

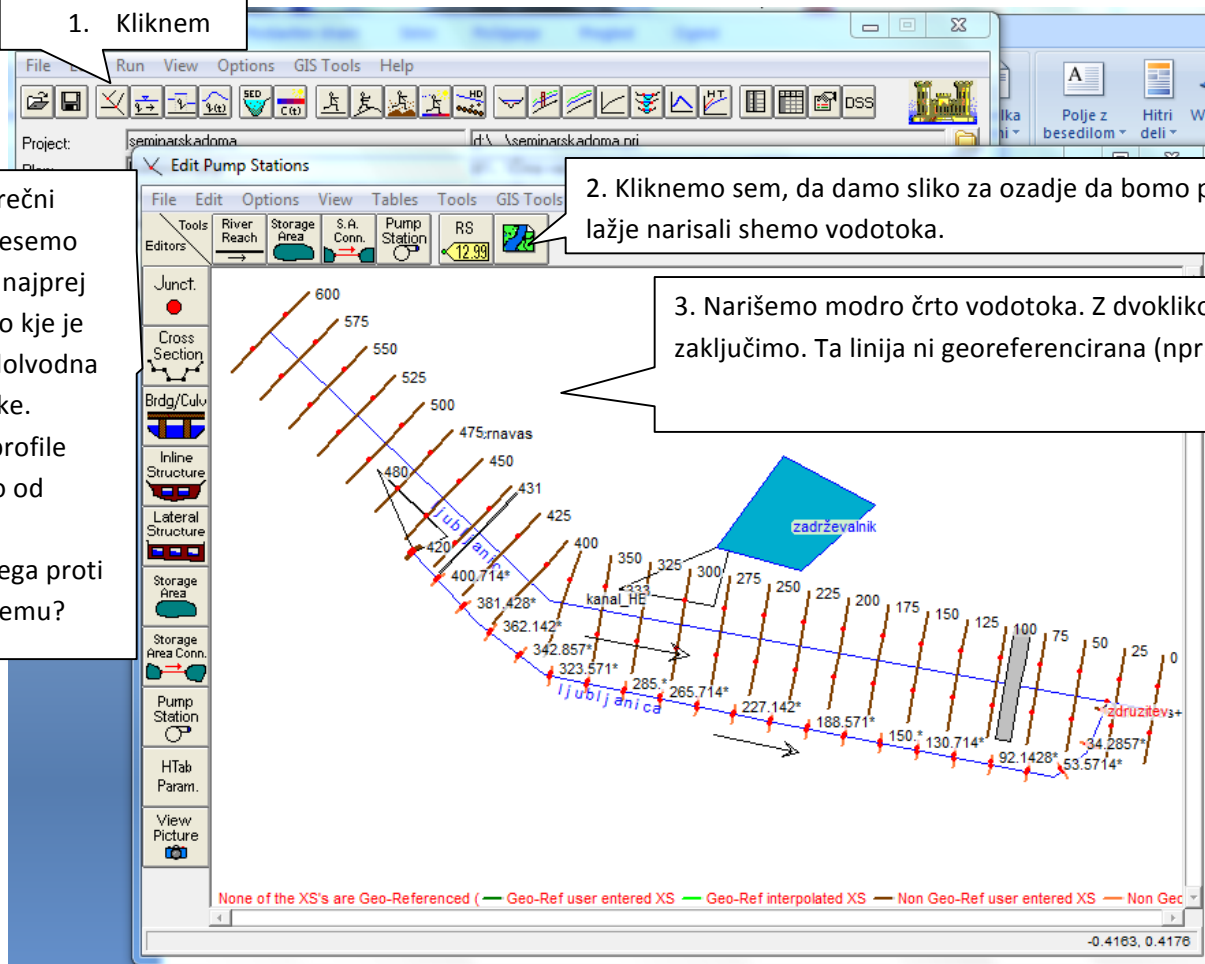
Geometrijski podatki:

1. Kliknem

4. Prvi prečni profil vnesemo tako, da najprej označimo kje je najbolj dolvodna točka reke. Prečne profile vnašamo od najbolj dolvodnega proti gorvodnemu?

2. Kliknemo sem, da damo sliko za ozadje da bomo potem lažje narisali shemo vodotoka.

3. Narišemo modro črto vodotoka. Z dvoklikom zaključimo. Ta linija ni georeferencirana (npr. GIS).



Izračun in podatki o pretoku: (spet shranimo novo datoteko):

Kliknemo

Project: seminarskadoma d:\...\seminarskadoma.pri

Plan: koncno+kanal d:\...\Črna vas seminarskadoma odpreš s HEC-RASom\seminarskadoma.p08

Geometry: osnovnageometrija+m+jez430+bpreliv+kanal d:\...\Črna vas seminarskadoma odpreš s HEC-RASom\seminarskadoma.g05

Steady Flow: seminarskadoma-SteadyFlowData+kanal d:\...\Črna vas seminarskadoma odpreš s HEC-RASom\seminarskadoma.f04

Unsteady Flow:

Description: SI Units

Steady Flow Data - seminarskadoma-SteadyFlowData+kanal

File Options Help

Enter/Edit Number of Profiles (25000 max): 1 Reach Boundary Conditions ... Apply Data

Locations of Flow Data Changes

River: ljubljana Add Multiple...

Reach: crnavas River Sta.: 600 Add A Flow Change Location

Flow Change Location			Profile Names and Flow Rates	
	River	Reach	RS	PF 1
1	ljubljanica	crnavas	600	1000
2	ljubljanica	kanal_HE	420	0.001
3	ljubljanica	crnavas+kanal_HE	25	250

Če nevedo točno kakšna je pretočno tukaj vsakokrat popravljamo to številko [km³/s].

