



# COMUNE DI SIENA

**STUDI IDROLOGICI E IDRAULICI INERENTI I CORSI D'ACQUA CHE ATTRAVERSANO O SONO SITUATI NELLE IMMEDIATE VICINANZE DI AREE OGGETTO DI PREVISIONE DA PARTE DEL REGOLAMENTO URBANISTICO ADOTTATO**

**E78 GROSSETO - FANO**

**ADEGUAMENTO A 4 CORSIE DEL TRATTO COMPRESO TRA LO SVINCOLO CON LA SIENA-FIRENZE (km 63.561 del tratto Grosseto-Siena) E LO SVINCOLO DI RUFFOLO (km 2.800 del tratto Siena-Bettolle) - LOTTO 0**

***d.03***

## **ALLEGATI DI CALCOLO DELLE VERIFICHE IDRAULICHE**

Novembre 2010 Rev.0

*Il tecnico incaricato*

Dott. Ing. CLAUDIO LOMBARDI

*Collaboratori*

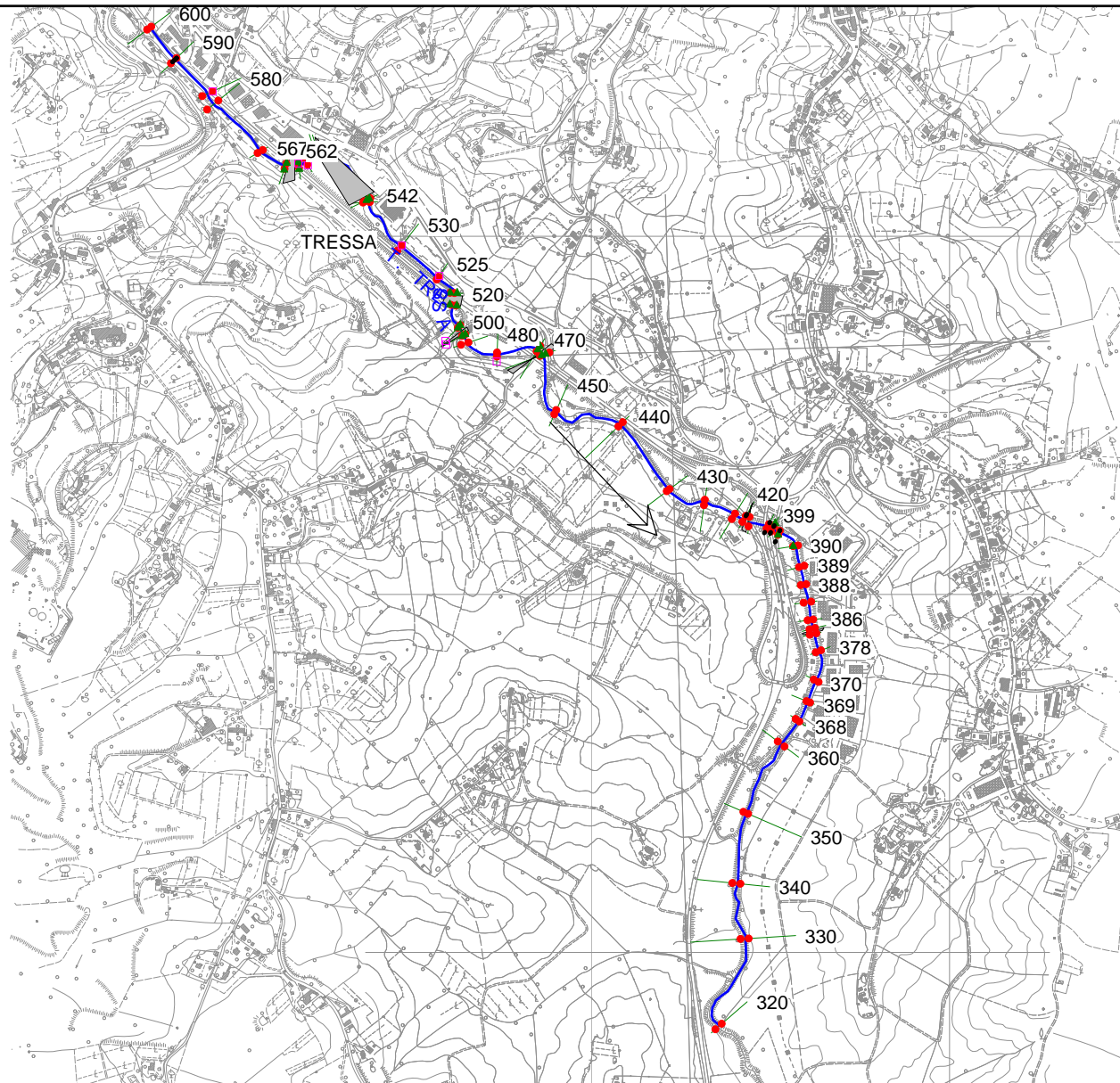
Dott. Ing. ALESSIO MAGAZZINI

Dott. Ing. ALBERTO NASTASI

Dott. Ing. RICCARDO RICCI

**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**TORRENTE TRESSA**



HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	600	Tr20	42.00	0.31	37.00	4.69	227.59	229.44	228.87	229.57	0.005702	1.66	1.30	32.24	40.22	0.43	0.46
TRESSA	600	Tr30	47.00	0.48	39.95	6.56	227.59	229.55	228.96	229.68	0.005296	1.67	1.28	36.79	43.05	0.41	0.44
TRESSA	600	Tr200	83.00	4.66	58.01	20.32	227.59	230.23	229.48	230.34	0.003544	1.72	1.06	78.67	87.34	0.36	0.35
TRESSA	590	Tr20	42.00		42.00		226.68	228.65	227.86	228.78	0.008923	1.59	1.59	26.35	16.30	0.40	0.40
TRESSA	590	Tr30	47.00		47.00		226.68	228.78	227.93	228.92	0.009129	1.66	1.66	28.37	16.52	0.40	0.40
TRESSA	590	Tr200	83.00		82.98	0.02	226.68	229.53	228.40	229.73	0.010594	2.01	2.01	41.33	18.70	0.42	0.43
TRESSA	580	Tr20	42.00		42.00		224.90	226.39	226.39	226.84	0.037681	2.98	2.98	14.10	15.62	1.00	1.00
TRESSA	580	Tr30	47.00		47.00		224.90	226.47	226.47	226.94	0.036750	3.04	3.04	15.47	16.33	1.00	1.00
TRESSA	580	Tr200	83.00		83.00		224.90	226.95	226.95	227.55	0.034674	3.44	3.44	24.15	20.24	1.00	1.00
TRESSA	570	Tr20	42.00		42.00		221.81	223.60	222.80	223.69	0.004217	1.30	1.30	32.33	24.02	0.36	0.36
TRESSA	570	Tr30	47.00		47.00		221.81	223.73	222.86	223.82	0.004036	1.32	1.32	35.55	24.88	0.35	0.35
TRESSA	570	Tr200	83.00		83.00		221.81	224.54	223.28	224.65	0.003233	1.44	1.44	57.82	30.14	0.33	0.33
TRESSA	567	Tr20	42.00		42.00		220.00	222.74	221.60	222.86	0.004548	1.53	1.53	27.43	15.45	0.37	0.37
TRESSA	567	Tr30	47.00		47.00		220.00	222.90	221.71	223.03	0.004487	1.57	1.57	29.91	16.02	0.37	0.37
TRESSA	567	Tr200	83.00	0.32	82.51	0.17	220.00	223.82	222.34	223.99	0.003708	1.82	1.77	46.77	21.73	0.35	0.39
TRESSA	565	Tr20	42.00		42.00		220.00	222.30	221.33	222.44	0.005543	1.69	1.69	24.78	13.13	0.39	0.39
TRESSA	565	Tr30	47.00		47.00		220.00	222.46	221.42	222.61	0.005477	1.75	1.75	26.88	13.36	0.39	0.39
TRESSA	565	Tr200	83.00		83.00		220.00	223.40	221.99	223.62	0.005424	2.07	2.07	40.10	14.73	0.40	0.40
TRESSA	563 BR U	Tr20	42.00		42.00		220.00	222.26	221.33	222.41	0.005842	1.73	1.73	24.33	13.08	0.40	0.40
TRESSA	563 BR U	Tr30	47.00		47.00		220.00	222.41	221.42	222.58	0.005748	1.78	1.78	26.43	13.31	0.40	0.40
TRESSA	563 BR U	Tr200	83.00		83.00		220.00	223.36	221.98	223.58	0.005613	2.10	2.10	39.61	14.68	0.41	0.41
TRESSA	563 BR D	Tr20	42.00		42.00		219.49	222.06	221.19	222.26	0.007405	1.96	1.96	21.41	11.45	0.46	0.46
TRESSA	563 BR D	Tr30	47.00		47.00		219.49	222.22	221.29	222.43	0.007377	2.02	2.02	23.22	11.72	0.46	0.46
TRESSA	563 BR D	Tr200	83.00		83.00		219.49	223.12	221.93	223.42	0.007674	2.44	2.44	33.98	12.18	0.47	0.47
TRESSA	562	Tr20	45.00		45.00		219.49	221.95	221.25	222.21	0.010032	2.23	2.23	20.20	11.27	0.53	0.53
TRESSA	562	Tr30	51.00		51.00		219.49	222.11	221.37	222.39	0.010118	2.32	2.32	21.99	11.54	0.54	0.54
TRESSA	562	Tr200	89.00		89.00		219.49	223.01	222.02	223.39	0.009852	2.72	2.72	32.69	12.13	0.53	0.53
TRESSA	560	Tr20	45.00		45.00		219.14	221.71	221.17	221.96	0.011919	2.20	2.20	20.41	14.28	0.59	0.59
TRESSA	560	Tr30	51.00		51.00		219.14	221.88	221.28	222.14	0.011203	2.22	2.22	22.94	15.12	0.58	0.58
TRESSA	560	Tr200	89.00		89.00		219.14	222.88	221.89	223.13	0.007500	2.20	2.20	40.39	19.92	0.49	0.49
TRESSA	550	Tr20	45.00		45.00		219.21	221.04	220.62	221.44	0.019895	2.81	2.81	16.00	9.00	0.67	0.67
TRESSA	550	Tr30	51.00		51.00		219.21	221.20	220.74	221.64	0.019769	2.92	2.92	17.46	9.04	0.67	0.67
TRESSA	550	Tr200	89.00		89.00		219.21	222.13	221.42	222.73	0.019319	3.43	3.43	25.96	9.28	0.65	0.65
TRESSA	548	Tr20	45.00		45.00		219.11	220.88	220.53	221.34	0.002613	2.99	2.99	15.04	9.00	0.72	0.72
TRESSA	548	Tr30	51.00		51.00		219.11	221.03	220.65	221.53	0.002567	3.13	3.13	16.30	9.04	0.72	0.72
TRESSA	548	Tr200	89.00		89.00		219.11	221.85	221.35	222.59	0.002380	3.82	3.82	23.29	9.24	0.74	0.74

HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	545 BR U	Tr20	45.00		45.00		219.11	220.52	220.52	221.24	0.005514	3.74	3.74	12.02	8.50	1.00	1.00
TRESSA	545 BR U	Tr30	51.00		51.00		219.11	220.66	220.66	221.42	0.005278	3.88	3.88	13.13	8.50	1.00	1.00
TRESSA	545 BR U	Tr200	89.00		89.00		219.11	221.35	221.35	222.46	0.004664	4.68	4.68	19.03	8.50	1.00	1.00
TRESSA	545 BR D	Tr20	45.00		45.00		217.00	219.05	218.42	219.39	0.001588	2.58	2.58	17.47	8.50	0.57	0.57
TRESSA	545 BR D	Tr30	51.00		51.00		217.00	219.21	218.54	219.59	0.001589	2.71	2.71	18.83	8.50	0.58	0.58
TRESSA	545 BR D	Tr200	89.00		89.00		217.00	219.94	219.24	220.59	0.001878	3.56	3.56	25.01	8.50	0.66	0.66
TRESSA	542	Tr20	46.00		46.00		217.00	219.03	218.44	219.39	0.001739	2.67	2.67	17.22	13.26	0.60	0.60
TRESSA	542	Tr30	52.00		52.00		217.00	219.19	218.56	219.58	0.001726	2.80	2.80	18.58	13.58	0.60	0.60
TRESSA	542	Tr200	91.00		91.00		217.00	219.90	219.27	220.60	0.002052	3.69	3.69	24.68	15.04	0.69	0.69
TRESSA	540	Tr20	46.00		46.00		216.86	219.11	218.11	219.26	0.005843	1.76	1.76	26.15	13.63	0.41	0.41
TRESSA	540	Tr30	52.00		52.00		216.86	219.28	218.22	219.45	0.005828	1.82	1.82	28.53	13.98	0.41	0.41
TRESSA	540	Tr200	91.00		91.00		216.86	220.10	218.81	220.35	0.006591	2.24	2.24	40.62	15.64	0.44	0.44
TRESSA	530	Tr20	46.00		46.00		215.15	218.11	217.15	218.27	0.006599	1.74	1.74	26.38	15.84	0.43	0.43
TRESSA	530	Tr30	52.00		52.00		215.15	218.29	217.26	218.45	0.006503	1.77	1.77	29.39	17.20	0.43	0.43
TRESSA	530	Tr200	91.00		91.00	0.00	215.15	219.15	217.89	219.36	0.005443	2.02	2.02	45.13	18.47	0.41	0.41
TRESSA	525	Tr20	46.00	0.10	45.90	0.00	213.93	216.90	216.12	217.19	0.009612	2.39	2.36	19.46	9.97	0.52	0.54
TRESSA	525	Tr30	52.00	0.19	51.81	0.00	213.93	217.04	216.26	217.37	0.009848	2.52	2.49	20.90	10.22	0.54	0.56
TRESSA	525	Tr200	91.00	1.56	89.44	0.00	213.93	217.77	216.98	218.32	0.011572	3.29	3.16	28.80	11.49	0.61	0.64
TRESSA	520	Tr20	46.00	3.36	42.64		213.99	216.60	215.42	216.70	0.002790	1.47	1.32	34.75	33.07	0.31	0.32
TRESSA	520	Tr30	52.00	4.41	47.59		213.99	216.74	215.52	216.86	0.002829	1.54	1.38	37.58	33.41	0.32	0.32
TRESSA	520	Tr200	91.00	11.95	79.05		213.99	217.48	216.14	217.66	0.003213	1.96	1.75	52.04	35.12	0.35	0.34
TRESSA	515 BR U	Tr20	46.00	3.26	42.74		213.99	216.58	215.42	216.68	0.002902	1.49	1.34	34.28	19.57	0.32	0.32
TRESSA	515 BR U	Tr30	52.00	4.31	47.69		213.99	216.72	215.52	216.84	0.002938	1.56	1.40	37.11	19.57	0.32	0.32
TRESSA	515 BR U	Tr200	91.00	11.82	79.18		213.99	217.45	216.15	217.64	0.003322	1.98	1.77	51.49	19.57	0.35	0.35
TRESSA	515 BR D	Tr20	46.00	0.08	45.63	0.29	213.89	216.33	215.63	216.54	0.008188	2.00	1.94	23.73	17.40	0.57	0.57
TRESSA	515 BR D	Tr30	52.00	0.17	51.18	0.65	213.89	216.47	215.74	216.69	0.007992	2.08	1.99	26.15	17.76	0.56	0.56
TRESSA	515 BR D	Tr200	91.00	1.54	85.63	3.82	213.89	217.15	216.35	217.47	0.007971	2.55	2.34	38.85	19.40	0.53	0.53
TRESSA	510	Tr20	46.00	0.08	45.64	0.28	213.89	216.33	215.63	216.53	0.008261	2.01	1.95	23.65	18.16	0.49	0.53
TRESSA	510	Tr30	52.00	0.17	51.19	0.64	213.89	216.47	215.74	216.69	0.008057	2.09	1.99	26.07	20.05	0.49	0.53
TRESSA	510	Tr200	91.00	1.53	85.66	3.81	213.89	217.15	216.35	217.47	0.008021	2.56	2.35	38.76	24.66	0.51	0.53
TRESSA	500	Tr20	46.00		46.00		212.05	216.09	213.54	216.16	0.000900	1.23	1.23	37.50	57.89	0.20	0.20
TRESSA	500	Tr30	52.00		52.00		212.05	216.23	213.65	216.32	0.001021	1.34	1.34	38.86	69.24	0.21	0.21
TRESSA	500	Tr200	91.00		91.00		212.05	216.87	214.29	217.08	0.001900	2.02	2.02	45.12	73.40	0.30	0.30
TRESSA	495 BR U	Tr20	46.00		46.00		212.05	216.07	213.54	216.15	0.000911	1.23	1.23	37.37	9.70	0.20	0.20
TRESSA	495 BR U	Tr30	52.00		52.00		212.05	216.21	213.65	216.30	0.001034	1.34	1.34	38.71	9.70	0.21	0.21
TRESSA	495 BR U	Tr200	91.00		91.00		212.05	216.84	214.30	217.05	0.001943	2.03	2.03	44.82	9.70	0.30	0.30

HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	495 BR D	Tr20	46.00		46.00		212.05	216.06	213.54	216.14	0.000917	1.23	1.23	37.28	9.70	0.20	0.20
TRESSA	495 BR D	Tr30	52.00		52.00		212.05	216.20	213.65	216.29	0.001043	1.35	1.35	38.62	9.70	0.22	0.22
TRESSA	495 BR D	Tr200	91.00		91.00		212.05	216.82	214.30	217.03	0.001971	2.04	2.04	44.63	9.70	0.30	0.30
TRESSA	492	Tr20	46.00		46.00		212.05	216.06	213.54	216.14	0.000921	1.24	1.24	37.24	57.07	0.20	0.20
TRESSA	492	Tr30	52.00		52.00		212.05	216.19	213.65	216.29	0.001047	1.35	1.35	38.57	61.28	0.22	0.22
TRESSA	492	Tr200	91.00		91.00		212.05	216.81	214.29	217.02	0.001986	2.04	2.04	44.53	73.00	0.30	0.30
TRESSA	490	Tr20	48.00		48.00		213.22	215.95	214.92	216.08	0.006029	1.60	1.60	30.00	20.33	0.42	0.42
TRESSA	490	Tr30	54.00		53.96	0.04	213.22	216.10	215.03	216.23	0.005784	1.63	1.62	33.29	26.87	0.42	0.47
TRESSA	490	Tr200	95.00	1.18	88.79	5.03	213.22	216.76	215.70	216.94	0.004857	1.88	1.62	58.71	49.88	0.40	0.48
TRESSA	480	Tr20	48.00	0.00	48.00		212.36	215.05	214.36	215.33	0.010810	2.36	2.36	20.38	11.84	0.56	0.57
TRESSA	480	Tr30	54.00	0.10	53.90		212.36	215.20	214.48	215.50	0.010745	2.45	2.41	22.43	16.39	0.56	0.66
TRESSA	480	Tr200	95.00	10.19	84.45	0.36	212.36	216.01	215.27	216.34	0.008302	2.69	2.03	46.79	46.44	0.52	0.65
TRESSA	470	Tr20	48.00		48.00		211.81	214.18	213.18	214.37	0.004538	1.93	1.93	24.87	14.89	0.41	0.41
TRESSA	470	Tr30	54.00		54.00		211.81	214.32	213.27	214.54	0.004699	2.04	2.04	26.41	15.12	0.42	0.42
TRESSA	470	Tr200	95.00		95.00		211.81	215.15	213.90	215.51	0.005431	2.68	2.68	35.49	57.86	0.48	0.48
TRESSA	465 BR U	Tr20	48.00		48.00		211.81	214.12	213.17	214.32	0.004992	1.99	1.99	24.17	11.03	0.43	0.43
TRESSA	465 BR U	Tr30	54.00		54.00		211.81	214.26	213.27	214.48	0.005174	2.10	2.10	25.66	11.03	0.44	0.44
TRESSA	465 BR U	Tr200	95.00		95.00		211.81	215.06	213.89	215.45	0.005928	2.75	2.75	34.57	11.03	0.50	0.50
TRESSA	465 BR D	Tr20	48.00		48.00		211.71	213.84	213.48	214.21	0.014440	2.69	2.69	17.81	11.03	0.68	0.68
TRESSA	465 BR D	Tr30	54.00		54.00		211.71	213.96	213.58	214.37	0.014446	2.82	2.82	19.12	11.03	0.68	0.68
TRESSA	465 BR D	Tr200	95.00		95.00		211.71	214.68	214.19	215.31	0.014038	3.51	3.51	27.06	11.03	0.72	0.72
TRESSA	460	Tr20	48.00		48.00		211.71	213.56	213.47	214.10	0.027139	3.26	3.26	14.74	16.53	0.90	0.90
TRESSA	460	Tr30	54.00		54.00		211.71	213.67	213.58	214.26	0.026483	3.39	3.39	15.94	17.34	0.90	0.90
TRESSA	460	Tr200	95.00		95.00		211.71	214.29	214.20	215.18	0.025249	4.19	4.19	22.69	42.26	0.93	0.93
TRESSA	450	Tr20	48.00		48.00		206.64	210.84	209.62	211.01	0.005922	1.83	1.83	26.27	12.33	0.40	0.40
TRESSA	450	Tr30	54.00		54.00		206.64	211.00	209.75	211.19	0.006147	1.91	1.91	28.23	12.71	0.41	0.41
TRESSA	450	Tr200	95.00	1.28	91.94	1.78	206.64	211.73	210.47	212.02	0.007096	2.43	2.14	44.36	35.66	0.46	0.61
TRESSA	440	Tr20	48.00		46.95	1.05	206.74	209.94	208.70	210.04	0.003345	1.43	1.33	35.96	27.63	0.33	0.37
TRESSA	440	Tr30	54.00	0.00	52.15	1.84	206.74	210.08	208.80	210.19	0.003297	1.48	1.34	40.16	31.53	0.33	0.38
TRESSA	440	Tr200	95.00	1.93	82.46	10.60	206.74	210.79	209.42	210.93	0.003041	1.74	1.33	71.63	56.36	0.33	0.38
TRESSA	430	Tr20	48.00	0.20	46.42	1.38	205.56	208.84	207.68	209.04	0.006153	2.01	1.80	26.61	20.68	0.42	0.51
TRESSA	430	Tr30	54.00	0.35	51.23	2.42	205.56	209.00	207.85	209.21	0.006078	2.08	1.80	29.95	23.22	0.42	0.51
TRESSA	430	Tr200	95.00	1.97	79.51	13.52	205.56	209.71	208.77	209.98	0.006341	2.51	1.88	50.66	35.10	0.45	0.50
TRESSA	425	Tr20	48.00	0.49	47.46	0.05	204.94	208.43	206.85	208.52	0.002400	1.34	1.28	37.62	24.28	0.28	0.33
TRESSA	425	Tr30	54.00	1.02	52.87	0.11	204.94	208.58	206.97	208.68	0.002387	1.40	1.29	41.72	27.16	0.28	0.33
TRESSA	425	Tr200	95.00	7.23	86.87	0.91	204.94	209.25	207.62	209.41	0.002907	1.81	1.48	63.97	39.29	0.33	0.37

HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	420	Tr20	53.00	0.75	52.12	0.13	204.48	208.26	206.34	208.33	0.001529	1.13	1.05	50.29	32.93	0.22	0.27
TRESSA	420	Tr30	60.00	1.49	58.26	0.25	204.48	208.42	206.46	208.49	0.001567	1.19	1.07	55.86	37.25	0.23	0.28
TRESSA	420	Tr200	105.00	9.32	94.23	1.45	204.48	209.05	207.09	209.17	0.002061	1.57	1.24	84.84	54.46	0.27	0.32
TRESSA	410	Tr20	53.00	1.58	51.28	0.14	204.56	208.23	206.25	208.28	0.001121	1.00	0.90	58.82	37.83	0.20	0.23
TRESSA	410	Tr30	60.00	2.61	57.15	0.24	204.56	208.39	206.35	208.45	0.001159	1.05	0.92	65.02	40.34	0.20	0.23
TRESSA	410	Tr200	105.00	10.88	93.02	1.10	204.56	209.01	206.95	209.10	0.001641	1.41	1.13	93.12	50.18	0.24	0.26
TRESSA	405 BR U	Tr20	53.00	5.76	46.94	0.27	204.56	208.23	206.24	208.28		1.73	1.70	31.11	37.83	0.32	0.32
TRESSA	405 BR U	Tr30	60.00	11.33	48.05	0.58	204.56	208.39	206.35	208.44		1.59	1.61	37.31	40.34	0.29	0.29
TRESSA	405 BR U	Tr200	105.00	41.12	61.12	2.50	204.56	209.01	208.39	209.10		1.45	1.61	65.41	50.18	0.27	0.27
TRESSA	405 BR D	Tr20	53.00	4.34	48.58		204.44	208.16	205.94	208.24		1.44	1.47	35.99	40.21	0.27	0.27
TRESSA	405 BR D	Tr30	60.00	8.72	51.08		204.44	208.26	206.05	208.38		1.40	1.50	40.01	41.44	0.27	0.27
TRESSA	405 BR D	Tr200	105.00	37.80	65.19	1.74	204.44	208.89	206.59	208.98		1.23	1.51	69.40	53.12	0.25	0.25
TRESSA	400	Tr20	53.00	1.08	51.92		204.44	207.96	205.94	208.00	0.000995	0.88	0.83	63.60	37.31	0.19	0.20
TRESSA	400	Tr30	60.00	1.90	58.10		204.44	208.14	206.05	208.18	0.000988	0.92	0.85	70.41	39.91	0.19	0.20
TRESSA	400	Tr200	105.00	8.38	96.42	0.20	204.44	208.89	206.58	208.95	0.001140	1.16	1.00	104.51	53.12	0.21	0.23
TRESSA	399	Tr20	53.00	3.96	49.04	0.00	204.42	207.73	206.79	207.88	0.005568	1.79	1.51	35.04	32.48	0.40	0.46
TRESSA	399	Tr30	60.00	6.72	53.23	0.05	204.42	207.92	206.93	208.06	0.004822	1.77	1.44	41.59	34.90	0.38	0.42
TRESSA	399	Tr200	105.00	22.05	78.05	4.90	204.42	208.68	207.71	208.83	0.003854	1.93	1.38	76.08	49.94	0.36	0.36
TRESSA	398	Tr20	53.00	0.03	52.18	0.79	204.37	207.65	206.62	207.80	0.004888	1.70	1.64	32.36	19.99	0.38	0.41
TRESSA	398	Tr30	60.00	0.13	58.56	1.31	204.37	207.84	206.76	207.99	0.004636	1.75	1.65	36.40	23.10	0.38	0.42
TRESSA	398	Tr200	105.00	6.60	90.69	7.71	204.37	208.59	207.37	208.77	0.004431	2.02	1.53	68.82	52.11	0.38	0.42
TRESSA	397	Tr20	53.00	0.00	53.00		204.23	207.43	206.56	207.66	0.008201	2.13	2.13	24.85	21.67	0.47	0.48
TRESSA	397	Tr30	60.00	0.02	59.98		204.23	207.60	206.67	207.86	0.008262	2.22	2.22	27.08	26.57	0.48	0.49
TRESSA	397	Tr200	105.00	1.28	85.08	18.64	204.23	208.43	207.34	208.65	0.006267	2.30	1.78	59.13	38.25	0.42	0.46
TRESSA	390	Tr20	53.00		53.00		203.83	206.61	206.06	206.98	0.014546	2.70	2.70	19.66	12.59	0.64	0.64
TRESSA	390	Tr30	60.00		60.00		203.83	206.80	206.19	207.19	0.013989	2.76	2.76	21.75	14.59	0.63	0.63
TRESSA	390	Tr200	105.00		92.29	12.71	203.83	207.85	206.94	208.17	0.009249	2.66	2.10	50.12	40.47	0.53	0.60
TRESSA	389	Tr20	53.00		53.00		202.90	206.10	204.89	206.30	0.006283	1.99	1.99	26.64	11.78	0.42	0.42
TRESSA	389	Tr30	60.00		60.00		202.90	206.30	205.02	206.52	0.006318	2.06	2.06	29.12	12.20	0.43	0.43
TRESSA	389	Tr200	105.00		105.00		202.90	207.39	205.80	207.69	0.006488	2.40	2.40	43.66	14.43	0.44	0.44
TRESSA	388	Tr20	53.00		53.00		202.60	205.70	204.66	205.94	0.007765	2.17	2.17	24.47	11.36	0.47	0.47
TRESSA	388	Tr30	60.00		60.00		202.60	205.91	204.81	206.16	0.007723	2.23	2.23	26.85	11.78	0.47	0.47
TRESSA	388	Tr200	105.00		105.00		202.60	206.99	205.59	207.33	0.007581	2.57	2.57	40.87	13.97	0.48	0.48
TRESSA	387	Tr20	53.00		53.00		202.07	205.50	204.06	205.62	0.003430	1.54	1.54	34.47	15.52	0.33	0.33
TRESSA	387	Tr30	60.00		60.00		202.07	205.72	204.18	205.84	0.003385	1.59	1.59	37.84	16.03	0.33	0.33
TRESSA	387	Tr200	105.00		105.00		202.07	206.83	204.86	207.01	0.003299	1.83	1.83	57.27	18.69	0.33	0.33

HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	386	Tr20	53.00		53.00		201.69	205.17	204.02	205.38	0.006847	2.06	2.06	25.74	11.53	0.44	0.44
TRESSA	386	Tr30	60.00		60.00		201.69	205.38	204.16	205.61	0.006903	2.13	2.13	28.19	12.07	0.44	0.44
TRESSA	386	Tr200	105.00		105.00		201.69	206.46	204.93	206.77	0.006915	2.46	2.46	42.61	14.33	0.46	0.46
TRESSA	380	Tr20	53.00		53.00		201.46	204.97	203.79	205.20	0.007621	2.11	2.11	25.12	11.48	0.46	0.46
TRESSA	380	Tr30	60.00		60.00		201.46	205.18	203.96	205.42	0.007621	2.18	2.18	27.54	11.95	0.46	0.46
TRESSA	380	Tr200	105.00		105.00		201.46	206.27	204.80	206.59	0.007572	2.51	2.51	41.86	14.46	0.47	0.47
TRESSA	379.5 BR U	Tr20	53.00		53.00		201.46	204.92	203.79	205.15	0.008211	2.17	2.17	24.44	11.34	0.47	0.47
TRESSA	379.5 BR U	Tr30	60.00		60.00		201.46	205.12	203.96	205.38	0.008178	2.24	2.24	26.83	11.82	0.47	0.47
TRESSA	379.5 BR U	Tr200	105.00		105.00		201.46	206.16	204.81	206.52	0.019184	2.66	2.66	39.50		0.50	0.50
TRESSA	379.5 BR D	Tr20	53.00		53.00		201.37	204.89	203.77	205.11	0.008038	2.06	2.06	25.74	13.62	0.48	0.48
TRESSA	379.5 BR D	Tr30	60.00		60.00		201.37	205.10	203.92	205.33	0.007754	2.09	2.09	28.76	14.56	0.47	0.47
TRESSA	379.5 BR D	Tr200	105.00	0.01	104.99		201.37	206.13	204.81	206.40	0.016170	2.33	2.32	45.24		0.49	0.49
TRESSA	379	Tr20	53.00		53.00		201.37	204.85	203.77	205.07	0.008518	2.11	2.11	25.14	13.39	0.49	0.49
TRESSA	379	Tr30	60.00		60.00		201.37	205.06	203.92	205.29	0.008217	2.13	2.13	28.14	14.40	0.49	0.49
TRESSA	379	Tr200	105.00	0.01	104.99		201.37	206.07	204.81	206.35	0.007284	2.35	2.35	44.71	19.57	0.48	0.50
TRESSA	378	Tr20	53.00		53.00		201.23	204.61	203.12	204.74	0.003585	1.61	1.61	32.99	13.91	0.33	0.33
TRESSA	378	Tr30	60.00		60.00		201.23	204.83	203.24	204.97	0.003581	1.66	1.66	36.11	14.37	0.33	0.33
TRESSA	378	Tr200	105.00	0.26	104.74	0.00	201.23	205.84	203.94	206.06	0.003825	2.04	2.02	52.10	18.09	0.36	0.38
TRESSA	370	Tr20	53.00		53.00		200.83	204.14	202.90	204.34	0.006074	1.99	1.99	26.57	11.31	0.42	0.42
TRESSA	370	Tr30	60.00		60.00		200.83	204.34	203.04	204.56	0.006427	2.07	2.07	28.95	12.15	0.43	0.43
TRESSA	370	Tr200	105.00	0.00	104.33	0.67	200.83	205.31	203.82	205.61	0.006939	2.44	2.35	44.59	23.08	0.46	0.54
TRESSA	369	Tr20	53.00		53.00		200.35	203.57	202.57	203.86	0.009824	2.39	2.39	22.21	9.95	0.51	0.51
TRESSA	369	Tr30	60.00		60.00		200.35	203.73	202.73	204.05	0.010447	2.52	2.52	23.81	10.25	0.53	0.53
TRESSA	369	Tr200	105.00	0.06	104.41	0.53	200.35	204.48	203.58	205.02	0.013044	3.28	3.19	32.94	15.56	0.61	0.70
TRESSA	368	Tr20	53.00		52.99	0.01	200.00	203.09	202.07	203.31	0.007540	2.07	2.07	25.61	13.12	0.46	0.47
TRESSA	368	Tr30	60.00		59.95	0.05	200.00	203.23	202.22	203.47	0.007960	2.20	2.19	27.37	13.90	0.48	0.50
TRESSA	368	Tr200	105.00	0.03	103.48	1.49	200.00	203.82	202.97	204.27	0.010892	2.98	2.85	36.89	18.64	0.57	0.65
TRESSA	360	Tr20	53.00	0.11	52.88	0.01	199.39	202.69	201.73	202.79	0.004455	1.44	1.41	37.46	29.32	0.37	0.40
TRESSA	360	Tr30	60.00	0.38	59.57	0.05	199.39	202.82	201.83	202.94	0.004303	1.49	1.44	41.66	33.15	0.36	0.41
TRESSA	360	Tr200	105.00	4.91	99.10	0.99	199.39	203.40	202.37	203.56	0.004545	1.86	1.61	65.33	51.19	0.39	0.45
TRESSA	350	Tr20	60.00	0.00	59.99	0.01	198.34	201.49	200.30	201.68	0.005638	1.92	1.91	31.35	17.68	0.42	0.46
TRESSA	350	Tr30	67.00	0.00	66.72	0.28	198.34	201.65	200.42	201.86	0.005509	1.99	1.92	34.85	26.24	0.42	0.53
TRESSA	350	Tr200	117.00	10.81	90.89	15.30	198.34	202.49	201.16	202.65	0.003694	2.00	1.19	98.26	116.55	0.36	0.41
TRESSA	340	Tr20	60.00		60.00		196.55	200.52	199.05	200.66	0.004427	1.67	1.67	35.96	17.38	0.37	0.37
TRESSA	340	Tr30	67.00		67.00		196.55	200.69	199.18	200.84	0.004506	1.72	1.72	38.94	18.23	0.38	0.38
TRESSA	340	Tr200	117.00	0.02	116.91	0.06	196.55	201.58	199.98	201.79	0.004970	2.04	2.02	58.03	42.59	0.41	0.55

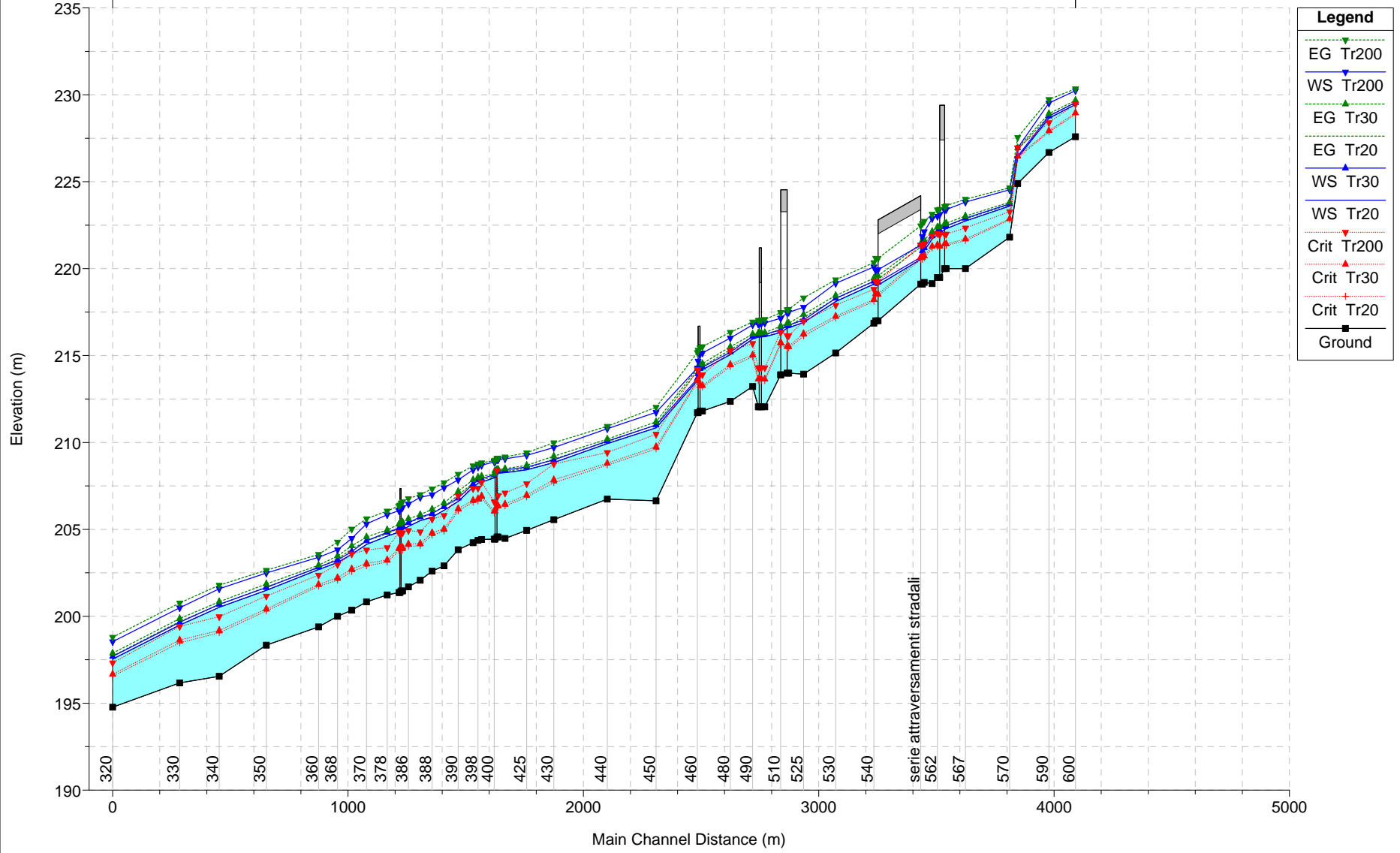


HEC-RAS Plan: Tre01 River: T. TRESSA Reach: TRESSA (Continued)

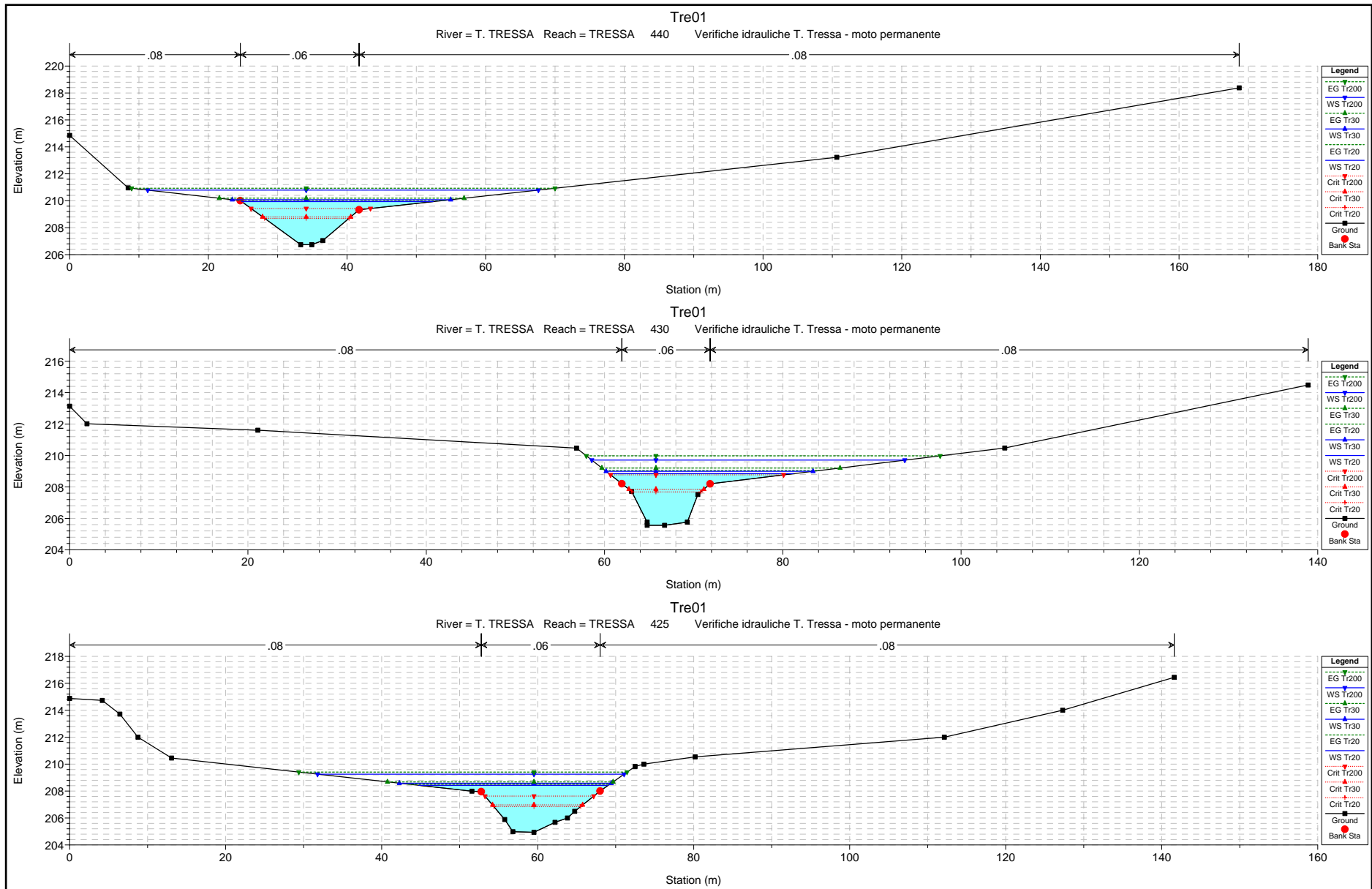
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
TRESSA	330	Tr20	60.00		60.00		196.17	199.50	198.47	199.70	0.007876	2.01	2.01	29.78	16.99	0.49	0.49
TRESSA	330	Tr30	67.00		67.00		196.17	199.65	198.64	199.87	0.007903	2.06	2.06	32.47	17.96	0.49	0.49
TRESSA	330	Tr200	117.00		116.34	0.66	196.17	200.49	199.41	200.77	0.007766	2.34	2.20	53.23	73.29	0.50	0.82
TRESSA	320	Tr20	60.00		60.00		194.77	197.54	196.56	197.71	0.006009	1.85	1.85	32.40	17.71	0.44	0.44
TRESSA	320	Tr30	67.00		67.00		194.77	197.69	196.67	197.88	0.006005	1.91	1.91	35.12	18.33	0.44	0.44
TRESSA	320	Tr200	117.00	0.38	116.62		194.77	198.54	197.32	198.80	0.006004	2.24	2.18	53.70	33.61	0.46	0.55

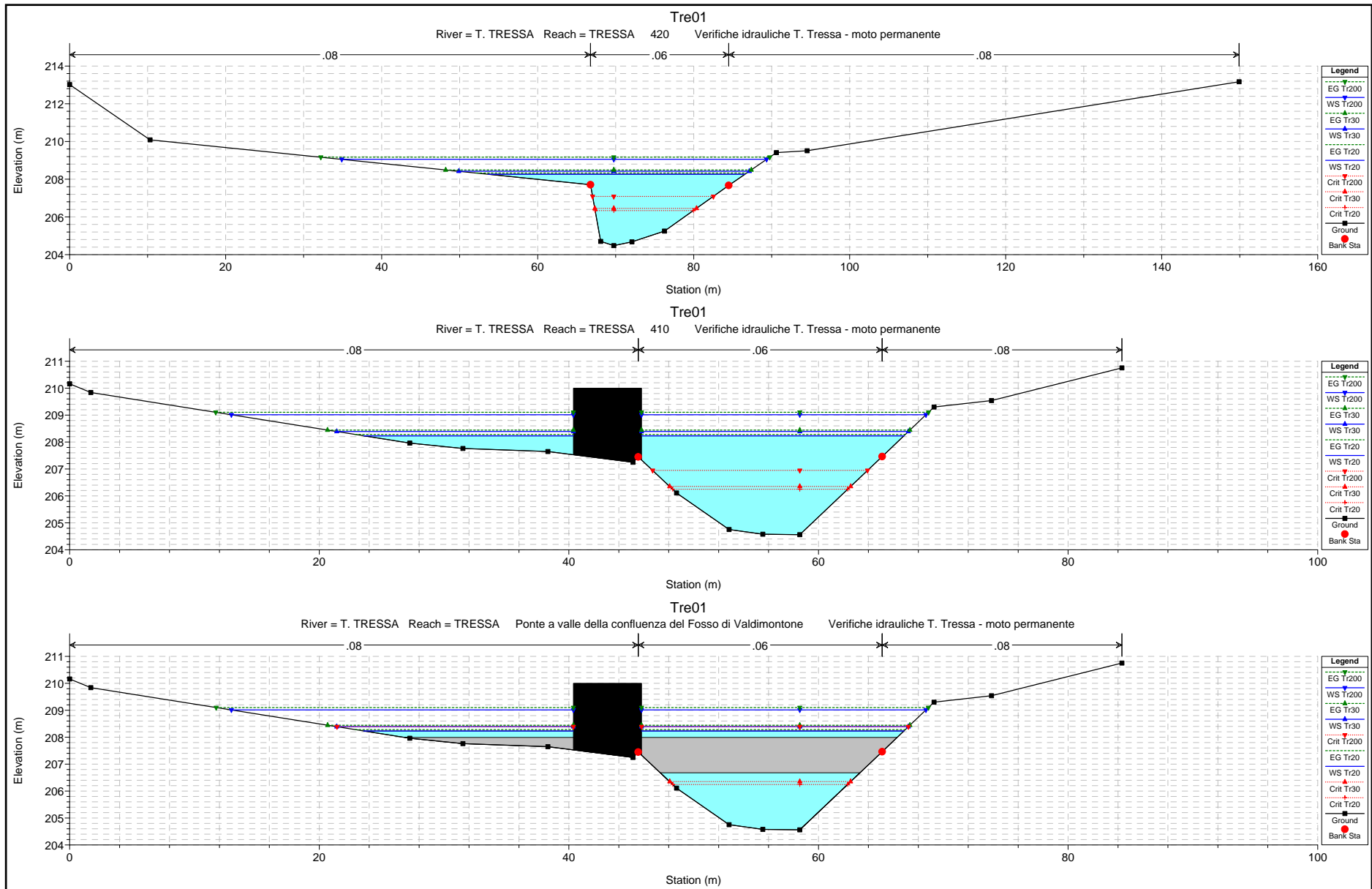
Tre01 Verifiche idrauliche T. Tressa - moto permanente

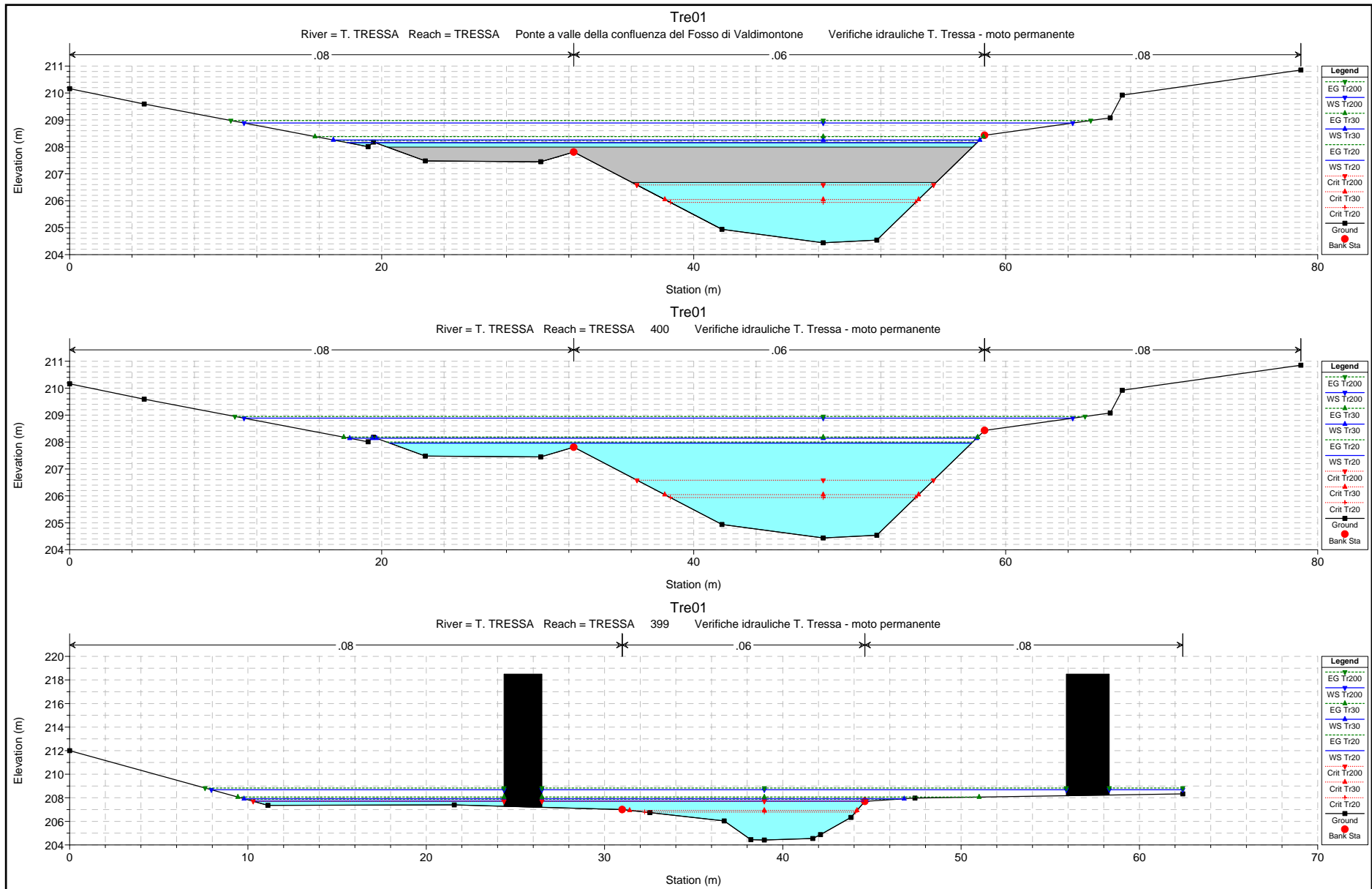
T. TRESSA TRESSA

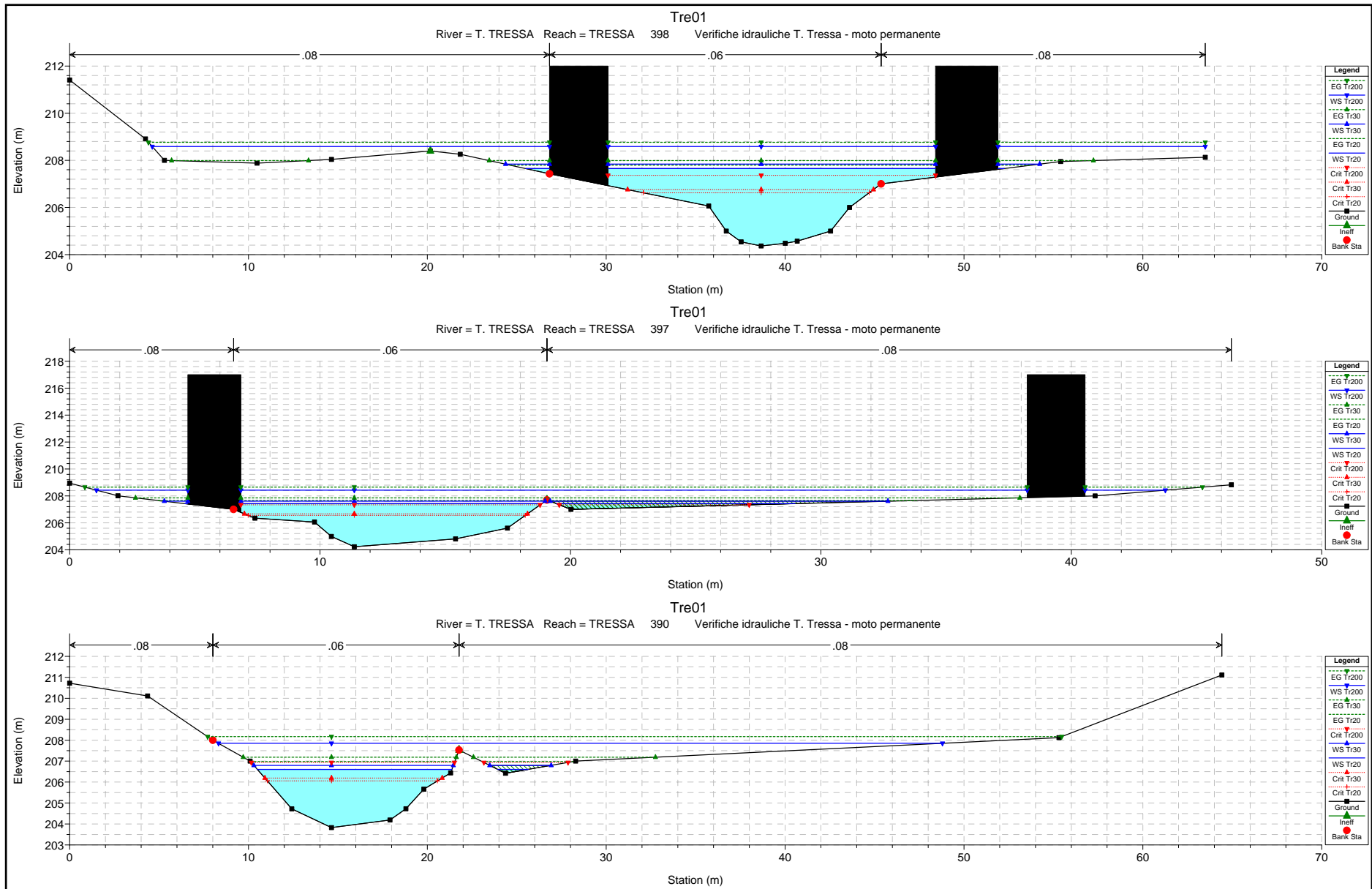


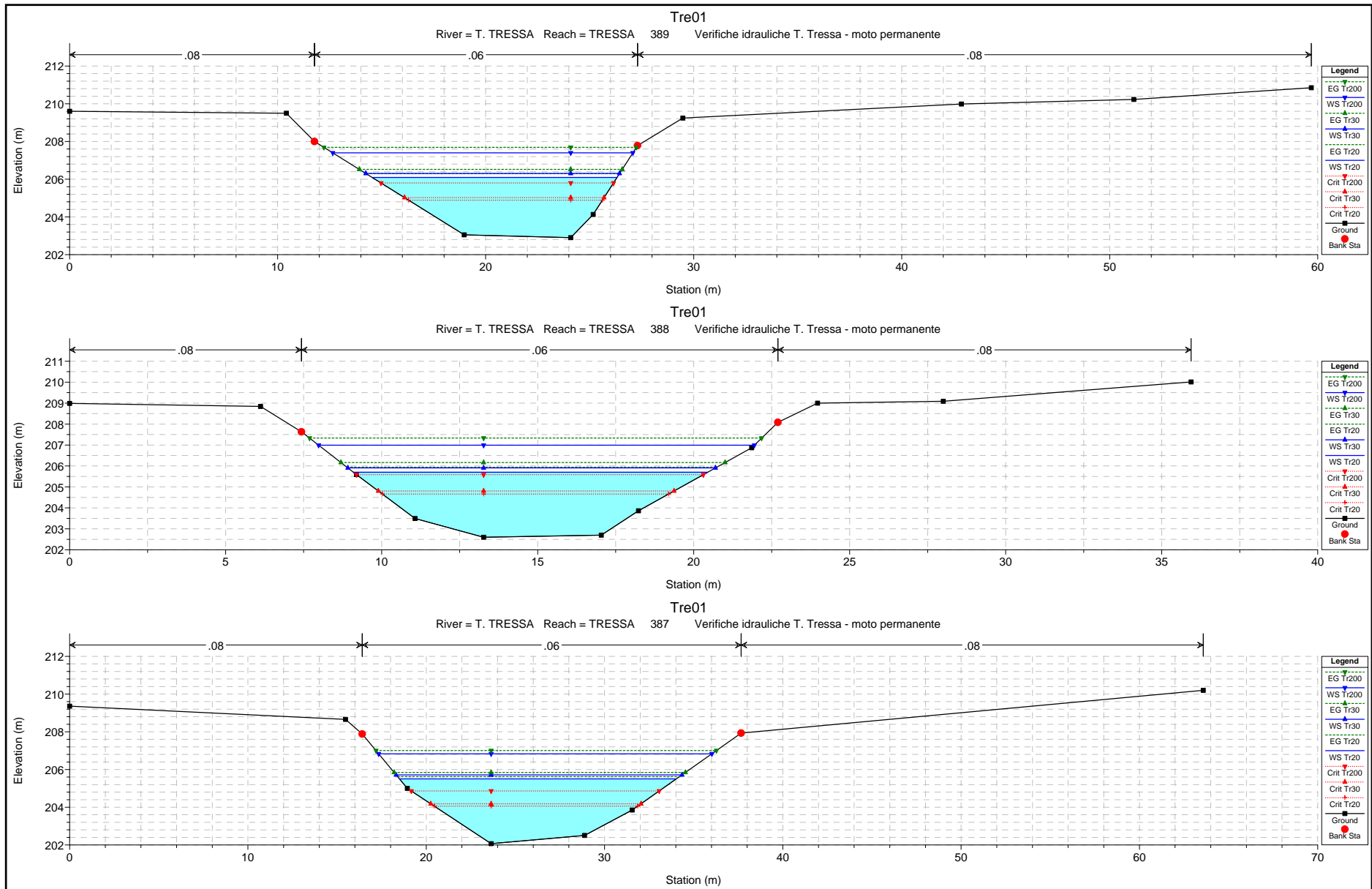
Legend	
EG Tr200	Green inverted triangle
WS Tr200	Blue line with inverted triangle
EG Tr30	Green triangle
EG Tr20	Green inverted triangle
WS Tr30	Blue line with triangle
WS Tr20	Blue line
Crit Tr200	Red inverted triangle
Crit Tr30	Red triangle
Crit Tr20	Red line with cross
Ground	Black line with square

