419.926	0.75	1.12	

Zaključna zunanjega robu krone zidu in pripadajoče pravokotne točke na drugo temeljno									
TOČKA	X [m]	Y [m]	Z [m]	X [m]	Y [m]	Z [m]	H _{max}	mini	δ
2-1	439753.133	119880.819	419.515	439754.105	119881.756	419.425			
2-2	439754.501	119879.407	419.521	439755.515	119880.414	419.426			
2-3	439755.858	119878.017	419.525	439756.934	119879.075	419.425			
2-4	439757.131	119876.713	419.527	439758.302	119877.886	419.417			
2-5	439758.394	119875.448	419.527	439759.742	119876.787	419.400			
2-6	439759.644	119874.196	419.526	439761.112	119875.655	419.388			
2-7	439760.896	119872.950	419.524	439762.260	119874.663	419.362			
2-8	439762.240	119871.618	419.522	439763.498	119873.581	419.349			
2-9	439763.521	119870.318	419.527	439764.810	119872.568	419.358			
2-10	439764.996	119869.032	419.544	439766.858	119870.887	419.364			
2-11	439766.440	119867.391	419.548	439768.301	119869.509	419.367			
2-12	439767.888	119866.153	419.552	439769.751	119868.135	419.371			
2-13	439769.341	119864.713	419.554	439771.139	119866.713	419.373			
2-14	439770.793	119863.407	419.556	439772.620	119865.368	419.377			
2-15	439771.186	119862.106	419.557	439773.931	119863.993	419.386			
2-16	439771.616	119860.788	419.557	439775.292	119862.616	419.392			
2-17	439772.097	119859.446	419.556	439776.722	119861.252	419.394			
2-18	439772.550	119858.129	419.551	439778.194	119859.915	419.391			
2-19	439778.117	119856.821	419.542	439779.542	119858.444	419.398			
2-20	439779.628	119855.563	419.525	439781.065	119857.149	419.382			
2-21	439781.219	119854.309	419.502	439782.602	119855.998	419.360			
2-22	439782.834	119853.010	419.491	439784.314	119854.879	419.346			
2-23	439784.439	119851.788	419.481	439785.761	119853.471	419.338			
2-24	439786.060	119850.590	419.469	439787.351	119852.272	419.328			
2-25	439787.679	119849.429	419.452	439788.950	119851.088	419.313			
2-26	439789.321	119848.280	419.434	439790.553	119849.936	419.297			
2-27	439790.998	119847.155	419.414	439792.182	119848.792	419.279			
2-28	439792.680	119846.051	419.395	439793.834	119847.684	419.262			
2-29	439794.358	119844.945	419.383	439795.495	119846.578	419.250			
2-30	439796.033	119843.839	419.371	439797.166	119845.473	419.238			
2-31	439797.661	119842.721	419.350	439798.824	119844.349	419.227			
2-32	439799.300	119841.594	419.350	439800.467	119843.206	419.217			
2-33	439800.933	119840.456	419.339	439802.104	119842.053	419.207			
2-34	439802.557	119839.307	419.328	439803.741	119840.999	419.197			
2-35	439804.174	119838.148	419.318	439805.354	119839.915	419.187			
2-36	439805.780	119836.980	419.307	439806.959	119838.821	419.178			
2-37	439807.382	119835.800	419.296	439808.571	119837.733	419.167			
2-38	439808.963	119834.619	419.285	439810.188	119836.574	419.153			
2-39	439810.521	119833.431	419.274	439811.798	119835.417	419.139			
2-40	439812.103	119832.224	419.262	439813.395	119834.278	419.129			
2-41	439813.666	119831.008	419.251	439814.956	119833.130	419.120			
2-42	439815.225	119829.778	419.239	439816.473	119831.976	419.109			
2-43	439816.778	119828.537	419.227	439818.040	119830.805	419.096			
2-44	439818.317	119827.290	419.215	439819.617	119829.610	419.082			
2-45	439819.856	119826.035	419.203	439821.181	119828.411	419.070			
2-46	439821.350	119824.777	419.192	439822.677	119827.202	419.062			
2-47	439822.747	119823.527	419.180	439824.129	119826.024	419.052			
2-48	439824.306	119822.280	419.165	439825.623	119824.823	419.043			
2-49	439825.779	119821.086	419.148	439827.133	119823.612	419.032			
2-50	439827.228	119819.847	419.131	439828.550	119822.400	419.020			
2-51	439828.658	119818.211	419.115	439829.970	119821.190	419.009			
2-52	439830.077	119816.574	419.098	439831.396	119819.980	418.998			
2-53	439831.263	119815.541	419.071	439832.827	119818.764	418.987			
2-54	439832.716	119814.000	419.035	439834.677	119817.014	418.950			
2-55	439833.896	119812.615	419.008	439836.868	119815.161	418.913			
2-56	439835.209	119811.130	418.972	439838.654	119813.264	418.876			
2-57	439836.260	119809.645	418.926	439840.477	119811.310	418.839			