Gate Openings Set

Edit Steady flow data for the profiles (m³/s)

Odprtje zapornic: Steady flow data -> Options -> Gate openings:

HEC-RAS 4.1.0

File Edit Run View Options GIS Tools Help

Project: seminarSKadoma d:\...seminarskadoma.prj

Plan: koncno+kanal d:\...Črna vas seminarSKadoma odpreš s HEC-RASom\seminarskadoma.p08

Geometry: osnovnageometrija+m+jez430+bpreliv+kanal d:\...Črna vas seminarSKadoma odpreš s HEC-RASom\seminarskadoma.g05

Steady Flow: seminarSKadoma-SteadyFlowData+kanal d:\...Črna vas seminarSKadoma odpreš s HEC-RASom\seminarskadoma.f04

Unsteady Flow:

Description: SI Units

Steady Flow Data - seminarSKadoma-SteadyFlowData+kanal

File Options Help

Enter/Edit Number of Profiles (25000 max): 1 Reach Bound

Locations of Flow Data Changes

River: ljubljanica

Reach: crnavas River Sta.: 600

Flow Change Location		
River	Reach	RS
1 ljubljanica	crnavas	600
2 ljubljanica	kanal_HE	420
3 ljubljanica	crnavas+kanal_HE	25

Spillway Gate Openings

Gate: ljubljanica crnavas 430

Desc. # Gate groups: 1

Gate Group	# Openings	Gate Ht (m)	PF 1 # Open	Open Ht
Gate #1	3	0.13	3	0.13

OK Cancel

Gate Openings Set

Edit Steady flow data for the profiles (m3/s)

Katere zapornice so odprte.

Koliko jih je odprtih.

Koliko so odprte. (v tem primeru do konca - 100%)

Kliknemo Reach Boundary Conditions:

Za koliko različnih pretokov lahko naenkrat računamo.

Stacionaža PP za katerega mi podajamo robni pogoj. Robni pogoje je dotok 1000 km³/s (glej odspodaj), zato je seveda robni pogoj na prvem najvišjem gorvodnem PP. (Zgornji robni pogoj)

Nimamo Q-h krivulje, zato bomo vzeli za spodnji robni pogoj Normalno gladino (normal depth). Pri normalni gladini so gladina, dno in energijska črta vzporedne.

Pri normalni gladini je gladina vzporedna z dnom torej je 0,0065 (podan podatek padec dna).

Enter/Edit Number of Profiles (25000 max): 1

Reach Boundary Conditions ...

Locations of Flow Data Changes

River: ljubljana

Reach: crnavas River Sta.: 600

Flow Change Location				Profile Names and Flow Rates	
	River	Reach	RS	PF 1	
1	ljubljanica	crnavas	600	1000	
2	ljubljanica	kanal_HE	420	0.001	
3	ljubljanica	crnavas+kanal_HE	25	250	

Steady Flow Boundary Conditions

Set boundary for all profiles

Available External Boundary Condition Types

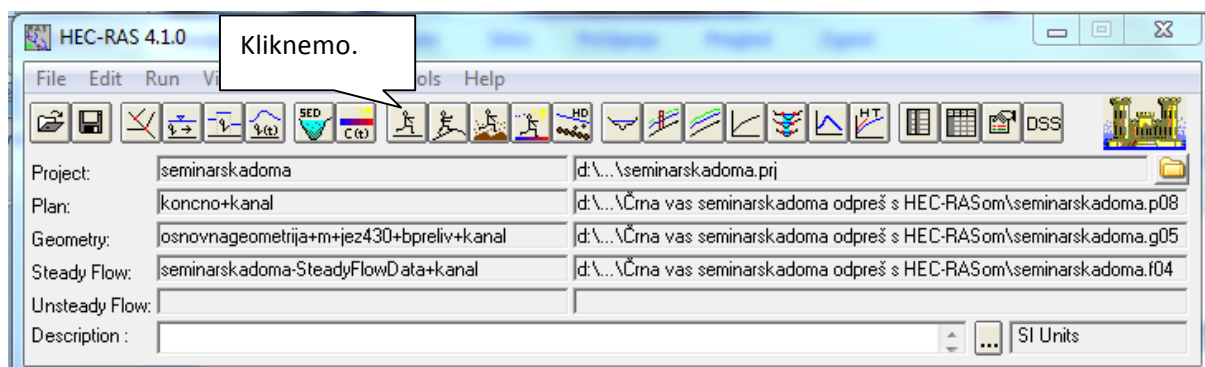
Known W.S. Critical Depth Normal Depth Rating Curve Delete

Selected Boundary Condition Locations and Types					
River	Reach	Profile	Upstream	Downstream	
ljubljanica	crnavas	all		Junction=zdruzitev	
ljubljanica	kanal_HE	all		Junction=zdruzitev	
ljubljanica	crnavas+kanal_HE	all	Junction=zdruzitev	Normal Depth S = 0.0065	

