

REGIONE PUGLIA

Comune di San Paolo di Civitate

Provincia di Foggia



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PROGETTO DEFINITIVO

PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN IMPIANTO AGRIVOLTAICO NECESSARIO ALLA PRODUZIONE DI ENERGIA ELETTRICA DA FONTE FOTOVOLTAICA E DELLE RELATIVE OPERE ED INFRASTRUTTURE CONNESSE DELLA POTENZA NOMINALE MASSIMA DI 54998 KW E POTENZA IN A.C. DI 50400 KW, SITO NEL COMUNE DI SAN PAOLO DI CIVITATE (FG) CON OPERE DI CONNESSIONE RICADENTI ANCHE NEI COMUNI DI SERRACAPRIOLA (FG) E DI LESINA (FG)

TITOLO TAVOLA

ALLEGATI RELAZIONE IDRAULICA

PROGETTAZIONE	PROPONENTE	SPAZIO RISERVATO AGLI ENTI
PROGETTISTI Ing. Nicola ROSELLI Ing. Rocco SALOME PROGETTISTI PARTI ELETTRICHE Per.Ind. Alessandro CORTI CONSULENZE E COLLABORAZIONI Arch. Gianluca DI DONATO Dott. Massimo MACCHIAROLA Ing. Elvio MURETTA Archeol. Gerardo FRATIANNI Geol. Vito PLESCIA	LIMES 4 S.R.L. SEDE LEGALE Milano, cap 20121 via Manzoni n.41 P.IVA 10307450964	

4.2.5_3	FILE B4XNJR9_4.2.5_3_AllRelazioneIdraulica	CODICE PROGETTO B4XNJR9	SCALA
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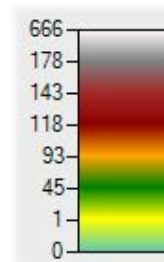
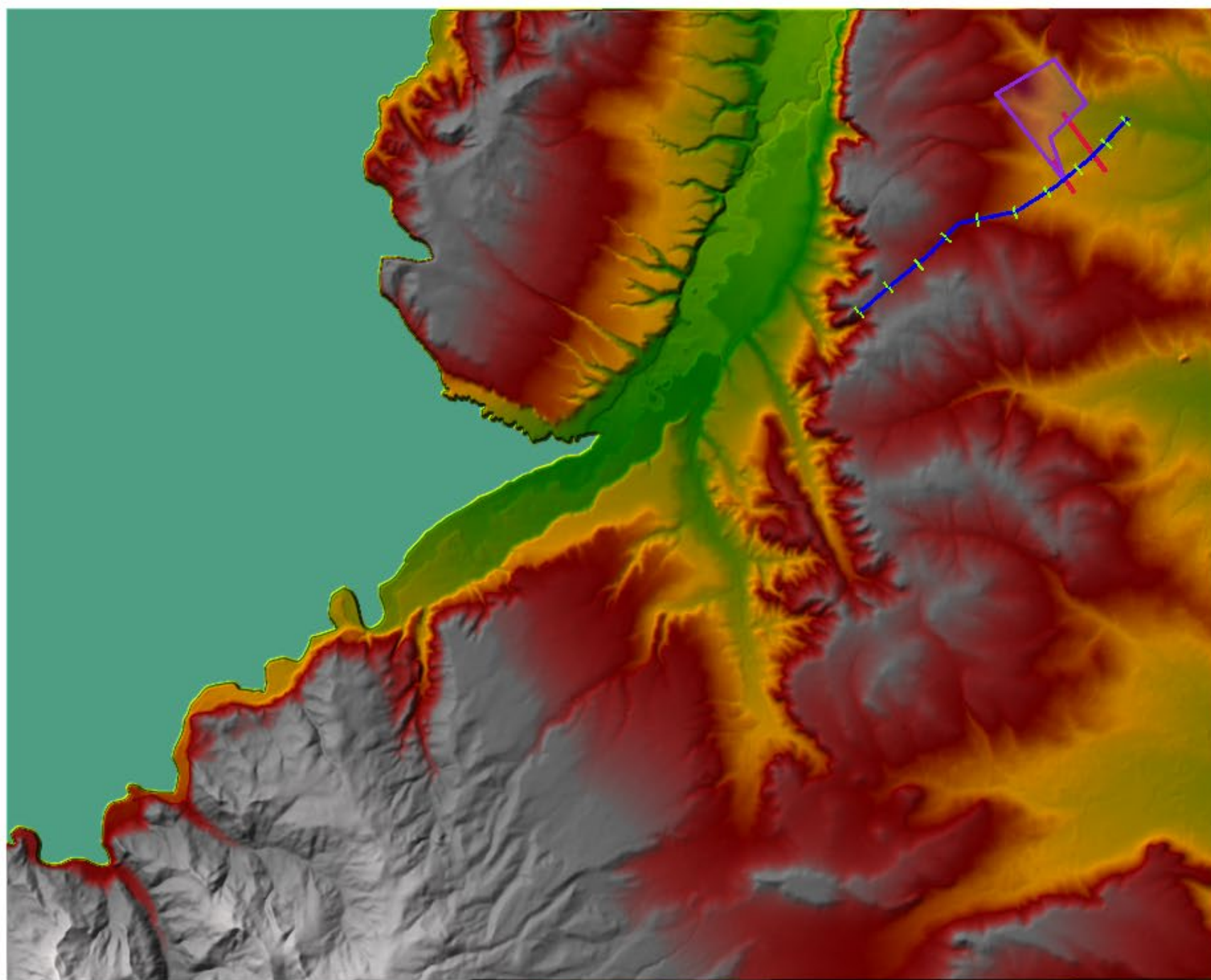
REVISIONE	DATA	DESCRIZIONE REVISIONE	REDATTO	VERIFICATO	APPROVATO
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C					
D					
E					
F					

ALLEGATO N°9

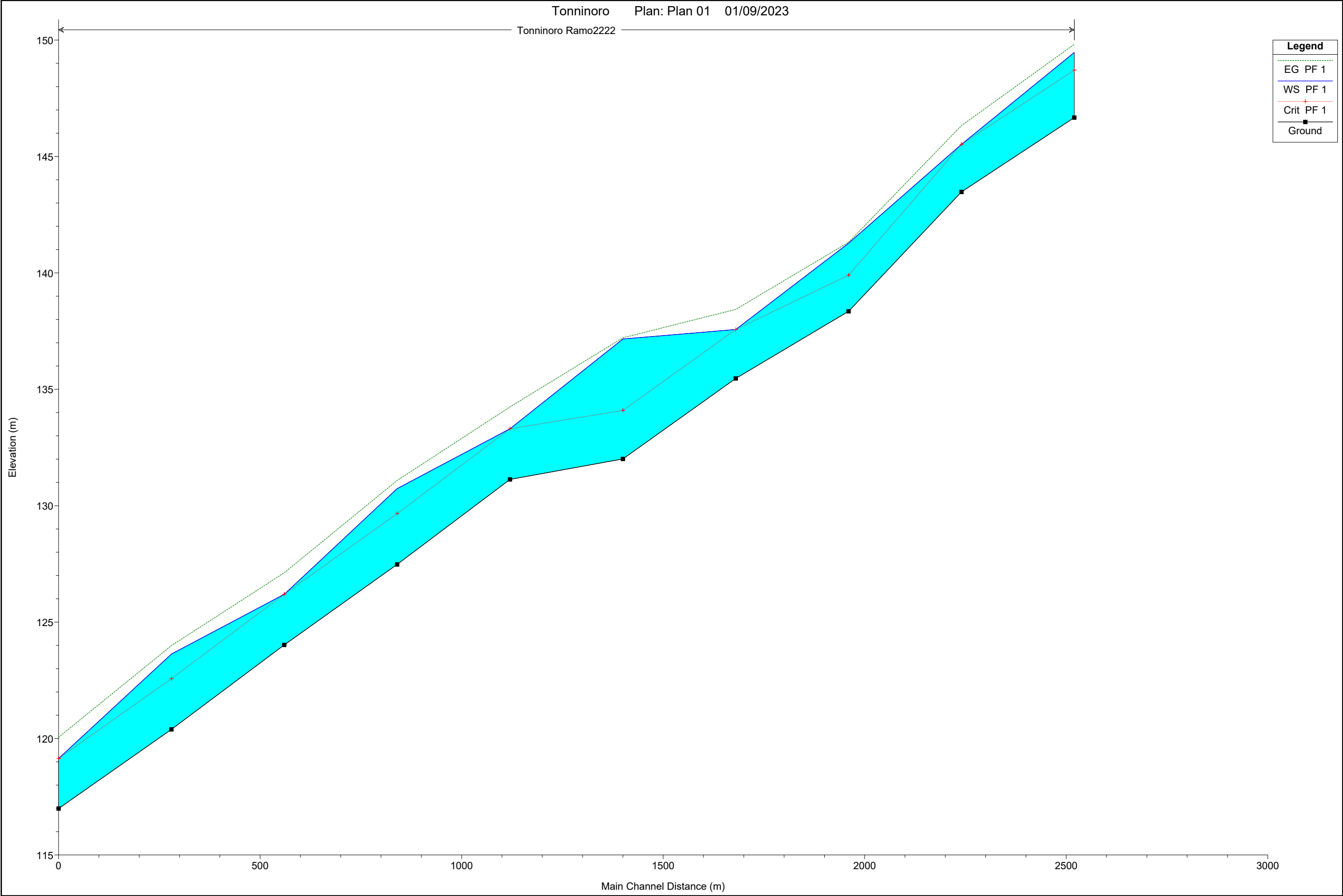
**OUTPUT DEI RISULTATI OTTENUTI CON IL SOFTWARE HEC-RAS IN
CORRISPONDENZA DI OGNI SEZIONE DI CALCOLO PER IL CANALE
TONNINORO E PER N°2 SEZIONI DI CONTROLLO.**

PORTATA 100 ANNI

Selected: 'Terrain (2)'



5 km



HEC-RAS Plan: Plan 01 River: Tonninoro Reach: Ramo2222 Profile: PF 1

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Ramo2222	200	PF 1	45.05	146.67	149.47	148.71	149.82	0.004672	2.62	17.18	8.29	0.58
Ramo2222	190	PF 1	45.05	143.48	145.52	145.52	146.33	0.014508	3.97	11.33	7.12	1.01
Ramo2222	180	PF 1	45.05	138.35	141.27	139.90	141.32	0.000521	0.90	49.83	29.75	0.22
Ramo2222	170	PF 1	45.05	135.47	137.57	137.57	138.43	0.015614	4.12	10.95	6.41	1.01
Ramo2222	160	PF 1	45.05	132.01	137.16	134.09	137.21	0.000379	1.09	49.66	30.50	0.17
Ramo2222	150	PF 1	45.05	131.13	133.31	133.31	134.24	0.017391	4.29	10.51	5.66	1.00
Ramo2222	140	PF 1	45.05	127.48	130.73	129.66	131.08	0.004613	2.62	17.22	6.59	0.52
Ramo2222	130	PF 1	45.05	124.02	126.20	126.20	127.12	0.017047	4.26	10.58	5.73	1.00
Ramo2222	120	PF 1	45.05	120.39	123.63	122.57	123.99	0.004838	2.66	16.93	6.47	0.53
Ramo2222	110	PF 1	45.05	116.99	119.14	119.14	120.05	0.016700	4.23	10.66	5.92	1.01

Plan: Plan 01 Tonninoro Ramo2222 RS: 200 Profile: PF 1

E.G. Elev (m)	149.82	Element	Left OB	Channel	Right OB
Vel Head (m)	0.35	Wt. n-Val.		0.035	
W.S. Elev (m)	149.47	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	148.71	Flow Area (m2)		17.18	
E.G. Slope (m/m)	0.004672	Area (m2)		17.18	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	8.29	Top Width (m)		8.29	
Vel Total (m/s)	2.62	Avg. Vel. (m/s)		2.62	
Max Chl Dpth (m)	2.80	Hydr. Depth (m)		2.07	
Conv. Total (m3/s)	659.1	Conv. (m3/s)		659.1	
Length Wtd. (m)	280.00	Wetted Per. (m)		11.05	
Min Ch El (m)	146.67	Shear (N/m2)		71.27	
Alpha	1.00	Stream Power (N/m s)		186.84	
Frctn Loss (m)	2.13	Cum Volume (1000 m3)	2.77	49.79	0.90
C & E Loss (m)	1.36	Cum SA (1000 m2)	4.55	23.48	1.47

Plan: Plan 01 Tonninoro Ramo2222 RS: 190 Profile: PF 1

E.G. Elev (m)	146.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.81	Wt. n-Val.		0.035	
W.S. Elev (m)	145.52	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	145.52	Flow Area (m2)		11.33	
E.G. Slope (m/m)	0.014508	Area (m2)		11.33	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	7.12	Top Width (m)		7.12	
Vel Total (m/s)	3.97	Avg. Vel. (m/s)		3.97	
Max Chl Dpth (m)	2.04	Hydr. Depth (m)		1.59	
Conv. Total (m3/s)	374.0	Conv. (m3/s)		374.0	
Length Wtd. (m)	280.00	Wetted Per. (m)		9.13	
Min Ch El (m)	143.48	Shear (N/m2)		176.58	
Alpha	1.00	Stream Power (N/m s)		701.80	
Frctn Loss (m)	0.41	Cum Volume (1000 m3)	2.77	45.80	0.90
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.55	21.32	1.47

Plan: Plan 01 Tonninoro Ramo2222 RS: 180 Profile: PF 1

E.G. Elev (m)	141.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.035	
W.S. Elev (m)	141.27	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	139.90	Flow Area (m2)		49.83	
E.G. Slope (m/m)	0.000521	Area (m2)		49.83	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	29.75	Top Width (m)		29.75	
Vel Total (m/s)	0.90	Avg. Vel. (m/s)		0.90	
Max Chl Dpth (m)	2.93	Hydr. Depth (m)		1.67	
Conv. Total (m3/s)	1973.9	Conv. (m3/s)		1973.9	
Length Wtd. (m)	280.00	Wetted Per. (m)		30.52	
Min Ch El (m)	138.35	Shear (N/m2)		8.34	
Alpha	1.00	Stream Power (N/m s)		7.54	
Frctn Loss (m)	0.42	Cum Volume (1000 m3)	2.77	37.23	0.90
C & E Loss (m)	2.47	Cum SA (1000 m2)	4.55	16.16	1.47

Plan: Plan 01 Tonninoro Ramo2222 RS: 170 Profile: PF 1

E.G. Elev (m)	138.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.86	Wt. n-Val.		0.035	
W.S. Elev (m)	137.57	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	137.57	Flow Area (m2)		10.95	
E.G. Slope (m/m)	0.015614	Area (m2)		10.95	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	

Plan: Plan 01 Tonninoro Ramo2222 RS: 170 Profile: PF 1 (Continued)

