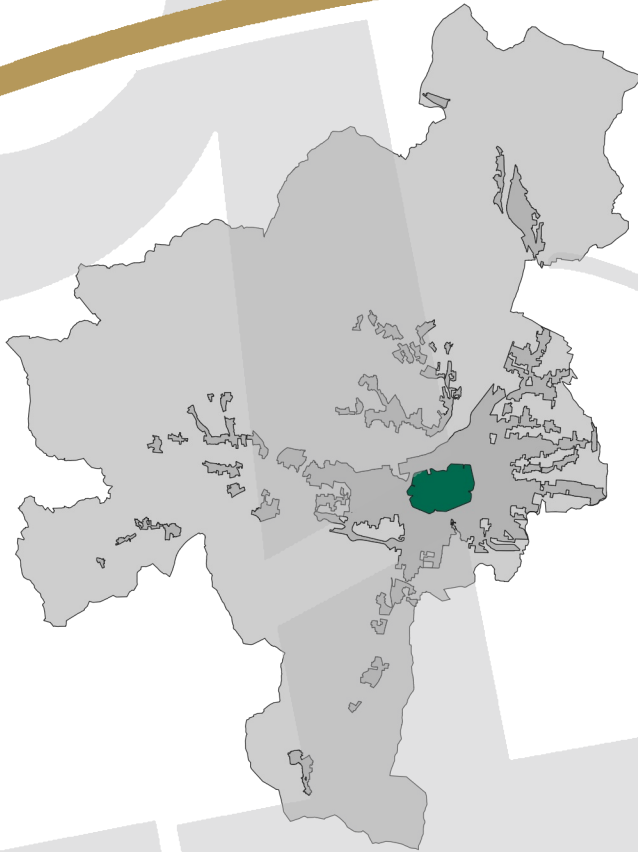




Città  
di Lucca

La casa  
della Città

# il Piano Operativo



## Quadro geologico - tecnico

All. I4.1 - Idraulica  
Simulazioni sul sistema  
Rio Freddanella Sant'Alessio

Assessore all'Urbanistica

Serena Mammini

Sindaco

Alessandro Tambellini

**Adozione**



## MODELLI IDRAULICI MONODIMENSIONALI

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

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

## LEGENDA DELLE TABELLE

Le grandezze riportate in tabella hanno il seguente significato:

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



# **SISTEMA RIO FREDDANELLA S. ALESSIO**

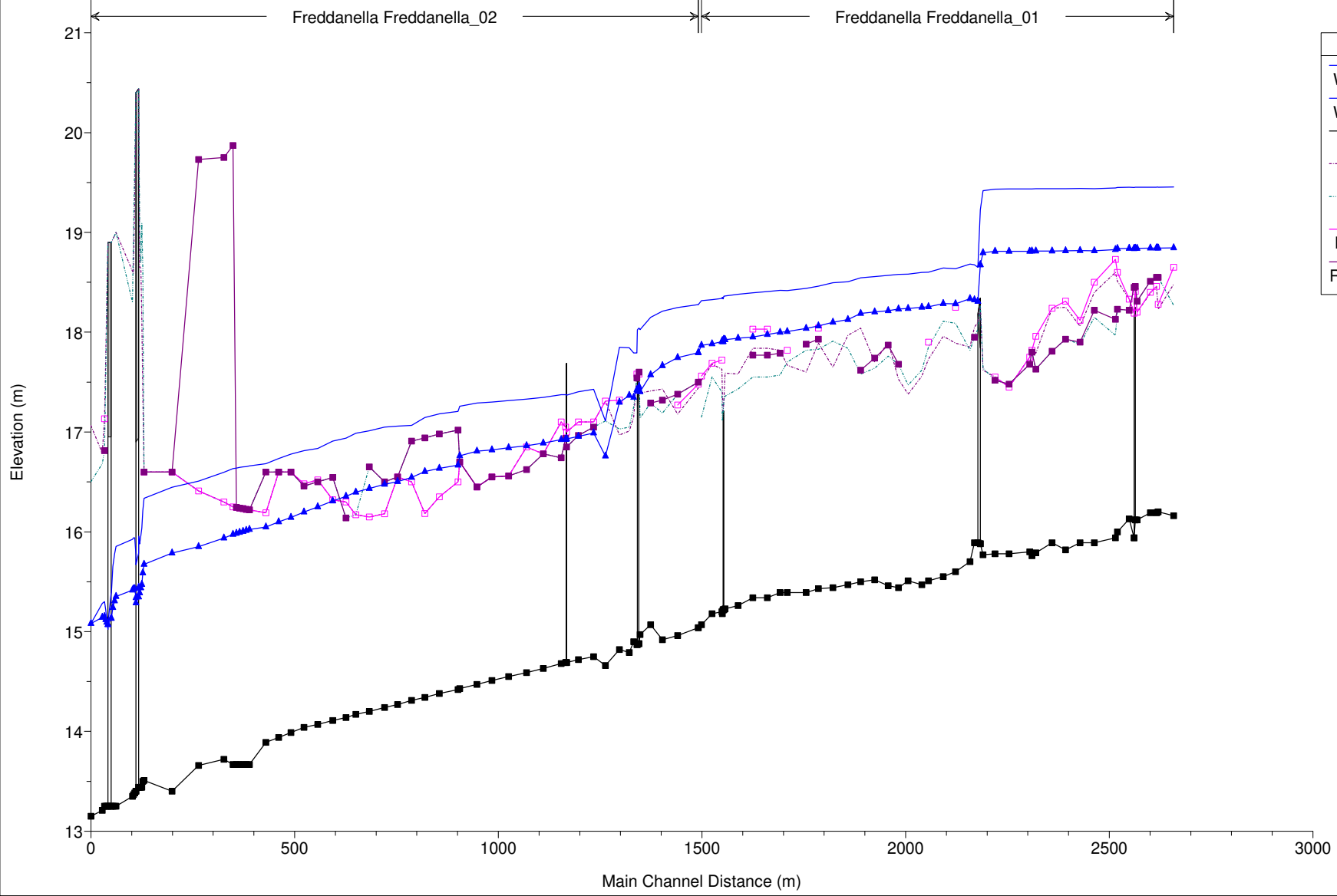
## **“Freddanella Nuova”**



19\_011\_Comune\_Lucca\_INT Plan: Freddanella Nuova\_15.08 07/19/2021

Freddanella Freddanella\_02

Freddanella Freddanella\_01



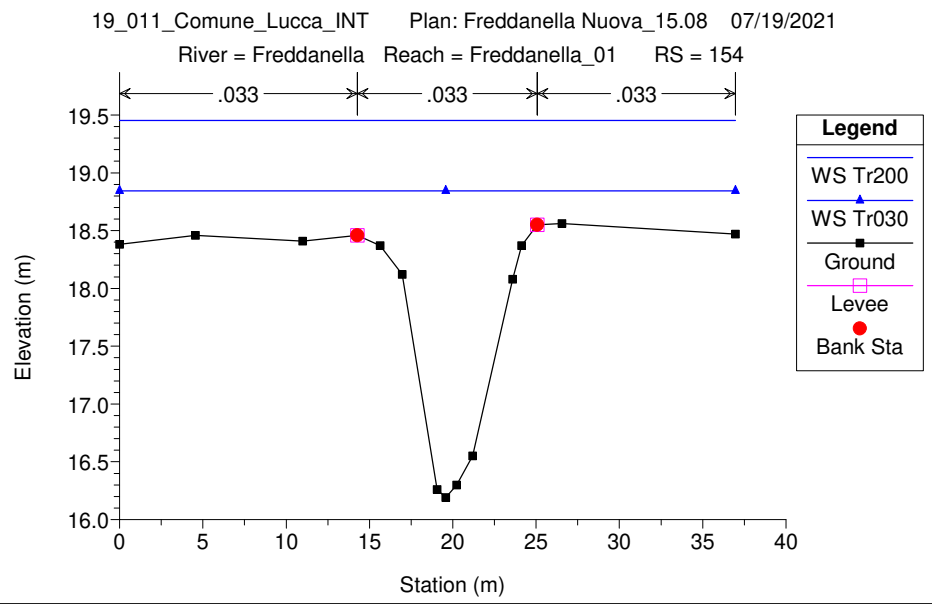
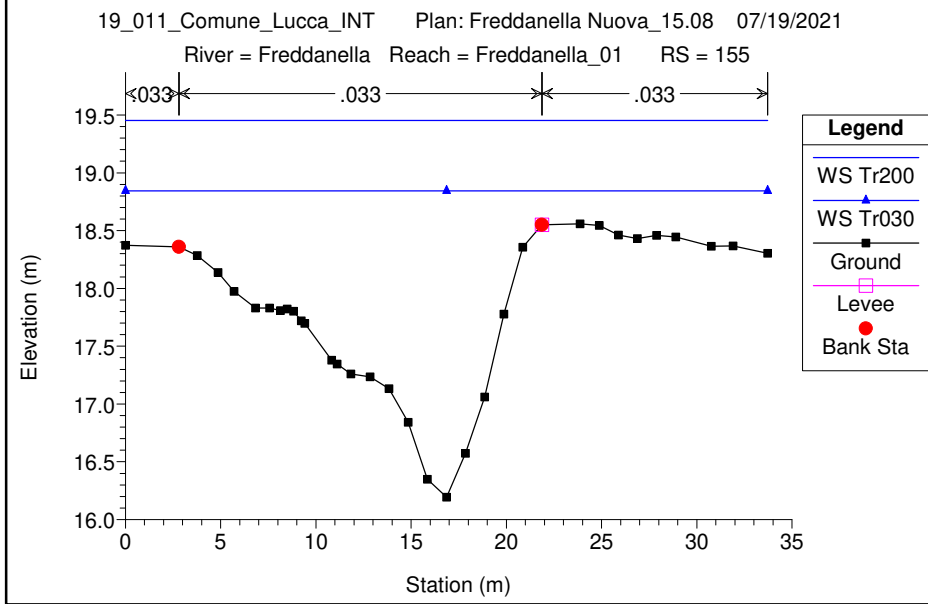
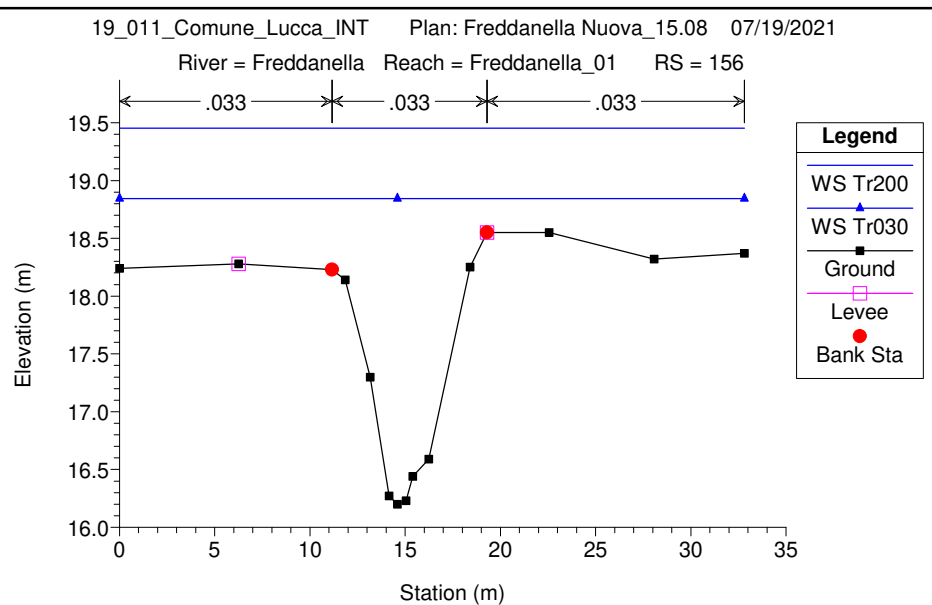
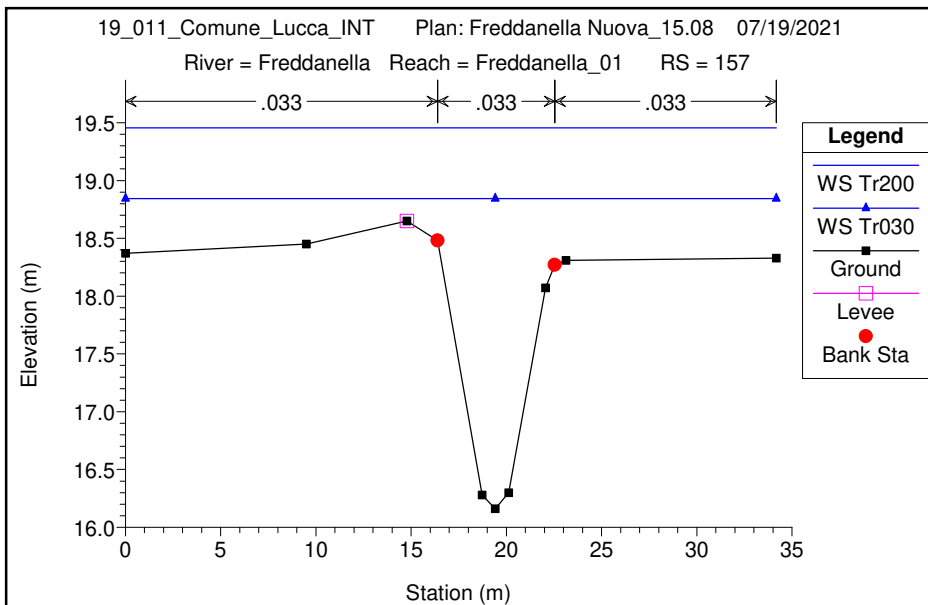
Legend	
WS Tr200	— (Blue line)
WS Tr030	—▲ (Blue line with triangles)
Ground	—■ (Black line with squares)
LOB	-.-.- (Red dashed line)
ROB	-.-.- (Green dashed line)
Left Levee	—□ (Magenta line with squares)
Right Levee	—■ (Magenta line with squares)

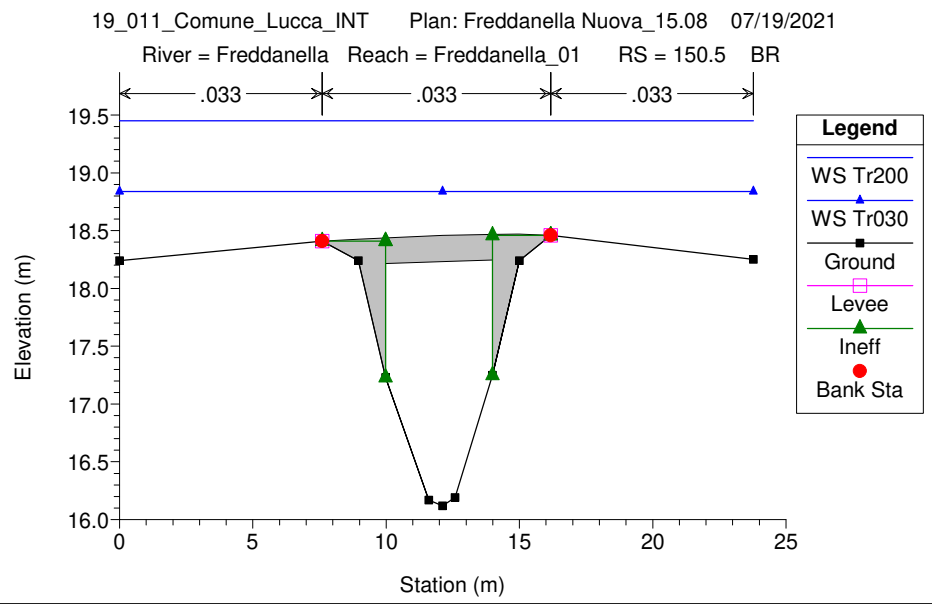
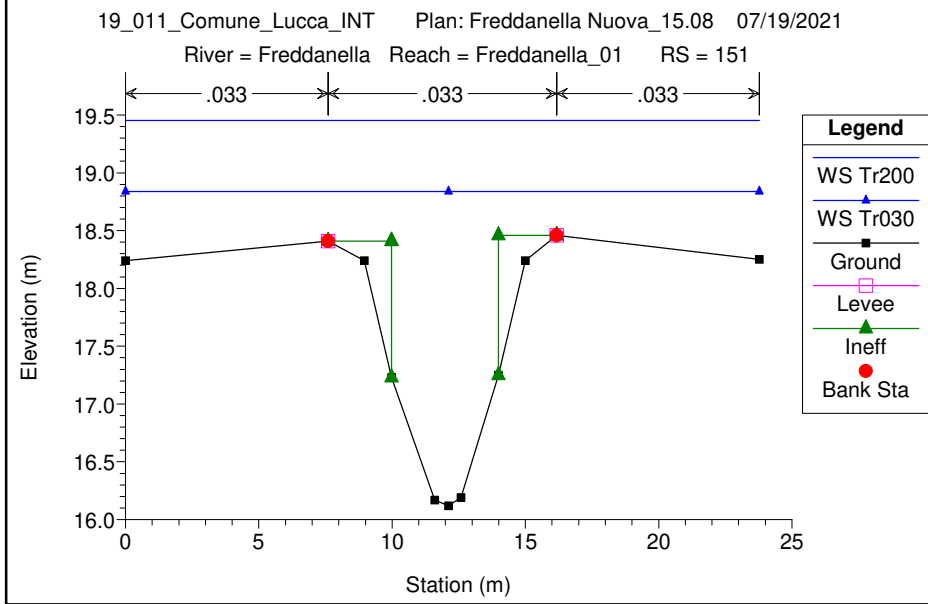
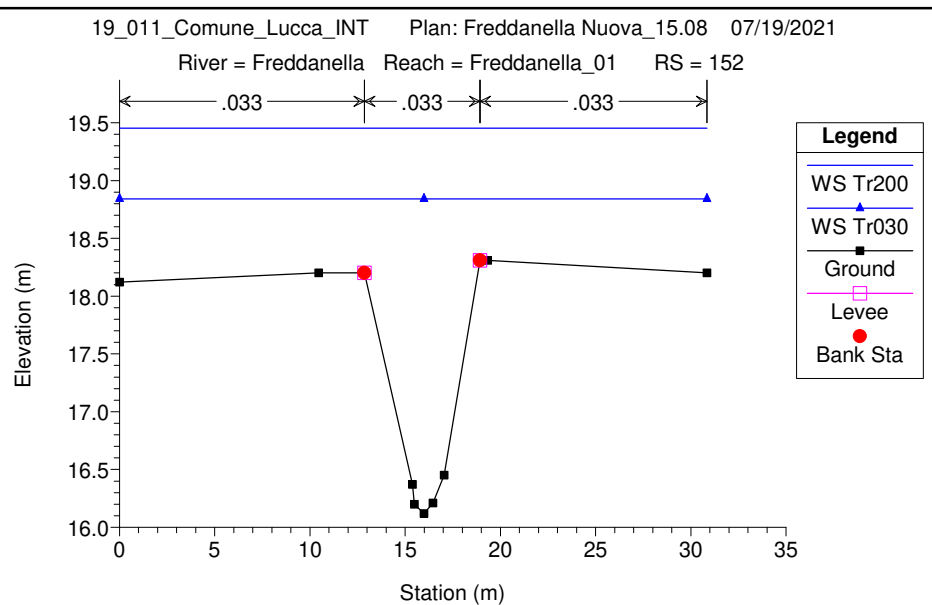
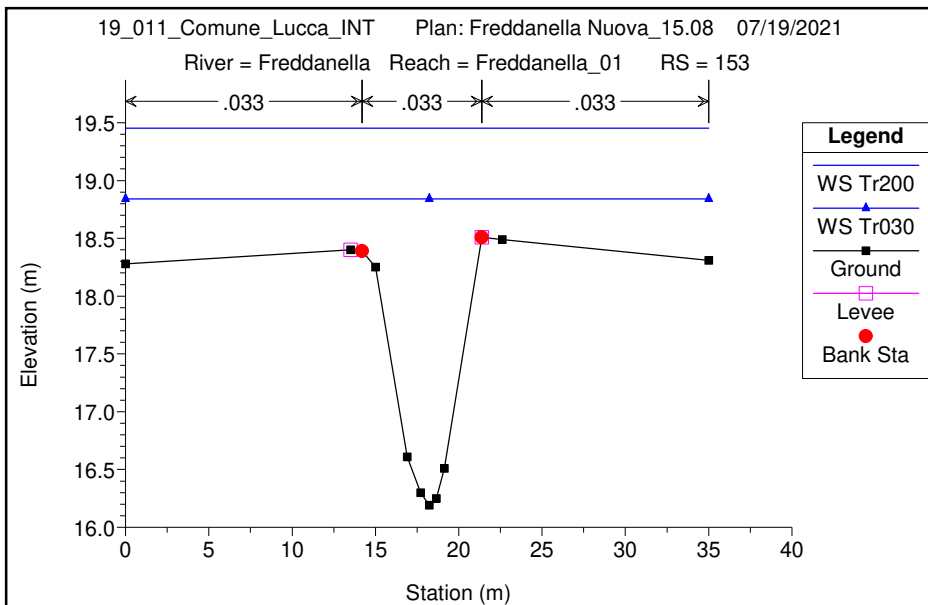


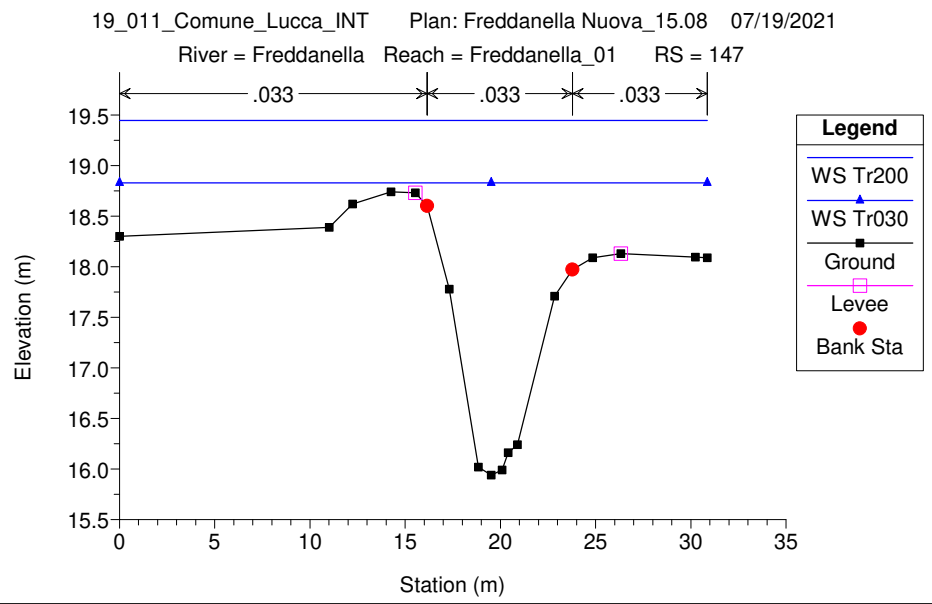
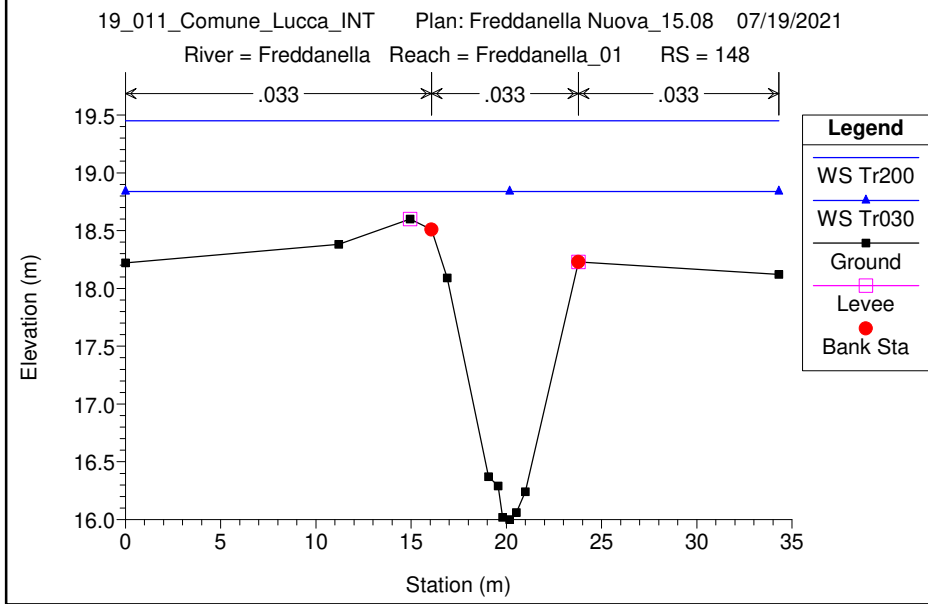
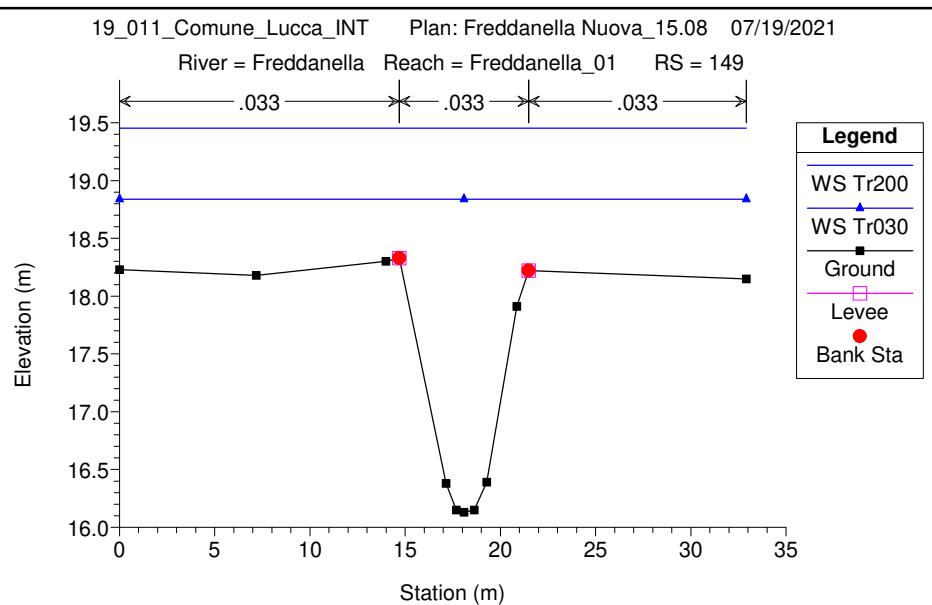
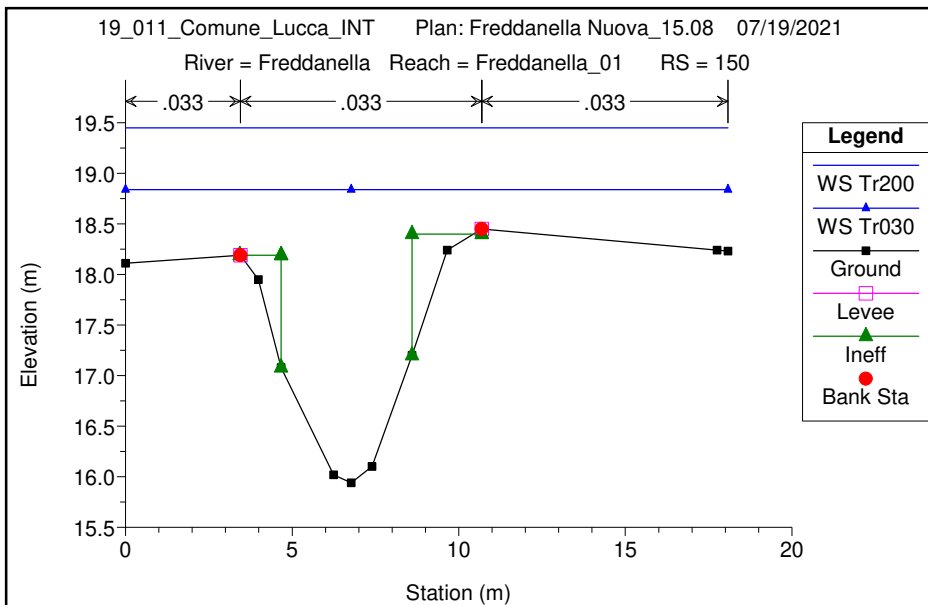


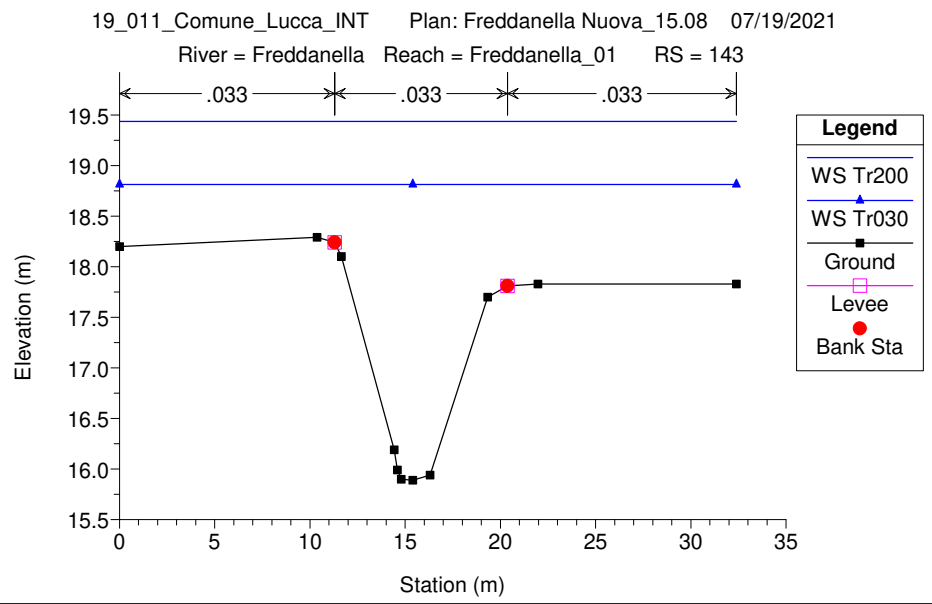
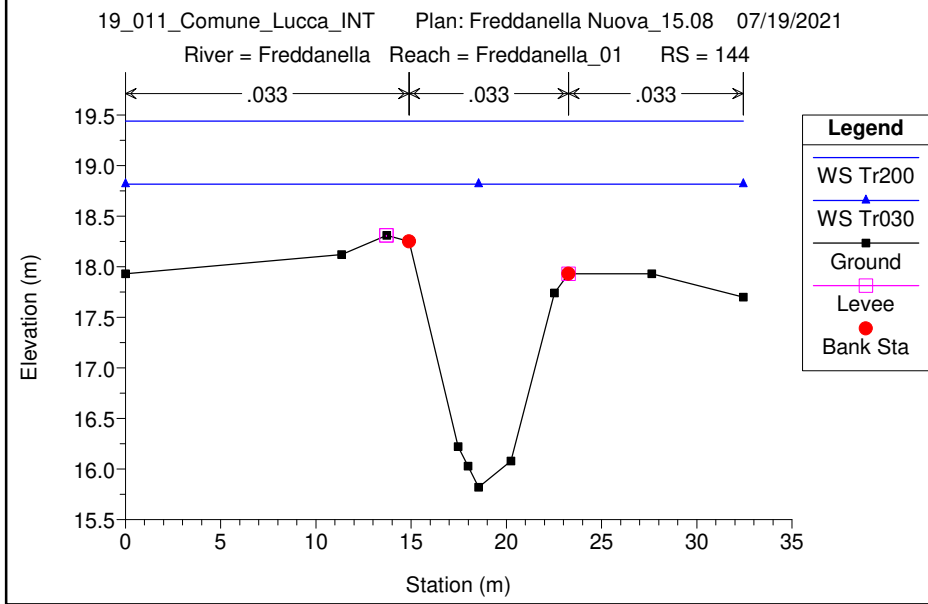
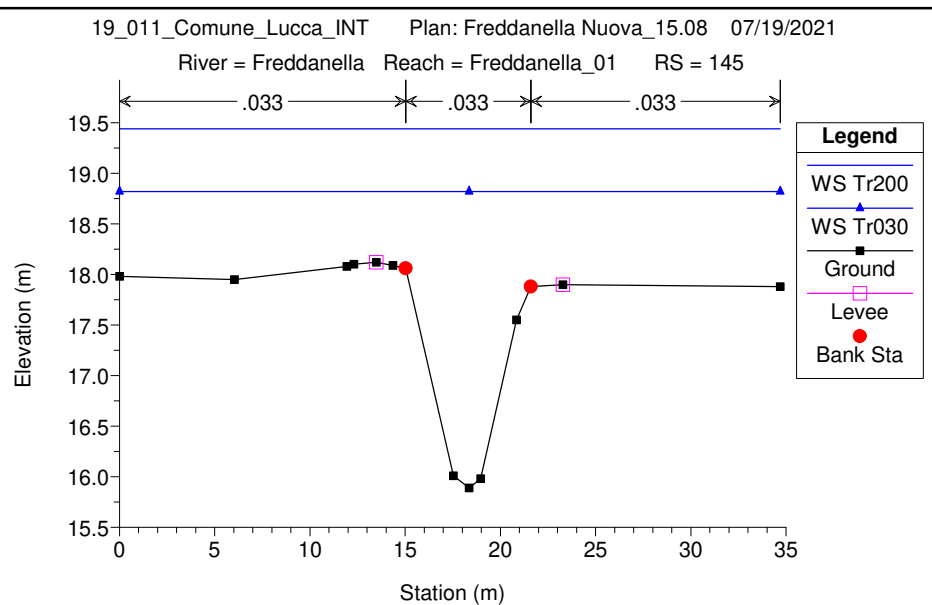
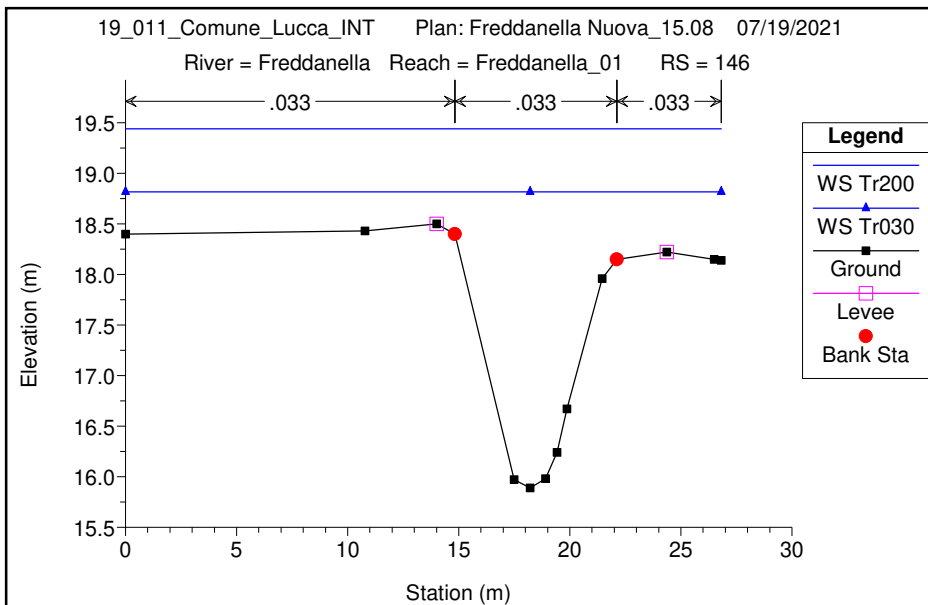
## **SEZIONI SISTEMA FREDDANELLA S. ALESSIO “Freddanella Nuova”**

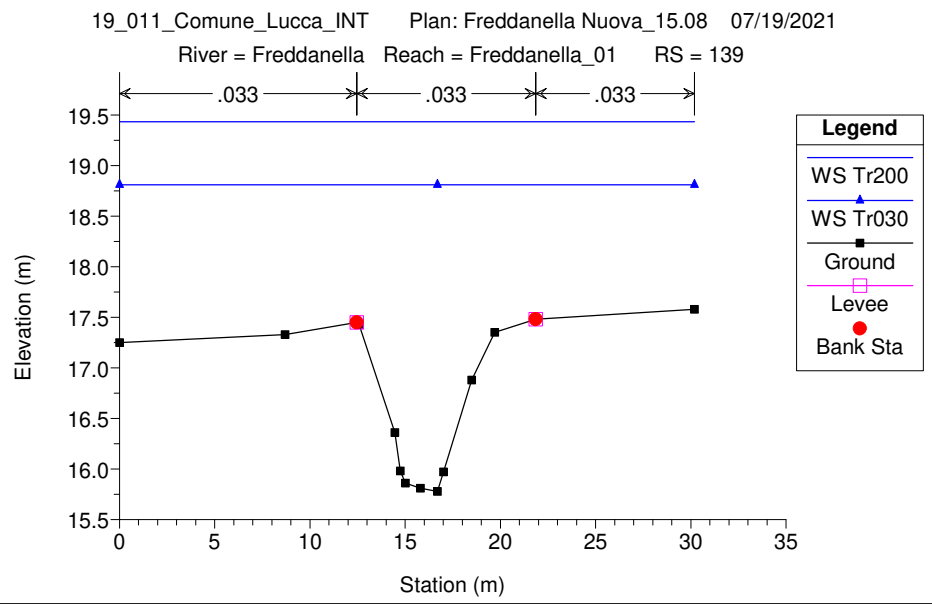
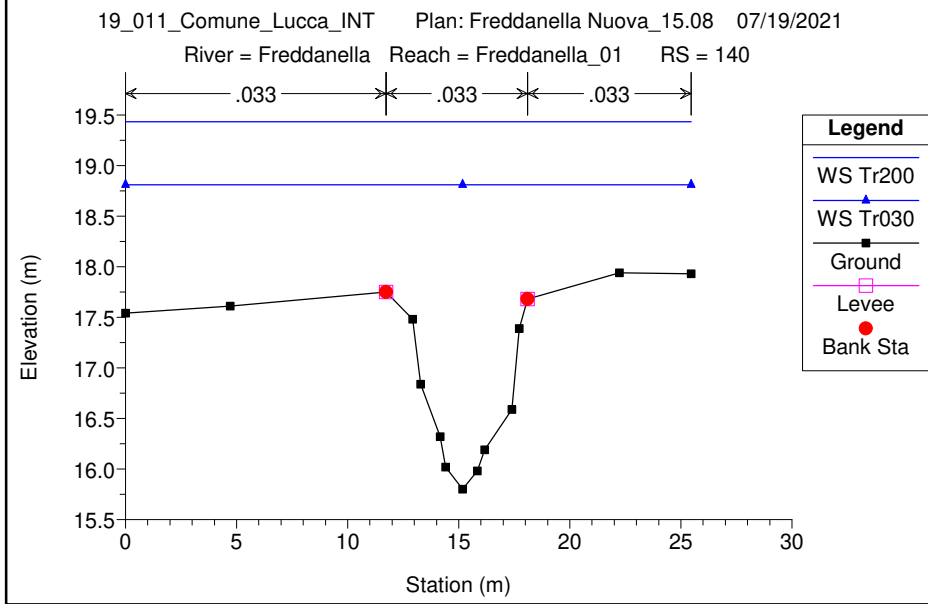
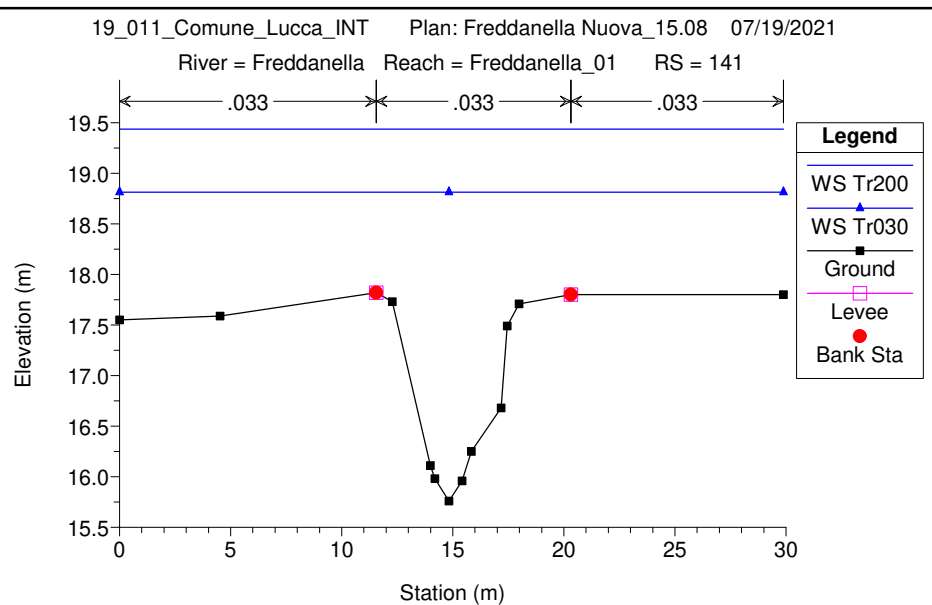
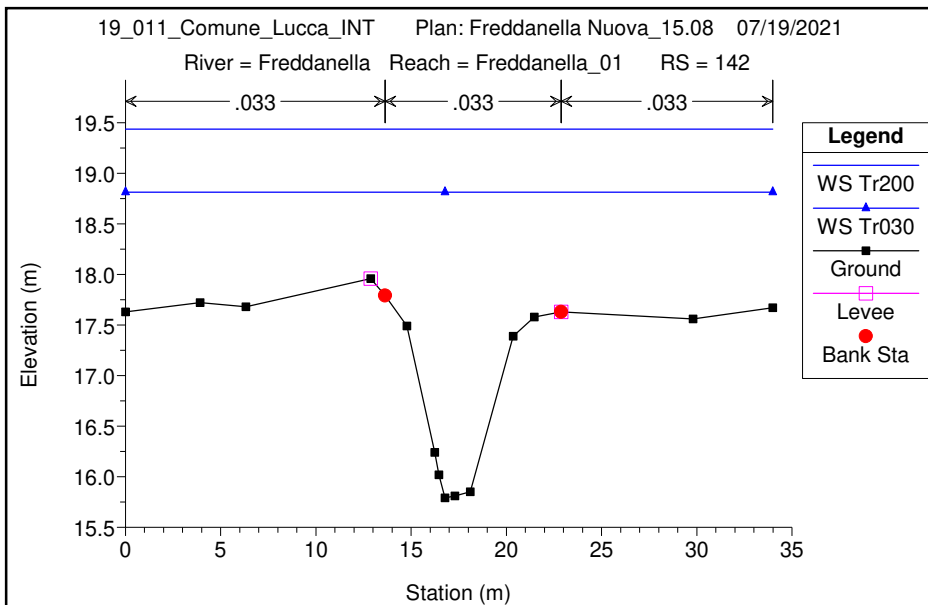


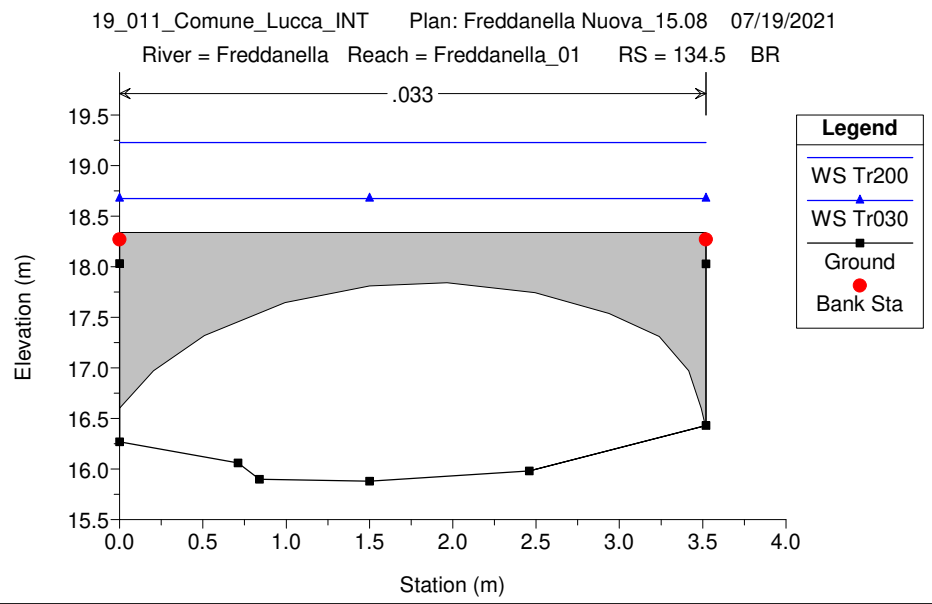
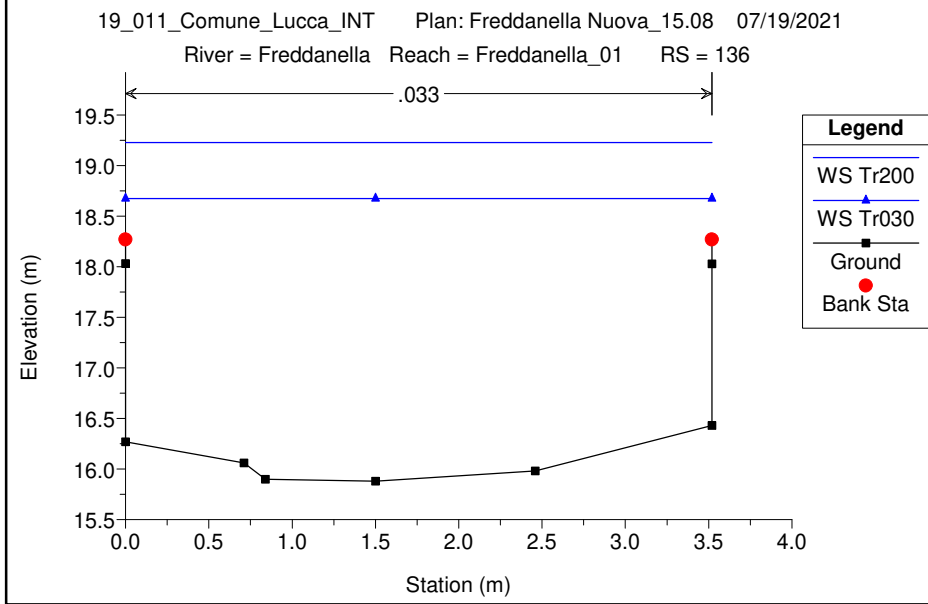
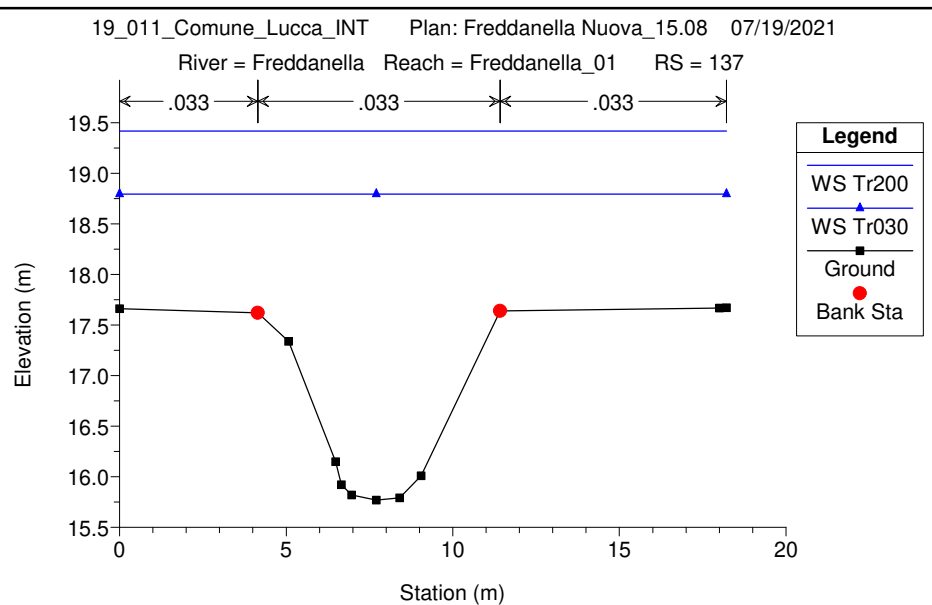
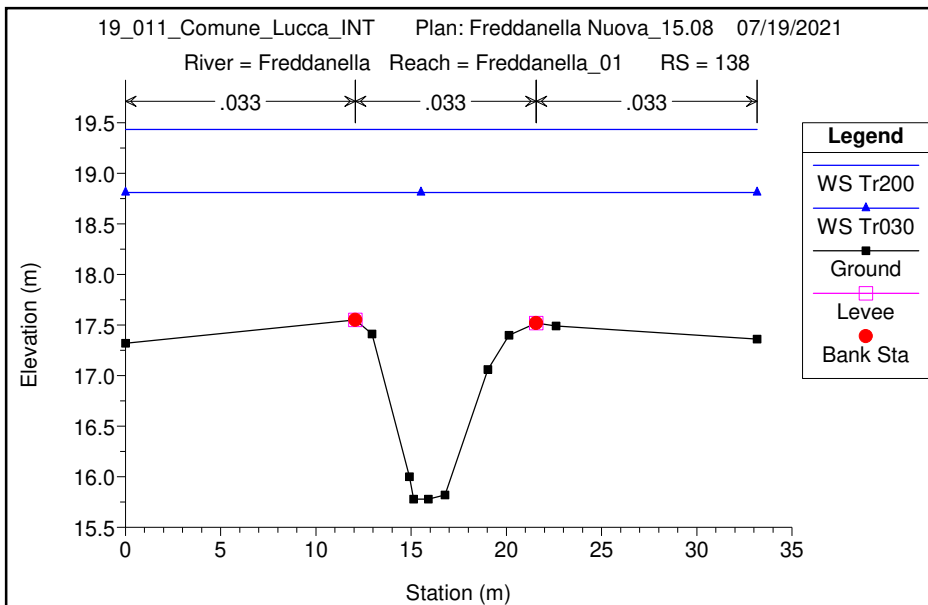




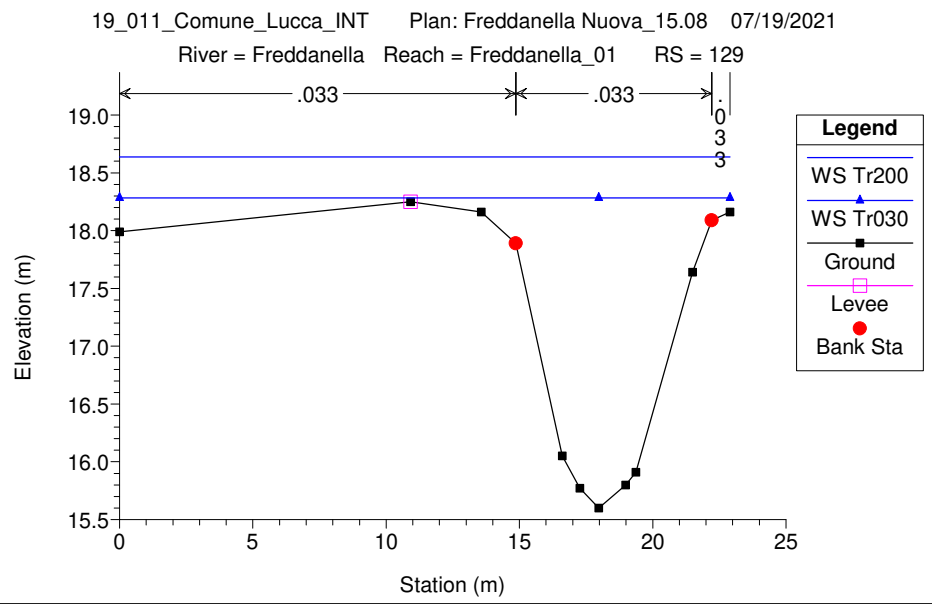
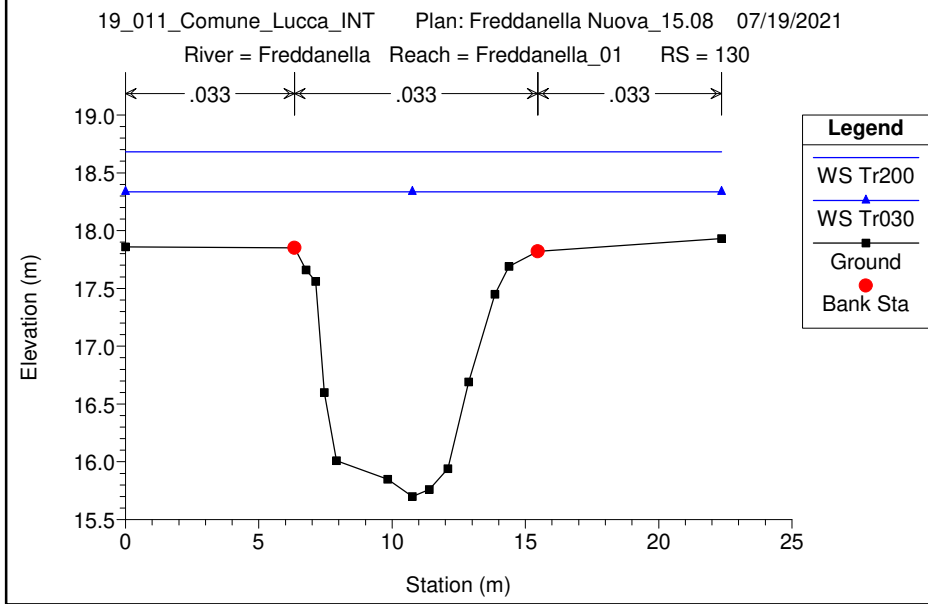
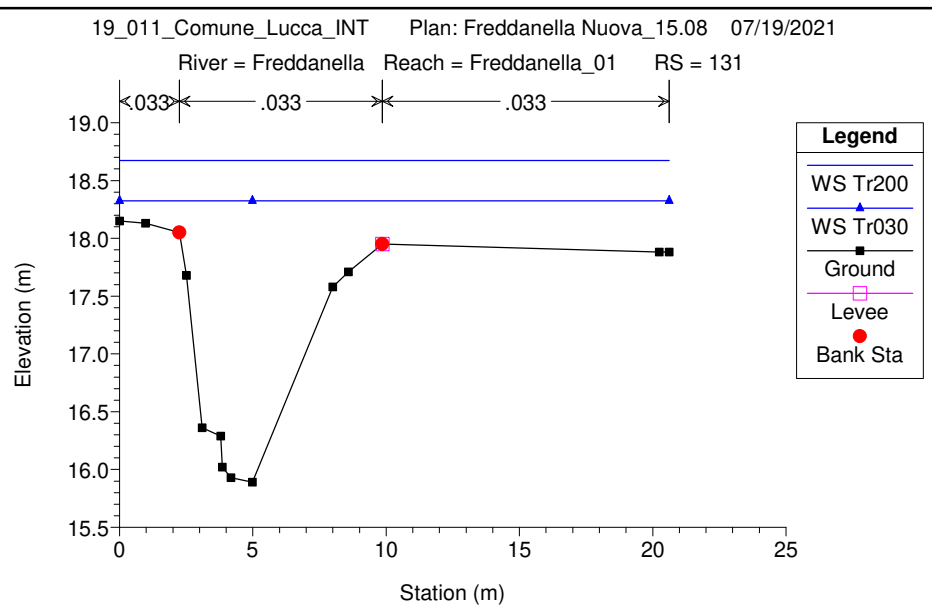
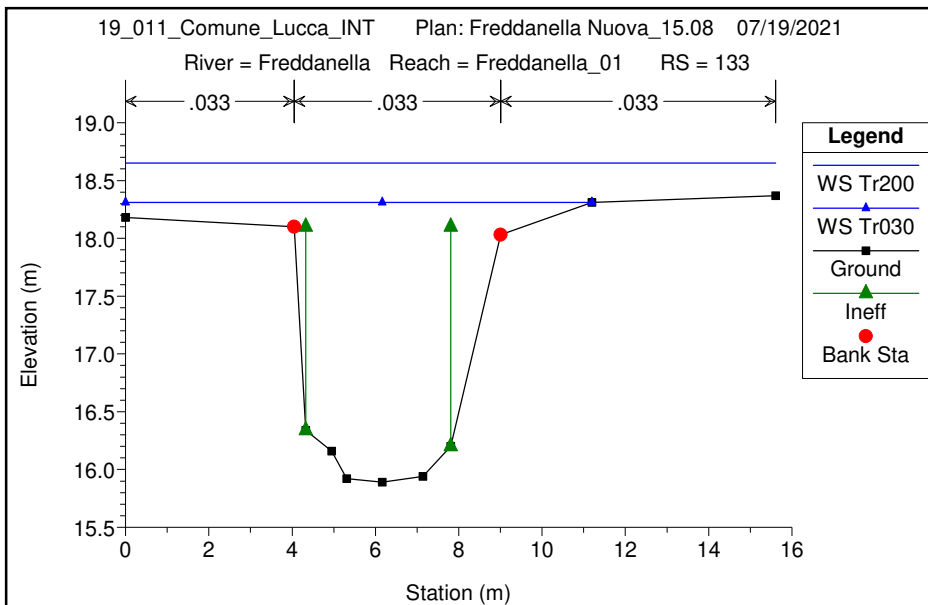


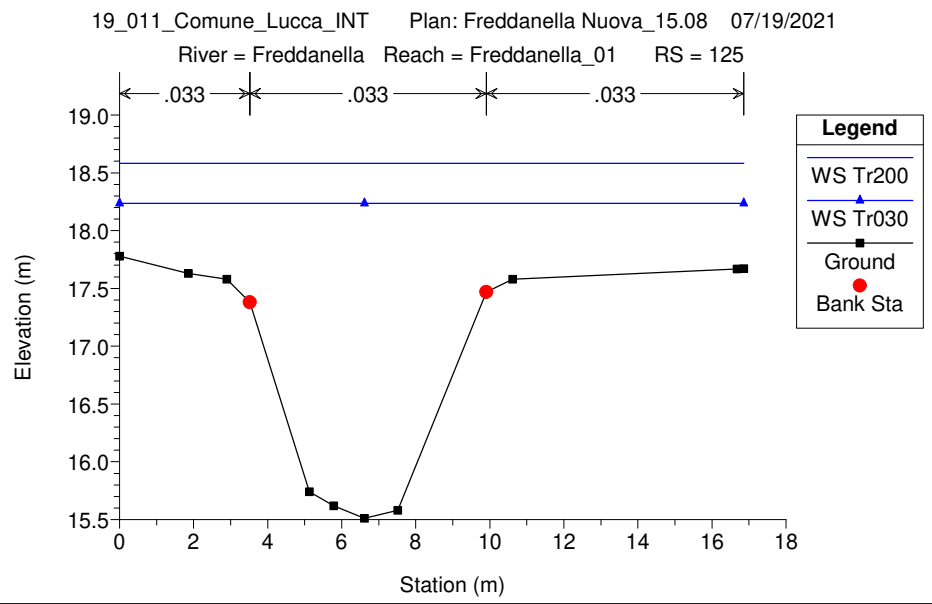
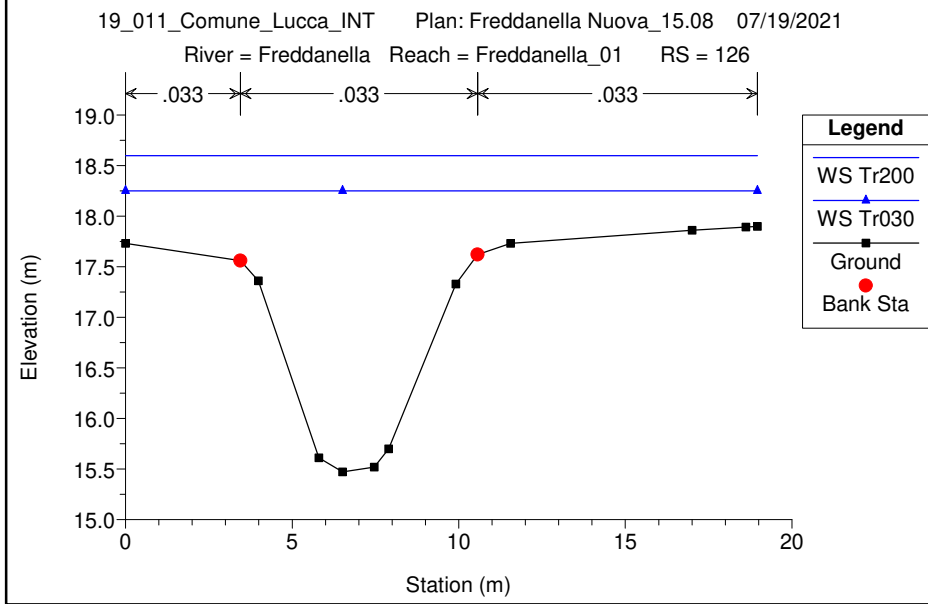
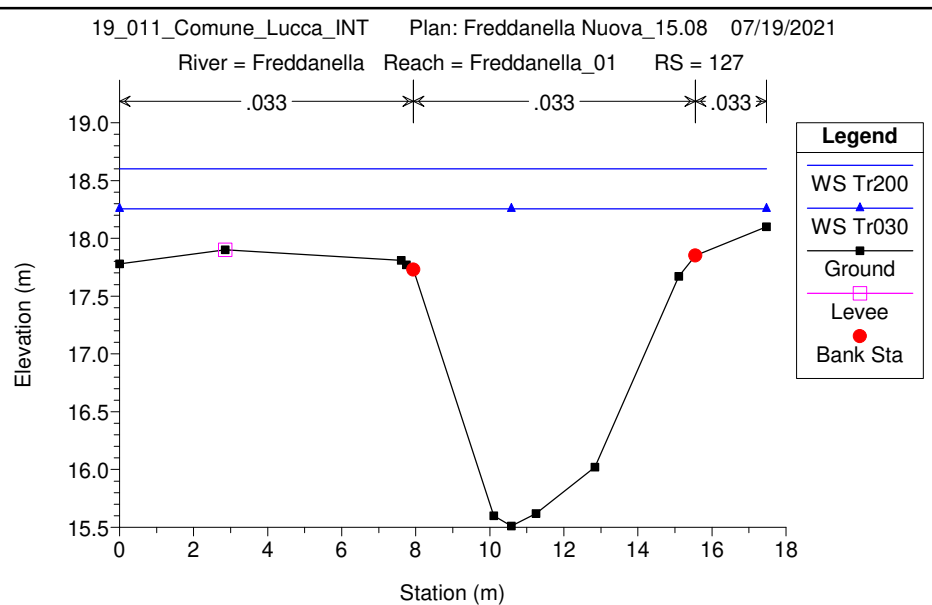
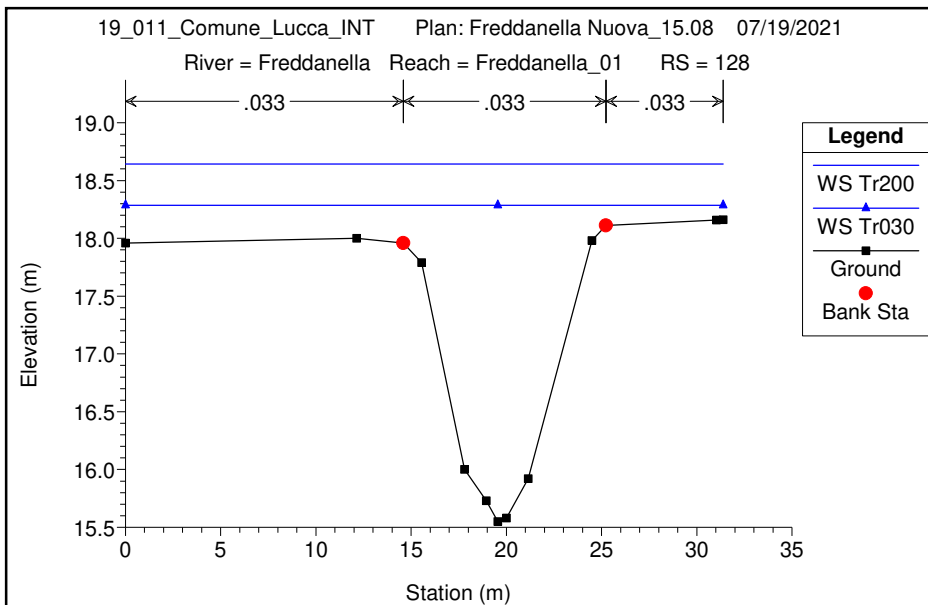


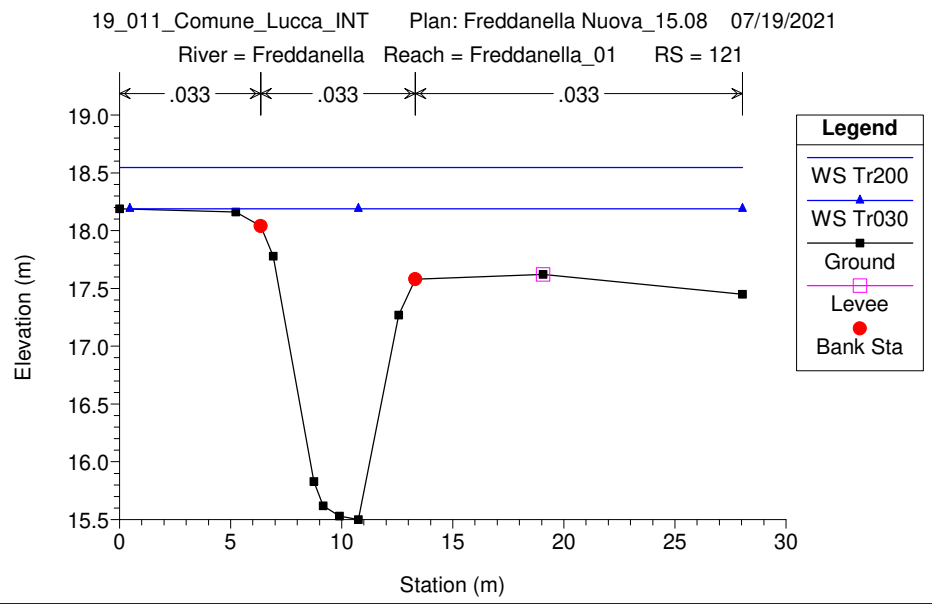
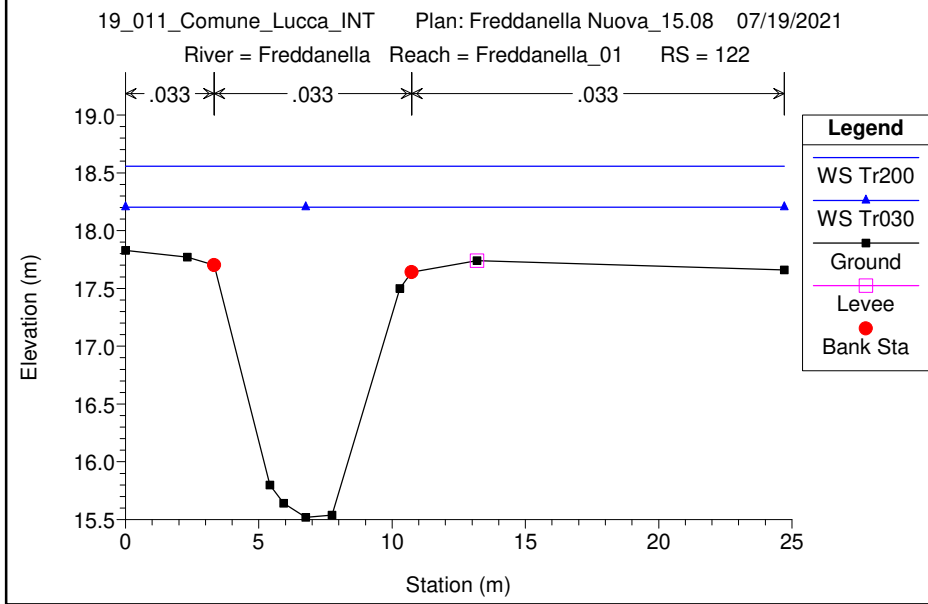
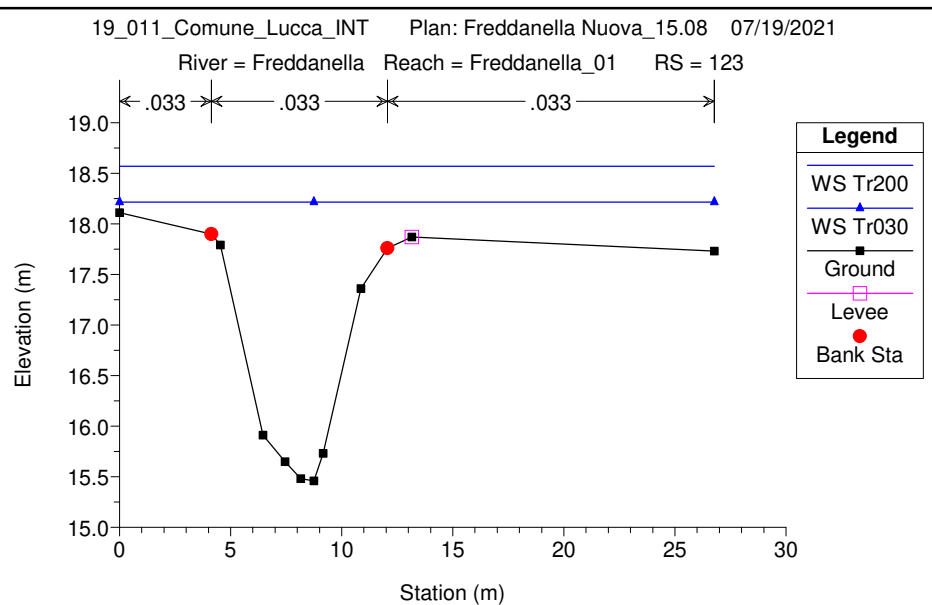
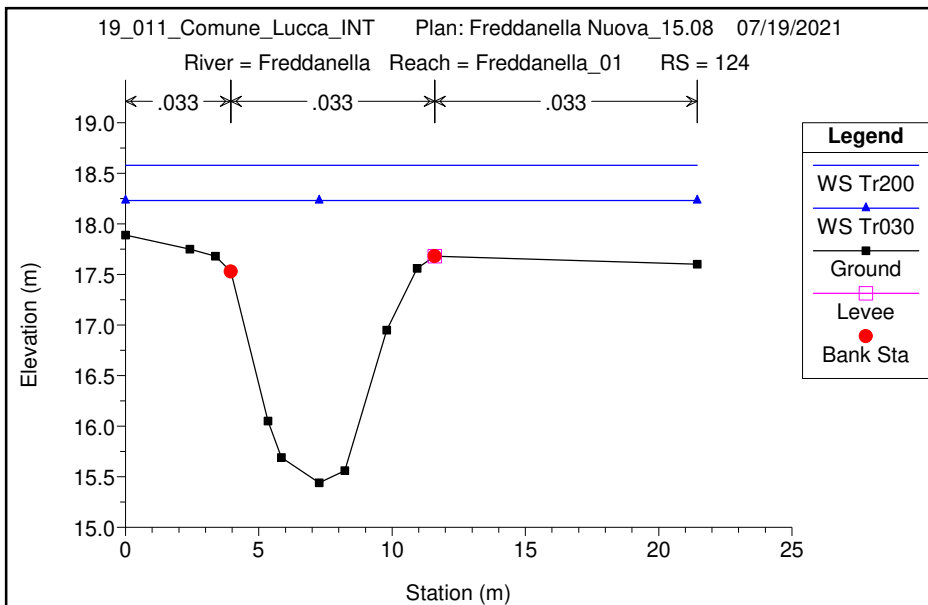