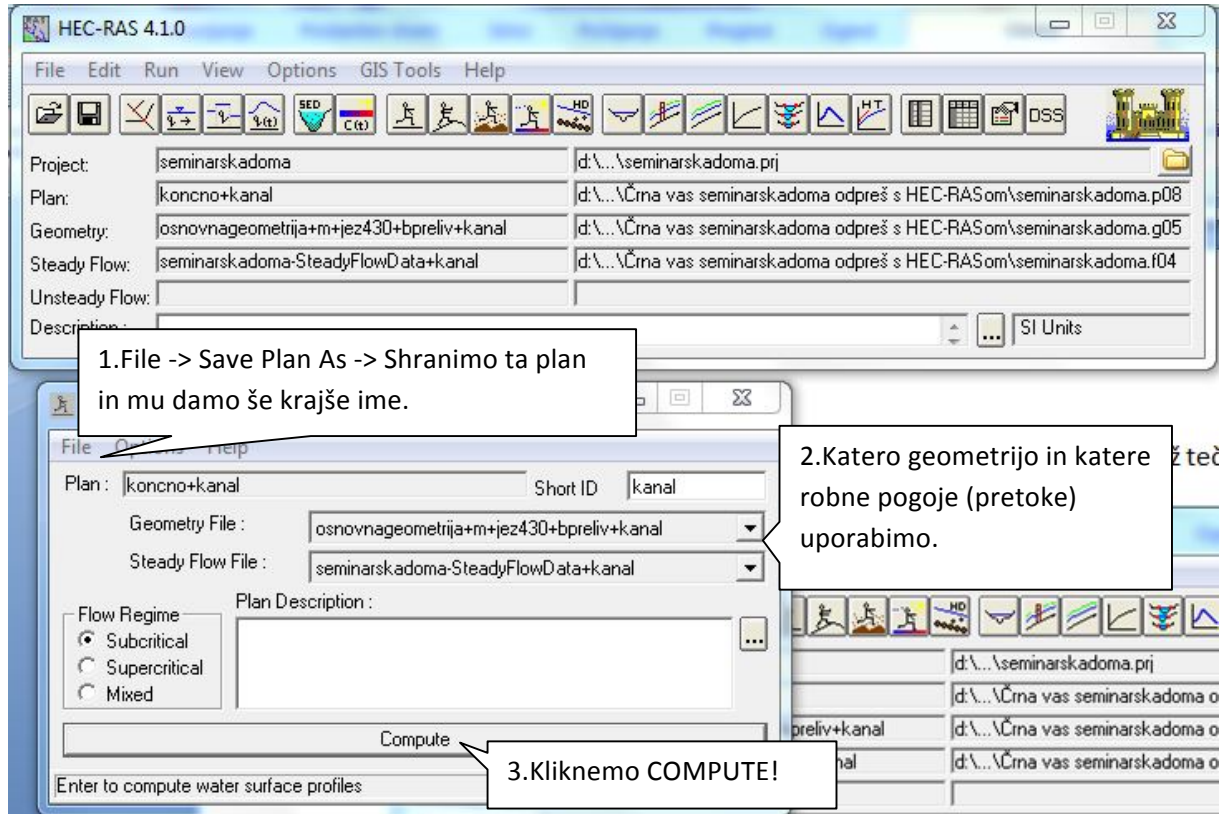
Steady Flow Reach-Storage Area Optimization ... OK

Smo dali konstantno vrednost za pretok – torej imamo stalni tok, nimamo npr kakšnega poplavnega vala.

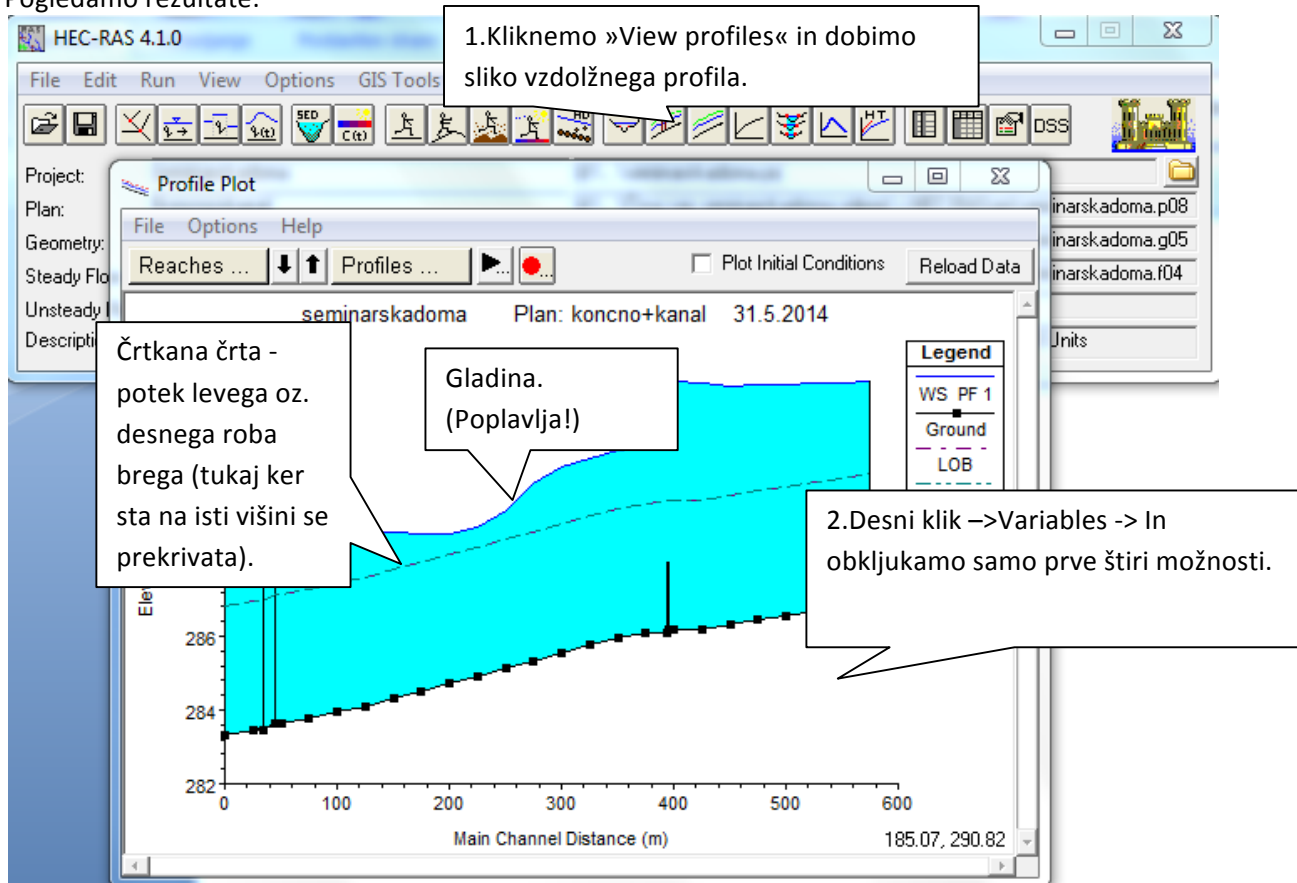
Zdej mam vse podatke in lahko zaženemo izračun. (9. ikona – mož teče po črno-belem ravnem)



Compute:



Pogledamo rezultate:



Vsako stvar moraš posebej shranjevati.

Pri vnosu geometrijskih podatkov vedno najprej narišemo določen element z gumbi na vrhu (zaključimo z dvoklikom). Šele nato vnašamo podatke posameznega elementa z gumbu na levi strani.