Top Width (m)	6.41	Top Width (m)		6.41	
Vel Total (m/s)	4.12	Avg. Vel. (m/s)		4.12	
Max Chl Dpth (m)	2.11	Hydr. Depth (m)		1.71	
Conv. Total (m3/s)	360.5	Conv. (m3/s)		360.5	
Length Wtd. (m)	280.00	Wetted Per. (m)		8.85	
Min Ch El (m)	135.47	Shear (N/m2)		189.48	
Alpha	1.00	Stream Power (N/m s)		779.75	
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	2.77	28.73	0.90
C & E Loss (m)	0.00	Cum SA (1000 m2)	4.55	11.10	1.47

Plan: Plan 01 Tonninoro Ramo2222 RS: 160 Profile: PF 1

E.G. Elev (m)	137.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (m)	137.16	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	134.09	Flow Area (m2)	9.90	36.55	3.21
E.G. Slope (m/m)	0.000379	Area (m2)	9.90	36.55	3.21
Q Total (m3/s)	45.05	Flow (m3/s)	3.95	39.84	1.26
Top Width (m)	30.50	Top Width (m)	16.25	9.01	5.24
Vel Total (m/s)	0.91	Avg. Vel. (m/s)	0.40	1.09	0.39
Max Chl Dpth (m)	5.15	Hydr. Depth (m)	0.61	4.06	0.61
Conv. Total (m3/s)	2315.5	Conv. (m3/s)	202.8	2047.9	64.9
Length Wtd. (m)	280.00	Wetted Per. (m)	16.29	13.31	5.38
Min Ch El (m)	132.01	Shear (N/m2)	2.25	10.19	2.21
Alpha	1.30	Stream Power (N/m s)	0.90	11.11	0.87
Frctn Loss (m)	0.32	Cum Volume (1000 m3)	1.39	22.08	0.45
C & E Loss (m)	2.65	Cum SA (1000 m2)	2.27	8.94	0.73

Plan: Plan 01 Tonninoro Ramo2222 RS: 150 Profile: PF 1

E.G. Elev (m)	134.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.94	Wt. n-Val.		0.035	
W.S. Elev (m)	133.31	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	133.31	Flow Area (m2)		10.51	
E.G. Slope (m/m)	0.017391	Area (m2)		10.51	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	5.66	Top Width (m)		5.66	
Vel Total (m/s)	4.29	Avg. Vel. (m/s)		4.29	
Max Chl Dpth (m)	2.18	Hydr. Depth (m)		1.86	
Conv. Total (m3/s)	341.6	Conv. (m3/s)		341.6	
Length Wtd. (m)	280.00	Wetted Per. (m)		8.65	
Min Ch El (m)	131.13	Shear (N/m2)		207.04	
Alpha	1.00	Stream Power (N/m s)		887.76	
Frctn Loss (m)	2.25	Cum Volume (1000 m3)		15.49	
C & E Loss (m)	0.00	Cum SA (1000 m2)		6.88	

Plan: Plan 01 Tonninoro Ramo2222 RS: 140 Profile: PF 1

E.G. Elev (m)	131.08	Element	Left OB	Channel	Right OB
Vel Head (m)	0.35	Wt. n-Val.		0.035	
W.S. Elev (m)	130.73	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	129.66	Flow Area (m2)		17.22	
E.G. Slope (m/m)	0.004613	Area (m2)		17.22	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	6.59	Top Width (m)		6.59	
Vel Total (m/s)	2.62	Avg. Vel. (m/s)		2.62	
Max Chl Dpth (m)	3.25	Hydr. Depth (m)		2.61	
Conv. Total (m3/s)	663.3	Conv. (m3/s)		663.3	
Length Wtd. (m)	280.00	Wetted Per. (m)		11.00	
Min Ch El (m)	127.48	Shear (N/m2)		70.82	

Plan: Plan 01 Tonninoro Ramo2222 RS: 140 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		185.30	
Frctn Loss (m)	2.24	Cum Volume (1000 m3)		11.61	
C & E Loss (m)	1.73	Cum SA (1000 m2)		5.17	

Plan: Plan 01 Tonninoro Ramo2222 RS: 130 Profile: PF 1

E.G. Elev (m)	127.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.92	Wt. n-Val.		0.035	
W.S. Elev (m)	126.20	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	126.20	Flow Area (m2)		10.58	
E.G. Slope (m/m)	0.017047	Area (m2)		10.58	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	5.73	Top Width (m)		5.73	
Vel Total (m/s)	4.26	Avg. Vel. (m/s)		4.26	
Max Chl Dpth (m)	2.18	Hydr. Depth (m)		1.85	
Conv. Total (m3/s)	345.0	Conv. (m3/s)		345.0	
Length Wtd. (m)	280.00	Wetted Per. (m)		8.68	
Min Ch El (m)	124.02	Shear (N/m2)		203.81	
Alpha	1.00	Stream Power (N/m s)		867.69	
Frctn Loss (m)	2.31	Cum Volume (1000 m3)		7.71	
C & E Loss (m)	0.00	Cum SA (1000 m2)		3.44	

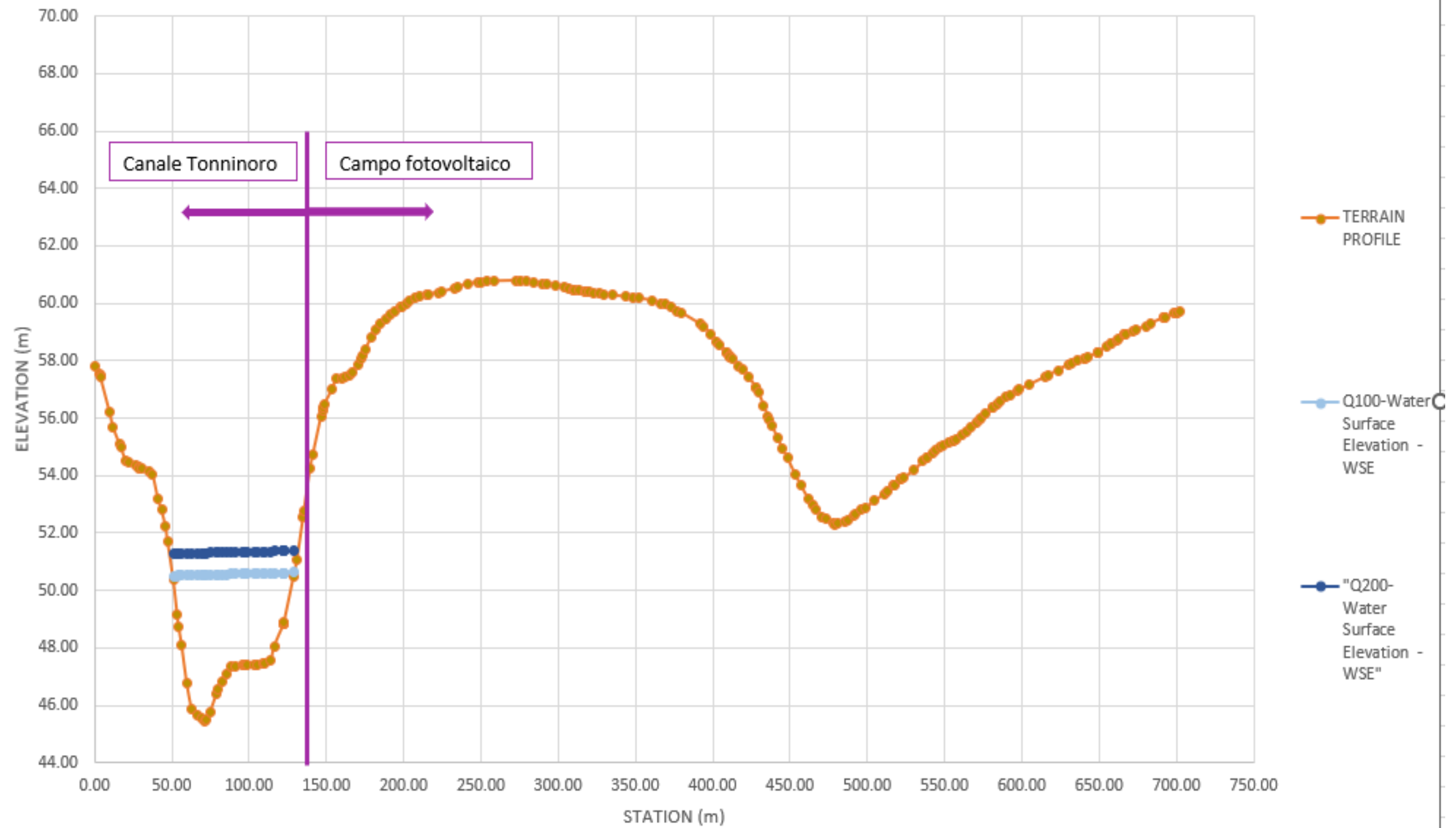
Plan: Plan 01 Tonninoro Ramo2222 RS: 120 Profile: PF 1

E.G. Elev (m)	123.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.36	Wt. n-Val.		0.035	
W.S. Elev (m)	123.63	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	122.57	Flow Area (m2)		16.93	
E.G. Slope (m/m)	0.004838	Area (m2)		16.93	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	6.47	Top Width (m)		6.47	
Vel Total (m/s)	2.66	Avg. Vel. (m/s)		2.66	
Max Chl Dpth (m)	3.24	Hydr. Depth (m)		2.62	
Conv. Total (m3/s)	647.7	Conv. (m3/s)		647.7	
Length Wtd. (m)	280.00	Wetted Per. (m)		10.92	
Min Ch El (m)	120.39	Shear (N/m2)		73.53	
Alpha	1.00	Stream Power (N/m s)		195.68	
Frctn Loss (m)	2.29	Cum Volume (1000 m3)		3.86	
C & E Loss (m)	1.65	Cum SA (1000 m2)		1.73	

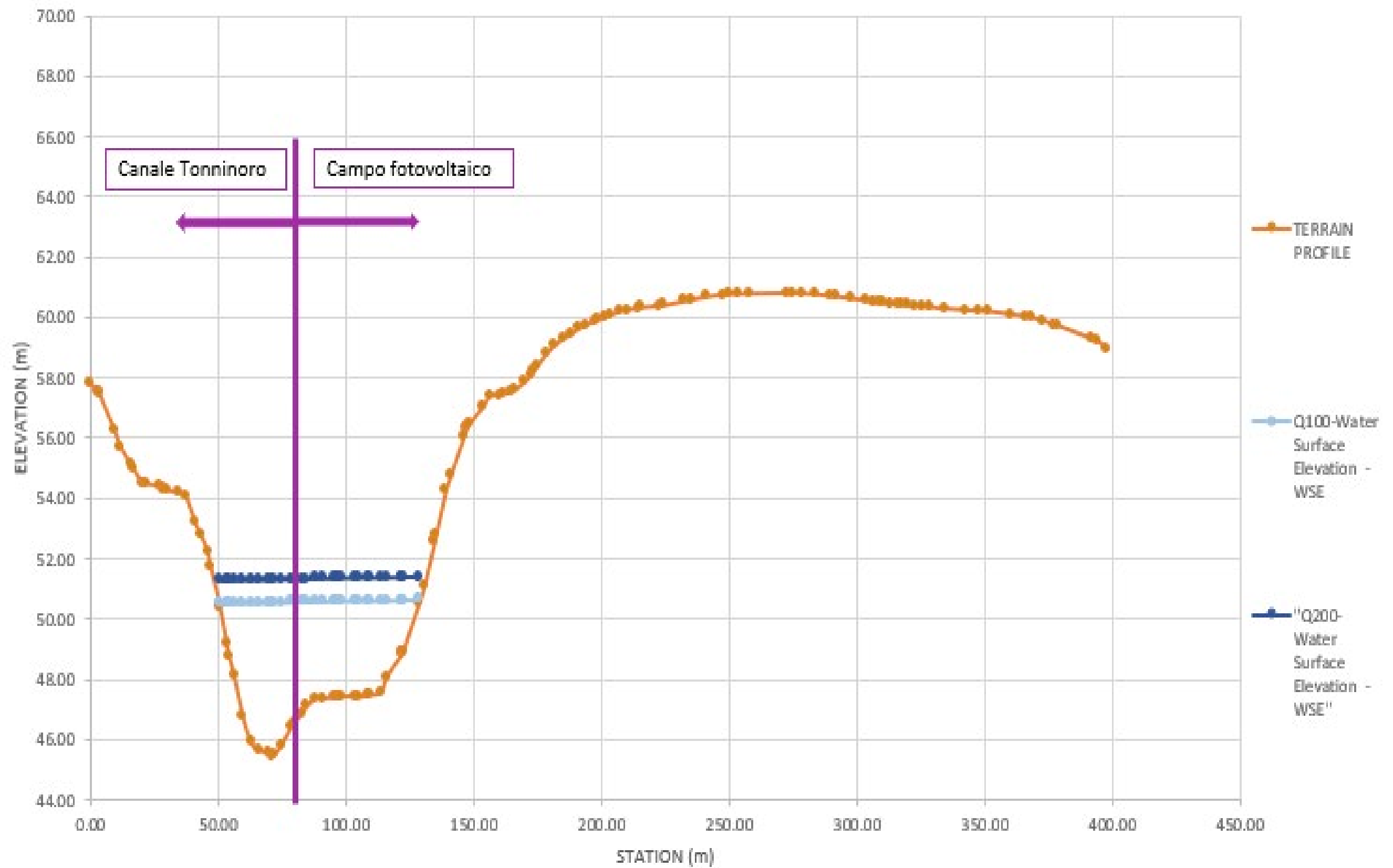
Plan: Plan 01 Tonninoro Ramo2222 RS: 110 Profile: PF 1