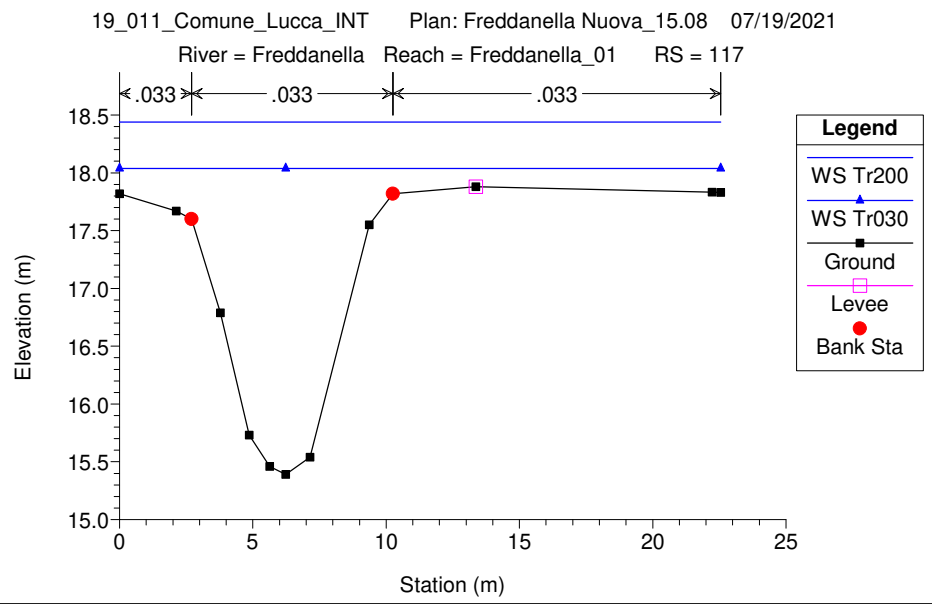
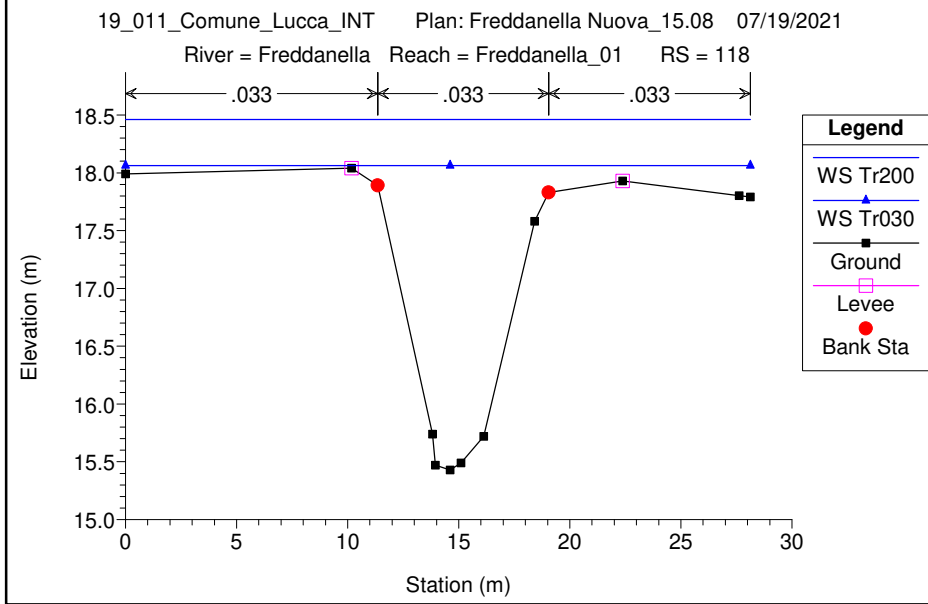
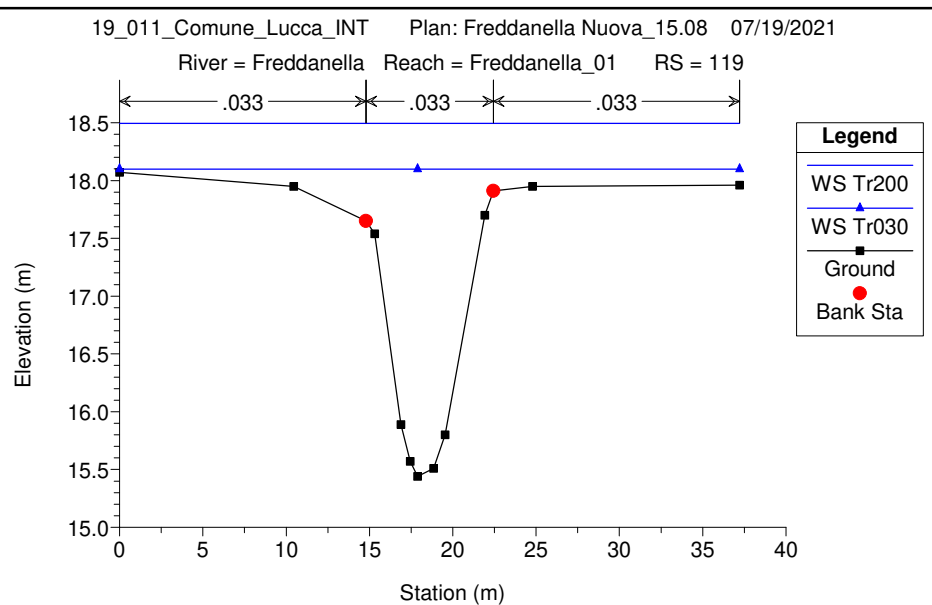
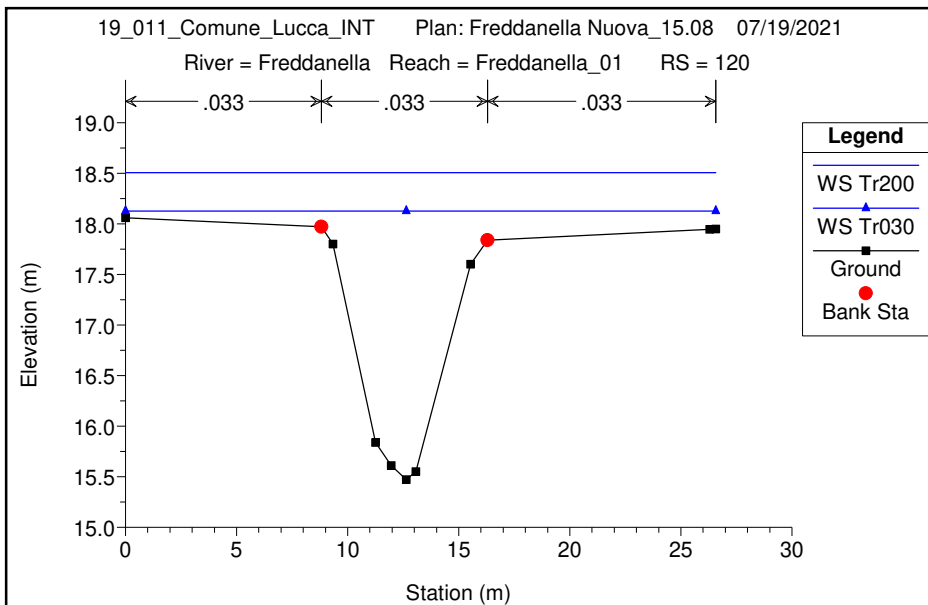


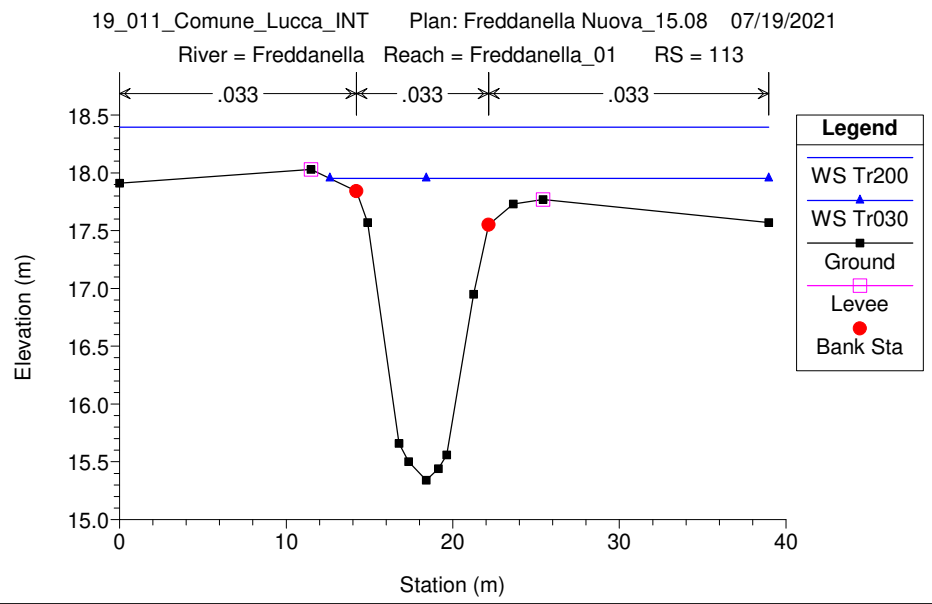
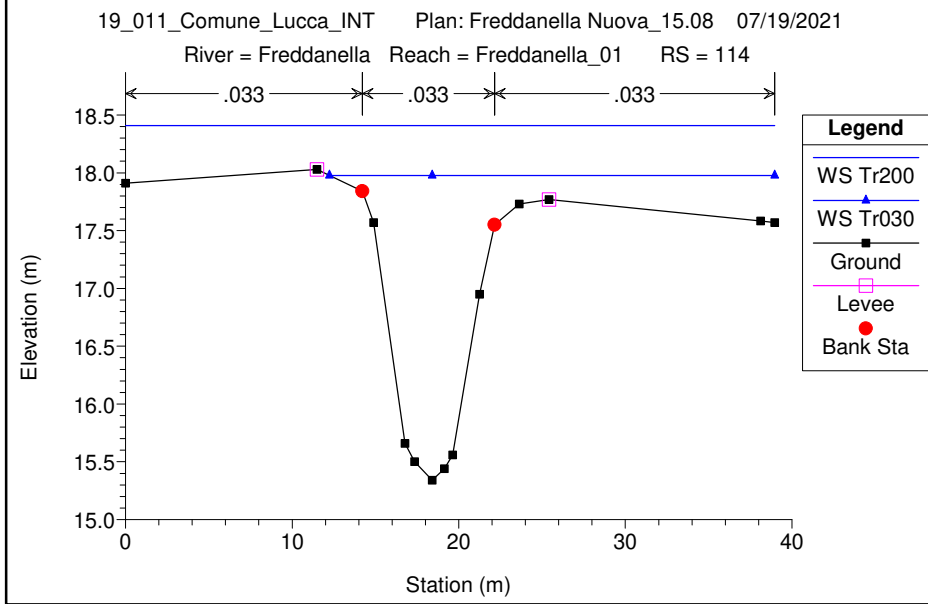
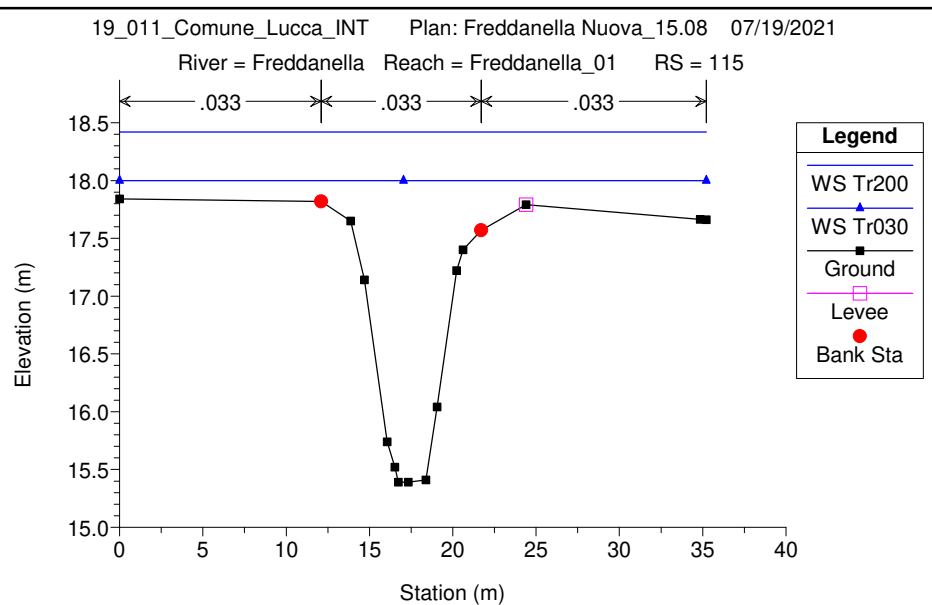
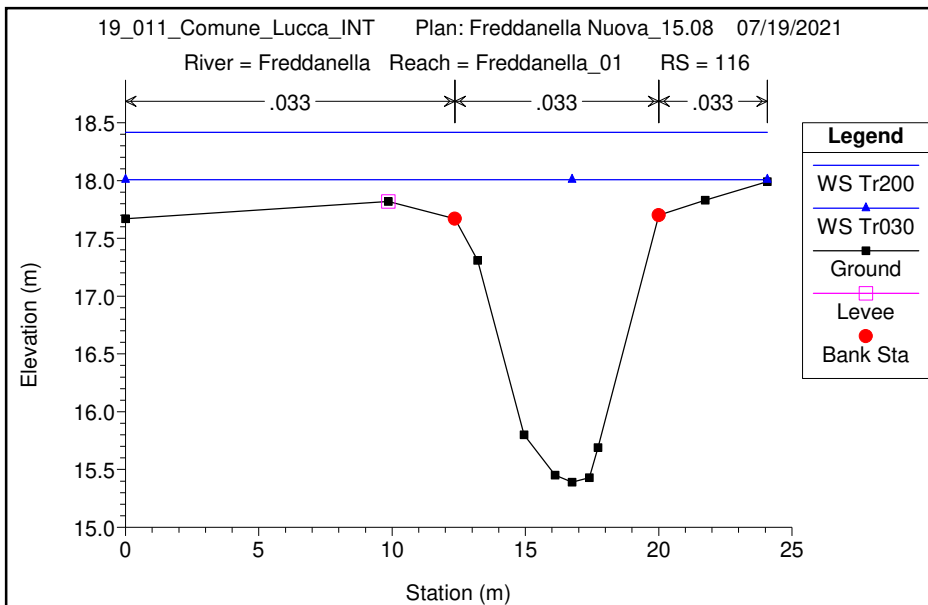


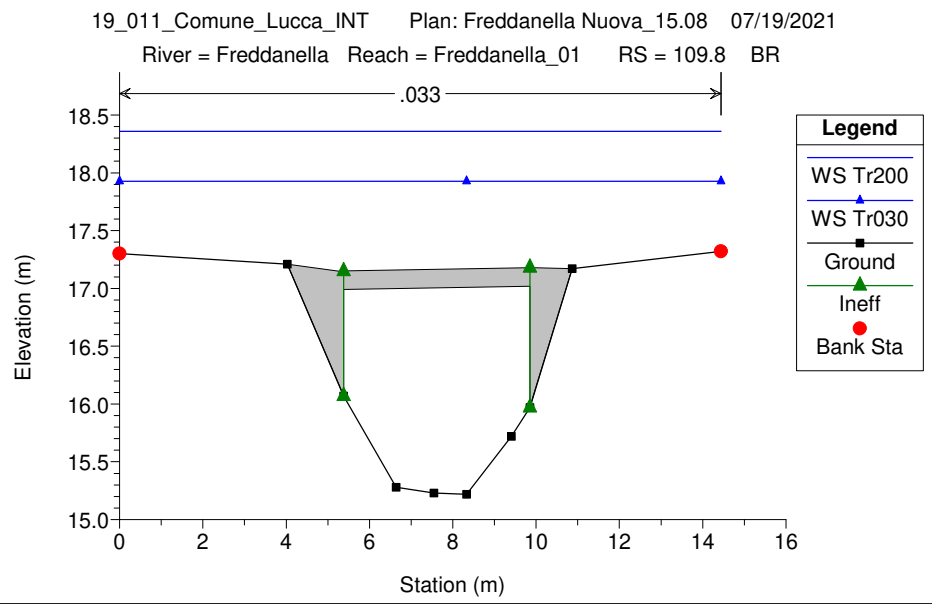
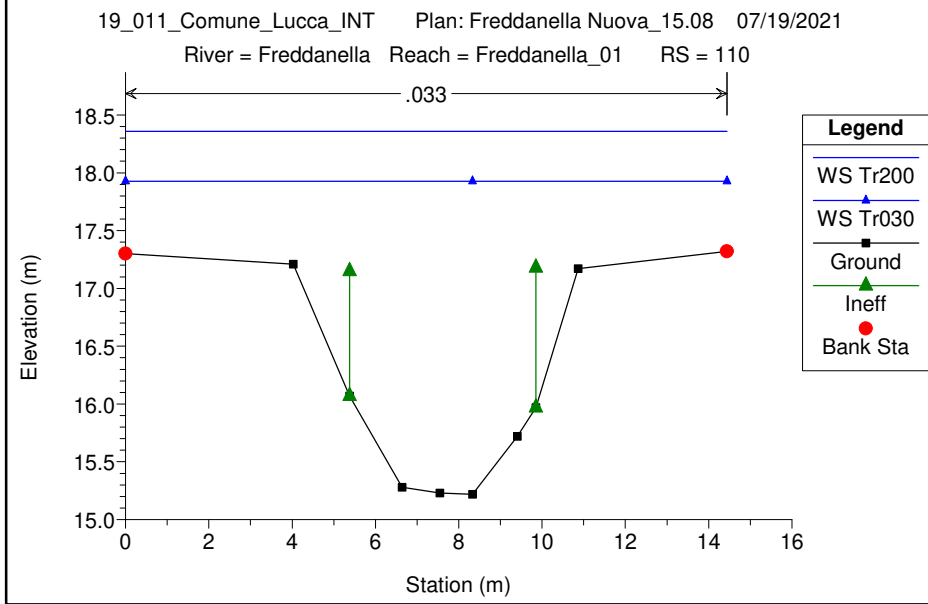
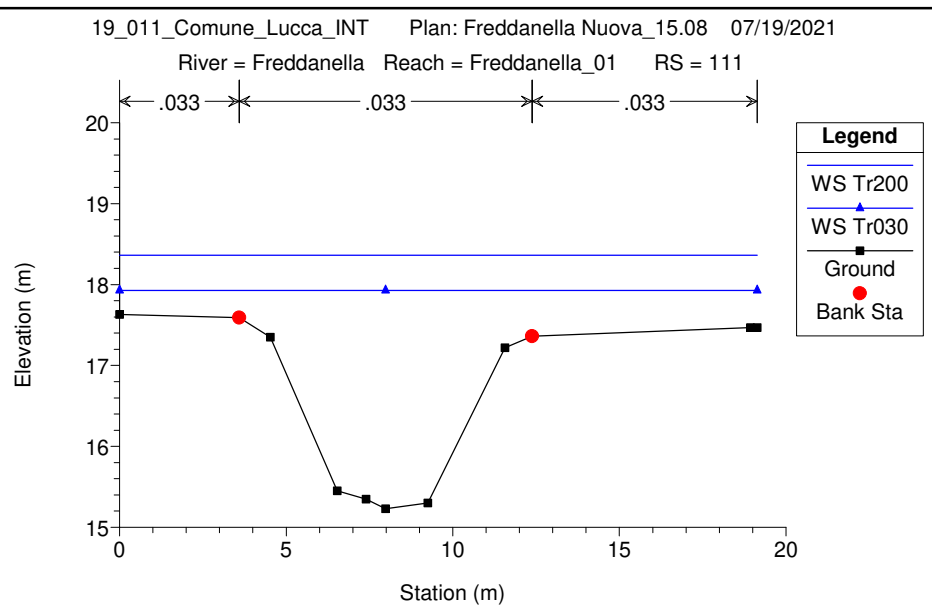
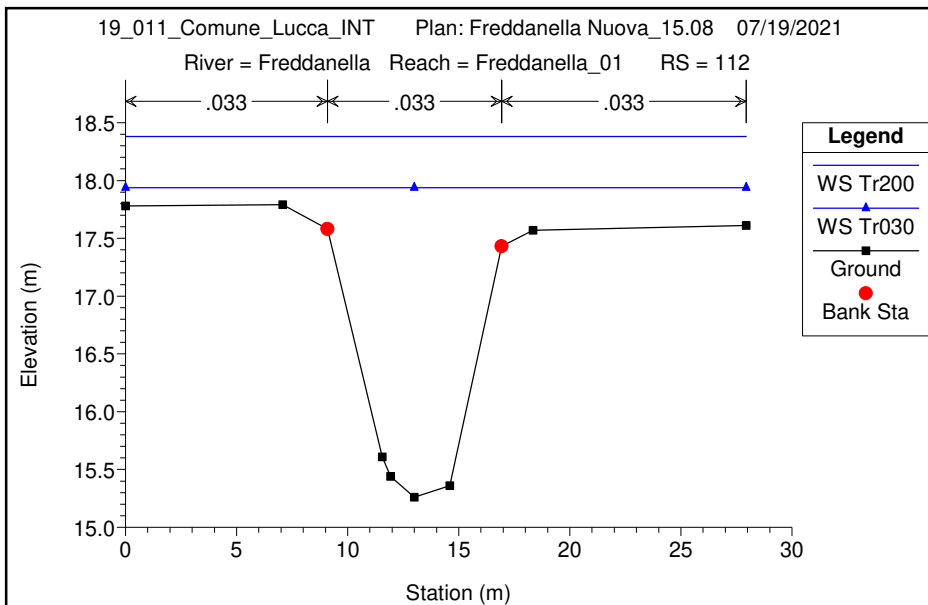


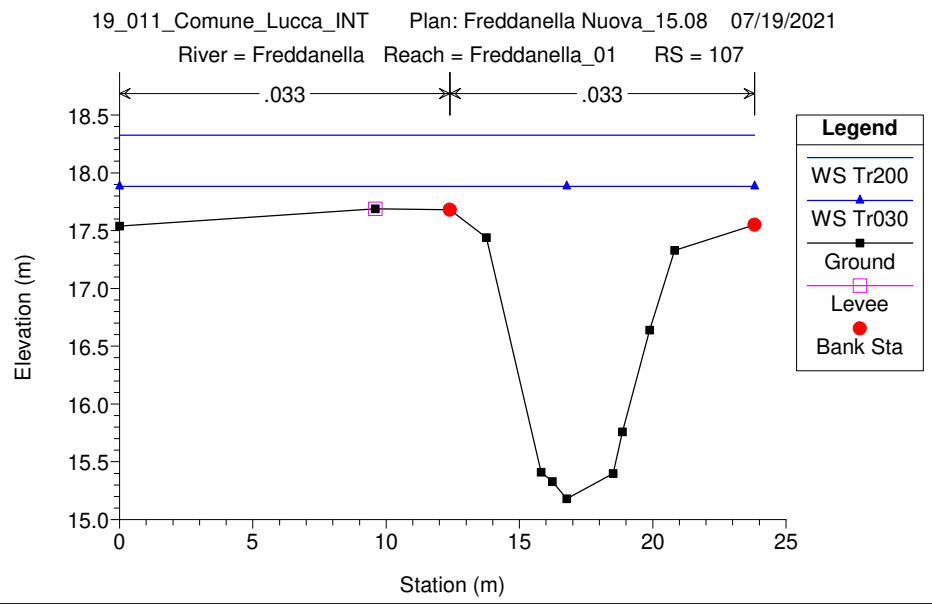
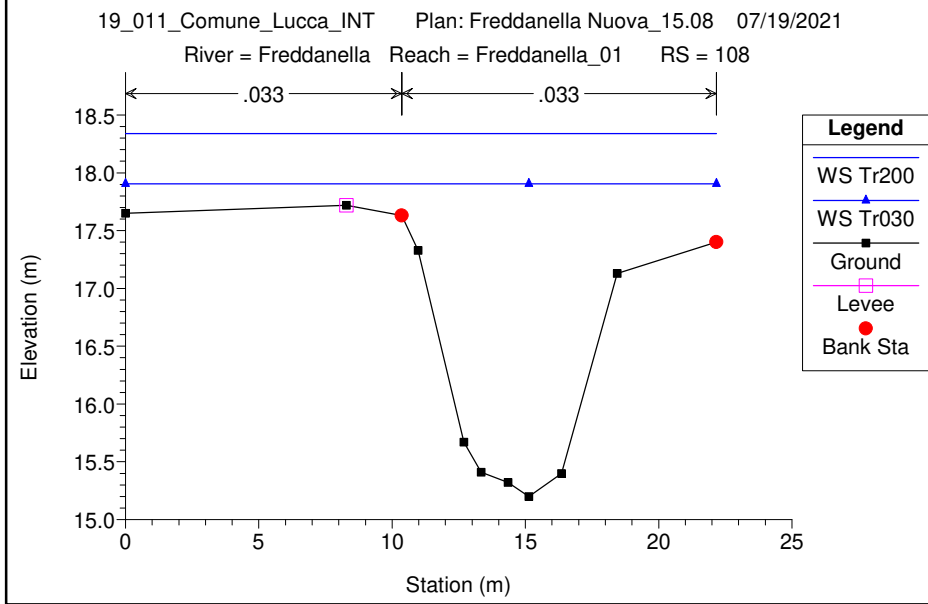
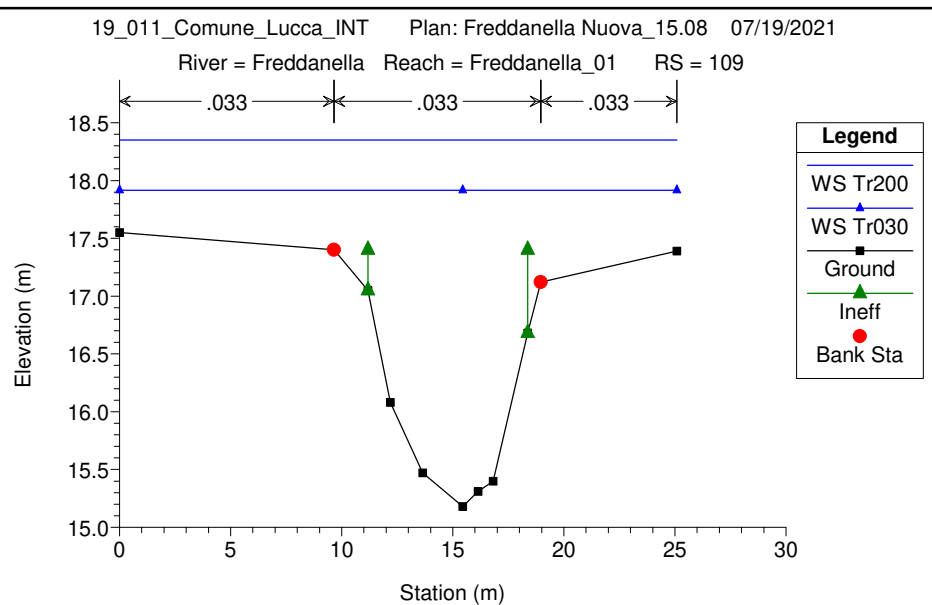
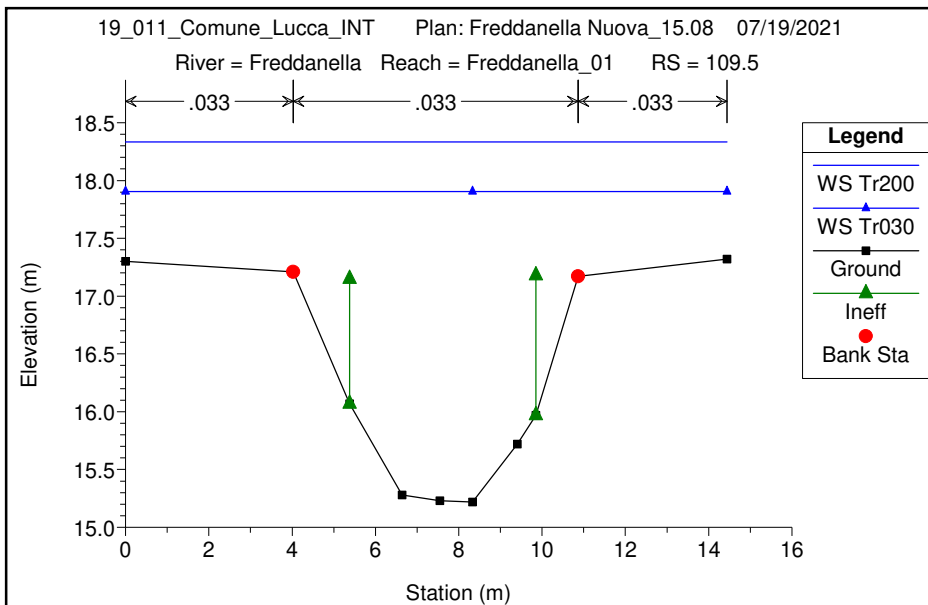


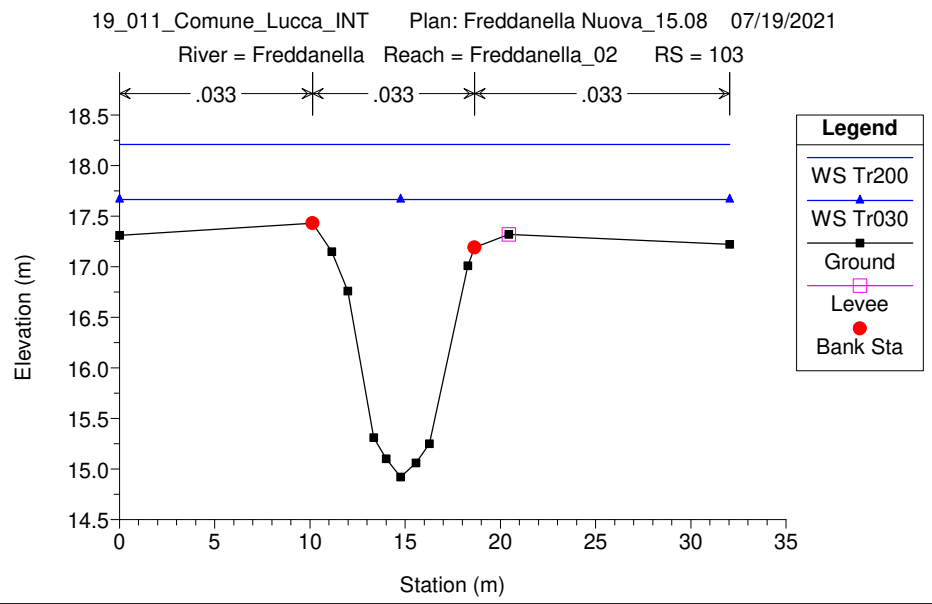
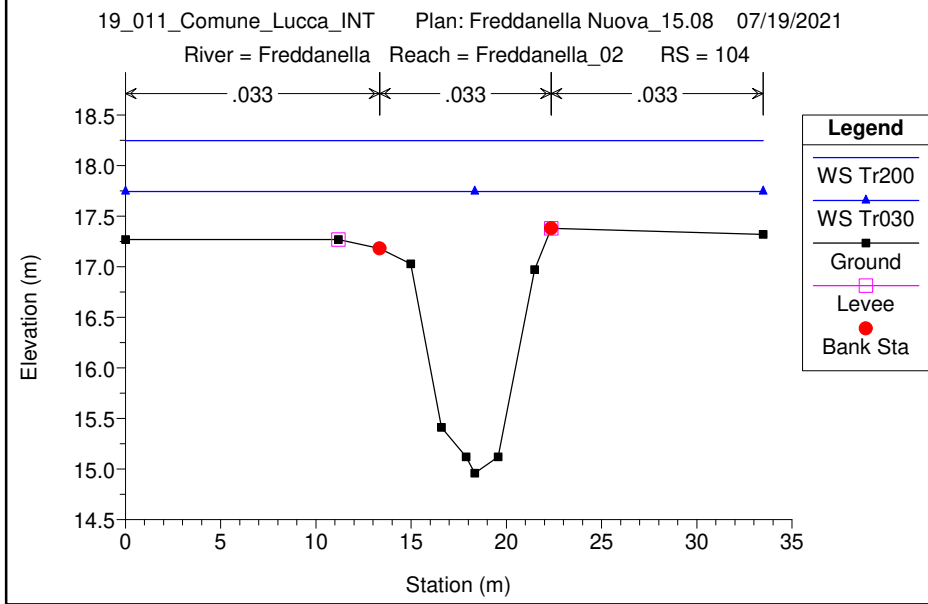
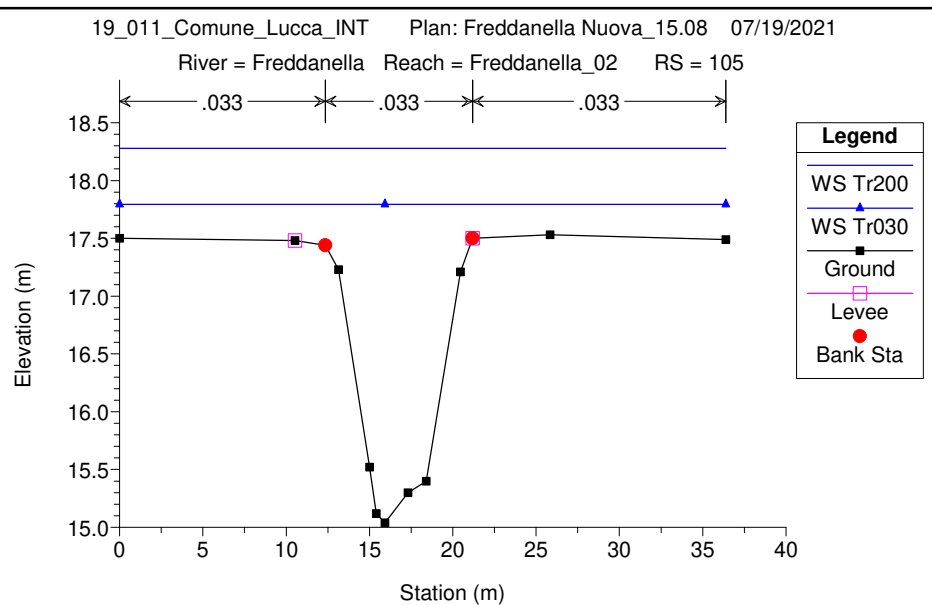
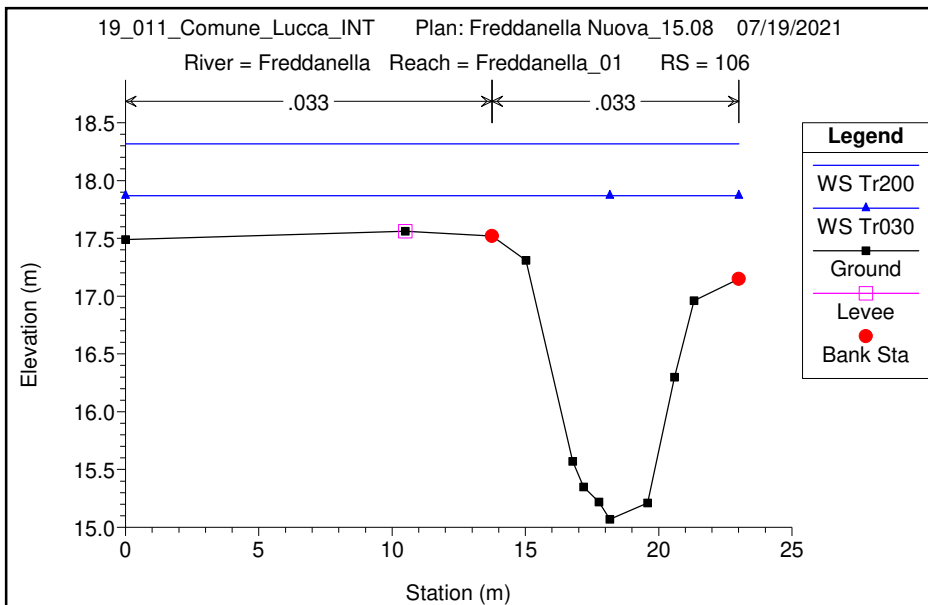




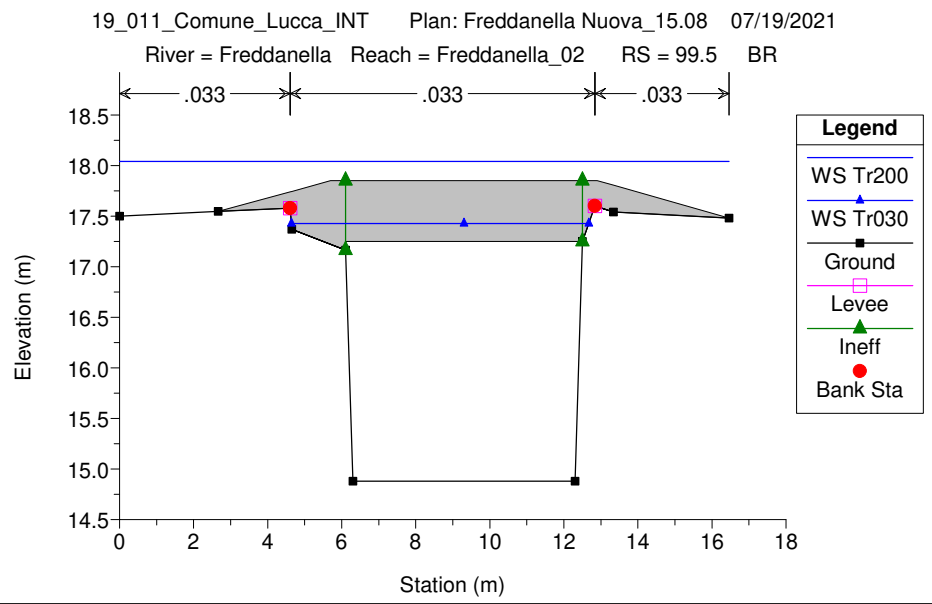
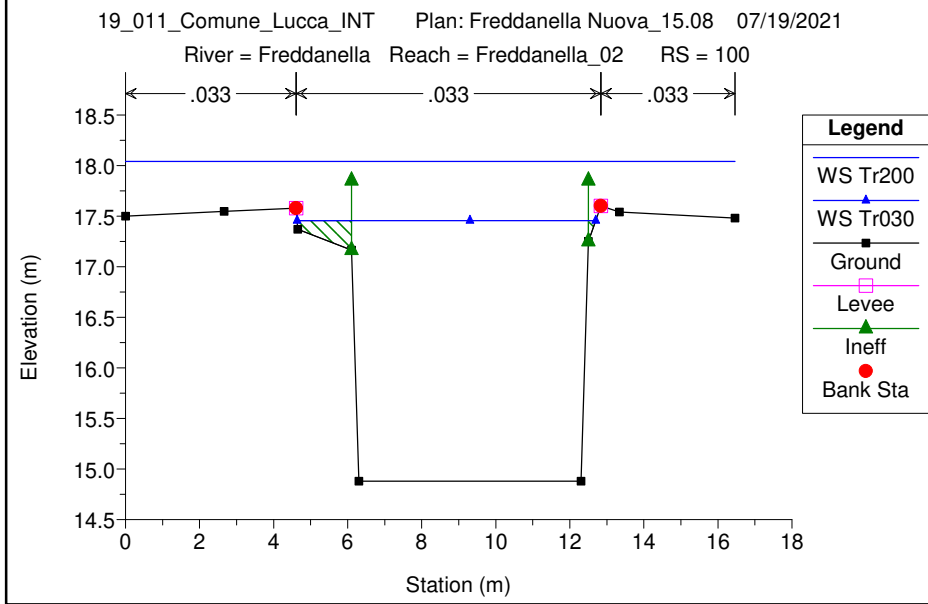
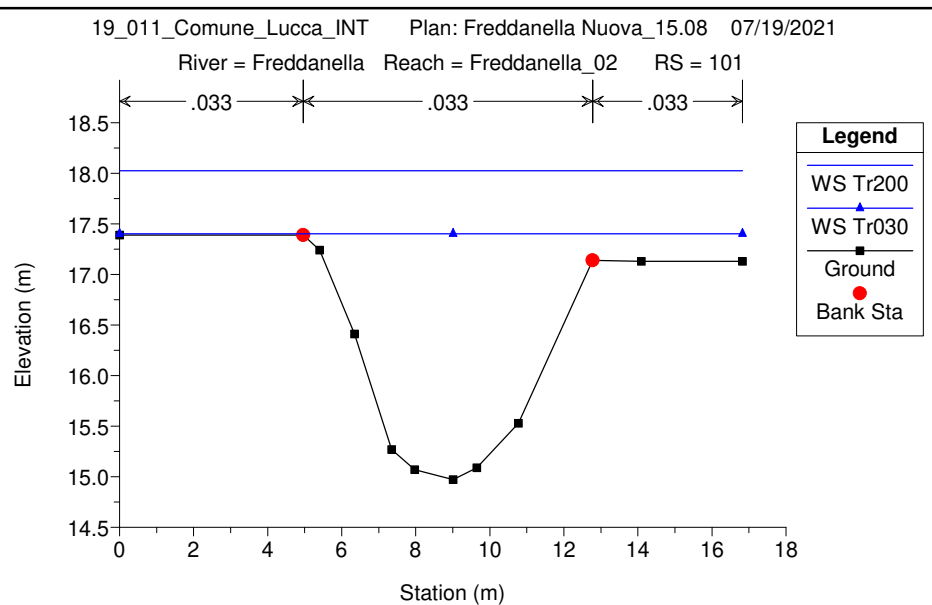
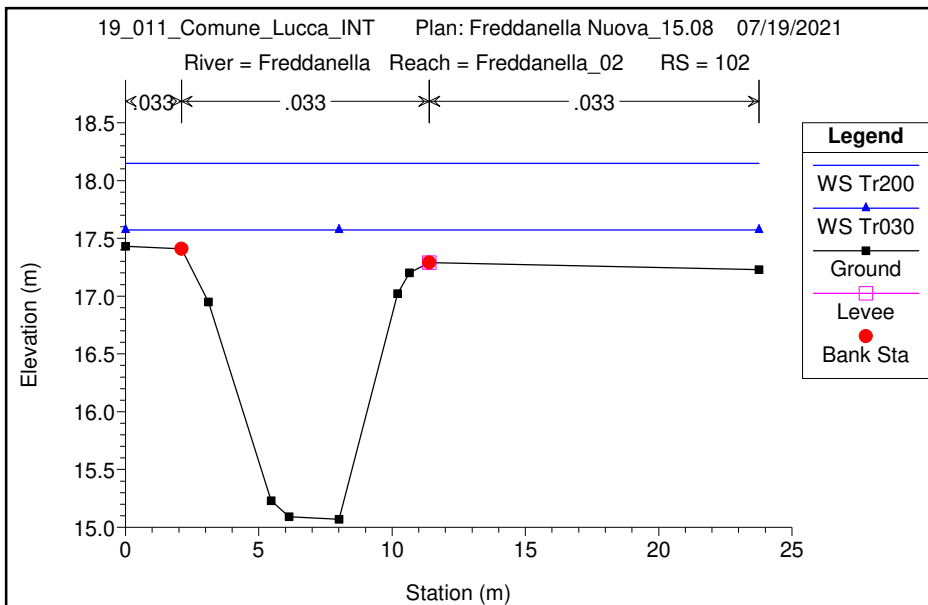


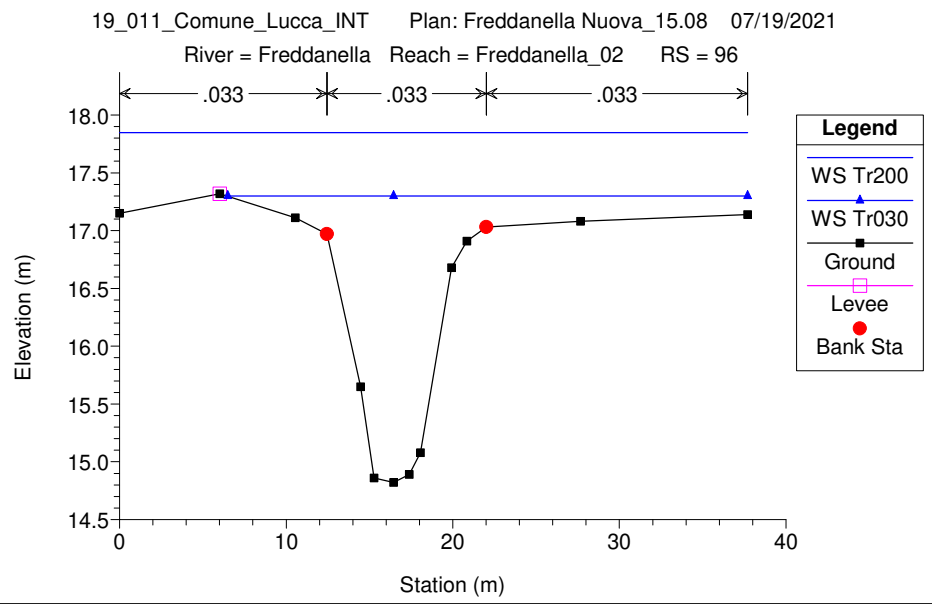
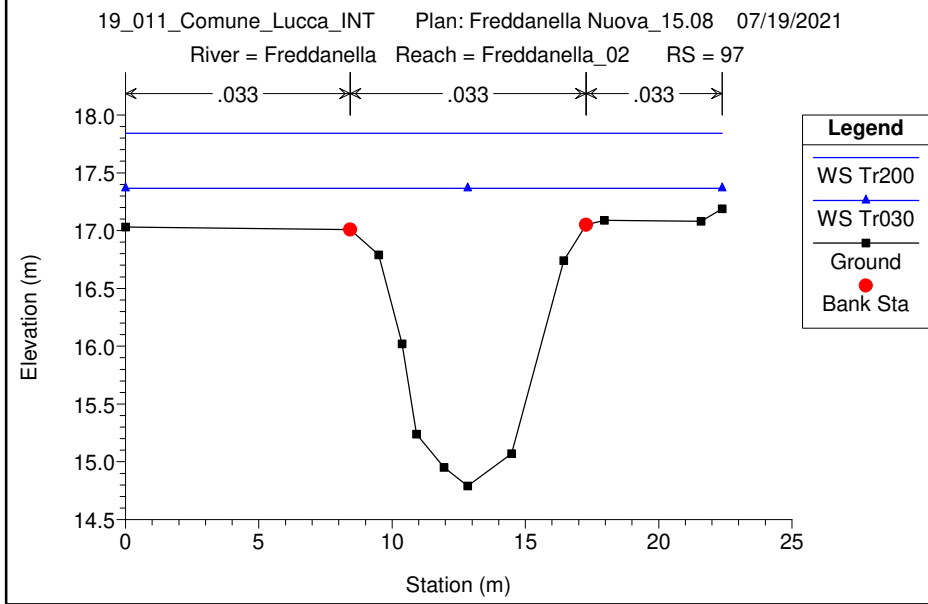
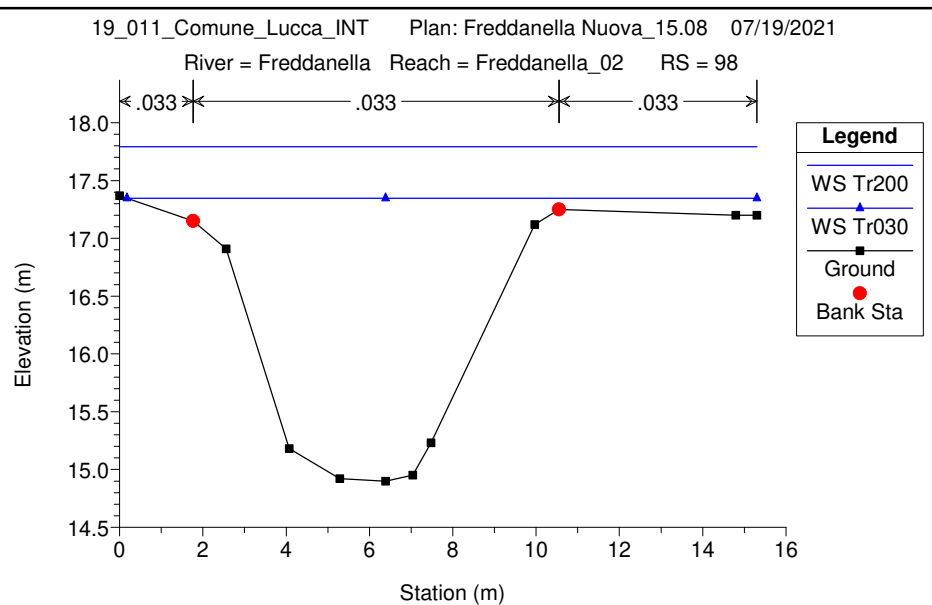
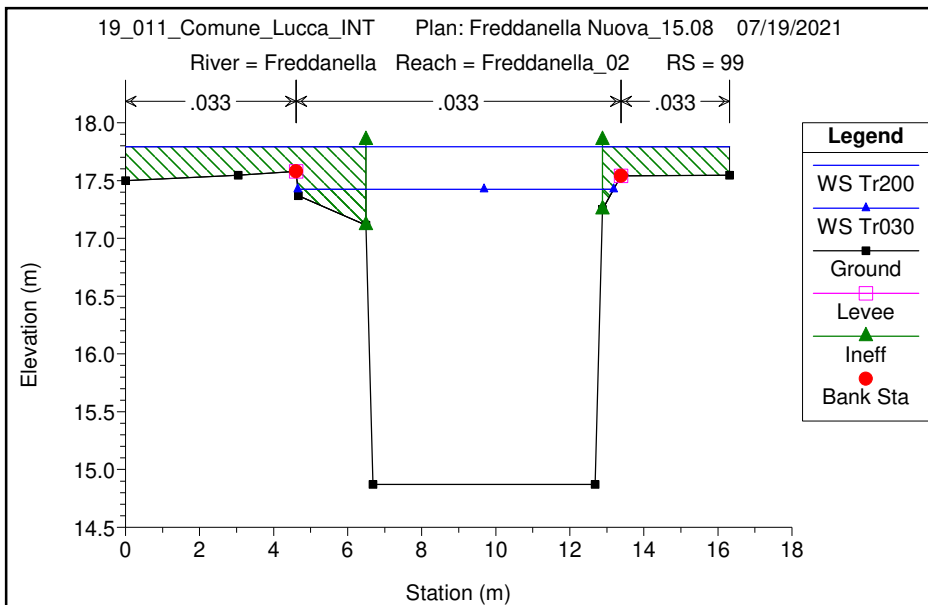


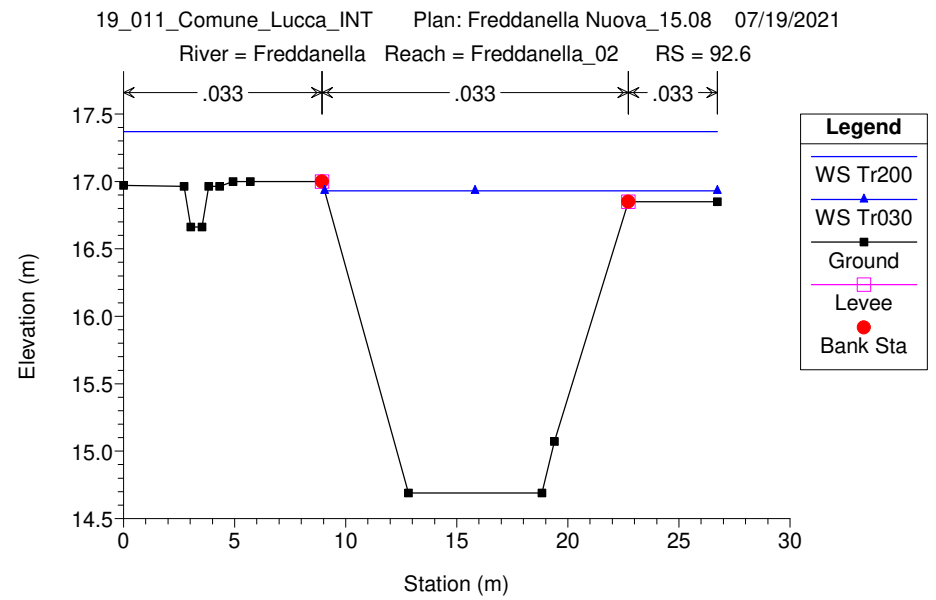
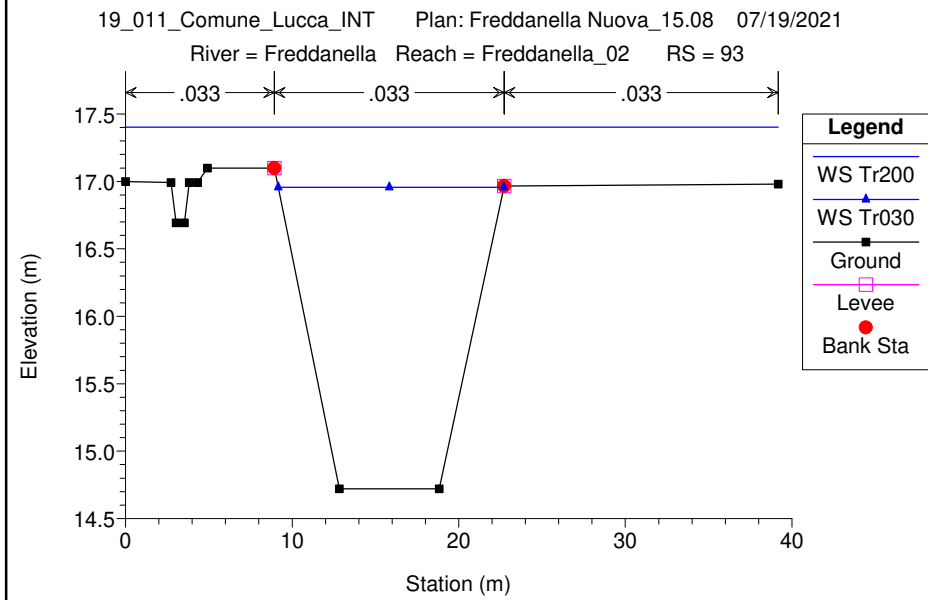
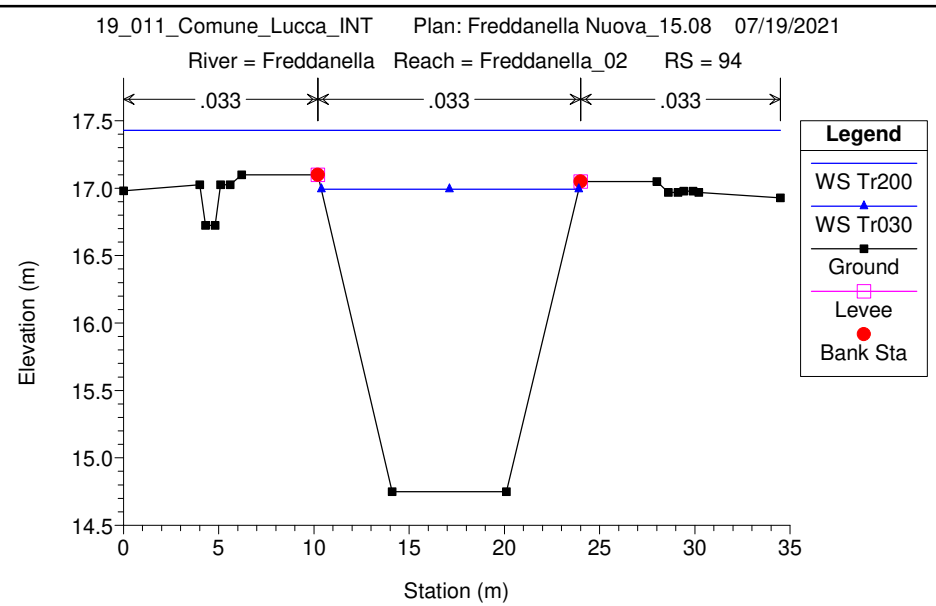
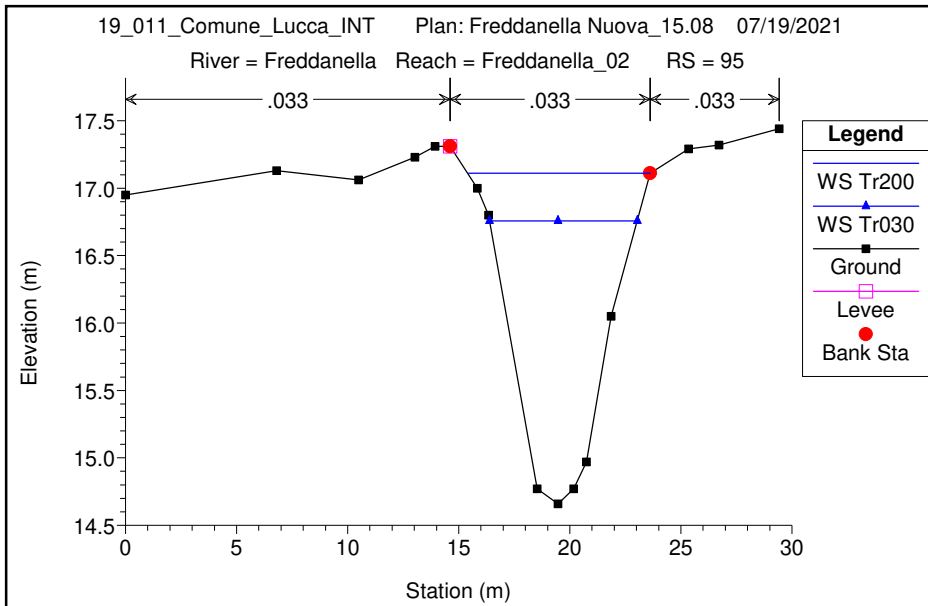


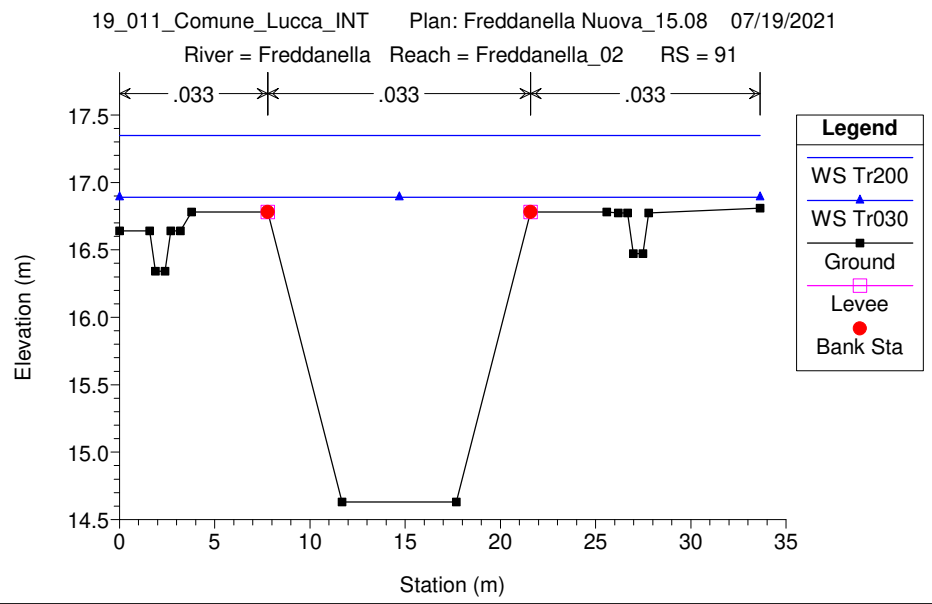
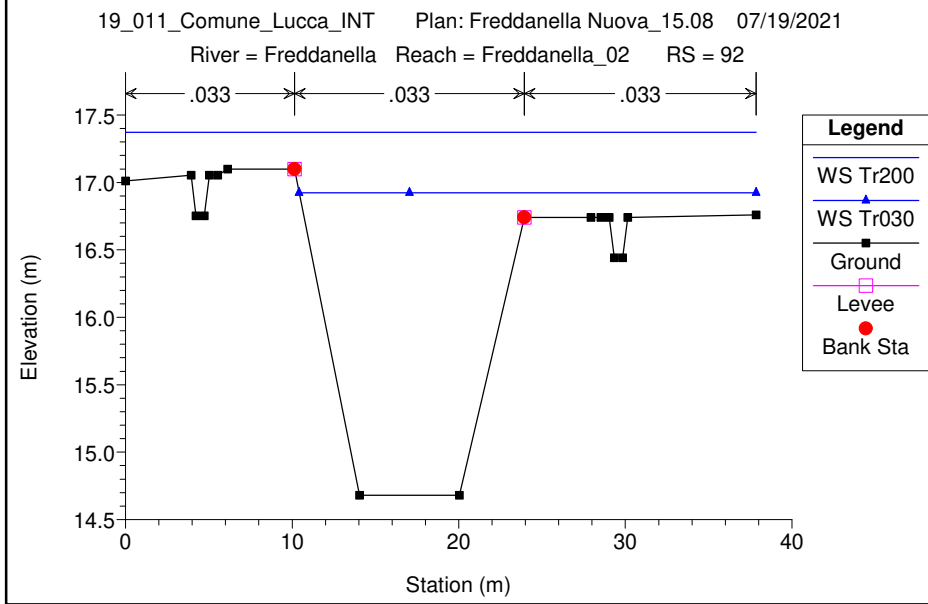
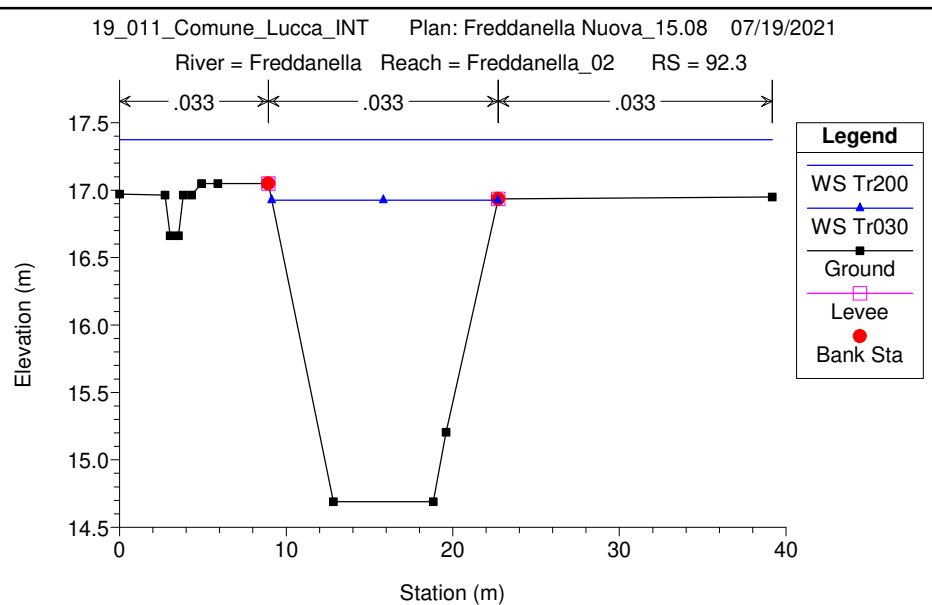
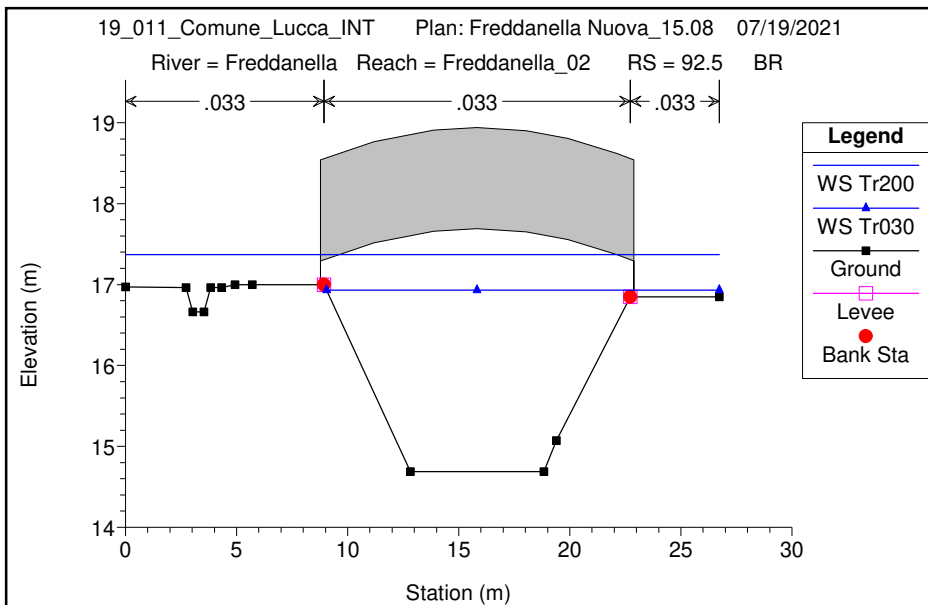


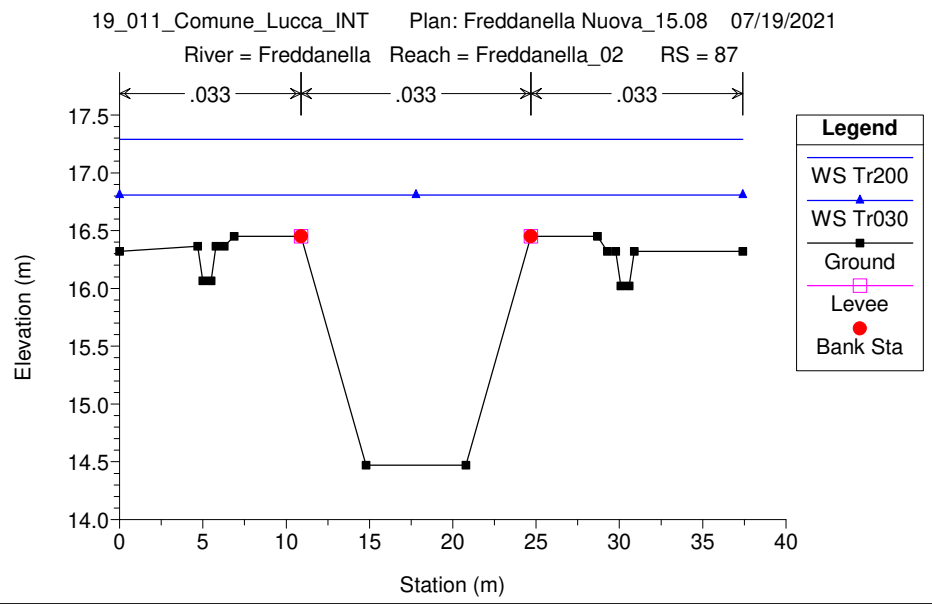
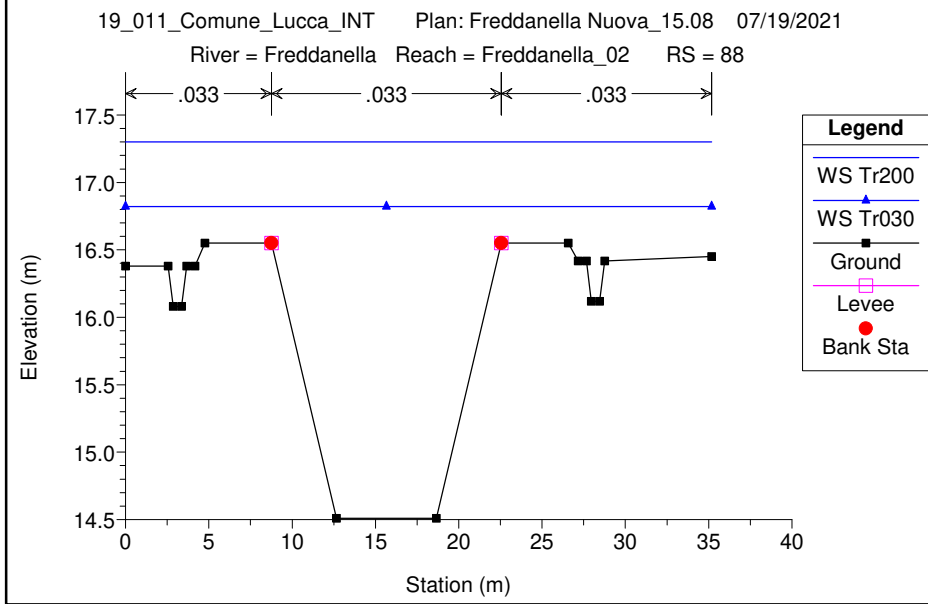
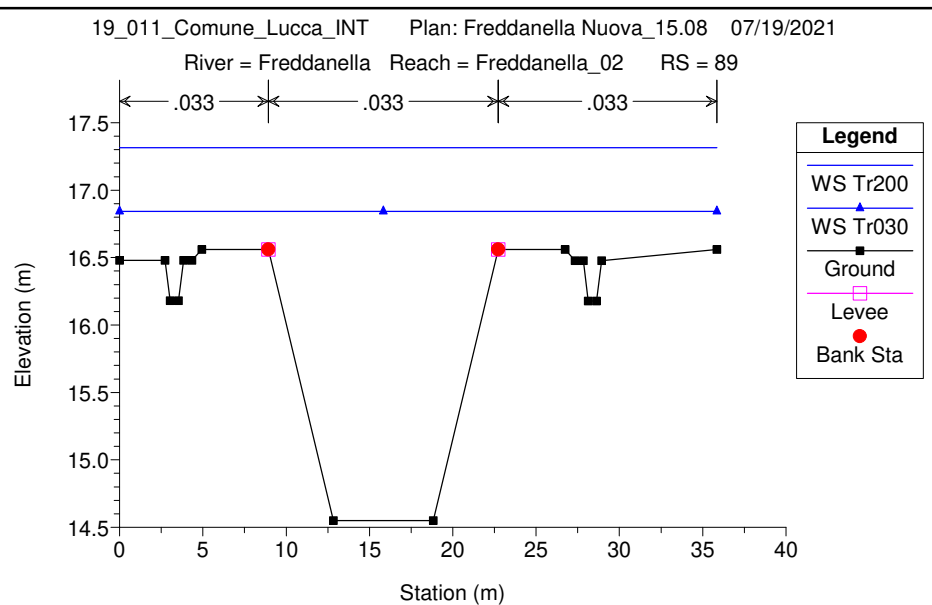
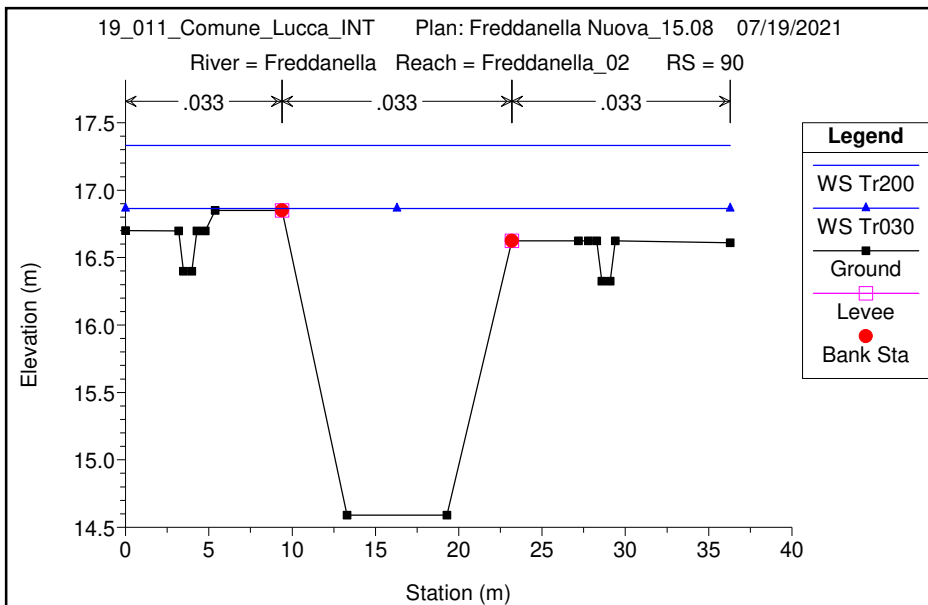


