

ALLEGATO IDRAULICO

CORSO D'ACQUA: RIO DOMO, GARASSINI, MOLINO
AFFLUENTI TORRENTE MERULA
BACINO: MERULA
COMUNE: ANDORA

Modellazione idraulica in condizioni di moto permanente.

- ✚ Geometria delle sezioni ed altezza del pelo libero in condizioni di moto permanente per le portate T=50, 200, 500 anni
- ✚ Profili di rigurgito in condizioni di moto permanente per le portate T=50, 200, 500 anni
- ✚ Tabelle delle grandezze idrauliche significative per le portate T=50, 200, 500 anni

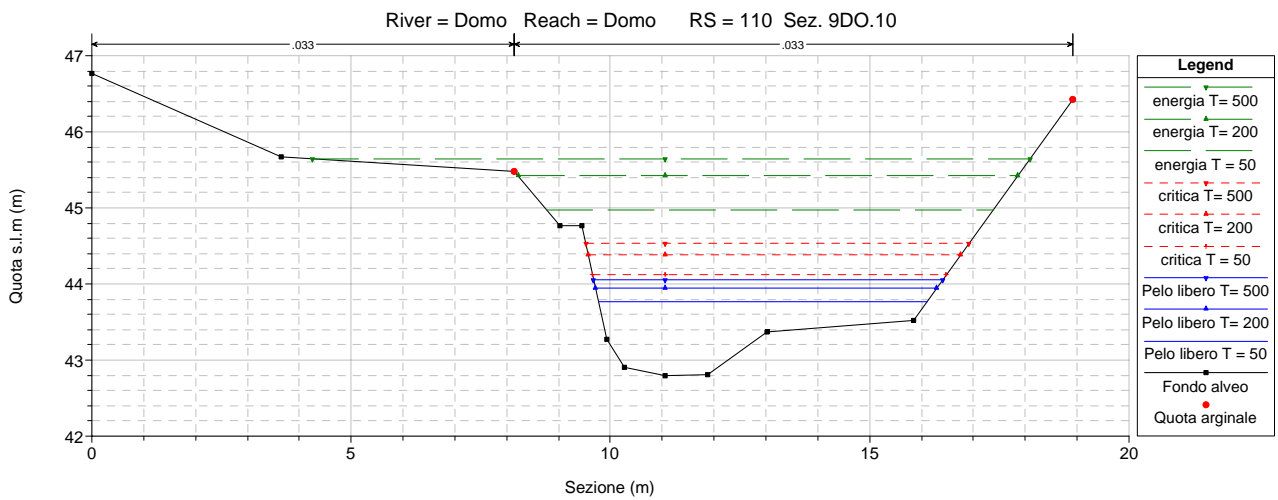
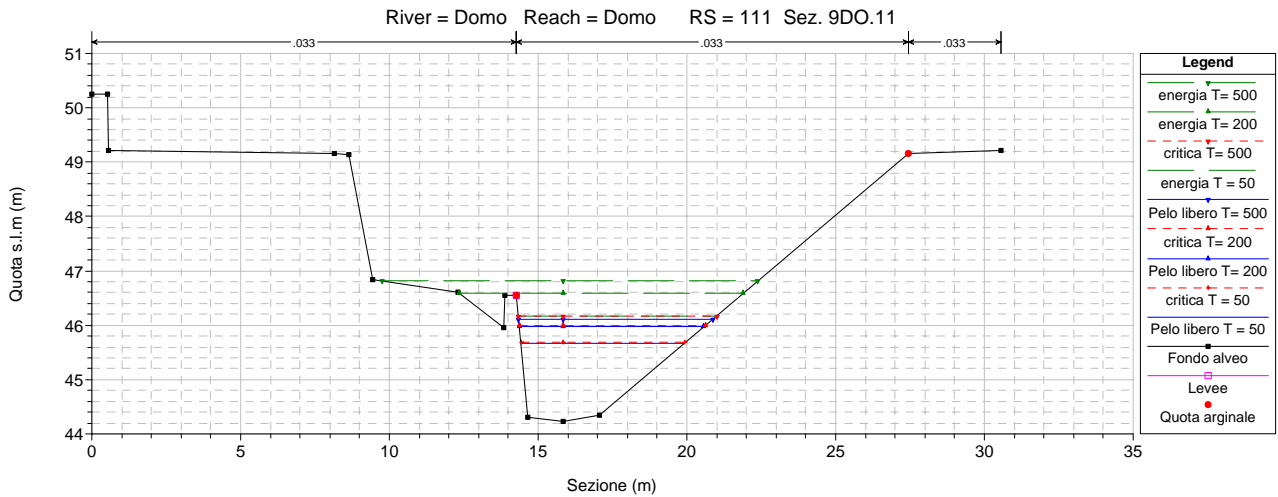
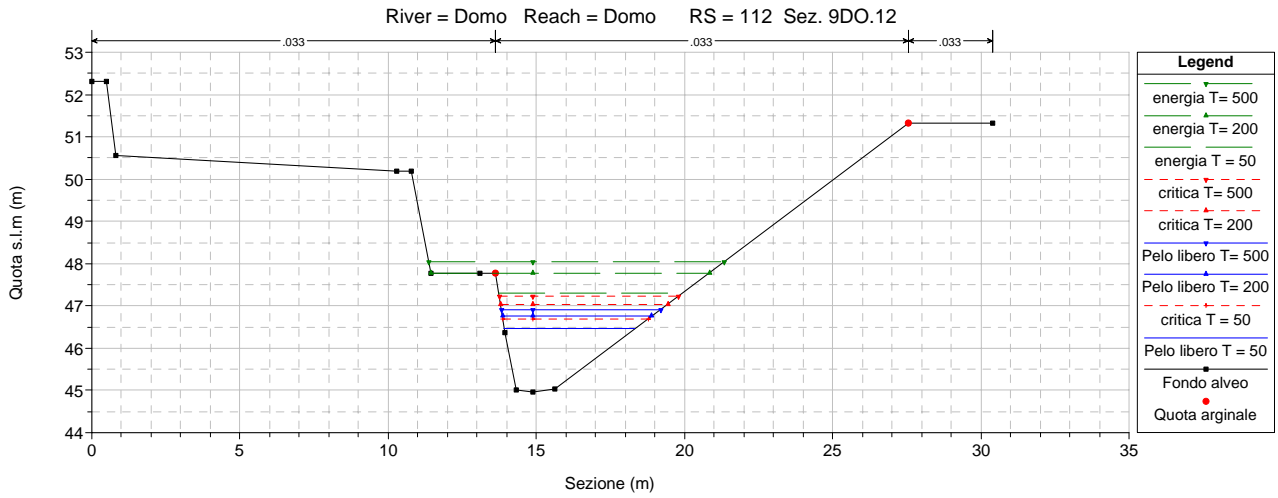
GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE T=50, 200, 500 ANNI

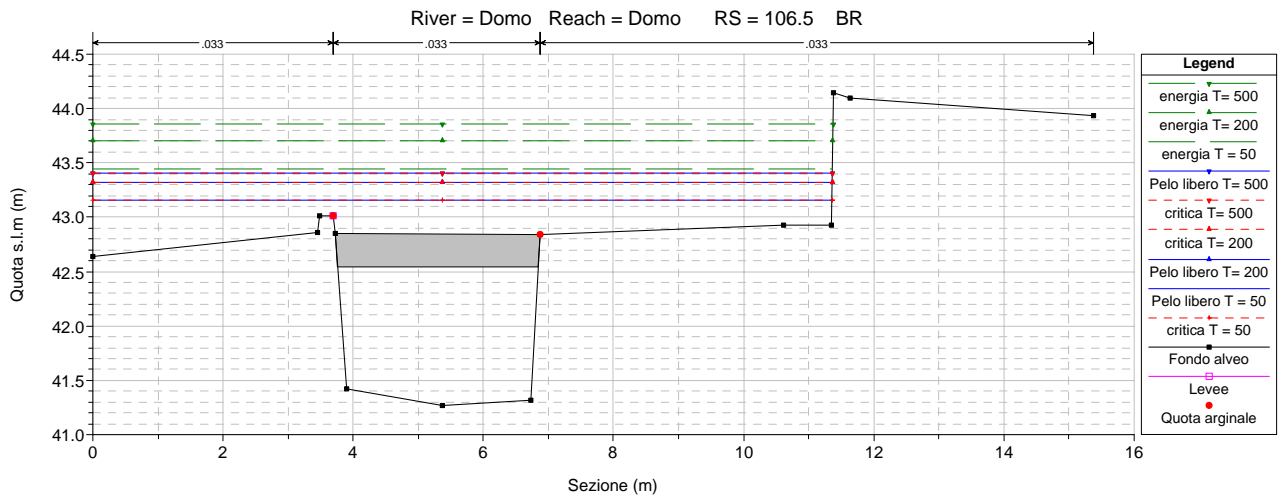
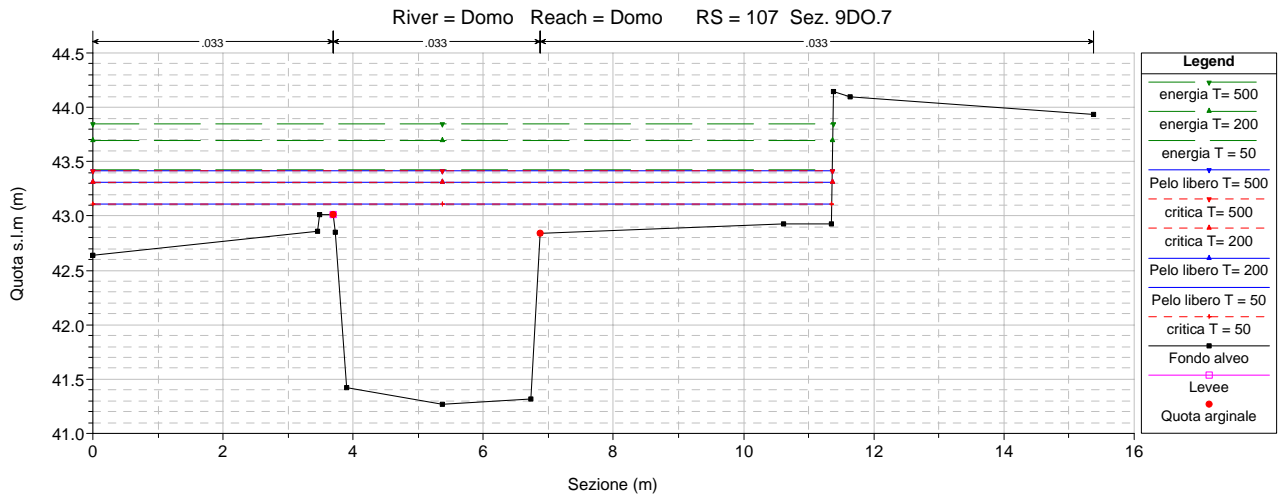
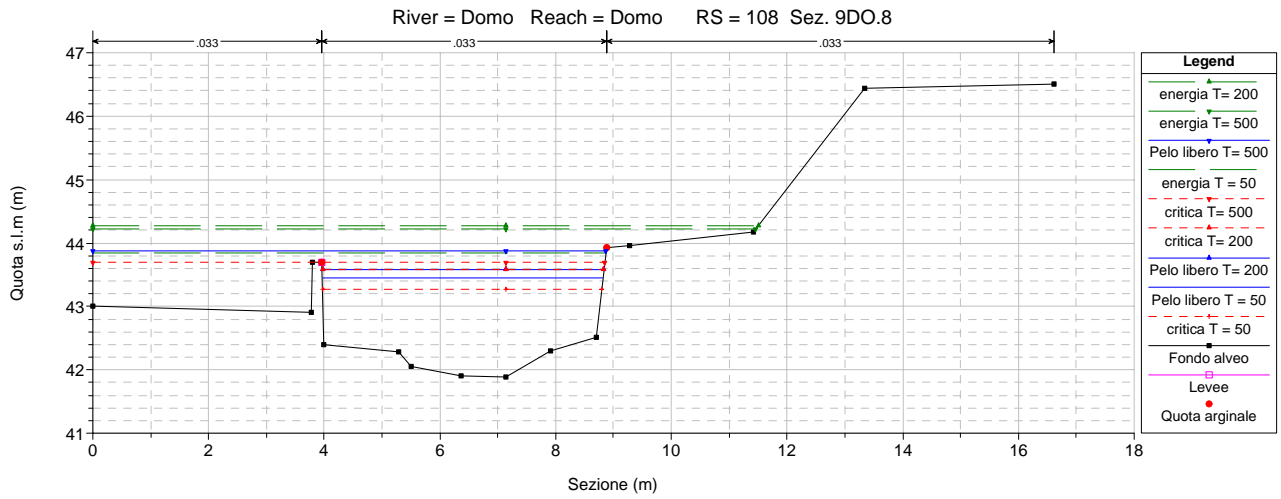
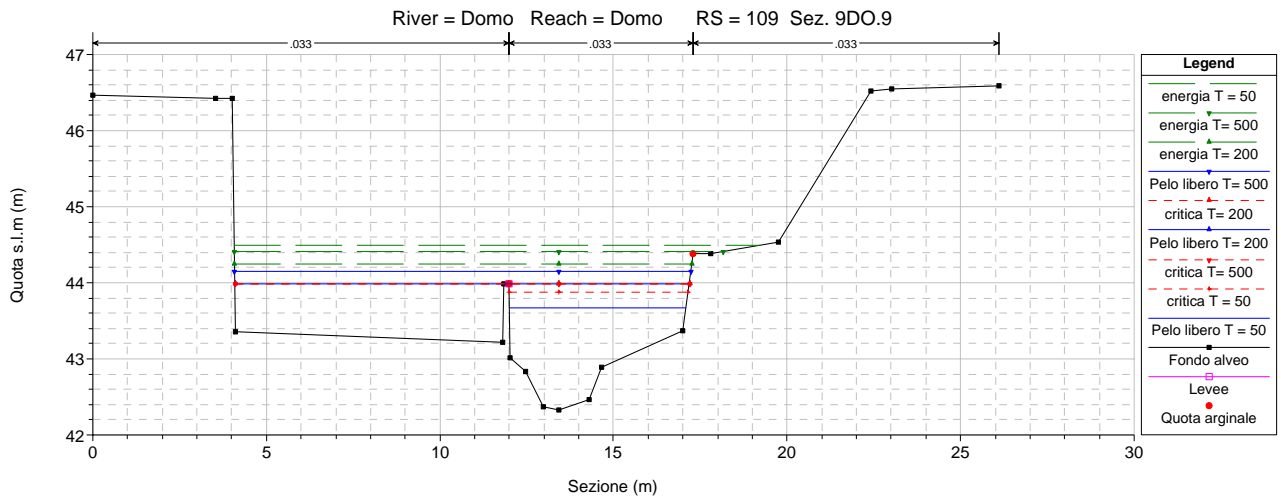
DOMO

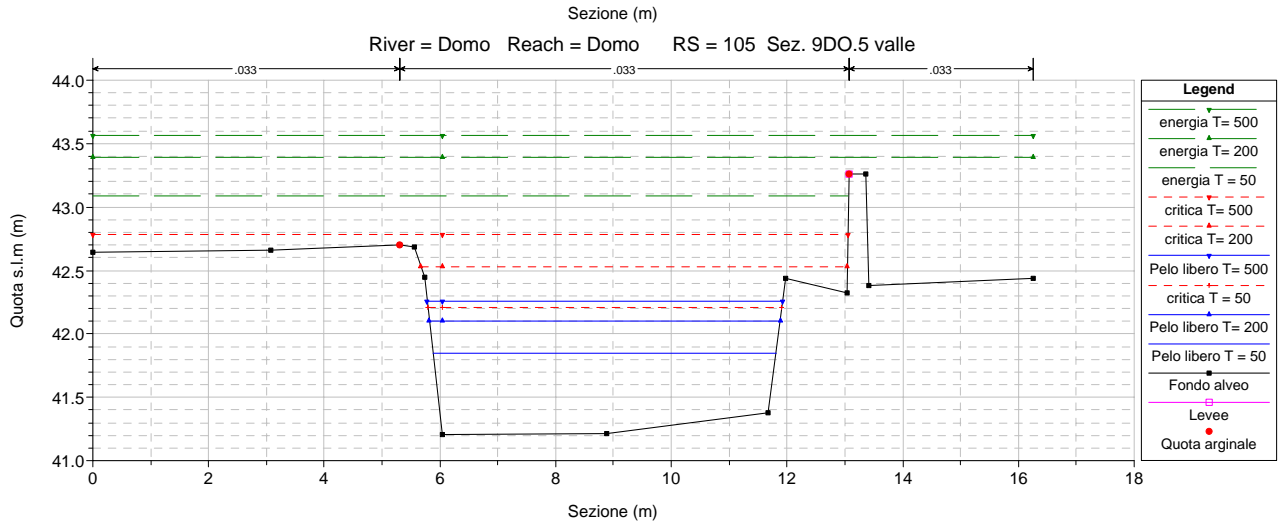
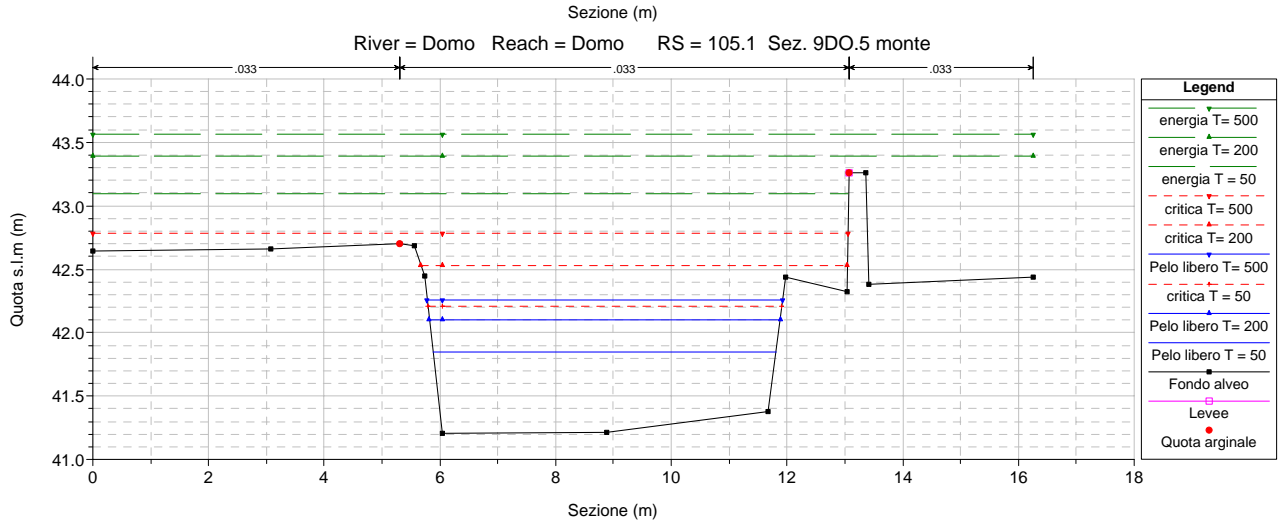
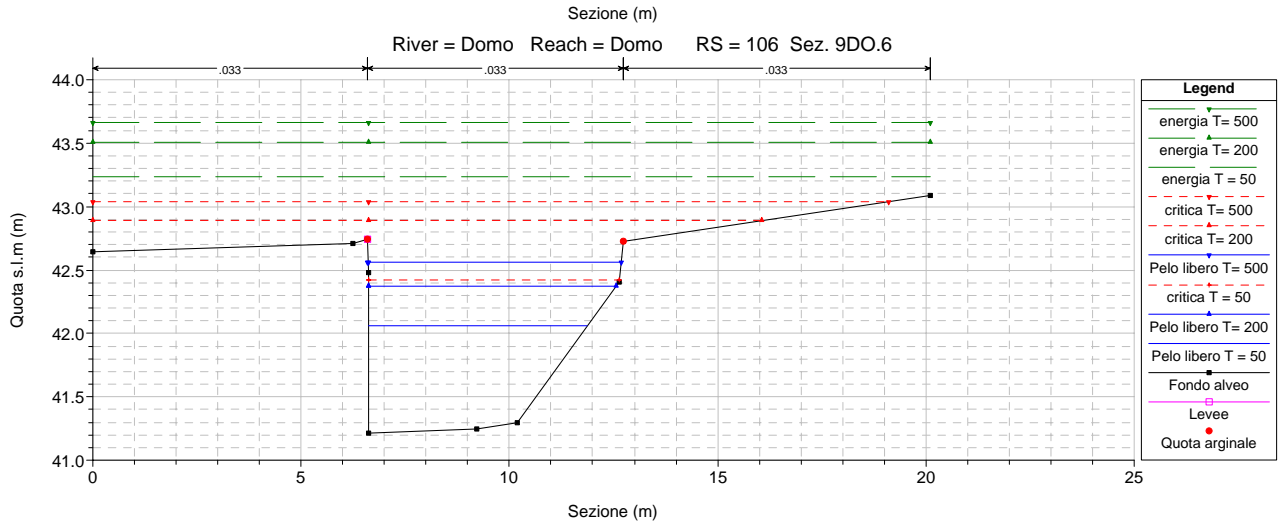
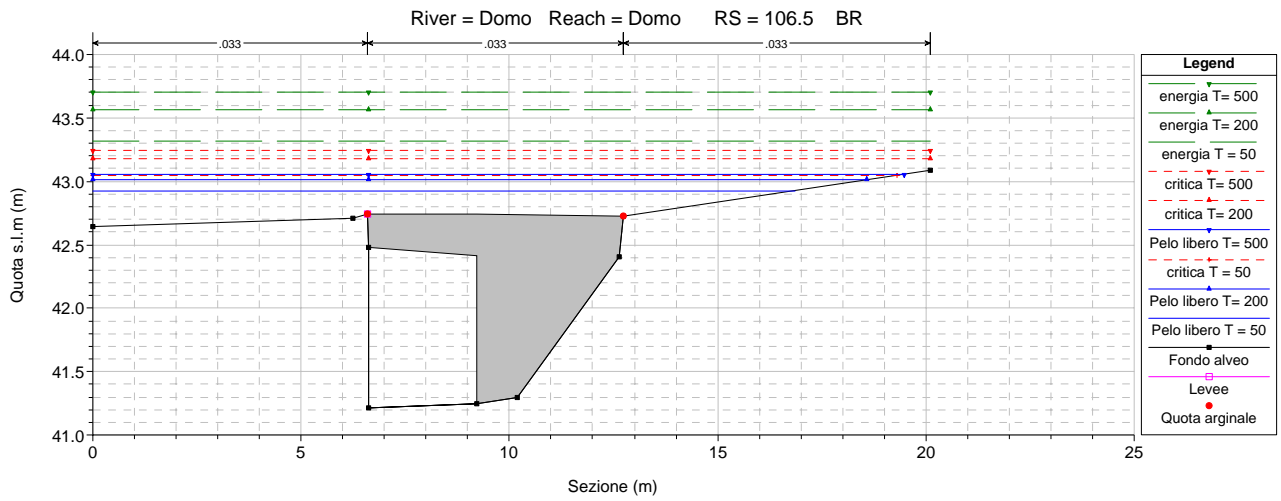
DALLA SEZ. 101
ALLA SEZ. 112