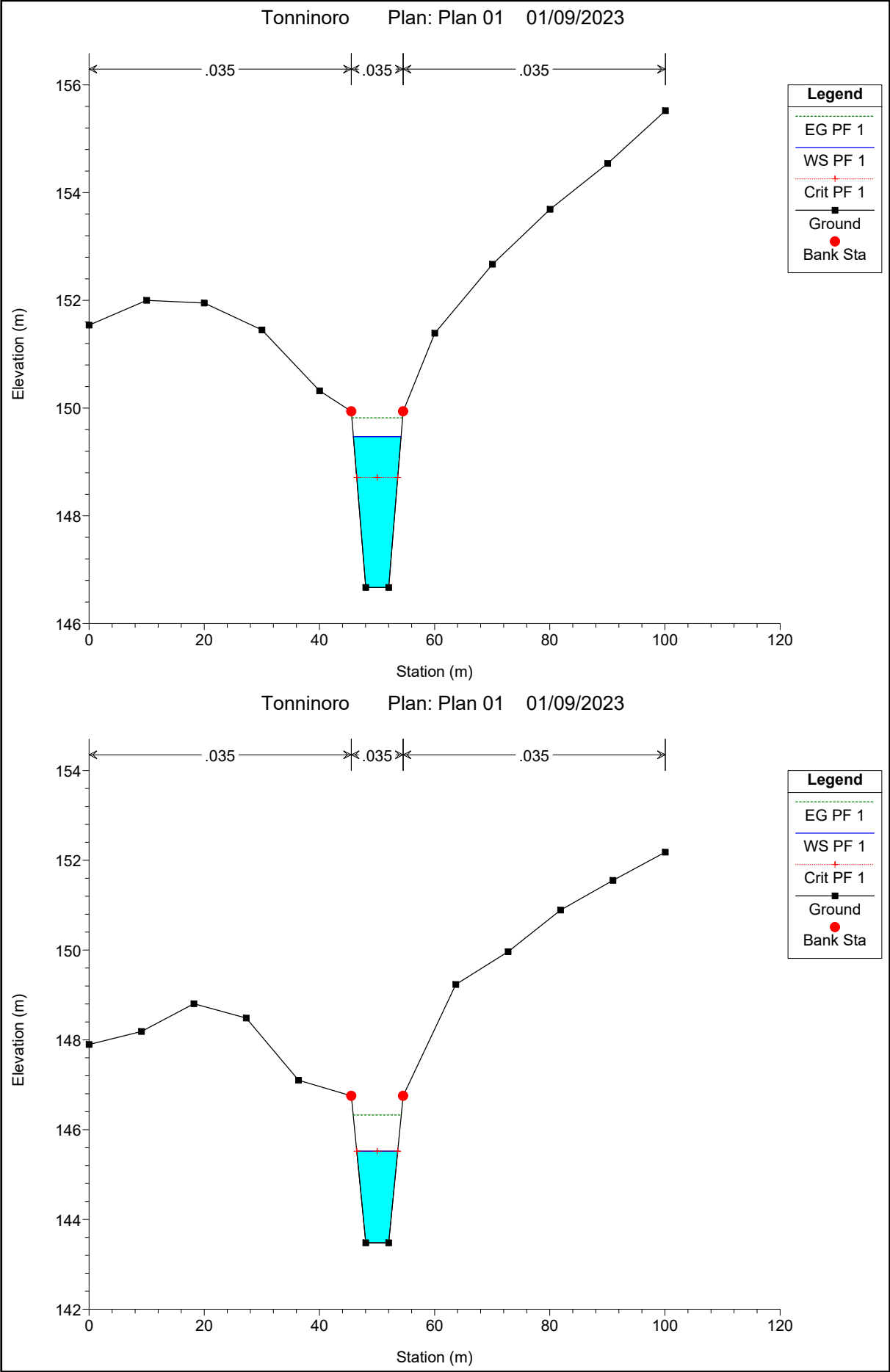
E.G. Elev (m)	120.05	Element	Left OB	Channel	Right OB
Vel Head (m)	0.91	Wt. n-Val.		0.035	
W.S. Elev (m)	119.14	Reach Len. (m)			
Crit W.S. (m)	119.14	Flow Area (m2)		10.66	
E.G. Slope (m/m)	0.016700	Area (m2)		10.66	
Q Total (m3/s)	45.05	Flow (m3/s)		45.05	
Top Width (m)	5.92	Top Width (m)		5.92	
Vel Total (m/s)	4.23	Avg. Vel. (m/s)		4.23	
Max Chl Dpth (m)	2.15	Hydr. Depth (m)		1.80	
Conv. Total (m3/s)	348.6	Conv. (m3/s)		348.6	
Length Wtd. (m)		Wetted Per. (m)		8.71	
Min Ch El (m)	116.99	Shear (N/m2)		200.53	
Alpha	1.00	Stream Power (N/m s)		847.45	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

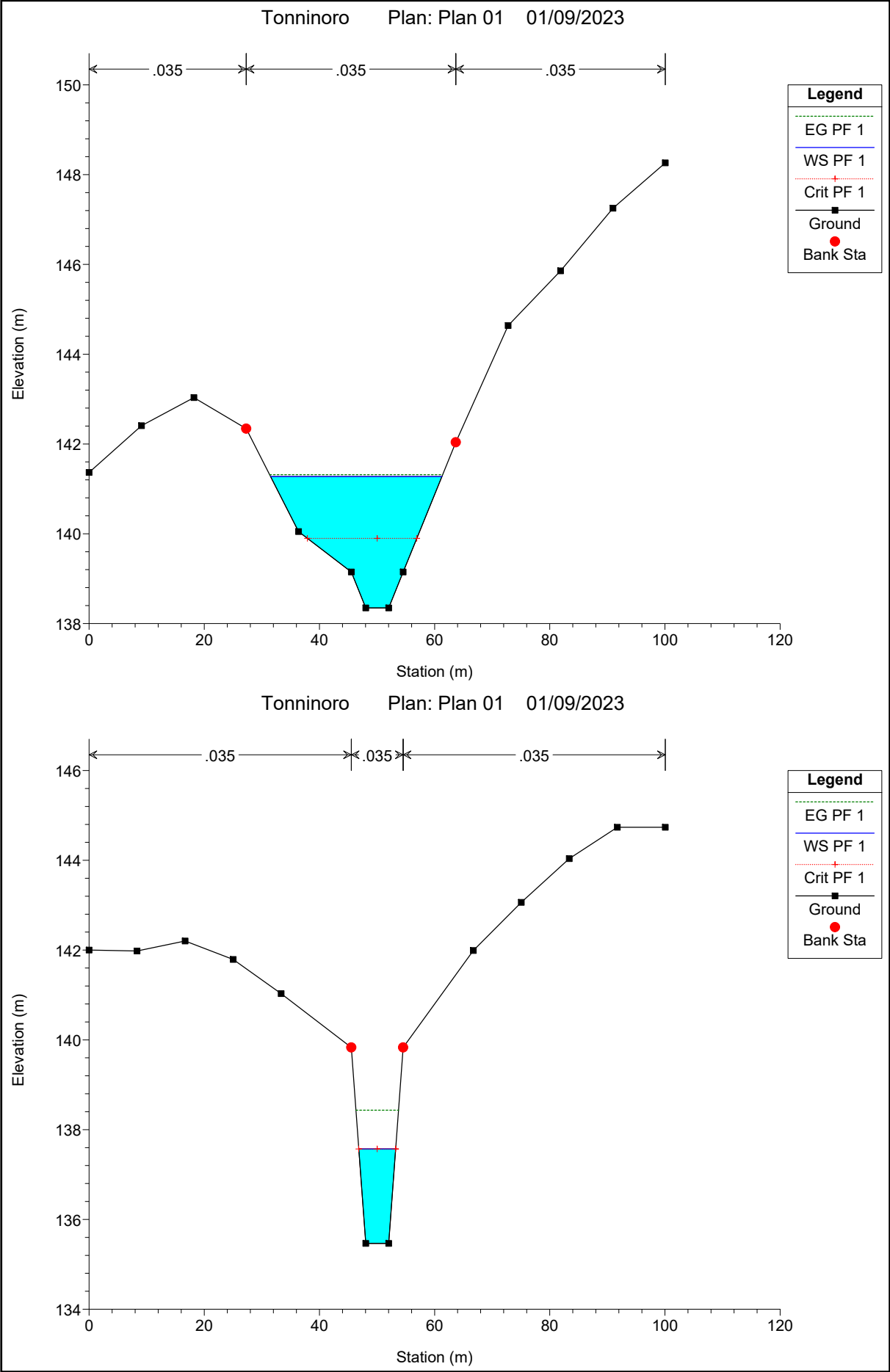
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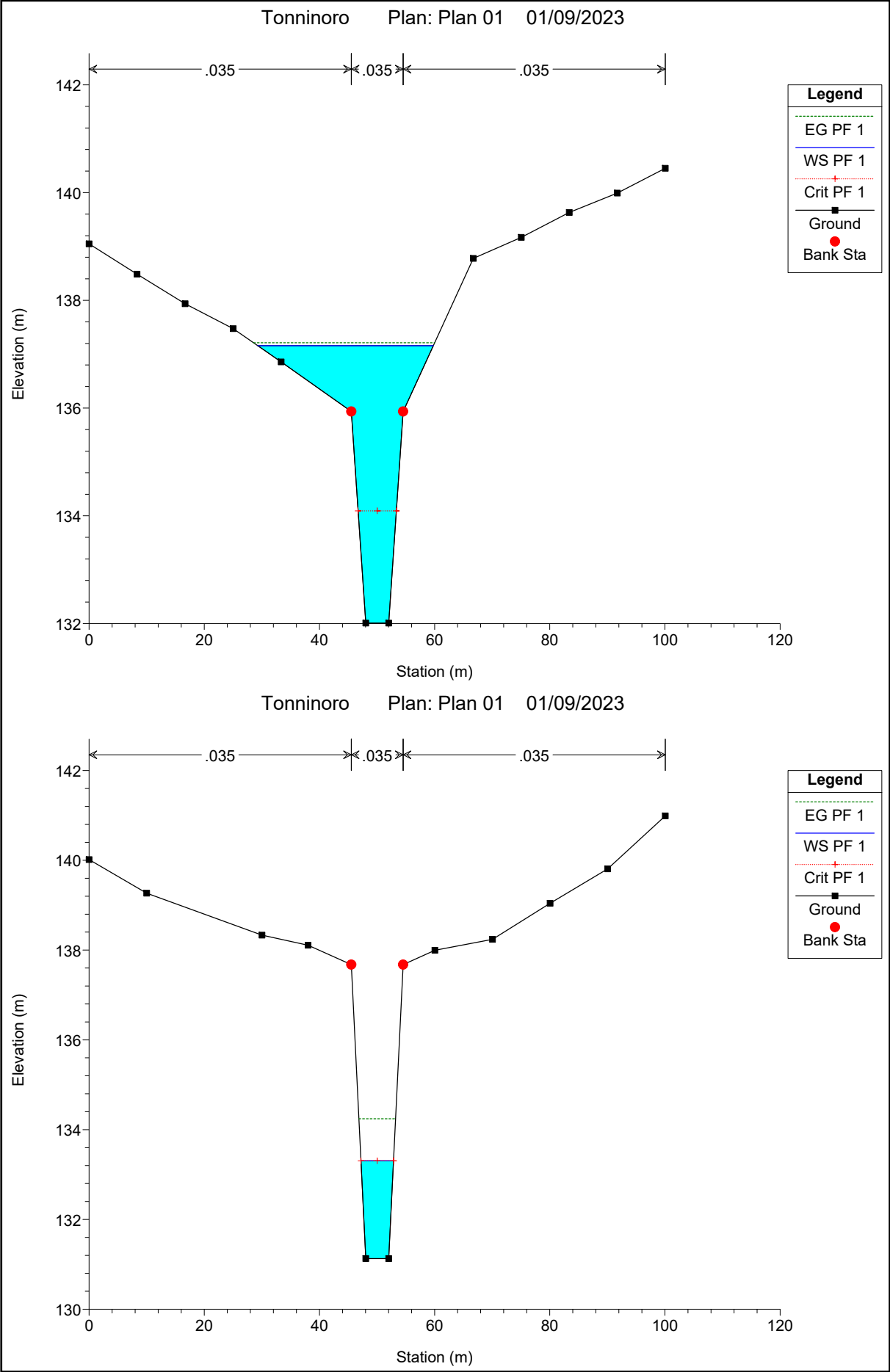


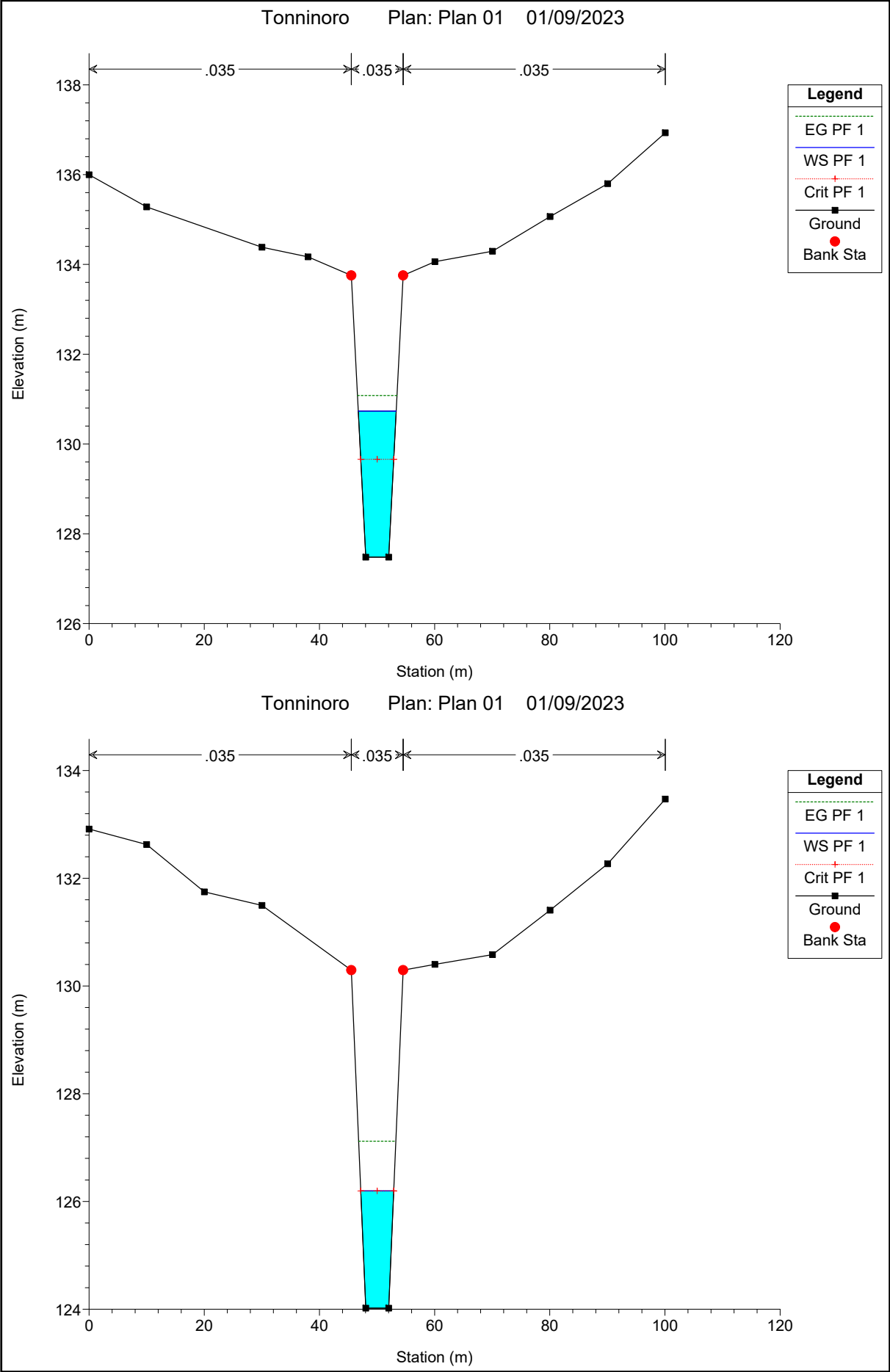
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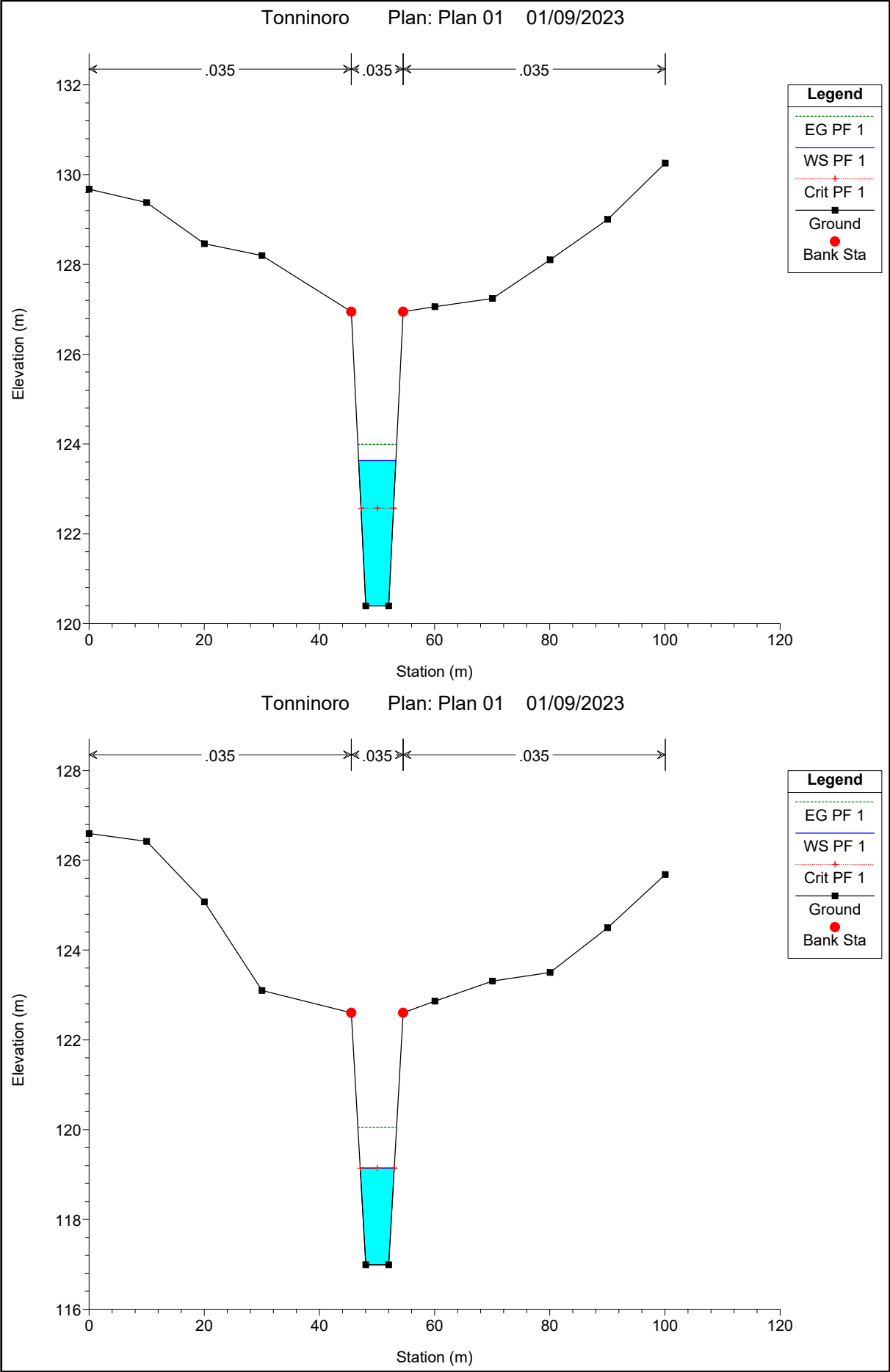