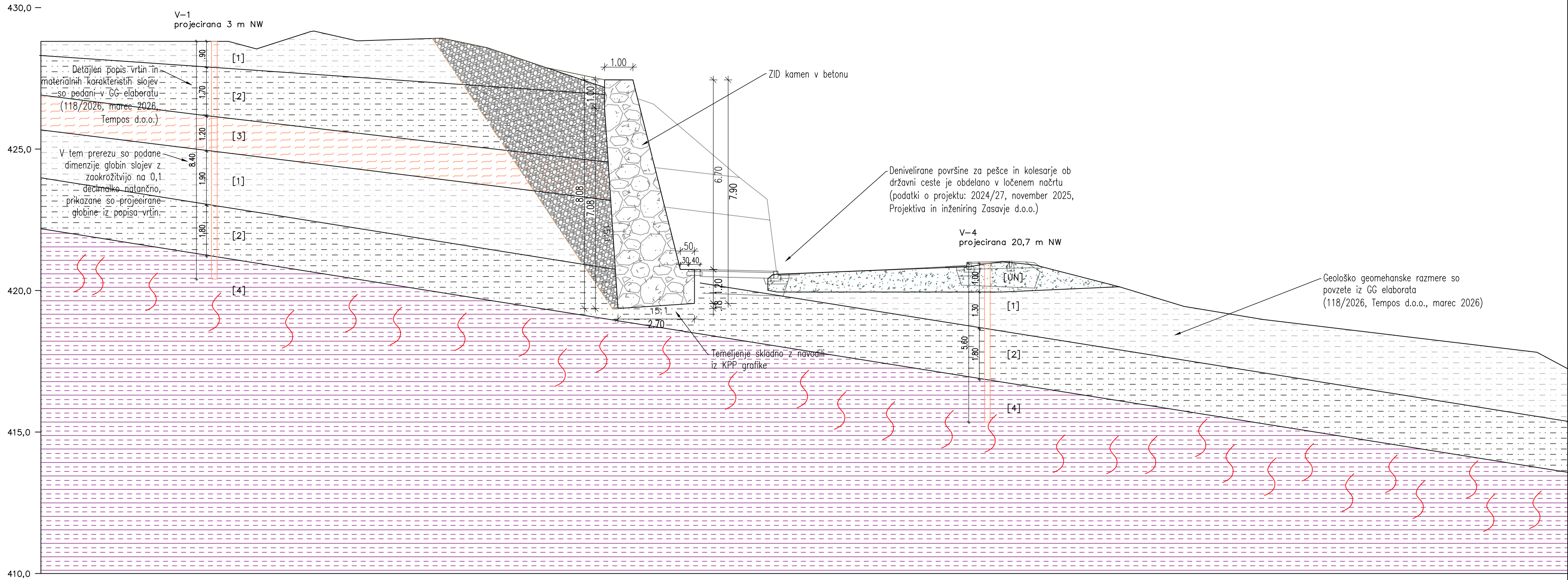


Investitor: Občina Železniki Češnjica 48 4228 Železniki		Naziv gradnje: Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675	
Vodilni projektant: PIZ PROJEKTVNA IN INŽENIRSKO ZAGRAJE d.o.o. Osrednja 22, 1420 Trbovlje T: +386 (0)70 362 527 M: info@piz.si W: www.piz.si		Način: 2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner: Tempus Tehnološki park 25 1000 Ljubljana T: +386 (0)6 288 642 M: info@tempus.si W: www.tempus.si		Vrsta projektnih dokumentacij: PZI	
Vodja projektiranja: mag. Simon Kovačič, dipl.inž.grad.		Št. projekta: 2024/27	
Poslaščeni inženir: dr. Jošt Sodnik, univ.dipl.inž.grad.		Št. načrta: 119/2026	
Sodelavci načrta: Aleš Oblak, mag. inž. grad. Nina Gognjavec, univ. dipl. inž. geol.		Vrednotenje projekta: PREČNI PREREZI - P1 do P3 (cestrni profil 88 do 90)	
Datum: Marec 2026		Merilo: 1:100	
ID oznaka: RG-0234		ID oznaka: G.2.1	



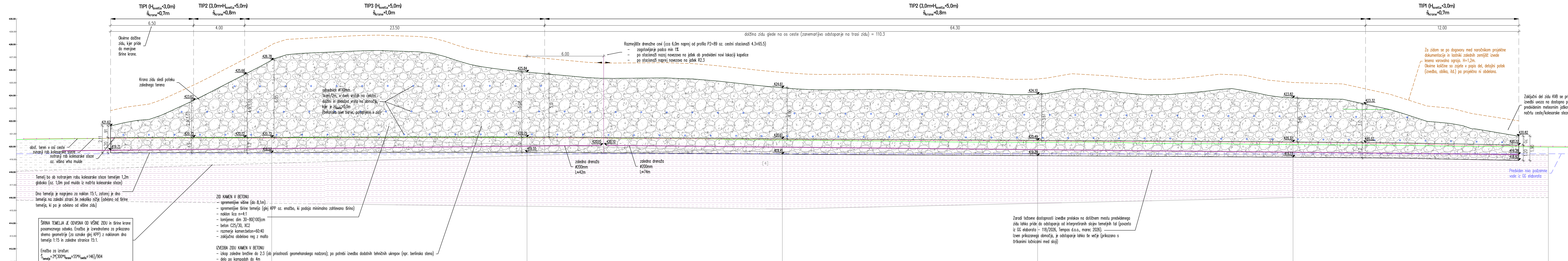
