ALLEGATO D: *Verifiche di stabilità globale FASE 2: completamento di prima fase*

LISTATO DI CALCOLO - FASE 2

RICERCA SUPERFICIE CRITICA CIRCOLARE

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	25.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	0.0 m
Ordinata vertice sinistro inferiore yi	80.0 m
Ascissa vertice destro superiore xs	160.0 m
Ordinata vertice destro superiore ys	350.0 m
Passo di ricerca	10.0
Numero di celle lungo x	20.0
Numero di celle lungo y	20.0

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.01 6

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99
12	40.78	12.47
13	44.41	12.47
14	44.41	18.47
15	63.11	25.52
16	68.65	25.52
17	68.65	29.52
18	71.75	31.66
19	75.51	31.66
20	75.86	32.59
21	79.4	32.59
22	79.4	36.59
23	83.49	38.64
24	88.14	38.73
25	88.19	38.85
26	92.03	38.85
27	92.03	42.85
28	95.67	44.37
29	104.28	44.37
30	104.28	48.37
31	115.54	50.26
32	121.1	50.26
33	121.76	51.58
34	125.29	51.58
35	125.29	55.58
36	132.31	58.76
37	137.8	58.76
38	137.9	58.96
39	141.69	58.96
40	141.69	62.96
41	145.87	64.54
42	157.55	64.54
43	157.74	65.05
44	161.48	65.05
45	161.48	69.05
46	168.1	70.49
47	173.12	70.52
48	173.32	71.07
49	177.3	71.07
50	177.3	75.07
51	184.02	76.51
52	189.03	76.54
53	189.23	77.06
54	193.1	77.06
55	193.1	81.06
56	199.73	82.47
57	204.74	82.5
58	204.92	82.98
59	208.56	82.98

60	208.56	86.98
61	215.56	88.51
62	220.57	88.54
63	220.76	89.04
64	224.49	89.04
65	224.49	93.04
66	231.36	94.51
67	236.37	94.54
68	236.56	95.05
69	240.34	95.05
70	240.34	99.05
71	246.76	100.42
72	267.01	100.47
73	272.02	102.54
74	276.14	102.54
75	276.14	105.14
76	277.14	105.14
77	282.79	107.56
78	287.09	107.56
79	287.09	110.16
80	288.09	110.16
81	296.09	112.54
82	299.97	112.54
83	299.97	115.14
84	300.97	115.14
85	307.85	117.6
86	315.6	117.6
87	315.6	120.2
88	316.6	120.2
89	324.51	122.58
90	329.47	122.58
91	329.47	125.18
92	330.47	125.18
93	339.18	127.6
94	344.88	127.6
95	344.88	130.2
96	345.88	130.2
97	355.93	132.19
98	355.93	132.19
99	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	22.6
9	102.8	22.6
10	159.6	45.8
11	159.6	45.8
12	294.28	96.5
13	294.29	96.5
14	330.58	115.8
15	330.6	115.8
16	363.07	120.8
17	363.1	120.8
18	414.33	131.5
19	433.8	136.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52

9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4

46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106.1

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.41	12.47	0	0.1	6	2	4	2800
2	68.65	25.52	0	0.1	4	3	4	2800
3	79.4	32.59	0	0.1	4	3	4	2800
4	92.03	38.85	0	0.1	4	3	4	2800
5	104.28	44.37	0	0.1	4	3	4	2800
6	125.29	51.58	0	0.1	4	3	4	2800
7	141.69	58.96	0	0.1	4	3	4	2800
8	161.48	65.05	0	0.1	4	3	4	2800
9	177.3	71.07	0	0.1	4	3	4	2800
10	193.1	77.06	0	0.1	4	3	4	2800
11	208.56	82.98	0	0.1	4	3	4	2800
12	224.49	89.04	0	0.1	4	3	4	2800
13	240.34	95.05	0	0.1	4	3	4	2800

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.22313	10.96872	0.2	6	90	3.6
2	43.81049	10.96872	0.2	6	90	3.6

Risultati analisi pendio [NTC 2008: [A2+M2+R2]]

Fs minimo individuato	1.18
Ascissa centro superficie	28.0 m
Ordinata centro superficie	113.75 m
Raggio superficie	105.55 m

Numero di superfici esaminate....(309)

N°	Xo	Yo	Ro	Fs
1	40.0	80.0	75.8	1.25
2	44.0	86.8	81.7	1.28
3	48.0	80.0	75.8	1.29
4	60.0	86.8	81.8	1.30
5	64.0	80.0	75.7	1.31
6	68.0	86.8	63.8	1.66
7	76.0	86.8	72.8	1.34
8	80.0	80.0	67.2	1.38
9	84.0	86.8	72.8	1.38
10	88.0	80.0	67.4	1.43
11	92.0	86.8	81.7	1.76
12	96.0	80.0	75.7	1.83
13	100.0	86.8	72.8	1.54
14	104.0	80.0	75.7	1.87
15	108.0	86.8	45.9	1.93
16	116.0	86.8	72.8	1.91
17	120.0	80.0	34.8	1.82
18	124.0	86.8	63.7	1.65
19	128.0	80.0	51.2	1.70
20	132.0	86.8	54.8	1.64
21	136.0	80.0	67.2	2.15
22	140.0	86.8	45.7	1.90
23	144.0	80.0	42.9	1.77
24	148.0	86.8	54.5	1.68
25	152.0	80.0	50.4	2.01
26	156.0	86.8	55.0	1.91
27	160.0	80.0	42.1	1.95
28	36.0	100.3	93.9	1.28
29	40.0	93.5	87.8	1.26
30	60.0	100.3	93.8	1.28
31	64.0	93.5	87.8	1.30
32	76.0	100.3	83.4	1.24
33	80.0	93.5	78.0	1.34
34	92.0	100.3	83.4	1.37
35	96.0	93.5	78.0	1.51
36	104.0	93.5	58.6	1.87
37	112.0	93.5	87.8	1.90
38	116.0	100.3	73.0	1.48
39	120.0	93.5	68.4	1.57
40	124.0	100.3	62.6	1.68
41	128.0	93.5	58.7	1.68
42	132.0	100.3	93.8	1.94
43	136.0	93.5	49.0	1.88
44	140.0	100.3	62.6	1.55
45	144.0	93.5	58.7	1.63
46	152.0	93.5	58.7	1.63
47	156.0	100.3	62.6	1.66
48	160.0	93.5	58.5	1.93
49	28.0	113.8	105.6	1.18
50	32.0	107.0	100.0	1.26
51	36.0	113.8	106.1	1.29
52	44.0	113.8	106.1	1.29
53	48.0	107.0	100.0	1.29
54	52.0	113.8	106.1	1.29
55	56.0	107.0	100.0	1.29
56	60.0	113.8	106.1	1.28
57	64.0	107.0	100.0	1.29
58	68.0	113.8	94.4	1.34
59	72.0	107.0	88.9	1.29

60	76.0	113.8	94.4	1.33
61	84.0	113.8	94.4	1.29
62	88.0	107.0	88.9	1.33
63	100.0	113.8	106.1	1.71
64	108.0	113.8	106.1	1.77
65	112.0	107.0	66.8	1.86
66	116.0	113.8	106.1	1.83
67	120.0	107.0	100.0	1.90
68	136.0	107.0	100.0	1.95
69	140.0	113.8	82.8	1.54
70	144.0	107.0	77.9	1.77
71	148.0	113.8	71.1	1.55
72	152.0	107.0	66.8	1.52
73	156.0	113.8	94.4	1.92
74	160.0	107.0	55.8	1.81
75	36.0	127.3	118.2	1.28
76	40.0	120.5	112.1	1.31
77	48.0	120.5	99.7	1.61
78	52.0	127.3	118.2	1.30
79	56.0	120.5	99.7	1.51
80	68.0	127.3	105.0	1.49
81	72.0	120.5	99.7	1.40
82	80.0	120.5	99.7	1.37
83	84.0	127.3	105.1	1.41
84	92.0	127.3	118.2	1.62
85	100.0	127.3	118.2	1.68
86	104.0	120.5	112.1	1.74
87	108.0	127.3	105.1	1.40
88	112.0	120.5	99.7	1.43
89	116.0	127.3	105.1	1.52
90	124.0	127.3	78.9	2.00
91	128.0	120.5	74.8	1.82
92	132.0	127.3	92.0	1.40
93	136.0	120.5	87.2	1.48
94	140.0	127.3	118.2	1.88
95	156.0	127.3	92.0	1.67
96	160.0	120.5	87.2	1.74
97	32.0	134.0	110.6	2.32
98	48.0	134.0	124.4	1.30
99	56.0	134.0	110.8	1.63
100	60.0	140.8	117.5	1.55
101	64.0	134.0	110.8	1.53
102	76.0	140.8	102.7	13.97
103	88.0	134.0	97.1	1.95
104	96.0	134.0	124.4	1.64
105	100.0	140.8	130.5	1.62
106	108.0	140.8	130.5	1.67
107	112.0	134.0	110.8	1.39
108	128.0	134.0	97.1	1.52
109	140.0	140.8	116.3	1.70
110	144.0	134.0	124.3	1.87
111	156.0	140.8	103.3	1.56
112	160.0	134.0	97.1	1.64
113	32.0	147.5	137.2	1.23
114	36.0	154.3	128.5	2.89
115	40.0	147.5	136.9	1.24
116	72.0	147.5	106.3	4.59
117	92.0	154.3	142.6	1.59
118	100.0	154.3	142.8	1.60
119	104.0	147.5	136.5	1.65
120	112.0	147.5	122.5	1.37
121	116.0	154.3	143.0	1.68
122	120.0	147.5	136.4	1.74