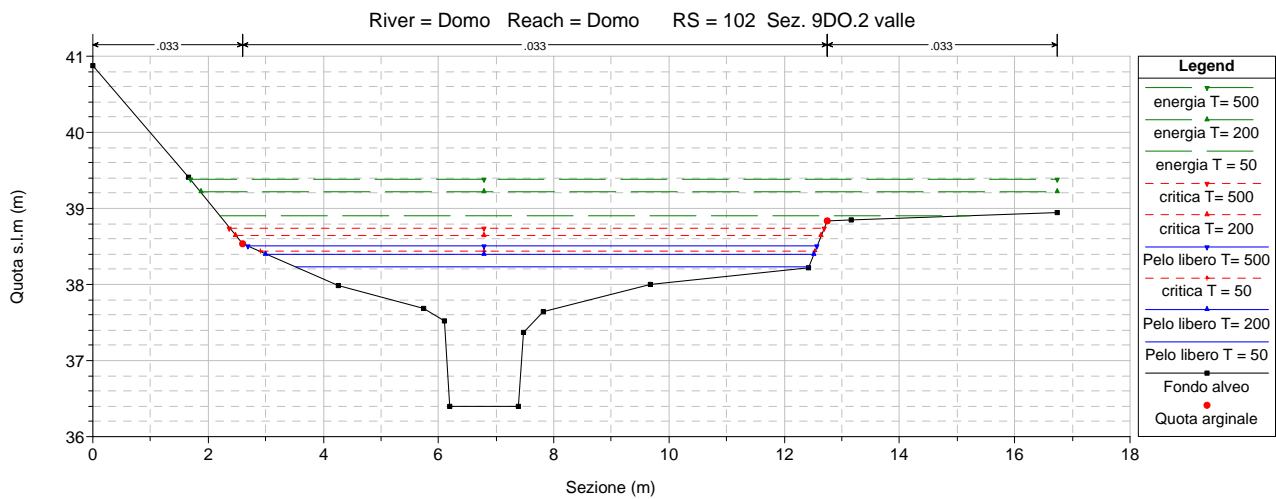
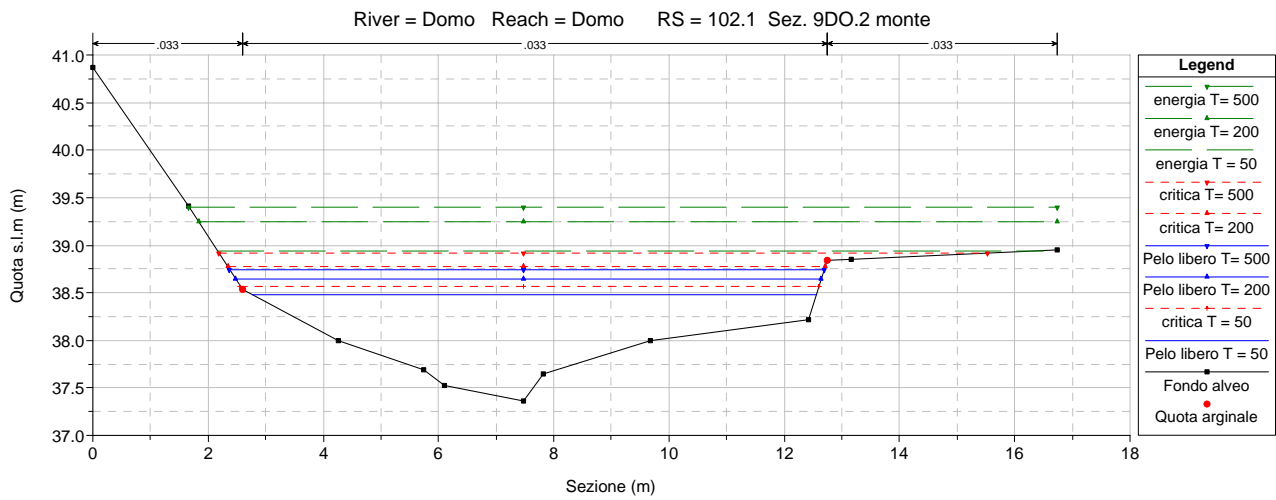
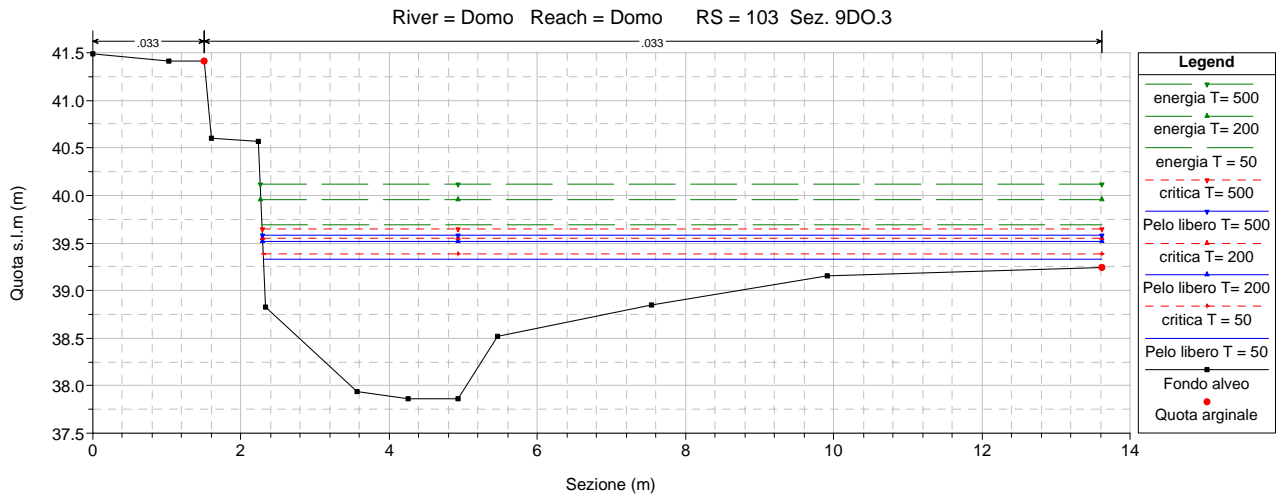
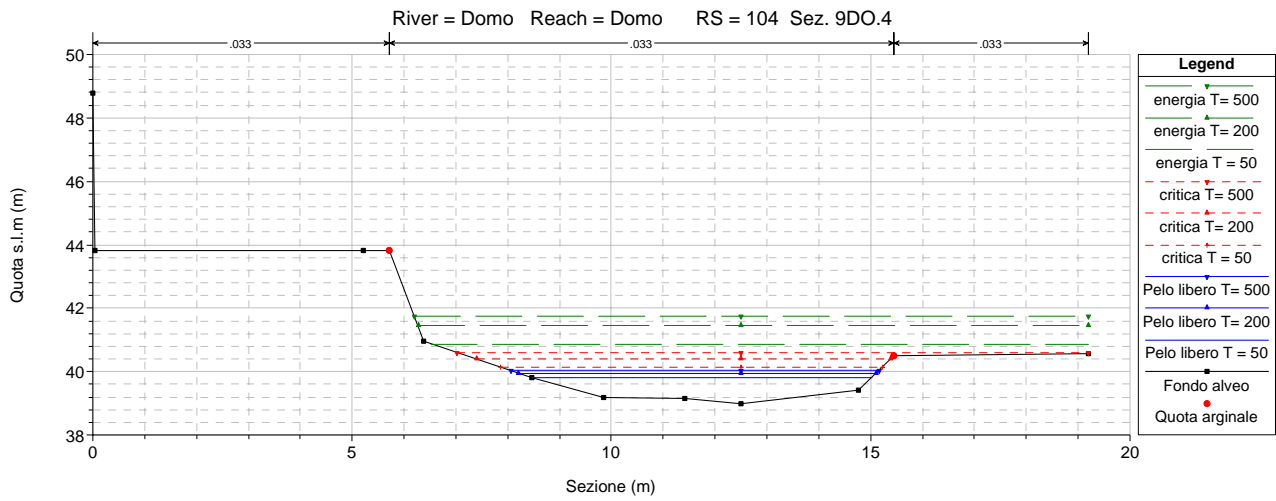
RIO DOMO

Sezioni trasversali

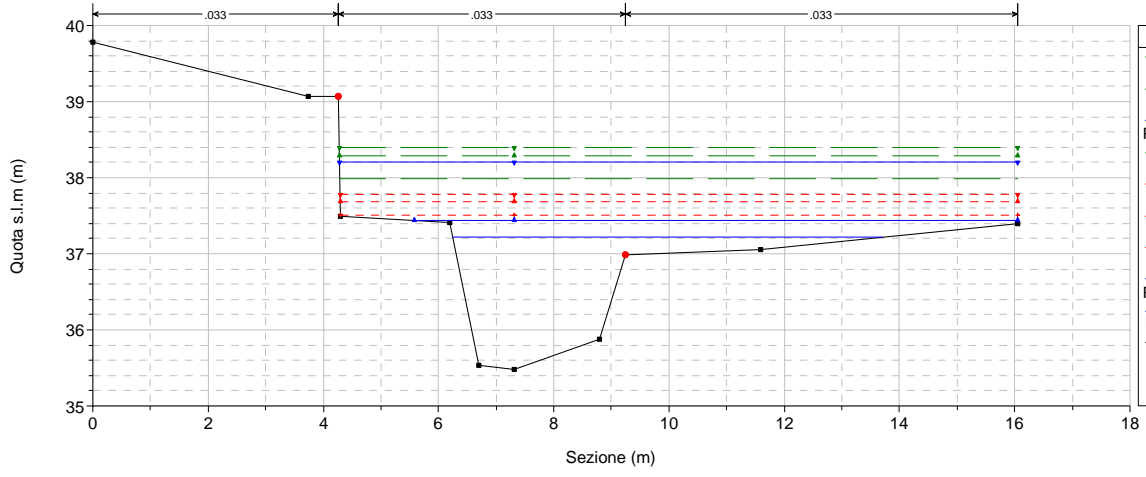








River = Domo Reach = Domo RS = 101 Sez. 9DO.1

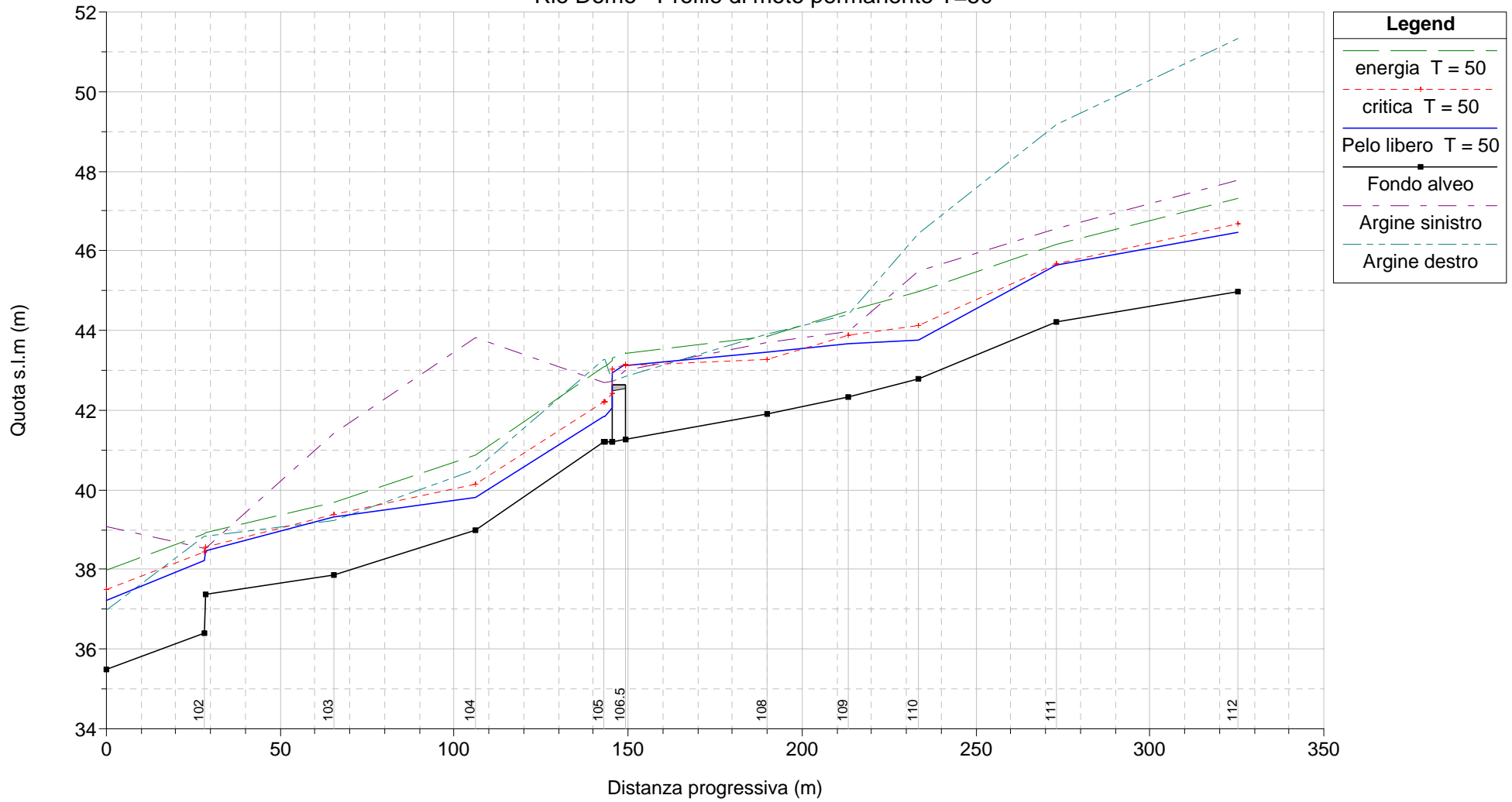


Legend	
energia T= 500	▲
energia T= 200	▲
Pelo libero T= 500	▲
energia T= 50	▲
critica T= 500	▲
critica T= 200	▲
critica T= 50	▲
Pelo libero T= 200	▲
Pelo libero T= 50	▲
Fondo alveo	●
Quota arginale	●

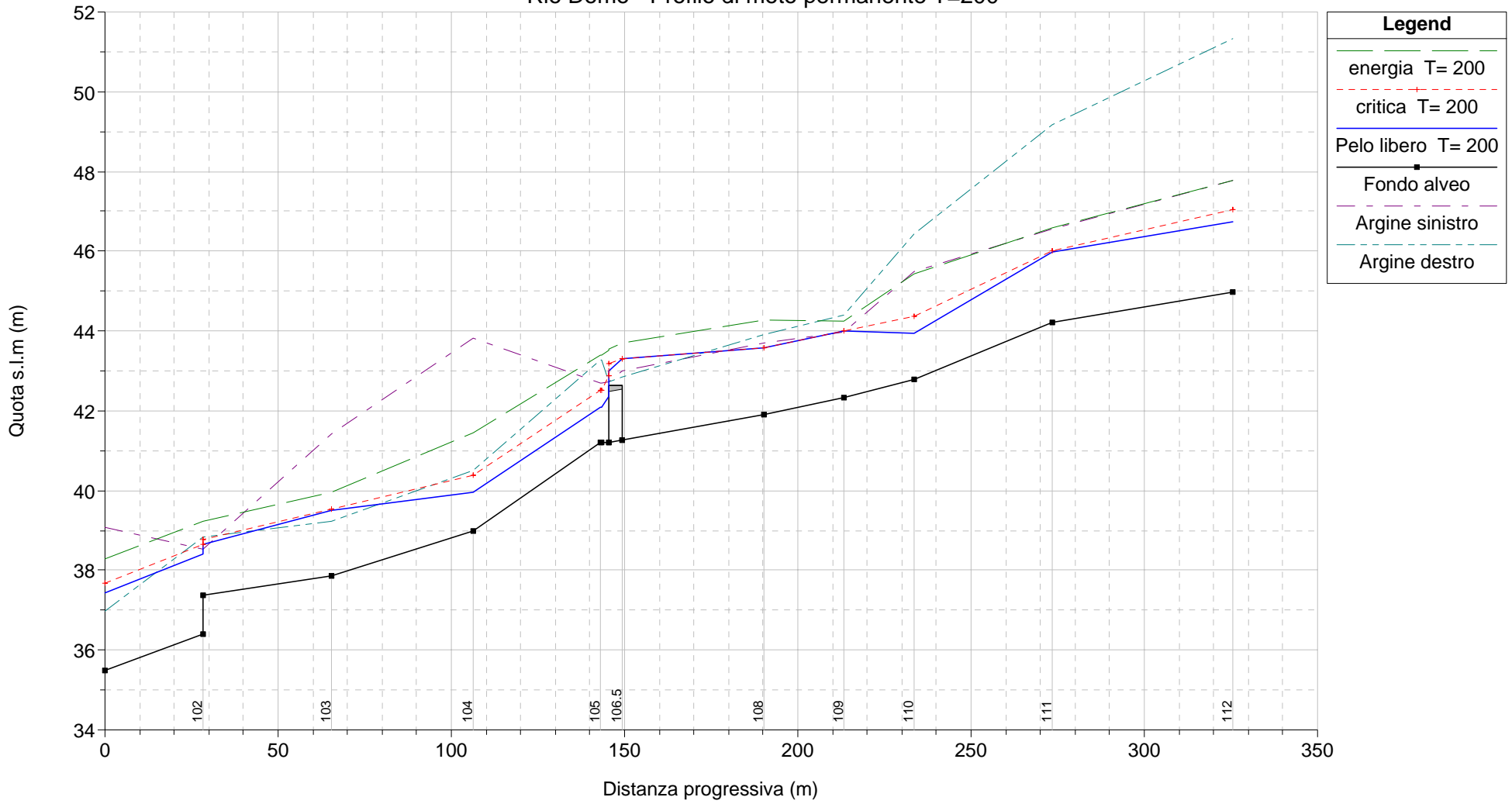
**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

DOMO

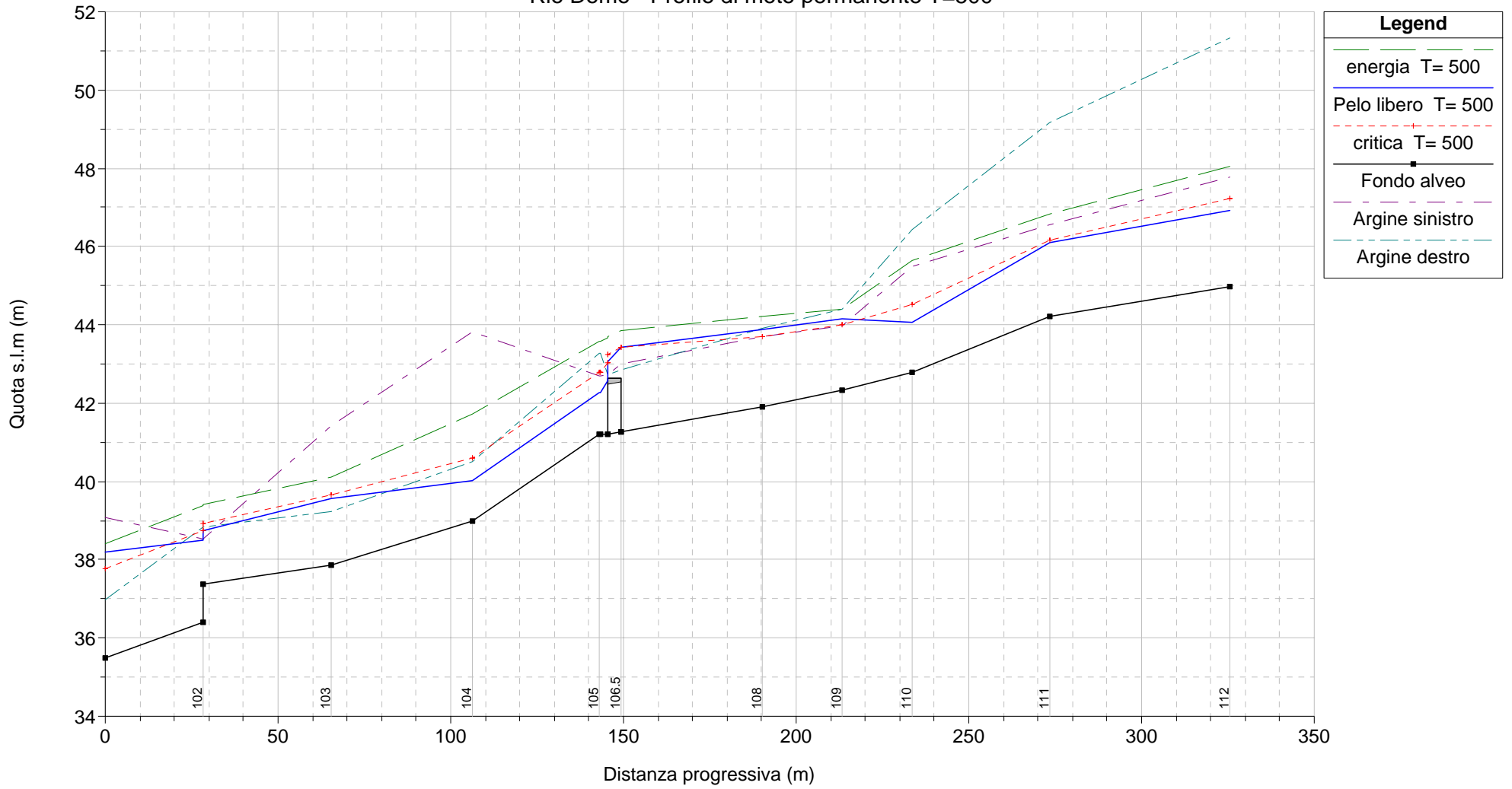
Rio Domo - Profilo di moto permanente T=50



