



**COMUNE DI PORTOFERRAIO**  
PROVINCIA DI LIVORNO

PEEP "AMBITO CASERME ALBERETO"  
E IMPIANTI SPORTIVI "AMBITO BRICCHETTERIA"

**STUDIO IDRAULICO**

ALL  
2

Allegato idraulico

Data emissione:  
Febbraio 2021

CODICE  
ELABORATO

Anno	Commessa	Progetto	Tipologia	Elaborato n°
2021	005	I	ALL	2

LIVELLO	Numero	Data	Stesura	Controllo	Approvazione
Prima stesura	01	12/02/2021	FM	CR	PB
Revisione	02	08/03/2021	FM	CR	PB

Progettazione

**INGEO**

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Telefono 0583 - 48682  
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E-mail studio@ingeo.it

Il progettista

ing. Paolo Barsotti

Il gruppo di lavoro

ing. Federico Morgantini

ing. Claudio Rossi



## MODELLI IDRAULICI MONODIMENSIONALI

Si riportano gli output forniti dal codice di calcolo Hec-Ras 5.0.6 sul reticolo idraulico con simulazione del deflusso trentennale e duecentennale. Si allegano

- I profili;
- Le sezioni dei corsi d'acqua;
- L'output tabellare con i risultati delle simulazioni svolte.

L'indicazione della posizione delle sezioni in planimetria è riportata nella tavola TAV 01.

### LEGENDA TABELLE

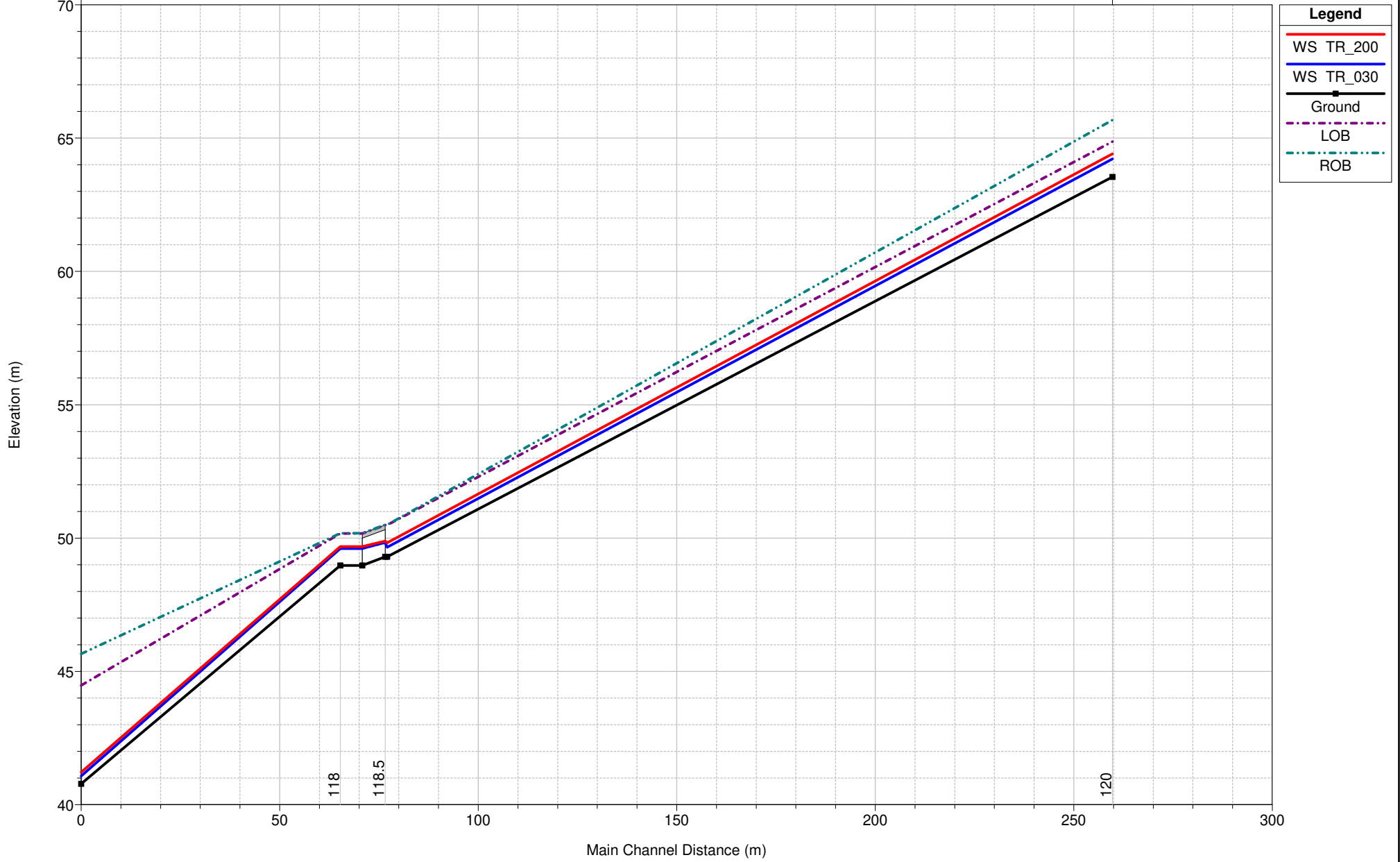
**Le grandezze riportate in tabella hanno il seguente significato**

- River station Sezione trasversale del corso d'acqua
- Q Total Portata idraulica
- Min Ch Elev Quota del fondo rispetto al prescelto sistema di riferimento
- W.S. Elev Quota del pelo libero rispetto al prescelto sistema di riferimento
- Max Chl Dpth Tirante idraulico massimo (differenza dei termini W.S Elev e il termine Min Ch Elev)
- LOB Elev Quota della sommità arginale sinistra rispetto al prescelto sistema di riferimento
- ROB Elev Quota della sommità arginale destra rispetto al prescelto sistema di riferimento
- L.Freeboard Franco sinistro: differenza fra il termine LOB Elev e il termine W.S Elev
- R.Freeboard Franco destro: differenza fra il termine ROB Elev e il termine W.S Elev
- Vel Chnl Velocità media della corrente
- Froude n. Numero di Froude: se maggiore di 1 indica la presenza di corrente veloce, se inferiore a 1 segnala la presenza di corrente lenta



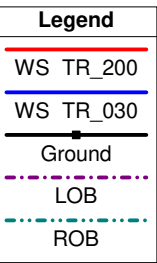
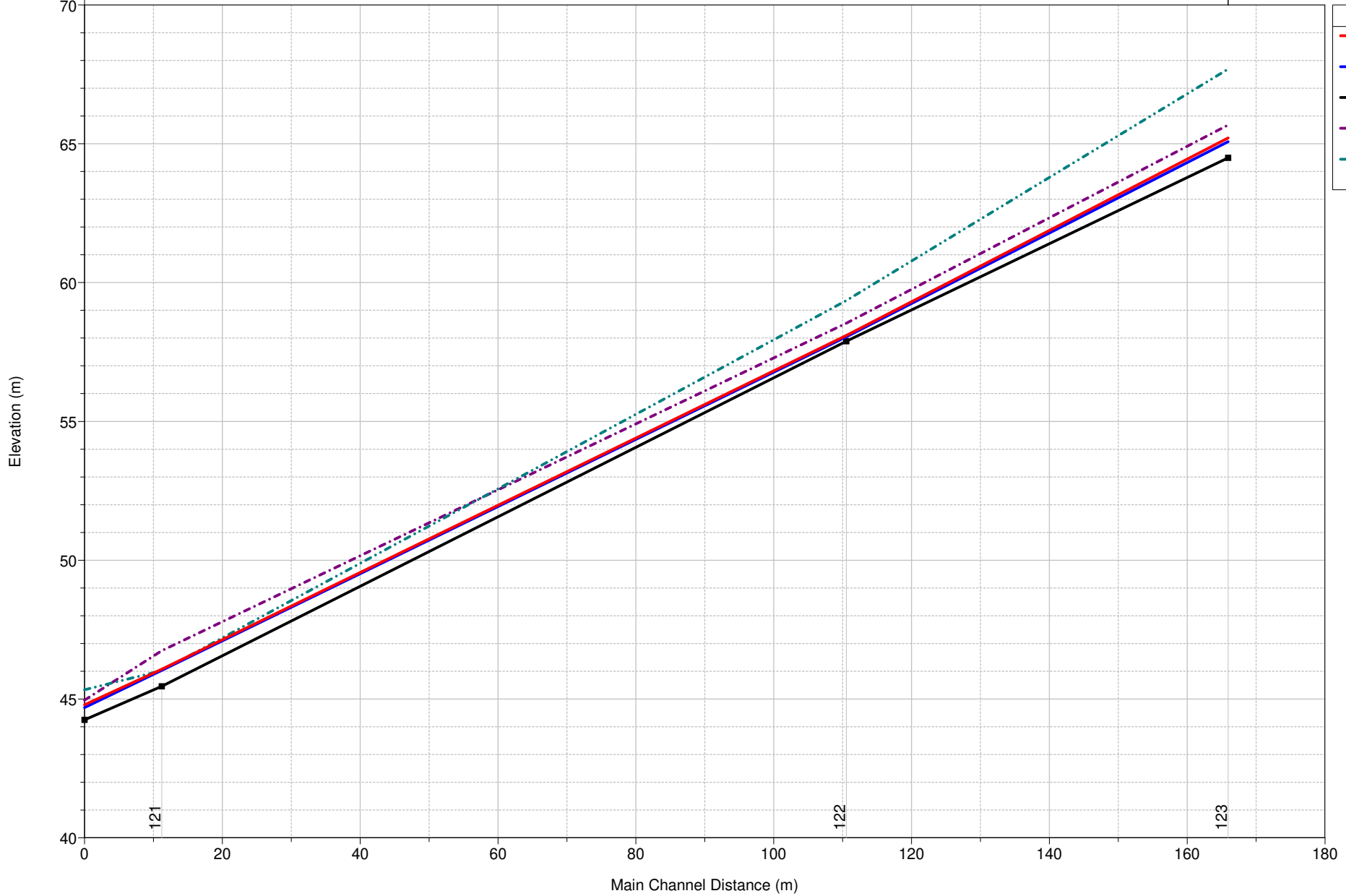
concia\_2021 Plan: Concia\_Definitivo\_REV02  
Geom: Concia\_Definitivo\_REV01 Flow: concia

← asse\_botrovecchi asse\_botrovecchi →



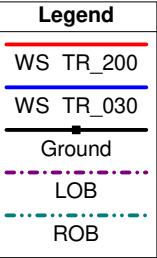
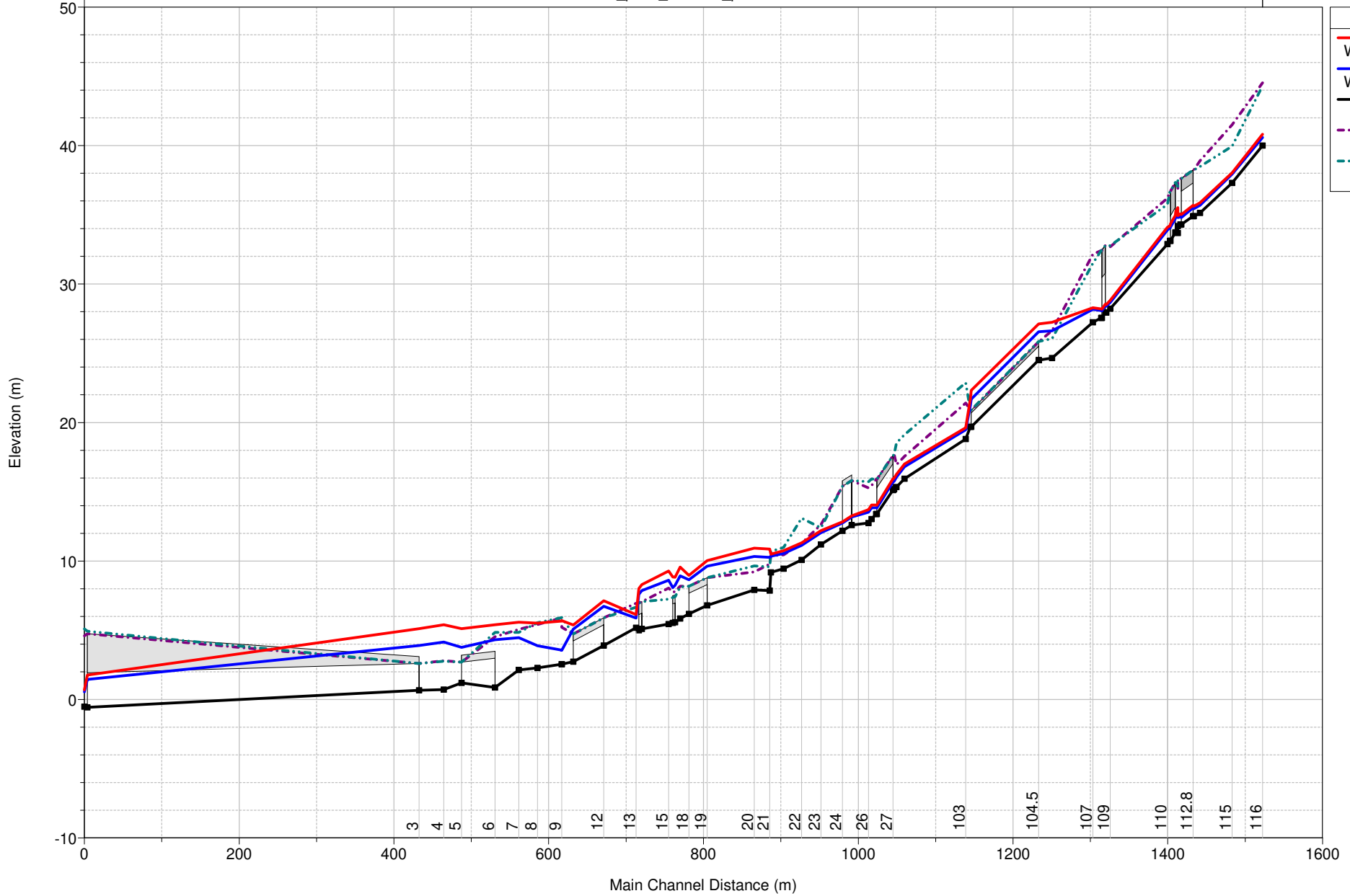
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Geom: Concia\_Definitivo\_REV01 Flow: concia

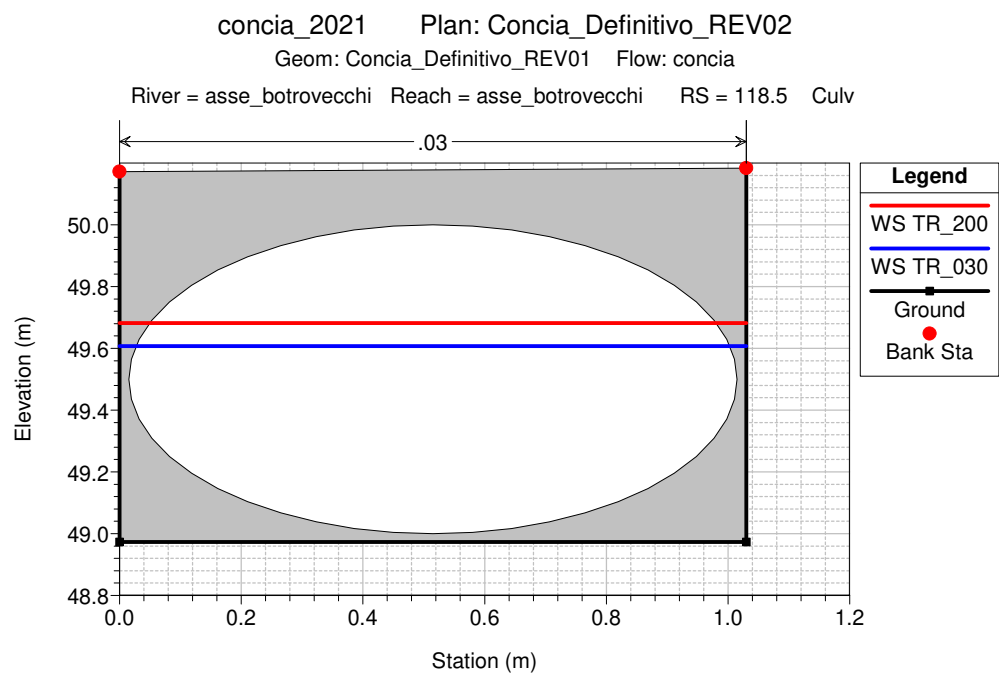
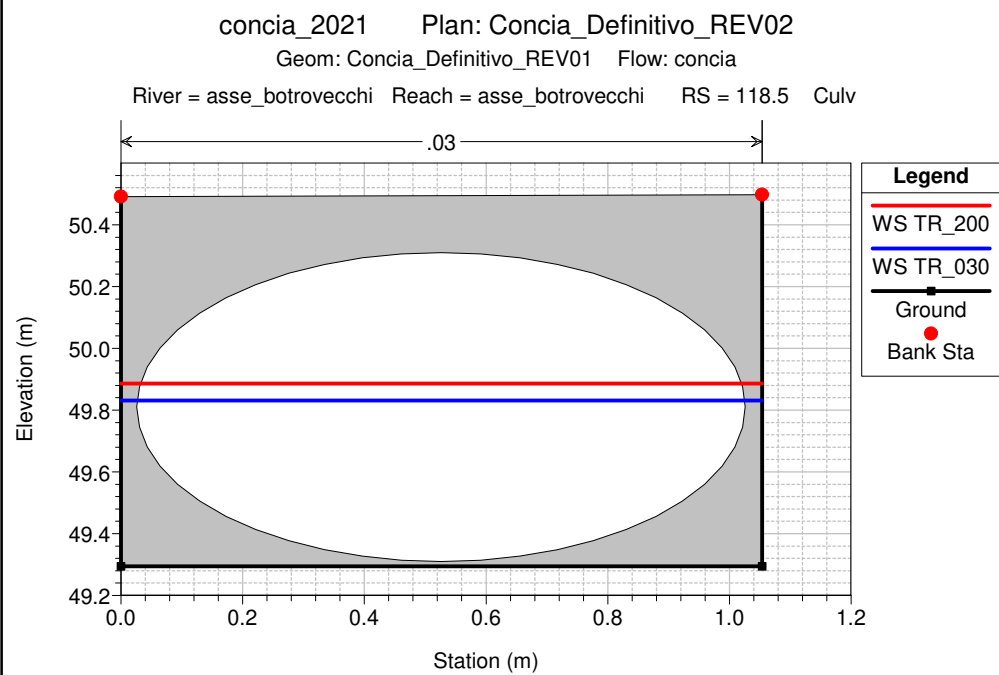
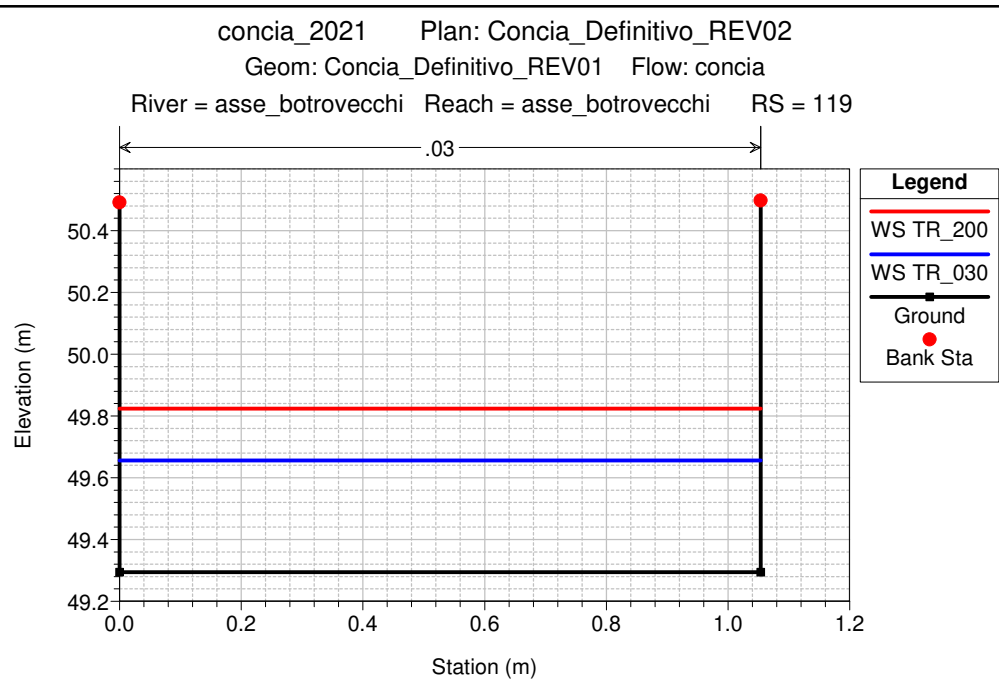
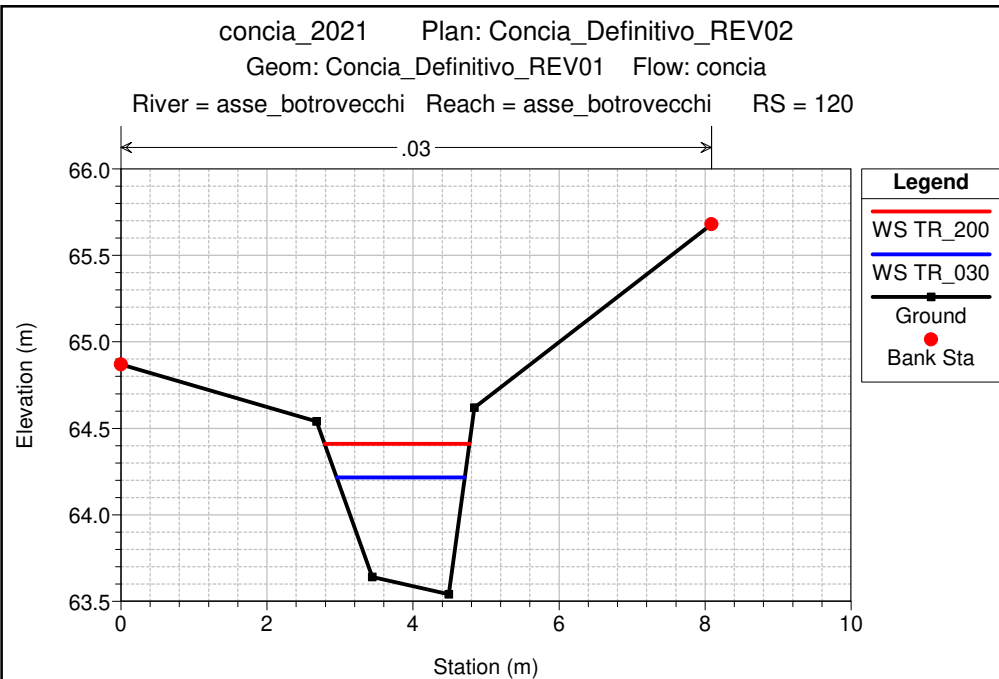
Asse\_princ\_dx Asse\_princ\_dx



concia\_2021 Plan: Concia\_Definitivo\_REV02  
Geom: Concia\_Definitivo\_REV01 Flow: concia

Asse princ\_dx Asse princ



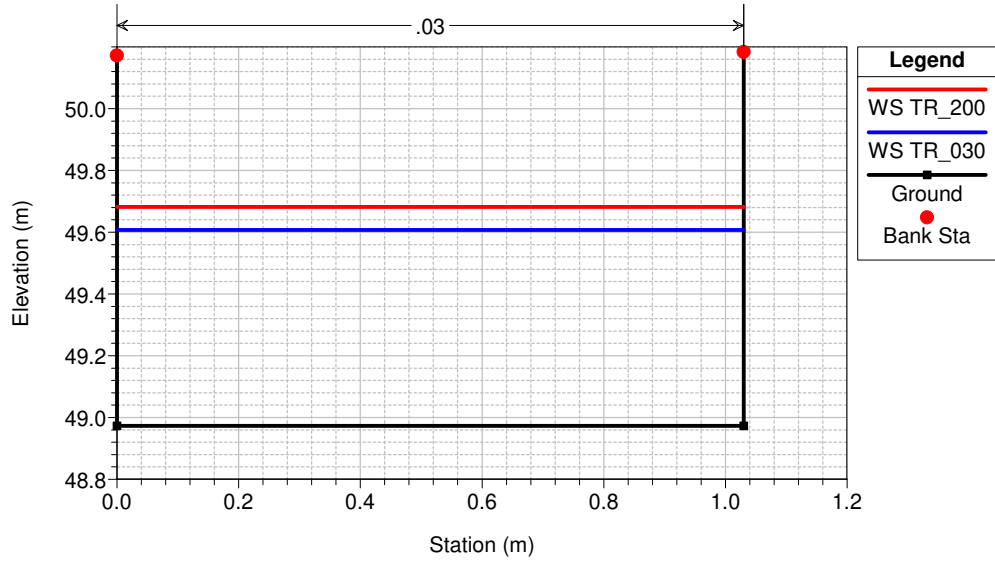




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Geom: Concia\_Definitivo\_REV01 Flow: concia

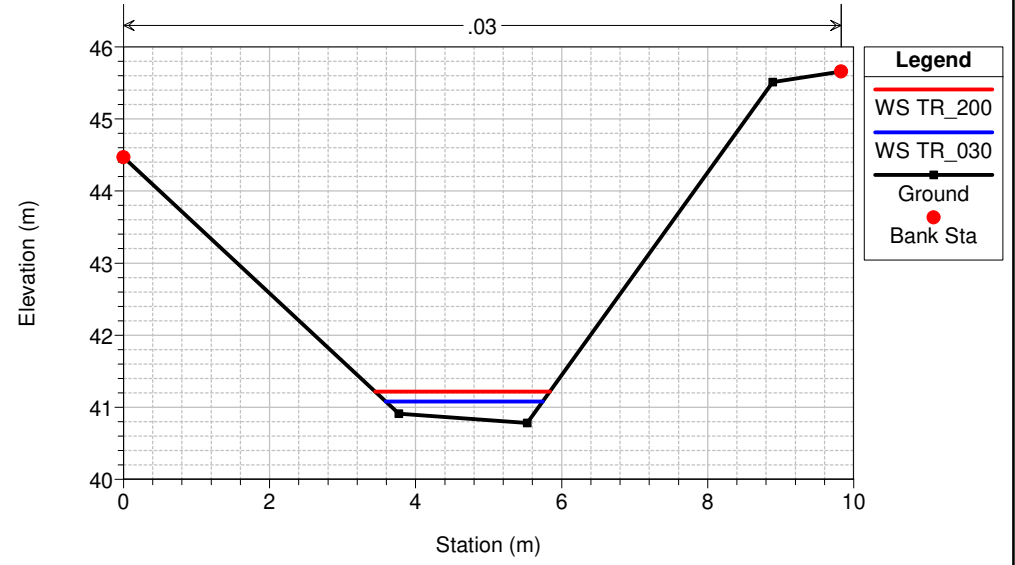
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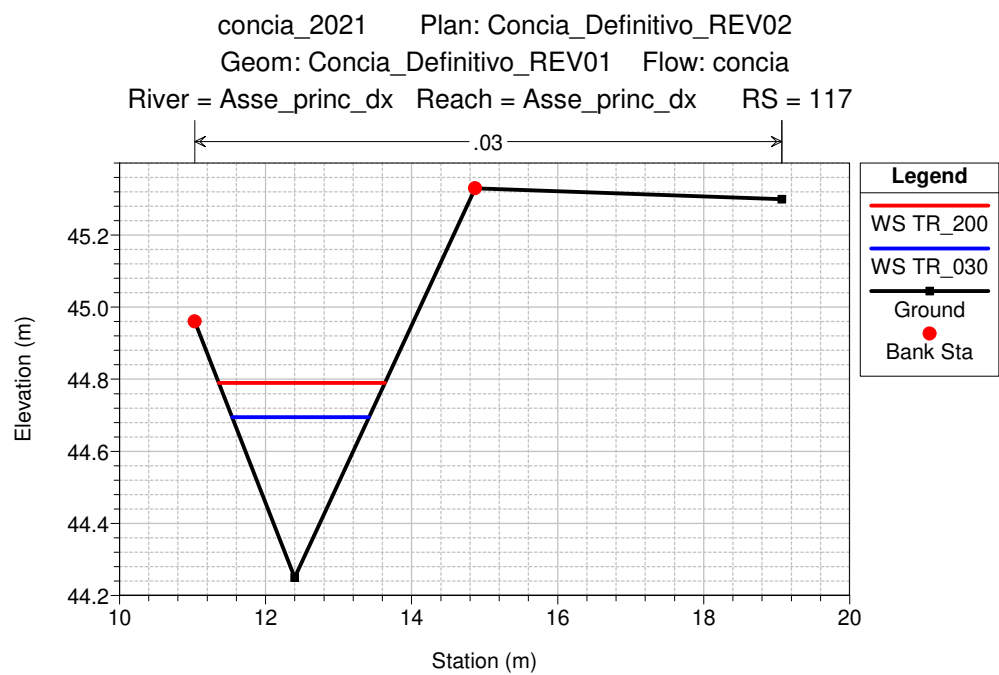
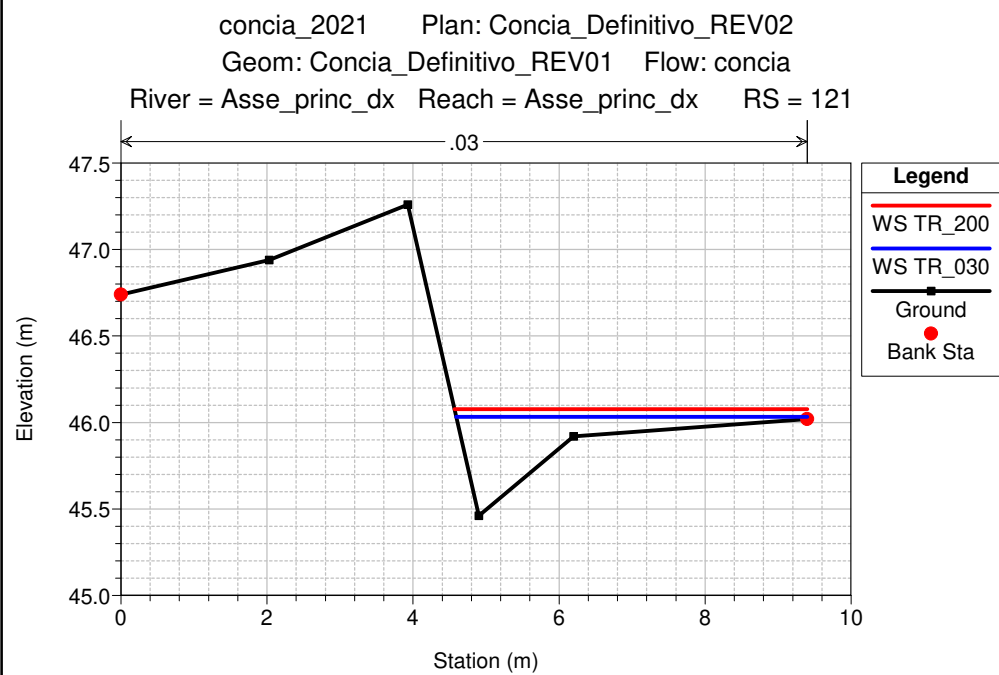
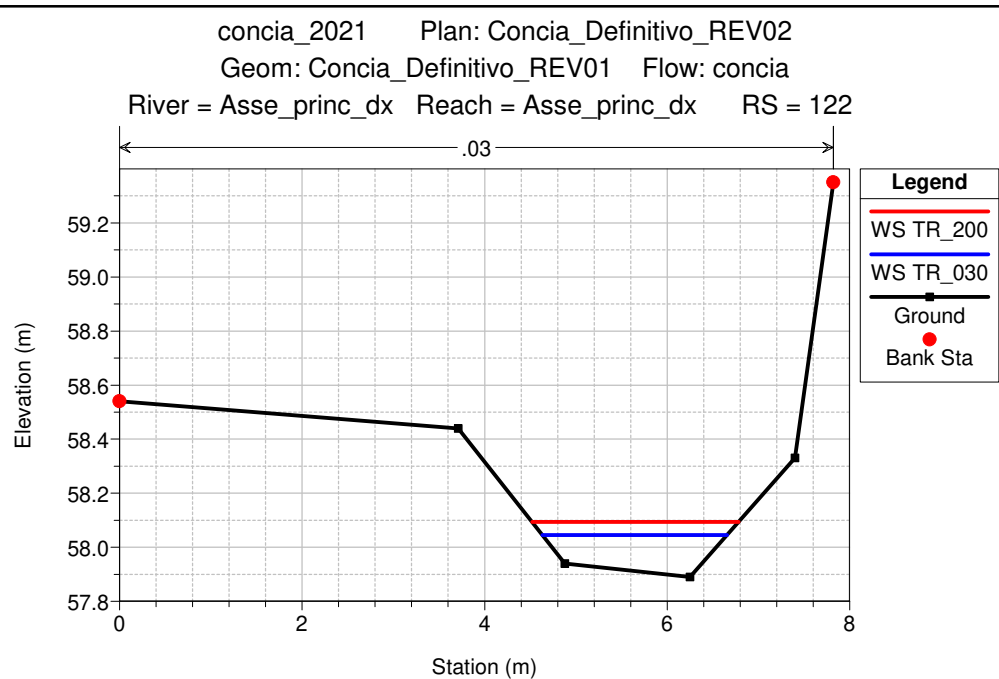
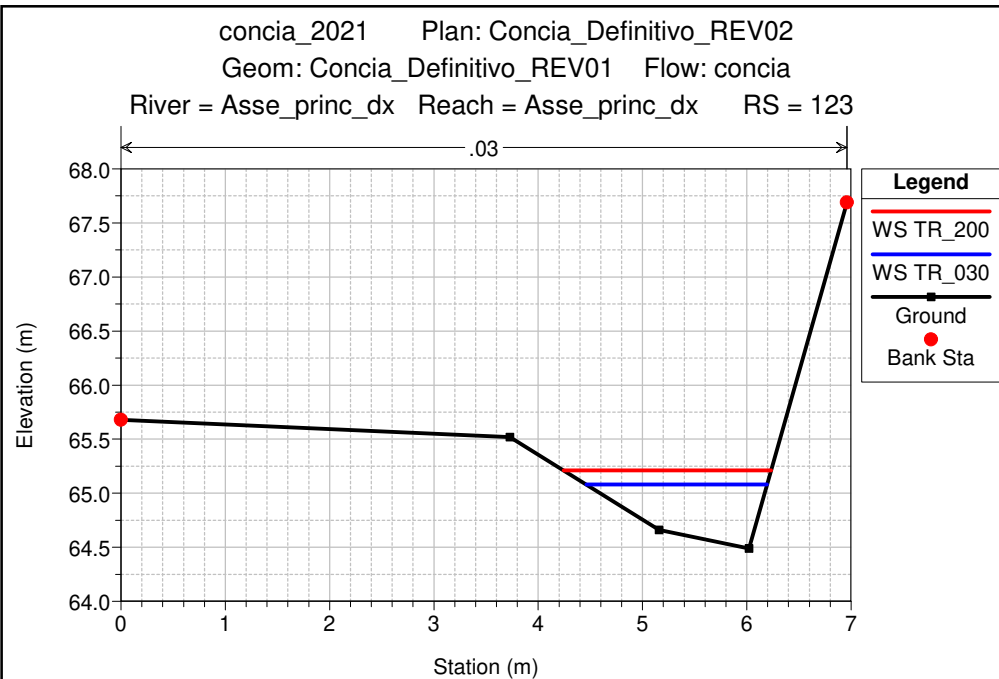


concia\_2021 Plan: Concia\_Definitivo\_REV02

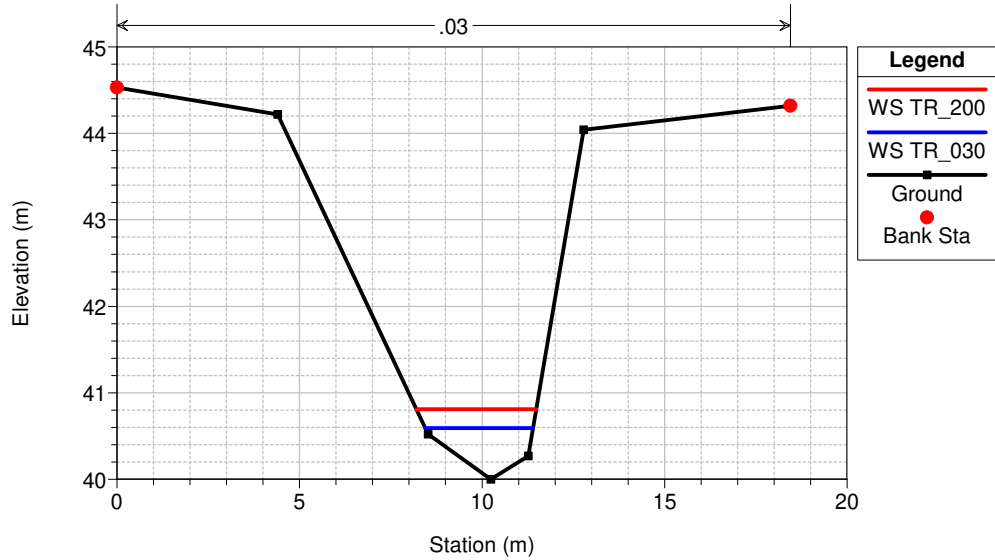
Geom: Concia\_Definitivo\_REV01 Flow: concia

River = asse\_botrovecchi Reach = asse\_botrovecchi RS = 117

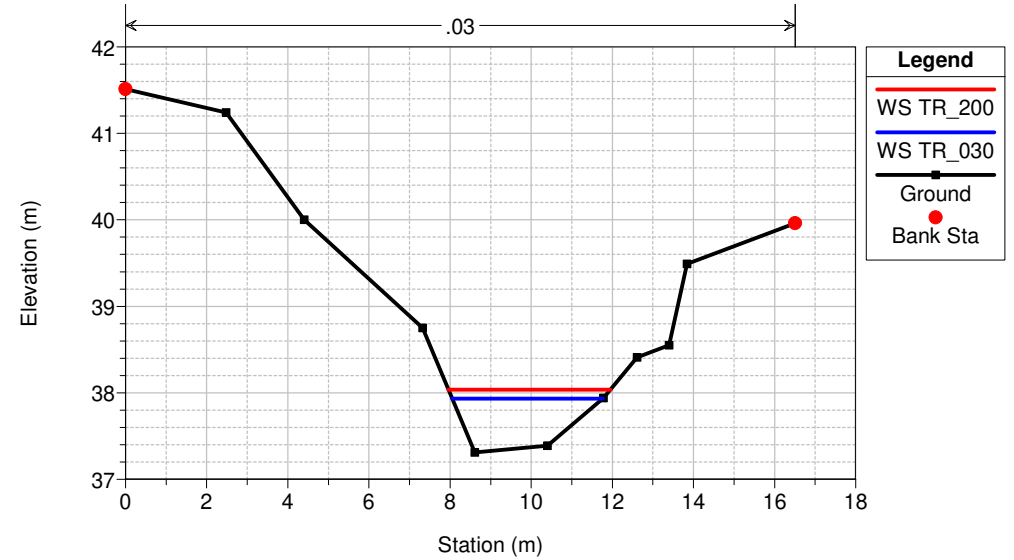




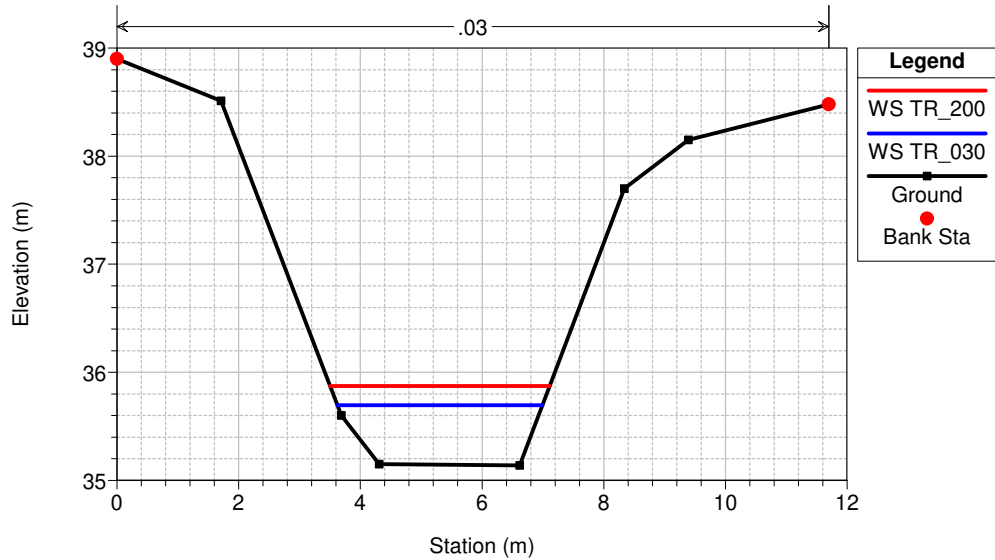
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 116



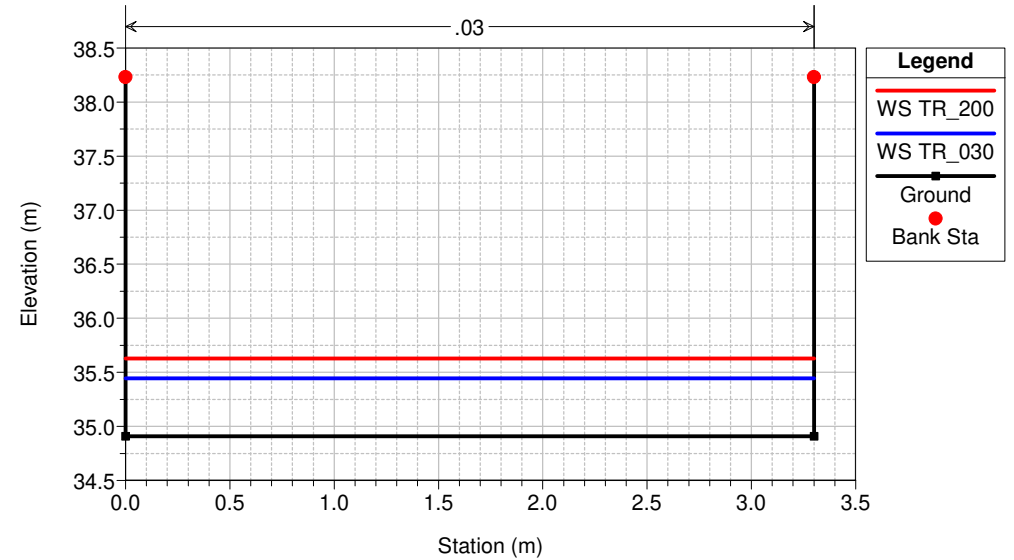
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 115



concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 114



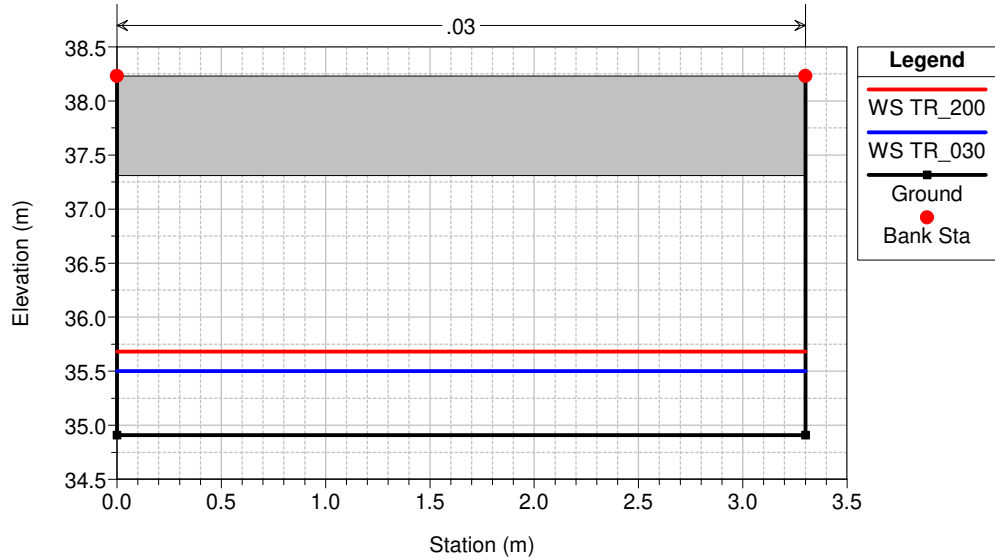
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 113



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

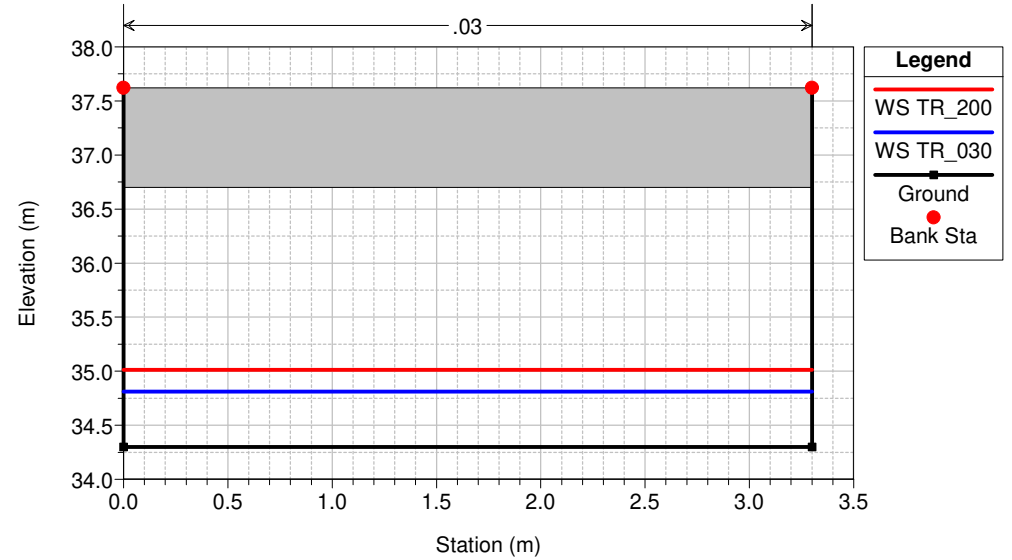
River = Asse\_princ\_dx Reach = Asse\_princ RS = 112.8 BR



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

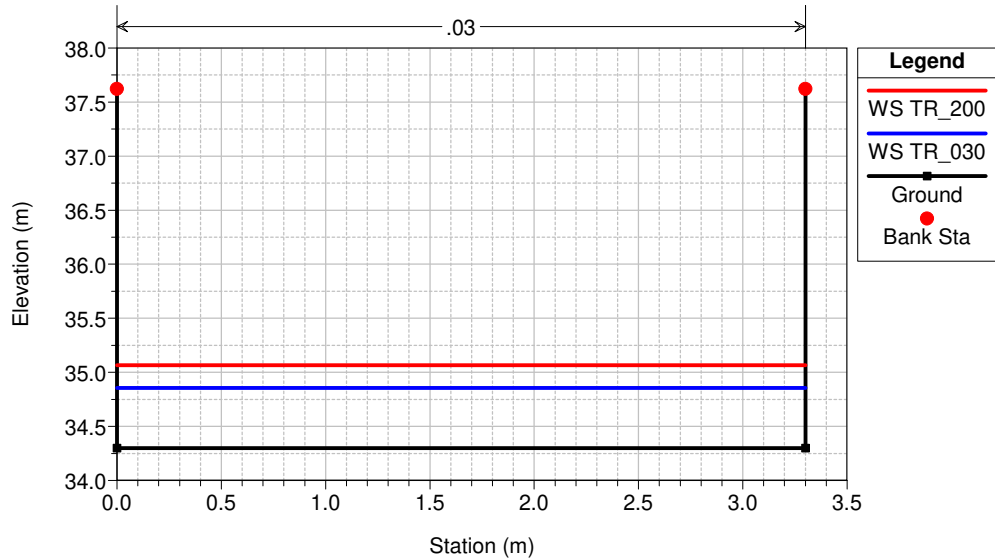
River = Asse\_princ\_dx Reach = Asse\_princ RS = 112.8 BR



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

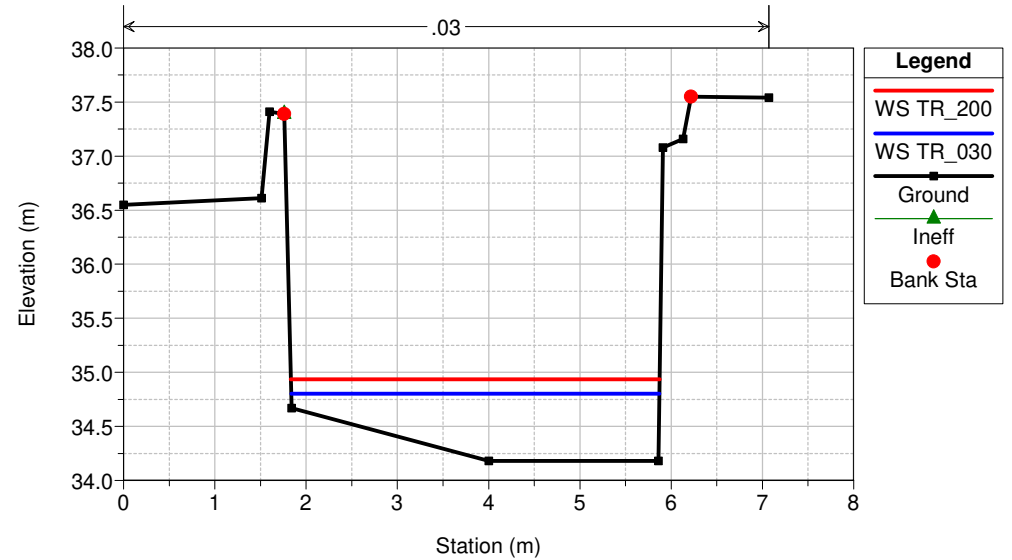
River = Asse\_princ\_dx Reach = Asse\_princ RS = 112.6

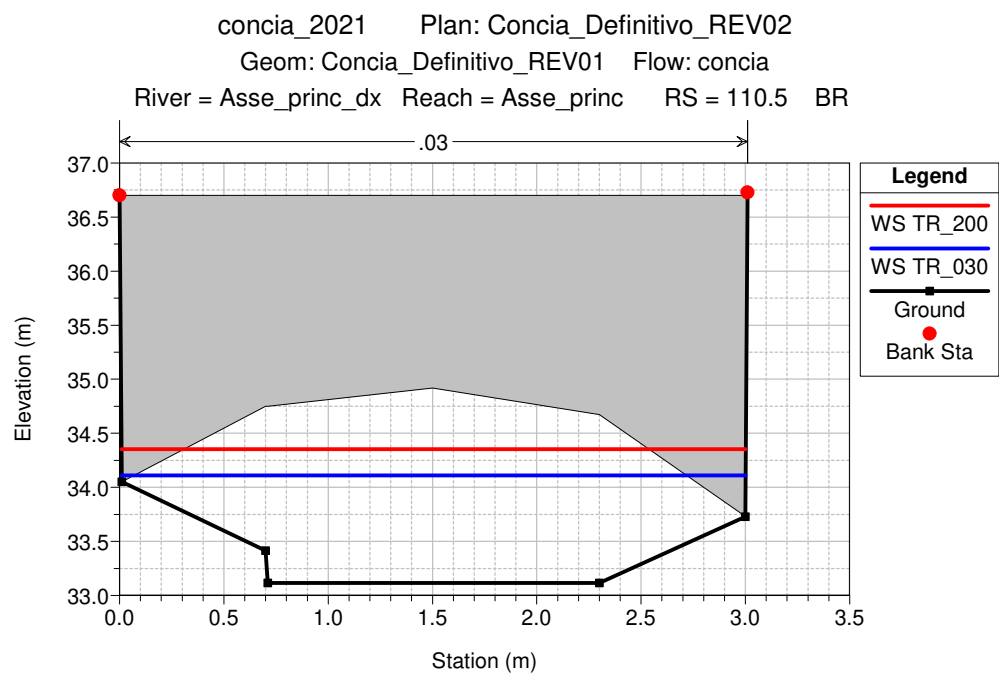
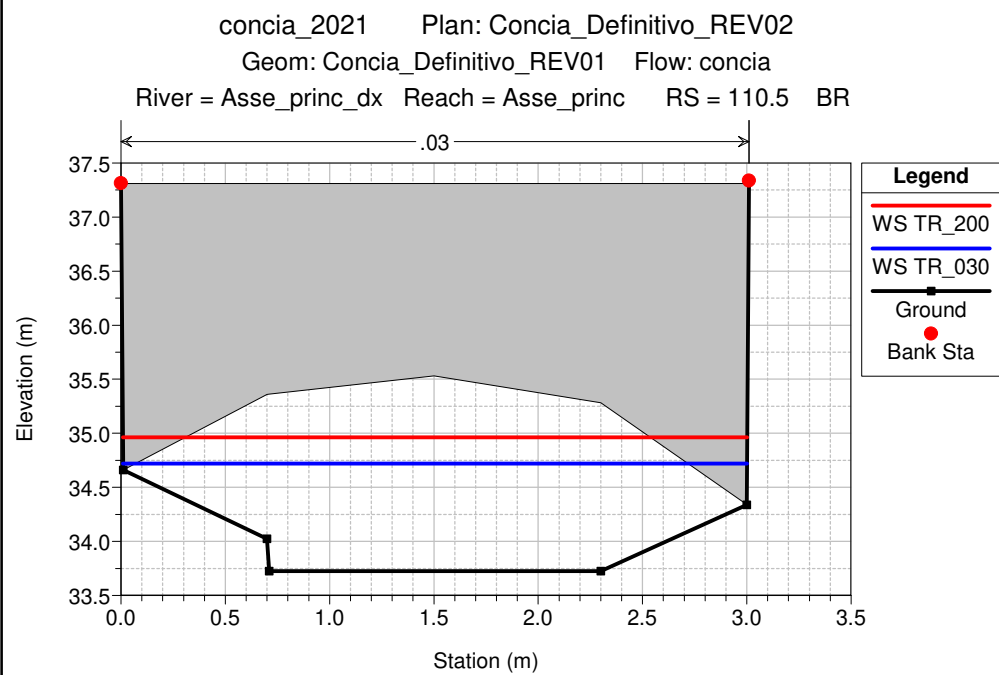
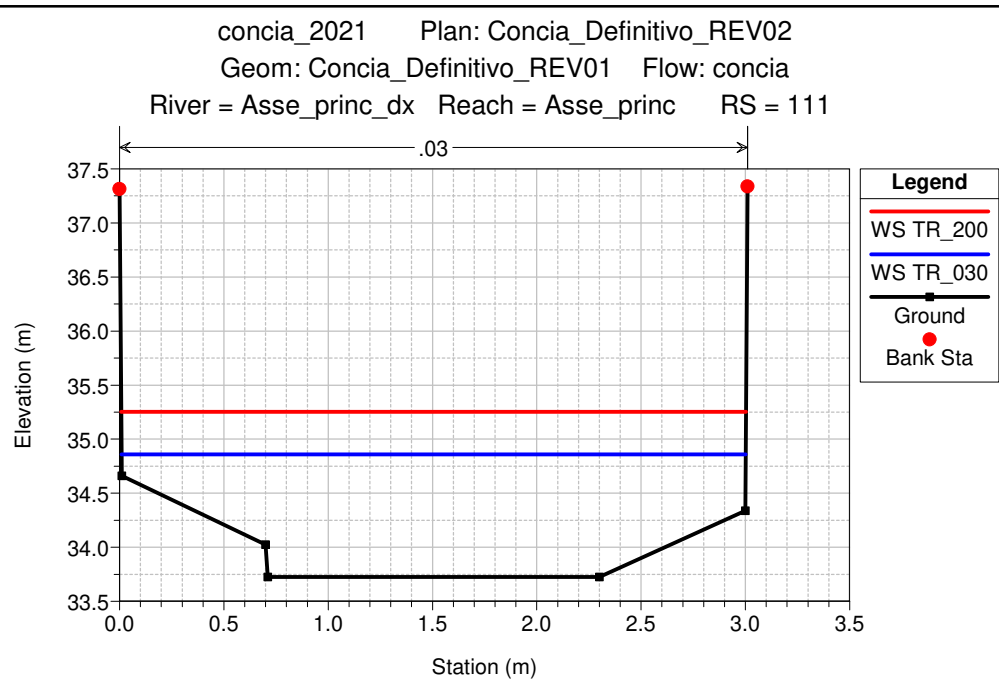
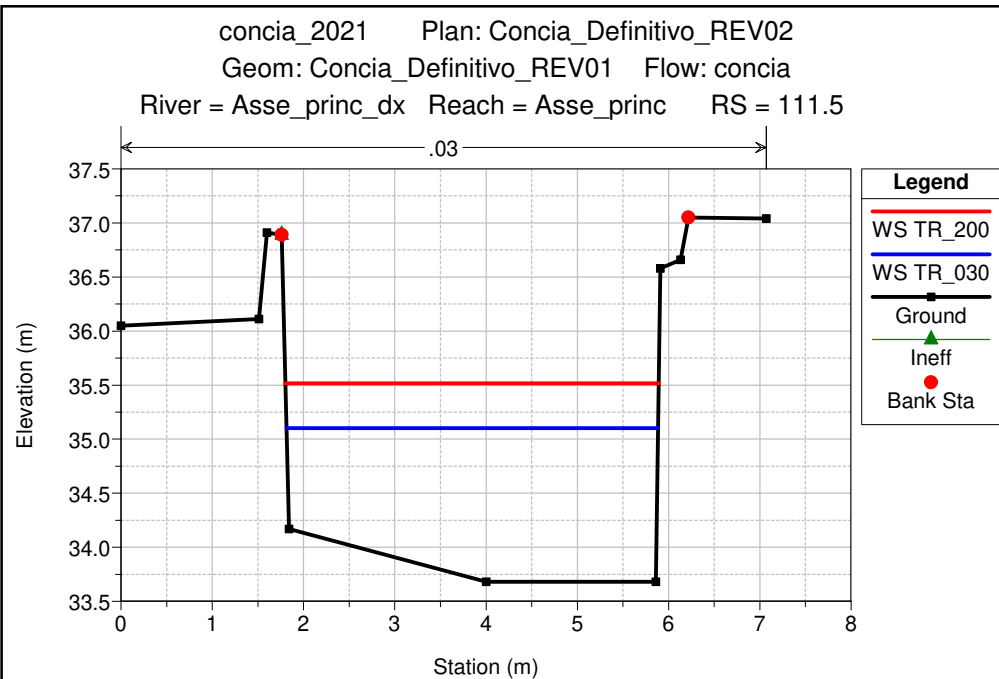


concia\_2021 Plan: Concia\_Definitivo\_REV02

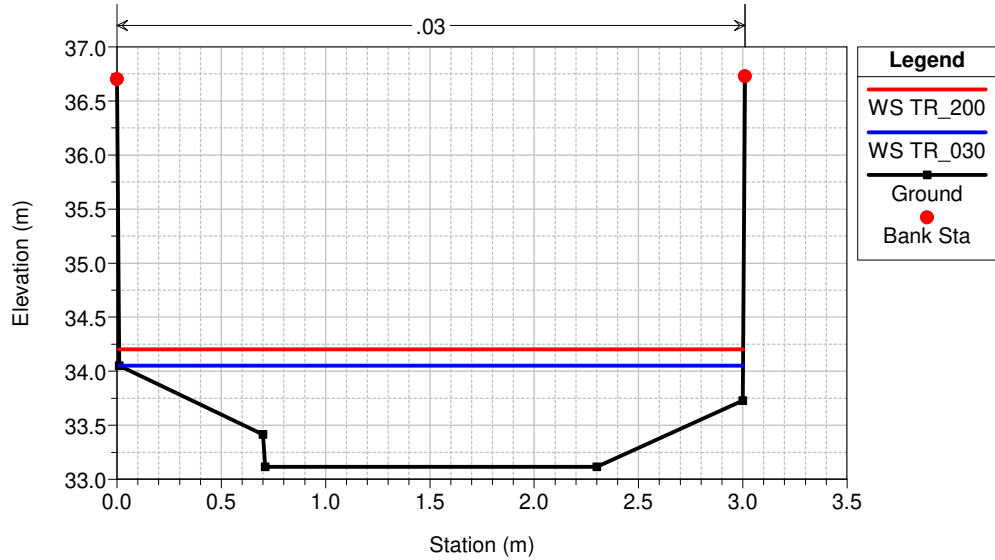
Geom: Concia\_Definitivo\_REV01 Flow: concia

River = Asse\_princ\_dx Reach = Asse\_princ RS = 112

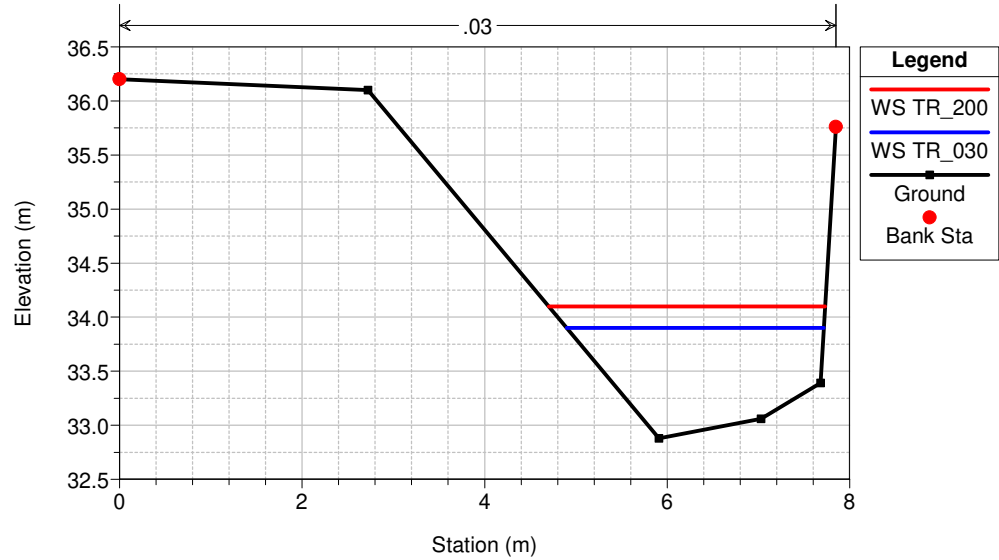




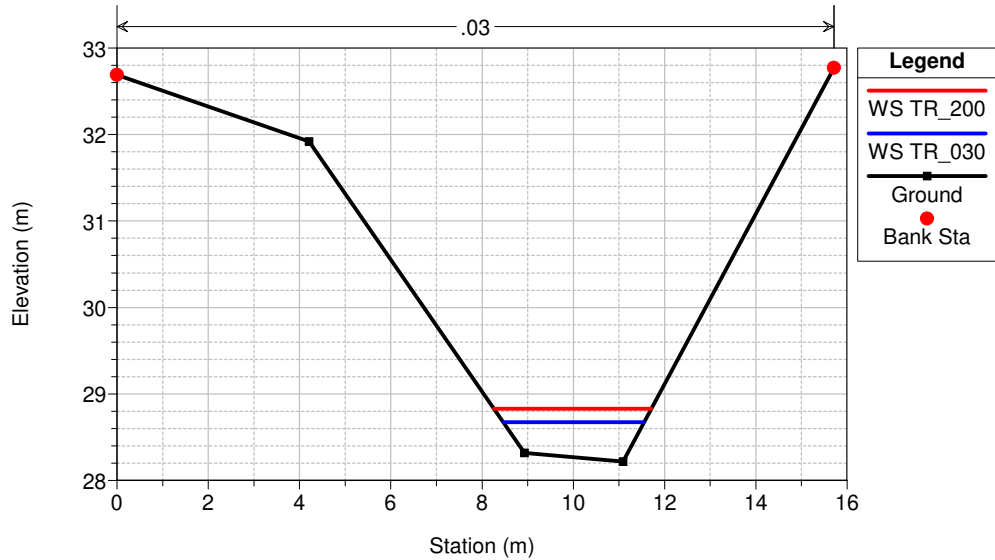
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 110.3



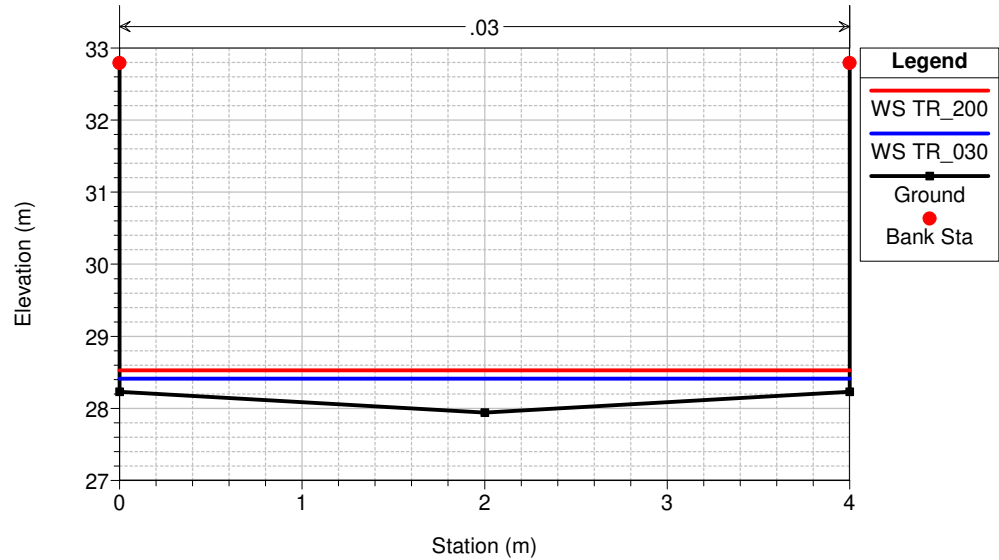
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 110



concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 109



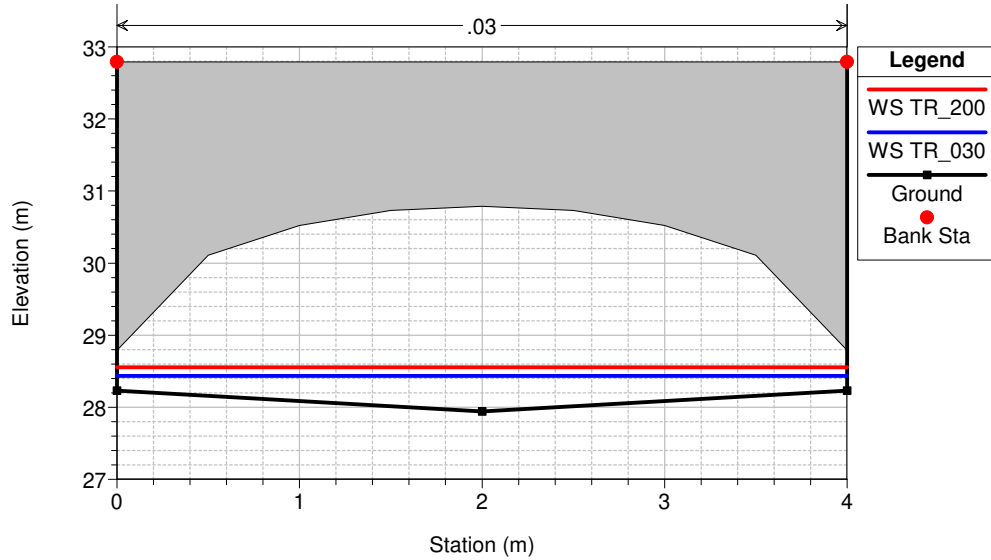
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 108



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

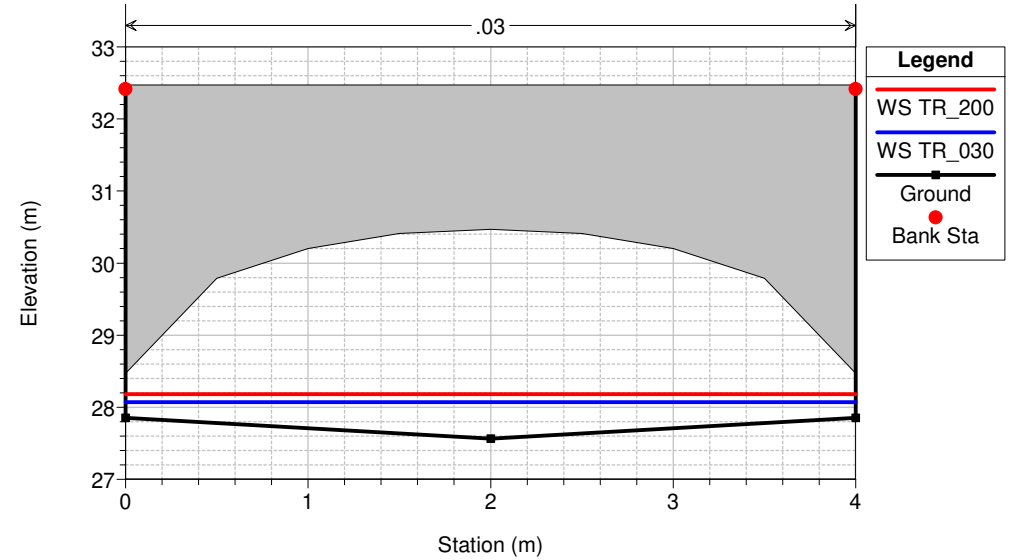
River = Asse\_princ\_dx Reach = Asse\_princ RS = 107.8 BR



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

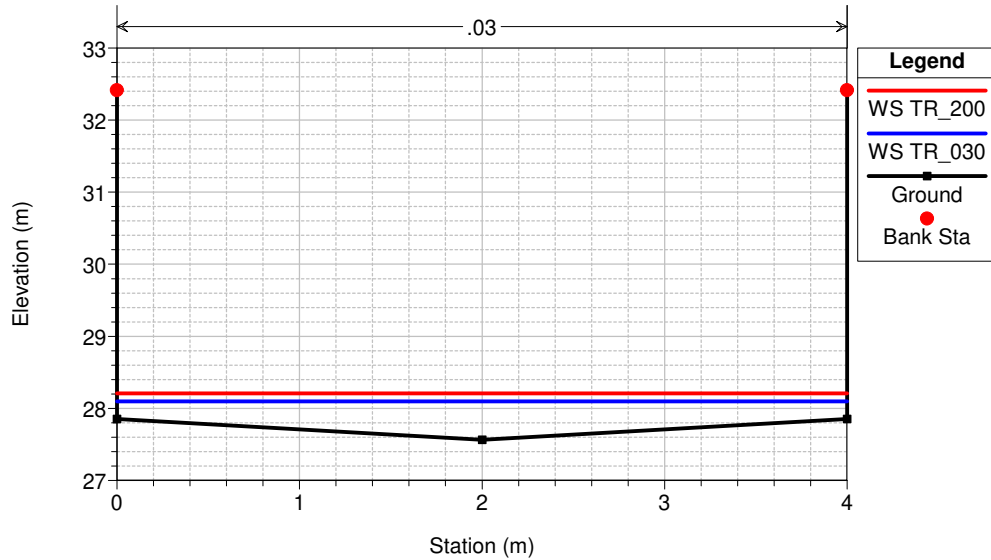
River = Asse\_princ\_dx Reach = Asse\_princ RS = 107.8 BR



concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

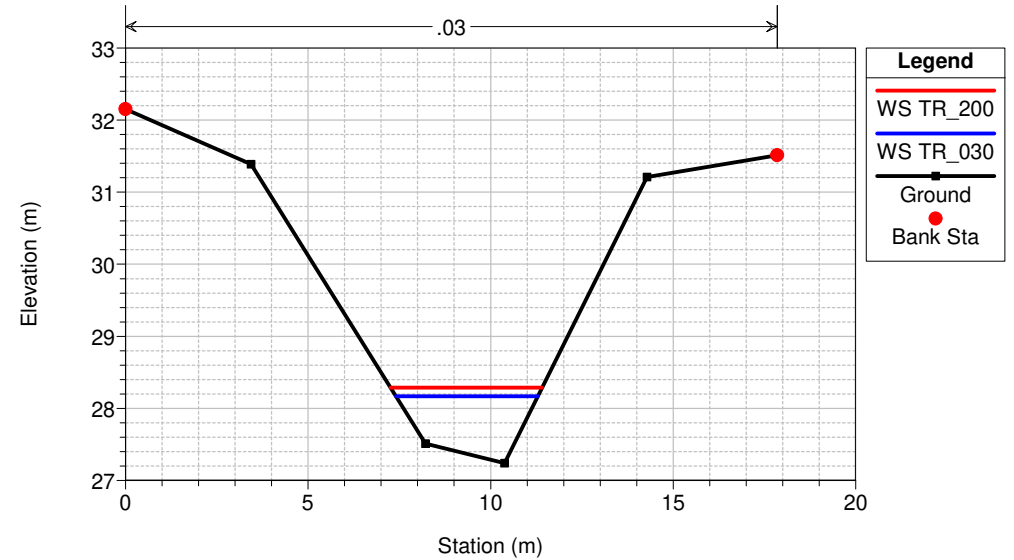
River = Asse\_princ\_dx Reach = Asse\_princ RS = 107.5



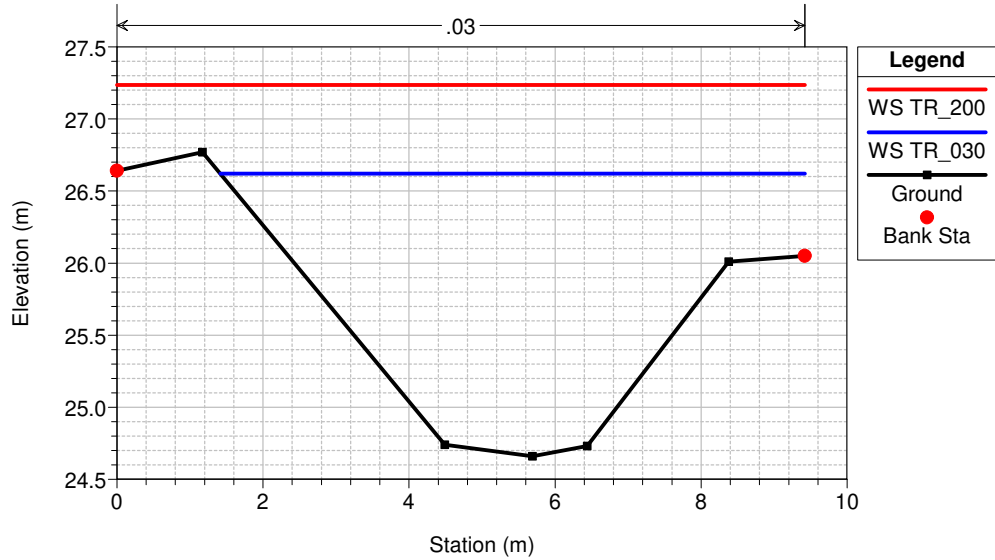
concia\_2021 Plan: Concia\_Definitivo\_REV02

Geom: Concia\_Definitivo\_REV01 Flow: concia

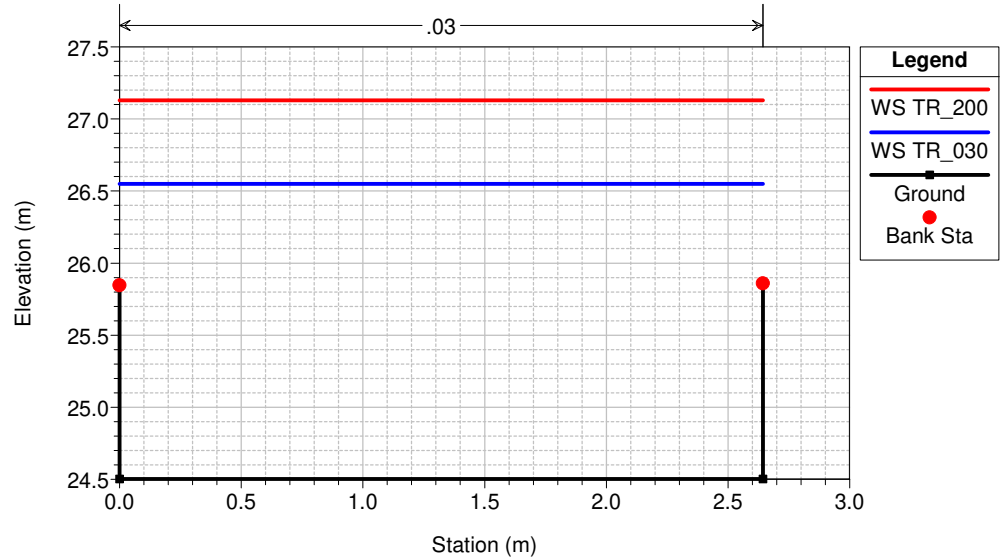
River = Asse\_princ\_dx Reach = Asse\_princ RS = 107



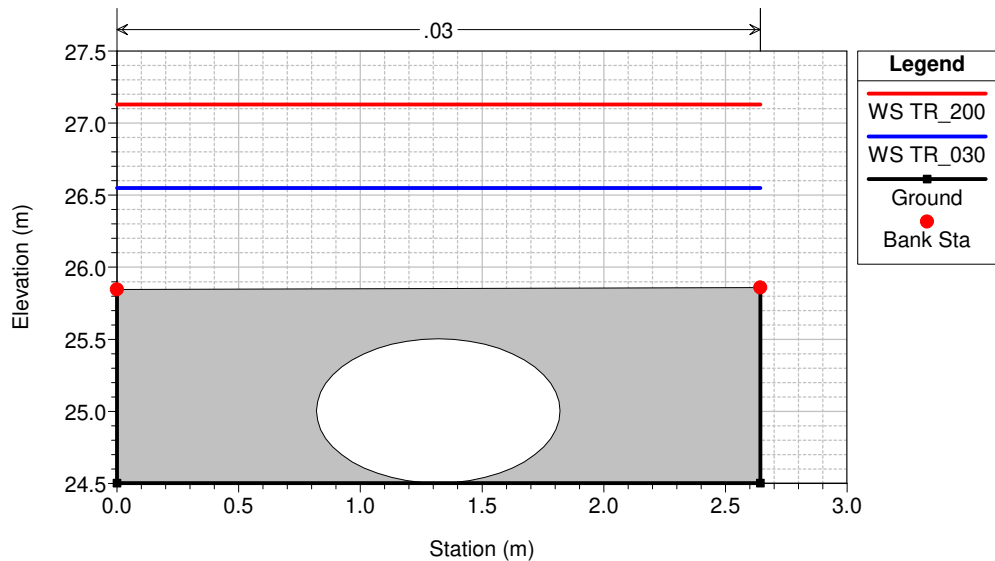
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 106



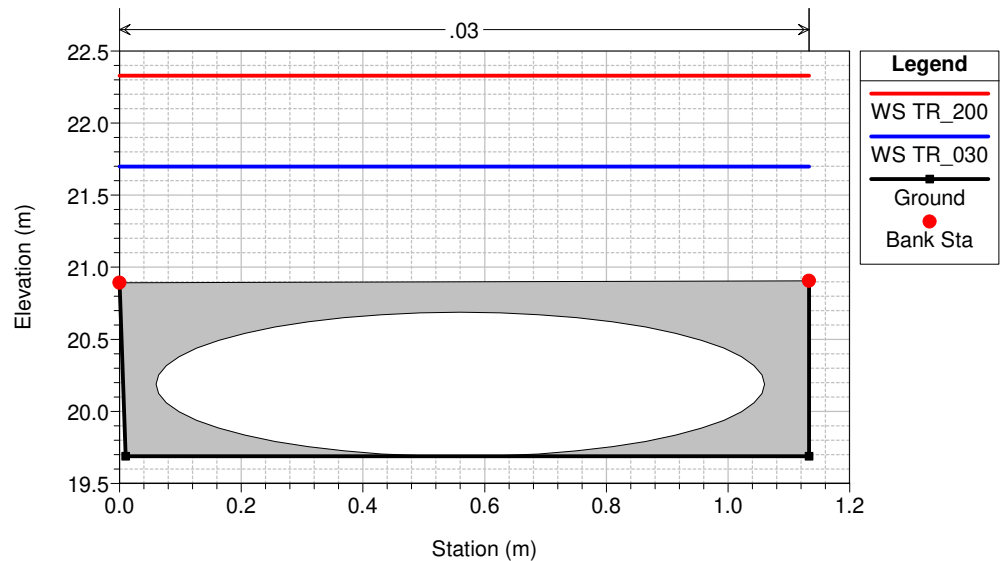
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 105



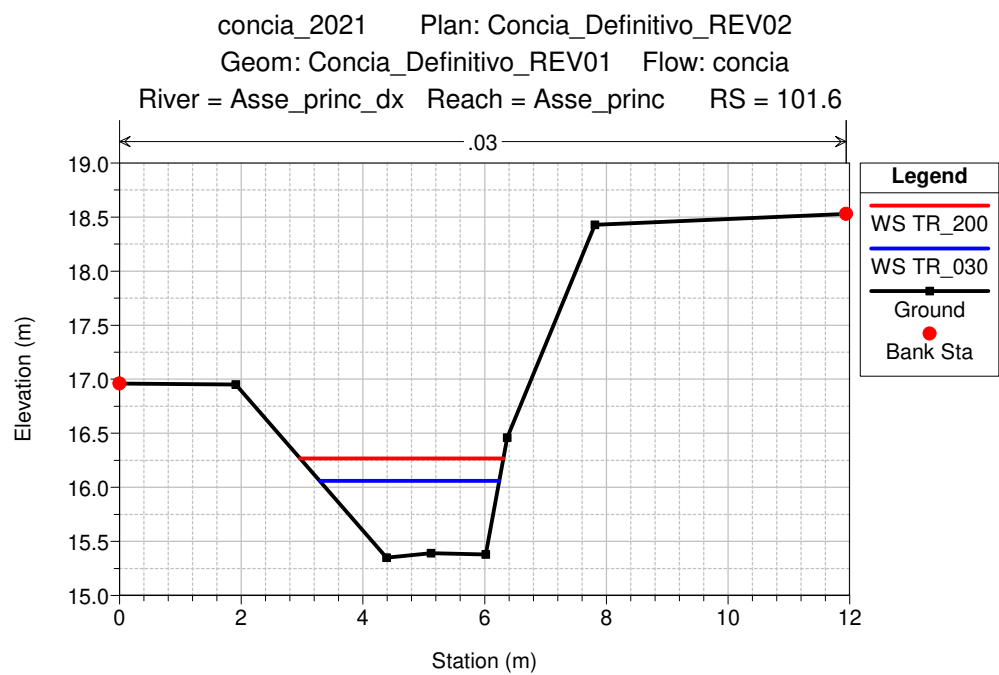
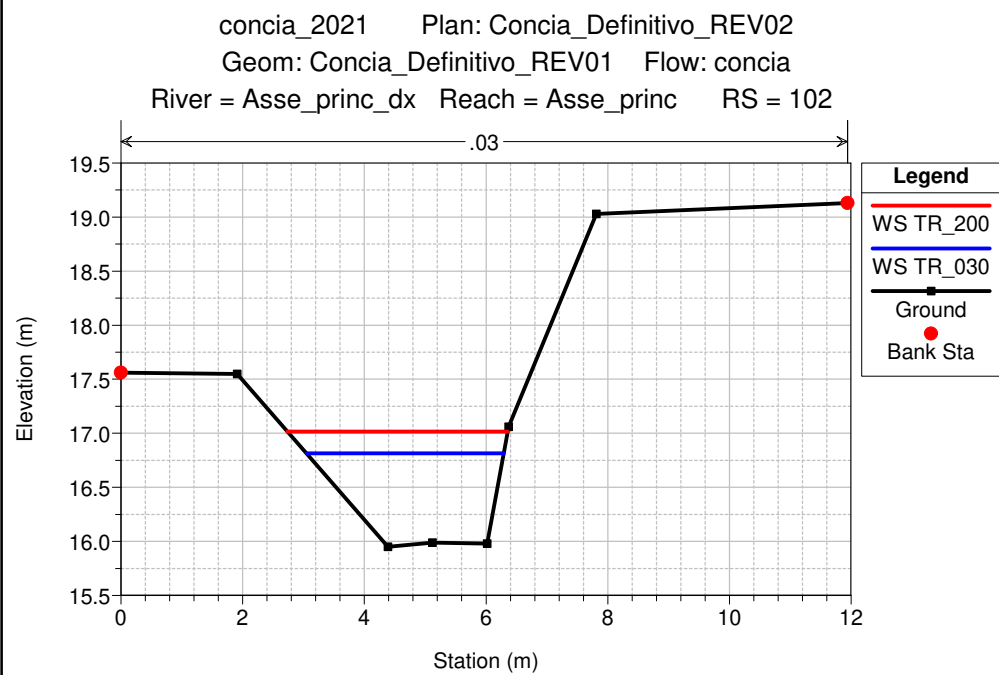
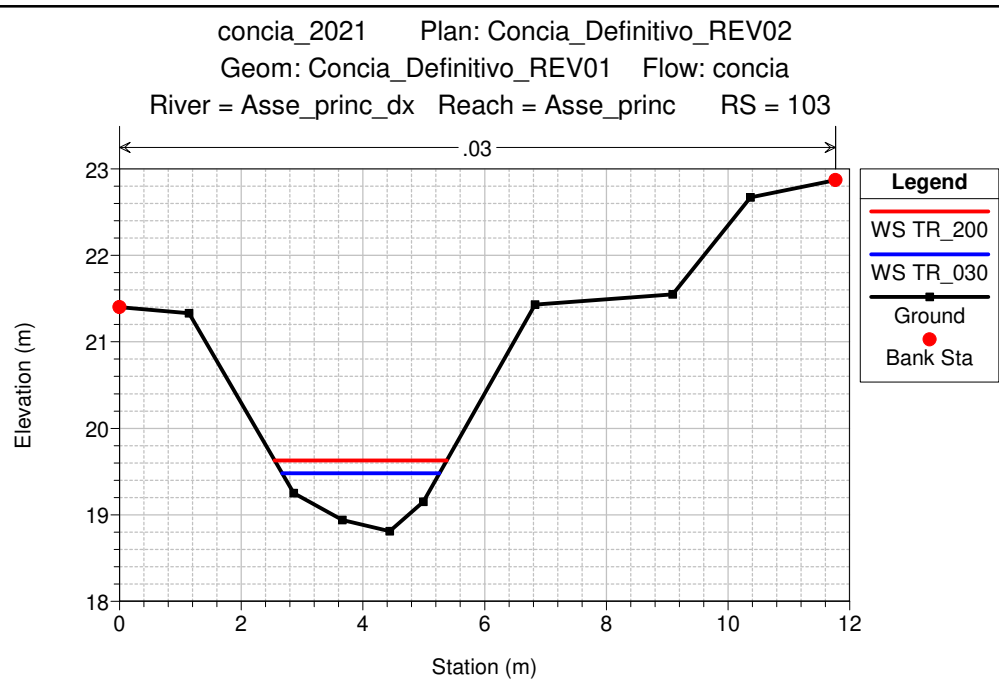
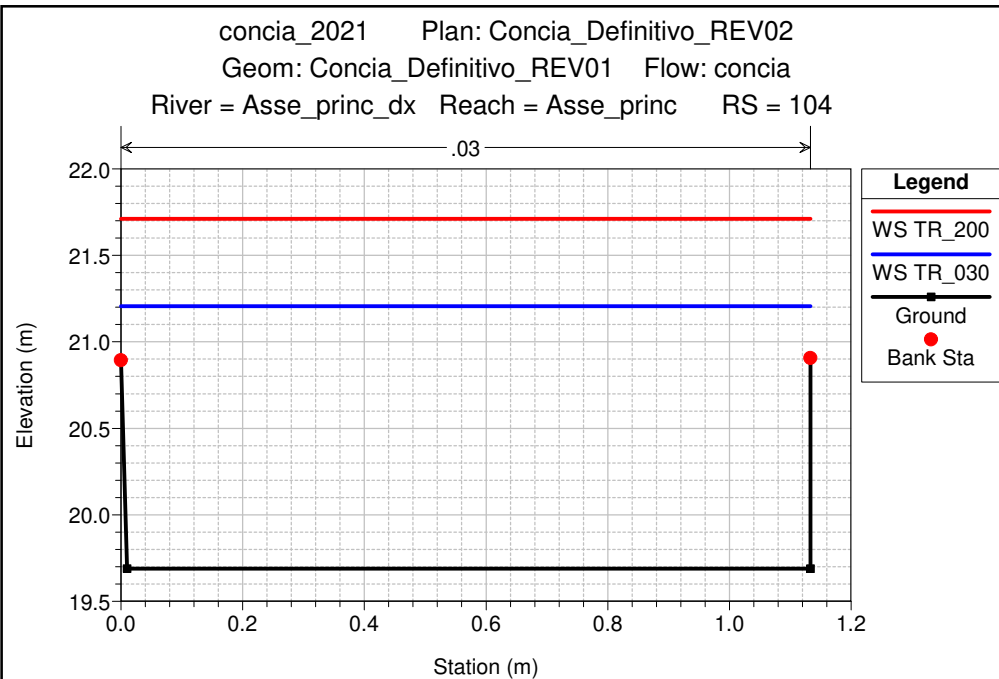
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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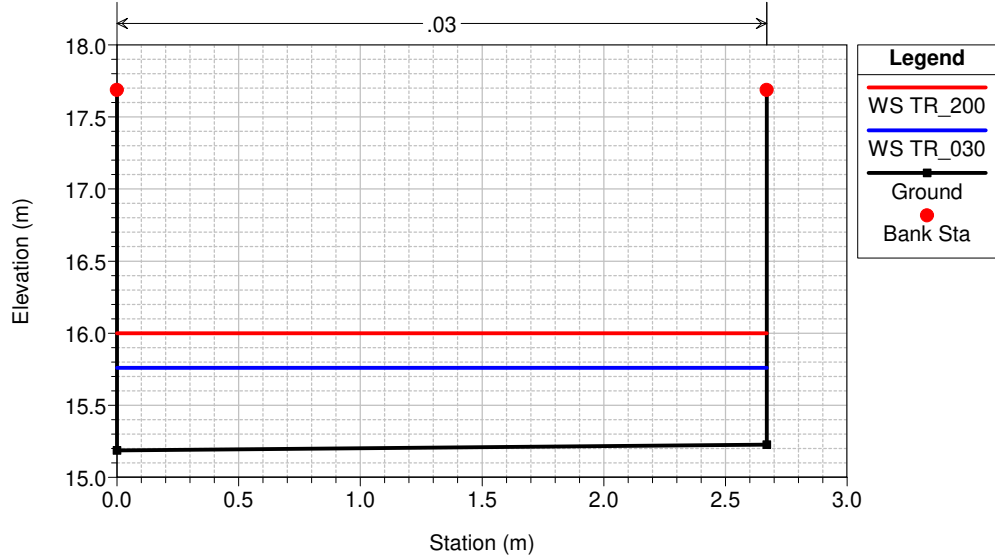
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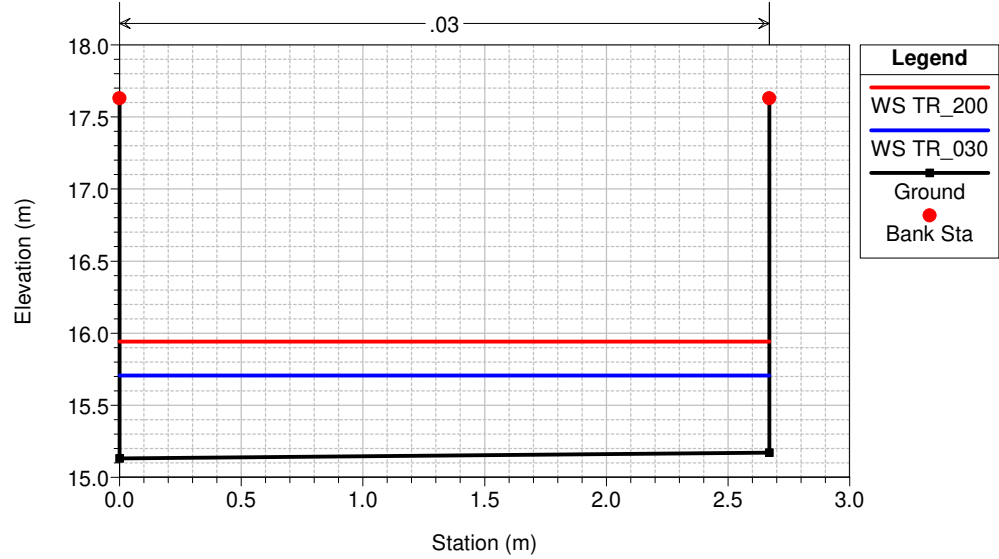




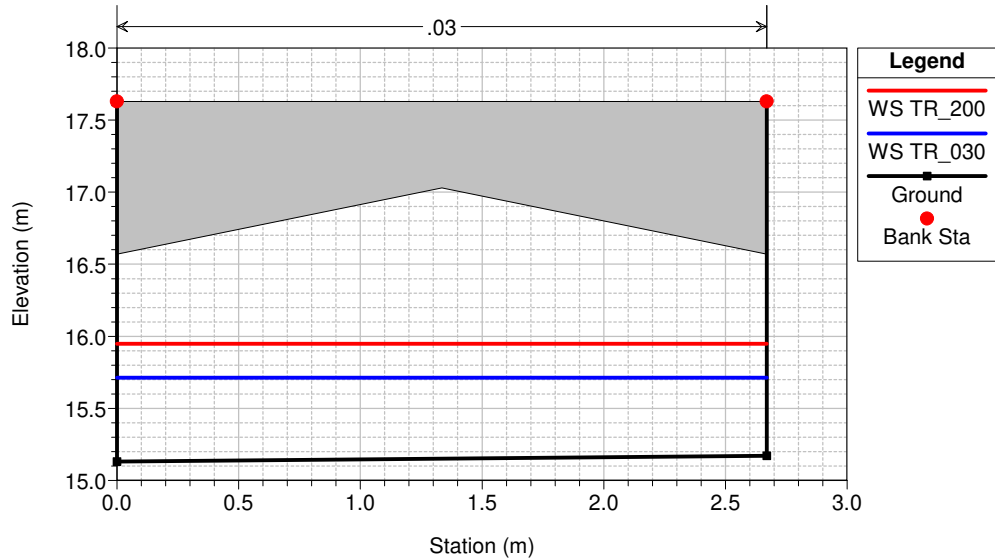
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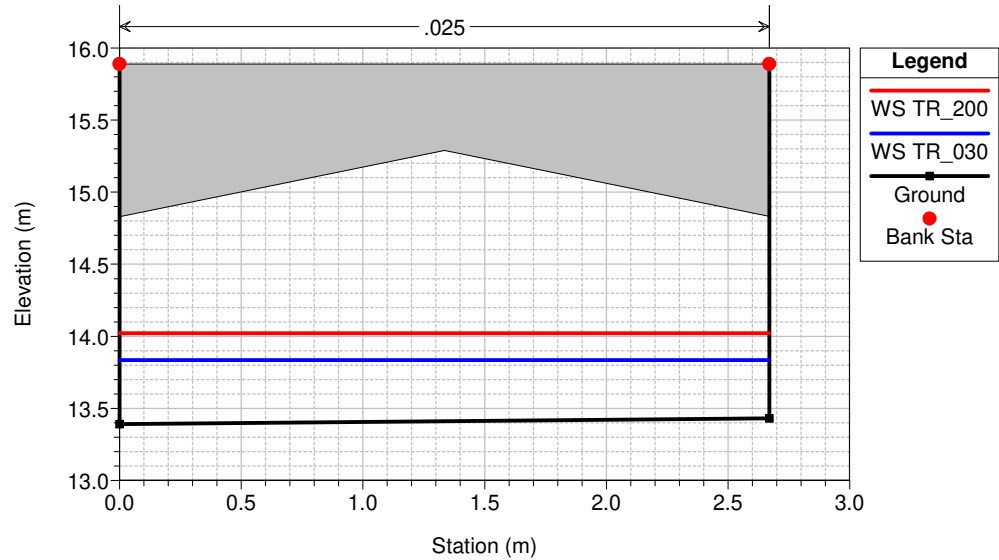
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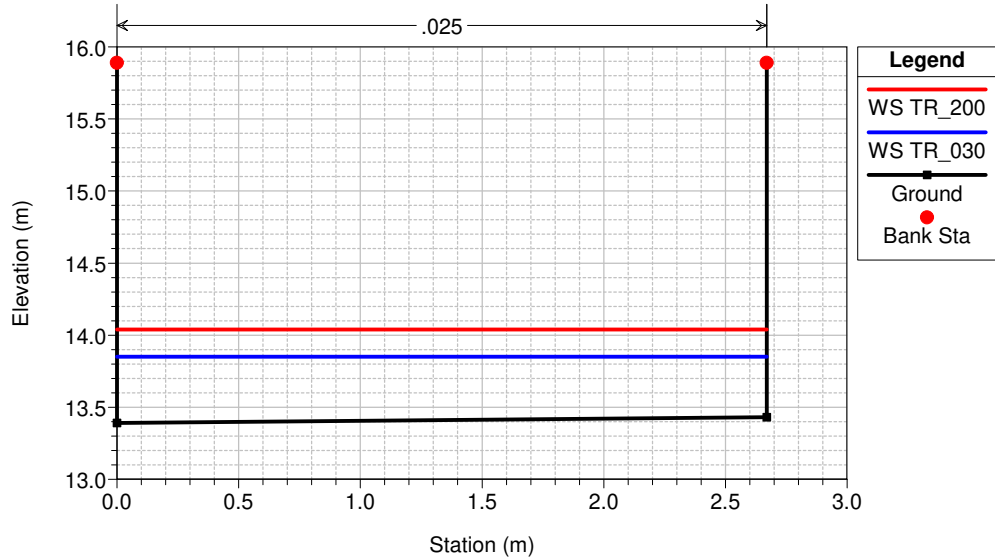
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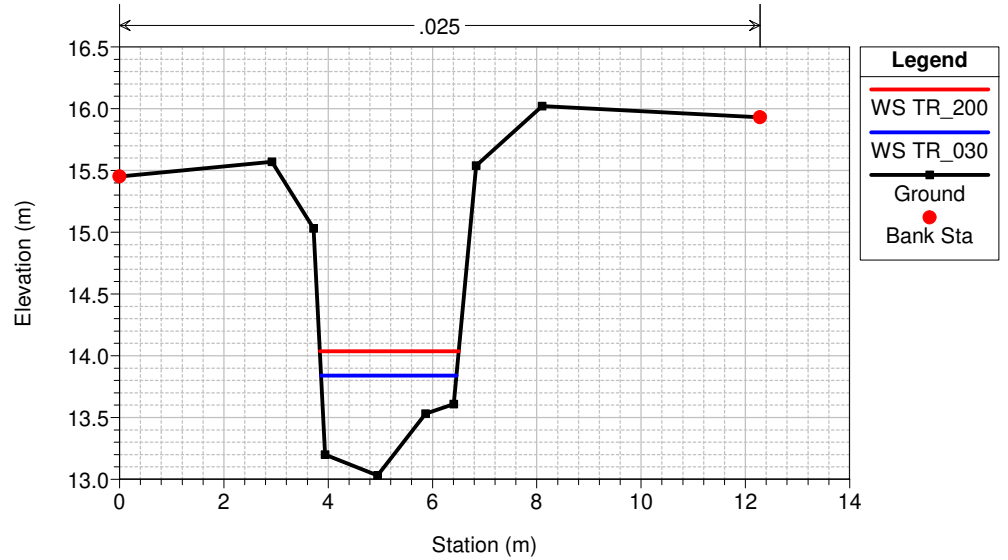
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Geom: Concia\_Definitivo\_REV01 Flow: concia  
River = Asse\_princ\_dx Reach = Asse\_princ RS = 27 BR



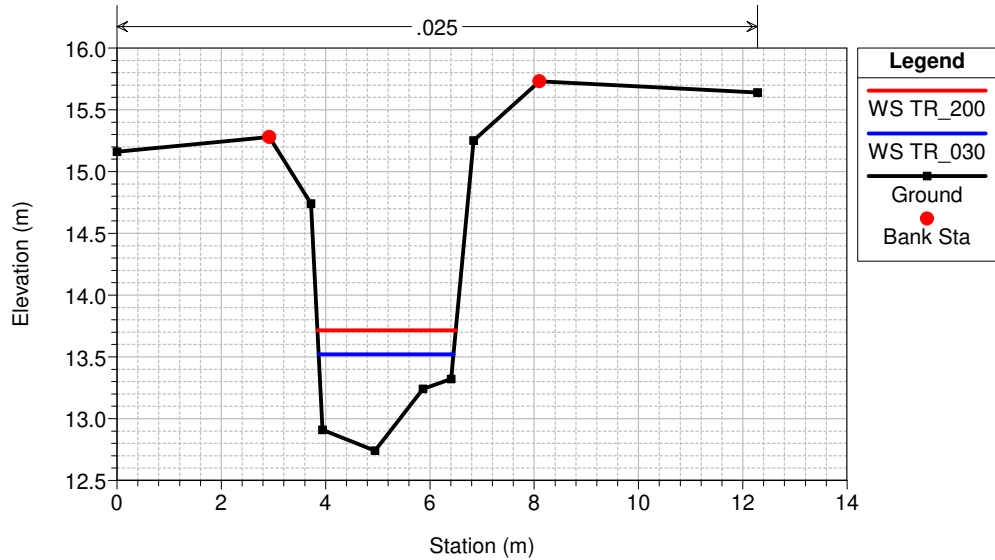
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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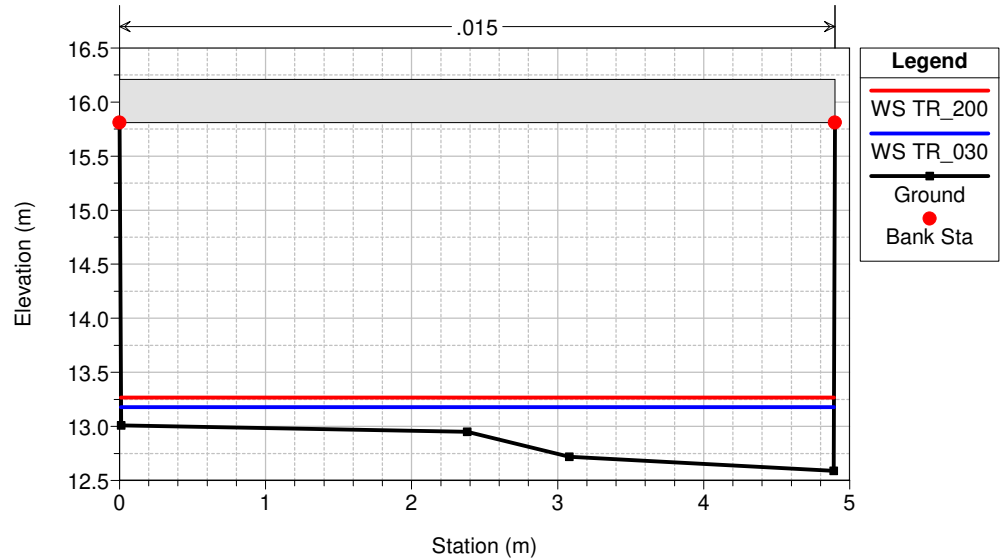
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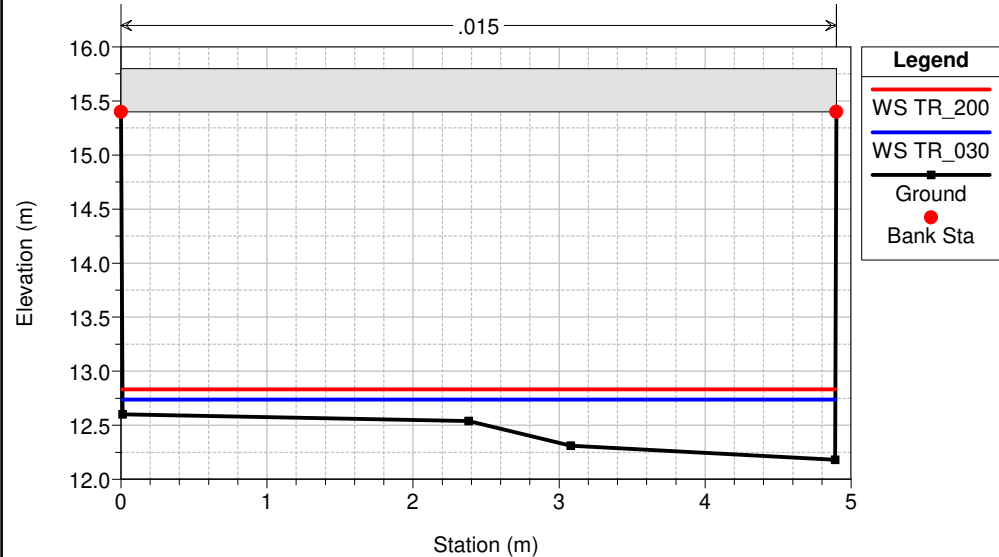
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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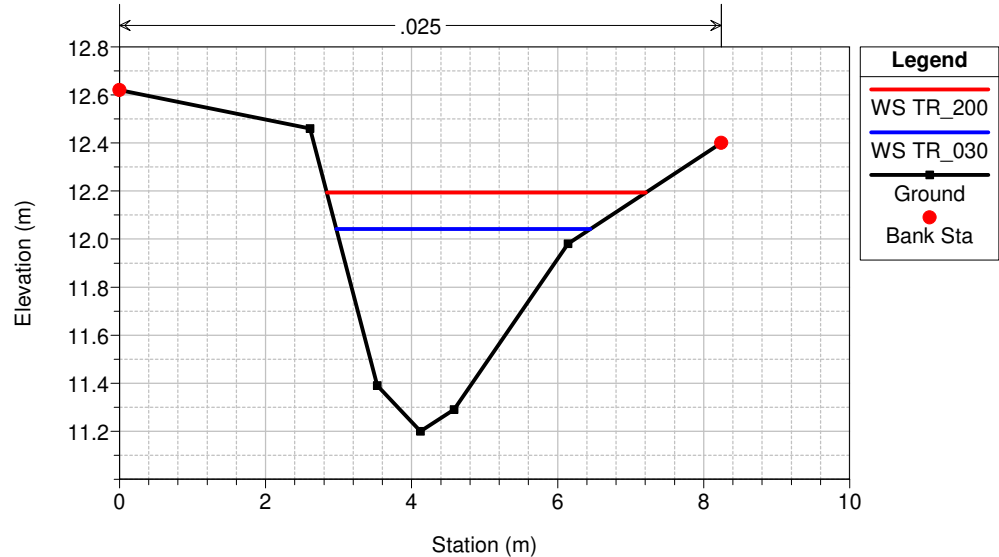
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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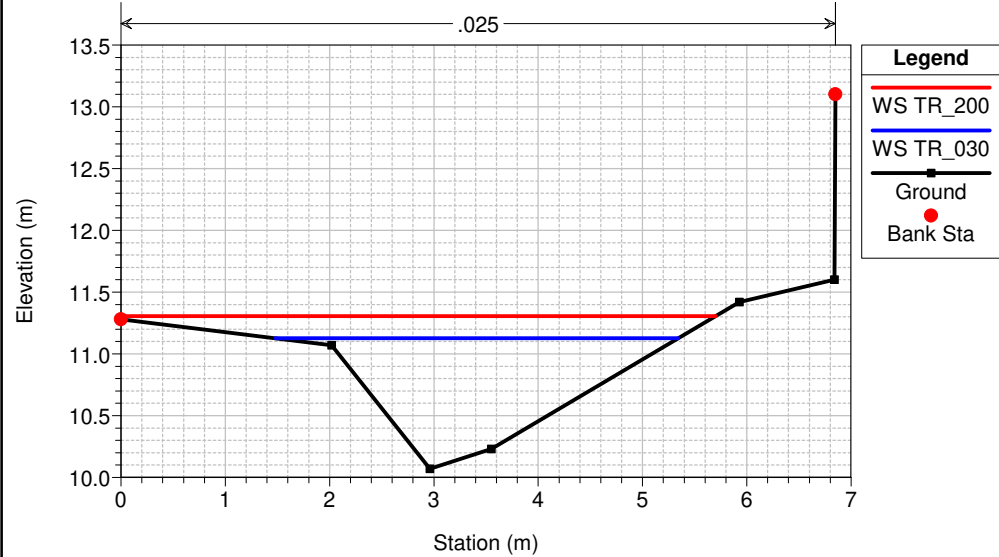
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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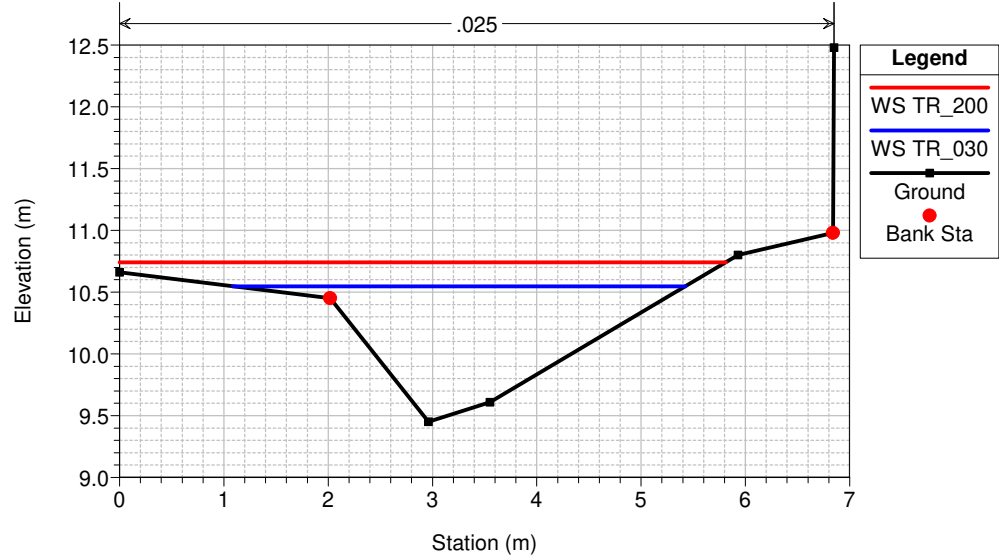
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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 23

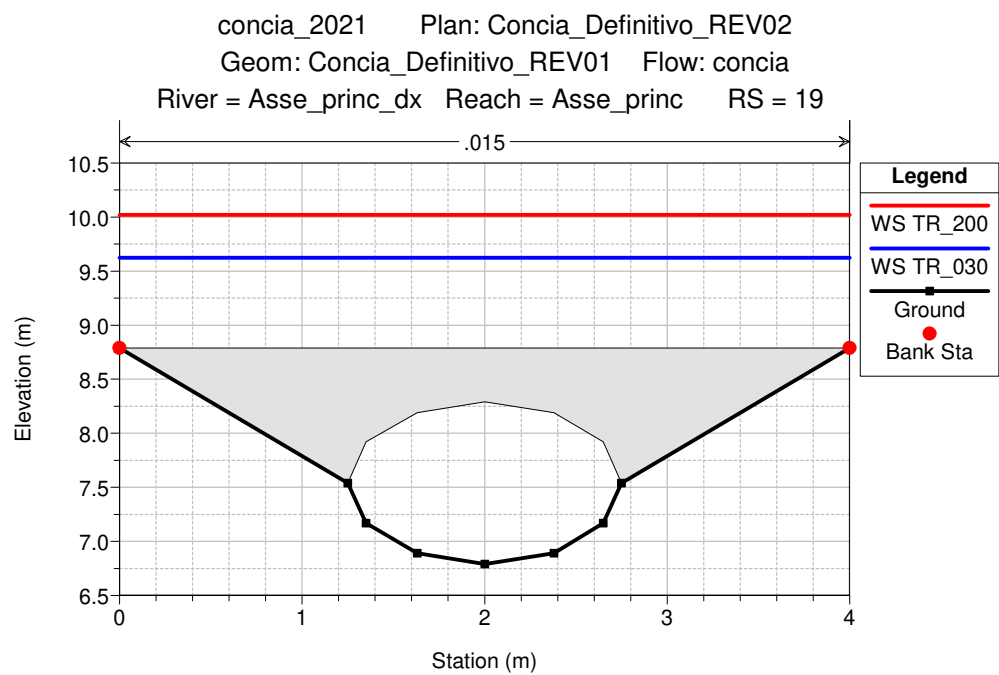
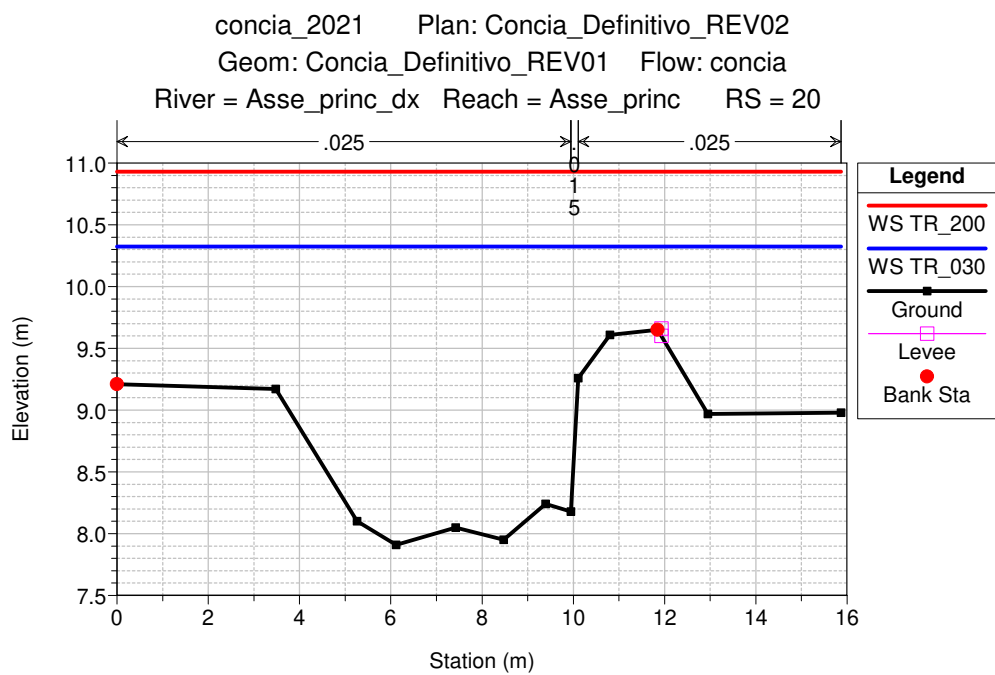
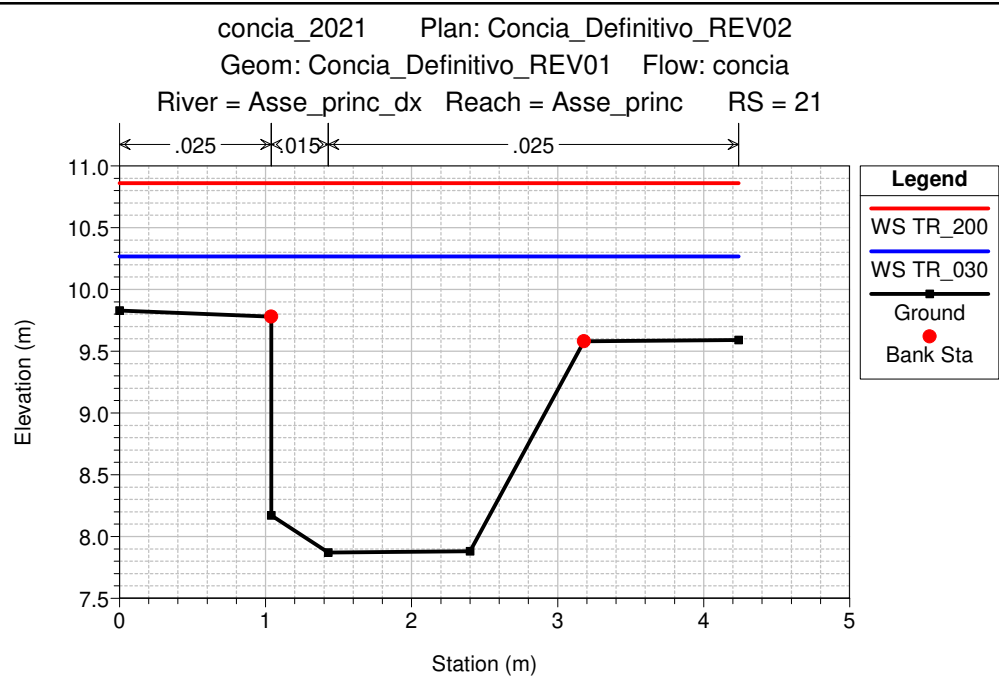
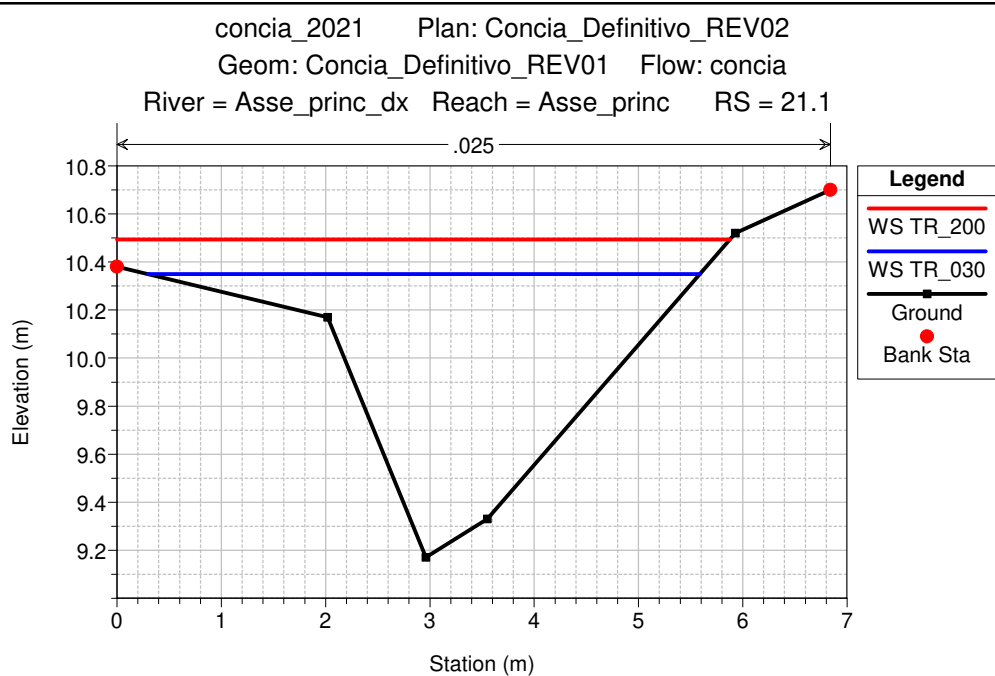


concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
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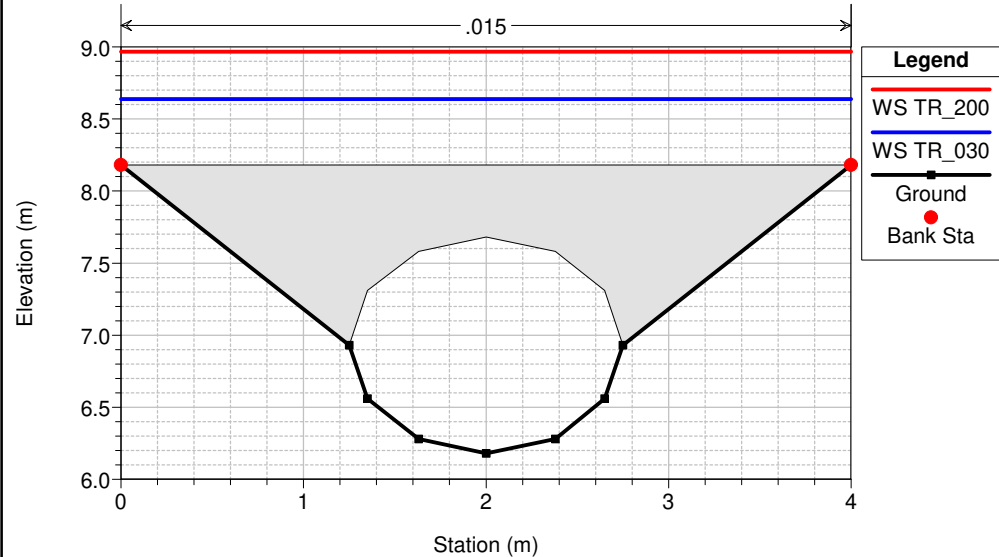


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 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 21.5

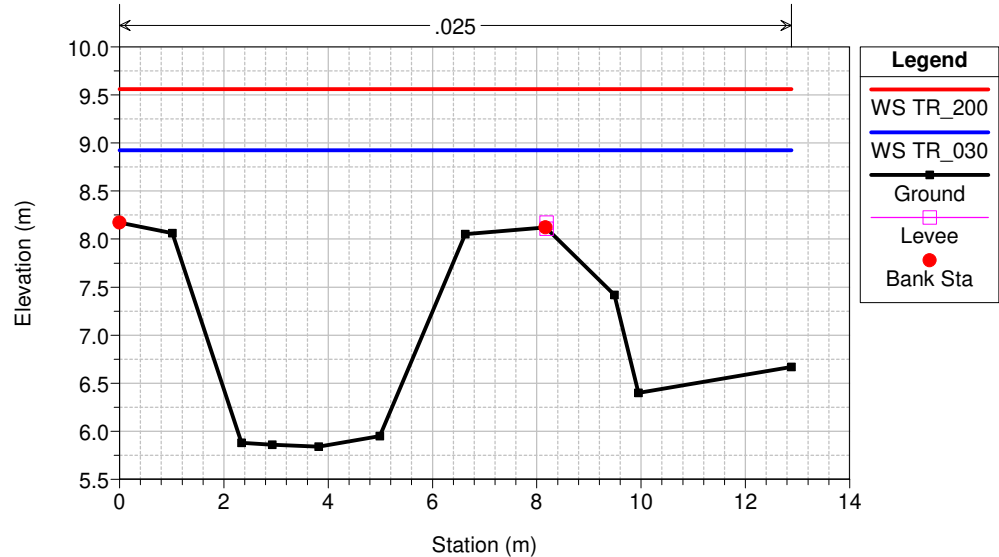




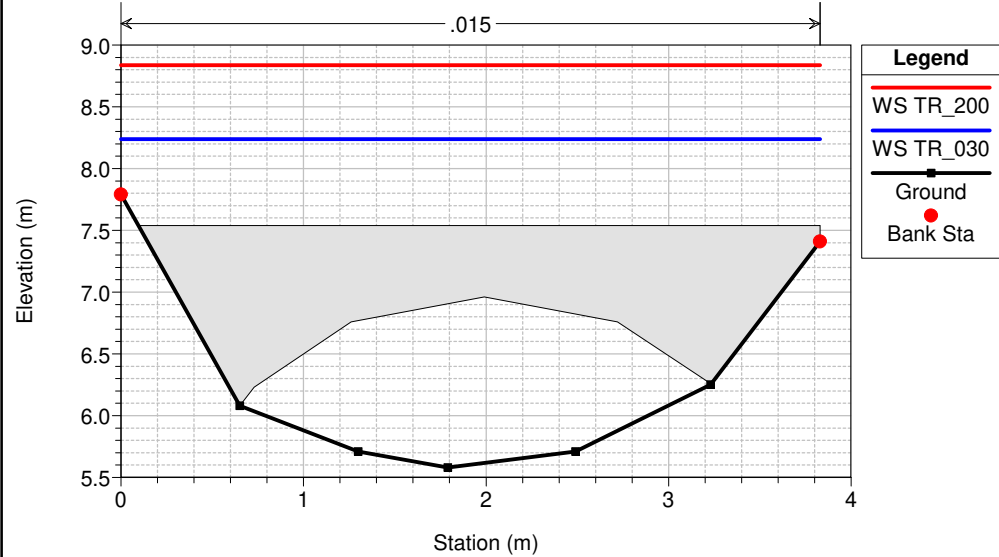
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 18



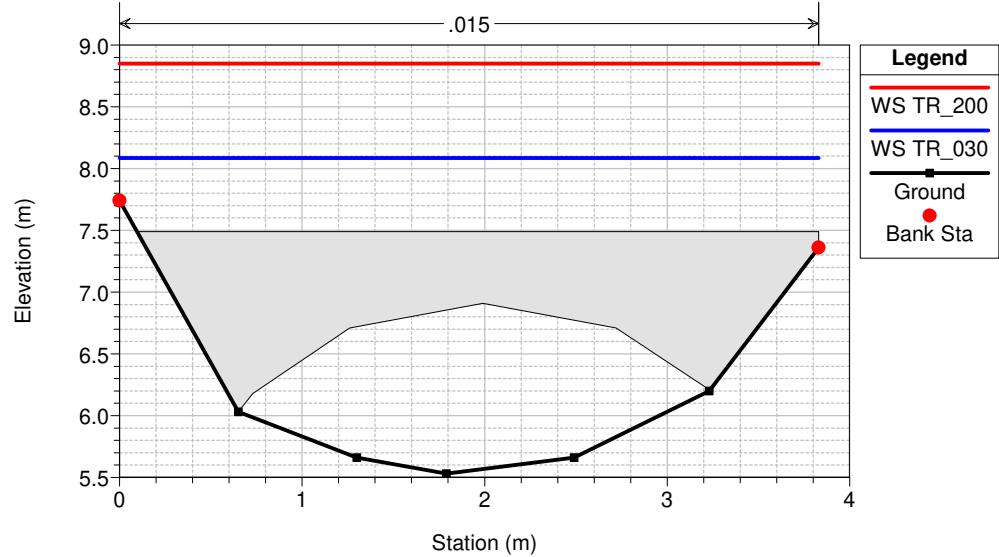
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 17



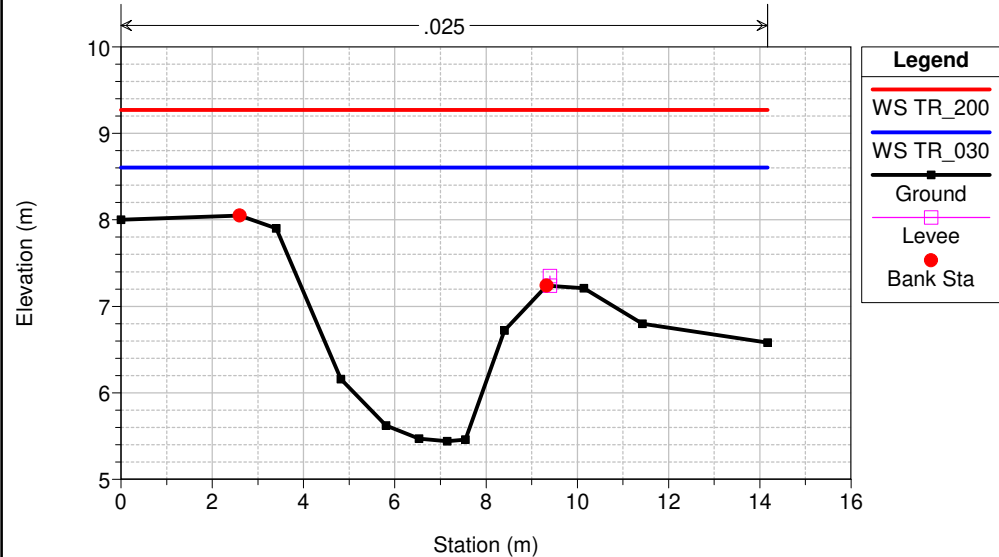
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 16



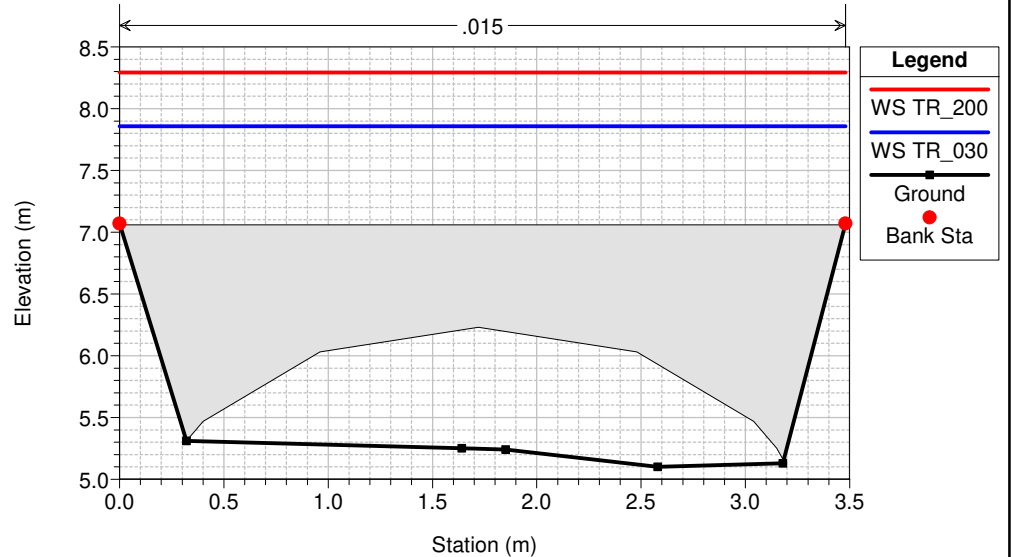
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 15.9



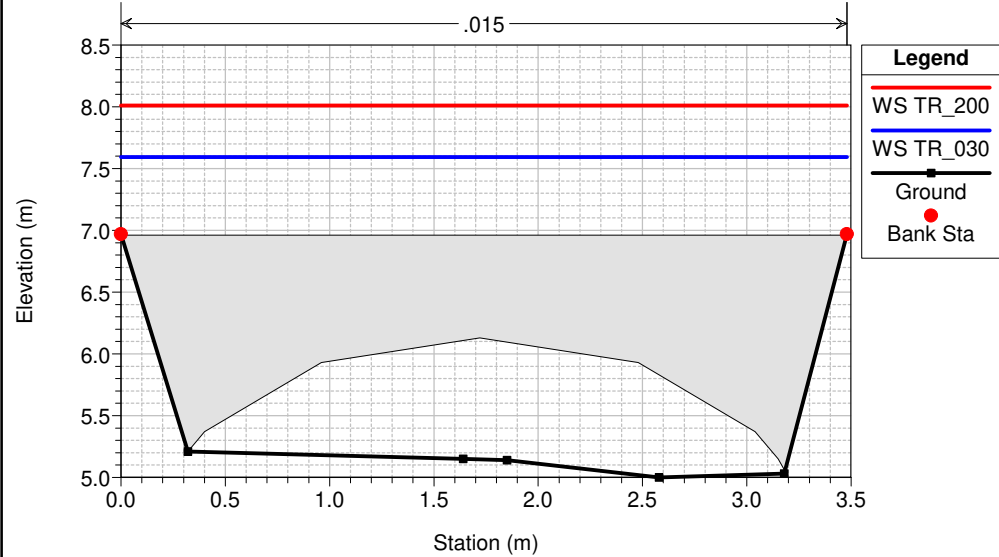
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 15



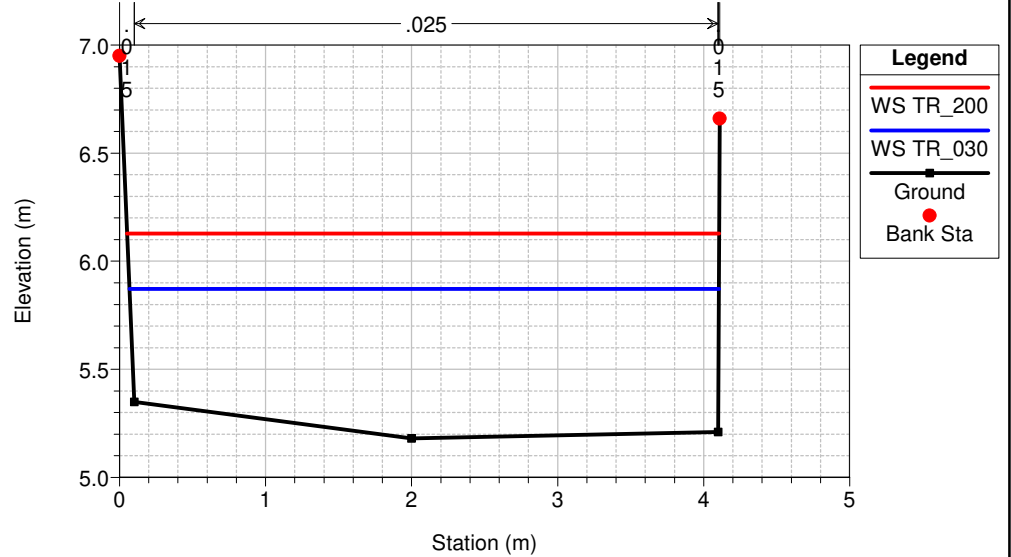
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 14



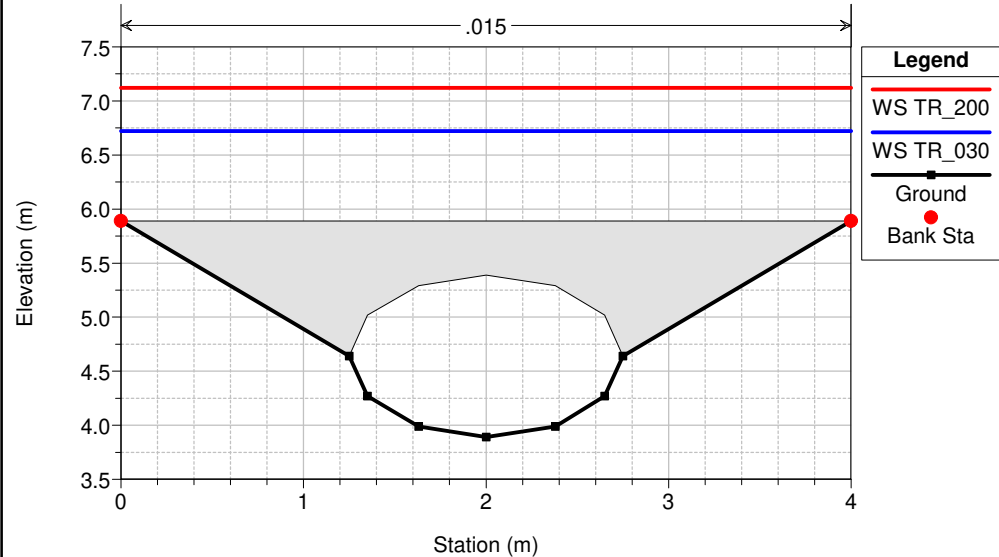
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 13.9



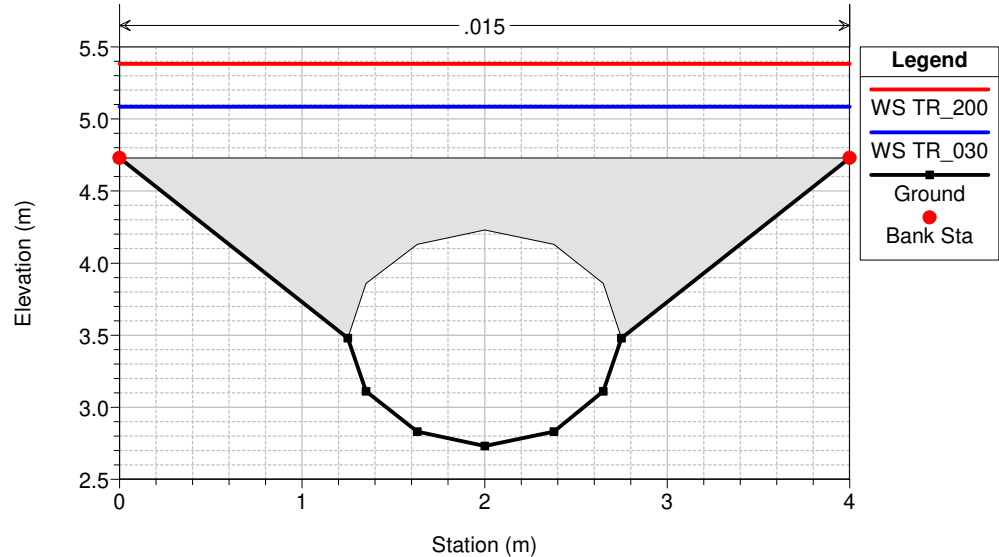
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 13



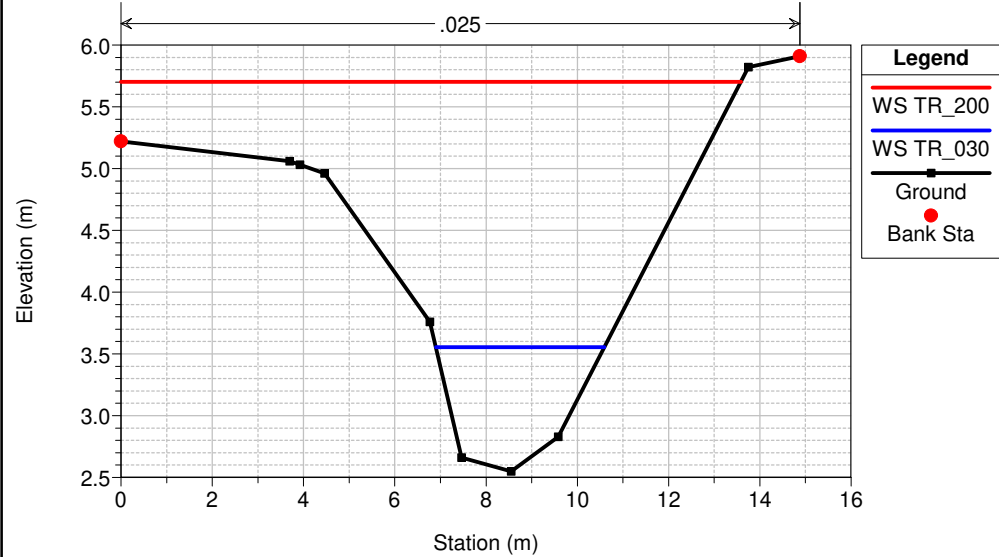
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 12



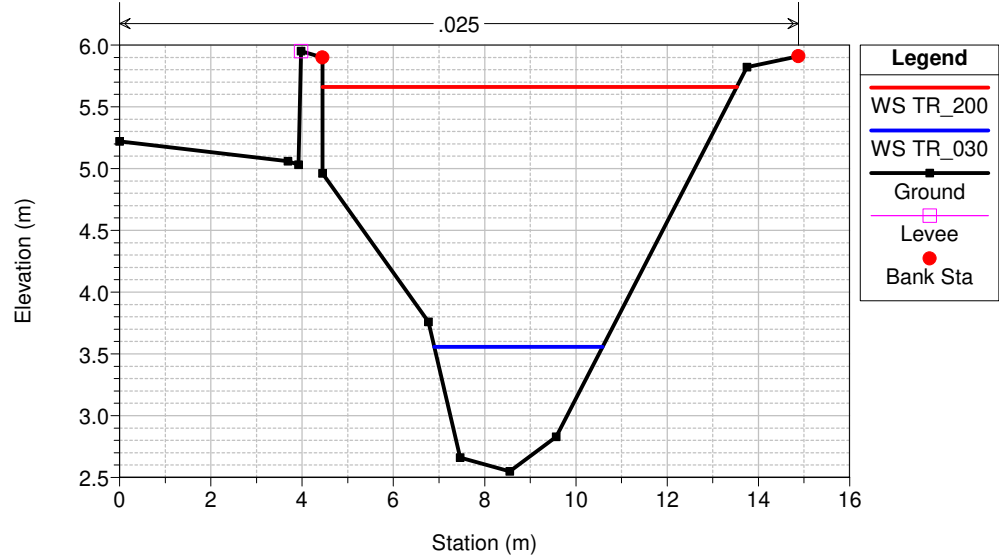
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 11



concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 10

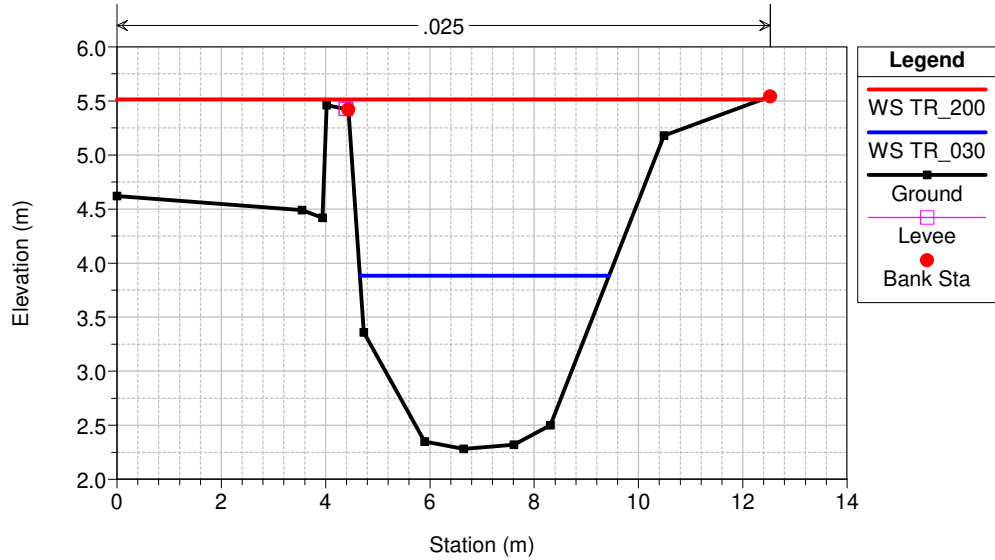


concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 9

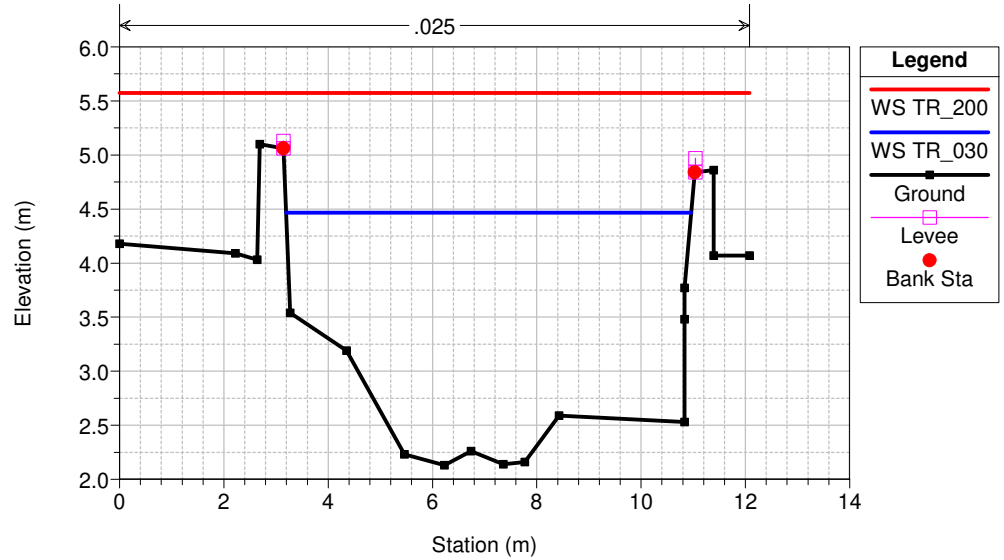




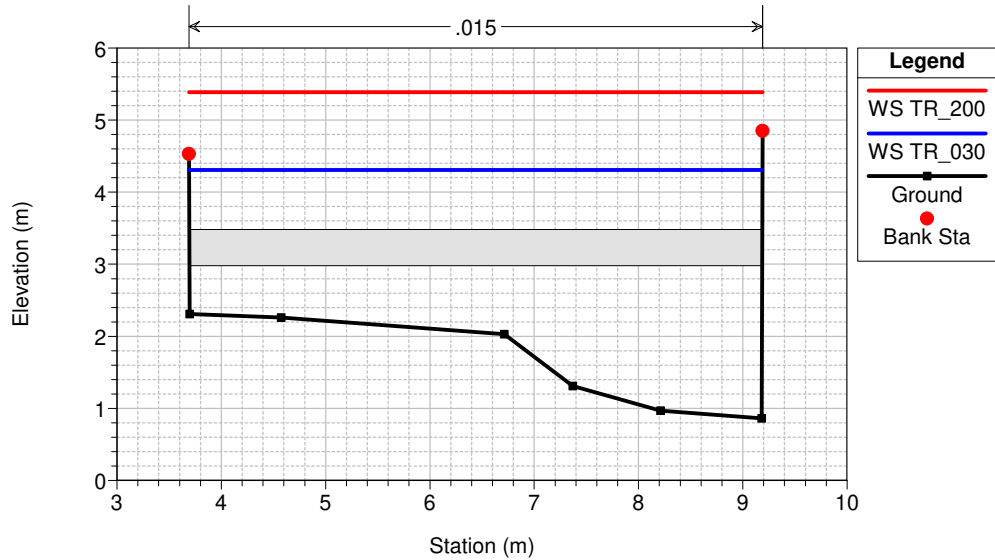
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 8



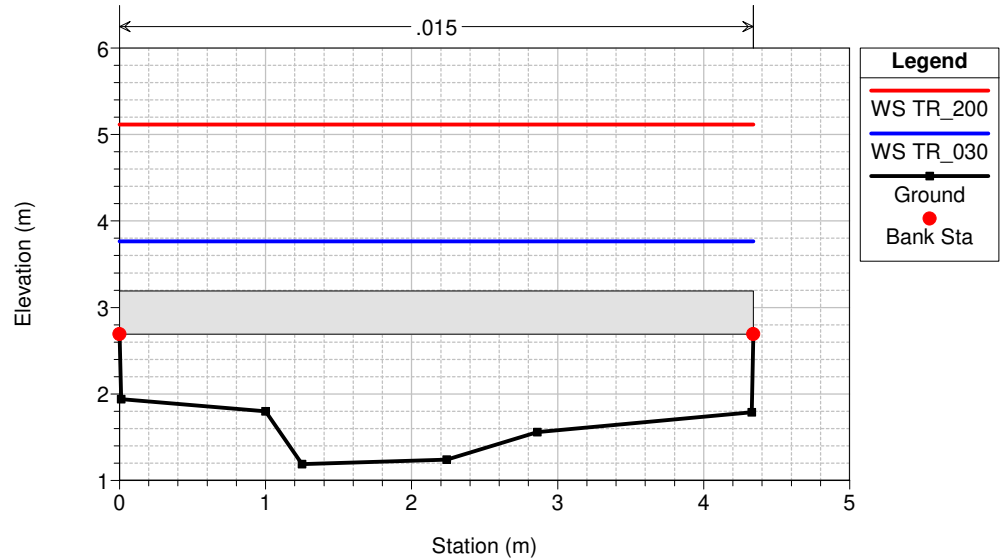
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 7



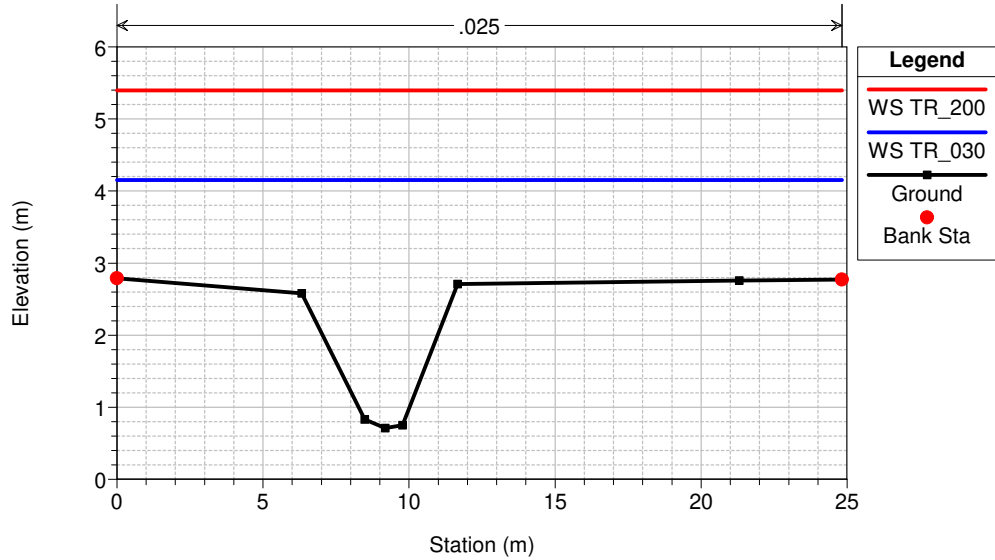
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 6



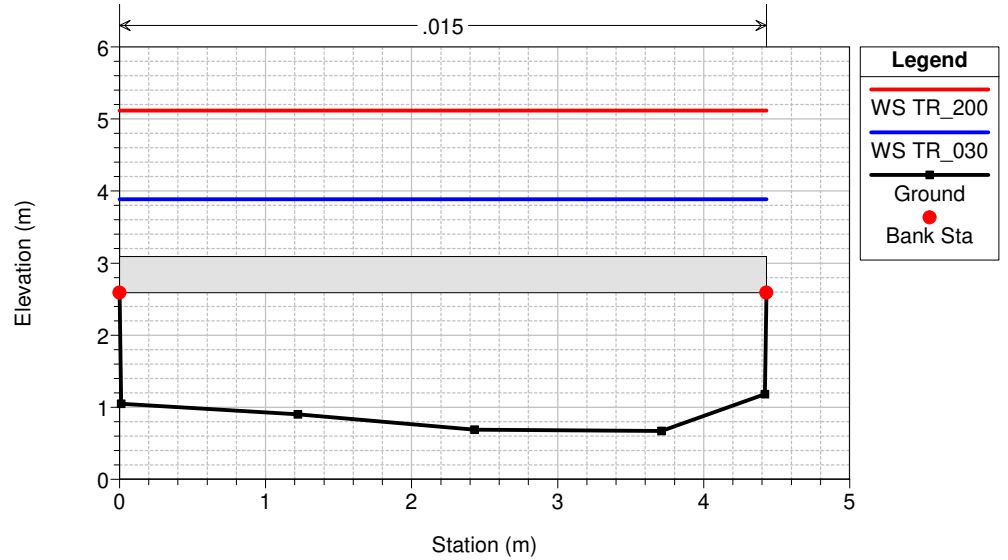
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse Princ\_dx Reach = Asse Princ RS = 5



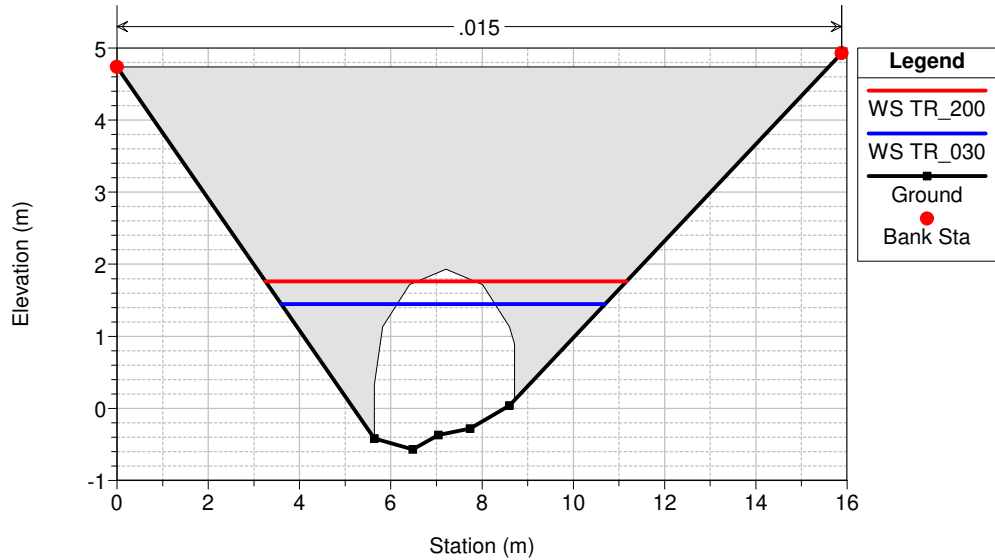
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 4



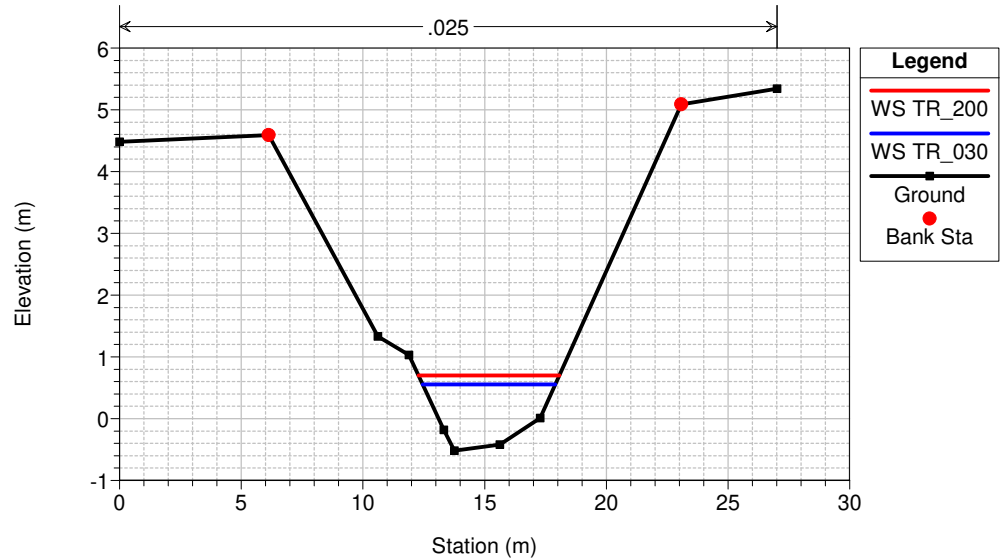
concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 3



concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 2



concia\_2021 Plan: Concia\_Definitivo\_REV02  
 Geom: Concia\_Definitivo\_REV01 Flow: concia  
 River = Asse\_princ\_dx Reach = Asse\_princ RS = 1



HEC-RAS Plan: RE River: asse\_botrovecchi Reach: asse\_botrovecchi

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
asse_botrovecchi	120	TR_030	2.48	63.54	64.22	0.68	64.87	65.68	0.65	1.46	2.85	1.29	182.67
asse_botrovecchi	120	TR_200	3.97	63.54	64.41	0.87	64.87	65.68	0.46	1.27	3.21	1.30	182.67
asse_botrovecchi	119	TR_030	2.48	49.29	49.66	0.36	50.49	50.50	0.84	0.84	6.51	3.45	11.78
asse_botrovecchi	119	TR_200	3.97	49.29	49.82	0.53	50.49	50.50	0.67	0.67	7.11	3.12	11.78
asse_botrovecchi	118.5		Culvert										
asse_botrovecchi	118	TR_030	2.48	48.97	49.61	0.63	50.17	50.18	0.56	0.58	3.79	1.52	65.27
asse_botrovecchi	118	TR_200	3.97	48.97	49.68	0.71	50.17	50.18	0.49	0.50	5.44	2.06	65.27
asse_botrovecchi	117	TR_030	2.48	40.78	41.08	0.30	44.47	45.66	3.39	4.58	5.45	3.78	0.00
asse_botrovecchi	117	TR_200	3.97	40.78	41.22	0.44	44.47	45.66	3.25	4.44	5.14	2.89	0.00

HEC-RAS Plan: RE

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Asse_princ_dx	123	TR_030	1.54	64.49	65.08	0.59	65.68	67.69	0.60	2.61	2.44	1.29	55.41
Asse_princ_dx	123	TR_200	2.39	64.49	65.21	0.72	65.68	67.69	0.47	2.48	2.73	1.31	55.41
Asse_princ_dx	122	TR_030	1.54	57.89	58.05	0.16	58.54	59.35	0.49	1.30	6.89	6.63	99.33
Asse_princ_dx	122	TR_200	2.39	57.89	58.09	0.20	58.54	59.35	0.45	1.26	7.33	6.16	99.33
Asse_princ_dx	121	TR_030	1.54	45.46	46.03	0.57	46.74	46.02	0.71	-0.01	2.09	1.70	11.21
Asse_princ_dx	121	TR_200	2.39	45.46	46.08	0.62	46.74	46.02	0.66	-0.06	2.53	1.83	11.21
Asse_princ_dx	117	TR_030	1.54	44.25	44.69	0.44	44.96	45.33	0.27	0.64	3.70	2.51	0.00
Asse_princ_dx	117	TR_200	2.39	44.25	44.79	0.54	44.96	45.33	0.17	0.54	3.89	2.39	0.00
Asse_princ	116	TR_030	6.61	40.00	40.59	0.59	44.53	44.32	3.94	3.73	6.19	3.29	39.46
Asse_princ	116	TR_200	10.17	40.00	40.81	0.81	44.53	44.32	3.72	3.51	5.80	2.54	39.46
Asse_princ	115	TR_030	6.61	37.31	37.93	0.62	41.51	39.96	3.58	2.03	4.15	2.03	41.49
Asse_princ	115	TR_200	10.17	37.31	38.04	0.73	41.51	39.96	3.47	1.92	5.11	2.31	41.49
Asse_princ	114	TR_030	6.61	35.14	35.70	0.56	38.90	38.48	3.20	2.78	4.19	1.96	7.98
Asse_princ	114	TR_200	10.17	35.14	35.87	0.73	38.90	38.48	3.03	2.61	4.62	1.89	7.98
Asse_princ	113	TR_030	6.61	34.91	35.44	0.53	38.23	38.23	2.79	2.79	3.75	1.64	1.00
Asse_princ	113	TR_200	10.17	34.91	35.63	0.72	38.23	38.23	2.60	2.60	4.30	1.62	1.00
Asse_princ	112.8		Bridge										
Asse_princ	112.6	TR_030	6.61	34.30	34.86	0.56	37.62	37.62	2.76	2.76	3.60	1.54	3.34
Asse_princ	112.6	TR_200	10.17	34.30	35.07	0.77	37.62	37.62	2.55	2.55	4.03	1.47	3.34
Asse_princ	112	TR_030	6.61	34.18	34.80	0.62	37.39	37.55	2.59	2.75	3.34	1.52	0.05
Asse_princ	112	TR_200	10.17	34.18	34.94	0.76	37.39	37.55	2.45	2.61	4.05	1.64	0.05
Asse_princ	111.5	TR_030	6.61	33.68	35.10	1.42	36.89	37.05	1.79	1.95	1.27	0.36	2.67
Asse_princ	111.5	TR_200	10.17	33.68	35.52	1.84	36.89	37.05	1.37	1.53	1.47	0.36	2.67
Asse_princ	111	TR_030	6.61	33.72	34.86	1.13	37.31	37.34	2.45	2.48	2.41	0.80	0.50
Asse_princ	111	TR_200	10.17	33.72	35.25	1.53	37.31	37.34	2.06	2.09	2.59	0.72	0.50
Asse_princ	110.5		Bridge										
Asse_princ	110.3	TR_030	6.61	33.11	34.05	0.94	36.70	36.73	2.65	2.68	3.06	1.15	3.25
Asse_princ	110.3	TR_200	10.17	33.11	34.20	1.09	36.70	36.73	2.50	2.53	3.91	1.34	3.25

HEC-RAS Plan: RE (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Asse Princ	110	TR_030	6.61	32.88	33.90	1.02	36.20	35.76	2.30	1.86	3.30	1.25	73.92
Asse Princ	110	TR_200	10.17	32.88	34.10	1.22	36.20	35.76	2.10	1.66	3.94	1.36	73.92
Asse Princ	109	TR_030	6.61	28.22	28.67	0.45	32.69	32.77	4.02	4.10	6.27	3.42	5.35
Asse Princ	109	TR_200	10.17	28.22	28.83	0.61	32.69	32.77	3.86	3.94	6.49	3.07	5.35
Asse Princ	108	TR_030	6.61	27.94	28.41	0.47	32.79	32.79	4.38	4.38	5.08	2.84	1.00
Asse Princ	108	TR_200	10.17	27.94	28.53	0.59	32.79	32.79	4.26	4.26	5.75	2.76	1.00
Asse Princ	107.8		Bridge										
Asse Princ	107.5	TR_030	6.61	27.56	28.10	0.53	32.41	32.41	4.32	4.32	4.27	2.19	10.64
Asse Princ	107.5	TR_200	10.17	27.56	28.21	0.65	32.41	32.41	4.20	4.20	5.08	2.29	10.64
Asse Princ	107	TR_030	6.61	27.24	28.17	0.93	32.15	31.51	3.98	3.34	2.75	1.12	52.86
Asse Princ	107	TR_200	10.17	27.24	28.29	1.05	32.15	31.51	3.86	3.22	3.53	1.35	52.86
Asse Princ	106	TR_030	6.61	24.66	26.62	1.96	26.64	26.05	0.02	-0.57	0.68	0.20	16.99
Asse Princ	106	TR_200	10.17	24.66	27.24	2.57	26.64	26.05	-0.59	-1.19	0.66	0.17	16.99
Asse Princ	105	TR_030	6.61	24.50	26.55	2.05	25.85	25.86	-0.70	-0.69	1.22	0.27	88.44
Asse Princ	105	TR_200	10.17	24.50	27.13	2.63	25.85	25.86	-1.28	-1.27	1.47	0.29	88.44
Asse Princ	104.5		Culvert										
Asse Princ	104	TR_030	6.61	19.69	21.21	1.52	20.89	20.91	-0.31	-0.30	3.85	1.00	5.98
Asse Princ	104	TR_200	10.17	19.69	21.71	2.02	20.89	20.91	-0.82	-0.80	4.45	1.00	5.98
Asse Princ	103	TR_030	6.61	18.81	19.48	0.67	21.40	22.87	1.92	3.39	5.90	2.86	79.11
Asse Princ	103	TR_200	10.17	18.81	19.63	0.82	21.40	22.87	1.77	3.24	6.66	2.90	79.11
Asse Princ	102	TR_030	6.61	15.95	16.81	0.86	17.56	19.13	0.75	2.32	3.22	1.29	10.60
Asse Princ	102	TR_200	10.17	15.95	17.02	1.07	17.56	19.13	0.54	2.11	3.70	1.36	10.60
Asse Princ	101.6	TR_030	6.61	15.35	16.06	0.71	16.96	18.53	0.90	2.47	4.20	1.84	3.00
Asse Princ	101.6	TR_200	10.17	15.35	16.27	0.92	16.96	18.53	0.69	2.26	4.57	1.79	3.00
Asse Princ	101.3	TR_030	6.61	15.19	15.76	0.57	17.69	17.69	1.93	1.93	4.47	1.92	1.00
Asse Princ	101.3	TR_200	10.17	15.19	16.00	0.81	17.69	17.69	1.69	1.69	4.81	1.72	1.00
Asse Princ	101	TR_030	6.61	15.13	15.71	0.58	17.63	17.63	1.92	1.92	4.45	1.91	0.20
Asse Princ	101	TR_200	10.17	15.13	15.94	0.81	17.63	17.63	1.69	1.69	4.81	1.73	0.20

HEC-RAS Plan: RE (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Asse_princ	27		Bridge										
Asse_princ	26.6	TR_030	6.61	13.39	13.85	0.46	15.89	15.89	2.04	2.04	5.61	2.70	6.00
Asse_princ	26.6	TR_200	10.17	13.39	14.04	0.65	15.89	15.89	1.85	1.85	6.05	2.44	6.00
Asse_princ	26.3	TR_030	6.61	13.03	13.84	0.81	15.45	15.93	1.61	2.09	4.65	2.01	3.90
Asse_princ	26.3	TR_200	10.17	13.03	14.04	1.01	15.45	15.93	1.41	1.89	5.25	1.97	3.90
Asse_princ	26	TR_030	6.61	12.74	13.52	0.78	15.28	15.73	1.76	2.21	4.89	2.16	21.74
Asse_princ	26	TR_200	10.17	12.74	13.71	0.97	15.28	15.73	1.57	2.02	5.48	2.09	21.74
Asse_princ	25	TR_030	6.61	12.59	13.18	0.59	15.81	15.81	2.63	2.63	3.99	2.18	11.79
Asse_princ	25	TR_200	10.17	12.59	13.27	0.68	15.81	15.81	2.54	2.54	4.88	2.39	11.79
Asse_princ	24	TR_030	6.61	12.18	12.74	0.56	15.40	15.40	2.66	2.66	4.39	2.52	27.76
Asse_princ	24	TR_200	10.17	12.18	12.83	0.65	15.40	15.40	2.57	2.57	5.17	2.60	27.76
Asse_princ	23	TR_030	6.61	11.20	12.04	0.84	12.62	12.40	0.58	0.36	4.05	1.89	25.31
Asse_princ	23	TR_200	10.17	11.20	12.19	0.99	12.62	12.40	0.43	0.21	4.56	2.04	25.31
Asse_princ	22	TR_030	8.00	10.07	11.13	1.06	11.28	13.10	0.15	1.97	4.17	1.89	23.05
Asse_princ	22	TR_200	12.30	10.07	11.31	1.24	11.28	13.10	-0.03	1.79	4.40	2.00	23.05
Asse_princ	21.5	TR_030	8.00	9.45	10.55	1.10	10.45	10.98	-0.10	0.43	3.90	1.61	16.50
Asse_princ	21.5	TR_200	12.30	9.45	10.74	1.29	10.45	10.98	-0.29	0.24	4.24	1.59	16.50
Asse_princ	21.1	TR_030	8.00	9.17	10.35	1.18	10.38	10.70	0.03	0.35	3.23	1.50	1.51
Asse_princ	21.1	TR_200	12.30	9.17	10.49	1.32	10.38	10.70	-0.11	0.21	3.72	1.58	1.51
Asse_princ	21	TR_030	8.00	7.87	10.27	2.40	9.78	9.58	-0.49	-0.69	1.61	0.36	20.06
Asse_princ	21	TR_200	12.30	7.87	10.86	2.99	9.78	9.58	-1.08	-1.28	1.77	0.35	20.06
Asse_princ	20	TR_030	17.62	7.91	10.32	2.41	9.21	9.65	-1.11	-0.67	0.77	0.19	60.85
Asse_princ	20	TR_200	26.63	7.91	10.93	3.02	9.21	9.65	-1.72	-1.28	0.83	0.18	60.85
Asse_princ	19	TR_030	17.62	6.79	9.62	2.83	7.54	7.54	-2.08	-2.08	3.51	0.66	23.51
Asse_princ	19	TR_200	26.63	6.79	10.02	3.23	7.54	7.54	-2.48	-2.48	4.03	0.72	23.51
Asse_princ	18	TR_030	17.62	6.18	8.64	2.46	6.93	6.93	-1.71	-1.71	5.01	1.02	11.18
Asse_princ	18	TR_200	26.63	6.18	8.97	2.79	6.93	6.93	-2.04	-2.04	5.51	1.05	11.18
Asse_princ	17	TR_030	17.62	5.84	8.92	3.08	8.17	8.12	-0.75	-0.80	0.72	0.17	6.80
Asse_princ	17	TR_200	26.63	5.84	9.56	3.72	8.17	8.12	-1.39	-1.44	0.83	0.17	6.80

HEC-RAS Plan: RE (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Asse_princ	16	TR_030	17.62	5.58	8.24	2.66	6.08	6.26	-2.16	-1.98	3.56	0.70	2.80
Asse_princ	16	TR_200	26.63	5.58	8.84	3.26	6.08	6.26	-2.76	-2.58	3.68	0.65	2.80
Asse_princ	15.9	TR_030	17.62	5.53	8.09	2.56	6.03	6.21	-2.06	-1.88	3.86	0.77	5.38
Asse_princ	15.9	TR_200	26.63	5.53	8.85	3.32	6.03	6.21	-2.82	-2.64	3.55	0.62	5.38
Asse_princ	15	TR_030	17.62	5.44	8.60	3.16	8.05	7.24	-0.55	-1.36	0.81	0.18	34.70
Asse_princ	15	TR_200	26.63	5.44	9.27	3.83	8.05	7.24	-1.22	-2.03	0.90	0.17	34.70
Asse_princ	14	TR_030	17.62	5.10	7.86	2.76	5.31	5.15	-2.55	-2.71	3.67	0.71	3.88
Asse_princ	14	TR_200	26.63	5.10	8.29	3.19	5.31	5.15	-2.98	-3.14	4.22	0.75	3.88
Asse_princ	13.9	TR_030	17.62	5.00	7.59	2.59	5.21	5.05	-2.38	-2.54	4.17	0.83	3.53
Asse_princ	13.9	TR_200	26.63	5.00	8.01	3.01	5.21	5.05	-2.80	-2.96	4.69	0.86	3.53
Asse_princ	13	TR_030	17.62	5.18	5.87	0.69	6.95	6.66	1.08	0.79	6.81	2.72	41.75
Asse_princ	13	TR_200	26.63	5.18	6.13	0.95	6.95	6.66	0.82	0.53	7.36	2.49	41.75
Asse_princ	12	TR_030	17.62	3.89	6.72	2.83	4.64	4.64	-2.08	-2.08	3.51	0.67	39.50
Asse_princ	12	TR_200	26.63	3.89	7.12	3.23	4.64	4.64	-2.48	-2.48	4.03	0.72	39.50
Asse_princ	11	TR_030	17.62	2.73	5.08	2.35	3.48	3.48	-1.60	-1.60	5.67	1.18	14.76
Asse_princ	11	TR_200	26.63	2.73	5.38	2.65	3.48	3.48	-1.90	-1.90	6.20	1.21	14.76
Asse_princ	10	TR_030	17.62	2.55	3.55	1.00	5.22	5.91	1.67	2.36	6.93	2.67	0.10
Asse_princ	10	TR_200	26.63	2.55	5.70	3.15	5.22	5.91	-0.48	0.21	1.36	0.36	0.10
Asse_princ	9	TR_030	17.62	2.55	3.56	1.01	5.90	5.91	2.34	2.35	6.91	2.66	31.16
Asse_princ	9	TR_200	26.63	2.55	5.66	3.11	5.90	5.91	0.24	0.25	1.60	0.38	31.16
Asse_princ	8	TR_030	25.04	2.28	3.88	1.60	5.42	5.54	1.54	1.66	4.38	1.28	24.11
Asse_princ	8	TR_200	37.98	2.28	5.51	3.23	5.42	5.54	-0.09	0.03	2.18	0.51	24.11
Asse_princ	7	TR_030	25.04	2.13	4.47	2.34	5.06	4.84	0.59	0.37	1.73	0.41	30.91
Asse_princ	7	TR_200	37.98	2.13	5.57	3.44	5.06	4.84	-0.51	-0.73	1.48	0.28	30.91
Asse_princ	6	TR_030	25.04	0.86	4.31	3.45	2.98	2.98	-1.33	-1.33	2.20	0.38	43.10
Asse_princ	6	TR_200	37.98	0.86	5.39	4.53	2.98	2.98	-2.41	-2.41	2.19	0.33	43.10
Asse_princ	5	TR_030	25.04	1.19	3.76	2.57	2.69	2.69	-1.07	-1.07	3.40	0.68	23.14
Asse_princ	5	TR_200	37.98	1.19	5.11	3.92	2.69	2.69	-2.43	-2.43	2.87	0.46	23.14

HEC-RAS Plan: RE (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Asse_princ	4	TR_030	25.04	0.71	4.15	3.44	2.79	2.77	-1.36	-1.38	0.59	0.15	31.81
Asse_princ	4	TR_200	37.98	0.71	5.40	4.69	2.79	2.77	-2.61	-2.63	0.52	0.10	31.81
Asse_princ	3	TR_030	25.04	0.67	3.89	3.22	2.59	2.59	-1.30	-1.30	2.22	0.39	428.54
Asse_princ	3	TR_200	37.98	0.67	5.12	4.45	2.59	2.59	-2.53	-2.53	2.27	0.34	428.54
Asse_princ	2	TR_030	25.04	-0.57	1.45	2.02	-0.42	0.11	-1.87	-1.33	4.85	1.09	4.01
Asse_princ	2	TR_200	37.98	-0.57	1.76	2.33	-0.42	0.11	-2.18	-1.65	6.62	1.38	4.01
Asse_princ	1	TR_030	25.04	-0.52	0.55	1.07	4.59	5.09	4.04	4.54	6.20	2.30	
Asse_princ	1	TR_200	37.98	-0.52	0.70	1.22	4.59	5.09	3.89	4.39	7.81	2.72	