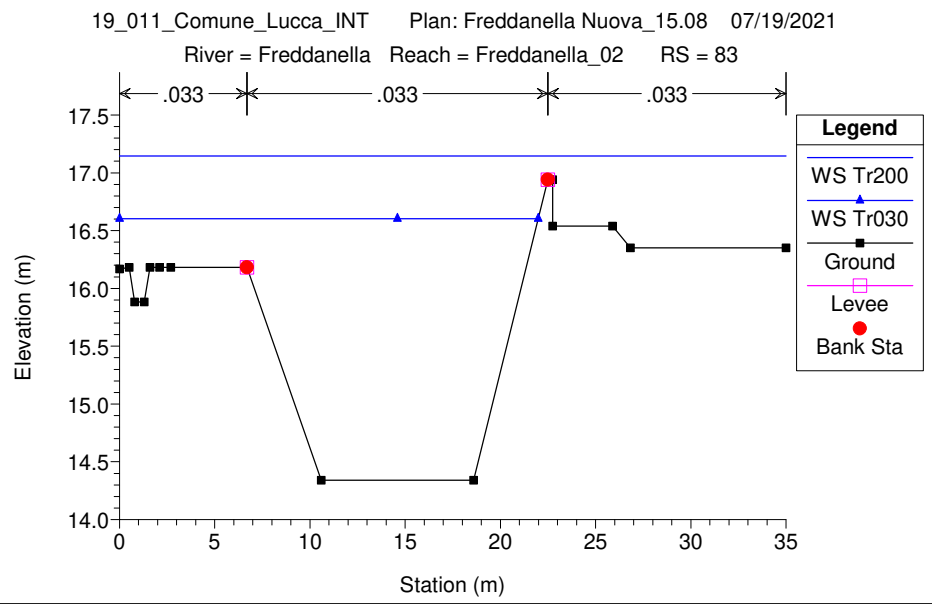
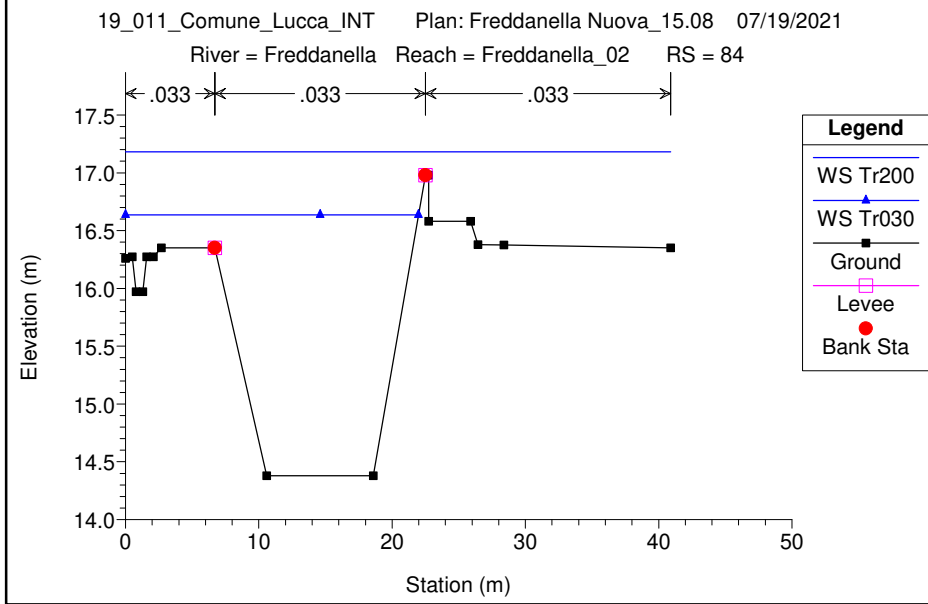
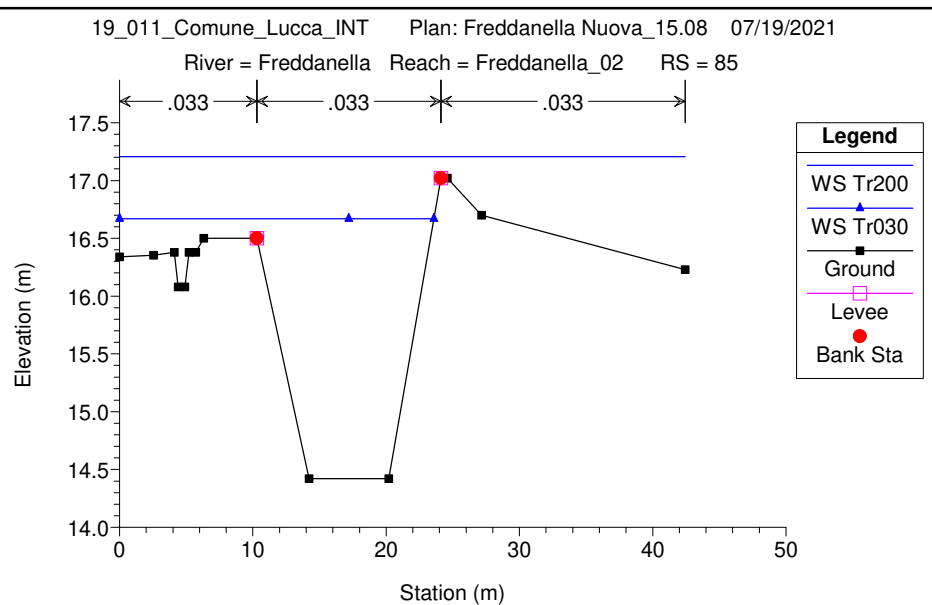
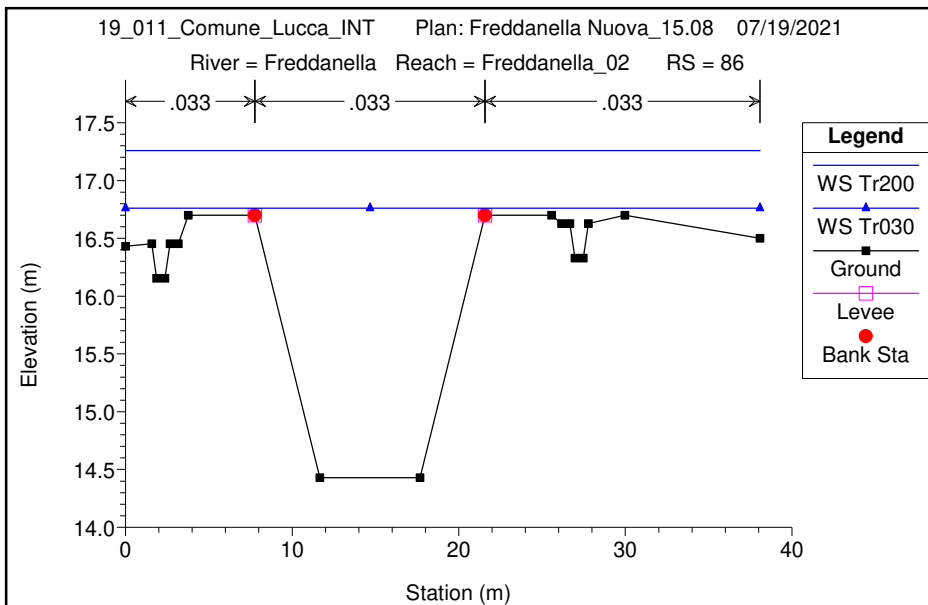


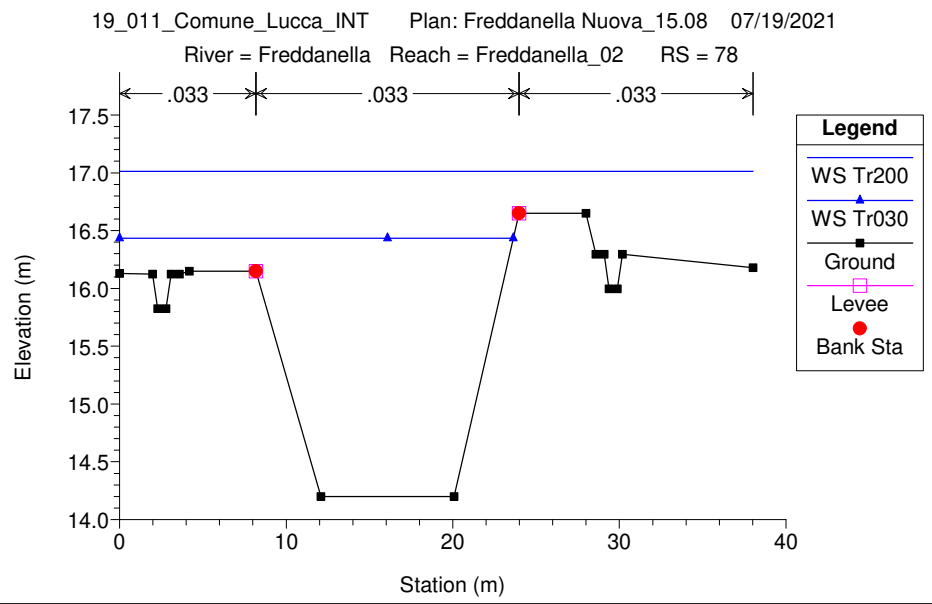
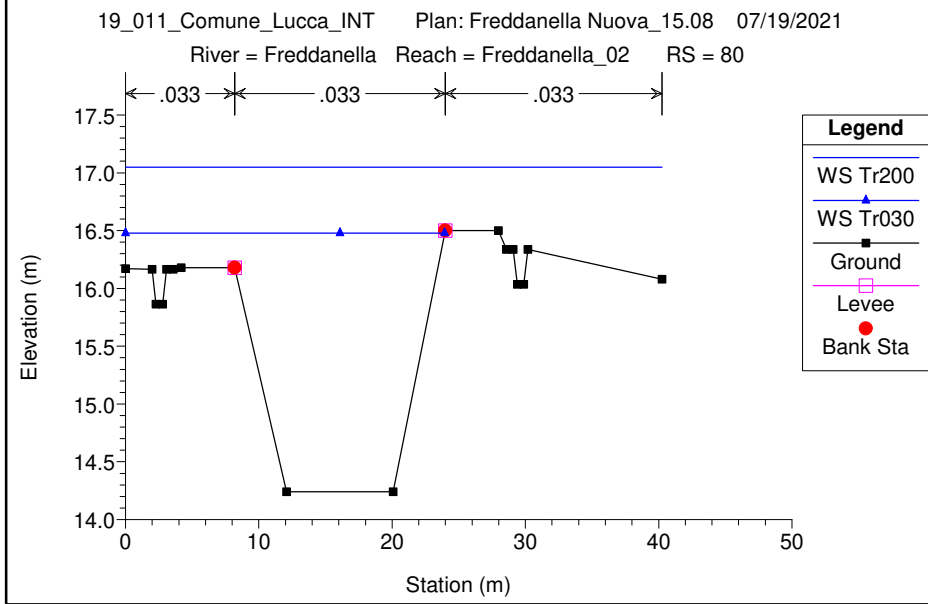
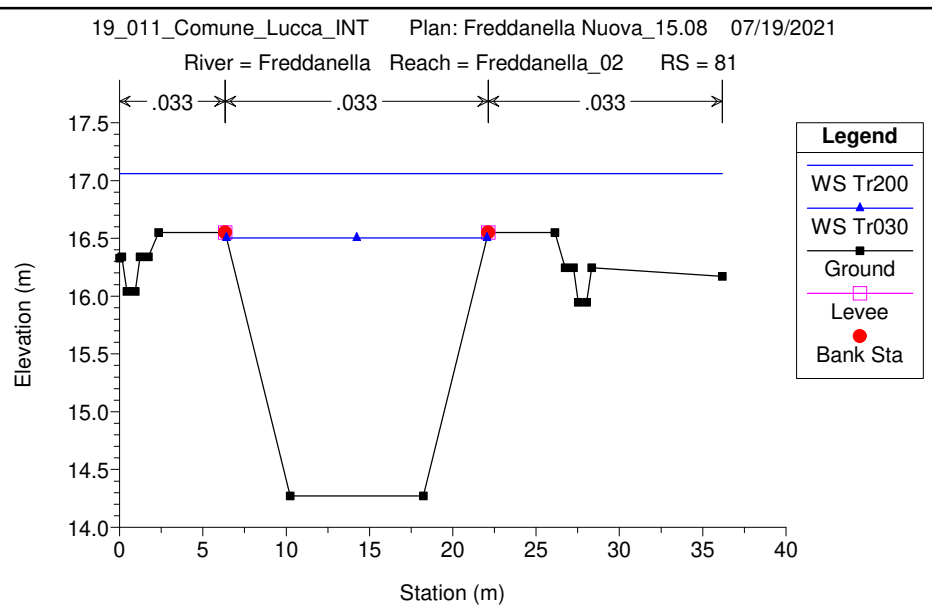
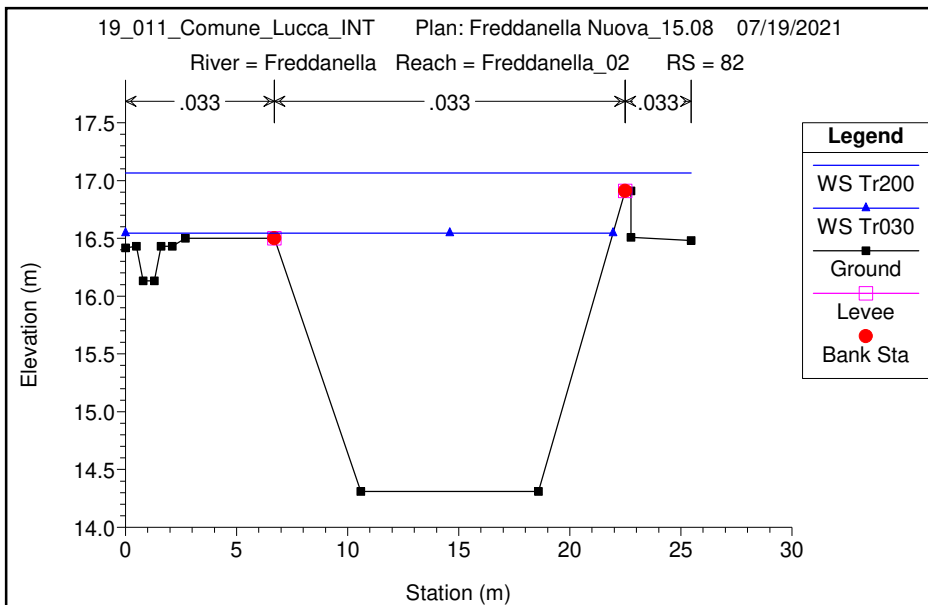


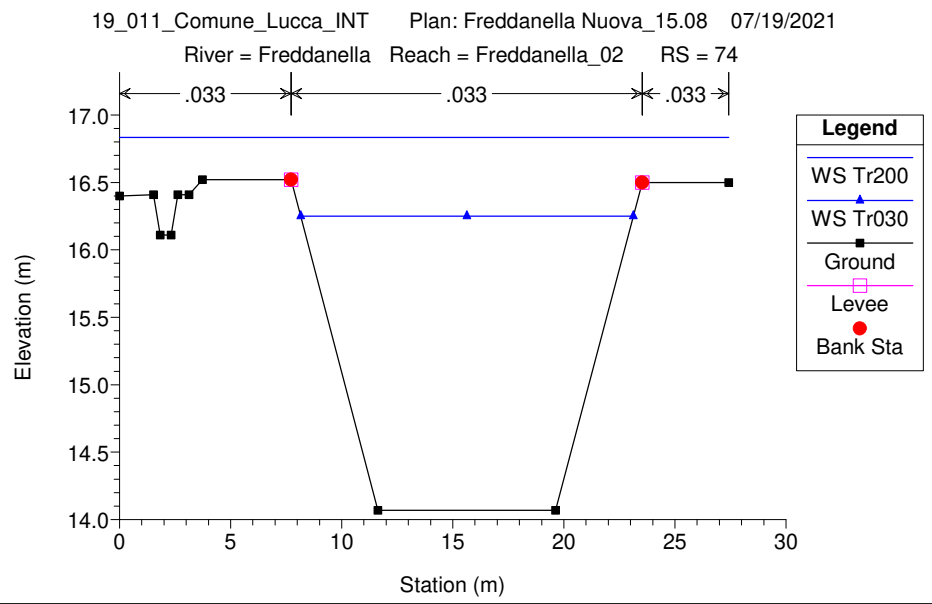
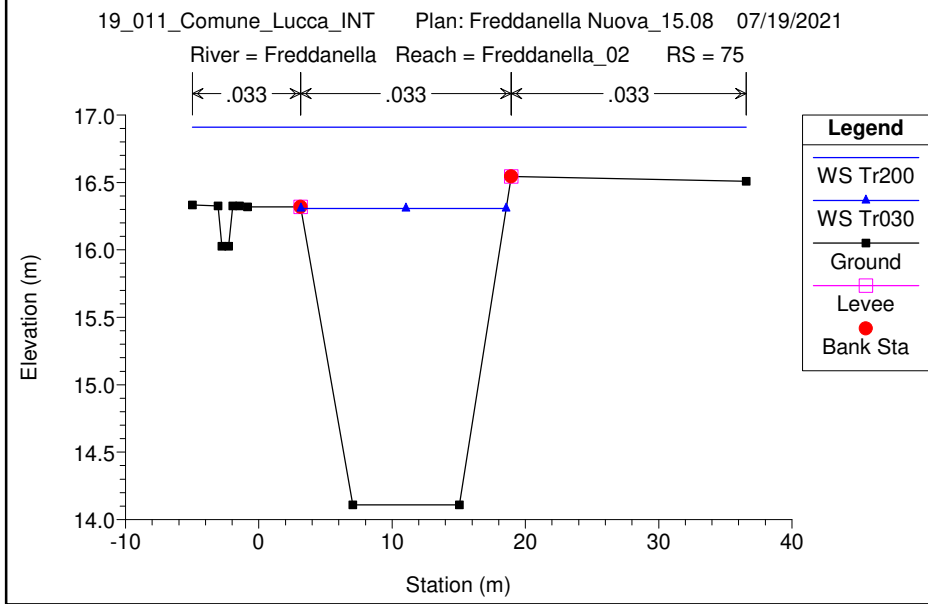
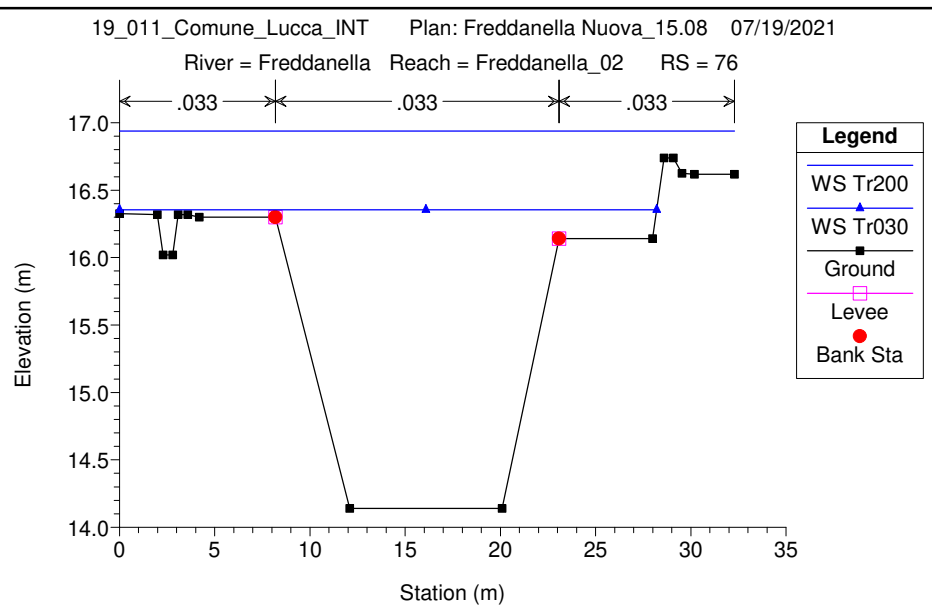
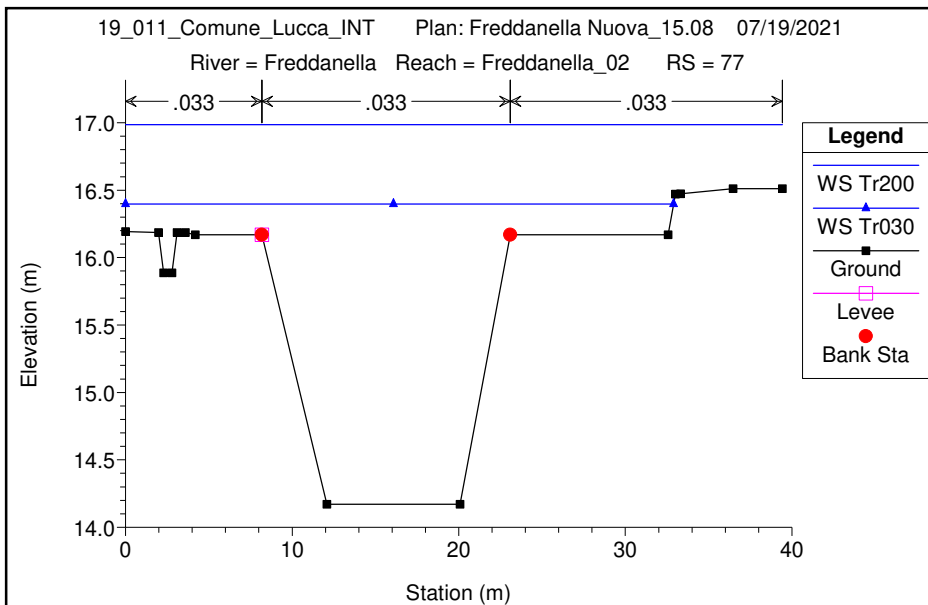




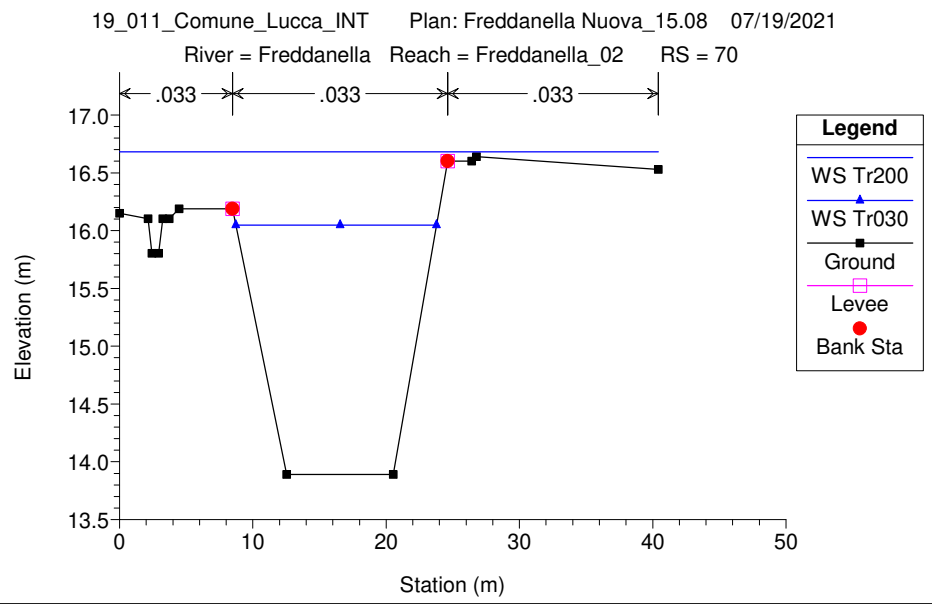
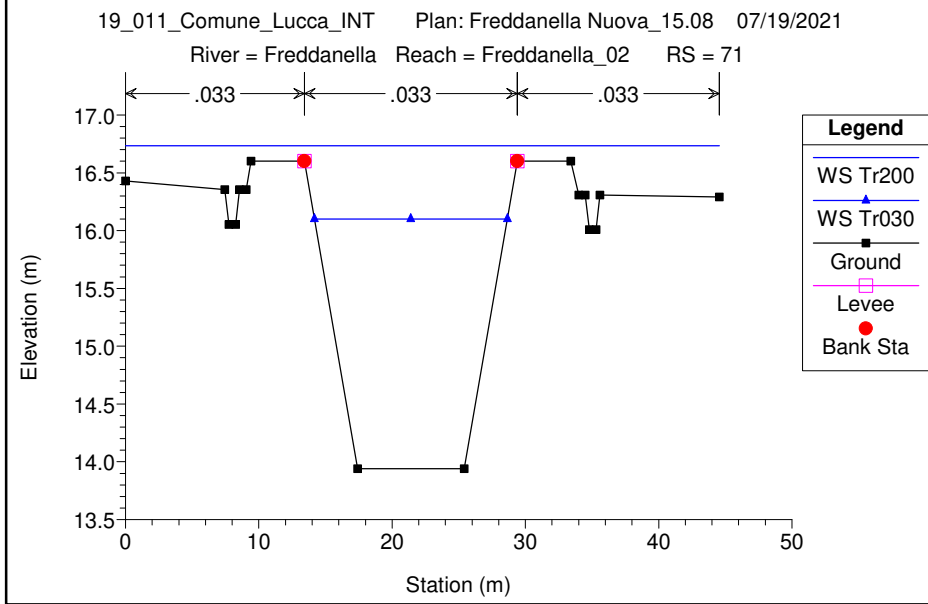
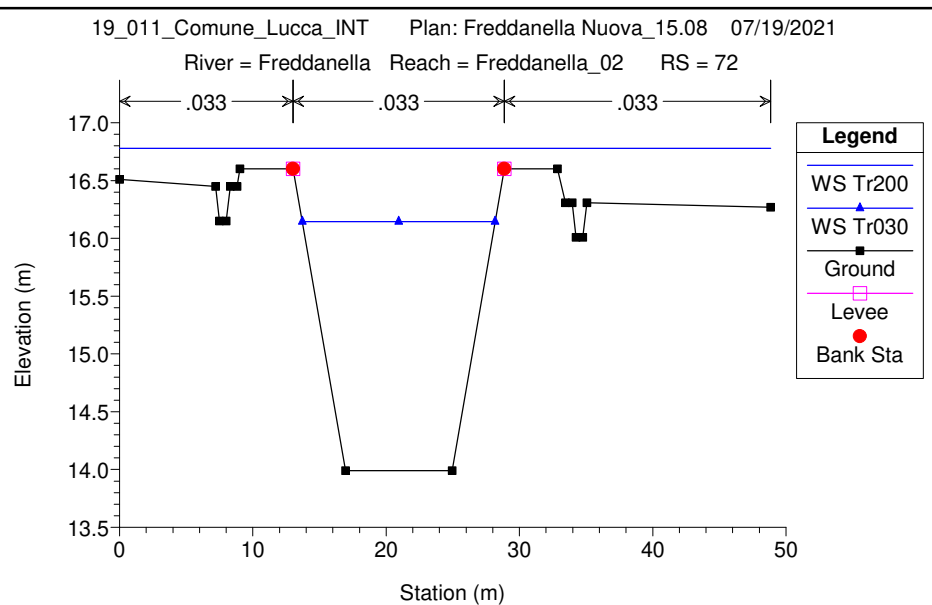
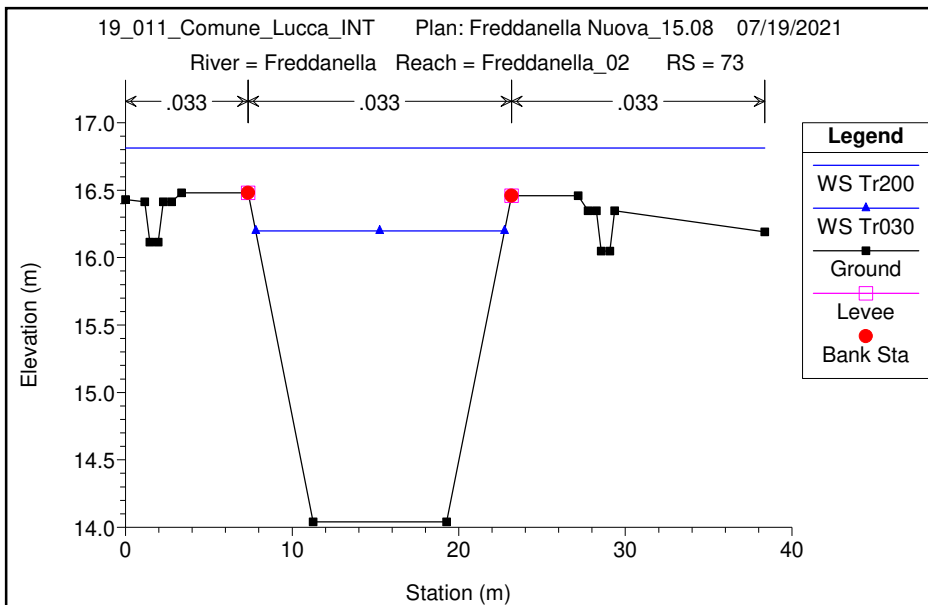


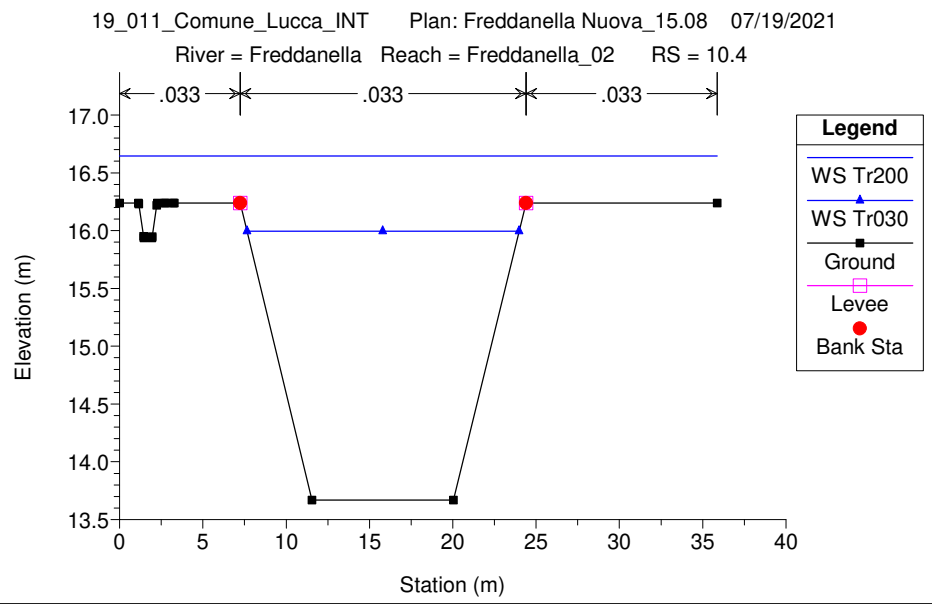
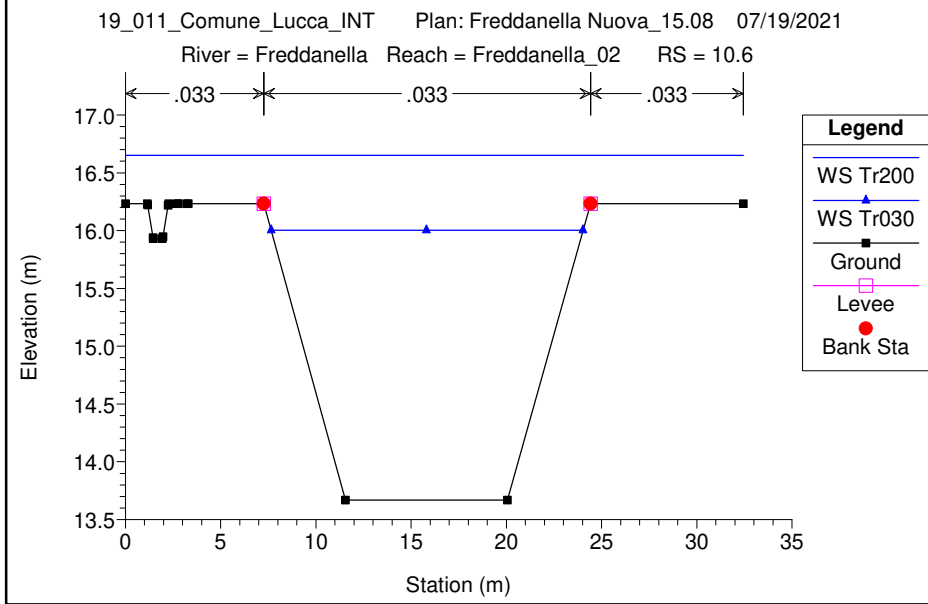
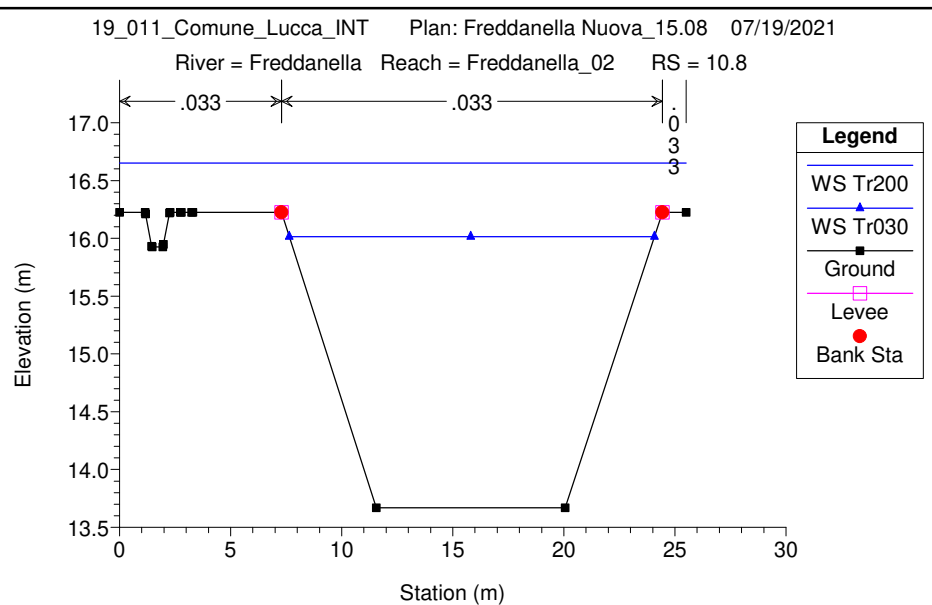
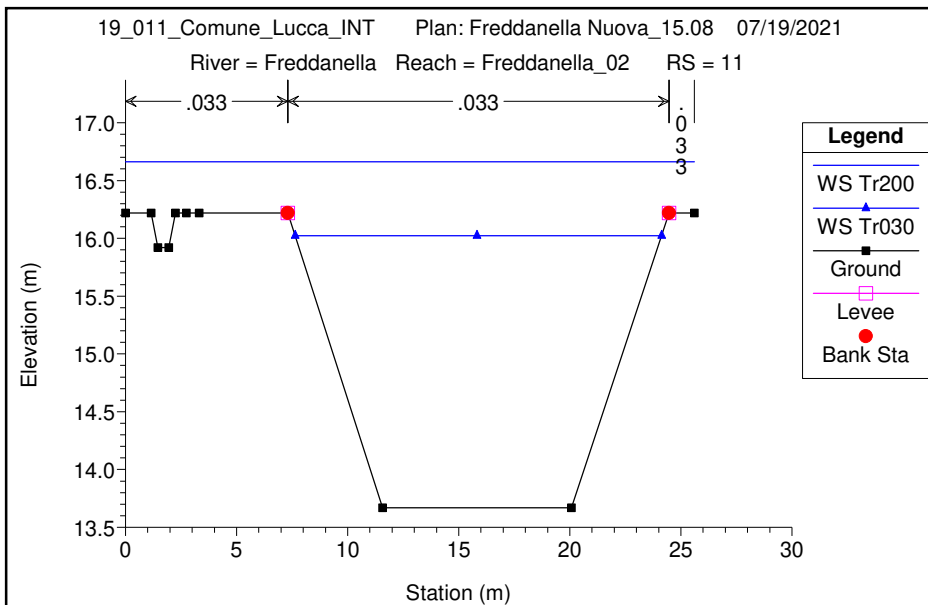


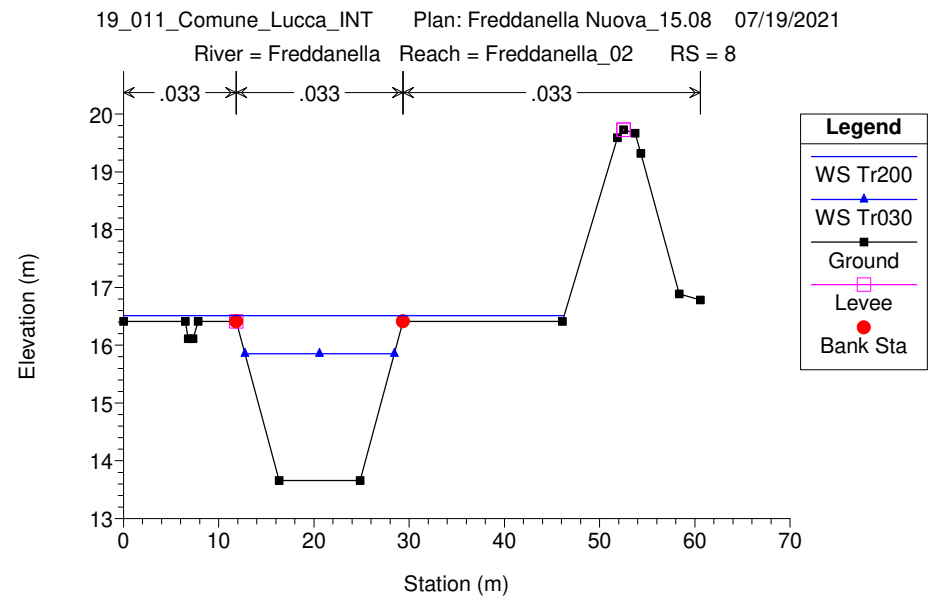
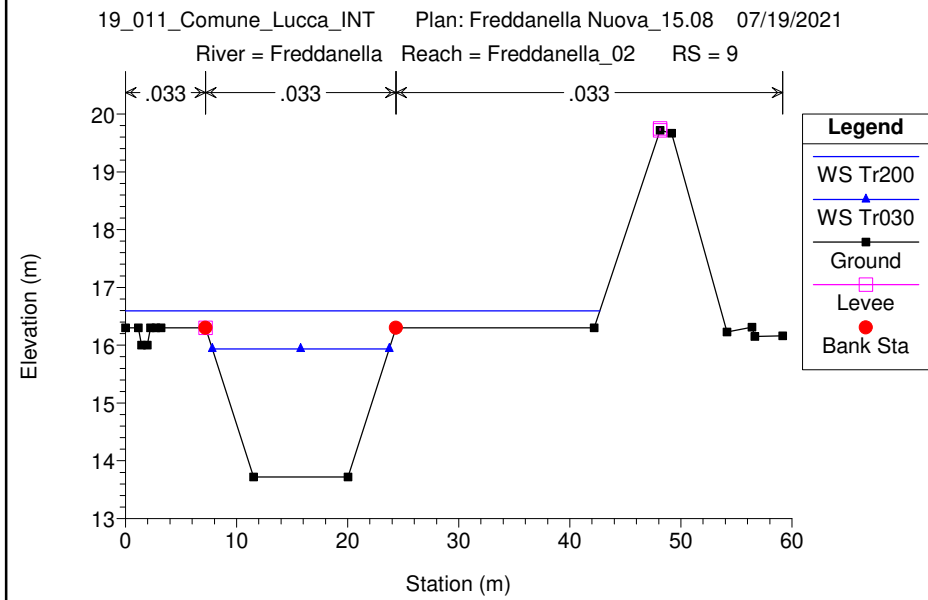
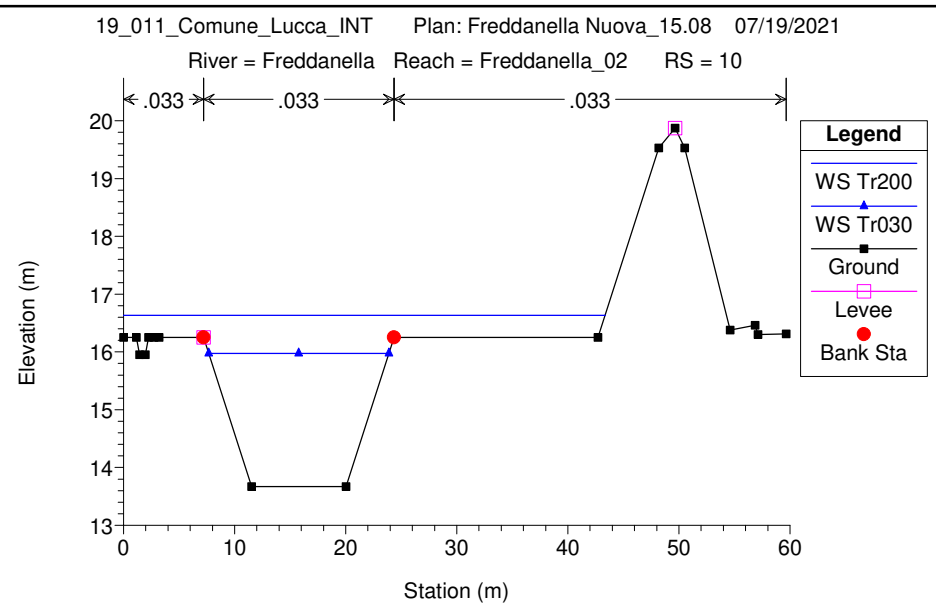
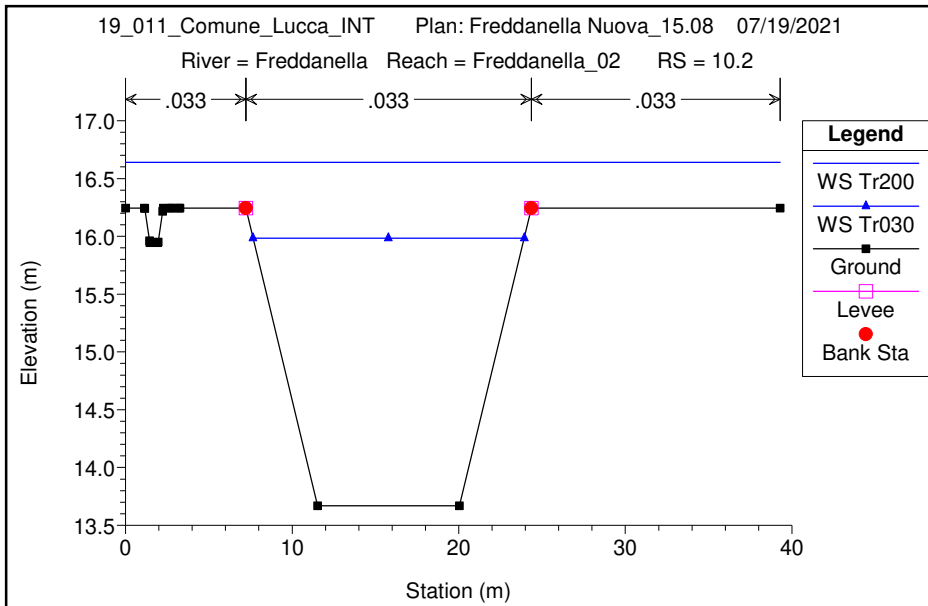


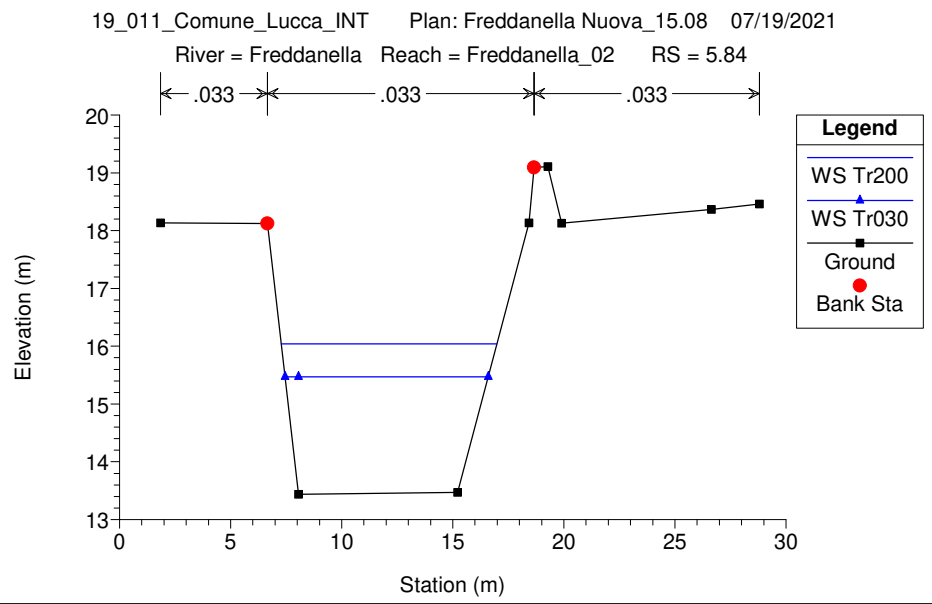
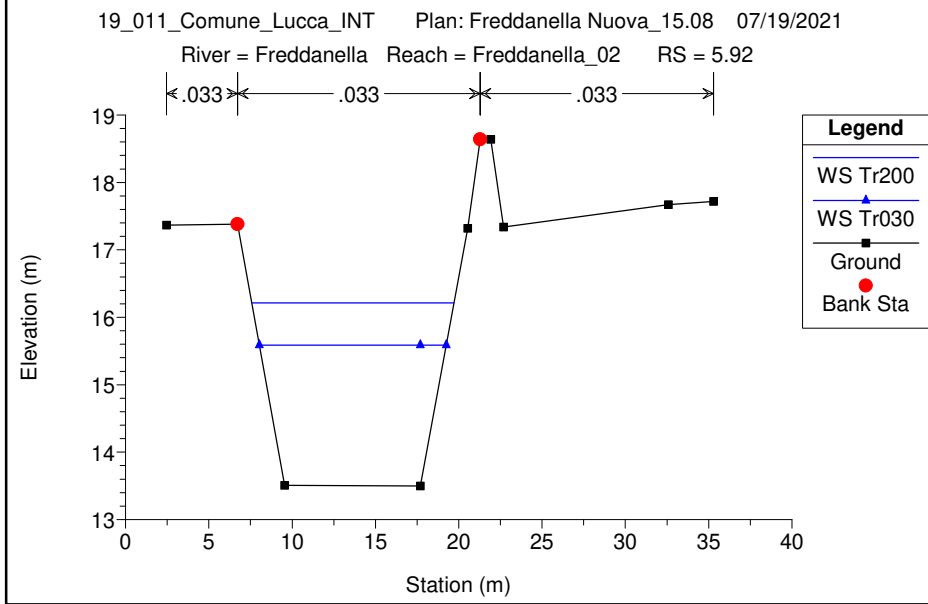
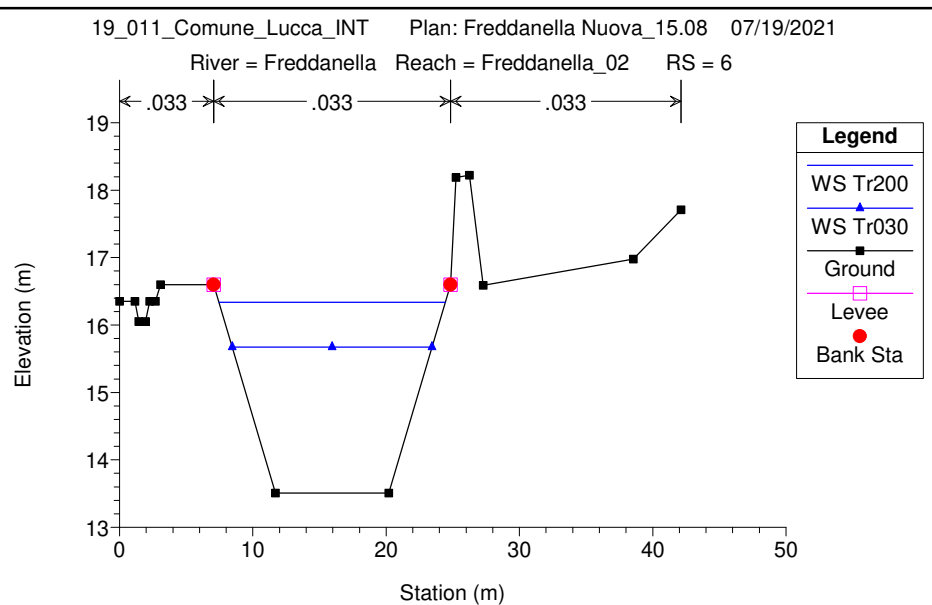
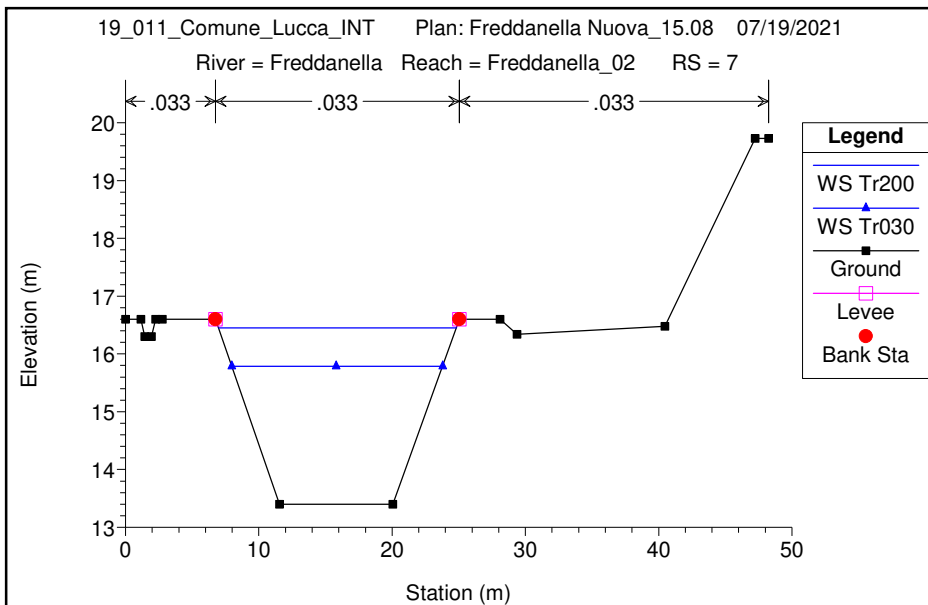


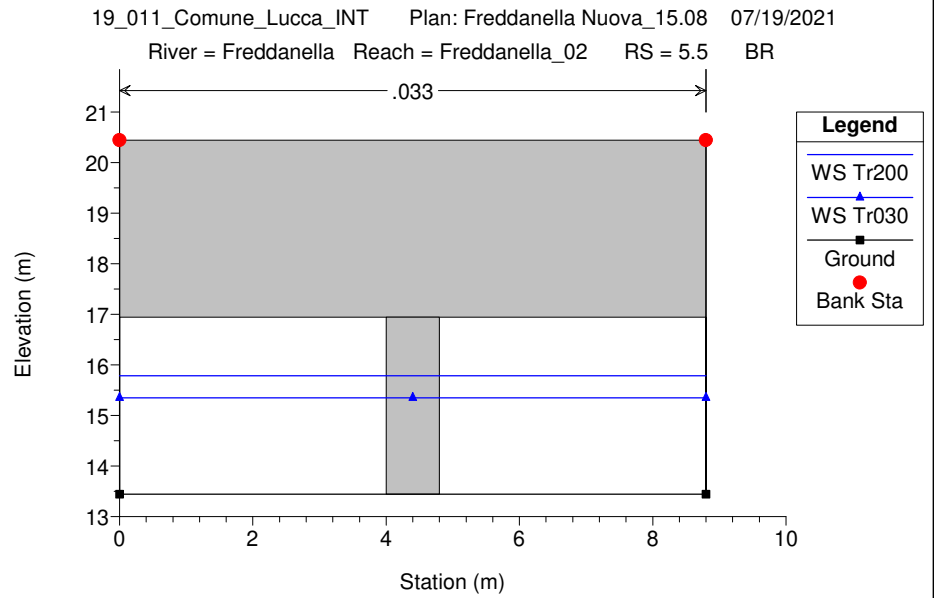
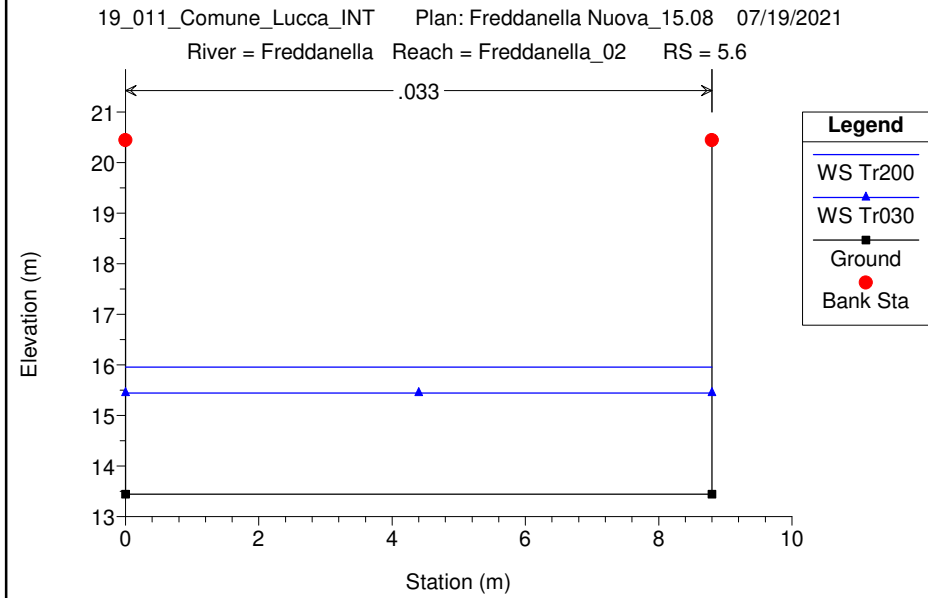
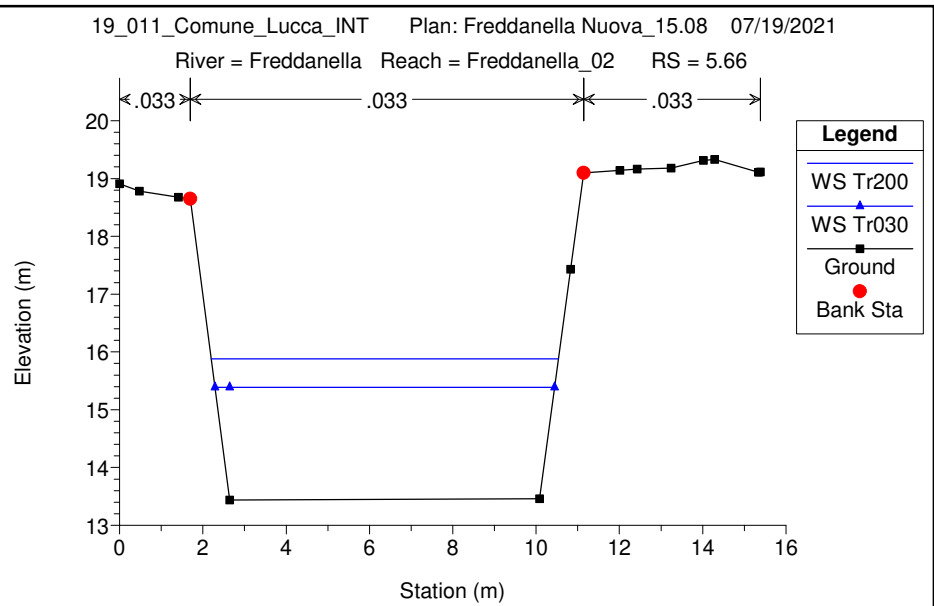
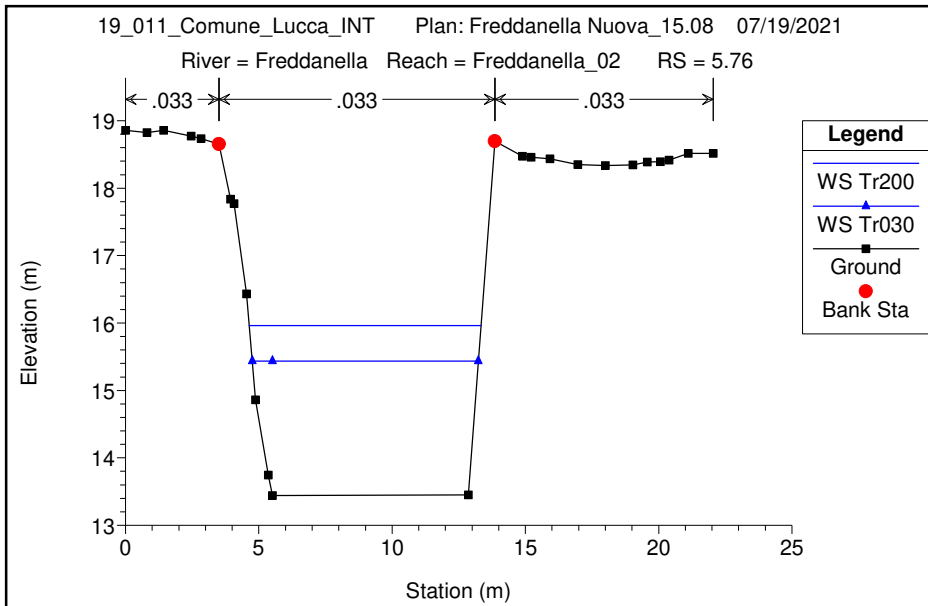


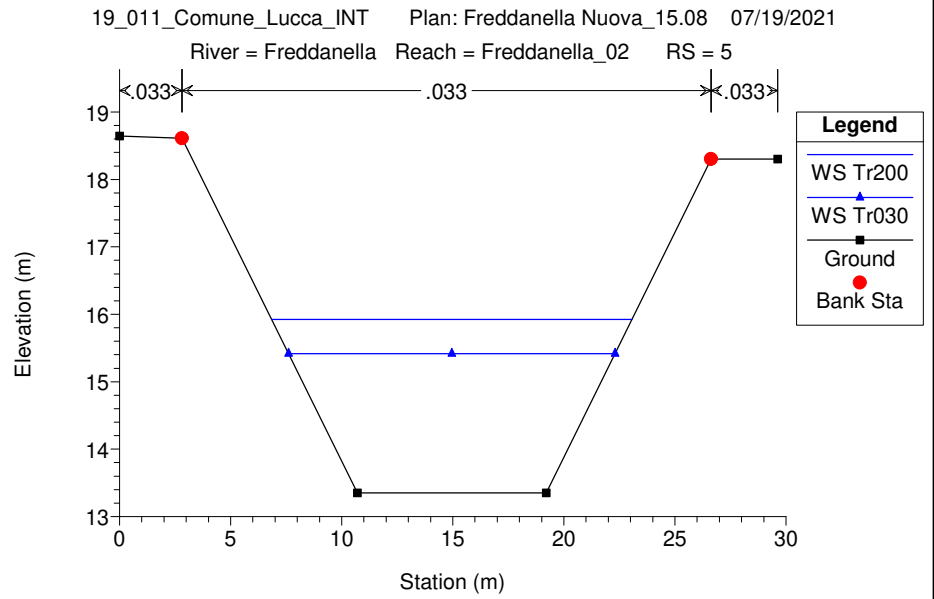
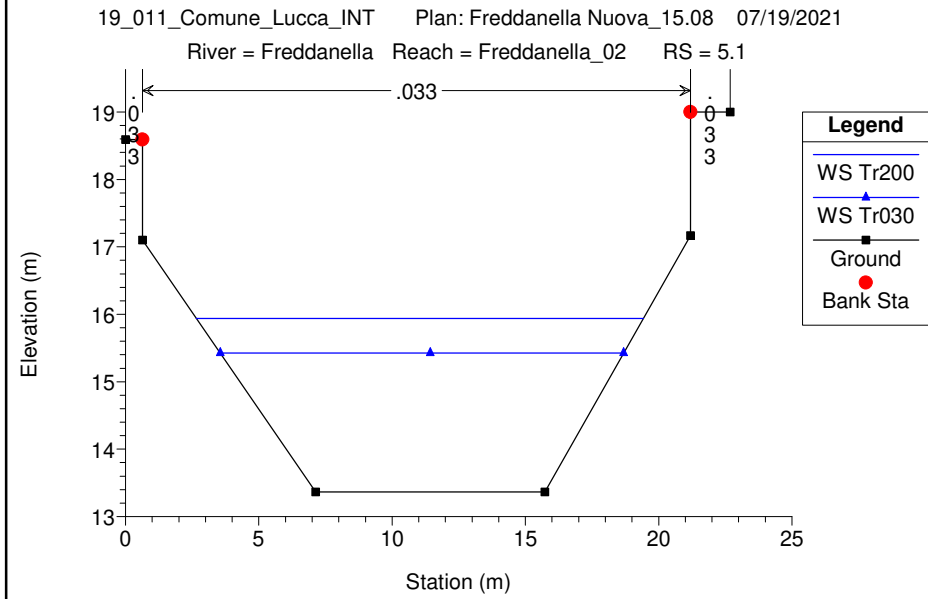
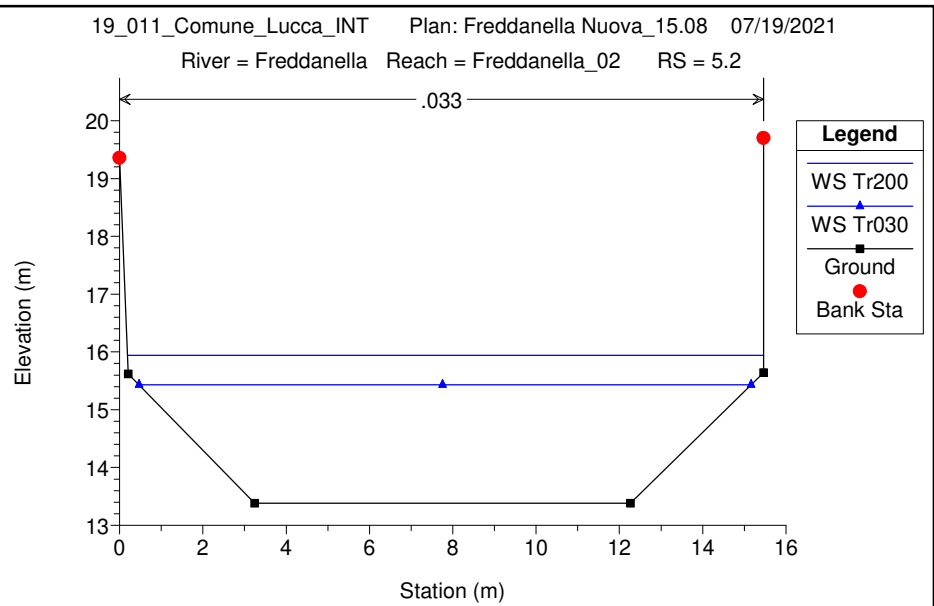
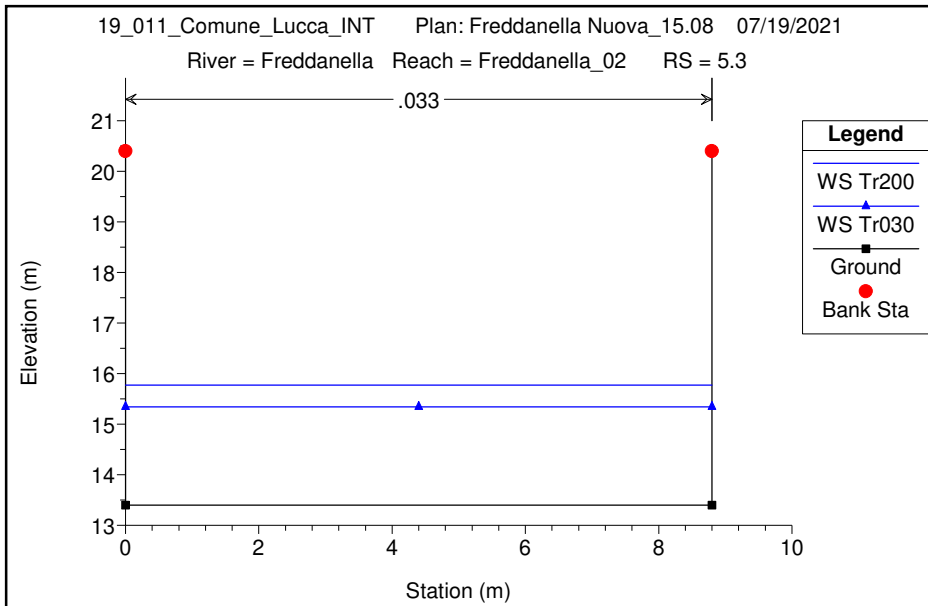


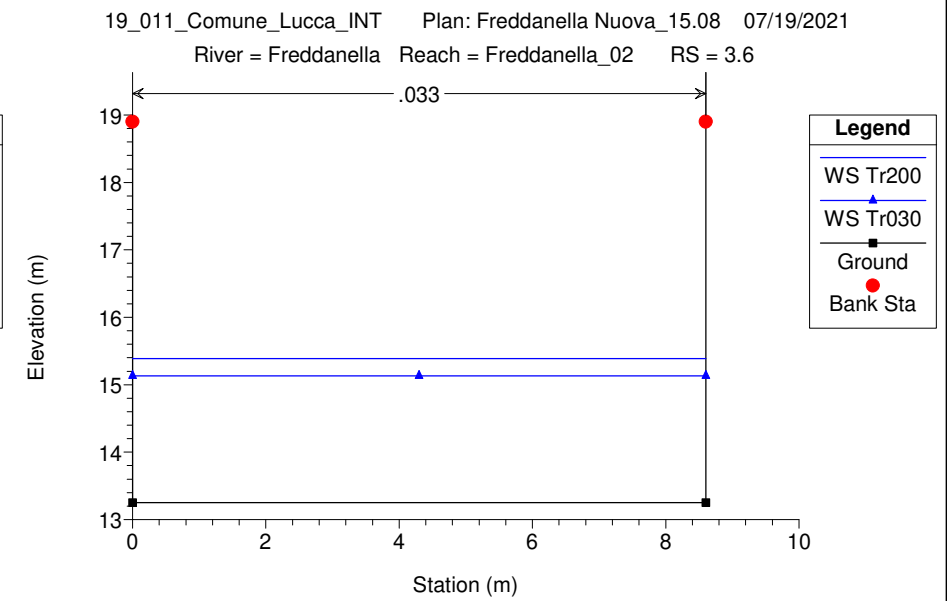
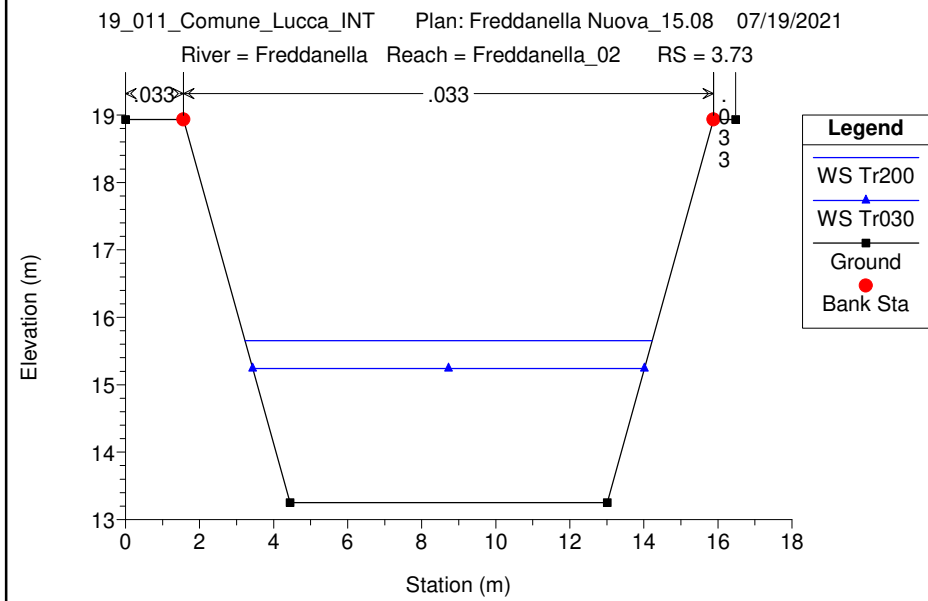
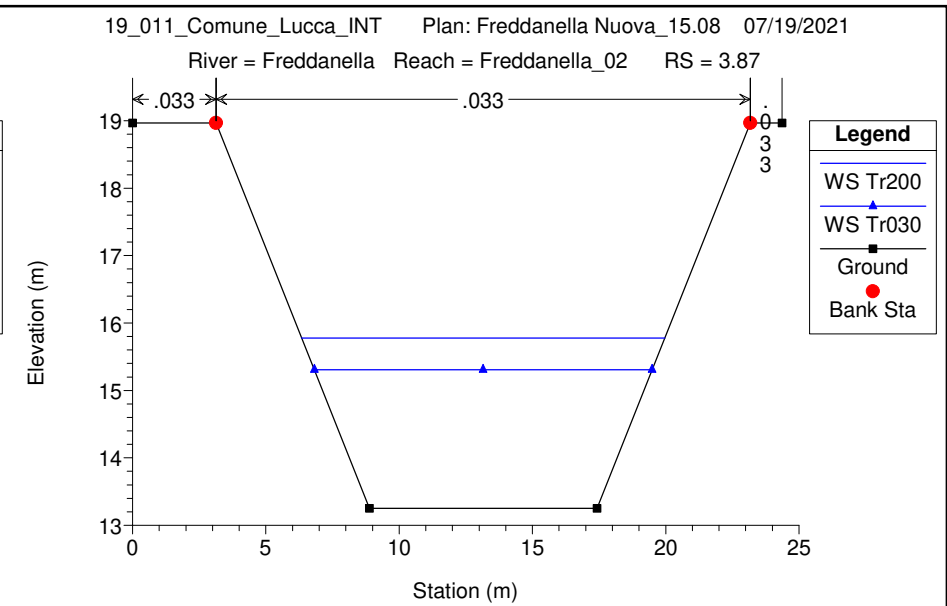
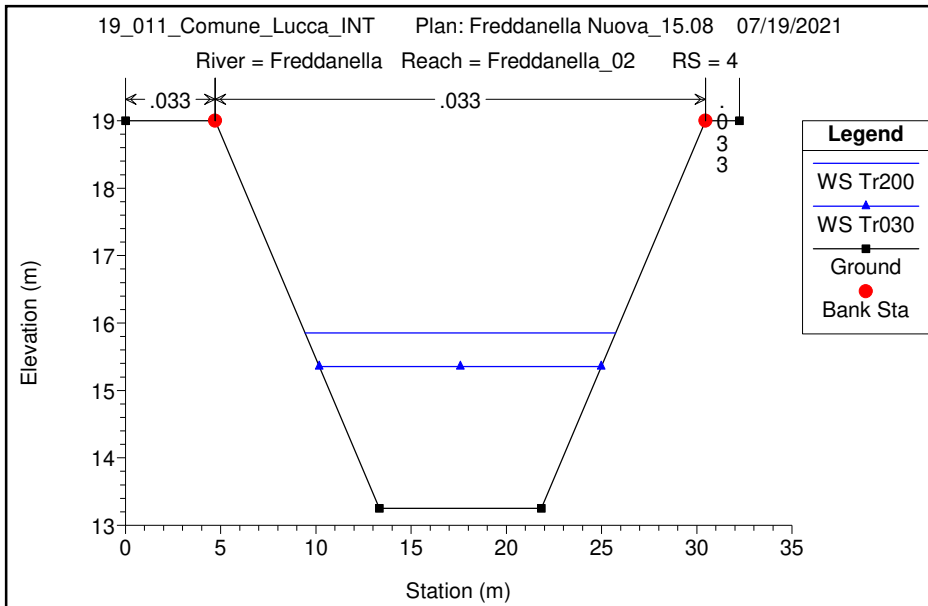