Rio Domo - Profilo di moto permanente T=200



Rio Domo - Profilo di moto permanente T=500



**MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI**

DOMO

Rio Domo T=50 anni

Sezioni	Portata totale	Fondo alveo	Argine sinistro	Argine destro	Pelo libero	Profondità critica	Energia (m2)	Velocità (m/s)	Area bagnata	N° Froude
112	17	44.96	47.77	51.32	46.46	46.69	47.31	4.09	4.15	1.35
111	17	44.22	46.56	49.16	45.66	45.68	46.17	3.18	5.35	1.03
110	17	42.8	45.48	46.42	43.76	44.12	44.98	4.88	3.48	2.1
109	17	42.33	43.99	44.38	43.67	43.88	44.49	4.01	4.24	1.4
108	17	41.9	43.7	43.92	43.44	43.26	43.84	2.78	6.1	0.79
107	17	41.27	43.01	42.84	43.11	43.11	43.43	2.68	7.62	0.66
106.5	Bridge									
106	17	41.21	42.74	42.73	42.06	42.43	43.23	4.81	3.54	1.87
105.1	17	41.2	42.7	43.26	41.84	42.21	43.09	4.95	3.43	2.08
105	17	41.2	42.7	43.26	41.85	42.21	43.09	4.94	3.44	2.07
104	17	38.99	43.81	40.49	39.82	40.14	40.88	4.56	3.73	1.93
103	17	37.86	41.42	39.24	39.33	39.38	39.69	2.65	6.41	1.13
102.1	17	37.36	38.53	38.84	38.48	38.57	38.94	3	5.66	1.26
102	17	36.39	38.53	38.84	38.23	38.43	38.91	3.64	4.67	1.61
101	17	35.49	39.07	36.99	37.21	37.51	37.99	3.99	4.69	1.09

Rio Domo T=200 anni

Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
112	25	44.96	47.77	51.32	46.75	47.04	47.78	4.5	5.55	1.37
111	25	44.22	46.56	49.16	45.97	46	46.59	3.49	7.16	1.04
110	25	42.8	45.48	46.42	43.94	44.38	45.43	5.4	4.63	2.06
109	25	42.33	43.99	44.38	43.99	43.99	44.25	2.46	11.31	0.74
108	25	41.9	43.7	43.92	43.58	43.58	44.27	3.69	6.77	1
107	25	41.27	43.01	42.84	43.31	43.31	43.7	3.05	9.94	0.71
106.5	Bridge									
106	25	41.21	42.74	42.73	42.37	42.89	43.5	4.71	5.31	1.59
105.1	25	41.2	42.7	43.26	42.1	42.53	43.39	5.04	4.96	1.78
105	25	41.2	42.7	43.26	42.1	42.53	43.39	5.04	4.96	1.78
104	25	38.99	43.81	40.49	39.95	40.39	41.44	5.41	4.62	2.11
103	25	37.86	41.42	39.24	39.51	39.55	39.96	2.96	8.44	1.1
102.1	25	37.36	38.53	38.84	38.64	38.77	39.24	3.45	7.26	1.29
102	25	36.39	38.53	38.84	38.4	38.64	39.21	3.99	6.26	1.57
101	25	35.49	39.07	36.99	37.44	37.68	38.28	4.35	6.72	1.22

Rio Domo T=500 anni

Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
112	30	44.96	47.77	51.32	46.91	47.22	48.04	4.71	6.37	1.38
111	30	44.22	46.56	49.16	46.12	46.18	46.82	3.71	8.08	1.06
110	30	42.8	45.48	46.42	44.05	44.53	45.65	5.6	5.36	2
109	30	42.33	43.99	44.38	44.15	43.99	44.41	2.43	13.45	0.68
108	30	41.9	43.7	43.92	43.87	43.7	44.23	2.82	11.7	0.7
107	30	41.27	43.01	42.84	43.41	43.41	43.85	3.27	11.07	0.74
106.5	Bridge									
106	30	41.21	42.74	42.73	42.56	43.04	43.67	4.65	6.44	1.44
105.1	30	41.2	42.7	43.26	42.26	42.79	43.57	5.07	5.92	1.65
105	30	41.2	42.7	43.26	42.26	42.79	43.56	5.06	5.93	1.65
104	30	38.99	43.81	40.49	40.03	40.6	41.73	5.79	5.18	2.16
103	30	37.86	41.42	39.24	39.58	39.65	40.12	3.27	9.17	1.16
102.1	30	37.36	38.53	38.84	38.75	38.91	39.41	3.6	8.36	1.26
102	30	36.39	38.53	38.84	38.5	38.75	39.38	4.15	7.23	1.55
101	30	35.49	39.07	36.99	38.21	37.78	38.4	1.99	15.71	0.48

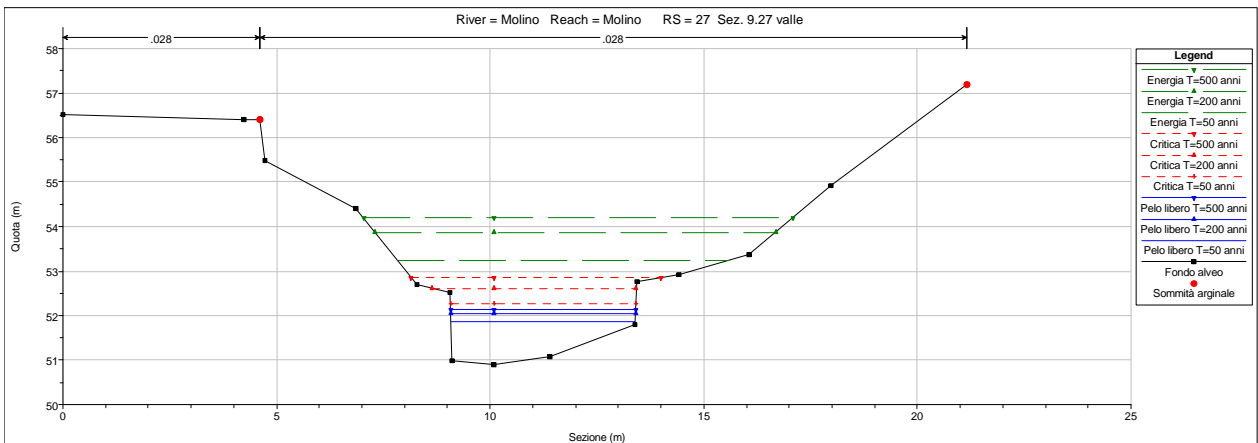
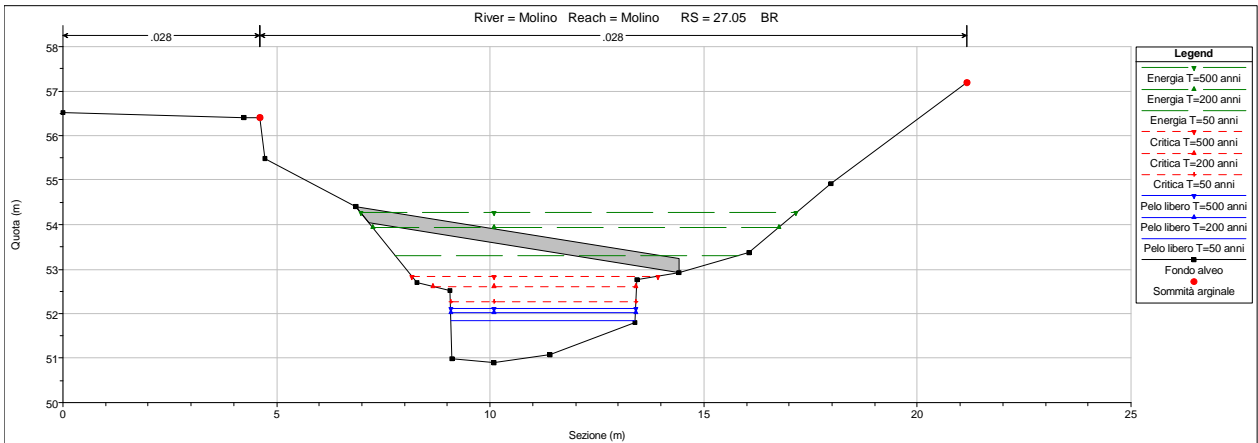
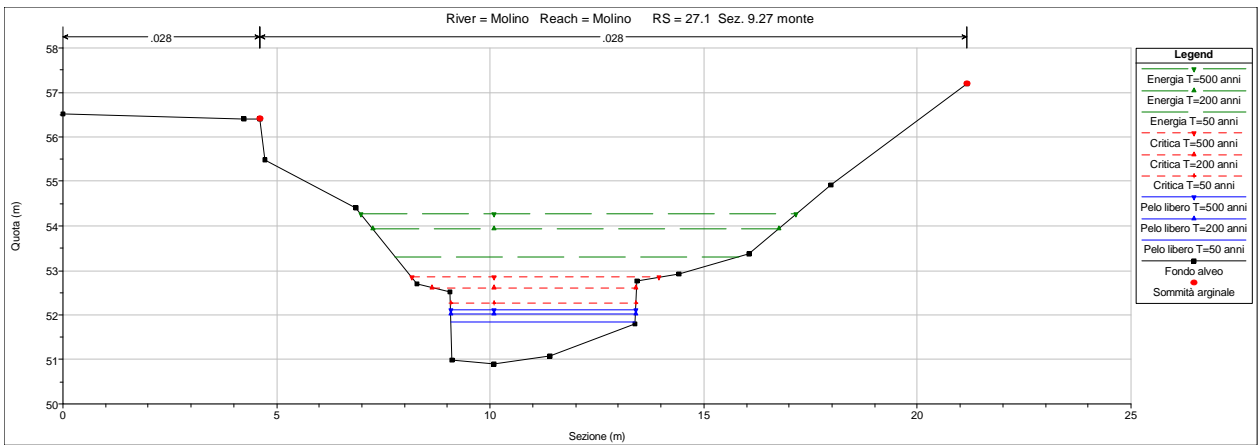
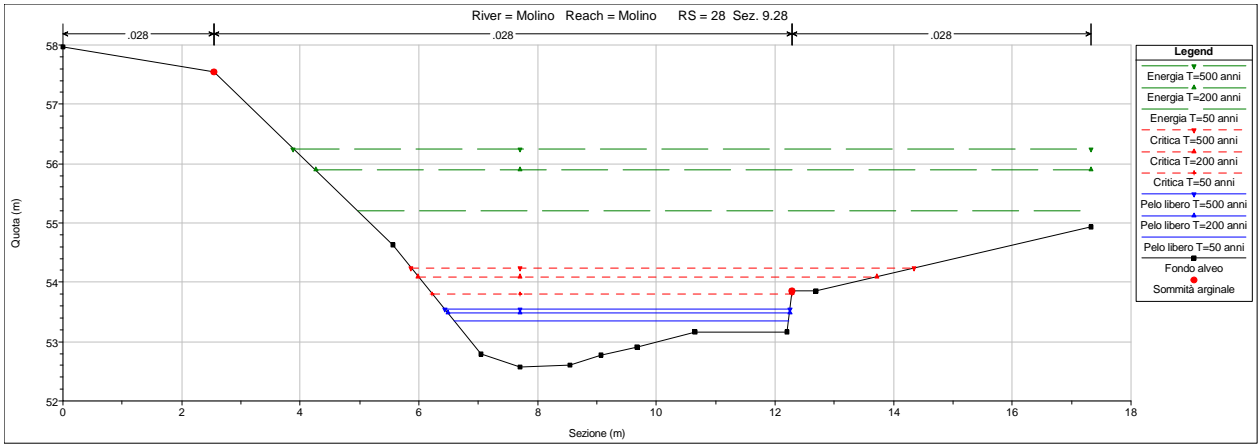
**GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE T=50, 200, 500 ANNI**

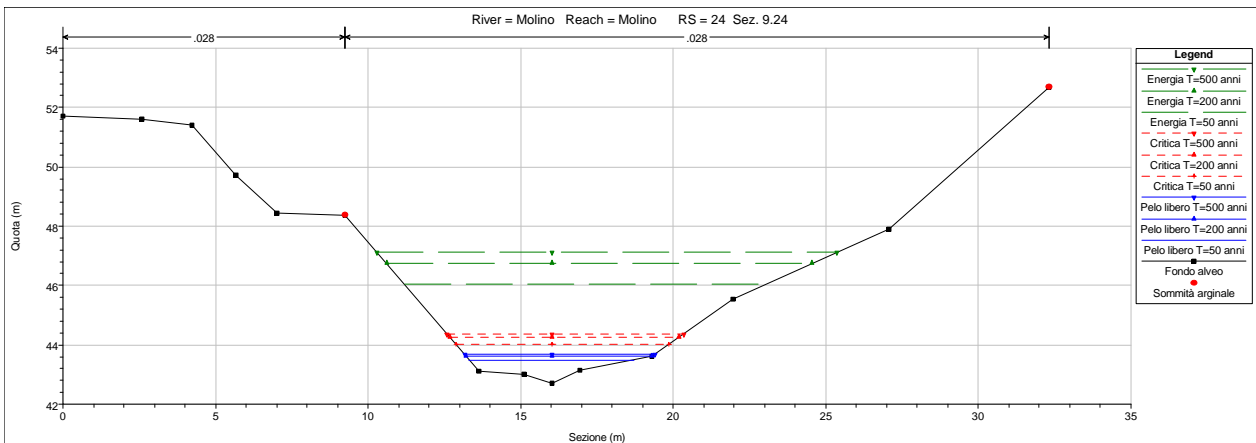
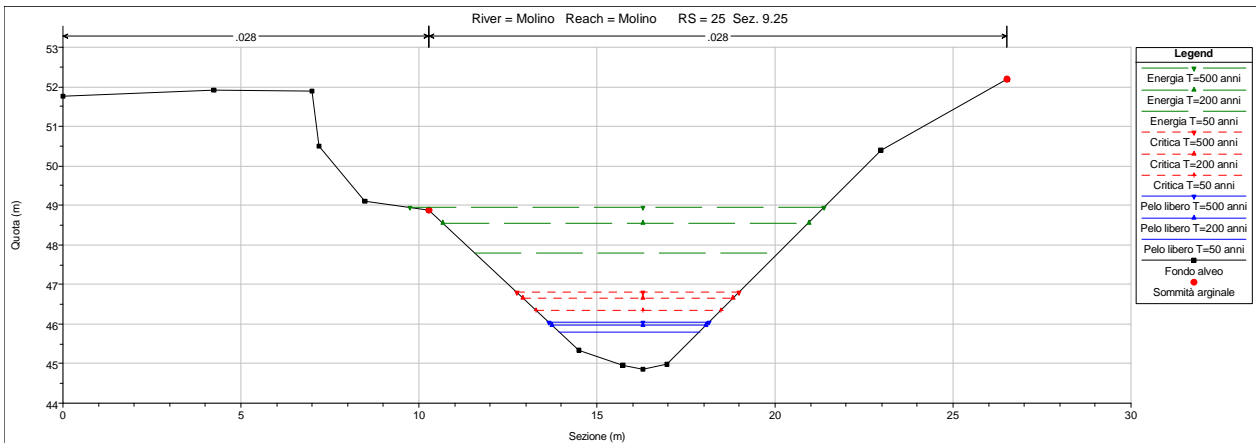
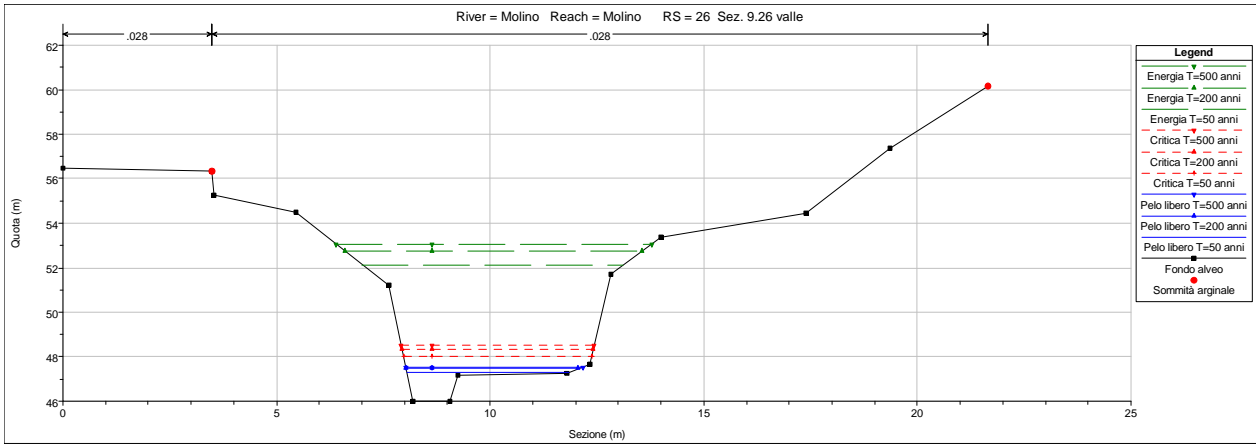
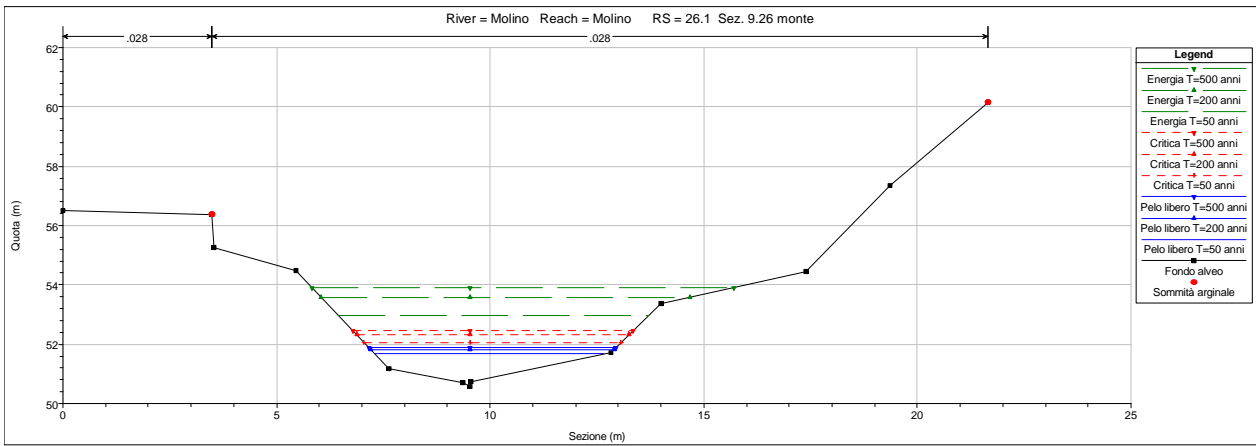
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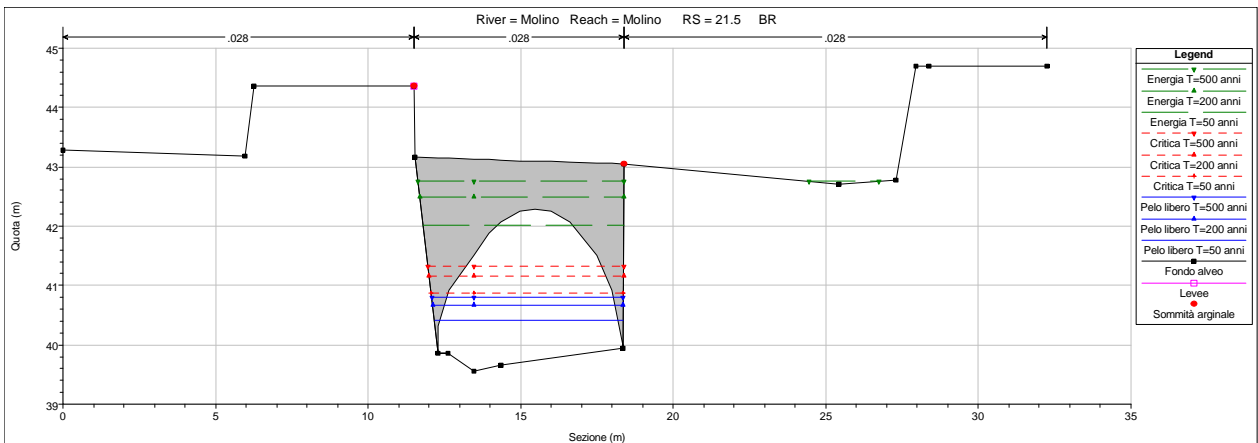
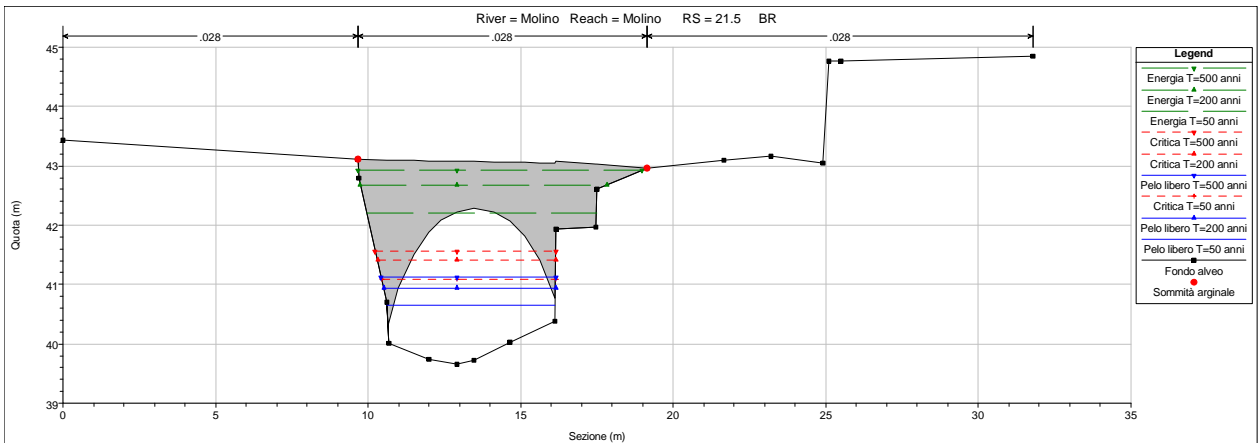
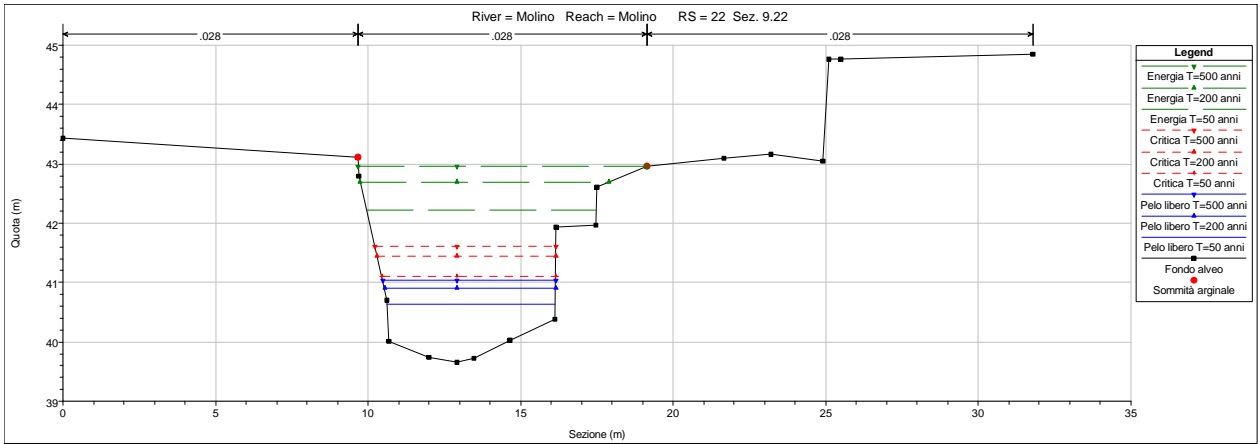
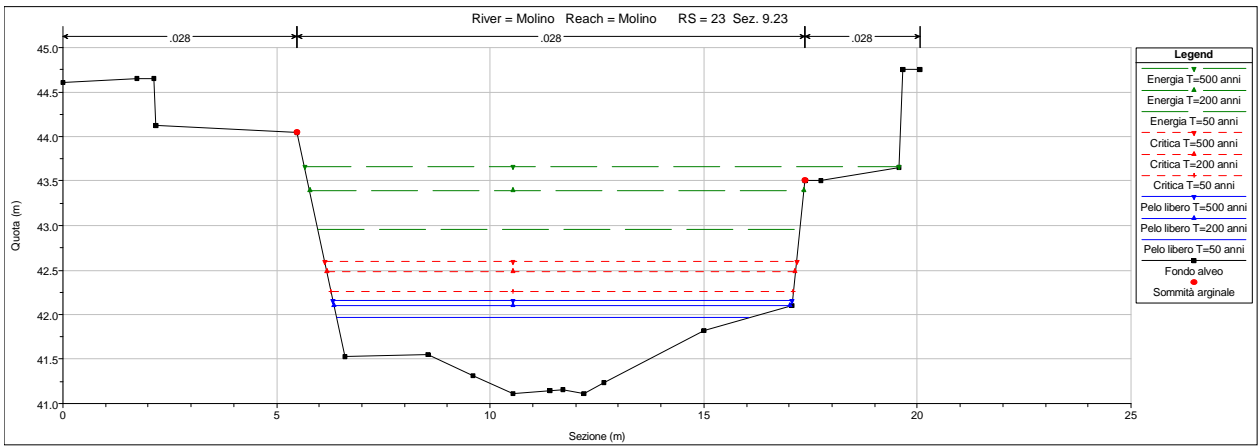
DALLA SEZ. 1
ALLA SEZ. 28