123	132.0	154.3	127.7	1.61
124	136.0	147.5	121.4	1.67
125	140.0	154.3	110.8	1.49
126	144.0	147.5	106.4	1.41
127	148.0	154.3	112.3	1.38
128	152.0	147.5	108.8	1.42
129	156.0	154.3	112.8	1.49
130	160.0	147.5	106.8	1.48
131	84.0	167.8	138.0	1.64
132	88.0	161.0	117.2	16.36
133	92.0	167.8	137.7	1.55
134	96.0	161.0	132.5	1.48
135	108.0	167.8	154.8	1.63
136	112.0	161.0	148.8	1.66
137	116.0	167.8	154.9	1.69
138	128.0	161.0	132.3	1.47
139	132.0	167.8	138.4	1.61
140	136.0	161.0	133.3	1.61
141	140.0	167.8	154.9	1.83
142	144.0	161.0	148.6	1.84
143	148.0	167.8	120.7	1.51
144	152.0	161.0	117.9	1.39
145	156.0	167.8	138.8	1.81
146	160.0	161.0	132.5	1.84
147	44.0	181.3	148.6	3.63
148	92.0	181.3	166.9	1.54
149	96.0	174.5	160.9	1.61
150	100.0	181.3	167.3	1.63
151	104.0	174.5	160.8	1.63
152	112.0	174.5	161.0	1.67
153	116.0	181.3	167.1	1.70
154	120.0	174.5	161.0	1.73
155	124.0	181.3	148.8	1.40
156	128.0	174.5	143.0	1.39
157	136.0	174.5	126.8	1.69
158	140.0	181.3	167.0	1.80
159	144.0	174.5	160.7	1.80
160	148.0	181.3	149.0	1.69
161	152.0	174.5	143.3	1.75
162	4.0	194.8	179.5	4.98
163	48.0	188.0	154.0	4.48
164	84.0	194.8	178.9	1.30
165	96.0	188.0	135.0	3.09
166	100.0	194.8	179.5	1.58
167	108.0	194.8	159.4	1.53
168	112.0	188.0	154.8	1.36
169	116.0	194.8	161.0	1.32
170	120.0	188.0	154.2	1.33
171	140.0	194.8	179.2	1.80
172	144.0	188.0	153.7	1.66
173	148.0	194.8	159.9	1.67
174	152.0	188.0	154.2	1.69
175	156.0	194.8	139.7	1.67
176	160.0	188.0	135.3	1.61
177	72.0	201.5	185.1	1.26
178	76.0	208.3	191.5	1.25
179	80.0	201.5	164.7	1.89
180	88.0	201.5	164.8	1.76
181	96.0	201.5	185.1	1.51
182	104.0	201.5	185.2	1.58
183	108.0	208.3	149.1	4.39
184	116.0	208.3	192.0	1.68
185	136.0	201.5	144.8	2.00

186	140.0	208.3	170.2	1.45
187	148.0	208.3	191.5	1.76
188	152.0	201.5	146.4	1.73
189	24.0	215.0	196.9	1.59
190	28.0	221.8	203.0	1.55
191	36.0	221.8	203.2	1.49
192	76.0	221.8	203.7	1.24
193	80.0	215.0	197.3	1.25
194	88.0	215.0	197.2	1.37
195	92.0	221.8	203.3	1.46
196	100.0	221.8	203.7	1.56
197	104.0	215.0	197.3	1.60
198	108.0	221.8	203.3	1.65
199	112.0	215.0	197.7	1.66
200	124.0	221.8	181.3	1.44
201	128.0	215.0	175.3	1.37
202	140.0	221.8	203.4	1.71
203	144.0	215.0	197.1	1.75
204	0.0	228.5	210.3	2.49
205	64.0	228.5	187.4	5.32
206	68.0	235.3	215.7	1.21
207	72.0	228.5	209.3	1.19
208	76.0	235.3	192.3	9.18
209	84.0	235.3	215.5	1.23
210	96.0	228.5	209.4	1.46
211	116.0	235.3	193.3	1.59
212	120.0	228.5	187.5	1.49
213	136.0	228.5	165.1	8.36
214	148.0	235.3	191.8	1.48
215	156.0	235.3	192.1	1.48
216	160.0	228.5	186.7	1.58
217	4.0	248.8	228.1	2.91
218	32.0	242.0	221.1	1.61
219	40.0	242.0	221.4	1.53
220	48.0	242.0	221.6	1.43
221	56.0	242.0	222.4	1.33
222	68.0	248.8	227.8	1.24
223	76.0	248.8	227.9	1.24
224	88.0	242.0	198.0	27.28
225	92.0	248.8	227.7	1.44
226	100.0	248.8	227.8	1.55
227	104.0	242.0	221.7	1.60
228	132.0	248.8	227.9	1.66
229	136.0	242.0	222.2	1.68
230	140.0	248.8	203.0	1.44
231	144.0	242.0	196.8	1.46
232	148.0	248.8	203.0	1.43
233	152.0	242.0	197.2	1.47
234	156.0	248.8	202.4	1.43
235	160.0	242.0	197.5	1.46
236	44.0	262.3	239.6	1.55
237	52.0	262.3	240.2	1.44
238	60.0	262.3	240.8	1.36
239	64.0	255.5	209.1	2.48
240	76.0	262.3	240.1	1.26
241	80.0	255.5	233.8	1.28
242	84.0	262.3	239.8	1.29
243	88.0	255.5	234.1	1.28
244	92.0	262.3	213.6	12.73
245	96.0	255.5	233.7	1.51
246	124.0	262.3	213.8	1.65
247	128.0	255.5	207.6	1.59
248	132.0	262.3	213.8	1.61

249	136.0	255.5	209.2	1.47
250	140.0	262.3	213.8	1.49
251	144.0	255.5	207.6	1.45
252	152.0	255.5	209.1	1.46
253	156.0	262.3	188.2	8.84
254	76.0	275.8	224.6	4.40
255	80.0	269.0	245.9	1.29
256	112.0	269.0	219.4	1.77
257	120.0	269.0	220.0	1.69
258	124.0	275.8	252.2	1.63
259	132.0	275.8	252.2	1.67
260	136.0	269.0	220.0	1.58
261	16.0	282.5	257.7	3.78
262	64.0	282.5	258.6	1.29
263	124.0	289.3	264.4	1.63
264	128.0	282.5	257.9	1.65
265	132.0	289.3	264.3	1.69
266	136.0	282.5	258.6	1.69
267	160.0	282.5	258.3	1.76
268	0.0	296.0	271.1	3.43
269	112.0	296.0	240.7	2.03
270	116.0	302.8	276.7	1.58
271	120.0	296.0	270.8	1.59
272	124.0	302.8	276.5	1.60
273	128.0	296.0	240.1	1.86
274	132.0	302.8	246.1	1.87
275	140.0	302.8	246.3	1.80
276	144.0	296.0	240.1	1.71
277	148.0	302.8	246.1	1.65
278	152.0	296.0	241.5	1.50
279	156.0	302.8	247.1	1.49
280	160.0	296.0	240.9	1.43
281	44.0	316.3	287.7	1.66
282	108.0	316.3	288.3	1.50
283	112.0	309.5	282.2	1.57
284	116.0	316.3	288.5	1.56
285	120.0	309.5	283.0	1.60
286	128.0	309.5	250.9	56.35
287	136.0	309.5	252.3	1.86
288	160.0	309.5	282.6	1.73
289	8.0	323.0	294.7	4.24
290	12.0	329.8	300.5	3.60
291	84.0	329.8	300.5	1.35
292	92.0	329.8	300.7	1.35
293	104.0	323.0	262.4	6.06
294	112.0	323.0	294.6	1.56
295	152.0	323.0	295.0	1.72
296	160.0	323.0	294.8	1.77
297	16.0	336.5	306.3	3.46
298	68.0	343.3	313.0	1.41
299	72.0	336.5	306.5	1.36
300	76.0	343.3	312.9	1.35
301	88.0	336.5	306.9	1.40
302	92.0	343.3	312.9	1.36
303	96.0	336.5	306.5	1.33
304	144.0	336.5	306.6	1.68
305	148.0	343.3	312.8	1.72
306	156.0	343.3	313.4	1.76
307	160.0	336.5	273.4	1.70
308	144.0	350.0	318.7	1.73
309	152.0	350.0	319.3	1.73

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CARICO LIMITE PALI ESISTENTI

xc = 40.00 yc = 80.00 Rc = 75.752 Fs=1.248
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 44.00 yc = 86.75 Rc = 81.749 Fs=1.2846
Micropali x=41.22313 Y=10.96872 Plim=4673.1 Kg Sbalzo del palo 7.45 m
Micropali x=43.81049 Y=10.96872 Plim=4673.1 Kg Sbalzo del palo 7.45 m

xc = 48.00 yc = 80.00 Rc = 75.756 Fs=1.2884
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 36.00 yc = 100.25 Rc = 93.851 Fs=1.2849
Micropali x=41.22313 Y=10.96872 Plim=56.1 Kg Sbalzo del palo 5.84 m
Micropali x=43.81049 Y=10.96872 Plim=56.1 Kg Sbalzo del palo 5.84 m

xc = 40.00 yc = 93.50 Rc = 87.763 Fs=1.2641
Micropali x=41.22313 Y=10.96872 Plim=1064.3 Kg Sbalzo del palo 6.69 m
Micropali x=43.81049 Y=10.96872 Plim=1064.3 Kg Sbalzo del palo 6.69 m

xc = 60.00 yc = 100.25 Rc = 93.846 Fs=1.2761
Micropali x=41.22313 Y=10.96872 Plim=3436.8 Kg Sbalzo del palo 4.43 m
Micropali x=43.81049 Y=10.96872 Plim=3436.8 Kg Sbalzo del palo 4.43 m

xc = 76.00 yc = 100.25 Rc = 83.436 Fs=1.2446
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 28.00 yc = 113.75 Rc = 105.552 Fs=1.1802
Micropali x=41.22313 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.26 m
Micropali x=43.81049 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.26 m

xc = 32.00 yc = 107.00 Rc = 99.956 Fs=1.2569
Micropali x=41.22313 Y=10.96872 Plim=2842.8 Kg Sbalzo del palo 4.87 m
Micropali x=43.81049 Y=10.96872 Plim=2842.8 Kg Sbalzo del palo 4.87 m

xc = 36.00 yc = 113.75 Rc = 106.096 Fs=1.286
Micropali x=41.22313 Y=10.96872 Plim=3254.9 Kg Sbalzo del palo 4.61 m
Micropali x=43.81049 Y=10.96872 Plim=3254.9 Kg Sbalzo del palo 4.61 m

xc = 44.00 yc = 113.75 Rc = 106.096 Fs=1.2886
Micropali x=41.22313 Y=10.96872 Plim=3154.9 Kg Sbalzo del palo 4.80 m
Micropali x=43.81049 Y=10.96872 Plim=3154.9 Kg Sbalzo del palo 4.80 m

xc = 52.00 yc = 113.75 Rc = 106.096 Fs=1.2888
Micropali x=41.22313 Y=10.96872 Plim=3485.9 Kg Sbalzo del palo 4.39 m
Micropali x=43.81049 Y=10.96872 Plim=3485.9 Kg Sbalzo del palo 4.39 m

xc = 60.00 yc = 113.75 Rc = 106.096 Fs=1.2843
Micropali x=41.22313 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.43 m
Micropali x=43.81049 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.43 m

xc = 36.00 yc = 127.25 Rc = 118.16 Fs=1.2773
Micropali x=41.22313 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.20 m
Micropali x=43.81049 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 3.20 m

xc = 32.00 yc = 147.50 Rc = 137.191 Fs=1.2347
Micropali x=41.22313 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 1.75 m
Micropali x=43.81049 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 1.75 m

xc = 40.00 yc = 147.50 Rc = 136.903 Fs=1.2395
Micropali x=41.22313 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 1.85 m
Micropali x=43.81049 Y=10.96872 Plim=5056.0 Kg Sbalzo del palo 1.85 m

xc = 72.00 yc = 201.50 Rc = 185.065 Fs=1.2562
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 76.00 yc = 208.25 Rc = 191.532 Fs=1.2495
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 76.00 yc = 221.75 Rc = 203.665 Fs=1.2444
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 80.00 yc = 215.00 Rc = 197.268 Fs=1.2547
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 68.00 yc = 235.25 Rc = 215.652 Fs=1.2149
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 72.00 yc = 228.50 Rc = 209.332 Fs=1.1934
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 84.00 yc = 235.25 Rc = 215.532 Fs=1.2254
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 68.00 yc = 248.75 Rc = 227.819 Fs=1.2353
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 76.00 yc = 248.75 Rc = 227.931 Fs=1.2446
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