Med bočnim prelivom in prečnim prerezom mora biti vsaj eden PP. Bočni preliv mora sekati vsaj en PP.

HW – head water; TW – tail water.

Priročnik (XS je oznaka za prečni profil; cross section) **PREČNI PROFIL:**

The screenshot shows a software window for entering cross-section profile data. The interface includes several data tables and a graph. Callouts provide explanations for various elements:

- Ime reke** (River name): Ljubljanica
- Ime rokava** (Reach name): crnavas
- Na kateri stacionaži je PP** (At which station is the cross-section): 600
- Oddaljenost PP (L in D breg in korito) od spodnjega naslednjega profila** (Distance of cross-section from the next downstream profile): 0.06, 0.03, 0.035
- Ng koef za L,D breg in korito** (Manning's n values for L, D bank and channel): 0.06, 0.03, 0.035
- Kje (glede na X-os) je L in D rob struge; rdeči piki** (Where on the X-axis are the L and D bank edges; red dots): 20, 50
- NMV točke** (NMV points): 0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
- Kje na x osi je posamez na točka (glej desni graf)** (Where on the x-axis is each point (see right graph))

Del Row	Ins Row	Station	Elevation
0		0	291.4125
2		20	290.4125
3		21	287.1925
4		35	286.9125
5		49	287.1925
6		50	290.4125
7		70	291.4125
8			
9			
10			
11			

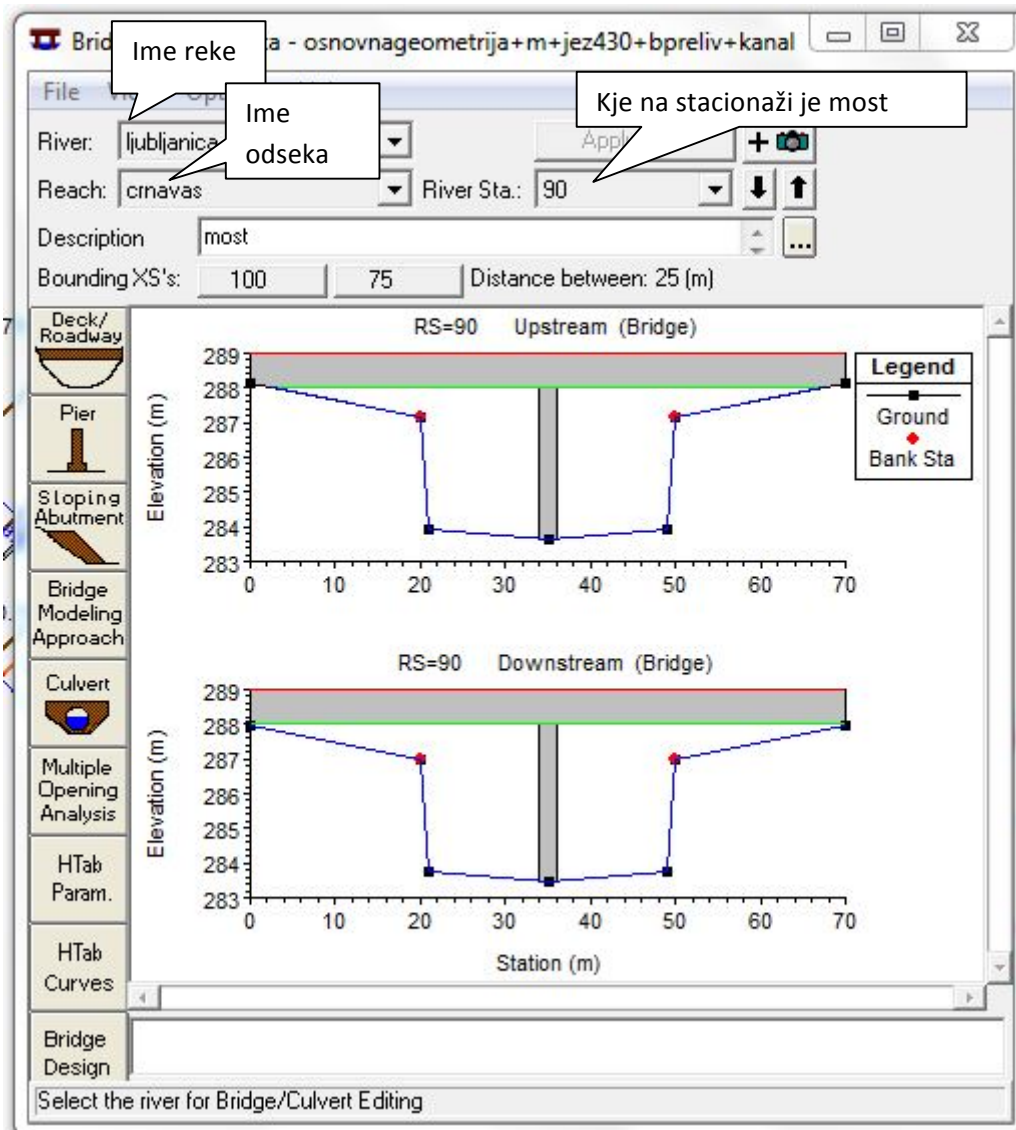
LOB	Channel	ROB
25	25	25
0.06	0.03	0.035

Left Bank	Right Bank
20	50

Contraction	Expansion
0.1	0.3

The graph shows Elevation (m) on the y-axis (288 to 292) and Station (m) on the x-axis (0 to 70). It displays the ground profile (black line), the water surface profile (WS PF 1, red line), and the bank stations (red dots at 20 and 50). A legend identifies the symbols used.

Most: (ponavadi ni dobro da je most točno na nekem PP?; ampak da je vmes med dvema?)