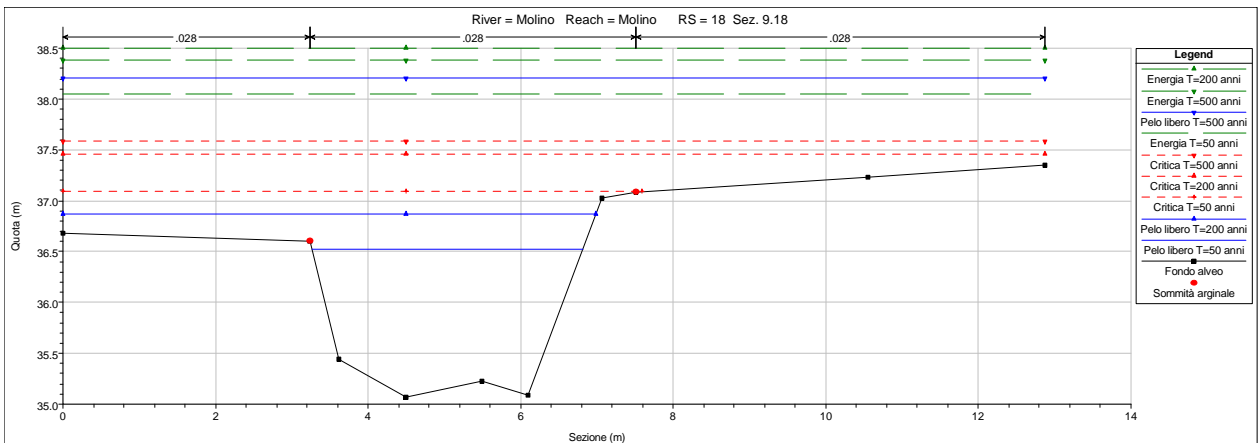
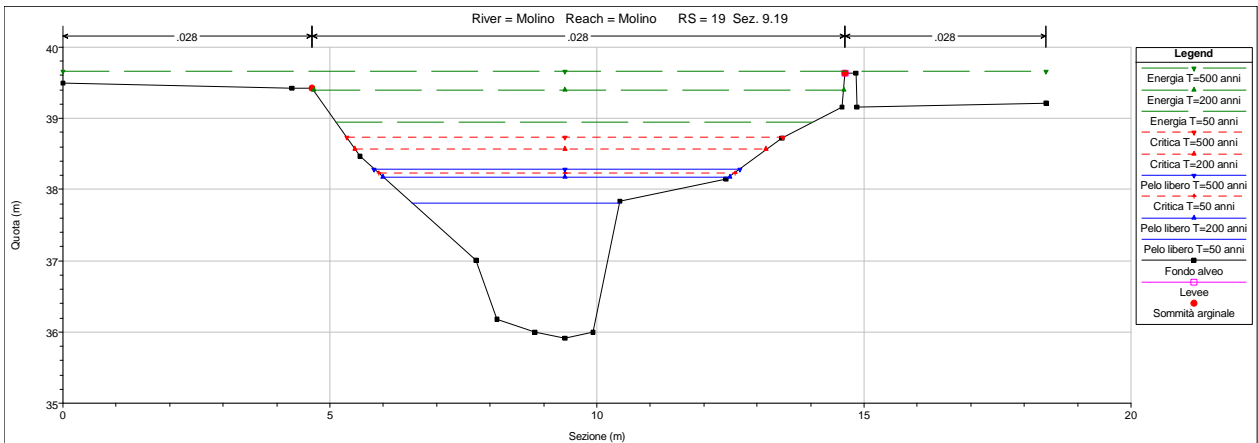
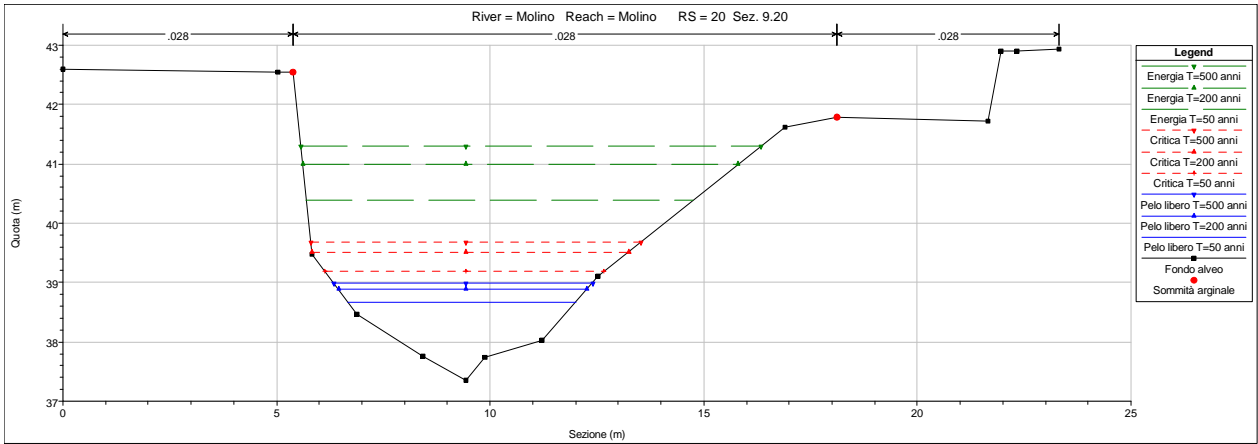
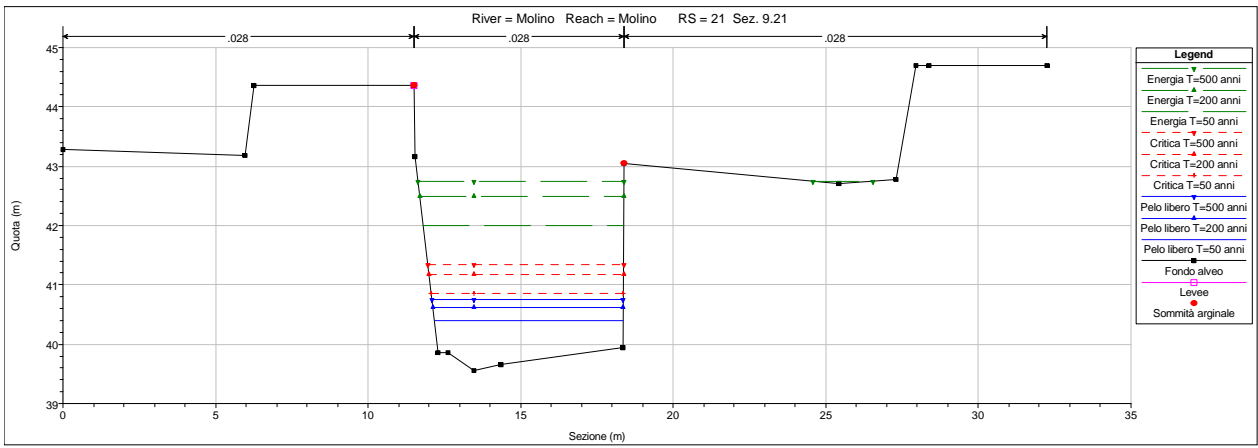
TORRENTE MOLINO

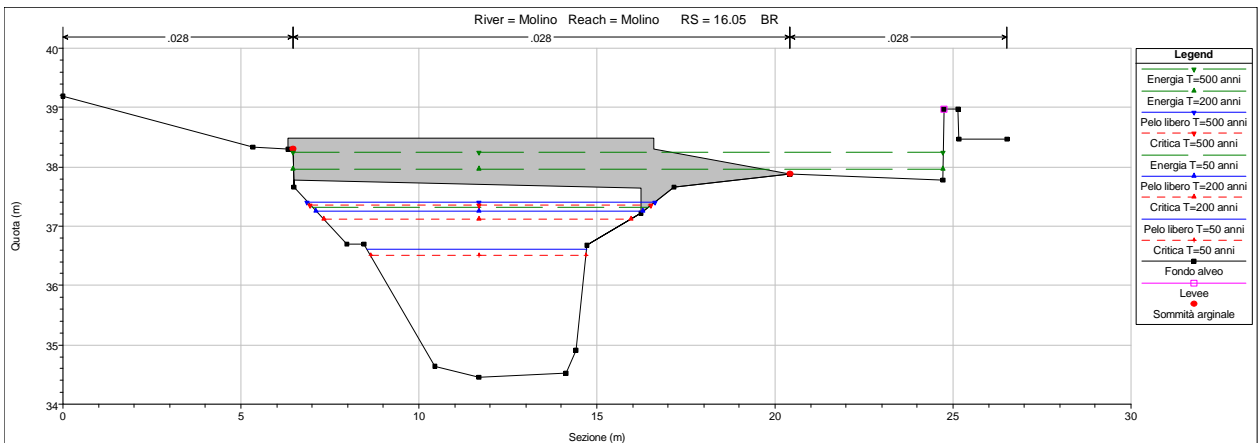
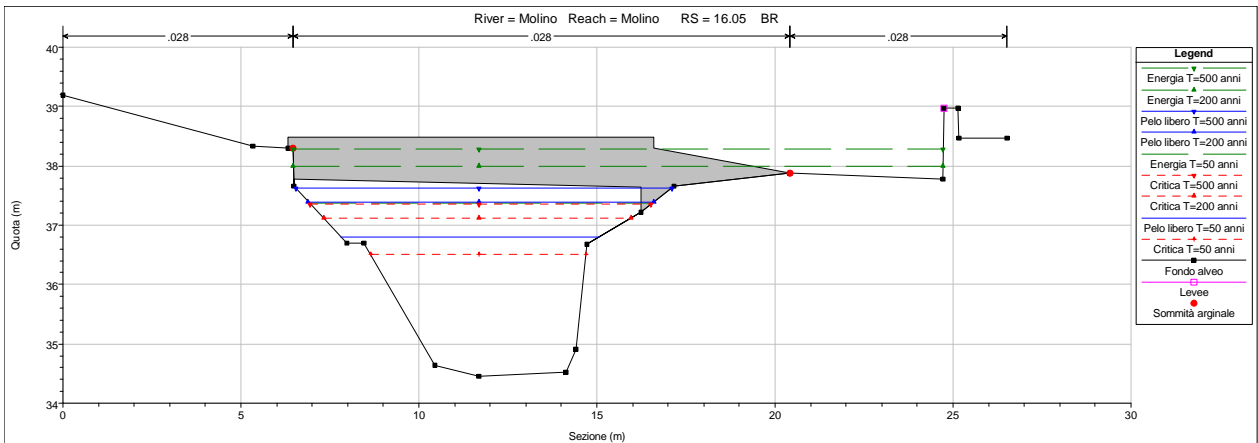
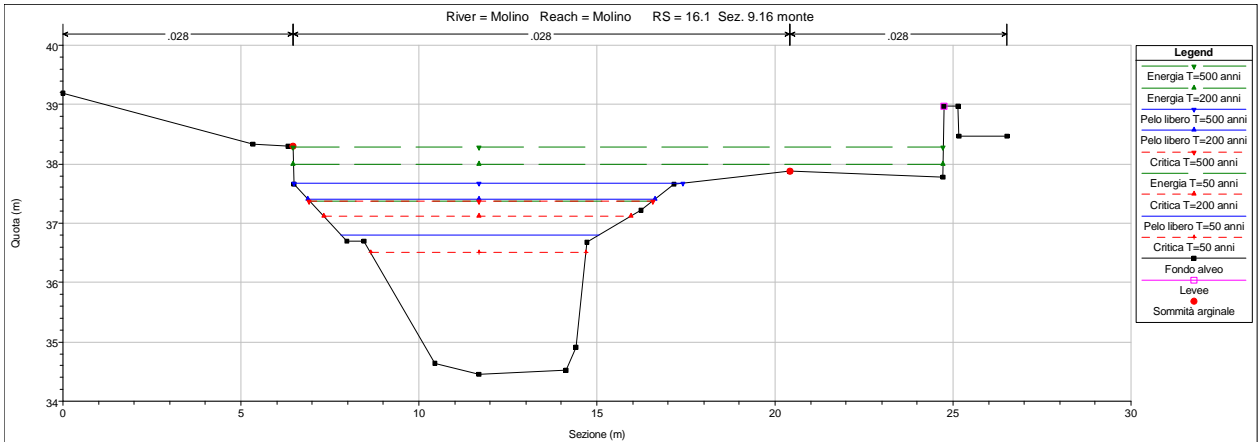
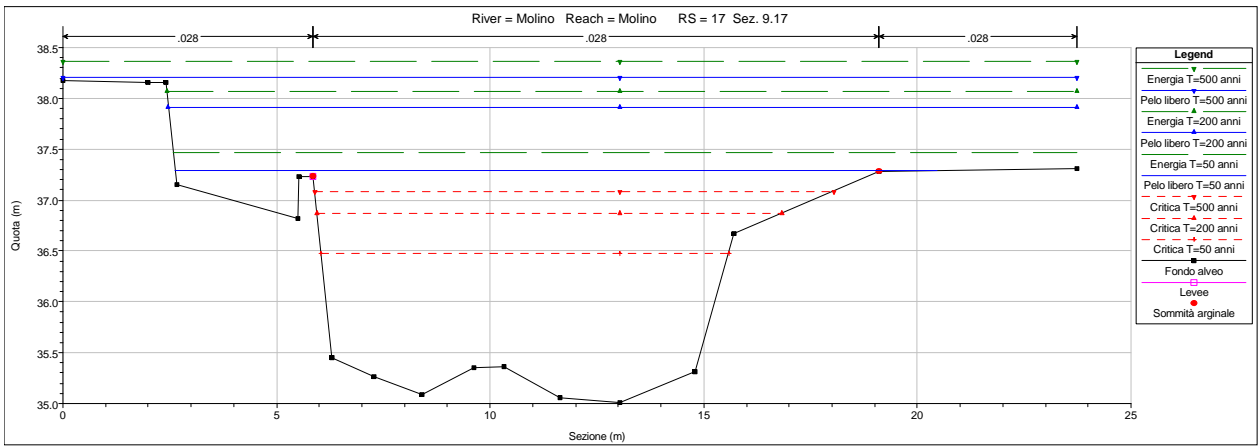
Sezioni trasversali

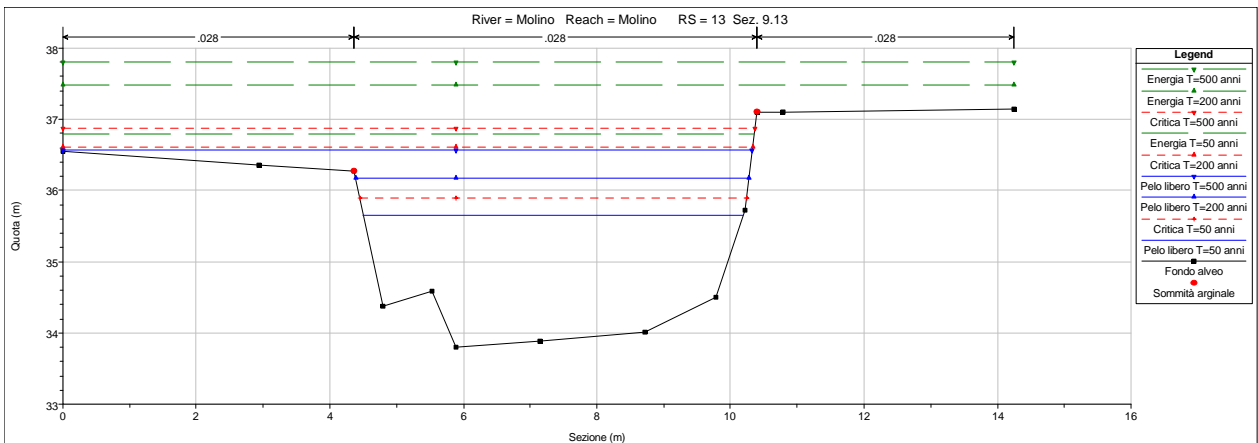
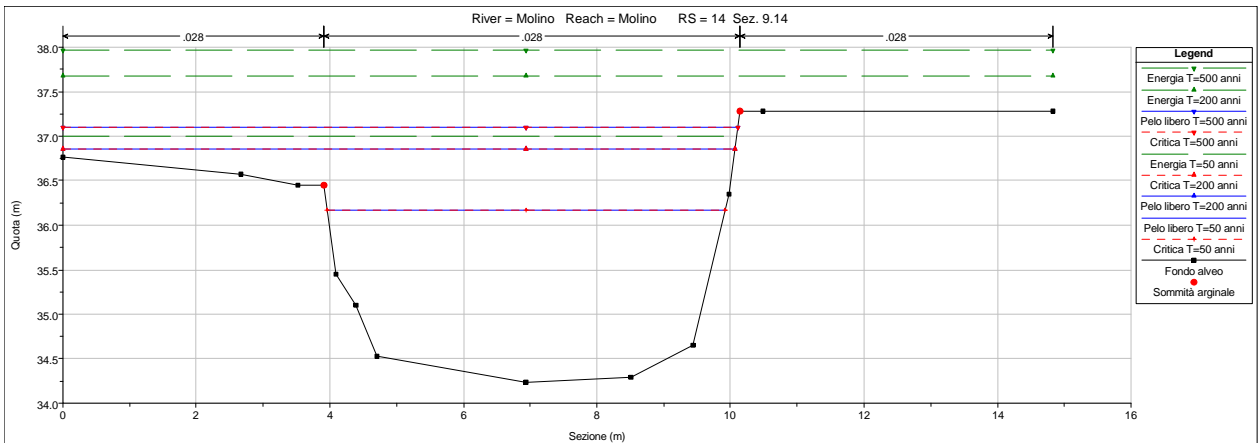
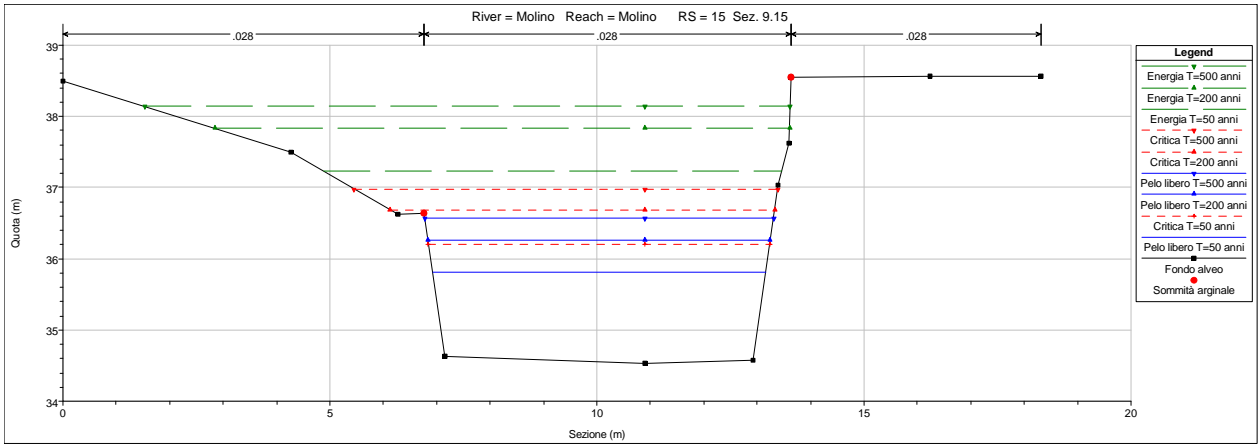
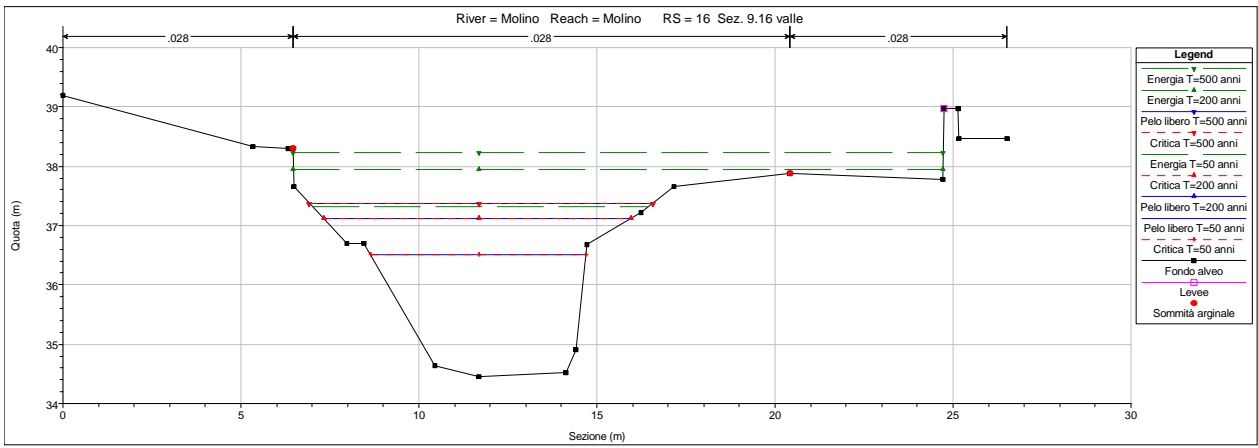


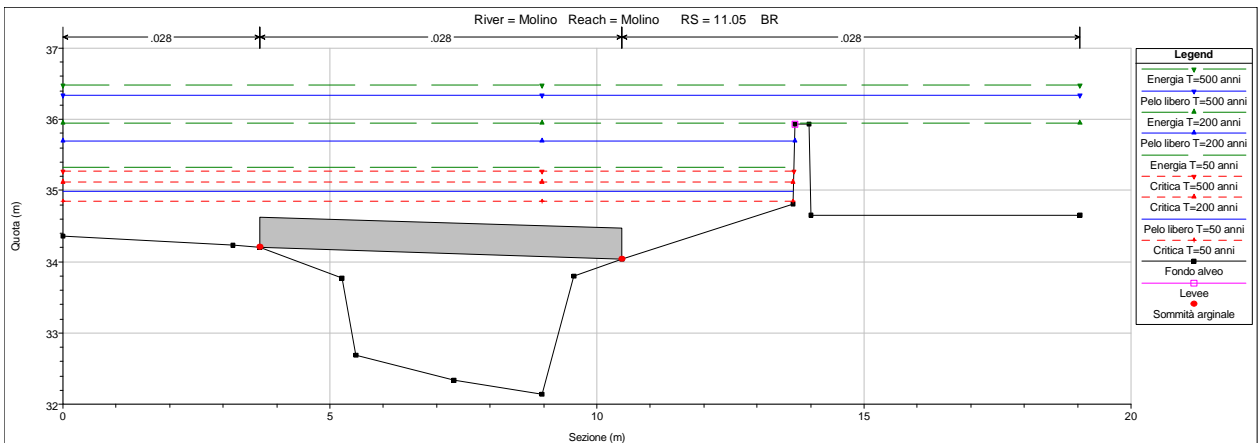
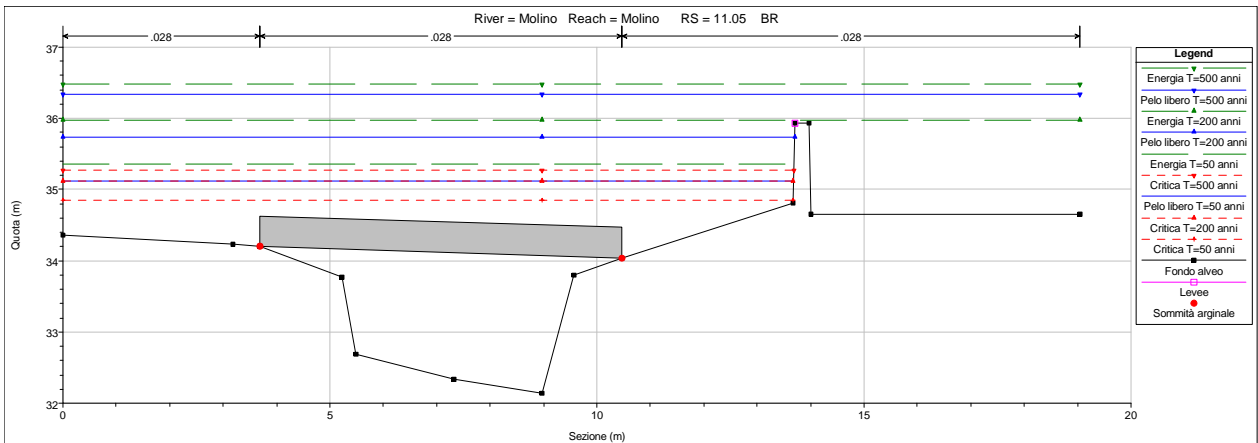
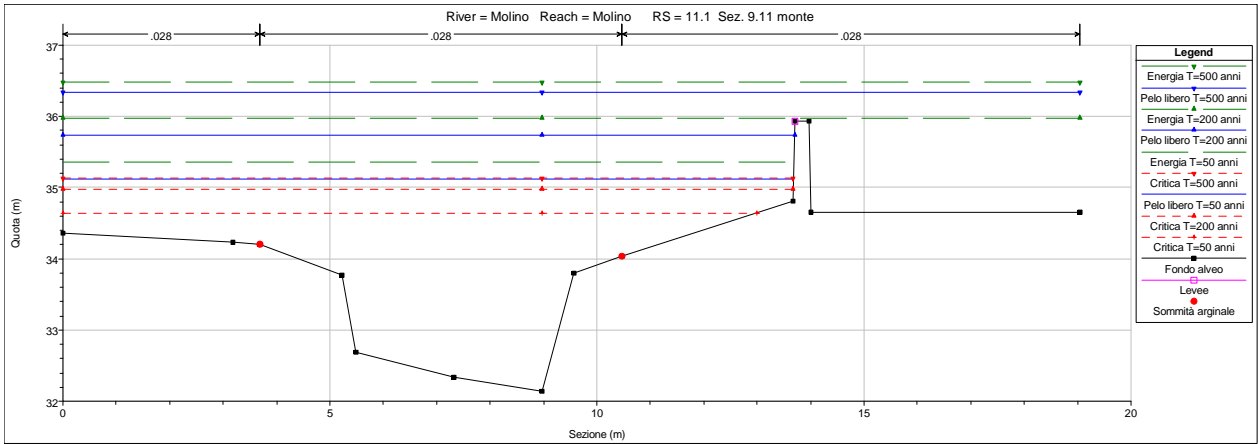
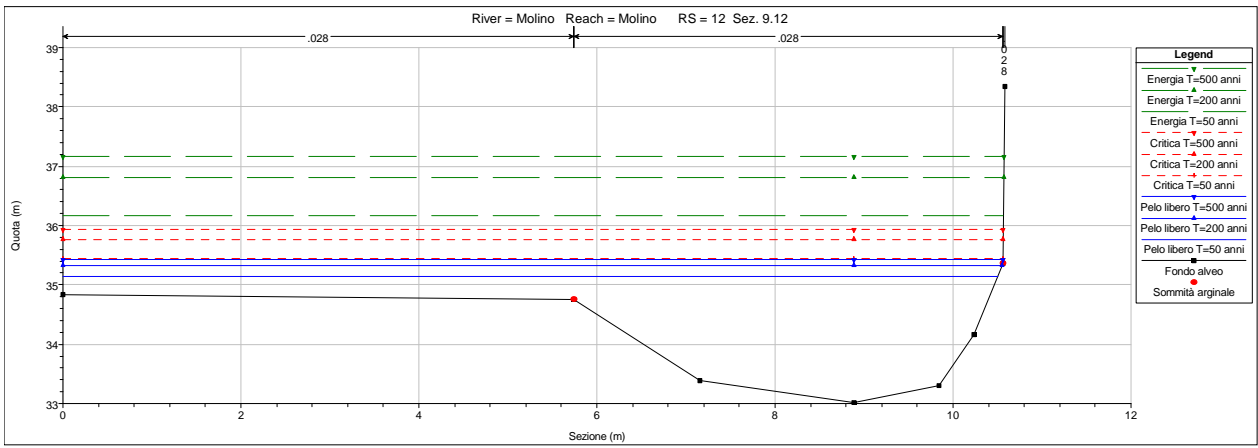


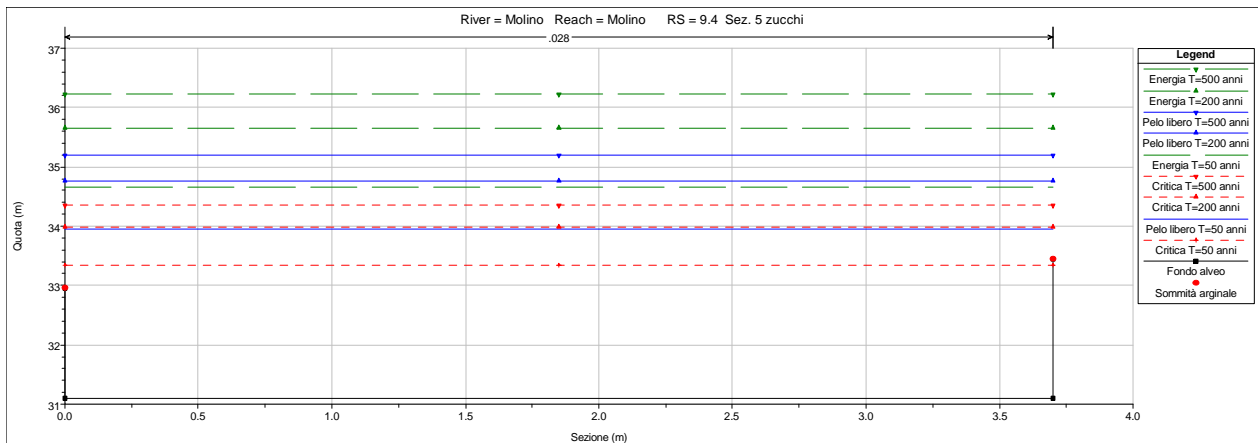
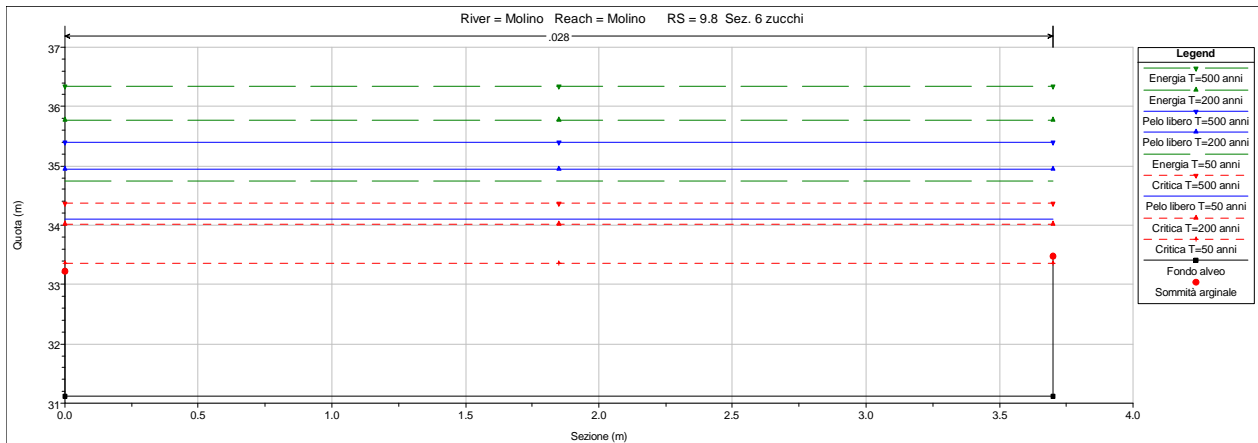
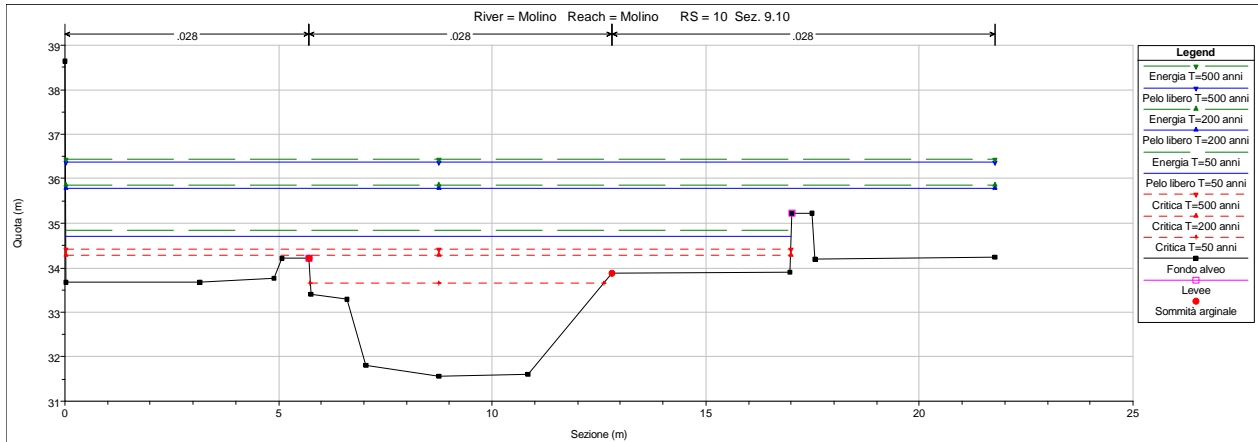
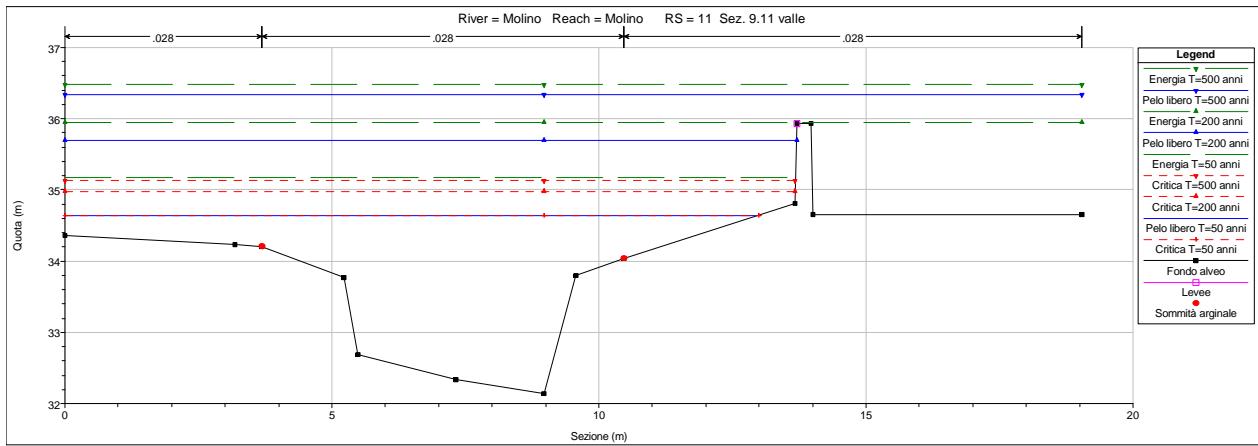


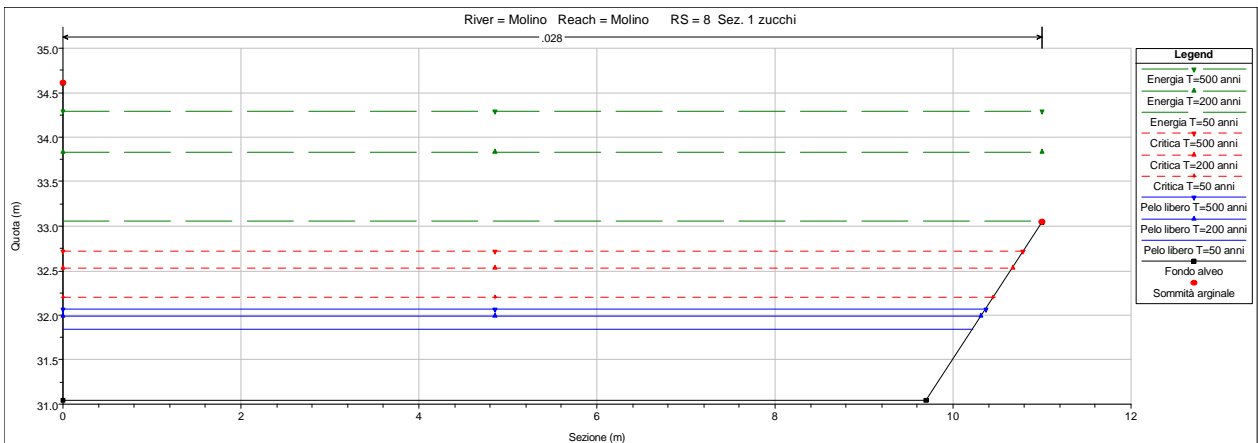
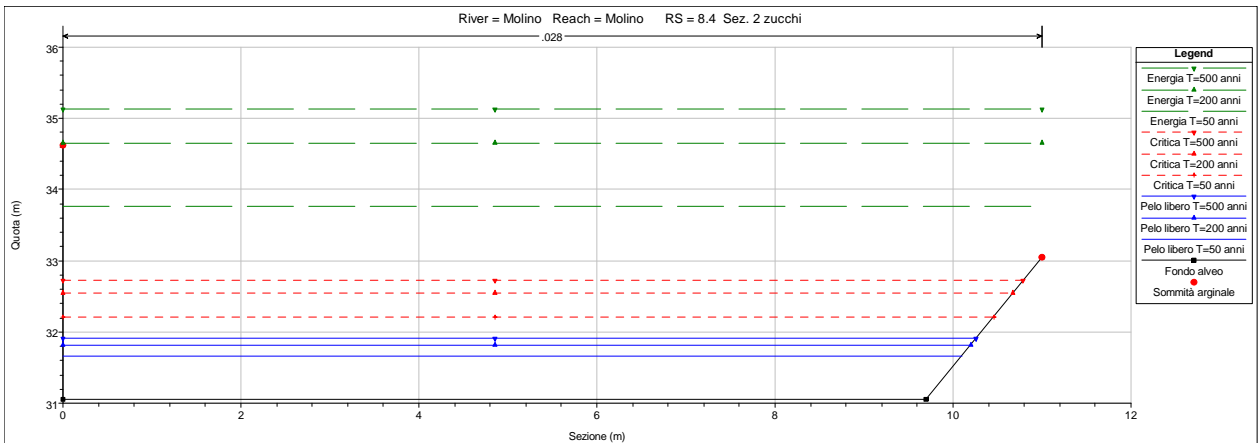
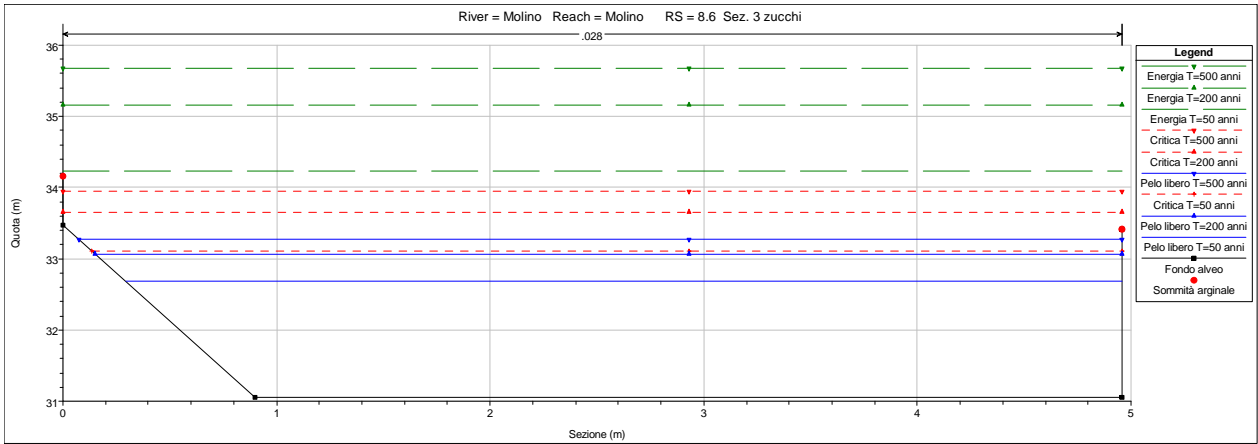
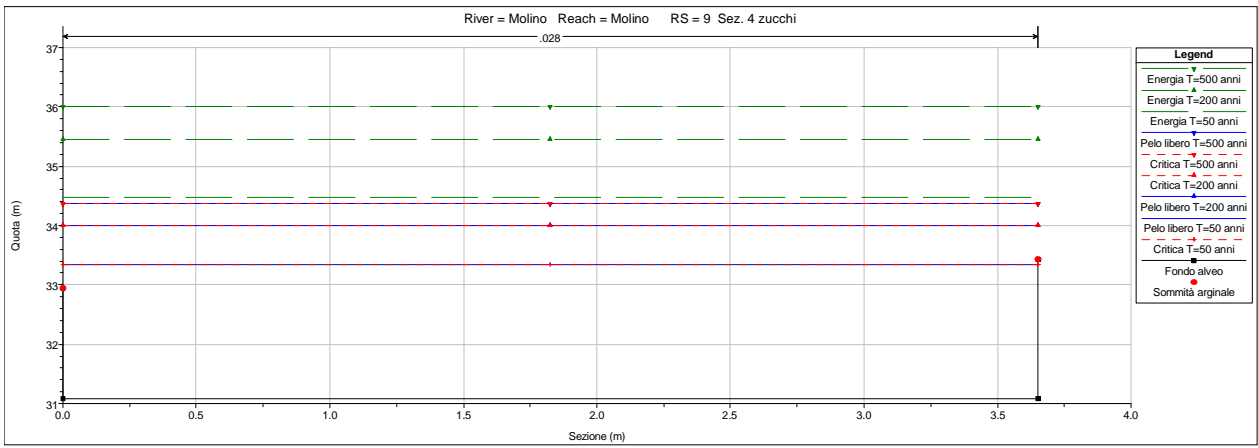


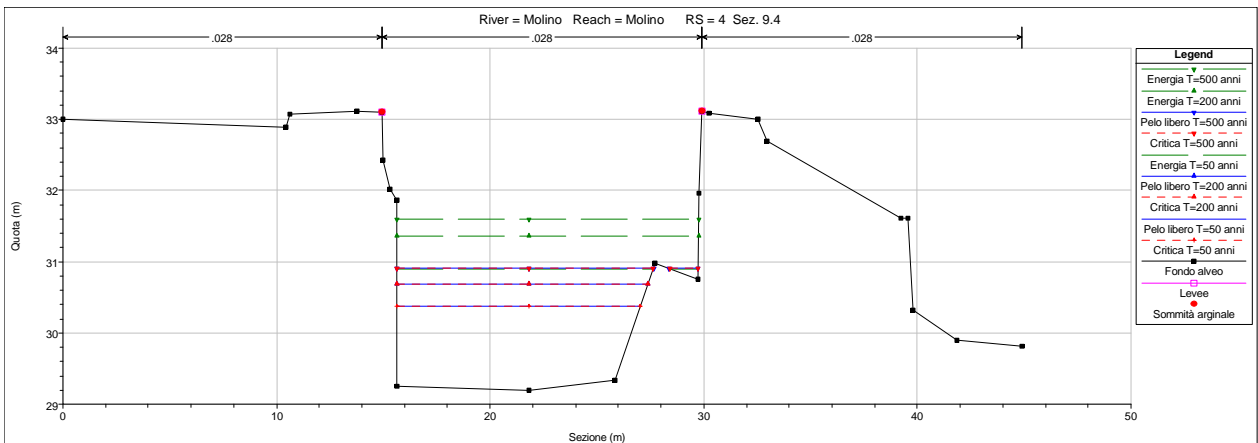
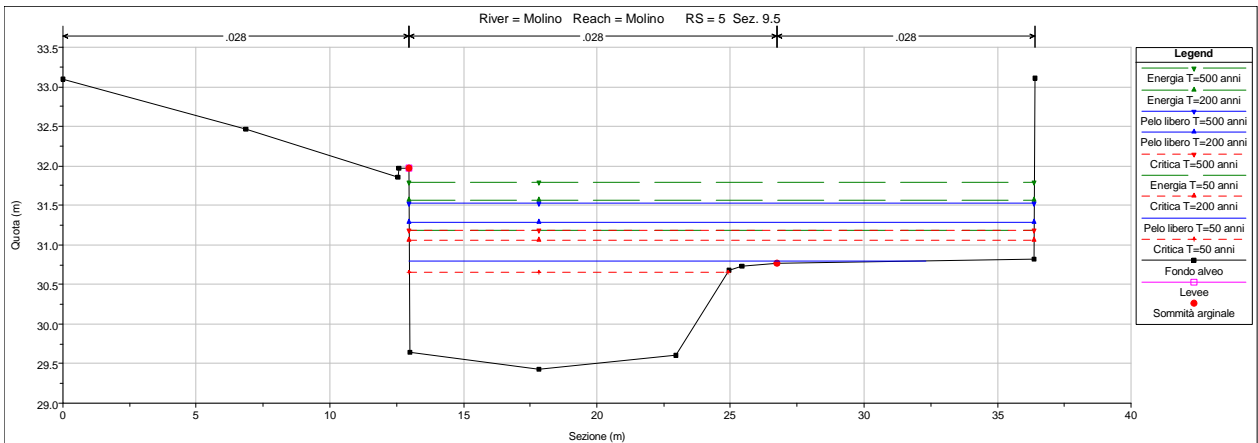
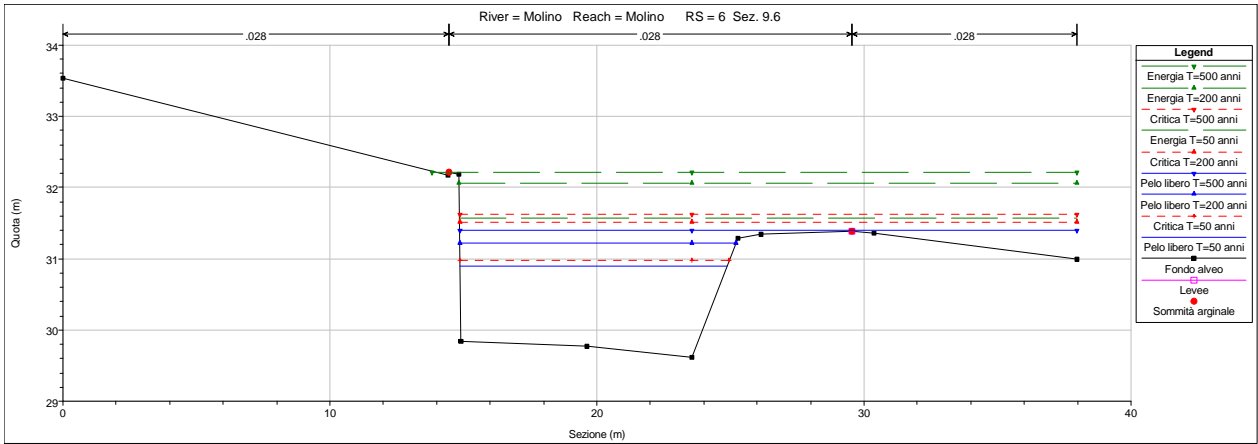
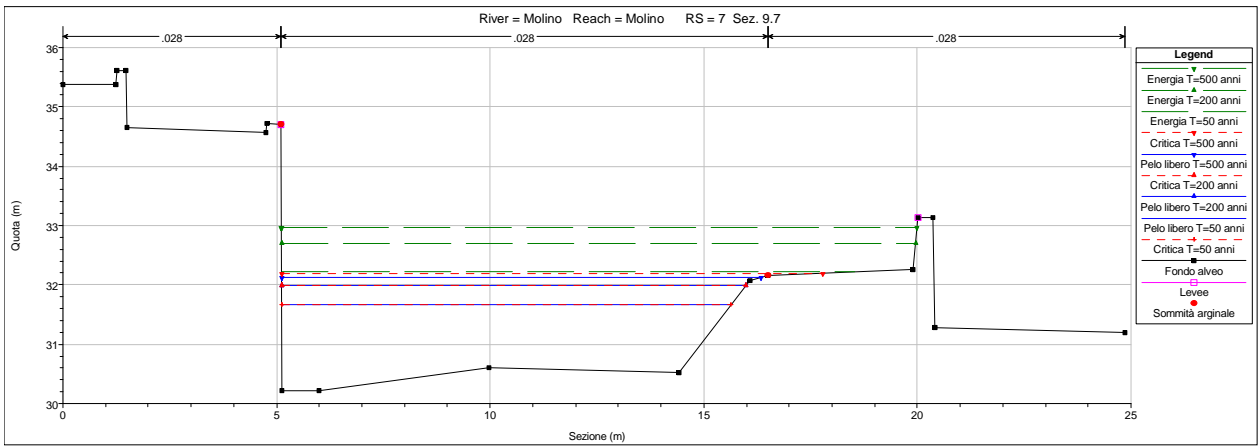


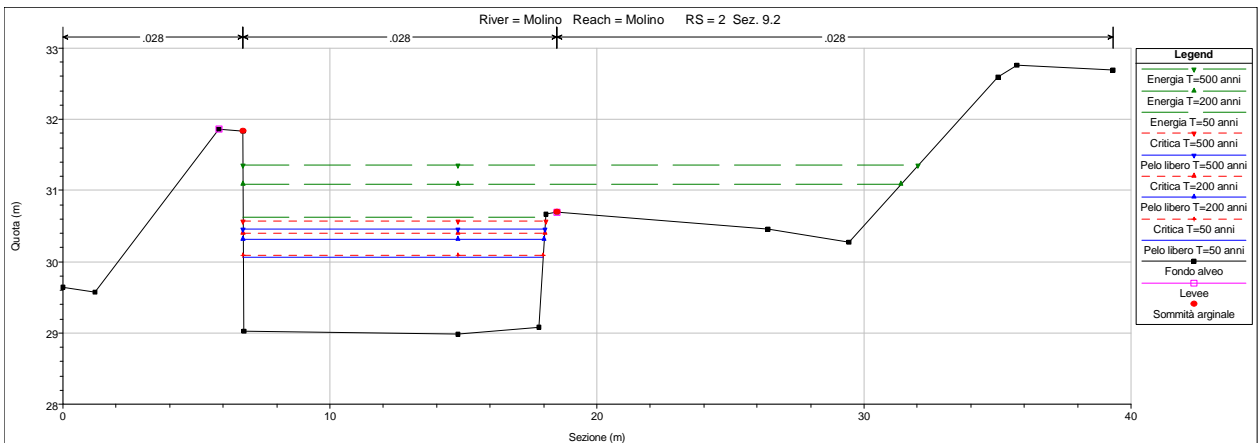
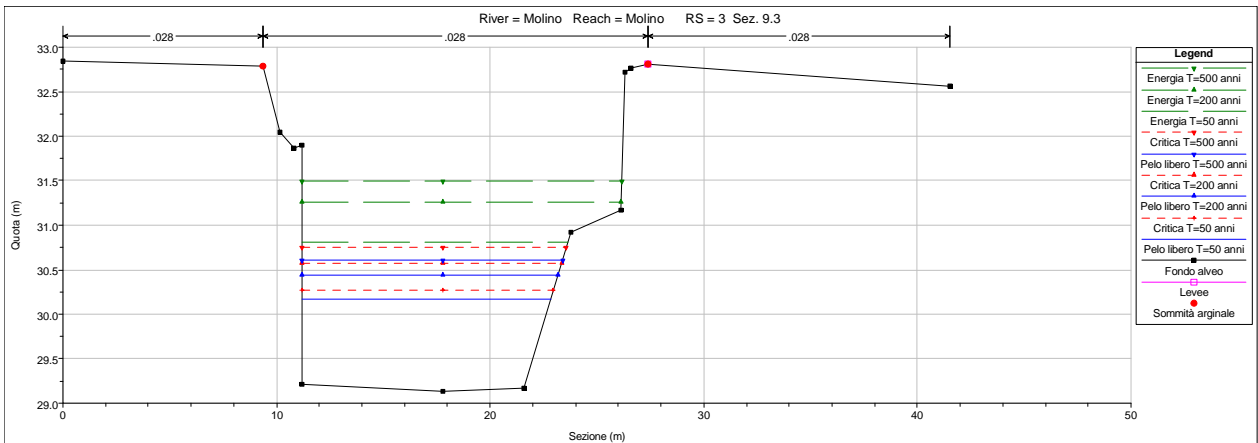
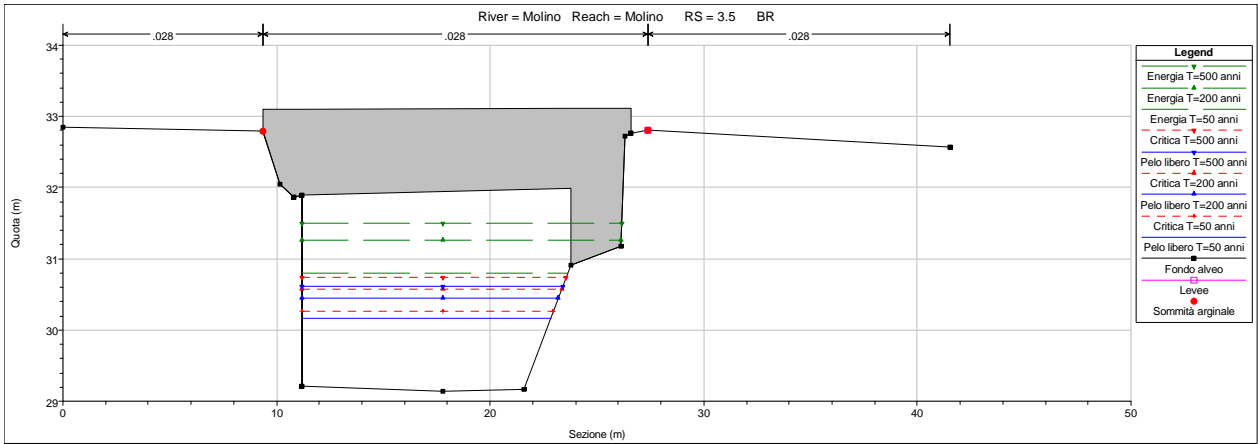
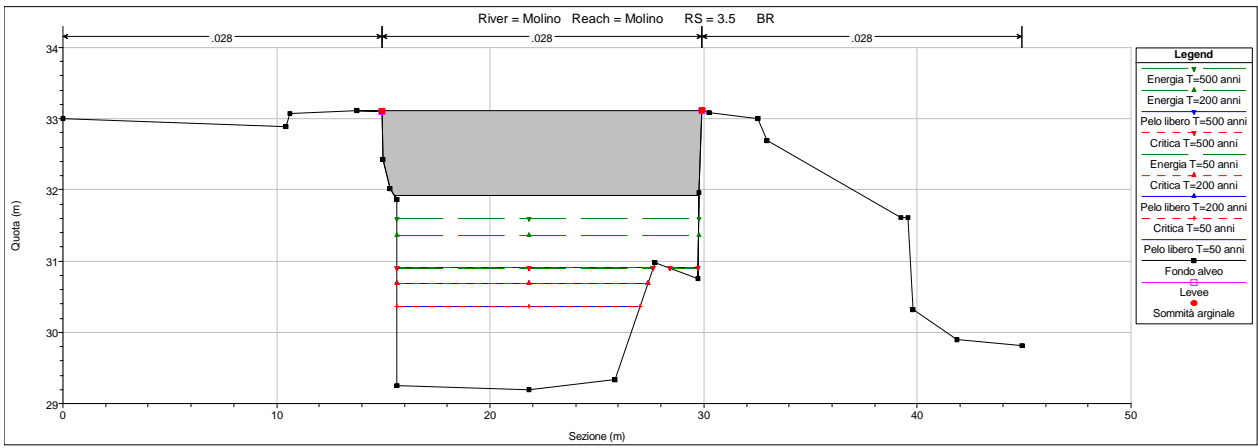


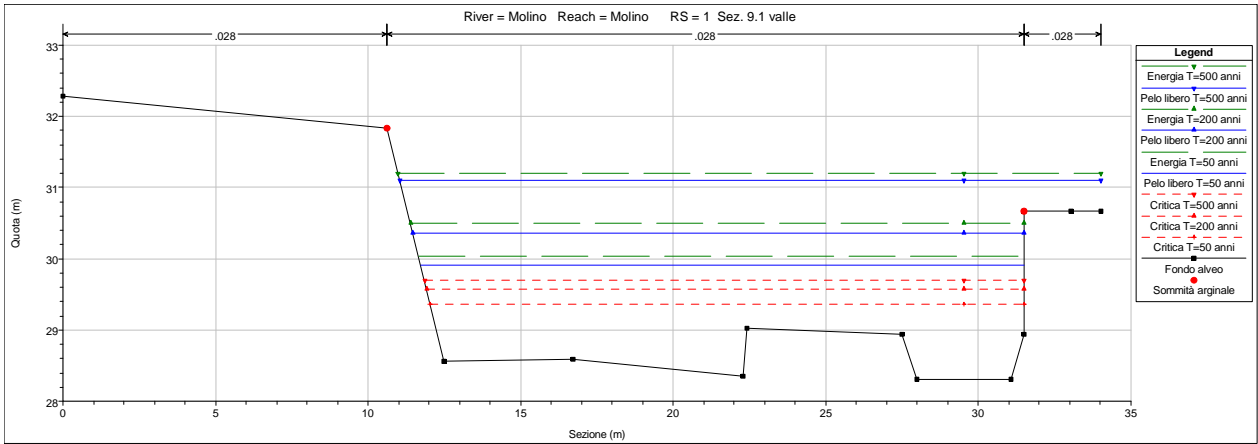
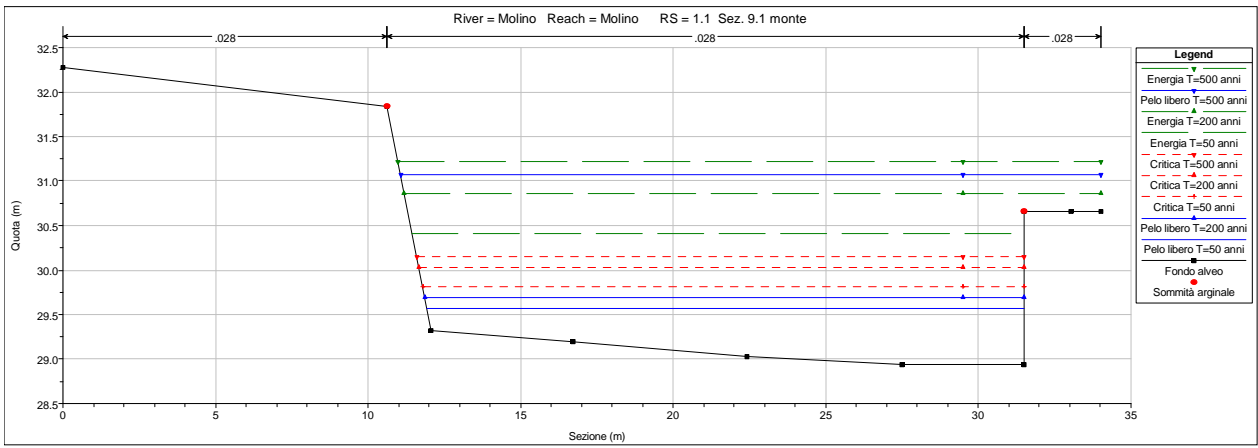








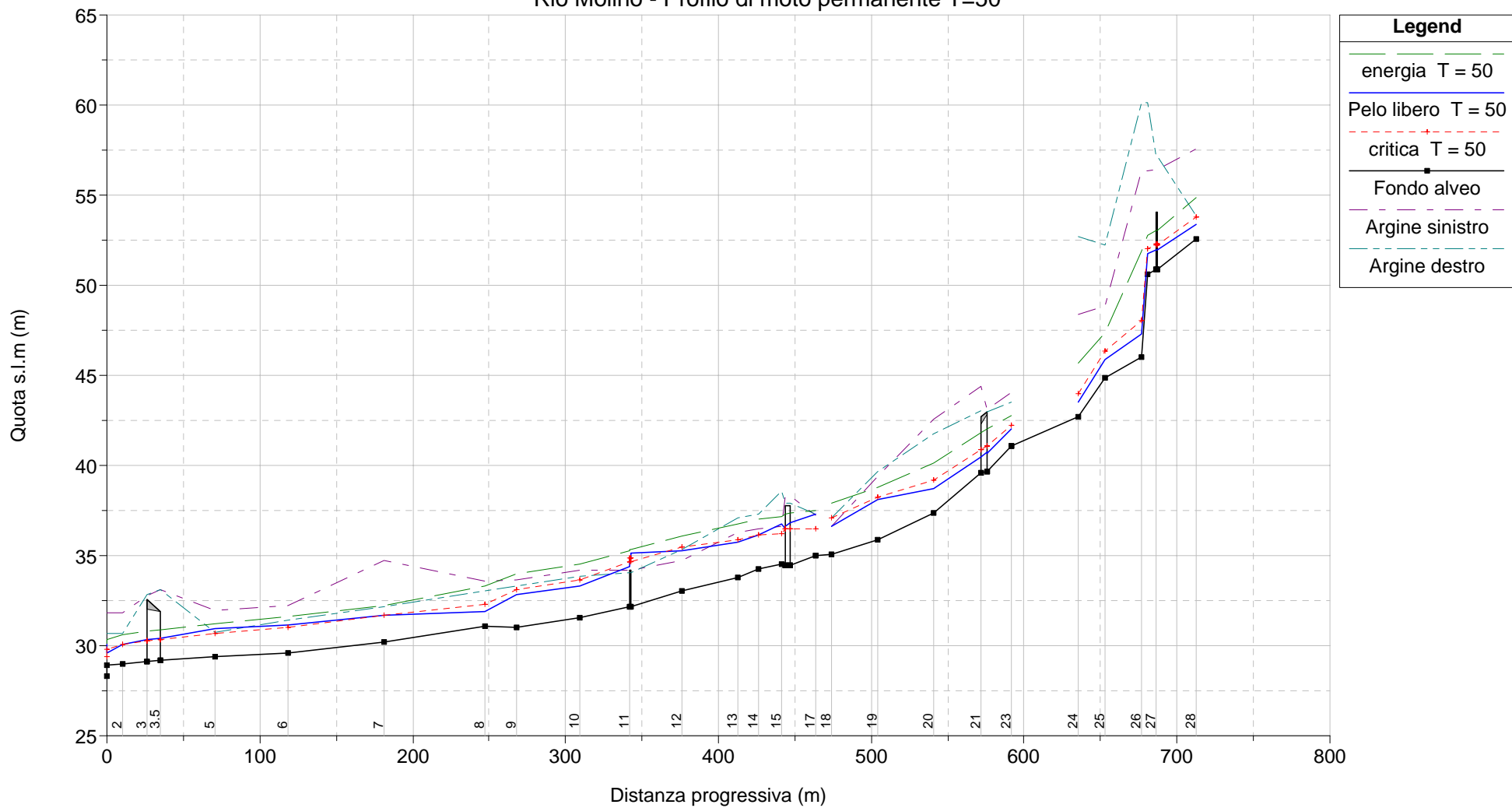




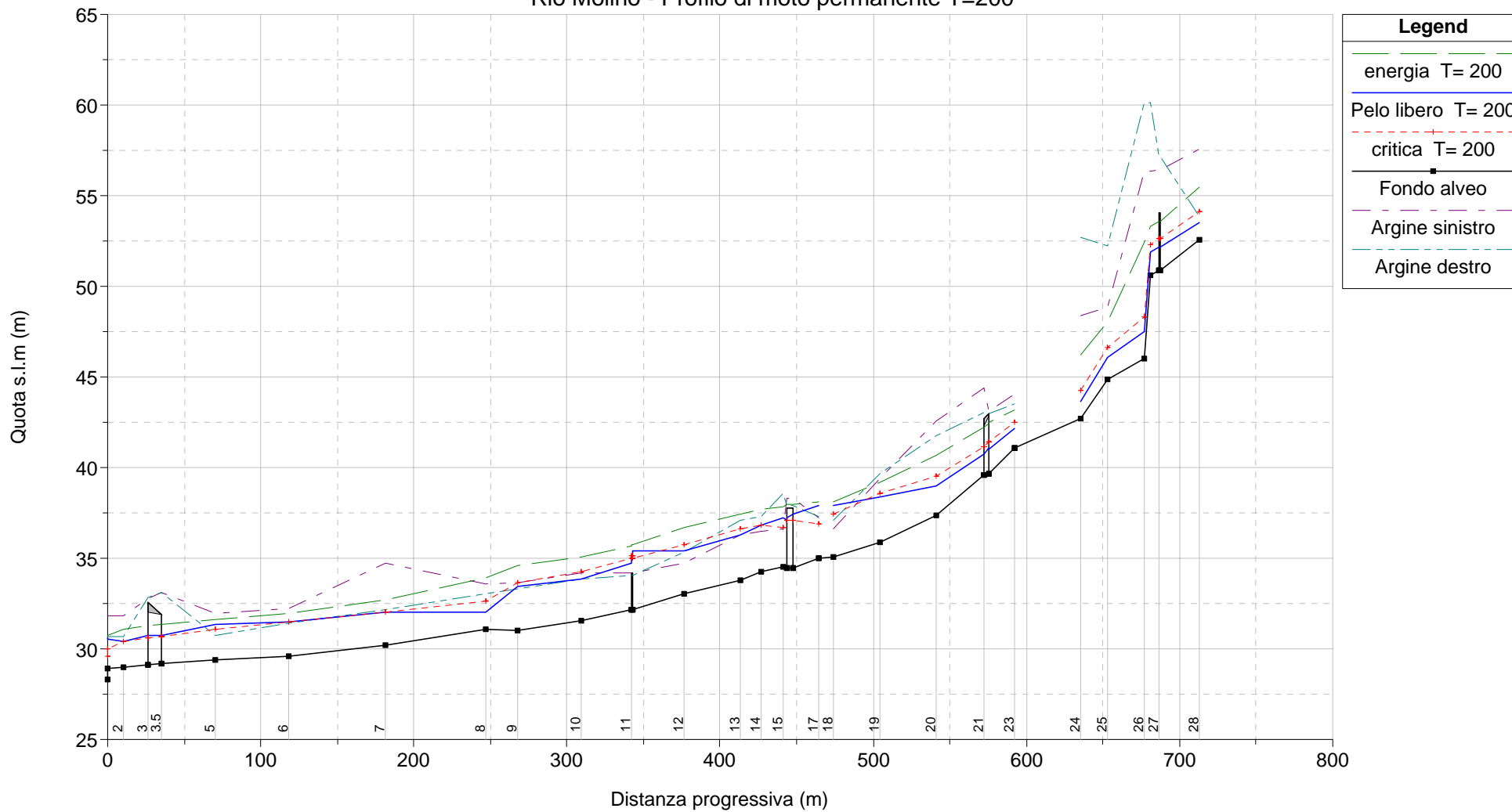
**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

MOLINO

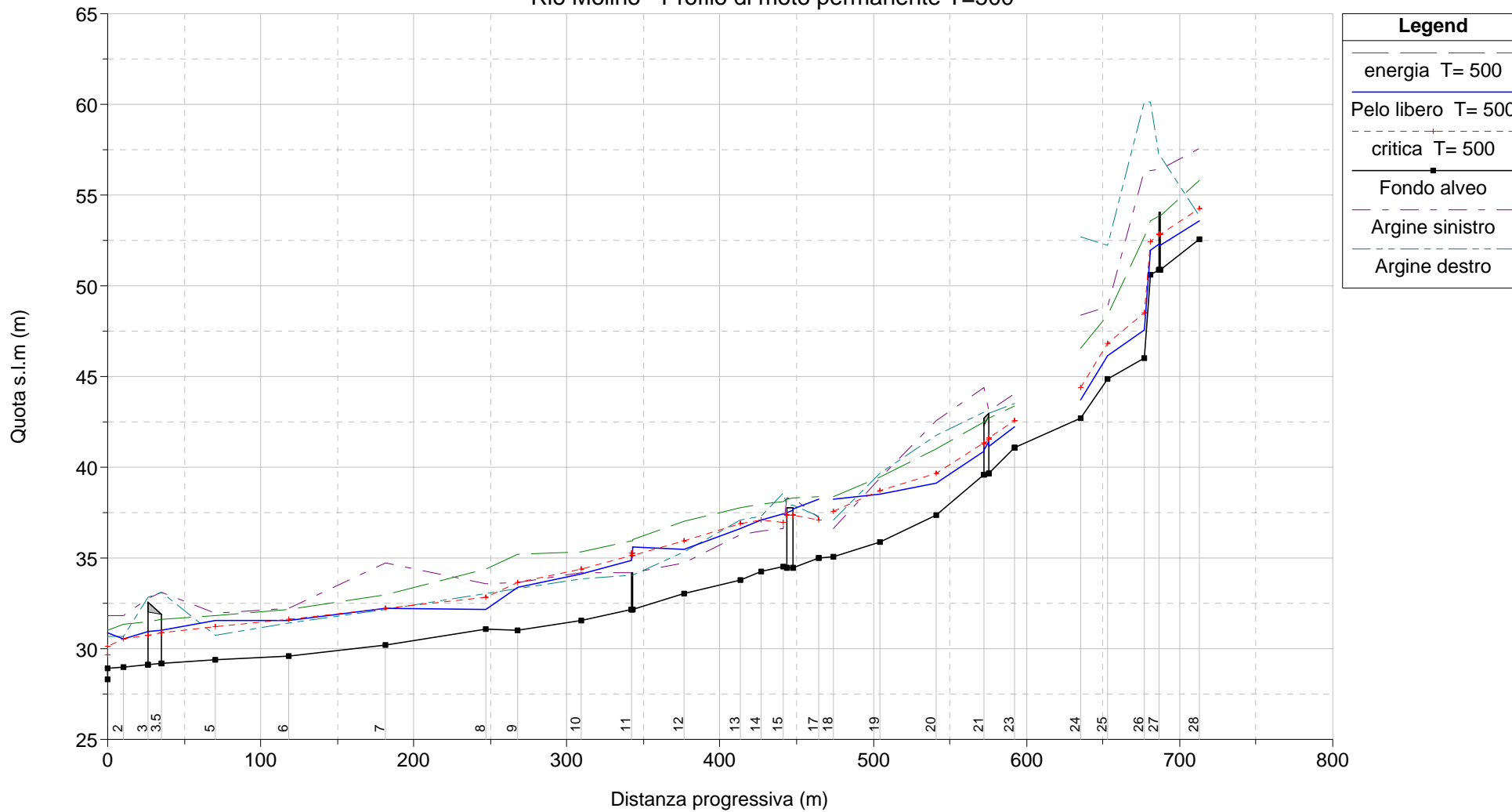
Rio Molino - Profilo di moto permanente T=50



Rio Molino - Profilo di moto permanente T=200



Rio Molino - Profilo di moto permanente T=500



**MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI**

MOLINO

Torrente Molino T=50 anni

Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
28	15	52.57	57.55	53.86	53.41	53.81	54.89	5.4	2.78	2.47
27.1	15	50.9	56.4	57.19	51.93	52.26	53.06	4.71	3.19	1.75
27.05	Bridge									
27	15	50.9	56.4	57.19	51.95	52.26	53.02	4.57	3.29	1.67
26.1	15	50.58	56.36	60.15	51.74	52.05	52.77	4.49	3.34	1.85
26	15	46.01	56.36	60.15	47.31	48.03	51.89	9.48	1.58	4.69
25	15	44.86	48.87	52.2	45.89	46.35	47.39	5.44	2.76	2.13
24	15	42.7	48.37	52.7	43.53	44.01	45.65	6.45	2.33	3.2
23	22	41.11	44.05	43.5	42.05	42.26	42.77	3.76	5.86	1.59
22	22	39.66	43.11	42.97	40.7	41.1	42.04	5.12	4.3	1.85
21.5	Bridge									
21	22	39.56	44.36	43.05	40.46	40.86	41.82	5.17	4.26	1.99
20	22	37.36	42.55	41.79	38.75	39.18	40.13	5.2	4.23	1.89
19	22	35.91	39.42	39.63	38.12	38.23	38.76	3.55	6.2	1.13
18	22	35.07	36.6	37.09	36.64	37.08	37.9	4.98	4.44	1.44
17	39	35.01	37.23	37.28	37.33	36.47	37.5	1.83	22.13	0.46
16.1	39	34.45	38.3	37.87	36.86	36.51	37.39	3.23	12.09	0.81
16.05	Bridge									
16	39	34.45	38.3	37.87	36.51	36.51	37.32	3.99	9.78	1
15	39	34.53	36.63	38.55	36.73	36.21	37.17	2.92	13.4	0.65
14	39	34.24	36.45	37.28	36.17	36.17	37	4.02	9.7	1.01
13	39	33.8	36.27	37.1	35.74	35.89	36.75	4.47	8.72	1.16
12	39	33.01	34.76	35.35	35.26	35.44	36.05	4.17	10.63	1.03
11.1	39	32.14	34.2	34.04	35.1	34.65	35.34	2.31	19.21	0.51
11.05	Bridge									
11	39	32.14	34.2	34.04	34.37	34.65	35.28	4.25	9.58	1.18
10	39	31.56	34.22	33.88	33.32	33.65	34.53	4.87	8	1.33
9	39	31.02	33.65	33.28	32.81	33.09	34	4.82	8.1	1.29
8	39	31.05	33.58	33.04	31.87	32.29	33.28	5.27	7.4	1.95
7	39	30.22	34.71	32.16	31.7	31.66	32.22	3.2	12.21	0.95
6	39	29.62	32.22	31.39	31.16	30.98	31.59	2.91	13.41	0.81
5	39	29.42	31.97	30.77	30.91	30.65	31.21	2.44	16.85	0.73
4	39	29.2	33.11	33.11	30.42	30.37	30.9	3.09	12.61	0.94
3.5	Bridge									
3	39	29.14	32.79	32.81	30.37	30.27	30.8	2.91	13.42	0.87
2	39	28.98	31.84	30.7	30.09	30.09	30.62	3.25	12	1
1.1	39	28.94	31.84	30.66	29.59	29.82	30.36	3.88	10.04	1.73
1	39	28.31	31.84	30.66	30.04	29.36	30.14	1.41	27.62	0.38

Torrente Molino T=200 anni

Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
28	22	52.57	57.55	53.86	53.54	54.1	55.49	6.18	3.56	2.52
27.1	22	50.9	56.4	57.19	52.15	52.62	53.6	5.34	4.12	1.75
27.05	Bridge									
27	22	50.9	56.4	57.19	52.17	52.62	53.56	5.21	4.22	1.69
26.1	22	50.58	56.36	60.15	51.89	52.31	53.3	5.27	4.18	1.98
26	22	46.01	56.36	60.15	47.48	48.34	52.42	9.85	2.23	4.23
25	22	44.86	48.87	52.2	46.07	46.65	48.03	6.21	3.54	2.25
24	22	42.7	48.37	52.7	43.66	44.25	46.23	7.1	3.1	3.21
23	32	41.11	44.05	43.5	42.19	42.47	43.16	4.37	7.32	1.69
22	32	39.66	43.11	42.97	41	41.43	42.47	5.38	5.94	1.68
21.5	Bridge									
21	32	39.56	44.36	43.05	40.71	41.17	42.24	5.48	5.83	1.81
20	32	37.36	42.55	41.79	38.97	39.51	40.7	5.82	5.5	1.94
19	32	35.91	39.42	39.63	38.38	38.56	39.21	4.05	7.9	1.23
18	32	35.07	36.6	37.09	37.93	37.46	38.12	2.15	17.71	0.45
17	57	35.01	37.23	37.28	37.94	36.87	38.09	1.78	35.07	0.38
16.1	57	34.45	38.3	37.87	37.43	37.12	38	3.34	17.05	0.81
16.05	Bridge									
16	57	34.45	38.3	37.87	37.12	37.12	37.94	4.02	14.17	1
15	57	34.53	36.63	38.55	37.26	36.69	37.82	3.33	17.61	0.67
14	57	34.24	36.45	37.28	36.85	36.85	37.67	4.04	14.76	0.86
13	57	33.8	36.27	37.1	36.29	36.61	37.45	4.77	11.94	1.07
12	57	33.01	34.76	35.35	35.39	35.74	36.69	5.38	12.04	1.28
11.1	57	32.14	34.2	34.04	35.43	34.98	35.76	2.75	23.68	0.57
11.05	Bridge									
11	57	32.14	34.2	34.04	34.71	34.98	35.7	4.57	13.89	1.13
10	57	31.56	34.22	33.88	33.86	34.26	35.08	4.9	11.64	1.22
9	57	31.02	33.65	33.28	33.46	33.65	34.59	4.75	12.41	1.08
8	57	31.05	33.58	33.04	32.06	32.62	33.95	6.08	9.37	2.02
7	57	30.22	34.71	32.16	32	32	32.7	3.7	15.39	0.99
6	57	29.62	32.22	31.39	31.52	31.52	31.95	3	20.52	0.87
5	57	29.42	31.97	30.77	31.35	31.07	31.6	2.32	27.12	0.59
4	57	29.2	33.11	33.11	30.76	30.68	31.36	3.43	16.62	0.93
3.5	Bridge									
3	57	29.14	32.79	32.81	30.74	30.58	31.26	3.18	17.9	0.84
2	57	28.98	31.84	30.7	30.4	30.4	31.09	3.68	15.5	1
1.1	57	28.94	31.84	30.66	30.52	30.03	30.72	2.01	28.42	0.54
1	57	28.31	31.84	30.66	30.58	29.57	30.7	1.48	38.62	0.34

Torrente Molino T=500 anni

Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
28	26	52.57	57.55	53.86	53.61	54.24	55.79	6.54	3.97	2.54
27.1	26	50.9	56.4	57.19	52.26	52.85	53.88	5.63	4.62	1.74
27.05	Bridge									
27	26	50.9	56.4	57.19	52.29	52.85	53.83	5.49	4.73	1.68
26.1	26	50.58	56.36	60.15	51.97	52.45	53.55	5.57	4.67	2
26	26	46.01	56.36	60.15	47.57	48.52	52.69	10.03	2.59	4.06
25	26	44.86	48.87	52.2	46.16	46.8	48.36	6.57	3.96	2.3
24	26	42.7	48.37	52.7	43.73	44.38	46.55	7.44	3.49	3.2
23	38	41.11	44.05	43.5	42.26	42.59	43.39	4.72	8.06	1.74
22	38	39.66	43.11	42.97	41.16	41.61	42.72	5.55	6.85	1.62
21.5	Bridge									
21	38	39.56	44.36	43.05	40.85	41.34	42.49	5.67	6.71	1.75
20	38	37.36	42.55	41.79	39.09	39.68	40.99	6.1	6.23	1.96
19	38	35.91	39.42	39.63	38.5	38.73	39.45	4.33	8.78	1.28
18	38	35.07	36.6	37.09	38.24	37.59	38.41	2.08	21.64	0.41
17	68	35.01	37.23	37.28	38.23	37.09	38.39	1.84	41.45	0.37
16.1	68	34.45	38.3	37.87	37.71	37.38	38.3	3.4	19.99	0.82
16.05	Bridge									
16	68	34.45	38.3	37.87	37.38	37.38	38.24	4.09	16.61	1
15	68	34.53	36.63	38.55	37.44	36.98	38.11	3.67	19.22	0.72
14	68	34.24	36.45	37.28	37.09	37.09	37.96	4.22	17.19	0.86
13	68	33.8	36.27	37.1	36.64	36.87	37.76	4.73	15.09	0.98
12	68	33.01	34.76	35.35	35.5	35.94	37.02	5.86	13.19	1.35
11.1	68	32.14	34.2	34.04	35.61	35.13	36	2.97	26.18	0.59
11.05	Bridge									
11	68	32.14	34.2	34.04	34.86	35.13	35.93	4.81	15.95	1.14
10	68	31.56	34.22	33.88	34.1	34.42	35.35	5	14.24	1.16
9	68	31.02	33.65	33.28	33.36	33.65	35.19	6.01	11.5	1.4
8	68	31.05	33.58	33.04	32.15	32.81	34.36	6.58	10.33	2.1
7	68	30.22	34.71	32.16	32.2	32.2	32.96	3.86	17.67	0.99
6	68	29.62	32.22	31.39	31.53	31.63	32.13	3.53	20.81	1.02
5	68	29.42	31.97	30.77	31.58	31.19	31.83	2.3	32.57	0.55
4	68	29.2	33.11	33.11	31.02	30.91	31.61	3.39	20.09	0.91
3.5	Bridge									
3	68	29.14	32.79	32.81	30.98	30.75	31.52	3.26	20.89	0.82
2	68	28.98	31.84	30.7	30.57	30.57	31.34	3.9	17.46	1
1.1	68	28.94	31.84	30.66	30.86	30.15	31.05	1.92	35.76	0.47
1	68	28.31	31.84	30.66	30.91	29.69	31.02	1.5	45.78	0.32

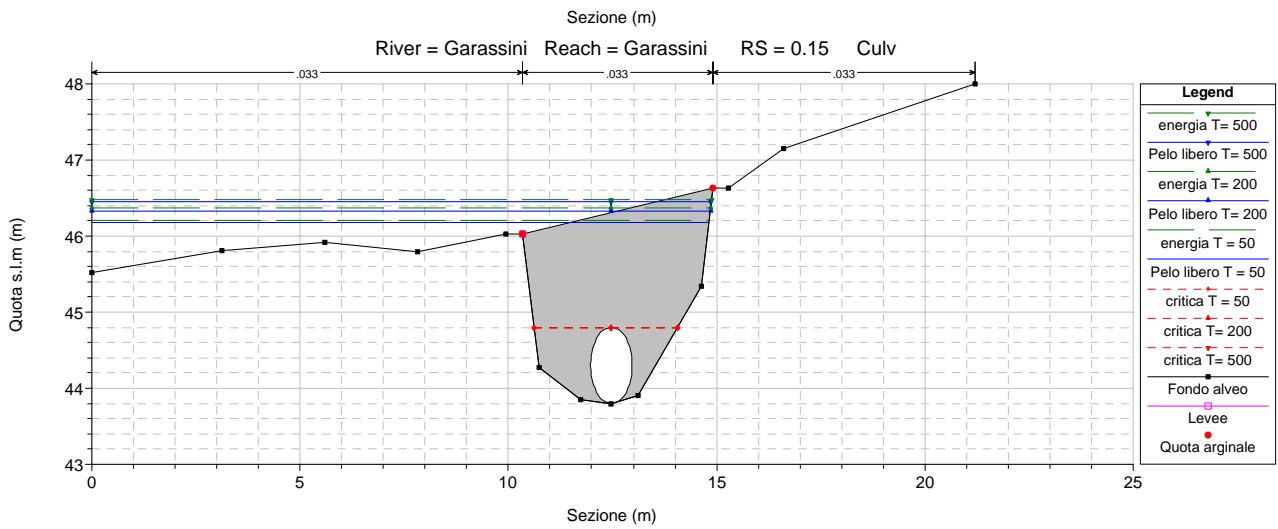
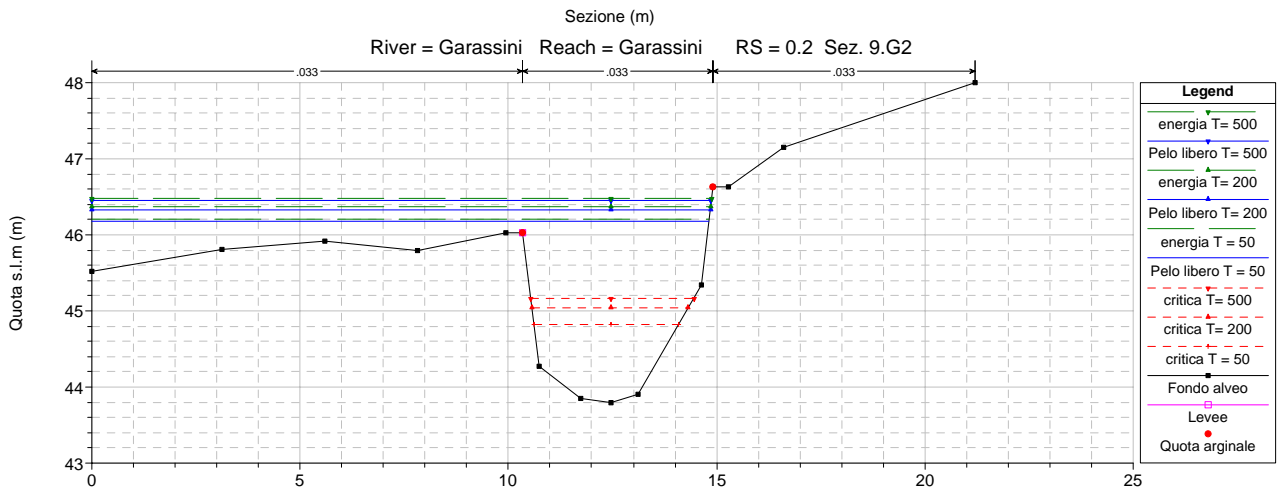
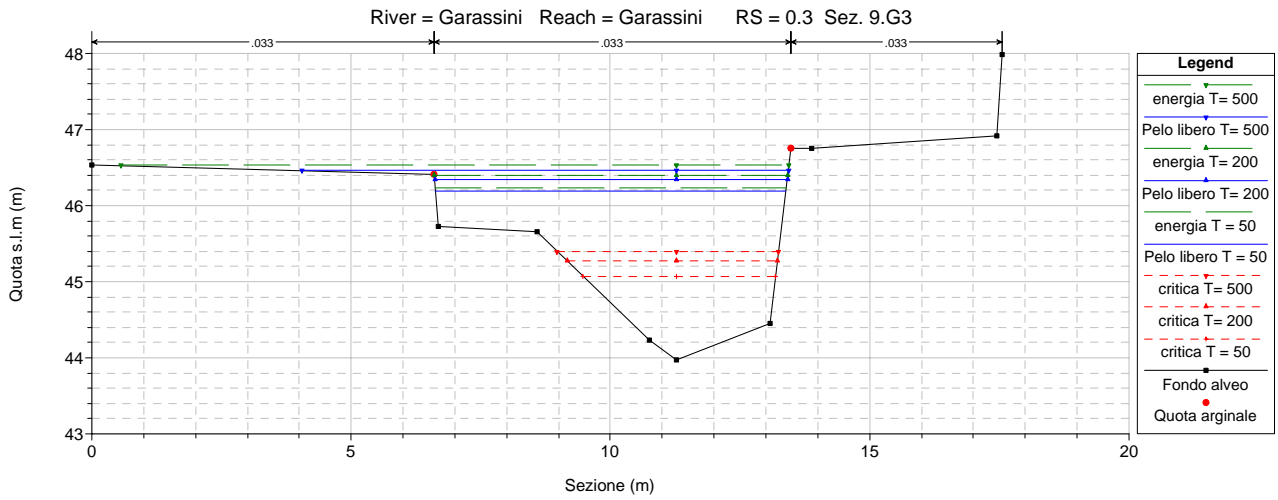
**GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE T=50, 200, 500 ANNI**

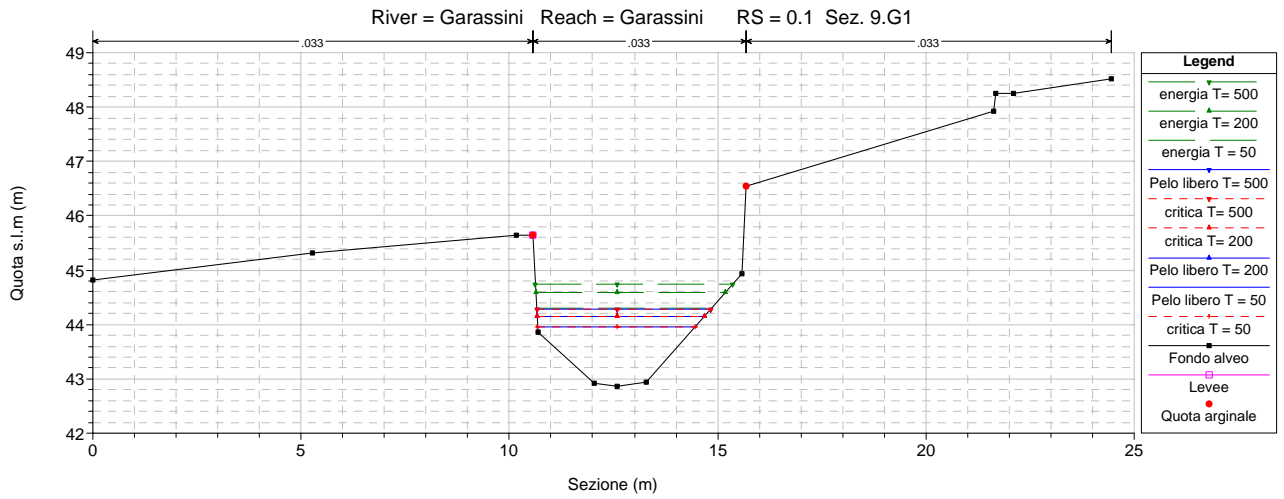
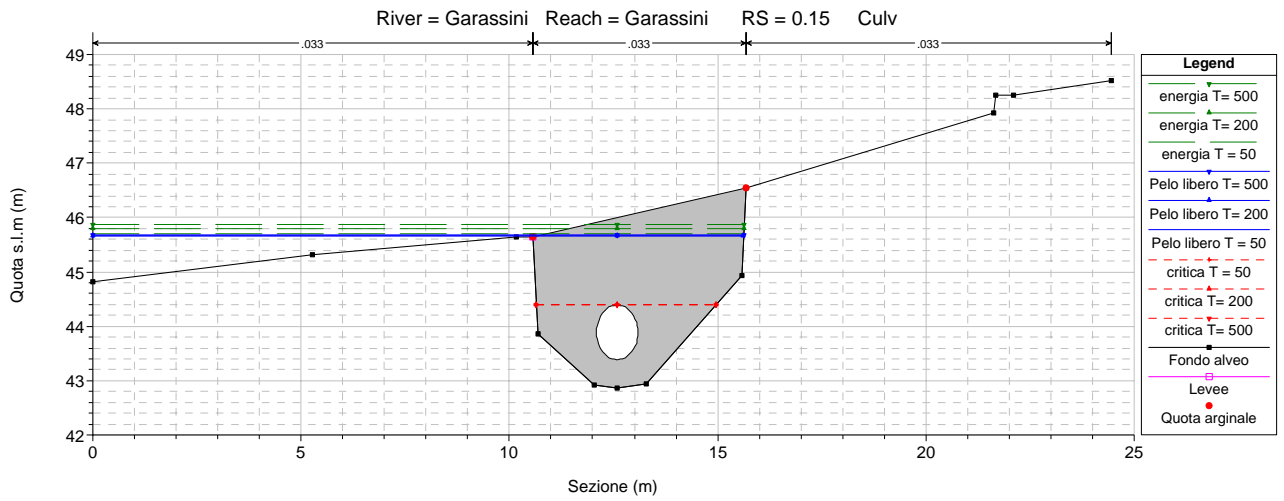
GARASSINI

DALLA SEZ. 0.1
ALLA SEZ. 0.3

RIO GARASSINI

Sezioni trasversali

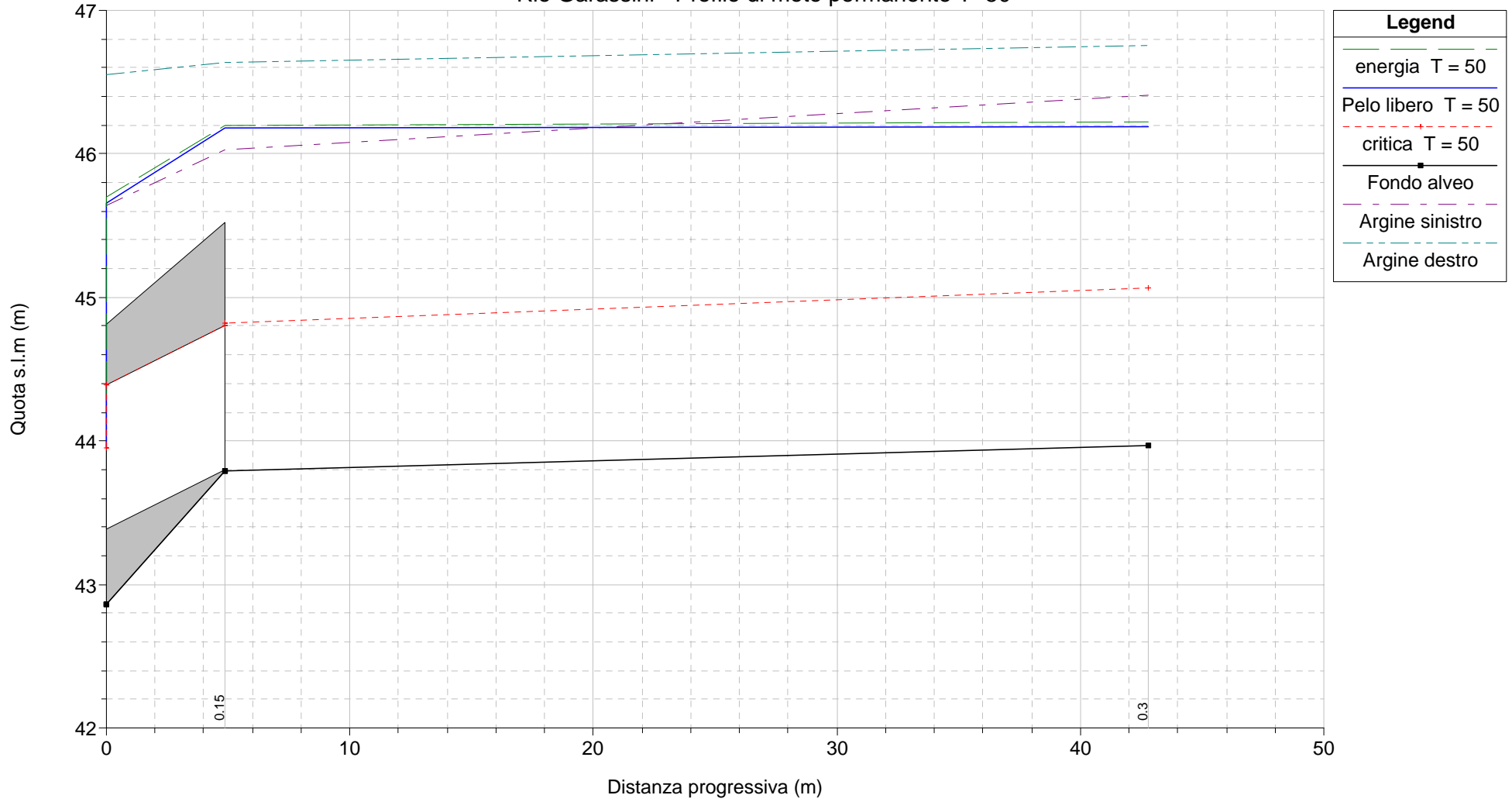




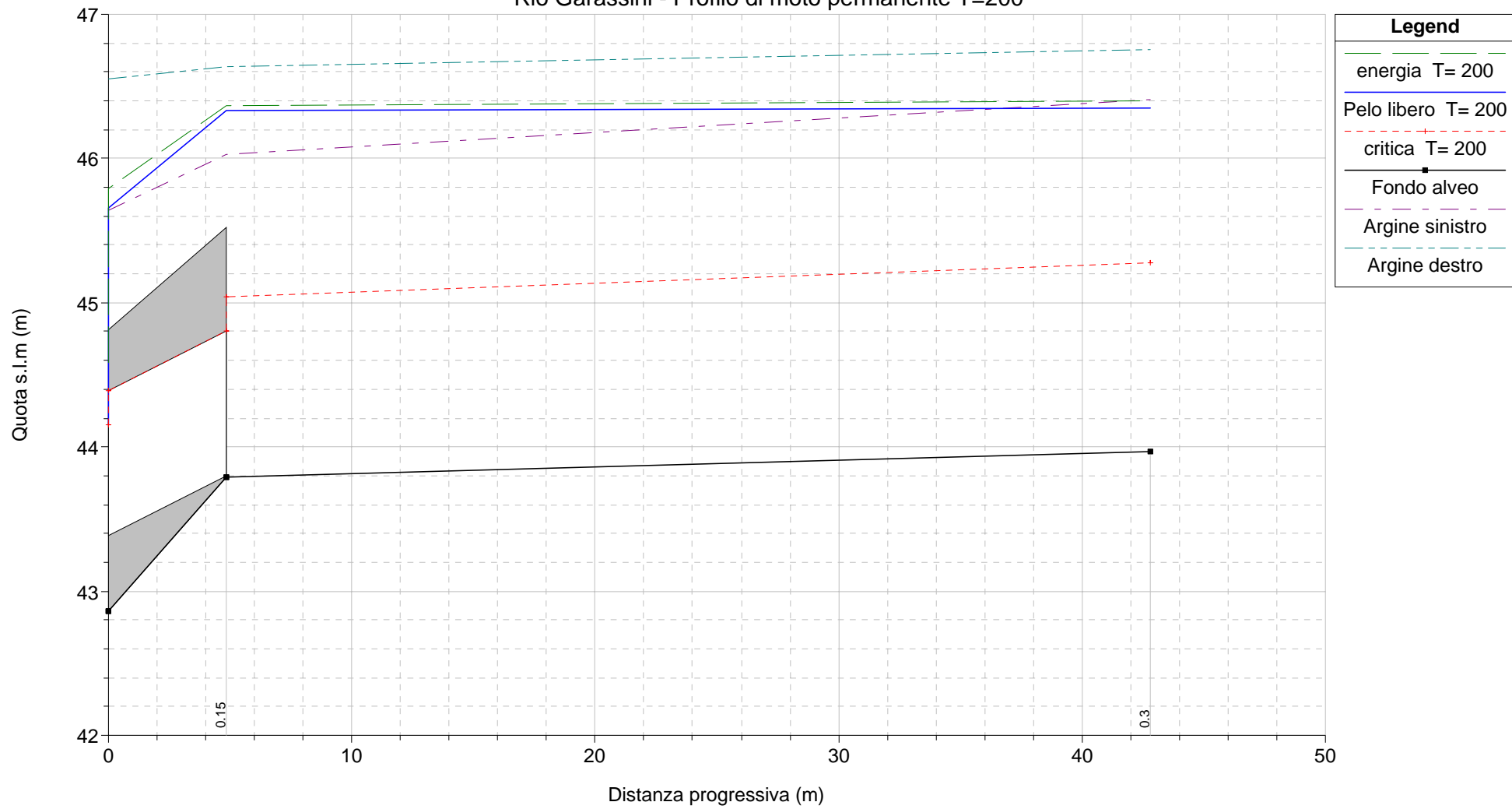
**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

GARASSINI

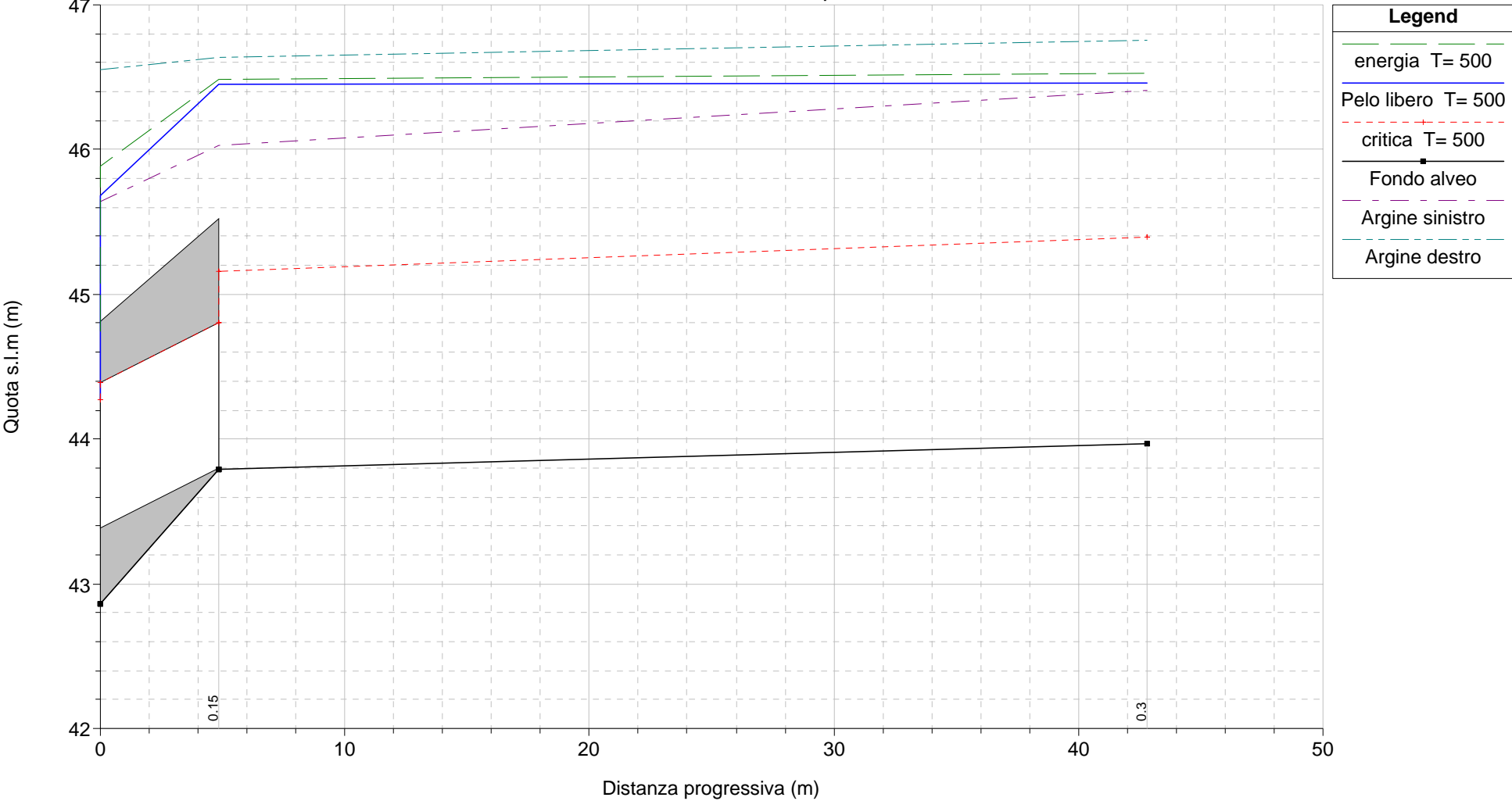
Rio Garassini - Profilo di moto permanente T=50



Rio Garassini - Profilo di moto permanente T=200



Rio Garassini - Profilo di moto permanente T=500



**MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI**

GARASSINI

Rio Garassini T=50 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
0.3	7	43.97	46.41	46.75	46.19	45.07	46.23	0.81	8.62	0.23
0.2	7	43.79	46.03	46.63	46.18	44.82	46.2	0.71	11.94	0.17
0.15	Culvert									
0.1	7	42.86	45.64	46.55	43.95	43.95	44.3	2.65	2.65	1.01

Rio Garassini T=200 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
0.3	10	43.97	46.41	46.75	46.35	45.28	46.4	1.03	9.68	0.28
0.2	10	43.79	46.03	46.63	46.33	45.04	46.37	0.85	14.25	0.19
0.15	Culvert									
0.1	10	42.86	45.64	46.55	44.16	44.16	44.58	2.89	3.46	1

Rio Garassini T=500 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
0.3	12	43.97	46.41	46.75	46.46	45.4	46.53	1.15	10.51	0.3
0.2	12	43.79	46.03	46.63	46.45	45.16	46.48	0.9	15.98	0.2
0.15	Culvert									
0.1	12	42.86	45.64	46.55	44.28	44.28	44.75	3.04	3.95	1