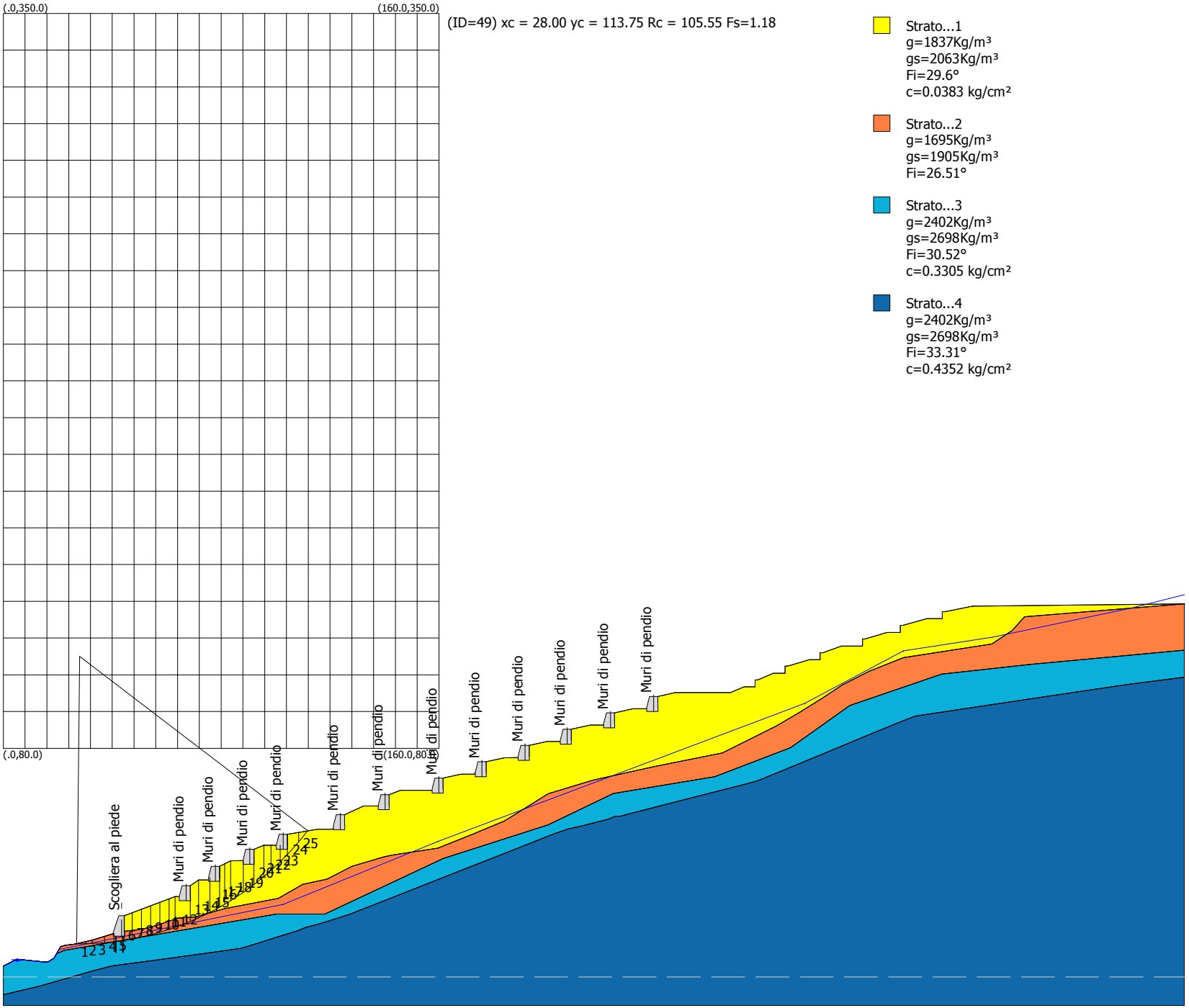
xc = 76.00 yc = 262.25 Rc = 240.064 Fs=1.2635
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 80.00 yc = 255.50 Rc = 233.769 Fs=1.2809
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

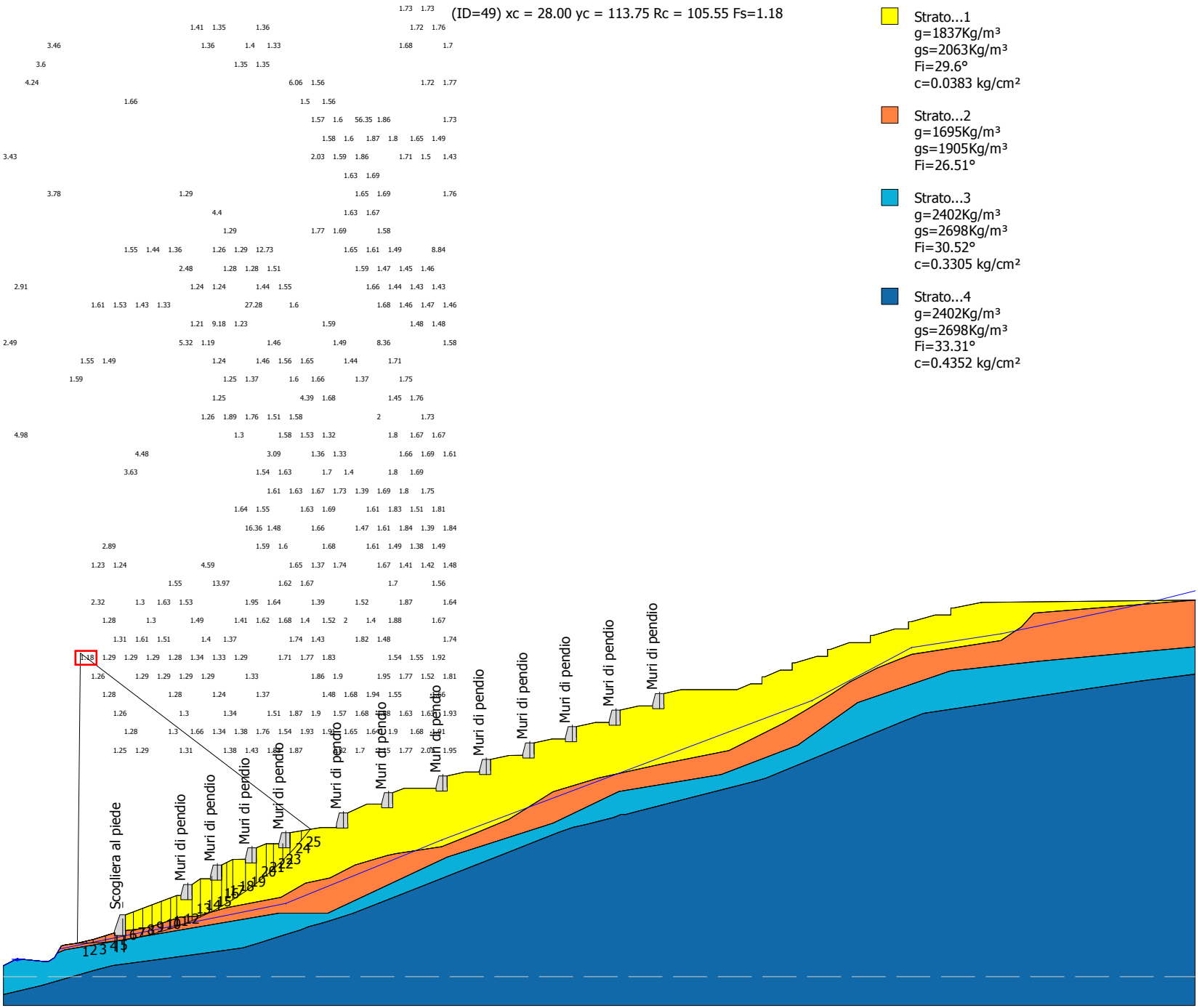
xc = 84.00 yc = 262.25 Rc = 239.798 Fs=1.2885
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 88.00 yc = 255.50 Rc = 234.131 Fs=1.2794
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m

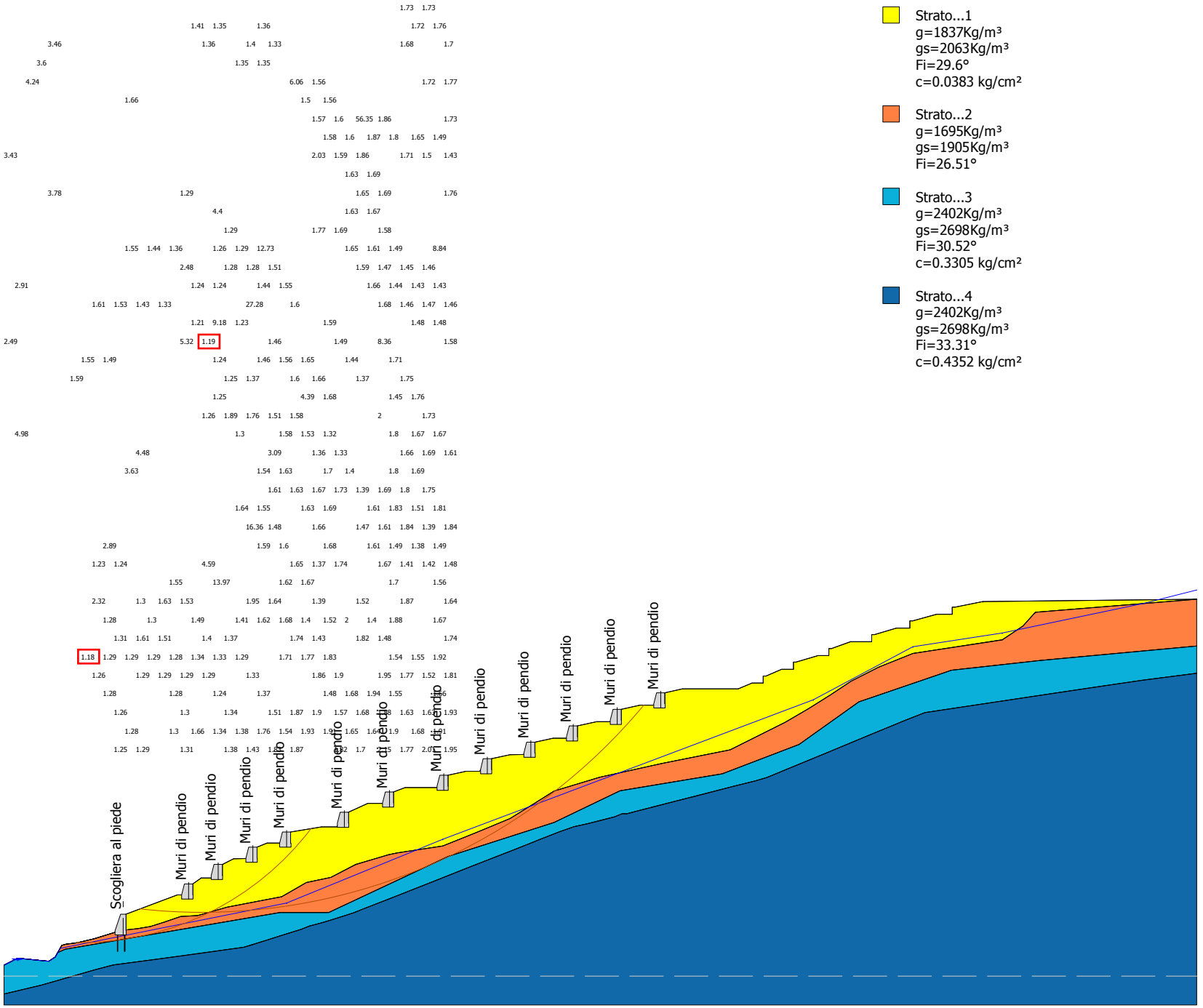
xc = 64.00 yc = 282.50 Rc = 258.636 Fs=1.2856
Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m