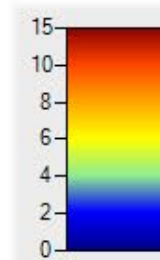
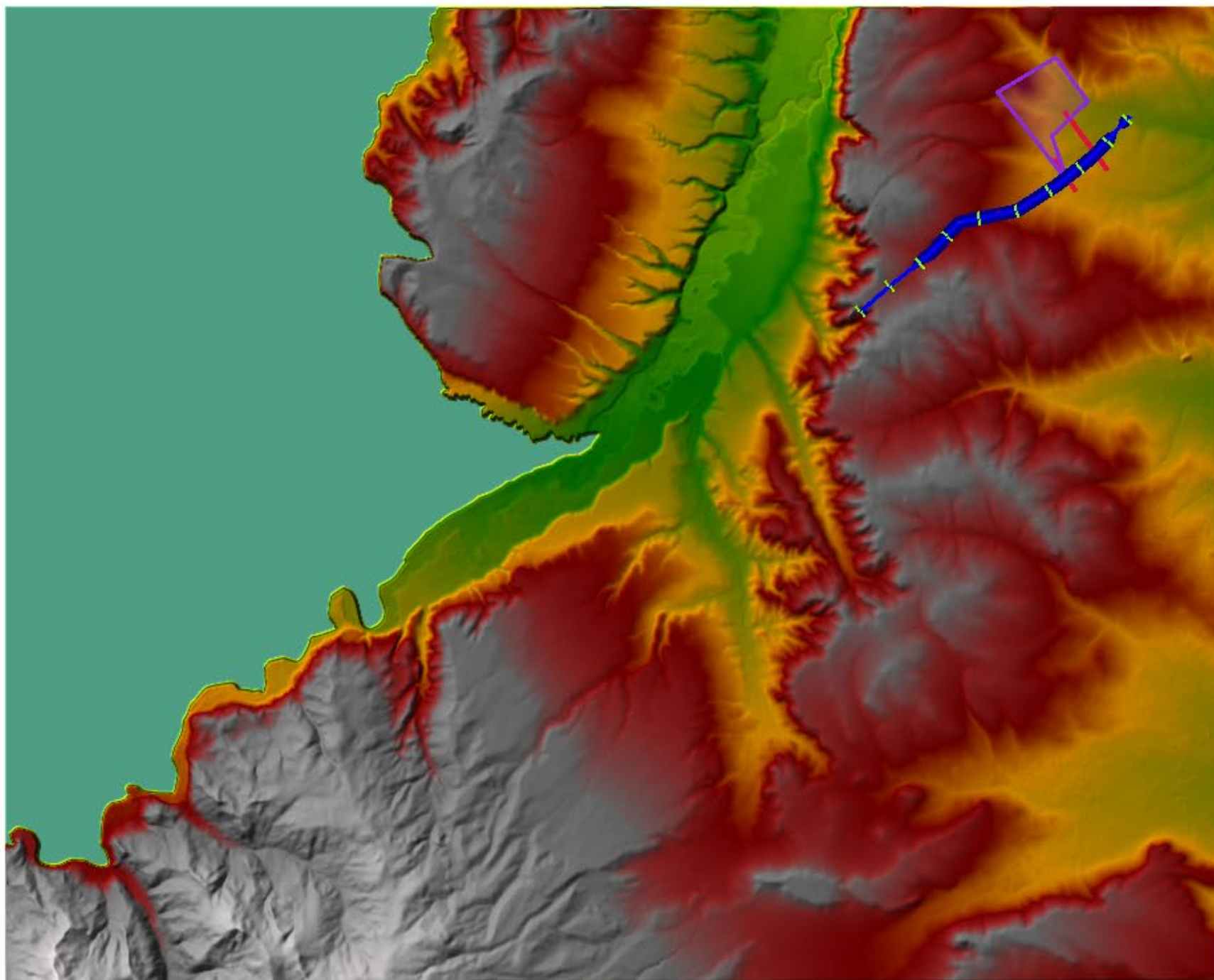






Selected: 'Velocity'

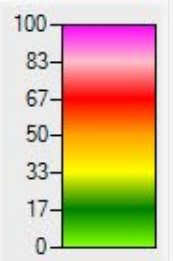
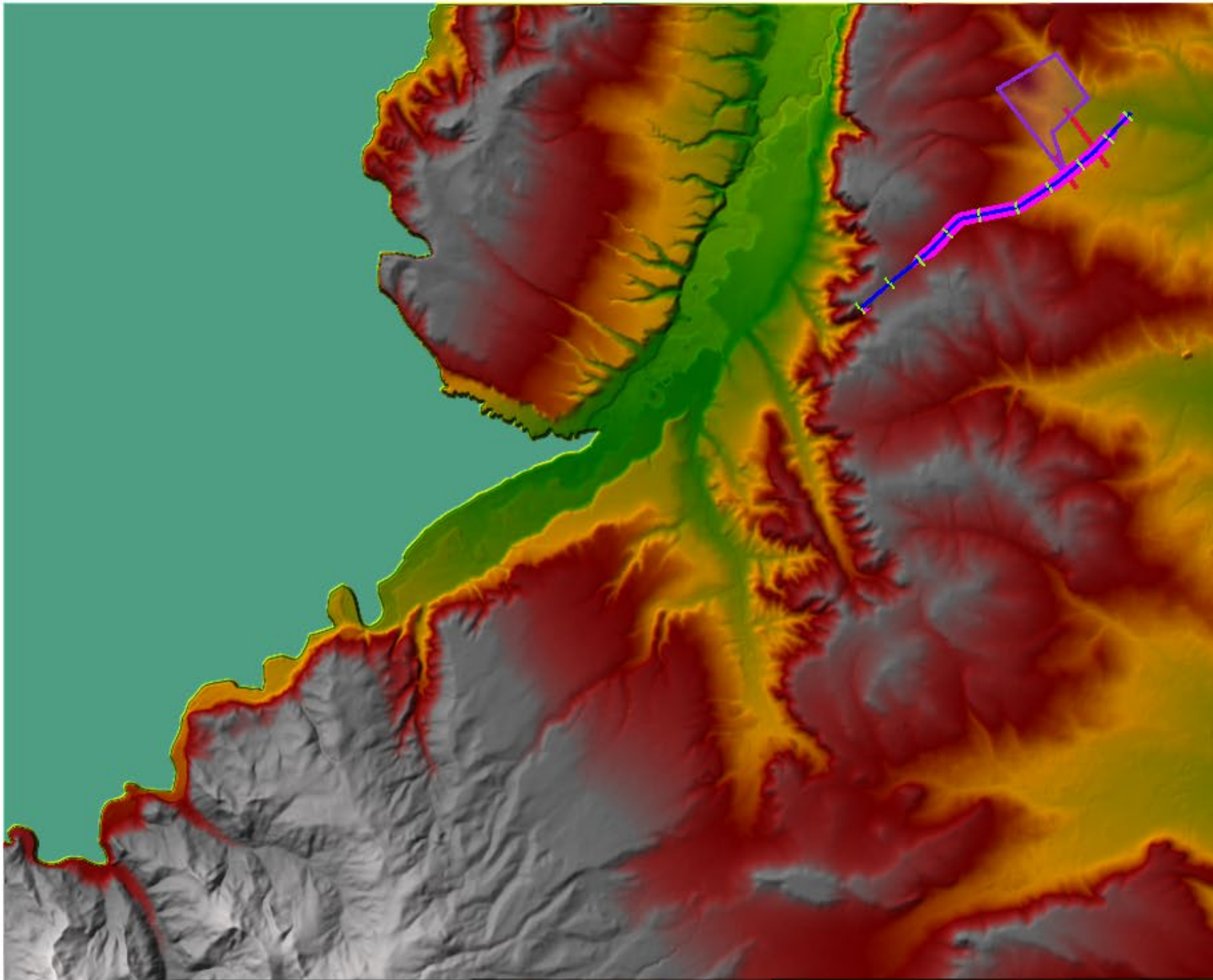
PF 1



5 km

Selected: 'WSE'

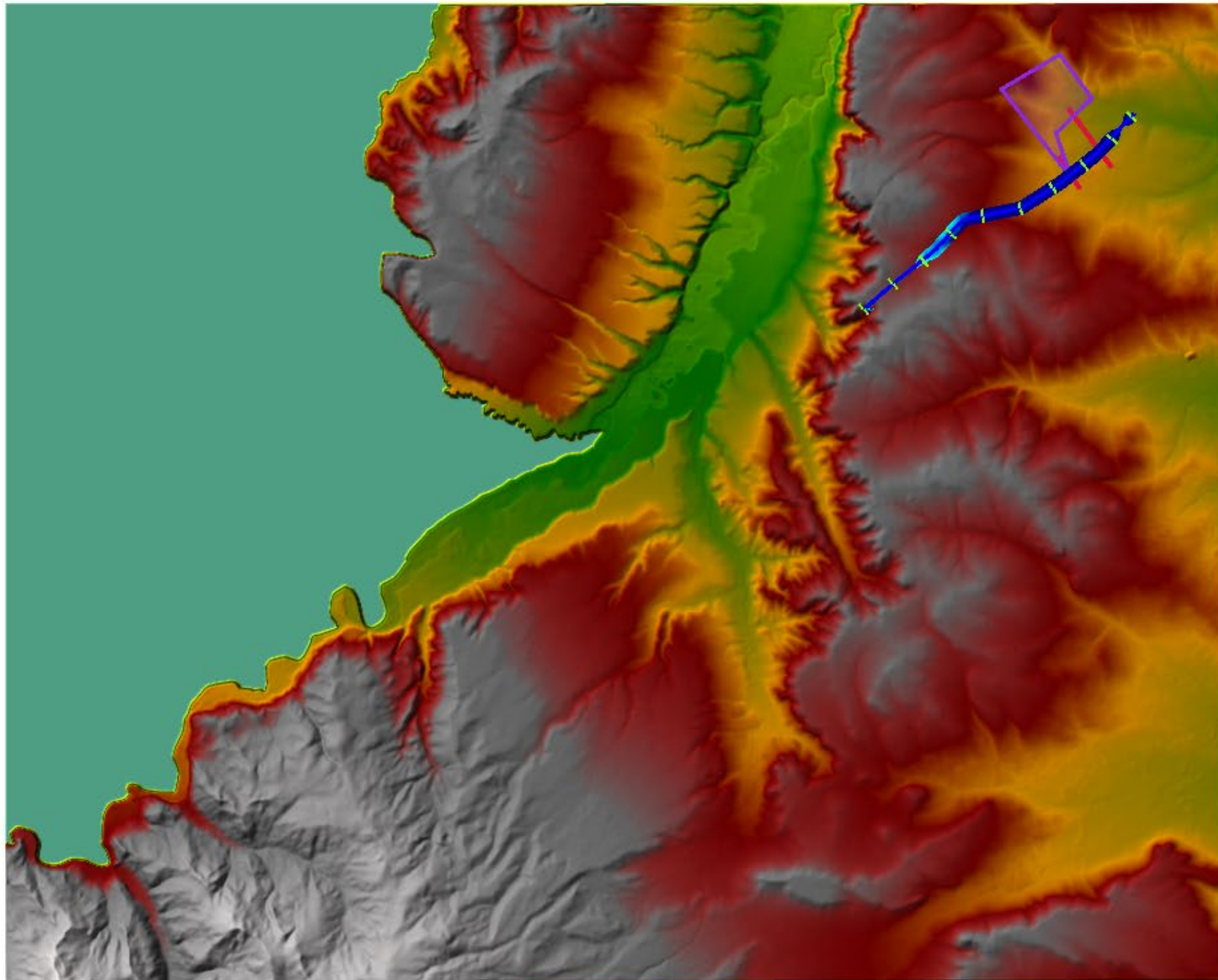
PF 1



5 km

Selected: 'Depth'

PF 1



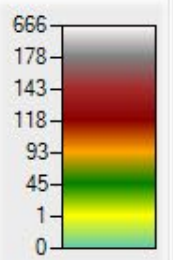
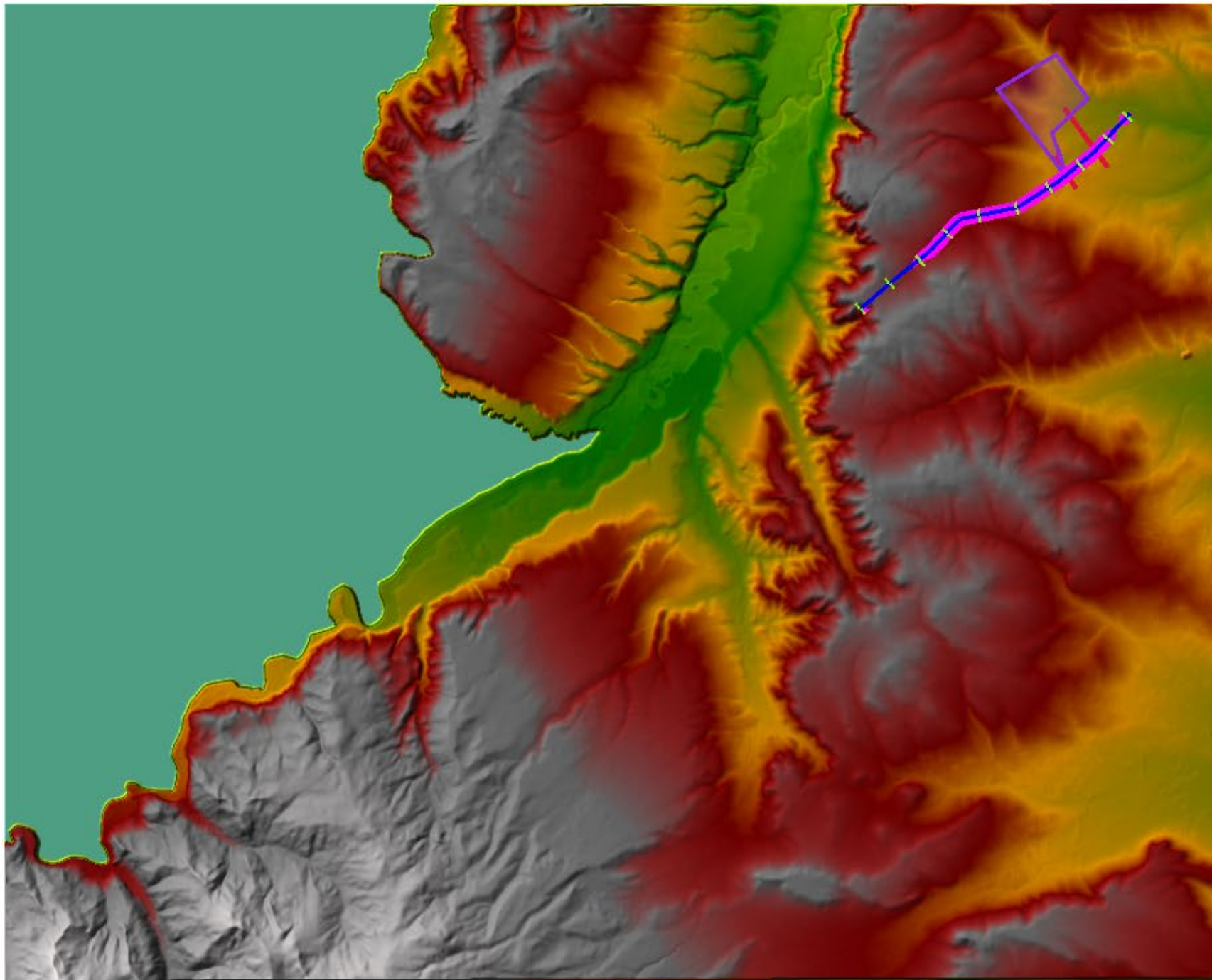
5 km

ALLEGATO N°10

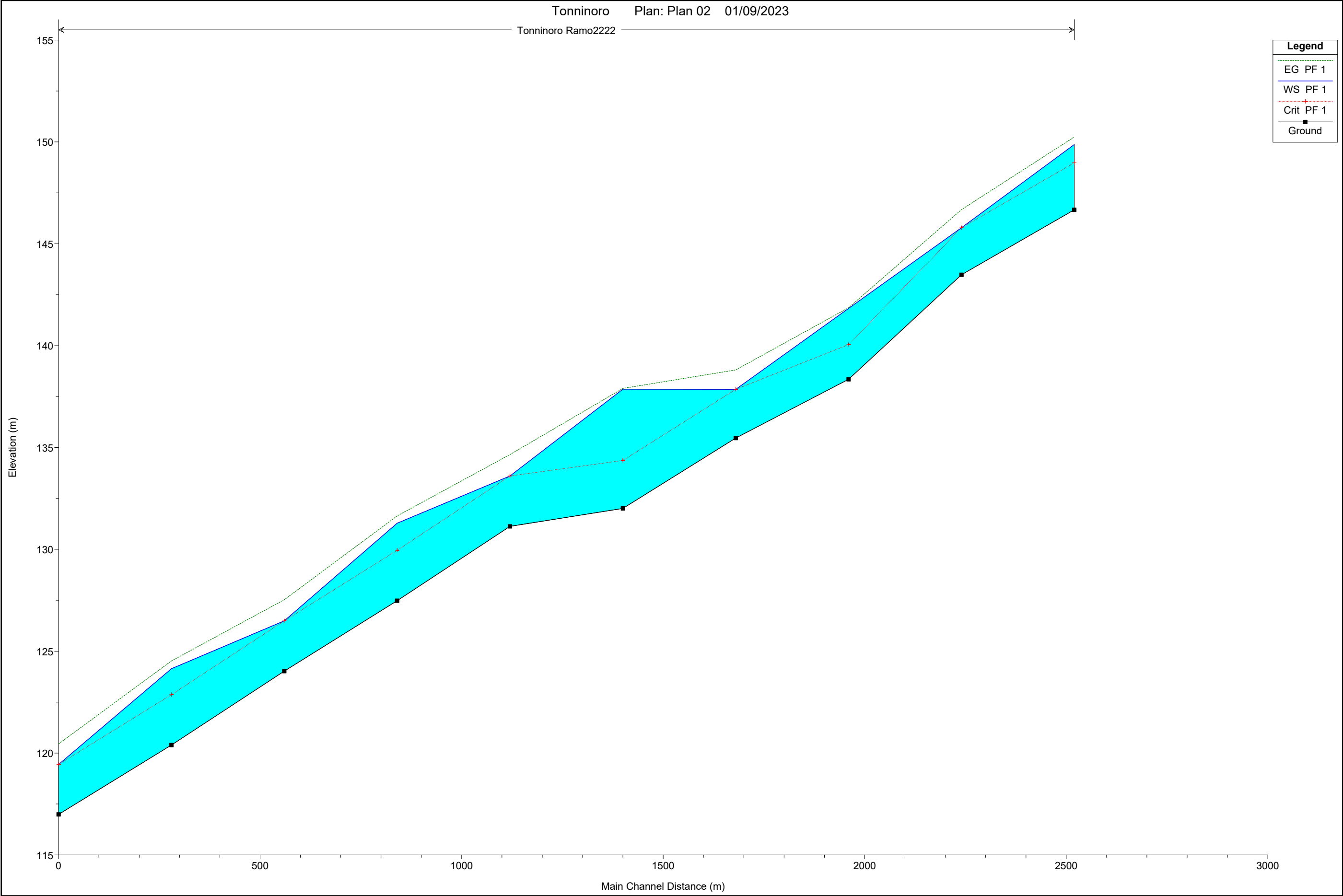
**OUTPUT DEI RISULTATI OTTENUTI CON IL SOFTWARE HEC-RAS IN
CORRISPONDENZA DI OGNI SEZIONE DI CALCOLO PER IL CANALE
TONNINORO E PER N°2 SEZIONI DI CONTROLLO.**

PORTATA 200 ANNI

Selected: 'Terrain (2)'



5 km



HEC-RAS Plan: Plan 02 River: Tonninoro Reach: Ramo2222 Profile: PF 1

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Ramo2222	200	PF 1	55.45	146.67	149.87	148.98	150.24	0.004305	2.68	20.67	8.91	0.56
Ramo2222	190	PF 1	55.45	143.48	145.79	145.79	146.67	0.014215	4.17	13.29	7.53	1.00
Ramo2222	180	PF 1	55.45	138.35	141.83	140.05	141.86	0.000340	0.82	68.29	37.72	0.19
Ramo2222	170	PF 1	55.45	135.47	137.85	137.85	138.81	0.015415	4.33	12.81	6.74	1.00
Ramo2222	160	PF 1	55.45	132.01	137.86	134.36	137.90	0.000243	0.97	75.83	44.77	0.14
Ramo2222	150	PF 1	55.45	131.13	133.60	133.60	134.65	0.017471	4.53	12.23	5.89	1.00
Ramo2222	140	PF 1	55.45	127.48	131.28	129.95	131.64	0.004148	2.64	20.98	7.03	0.49
Ramo2222	130	PF 1	55.45	124.02	126.49	126.49	127.53	0.017097	4.50	12.32	5.97	1.00
Ramo2222	120	PF 1	55.45	120.39	124.14	122.87	124.52	0.004516	2.73	20.34	6.86	0.51
Ramo2222	110	PF 1	55.45	116.99	119.44	119.44	120.45	0.016536	4.45	12.47	6.18	1.00

Plan: Plan 02 Tonninoro Ramo2222 RS: 200 Profile: PF 1

E.G. Elev (m)	150.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.37	Wt. n-Val.		0.035	
W.S. Elev (m)	149.87	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	148.98	Flow Area (m2)		20.67	
E.G. Slope (m/m)	0.004305	Area (m2)		20.67	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	8.91	Top Width (m)		8.91	
Vel Total (m/s)	2.68	Avg. Vel. (m/s)		2.68	
Max Chl Dpth (m)	3.20	Hydr. Depth (m)		2.32	
Conv. Total (m3/s)	845.1	Conv. (m3/s)		845.1	
Length Wtd. (m)	280.00	Wetted Per. (m)		12.07	
Min Ch El (m)	146.67	Shear (N/m2)		72.29	
Alpha	1.00	Stream Power (N/m s)		193.96	
Frctn Loss (m)	2.01	Cum Volume (1000 m3)	7.26	61.26	2.23
C & E Loss (m)	1.56	Cum SA (1000 m2)	8.83	25.27	2.31

Plan: Plan 02 Tonninoro Ramo2222 RS: 190 Profile: PF 1

E.G. Elev (m)	146.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.89	Wt. n-Val.		0.035	
W.S. Elev (m)	145.79	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	145.79	Flow Area (m2)		13.29	
E.G. Slope (m/m)	0.014215	Area (m2)		13.29	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	7.53	Top Width (m)		7.53	
Vel Total (m/s)	4.17	Avg. Vel. (m/s)		4.17	
Max Chl Dpth (m)	2.31	Hydr. Depth (m)		1.77	
Conv. Total (m3/s)	465.1	Conv. (m3/s)		465.1	
Length Wtd. (m)	280.00	Wetted Per. (m)		9.81	
Min Ch El (m)	143.48	Shear (N/m2)		188.94	
Alpha	1.00	Stream Power (N/m s)		788.24	
Frctn Loss (m)	0.29	Cum Volume (1000 m3)	7.26	56.50	2.23
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.83	22.97	2.31

Plan: Plan 02 Tonninoro Ramo2222 RS: 180 Profile: PF 1

E.G. Elev (m)	141.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.035	0.035	
W.S. Elev (m)	141.83	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	140.05	Flow Area (m2)	0.93	67.36	
E.G. Slope (m/m)	0.000340	Area (m2)	0.93	67.36	
Q Total (m3/s)	55.45	Flow (m3/s)	0.17	55.28	
Top Width (m)	37.72	Top Width (m)	4.04	33.69	
Vel Total (m/s)	0.81	Avg. Vel. (m/s)	0.18	0.82	
Max Chl Dpth (m)	3.48	Hydr. Depth (m)	0.23	2.00	
Conv. Total (m3/s)	3009.0	Conv. (m3/s)	9.3	2999.7	
Length Wtd. (m)	280.00	Wetted Per. (m)	4.53	34.61	
Min Ch El (m)	138.35	Shear (N/m2)	0.69	6.48	
Alpha	1.02	Stream Power (N/m s)	0.13	5.32	
Frctn Loss (m)	0.29	Cum Volume (1000 m3)	7.13	45.21	2.23
C & E Loss (m)	2.76	Cum SA (1000 m2)	8.27	17.20	2.31

Plan: Plan 02 Tonninoro Ramo2222 RS: 170 Profile: PF 1

E.G. Elev (m)	138.81	Element	Left OB	Channel	Right OB
Vel Head (m)	0.96	Wt. n-Val.		0.035	
W.S. Elev (m)	137.85	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	137.85	Flow Area (m2)		12.81	
E.G. Slope (m/m)	0.015415	Area (m2)		12.81	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	

Plan: Plan 02 Tonninoro Ramo2222 RS: 170 Profile: PF 1 (Continued)

Top Width (m)	6.74	Top Width (m)		6.74	
Vel Total (m/s)	4.33	Avg. Vel. (m/s)		4.33	
Max Chl Dpth (m)	2.39	Hydr. Depth (m)		1.90	
Conv. Total (m3/s)	446.6	Conv. (m3/s)		446.6	
Length Wtd. (m)	280.00	Wetted Per. (m)		9.50	
Min Ch El (m)	135.47	Shear (N/m2)		203.81	
Alpha	1.00	Stream Power (N/m s)		882.36	
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	7.00	33.99	2.23
C & E Loss (m)	0.00	Cum SA (1000 m2)	7.70	11.54	2.31

Plan: Plan 02 Tonninoro Ramo2222 RS: 160 Profile: PF 1

E.G. Elev (m)	137.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (m)	137.86	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	134.36	Flow Area (m2)	24.99	42.89	7.95
E.G. Slope (m/m)	0.000243	Area (m2)	24.99	42.89	7.95
Q Total (m3/s)	55.45	Flow (m3/s)	10.42	41.64	3.39
Top Width (m)	44.77	Top Width (m)	27.51	9.01	8.25
Vel Total (m/s)	0.73	Avg. Vel. (m/s)	0.42	0.97	0.43
Max Chl Dpth (m)	5.85	Hydr. Depth (m)	0.91	4.76	0.96
Conv. Total (m3/s)	3559.1	Conv. (m3/s)	668.8	2672.7	217.6
Length Wtd. (m)	280.00	Wetted Per. (m)	27.58	13.31	8.48
Min Ch El (m)	132.01	Shear (N/m2)	2.16	7.67	2.23
Alpha	1.41	Stream Power (N/m s)	0.90	7.44	0.95
Frctn Loss (m)	0.22	Cum Volume (1000 m3)	3.50	26.19	1.11
C & E Loss (m)	3.03	Cum SA (1000 m2)	3.85	9.34	1.16

Plan: Plan 02 Tonninoro Ramo2222 RS: 150 Profile: PF 1

E.G. Elev (m)	134.65	Element	Left OB	Channel	Right OB
Vel Head (m)	1.05	Wt. n-Val.		0.035	
W.S. Elev (m)	133.60	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	133.60	Flow Area (m2)		12.23	
E.G. Slope (m/m)	0.017471	Area (m2)		12.23	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	5.89	Top Width (m)		5.89	
Vel Total (m/s)	4.53	Avg. Vel. (m/s)		4.53	
Max Chl Dpth (m)	2.48	Hydr. Depth (m)		2.08	
Conv. Total (m3/s)	419.5	Conv. (m3/s)		419.5	
Length Wtd. (m)	280.00	Wetted Per. (m)		9.29	
Min Ch El (m)	131.13	Shear (N/m2)		225.44	
Alpha	1.00	Stream Power (N/m s)		1022.34	
Frctn Loss (m)	2.10	Cum Volume (1000 m3)		18.48	
C & E Loss (m)	0.00	Cum SA (1000 m2)		7.25	

Plan: Plan 02 Tonninoro Ramo2222 RS: 140 Profile: PF 1

E.G. Elev (m)	131.64	Element	Left OB	Channel	Right OB
Vel Head (m)	0.36	Wt. n-Val.		0.035	
W.S. Elev (m)	131.28	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	129.95	Flow Area (m2)		20.98	
E.G. Slope (m/m)	0.004148	Area (m2)		20.98	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	7.03	Top Width (m)		7.03	
Vel Total (m/s)	2.64	Avg. Vel. (m/s)		2.64	
Max Chl Dpth (m)	3.81	Hydr. Depth (m)		2.98	
Conv. Total (m3/s)	860.9	Conv. (m3/s)		860.9	
Length Wtd. (m)	280.00	Wetted Per. (m)		12.19	
Min Ch El (m)	127.48	Shear (N/m2)		70.02	

Plan: Plan 02 Tonninoro Ramo2222 RS: 140 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		185.07	
Frctn Loss (m)	2.09	Cum Volume (1000 m3)		13.83	
C & E Loss (m)	2.03	Cum SA (1000 m2)		5.44	

Plan: Plan 02 Tonninoro Ramo2222 RS: 130 Profile: PF 1

E.G. Elev (m)	127.53	Element	Left OB	Channel	Right OB
Vel Head (m)	1.03	Wt. n-Val.		0.035	
W.S. Elev (m)	126.49	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	126.49	Flow Area (m2)		12.32	
E.G. Slope (m/m)	0.017097	Area (m2)		12.32	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	5.97	Top Width (m)		5.97	
Vel Total (m/s)	4.50	Avg. Vel. (m/s)		4.50	
Max Chl Dpth (m)	2.47	Hydr. Depth (m)		2.06	
Conv. Total (m3/s)	424.1	Conv. (m3/s)		424.1	
Length Wtd. (m)	280.00	Wetted Per. (m)		9.32	
Min Ch El (m)	124.02	Shear (N/m2)		221.66	
Alpha	1.00	Stream Power (N/m s)		997.54	
Frctn Loss (m)	2.21	Cum Volume (1000 m3)		9.16	
C & E Loss (m)	0.00	Cum SA (1000 m2)		3.62	

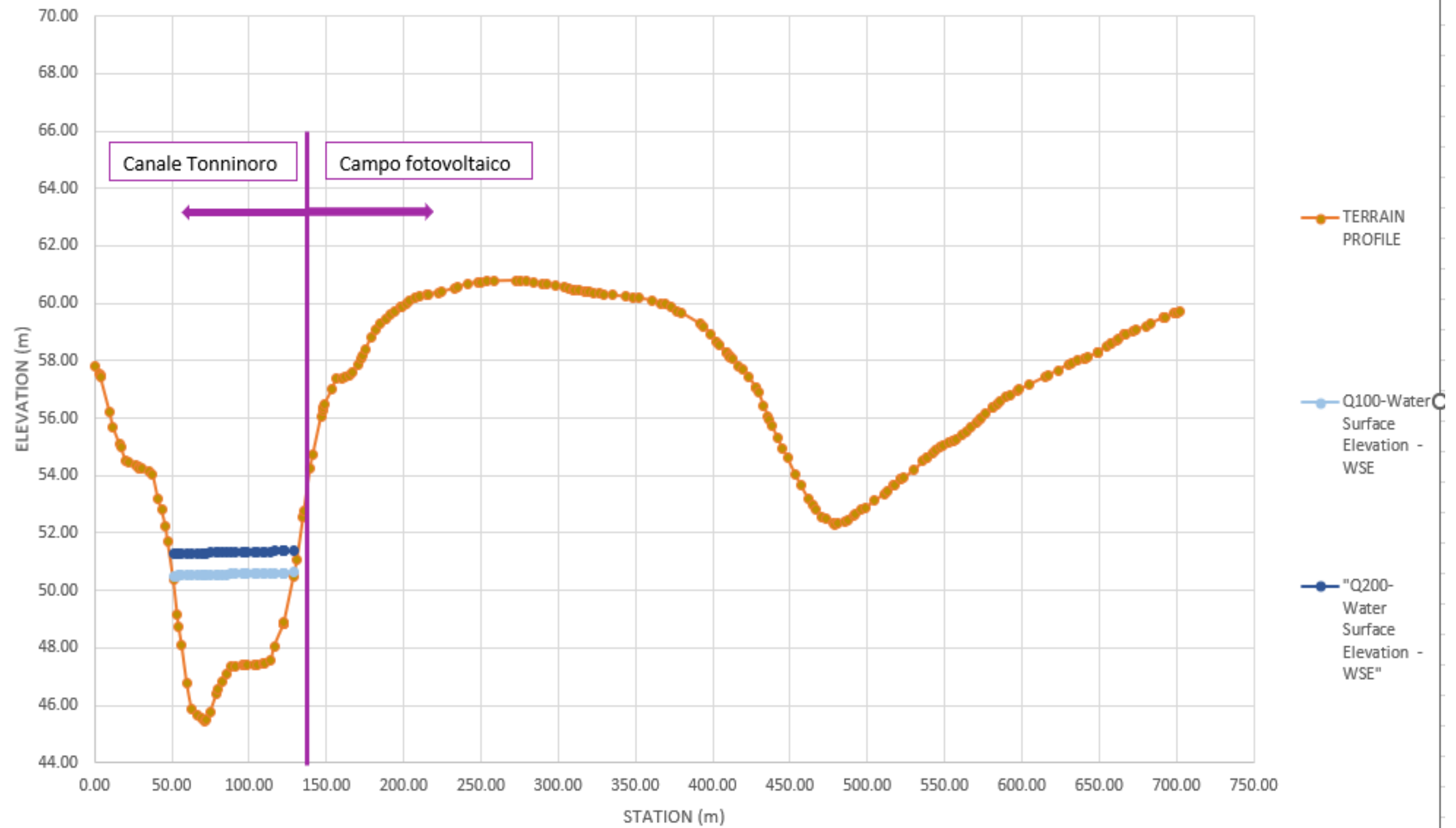
Plan: Plan 02 Tonninoro Ramo2222 RS: 120 Profile: PF 1

E.G. Elev (m)	124.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.38	Wt. n-Val.		0.035	
W.S. Elev (m)	124.14	Reach Len. (m)	280.00	280.00	280.00
Crit W.S. (m)	122.87	Flow Area (m2)		20.34	
E.G. Slope (m/m)	0.004516	Area (m2)		20.34	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	6.86	Top Width (m)		6.86	
Vel Total (m/s)	2.73	Avg. Vel. (m/s)		2.73	
Max Chl Dpth (m)	3.75	Hydr. Depth (m)		2.96	
Conv. Total (m3/s)	825.1	Conv. (m3/s)		825.1	
Length Wtd. (m)	280.00	Wetted Per. (m)		12.02	
Min Ch El (m)	120.39	Shear (N/m2)		74.95	
Alpha	1.00	Stream Power (N/m s)		204.35	
Frctn Loss (m)	2.18	Cum Volume (1000 m3)		4.59	
C & E Loss (m)	1.89	Cum SA (1000 m2)		1.83	

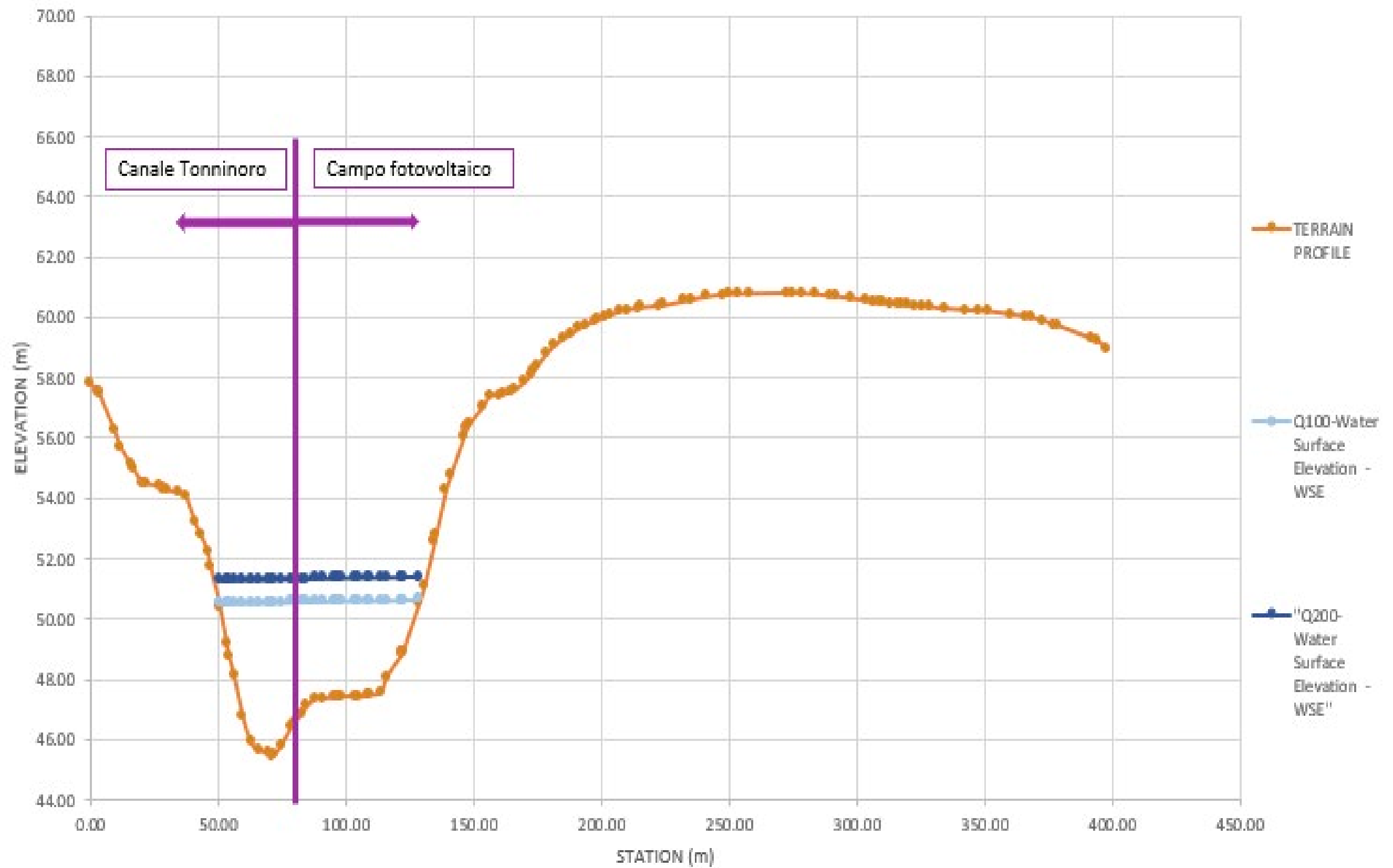
Plan: Plan 02 Tonninoro Ramo2222 RS: 110 Profile: PF 1

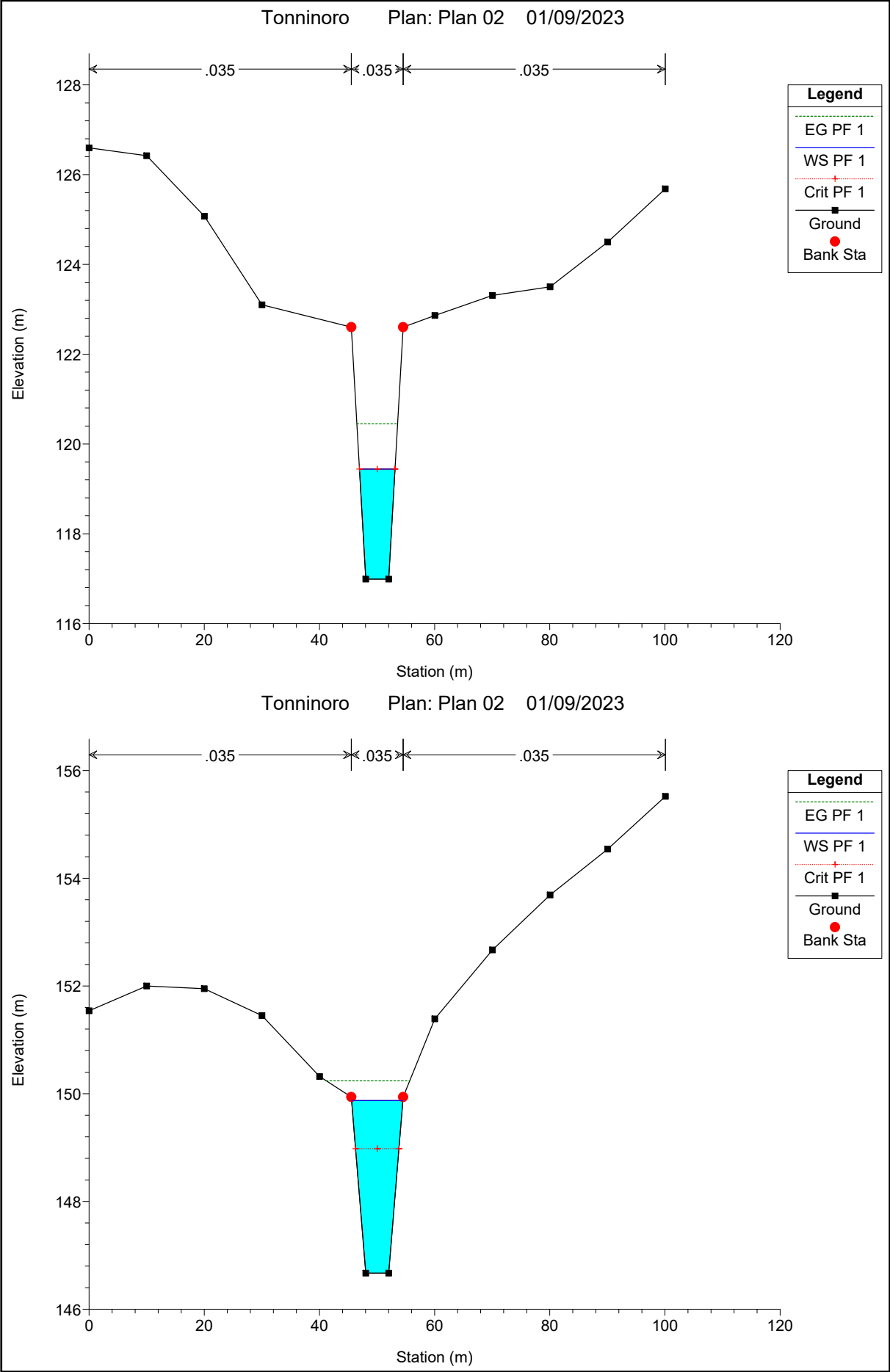
E.G. Elev (m)	120.45	Element	Left OB	Channel	Right OB
Vel Head (m)	1.01	Wt. n-Val.		0.035	
W.S. Elev (m)	119.44	Reach Len. (m)			
Crit W.S. (m)	119.44	Flow Area (m2)		12.47	
E.G. Slope (m/m)	0.016536	Area (m2)		12.47	
Q Total (m3/s)	55.45	Flow (m3/s)		55.45	
Top Width (m)	6.18	Top Width (m)		6.18	
Vel Total (m/s)	4.45	Avg. Vel. (m/s)		4.45	
Max Chl Dpth (m)	2.45	Hydr. Depth (m)		2.02	
Conv. Total (m3/s)	431.2	Conv. (m3/s)		431.2	
Length Wtd. (m)		Wetted Per. (m)		9.36	
Min Ch El (m)	116.99	Shear (N/m2)		215.98	
Alpha	1.00	Stream Power (N/m s)		960.60	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

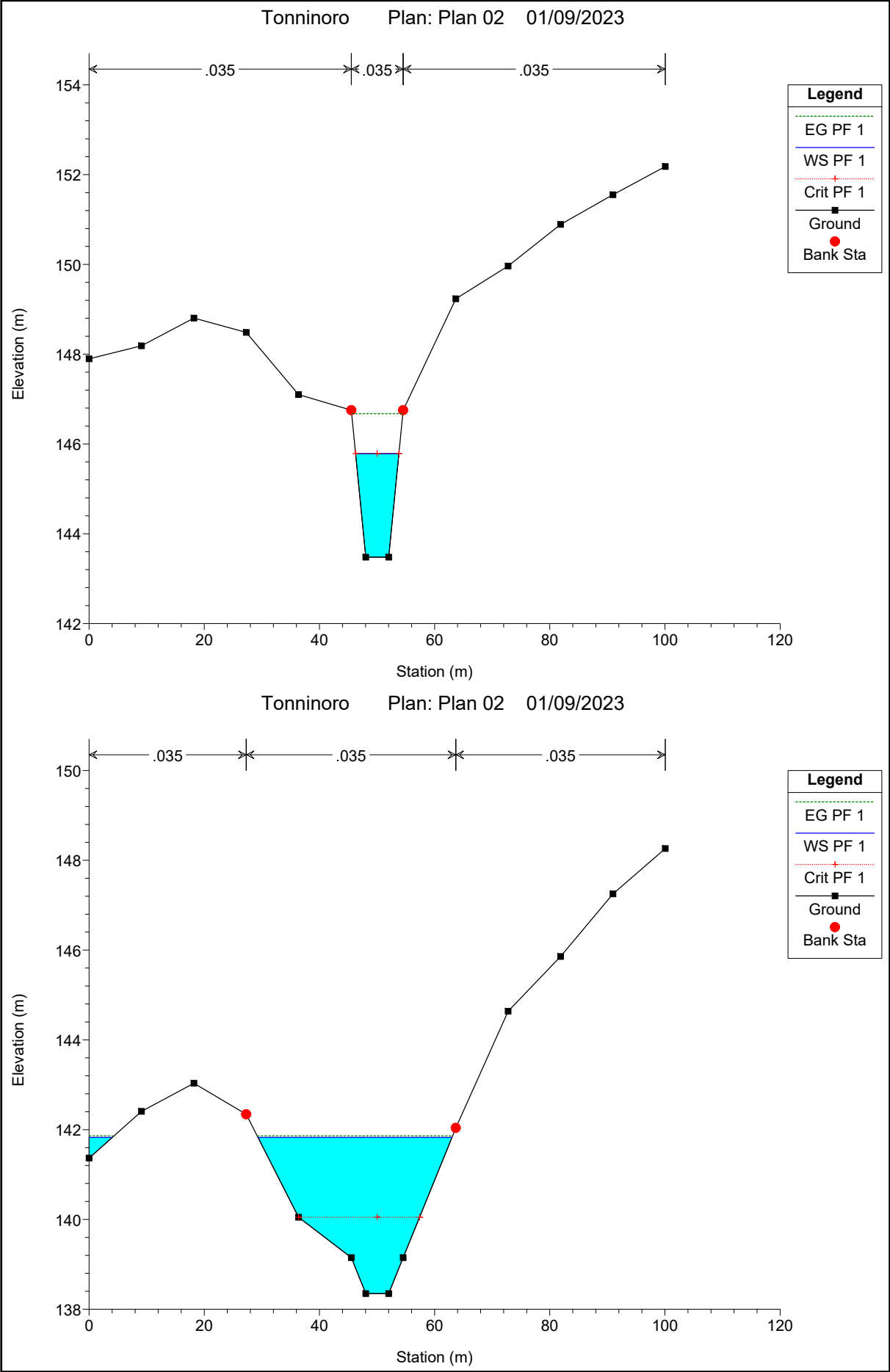
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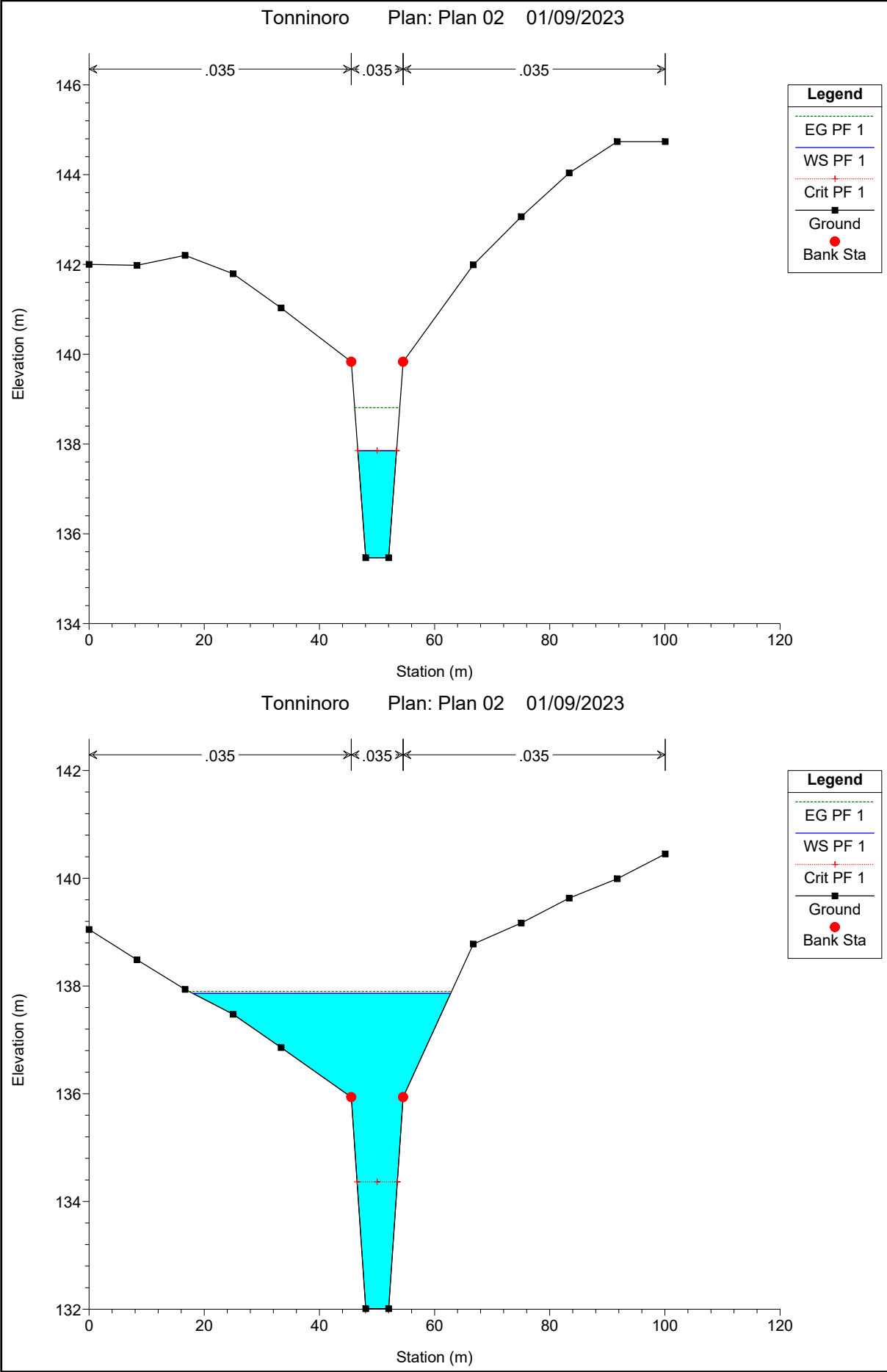


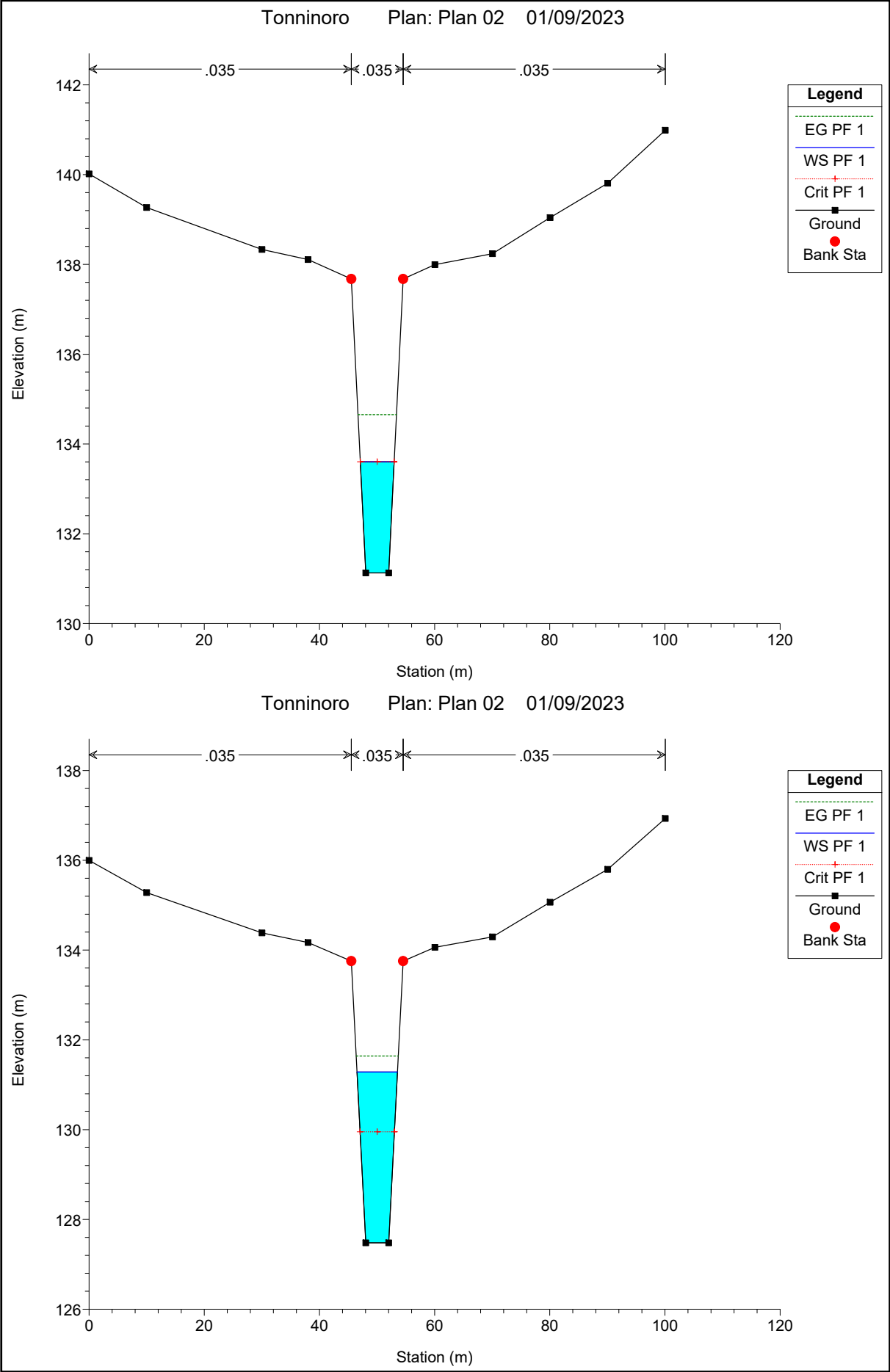
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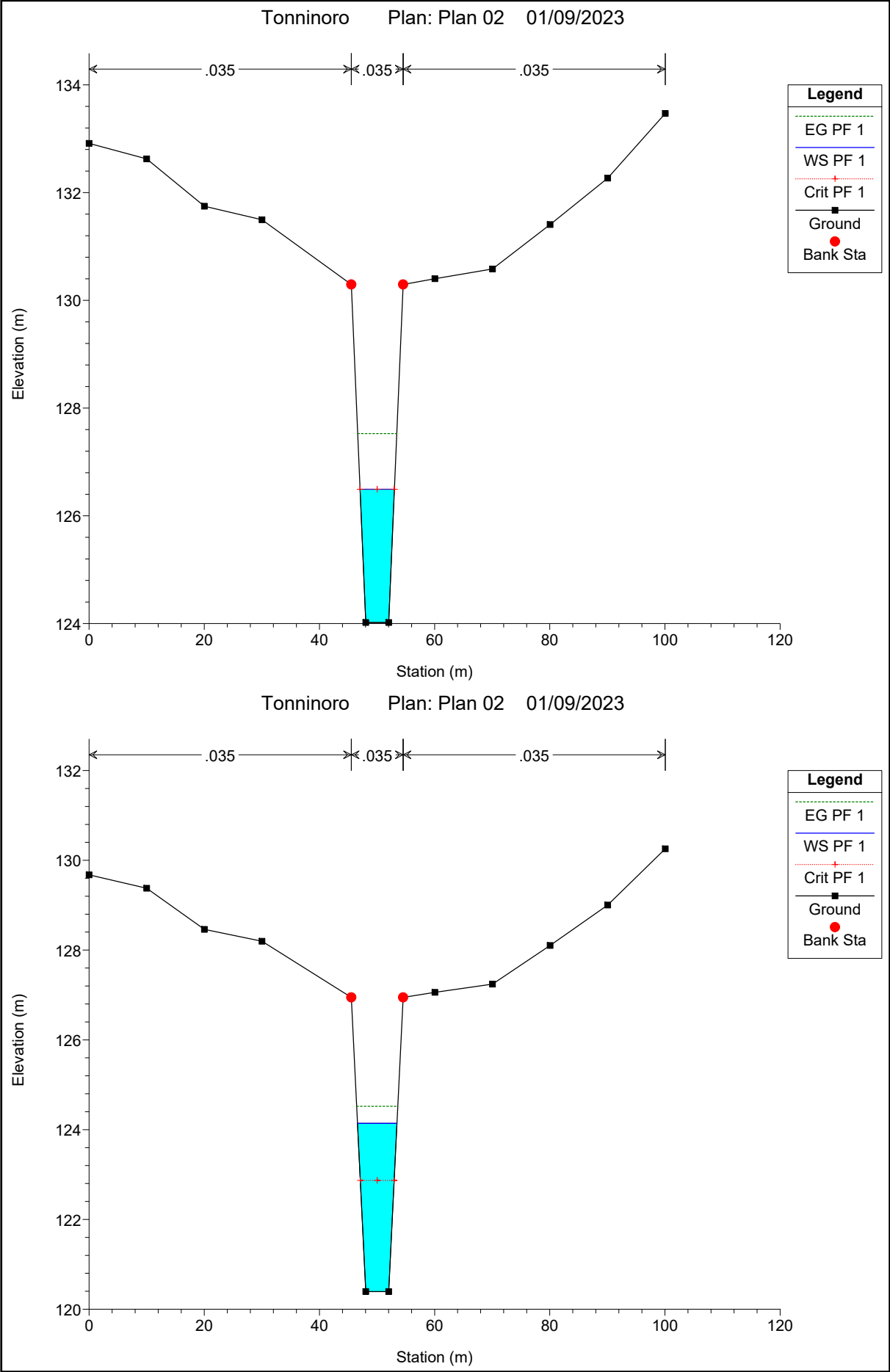






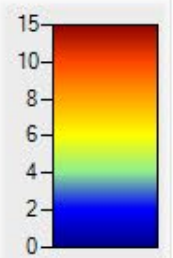
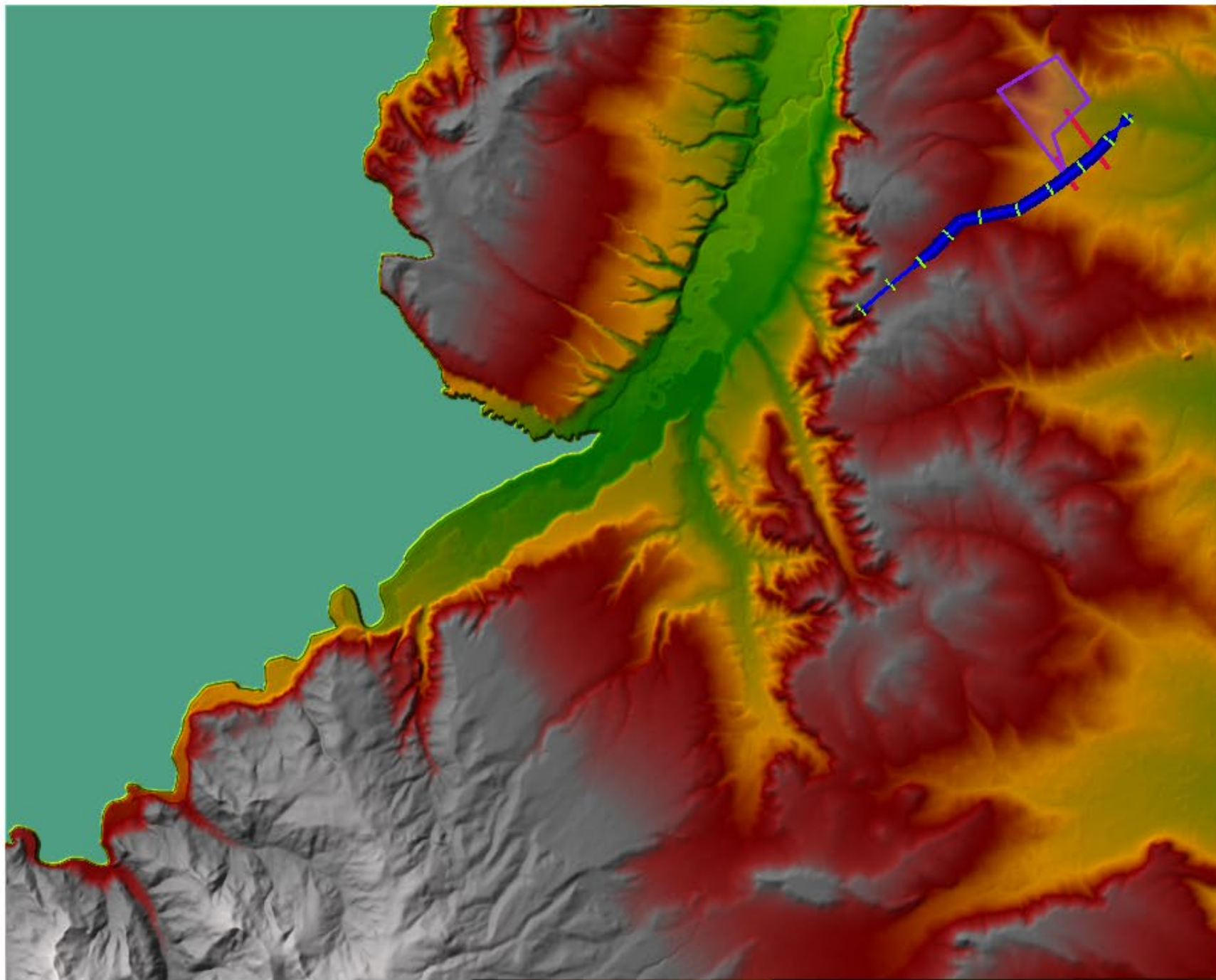






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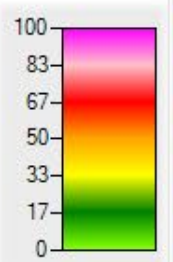
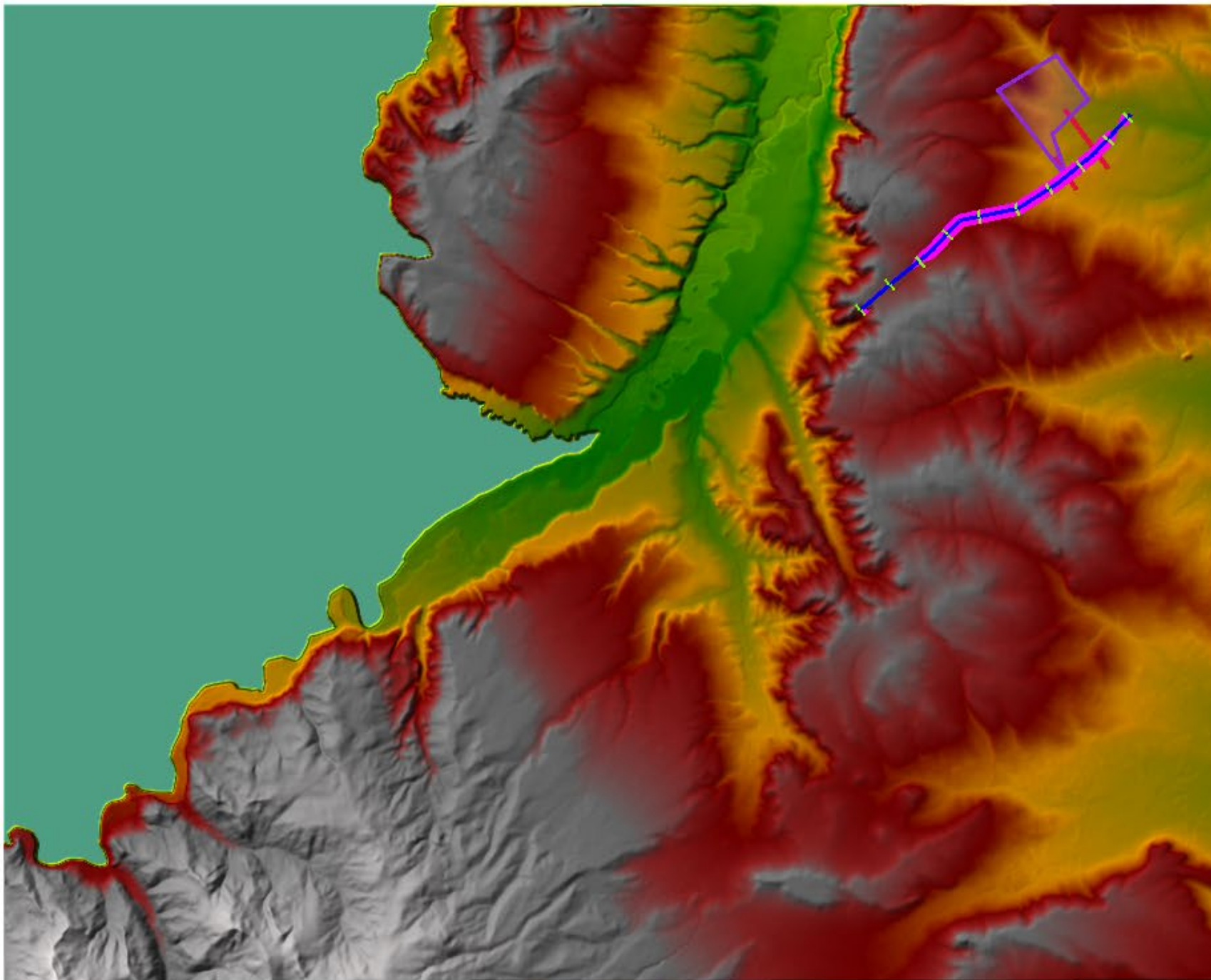
PF 1



5 km

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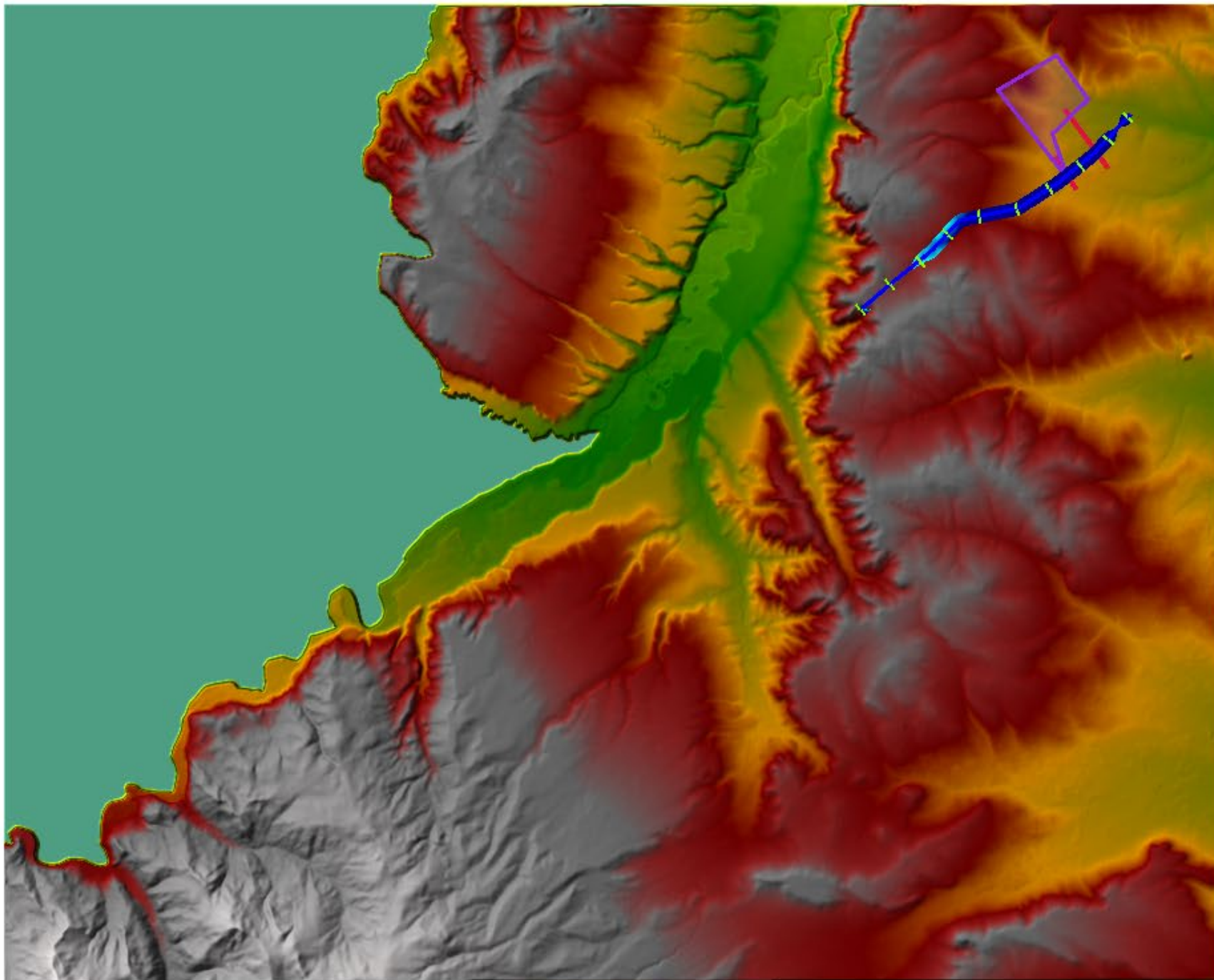
PF 1



5 km

Selected: 'Depth'

PF 1



5 km