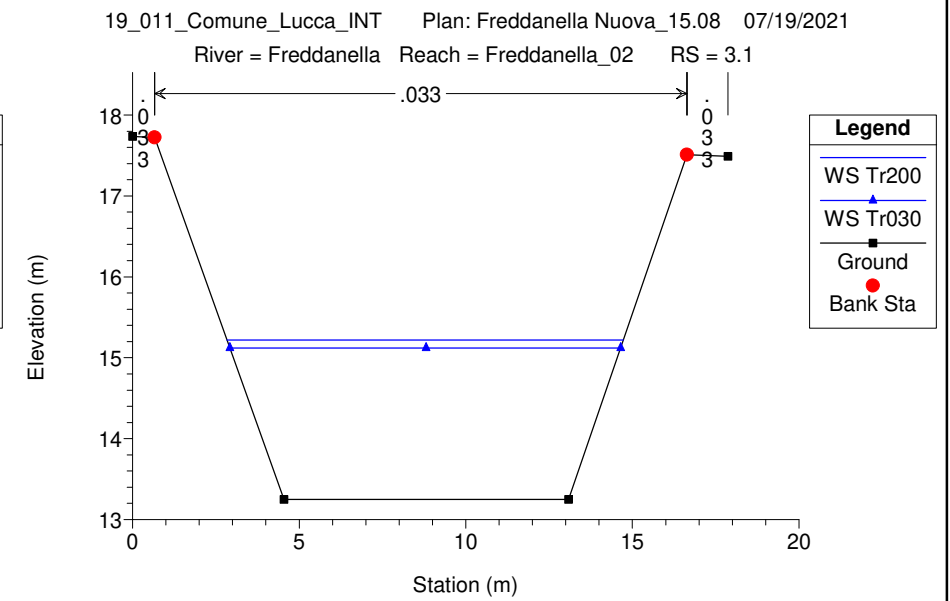
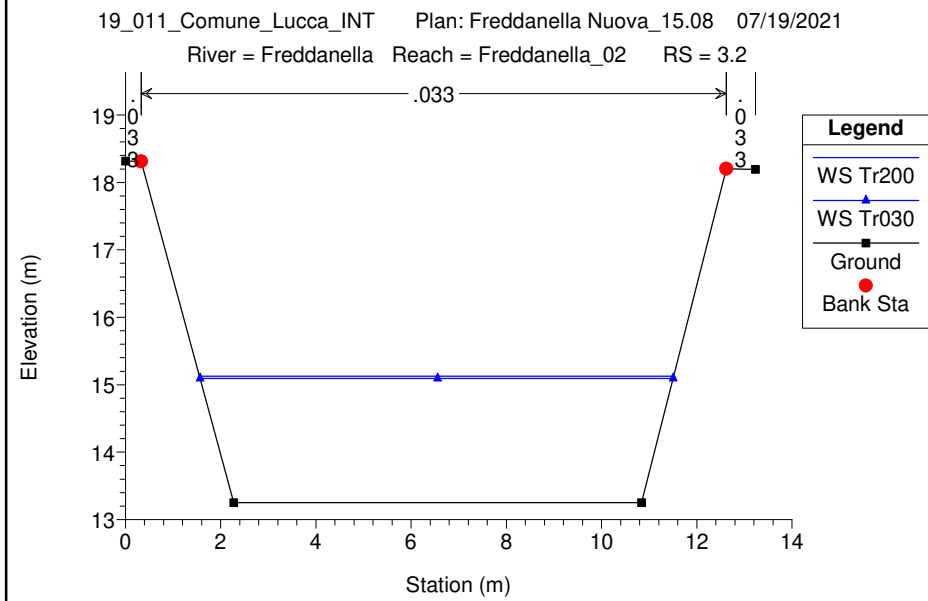
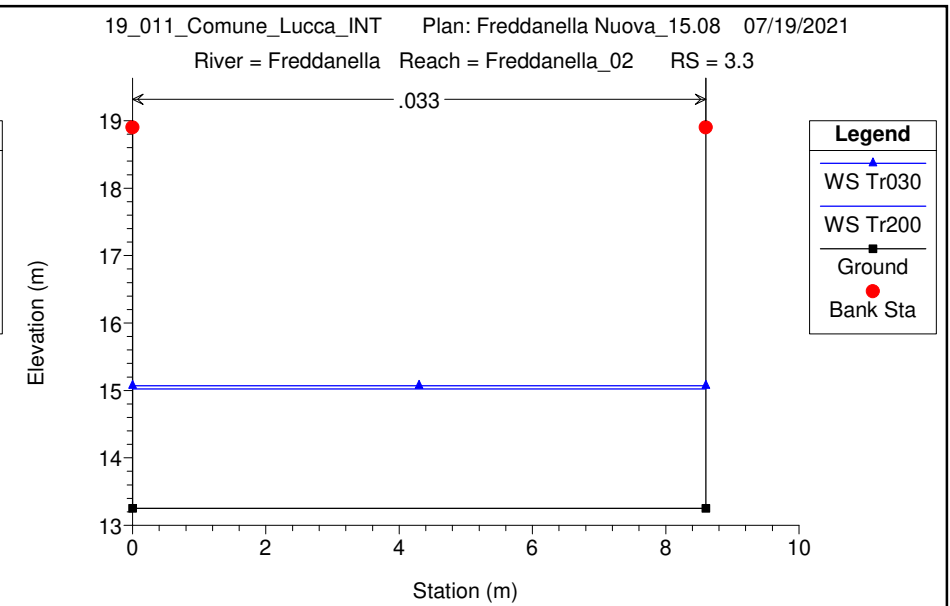
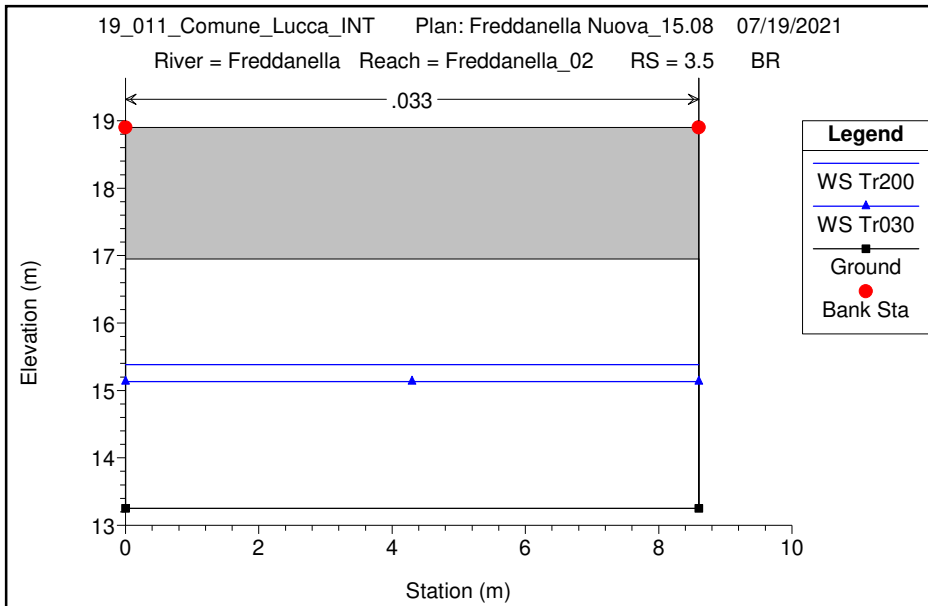




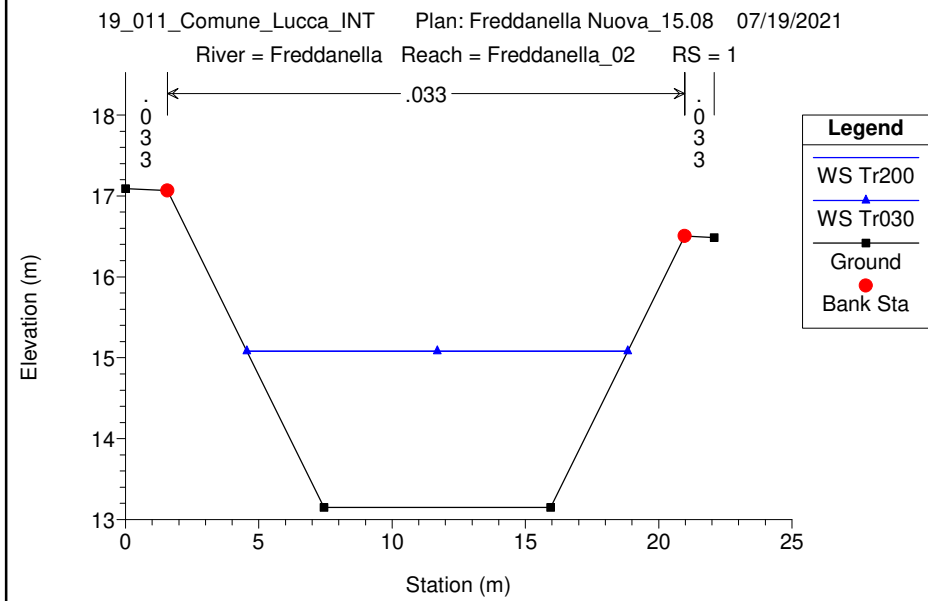
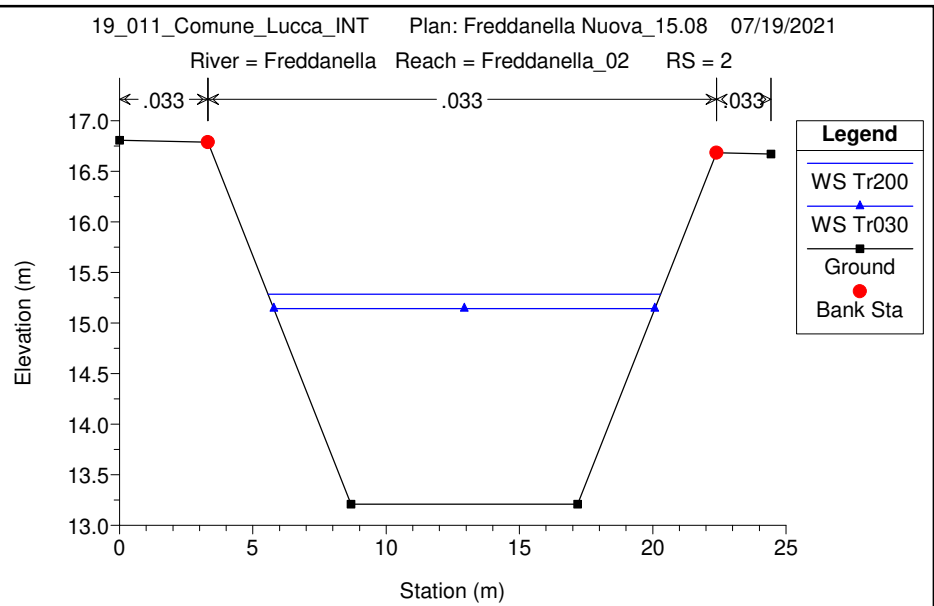
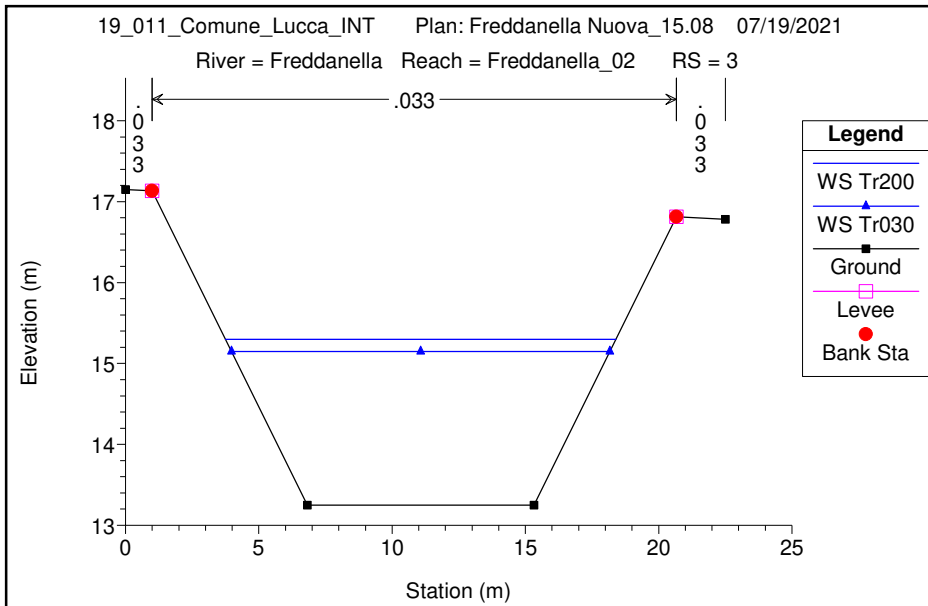














**OUTPUT IDRAULICI RELATIVI  
AL SISTEMA RIO FREDDANELLA S. ALESSIO  
“Freddannella Nuova”**



HEC-RAS Plan: FN\_15.08

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_01	157	Tr200	6.90	16.16	19.45	3.29	18.48	18.27	-0.97	-1.18	0.21	0.04	38.00
Freddanella_01	157	Tr030	4.70	16.16	18.85	2.69	18.48	18.27	-0.37	-0.58	0.29	0.07	38.00
Freddanella_01	156	Tr200	6.90	16.20	19.45	3.25	18.23	18.55	-1.22	-0.90	0.19	0.04	2.40
Freddanella_01	156	Tr030	4.70	16.20	18.84	2.64	18.23	18.55	-0.61	-0.29	0.25	0.06	2.40
Freddanella_01	155	Tr200	6.90	16.19	19.45	3.26	18.36	18.55	-1.09	-0.90	0.15	0.03	2.20
Freddanella_01	155	Tr030	4.70	16.19	18.84	2.65	18.36	18.55	-0.49	-0.29	0.16	0.04	2.20
Freddanella_01	154	Tr200	6.90	16.19	19.45	3.26	18.46	18.55	-0.99	-0.90	0.18	0.04	14.70
Freddanella_01	154	Tr030	4.70	16.19	18.84	2.65	18.46	18.55	-0.38	-0.29	0.25	0.07	14.70
Freddanella_01	153	Tr200	6.90	16.19	19.45	3.26	18.39	18.51	-1.06	-0.94	0.19	0.04	33.00
Freddanella_01	153	Tr030	4.70	16.19	18.84	2.65	18.39	18.51	-0.45	-0.33	0.26	0.07	33.00
Freddanella_01	152	Tr200	6.90	16.12	19.45	3.33	18.20	18.31	-1.25	-1.14	0.19	0.04	3.90
Freddanella_01	152	Tr030	4.70	16.12	18.84	2.72	18.20	18.31	-0.64	-0.53	0.24	0.06	3.90
Freddanella_01	151	Tr200	6.90	16.12	19.45	3.33	18.41	18.46	-1.04	-0.99	0.24	0.05	0.05
Freddanella_01	151	Tr030	4.70	16.12	18.84	2.72	18.41	18.46	-0.43	-0.38	0.28	0.07	0.05
Freddanella_01	150.5		Bridge										
Freddanella_01	150	Tr200	6.90	15.94	19.45	3.51	18.19	18.45	-1.26	-1.00	0.28	0.06	12.10
Freddanella_01	150	Tr030	4.70	15.94	18.84	2.90	18.19	18.45	-0.65	-0.39	0.30	0.07	12.10
Freddanella_01	149	Tr200	6.90	16.13	19.45	3.32	18.33	18.22	-1.12	-1.23	0.18	0.04	29.20
Freddanella_01	149	Tr030	4.70	16.13	18.84	2.71	18.33	18.22	-0.51	-0.62	0.22	0.05	29.20
Freddanella_01	148	Tr200	6.90	16.00	19.45	3.45	18.51	18.23	-0.94	-1.22	0.18	0.04	4.40
Freddanella_01	148	Tr030	4.70	16.00	18.84	2.84	18.51	18.23	-0.33	-0.61	0.22	0.05	4.40
Freddanella_01	147	Tr200	14.50	15.94	19.45	3.51	18.60	17.97	-0.85	-1.48	0.42	0.08	52.00
Freddanella_01	147	Tr030	9.70	15.94	18.83	2.89	18.60	17.97	-0.23	-0.86	0.50	0.12	52.00
Freddanella_01	146	Tr200	14.50	15.89	19.44	3.55	18.40	18.15	-1.04	-1.29	0.47	0.09	35.30
Freddanella_01	146	Tr030	9.70	15.89	18.82	2.93	18.40	18.15	-0.42	-0.67	0.55	0.13	35.30
Freddanella_01	145	Tr200	14.50	15.89	19.44	3.55	18.06	17.88	-1.38	-1.56	0.30	0.06	35.40
Freddanella_01	145	Tr030	9.70	15.89	18.82	2.93	18.06	17.88	-0.76	-0.94	0.34	0.08	35.40
Freddanella_01	144	Tr200	14.50	15.82	19.44	3.62	18.25	17.93	-1.19	-1.51	0.32	0.06	32.80

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_01	144	Tr030	9.70	15.82	18.82	3.00	18.25	17.93	-0.57	-0.89	0.34	0.08	32.80
Freddanella_01	143	Tr200	14.50	15.89	19.44	3.55	18.24	17.81	-1.20	-1.63	0.32	0.06	40.20
Freddanella_01	143	Tr030	9.70	15.89	18.81	2.92	18.24	17.81	-0.57	-1.00	0.34	0.08	40.20
Freddanella_01	142	Tr200	14.50	15.79	19.44	3.65	17.79	17.63	-1.65	-1.81	0.26	0.05	9.80
Freddanella_01	142	Tr030	9.70	15.79	18.81	3.02	17.79	17.63	-1.02	-1.18	0.26	0.06	9.80
Freddanella_01	141	Tr200	14.50	15.76	19.44	3.68	17.82	17.80	-1.62	-1.64	0.29	0.06	5.20
Freddanella_01	141	Tr030	9.70	15.76	18.81	3.05	17.82	17.80	-0.99	-1.01	0.29	0.07	5.20
Freddanella_01	140	Tr200	14.50	15.80	19.43	3.63	17.75	17.68	-1.68	-1.75	0.34	0.07	50.40
Freddanella_01	140	Tr030	9.70	15.80	18.81	3.01	17.75	17.68	-1.06	-1.13	0.35	0.08	50.40
Freddanella_01	139	Tr200	14.50	15.78	19.43	3.65	17.45	17.48	-1.98	-1.95	0.25	0.05	34.50
Freddanella_01	139	Tr030	9.70	15.78	18.81	3.03	17.45	17.48	-1.36	-1.33	0.23	0.05	34.50
Freddanella_01	138	Tr200	14.50	15.78	19.43	3.65	17.55	17.52	-1.88	-1.91	0.23	0.04	29.70
Freddanella_01	138	Tr030	9.70	15.78	18.81	3.03	17.55	17.52	-1.26	-1.29	0.22	0.05	29.70
Freddanella_01	137	Tr200	21.40	15.77	19.42	3.65	17.62	17.64	-1.80	-1.78	0.63	0.12	6.30
Freddanella_01	137	Tr030	14.20	15.77	18.79	3.02	17.62	17.64	-1.17	-1.15	0.59	0.13	6.30
Freddanella_01	136	Tr200	21.40	15.88	19.23	3.35	18.27	18.27	-0.96	-0.96	1.92	0.34	0.05
Freddanella_01	136	Tr030	14.20	15.88	18.68	2.79	18.27	18.27	-0.41	-0.41	1.54	0.30	0.05
Freddanella_01	134.5	Bridge											
Freddanella_01	133	Tr200	21.40	15.89	18.65	2.76	18.10	18.03	-0.55	-0.62	1.61	0.34	8.70
Freddanella_01	133	Tr030	14.20	15.89	18.31	2.42	18.10	18.03	-0.21	-0.28	1.42	0.32	8.70
Freddanella_01	131	Tr200	21.40	15.89	18.67	2.78	18.05	17.95	-0.62	-0.72	1.11	0.27	10.90
Freddanella_01	131	Tr030	14.20	15.89	18.32	2.43	18.05	17.95	-0.27	-0.37	1.08	0.29	10.90
Freddanella_01	130	Tr200	21.40	15.70	18.68	2.98	17.85	17.82	-0.83	-0.86	0.85	0.19	35.20
Freddanella_01	130	Tr030	14.20	15.70	18.34	2.64	17.85	17.82	-0.49	-0.52	0.75	0.18	35.20
Freddanella_01	129	Tr200	21.40	15.60	18.64	3.04	17.89	18.09	-0.75	-0.55	1.14	0.25	30.60
Freddanella_01	129	Tr030	14.20	15.60	18.28	2.68	17.89	18.09	-0.39	-0.19	1.07	0.26	30.60
Freddanella_01	128	Tr200	21.40	15.55	18.64	3.09	17.96	18.11	-0.68	-0.53	0.80	0.18	35.90
Freddanella_01	128	Tr030	14.20	15.55	18.29	2.74	17.96	18.11	-0.33	-0.18	0.77	0.20	35.90

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_01	127	Tr200	21.40	15.51	18.60	3.09	17.73	17.85	-0.87	-0.75	1.06	0.23	16.60
Freddanella_01	127	Tr030	14.20	15.51	18.26	2.75	17.73	17.85	-0.53	-0.41	0.93	0.22	16.60
Freddanella_01	126	Tr200	21.40	15.47	18.60	3.13	17.56	17.62	-1.04	-0.98	1.01	0.22	33.70
Freddanella_01	126	Tr030	14.20	15.47	18.25	2.78	17.56	17.62	-0.69	-0.63	0.89	0.21	33.70
Freddanella_01	125	Tr200	21.40	15.51	18.58	3.07	17.38	17.47	-1.20	-1.11	1.02	0.21	23.30
Freddanella_01	125	Tr030	14.20	15.51	18.24	2.73	17.38	17.47	-0.86	-0.77	0.88	0.20	23.30
Freddanella_01	124	Tr200	21.40	15.44	18.58	3.14	17.53	17.68	-1.05	-0.90	0.89	0.19	25.60
Freddanella_01	124	Tr030	14.20	15.44	18.23	2.79	17.53	17.68	-0.70	-0.55	0.79	0.19	25.60
Freddanella_01	123	Tr200	21.40	15.46	18.57	3.11	17.90	17.76	-0.67	-0.81	0.90	0.20	33.10
Freddanella_01	123	Tr030	14.20	15.46	18.21	2.75	17.90	17.76	-0.31	-0.45	0.87	0.21	33.10
Freddanella_01	122	Tr200	21.40	15.52	18.56	3.04	17.70	17.64	-0.86	-0.92	0.87	0.19	34.10
Freddanella_01	122	Tr030	14.20	15.52	18.20	2.68	17.70	17.64	-0.50	-0.56	0.81	0.19	34.10
Freddanella_01	121	Tr200	21.40	15.50	18.55	3.05	18.04	17.58	-0.51	-0.97	0.86	0.19	31.30
Freddanella_01	121	Tr030	14.20	15.50	18.19	2.69	18.04	17.58	-0.15	-0.61	0.83	0.20	31.30
Freddanella_01	120	Tr200	21.40	15.47	18.51	3.04	17.97	17.84	-0.54	-0.67	1.10	0.26	37.00
Freddanella_01	120	Tr030	14.20	15.47	18.13	2.66	17.97	17.84	-0.16	-0.29	1.15	0.30	37.00
Freddanella_01	119	Tr200	21.40	15.44	18.50	3.06	17.65	17.91	-0.85	-0.59	0.93	0.21	35.40
Freddanella_01	119	Tr030	14.20	15.44	18.10	2.66	17.65	17.91	-0.45	-0.19	1.05	0.26	35.40
Freddanella_01	118	Tr200	21.40	15.43	18.46	3.03	17.89	17.83	-0.57	-0.63	1.06	0.24	30.10
Freddanella_01	118	Tr030	14.20	15.43	18.06	2.63	17.89	17.83	-0.17	-0.23	1.10	0.28	30.10
Freddanella_01	117	Tr200	21.40	15.39	18.44	3.05	17.60	17.82	-0.84	-0.62	1.09	0.24	46.50
Freddanella_01	117	Tr030	14.20	15.39	18.04	2.65	17.60	17.82	-0.44	-0.22	1.08	0.27	46.50
Freddanella_01	116	Tr200	21.40	15.39	18.42	3.03	17.67	17.70	-0.75	-0.72	1.01	0.22	17.40
Freddanella_01	116	Tr030	14.20	15.39	18.01	2.62	17.67	17.70	-0.34	-0.31	1.01	0.25	17.40
Freddanella_01	115	Tr200	21.40	15.39	18.42	3.03	17.82	17.57	-0.60	-0.85	0.82	0.20	31.70
Freddanella_01	115	Tr030	14.20	15.39	18.00	2.61	17.82	17.57	-0.18	-0.43	0.95	0.26	31.70
Freddanella_01	114	Tr200	21.40	15.34	18.41	3.07	17.84	17.55	-0.57	-0.86	0.83	0.18	35.80
Freddanella_01	114	Tr030	14.20	15.34	17.98	2.64	17.84	17.55	-0.14	-0.43	0.94	0.23	35.80

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_01	113	Tr200	21.40	15.34	18.39	3.05	17.84	17.55	-0.55	-0.84	0.84	0.18	35.60
Freddanella_01	113	Tr030	14.20	15.34	17.95	2.61	17.84	17.55	-0.11	-0.40	0.96	0.24	35.60
Freddanella_01	112	Tr200	21.40	15.26	18.38	3.12	17.58	17.43	-0.80	-0.95	0.84	0.18	32.50
Freddanella_01	112	Tr030	14.20	15.26	17.94	2.68	17.58	17.43	-0.36	-0.51	0.86	0.20	32.50
Freddanella_01	111	Tr200	21.40	15.23	18.36	3.13	17.59	17.36	-0.77	-1.00	0.89	0.20	2.70
Freddanella_01	111	Tr030	14.20	15.23	17.93	2.70	17.59	17.36	-0.34	-0.57	0.84	0.20	2.70
Freddanella_01	110	Tr200	21.40	15.22	18.36	3.14	17.30	17.32	-1.06	-1.04	0.84	0.20	0.10
Freddanella_01	110	Tr030	14.20	15.22	17.93	2.71	17.30	17.32	-0.63	-0.61	0.74	0.20	0.10
Freddanella_01	109.8	Bridge											
Freddanella_01	109.5	Tr200	21.40	15.22	18.33	3.11	17.21	17.17	-1.12	-1.16	1.00	0.20	1.50
Freddanella_01	109.5	Tr030	14.20	15.22	17.91	2.69	17.21	17.17	-0.70	-0.74	0.87	0.19	1.50
Freddanella_01	109	Tr200	21.40	15.18	18.35	3.17	17.40	17.12	-0.95	-1.23	0.72	0.15	1.50
Freddanella_01	109	Tr030	14.20	15.18	17.92	2.74	17.40	17.12	-0.52	-0.80	0.67	0.16	1.50
Freddanella_01	108	Tr200	21.40	15.20	18.34	3.14	17.63	17.40	-0.71	-0.94	0.81	0.18	24.30
Freddanella_01	108	Tr030	14.20	15.20	17.90	2.70	17.63	17.40	-0.28	-0.50	0.77	0.20	24.30
Freddanella_01	107	Tr200	21.40	15.18	18.33	3.15	17.68	17.55	-0.65	-0.78	0.85	0.20	25.90
Freddanella_01	107	Tr030	14.20	15.18	17.88	2.70	17.68	17.55	-0.20	-0.33	0.87	0.24	25.90
Freddanella_01	106	Tr200	21.40	15.07	18.32	3.25	17.52	17.15	-0.80	-1.17	0.84	0.19	7.70
Freddanella_01	106	Tr030	14.20	15.07	17.87	2.80	17.52	17.15	-0.35	-0.72	0.84	0.21	7.70
Freddanella_02	105	Tr200	39.70	15.04	18.28	3.24	17.44	17.50	-0.84	-0.78	1.28	0.28	50.50
Freddanella_02	105	Tr030	26.20	15.04	17.79	2.75	17.44	17.50	-0.35	-0.29	1.47	0.36	50.50
Freddanella_02	104	Tr200	39.70	14.96	18.25	3.29	17.18	17.38	-1.07	-0.87	1.18	0.26	37.50
Freddanella_02	104	Tr030	26.20	14.96	17.74	2.78	17.18	17.38	-0.56	-0.36	1.32	0.33	37.50
Freddanella_02	103	Tr200	39.70	14.92	18.21	3.29	17.43	17.19	-0.78	-1.02	1.28	0.28	28.70
Freddanella_02	103	Tr030	26.20	14.92	17.66	2.74	17.43	17.19	-0.23	-0.47	1.52	0.38	28.70
Freddanella_02	102	Tr200	39.70	15.07	18.15	3.08	17.41	17.29	-0.74	-0.86	1.49	0.33	26.20
Freddanella_02	102	Tr030	26.20	15.07	17.57	2.50	17.41	17.29	-0.16	-0.28	1.69	0.44	26.20



HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_02	101	Tr200	39.70	14.97	18.03	3.06	17.39	17.14	-0.64	-0.89	1.95	0.42	2.60
Freddanella_02	101	Tr030	26.20	14.97	17.40	2.43	17.39	17.14	-0.01	-0.26	2.11	0.54	2.60
Freddanella_02	100	Tr200	39.70	14.88	18.04	3.16	17.58	17.60	-0.46	-0.44	1.74	0.35	0.10
Freddanella_02	100	Tr030	26.20	14.88	17.46	2.58	17.58	17.60	0.12	0.14	1.64	0.33	0.10
Freddanella_02	99.5	Bridge											
Freddanella_02	99	Tr200	39.70	14.87	17.79	2.92	17.58	17.54	-0.21	-0.25	2.18	0.41	8.30
Freddanella_02	99	Tr030	26.20	14.87	17.42	2.55	17.58	17.54	0.16	0.12	1.65	0.33	8.30
Freddanella_02	98	Tr200	39.70	14.90	17.79	2.89	17.15	17.25	-0.64	-0.54	2.11	0.48	10.40
Freddanella_02	98	Tr030	26.20	14.90	17.35	2.45	17.15	17.25	-0.20	-0.10	1.95	0.51	10.40
Freddanella_02	97	Tr200	39.70	14.79	17.84	3.05	17.01	17.05	-0.83	-0.79	1.64	0.36	24.10
Freddanella_02	97	Tr030	26.20	14.79	17.37	2.58	17.01	17.05	-0.36	-0.32	1.67	0.42	24.10
Freddanella_02	96	Tr200	39.70	14.82	17.85	3.03	16.97	17.03	-0.88	-0.82	1.33	0.30	34.40
Freddanella_02	96	Tr030	26.20	14.82	17.30	2.48	16.97	17.03	-0.33	-0.27	1.74	0.46	34.40
Freddanella_02	95	Tr200	39.70	14.66	17.11	2.45	17.31	17.11	0.20	0.00	3.62	1.00	29.20
Freddanella_02	95	Tr030	26.20	14.66	16.76	2.10	17.31	17.11	0.55	0.35	3.13	0.89	29.20
Freddanella_02	94	Tr200	39.70	14.75	17.43	2.68	17.10	17.05	-0.33	-0.38	1.28	0.29	37.60
Freddanella_02	94	Tr030	26.20	14.75	16.99	2.24	17.10	17.05	0.11	0.06	1.20	0.30	37.60
Freddanella_02	93	Tr200	39.70	14.72	17.40	2.68	17.10	16.96	-0.30	-0.44	1.25	0.28	28.80
Freddanella_02	93	Tr030	26.20	14.72	16.96	2.24	17.10	16.96	0.14	0.01	1.20	0.30	28.80
Freddanella_02	92.6	Tr200	39.70	14.69	17.37	2.68	17.00	16.85	-0.37	-0.52	1.31	0.29	0.05
Freddanella_02	92.6	Tr030	26.20	14.69	16.93	2.24	17.00	16.85	0.07	-0.08	1.18	0.30	0.05
Freddanella_02	92.5	Bridge											
Freddanella_02	92.3	Tr200	39.70	14.69	17.37	2.68	17.05	16.93	-0.32	-0.44	1.25	0.28	10.90
Freddanella_02	92.3	Tr030	26.20	14.69	16.93	2.24	17.05	16.93	0.12	0.01	1.20	0.30	10.90
Freddanella_02	92	Tr200	39.70	14.68	17.37	2.69	17.10	16.74	-0.27	-0.63	1.18	0.26	44.00
Freddanella_02	92	Tr030	26.20	14.68	16.92	2.24	17.10	16.74	0.18	-0.18	1.14	0.28	44.00
Freddanella_02	91	Tr200	39.70	14.63	17.35	2.72	16.78	16.78	-0.57	-0.57	1.15	0.25	40.80
Freddanella_02	91	Tr030	26.20	14.63	16.89	2.26	16.78	16.78	-0.11	-0.11	1.12	0.28	40.80

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_02	90	Tr200	39.70	14.59	17.33	2.74	16.85	16.62	-0.48	-0.71	1.09	0.24	44.30
Freddanella_02	90	Tr030	26.20	14.59	16.86	2.27	16.85	16.62	-0.01	-0.24	1.08	0.27	44.30
Freddanella_02	89	Tr200	39.70	14.55	17.32	2.77	16.56	16.56	-0.76	-0.76	1.01	0.22	41.10
Freddanella_02	89	Tr030	26.20	14.55	16.84	2.29	16.56	16.56	-0.28	-0.28	0.99	0.24	41.10
Freddanella_02	88	Tr200	39.70	14.51	17.30	2.79	16.55	16.55	-0.75	-0.75	0.99	0.21	36.90
Freddanella_02	88	Tr030	26.20	14.51	16.82	2.31	16.55	16.55	-0.27	-0.27	0.98	0.24	36.90
Freddanella_02	87	Tr200	39.70	14.47	17.29	2.82	16.45	16.45	-0.84	-0.84	0.92	0.20	41.70
Freddanella_02	87	Tr030	26.20	14.47	16.81	2.34	16.45	16.45	-0.36	-0.36	0.91	0.22	41.70
Freddanella_02	86	Tr200	39.70	14.43	17.26	2.83	16.70	16.70	-0.56	-0.56	1.06	0.23	4.35
Freddanella_02	86	Tr030	26.20	14.43	16.76	2.33	16.70	16.70	-0.06	-0.06	1.09	0.27	4.35
Freddanella_02	85	Tr200	59.40	14.42	17.21	2.79	16.50	17.02	-0.71	-0.19	1.50	0.33	46.00
Freddanella_02	85	Tr030	38.20	14.42	16.67	2.25	16.50	17.02	-0.17	0.35	1.67	0.41	46.00
Freddanella_02	84	Tr200	59.40	14.38	17.18	2.80	16.35	16.98	-0.83	-0.20	1.31	0.28	35.30
Freddanella_02	84	Tr030	38.20	14.38	16.64	2.26	16.35	16.98	-0.29	0.34	1.38	0.33	35.30
Freddanella_02	83	Tr200	59.40	14.34	17.15	2.81	16.18	16.94	-0.96	-0.21	1.36	0.29	32.60
Freddanella_02	83	Tr030	38.20	14.34	16.60	2.26	16.18	16.94	-0.42	0.34	1.35	0.32	32.60
Freddanella_02	82	Tr200	59.40	14.31	17.07	2.76	16.50	16.91	-0.57	-0.16	1.63	0.35	34.80
Freddanella_02	82	Tr030	38.20	14.31	16.55	2.24	16.50	16.91	-0.05	0.36	1.46	0.36	34.80
Freddanella_02	81	Tr200	59.40	14.27	17.06	2.79	16.55	16.55	-0.51	-0.51	1.42	0.30	31.50
Freddanella_02	81	Tr030	38.20	14.27	16.50	2.23	16.55	16.55	0.05	0.05	1.45	0.36	31.50
Freddanella_02	80	Tr200	59.40	14.24	17.05	2.81	16.18	16.50	-0.87	-0.55	1.29	0.27	37.40
Freddanella_02	80	Tr030	38.20	14.24	16.48	2.24	16.18	16.50	-0.30	0.02	1.36	0.33	37.40
Freddanella_02	78	Tr200	59.40	14.20	17.01	2.81	16.15	16.65	-0.86	-0.36	1.36	0.29	33.50
Freddanella_02	78	Tr030	38.20	14.20	16.43	2.23	16.15	16.65	-0.28	0.22	1.38	0.34	33.50
Freddanella_02	77	Tr200	59.40	14.17	16.99	2.82	16.17	16.17	-0.82	-0.82	1.37	0.28	23.80
Freddanella_02	77	Tr030	38.20	14.17	16.40	2.23	16.17	16.17	-0.23	-0.23	1.39	0.34	23.80
Freddanella_02	76	Tr200	59.40	14.14	16.94	2.80	16.30	16.14	-0.64	-0.80	1.53	0.32	32.80
Freddanella_02	76	Tr030	38.20	14.14	16.36	2.22	16.30	16.14	-0.06	-0.22	1.46	0.35	32.80

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_02	75	Tr200	59.40	14.11	16.91	2.80	16.32	16.54	-0.59	-0.36	1.51	0.32	37.00
Freddanella_02	75	Tr030	38.20	14.11	16.31	2.20	16.32	16.54	0.01	0.24	1.48	0.37	37.00
Freddanella_02	74	Tr200	59.40	14.07	16.83	2.76	16.52	16.50	-0.31	-0.33	1.67	0.36	33.50
Freddanella_02	74	Tr030	38.20	14.07	16.25	2.18	16.52	16.50	0.27	0.25	1.53	0.38	33.50
Freddanella_02	73	Tr200	59.40	14.04	16.81	2.77	16.48	16.46	-0.33	-0.35	1.56	0.34	31.90
Freddanella_02	73	Tr030	38.20	14.04	16.20	2.16	16.48	16.46	0.28	0.26	1.54	0.38	31.90
Freddanella_02	72	Tr200	59.40	13.99	16.78	2.79	16.60	16.60	-0.18	-0.18	1.56	0.34	30.10
Freddanella_02	72	Tr030	38.20	13.99	16.14	2.15	16.60	16.60	0.46	0.46	1.58	0.39	30.10
Freddanella_02	71	Tr200	59.40	13.94	16.73	2.79	16.60	16.60	-0.13	-0.13	1.61	0.35	31.70
Freddanella_02	71	Tr030	38.20	13.94	16.10	2.16	16.60	16.60	0.50	0.50	1.57	0.39	31.70
Freddanella_02	70	Tr200	61.70	13.89	16.68	2.79	16.19	16.60	-0.49	-0.08	1.67	0.36	40.10
Freddanella_02	70	Tr030	39.60	13.89	16.05	2.16	16.19	16.60	0.14	0.55	1.59	0.40	40.10
Freddanella_02	11	Tr200	61.70	13.67	16.66	2.99	16.22	16.22	-0.44	-0.44	1.48	0.31	8.06
Freddanella_02	11	Tr030	39.60	13.67	16.02	2.35	16.22	16.22	0.20	0.20	1.35	0.32	8.06
Freddanella_02	10.8	Tr200	61.70	13.67	16.65	2.98	16.23	16.23	-0.43	-0.43	1.49	0.31	8.06
Freddanella_02	10.8	Tr030	39.60	13.67	16.01	2.34	16.23	16.23	0.21	0.21	1.35	0.32	8.06
Freddanella_02	10.6	Tr200	61.70	13.67	16.65	2.98	16.23	16.23	-0.42	-0.42	1.46	0.31	8.06
Freddanella_02	10.6	Tr030	39.60	13.67	16.00	2.33	16.23	16.23	0.23	0.23	1.36	0.33	8.06
Freddanella_02	10.4	Tr200	61.70	13.67	16.64	2.97	16.24	16.24	-0.41	-0.41	1.45	0.30	8.06
Freddanella_02	10.4	Tr030	39.60	13.67	15.99	2.32	16.24	16.24	0.24	0.24	1.37	0.33	8.06
Freddanella_02	10.2	Tr200	61.70	13.67	16.64	2.97	16.24	16.24	-0.40	-0.40	1.45	0.30	8.06
Freddanella_02	10.2	Tr030	39.60	13.67	15.98	2.31	16.24	16.24	0.26	0.26	1.38	0.33	8.06
Freddanella_02	10	Tr200	61.70	13.67	16.63	2.96	16.25	16.25	-0.38	-0.38	1.44	0.30	22.70
Freddanella_02	10	Tr030	39.60	13.67	15.97	2.30	16.25	16.25	0.28	0.28	1.39	0.33	22.70
Freddanella_02	9	Tr200	61.70	13.72	16.60	2.88	16.30	16.30	-0.30	-0.30	1.53	0.33	61.90
Freddanella_02	9	Tr030	39.60	13.72	15.94	2.22	16.30	16.30	0.36	0.36	1.46	0.36	61.90
Freddanella_02	8	Tr200	61.70	13.66	16.51	2.85	16.41	16.41	-0.10	-0.10	1.63	0.35	65.50
Freddanella_02	8	Tr030	39.60	13.66	15.85	2.19	16.41	16.41	0.56	0.56	1.50	0.37	65.50

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_02	7	Tr200	61.70	13.40	16.45	3.05	16.60	16.60	0.15	0.15	1.54	0.33	68.70
Freddanella_02	7	Tr030	39.60	13.40	15.79	2.39	16.60	16.60	0.81	0.81	1.36	0.32	68.70
Freddanella_02	6	Tr200	61.70	13.51	16.34	2.83	16.60	16.60	0.26	0.26	1.71	0.38	2.60
Freddanella_02	6	Tr030	39.60	13.51	15.67	2.16	16.60	16.60	0.93	0.93	1.56	0.38	2.60
Freddanella_02	5.92	Tr200	61.70	13.50	16.21	2.71	17.38	18.64	1.17	2.43	2.25	0.48	2.60
Freddanella_02	5.92	Tr030	39.60	13.50	15.59	2.09	17.38	18.64	1.79	3.05	1.96	0.47	2.60
Freddanella_02	5.84	Tr200	61.70	13.44	16.04	2.60	18.12	19.09	2.08	3.05	2.83	0.60	2.60
Freddanella_02	5.84	Tr030	39.60	13.44	15.47	2.03	18.12	19.09	2.65	3.62	2.41	0.57	2.60
Freddanella_02	5.76	Tr200	61.70	13.44	15.96	2.52	18.65	18.69	2.69	2.73	3.03	0.63	2.60
Freddanella_02	5.76	Tr030	39.60	13.44	15.44	2.00	18.65	18.69	3.22	3.26	2.49	0.58	2.60
Freddanella_02	5.66	Tr200	61.70	13.44	15.88	2.44	18.65	19.10	2.77	3.22	3.22	0.68	2.60
Freddanella_02	5.66	Tr030	39.60	13.44	15.39	1.95	18.65	19.10	3.26	3.71	2.62	0.61	2.60
Freddanella_02	5.6	Tr200	61.70	13.44	15.96	2.52	20.44	20.44	4.48	4.48	2.78	0.56	0.05
Freddanella_02	5.6	Tr030	39.60	13.44	15.44	2.00	20.44	20.44	5.00	5.00	2.25	0.51	0.05
Freddanella_02	5.5		Bridge										
Freddanella_02	5.3	Tr200	61.70	13.40	15.77	2.37	20.40	20.40	4.63	4.63	2.96	0.61	2.83
Freddanella_02	5.3	Tr030	39.60	13.40	15.34	1.94	20.40	20.40	5.06	5.06	2.32	0.53	2.83
Freddanella_02	5.2	Tr200	61.70	13.38	15.94	2.56	19.36	19.70	3.42	3.76	1.93	0.43	2.83
Freddanella_02	5.2	Tr030	39.60	13.38	15.43	2.05	19.36	19.70	3.93	4.27	1.63	0.40	2.83
Freddanella_02	5.1	Tr200	61.70	13.37	15.94	2.57	18.59	19.00	2.65	3.06	1.89	0.43	2.83
Freddanella_02	5.1	Tr030	39.60	13.37	15.43	2.06	18.59	19.00	3.16	3.57	1.62	0.41	2.83
Freddanella_02	5	Tr200	61.70	13.35	15.92	2.57	18.61	18.30	2.69	2.38	1.94	0.44	40.20
Freddanella_02	5	Tr030	39.60	13.35	15.42	2.07	18.61	18.30	3.20	2.88	1.65	0.41	40.20
Freddanella_02	4	Tr200	61.70	13.25	15.85	2.60	19.00	19.00	3.15	3.15	1.91	0.43	3.90
Freddanella_02	4	Tr030	39.60	13.25	15.35	2.10	19.00	19.00	3.65	3.65	1.62	0.40	3.90
Freddanella_02	3.87	Tr200	61.70	13.25	15.78	2.53	18.97	18.97	3.19	3.19	2.20	0.49	3.90
Freddanella_02	3.87	Tr030	39.60	13.25	15.31	2.06	18.97	18.97	3.66	3.66	1.82	0.44	3.90

HEC-RAS Plan: FN\_15.08 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_02	3.73	Tr200	61.70	13.25	15.65	2.40	18.93	18.93	3.28	3.28	2.63	0.57	3.90
Freddanella_02	3.73	Tr030	39.60	13.25	15.24	1.99	18.93	18.93	3.69	3.69	2.08	0.49	3.90
Freddanella_02	3.6	Tr200	61.70	13.25	15.39	2.14	18.90	18.90	3.51	3.51	3.36	0.73	0.20
Freddanella_02	3.6	Tr030	39.60	13.25	15.13	1.88	18.90	18.90	3.77	3.77	2.44	0.57	0.20
Freddanella_02	3.5	Bridge											
Freddanella_02	3.3	Tr200	61.70	13.25	15.02	1.77	18.90	18.90	3.88	3.88	4.05	0.97	2.77
Freddanella_02	3.3	Tr030	39.60	13.25	15.07	1.82	18.90	18.90	3.83	3.83	2.53	0.60	2.77
Freddanella_02	3.2	Tr200	61.70	13.25	15.13	1.88	18.31	18.20	3.18	3.08	3.55	0.86	2.77
Freddanella_02	3.2	Tr030	39.60	13.25	15.09	1.84	18.31	18.20	3.22	3.11	2.32	0.57	2.77
Freddanella_02	3.1	Tr200	61.70	13.25	15.22	1.97	17.72	17.51	2.50	2.29	3.07	0.75	2.77
Freddanella_02	3.1	Tr030	39.60	13.25	15.12	1.87	17.72	17.51	2.60	2.39	2.09	0.52	2.77
Freddanella_02	3	Tr200	61.70	13.25	15.30	2.05	17.13	16.81	1.83	1.51	2.60	0.65	5.30
Freddanella_02	3	Tr030	39.60	13.25	15.15	1.90	17.13	16.81	1.99	1.66	1.84	0.48	5.30
Freddanella_02	2	Tr200	61.70	13.21	15.28	2.07	16.79	16.68	1.50	1.40	2.56	0.64	27.90
Freddanella_02	2	Tr030	39.60	13.21	15.14	1.93	16.79	16.68	1.65	1.54	1.80	0.46	27.90
Freddanella_02	1	Tr200	61.70	13.15	15.08	1.93	17.07	16.50	1.99	1.42	2.81	0.72	
Freddanella_02	1	Tr030	39.60	13.15	15.08	1.93	17.07	16.50	1.99	1.42	1.80	0.46	

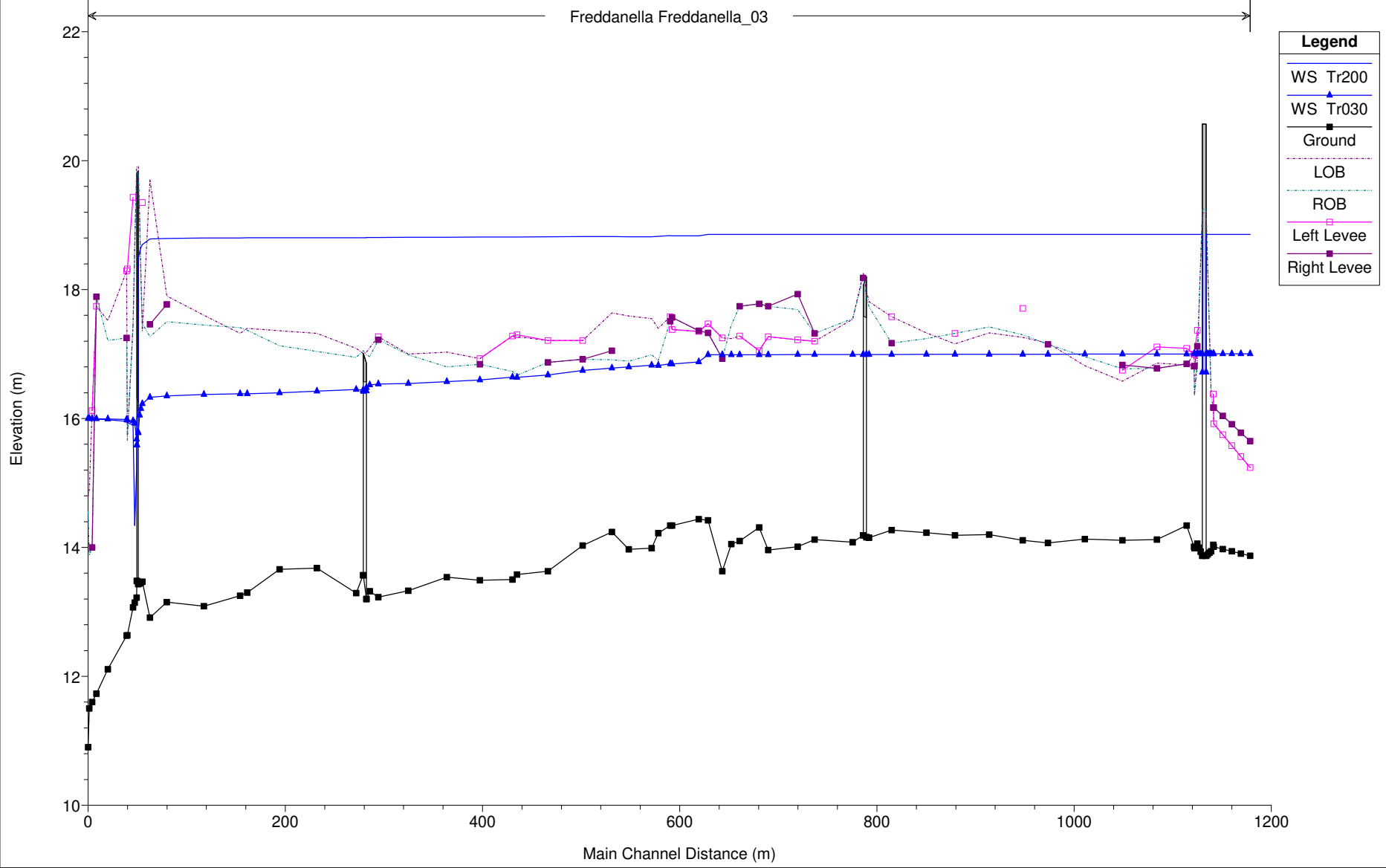


# **SISTEMA RIO FREDDANELLA S. ALESSIO**

## **“Freddanella Vecchia”**



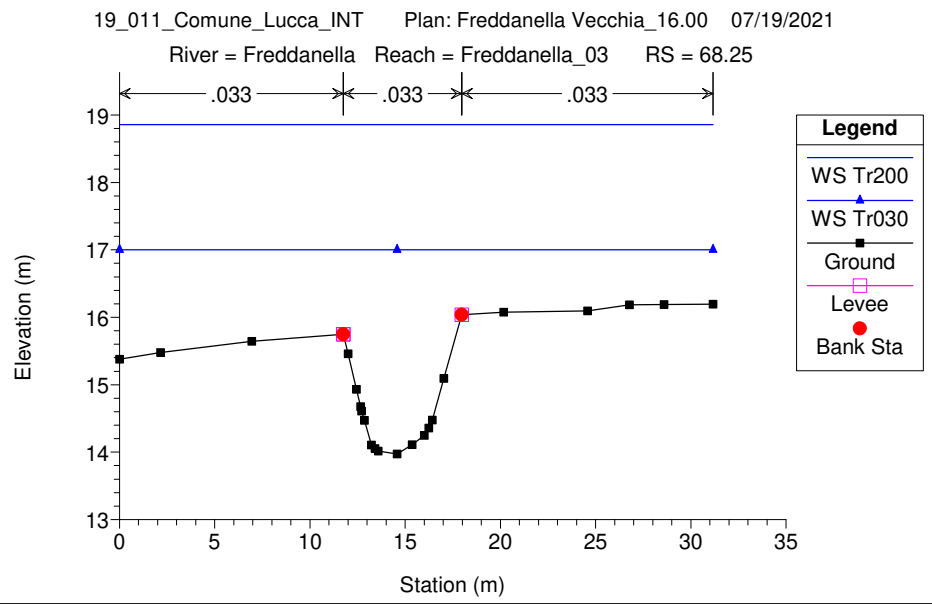
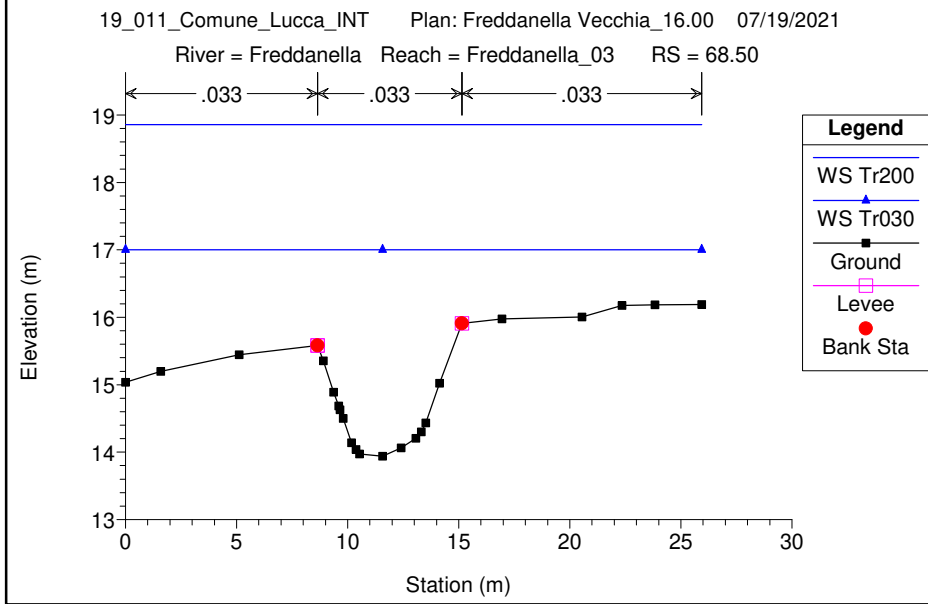
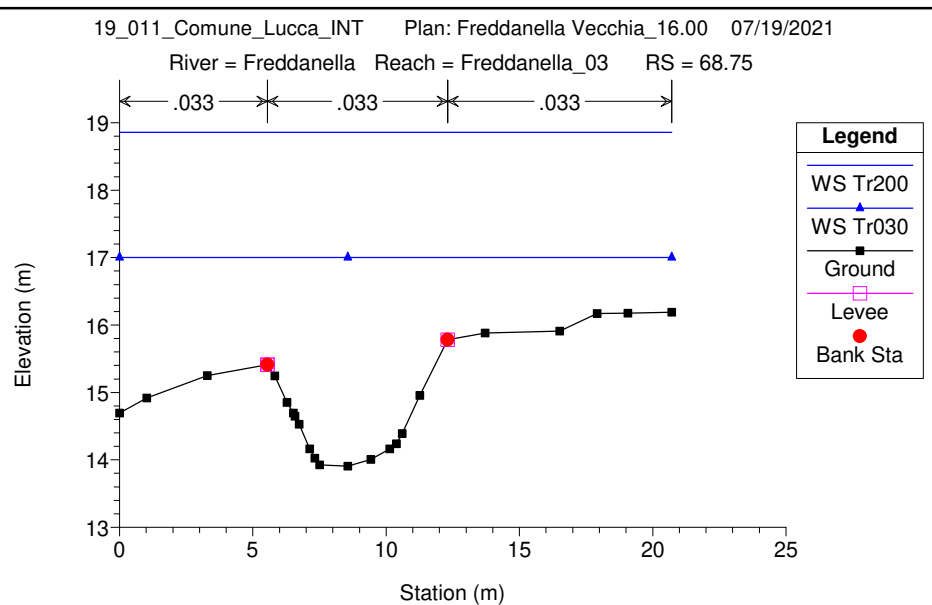
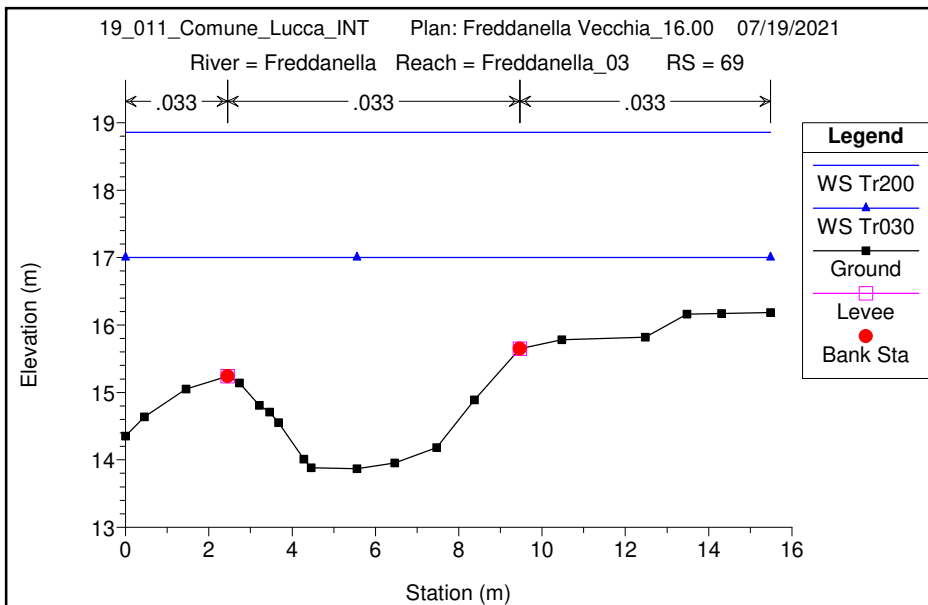


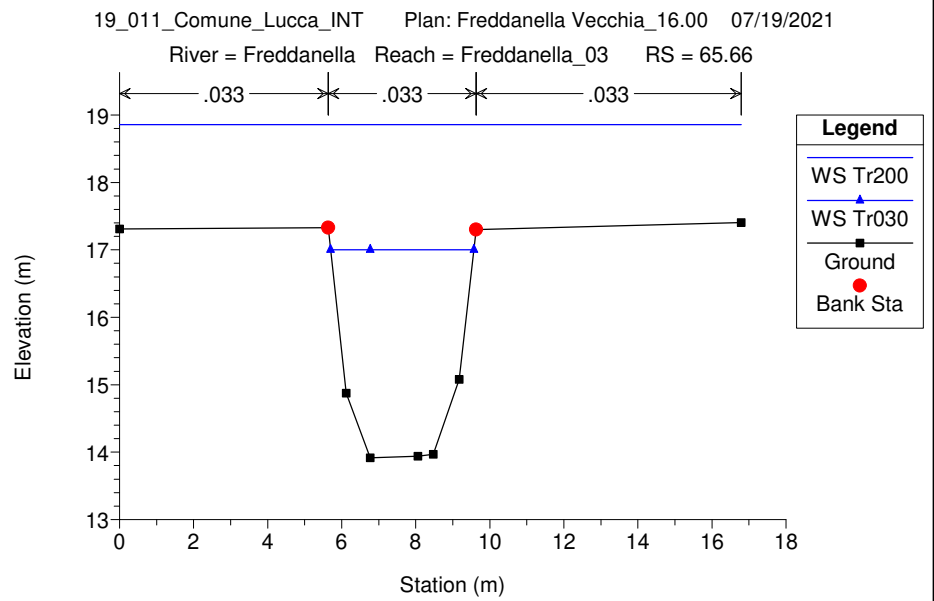
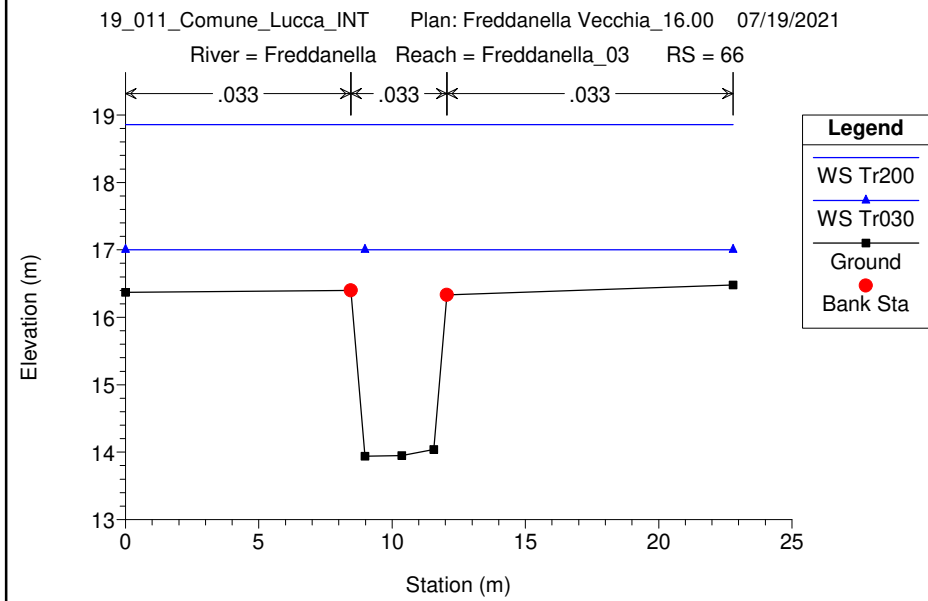
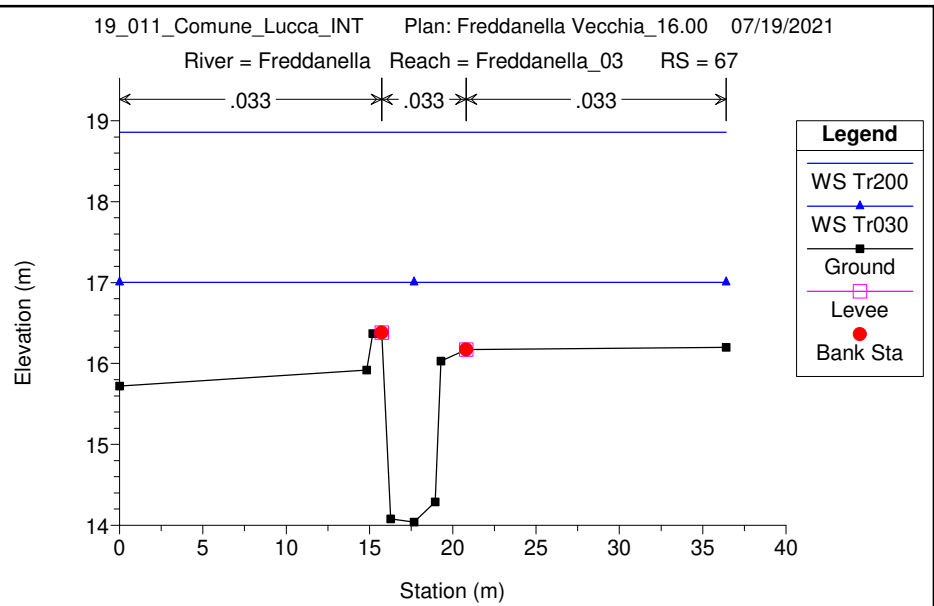
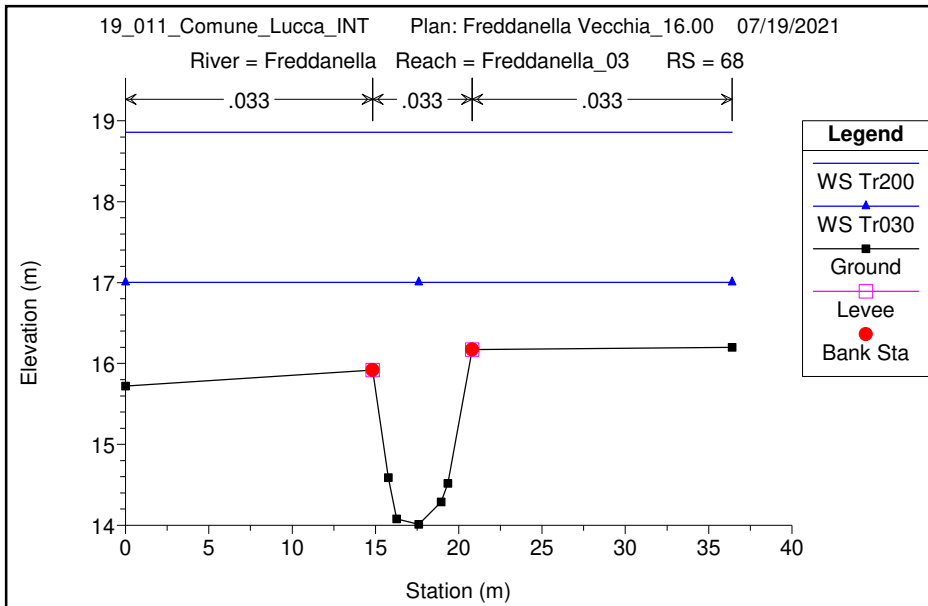


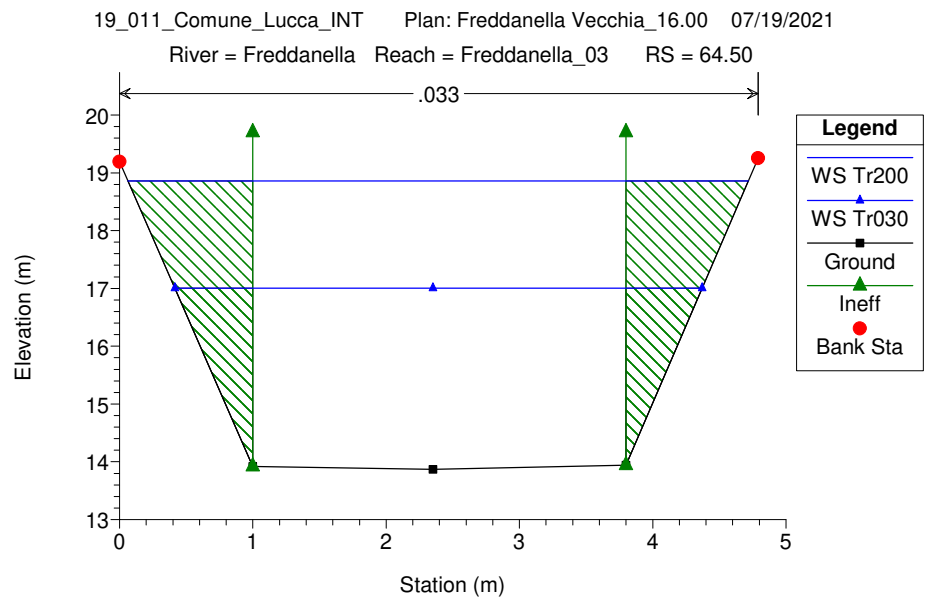
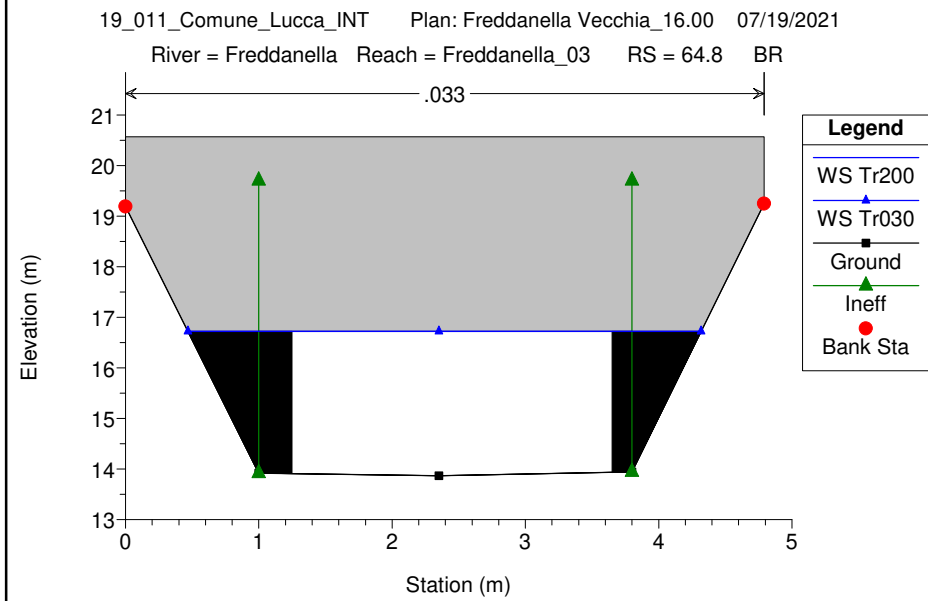
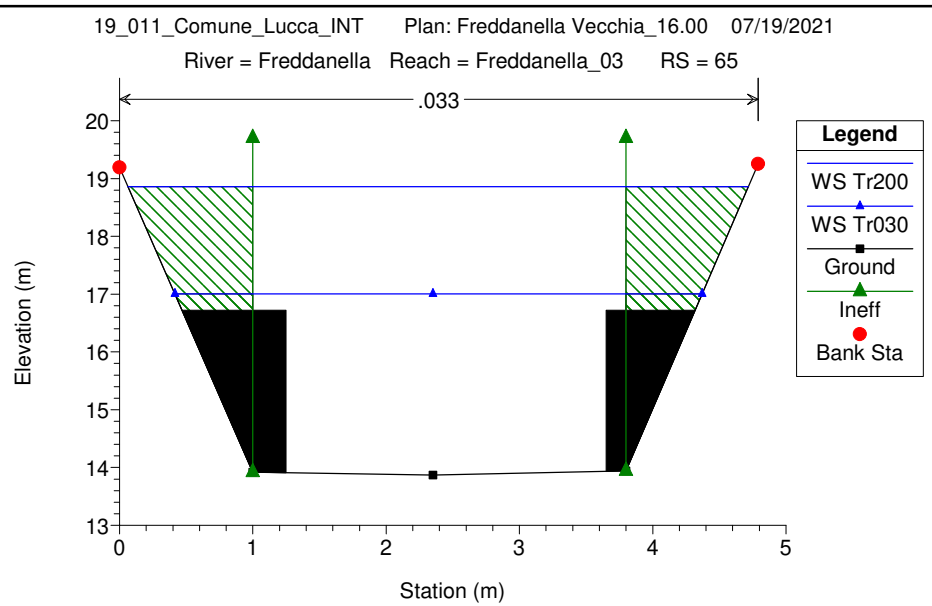
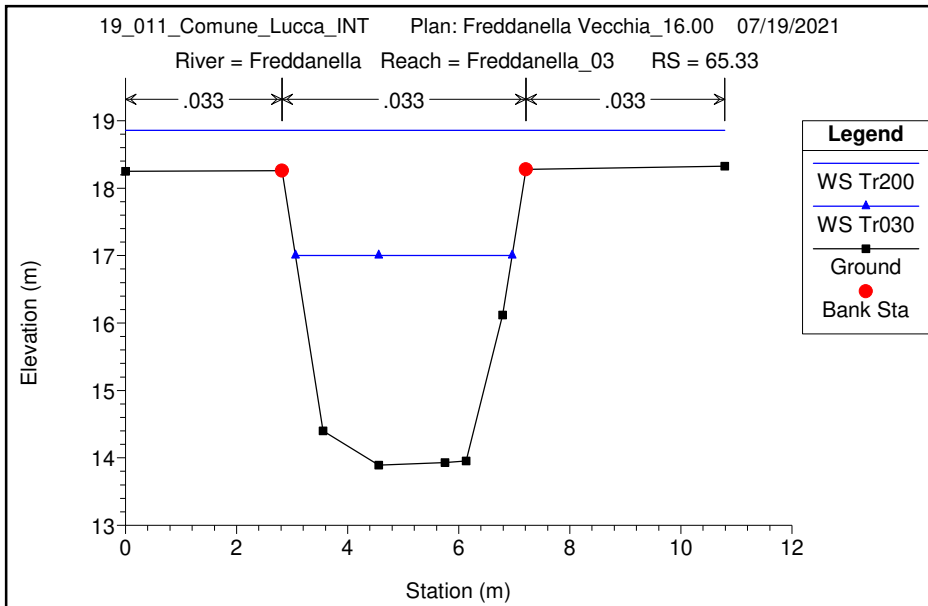