(.0,350.0)
(160.0,350.0)
(ID=49) xc = 28.00 yc = 113.75 Rc = 105.55 Fs=1.18
Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°
Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
(.0,80.0)
(160.0,80.0)
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio

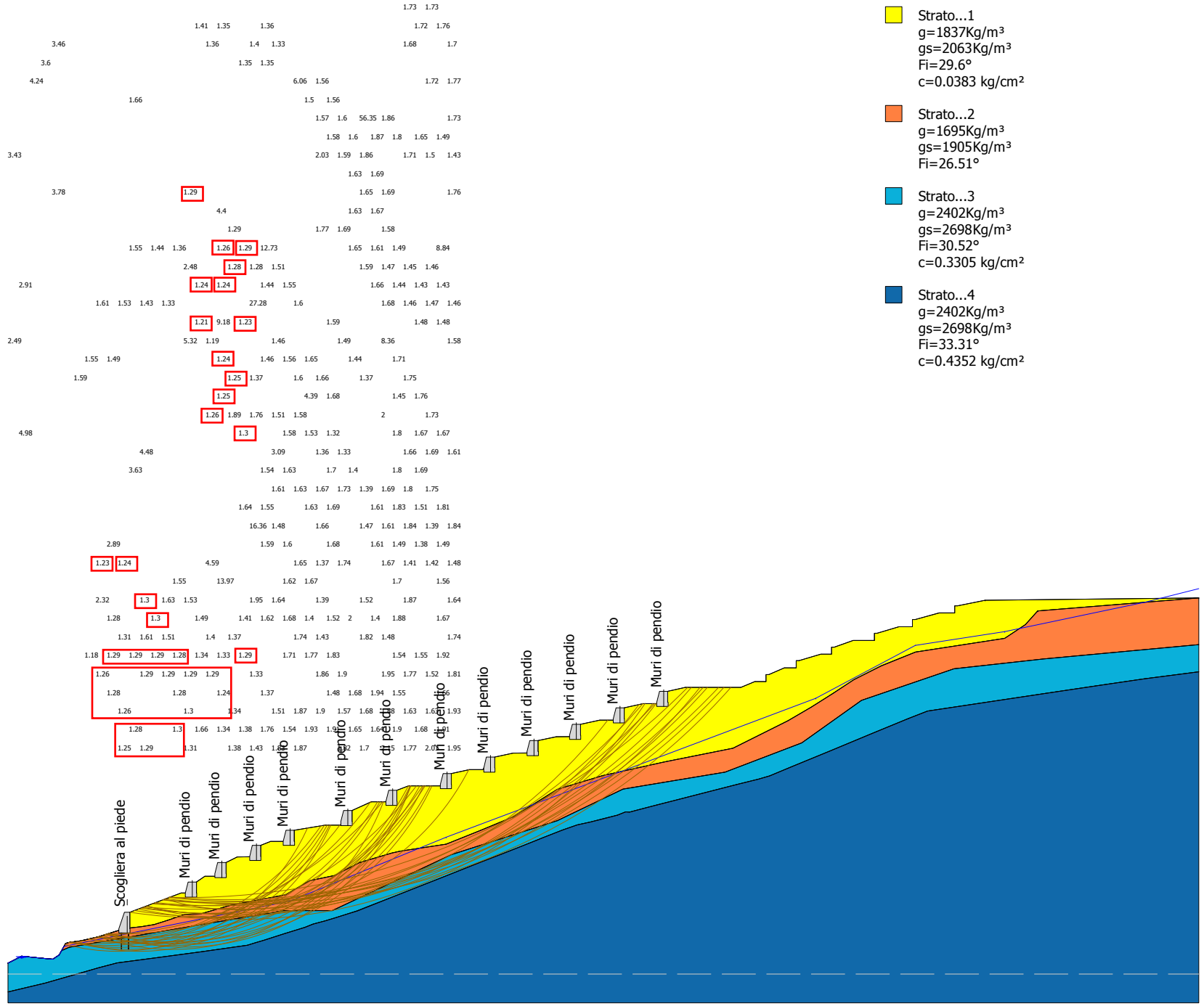
SUPERFICIE A FATTORE MINIMO FS=1.18



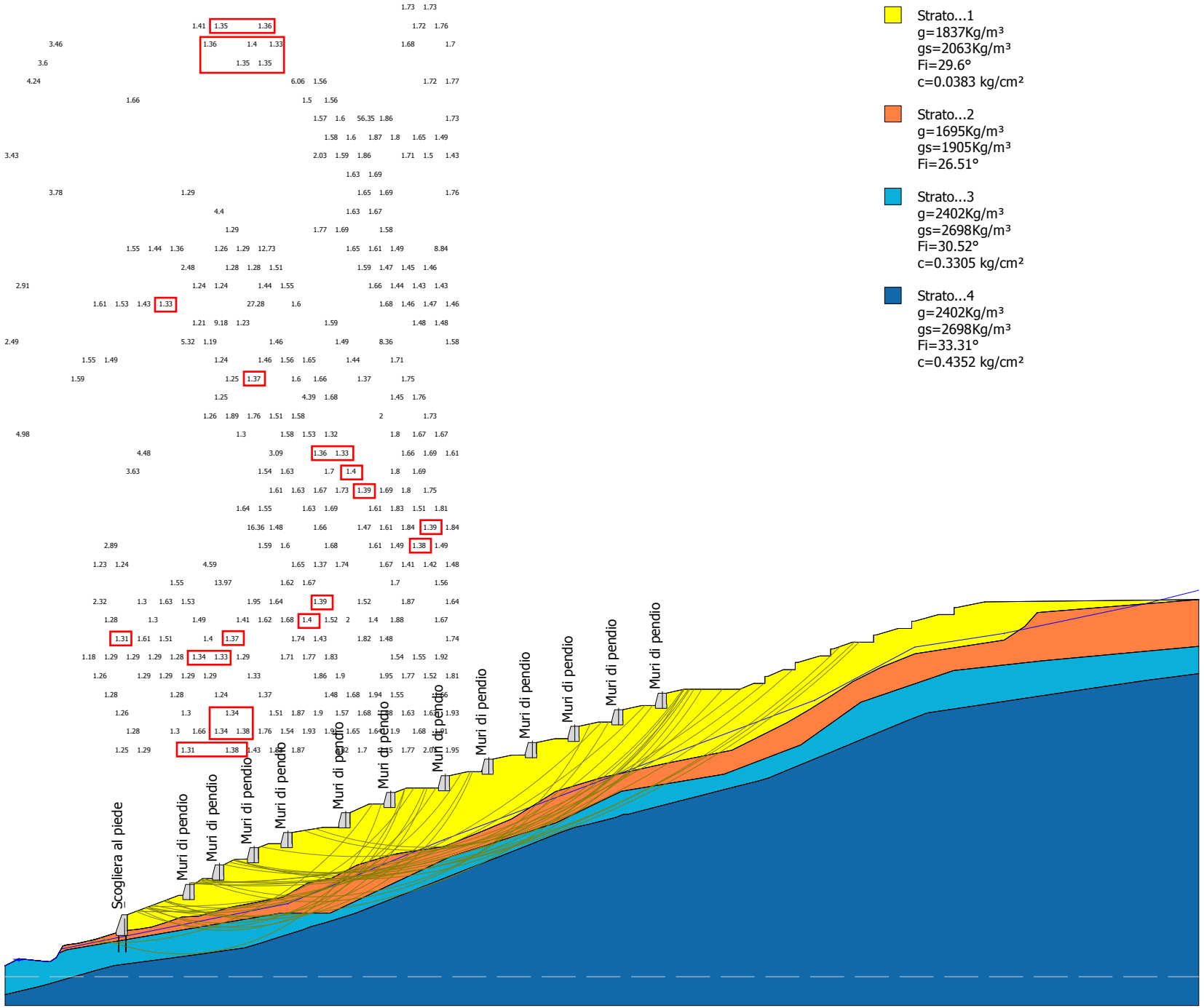
SUPERFICI FATTORE FS>1.1 - FS (1.1-1.2)



SUPERFICI FATTORE FS>1.1 - FS (1.2-1.3)



SUPERFICI FATTORE FS>1.1 - FS (1.3-1.4)



ANALISI SUPERFICIE GENERICA 1
Linea separatrice strato PREESISTENTE e strato nuovo materiale oggetto di deposito

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	15.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.78	12.47
13	44.41	12.47
14	44.41	18.47
15	63.11	25.52
16	68.65	25.52
17	68.65	29.52
18	71.75	31.66
19	75.51	31.66
20	75.86	32.59
21	79.4	32.59
22	79.4	36.59
23	83.49	38.64
24	88.14	38.73
25	88.19	38.85
26	92.03	38.85
27	92.03	42.85
28	95.67	44.37
29	104.28	44.37
30	104.28	48.37
31	115.54	50.26
32	121.1	50.26
33	121.76	51.58
34	125.29	51.58
35	125.29	55.58
36	132.31	58.76
37	137.8	58.76
38	137.9	58.96
39	141.69	58.96
40	141.69	62.96
41	145.87	64.54
42	157.55	64.54
43	157.74	65.05
44	161.48	65.05
45	161.48	69.05
46	168.1	70.49
47	173.12	70.52
48	173.32	71.07
49	177.3	71.07
50	177.3	75.07
51	184.02	76.51
52	189.03	76.54
53	189.23	77.06
54	193.1	77.06
55	193.1	81.06
56	199.73	82.47
57	204.74	82.5
58	204.92	82.98
59	208.56	82.98
60	208.56	86.98
61	215.56	88.51
62	220.57	88.54
63	220.76	89.04
64	224.49	89.04
65	224.49	93.04
66	231.36	94.51
67	236.37	94.54
68	236.56	95.05
69	240.34	95.05
70	240.34	99.05
71	246.76	100.42
72	267.01	100.47