Most prečno:

The screenshot shows the 'Bridge Culvert Data' window with several callout boxes providing Slovenian explanations for the software's parameters and data table:

- Kliknemo za prečni del mostu.** (Click for cross-section of the bridge.)
- Razdalja med zgornjim naslednjim PP in prečnim delom mostu.** (Distance between the top next PP and the cross-section of the bridge.)
- Širina prečnega dela mostu.** (Width of the bridge cross-section.)
- Koeficient jezua (oglat=broad crested 2.5-3.1, ovalen=ogee 3.1-4.0)** (Weir coefficient (oglat=broad crested 2.5-3.1, ovalen=ogee 3.1-4.0))
- Točka glede na X-os.** (Point relative to the X-axis.)
- Višina spodnjega in zgornjega roba prečnega dela mostu.** (Height of the bottom and top edges of the bridge cross-section.)
- Gorvodni rob prečnega dela m.** (Upper edge of the cross-section m.)
- Dolvodni rob prečnega dela mostu.** (Lower edge of the cross-section of the bridge.)

The software window contains a table with the following data:

	Distance	Width	Weir Coef
	5	10	2.8

	Station	high chord	low chord	Station	high chord	low chord
1	0.	289.	288.	0.	289.	288.
2	6.	289.	288.	6.	289.	288.
3	6.	289.	288.	6.	289.	288.
4	6.	289.	288.	6.	289.	288.
5	6.	289.	288.	6.	289.	288.
6	70.	289.	288.	70.	289.	288.
7						
8						

Additional parameters shown in the window include:

- U.S Embankment SS: 0, D.S Embankment SS: 0
- Weir Data: Max Submergence: 0.98, Min Weir Flow El: [empty]
- Weir Crest Shape: Broad Crested, Ogee

Buttons: OK, Cancel

Footer text: Enter distance between upstream cross section and deck/roadway. (m)

Most.

Steber mostu:

Klikne mo »Pier«

Št. stebra

Razdalja središča stebra glede na X-os (gorvodno in dolvodno središče)

Gorvodni in dolvodni rob.

	Upstream		Downstream	
	Pier Width	Elevation	Pier Width	Elevation
1	2.	283.	2.	283.
2	2.	284.	2.	284.
3	2.	288.	2.	288.
4				
5				

Širina stebra glede na NMV. (zgornja omejitev je NMV spodnjega roba mostu)

OK

Select the Pier to Edit

Vnos opornika:

The screenshot shows the 'Sloping Abutment Data Editor' window. At the top, there are buttons for 'Add', 'Copy', and 'Delete', followed by an 'Abutment #' dropdown menu set to '1' and up/down arrow buttons. Below these are 'Del Row' and 'Ins Row' buttons. The main data area is a table with columns for 'Station' and 'Elevation' under 'Upstream' and 'Downstream' headers. The table contains two rows of data: (1, 2444., 340.2) and (2, 2458., 323.6). At the bottom, there are 'OK' and 'Copy Up to Down' buttons. Several callout boxes provide instructions: 'Št. opornika' points to the 'Abutment #' dropdown; 'Gorvodni in dolvodni rob opornika; točke vnesemo za vsakega posebej' points to the table headers; 'Lega točke na X-osi.' points to the 'Station' column; 'Lega točke na Z-osi (NMV)' points to the 'Elevation' column; and 'Če je trikotni opornik, zadostujeta že dve točki; zgornja in desna oz. leva točka.' points to the 'OK' button.

Št. opornika

Gorvodni in dolvodni rob opornika; točke vnesemo za vsakega posebej

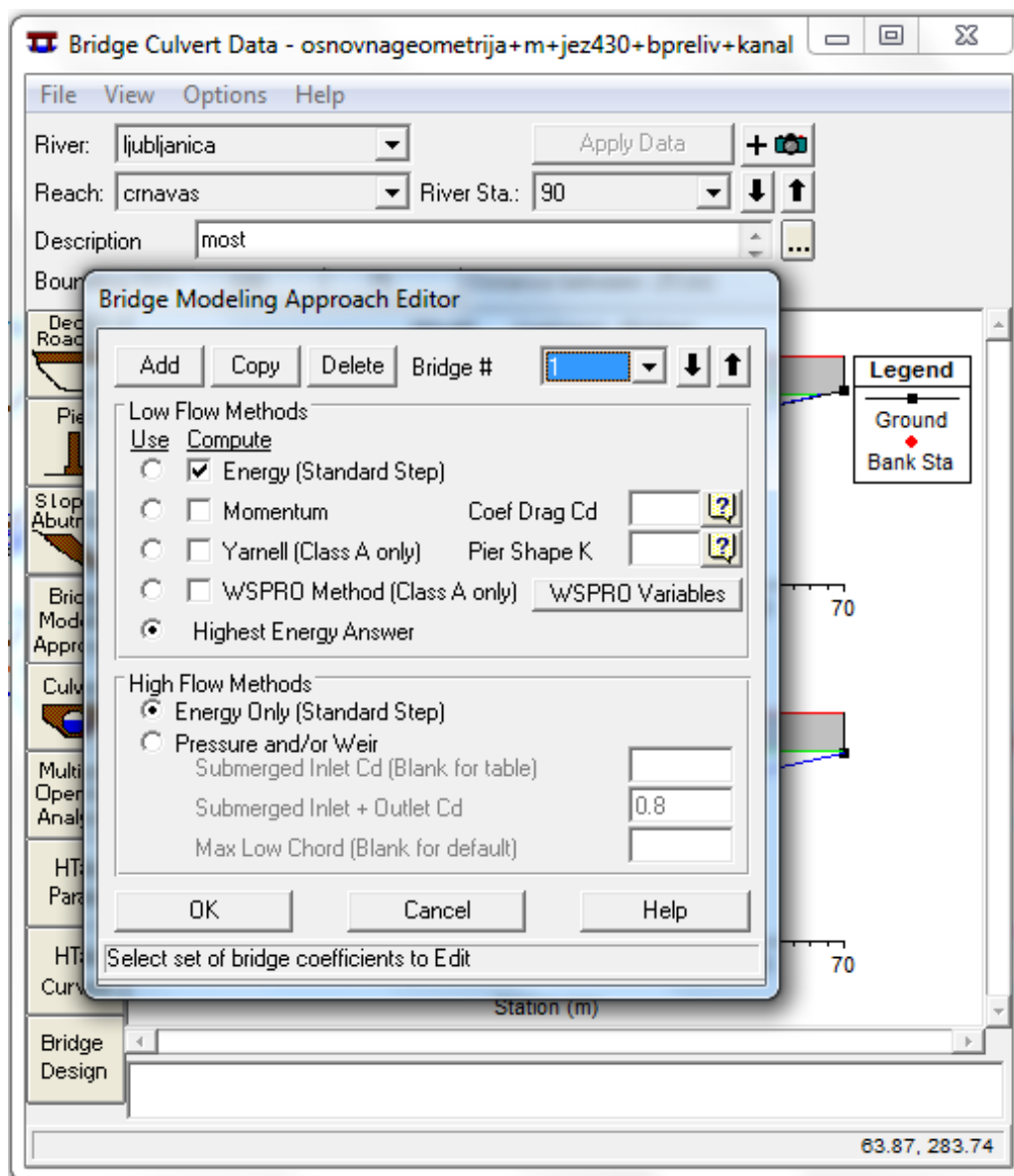
Lega točke na X-osi.