Investitor: Občina Železniki Češnjica 48 4228 Železniki		Naziv gradnje: Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675	
Vodilni projektant: PIZ PROJEKTIVALNI INŽENIRSKI ZAGRAJE d.o.o. Glasna 22, 1420 Trbovlje T: +386 (0)70 262 527 M: info@piz.si		Način: 2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner: Tempo Tehnološki park 25 1000 Ljubljana T: +386 (0)1 208 642 M: info@tempo.si W: www.tempo.si		Vrsta projektnih dokumentacij: PZI	
Vodja projektiranja: mag. Simon Kovačič, dipl.inž.grad.		Št. projekta: 2024/27	
Poslaščeni inženir: dr. Jošt Sodnik, univ.dipl.inž.grad.		Št. načrta: 119/2026	
Sodelavci načrta: Aleš Oblak, mag. inž. grad. Nina Gognjavec, univ. dipl. inž. geol.		Vrednotenje projekta: PREČNI PREREZI - P4 DO P6 (cestrni profil 91 do 93)	
Datum: Marec 2026		Merilo: 1:100	
ID oznaka: RG-0234		ID oznaka: G.2.2	

- PREREZ A-A'
- odsek z maksimalno višino zidu
 - izvedena stabilnostna analiza predvidenega stanja v kritičnem prerezu



Investitor: Občina Železniki Češnjica 48 4228 Železniki		Naziv gradnje: Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675	
Vodilni projektant: PIZ PROJEKTIVA IN INŽENIRING ZASAVJE d.o.o. Ojstro 22, 1420 Trbovlje T: +386 (0)70 262 527 M: info@piz.si		Načrt: 2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner: Tempos okoljsko gradbeništvo Tehnološki park 21 1000 Ljubljana T: +386 (0)41 288 442 M: info@tempos.si W: www.tempos.si		Vrsta projektne dokumentacije: PZI	
Vodja projektiranja: mag. Simon Kovačič, dipl.inž.grad.		Št. projekta: 2024/27	Št. načrta: 119/2026
Pooblaščen inženir: dr. Jošt Sodnik, univ.dipl.inž.grad.		Vsebina grafičnega prikaza: PREČNI PREREZ - A-A' (Kritični prerez za stabilnostno analizo)	
Sodelavci načrta: Aleš Oblak, mag. inž. grad. Nina Gognjavec, univ. dipl. inž. geol.		Datum: Marec 2026	ID oznaka: G.2.3
RG-0234		Merilo: 1:100	

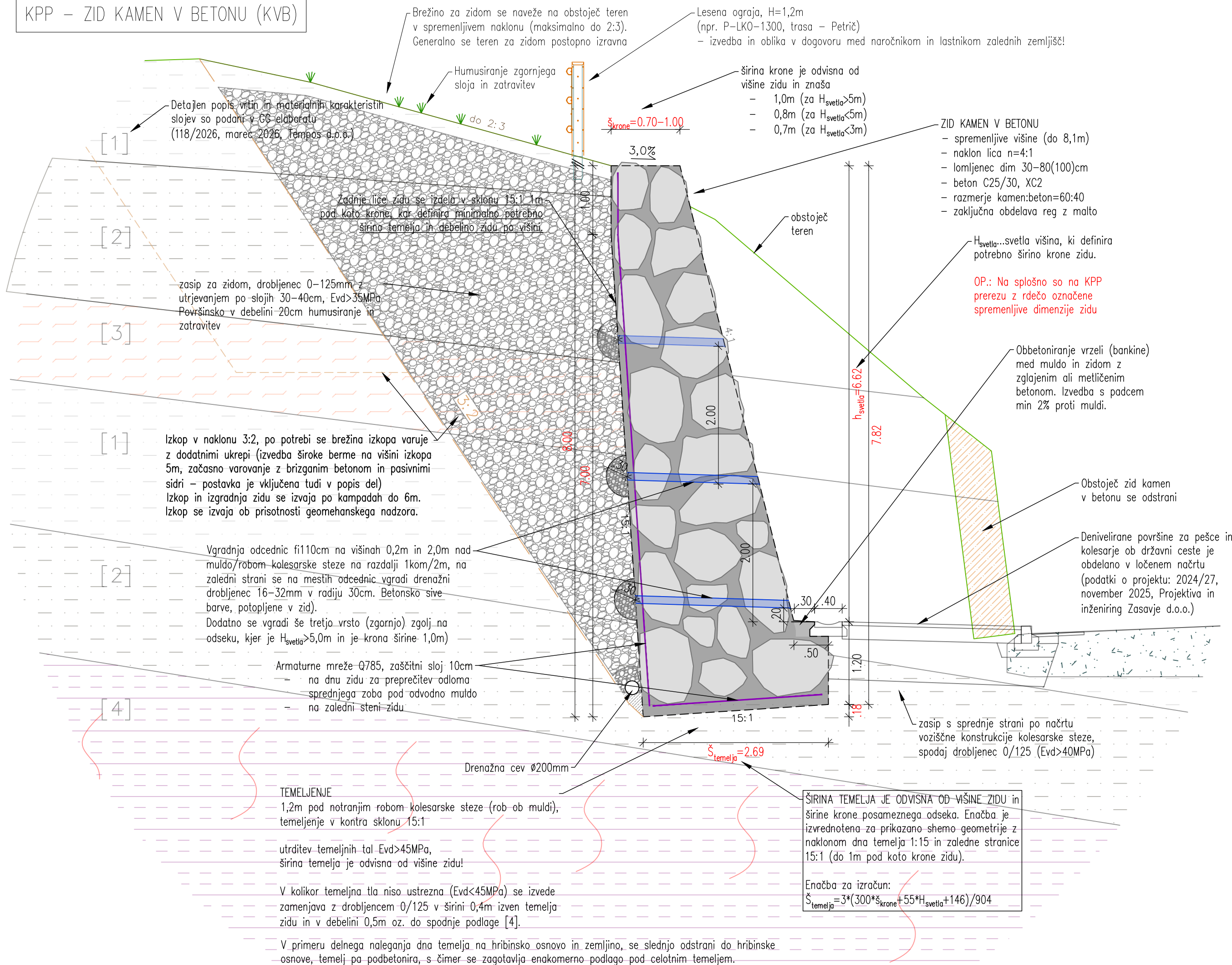
olžni prerez po osi ceste (izsek od cestnih profilov 87 do 93; relativno profili P1 do P6)



OZNAKE PROFILOV	87		P1=88	20.00	P2=89	20.00	P3=90	19.99	P4=91	20.01	P5=92	20.00	P6=93
STACIONAŽE		začetek zidu											konec zidu
		0+07.38 (4.3+26.86)	0+20.00 (4.3+39.48) relativna oddaljenost od profila 87 oz. absolutna stacionaža cestnih profilov		0+40.00 (4.3+59.48)		0+60.00 (4.3+79.48)		0+79.99 (4.3+99.48)		1+00.00 (4.4+19.48)		1+17.68 (4.4+37.16) 1+20.00 (4.4+39.48)
KOTE TERENA			420.72		420.70		420.51		420.34		420.16		419.96

Investitor:		Naziv gradnje:	
Občina Železniki Češnjica 48 4228 Železniki		Rokolazska povezava Selca - Dolenja vas - Ševlje, ob K2-403/1076 Češnjica - Škofja Loka med 1,607 in km 4,675	
Vodilni projektant:		Načrt:	
 PROJEKTIRANJE IN INŽENJIRSKO ZASLANJE d.o.o. Opatje 22, 1420 Trzinje T: +386 (0)70 242 527 M: info@piz.si		2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner:		Vrsta projektnje dokumentacije:	
 Tempos okoljsko gradbeništvo		PZI	
Tehnološki park 21 1000 Ljubljana T: +386 (0)1 2988 442 M: info@tempos.si W: www.tempos.si		Št. projekta: 2024/27	
		Št. načrta: 119/2026	
Vodja projektiranja: mag. Simon Kovačič, dipl.inž.grad. G-3712		Vsebina grafičnega prikaza:	
Pooblaščen inženjer: dr. Jošt Sodnik, univ.dipl.inž.grad. G-2812		VZDOLŽNI PREREZ	
Sodelavci načrta: Aleš Oblak, mag. inž. grad. Nina Gognjavec, univ. dipl. inž. geol. RG-0234		Datum: Marec 2026	
		Merilo: 1:100	
		ID oznaka: G.3	

KPP – ZID KAMEN V BETONU (KVB)



Investitor: Občina Železniki Češnjica 48 4228 Železniki		Naziv gradnje: Kolesarska povezava Selca - Dolenja vas - Ševlje, ob R2-403/1076 Češnjica - Škofja Loka med km 2,607 in km 4,675	
Vodilni projektant: PIZ PROJEKTIVA IN INŽENIRING ZASAVJE d.o.o. Oljstro 22, 1420 Trbovlje T: +386 (0)70 262 527 M: info@piz.si		Načrt: 2.1 Načrt opornih konstrukcij (med cestnima profiloma 87 in 93)	
Partner: Tempos okoljsko gradbeništvo Tehnološki park 21 1000 Ljubljana T: +386 (0)41 288 442 M: info@tempos.si W: www.tempos.si		Vrsta projektne dokumentacije: PZI	
Vodja projektiranja: mag. Simon Kovačič, dipl.inž.grad.		Št. projekta: 2024/27	Št. načrta: 119/2026
Pooblašeni inženir: dr. Jošt Sodnik, univ.dipl.inž.grad.		Vsebina grafičnega prikaza: KARAKTERISTIČNI PREČNI PREREZ	
Sodelavci načrta: Aleš Oblak, mag. inž. grad. Nina Gognjavec, univ. dipl. inž. geol.		Datum: Marec 2026	ID oznaka: G.4
RG-0234		Merilo: 1:50	