73	272.02	102.54
74	276.14	102.54
75	276.14	105.14
76	277.14	105.14
77	282.79	107.56
78	287.09	107.56
79	287.09	110.16
80	288.09	110.16
81	296.09	112.54
82	299.97	112.54
83	299.97	115.14
84	300.97	115.14
85	307.85	117.6
86	315.6	117.6
87	315.6	120.2
88	316.6	120.2
89	324.51	122.58
90	329.47	122.58
91	329.47	125.18
92	330.47	125.18
93	339.18	127.6
94	344.88	127.6
95	344.88	130.2
96	345.88	130.2
97	355.93	132.19
98	355.93	132.19
99	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	22.6
9	102.8	22.6
10	159.6	45.8
11	159.6	45.8
12	294.28	96.5
13	294.29	96.5
14	330.58	115.8
15	330.6	115.8
16	363.07	120.8
17	363.1	120.8
18	414.33	131.5
19	433.8	136.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15

9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22

20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	38.21	11.33
2	48.71	13.21
3	53.26	14.02
4	58.12	15.53
5	64.29	17.64
6	70.5	18.02
7	81.13	21.02
8	93.9	23.5
9	101.03	24.85
10	109.98	30.03
11	118.88	31.91
12	128.0	36.58
13	139.9	41.65
14	145.6	43.29
15	148.4	47.14
16	151.7	47.14
17	158.59	49.54
18	162.04	52.14
19	169.53	54.54
20	173.09	57.14
21	180.73	59.58
22	184.32	62.18
23	193.09	65.24
24	200.34	67.49
25	203.83	70.09
26	211.16	72.53
27	214.58	75.13
28	221.76	77.58
29	225.19	80.18
30	232.35	82.54
31	235.79	85.14
32	242.59	87.91
33	246.38	90.51
34	252.88	92.62
35	254.7	95.22
36	261.93	97.54
37	267.28	100.59

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.41	12.47	0	0.1	6	2	4	2800
2	68.65	25.52	0	0.1	4	3	4	2800
3	79.4	32.59	0	0.1	4	3	4	2800
4	92.03	38.85	0	0.1	4	3	4	2800
5	104.28	44.37	0	0.1	4	3	4	2800
6	125.29	51.58	0	0.1	4	3	4	2800
7	141.69	58.96	0	0.1	4	3	4	2800
8	161.48	65.05	0	0.1	4	3	4	2800
9	177.3	71.07	0	0.1	4	3	4	2800
10	193.1	77.06	0	0.1	4	3	4	2800
11	208.56	82.98	0	0.1	4	3	4	2800
12	224.49	89.04	0	0.1	4	3	4	2800
13	240.34	95.05	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.22313	10.96872	0.2	6	90	3.6
2	43.81049	10.96872	0.2	6	90	3.6

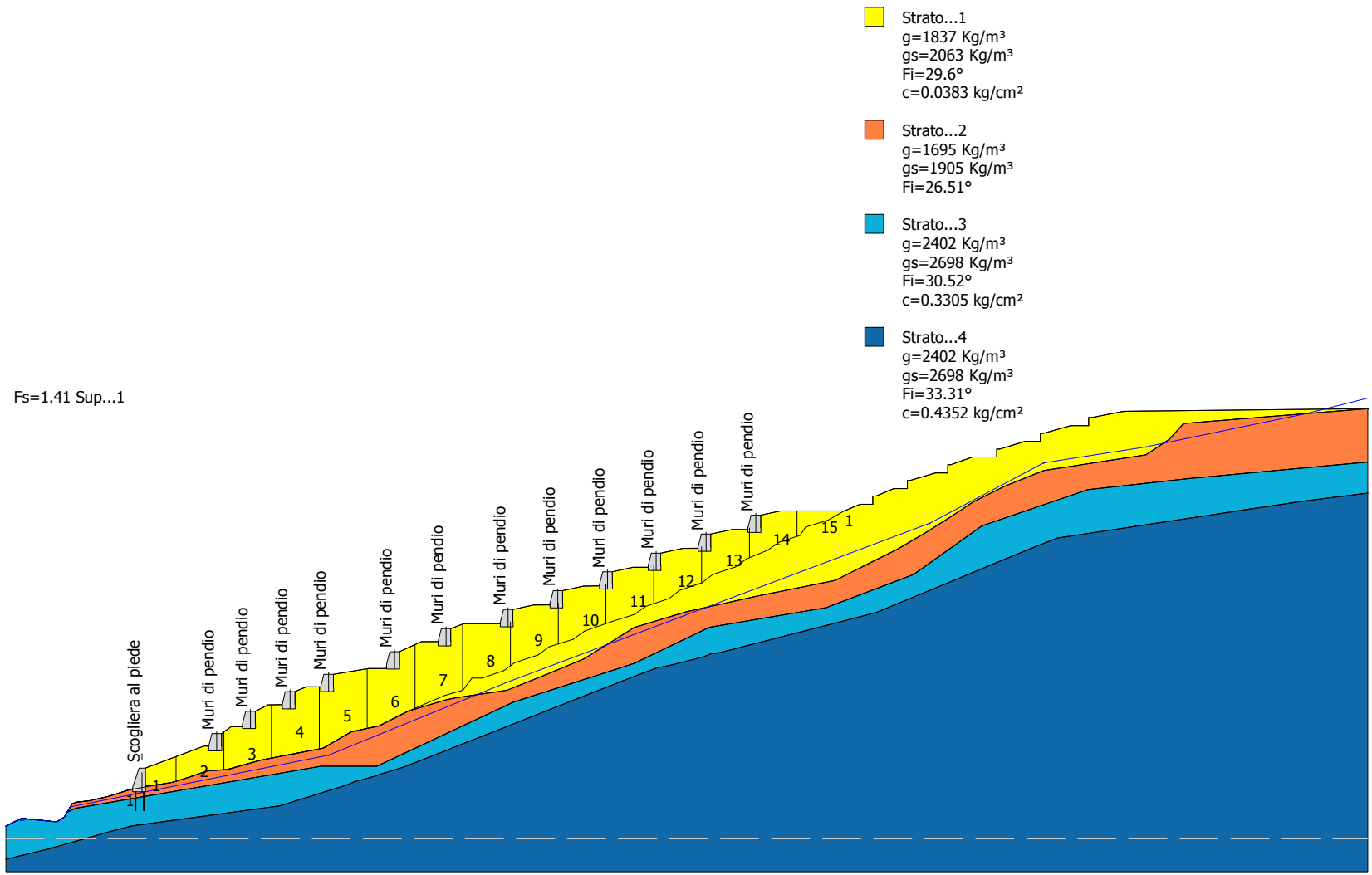
Superficie Nr...1 Fattore di sicurezza=1.41

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	15.21	10.6	15.48	245867.6	7621.9	3933.88	0.0	21.8	0.0	236508.3	74132.0
2	15.21	13.5	15.64	303687.8	9414.32	4859.01	0.0	21.8	0.0	290821.5	92133.8
3	15.21	13.8	15.67	413104.8	12806.25	6609.68	0.0	21.8	0.0	395441.2	125482.3
4	15.21	10.9	15.49	608598.7	18866.56	9737.58	0.0	21.8	0.0	585082.8	183575.4
5	15.21	23.1	16.54	642595.1	19920.45	10281.52	0.0	21.8	0.0	617417.8	206759.2
6	15.21	23.0	16.52	538469.4	16692.55	8615.51	0.03	24.4	0.0	507673.4	197728.6
7	15.21	20.6	16.25	574264.7	17802.21	9188.24	0.03	24.4	0.0	540720.8	206764.8
8	15.21	27.4	17.13	541162.6	16776.04	8658.6	0.03	24.4	0.0	513924.5	207643.1
9	15.21	24.4	16.71	500899.6	15527.89	8014.39	0.03	24.4	0.0	472962.7	186615.4
10	15.21	23.2	16.55	422182.4	13087.65	6754.92	0.03	24.4	0.0	397806.9	156109.5
11	15.21	22.7	16.49	462116.4	14325.61	7393.86	0.03	24.4	0.0	435385.8	169864.8
12	15.21	23.4	16.58	445977.8	13825.31	7135.65	0.03	24.4	0.0	420408.5	165021.6
13	15.21	27.8	17.2	406103.3	12589.2	6497.65	0.03	24.4	0.0	385625.6	157611.0
14	15.21	24.0	16.66	363112.2	11256.48	5809.8	0.03	24.4	0.0	342270.5	135838.1
15	15.21	28.4	17.29	112123.7	3475.84	1793.98	0.03	24.4	0.0	105269.6	46629.4

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.41

Micropali x=41.22313 Y=10.96872 Plim=329.0 Kg Sbalzo del palo 6.39 m
Micropali x=43.81049 Y=10.96872 Plim=329.0 Kg Sbalzo del palo 6.39 m


Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°
Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.41 Sup...1
Scogliera al piede
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ANALISI SUPERFICIE GENERICA 2
Linea separatrice strato COLTRE NATURALE e strato materiale oggetto di deposito (preesistente e nuovo)

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	21.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.78	12.47
13	44.41	12.47
14	44.41	18.47
15	63.11	25.52
16	68.65	25.52
17	68.65	29.52
18	71.75	31.66
19	75.51	31.66
20	75.86	32.59
21	79.4	32.59
22	79.4	36.59
23	83.49	38.64
24	88.14	38.73
25	88.19	38.85
26	92.03	38.85
27	92.03	42.85
28	95.67	44.37
29	104.28	44.37
30	104.28	48.37
31	115.54	50.26
32	121.1	50.26
33	121.76	51.58
34	125.29	51.58
35	125.29	55.58
36	132.31	58.76
37	137.8	58.76
38	137.9	58.96
39	141.69	58.96
40	141.69	62.96
41	145.87	64.54
42	157.55	64.54
43	157.74	65.05
44	161.48	65.05
45	161.48	69.05
46	168.1	70.49
47	173.12	70.52
48	173.32	71.07
49	177.3	71.07
50	177.3	75.07
51	184.02	76.51
52	189.03	76.54
53	189.23	77.06
54	193.1	77.06
55	193.1	81.06
56	199.73	82.47
57	204.74	82.5
58	204.92	82.98
59	208.56	82.98
60	208.56	86.98
61	215.56	88.51
62	220.57	88.54
63	220.76	89.04
64	224.49	89.04
65	224.49	93.04
66	231.36	94.51
67	236.37	94.54
68	236.56	95.05
69	240.34	95.05
70	240.34	99.05
71	246.76	100.42
72	267.01	100.47