Lega točke na Z-osi (NMV)

Če je trikotni opornik, zadostujeta že dve točki; zgornja in desna oz. leva točka.

	Upstream		Downstream	
	Station	Elevation	Station	Elevation
1	2444.	340.2	2444.	340.2
2	2458.	323.6	2458.	323.6

Bridge Modeling approach editor:



Vnos prepusta (Culvert):

Širina prepusta, če je okrogel, je to polje prazno.

Oblika prepusta

Številka

Višina oz. premer prepusta

Gorvodna in dolvodna NMV spodnje ploskve prepusta.

Gorvodno in dolvodno središče prepusta glede na X-os.

?

Chart #: 8 - flared wingwalls

Scale #: 1 - Wingwall flared 30 to 75 deg.

Distance to Upstrm XS: 0 Upstream Invert Elev: 288.2

Culvert Length: 10 Downstream Invert Elev: 288.2

Entrance Loss Coeff: 0.5 # identical barrels: 1

Exit Loss Coeff: 1

Manning's n for Top: 0.011

Manning's n for Bottom: 0.01

Depth to use Bottom n: 0

Depth Blocked: 0

Centerline Stations		
	Upstream	Downstream
1	25	25
2		
3		
4		

1. Razdalja do zgornjega PP.
2. Dolžina prepusta
3. Koefficient izgube
4. Izhodni koefficient izgube
5. Maningov koefficient za zgornjo in stranske ploskve prepusta
6. Maningov koefficient za spodnjo ploskev
7. Pri kateri globini se uporabi spodnji manningov koefficient n (?)
8. ?

Manning opening values:

Multiple Opening Analysis

Conveyance Culvert Group Bridge Insert Row Delete Row

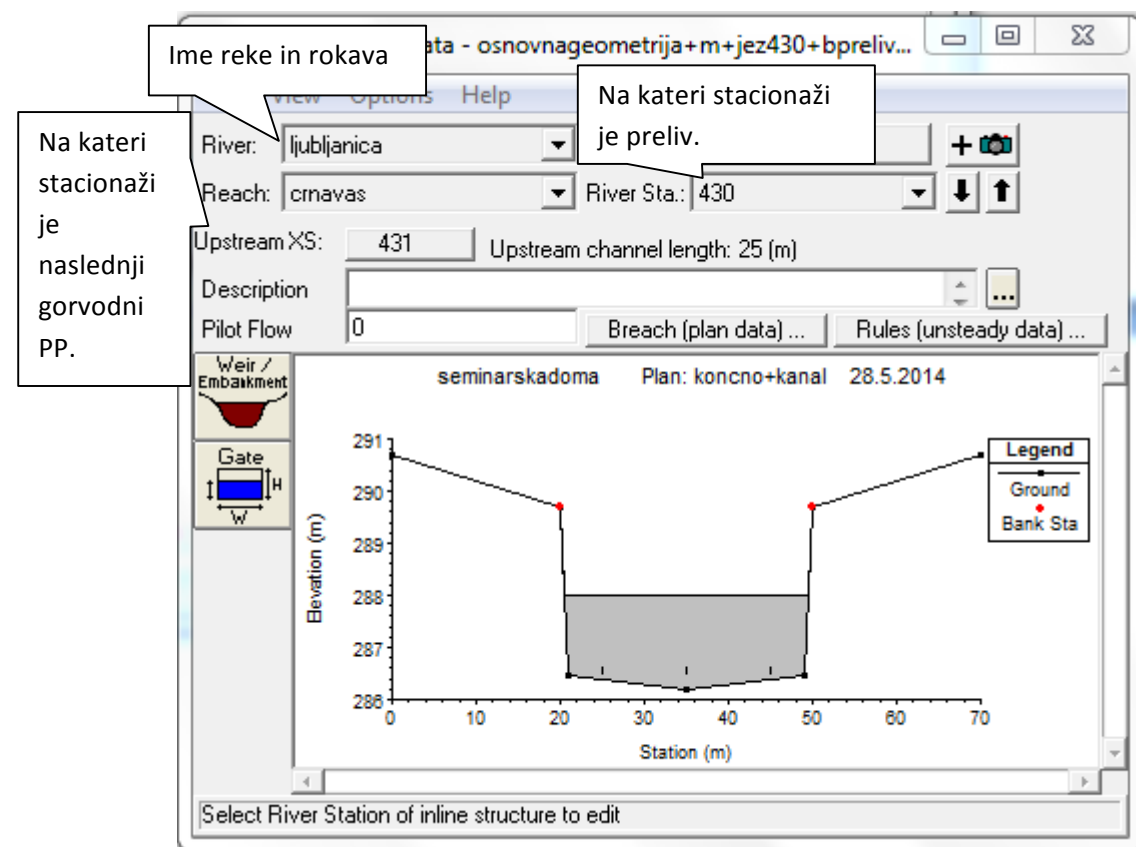
		Upstream		Downstream	
	Opening Type	Station Left	Station Right	Station Left	Station Right
1					
2					
3					
4					
5					
6					
7					

OK Cancel Help Copy Up to Down

Press enter to make the selected opening a conveyance opening.

- Multiple Opening Analysis
- HTab Param.
- HTab Curves
- Bridge Design

Prečni preliv:



Prečni preliv: oblika:

Razdalja do naslednjega gorvodnega PP:

Širina preliva.

Koeficient.

Tukaj »narišemo« preliv. Na levi strani so točke na X-osi, na desni pa NMV točk (Y-os).

Distance	Width	Weir Coef
5	1	1.4

Clear Del Row Ins Row Filter...

Edit Station and Elevation coordinates

	Station	Elevation
1	0.	288.
2	30.	288.
3	35.	288.
4	36.	288.
5	70.	288.
6		
7		
8		

U.S Embankment SS D.S Embankment SS

Weir Data
Weir Crest Shape

Broad Crested
 Ogee

?

OK Cancel

Enter distance between upstream cross section and deck/roadway. (m)

Prečni preliv (oblika lukenj):

Številka prepusta, v smislu tip prepusta.

Gate Group: Gate #1

Gate type (or methodology): Sluice

Oblika?

1. višina (m)
2. širina (m)
3. NMV spodnje ploskve prepusta.

Geometric Properties

Height: 0.13
Width: 0.2
Invert: 286.5

Gate Flow

Sluice Gate Flow

Sluice Discharge Coefficient (0.5-0.7): 0.6

Koeficient izpusta.

Openings: 3

Številko lukenj v prečnem prelivu.

Centerline Stations

	Station
1	25.
2	35.
3	45.
4	
5	
6	
7	
8	
9	
10	
11	
12	

Lege središč lukenj glede na X-os.

Submerged Orifice Flow

Orifice Coefficient (typically 0.8): 0.8

Koeficient izpusta.

Head Reference: Sill (Invert)

Weir Flow Over Gate Sill (gate out of water)

Weir Shape: Broad Crested

Weir Coefficient: 1.67

Koeficient izpusta.

OK Cancel Help

Bočni preliv:

The screenshot shows the 'Lateral Structure Editor' window. The interface includes a menu bar (File, View, Options, Help), a toolbar, and several input fields for defining a structure. The 'River' is set to 'ljubljanica' and the 'Reach' to 'crnavas'. The 'HW RS' is 480. The 'Description' is 'bočni_preliv_'. The 'HW Position' is 'Next to right bank station'. The 'Tailwater Connection' is set to 'Cross section(s) of a river/reach'. The 'TW RS' is 'ljubljanica kanal_HE RS: 420'. The 'TW Position' is 'Next to left bank station'. The 'All Culverts' are set to 'No Flap Gates'. The 'Structure Type' is 'Weir/Gates/Culverts/Diversion Rating Curves'. A graph at the bottom shows 'Elevation (m)' vs 'Station (m)' with a ground profile and four bank stations marked with red dots. The graph title is 'seminarskadoma Plan: končno+kanal 28.5.2014'. A legend indicates 'Ground' (grey area) and 'Bank Sta' (red dots).

Callout boxes:

- Ime reke in rokava** (River and reach name): Points to the 'River' and 'Reach' fields.
- Na kateri stacionaži je preliv (sredina preliva ali eden od krajnih robov?) – mislim da gorvodni rob** (At which station is the spillway (middle of the spillway or one of the edge stations?) – I think the upstream edge): Points to the 'HW RS' field.
- Kam se bo prelivalo: -V nov odsek -V zadrževalnik -Izven sistema.** (Where will it spill: -V new section -V reservoir -Out of system.): Points to the 'Tailwater Connection' dropdown.
- Lopute (flaps) – preprečuj ejo negativno /pozitivni tok. ?** (Flaps – prevent negative /positive flow. ?): Points to the 'All Culverts' dropdown.
- ?** (Question mark): Points to the 'Plan Data Optimization ...' button.
- Kje točno bo preliv: - Točno čez levi del roba struge (L bank station) - Čez levi del brega - Točno čez desni del roba struge (R bank station) - Čez desni del brega** (Where exactly will the spillway be: - Exactly across the left edge of the channel (L bank station) - Across the left bank - Exactly across the right edge of the channel (R bank station) - Across the right bank): Points to the 'TW Position' dropdown.
- Če izbereš da se bo izlivalo v nov odsek, določiš kateri je ta in kako se bo izlivalo.** (If you choose that it will spill into a new section, you will determine which one it is and how it will spill.): Points to the 'Structure Type' dropdown.

Bočni preliv: Lastnosti:

Širina krone preliva.

Koeficient (pustimo stat).

Oblika krone preliva:
 -Broad crested (kvadratno)
 -Ogee (zaobljeno)
 -Sharp crested (ostrorobo)
 -Zero height (v višini struge?)

Kliknemo

Stacionaža in NMV. Ponavadi dve točki?

Razdalja zgornjega roba bočnega preliva do gorvodnega PP. Elevation naj bo ene 10 cm nižje od krone prečnega jezua.

Preliva se v:
 - med dva PP novega odseka
 - prek več PP.

Station	Elevation
1	440.
2	500.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	

RS	Weir Sta
500	432
1	475
2	450
3	431
4	425
5	400
6	375
7	350
8	325
9	300
10	275
11	250
12	225
13	200
14	175
15	150
16	125
17	100
18	75
19	50
20	25
21	0
22	

Bočni preliv: Odprtine:

Številka odprtine (različne vrste odprtin)

Višina, širina
Invert elevation of gate opening (?).

Število enakih vrat, ki so odprta.

Pozicije odprtin glede na X-os (središče odprtine ali središče spodnje ploskve?)

Gate Group: Gate #1

Gate type (or methodology): Sluice

Geometric Properties

Height:

Width:

Invert:

Openings: 0

Centerline Stations

Station
1
2
3
4
5
6
7
8
9
10
11
12

Gate Flow

Sluice Gate Flow

Sluice Discharge Coefficient (0.5-0.7):

Submerged Orifice Flow

Orifice Coefficient (typically 0.8):

Head Reference:

Weir Flow Over Gate Sill (gate out of water)

Weir Shape:

Weir Coefficient:

OK Cancel Help

-Zapora,
-Radialno,
-Overflow (na prostem)
-Overflow (zaprt vrh)
-Po meri

Ostalo je odvisno od izbire vrste odprtine.

Bočni preliv: prepust:

Številka prepusta.

Oblika prepusta.

Širina, višina oz. premer če je prepust okrogel.

Gorvodna in dolvodna NMV spodnje ploskve prepusta.

Gorvodno in dolvodno središče prepusta glede na X-os.

1. Dolžina prepusta
 2. Koefficient izgube
 3. Izhodni koefficient izgube
 4. Maningov koefficient za zgornjo in stranske ploskve prepusta
 5. Maningov koefficient za spodnjo ploskev
 6. Pri kateri globini se uporabi spodnji Manningov koefficient n (?)
 7. ?

Culvert Data Editor

Add ... Copy Delete ... Culvert ID Culvert #1

Solution Criteria: Highest U.S. EG Rename ...

Shape: Circular Span: Diameter:

Chart #: 1 - Concrete Pipe Culvert

Scale #: 1 - Square edge entrance with headwall

Culvert Length: Upstream Invert Elev: Downstream Invert Elev:

Entrance Loss Coeff: # identical barrels: 0

Exit Loss Coeff: 1

Manning's n for Top: Centerline Stations

Manning's n for Bottom: Upstream Downstream

Depth to use Bottom n: 0

Depth Blocked: 0

OK Cancel He

Select culvert to edit

seminarskadoma Plan: koncno+kanal 28.5.2014

Elevation (m)

Station (m)

Legend
 Ground
 Bank Sta

Bočni preliv: Diversion RC:

Lateral Structure Editor - osnovnageometrija+m+jez...

File View Options Help

River: ljubljana Apply Data +

Reach: crnavas HW RS: 480

Description: bočni_preliv_

HW Position: Next to right bank station Plan Data Optimization ... Breach ...

Tailwater Connection

Type: Cross section(s) of a river/reach

TW RS: ljubljana_kanal_HE_RS: 420 Set TW RS ...

TW Position: Next to left bank station

All Culverts: No Flap Gates

Structure Type: Weir/Gates/Culverts/Diversion Rating Curves

Diversion based on water surface in channel
 Diversion based on flow in the channel
 Distance to Diversion:

Diversion Rating Curve		
	Chan WS Elev	Div Flow
1		
2		
3		
4		
5		
6		
7		
8		
9		

Plot Curve ... OK Cancel

Weir / Embankment
 Gate
 Culvert
 Diversion RC

seminarskadoma Plan: končno+kanal 28.5.2014

Elevation (m)

Station (m)

Legend
Ground
Bank Sta

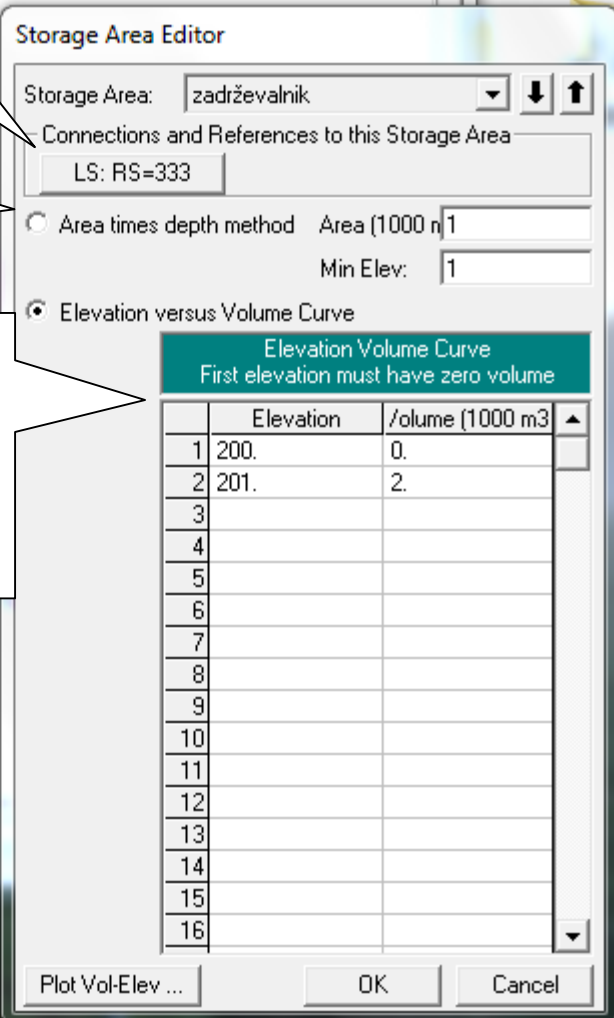
Zadrževalnik:

Kako je povezan zadrževalnik (v tem primeru z bočnim prelivom (LS) na stacionaži 333m).

Površina krat globina
Površina - Area (1000m)
Minimalna višina zadrževalnika

Prvi stolpec je NMV, drugi stolpec pa je koliko vode lahko zadrževalnik lahko zadrži pri do te NMV.
V prvi vrstici je volumen vedno 0 (dno zadrževalnika)

S — Geo-Ref interpolated XS



Elevation Volume Curve		
First elevation must have zero volume		
	Elevation	Volume (1000 m3)
1	200.	0.
2	201.	2.
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Povezava med zadrževalniki:

Ime povezave med zadrževalniki.

Iz katerega v kateri zadrževalnik

Primer za preliv (Weir):

Tip preliva:
 -preliv čez
 -odpritne
 -Zapore in odpritne
 -linear routing

Širina

Stacionaža in NMV

Parameters for Hydraulic Property Tables

Number of points on free flow curve: 50
 Number of submerged curves: 50
 Number of points on each submerged curves: 20
 Apply number of points to all Connections
 Head water maximum elevation:
 Tail water maximum elevation (Optional):
 Maximum Flow (Recommended):

Storage Area Connect

Weir Data
 Weir Width
 Weir Computations:
 Standard Weir Equation Parameters
 Weir Coefficient (Cd) 1.66
 Weir Crest Shape: Broad Crested

Weir Station and Elevation		Filter...
Station	Elevation	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Optimizacija: COMPUTE:

