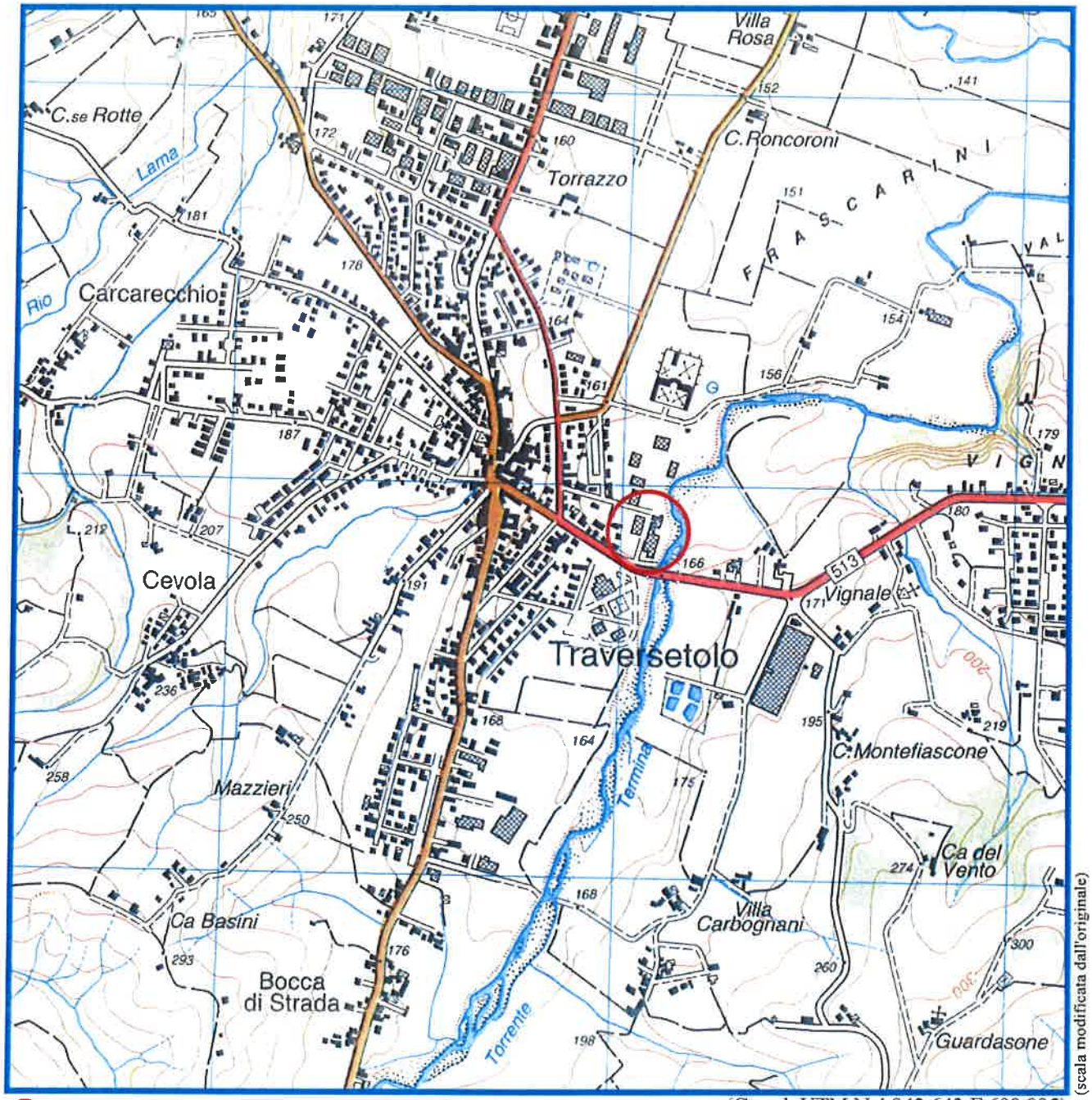
TAVOLE


ORDINE DEI GEOLOGI REGIONE EMILIA ROMAGNA
DOTT. LUCA CALZOLARI
GEOLOGO
SEZ.A
N. 899 ALBO P.

Tavola I

STRALCIO CARTA TOPOGRAFICA REGIONALE
BIBBIANO
Tavola 200 - SO
scala 1:25.000



(scala modificata dall'originale)

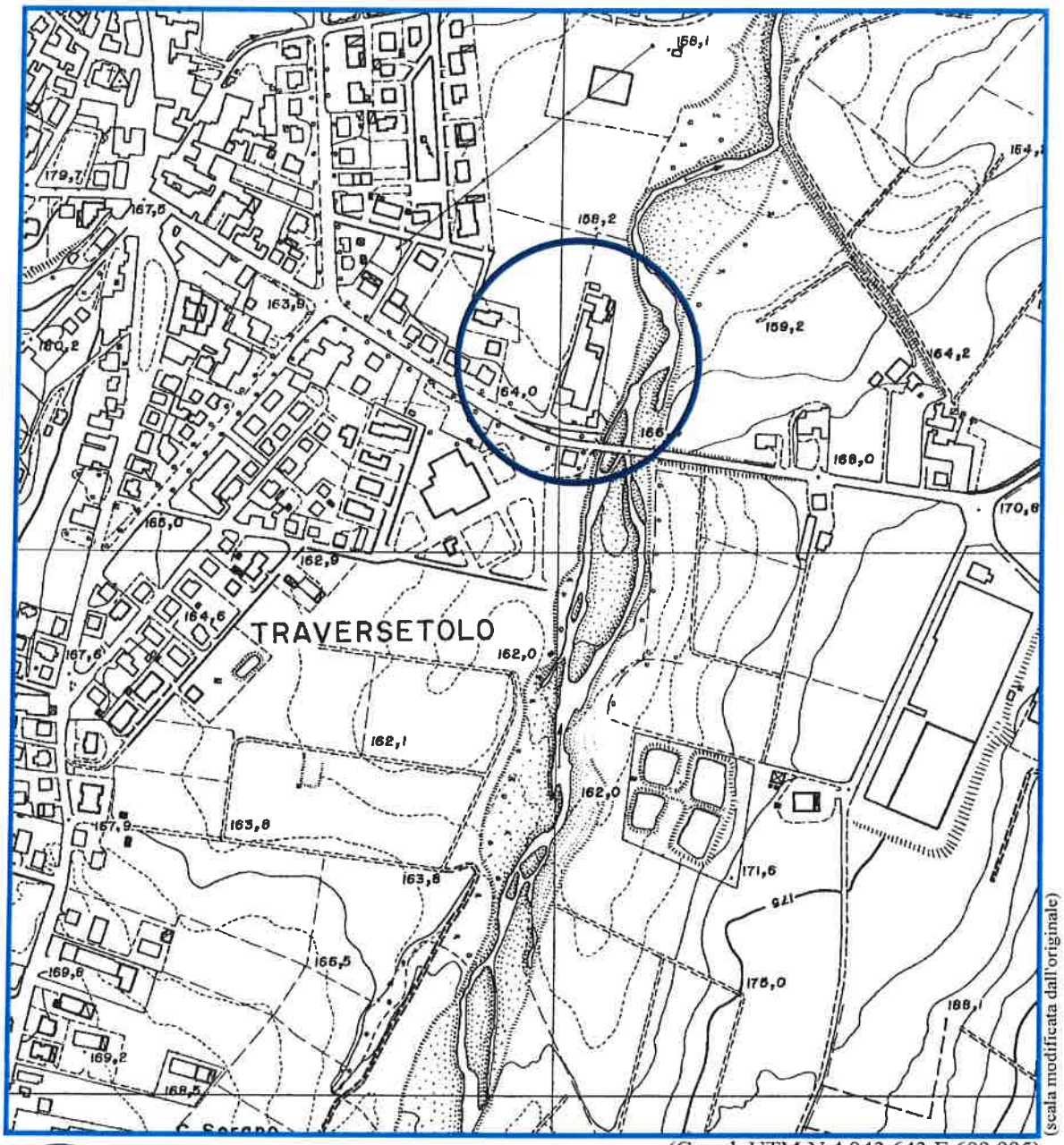
Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898°)

43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Tavola I bis

STRALCIO CARTA TECNICA REGIONALE
BIBBIANO
Foglio 200 - SO Elemento 131
scala 1:5.000



(scala modificata dall'originale)

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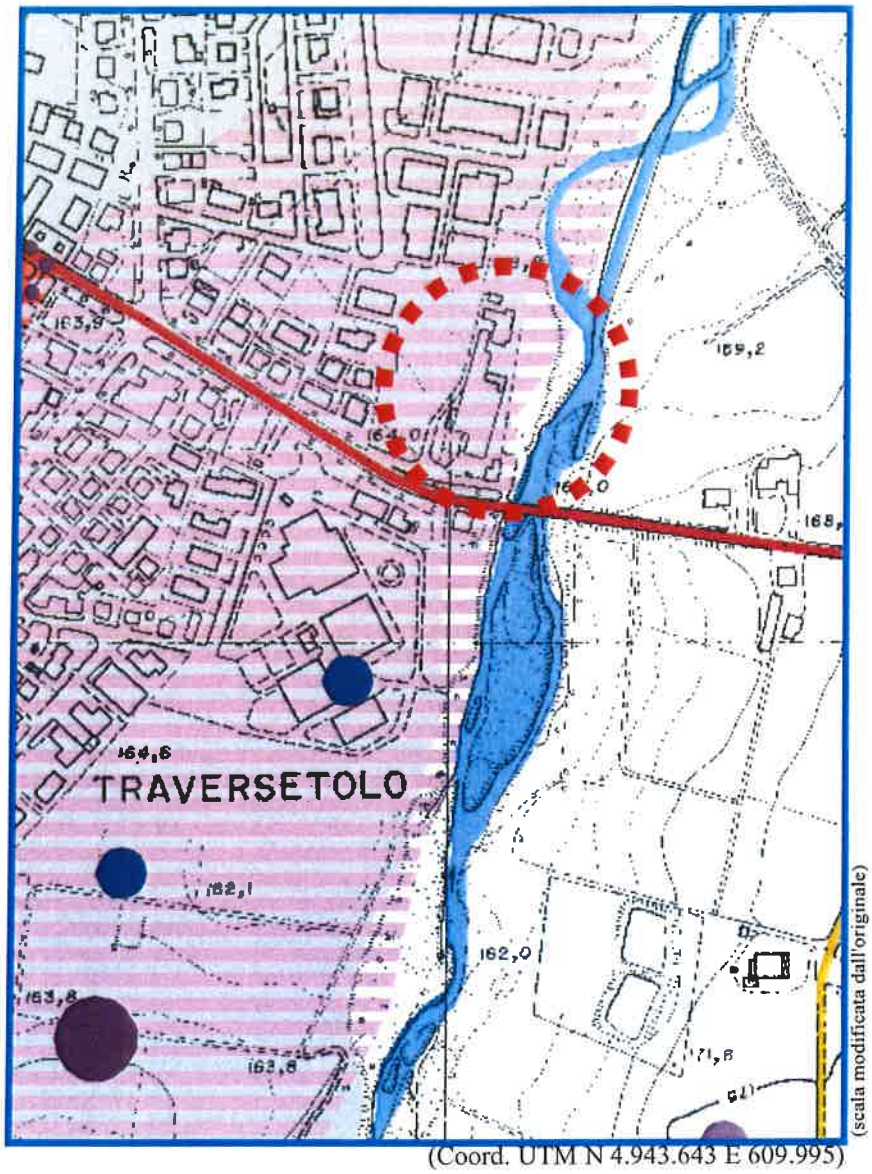
Tavola IIa

STRALCIO PSC

Comune di Traversetolo

- Tutela degli elementi storici e archeologici -



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Area di ubicazione opera in progetto

Aree a potenziale rischio archeologico (Art.10.31)

- Rischio di livello A
- Rischio di livello A in aree urbane storiche
- Rischio di livello A/C
- Rischio di livello B
- Rischio di livello C
- Rischio di livello C

Viabilità storica (Art.10.30)

- di epoca romana
- di epoca medioevale
- di epoca successiva (CM 1881)

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MaC *Studio Associato*

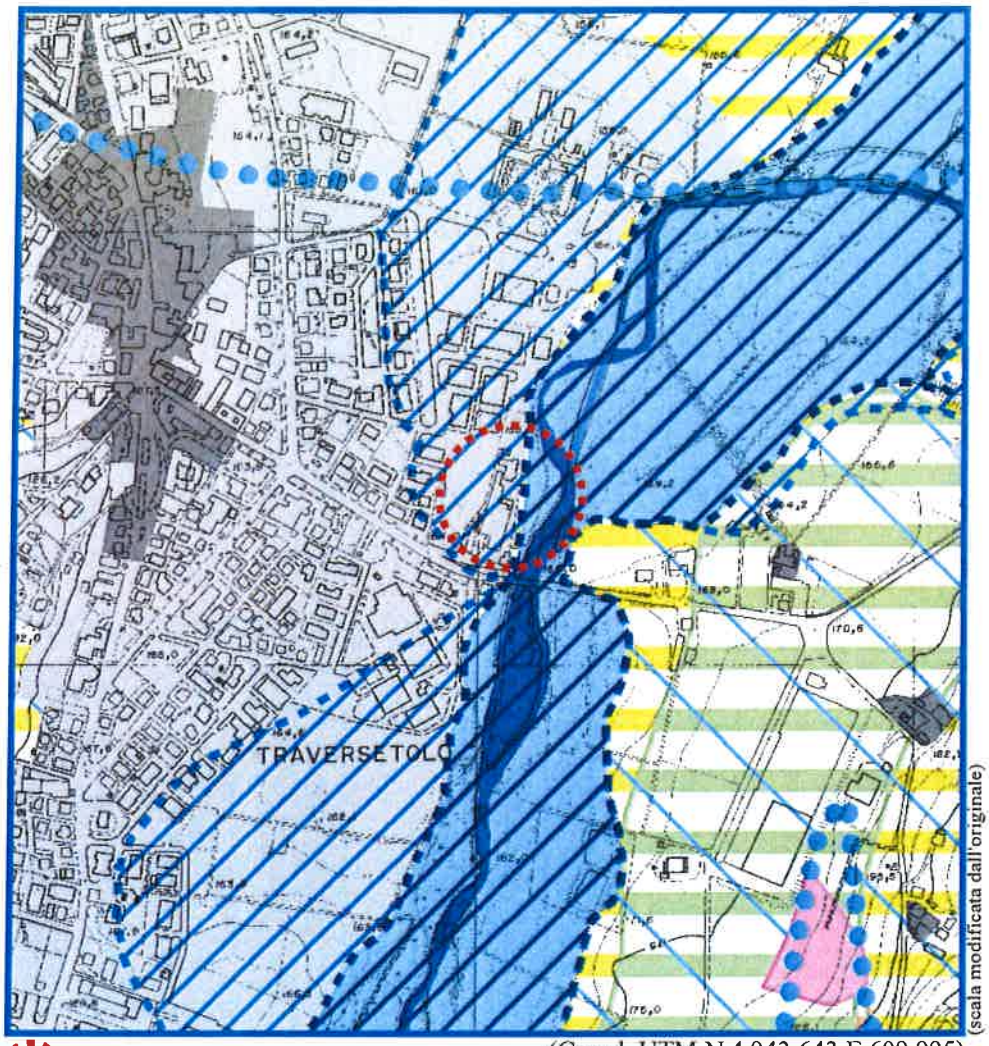
di geol. Luca Calzolari
geom. Massimo Marchesi
arch. Paolo Montanari

Tavola IIb

STRALCIO PSC

Comune di Traversetolo

- Tutela delle risorse idriche, assetto idrogeologico e stabilità dei versanti -



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Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898°)

LEGENDA

- Zone di tutela ambientale ed idraulica dei corsi d'acqua (Art.10.15)
- Zona di deflusso della piena - fascia A (Art.10.16)
- Invasi ed alvei di laghi, bacini e corsi d'acqua (Art.10.17)
- Area di inondazione per piena catastrofica - fascia C (Art.10.18)

Zone di tutela dei corpi idrici superficiali e sotterranei (Art.10.19)

- Bacini drenanti direttamente su aree vulnerabili
- Vulnerabilità a sensibilità elevata
- Vulnerabilità a sensibilità attenuata
- Area di ricarica degli acquiferi

- Pozzi per la captazione di acque destinate al consumo umano

Rispetto ai punti di captazione di acque destinate al consumo umano (Art.10.37)

- Fascia di rispetto ristretta
- Fascia di rispetto allargata

- Tessuti urbanizzati di antico impianto
- Tessuti urbanizzati di impianto recente
- Confine Comunale
- Corsi d'acqua

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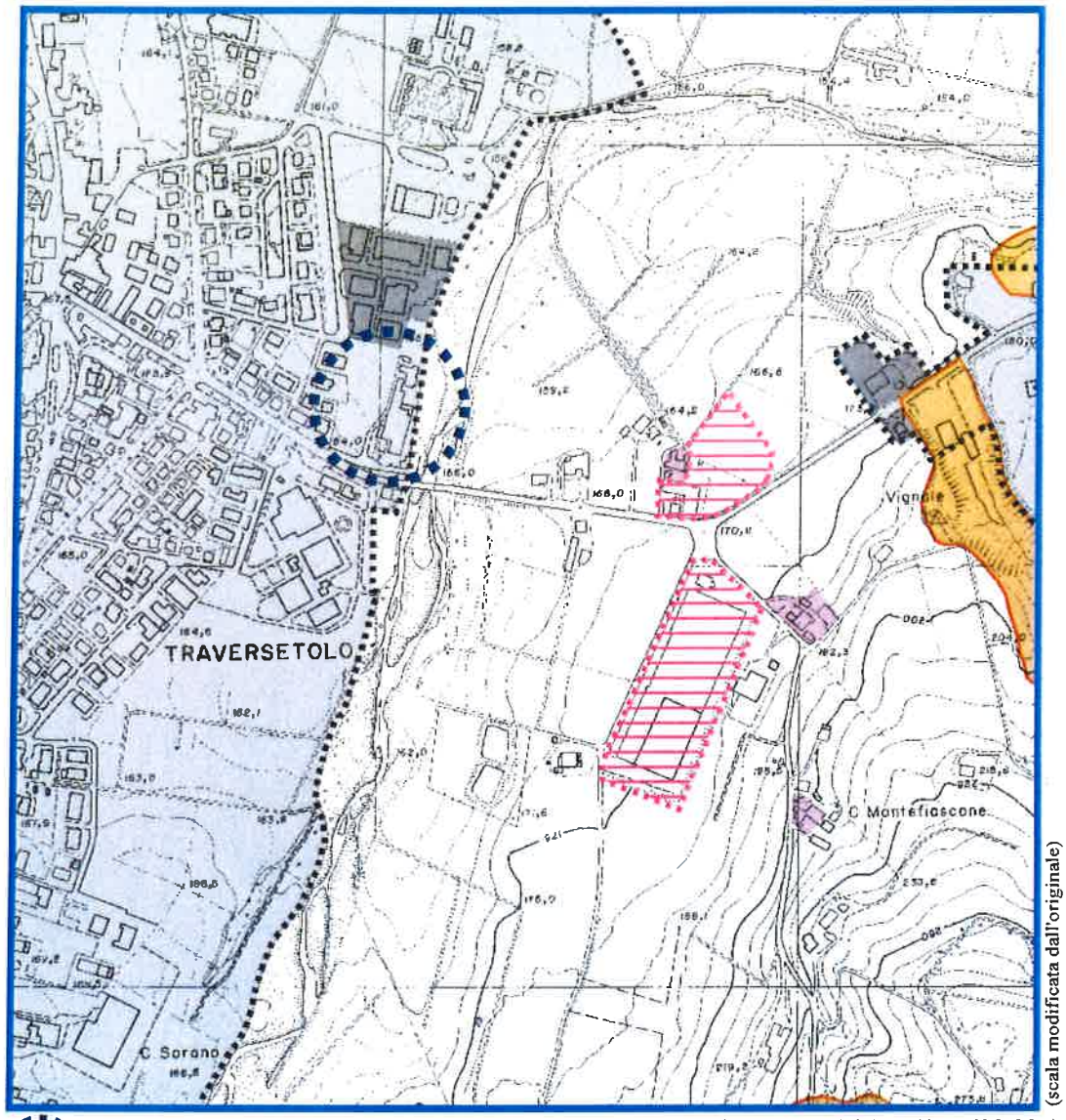
Tavola IIc
STRALCIO PSC
Comune di Traversetolo
- Vincolo idrogeologico -



(scala modificata dall'originale)

Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898)

LEGENDA

Aree soggette a vincolo idrogeologico (Art.10.40)

Confine Comunale

Territorio urbanizzato

Territorio urbanizzabile

Ambiti specializzati per attività produttive esistenti

Ambiti specializzati per attività produttive di sviluppo

Ambiti di riqualificazione in territorio rurale

Nuclei rurali di antico insediamento

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MaC Studio Associato

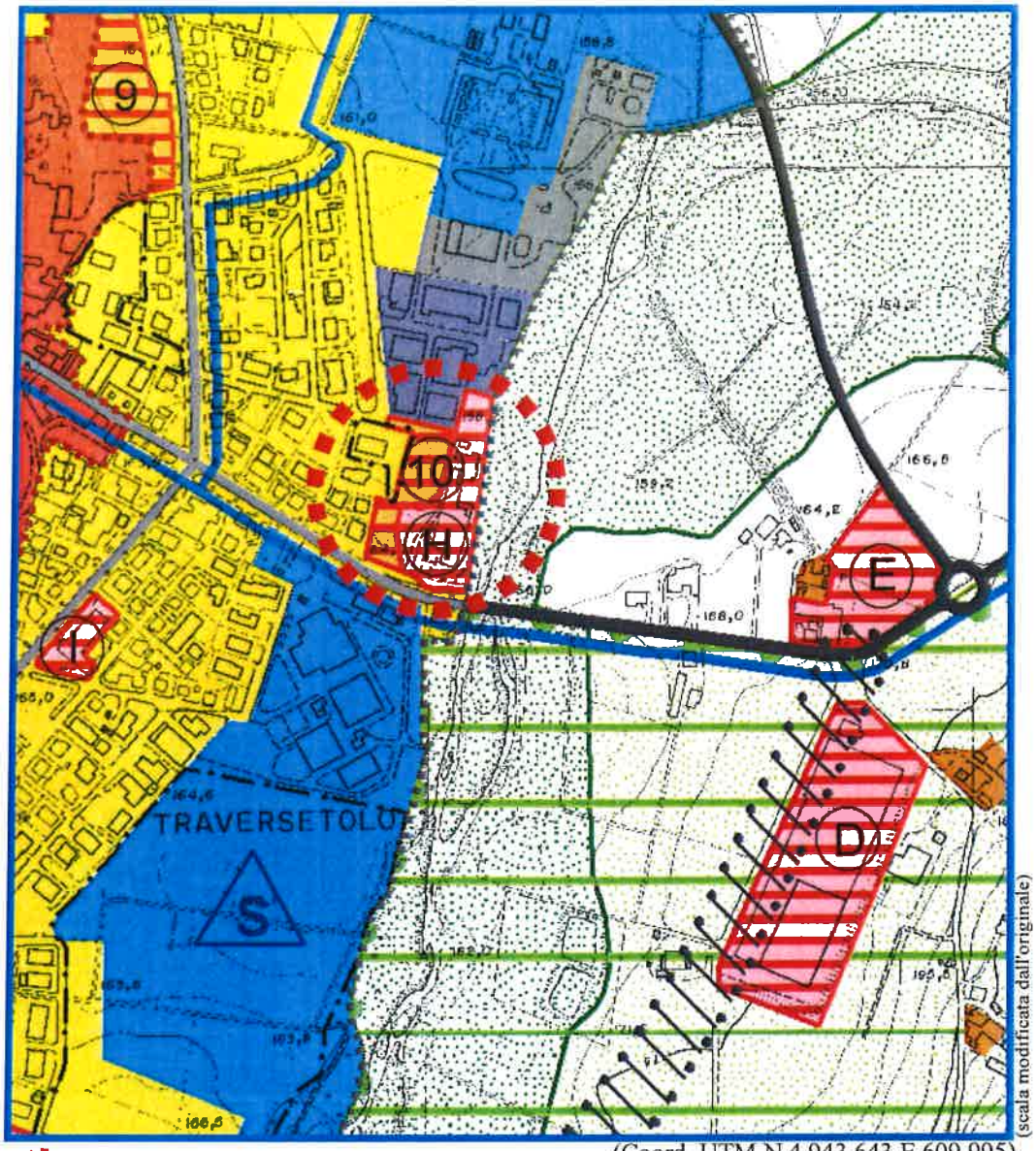
di geol. Luca Calzolari
geom. Massimo Marchesi
arch. Paolo Montanari

Tavola IId

STRALCIO PSC

Comune di Traversetolo

- Trasformazioni territoriali -



(scala modificata dall'originale)

Area di ubicazione opera in progetto

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TERRITORIO URBANIZZATO

- Ambiti urbani consolidati - AC
- Ambiti urbani consolidati interessati da Piani Attuativi convenzionati - AC*
- Ambiti di riqualificazione e trasformazione funzionale - ART*

TERRITORIO URBANIZZABILE

- Ambiti per nuovi insediamenti già previsti dal P.R.G. previgente confermati - ANC
- Ambiti per i nuovi insediamenti - AN
- Ambiti di riqualificazione e trasformazione funzionale - ART**

SISTEMA DELLE DOTAZIONI TERRITORIALI

Infrastrutture per l'urbanizzazione degli insediamenti

- Attrezzature tecnologiche

Aree per attrezzature e spazi collettivi di rilievo sovracomunale

- Centro culturale "Villa Magnani Rocca"
- Centro sportivo "Lido Valtermina"
- Cimitero

TERRITORIO RURALE

Ambiti agricoli

- Ambiti ad alta vocazione produttiva agricola
- Ambiti agricoli di rilievo paesaggistico
- Ambiti agricoli di valore naturale e ambientale

Ambiti per la valorizzazione fruitiva del territorio rurale

- Campagna Parco

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Tavola II bis

STRALCIO ELABORATO PLANIMETRICO

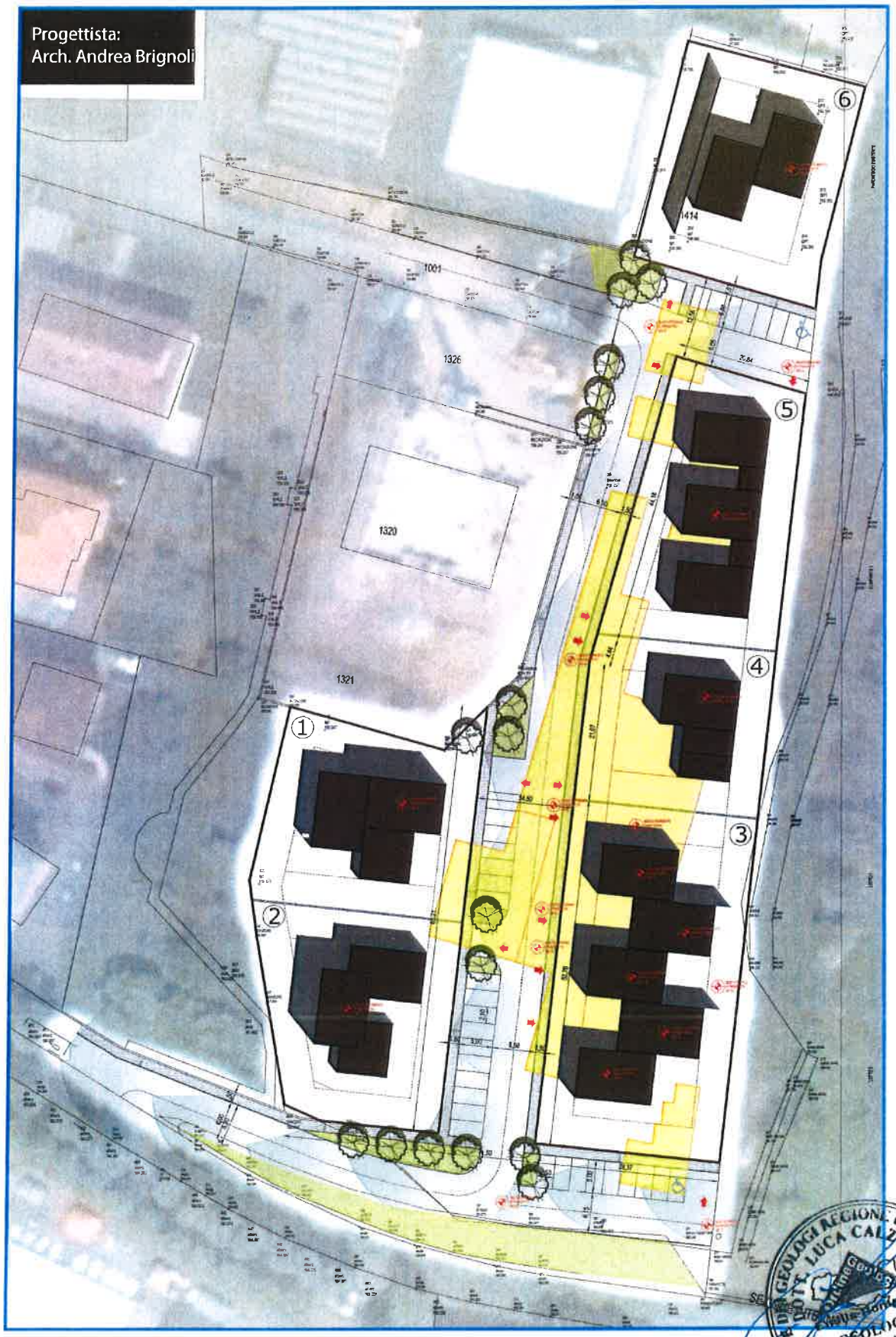

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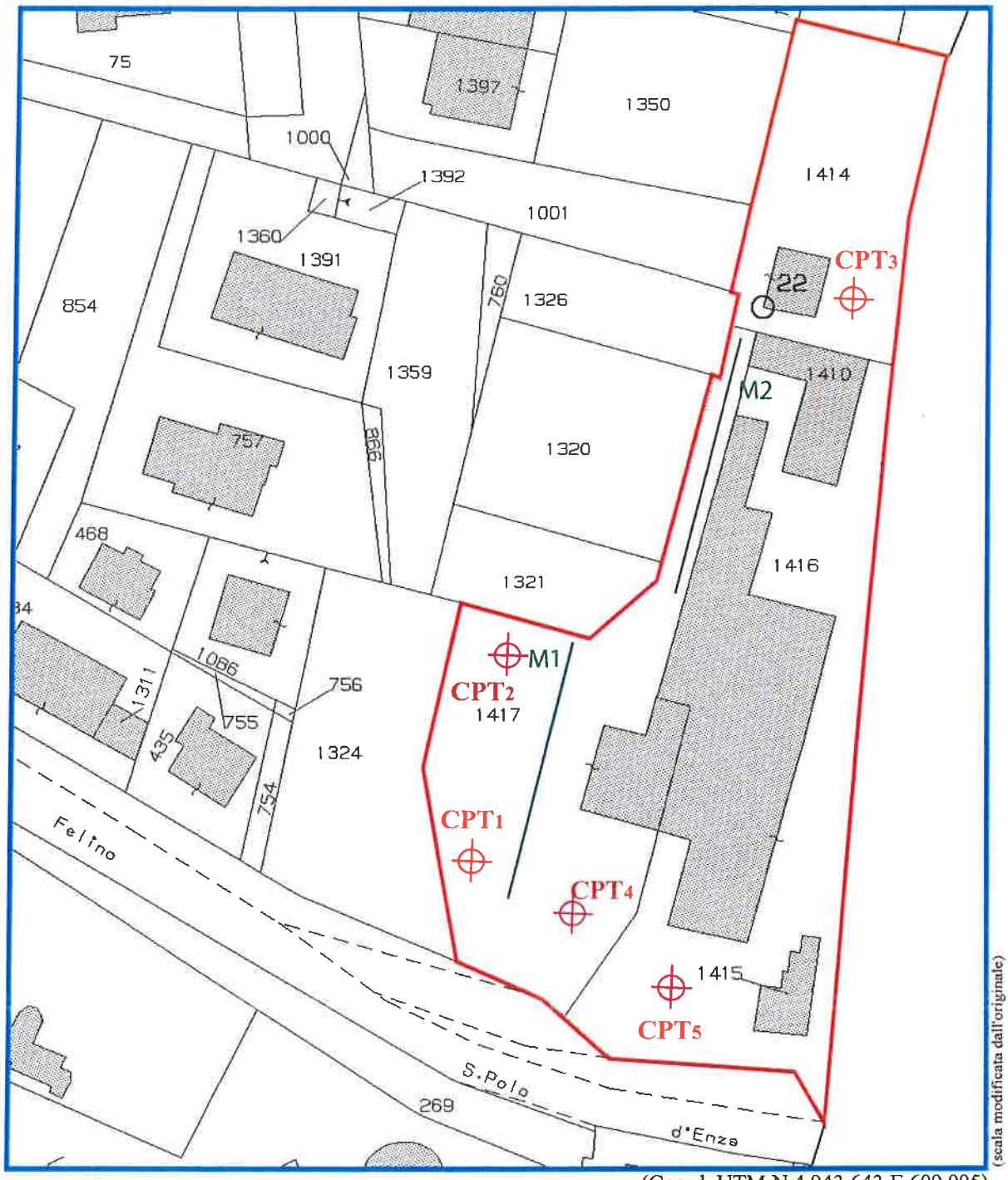
Tavola III

STRALCIO PLANIMETRIA CATASTALE
N.C.T. Comune di Traversetolo
Foglio 24 Mappali 1410 - 1414 -1415 - 1416 - 1417
Scala 1:2000



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Area di ubicazione opere in progetto

CPT1 : Ubicazione prova penetrometrica di tipo statico

M1 : Ubicazione stendimento prova geofisica di tipo MASW

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Tavola III bis

CARTA DI SINTESI MICROZONAZIONE SISMICA
P.U.A. Area ex "For Lady"
scala 1:2.000

Capitolo 4 dell'Allegato A agli Atto di indirizzo e coordinamento tecnico ai sensi dell'art. 16, c. 1, della L. R. 20/2000 per "Indirizzi per gli studi di microzonazione sismica in Emilia-Romagna per la pianificazione territoriale e urbanistica" (Delibera Regione Emilia Romagna Prog. N. 112, oggetto n. 2131 del 2 maggio 2007)

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Area di studio indagata, considerata omogenea in termini di microzonazzione sis
sulla base delle analoghe condizioni geologico-geotecniche esistenti,
così come per l'analoga risposta sismica locale:

- Categoria di sottosuolo "B" (D.M. 14/01/2008 – Tabella 3.2.II)
- Condizioni topografiche categoria T1 (D.M. 14/01/2008 – Tabella 3.2.IV)

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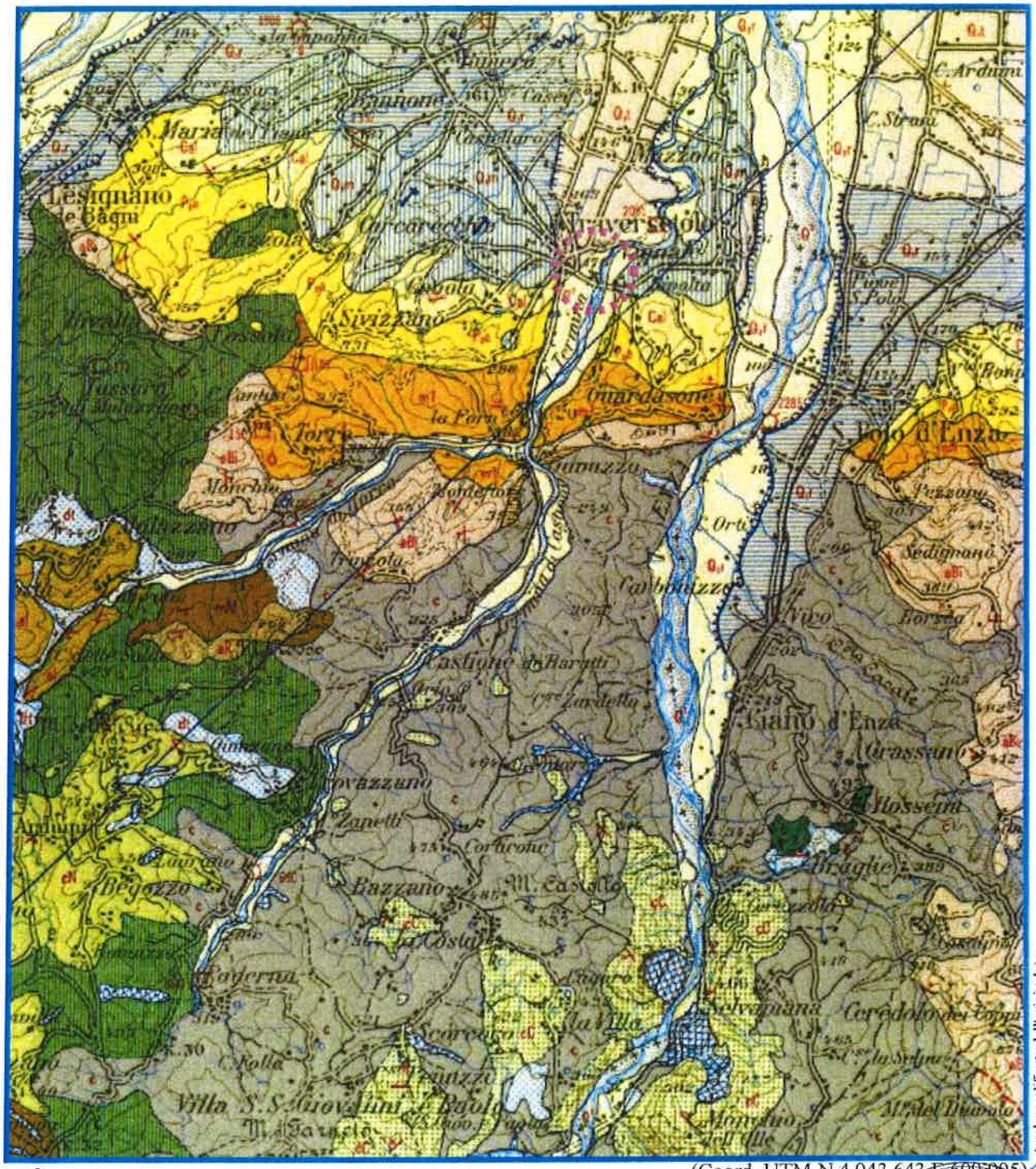
Tavola IV

STRALCIO CARTA GEOLOGICA D'ITALIA
-Foglio 85-
CASTELNUOVO NEI MONTI
scala 1:100.000



(scala modificata dall'originale)

Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Long. 10.364998°)

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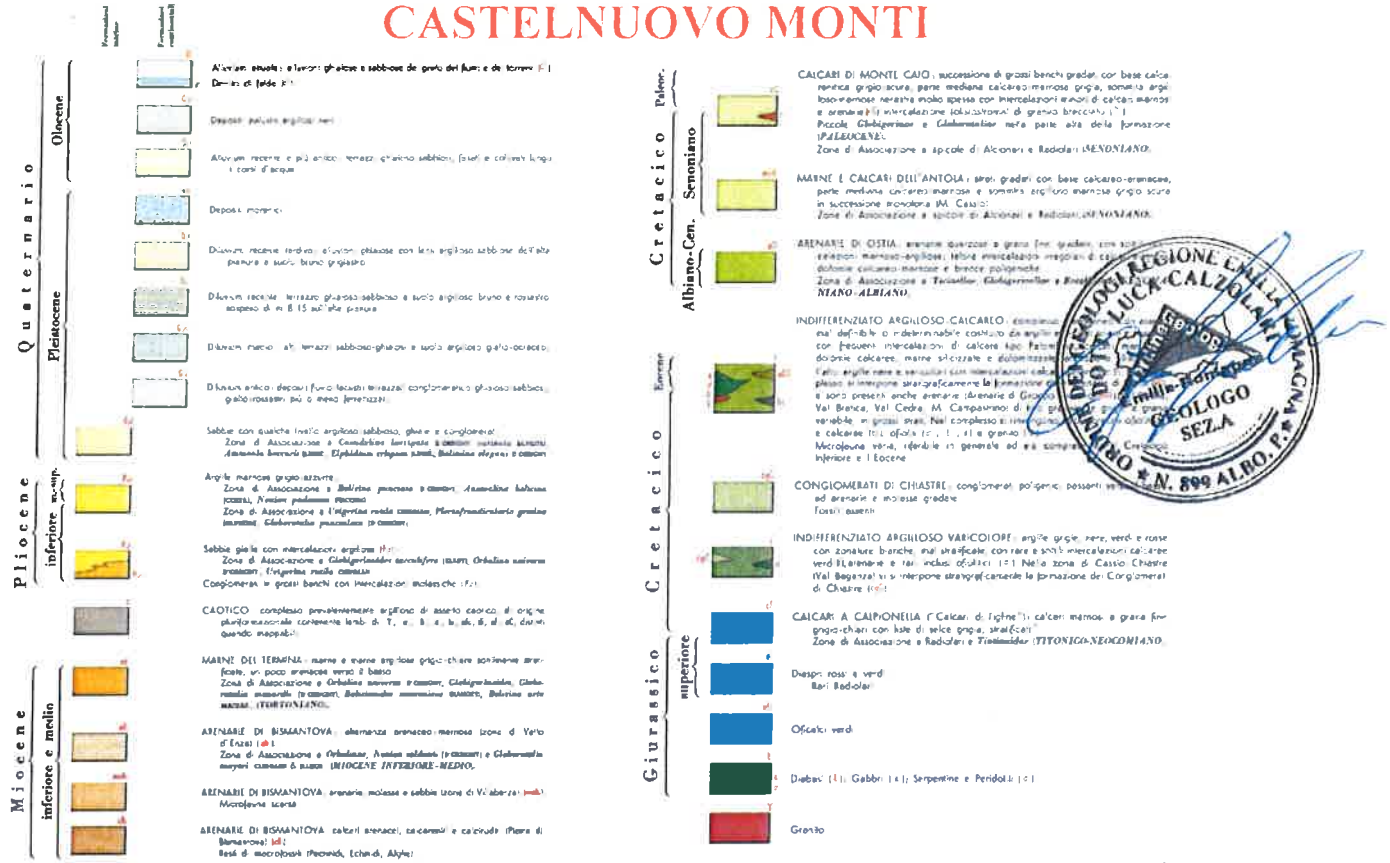
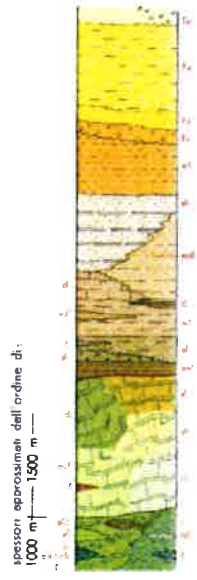
LEGENDA CARTA GEOLOGICA D'ITALIA
Foglio 85
CASTELNUOVO MONTI



Schema dei rapporti stratigrafici e spessori indicativi delle formazioni



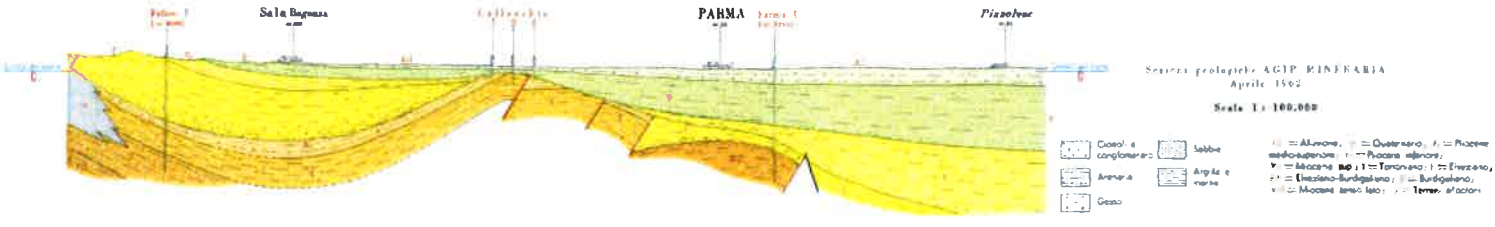
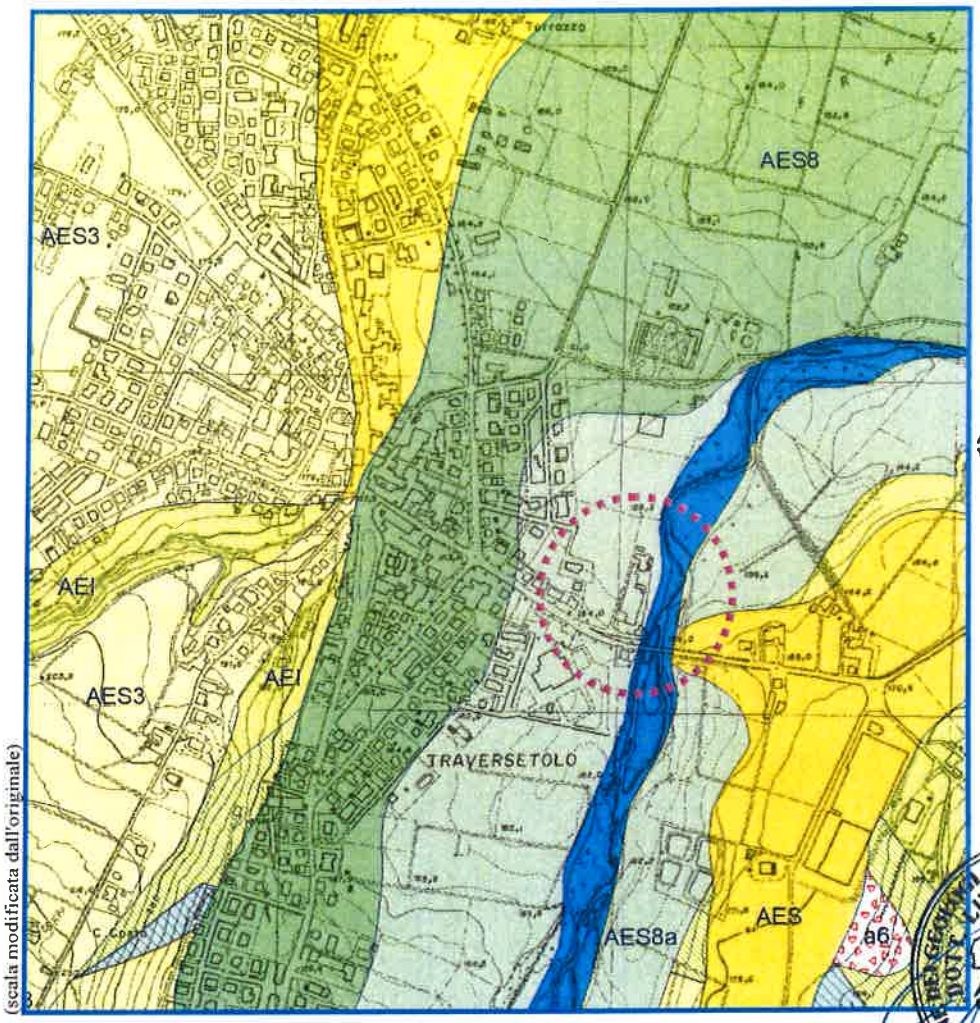


Tavola IV bis

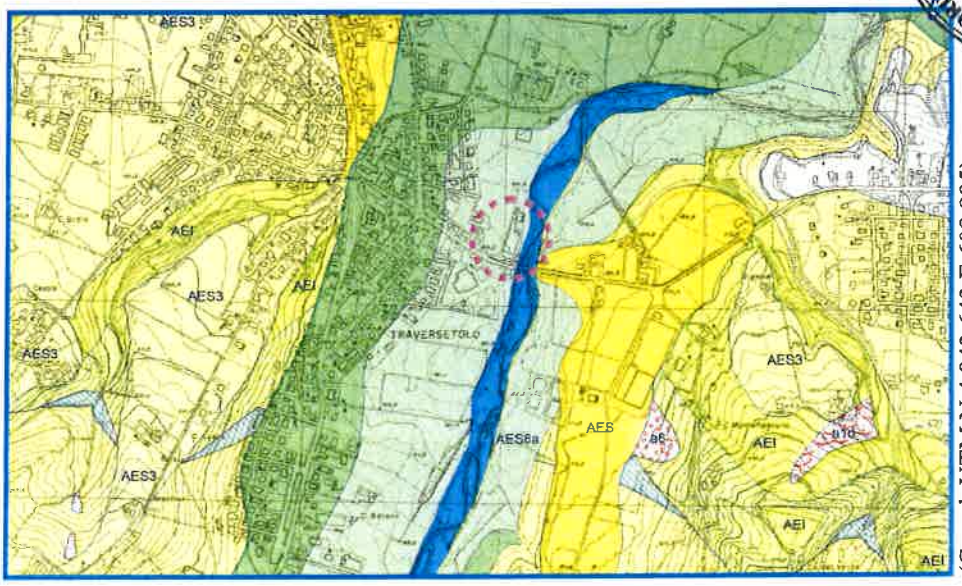
STRALCIO CARTA GEOLOGICA REGIONE EMILIA ROMAGNA - Scala 1:10.000

Foglio 200130 Traversetolo



(scala modificata dall'originale)

APAT
Agenzia per la protezione dell'ambiente e per i servizi tecnici
DIPARTIMENTO DIFESA DEL SUOLO
Servizio Geologico d'Italia



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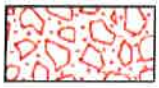
Area di ubicazione opera in progetto

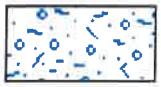
LEGENDA CARTA GEOLOGICA REGIONE EMILIA ROMAGNA - Scala 1:10.000 -

Foglio 200130 Traversetolo


a1d - Deposito di frana attiva per colamento lento


a1e - Deposito di frana attiva per colamento rapido


a1g - Deposito di frana attiva complessa


a2b - Deposito di frana quiescente per scivolamento


a2d - Deposito di frana quiescente per colamento lento


a2g - Deposito di frana quiescente complessa


a2h - Deposito di frana quiescente per scivolamento in blocco o DGPV

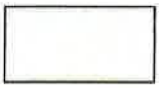

a3 - Deposito di versante s.l.

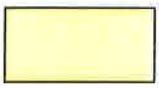

a6 - Detrito di falda


AES - Sintema Emiliano-Romagnolo Superiore


AES8 - Subsintema di Ravenna


AES8a - Unità di Modena


AES7a - Unità di Niviano


AES3 - Subsintema di Agazzano

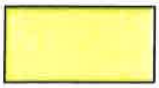
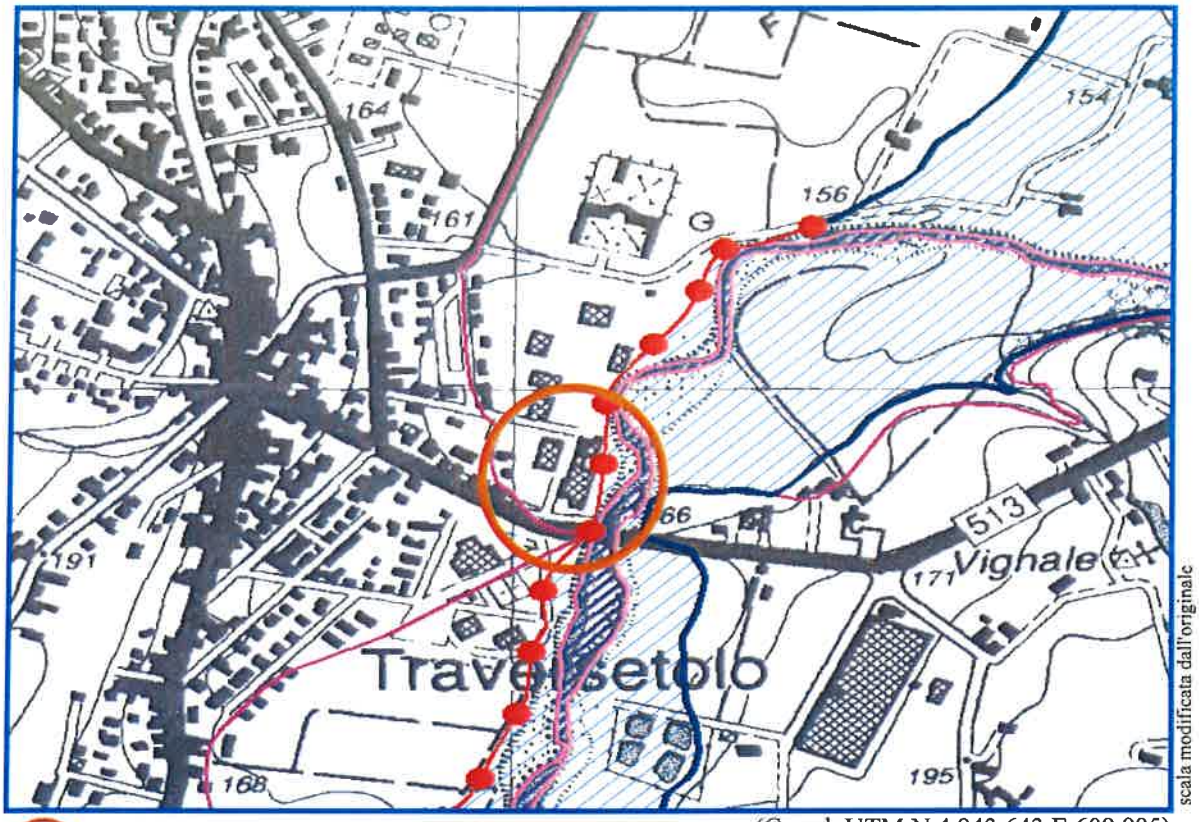

AEI - Sintema Emiliano-Romagnolo Inferiore

Tavola V

Elementi del Piano Territoriale di Coordinamento Provinciale
Provincia di Parma
C1 - Tutela ambientale paesistica e storico culturale



scala modificata dall'originale

Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898°)

Legenda

Zone ed elementi di interesse paesaggistico ambientale

- Zone di particolare interesse paesaggistico - ambientale
- Zone di tutela naturalistica
- Dossi
- Calanchi meritevoli di tutela
- Parchi regionali con P.T.P. approvato

Zone ed elementi di specifico interesse storico, archeologico e testimoniale

- Aree di accertata consistenza archeologica
- Zone di tutela della struttura centuriata
- Elementi della centuriazione
- Bonifiche storiche

Zone di tutela di laghi,corsi d'acqua e corpi idrici sotterranei

- Zone di tutela ambientale ed idraulica dei corsi d'acqua (art.12)

Zone di deflusso di piena (art.13)

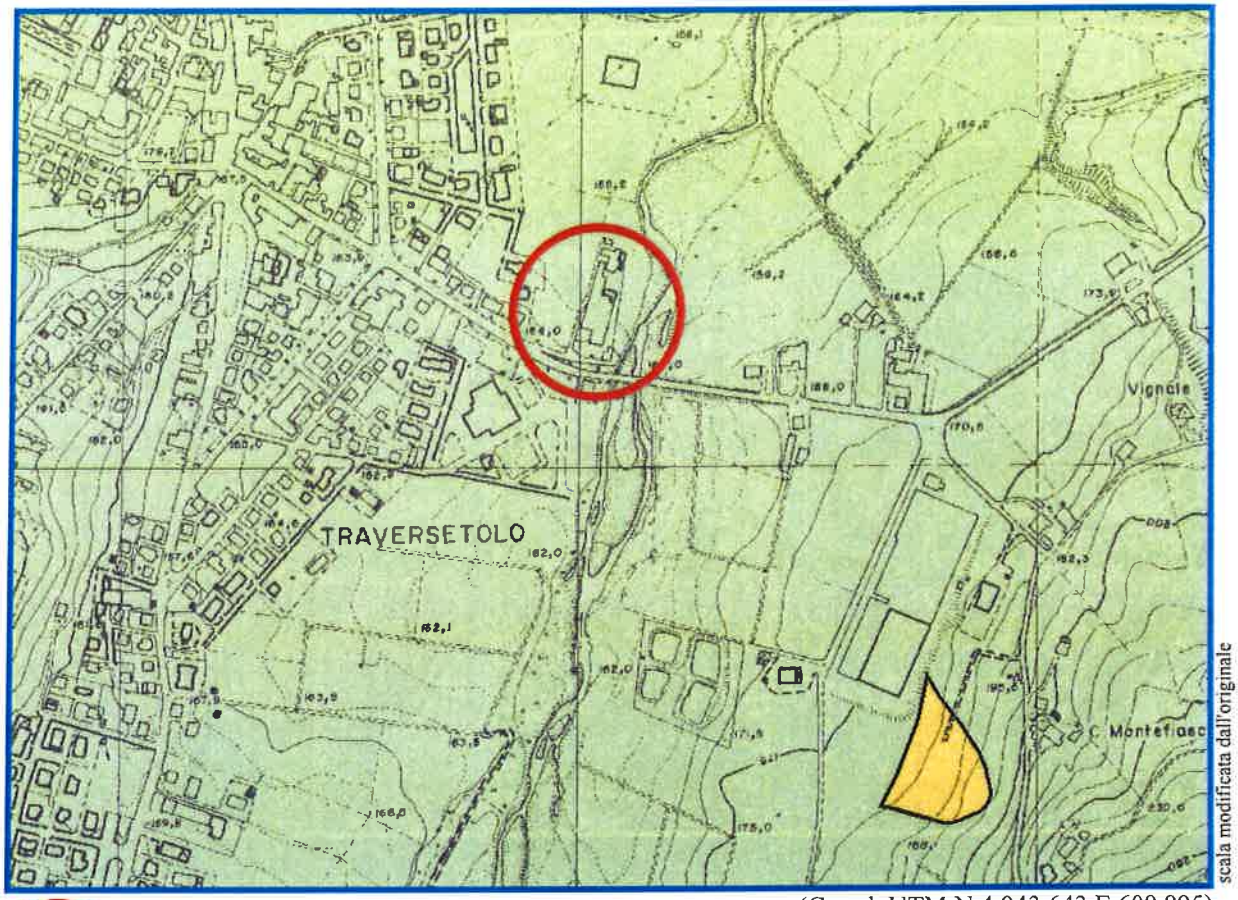
- Ambito A1 - Alveo
- Ambito A2
- Limiti di progetto (art.12)
- Zone di tutela dei caratteri ambientali di laghi, bacini e corsi d'acqua
- Invasi ed alvei di laghi, bacini e corsi d'acqua (art.13bis)
- Area di inondazione per piena catastrofica (fascia C)
- Corsi d'acqua meritevoli di tutela
- Zone di tutela dei corpi idrici superficiali e sotterranei

ORDINE DEI GEOLOGI REGIONE EMILIA ROMAGNA
DOTT. LUCA CALZOLARI
GEOLOGO
SEZ.A
N. 899 ALBO PR

Tavola VI

Elementi del Piano Territoriale di Coordinamento Provinciale
Provincia di Parma

C2 - Carta del Dissesto



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Area di ubicazione opera in progetto

Legenda

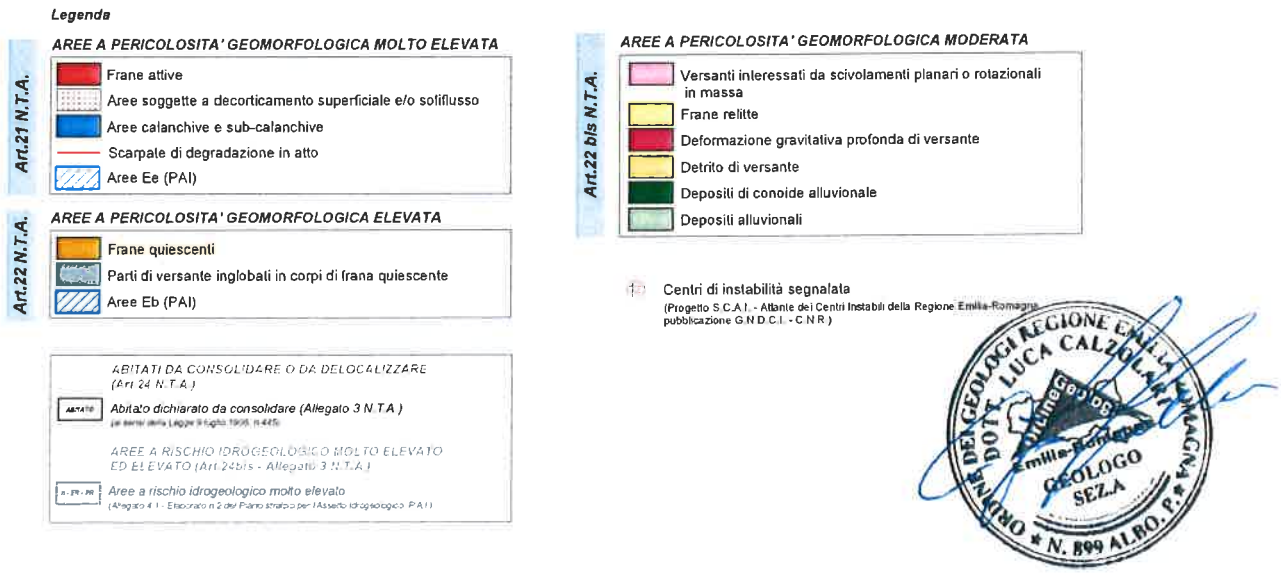

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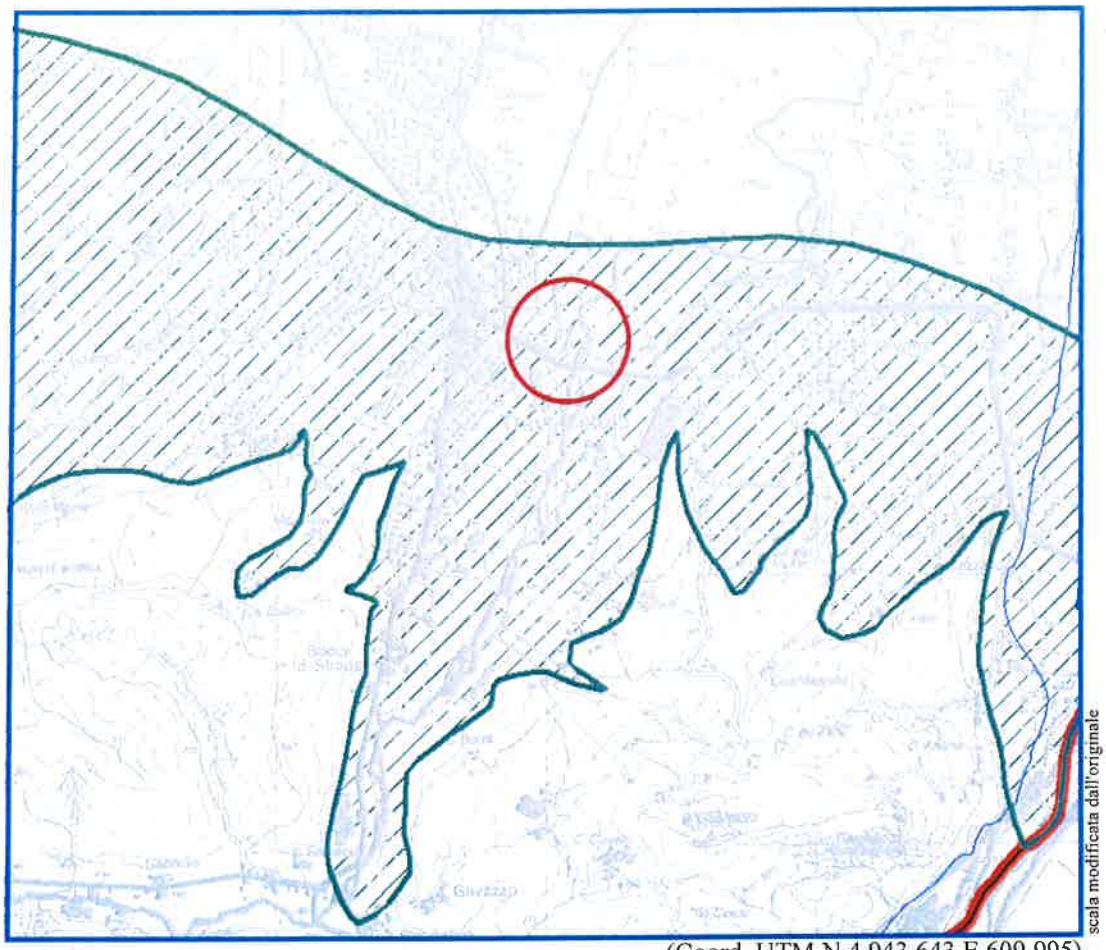
Tavola VII

Elementi del Piano Territoriale di Coordinamento Provinciale

Provincia di Parma

C4 - Rischio ambientale e principali interventi di difesa



scala modificata dall'originale

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Area di ubicazione opera in progetto

Legenda

RISCHIO IDRAULICO

- Ambito di criticità idraulico-ambientale (Del. G.P. n° 306/2000)
- Ambito a rischio di inondazione per inadeguatezza argini
- Ambito a rischio idraulico per inadeguatezza rete scolante e/o bonifica
- Area di inondazione per piena catastrofica del Po e per inadeguatezza rete scolante di pianura
- Area urbana a rischio di inondazione
- PARMA — Centri abitati principali soggetti ad elevato rischio idraulico (città di Parma e Colorno)
- Nodi critici rete idrografica principale (PR01 e EN01 - P.A.I.) (Autorità di Bacino del Po - All.1 Relazione generale - Del. n.°18 del 26/04/01)
- Nodi critici rete idrografica secondaria
- Perimetrazione aree a rischio idraulico molto elevato (P.A.I. - Autorità di Bacino del Po - Titolo IV - Del. n.° 18 del 26/04/01)
- Perimetrazione aree a rischio idraulico molto elevato (P.S. 267 - 1° Aggiornamento - Autorità di Bacino del Po - Del. n.° 20 del 26/04/01)
- Progetto Strategico Canale Navigabile Navigabile (L. 183/89 - art. 2, D.P.R. 33/2001)

RISCHIO INQUINAMENTO ACQUIFERI PRINCIPALI

- AREE DI RICARICA DELLE FALDE ACQUIFERE

RISCHIO AMBIENTALE DA ATTIVITA' ANTROPICHE

- Dichiarati
- Proposti

COMUNI AD ELEVATO GRADO DI CRISI AMBIENTALE (v.elenco)

- SITI DA BONIFICARE PER INQUINAMENTO DA ATTIVITA' PREGRESSE E DA ATTIVITA' DI DISCARICA NON CONTROLLATA

RISCHIO SISMICO

- COMUNI DICHIARATI SISMICI (All.A all'All.1 dell'Ord.327[illegible])
- COMUNI DICHIARATI SISMICI (All.A all'All.1 dell'Ord.327[illegible])

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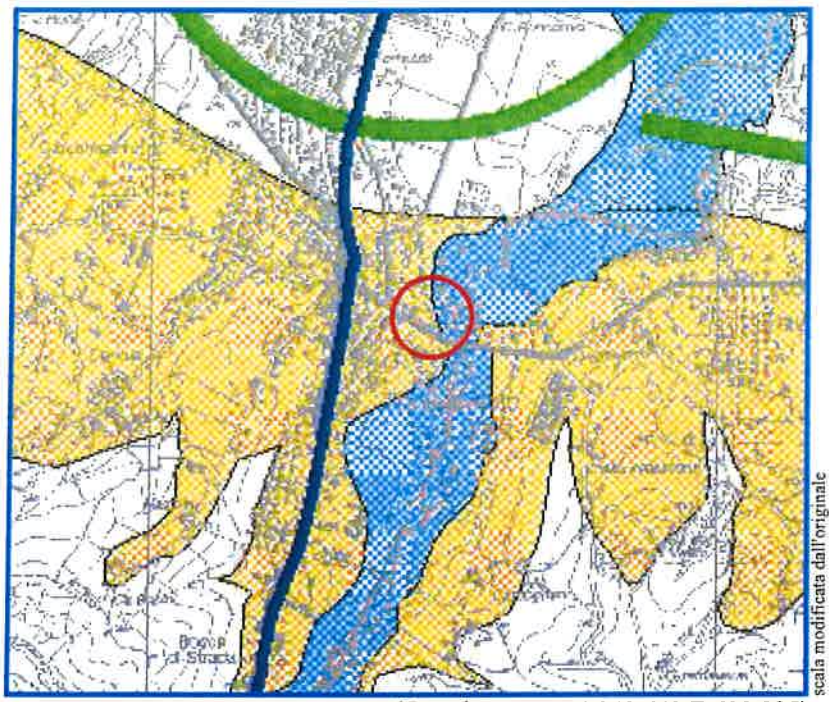
Tavola VIII

Elementi del Piano Territoriale di Coordinamento Provinciale
Provincia di Parma

C12 - Assetto territoriale



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Area di ubicazione opera in progetto

Legenda

- Ambiti ad elevato pregio naturalistico
- Ambito ad alta vulnerabilità degli acquiferi
- Principali ambiti ad elevato dissesto idrogeologico
- Principali ambiti a rischio idraulico elevato
- Ambito fluviale del Po
- Fasce di pertinenza fluviale
- Principali progetti di recupero, tutela e valorizzazione
- Aree di integrazione delle politiche territoriale
- Poli funzionali
- Siti da bonificare

GERARCHIA URBANA ESISTENTE

- Centri ordinatori
- Centri integrativi
- Polo ordinatore Fidenza-Salsomaggiore

CORRIDOI PLURIMODALI

- Corridoio centrale A1 - TAV
- Corridoio Tirreno Brennero TI - BRE

CORRIDOI PLURIMODALI

- Corridoio centrale A1 - TAV
- Corridoio Tirreno Brennero TI - BRE

SISTEMI INSEDIATIVI

- Emilia
- Cispadana
- Pedemontana

RETE STRADALE

- Autostrade
- Tratti autostradali in dismissione
- Viabilità di interesse regionale
- Viabilità di interesse provinciale

RETE FERROVIARIA

- Linea alta velocità
- Linea Tirreno - Brennero
- Altre linee ferroviarie

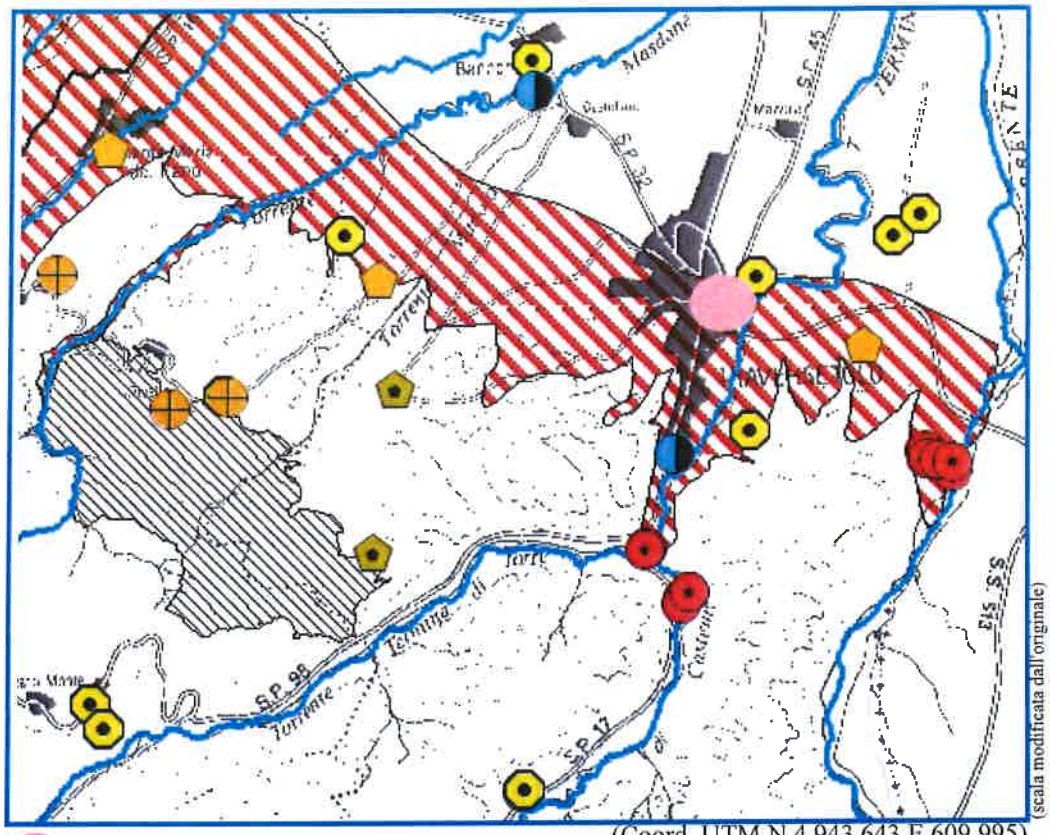
CENTRI DI SERVIZIO ALLA MOBILITA'

- Caselli autostradali
- Fermate alta velocità
- Principali nodi di interscambio
- Principali approdi fluviali

Tavola IX

Elementi del Piano Territoriale di Coordinamento Provinciale
Provincia di Parma

Approfondimento in materia di tutela delle acque
Variante 22-12-2008 approvato Del. Cons. Pr. n° 118
Tavola VI - Scala 1:100.000



(scala modificata dall'originale)

Area di ubicazione opera in progetto

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898°)

Legenda

- Località con presenza di sfioratori di piena
- Località con rete fognaria depurata a livello privato con A.E.<50
- Località con rete dotata di sfioratore
- Scarico produttivo e/o meteorico di dilavamento
- Depuratore
- Località con depuratore e con scaricatore di piena
- Località con depuratore e con presenza di rete fognaria non collettata ma trattata a livello privato
- Località con depuratore e con presenza di rete fognaria non collettata ma trattata a livello privato e con scaricatori di piena

CARTA DEGLI INDIRIZZI PER LA TUTELA DELLE ACQUE

- Aree di ricarica diretta dell'acquifero C, oltre B e A

Classi di vulnerabilità

- poco vulnerabile
- vulnerabilità a sensibilità attenuata
- vulnerabilità a sensibilità elevata

- Bacini idrografici
- Area di rilevante interesse scientifico naturalistico e ambientale (D.G.R. 2006/167
- Rete idrografica

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di geol. Luca Calzolari
geom. Massimo Marchesi
arch. Paolo Montanari

Tavola XII

STRALCIO RIPRESA AEROFOTOGRAMMETRICA

Google Earth versione 4.3 - Luglio 2008 -

(scala modificata dall'originale)

(Coord. UTM N 4.943.643 E 609.995)
(Lat. 44.637715° - Lon. 10.386898°)

Area di ubicazione opera in progetto

43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

ALLEGATO 1

Prove Penetrometriche Statiche (CPT)

LEGENDA VALORI DI RESISTENZA

Strumento utilizzato:

PENETROMETRO STATICO OLANDESE tipo GOUDA (tipo meccanico).

Caratteristiche:

- punta conica meccanica Ø 35.7 mm, angolo di apertura α= 60 ° -(area punta Ap = 10 cm²)
- manicotto laterale di attrito tipo 'Begemann' (Ø 35.7 mm - h 133 mm - sup. lat. Am. = 150 cm²)
- velocità di avanzamento costante V = 2 cm / sec (± 0,5 cm / sec)
- spinta max nominale dello strumento Smax variabile a seconda del tipo
- costante di trasformazione (lett.⇒ Spinta) Ct = SPINTA (Kg) / LETTURA DI CAMPAGNA

fase 1 - resistenza alla punta Rp (Kg / cm²) = (L. punta) Ct /10

fase 2 - resistenza laterale locale RL (Kg / cm²) = [(L. laterale) - (L. punta)] Ct / 150

fase 3 - resistenza totale Rt (Kg) = (L. totale) Ct

Rp / RL = 'rapporto Begemann'

- L. punta = lettura di campagna durante l' infissione della sola punta (fase 1)
- L. laterale = lettura di campagna relativa all'infissione di punta e manicotto (fase 2)
- L. totale = lettura di campagna relativa all'infissione delle aste esterne (fase 3)

N.B. : la spinta S (Kg) , corrispondente a ciascuna fase , si ottiene moltiplicando la corrispondente lettura di campagna L per la costante di trasformazione Ct .

N.B. : causa la distanza intercorrente (20 cm circa) fra il manicotto laterale e la punta conica del penetrometro , la resistenza laterale locale RL viene computata 20 cm sopra la punta .

CONVERSIONI

1 kN (kiloNewton) = 1000 N ≈ 100 kg = 0,1 t - 1MN (megaNewton) = 1000 kN = 1000000 N ≈ 100 t

1 kPa (kiloPascal) = 1 kN/m² = 0,001 MN/m² = 0,001 MPa ≈ 0,1 t/m² = 0,01 kg/cm²

1 MPa (MegaPascal) = 1 MN/m² = 1000 kN/m² = 1000 kPa ≈ 100 t / m2 = 10 kg/cm²

kg/cm² = 10 t/m² ≈ 100 kN/m² = 100 kPa = 0,1 MN/m² = 0,1 Mpa

1 t = 1000 kg ≈ 10 kN

LEGENDA VALUTAZIONI LITOLOGICHE

Valutazioni in base al rapporto: **F = (Rp / RL)**

(Begemann 1965 - Raccomandazioni A.G.I. 1977)

valide in via approssimata per terreni immersi in falda :

F = Rp / RL	NATURA LITOLOGICA	PROPRIETA'
F < 15	TORBE ED ARGILLE ORGANICHE	COESIVE
15 < F ≤ 30	LIMI ED ARGILLE	COESIVE
30 < F ≤ 60	LIMI SABBIOSI E SABBIE LIMOSE	GRANULARI
F > 60	SABBIE E SABBIE CON GHIAIA	GRANULARI

Vengono inoltre riportate le valutazioni stratigrafiche fornite da Schmertmann (1978), ricavabili in base ai valori di Rp e di FR = (RL / Rp) % :

- AO = argilla organica e terreni misti
- Att = argilla (inorganica) molto tenera
- At = argilla (inorganica) tenera
- Am = argilla (inorganica) di media consistenza
- Ac = argilla (inorganica) consistente
- Acc = argilla (inorganica) molto consistente
- ASL = argilla sabbiosa e limosa
- SAL = sabbia e limo / sabbia e limo argilloso
- Ss = sabbia sciolta
- Sm = sabbia mediamente addensata
- Sd = sabbia densa o cementata
- SC = sabbia con molti fossili, calcareniti

Secondo Schmertmann il valore della resistenza laterale da usarsi, dovrebbe essere pari a:

- 1/3 ± 1/2 di quello misurato , per depositi sabbiosi
- quello misurato (inalterato) , per depositi coesivi.

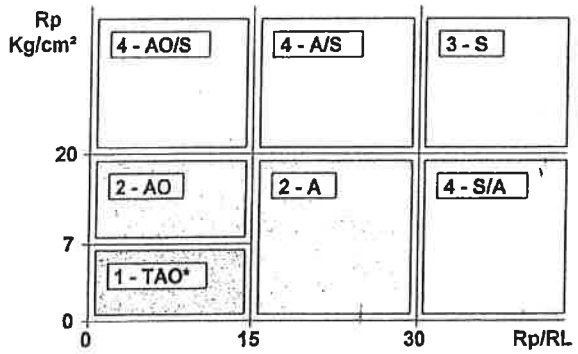
LEGENDA PARAMETRI GEOTECNICI

SCELTE LITOLOGICHE (validità orientativa)

Le scelte litologiche vengono effettuate in base al rapporto Rp / RL
(Begemann 1965 -Raccomandazioni A.G.I. 1977), prevedendo altresì la possibilità di casi dubbi :

Rp ≤ 20 kg/cm² : possibili terreni COESIVI anche se (Rp / RL) > 30

Rp ≥ 20 kg/cm² : possibili terreni GRANULARI anche se (Rp / RL) < 30



NATURA LITOLOGICA

1 - COESIVA (TORBOSA) ALTA COMPRIMIBILITA'
2 - COESIVA IN GENERE
3 - GRANULARE
4 - COESIVA / GRANULARE

PARAMETRI GEOTECNICI (validità orientativa) - simboli - correlazioni - bibliografia

γ' = peso dell' unità di volume (efficace) del terreno [correlazioni : γ' - Rp - natura]
(Terzaghi & Peck 1967 -Bowles 1982)

σ'vo = tensione verticale geostatica (efficace) del terreno (valutata in base ai valori di γ')

Cu = coesione non drenata (terreni coesivi) [correlazioni : Cu - Rp]

OCR = grado di sovra consolidazione (terreni coesivi) [correlazioni : OCR - Cu - σ'vo]
(Ladd et al. 1972 / 1974 / 1977 - Lancellotta 1983)

Eu = modulo di deformazione non drenato (terr.coes.) [correl. : Eu - Cu - OCR - Ip Ip= ind.plast.]
Eu50 - Eu25 corrispondono rispettivamente ad un grado di mobilitazione dello sforzo deviatorico pari al 50-25% (Duncan & Buchigani 1976)

E' = modulo di deformazione drenato (terreni granulari) [correlazioni : E' - Rp]
E'50 - E'25 corrispondono rispettivamente ad un grado di mobilitazione dello sforzo deviatorico pari al 50-25% (coeff. di sicurezza F = 2 - 4 rispettivamente)
(Schmertmann 1970 / 1978 - Jamiolkowski et al. 1983)

Mo = modulo di deformazione edometrico (terreni coesivi e granulari) [correl. : Mo - Rp - natura]
(Sanglerat 1972 - Mitchell & Gardner 1975 - Ricceri et al. 1974 - Holden 1973)

Dr = densità relativa (terreni gran. N. C. - normalmente consolidati)
[correlazioni : Dr - Rp - σ'vo] (Schmertmann 1976)

Ø' = angolo di attrito interno efficace (terreni granulari N.C.) [correl. : Ø' - Dr - Rp - σ'vo]
(Schmertmann 1978 - Durgunoglu & Mitchell 1975 - Meyerhof 1956 / 1976)
Ø1s - (Schmertmann) sabbia fine uniforme Ø2s - sabbia media unif./ fine ben gradata
Ø3s - sabbia grossa unif./ media ben gradata Ø4s - sabbia-ghiaia poco lim./ ghiaietto unif.
Ødm - (Durgunoglu & Mitchell) sabbie N.C. Ømy - (Meyerhof) sabbie limose

Prova Penetrometrica Statica
Letture di Campagna/Valori di Resistenza

CPT 1

Committente	Arch. Andrea Brignoli	Data	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00
Località	Traversetolo	Prof. Falda	/ metri
Provincia	Parma		

Profondità m	Letture Campagna punta	Letture Campagna laterale	qc kg/cm2	fs kg/cm2	RF
0,20	---	---	---	0,800	0,0
0,40	15	27	15,00	1,533	9,8
0,60	32	55	32,00	1,467	21,8
0,80	35	57	35,00	1,867	18,8
1,00	44	72	44,00	3,067	14,3
1,20	60	106	60,00	5,867	10,2
1,40	324	412	324,00	3,400	95,3
1,60	308	359	308,00	4,467	69,0
1,80	451	518	451,00	5,467	82,5
2,00	371	453	371,00	5,667	65,5
2,20	351	436	351,00	0,800	438,8
2,40	135	147	135,00	5,267	25,6
2,60	95	174	95,00	1,933	49,1
2,80	127	156	127,00	1,333	95,3
3,00	134	154	134,00	3,467	38,7
3,20	207	259	207,00	2,933	70,6
3,40	115	159	115,00	1,800	63,9
3,60	178	205	178,00	2,000	89,0
3,80	215	245	215,00	7,267	29,6
4,00	131	240	131,00	4,000	32,8
4,20	66	126	66,00	0,600	110,0
4,40	196	205	196,00	2,533	77,4
4,60	194	232	194,00	0,733	264,5
4,80	164	175	164,00	0,467	351,4
5,00	178	185	178,00	3,400	52,4
5,20	173	224	173,00	3,600	48,1
5,40	131	185	131,00	2,133	61,4
5,60	141	173	141,00	1,933	72,9
5,80	113	142	113,00	3,867	29,2
6,00	38	96	38,00	8,267	4,6
6,20	154	278	154,00	7,533	20,4
6,40	472	585	472,00	2,400	196,7
6,60	495	531	495,00	---	---
6,80	---	---	---	---	---
7,00	---	---	---	---	---
7,20	---	---	---	---	---
7,40	---	---	---	---	---
7,60	---	---	---	---	---

Profondità m	Letture Campagna punta	Letture Campagna laterale	qc kg/cm2	fs kg/cm2	RF
7,80	---	---	---	---	---
8,00	---	---	---	---	---
8,20	---	---	---	---	---
8,40	---	---	---	---	---
8,60	---	---	---	---	---
8,80	---	---	---	---	---
9,00	---	---	---	---	---
9,20	---	---	---	---	---
9,40	---	---	---	---	---
9,60	---	---	---	---	---
9,80	---	---	---	---	---
10,00	---	---	---	---	---
10,20	---	---	---	---	---
10,40	---	---	---	---	---
10,60	---	---	---	---	---
10,80	---	---	---	---	---
11,00	---	---	---	---	---
11,20	---	---	---	---	---
11,40	---	---	---	---	---
11,60	---	---	---	---	---
11,80	---	---	---	---	---
12,00	---	---	---	---	---
12,20	---	---	---	---	---
12,40	---	---	---	---	---
12,60	---	---	---	---	---
12,80	---	---	---	---	---
13,00	---	---	---	---	---
13,20	---	---	---	---	---
13,40	---	---	---	---	---
13,60	---	---	---	---	---
13,80	---	---	---	---	---
14,00	---	---	---	---	---
14,20	---	---	---	---	---
14,40	---	---	---	---	---
14,60	---	---	---	---	---
14,80	---	---	---	---	---
15,00	---	---	---	---	---
15,20	---	---	---	---	---

Penetrometro Statico tipo Pagani da 10/20 t
Costante di trasformazione Ct=10 - Velocità avanzamento punta 2cm/s
Punta meccanica tipo Begemann = 35,7 mm (area punta 10 mm2 - apertura 60°)
Manicotto laterale (superficie 150 cm2)

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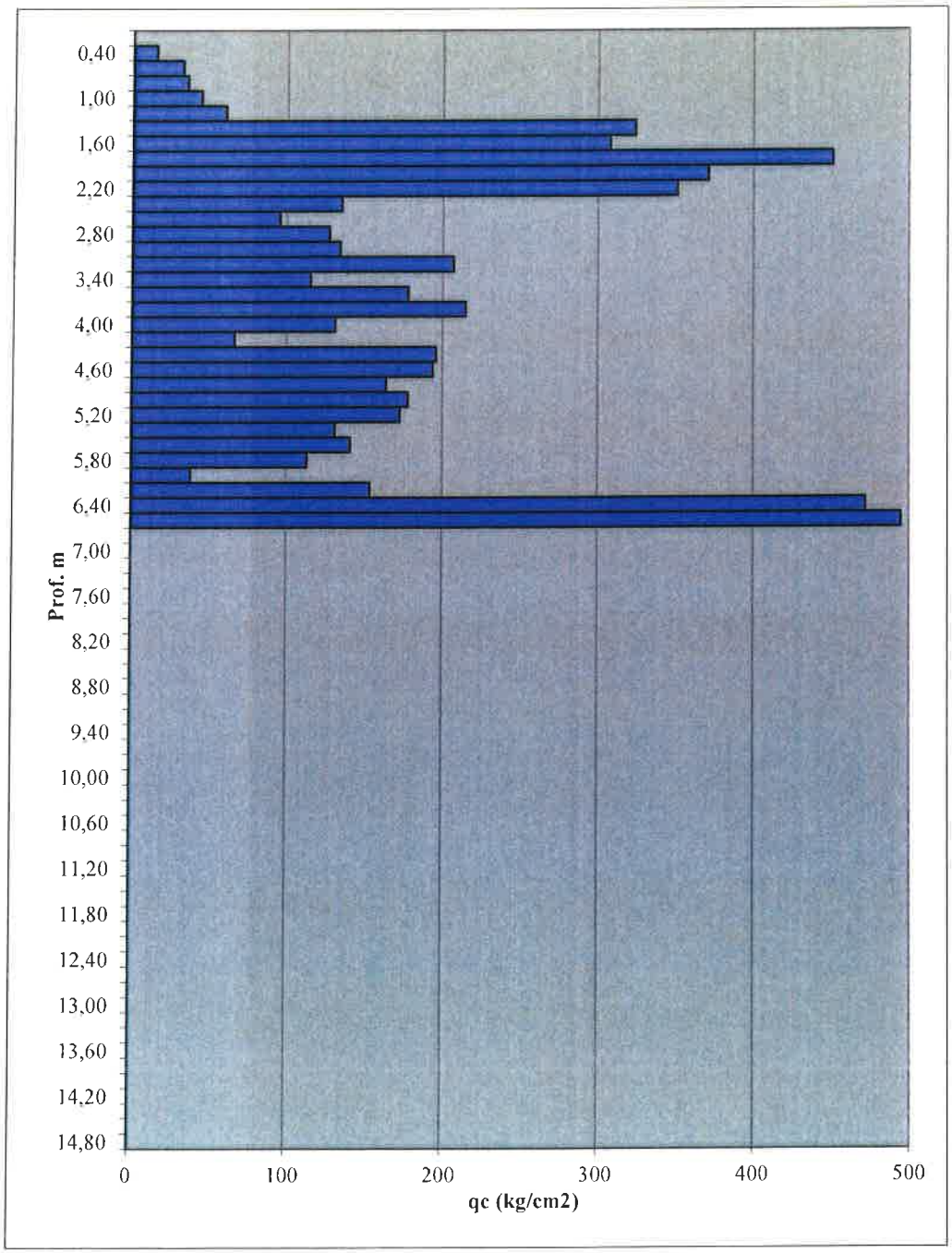
Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 1

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	/	metri
Provincia	Parma			

Resistenza alla Punta (Cone Resistence)

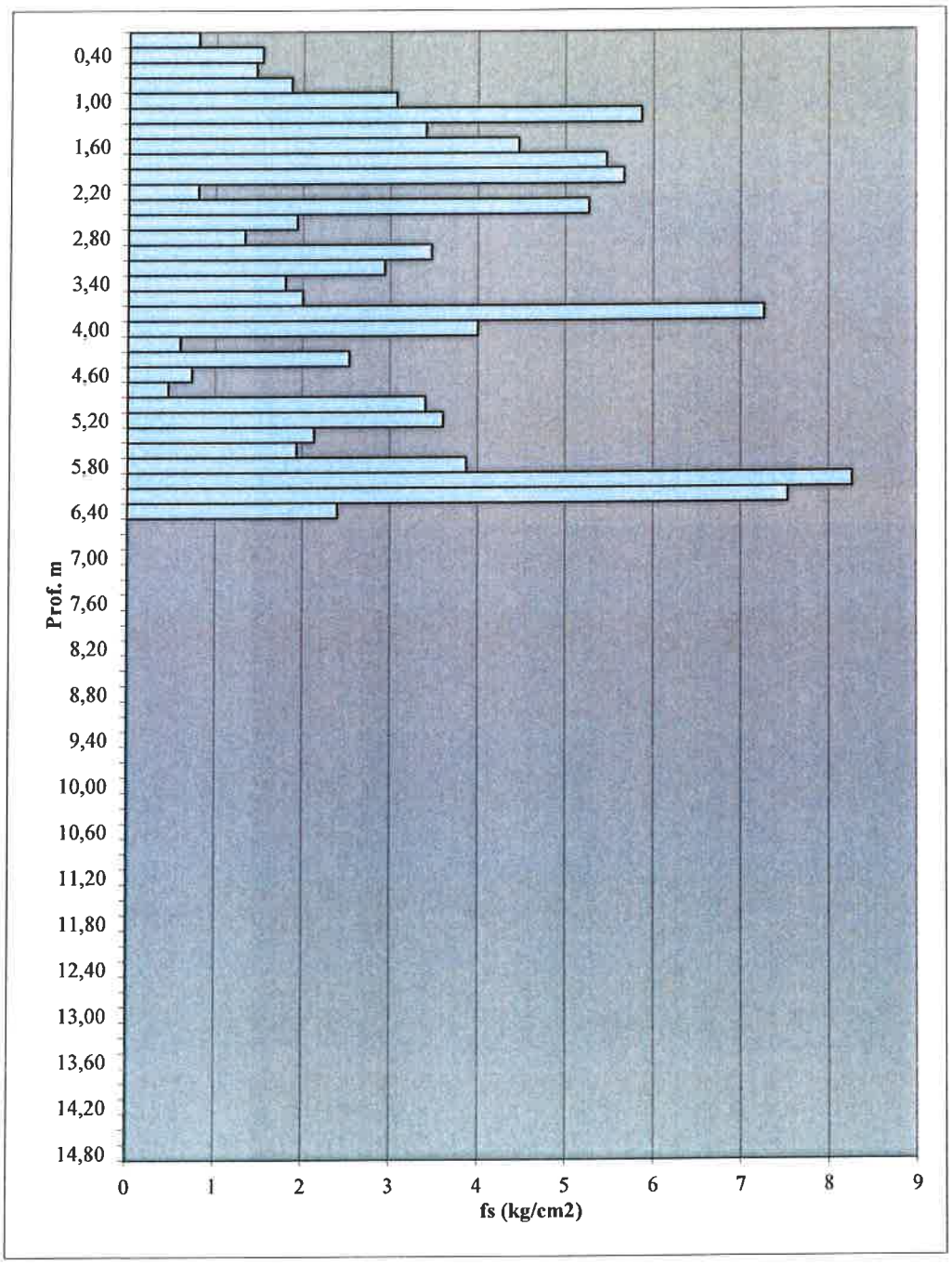


Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 1

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	/	metri
Provincia	Parma			

Resistenza Unitaria di attrito laterale locale



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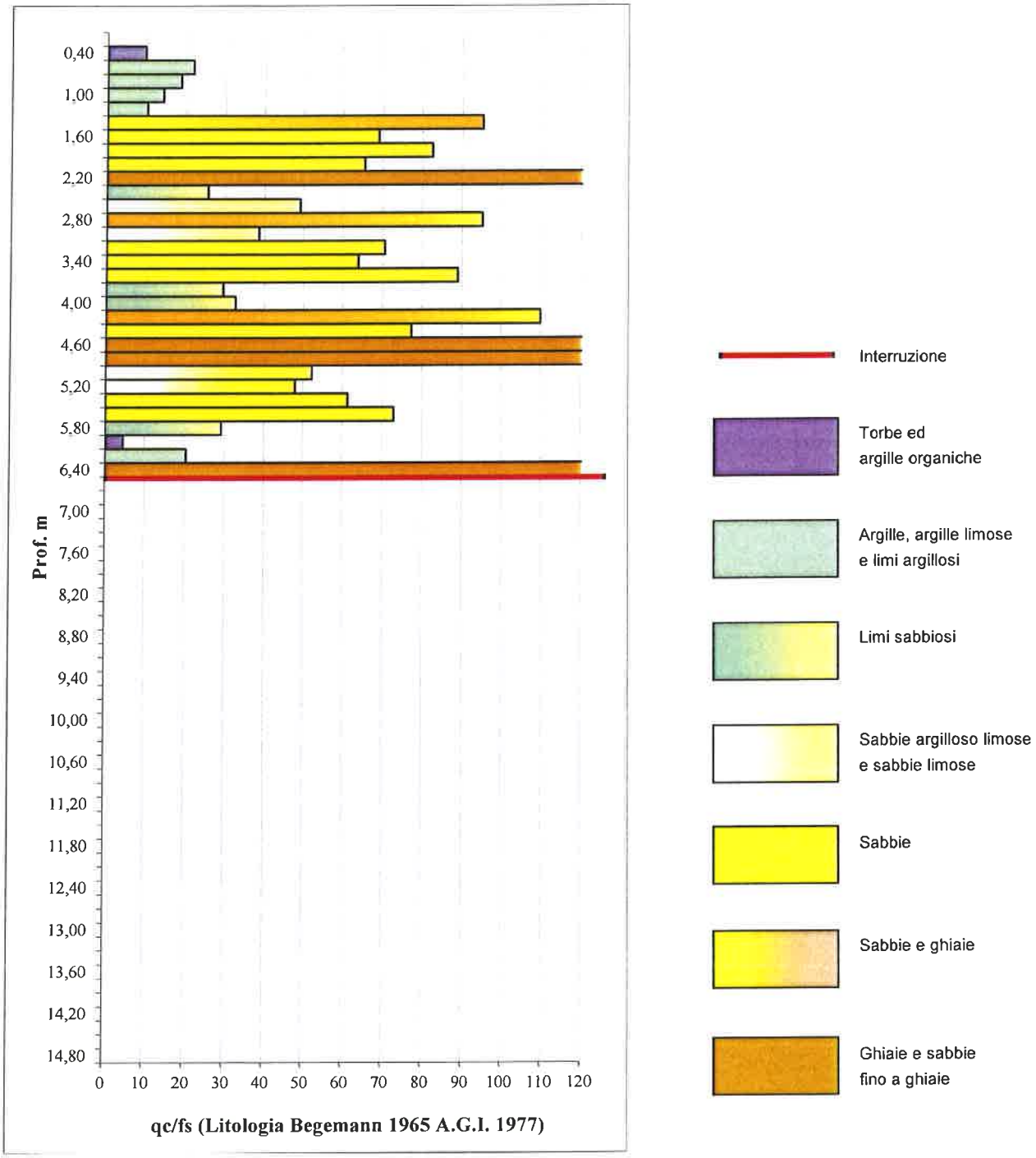
Prova Penetrometrica Statica
Valutazioni Litologiche

CPT 1

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	/ metri
Provincia	Parma		

Valutazioni Litologiche



Prova Penetrometrica Statica CPT 1
Valutazioni Litologiche - Tabella Parametri Geotecnici

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	/ metri
Provincia	Parma		

Prof. m	qc kg/cm2	fs kg/cm2	RF	Litologia (Begemann, 1977- Searle)	Consistenza addensamento	Natura	γ t/m3	σ'vo kg/cm2	Cu	Mo	OCR (-)	φ (dm) °	φ (my) °	DR (%)	φ (1s) °	φ (2s) °	φ (3s) °	φ (4s) °
0,20	---	0,800	0,0	---	---	coesive	---	---	---	---	---	-----	-----	---	---	---	---	---
0,40	15,00	1,533	9,8	argille organiche	--------	coesive	1,80	0,07	0,65	53	69,4	-----	-----	---	---	---	---	---
0,60	32,00	1,467	21,8	limo argilloso	++consistente	coesive	1,80	0,11	1,06	96	106,1	-----	-----	---	---	---	---	---
0,80	35,00	1,867	18,8	limo argilloso	++consistente	coesive	1,85	0,15	1,05	105	71,5	-----	-----	---	---	---	---	---
1,00	44,00	3,067	14,3	argilla limosa	dura	coesive	1,85	0,19	1,32	132	70,8	-----	-----	---	---	---	---	---
1,20	60,00	5,867	10,2	argille	dura	coesive	1,70	0,23	1,80	180	82,2	-----	-----	---	---	---	---	---
1,40	324,00	3,400	95,3	sabbia e ghiaia	++add,	granulari	1,70	0,27	9,72	972	553,6	46	43	145	48	48	49	50
1,60	308,00	4,467	69,0	sabbia	++add,	granulari	1,70	0,31	9,24	924	437,2	47	43	140	48	48	48	49
1,80	451,00	5,467	82,5	sabbia	++add,	granulari	1,70	0,35	13,53	1353	605,2	48	44	150	49	49	50	50
2,00	371,00	5,667	65,5	sabbia	++add,	granulari	1,70	0,39	11,13	1113	414,1	47	44	141	48	48	49	49
2,20	351,00	0,800	438,8	ghiaie	++add,	granulari	1,80	0,43	10,53	1053	342,0	46	43	136	47	47	48	49
2,40	135,00	5,267	25,6	limi argilloso-sabbiosi	dura	coesive	1,75	0,47	4,05	405	92,7	-----	-----	---	---	---	---	---
2,60	95,00	1,933	49,1	sabbia limosa	med.add,	granulari	1,70	0,51	2,85	285	53,9	39	37	87	40	42	43	45
2,80	127,00	1,333	95,3	sabbia e ghiaia	addensata	granulari	1,75	0,55	3,81	381	70,6	40	39	96	41	42	44	46
3,00	134,00	3,467	38,7	sabbie argilloso-limose	addensata	granulari	1,70	0,59	4,02	402	69,1	40	39	96	41	43	44	46
3,20	207,00	2,933	70,6	sabbia	addensata	granulari	1,70	0,63	6,21	621	109,7	42	41	109	43	44	45	47
3,40	115,00	1,800	63,9	sabbia	addensata	granulari	1,70	0,67	3,45	345	48,7	39	38	87	40	42	43	45
3,60	176,00	2,000	89,0	sabbia	addensata	granulari	1,80	0,71	5,34	534	76,2	41	40	101	42	43	45	46
3,80	215,00	7,267	29,6	limi argilloso-sabbiosi	dura	coesive	1,75	0,75	6,45	645	92,5	-----	-----	---	---	---	---	---
4,00	131,00	4,000	32,8	limi argilloso-sabbiosi	addensata	granulari	1,70	0,79	3,93	393	46,6	39	39	88	40	42	43	45
4,20	66,00	0,600	110,0	sabbia e ghiaia	med.add,	granulari	1,70	0,83	1,98	198	18,6	35	36	63	37	39	41	43
4,40	196,00	2,533	77,4	sabbia	addensata	granulari	1,70	0,87	5,88	588	68,4	40	41	99	42	43	44	46
4,60	194,00	0,733	264,5	ghiaie	med.add,	granulari	1,70	0,91	5,82	582	63,9	40	41	98	42	43	44	46
4,80	164,00	0,467	351,4	ghiaie	med.add,	granulari	1,75	0,95	4,92	492	49,1	39	40	91	41	42	44	45
5,00	178,00	3,400	52,4	sabbia limosa	addensata	granulari	1,75	0,99	5,34	534	51,6	39	40	93	41	42	44	45
5,20	173,00	3,600	48,1	sabbia limosa	addensata	granulari	1,70	1,03	5,19	519	47,4	39	40	91	41	42	44	45
5,40	131,00	2,133	61,4	sabbia limosa	addensata	granulari	1,70	1,07	3,93	393	31,9	37	39	81	39	41	43	44
5,60	141,00	1,933	72,9	sabbia	addensata	granulari	1,80	1,11	4,23	423	33,4	38	39	82	40	41	43	45
5,80	113,00	3,867	29,2	limi argilloso-sabbiosi	dura	coesive	1,85	1,15	3,39	339	24,3	-----	-----	---	---	---	---	---
6,00	38,00	8,267	4,6	torbe	++consistente	coesive	1,80	1,19	1,14	114	6,0	-----	-----	---	---	---	---	---
6,20	154,00	7,533	20,4	limo argilloso	dura	coesive	1,70	1,23	4,62	462	32,8	-----	-----	---	---	---	---	---
6,40	472,00	2,400	196,7	ghiaie	++add,	granulari	1,70	1,27	14,16	1416	127,9	43	45	121	45	45	47	48
6,60	495,00	---	---	---	---	---	1,70	1,31	14,85	1485	130,6	43	45	121	45	45	47	48
6,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

γ' = peso di unità di volume del terreno alleggerito

$\sigma'vo$ = Tensione verticale geostatica (efficace) del terreno

Cu = coesione non drenata

Mo = Modulo confinato drenato (Mitchell & Gardner, 1975) non ricavato da prove su campioni

OCR = Rapporto di sovraconsolidazione (Ladd e Foot)

φ (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ (my) = angolo di attrito interno efficace (Meyerhof)

φ (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

DR = Densità relativa (Harman)

Prova Penetrometrica Statica
Letture di Campagna/Valori di Resistenza

CPT 2

Committente	Arch. Andrea Brignoli	Data	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00
Località	Traversetolo	Prof. Falda	-1,80 metri
Provincia	Parma		

Profondità m	Letture Campagna punta	Letture Campagna laterale	qc kg/cm2	fs kg/cm2	RF
0,20	---	---	---	0,533	0,0
0,40	11	19	11,00	0,933	11,8
0,60	10	24	10,00	0,933	10,7
0,80	12	26	12,00	1,267	9,5
1,00	147	166	147,00	3,867	38,0
1,20	136	194	136,00	2,400	56,7
1,40	144	180	144,00	2,600	55,4
1,60	99	138	99,00	2,467	40,1
1,80	115	152	115,00	1,533	75,0
2,00	128	151	128,00	2,800	45,7
2,20	149	191	149,00	1,000	149,0
2,40	195	210	195,00	2,133	91,4
2,60	183	215	183,00	2,133	85,8
2,80	152	184	152,00	4,667	32,6
3,00	190	260	190,00	3,067	62,0
3,20	265	311	265,00	6,600	40,2
3,40	178	277	178,00	6,067	29,3
3,60	165	256	165,00	2,000	82,5
3,80	209	239	209,00	5,267	39,7
4,00	435	514	435,00	0,267	1631,3
4,20	259	263	259,00	6,000	43,2
4,40	249	339	249,00	0,533	466,9
4,60	293	301	293,00	4,533	64,6
4,80	574	642	574,00	---	---
5,00	---	---	---	---	---
5,20	---	---	---	---	---
5,40	---	---	---	---	---
5,60	---	---	---	---	---
5,80	---	---	---	---	---
6,00	---	---	---	---	---
6,20	---	---	---	---	---
6,40	---	---	---	---	---
6,60	---	---	---	---	---
6,80	---	---	---	---	---
7,00	---	---	---	---	---
7,20	---	---	---	---	---
7,40	---	---	---	---	---
7,60	---	---	---	---	---

Profondità m	Letture Campagna punta	Letture Campagna laterale	qc kg/cm2	fs kg/cm2	RF
7,80	---	---	---	---	---
8,00	---	---	---	---	---
8,20	---	---	---	---	---
8,40	---	---	---	---	---
8,60	---	---	---	---	---
8,80	---	---	---	---	---
9,00	---	---	---	---	---
9,20	---	---	---	---	---
9,40	---	---	---	---	---
9,60	---	---	---	---	---
9,80	---	---	---	---	---
10,00	---	---	---	---	---
10,20	---	---	---	---	---
10,40	---	---	---	---	---
10,60	---	---	---	---	---
10,80	---	---	---	---	---
11,00	---	---	---	---	---
11,20	---	---	---	---	---
11,40	---	---	---	---	---
11,60	---	---	---	---	---
11,80	---	---	---	---	---
12,00	---	---	---	---	---
12,20	---	---	---	---	---
12,40	---	---	---	---	---
12,60	---	---	---	---	---
12,80	---	---	---	---	---
13,00	---	---	---	---	---
13,20	---	---	---	---	---
13,40	---	---	---	---	---
13,60	---	---	---	---	---
13,80	---	---	---	---	---
14,00	---	---	---	---	---
14,20	---	---	---	---	---
14,40	---	---	---	---	---
14,60	---	---	---	---	---
14,80	---	---	---	---	---
15,00	---	---	---	---	---
15,20	---	---	---	---	---

Penetrometro Statico tipo Pagani da 10/20 t
Costante di trasformazione Ct=10 - Velocità avanzamento punta 2cm/s
Punta meccanica tipo Begemann = 35,7 mm (area punta 10 mm2 - apertura 60°)
Manicotto laterale (superficie 150 cm2)

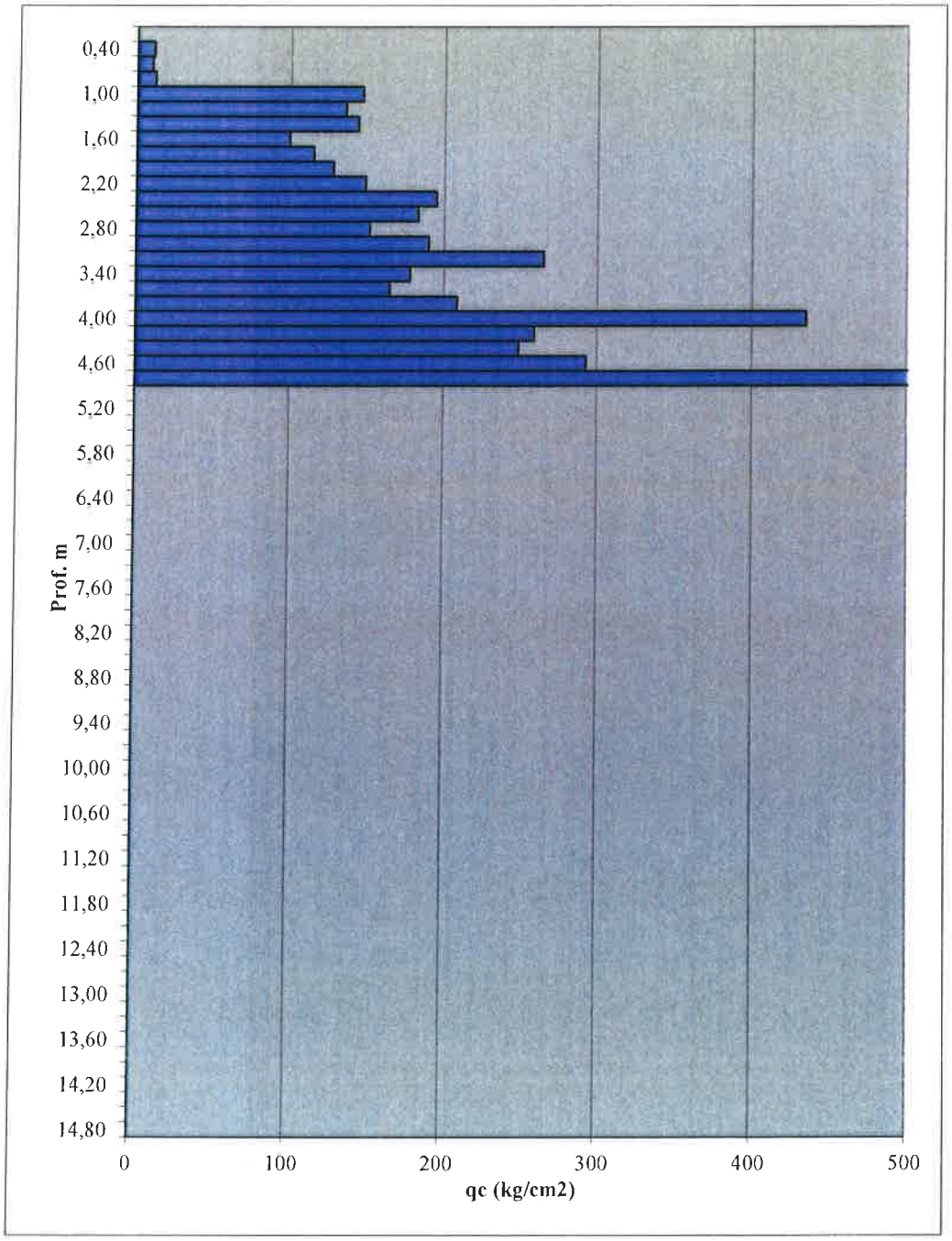
43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 2

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-1,80	metri
Provincia	Parma			

Resistenza alla Punta (Cone Resistence)



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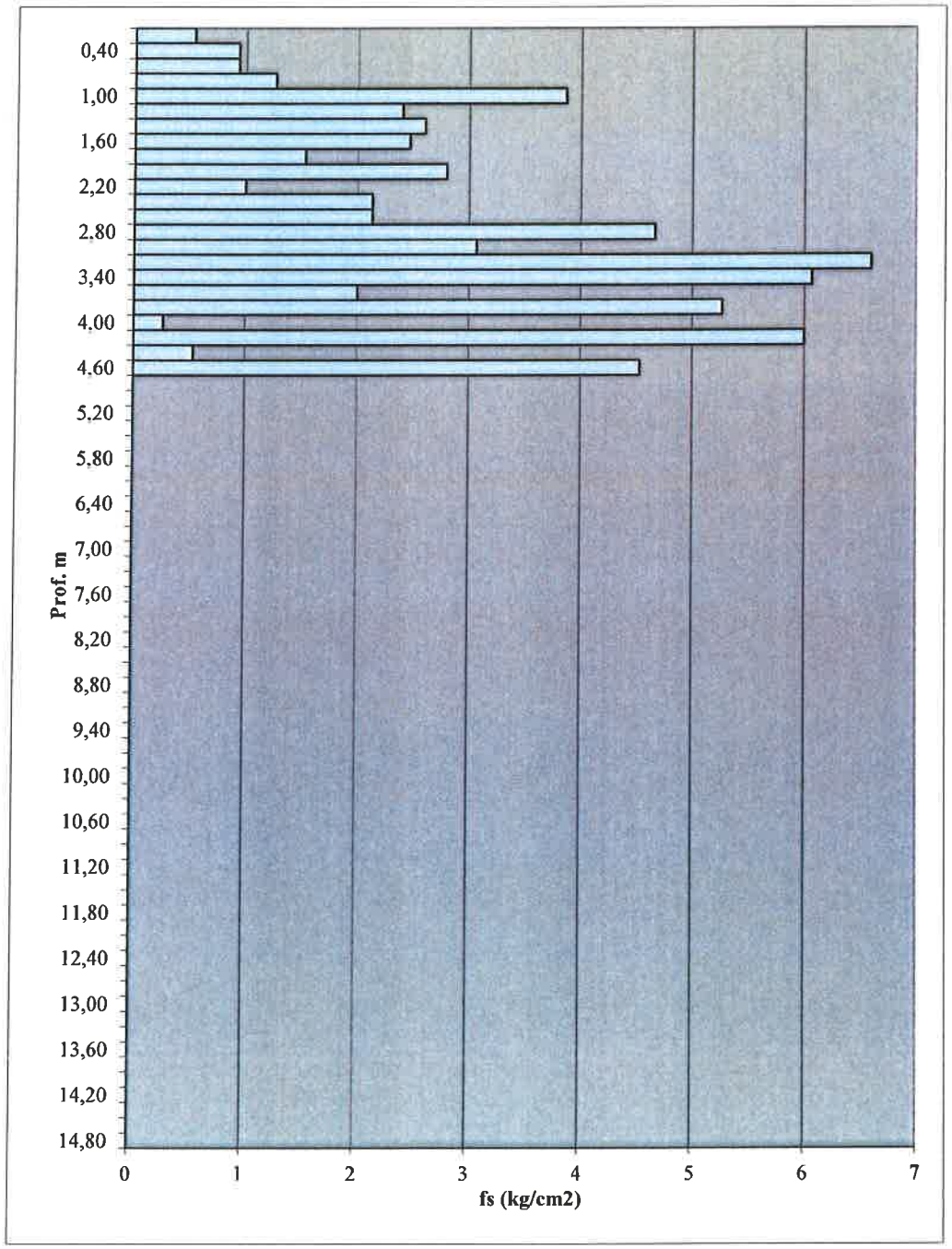
Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 2

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-1,80	metri
Provincia	Parma			

Resistenza Unitaria di attrito laterale locale



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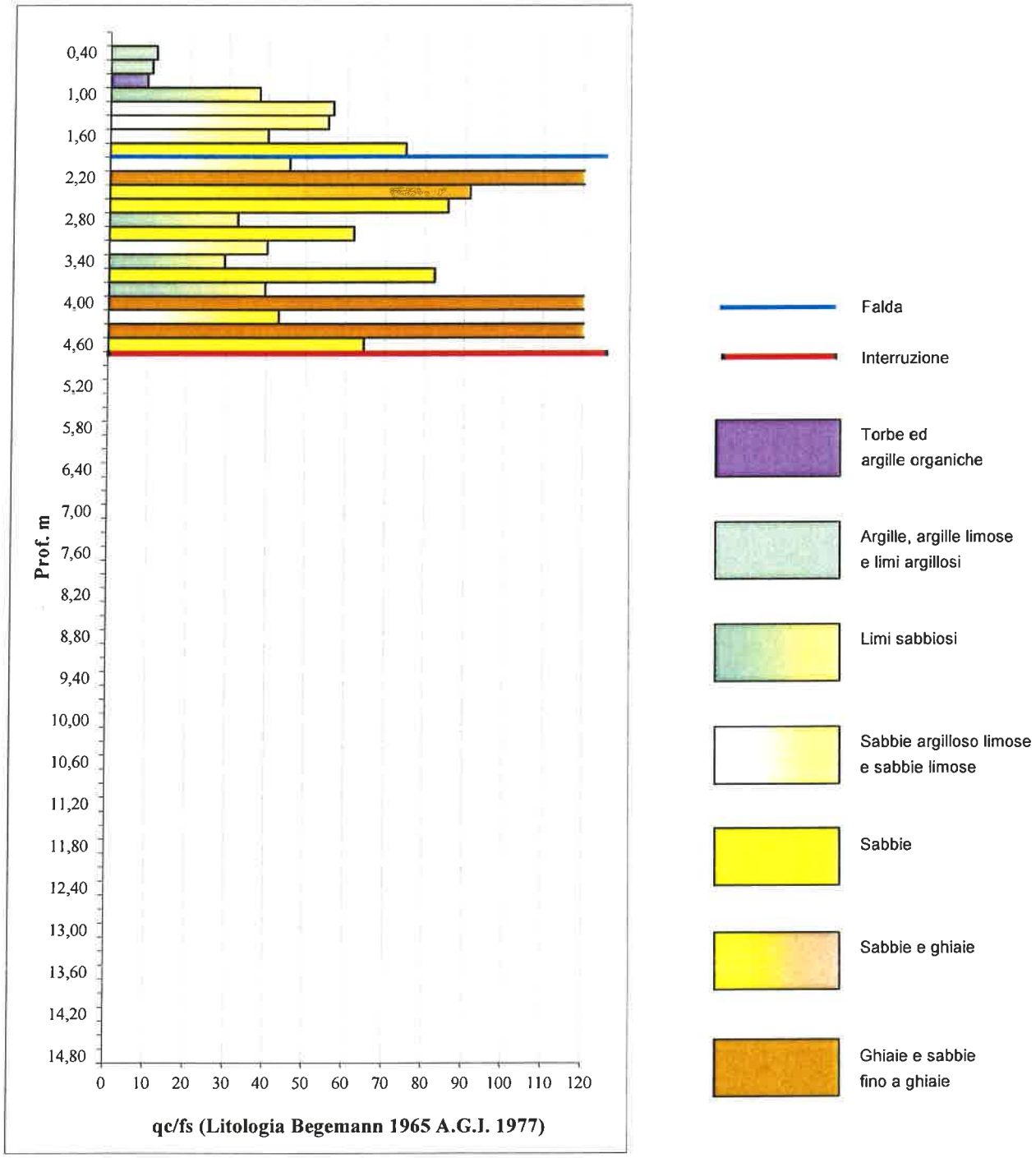
Prova Penetrometrica Statica
Valutazioni Litologiche

CPT 2

Committente	Arch. Andrea Brignoli	Data:	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00	
Località	Traversetolo	Prof. Falda:	-1,80	metri
Provincia	Parma			

Valutazioni Litologiche



43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Prova Penetrometrica Statica CPT 2
Valutazioni Litologiche - Tabella Parametri Geotecnici

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	-1,80 metri
Provincia	Parma		

Prof.	qc	fs	RF	Litologia - Consistenza addensamento		Natura	γ	σ'vo	Cu	Mo	OCR	φ' (dm)	φ' (my)	DR	φ' (1s)	φ' (2s)	φ' (3s)	φ' (4s)
m	kg/cm2	kg/cm2		(Begemann, 1977- Searle)			t/m3	kg/cm2			(-)	°	°	(%)	°	°	°	°
0,20	---	0,533	0,0	---	---	coesive	---	---	---	---	---	-----	-----	---	---	---	---	---
0,40	11,00	0,933	11,8	argille	plastica	coesive	0,85	0,07	0,50	39	49,9	----	----	---	---	---	---	---
0,60	10,00	0,933	10,7	argille	plastica	coesive	0,85	0,11	0,45	35	36,5	----	----	---	---	---	---	---
0,80	12,00	1,267	9,5	argille organiche	--------	coesive	0,75	0,13	0,54	42	37,2	----	----	---	---	---	---	---
1,00	147,00	3,867	38,0	sabbie argilloso-limose	addensata	granulari	0,75	0,15	4,41	441	429,8	47	39	132	46	47	48	49
1,20	136,00	2,400	56,7	sabbia limosa	addensata	granulari	0,75	0,17	4,08	408	333,5	46	39	126	46	46	47	48
1,40	144,00	2,600	55,4	sabbia limosa	addensata	granulari	0,75	0,19	4,32	432	311,7	46	39	125	46	46	47	48
1,60	99,00	2,467	40,1	sabbie argilloso-limose	med.add,	granulari	0,70	0,21	2,97	297	172,2	43	38	110	43	44	46	47
1,80	115,00	1,533	75,0	sabbia	addensata	granulari	0,75	0,23	3,45	345	185,3	44	38	113	44	45	46	47
2,00	128,00	2,800	45,7	sabbia limosa	addensata	granulari	0,70	0,25	3,84	384	190,9	44	39	115	44	45	46	47
2,20	149,00	1,000	149,0	ghiaie sabbiose	sciolta	granulari	0,70	0,27	4,47	447	209,7	44	39	118	45	45	46	47
2,40	195,00	2,133	91,4	sabbia e ghiaia	addensata	granulari	0,70	0,29	5,85	585	268,4	45	41	126	46	46	47	48
2,60	183,00	2,133	85,8	sabbia	addensata	granulari	0,75	0,31	5,49	549	228,1	45	40	122	45	46	47	48
2,80	152,00	4,667	32,6	limi argilloso-sabbiosi	addensata	granulari	0,70	0,33	4,56	456	167,3	44	40	114	44	45	46	47
3,00	190,00	3,067	62,0	sabbia limosa	addensata	granulari	0,75	0,35	5,70	570	205,4	44	41	120	45	45	47	48
3,20	265,00	6,600	40,2	sabbie argilloso-limose	addensata	granulari	0,80	0,37	7,95	795	290,4	46	42	130	46	46	48	48
3,40	178,00	6,067	29,3	limi argilloso-sabbiosi	dura	coesive	0,70	0,39	5,34	534	165,4	-----	-----	---	---	---	---	---
3,60	165,00	2,000	82,5	sabbia	addensata	granulari	0,75	0,41	4,95	495	141,3	43	40	112	44	44	46	47
3,80	209,00	5,267	39,7	sabbie argilloso-limose	addensata	granulari	0,70	0,43	6,27	627	178,9	44	41	119	45	45	46	47
4,00	435,00	0,267	1631,3	ghiaie	++add,	granulari	0,75	0,45	13,05	1305	422,5	47	44	143	48	48	49	49
4,20	259,00	6,000	43,2	sabbia limosa	addensata	granulari	0,70	0,47	7,77	777	209,3	44	42	124	45	46	47	48
4,40	249,00	0,533	466,9	ghiaie	med.add,	granulari	0,70	0,49	7,47	747	189,1	44	42	122	45	45	47	48
4,60	293,00	4,533	64,6	sabbia	addensata	granulari	0,70	0,51	8,79	879	220,5	45	43	126	46	46	47	48
4,80	574,00	---	---	---	++add,	---	0,70	0,53	17,22	1722	467,0	48	46	148	49	49	49	50
5,00	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,20	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,40	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,60	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

γ' = peso di unità di volume del terreno alleggerito

σ'vo = Tensione verticale geostatica (efficace) del terreno

Cu = coesione non drenata

Mo = Modulo confinato drenato (Mitchell & Gardner, 1975) non ricavato da prove su campioni

OCR = Rapporto di sovraconsolidazione (Ladd e Foot)

φ' (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ' (my) = angolo di attrito interno efficace (Meyerhof)

φ' (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ' (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ' (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ' (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

DR = Densità relativa (Harman)

Prova Penetrometrica Statica
Letture di Campagna/Valori di Resistenza

CPT 3

Committente	Arch. Andrea Brignoli	Data	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00
Località	Traversetolo	Prof. Falda	-2,50 metri
Provincia	Parma		

Profondità m	Letture Campagna punta	Letture Campagna laterale	qc kg/cm2	fs kg/cm2	RF
0,20	---	---	---	1,600	0,0
0,40	29	53	29,00	0,867	33,5
0,60	18	31	18,00	1,800	10,0
0,80	29	56	29,00	1,800	16,1
1,00	65	92	65,00	1,067	60,9
1,20	14	30	14,00	0,600	23,3
1,40	147	156	147,00	1,267	116,1
1,60	155	174	155,00	4,667	33,2
1,80	232	302	232,00	1,067	217,5
2,00	215	231	215,00	1,533	140,2
2,20	201	224	201,00	3,867	52,0
2,40	136	194	136,00	1,933	70,3
2,60	396	425	396,00	0,467	848,6
2,80	295	302	295,00	2,067	142,7
3,00	149	180	149,00	1,467	101,6
3,20	190	212	190,00	2,067	91,9
3,40	156	187	156,00	0,667	234,0
3,60	199	189	199,00	0,800	248,8
3,80	194	206	194,00	1,800	107,8
4,00	224	251	224,00	2,200	101,8
4,20	191	224	191,00	1,733	110,2
4,40	295	321	295,00	1,800	163,9
4,60	394	421	394,00	6,067	64,9
4,80	154	245	154,00	3,733	41,3
5,00	50	106	50,00	2,733	18,3
5,20	18	59	18,00	0,467	38,6
5,40	5	12	5,00	0,333	15,0
5,60	4	9	4,00	0,667	6,0
5,80	56	66	56,00	1,133	49,4
6,00	44	61	44,00	0,467	94,3
6,20	48	55	48,00	0,667	72,0
6,40	49	59	49,00	0,933	52,5
6,60	45	59	45,00	0,733	61,4
6,80	46	57	46,00	1,067	43,1
7,00	46	62	46,00	1,133	40,6
7,20	37	54	37,00	1,000	37,0
7,40	39	54	39,00	0,933	41,8
7,60	38	52	38,00	1,533	24,8
7,80	39	62	39,00	---	---
8,00	---	---	---	---	---
8,20	---	---	---	---	---
8,40	---	---	---	---	---
8,60	---	---	---	---	---
8,80	---	---	---	---	---
9,00	---	---	---	---	---
9,20	---	---	---	---	---
9,40	---	---	---	---	---
9,60	---	---	---	---	---
9,80	---	---	---	---	---
10,00	---	---	---	---	---
10,20	---	---	---	---	---
10,40	---	---	---	---	---
10,60	---	---	---	---	---
10,80	---	---	---	---	---
11,00	---	---	---	---	---
11,20	---	---	---	---	---
11,40	---	---	---	---	---
11,60	---	---	---	---	---
11,80	---	---	---	---	---
12,00	---	---	---	---	---
12,20	---	---	---	---	---
12,40	---	---	---	---	---
12,60	---	---	---	---	---
12,80	---	---	---	---	---
13,00	---	---	---	---	---
13,20	---	---	---	---	---
13,40	---	---	---	---	---
13,60	---	---	---	---	---
13,80	---	---	---	---	---
14,00	---	---	---	---	---
14,20	---	---	---	---	---
14,40	---	---	---	---	---
14,60	---	---	---	---	---
14,80	---	---	---	---	---
15,00	---	---	---	---	---
15,20	---	---	---	---	---

Penetrometro Statico tipo Pagani da 10/20 t
Costante di trasformazione Ct=10 - Velocità avanzamento punta 2cm/s
Punta meccanica tipo Begemann = 35,7 mm (area punta 10 mm2 - apertura 60°)
Manicotto laterale (superficie 150 cm2)

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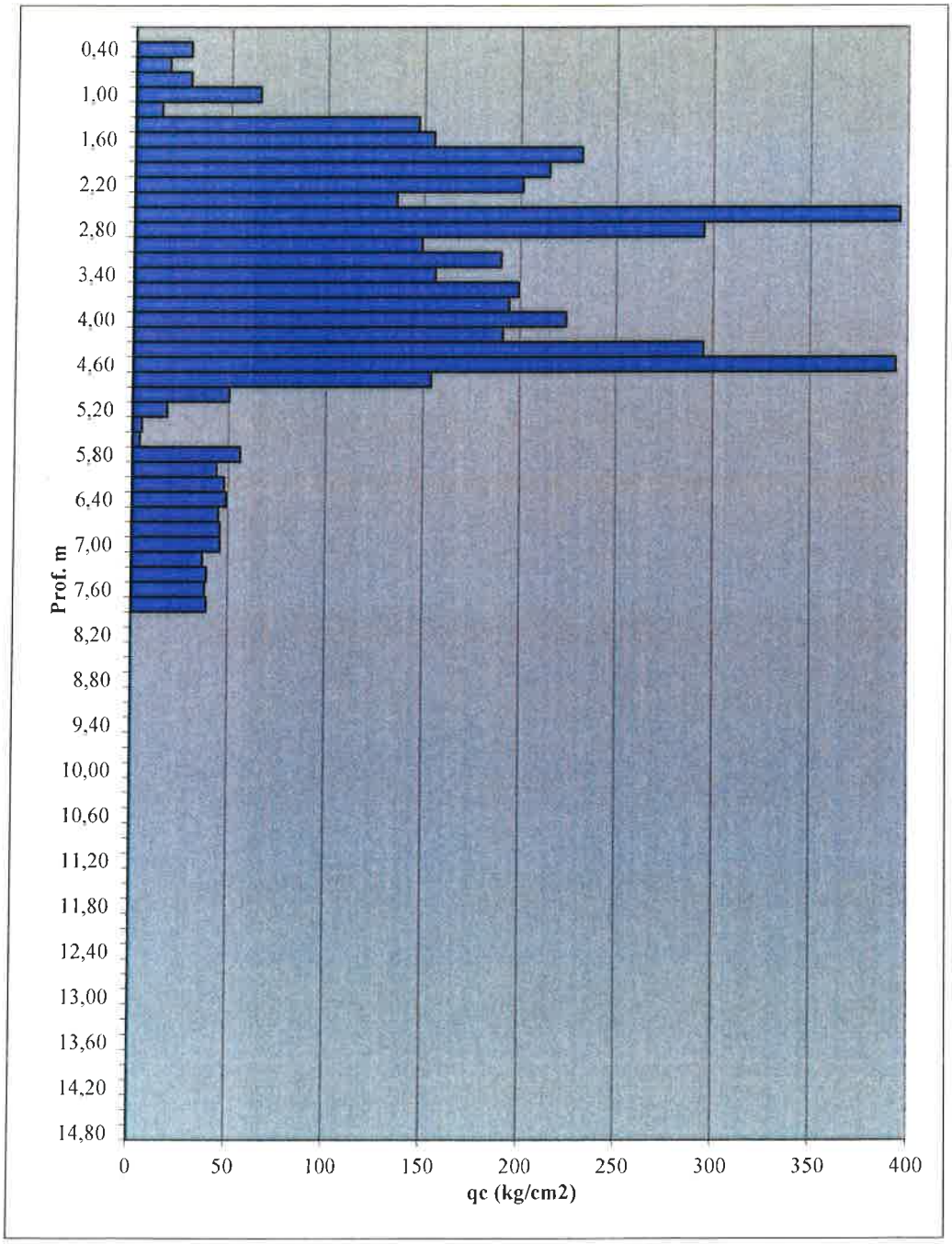
Prova Penetrometrica Statica CPT 3
Diagramma di Resistenza

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,50	metri
Provincia	Parma			

Resistenza alla Punta (Cone Resistence)

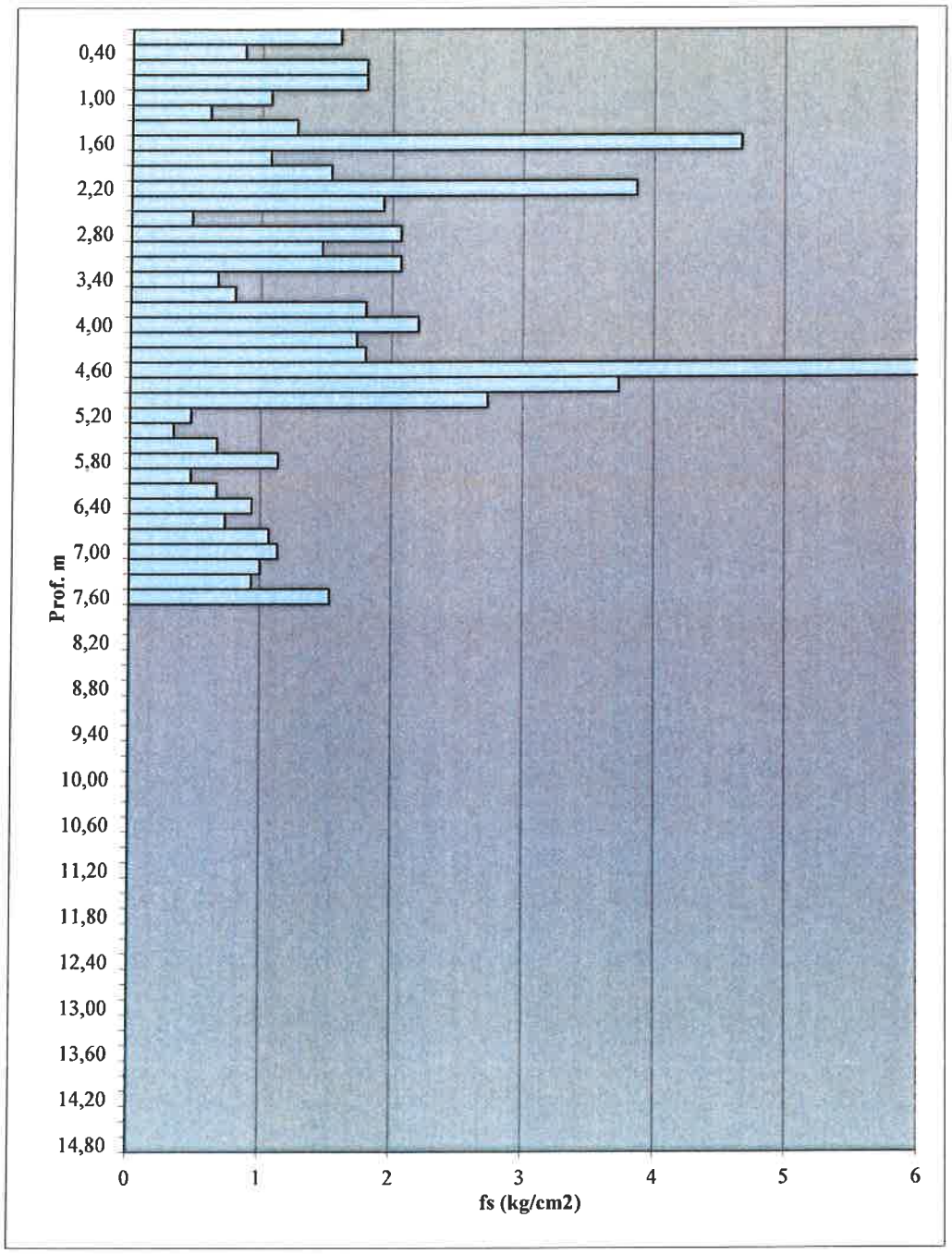


Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 3

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,50	metri
Provincia	Parma			

Resistenza Unitaria di attrito laterale locale



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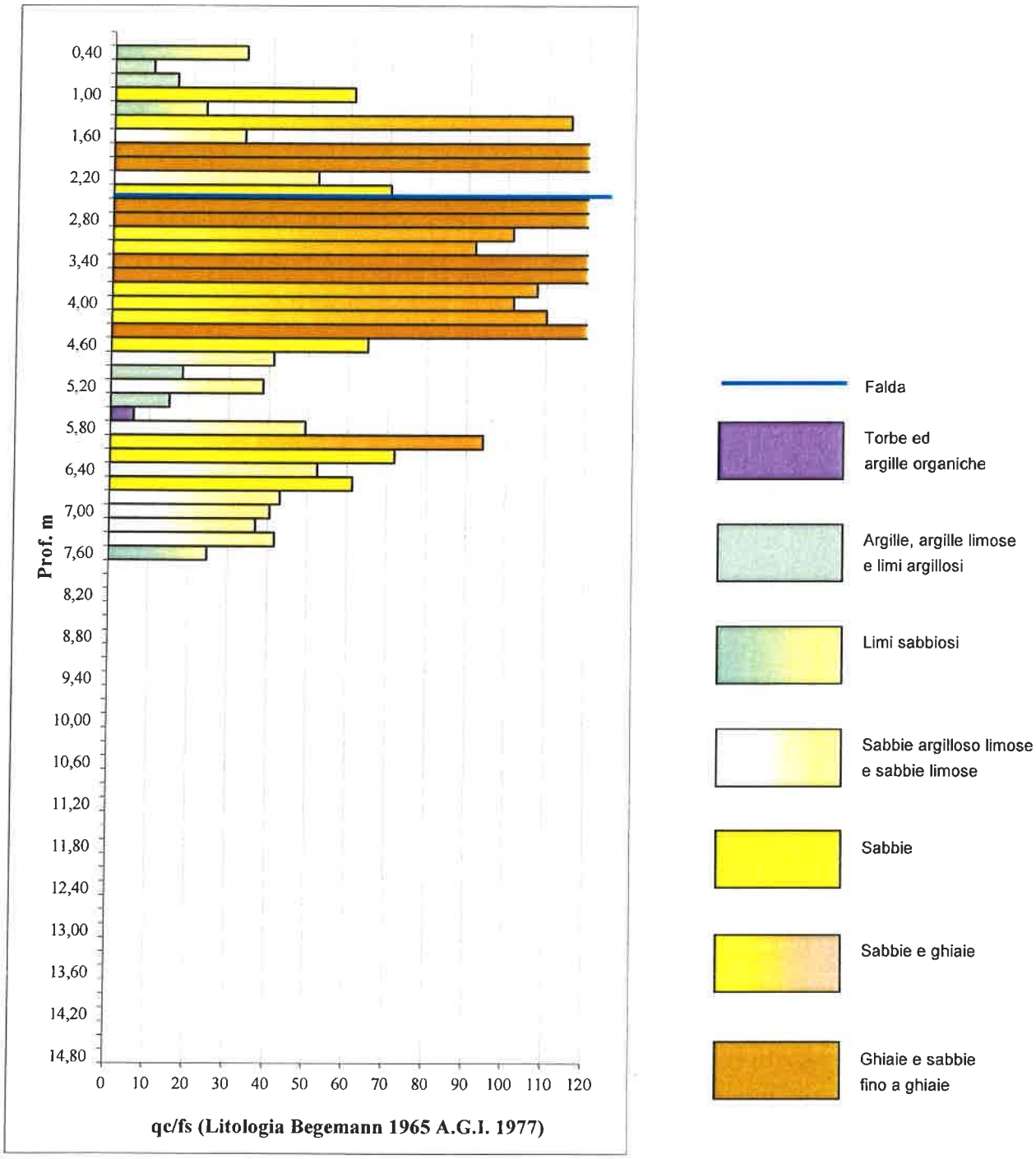
Prova Penetrometrica Statica
Valutazioni Litologiche

CPT 3

Committente	Arch. Andrea Brignoli	Data:	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00	
Località	Traversetolo	Prof. Falda:	-2,50	metri
Provincia	Parma			

Valutazioni Litologiche



Prova Penetrometrica Statica
Valutazioni Litologiche - Tabella Parametri Geotecnici

CPT 3

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	-2,50 metri
Provincia	Parma		

Prof.	qc	fs	RF	Litologia - Consistenza addensamento		Natura	γ	σ vo	Cu	Mo	OCR	φ (dm)	φ (my)	DR	φ (1s)	φ (2s)	φ (3s)	φ (4s)
m	kg/cm2	kg/cm2		(Begemann, 1977- Searle)			t/m3	kg/cm2			(-)	°	°	(%)	°	°	°	°
0,20	---	1,600	0,0	---	---	coesive	---	---	---	---	---	-----	-----	---	---	---	---	---
0,40	29,00	0,867	33,5	limi argilloso-sabbiosi	sciolta	granulari	0,85	0,07	1,02	58	122,3	43	32	94	41	42	44	46
0,60	18,00	1,800	10,0	argille	consistente	coesive	0,80	0,11	0,77	63	71,9	-----	-----	---	---	---	---	---
0,80	29,00	1,800	16,1	argilla limosa	++consistente	coesive	0,70	0,13	1,02	58	81,9	-----	-----	---	---	---	---	---
1,00	65,00	1,067	60,9	sabbia limosa	med.add,	granulari	0,80	0,15	1,95	195	155,0	43	36	104	43	43	45	46
1,20	14,00	0,600	23,3	limi argilloso-sabbiosi	consistente	coesive	0,70	0,17	0,63	49	32,3	-----	-----	---	---	---	---	---
1,40	147,00	1,267	116,1	sabbia e ghiaia	addensata	granulari	0,75	0,19	4,41	441	319,9	46	39	126	46	46	47	48
1,60	155,00	4,667	33,2	limi argilloso-sabbiosi	addensata	granulari	0,70	0,21	4,65	465	301,6	46	40	126	46	46	47	48
1,80	232,00	1,067	217,5	ghiaie	med.add,	granulari	0,70	0,23	6,96	696	445,6	47	41	137	47	47	48	49
2,00	215,00	1,533	140,2	ghiaie sabbiose	med.add,	granulari	0,75	0,25	6,45	645	365,1	46	41	133	47	47	48	49
2,20	201,00	3,867	52,0	sabbia limosa	addensata	granulari	0,70	0,27	6,03	603	304,8	46	41	128	46	46	47	48
2,40	136,00	1,933	70,3	sabbia	addensata	granulari	0,70	0,29	4,08	408	171,1	44	39	113	44	45	46	47
2,60	396,00	0,467	848,6	ghiaie	++add,	granulari	0,70	0,31	11,88	1188	598,6	48	44	148	49	49	49	50
2,80	295,00	2,067	142,7	ghiaie sabbiose	med.add,	granulari	0,70	0,33	8,85	885	383,2	47	43	137	47	47	48	49
3,00	149,00	1,467	101,6	sabbia e ghiaia	addensata	granulari	0,70	0,35	4,47	447	151,6	43	39	112	44	44	46	47
3,20	190,00	2,067	91,9	sabbia e ghiaia	addensata	granulari	0,70	0,37	5,70	570	191,6	44	41	119	45	45	46	48
3,40	156,00	0,667	234,0	ghiaie	med.add,	granulari	0,70	0,39	4,68	468	140,2	43	40	111	44	44	46	47
3,60	199,00	0,800	248,8	ghiaie	med.add,	granulari	0,70	0,41	5,97	597	178,6	44	41	118	45	45	46	47
3,80	194,00	1,800	107,8	sabbia e ghiaia	addensata	granulari	0,70	0,43	5,82	582	163,0	43	41	116	44	45	46	47
4,00	224,00	2,200	101,8	sabbia e ghiaia	addensata	granulari	0,70	0,45	6,72	672	184,3	44	41	120	45	45	46	48
4,20	191,00	1,733	110,2	sabbia e ghiaia	addensata	granulari	0,70	0,47	5,73	573	143,0	43	41	113	44	45	46	47
4,40	295,00	1,800	163,9	ghiaie	med.add,	granulari	0,70	0,49	8,85	885	233,8	45	43	127	46	46	47	48
4,60	394,00	6,067	64,9	sabbia	++add,	granulari	0,75	0,51	11,82	1182	319,3	46	44	136	47	47	48	49
4,80	154,00	3,733	41,3	sabbie argilloso-limose	addensata	granulari	0,80	0,53	4,62	462	94,0	41	40	103	42	43	45	46
5,00	50,00	2,733	18,3	limo argilloso	++consistente	coesive	0,75	0,55	1,50	150	22,0	-----	----	---	---	---	---	---
5,20	18,00	0,467	38,6	sabbie argilloso-limose	sciolta	granulari	0,80	0,57	0,77	63	9,2	31	30	28	32	35	37	40
5,40	5,00	0,333	15,0	argilla limosa	soffice	coesive	0,85	0,59	0,25	35	2,1	-----	-----	---	---	---	---	---
5,60	4,00	0,667	6,0	argille organiche	-------	coesive	0,75	0,61	0,20	35	1,6	-----	-----	---	---	---	---	---
5,80	56,00	1,133	49,4	sabbia limosa	med.add,	granulari	0,70	0,63	1,68	168	21,4	36	35	64	37	39	41	43
6,00	44,00	0,467	94,3	sabbia e ghiaia	med.add,	granulari	0,70	0,65	1,32	132	15,2	35	34	55	36	38	40	42
6,20	48,00	0,667	72,0	sabbia	med.add,	granulari	0,75	0,67	1,44	144	16,3	35	34	57	36	38	40	43
6,40	49,00	0,933	52,5	sabbia limosa	med.add,	granulari	0,70	0,69	1,47	147	16,2	35	34	57	36	38	40	43
6,60	45,00	0,733	61,4	sabbia limosa	med.add,	granulari	0,75	0,71	1,35	135	14,0	34	34	54	36	38	40	42
6,80	46,00	1,067	43,1	sabbia limosa	med.add,	granulari	0,75	0,73	1,38	138	13,9	34	34	54	36	38	40	42
7,00	46,00	1,133	40,6	sabbie argilloso-limose	med.add,	granulari	0,75	0,75	1,38	138	13,5	34	34	53	35	38	40	42
7,20	37,00	1,000	37,0	sabbie argilloso-limose	sciolta	granulari	0,75	0,77	1,11	111	9,9	33	33	45	34	37	39	42
7,40	39,00	0,933	41,8	sabbie argilloso-limose	sciolta	granulari	0,80	0,79	1,17	117	10,3	33	33	46	34	37	39	42
7,60	38,00	1,533	24,8	limi argilloso-sabbiosi	++consistente	coesive	0,70	0,81	1,14	114	9,6	-----	-----	---	---	---	---	---

γ' = peso di unità di volume del terreno alleggerito

σ vo = Tensione verticale geostatica (efficace) del terreno

Cu = coesione non drenata

Mo = Modulo confinato drenato (Mitchell & Gardner, 1975) non ricavato da prove su campioni

OCR = Rapporto di sovraconsolidazione (Ladd e Foot)

φ (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ (my) = angolo di attrito interno efficace (Meyerhof)

φ (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

DR = Densità relativa (Harman)

Prova Penetrometrica Statica
Valutazioni Litologiche - Tabella Parametri Geotecnici

CPT 3

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	-2,50 metri
Provincia	Parma		

Prof. m	qc kg/cm2	fs kg/cm2	RF	Litologia - Consistenza addensamento (Begemann, 1977- Searle)		Natura	γ t/m3	σ'vo kg/cm2	Cu	Mo	OCR (-)	φ (1s) °	φ (2s) °	DR (%)	φ (1s) °	φ (2s) °	φ (3s) °	φ (4s) °
7,80	39,00	---	---	---	---	---	0,70	0,83	1,17	117	9,6	33	33	41	34	37	39	42
8,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

γ' = peso di unità di volume del terreno alleggerito

$\sigma'vo$ = Tensione verticale geostatica (efficace) del terreno

Cu = coesione non drenata

Mo = Modulo confinato drenato (Mitchell & Gardner, 1975) non ricavato da prove su campioni

OCR = Rapporto di sovraconsolidazione (Ladd e Foot)

φ (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ (my) = angolo di attrito interno efficace (Meyerhof)

DR = Densità relativa (Harman)

φ (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

Prova Penetrometrica Statica
Letture di Campagna/Valori di Resistenza

CPT 4

Committente	Arch. Andrea Brignoli		Data	05/11/2014	
Cantiere	P.U.A. Traversetolo		Quota inizio	0,00	
Località	Traversetolo		Prof. Falda	-2,90	metri
Provincia	Parma				

Profondità m	Letture Campagna punta	laterale	qc kg/cm2	fs	RF
0,20	---	---	---	0,800	0,0
0,40	9	21	9,00	0,600	15,0
0,60	17	26	17,00	1,000	17,0
0,80	16	31	16,00	1,200	13,3
1,00	12	30	12,00	1,733	6,9
1,20	47	73	47,00	0,667	70,5
1,40	197	207	197,00	2,200	89,5
1,60	201	234	201,00	3,533	56,9
1,80	105	158	105,00	0,467	225,0
2,00	286	293	286,00	4,333	66,0
2,20	297	362	297,00	1,933	153,6
2,40	313	342	313,00	3,733	83,8
2,60	268	324	268,00	1,867	143,6
2,80	189	217	189,00	3,133	60,3
3,00	524	571	524,00	---	---
3,20	---	---	---	---	---
3,40	---	---	---	---	---
3,60	---	---	---	---	---
3,80	---	---	---	---	---
4,00	---	---	---	---	---
4,20	---	---	---	---	---
4,40	---	---	---	---	---
4,60	---	---	---	---	---
4,80	---	---	---	---	---
5,00	---	---	---	---	---
5,20	---	---	---	---	---
5,40	---	---	---	---	---
5,60	---	---	---	---	---
5,80	---	---	---	---	---
6,00	---	---	---	---	---
6,20	---	---	---	---	---
6,40	---	---	---	---	---
6,60	---	---	---	---	---
6,80	---	---	---	---	---
7,00	---	---	---	---	---
7,20	---	---	---	---	---
7,40	---	---	---	---	---
7,60	---	---	---	---	---

Profondità m	Letture Campagna punta	laterale	qc kg/cm2	fs	RF
7,80	---	---	---	---	---
8,00	---	---	---	---	---
8,20	---	---	---	---	---
8,40	---	---	---	---	---
8,60	---	---	---	---	---
8,80	---	---	---	---	---
9,00	---	---	---	---	---
9,20	---	---	---	---	---
9,40	---	---	---	---	---
9,60	---	---	---	---	---
9,80	---	---	---	---	---
10,00	---	---	---	---	---
10,20	---	---	---	---	---
10,40	---	---	---	---	---
10,60	---	---	---	---	---
10,80	---	---	---	---	---
11,00	---	---	---	---	---
11,20	---	---	---	---	---
11,40	---	---	---	---	---
11,60	---	---	---	---	---
11,80	---	---	---	---	---
12,00	---	---	---	---	---
12,20	---	---	---	---	---
12,40	---	---	---	---	---
12,60	---	---	---	---	---
12,80	---	---	---	---	---
13,00	---	---	---	---	---
13,20	---	---	---	---	---
13,40	---	---	---	---	---
13,60	---	---	---	---	---
13,80	---	---	---	---	---
14,00	---	---	---	---	---
14,20	---	---	---	---	---
14,40	---	---	---	---	---
14,60	---	---	---	---	---
14,80	---	---	---	---	---
15,00	---	---	---	---	---
15,20	---	---	---	---	---

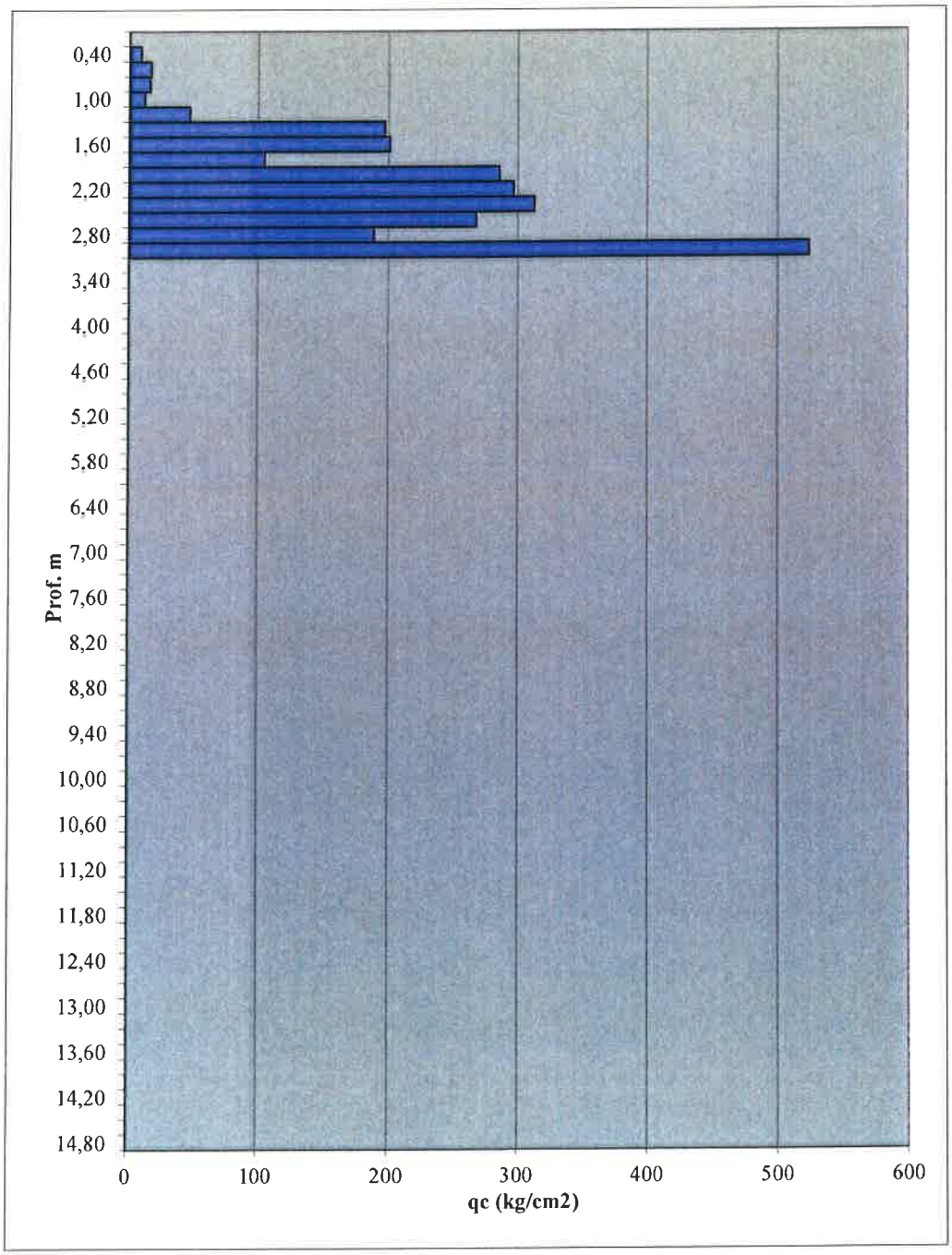
Penetrometro Statico tipo Pagani da 10/20 t
Costante di trasformazione Ct=10 - Velocità avanzamento punta 2cm/s
Punta meccanica tipo Begemann = 35,7 mm (area punta 10 mm2 - apertura 60°)
Manicotto laterale (superficie 150 cm2)

Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 4

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,90	metri
Provincia	Parma			

Resistenza alla Punta (Cone Resistence)

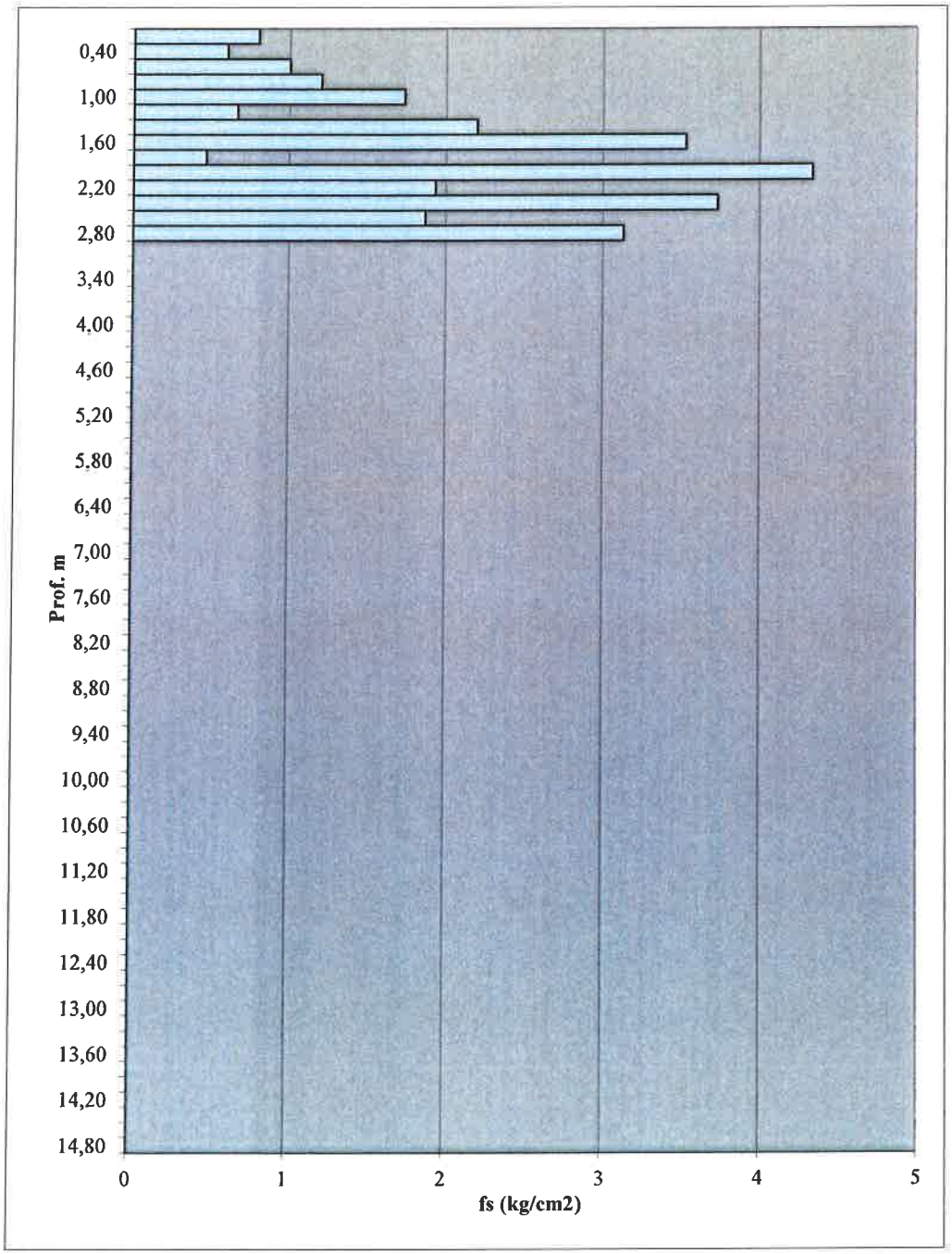


Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 4

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,90	metri
Provincia	Parma			

Resistenza Unitaria di attrito laterale locale



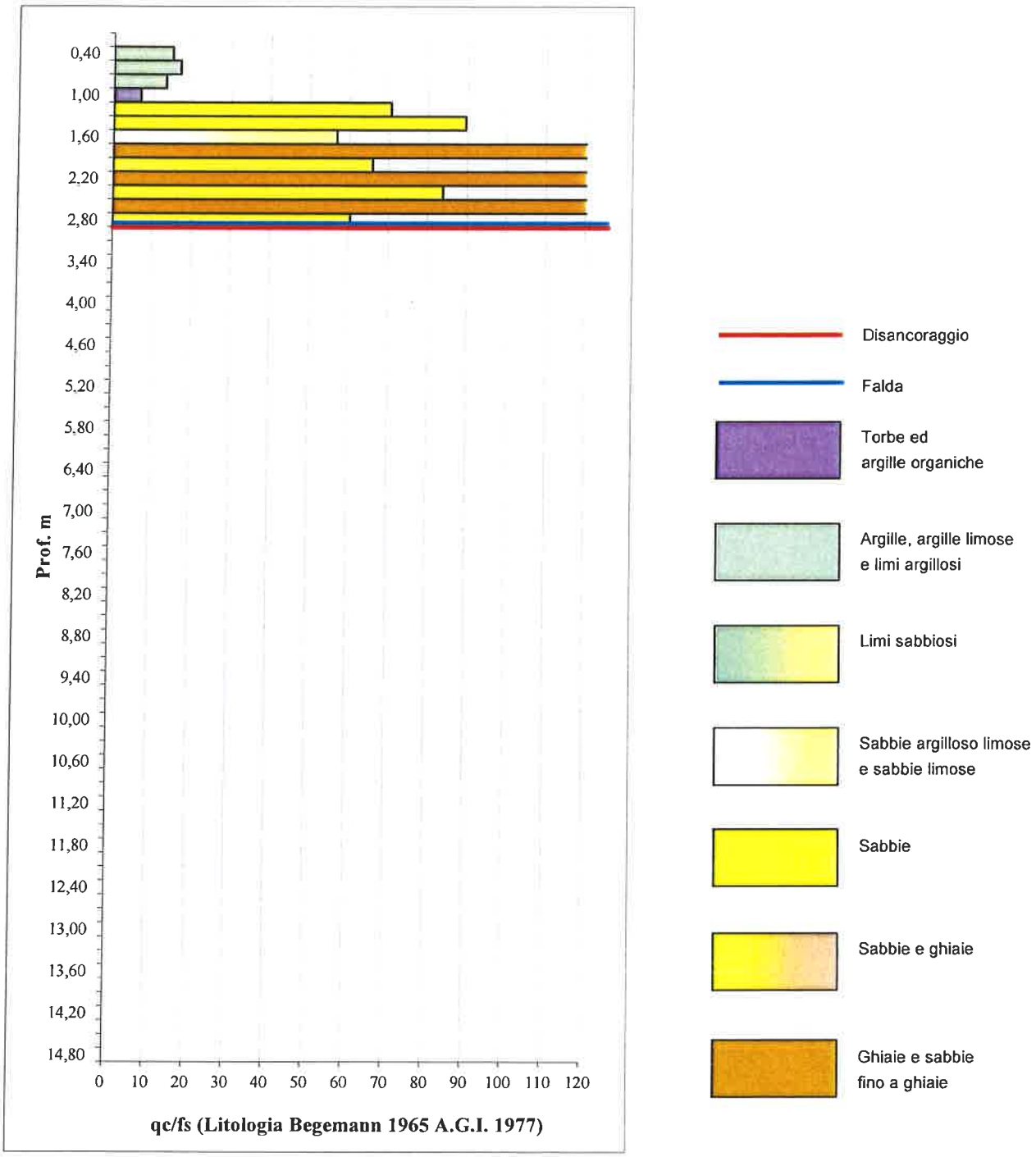
43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Prova Penetrometrica Statica
Valutazioni Litologiche

CPT 4

Committente	Arch. Andrea Brignoli	Data:	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00	
Località	Traversetolo	Prof. Falda:	-2,90	metri
Provincia	Parma			

Valutazioni Litologiche



Prova Penetrometrica Statica CPT 4
Valutazioni Litologiche - Tabella Parametri Geotecnici

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	-2,90 metri
Provincia	Parma		

Prof.	qc	fs	RF	Litologia - Consistenza addensamento (Begemann, 1977- Seerle)		Natura	γ'	σ'vo	Cu	Mo	OCR	φ' (dm)	φ' (my)	DR	φ' (1s)	φ' (2s)	φ' (3s)	φ' (4s)
m	kg/cm2	kg/cm2		(Begemann, 1977- Seerle)			t/m3	kg/cm2			(-)	°	°	(%)	°	°	°	°
0,20	---	0,800	0,0	---	---	coesive	---	---	---	---	---	-----	-----	---	---	---	---	---
0,40	9,00	0,600	15,0	argilla limosa	plastica	coesive	0,80	0,07	0,45	35	44,3	-----	-----	---	---	---	---	---
0,60	17,00	1,000	17,0	limo argilloso	consistente	coesive	0,85	0,11	0,73	60	67,0	-----	-----	---	---	---	---	---
0,80	16,00	1,200	13,3	argilla limosa	consistente	coesive	0,85	0,13	0,69	56	50,4	-----	-----	---	---	---	---	---
1,00	12,00	1,733	6,9	argille organiche	--------	coesive	0,70	0,15	0,54	42	31,1	-----	-----	---	---	---	---	---
1,20	47,00	0,667	70,5	sabbia	med.add,	granulari	0,70	0,17	1,41	141	88,4	41	34	90	41	42	43	45
1,40	197,00	2,200	89,5	sabbia	addensata	granulari	0,75	0,19	5,91	591	461,2	47	41	136	47	47	48	49
1,60	201,00	3,533	56,9	sabbia limosa	addensata	granulari	0,70	0,21	6,03	603	417,3	47	41	135	47	47	48	49
1,80	105,00	0,467	225,0	ghiaie	sciolta	granulari	0,70	0,23	3,15	315	165,4	43	38	110	43	44	46	47
2,00	286,00	4,333	66,0	sabbia	addensata	granulari	0,70	0,25	8,58	858	521,5	48	42	142	48	48	49	49
2,20	297,00	1,933	153,6	ghiaie sabbiose	med.add,	granulari	0,70	0,27	8,91	891	496,6	48	43	142	48	48	49	49
2,40	313,00	3,733	83,8	sabbia	++add,	granulari	0,70	0,29	9,39	939	484,9	48	43	142	48	48	49	49
2,60	268,00	1,867	143,6	ghiaie sabbiose	med.add,	granulari	0,70	0,31	8,04	804	367,5	47	42	135	47	47	48	49
2,80	189,00	3,133	60,3	sabbia limosa	addensata	granulari	0,70	0,33	5,67	567	219,6	45	41	122	45	45	47	48
3,00	524,00	---	---	---	++add,	---	0,70	0,35	15,72	1572	730,0	49	45	155	50	49	50	50
3,20	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
3,40	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
3,60	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
3,80	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
4,00	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
4,20	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
4,40	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
4,60	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
4,80	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,00	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,20	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,40	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,60	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---
5,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

γ' = peso di unità di volume del terreno alleggerito

σ'vo = Tensione verticale geostatica (efficace) del terreno

Cu = coesione non drenata

Mo = Modulo confinato drenato (Mitchell & Gardner, 1975) non ricavato da prove su campioni

OCR = Rapporto di sovraconsolidazione (Ladd e Foot)

φ' (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ' (my) = angolo di attrito interno efficace (Meyerhof)

φ' (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ' (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ' (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ' (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

DR = Densità relativa (Harman)

Prova Penetrometrica Statica
Letture di Campagna/Valori di Resistenza

CPT 5

Committente	Arch. Andrea Brignoli		Data	05/11/2014	
Cantiere	P.U.A. Traversetolo		Quota inizio	0,00	
Località	Traversetolo		Prof. Falda	-2,60	metri
Provincia	Parma				

Profondità m	Letture Campagna punta	laterale	qc kg/cm2	fs kg/cm2	RF
0,20	---	---	---	0,800	0,0
0,40	15	27	15,00	1,533	9,8
0,60	32	55	32,00	1,467	21,8
0,80	35	57	35,00	1,867	18,8
1,00	44	72	44,00	3,067	14,3
1,20	60	106	60,00	2,400	25,0
1,40	144	180	144,00	2,600	55,4
1,60	99	138	99,00	2,467	40,1
1,80	115	152	115,00	1,533	75,0
2,00	128	151	128,00	2,800	45,7
2,20	149	191	149,00	3,867	38,5
2,40	136	194	136,00	1,933	70,3
2,60	396	425	396,00	0,467	848,6
2,80	295	302	295,00	2,067	142,7
3,00	149	180	149,00	1,467	101,6
3,20	190	212	190,00	4,333	43,8
3,40	297	362	297,00	1,933	153,6
3,60	313	342	313,00	3,733	83,8
3,80	268	324	268,00	1,867	143,6
4,00	189	217	189,00	3,133	60,3
4,20	524	571	524,00	---	---
4,40	---	---	---	---	---
4,60	---	---	---	---	---
4,80	---	---	---	---	---
5,00	---	---	---	---	---
5,20	---	---	---	---	---
5,40	---	---	---	---	---
5,60	---	---	---	---	---
5,80	---	---	---	---	---
6,00	---	---	---	---	---
6,20	---	---	---	---	---
6,40	---	---	---	---	---
6,60	---	---	---	---	---
6,80	---	---	---	---	---
7,00	---	---	---	---	---
7,20	---	---	---	---	---
7,40	---	---	---	---	---
7,60	---	---	---	---	---

Profondità m	Letture Campagna punta	laterale	qc kg/cm2	fs kg/cm2	RF
7,80	---	---	---	---	---
8,00	---	---	---	---	---
8,20	---	---	---	---	---
8,40	---	---	---	---	---
8,60	---	---	---	---	---
8,80	---	---	---	---	---
9,00	---	---	---	---	---
9,20	---	---	---	---	---
9,40	---	---	---	---	---
9,60	---	---	---	---	---
9,80	---	---	---	---	---
10,00	---	---	---	---	---
10,20	---	---	---	---	---
10,40	---	---	---	---	---
10,60	---	---	---	---	---
10,80	---	---	---	---	---
11,00	---	---	---	---	---
11,20	---	---	---	---	---
11,40	---	---	---	---	---
11,60	---	---	---	---	---
11,80	---	---	---	---	---
12,00	---	---	---	---	---
12,20	---	---	---	---	---
12,40	---	---	---	---	---
12,60	---	---	---	---	---
12,80	---	---	---	---	---
13,00	---	---	---	---	---
13,20	---	---	---	---	---
13,40	---	---	---	---	---
13,60	---	---	---	---	---
13,80	---	---	---	---	---
14,00	---	---	---	---	---
14,20	---	---	---	---	---
14,40	---	---	---	---	---
14,60	---	---	---	---	---
14,80	---	---	---	---	---
15,00	---	---	---	---	---
15,20	---	---	---	---	---

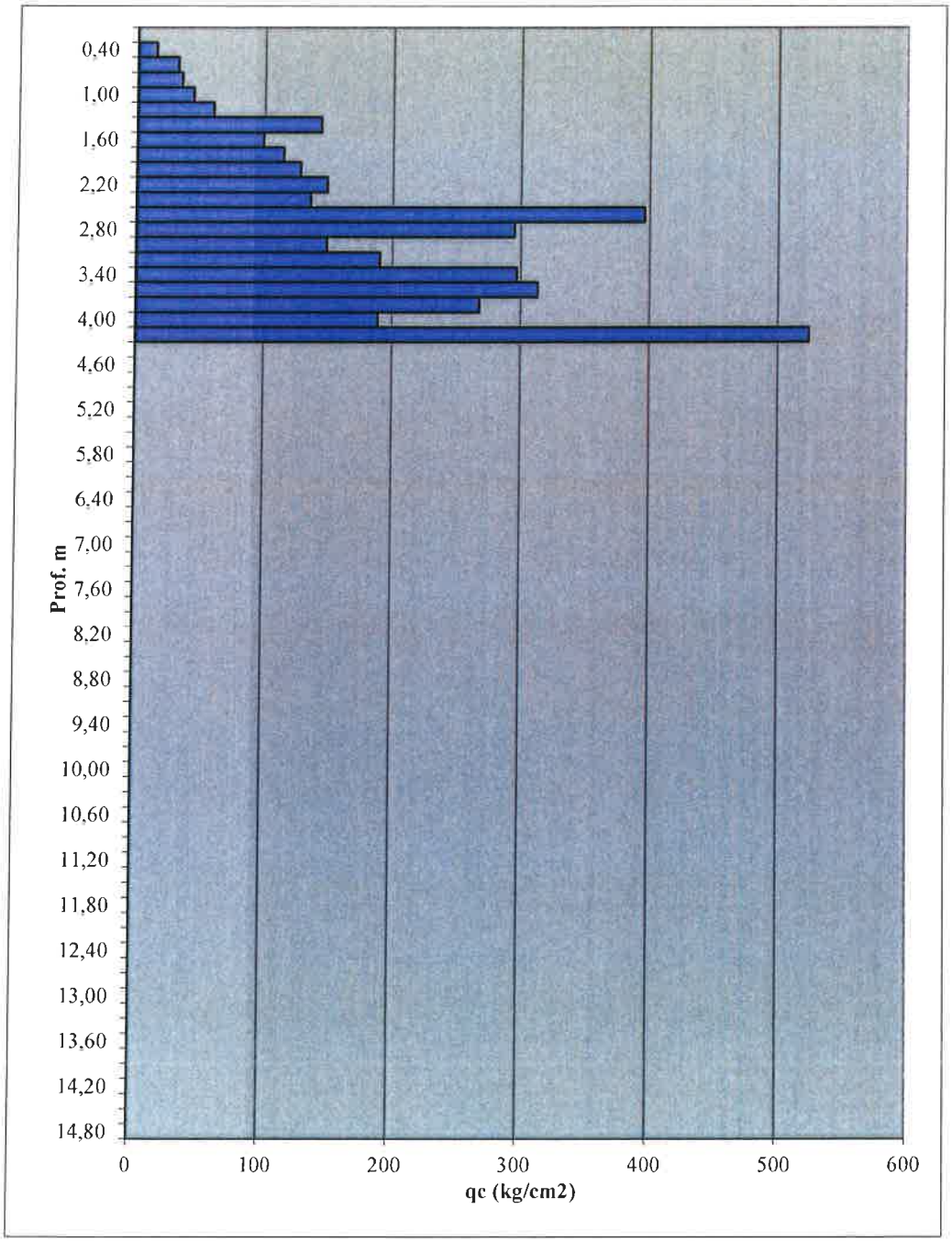
Penetrometro Statico tipo Pagani da 10/20 t
Costante di trasformazione Ct=10 - Velocità avanzamento punta 2cm/s
Punta meccanica tipo Begemann = 35,7 mm (area punta 10 mm2 - apertura 60°)
Manicotto laterale (superficie 150 cm2)

43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Prova Penetrometrica Statica CPT 5
Diagramma di Resistenza

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,60	metri
Provincia	Parma			

Resistenza alla Punta (Cone Resistence)



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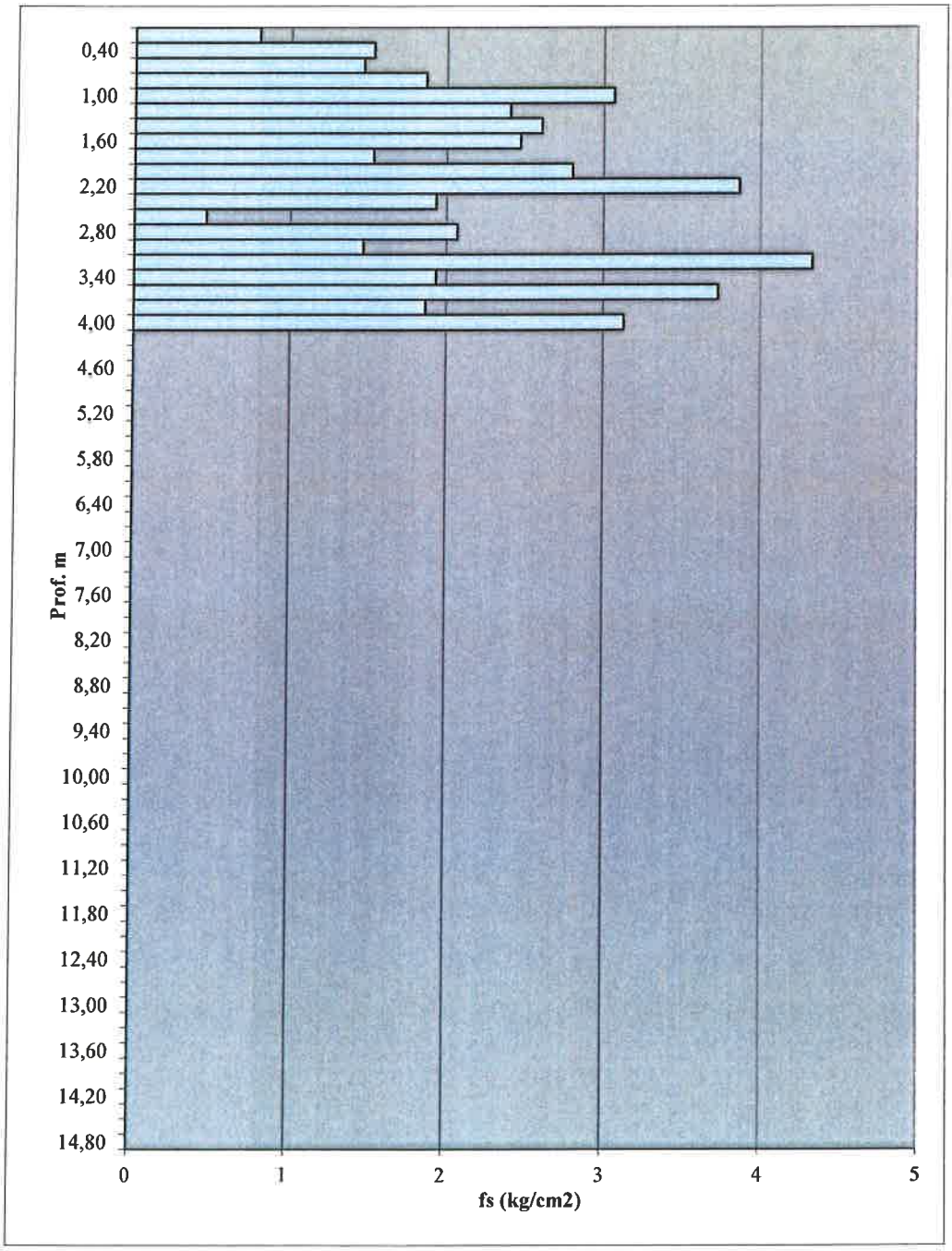
Prova Penetrometrica Statica
Diagramma di Resistenza

CPT 5

Committente	Arch. Andrea Brignoli	Data	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio	0,00	
Località	Traversetolo	Prof. Falda	-2,60	metri
Provincia	Parma			

Resistenza Unitaria di attrito laterale locale



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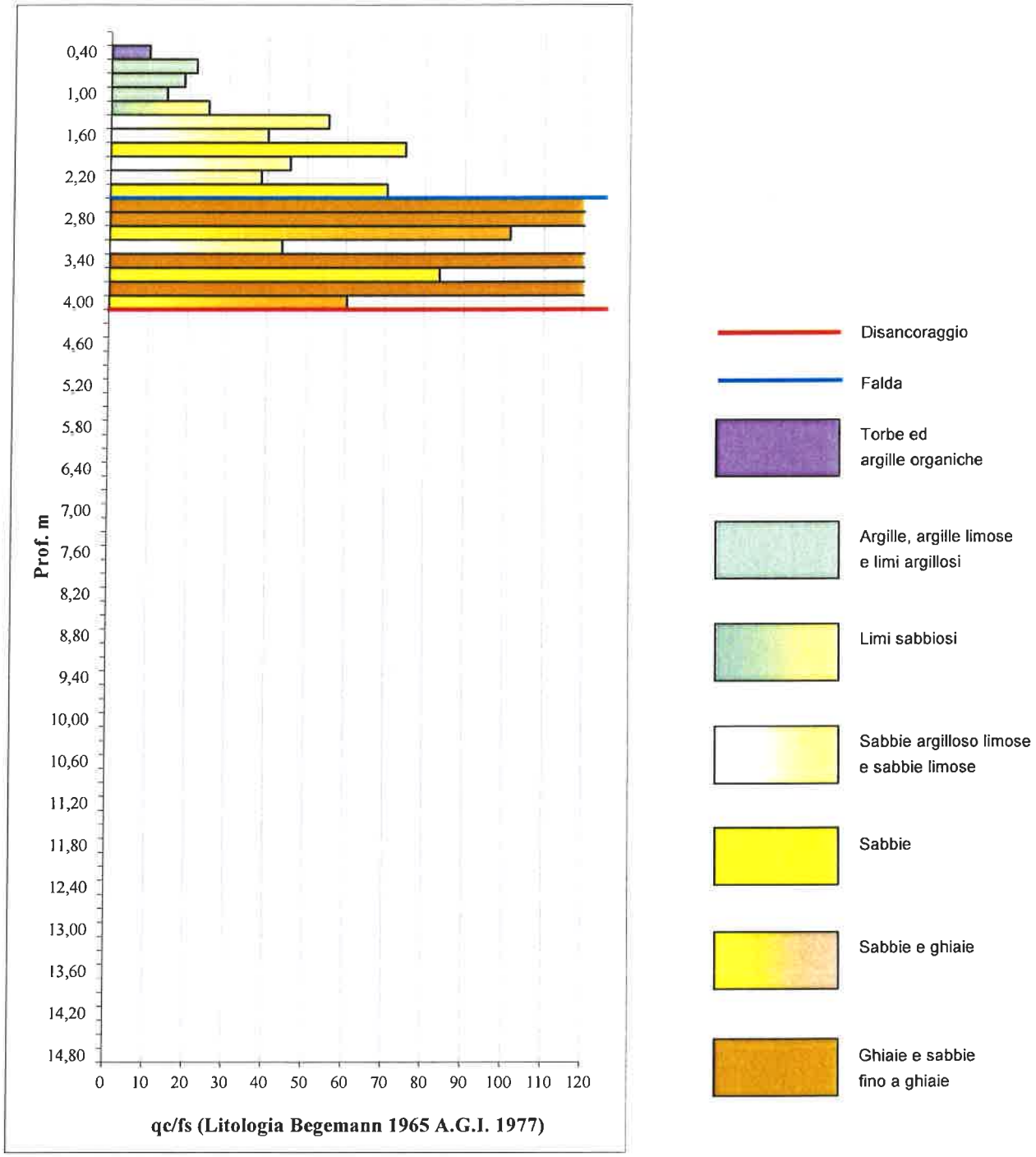
Prova Penetrometrica Statica
Valutazioni Litologiche

CPT 5

Committente	Arch. Andrea Brignoli	Data:	05/11/2014	
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00	
Località	Traversetolo	Prof. Falda:	-2,60	metri
Provincia	Parma			

Valutazioni Litologiche



43030 San Michele Tiorre - Felino (PR) Via Cotti, 13 Tel. 0521-336.192 Fax 0521-336.193 E-mail info@studiomac.it

Prova Penetrometrica Statica CPT 5

Valutazioni Litologiche - Tabella Parametri Geotecnici

Committente	Arch. Andrea Brignoli	Data:	05/11/2014
Cantiere	P.U.A. Traversetolo	Quota inizio:	0,00
Località	Traversetolo	Prof. Falda:	-2,60 metri
Provincia	Parma		

Prof.	qc	fs	RF	Litologia - Consistenza addensamento		Natura	γ	σ'vo	Cu	Mo	OCR	φ (dm)	φ (my)	DR	φ (1s)	φ (2s)	φ (3s)	φ (4s)
m	kg/cm2	kg/cm2		(Begemann, 1977- Searle)			t/m3	kg/cm2			(-)	°	°	(%)	°	°	°	°
0,20	---	0,800	0,0	---	---	coesive	---	---	---	---	---	-----	-----	---	---	---	---	---
0,40	15,00	1,533	9,8	argille organiche	--------	coesive	0,80	0,07	0,65	53	69,4	-----	-----	---	---	---	---	---
0,60	32,00	1,467	21,8	limo argilloso	++consistente	coesive	0,80	0,11	1,06	96	106,1	-----	-----	---	---	---	---	---
0,80	35,00	1,867	18,8	limo argilloso	++consistente	coesive	0,85	0,13	1,05	105	85,5	-----	-----	---	---	---	---	---
1,00	44,00	3,067	14,3	argilla limosa	dura	coesive	0,80	0,15	1,32	132	95,2	-----	-----	---	---	---	---	---
1,20	60,00	2,400	25,0	limi argilloso-sabbiosi	dura	coesive	0,75	0,17	1,80	180	119,9	-----	-----	---	---	---	---	---
1,40	144,00	2,600	55,4	sabbia limosa	addensata	granulari	0,75	0,19	4,32	432	311,7	46	39	125	46	46	47	48
1,60	99,00	2,467	40,1	sabbie argilloso-limose	med.add.	granulari	0,70	0,21	2,97	297	172,2	43	38	110	43	44	46	47
1,80	115,00	1,533	75,0	sabbia	addensata	granulari	0,75	0,23	3,45	345	185,3	44	38	113	44	45	46	47
2,00	128,00	2,800	45,7	sabbia limosa	addensata	granulari	0,75	0,25	3,84	384	190,9	44	39	115	44	45	46	47
2,20	149,00	3,867	38,5	sabbie argilloso-limose	addensata	granulari	0,70	0,27	4,47	447	209,7	44	39	118	45	45	46	47
2,40	136,00	1,933	70,3	sabbia	addensata	granulari	0,70	0,29	4,08	408	171,1	44	39	113	44	45	46	47
2,60	396,00	0,467	848,6	ghiaie	++add.	granulari	0,70	0,31	11,88	1188	598,6	48	44	148	49	49	49	50
2,80	295,00	2,067	142,7	ghiaie sabbiose	med.add.	granulari	0,70	0,33	8,85	885	383,2	47	43	137	47	47	48	49
3,00	149,00	1,467	101,6	sabbia e ghiaia	addensata	granulari	0,75	0,35	4,47	447	151,6	43	39	112	44	44	46	47
3,20	190,00	4,333	43,8	sabbia limosa	addensata	granulari	0,70	0,37	5,70	570	191,6	44	41	119	45	45	46	48
3,40	297,00	1,933	153,6	ghiaie sabbiose	med.add.	granulari	0,70	0,39	8,91	891	313,6	46	43	133	47	47	48	49
3,60	313,00	3,733	83,8	sabbia	++add.	granulari	0,70	0,41	9,39	939	314,6	46	43	134	47	47	48	49
3,80	268,00	1,867	143,6	ghiaie sabbiose	med.add.	granulari	0,70	0,43	8,04	804	244,1	45	42	127	46	46	47	48
4,00	189,00	3,133	60,3	sabbia limosa	addensata	granulari	0,70	0,45	5,67	567	149,0	43	41	114	44	45	46	47
4,20	524,00	---	---	---	++add.	---	0,70	0,47	15,72	1572	505,0	48	45	148	49	49	49	50
4,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6,80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7,60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

γ = peso di unità di volume del terreno alleggerito

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φ (dm) = angolo di attrito interno efficace (Durgunoglu&Mitchell)

φ (my) = angolo di attrito interno efficace (Meyerhof)

φ (1s) = angolo di attrito interno efficace - sabbia fine unif.(Schmertmann)

φ (2s) = angolo di attrito interno efficace - sabbia media unif. (Schmertmann)

φ (3s) = angolo di attrito interno efficace - sabbia grossa unif.(Schmertmann)

φ (4s) = angolo di attrito interno efficace - sabbia-ghiaia (Schmertmann)

DR = Densità relativa (Harman)

ALLEGATO 2

Documentazione Fotografica


Faraday