73	272.02	102.54
74	276.14	102.54
75	276.14	105.14
76	277.14	105.14
77	282.79	107.56
78	287.09	107.56
79	287.09	110.16
80	288.09	110.16
81	296.09	112.54
82	299.97	112.54
83	299.97	115.14
84	300.97	115.14
85	307.85	117.6
86	315.6	117.6
87	315.6	120.2
88	316.6	120.2
89	324.51	122.58
90	329.47	122.58
91	329.47	125.18
92	330.47	125.18
93	339.18	127.6
94	344.88	127.6
95	344.88	130.2
96	345.88	130.2
97	355.93	132.19
98	355.93	132.19
99	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	22.6
9	102.8	22.6
10	159.6	45.8
11	159.6	45.8
12	294.28	96.5
13	294.29	96.5
14	330.58	115.8
15	330.6	115.8
16	363.07	120.8
17	363.1	120.8
18	414.33	131.5
19	433.8	136.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15

9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22

20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	39.28	11.67
2	48.71	13.21
3	53.26	14.02
4	58.12	15.53
5	64.29	17.64
6	70.5	18.02
7	81.13	21.02
8	93.9	23.5
9	101.03	24.85
10	109.98	30.0
11	118.88	31.91
12	128.0	36.58
13	139.9	40.13
14	142.92	40.79
15	159.6	43.29
16	172.1	48.29
17	184.1	53.29
18	192.1	58.29
19	200.1	63.29
20	216.6	68.29
21	239.1	73.29
22	264.1	78.29
23	274.1	83.29
24	284.1	88.29
25	292.6	93.29
26	300.6	98.29
27	303.97	100.54
28	308.1	103.29
29	318.1	108.29
30	330.6	113.29
31	363.1	118.29
32	370.6	123.29
33	378.99	132.5

Coefficienti parziali per i parametri geotecnici del terreno

==========

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

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Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.41	12.47	0	0.1	6	2	4	2800
2	68.65	25.52	0	0.1	4	3	4	2800
3	79.4	32.59	0	0.1	4	3	4	2800

4	92.03	38.85	0	0.1	4	3	4	2800
5	104.28	44.37	0	0.1	4	3	4	2800
6	125.29	51.58	0	0.1	4	3	4	2800
7	141.69	58.96	0	0.1	4	3	4	2800
8	161.48	65.05	0	0.1	4	3	4	2800
9	177.3	71.07	0	0.1	4	3	4	2800
10	193.1	77.06	0	0.1	4	3	4	2800
11	208.56	82.98	0	0.1	4	3	4	2800
12	224.49	89.04	0	0.1	4	3	4	2800
13	240.34	95.05	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.22313	10.96872	0.2	6	90	3.6
2	43.81049	10.96872	0.2	6	90	3.6

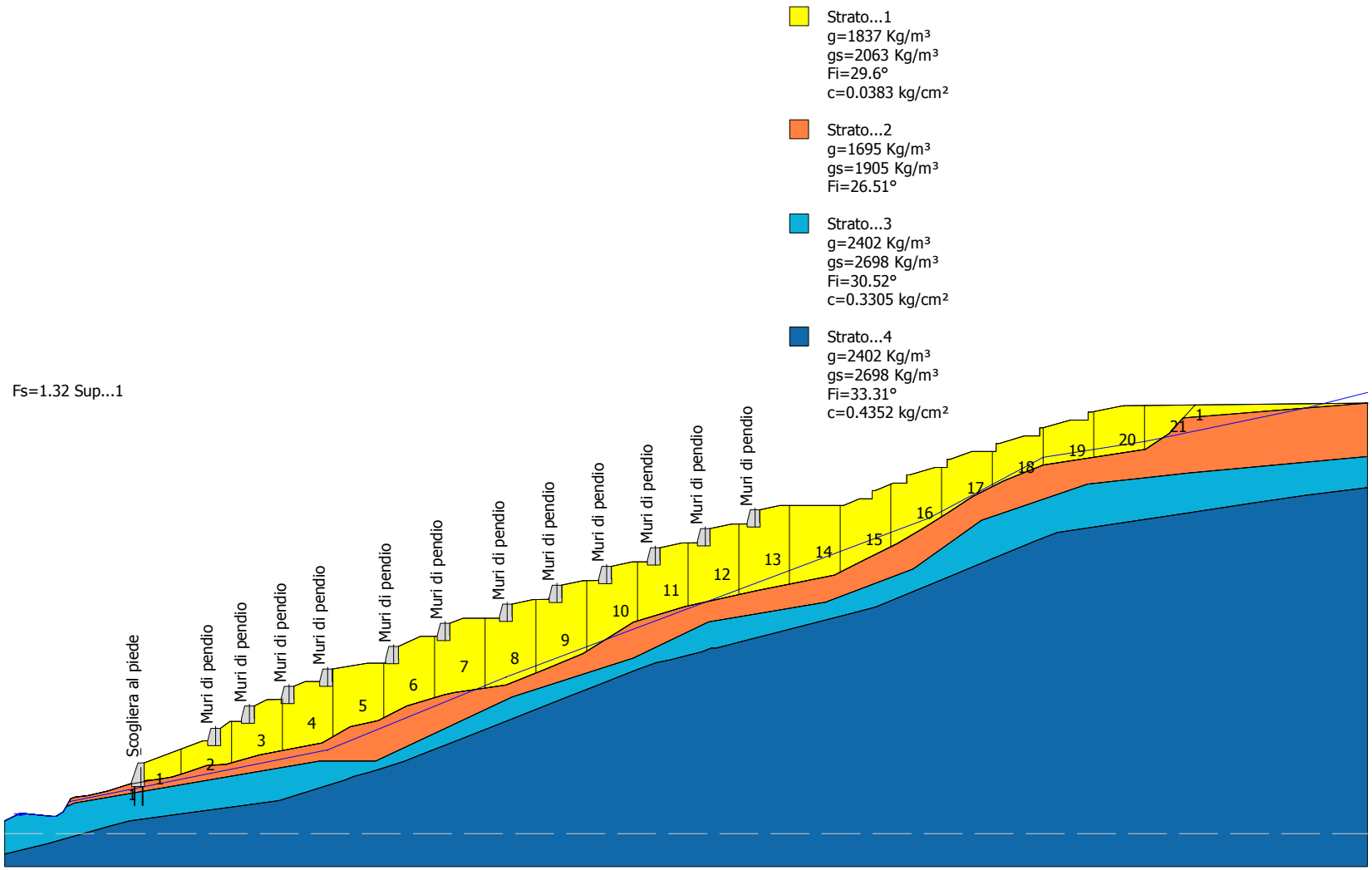
Superficie Nr...1 Fattore di sicurezza=1.32

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	16.14	11.0	16.44	259840.0	8055.04	4157.44	0.03	24.4	0.0	245914.2	98601.6
2	16.14	12.6	16.54	315577.0	9782.89	5049.23	0.0	21.8	0.0	301104.8	102040.0
3	16.14	13.6	16.61	546823.6	16951.53	8749.18	0.0	21.8	0.0	520894.0	177266.7
4	16.14	15.4	16.74	640907.8	19868.14	10254.53	0.03	24.4	0.0	601250.6	239284.3
5	16.14	20.3	17.21	588726.1	18250.51	9419.62	0.0	21.8	0.0	559282.4	197182.6
6	16.14	21.6	17.35	680579.4	21097.96	10889.27	0.0	21.8	0.0	647208.5	230155.9
7	16.14	10.8	16.43	749822.3	23244.49	11997.16	0.0	21.8	0.0	718019.4	241758.6
8	16.14	16.6	16.84	665916.6	20643.41	10654.67	0.03	24.4	1647.7	598674.0	239701.7
9	16.14	23.2	17.56	671742.8	20824.03	10747.89	0.03	24.4	1868.7	599353.9	250440.7
10	16.14	30.9	18.82	715774.1	22189.01	11452.39	0.0	21.8	0.0	696444.1	268533.7
11	16.14	16.6	16.84	681327.8	21121.16	10901.24	0.0	21.8	0.0	647148.9	223352.3
12	16.14	12.5	16.53	738927.9	22906.76	11822.85	0.0	21.8	356.4	699641.8	237031.8
13	16.14	11.7	16.48	825531.8	25591.48	13208.51	0.0	21.8	2964.6	743244.6	251042.9
14	16.14	13.2	16.58	705639.0	21874.81	11290.22	0.03	24.4	5475.3	581663.6	229345.0
15	16.14	26.6	18.05	592622.1	18371.29	9481.95	0.0	21.8	5625.4	481446.4	178019.1
16	16.14	30.5	18.74	565953.6	17544.56	9055.26	0.03	24.4	2904.7	490805.6	220172.4
17	16.14	30.8	18.79	460863.5	14286.77	7373.82	0.0	21.8	1271.3	428204.2	164849.2
18	16.14	22.9	17.53	364731.1	11306.66	5835.7	0.0	21.8	1630.9	322346.8	115758.2
19	16.14	8.8	16.33	392405.9	12164.58	6278.5	0.0	21.8	2523.0	338514.3	113295.9
20	16.14	8.7	16.33	452499.5	14027.48	7239.99	0.0	21.8	2513.4	396600.3	132707.8
21	16.14	41.3	21.5	207911.7	6445.26	3326.59	0.03	24.4	0.0	204382.0	109794.1

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.32

Micropali x=41.22313 Y=10.96872 Plim=515.2 Kg Sbalzo del palo 6.48 m
Micropali x=43.81049 Y=10.96872 Plim=515.2 Kg Sbalzo del palo 6.48 m


Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°
Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.32 Sup...1
Scogliera al piede
Muri di pendio
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ANALISI SUPERFICIE GENERICA 3
Linea separatrice CAPPELLACCIO DI ALTERAZIONE SUBSTRATO ROCCIOSO e strato COLTRE NATURALE

Analisi di stabilità dei pendii con: JANBU (1956)

==========

Lat./Long. 44.417087/9.129564
Normativa NTC 2008
Numero di strati 4.0
Numero dei conci 21.0
Grado di sicurezza ritenuto accettabile 1.1
Coefficiente parziale resistenza 1.1
Analisi Condizione drenata
Superficie di forma generica

==========

Coefficienti sismici [N.T.C.]