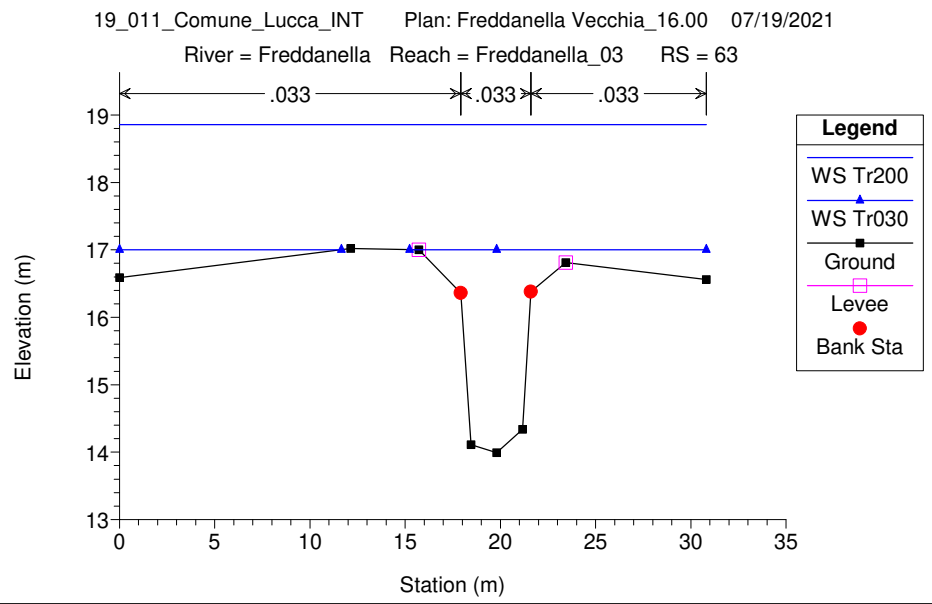
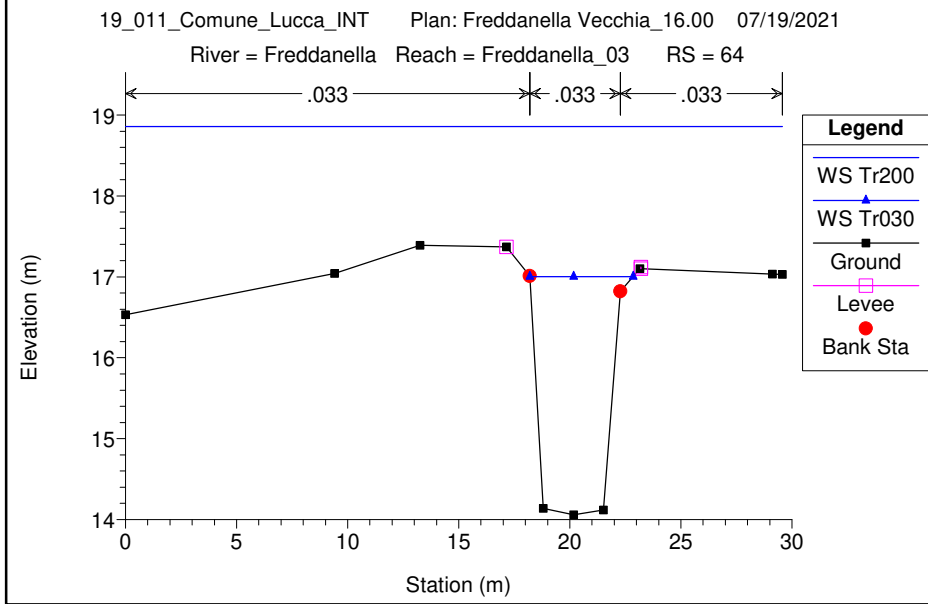
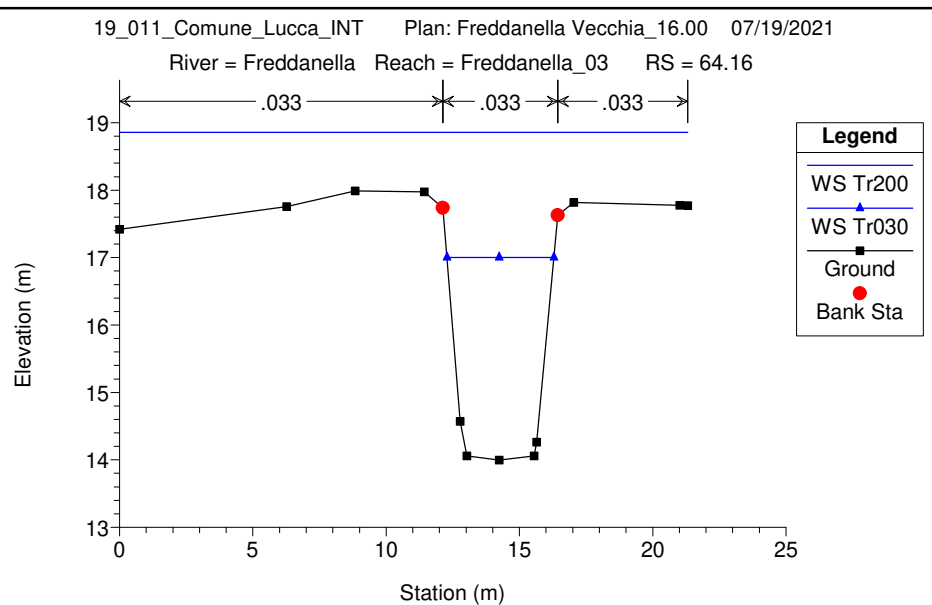
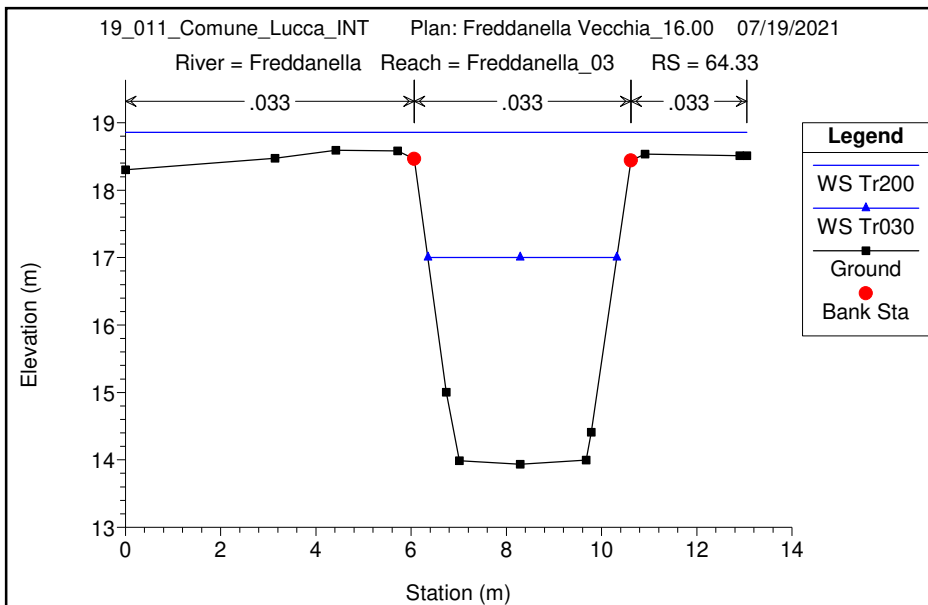
## **SEZIONI SISTEMA FREDDANELLA S. ALESSIO “Freddanella Vecchia”**



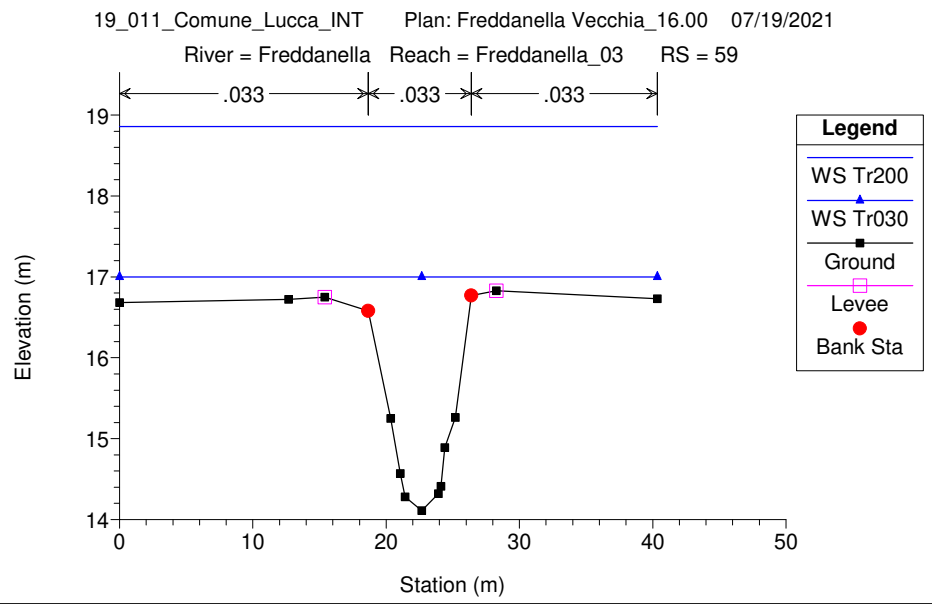
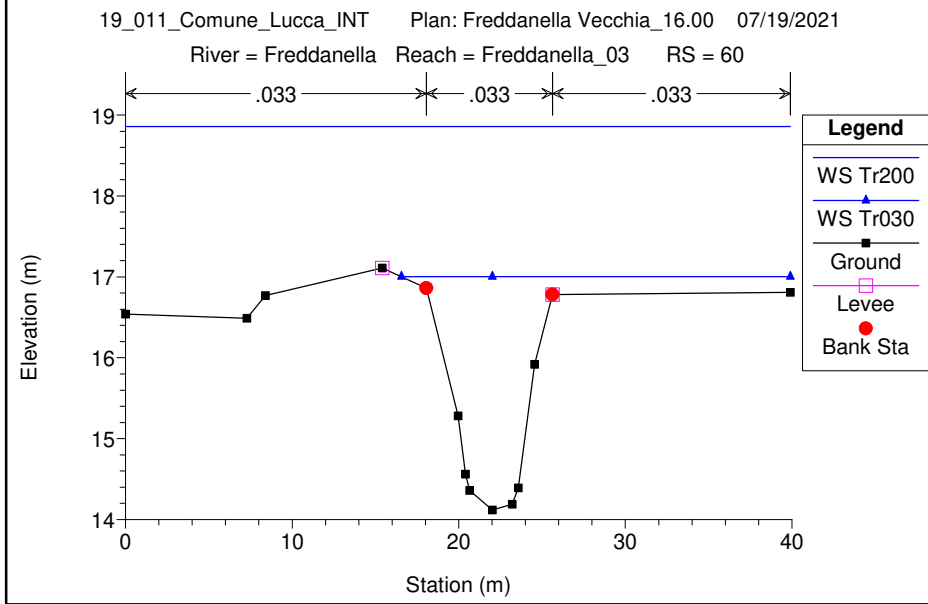
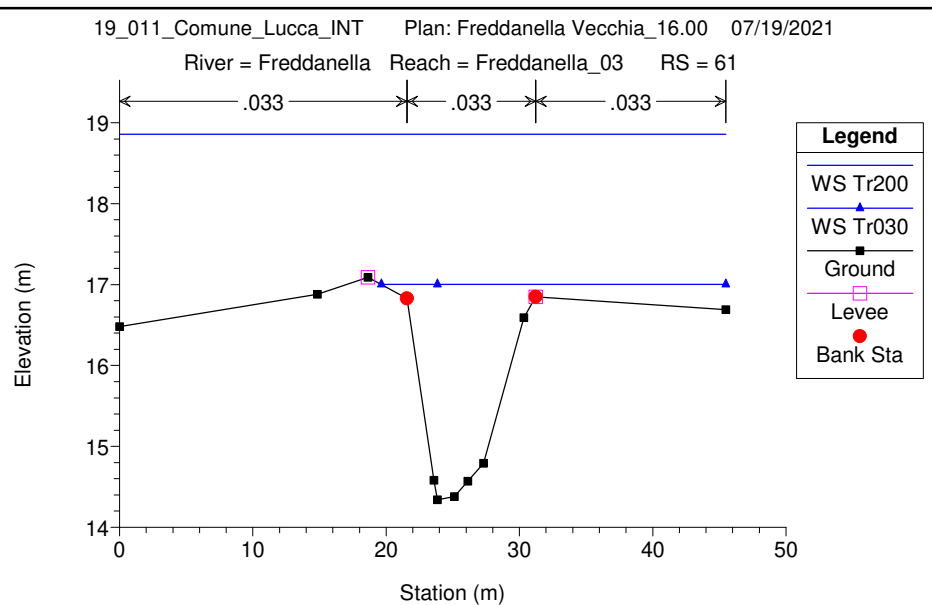
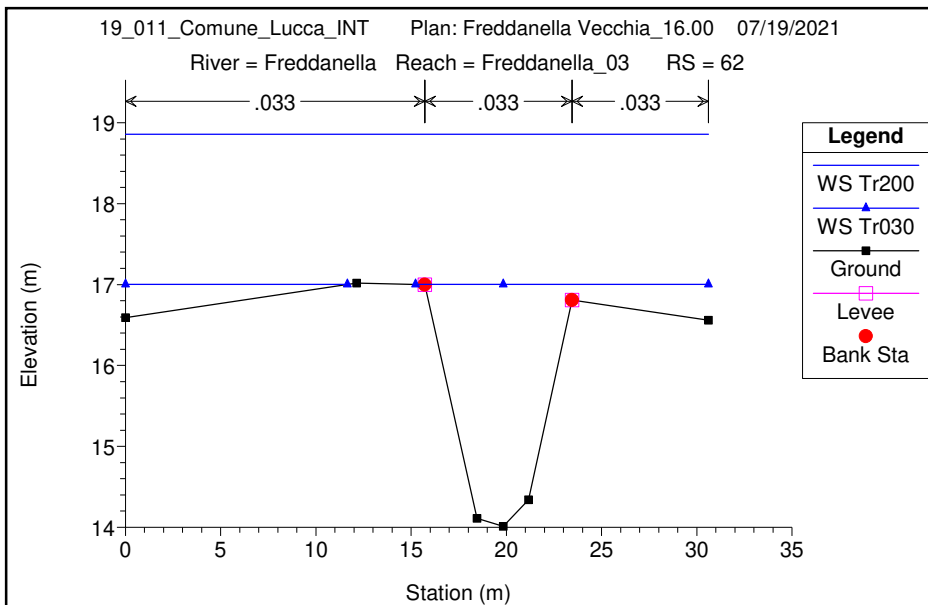


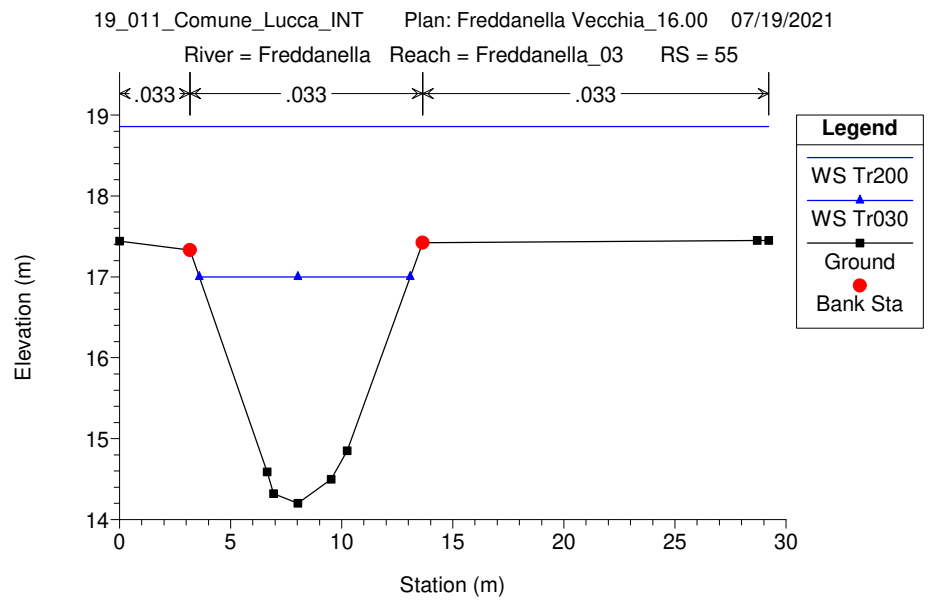
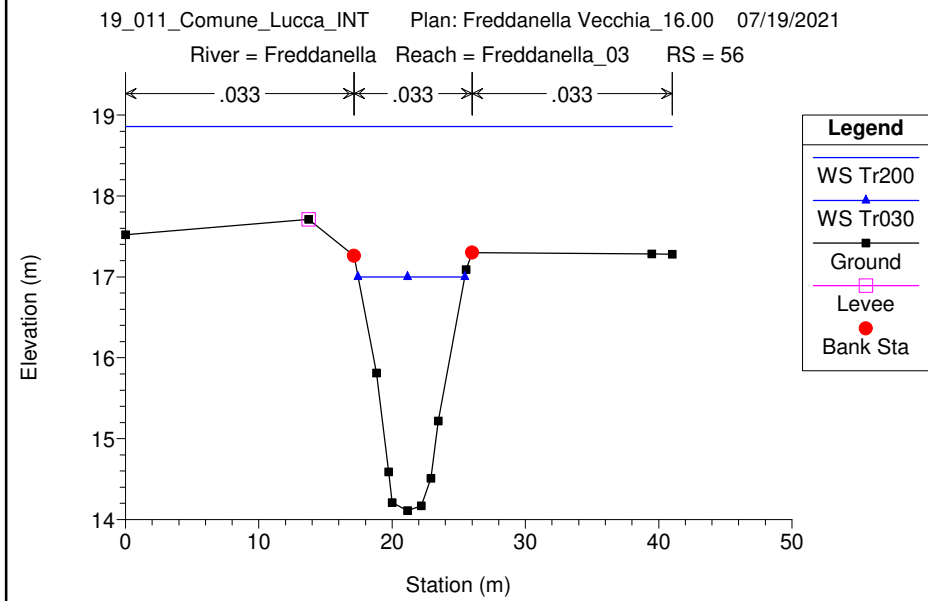
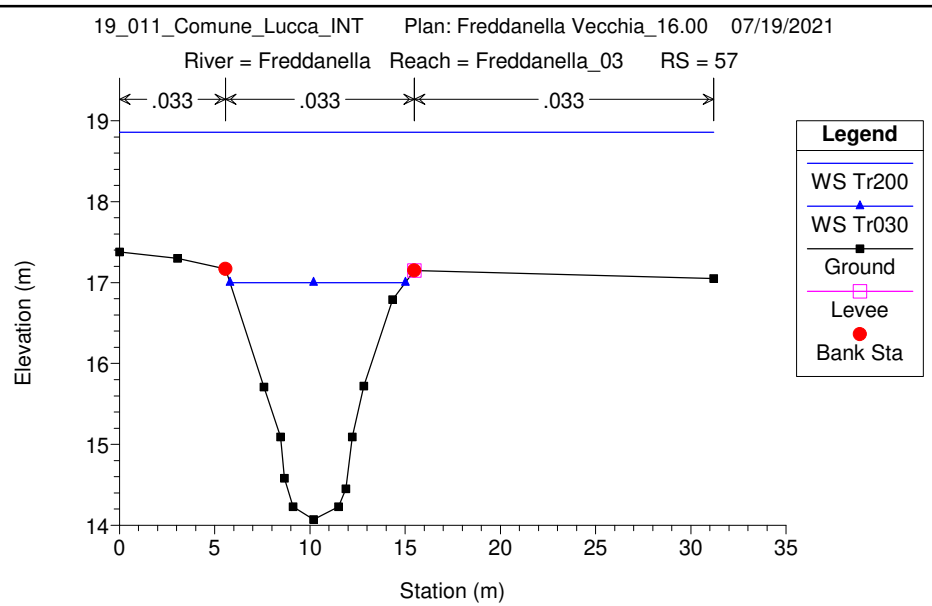
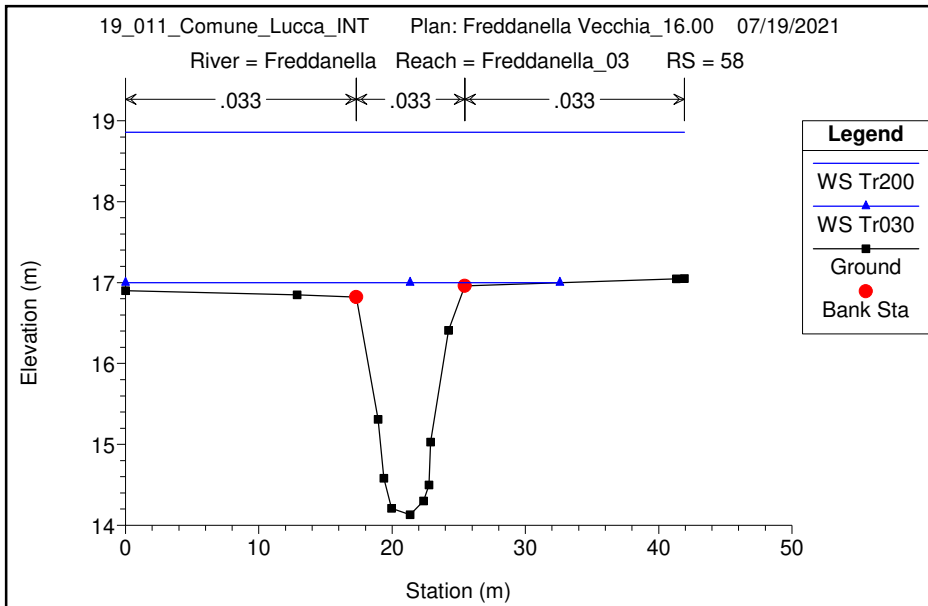


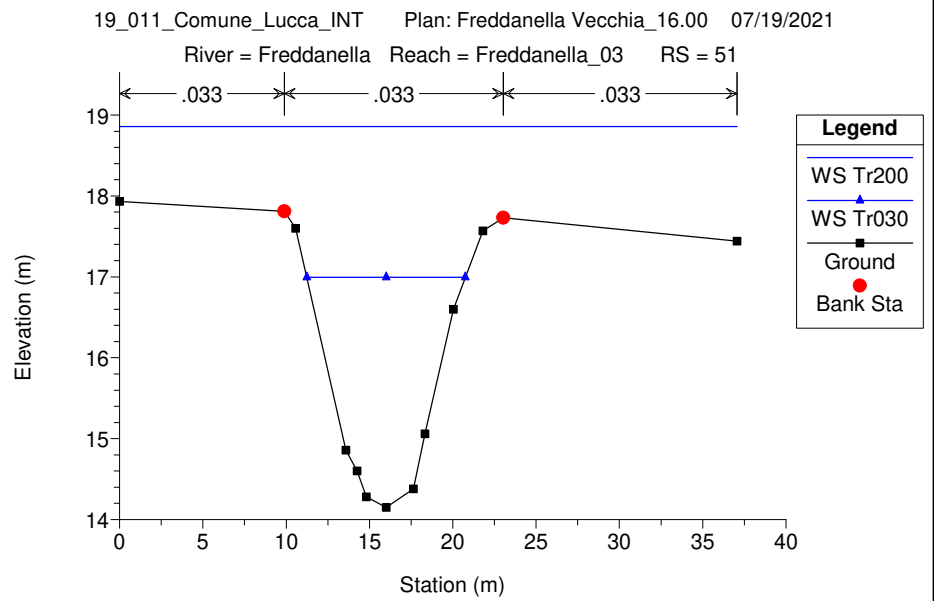
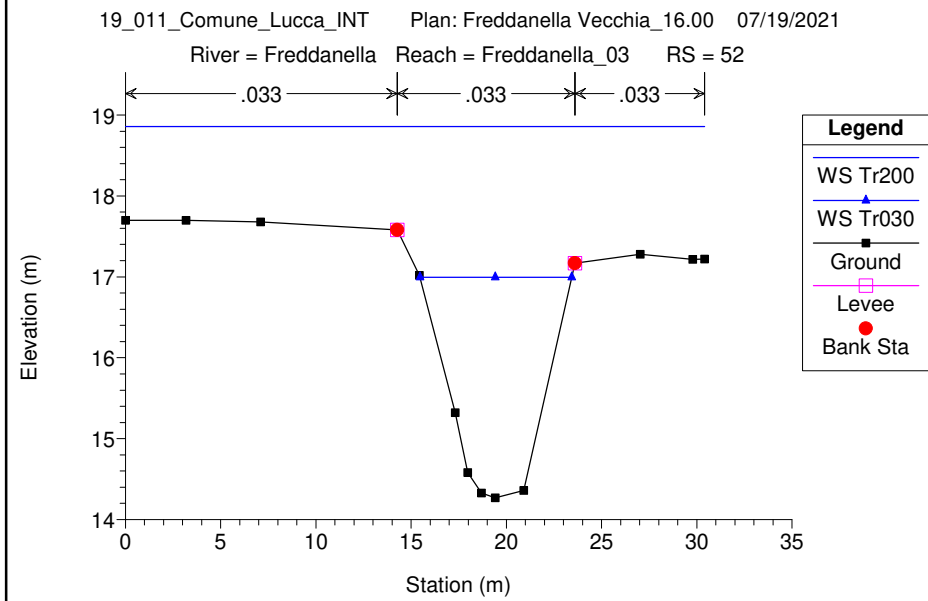
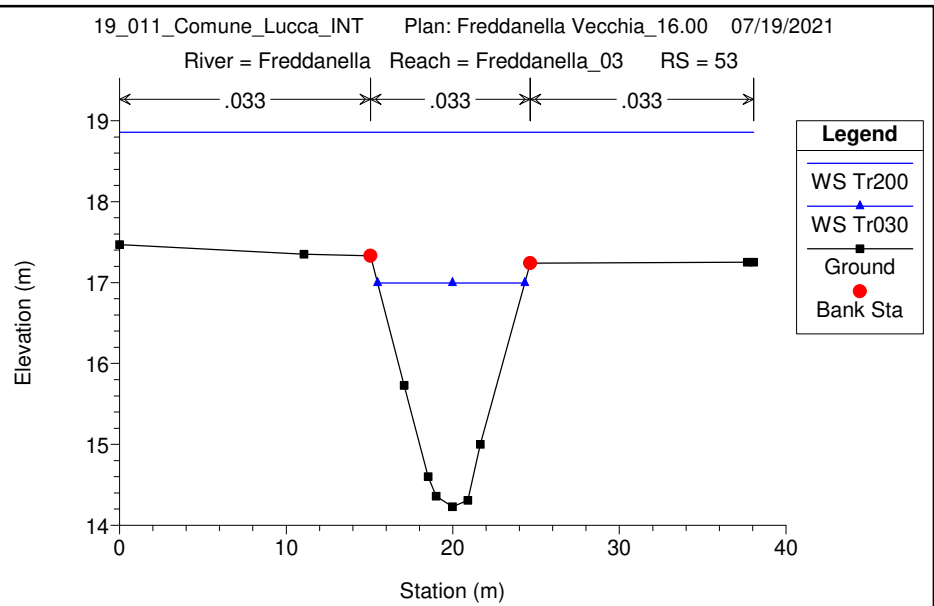
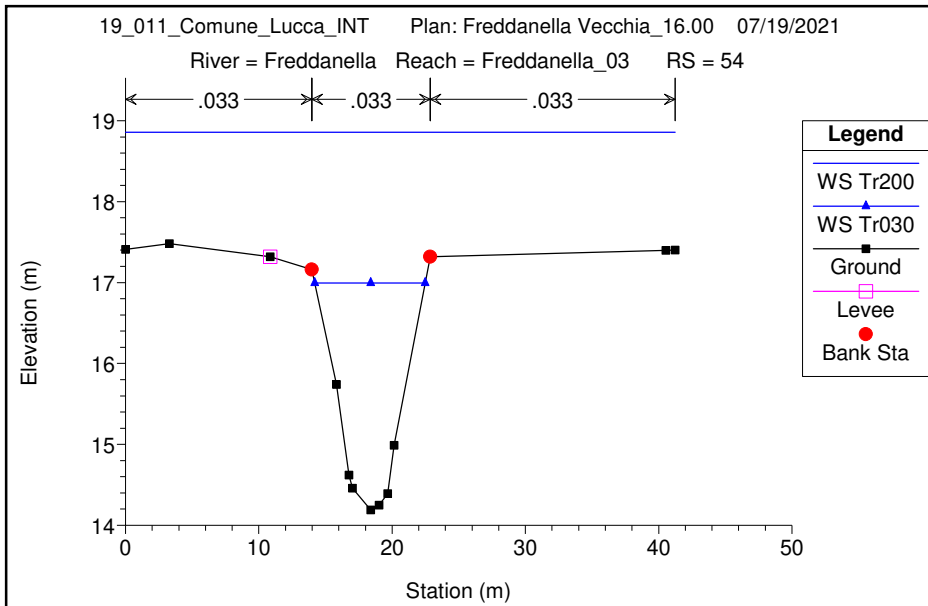


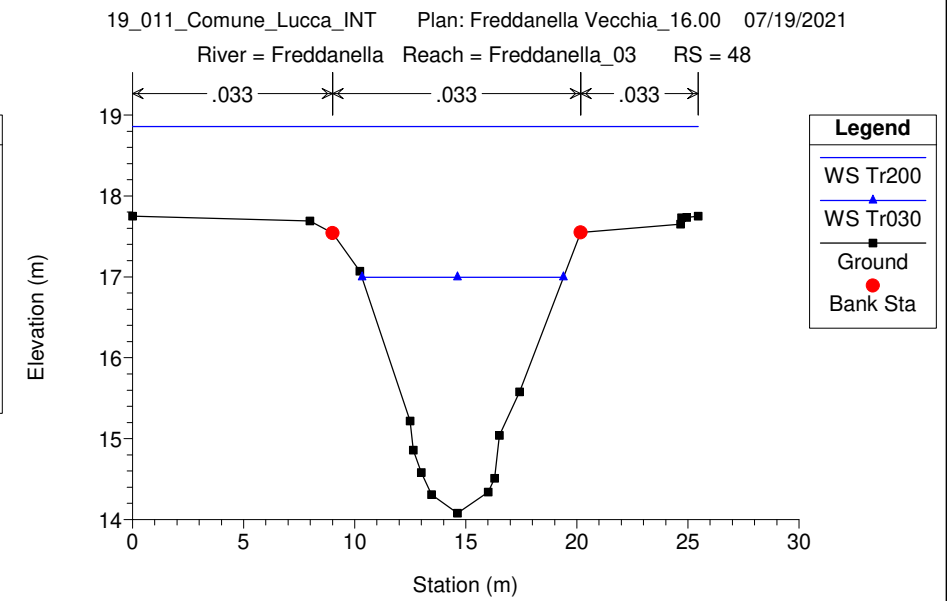
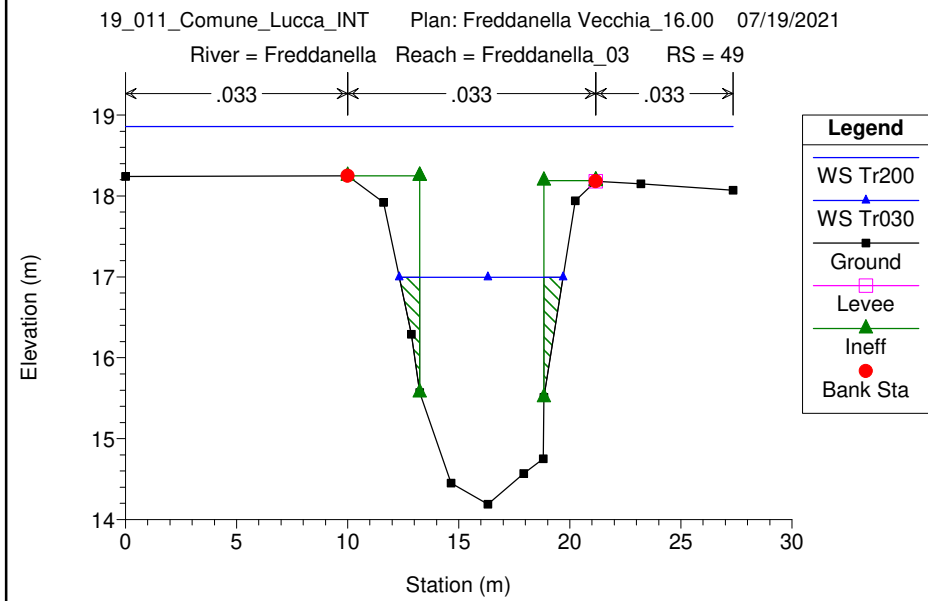
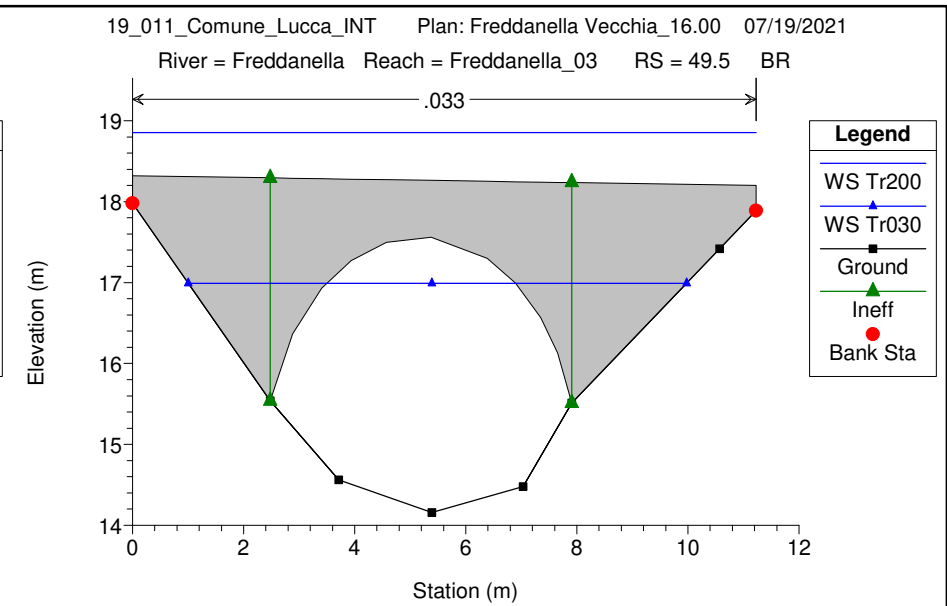
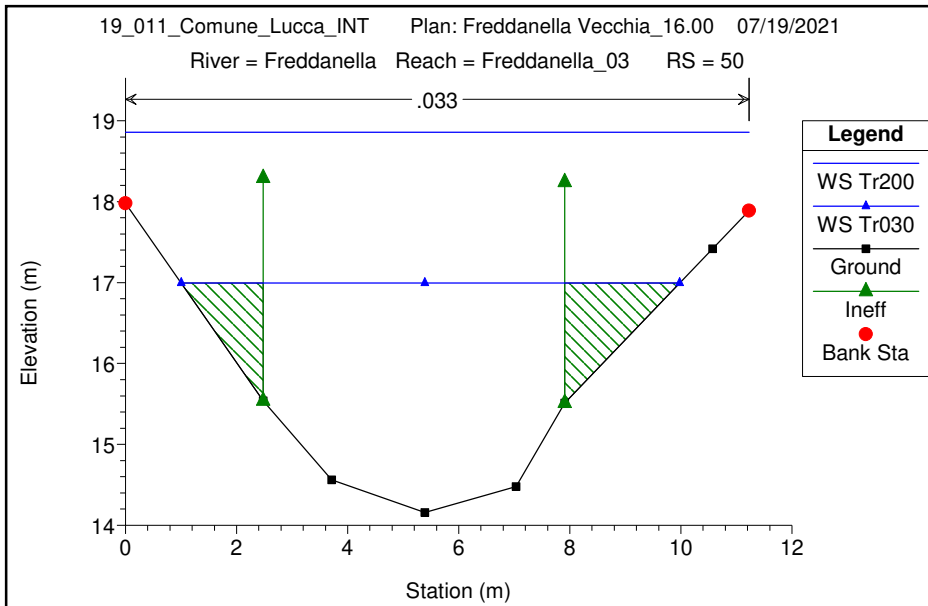


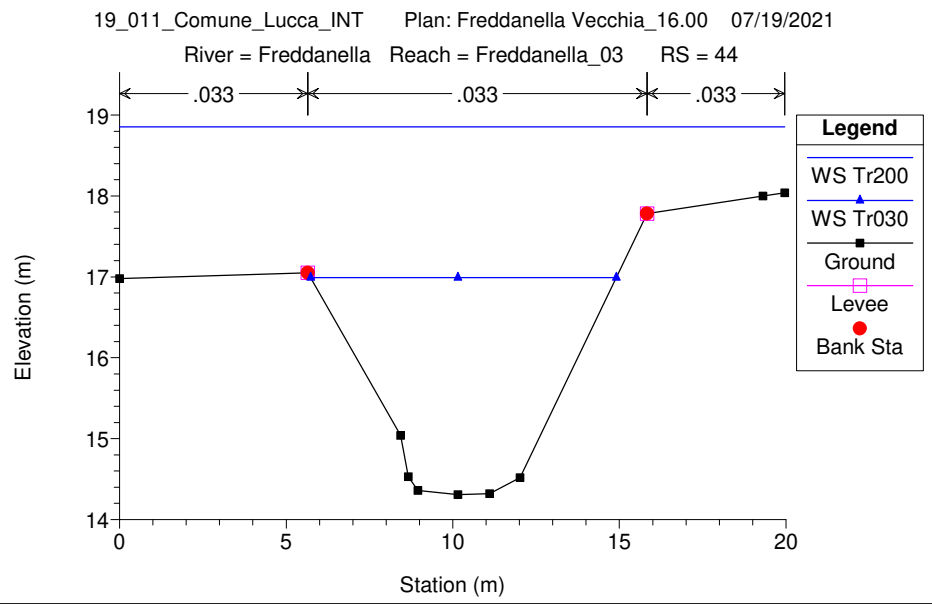
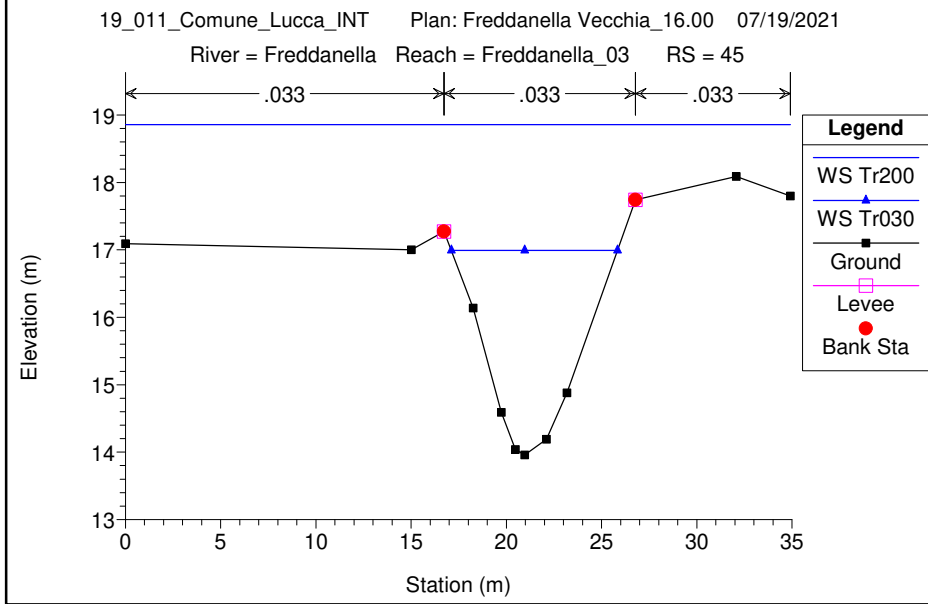
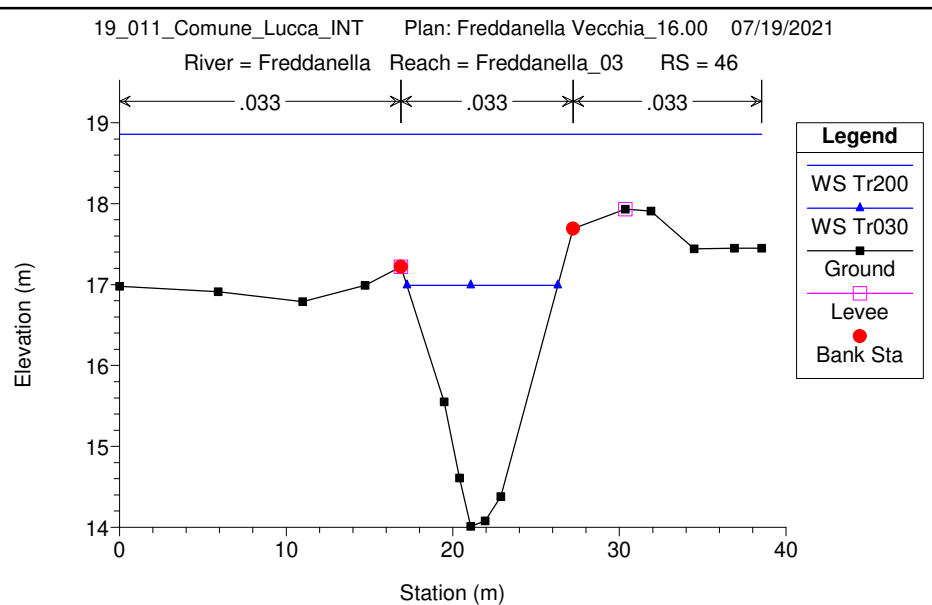
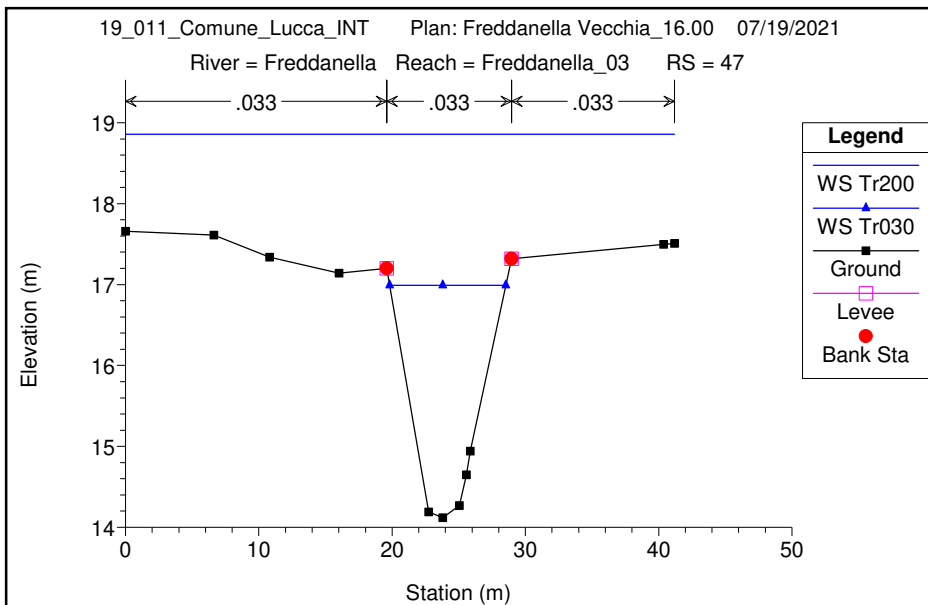


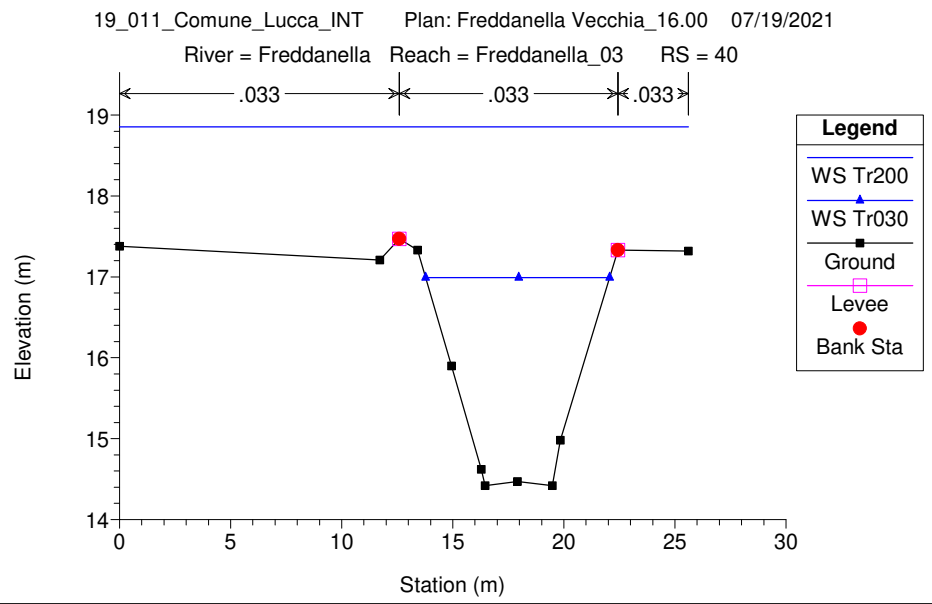
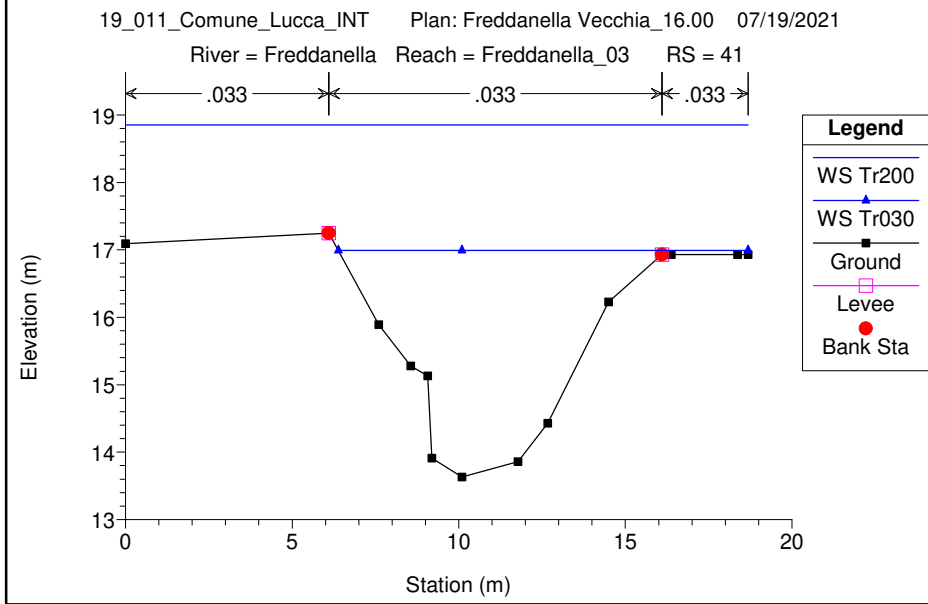
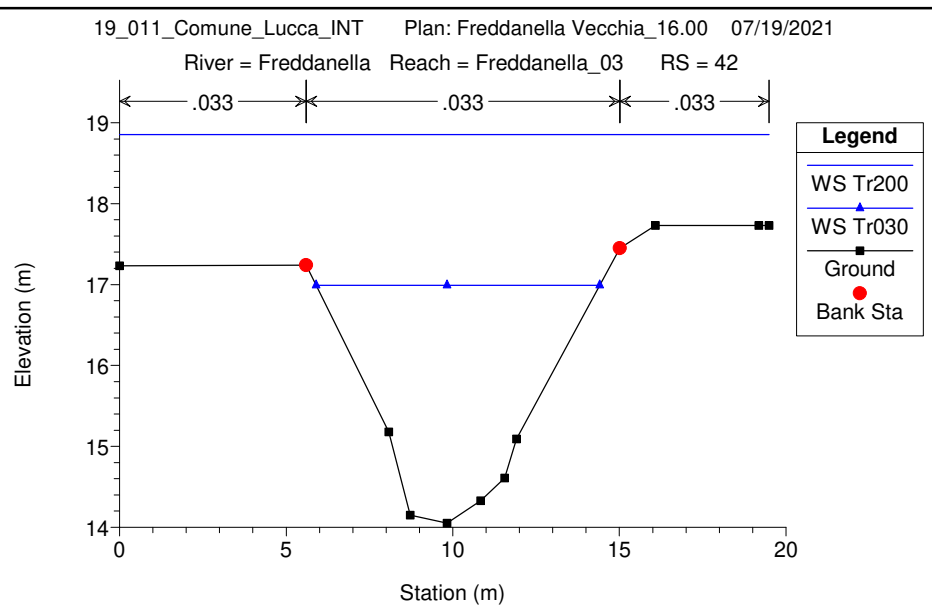
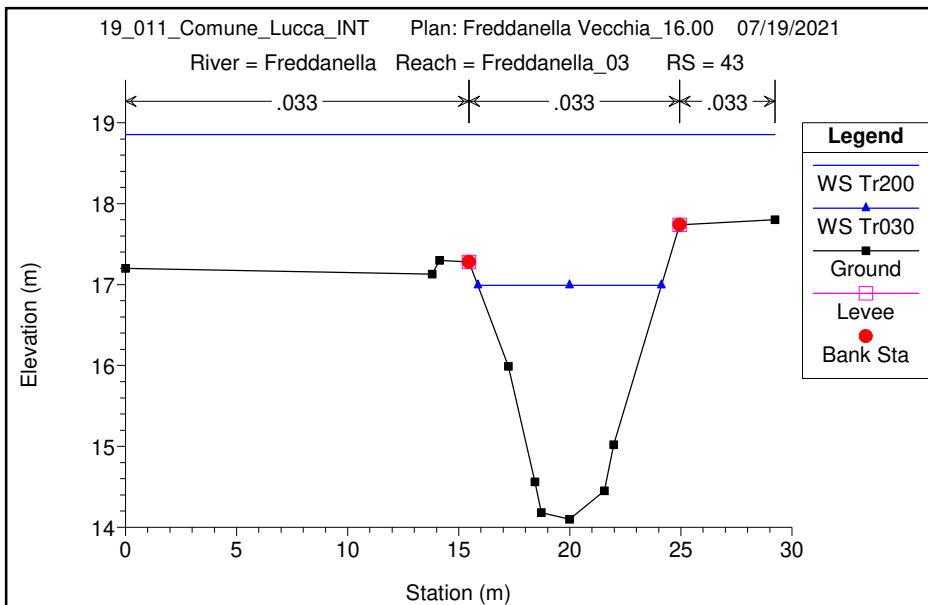


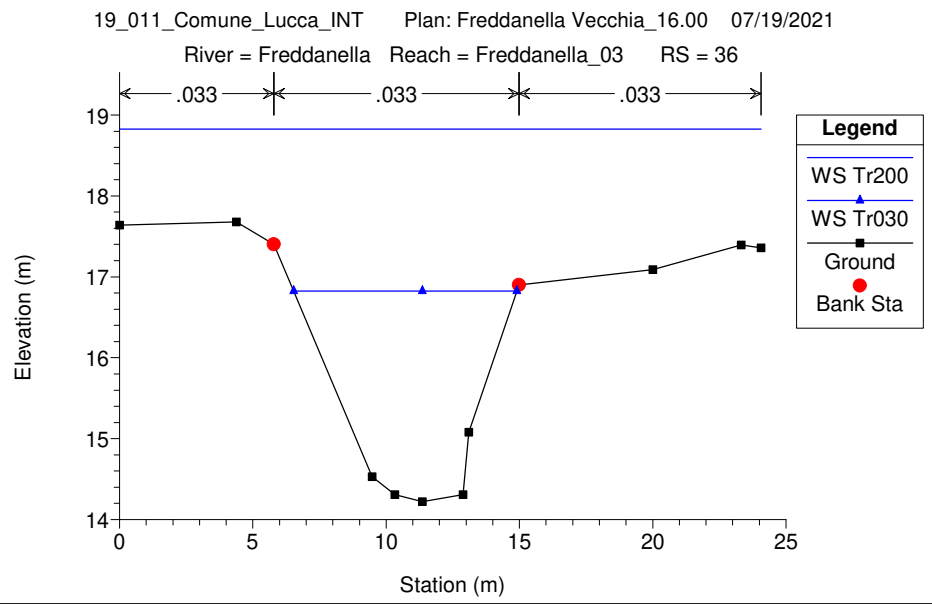
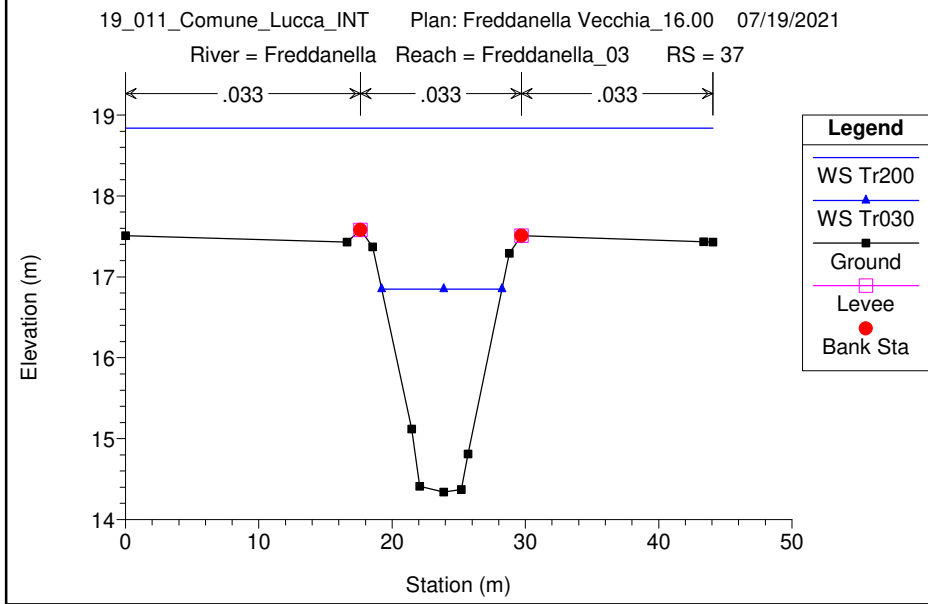
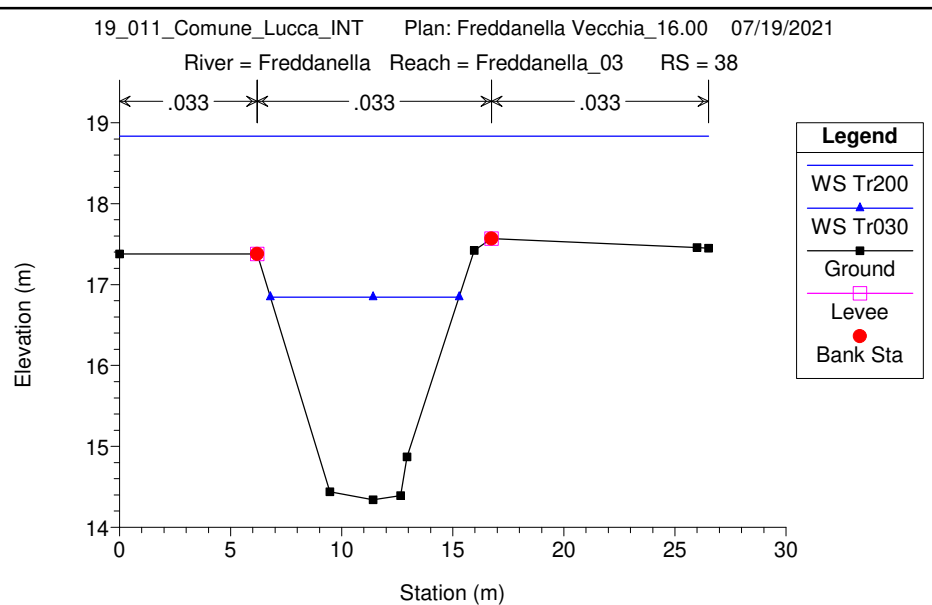
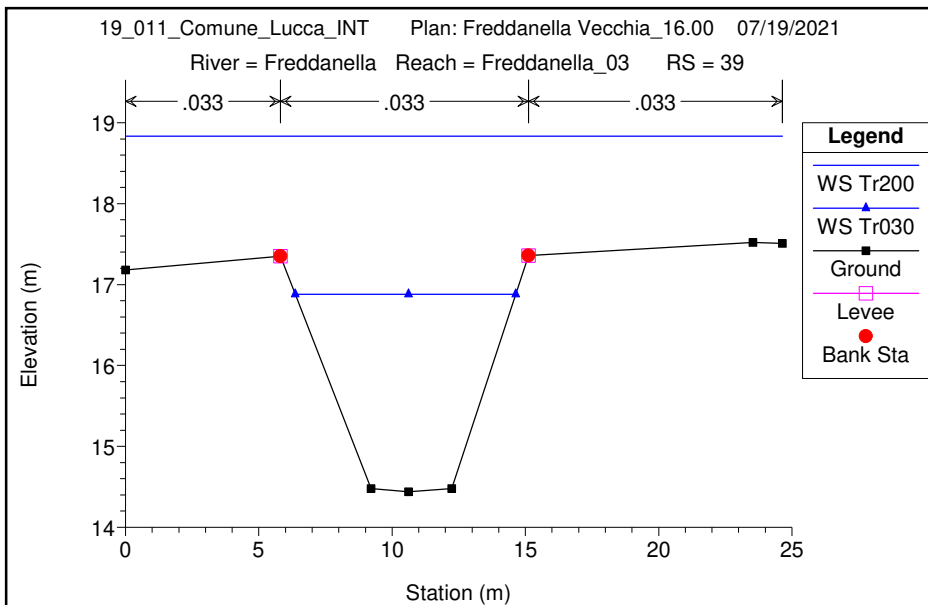


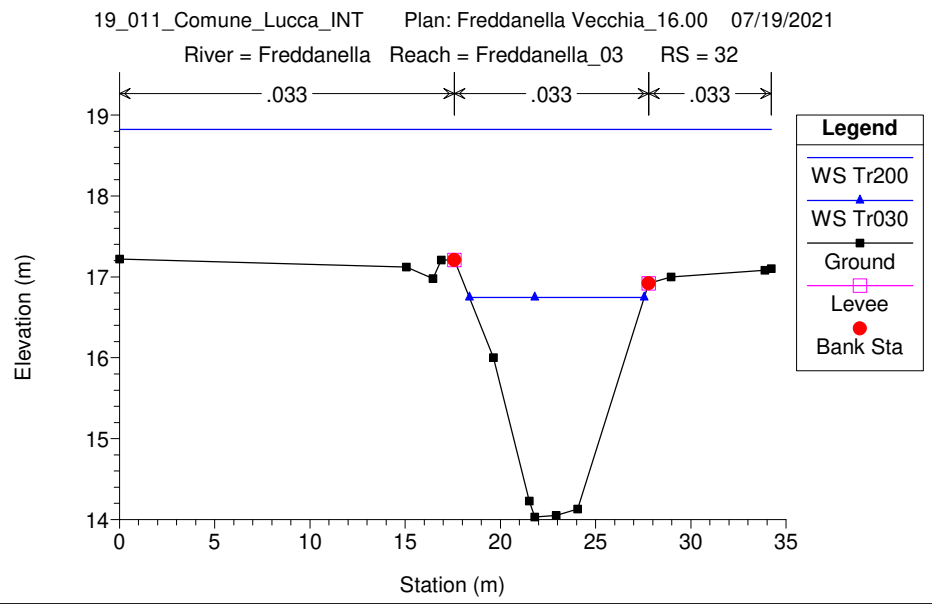
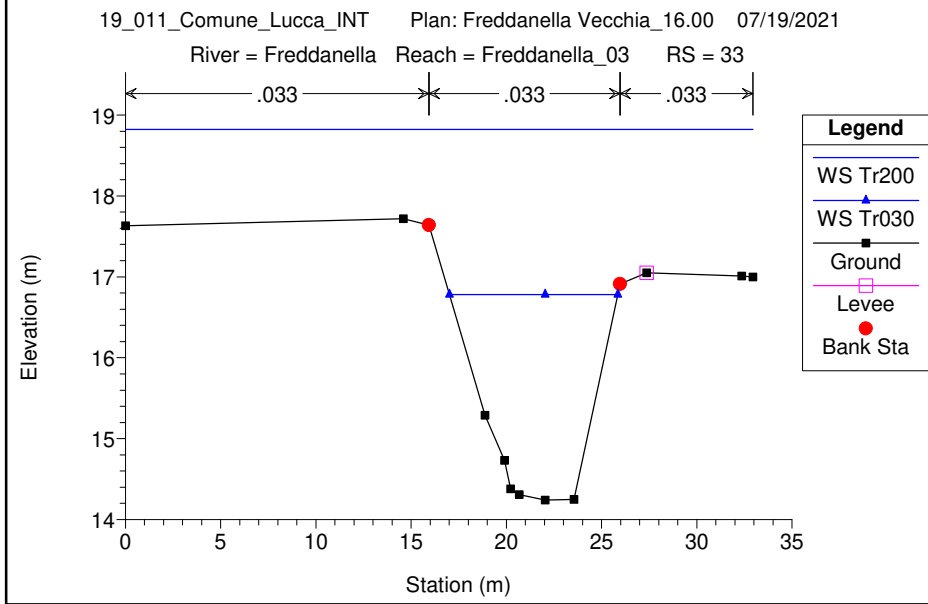
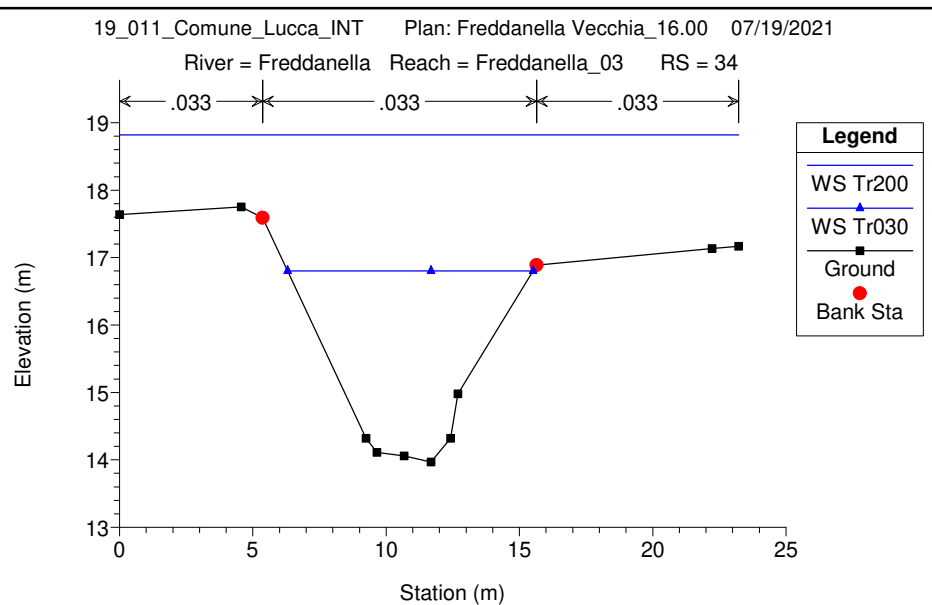
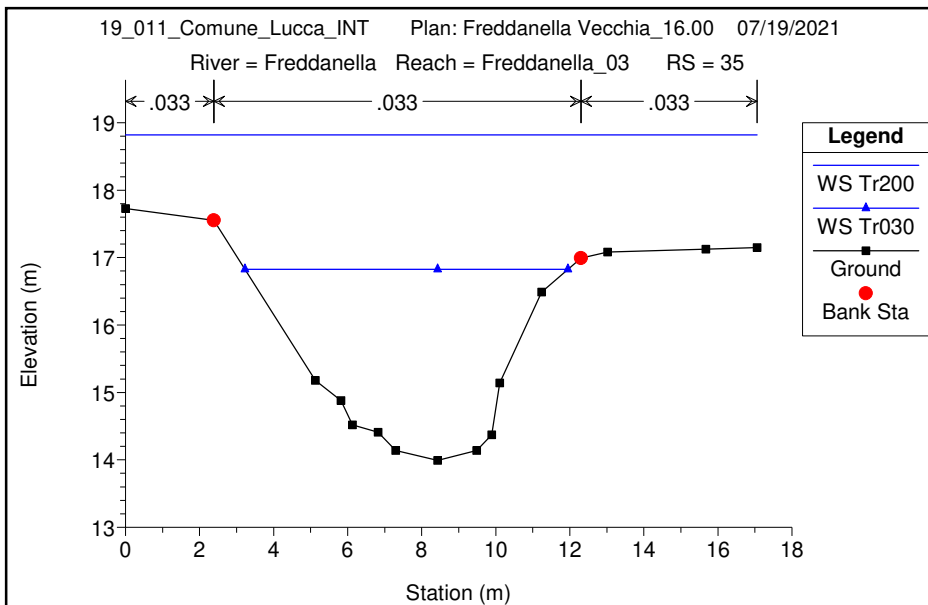




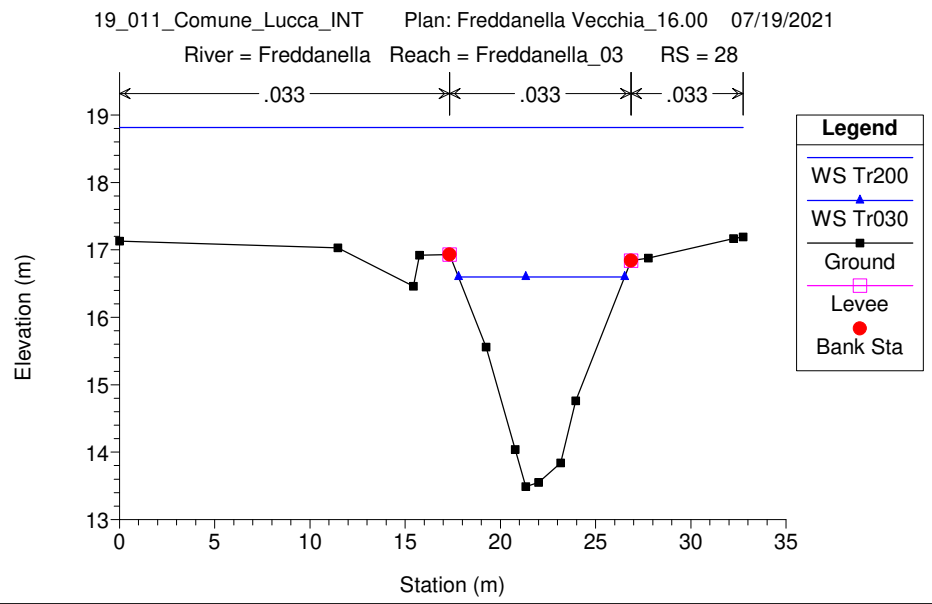
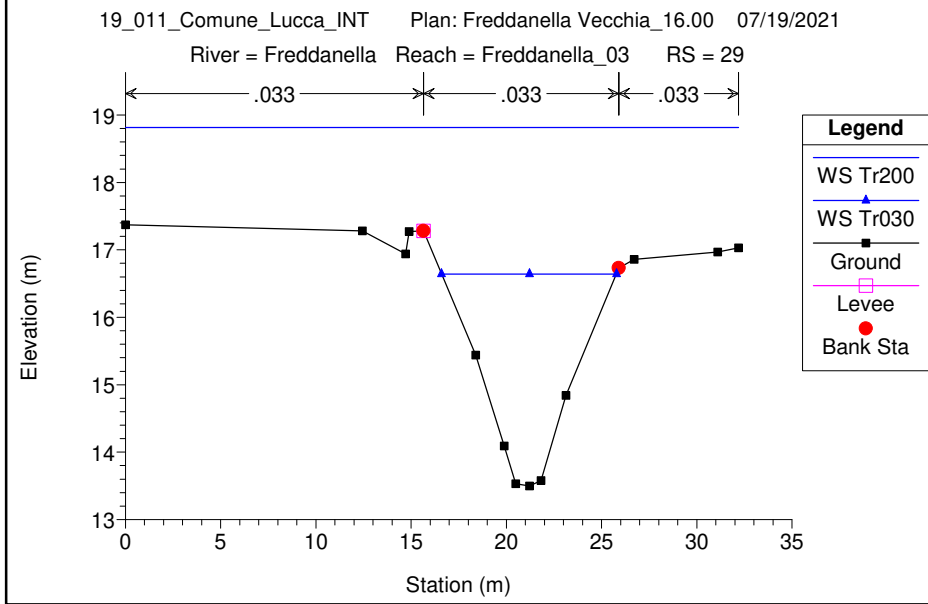
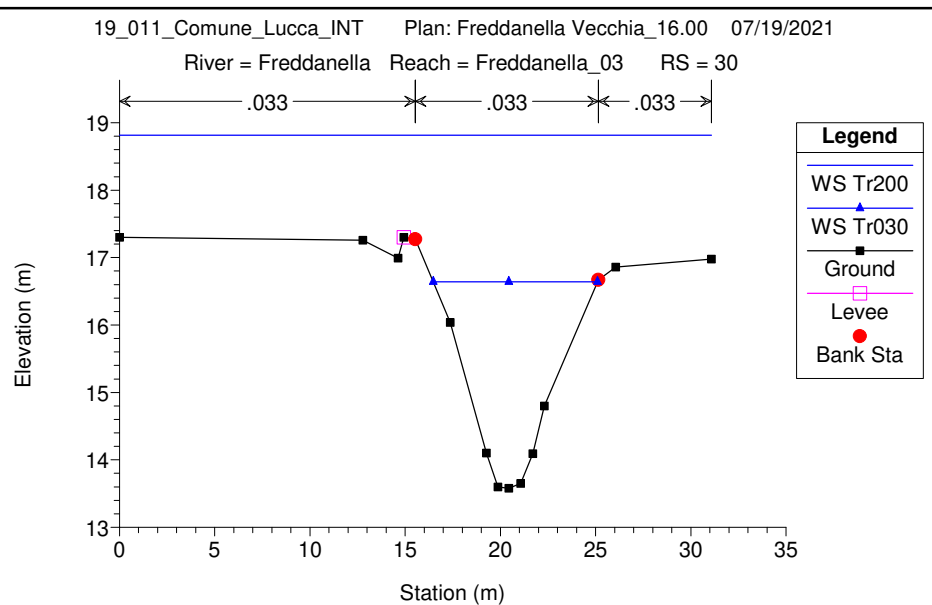
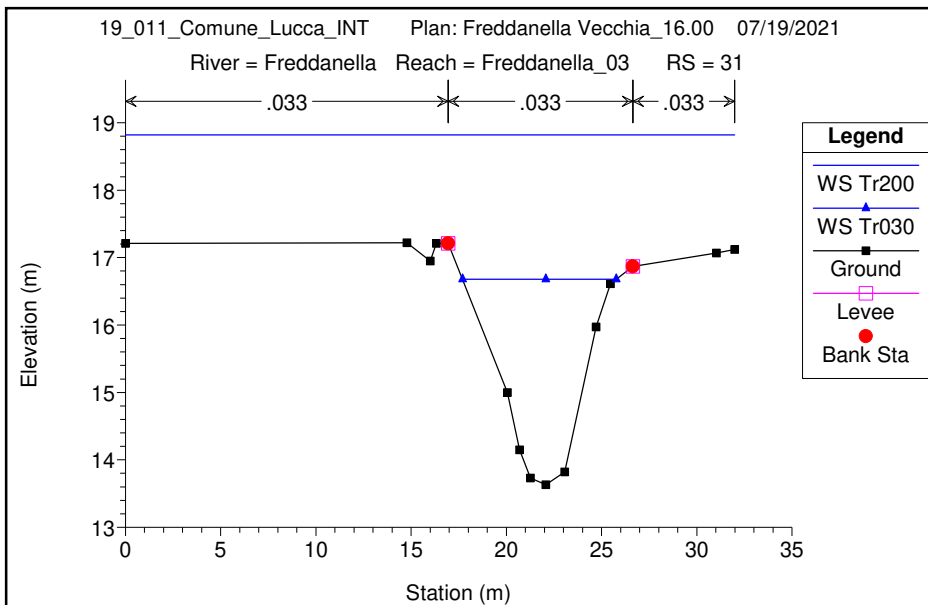


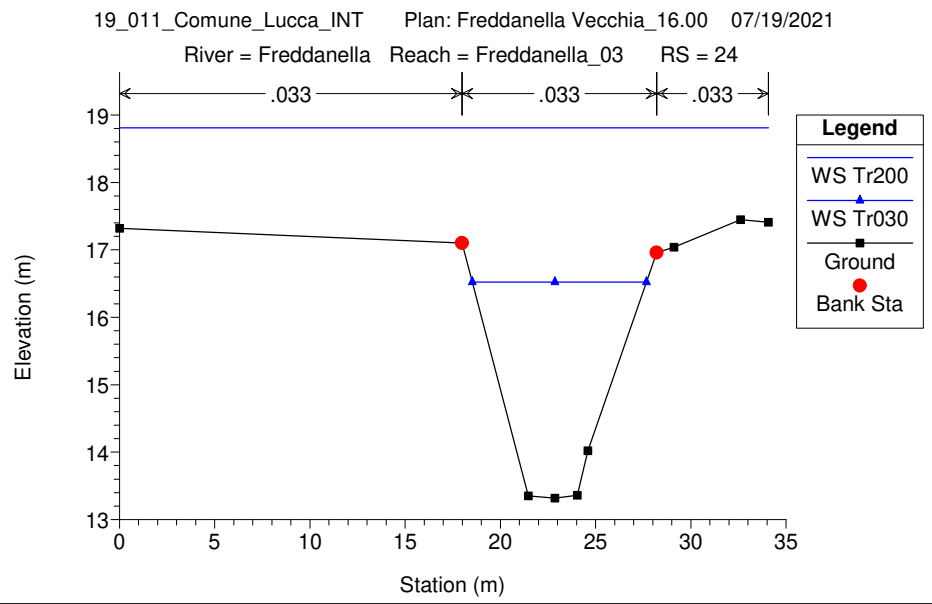
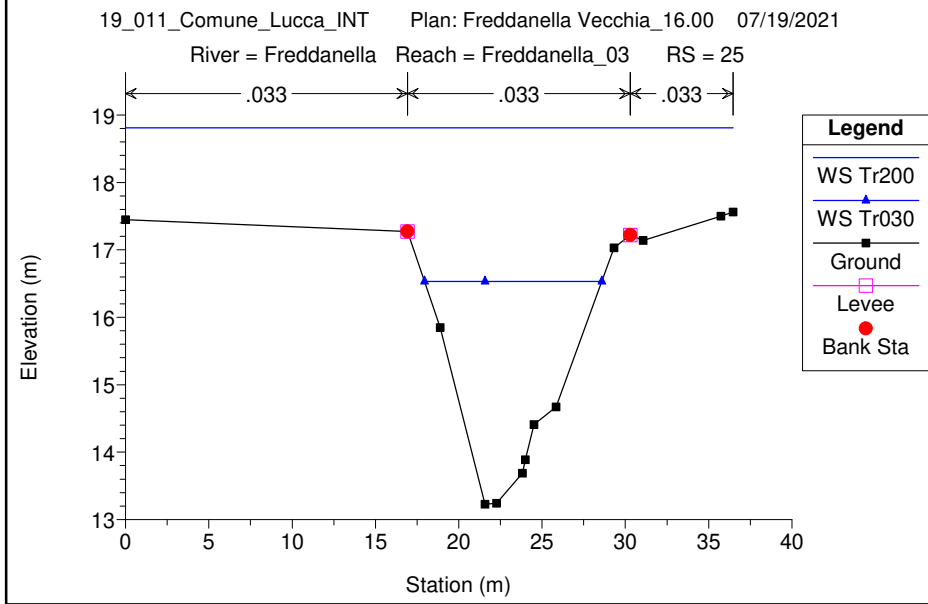
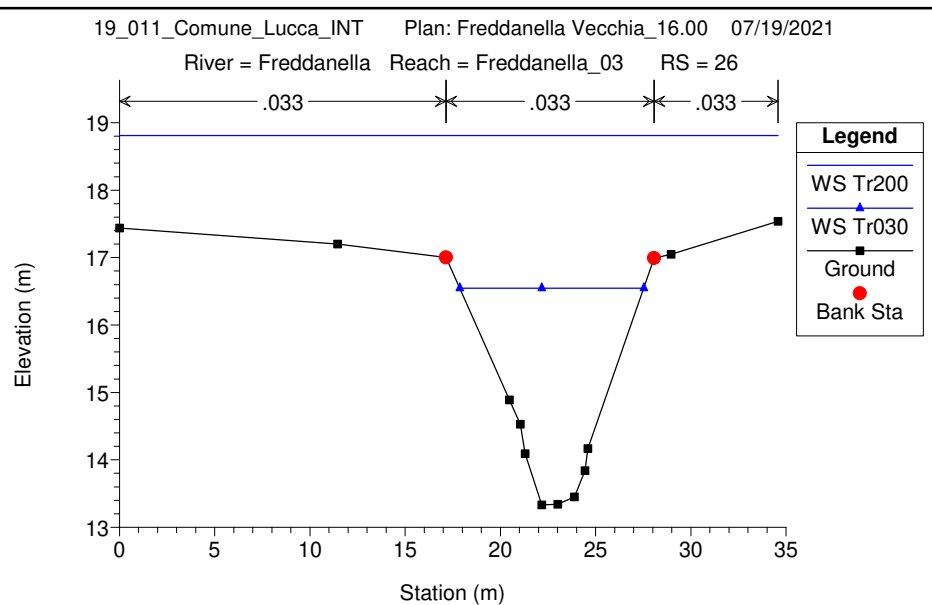
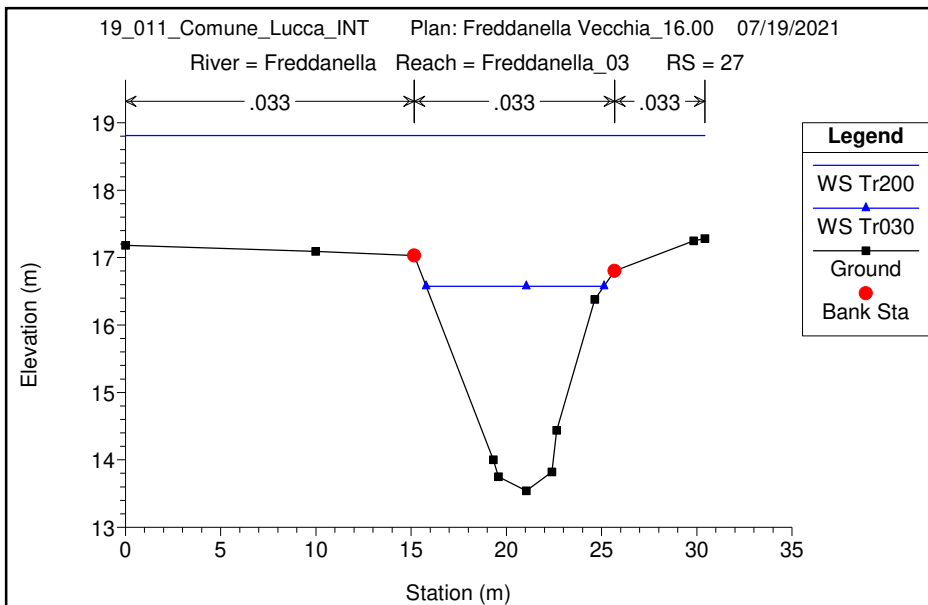