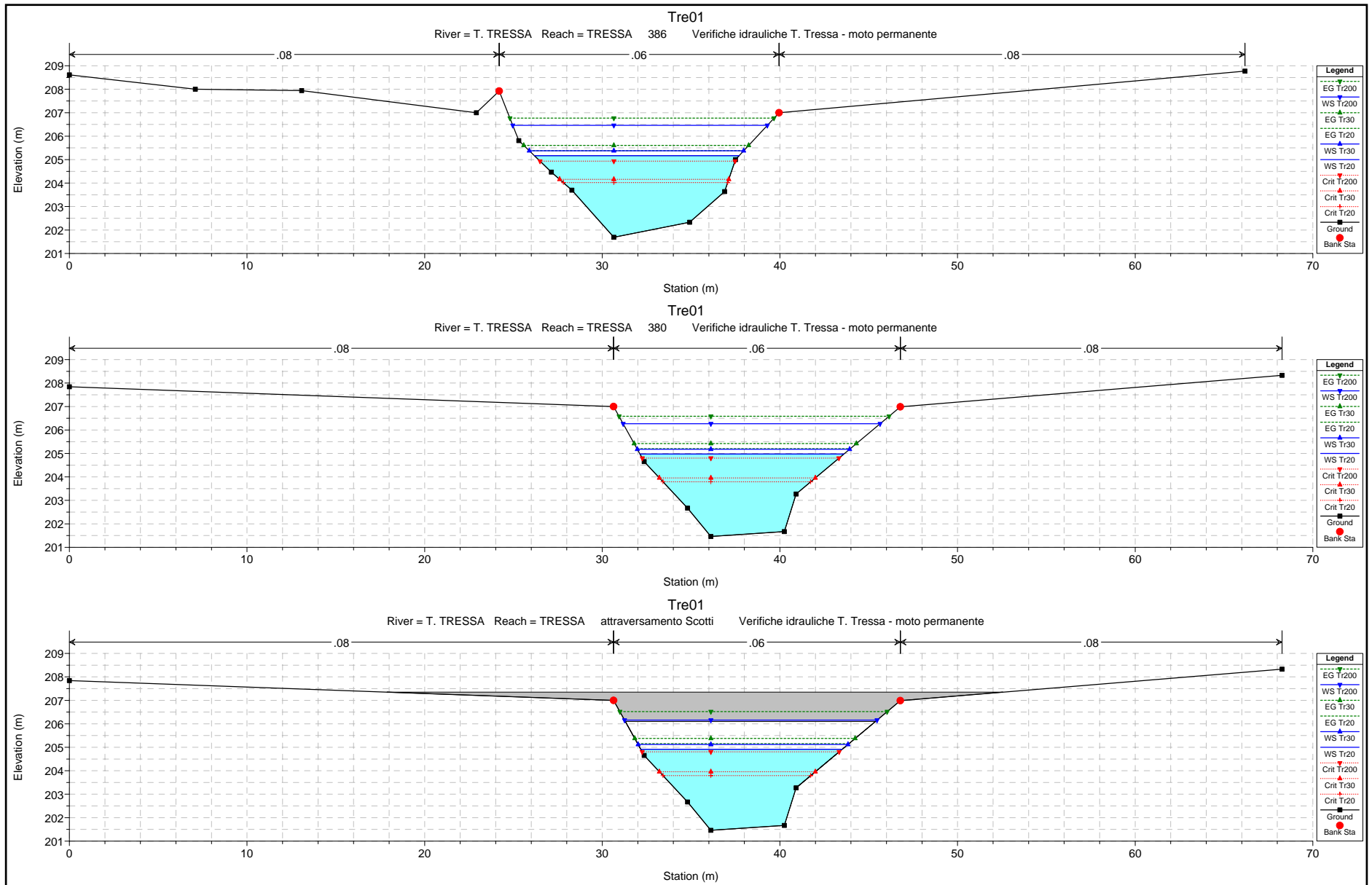




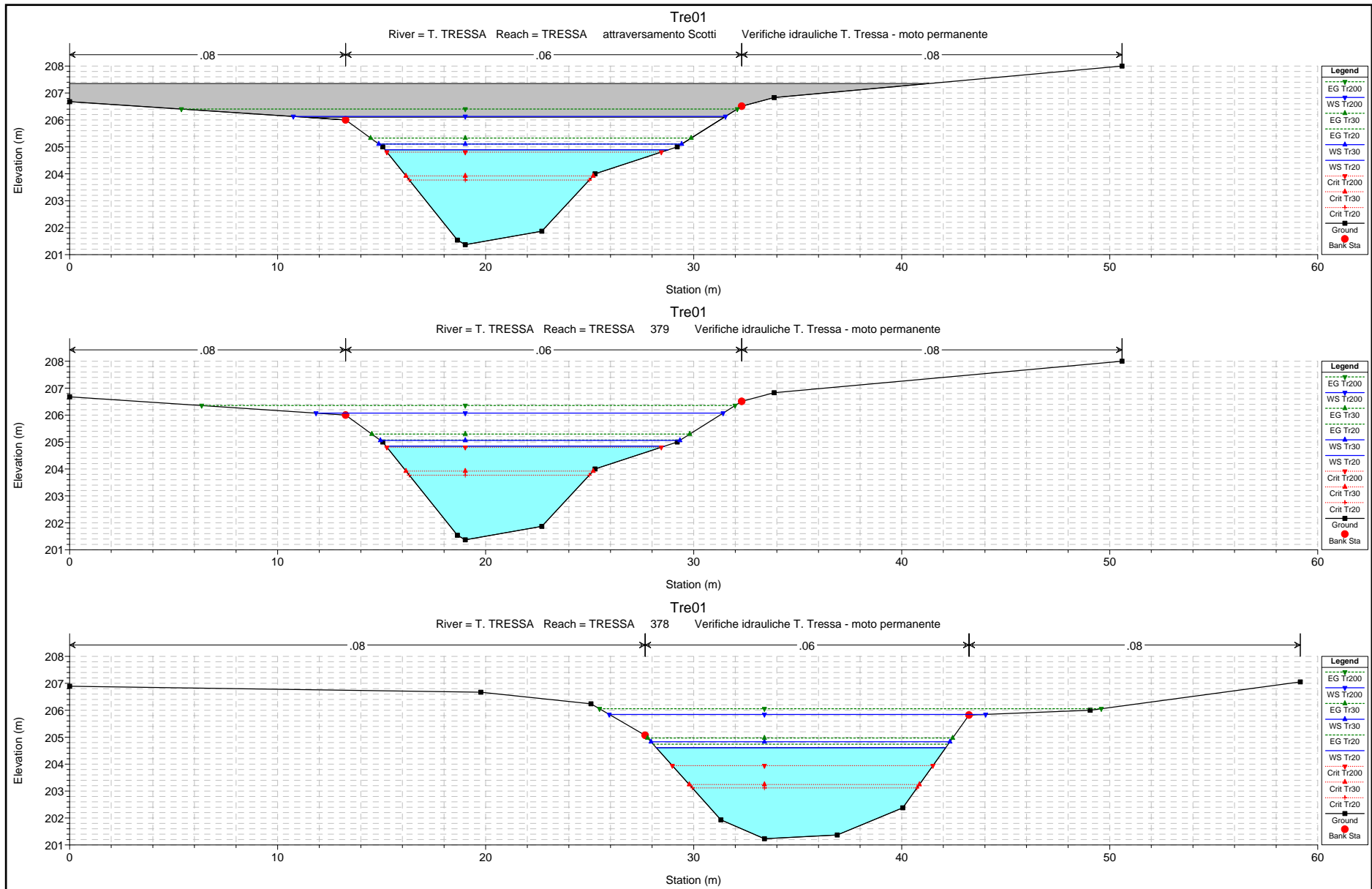


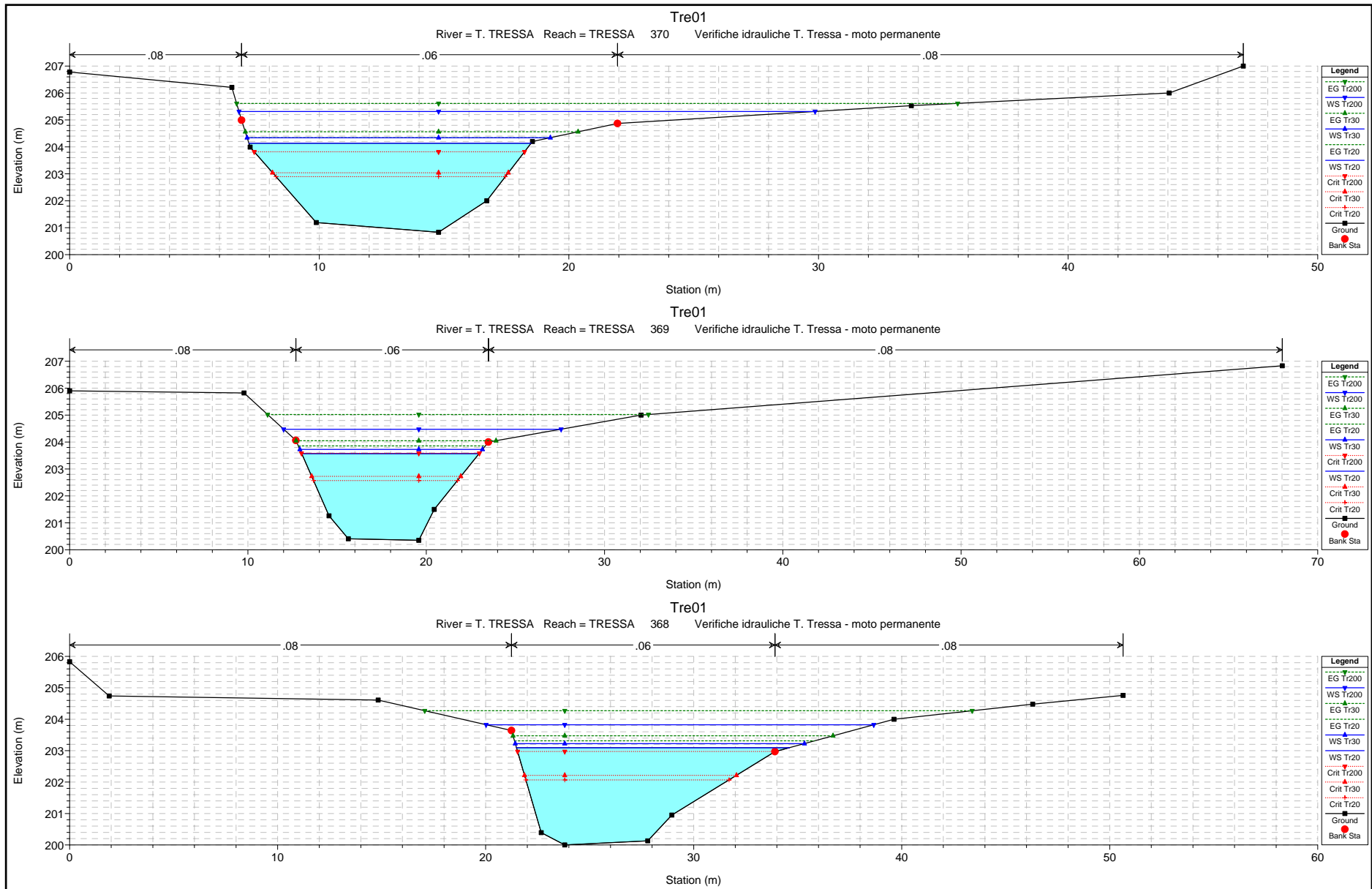


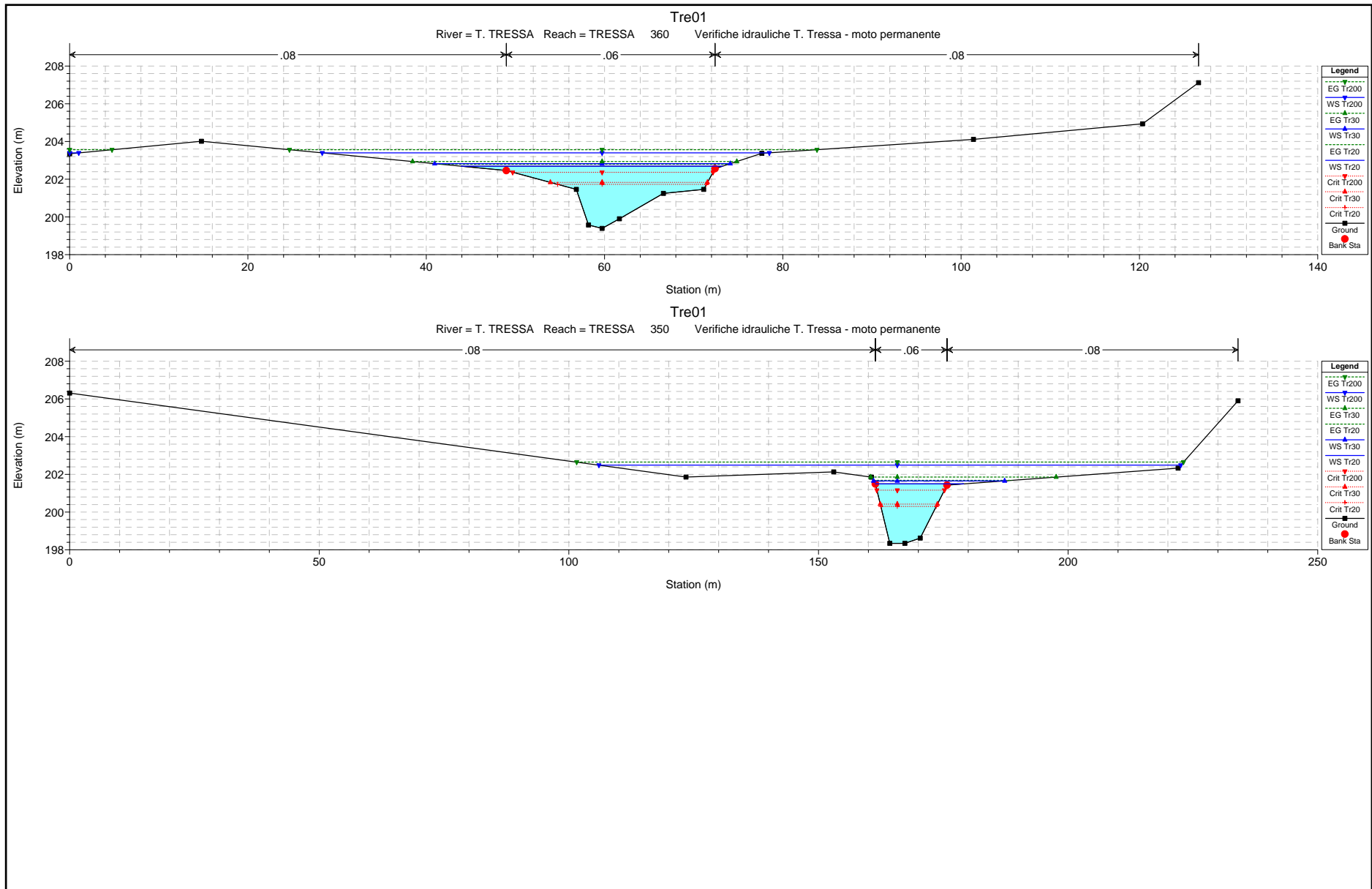






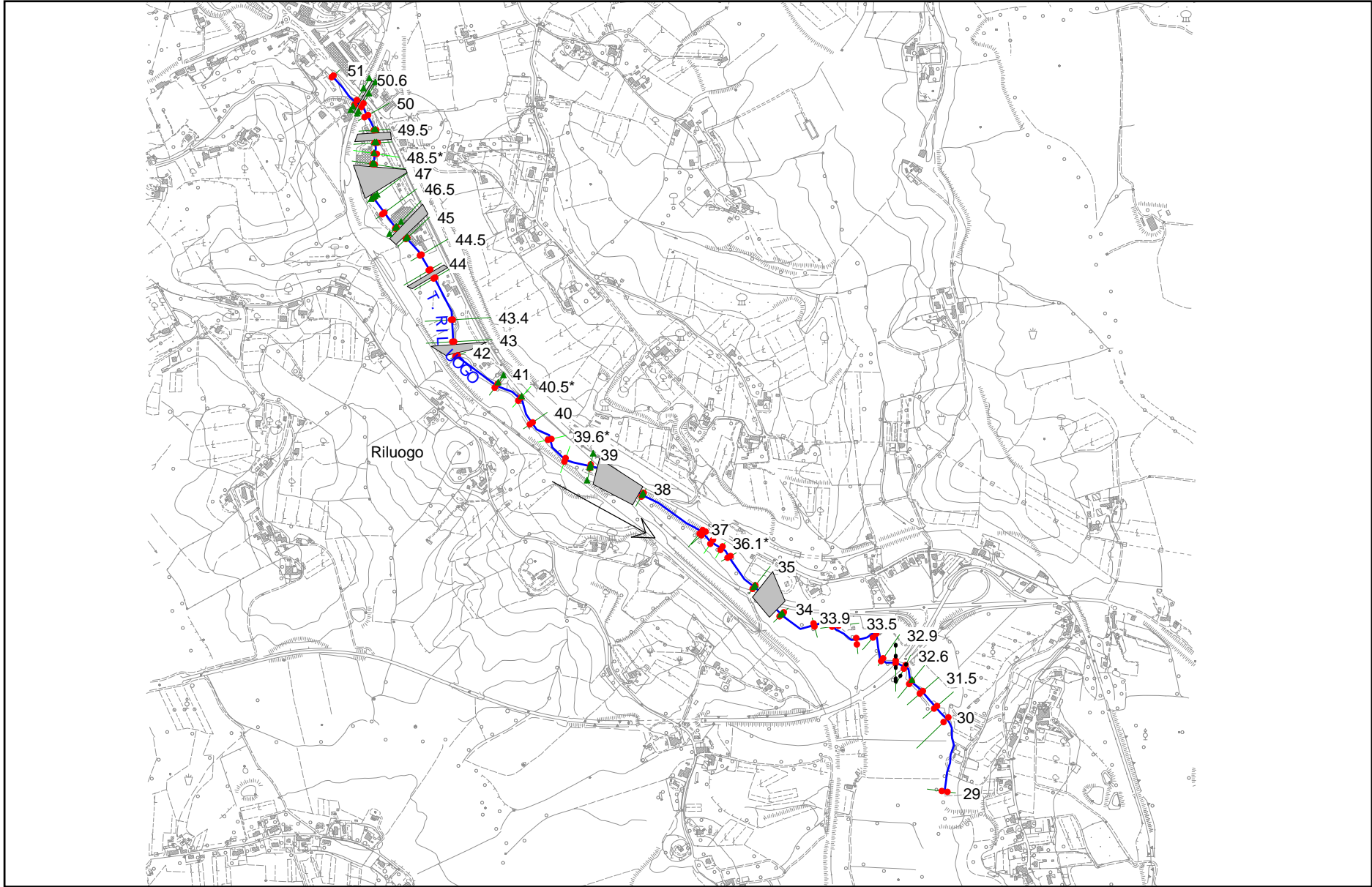






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**TORRENTE RILUOGO**



HEC-RAS Plan: Ril01 River: T. RILUOGO Reach: Riluogo

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Riluogo	51	TR20	40.60		40.60		216.33	219.31	218.45	219.68	0.012023	2.69	2.69	15.10	6.51	0.56	0.56
Riluogo	51	TR30	45.40		45.40		216.33	219.52	218.62	219.91	0.011736	2.75	2.75	16.52	6.62	0.56	0.56
Riluogo	51	TR200	74.40	1.11	73.25	0.04	216.33	220.73	219.35	221.17	0.008893	2.96	2.86	26.05	9.86	0.50	0.56
Riluogo	50.6	TR20	40.60		40.60		215.96	218.66	217.55	218.81	0.003904	1.76	1.76	23.10	11.59	0.40	0.40
Riluogo	50.6	TR30	45.40		45.40		215.96	218.92	217.65	219.07	0.003440	1.73	1.73	26.24	12.18	0.38	0.38
Riluogo	50.6	TR200	74.40		74.16	0.24	215.96	220.38	218.21	220.51	0.001840	1.61	1.58	47.14	17.00	0.29	0.30
Riluogo	50.5 BR U	TR20	40.60		40.60		215.96	218.59	217.54	218.77	0.004530	1.89	1.89	21.54	10.04	0.41	0.41
Riluogo	50.5 BR U	TR30	45.40		45.40		215.96	218.85	217.64	219.03	0.004075	1.87	1.87	24.23	10.29	0.39	0.39
Riluogo	50.5 BR U	TR200	74.40		74.16	0.24	215.96	220.31	218.19	220.48	0.002940	1.83	1.80	41.32	14.31	0.32	0.34
Riluogo	50.5 BR D	TR20	40.60		40.60		215.28	218.53	217.29	218.74	0.004708	1.99	1.99	20.44	8.23	0.40	0.40
Riluogo	50.5 BR D	TR30	45.40		45.40		215.28	218.79	217.42	219.00	0.004491	2.01	2.01	22.57	8.36	0.39	0.39
Riluogo	50.5 BR D	TR200	74.40	0.14	73.30	0.96	215.28	220.23	218.05	220.45	0.003542	2.09	1.92	38.65	20.16	0.34	0.44
Riluogo	50.4	TR20	40.60		40.60		215.28	218.52	217.29	218.71	0.004567	1.94	1.94	20.91	9.32	0.41	0.41
Riluogo	50.4	TR30	45.40		45.40		215.28	218.78	217.42	218.97	0.004210	1.94	1.94	23.40	9.70	0.40	0.40
Riluogo	50.4	TR200	74.40	0.12	73.29	0.99	215.28	220.23	218.08	220.41	0.002558	1.89	1.74	42.79	24.39	0.32	0.42
Riluogo	50	TR20	40.60		40.60		215.00	218.29	217.05	218.53	0.006425	2.16	2.16	18.79	8.12	0.45	0.45
Riluogo	50	TR30	45.40		45.40		215.00	218.57	217.19	218.80	0.005923	2.15	2.15	21.12	8.69	0.44	0.44
Riluogo	50	TR200	74.40	0.01	74.21	0.18	215.00	220.10	217.95	220.31	0.003479	2.02	1.96	37.91	18.61	0.36	0.44
Riluogo	49.5	TR20	40.60		40.60		214.75	218.06	216.62	218.36	0.000511	2.41	2.41	16.83	7.16	0.42	0.42
Riluogo	49.5	TR30	45.40		45.40		214.75	218.32	216.77	218.64	0.000498	2.50	2.50	18.14	8.29	0.42	0.42
Riluogo	49.5	TR200	74.40		74.40		214.75	219.71	217.55	220.15	0.000445	2.95	2.95	25.24	38.00	0.42	0.42
Riluogo	49.25 Culvert #1	TR20	40.60														
Riluogo	49.25 Culvert #1	TR30	45.40														
Riluogo	49.25 Culvert #1	TR200	74.40														
Riluogo	49	TR20	40.60		40.60		214.13	215.91	216.02	216.97	0.003232	4.55	4.55	8.92	5.06	0.42	0.42
Riluogo	49	TR30	45.40		45.40		214.13	216.05	216.16	217.19	0.003262	4.73	4.73	9.59	5.07	0.42	0.42
Riluogo	49	TR200	74.40		74.40		214.13	217.48	216.96	218.49	0.001752	4.44	4.44	16.76	5.90	0.77	0.77
Riluogo	48	TR20	40.60		40.60		213.60	216.11	215.48	216.64	0.001723	3.24	3.24	12.54	5.06	0.65	0.65
Riluogo	48	TR30	45.40		45.40		213.60	216.32	215.63	216.89	0.001686	3.34	3.34	13.61	5.17	0.65	0.65
Riluogo	48	TR200	74.40		74.40		213.60	217.51	216.42	218.25	0.001576	3.81	3.81	19.53	5.80	0.62	0.62
Riluogo	47.5 Culvert #1	TR20	40.60														
Riluogo	47.5 Culvert #1	TR30	45.40														
Riluogo	47.5 Culvert #1	TR200	74.40														
Riluogo	47	TR20	40.60		40.60		211.38	212.46	213.35	215.86	0.018985	8.18	8.18	4.96	5.54	0.65	0.65
Riluogo	47	TR30	45.40		45.40		211.38	212.55	213.50	216.10	0.017884	8.35	8.35	5.44	5.59	0.65	0.65
Riluogo	47	TR200	74.40		74.40		211.38	213.09	214.29	217.36	0.014100	9.15	9.15	8.13	5.86	0.62	0.62
Riluogo	46.5	TR20	40.60		40.60		211.25	213.92	213.09	214.29	0.001043	2.71	2.71	14.98	6.29	0.56	0.56

HEC-RAS Plan: Ril01 River: T. RILUOGO Reach: Riluogo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Riluogo	46.5	TR30	45.40		45.40		211.25	214.20	213.23	214.58	0.000962	2.71	2.71	16.77	6.43	0.53	0.53
Riluogo	46.5	TR200	74.40	0.00	74.33	0.07	211.25	215.73	213.97	216.11	0.000685	2.74	2.71	27.49	8.45	0.44	0.48
Riluogo	46	TR20	40.60		40.60		211.12	213.67	213.01	214.18	0.001680	3.19	3.19	12.73	5.00	0.64	0.64
Riluogo	46	TR30	45.90		45.90		211.12	213.90	213.17	214.46	0.001700	3.30	3.30	13.90	5.00	0.63	0.63
Riluogo	46	TR200	78.30		78.30		211.12	215.20	214.04	215.95	0.001844	3.84	3.84	20.42	5.00	0.61	0.61
Riluogo	45.5 Culvert #1	TR20	40.60														
Riluogo	45.5 Culvert #1	TR30	45.90														
Riluogo	45.5 Culvert #1	TR200	78.30														
Riluogo	45	TR20	40.60		40.60		210.62	212.31	212.51	213.49	0.005161	4.81	4.81	8.44	5.00	0.64	0.64
Riluogo	45	TR30	45.90		45.90		210.62	212.45	212.67	213.73	0.005261	5.02	5.02	9.15	5.00	0.63	0.63
Riluogo	45	TR200	78.30		78.30		210.62	213.24	213.54	215.06	0.005768	5.97	5.97	13.12	5.00	0.61	0.61
Riluogo	44.5	TR20	40.60		40.60		210.30	212.43	212.19	213.17	0.002708	3.81	3.81	10.66	5.00	0.83	0.83
Riluogo	44.5	TR30	45.90		45.90		210.30	212.64	212.35	213.42	0.002698	3.93	3.93	11.69	5.00	0.82	0.82
Riluogo	44.5	TR200	78.30		78.30		210.30	213.63	213.22	214.76	0.003100	4.71	4.71	16.64	5.00	0.82	0.82
Riluogo	44	TR20	40.60		40.60		209.98	212.36	211.87	212.95	0.003576	3.41	3.41	11.90	5.00	0.71	0.71
Riluogo	44	TR30	45.90		45.90		209.98	212.56	212.03	213.21	0.003673	3.55	3.55	12.91	5.00	0.71	0.71
Riluogo	44	TR200	78.30		78.30		209.98	213.52	212.90	214.52	0.004719	4.43	4.43	17.68	5.00	0.75	0.75
Riluogo	43.75 BR U	TR20	40.60		40.60		209.98	211.87	211.87	212.81	0.006702	4.30	4.30	9.45	5.00	1.00	1.00
Riluogo	43.75 BR U	TR30	45.90		45.90		209.98	212.02	212.02	213.05	0.006904	4.49	4.49	10.22	5.00	1.00	1.00
Riluogo	43.75 BR U	TR200	78.30		78.30		209.98	213.08	212.91	214.38	0.006647	5.06	5.06	15.47	5.00	0.92	0.92
Riluogo	43.75 BR D	TR20	40.60		40.60		209.59	211.92	211.48	212.54	0.005945	3.49	3.49	11.63	5.00	0.73	0.73
Riluogo	43.75 BR D	TR30	45.90		45.90		209.59	212.10	211.64	212.78	0.006180	3.65	3.65	12.56	5.00	0.74	0.74
Riluogo	43.75 BR D	TR200	78.30		78.30		209.59	213.15	212.52	214.14	0.007239	4.40	4.40	17.81	5.00	0.74	0.74
Riluogo	43.5	TR20	40.60		40.60		209.59	211.61	211.48	212.43	0.008713	4.02	4.02	10.10	5.00	0.90	0.90
Riluogo	43.5	TR30	45.90		45.90		209.59	211.80	211.64	212.68	0.008737	4.16	4.16	11.04	5.00	0.89	0.89
Riluogo	43.5	TR200	78.30		78.30		209.59	212.92	212.51	214.05	0.008586	4.70	4.70	16.66	5.00	0.82	0.82
Riluogo	43.4	TR20	40.60		40.60		208.84	210.83	210.73	211.68	0.003250	4.07	4.07	9.97	5.00	0.92	0.92
Riluogo	43.4	TR30	45.90		45.90		208.84	211.02	210.89	211.92	0.003239	4.20	4.20	10.92	5.00	0.91	0.91
Riluogo	43.4	TR200	78.30		78.30		208.84	212.21	211.76	213.31	0.003002	4.65	4.65	16.85	5.00	0.81	0.81
Riluogo	43	TR20	40.70		40.70		208.51	210.75	210.40	211.42	0.002376	3.63	3.63	11.20	5.00	0.77	0.77
Riluogo	43	TR30	46.10		46.10		208.51	210.94	210.56	211.67	0.002464	3.80	3.80	12.13	5.00	0.78	0.78
Riluogo	43	TR200	80.30		80.30		208.51	212.07	211.48	213.11	0.002747	4.51	4.51	17.79	5.00	0.76	0.76
Riluogo	42.50 BR U	TR20	40.70		40.70		208.51	210.56	210.40	211.36	0.003022	3.97	3.97	10.26	5.00	0.88	0.88
Riluogo	42.50 BR U	TR30	46.10		46.10		208.51	210.73	210.57	211.61	0.003116	4.15	4.15	11.11	5.00	0.89	0.89
Riluogo	42.50 BR U	TR200	80.30		80.30		208.51	211.58	211.48	212.97	0.004006	5.23	5.23	15.36	5.00	0.95	0.95
Riluogo	42.50 BR D	TR20	40.70		40.70		208.03	210.61	210.10	211.12	0.006019	3.15	3.15	12.90	6.12	0.69	0.69
Riluogo	42.50 BR D	TR30	46.10		46.10		208.03	210.80	210.27	211.35	0.006141	3.28	3.28	14.05	6.27	0.70	0.70

HEC-RAS Plan: Ril01 River: T. RILUOGO Reach: Riluogo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Riluogo	42.50 BR D	TR200	80.30		80.17	0.13	208.03	211.77	211.15	212.55	0.006420	3.91	3.87	20.77	7.98	0.73	0.76
Riluogo	42	TR20	40.70		40.70		208.03	210.43	210.10	211.04	0.007657	3.45	3.45	11.80	5.98	0.78	0.78
Riluogo	42	TR30	46.10		46.10		208.03	210.60	210.26	211.26	0.007795	3.59	3.59	12.86	6.12	0.79	0.79
Riluogo	42	TR200	80.30		80.29	0.01	208.03	211.43	211.13	212.42	0.009158	4.41	4.40	18.24	7.09	0.86	0.88
Riluogo	41	TR20	40.70		40.70		207.00	209.96	208.58	210.09	0.002807	1.58	1.58	25.80	11.81	0.34	0.34
Riluogo	41	TR30	46.10		46.10		207.00	210.14	208.70	210.28	0.002900	1.65	1.65	27.93	12.19	0.35	0.35
Riluogo	41	TR200	80.30	0.03	80.27		207.00	210.97	209.36	211.19	0.003419	2.08	2.07	38.71	13.78	0.39	0.40
Riluogo	40	TR20	40.70	0.02	40.67	0.01	206.16	209.15	208.36	209.41	0.007437	2.29	2.27	17.96	12.00	0.53	0.59
Riluogo	40	TR30	46.10	0.17	45.89	0.04	206.16	209.32	208.51	209.60	0.007072	2.37	2.28	20.26	14.89	0.53	0.62
Riluogo	40	TR200	80.30	4.19	75.07	1.04	206.16	210.08	209.25	210.46	0.006606	2.82	2.21	36.40	27.69	0.54	0.61
Riluogo	39	TR20	40.70		40.70		204.30	207.70	206.08	207.91	0.000233	2.06	2.06	19.71	9.36	0.36	0.36
Riluogo	39	TR30	46.10		46.10		204.30	207.99	206.23	208.23	0.000224	2.15	2.15	21.49	9.87	0.36	0.36
Riluogo	39	TR200	80.30	0.08	80.22		204.30	208.47	207.04	209.01	0.001209	3.27	3.09	25.96	42.84	0.67	1.08
Riluogo	38.5 Culvert #1	TR20	40.70														
Riluogo	38.5 Culvert #1	TR30	46.10														
Riluogo	38.5 Culvert #1	TR200	80.30														
Riluogo	38	TR20	40.70		40.70		201.60	204.17	203.27	204.52	0.004960	2.64	2.64	15.41	11.74	0.53	0.53
Riluogo	38	TR30	46.10		46.10		201.60	204.32	203.42	204.73	0.005265	2.83	2.83	16.31	12.07	0.55	0.55
Riluogo	38	TR200	80.30		80.30		201.60	205.06	204.23	205.82	0.007123	3.86	3.86	20.78	14.06	0.66	0.66
Riluogo	37	TR20	40.70	0.06	40.64		201.00	202.34	202.34	202.89	0.025418	3.28	3.25	12.53	12.10	1.00	1.02
Riluogo	37	TR30	46.10	0.12	45.98		201.00	202.45	202.45	203.03	0.024381	3.38	3.33	13.84	12.49	0.99	1.01
Riluogo	37	TR200	80.30	0.95	79.35		201.00	203.00	203.00	203.78	0.021814	3.94	3.78	21.25	14.53	0.98	1.00
Riluogo	36.5	TR20	40.70		40.70		195.00	195.61	196.48	200.25	0.532035	9.54	9.54	4.27	7.53	4.05	4.05
Riluogo	36.5	TR30	46.10		46.10		195.00	198.45	196.61	198.55	0.001815	1.40	1.40	32.99	12.65	0.28	0.28
Riluogo	36.5	TR200	80.30		80.23	0.07	195.00	199.50	197.25	199.65	0.001971	1.70	1.69	47.55	15.58	0.30	0.31
Riluogo	36	TR20	40.70		40.69	0.01	194.40	197.47	195.89	197.60	0.002753	1.61	1.60	25.40	10.48	0.31	0.33
Riluogo	36	TR30	46.10	0.03	45.18	0.89	194.40	198.30	196.02	198.39	0.001449	1.36	1.24	37.15	18.22	0.23	0.28
Riluogo	36	TR200	80.30	1.39	73.05	5.86	194.40	199.34	196.67	199.48	0.001576	1.69	1.29	62.34	30.96	0.25	0.29
Riluogo	35	TR20	40.70		40.70		193.50	197.31	195.07	197.44	0.000099	1.62	1.62	25.15	12.99	0.26	0.26
Riluogo	35	TR30	46.10		46.10		193.50	198.19	195.20	198.31	0.000063	1.49	1.49	30.97	50.62	0.22	0.22
Riluogo	35	TR200	80.30	0.33	79.94	0.02	193.50	199.12	195.96	199.34	0.000328	2.12	1.74	46.10	84.65	0.39	0.75
Riluogo	34.5 Culvert #1	TR20	40.70														
Riluogo	34.5 Culvert #1	TR30	46.10														
Riluogo	34.5 Culvert #1	TR200	80.30														
Riluogo	34	TR20	40.70		40.70		193.32	195.07	194.92	195.74	0.015622	3.63	3.63	11.21	11.38	0.88	0.88
Riluogo	34	TR30	46.10		46.10		193.32	195.19	195.06	195.95	0.016195	3.86	3.86	11.95	11.99	0.90	0.90
Riluogo	34	TR200	80.30		80.30		193.32	195.84	195.84	197.10	0.018032	4.98	4.98	16.14	15.48	1.00	1.00



HEC-RAS Plan: Ril01 River: T. RILUOGO Reach: Riluogo (Continued)

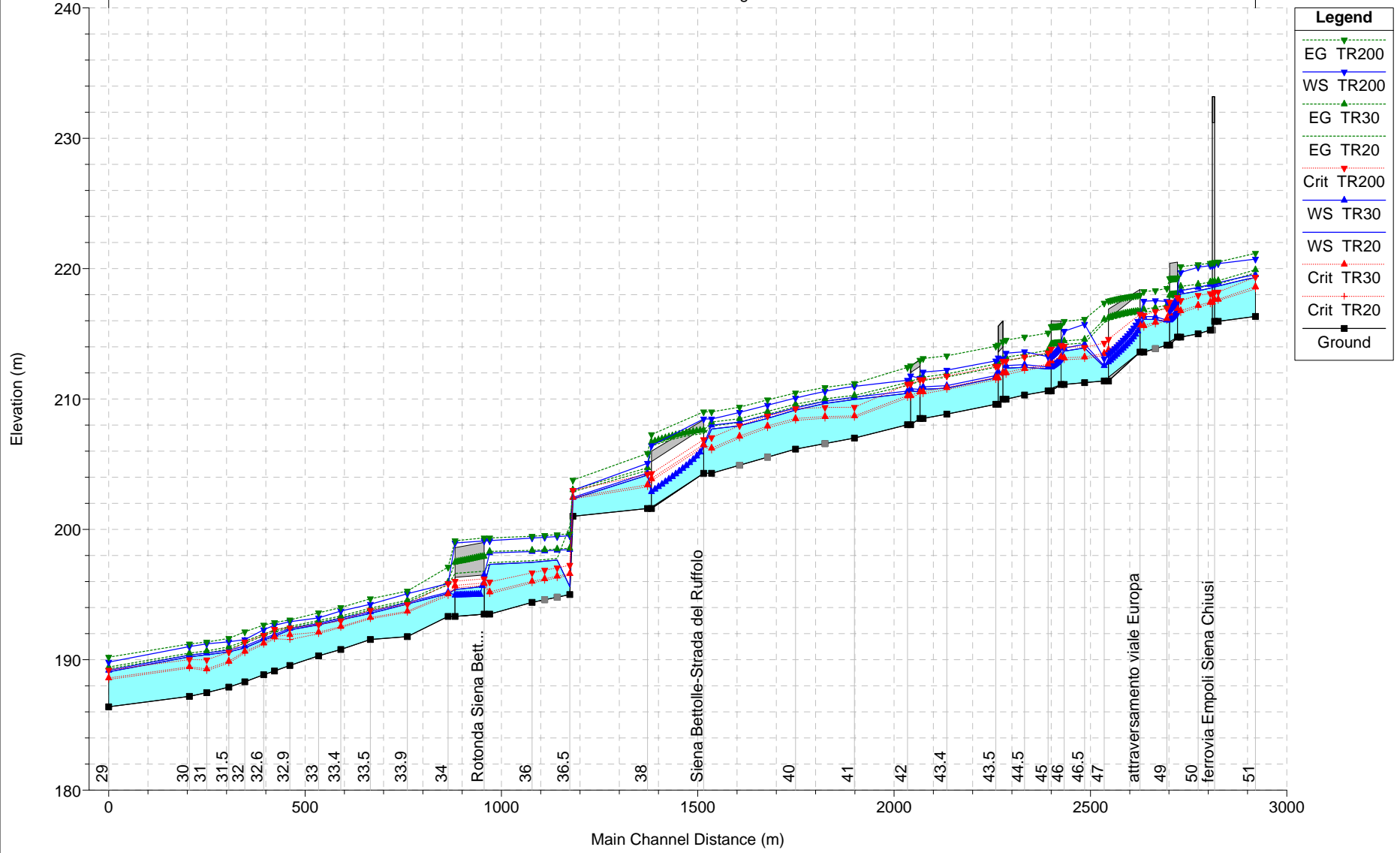
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Riluogo	33.9	TR20	40.70	0.03	32.74	7.92	191.77	194.27	193.64	194.43	0.004828	1.95	1.32	30.84	28.75	0.45	0.41
Riluogo	33.9	TR30	46.10	0.10	36.25	9.76	191.77	194.39	193.72	194.56	0.004775	2.02	1.33	34.62	31.07	0.45	0.40
Riluogo	33.9	TR200	80.30	1.30	55.64	23.36	191.77	195.06	194.25	195.26	0.004348	2.34	1.35	59.53	43.38	0.45	0.37
Riluogo	33.5	TR20	40.70		40.70		191.55	193.55	193.14	193.82	0.009697	2.30	2.30	17.68	13.16	0.63	0.63
Riluogo	33.5	TR30	46.10		46.10		191.55	193.67	193.24	193.96	0.009849	2.40	2.40	19.21	13.55	0.64	0.64
Riluogo	33.5	TR200	80.30		80.30		191.55	194.25	193.79	194.68	0.010756	2.90	2.90	27.70	15.54	0.69	0.69
Riluogo	33.4	TR20	40.70		40.69	0.01	190.79	193.06	192.47	193.22	0.005445	1.74	1.74	23.44	17.36	0.47	0.48
Riluogo	33.4	TR30	46.10		46.06	0.04	190.79	193.18	192.55	193.35	0.005360	1.81	1.80	25.57	17.92	0.47	0.48
Riluogo	33.4	TR200	80.30	0.00	79.74	0.56	190.79	193.74	192.99	194.00	0.005903	2.29	2.20	36.50	23.36	0.51	0.56
Riluogo	33	TR20	40.70		40.70		190.30	192.67	192.00	192.88	0.006445	2.01	2.01	20.26	13.29	0.52	0.52
Riluogo	33	TR30	46.10		46.09	0.01	190.30	192.77	192.11	193.01	0.006809	2.13	2.12	21.71	16.09	0.54	0.58
Riluogo	33	TR200	80.30	1.45	77.11	1.74	190.30	193.21	192.69	193.60	0.008594	2.79	2.14	37.49	64.04	0.63	0.89
Riluogo	32.9	TR20	40.70	7.33	33.37		189.56	192.29	191.55	192.44	0.005103	1.92	1.13	36.14	55.75	0.45	0.45
Riluogo	32.9	TR30	46.10	10.38	35.72		189.56	192.40	191.92	192.55	0.004869	1.94	1.07	43.11	61.99	0.44	0.41
Riluogo	32.9	TR200	80.30	32.83	47.47	0.00	189.56	192.92	192.44	193.05	0.004231	2.04	0.99	81.18	81.23	0.42	0.32
Riluogo	32.8	TR20	40.70	3.38	37.19	0.13	189.14	191.80	191.60	192.14	0.011728	2.70	1.95	20.89	30.79	0.66	0.75
Riluogo	32.8	TR30	46.10	5.24	40.70	0.17	189.14	191.93	191.77	192.27	0.011119	2.76	1.86	24.78	33.85	0.65	0.69
Riluogo	32.8	TR200	80.30	24.50	51.03	4.77	189.14	192.65	192.33	192.85	0.005722	2.47	1.16	69.40	87.27	0.50	0.41
Riluogo	32.6	TR20	40.70	0.40	39.72	0.58	188.85	191.52	191.17	191.83	0.010540	2.49	2.23	18.22	18.63	0.65	0.72
Riluogo	32.6	TR30	46.10	0.61	44.48	1.02	188.85	191.65	191.27	191.97	0.010090	2.57	2.22	20.72	20.67	0.64	0.71
Riluogo	32.6	TR200	80.30	3.68	69.29	7.32	188.85	192.29	191.86	192.66	0.008087	2.87	1.75	45.83	66.36	0.61	0.67
Riluogo	32	TR20	40.70	0.01	40.69		188.31	190.91	190.52	191.26	0.013155	2.65	2.64	15.43	10.69	0.69	0.70
Riluogo	32	TR30	46.10	0.04	46.06	0.00	188.31	191.04	190.65	191.43	0.012859	2.74	2.72	16.96	12.65	0.69	0.75
Riluogo	32	TR200	80.30	0.59	77.01	2.70	188.31	191.55	191.37	192.14	0.014389	3.48	2.66	30.18	64.86	0.77	1.24
Riluogo	31.5	TR20	40.70		40.70		187.90	190.60	189.76	190.83	0.006292	2.12	2.12	19.17	10.44	0.50	0.50
Riluogo	31.5	TR30	46.10	0.08	46.02		187.90	190.74	189.89	190.99	0.006582	2.23	2.14	21.50	33.34	0.51	0.85
Riluogo	31.5	TR200	80.30	11.34	67.36	1.60	187.90	191.38	190.58	191.63	0.005492	2.43	1.40	57.43	83.52	0.49	0.54
Riluogo	31	TR20	40.70	0.93	39.77		187.48	190.38	189.17	190.53	0.003433	1.75	1.48	27.54	35.47	0.37	0.54
Riluogo	31	TR30	46.40	2.13	44.27		187.48	190.51	189.29	190.68	0.003577	1.84	1.41	32.95	45.19	0.38	0.53
Riluogo	31	TR200	82.30	21.29	60.12	0.89	187.48	191.22	190.00	191.36	0.002884	1.92	0.99	83.48	102.66	0.35	0.35
Riluogo	30	TR20	48.80	0.00	48.80	0.00	187.19	190.23	189.36	190.36	0.004019	1.64	1.64	29.71	20.79	0.41	0.44
Riluogo	30	TR30	55.60	0.00	55.50	0.10	187.19	190.35	189.46	190.51	0.004020	1.73	1.69	32.92	29.19	0.42	0.51
Riluogo	30	TR200	98.50	0.21	91.11	7.19	187.19	191.01	190.02	191.21	0.003712	2.06	1.49	66.21	72.08	0.43	0.50
Riluogo	29	TR20	48.80	0.05	48.75		186.39	189.07	188.48	189.30	0.007103	2.11	2.08	23.42	18.09	0.55	0.58
Riluogo	29	TR30	55.60	0.18	55.42	0.00	186.39	189.20	188.60	189.44	0.007104	2.22	2.16	25.74	19.97	0.55	0.61
Riluogo	29	TR200	98.50	3.17	95.15	0.18	186.39	189.82	189.20	190.19	0.007104	2.75	2.36	41.70	36.48	0.58	0.71

HEC-RAS Plan: Ril01 River: T. RILUOGO Reach: Riluogo

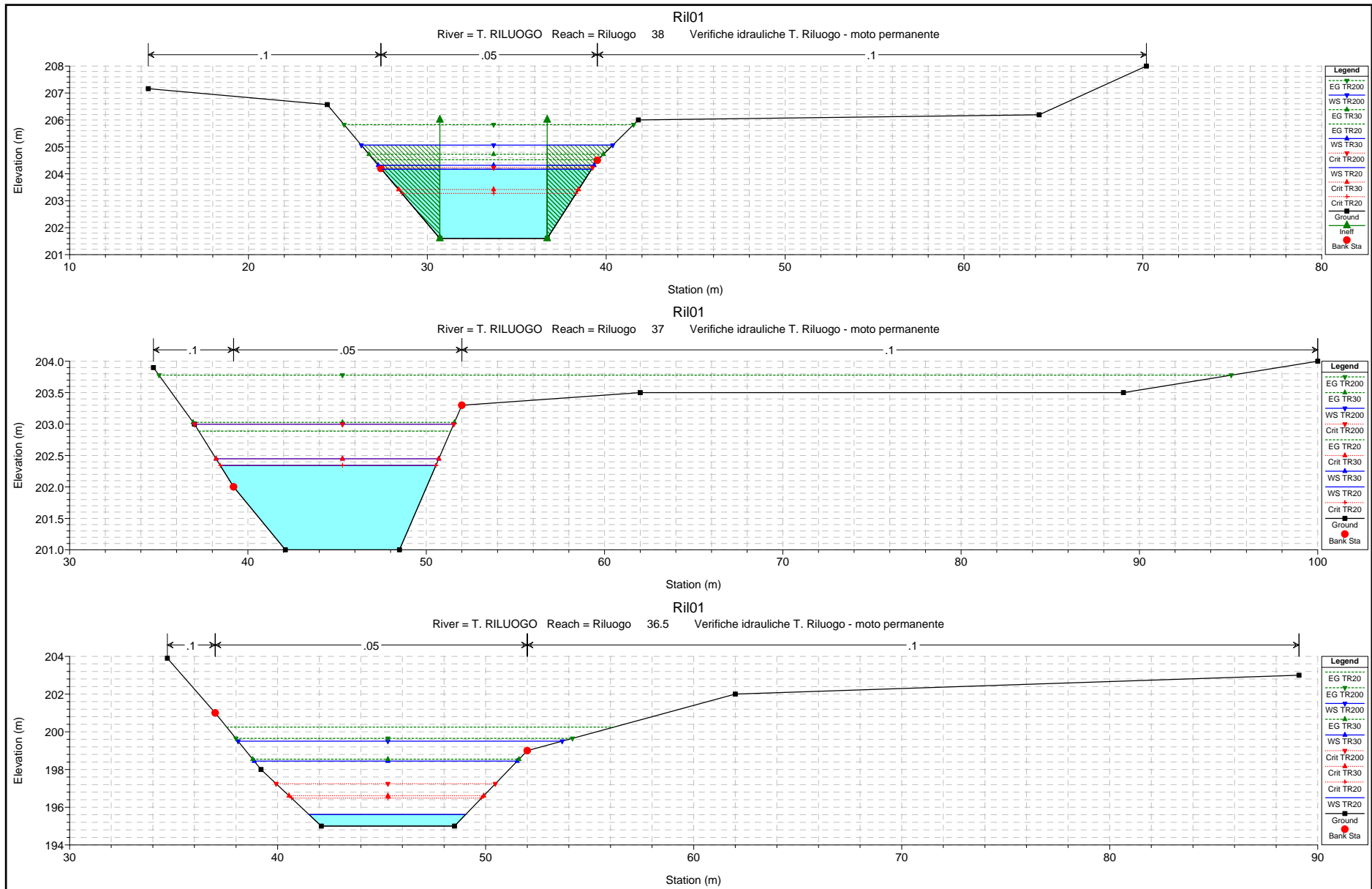
Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Riluogo	49.25 Culvert #1	TR20	218.36	218.06	218.36	218.29	220.50	40.60		2.01	4.46	5.96
Riluogo	49.25 Culvert #1	TR30	218.64	218.32	218.64	218.57	220.50	45.40		2.04	4.63	6.12
Riluogo	49.25 Culvert #1	TR200	220.15	219.71	220.15	220.05	220.50	74.40		2.23	5.45	6.93
Riluogo	47.5 Culvert #1	TR20	216.64	216.11	216.64	216.99	218.40	40.60		2.23	4.36	8.01
Riluogo	47.5 Culvert #1	TR30	216.89	216.32	216.89	217.26	218.40	45.40		2.17	4.53	8.18
Riluogo	47.5 Culvert #1	TR200	218.25	217.51	218.25	218.68	218.40	74.40		1.87	5.34	8.98
Riluogo	45.5 Culvert #1	TR20	214.18	213.67	214.18	214.51	216.00	40.60		1.13	4.36	5.69
Riluogo	45.5 Culvert #1	TR30	214.46	213.90	214.46	214.80	216.00	45.90		1.16	4.54	5.87
Riluogo	45.5 Culvert #1	TR200	215.95	215.20	215.95	216.38	216.00	78.30		1.44	5.43	6.73
Riluogo	38.5 Culvert #1	TR20	207.91	207.70	207.91	207.85	208.40	40.70		3.53	4.46	8.42
Riluogo	38.5 Culvert #1	TR30	208.23	207.99	208.23	208.16	208.40	46.10		3.67	4.65	8.63
Riluogo	38.5 Culvert #1	TR200	209.01	208.47	209.01	208.83	208.40	58.63	21.67	3.40	5.04	9.04
Riluogo	34.5 Culvert #1	TR20	197.45	197.31	197.45	197.34	199.00	40.70		2.24	4.64	4.92
Riluogo	34.5 Culvert #1	TR30	198.31	198.19	198.31	197.67	199.00	46.10		3.01	3.84	7.04
Riluogo	34.5 Culvert #1	TR200	199.34	199.12	199.34	198.23	199.00	55.70	24.60	3.27	4.64	7.90

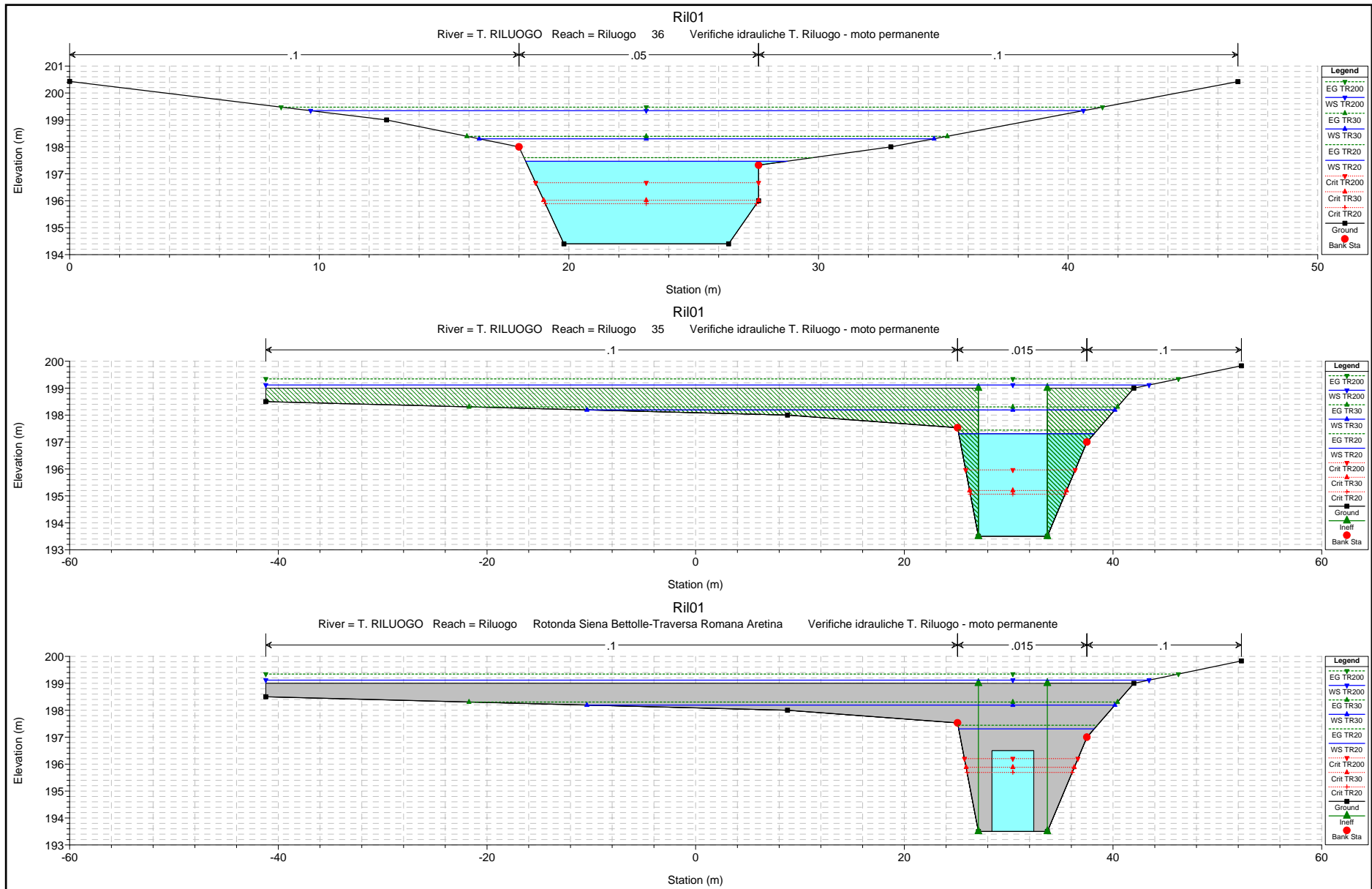
Ril01 Verifiche idrauliche T. Riluogo - moto permanente

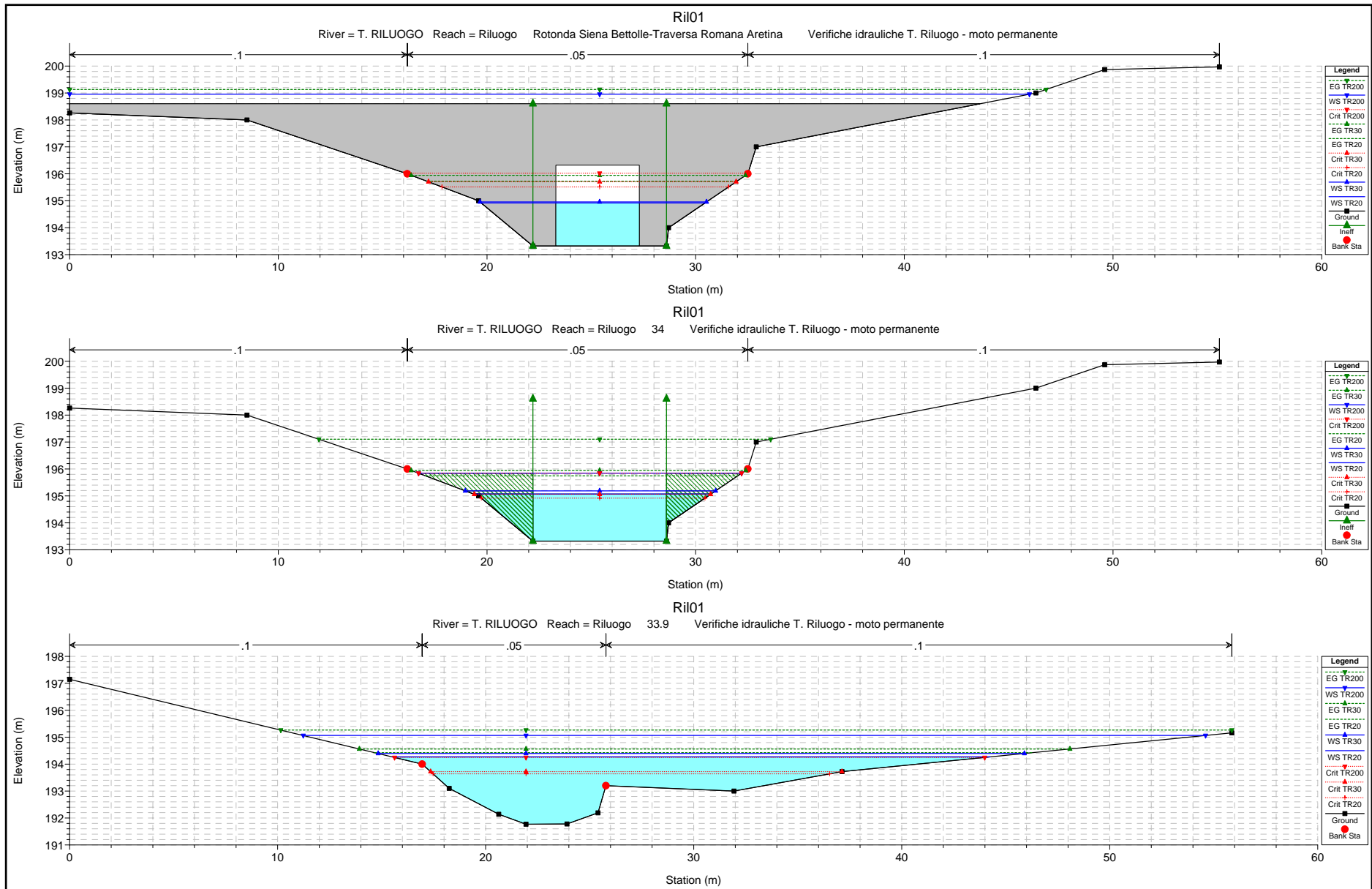
T. RILUOGO Riluogo

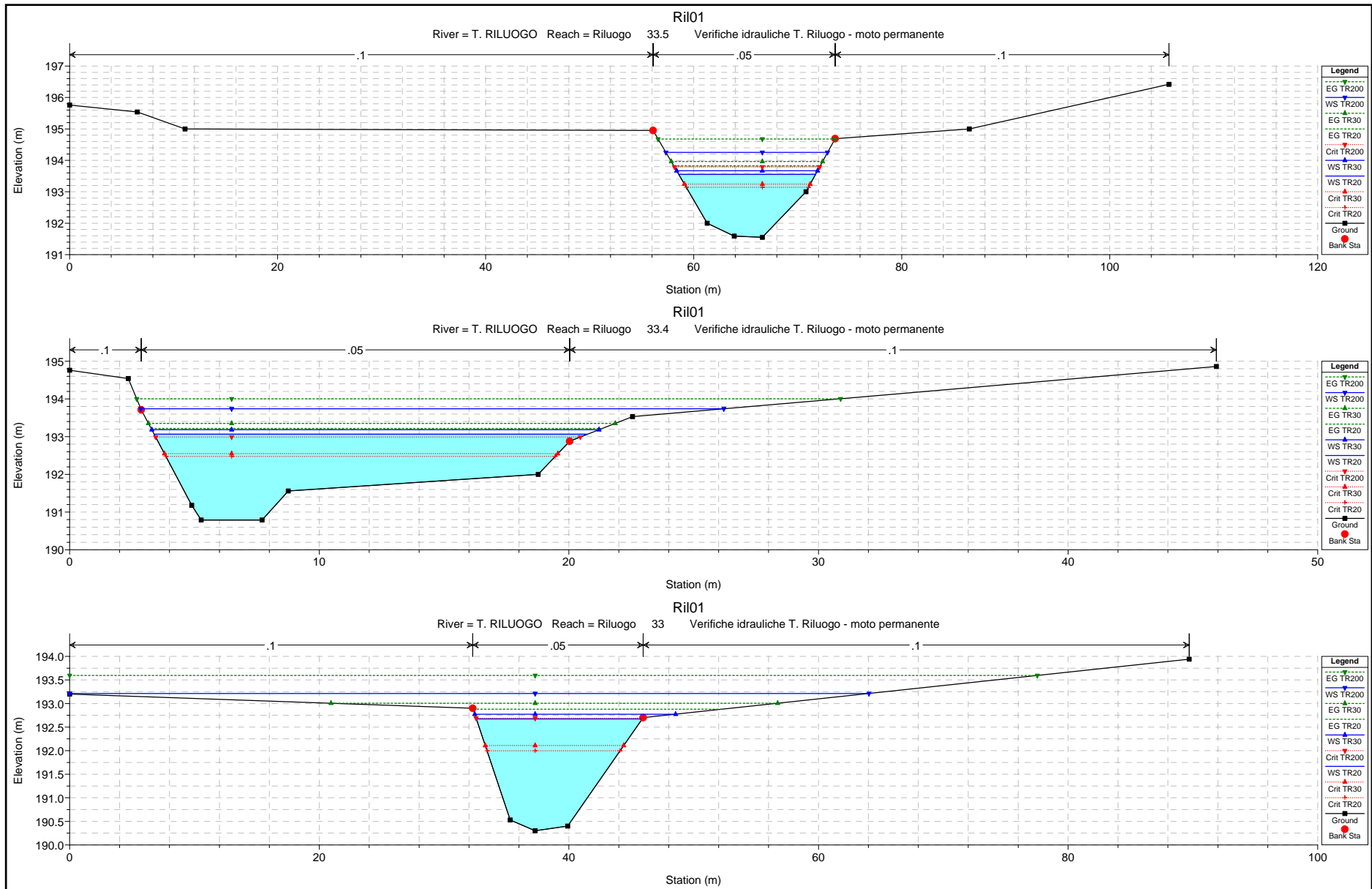


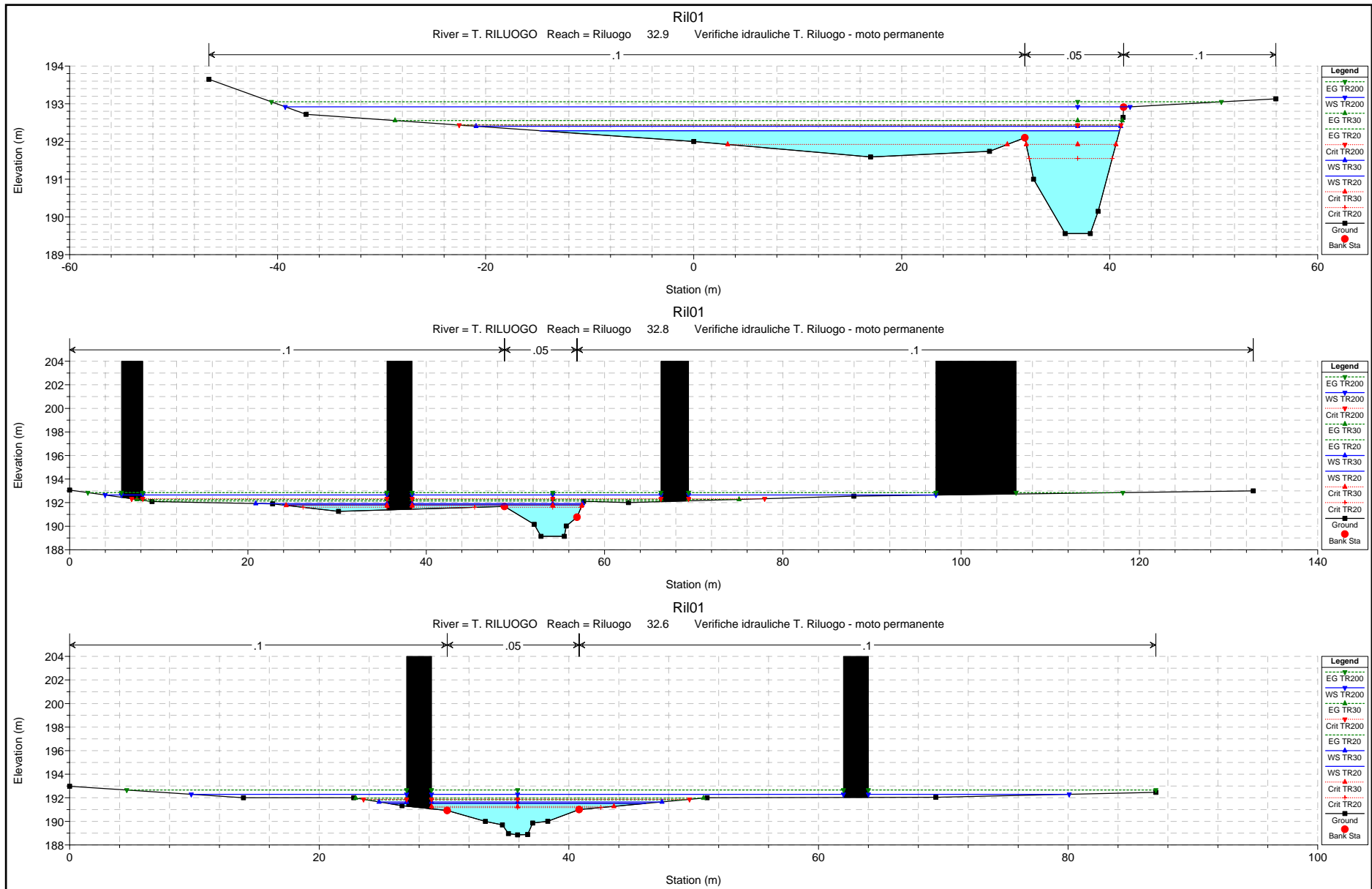
Legend	
EG TR200	Green dashed line with inverted triangles
WS TR200	Blue solid line with inverted triangles
EG TR30	Green dashed line with triangles
EG TR20	Green dotted line with triangles
Crit TR200	Red dotted line with inverted triangles
WS TR30	Blue solid line with triangles
WS TR20	Blue solid line with triangles
Crit TR30	Red dotted line with triangles
Crit TR20	Red dotted line with crosses
Ground	Black solid line with squares



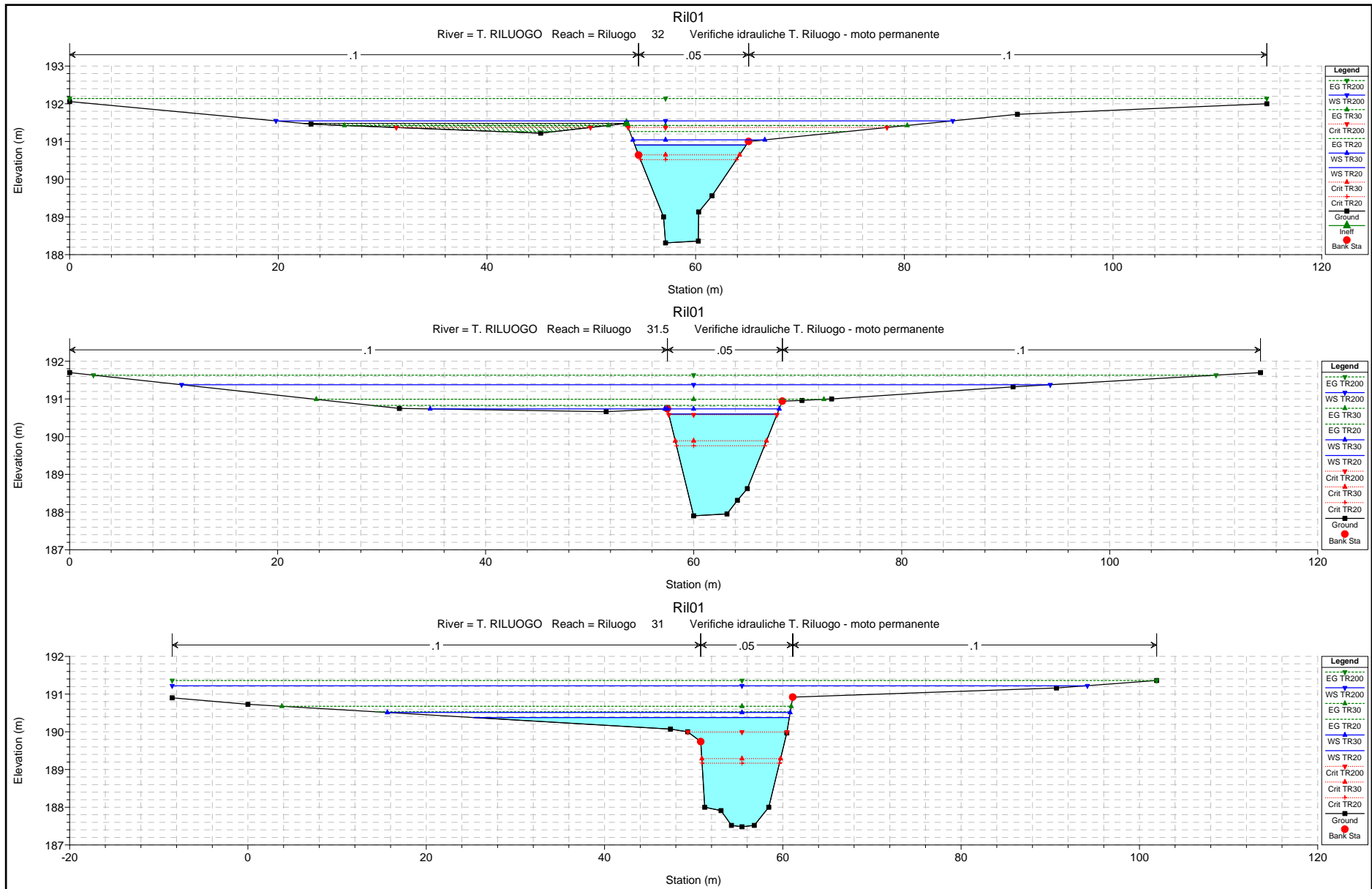


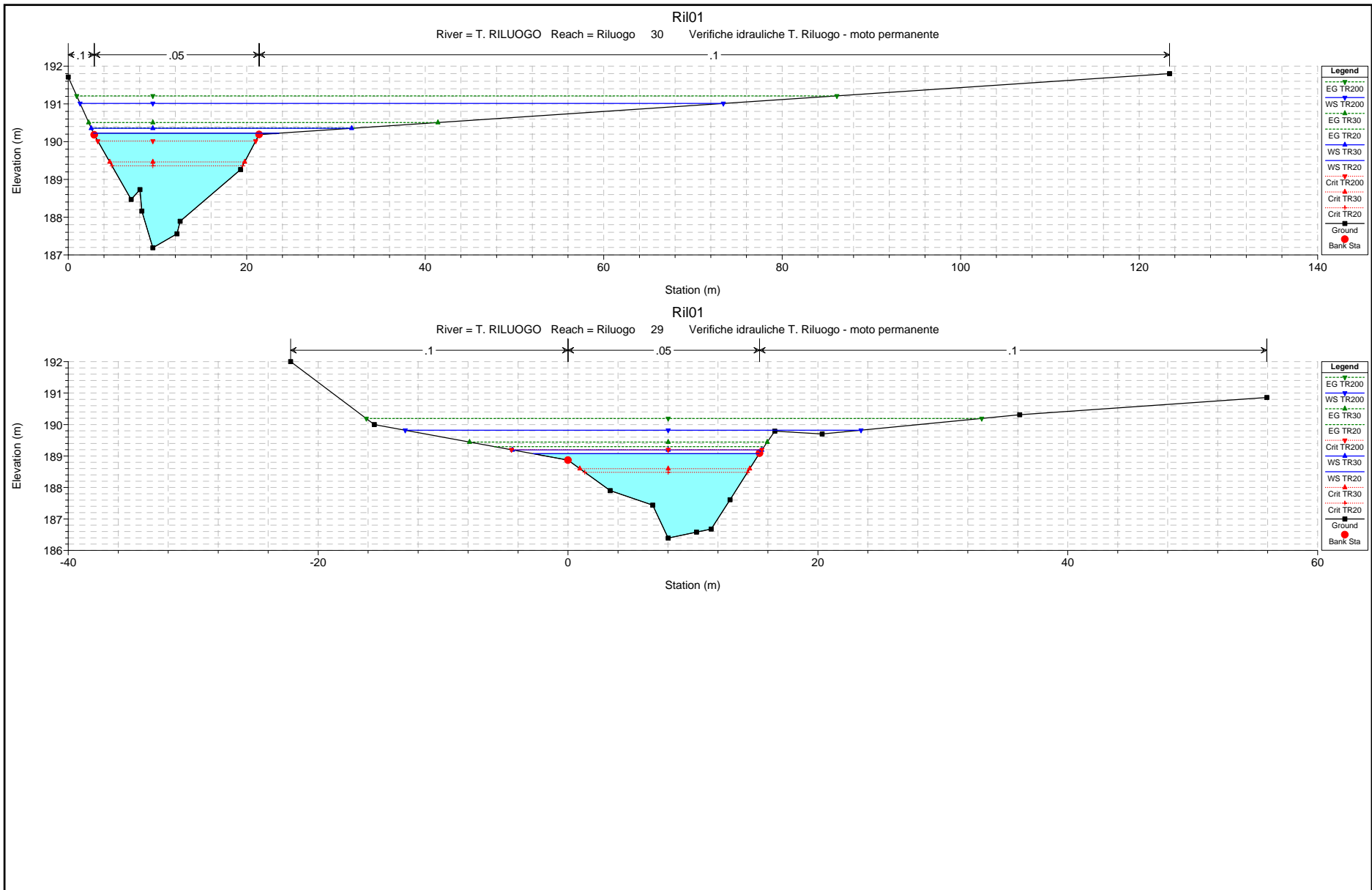






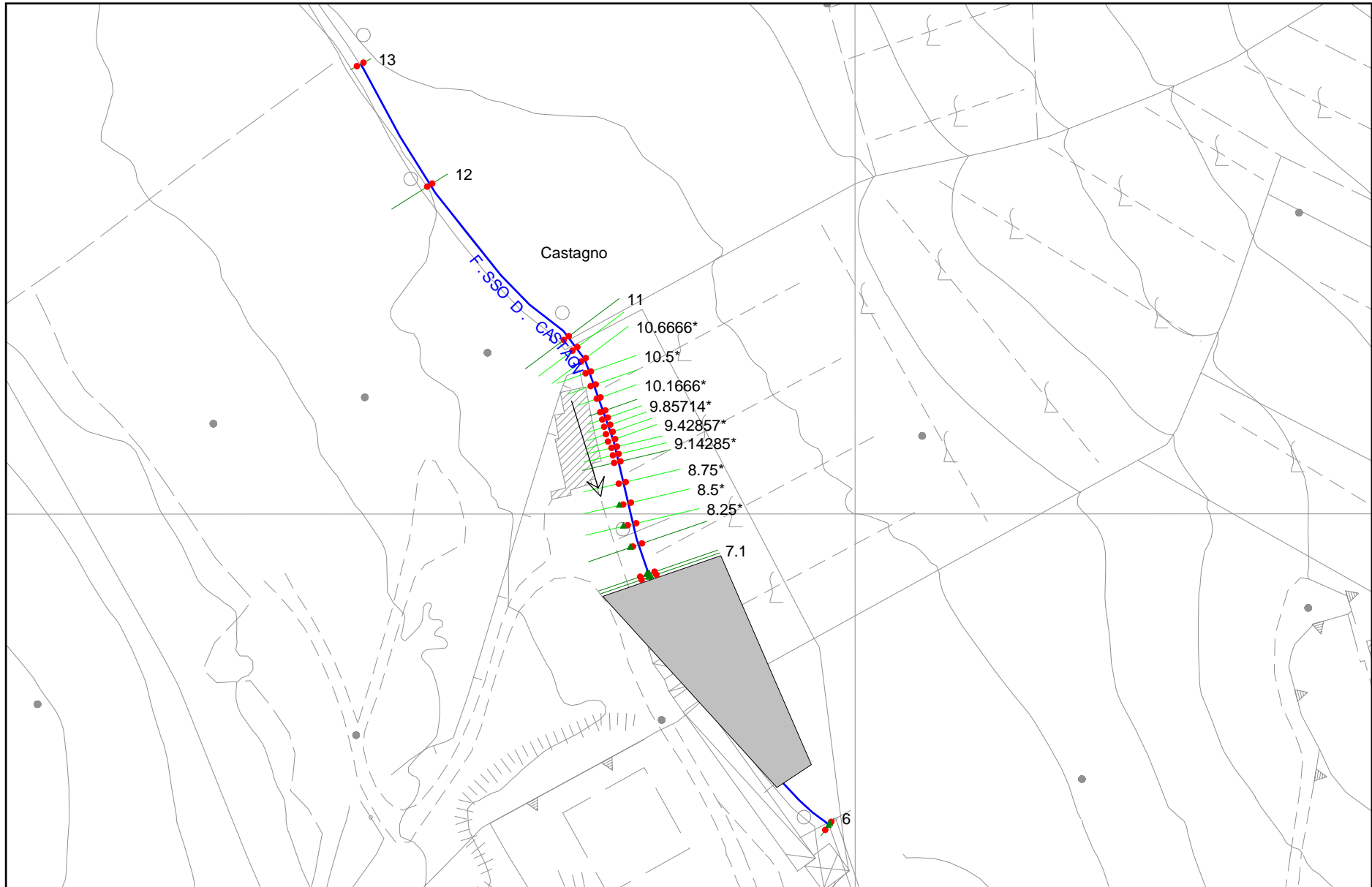






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO DEL CASTAGNO**

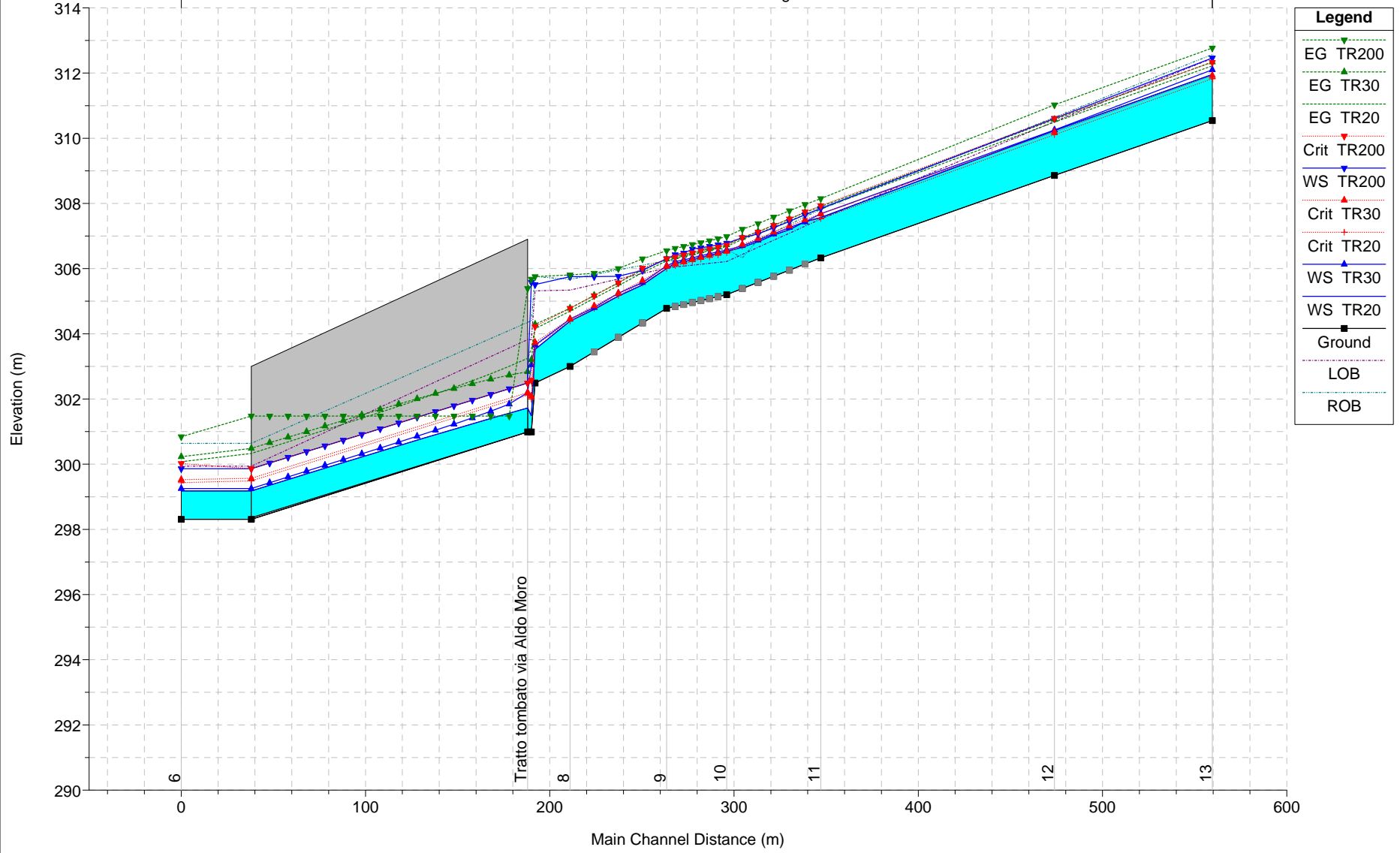


HEC-RAS Plan: CAST River: F.SSO D. CASTAGN Reach: Castagno

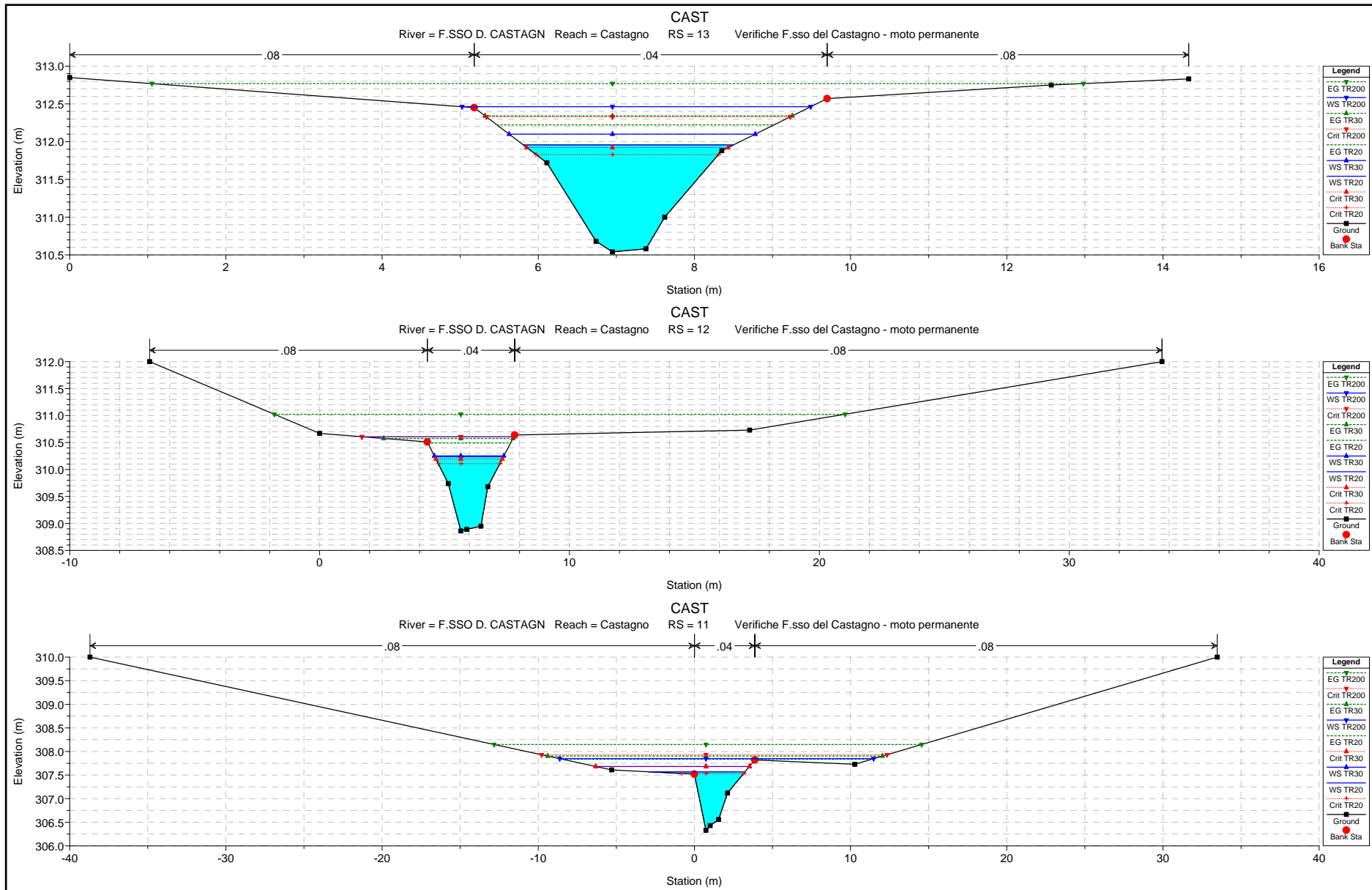
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Castagno	13	TR20	4.70		4.70		310.54	311.96	311.83	312.22	0.020619	2.28	2.28	2.06	2.70	0.83	0.83
Castagno	13	TR30	5.40		5.40		310.54	312.10	311.92	312.34	0.017484	2.18	2.18	2.48	3.15	0.79	0.79
Castagno	13	TR200	9.40	0.00	9.40		310.54	312.46	312.33	312.77	0.017470	2.45	2.45	3.83	4.46	0.83	0.84
Castagno	12	TR20	4.70		4.70		308.86	310.24	310.11	310.49	0.019765	2.23	2.23	2.11	2.75	0.81	0.81
Castagno	12	TR30	5.40		5.40		308.86	310.25	310.20	310.57	0.024941	2.51	2.51	2.15	2.78	0.91	0.91
Castagno	12	TR200	9.40	0.03	9.37		308.86	310.61	310.61	311.02	0.024037	2.87	2.77	3.40	6.08	0.94	1.18
Castagno	11	TR20	4.70	0.01	4.69		306.33	307.57	307.53	307.84	0.022202	2.29	2.21	2.12	6.21	0.92	1.21
Castagno	11	TR30	5.40	0.24	5.16		306.33	307.68	307.68	307.90	0.016711	2.12	1.75	3.09	9.85	0.82	0.99
Castagno	11	TR200	9.40	1.25	7.99	0.17	306.33	307.85	307.93	308.15	0.020894	2.62	1.71	5.48	20.10	0.94	1.05
Castagno	10	TR20	4.70	0.90	3.80		305.20	306.53	306.49	306.68	0.014037	1.88	1.31	3.58	9.62	0.75	0.69
Castagno	10	TR30	5.40	1.17	4.23		305.20	306.58	306.53	306.73	0.014161	1.95	1.33	4.05	10.14	0.76	0.67
Castagno	10	TR200	9.40	2.78	6.61	0.01	305.20	306.78	306.72	306.98	0.014379	2.33	1.49	6.33	12.38	0.80	0.66
Castagno	9	TR20	4.70	0.12	4.58		304.78	306.00	306.00	306.24	0.019279	2.17	1.89	2.49	8.04	0.88	1.08
Castagno	9	TR30	5.40	0.34	5.06		304.78	306.08	306.08	306.30	0.016733	2.12	1.69	3.19	9.56	0.83	0.94
Castagno	9	TR200	9.40	1.64	7.76	0.00	304.78	306.30	306.30	306.55	0.016183	2.42	1.66	5.67	13.09	0.85	0.80
Castagno	8	TR20	4.70		4.70		303.00	304.39	304.39	304.70	0.028091	2.45	2.45	1.92	3.13	1.00	1.00
Castagno	8	TR30	5.40		5.40		303.00	304.45	304.46	304.78	0.028718	2.56	2.56	2.11	3.28	1.02	1.02
Castagno	8	TR200	9.40	0.69	8.71	0.00	303.00	305.75	304.78	305.81	0.001590	1.04	0.80	11.74	31.18	0.28	0.33
Castagno	7.1	TR20	4.70		4.70		302.49	303.52	303.64	304.16	0.024960	3.53	3.53	1.33	3.86	1.20	1.20
Castagno	7.1	TR30	5.40		5.40		302.49	303.65	303.73	304.29	0.020853	3.54	3.54	1.53	4.15	1.12	1.12
Castagno	7.1	TR200	9.40		9.40		302.49	305.51	304.23	305.75	0.001983	2.18	2.18	4.31	22.86	0.41	0.41
Castagno	7	TR20	4.70		4.70		300.99	301.48	301.99	303.54	0.165892	6.36	6.36	0.74	2.90	2.89	2.89
Castagno	7	TR30	5.40		5.40		300.99	303.05	302.09	303.20	0.001880	1.75	1.75	3.08	6.49	0.39	0.39
Castagno	7	TR200	9.40		9.40		300.99	305.58	302.58	305.68	0.000391	1.36	1.36	6.89	29.02	0.20	0.20
Castagno	6.5	Culvert #1	4.70														
Castagno	6.5	Culvert #1	5.40														
Castagno	6.5	Culvert #1	9.40														
Castagno	6	TR20	4.70		4.70		298.31	299.18	299.43	300.07	0.044461	4.19	4.19	1.12	3.56	2.89	2.89
Castagno	6	TR30	5.40		5.40		298.31	299.25	299.53	300.23	0.042824	4.38	4.38	1.23	3.72	0.39	0.39
Castagno	6	TR200	9.40		9.40		298.31	299.86	300.02	300.84	0.020623	4.39	4.39	2.14	5.01	0.20	0.20

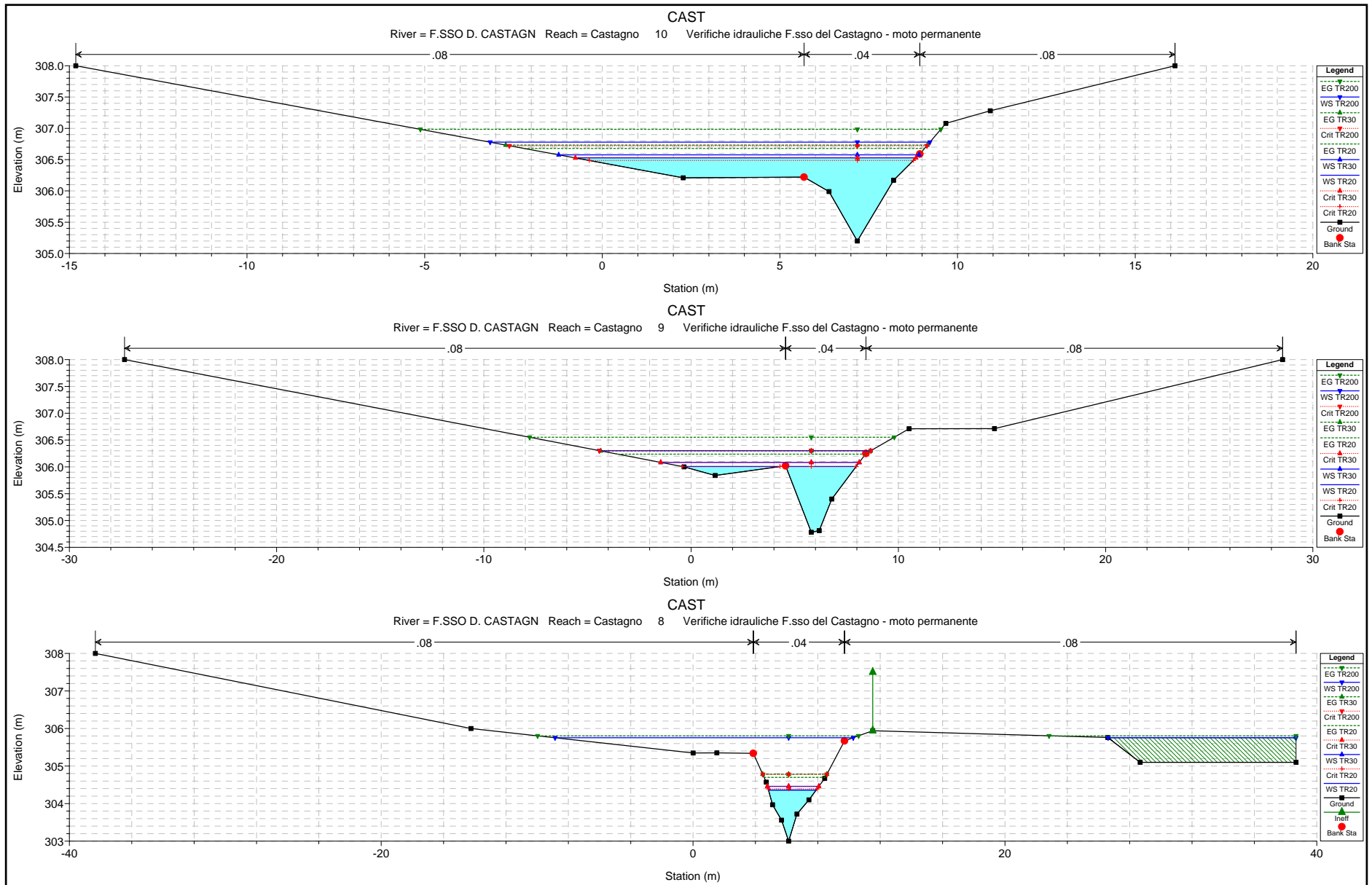
CAST Verifiche idrauliche F.sso del Castagno - moto permanente

F.SSO D. CASTAGN Castagno

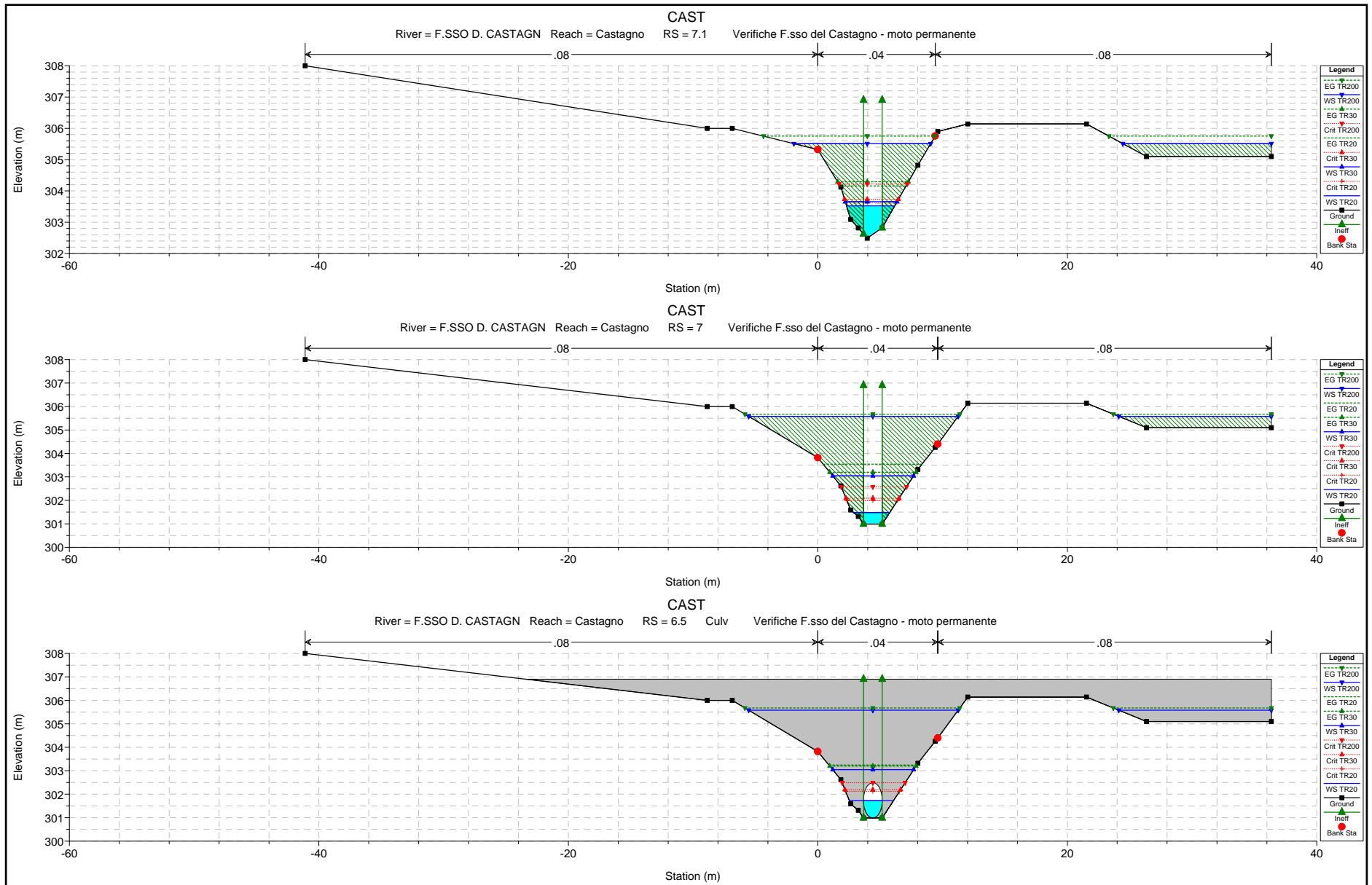


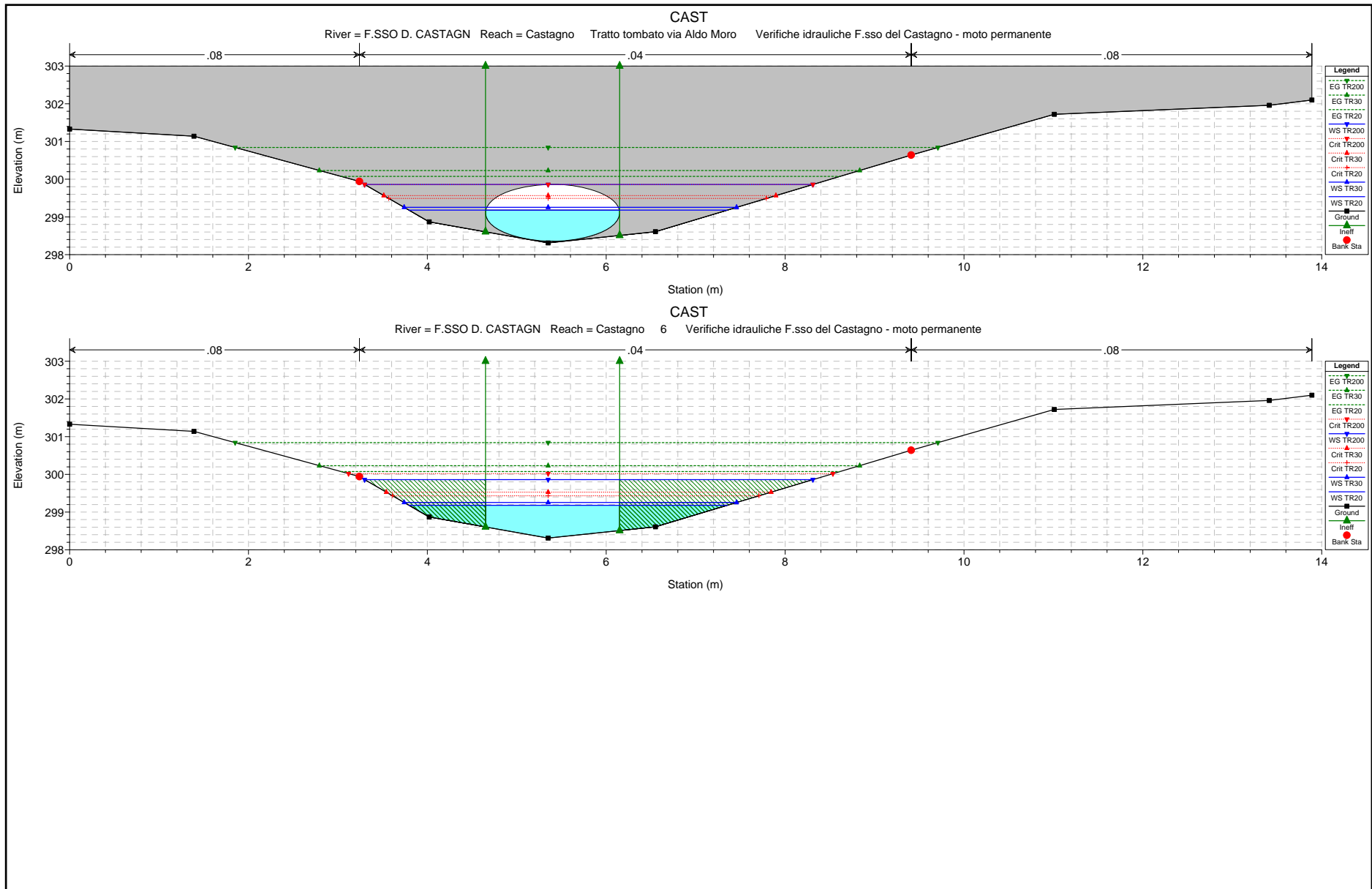
Legend	
EG TR20	Green dashed line with inverted triangles
EG TR30	Purple dashed line with triangles
EG TR20	Green dotted line with inverted triangles
Crit TR20	Red dotted line with inverted triangles
WS TR200	Blue solid line with inverted triangles
Crit TR30	Red dotted line with triangles
Crit TR20	Red dotted line with triangles
WS TR30	Blue solid line with triangles
WS TR20	Blue solid line with triangles
Ground	Grey solid line with squares
LOB	Purple dotted line with squares
ROB	Green dotted line with squares





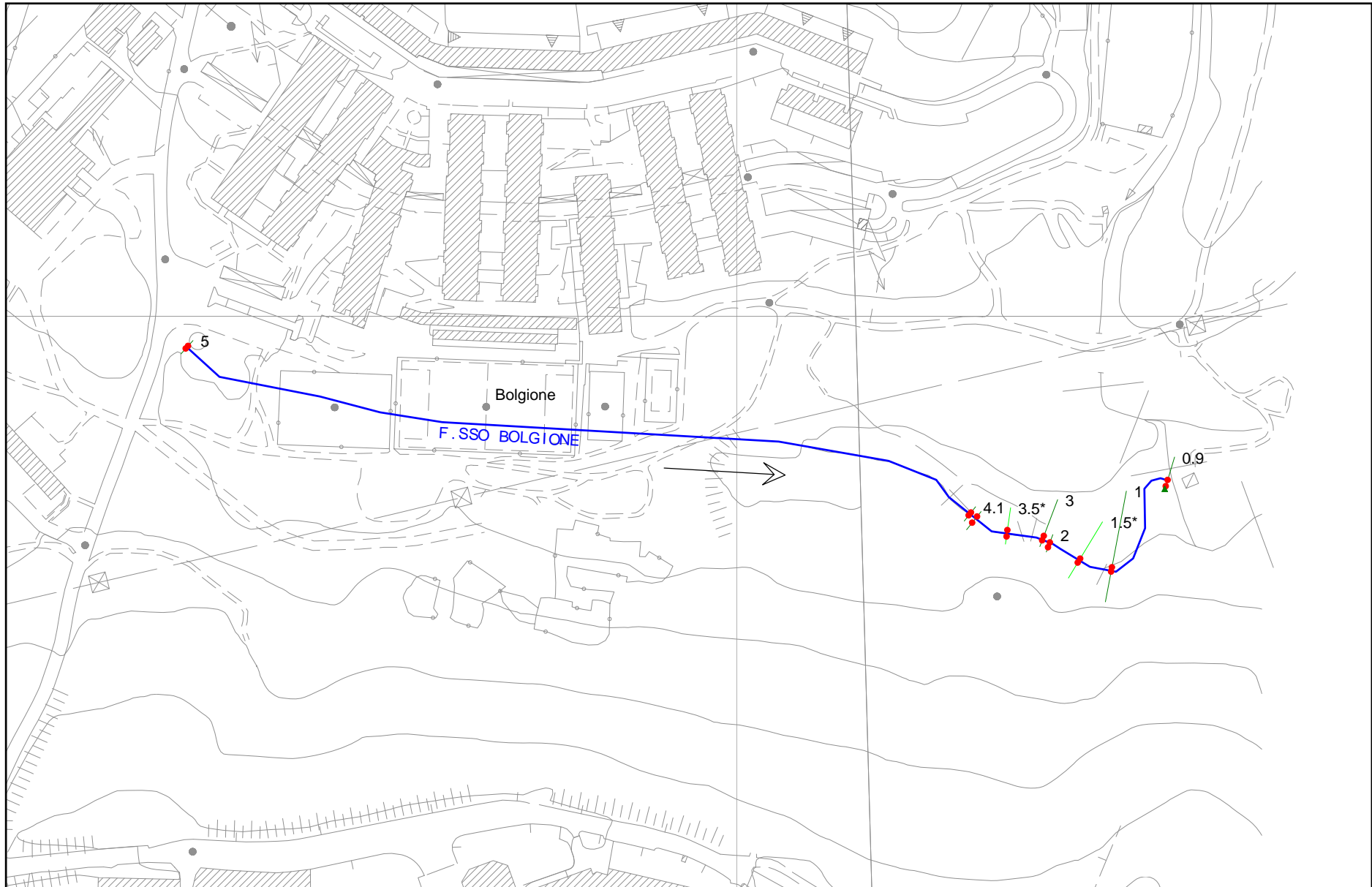






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO DEL BOLGIONE**

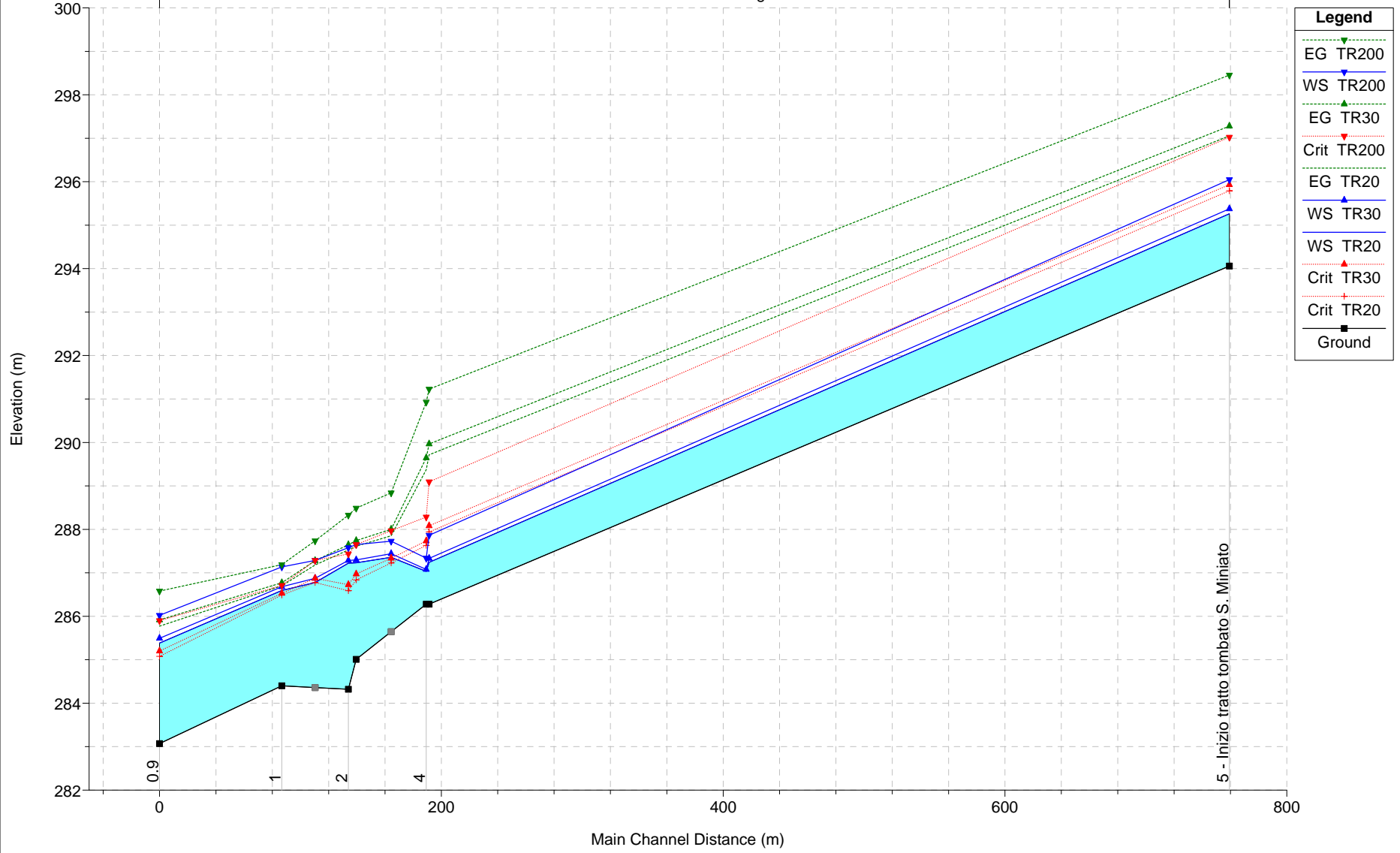


HEC-RAS Plan: BOLG River: F.SSO BOLGIONE Reach: Bolgione

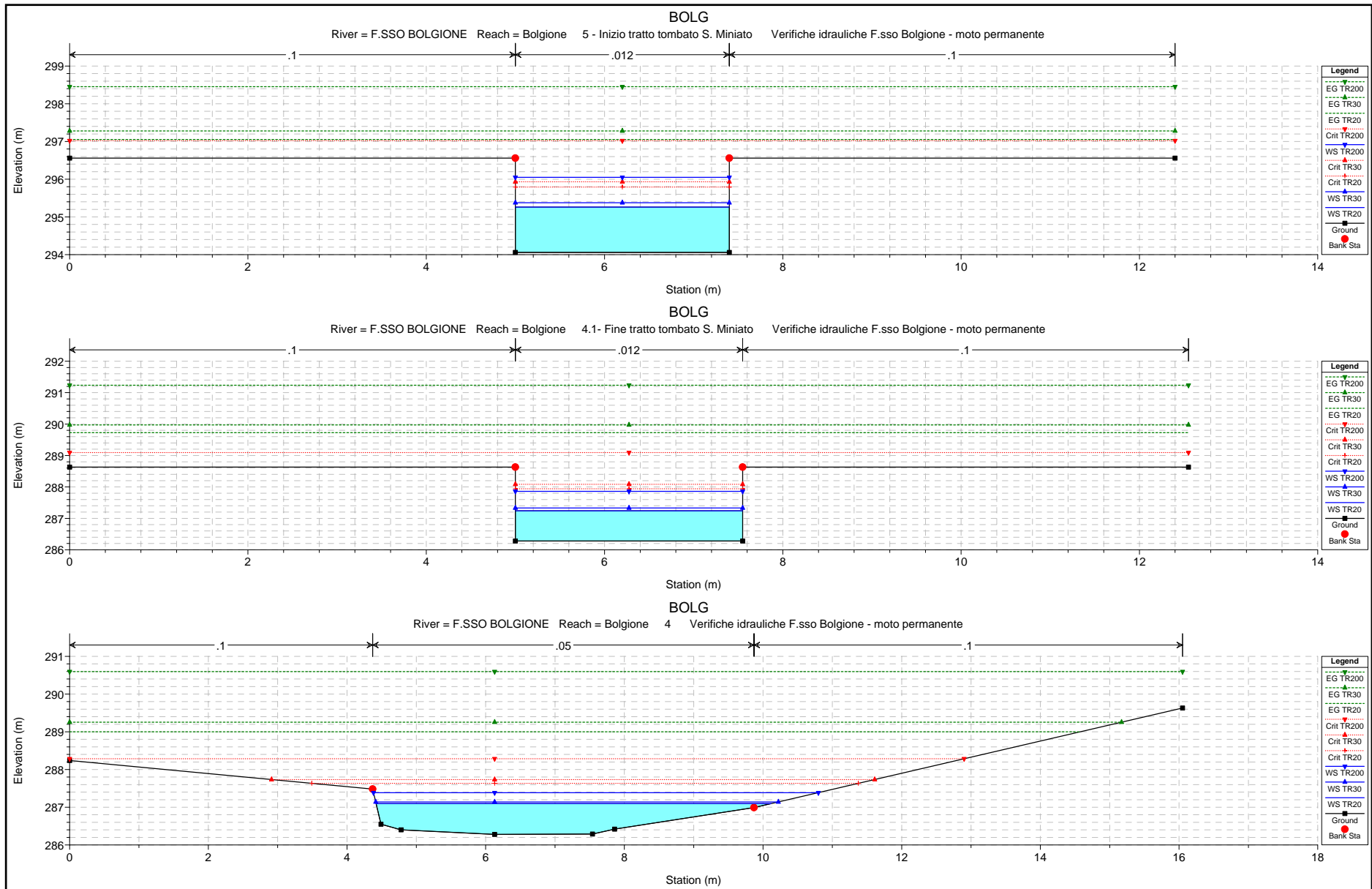
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Bolgione	5	TR20	17.10		17.10		294.06	295.26	295.79	297.05	0.010011	5.93	5.93	2.88	2.40	1.73	1.73
Bolgione	5	TR30	19.30		19.30		294.06	295.38	295.93	297.28	0.010009	6.11	6.11	3.16	2.40	1.70	1.70
Bolgione	5	TR200	32.80		32.80		294.06	296.05	297.02	298.45	0.010006	6.87	6.87	4.77	2.40	1.56	1.56
Bolgione	4.1	TR20	17.10		17.10		286.28	287.24	287.94	289.72	0.015586	6.97	6.97	2.45	2.55	2.27	2.27
Bolgione	4.1	TR30	19.30		19.30		286.28	287.33	288.08	289.96	0.015490	7.19	7.19	2.69	2.55	2.24	2.24
Bolgione	4.1	TR200	32.80		32.80		286.28	287.86	289.09	291.23	0.015111	8.12	8.12	4.04	2.55	2.06	2.06
Bolgione	4	TR20	20.10		20.10	0.00	286.28	287.02	287.60	289.37	0.296068	6.79	6.79	2.96	5.50	2.94	2.96
Bolgione	4	TR30	22.70		22.70	0.00	286.28	287.06	287.71	289.63	0.295376	7.11	7.09	3.20	5.61	2.96	3.00
Bolgione	4	TR200	38.60		38.42	0.18	286.28	287.31	288.23	290.91	0.273031	8.43	8.25	4.68	6.23	2.95	3.04
Bolgione	3	TR20	20.10	0.70	18.41	0.99	285.01	287.21	286.81	287.58	0.010864	2.79	2.21	9.10	7.34	0.63	0.63
Bolgione	3	TR30	22.70	0.84	20.64	1.22	285.01	287.28	286.94	287.71	0.012229	3.03	2.37	9.60	7.58	0.67	0.67
Bolgione	3	TR200	38.60	1.86	33.77	2.97	285.01	287.61	287.61	288.43	0.020041	4.28	3.15	12.25	8.55	0.89	0.84
Bolgione	2	TR20	20.10	0.76	18.97	0.37	284.32	287.21	286.55	287.50	0.011202	2.46	2.12	9.48	6.85	0.53	0.58
Bolgione	2	TR30	22.70	0.93	21.29	0.48	284.32	287.27	286.69	287.62	0.012780	2.68	2.28	9.94	7.05	0.57	0.61
Bolgione	2	TR200	38.60	2.10	35.14	1.36	284.32	287.56	287.38	288.28	0.023222	3.91	3.19	12.11	7.93	0.78	0.82
Bolgione	1	TR20	20.10	7.24	11.60	1.26	284.40	286.57	286.48	286.69	0.007598	1.91	0.82	24.65	51.76	0.43	0.38
Bolgione	1	TR30	22.70	9.44	11.65	1.60	284.40	286.66	286.52	286.75	0.006676	1.84	0.78	29.08	52.52	0.41	0.33
Bolgione	1	TR200	38.60	22.49	12.56	3.55	284.40	287.10	286.70	287.16	0.004077	1.64	0.72	53.25	56.46	0.33	0.24
Bolgione	0.9	TR20	20.10	0.03	19.69	0.38	283.07	285.36	285.05	285.74	0.017609	2.77	2.57	7.83	7.85	0.70	0.82
Bolgione	0.9	TR30	22.70	0.13	22.01	0.56	283.07	285.47	285.17	285.88	0.017606	2.90	2.59	8.76	9.02	0.71	0.84
Bolgione	0.9	TR200	38.60	2.07	34.43	2.10	283.07	285.99	285.86	286.54	0.017608	3.46	2.60	14.85	13.86	0.74	0.80

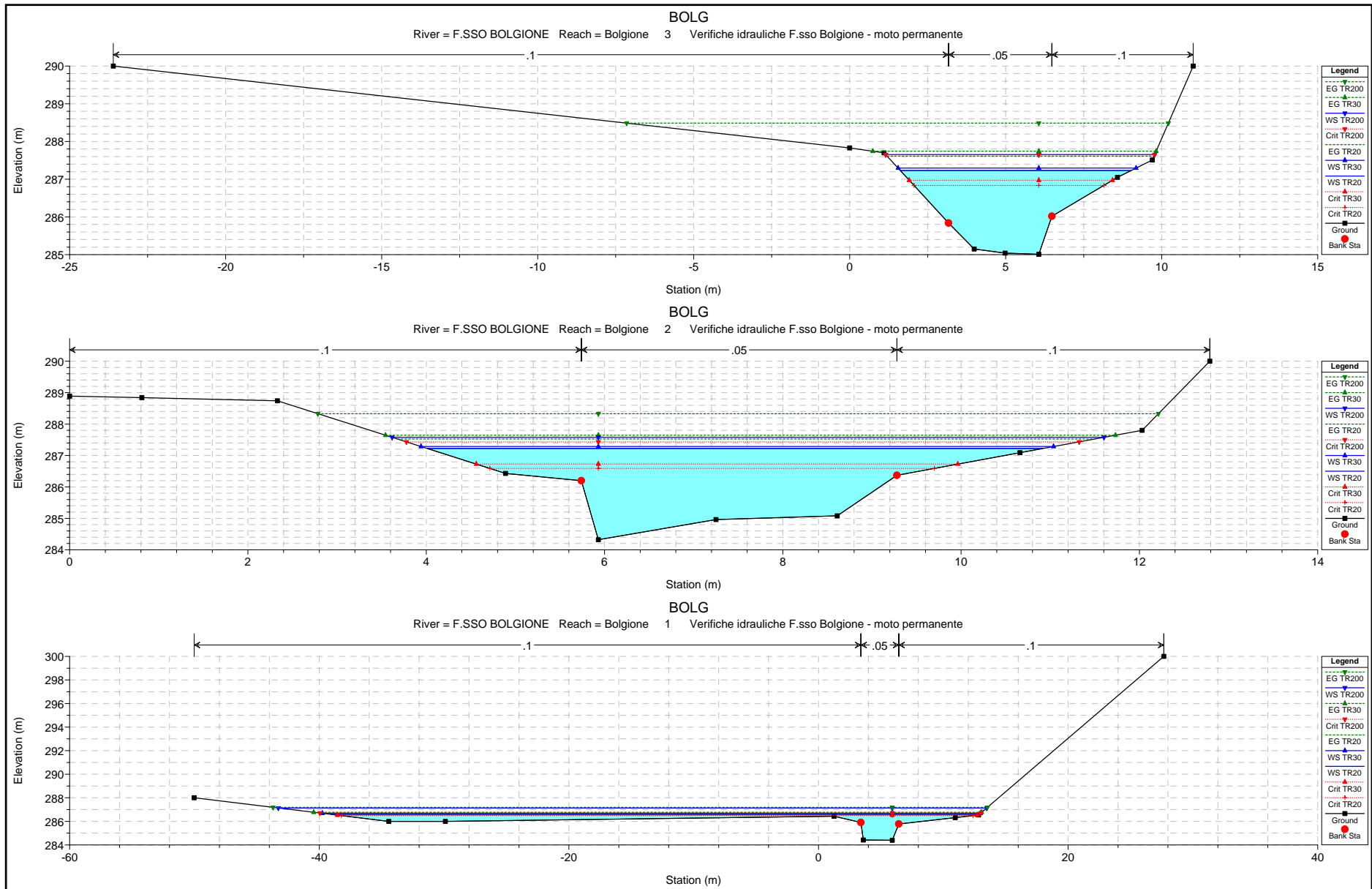
BOLG Verifiche idrauliche F.sso Bolgione - moto permanente

F.SSO BOLGIONE Bolgione

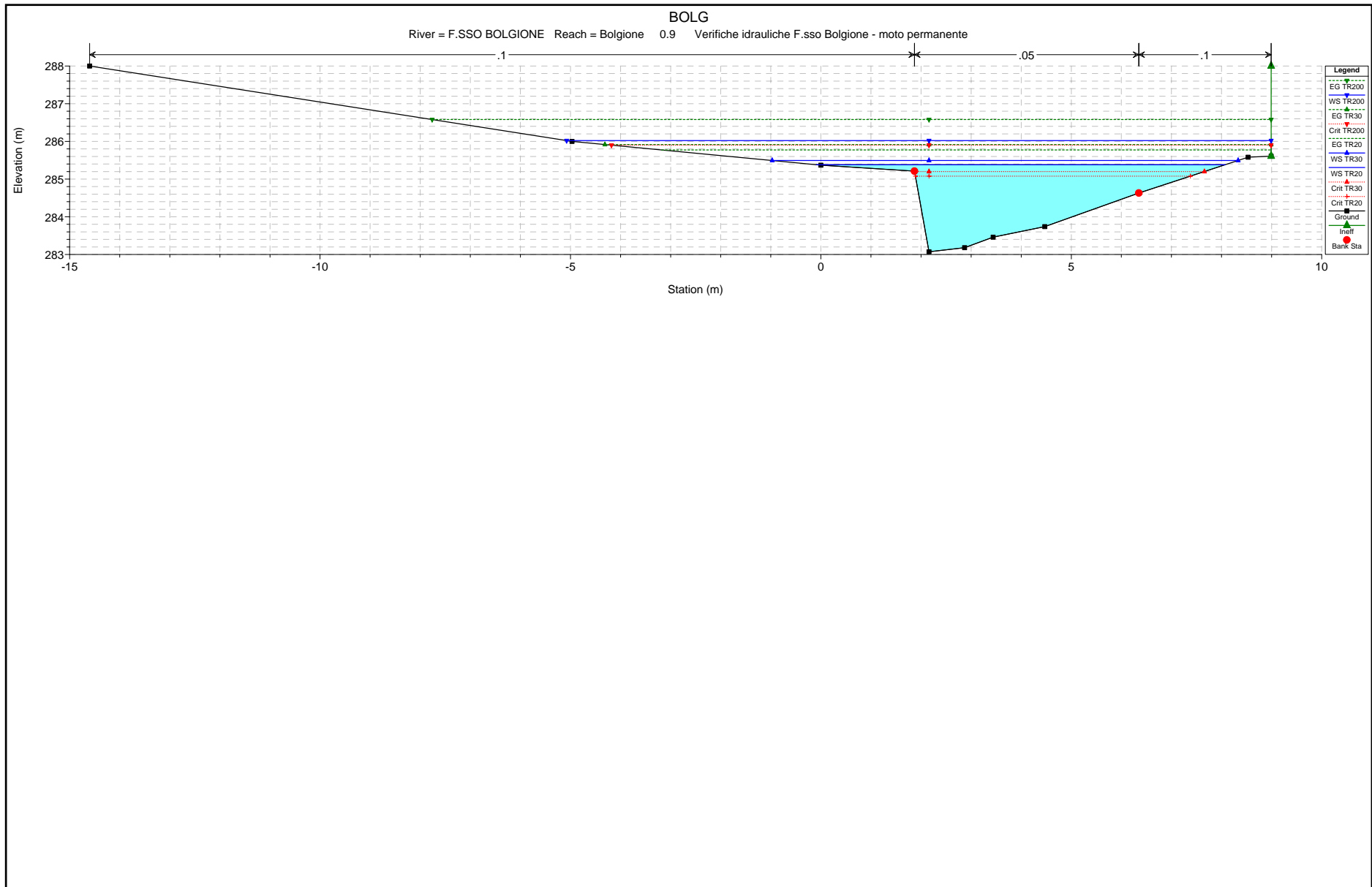


Legend	
EG TR200	Green dashed line with inverted triangle marker
WS TR200	Blue solid line with inverted triangle marker
EG TR30	Green dashed line with triangle marker
Crit TR200	Red dotted line with inverted triangle marker
EG TR20	Green dashed line with triangle marker
WS TR30	Blue solid line with triangle marker
WS TR20	Blue solid line with inverted triangle marker
Crit TR30	Red dotted line with triangle marker
Crit TR20	Red dotted line with inverted triangle marker
Ground	Black solid line with square marker



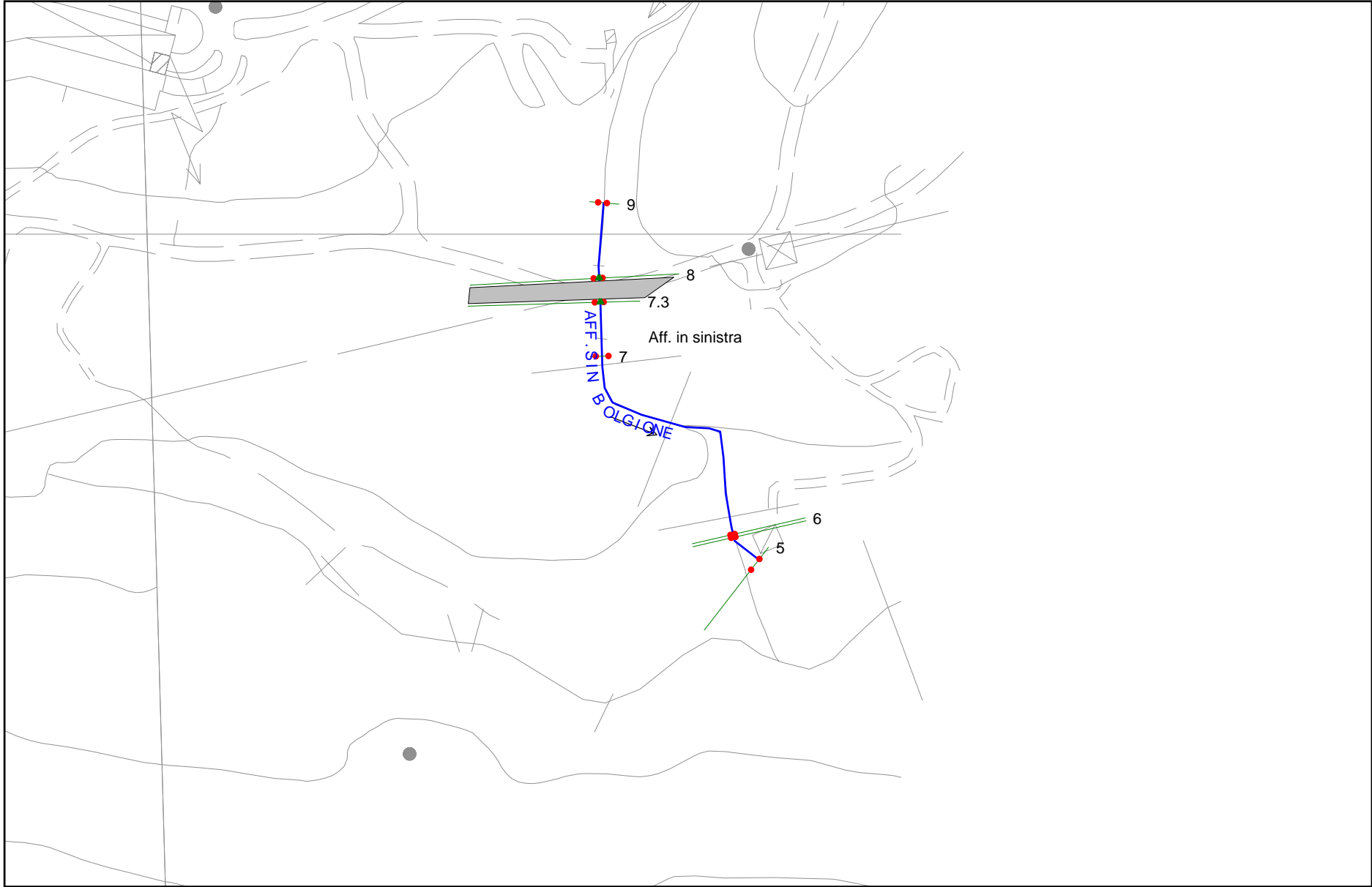






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**AFFLUENTE IN SINISTRA FOSSO DEL BOLGIONE**



HEC-RAS Plan: AFF.SIN BOLG

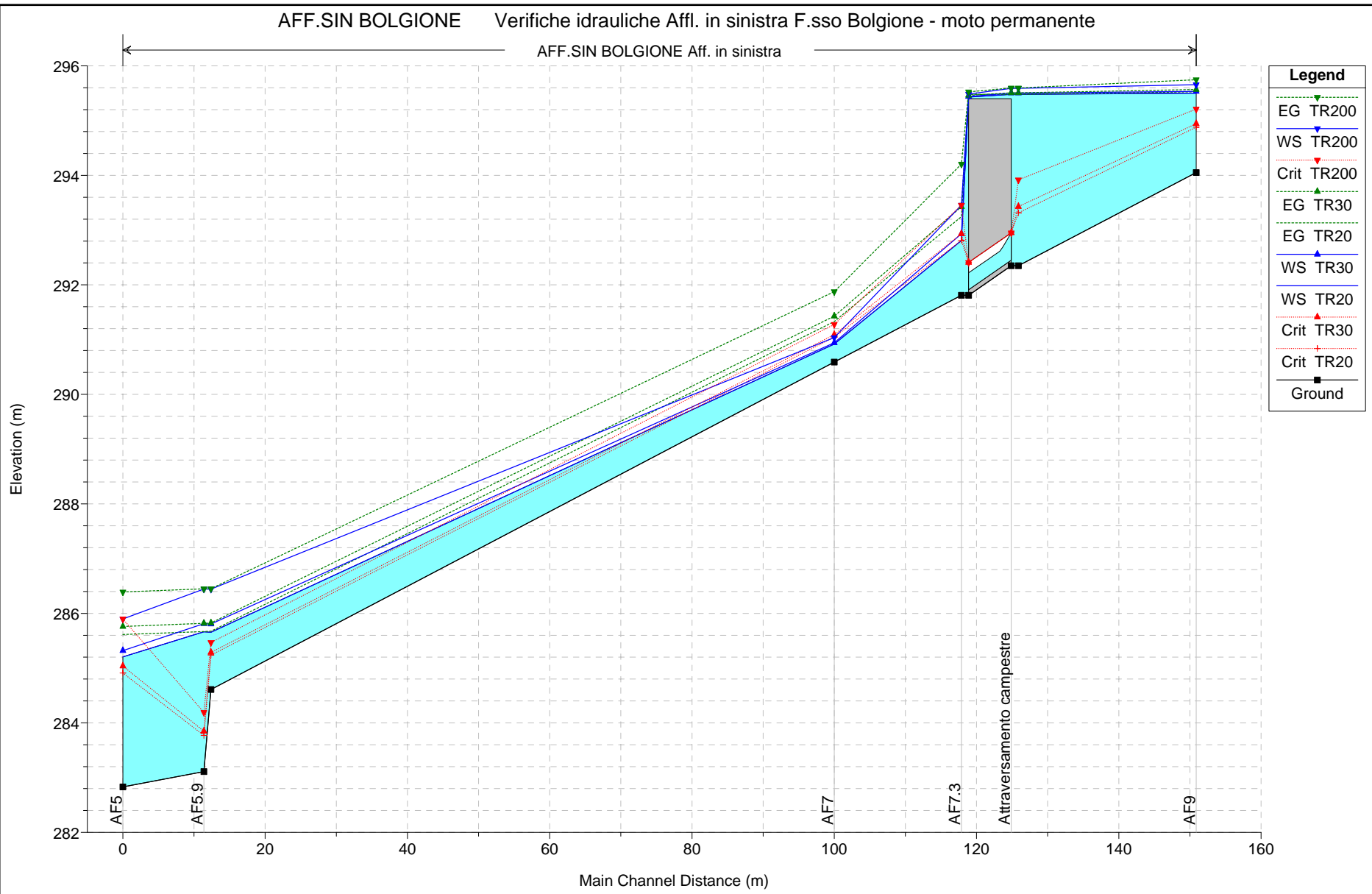
River	Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
AFF.SIN BOLGIONE	Aff. in sinistra	9	TR20	1.40		1.40		294.05	295.50	294.88	295.53	0.003109	0.71	0.71	1.99	2.58	0.26	0.26
AFF.SIN BOLGIONE	Aff. in sinistra	9	TR30	1.70		1.70		294.05	295.53	294.94	295.57	0.004102	0.82	0.82	2.07	2.64	0.30	0.30
AFF.SIN BOLGIONE	Aff. in sinistra	9	TR200	3.20		3.20		294.05	295.66	295.21	295.75	0.009778	1.33	1.33	2.40	2.83	0.46	0.46
AFF.SIN BOLGIONE	Aff. in sinistra	8	TR20	1.40	0.03	1.28	0.09	292.35	295.48	293.32	295.48	0.000052	0.19	0.13	11.04	18.91	0.04	0.05
AFF.SIN BOLGIONE	Aff. in sinistra	8	TR30	1.70	0.04	1.54	0.11	292.35	295.50	293.43	295.51	0.000072	0.22	0.15	11.55	20.57	0.05	0.06
AFF.SIN BOLGIONE	Aff. in sinistra	8	TR200	3.20	0.11	2.82	0.27	292.35	295.59	293.92	295.60	0.000214	0.39	0.24	13.53	26.04	0.08	0.10
AFF.SIN BOLGIONE	Aff. in sinistra	7.5	Culvert #1	1.40														
AFF.SIN BOLGIONE	Aff. in sinistra	7.5	Culvert #1	1.70														
AFF.SIN BOLGIONE	Aff. in sinistra	7.5	Culvert #1	3.20														
AFF.SIN BOLGIONE	Aff. in sinistra	7.3	TR20	1.40		1.40		291.81	292.81	292.81	293.25	0.040178	2.93	2.93	0.48	1.87	1.00	1.00
AFF.SIN BOLGIONE	Aff. in sinistra	7.3	TR30	1.70		1.70		291.81	292.93	292.93	293.43	0.038298	3.12	3.12	0.55	2.06	1.00	1.00
AFF.SIN BOLGIONE	Aff. in sinistra	7.3	TR200	3.20		3.20		291.81	293.45	293.45	294.21	0.033092	3.84	3.84	0.83	2.97	1.00	1.00
AFF.SIN BOLGIONE	Aff. in sinistra	7	TR20	1.40		1.40		290.59	290.92	291.05	291.33	0.173384	2.84	2.84	0.49	2.35	1.98	1.98
AFF.SIN BOLGIONE	Aff. in sinistra	7	TR30	1.70		1.70		290.59	290.94	291.09	291.43	0.184860	3.09	3.09	0.55	2.41	2.06	2.06
AFF.SIN BOLGIONE	Aff. in sinistra	7	TR200	3.20		3.20		290.59	291.04	291.28	291.88	0.226576	4.06	4.06	0.79	2.61	2.36	2.36
AFF.SIN BOLGIONE	Aff. in sinistra	6	TR20	1.40	0.04	0.98	0.39	284.61	285.65	285.24	285.67	0.002338	0.73	0.48	2.93	5.40	0.25	0.21
AFF.SIN BOLGIONE	Aff. in sinistra	6	TR30	1.70	0.06	1.12	0.53	284.61	285.81	285.29	285.82	0.001818	0.72	0.45	3.82	6.62	0.22	0.19
AFF.SIN BOLGIONE	Aff. in sinistra	6	TR200	3.20	0.86	1.40	0.94	284.61	286.44	285.47	286.45	0.000587	0.56	0.24	13.07	19.89	0.14	0.10
AFF.SIN BOLGIONE	Aff. in sinistra	5.9	TR20	1.40	0.02	1.17	0.21	283.11	285.66	283.77	285.67	0.000641	0.38	0.30	4.74	5.43	0.08	0.10
AFF.SIN BOLGIONE	Aff. in sinistra	5.9	TR30	1.70	0.03	1.34	0.33	283.11	285.81	283.85	285.82	0.000666	0.40	0.30	5.63	6.70	0.09	0.11
AFF.SIN BOLGIONE	Aff. in sinistra	5.9	TR200	3.20	0.75	1.64	0.82	283.11	286.44	284.19	286.45	0.000436	0.38	0.22	14.88	19.92	0.07	0.08
AFF.SIN BOLGIONE	Aff. in sinistra	5	TR20	22.20	0.11	21.57	0.52	282.83	285.21	284.91	285.61	0.017601	2.87	2.59	8.57	8.48	0.71	0.82
AFF.SIN BOLGIONE	Aff. in sinistra	5	TR30	25.10	0.27	24.08	0.74	282.83	285.32	285.04	285.76	0.017607	3.00	2.62	9.58	9.14	0.72	0.82
AFF.SIN BOLGIONE	Aff. in sinistra	5	TR200	42.60	2.20	35.84	4.56	282.83	285.90	285.90	286.39	0.015352	3.38	2.06	20.72	30.64	0.70	0.80

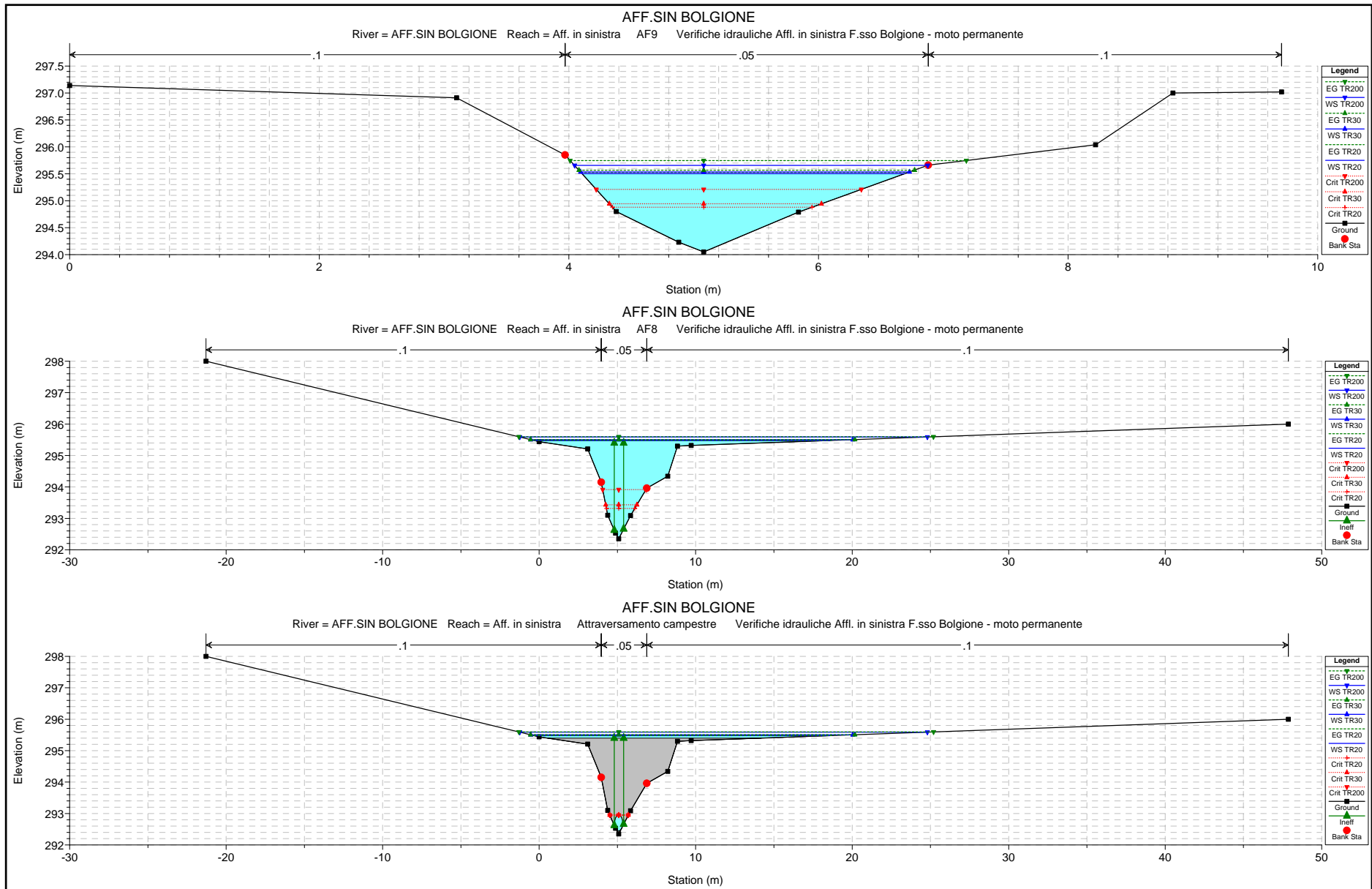
HEC-RAS Plan: AFF.SIN BOLG

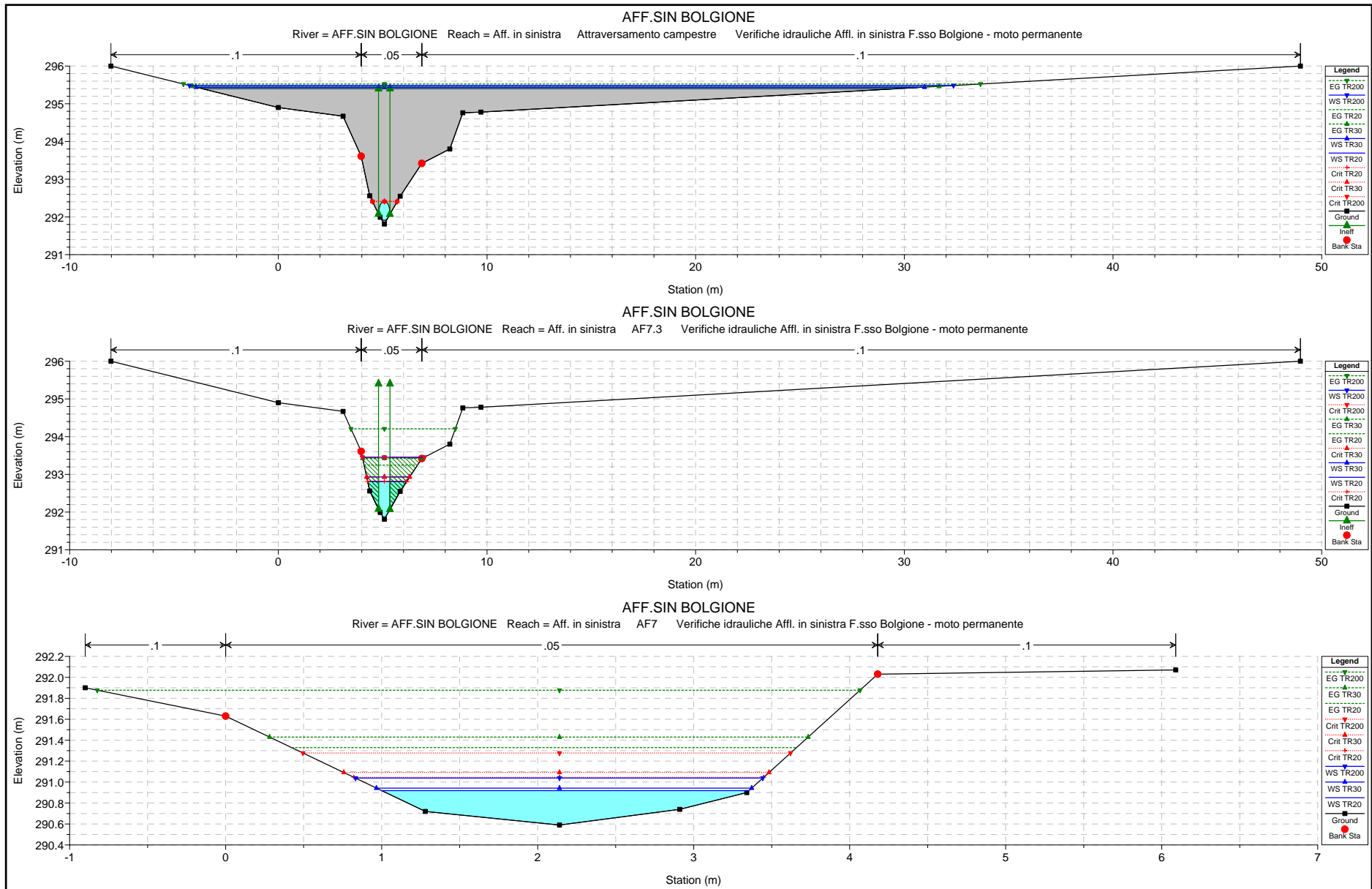
River	Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR20	295.48	295.48	295.48	294.37	295.40	0.90	0.51	2.67	4.56	7.02
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR30	295.51	295.50	295.51	295.48	295.40	0.90	0.80	2.57	4.58	4.58
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR200	295.60	295.59	295.60	295.59	295.40	0.91	2.29	2.13	4.66	4.66

AFF.SIN BOLGIONE Verifiche idrauliche Affl. in sinistra F.sso Bolgione - moto permanente

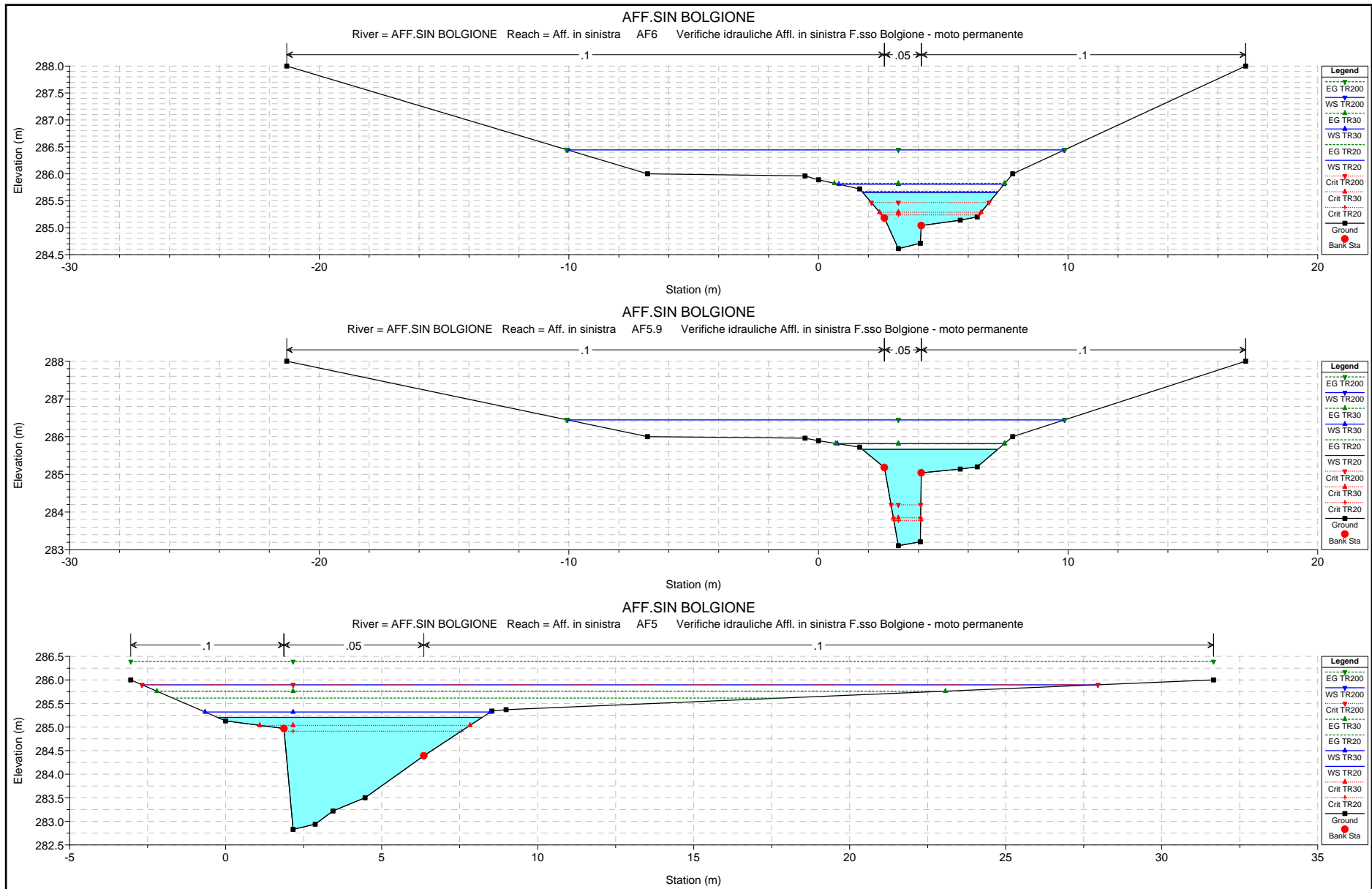
AFF.SIN BOLGIONE Aff. in sinistra





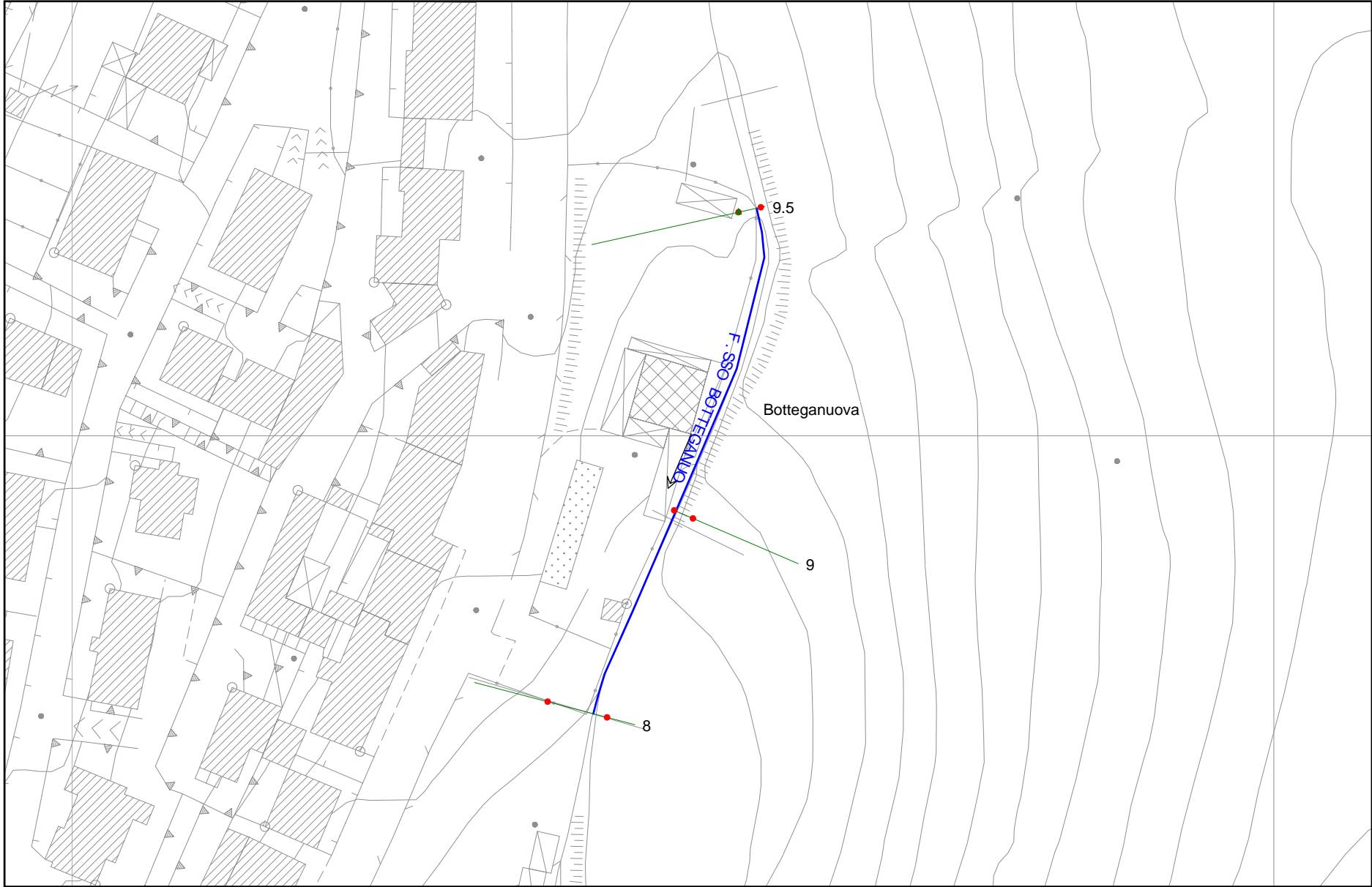






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO IN ZONA "BOTTEGA NUOVA"**

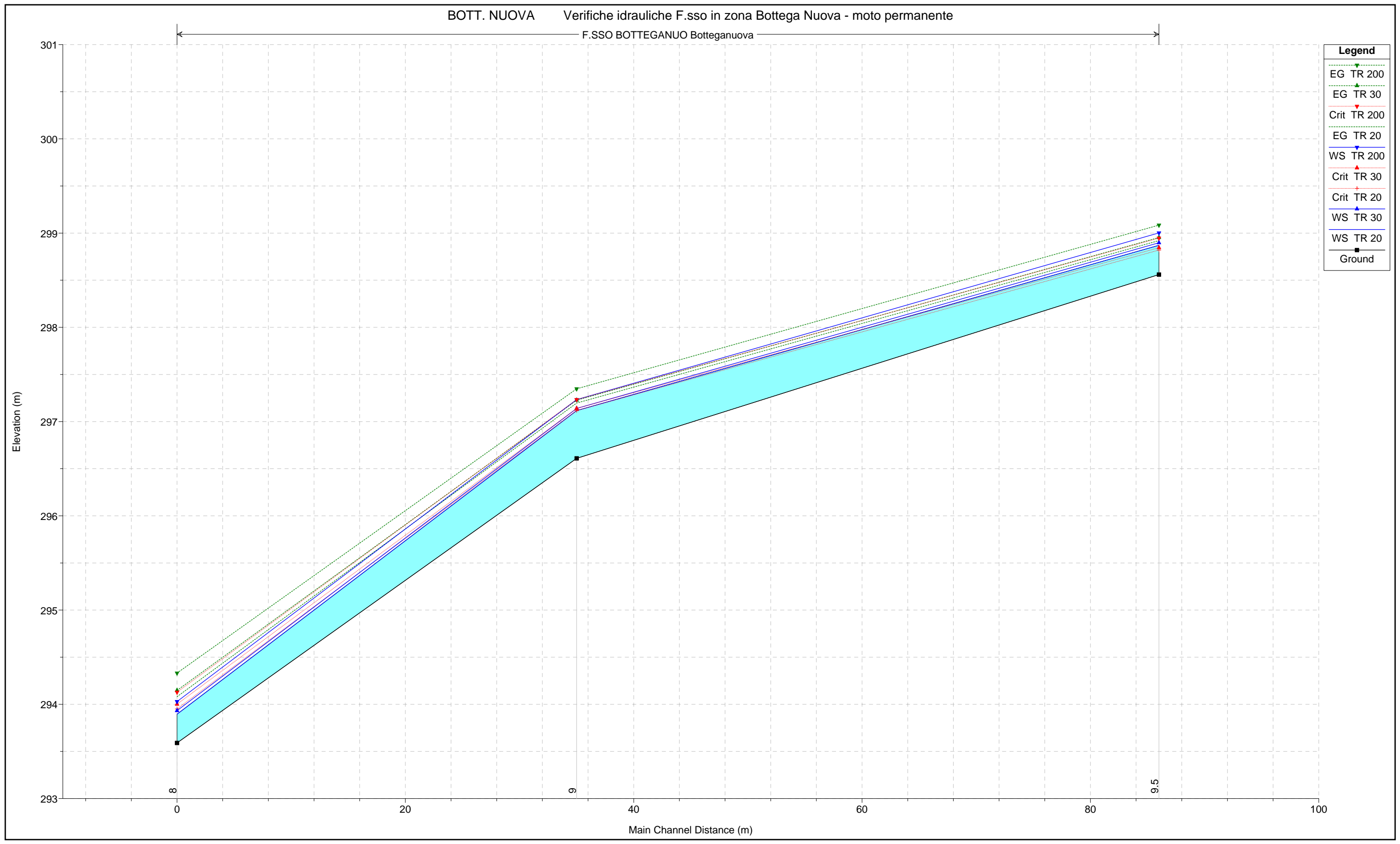


HEC-RAS Plan: BOTT. NUOVA River: F.SSO BOTTEGANUO Reach: Botteganuova

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Botteganuova	9.5	TR 20	0.50		0.50		298.56	298.87	298.82	298.92	0.022383	0.99	0.99	0.50	2.46	0.70	0.70
Botteganuova	9.5	TR 30	0.60		0.60		298.56	298.90	298.85	298.95	0.022589	1.05	1.05	0.57	2.58	0.71	0.71
Botteganuova	9.5	TR 200	1.10		1.10		298.56	299.00	298.95	299.08	0.023873	1.27	1.27	0.87	3.09	0.76	0.76
Botteganuova	9	TR 20	0.50		0.50		296.61	297.12	297.12	297.20	0.068891	1.25	1.25	0.40	2.50	1.00	1.00
Botteganuova	9	TR 30	0.60		0.60		296.61	297.14	297.14	297.23	0.067037	1.31	1.31	0.46	2.64	1.00	1.00
Botteganuova	9	TR 200	1.10		1.10		296.61	297.23	297.23	297.35	0.059262	1.50	1.50	0.73	3.22	1.00	1.00
Botteganuova	8	TR 20	0.60		0.60		293.59	293.89	293.95	294.08	0.108424	1.91	1.91	0.31	1.88	1.49	1.49
Botteganuova	8	TR 30	0.80		0.80		293.59	293.93	294.00	294.15	0.108184	2.05	2.05	0.39	2.08	1.51	1.51
Botteganuova	8	TR 200	1.50		1.50		293.59	294.03	294.13	294.33	0.111977	2.44	2.44	0.62	2.60	1.60	1.60

BOTT. NUOVA Verifiche idrauliche F.sso in zona Bottega Nuova - moto permanente

F.SSO BOTTEGANUO Botteganuova

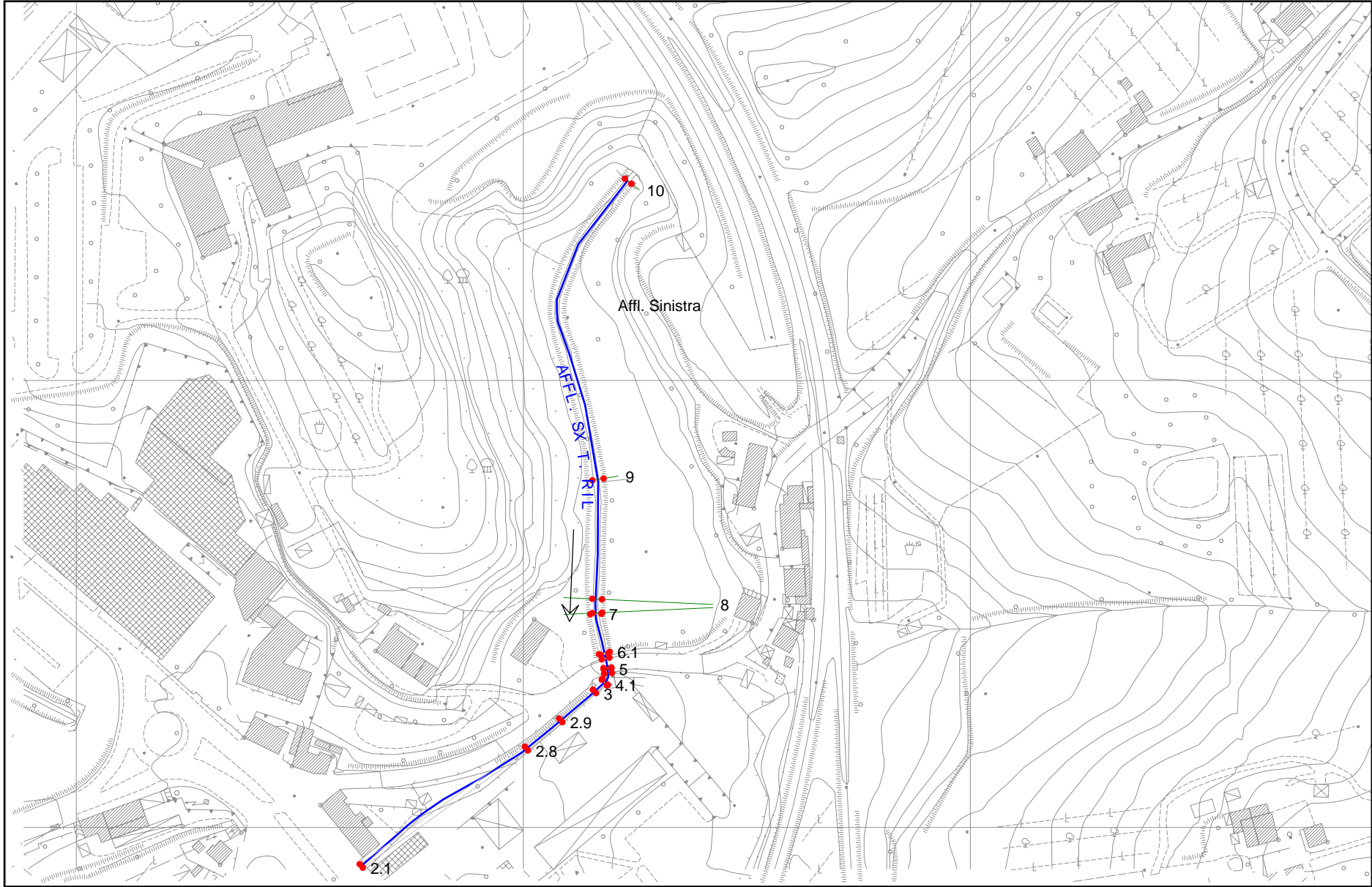


- Legend
- EG TR 200
- EG TR 30
- Crit TR 200
- EG TR 20
- WS TR 200
- Crit TR 30
- Crit TR 20
- WS TR 30
- WS TR 20
- Ground



**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**AFFLUENTE IN SINISTRA T. RILUOGO IN ZONA "LA VELOCE"**





HEC-RAS Plan: AFFL.RIL. River: AFFL.SX T.RIL. Reach: Affl.Sinistra

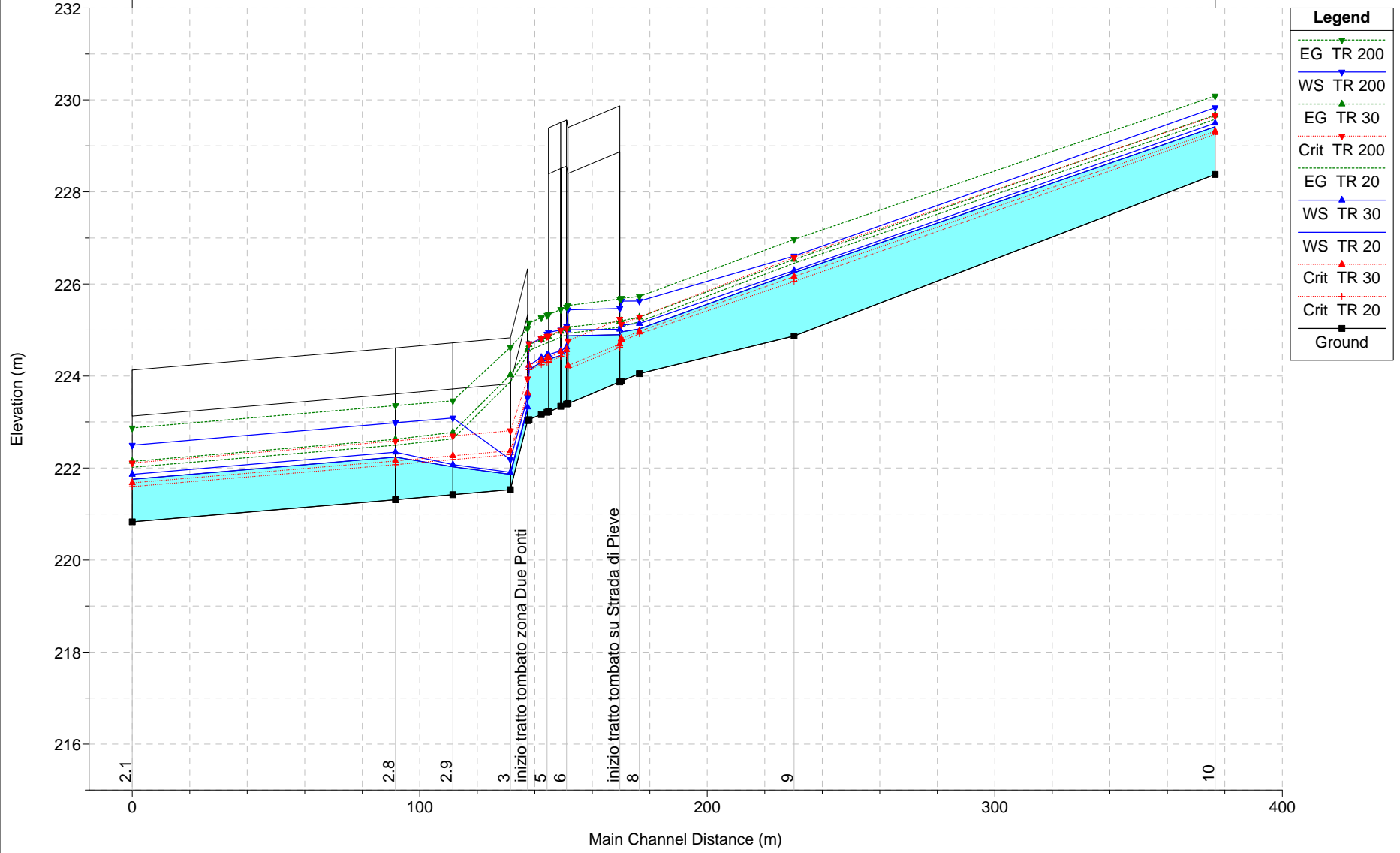
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Affl. Sinistra	10	TR 20	4.40	0.01	4.39		228.38	229.42	229.25	229.58	0.017377	1.79	1.76	2.49	4.28	0.70	0.74
Affl. Sinistra	10	TR 30	5.10	0.03	5.07	0.00	228.38	229.49	229.32	229.67	0.016120	1.85	1.79	2.85	4.78	0.69	0.74
Affl. Sinistra	10	TR 200	9.50	0.35	9.10	0.05	228.38	229.83	229.65	230.09	0.014787	2.27	1.97	4.83	6.95	0.70	0.75
Affl. Sinistra	9	TR 20	4.40		4.40		224.87	226.25	226.06	226.45	0.027628	2.01	2.01	2.19	3.11	0.76	0.76
Affl. Sinistra	9	TR 30	5.10		5.10		224.87	226.29	226.16	226.53	0.031616	2.18	2.18	2.34	3.29	0.82	0.82
Affl. Sinistra	9	TR 200	9.50		9.50		224.87	226.61	226.58	226.97	0.037582	2.66	2.66	3.57	4.53	0.95	0.95
Affl. Sinistra	8	TR 20	4.40	0.01	4.39		224.05	225.02	224.92	225.18	0.019116	1.76	1.72	2.55	5.71	0.74	0.82
Affl. Sinistra	8	TR 30	5.10	0.08	5.02		224.05	225.14	224.97	225.28	0.013871	1.67	1.53	3.33	7.64	0.64	0.74
Affl. Sinistra	8	TR 200	9.50	1.42	7.83	0.25	224.05	225.63	225.28	225.73	0.005603	1.52	0.98	9.69	17.26	0.45	0.42
Affl. Sinistra	7.1	TR 20	4.40	0.06	4.34		223.89	224.96	224.76	225.07	0.011463	1.49	1.39	3.18	7.30	0.58	0.67
Affl. Sinistra	7.1	TR 30	5.10	0.22	4.86	0.02	223.89	225.11	224.81	225.20	0.007354	1.36	1.12	4.56	10.96	0.48	0.55
Affl. Sinistra	7.1	TR 200	9.50	1.87	7.32	0.31	223.89	225.63	225.12	225.69	0.003232	1.25	0.75	12.60	19.92	0.35	0.30
Affl. Sinistra	7	TR 20	4.40		4.40		223.87	224.90	224.62	225.06	0.008006	1.79	1.79	2.46	2.79	0.61	0.61
Affl. Sinistra	7	TR 30	5.10		5.10		223.87	225.02	224.69	225.19	0.007585	1.82	1.82	2.80	2.88	0.59	0.59
Affl. Sinistra	7	TR 200	9.50		9.50		223.87	225.47	225.24	225.67	0.008899	2.01	2.01	4.74	5.00	0.66	0.66
Affl. Sinistra	6.1	TR 20	4.40		4.40		223.40	224.87	224.15	224.93	0.002932	1.07	1.07	4.11	5.00	0.38	0.38
Affl. Sinistra	6.1	TR 30	5.10		5.10		223.40	225.00	224.22	225.06	0.002526	1.07	1.07	4.76	5.00	0.35	0.35
Affl. Sinistra	6.1	TR 200	9.50		9.50		223.40	225.44	224.77	225.53	0.002898	1.37	1.37	6.94	5.00	0.37	0.37
Affl. Sinistra	6	TR 20	4.40		4.40		223.39	224.53	224.47	224.90	0.023849	2.69	2.69	1.64	1.88	0.92	0.92
Affl. Sinistra	6	TR 30	5.10		5.10		223.39	224.63	224.57	225.02	0.024005	2.79	2.79	1.83	1.95	0.92	0.92
Affl. Sinistra	6	TR 200	9.50		9.50		223.39	225.08	225.04	225.50	0.022394	2.86	2.86	3.32	3.50	0.94	0.94
Affl. Sinistra	5.9	TR 20	4.40		4.40		223.34	224.45	224.42	224.84	0.026296	2.79	2.79	1.58	1.85	0.97	0.97
Affl. Sinistra	5.9	TR 30	5.10		5.10		223.34	224.55	224.52	224.97	0.026152	2.88	2.88	1.77	1.93	0.96	0.96
Affl. Sinistra	5.9	TR 200	9.50		9.50		223.34	225.00	224.99	225.45	0.024696	2.96	2.96	3.21	3.50	0.99	0.99
Affl. Sinistra	5.1	TR 20	4.40		4.40		223.22	224.36	224.30	224.73	0.023623	2.68	2.68	1.64	1.88	0.91	0.91
Affl. Sinistra	5.1	TR 30	5.10		5.10		223.22	224.46	224.40	224.86	0.023659	2.77	2.77	1.84	1.96	0.91	0.91
Affl. Sinistra	5.1	TR 200	9.50		9.50		223.22	224.95	224.87	225.33	0.020103	2.76	2.76	3.45	3.50	0.89	0.89
Affl. Sinistra	5	TR 20	4.40		4.40		223.21	224.35	224.29	224.72	0.023876	2.69	2.69	1.64	1.87	0.92	0.92
Affl. Sinistra	5	TR 30	5.10		5.10		223.21	224.45	224.39	224.85	0.023895	2.79	2.79	1.83	1.95	0.92	0.92
Affl. Sinistra	5	TR 200	9.50		9.50		223.21	224.91	224.86	225.32	0.021761	2.83	2.83	3.35	3.50	0.92	0.92
Affl. Sinistra	4.9	TR 20	4.40		4.40		223.16	224.30	224.24	224.67	0.023803	2.69	2.69	1.64	1.88	0.92	0.92
Affl. Sinistra	4.9	TR 30	5.10		5.10		223.16	224.40	224.34	224.80	0.023843	2.78	2.78	1.83	1.95	0.92	0.92
Affl. Sinistra	4.9	TR 200	9.50		9.50		223.16	224.81	224.81	225.27	0.025329	2.98	2.98	3.18	3.50	1.00	1.00
Affl. Sinistra	4.1	TR 20	4.40		4.40		223.05	224.13	224.13	224.55	0.028127	2.86	2.86	1.54	1.83	1.00	1.00
Affl. Sinistra	4.1	TR 30	5.10		5.10		223.05	224.23	224.23	224.68	0.028297	2.97	2.97	1.72	1.91	1.00	1.00
Affl. Sinistra	4.1	TR 200	9.50		9.50		223.05	224.70	224.70	225.16	0.025468	2.99	2.99	3.18	3.50	1.00	1.00
Affl. Sinistra	4	TR 20	4.40		4.40		223.03	223.29	223.58	224.45	0.065095	4.77	4.77	0.92	3.50	2.97	2.97
Affl. Sinistra	4	TR 30	5.10		5.10		223.03	223.32	223.63	224.58	0.061953	4.96	4.96	1.03	3.50	2.92	2.92
Affl. Sinistra	4	TR 200	9.50		9.50		223.03	223.53	223.94	225.03	0.041652	5.43	5.43	1.75	3.50	2.45	2.45

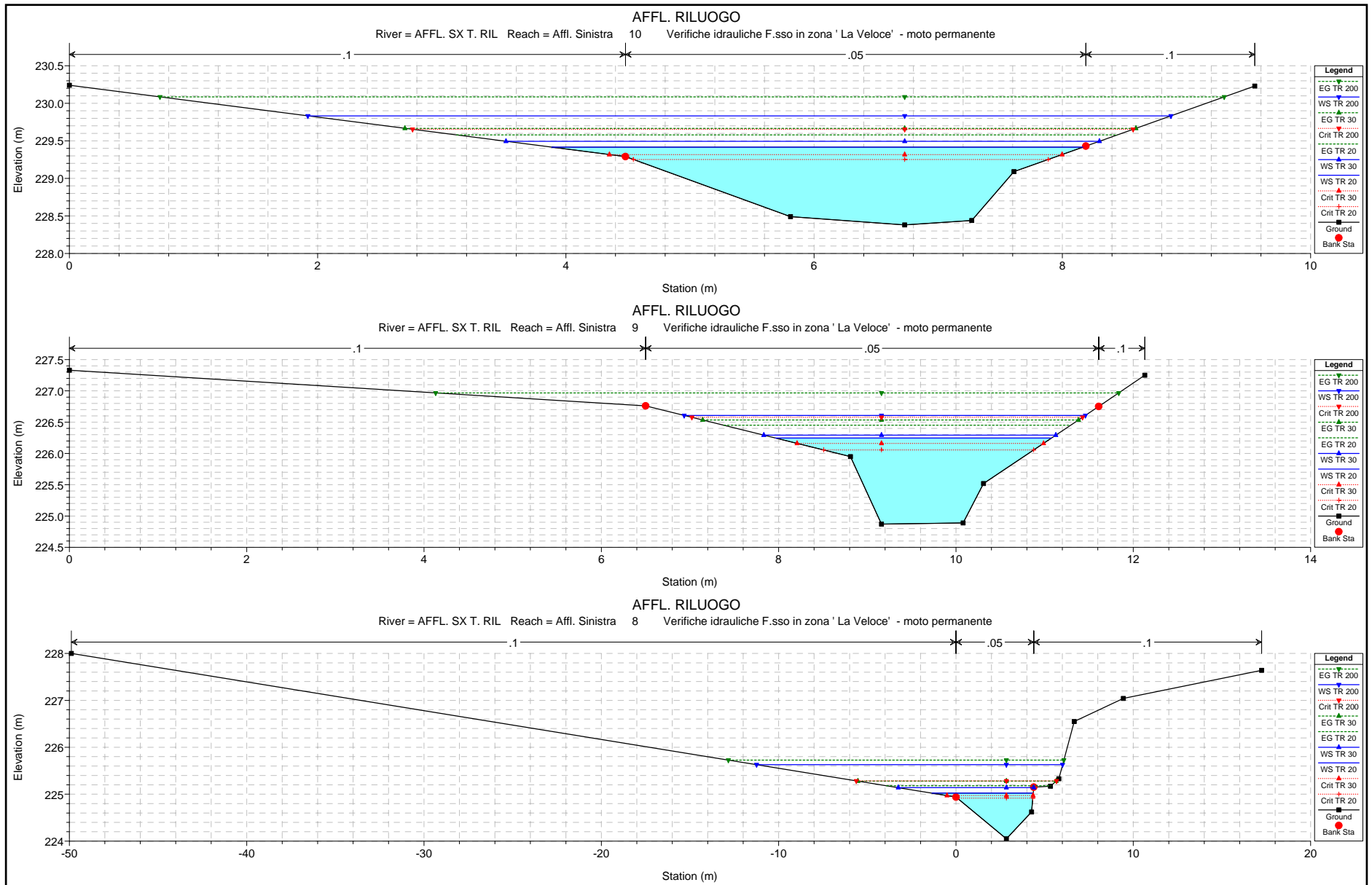
HEC-RAS Plan: AFLL. RIL. River: AFLL. SX T. RIL. Reach: Affl. Sinistra (Continued)

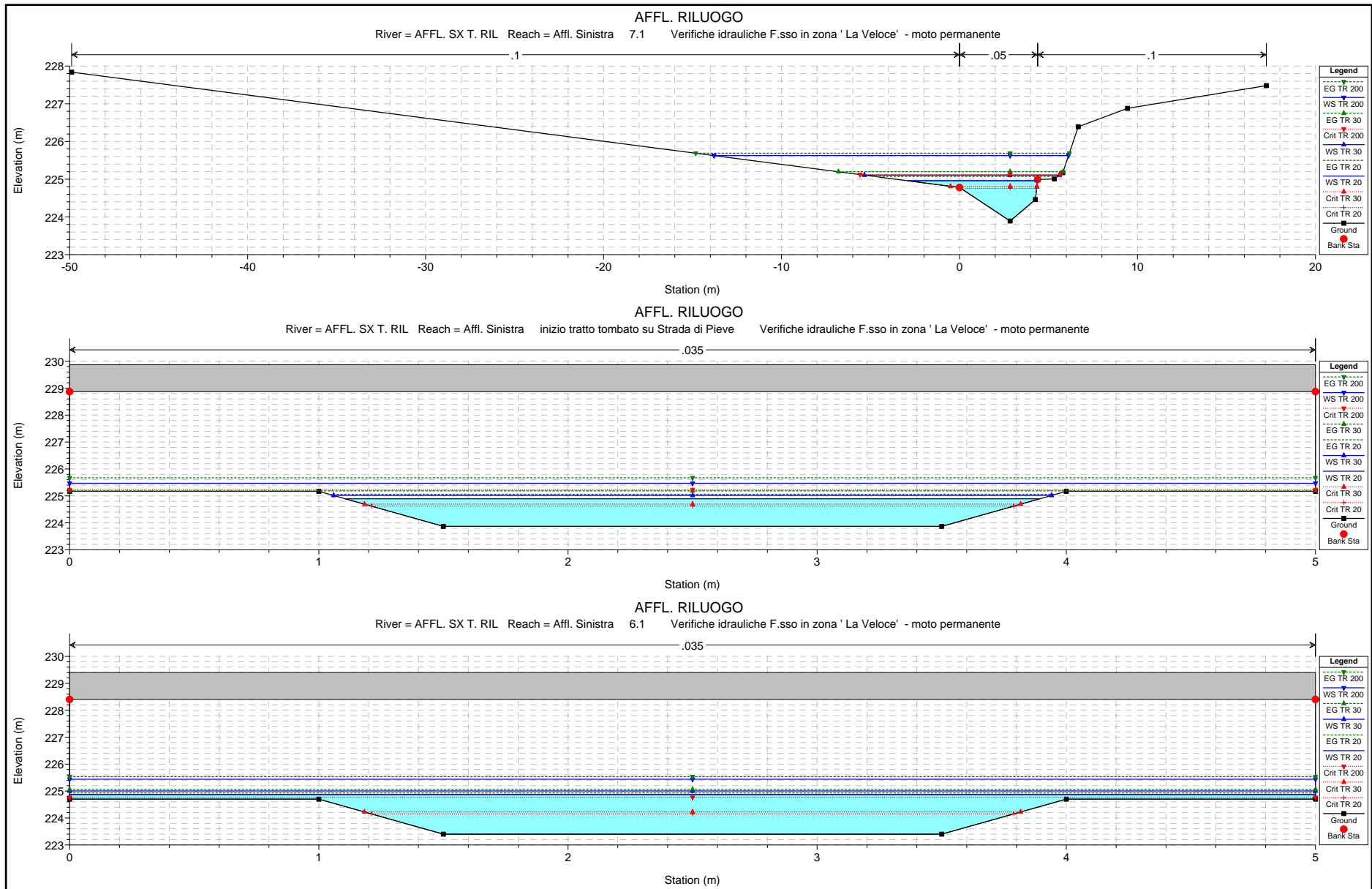
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Affl. Sinistra	3	TR 20	4.40		4.40		221.53	221.86	222.29	223.88	0.098848	6.29	6.29	0.70	2.10	3.48	3.48
Affl. Sinistra	3	TR 30	5.10		5.10		221.53	221.91	222.38	224.03	0.092243	6.45	6.45	0.79	2.10	3.36	3.36
Affl. Sinistra	3	TR 200	9.50		9.50		221.53	222.18	222.81	224.62	0.064355	6.92	6.92	1.37	2.10	2.73	2.73
Affl. Sinistra	2.9	TR 20	4.40		4.40		221.42	222.03	222.18	222.63	0.017101	3.46	3.46	1.27	2.10	1.42	1.42
Affl. Sinistra	2.9	TR 30	5.10		5.10		221.42	222.07	222.27	222.78	0.018513	3.71	3.71	1.37	2.10	1.47	1.47
Affl. Sinistra	2.9	TR 200	9.50		9.50		221.42	223.09	222.70	223.46	0.005297	2.71	2.71	3.50	2.10	0.67	0.67
Affl. Sinistra	2.8	TR 20	4.40		4.40		221.31	222.24	222.07	222.50	0.005227	2.26	2.26	1.95	2.10	0.75	0.75
Affl. Sinistra	2.8	TR 30	5.10		5.10		221.31	222.35	222.16	222.63	0.005233	2.34	2.34	2.18	2.10	0.73	0.73
Affl. Sinistra	2.8	TR 200	9.50		9.50		221.31	222.98	222.59	223.36	0.005251	2.70	2.70	3.51	2.10	0.67	0.67
Affl. Sinistra	2.1	TR 20	4.40		4.40		220.83	221.75	221.60	222.02	0.005301	2.27	2.27	1.94	2.10	0.75	0.75
Affl. Sinistra	2.1	TR 30	5.10		5.10		220.83	221.86	221.68	222.14	0.005300	2.35	2.35	2.17	2.10	0.74	0.74
Affl. Sinistra	2.1	TR 200	9.50		9.50		220.83	222.50	222.11	222.87	0.005301	2.72	2.72	3.50	2.10	0.67	0.67

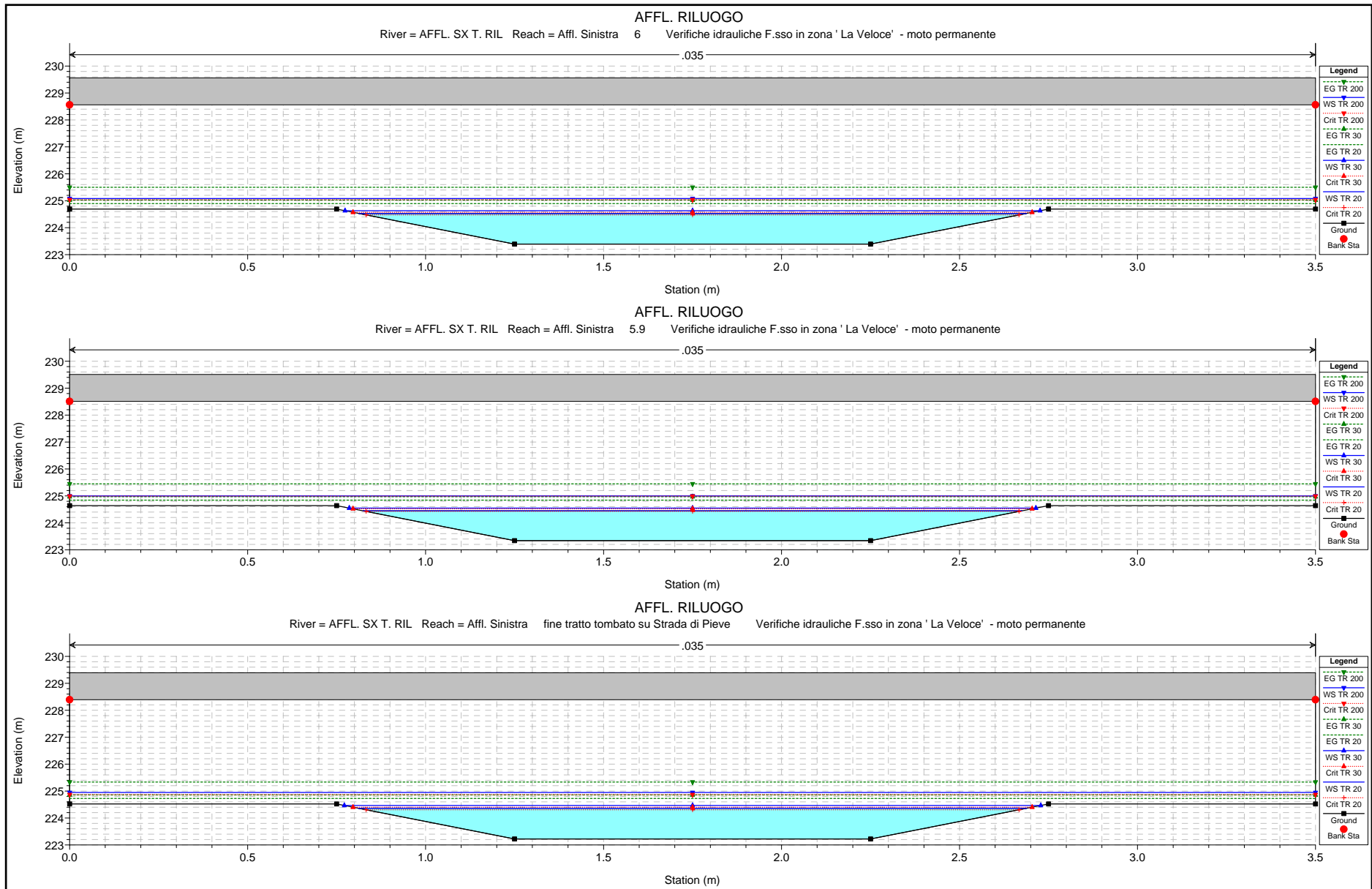
AFFL. RILUOGO Verifiche idrauliche F.sso in zona "La Veloce" - moto permanente

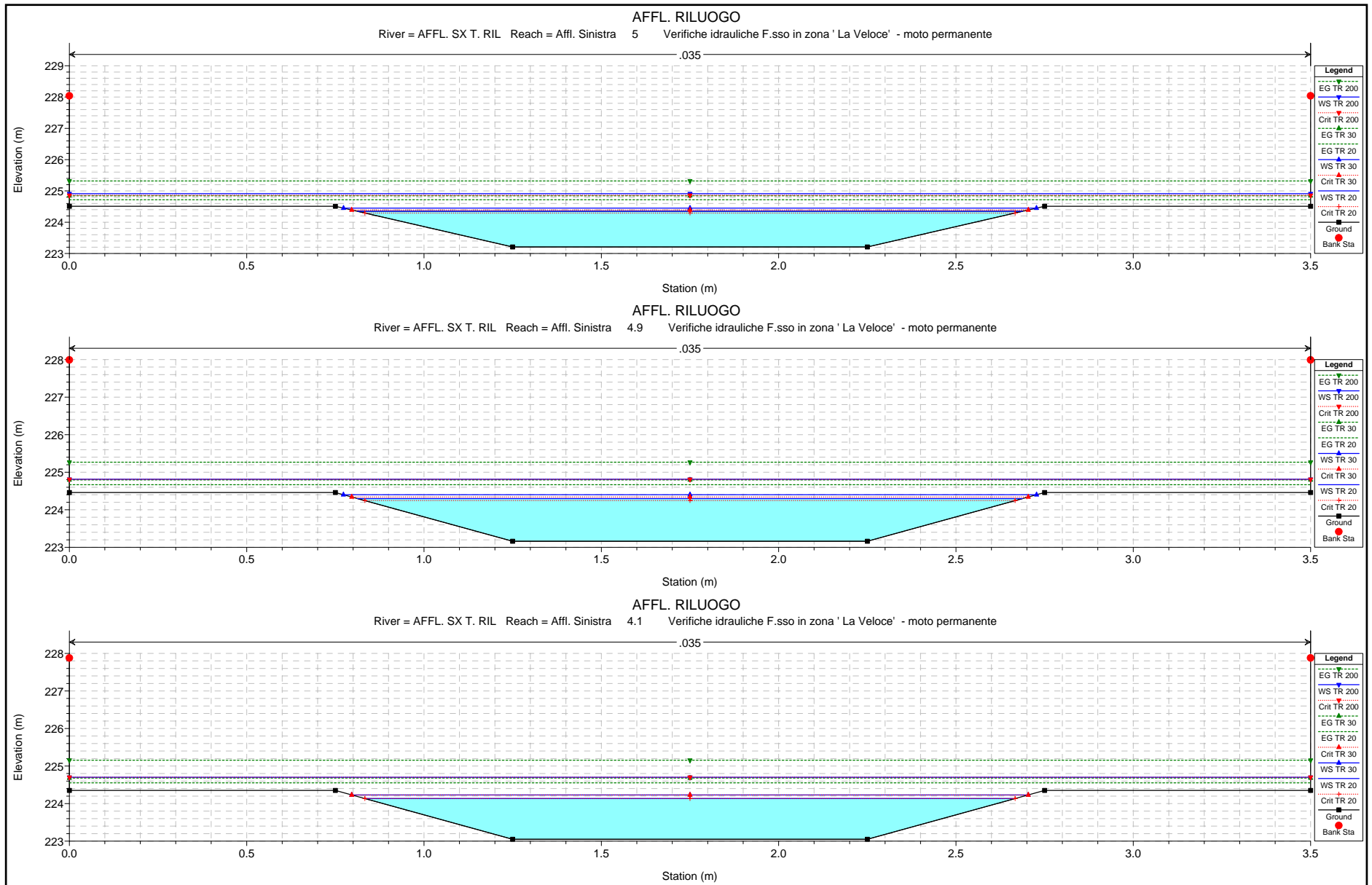
AFFL. SX T. RIL Affl. Sinistra

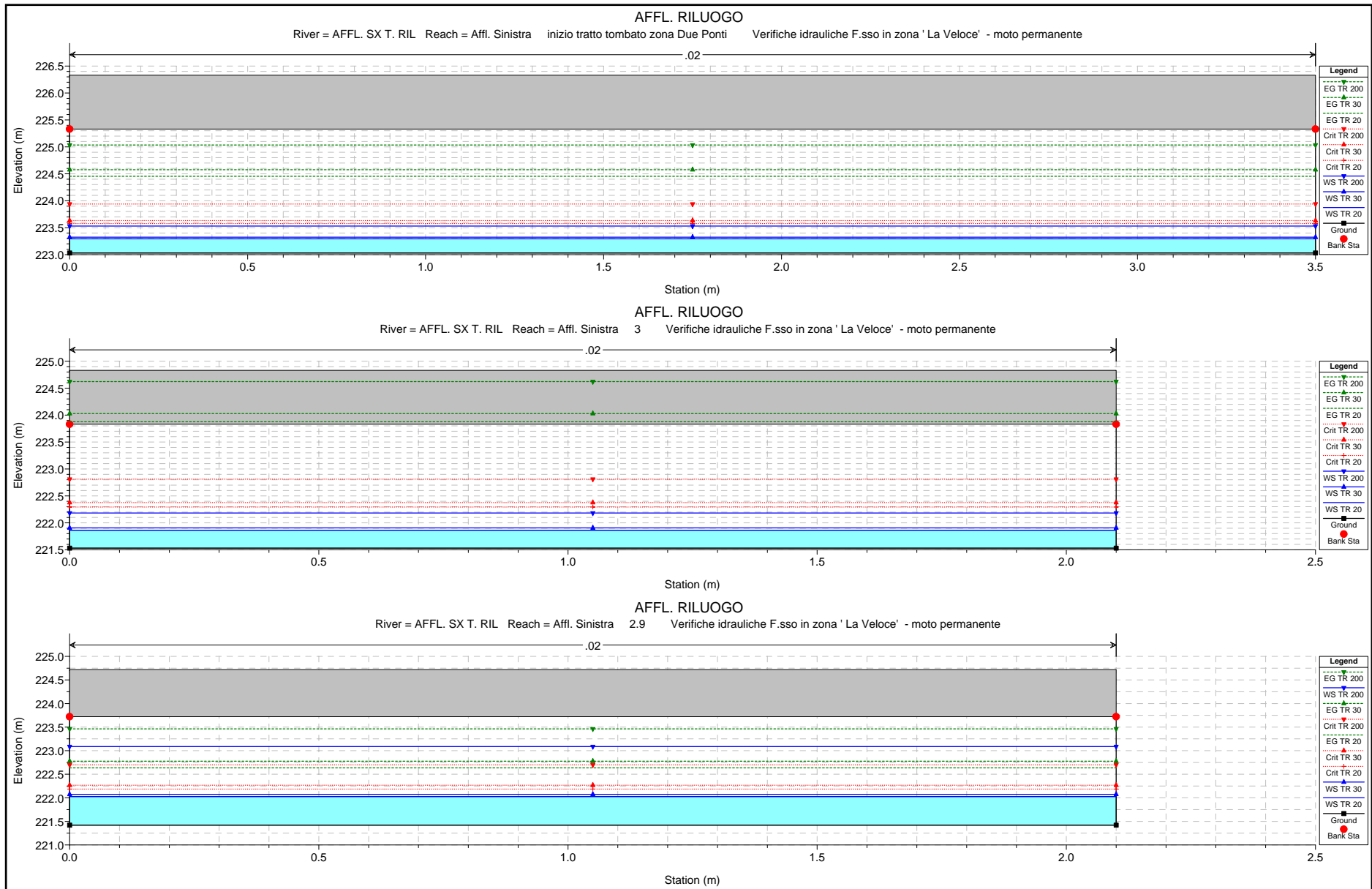




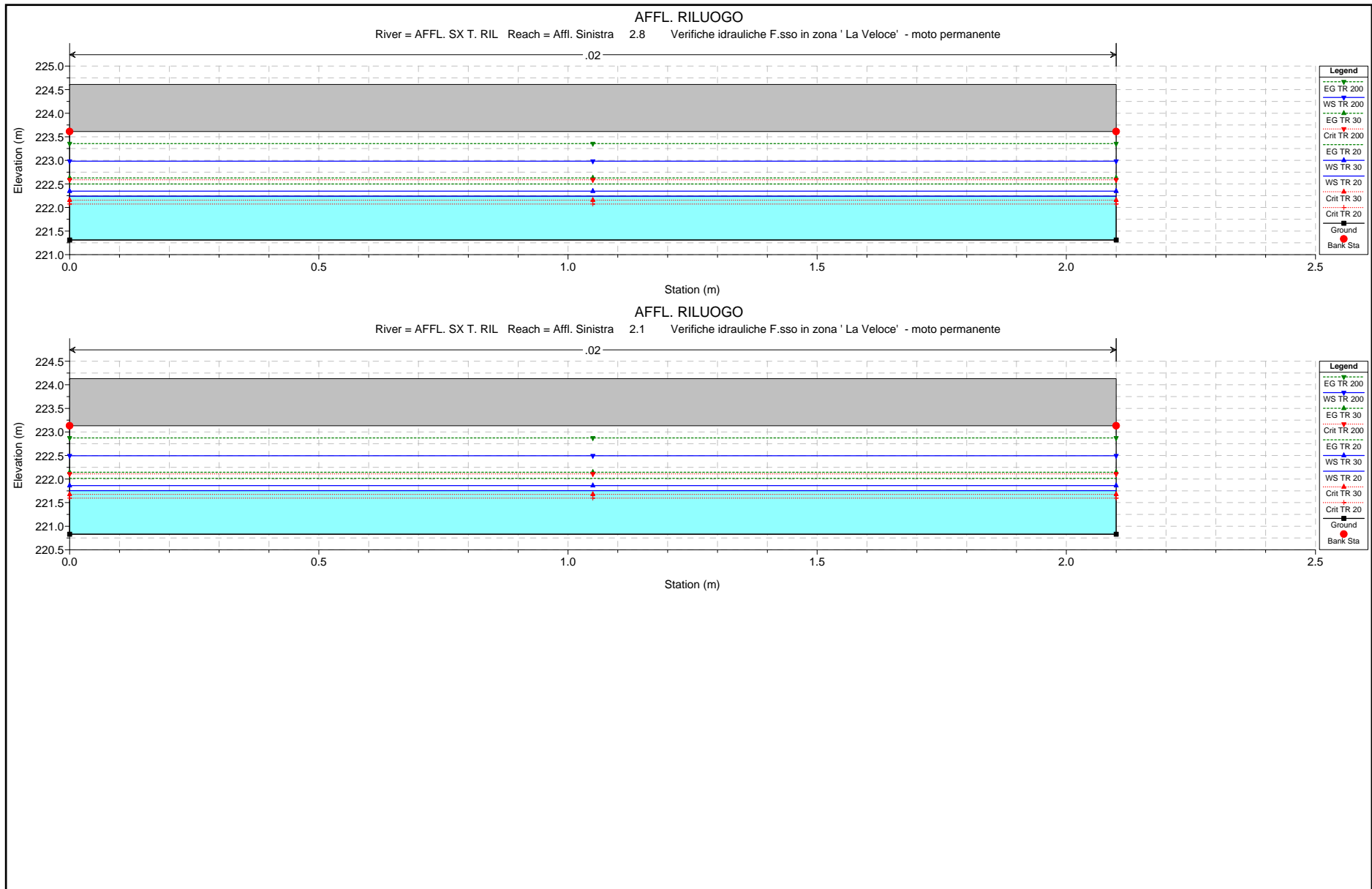












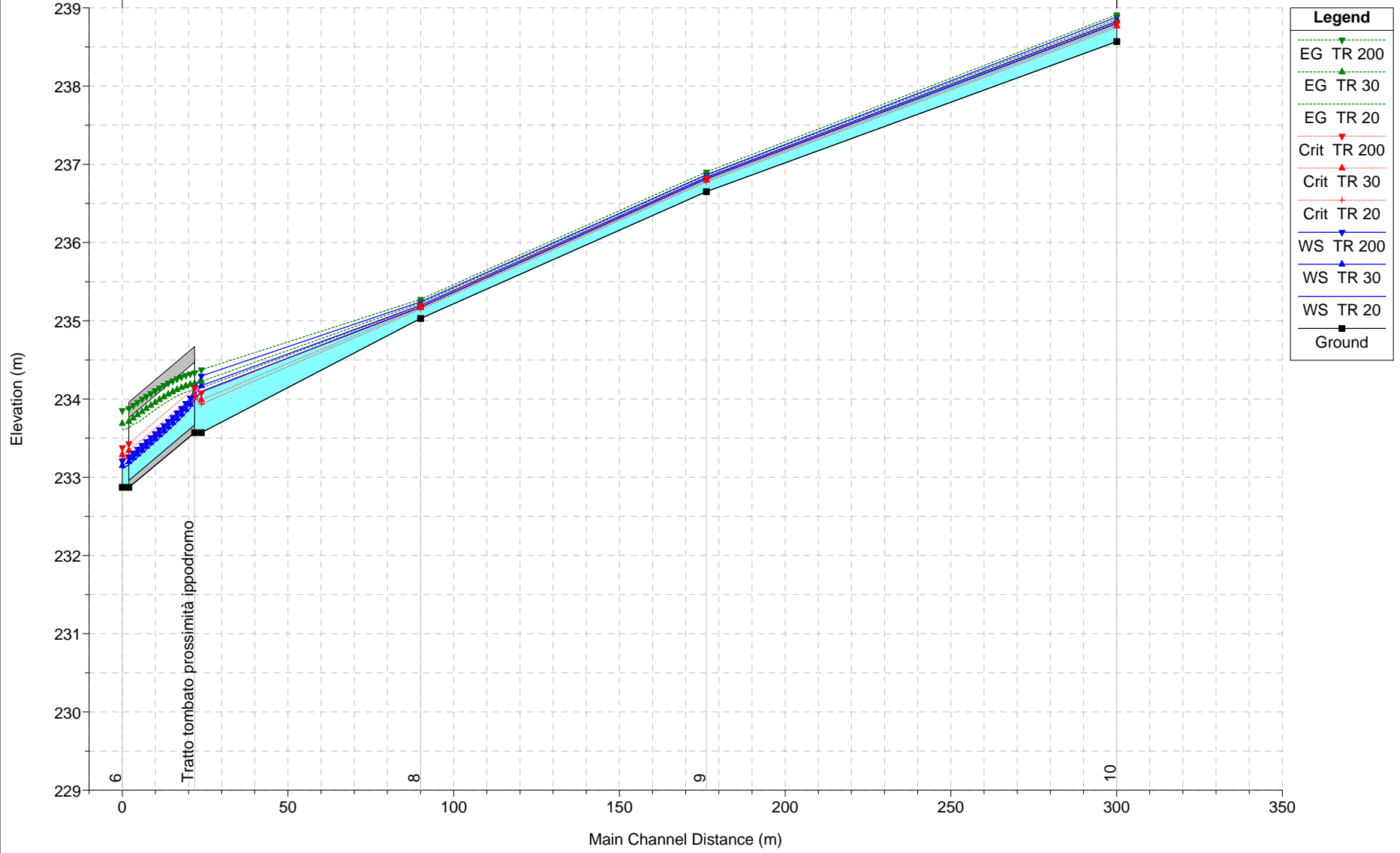
**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**AFFLUENTE IN SINISTRA T. SORRA IN ZONA "PIAN DELLE FORNACI"**



AFFL. SX SORRA Verifiche idrauliche F.sso in zona Pian delle Fornaci - moto permanente

AFFL. SX T. SORRA Affl. sinistra

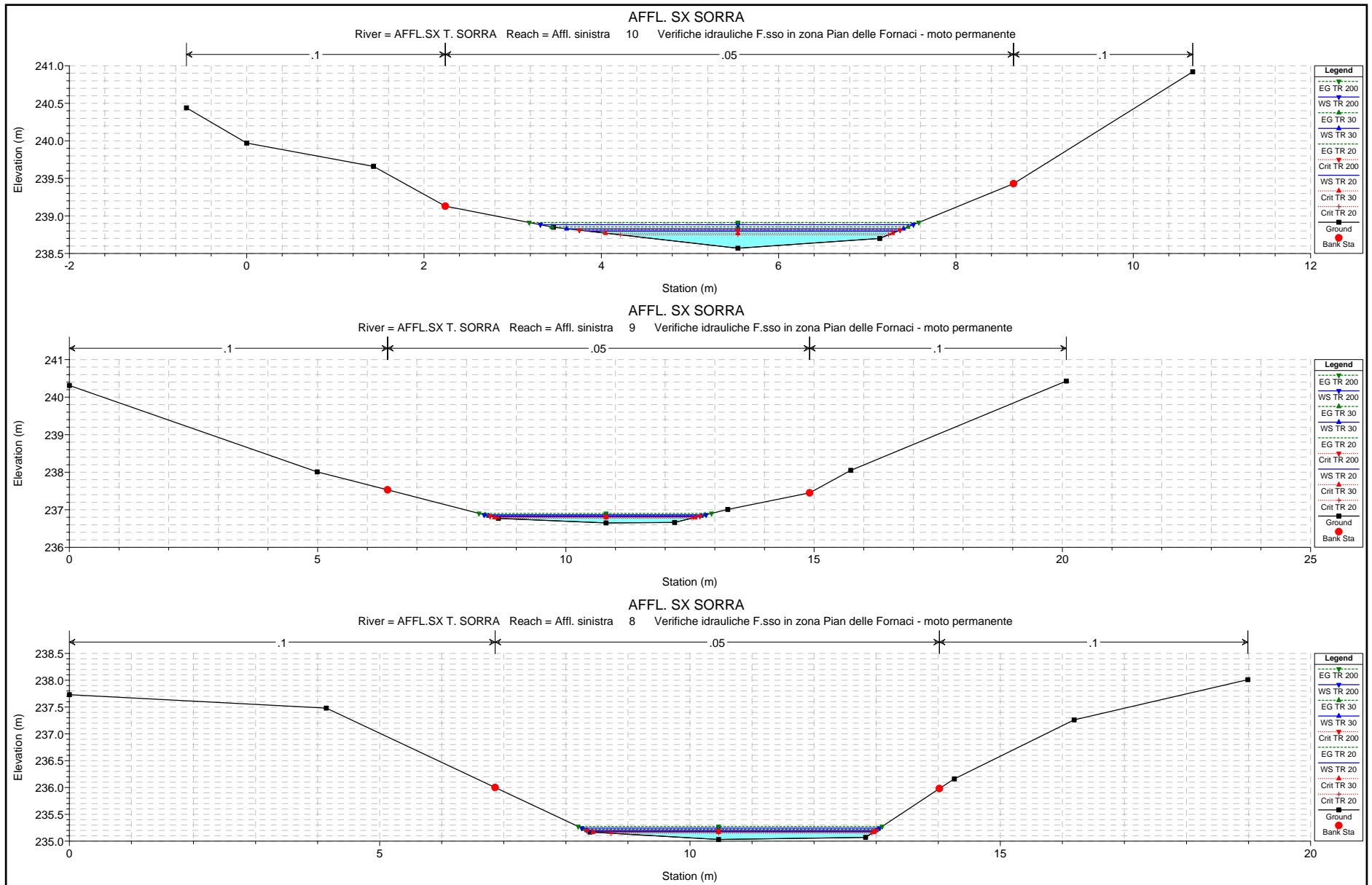


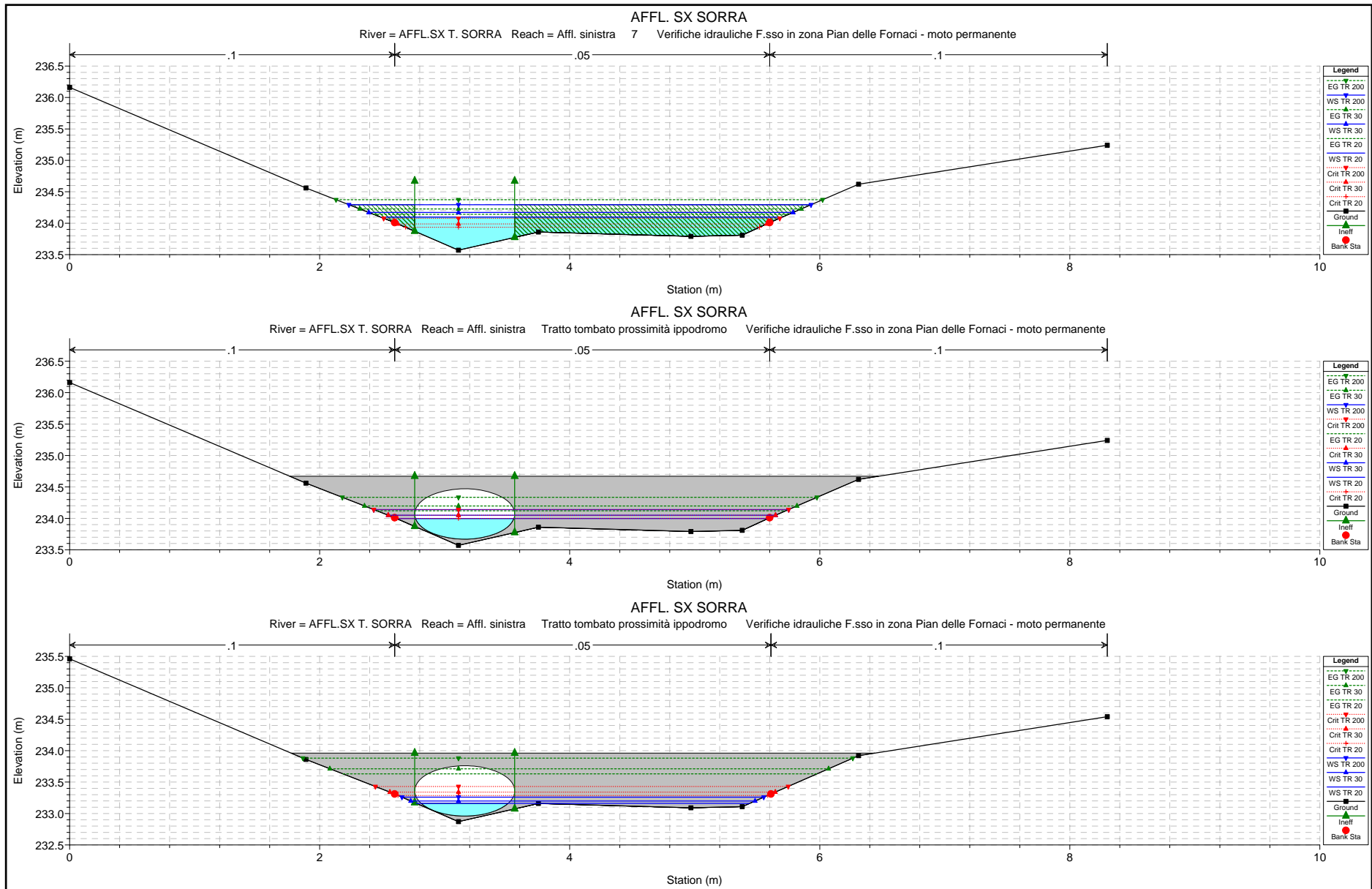
HEC-RAS Plan: AFFL. SORRA

River	Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
AFFL.SX T. SORRA	Affl. sinistra	10	TR 20	0.30		0.30		238.57	238.80	238.75	238.82	0.015632	0.65	0.65	0.46	3.50	0.57	0.57
AFFL.SX T. SORRA	Affl. sinistra	10	TR 30	0.40		0.40		238.57	238.83	238.77	238.85	0.014813	0.69	0.69	0.58	3.80	0.56	0.56
AFFL.SX T. SORRA	Affl. sinistra	10	TR 200	0.60		0.60		238.57	238.88	238.81	238.91	0.013291	0.75	0.75	0.80	4.21	0.55	0.55
AFFL.SX T. SORRA	Affl. sinistra	9	TR 20	0.30		0.30		236.65	236.82	236.78	236.83	0.016387	0.61	0.61	0.49	4.16	0.57	0.57
AFFL.SX T. SORRA	Affl. sinistra	9	TR 30	0.40		0.40		236.65	236.84	236.80	236.86	0.017612	0.69	0.69	0.58	4.28	0.60	0.60
AFFL.SX T. SORRA	Affl. sinistra	9	TR 200	0.60		0.60		236.65	236.87	236.83	236.90	0.020818	0.84	0.84	0.71	4.47	0.67	0.67
AFFL.SX T. SORRA	Affl. sinistra	8	TR 20	0.30		0.30		235.03	235.18	235.15	235.20	0.022650	0.65	0.65	0.46	4.59	0.65	0.65
AFFL.SX T. SORRA	Affl. sinistra	8	TR 30	0.40		0.40		235.03	235.20	235.17	235.22	0.020630	0.70	0.70	0.57	4.66	0.64	0.64
AFFL.SX T. SORRA	Affl. sinistra	8	TR 200	0.60		0.60		235.03	235.24	235.20	235.27	0.016993	0.77	0.77	0.78	4.80	0.61	0.61
AFFL.SX T. SORRA	Affl. sinistra	7	TR 20	0.30		0.30		233.57	234.10	233.94	234.14	0.009142	0.93	0.93	0.32	3.22	0.47	0.47
AFFL.SX T. SORRA	Affl. sinistra	7	TR 30	0.40		0.40		233.57	234.17	233.99	234.23	0.009330	1.05	1.05	0.38	3.39	0.48	0.48
AFFL.SX T. SORRA	Affl. sinistra	7	TR 200	0.60		0.60		233.57	234.29	234.08	234.37	0.009762	1.25	1.25	0.48	3.70	0.51	0.51
AFFL.SX T. SORRA	Affl. sinistra	6.5	Culvert #1	0.30														
AFFL.SX T. SORRA	Affl. sinistra	6.5	Culvert #1	0.40														
AFFL.SX T. SORRA	Affl. sinistra	6.5	Culvert #1	0.60														
AFFL.SX T. SORRA	Affl. sinistra	6	TR 20	0.30		0.30		232.87	233.11	233.24	233.61	0.452977	3.12	3.12	0.10	1.59	0.47	0.47
AFFL.SX T. SORRA	Affl. sinistra	6	TR 30	0.40		0.40		232.87	233.15	233.29	233.69	0.385411	3.25	3.25	0.12	2.37	0.48	0.48
AFFL.SX T. SORRA	Affl. sinistra	6	TR 200	0.60		0.60		232.87	233.20	233.38	233.85	0.324426	3.57	3.57	0.17	2.76	0.51	0.51

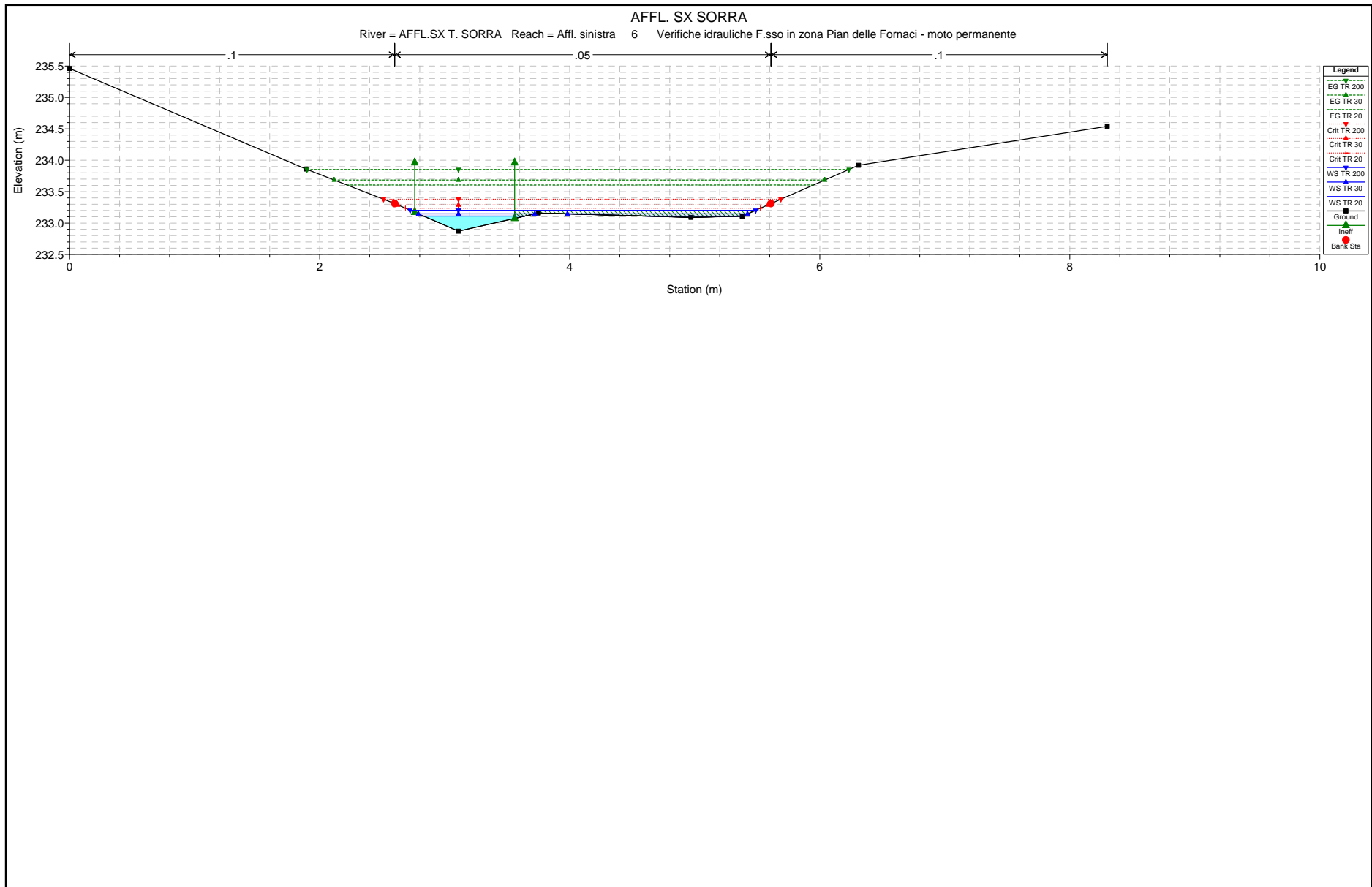
HEC-RAS Plan: AFF.SIN BOLG

River	Reach	River Sta	Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR20	295.48	295.48	295.48	294.37	295.40	0.90	0.51	2.67	4.56	7.02
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR30	295.51	295.50	295.51	295.48	295.40	0.90	0.80	2.57	4.58	4.58
AFF.SIN BOLGIONE	Aff. in sinistra	7.5 Culvert #1	TR200	295.60	295.59	295.60	295.59	295.40	0.91	2.29	2.13	4.66	4.66



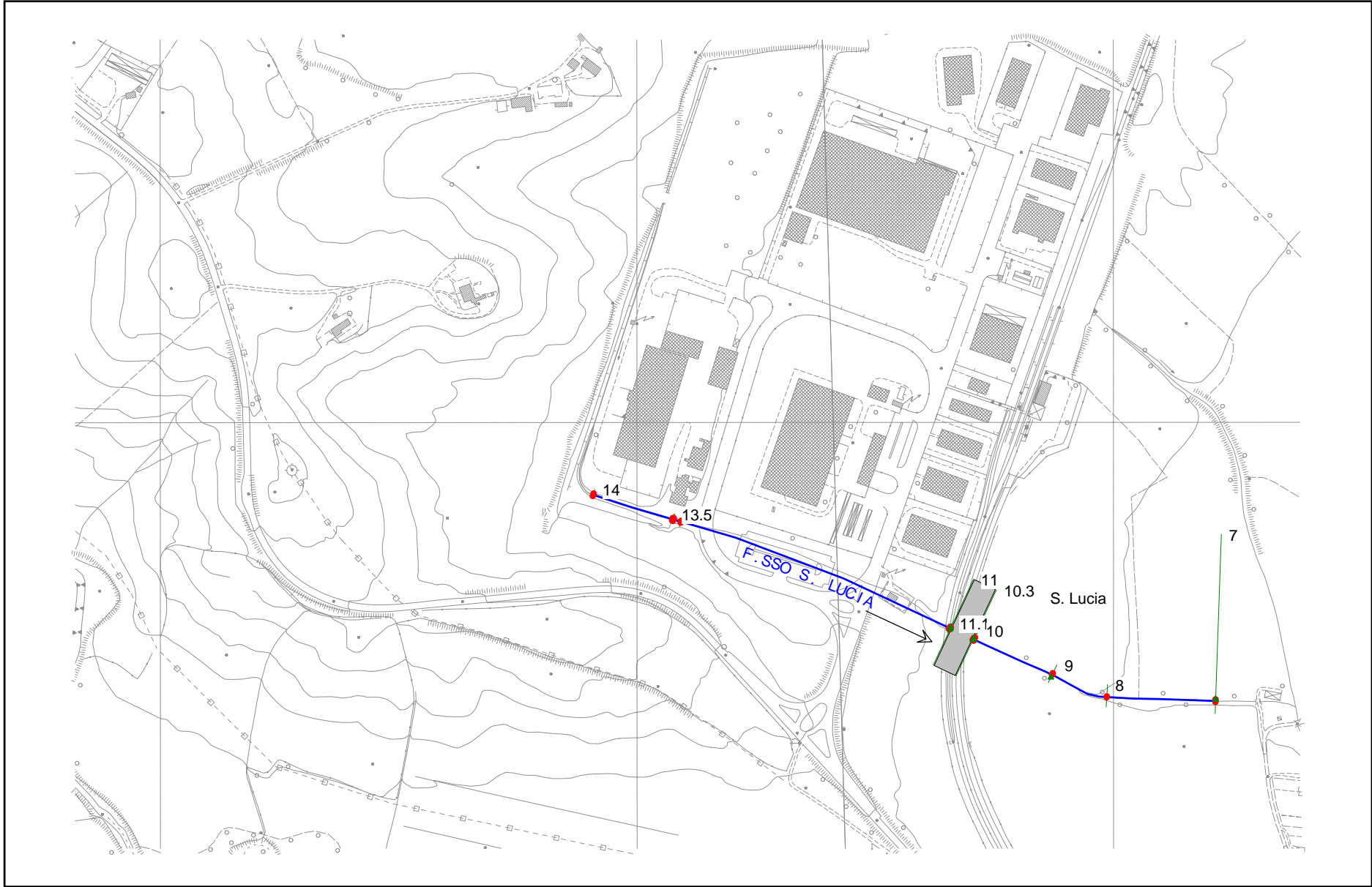






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO S. LUCIA**



HEC-RAS Plan: S. LUCIA River: F.SSO S. LUCIA Reach: S. Lucia

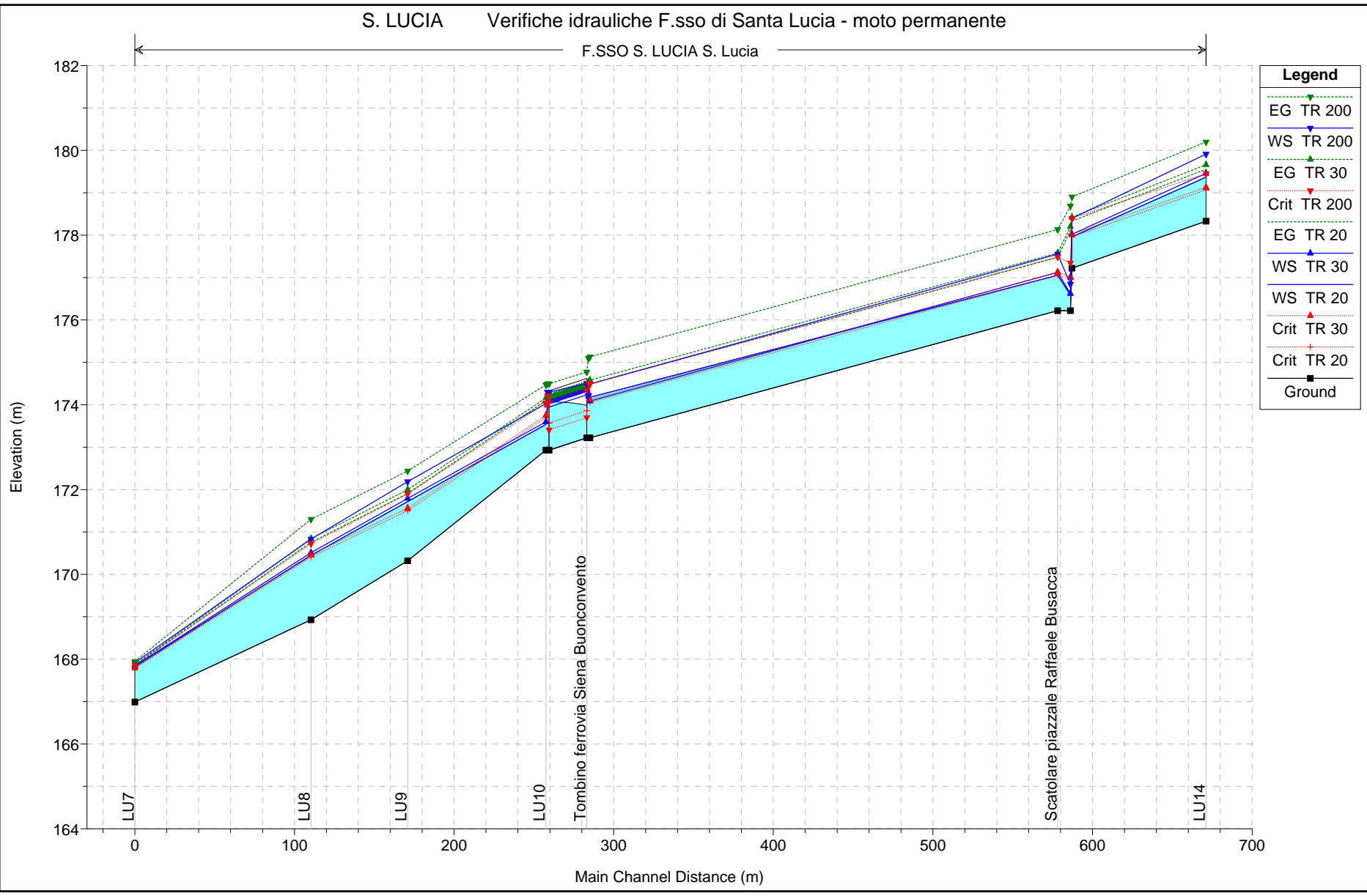
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
S. Lucia	14	TR 20	4.80		4.80		178.33	179.37	179.07	179.56	0.009983	1.93	1.93	2.49	2.40	0.61	0.61
S. Lucia	14	TR 30	5.40		5.40		178.33	179.46	179.13	179.66	0.010063	2.00	2.00	2.71	2.40	0.60	0.60
S. Lucia	14	TR 200	9.00		9.00		178.33	179.91	179.45	180.20	0.011484	2.37	2.37	3.79	2.40	0.60	0.60
S. Lucia	13.5	TR 20	4.80		4.80		177.22	177.96	177.96	178.33	0.025473	2.71	2.71	1.77	2.40	1.01	1.01
S. Lucia	13.5	TR 30	5.40		5.40		177.22	178.02	178.02	178.42	0.025853	2.82	2.82	1.92	2.40	1.01	1.01
S. Lucia	13.5	TR 200	9.00	0.01	8.94	0.05	177.22	178.40	178.40	178.90	0.022210	3.17	2.98	3.02	4.38	0.93	1.15
S. Lucia	13	TR 20	4.80		4.80		176.22	176.59	176.96	178.11	0.199030	5.46	5.46	0.88	2.40	2.88	2.88
S. Lucia	13	TR 30	5.40		5.40		176.22	176.62	177.02	178.20	0.186817	5.56	5.56	0.97	2.40	2.79	2.79
S. Lucia	13	TR 200	9.00		9.00		176.22	176.84	177.34	178.69	0.145190	6.01	6.01	1.50	2.40	2.43	2.43
S. Lucia	12	TR 20	4.80		4.80		176.22	177.05	177.05	177.48	0.009458	2.88	2.88	1.67	2.00	1.01	1.01
S. Lucia	12	TR 30	5.40		5.40		176.22	177.12	177.12	177.58	0.009670	2.99	2.99	1.81	2.00	1.00	1.00
S. Lucia	12	TR 200	9.00		9.00		176.22	177.55	177.49	178.13	0.009622	3.38	3.38	2.67	2.00	0.93	0.93
S. Lucia	11.1	TR 20	4.80		4.80		173.22	174.18	174.05	174.50	0.006548	2.51	2.51	1.91	2.00	0.82	0.82
S. Lucia	11.1	TR 30	5.40		5.40		173.22	174.09	174.12	174.58	0.010769	3.11	3.11	1.74	2.00	1.07	1.07
S. Lucia	11.1	TR 200	9.00		9.00		173.22	174.49	174.49	175.13	0.010921	3.55	3.55	2.54	2.00	1.01	1.01
S. Lucia	11	TR 20	4.80		3.75	1.05	173.22	174.23	174.23	174.46	0.003372	2.41	0.75	6.43	52.69	0.81	0.45
S. Lucia	11	TR 30	5.40		4.30	1.10	173.22	174.20	174.29	174.54	0.004932	2.86	0.92	5.89	50.55	0.97	0.57
S. Lucia	11	TR 200	9.00		7.11	1.89	173.22	174.22	174.51	175.09	0.012890	4.66	1.47	6.11	51.45	1.57	0.91
S. Lucia	10.5 Culvert #1	TR 20	4.80														
S. Lucia	10.5 Culvert #1	TR 30	5.40														
S. Lucia	10.5 Culvert #1	TR 200	9.00														
S. Lucia	10.3	TR 20	4.80		3.74	1.06	172.93	173.95	173.95	174.17	0.003308	2.40	0.74	6.51	52.99	0.80	0.45
S. Lucia	10.3	TR 30	5.40		4.06	1.34	172.93	173.99	173.99	174.23	0.003292	2.47	0.72	7.50	56.65	0.80	0.42
S. Lucia	10.3	TR 200	9.00		5.43	3.57	172.93	174.30	174.22	174.50	0.002354	2.51	0.58	15.60	80.06	0.71	0.28
S. Lucia	10	TR 20	5.40	0.01	5.38	0.01	172.93	173.54	173.70	174.10	0.081752	3.32	3.26	1.65	3.86	1.54	1.59
S. Lucia	10	TR 30	6.10	0.02	6.07	0.01	172.93	173.60	173.75	174.16	0.070215	3.33	3.23	1.89	4.03	1.45	1.51
S. Lucia	10	TR 200	10.30	0.23	9.89	0.18	172.93	174.03	174.04	174.47	0.025778	3.00	2.63	3.91	5.34	0.97	0.98
S. Lucia	9	TR 20	5.40	0.50	4.48	0.42	170.32	171.72	171.50	171.91	0.012937	2.11	1.49	3.61	5.12	0.63	0.57
S. Lucia	9	TR 30	6.10	0.61	4.97	0.52	170.32	171.79	171.56	171.99	0.012809	2.19	1.52	4.01	5.38	0.63	0.56
S. Lucia	9	TR 200	10.30	1.42	7.64	1.24	170.32	172.19	171.90	172.44	0.011884	2.54	1.61	6.40	9.49	0.64	0.53
S. Lucia	8	TR 20	5.40	1.32	3.24	0.84	168.93	170.45	170.41	170.76	0.034100	3.04	1.81	2.99	4.31	0.84	0.69
S. Lucia	8	TR 30	6.10	1.56	3.55	0.99	168.93	170.51	170.47	170.84	0.035233	3.19	1.87	3.27	4.51	0.86	0.70
S. Lucia	8	TR 200	10.30	2.78	5.43	2.10	168.93	170.83	170.73	171.30	0.041436	3.96	2.09	4.94	6.54	0.96	0.77
S. Lucia	7	TR 20	5.40	3.92	1.48		166.99	167.83	167.79	167.86	0.017007	1.37	0.44	12.23	81.97	0.63	0.36
S. Lucia	7	TR 30	6.10	4.54	1.56		166.99	167.84	167.79	167.87	0.017020	1.39	0.45	13.54	85.99	0.64	0.36
S. Lucia	7	TR 200	10.30	8.36	1.94		166.99	167.92	167.86	167.95	0.017000	1.50	0.50	20.77	105.44	0.65	0.36

HEC-RAS Plan: S. LUCIA River: F.SSO S. LUCIA Reach: S. Lucia

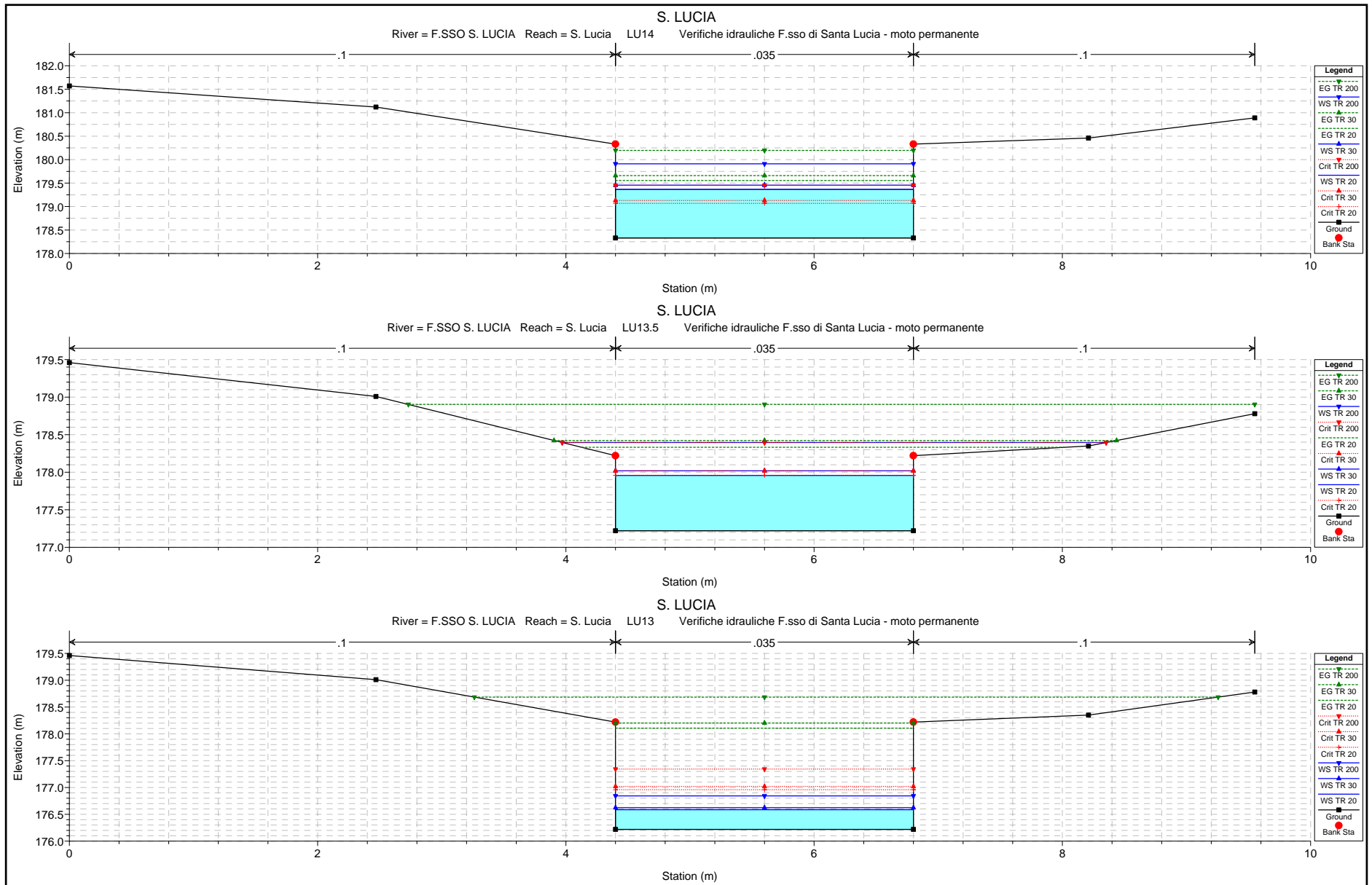
Reach	River Sta		Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
				(m)	(m)	(m)	(m)	(m)	(m3/s)	(m3/s)	(m)	(m/s)	(m/s)
S. Lucia	10.5	Culvert #1	TR 20	174.25	174.23	174.25	174.25	173.78	2.24	2.56	0.29	2.09	1.40
S. Lucia	10.5	Culvert #1	TR 30	174.54	174.20			173.78	2.27		0.21	1.41	1.41
S. Lucia	10.5	Culvert #1	TR 200	175.09	174.22	174.50	174.51	173.78	1.45	7.55	0.08	0.74	0.74

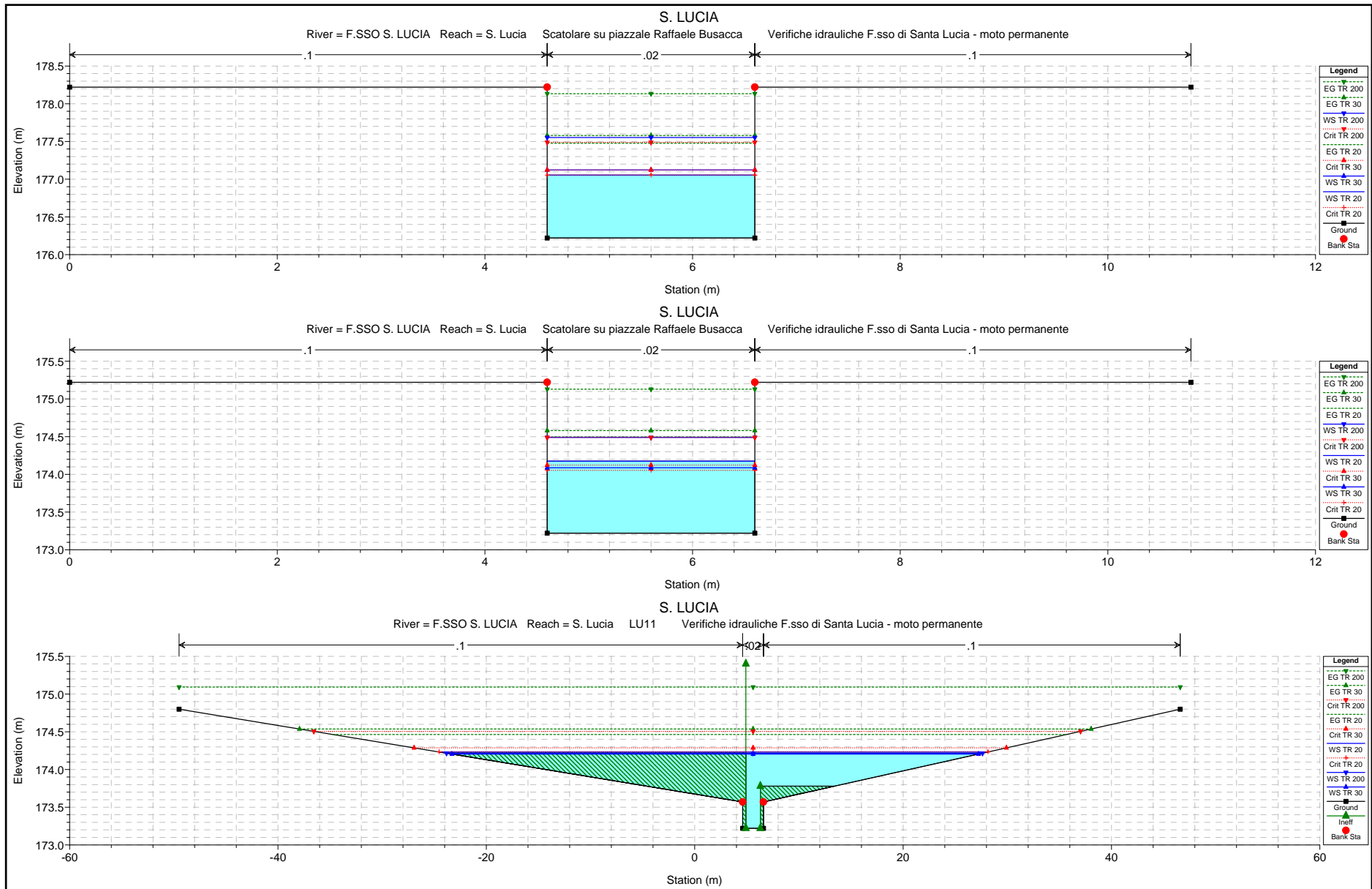
S. LUCIA Verifiche idrauliche F.sso di Santa Lucia - moto permanente

F.SSO S. LUCIA S. Lucia

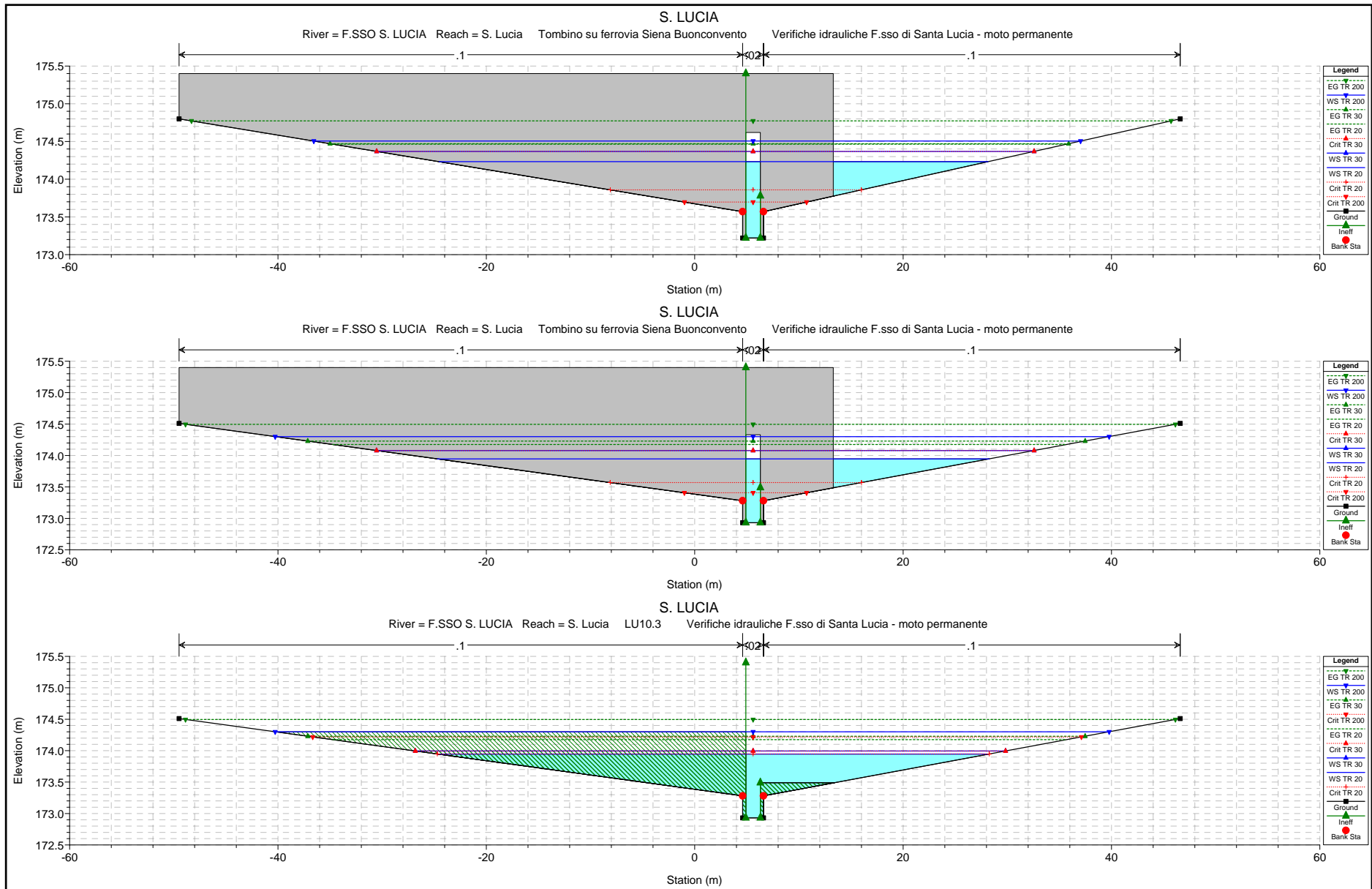


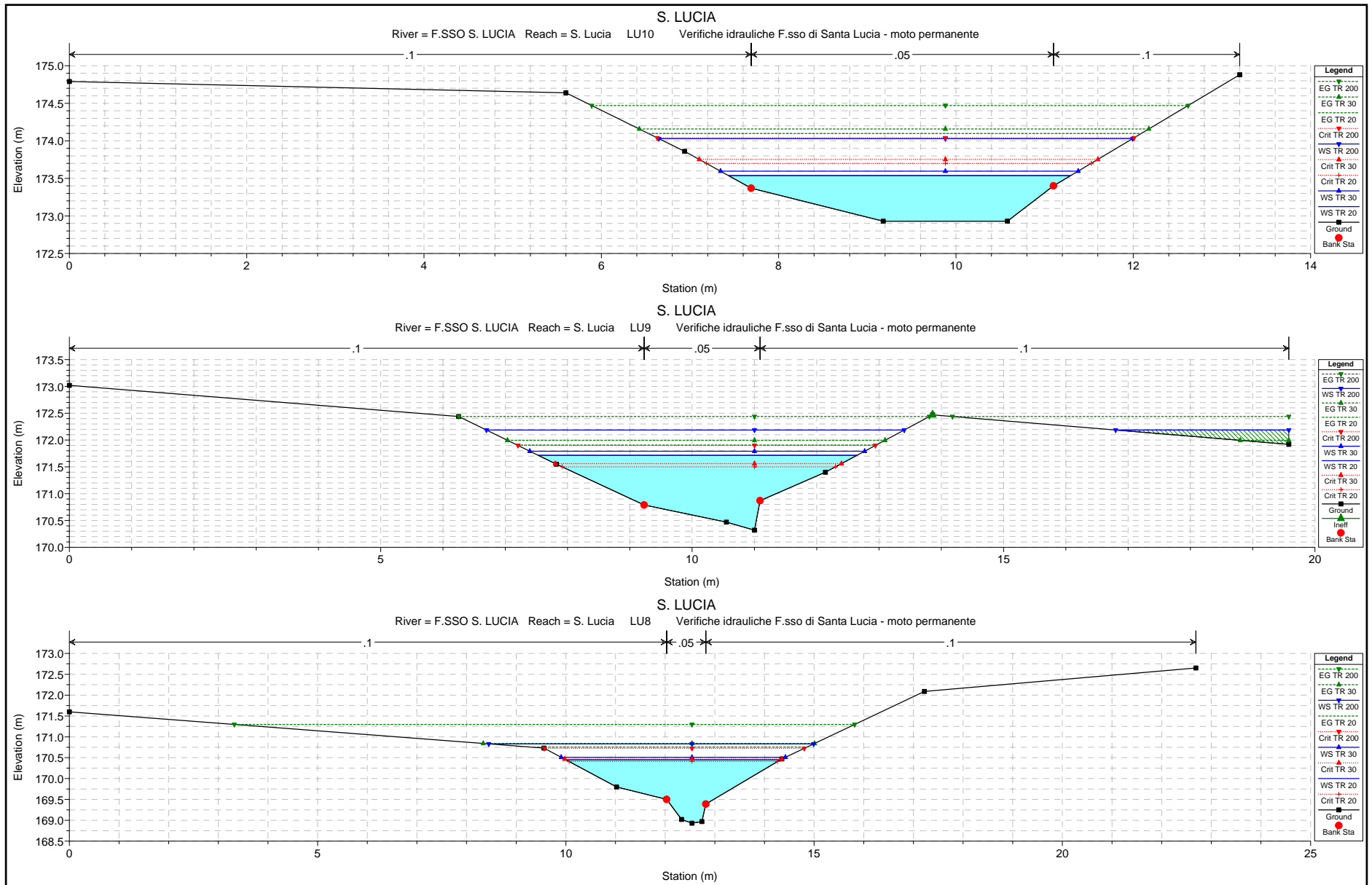
Legend	
EG TR 200	Green dashed line with inverted triangle
WS TR 200	Blue solid line with triangle
EG TR 30	Red dashed line with inverted triangle
Crit TR 200	Green dotted line with inverted triangle
EG TR 20	Purple dashed line with inverted triangle
WS TR 30	Red solid line with triangle
WS TR 20	Purple solid line with triangle
Crit TR 30	Red dotted line with inverted triangle
Crit TR 20	Purple dotted line with inverted triangle
Ground	Black solid line with square

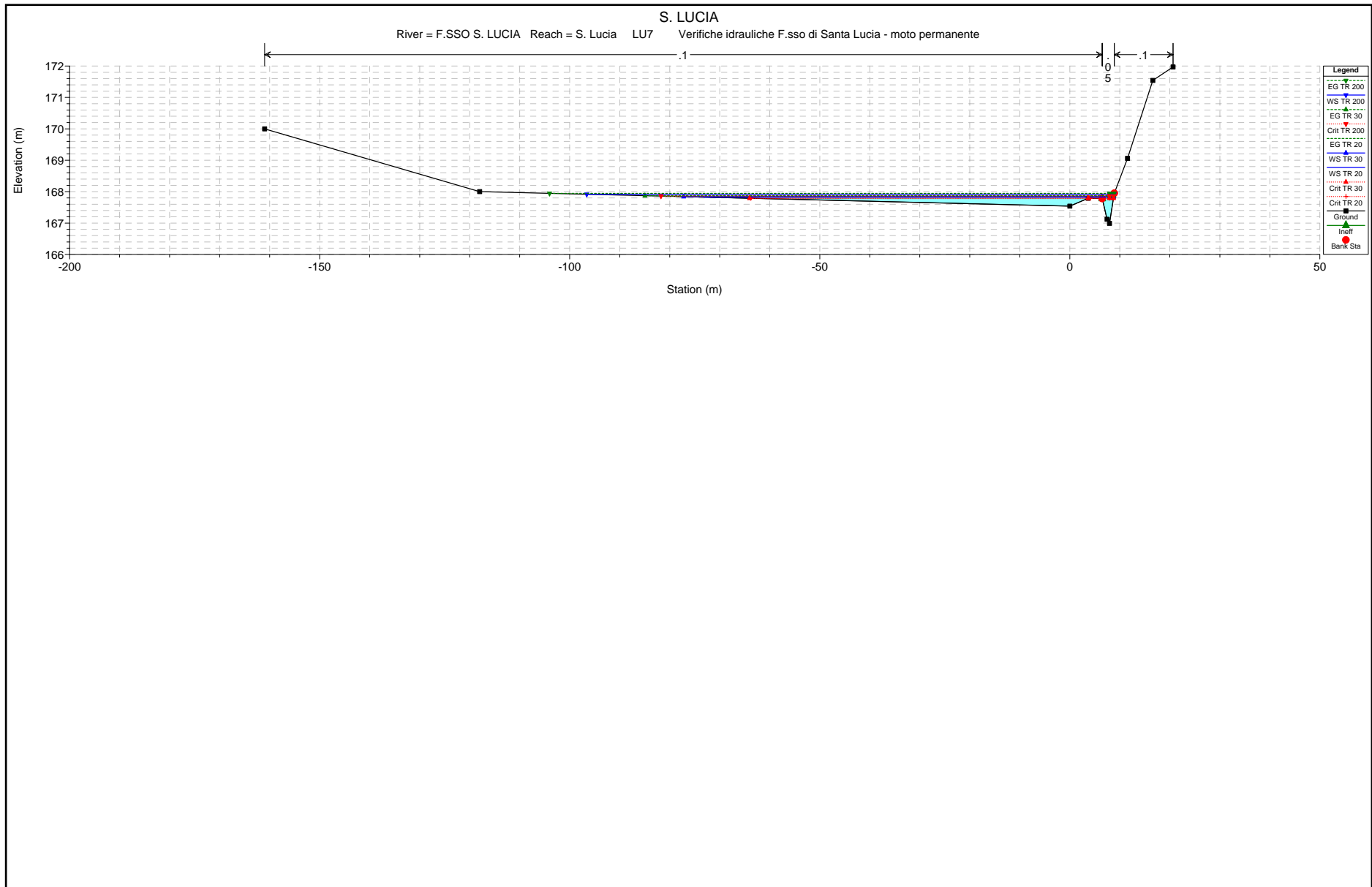












**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO FOSSATONE E FOSSO LA BANDITA**



HEC-RAS Plan: FOS

River	Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
F.SSO FOSSATONE	Fossatone 1	22	TR20	5.00	0.42	2.33	2.25	195.61	196.48	196.25	196.51	0.004582	1.03	0.51	9.71	23.58	0.40	0.26
F.SSO FOSSATONE	Fossatone 1	22	TR30	5.60	0.51	2.55	2.54	195.61	196.52	196.28	196.55	0.004591	1.06	0.53	10.58	24.30	0.40	0.26
F.SSO FOSSATONE	Fossatone 1	22	TR200	9.00	1.10	3.68	4.22	195.61	196.69	196.38	196.73	0.004654	1.24	0.60	15.06	27.75	0.42	0.26
F.SSO FOSSATONE	Fossatone 1	21	TR20	5.00		4.24	0.76	194.48	195.71	195.71	195.87	0.018647	1.86	1.16	4.32	17.67	0.71	0.75
F.SSO FOSSATONE	Fossatone 1	21	TR30	5.60		4.56	1.04	194.48	195.74	195.74	195.90	0.018915	1.92	1.15	4.87	18.18	0.72	0.71
F.SSO FOSSATONE	Fossatone 1	21	TR200	9.00		6.24	2.76	194.48	195.87	195.87	196.05	0.021708	2.23	1.23	7.31	20.27	0.78	0.65
F.SSO FOSSATONE	Fossatone 1	20	TR20	5.00		5.00	0.00	192.49	193.29	193.35	193.58	0.051428	2.39	2.39	2.10	5.34	1.21	1.21
F.SSO FOSSATONE	Fossatone 1	20	TR30	5.60		5.60	0.00	192.49	193.32	193.39	193.63	0.050454	2.46	2.44	2.29	6.00	1.21	1.26
F.SSO FOSSATONE	Fossatone 1	20	TR200	9.00	0.13	8.75	0.12	192.49	193.47	193.60	193.87	0.044511	2.83	2.42	3.72	12.85	1.19	1.44
F.SSO FOSSATONE	Fossatone 1	19	TR20	5.00	0.62	4.38		190.26	191.50	191.40	191.63	0.014926	1.72	1.23	4.08	11.80	0.67	0.67
F.SSO FOSSATONE	Fossatone 1	19	TR30	5.60	0.79	4.81		190.26	191.53	191.45	191.67	0.015796	1.81	1.26	4.46	12.47	0.69	0.67
F.SSO FOSSATONE	Fossatone 1	19	TR200	9.00	1.85	7.15	0.00	190.26	191.66	191.62	191.87	0.019892	2.27	1.44	6.24	15.03	0.79	0.71
F.SSO FOSSATONE	Fossatone 1	18	TR20	5.00	0.96	4.04		189.91	190.93	190.92	191.06	0.020026	1.75	1.12	4.47	16.67	0.77	0.69
F.SSO FOSSATONE	Fossatone 1	18	TR30	5.60	1.26	4.34		189.91	190.97	190.95	191.09	0.019071	1.76	1.11	5.05	16.83	0.75	0.65
F.SSO FOSSATONE	Fossatone 1	18	TR200	9.00	2.94	6.02	0.04	189.91	191.13	191.06	191.26	0.015472	1.88	1.12	8.03	19.56	0.71	0.56
F.SSO FOSSATONE	Fossatone 1	17	TR20	5.00	0.60	3.97	0.43	188.66	189.74	189.68	189.86	0.014100	1.73	1.03	4.85	16.30	0.67	0.60
F.SSO FOSSATONE	Fossatone 1	17	TR30	5.60	0.73	4.34	0.53	188.66	189.76	189.72	189.89	0.014941	1.82	1.06	5.26	16.97	0.69	0.61
F.SSO FOSSATONE	Fossatone 1	17	TR200	9.00	1.55	6.25	1.20	188.66	189.88	189.86	190.06	0.018570	2.25	1.21	7.43	20.00	0.79	0.64
F.SSO FOSSATONE	Fossatone 1	16	TR20	5.00	0.00	2.88	2.12	187.86	188.77	188.70	188.84	0.015182	1.54	0.77	6.46	24.30	0.67	0.48
F.SSO FOSSATONE	Fossatone 1	16	TR30	5.60	0.01	3.08	2.51	187.86	188.80	188.73	188.87	0.014250	1.56	0.77	7.31	26.29	0.66	0.46
F.SSO FOSSATONE	Fossatone 1	16	TR200	9.00	0.20	4.01	4.79	187.86	188.96	188.83	189.03	0.010579	1.58	0.74	12.13	32.78	0.59	0.39
F.SSO FOSSATONE	Fossatone 1	15	TR20	5.00		5.00		186.27	187.60	187.39	187.75	0.015661	1.72	1.72	2.90	4.31	0.67	0.67
F.SSO FOSSATONE	Fossatone 1	15	TR30	5.60		5.60		186.27	187.66	187.45	187.82	0.015641	1.77	1.77	3.17	4.52	0.67	0.67
F.SSO FOSSATONE	Fossatone 1	15	TR200	9.00	0.00	8.92	0.08	186.27	187.90	187.70	188.12	0.016205	2.05	1.93	4.66	14.25	0.71	1.08
F.SSO FOSSATONE	Fossatone 1	14	TR20	5.00		5.00		184.91	186.23	186.11	186.44	0.022979	2.01	2.01	2.49	3.77	0.79	0.79
F.SSO FOSSATONE	Fossatone 1	14	TR30	5.60		5.60		184.91	186.29	186.16	186.50	0.022961	2.07	2.07	2.71	3.94	0.79	0.79
F.SSO FOSSATONE	Fossatone 1	14	TR200	9.00		8.99	0.01	184.91	186.58	186.42	186.84	0.020468	2.25	2.23	4.03	5.71	0.78	0.85
F.SSO FOSSATONE	Fossatone 1	13	TR20	5.00		5.00		184.04	185.44	185.12	185.54	0.009681	1.38	1.38	3.62	5.42	0.54	0.54
F.SSO FOSSATONE	Fossatone 1	13	TR30	5.60		5.60		184.04	185.55	185.17	185.64	0.008251	1.32	1.32	4.25	6.12	0.50	0.50
F.SSO FOSSATONE	Fossatone 1	13	TR200	9.00	0.00	8.78	0.22	184.04	186.09	185.42	186.15	0.003113	1.10	0.99	9.05	11.82	0.33	0.36
F.SSO FOSSATONE	Fossatone 1	12	TR20	5.00		5.00		183.86	185.16	184.77	185.36	0.007805	2.01	2.01	2.49	4.86	0.57	0.57
F.SSO FOSSATONE	Fossatone 1	12	TR30	5.60		5.60		183.86	185.24	184.84	185.47	0.007964	2.11	2.11	2.65	5.02	0.59	0.59
F.SSO FOSSATONE	Fossatone 1	12	TR200	9.00		9.00		183.86	185.66	185.19	186.00	0.008194	2.58	2.58	3.49	5.76	0.62	0.62
F.SSO FOSSATONE	Fossatone 1	11.5 BR U	TR20	5.00		5.00		183.86	185.11	184.77	185.33	0.008938	2.09	2.09	2.39	2.00	0.61	0.61
F.SSO FOSSATONE	Fossatone 1	11.5 BR U	TR30	5.60		5.60		183.86	185.19	184.84	185.44	0.009119	2.20	2.20	2.54	2.00	0.62	0.62
F.SSO FOSSATONE	Fossatone 1	11.5 BR U	TR200	9.00		9.00		183.86	185.60	185.19	185.96	0.009252	2.67	2.67	3.37	2.00	0.66	0.66
F.SSO FOSSATONE	Fossatone 1	11.5 BR D	TR20	5.00		5.00		183.81	185.01	184.75	185.27	0.011061	2.23	2.23	2.24	2.00	0.67	0.67
F.SSO FOSSATONE	Fossatone 1	11.5 BR D	TR30	5.60		5.60		183.81	185.08	184.82	185.36	0.011347	2.36	2.36	2.38	2.00	0.69	0.69
F.SSO FOSSATONE	Fossatone 1	11.5 BR D	TR200	9.00		9.00		183.81	185.48	185.17	185.89	0.011067	2.83	2.83	3.18	2.00	0.71	0.71
F.SSO FOSSATONE	Fossatone 1	11	TR20	5.00		5.00		183.81	184.93	184.75	185.23	0.014096	2.40	2.40	2.08	6.35	0.75	0.75
F.SSO FOSSATONE	Fossatone 1	11	TR30	5.60		5.60		183.81	184.98	184.81	185.32	0.015039	2.56	2.56	2.18	6.51	0.78	0.78
F.SSO FOSSATONE	Fossatone 1	11	TR200	9.00		9.00		183.81	185.20	185.17	185.80	0.021285	3.44	3.44	2.62	7.07	0.96	0.96
F.SSO FOSSATONE	Fossatone 1	10	TR20	5.00		5.00		183.70	184.69	184.58	184.89	0.021832	1.98	1.98	2.53	4.01	0.80	0.80

HEC-RAS Plan: FOS (Continued)

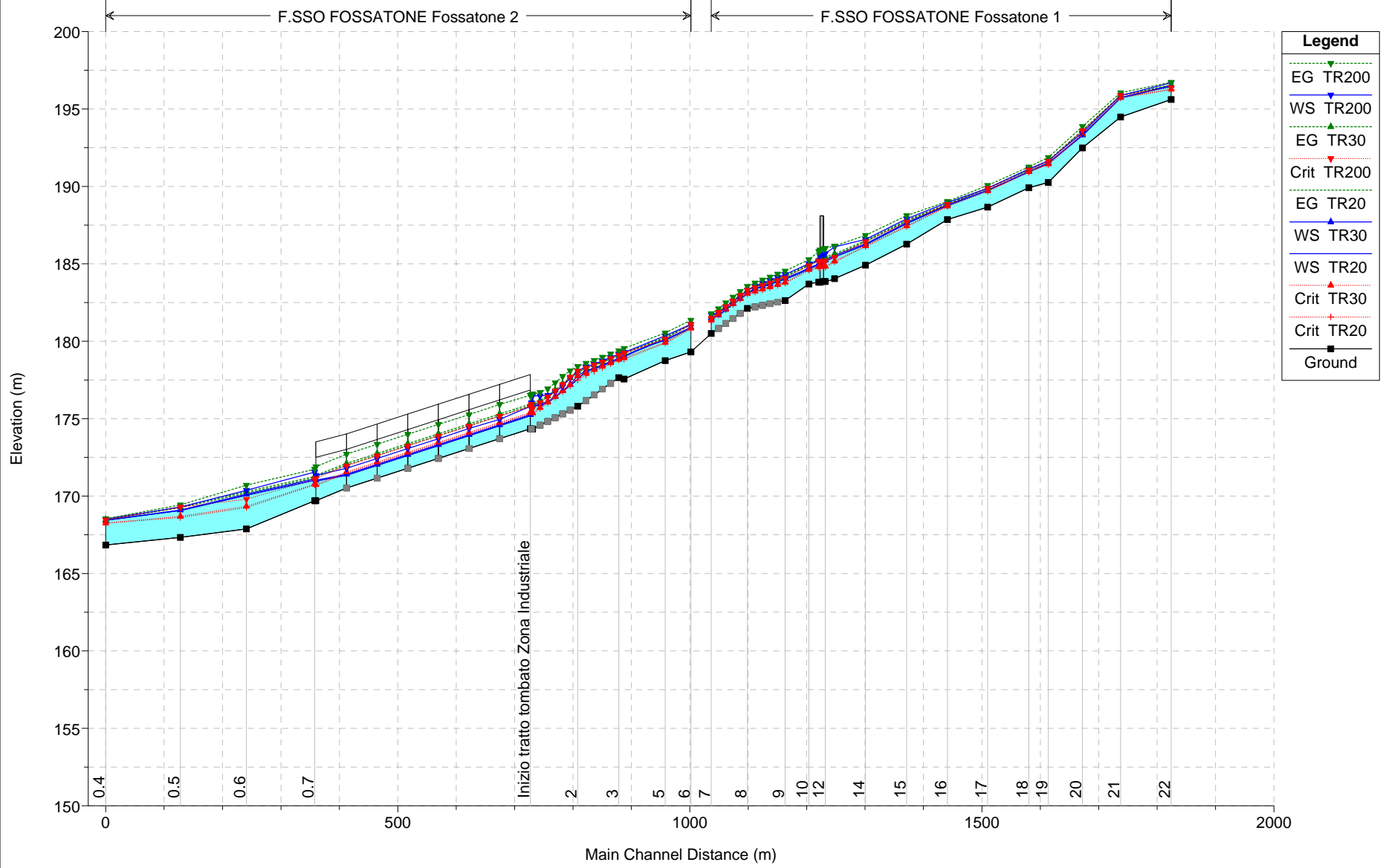
River	Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
F.SSO FOSSATONE	Fossatone 1	10	TR30	5.60		5.60		183.70	184.75	184.63	184.96	0.021589	2.03	2.03	2.76	4.17	0.80	0.80
F.SSO FOSSATONE	Fossatone 1	10	TR200	9.00		9.00		183.70	185.01	184.88	185.28	0.020903	2.26	2.26	3.97	4.92	0.80	0.80
F.SSO FOSSATONE	Fossatone 1	9	TR20	5.00	0.01	4.99		182.63	184.01	183.75	184.16	0.013206	1.70	1.68	2.97	4.49	0.61	0.66
F.SSO FOSSATONE	Fossatone 1	9	TR30	5.60	0.02	5.58		182.63	184.06	183.80	184.23	0.013508	1.78	1.74	3.23	5.04	0.62	0.69
F.SSO FOSSATONE	Fossatone 1	9	TR200	9.00	0.30	8.70		182.63	184.31	184.08	184.53	0.014902	2.13	1.84	4.89	8.68	0.67	0.78
F.SSO FOSSATONE	Fossatone 1	8	TR20	5.00	0.02	4.98		182.12	183.07	183.04	183.26	0.027738	1.96	1.92	2.61	6.58	0.91	0.97
F.SSO FOSSATONE	Fossatone 1	8	TR30	5.60	0.04	5.56	0.00	182.12	183.11	183.08	183.31	0.026904	2.03	1.94	2.88	7.68	0.90	1.01
F.SSO FOSSATONE	Fossatone 1	8	TR200	9.00	0.30	8.48	0.22	182.12	183.30	183.30	183.54	0.021748	2.25	1.77	5.09	15.33	0.86	0.98
F.SSO FOSSATONE	Fossatone 1	7	TR20	5.00	1.07	3.93	0.00	180.50	181.44	181.32	181.53	0.010658	1.43	0.92	5.44	15.77	0.58	0.50
F.SSO FOSSATONE	Fossatone 1	7	TR30	5.60	1.26	4.34	0.00	180.50	181.48	181.35	181.57	0.010467	1.48	0.91	6.12	19.23	0.58	0.50
F.SSO FOSSATONE	Fossatone 1	7	TR200	9.00	2.79	6.20	0.02	180.50	181.67	181.48	181.77	0.009339	1.65	0.89	10.14	31.62	0.58	0.45
F.SSO FOSSATONE	Fossatone 2	6	TR20	7.50	0.01	7.49		179.31	180.82	180.75	181.00	0.024902	1.87	1.84	4.09	10.01	0.84	0.92
F.SSO FOSSATONE	Fossatone 2	6	TR30	8.40	0.04	8.36		179.31	180.85	180.79	181.05	0.025082	1.95	1.88	4.46	11.15	0.85	0.95
F.SSO FOSSATONE	Fossatone 2	6	TR200	13.50	0.52	12.98		179.31	181.03	181.01	181.28	0.024486	2.27	1.95	6.91	16.52	0.87	0.96
F.SSO FOSSATONE	Fossatone 2	5	TR20	7.50		7.50		178.75	180.00	179.83	180.12	0.014000	1.55	1.55	4.83	8.49	0.66	0.66
F.SSO FOSSATONE	Fossatone 2	5	TR30	8.40	0.00	8.40		178.75	180.05	179.87	180.18	0.013410	1.60	1.59	5.27	9.39	0.65	0.68
F.SSO FOSSATONE	Fossatone 2	5	TR200	13.50	0.19	13.31		178.75	180.28	180.07	180.45	0.012291	1.85	1.72	7.86	13.46	0.65	0.72
F.SSO FOSSATONE	Fossatone 2	4	TR20	7.50	0.47	7.03		177.56	178.94	178.75	179.12	0.014214	1.97	1.55	4.83	11.03	0.65	0.75
F.SSO FOSSATONE	Fossatone 2	4	TR30	8.40	0.68	7.72		177.56	178.99	178.81	179.19	0.014686	2.05	1.55	5.43	12.34	0.66	0.75
F.SSO FOSSATONE	Fossatone 2	4	TR200	13.50	2.33	11.16	0.01	177.56	179.21	179.14	179.45	0.016243	2.42	1.54	8.76	18.50	0.72	0.72
F.SSO FOSSATONE	Fossatone 2	3	TR20	7.50	0.80	6.70		177.65	178.80	178.71	178.99	0.015770	2.02	1.48	5.07	12.03	0.71	0.73
F.SSO FOSSATONE	Fossatone 2	3	TR30	8.40	1.08	7.32		177.65	178.86	178.77	179.05	0.015530	2.07	1.45	5.78	13.34	0.71	0.71
F.SSO FOSSATONE	Fossatone 2	3	TR200	13.50	3.12	10.38		177.65	179.09	179.02	179.30	0.015180	2.29	1.41	9.61	18.77	0.72	0.63
F.SSO FOSSATONE	Fossatone 2	2	TR20	7.50	0.15	7.35	0.00	175.80	177.48	177.43	177.86	0.032579	2.77	2.61	2.88	3.59	0.91	0.93
F.SSO FOSSATONE	Fossatone 2	2	TR30	8.40	0.14	8.26	0.00	175.80	177.54	177.47	177.97	0.033669	2.93	2.70	3.11	4.76	0.94	1.07
F.SSO FOSSATONE	Fossatone 2	2	TR200	13.50	2.51	10.95	0.05	175.80	177.98	177.98	178.28	0.017458	2.69	1.61	8.41	17.10	0.72	0.73
F.SSO FOSSATONE	Fossatone 2	1	TR20	8.60	0.09	8.39	0.11	174.33	175.82	175.31	175.93	0.004542	1.44	1.32	6.53	7.00	0.42	0.44
F.SSO FOSSATONE	Fossatone 2	1	TR30	9.60	0.13	9.30	0.17	174.33	175.93	175.36	176.04	0.004231	1.47	1.32	7.28	7.34	0.41	0.42
F.SSO FOSSATONE	Fossatone 2	1	TR200	15.60	0.47	14.52	0.62	174.33	176.47	175.65	176.59	0.003264	1.63	1.33	11.72	9.13	0.38	0.38
F.SSO FOSSATONE	Fossatone 2	0.9	TR20	8.60		8.60		174.35	175.19	175.31	175.83	0.011690	3.54	3.54	2.43	2.90	1.24	1.24
F.SSO FOSSATONE	Fossatone 2	0.9	TR30	9.60		9.60		174.35	175.26	175.39	175.93	0.011461	3.63	3.63	2.64	2.90	1.22	1.22
F.SSO FOSSATONE	Fossatone 2	0.9	TR200	15.60		15.60		174.35	175.79	175.79	176.50	0.008668	3.75	3.75	4.17	2.90	1.00	1.00
F.SSO FOSSATONE	Fossatone 2	0.8	TR20	8.60		8.60		169.70	170.96	170.66	171.24	0.023207	2.35	2.35	3.67	2.90	0.67	0.67
F.SSO FOSSATONE	Fossatone 2	0.8	TR30	9.60		9.60		169.70	171.03	170.74	171.35	0.025152	2.49	2.49	3.86	2.90	0.69	0.69
F.SSO FOSSATONE	Fossatone 2	0.8	TR200	15.60		15.60		169.70	171.33	171.14	171.89	0.038732	3.30	3.30	4.73	2.90	0.82	0.82
F.SSO FOSSATONE	Fossatone 2	0.7	TR20	8.60	0.06	8.52	0.02	169.70	171.02	170.72	171.17	0.008773	1.74	1.65	5.21	6.76	0.56	0.60
F.SSO FOSSATONE	Fossatone 2	0.7	TR30	9.60	0.10	9.46	0.03	169.70	171.11	170.77	171.27	0.008133	1.77	1.65	5.81	7.18	0.55	0.59
F.SSO FOSSATONE	Fossatone 2	0.7	TR200	15.60	0.64	14.84	0.11	169.70	171.54	171.06	171.73	0.006308	1.96	1.66	9.38	9.19	0.51	0.53
F.SSO FOSSATONE	Fossatone 2	0.6	TR20	8.60	0.01	8.55	0.05	167.88	170.04	169.25	170.19	0.008004	1.72	1.67	5.16	3.95	0.43	0.47
F.SSO FOSSATONE	Fossatone 2	0.6	TR30	9.60	0.01	9.52	0.07	167.88	170.12	169.34	170.29	0.008509	1.83	1.75	5.47	4.17	0.44	0.49
F.SSO FOSSATONE	Fossatone 2	0.6	TR200	15.60	0.09	15.27	0.24	167.88	170.37	169.79	170.70	0.013952	2.56	2.36	6.61	4.88	0.58	0.65
F.SSO FOSSATONE	Fossatone 2	0.5	TR20	8.60	0.06	8.47	0.07	167.33	169.07	168.62	169.26	0.008472	1.93	1.48	5.80	192.37	0.53	1.73
F.SSO FOSSATONE	Fossatone 2	0.5	TR30	9.60	0.07	9.07	0.46	167.33	169.11	168.69	169.30	0.008926	2.01	1.15	8.37	192.79	0.54	1.12

HEC-RAS Plan: FOS (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
F.SSO FOSSATONE	Fossatone 2	0.5	TR200	15.60	0.14	10.25	5.20	167.33	169.29	169.29	169.43	0.007548	2.01	0.71	22.06	196.67	0.51	0.43
F.SSO FOSSATONE	Fossatone 2	0.4	TR20	10.10	6.26	3.14	0.70	166.84	168.45	168.37	168.48	0.002999	1.24	0.23	44.17	308.92	0.32	0.19
F.SSO FOSSATONE	Fossatone 2	0.4	TR30	11.30	7.07	3.20	1.03	166.84	168.47	168.37	168.49	0.002999	1.25	0.23	48.93	309.03	0.32	0.19
F.SSO FOSSATONE	Fossatone 2	0.4	TR200	18.50	11.69	3.48	3.34	166.84	168.54	168.47	168.56	0.003004	1.29	0.25	72.56	309.54	0.33	0.17
F.SSO BANDITA	Bandita	12	TR20	2.50	0.06	2.41	0.03	202.55	203.25	203.35	203.51	0.060056	2.31	1.87	1.34	10.14	1.23	1.65
F.SSO BANDITA	Bandita	12	TR30	2.80	0.11	2.64	0.05	202.55	203.27	203.37	203.55	0.060061	2.39	1.80	1.56	11.77	1.24	1.58
F.SSO BANDITA	Bandita	12	TR200	4.50	0.64	3.73	0.13	202.55	203.36	203.47	203.68	0.060032	2.75	1.59	2.83	17.85	1.29	1.27
F.SSO BANDITA	Bandita	11	TR20	2.50	0.82	1.65	0.02	198.67	199.38	199.44	199.57	0.051085	2.33	1.11	2.25	14.51	1.10	0.90
F.SSO BANDITA	Bandita	11	TR30	2.80	1.01	1.76	0.03	198.67	199.40	199.46	199.59	0.051433	2.39	1.12	2.49	14.81	1.11	0.87
F.SSO BANDITA	Bandita	11	TR200	4.50	2.12	2.29	0.09	198.67	199.48	199.54	199.68	0.052296	2.67	1.21	3.70	16.11	1.15	0.81
F.SSO BANDITA	Bandita	10	TR20	2.50	0.20	2.23	0.07	195.05	195.74	195.78	196.01	0.048945	2.43	1.70	1.47	7.28	1.15	1.21
F.SSO BANDITA	Bandita	10	TR30	2.80	0.28	2.43	0.09	195.05	195.77	195.89	196.05	0.048116	2.51	1.67	1.67	7.95	1.15	1.17
F.SSO BANDITA	Bandita	10	TR200	4.50	0.90	3.39	0.21	195.05	195.88	195.99	196.19	0.045819	2.82	1.40	3.21	17.44	1.17	1.04
F.SSO BANDITA	Bandita	9	TR20	2.50	0.25	2.25	0.00	192.99	193.58	193.58	193.69	0.034470	1.51	1.17	2.14	12.37	0.94	0.90
F.SSO BANDITA	Bandita	9	TR30	2.80	0.32	2.48	0.00	192.99	193.60	193.60	193.71	0.033929	1.56	1.18	2.36	13.08	0.94	0.89
F.SSO BANDITA	Bandita	9	TR200	4.50	0.79	3.70	0.01	192.99	193.70	193.70	193.83	0.029063	1.75	1.17	3.85	18.27	0.91	0.81
F.SSO BANDITA	Bandita	8	TR20	2.50	0.23	2.19	0.08	190.54	191.23	191.24	191.43	0.029177	2.10	1.52	1.65	5.62	0.94	0.89
F.SSO BANDITA	Bandita	8	TR30	2.80	0.29	2.41	0.10	190.54	191.26	191.28	191.47	0.029170	2.18	1.54	1.82	5.93	0.95	0.89
F.SSO BANDITA	Bandita	8	TR200	4.50	0.68	3.59	0.23	190.54	191.39	191.44	191.67	0.031120	2.61	1.66	2.71	7.46	1.01	0.88
F.SSO BANDITA	Bandita	7	TR20	2.50	0.38	1.73	0.39	187.94	188.65	188.70	188.88	0.042345	2.48	1.38	1.81	6.94	1.08	0.87
F.SSO BANDITA	Bandita	7	TR30	2.80	0.45	1.88	0.46	187.94	188.68	188.70	188.92	0.042550	2.57	1.40	2.00	7.38	1.10	0.86
F.SSO BANDITA	Bandita	7	TR200	4.50	0.99	2.67	0.84	187.94	188.82	188.90	189.09	0.041421	2.93	1.36	3.31	11.70	1.12	0.82
F.SSO BANDITA	Bandita	6	TR20	2.50	0.11	2.39		185.08	186.07	186.09	186.25	0.032382	1.92	1.56	1.61	7.88	0.87	1.10
F.SSO BANDITA	Bandita	6	TR30	2.80	0.19	2.61		185.08	186.10	186.13	186.29	0.032209	1.97	1.51	1.85	8.65	0.88	1.04
F.SSO BANDITA	Bandita	6	TR200	4.50	0.79	3.71		185.08	186.22	186.27	186.44	0.033608	2.25	1.45	3.11	11.76	0.92	0.90
F.SSO BANDITA	Bandita	5	TR20	2.50	0.30	2.12	0.08	183.81	184.67	184.65	184.75	0.015832	1.38	0.83	3.02	19.61	0.66	0.67
F.SSO BANDITA	Bandita	5	TR30	2.80	0.42	2.26	0.12	183.81	184.69	184.66	184.77	0.014996	1.39	0.79	3.55	21.08	0.64	0.61
F.SSO BANDITA	Bandita	5	TR200	4.50	1.15	2.98	0.37	183.81	184.80	184.76	184.88	0.012938	1.49	0.72	6.24	27.41	0.62	0.48
F.SSO BANDITA	Bandita	4	TR20	2.50		2.29	0.21	183.32	184.08	183.99	184.16	0.014742	1.32	1.02	2.46	10.52	0.65	0.67
F.SSO BANDITA	Bandita	4	TR30	2.80		2.53	0.27	183.32	184.10	184.02	184.19	0.015572	1.39	1.04	2.68	11.15	0.67	0.68
F.SSO BANDITA	Bandita	4	TR200	4.50	0.00	3.73	0.76	183.32	184.21	184.15	184.32	0.016199	1.63	1.09	4.12	14.62	0.71	0.66
F.SSO BANDITA	Bandita	3	TR20	2.50	0.48	2.02	0.00	182.75	183.49	183.49	183.60	0.021048	1.57	0.91	2.73	16.45	0.76	0.72
F.SSO BANDITA	Bandita	3	TR30	2.80	0.64	2.16	0.00	182.75	183.52	183.52	183.62	0.020125	1.59	0.89	3.15	17.56	0.75	0.67
F.SSO BANDITA	Bandita	3	TR200	4.50	1.49	2.98	0.02	182.75	183.60	183.60	183.72	0.021888	1.86	0.95	4.73	20.25	0.81	0.63
F.SSO BANDITA	Bandita	2	TR20	2.50		2.50		182.13	182.81	182.89	183.11	0.070747	2.42	2.42	1.03	3.03	1.32	1.32
F.SSO BANDITA	Bandita	2	TR30	2.80		2.80		182.13	182.85	182.92	183.15	0.067834	2.45	2.45	1.14	3.19	1.31	1.31
F.SSO BANDITA	Bandita	2	TR200	4.50	0.04	4.46		182.13	183.03	183.11	183.35	0.047310	2.54	2.39	1.89	5.63	1.15	1.32
F.SSO BANDITA	Bandita	1	TR20	2.50	0.51	1.97	0.02	180.76	181.54	181.41	181.60	0.009069	1.25	0.78	3.21	10.97	0.53	0.46
F.SSO BANDITA	Bandita	1	TR30	2.80	0.63	2.14	0.03	180.76	181.58	181.44	181.64	0.008722	1.28	0.77	3.62	11.68	0.53	0.44
F.SSO BANDITA	Bandita	1	TR200	4.50	1.39	3.03	0.07	180.76	181.75	181.57	181.82	0.007442	1.40	0.76	5.92	15.05	0.51	0.39

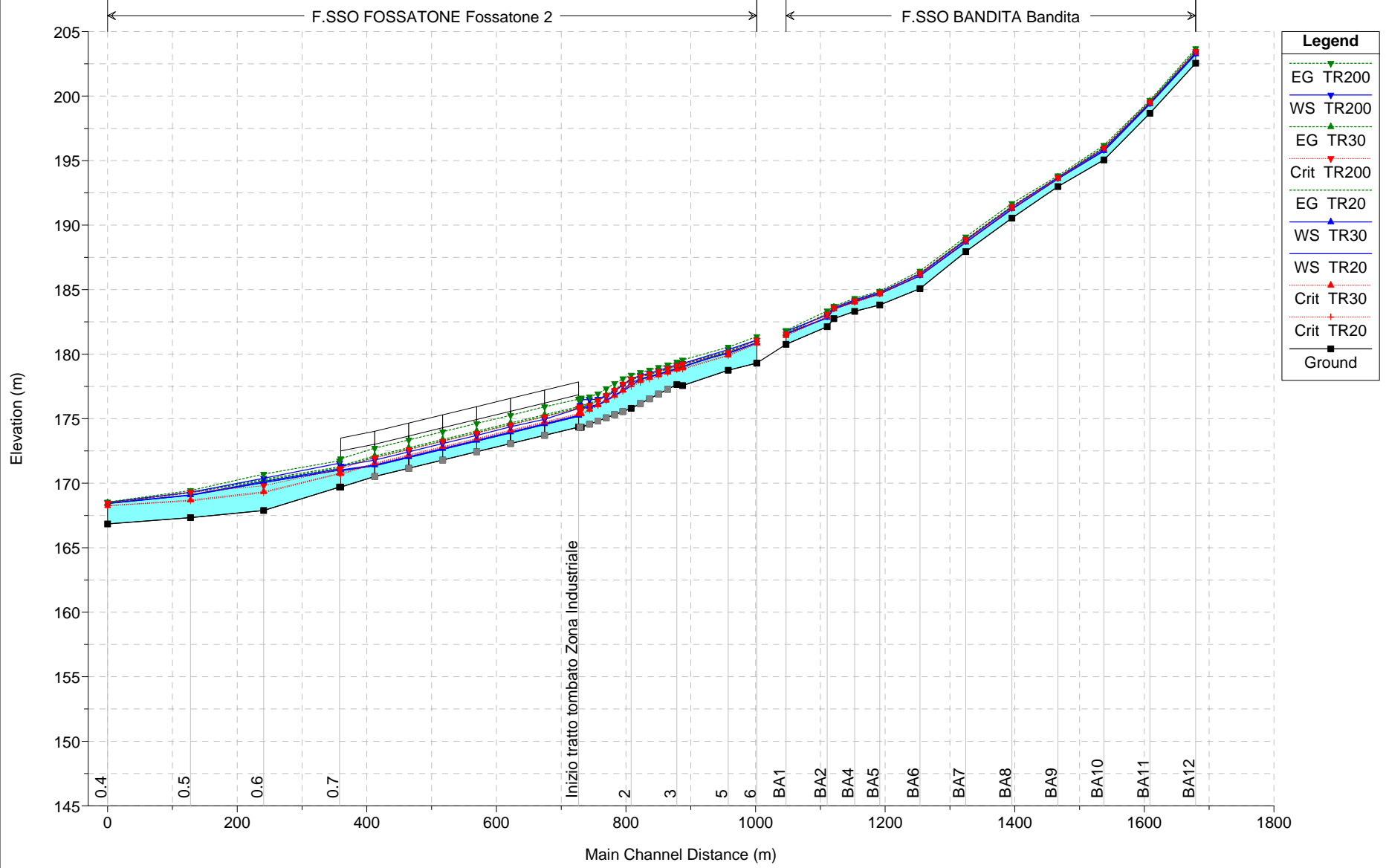


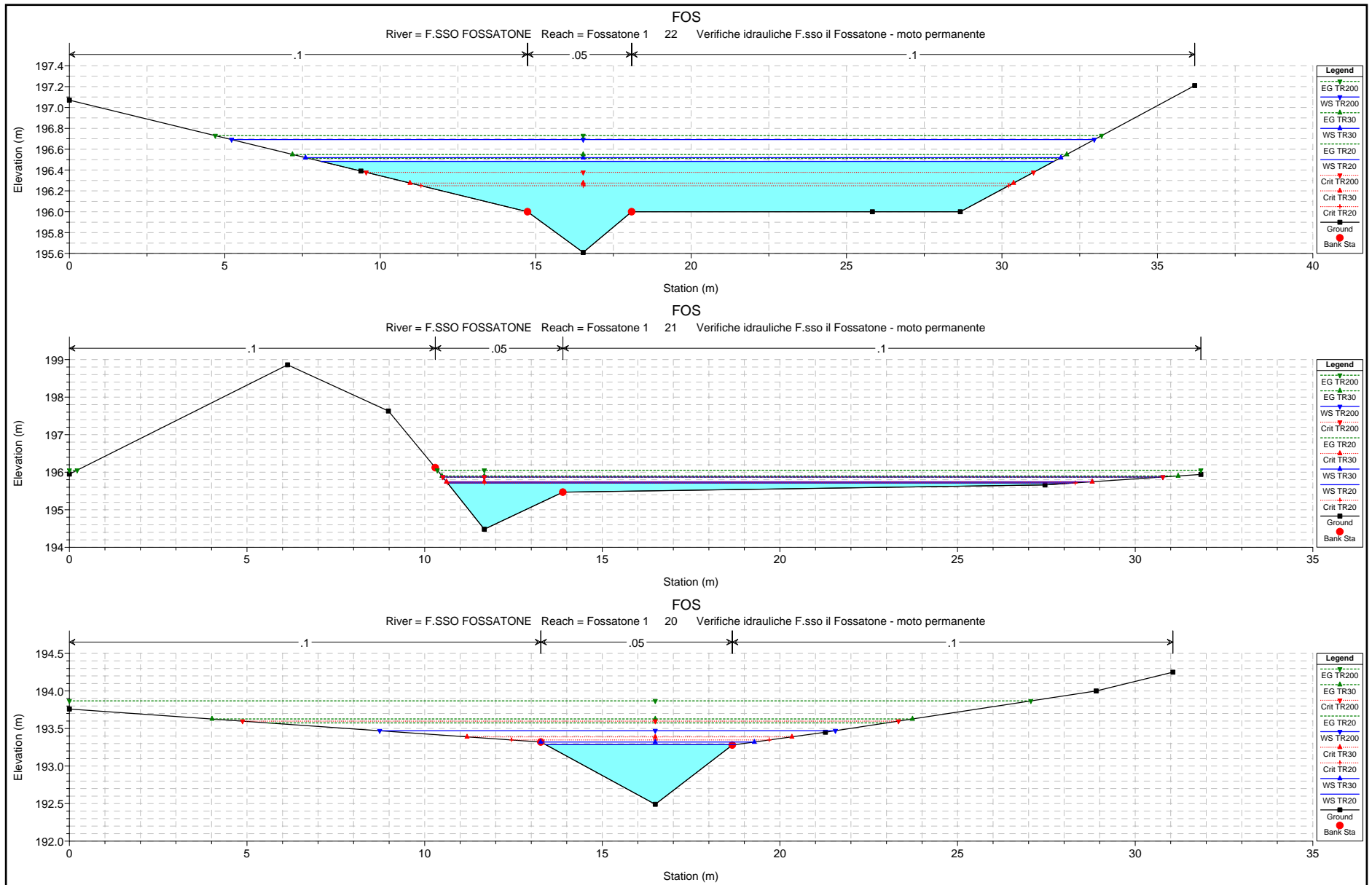
FOS Verifiche idrauliche F.sso il Fossatone - moto permanente

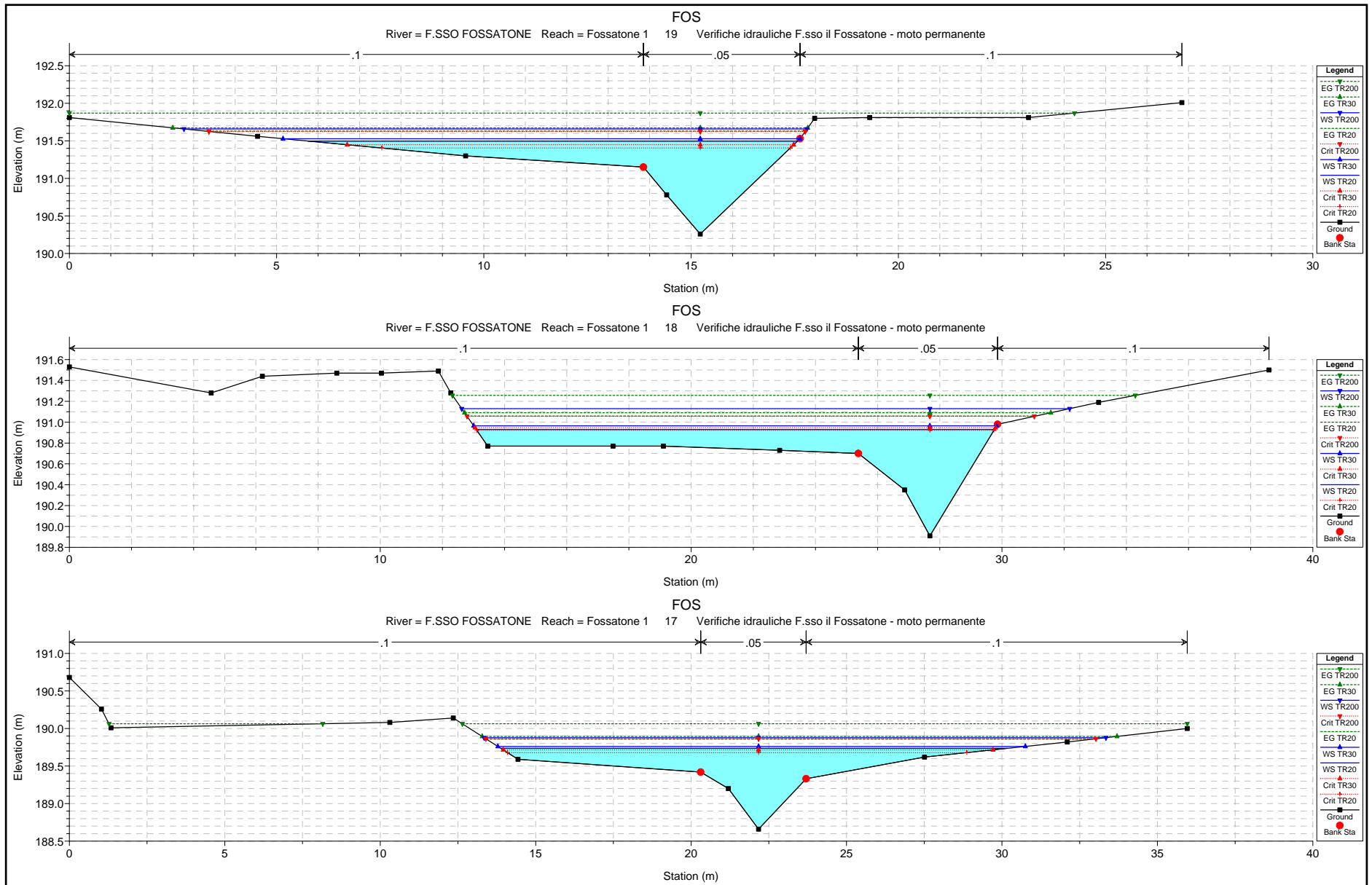


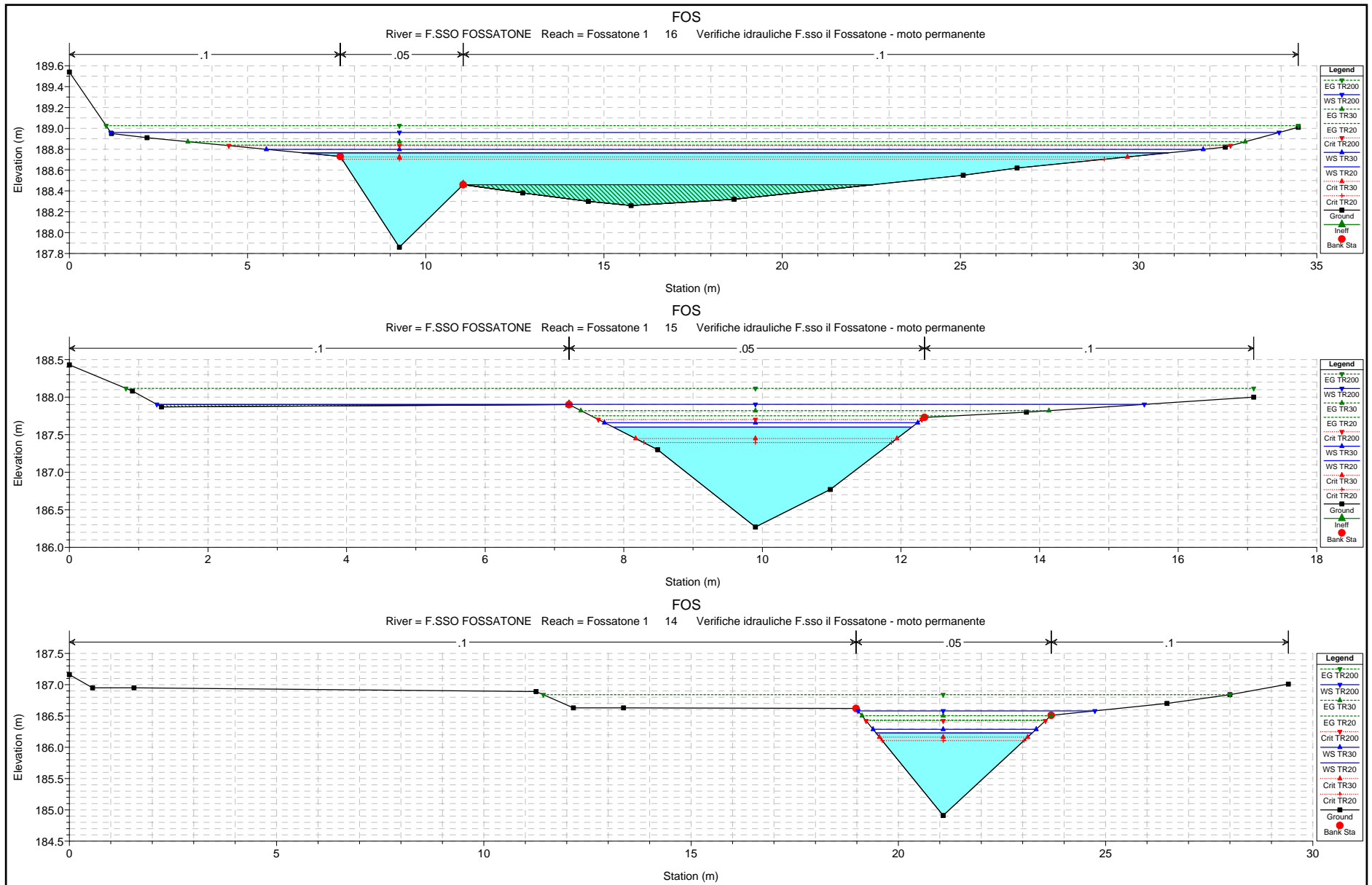
Legend	
EG TR200	Green dashed line with inverted triangles
WS TR200	Blue solid line with inverted triangles
EG TR30	Green dashed line with triangles
Crit TR200	Red dotted line with inverted triangles
EG TR20	Green dashed line with triangles
WS TR30	Blue solid line with triangles
WS TR20	Blue solid line with triangles
Crit TR30	Red dotted line with triangles
Crit TR20	Red dotted line with triangles
Ground	Black solid line with squares

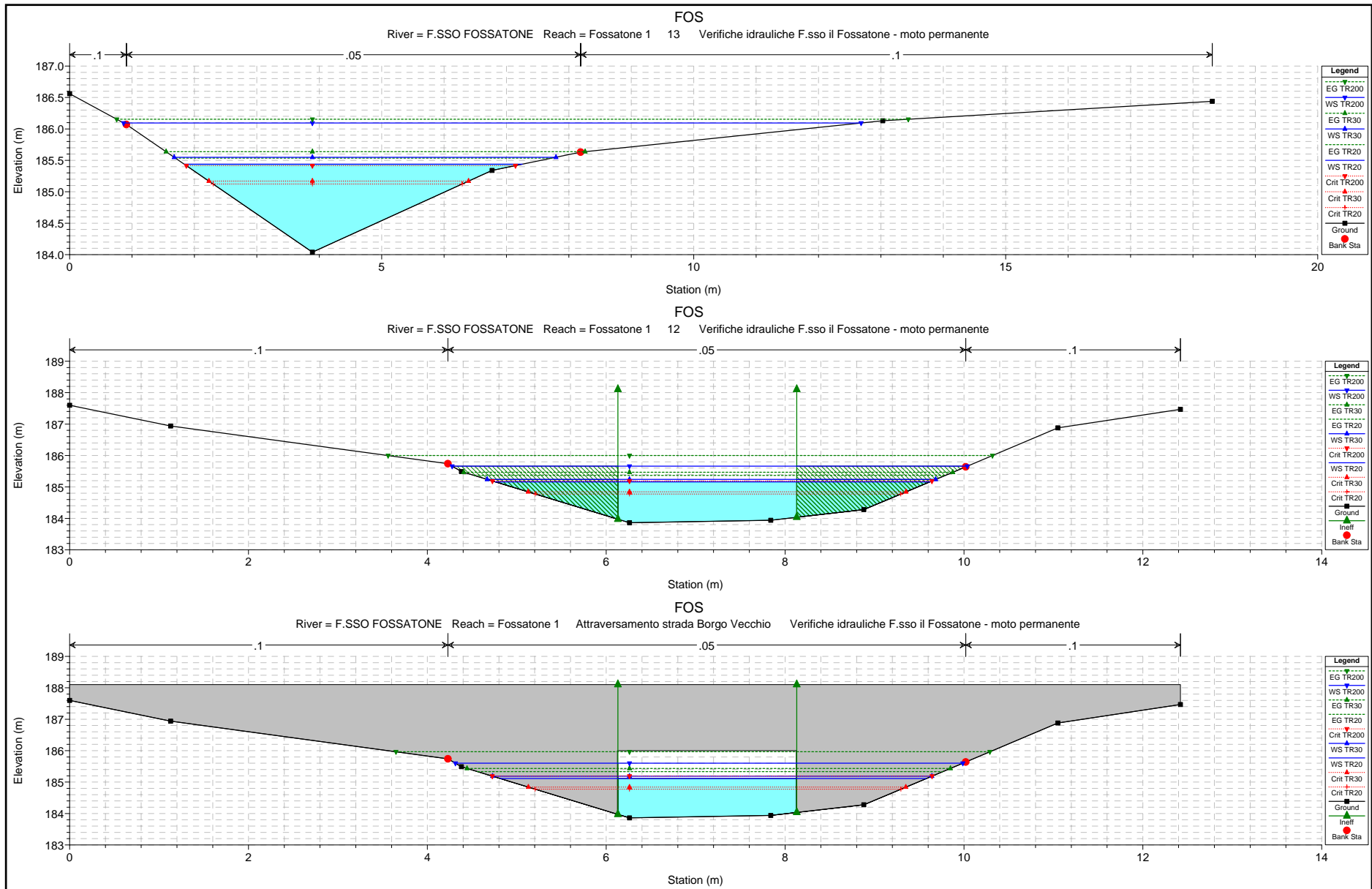
### FOS Verifiche idrauliche F.sso il Fossatone - moto permanente

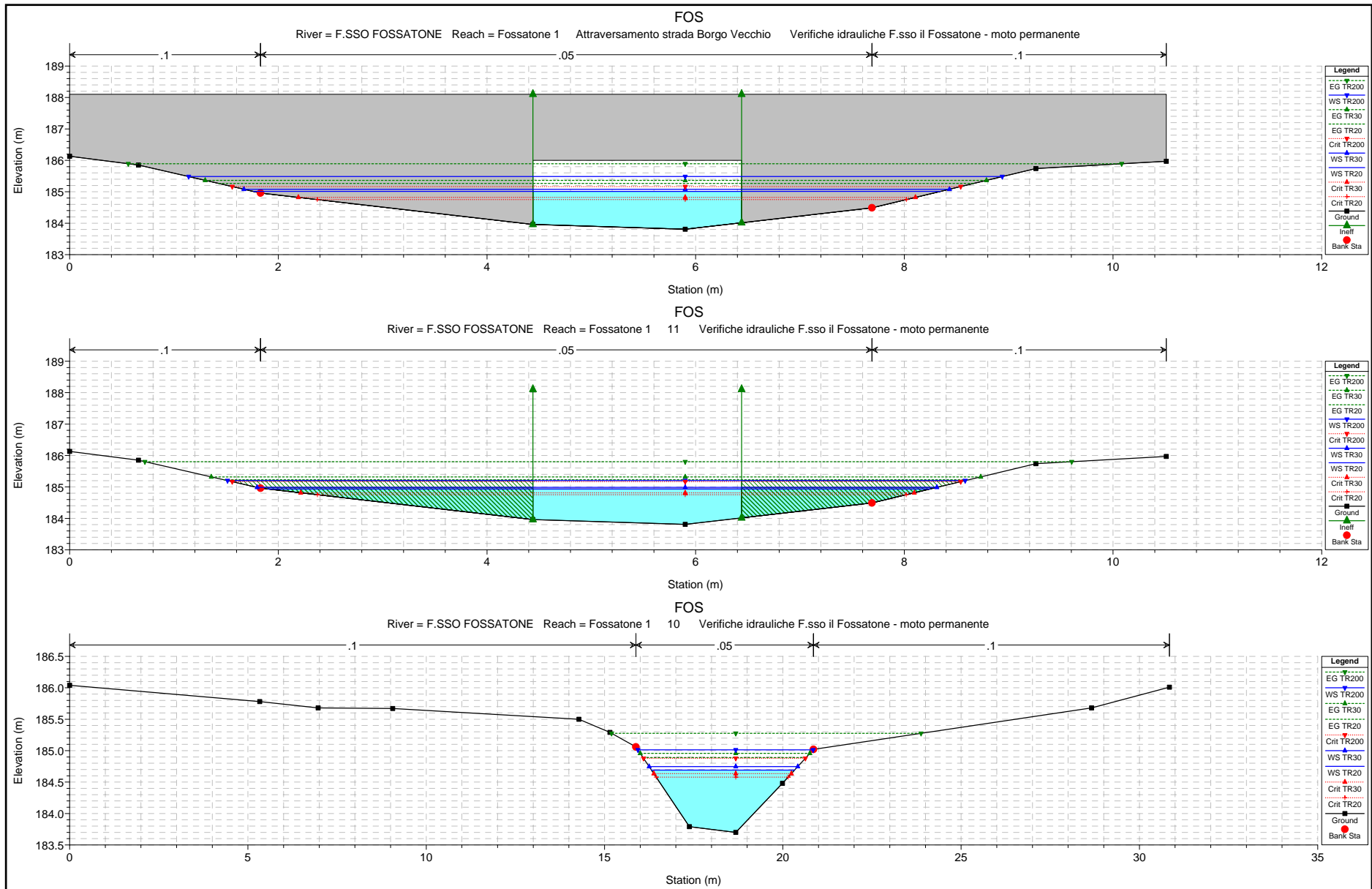


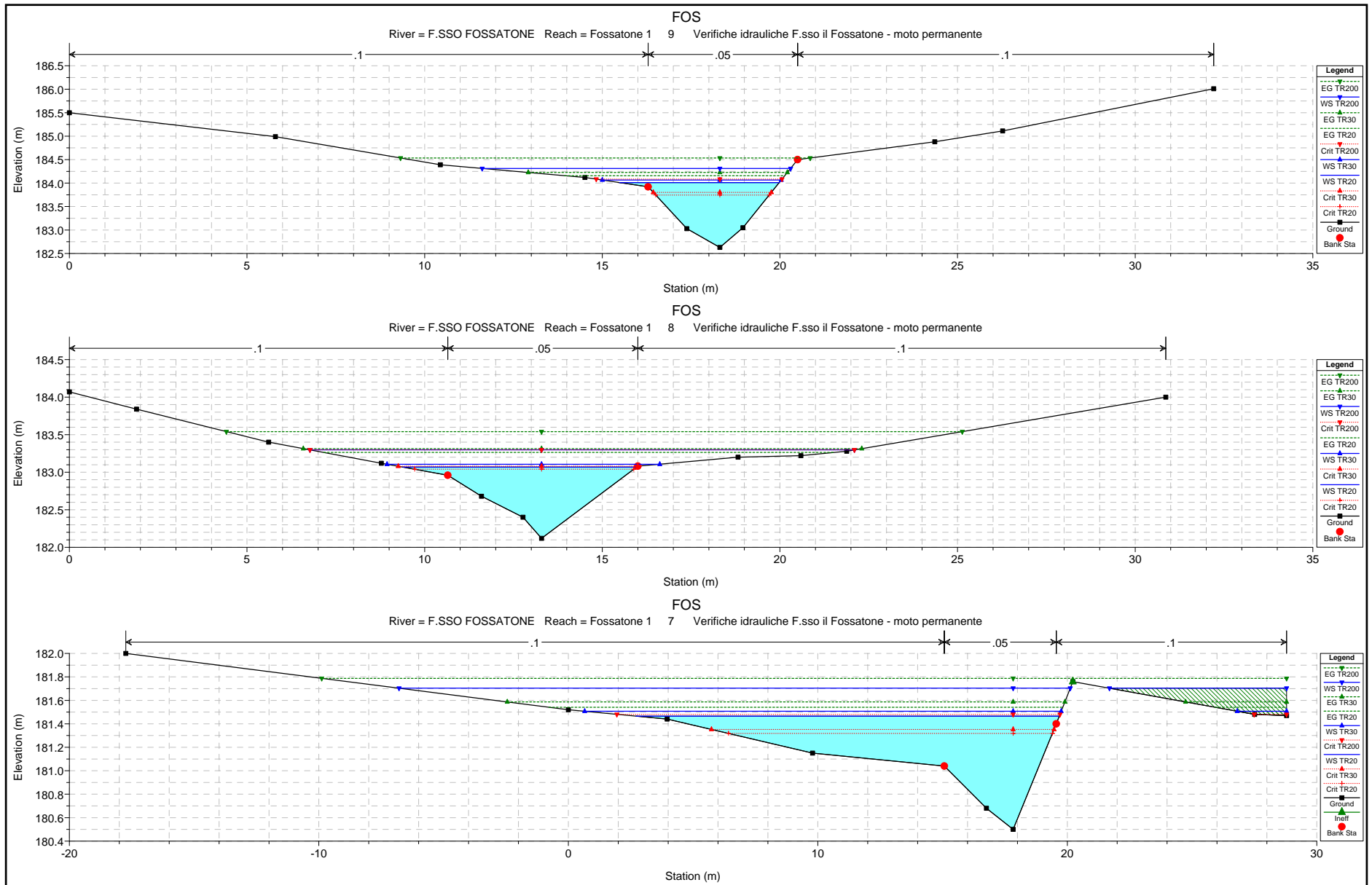




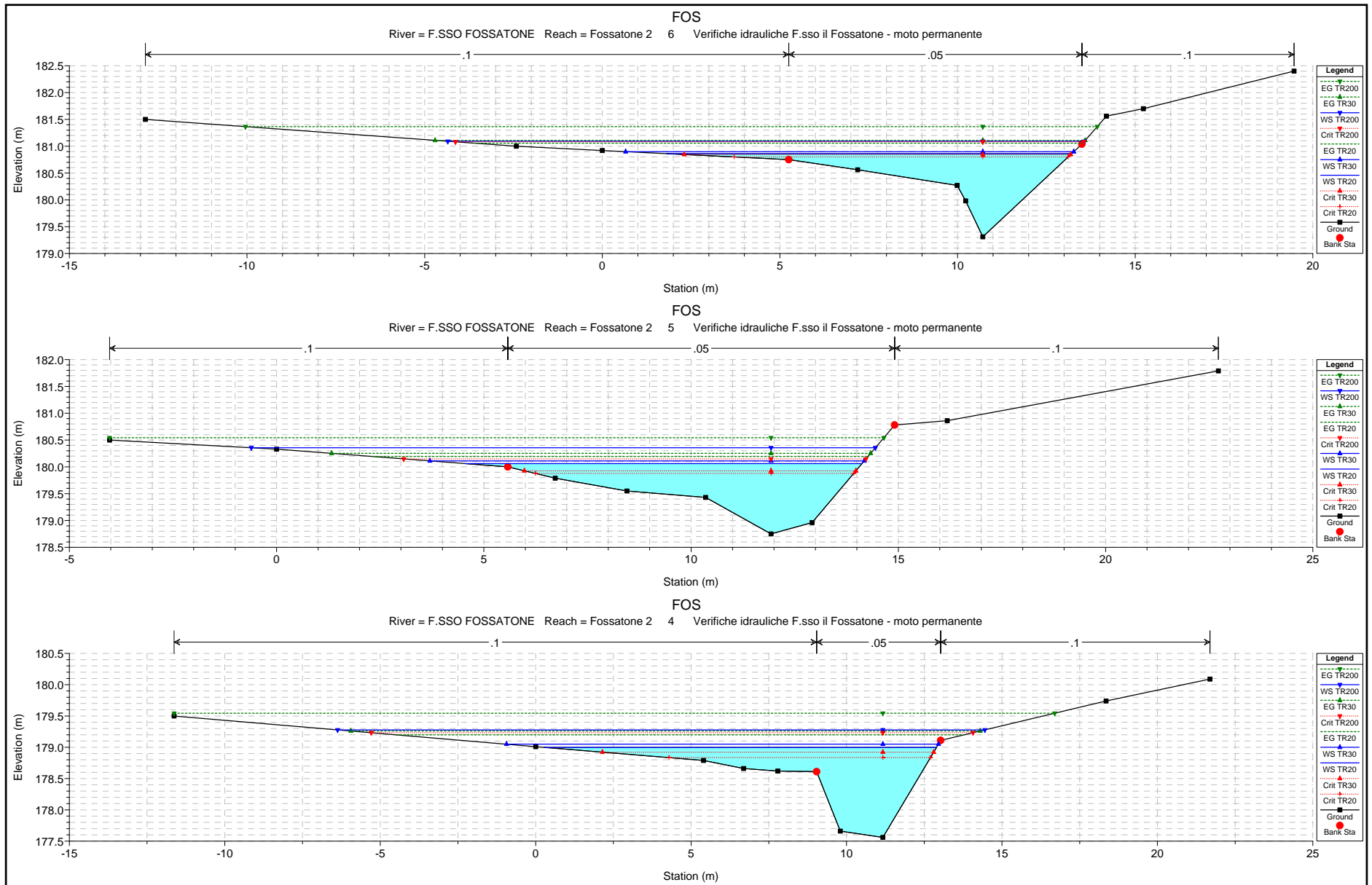


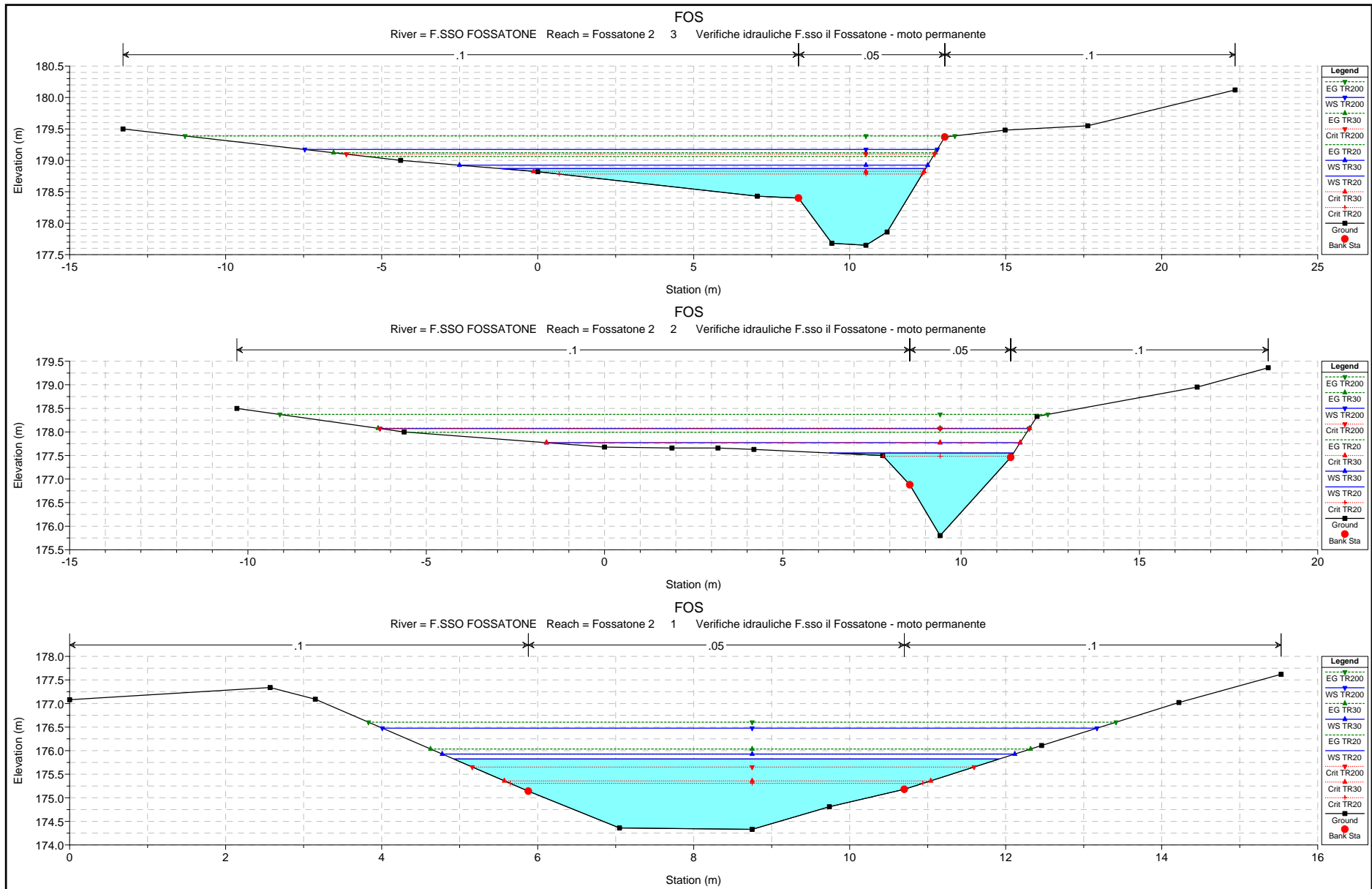


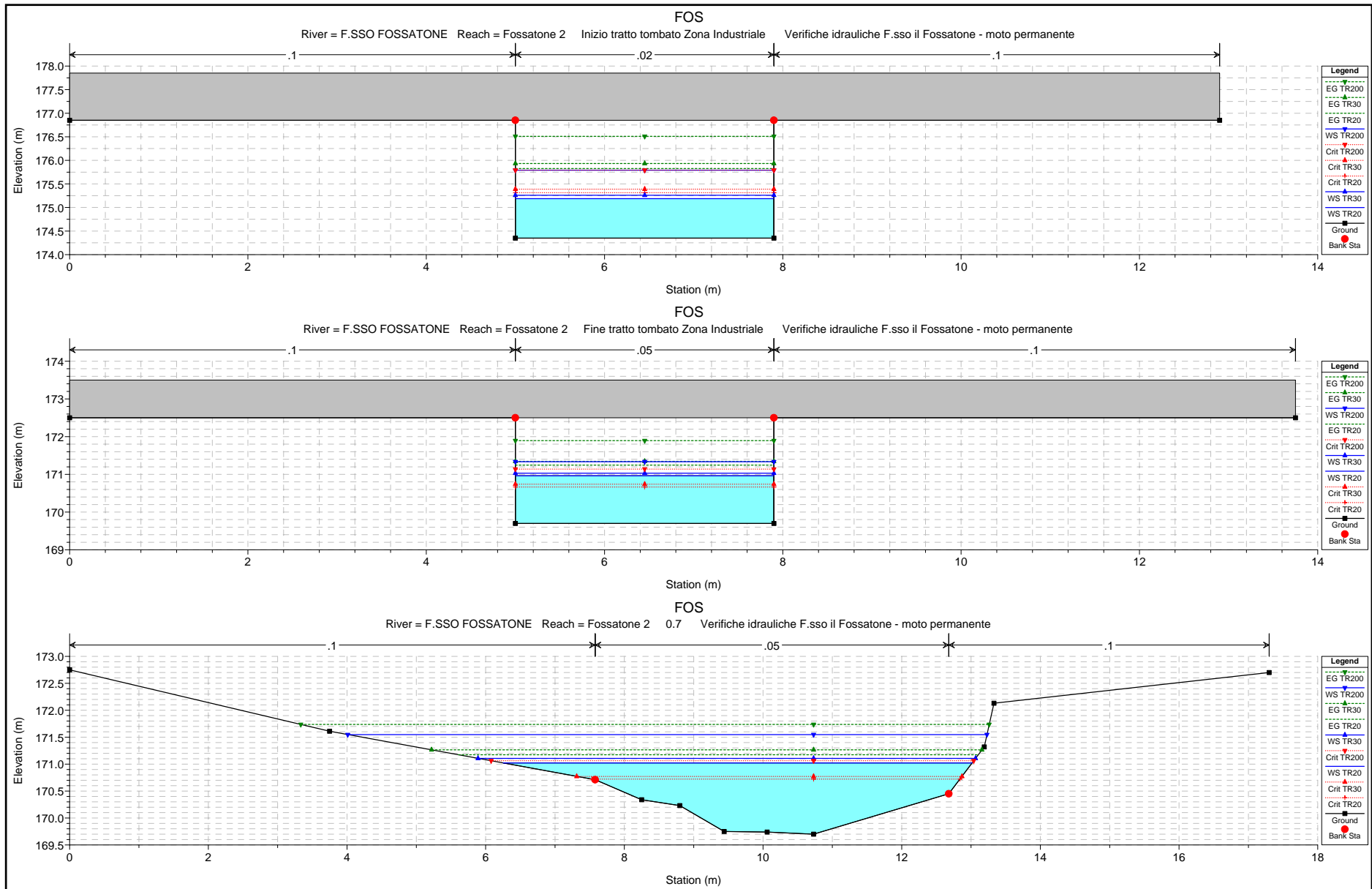


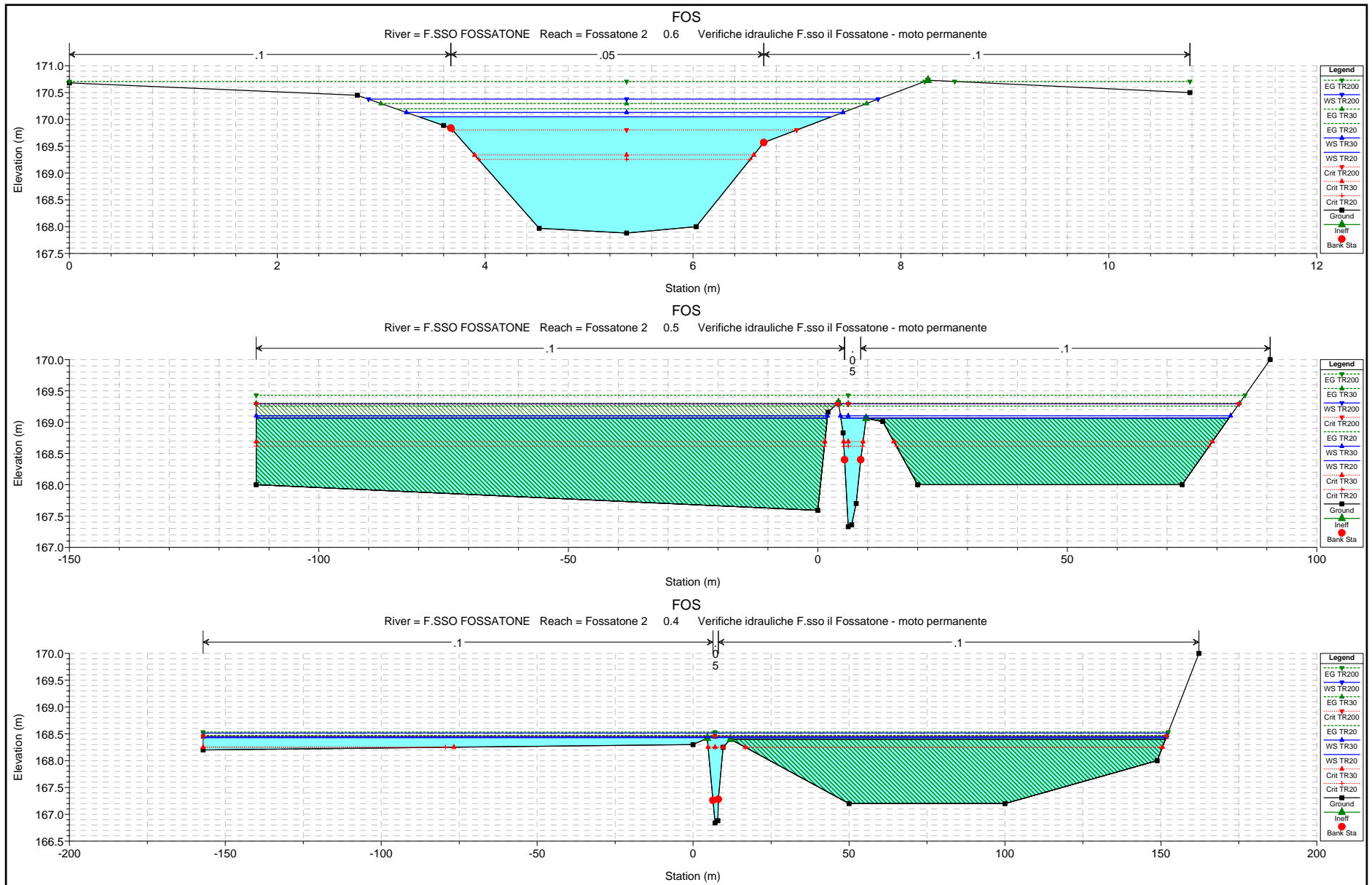


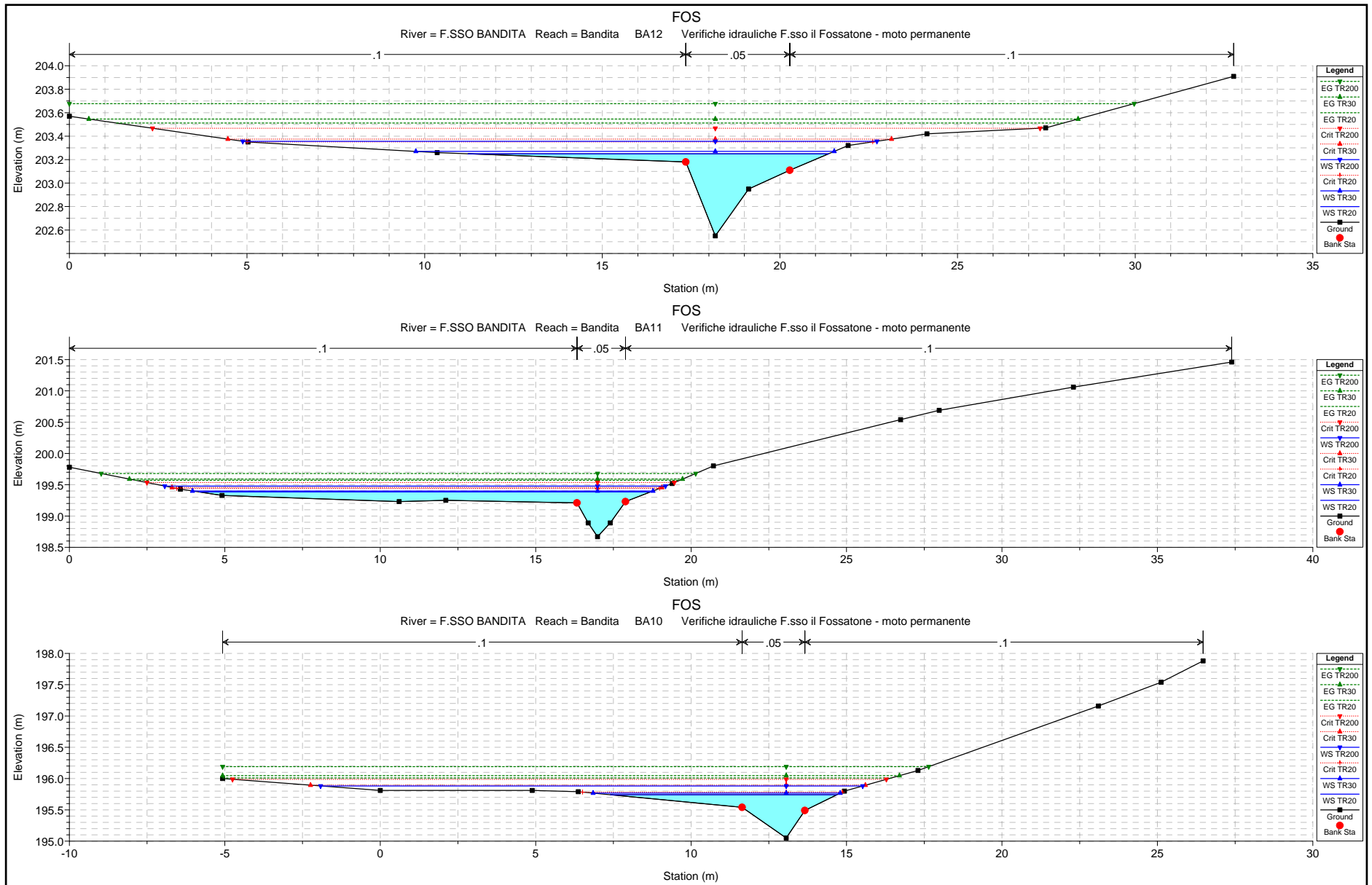


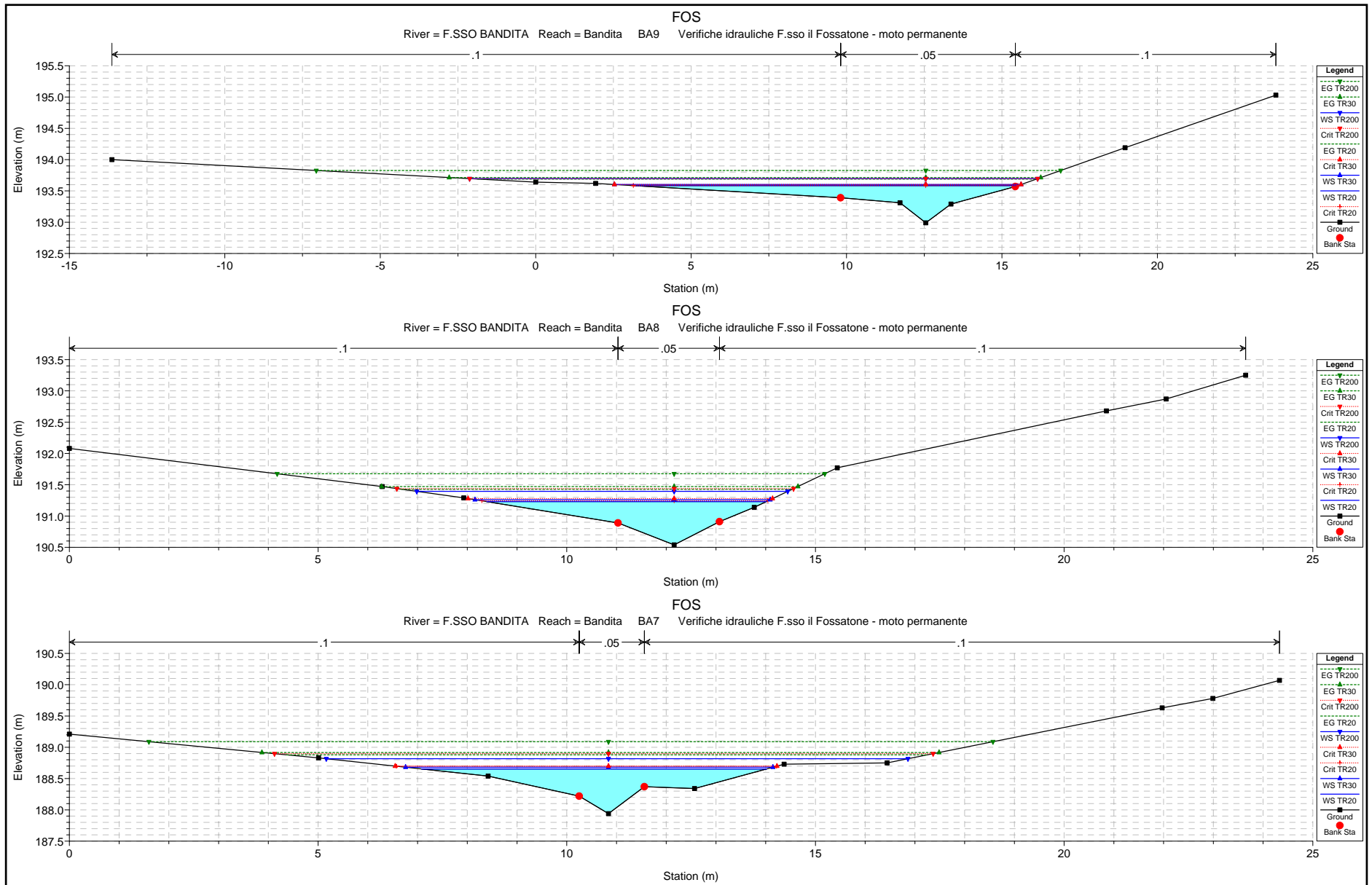


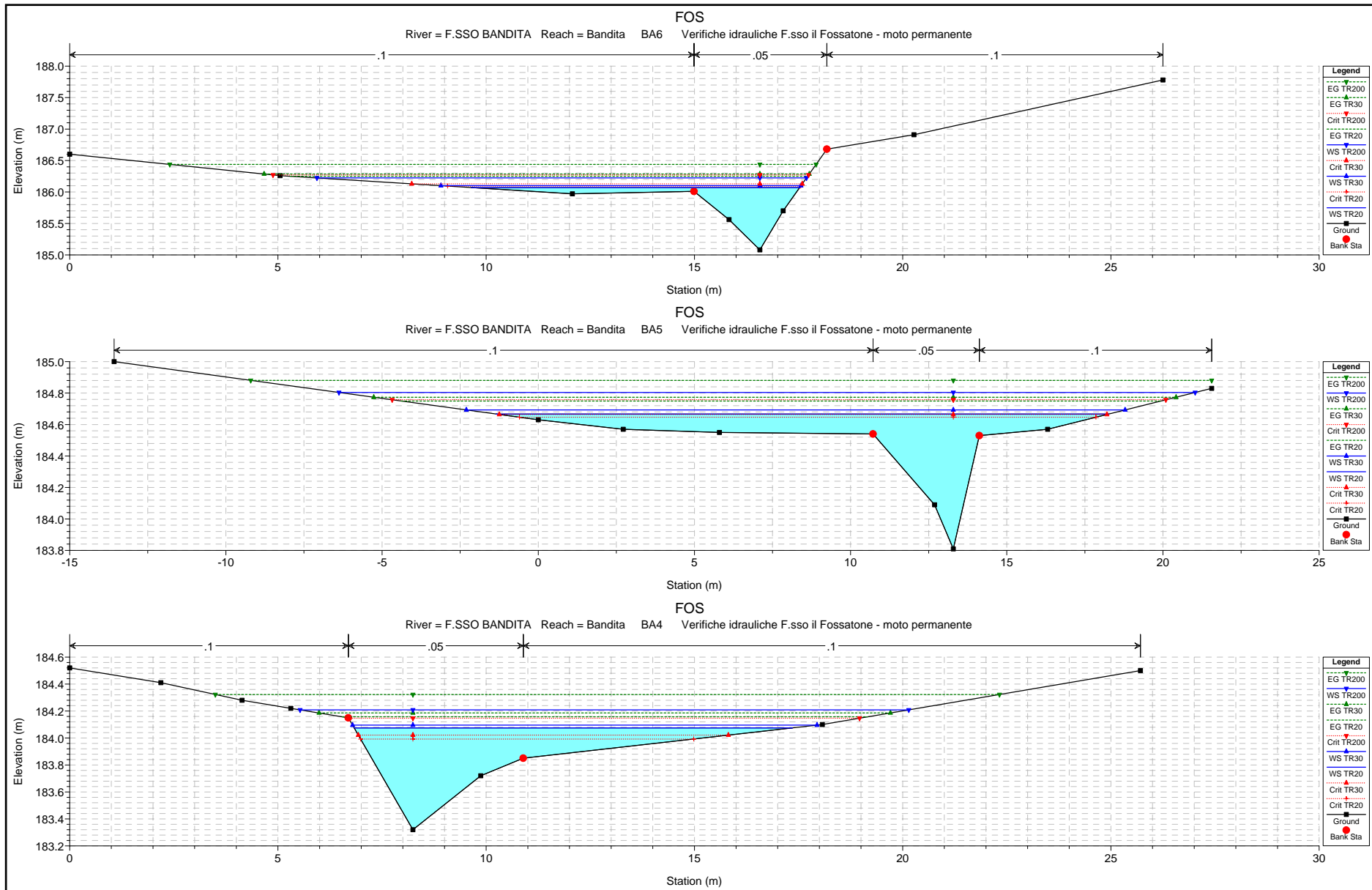


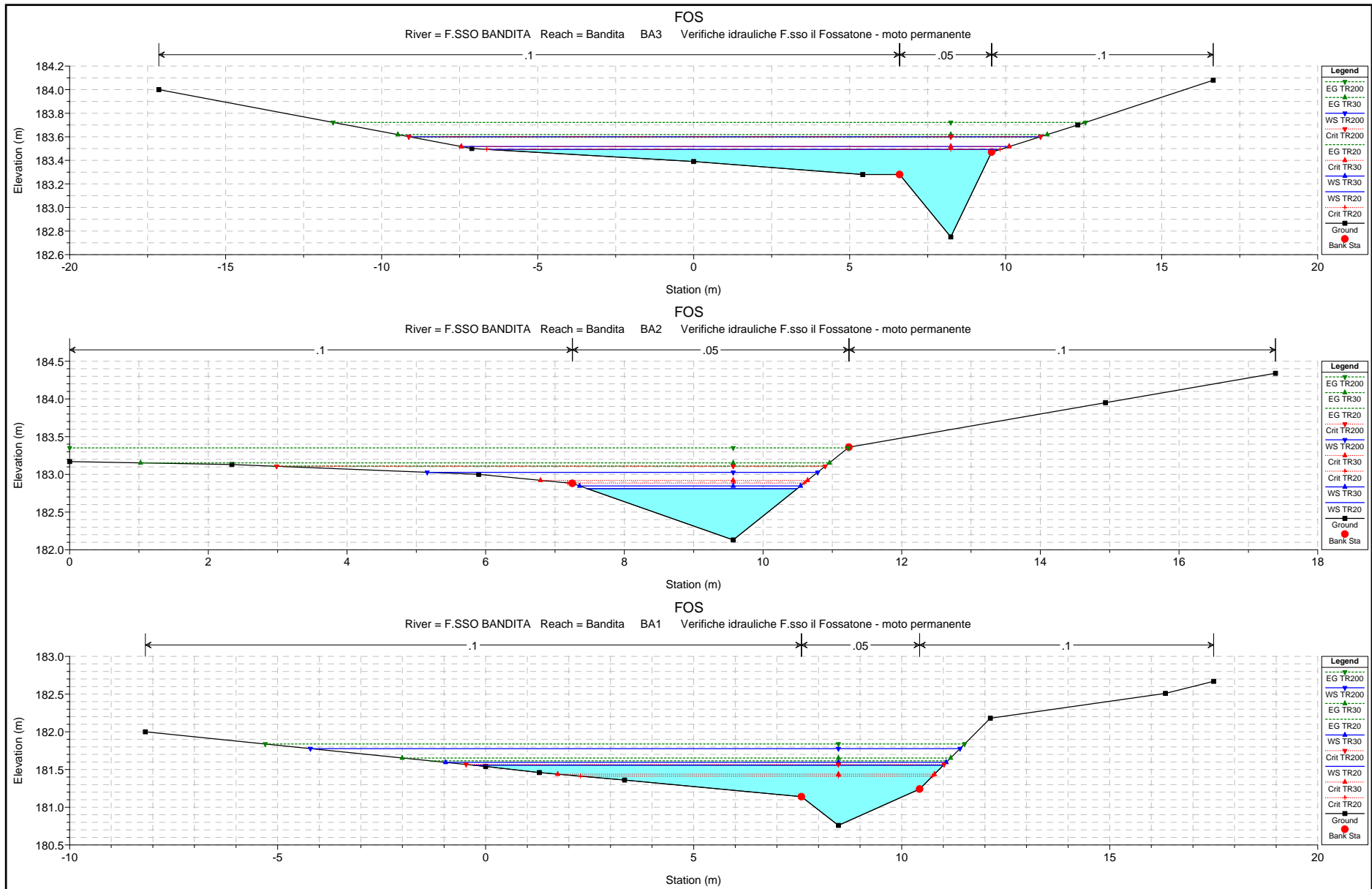








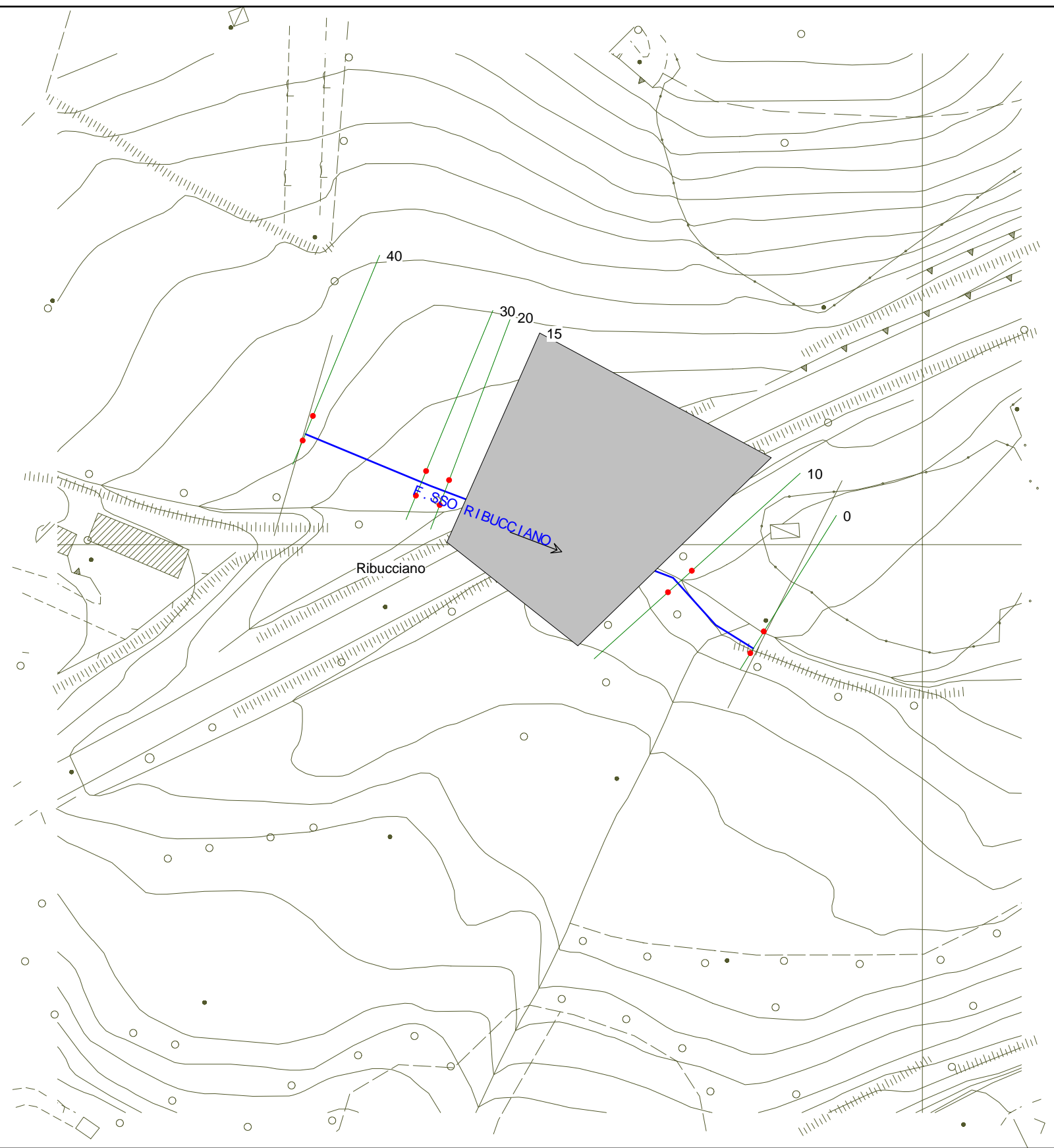






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO RIBUCCIANO**



HEC-RAS Plan: RIBU River: F.SSO RIBUCCIANO Reach: Ribucciano

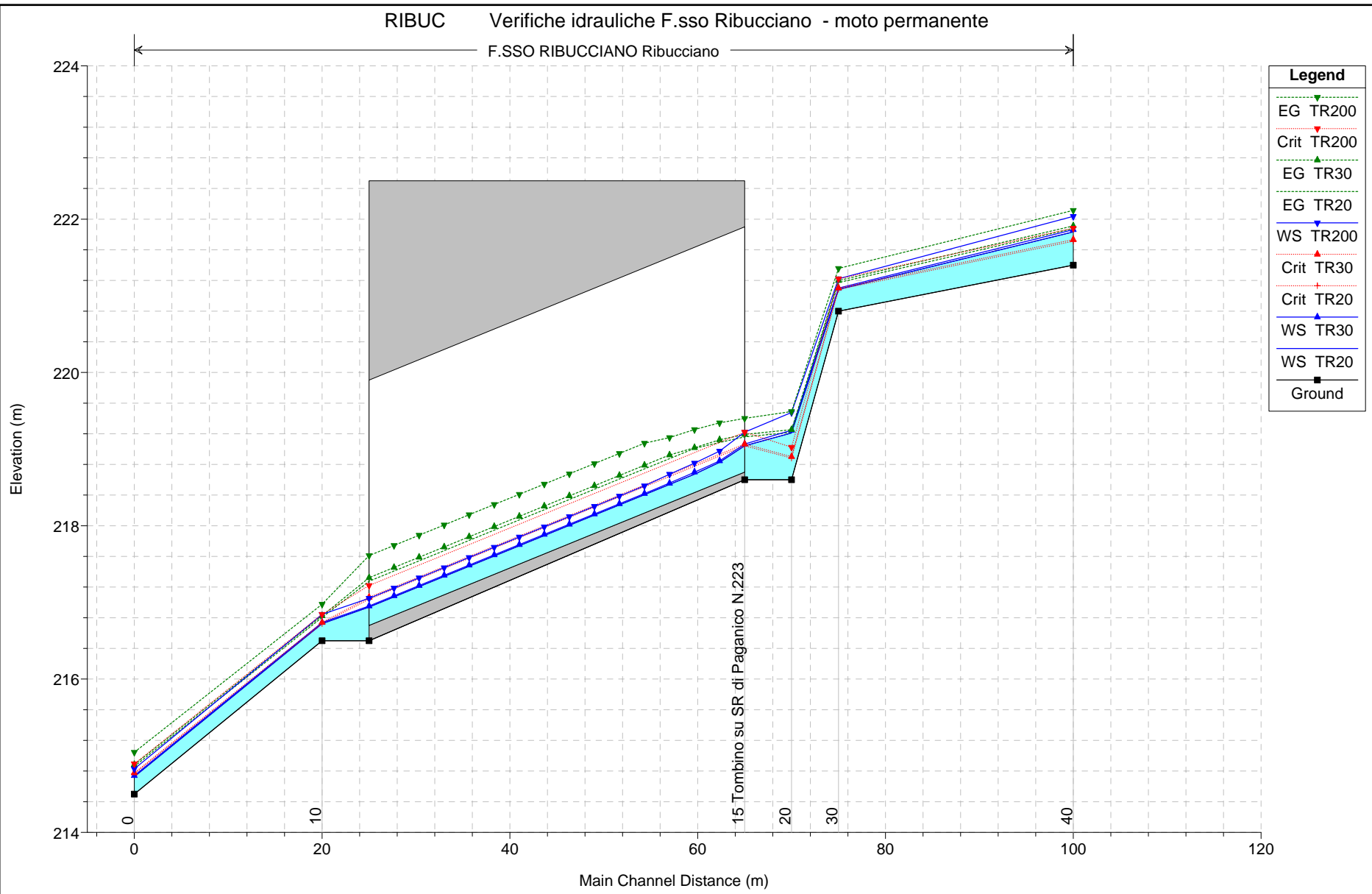
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Ribucciano	40	TR20	0.70		0.70		221.40	221.83	221.71	221.88	0.017691	0.94	0.94	0.75	2.41	0.54	0.54
Ribucciano	40	TR30	0.80		0.80		221.40	221.86	221.73	221.91	0.017848	0.98	0.98	0.82	2.48	0.55	0.55
Ribucciano	40	TR200	1.60		1.60		221.40	222.04	221.88	222.12	0.020018	1.24	1.24	1.29	2.92	0.60	0.60
Ribucciano	30	TR20	0.70		0.70		220.80	221.08	221.08	221.17	0.063335	1.32	1.32	0.53	2.90	0.99	0.99
Ribucciano	30	TR30	0.80		0.80		220.80	221.10	221.10	221.20	0.064266	1.38	1.38	0.58	3.00	1.01	1.01
Ribucciano	30	TR200	1.60		1.60		220.80	221.22	221.22	221.36	0.057772	1.62	1.62	0.99	3.70	1.00	1.00
Ribucciano	20	TR20	0.70		0.70		218.60	219.21	218.88	219.22	0.002192	0.39	0.39	1.78	4.78	0.21	0.21
Ribucciano	20	TR30	0.80		0.80		218.60	219.25	218.90	219.25	0.002218	0.41	0.41	1.96	4.99	0.21	0.21
Ribucciano	20	TR200	1.60	0.01	1.59	0.00	218.60	219.48	219.02	219.49	0.001875	0.50	0.48	3.33	7.03	0.21	0.22
Ribucciano	15	Culvert #1	0.70														
Ribucciano	15	Culvert #1	0.80														
Ribucciano	15	Culvert #1	1.60														
Ribucciano	10	TR20	0.70		0.70		216.50	216.72	216.72	216.80	0.067072	1.26	1.26	0.56	3.45	1.00	1.00
Ribucciano	10	TR30	0.80		0.80		216.50	216.74	216.74	216.83	0.067195	1.32	1.32	0.61	3.50	1.01	1.01
Ribucciano	10	TR200	1.60		1.60		216.50	216.84	216.84	216.98	0.058748	1.60	1.60	1.00	3.81	1.00	1.00
Ribucciano	0	TR20	0.70		0.70		214.50	214.73	214.76	214.86	0.125717	1.62	1.62	0.43	2.96	1.35	1.35
Ribucciano	0	TR30	0.80		0.80		214.50	214.74	214.78	214.88	0.125327	1.68	1.68	0.48	3.08	1.36	1.36
Ribucciano	0	TR200	1.60		1.60		214.50	214.83	214.89	215.05	0.131794	2.06	2.06	0.78	3.80	1.46	1.46

HEC-RAS Plan: RIBU River: F.SSO RIBUCCIANO Reach: Ribucciano

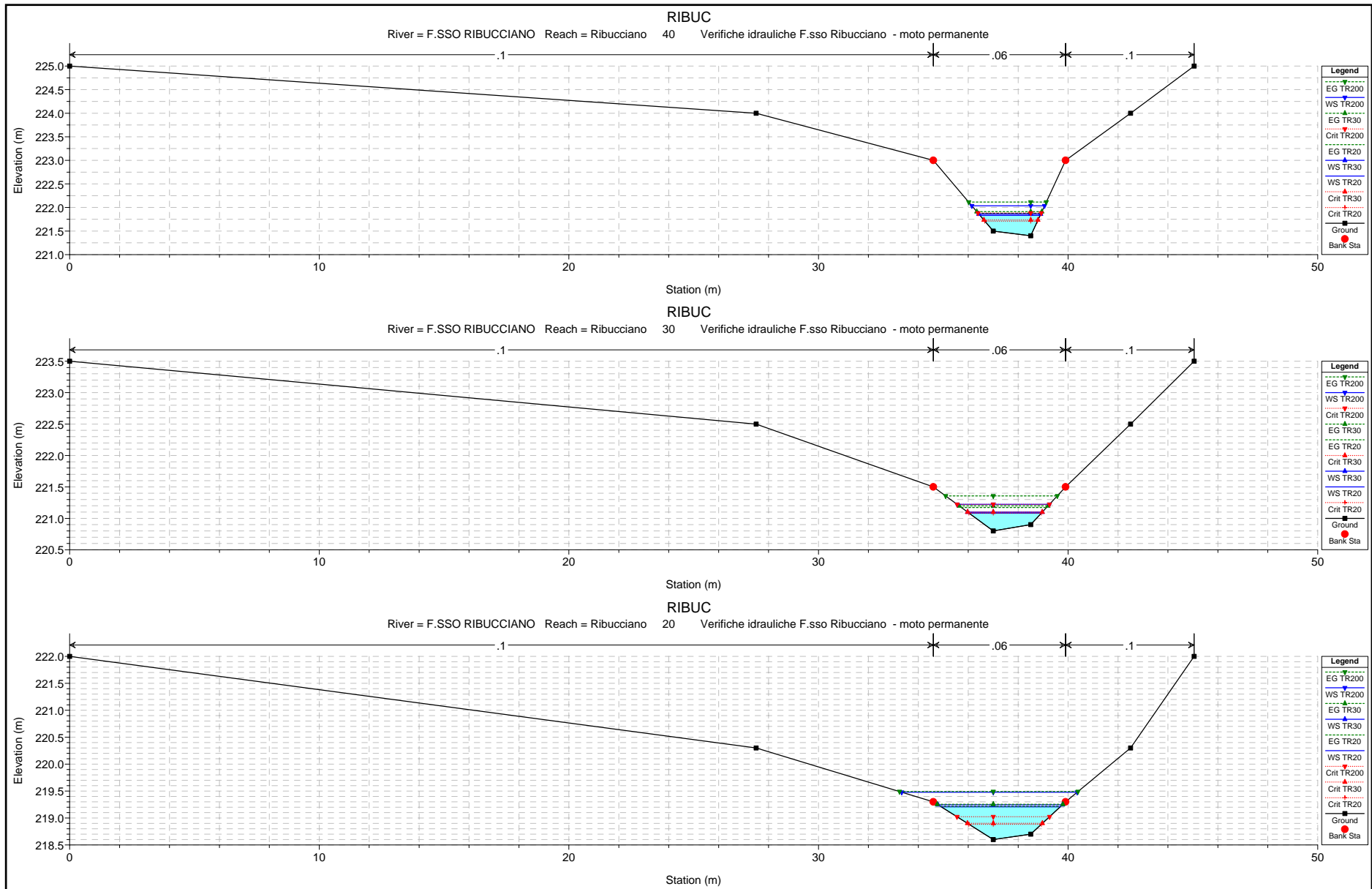
Reach	River Sta		Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Ribucciano	15	Culvert #1	TR20	219.22	219.21	219.08	219.22	222.50	0.70		2.49	1.51	2.57
Ribucciano	15	Culvert #1	TR30	219.25	219.25	219.11	219.25	222.50	0.80		2.51	1.57	2.69
Ribucciano	15	Culvert #1	TR200	219.49	219.48	219.32	219.49	222.50	1.60		2.63	1.88	3.31

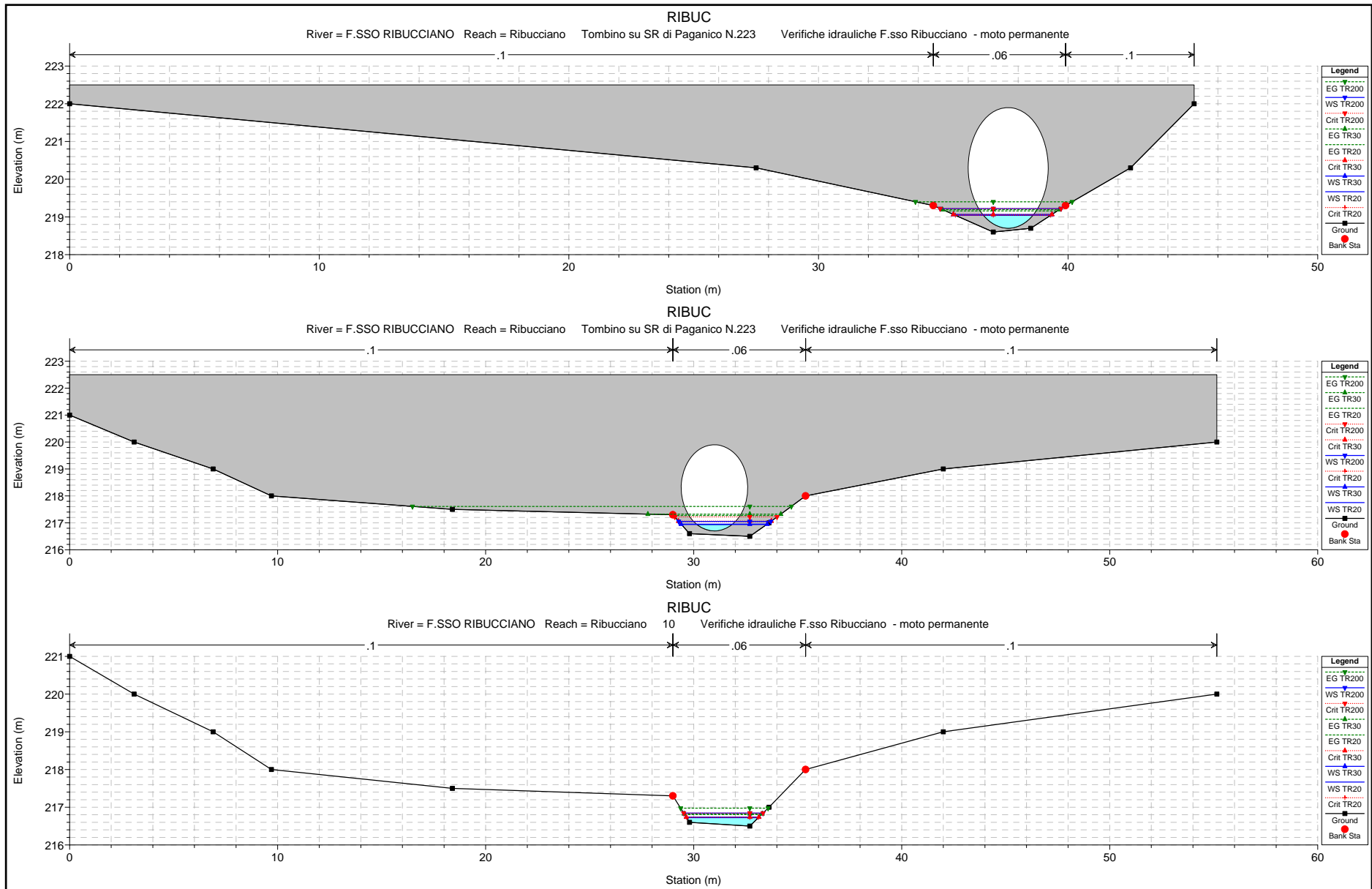
RIBUC Verifiche idrauliche F.sso Ribucciano - moto permanente

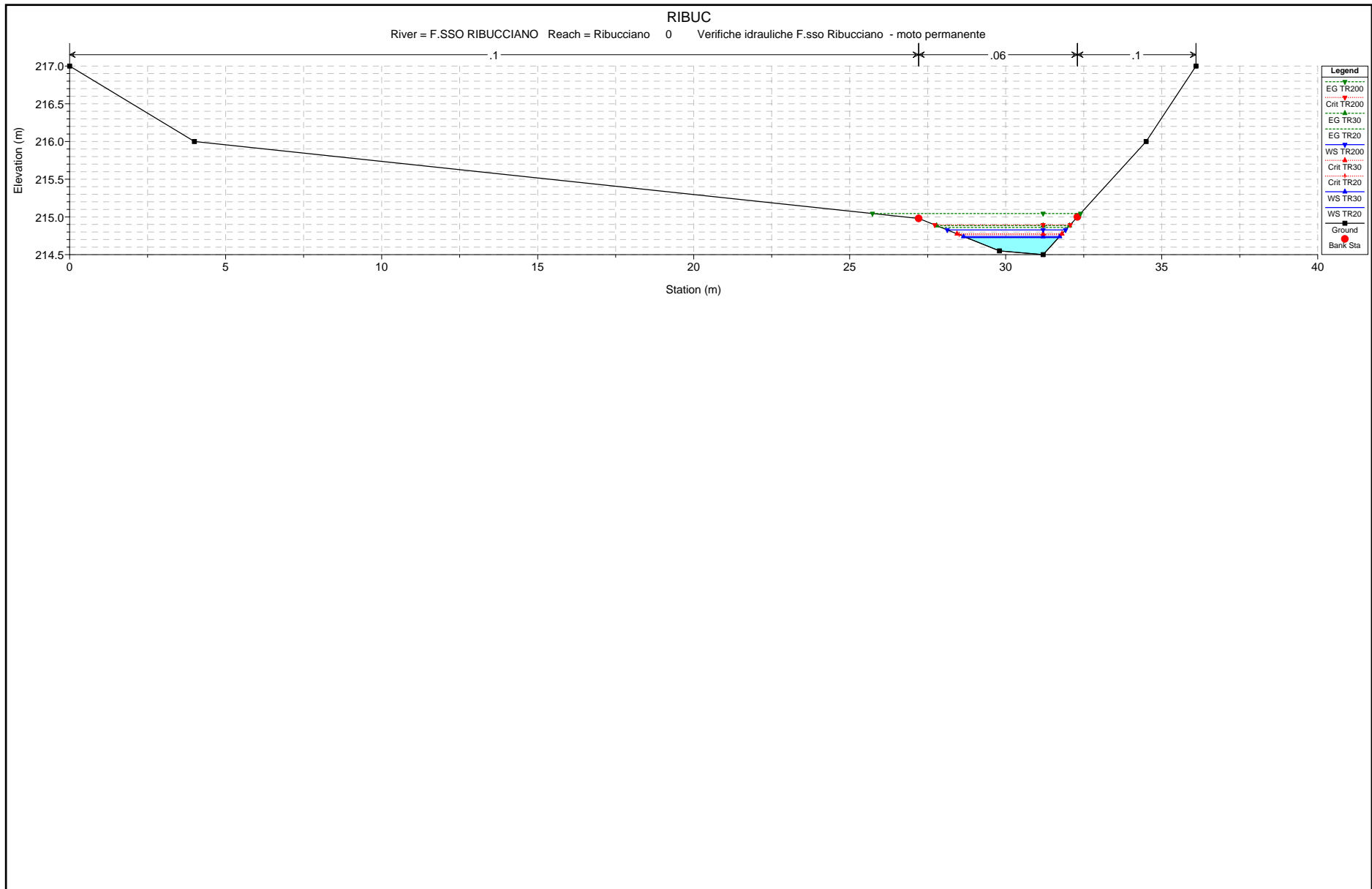
F.SSO RIBUCCIANO Ribucciano



Legend	
EG TR200	Green dashed line with inverted triangles
Crit TR200	Red dotted line with inverted triangles
EG TR30	Green dashed line with triangles
EG TR20	Blue solid line with inverted triangles
WS TR200	Blue solid line with inverted triangles
Crit TR30	Red dotted line with triangles
Crit TR20	Red dotted line with triangles
WS TR30	Blue solid line with triangles
WS TR20	Blue solid line with triangles
Ground	Black solid line with squares



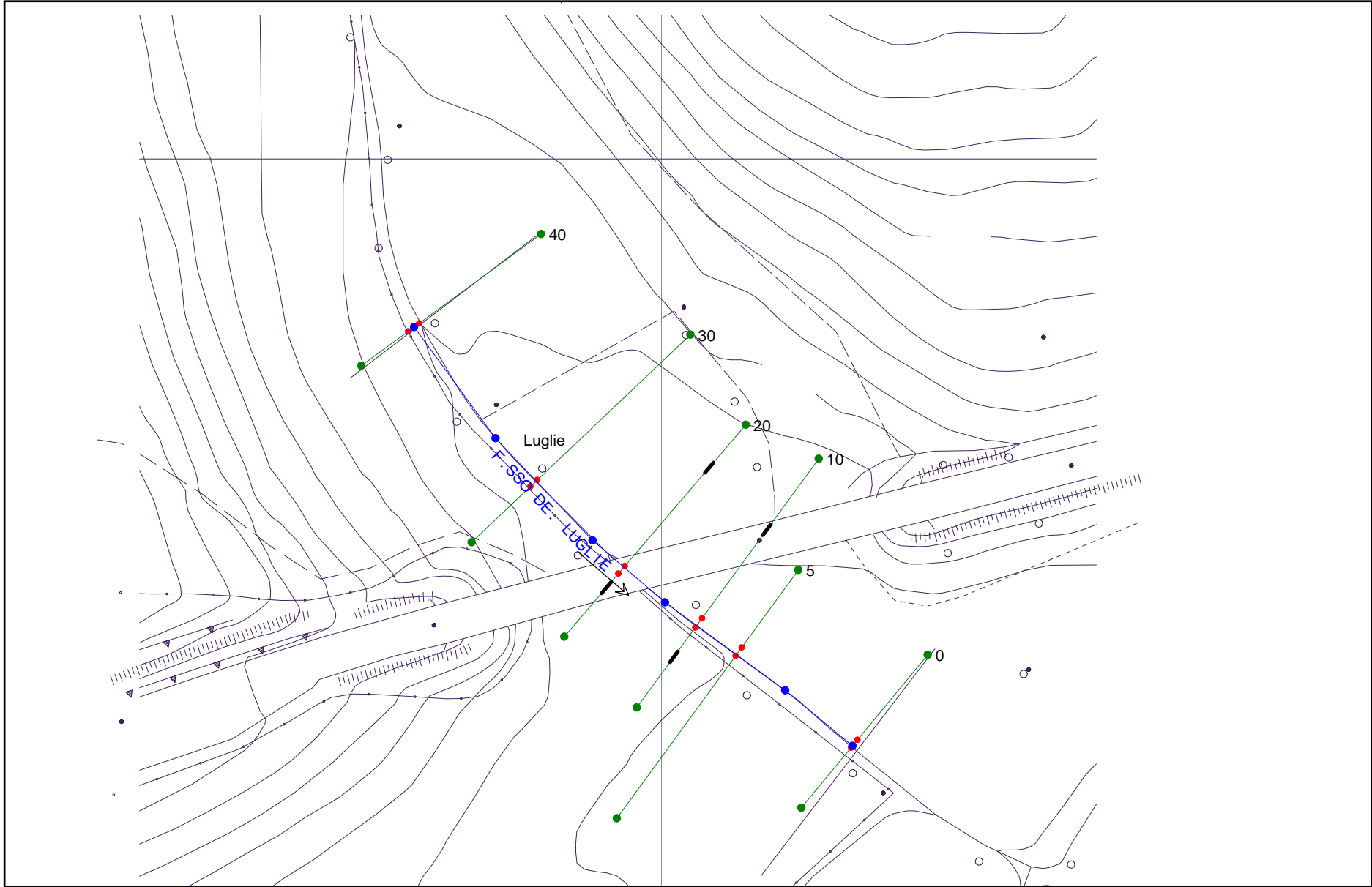






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO DELLE LUGLIE**

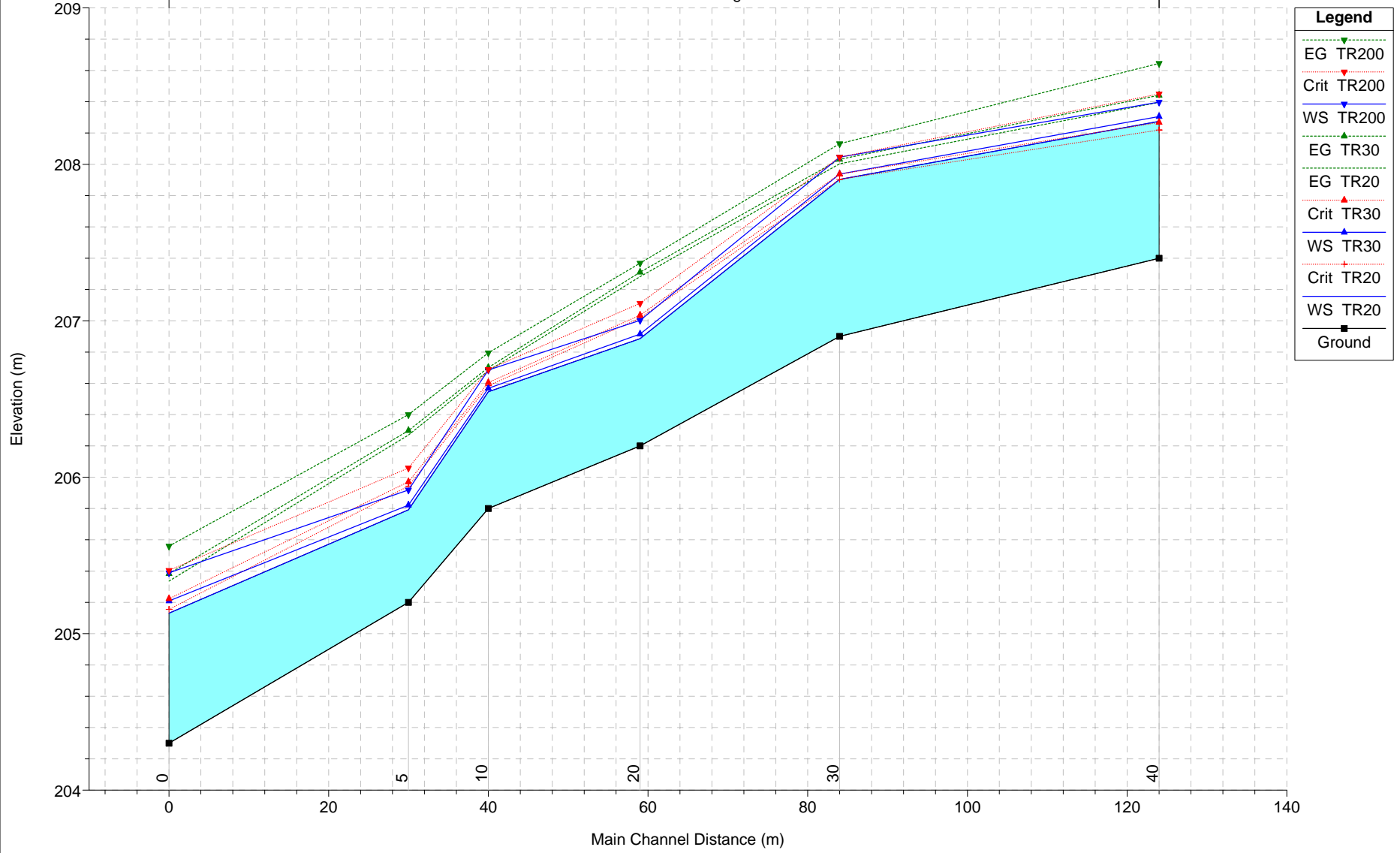


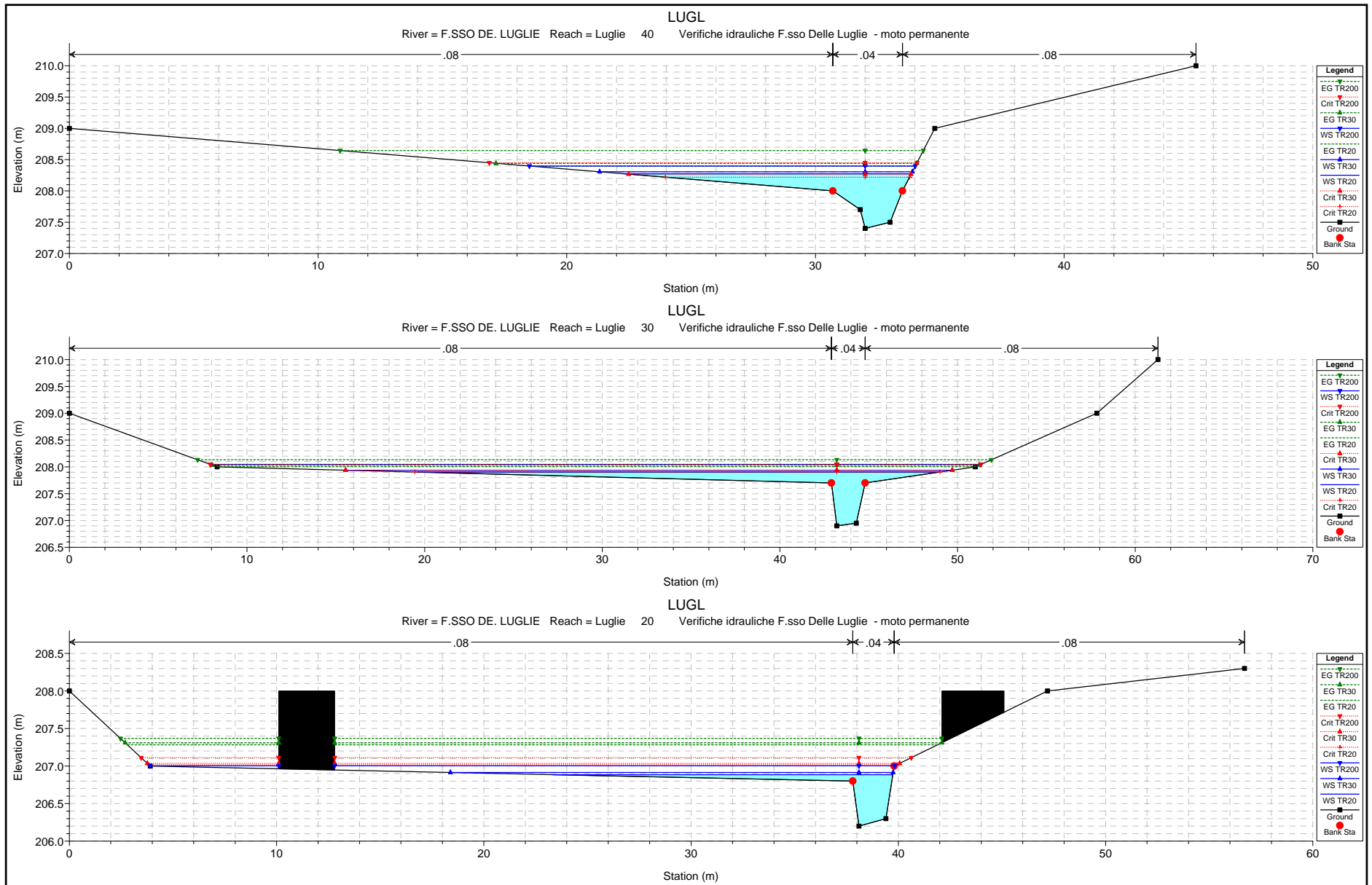
HEC-RAS Plan: LUGL River: F.SSO DE. LUGLIE Reach: Luglie

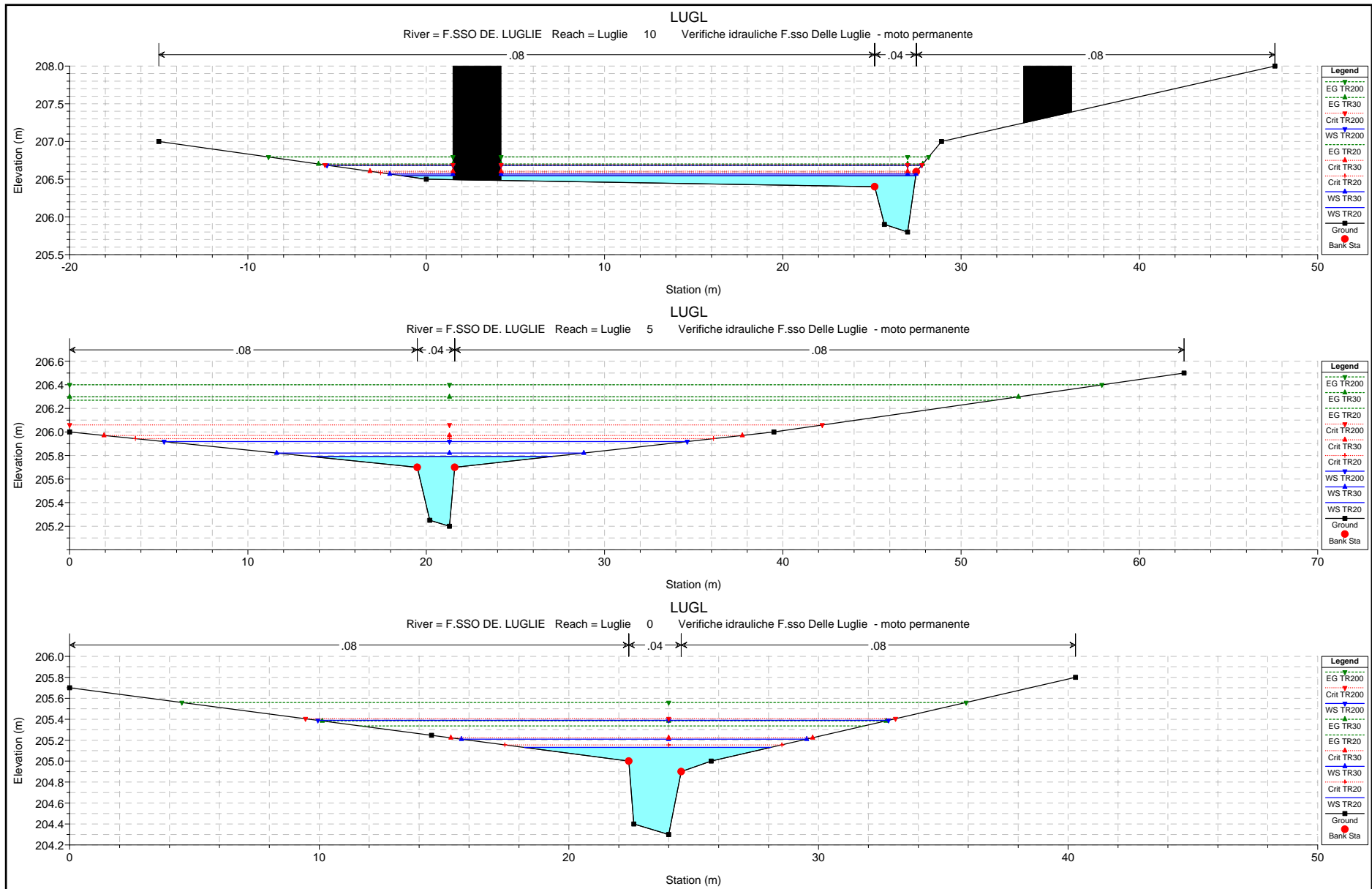
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Luglie	40	TR20	3.20	0.39	2.80	0.01	207.40	208.27	208.22	208.40	0.010129	1.65	1.10	2.91	11.59	0.67	0.70
Luglie	40	TR30	3.70	0.53	3.15	0.02	207.40	208.31	208.27	208.44	0.010882	1.76	1.13	3.28	12.57	0.70	0.71
Luglie	40	TR200	6.50	1.38	5.07	0.05	207.40	208.40	208.45	208.65	0.018001	2.48	1.42	4.57	15.51	0.93	0.84
Luglie	30	TR20	3.20	0.62	2.46	0.11	206.90	207.90	207.90	208.00	0.009207	1.59	0.73	4.36	29.55	0.56	0.61
Luglie	30	TR30	3.70	0.93	2.60	0.17	206.90	207.94	207.94	208.03	0.008982	1.62	0.68	5.44	34.15	0.56	0.54
Luglie	30	TR200	6.50	2.75	3.26	0.48	206.90	208.05	208.05	208.13	0.009426	1.80	0.66	9.81	43.37	0.59	0.44
Luglie	20	TR20	3.20	0.20	3.00		206.20	206.89	207.02	207.28	0.046217	2.88	1.93	1.66	16.43	1.25	1.94
Luglie	20	TR30	3.70	0.44	3.26		206.20	206.91	207.04	207.31	0.046522	2.97	1.68	2.21	21.36	1.26	1.66
Luglie	20	TR200	6.50	2.31	4.19	0.00	206.20	207.00	207.11	207.37	0.049424	3.30	1.41	4.63	33.23	1.32	1.20
Luglie	10	TR20	3.20	0.79	2.41		205.80	206.55	206.59	206.68	0.016448	1.86	0.89	3.58	26.14	0.79	0.77
Luglie	10	TR30	3.70	1.12	2.58		205.80	206.57	206.61	206.70	0.016802	1.92	0.89	4.17	26.82	0.81	0.72
Luglie	10	TR200	6.50	3.26	3.24	0.00	205.80	206.69	206.69	206.79	0.014491	2.00	0.86	7.54	30.66	0.77	0.55
Luglie	5	TR20	3.20	0.11	3.00	0.10	205.20	205.79	205.94	206.27	0.058834	3.16	2.18	1.47	13.53	1.50	2.11
Luglie	5	TR30	3.70	0.22	3.28	0.20	205.20	205.82	205.97	206.30	0.056955	3.25	1.92	1.93	17.22	1.49	1.83
Luglie	5	TR200	6.50	1.06	4.47	0.97	205.20	205.92	206.06	206.40	0.057253	3.68	1.55	4.19	29.34	1.54	1.31
Luglie	0	TR20	3.20	0.07	2.99	0.13	204.30	205.13	205.16	205.34	0.016739	2.07	1.53	2.09	9.88	0.80	1.06
Luglie	0	TR30	3.70	0.22	3.20	0.28	204.30	205.21	205.22	205.38	0.013294	1.99	1.22	3.02	13.83	0.72	0.83
Luglie	0	TR200	6.50	1.13	4.38	0.99	204.30	205.39	205.40	205.56	0.012351	2.20	1.03	6.32	22.85	0.72	0.62

LUGL Verifiche idrauliche F.sso Delle Luglie - moto permanente

F.SSO DE. LUGLIE Luglie

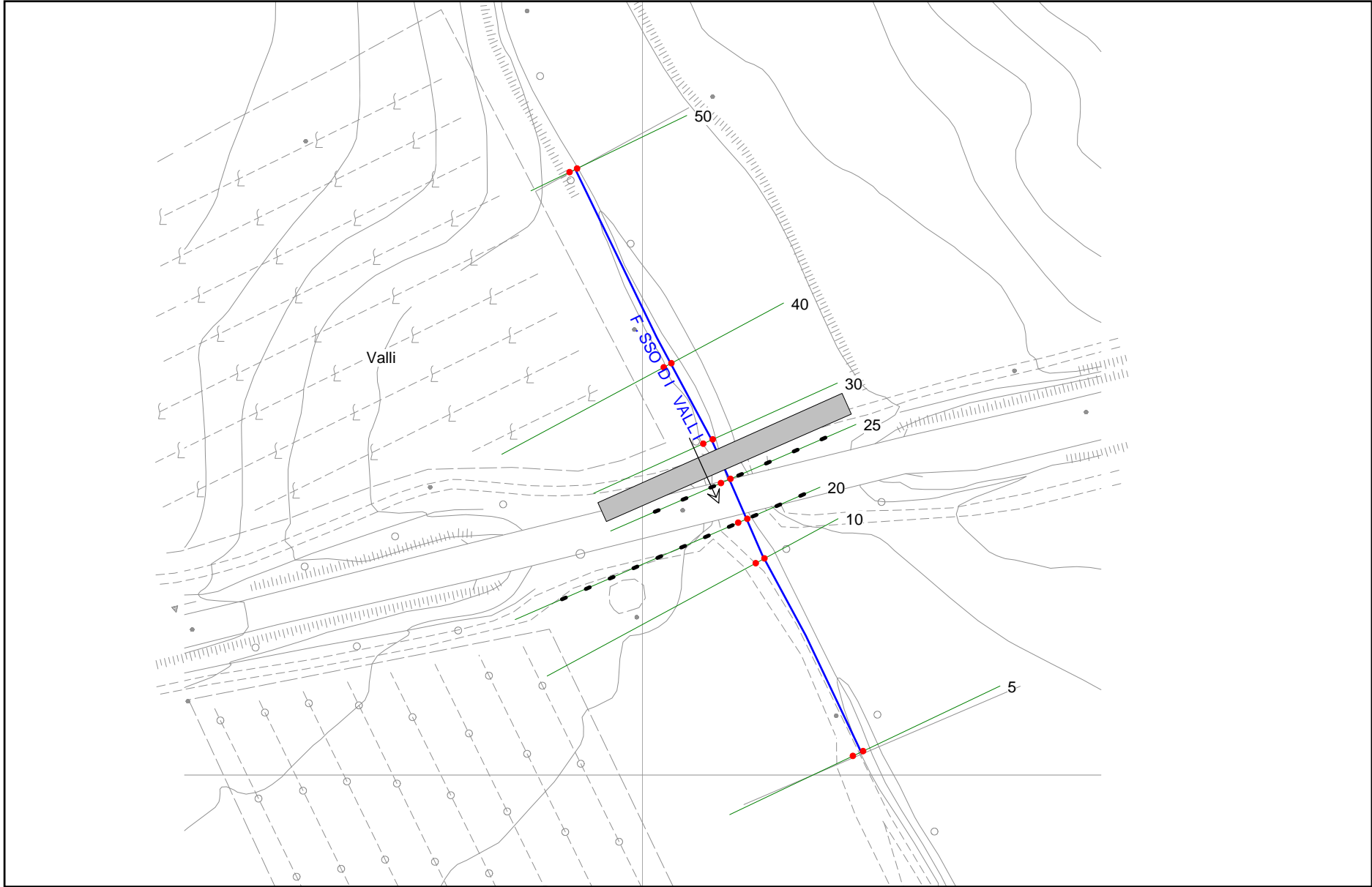






## **ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

### **FOSSO DI VALLI**





HEC-RAS Plan: VAL River: F.SSO DI VALLI Reach: Valli

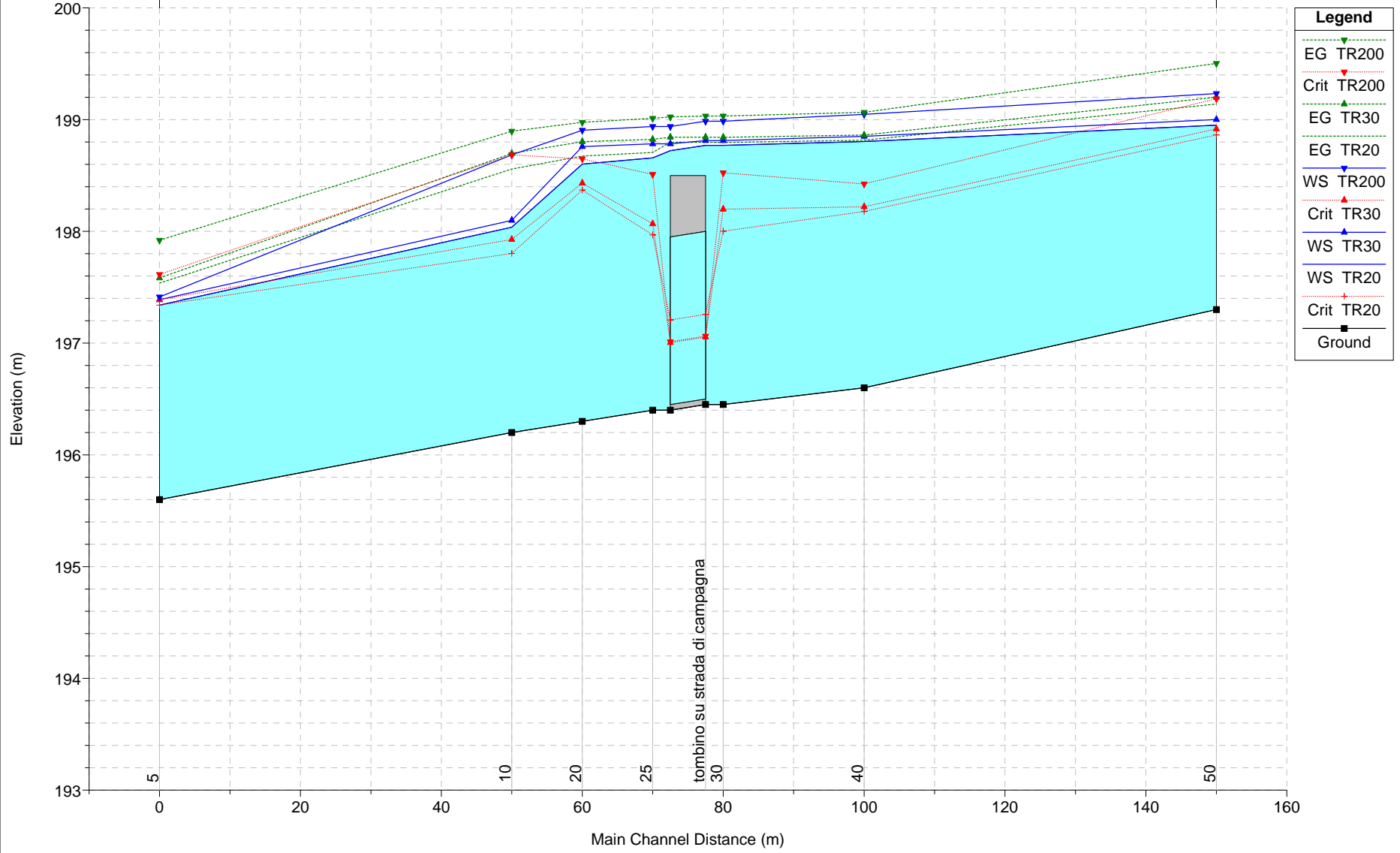
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Valli	50	TR20	11.90	4.99	6.69	0.22	197.30	198.95	198.86	199.14	0.010103	2.49	1.21	9.84	17.89	0.67	0.52
Valli	50	TR30	13.40	5.89	7.24	0.26	197.30	199.00	198.92	199.20	0.010513	2.60	1.24	10.78	18.80	0.69	0.52
Valli	50	TR200	23.10	12.10	10.44	0.56	197.30	199.23	199.19	199.50	0.013343	3.23	1.49	15.49	21.83	0.79	0.57
Valli	40	TR20	11.90	6.04	3.16	2.70	196.60	198.80	198.18	198.82	0.000767	0.81	0.31	38.72	62.91	0.18	0.13
Valli	40	TR30	13.40	6.78	3.40	3.23	196.60	198.85	198.22	198.86	0.000820	0.85	0.32	41.69	65.50	0.19	0.13
Valli	40	TR200	23.10	11.40	4.81	6.89	196.60	199.05	198.42	199.06	0.001201	1.09	0.42	55.57	73.89	0.24	0.15
Valli	30	TR20	11.90	3.02	5.36	3.53	196.45	198.77	198.00	198.80	0.001135	1.03	0.40	29.55	50.21	0.22	0.17
Valli	30	TR30	13.40	3.54	5.78	4.08	196.45	198.81	198.20	198.84	0.001237	1.09	0.42	31.77	52.38	0.23	0.17
Valli	30	TR200	23.10	7.01	8.45	7.64	196.45	198.99	198.52	199.03	0.002058	1.47	0.56	41.58	61.09	0.30	0.21
Valli	27	Culvert #1	TR20	11.90													
Valli	27	Culvert #1	TR30	13.40													
Valli	27	Culvert #1	TR200	23.10													
Valli	25	TR20	11.90	2.50	6.49	2.91	196.40	198.66	197.97	198.71	0.001759	1.28	0.55	21.64	38.58	0.28	0.23
Valli	25	TR30	13.40	3.23	6.59	3.58	196.40	198.78	198.07	198.82	0.001496	1.22	0.50	26.81	43.90	0.26	0.20
Valli	25	TR200	23.10	6.34	10.04	6.73	196.40	198.94	198.51	199.01	0.002778	1.75	0.68	34.21	51.69	0.36	0.26
Valli	20	TR20	11.90	0.96	6.93	4.01	196.30	198.60	198.37	198.67	0.004131	1.52	0.69	17.19	41.22	0.34	0.34
Valli	20	TR30	13.40	1.43	6.38	5.59	196.30	198.76	198.43	198.80	0.002719	1.30	0.55	24.37	50.00	0.28	0.25
Valli	20	TR200	23.10	2.94	9.22	10.94	196.30	198.91	198.65	198.98	0.004553	1.75	0.72	32.30	59.21	0.37	0.31
Valli	10	TR20	11.90	0.00	11.89	0.01	196.20	198.04	197.80	198.56	0.026871	3.20	3.16	3.77	5.08	0.80	1.17
Valli	10	TR30	13.40	0.03	13.29	0.08	196.20	198.10	197.93	198.70	0.029661	3.44	3.17	4.23	9.70	0.85	1.53
Valli	10	TR200	23.10	2.95	13.58	6.57	196.20	198.68	198.68	198.90	0.011405	2.61	1.13	20.36	49.28	0.55	0.56
Valli	5	TR20	11.90	0.67	8.87	2.36	195.60	197.34	197.34	197.54	0.010005	2.26	1.12	10.58	33.45	0.59	0.64
Valli	5	TR30	13.40	0.95	9.38	3.07	195.60	197.39	197.39	197.58	0.010065	2.31	1.09	12.28	36.92	0.59	0.60
Valli	5	TR200	23.10	1.82	15.63	5.65	195.60	197.41	197.61	197.92	0.026520	3.80	1.75	13.23	38.72	0.96	0.95

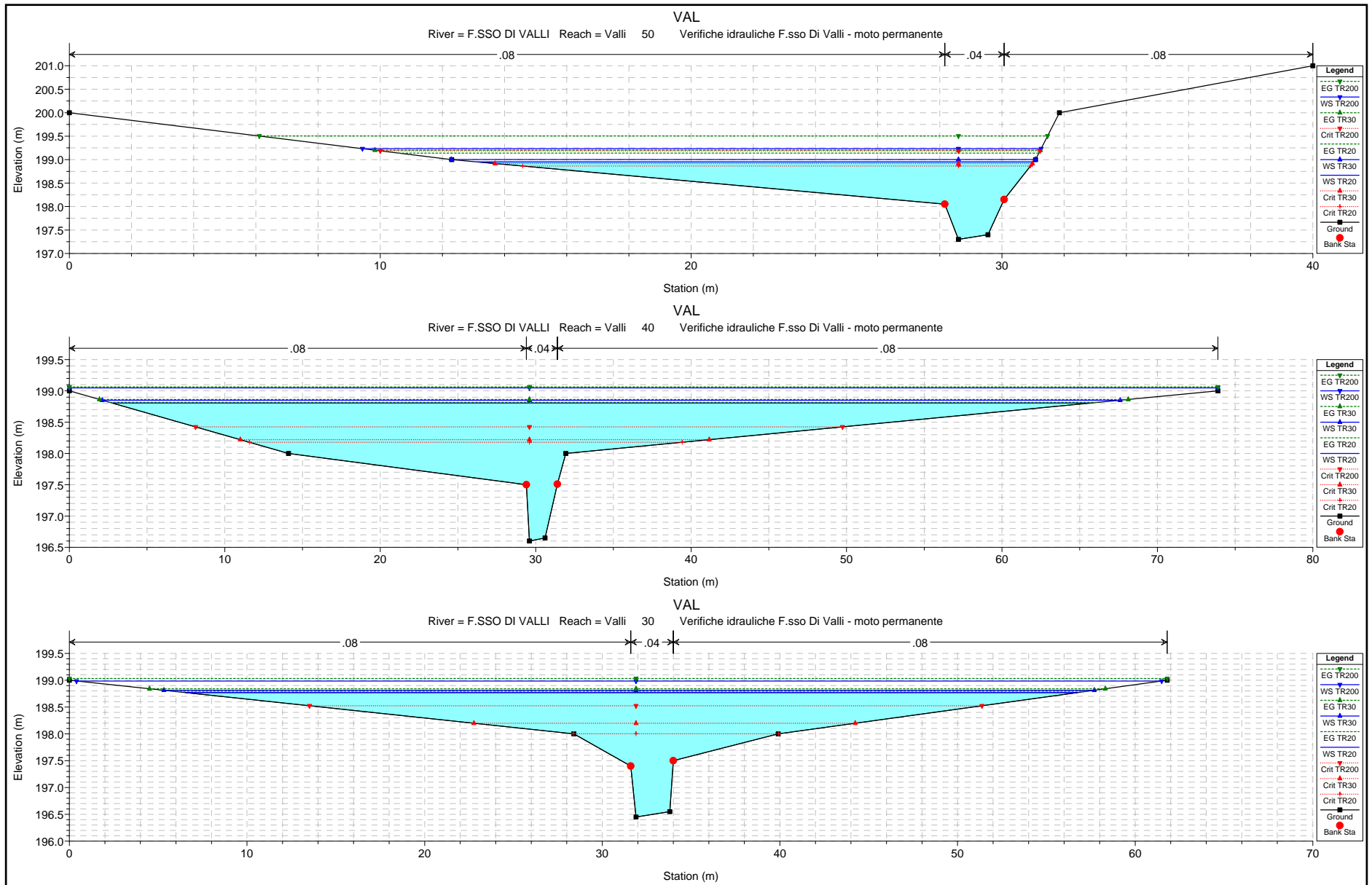
HEC-RAS Plan: VAL River: F.SSO DI VALLI Reach: Valli

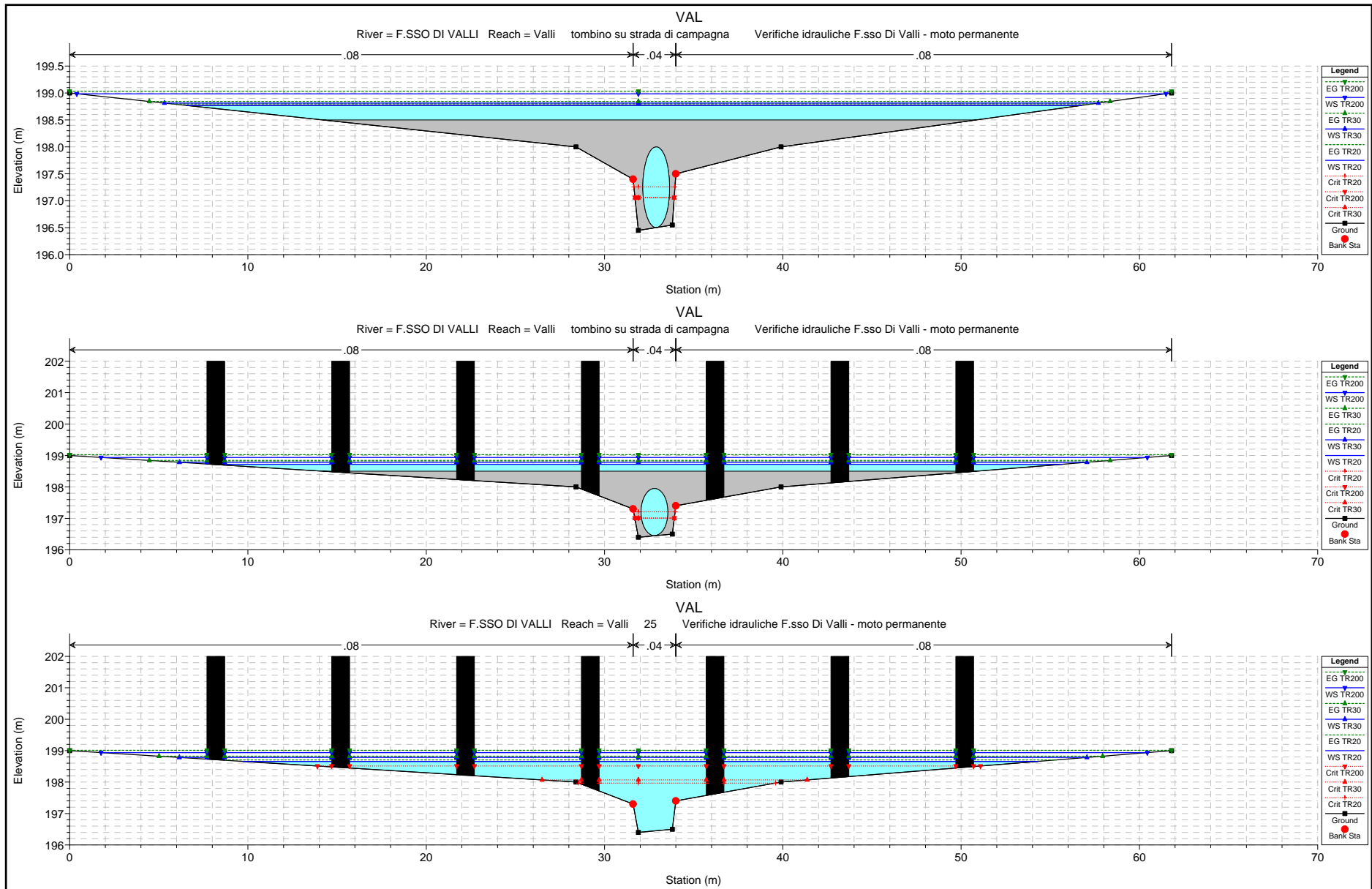
Reach	River Sta		Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Valli	27	Culvert #1	TR20	198.80	198.77	198.73	198.80	198.50	2.17	9.73	0.11	1.23	1.23
Valli	27	Culvert #1	TR30	198.84	198.81	198.83	198.84	198.50	1.19	12.21	0.03	0.67	0.67
Valli	27	Culvert #1	TR200	199.03	198.99	199.02	199.03	198.50	1.22	21.88	0.05	0.69	0.69

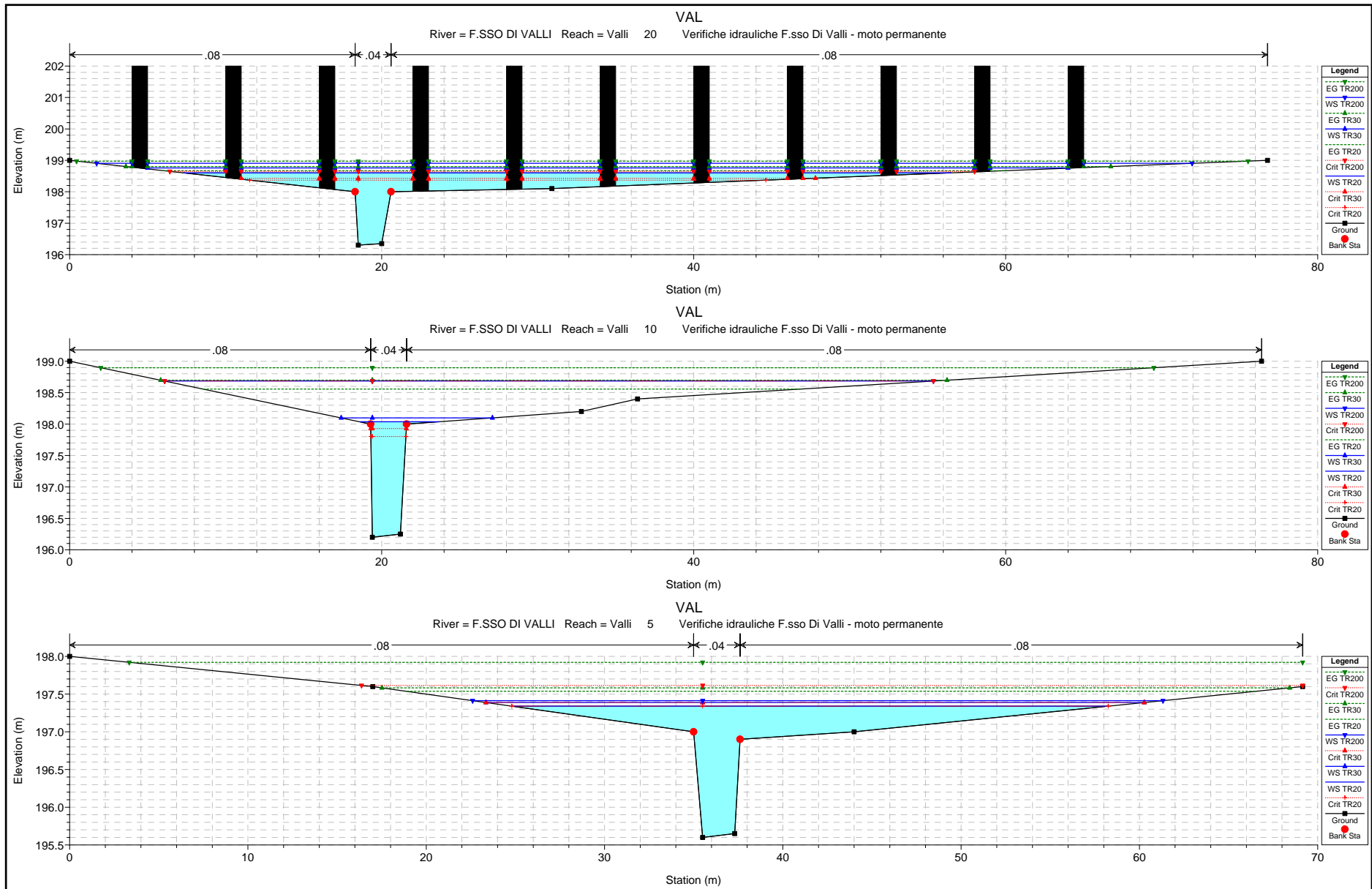
VAL Verifiche idrauliche F.sso Di Valli - moto permanente

F.SSO DI VALLI Valli



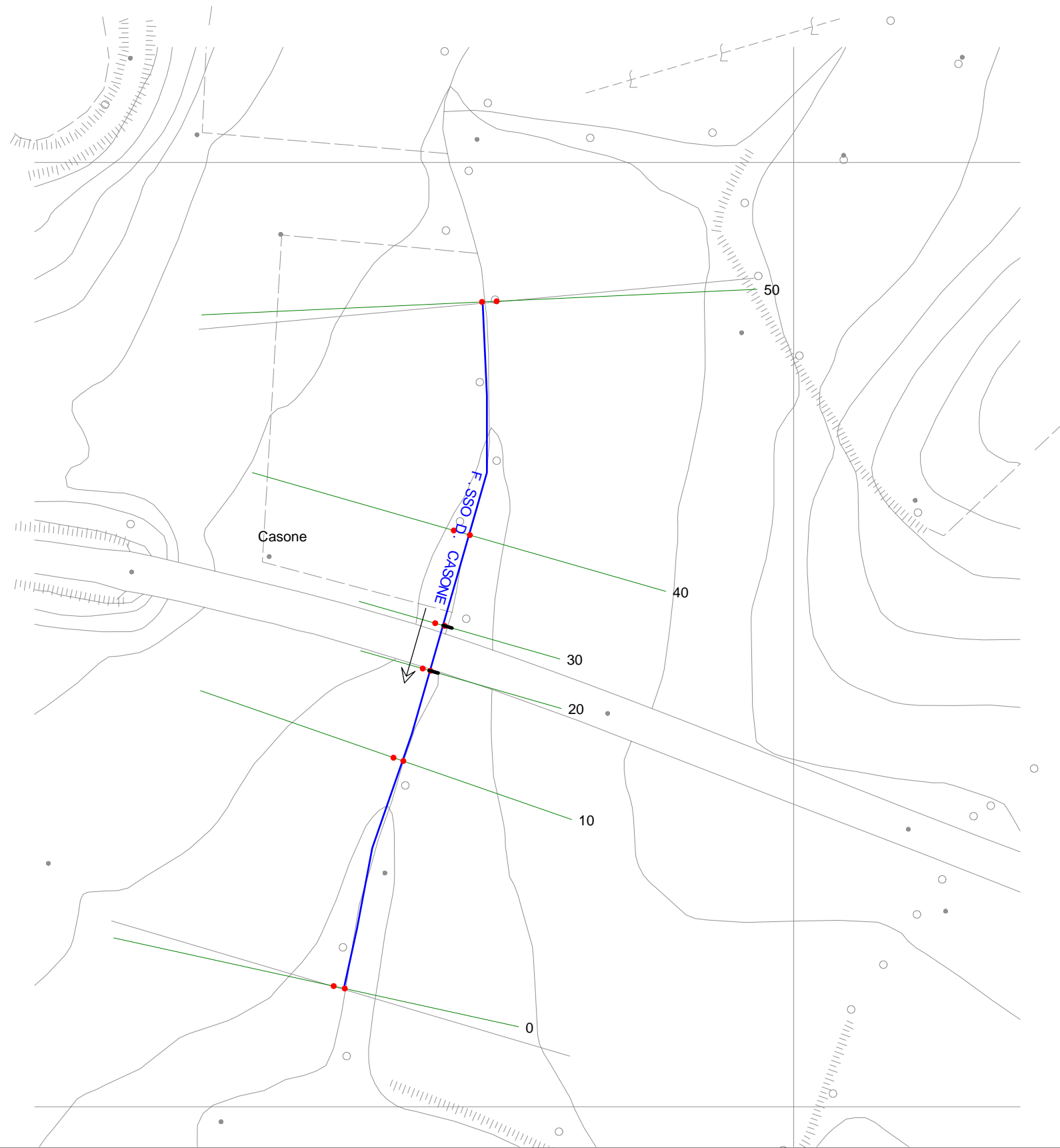






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO DEL CASONE**



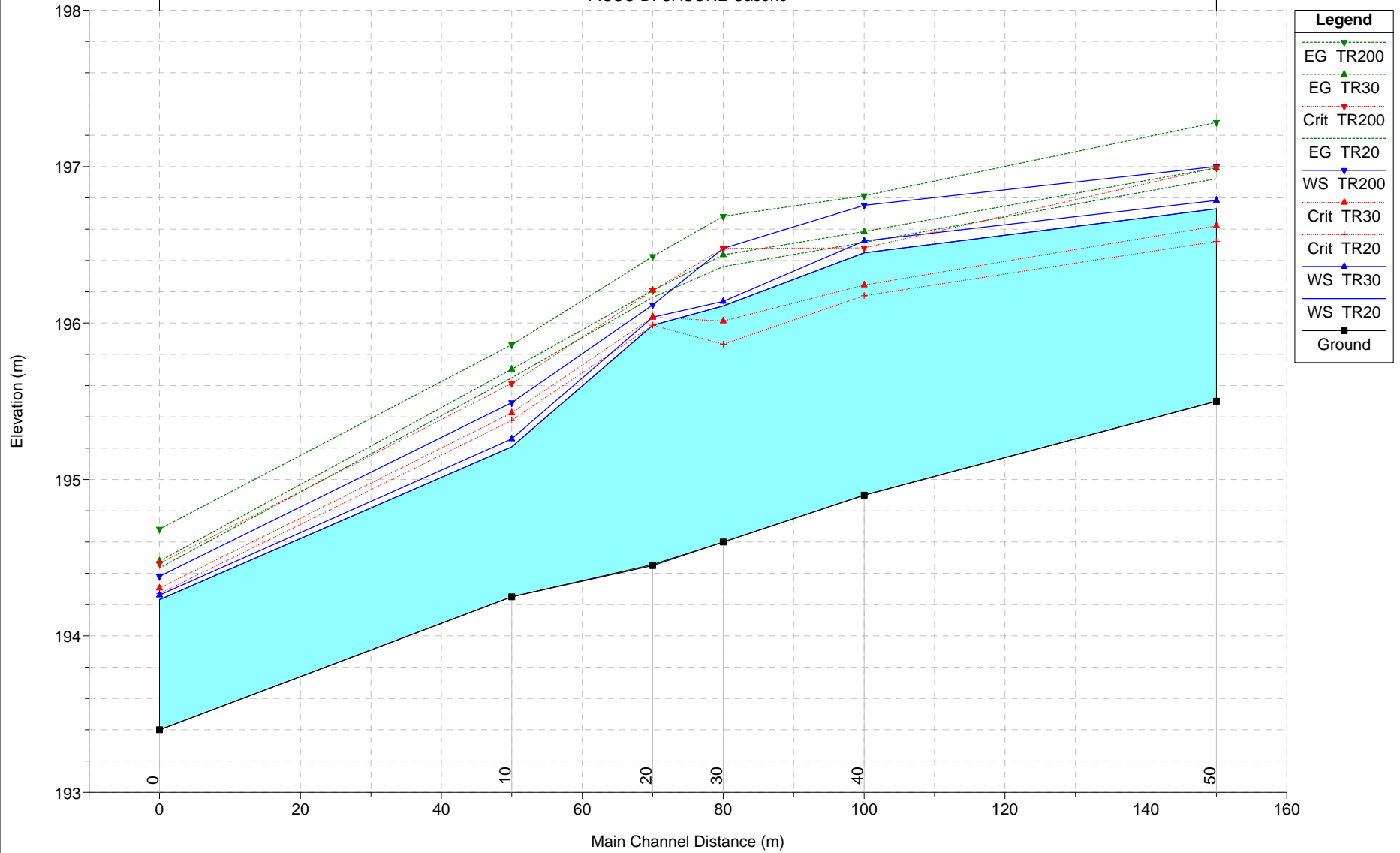


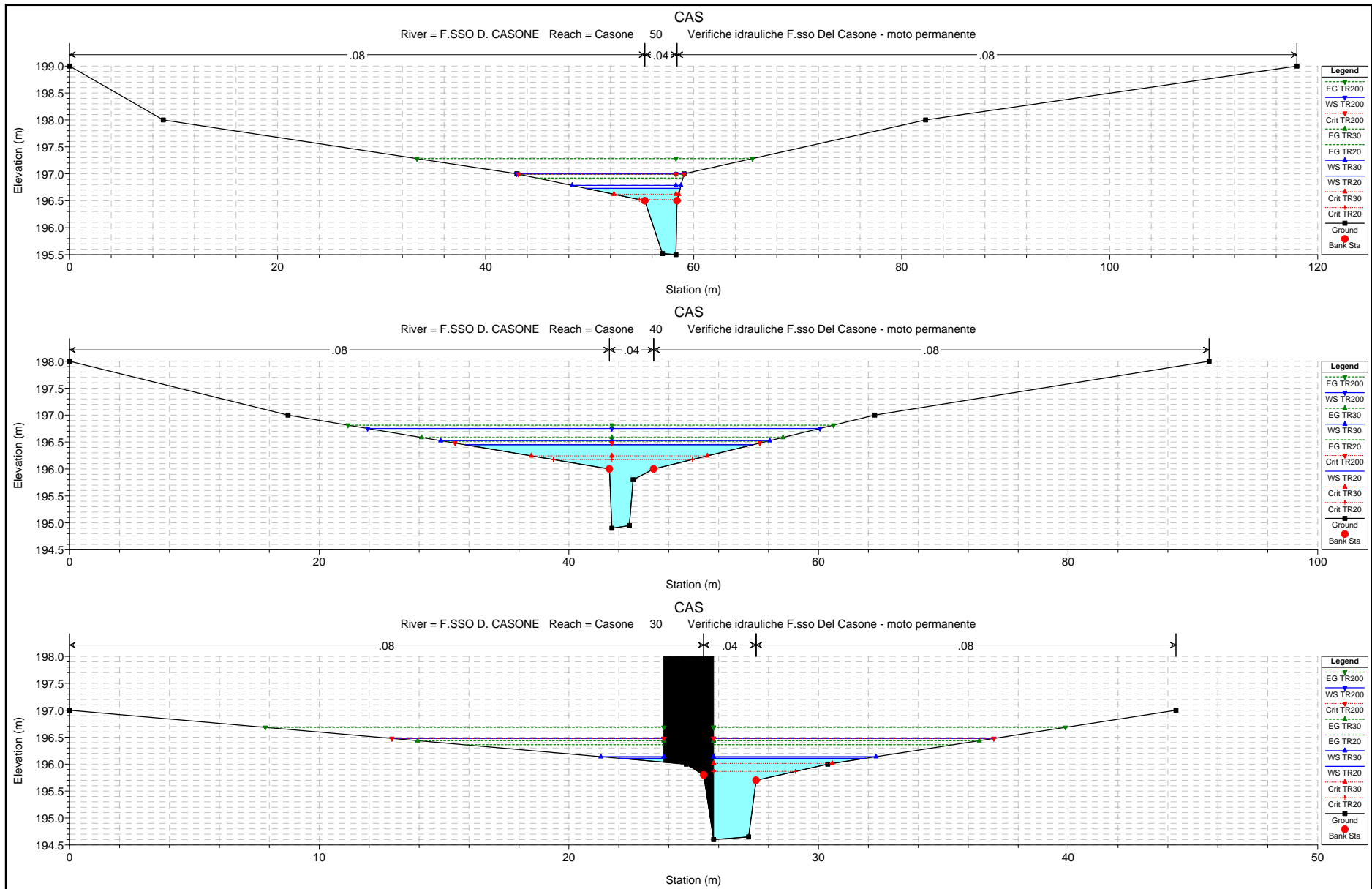
HEC-RAS Plan: CAS River: F.SSO D. CASONE Reach: Casone

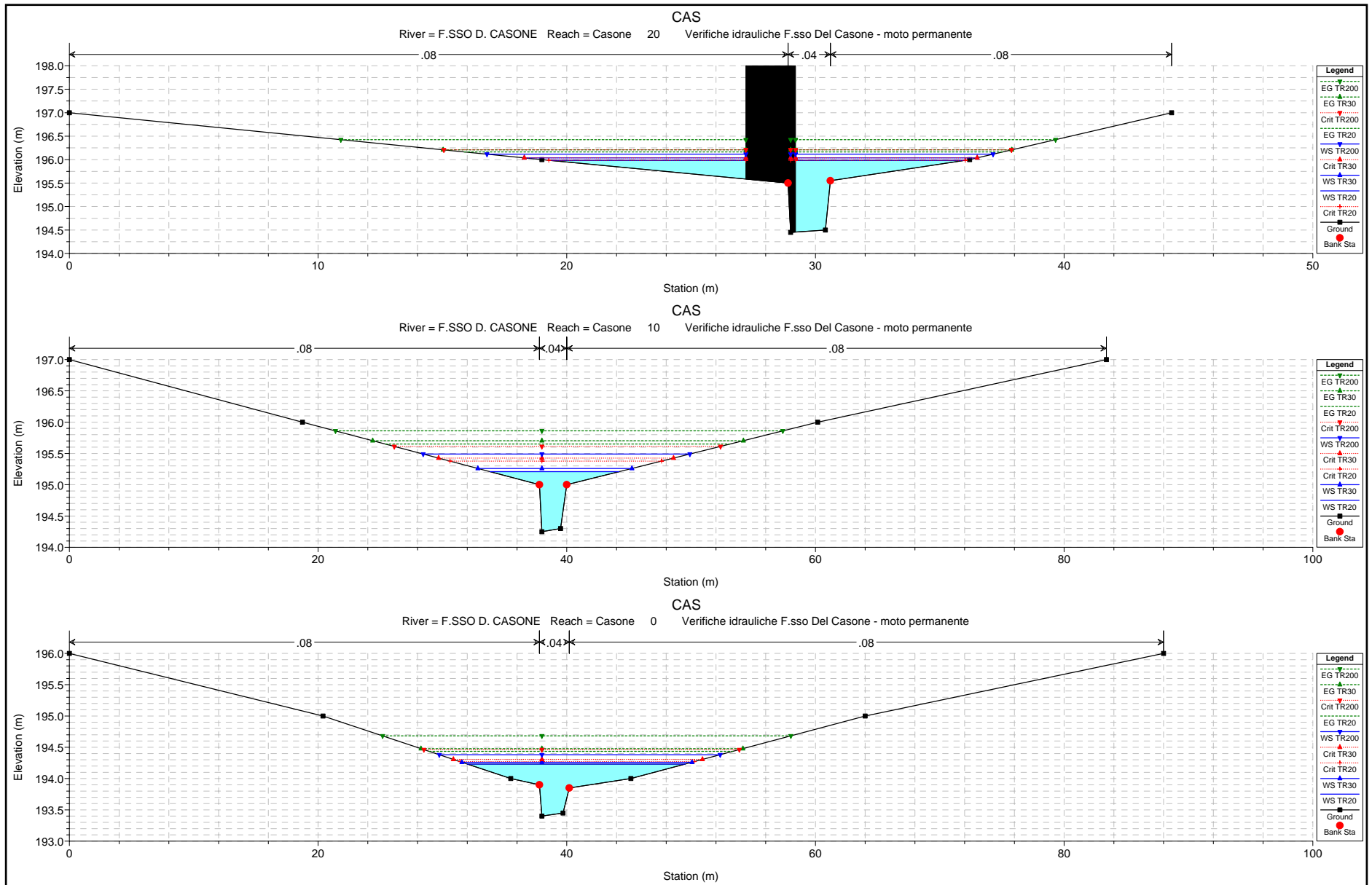
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Casone	50	TR20	5.90	0.20	5.69	0.01	195.50	196.73	196.52	196.92	0.010508	1.97	1.65	3.57	9.08	0.65	0.84
Casone	50	TR30	6.70	0.35	6.33	0.02	195.50	196.78	196.62	196.99	0.010798	2.08	1.64	4.10	10.46	0.67	0.83
Casone	50	TR200	11.30	1.71	9.51	0.08	195.50	197.00	196.99	197.28	0.012551	2.56	1.62	6.97	16.09	0.74	0.79
Casone	40	TR20	5.90	0.78	4.58	0.54	194.90	196.45	196.17	196.52	0.004255	1.29	0.74	7.94	23.06	0.41	0.40
Casone	40	TR30	6.70	1.11	4.83	0.76	194.90	196.53	196.24	196.59	0.003707	1.26	0.68	9.82	26.37	0.39	0.36
Casone	40	TR200	11.30	2.83	6.52	1.95	194.90	196.75	196.48	196.81	0.003572	1.41	0.67	16.93	36.24	0.39	0.31
Casone	30	TR20	5.90	0.01	5.44	0.44	194.60	196.11	195.86	196.36	0.017270	2.31	1.82	3.25	7.88	0.63	0.90
Casone	30	TR30	6.70	0.03	6.08	0.58	194.60	196.14	196.01	196.44	0.020303	2.53	1.91	3.50	9.02	0.68	0.98
Casone	30	TR200	11.30	1.34	7.29	2.67	194.60	196.48	196.48	196.68	0.015879	2.44	1.29	8.77	22.11	0.59	0.65
Casone	20	TR20	5.90	0.87	4.32	0.71	194.46	195.99	195.99	196.16	0.017559	2.16	1.24	4.77	14.74	0.58	0.69
Casone	20	TR30	6.70	1.20	4.54	0.96	194.46	196.04	196.04	196.21	0.017496	2.19	1.20	5.56	16.21	0.57	0.66
Casone	20	TR200	11.30	2.55	6.74	2.01	194.46	196.12	196.21	196.43	0.033404	3.09	1.63	6.93	18.35	0.79	0.85
Casone	10	TR20	5.90	0.20	5.48	0.22	194.25	195.21	195.38	195.65	0.031313	3.05	2.23	2.65	10.39	1.08	1.41
Casone	10	TR30	6.70	0.36	5.96	0.38	194.25	195.26	195.43	195.70	0.030296	3.12	2.07	3.23	12.38	1.07	1.30
Casone	10	TR200	11.30	1.72	7.77	1.82	194.25	195.49	195.61	195.86	0.023383	3.21	1.58	7.14	21.45	0.98	0.88
Casone	0	TR20	5.90	0.55	4.17	1.18	193.40	194.23	194.27	194.43	0.016726	2.34	1.21	4.86	17.52	0.87	0.74
Casone	0	TR30	6.70	0.69	4.56	1.45	193.40	194.26	194.31	194.48	0.017645	2.47	1.25	5.38	18.50	0.90	0.74
Casone	0	TR200	11.30	1.60	6.63	3.07	193.40	194.38	194.46	194.68	0.022920	3.10	1.44	7.85	22.59	1.05	0.78

CAS Verifiche idrauliche F.sso Del Casone - moto permanente

F.SSO D. CASONE Casone

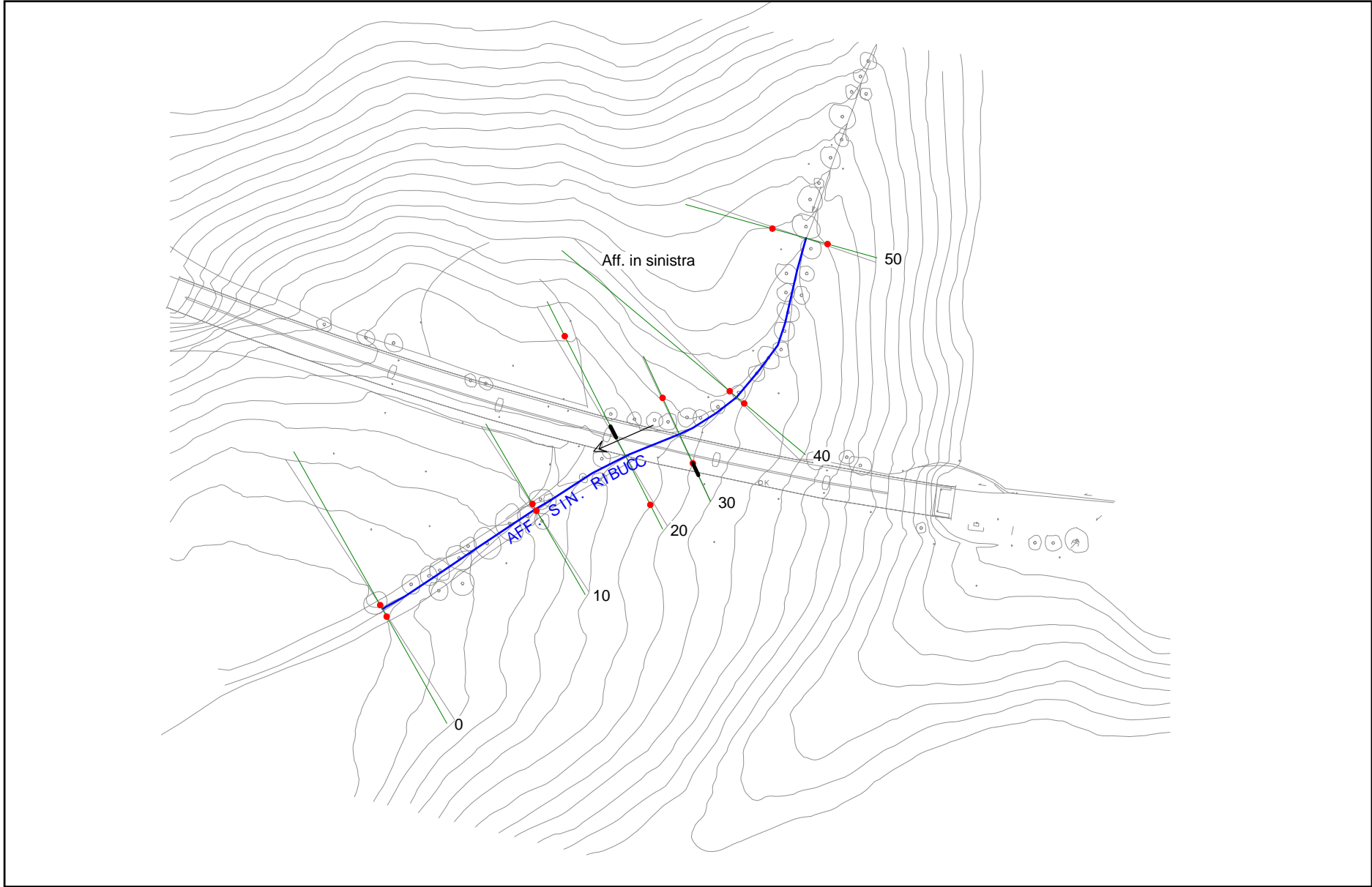






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**AFFLUENTE IN SINISTRA FOSSO RIBUCCIANO IN ZONA VIADOTTO "RIBUCCIANO"**

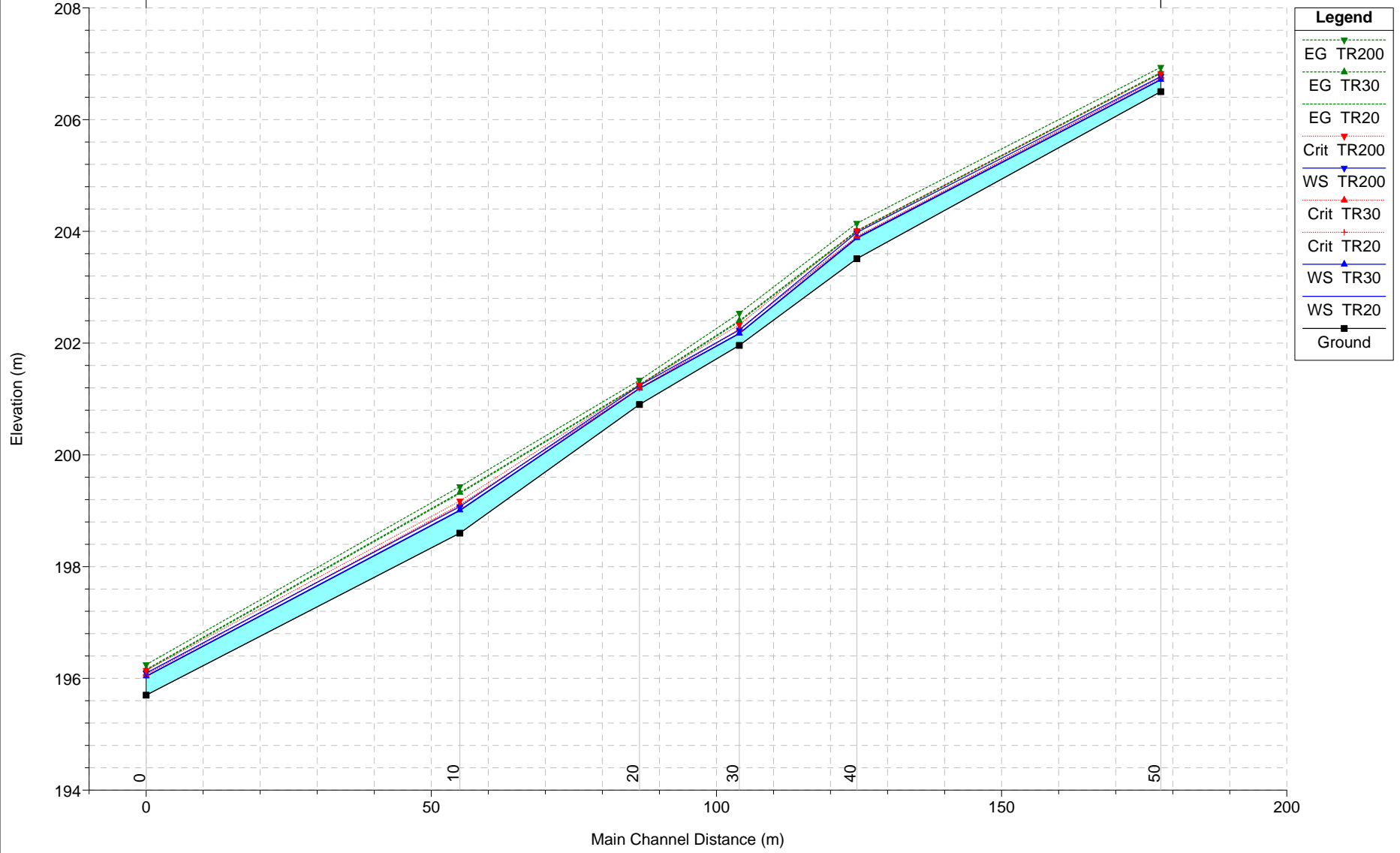


HEC-RAS Plan: AFF RIB River: AFF. SIN. RIBUCC Reach: Aff. in sinistra

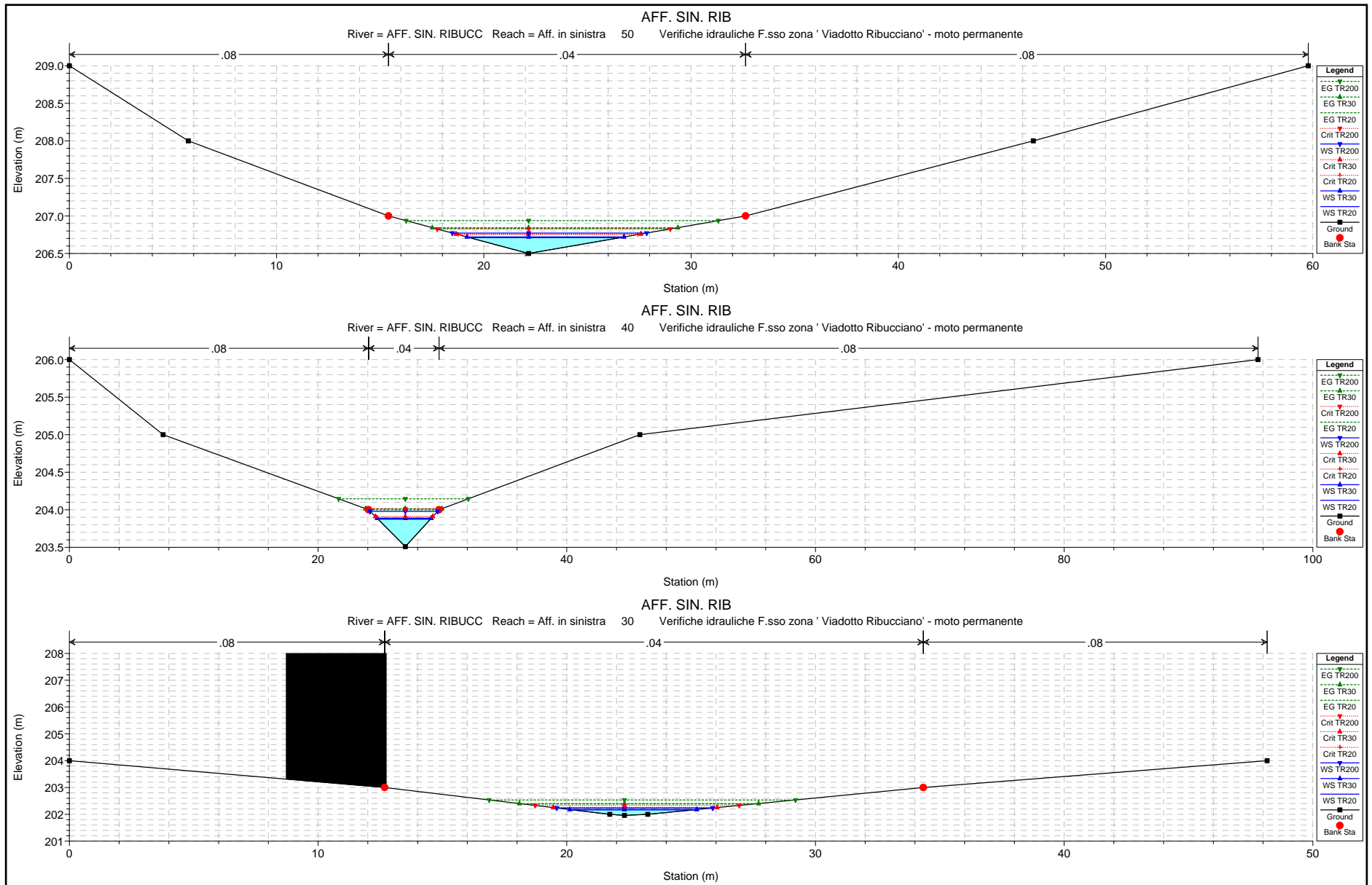
Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Aff. in sinistra	50	TR20	1.20		1.20		206.50	206.71	206.75	206.83	0.074102	1.53	1.53	0.78	7.35	1.49	1.49
Aff. in sinistra	50	TR30	1.30		1.30		206.50	206.72	206.76	206.84	0.074120	1.56	1.56	0.83	7.58	1.50	1.50
Aff. in sinistra	50	TR200	2.30		2.30		206.50	206.77	206.83	206.94	0.074130	1.80	1.80	1.28	9.38	1.56	1.56
Aff. in sinistra	40	TR20	1.20		1.20		203.51	203.88	203.90	204.00	0.038114	1.56	1.56	0.77	4.23	1.16	1.16
Aff. in sinistra	40	TR30	1.30		1.30		203.51	203.89	203.91	204.01	0.037963	1.58	1.58	0.82	4.36	1.17	1.17
Aff. in sinistra	40	TR200	2.30		2.30		203.51	203.98	204.01	204.15	0.036988	1.81	1.81	1.27	5.42	1.19	1.19
Aff. in sinistra	30	TR20	1.20		1.20		201.96	202.17	202.24	202.39	0.117632	2.05	2.05	0.58	4.96	1.91	1.91
Aff. in sinistra	30	TR30	1.30		1.30		201.96	202.18	202.25	202.40	0.117715	2.10	2.10	0.62	5.10	1.92	1.92
Aff. in sinistra	30	TR200	2.30		2.30		201.96	202.24	202.33	202.54	0.118043	2.43	2.43	0.95	6.26	2.00	2.00
Aff. in sinistra	20	TR20	1.20		1.20		200.90	201.19	201.19	201.25	0.033344	1.08	1.08	1.11	9.62	1.01	1.01
Aff. in sinistra	20	TR30	1.30		1.30		200.90	201.19	201.19	201.25	0.033556	1.11	1.11	1.17	9.72	1.02	1.02
Aff. in sinistra	20	TR200	2.30		2.30		200.90	201.24	201.25	201.34	0.035771	1.38	1.38	1.67	10.52	1.10	1.10
Aff. in sinistra	10	TR20	1.20	0.00	1.20	0.00	198.60	199.00	199.10	199.31	0.087921	2.46	2.31	0.52	10.63	1.74	3.33
Aff. in sinistra	10	TR30	1.30	0.00	1.28	0.02	198.60	199.01	199.10	199.33	0.087015	2.51	2.11	0.62	10.96	1.74	2.84
Aff. in sinistra	10	TR200	2.30	0.02	1.90	0.39	198.60	199.07	199.17	199.43	0.083592	2.91	1.72	1.34	13.14	1.78	1.72
Aff. in sinistra	0	TR20	1.20	0.00	1.12	0.07	195.70	196.04	196.07	196.15	0.036195	1.53	1.15	1.05	13.76	1.14	1.33
Aff. in sinistra	0	TR30	1.30	0.00	1.20	0.10	195.70	196.04	196.08	196.16	0.036743	1.58	1.15	1.14	14.08	1.15	1.29
Aff. in sinistra	0	TR200	2.30	0.03	1.85	0.42	195.70	196.10	196.14	196.25	0.038574	1.91	1.17	1.96	16.79	1.23	1.09

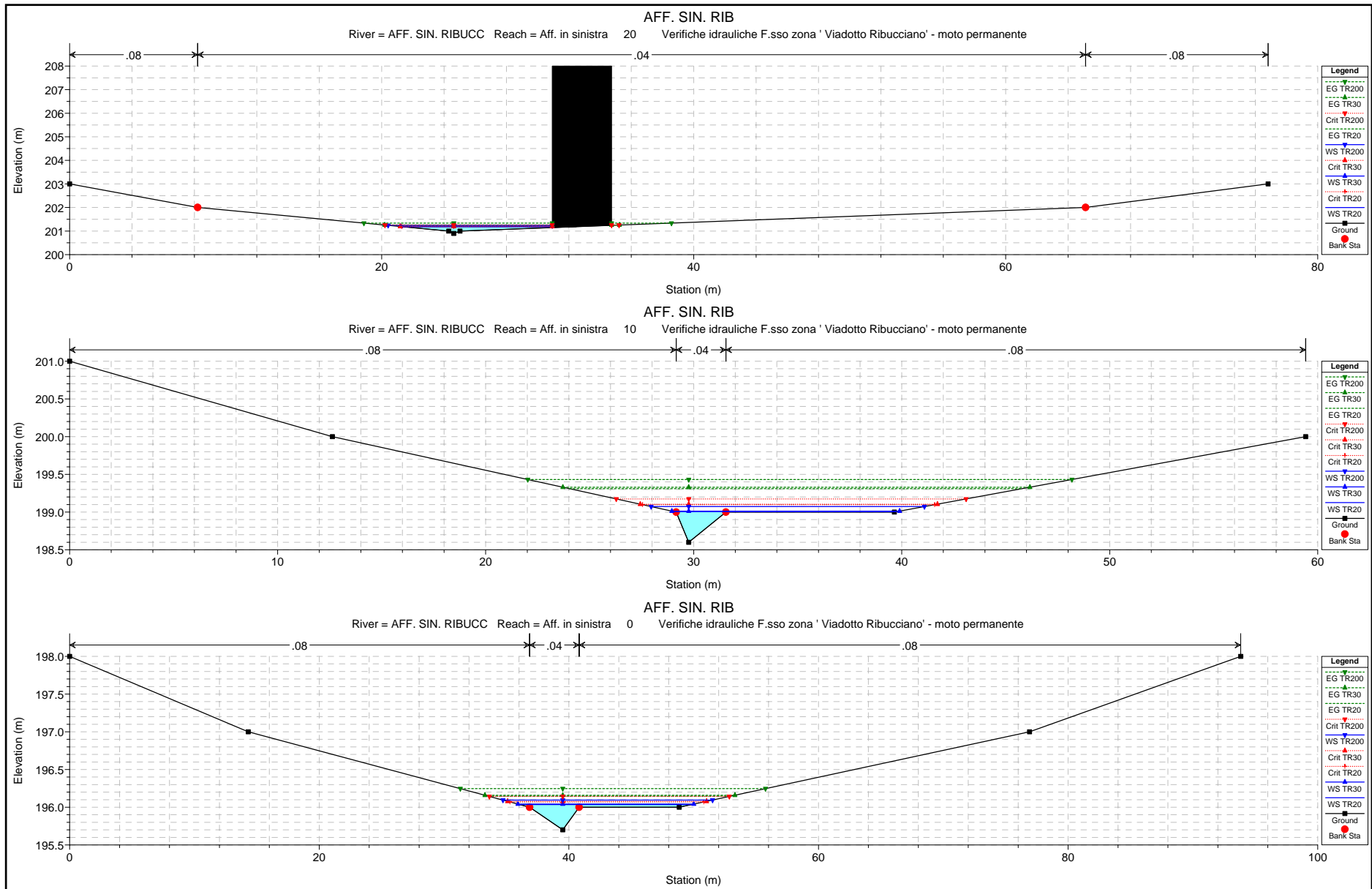
AFF. SIN. RIB Verifiche idrauliche F.sso zona ' Viadotto Ribucciano' - moto permanente

AFF. SIN. RIBUCC Aff. in sinistra



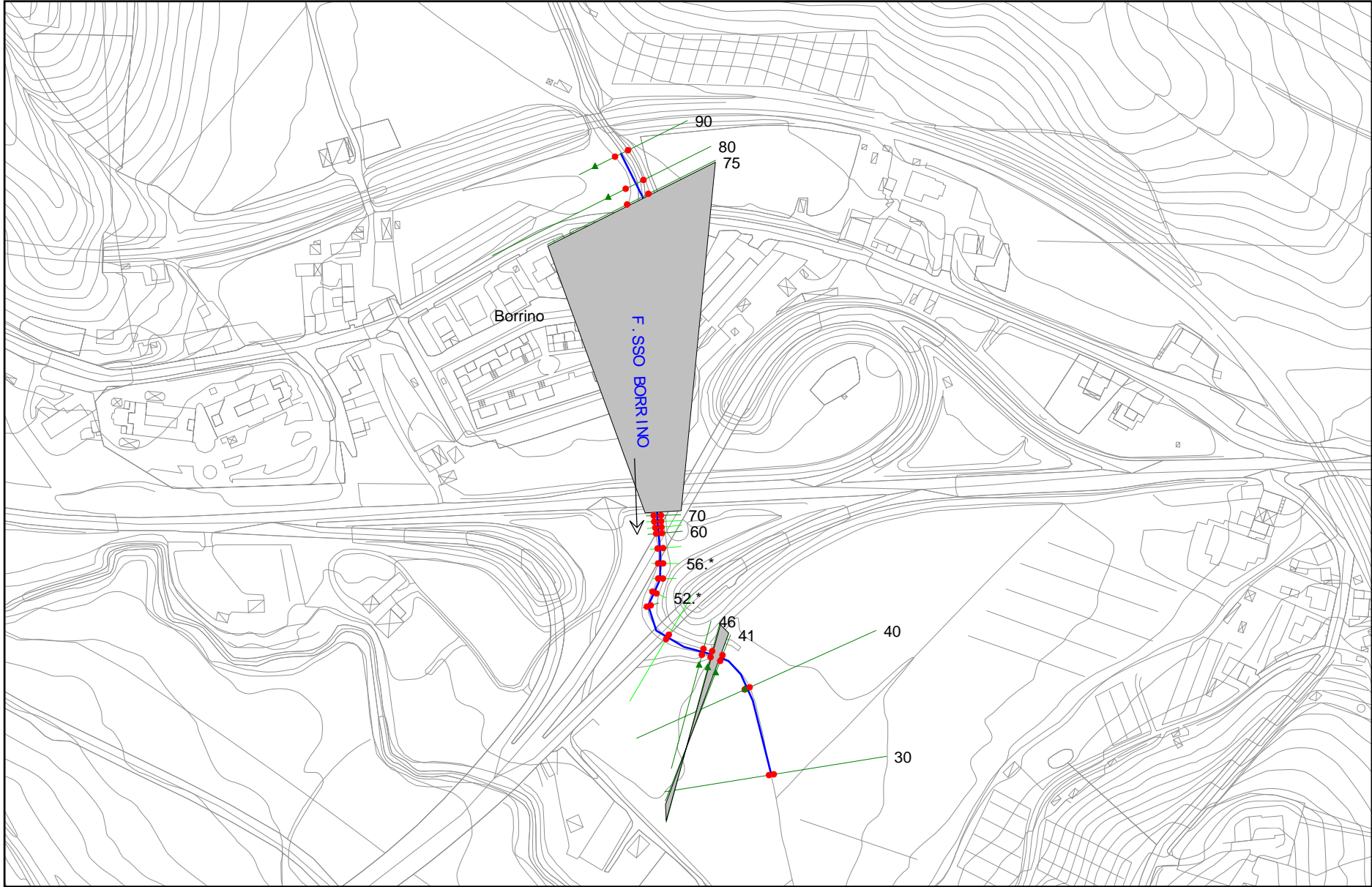






**ALLEGATI DI CALCOLO HEC-RAS 3.1.3**

**FOSSO BORRINO**



HEC-RAS Plan: BORR River: F.SSO BORRINO Reach: Borrino

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Borrino	90	TR20	13.30		13.30		193.65	195.82	195.14	195.95	0.004160	1.60	1.60	8.34	6.88	0.46	0.46
Borrino	90	TR30	15.10		15.10		193.65	195.92	195.23	196.06	0.004424	1.68	1.68	9.01	7.28	0.48	0.48
Borrino	90	TR200	26.20	0.08	26.08	0.04	193.65	196.22	195.72	196.49	0.006908	2.29	2.18	12.05	24.59	0.62	0.85
Borrino	80	TR20	13.30		13.30		193.24	195.83	194.59	195.88	0.001110	0.96	0.96	13.92	9.85	0.26	0.26
Borrino	80	TR30	15.10		15.10		193.24	195.93	194.68	195.98	0.001215	1.01	1.01	14.90	10.36	0.27	0.27
Borrino	80	TR200	26.20	0.27	25.78	0.15	193.24	196.26	195.11	196.36	0.001854	1.39	1.25	21.00	41.30	0.34	0.44
Borrino	76	TR20	13.30	0.00	13.30		193.24	195.83	194.43	195.86	0.000724	0.77	0.77	17.27	12.91	0.21	0.21
Borrino	76	TR30	15.10	0.00	15.10	0.00	193.24	195.93	194.51	195.97	0.000768	0.81	0.81	18.57	13.72	0.22	0.22
Borrino	76	TR200	26.20	0.24	25.16	0.80	193.24	196.27	194.93	196.33	0.001032	1.09	0.84	31.03	56.24	0.26	0.36
Borrino	75	Culvert #1	13.30														
Borrino	75	Culvert #1	15.10														
Borrino	75	Culvert #1	26.20														
Borrino	70	TR20	14.50	1.29	13.12	0.09	191.50	193.56	192.72	193.69	0.003356	1.69	1.32	10.98	10.88	0.39	0.42
Borrino	70	TR30	16.40	1.74	14.53	0.13	191.50	193.65	192.81	193.80	0.003529	1.78	1.37	11.98	11.03	0.40	0.42
Borrino	70	TR200	28.40	5.49	22.33	0.58	191.50	194.27	193.49	194.45	0.003422	2.10	1.49	19.08	12.03	0.41	0.38
Borrino	60	TR20	14.50	1.83	12.52	0.15	191.34	193.32	193.22	193.62	0.009889	2.58	1.86	7.82	10.76	0.68	0.69
Borrino	60	TR30	16.40	2.57	13.58	0.25	191.34	193.44	193.30	193.73	0.009153	2.61	1.82	9.02	10.94	0.66	0.64
Borrino	60	TR200	28.40	7.92	19.33	1.15	191.34	194.16	193.68	194.40	0.005334	2.55	1.63	17.37	12.12	0.53	0.44
Borrino	50	TR20	14.50	0.23	13.51	0.76	190.58	192.40	192.40	193.04	0.020281	3.67	3.08	4.71	4.32	0.93	0.94
Borrino	50	TR30	16.40	0.34	15.07	0.99	190.58	192.53	192.53	193.21	0.019543	3.80	3.10	5.28	4.62	0.92	0.93
Borrino	50	TR200	28.40	1.58	24.20	2.62	190.58	193.20	193.20	194.05	0.016994	4.40	3.20	8.88	6.10	0.91	0.85
Borrino	46	TR20	14.50	0.00	14.50		190.00	192.09	191.54	192.40	0.011012	2.46	2.46	5.90	12.75	0.60	0.63
Borrino	46	TR30	16.40	0.10	13.71	2.60	190.00	192.37	191.65	192.54	0.005896	2.00	1.08	15.19	45.97	0.45	0.60
Borrino	46	TR200	28.40	0.36	19.06	8.98	190.00	192.56	192.56	192.79	0.008456	2.54	1.14	24.89	57.83	0.55	0.56
Borrino	45	TR20	14.50	0.00	14.50	0.00	189.93	192.04	191.47	192.34	0.010622	2.44	2.43	5.97	10.74	0.59	0.67
Borrino	45	TR30	16.40	0.14	12.55	3.71	189.93	192.38	191.58	192.50	0.004370	1.76	0.81	20.25	65.58	0.39	0.47
Borrino	45	TR200	28.40	0.36	18.10	9.93	189.93	192.51	192.51	192.70	0.007446	2.39	0.96	29.56	80.35	0.52	0.51
Borrino	42	BR U	14.50		8.35		189.93	192.04	192.39	192.34		2.03	3.52	4.12		0.77	0.77
Borrino	42	BR U	16.40	0.15	7.54	8.71	189.93	192.40	192.40	192.49	0.020194	1.80	0.91	18.05	67.96	0.18	0.18
Borrino	42	BR U	28.40	0.49	8.51	19.39	189.93	192.57	192.49	192.64	0.016560	1.78	0.90	31.42	87.84	0.18	0.18
Borrino	42	BR D	14.50	0.08	8.34	2.94	189.85	192.04	192.25	192.34		1.95	3.33	4.35	31.51	0.72	0.72
Borrino	42	BR D	16.40	0.30	7.12	8.98	189.85	192.31	192.27	192.38	0.011336	1.65	0.74	22.03	72.69	0.15	0.15
Borrino	42	BR D	28.40	1.02	6.01	21.38	189.85	192.54	192.42	192.58	0.007816	1.23	0.69	41.30	91.63	0.13	0.13
Borrino	41	TR20	14.50	0.05	14.37	0.08	189.85	192.09	191.38	192.34	0.008247	2.25	2.07	6.99	49.16	0.53	0.84
Borrino	41	TR30	16.40	0.15	12.78	3.47	189.85	192.23	191.50	192.36	0.005104	1.86	0.85	19.19	68.63	0.42	0.52
Borrino	41	TR200	28.40	0.50	17.44	10.46	189.85	192.37	192.37	192.55	0.007505	2.36	0.94	30.16	80.56	0.52	0.49
Borrino	40	TR20	14.50	0.08	14.15	0.28	189.54	191.69	191.32	192.08	0.015592	2.81	2.22	6.53	28.79	0.70	1.49

HEC-RAS Plan: BARR River: F.SSO BARRINO Reach: Barrino (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Q Left (m3/s)	Q Channel (m3/s)	Q Right (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)	Vel Total (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Froude # XS
Barrino	40	TR30	16.40	0.21	15.34	0.85	189.54	191.74	191.45	192.16	0.016364	2.95	1.94	8.47	38.75	0.72	1.32
Barrino	40	TR200	28.40	2.57	17.89	7.94	189.54	192.01	192.10	192.30	0.013774	2.98	1.14	25.01	85.47	0.68	0.67
Barrino	30	TR20	14.50	2.04	11.20	1.26	188.78	191.24	190.72	191.43	0.008006	2.14	1.06	13.66	43.54	0.49	0.61
Barrino	30	TR30	16.40	2.81	11.75	1.84	188.78	191.30	191.27	191.48	0.008009	2.18	1.01	16.29	49.21	0.49	0.56
Barrino	30	TR200	28.40	8.09	14.22	6.09	188.78	191.54	191.50	191.69	0.008014	2.36	0.91	31.24	73.53	0.50	0.45

HEC-RAS Plan: BORR River: F.SSO BORRINO Reach: Borrino

Reach	River Sta		Profile	E.G. US. (m)	W.S. US. (m)	E.G. IC (m)	E.G. OC (m)	Min El Weir Flow (m)	Q Culv Group (m3/s)	Q Weir (m3/s)	Delta WS (m)	Culv Vel US (m/s)	Culv Vel DS (m/s)
Borrino	75	Culvert #1	TR20	195.87	195.83	196.05	195.87	195.99	13.30		2.27	3.69	5.48
Borrino	75	Culvert #1	TR30	195.97	195.93	196.46	195.97	195.99	15.10		2.28	3.87	5.65
Borrino	75	Culvert #1	TR200	196.33	196.27	196.33	196.33	195.99	14.27	11.93	2.01	3.66	3.66

BORR Verifiche idrauliche F.sso Borrino - moto permanente

F.SSO BORRINO Borrino