==========

Dati generali

Tipo opera: 2 - Opere ordinarie
Classe d'uso: Classe II
Vita nominale: 50.0 [anni]
Vita di riferimento: 50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo: C
Categoria topografica: T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale 0.031
Coefficiente azione sismica verticale 0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.78	12.47
13	44.41	12.47
14	44.41	18.47
15	63.11	25.52
16	68.65	25.52
17	68.65	29.52
18	71.75	31.66
19	75.51	31.66
20	75.86	32.59
21	79.4	32.59
22	79.4	36.59
23	83.49	38.64
24	88.14	38.73
25	88.19	38.85
26	92.03	38.85
27	92.03	42.85
28	95.67	44.37
29	104.28	44.37
30	104.28	48.37
31	115.54	50.26
32	121.1	50.26
33	121.76	51.58
34	125.29	51.58
35	125.29	55.58
36	132.31	58.76
37	137.8	58.76
38	137.9	58.96
39	141.69	58.96
40	141.69	62.96
41	145.87	64.54
42	157.55	64.54
43	157.74	65.05
44	161.48	65.05
45	161.48	69.05
46	168.1	70.49
47	173.12	70.52
48	173.32	71.07
49	177.3	71.07
50	177.3	75.07
51	184.02	76.51
52	189.03	76.54
53	189.23	77.06
54	193.1	77.06
55	193.1	81.06
56	199.73	82.47
57	204.74	82.5
58	204.92	82.98
59	208.56	82.98
60	208.56	86.98
61	215.56	88.51
62	220.57	88.54
63	220.76	89.04
64	224.49	89.04
65	224.49	93.04
66	231.36	94.51
67	236.37	94.54
68	236.56	95.05
69	240.34	95.05
70	240.34	99.05
71	246.76	100.42
72	267.01	100.47

73	272.02	102.54
74	276.14	102.54
75	276.14	105.14
76	277.14	105.14
77	282.79	107.56
78	287.09	107.56
79	287.09	110.16
80	288.09	110.16
81	296.09	112.54
82	299.97	112.54
83	299.97	115.14
84	300.97	115.14
85	307.85	117.6
86	315.6	117.6
87	315.6	120.2
88	316.6	120.2
89	324.51	122.58
90	329.47	122.58
91	329.47	125.18
92	330.47	125.18
93	339.18	127.6
94	344.88	127.6
95	344.88	130.2
96	345.88	130.2
97	355.93	132.19
98	355.93	132.19
99	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	22.6
9	102.8	22.6
10	159.6	45.8
11	159.6	45.8
12	294.28	96.5
13	294.29	96.5
14	330.58	115.8
15	330.6	115.8
16	363.07	120.8
17	363.1	120.8
18	414.33	131.5
19	433.8	136.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15

9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22

20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	20.2	5.8
2	22.25	5.7
3	66.68	13.34
4	100.36	19.1
5	118.09	19.1
6	161.53	39.47
7	200.09	51.87
8	224.02	63.38
9	261.26	69.58
10	289.18	80.21
11	310.9	95.71
12	344.58	107.22
13	363.1	118.29
14	370.6	123.29
15	378.99	132.5

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.41	12.47	0	0.1	6	2	4	2800
2	68.65	25.52	0	0.1	4	3	4	2800
3	79.4	32.59	0	0.1	4	3	4	2800
4	92.03	38.85	0	0.1	4	3	4	2800
5	104.28	44.37	0	0.1	4	3	4	2800
6	125.29	51.58	0	0.1	4	3	4	2800
7	141.69	58.96	0	0.1	4	3	4	2800
8	161.48	65.05	0	0.1	4	3	4	2800
9	177.3	71.07	0	0.1	4	3	4	2800
10	193.1	77.06	0	0.1	4	3	4	2800
11	208.56	82.98	0	0.1	4	3	4	2800
12	224.49	89.04	0	0.1	4	3	4	2800
13	240.34	95.05	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.22313	10.96872	0.2	6	90	3.6
2	43.81049	10.96872	0.2	6	90	3.6

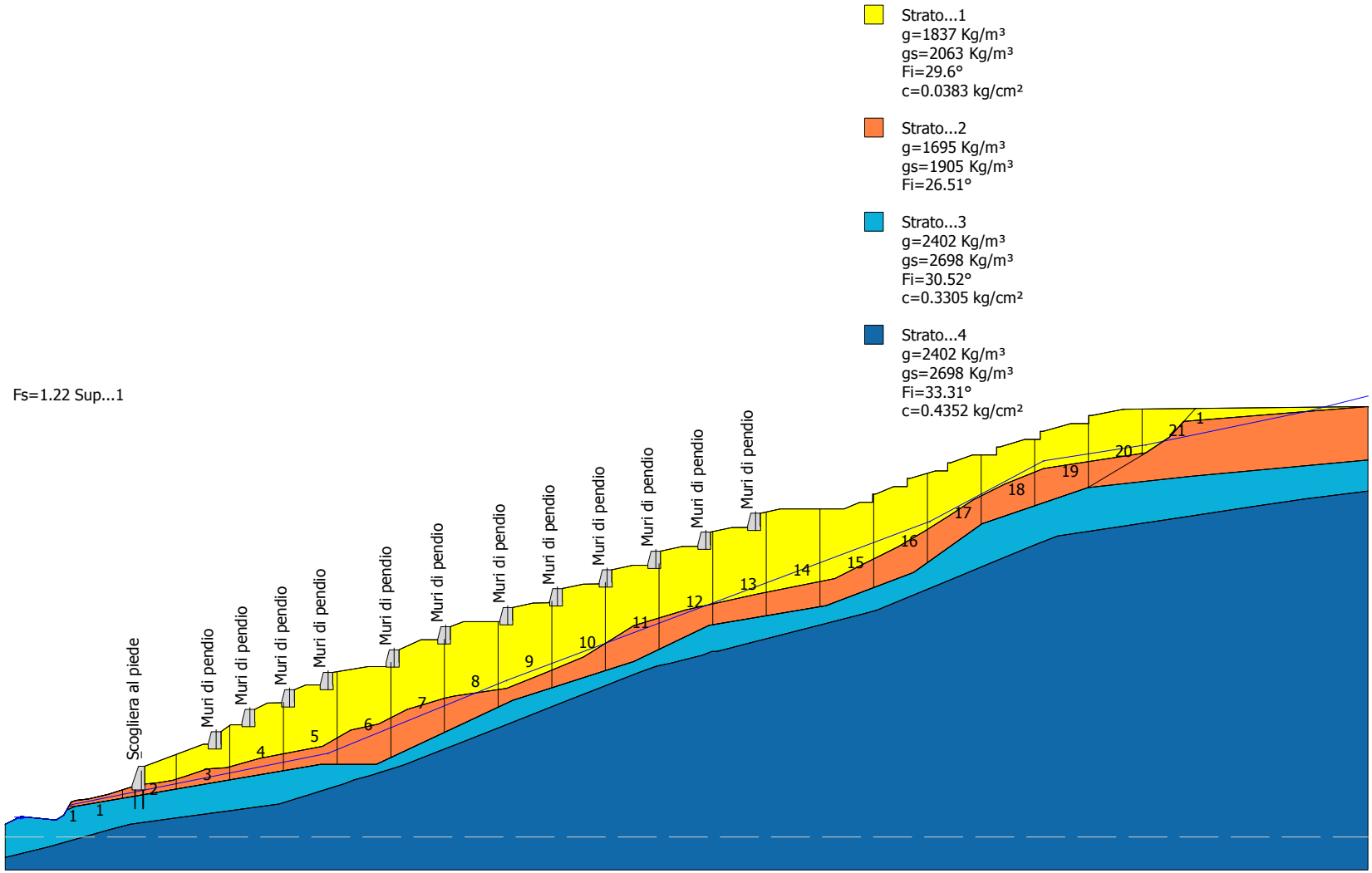
Superficie Nr...1 Fattore di sicurezza=1.22

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	17.08	8.4	17.26	48461.04	1502.29	775.38	0.0	21.8	720.5	34724.1	12532.3
2	17.08	9.8	17.33	355231.2	11012.17	5683.7	0.26	25.2	1423.9	306479.6	172841.6
3	17.08	9.7	17.33	453149.7	14047.64	7250.4	0.26	25.2	1914.8	391214.1	209115.3
4	17.08	9.7	17.33	720143.9	22324.46	11522.3	0.26	25.2	2413.8	635872.8	313838.3
5	17.08	6.7	17.2	884277.4	27412.61	4148.44	0.26	25.2	3373.0	788403.4	375992.7
6	17.08	7.3	17.22	935587.6	29003.21	14969.4	0.0	21.8	7070.8	785563.8	282801.3
7	17.08	25.1	18.86	1094145.0	33918.48	17506.31	0.0	21.8	8948.7	890553.1	351226.8
8	17.08	25.1	18.86	1044794.0	32388.61	16716.71	0.26	25.2	7916.0	821203.1	432070.3
9	17.08	19.9	18.16	1002362.0	31073.21	16037.79	0.26	25.2	7613.3	791336.4	400792.4
10	17.08	17.8	17.94	1010981.0	31340.42	16175.7	0.0	21.8	8210.1	820469.9	307750.9
11	17.08	21.6	18.37	1005086.0	31157.67	16081.38	0.0	21.8	8505.3	810244.3	311264.3
12	17.08	24.6	18.79	970719.6	30092.31	15531.51	0.26	25.2	7628.4	757589.6	400682.9
13	17.08	9.5	17.31	997235.5	30914.3	15955.77	0.26	25.2	8717.8	797195.5	382593.1
14	17.08	9.5	17.31	1048845.0	32514.2	16781.52	0.26	25.2	12303.6	788074.3	378690.7
15	17.08	19.7	18.13	928673.3	28788.87	14858.77	0.0	21.8	14261.4	645212.6	244646.1
16	17.08	25.0	18.84	912429.8	28285.32	14598.88	0.0	21.8	13664.8	642276.1	252989.4
17	17.08	35.5	20.98	836383.8	25927.9	13382.14	0.26	25.2	11229.1	581395.8	362418.0
18	17.08	19.2	18.08	721983.1	22381.48	11551.73	0.26	25.2	11245.6	476267.4	258116.8
19	17.08	19.0	18.06	723418.9	22425.98	11574.7	0.0	21.8	12276.3	483869.9	182752.3
20	17.08	30.9	19.9	618211.3	19164.55	9891.38	0.0	21.8	6859.1	481078.8	200133.3
21	17.08	41.1	22.66	230815.1	7155.27	3693.04	0.03	24.4	0.0	222084.0	128092.0

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.22

Micropali x=41.22313 Y=10.96872 Plim=23292.0 Kg Sbalzo del palo 9.25 m
Micropali x=43.81049 Y=10.96872 Plim=23292.0 Kg Sbalzo del palo 9.25 m


Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°
Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.22 Sup...1
Scogliera al piede
Muri di pendio
Muri di pendio
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Muri di pendio
Muri di pendio
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ANALISI SUPERFICIE GENERICA 4
Linea separatrice SUBSTRATO ROCCIOSO e strato CAPPELLACCIO DI ALTERAZIONE SUBSTRATO ROCCIOSO

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	23.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99
12	40.78	12.47