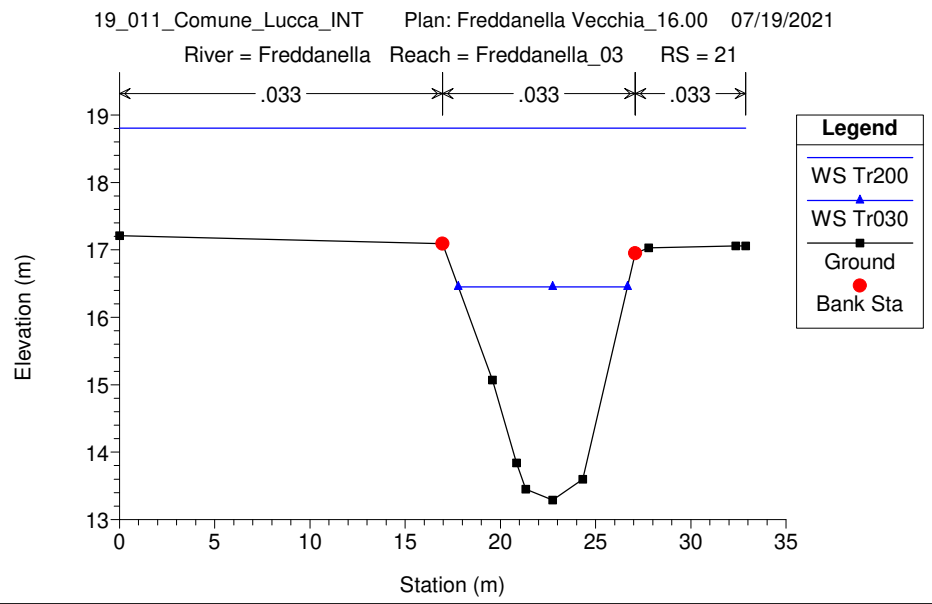
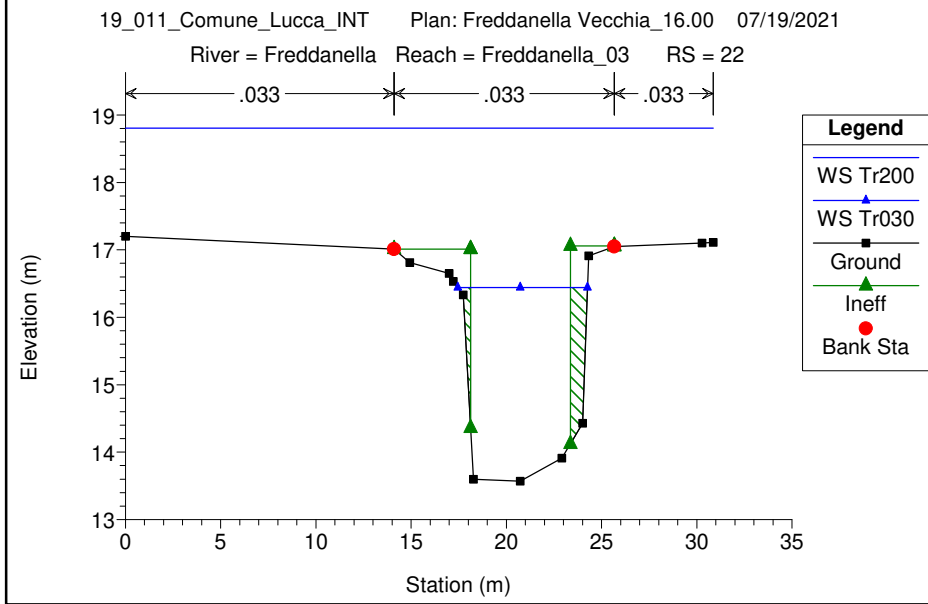
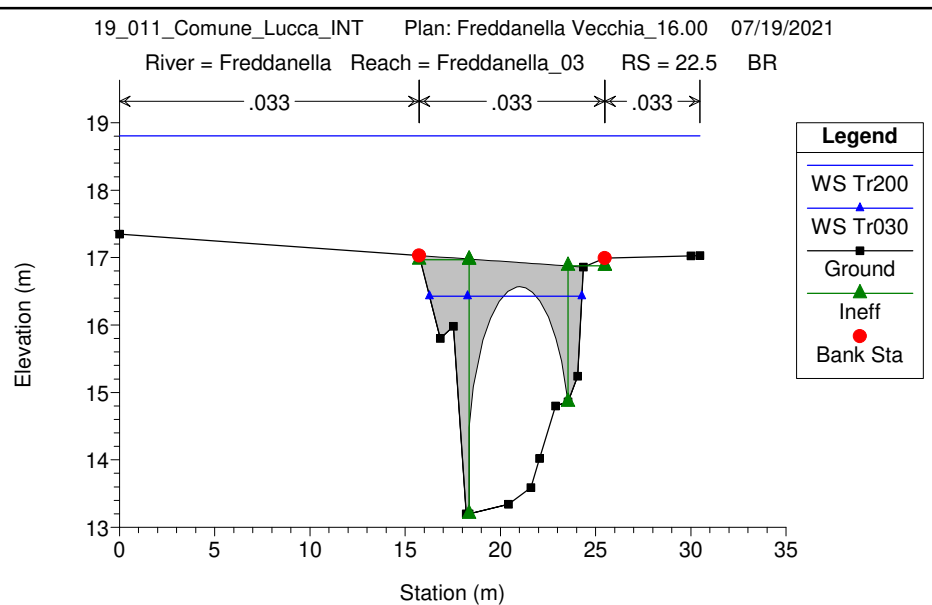
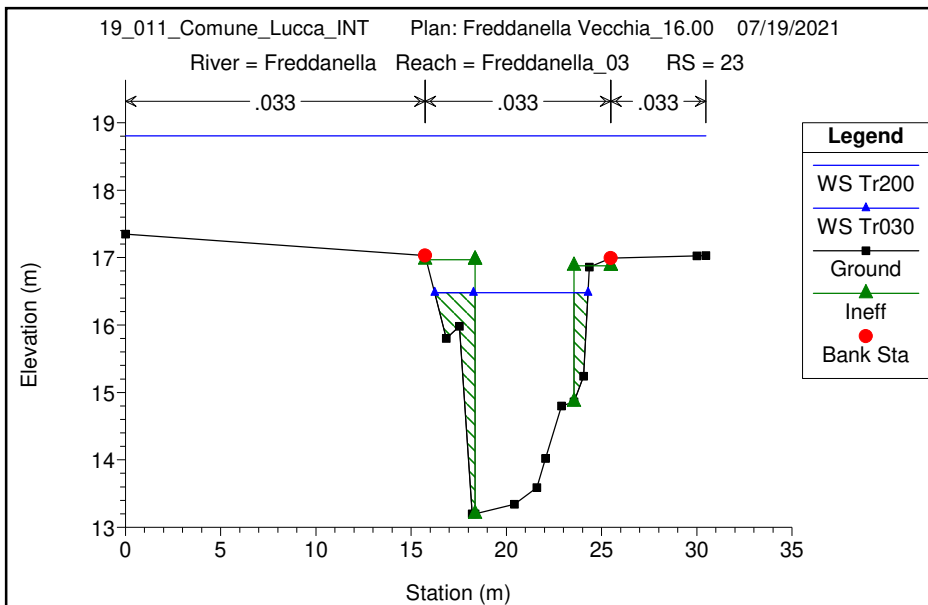


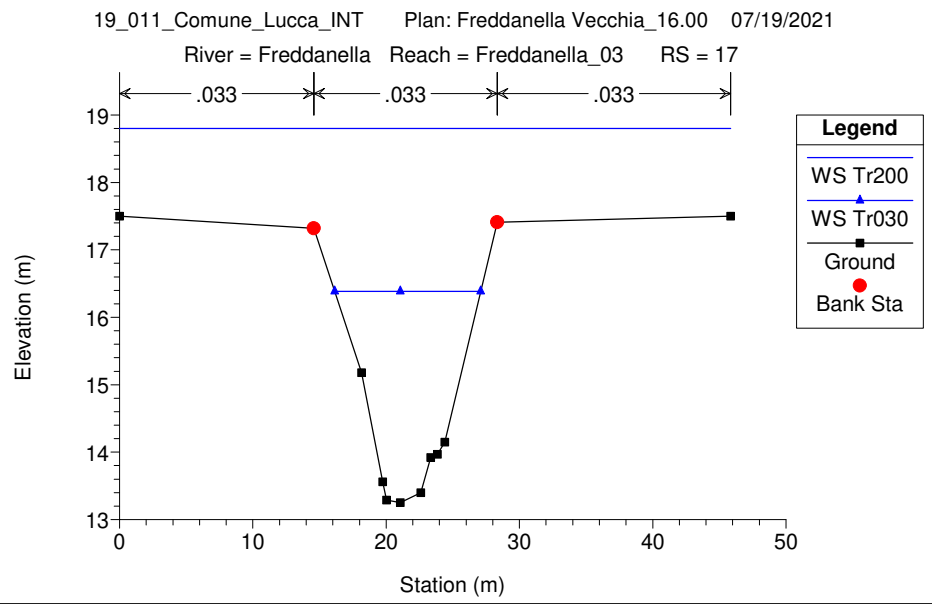
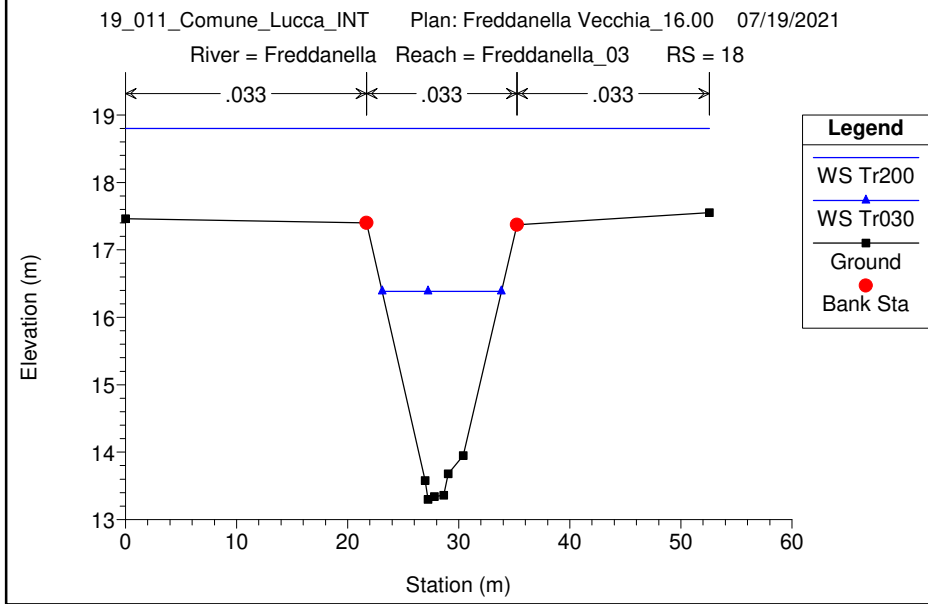
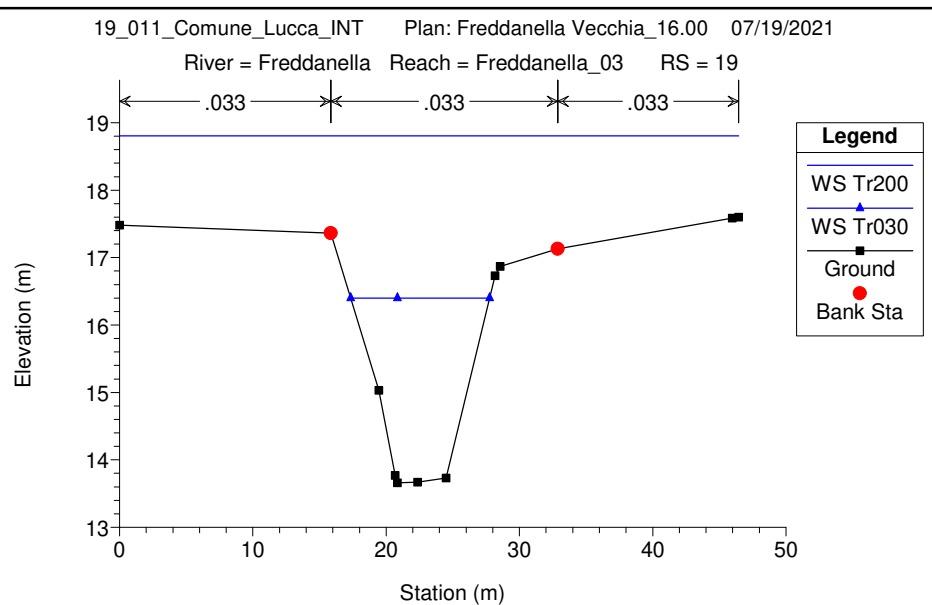
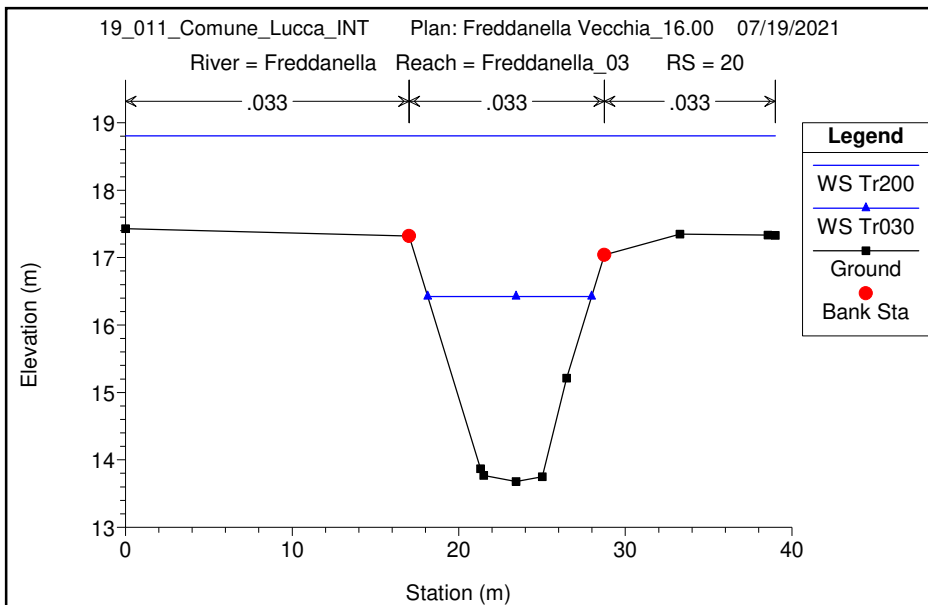


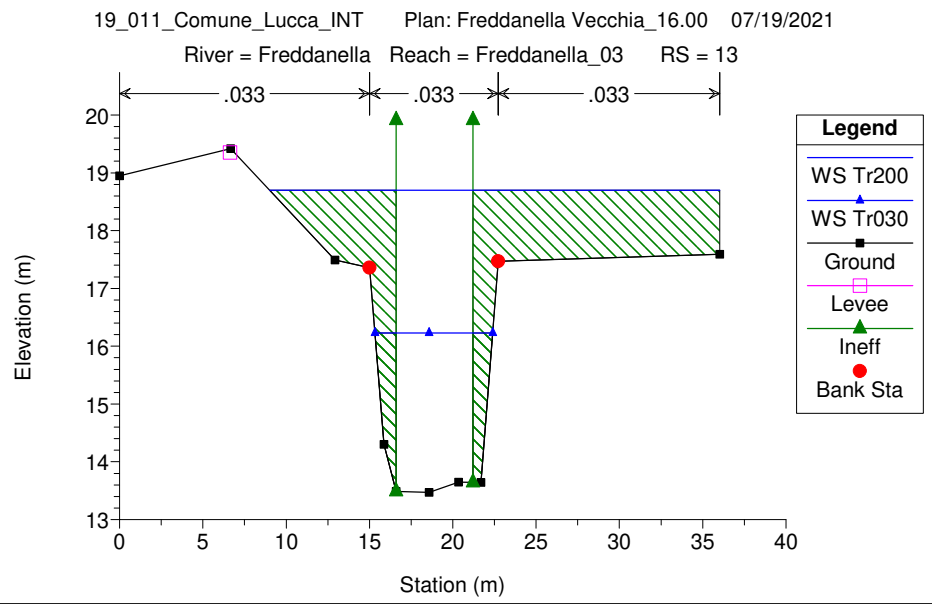
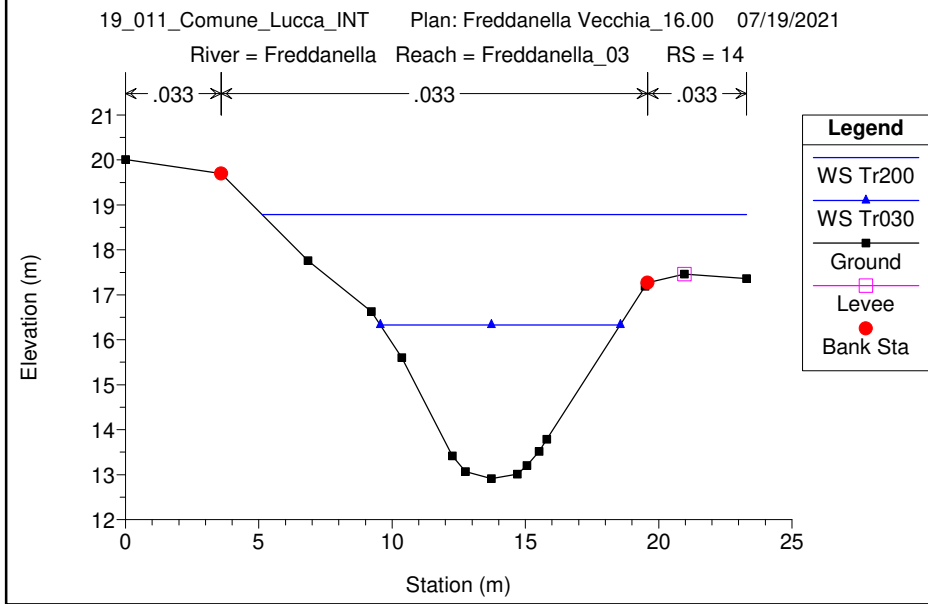
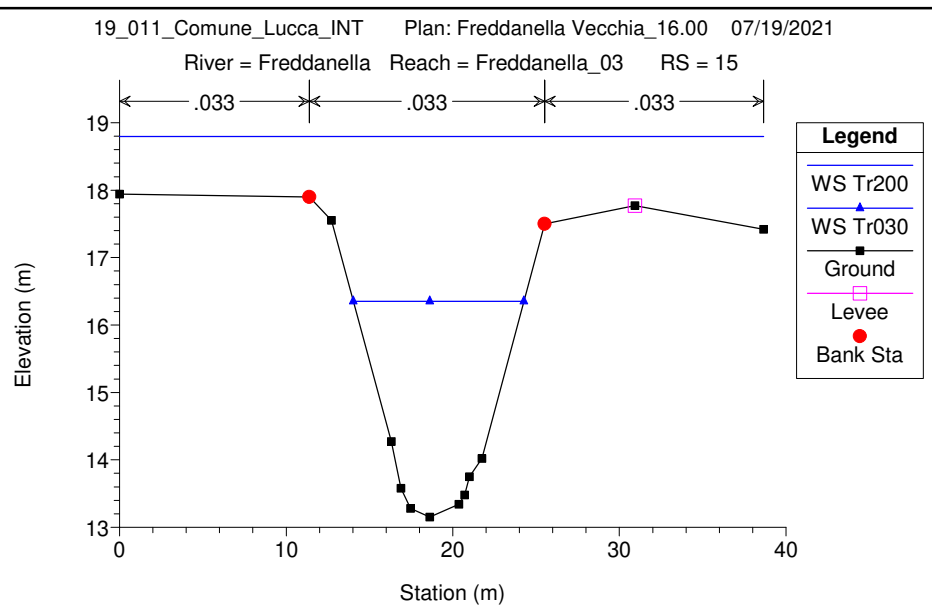
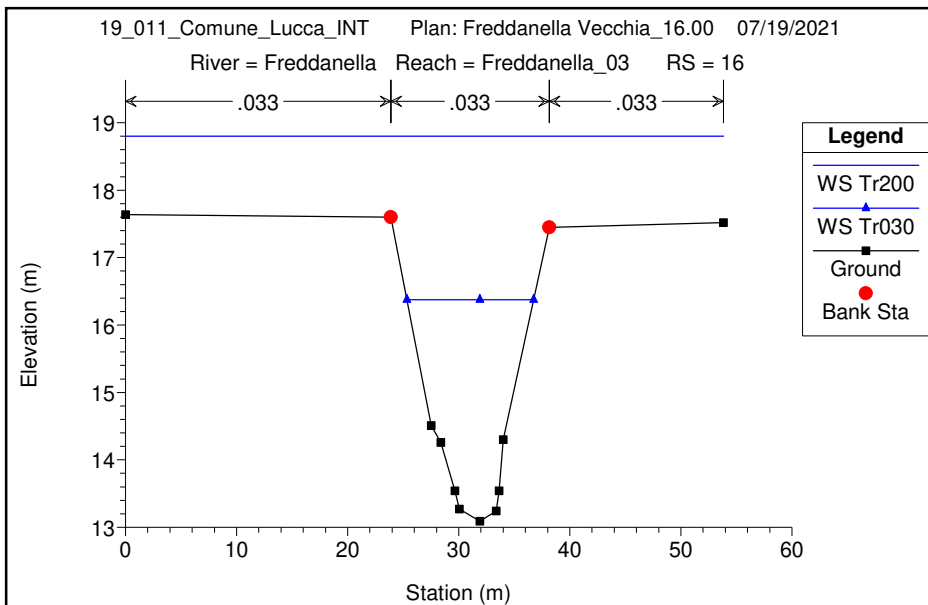


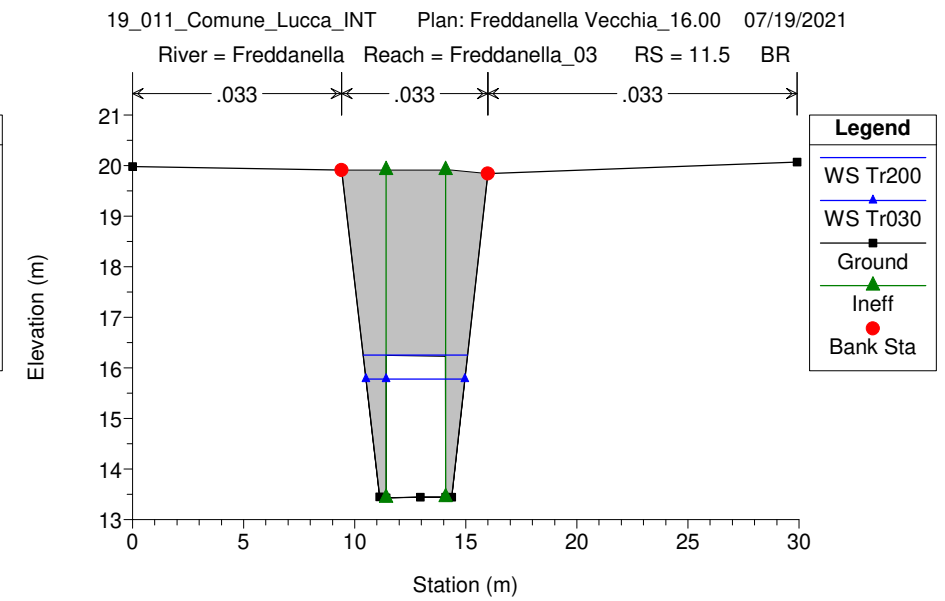
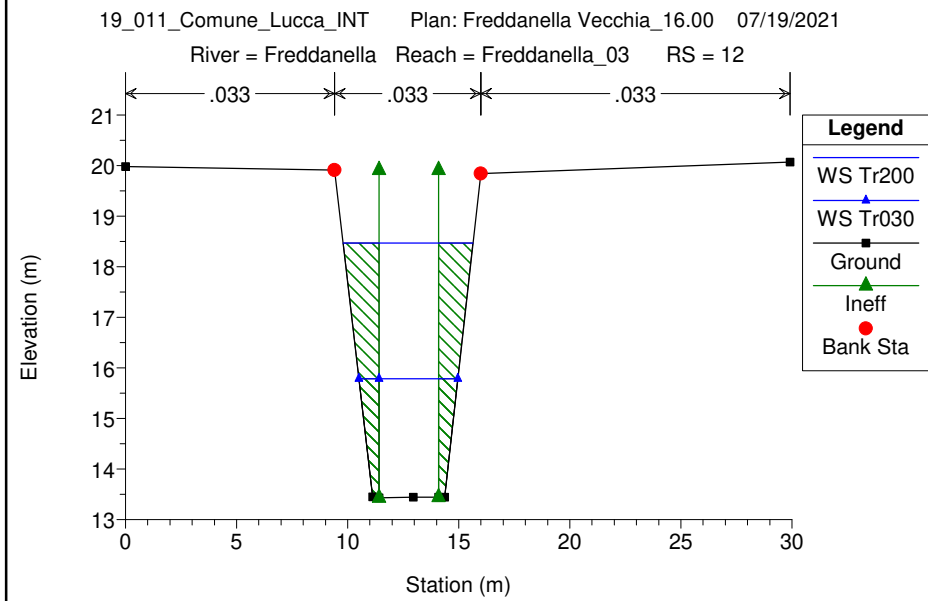
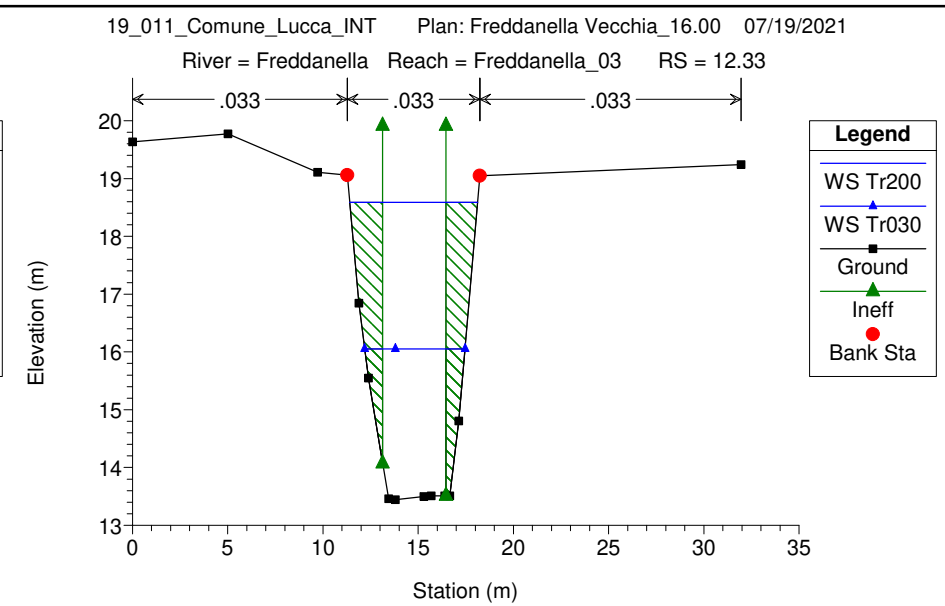
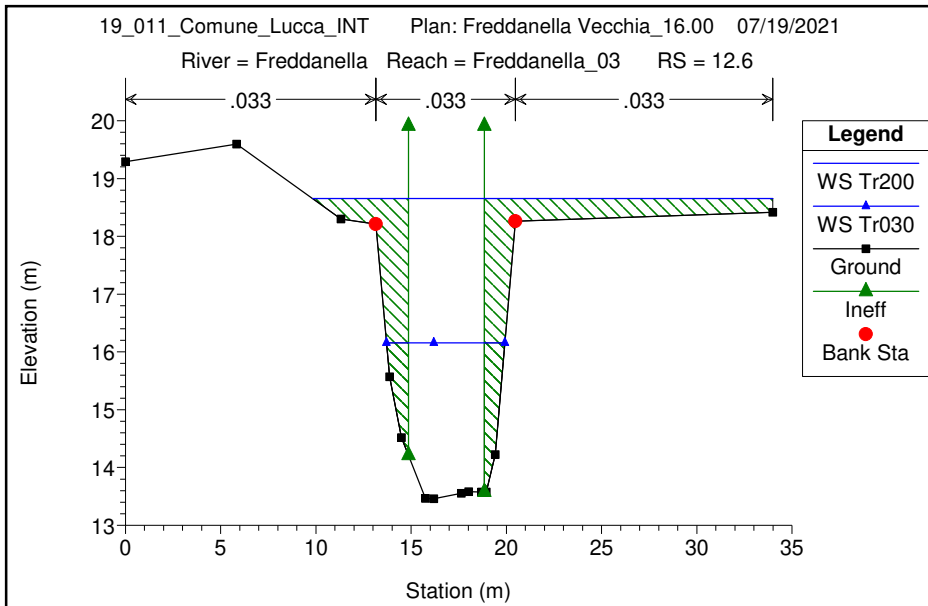


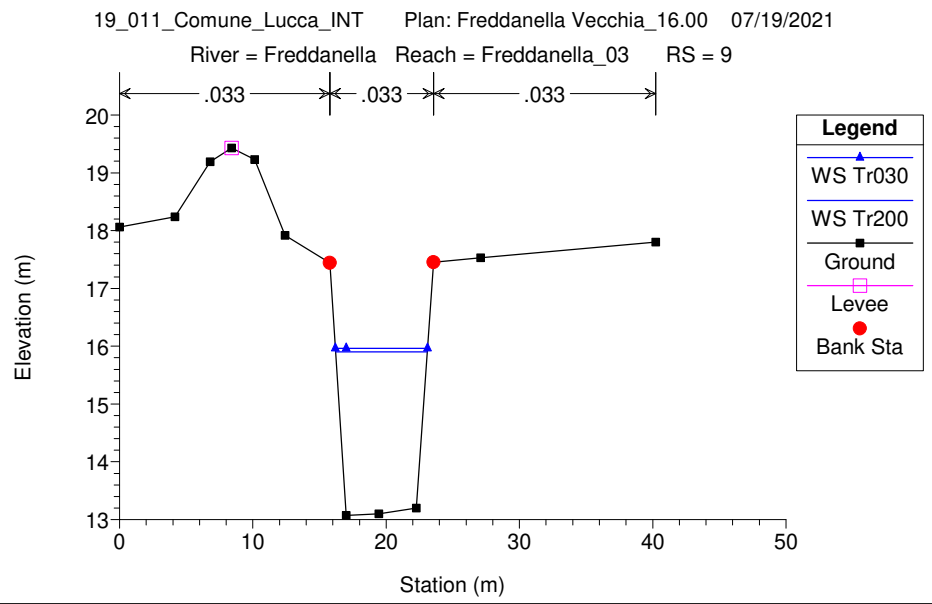
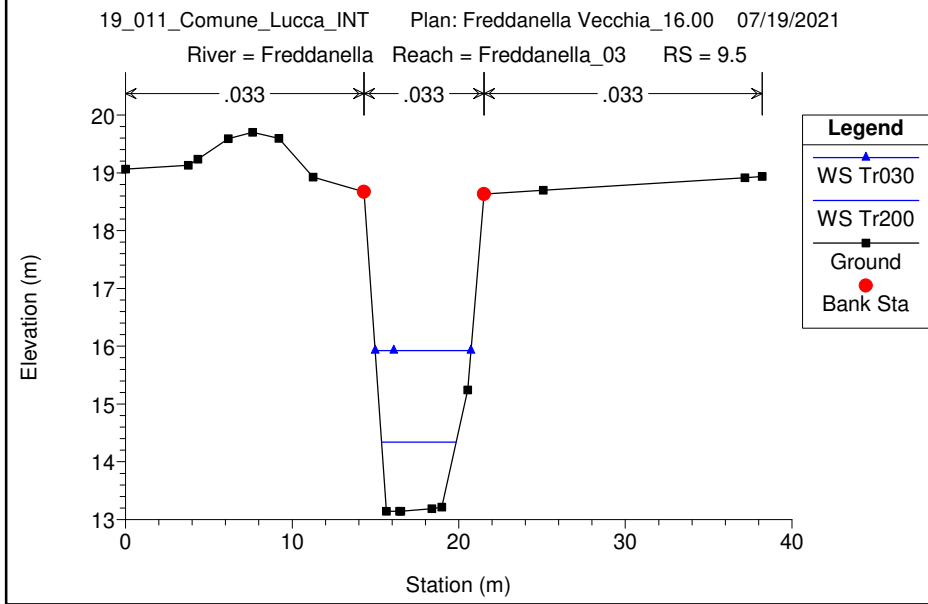
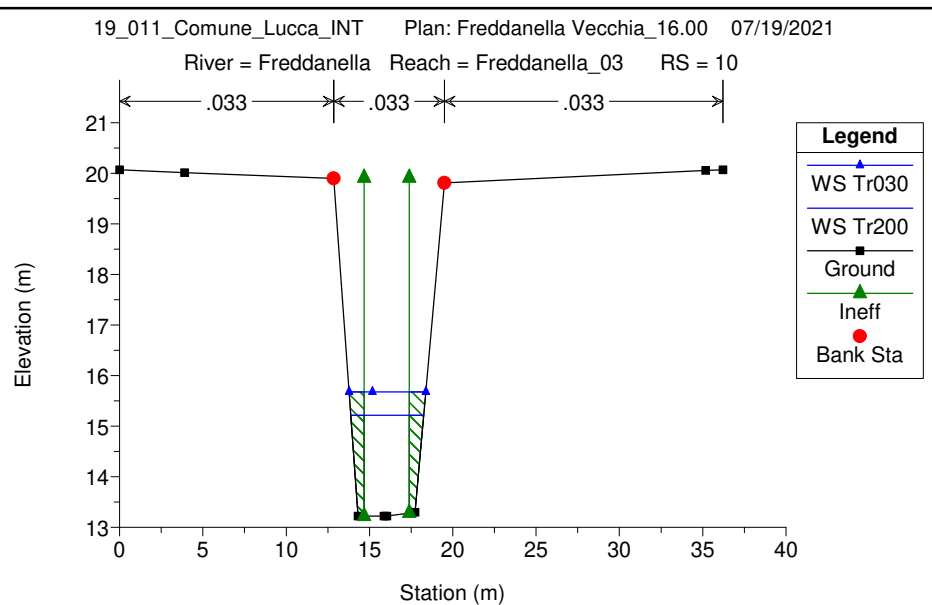
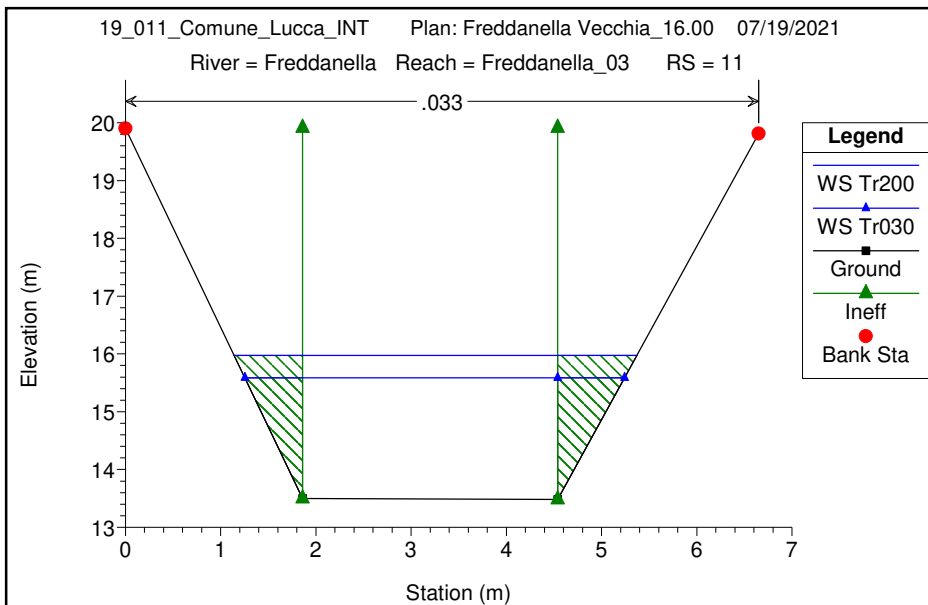


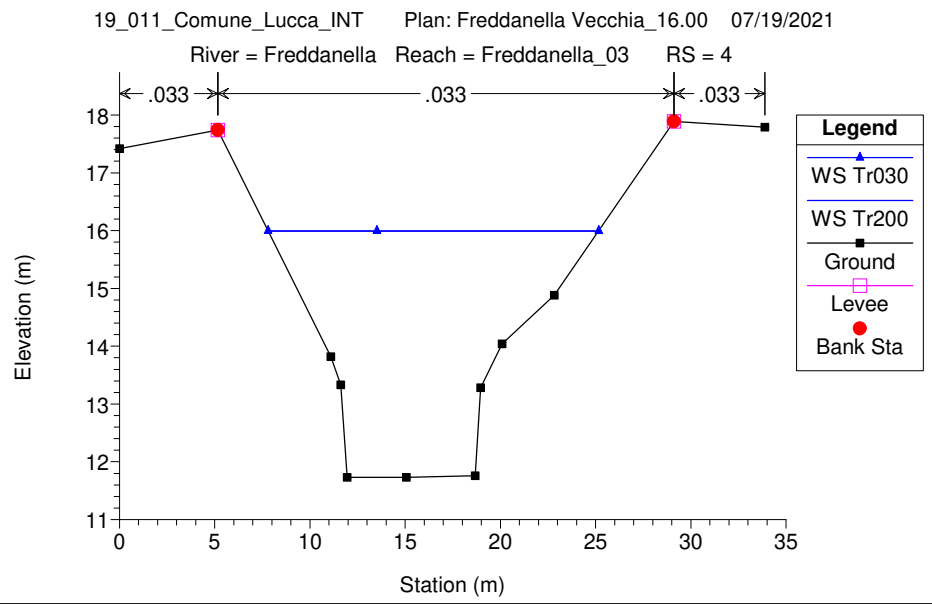
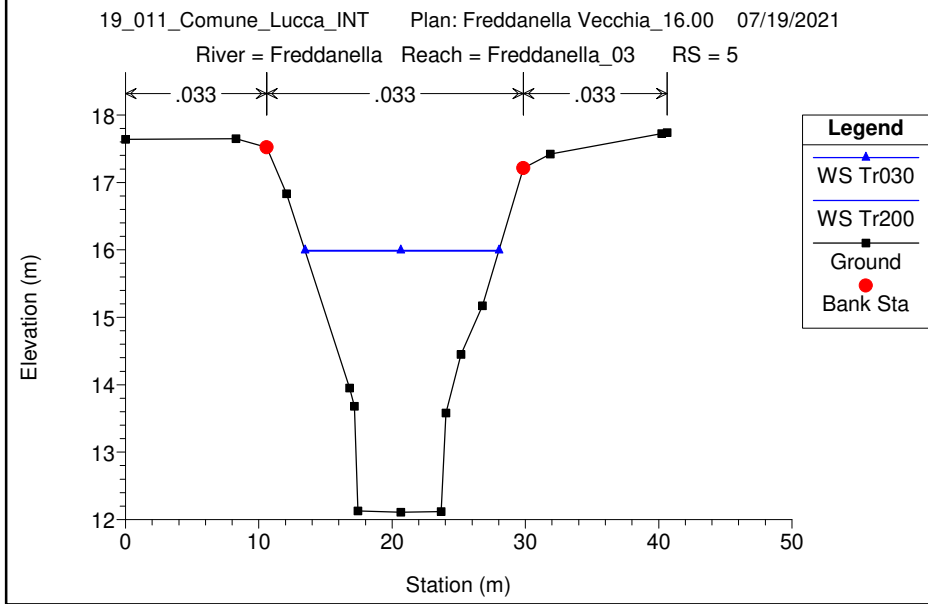
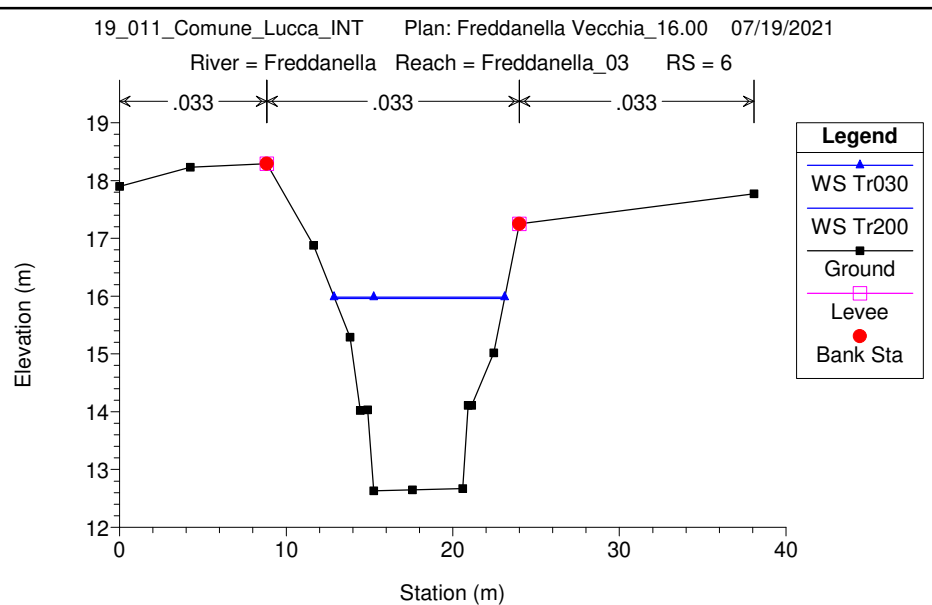
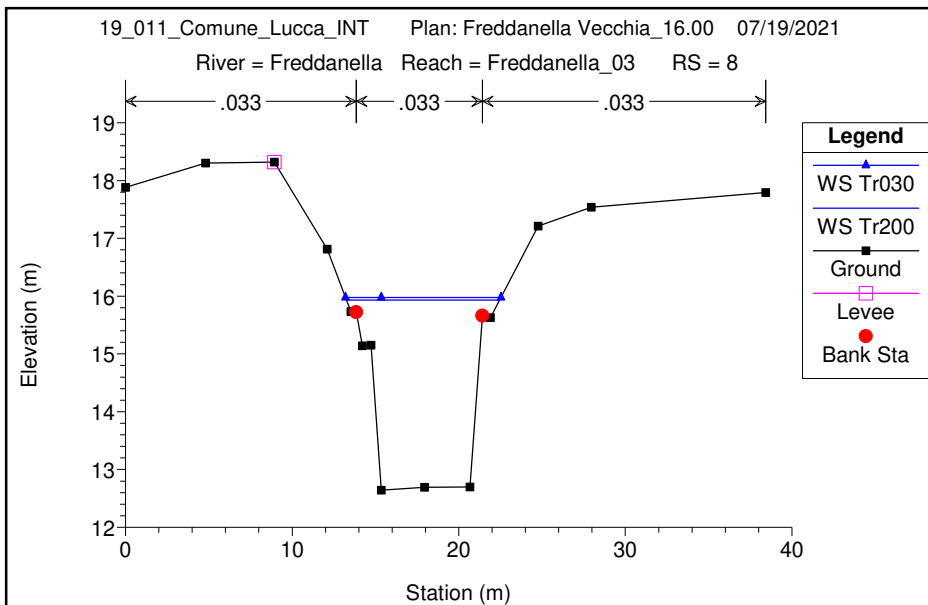




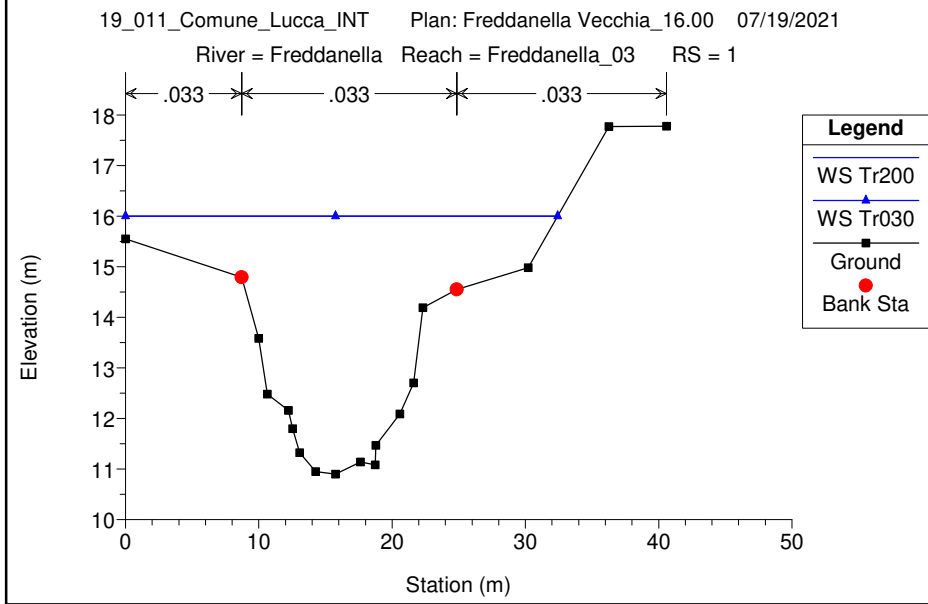
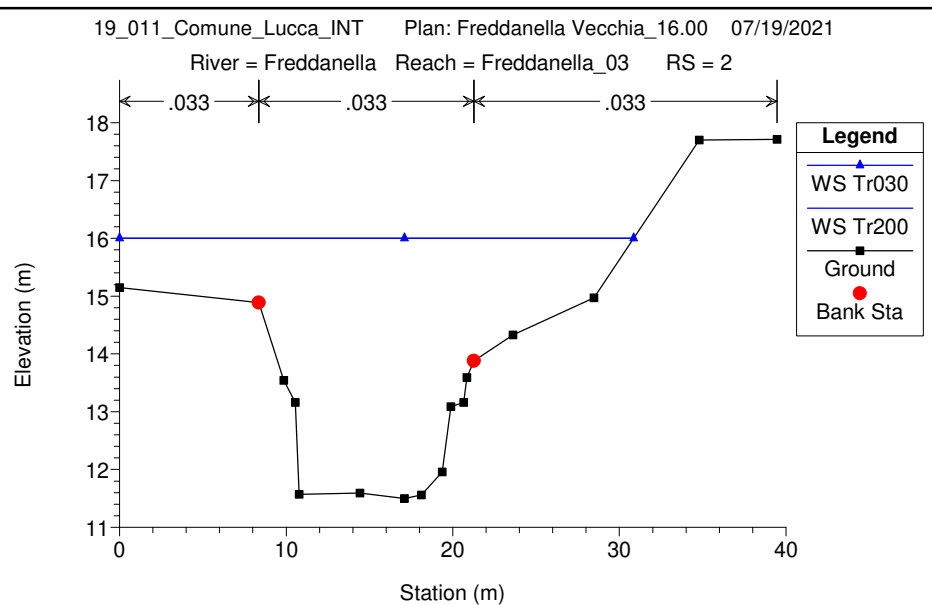
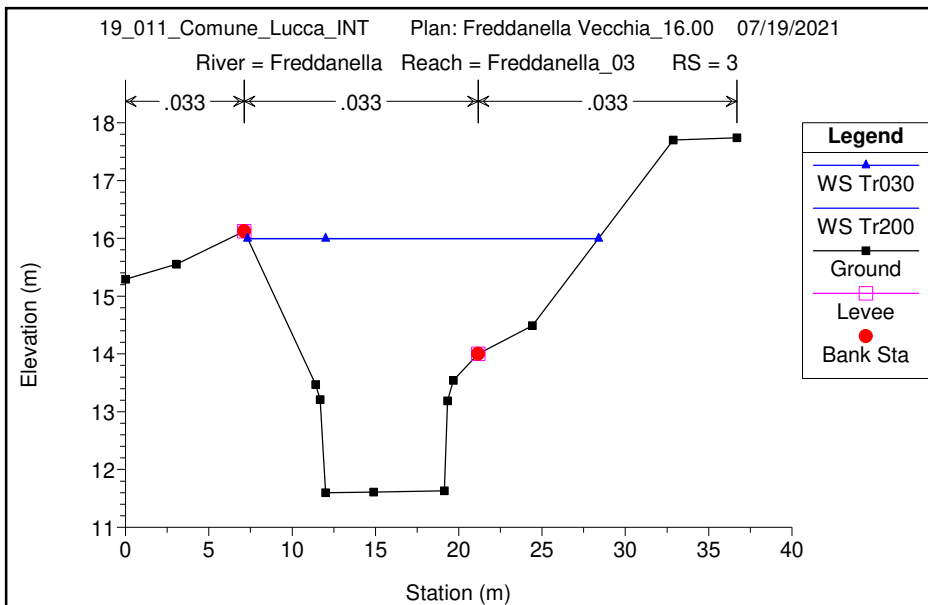














**OUTPUT IDRAULICI RELATIVI  
AL SISTEMA RIO FREDDANELLA S. ALESSIO  
“Freddannella Vecchia”**



HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	69	Tr200	0.10	13.87	18.86	4.99	15.24	15.65	-3.62	-3.21	0.00	0.00	9.20
Freddanella_03	69	Tr030	0.10	13.87	17.00	3.13	15.24	15.65	-1.76	-1.35	0.00	0.00	9.20
Freddanella_03	68.75	Tr200	0.10	13.90	18.86	4.95	15.41	15.78	-3.45	-3.08	0.00	0.00	9.20
Freddanella_03	68.75	Tr030	0.10	13.90	17.00	3.10	15.41	15.78	-1.59	-1.22	0.00	0.00	9.20
Freddanella_03	68.50	Tr200	0.10	13.94	18.86	4.92	15.58	15.91	-3.28	-2.95	0.00	0.00	9.20
Freddanella_03	68.50	Tr030	0.10	13.94	17.00	3.06	15.58	15.91	-1.42	-1.09	0.00	0.00	9.20
Freddanella_03	68.25	Tr200	0.10	13.98	18.86	4.88	15.75	16.04	-3.11	-2.82	0.00	0.00	9.20
Freddanella_03	68.25	Tr030	0.10	13.98	17.00	3.03	15.75	16.04	-1.25	-0.96	0.00	0.00	9.20
Freddanella_03	68	Tr200	0.10	14.01	18.86	4.85	15.92	16.17	-2.94	-2.69	0.00	0.00	0.40
Freddanella_03	68	Tr030	0.10	14.01	17.00	2.99	15.92	16.17	-1.08	-0.83	0.00	0.00	0.40
Freddanella_03	67	Tr200	0.10	14.04	18.86	4.82	16.38	16.17	-2.48	-2.69	0.00	0.00	2.30
Freddanella_03	67	Tr030	0.10	14.04	17.00	2.96	16.38	16.17	-0.62	-0.83	0.00	0.00	2.30
Freddanella_03	66	Tr200	0.10	13.94	18.86	4.92	16.40	16.33	-2.46	-2.53	0.00	0.00	1.67
Freddanella_03	66	Tr030	0.10	13.94	17.00	3.06	16.40	16.33	-0.60	-0.67	0.01	0.00	1.67
Freddanella_03	65.66	Tr200	0.10	13.92	18.86	4.94	17.33	17.30	-1.53	-1.55	0.00	0.00	1.67
Freddanella_03	65.66	Tr030	0.10	13.92	17.00	3.09	17.33	17.30	0.33	0.30	0.01	0.00	1.67
Freddanella_03	65.33	Tr200	0.10	13.89	18.86	4.96	18.26	18.28	-0.60	-0.58	0.01	0.00	1.67
Freddanella_03	65.33	Tr030	0.10	13.89	17.00	3.11	18.26	18.28	1.26	1.27	0.01	0.00	1.67
Freddanella_03	65	Tr200	0.10	13.87	18.86	4.99	19.19	19.25	0.33	0.39	0.01	0.00	0.05
Freddanella_03	65	Tr030	0.10	13.87	17.00	3.13	19.19	19.25	2.19	2.25	0.01	0.00	0.05
Freddanella_03	64.8		Bridge										
Freddanella_03	64.50	Tr200	0.10	13.87	18.86	4.99	19.19	19.25	0.33	0.39	0.01	0.00	1.70
Freddanella_03	64.50	Tr030	0.10	13.87	17.00	3.13	19.19	19.25	2.19	2.25	0.01	0.00	1.70
Freddanella_03	64.33	Tr200	0.10	13.93	18.86	4.92	18.46	18.44	-0.39	-0.42	0.01	0.00	1.70
Freddanella_03	64.33	Tr030	0.10	13.93	17.00	3.07	18.46	18.44	1.46	1.44	0.01	0.00	1.70
Freddanella_03	64.16	Tr200	0.10	14.00	18.86	4.86	17.74	17.63	-1.12	-1.23	0.00	0.00	1.70
Freddanella_03	64.16	Tr030	0.10	14.00	17.00	3.01	17.74	17.63	0.73	0.63	0.01	0.00	1.70
Freddanella_03	64	Tr200	0.10	14.06	18.86	4.80	17.01	16.82	-1.85	-2.04	0.00	0.00	2.90

HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	64	Tr030	0.10	14.06	17.00	2.94	17.01	16.82	0.01	-0.18	0.01	0.00	2.90
Freddanella_03	63	Tr200	0.10	13.99	18.86	4.87	16.36	16.38	-2.50	-2.48	0.00	0.00	0.30
Freddanella_03	63	Tr030	0.10	13.99	17.00	3.01	16.36	16.38	-0.64	-0.62	0.01	0.00	0.30
Freddanella_03	62	Tr200	0.10	14.01	18.86	4.85	17.00	16.81	-1.86	-2.05	0.00	0.00	7.50
Freddanella_03	62	Tr030	0.10	14.01	17.00	2.99	17.00	16.81	0.00	-0.19	0.01	0.00	7.50
Freddanella_03	61	Tr200	4.00	14.34	18.86	4.52	16.83	16.85	-2.03	-2.01	0.05	0.01	30.30
Freddanella_03	61	Tr030	2.60	14.34	17.00	2.66	16.83	16.85	-0.17	-0.15	0.15	0.04	30.30
Freddanella_03	60	Tr200	4.00	14.12	18.86	4.74	16.86	16.78	-2.00	-2.08	0.05	0.01	34.90
Freddanella_03	60	Tr030	2.60	14.12	17.00	2.88	16.86	16.78	-0.14	-0.22	0.18	0.04	34.90
Freddanella_03	59	Tr200	4.00	14.11	18.86	4.75	16.58	16.77	-2.28	-2.09	0.05	0.01	38.10
Freddanella_03	59	Tr030	2.60	14.11	17.00	2.89	16.58	16.77	-0.42	-0.23	0.15	0.03	38.10
Freddanella_03	58	Tr200	4.00	14.13	18.86	4.73	16.82	16.96	-2.04	-1.90	0.05	0.01	37.50
Freddanella_03	58	Tr030	2.60	14.13	17.00	2.87	16.82	16.96	-0.18	-0.04	0.18	0.04	37.50
Freddanella_03	57	Tr200	4.00	14.07	18.86	4.79	17.17	17.15	-1.69	-1.71	0.07	0.01	25.40
Freddanella_03	57	Tr030	2.60	14.07	17.00	2.93	17.17	17.15	0.17	0.15	0.17	0.04	25.40
Freddanella_03	56	Tr200	4.00	14.11	18.86	4.75	17.26	17.30	-1.60	-1.56	0.07	0.01	34.20
Freddanella_03	56	Tr030	2.60	14.11	17.00	2.89	17.26	17.30	0.26	0.30	0.18	0.04	34.20
Freddanella_03	55	Tr200	4.00	14.20	18.86	4.66	17.33	17.42	-1.53	-1.44	0.08	0.01	34.70
Freddanella_03	55	Tr030	2.60	14.20	17.00	2.80	17.33	17.42	0.33	0.42	0.16	0.04	34.70
Freddanella_03	54	Tr200	4.00	14.19	18.86	4.67	17.16	17.32	-1.70	-1.54	0.07	0.01	29.00
Freddanella_03	54	Tr030	2.60	14.19	17.00	2.81	17.16	17.32	0.16	0.32	0.19	0.05	29.00
Freddanella_03	53	Tr200	4.00	14.23	18.86	4.63	17.33	17.24	-1.53	-1.62	0.07	0.01	35.10
Freddanella_03	53	Tr030	2.60	14.23	17.00	2.77	17.33	17.24	0.34	0.25	0.18	0.05	35.10
Freddanella_03	52	Tr200	4.00	14.27	18.86	4.59	17.58	17.17	-1.28	-1.69	0.08	0.01	23.00
Freddanella_03	52	Tr030	2.60	14.27	16.99	2.72	17.58	17.17	0.59	0.18	0.19	0.04	23.00
Freddanella_03	51	Tr200	4.00	14.15	18.86	4.71	17.81	17.73	-1.05	-1.13	0.07	0.01	2.60
Freddanella_03	51	Tr030	2.60	14.15	16.99	2.84	17.81	17.73	0.82	0.74	0.15	0.04	2.60
Freddanella_03	50	Tr200	4.40	14.16	18.86	4.70	17.98	17.89	-0.88	-0.97	0.12	0.02	0.10

HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	50	Tr030	2.70	14.16	16.99	2.83	17.98	17.89	0.99	0.90	0.21	0.04	0.10
Freddanella_03	49.5		Bridge										
Freddanella_03	49	Tr200	4.40	14.19	18.86	4.67	18.25	18.18	-0.61	-0.68	0.12	0.02	10.70
Freddanella_03	49	Tr030	2.70	14.19	16.99	2.80	18.25	18.18	1.26	1.19	0.20	0.04	10.70
Freddanella_03	48	Tr200	4.40	14.08	18.86	4.78	17.54	17.55	-1.32	-1.31	0.10	0.02	38.50
Freddanella_03	48	Tr030	2.70	14.08	16.99	2.91	17.54	17.55	0.55	0.56	0.17	0.04	38.50
Freddanella_03	47	Tr200	4.40	14.12	18.86	4.74	17.20	17.32	-1.66	-1.54	0.07	0.01	17.10
Freddanella_03	47	Tr030	2.70	14.12	16.99	2.87	17.20	17.32	0.21	0.33	0.18	0.04	17.10
Freddanella_03	46	Tr200	4.40	14.01	18.86	4.85	17.22	17.69	-1.64	-1.17	0.07	0.01	30.00
Freddanella_03	46	Tr030	2.70	14.01	16.99	2.98	17.22	17.69	0.23	0.70	0.18	0.05	30.00
Freddanella_03	45	Tr200	4.40	13.96	18.86	4.90	17.27	17.74	-1.59	-1.12	0.08	0.01	9.30
Freddanella_03	45	Tr030	2.70	13.96	16.99	3.03	17.27	17.74	0.28	0.75	0.18	0.04	9.30
Freddanella_03	44	Tr200	4.40	14.31	18.86	4.55	17.05	17.78	-1.81	-1.08	0.10	0.02	19.60
Freddanella_03	44	Tr030	2.70	14.31	16.99	2.68	17.05	17.78	0.06	0.79	0.17	0.04	19.60
Freddanella_03	43	Tr200	4.40	14.10	18.86	4.76	17.28	17.74	-1.58	-1.12	0.08	0.01	8.50
Freddanella_03	43	Tr030	2.70	14.10	16.99	2.89	17.28	17.74	0.29	0.75	0.19	0.05	8.50
Freddanella_03	42	Tr200	4.40	14.05	18.86	4.81	17.24	17.45	-1.62	-1.41	0.11	0.02	9.07
Freddanella_03	42	Tr030	2.70	14.05	16.99	2.94	17.24	17.45	0.25	0.46	0.19	0.05	9.07
Freddanella_03	41	Tr200	4.40	13.63	18.86	5.23	17.25	16.93	-1.61	-1.93	0.10	0.02	14.50
Freddanella_03	41	Tr030	2.70	13.63	16.99	3.36	17.25	16.93	0.26	-0.06	0.15	0.04	14.50
Freddanella_03	40	Tr200	4.40	14.42	18.86	4.44	17.47	17.33	-1.39	-1.53	0.09	0.02	9.50
Freddanella_03	40	Tr030	2.70	14.42	16.99	2.57	17.47	17.33	0.48	0.34	0.19	0.05	9.50
Freddanella_03	39	Tr200	30.00	14.44	18.83	4.39	17.35	17.36	-1.48	-1.47	0.67	0.12	27.10
Freddanella_03	39	Tr030	18.90	14.44	16.88	2.44	17.35	17.36	0.47	0.48	1.39	0.35	27.10
Freddanella_03	38	Tr200	30.00	14.34	18.83	4.49	17.38	17.57	-1.45	-1.26	0.64	0.11	1.90
Freddanella_03	38	Tr030	18.90	14.34	16.85	2.51	17.38	17.57	0.53	0.72	1.35	0.33	1.90
Freddanella_03	37	Tr200	30.00	14.34	18.84	4.50	17.58	17.51	-1.26	-1.33	0.47	0.08	12.00
Freddanella_03	37	Tr030	18.90	14.34	16.85	2.51	17.58	17.51	0.73	0.66	1.29	0.32	12.00

HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	36	Tr200	30.00	14.22	18.83	4.61	17.40	16.90	-1.43	-1.93	0.66	0.11	6.70
Freddanella_03	36	Tr030	18.90	14.22	16.82	2.60	17.40	16.90	0.58	0.08	1.35	0.33	6.70
Freddanella_03	35	Tr200	30.00	13.99	18.82	4.83	17.55	16.99	-1.27	-1.83	0.74	0.13	23.20
Freddanella_03	35	Tr030	18.90	13.99	16.82	2.83	17.55	16.99	0.73	0.16	1.25	0.30	23.20
Freddanella_03	34	Tr200	30.00	13.97	18.82	4.85	17.59	16.89	-1.23	-1.93	0.63	0.11	17.20
Freddanella_03	34	Tr030	18.90	13.97	16.80	2.83	17.59	16.89	0.79	0.09	1.23	0.30	17.20
Freddanella_03	33	Tr200	30.00	14.24	18.82	4.58	17.64	16.91	-1.18	-1.91	0.57	0.10	29.70
Freddanella_03	33	Tr030	18.90	14.24	16.78	2.54	17.64	16.91	0.86	0.13	1.25	0.30	29.70
Freddanella_03	32	Tr200	30.00	14.03	18.82	4.79	17.21	16.92	-1.61	-1.90	0.49	0.08	35.20
Freddanella_03	32	Tr030	18.90	14.03	16.74	2.71	17.21	16.92	0.47	0.18	1.27	0.32	35.20
Freddanella_03	31	Tr200	30.00	13.63	18.82	5.19	17.21	16.87	-1.61	-1.95	0.52	0.09	31.20
Freddanella_03	31	Tr030	18.90	13.63	16.68	3.05	17.21	16.87	0.53	0.19	1.40	0.35	31.20
Freddanella_03	30	Tr200	30.00	13.58	18.82	5.24	17.27	16.67	-1.55	-2.15	0.53	0.09	4.80
Freddanella_03	30	Tr030	18.90	13.58	16.64	3.06	17.27	16.67	0.63	0.03	1.33	0.33	4.80
Freddanella_03	29	Tr200	30.00	13.50	18.82	5.32	17.28	16.73	-1.54	-2.09	0.51	0.08	33.00
Freddanella_03	29	Tr030	18.90	13.50	16.64	3.14	17.28	16.73	0.64	0.09	1.23	0.30	33.00
Freddanella_03	28	Tr200	30.00	13.49	18.81	5.32	16.93	16.84	-1.88	-1.98	0.47	0.08	33.50
Freddanella_03	28	Tr030	18.90	13.49	16.60	3.11	16.93	16.84	0.33	0.24	1.29	0.32	33.50
Freddanella_03	27	Tr200	30.00	13.54	18.81	5.27	17.03	16.80	-1.78	-2.01	0.49	0.08	39.00
Freddanella_03	27	Tr030	18.90	13.54	16.57	3.03	17.03	16.80	0.46	0.23	1.15	0.28	39.00
Freddanella_03	26	Tr200	30.00	13.33	18.81	5.48	17.00	16.99	-1.81	-1.82	0.47	0.08	30.40
Freddanella_03	26	Tr030	18.90	13.33	16.54	3.21	17.00	16.99	0.46	0.45	1.10	0.26	30.40
Freddanella_03	25	Tr200	30.00	13.23	18.81	5.58	17.27	17.22	-1.54	-1.59	0.44	0.07	8.70
Freddanella_03	25	Tr030	18.90	13.23	16.53	3.30	17.27	17.22	0.74	0.69	0.96	0.23	8.70
Freddanella_03	24	Tr200	30.00	13.32	18.81	5.49	17.10	16.96	-1.71	-1.85	0.47	0.07	3.50
Freddanella_03	24	Tr030	18.90	13.32	16.52	3.20	17.10	16.96	0.58	0.44	1.03	0.23	3.50
Freddanella_03	23	Tr200	30.00	13.20	18.81	5.61	17.03	16.99	-1.78	-1.82	0.48	0.08	0.05
Freddanella_03	23	Tr030	18.90	13.20	16.48	3.28	17.03	16.99	0.55	0.51	1.33	0.26	0.05



HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	22.5		Bridge										
Freddanella_03	22	Tr200	30.00	13.57	18.81	5.24	17.01	17.05	-1.80	-1.76	0.46	0.08	7.20
Freddanella_03	22	Tr030	18.90	13.57	16.44	2.87	17.01	17.05	0.57	0.61	1.32	0.25	7.20
Freddanella_03	21	Tr200	30.00	13.29	18.81	5.52	17.09	16.95	-1.72	-1.86	0.47	0.07	39.60
Freddanella_03	21	Tr030	18.90	13.29	16.45	3.16	17.09	16.95	0.64	0.50	1.07	0.24	39.60
Freddanella_03	20	Tr200	30.00	13.68	18.80	5.12	17.32	17.04	-1.48	-1.76	0.45	0.07	37.90
Freddanella_03	20	Tr030	18.90	13.68	16.42	2.74	17.32	17.04	0.90	0.62	1.06	0.25	37.90
Freddanella_03	19	Tr200	30.00	13.66	18.80	5.14	17.36	17.13	-1.44	-1.67	0.37	0.07	32.90
Freddanella_03	19	Tr030	18.90	13.66	16.40	2.74	17.36	17.13	0.96	0.73	1.02	0.24	32.90
Freddanella_03	18	Tr200	30.00	13.30	18.80	5.50	17.40	17.37	-1.40	-1.43	0.38	0.06	7.30
Freddanella_03	18	Tr030	18.90	13.30	16.38	3.08	17.40	17.37	1.02	0.99	0.98	0.23	7.30
Freddanella_03	17	Tr200	30.00	13.25	18.80	5.55	17.32	17.41	-1.48	-1.39	0.39	0.06	36.60
Freddanella_03	17	Tr030	18.90	13.25	16.38	3.13	17.32	17.41	0.94	1.03	0.91	0.21	36.60
Freddanella_03	16	Tr200	30.00	13.09	18.80	5.71	17.60	17.45	-1.20	-1.35	0.37	0.06	37.60
Freddanella_03	16	Tr030	18.90	13.09	16.37	3.28	17.60	17.45	1.23	1.08	0.81	0.18	37.60
Freddanella_03	15	Tr200	30.00	13.15	18.79	5.64	17.90	17.50	-0.89	-1.29	0.47	0.08	17.10
Freddanella_03	15	Tr030	18.90	13.15	16.35	3.20	17.90	17.50	1.55	1.15	0.90	0.20	17.10
Freddanella_03	14	Tr200	30.00	12.91	18.79	5.88	19.70	17.27	0.91	-1.52	0.59	0.10	7.80
Freddanella_03	14	Tr030	18.90	12.91	16.33	3.42	19.70	17.27	3.37	0.94	1.02	0.23	7.80
Freddanella_03	13	Tr200	32.90	13.47	18.70	5.23	17.36	17.47	-1.34	-1.23	1.38	0.19	1.37
Freddanella_03	13	Tr030	20.40	13.47	16.23	2.76	17.36	17.47	1.13	1.24	1.64	0.32	1.37
Freddanella_03	12.6	Tr200	32.90	13.46	18.65	5.20	18.21	18.26	-0.44	-0.39	1.64	0.23	1.37
Freddanella_03	12.6	Tr030	20.40	13.46	16.15	2.70	18.21	18.26	2.06	2.11	2.01	0.40	1.37
Freddanella_03	12.33	Tr200	32.90	13.44	18.59	5.15	19.06	19.05	0.47	0.46	1.95	0.28	1.37
Freddanella_03	12.33	Tr030	20.40	13.44	16.05	2.61	19.06	19.05	3.01	3.00	2.41	0.48	1.37
Freddanella_03	12	Tr200	32.90	13.43	18.47	5.04	19.91	19.84	1.44	1.37	2.44	0.35	0.05
Freddanella_03	12	Tr030	20.40	13.43	15.78	2.35	19.91	19.84	4.13	4.06	3.24	0.68	0.05

HEC-RAS Plan: FV\_16.00 River: Freddanella Reach: Freddanella\_03 (Continued)

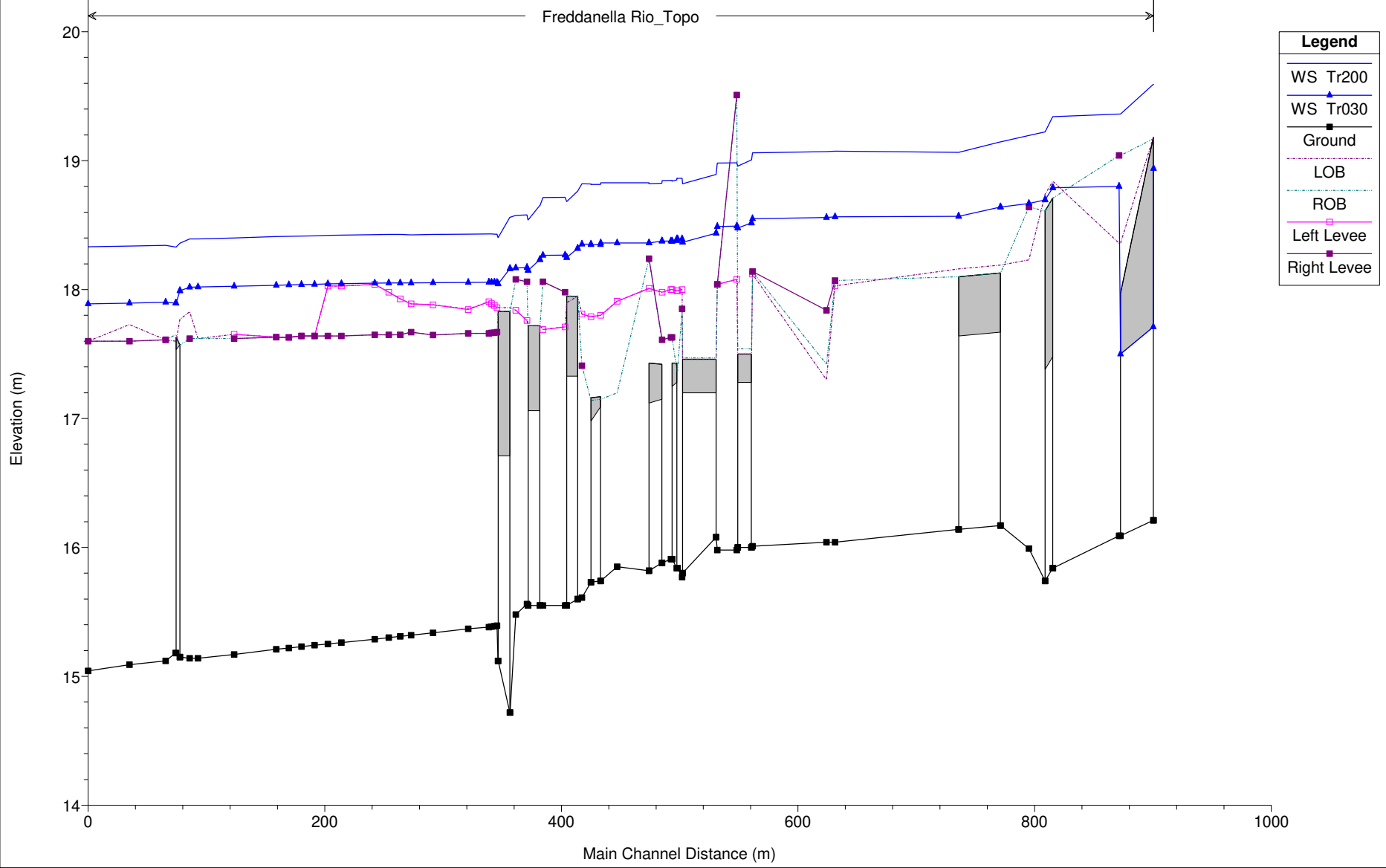
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Freddanella_03	11.5		Bridge										
Freddanella_03	11	Tr200	32.90	13.48	15.98	2.50	19.90	19.81	3.92	3.83	4.94	1.00	0.30
Freddanella_03	11	Tr030	20.40	13.48	15.59	2.11	19.90	19.81	4.31	4.22	3.63	0.80	0.30
Freddanella_03	10	Tr200	32.90	13.22	15.22	2.00	19.90	19.81	4.68	4.59	6.15	1.40	1.80
Freddanella_03	10	Tr030	20.40	13.22	15.68	2.46	19.90	19.81	4.22	4.13	3.09	0.63	1.80
Freddanella_03	9.5	Tr200	32.90	13.15	14.34	1.19	18.67	18.63	4.33	4.29	7.25	2.30	1.80
Freddanella_03	9.5	Tr030	20.40	13.15	15.92	2.78	18.67	18.63	2.75	2.71	1.59	0.34	1.80
Freddanella_03	9	Tr200	32.90	13.07	15.90	2.83	17.44	17.45	1.54	1.55	1.96	0.40	5.70
Freddanella_03	9	Tr030	20.40	13.07	15.96	2.89	17.44	17.45	1.48	1.49	1.18	0.24	5.70
Freddanella_03	8	Tr200	32.90	12.64	15.93	3.29	15.72	15.66	-0.21	-0.27	1.60	0.31	0.80
Freddanella_03	8	Tr030	20.40	12.64	15.98	3.34	15.72	15.66	-0.26	-0.32	0.98	0.19	0.80
Freddanella_03	6	Tr200	32.90	12.63	15.96	3.33	18.29	17.25	2.33	1.29	1.37	0.29	19.00
Freddanella_03	6	Tr030	20.40	12.63	15.98	3.35	18.29	17.25	2.31	1.27	0.84	0.17	19.00
Freddanella_03	5	Tr200	32.90	12.11	15.98	3.87	17.52	17.21	1.54	1.23	0.95	0.19	11.60
Freddanella_03	5	Tr030	20.40	12.11	15.99	3.88	17.52	17.21	1.53	1.22	0.58	0.12	11.60
Freddanella_03	4	Tr200	32.90	11.73	15.99	4.26	17.74	17.89	1.75	1.90	0.75	0.15	4.20
Freddanella_03	4	Tr030	20.40	11.73	16.00	4.27	17.74	17.89	1.74	1.89	0.47	0.09	4.20
Freddanella_03	3	Tr200	32.90	11.60	15.99	4.39	16.12	14.00	0.13	-1.99	0.68	0.12	3.10
Freddanella_03	3	Tr030	20.40	11.60	16.00	4.40	16.12	14.00	0.12	-2.00	0.42	0.08	3.10
Freddanella_03	2	Tr200	32.90	11.50	16.00	4.50	14.89	13.88	-1.11	-2.12	0.56	0.09	1.10
Freddanella_03	2	Tr030	20.40	11.50	16.00	4.50	14.89	13.88	-1.11	-2.12	0.35	0.06	1.10
Freddanella_03	1	Tr200	32.90	10.90	16.00	5.10	14.79	14.55	-1.21	-1.45	0.50	0.08	
Freddanella_03	1	Tr030	20.40	10.90	16.00	5.10	14.79	14.55	-1.21	-1.45	0.31	0.05	

# **SISTEMA RIO FREDDANELLA S. ALESSIO**

## **“Rio del Topo”**



Freddanella Rio\_Topo



Legend	
WS Tr200	Blue line with triangles
WS Tr030	Blue line with triangles
Ground	Black line with squares
LOB	Red dotted line
ROB	Green dotted line
Left Levee	Magenta line with squares
Right Levee	Purple line with squares

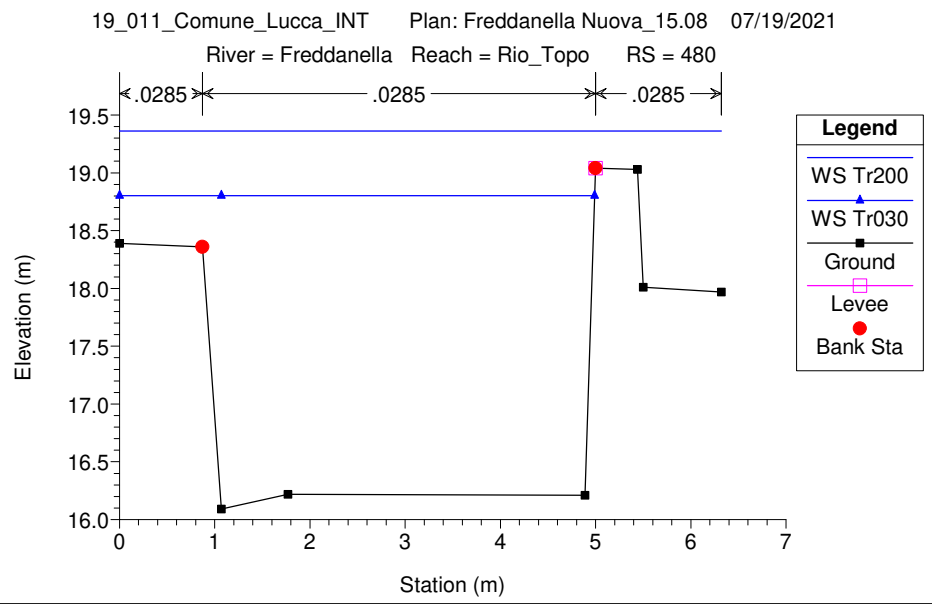
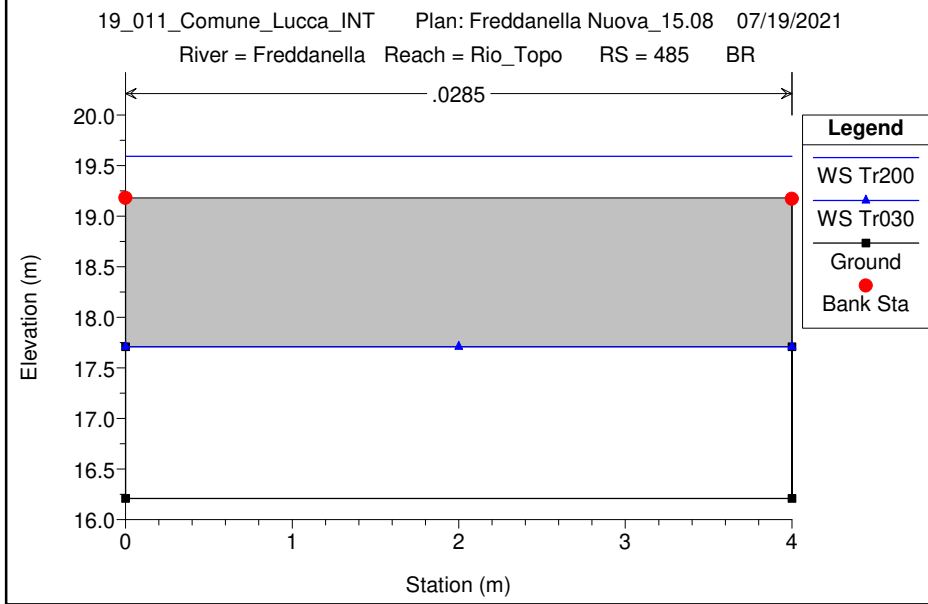
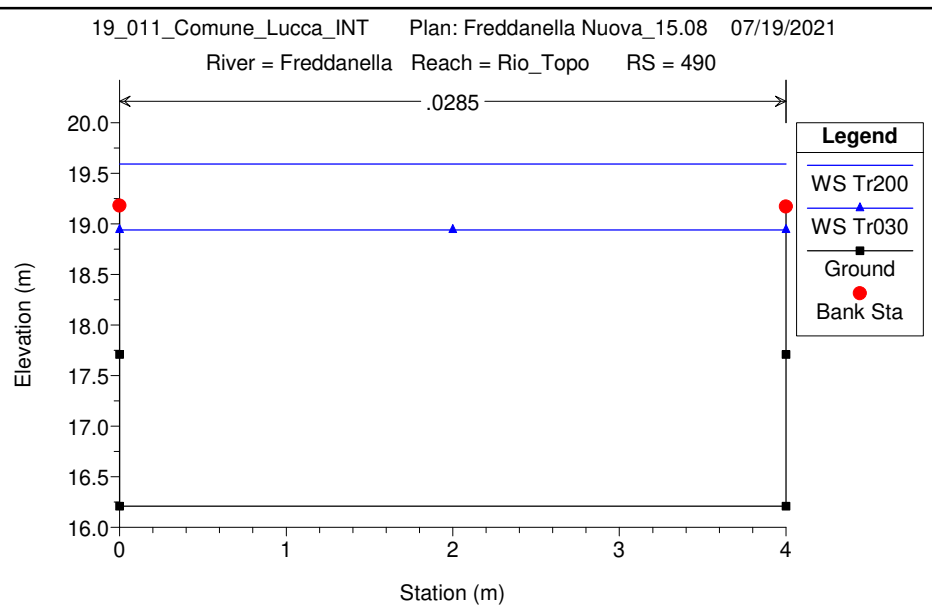
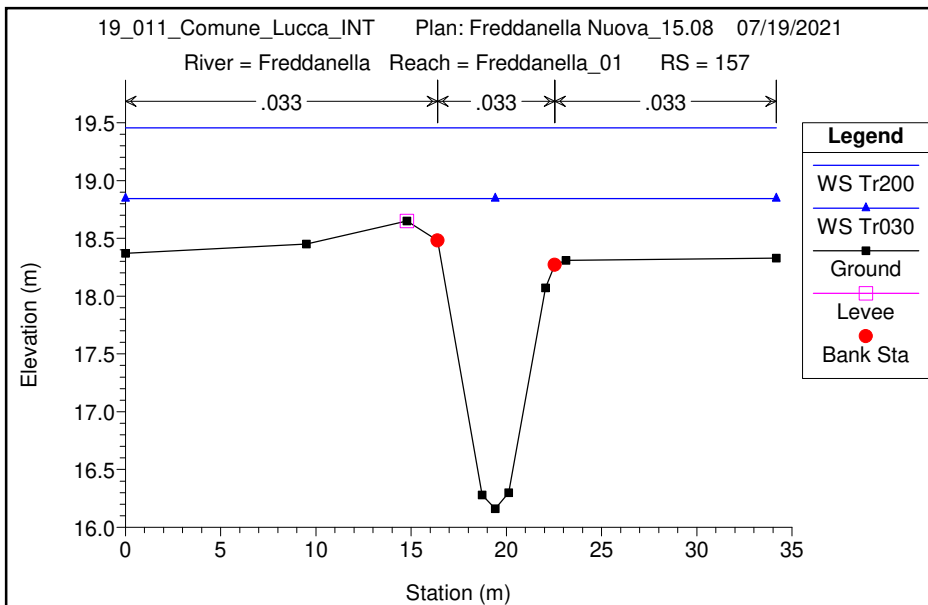


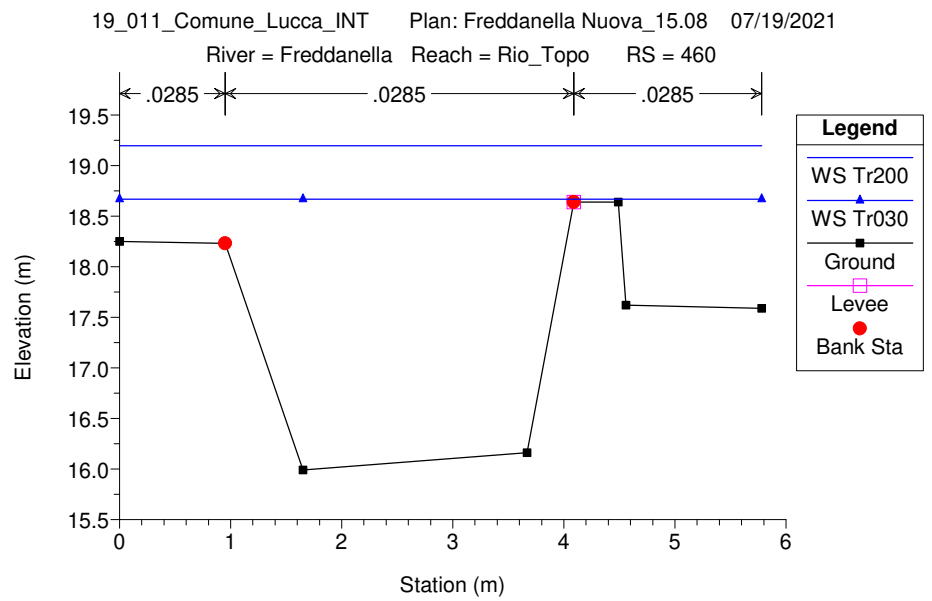
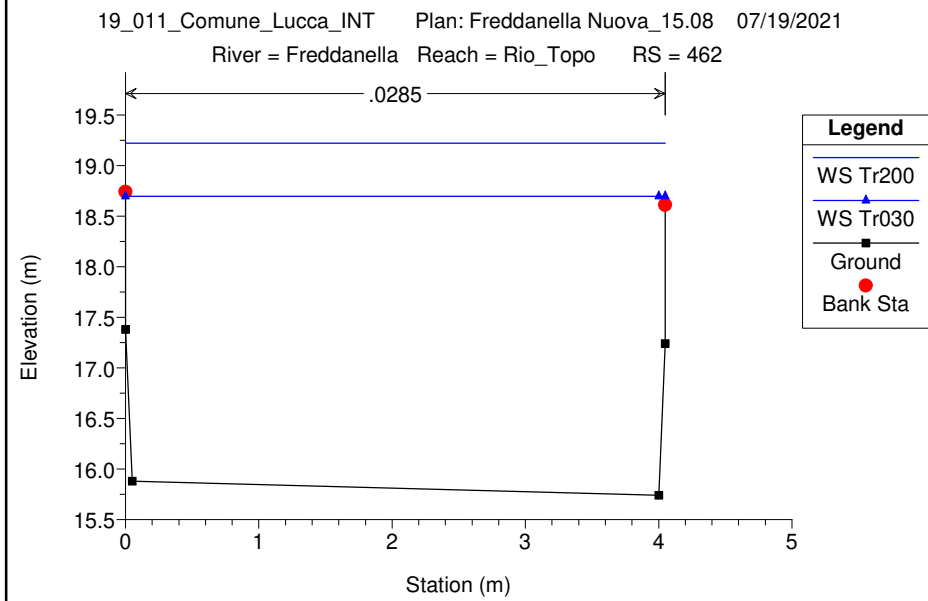
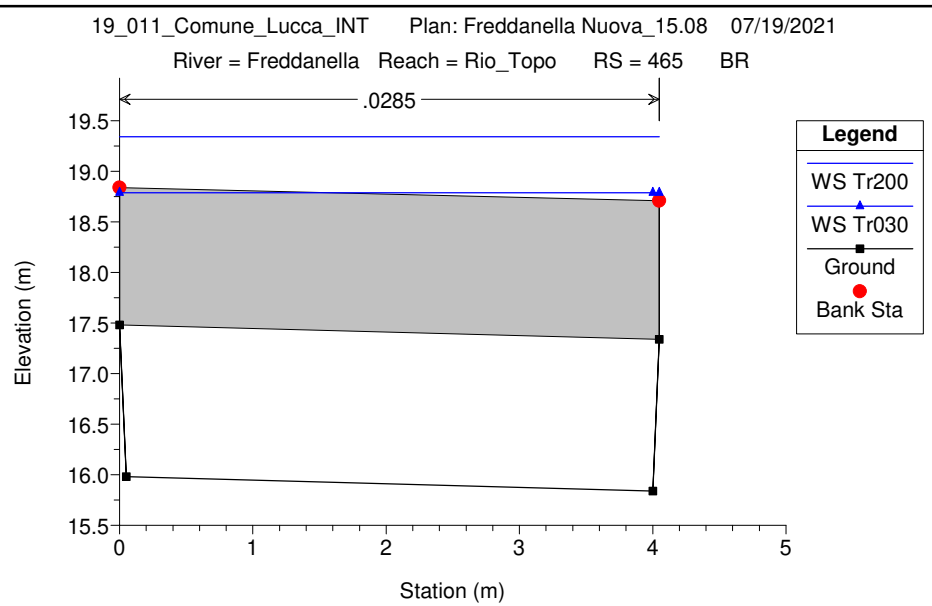
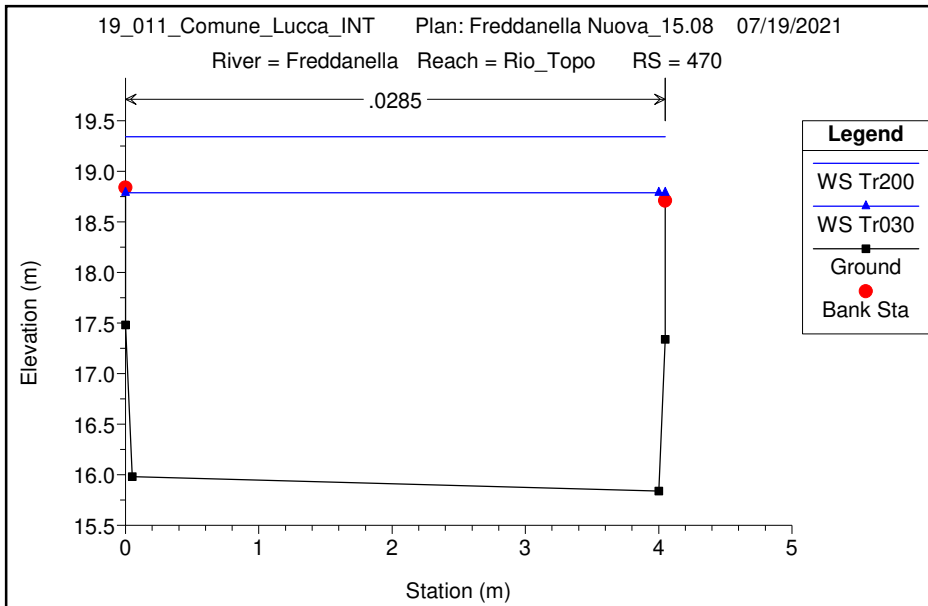
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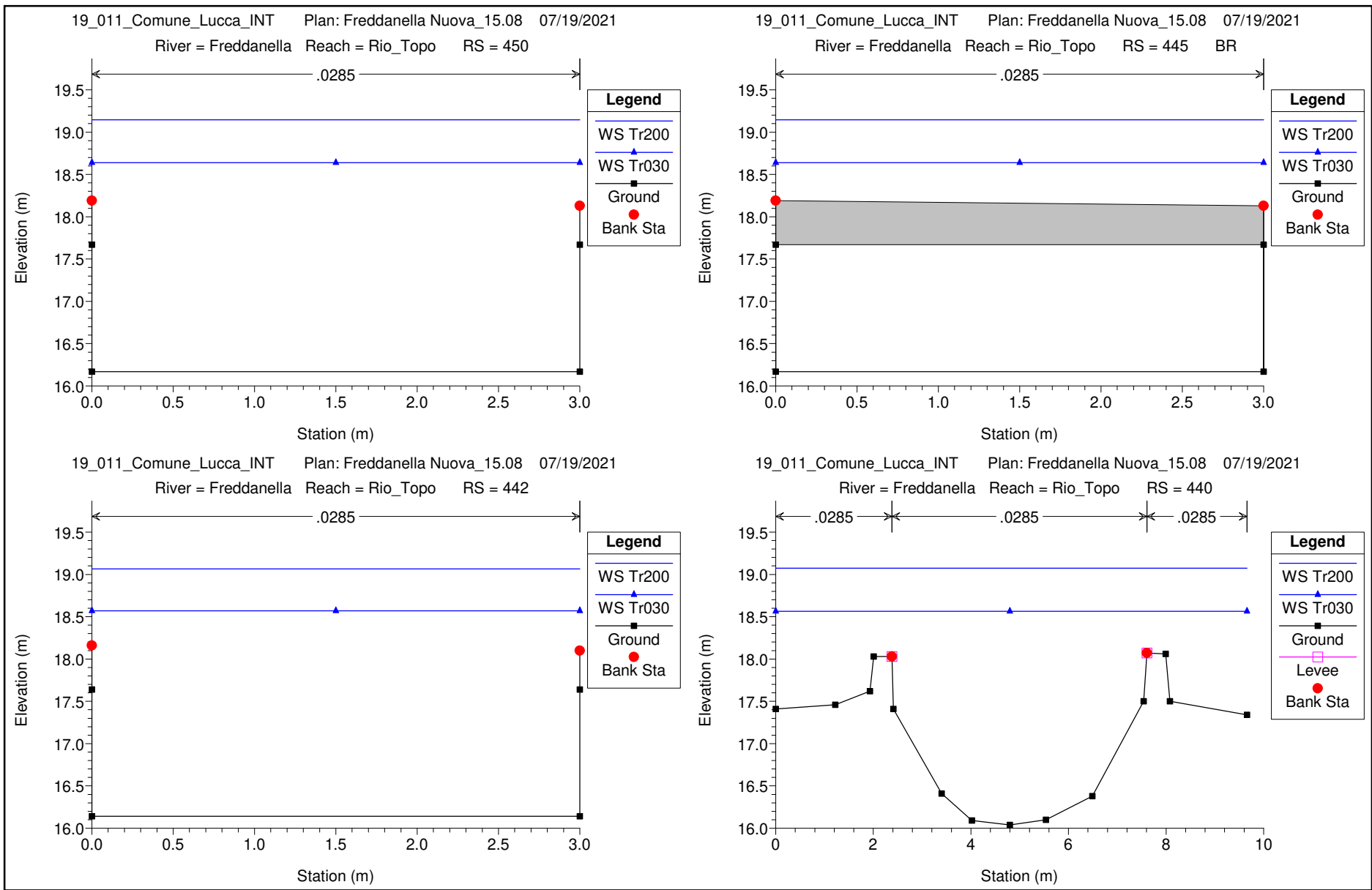
## **SEZIONI SISTEMA FREDDANELLA S. ALESSIO “Rio del Topo”**

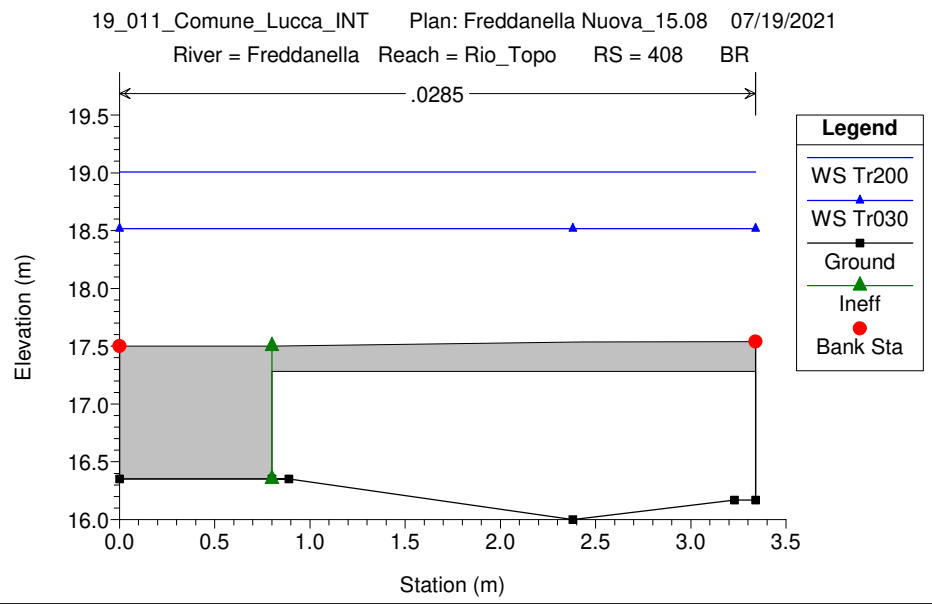
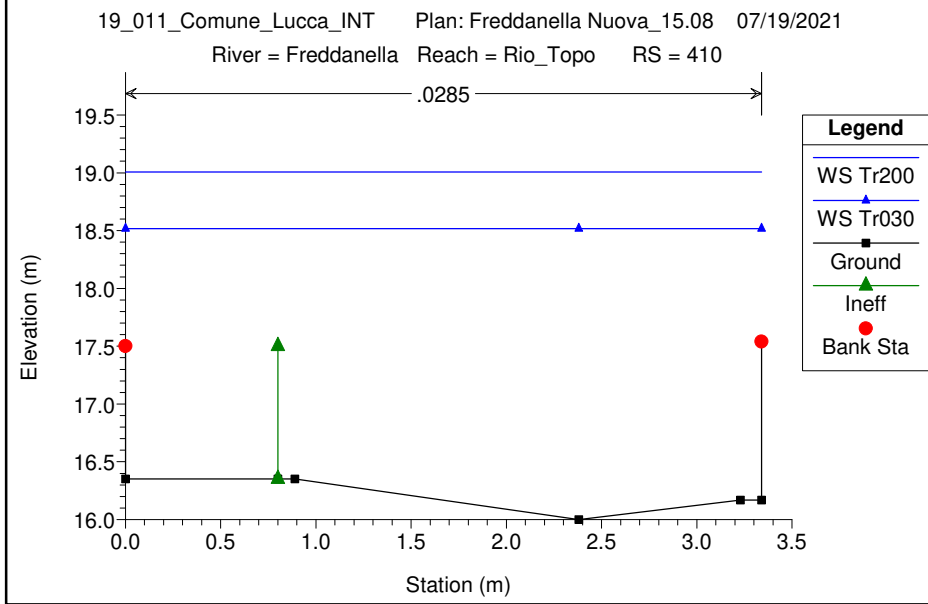
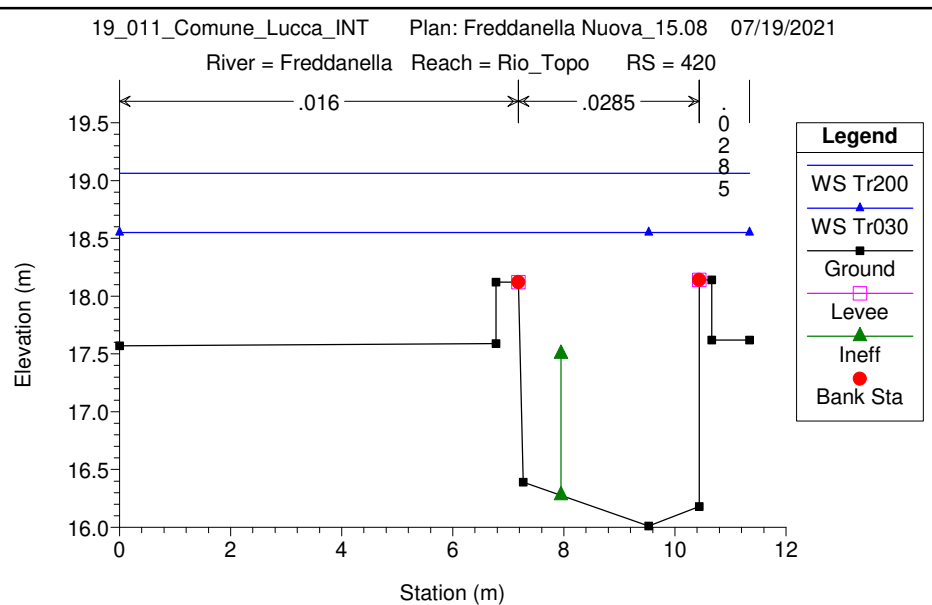
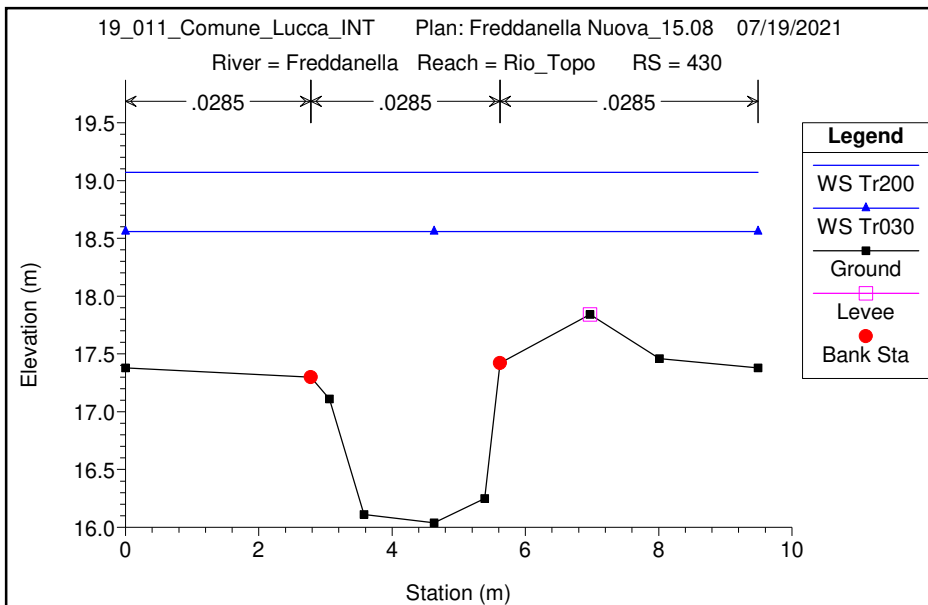


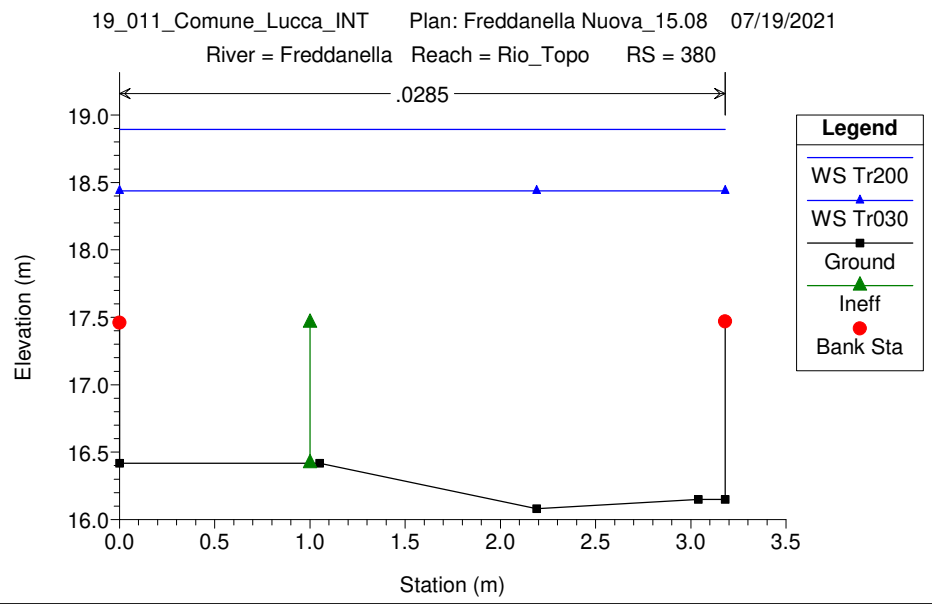
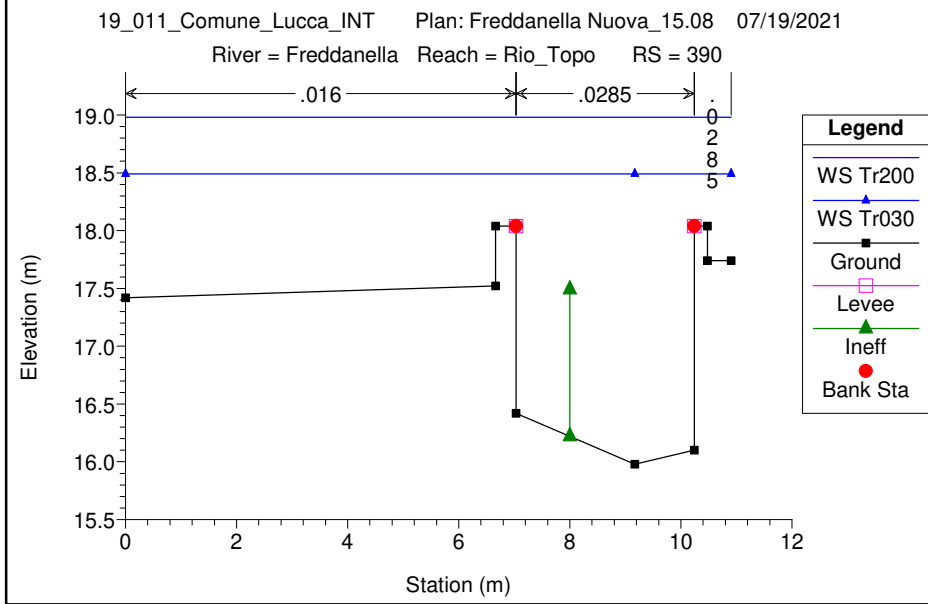
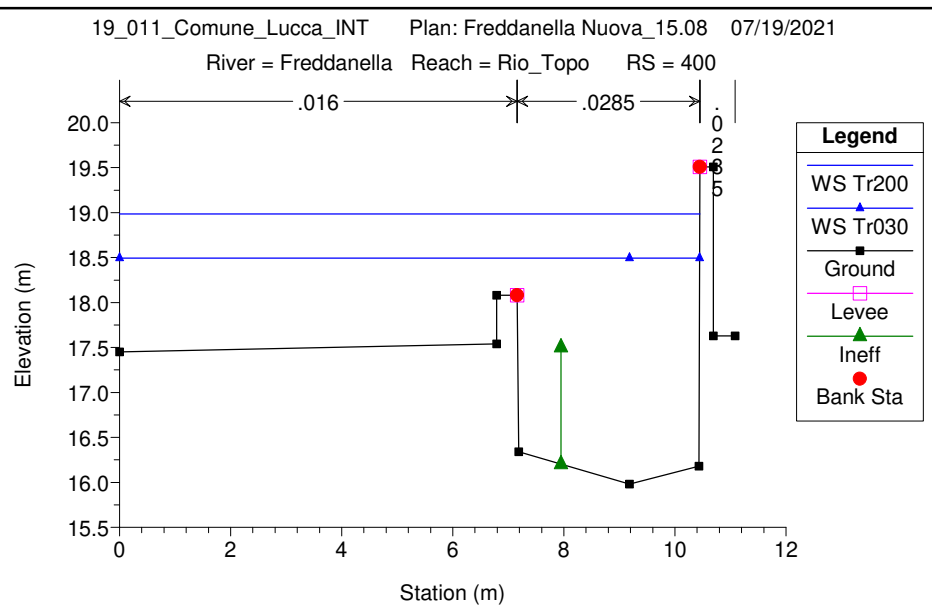
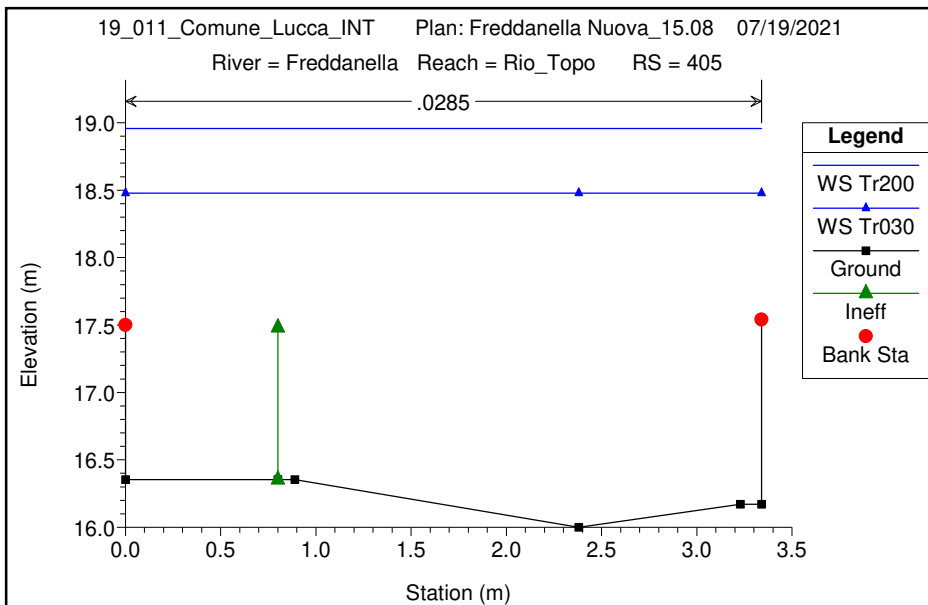


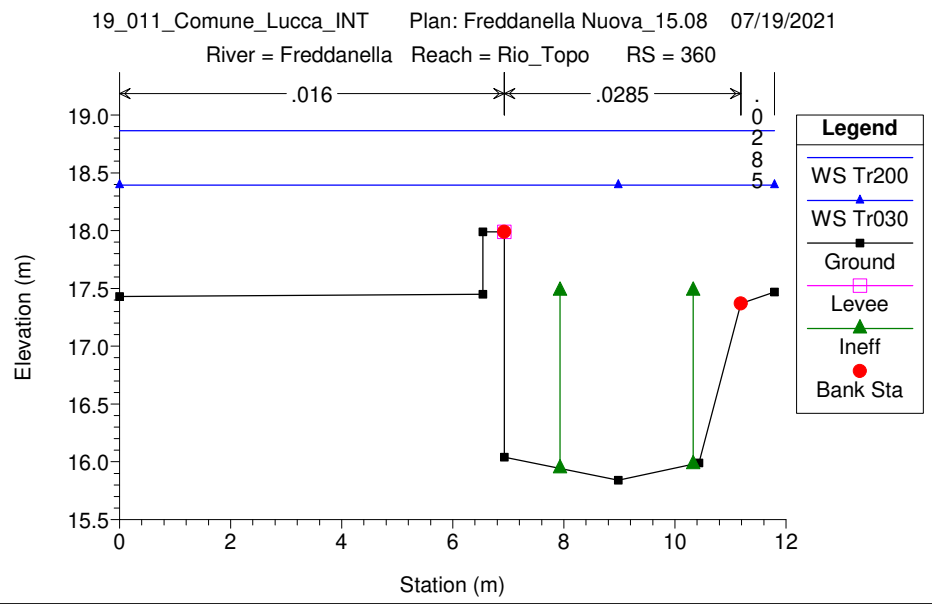
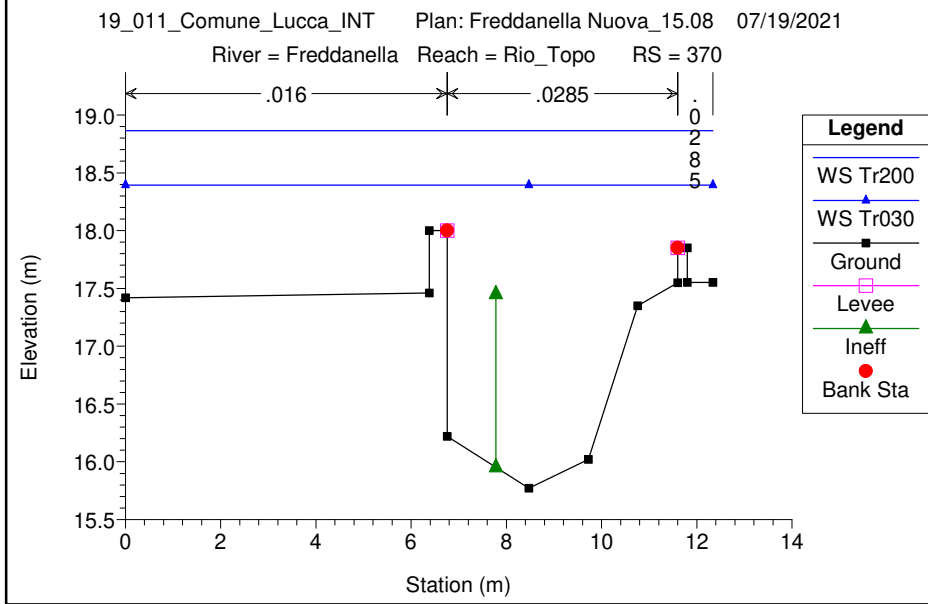
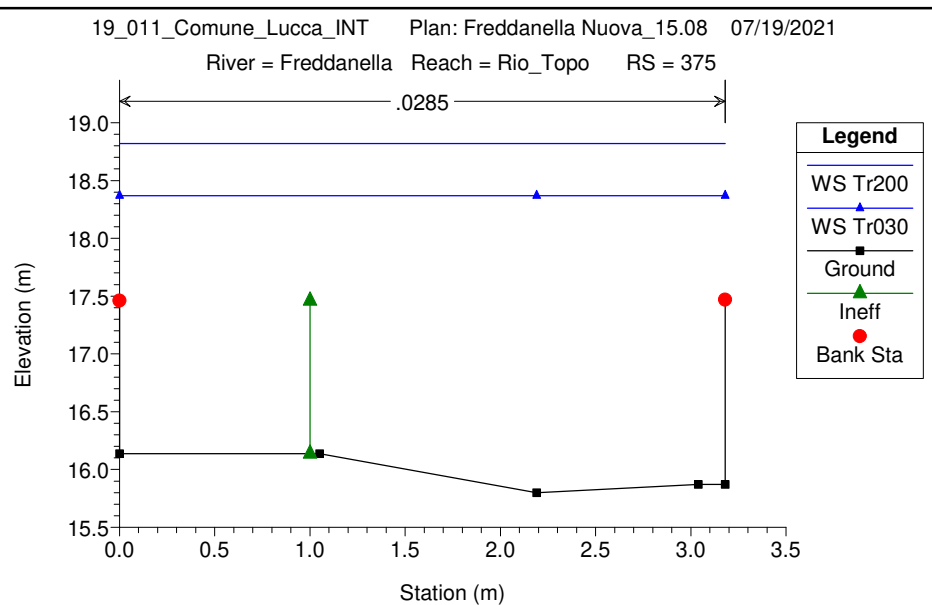
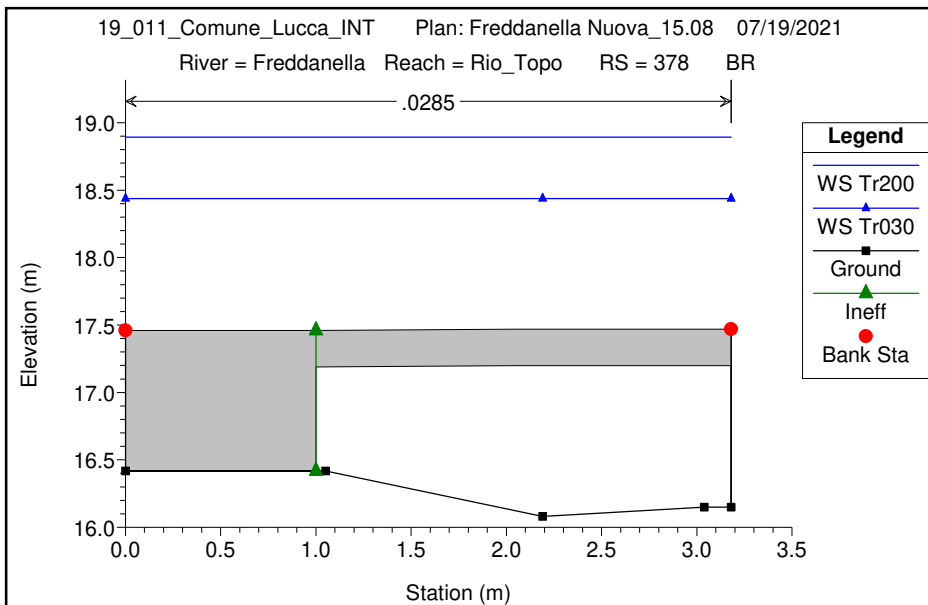


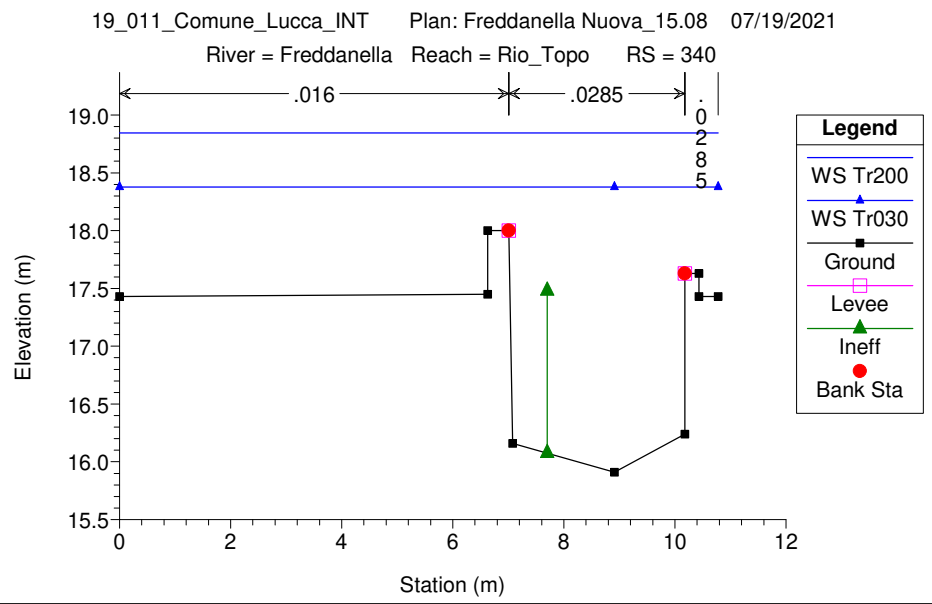
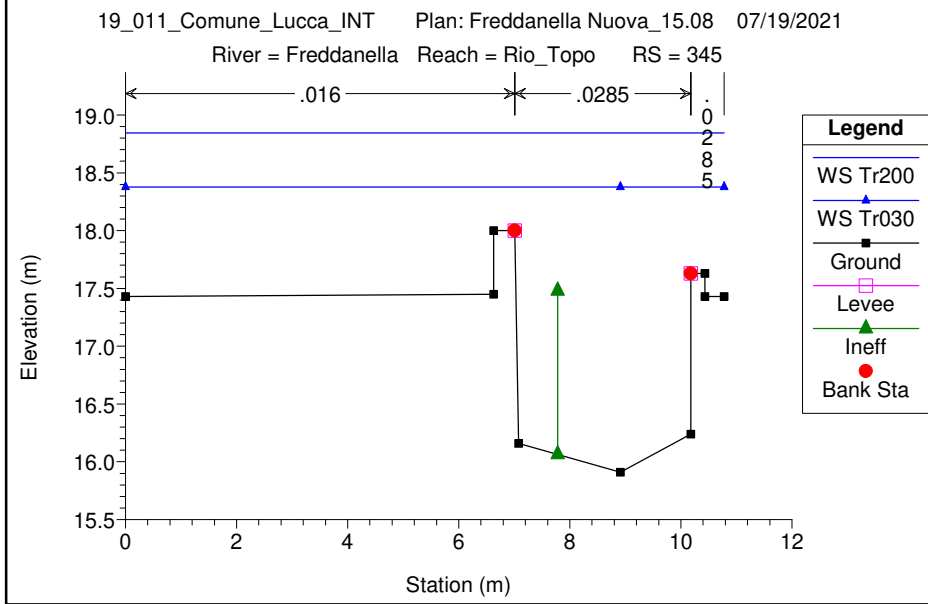
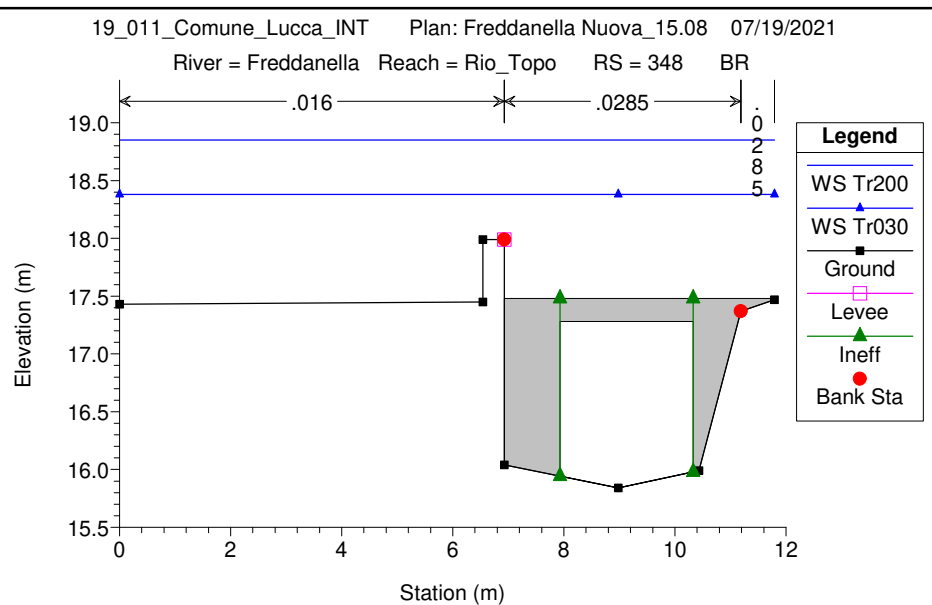
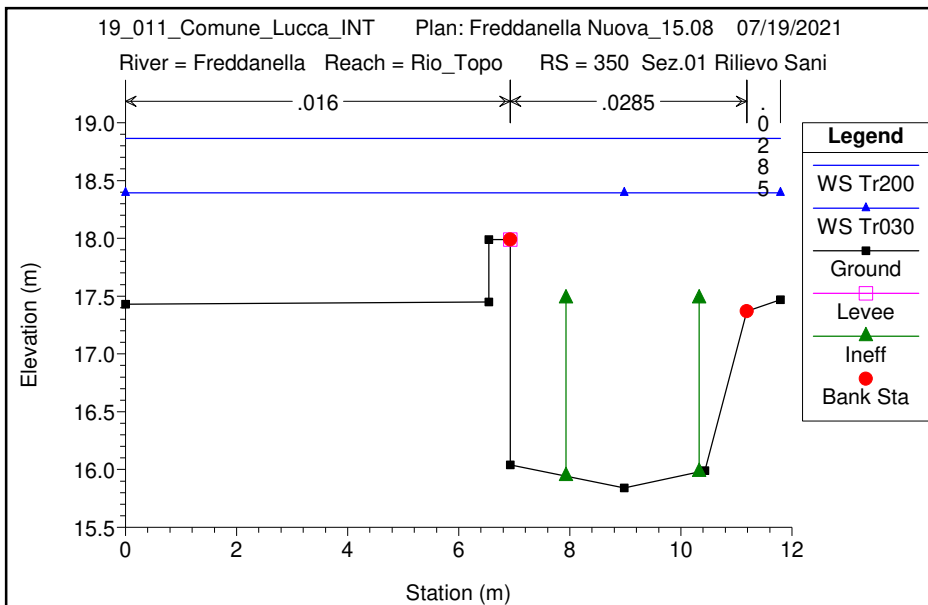


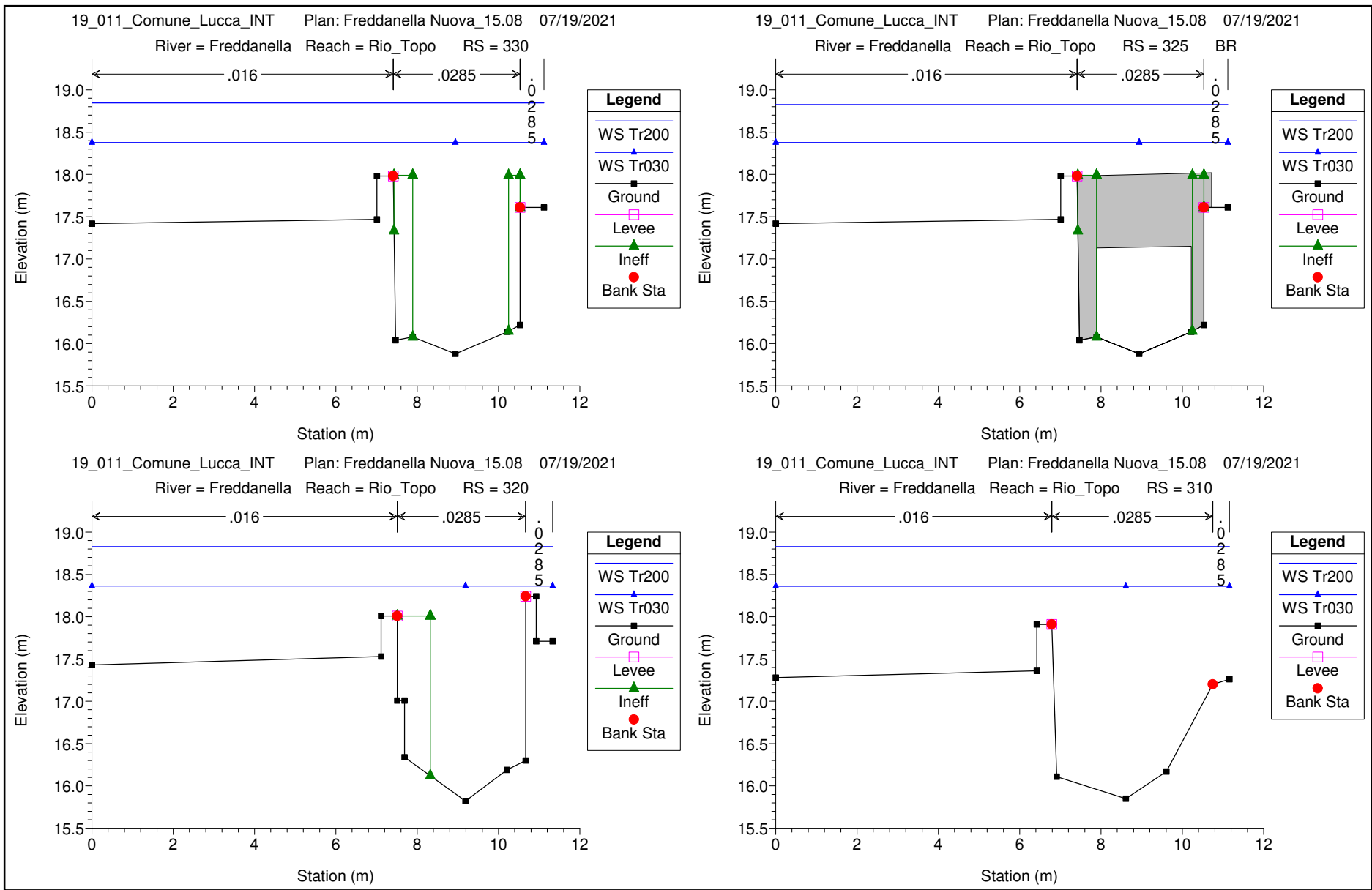




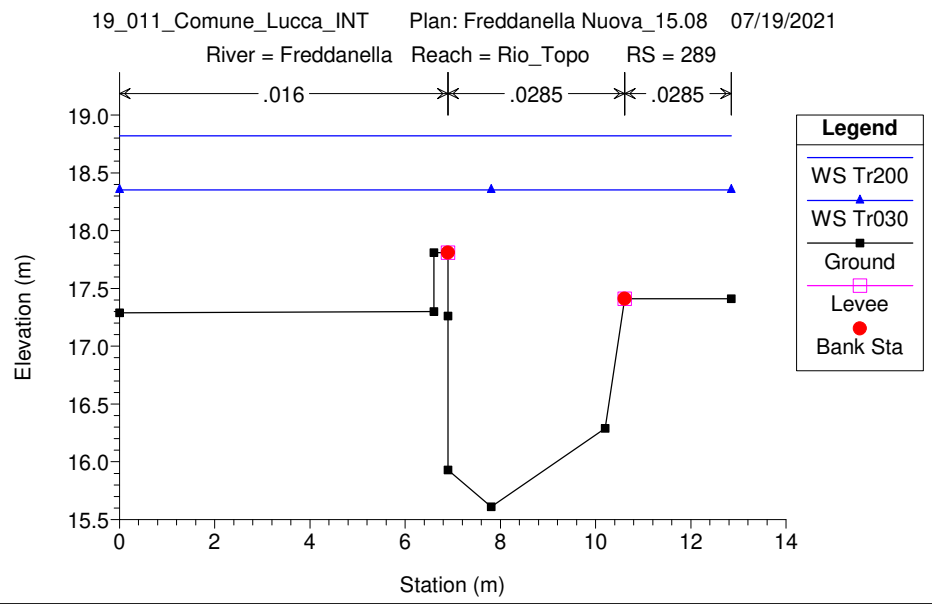
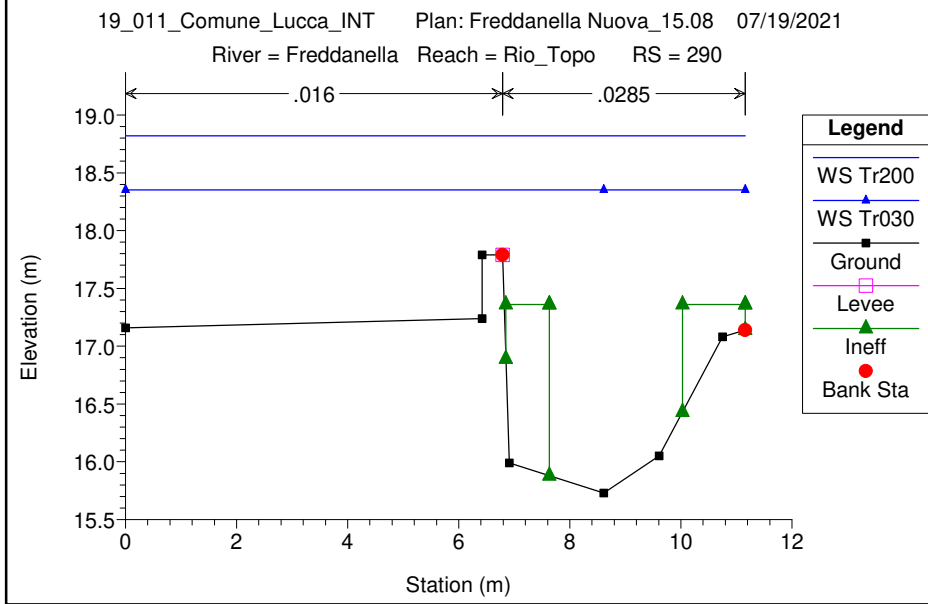
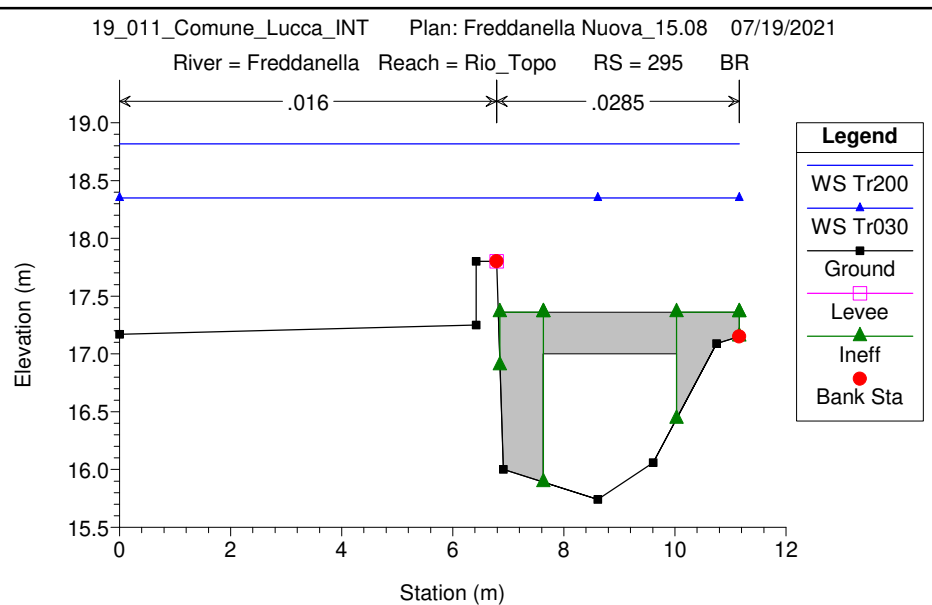
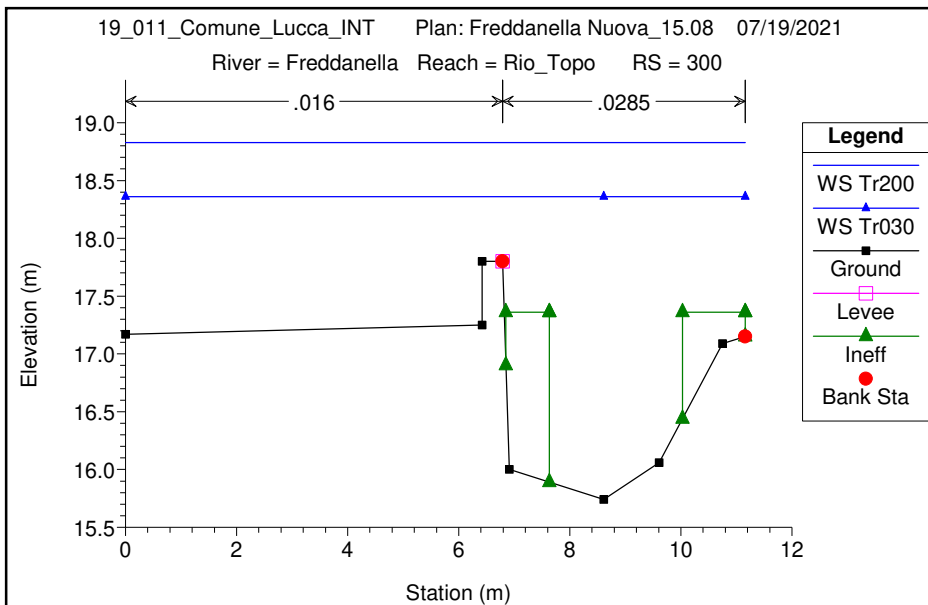


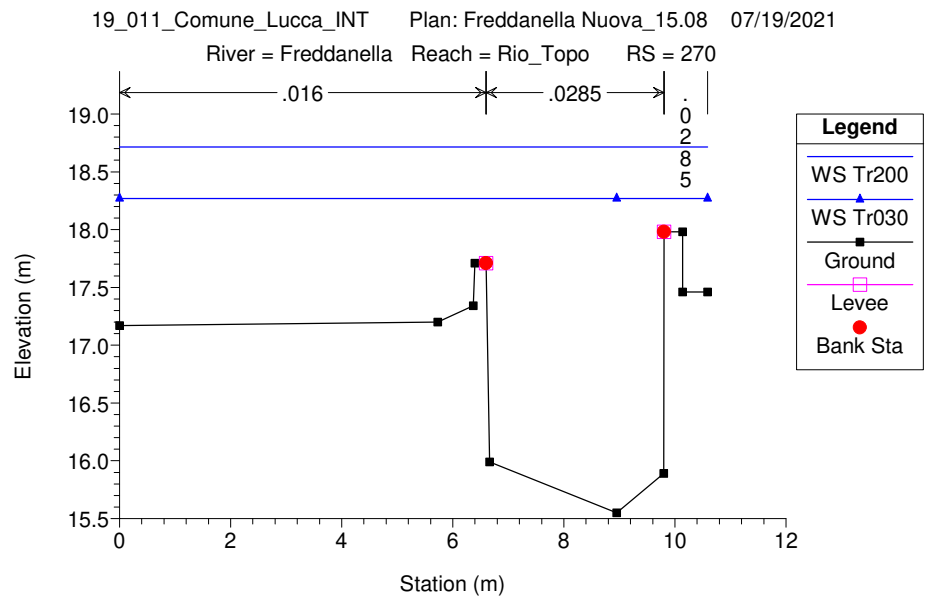
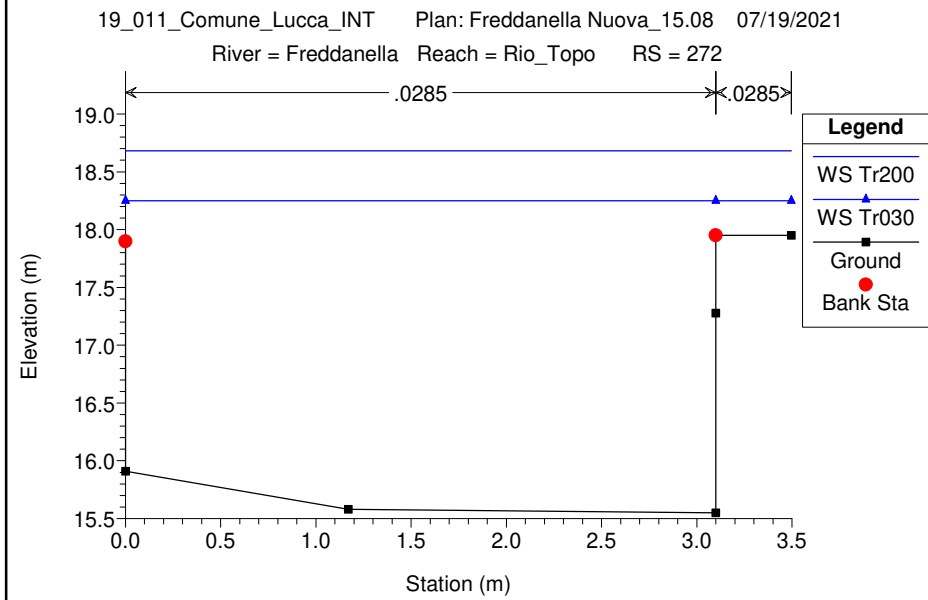
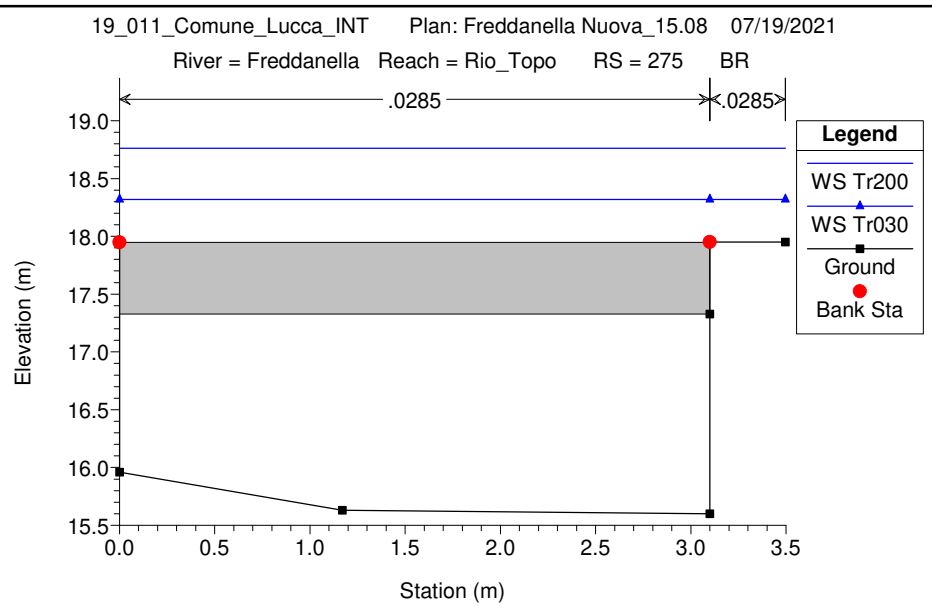
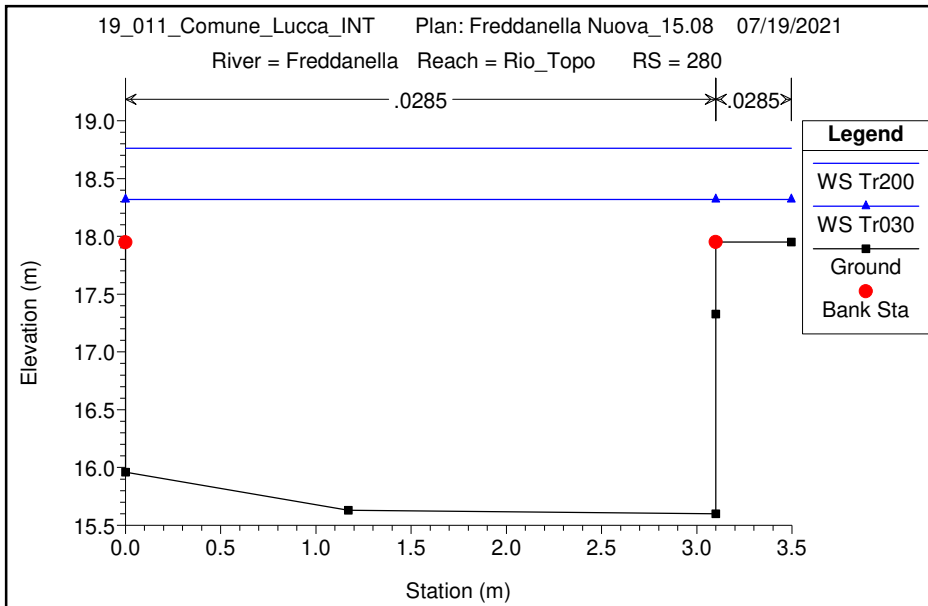


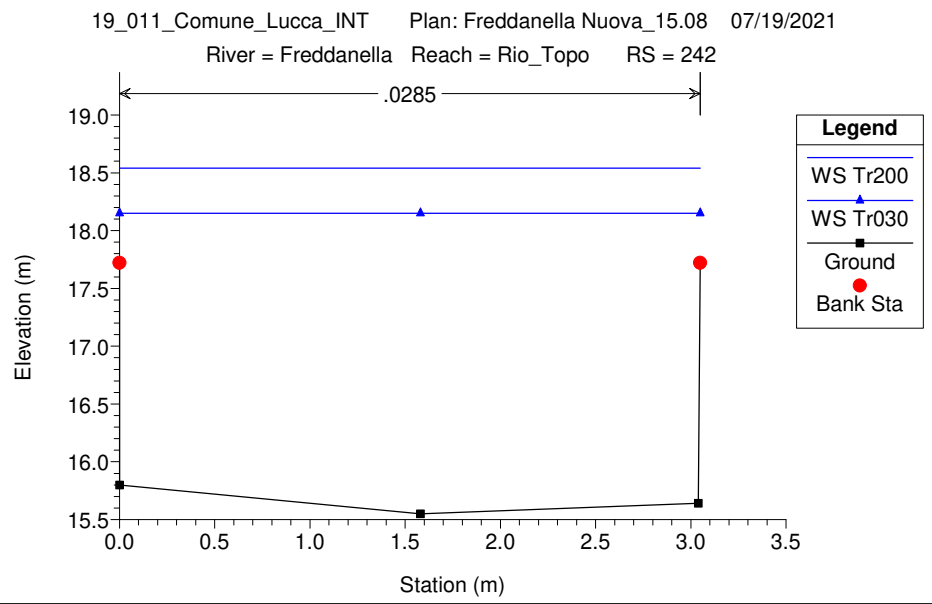
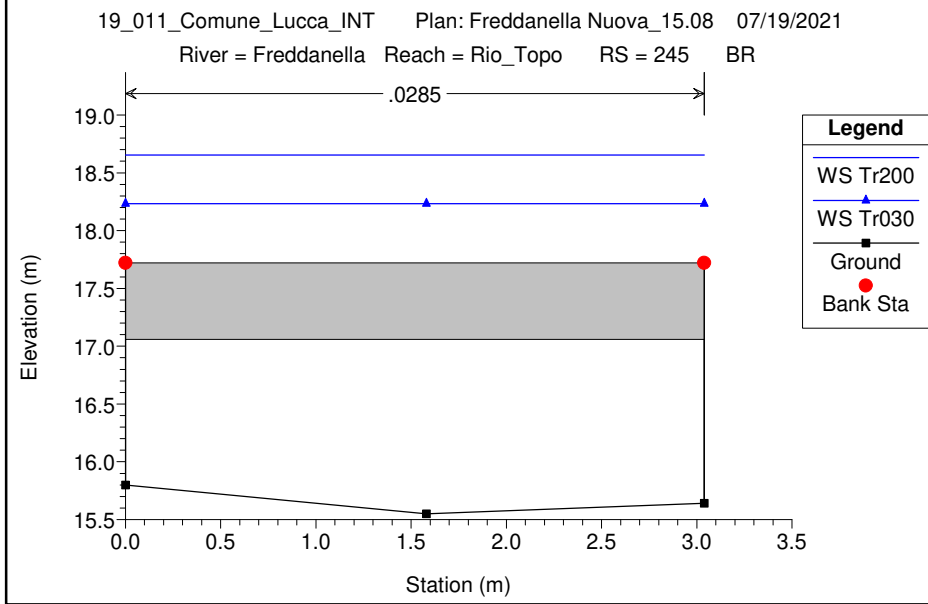
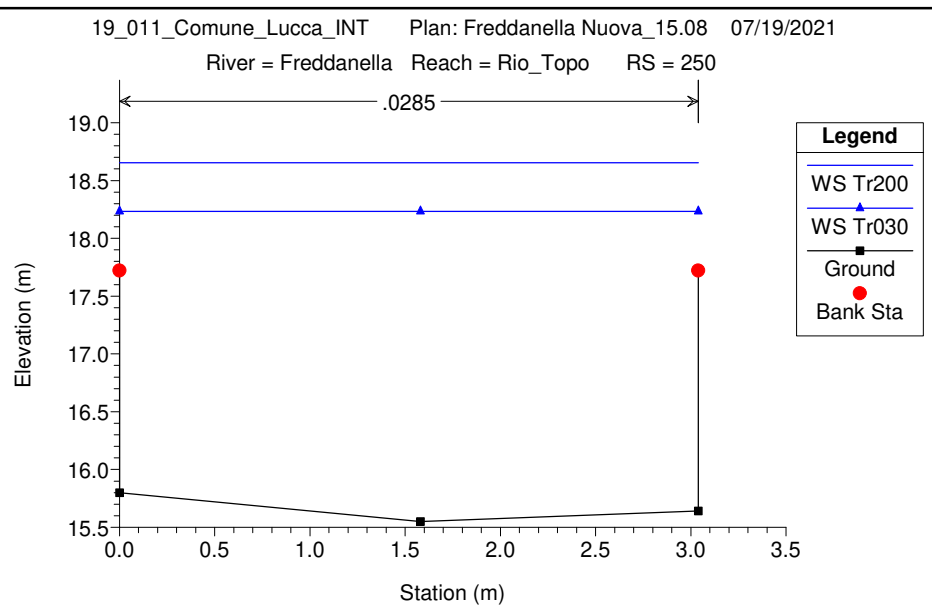
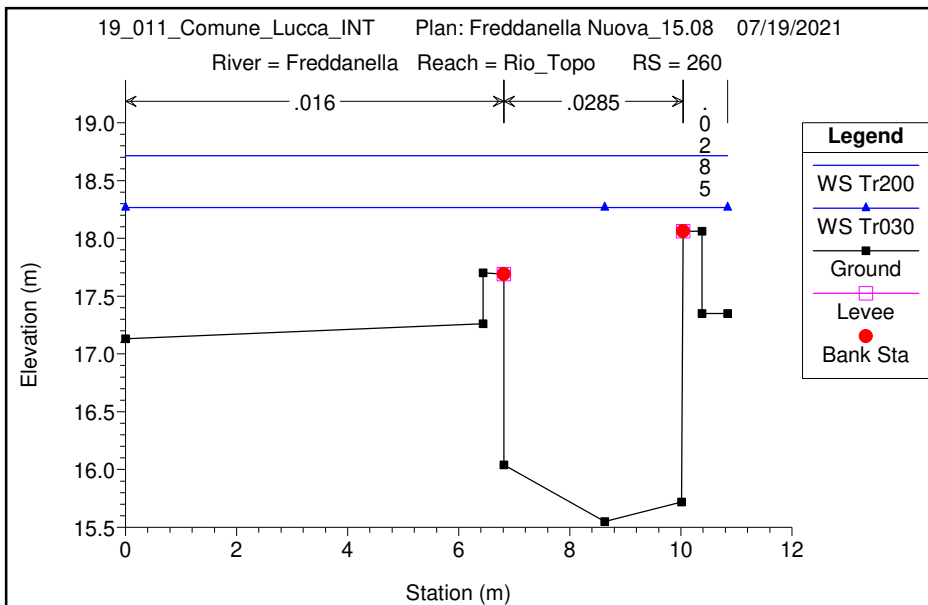


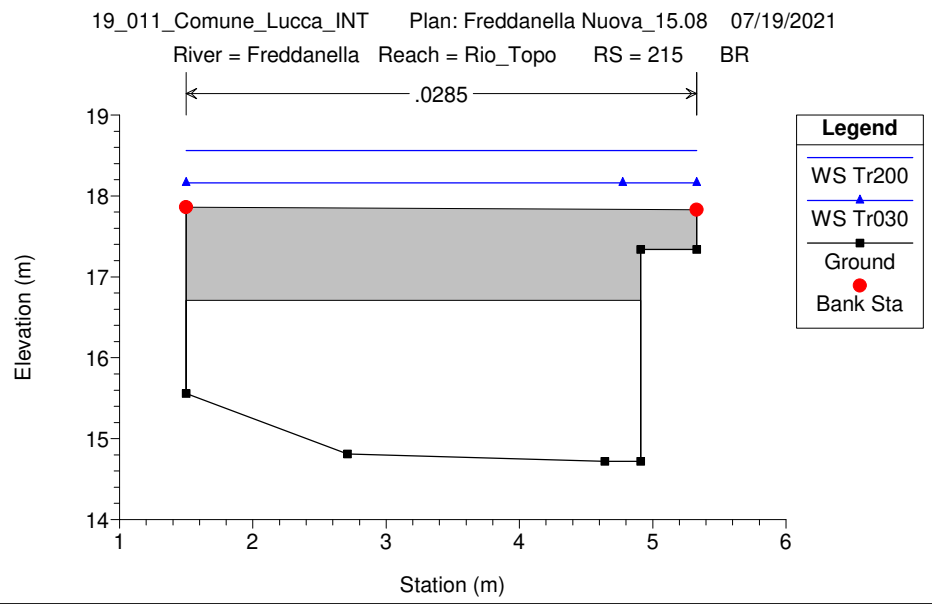
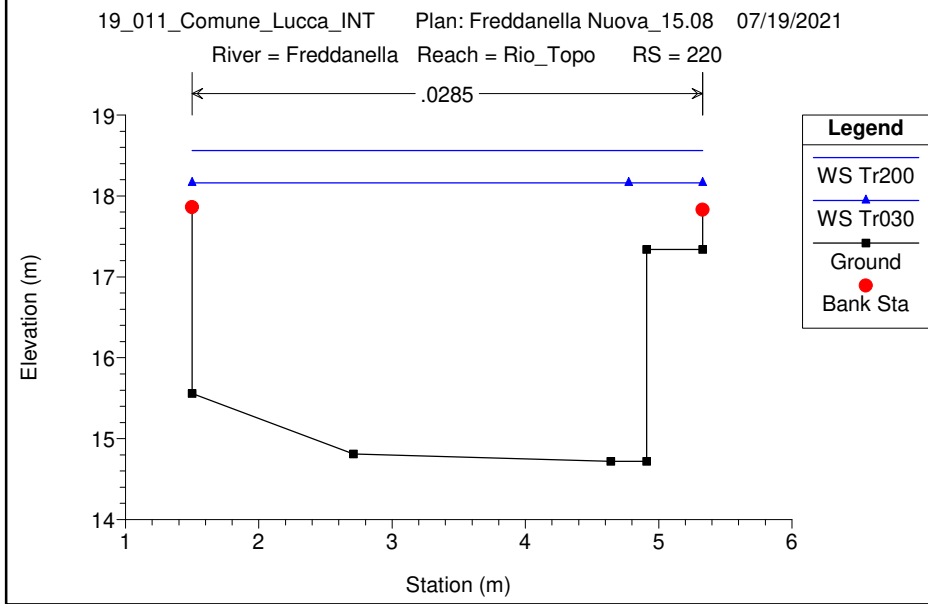
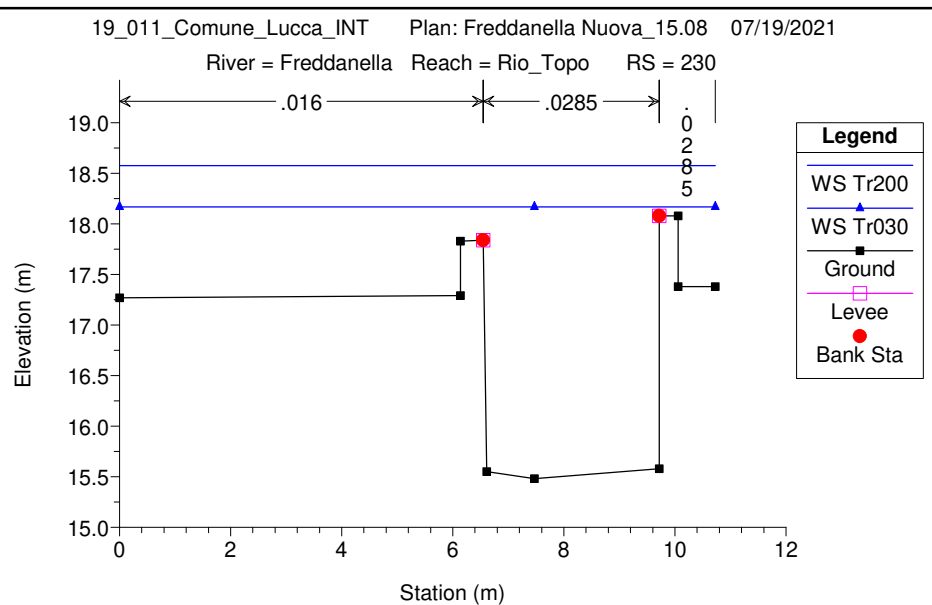
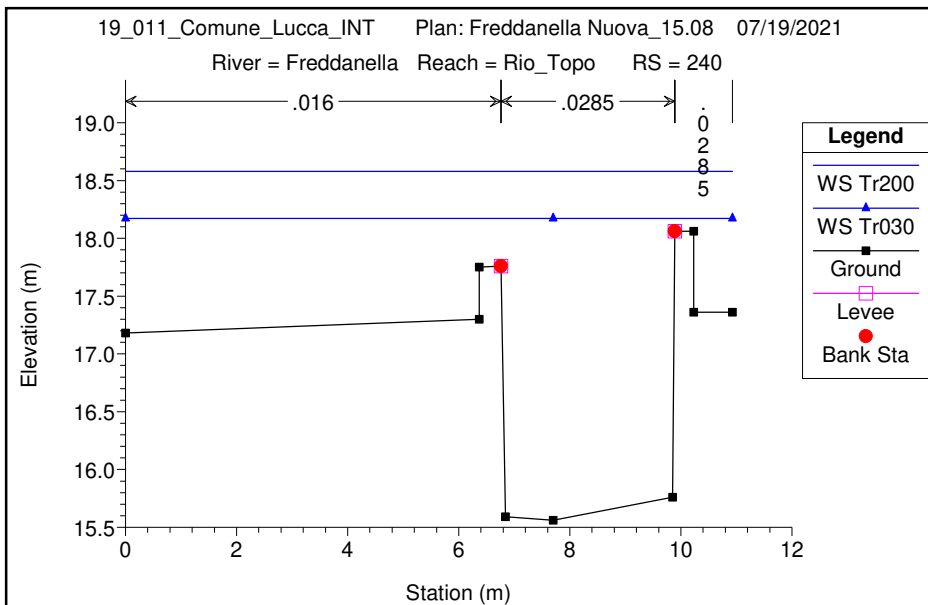


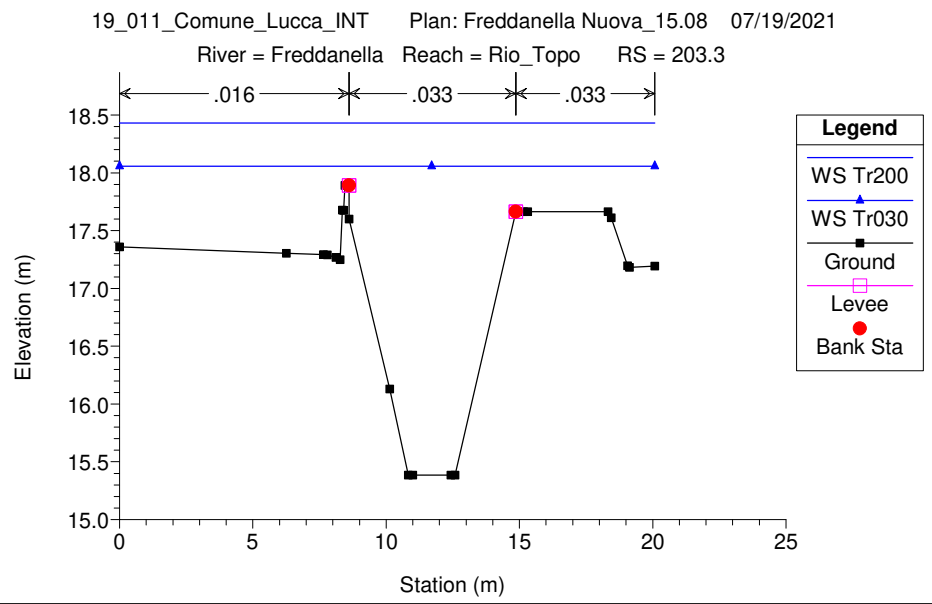
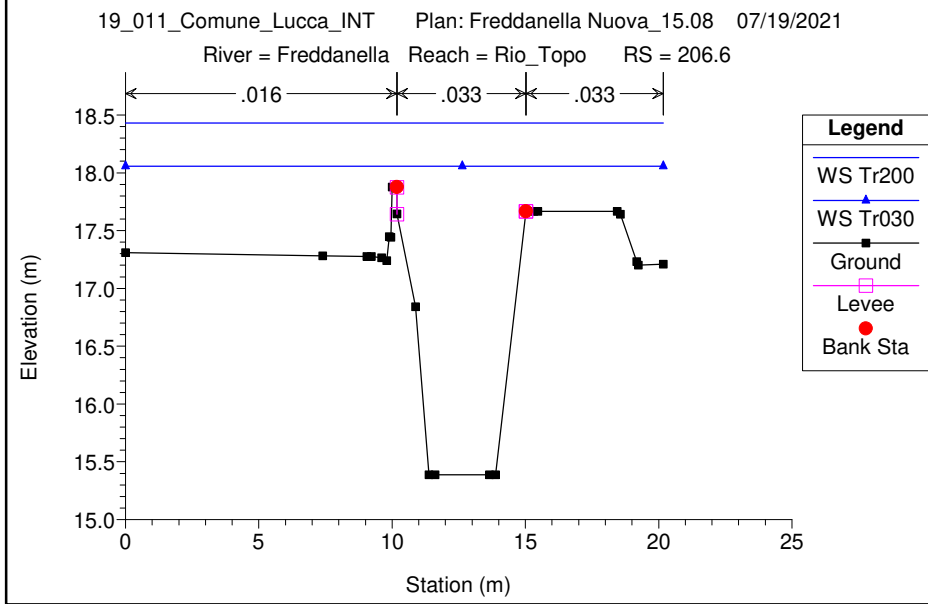
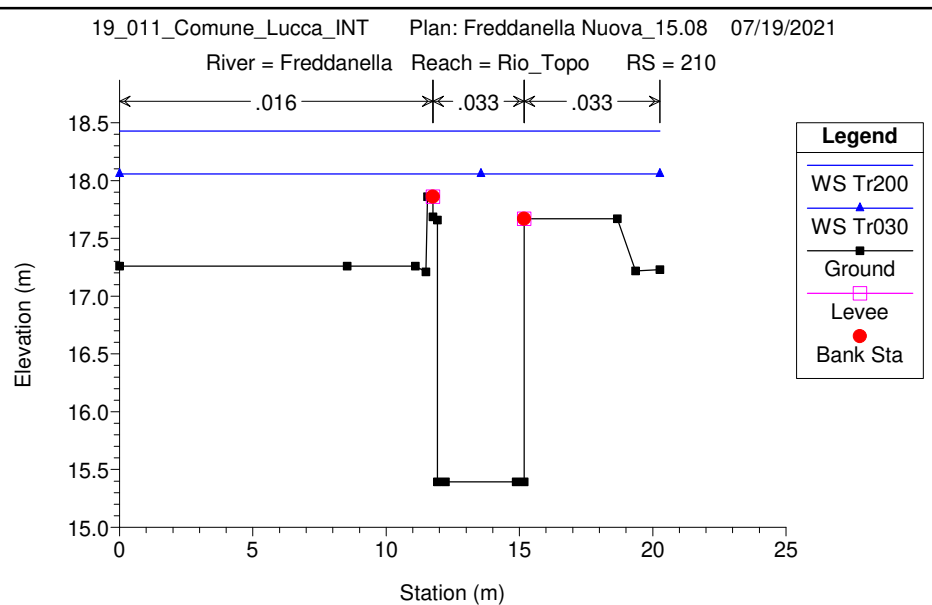
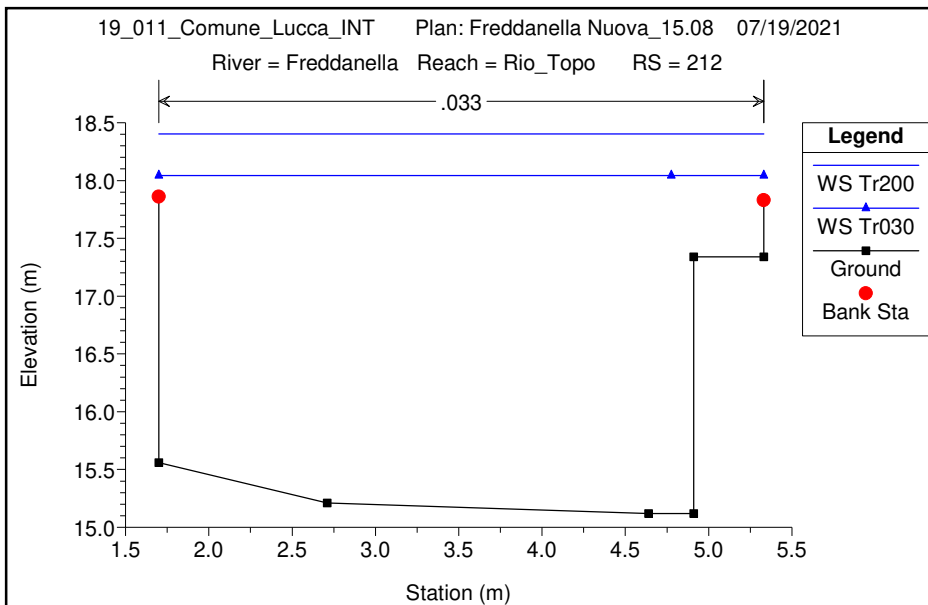


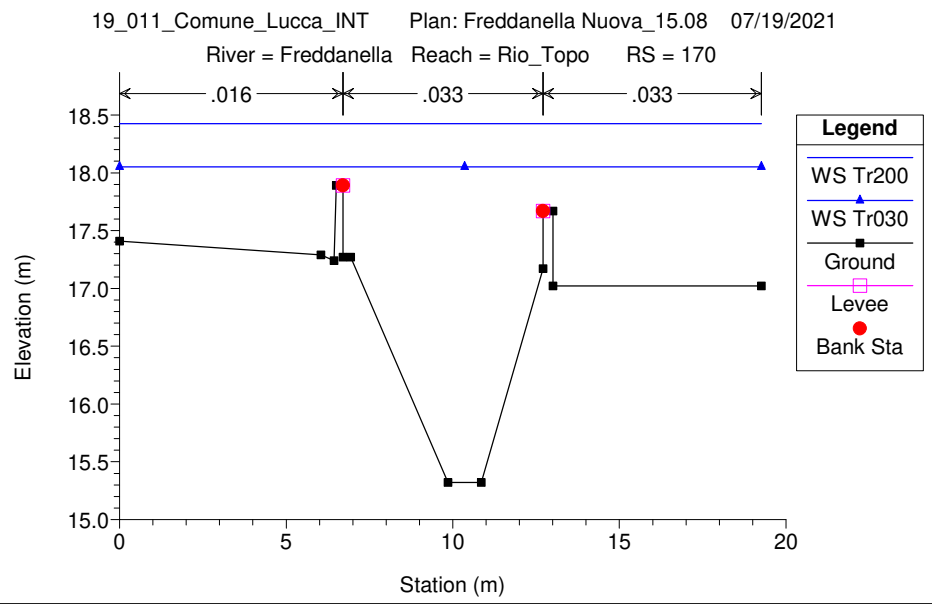
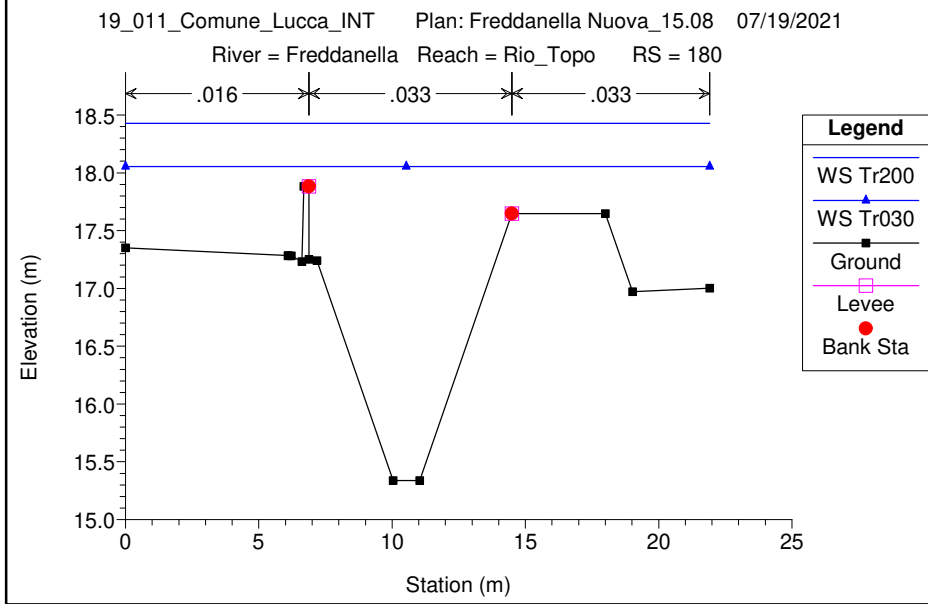
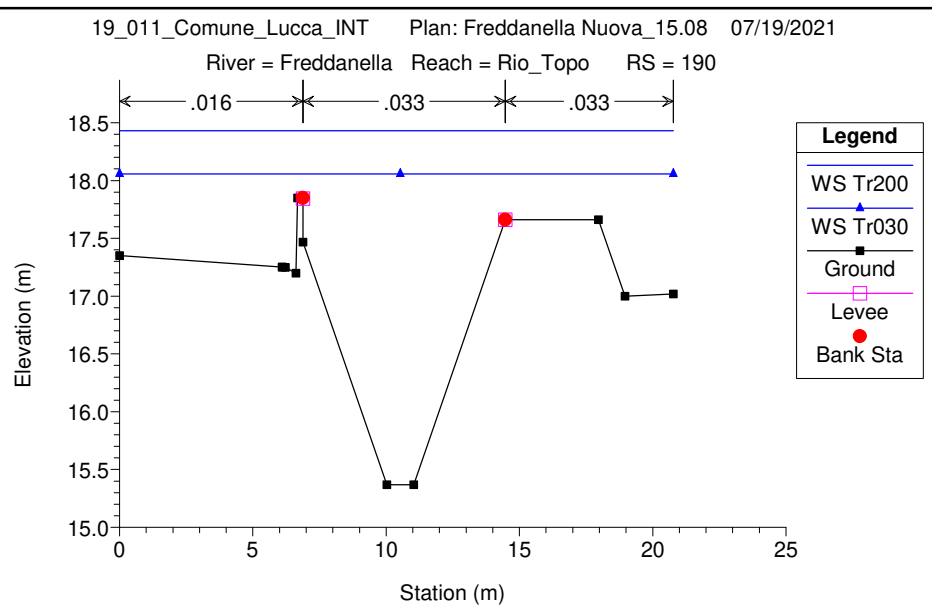
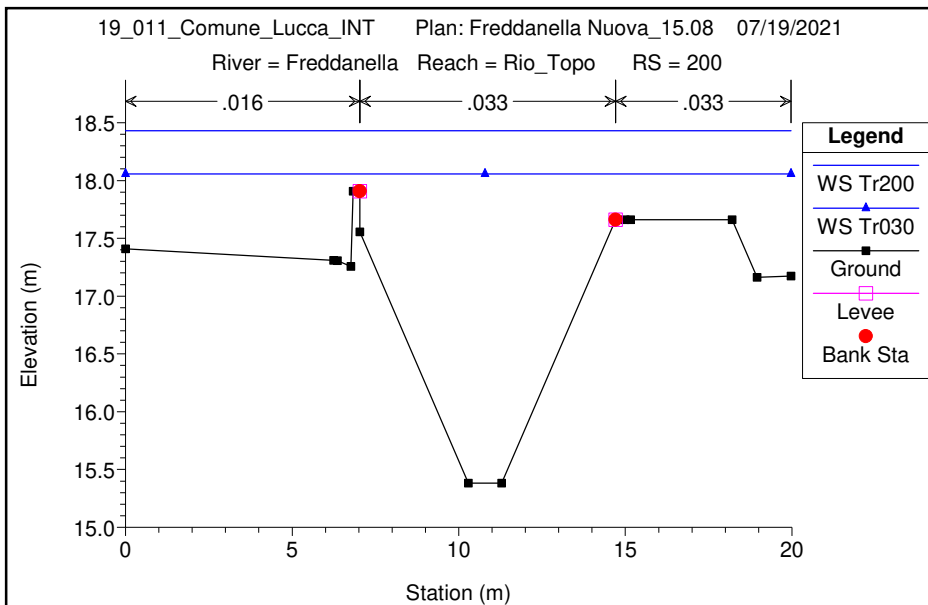


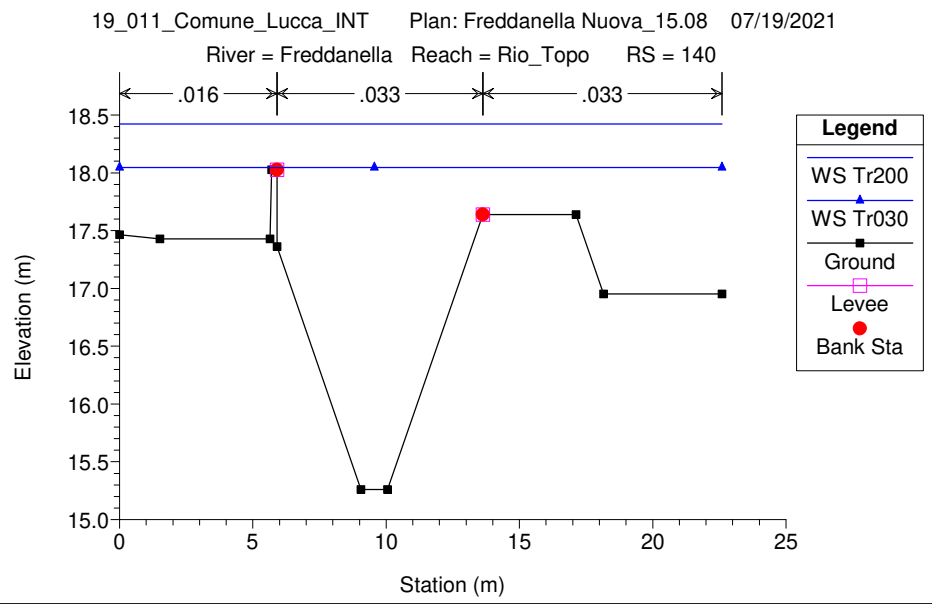
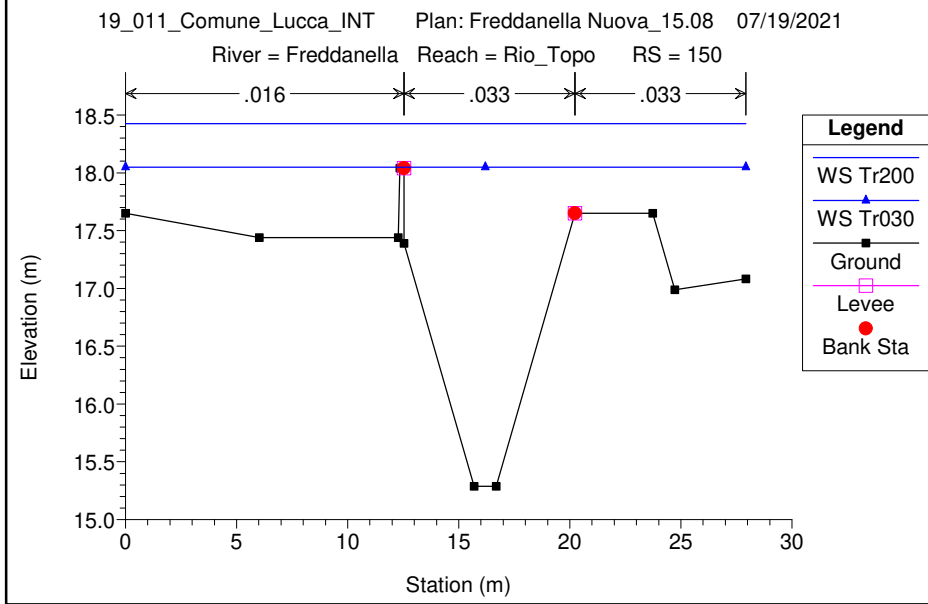
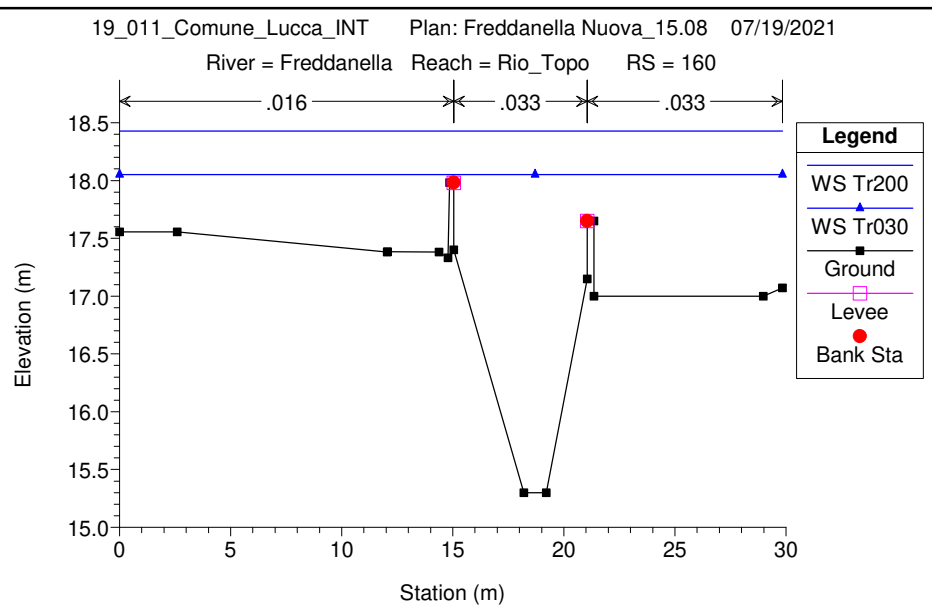
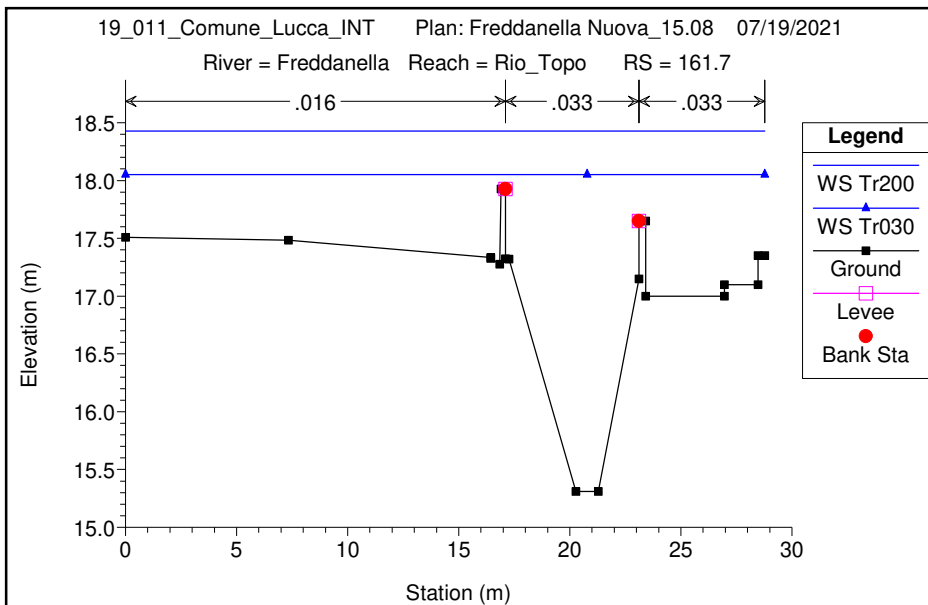


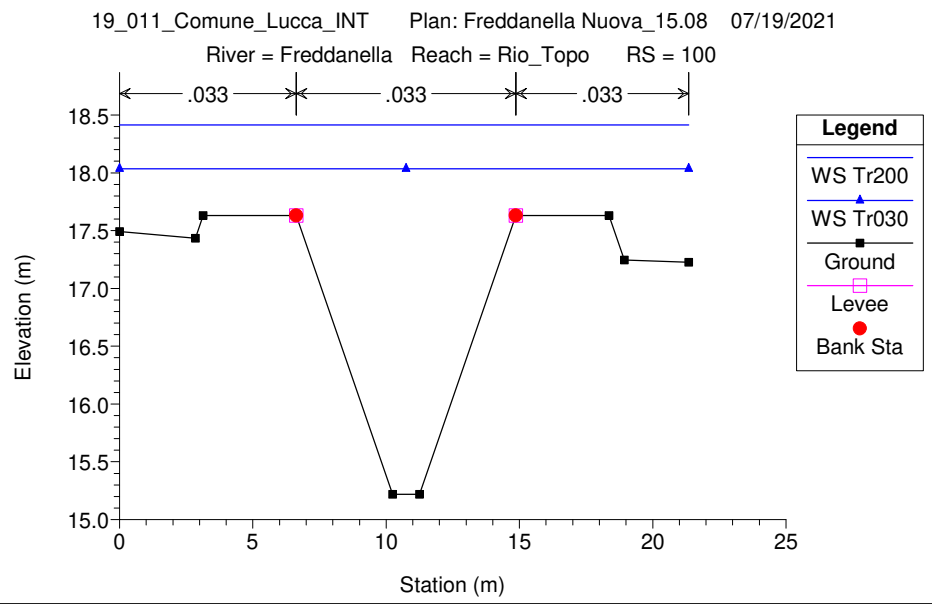
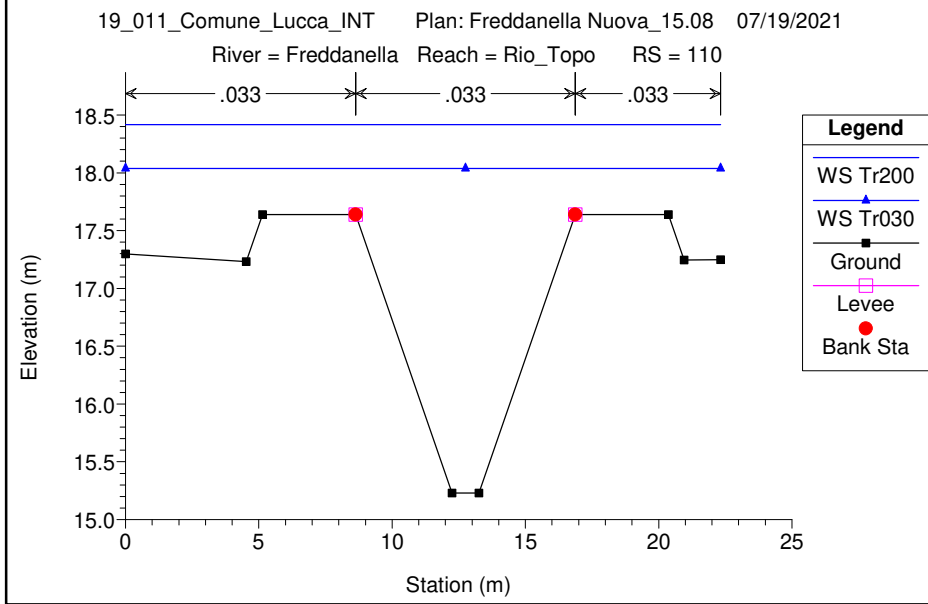
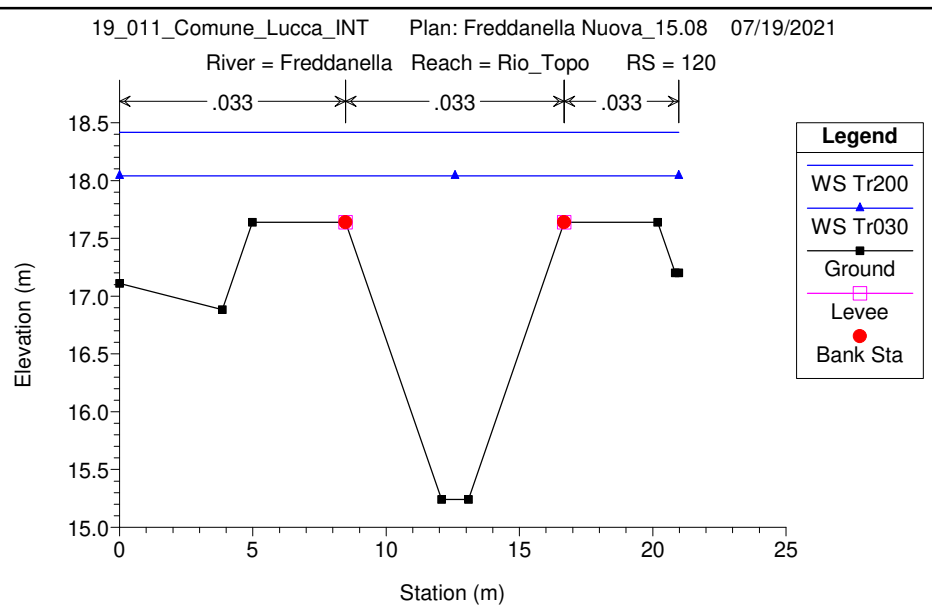
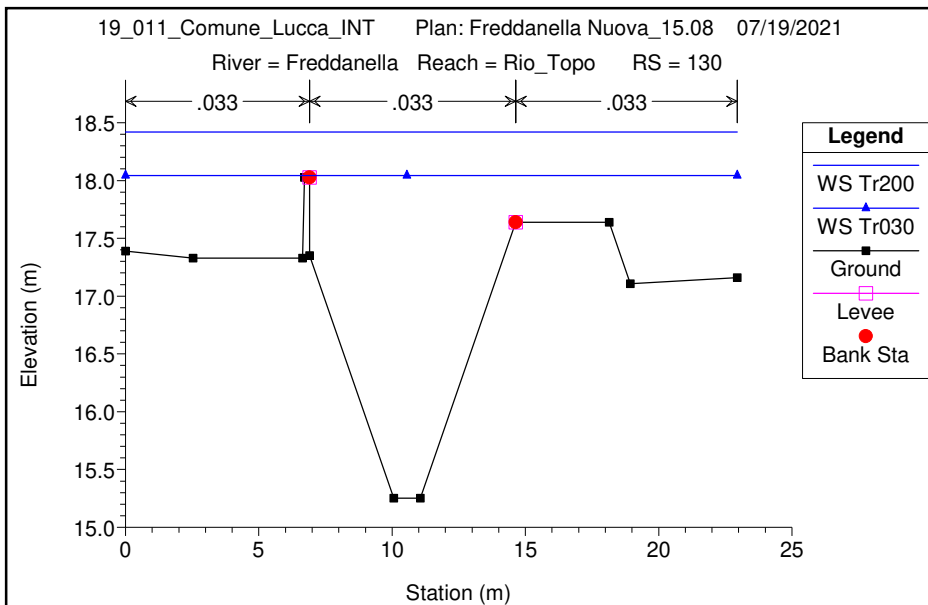




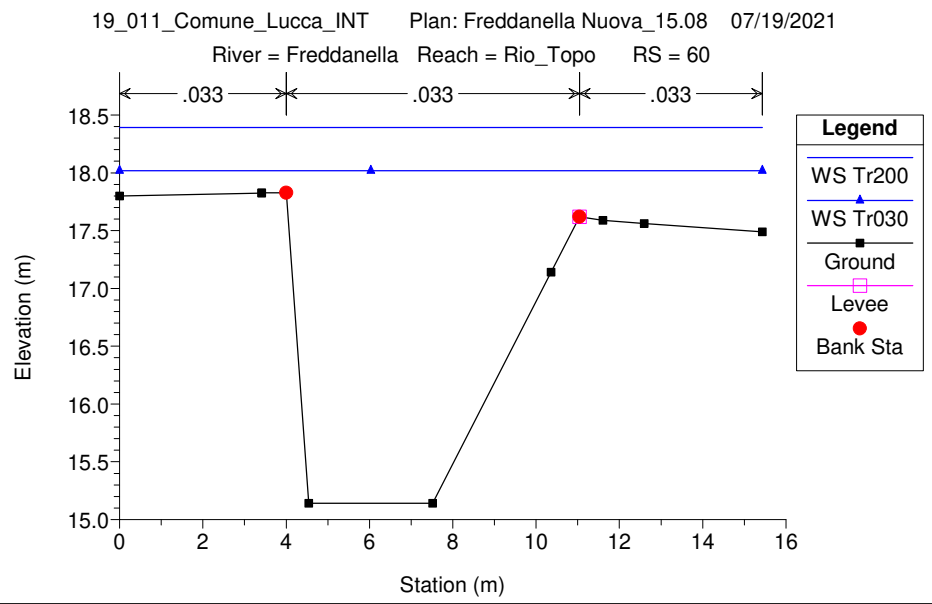
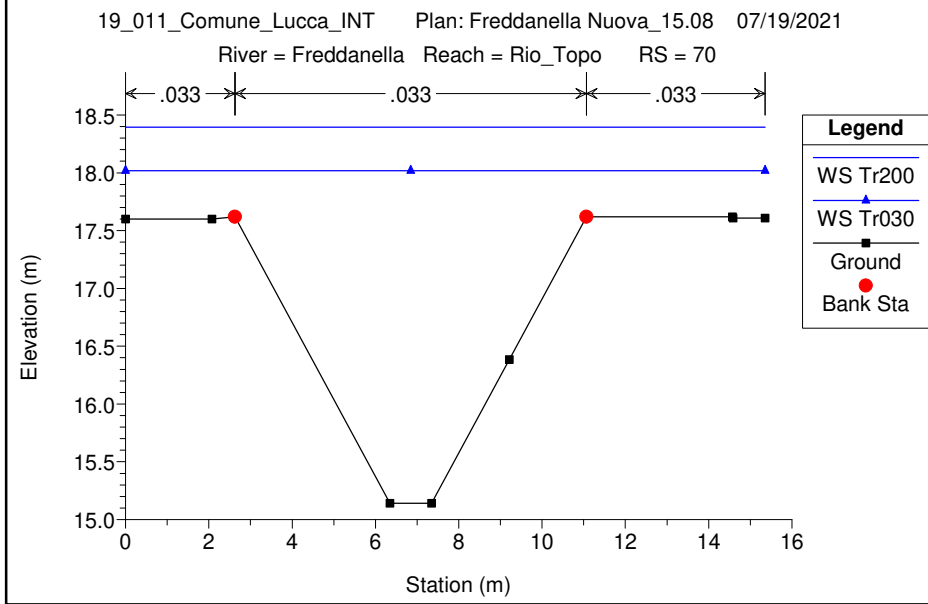
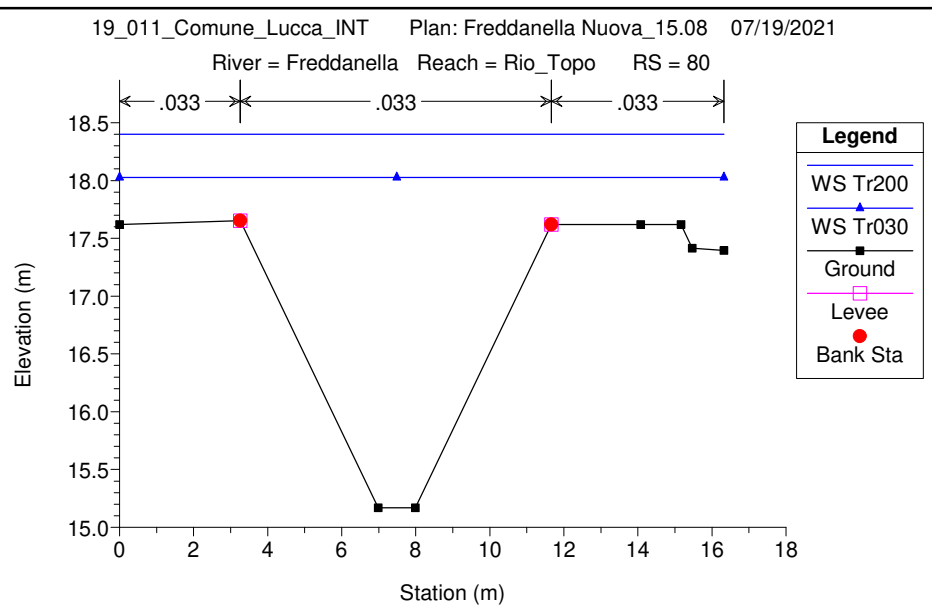
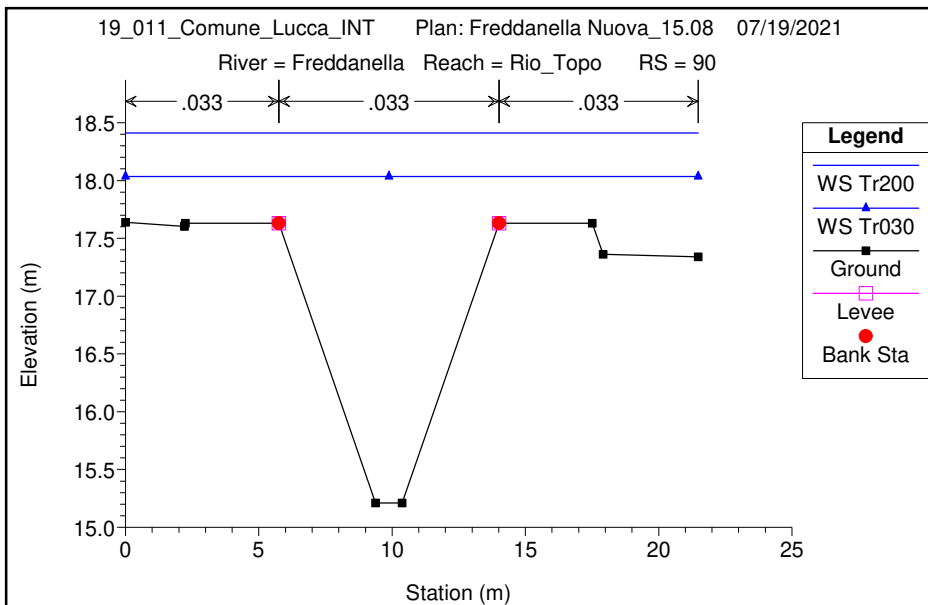


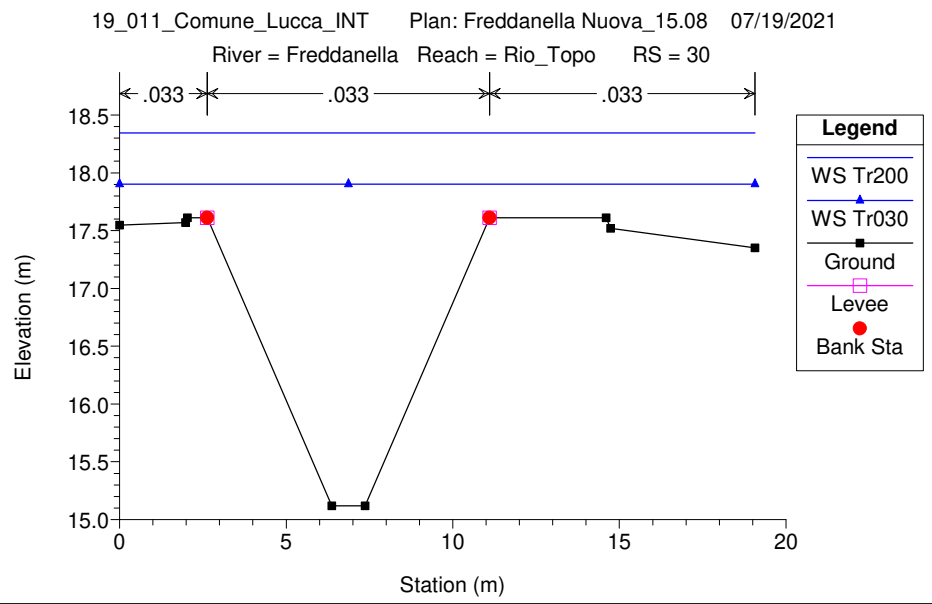
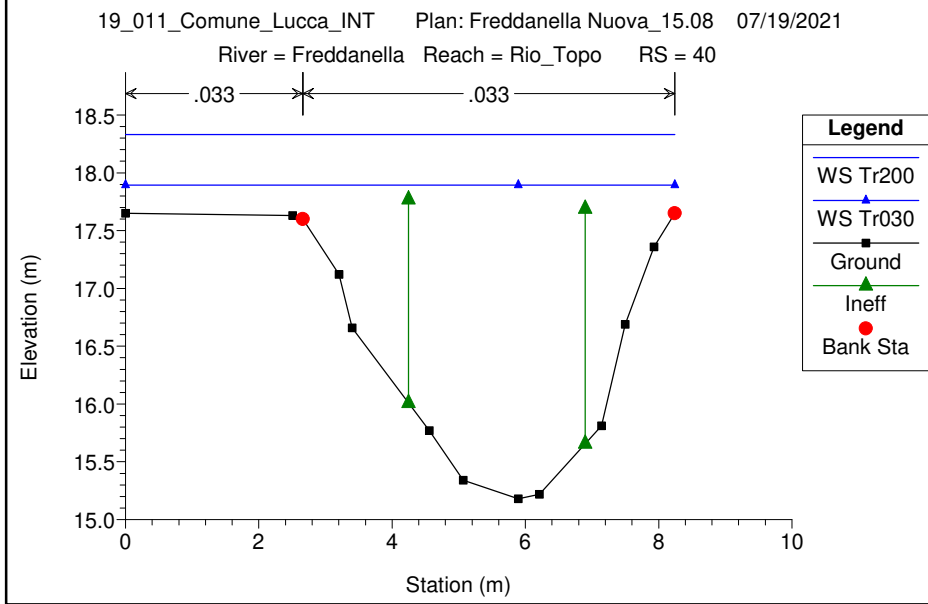
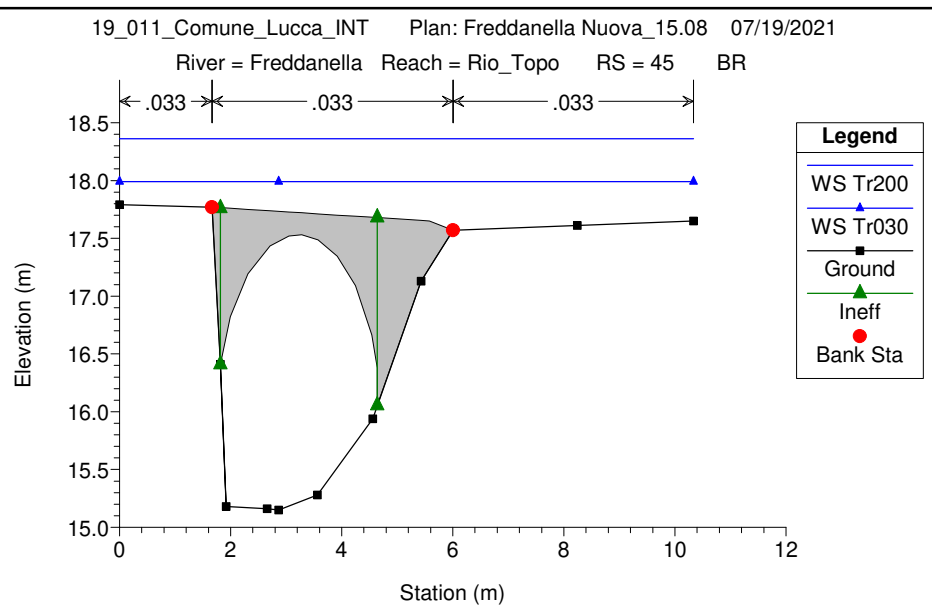
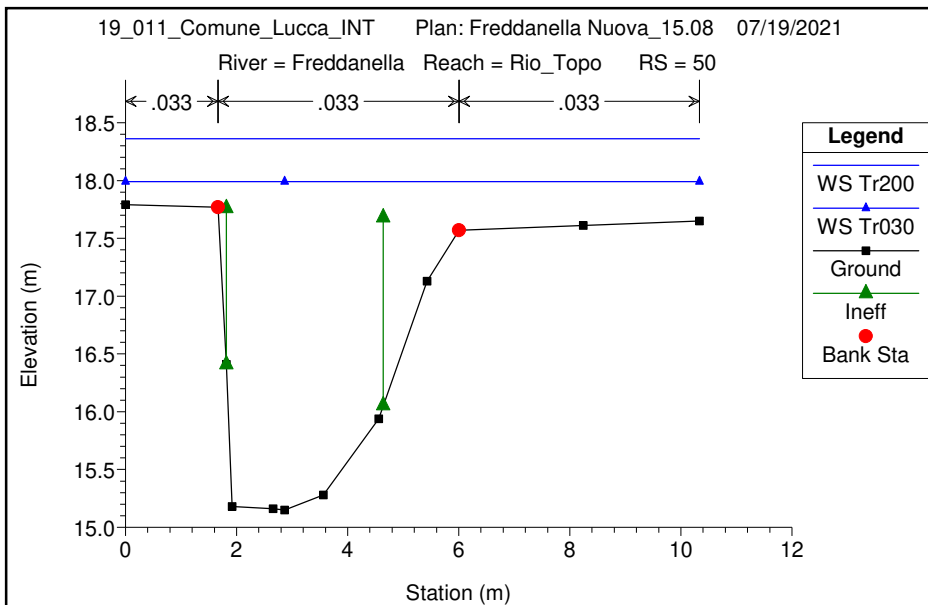






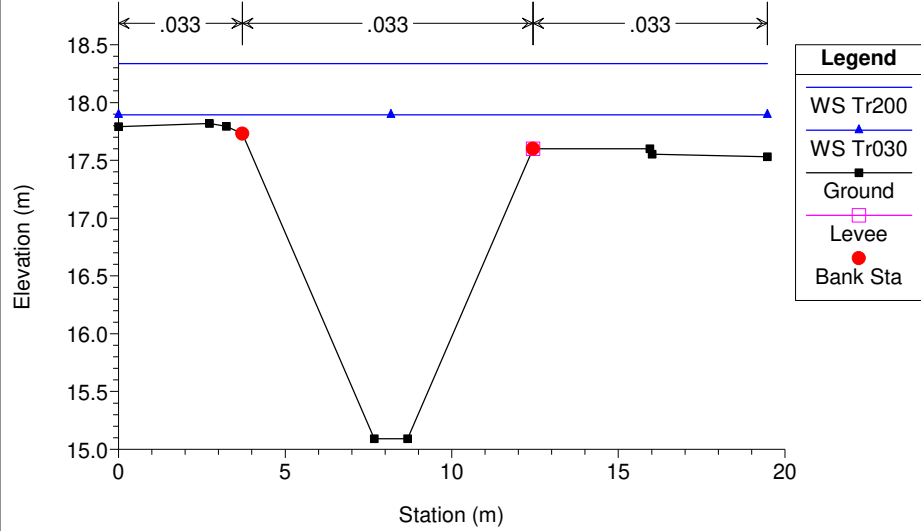






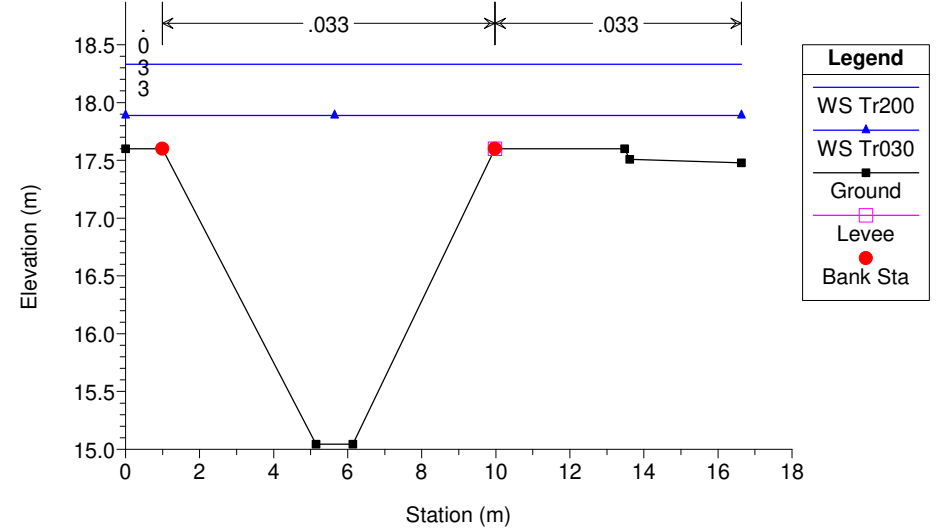
19\_011\_Comune\_Lucca\_INT Plan: Freddanella Nuova\_15.08 07/19/2021

River = Freddanella Reach = Rio\_Topo RS = 20



19\_011\_Comune\_Lucca\_INT Plan: Freddanella Nuova\_15.08 07/19/2021

River = Freddanella Reach = Rio\_Topo RS = 10





**OUTPUT IDRAULICI RELATIVI  
AL SISTEMA RIO FREDDANELLA S. ALESSIO  
“Rio del Topo”**









HEC-RAS Plan: FN\_15.08 River: Freddanella Reach: Rio\_Topo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Rio_Topo	320	Tr200	10.90	15.82	18.83	3.01	18.01	18.24	-0.82	-0.59	0.40	0.08	27.00
Rio_Topo	320	Tr030	7.20	15.82	18.36	2.54	18.01	18.24	-0.35	-0.12	0.40	0.09	27.00
Rio_Topo	310	Tr200	10.90	15.85	18.83	2.98	17.91	17.20	-0.92	-1.63	0.45	0.09	13.90
Rio_Topo	310	Tr030	7.20	15.85	18.36	2.51	17.91	17.20	-0.45	-1.16	0.42	0.09	13.90
Rio_Topo	300	Tr200	10.90	15.74	18.83	3.09	17.80	17.15	-1.03	-1.68	0.38	0.07	0.05
Rio_Topo	300	Tr030	7.20	15.74	18.36	2.62	17.80	17.15	-0.56	-1.21	0.35	0.08	0.05
Rio_Topo	295		Bridge										
Rio_Topo	290	Tr200	10.90	15.73	18.82	3.09	17.79	17.14	-1.03	-1.68	0.38	0.07	7.60
Rio_Topo	290	Tr030	7.20	15.73	18.35	2.62	17.79	17.14	-0.56	-1.21	0.35	0.08	7.60
Rio_Topo	289	Tr200	10.90	15.61	18.82	3.21	17.81	17.41	-1.01	-1.41	0.40	0.08	3.60
Rio_Topo	289	Tr030	7.20	15.61	18.35	2.74	17.81	17.41	-0.54	-0.94	0.37	0.08	3.60
Rio_Topo	280	Tr200	10.90	15.60	18.76	3.16	17.95	17.95	-0.81	-0.81	1.13	0.21	0.05
Rio_Topo	280	Tr030	7.20	15.60	18.32	2.72	17.95	17.95	-0.37	-0.37	0.88	0.17	0.05
Rio_Topo	275		Bridge										
Rio_Topo	272	Tr200	10.90	15.55	18.68	3.13	17.90	17.95	-0.78	-0.73	1.14	0.21	1.36
Rio_Topo	272	Tr030	7.20	15.55	18.25	2.70	17.90	17.95	-0.35	-0.30	0.88	0.17	1.36
Rio_Topo	270	Tr200	10.90	15.55	18.72	3.17	17.71	17.98	-1.00	-0.74	0.42	0.08	18.80
Rio_Topo	270	Tr030	7.20	15.55	18.27	2.72	17.71	17.98	-0.56	-0.29	0.39	0.08	18.80
Rio_Topo	260	Tr200	10.90	15.55	18.71	3.16	17.69	18.06	-1.02	-0.65	0.41	0.08	2.40
Rio_Topo	260	Tr030	7.20	15.55	18.27	2.72	17.69	18.06	-0.58	-0.21	0.38	0.08	2.40
Rio_Topo	250	Tr200	10.90	15.55	18.65	3.10	17.72	17.72	-0.93	-0.93	1.19	0.22	0.05
Rio_Topo	250	Tr030	7.20	15.55	18.23	2.68	17.72	17.72	-0.51	-0.51	0.91	0.18	0.05
Rio_Topo	245		Bridge										
Rio_Topo	242	Tr200	10.90	15.55	18.54	2.99	17.72	17.72	-0.82	-0.82	1.23	0.23	0.80
Rio_Topo	242	Tr030	7.20	15.55	18.15	2.60	17.72	17.72	-0.43	-0.43	0.94	0.19	0.80
Rio_Topo	240	Tr200	10.90	15.56	18.58	3.02	17.76	18.06	-0.82	-0.52	0.46	0.09	9.50

HEC-RAS Plan: FN\_15.08 River: Freddanella Reach: Rio\_Topo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Rio_Topo	240	Tr030	7.20	15.56	18.17	2.61	17.76	18.06	-0.41	-0.11	0.43	0.09	9.50
Rio_Topo	230	Tr200	10.90	15.48	18.58	3.10	17.84	18.08	-0.74	-0.50	0.43	0.08	4.90
Rio_Topo	230	Tr030	7.20	15.48	18.17	2.69	17.84	18.08	-0.33	-0.09	0.41	0.08	4.90
Rio_Topo	220	Tr200	10.90	14.72	18.56	3.84	17.86	17.83	-0.70	-0.73	0.84	0.15	0.05
Rio_Topo	220	Tr030	7.20	14.72	18.16	3.44	17.86	17.83	-0.30	-0.33	0.63	0.12	0.05
Rio_Topo	215		Bridge										
Rio_Topo	212	Tr200	10.90	15.12	18.40	3.28	17.86	17.83	-0.54	-0.57	1.03	0.19	0.90
Rio_Topo	212	Tr030	7.20	15.12	18.04	2.92	17.86	17.83	-0.18	-0.21	0.77	0.15	0.90
Rio_Topo	210	Tr200	12.90	15.39	18.43	3.04	17.86	17.67	-0.57	-0.76	0.31	0.06	2.30
Rio_Topo	210	Tr030	8.60	15.39	18.06	2.66	17.86	17.67	-0.20	-0.39	0.32	0.06	2.30
Rio_Topo	206.6	Tr200	12.90	15.39	18.43	3.04	17.88	17.67	-0.55	-0.76	0.39	0.08	2.30
Rio_Topo	206.6	Tr030	8.60	15.39	18.06	2.67	17.88	17.67	-0.18	-0.39	0.39	0.09	2.30
Rio_Topo	203.3	Tr200	12.90	15.39	18.43	3.05	17.89	17.66	-0.54	-0.77	0.43	0.09	2.30
Rio_Topo	203.3	Tr030	8.60	15.39	18.06	2.67	17.89	17.66	-0.17	-0.39	0.42	0.10	2.30
Rio_Topo	200	Tr200	12.90	15.38	18.43	3.05	17.91	17.66	-0.52	-0.77	0.45	0.10	17.50
Rio_Topo	200	Tr030	8.60	15.38	18.06	2.68	17.91	17.66	-0.15	-0.40	0.43	0.11	17.50
Rio_Topo	190	Tr200	12.90	15.37	18.43	3.06	17.85	17.66	-0.58	-0.77	0.43	0.09	29.60
Rio_Topo	190	Tr030	8.60	15.37	18.06	2.69	17.85	17.66	-0.21	-0.40	0.40	0.10	29.60
Rio_Topo	180	Tr200	12.90	15.34	18.43	3.09	17.88	17.65	-0.55	-0.78	0.41	0.09	18.50
Rio_Topo	180	Tr030	8.60	15.34	18.05	2.72	17.88	17.65	-0.17	-0.41	0.39	0.09	18.50
Rio_Topo	170	Tr200	12.90	15.32	18.43	3.11	17.89	17.67	-0.54	-0.76	0.42	0.09	9.30
Rio_Topo	170	Tr030	8.60	15.32	18.05	2.73	17.89	17.67	-0.16	-0.38	0.40	0.09	9.30
Rio_Topo	161.7	Tr200	12.90	15.31	18.43	3.12	17.93	17.65	-0.50	-0.78	0.30	0.06	9.70
Rio_Topo	161.7	Tr030	8.60	15.31	18.05	2.74	17.93	17.65	-0.12	-0.40	0.31	0.07	9.70
Rio_Topo	160	Tr200	12.90	15.30	18.43	3.13	17.98	17.65	-0.45	-0.78	0.29	0.06	11.80
Rio_Topo	160	Tr030	8.60	15.30	18.05	2.75	17.98	17.65	-0.07	-0.40	0.30	0.07	11.80

HEC-RAS Plan: FN\_15.08 River: Freddanella Reach: Rio\_Topo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Rio_Topo	150	Tr200	12.90	15.29	18.43	3.14	18.04	17.65	-0.39	-0.78	0.35	0.08	28.10
Rio_Topo	150	Tr030	8.60	15.29	18.05	2.76	18.04	17.65	-0.01	-0.40	0.36	0.09	28.10
Rio_Topo	140	Tr200	12.90	15.26	18.42	3.16	18.03	17.64	-0.39	-0.78	0.42	0.09	11.60
Rio_Topo	140	Tr030	8.60	15.26	18.05	2.78	18.03	17.64	-0.02	-0.41	0.39	0.09	11.60
Rio_Topo	130	Tr200	12.90	15.25	18.42	3.17	18.03	17.64	-0.39	-0.78	0.48	0.10	11.30
Rio_Topo	130	Tr030	8.60	15.25	18.04	2.79	18.03	17.64	-0.02	-0.40	0.44	0.10	11.30
Rio_Topo	120	Tr200	12.90	15.24	18.42	3.18	17.64	17.64	-0.78	-0.78	0.51	0.11	10.90
Rio_Topo	120	Tr030	8.60	15.24	18.04	2.80	17.64	17.64	-0.40	-0.40	0.46	0.11	10.90
Rio_Topo	110	Tr200	12.90	15.23	18.42	3.19	17.64	17.64	-0.78	-0.78	0.51	0.11	10.80
Rio_Topo	110	Tr030	8.60	15.23	18.04	2.81	17.64	17.64	-0.40	-0.40	0.47	0.11	10.80
Rio_Topo	100	Tr200	12.90	15.22	18.41	3.19	17.63	17.63	-0.78	-0.78	0.53	0.12	10.50
Rio_Topo	100	Tr030	8.60	15.22	18.04	2.82	17.63	17.63	-0.41	-0.41	0.49	0.12	10.50
Rio_Topo	90	Tr200	12.90	15.21	18.41	3.20	17.63	17.63	-0.78	-0.78	0.54	0.12	35.60
Rio_Topo	90	Tr030	8.60	15.21	18.03	2.82	17.63	17.63	-0.40	-0.40	0.49	0.12	35.60
Rio_Topo	80	Tr200	12.90	15.17	18.40	3.23	17.65	17.62	-0.75	-0.78	0.61	0.13	30.70
Rio_Topo	80	Tr030	8.60	15.17	18.03	2.86	17.65	17.62	-0.37	-0.41	0.53	0.13	30.70
Rio_Topo	70	Tr200	12.90	15.14	18.39	3.25	17.62	17.62	-0.77	-0.77	0.62	0.13	6.90
Rio_Topo	70	Tr030	8.60	15.14	18.02	2.88	17.62	17.62	-0.40	-0.40	0.53	0.13	6.90
Rio_Topo	60	Tr200	12.90	15.14	18.39	3.25	17.83	17.62	-0.56	-0.77	0.62	0.12	8.20
Rio_Topo	60	Tr030	8.60	15.14	18.02	2.88	17.83	17.62	-0.19	-0.40	0.53	0.12	8.20
Rio_Topo	50	Tr200	12.90	15.15	18.36	3.21	17.77	17.57	-0.59	-0.79	0.99	0.20	0.10
Rio_Topo	50	Tr030	8.60	15.15	17.99	2.84	17.77	17.57	-0.22	-0.42	0.88	0.19	0.10
Rio_Topo	45		Bridge										
Rio_Topo	40	Tr200	12.90	15.18	18.33	3.15	17.60	17.65	-0.73	-0.68	0.97	0.21	8.50
Rio_Topo	40	Tr030	8.60	15.18	17.89	2.71	17.60	17.65	-0.29	-0.24	0.85	0.20	8.50
Rio_Topo	30	Tr200	12.90	15.12	18.34	3.22	17.61	17.61	-0.73	-0.73	0.57	0.12	30.60
Rio_Topo	30	Tr030	8.60	15.12	17.90	2.78	17.61	17.61	-0.29	-0.29	0.54	0.13	30.60

HEC-RAS Plan: FN\_15.08 River: Freddanella Reach: Rio\_Topo (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Max Chl Dpth (m)	LOB Elev (m)	ROB Elev (m)	L. Freeboard (m)	R. Freeboard (m)	Vel Chnl (m/s)	Froude # Chl	Length Chnl (m)
Rio_Topo	20	Tr200	12.90	15.09	18.34	3.25	17.73	17.60	-0.61	-0.74	0.59	0.13	34.90
Rio_Topo	20	Tr030	8.60	15.09	17.89	2.80	17.73	17.60	-0.16	-0.29	0.56	0.14	34.90
Rio_Topo	10	Tr200	12.90	15.04	18.33	3.29	17.60	17.60	-0.73	-0.73	0.58	0.13	7.79
Rio_Topo	10	Tr030	8.60	15.04	17.89	2.85	17.60	17.60	-0.29	-0.29	0.53	0.13	7.79