13	44.41	12.47
14	44.41	18.47
15	63.11	25.52
16	68.65	25.52
17	68.65	29.52
18	71.75	31.66
19	75.51	31.66
20	75.86	32.59
21	79.4	32.59
22	79.4	36.59
23	83.49	38.64
24	88.14	38.73
25	88.19	38.85
26	92.03	38.85
27	92.03	42.85
28	95.67	44.37
29	104.28	44.37
30	104.28	48.37
31	115.54	50.26
32	121.1	50.26
33	121.76	51.58
34	125.29	51.58
35	125.29	55.58
36	132.31	58.76
37	137.8	58.76
38	137.9	58.96
39	141.69	58.96
40	141.69	62.96
41	145.87	64.54
42	157.55	64.54
43	157.74	65.05
44	161.48	65.05
45	161.48	69.05
46	168.1	70.49
47	173.12	70.52
48	173.32	71.07
49	177.3	71.07
50	177.3	75.07
51	184.02	76.51
52	189.03	76.54
53	189.23	77.06
54	193.1	77.06
55	193.1	81.06
56	199.73	82.47
57	204.74	82.5
58	204.92	82.98
59	208.56	82.98
60	208.56	86.98
61	215.56	88.51
62	220.57	88.54
63	220.76	89.04
64	224.49	89.04
65	224.49	93.04
66	231.36	94.51
67	236.37	94.54
68	236.56	95.05
69	240.34	95.05
70	240.34	99.05
71	246.76	100.42
72	267.01	100.47
73	272.02	102.54
74	276.14	102.54
75	276.14	105.14

76	277.14	105.14
77	282.79	107.56
78	287.09	107.56
79	287.09	110.16
80	288.09	110.16
81	296.09	112.54
82	299.97	112.54
83	299.97	115.14
84	300.97	115.14
85	307.85	117.6
86	315.6	117.6
87	315.6	120.2
88	316.6	120.2
89	324.51	122.58
90	329.47	122.58
91	329.47	125.18
92	330.47	125.18
93	339.18	127.6
94	344.88	127.6
95	344.88	130.2
96	345.88	130.2
97	355.93	132.19
98	355.93	132.19
99	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	20.1
9	102.8	20.1
10	159.6	43.29
11	159.6	43.29
12	294.28	93.94
13	294.29	93.95
14	330.58	113.29
15	330.6	113.29
16	363.07	118.29
17	363.1	118.29
18	414.33	131.4 6

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21

14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	17.16	2.07
2	26.86	0.43

3	39.85	0.02
4	54.66	2.02
5	70.5	4.15
6	87.26	6.45
7	90.23	7.38
8	93.4	8.38
9	96.57	9.37
10	100.79	10.7
11	108.18	13.01
12	111.13	14.19
13	115.57	15.33
14	117.58	15.96
15	119.26	16.49
16	124.31	18.08
17	127.17	18.98
18	131.46	20.67
19	138.89	23.6
20	144.47	25.8
21	150.88	28.32
22	155.61	30.19
23	163.73	33.38
24	171.63	36.49
25	179.77	39.7
26	185.34	41.9
27	192.38	44.67
28	194.63	45.56
29	202.06	48.48
30	207.37	50.36
31	212.01	51.32
32	216.59	52.5
33	222.0	53.88
34	224.95	55.07
35	226.44	55.02
36	230.89	56.16
37	236.44	57.58
38	243.1	59.29
39	251.98	61.57
40	265.52	65.03
41	273.41	67.06
42	277.44	68.18
43	285.22	71.4
44	299.4	77.28
45	308.54	81.07
46	314.66	83.6
47	327.98	89.12
48	334.95	91.81
49	357.78	100.53
50	380.61	112.19
51	405.32	128.03
52	413.36	132.85

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.41	12.47	0	0.1	6	2	4	2800
2	68.65	25.52	0	0.1	4	3	4	2800
3	79.4	32.59	0	0.1	4	3	4	2800
4	92.03	38.85	0	0.1	4	3	4	2800
5	104.28	44.37	0	0.1	4	3	4	2800
6	125.29	51.58	0	0.1	4	3	4	2800
7	141.69	58.96	0	0.1	4	3	4	2800
8	161.48	65.05	0	0.1	4	3	4	2800
9	177.3	71.07	0	0.1	4	3	4	2800
10	193.1	77.06	0	0.1	4	3	4	2800
11	208.56	82.98	0	0.1	4	3	4	2800
12	224.49	89.04	0	0.1	4	3	4	2800
13	240.34	95.05	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.22313	10.96872	0.2	6	90	3.6
2	43.81049	10.96872	0.2	6	90	3.6

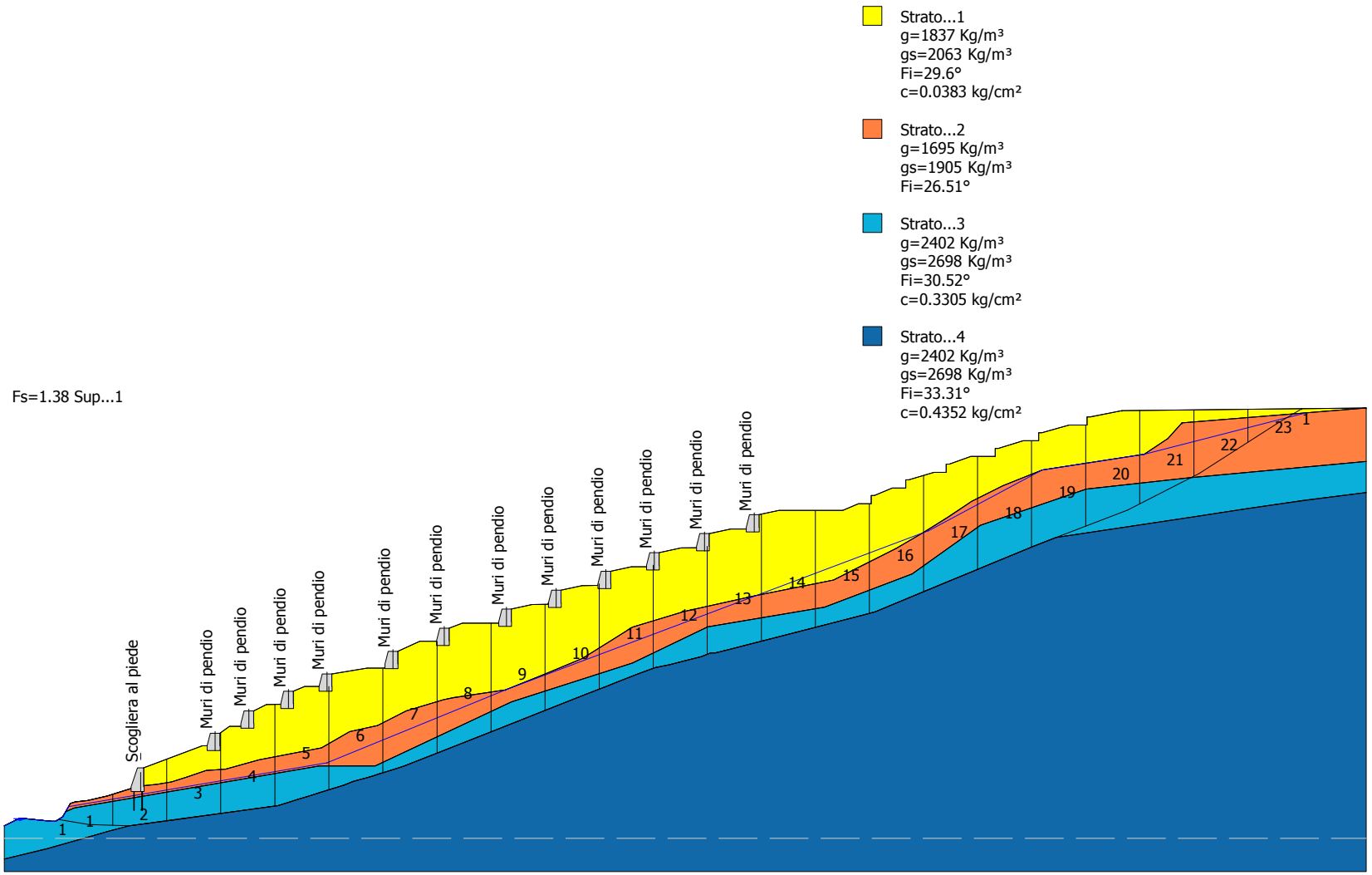
Superficie Nr...1 Fattore di sicurezza=1.38

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	17.22	-6.1	17.32	294055.1	9115.71	4704.88	0.26	25.2	5895.6	205794.8	113236.4
2	17.22	4.7	17.28	551722.3	17103.39	8827.56	0.26	25.2	9037.3	382687.6	178870.2
3	17.22	7.7	17.37	875354.0	27135.97	14005.67	0.35	27.7	0.0	830530.9	395335.3
4	17.22	7.8	17.38	1065219.0	33021.81	7043.51	0.26	25.2	10684.1	841640.3	352341.4
5	17.22	16.8	17.99	1291631.0	40040.55	20666.1	0.26	25.2	9828.4	1043923.0	444582.3
6	17.22	17.4	18.04	1183116.0	36676.61	8929.86	0.35	27.7	0.0	1083577.0	522462.1
7	17.22	20.0	18.32	1292242.0	40059.48	20675.87	0.26	25.2	10840.8	1024106.0	445727.0
8	17.22	21.5	18.5	1341890.0	41598.59	21470.24	0.26	25.2	11348.6	1061612.0	465583.1
9	17.22	21.5	18.5	1306222.0	40492.89	20899.56	0.26	25.2	11467.0	1026263.0	451460.4
10	17.22	21.5	18.5	1272828.0	39457.67	20365.25	0.26	25.2	11159.6	999916.9	440934.7
11	17.22	21.0	18.44	1235263.0	38293.14	19764.21	0.35	27.7	0.0	1124859.0	553318.6
12	17.22	14.7	17.8	1295034.0	40146.07	20720.55	0.26	25.2	11856.1	1018662.0	429900.8
13	17.22	13.5	17.71	1376136.0	42660.21	22018.18	0.26	25.2	13998.2	1063589.0	444558.2
14	17.22	14.4	17.77	1362368.0	42233.41	21797.89	0.35	27.7	0.0	1260095.0	589343.8
15	17.22	14.5	17.78	1226725.0	38028.47	19627.6	0.26	25.2	18237.4	851295.1	365175.6
16	17.22	21.8	18.54	1279009.0	39649.27	20464.14	0.26	25.2	19043.5	878365.4	393194.6
17	17.22	22.5	18.64	1344223.0	41670.91	21507.57	0.35	27.7	0.0	1223752.0	604232.9
18	17.22	22.5	18.64	1325191.0	41080.93	21203.06	0.26	25.2	21664.8	879193.9	395801.5
19	17.22	21.1	18.45	1283814.0	39798.23	20541.02	0.26	25.2	21984.2	835700.1	374065.3
20	17.22	22.3	18.61	1178945.0	36547.29	18863.12	0.26	25.2	17781.6	804758.1	365360.7
21	17.22	27.0	19.33	856224.8	26542.97	13699.6	0.26	25.2	13236.5	575665.8	285449.0
22	17.22	32.1	20.33	498571.7	15455.72	7977.15	0.0	21.8	7860.9	358176.6	133027.8
23	17.22	31.9	20.28	164057.6	5085.79	2624.92	0.0	21.8	1522.9	135767.1	50288.1

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.38

Micropali x=41.22313 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali x=43.81049 Y=10.96872 Plim=0.0 Kg Sbalzo del palo 0.00 m


Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°
Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.38 Sup...1
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio