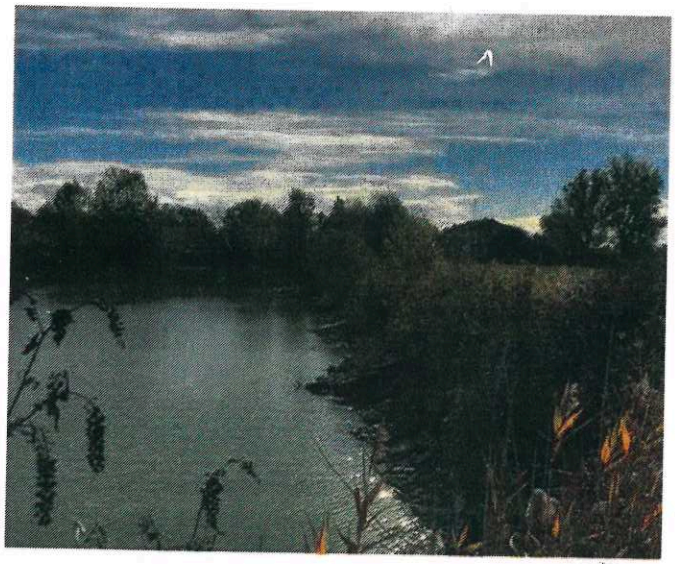
Progetto Strutturale

LAVORI DI RIPRISTINO FUNZIONALE DELLA SPONDA DEL LAGO SITO PRESSO L'AREA DI RIEQUILIBRIO ECOLOGICO SAN MATTEO DI MEDOLLA

Fg.8 Map.li 27-28-29-34-106-107 - Via Rubadello n°1 - 41036 - Medolla (MO)

PROGETTO ESECUTIVO



Progettazione:

ISG Equipment S.r.l.s.
Ingegneria Sismica e Strutture, Geofisica e Geologia

-Coordinamento Generale;
-Progettazione Specialistica Geologica-Geotecnica;

Dott. Geol. Lorenzo Del Maschio

-Progettazione Architettonica e Strutturale;
-Coordinamento della sicurezza in fase di progettazione;

Ing. Gabriele Mungo Zanetti

Committente:

Comune di Medolla

-Responsabile Unico del Procedimento
Geom. Lorenzo Guagliumi

Relazione Geologico-Geotecnica

Codice Progetto	Scala	Codice Elaborato
007-2018-P2	1:100	**E-00-S-R-06**

Rev.	Data	Descrizione revisione	Dis.	Contr.
a	Dicembre 2018	emissione	ldm	gmz

Progetto Strutturale

LAVORI DI RIPRISTINO FUNZIONALE DELLA SPONDA DEL LAGO SITO PRESSO L'AREA DI RIEQUILIBRIO ECOLOGICO SAN MATTEO DI MEDOLLA

Fg.8 Map.li 27-28-29-34-106-107 - Via Rubadello n°1 - 41036 - Medolla (MO)

PROGETTO ESECUTIVO

Progettazione:

ISG Equipment S.r.l.s.

Ingegneria Sismica e Strutture, Geofisica e Geologia

-Coordinamento Generale;
-Progettazione Specialistica Geologica-Geotecnica;

Dott. Geol. Lorenzo Del Maschio

-Progettazione Architettonica e Strutturale;
-Coordinamento della sicurezza in fase di progettazione;

Ing. Gabriele Mungo Zanetti

Committente:

Comune di Medolla

-Responsabile Unico del Procedimento
Geom. Lorenzo Guagliumi

Relazione Geologico-Geotecnica

Codice Progetto	Scala	Codice Elaborato
007-2018-P2	1:100	**E-00-S-R-06**

Rev.	Data	Descrizione revisione	Dis.	Contr.
a	Dicembre 2018	emissione	ldm	gmz

c:\users\utente\desktop\0_medolla-guagliumi\medolla-palancole\xrif\copertine medolla-ripristino sponda.dwg

STUDIO DI GEOLOGIA TECNICA
Dott. Geol. LORENZO DEL MASCHIO
Via Camogli 59 - 41125 Modena
Tel 347/4128277 - Fax 059/394816
e-mail delmaschio.l@alice.it
PEC delmaschio.l@epap.sicurezzapostale.it

COMUNE DI MEDOLLA
PROVINCIA DI MODENA

OGGETTO:

RELAZIONE GEOLOGICA A CORREDO DEL PROGETTO DI FATTIBILITA' TECNICO-ECONOMICO FINALIZZATO AI LAVORI DI RIPRISTINO DELLA SPONDA DEL LAGO PRESSO L'AREA DI RIEQUILIBRIO ECOLOGICO SAN MATTEO IN COMUNE DI MEDOLLA

LOCALITÀ:
Medolla - Via Rubadello

COMMITTENTE
Comune di Medolla

ORDINE DEI GEOLOGI DEL LAZIO
Dott.
LORENZO
DEL MASCHIO
Geologo
A.P. n.1725

INDICE GENERALE

1. PREMESSA 1

2. INQUADRAMENTO GEOGRAFICO DELL'AREA 1
a. Riferimenti cartografici 1
b. Copertura aerofotogrammetrica 1
c. Riferimenti catastali 1

3. INQUADRAMENTO NORMATIVO 3

4. USO DEL SUOLO 4

5. INDAGINI REALIZZATE 5

6. INQUADRAMENTO GEOLOGICO E GEOMORFOLOGICO 6

7. VERIFICA A LIQUEFAZIONE 11

8. CARATTERIZZAZIONE GEOLOGICO-TECNICA DEL SITO 28
a. Indagini geofisiche 28
a1. I dati ottenuti 28
a2. Interpretazione delle indagini 28
b. Indagini geognostiche 36
b1. I dati ottenuti 36
b2. Interpretazione delle indagini 36

9. CARATTERIZZAZIONE IDROGEOLOGICA DEL SITO 64

10. PERICOLOSITA' SISMICA DI BASE E LOCALE 72
a. Sismicità delle aree di interesse 72
b. Sismicità storica delle aree di intervento 73
c. Individuazione della pericolosità sismica del sito 75

11. CONSIDERAZIONI CONCLUSIVE 78

12. ALLEGATI 83

1. PREMESSA

Su incarico dell'amministrazione comunale di Medolla, è stato redatto lo studio della sponda del lago presso l'area di riequilibrio ecologico San Matteo per il progetto di fattibilità tecnico-economica e finalizzato all'individuazione della corretta soluzione progettuale da porre in essere per l'intervento di consolidamento della sponda stessa, in comune di Medolla. La problematica riscontrata alla stato attuale è il fenomeno di retrogressione della sponda del lago dovuta all'instabilità della scarpata stessa che sta progressivamente arretrando ed interessando la vicina proprietà privata.
L'indagine è stata effettuata mediante reperimento di materiale bibliografico conoscitivo, sopralluoghi, rilievi diretti sul sito e indagini geognostiche e sismiche.

2. INQUADRAMENTO GEOGRAFICO - AMMINISTRATIVO

L'area di intervento è ubicata in Medolla, in via Rubadello
I principali riferimenti sono:

a. Riferimenti cartografici (fig. 2.1 - 2.2)

C.T.R.: Tavola 184 SO (1:25.000);
Sezione 184140 (1:10.000);
Elemento 184144 (1:5000).

b. Copertura aereofotogrammetrica

- Foto aeree RER 1954
- Foto aeree RER 1973-1978
- Ortofoto digitali AIMA 1996
- Ortofoto digitali Terraitaly 2000
- Ortofoto digitali QB 2003
- Ortofoto AGEA-RER 2008
- Ortofoto AGEA-RER 2011

c. Riferimenti catastali

Foglio 8, Mappale 28 - Comune di Medolla

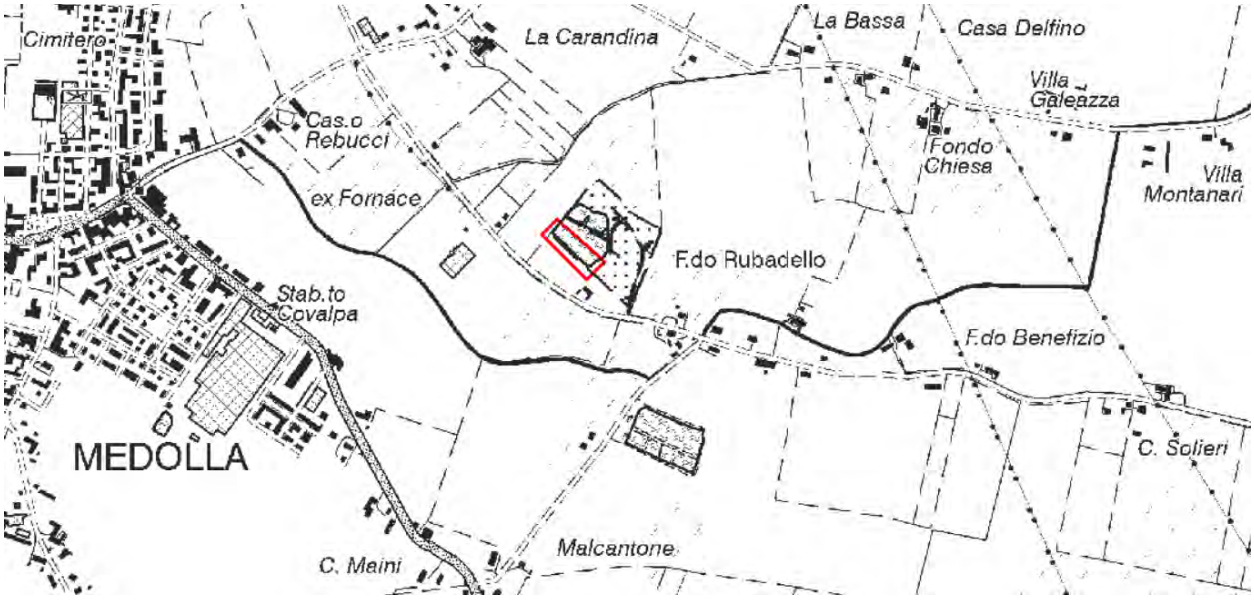


Figura 2.1: Localizzazione area di indagine su C.T.R. a scala 1:25.000.

Figura 2.2: Localizzazione area di indagine su C.T.R. a scala 1:5.000.

3. INQUADRAMENTO NORMATIVO

- D.P.R. 380/2001

- Ordinanza P.C.M. n. 3274del 20.3.2003

Primi elementi in materia di criteri generali per la classificazione sismica del territorio nazionale e di normative tecniche per le costruzioni in zona sismica.

- Eurocodice 7

Progettazione geotecnica – Parte 1: Regole generali.

- Eurocodice 8

Indicazioni progettuali per la resistenza sismica delle strutture - Parte 5: Fondazioni, strutture di contenimento ed aspetti geotecnici.

- D.M. 14 Gennaio 2008

Norme Tecniche per le costruzioni.

- Circolare n. 617 del 02/02/2009

4. USO DEL SUOLO

L'area di intervento risulta compresa nella tipologia "Seminativi semplici (Se)". Quanto precedentemente descritto si può riscontrare nella Carta dell'Uso del Suolo della Regione Emilia-Romagna (ed. 2008) (fig. 4.1).

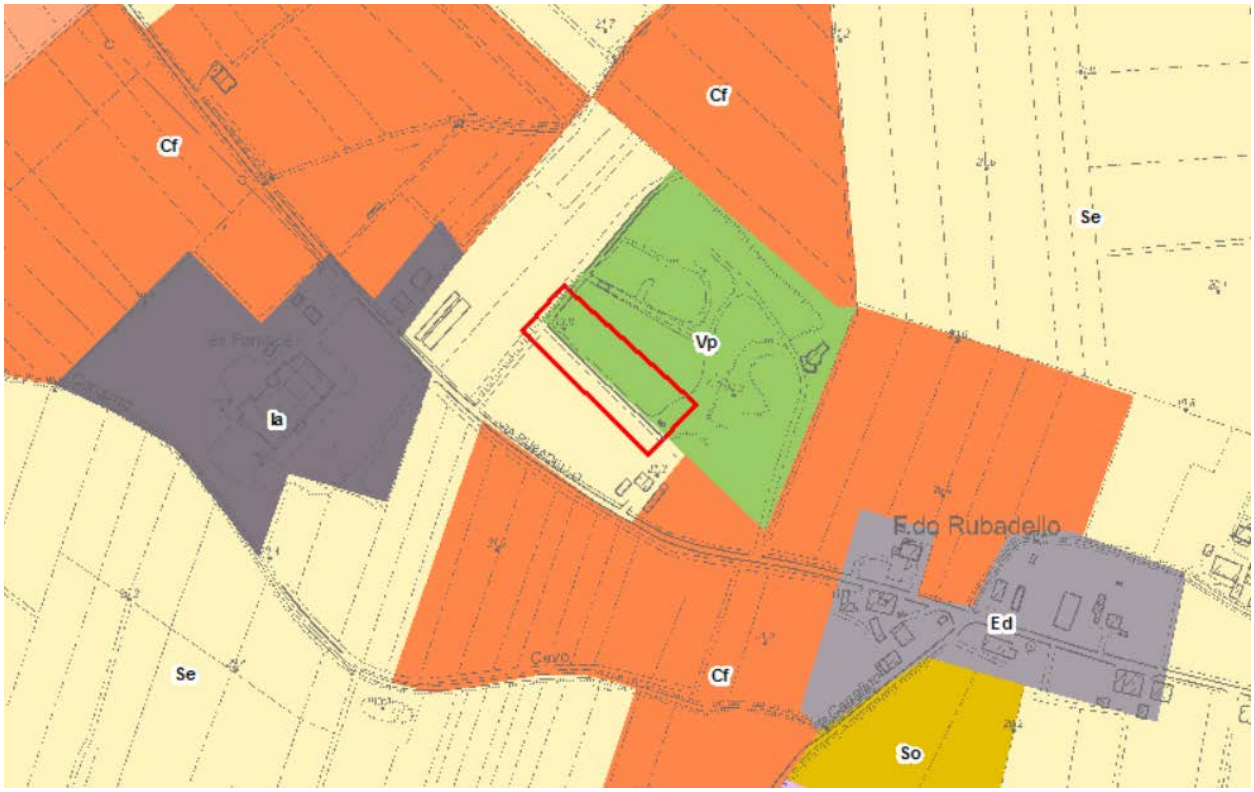


Figura 4.1: Carta Uso del suolo - Regione Emilia-Romagna ed. 2008.

5. INDAGINI REALIZZATE

Al fine di determinare la ricostruzione delle caratteristiche litologiche e geotecniche dei terreni di fondazione si è provveduto a reperire tutte le informazioni provenienti dalle nuove indagini eseguite. In particolar modo sono state utilizzate le seguenti indagini geognostiche e geofisiche (figura 5.1):

- n. 6 prove penetrometriche statiche elettriche con piezocono (CPTU01, CPTU02, CPTU03, CPTU04, CPTU05 e CPTU06) spinte alla profondità massima di 17.45 m dal p.c.;
- n. 1 indagine sismica passiva di microtremori (HV01);
- n. 1 indagine sismica attiva MFA-Hs (in onde Rayleigh).

Figura 5.1: Ubicazione delle indagini geognostiche e sismiche.

6. INQUADRAMENTO GEOLOGICO E GEOMORFOLOGICO

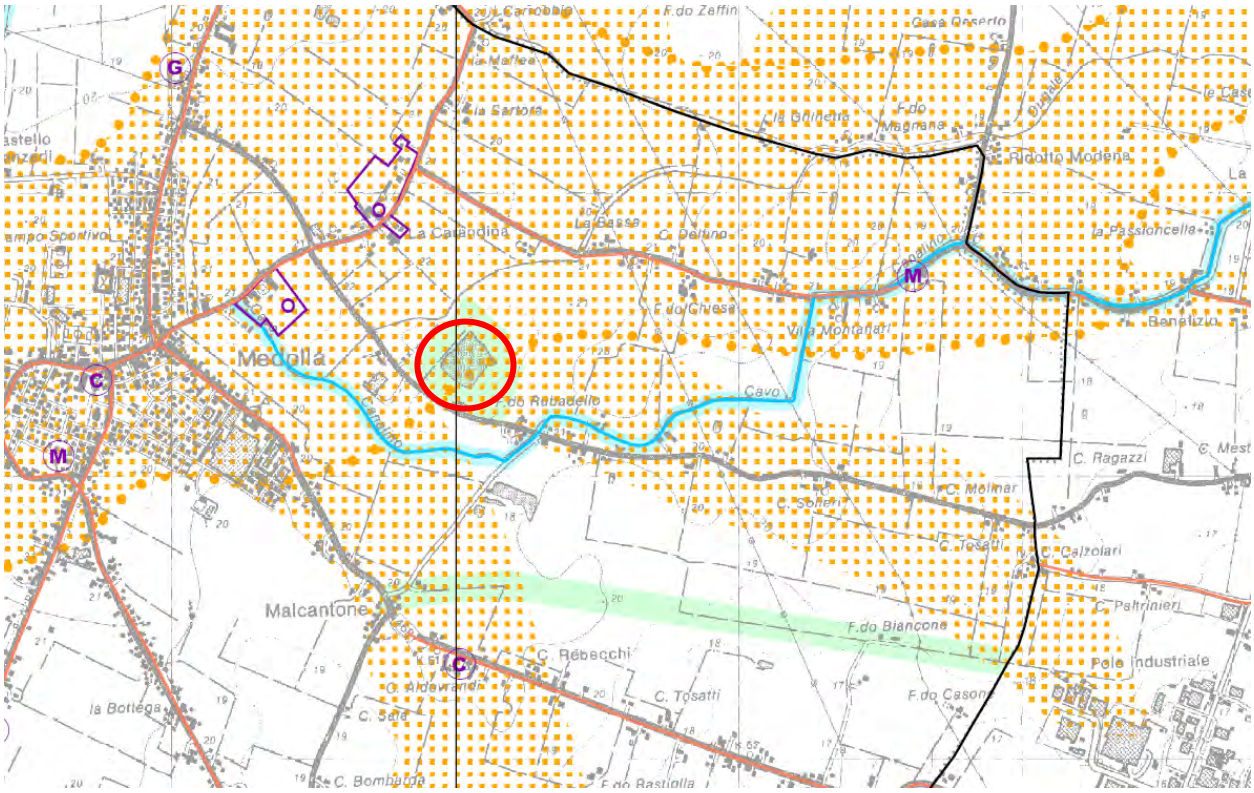
a. Inquadramento generale

Dal punto di vista geologico il territorio comunale di Medolla è inserito nella pianura alluvionale entro la quale, negli ultimi 4.000-5.000 anni dell'Olocene, gli affluenti appenninici del fiume Po (Secchia e Panaro), hanno determinando l'attuale assetto morfologico ed altimetrico del territorio che, a sua volta, dipende dai movimenti tettonici, dalla subsidenza naturale e dall'intervento antropico.
I fiumi che scorrono in questa porzione di bassa pianura si trovano in uno stadio di maturità evolutiva in cui la fase deposizionale prevale su quella erosiva a causa della bassa capacità di deflusso e della esigua capacità di trasporto; questo quadro è confermato dalla presenza di meandri e di alvei pensili che hanno reso necessaria la costruzione di argini artificiali.
In assenza di argini artificiali i fiumi tendono a divagare e quando le acque di piena traboccano si verifica un deposito differenziato con la sedimentazione di elementi fini o grossolani in funzione della diversa energia cinetica della corrente. In prossimità dell'alveo il fiume tende a depositare materiali più grossolani formando dossi di tracimazione (argini naturali), oltre che ventagli e canali di esondazione in corrispondenza delle rotte; tali emergenze morfologiche si manifestano sia lungo i corsi attuali dei fiumi che in corrispondenza di alvei abbandonati (paleoalvei).
La distribuzione dei paleoalvei e, più in generale, delle unità geomorfologiche degli argini naturali e dei bacini interfluviali ha condizionato e condiziona tuttora sia l'assetto idraulico di superficie che la distribuzione degli insediamenti antropici, soprattutto storici: le strutture rilevate (paleoalvei), vere e proprie direttrici geomorfologiche, sono state infatti sede preferenziale dello sviluppo insediativo e viario, a causa della migliore difesa dalle esondazioni e delle migliori condizioni geotecniche dei terreni; al contrario le aree depresse, specie nelle zone di vera e propria conca, sono state sede di paludi ed acquitrini fino alla avvenuta bonifica. Le conche morfologiche rappresentano ancora le aree di maggior rischio idraulico, non solo in caso di esondazione ma anche nel caso di eventi pluviometrici di eccezionale durata e/o intensità, che possono mettere in crisi la rete scolante o produrre ristagni di acqua, favoriti anche dalla scarsa permeabilità della litologia di superficie.

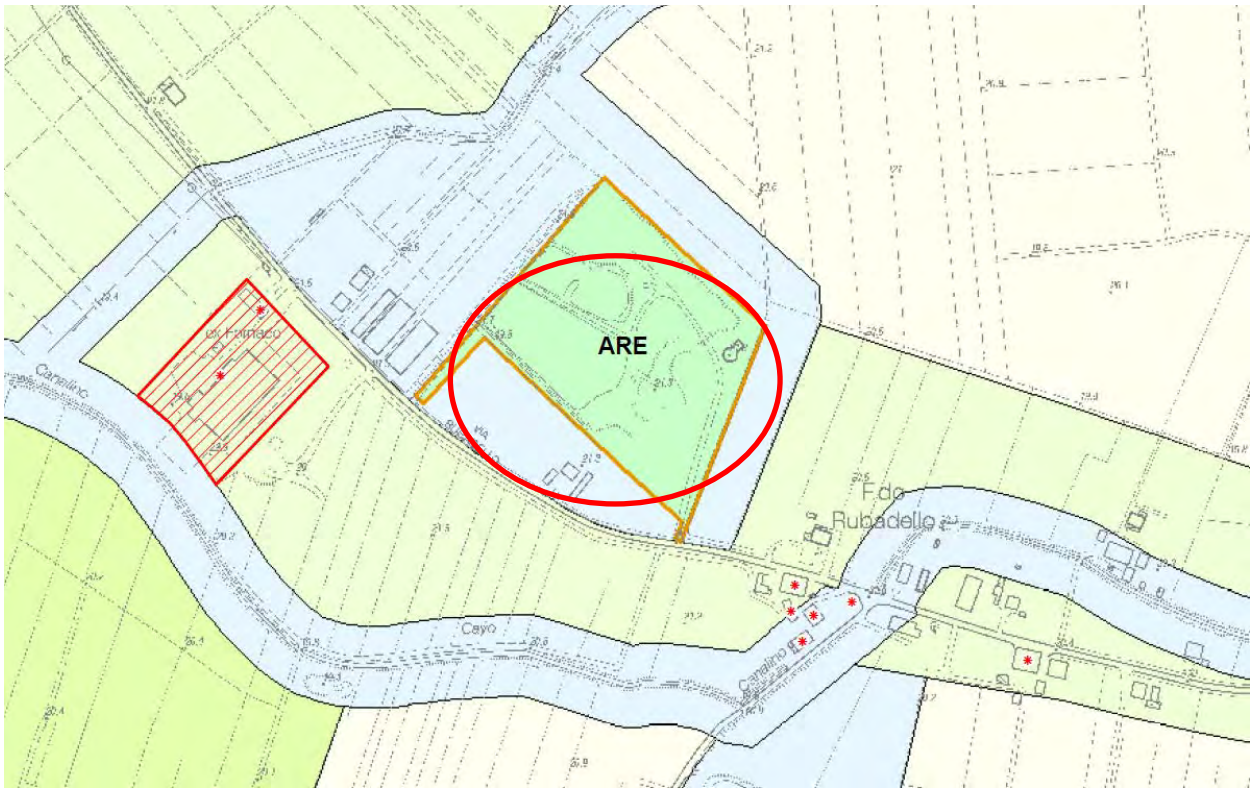
I paleoalvei quindi sono aree generalmente più elevate di qualche metro rispetto al contorno, la tessitura granulometrica risulta variabile dal franco al franco - sabbioso; sono zone di infiltrazione meteorica con percentuali variabili dal 20 - 30 % del totale.
Nelle aree distali più depresse, poste tra un fiume e l'altro, l'energia cinetica della corrente diminuisce ed i depositi si fanno sempre più fini per diventare prevalentemente argillosi nelle basse dove la prolungata permanenza delle acque favorisce la sedimentazione delle particelle in sospensione; per la maggiore costipabilità dei materiali fini rispetto a quelli sabbiosi, si determina poi un aumento dei dislivelli fra i dossi dei paleoalvei e le valli, oltre che fra la rete idrografica ed il livello medio del territorio.
In questo meccanismo "naturale" è intervenuto l'uomo che, innalzando argini artificiali ed emungendo acqua dal sottosuolo, accelerando i processi di costipazione e di ubsidenza, ha modificato la dinamica deposizionale e quindi l'assetto morfologico del territorio.
La costruzione di argini artificiali, in questa zona, si è completata nel XV secolo; a partire da questo periodo i fiumi sono stati canalizzati entro percorsi ben definiti e non hanno più avuto la possibilità di aprirsi, dopo un rotta, nuovi percorsi. Di conseguenza le alluvioni degli ultimi 500 anni hanno determinato un classamento ben preciso dei depositi per cui troviamo sedimenti più grossolani e sedimenti più fini rispettivamente nelle vicinanze e nelle zone più lontane dai percorsi attuali dei fiumi;

questo spiega perchè antichi dossi corrispondenti a paleoalvei siano stati ricoperti da sedimenti più fini che hanno notevolmente uniformato la morfologia dell'area.
Altre forme di notevole interesse sono i numerosi ventagli d'esondazione che indicano che in quel punto del fiume si è verificata una rotta non contrastata da interventi di riparazione degli argini.
La zona di studio si trova ubicata in una zona di tutela naturalistica su un paleodosso di accertato interesse come indicato nella Carta della Tutela delle risorse paesistiche e storico culturali del PTCP 2009 di cui si riporta uno stralcio.

Elementi strutturanti la forma del territorio	
Sistema dei crinali e sistema collinare (Art. 20)	
	Crinale
	Collina
Dossi di pianura (Art. 23A)	
	Paleodossi di accertato interesse (Art. 23A, comma 2, lettera a)
	Dossi di ambito fluviale recente (Art. 23A, comma 2, lettera b)
	Paleodossi di modesta rilevanza (Art. 23A, comma 2, lettera c)
Calanchi (Art. 23B)	
A	*Calanchi peculiari (Art. 23B, comma 2, lettera a)*
B	*Calanchi tipici (Art. 23B, comma 2, lettera b)*
C	*Forme sub-calanchive (Art. 23B, comma 2, lettera c)*
Crinali (Art. 23C)	
	Crinali spartiacque principali (Art. 23C, comma 1, lettera a)
	Crinale spartiacque principale che rappresenta la connotazione fisiografica e paesistica di delimitazione delle regioni Emilia Romagna e Toscana (Art. 23C, comma 1, lettera a)
	Crinali minori (Art. 23C, comma 1, lettera b)
Xn.	Patrimonio geologico (Art. 23D)
	Zone di tutela naturalistica (Art. 24)



Nella carta di individuazione degli ambiti PSC 2011 la zona di ubicazione del capannone è classificata in zona ARE - Area di riequilibrio ecologico (Art. 10bis).



b. Ricostruzione del modello geologico di dettaglio

L'analisi geomorfologica di dettaglio dell'area oggetto di intervento, effettuata mediante rilevamento in campagna e sulla base dei dati derivanti dalle indagini geognostiche e geofisiche, evidenzia che l'area oggetto del piano di intervento è situata su sedimenti alluvionali prevalentemente fini (limi sabbiosi-argillosi e argille). Tale materiale coinvolge uno spessore di circa 17/18 m su cui si andrà ad intestare la futura opera di contenimento della sponda del lago.
A tal proposito è stata ricostruita 1 sezione lito-stratigrafica (Sezione01) di cui sotto si riporta la planimetria (fig. 6.4).

Figura 6.4: Planimetria della sezione litostratigrafica.

Il modello geologico di dettaglio evidenzia che, partendo dall'alto (piano campagna) verso la seguente stratigrafia:

SEZIONE 01
0.02 - 1.00 m Al di sotto del terreno vegetale argille limose sovraconsolidate (A);
1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B);
1.50/4.80 - 8.70/10.50 m Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C);
8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti (D);
>17.10 m Sabbie da mediamente addensate ad addensate (E).

Si riporta di seguito la sezione di dettaglio:

SEZIONE 01


SEZIONE 01 - SPONDA LAGO AREA ECOLOGICA SAN MATTEO
CPTU01
CPTU02
CPTU03
CPTU04
CPTU05
CPTU06
0.02 - 1.00 m Al di sotto del Terreno vegetale argille limose sovraconsolidate
1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e PTU02 la frazione sabbiosa risulta essere più abbondante
1.50/4.80 - 8.70/10.50 m Argille a media bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi argillosi debolmente sabbiosi mediamente consistenti
Nella prova CPTU05 alla profondità di -6.20/-7.00m si riscontra un livello di argille organiche a bassa consistenza
8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti
17.10 - 17.45 m Sabbie da mediamente addensate ad addensate

7. VERIFICA A LIQUEFAZIONE

L'area di intervento ricade all'interno della zona sismogenetica 912 della Zonazione sismogenetica ZS9 del 2004 dell'intero territorio italiano realizzata da INGV e pertanto è stata scelta come "Magnitudo di riferimento" Mw = 6.14, mentre l'accelerazione di riferimento ag = 0.22 è stabilita sulla base del periodo di riferimento dell'azione sismica dell'opera in progetto.
La verifica del potenziale di liquefazione, per ciascuna verticale di indagine, è stata condotta utilizzando il metodo di Idriss e Boulanger (2008) e Boulanger & Idriss (2014). La verifica è stata effettuata con Software CLiq v 2.0 della Geologismiki Geotechnical Engineers - Serrai(Grecia).
In considerazione del fatto che l'"Indice del potenziale di liquefazione ($\mathbf{I_L}$)" è definito dalla seguente relazione:

$$I_L = \int_0^{20} F(z)w(z)dz$$

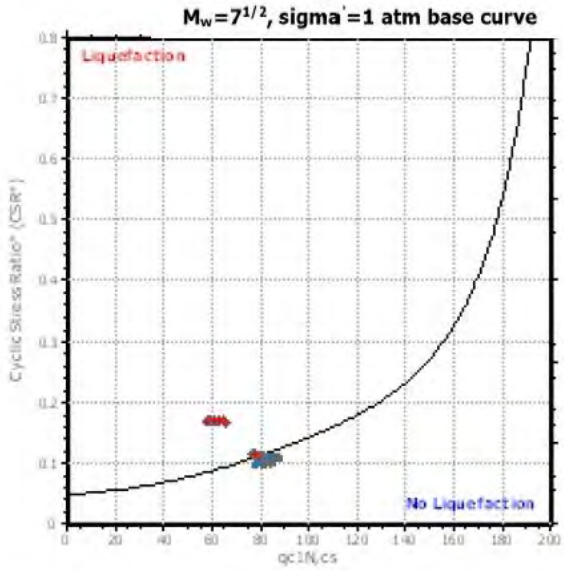
Dove, secondo la classificazione di Sonmez (2003), adottata anche dalla Regione Emilia-Romagna, risulta che:

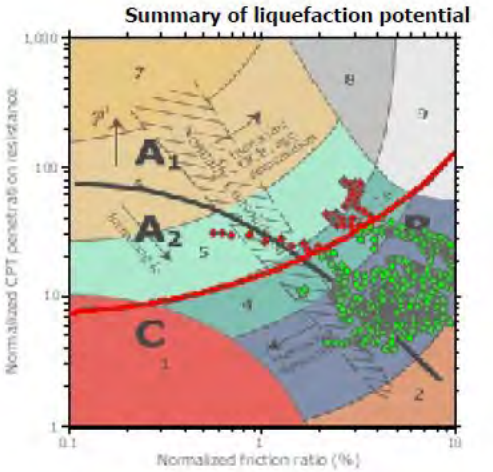
- $I_L = 0$ il rischio di liquefazione è "Molto basso";
- $0 < I_L < 2$ il rischio di liquefazione è "Basso";
- $2 \leq I_L < 5$ il rischio di liquefazione è "Moderato";
- $5 \leq I_L < 15$ il rischio di liquefazione è "Elevato";
- $I_L \geq 15$ il rischio di liquefazione è "Estremamente elevato".

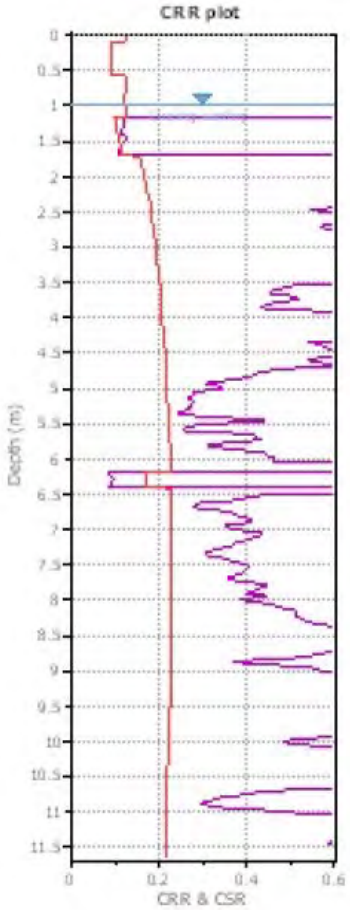
In allegato sono riportati i risultati completi della verifica a liquefazione.

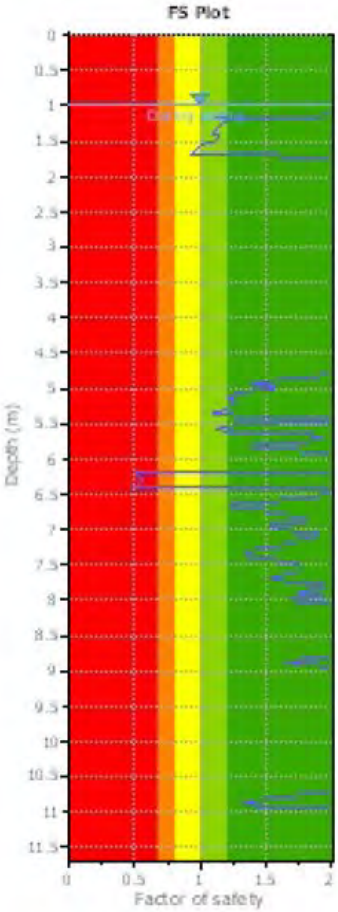
CPTU01

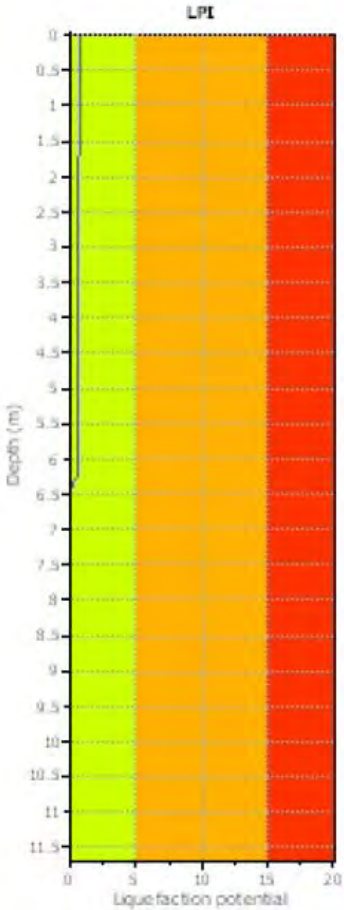
- Metodo di Idriss e Boulanger (2008)





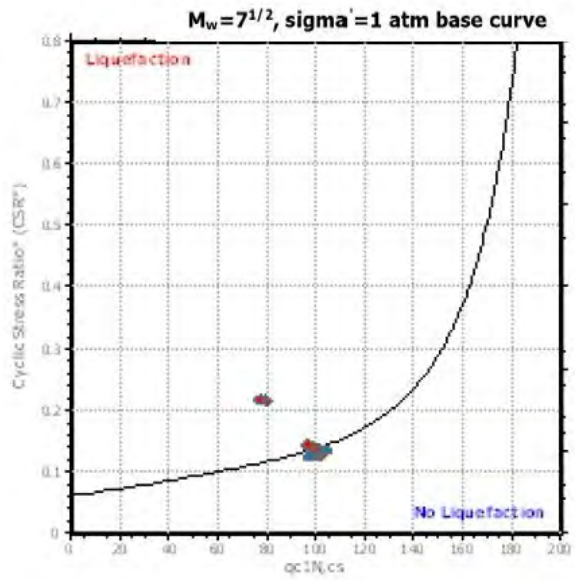


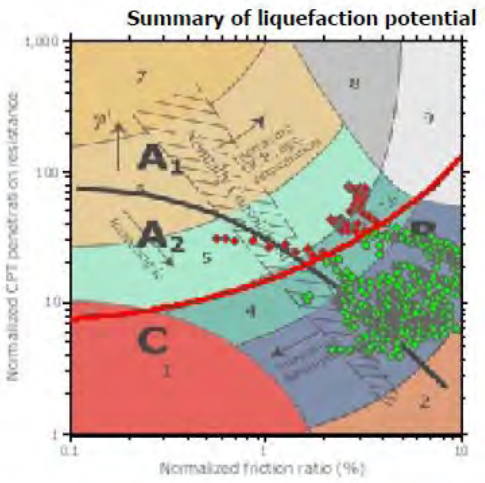


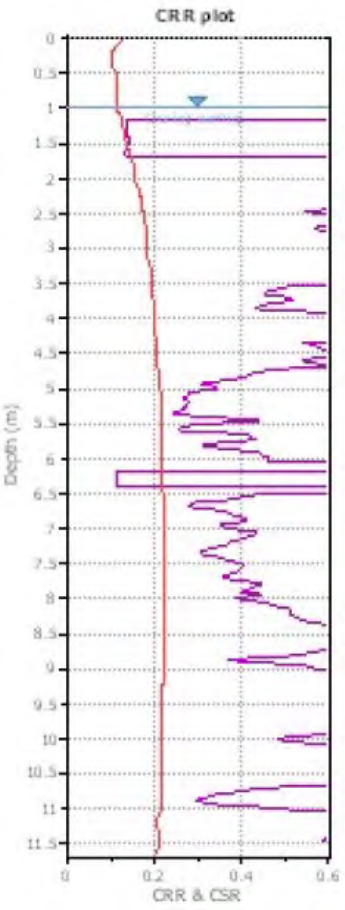


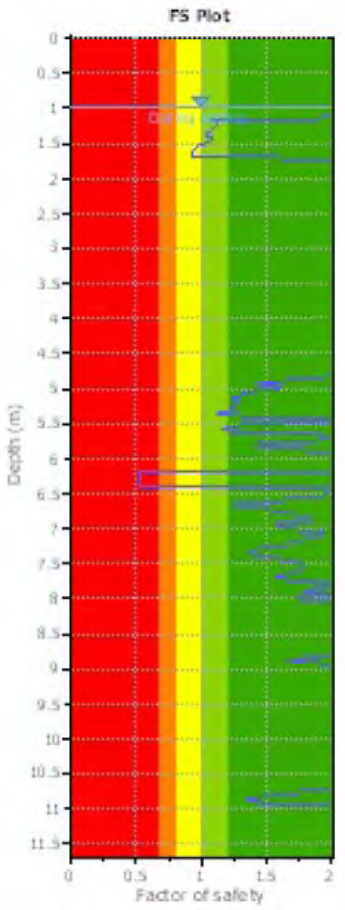
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 0.75

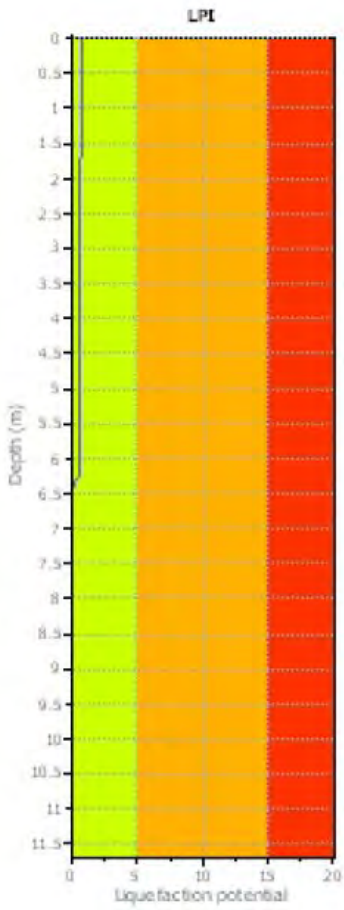
- Metodo di Boulanger & Idriss (2014)







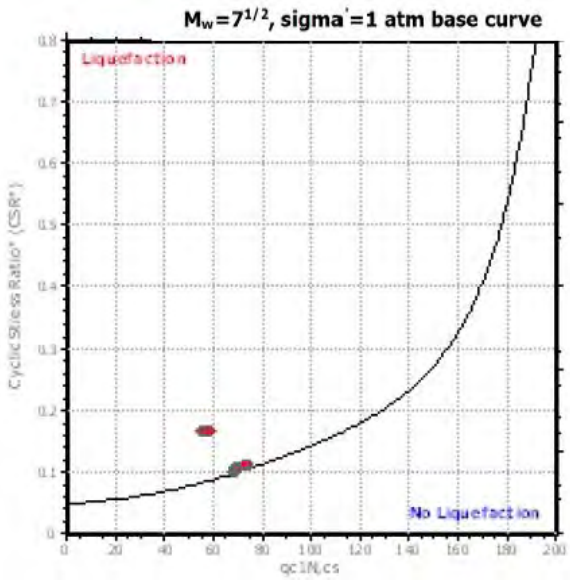


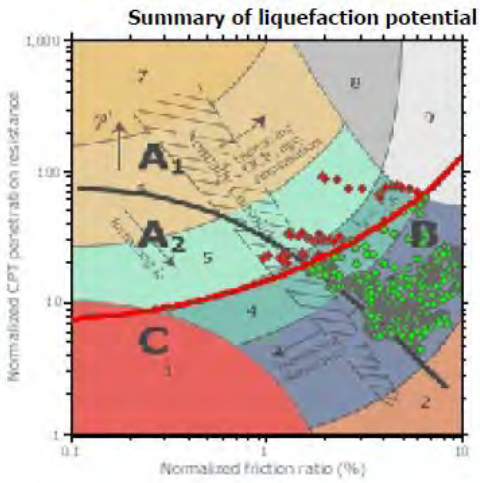


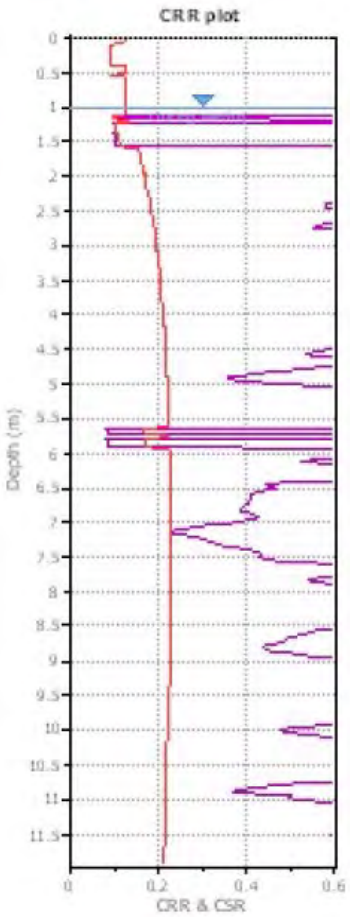
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 0.79

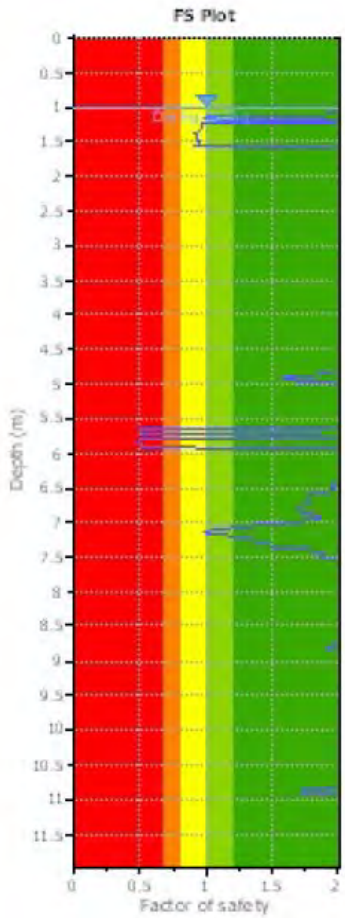
CPTU02

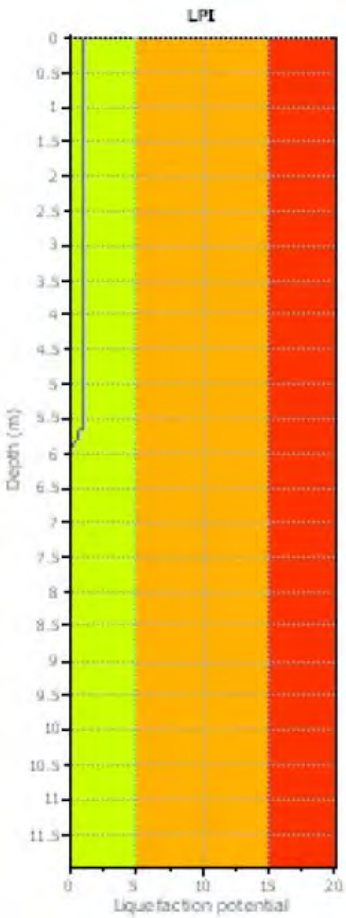
- Metodo di Idriss e Boulanger (2008)





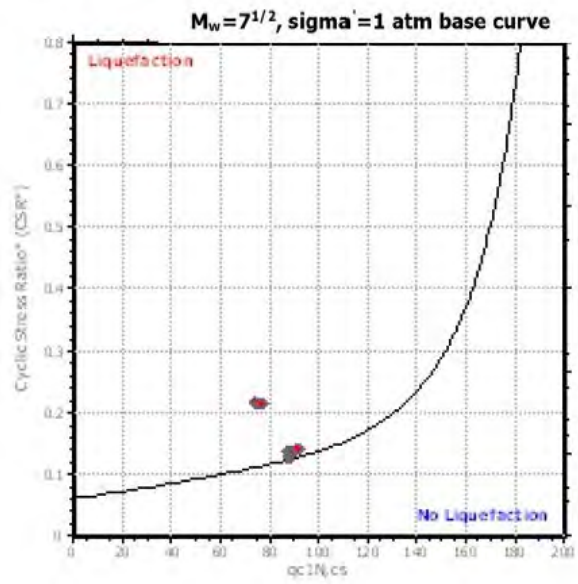


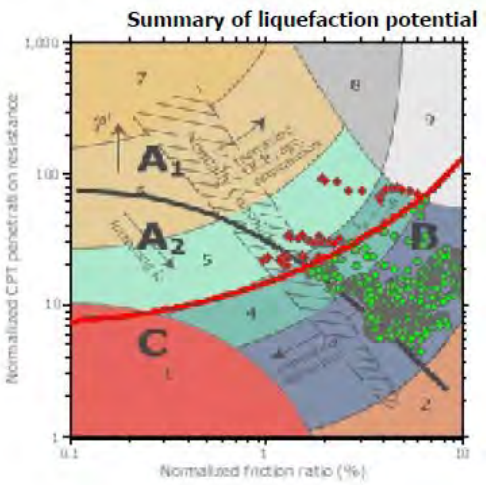


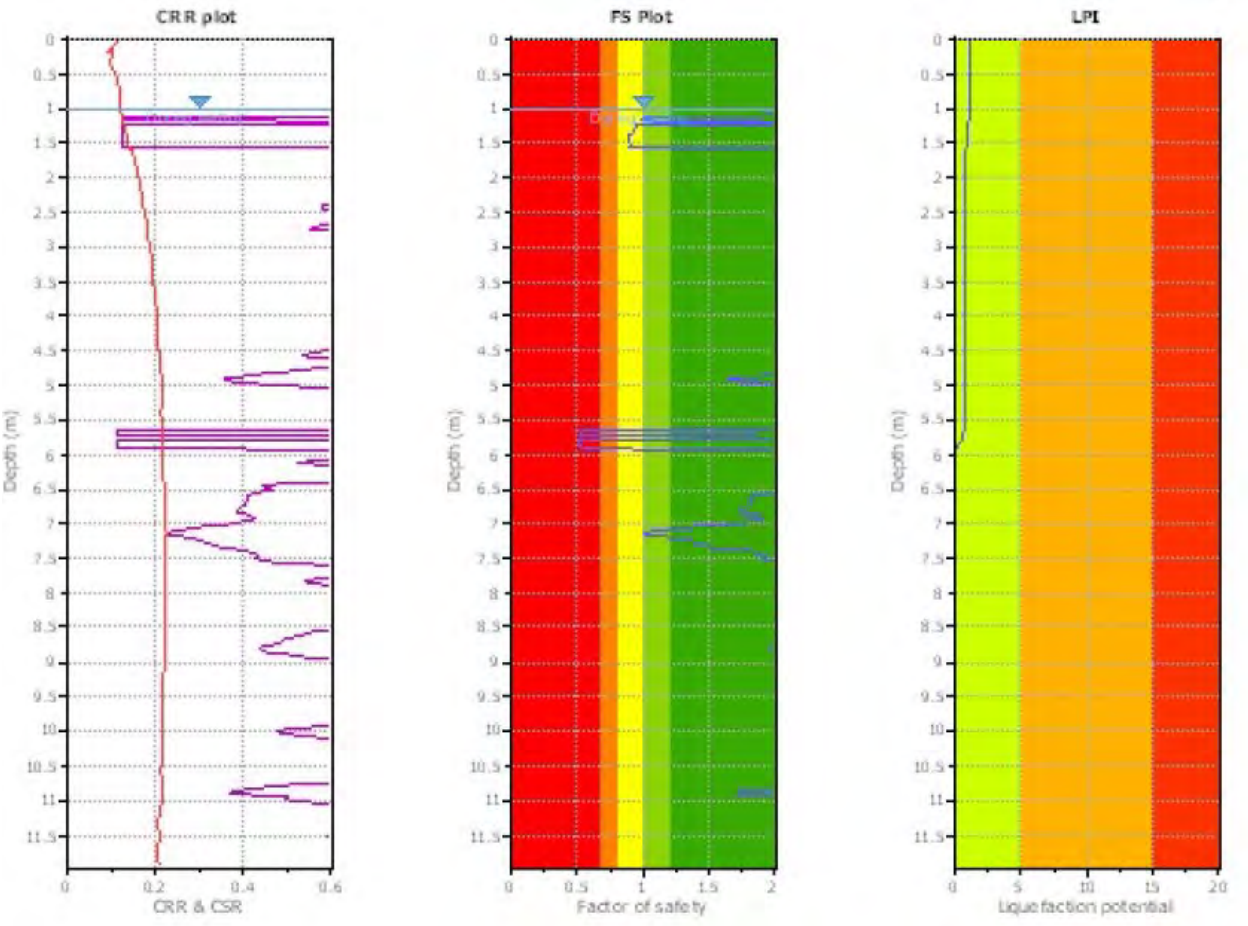


Abbiamo che i livelli risultano essere non liquefacibili con I_L = 1.04

- Metodo di Boulanger & Idriss (2014)



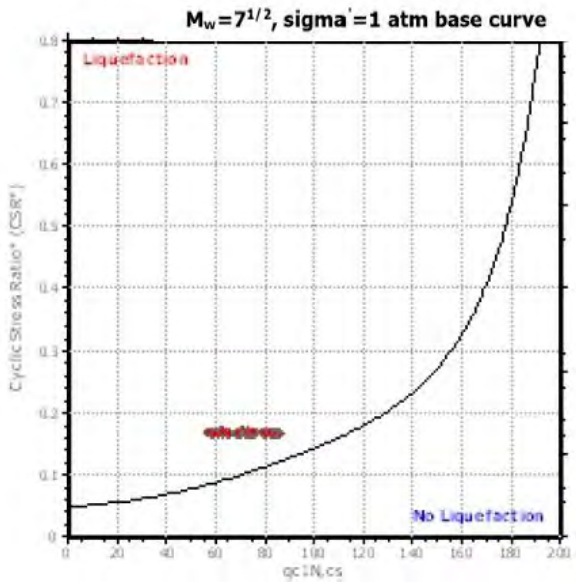


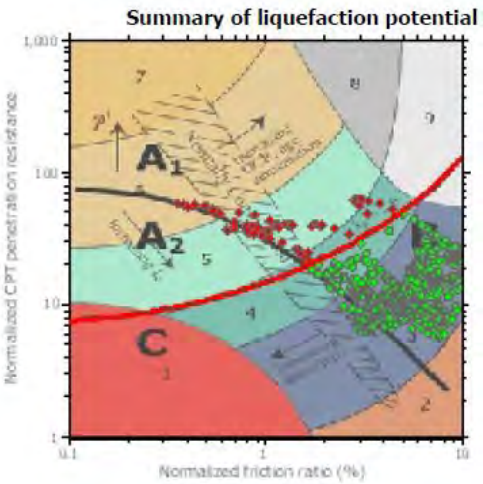


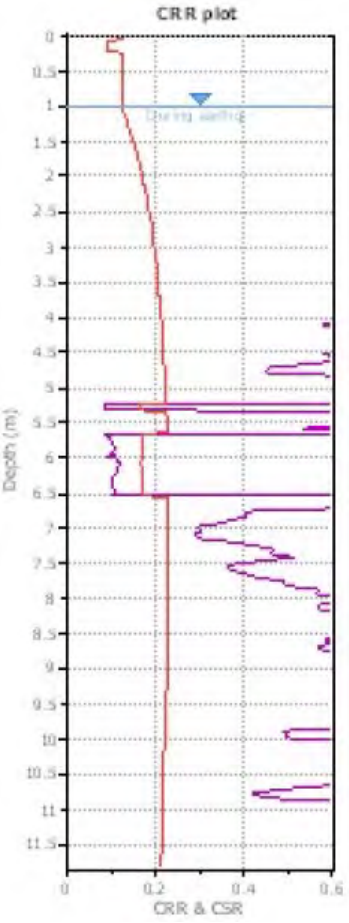
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 1.09

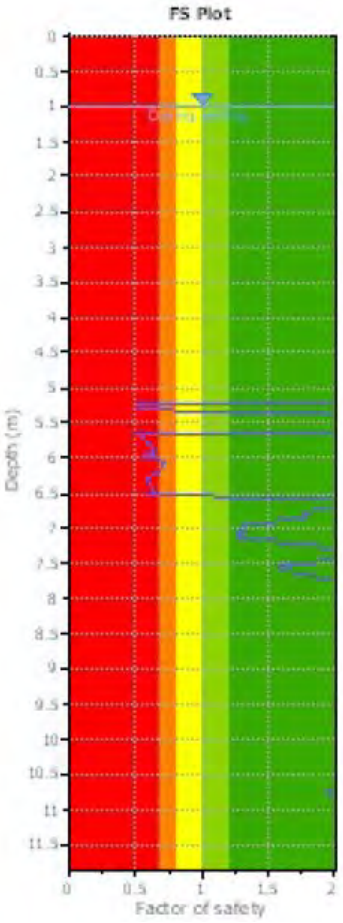
CPTU03

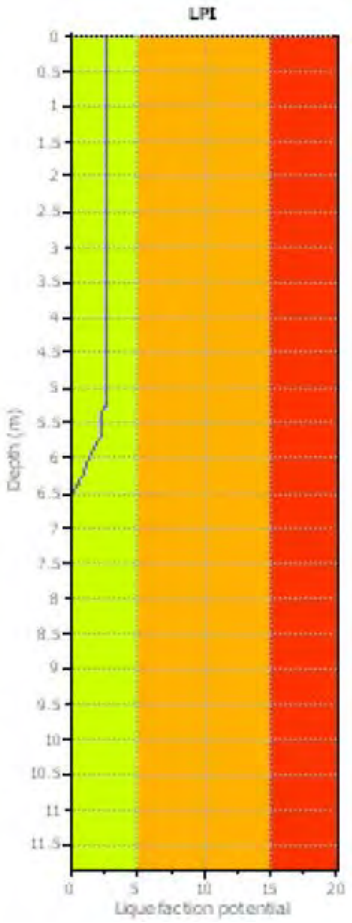
- Metodo di Idriss e Boulanger (2008)





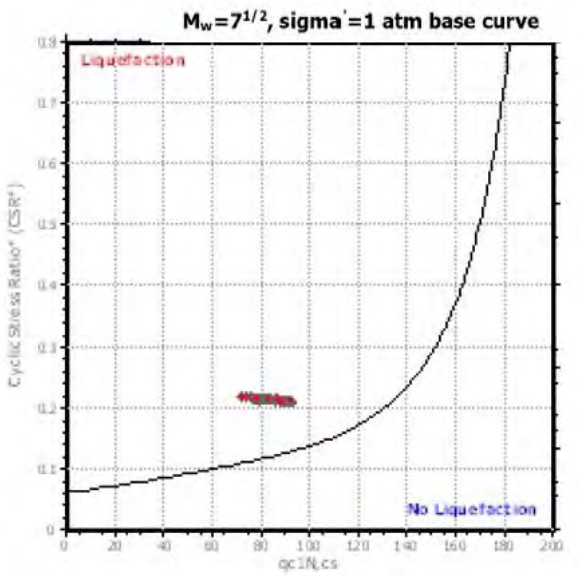


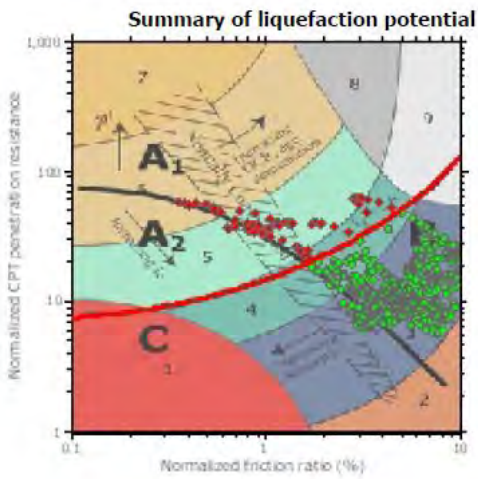


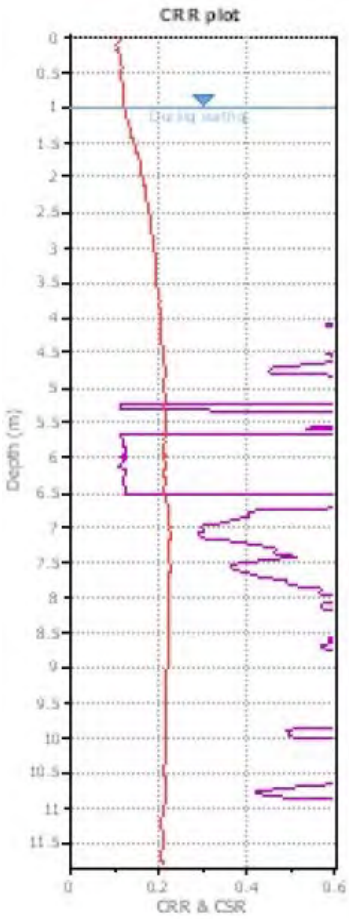


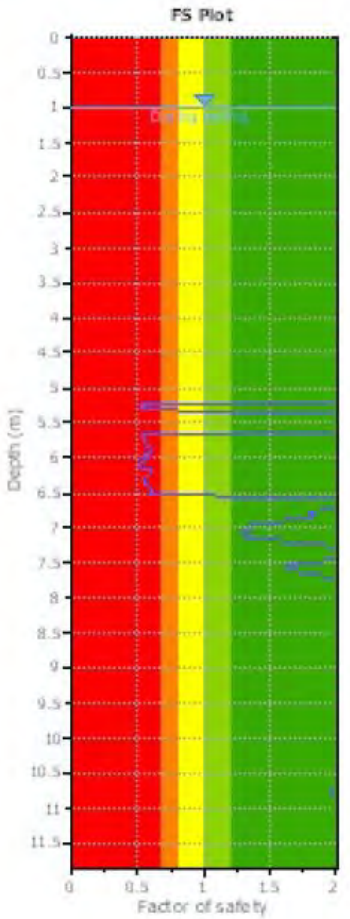
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 2.69

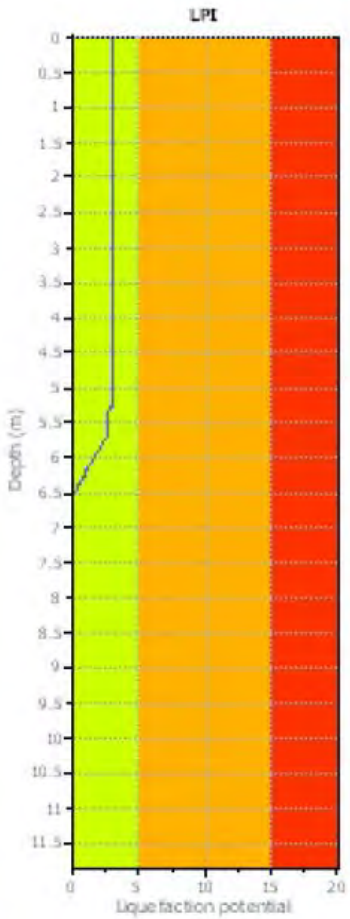
- Metodo di Boulanger & Idriss (2014)







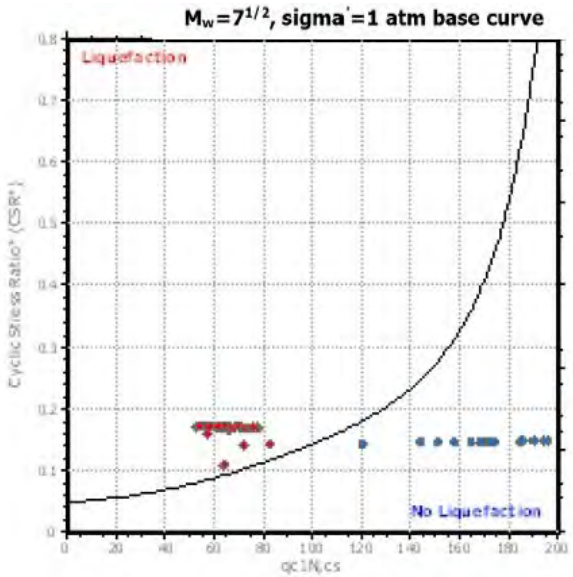


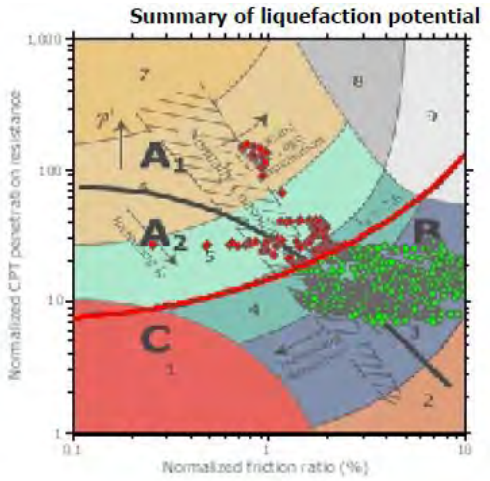


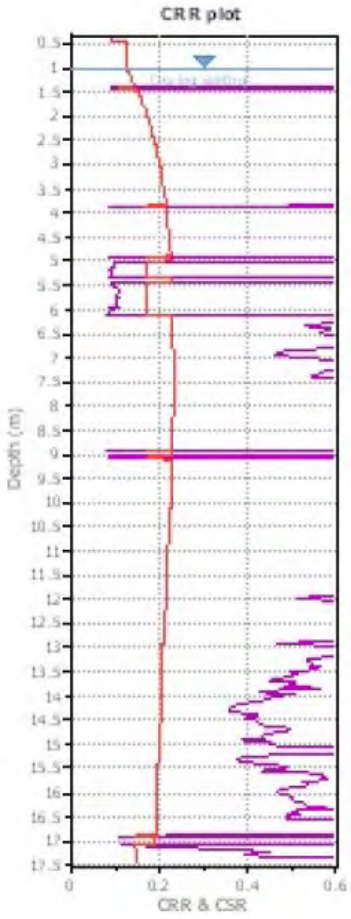
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 3.05

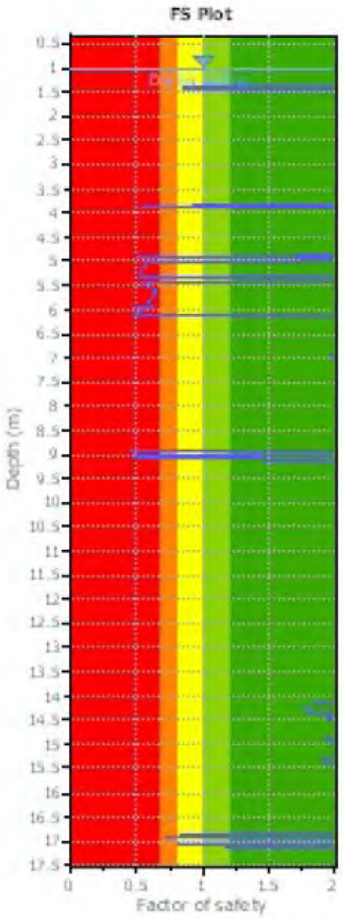
CPTU04

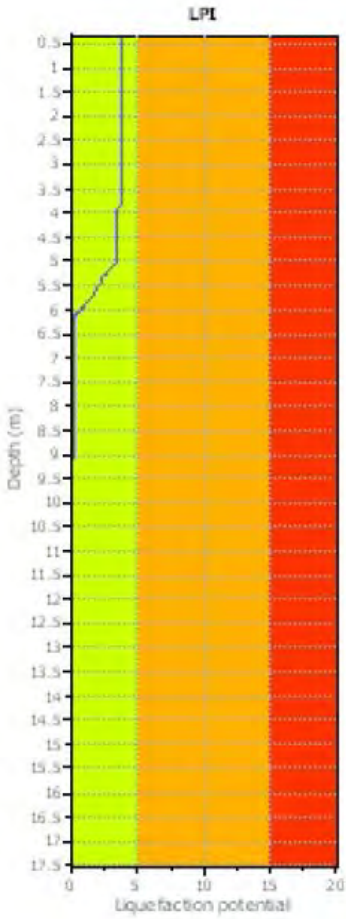
- Metodo di Idriss e Boulanger (2008)





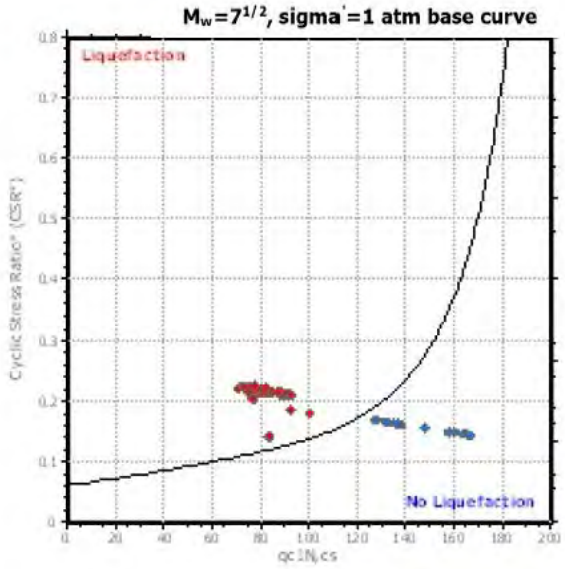


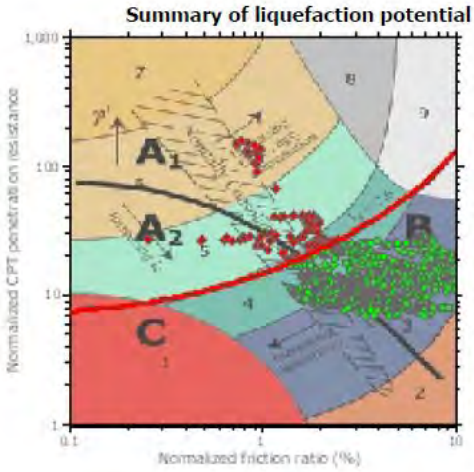


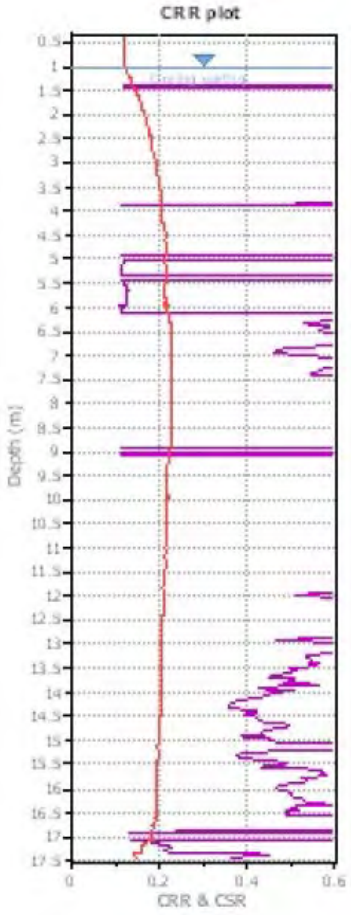


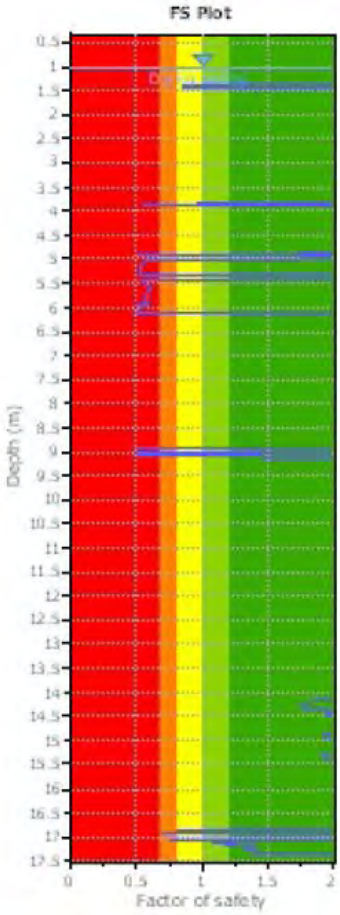
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 3.75

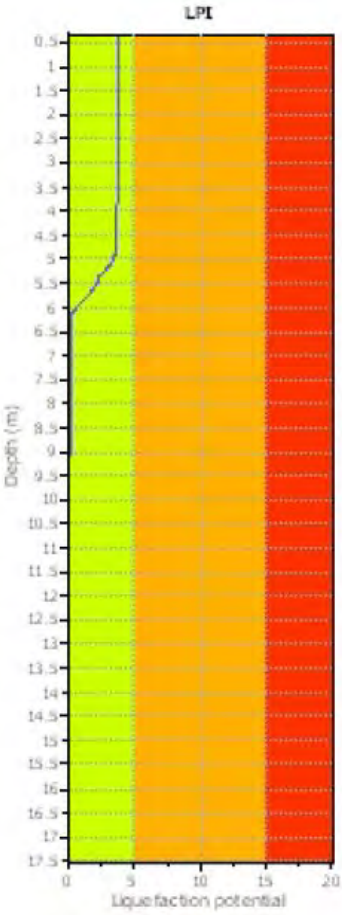
- Metodo di Boulanger & Idriss (2014)







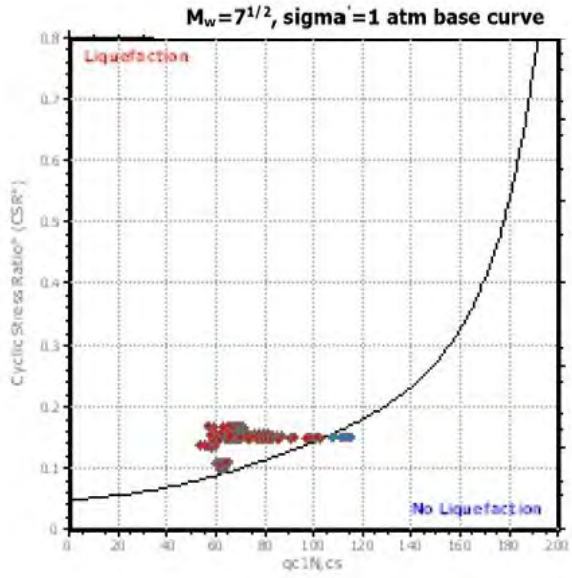


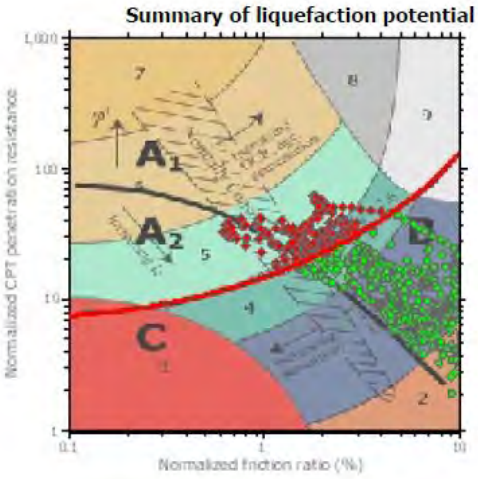


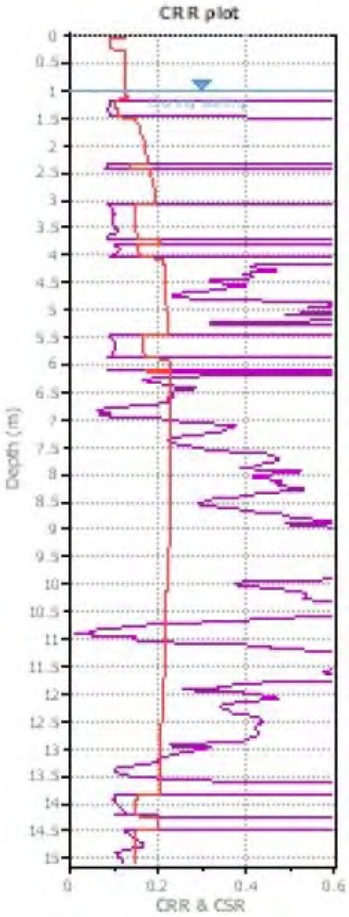
Abbiamo che i livelli risultano essere non liquefacibili con $I_L = 3.82$

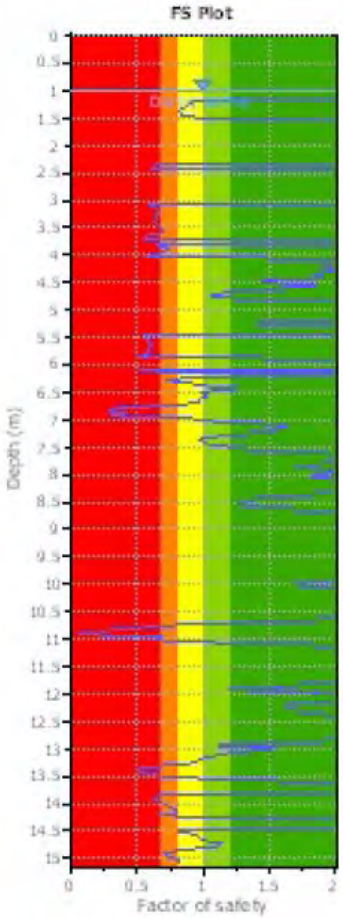
CPTU05

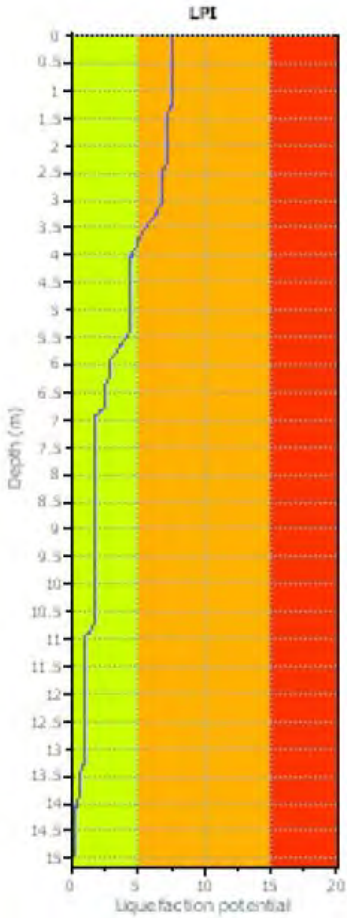
- Metodo di Idriss e Boulanger (2008)





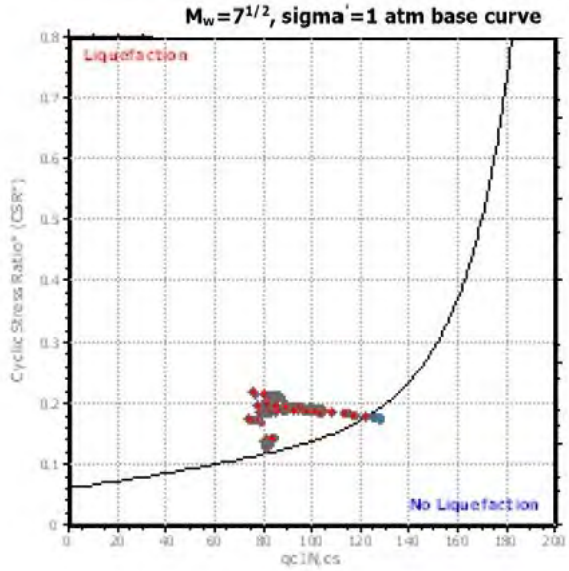


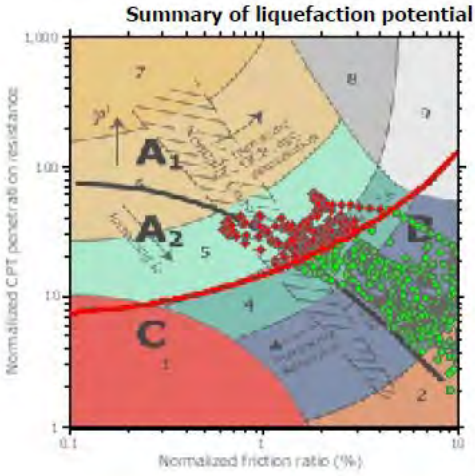


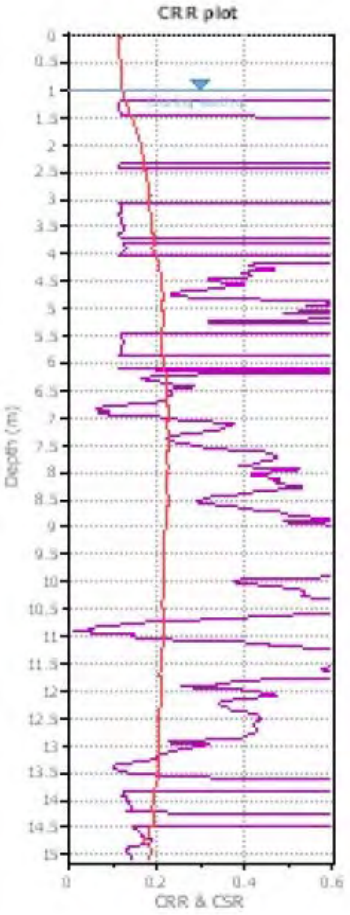


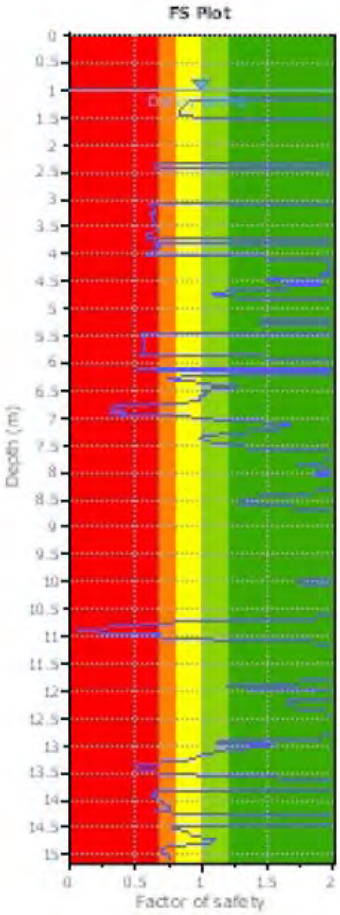
Abbiamo che i livelli risultano essere non liquefacibili con $I_L = 7.61$

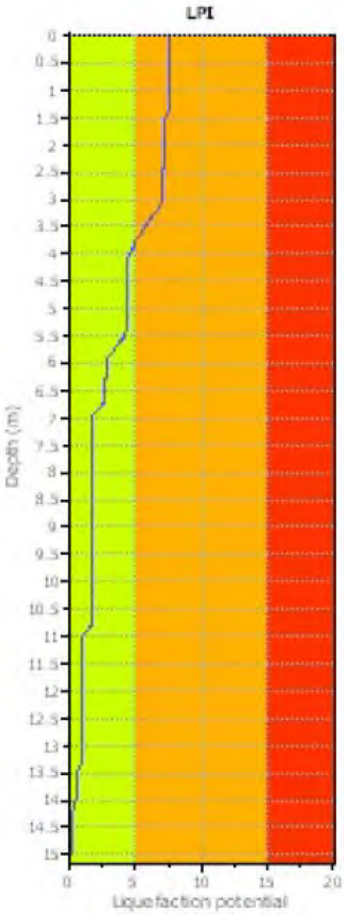
- Metodo di Boulanger & Idriss (2014)







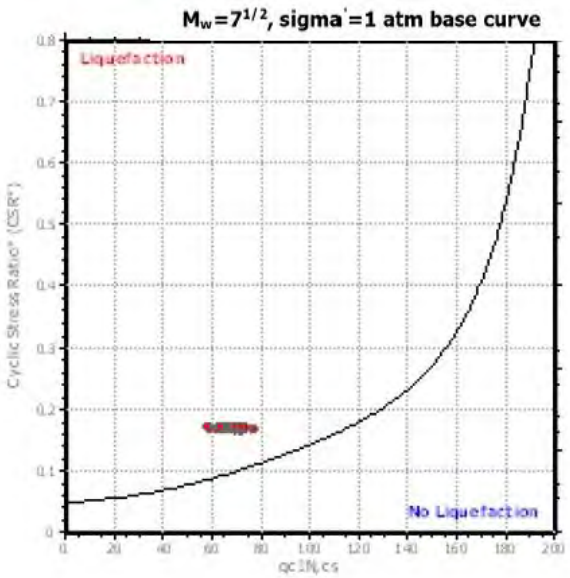


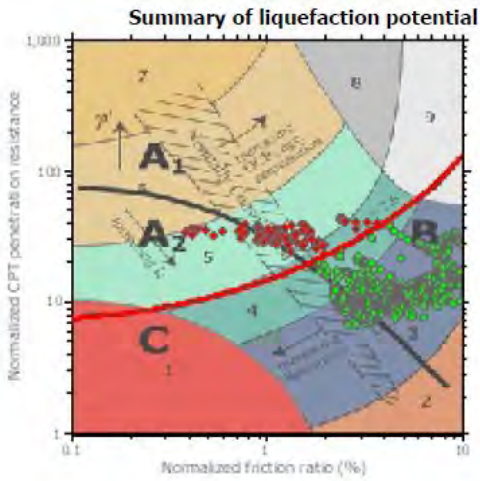


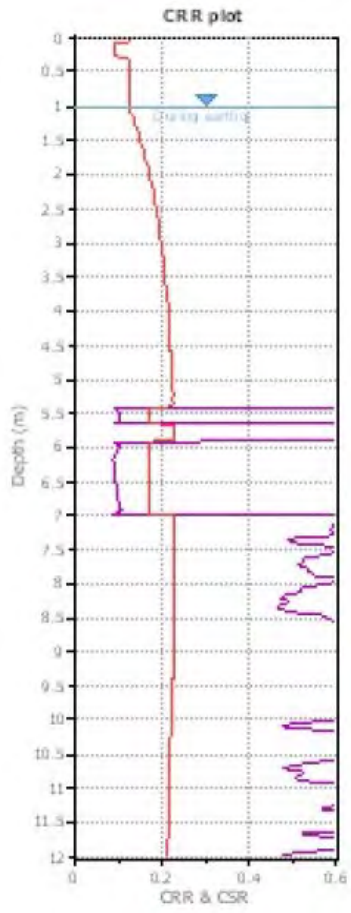
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 7.73

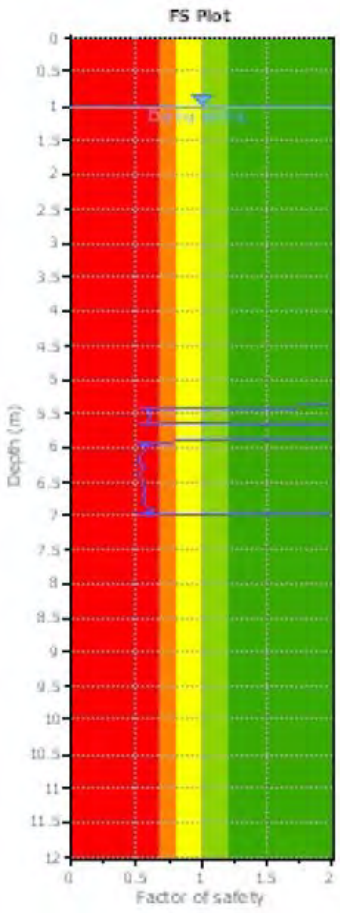
CPTU06

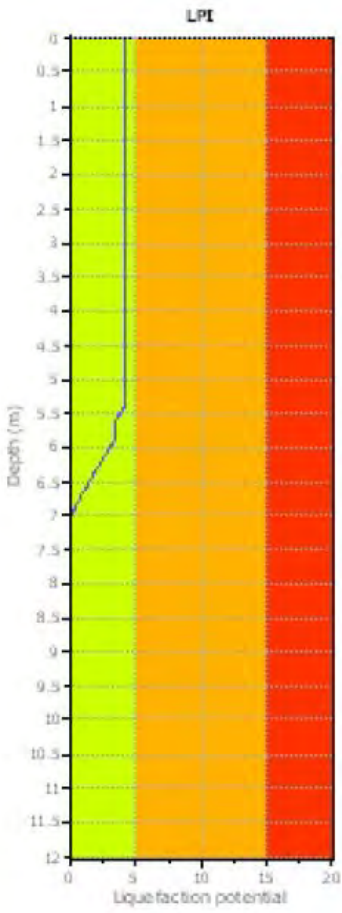
- Metodo di Idriss e Boulanger (2008)





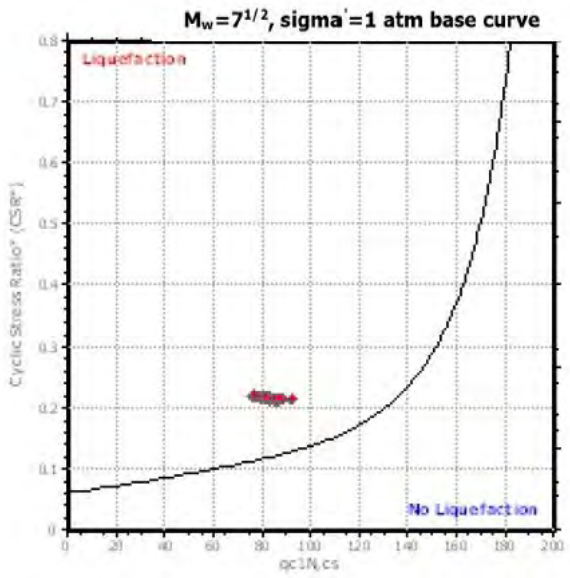


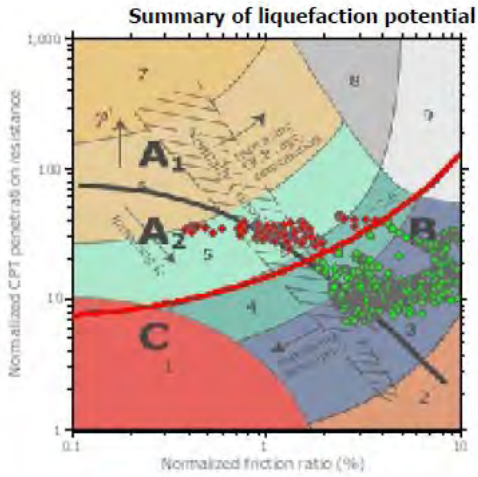


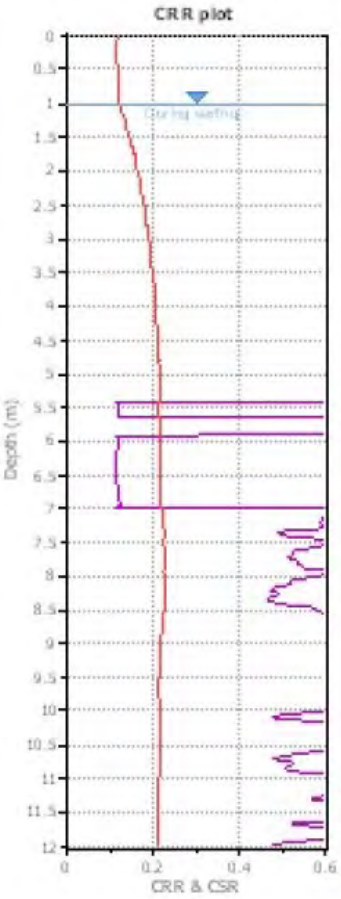


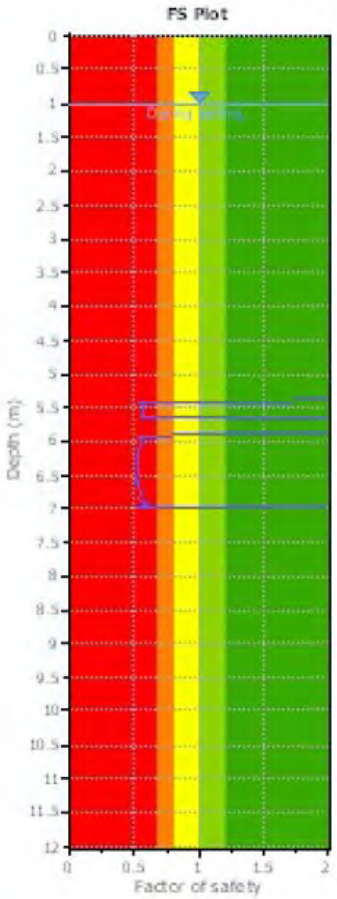
Abbiamo che i livelli risultano essere non liquefacibili con I_L = 4.06

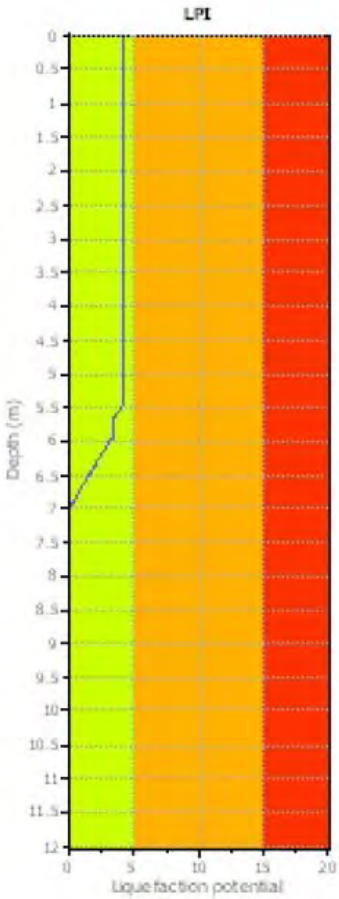
- Metodo di Boulanger & Idriss (2014)





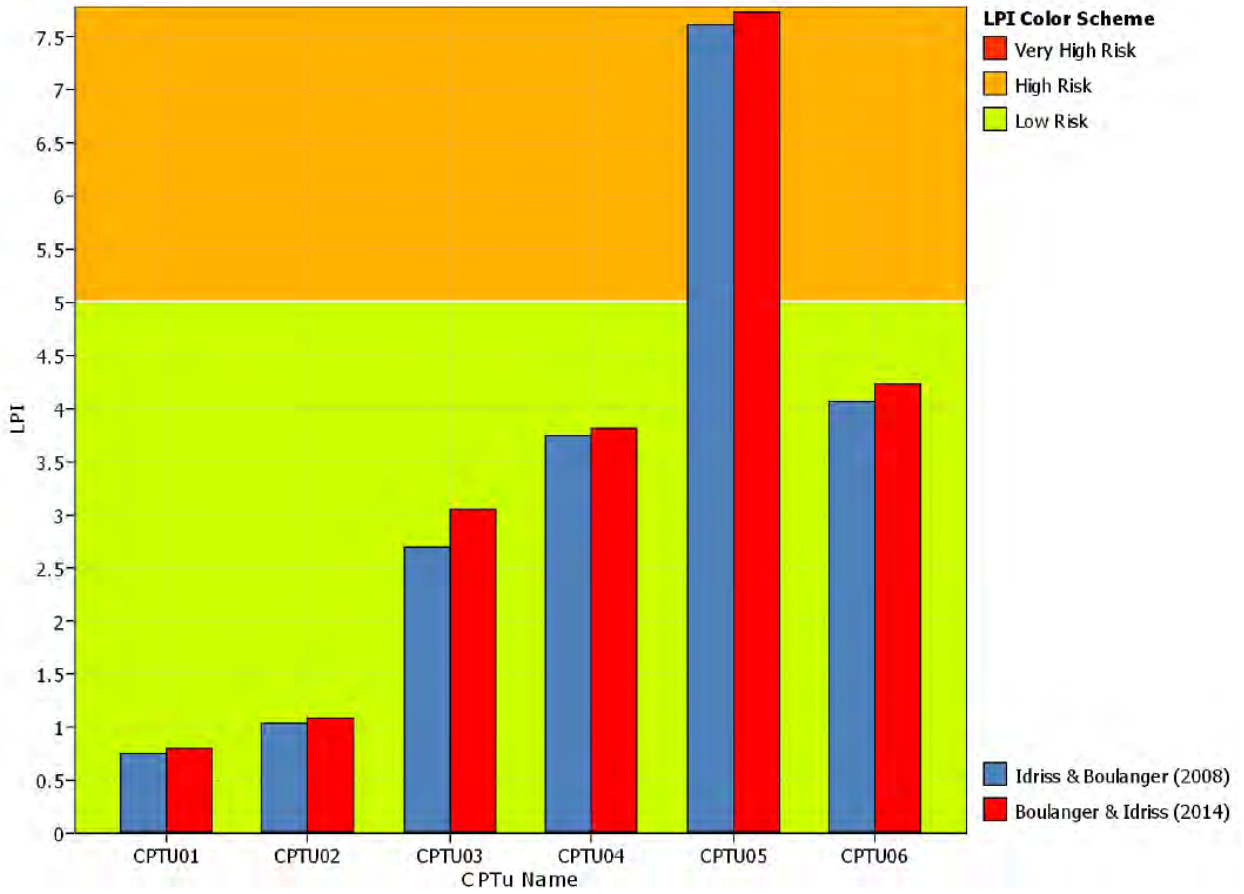






Abbiamo che i livelli risultano essere non liquefacibili con I_L = 4.24

Riassumendo si può concludere che la verifica del potenziale di liquefazione, condotta secondo i metodi sotto elencati, evidenzia:



PROVA	INDICE DEL POTENZIALE DI LIQUEFAZIONE I_L (I&B 2008)	INDICE DEL POTENZIALE DI LIQUEFAZIONE I_L (B&I 2014)	RISCHIO (Sonmez 2003)
CPTU01	**0.75**	**0.79**	**BASSO**
CPTU02	**1.04**	**1.09**	**BASSO**
CPTU03	**2.69**	**3.05**	**MODERATO**
CPTU04	**3.75**	**3.82**	**MODERATO**
CPTU05	**7.61**	**7.73**	**ELEVATO**
CPTU06	**4.06**	**4.24**	**MODERATO**

Pertanto la verifica a liquefazione evidenzia un rischio di liquefazione da "Basso a Elevato".

Sulla base dei risultati sopra descritti al fine di evidenziare eventuali criticità legate ai problemi di liquefazione è stato deciso di applicare per la futura opera in oggetto il metodo di Ishihara (1985). Si tratta di una procedura empirica basata sull'impiego degli spessori dello strato o degli strati di copertura non liquefacibili (H1) e quello dei sottostanti livelli suscettibili di liquefazione (H2) oltre all'accelerazione

orizzontale massima in superficie; la procedura pertanto fornisce, in maniera puramente qualitativa, l'entità delle deformazioni, e quindi del danno, indotte dal sisma in caso di liquefazione.

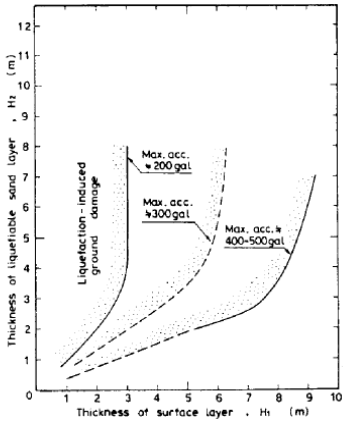
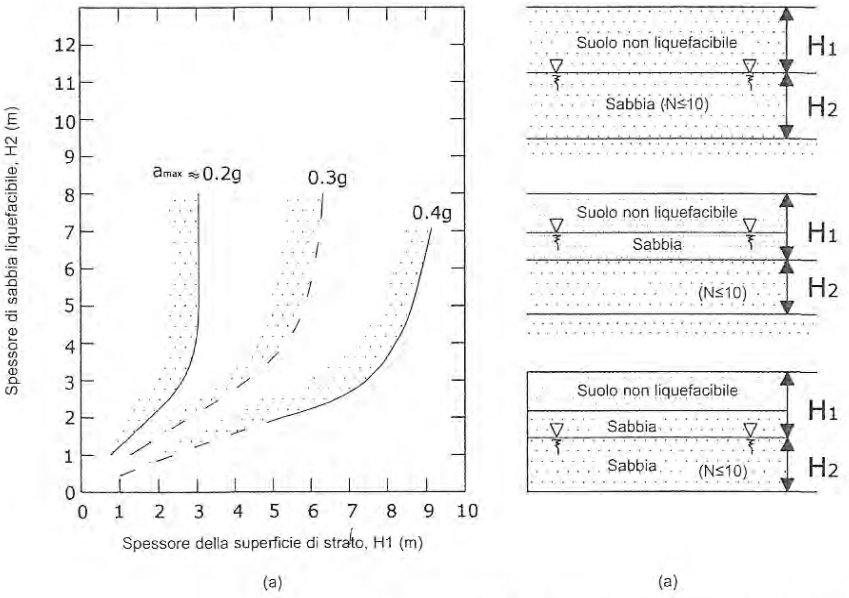


Figure 2. Proposed Boundary Curves for Discriminating Between Occurrence and Non-occurrence of Surface Effects of Liquefaction (After Ishihara, 1985)

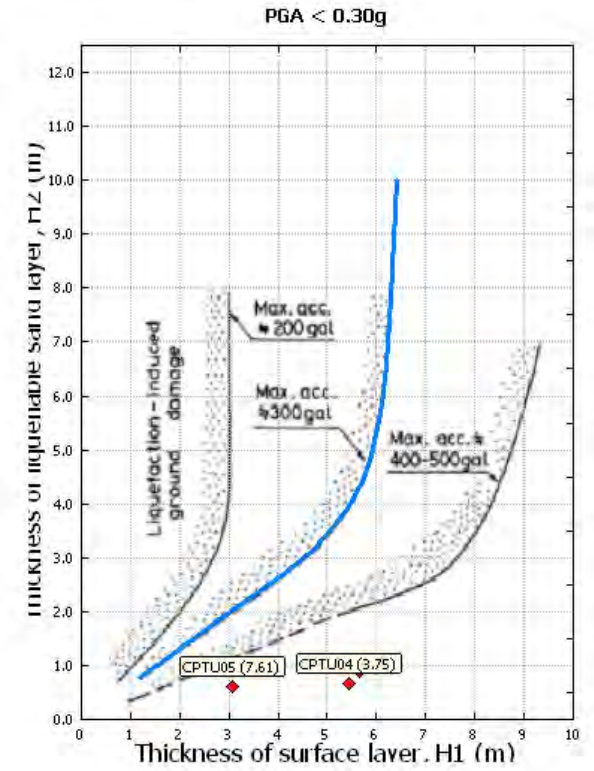


Relazione fra lo spessore dello strato liquefacibile e lo spessore dello strato sovrapposto (Ishihara, 1985)

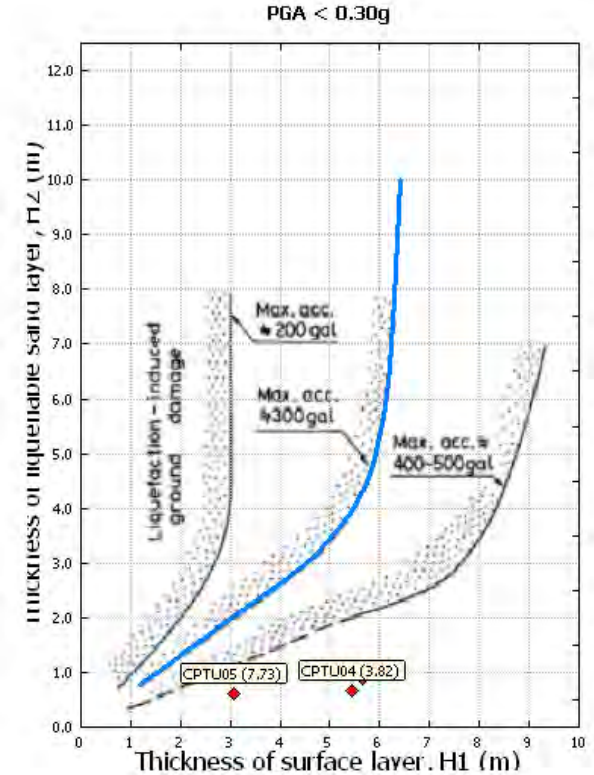
Valutazione delle manifestazioni superficiali in funzione del rapporto fra lo spessore dello strato superficiale non liquefacibile e quello sottostante liquefacibile

Accelerazione [gal] 1 gal = 1 cm/s²	Condizione	Propagazione della liquefazione verso l'alto	Manifestazioni superficiali
200	$h_1 \geq 3$ m e $h_2 < 3$ m	IMPEDITA	NO
	$h_1 \leq 3$ m e $h_2 > 3$ m	NON IMPEDITA	SI
300	$h_1 < 5$ m e $h_2 > 4$ m	NON IMPEDITA	SI
	$h_1 > 5$ m e $h_2 < 4$ m	IMPEDITA	NO
400 - 500	$h_1 < 7$ m e $h_2 > 3$ m	NON IMPEDITA	SI
	$h_1 > 7$ m e $H_2 < 3$ m	IMPEDITA	NO

- Metodo di Idriss e Boulanger (2008)



- Metodo di Boulanger & Idriss (2014)



Considerato comunque lo spessore dello strato liquefacibile, lo spessore dello strato non liquefacibile sovrastante e l'accelerazione massima attesa in superficie per il sito d'indagine (0.22g), si può concludere (dal grafico sopra riportato - Ishihara 1985) che la liquefazione dello strato liquefacibile non si estende in superficie.

Dal momento che l'Indice del Potenziale di liquefazione risulta $0.75 < I_L < 7.73$ e che dal punto di vista degli effetti in superficie e quindi delle deformazioni attese non si dovrebbe avere alcun riscontro in merito, si ritiene corretto poter determinare la definizione dell'azione sismica mediante l'approccio semplificato previsto dalle NTC08.
In ogni caso, si sottolinea che la normativa in materia di costruzioni di cui al D.M. 14/01/2008, stabilisce al § (§7.11.3.4.3) che "*L'adeguatezza del margine di sicurezza nei confronti della liquefazione deve essere valutata e motivata dal progettista*".

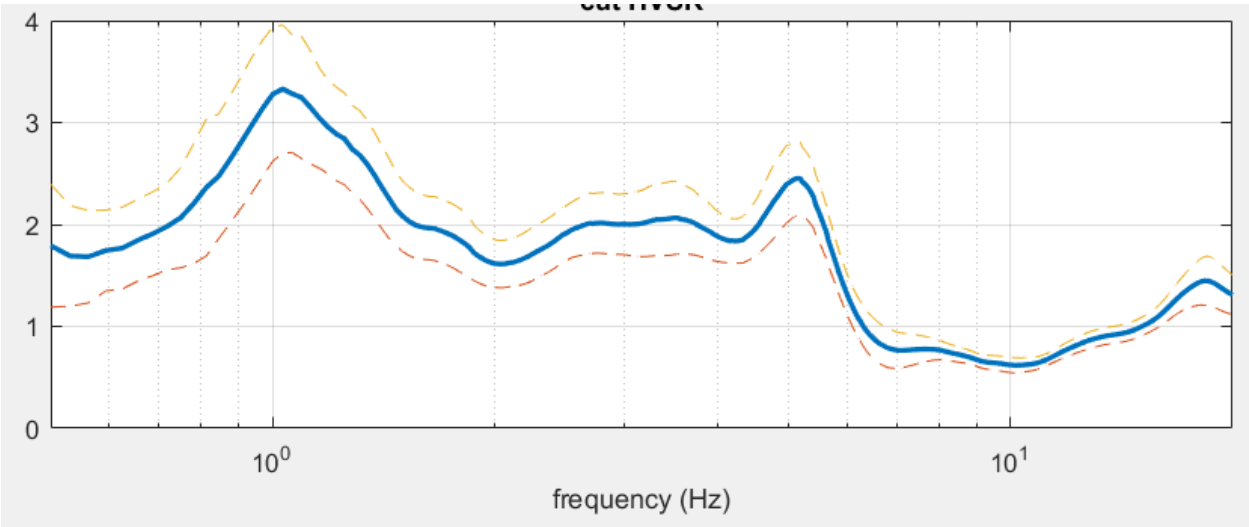
8. CARATTERIZZAZIONE GEOLOGICO-TECNICA DEL SITO

a1. I dati ottenuti

L'indagine geofisica è stata eseguita mediante sismica attiva (MFA - Hs) e a stazione singola (HVSR) sia per la definizione del picco di risonanza dei terreni di fondazione ($\mathbf{f_0}$) sia per la determinazione della categoria di suolo richiesta dalla normativa, mediante la ricostruzione delle $\mathbf{Vs_{30}}$.

a2. Interpretazione delle indagini geofisiche

La campagna di prospezione geofisica è stata eseguita nel maggio 2017. Tale indagine ha consistito nelle acquisizioni di microtremori a stazione singola di tipo HVSR e nella definizione del profilo di Vs mediante analisi di tipo MFA. I dati ottenuti dalla curva HVSR forniscono utili indicazioni soprattutto per quanto riguarda le frequenze di risonanza e sui fattori di amplificazione sismica dei suoli durante un terremoto mentre attraverso la tecnica MFA è stato possibile definire l'andamento delle Vs con la profondità e quindi la definizione delle V_{S30} ai fini della classificazione sismica dei suoli di fondazione come previsto dal D.M. 14 gennaio 2008.
Dall'analisi dei risultati delle indagini geofisiche specifiche si è riscontrato che il terreno di fondazione su cui andrà realizzato l'intervento in esame, appartiene alla categoria di sottosuolo "C", ai sensi del D.M. 14/01/08.
Relativamente alle frequenze caratteristiche di sito, dal diagramma delle curve H/V, abbiamo un picco stratigrafico con le seguenti caratteristiche:

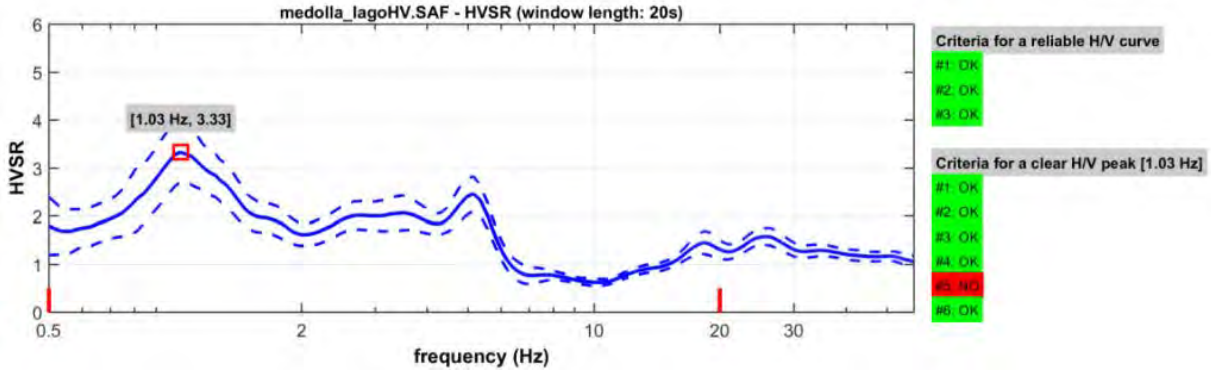


Le acquisizione HVSR, risultano in parte convalidate dalle linee guida SESAME 2005.
Si riportano di seguito i report delle indagini sismiche a stazione singola (HVSR) e antenna sismica attiva (MFA-Hs):

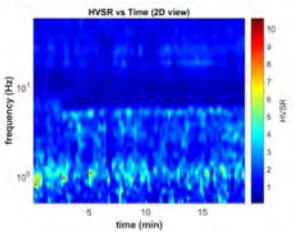
Medolla (MO) - via Rubadello - HVSR

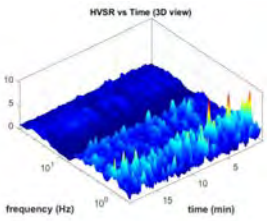
Strumento: Gemini2 - PASI Srl
Inizio registrazione: 03/05/17 Fine registrazione: 03/05/17
Nomi canali: NORTH-SOUTH; EAST-WEST; UP-DOWN
Durata registrazione: 0h20'00''. Analizzato 0h20'0'' tracciato (selezione manuale)
Freq. campionamento: 200 Hz
Lunghezza finestre: 30 s
Tipo di lisciamento: Triangular window
Lisciamento: 10%

RAPPORTO SPETTRALE ORIZZONTALE SU VERTICALE

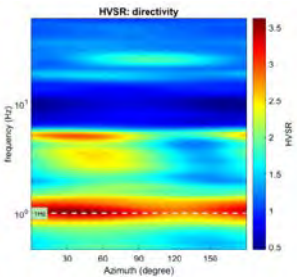


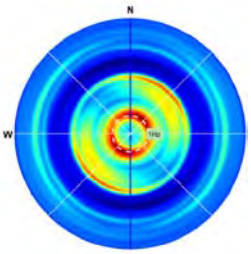
SERIE TEMPORALE H/V



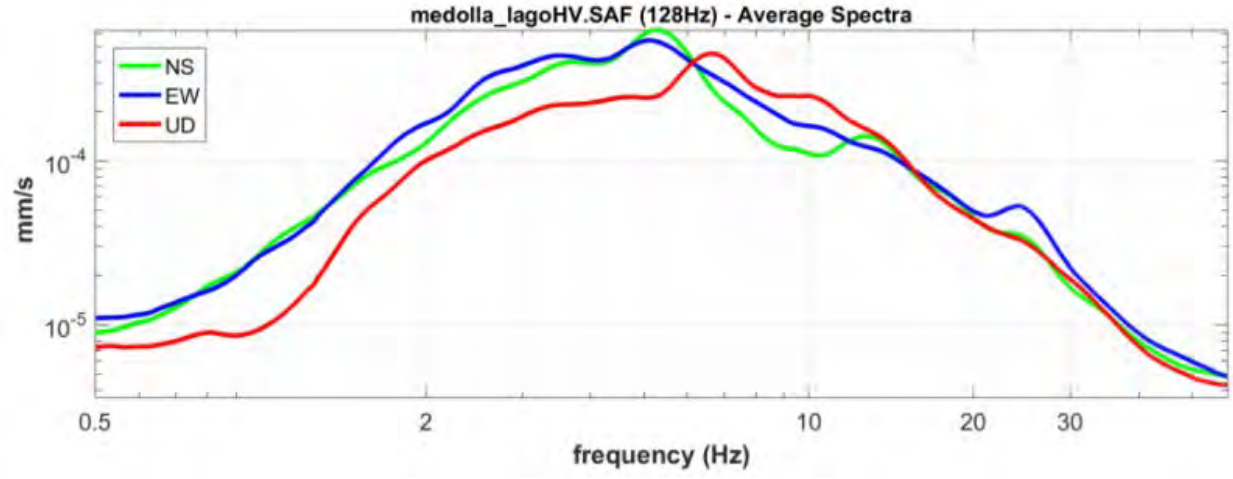


DIREZIONALITA' H/V





SPETTRI DELLE SINGOLE COMPONENTI



Secondo le linee guida SESAME, 2005.

0.5-20.0Hz frequency range **Peak frequency (Hz): 1.0 (±1.4)** **Peak HVSR value: 3.3 (±0.6)**

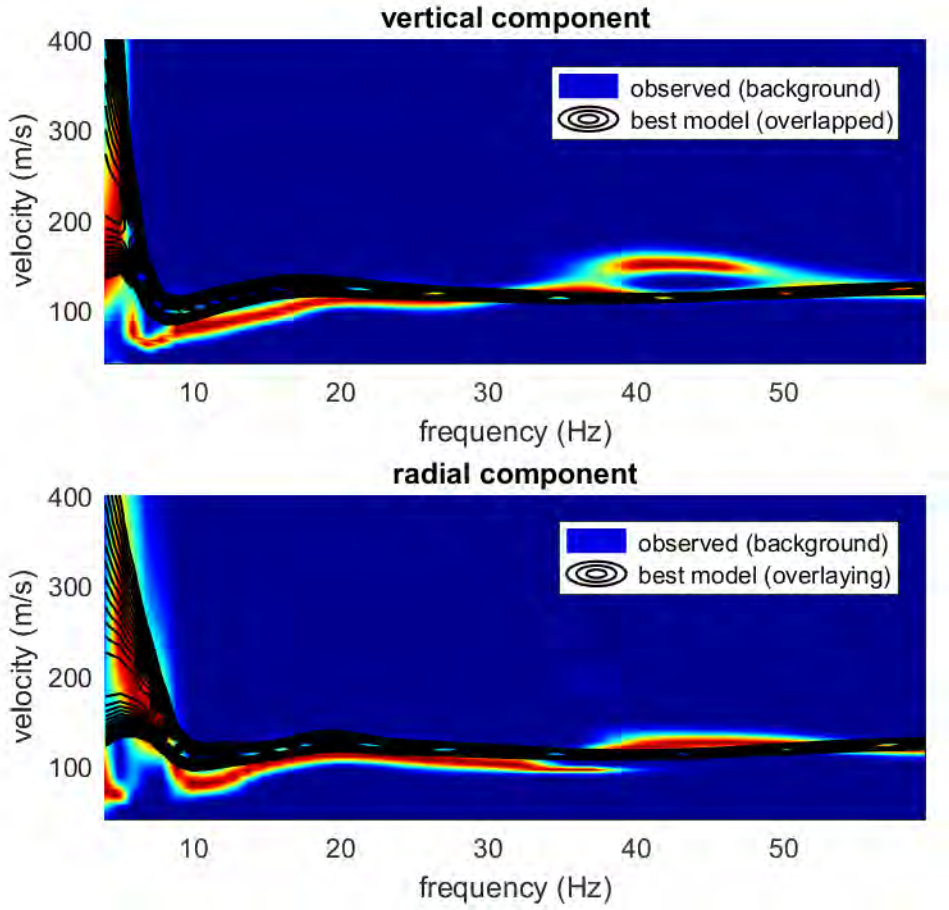
Criteri per una curva H/V affidabile [Tutti 3 dovrebbero risultare soddisfatti]			
$f_0 > 10 / L_w$	1.0 > 0.5	OK	
$n_c(f_0) > 200$	2332 > 200	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5$Hz **$\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5$Hz**		OK	
Criteri per un picco H/V chiaro [Almeno 5 su 6 dovrebbero essere soddisfatti]			
Esiste f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0.3 Hz	OK	
Esiste f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2.0 Hz	OK	
$A_0 > 2$	3.3 > 2	OK	
$f_{picco}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$		OK	
$\sigma_f < \varepsilon(f_0)$	1.408 < 0.103		NO
$\sigma_A(f_0) < \theta(f_0)$	0.986< 1.78	OK	

L_w	lunghezza della finestra
n_w	numero di finestre usate nell'analisi
$n_c = L_w n_w f_0$	numero di cicli significativi
f	frequenza attuale
f_0	frequenza del picco H/V
σ_f	deviazione standard della frequenza del picco H/V
$\varepsilon(f_0)$	valore di soglia per la condizione di stabilità $\sigma_f < \varepsilon(f_0)$
A_0	ampiezza della curva H/V alla frequenza f_0
$A_{H/V}(f)$	ampiezza della curva H/V alla frequenza f
f^-	frequenza tra $f_0/4$ e f_0 alla quale $A_{H/V}(f^-) < A_0/2$
f^+	frequenza tra f_0 e $4f_0$ alla quale $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	deviazione standard di $A_{H/V}(f)$, $\sigma_A(f)$ è il fattore per il quale la curva $A_{H/V}(f)$ media deve essere moltiplicata o divisa
$\sigma_{logH/V}(f)$	deviazione standard della funzione log $A_{H/V}(f)$
$\theta(f_0)$	valore di soglia per la condizione di stabilità $\sigma_A(f) < \theta(f_0)$

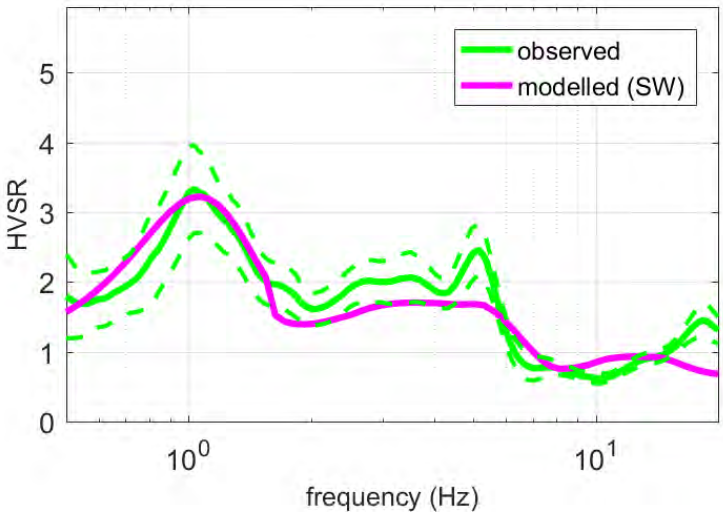
Valori di soglia per σ_f e $\sigma_A(f_0)$					
Intervallo di freq. [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ per $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
log $\theta(f_0)$ per $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

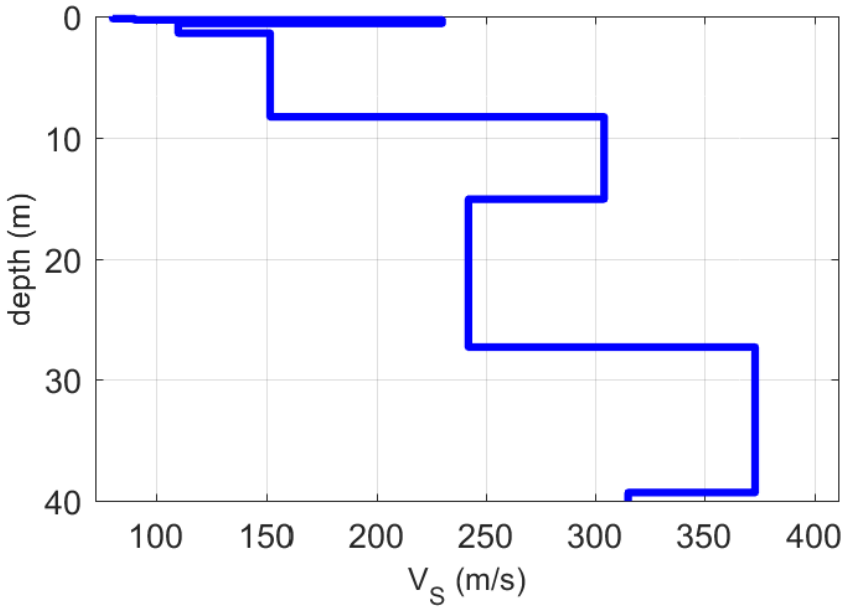
Medolla (MO) - via Rubadello - MFA - Hs
(Analisi Rayleigh + HVSR)

Analisi onde Rayleigh (offset 40 m e frequenza di campionamento a 1 KHz)



Analisi HVSR





Shear-wave velocities (m/s): 80 90 230 110 152 304 242 373 315 490 440 600

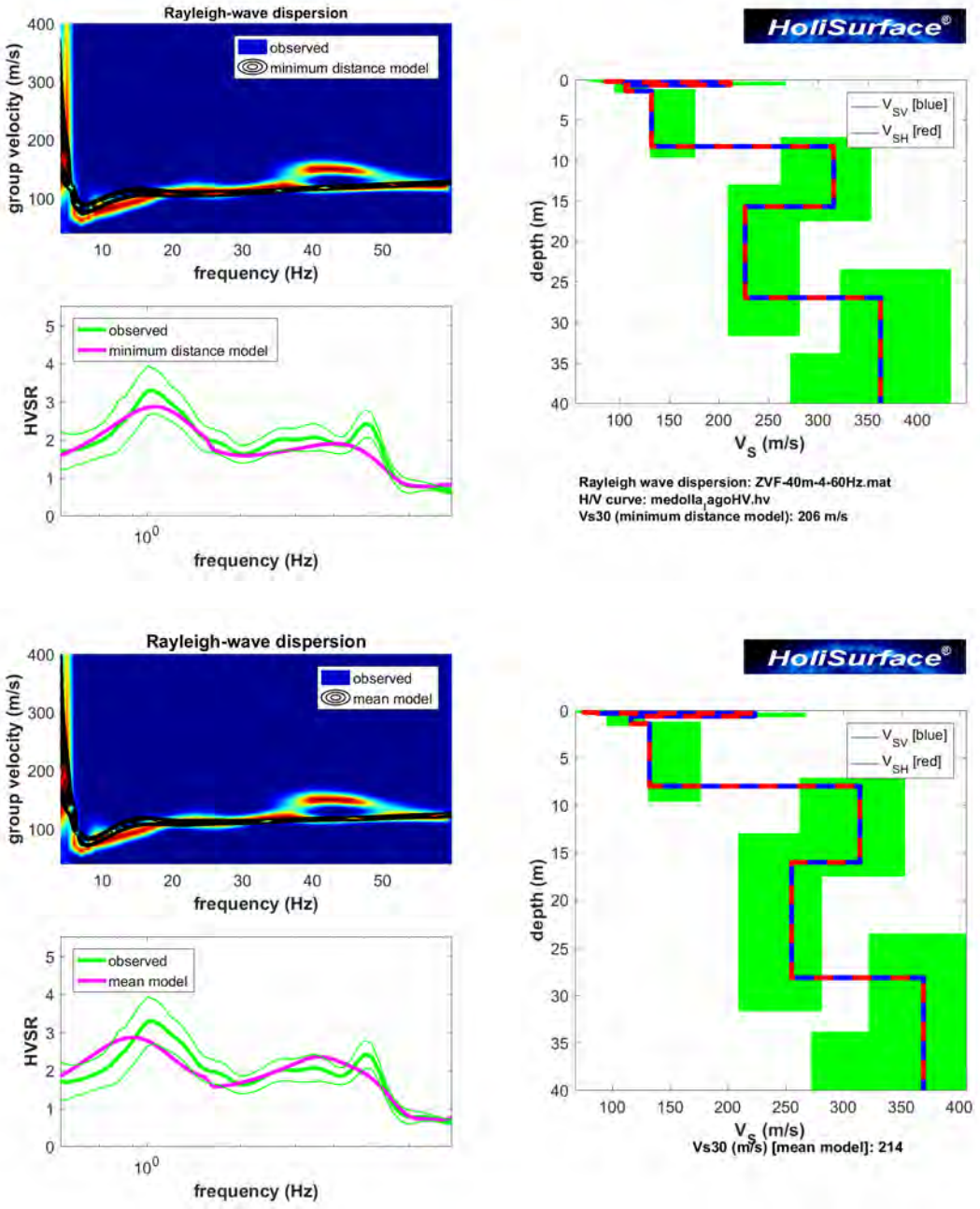
Thicknesses (m): 0.2 0.1 0.3 0.8 6.9 6.8 12.2 12.0 22.0 15.0 25.0

Seismic/Dynamic Shear modulus (MPa) (approximate values): 12 15 105 23 44 190 114 283 198 504 394 738

Vs30 (m/s): 218

Medolla (MO) - via Rubadello - MFA
(Analisi Rayleigh + HVSR)

Analisi onde Rayleigh (offset 40 m e frequenza di campionamento a 1 KHz)
Procedura di inversione automatica FVS - Componente verticale



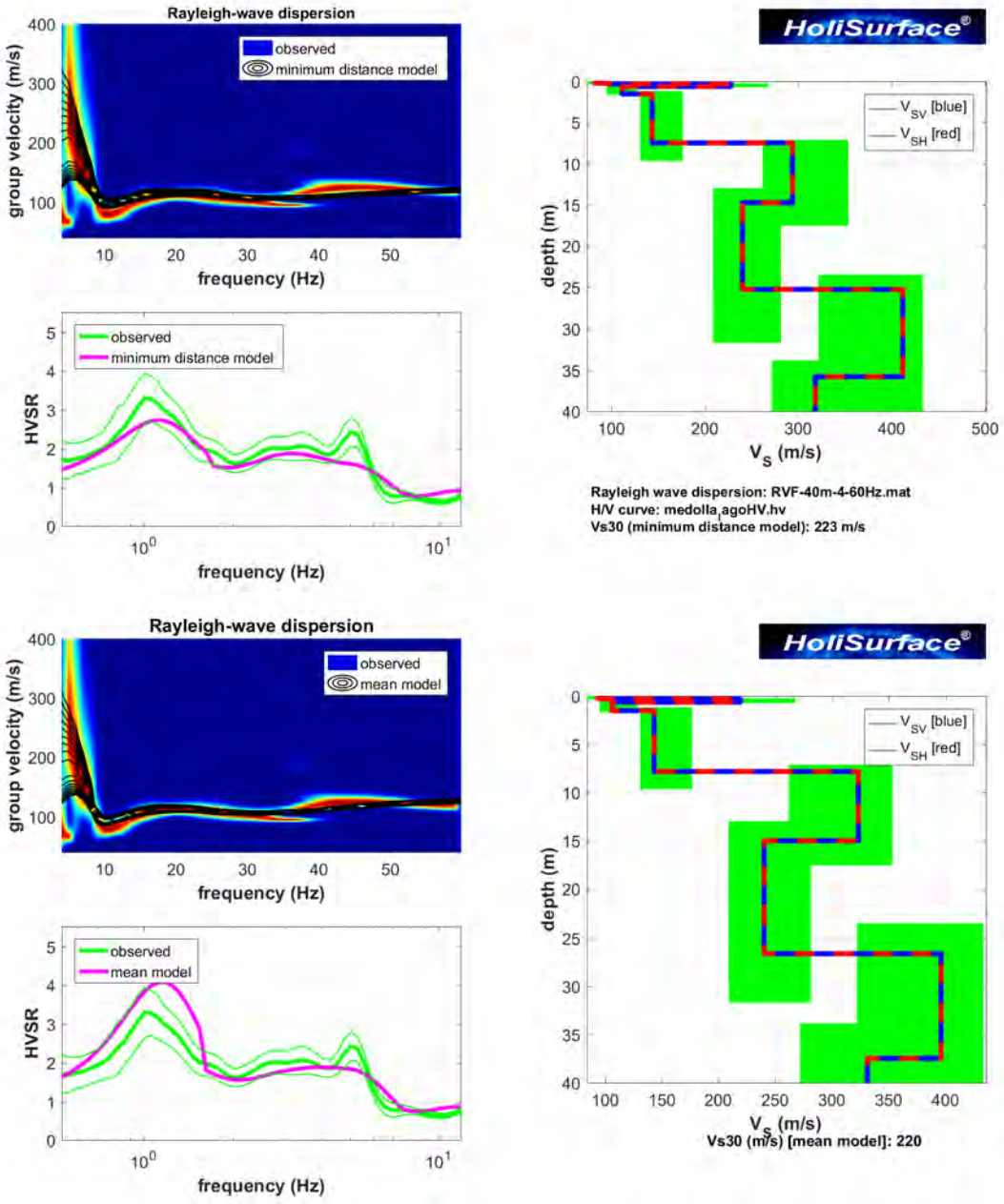
Vs (m/s): 75, 87, 223, 116, 132, 314, 255, 369, 315, 514, 406, 610

Thickness (m): 0.2, 0.1, 0.3, 0.8, 6.6, 8.0, 12.1, 14.8, 21.9, 17.8, 32.2

Vs30 (m/s): 206-214

Medolla (MO) - via Rubadello - MFA
(Analisi Rayleigh + HVSR)

Analisi onde Rayleigh (offset 40 m e frequenza di campionamento a 1 KHz)
Procedura di inversione automatica FVS - Componente radiale

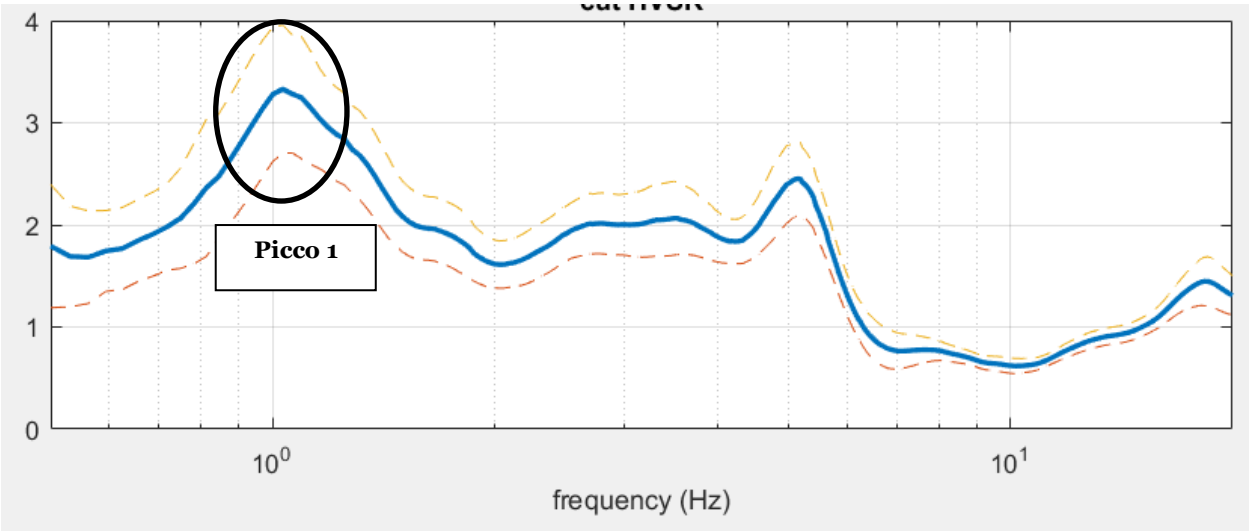


Vs (m/s): 93, 95, 219, 106, 143, 323, 240, 396, 331, 518, 467, 679

Thickness (m): 0.2, 0.1, 0.3, 0.9, 6.3, 7.2, 11.6, 10.9, 22.9, 16.9, 25.1

Vs30 (m/s): 220-223

Sul sito di studio, sono state eseguite 1 acquisizione HVSR, 1 acquisizione SPAC collegato con 4 geofoni verticali e 1 acquisizione MASW.
Relativamente alle **frequenze caratteristiche di sito**, dal diagramma del confronto delle curve H/V, di seguito riportato, abbiamo:

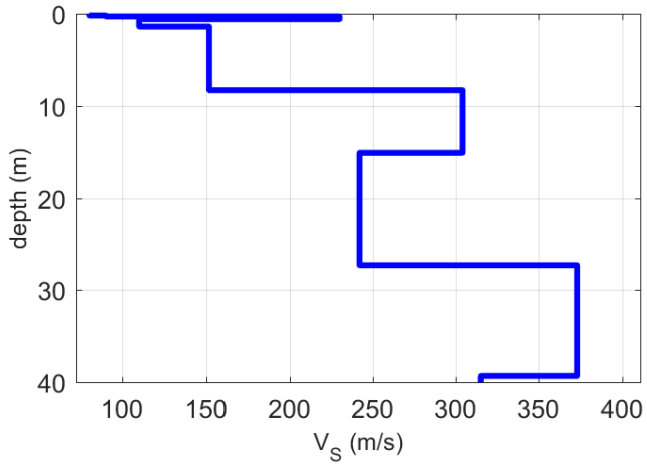


Picchi Stratigrafici	Rapporto H/V (valori medi)	Frequenza(Hz) Caratteristica (valori medi)
1	~ 3.3	~ 1.03

Il rapporto H/V evidenzia contrasti di impedenza significativi (H/V > 3) in caso di moto sismico.

Relativamente al profilo di Vs con la profondità e alla determinazione della categoria di suolo richiesta dalla normativa, **mediante la ricostruzione delle Vs_{30}**, abbiamo che:

- MASW + HV



Vs (30): 206-223 (categoria di sottosuolo "C")

b. Indagini geognostiche

b1. I dati ottenuti

Le indagini geognostiche sono state eseguite dal Dott. Geol Lorenzo Del Maschio.
Per l'ubicazione delle prove si veda la planimetria riportata in figura 6.1, mentre per le schede delle prove si rimanda all'allegato tecnico inserito nel presente documento.

b2. Interpretazione dei sondaggi geognostici

Dall'analisi dei valori desunti dalla prova penetrometrica statica (CPT) è stato possibile dettagliare e ricostruire la stratigrafia del sottosuolo e determinare i parametri geotecnici di riferimento dei terreni di fondazione. I valori riportati nelle tabelle della prova penetrometrica statica elettrica rappresentano i valori della resistenza alla penetrazione della punta elettrica (Qc), infissa nel terreno a velocità costante (v = 2 cm / s), espressi in kg/cm², i valori della resistenza laterale specifica (fs), in kg/cm² i valori U (pressione idrostatica nei pori) ed i valori del rapporto delle resistenze Qc/fs (Rapporto Robertson 1990, 2010 e 2016).
Nei diagrammi sono riportati i valori i valori della resistenza alla penetrazione della punta meccanica (Qc) in Mpa, i valori della resistenza laterale specifica (fs), in kPa, i valori U (pressione idrostatica nei pori).
Il rilievo e la memorizzazione dei dati di prova sono stati eseguiti mediante l'impiego di una punta digitale "G1 CPLS D" della TecnoPenta Srl, delle seguenti caratteristiche tecniche:

Resistenza alla punta (Qc)	
Sensore	Cella di carico da 8 strain gauges in configurazione full bridge
F.S.	50 MPa

Attrito laterale (Fs)	
Sensore	Cella di carico da 8 strain gauges in configurazione full bridge
F.S.	500 kPa

Pressione neutra (U)	
Sensore	trasduttore di pressione piezoresistivo
F.S.	3500 kPa
Filtro poroso	Bronzo sinterizzato Ø pori 50 µm altezza 6 mm

Inclinazione (I)	
Sensore	MEMS
F.S.	±15 °

Temperature	
Sensore	Monolitico
Range	−50°C ÷ +150 °C

G1-EST CPL BLue trasduttore di spostamento	
Sensore	Potenziometrico, 10 rotazioni da 10 kΩ
F.S.	150 cm (standard)

Accelerometri	
Sensore	MEMS 3D
F.S.	+/-2g
Frequenza	0 ÷ 100 Hz
Temperatura di funzionamento	−40°C ÷ +90°C

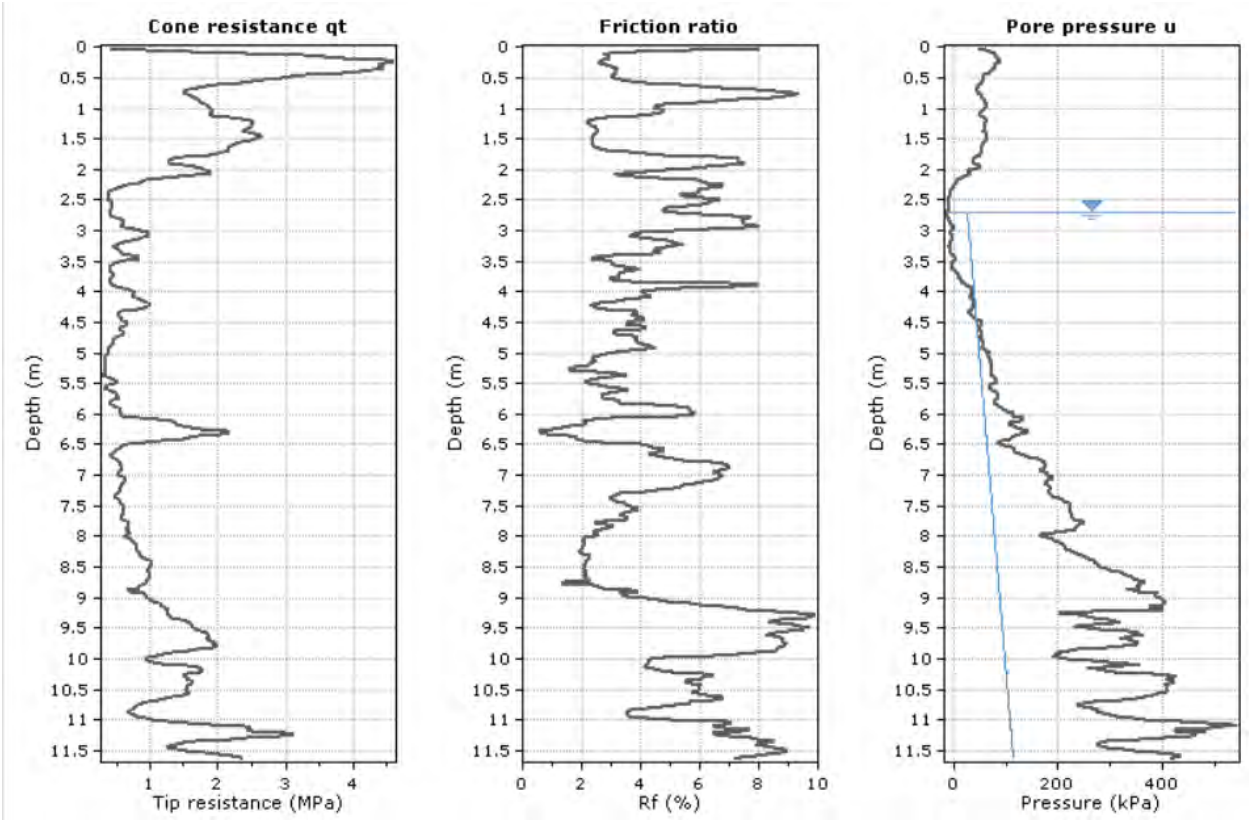
D1-CPL Blue	
Dimensioni	220 x 120 x 90 mm
Trasmissione dati	Bluetooth
Alimentazione	Batteria interna 12 VDC
Autonomia	40 h al 50% di carica della batteria

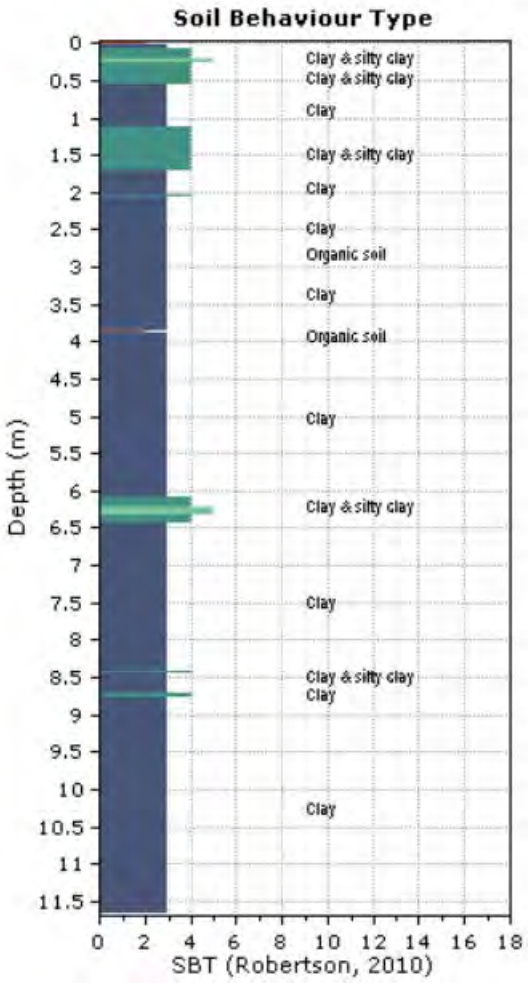
Cavo	
Guaina	PU
Conduttori	10 x 0.35 mm^2

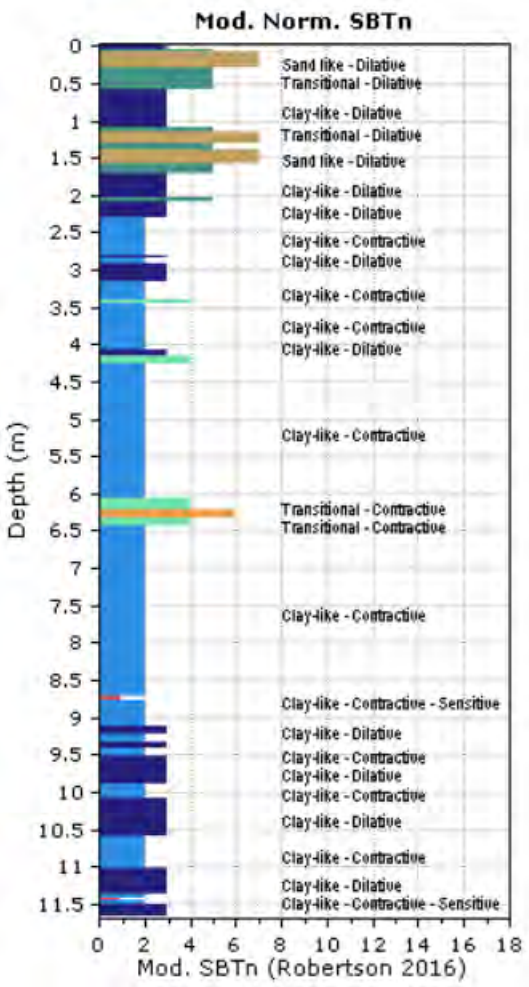
Vengono di seguito riportate le tabelle ed i grafici dei valori desunti dalle prove penetrometriche statiche con piezocono CPTu:

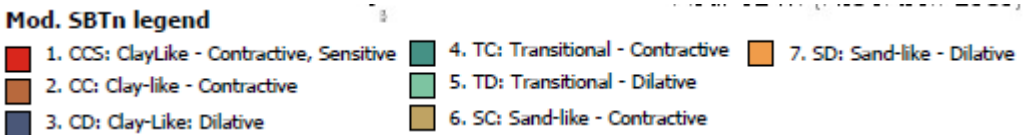
PROVA CPTu01

Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 20/04/2017
Profondità prova: 11.98 m
Località: Medolla - Via Rubadello

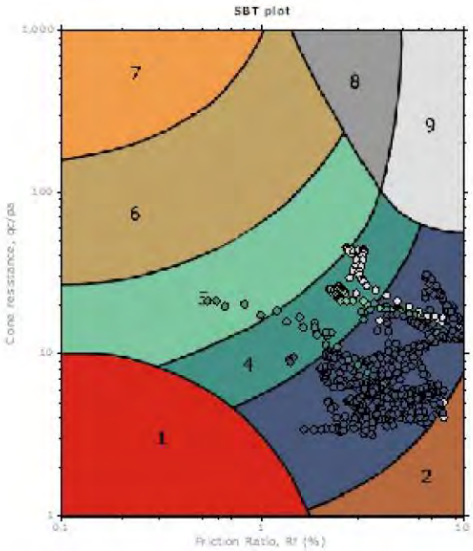


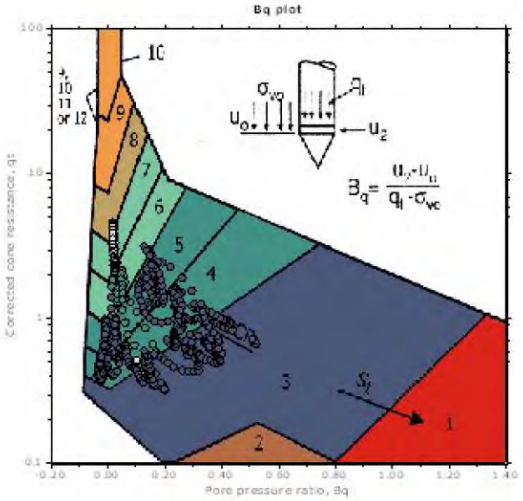

Soil Behaviour Type
Depth (m)
SBT (Robertson, 2010)
Clay & silty clay
Clay & silty clay
Clay
Clay & silty clay
Clay
Clay
Organic soil
Clay
Organic soil
Clay
Clay & silty clay
Clay
Clay & silty clay
Clay
Clay


Mod. Norm. SBTn
Depth (m)
Mod. SBTn (Robertson 2016)
Sand like - Dilative
Transitional - Dilative
Clay-like - Dilative
Transitional - Dilative
Sand like - Dilative
Clay-like - Dilative
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Transitional - Contractive
Transitional - Contractive
Clay-like - Contractive
Clay-like - Contractive - Sensitive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive - Sensitive

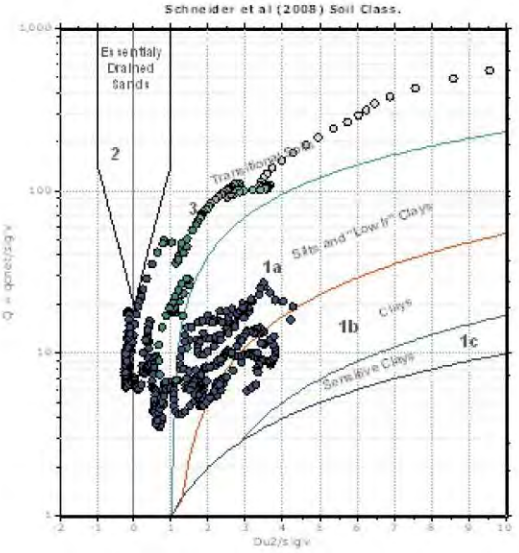

Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

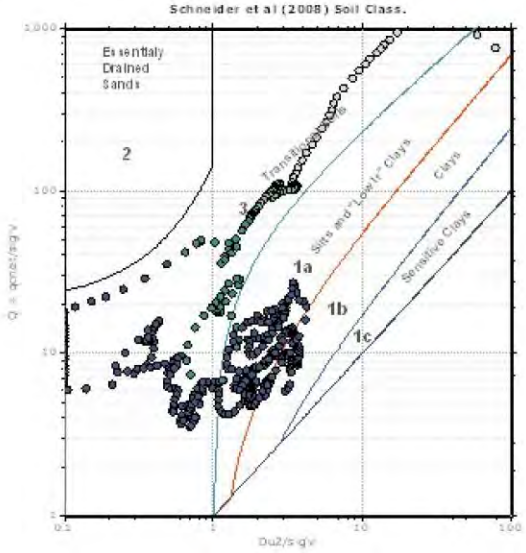
SBT - Bq plots

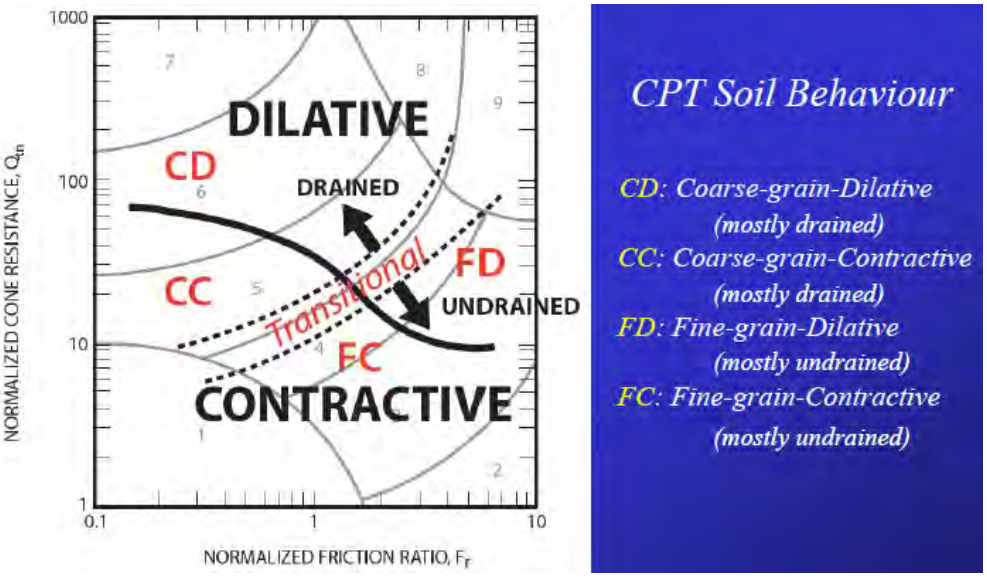


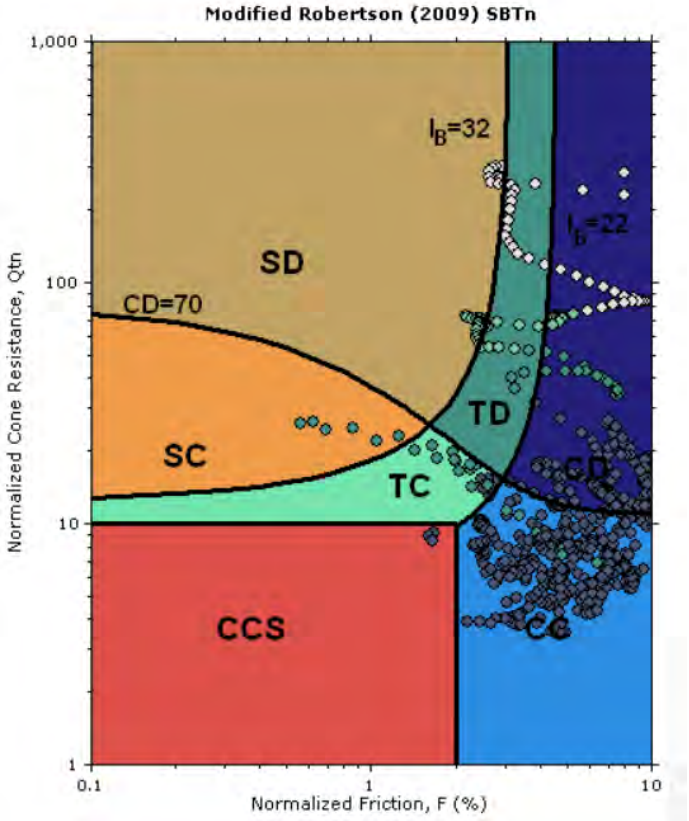


Bq plots (Schneider)





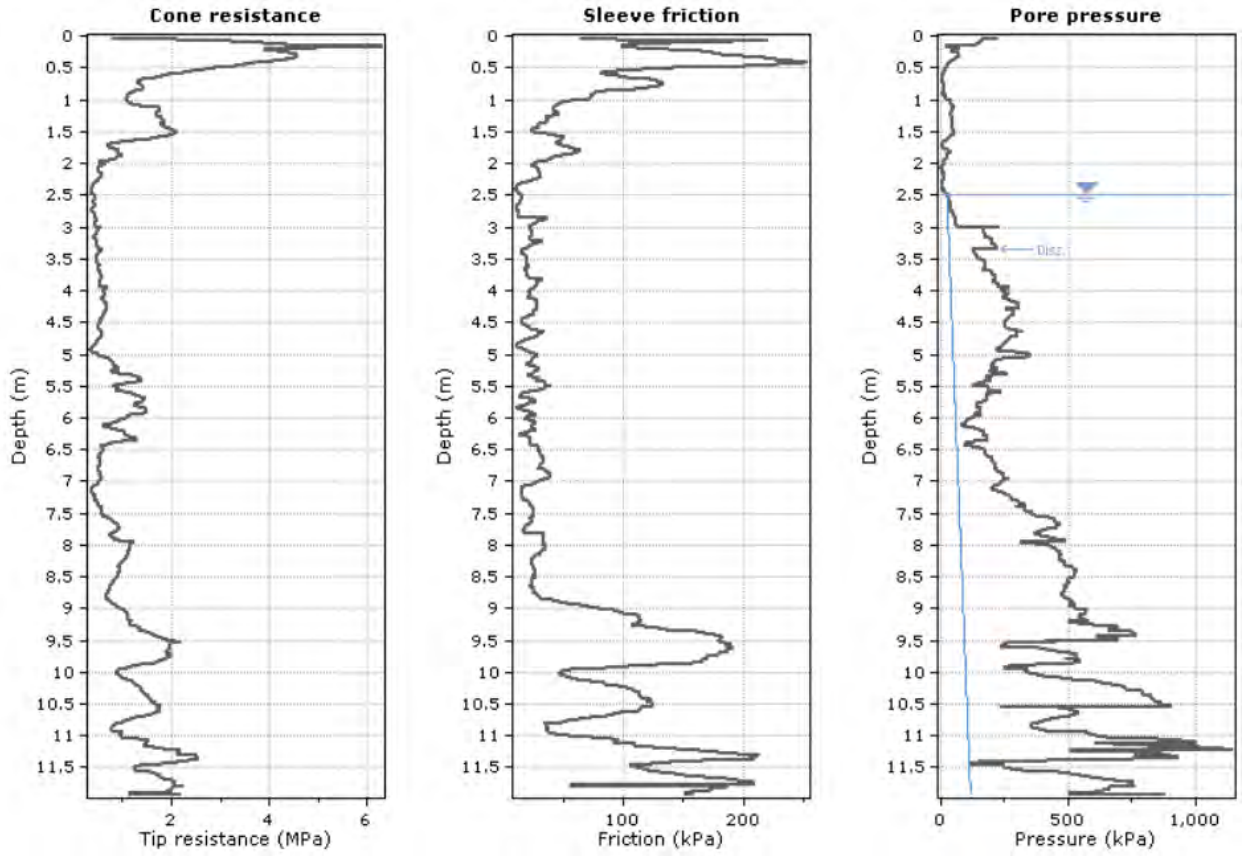


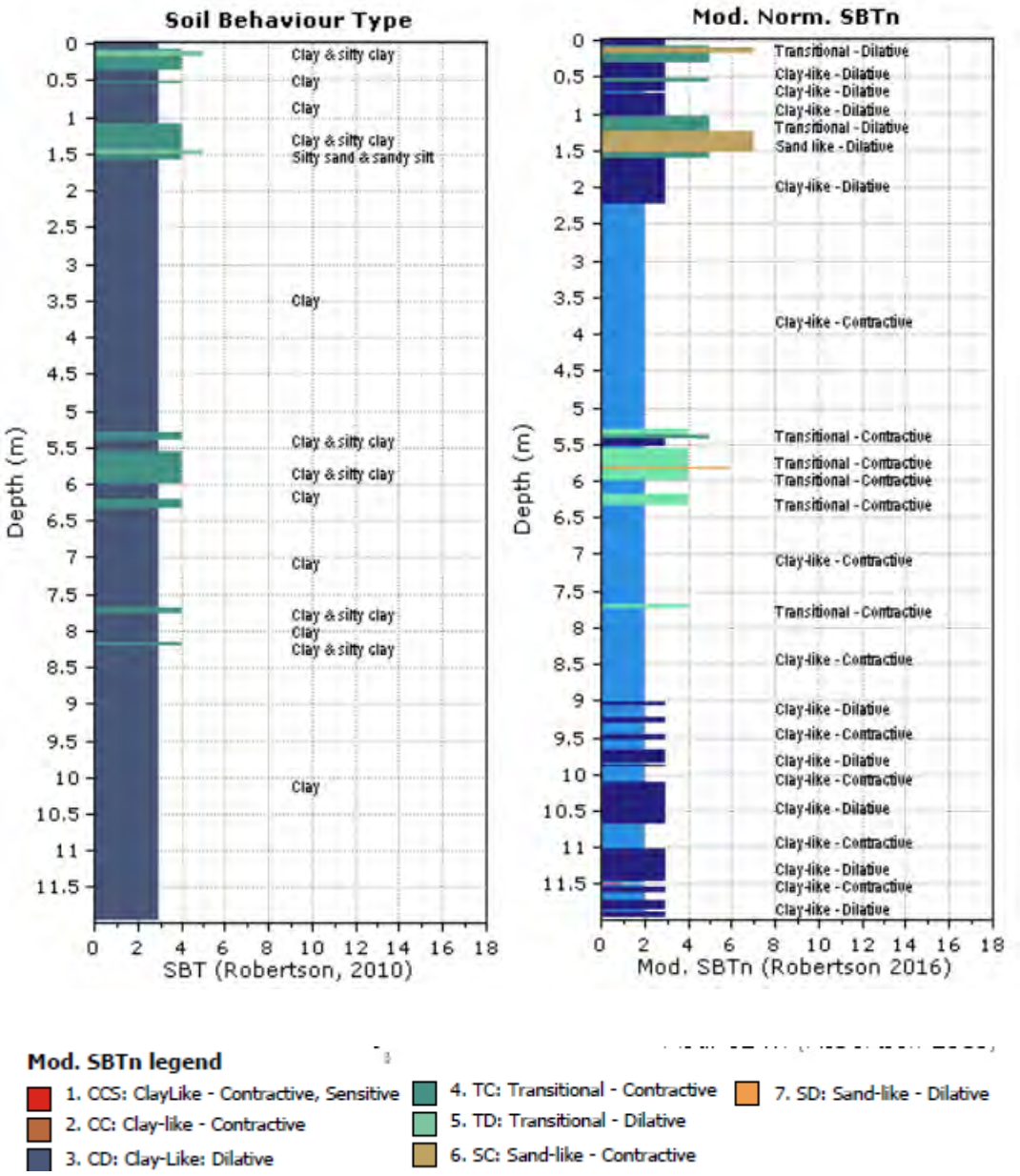


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

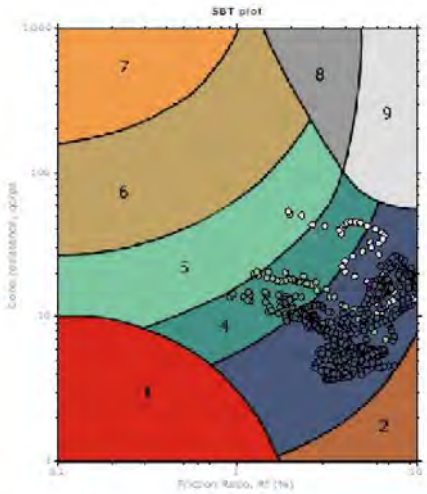
PROVA CPTu02

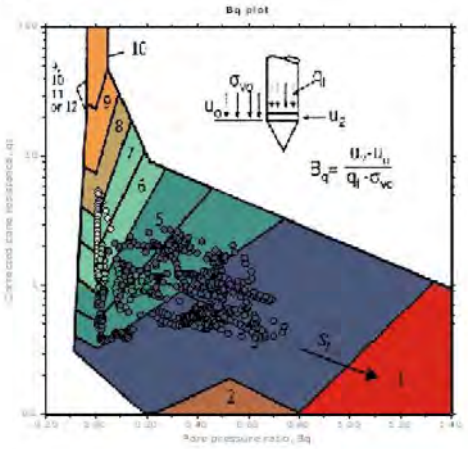
Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 20/04/2017
Profondità prova: 12.10 m
Località: Medolla - Via Rubadello




Soil Behaviour Type
Depth (m)
Clay & silty clay
Clay
Clay
Clay & silty clay
Silty sand & sandy silt
Clay
Clay & silty clay
Clay & silty clay
Clay
Clay
Clay & silty clay
Clay
Clay & silty clay
Clay
SBT (Robertson, 2010)
Mod. Norm. SBTn
Depth (m)
Transitional - Dilative
Clay-like - Dilative
Clay-like - Dilative
Clay-like - Dilative
Transitional - Dilative
Sand like - Dilative
Clay-like - Dilative
Clay-like - Contractive
Transitional - Contractive
Transitional - Contractive
Transitional - Contractive
Transitional - Contractive
Clay-like - Contractive
Transitional - Contractive
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Mod. SBTn (Robertson 2016)
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

SBT - Bq plots

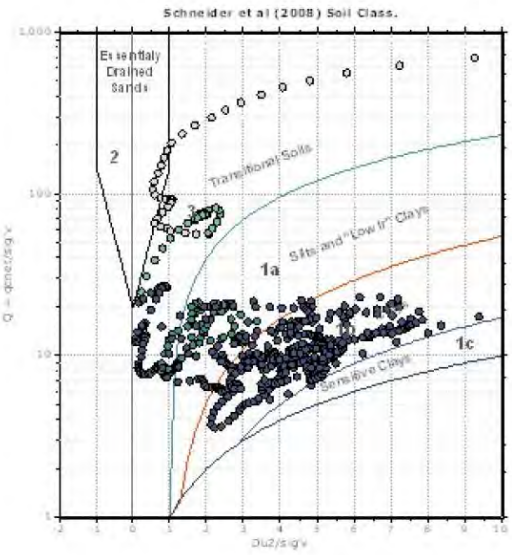


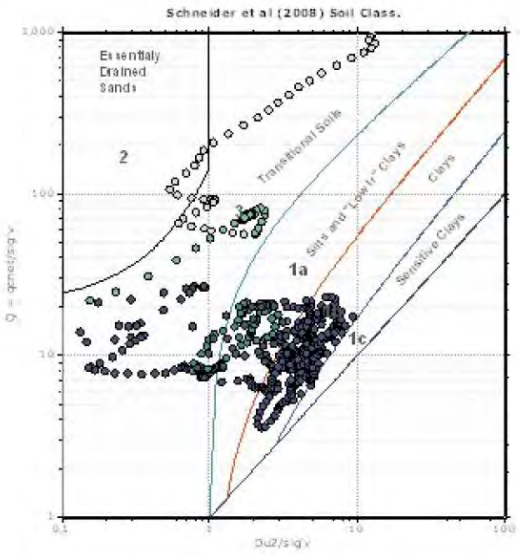


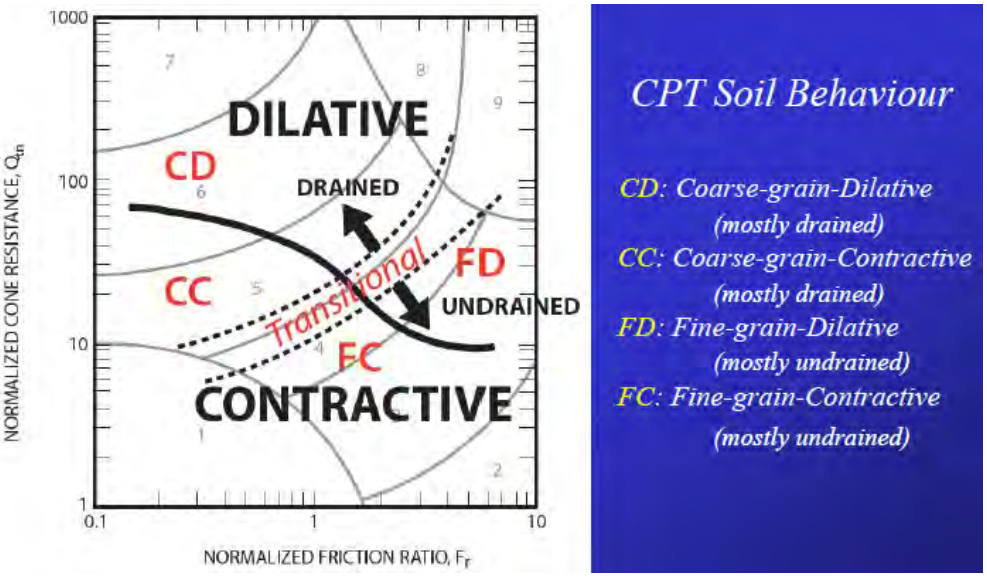
SBT legend

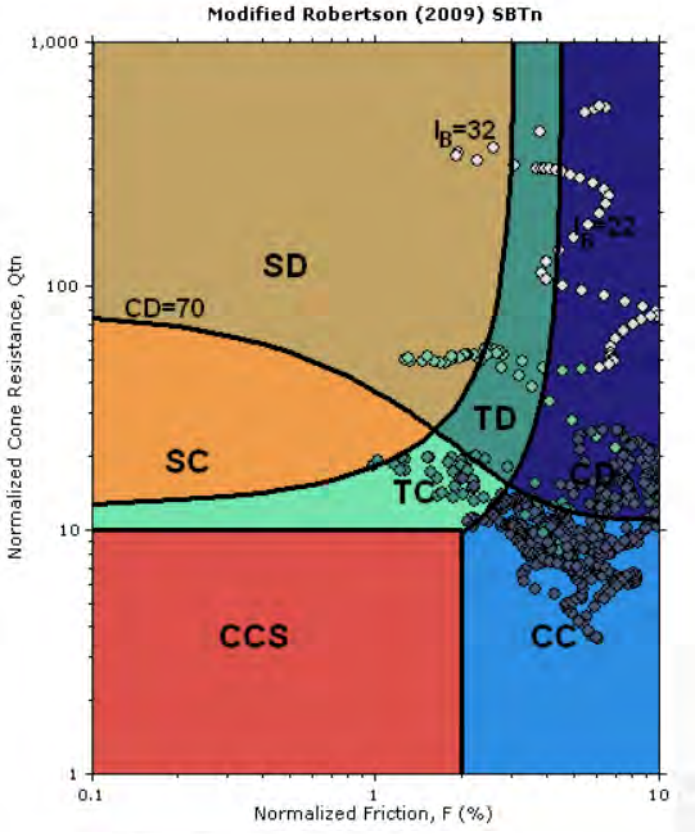
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Bq plots (Schneider)





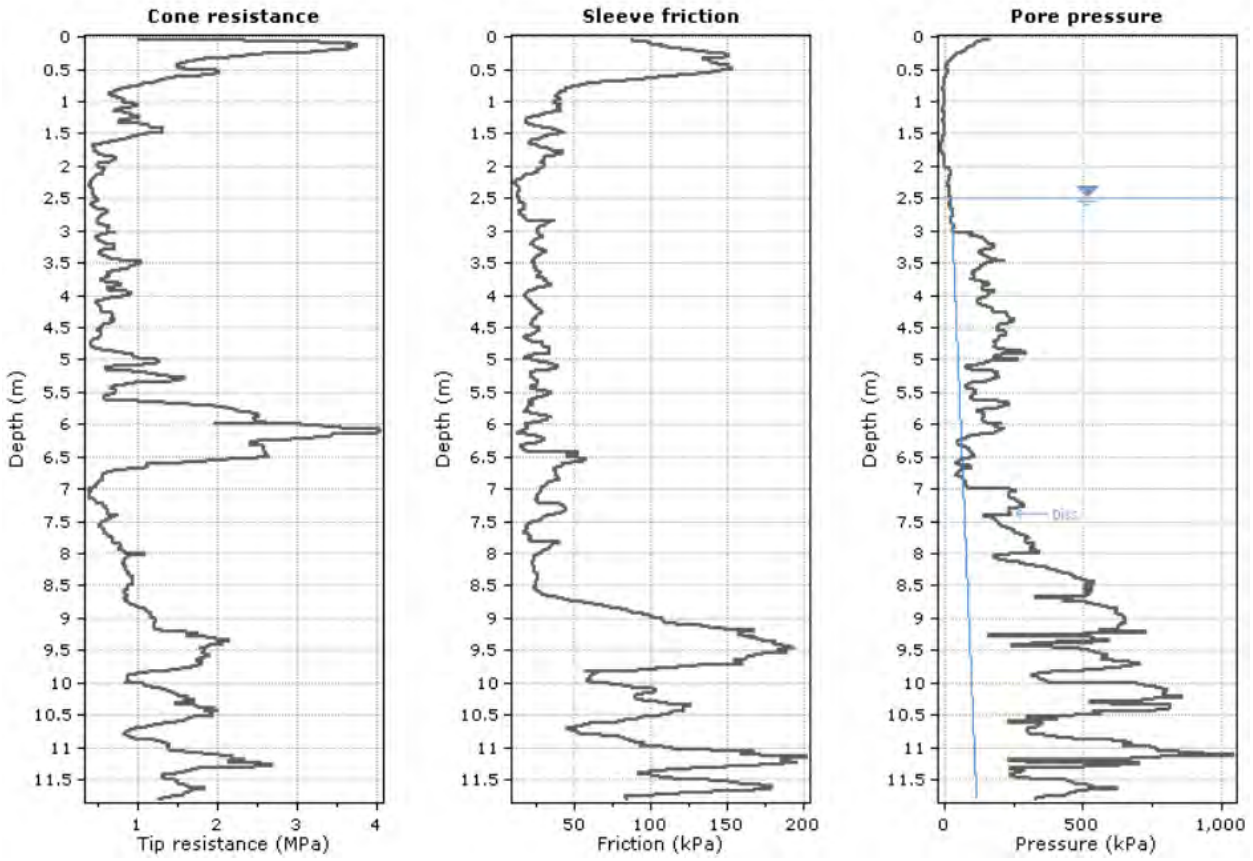


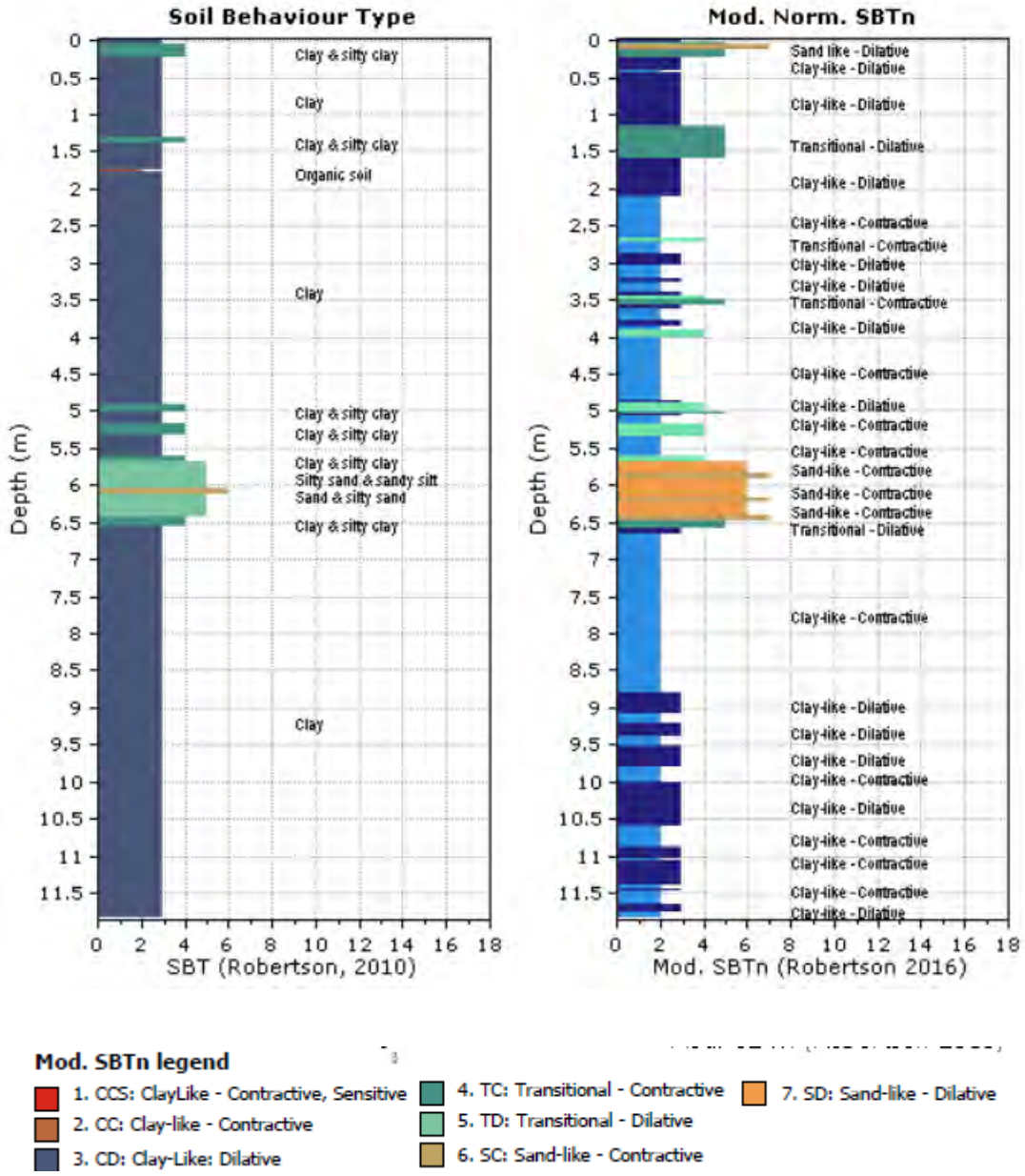


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

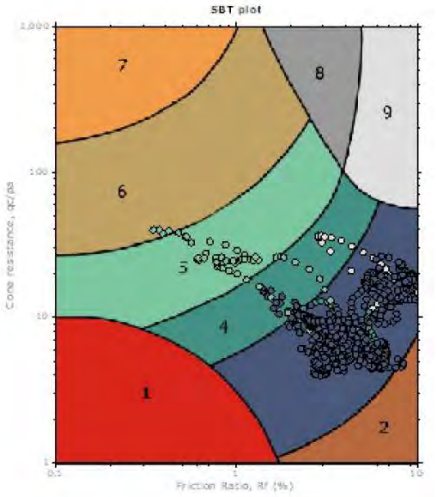
PROVA CPTu03

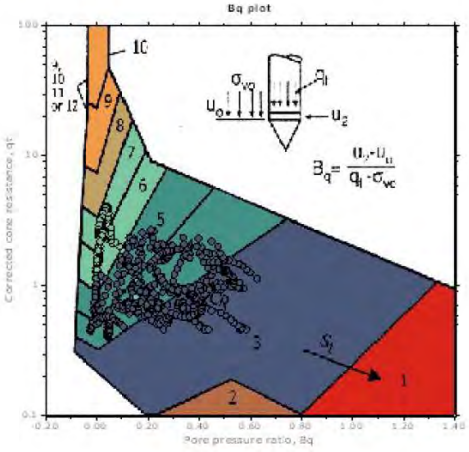
Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 20/04/2017
Profondità prova: 12.00 m
Località: Medolla - Via Rubadello




Soil Behaviour Type
Depth (m)
Clay & silty clay
Clay
Clay & silty clay
Organic soil
Clay
Clay & silty clay
Clay & silty clay
Clay & silty clay
Silty sand & sandy silt
Sand & silty sand
Clay & silty clay
Clay
SBT (Robertson, 2010)
Mod. Norm. SBTn
Depth (m)
Sand like - Dilative
Clay-like - Dilative
Clay-like - Dilative
Transitional - Dilative
Clay-like - Dilative
Clay-like - Contractive
Transitional - Contractive
Clay-like - Dilative
Clay-like - Dilative
Transitional - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Contractive
Sand-like - Contractive
Sand-like - Contractive
Sand-like - Contractive
Transitional - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Dilative
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Contractive
Clay-like - Contractive
Clay-like - Dilative
Mod. SBTn (Robertson 2016)
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

SBT - Bq plots

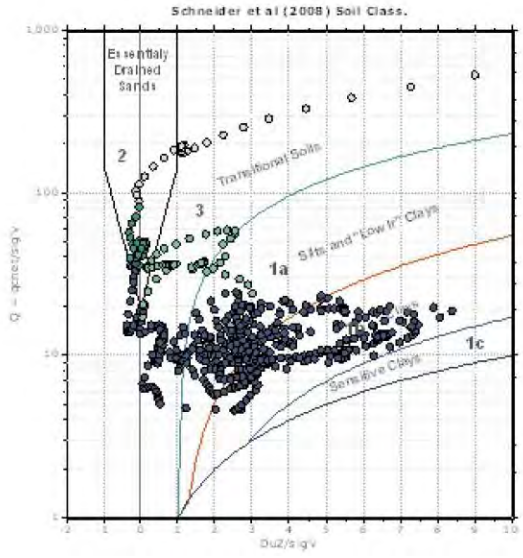


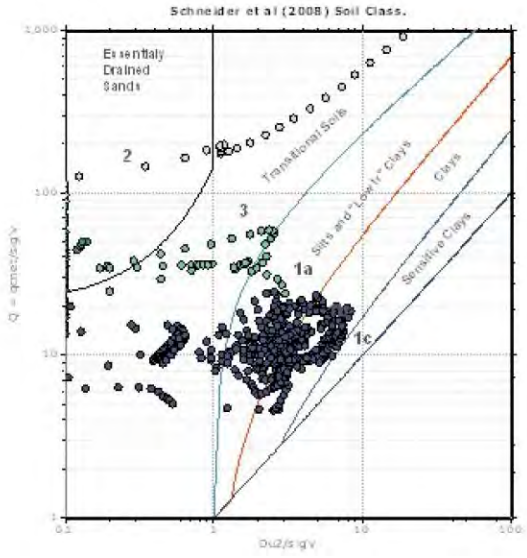


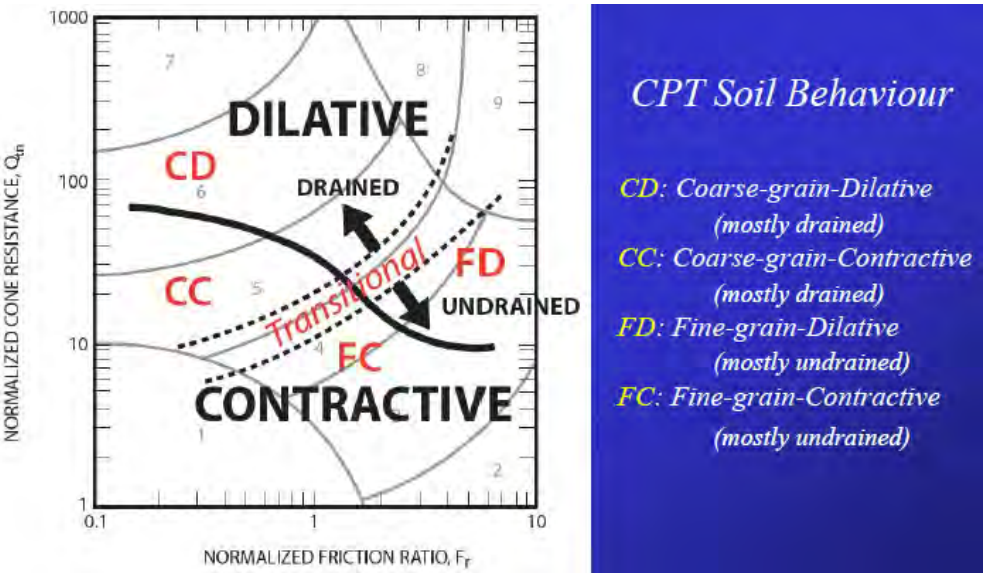
SBT legend

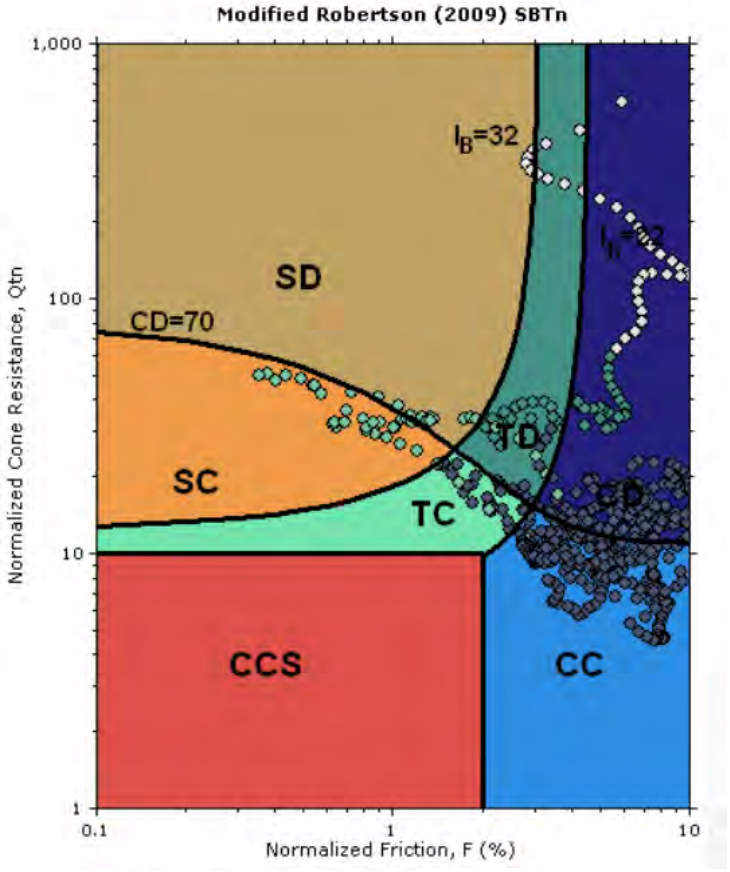
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Bq plots (Schneider)





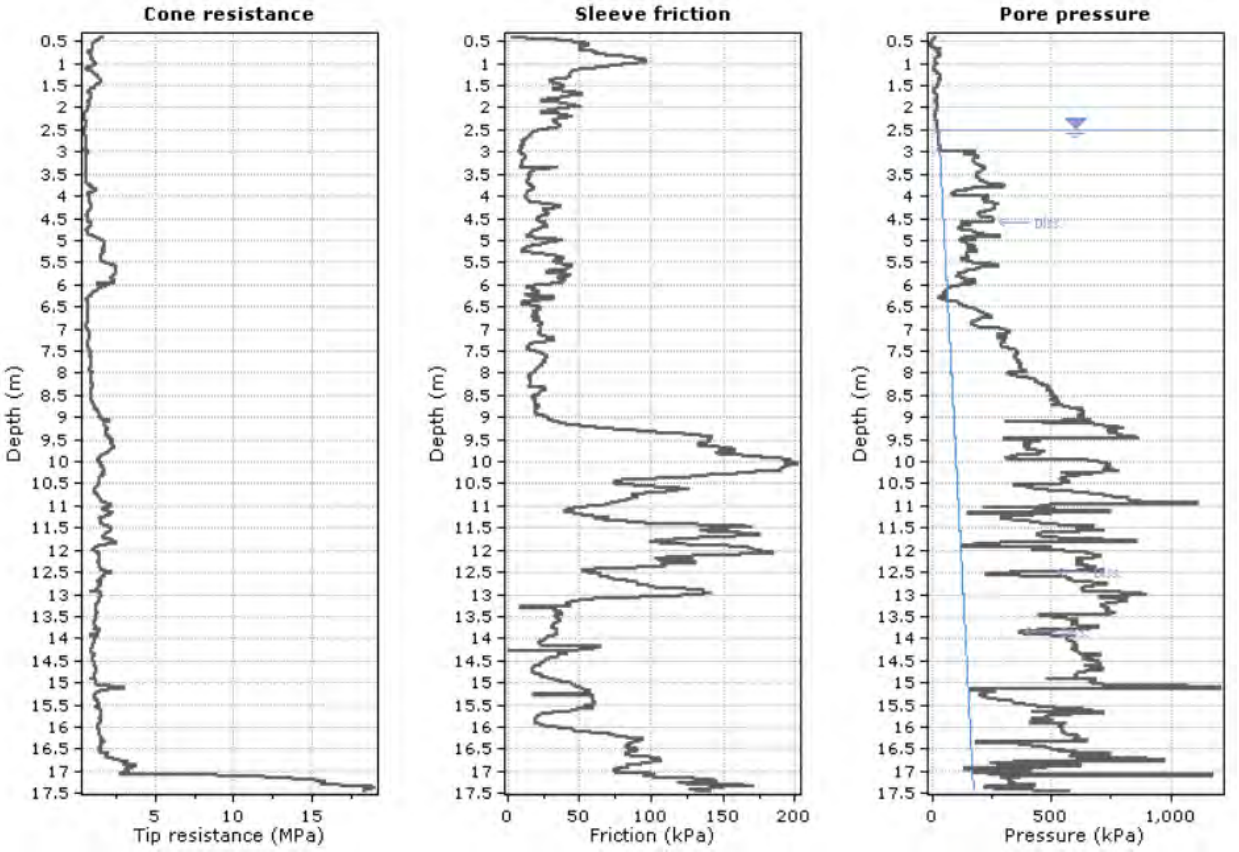


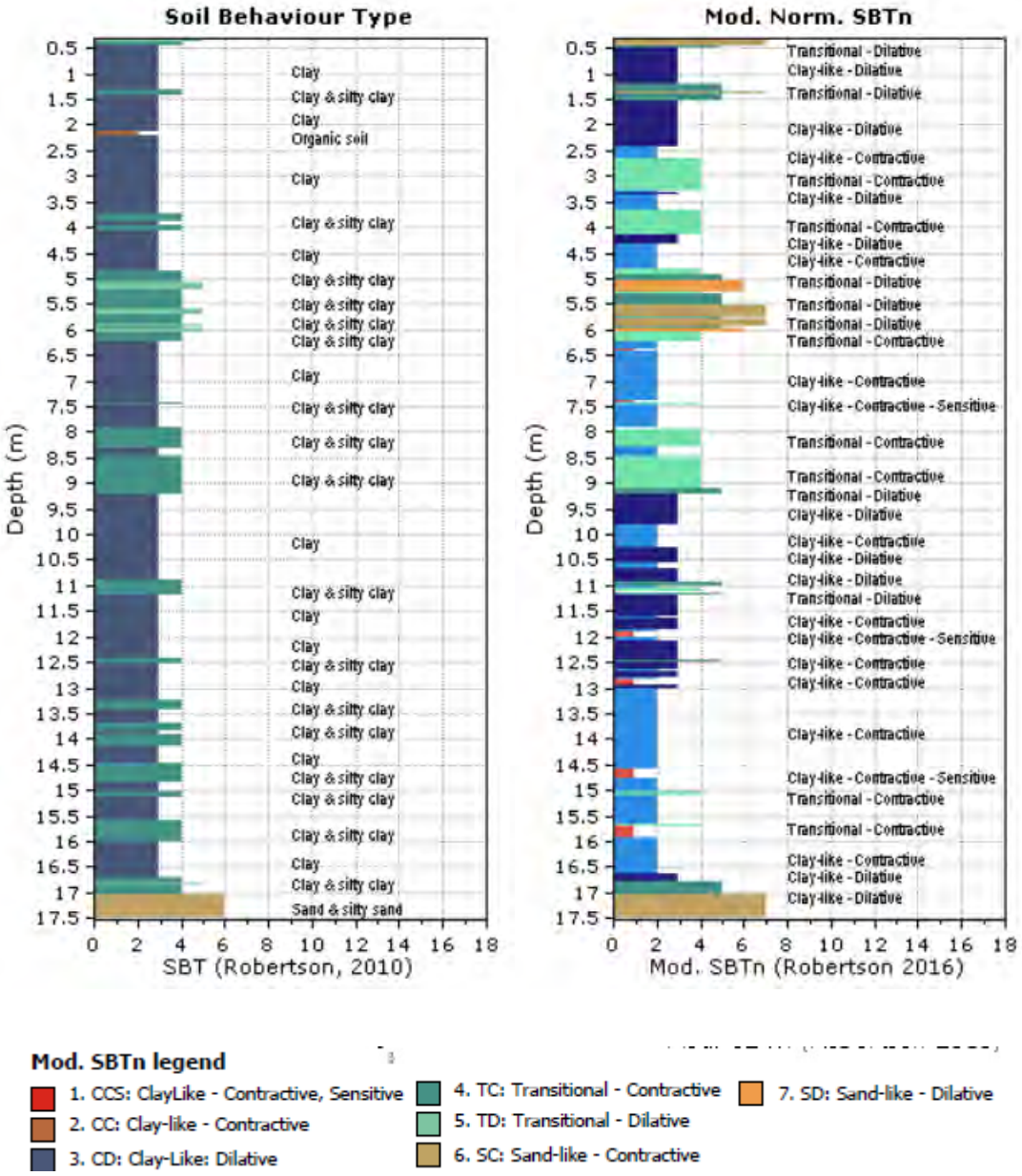


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

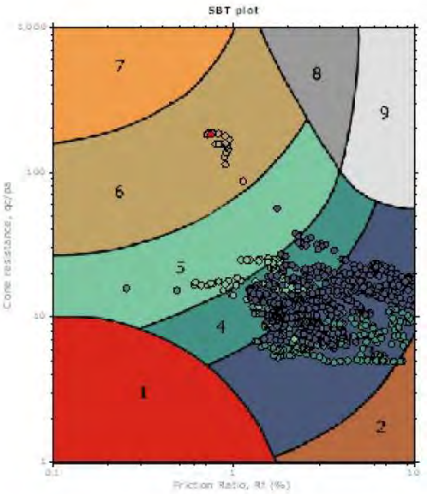
PROVA CPTu04

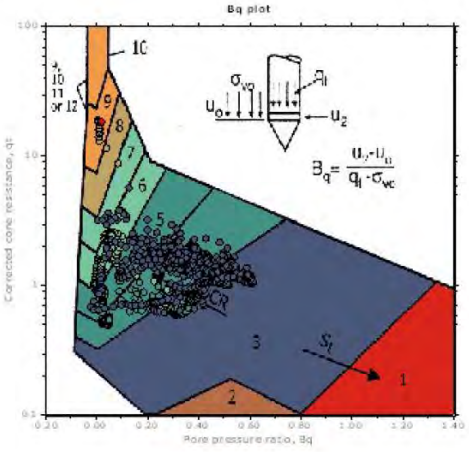
Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 20/04/2017
Profondità prova: 17.54 m
Località: Medolla - Via Rubadello




Soil Behaviour Type
Depth (m)
SBT (Robertson, 2010)
Clay
Clay & silty clay
Organic soil
Sand & silty sand
Mod. Norm. SBTn
Mod. SBTn (Robertson 2016)
Transitional - Dilative
Clay-like - Dilative
Transitional - Contractive
Clay-like - Contractive
Clay-like - Contractive - Sensitive
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

SBT - Bq plots

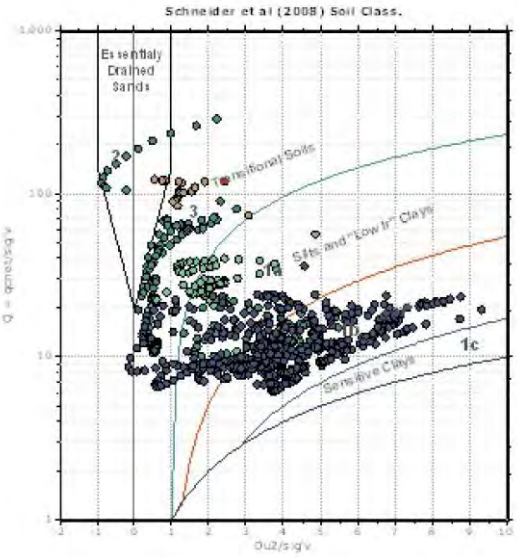


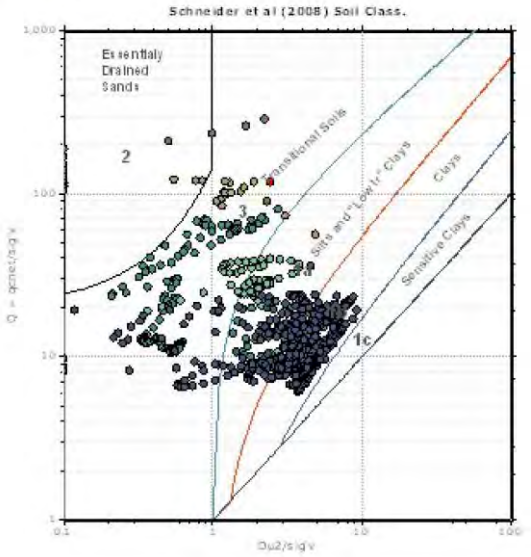


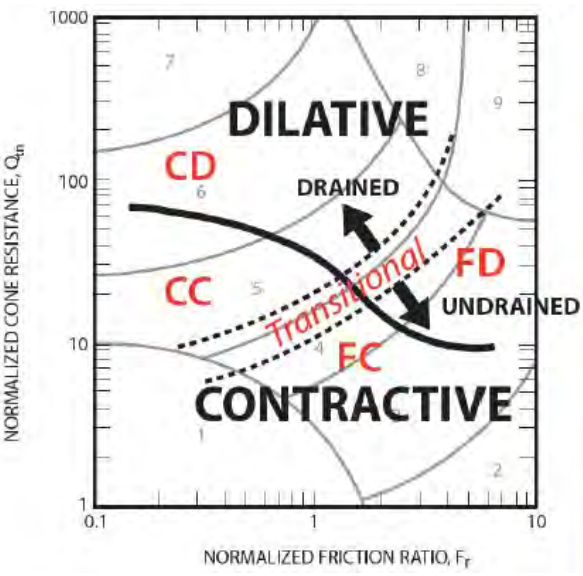
SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Bq plots (Schneider)

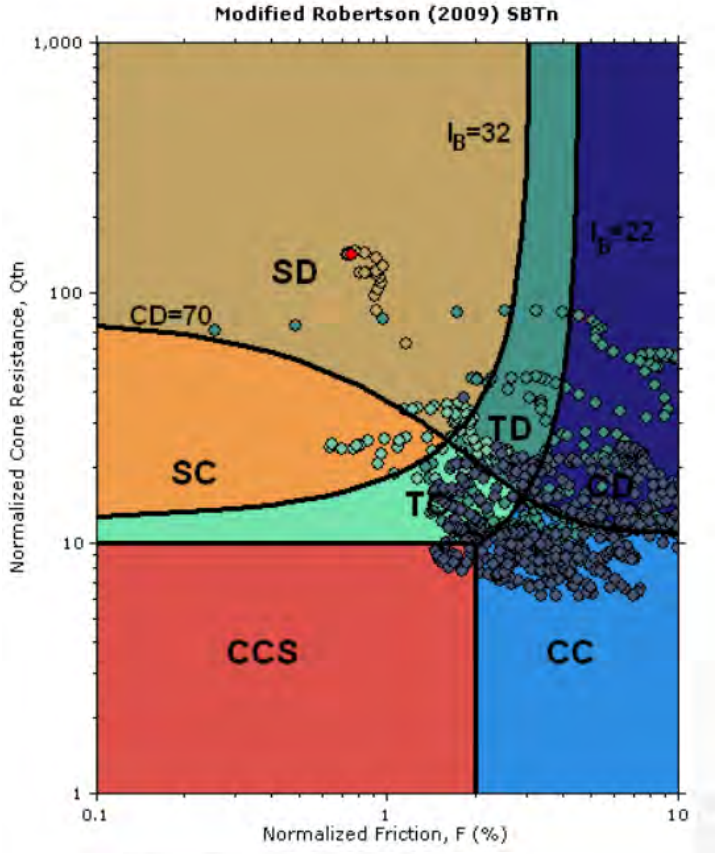






CPT Soil Behaviour

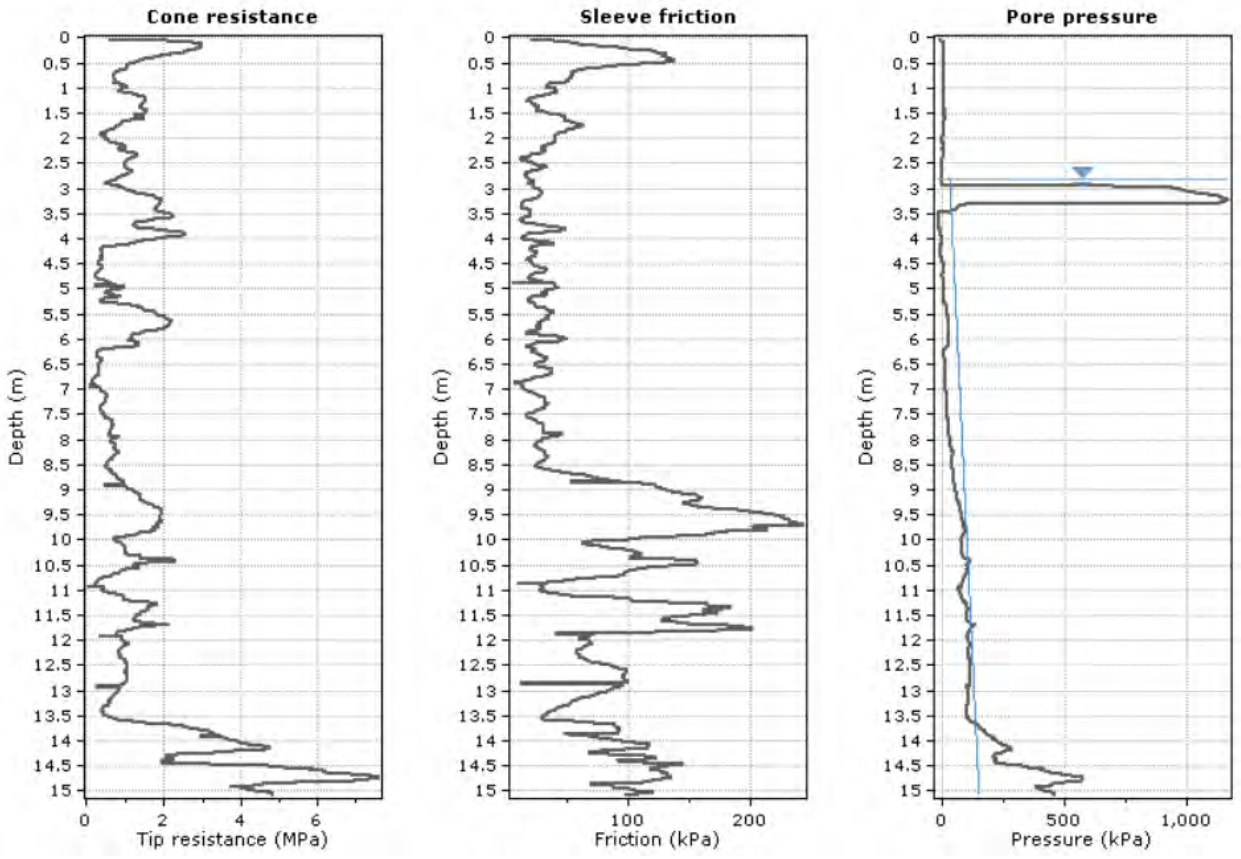
CD: Coarse-grain-Dilative
(mostly drained)
CC: Coarse-grain-Contractive
(mostly drained)
FD: Fine-grain-Dilative
(mostly undrained)
FC: Fine-grain-Contractive
(mostly undrained)

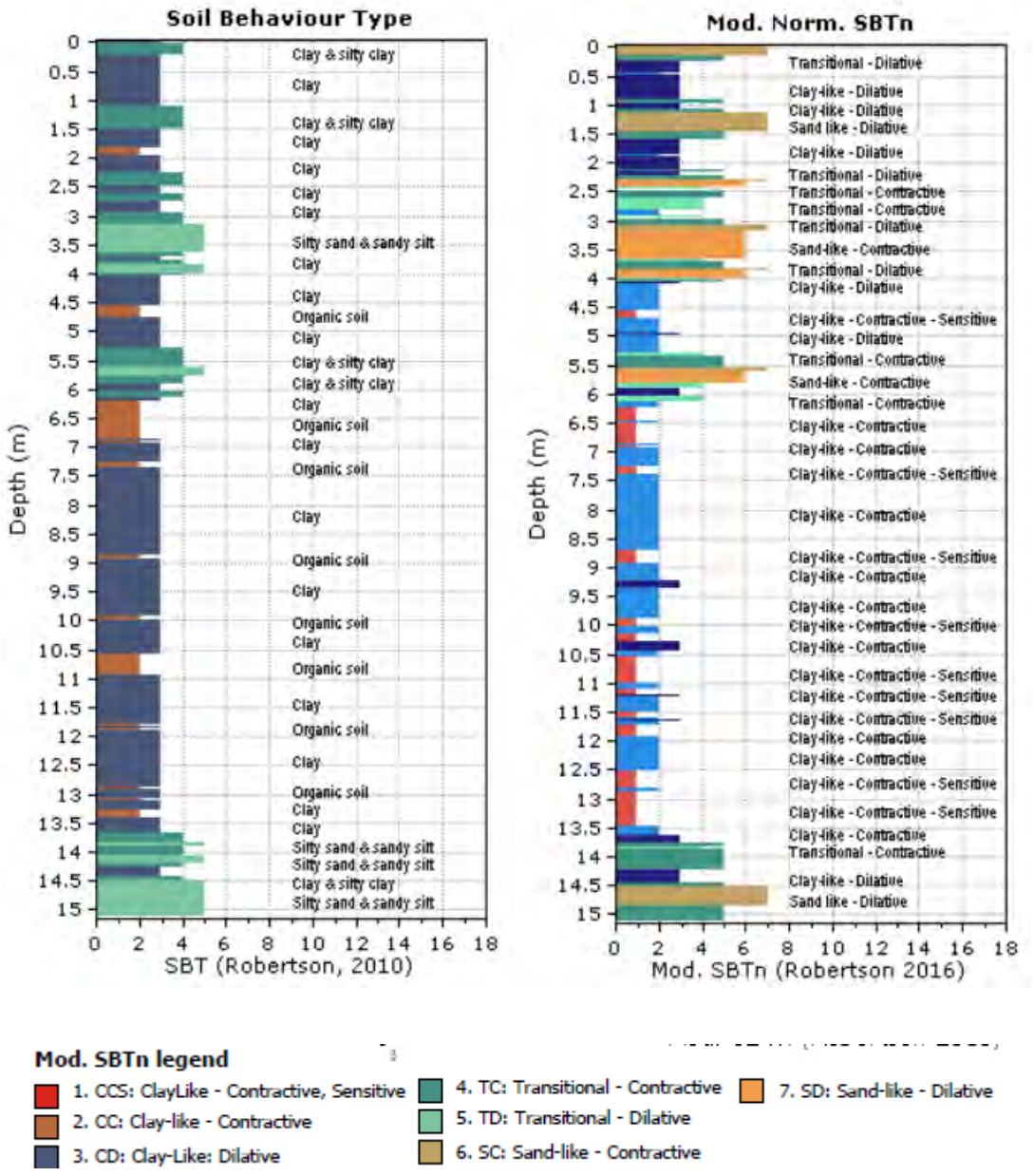


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

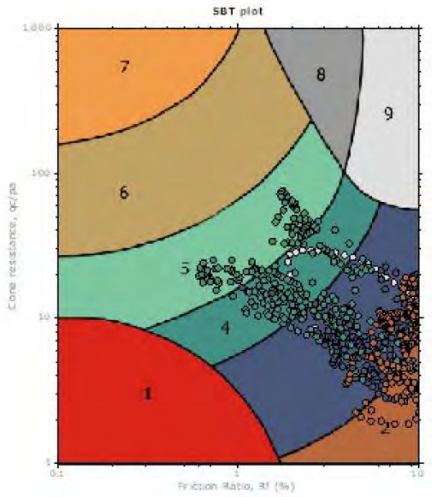
PROVA CPTu05

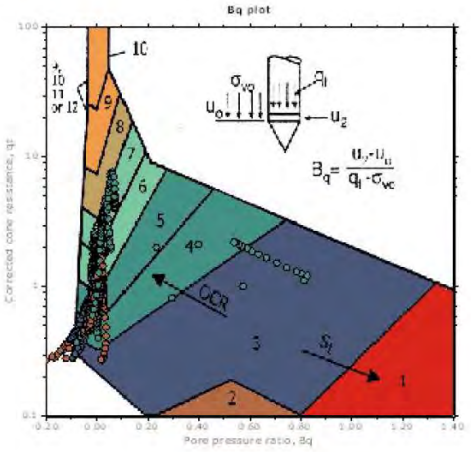
Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 21/04/2017
Profondità prova: 15.18 m
Località: Medolla - Via Rubadello




Soil Behaviour Type
Depth (m)
SBT (Robertson, 2010)
Clay & silty clay
Clay
Silty sand & sandy silt
Organic soil
Mod. Norm. SBTn
Mod. SBTn (Robertson 2016)
Transitional - Dilative
Clay-like - Dilative
Sand-like - Dilative
Transitional - Contractive
Sand-like - Contractive
Clay-like - Contractive
Clay-like - Contractive - Sensitive
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

SBT - Bq plots

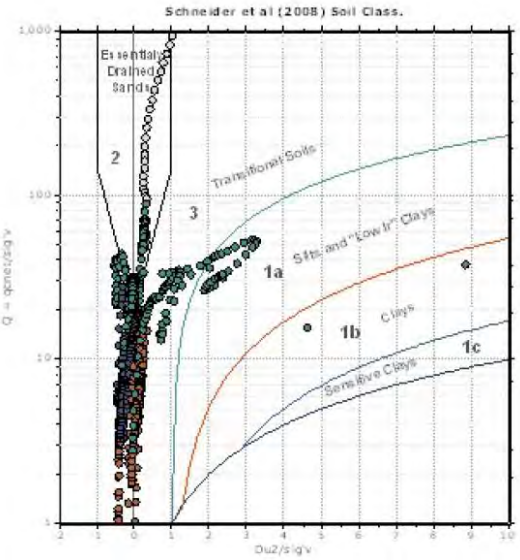


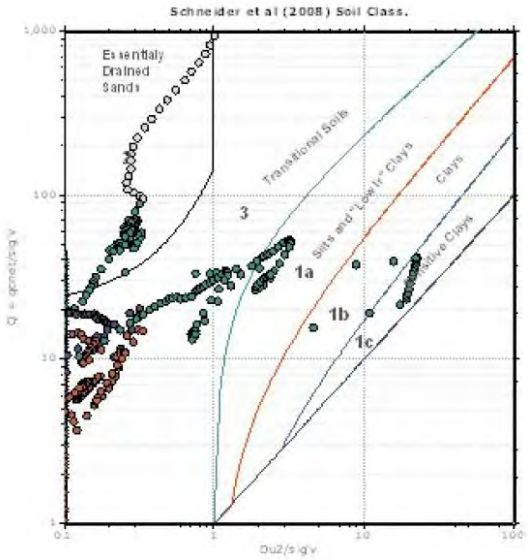


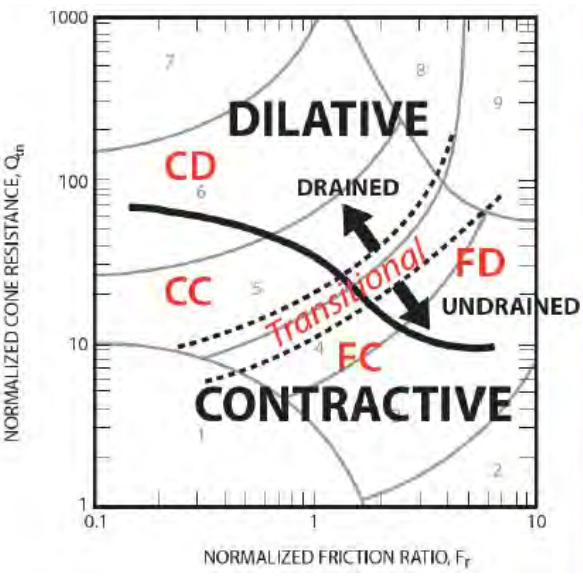
SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Bq plots (Schneider)

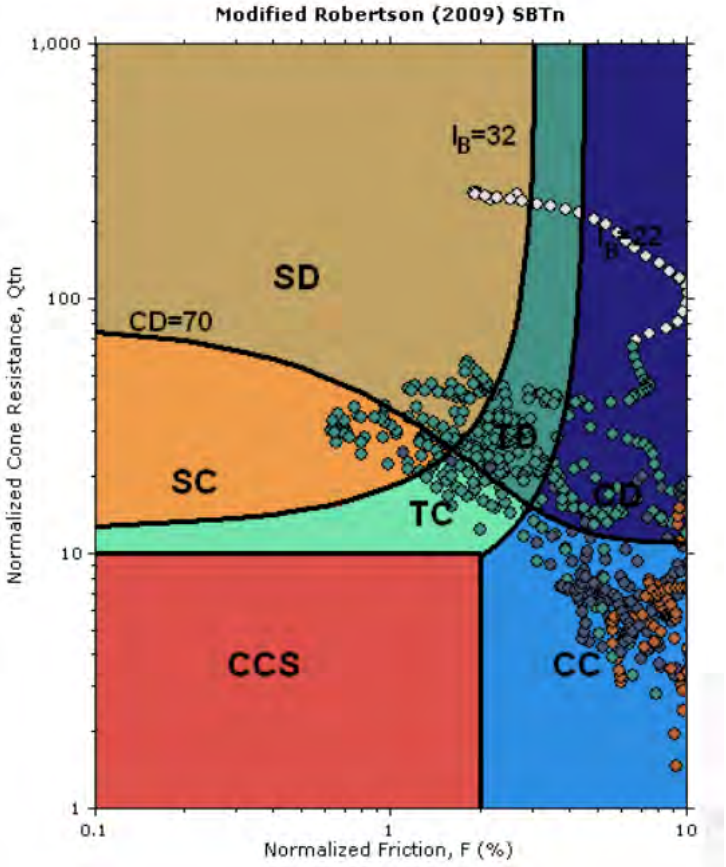






CPT Soil Behaviour

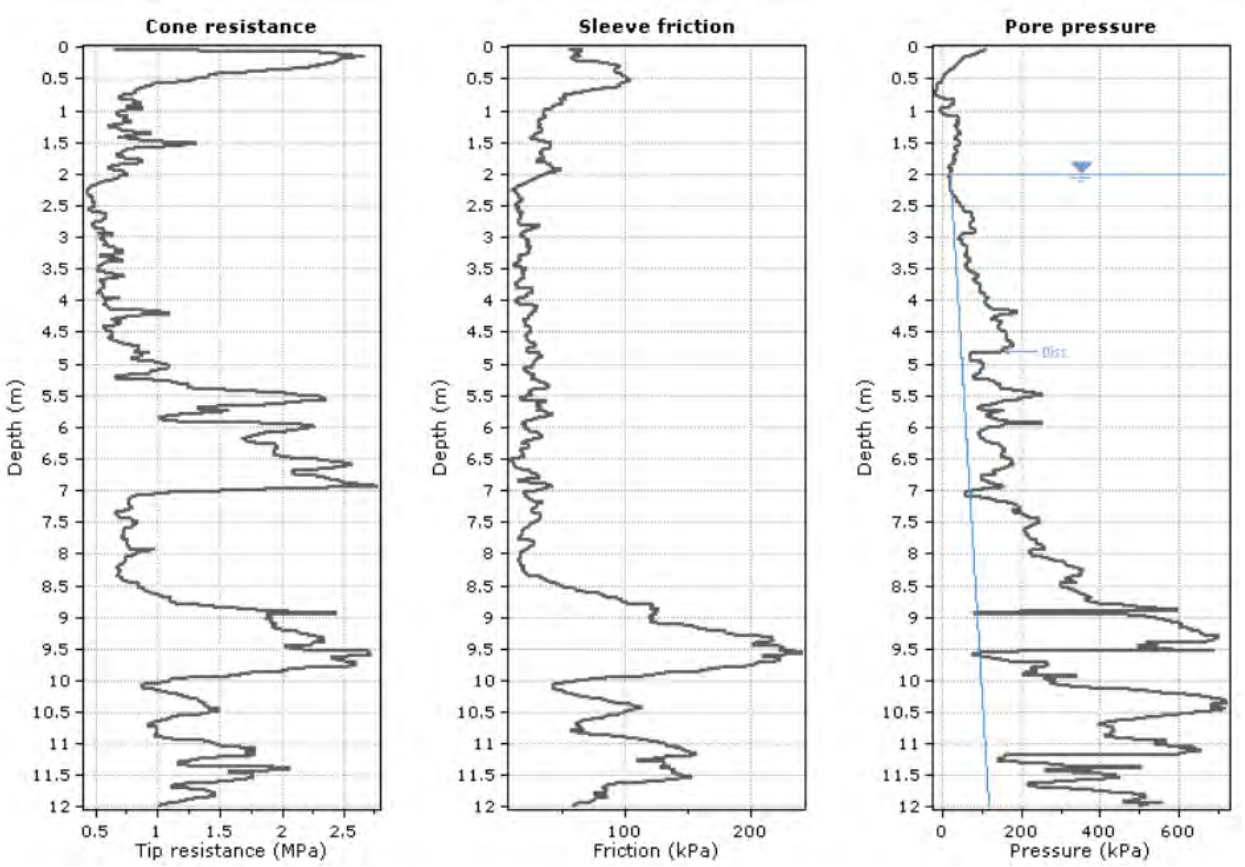
CD: Coarse-grain-Dilative
(mostly drained)
CC: Coarse-grain-Contractive
(mostly drained)
FD: Fine-grain-Dilative
(mostly undrained)
FC: Fine-grain-Contractive
(mostly undrained)

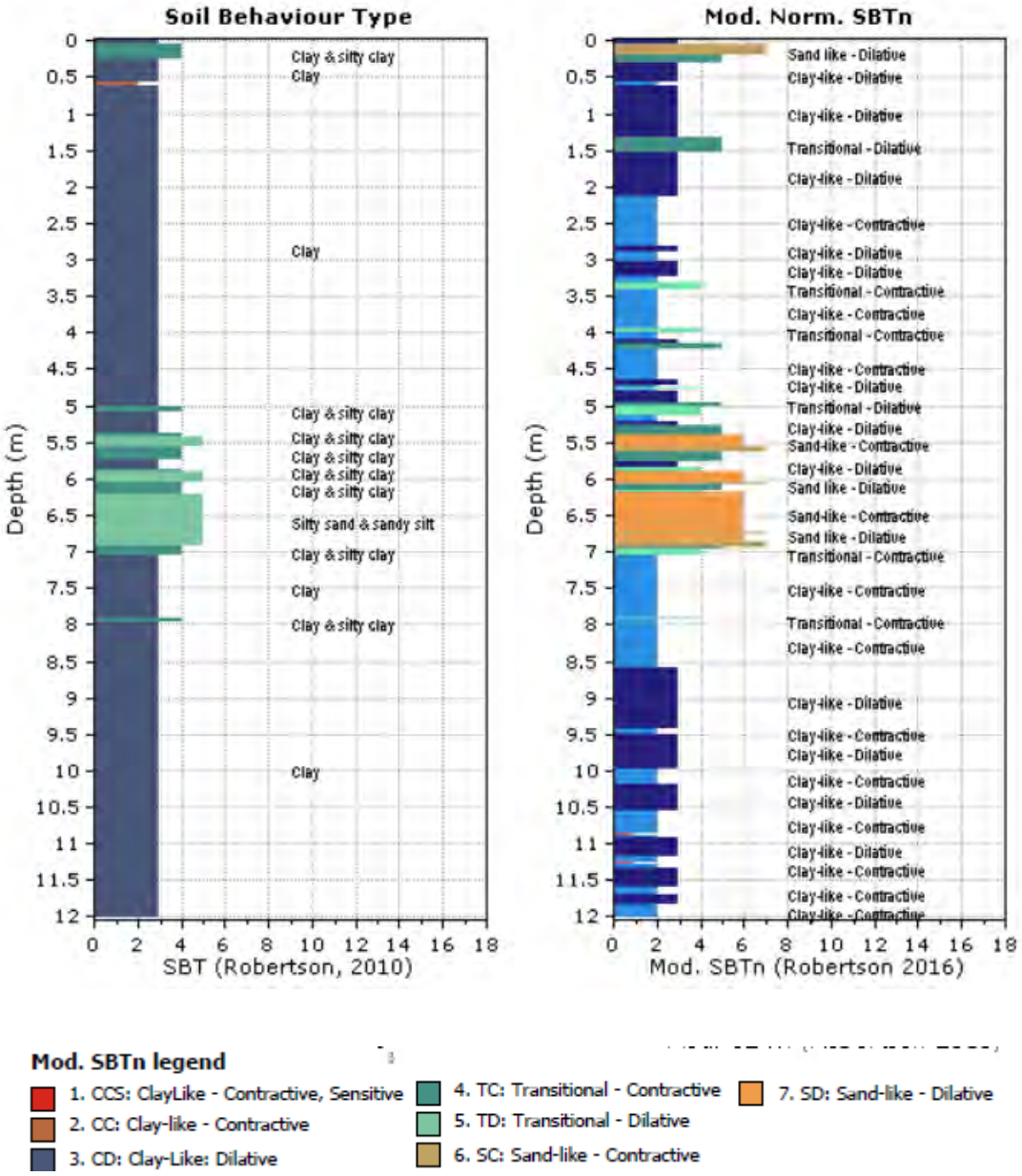


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

PROVA CPTu06

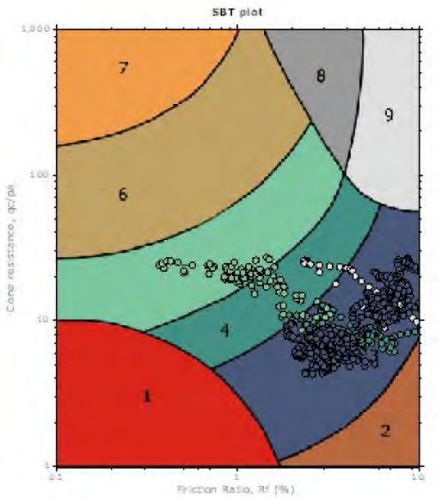
Committente: Comune di Medolla
Strumento utilizzato: Tecnopenta - G1 CPLS D
Prova eseguita in data: 21/04/2017
Profondità prova: 12.16 m
Località: Medolla - Via Rubadello

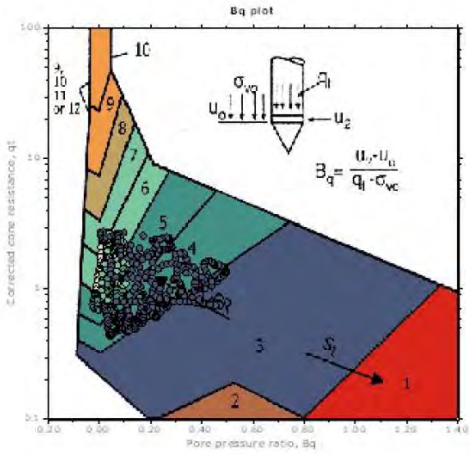



Soil Behaviour Type
Depth (m)
SBT (Robertson, 2010)
Clay & silty clay
Clay
Clay
Clay & silty clay
Clay & silty clay
Clay & silty clay
Clay & silty clay
Clay & silty clay
Silty sand & sandy silt
Clay & silty clay
Clay
Clay & silty clay
Clay
Mod. Norm. SBTn
Mod. SBTn (Robertson 2016)
Sand like - Dilative
Clay-like - Dilative
Clay-like - Dilative
Transitional - Dilative
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Dilative
Transitional - Contractive
Clay-like - Contractive
Transitional - Contractive
Clay-like - Contractive
Clay-like - Dilative
Transitional - Dilative
Clay-like - Dilative
Sand-like - Contractive
Clay-like - Dilative
Sand like - Dilative
Sand-like - Contractive
Sand like - Dilative
Transitional - Contractive
Clay-like - Contractive
Transitional - Contractive
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Contractive
Clay-like - Contractive

Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

SBT - Bq plots

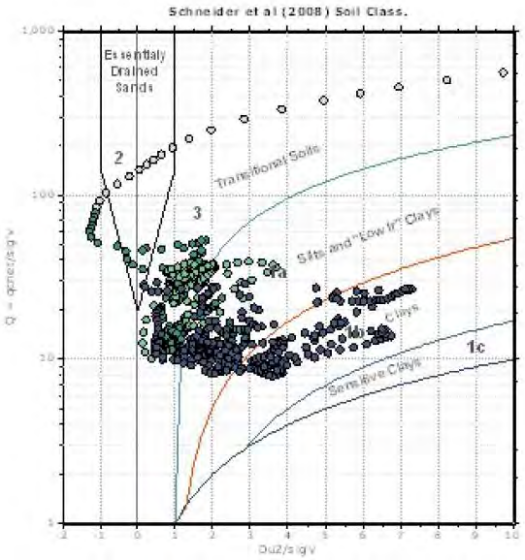


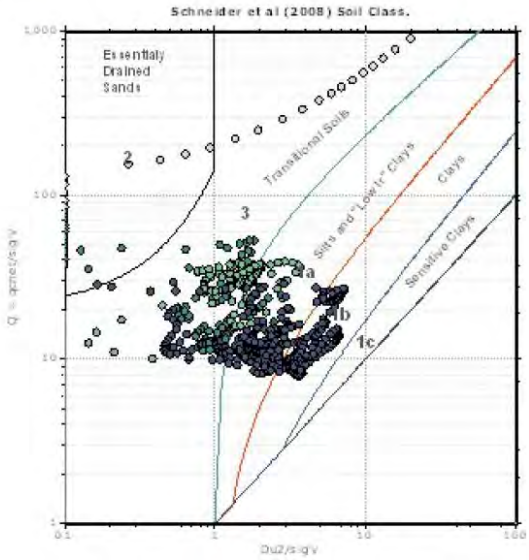


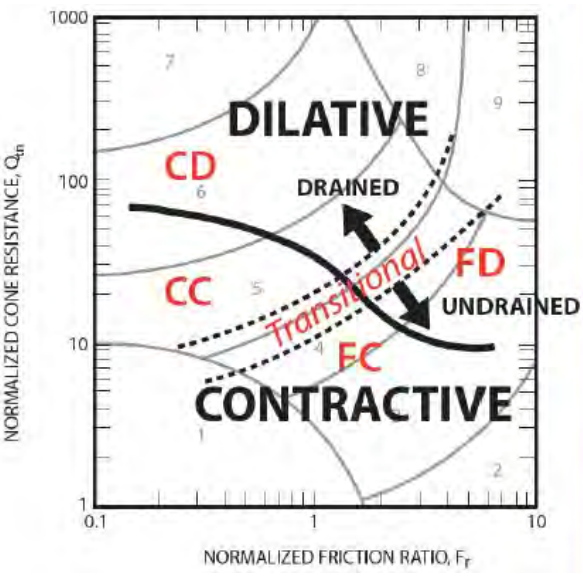
SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Bq plots (Schneider)

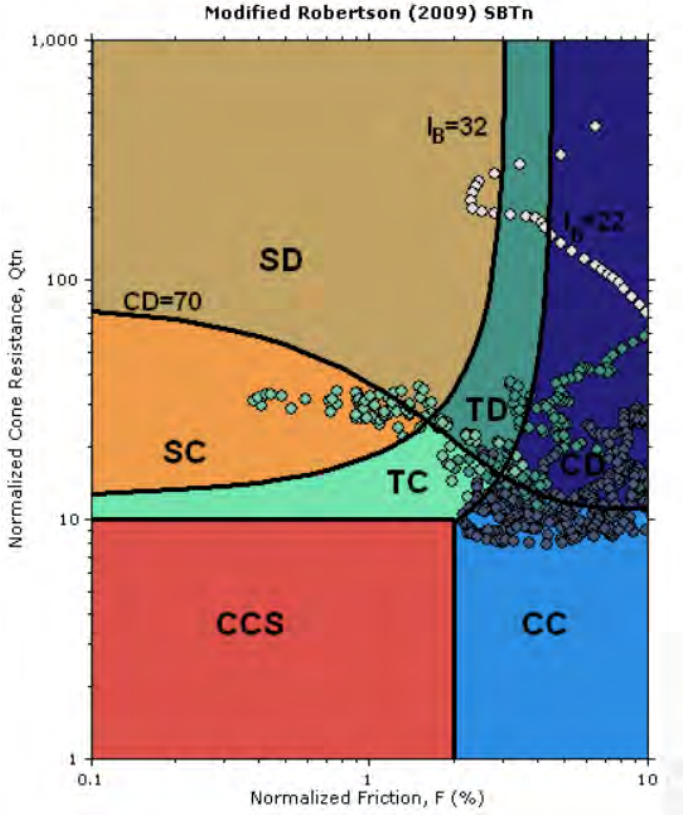






CPT Soil Behaviour

CD: Coarse-grain-Dilative
(mostly drained)
CC: Coarse-grain-Contractive
(mostly drained)
FD: Fine-grain-Dilative
(mostly undrained)
FC: Fine-grain-Contractive
(mostly undrained)



CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

La natura litologica dei terreni oggetto delle prove penetrometriche è dedotta dall'analisi dei diagrammi penetrometrici mediante Robertson (2010, 2016).
Le sequenze stratigrafiche desunte dall'analisi delle prove penetrometriche e delle indagini geofisiche evidenzia i seguenti livelli litologici per la sezione ricavata:

0.02 - 1.00 m Al di sotto del terreno vegetale argille limose sovraconsolidate (A);
1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B);
1.50/4.80 - 8.70/10.50 m Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C);
8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti (D);
>17.10 m Sabbie da mediamente addensate ad addensate (E).

Infine sulla base delle indicazioni emerse dall'analisi delle prove penetrometriche e sulla base delle litologie presenti si è provveduto a caratterizzare e parametrizzare, dal punto di vista geotecnico, i terreni di fondazione.
In virtù delle considerazioni sopra esposte risulta che i parametrici geotecnici caratteristici per i materiali presenti sono i seguenti:

- In termini di parametri di resistenza:

Profondità dal p.c. (m)	Unità Formazionale	γ'_d (kN/m³)	γ'_w (KN/m³)	c'k(kPa)	ϕ' k(°)	Cuk(kPa)
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**7**	**19**	**100**
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B)**	**17**	**19**	**5**	**24**	**110**
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche**	**14**	**17**	**2**	**14**	**35**

	a bassa consistenza (C)					
8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**4**	**19**	**100**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**0**	**30**	**/**

- In termini di parametri di deformabilità:

Profondità dal p.c. (m)	**Unità Formazionale**	γ'_d **(kN/m³)**	γ'_w **(KN/m³)**	**Coeff. di Poisson (v)**	**Modulo Elastico E' (kPa)**	**Modulo Edometrico Ed (kPa)**
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**0.35**	**/**	**7000**
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B)**	**17**	**19**	**0.35**	**/**	**8000**
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C)**	**14**	**17**	**0.45**	**/**	**3000**
8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**0.4**	**/**	**7000**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**0.3**	**30000**	**/**

9. CARATTERIZZAZIONE IDROGEOLOGICA

Dal momento che l'opera che si dovrà realizzare dovrà contenere i dissesti presenti sulla sponda, si è anche provveduto a caratterizzare dal punto di vista idrogeologico i terreni di fondazione qui presenti; in particolar modo nella progettazione di opere di questo genere uno dei parametri di maggior importanza risulta essere la conduttività idraulica dei terreni attraversati e nello specifico la permeabilità orizzontale Kh.
La prova di dissipazione si realizza arrestando la discesa del piezocono durante la prova penetrometrica, e graficando l'andamento della sovrappressione idrica in funzione del tempo; in questo modo si ottiene la "curva di dissipazione" della pressione neutra, poiché, con il trascorrere del tempo, la sovrappressione dovuta alla penetrazione della punta conica inizia a dissiparsi, fino a raggiungere gradualmente la pressione idrostatica. La velocità di dissipazione della pressione neutra dipende dal coefficiente di consolidazione del terreno, quindi dalla sua compressibilità e dalla sua permeabilità, e se si volesse raggiungere la pressione interstiziale di equilibrio presente in situ, questa prova dovrebbe continuare fino a quando non si arriva ad avere nessuna ulteriore diminuzione della pressione interstiziale; essendo questa velocità dipendente dalla permeabilità del terreno, la prova ha durata molto breve nelle sabbie, che essendo non coesive non creano sovrappressioni, mentre ha durata molto lunga nelle argille, che trattengono acqua al loro interno e la rilasciano molto gradualmente.
L'attrezzatura per eseguire questa prova è la medesima di quella utilizzata per la prova penetrometrica, ed il risultato che si ottiene è il grafico della curva di dissipazione.
La natura litologica dei terreni oggetto delle prove penetrometriche è dedotta dall'analisi dei diagrammi penetrometrici mediante Robertson (2010, 2016).
Le sequenze stratigrafiche desunte dall'analisi delle prove penetrometriche e delle indagini geofisiche evidenzia i seguenti livelli litologici per la sezione ricavata:

0.02 - 1.00 m Al di sotto del terreno vegetale argille limose sovraconsolidate (A);
1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B);
1.50/4.80 - 8.70/10.50 m Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C);
8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti (D);
>17.10 m Sabbie da mediamente addensate ad addensate (E).

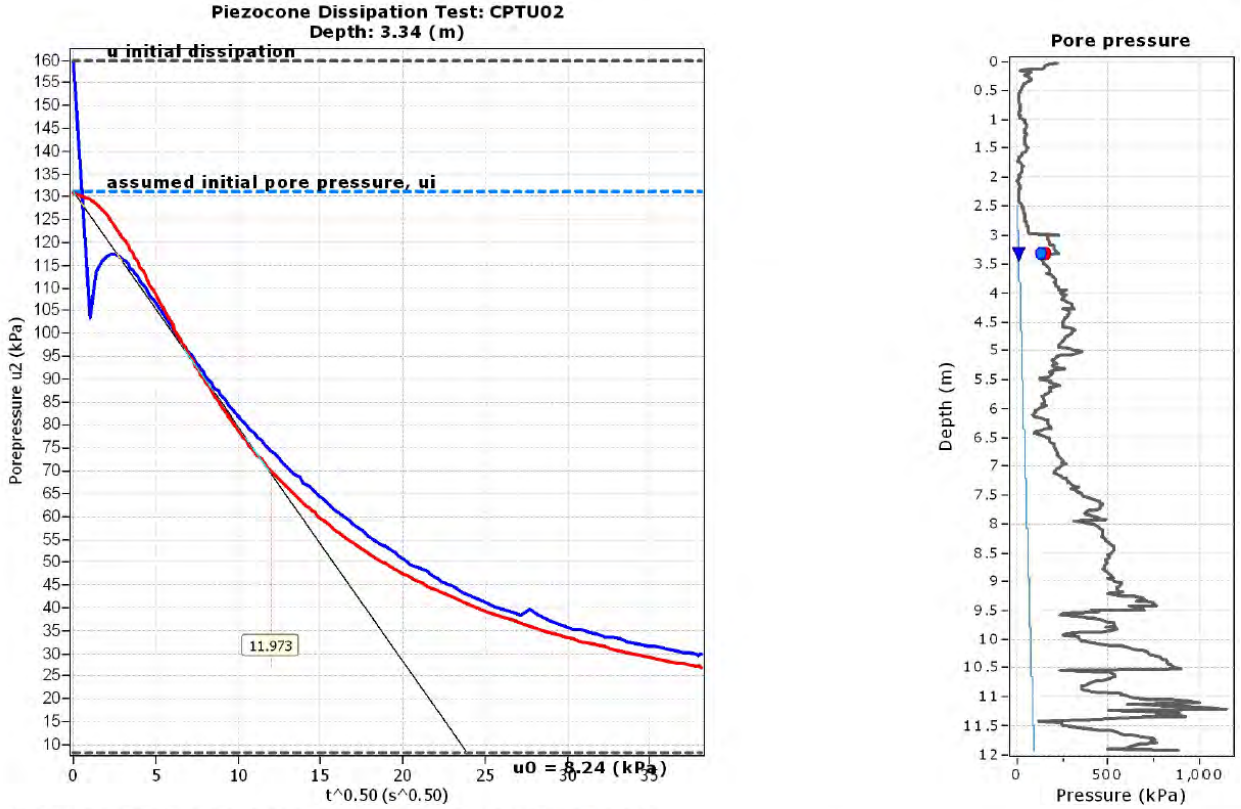
Ai fini della corretta progettazione delle opere di contenimento per i dissesti presenti si è provveduto a stimare i valori di permeabilità mediante prove di dissipazione in sito lungo le verticali penetrometriche e nello specifico lungo:

- CPTU02 - Dissipazione a 3.34m dal p.c.;
- CPTU03 - Dissipazione a 7.39m dal p.c.;
- CPTU04 - Dissipazione a 4.58m dal p.c. e dissipazione a 13.85m dal p.c.;
- CPTU06 - Dissipazione a 4.80m dal p.c..

Attraverso tali prove è stato possibile caratterizzare dal punto di vista idrogeologico i litotipi B,C e D.

a. Prova di dissipazione a 3.34 m dal p.c.

In corrispondenza della prova penetrometrica CPTU02 è stata effettuata una prova di dissipazione alla profondità 3.34 m da p.c. dentro il Litotipo B.
Si riporta nel grafico sottostante il report della prova di dissipazione con i parametri desunti



Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

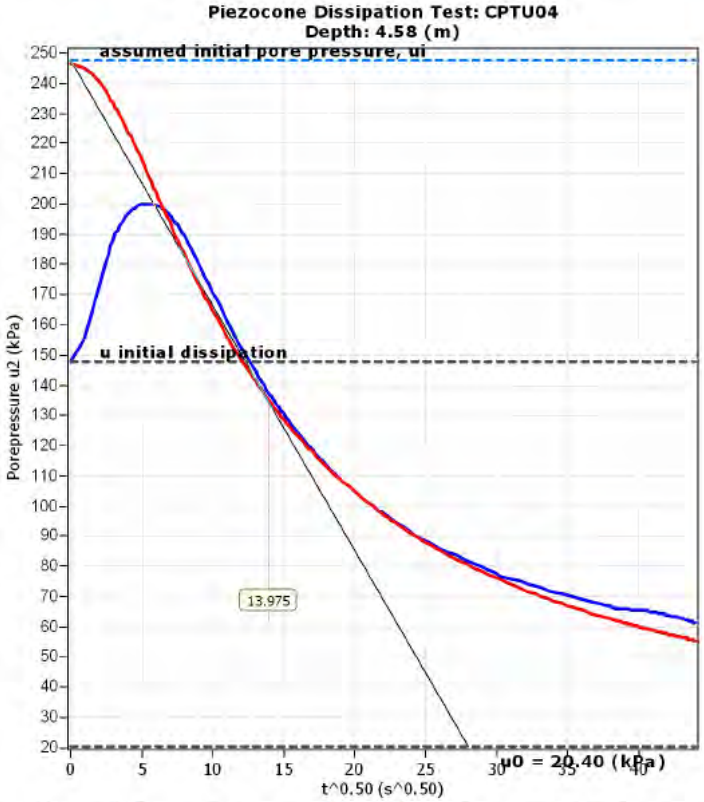
Tabular results

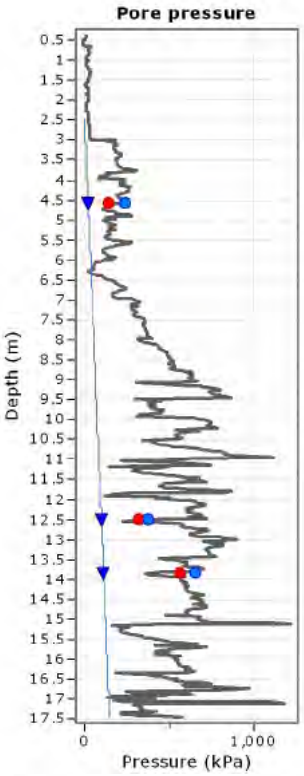
CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU02	3.34	12.0	143	4.55E-006	606.22	1.41E-005	444	17.64	7.84E-009

Si definisce quindi un valore della permeabilità pari a:
- Litotipo B
Kh = 7.84 x 10^{-9} m/s

b. Prova di dissipazione a 4.58 m dal p.c.

In corrispondenza della prova penetrometrica CPTU04 è stata effettuata una prova di dissipazione alla profondità 4.58 m da p.c. dentro il Litotipo B.
Si riporta nel grafico sottostante il report della prova di dissipazione con i parametri desunti





Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

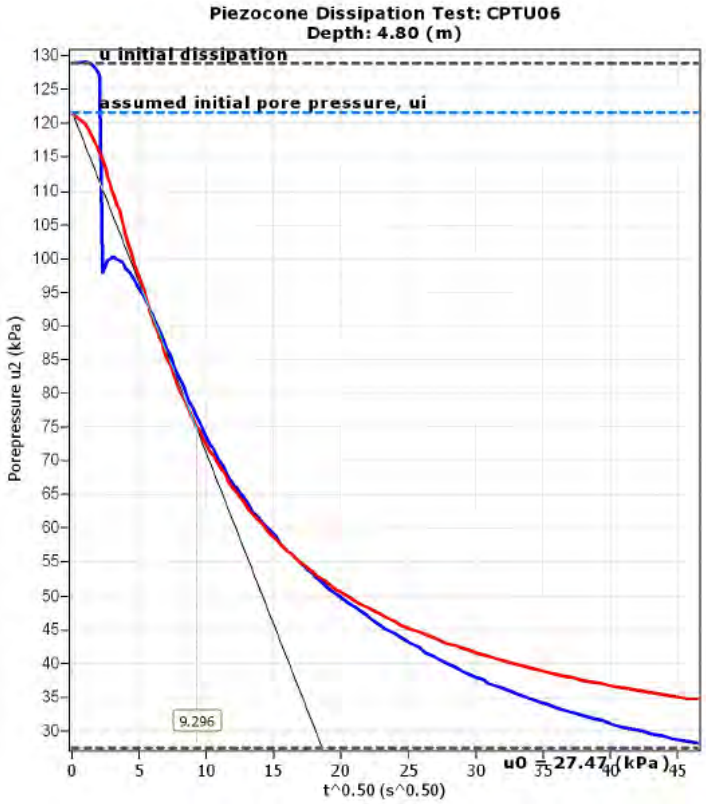
Tabular results

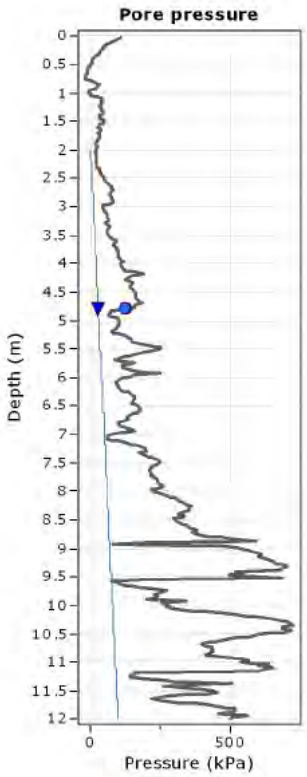
CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU04	4.58	14.0	195	6.19E-006	150.16	5.15E-006	162	10.15	4.97E-009

Si definisce quindi un valore della permeabilità pari a:
- Litotipo B
Kh = 4.97 x 10^{-9} m/s

c. Prova di dissipazione a 4.80 m dal p.c.

In corrispondenza della prova penetrometrica CPTU06 è stata effettuata una prova di dissipazione alla profondità 4.80 m da p.c. dentro il Litotipo B.
Si riporta nel grafico sottostante il report della prova di dissipazione con i parametri desunti





Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

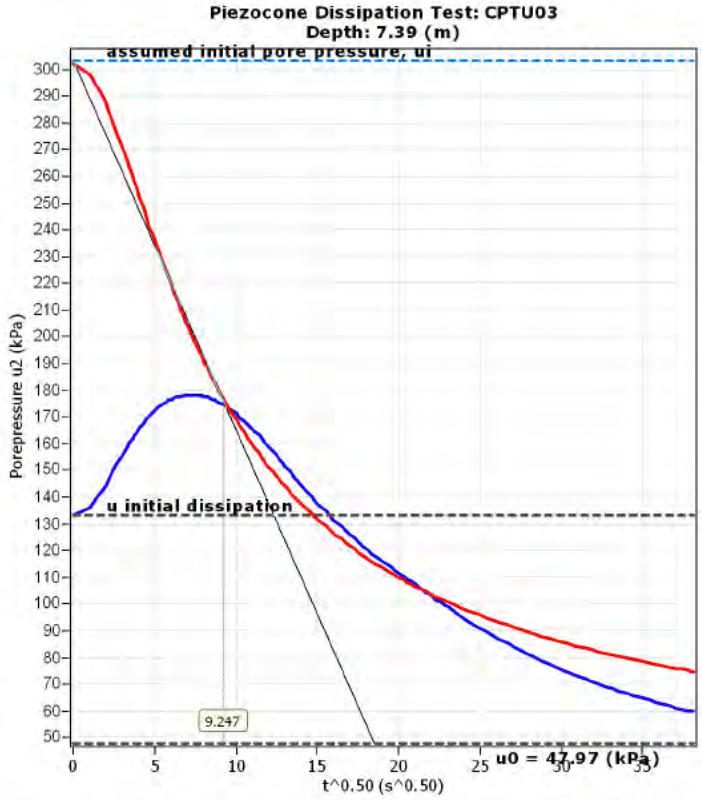
Tabular results

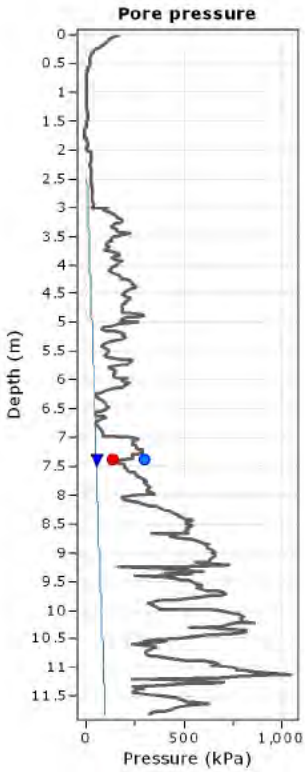
CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU06	4.80	9.3	86	2.74E-006	140.08	1.12E-005	354	11.29	9.76E-009

Si definisce quindi un valore della permeabilità pari a:
- Litotipo B
Kh = 9.76 x 10^{-9} m/s

d. Prova di dissipazione a 7.39 m dal p.c.

In corrispondenza della prova penetrometrica CPTU03 è stata effettuata una prova di dissipazione alla profondità 7.39 m da p.c. dentro il Litotipo C.
Si riporta nel grafico sottostante il report della prova di dissipazione con i parametri desunti





Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

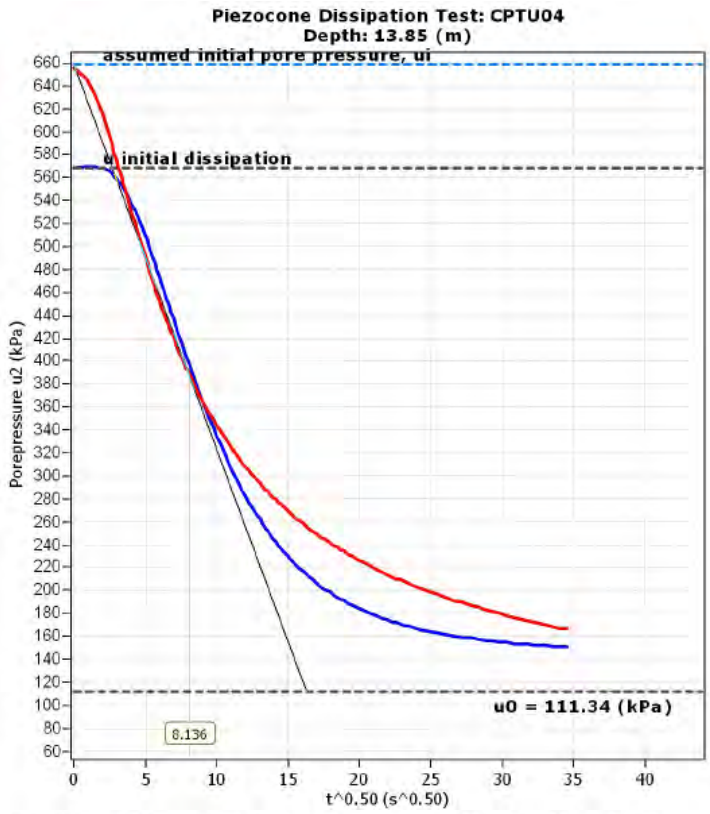
CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU03	7.39	9.2	86	2.71E-006	242.41	1.49E-005	471	4.47	3.28E-008

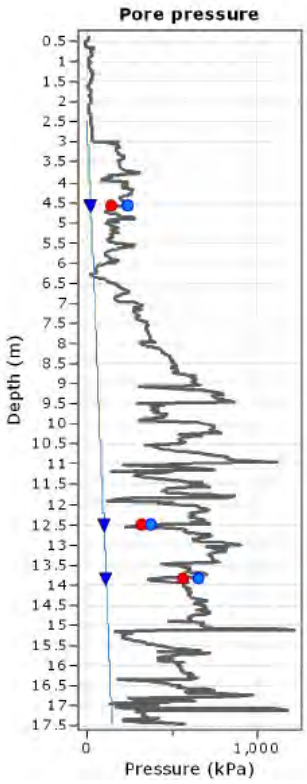
Si definisce quindi un valore della permeabilità pari a:
- Litotipo C

Kh = 3.28 x 10^{-8} m/s

e. Prova di dissipazione a 13.85 m dal p.c.

In corrispondenza della prova penetrometrica CPTU04 è stata effettuata una prova di dissipazione alla profondità 13.85 m da p.c. dentro il Litotipo D.
Si riporta nel grafico sottostante il report della prova di dissipazione con i parametri desunti





Permeability estimates based on dissipation test

The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

$$k_h = c_h \times \gamma_w / M$$

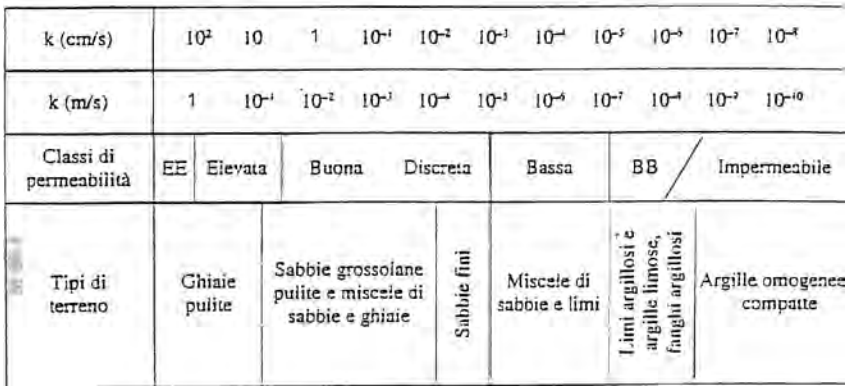
where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU04	13.85	8.1	66	2.10E-006	167.08	1.60E-005	505	22.40	7.02E-009

Si definisce quindi un valore della permeabilità pari a:
- Litotipo D
Kh = 7.02 x 10^{-9} m/s

La permeabilità orizzontale così calcolata, come si evidenzia in tabella di seguito riprodotta, risulta essere bassissima ed è tipica di acquitardi caratterizzati da terreni limo-argillosi a granulometria fine, dove si rileva la presenza di acqua con un movimento a velocità molto lenta.
Si tratta di terreni classificati a permeabilità "da bassissima a impermeabile", se si fa riferimento alla classificazione dei terreni in base alla conducibilità idraulica K definita da Civita (2005) di seguito riproposta.



In virtù delle considerazioni sopra esposte risulta che i parametrici idrogeologici per i materiali presenti sono i seguenti:

Profondità dal p.c. (m)	Unità Formazionale	γ'_d (kN/m³)	γ'_w (KN/m³)	K_h(m/s)
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**/**
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B)**	**17**	**19**	**4.97/9.76 x 10^{-9}**
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C)**	**14**	**17**	**3.28 x 10^{-8}**

8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**7.02×10^{-9}**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**/**

10. PERICOLOSITA' SISMICA DI BASE E LOCALE

a. Sismicità delle aree di interesse

Allo stato attuale la normativa di riferimento in materia sismica risulta essere il D.M. 14 gennaio 2008 recante "norme tecniche per le costruzioni", entrato in vigore a partire dal 1 luglio 2009.
La classificazione sismica dei comuni della regione Emilia-Romagna introdotta ai sensi del punto 3 dell'Allegato 1 dell'Ordinanza del Presidente del Consiglio dei Ministri n. 3274 del 20 maggio 2003, prevede che il territorio nazionale sia suddiviso in quattro zone sismiche, caratterizzate da quattro diversi valori di accelerazione (a_g).
Nell'Ordinanza del Presidente del Consiglio dei Ministri n. 3519 del 28 aprile 2006 "Criteri generali per l'individuazione delle zone sismiche e per la formulazione degli elenchi delle medesime zone" all'allegato 1.A" sono individuate quattro zone sismiche orizzontale massima convenzionale su suolo di tipo A, ai quali ancorare lo spettro di risposta elastico.
Ciascuna zona è individuata mediante valori di accelerazione massima al suolo a_g, con probabilità di superamento del 10% in 50 anni, riferiti a suoli rigidi caratterizzati da $Vs_{30} > 800\ m/s$ secondo lo schema seguente. I valori di accelerazione delle quattro zone sismiche sono maggiormente specificati rispetto all' Ordinanza del Presidente del Consiglio dei Ministri n. 3274 secondo la schema di seguito proposto (tabella 10.1):

Tabella 10.1: Valori di accelerazione al suolo a_g

Zona	Accelerazione con probabilità di superamento pari al 10% in 50 anni (a_g) – OPCM 3519	Accelerazione orizzontale massima convenzionale di ancoraggio dello spettro di risposta elastico (a_g) – OPCM 3472
1	$0.25 < a_g \leq 0.35\ g$	$0.35\ g$
2	$0.15 < a_g \leq 0.25\ g$	$0.25\ g$
3	$0.05 < a_g \leq 0.15\ g$	$0.15\ g$
4	$\leq 0.05\ g$	$0.05\ g$

Di seguito si riportano le classificazioni della sismicità dei comuni interessati dagli interventi in base alle vecchie normative e ovviamente anche in base alla nuova e vigente classificazione proposta dall'OPCM 3274/2003 e s.m.i (tabella 10.2).

Tabella 10.2: Classificazione della sismicità del comune e valore dell'accelerazione al suolo a_g

Comune	Classificazione sismica (Decreti fino al 1984)	Classificazione sismica OPCM 3274/2003	a_g
Medolla	n.c.	3	0.15 g

b. Sismicità storica delle aree di intervento

Nella tabella 10.3 sono riportati i dati storici del comune di Medolla, definiti nel Gruppo di lavoro CPTI (2015) Catalogo Parametrico dei Terremoti Italiani, versione 2015 (CPTI15), INGV, Bologna con aggiornamento DBMI15 (dicembre 2015) reperibile all'indirizzo web http://emidius.mi.ingv.it/CPTI15-DBMI15/

Effetti	In occasione del terremoto del									
Int.	Anno	Me	Gi	Ho	Mi	Se	Area epicentrale	NMDP	Io	Mw
3-4	1901	01	20	06	30		Bassa modenese	10	4	3.68
3-4	1901	01	20	06	34	2	Bassa modenese	12	5	4.11
4	1971	07	15	01	33	2	Parmense	228	8	5.51
5	1978	12	25	22	53	4	Bassa modenese	28	5	4.39
3	1983	11	09	16	29	5	Parmense	850	6-7	5.04
3	1986	12	06	17	07	1	Ferrarese	604	6	4.43
4	1987	04	24	02	30	2	Reggiano	54	6	4.64
6	1987	05	02	20	43	5	Reggiano	802	6	4.71
5	1987	05	08	11	10	2	Bassa modenese	24	6	4.44
5	1987	07	11	01	46	5	Bassa Bolognese	15	5	4.20
4	1988	03	15	12	03	1	Reggiano	160	6	4.57
NF	1996	10	26	04	56	5	Pianura emiliana	63	5-6	3.94
NF	1996	11	25	19	47	5	Pianura emiliana	65	5-6	4.29
NF	1996	12	16	09	09	5	Pianura emiliana	115	5-6	4.06
NF	1998	02	21	02	21	1	Pianura emiliana	104	5	3.93
3-4	2000	06	18	07	42	0	Pianura emiliana	304	5-6	4.40
NF	2002	06	18	22	23	3	Frignano	186	4	4.30
4-5	2011	07	17	18	30	2	Pianura lombardo-veneta	73	5	4.79
5-6	2012	05	20	02	03	5	Pianura emiliana	53	7	6.09
6	2012	05	29	07	00	0	Pianura emiliana	87	7-8	5.90

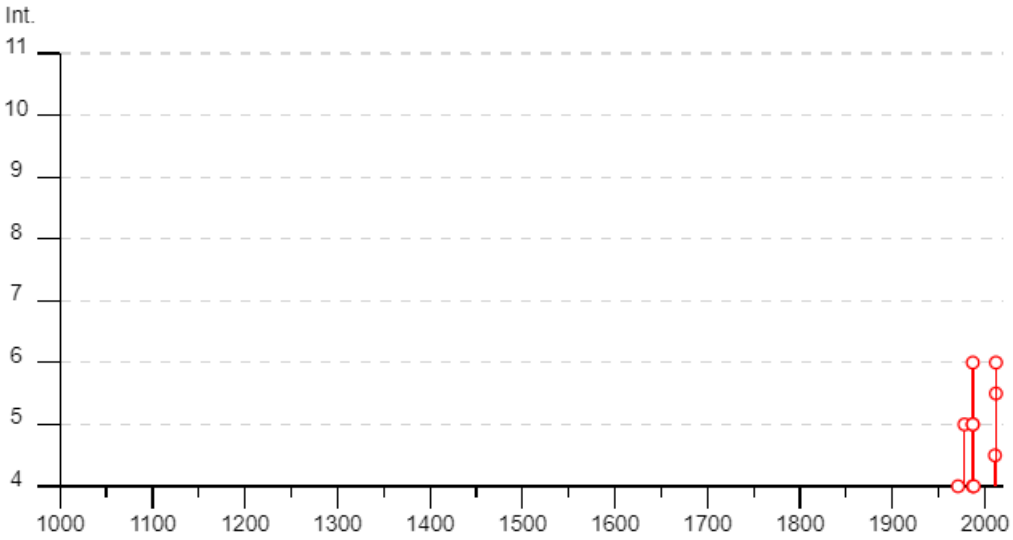
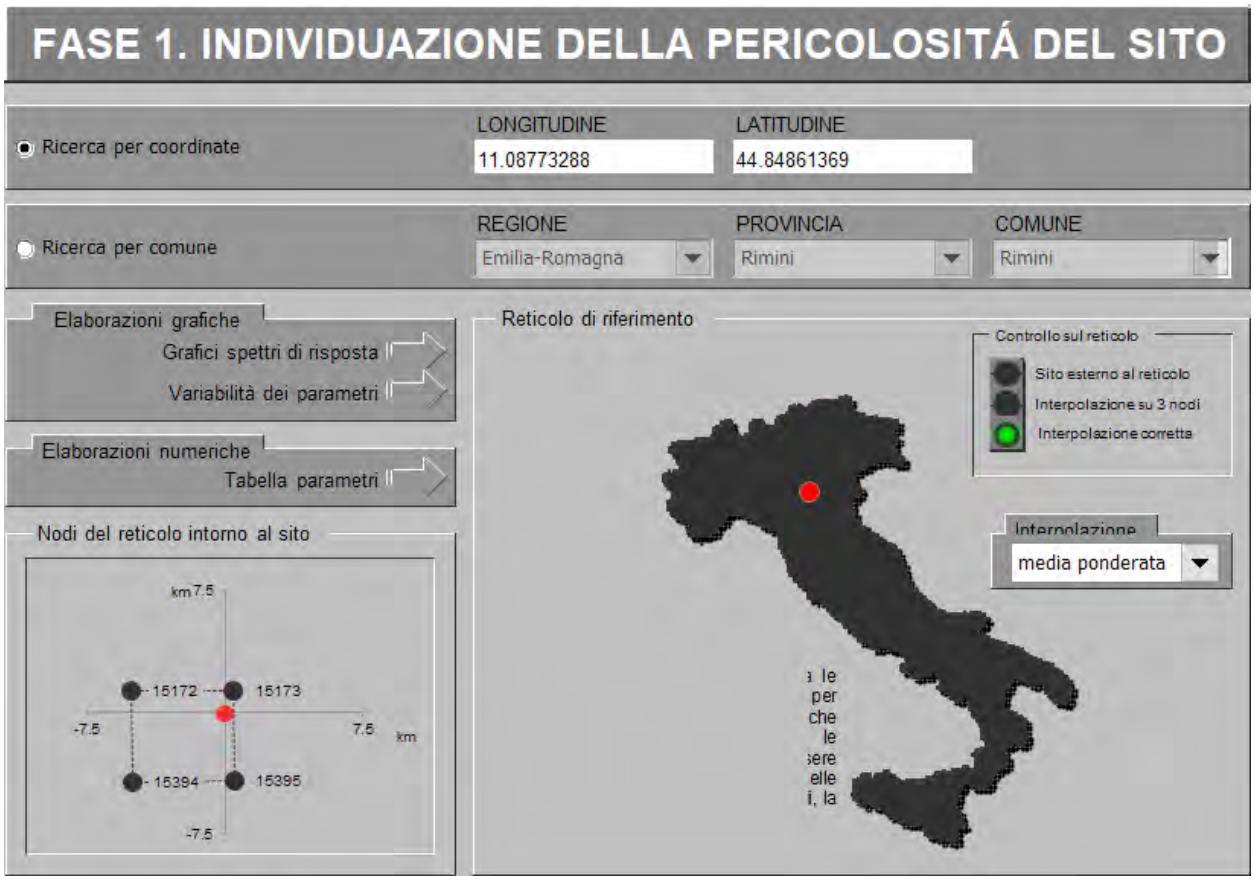


Tabella 10.3: Storia sismica del comune di Medolla (Mo).

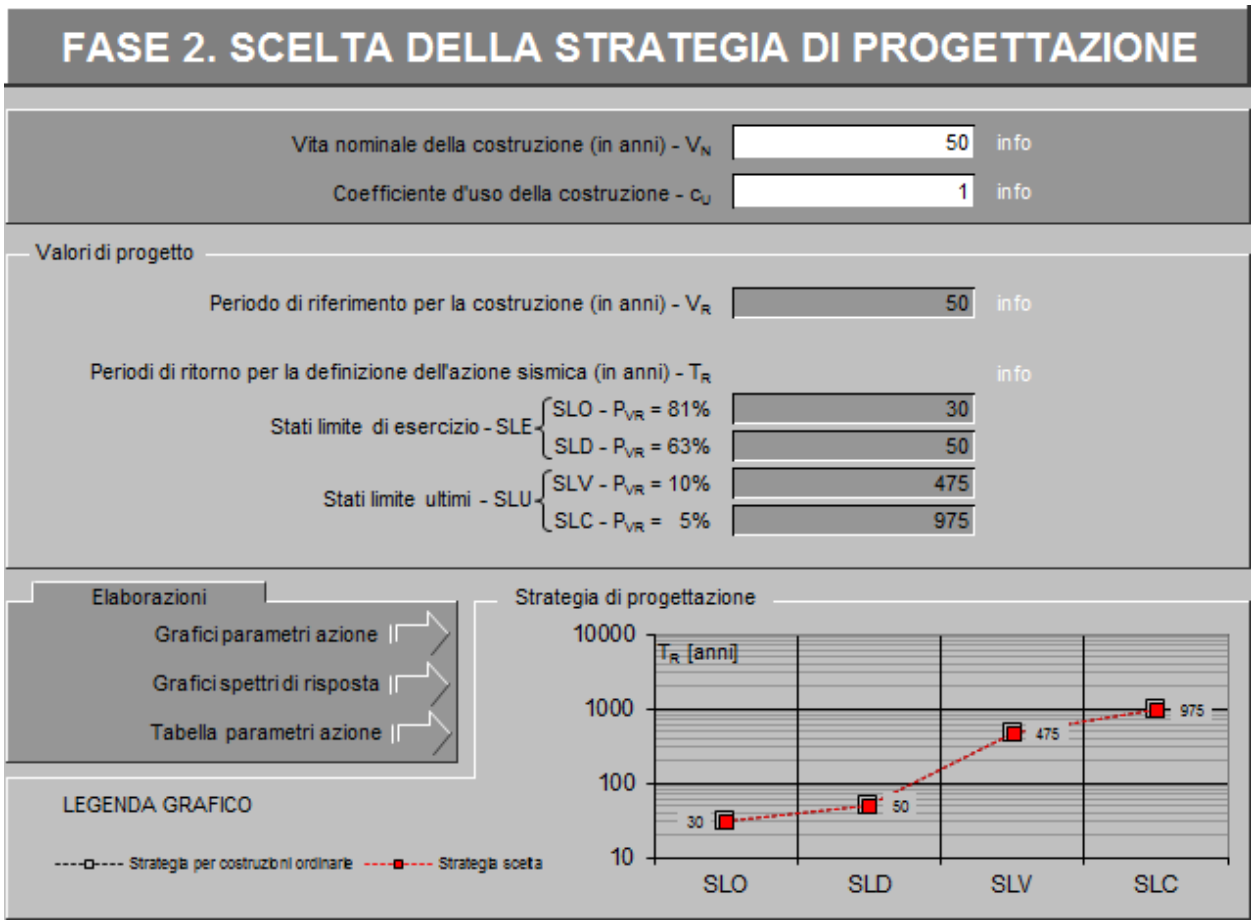
c. Individuazione della pericolosità sismica del sito

Di seguito si riportano i dati salienti per la definizione della pericolosità sismica del sito che sono stati inseriti nel foglio di calcolo "Spetti NTC v. 1.03" scaricabile dal sito del Consiglio Superiore dei Lavori Pubblici (http://www.infrastrutture.gov.it/consuplp/).

FASE 1 - Individuazione della pericolosità del sito



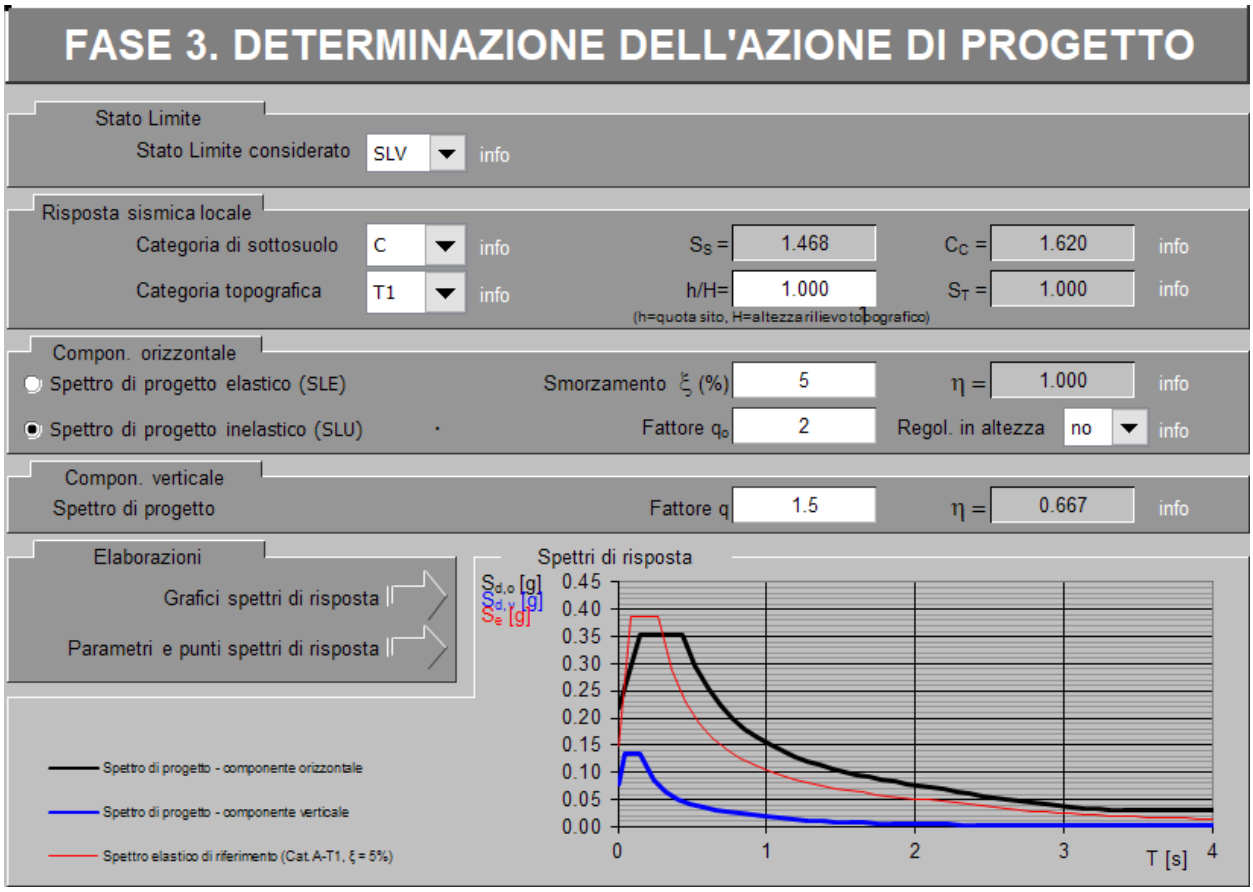
FASE 2 - Scelta della strategia di progettazione



STATO LIMITE	T_R [anni]	a_g [g]	F_o [-]	T_C^* [s]
SLO	30	0.039	2.568	0.250
SLD	50	0.050	2.494	0.269
SLV	475	0.149	2.588	0.269
SLC	975	0.201	2.536	0.276

Tabella 10.4: Valori dei parametri a_g, F_o, T_c^* per i periodi di ritorno T_R associati a ciascuno Stato Limite.

FASE 3 – Determinazione dell'azione di progetto



11. CONSIDERAZIONI CONCLUSIVE

Lo studio condotto ha permesso di delineare i principali aspetti geologici significativi ai fini del progetto di fattibilità tecnico-economico finalizzato ai lavori di ripristino della sponda del lago presso l'area riequilibrio ecologico "San Matteo" in comune di Medolla.
Il quadro di questi aspetti ha portato alle seguenti considerazioni di fattibilità:

1. Dal punto di vista sismico risulta che il comune di Medolla, è stato dichiarato sismico e iscritto nella Zona 3 della OPCM 3274/2003 e s.m.i;

2. Il terreno di fondazione in oggetto appartiene alla categoria di suolo "C", ai sensi del D.M. 14/01/2008;

3. Al fine di determinare le caratteristiche litologiche e geotecniche dei terreni di fondazione si è provveduto ad effettuare sul lotto in esame le seguenti indagini geognostiche e sismiche:
   - n. 6 prove penetrometriche statiche elettriche con piezocono (CPTU01, CPTU02, CPTU03, CPTU04, CPTU05 e CPTU06) spinte alla profondità massima di 17.45 m dal p.c.;
   - n. 1 indagine sismica passiva di microtremori (HV01);
   - n. 1 indagine sismica attiva MFA-Hs (in onde Rayleigh).

4. La natura litologica dei terreni oggetto delle prove penetrometriche è dedotta dall'analisi dei diagrammi penetrometrici mediante Robertson (2010, 2016).
   Le sequenze stratigrafiche desunte dall'analisi delle prove penetrometriche e delle indagini geofisiche evidenzia i seguenti livelli litologici per la sezione ricavata:

   0.02 - 1.00 m Al di sotto del terreno vegetale argille limose sovraconsolidate (A);
   1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B);
   1.50/4.80 - 8.70/10.50 m Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C);
   8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti (D);
   >17.10 m Sabbie da mediamente addensate ad addensate (E).

   La falda, in fase di indagine, è stata rinvenuta.

5. I parametrici geotecnici caratteristici per i materiali presenti sono i seguenti:

   In termini di parametri di resistenza:

Profondità dal p.c. (m)	Unità Formazionale	γ'_d (kN/m³)	γ'_w (KN/m³)	c'k(kPa)	ϕ'_k(°)	Cuk(kPa)
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**7**	**19**	**100**

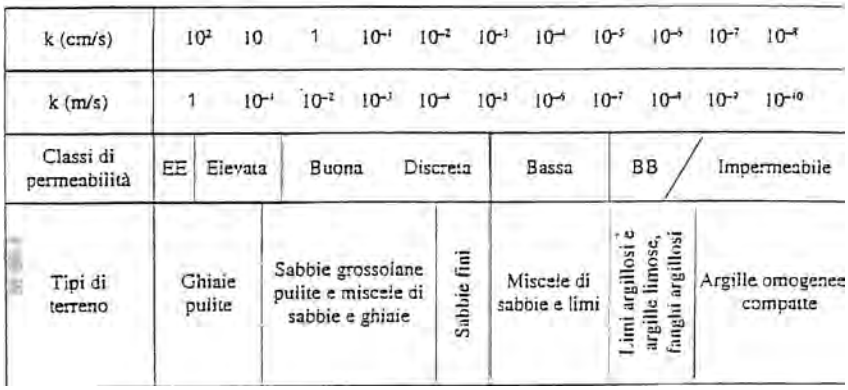
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B)**	**17**	**19**	**5**	**24**	**110**
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C)**	**14**	**17**	**2**	**14**	**35**
8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**4**	**19**	**100**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**0**	**30**	**/**

In termini di parametri di deformabilità:

Profondità dal p.c. (m)	**Unità Formazionale**	γ'_d **(kN/m³)**	γ'_w **(KN/m³)**	**Coeff. di Poisson (v)**	**Modulo Elastico E' (kPa)**	**Modulo Edometrico E_d (kPa)**
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**0.35**	**/**	**7000**
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e CPTU02 la frazione sabbiosa risulta essere più abbondante (B)**	**17**	**19**	**0.35**	**/**	**8000**
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli**	**14**	**17**	**0.45**	**/**	**3000**

	di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C)					
8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**0.4**	**/**	**7000**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**0.3**	**30000**	**/**

6. La permeabilità orizzontale calcolata, come si evidenzia in tabella di seguito riprodotta, risulta essere bassissima ed è tipica di acquitardi caratterizzati da terreni limo-argillosi a granulometria fine, dove si rileva la presenza di acqua con un movimento a velocità molto lenta.
   Si tratta di terreni classificati a permeabilità "da bassissima a impermeabile", se si fa riferimento alla classificazione dei terreni in base alla conducibilità idraulica K definita da Civita (2005) di seguito riproposta.



   In virtù delle considerazioni sopra esposte risulta che i parametrici idrogeologici per i materiali presenti sono i seguenti:

Profondità dal p.c. (m)	**Unità Formazionale**	γ'_d **(kN/m³)**	γ'_w **(KN/m³)**	**K_h(m/s)**
0.20 - 1.00	**Al di sotto del terreno vegetale argille limose sovraconsolidate (A)**	**17**	**19**	**/**
1.00 - 1.50/4.80	**Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e**	**17**	**19**	**4.97/9.76 x 10^{-9}**

	CPTU02 la frazione sabbiosa risulta essere più abbondante (B)			
1.50/4.80 - 8.70/10.50	**Argille a media-bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi sabbiosi-argillosi a medio-basso addensamento. Nella prova CPTU05 alla profondità di -6.20/7.40m si riscontra un livello di argille organiche a bassa consistenza (C)**	**14**	**17**	**3.28×10^{-8}**
8.70/10.50 - 17.10	**Argille da mediamente consistenti a consistenti (D)**	**17**	**19**	**7.02×10^{-9}**
> 17.10	**Sabbie da mediamente addensate ad addensate (E)**	**18**	**20**	**/**

7. L'area di intervento ricade all'interno della zona sismogenetica 912 della Zonazione sismogenetica ZS9 del 2004 dell'intero territorio italiano realizzata da INGV e pertanto è stata scelta come "Magnitudo di riferimento" Mw = 6.14, mentre l'accelerazione di riferimento ag = 0.22 è stabilita sulla base del periodo di riferimento dell'azione sismica dell'opera in progetto.

La verifica del potenziale di liquefazione, condotta secondo i metodi sotto elencati, evidenzia:

PROVA	**INDICE DEL POTENZIALE DI LIQUEFAZIONE I_L (I&B 2008)**	**INDICE DEL POTENZIALE DI LIQUEFAZIONE I_L (B&I 2014)**	**RISCHIO (Sonmez 2003)**
CPTU01	**0.75**	**0.79**	**BASSO**
CPTU02	**1.04**	**1.09**	**BASSO**
CPTU03	**2.69**	**3.05**	**MODERATO**
CPTU04	**3.75**	**3.82**	**MODERATO**
CPTU05	**7.61**	**7.73**	**ELEVATO**
CPTU06	**4.06**	**4.24**	**MODERATO**

Sulla base dei risultati sopra descritti al fine di evidenziare eventuali criticità legate ai problemi di liquefazione è stato deciso di applicare per la futura opera in oggetto il metodo di Ishihara (1985). Si tratta di una procedura empirica basata sull'impiego degli spessori dello strato o degli strati di copertura non liquefacibili (H1) e quello dei sottostanti livelli suscettibili di liquefazione (H2) oltre all'accelerazione orizzontale massima in superficie; la procedura pertanto fornisce, in maniera

puramente qualitativa, l'entità delle deformazioni, e quindi del danno, indotte dal sisma in caso di liquefazione.

Considerato comunque lo spessore dello strato liquefacibile, lo spessore dello strato non liquefacibile sovrastante e l'accelerazione massima attesa in superficie per il sito d'indagine (0.22g), si può concludere (dal grafico sopra riportato - Ishihara 1985) che la liquefazione dello strato liquefacibile non si estende in superficie.

Dal momento che l'Indice del Potenziale di liquefazione risulta $0.75 < I_L < 7.73$ e che dal punto di vista degli effetti in superficie e quindi delle deformazioni attese non si dovrebbe avere alcun riscontro in merito, si ritiene corretto poter determinare la definizione dell'azione sismica mediante l'approccio semplificato previsto dalle NTC08.

In ogni caso, si sottolinea che la normativa in materia di costruzioni di cui al D.M. 14/01/2008, stabilisce al § (§7.11.3.4.3) che "*L'adeguatezza del margine di sicurezza nei confronti della liquefazione deve essere valutata e motivata dal progettista*".

Modena, maggio 2017

Dott. Geol. Lorenzo Del Maschio
(A.P. n° 1725 Ordine dei Geologi della Regione Lazio)

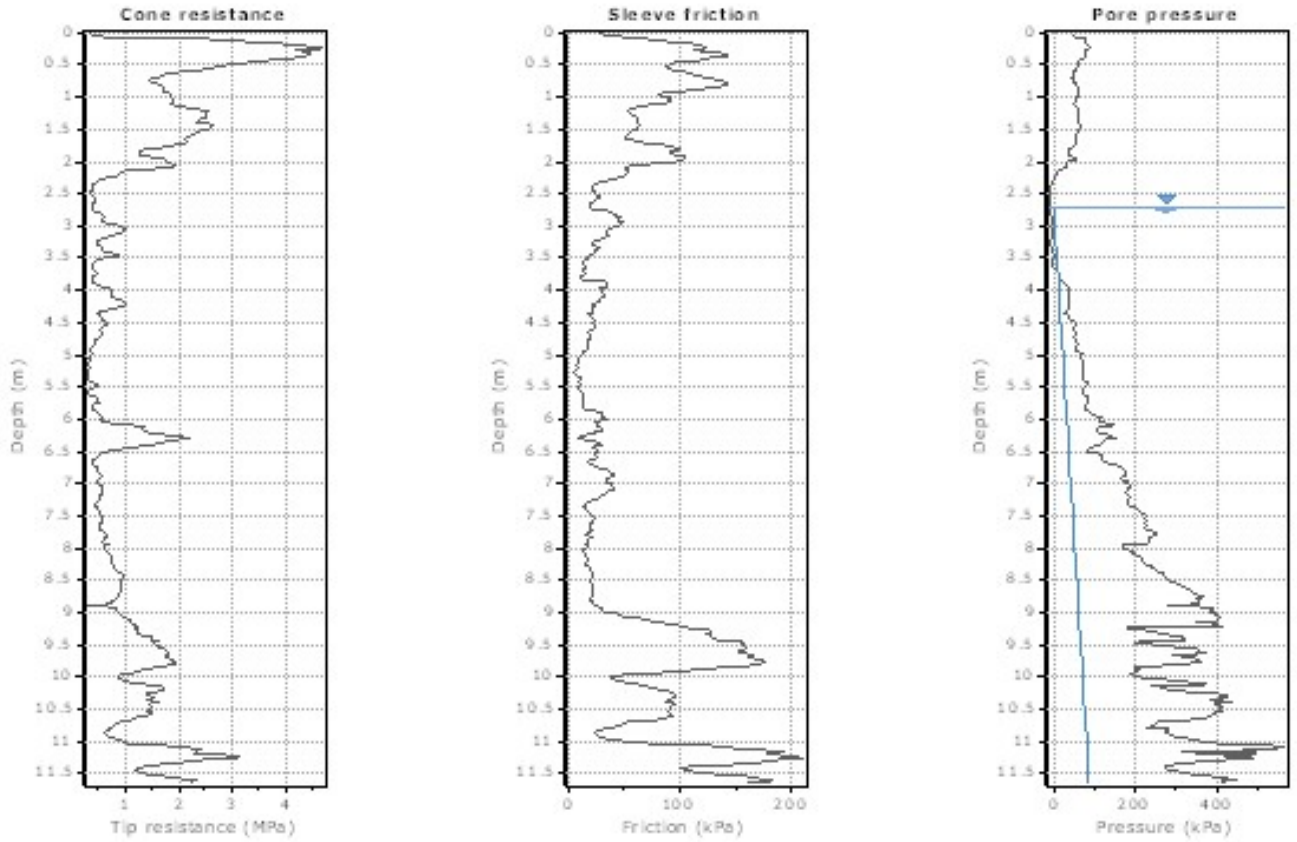
12. ALLEGATI

- Interpretazioni stratigrafiche desunte dalle indagini geognostiche;
- Stima dei parametri geotecnici desunti dalle indagini geognostiche;
- Stima dei parametri idrogeologici desunti dalle prove di dissipazione;
- Sezione Litostratigrafica - Sezione 01;
- Verifica del potenziale di liquefazione secondo il metodo di Idriss & Boulanger (2008) e Boulanger & Idriss (2014);
- Documentazione fotografica.

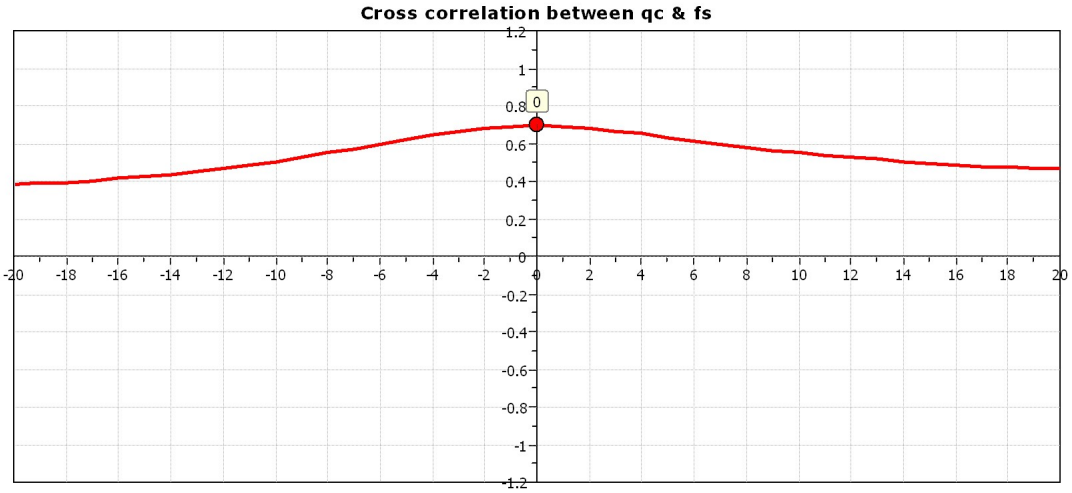
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU01

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 11.64 m, Date: 20/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



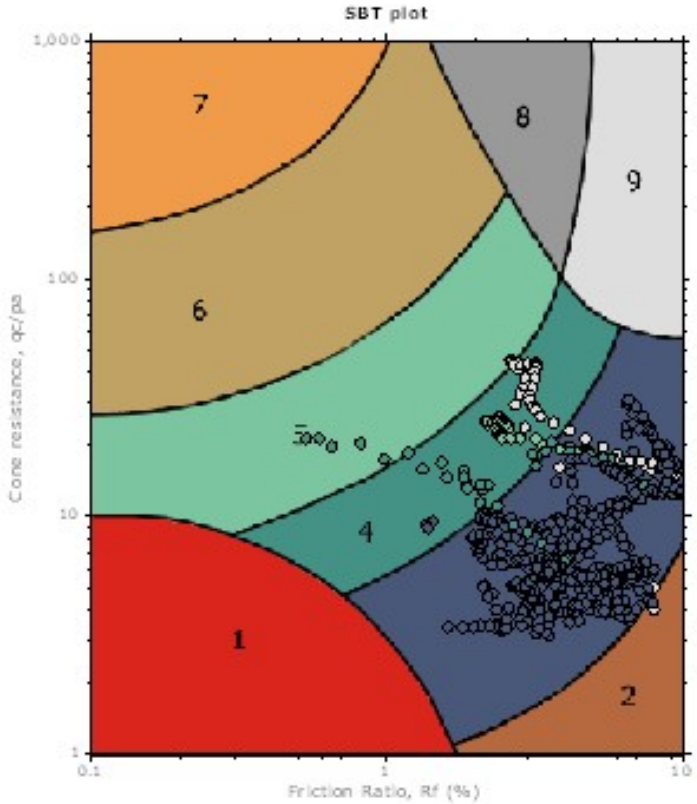
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

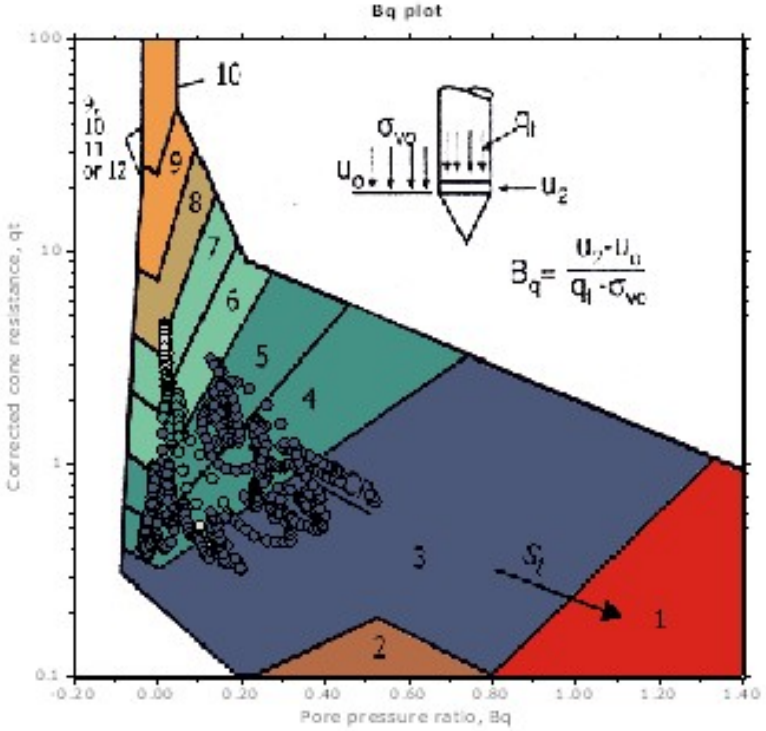
CPTU01

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

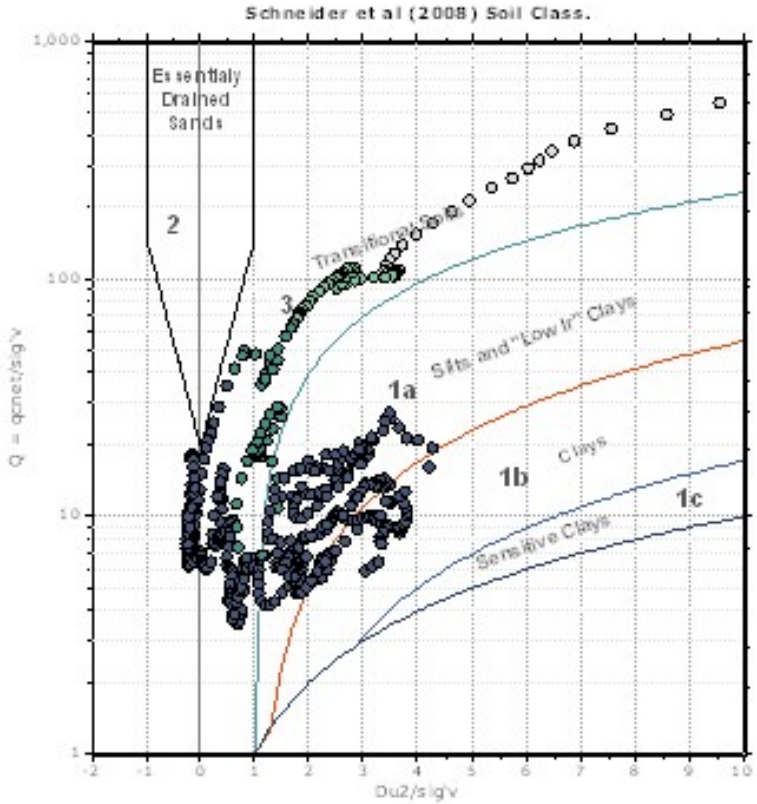
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU01

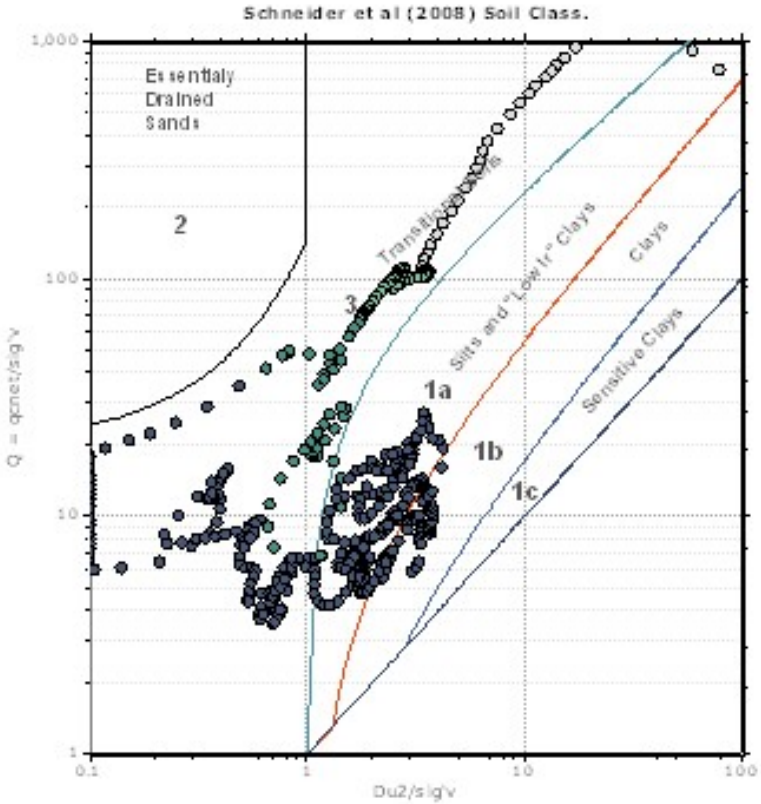
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)



-



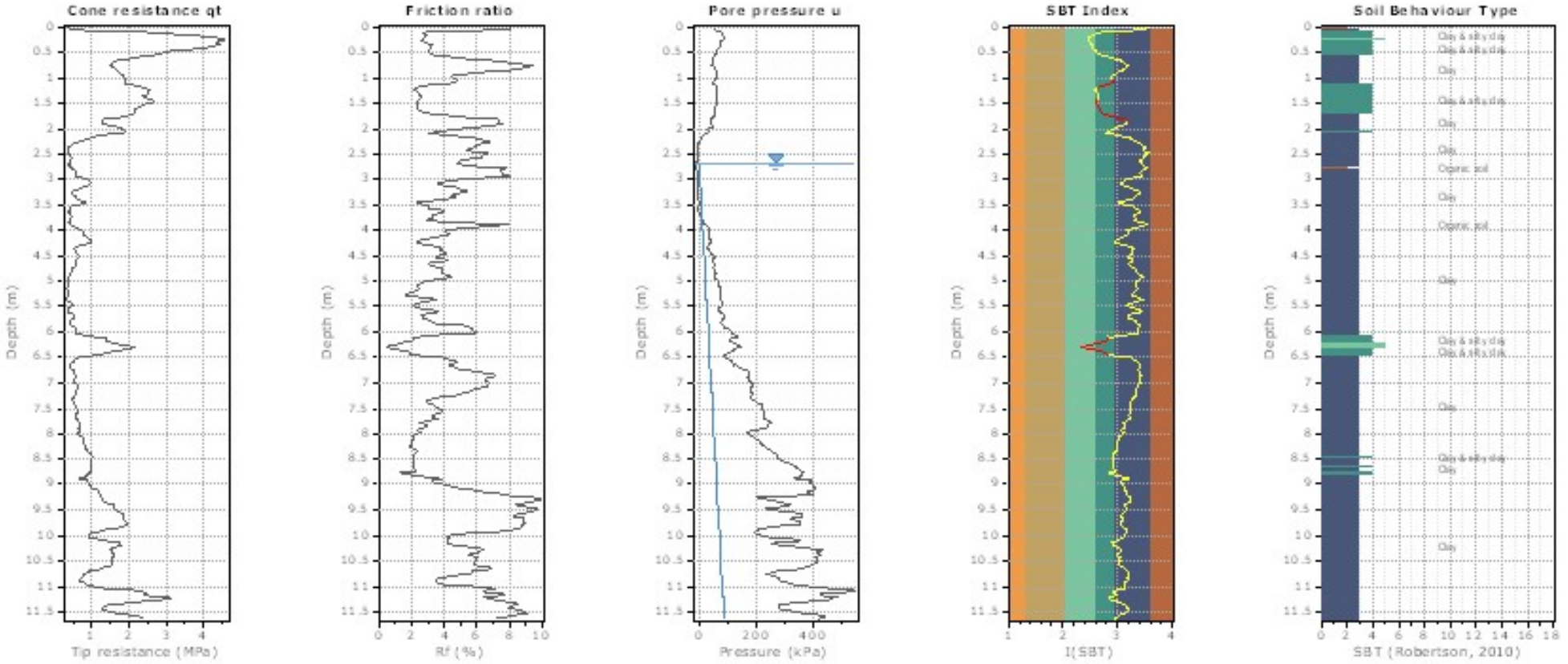
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU01

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

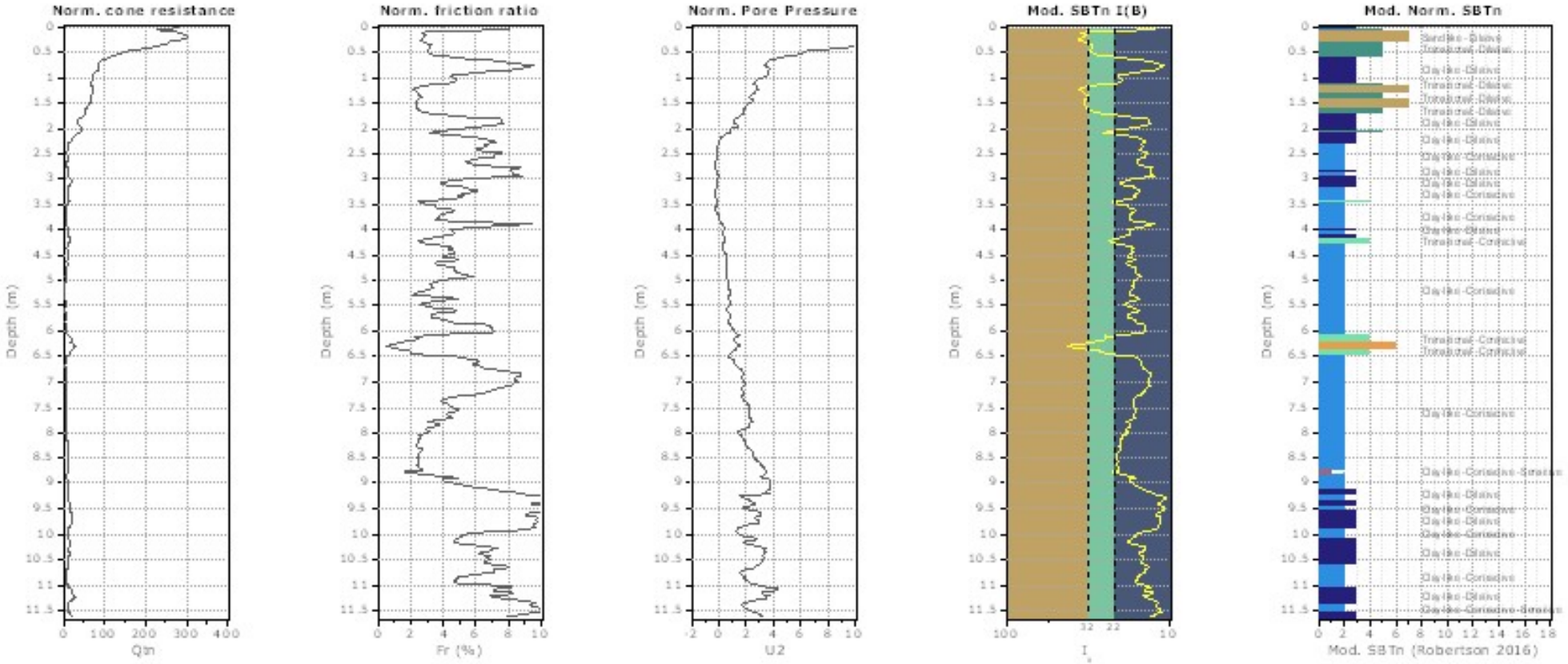
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU01

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Mod. SBTn legend

- 1. CCS: ClayLike - Contractive, Sensitive
- 2. CC: Clay-like - Contractive
- 3. CD: Clay-Like: Dilative
- 4. TC: Transitional - Contractive
- 5. TD: Transitional - Dilative
- 6. SC: Sand-like - Contractive
- 7. SD: Sand-like - Dilative

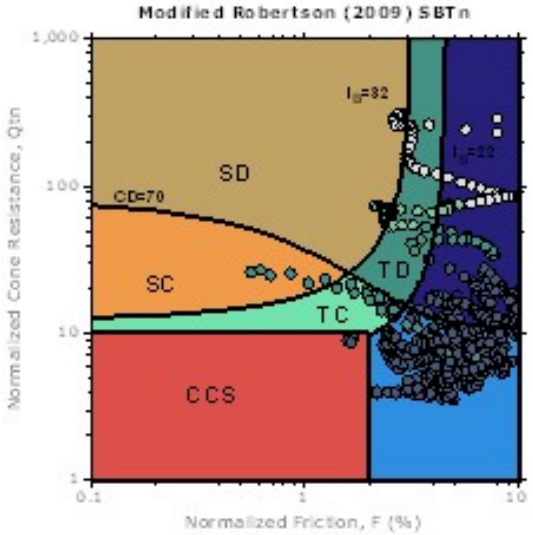
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU01

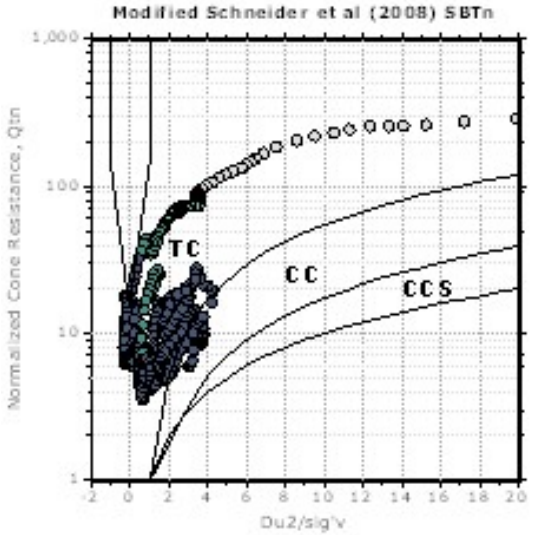
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

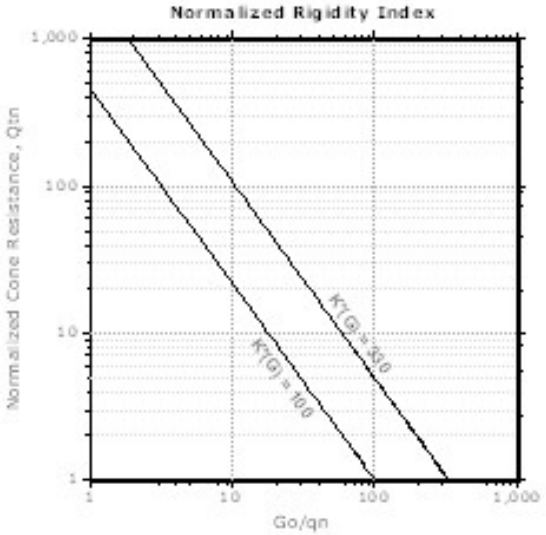
Updated SBTn plots



-



-



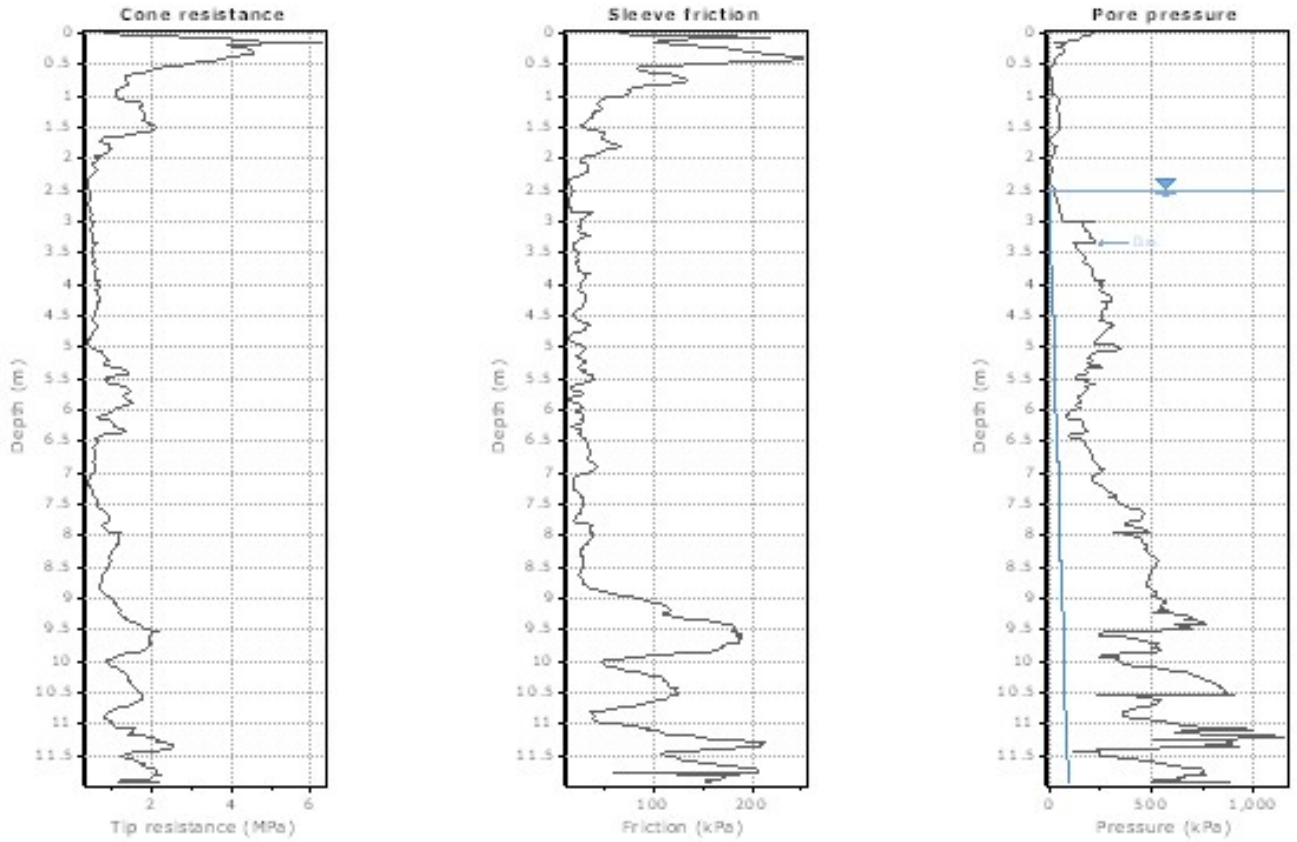
-

CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

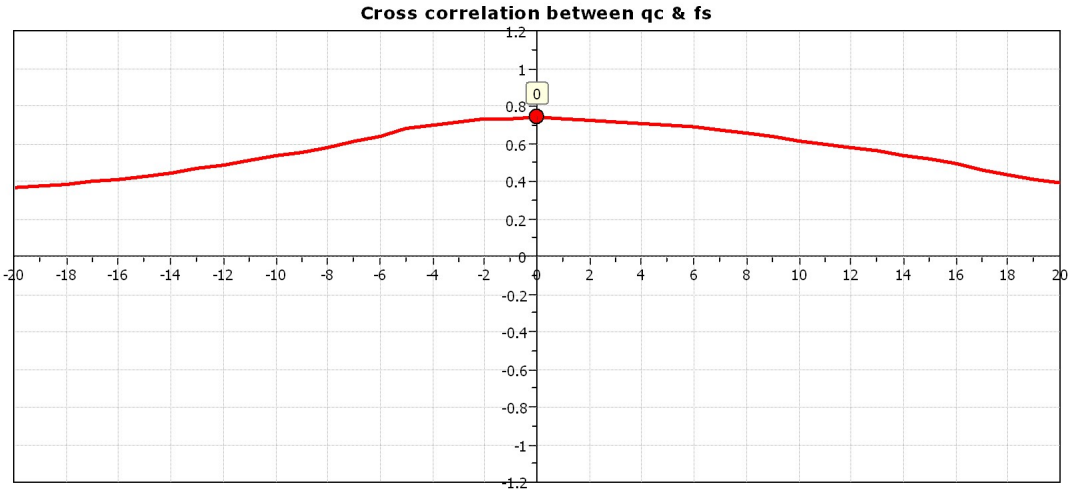
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU02

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 11.93 m, Date: 20/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



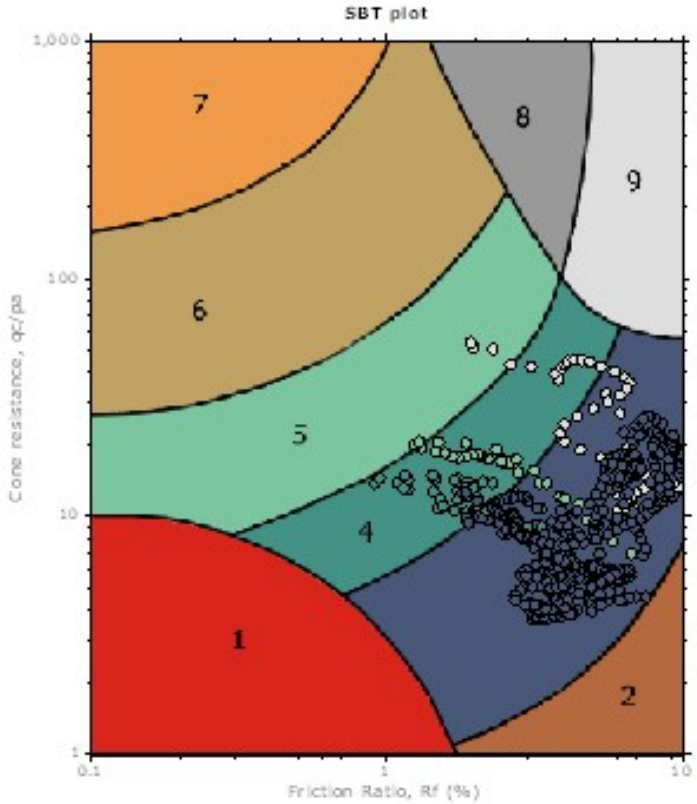
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

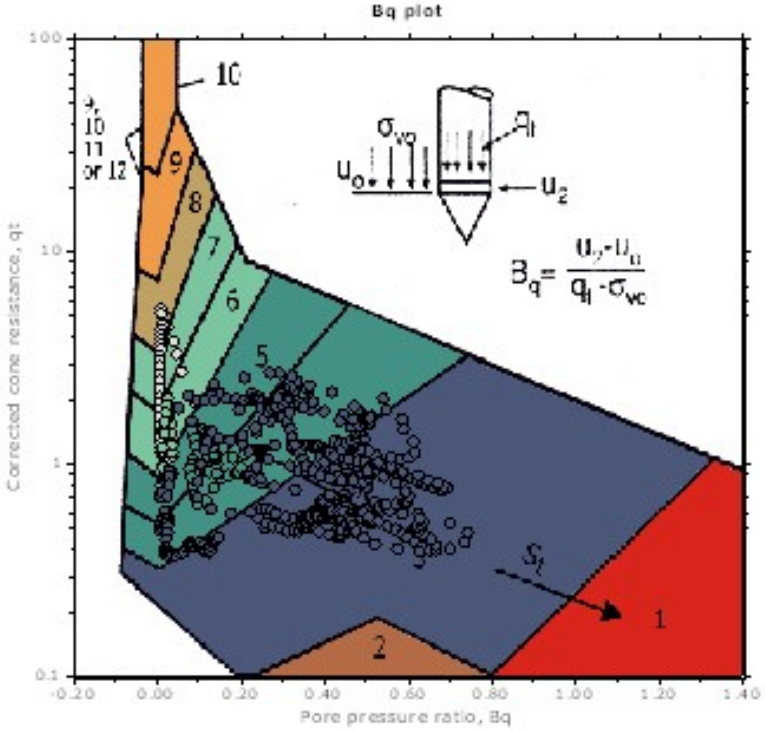
CPTU02

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

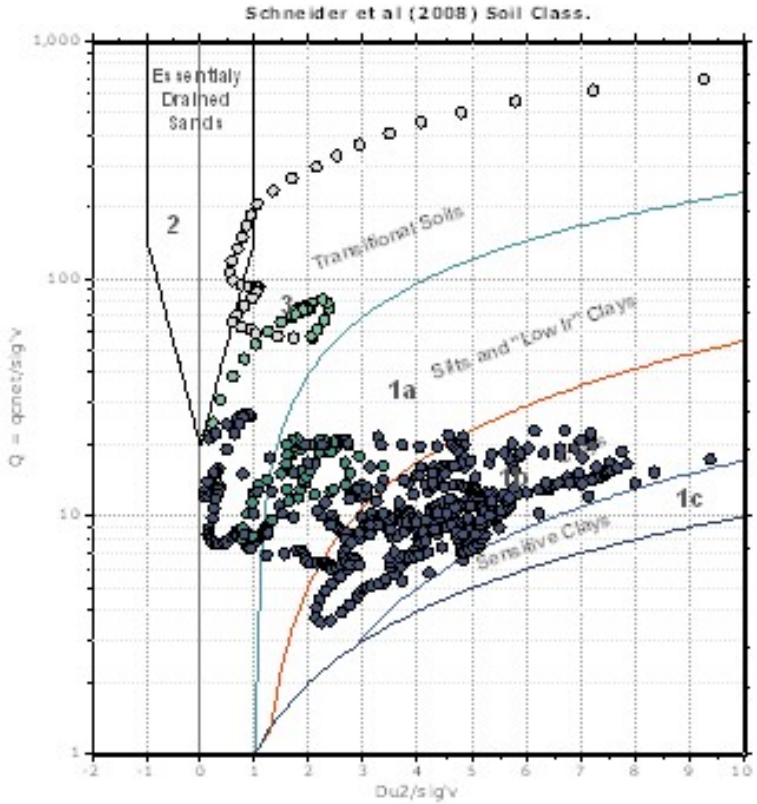
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU02

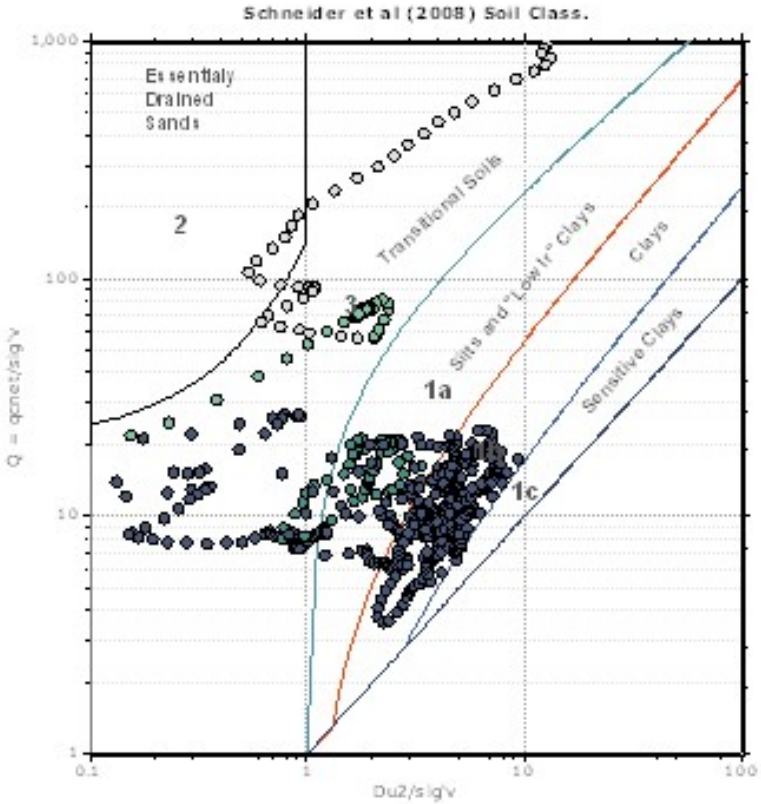
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)



-



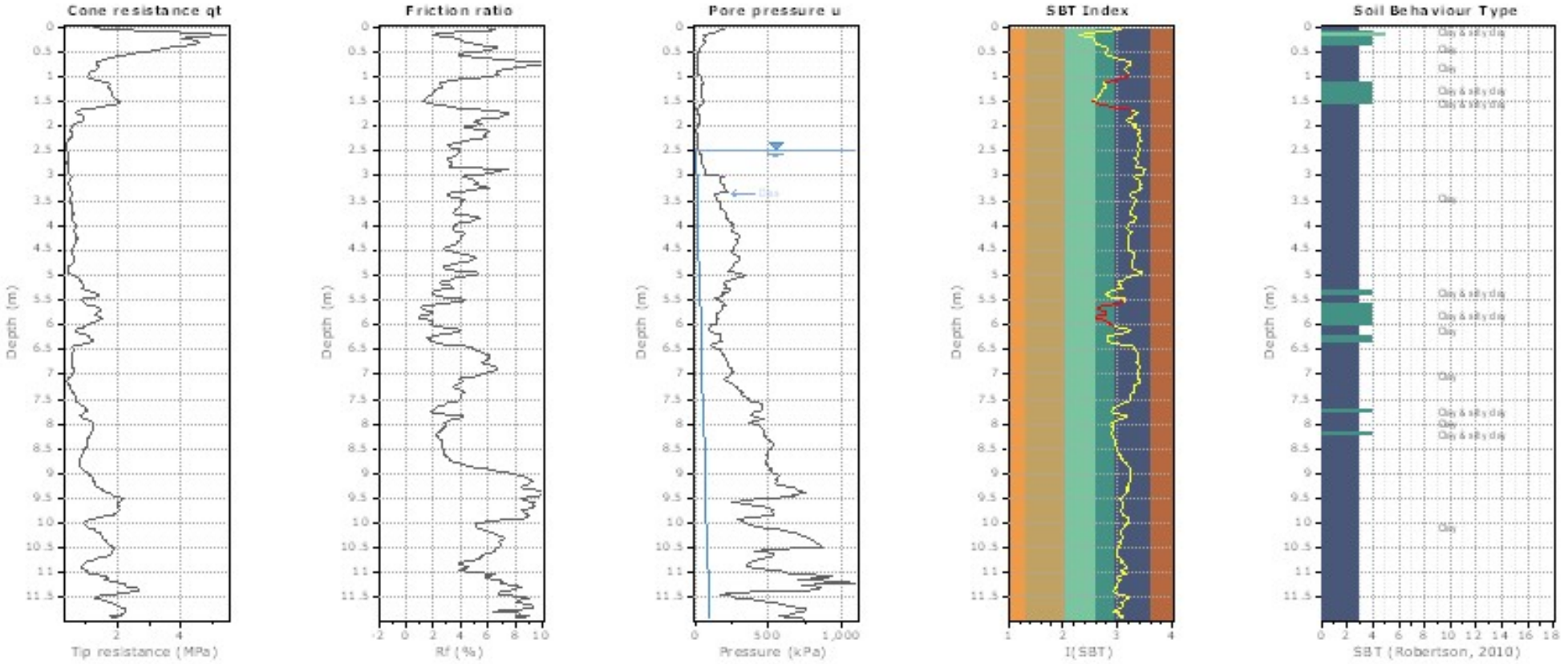
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU02

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

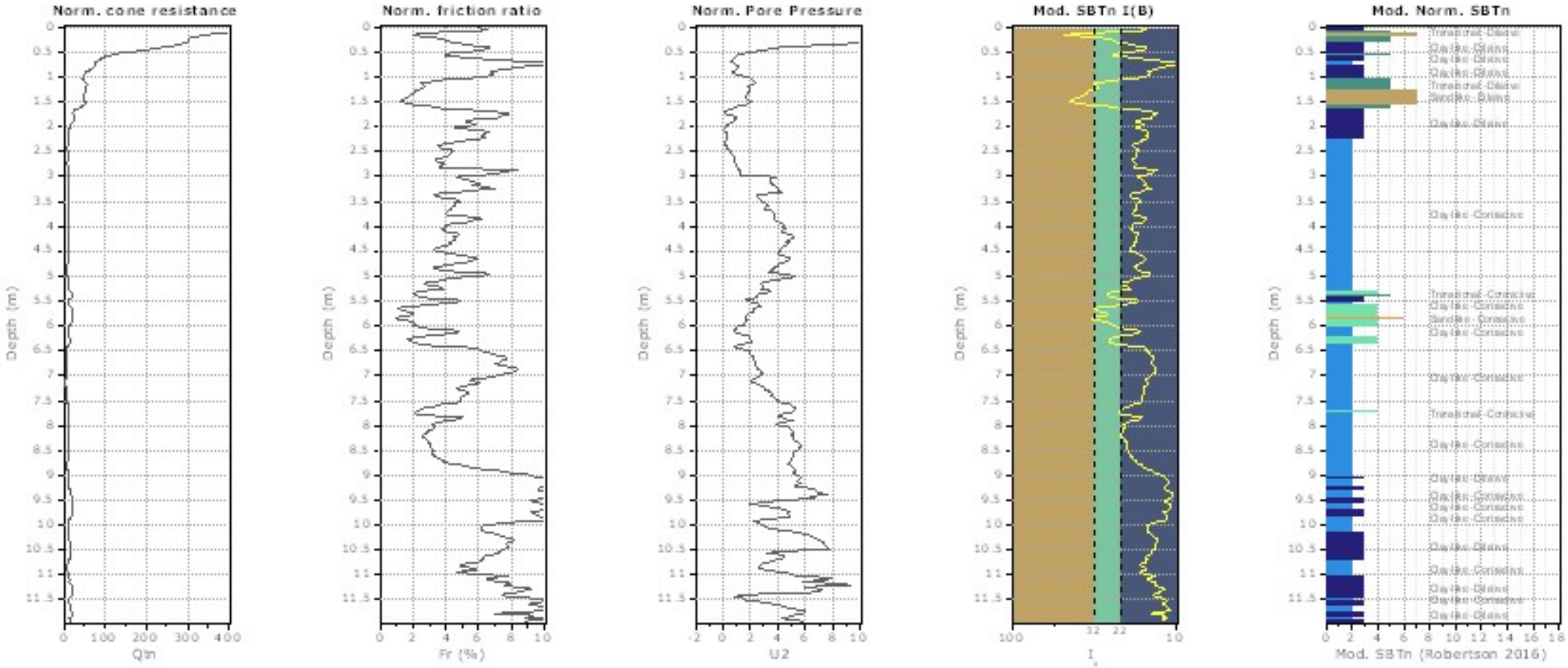
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU02

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Mod. SBTn legend

1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

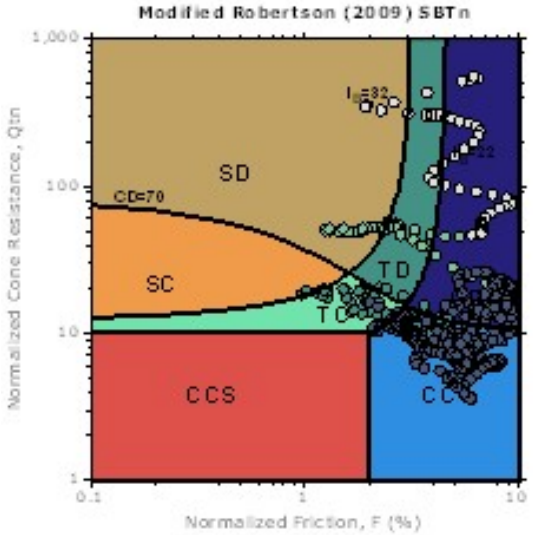
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU02

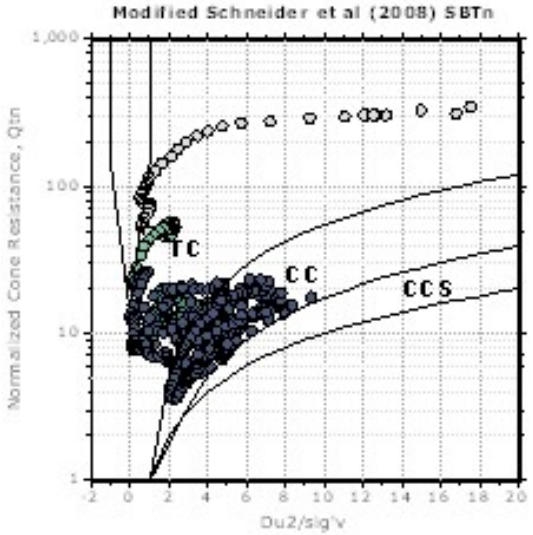
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

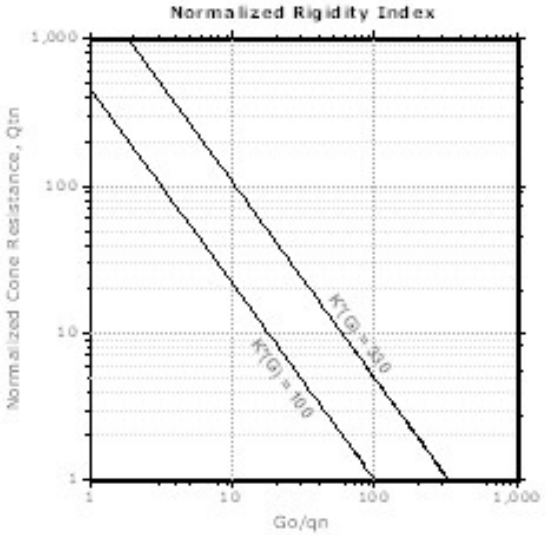
Updated SBTn plots



-



-



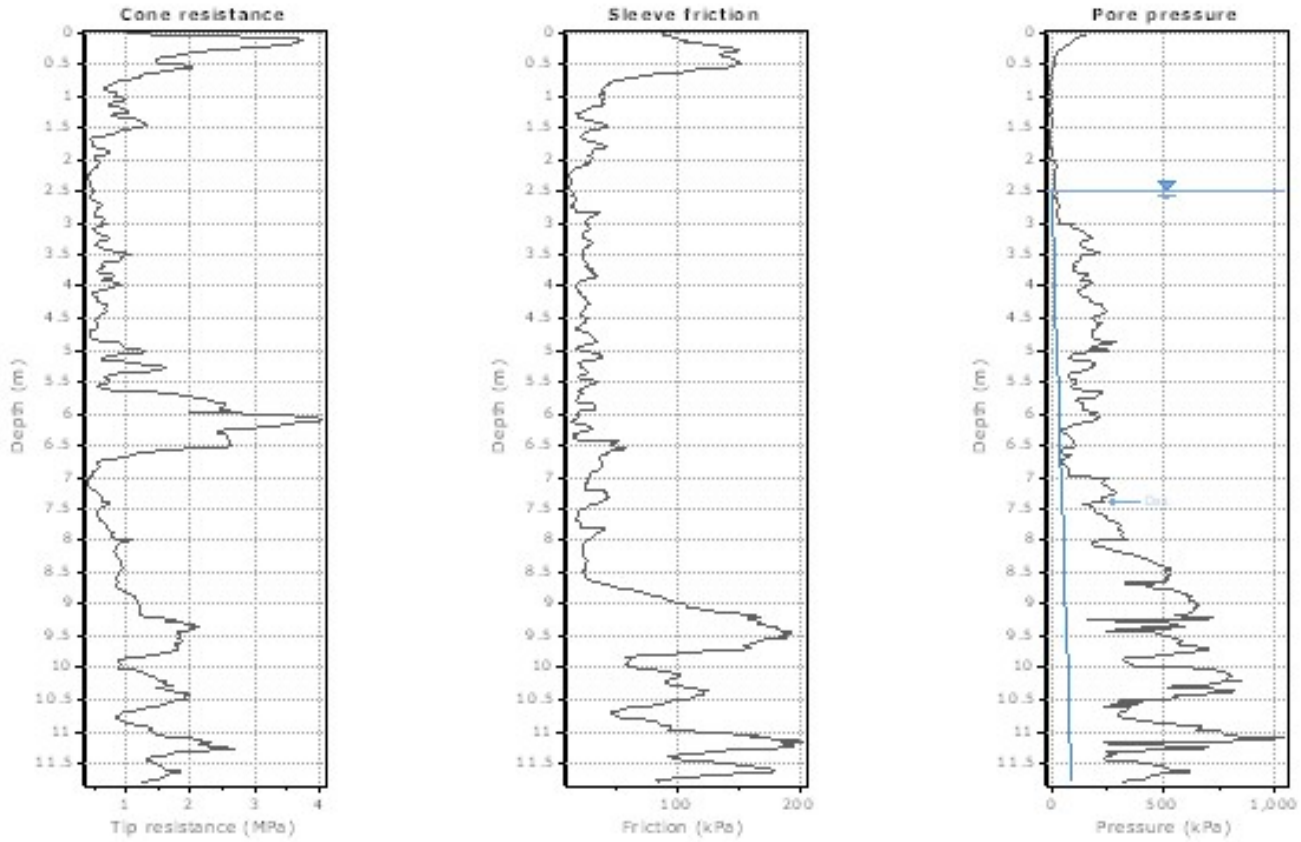
-

CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

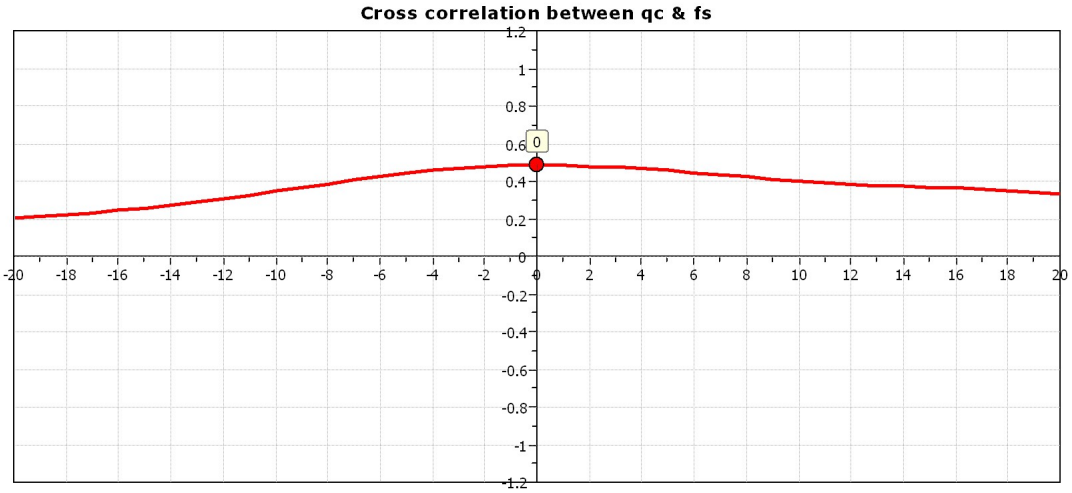
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU03

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 11.81 m, Date: 20/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



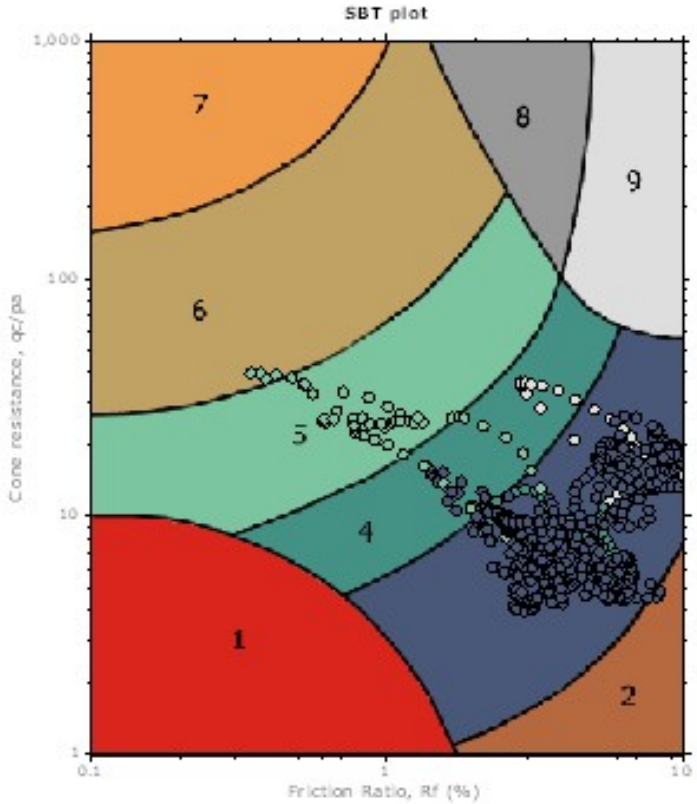
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

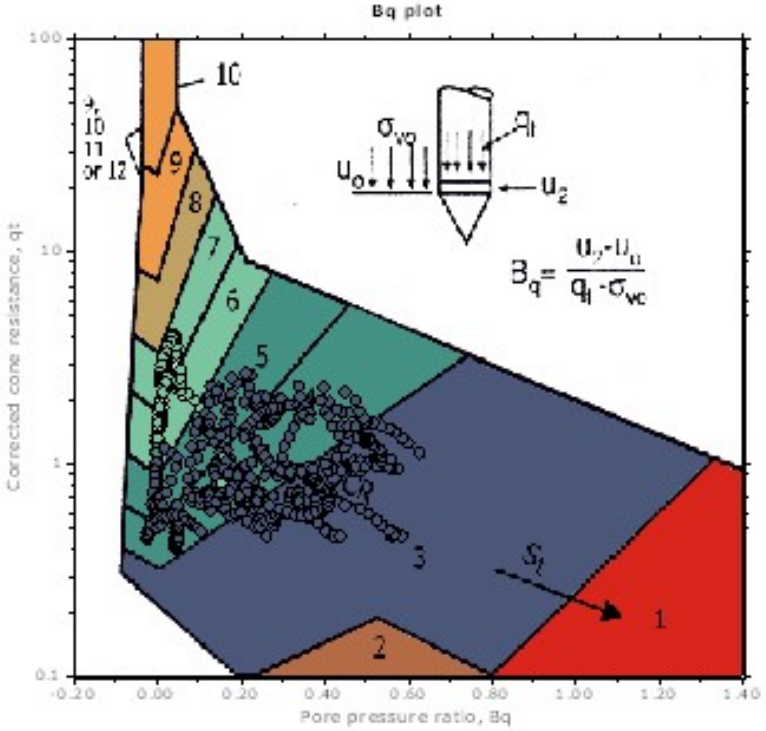
CPTU03

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

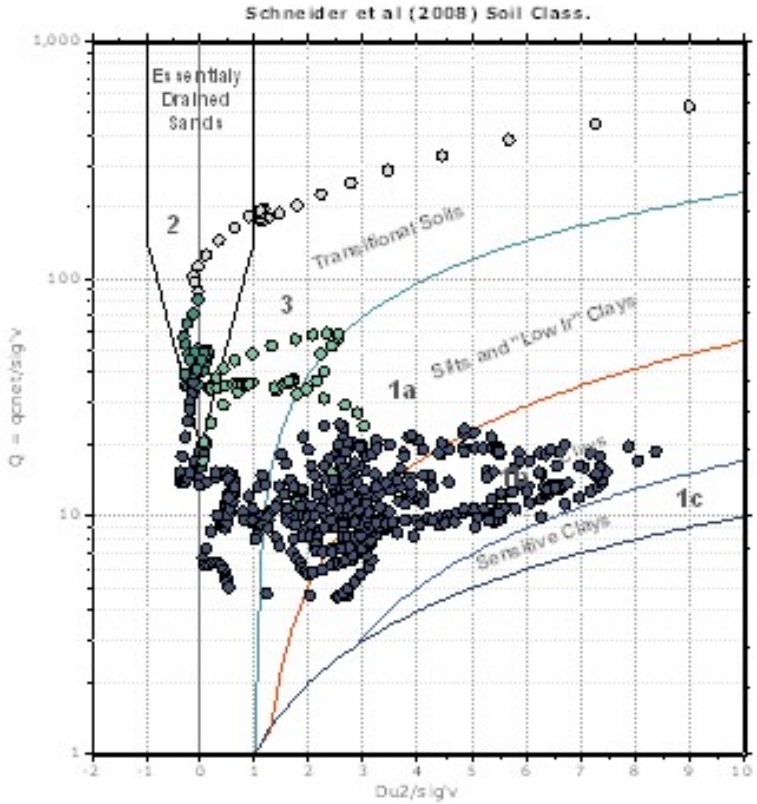
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU03

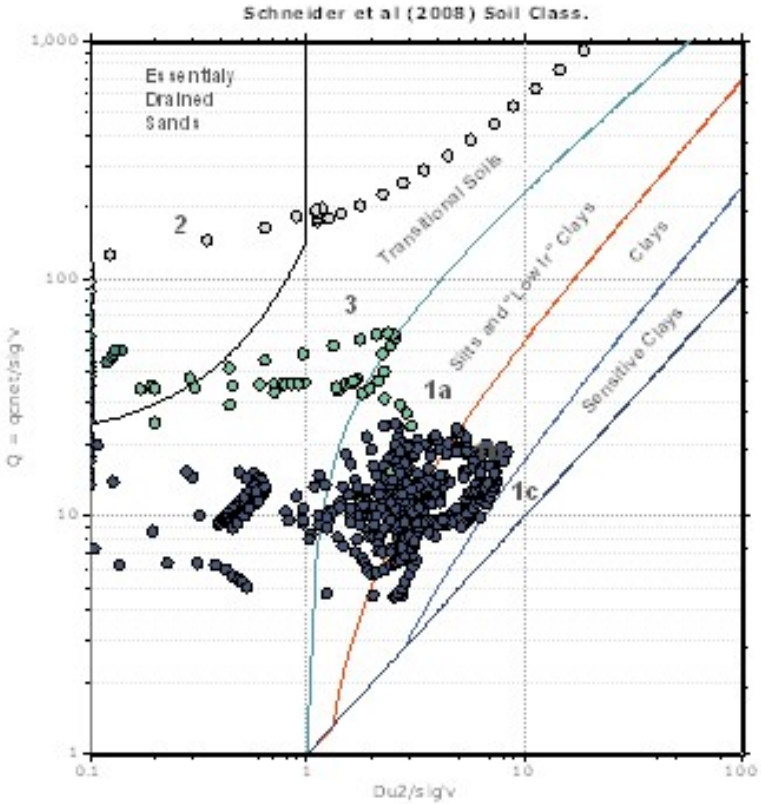
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)



-



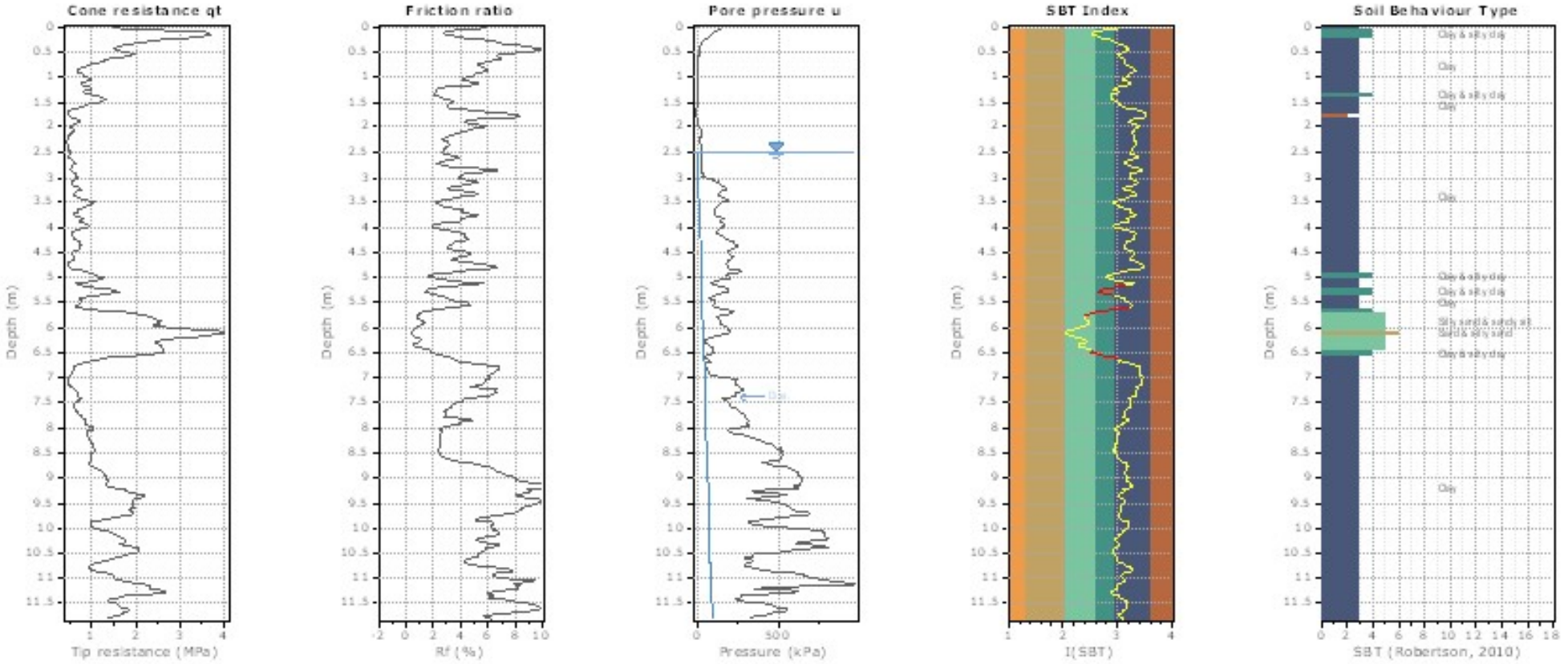
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU03

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

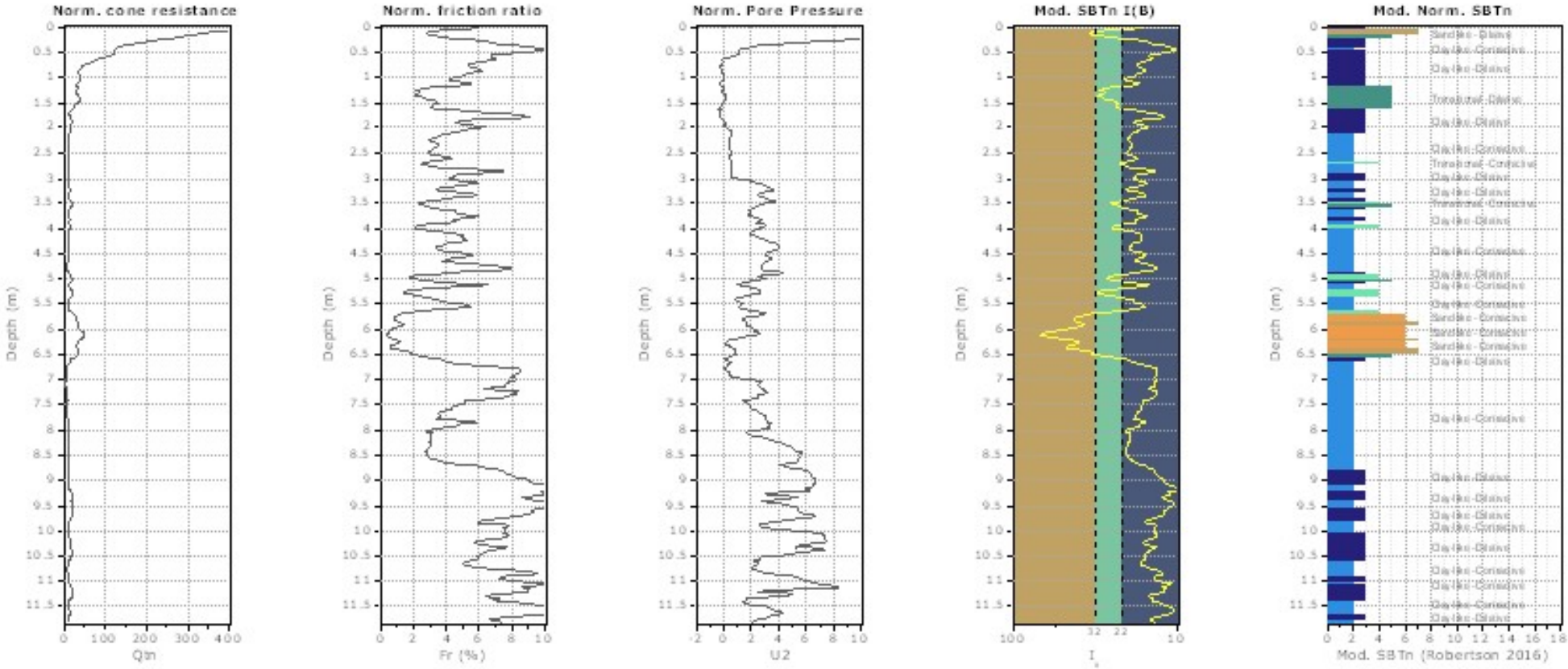
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU03

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Mod. SBTn legend

1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

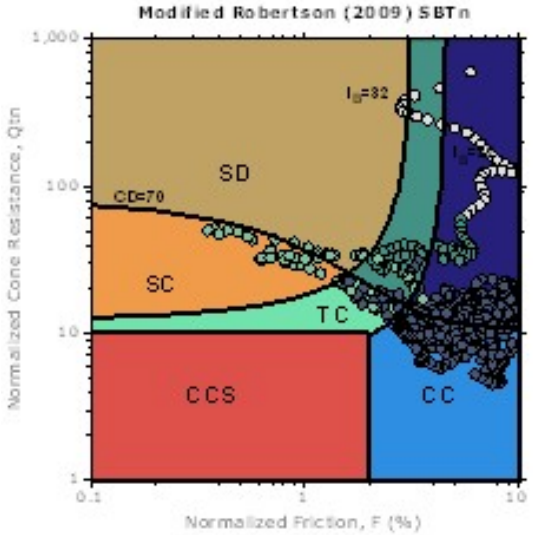
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

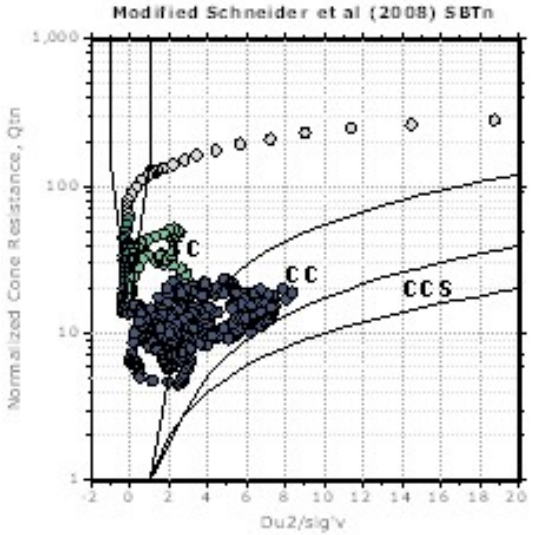
CPTU03

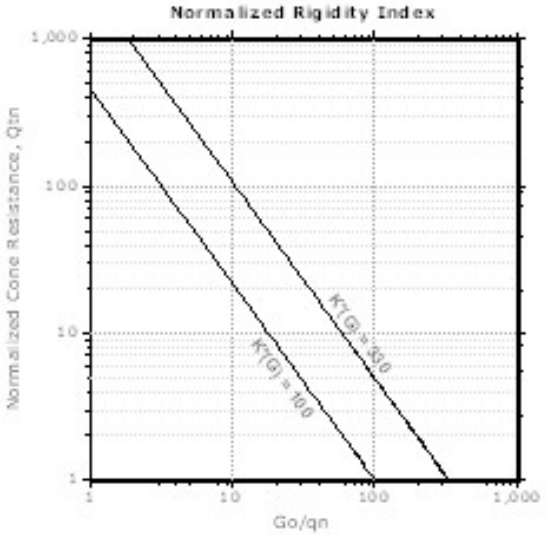
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Updated SBTn plots





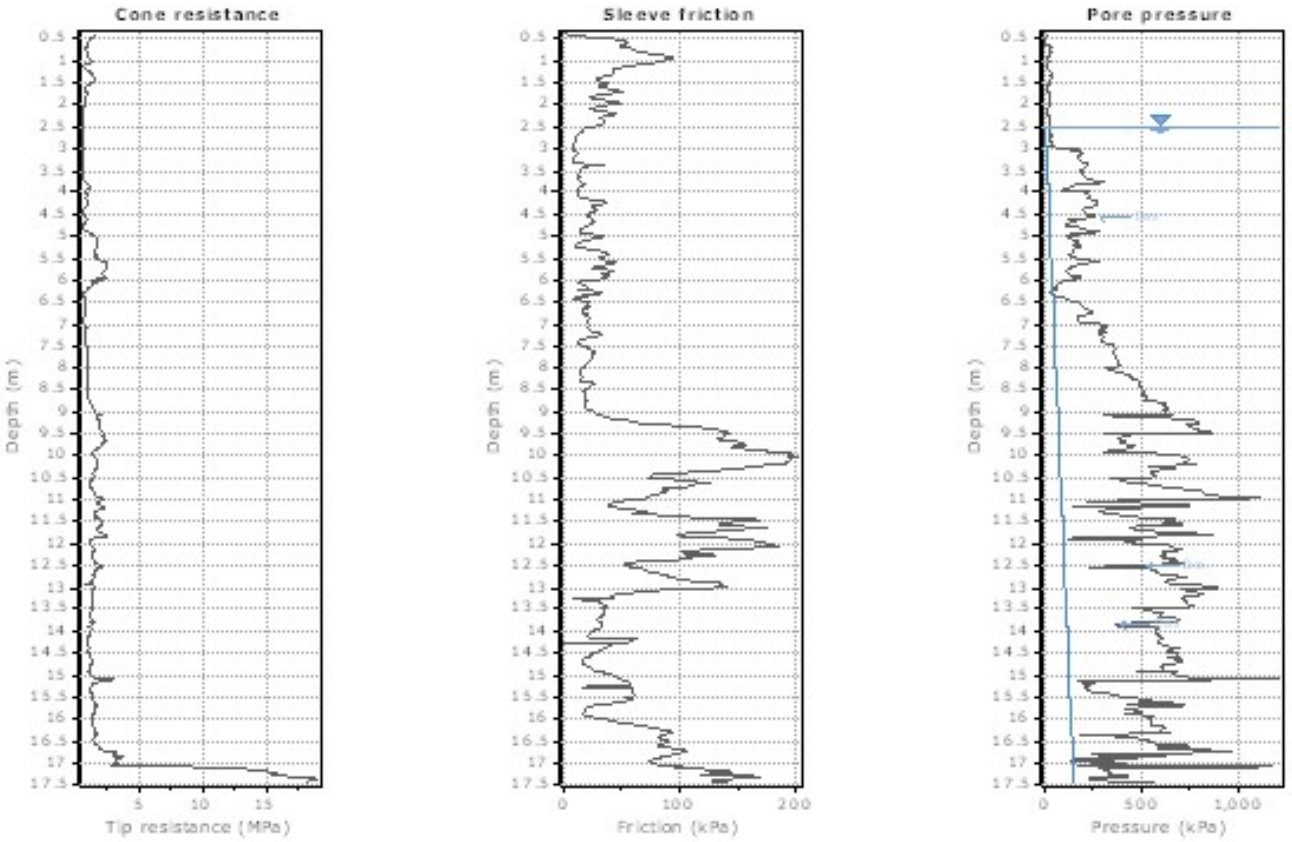


CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

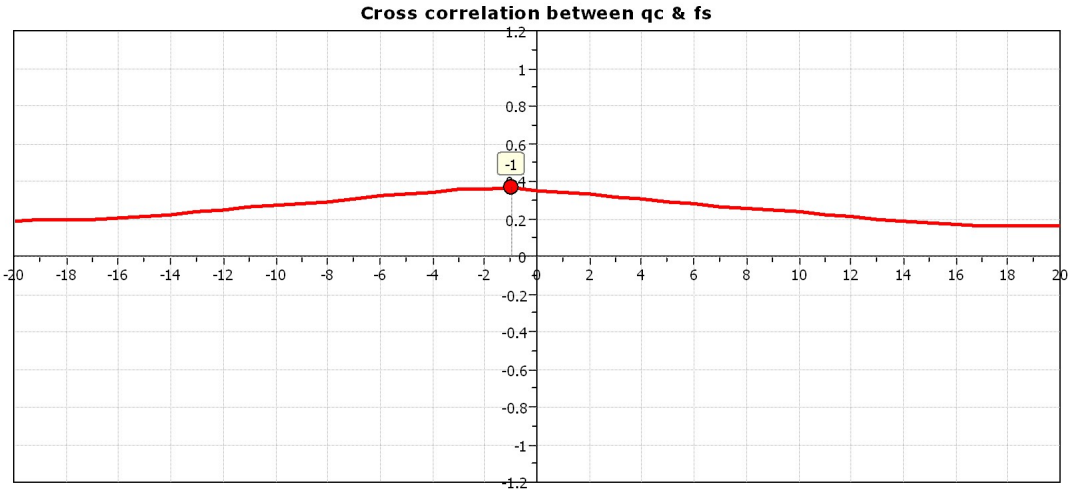
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 17.45 m, Date: 20/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



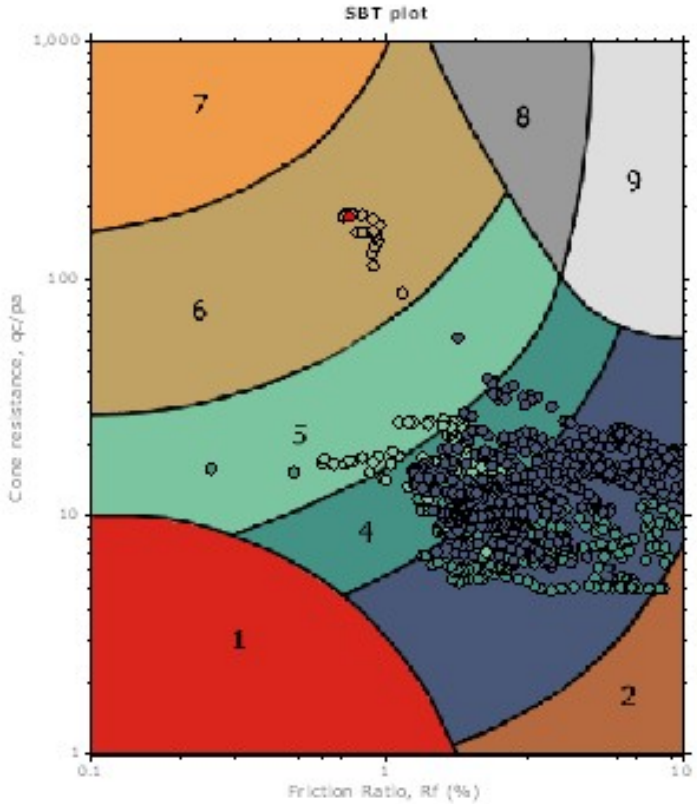
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

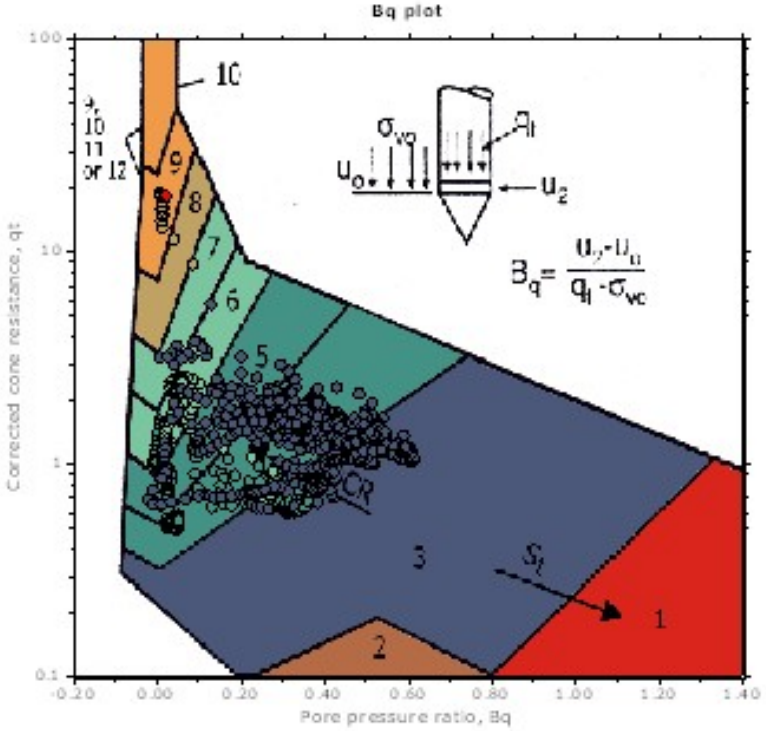
CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

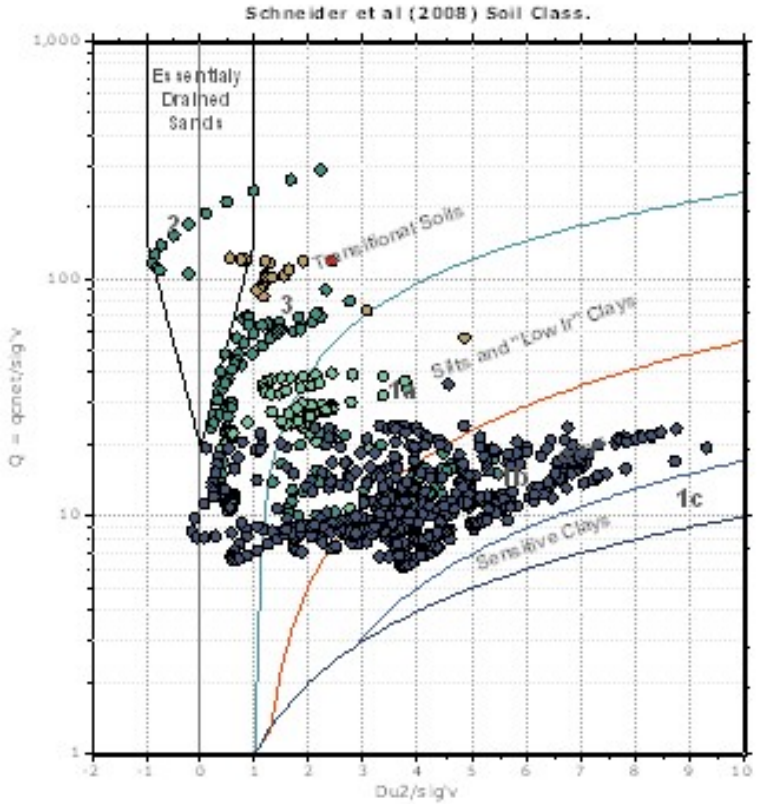
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

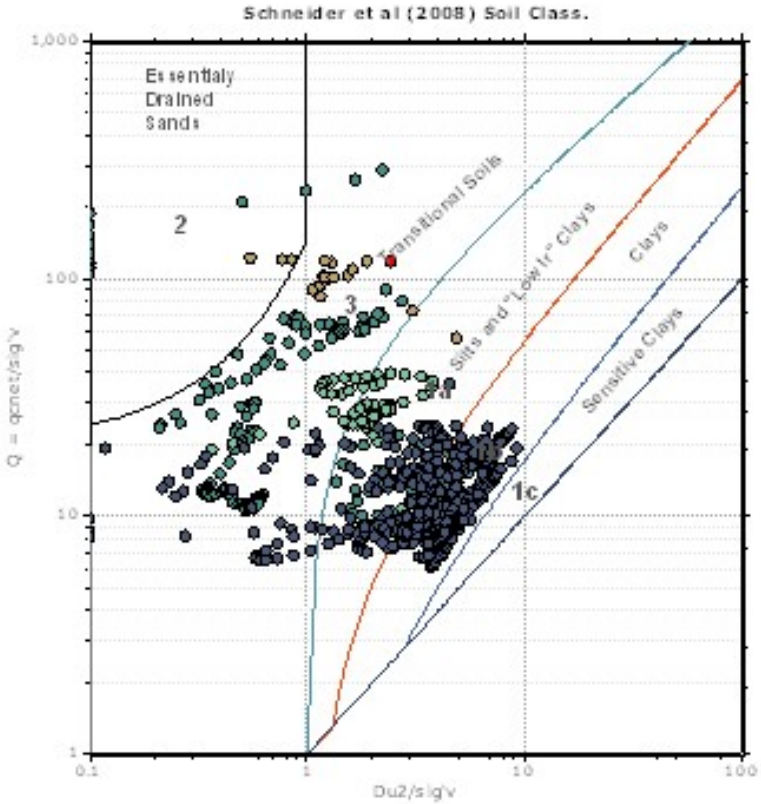
CPT: CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)





-

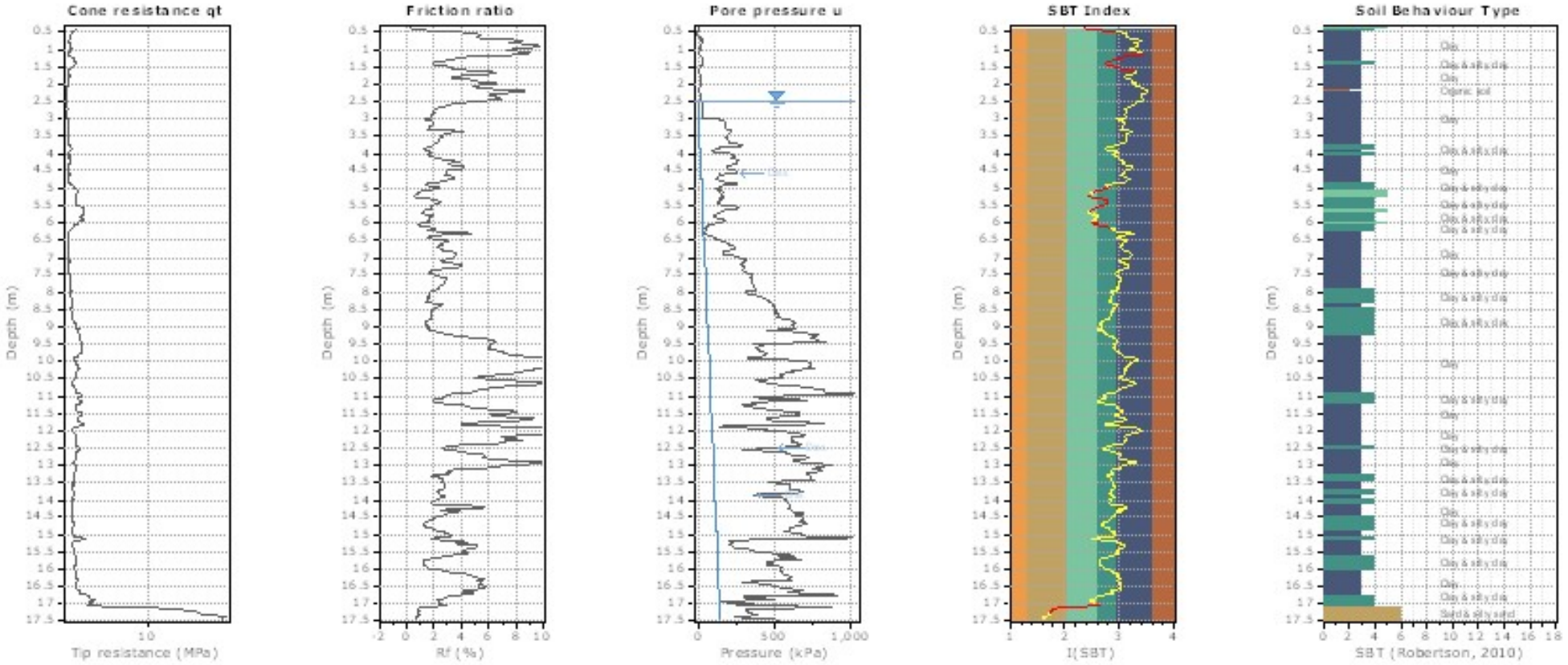
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

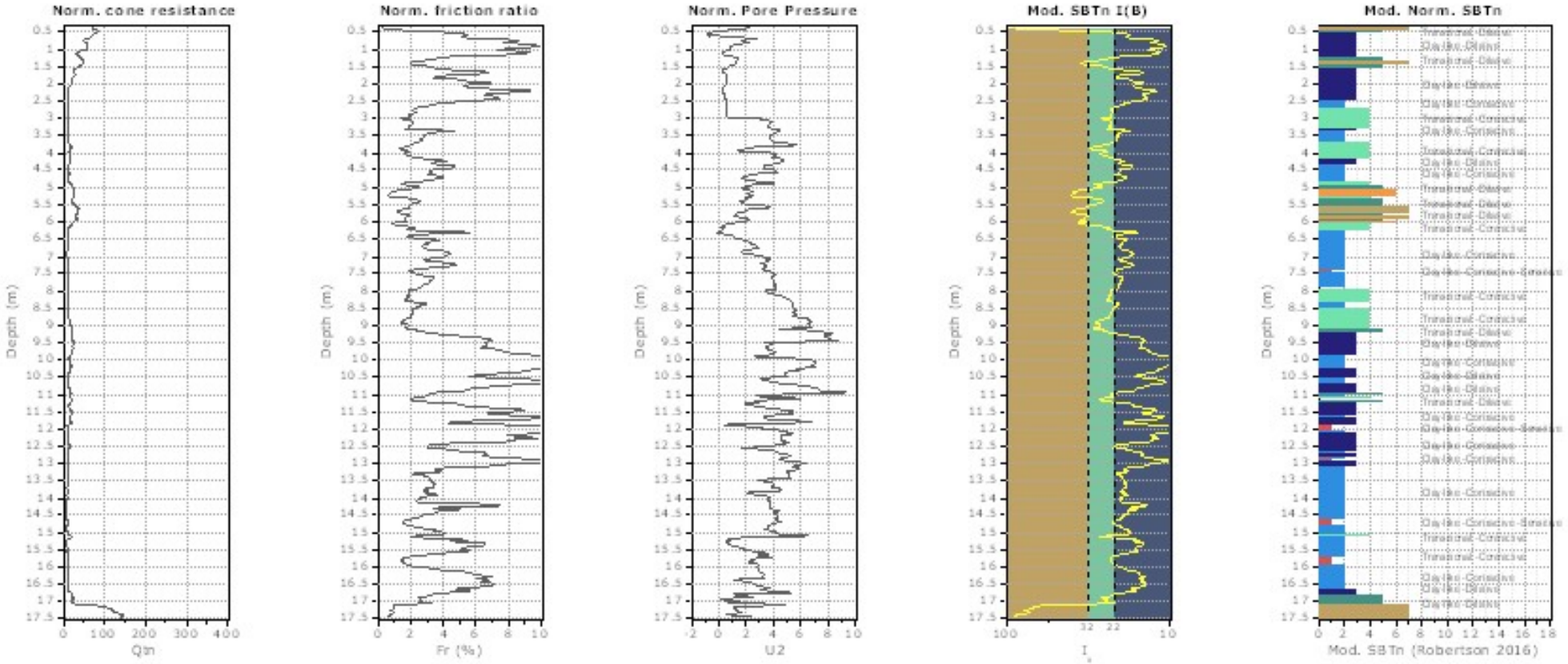
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Mod. SBTn legend

1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

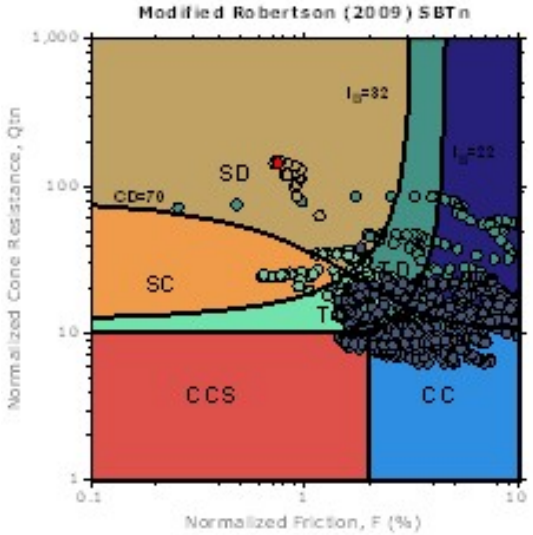
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU04

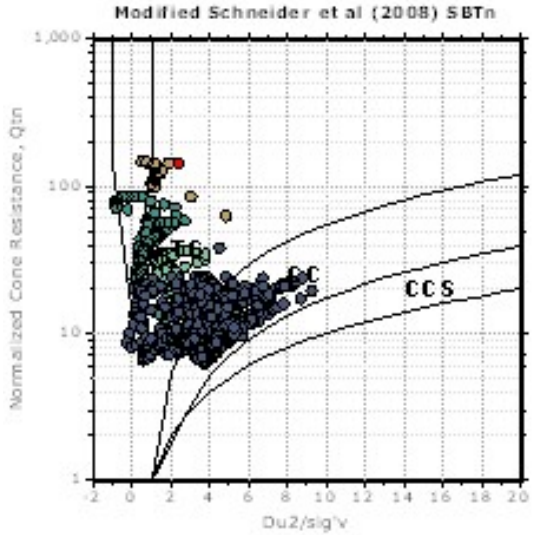
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

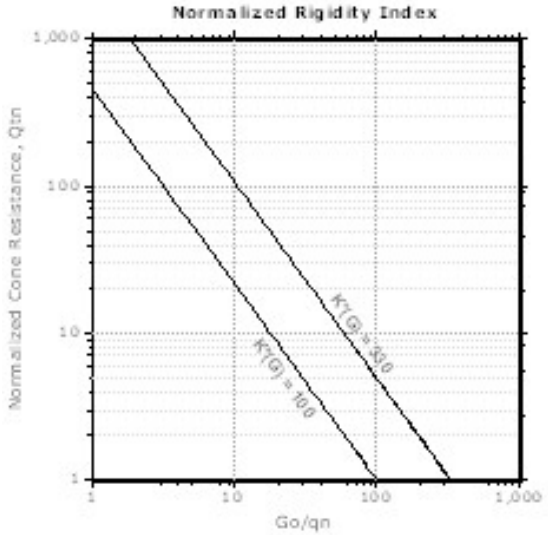
Updated SBTn plots



-



-



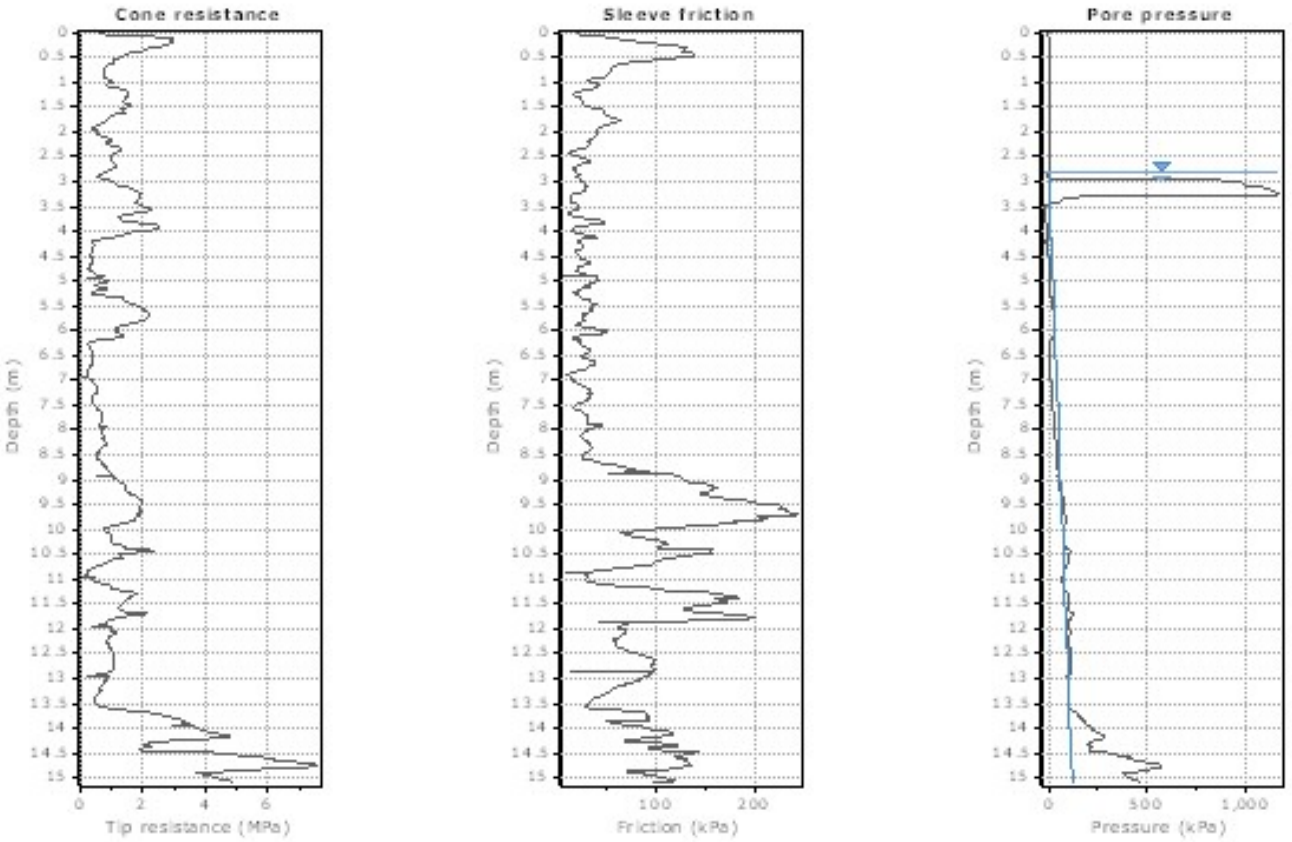
-

CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

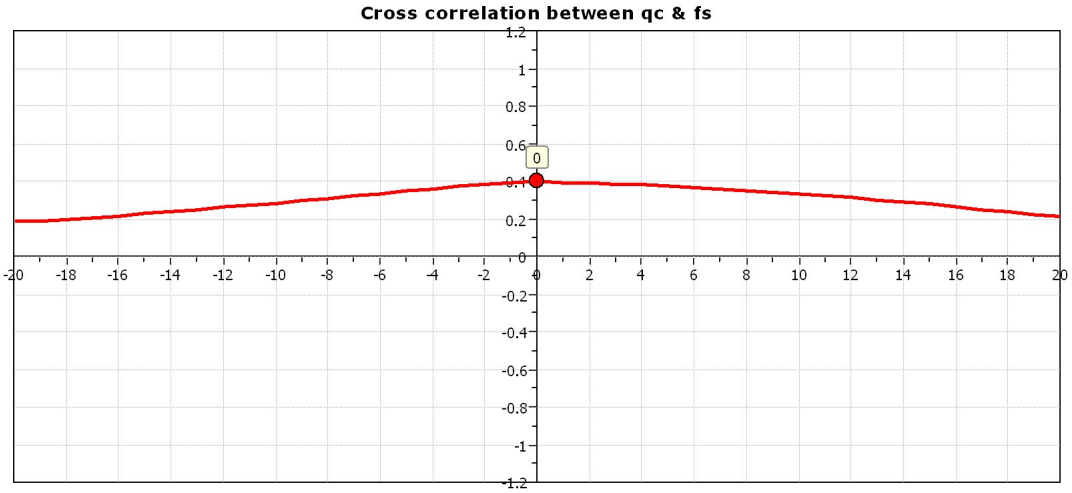
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU05

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 15.09 m, Date: 21/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



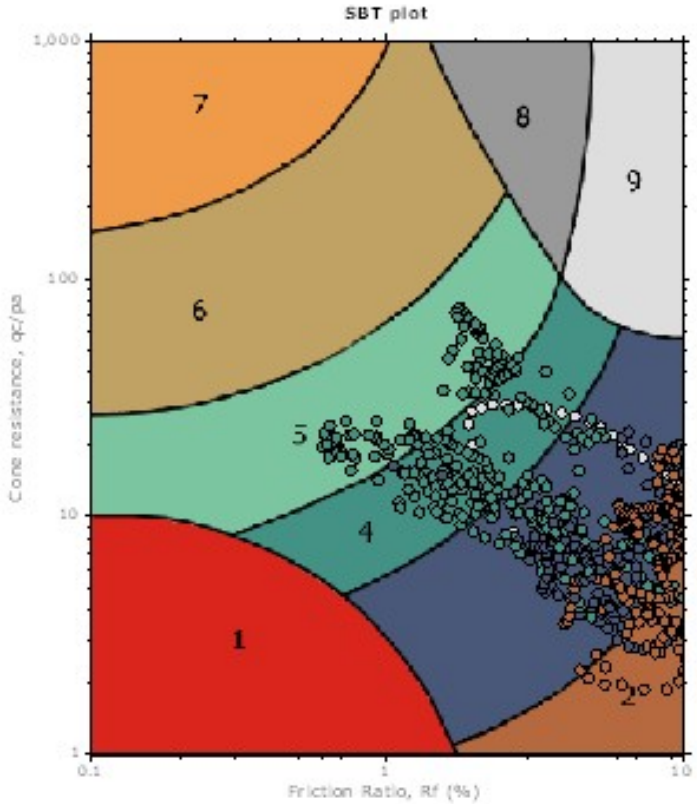
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

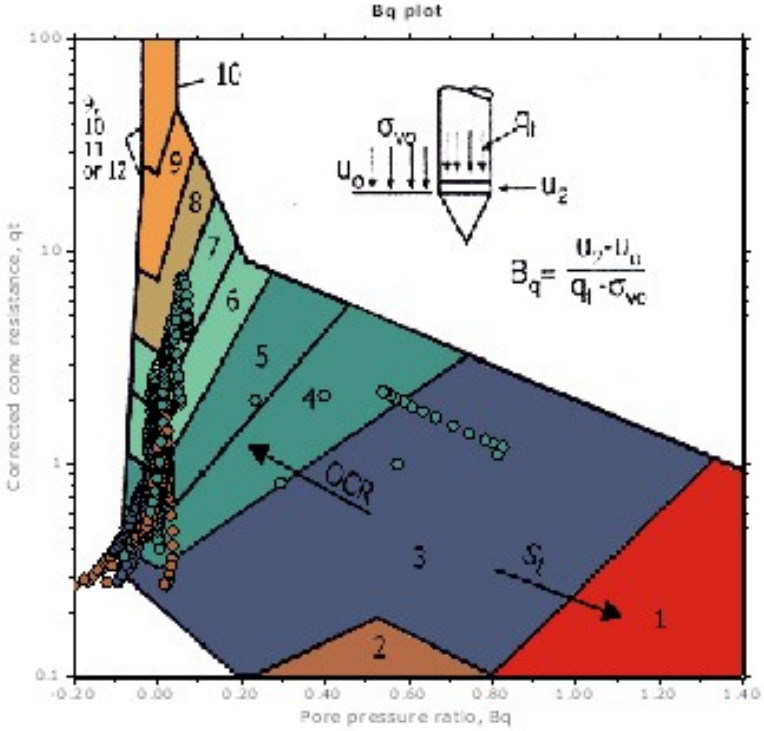
CPTU05

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

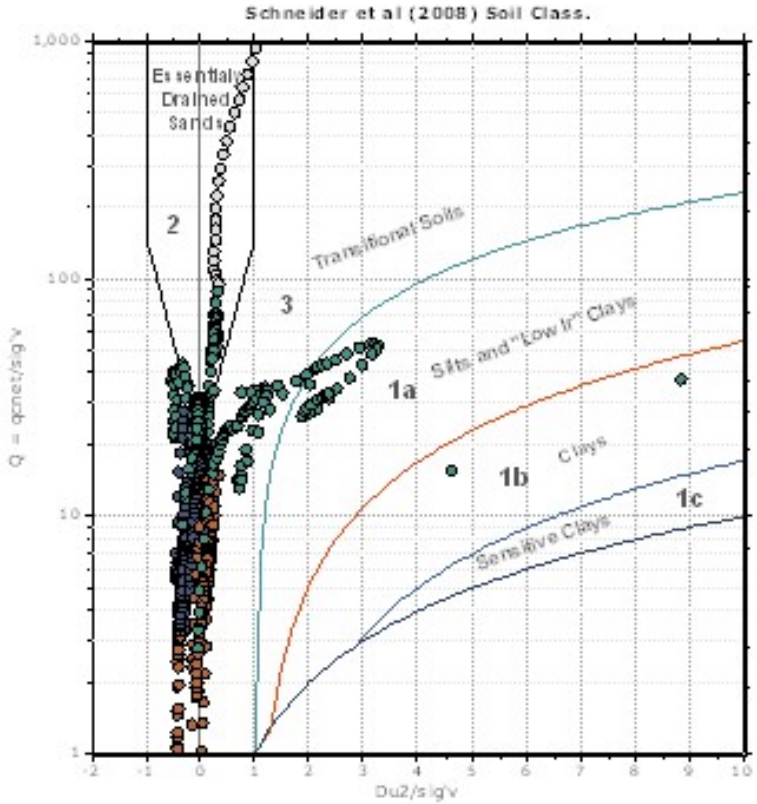
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU05

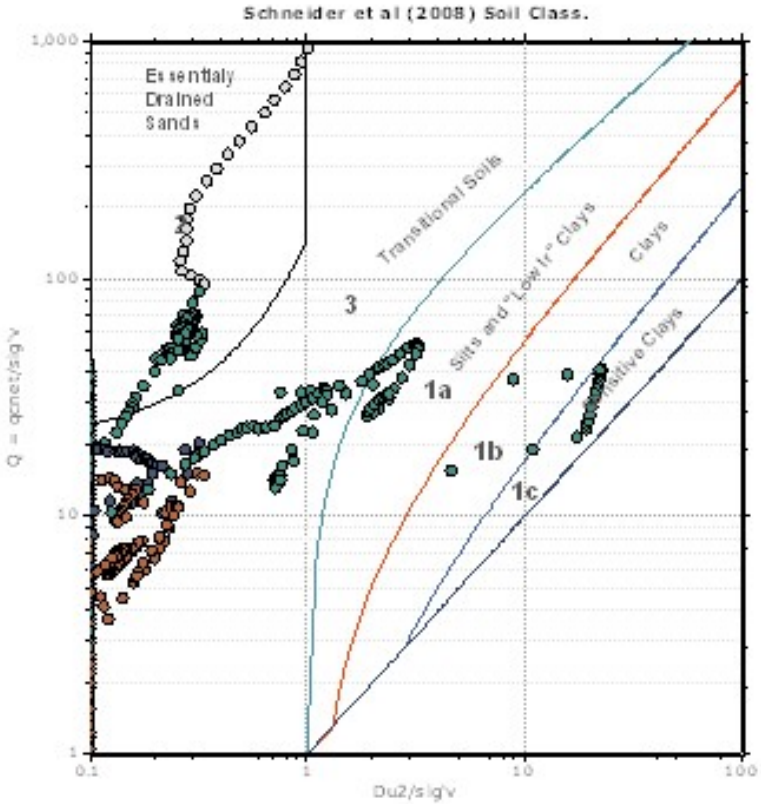
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)



-



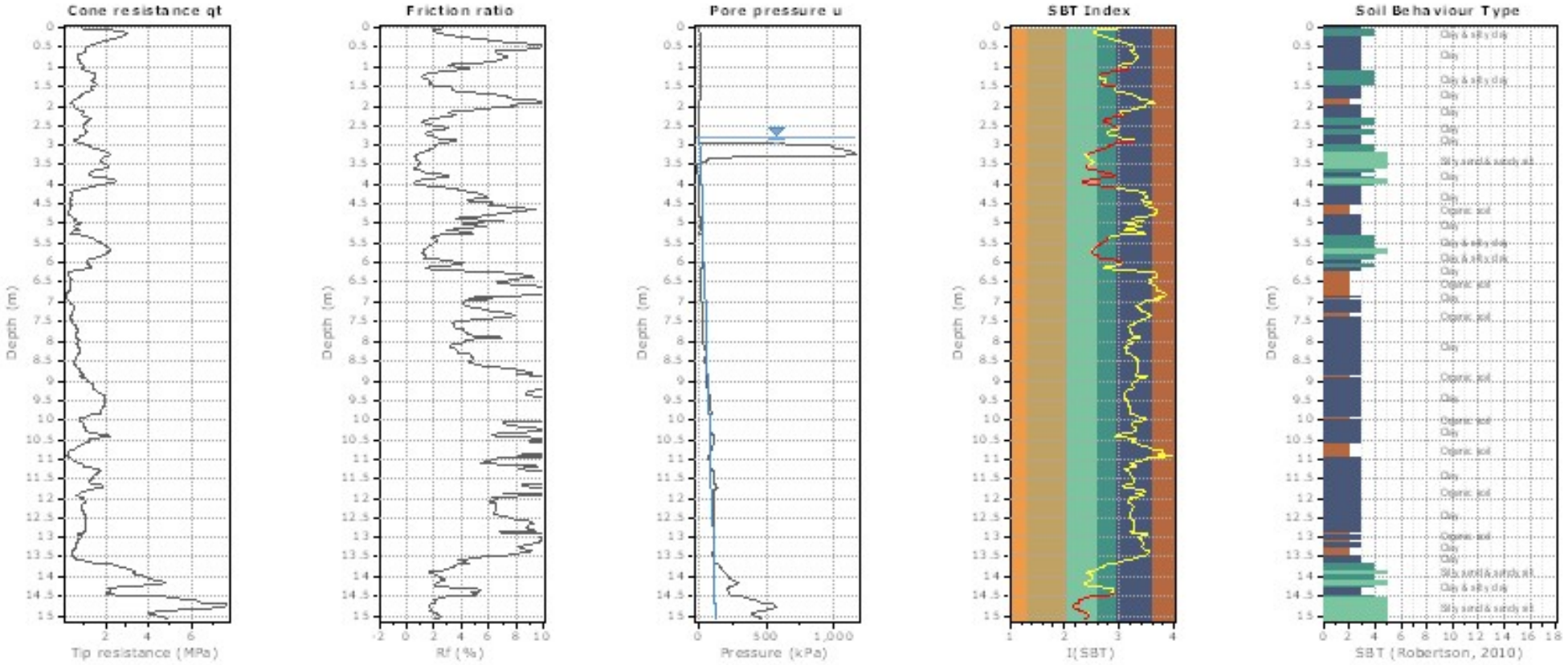
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU05

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

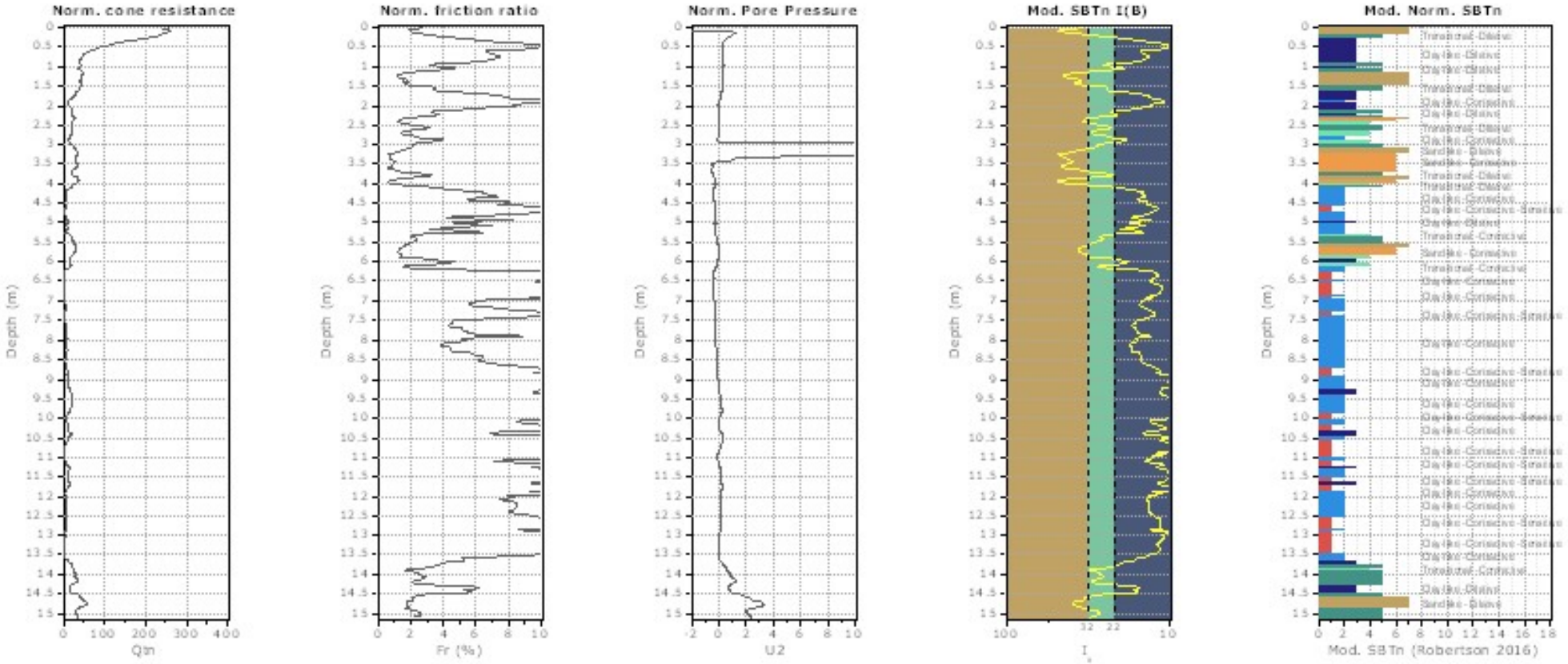
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU05

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Mod. SBTn legend

- 1. CCS: ClayLike - Contractive, Sensitive
- 2. CC: Clay-like - Contractive
- 3. CD: Clay-Like: Dilative
- 4. TC: Transitional - Contractive
- 5. TD: Transitional - Dilative
- 6. SC: Sand-like - Contractive
- 7. SD: Sand-like - Dilative

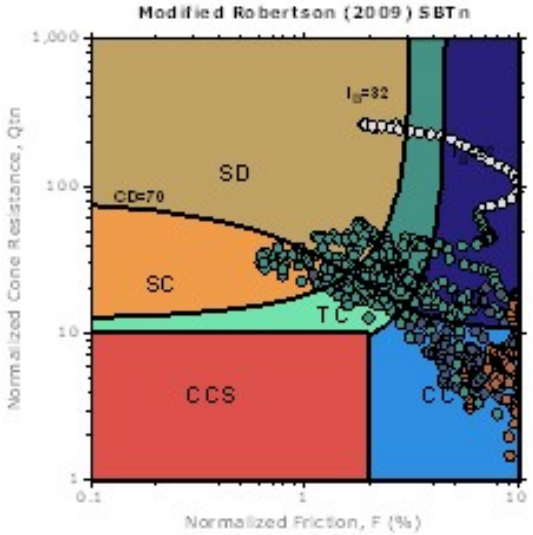
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU05

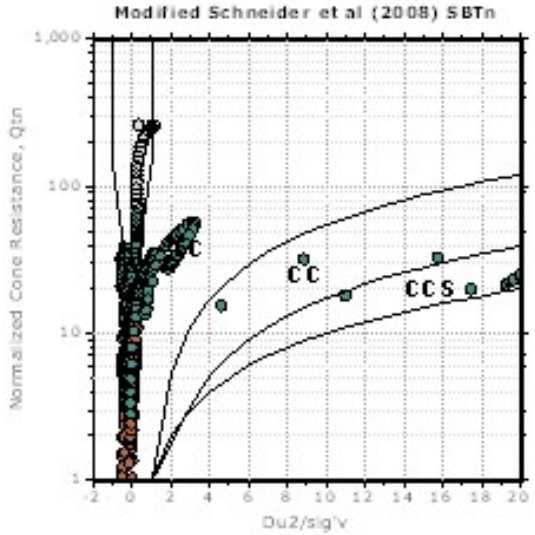
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Total depth: 15.09 m, Date: 21/04/2017

Location: **Medolla**
Cone Type: Tecnopenta - G1 CPLS D1

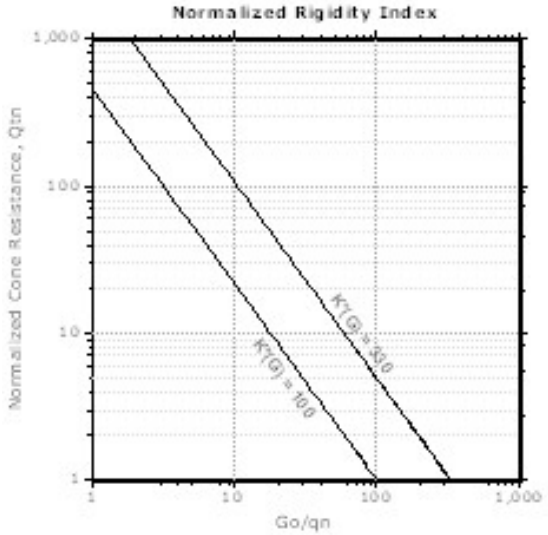
Updated SBTn plots



-



-



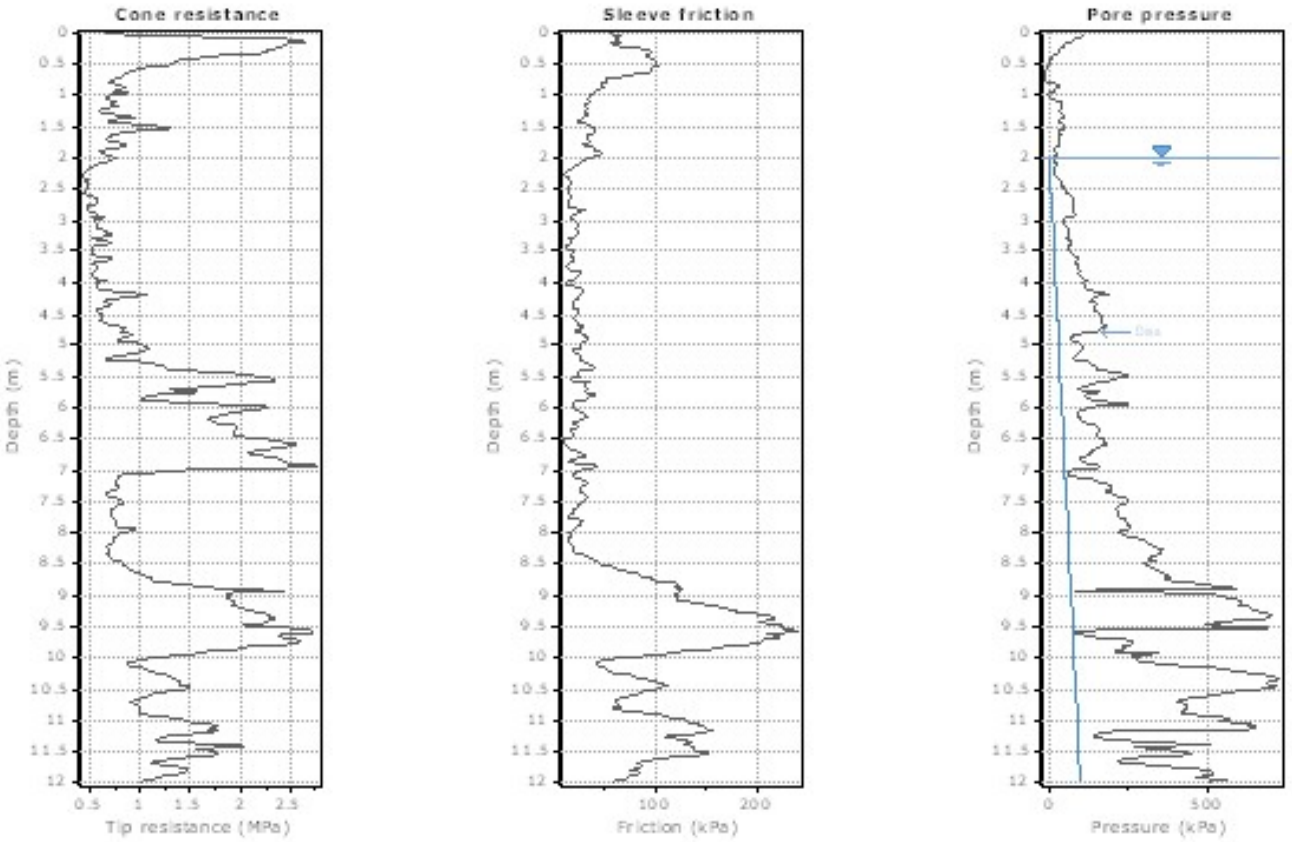
-

CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

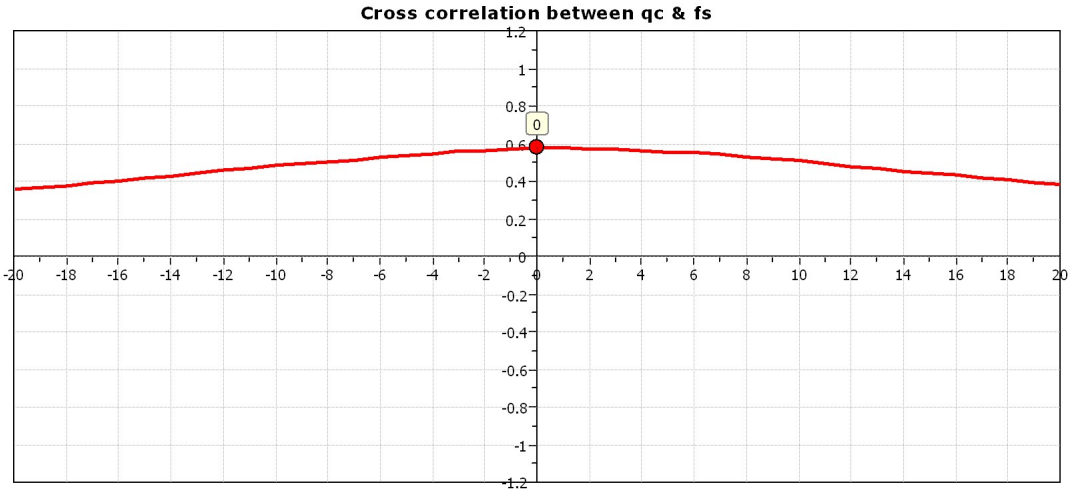
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU06

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo** Total depth: 11.99 m, Date: 21/04/2017
Location: **Medolla** Cone Type: Tecnopenta - G1 CPLS D1



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



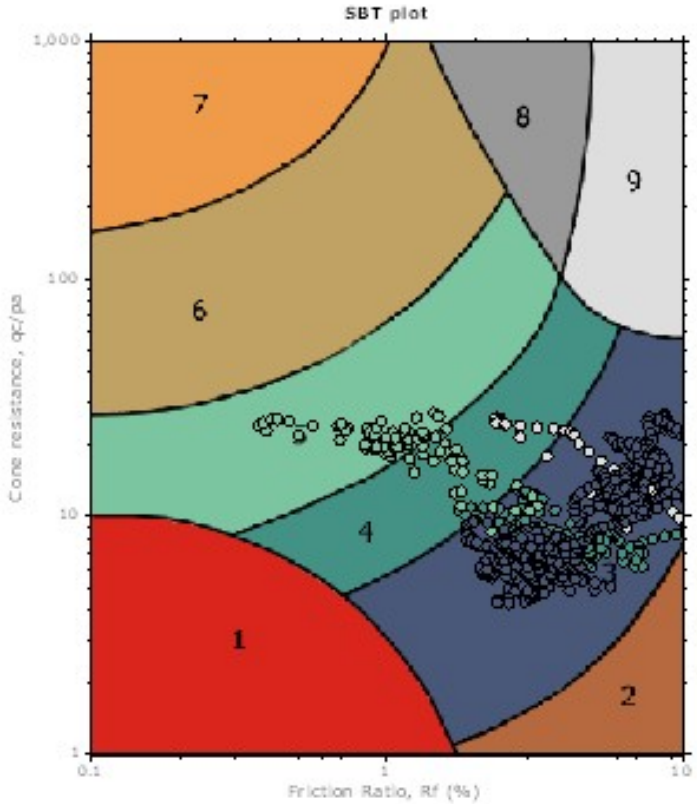
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

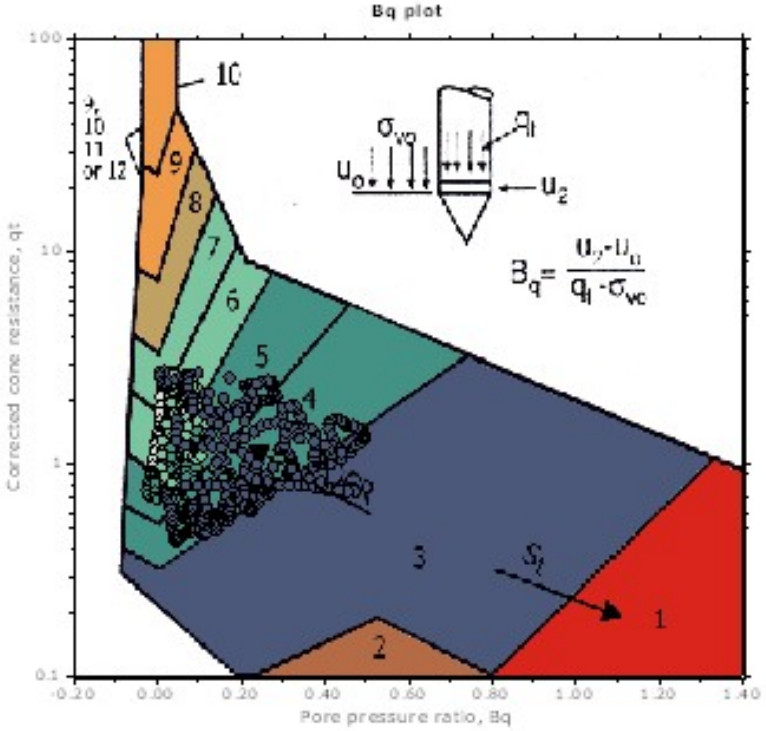
CPTU06

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

SBT - Bq plots





SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

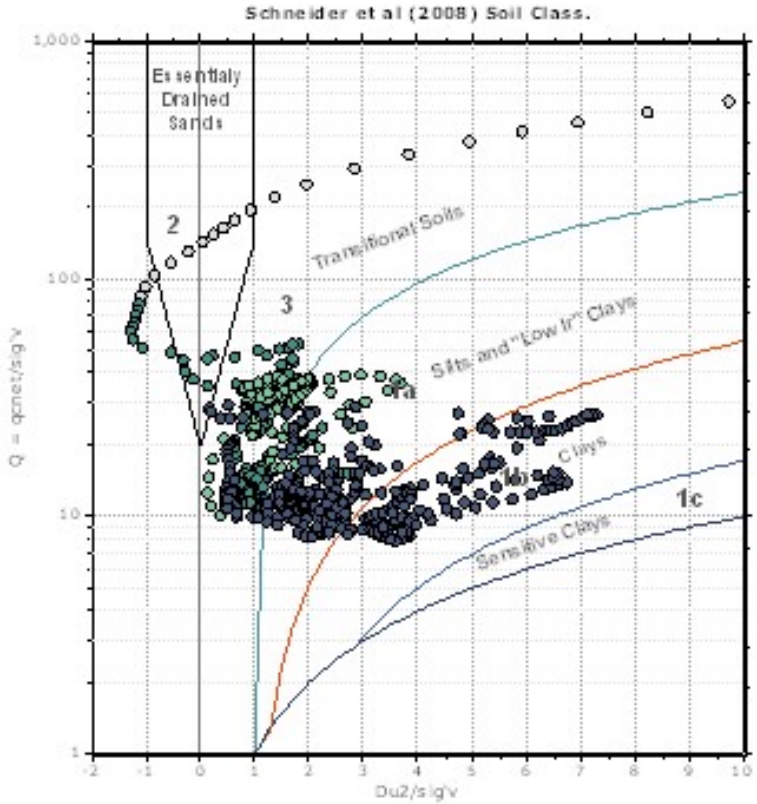
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU06

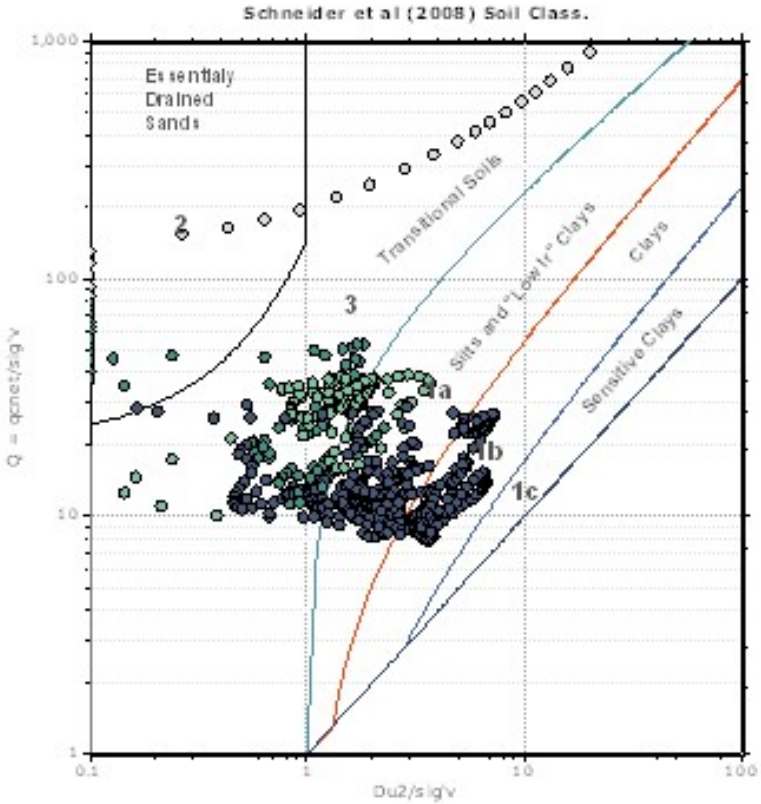
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Bq plots (Schneider)



-



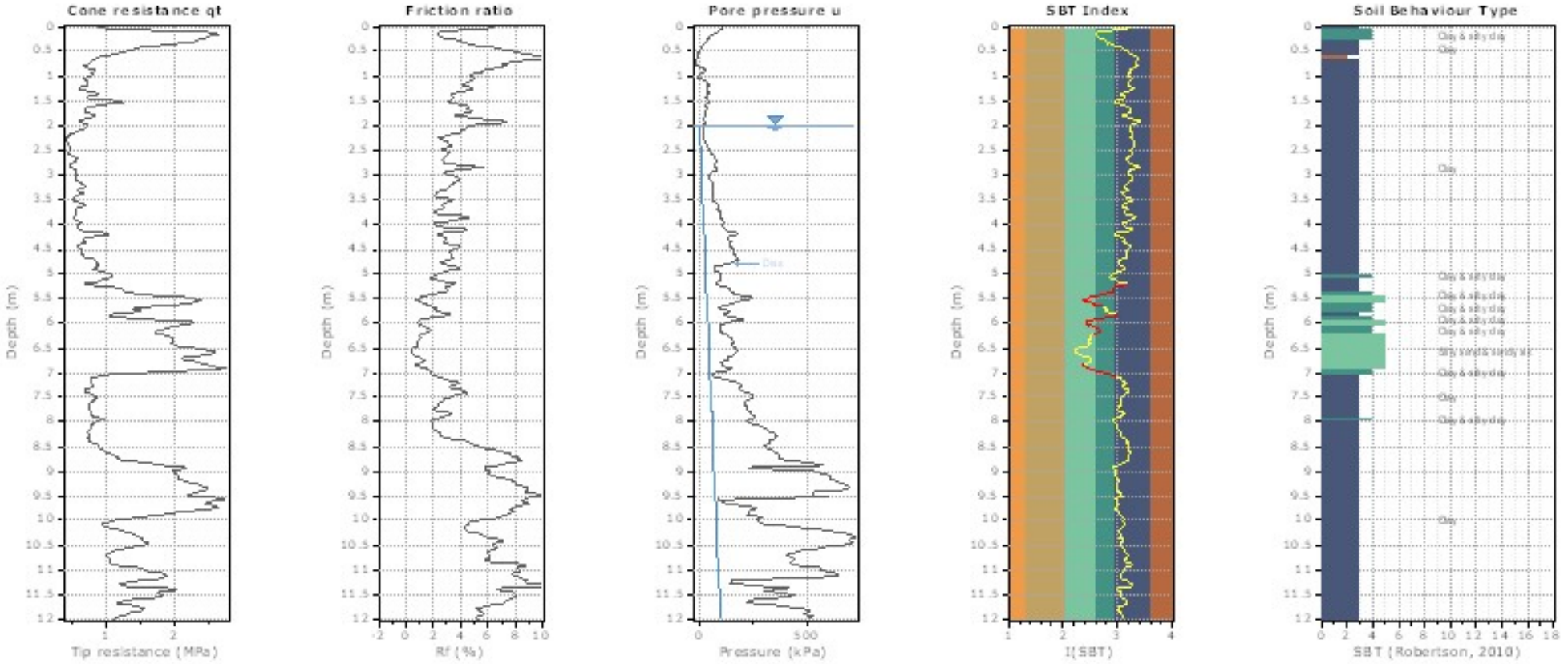
-

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU06

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



SBT legend

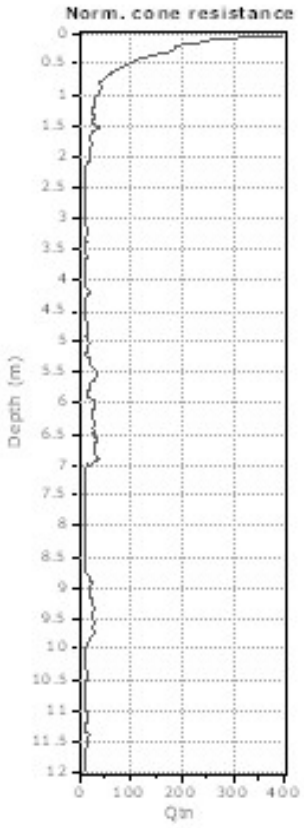
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

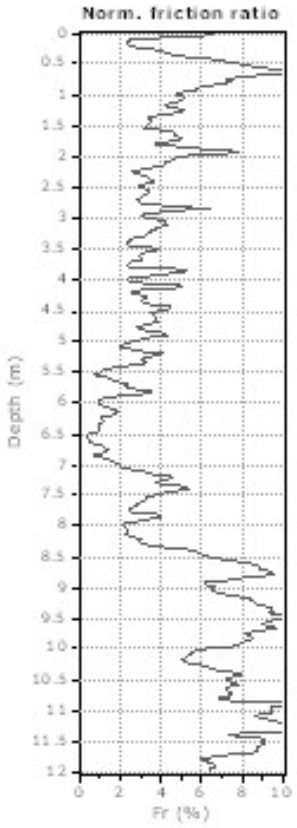
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

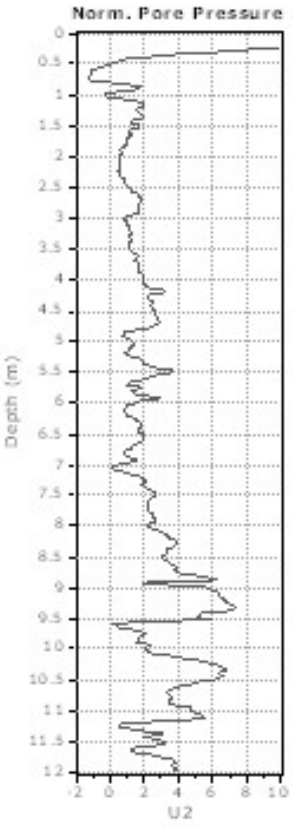
CPTU06

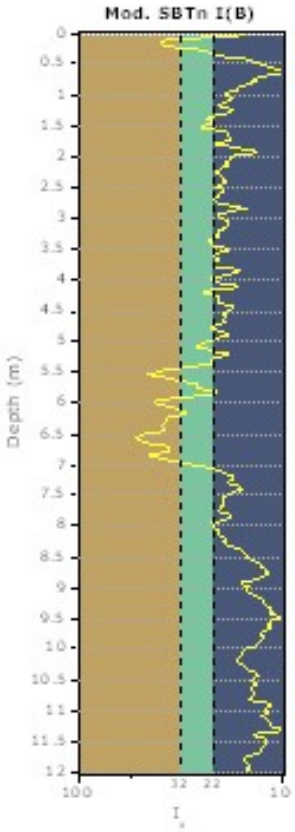
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

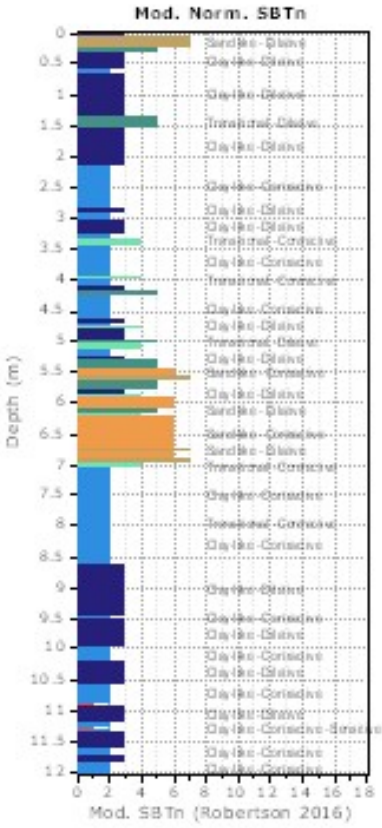
Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1











Mod. SBTn legend

- 1. CCS: ClayLike - Contractive, Sensitive
- 2. CC: Clay-like - Contractive
- 3. CD: Clay-Like: Dilative
- 4. TC: Transitional - Contractive
- 5. TD: Transitional - Dilative
- 6. SC: Sand-like - Contractive
- 7. SD: Sand-like - Dilative

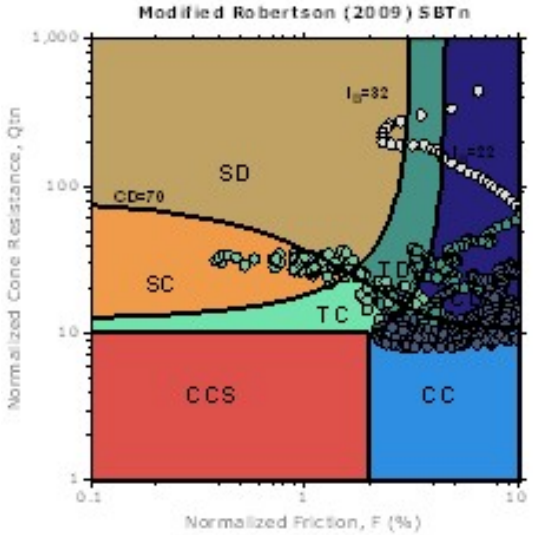
Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU06

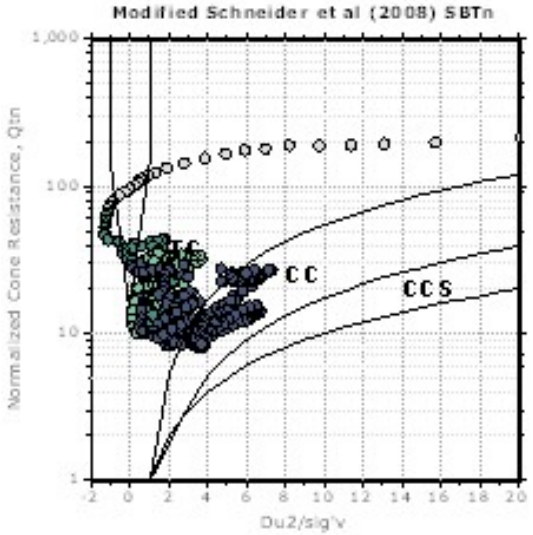
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

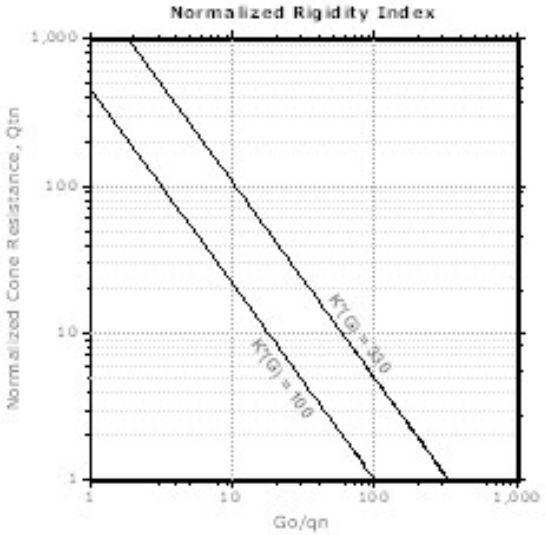
Updated SBTn plots



-



-



-

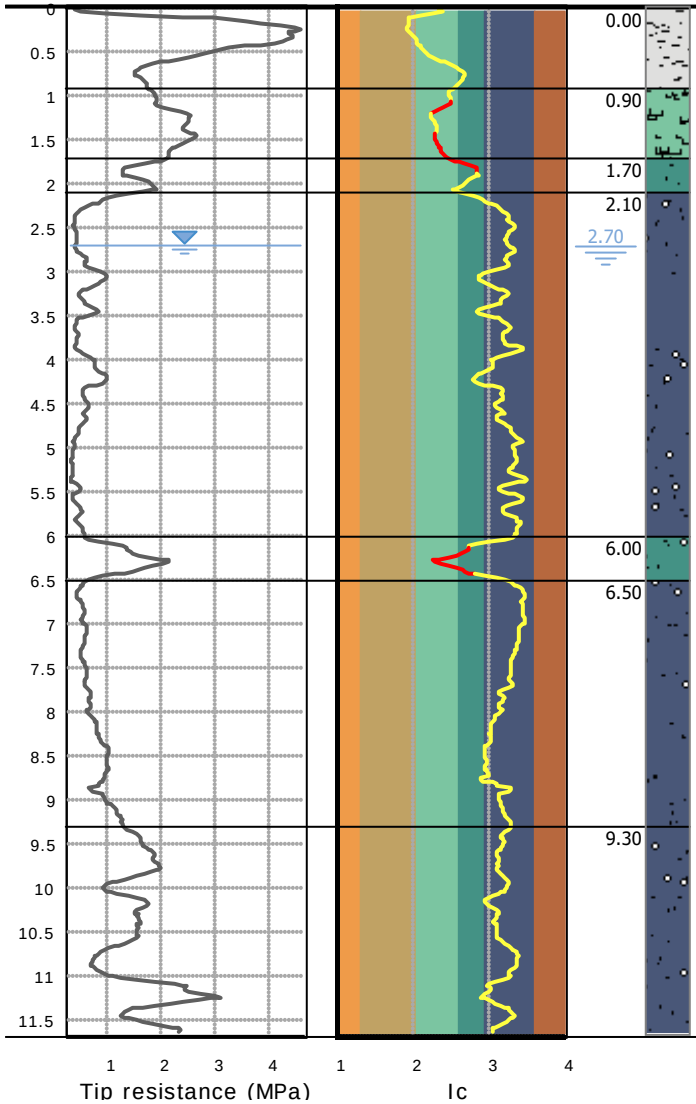
CCS: Clay-like - Contractive - Sensitive
CC: Clay-like - Contractive
CD: Clay-like - Dilative
TC: Transitional - Contractive
TD: Transitional - Dilative
SC: Sand-like - Contractive
SD: Sand-like - Dilative

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

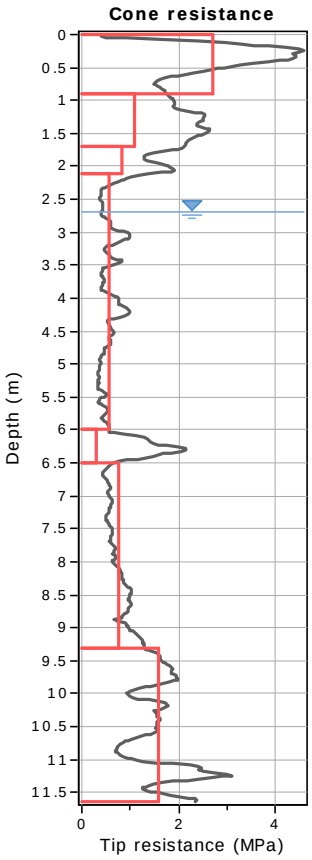
CPTU01

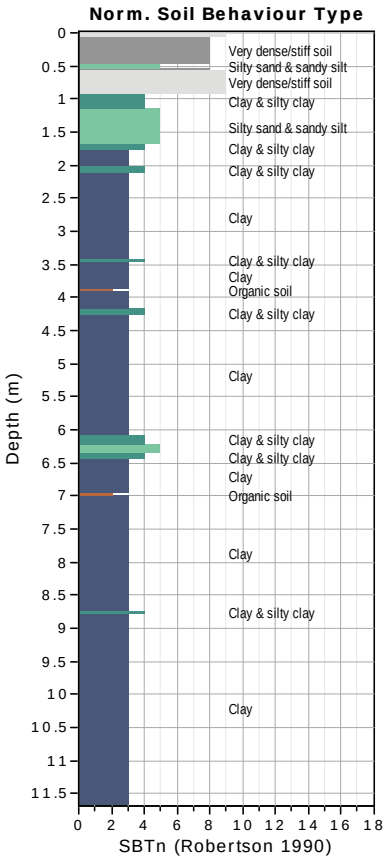
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

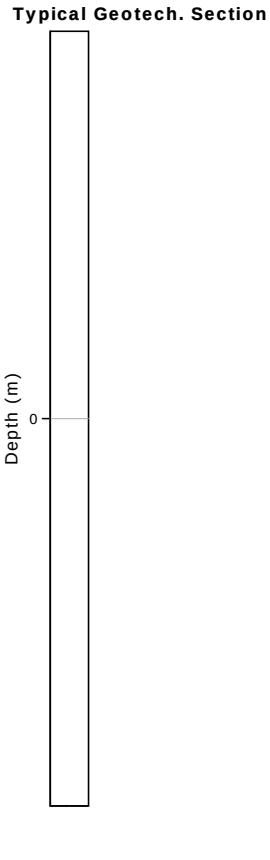
Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Depth (m)	Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
0.00	Al di sotto del terreno vegetale argille limose sovraconsolidate	2.7	3.93E-6	8.2	24.7	-	-	33.2	39.4	110.8	8.2	37.7	18.7
0.90	Limi sabbiosi mediamente addensati	1.1	6.38E-7	7.6	32.3	44.3	37.8	30.5	39.8	-	-	-	8.9
1.70	Limi argillosi consistenti	0.8	8.40E-8	7.2	32.1	-	-	23.5	44.4	119.9	2.9	13.4	8.7
2.10	Argille a bassa consistenza	0.6	4.53E-9	3.2	30.3	-	-	4.7	23.5	34.7	0.6	2.9	16.2
6.00	Limi argillosi a media-bassa consistenza	0.3	1.23E-8	4.5	-	-	-	8.1	31.0	52.9	0.7	3.4	6.2
6.50	Argille a media-bassa consistenza	0.7	3.02E-9	4.4	-	-	-	5.0	31.6	44.0	0.5	2.4	16.6
9.30	Argille da mediamente consistenti a consistenti	1.6	2.94E-9	9.0	-	-	-	17.8	66.7	99.3	1.0	4.5	18.4







Tabular results

.:: Layer No: 1 ::.

Code: Riempimento **Start depth:** 0.00 (m), **End depth:** 0.90 (m)

Description: Al di sotto del terreno vegetale argille limose sovraconsolidate

Basic results	**Estimation results**	
Total cone resistance: 2.70 ±1.24 MPa	Permeability: 3.93E-06 ±4.29E-06 m/s	Constrained Mod.: 33.16 ±12.69 MPa
Sleeve friction: 109.25 ±27.64 kPa	N60: 8.22 ±2.74 blows	Go: 39.35 ±9.94 MPa
SBT_n: 9	Es: 24.71 ±10.61 MPa	Su: 110.83 ±33.13 kPa
SBTn description: Very dense/stiff soil	Dr (%): 0.00 ±0.00	Su ratio: 8.16 ±4.33
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 37.69 ±20.00
	Unit weight: 18.67 ±0.52 kN/m³	

.:: Layer No: 2 ::.

Code: Ls **Start depth:** 0.90 (m), **End depth:** 1.70 (m)

Description: Limi sabbiosi mediamente addensati

Basic results	**Estimation results**	
Total cone resistance: 1.07 ±1.14 MPa	Permeability: 6.38E-07 ±3.96E-07 m/s	Constrained Mod.: 30.53 ±4.58 MPa
Sleeve friction: 35.83 ±38.65 kPa	N60: 7.60 ±0.60 blows	Go: 39.78 ±1.28 MPa
SBT_n: 5	Es: 32.28 ±0.88 MPa	Su: 0.00 ±0.00 kPa
SBTn description: Silty sand & sandy silt	Dr (%): 44.30 ±0.68	Su ratio: 0.00 ±0.00
	φ (degrees): 37.80 ±0.15 °	O.C.R.: 0.00 ±0.00
	Unit weight: 8.88 ±9.21 kN/m³	

.:: Layer No: 3 ::.

Code: La_c **Start depth:** 1.70 (m), **End depth:** 2.10 (m)

Description: Limi argillosi consistenti

Basic results	**Estimation results**	
Total cone resistance: 0.82 ±0.89 MPa	Permeability: 8.40E-08 ±5.34E-08 m/s	Constrained Mod.: 23.50 ±2.45 MPa
Sleeve friction: 40.31 ±45.54 kPa	N60: 7.20 ±0.79 blows	Go: 44.38 ±3.26 MPa
SBT_n: 4	Es: 32.14 ±1.84 MPa	Su: 119.91 ±12.52 kPa
SBTn description: Clay & silty clay	Dr (%): 0.00 ±0.00	Su ratio: 2.89 ±0.20
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 13.37 ±0.93
	Unit weight: 8.70 ±9.35 kN/m³	

.:: Layer No: 4 ::.

Code: A_bc **Start depth:** 2.10 (m), **End depth:** 6.00 (m)

Description: Argille a bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.56 ±0.21 MPa	Permeability: 4.53E-09 ±1.13E-08 m/s	Constrained Mod.: 4.65 ±3.86 MPa
Sleeve friction: 23.44 ±11.61 kPa	N60: 3.16 ±0.85 blows	Go: 23.51 ±4.90 MPa
SBT_n: 3	Es: 30.33 ±30.33 MPa	Su: 34.67 ±15.25 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.64 ±0.35
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.93 ±1.60
	Unit weight: 16.23 ±0.68 kN/m³	

.:: Layer No: 5 ::.

Code: La_mbc **Start depth:** 6.00 (m), **End depth:** 6.50 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.31 ±0.45 MPa	Permeability: 1.23E-08 ±1.73E-08 m/s	Constrained Mod.: 8.08 ±5.87 MPa
Sleeve friction: 10.55 ±14.19 kPa	N60: 4.50 ±0.85 blows	Go: 31.01 ±2.67 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 52.88 ±21.96 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.74 ±0.30
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.43 ±1.39
	Unit weight: 6.20 ±8.24 kN/m³	

.:: Layer No: 6 ::.

Code: A_mbc **Start depth:** 6.50 (m), **End depth:** 9.30 (m)

Description: Argille a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.75 ±0.22 MPa	Permeability: 3.02E-09 ±3.27E-09 m/s	Constrained Mod.: 4.97 ±3.15 MPa
Sleeve friction: 29.50 ±21.73 kPa	N60: 4.42 ±1.10 blows	Go: 31.63 ±8.63 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 44.00 ±14.97 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.53 ±0.15
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.43 ±0.68
	Unit weight: 16.58 ±0.62 kN/m³	

.:: Layer No: 7 ::.

Code: A_mc_c **Start depth:** 9.30 (m), **End depth:** 11.64 (m)

Description: Argille da mediamente consistenti a consistenti

Basic results	**Estimation results**	
Total cone resistance: 1.57 ±0.51 MPa	Permeability: 2.94E-09 ±2.49E-09 m/s	Constrained Mod.: 17.79 ±8.87 MPa
Sleeve friction: 111.56 ±50.30 kPa	N60: 8.96 ±2.37 blows	Go: 66.66 ±17.24 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 99.35 ±36.41 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.98 ±0.34
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.51 ±1.59
	Unit weight: 18.41 ±0.76 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU01

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.64 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00	0.90	3.93E-06	8.2	24.7	0.0	0.0	33.2	39.4	110.8	8.2	37.7	18.7
0.90		(±4.29E-06)	(±2.7)	(±10.6)	(±0.0)	(±0.0)	(±12.7)	(±9.9)	(±33.1)	(±4.3)	(±20.0)	(±0.5)
0.90	0.80	6.38E-07	7.6	32.3	44.3	37.8	30.5	39.8	0.0	0.0	0.0	8.9
1.70		(±3.96E-07)	(±0.6)	(±0.9)	(±0.7)	(±0.1)	(±4.6)	(±1.3)	(±0.0)	(±0.0)	(±0.0)	(±9.2)
1.70	0.40	8.40E-08	7.2	32.1	0.0	0.0	23.5	44.4	119.9	2.9	13.4	8.7
2.10		(±5.34E-08)	(±0.8)	(±1.8)	(±0.0)	(±0.0)	(±2.5)	(±3.3)	(±12.5)	(±0.2)	(±0.9)	(±9.3)
2.10	3.90	4.53E-09	3.2	30.3	0.0	0.0	4.7	23.5	34.7	0.6	2.9	16.2
6.00		(±1.13E-08)	(±0.9)	(±30.3)	(±0.0)	(±0.0)	(±3.9)	(±4.9)	(±15.3)	(±0.3)	(±1.6)	(±0.7)
6.00	0.50	1.23E-08	4.5	0.0	0.0	0.0	8.1	31.0	52.9	0.7	3.4	6.2
6.50		(±1.73E-08)	(±0.8)	(±0.0)	(±0.0)	(±0.0)	(±5.9)	(±2.7)	(±22.0)	(±0.3)	(±1.4)	(±8.2)
6.50	2.80	3.02E-09	4.4	0.0	0.0	0.0	5.0	31.6	44.0	0.5	2.4	16.6
9.30		(±3.27E-09)	(±1.1)	(±0.0)	(±0.0)	(±0.0)	(±3.1)	(±8.6)	(±15.0)	(±0.1)	(±0.7)	(±0.6)
9.30	2.34	2.94E-09	9.0	0.0	0.0	0.0	17.8	66.7	99.3	1.0	4.5	18.4
11.64		(±2.49E-09)	(±2.4)	(±0.0)	(±0.0)	(±0.0)	(±8.9)	(±17.2)	(±36.4)	(±0.3)	(±1.6)	(±0.8)

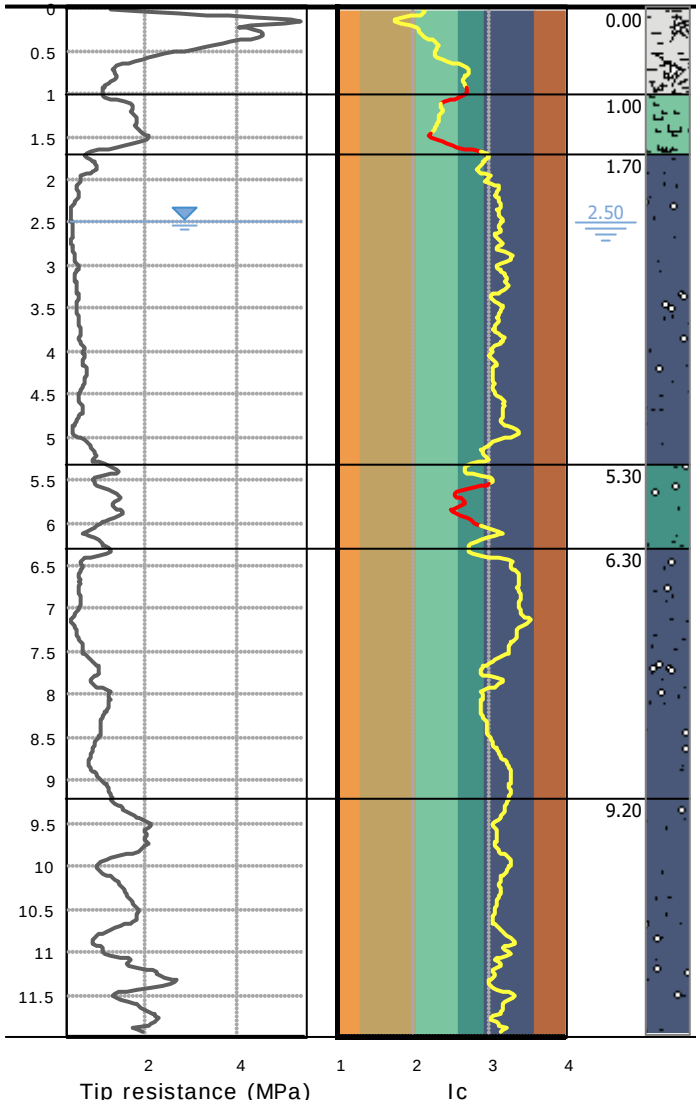
Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

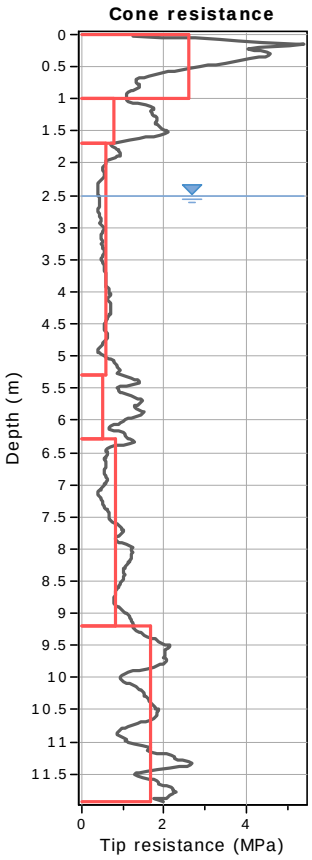
CPTU02

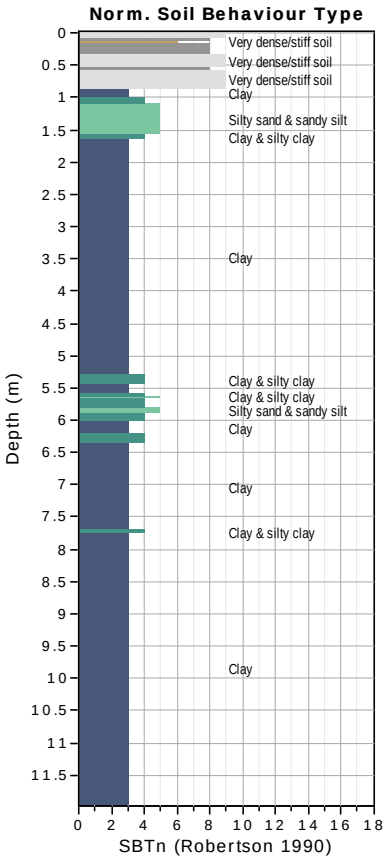
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

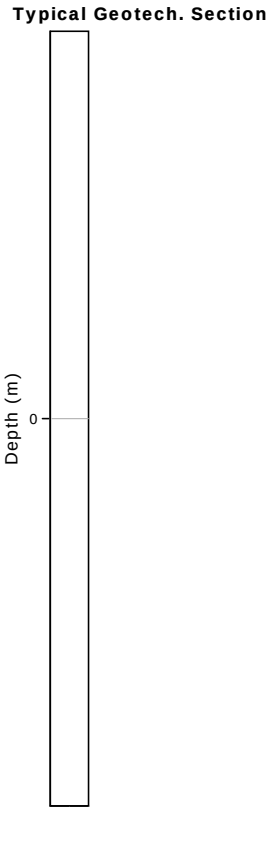
Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Depth (m)	Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
0.00	Al di sotto del terreno vegetale argille limose sovraconsolidate	2.6	3.92E-6	8.8	37.2	-	-	35.4	43.4	155.1	12.4	57.4	17.8
1.00	Limi debolmente sabbiosi mediamente addensati	0.8	7.70E-7	6.0	24.4	38.3	36.4	24.8	30.5	-	-	-	7.7
1.70	Argille a bassa consistenza	0.6	4.10E-9	3.1	-	-	-	5.3	23.2	36.5	0.8	3.5	16.3
5.30	Limi argillosi mediamente addensati	0.5	2.53E-8	5.0	-	-	-	12.0	31.5	66.2	1.0	4.6	8.2
6.30	Argille a media-bassa consistenza	0.8	5.17E-9	4.8	-	-	-	6.8	33.8	50.0	0.6	2.9	16.8
9.20	Argille da mediamente consistenti a consistenti	1.7	2.66E-9	9.4	-	-	-	19.3	70.8	105.4	1.0	4.8	18.6







Tabular results

.:: Layer No: 1 ::.

Code: 9 **Start depth:** 0.00 (m), **End depth:** 1.00 (m)

Description: Al di sotto del terreno vegetale argille limose sovraconsolidate

Basic results	**Estimation results**	
Total cone resistance: 2.62 ±1.51 MPa	Permeability: 3.92E-06 ±8.18E-06 m/s	Constrained Mod.: 35.37 ±15.66 MPa
Sleeve friction: 130.87 ±62.26 kPa	N60: 8.77 ±3.07 blows	Go: 43.39 ±11.37 MPa
SBT_n: 9	Es: 37.22 ±11.44 MPa	Su: 155.09 ±78.02 kPa
SBTn description: Very dense/stiff soil	Dr (%): 0.00 ±0.00	Su ratio: 12.42 ±10.91
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 57.38 ±50.39
	Unit weight: 17.80 ±4.58 kN/m³	

.:: Layer No: 2 ::.

Code: 5 **Start depth:** 1.00 (m), **End depth:** 1.70 (m)

Description: Limi debolmente sabbiosi mediamente addensati

Basic results	Estimation results	
Total cone resistance: 0.80 ±0.91 MPa	Permeability: 7.70E-07 ±2.95E-07 m/s	Constrained Mod.: 24.77 ±1.02 MPa
Sleeve friction: 16.28 ±18.98 kPa	N60: 6.00 ±0.00 blows	Go: 30.55 ±0.82 MPa
SBT_n: 5	Es: 24.37 ±0.66 MPa	Su: 0.00 ±0.00 kPa
SBTn description: Silty sand & sandy silt	Dr (%): 38.26 ±0.79	Su ratio: 0.00 ±0.00
	φ (degrees): 36.40 ±0.20 °	O.C.R.: 0.00 ±0.00
	Unit weight: 7.70 ±8.74 kN/m³	

.:: Layer No: 3 ::.

Code: 3 **Start depth:** 1.70 (m), **End depth:** 5.30 (m)

Description: Argille a bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.57 ±0.15 MPa	Permeability: 4.10E-09 ±3.55E-09 m/s	Constrained Mod.: 5.29 ±2.53 MPa
Sleeve friction: 24.44 ±9.96 kPa	N60: 3.13 ±0.66 blows	Go: 23.19 ±3.79 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 36.47 ±9.83 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.75 ±0.29
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.48 ±1.32
	Unit weight: 16.28 ±1.30 kN/m³	

.:: Layer No: 4 ::.

Code: 4 **Start depth:** 5.30 (m), **End depth:** 6.30 (m)

Description: Limi argillosi mediamente addensati

Basic results	Estimation results	
Total cone resistance: 0.50 ±0.54 MPa	Permeability: 2.53E-08 ±2.18E-08 m/s	Constrained Mod.: 12.00 ±4.27 MPa
Sleeve friction: 13.32 ±14.48 kPa	N60: 4.96 ±0.61 blows	Go: 31.47 ±2.54 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 66.15 ±16.22 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.99 ±0.25
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.58 ±1.16
	Unit weight: 8.21 ±8.46 kN/m³	

.:: Layer No: 5 ::.

Code: 3 **Start depth:** 6.30 (m), **End depth:** 9.20 (m)

Description: Argille a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.83 ±0.26 MPa	Permeability: 5.17E-09 ±7.84E-09 m/s	Constrained Mod.: 6.76 ±4.24 MPa
Sleeve friction: 34.22 ±21.56 kPa	N60: 4.77 ±1.13 blows	Go: 33.78 ±8.47 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 49.99 ±17.72 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.62 ±0.20
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.88 ±0.95
	Unit weight: 16.83 ±0.56 kN/m³	

.:: Layer No: 6 ::.

Code: 3 **Start depth:** 9.20 (m), **End depth:** 11.93 (m)

Description: Argille da mediamente consistenti a consistenti

Basic results	**Estimation results**	
Total cone resistance: 1.66 ±0.43 MPa	Permeability: 2.66E-09 ±1.38E-09 m/s	Constrained Mod.: 19.34 ±7.70 MPa
Sleeve friction: 124.66 ±50.13 kPa	N60: 9.36 ±2.10 blows	Go: 70.78 ±15.82 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 105.43 ±30.75 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 1.04 ±0.30
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.80 ±1.37
	Unit weight: 18.61 ±0.65 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU02

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.93 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00	1.00	3.92E-06	8.8	37.2	0.0	0.0	35.4	43.4	155.1	12.4	57.4	17.8
1.00		(±8.18E-06)	(±3.1)	(±11.4)	(±0.0)	(±0.0)	(±15.7)	(±11.4)	(±78.0)	(±10.9)	(±50.4)	(±4.6)
1.00	0.70	7.70E-07	6.0	24.4	38.3	36.4	24.8	30.5	0.0	0.0	0.0	7.7
1.70		(±2.95E-07)	(±0.0)	(±0.7)	(±0.8)	(±0.2)	(±1.0)	(±0.8)	(±0.0)	(±0.0)	(±0.0)	(±8.7)
1.70	3.60	4.10E-09	3.1	0.0	0.0	0.0	5.3	23.2	36.5	0.8	3.5	16.3
5.30		(±3.55E-09)	(±0.7)	(±0.0)	(±0.0)	(±0.0)	(±2.5)	(±3.8)	(±9.8)	(±0.3)	(±1.3)	(±1.3)
5.30	1.00	2.53E-08	5.0	0.0	0.0	0.0	12.0	31.5	66.2	1.0	4.6	8.2
6.30		(±2.18E-08)	(±0.6)	(±0.0)	(±0.0)	(±0.0)	(±4.3)	(±2.5)	(±16.2)	(±0.3)	(±1.2)	(±8.5)
6.30	2.90	5.17E-09	4.8	0.0	0.0	0.0	6.8	33.8	50.0	0.6	2.9	16.8
9.20		(±7.84E-09)	(±1.1)	(±0.0)	(±0.0)	(±0.0)	(±4.2)	(±8.5)	(±17.7)	(±0.2)	(±0.9)	(±0.6)
9.20	2.73	2.66E-09	9.4	0.0	0.0	0.0	19.3	70.8	105.4	1.0	4.8	18.6
11.93		(±1.38E-09)	(±2.1)	(±0.0)	(±0.0)	(±0.0)	(±7.7)	(±15.8)	(±30.7)	(±0.3)	(±1.4)	(±0.6)

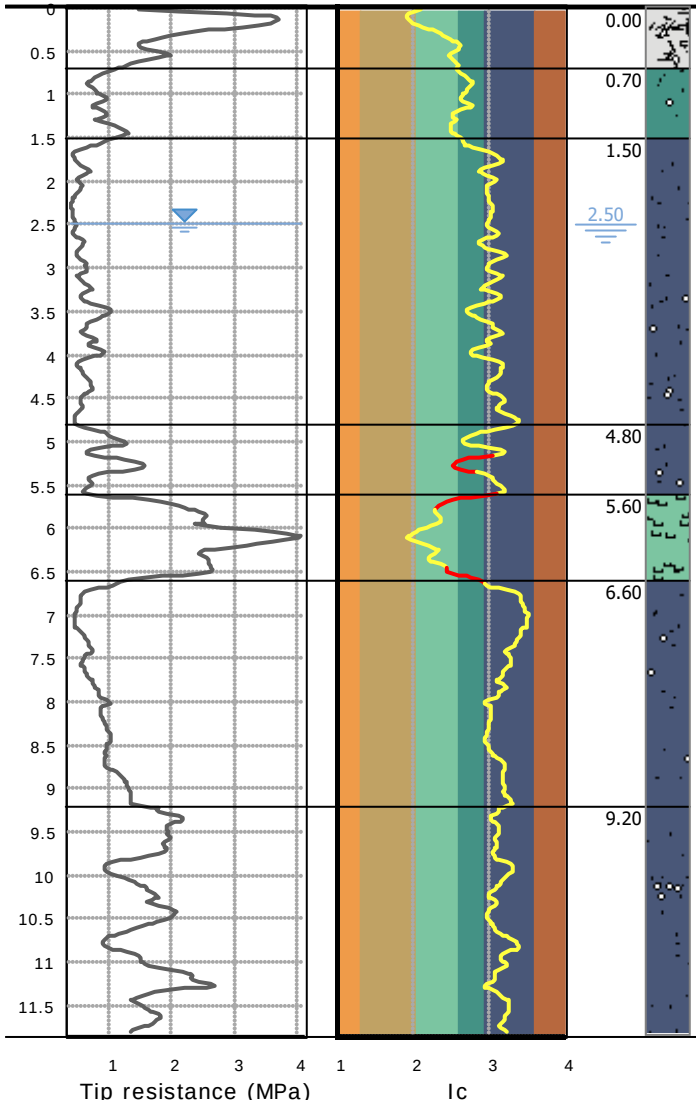
Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

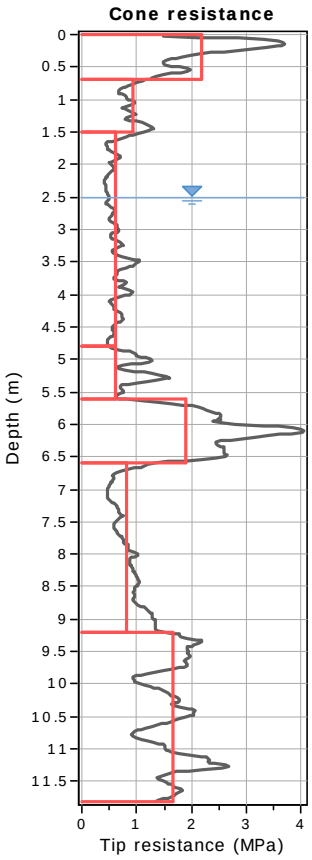
CPTU03

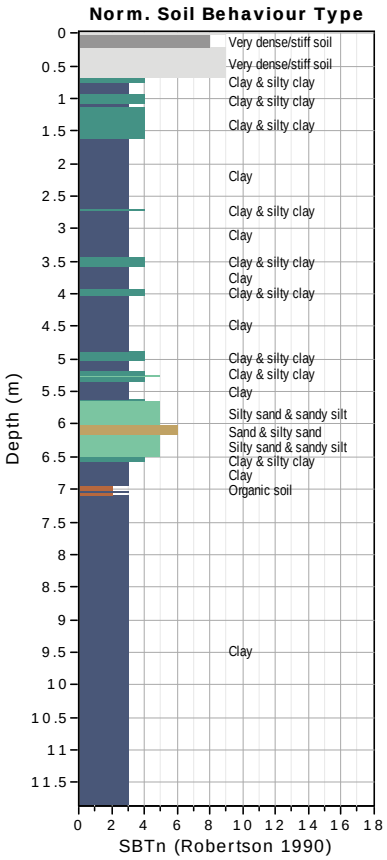
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

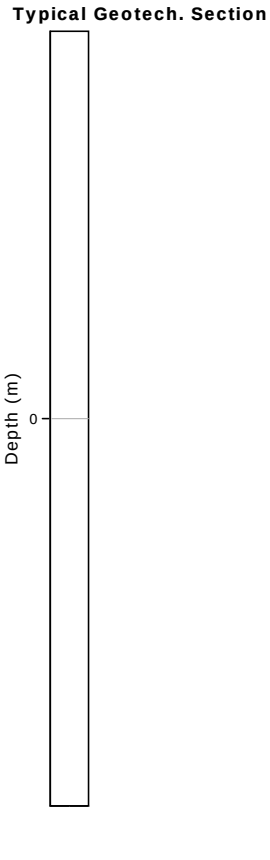
Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Depth (m)	Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
0.00	Al di sotto del terreno vegetale argille limose sovraconsolidate	2.2	2.97E-6	7.1	28.8	-	-	27.9	36.3	124.9	10.8	49.8	18.8
0.70	Limi argillosi a media-bassa consistenza	0.9	1.06E-7	3.7	18.8	-	-	12.7	22.8	65.0	2.7	12.3	17.0
1.50	Argille a bassa consistenza	0.6	1.03E-8	3.1	-	-	-	6.7	22.7	40.0	0.9	4.1	16.4
4.80	Limi argillosi a media-bassa consistenza	0.6	1.47E-8	4.2	-	-	-	8.6	29.2	52.3	0.9	3.9	12.2
5.60	Limi sabbiosi sciolti	1.9	2.68E-6	8.9	33.1	32.5	34.8	35.9	41.1	-	-	-	11.3
6.60	Argille a media-bassa consistenza	0.8	2.87E-9	4.9	-	-	-	6.9	36.6	51.2	0.6	2.9	16.5
9.20	Argille da mediamente consistenti a consistenti	1.7	3.19E-9	9.3	-	-	-	19.5	70.0	106.1	1.1	4.9	18.6







Tabular results

.:: Layer No: 1 ::.

Code: 9 **Start depth:** 0.00 (m), **End depth:** 0.70 (m)

Description: Al di sotto del terreno vegetale argille limose sovraconsolidate

Basic results	**Estimation results**	
Total cone resistance: 2.20 ±0.83 MPa	Permeability: 2.97E-06 ±4.58E-06 m/s	Constrained Mod.: 27.91 ±7.96 MPa
Sleeve friction: 122.40 ±25.33 kPa	N60: 7.06 ±1.63 blows	Go: 36.32 ±5.22 MPa
SBT_n: 9	Es: 28.81 ±4.39 MPa	Su: 124.92 ±29.36 kPa
SBTn description: Very dense/stiff soil	Dr (%): 0.00 ±0.00	Su ratio: 10.77 ±7.36
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 49.77 ±33.99
	Unit weight: 18.77 ±0.31 kN/m³	

.:: Layer No: 2 ::.

Code: 4 **Start depth:** 0.70 (m), **End depth:** 1.50 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.93 ±0.18 MPa	Permeability: 1.06E-07 ±6.48E-08 m/s	Constrained Mod.: 12.74 ±2.53 MPa
Sleeve friction: 36.60 ±10.82 kPa	N60: 3.73 ±0.74 blows	Go: 22.77 ±2.77 MPa
SBT_n: 4	Es: 18.81 ±3.00 MPa	Su: 65.01 ±12.91 kPa
SBTn description: Clay & silty clay	Dr (%): 0.00 ±0.00	Su ratio: 2.66 ±0.54
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 12.30 ±2.50
	Unit weight: 17.04 ±0.37 kN/m³	

.:: Layer No: 3 ::.

Code: 3 **Start depth:** 1.50 (m), **End depth:** 4.80 (m)

Description: Argille a bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.61 ±0.15 MPa	Permeability: 1.03E-08 ±1.48E-08 m/s	Constrained Mod.: 6.67 ±2.71 MPa
Sleeve friction: 23.75 ±6.58 kPa	N60: 3.10 ±0.63 blows	Go: 22.73 ±3.29 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 40.02 ±10.44 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.89 ±0.30
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.12 ±1.37
	Unit weight: 16.39 ±0.38 kN/m³	

.:: Layer No: 4 ::.

Code: 3 **Start depth:** 4.80 (m), **End depth:** 5.60 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.60 ±0.41 MPa	Permeability: 1.47E-08 ±2.15E-08 m/s	Constrained Mod.: 8.61 ±4.29 MPa
Sleeve friction: 21.04 ±13.99 kPa	N60: 4.23 ±0.57 blows	Go: 29.18 ±2.30 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 52.34 ±15.90 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.85 ±0.25
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.93 ±1.18
	Unit weight: 12.25 ±7.51 kN/m³	

.:: Layer No: 5 ::.

Code: 5 **Start depth:** 5.60 (m), **End depth:** 6.60 (m)

Description: Limi sabbiosi sciolti

Basic results	Estimation results	
Total cone resistance: 1.89 ±1.46 MPa	Permeability: 2.68E-06 ±3.33E-06 m/s	Constrained Mod.: 35.91 ±6.67 MPa
Sleeve friction: 16.00 ±13.65 kPa	N60: 8.85 ±1.26 blows	Go: 41.08 ±4.24 MPa
SBT_n: 5	Es: 33.14 ±2.67 MPa	Su: 0.00 ±0.00 kPa
SBTn description: Silty sand & sandy silt	Dr (%): 32.48 ±2.77	Su ratio: 0.00 ±0.00
	φ (degrees): 34.81 ±0.79 °	O.C.R.: 0.00 ±0.00
	Unit weight: 11.31 ±8.08 kN/m³	

.:: Layer No: 6 ::.

Code: 5 **Start depth:** 6.60 (m), **End depth:** 9.20 (m)

Description: Argille a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.82 ±0.30 MPa	Permeability: 2.87E-09 ±2.71E-09 m/s	Constrained Mod.: 6.94 ±4.35 MPa
Sleeve friction: 41.36 ±32.71 kPa	N60: 4.94 ±1.42 blows	Go: 36.55 ±11.64 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 51.17 ±18.19 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.63 ±0.19
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.90 ±0.87
	Unit weight: 16.49 ±3.02 kN/m³	

.:: Layer No: 7 ::.

Code: 3 **Start depth:** 9.20 (m), **End depth:** 11.81 (m)

Description: Argille da mediamente consistenti a consistenti

Basic results	**Estimation results**	
Total cone resistance: 1.66 ±0.40 MPa	Permeability: 3.19E-09 ±2.07E-09 m/s	Constrained Mod.: 19.46 ±7.16 MPa
Sleeve friction: 120.75 ±44.31 kPa	N60: 9.27 ±1.85 blows	Go: 70.04 ±13.49 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 106.08 ±28.28 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 1.05 ±0.29
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.87 ±1.36
	Unit weight: 18.60 ±0.54 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU03

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.81 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00	0.70	2.97E-06	7.1	28.8	0.0	0.0	27.9	36.3	124.9	10.8	49.8	18.8
0.70		(±4.58E-06)	(±1.6)	(±4.4)	(±0.0)	(±0.0)	(±8.0)	(±5.2)	(±29.4)	(±7.4)	(±34.0)	(±0.3)
0.70	0.80	1.06E-07	3.7	18.8	0.0	0.0	12.7	22.8	65.0	2.7	12.3	17.0
1.50		(±6.48E-08)	(±0.7)	(±3.0)	(±0.0)	(±0.0)	(±2.5)	(±2.8)	(±12.9)	(±0.5)	(±2.5)	(±0.4)
1.50	3.30	1.03E-08	3.1	0.0	0.0	0.0	6.7	22.7	40.0	0.9	4.1	16.4
4.80		(±1.48E-08)	(±0.6)	(±0.0)	(±0.0)	(±0.0)	(±2.7)	(±3.3)	(±10.4)	(±0.3)	(±1.4)	(±0.4)
4.80	0.80	1.47E-08	4.2	0.0	0.0	0.0	8.6	29.2	52.3	0.9	3.9	12.2
5.60		(±2.15E-08)	(±0.6)	(±0.0)	(±0.0)	(±0.0)	(±4.3)	(±2.3)	(±15.9)	(±0.3)	(±1.2)	(±7.5)
5.60	1.00	2.68E-06	8.9	33.1	32.5	34.8	35.9	41.1	0.0	0.0	0.0	11.3
6.60		(±3.33E-06)	(±1.3)	(±2.7)	(±2.8)	(±0.8)	(±6.7)	(±4.2)	(±0.0)	(±0.0)	(±0.0)	(±8.1)
6.60	2.60	2.87E-09	4.9	0.0	0.0	0.0	6.9	36.6	51.2	0.6	2.9	16.5
9.20		(±2.71E-09)	(±1.4)	(±0.0)	(±0.0)	(±0.0)	(±4.3)	(±11.6)	(±18.2)	(±0.2)	(±0.9)	(±3.0)
9.20	2.61	3.19E-09	9.3	0.0	0.0	0.0	19.5	70.0	106.1	1.1	4.9	18.6
11.81		(±2.07E-09)	(±1.9)	(±0.0)	(±0.0)	(±0.0)	(±7.2)	(±13.5)	(±28.3)	(±0.3)	(±1.4)	(±0.5)

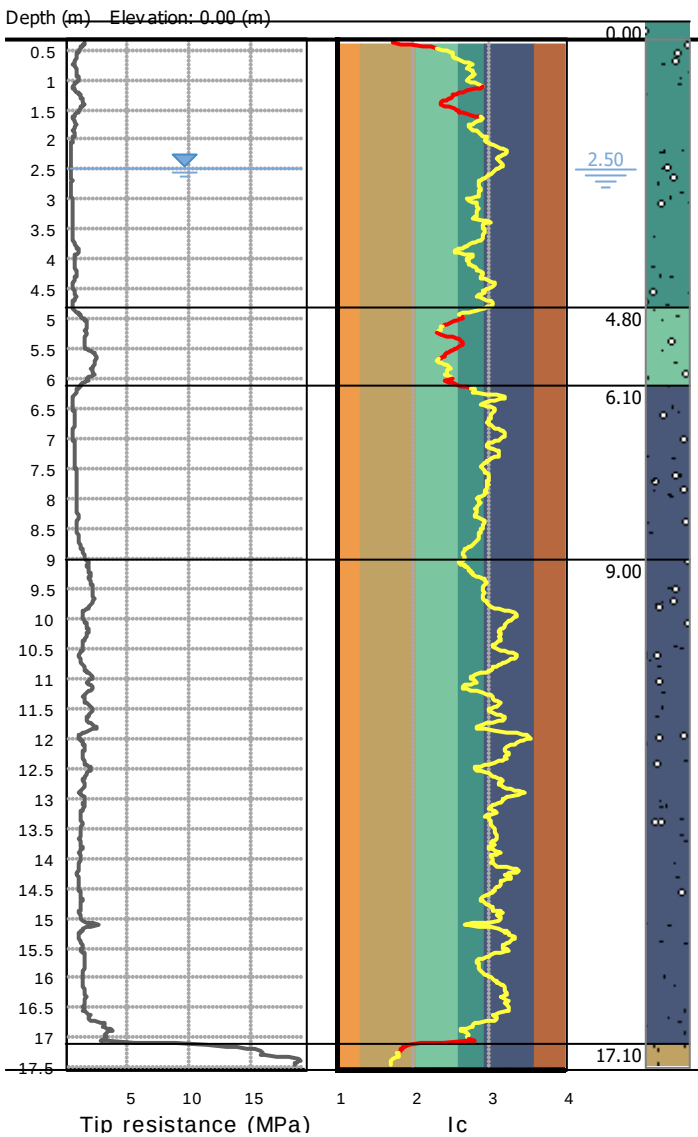
Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

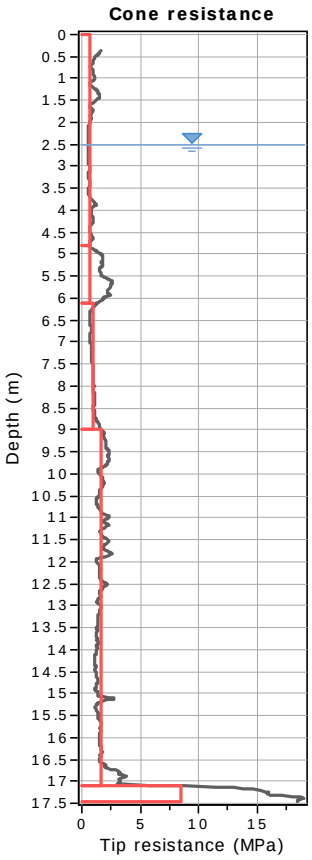
CPTU04

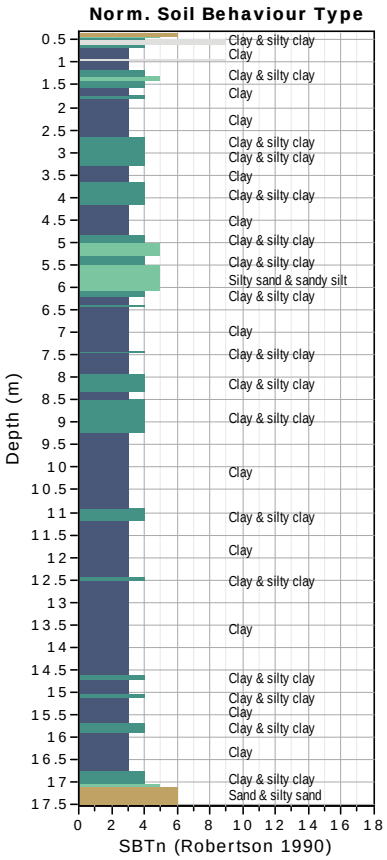
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Total depth: 17.45 m, Date: 20/04/2017

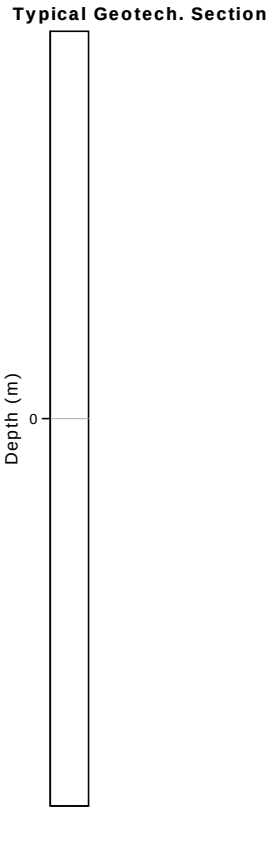
Location: **Medolla**
Cone Type: Tecnopenta - G1 CPLS D1



Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
Al di sotto del terreno vegetale limi argillosi a media-bassa consistenza	0.6	2.93E-8	3.5	18.4	-	-	8.9	23.1	48.8	1.5	6.9	19.0
Limi argillosi debolmente sabbiosi a media-bassa consistenza	0.7	2.85E-7	6.5	-	-	-	23.0	35.4	62.8	1.1	4.9	7.1
Argille limose a media-bassa consistenza	0.9	1.43E-8	4.6	-	-	-	8.6	29.7	57.2	0.7	3.4	15.8
Argille debolmente limose da mediamente consistenti a consistenti	1.7	1.01E-8	8.9	-	-	-	17.0	62.3	103.3	0.9	4.2	17.9
Sabbie da mediamente addensate ad addensate	8.4	4.36E-5	40.9	116.0	62.2	41.0	145.4	145.4	-	-	-	9.4







Tabular results

.:: Layer No: 1 ::.

Code: 4 **Start depth:** 0.00 (m), **End depth:** 4.80 (m)

Description: Al di sotto del terreno vegetale limi argillosi a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.62 ±0.31 MPa	Permeability: 2.93E-08 ±4.37E-08 m/s	Constrained Mod.: 8.90 ±3.07 MPa
Sleeve friction: 25.34 ±21.93 kPa	N60: 3.52 ±0.59 blows	Go: 23.14 ±3.72 MPa
SBT_n: 3	Es: 18.42 ±1.28 MPa	Su: 48.81 ±12.95 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 1.50 ±1.20
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 6.91 ±5.56
	Unit weight: 14.00 ±6.01 kN/m³	

.:: Layer No: 2 ::.

Code: 5 **Start depth:** 4.80 (m), **End depth:** 6.10 (m)

Description: Limi argillosi debolmente sabbiosi a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.74 ±0.96 MPa	Permeability: 2.85E-07 ±2.24E-07 m/s	Constrained Mod.: 22.99 ±9.08 MPa
Sleeve friction: 11.36 ±15.34 kPa	N60: 6.54 ±1.99 blows	Go: 35.40 ±8.87 MPa
SBT_n: 4	Es: 0.00 ±0.00 MPa	Su: 62.78 ±18.86 kPa
SBTn description: Clay & silty clay	Dr (%): 0.00 ±0.00	Su ratio: 1.05 ±0.28
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.87 ±1.31
	Unit weight: 7.14 ±8.40 kN/m³	

.:: Layer No: 3 ::.

Code: 3 **Start depth:** 6.10 (m), **End depth:** 9.00 (m)

Description: Argille limose a media-bassa consistenza

Basic results	Estimation results	
Total cone resistance: 0.89 ±0.27 MPa	Permeability: 1.43E-08 ±1.59E-08 m/s	Constrained Mod.: 8.57 ±3.63 MPa
Sleeve friction: 20.04 ±6.05 kPa	N60: 4.65 ±0.70 blows	Go: 29.66 ±3.20 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 57.15 ±14.39 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.75 ±0.14
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.45 ±0.64
	Unit weight: 15.85 ±3.01 kN/m³	

.:: Layer No: 4 ::.

Code: 3 **Start depth:** 9.00 (m), **End depth:** 17.10 (m)

Description: Argille debolmente limose da mediamente consistenti a consistenti

Basic results	Estimation results	
Total cone resistance: 1.66 ±0.49 MPa	Permeability: 1.01E-08 ±1.70E-08 m/s	Constrained Mod.: 16.97 ±8.93 MPa
Sleeve friction: 80.34 ±49.26 kPa	N60: 8.91 ±1.82 blows	Go: 62.29 ±14.11 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 103.28 ±33.95 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.91 ±0.35
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.18 ±1.63
	Unit weight: 17.86 ±1.73 kN/m³	

.:: Layer No: 5 ::.

Code: 6 **Start depth:** 17.10 (m), **End depth:** 17.45 (m)

Description: Sabbie da mediamente addensate ad addensate

Basic results	Estimation results	
Total cone resistance: 8.45 ±9.18 MPa	Permeability: 4.36E-05 ±1.47E-05 m/s	Constrained Mod.: 145.44 ±5.08 MPa
Sleeve friction: 68.32 ±74.77 kPa	N60: 40.89 ±1.83 blows	Go: 145.44 ±5.08 MPa
SBT_n: 6	Es: 116.05 ±4.05 MPa	Su: 0.00 ±0.00 kPa
SBTn description: Sand & silty sand	Dr (%): 62.22 ±2.36	Su ratio: 0.00 ±0.00
	φ (degrees): 41.04 ±0.37 °	O.C.R.: 0.00 ±0.00
	Unit weight: 9.38 ±10.16 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU04

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 17.45 m, Date: 20/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00	4.80	2.93E-08	3.5	18.4	0.0	0.0	8.9	23.1	48.8	1.5	6.9	14.0
4.80		(±4.37E-08)	(±0.6)	(±1.3)	(±0.0)	(±0.0)	(±3.1)	(±3.7)	(±12.9)	(±1.2)	(±5.6)	(±6.0)
4.80	1.30	2.85E-07	6.5	0.0	0.0	0.0	23.0	35.4	62.8	1.1	4.9	7.1
6.10		(±2.24E-07)	(±2.0)	(±0.0)	(±0.0)	(±0.0)	(±9.1)	(±8.9)	(±18.9)	(±0.3)	(±1.3)	(±8.4)
6.10	2.90	1.43E-08	4.6	0.0	0.0	0.0	8.6	29.7	57.2	0.7	3.4	15.8
9.00		(±1.59E-08)	(±0.7)	(±0.0)	(±0.0)	(±0.0)	(±3.6)	(±3.2)	(±14.4)	(±0.1)	(±0.6)	(±3.0)
9.00	8.10	1.01E-08	8.9	0.0	0.0	0.0	17.0	62.3	103.3	0.9	4.2	17.9
17.10		(±1.70E-08)	(±1.8)	(±0.0)	(±0.0)	(±0.0)	(±8.9)	(±14.1)	(±34.0)	(±0.4)	(±1.6)	(±1.7)
17.10	0.35	4.36E-05	40.9	116.0	62.2	41.0	145.4	145.4	0.0	0.0	0.0	9.4
17.45		(±1.47E-05)	(±1.8)	(±4.1)	(±2.4)	(±0.4)	(±5.1)	(±5.1)	(±0.0)	(±0.0)	(±0.0)	(±10.2)

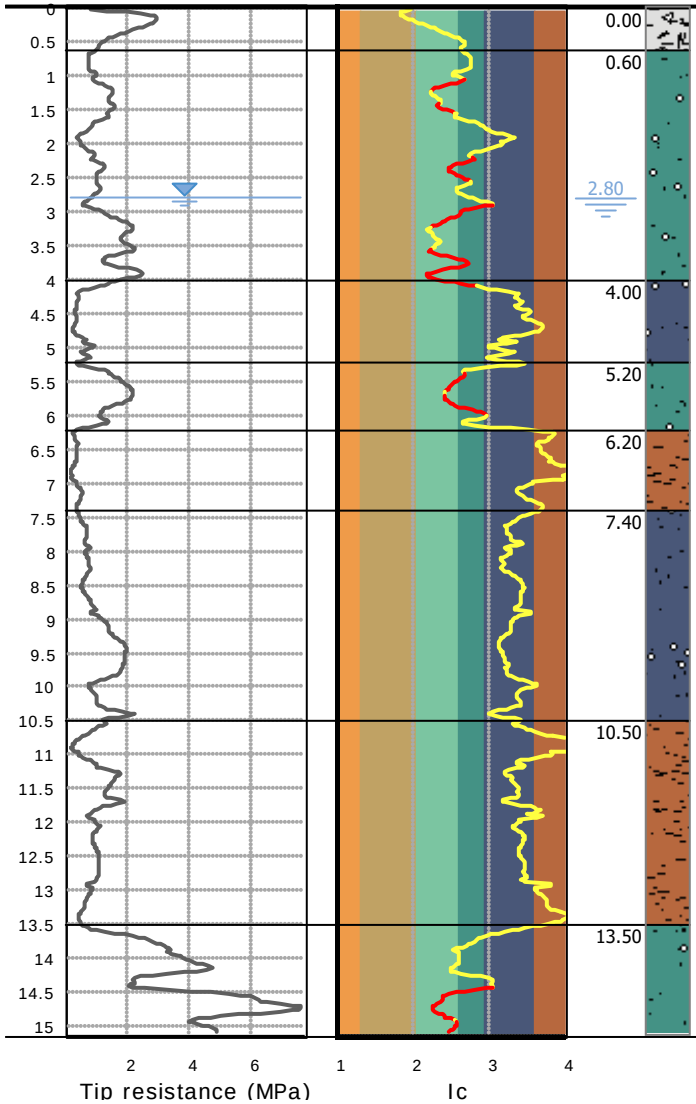
Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

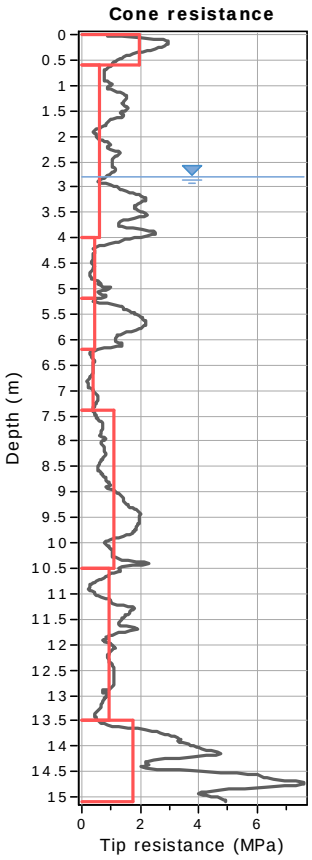
CPTU05

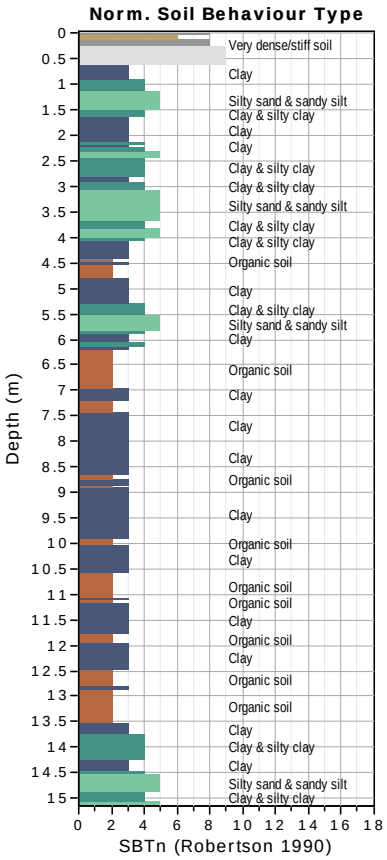
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

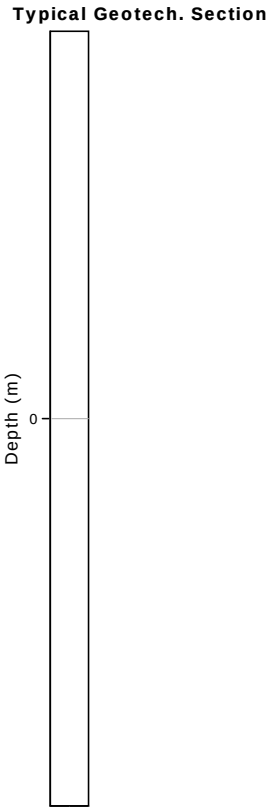
Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Depth (m)	Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
0.00	Al di sotto del terreno vegetale argille limose sovraconsolidate	2.0	5.51E-6	6.2	29.3	-	-	24.3	30.8	111.7	9.0	41.4	18.4
0.60	Limi argillosi debolmente sabbiosi a media-bassa consistenza	0.6	2.80E-7	4.3	20.9	-	-	14.5	25.9	57.8	2.0	9.4	9.4
4.00	Argille a bassa consistenza	0.4	1.60E-9	3.1	-	-	-	3.2	24.4	29.3	0.5	2.2	14.5
5.20	Limi argillosi a media-bassa consistenza	0.4	6.45E-8	5.0	-	-	-	12.7	30.8	62.4	0.9	4.1	6.8
6.20	Argille organiche a bassa consistenza	0.4	3.34E-10	3.0	-	-	-	1.0	23.7	18.2	0.2	1.1	16.3
7.40	Argille a media-bassa consistenza	1.1	1.21E-9	6.7	-	-	-	10.3	54.0	67.1	0.7	3.3	17.9
10.50	Alternanze di livelli di argille e argille organiche a media-bassa consistenza	1.0	5.69E-10	6.8	-	-	-	6.1	55.0	53.5	0.5	2.1	17.9
13.50	Limi argillosi consistenti	1.8	6.88E-8	12.5	69.8	-	-	35.8	76.7	187.0	1.4	6.6	11.2







Tabular results

.:: Layer No: 1 ::.

Code: 9 **Start depth:** 0.00 (m), **End depth:** 0.60 (m)

Description: Al di sotto del terreno vegetale argille limose sovraconsolidate

Basic results	Estimation results	
Total cone resistance: 1.97 ±0.73 MPa	Permeability: 5.51E-06 ±7.80E-06 m/s	Constrained Mod.: 24.29 ±8.26 MPa
Sleeve friction: 96.37 ±35.22 kPa	N60: 6.17 ±1.68 blows	Go: 30.83 ±7.23 MPa
SBT_n: 9	Es: 29.34 ±0.99 MPa	Su: 111.69 ±35.16 kPa
SBTn description: Very dense/stiff soil	Dr (%): 0.00 ±0.00	Su ratio: 8.96 ±3.14
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 41.38 ±14.49
	Unit weight: 18.37 ±0.58 kN/m³	

.:: Layer No: 2 ::.

Code: 4 **Start depth:** 0.60 (m), **End depth:** 4.00 (m)

Description: Limi argillosi debolmente sabbiosi a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.60 ±0.64 MPa	Permeability: 2.80E-07 ±4.30E-07 m/s	Constrained Mod.: 14.50 ±6.73 MPa
Sleeve friction: 19.37 ±21.01 kPa	N60: 4.27 ±1.16 blows	Go: 25.93 ±3.55 MPa
SBT_n: 4	Es: 20.88 ±3.34 MPa	Su: 57.75 ±16.57 kPa
SBTn description: Clay & silty clay	Dr (%): 0.00 ±0.00	Su ratio: 2.04 ±1.02
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 9.42 ±4.73
	Unit weight: 9.41 ±8.45 kN/m³	

.:: Layer No: 3 ::.

Code: 4 **Start depth:** 4.00 (m), **End depth:** 5.20 (m)

Description: Argille a bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.43 ±0.23 MPa	Permeability: 1.60E-09 ±2.02E-09 m/s	Constrained Mod.: 3.22 ±2.75 MPa
Sleeve friction: 22.42 ±10.70 kPa	N60: 3.13 ±0.75 blows	Go: 24.39 ±4.05 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 29.35 ±12.45 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.48 ±0.19
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.21 ±0.90
	Unit weight: 14.50 ±5.27 kN/m³	

.:: Layer No: 4 ::.

Code: 4 **Start depth:** 5.20 (m), **End depth:** 6.20 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.45 ±0.63 MPa	Permeability: 6.45E-08 ±1.14E-07 m/s	Constrained Mod.: 12.66 ±8.43 MPa
Sleeve friction: 9.85 ±12.83 kPa	N60: 4.95 ±1.60 blows	Go: 30.76 ±6.18 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 62.43 ±27.30 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.89 ±0.38
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.13 ±1.73
	Unit weight: 6.83 ±8.25 kN/m³	

.:: Layer No: 5 ::.

Code: 2 **Start depth:** 6.20 (m), **End depth:** 7.40 (m)

Description: Argille organiche a bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.37 ±0.10 MPa	Permeability: 3.34E-10 ±1.91E-10 m/s	Constrained Mod.: 1.01 ±0.65 MPa
Sleeve friction: 25.77 ±7.76 kPa	N60: 2.98 ±0.56 blows	Go: 23.70 ±4.96 MPa
SBT_n: 2	Es: 0.00 ±0.00 MPa	Su: 18.21 ±7.14 kPa
SBTn description: Organic soil	Dr (%): 0.00 ±0.00	Su ratio: 0.24 ±0.09
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 1.11 ±0.43
	Unit weight: 16.27 ±0.48 kN/m³	

.:: Layer No: 6 ::.

Code: 3 **Start depth:** 7.40 (m), **End depth:** 10.50 (m)

Description: Argille a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 1.09 ±0.50 MPa	Permeability: 1.21E-09 ±9.59E-10 m/s	Constrained Mod.: 10.32 ±8.55 MPa
Sleeve friction: 95.78 ±69.46 kPa	N60: 6.71 ±2.75 blows	Go: 54.00 ±22.69 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 67.08 ±35.00 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.72 ±0.34
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.33 ±1.58
	Unit weight: 17.87 ±1.13 kN/m³	

.:: Layer No: 7 ::.

Code: 2 **Start depth:** 10.50 (m), **End depth:** 13.50 (m)

Description: Alternanze di livelli di argille e argille organiche a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.96 ±0.37 MPa	Permeability: 5.69E-10 ±3.34E-10 m/s	Constrained Mod.: 6.15 ±5.66 MPa
Sleeve friction: 87.79 ±44.57 kPa	N60: 6.80 ±1.90 blows	Go: 55.01 ±17.31 MPa
SBT_n: 2	Es: 0.00 ±0.00 MPa	Su: 53.54 ±27.02 kPa
SBTn description: Organic soil	Dr (%): 0.00 ±0.00	Su ratio: 0.46 ±0.25
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 2.14 ±1.13
	Unit weight: 17.94 ±0.75 kN/m³	

.:: Layer No: 8 ::.

Code: 4 **Start depth:** 13.50 (m), **End depth:** 15.09 (m)

Description: Limi argillosi consistenti

Basic results	**Estimation results**	
Total cone resistance: 1.75 ±1.68 MPa	Permeability: 6.88E-08 ±7.15E-08 m/s	Constrained Mod.: 35.76 ±18.01 MPa
Sleeve friction: 51.14 ±46.01 kPa	N60: 12.53 ±3.54 blows	Go: 76.73 ±16.91 MPa
SBT_n: 4	Es: 69.85 ±8.39 MPa	Su: 187.03 ±84.45 kPa
SBTn description: Clay & silty clay	Dr (%): 0.00 ±0.00	Su ratio: 1.43 ±0.66
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 6.61 ±3.03
	Unit weight: 11.24 ±9.01 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU05

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 15.09 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00 0.60	0.60	5.51E-06 (±7.80E-06)	6.2 (±1.7)	29.3 (±1.0)	0.0 (±0.0)	0.0 (±0.0)	24.3 (±8.3)	30.8 (±7.2)	111.7 (±35.2)	9.0 (±3.1)	41.4 (±14.5)	18.4 (±0.6)
0.60 4.00	3.40	2.80E-07 (±4.30E-07)	4.3 (±1.2)	20.9 (±3.3)	0.0 (±0.0)	0.0 (±0.0)	14.5 (±6.7)	25.9 (±3.5)	57.8 (±16.6)	2.0 (±1.0)	9.4 (±4.7)	9.4 (±8.4)
4.00 5.20	1.20	1.60E-09 (±2.02E-09)	3.1 (±0.8)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	3.2 (±2.7)	24.4 (±4.0)	29.3 (±12.5)	0.5 (±0.2)	2.2 (±0.9)	14.5 (±5.3)
5.20 6.20	1.00	6.45E-08 (±1.14E-07)	5.0 (±1.6)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	12.7 (±8.4)	30.8 (±6.2)	62.4 (±27.3)	0.9 (±0.4)	4.1 (±1.7)	6.8 (±8.2)
6.20 7.40	1.20	3.34E-10 (±1.91E-10)	3.0 (±0.6)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	1.0 (±0.6)	23.7 (±5.0)	18.2 (±7.1)	0.2 (±0.1)	1.1 (±0.4)	16.3 (±0.5)
7.40 10.50	3.10	1.21E-09 (±9.59E-10)	6.7 (±2.8)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	10.3 (±8.5)	54.0 (±22.7)	67.1 (±35.0)	0.7 (±0.3)	3.3 (±1.6)	17.9 (±1.1)
10.50 13.50	3.00	5.69E-10 (±3.34E-10)	6.8 (±1.9)	0.0 (±0.0)	0.0 (±0.0)	0.0 (±0.0)	6.1 (±5.7)	55.0 (±17.3)	53.5 (±27.0)	0.5 (±0.2)	2.1 (±1.1)	17.9 (±0.7)
13.50 15.09	1.59	6.88E-08 (±7.15E-08)	12.5 (±3.5)	69.8 (±8.4)	0.0 (±0.0)	0.0 (±0.0)	35.8 (±18.0)	76.7 (±16.9)	187.0 (±84.5)	1.4 (±0.7)	6.6 (±3.0)	11.2 (±9.0)

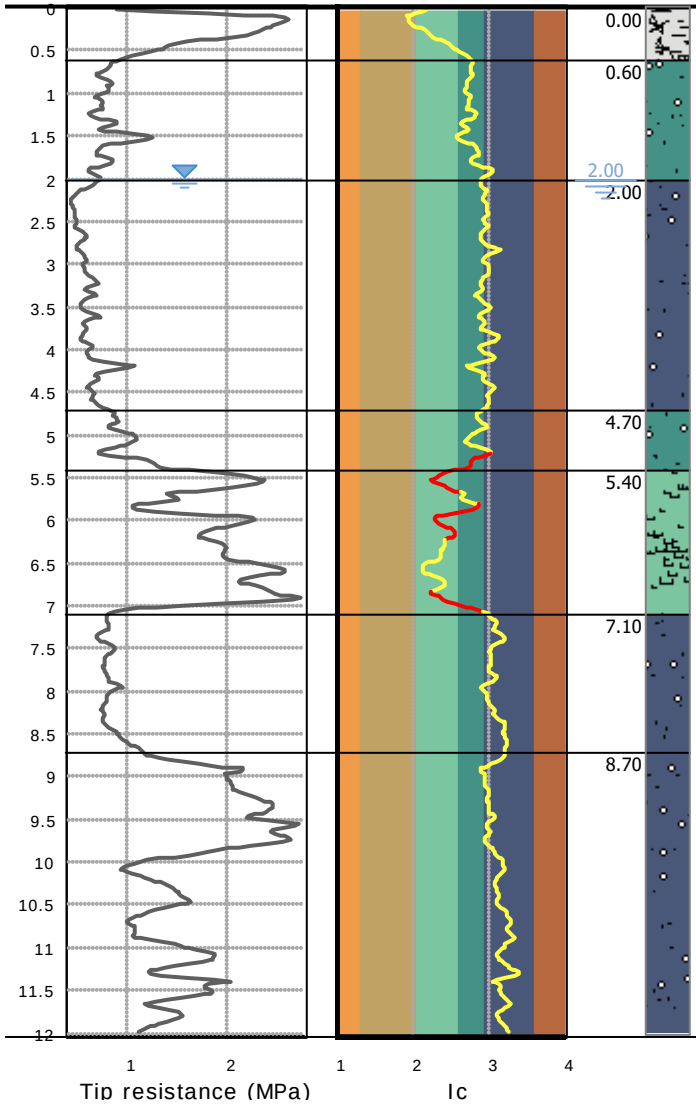
Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

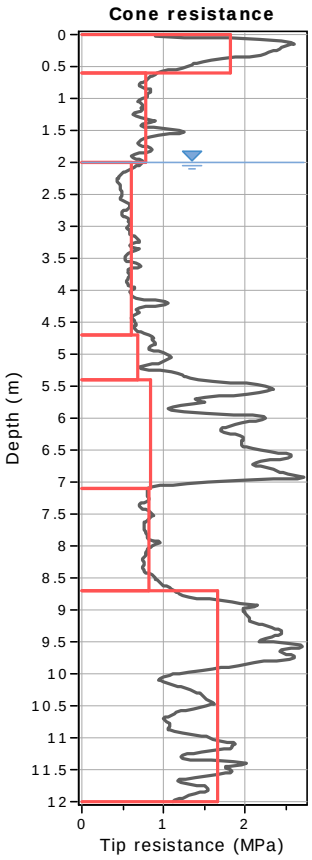
CPTU06

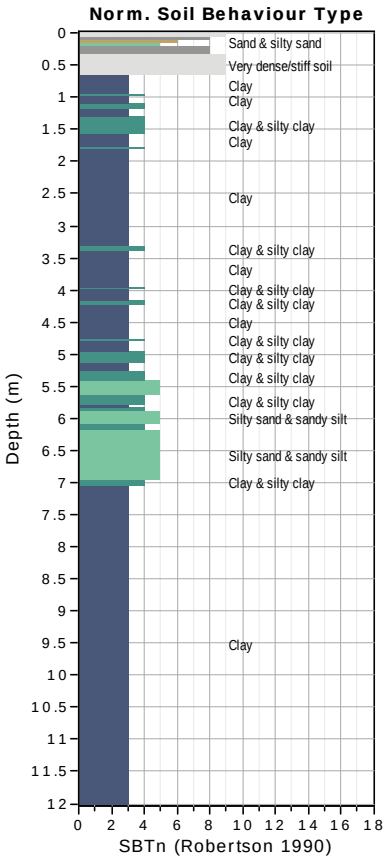
Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

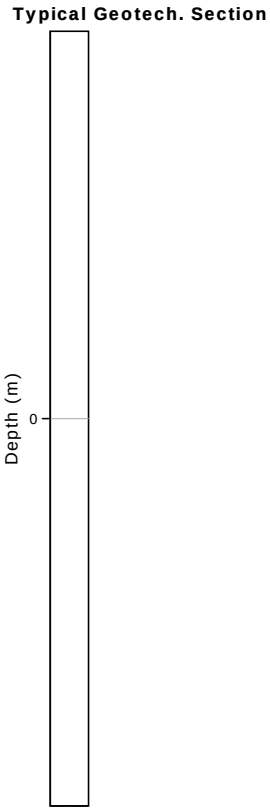
Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1



Depth (m)	Description	qt (MPa)	Ksbt (m/s)	N60	Es (MPa)	Dr	Phi (°)	M (MPa)	Go (MPa)	Su (kPa)	Su ratio	OCR	Gamma (kN/m³)
0.00	Al di sotto del terreno vegetale argille limose sovraconsolidate	1.8	3.40E-6	5.8	22.5	-	-	23.3	28.5	96.6	10.0	46.1	18.3
0.60	Limi argillosi a media-bassa consistenza	0.8	4.06E-8	3.5	22.4	-	-	10.8	23.1	54.9	2.3	10.6	17.1
2.00	Argille a bassa consistenza	0.6	1.07E-8	3.0	-	-	-	6.8	20.8	39.4	0.9	4.2	16.2
4.70	Limi argillosi a media-bassa consistenza	0.7	2.19E-8	4.2	-	-	-	11.4	27.8	59.2	1.1	5.0	12.5
5.40	Limi sabbiosi sciolti	0.8	9.51E-7	7.1	28.0	28.8	33.7	27.2	35.2	-	-	-	6.8
7.10	Argille a media-bassa consistenza	0.8	4.55E-9	4.4	-	-	-	6.6	31.5	49.7	0.7	3.1	16.5
8.70	Argille da mediamente consistenti a consistenti	1.7	3.90E-9	9.2	-	-	-	19.4	68.1	106.6	1.2	5.3	18.6







Tabular results

.:: Layer No: 1 ::.

Code: 9 **Start depth:** 0.00 (m), **End depth:** 0.60 (m)

Description: Al di sotto del terreno vegetale argille limose sovraconsolidate

Basic results	**Estimation results**	
Total cone resistance: 1.83 ±0.58 MPa	Permeability: 3.40E-06 ±4.11E-06 m/s	Constrained Mod.: 23.28 ±6.24 MPa
Sleeve friction: 82.66 ±17.24 kPa	N60: 5.77 ±1.22 blows	Go: 28.51 ±4.67 MPa
SBT_n: 9	Es: 22.49 ±5.27 MPa	Su: 96.62 ±23.87 kPa
SBTn description: Very dense/stiff soil	Dr (%): 0.00 ±0.00	Su ratio: 9.97 ±7.11
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 46.08 ±32.83
	Unit weight: 18.25 ±0.22 kN/m³	

.:: Layer No: 2 ::.

Code: 4 **Start depth:** 0.60 (m), **End depth:** 2.00 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.79 ±0.13 MPa	Permeability: 4.06E-08 ±2.63E-08 m/s	Constrained Mod.: 10.77 ±1.78 MPa
Sleeve friction: 41.02 ±15.04 kPa	N60: 3.45 ±0.58 blows	Go: 23.09 ±2.39 MPa
SBT_n: 3	Es: 22.42 ±0.39 MPa	Su: 54.94 ±9.11 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 2.30 ±0.82
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 10.63 ±3.79
	Unit weight: 17.11 ±0.35 kN/m³	

.:: Layer No: 3 ::.

Code: 3 **Start depth:** 2.00 (m), **End depth:** 4.70 (m)

Description: Argille a bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.61 ±0.11 MPa	Permeability: 1.07E-08 ±6.40E-09 m/s	Constrained Mod.: 6.84 ±1.84 MPa
Sleeve friction: 19.32 ±5.30 kPa	N60: 2.96 ±0.55 blows	Go: 20.80 ±2.95 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 39.41 ±7.42 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.90 ±0.14
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.16 ±0.65
	Unit weight: 16.16 ±0.34 kN/m³	

.:: Layer No: 4 ::.

Code: 4 **Start depth:** 4.70 (m), **End depth:** 5.40 (m)

Description: Limi argillosi a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.68 ±0.41 MPa	Permeability: 2.19E-08 ±1.47E-08 m/s	Constrained Mod.: 11.43 ±1.84 MPa
Sleeve friction: 19.23 ±11.84 kPa	N60: 4.22 ±0.42 blows	Go: 27.79 ±1.18 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 59.21 ±7.68 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 1.08 ±0.12
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 4.97 ±0.55
	Unit weight: 12.50 ±7.32 kN/m³	

.:: Layer No: 5 ::.

Code: 5 **Start depth:** 5.40 (m), **End depth:** 7.10 (m)

Description: Limi sabbiosi sciolti

Basic results	**Estimation results**	
Total cone resistance: 0.84 ±1.05 MPa	Permeability: 9.51E-07 ±9.56E-07 m/s	Constrained Mod.: 27.17 ±5.06 MPa
Sleeve friction: 8.56 ±11.80 kPa	N60: 7.06 ±0.73 blows	Go: 35.24 ±2.73 MPa
SBT_n: 5	Es: 28.04 ±2.37 MPa	Su: 0.00 ±0.00 kPa
SBTn description: Silty sand & sandy silt	Dr (%): 28.81 ±1.12	Su ratio: 0.00 ±0.00
	φ (degrees): 33.69 ±0.37 °	O.C.R.: 0.00 ±0.00
	Unit weight: 6.78 ±8.24 kN/m³	

.:: Layer No: 6 ::.

Code: 3 **Start depth:** 7.10 (m), **End depth:** 8.70 (m)

Description: Argille a media-bassa consistenza

Basic results	**Estimation results**	
Total cone resistance: 0.82 ±0.13 MPa	Permeability: 4.55E-09 ±2.83E-09 m/s	Constrained Mod.: 6.60 ±1.58 MPa
Sleeve friction: 29.27 ±17.49 kPa	N60: 4.41 ±0.74 blows	Go: 31.46 ±6.46 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 49.67 ±6.11 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 0.67 ±0.07
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 3.09 ±0.33
	Unit weight: 16.47 ±1.93 kN/m³	

.:: Layer No: 7 ::.

Code: 3 **Start depth:** 8.70 (m), **End depth:** 11.99 (m)

Description: Argille da mediamente consistenti a consistenti

Basic results	**Estimation results**	
Total cone resistance: 1.67 ±0.48 MPa	Permeability: 3.90E-09 ±3.09E-09 m/s	Constrained Mod.: 19.43 ±8.39 MPa
Sleeve friction: 122.36 ±51.53 kPa	N60: 9.19 ±2.09 blows	Go: 68.11 ±14.74 MPa
SBT_n: 3	Es: 0.00 ±0.00 MPa	Su: 106.56 ±35.13 kPa
SBTn description: Clay	Dr (%): 0.00 ±0.00	Su ratio: 1.15 ±0.44
	φ (degrees): 0.00 ±0.00 °	O.C.R.: 5.34 ±2.06
	Unit weight: 18.59 ±0.60 kN/m³	

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPTU06

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Total depth: 11.99 m, Date: 21/04/2017
Cone Type: Tecnopenta - G1 CPLS D1

Summary table of mean values

From depth To depth (m)	Thickness (m)	Permeability (m/s)	SPT_{N60} (blows/30cm)	E_s (MPa)	D_r	Friction angle	Constrained modulus, M (MPa)	Shear modulus, G_O (MPa)	Undrained strength, S_U (kPa)	Undrained strength ratio	OCR	Unit weight (kN/m³)
0.00	0.60	3.40E-06	5.8	22.5	0.0	0.0	23.3	28.5	96.6	10.0	46.1	18.3
0.60		(±4.11E-06)	(±1.2)	(±5.3)	(±0.0)	(±0.0)	(±6.2)	(±4.7)	(±23.9)	(±7.1)	(±32.8)	(±0.2)
0.60	1.40	4.06E-08	3.5	22.4	0.0	0.0	10.8	23.1	54.9	2.3	10.6	17.1
2.00		(±2.63E-08)	(±0.6)	(±0.4)	(±0.0)	(±0.0)	(±1.8)	(±2.4)	(±9.1)	(±0.8)	(±3.8)	(±0.4)
2.00	2.70	1.07E-08	3.0	0.0	0.0	0.0	6.8	20.8	39.4	0.9	4.2	16.2
4.70		(±6.40E-09)	(±0.5)	(±0.0)	(±0.0)	(±0.0)	(±1.8)	(±2.9)	(±7.4)	(±0.1)	(±0.6)	(±0.3)
4.70	0.70	2.19E-08	4.2	0.0	0.0	0.0	11.4	27.8	59.2	1.1	5.0	12.5
5.40		(±1.47E-08)	(±0.4)	(±0.0)	(±0.0)	(±0.0)	(±1.8)	(±1.2)	(±7.7)	(±0.1)	(±0.6)	(±7.3)
5.40	1.70	9.51E-07	7.1	28.0	28.8	33.7	27.2	35.2	0.0	0.0	0.0	6.8
7.10		(±9.56E-07)	(±0.7)	(±2.4)	(±1.1)	(±0.4)	(±5.1)	(±2.7)	(±0.0)	(±0.0)	(±0.0)	(±8.2)
7.10	1.60	4.55E-09	4.4	0.0	0.0	0.0	6.6	31.5	49.7	0.7	3.1	16.5
8.70		(±2.83E-09)	(±0.7)	(±0.0)	(±0.0)	(±0.0)	(±1.6)	(±6.5)	(±6.1)	(±0.1)	(±0.3)	(±1.9)
8.70	3.29	3.90E-09	9.2	0.0	0.0	0.0	19.4	68.1	106.6	1.2	5.3	18.6
11.99		(±3.09E-09)	(±2.1)	(±0.0)	(±0.0)	(±0.0)	(±8.4)	(±14.7)	(±35.1)	(±0.4)	(±2.1)	(±0.6)

Depth values presented in this table are measured from free ground surface

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU02
Total depth: 11.93 m, Date: 20/04/2017
Surface Elevation: 0.00 m
Coords: X:10.00, Y:0.00
Cone Type: Tecnopenta - G1 CPLS D1
Cone Operator:

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

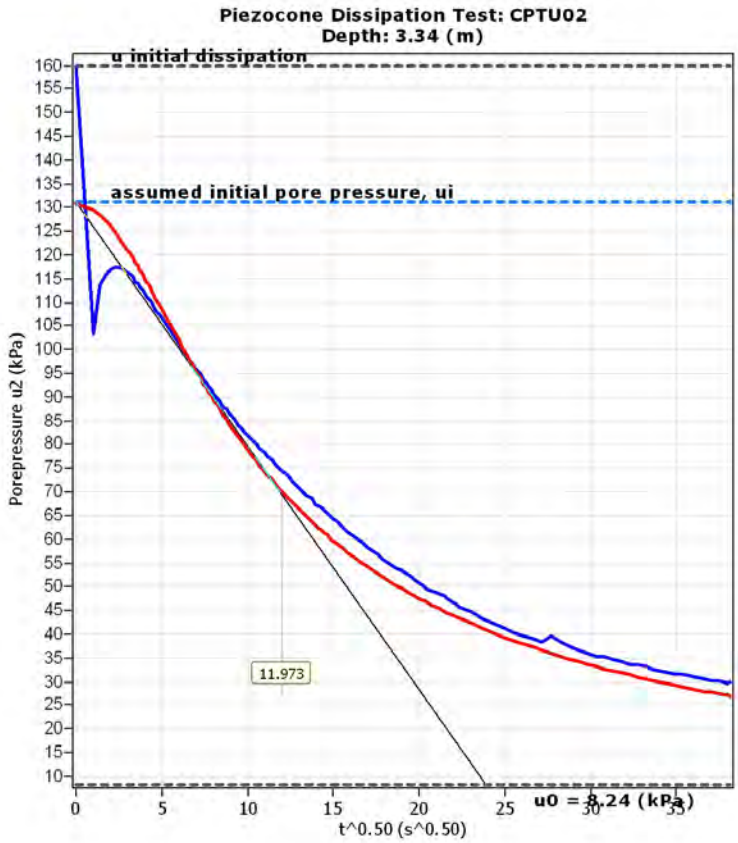
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

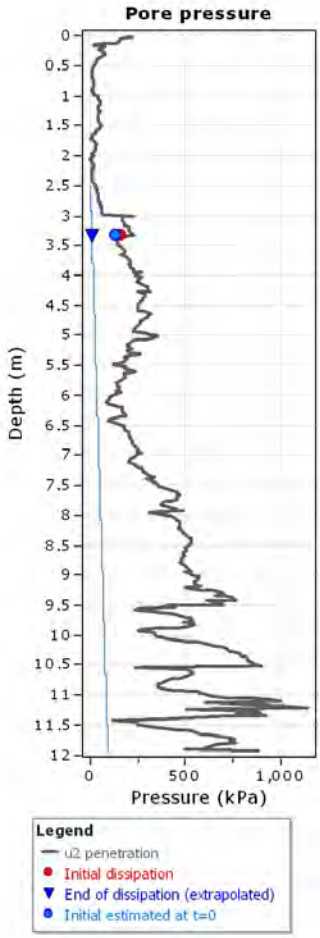
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU02	3.34	12.0	143	4.55E-006	606.22	1.41E-005	444	17.64	7.84E-009


Piezocone Dissipation Test: CPTU02
Depth: 3.34 (m)
u initial dissipation
assumed initial pore pressure, ui
Porepressure u2 (kPa)
11.973
u0 = 8.24 (kPa)
t^0.50 (s^0.50)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU04
Total depth: 17.45 m, Date: 20/04/2017
Surface Elevation: 0.00 m
Coords: X:30.00, Y:0.00
Cone Type: Tecnopenta - G1 CPLS D1
Cone Operator:

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

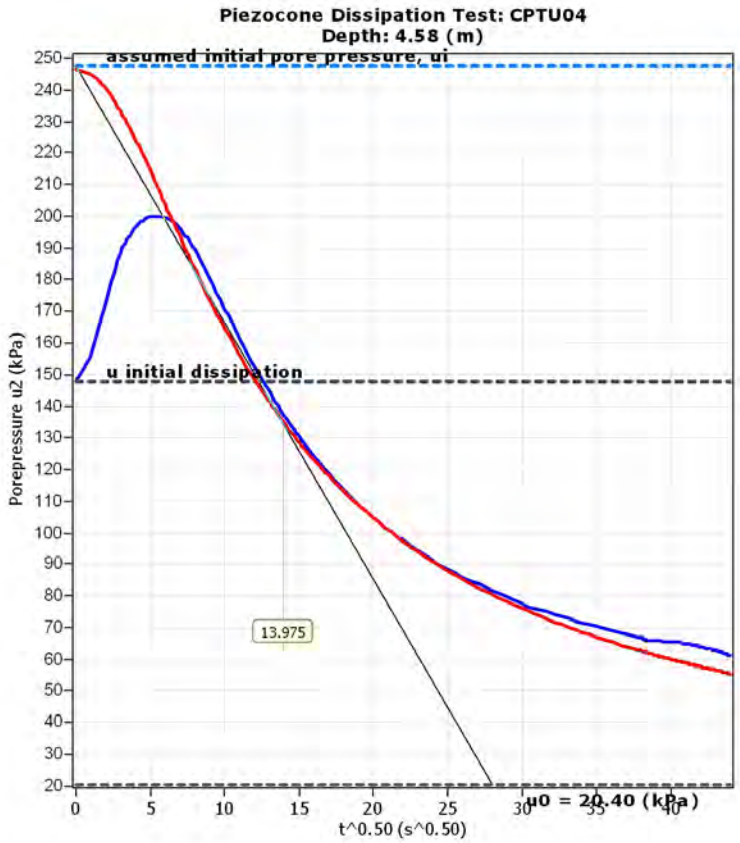
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

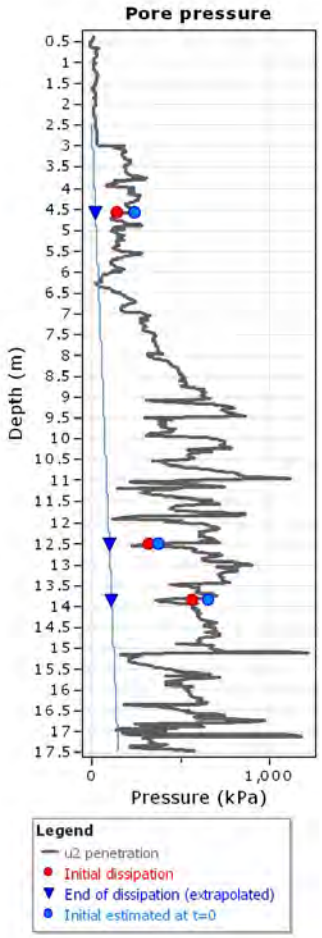
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU04	4.58	14.0	195	6.19E-006	150.16	5.15E-006	162	10.15	4.97E-009


Piezocone Dissipation Test: CPTU04
Depth: 4.58 (m)
assumed initial pore pressure, ui
u initial dissipation
13.975
u0 = 20.40 (kPa)
Porepressure u2 (kPa)
t^0.50 (s^0.50)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU06
Total depth: 11.99 m, Date: 21/04/2017
Surface Elevation: 0.00 m
Coords: X:50.00, Y:0.00
Cone Type: Tecnopenta - G1 CPLS D1
Cone Operator:

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

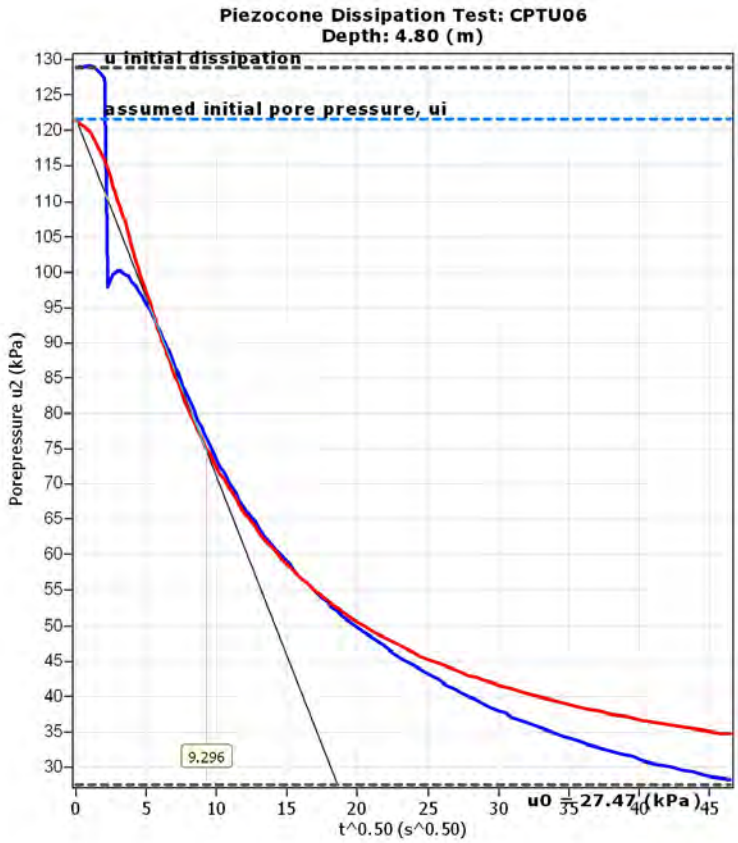
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

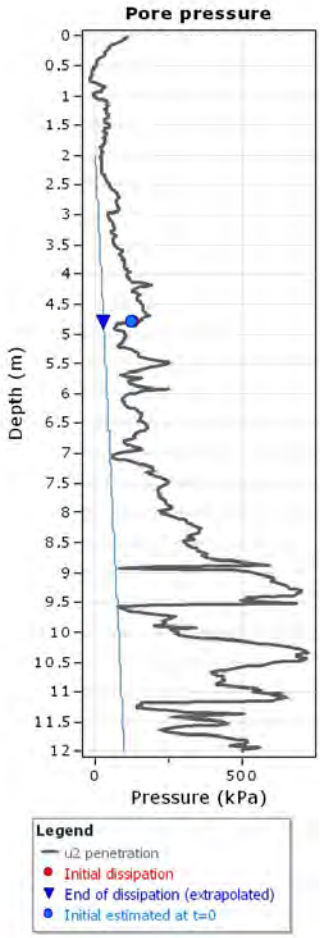
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU06	4.80	9.3	86	2.74E-006	140.08	1.12E-005	354	11.29	9.76E-009


Piezocone Dissipation Test: CPTU06
Depth: 4.80 (m)
u initial dissipation
assumed initial pore pressure, ui
Porepressure u2 (kPa)
t^0.50 (s^0.50)
9.296
u0 = 27.47 (kPa)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU03
Total depth: 11.81 m, Date: 20/04/2017
Surface Elevation: 0.00 m
Coords: X:20.00, Y:0.00
Cone Type: Tecnopenta - G1 CPLS D1
Cone Operator:

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

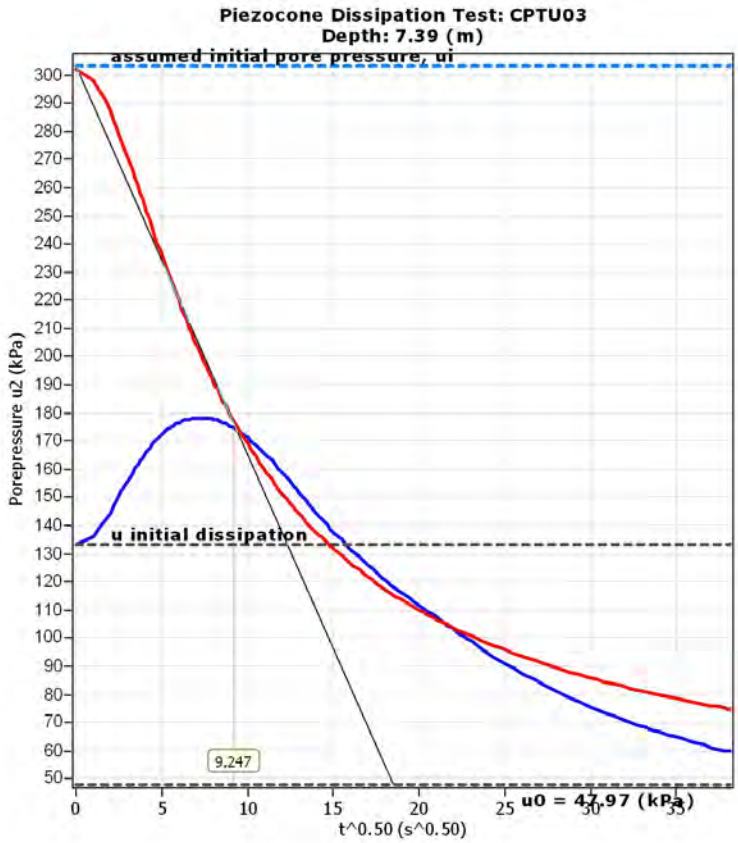
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

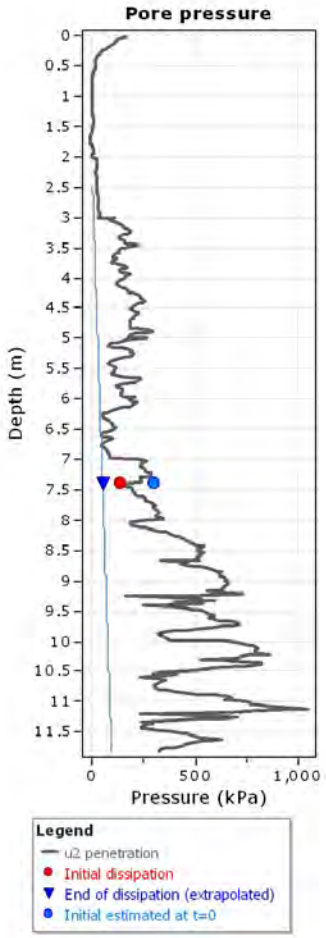
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU03	7.39	9.2	86	2.71E-006	242.41	1.49E-005	471	4.47	3.28E-008


Piezocone Dissipation Test: CPTU03
Depth: 7.39 (m)
assumed initial pore pressure, ui
u initial dissipation
9.247
u0 = 47.97 (kPa)
Porepressure u2 (kPa)
t^0.50 (s^0.50)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

CPT: CPTU04
Total depth: 17.45 m, Date: 20/04/2017
Surface Elevation: 0.00 m
Coords: X:30.00, Y:0.00
Cone Type: Tecnopenta - G1 CPLS D1
Cone Operator:

Project: **Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo**
Location: **Medolla**

Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

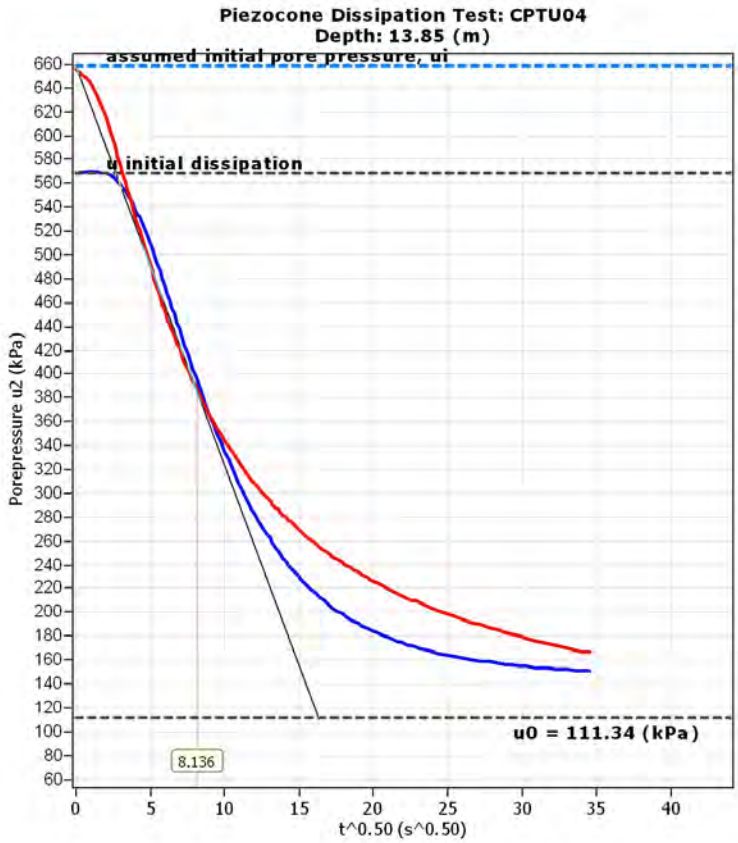
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

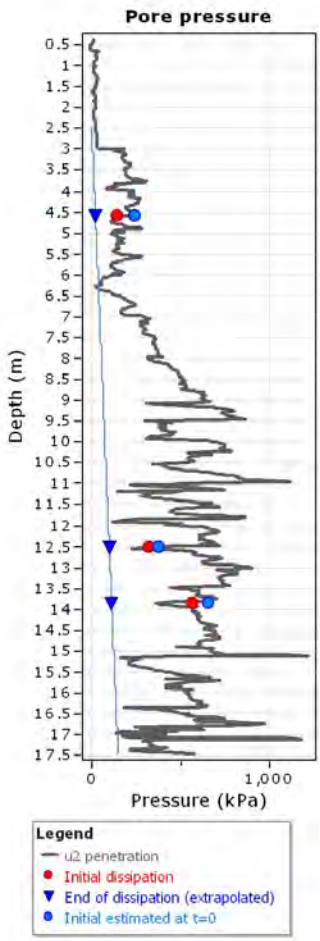
$$k_h = c_h \times \gamma_w / M$$

where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

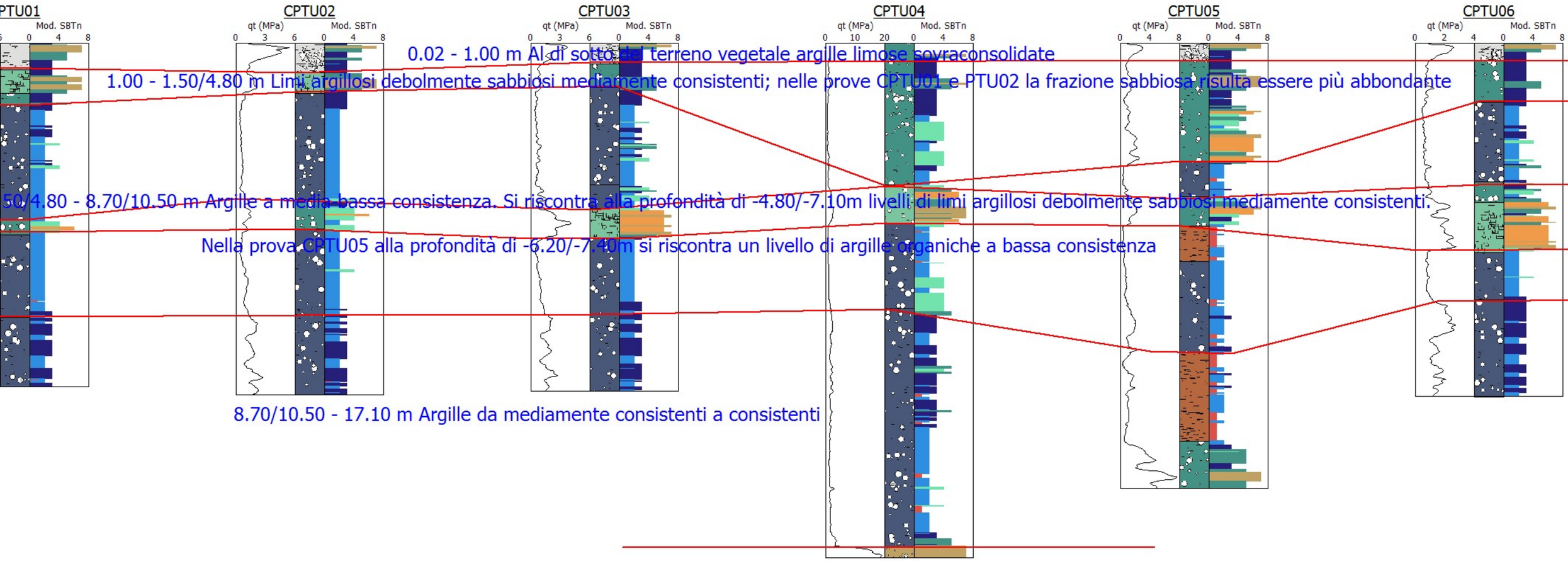
Tabular results

CPTU Borehole	Depth (m)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (m^2/s)	c_h (m^2/year)	M (MPa)	k_h (m/s)
CPTU04	13.85	8.1	66	2.10E-006	167.08	1.60E-005	505	22.40	7.02E-009


Piezocone Dissipation Test: CPTU04
Depth: 13.85 (m)
assumed initial pore pressure, ui
u initial dissipation
u0 = 111.34 (kPa)
8.136
Porepressure u2 (kPa)
t^0.50 (s^0.50)


Pore pressure
Depth (m)
Pressure (kPa)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

SEZIONE 01 - SPONDA LAGO AREA ECOLOGICA SAN MATTEO



0.02 - 1.00 m Al di sotto del terreno vegetale argille limose sovraconsolidate

1.00 - 1.50/4.80 m Limi argillosi debolmente sabbiosi mediamente consistenti; nelle prove CPTU01 e PTU02 la frazione sabbiosa risulta essere più abbondante

50/4.80 - 8.70/10.50 m Argille a media bassa consistenza. Si riscontra alla profondità di -4.80/-7.10m livelli di limi argillosi debolmente sabbiosi mediamente consistenti.

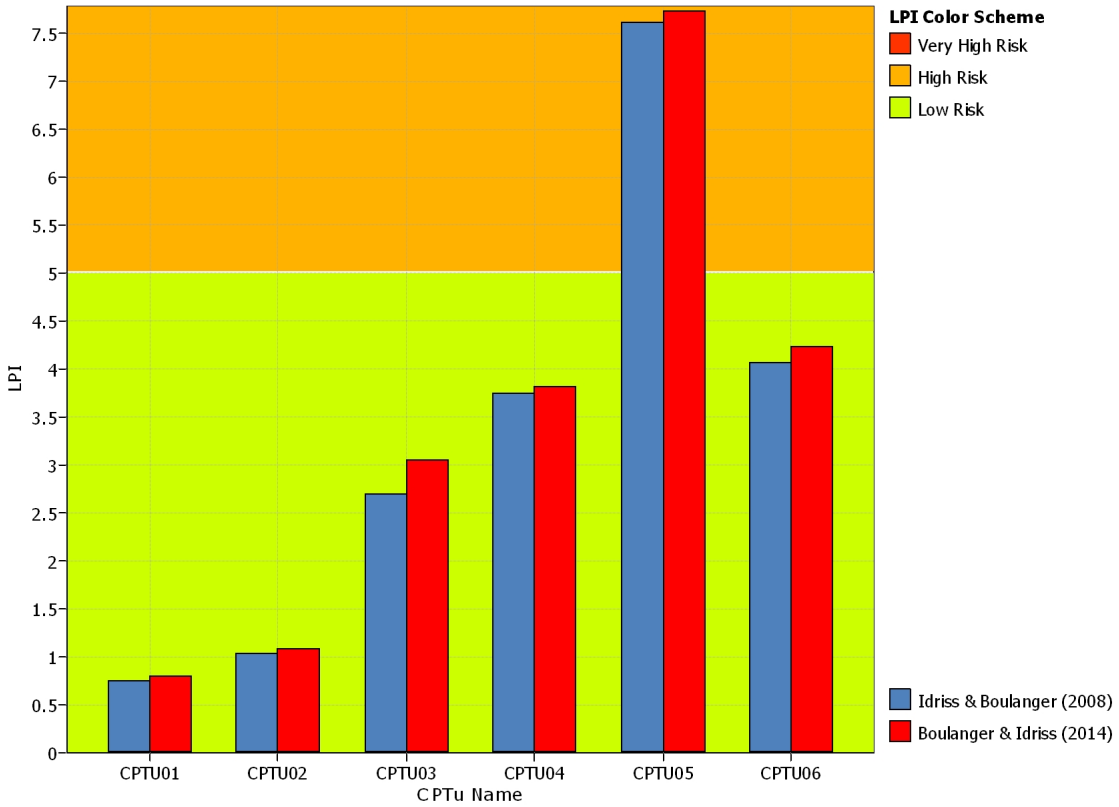
Nella prova CPTU05 alla profondità di -6.20/-7.40m si riscontra un livello di argille organiche a bassa consistenza

8.70/10.50 - 17.10 m Argille da mediamente consistenti a consistenti

17.10 - 17.45 m Sabbie da mediamente addensate ad addensate

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

Overall Parametric Assessment Method



:: CPT main liquefaction parameters details ::

CPT Name	Earthquake Mag.	Earthquake Accel.	GWT in situ (m)	GWT earthq. (m)
CPTU01	6.14	0.22	1.00	1.00
CPTU02	6.14	0.22	1.00	1.00
CPTU03	6.14	0.22	1.00	1.00
CPTU04	6.14	0.22	1.00	1.00
CPTU05	6.14	0.22	1.00	1.00
CPTU06	6.14	0.22	1.00	1.00

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

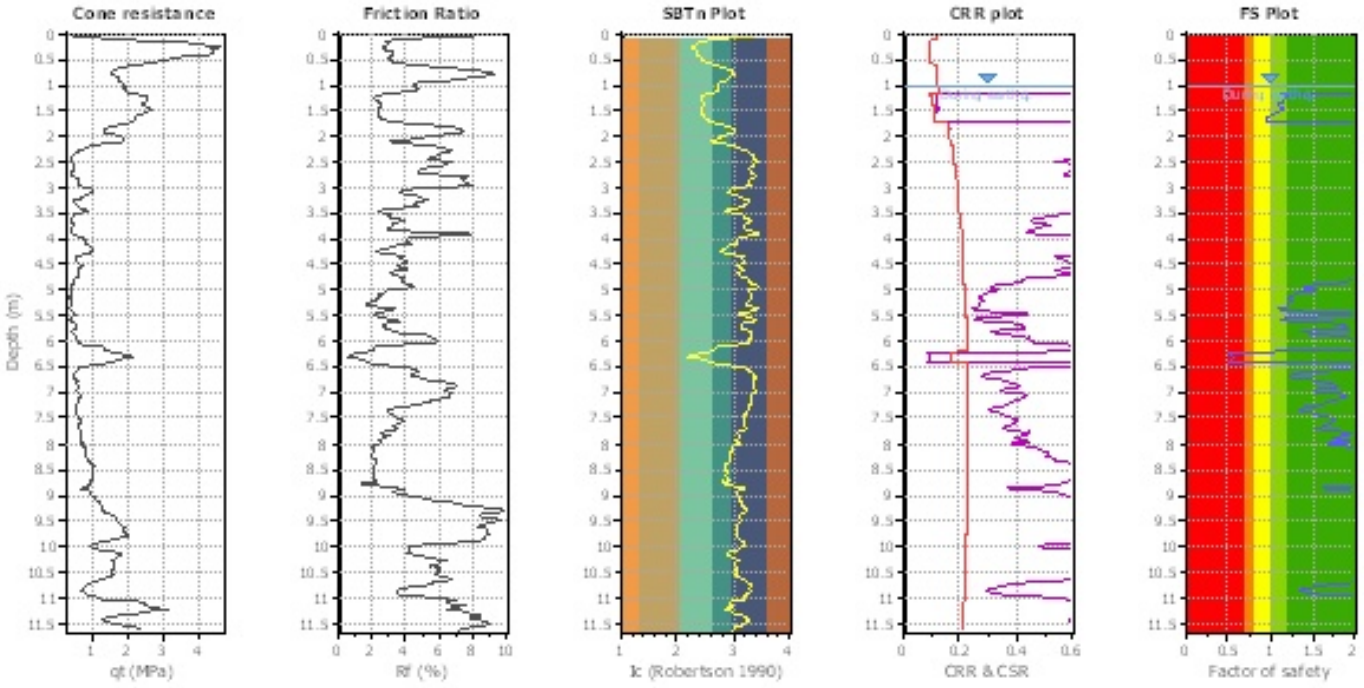
LIQUEFACTION ANALYSIS REPORT

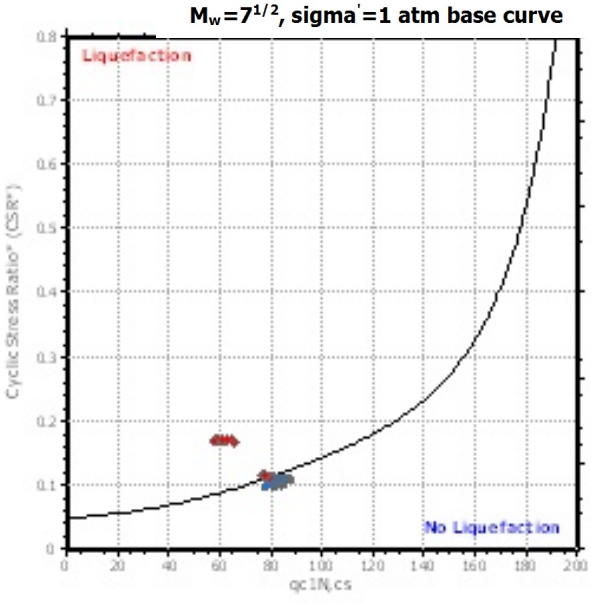
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

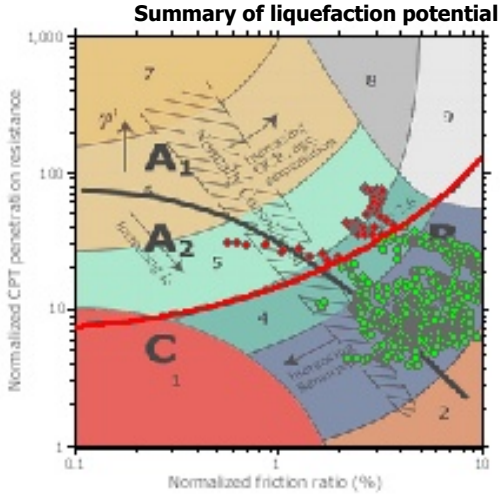
CPT file : CPTU01

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

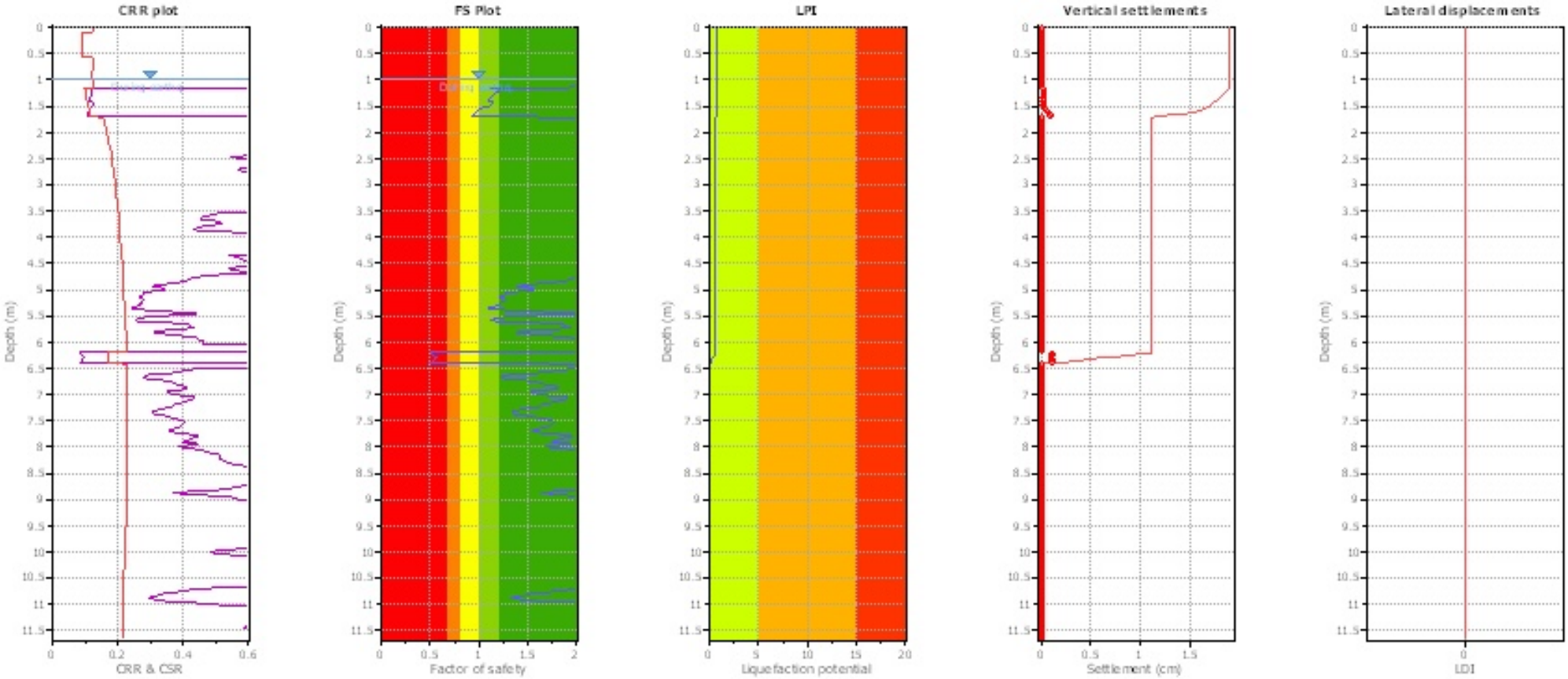






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	1.13	0.00	9.42	0.02	0.00
1.18	1.17	0.00	9.41	0.02	0.00	1.20	1.19	0.00	9.40	0.02	0.00
1.22	1.20	0.00	9.39	0.02	0.00	1.24	1.18	0.00	9.38	0.02	0.00
1.26	1.16	0.00	9.37	0.02	0.00	1.28	1.17	0.00	9.36	0.02	0.00
1.30	1.16	0.00	9.35	0.02	0.00	1.32	1.14	0.00	9.34	0.02	0.00
1.34	1.12	0.00	9.33	0.02	0.00	1.36	1.10	0.00	9.32	0.02	0.00
1.38	1.09	0.00	9.31	0.02	0.00	1.40	1.10	0.00	9.30	0.02	0.00
1.42	1.13	0.00	9.29	0.02	0.00	1.44	1.15	0.00	9.28	0.02	0.00
1.46	1.14	0.00	9.27	0.02	0.00	1.48	1.12	0.00	9.26	0.02	0.00
1.50	1.11	0.00	9.25	0.02	0.00	1.52	1.07	0.00	9.24	0.02	0.00
1.54	1.04	0.00	9.23	0.02	0.00	1.56	1.02	0.00	9.22	0.02	0.00
1.58	1.00	0.00	9.21	0.02	0.00	1.60	0.97	0.03	9.20	0.02	0.00
1.62	0.96	0.04	9.19	0.02	0.01	1.64	0.95	0.05	9.18	0.02	0.01
1.66	0.95	0.05	9.17	0.02	0.01	1.68	0.95	0.05	9.16	0.02	0.01
1.70	0.94	0.06	9.15	0.02	0.01	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.67	2.00	0.00	8.66	0.02	0.00
2.69	2.00	0.00	8.65	0.02	0.00	2.71	2.00	0.00	8.64	0.02	0.00
2.73	2.00	0.00	8.63	0.02	0.00	2.75	2.00	0.00	8.62	0.02	0.00
2.77	2.00	0.00	8.61	0.02	0.00	2.79	2.00	0.00	8.60	0.02	0.00
2.81	2.00	0.00	8.59	0.02	0.00	2.83	2.00	0.00	8.58	0.02	0.00
2.85	2.00	0.00	8.57	0.02	0.00	2.87	2.00	0.00	8.56	0.02	0.00
2.89	2.00	0.00	8.55	0.02	0.00	2.91	2.00	0.00	8.54	0.02	0.00
2.93	2.00	0.00	8.53	0.02	0.00	2.95	2.00	0.00	8.52	0.02	0.00
2.97	2.00	0.00	8.51	0.02	0.00	2.99	2.00	0.00	8.50	0.02	0.00
3.01	2.00	0.00	8.49	0.02	0.00	3.03	2.00	0.00	8.48	0.02	0.00
3.05	2.00	0.00	8.47	0.02	0.00	3.07	2.00	0.00	8.46	0.02	0.00
3.09	2.00	0.00	8.45	0.02	0.00	3.11	2.00	0.00	8.44	0.02	0.00
3.13	2.00	0.00	8.43	0.02	0.00	3.15	2.00	0.00	8.42	0.02	0.00
3.17	2.00	0.00	8.41	0.02	0.00	3.19	2.00	0.00	8.40	0.02	0.00
3.21	2.00	0.00	8.39	0.02	0.00	3.23	2.00	0.00	8.38	0.02	0.00
3.25	2.00	0.00	8.37	0.02	0.00	3.27	2.00	0.00	8.36	0.02	0.00
3.29	2.00	0.00	8.35	0.02	0.00	3.31	2.00	0.00	8.34	0.02	0.00
3.33	2.00	0.00	8.33	0.02	0.00	3.35	2.00	0.00	8.32	0.02	0.00
3.37	2.00	0.00	8.31	0.02	0.00	3.39	2.00	0.00	8.30	0.02	0.00
3.41	2.00	0.00	8.29	0.02	0.00	3.43	2.00	0.00	8.28	0.02	0.00
3.45	2.00	0.00	8.27	0.02	0.00	3.47	2.00	0.00	8.26	0.02	0.00
3.49	2.00	0.00	8.25	0.02	0.00	3.51	2.00	0.00	8.24	0.02	0.00
3.53	2.00	0.00	8.23	0.02	0.00	3.55	2.00	0.00	8.22	0.02	0.00
3.57	2.00	0.00	8.21	0.02	0.00	3.59	2.00	0.00	8.20	0.02	0.00
3.61	2.00	0.00	8.19	0.02	0.00	3.63	2.00	0.00	8.18	0.02	0.00
3.65	2.00	0.00	8.17	0.02	0.00	3.67	2.00	0.00	8.17	0.02	0.00
3.69	2.00	0.00	8.16	0.02	0.00	3.71	2.00	0.00	8.15	0.02	0.00
3.73	2.00	0.00	8.14	0.02	0.00	3.75	2.00	0.00	8.13	0.02	0.00
3.77	2.00	0.00	8.12	0.02	0.00	3.79	2.00	0.00	8.11	0.02	0.00
3.81	2.00	0.00	8.10	0.02	0.00	3.83	2.00	0.00	8.09	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.85	2.00	0.00	8.08	0.02	0.00	3.87	2.00	0.00	8.07	0.02	0.00
3.89	2.00	0.00	8.06	0.02	0.00	3.91	2.00	0.00	8.05	0.02	0.00
3.93	2.00	0.00	8.04	0.02	0.00	3.95	2.00	0.00	8.03	0.02	0.00
3.97	2.00	0.00	8.02	0.02	0.00	3.99	2.00	0.00	8.01	0.02	0.00
4.01	2.00	0.00	8.00	0.02	0.00	4.03	2.00	0.00	7.99	0.02	0.00
4.05	2.00	0.00	7.98	0.02	0.00	4.07	2.00	0.00	7.97	0.02	0.00
4.09	2.00	0.00	7.96	0.02	0.00	4.11	2.00	0.00	7.95	0.02	0.00
4.13	2.00	0.00	7.94	0.02	0.00	4.15	2.00	0.00	7.93	0.02	0.00
4.17	2.00	0.00	7.92	0.02	0.00	4.19	2.00	0.00	7.91	0.02	0.00
4.21	2.00	0.00	7.90	0.02	0.00	4.23	2.00	0.00	7.89	0.02	0.00
4.25	2.00	0.00	7.88	0.02	0.00	4.27	2.00	0.00	7.87	0.02	0.00
4.29	2.00	0.00	7.86	0.02	0.00	4.31	2.00	0.00	7.85	0.02	0.00
4.33	2.00	0.00	7.84	0.02	0.00	4.35	2.00	0.00	7.83	0.02	0.00
4.37	2.00	0.00	7.82	0.02	0.00	4.38	2.00	0.00	7.81	0.02	0.00
4.40	2.00	0.00	7.80	0.02	0.00	4.42	2.00	0.00	7.79	0.02	0.00
4.44	2.00	0.00	7.78	0.02	0.00	4.46	2.00	0.00	7.77	0.02	0.00
4.48	2.00	0.00	7.76	0.02	0.00	4.50	2.00	0.00	7.75	0.02	0.00
4.52	2.00	0.00	7.74	0.02	0.00	4.54	2.00	0.00	7.73	0.02	0.00
4.56	2.00	0.00	7.72	0.02	0.00	4.58	2.00	0.00	7.71	0.02	0.00
4.60	2.00	0.00	7.70	0.02	0.00	4.62	2.00	0.00	7.69	0.02	0.00
4.64	2.00	0.00	7.68	0.02	0.00	4.66	2.00	0.00	7.67	0.02	0.00
4.68	2.00	0.00	7.66	0.02	0.00	4.70	2.00	0.00	7.65	0.02	0.00
4.72	2.00	0.00	7.64	0.02	0.00	4.74	2.00	0.00	7.63	0.02	0.00
4.76	2.00	0.00	7.62	0.02	0.00	4.78	1.96	0.00	7.61	0.02	0.00
4.80	1.94	0.00	7.60	0.02	0.00	4.82	1.92	0.00	7.59	0.02	0.00
4.84	1.89	0.00	7.58	0.02	0.00	4.86	1.79	0.00	7.57	0.02	0.00
4.88	1.65	0.00	7.56	0.02	0.00	4.90	1.53	0.00	7.55	0.02	0.00
4.92	1.42	0.00	7.54	0.02	0.00	4.94	1.39	0.00	7.53	0.02	0.00
4.96	1.49	0.00	7.52	0.02	0.00	4.98	1.56	0.00	7.51	0.02	0.00
5.00	1.56	0.00	7.50	0.02	0.00	5.02	1.43	0.00	7.49	0.02	0.00
5.04	1.33	0.00	7.48	0.02	0.00	5.06	1.29	0.00	7.47	0.02	0.00
5.08	1.28	0.00	7.46	0.02	0.00	5.10	1.27	0.00	7.45	0.02	0.00
5.12	1.24	0.00	7.44	0.02	0.00	5.14	1.20	0.00	7.43	0.02	0.00
5.16	1.21	0.00	7.42	0.02	0.00	5.18	1.25	0.00	7.41	0.02	0.00
5.20	1.27	0.00	7.40	0.02	0.00	5.22	1.25	0.00	7.39	0.02	0.00
5.24	1.23	0.00	7.38	0.02	0.00	5.26	1.22	0.00	7.37	0.02	0.00
5.28	1.22	0.00	7.36	0.02	0.00	5.30	1.21	0.00	7.35	0.02	0.00
5.32	1.18	0.00	7.34	0.02	0.00	5.34	1.11	0.00	7.33	0.02	0.00
5.36	1.08	0.00	7.32	0.02	0.00	5.38	1.11	0.00	7.31	0.02	0.00
5.39	1.25	0.00	7.30	0.02	0.00	5.41	1.51	0.00	7.29	0.02	0.00
5.43	1.79	0.00	7.28	0.02	0.00	5.45	1.98	0.00	7.27	0.02	0.00
5.47	1.94	0.00	7.26	0.02	0.00	5.49	1.72	0.00	7.25	0.02	0.00
5.51	1.45	0.00	7.24	0.02	0.00	5.53	1.27	0.00	7.23	0.02	0.00
5.55	1.17	0.00	7.22	0.02	0.00	5.57	1.13	0.00	7.21	0.02	0.00
5.59	1.17	0.00	7.20	0.02	0.00	5.61	1.30	0.00	7.19	0.02	0.00
5.63	1.55	0.00	7.18	0.02	0.00	5.65	1.76	0.00	7.17	0.02	0.00
5.67	1.89	0.00	7.16	0.02	0.00	5.69	1.88	0.00	7.15	0.02	0.00
5.71	1.91	0.00	7.14	0.02	0.00	5.73	1.93	0.00	7.13	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.75	1.82	0.00	7.12	0.02	0.00	5.77	1.58	0.00	7.11	0.02	0.00
5.79	1.40	0.00	7.10	0.02	0.00	5.81	1.38	0.00	7.10	0.02	0.00
5.83	1.45	0.00	7.09	0.02	0.00	5.85	1.50	0.00	7.08	0.02	0.00
5.87	1.63	0.00	7.07	0.02	0.00	5.89	1.80	0.00	7.06	0.02	0.00
5.91	1.94	0.00	7.05	0.02	0.00	5.93	1.97	0.00	7.04	0.02	0.00
5.95	1.98	0.00	7.03	0.02	0.00	5.97	2.00	0.00	7.02	0.02	0.00
5.99	2.00	0.00	7.01	0.02	0.00	6.01	2.00	0.00	7.00	0.02	0.00
6.03	2.00	0.00	6.99	0.02	0.00	6.05	2.00	0.00	6.98	0.02	0.00
6.07	2.00	0.00	6.97	0.02	0.00	6.09	2.00	0.00	6.96	0.02	0.00
6.11	2.00	0.00	6.95	0.02	0.00	6.13	2.00	0.00	6.94	0.02	0.00
6.15	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	0.51	0.49	6.90	0.02	0.07
6.22	0.51	0.49	6.89	0.02	0.07	6.24	0.53	0.47	6.88	0.02	0.06
6.26	0.54	0.46	6.87	0.02	0.06	6.28	0.56	0.44	6.86	0.02	0.06
6.30	0.56	0.44	6.85	0.02	0.06	6.32	0.55	0.45	6.84	0.02	0.06
6.34	0.54	0.46	6.83	0.02	0.06	6.36	0.52	0.48	6.82	0.02	0.06
6.38	0.51	0.49	6.81	0.02	0.07	6.40	0.51	0.49	6.80	0.02	0.07
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	1.94	0.00	6.74	0.02	0.00
6.54	1.80	0.00	6.73	0.02	0.00	6.56	1.73	0.00	6.72	0.02	0.00
6.58	1.63	0.00	6.71	0.02	0.00	6.60	1.50	0.00	6.70	0.02	0.00
6.62	1.37	0.00	6.69	0.02	0.00	6.64	1.27	0.00	6.68	0.02	0.00
6.66	1.23	0.00	6.67	0.02	0.00	6.68	1.23	0.00	6.66	0.02	0.00
6.70	1.27	0.00	6.65	0.02	0.00	6.72	1.38	0.00	6.64	0.02	0.00
6.74	1.48	0.00	6.63	0.02	0.00	6.76	1.58	0.00	6.62	0.02	0.00
6.77	1.61	0.00	6.61	0.02	0.00	6.79	1.65	0.00	6.60	0.02	0.00
6.81	1.69	0.00	6.59	0.02	0.00	6.83	1.74	0.00	6.58	0.02	0.00
6.85	1.80	0.00	6.57	0.02	0.00	6.87	1.81	0.00	6.56	0.02	0.00
6.89	1.78	0.00	6.55	0.02	0.00	6.91	1.68	0.00	6.54	0.02	0.00
6.93	1.59	0.00	6.53	0.02	0.00	6.95	1.54	0.00	6.52	0.02	0.00
6.97	1.55	0.00	6.51	0.02	0.00	6.99	1.62	0.00	6.50	0.02	0.00
7.01	1.72	0.00	6.49	0.02	0.00	7.03	1.84	0.00	6.48	0.02	0.00
7.05	1.90	0.00	6.48	0.02	0.00	7.07	1.91	0.00	6.47	0.02	0.00
7.09	1.89	0.00	6.46	0.02	0.00	7.11	1.84	0.00	6.45	0.02	0.00
7.13	1.78	0.00	6.44	0.02	0.00	7.15	1.74	0.00	6.43	0.02	0.00
7.17	1.70	0.00	6.42	0.02	0.00	7.19	1.66	0.00	6.41	0.02	0.00
7.21	1.63	0.00	6.40	0.02	0.00	7.23	1.62	0.00	6.39	0.02	0.00
7.25	1.59	0.00	6.38	0.02	0.00	7.27	1.52	0.00	6.37	0.02	0.00
7.29	1.44	0.00	6.36	0.02	0.00	7.30	1.39	0.00	6.35	0.02	0.00
7.32	1.34	0.00	6.34	0.02	0.00	7.34	1.35	0.00	6.33	0.02	0.00
7.36	1.37	0.00	6.32	0.02	0.00	7.38	1.42	0.00	6.31	0.02	0.00
7.40	1.49	0.00	6.30	0.02	0.00	7.42	1.55	0.00	6.29	0.02	0.00
7.44	1.60	0.00	6.28	0.02	0.00	7.46	1.63	0.00	6.27	0.02	0.00
7.48	1.69	0.00	6.26	0.02	0.00	7.50	1.73	0.00	6.25	0.02	0.00
7.52	1.76	0.00	6.24	0.02	0.00	7.54	1.76	0.00	6.23	0.02	0.00
7.56	1.74	0.00	6.22	0.02	0.00	7.58	1.73	0.00	6.21	0.02	0.00
7.60	1.73	0.00	6.20	0.02	0.00	7.62	1.69	0.00	6.19	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.64	1.65	0.00	6.18	0.02	0.00	7.66	1.61	0.00	6.17	0.02	0.00
7.68	1.58	0.00	6.16	0.02	0.00	7.70	1.55	0.00	6.15	0.02	0.00
7.72	1.57	0.00	6.14	0.02	0.00	7.74	1.69	0.00	6.13	0.02	0.00
7.75	1.85	0.00	6.12	0.02	0.00	7.77	1.96	0.00	6.11	0.02	0.00
7.79	1.96	0.00	6.10	0.02	0.00	7.81	1.91	0.00	6.09	0.02	0.00
7.83	1.87	0.00	6.08	0.02	0.00	7.85	1.83	0.00	6.07	0.02	0.00
7.87	1.80	0.00	6.06	0.02	0.00	7.89	1.74	0.00	6.05	0.02	0.00
7.91	1.88	0.00	6.04	0.02	0.00	7.93	1.93	0.00	6.03	0.02	0.00
7.95	1.95	0.00	6.03	0.02	0.00	7.97	1.77	0.00	6.02	0.02	0.00
7.99	1.69	0.00	6.01	0.02	0.00	8.01	1.70	0.00	6.00	0.02	0.00
8.03	1.80	0.00	5.99	0.02	0.00	8.05	1.94	0.00	5.98	0.02	0.00
8.07	2.00	0.00	5.97	0.02	0.00	8.09	2.00	0.00	5.96	0.02	0.00
8.11	2.00	0.00	5.95	0.02	0.00	8.13	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.51	2.00	0.00	5.74	0.02	0.00
8.53	2.00	0.00	5.73	0.02	0.00	8.55	2.00	0.00	5.72	0.02	0.00
8.57	2.00	0.00	5.71	0.02	0.00	8.59	2.00	0.00	5.70	0.02	0.00
8.61	2.00	0.00	5.69	0.02	0.00	8.63	2.00	0.00	5.68	0.02	0.00
8.65	2.00	0.00	5.67	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.82	2.00	0.00	5.59	0.02	0.00
8.84	2.00	0.00	5.58	0.02	0.00	8.86	1.62	0.00	5.57	0.02	0.00
8.88	1.70	0.00	5.56	0.02	0.00	8.90	1.79	0.00	5.55	0.02	0.00
8.92	2.00	0.00	5.54	0.02	0.00	8.94	2.00	0.00	5.53	0.02	0.00
8.96	2.00	0.00	5.52	0.02	0.00	8.98	2.00	0.00	5.51	0.02	0.00
9.00	2.00	0.00	5.50	0.02	0.00	9.02	2.00	0.00	5.49	0.02	0.00
9.04	2.00	0.00	5.48	0.02	0.00	9.06	2.00	0.00	5.47	0.02	0.00
9.08	2.00	0.00	5.46	0.02	0.00	9.10	2.00	0.00	5.45	0.02	0.00
9.11	2.00	0.00	5.44	0.02	0.00	9.13	2.00	0.00	5.43	0.02	0.00
9.15	2.00	0.00	5.42	0.02	0.00	9.17	2.00	0.00	5.41	0.02	0.00
9.19	2.00	0.00	5.40	0.02	0.00	9.21	2.00	0.00	5.39	0.02	0.00
9.23	2.00	0.00	5.38	0.02	0.00	9.25	2.00	0.00	5.37	0.02	0.00
9.27	2.00	0.00	5.37	0.02	0.00	9.29	2.00	0.00	5.36	0.02	0.00
9.31	2.00	0.00	5.35	0.02	0.00	9.33	2.00	0.00	5.34	0.02	0.00
9.35	2.00	0.00	5.33	0.02	0.00	9.37	2.00	0.00	5.32	0.02	0.00
9.39	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.65	2.00	0.00	5.17	0.02	0.00	9.67	2.00	0.00	5.16	0.02	0.00
9.69	2.00	0.00	5.15	0.02	0.00	9.71	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.79	2.00	0.00	5.11	0.02	0.00
9.81	2.00	0.00	5.10	0.02	0.00	9.83	2.00	0.00	5.09	0.02	0.00
9.85	2.00	0.00	5.08	0.02	0.00	9.87	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.13	2.00	0.00	4.93	0.02	0.00
10.15	2.00	0.00	4.92	0.02	0.00	10.17	2.00	0.00	4.91	0.02	0.00
10.19	2.00	0.00	4.90	0.02	0.00	10.21	2.00	0.00	4.89	0.02	0.00
10.23	2.00	0.00	4.89	0.02	0.00	10.25	2.00	0.00	4.88	0.02	0.00
10.27	2.00	0.00	4.87	0.02	0.00	10.29	2.00	0.00	4.86	0.02	0.00
10.31	2.00	0.00	4.85	0.02	0.00	10.33	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.55	2.00	0.00	4.72	0.02	0.00
10.57	2.00	0.00	4.71	0.02	0.00	10.59	2.00	0.00	4.70	0.02	0.00
10.61	2.00	0.00	4.69	0.02	0.00	10.63	2.00	0.00	4.68	0.02	0.00
10.65	2.00	0.00	4.67	0.02	0.00	10.67	2.00	0.00	4.67	0.02	0.00
10.69	2.00	0.00	4.66	0.02	0.00	10.71	2.00	0.00	4.65	0.02	0.00
10.73	1.88	0.00	4.64	0.02	0.00	10.75	1.77	0.00	4.63	0.02	0.00
10.76	1.66	0.00	4.62	0.02	0.00	10.78	1.57	0.00	4.61	0.02	0.00
10.80	1.53	0.00	4.60	0.02	0.00	10.82	1.48	0.00	4.59	0.02	0.00
10.84	1.42	0.00	4.58	0.02	0.00	10.86	1.34	0.00	4.57	0.02	0.00
10.88	1.33	0.00	4.56	0.02	0.00	10.90	1.39	0.00	4.55	0.02	0.00
10.92	1.49	0.00	4.54	0.02	0.00	10.94	1.63	0.00	4.53	0.02	0.00
10.96	1.80	0.00	4.52	0.02	0.00	10.97	2.00	0.00	4.51	0.02	0.00
10.99	2.00	0.00	4.50	0.02	0.00	11.01	2.00	0.00	4.49	0.02	0.00
11.03	2.00	0.00	4.48	0.02	0.00	11.05	2.00	0.00	4.47	0.02	0.00
11.07	2.00	0.00	4.47	0.02	0.00	11.09	2.00	0.00	4.46	0.02	0.00
11.11	2.00	0.00	4.45	0.02	0.00	11.13	2.00	0.00	4.44	0.02	0.00
11.15	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.34	2.00	0.00	4.33	0.02	0.00	11.35	2.00	0.00	4.32	0.02	0.00
11.37	2.00	0.00	4.31	0.02	0.00	11.39	2.00	0.00	4.30	0.02	0.00
11.41	2.00	0.00	4.29	0.02	0.00	11.43	2.00	0.00	4.28	0.02	0.00
11.45	2.00	0.00	4.28	0.02	0.00	11.47	2.00	0.00	4.27	0.02	0.00
11.49	2.00	0.00	4.26	0.02	0.00	11.51	2.00	0.00	4.25	0.02	0.00
11.53	2.00	0.00	4.24	0.02	0.00	11.54	2.00	0.00	4.23	0.02	0.00
11.56	2.00	0.00	4.22	0.02	0.00	11.58	2.00	0.00	4.21	0.02	0.00
11.60	2.00	0.00	4.20	0.02	0.00	11.62	2.00	0.00	4.19	0.02	0.00
11.64	2.00	0.00	4.18	0.02	0.00						

Overall liquefaction potential: 0.75

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

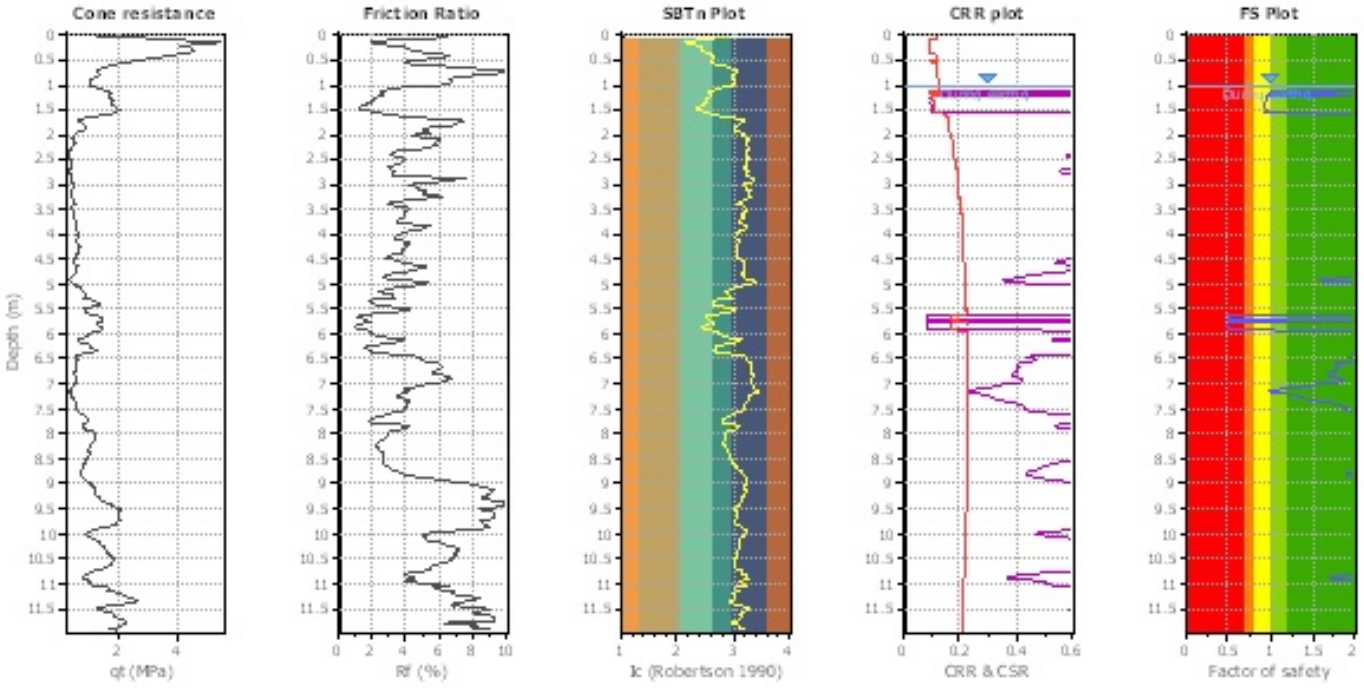
LIQUEFACTION ANALYSIS REPORT

Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

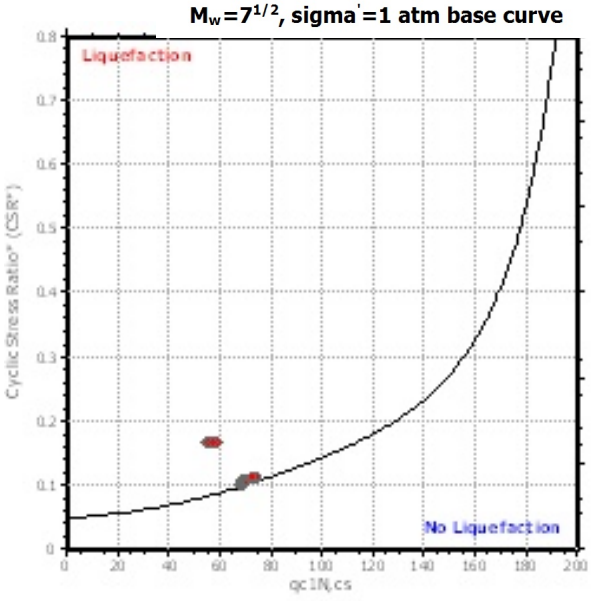
CPT file : CPTU02

Input parameters and analysis data

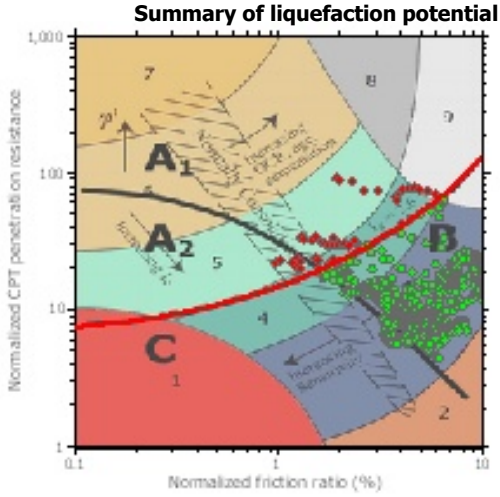
Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

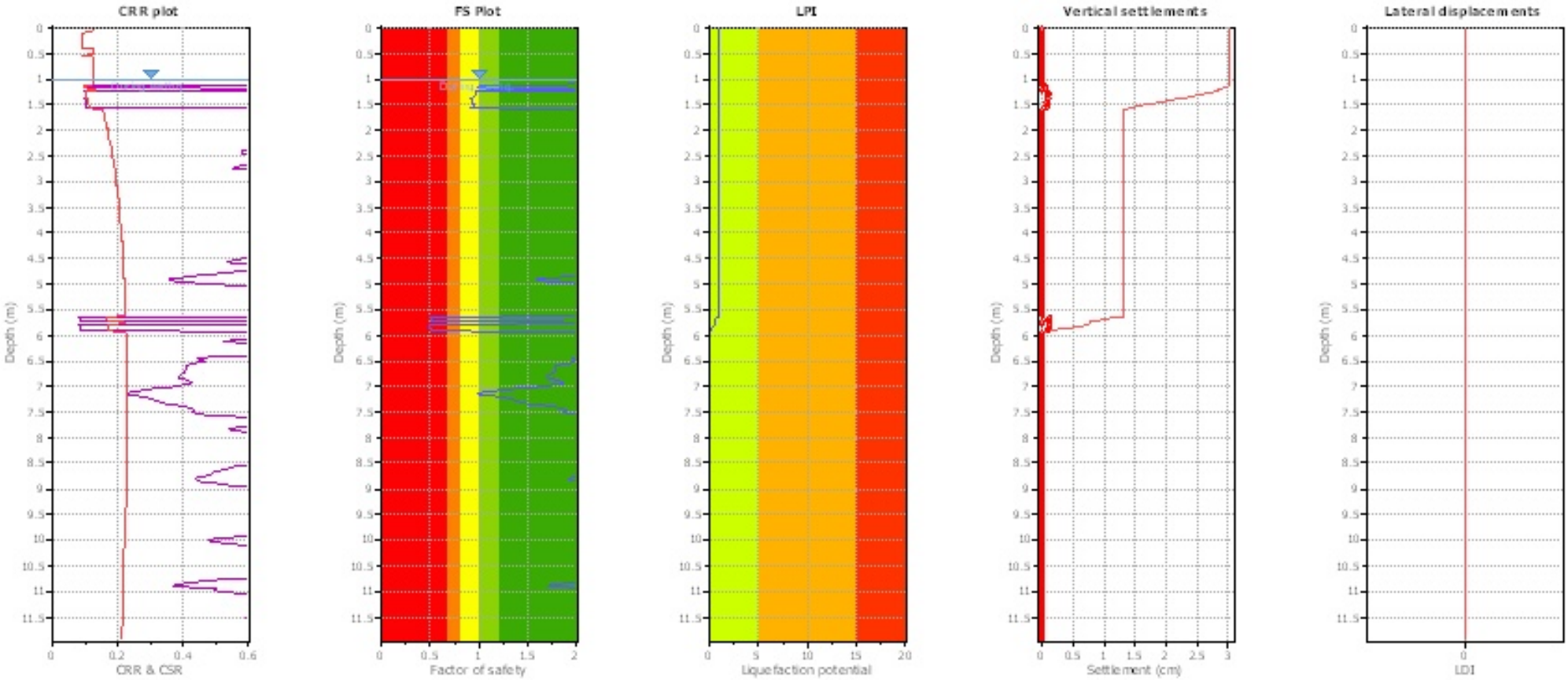


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	1.01	0.00	9.44	0.02	0.00
1.14	1.01	0.00	9.43	0.02	0.00	1.16	1.00	0.00	9.42	0.02	0.00
1.18	0.98	0.02	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	0.96	0.04	9.38	0.02	0.01
1.26	0.96	0.04	9.37	0.02	0.01	1.28	0.96	0.04	9.36	0.02	0.01
1.30	0.96	0.04	9.35	0.02	0.01	1.32	0.96	0.04	9.34	0.02	0.01
1.34	0.95	0.05	9.33	0.02	0.01	1.36	0.93	0.07	9.32	0.02	0.01
1.38	0.92	0.08	9.31	0.02	0.02	1.40	0.92	0.08	9.30	0.02	0.01
1.42	0.92	0.08	9.29	0.02	0.01	1.44	0.93	0.07	9.28	0.02	0.01
1.46	0.93	0.07	9.27	0.02	0.01	1.48	0.94	0.06	9.26	0.02	0.01
1.50	0.95	0.05	9.25	0.02	0.01	1.52	0.95	0.05	9.24	0.02	0.01
1.54	0.94	0.06	9.23	0.02	0.01	1.56	0.92	0.08	9.22	0.02	0.02
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	1.90	0.00	7.57	0.02	0.00	4.88	1.77	0.00	7.56	0.02	0.00
4.90	1.67	0.00	7.55	0.02	0.00	4.92	1.59	0.00	7.54	0.02	0.00
4.94	1.63	0.00	7.53	0.02	0.00	4.96	1.76	0.00	7.52	0.02	0.00
4.98	1.99	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	0.49	0.51	7.18	0.02	0.07
5.66	0.50	0.50	7.17	0.02	0.07	5.68	0.51	0.49	7.16	0.02	0.07
5.70	0.51	0.49	7.15	0.02	0.07	5.72	0.51	0.49	7.14	0.02	0.07
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	0.49	0.51	7.10	0.02	0.07
5.82	0.49	0.51	7.09	0.02	0.07	5.84	0.50	0.50	7.08	0.02	0.07
5.86	0.50	0.50	7.07	0.02	0.07	5.88	0.51	0.49	7.06	0.02	0.07
5.90	0.51	0.49	7.05	0.02	0.07	5.92	0.51	0.49	7.04	0.02	0.07
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	2.00	0.00	6.85	0.02	0.00	6.32	2.00	0.00	6.84	0.02	0.00
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	1.95	0.00	6.77	0.02	0.00	6.48	1.98	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	1.98	0.00	6.73	0.02	0.00	6.56	1.90	0.00	6.72	0.02	0.00
6.58	1.83	0.00	6.71	0.02	0.00	6.60	1.78	0.00	6.70	0.02	0.00
6.62	1.78	0.00	6.69	0.02	0.00	6.64	1.80	0.00	6.68	0.02	0.00
6.66	1.80	0.00	6.67	0.02	0.00	6.68	1.78	0.00	6.66	0.02	0.00
6.70	1.79	0.00	6.65	0.02	0.00	6.71	1.78	0.00	6.64	0.02	0.00
6.73	1.77	0.00	6.63	0.02	0.00	6.75	1.75	0.00	6.62	0.02	0.00
6.77	1.72	0.00	6.61	0.02	0.00	6.79	1.70	0.00	6.60	0.02	0.00
6.81	1.69	0.00	6.59	0.02	0.00	6.83	1.71	0.00	6.58	0.02	0.00
6.85	1.75	0.00	6.57	0.02	0.00	6.87	1.80	0.00	6.56	0.02	0.00
6.89	1.84	0.00	6.55	0.02	0.00	6.91	1.86	0.00	6.54	0.02	0.00
6.93	1.85	0.00	6.53	0.02	0.00	6.95	1.82	0.00	6.52	0.02	0.00
6.97	1.74	0.00	6.51	0.02	0.00	6.99	1.66	0.00	6.50	0.02	0.00
7.01	1.56	0.00	6.49	0.02	0.00	7.03	1.46	0.00	6.48	0.02	0.00
7.05	1.35	0.00	6.47	0.02	0.00	7.07	1.24	0.00	6.46	0.02	0.00
7.09	1.14	0.00	6.45	0.02	0.00	7.11	1.04	0.00	6.44	0.02	0.00
7.13	0.99	0.01	6.43	0.02	0.00	7.15	1.01	0.00	6.42	0.02	0.00
7.17	1.08	0.00	6.41	0.02	0.00	7.19	1.18	0.00	6.40	0.02	0.00
7.21	1.27	0.00	6.39	0.02	0.00	7.23	1.33	0.00	6.38	0.02	0.00
7.25	1.36	0.00	6.37	0.02	0.00	7.27	1.39	0.00	6.36	0.02	0.00
7.29	1.41	0.00	6.35	0.02	0.00	7.31	1.44	0.00	6.34	0.02	0.00
7.33	1.50	0.00	6.33	0.02	0.00	7.35	1.58	0.00	6.32	0.02	0.00
7.37	1.67	0.00	6.31	0.02	0.00	7.39	1.75	0.00	6.30	0.02	0.00
7.41	1.82	0.00	6.29	0.02	0.00	7.43	1.87	0.00	6.28	0.02	0.00
7.45	1.90	0.00	6.27	0.02	0.00	7.47	1.87	0.00	6.26	0.02	0.00
7.49	1.86	0.00	6.25	0.02	0.00	7.51	1.89	0.00	6.24	0.02	0.00
7.53	1.94	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	2.00	0.00	6.11	0.02	0.00	7.79	2.00	0.00	6.10	0.02	0.00
7.81	2.00	0.00	6.09	0.02	0.00	7.83	2.00	0.00	6.08	0.02	0.00
7.85	2.00	0.00	6.07	0.02	0.00	7.87	2.00	0.00	6.06	0.02	0.00
7.89	2.00	0.00	6.05	0.02	0.00	7.91	2.00	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	2.00	0.00	6.00	0.02	0.00
8.01	2.00	0.00	5.99	0.02	0.00	8.03	2.00	0.00	5.98	0.02	0.00
8.05	2.00	0.00	5.97	0.02	0.00	8.07	2.00	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	2.00	0.00	5.83	0.02	0.00	8.35	2.00	0.00	5.82	0.02	0.00
8.37	2.00	0.00	5.81	0.02	0.00	8.39	2.00	0.00	5.80	0.02	0.00
8.41	2.00	0.00	5.79	0.02	0.00	8.43	2.00	0.00	5.78	0.02	0.00
8.45	2.00	0.00	5.77	0.02	0.00	8.47	2.00	0.00	5.76	0.02	0.00
8.49	2.00	0.00	5.75	0.02	0.00	8.51	2.00	0.00	5.74	0.02	0.00
8.53	2.00	0.00	5.73	0.02	0.00	8.55	2.00	0.00	5.72	0.02	0.00
8.57	2.00	0.00	5.71	0.02	0.00	8.59	2.00	0.00	5.70	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	1.97	0.00	5.62	0.02	0.00	8.79	1.93	0.00	5.61	0.02	0.00
8.81	1.93	0.00	5.60	0.02	0.00	8.83	1.94	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	2.00	0.00	5.55	0.02	0.00
8.93	2.00	0.00	5.54	0.02	0.00	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	2.00	0.00	5.48	0.02	0.00	9.07	2.00	0.00	5.47	0.02	0.00
9.09	2.00	0.00	5.46	0.02	0.00	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.19	2.00	0.00	5.41	0.02	0.00
9.21	2.00	0.00	5.40	0.02	0.00	9.23	2.00	0.00	5.39	0.02	0.00
9.25	2.00	0.00	5.38	0.02	0.00	9.27	2.00	0.00	5.37	0.02	0.00
9.29	2.00	0.00	5.36	0.02	0.00	9.31	2.00	0.00	5.35	0.02	0.00
9.33	2.00	0.00	5.34	0.02	0.00	9.35	2.00	0.00	5.33	0.02	0.00
9.37	2.00	0.00	5.32	0.02	0.00	9.39	2.00	0.00	5.31	0.02	0.00
9.41	2.00	0.00	5.30	0.02	0.00	9.43	2.00	0.00	5.29	0.02	0.00
9.45	2.00	0.00	5.28	0.02	0.00	9.47	2.00	0.00	5.27	0.02	0.00
9.49	2.00	0.00	5.26	0.02	0.00	9.51	2.00	0.00	5.25	0.02	0.00
9.53	2.00	0.00	5.24	0.02	0.00	9.55	2.00	0.00	5.23	0.02	0.00
9.57	2.00	0.00	5.22	0.02	0.00	9.59	2.00	0.00	5.21	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.61	2.00	0.00	5.20	0.02	0.00	9.63	2.00	0.00	5.19	0.02	0.00
9.65	2.00	0.00	5.18	0.02	0.00	9.67	2.00	0.00	5.17	0.02	0.00
9.69	2.00	0.00	5.16	0.02	0.00	9.71	2.00	0.00	5.15	0.02	0.00
9.73	2.00	0.00	5.14	0.02	0.00	9.75	2.00	0.00	5.13	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.78	2.00	0.00	5.11	0.02	0.00
9.80	2.00	0.00	5.10	0.02	0.00	9.82	2.00	0.00	5.09	0.02	0.00
9.84	2.00	0.00	5.08	0.02	0.00	9.86	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	1.97	0.00	4.59	0.02	0.00
10.84	1.84	0.00	4.58	0.02	0.00	10.86	1.77	0.00	4.57	0.02	0.00
10.88	1.71	0.00	4.56	0.02	0.00	10.90	1.71	0.00	4.55	0.02	0.00
10.92	1.95	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.98	2.00	0.00	4.51	0.02	0.00
11.00	2.00	0.00	4.50	0.02	0.00	11.02	2.00	0.00	4.49	0.02	0.00
11.04	2.00	0.00	4.48	0.02	0.00	11.06	2.00	0.00	4.47	0.02	0.00
11.08	2.00	0.00	4.46	0.02	0.00	11.10	2.00	0.00	4.45	0.02	0.00
11.12	2.00	0.00	4.44	0.02	0.00	11.14	2.00	0.00	4.43	0.02	0.00
11.16	2.00	0.00	4.42	0.02	0.00	11.18	2.00	0.00	4.41	0.02	0.00
11.20	2.00	0.00	4.40	0.02	0.00	11.22	2.00	0.00	4.39	0.02	0.00
11.24	2.00	0.00	4.38	0.02	0.00	11.26	2.00	0.00	4.37	0.02	0.00
11.28	2.00	0.00	4.36	0.02	0.00	11.29	2.00	0.00	4.35	0.02	0.00
11.31	2.00	0.00	4.34	0.02	0.00	11.33	2.00	0.00	4.33	0.02	0.00
11.35	2.00	0.00	4.32	0.02	0.00	11.37	2.00	0.00	4.31	0.02	0.00
11.39	2.00	0.00	4.30	0.02	0.00	11.41	2.00	0.00	4.29	0.02	0.00
11.43	2.00	0.00	4.28	0.02	0.00	11.45	2.00	0.00	4.27	0.02	0.00
11.47	2.00	0.00	4.26	0.02	0.00	11.49	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.51	2.00	0.00	4.24	0.02	0.00	11.53	2.00	0.00	4.23	0.02	0.00
11.55	2.00	0.00	4.22	0.02	0.00	11.57	2.00	0.00	4.21	0.02	0.00
11.59	2.00	0.00	4.20	0.02	0.00	11.61	2.00	0.00	4.19	0.02	0.00
11.63	2.00	0.00	4.18	0.02	0.00	11.65	2.00	0.00	4.17	0.02	0.00
11.67	2.00	0.00	4.16	0.02	0.00	11.69	2.00	0.00	4.15	0.02	0.00
11.71	2.00	0.00	4.14	0.02	0.00	11.73	2.00	0.00	4.13	0.02	0.00
11.75	2.00	0.00	4.12	0.02	0.00	11.77	2.00	0.00	4.11	0.02	0.00
11.79	2.00	0.00	4.10	0.02	0.00	11.81	2.00	0.00	4.09	0.02	0.00
11.83	2.00	0.00	4.08	0.02	0.00	11.85	2.00	0.00	4.07	0.02	0.00
11.87	2.00	0.00	4.07	0.02	0.00	11.89	2.00	0.00	4.06	0.02	0.00
11.91	2.00	0.00	4.05	0.02	0.00	11.93	2.00	0.00	4.04	0.02	0.00

Overall liquefaction potential: 1.04

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

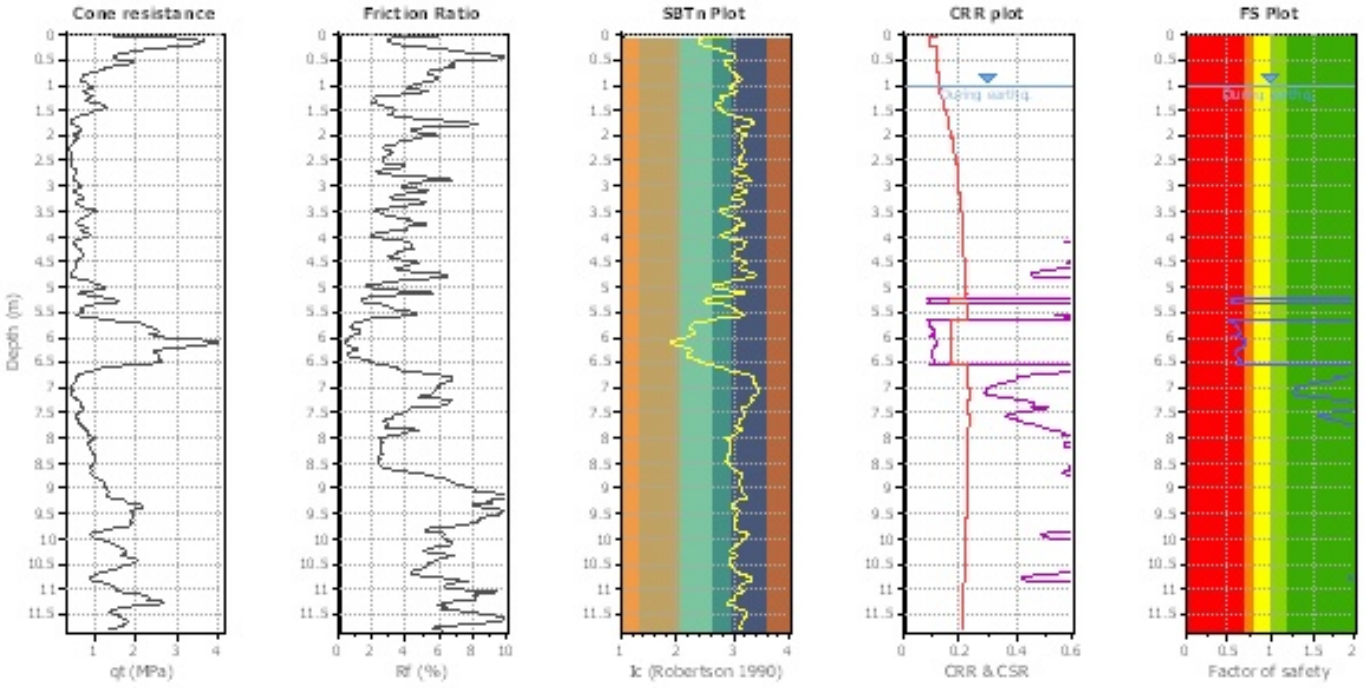
LIQUEFACTION ANALYSIS REPORT

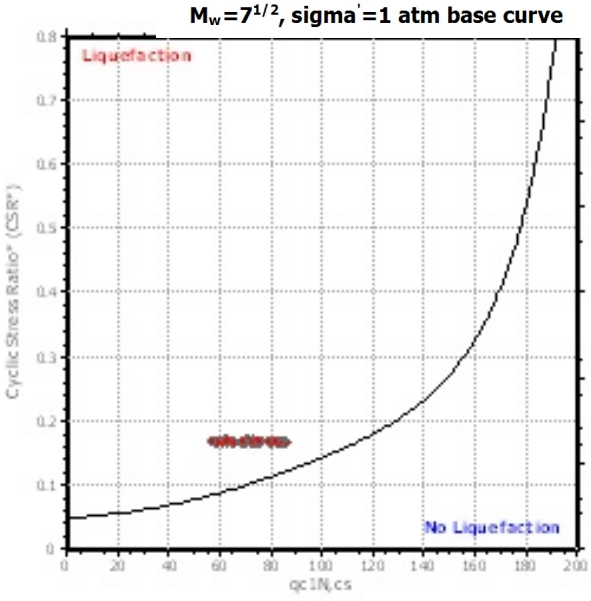
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

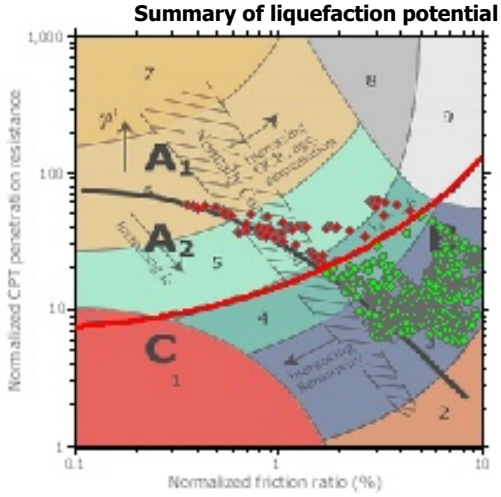
CPT file : CPTU03

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

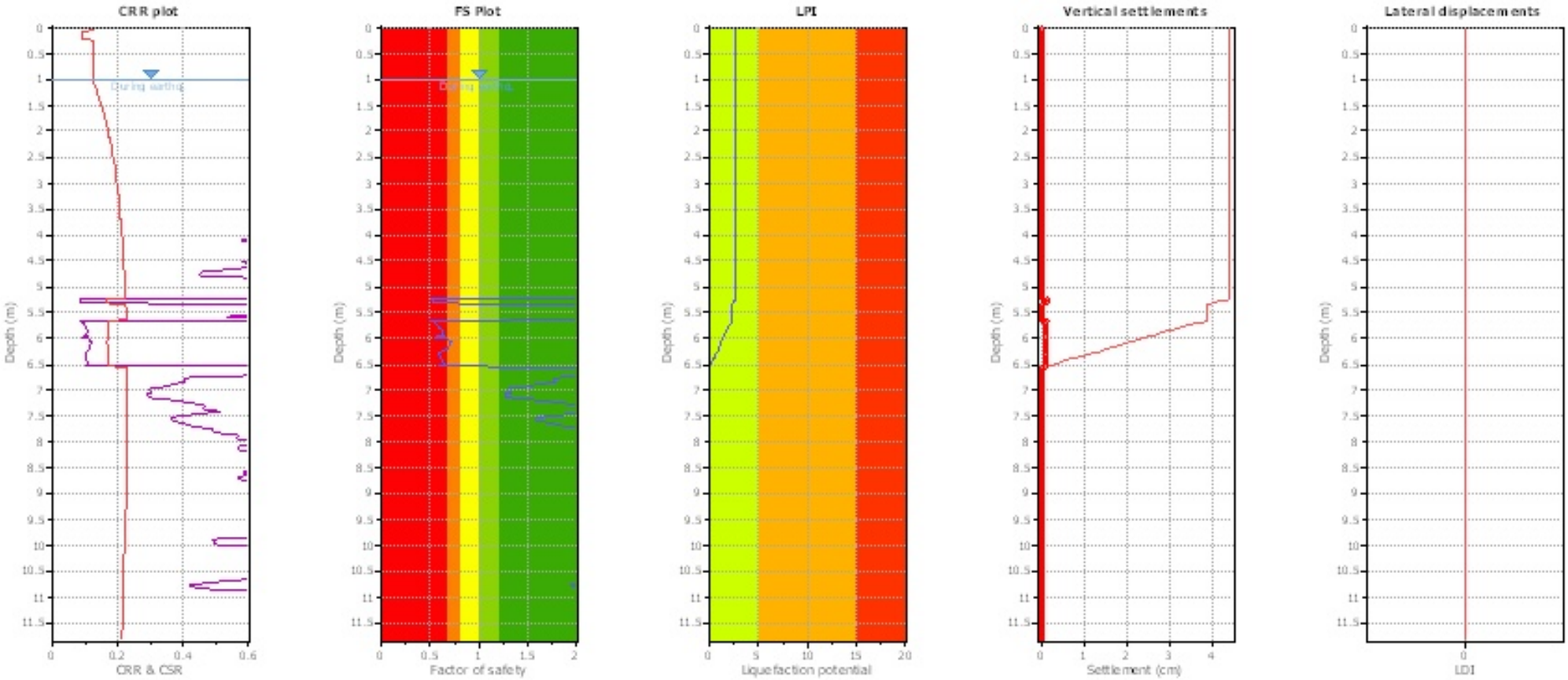






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	0.52	0.48	7.38	0.02	0.07
5.26	0.53	0.47	7.37	0.02	0.07	5.28	0.54	0.46	7.36	0.02	0.07
5.30	0.54	0.46	7.35	0.02	0.07	5.32	0.52	0.48	7.34	0.02	0.07
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	0.50	0.50	7.17	0.02	0.07	5.68	0.53	0.47	7.16	0.02	0.07
5.70	0.55	0.45	7.15	0.02	0.06	5.72	0.56	0.44	7.14	0.02	0.06
5.74	0.58	0.42	7.13	0.02	0.06	5.76	0.59	0.41	7.12	0.02	0.06

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	0.59	0.41	7.11	0.02	0.06	5.80	0.59	0.41	7.10	0.02	0.06
5.82	0.61	0.39	7.09	0.02	0.06	5.84	0.62	0.38	7.08	0.02	0.05
5.86	0.63	0.37	7.07	0.02	0.05	5.88	0.63	0.37	7.06	0.02	0.05
5.90	0.62	0.38	7.05	0.02	0.05	5.92	0.62	0.38	7.04	0.02	0.05
5.94	0.62	0.38	7.03	0.02	0.05	5.96	0.64	0.36	7.02	0.02	0.05
5.98	0.54	0.46	7.01	0.02	0.06	6.00	0.67	0.33	7.00	0.02	0.05
6.02	0.67	0.33	6.99	0.02	0.05	6.04	0.69	0.31	6.98	0.02	0.04
6.06	0.71	0.29	6.97	0.02	0.04	6.08	0.72	0.28	6.96	0.02	0.04
6.10	0.71	0.29	6.95	0.02	0.04	6.12	0.70	0.30	6.94	0.02	0.04
6.14	0.71	0.29	6.93	0.02	0.04	6.16	0.67	0.33	6.92	0.02	0.05
6.18	0.70	0.30	6.91	0.02	0.04	6.20	0.68	0.32	6.90	0.02	0.04
6.22	0.66	0.34	6.89	0.02	0.05	6.24	0.63	0.37	6.88	0.02	0.05
6.26	0.61	0.39	6.87	0.02	0.05	6.28	0.60	0.40	6.86	0.02	0.06
6.30	0.59	0.41	6.85	0.02	0.06	6.32	0.59	0.41	6.84	0.02	0.06
6.34	0.60	0.40	6.83	0.02	0.05	6.36	0.60	0.40	6.82	0.02	0.05
6.38	0.60	0.40	6.81	0.02	0.05	6.40	0.61	0.39	6.80	0.02	0.05
6.42	0.62	0.38	6.79	0.02	0.05	6.44	0.63	0.37	6.78	0.02	0.05
6.46	0.63	0.37	6.77	0.02	0.05	6.48	0.64	0.36	6.76	0.02	0.05
6.50	0.64	0.36	6.75	0.02	0.05	6.52	0.62	0.38	6.74	0.02	0.05
6.54	0.58	0.42	6.73	0.02	0.06	6.56	2.00	0.00	6.72	0.02	0.00
6.58	2.00	0.00	6.71	0.02	0.00	6.60	2.00	0.00	6.70	0.02	0.00
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	2.00	0.00	6.67	0.02	0.00	6.68	2.00	0.00	6.66	0.02	0.00
6.70	2.00	0.00	6.65	0.02	0.00	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	1.85	0.00	6.62	0.02	0.00
6.78	1.77	0.00	6.61	0.02	0.00	6.80	1.76	0.00	6.60	0.02	0.00
6.82	1.79	0.00	6.59	0.02	0.00	6.84	1.79	0.00	6.58	0.02	0.00
6.86	1.74	0.00	6.57	0.02	0.00	6.88	1.66	0.00	6.56	0.02	0.00
6.90	1.58	0.00	6.55	0.02	0.00	6.92	1.52	0.00	6.54	0.02	0.00
6.94	1.46	0.00	6.53	0.02	0.00	6.96	1.41	0.00	6.52	0.02	0.00
6.98	1.31	0.00	6.51	0.02	0.00	7.00	1.30	0.00	6.50	0.02	0.00
7.02	1.30	0.00	6.49	0.02	0.00	7.04	1.33	0.00	6.48	0.02	0.00
7.06	1.29	0.00	6.47	0.02	0.00	7.08	1.27	0.00	6.46	0.02	0.00
7.10	1.27	0.00	6.45	0.02	0.00	7.12	1.27	0.00	6.44	0.02	0.00
7.14	1.31	0.00	6.43	0.02	0.00	7.16	1.37	0.00	6.42	0.02	0.00
7.18	1.47	0.00	6.41	0.02	0.00	7.20	1.57	0.00	6.40	0.02	0.00
7.22	1.70	0.00	6.39	0.02	0.00	7.24	1.81	0.00	6.38	0.02	0.00
7.26	1.91	0.00	6.37	0.02	0.00	7.28	1.96	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	1.95	0.00	6.27	0.02	0.00	7.48	1.83	0.00	6.26	0.02	0.00
7.50	1.74	0.00	6.25	0.02	0.00	7.52	1.67	0.00	6.24	0.02	0.00
7.54	1.61	0.00	6.23	0.02	0.00	7.56	1.58	0.00	6.22	0.02	0.00
7.58	1.59	0.00	6.21	0.02	0.00	7.60	1.64	0.00	6.20	0.02	0.00
7.62	1.71	0.00	6.19	0.02	0.00	7.64	1.74	0.00	6.18	0.02	0.00
7.66	1.77	0.00	6.17	0.02	0.00	7.68	1.80	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.70	1.89	0.00	6.15	0.02	0.00	7.72	1.99	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.52	2.00	0.00	5.74	0.02	0.00
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	2.00	0.00	5.70	0.02	0.00
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	2.00	0.00	5.64	0.02	0.00
8.74	2.00	0.00	5.63	0.02	0.00	8.76	2.00	0.00	5.62	0.02	0.00
8.78	2.00	0.00	5.61	0.02	0.00	8.80	2.00	0.00	5.60	0.02	0.00
8.82	2.00	0.00	5.59	0.02	0.00	8.84	2.00	0.00	5.58	0.02	0.00
8.86	2.00	0.00	5.57	0.02	0.00	8.88	2.00	0.00	5.56	0.02	0.00
8.90	2.00	0.00	5.55	0.02	0.00	8.92	2.00	0.00	5.54	0.02	0.00
8.94	2.00	0.00	5.53	0.02	0.00	8.96	2.00	0.00	5.52	0.02	0.00
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	2.00	0.00	5.34	0.02	0.00
9.34	2.00	0.00	5.33	0.02	0.00	9.36	2.00	0.00	5.32	0.02	0.00
9.38	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.66	2.00	0.00	5.17	0.02	0.00	9.68	2.00	0.00	5.16	0.02	0.00
9.70	2.00	0.00	5.15	0.02	0.00	9.72	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.11	0.02	0.00	9.79	2.00	0.00	5.10	0.02	0.00
9.81	2.00	0.00	5.09	0.02	0.00	9.83	2.00	0.00	5.08	0.02	0.00
9.85	2.00	0.00	5.07	0.02	0.00	9.87	2.00	0.00	5.06	0.02	0.00
9.89	2.00	0.00	5.05	0.02	0.00	9.91	2.00	0.00	5.04	0.02	0.00
9.93	2.00	0.00	5.03	0.02	0.00	9.95	2.00	0.00	5.02	0.02	0.00
9.97	2.00	0.00	5.01	0.02	0.00	9.99	2.00	0.00	5.00	0.02	0.00
10.01	2.00	0.00	4.99	0.02	0.00	10.03	2.00	0.00	4.98	0.02	0.00
10.05	2.00	0.00	4.97	0.02	0.00	10.07	2.00	0.00	4.96	0.02	0.00
10.09	2.00	0.00	4.95	0.02	0.00	10.11	2.00	0.00	4.94	0.02	0.00
10.13	2.00	0.00	4.93	0.02	0.00	10.15	2.00	0.00	4.92	0.02	0.00
10.17	2.00	0.00	4.91	0.02	0.00	10.19	2.00	0.00	4.90	0.02	0.00
10.21	2.00	0.00	4.89	0.02	0.00	10.23	2.00	0.00	4.88	0.02	0.00
10.25	2.00	0.00	4.87	0.02	0.00	10.27	2.00	0.00	4.86	0.02	0.00
10.29	2.00	0.00	4.85	0.02	0.00	10.31	2.00	0.00	4.84	0.02	0.00
10.33	2.00	0.00	4.83	0.02	0.00	10.35	2.00	0.00	4.82	0.02	0.00
10.37	2.00	0.00	4.81	0.02	0.00	10.39	2.00	0.00	4.80	0.02	0.00
10.41	2.00	0.00	4.79	0.02	0.00	10.43	2.00	0.00	4.78	0.02	0.00
10.45	2.00	0.00	4.77	0.02	0.00	10.47	2.00	0.00	4.76	0.02	0.00
10.49	2.00	0.00	4.75	0.02	0.00	10.51	2.00	0.00	4.74	0.02	0.00
10.53	2.00	0.00	4.73	0.02	0.00	10.55	2.00	0.00	4.72	0.02	0.00
10.57	2.00	0.00	4.71	0.02	0.00	10.59	2.00	0.00	4.70	0.02	0.00
10.61	2.00	0.00	4.69	0.02	0.00	10.63	2.00	0.00	4.68	0.02	0.00
10.65	2.00	0.00	4.67	0.02	0.00	10.67	2.00	0.00	4.66	0.02	0.00
10.69	2.00	0.00	4.65	0.02	0.00	10.71	2.00	0.00	4.64	0.02	0.00
10.73	2.00	0.00	4.63	0.02	0.00	10.75	1.98	0.00	4.62	0.02	0.00
10.77	1.94	0.00	4.61	0.02	0.00	10.79	1.95	0.00	4.60	0.02	0.00
10.81	2.00	0.00	4.59	0.02	0.00	10.83	2.00	0.00	4.58	0.02	0.00
10.85	2.00	0.00	4.57	0.02	0.00	10.87	2.00	0.00	4.56	0.02	0.00
10.89	2.00	0.00	4.55	0.02	0.00	10.91	2.00	0.00	4.54	0.02	0.00
10.93	2.00	0.00	4.53	0.02	0.00	10.95	2.00	0.00	4.52	0.02	0.00
10.97	2.00	0.00	4.51	0.02	0.00	10.99	2.00	0.00	4.50	0.02	0.00
11.01	2.00	0.00	4.49	0.02	0.00	11.03	2.00	0.00	4.48	0.02	0.00
11.05	2.00	0.00	4.47	0.02	0.00	11.07	2.00	0.00	4.46	0.02	0.00
11.09	2.00	0.00	4.45	0.02	0.00	11.11	2.00	0.00	4.44	0.02	0.00
11.13	2.00	0.00	4.43	0.02	0.00	11.15	2.00	0.00	4.42	0.02	0.00
11.17	2.00	0.00	4.41	0.02	0.00	11.19	2.00	0.00	4.40	0.02	0.00
11.21	2.00	0.00	4.39	0.02	0.00	11.23	2.00	0.00	4.38	0.02	0.00
11.25	2.00	0.00	4.37	0.02	0.00	11.27	2.00	0.00	4.36	0.02	0.00
11.29	2.00	0.00	4.35	0.02	0.00	11.31	2.00	0.00	4.34	0.02	0.00
11.33	2.00	0.00	4.33	0.02	0.00	11.35	2.00	0.00	4.32	0.02	0.00
11.37	2.00	0.00	4.31	0.02	0.00	11.39	2.00	0.00	4.30	0.02	0.00
11.41	2.00	0.00	4.29	0.02	0.00	11.43	2.00	0.00	4.28	0.02	0.00
11.45	2.00	0.00	4.27	0.02	0.00	11.47	2.00	0.00	4.26	0.02	0.00
11.49	2.00	0.00	4.25	0.02	0.00	11.51	2.00	0.00	4.24	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.53	2.00	0.00	4.23	0.02	0.00	11.55	2.00	0.00	4.22	0.02	0.00
11.57	2.00	0.00	4.22	0.02	0.00	11.59	2.00	0.00	4.21	0.02	0.00
11.61	2.00	0.00	4.20	0.02	0.00	11.63	2.00	0.00	4.19	0.02	0.00
11.65	2.00	0.00	4.18	0.02	0.00	11.67	2.00	0.00	4.17	0.02	0.00
11.69	2.00	0.00	4.16	0.02	0.00	11.71	2.00	0.00	4.15	0.02	0.00
11.73	2.00	0.00	4.14	0.02	0.00	11.75	2.00	0.00	4.13	0.02	0.00
11.77	2.00	0.00	4.12	0.02	0.00	11.79	2.00	0.00	4.11	0.02	0.00
11.81	2.00	0.00	4.10	0.02	0.00						

Overall liquefaction potential: 2.69

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

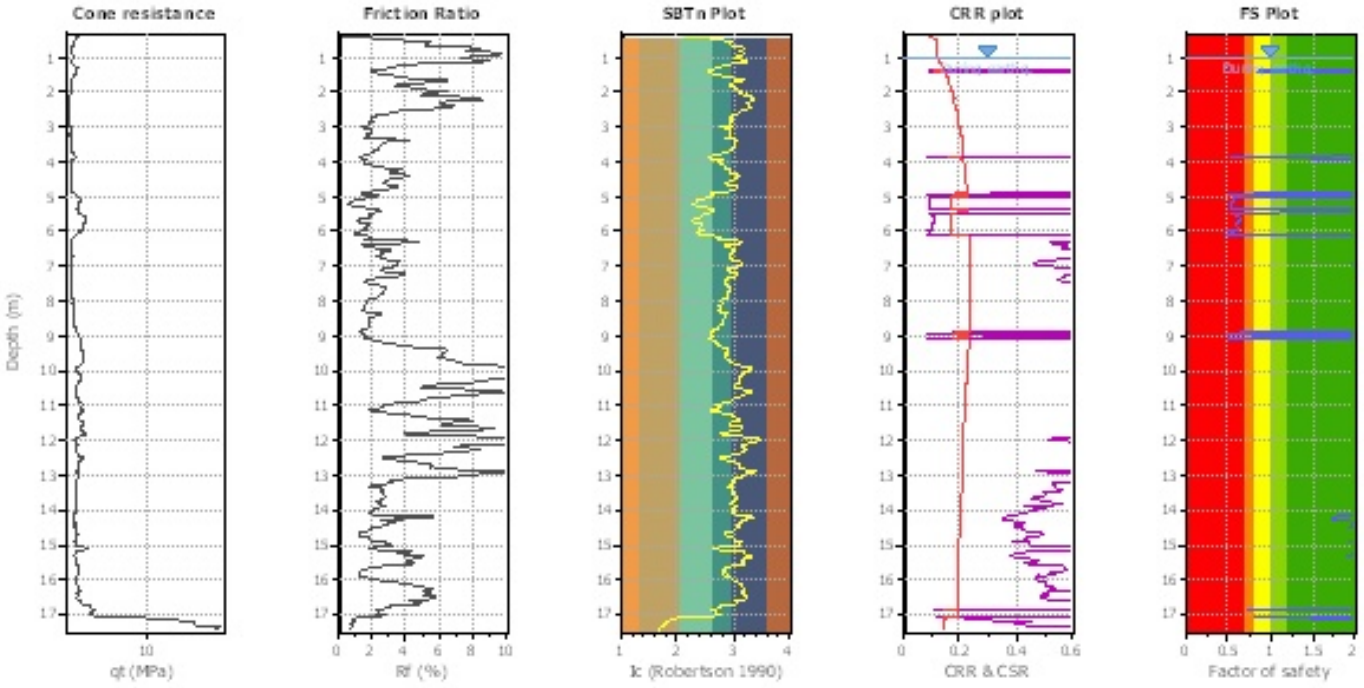
LIQUEFACTION ANALYSIS REPORT

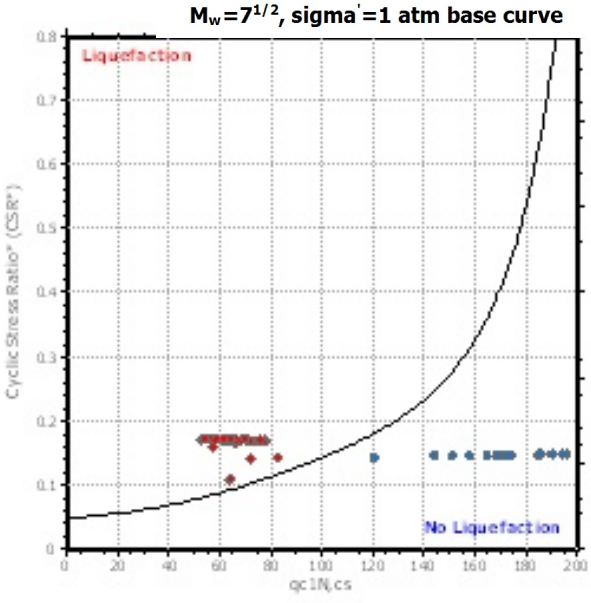
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

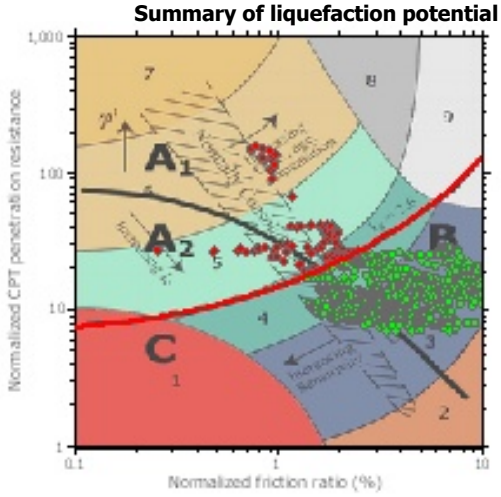
CPT file : CPTU04

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

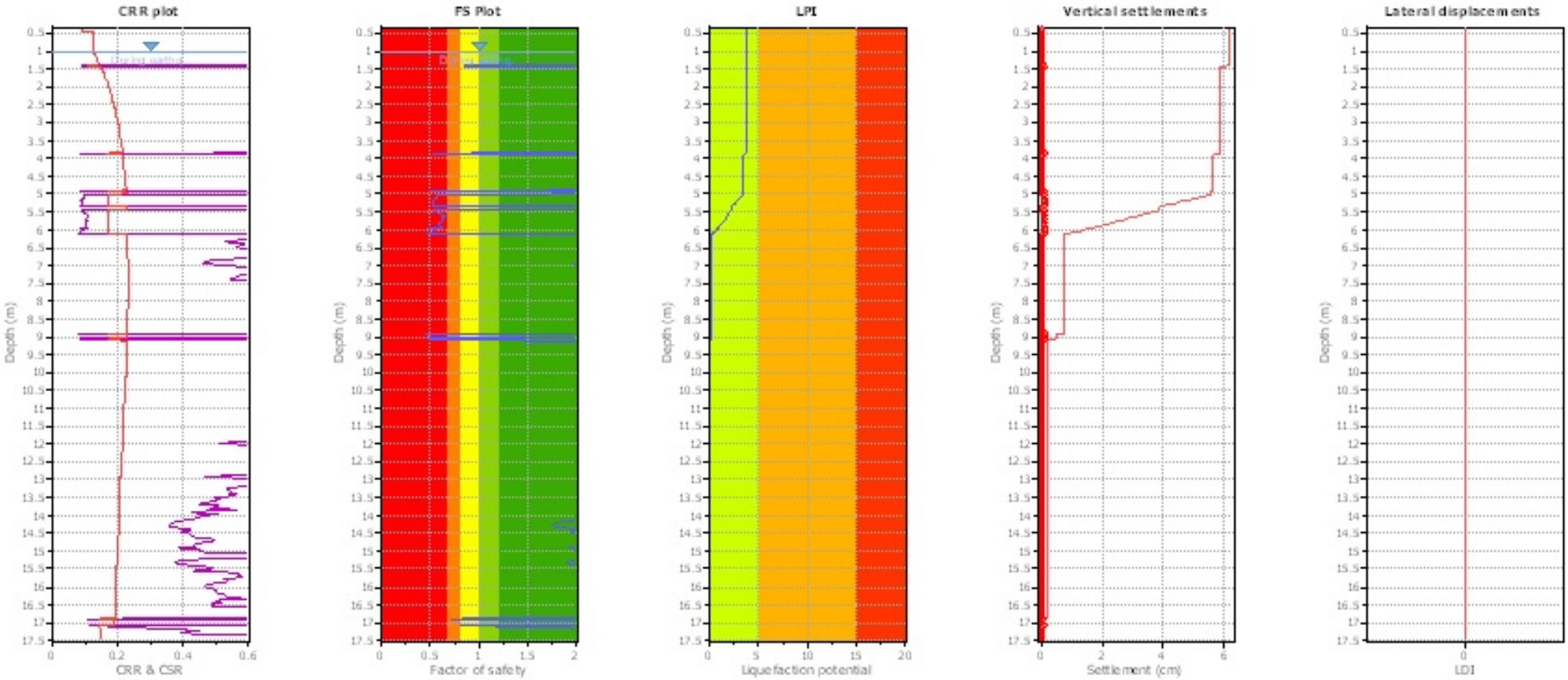






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	0.85	0.15	9.31	0.02	0.03	1.40	0.85	0.15	9.30	0.02	0.03
1.42	0.85	0.15	9.29	0.02	0.03	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00
3.86	0.53	0.47	8.07	0.02	0.08	3.88	0.53	0.47	8.06	0.02	0.08
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	0.50	0.50	7.54	0.02	0.08
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	0.56	0.44	7.49	0.02	0.07	5.04	0.56	0.44	7.48	0.02	0.07
5.06	0.57	0.43	7.47	0.02	0.06	5.08	0.56	0.44	7.46	0.02	0.07
5.10	0.56	0.44	7.45	0.02	0.07	5.12	0.56	0.44	7.44	0.02	0.07
5.14	0.55	0.45	7.43	0.02	0.07	5.16	0.54	0.46	7.42	0.02	0.07
5.18	0.53	0.47	7.41	0.02	0.07	5.20	0.53	0.47	7.40	0.02	0.07
5.22	0.53	0.47	7.39	0.02	0.07	5.24	0.54	0.46	7.38	0.02	0.07
5.26	0.54	0.46	7.37	0.02	0.07	5.28	0.54	0.46	7.36	0.02	0.07
5.30	0.53	0.47	7.35	0.02	0.07	5.32	0.53	0.47	7.34	0.02	0.07
5.34	0.53	0.47	7.33	0.02	0.07	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	0.53	0.47	7.27	0.02	0.07	5.48	0.54	0.46	7.26	0.02	0.07
5.50	0.56	0.44	7.25	0.02	0.06	5.52	0.57	0.43	7.24	0.02	0.06
5.54	0.59	0.41	7.23	0.02	0.06	5.56	0.60	0.40	7.22	0.02	0.06
5.58	0.63	0.37	7.21	0.02	0.05	5.60	0.64	0.36	7.20	0.02	0.05
5.62	0.65	0.35	7.19	0.02	0.05	5.64	0.64	0.36	7.18	0.02	0.05
5.66	0.64	0.36	7.17	0.02	0.05	5.68	0.63	0.37	7.16	0.02	0.05
5.70	0.62	0.38	7.15	0.02	0.05	5.72	0.62	0.38	7.14	0.02	0.05
5.74	0.63	0.37	7.13	0.02	0.05	5.76	0.63	0.37	7.12	0.02	0.05
5.78	0.62	0.38	7.11	0.02	0.05	5.80	0.61	0.39	7.10	0.02	0.06
5.82	0.59	0.41	7.09	0.02	0.06	5.84	0.59	0.41	7.08	0.02	0.06
5.86	0.59	0.41	7.07	0.02	0.06	5.88	0.60	0.40	7.06	0.02	0.06
5.90	0.60	0.40	7.05	0.02	0.06	5.92	0.62	0.38	7.04	0.02	0.05
5.94	0.62	0.38	7.03	0.02	0.05	5.95	0.63	0.37	7.02	0.02	0.05
5.97	0.47	0.53	7.01	0.02	0.07	5.99	0.58	0.42	7.00	0.02	0.06
6.01	0.54	0.46	6.99	0.02	0.06	6.03	0.52	0.48	6.98	0.02	0.07
6.05	0.50	0.50	6.97	0.02	0.07	6.07	0.49	0.51	6.96	0.02	0.07
6.09	0.49	0.51	6.95	0.02	0.07	6.11	0.48	0.52	6.94	0.02	0.07

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
6.13	2.00	0.00	6.93	0.02	0.00	6.15	2.00	0.00	6.92	0.02	0.00
6.17	2.00	0.00	6.91	0.02	0.00	6.19	2.00	0.00	6.90	0.02	0.00
6.21	2.00	0.00	6.89	0.02	0.00	6.23	2.00	0.00	6.88	0.02	0.00
6.25	2.00	0.00	6.87	0.02	0.00	6.27	2.00	0.00	6.86	0.02	0.00
6.29	2.00	0.00	6.85	0.02	0.00	6.31	2.00	0.00	6.84	0.02	0.00
6.33	2.00	0.00	6.83	0.02	0.00	6.35	2.00	0.00	6.82	0.02	0.00
6.37	2.00	0.00	6.81	0.02	0.00	6.39	2.00	0.00	6.80	0.02	0.00
6.41	2.00	0.00	6.79	0.02	0.00	6.43	2.00	0.00	6.78	0.02	0.00
6.45	2.00	0.00	6.77	0.02	0.00	6.47	2.00	0.00	6.76	0.02	0.00
6.49	2.00	0.00	6.75	0.02	0.00	6.51	2.00	0.00	6.74	0.02	0.00
6.53	2.00	0.00	6.73	0.02	0.00	6.55	2.00	0.00	6.72	0.02	0.00
6.57	2.00	0.00	6.71	0.02	0.00	6.59	2.00	0.00	6.70	0.02	0.00
6.61	2.00	0.00	6.69	0.02	0.00	6.63	2.00	0.00	6.68	0.02	0.00
6.65	2.00	0.00	6.67	0.02	0.00	6.67	2.00	0.00	6.66	0.02	0.00
6.69	2.00	0.00	6.65	0.02	0.00	6.71	2.00	0.00	6.64	0.02	0.00
6.73	2.00	0.00	6.63	0.02	0.00	6.75	2.00	0.00	6.62	0.02	0.00
6.77	2.00	0.00	6.61	0.02	0.00	6.79	2.00	0.00	6.60	0.02	0.00
6.81	2.00	0.00	6.59	0.02	0.00	6.83	2.00	0.00	6.58	0.02	0.00
6.85	2.00	0.00	6.57	0.02	0.00	6.87	2.00	0.00	6.56	0.02	0.00
6.89	2.00	0.00	6.55	0.02	0.00	6.91	1.99	0.00	6.54	0.02	0.00
6.93	1.96	0.00	6.53	0.02	0.00	6.95	2.00	0.00	6.52	0.02	0.00
6.97	2.00	0.00	6.51	0.02	0.00	6.99	2.00	0.00	6.50	0.02	0.00
7.01	2.00	0.00	6.49	0.02	0.00	7.03	2.00	0.00	6.48	0.02	0.00
7.05	2.00	0.00	6.47	0.02	0.00	7.07	2.00	0.00	6.46	0.02	0.00
7.09	2.00	0.00	6.45	0.02	0.00	7.11	2.00	0.00	6.44	0.02	0.00
7.13	2.00	0.00	6.43	0.02	0.00	7.15	2.00	0.00	6.42	0.02	0.00
7.17	2.00	0.00	6.41	0.02	0.00	7.19	2.00	0.00	6.40	0.02	0.00
7.21	2.00	0.00	6.39	0.02	0.00	7.23	2.00	0.00	6.38	0.02	0.00
7.25	2.00	0.00	6.37	0.02	0.00	7.27	2.00	0.00	6.36	0.02	0.00
7.29	2.00	0.00	6.35	0.02	0.00	7.31	2.00	0.00	6.34	0.02	0.00
7.33	2.00	0.00	6.33	0.02	0.00	7.35	2.00	0.00	6.32	0.02	0.00
7.37	2.00	0.00	6.31	0.02	0.00	7.39	2.00	0.00	6.30	0.02	0.00
7.41	2.00	0.00	6.29	0.02	0.00	7.43	2.00	0.00	6.28	0.02	0.00
7.45	2.00	0.00	6.27	0.02	0.00	7.47	2.00	0.00	6.26	0.02	0.00
7.49	2.00	0.00	6.25	0.02	0.00	7.51	2.00	0.00	6.24	0.02	0.00
7.53	2.00	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	2.00	0.00	6.11	0.02	0.00	7.79	2.00	0.00	6.10	0.02	0.00
7.81	2.00	0.00	6.09	0.02	0.00	7.83	2.00	0.00	6.08	0.02	0.00
7.85	2.00	0.00	6.07	0.02	0.00	7.87	2.00	0.00	6.06	0.02	0.00
7.89	2.00	0.00	6.05	0.02	0.00	7.91	2.00	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	2.00	0.00	6.00	0.02	0.00
8.01	2.00	0.00	5.99	0.02	0.00	8.03	2.00	0.00	5.98	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
8.05	2.00	0.00	5.97	0.02	0.00	8.07	2.00	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	2.00	0.00	5.83	0.02	0.00	8.35	2.00	0.00	5.82	0.02	0.00
8.37	2.00	0.00	5.81	0.02	0.00	8.39	2.00	0.00	5.80	0.02	0.00
8.41	2.00	0.00	5.79	0.02	0.00	8.43	2.00	0.00	5.78	0.02	0.00
8.45	2.00	0.00	5.77	0.02	0.00	8.47	2.00	0.00	5.76	0.02	0.00
8.49	2.00	0.00	5.76	0.02	0.00	8.51	2.00	0.00	5.75	0.02	0.00
8.53	2.00	0.00	5.74	0.02	0.00	8.55	2.00	0.00	5.73	0.02	0.00
8.57	2.00	0.00	5.72	0.02	0.00	8.59	2.00	0.00	5.71	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.83	2.00	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	0.46	0.54	5.55	0.02	0.06
8.93	0.47	0.53	5.54	0.02	0.06	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	0.49	0.51	5.48	0.02	0.06	9.07	0.53	0.47	5.47	0.02	0.05
9.09	0.50	0.50	5.46	0.02	0.05	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.19	2.00	0.00	5.41	0.02	0.00
9.21	2.00	0.00	5.40	0.02	0.00	9.23	2.00	0.00	5.39	0.02	0.00
9.25	2.00	0.00	5.38	0.02	0.00	9.27	2.00	0.00	5.37	0.02	0.00
9.29	2.00	0.00	5.36	0.02	0.00	9.31	2.00	0.00	5.35	0.02	0.00
9.33	2.00	0.00	5.34	0.02	0.00	9.35	2.00	0.00	5.33	0.02	0.00
9.37	2.00	0.00	5.32	0.02	0.00	9.39	2.00	0.00	5.31	0.02	0.00
9.41	2.00	0.00	5.30	0.02	0.00	9.43	2.00	0.00	5.29	0.02	0.00
9.45	2.00	0.00	5.28	0.02	0.00	9.47	2.00	0.00	5.27	0.02	0.00
9.49	2.00	0.00	5.26	0.02	0.00	9.51	2.00	0.00	5.25	0.02	0.00
9.53	2.00	0.00	5.24	0.02	0.00	9.55	2.00	0.00	5.23	0.02	0.00
9.57	2.00	0.00	5.22	0.02	0.00	9.59	2.00	0.00	5.21	0.02	0.00
9.61	2.00	0.00	5.20	0.02	0.00	9.63	2.00	0.00	5.19	0.02	0.00
9.65	2.00	0.00	5.18	0.02	0.00	9.67	2.00	0.00	5.17	0.02	0.00
9.69	2.00	0.00	5.16	0.02	0.00	9.71	2.00	0.00	5.15	0.02	0.00
9.73	2.00	0.00	5.14	0.02	0.00	9.75	2.00	0.00	5.13	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.79	2.00	0.00	5.11	0.02	0.00
9.81	2.00	0.00	5.10	0.02	0.00	9.83	2.00	0.00	5.09	0.02	0.00
9.85	2.00	0.00	5.08	0.02	0.00	9.87	2.00	0.00	5.07	0.02	0.00
9.89	2.00	0.00	5.06	0.02	0.00	9.91	2.00	0.00	5.05	0.02	0.00
9.93	2.00	0.00	5.04	0.02	0.00	9.95	2.00	0.00	5.03	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.97	2.00	0.00	5.02	0.02	0.00	9.99	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	2.00	0.00	4.59	0.02	0.00
10.84	2.00	0.00	4.58	0.02	0.00	10.86	2.00	0.00	4.57	0.02	0.00
10.88	2.00	0.00	4.56	0.02	0.00	10.90	2.00	0.00	4.55	0.02	0.00
10.92	2.00	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.98	2.00	0.00	4.51	0.02	0.00
11.00	2.00	0.00	4.50	0.02	0.00	11.02	2.00	0.00	4.49	0.02	0.00
11.04	2.00	0.00	4.48	0.02	0.00	11.06	2.00	0.00	4.47	0.02	0.00
11.08	2.00	0.00	4.46	0.02	0.00	11.10	2.00	0.00	4.45	0.02	0.00
11.12	2.00	0.00	4.44	0.02	0.00	11.14	2.00	0.00	4.43	0.02	0.00
11.16	2.00	0.00	4.42	0.02	0.00	11.18	2.00	0.00	4.41	0.02	0.00
11.20	2.00	0.00	4.40	0.02	0.00	11.22	2.00	0.00	4.39	0.02	0.00
11.24	2.00	0.00	4.38	0.02	0.00	11.26	2.00	0.00	4.37	0.02	0.00
11.28	2.00	0.00	4.36	0.02	0.00	11.30	2.00	0.00	4.35	0.02	0.00
11.32	2.00	0.00	4.34	0.02	0.00	11.34	2.00	0.00	4.33	0.02	0.00
11.36	2.00	0.00	4.32	0.02	0.00	11.38	2.00	0.00	4.31	0.02	0.00
11.40	2.00	0.00	4.30	0.02	0.00	11.42	2.00	0.00	4.29	0.02	0.00
11.44	2.00	0.00	4.28	0.02	0.00	11.46	2.00	0.00	4.27	0.02	0.00
11.48	2.00	0.00	4.26	0.02	0.00	11.50	2.00	0.00	4.25	0.02	0.00
11.52	2.00	0.00	4.24	0.02	0.00	11.54	2.00	0.00	4.23	0.02	0.00
11.56	2.00	0.00	4.22	0.02	0.00	11.58	2.00	0.00	4.21	0.02	0.00
11.60	2.00	0.00	4.20	0.02	0.00	11.62	2.00	0.00	4.19	0.02	0.00
11.64	2.00	0.00	4.18	0.02	0.00	11.66	2.00	0.00	4.17	0.02	0.00
11.68	2.00	0.00	4.16	0.02	0.00	11.70	2.00	0.00	4.15	0.02	0.00
11.72	2.00	0.00	4.14	0.02	0.00	11.74	2.00	0.00	4.13	0.02	0.00
11.76	2.00	0.00	4.12	0.02	0.00	11.78	2.00	0.00	4.11	0.02	0.00
11.80	2.00	0.00	4.10	0.02	0.00	11.82	2.00	0.00	4.09	0.02	0.00
11.84	2.00	0.00	4.08	0.02	0.00	11.85	2.00	0.00	4.07	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.87	2.00	0.00	4.06	0.02	0.00	11.89	2.00	0.00	4.05	0.02	0.00
11.91	2.00	0.00	4.04	0.02	0.00	11.93	2.00	0.00	4.03	0.02	0.00
11.95	2.00	0.00	4.02	0.02	0.00	11.97	2.00	0.00	4.01	0.02	0.00
11.99	2.00	0.00	4.00	0.02	0.00	12.01	2.00	0.00	3.99	0.02	0.00
12.03	2.00	0.00	3.98	0.02	0.00	12.05	2.00	0.00	3.97	0.02	0.00
12.07	2.00	0.00	3.96	0.02	0.00	12.09	2.00	0.00	3.95	0.02	0.00
12.11	2.00	0.00	3.94	0.02	0.00	12.13	2.00	0.00	3.93	0.02	0.00
12.15	2.00	0.00	3.92	0.02	0.00	12.17	2.00	0.00	3.91	0.02	0.00
12.19	2.00	0.00	3.90	0.02	0.00	12.21	2.00	0.00	3.89	0.02	0.00
12.23	2.00	0.00	3.88	0.02	0.00	12.25	2.00	0.00	3.87	0.02	0.00
12.27	2.00	0.00	3.86	0.02	0.00	12.29	2.00	0.00	3.85	0.02	0.00
12.31	2.00	0.00	3.84	0.02	0.00	12.33	2.00	0.00	3.83	0.02	0.00
12.35	2.00	0.00	3.82	0.02	0.00	12.37	2.00	0.00	3.81	0.02	0.00
12.39	2.00	0.00	3.80	0.02	0.00	12.41	2.00	0.00	3.79	0.02	0.00
12.43	2.00	0.00	3.78	0.02	0.00	12.45	2.00	0.00	3.77	0.02	0.00
12.47	2.00	0.00	3.76	0.02	0.00	12.49	2.00	0.00	3.75	0.02	0.00
12.51	2.00	0.00	3.74	0.02	0.00	12.53	2.00	0.00	3.73	0.02	0.00
12.55	2.00	0.00	3.73	0.02	0.00	12.57	2.00	0.00	3.72	0.02	0.00
12.59	2.00	0.00	3.71	0.02	0.00	12.61	2.00	0.00	3.70	0.02	0.00
12.63	2.00	0.00	3.69	0.02	0.00	12.65	2.00	0.00	3.68	0.02	0.00
12.67	2.00	0.00	3.67	0.02	0.00	12.69	2.00	0.00	3.66	0.02	0.00
12.71	2.00	0.00	3.65	0.02	0.00	12.73	2.00	0.00	3.64	0.02	0.00
12.75	2.00	0.00	3.63	0.02	0.00	12.77	2.00	0.00	3.62	0.02	0.00
12.79	2.00	0.00	3.61	0.02	0.00	12.81	2.00	0.00	3.60	0.02	0.00
12.83	2.00	0.00	3.59	0.02	0.00	12.85	2.00	0.00	3.58	0.02	0.00
12.87	2.00	0.00	3.57	0.02	0.00	12.89	2.00	0.00	3.56	0.02	0.00
12.91	2.00	0.00	3.55	0.02	0.00	12.93	2.00	0.00	3.54	0.02	0.00
12.95	2.00	0.00	3.53	0.02	0.00	12.97	2.00	0.00	3.52	0.02	0.00
12.99	2.00	0.00	3.51	0.02	0.00	13.01	2.00	0.00	3.50	0.02	0.00
13.03	2.00	0.00	3.49	0.02	0.00	13.05	2.00	0.00	3.48	0.02	0.00
13.07	2.00	0.00	3.47	0.02	0.00	13.09	2.00	0.00	3.46	0.02	0.00
13.11	2.00	0.00	3.45	0.02	0.00	13.13	2.00	0.00	3.44	0.02	0.00
13.15	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	1.96	0.00	2.93	0.02	0.00	14.16	1.93	0.00	2.92	0.02	0.00
14.18	1.91	0.00	2.91	0.02	0.00	14.20	1.85	0.00	2.90	0.02	0.00
14.22	1.80	0.00	2.89	0.02	0.00	14.24	1.77	0.00	2.88	0.02	0.00
14.25	1.75	0.00	2.87	0.02	0.00	14.27	1.76	0.00	2.86	0.02	0.00
14.29	1.76	0.00	2.85	0.02	0.00	14.31	1.78	0.00	2.84	0.02	0.00
14.33	1.83	0.00	2.83	0.02	0.00	14.35	1.94	0.00	2.82	0.02	0.00
14.37	2.00	0.00	2.81	0.02	0.00	14.39	2.00	0.00	2.80	0.02	0.00
14.41	2.00	0.00	2.79	0.02	0.00	14.43	1.98	0.00	2.78	0.02	0.00
14.45	1.94	0.00	2.77	0.02	0.00	14.47	1.96	0.00	2.76	0.02	0.00
14.49	2.00	0.00	2.75	0.02	0.00	14.51	2.00	0.00	2.74	0.02	0.00
14.53	2.00	0.00	2.73	0.02	0.00	14.55	2.00	0.00	2.72	0.02	0.00
14.57	2.00	0.00	2.71	0.02	0.00	14.59	2.00	0.00	2.70	0.02	0.00
14.61	2.00	0.00	2.69	0.02	0.00	14.63	2.00	0.00	2.68	0.02	0.00
14.65	2.00	0.00	2.67	0.02	0.00	14.67	2.00	0.00	2.66	0.02	0.00
14.69	2.00	0.00	2.65	0.02	0.00	14.71	2.00	0.00	2.64	0.02	0.00
14.73	2.00	0.00	2.64	0.02	0.00	14.75	2.00	0.00	2.63	0.02	0.00
14.77	2.00	0.00	2.62	0.02	0.00	14.79	2.00	0.00	2.61	0.02	0.00
14.81	2.00	0.00	2.60	0.02	0.00	14.83	2.00	0.00	2.59	0.02	0.00
14.85	2.00	0.00	2.58	0.02	0.00	14.87	2.00	0.00	2.57	0.02	0.00
14.89	1.93	0.00	2.56	0.02	0.00	14.91	1.95	0.00	2.55	0.02	0.00
14.93	1.97	0.00	2.54	0.02	0.00	14.95	2.00	0.00	2.53	0.02	0.00
14.97	2.00	0.00	2.52	0.02	0.00	14.99	2.00	0.00	2.51	0.02	0.00
15.01	2.00	0.00	2.50	0.02	0.00	15.03	2.00	0.00	2.49	0.02	0.00
15.05	2.00	0.00	2.48	0.02	0.00	15.07	2.00	0.00	2.47	0.02	0.00
15.09	2.00	0.00	2.46	0.02	0.00	15.11	2.00	0.00	2.45	0.02	0.00
15.13	2.00	0.00	2.44	0.02	0.00	15.15	2.00	0.00	2.43	0.02	0.00
15.17	2.00	0.00	2.42	0.02	0.00	15.18	2.00	0.00	2.41	0.02	0.00
15.20	2.00	0.00	2.40	0.02	0.00	15.22	2.00	0.00	2.39	0.02	0.00
15.24	2.00	0.00	2.38	0.02	0.00	15.26	1.98	0.00	2.37	0.02	0.00
15.28	1.93	0.00	2.36	0.02	0.00	15.30	1.90	0.00	2.35	0.02	0.00
15.32	1.90	0.00	2.34	0.02	0.00	15.34	1.91	0.00	2.33	0.02	0.00
15.36	1.97	0.00	2.32	0.02	0.00	15.38	2.00	0.00	2.31	0.02	0.00
15.40	2.00	0.00	2.30	0.02	0.00	15.42	2.00	0.00	2.29	0.02	0.00
15.44	2.00	0.00	2.28	0.02	0.00	15.46	2.00	0.00	2.27	0.02	0.00
15.48	2.00	0.00	2.26	0.02	0.00	15.50	2.00	0.00	2.25	0.02	0.00
15.52	2.00	0.00	2.24	0.02	0.00	15.54	2.00	0.00	2.23	0.02	0.00
15.56	2.00	0.00	2.22	0.02	0.00	15.58	2.00	0.00	2.21	0.02	0.00
15.60	2.00	0.00	2.20	0.02	0.00	15.62	2.00	0.00	2.19	0.02	0.00
15.64	2.00	0.00	2.18	0.02	0.00	15.66	2.00	0.00	2.17	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
15.68	2.00	0.00	2.16	0.02	0.00	15.70	2.00	0.00	2.15	0.02	0.00
15.72	2.00	0.00	2.14	0.02	0.00	15.74	2.00	0.00	2.13	0.02	0.00
15.76	2.00	0.00	2.12	0.02	0.00	15.78	2.00	0.00	2.11	0.02	0.00
15.80	2.00	0.00	2.10	0.02	0.00	15.82	2.00	0.00	2.09	0.02	0.00
15.84	2.00	0.00	2.08	0.02	0.00	15.86	2.00	0.00	2.07	0.02	0.00
15.88	2.00	0.00	2.06	0.02	0.00	15.90	2.00	0.00	2.05	0.02	0.00
15.92	2.00	0.00	2.04	0.02	0.00	15.94	2.00	0.00	2.03	0.02	0.00
15.96	2.00	0.00	2.02	0.02	0.00	15.98	2.00	0.00	2.01	0.02	0.00
16.00	2.00	0.00	2.00	0.02	0.00	16.02	2.00	0.00	1.99	0.02	0.00
16.03	2.00	0.00	1.98	0.02	0.00	16.05	2.00	0.00	1.97	0.02	0.00
16.07	2.00	0.00	1.96	0.02	0.00	16.09	2.00	0.00	1.95	0.02	0.00
16.11	2.00	0.00	1.94	0.02	0.00	16.13	2.00	0.00	1.93	0.02	0.00
16.15	2.00	0.00	1.92	0.02	0.00	16.17	2.00	0.00	1.91	0.02	0.00
16.19	2.00	0.00	1.90	0.02	0.00	16.21	2.00	0.00	1.89	0.02	0.00
16.23	2.00	0.00	1.88	0.02	0.00	16.25	2.00	0.00	1.87	0.02	0.00
16.27	2.00	0.00	1.86	0.02	0.00	16.29	2.00	0.00	1.85	0.02	0.00
16.31	2.00	0.00	1.84	0.02	0.00	16.33	2.00	0.00	1.83	0.02	0.00
16.35	2.00	0.00	1.82	0.02	0.00	16.37	2.00	0.00	1.81	0.02	0.00
16.39	2.00	0.00	1.80	0.02	0.00	16.41	2.00	0.00	1.80	0.02	0.00
16.43	2.00	0.00	1.79	0.02	0.00	16.45	2.00	0.00	1.78	0.02	0.00
16.47	2.00	0.00	1.77	0.02	0.00	16.49	2.00	0.00	1.76	0.02	0.00
16.51	2.00	0.00	1.75	0.02	0.00	16.53	2.00	0.00	1.74	0.02	0.00
16.55	2.00	0.00	1.73	0.02	0.00	16.57	2.00	0.00	1.72	0.02	0.00
16.59	2.00	0.00	1.71	0.02	0.00	16.61	2.00	0.00	1.70	0.02	0.00
16.63	2.00	0.00	1.69	0.02	0.00	16.65	2.00	0.00	1.68	0.02	0.00
16.67	2.00	0.00	1.67	0.02	0.00	16.69	2.00	0.00	1.66	0.02	0.00
16.71	2.00	0.00	1.65	0.02	0.00	16.73	2.00	0.00	1.64	0.02	0.00
16.75	2.00	0.00	1.63	0.02	0.00	16.76	2.00	0.00	1.62	0.02	0.00
16.78	2.00	0.00	1.61	0.02	0.00	16.80	2.00	0.00	1.60	0.02	0.00
16.82	2.00	0.00	1.59	0.02	0.00	16.84	2.00	0.00	1.58	0.02	0.00
16.86	2.00	0.00	1.57	0.02	0.00	16.88	0.72	0.28	1.56	0.02	0.01
16.90	2.00	0.00	1.55	0.02	0.00	16.92	2.00	0.00	1.54	0.02	0.00
16.94	2.00	0.00	1.53	0.02	0.00	16.96	2.00	0.00	1.52	0.02	0.00
16.98	2.00	0.00	1.51	0.02	0.00	17.00	2.00	0.00	1.50	0.02	0.00
17.02	2.00	0.00	1.49	0.02	0.00	17.04	2.00	0.00	1.48	0.02	0.00
17.06	2.00	0.00	1.47	0.02	0.00	17.08	0.82	0.18	1.46	0.02	0.01
17.10	1.26	0.00	1.45	0.02	0.00	17.12	1.73	0.00	1.44	0.02	0.00
17.14	1.92	0.00	1.43	0.02	0.00	17.16	2.00	0.00	1.42	0.02	0.00
17.18	2.00	0.00	1.41	0.02	0.00	17.20	2.00	0.00	1.40	0.02	0.00
17.22	2.00	0.00	1.39	0.02	0.00	17.24	2.00	0.00	1.38	0.02	0.00
17.26	2.00	0.00	1.37	0.02	0.00	17.28	2.00	0.00	1.36	0.02	0.00
17.30	2.00	0.00	1.35	0.02	0.00	17.32	2.00	0.00	1.34	0.02	0.00
17.34	2.00	0.00	1.33	0.02	0.00	17.36	2.00	0.00	1.32	0.02	0.00
17.38	2.00	0.00	1.31	0.02	0.00	17.40	2.00	0.00	1.30	0.02	0.00
17.42	2.00	0.00	1.29	0.02	0.00	17.43	2.00	0.00	1.28	0.02	0.00
17.45	2.00	0.00	1.27	0.02	0.00						

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 3.75

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

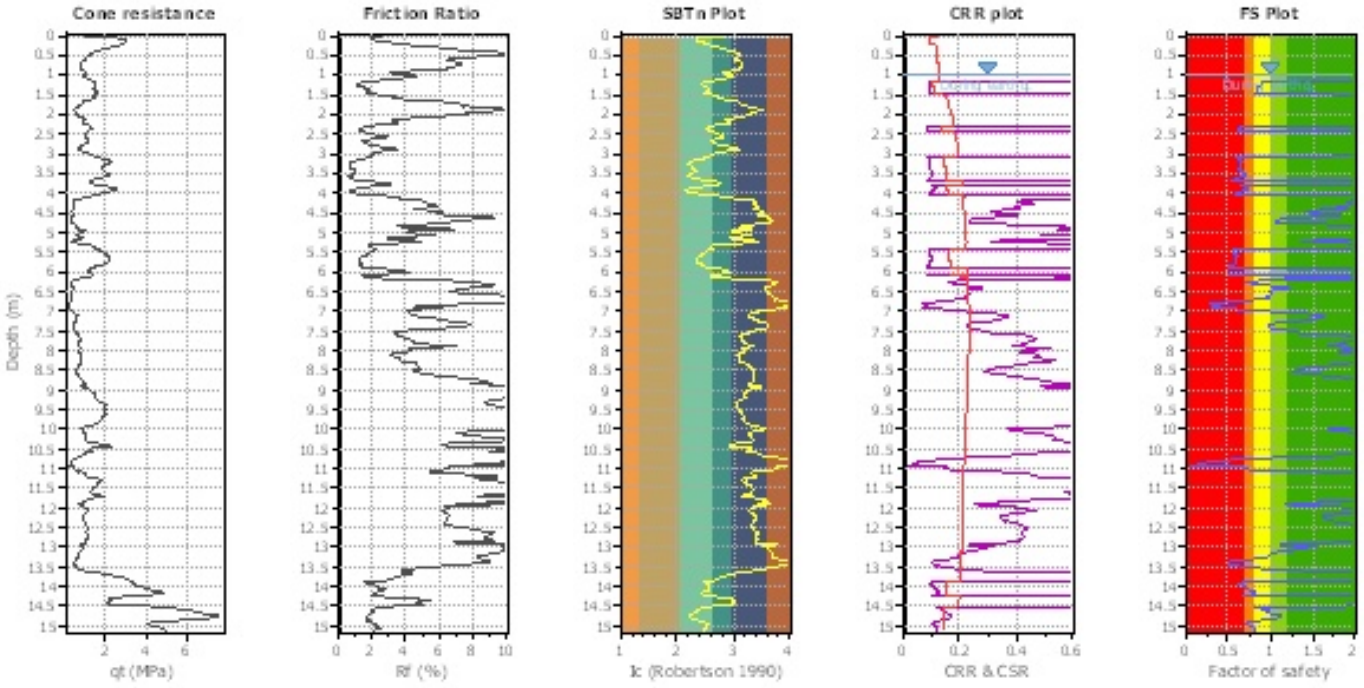
LIQUEFACTION ANALYSIS REPORT

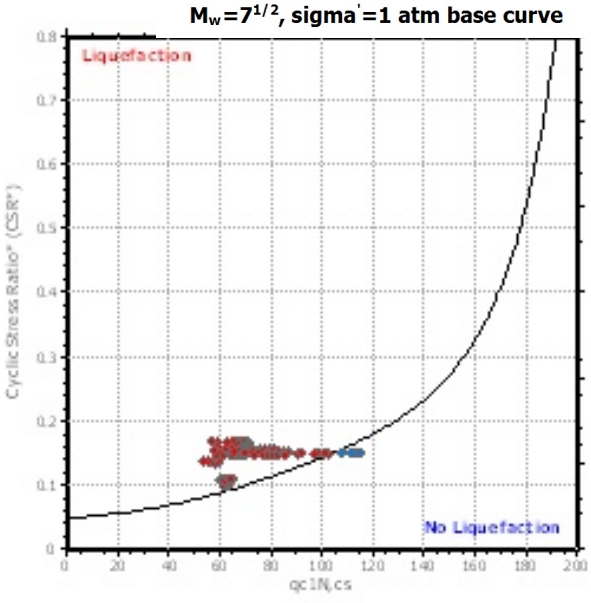
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

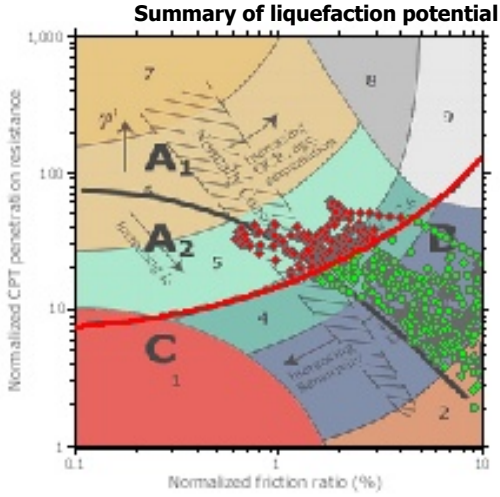
CPT file : CPTU05

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

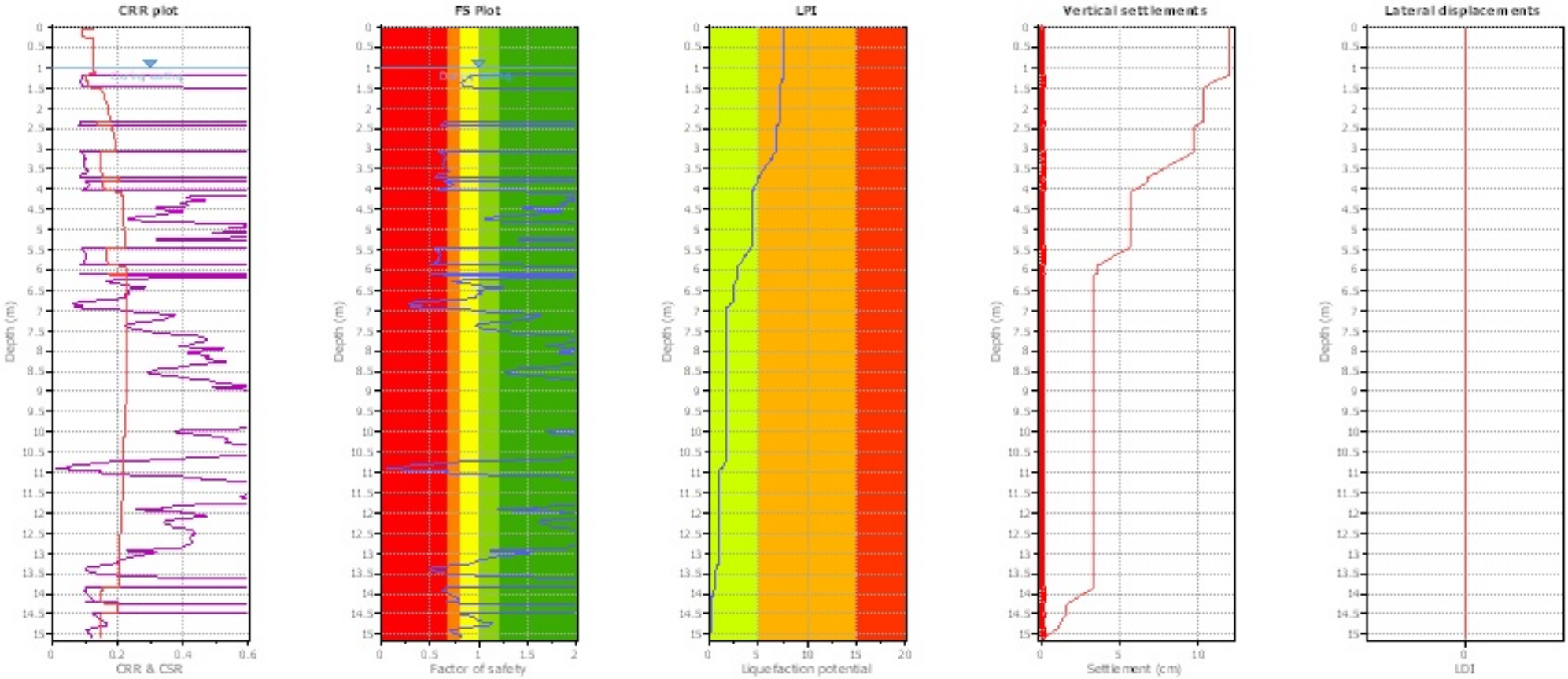






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	0.91	0.09	9.42	0.02	0.02
1.18	0.92	0.08	9.41	0.02	0.02	1.20	0.91	0.09	9.40	0.02	0.02
1.22	0.91	0.09	9.39	0.02	0.02	1.24	0.90	0.10	9.38	0.02	0.02
1.26	0.88	0.12	9.37	0.02	0.02	1.28	0.87	0.13	9.36	0.02	0.02
1.30	0.86	0.14	9.35	0.02	0.03	1.32	0.85	0.15	9.34	0.02	0.03
1.34	0.84	0.16	9.33	0.02	0.03	1.36	0.83	0.17	9.32	0.02	0.03
1.38	0.82	0.18	9.31	0.02	0.03	1.40	0.83	0.17	9.30	0.02	0.03
1.42	0.84	0.16	9.29	0.02	0.03	1.44	0.85	0.15	9.28	0.02	0.03
1.46	0.85	0.15	9.27	0.02	0.03	1.48	0.83	0.17	9.26	0.02	0.03
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	0.65	0.35	8.83	0.02	0.06	2.36	0.64	0.36	8.82	0.02	0.06
2.38	0.63	0.37	8.81	0.02	0.07	2.40	0.61	0.39	8.80	0.02	0.07
2.42	0.60	0.40	8.79	0.02	0.07	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	0.59	0.41	8.46	0.02	0.07
3.10	0.61	0.39	8.45	0.02	0.07	3.12	0.62	0.38	8.44	0.02	0.06
3.14	0.64	0.36	8.43	0.02	0.06	3.16	0.65	0.35	8.42	0.02	0.06
3.18	0.66	0.34	8.41	0.02	0.06	3.20	0.66	0.34	8.40	0.02	0.06
3.22	0.67	0.33	8.39	0.02	0.06	3.24	0.66	0.34	8.38	0.02	0.06
3.26	0.65	0.35	8.37	0.02	0.06	3.28	0.65	0.35	8.36	0.02	0.06
3.30	0.65	0.35	8.35	0.02	0.06	3.32	0.65	0.35	8.34	0.02	0.06
3.34	0.65	0.35	8.33	0.02	0.06	3.36	0.64	0.36	8.32	0.02	0.06
3.38	0.63	0.37	8.31	0.02	0.06	3.40	0.63	0.37	8.30	0.02	0.06
3.42	0.63	0.37	8.29	0.02	0.06	3.44	0.64	0.36	8.28	0.02	0.06
3.46	0.66	0.34	8.27	0.02	0.06	3.48	0.67	0.33	8.26	0.02	0.05
3.50	0.68	0.32	8.25	0.02	0.05	3.52	0.69	0.31	8.24	0.02	0.05
3.54	0.70	0.30	8.23	0.02	0.05	3.56	0.70	0.30	8.22	0.02	0.05
3.58	0.68	0.32	8.21	0.02	0.05	3.60	0.65	0.35	8.20	0.02	0.06
3.62	0.61	0.39	8.19	0.02	0.06	3.64	0.59	0.41	8.18	0.02	0.07
3.66	0.57	0.43	8.17	0.02	0.07	3.68	0.56	0.44	8.16	0.02	0.07
3.70	0.55	0.45	8.15	0.02	0.07	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	0.64	0.36	8.09	0.02	0.06	3.84	0.69	0.31	8.08	0.02	0.05

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	0.73	0.27	8.07	0.02	0.04	3.88	0.74	0.26	8.06	0.02	0.04
3.90	0.74	0.26	8.05	0.02	0.04	3.92	0.72	0.28	8.04	0.02	0.04
3.94	0.70	0.30	8.03	0.02	0.05	3.96	0.66	0.34	8.02	0.02	0.05
3.98	0.64	0.36	8.01	0.02	0.06	4.00	0.61	0.39	8.00	0.02	0.06
4.02	0.59	0.41	7.99	0.02	0.07	4.04	0.57	0.43	7.98	0.02	0.07
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	1.97	0.00	7.90	0.02	0.00
4.22	1.90	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	1.93	0.00	7.84	0.02	0.00
4.34	1.83	0.00	7.83	0.02	0.00	4.36	1.82	0.00	7.82	0.02	0.00
4.38	1.90	0.00	7.81	0.02	0.00	4.40	1.91	0.00	7.80	0.02	0.00
4.42	1.80	0.00	7.79	0.02	0.00	4.44	1.60	0.00	7.78	0.02	0.00
4.46	1.45	0.00	7.77	0.02	0.00	4.48	1.44	0.00	7.76	0.02	0.00
4.50	1.50	0.00	7.75	0.02	0.00	4.52	1.65	0.00	7.74	0.02	0.00
4.54	1.79	0.00	7.73	0.02	0.00	4.56	1.86	0.00	7.72	0.02	0.00
4.58	1.80	0.00	7.71	0.02	0.00	4.60	1.66	0.00	7.70	0.02	0.00
4.62	1.54	0.00	7.69	0.02	0.00	4.64	1.43	0.00	7.68	0.02	0.00
4.66	1.30	0.00	7.67	0.02	0.00	4.68	1.18	0.00	7.66	0.02	0.00
4.70	1.10	0.00	7.65	0.02	0.00	4.72	1.06	0.00	7.64	0.02	0.00
4.74	1.06	0.00	7.63	0.02	0.00	4.76	1.08	0.00	7.62	0.02	0.00
4.78	1.17	0.00	7.61	0.02	0.00	4.80	1.36	0.00	7.60	0.02	0.00
4.82	1.67	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	1.59	0.00	7.39	0.02	0.00	5.24	1.40	0.00	7.38	0.02	0.00
5.26	1.68	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	0.55	0.45	7.28	0.02	0.07
5.46	0.56	0.44	7.27	0.02	0.06	5.48	0.56	0.44	7.26	0.02	0.06
5.50	0.56	0.44	7.25	0.02	0.06	5.52	0.57	0.43	7.24	0.02	0.06
5.54	0.58	0.42	7.23	0.02	0.06	5.56	0.59	0.41	7.22	0.02	0.06
5.58	0.59	0.41	7.21	0.02	0.06	5.60	0.59	0.41	7.20	0.02	0.06
5.62	0.60	0.40	7.19	0.02	0.06	5.64	0.60	0.40	7.18	0.02	0.06
5.66	0.60	0.40	7.17	0.02	0.06	5.68	0.60	0.40	7.16	0.02	0.06
5.70	0.60	0.40	7.15	0.02	0.06	5.72	0.59	0.41	7.14	0.02	0.06
5.74	0.59	0.41	7.13	0.02	0.06	5.76	0.58	0.42	7.12	0.02	0.06

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	0.58	0.42	7.11	0.02	0.06	5.80	0.57	0.43	7.10	0.02	0.06
5.82	0.56	0.44	7.09	0.02	0.06	5.84	0.54	0.46	7.08	0.02	0.07
5.86	0.52	0.48	7.07	0.02	0.07	5.88	0.50	0.50	7.06	0.02	0.07
5.90	2.00	0.00	7.05	0.02	0.00	5.92	2.00	0.00	7.04	0.02	0.00
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	0.50	0.50	6.95	0.02	0.07	6.12	0.50	0.50	6.94	0.02	0.07
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	1.86	0.00	6.90	0.02	0.00
6.22	1.28	0.00	6.89	0.02	0.00	6.24	0.90	0.10	6.88	0.02	0.01
6.26	0.74	0.26	6.87	0.02	0.04	6.28	0.72	0.28	6.86	0.02	0.04
6.30	0.78	0.22	6.85	0.02	0.03	6.32	0.85	0.15	6.84	0.02	0.02
6.34	0.90	0.10	6.83	0.02	0.01	6.36	0.97	0.03	6.82	0.02	0.00
6.38	1.05	0.00	6.81	0.02	0.00	6.40	1.18	0.00	6.80	0.02	0.00
6.42	1.25	0.00	6.79	0.02	0.00	6.44	1.23	0.00	6.78	0.02	0.00
6.46	1.13	0.00	6.77	0.02	0.00	6.48	1.03	0.00	6.76	0.02	0.00
6.50	0.99	0.01	6.75	0.02	0.00	6.52	0.99	0.01	6.74	0.02	0.00
6.54	1.00	0.00	6.73	0.02	0.00	6.56	1.02	0.00	6.72	0.02	0.00
6.58	1.02	0.00	6.71	0.02	0.00	6.60	1.00	0.00	6.70	0.02	0.00
6.62	0.97	0.03	6.69	0.02	0.00	6.64	0.97	0.03	6.68	0.02	0.00
6.66	0.97	0.03	6.67	0.02	0.00	6.68	0.97	0.03	6.66	0.02	0.00
6.70	0.90	0.10	6.65	0.02	0.01	6.72	0.81	0.19	6.64	0.02	0.03
6.74	0.68	0.32	6.63	0.02	0.04	6.76	0.56	0.44	6.62	0.02	0.06
6.78	0.44	0.56	6.61	0.02	0.07	6.80	0.34	0.66	6.60	0.02	0.09
6.82	0.29	0.71	6.59	0.02	0.09	6.84	0.28	0.72	6.58	0.02	0.09
6.86	0.31	0.69	6.57	0.02	0.09	6.88	0.36	0.64	6.56	0.02	0.08
6.90	0.43	0.57	6.55	0.02	0.08	6.92	0.31	0.69	6.54	0.02	0.09
6.94	0.45	0.55	6.53	0.02	0.07	6.96	0.57	0.43	6.52	0.02	0.06
6.97	0.91	0.09	6.51	0.02	0.01	6.99	0.95	0.05	6.50	0.02	0.01
7.01	1.01	0.00	6.49	0.02	0.00	7.03	1.12	0.00	6.48	0.02	0.00
7.05	1.27	0.00	6.47	0.02	0.00	7.07	1.44	0.00	6.46	0.02	0.00
7.09	1.57	0.00	6.45	0.02	0.00	7.11	1.64	0.00	6.44	0.02	0.00
7.13	1.63	0.00	6.43	0.02	0.00	7.15	1.60	0.00	6.42	0.02	0.00
7.17	1.56	0.00	6.41	0.02	0.00	7.19	1.53	0.00	6.40	0.02	0.00
7.21	1.48	0.00	6.39	0.02	0.00	7.23	1.41	0.00	6.38	0.02	0.00
7.25	1.33	0.00	6.37	0.02	0.00	7.27	1.22	0.00	6.36	0.02	0.00
7.29	1.13	0.00	6.35	0.02	0.00	7.31	1.06	0.00	6.34	0.02	0.00
7.33	1.01	0.00	6.33	0.02	0.00	7.35	0.98	0.02	6.32	0.02	0.00
7.37	0.97	0.03	6.31	0.02	0.00	7.39	0.99	0.01	6.30	0.02	0.00
7.41	1.01	0.00	6.29	0.02	0.00	7.43	1.05	0.00	6.28	0.02	0.00
7.45	1.11	0.00	6.27	0.02	0.00	7.47	1.18	0.00	6.26	0.02	0.00
7.49	1.23	0.00	6.25	0.02	0.00	7.51	1.28	0.00	6.24	0.02	0.00
7.53	1.33	0.00	6.23	0.02	0.00	7.55	1.40	0.00	6.22	0.02	0.00
7.57	1.52	0.00	6.21	0.02	0.00	7.59	1.69	0.00	6.20	0.02	0.00
7.61	1.86	0.00	6.19	0.02	0.00	7.63	1.98	0.00	6.18	0.02	0.00
7.65	1.99	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	1.96	0.00	6.11	0.02	0.00	7.79	1.91	0.00	6.10	0.02	0.00
7.81	1.89	0.00	6.09	0.02	0.00	7.83	1.87	0.00	6.08	0.02	0.00
7.85	1.83	0.00	6.07	0.02	0.00	7.87	1.76	0.00	6.06	0.02	0.00
7.89	1.70	0.00	6.05	0.02	0.00	7.91	1.94	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	1.92	0.00	6.00	0.02	0.00
8.01	1.83	0.00	5.99	0.02	0.00	8.03	1.81	0.00	5.98	0.02	0.00
8.05	1.84	0.00	5.97	0.02	0.00	8.07	1.92	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	1.94	0.00	5.83	0.02	0.00	8.35	1.87	0.00	5.82	0.02	0.00
8.37	1.77	0.00	5.81	0.02	0.00	8.39	1.67	0.00	5.80	0.02	0.00
8.41	1.57	0.00	5.79	0.02	0.00	8.43	1.50	0.00	5.78	0.02	0.00
8.45	1.42	0.00	5.77	0.02	0.00	8.47	1.36	0.00	5.76	0.02	0.00
8.49	1.32	0.00	5.75	0.02	0.00	8.51	1.28	0.00	5.74	0.02	0.00
8.53	1.27	0.00	5.73	0.02	0.00	8.55	1.29	0.00	5.72	0.02	0.00
8.57	1.37	0.00	5.71	0.02	0.00	8.59	1.48	0.00	5.70	0.02	0.00
8.61	1.58	0.00	5.69	0.02	0.00	8.63	1.67	0.00	5.68	0.02	0.00
8.65	1.75	0.00	5.67	0.02	0.00	8.67	1.87	0.00	5.66	0.02	0.00
8.69	1.97	0.00	5.65	0.02	0.00	8.71	2.00	0.00	5.64	0.02	0.00
8.73	2.00	0.00	5.63	0.02	0.00	8.75	2.00	0.00	5.62	0.02	0.00
8.77	2.00	0.00	5.61	0.02	0.00	8.79	2.00	0.00	5.60	0.02	0.00
8.81	2.00	0.00	5.59	0.02	0.00	8.83	2.00	0.00	5.58	0.02	0.00
8.85	2.00	0.00	5.57	0.02	0.00	8.87	2.00	0.00	5.56	0.02	0.00
8.89	2.00	0.00	5.55	0.02	0.00	8.91	2.00	0.00	5.54	0.02	0.00
8.93	2.00	0.00	5.53	0.02	0.00	8.95	2.00	0.00	5.52	0.02	0.00
8.97	2.00	0.00	5.51	0.02	0.00	8.99	2.00	0.00	5.50	0.02	0.00
9.01	2.00	0.00	5.49	0.02	0.00	9.03	2.00	0.00	5.48	0.02	0.00
9.05	2.00	0.00	5.47	0.02	0.00	9.07	2.00	0.00	5.46	0.02	0.00
9.09	2.00	0.00	5.45	0.02	0.00	9.11	2.00	0.00	5.44	0.02	0.00
9.13	2.00	0.00	5.43	0.02	0.00	9.15	2.00	0.00	5.42	0.02	0.00
9.17	2.00	0.00	5.41	0.02	0.00	9.19	2.00	0.00	5.40	0.02	0.00
9.21	2.00	0.00	5.39	0.02	0.00	9.23	2.00	0.00	5.38	0.02	0.00
9.25	2.00	0.00	5.37	0.02	0.00	9.27	2.00	0.00	5.36	0.02	0.00
9.29	2.00	0.00	5.35	0.02	0.00	9.31	2.00	0.00	5.34	0.02	0.00
9.33	2.00	0.00	5.33	0.02	0.00	9.35	2.00	0.00	5.32	0.02	0.00
9.37	2.00	0.00	5.31	0.02	0.00	9.39	2.00	0.00	5.30	0.02	0.00
9.41	2.00	0.00	5.29	0.02	0.00	9.43	2.00	0.00	5.28	0.02	0.00
9.45	2.00	0.00	5.27	0.02	0.00	9.47	2.00	0.00	5.26	0.02	0.00
9.49	2.00	0.00	5.25	0.02	0.00	9.51	2.00	0.00	5.24	0.02	0.00
9.53	2.00	0.00	5.23	0.02	0.00	9.55	2.00	0.00	5.22	0.02	0.00
9.57	2.00	0.00	5.21	0.02	0.00	9.59	2.00	0.00	5.20	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.61	2.00	0.00	5.19	0.02	0.00	9.63	2.00	0.00	5.18	0.02	0.00
9.65	2.00	0.00	5.17	0.02	0.00	9.67	2.00	0.00	5.16	0.02	0.00
9.69	2.00	0.00	5.15	0.02	0.00	9.71	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.11	0.02	0.00	9.79	2.00	0.00	5.10	0.02	0.00
9.81	2.00	0.00	5.09	0.02	0.00	9.83	2.00	0.00	5.08	0.02	0.00
9.85	2.00	0.00	5.07	0.02	0.00	9.87	2.00	0.00	5.06	0.02	0.00
9.89	2.00	0.00	5.05	0.02	0.00	9.91	2.00	0.00	5.04	0.02	0.00
9.93	2.00	0.00	5.03	0.02	0.00	9.95	2.00	0.00	5.02	0.02	0.00
9.97	1.77	0.00	5.01	0.02	0.00	9.99	1.69	0.00	5.00	0.02	0.00
10.01	1.74	0.00	4.99	0.02	0.00	10.03	1.82	0.00	4.98	0.02	0.00
10.05	1.94	0.00	4.97	0.02	0.00	10.07	2.00	0.00	4.96	0.02	0.00
10.09	2.00	0.00	4.95	0.02	0.00	10.11	2.00	0.00	4.94	0.02	0.00
10.13	2.00	0.00	4.93	0.02	0.00	10.15	2.00	0.00	4.92	0.02	0.00
10.17	2.00	0.00	4.91	0.02	0.00	10.19	2.00	0.00	4.90	0.02	0.00
10.21	2.00	0.00	4.89	0.02	0.00	10.23	2.00	0.00	4.88	0.02	0.00
10.25	2.00	0.00	4.87	0.02	0.00	10.27	2.00	0.00	4.86	0.02	0.00
10.29	2.00	0.00	4.85	0.02	0.00	10.31	2.00	0.00	4.85	0.02	0.00
10.33	2.00	0.00	4.84	0.02	0.00	10.35	2.00	0.00	4.83	0.02	0.00
10.37	2.00	0.00	4.82	0.02	0.00	10.39	2.00	0.00	4.81	0.02	0.00
10.41	2.00	0.00	4.80	0.02	0.00	10.43	2.00	0.00	4.79	0.02	0.00
10.45	2.00	0.00	4.78	0.02	0.00	10.47	2.00	0.00	4.77	0.02	0.00
10.49	2.00	0.00	4.76	0.02	0.00	10.51	2.00	0.00	4.75	0.02	0.00
10.53	2.00	0.00	4.74	0.02	0.00	10.55	2.00	0.00	4.73	0.02	0.00
10.57	2.00	0.00	4.72	0.02	0.00	10.59	2.00	0.00	4.71	0.02	0.00
10.61	2.00	0.00	4.70	0.02	0.00	10.63	2.00	0.00	4.69	0.02	0.00
10.65	1.88	0.00	4.68	0.02	0.00	10.67	1.68	0.00	4.67	0.02	0.00
10.69	1.49	0.00	4.66	0.02	0.00	10.71	1.27	0.00	4.65	0.02	0.00
10.73	1.04	0.00	4.64	0.02	0.00	10.75	0.80	0.20	4.63	0.02	0.02
10.77	0.61	0.39	4.62	0.02	0.04	10.79	0.47	0.53	4.61	0.02	0.05
10.81	0.38	0.62	4.60	0.02	0.06	10.83	0.29	0.71	4.59	0.02	0.07
10.85	0.24	0.76	4.58	0.02	0.07	10.87	0.22	0.78	4.57	0.02	0.07
10.89	0.22	0.78	4.56	0.02	0.07	10.91	0.05	0.95	4.55	0.02	0.09
10.93	0.24	0.76	4.54	0.02	0.07	10.95	0.37	0.63	4.53	0.02	0.06
10.97	0.69	0.31	4.52	0.02	0.03	10.99	0.66	0.34	4.51	0.02	0.03
11.01	0.71	0.29	4.50	0.02	0.03	11.03	0.82	0.18	4.49	0.02	0.02
11.05	0.99	0.01	4.48	0.02	0.00	11.07	1.27	0.00	4.47	0.02	0.00
11.09	1.61	0.00	4.46	0.02	0.00	11.11	1.90	0.00	4.45	0.02	0.00
11.13	2.00	0.00	4.44	0.02	0.00	11.15	2.00	0.00	4.43	0.02	0.00
11.17	2.00	0.00	4.42	0.02	0.00	11.19	2.00	0.00	4.41	0.02	0.00
11.21	2.00	0.00	4.40	0.02	0.00	11.23	2.00	0.00	4.39	0.02	0.00
11.25	2.00	0.00	4.38	0.02	0.00	11.27	2.00	0.00	4.37	0.02	0.00
11.29	2.00	0.00	4.36	0.02	0.00	11.31	2.00	0.00	4.35	0.02	0.00
11.33	2.00	0.00	4.34	0.02	0.00	11.35	2.00	0.00	4.33	0.02	0.00
11.37	2.00	0.00	4.32	0.02	0.00	11.39	2.00	0.00	4.31	0.02	0.00
11.41	2.00	0.00	4.30	0.02	0.00	11.43	2.00	0.00	4.29	0.02	0.00
11.45	2.00	0.00	4.28	0.02	0.00	11.47	2.00	0.00	4.27	0.02	0.00
11.49	2.00	0.00	4.26	0.02	0.00	11.51	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.53	2.00	0.00	4.24	0.02	0.00	11.55	2.00	0.00	4.23	0.02	0.00
11.57	2.00	0.00	4.22	0.02	0.00	11.59	2.00	0.00	4.21	0.02	0.00
11.61	2.00	0.00	4.20	0.02	0.00	11.63	2.00	0.00	4.19	0.02	0.00
11.65	2.00	0.00	4.18	0.02	0.00	11.67	2.00	0.00	4.17	0.02	0.00
11.69	2.00	0.00	4.16	0.02	0.00	11.71	2.00	0.00	4.15	0.02	0.00
11.73	2.00	0.00	4.14	0.02	0.00	11.75	2.00	0.00	4.13	0.02	0.00
11.77	2.00	0.00	4.12	0.02	0.00	11.79	2.00	0.00	4.11	0.02	0.00
11.81	2.00	0.00	4.10	0.02	0.00	11.83	1.80	0.00	4.09	0.02	0.00
11.85	1.63	0.00	4.08	0.02	0.00	11.87	1.57	0.00	4.07	0.02	0.00
11.89	1.58	0.00	4.06	0.02	0.00	11.91	1.19	0.00	4.05	0.02	0.00
11.93	1.31	0.00	4.04	0.02	0.00	11.95	1.37	0.00	4.03	0.02	0.00
11.97	1.86	0.00	4.02	0.02	0.00	11.98	1.85	0.00	4.01	0.02	0.00
12.00	1.89	0.00	4.00	0.02	0.00	12.02	2.00	0.00	3.99	0.02	0.00
12.04	2.00	0.00	3.98	0.02	0.00	12.06	2.00	0.00	3.97	0.02	0.00
12.08	2.00	0.00	3.96	0.02	0.00	12.10	2.00	0.00	3.95	0.02	0.00
12.12	1.92	0.00	3.94	0.02	0.00	12.14	1.81	0.00	3.93	0.02	0.00
12.16	1.74	0.00	3.92	0.02	0.00	12.18	1.68	0.00	3.91	0.02	0.00
12.20	1.63	0.00	3.90	0.02	0.00	12.22	1.62	0.00	3.89	0.02	0.00
12.24	1.63	0.00	3.88	0.02	0.00	12.26	1.65	0.00	3.87	0.02	0.00
12.28	1.69	0.00	3.86	0.02	0.00	12.30	1.71	0.00	3.85	0.02	0.00
12.32	1.73	0.00	3.84	0.02	0.00	12.34	1.77	0.00	3.83	0.02	0.00
12.36	1.84	0.00	3.82	0.02	0.00	12.38	1.92	0.00	3.81	0.02	0.00
12.40	1.97	0.00	3.80	0.02	0.00	12.42	2.00	0.00	3.79	0.02	0.00
12.44	2.00	0.00	3.78	0.02	0.00	12.46	2.00	0.00	3.77	0.02	0.00
12.48	2.00	0.00	3.76	0.02	0.00	12.50	2.00	0.00	3.75	0.02	0.00
12.52	2.00	0.00	3.74	0.02	0.00	12.54	2.00	0.00	3.73	0.02	0.00
12.56	2.00	0.00	3.72	0.02	0.00	12.58	2.00	0.00	3.71	0.02	0.00
12.60	2.00	0.00	3.70	0.02	0.00	12.62	2.00	0.00	3.69	0.02	0.00
12.64	2.00	0.00	3.68	0.02	0.00	12.66	2.00	0.00	3.67	0.02	0.00
12.68	2.00	0.00	3.66	0.02	0.00	12.70	2.00	0.00	3.65	0.02	0.00
12.72	2.00	0.00	3.64	0.02	0.00	12.74	2.00	0.00	3.63	0.02	0.00
12.76	2.00	0.00	3.62	0.02	0.00	12.78	2.00	0.00	3.61	0.02	0.00
12.80	1.98	0.00	3.60	0.02	0.00	12.82	1.95	0.00	3.59	0.02	0.00
12.84	1.90	0.00	3.58	0.02	0.00	12.86	1.80	0.00	3.57	0.02	0.00
12.88	1.68	0.00	3.56	0.02	0.00	12.90	1.13	0.00	3.55	0.02	0.00
12.92	1.12	0.00	3.54	0.02	0.00	12.94	1.11	0.00	3.53	0.02	0.00
12.96	1.57	0.00	3.52	0.02	0.00	12.98	1.52	0.00	3.51	0.02	0.00
13.00	1.46	0.00	3.50	0.02	0.00	13.02	1.40	0.00	3.49	0.02	0.00
13.04	1.35	0.00	3.48	0.02	0.00	13.06	1.27	0.00	3.47	0.02	0.00
13.08	1.20	0.00	3.46	0.02	0.00	13.10	1.13	0.00	3.45	0.02	0.00
13.12	1.09	0.00	3.44	0.02	0.00	13.14	1.05	0.00	3.43	0.02	0.00
13.16	1.02	0.00	3.42	0.02	0.00	13.18	0.98	0.02	3.41	0.02	0.00
13.20	0.97	0.03	3.40	0.02	0.00	13.22	0.97	0.03	3.39	0.02	0.00
13.24	0.96	0.04	3.38	0.02	0.00	13.26	0.91	0.09	3.37	0.02	0.01
13.28	0.85	0.15	3.36	0.02	0.01	13.30	0.76	0.24	3.35	0.02	0.02
13.32	0.66	0.34	3.34	0.02	0.02	13.34	0.57	0.43	3.33	0.02	0.03
13.36	0.53	0.47	3.32	0.02	0.03	13.38	0.51	0.49	3.31	0.02	0.03
13.40	0.50	0.50	3.30	0.02	0.03	13.42	0.52	0.48	3.29	0.02	0.03

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
13.44	0.55	0.45	3.28	0.02	0.03	13.46	0.58	0.42	3.27	0.02	0.03
13.48	0.63	0.37	3.26	0.02	0.02	13.50	0.70	0.30	3.25	0.02	0.02
13.52	0.81	0.19	3.24	0.02	0.01	13.54	0.96	0.04	3.23	0.02	0.00
13.56	1.15	0.00	3.22	0.02	0.00	13.58	1.41	0.00	3.21	0.02	0.00
13.60	1.77	0.00	3.20	0.02	0.00	13.62	2.00	0.00	3.19	0.02	0.00
13.64	2.00	0.00	3.18	0.02	0.00	13.66	2.00	0.00	3.17	0.02	0.00
13.68	2.00	0.00	3.16	0.02	0.00	13.70	2.00	0.00	3.15	0.02	0.00
13.72	2.00	0.00	3.14	0.02	0.00	13.74	2.00	0.00	3.13	0.02	0.00
13.76	2.00	0.00	3.12	0.02	0.00	13.78	2.00	0.00	3.11	0.02	0.00
13.80	2.00	0.00	3.10	0.02	0.00	13.82	2.00	0.00	3.09	0.02	0.00
13.84	2.00	0.00	3.08	0.02	0.00	13.86	0.65	0.35	3.07	0.02	0.02
13.88	0.66	0.34	3.06	0.02	0.02	13.90	0.67	0.33	3.05	0.02	0.02
13.92	0.62	0.38	3.04	0.02	0.02	13.94	0.68	0.32	3.03	0.02	0.02
13.96	0.69	0.31	3.02	0.02	0.02	13.97	0.70	0.30	3.01	0.02	0.02
13.99	0.71	0.29	3.00	0.02	0.02	14.01	0.72	0.28	2.99	0.02	0.02
14.03	0.73	0.27	2.98	0.02	0.02	14.05	0.74	0.26	2.97	0.02	0.02
14.07	0.75	0.25	2.96	0.02	0.01	14.09	0.77	0.23	2.95	0.02	0.01
14.11	0.79	0.21	2.94	0.02	0.01	14.13	0.81	0.19	2.93	0.02	0.01
14.15	0.81	0.19	2.92	0.02	0.01	14.17	0.79	0.21	2.91	0.02	0.01
14.19	0.75	0.25	2.90	0.02	0.01	14.21	0.71	0.29	2.89	0.02	0.02
14.23	0.66	0.34	2.88	0.02	0.02	14.25	2.00	0.00	2.87	0.02	0.00
14.27	2.00	0.00	2.86	0.02	0.00	14.29	2.00	0.00	2.85	0.02	0.00
14.31	2.00	0.00	2.84	0.02	0.00	14.33	2.00	0.00	2.83	0.02	0.00
14.35	2.00	0.00	2.82	0.02	0.00	14.37	2.00	0.00	2.81	0.02	0.00
14.39	2.00	0.00	2.80	0.02	0.00	14.41	2.00	0.00	2.79	0.02	0.00
14.43	2.00	0.00	2.78	0.02	0.00	14.45	2.00	0.00	2.77	0.02	0.00
14.47	2.00	0.00	2.76	0.02	0.00	14.49	2.00	0.00	2.75	0.02	0.00
14.51	0.81	0.19	2.74	0.02	0.01	14.53	0.85	0.15	2.73	0.02	0.01
14.55	0.93	0.07	2.72	0.02	0.00	14.57	0.92	0.08	2.71	0.02	0.00
14.59	0.96	0.04	2.70	0.02	0.00	14.61	0.97	0.03	2.69	0.02	0.00
14.63	0.97	0.03	2.68	0.02	0.00	14.65	0.98	0.02	2.67	0.02	0.00
14.67	1.04	0.00	2.66	0.02	0.00	14.69	1.12	0.00	2.65	0.02	0.00
14.71	1.13	0.00	2.64	0.02	0.00	14.73	1.14	0.00	2.63	0.02	0.00
14.75	1.11	0.00	2.62	0.02	0.00	14.77	1.10	0.00	2.62	0.02	0.00
14.79	1.05	0.00	2.61	0.02	0.00	14.81	0.97	0.03	2.60	0.02	0.00
14.83	0.87	0.13	2.59	0.02	0.01	14.85	0.81	0.19	2.58	0.02	0.01
14.87	0.78	0.22	2.57	0.02	0.01	14.89	0.76	0.24	2.56	0.02	0.01
14.91	0.70	0.30	2.55	0.02	0.02	14.93	0.73	0.27	2.54	0.02	0.01
14.95	0.74	0.26	2.53	0.02	0.01	14.97	0.75	0.25	2.52	0.02	0.01
14.99	0.77	0.23	2.51	0.02	0.01	15.01	0.79	0.21	2.50	0.02	0.01
15.03	0.81	0.19	2.49	0.02	0.01	15.05	0.81	0.19	2.48	0.02	0.01
15.07	0.82	0.18	2.47	0.02	0.01	15.09	0.82	0.18	2.46	0.02	0.01

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 7.61

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

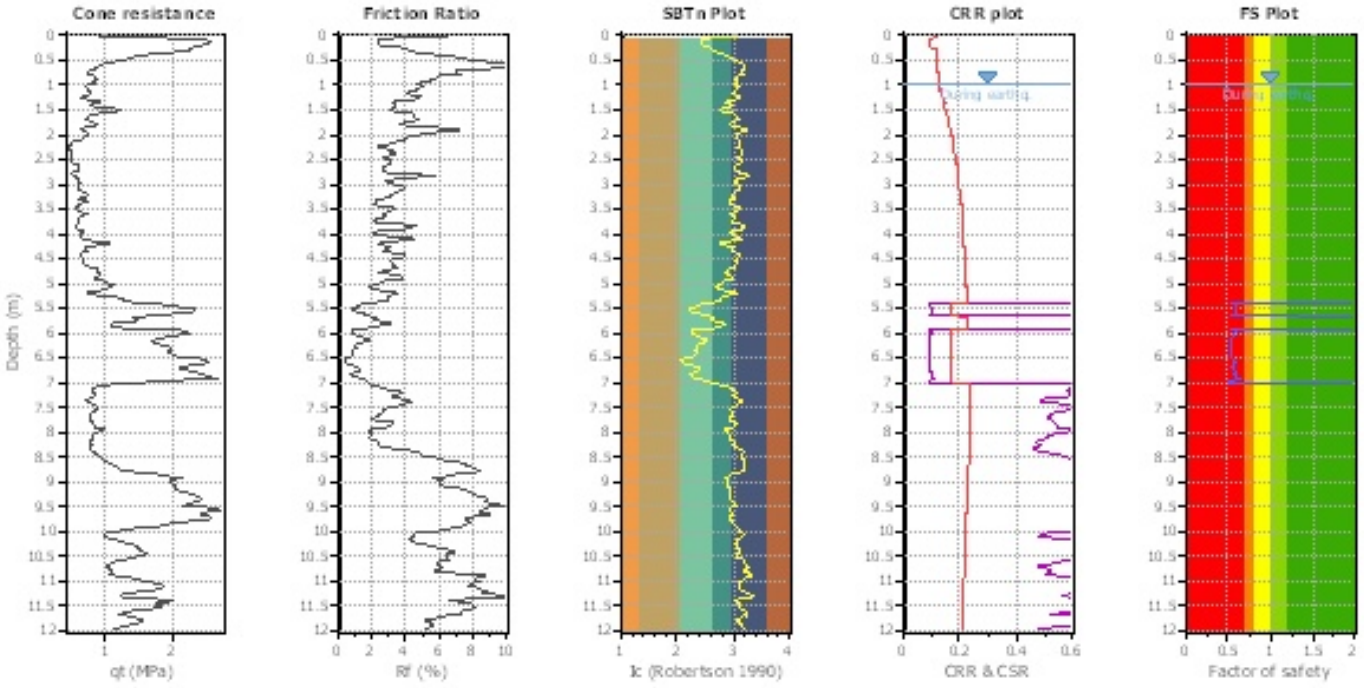
LIQUEFACTION ANALYSIS REPORT

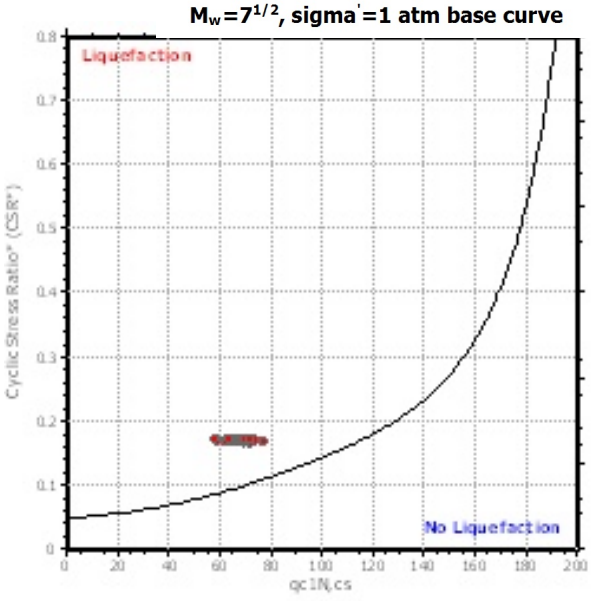
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

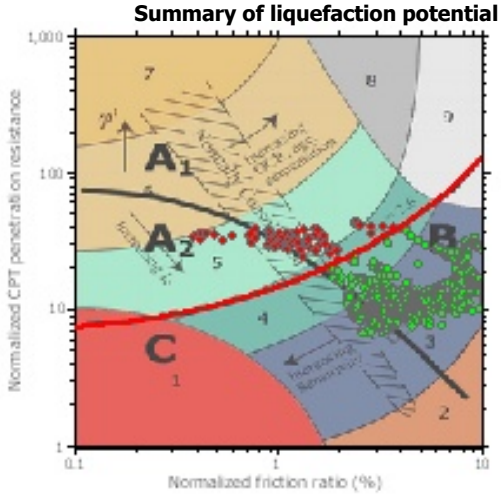
CPT file : CPTU06

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

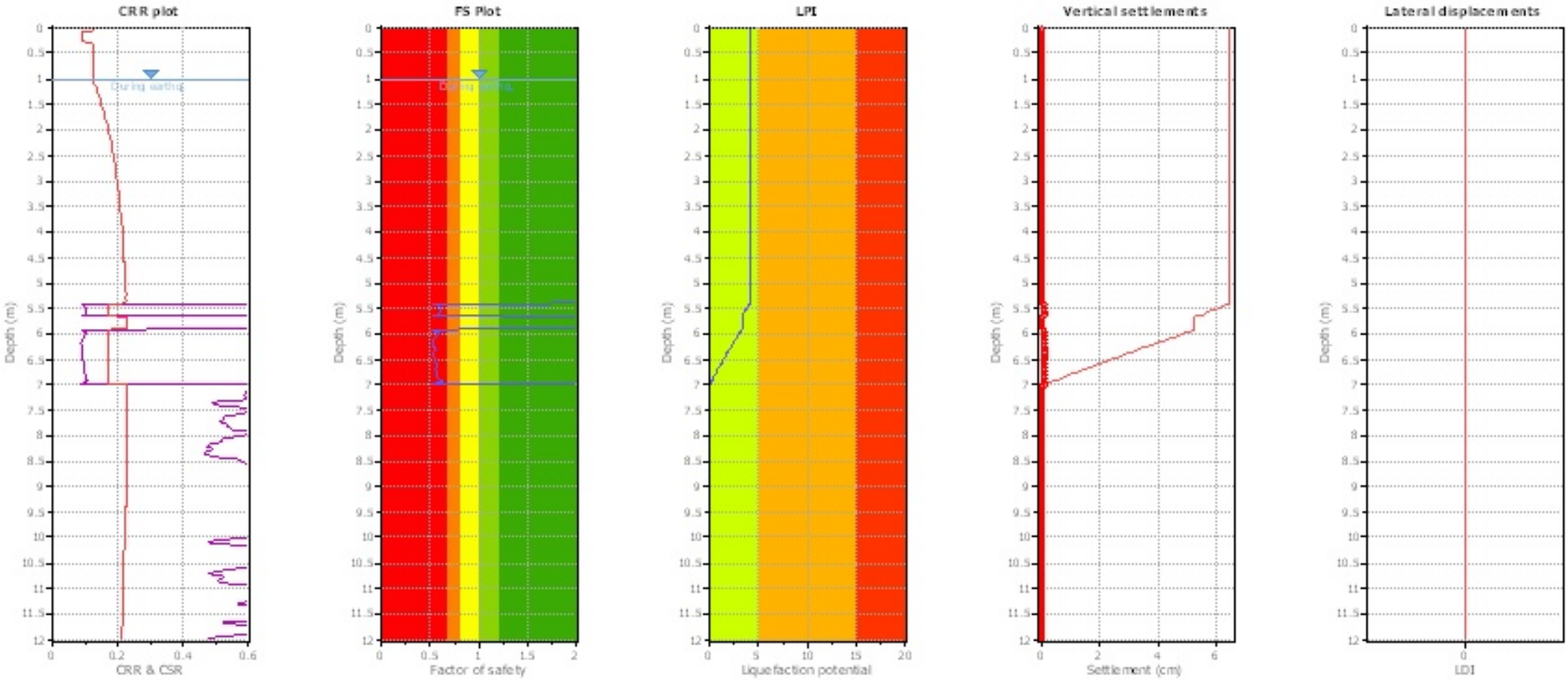






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	0.53	0.47	7.29	0.02	0.07	5.44	0.56	0.44	7.28	0.02	0.06
5.46	0.58	0.42	7.27	0.02	0.06	5.48	0.59	0.41	7.26	0.02	0.06
5.50	0.60	0.40	7.25	0.02	0.06	5.52	0.60	0.40	7.24	0.02	0.06
5.54	0.60	0.40	7.23	0.02	0.06	5.56	0.61	0.39	7.22	0.02	0.06
5.58	0.61	0.39	7.21	0.02	0.06	5.60	0.60	0.40	7.20	0.02	0.06
5.62	0.58	0.42	7.19	0.02	0.06	5.63	0.56	0.44	7.18	0.02	0.06
5.65	0.54	0.46	7.17	0.02	0.07	5.67	2.00	0.00	7.16	0.02	0.00
5.69	2.00	0.00	7.15	0.02	0.00	5.71	2.00	0.00	7.14	0.02	0.00
5.73	2.00	0.00	7.13	0.02	0.00	5.75	2.00	0.00	7.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.77	2.00	0.00	7.11	0.02	0.00	5.79	2.00	0.00	7.10	0.02	0.00
5.81	2.00	0.00	7.09	0.02	0.00	5.83	2.00	0.00	7.08	0.02	0.00
5.85	2.00	0.00	7.07	0.02	0.00	5.87	2.00	0.00	7.06	0.02	0.00
5.89	2.00	0.00	7.05	0.02	0.00	5.91	0.51	0.49	7.04	0.02	0.07
5.93	0.54	0.46	7.03	0.02	0.06	5.95	0.58	0.42	7.02	0.02	0.06
5.97	0.58	0.42	7.01	0.02	0.06	5.99	0.59	0.41	7.00	0.02	0.06
6.01	0.58	0.42	6.99	0.02	0.06	6.03	0.57	0.43	6.98	0.02	0.06
6.05	0.56	0.44	6.97	0.02	0.06	6.07	0.56	0.44	6.96	0.02	0.06
6.09	0.55	0.45	6.95	0.02	0.06	6.11	0.54	0.46	6.94	0.02	0.06
6.13	0.54	0.46	6.93	0.02	0.06	6.15	0.53	0.47	6.92	0.02	0.06
6.17	0.53	0.47	6.91	0.02	0.07	6.19	0.53	0.47	6.90	0.02	0.06
6.21	0.53	0.47	6.89	0.02	0.06	6.23	0.53	0.47	6.88	0.02	0.06
6.25	0.54	0.46	6.87	0.02	0.06	6.27	0.55	0.45	6.86	0.02	0.06
6.29	0.55	0.45	6.85	0.02	0.06	6.31	0.55	0.45	6.84	0.02	0.06
6.33	0.55	0.45	6.83	0.02	0.06	6.35	0.54	0.46	6.82	0.02	0.06
6.37	0.54	0.46	6.81	0.02	0.06	6.39	0.54	0.46	6.80	0.02	0.06
6.41	0.54	0.46	6.79	0.02	0.06	6.43	0.54	0.46	6.78	0.02	0.06
6.45	0.54	0.46	6.77	0.02	0.06	6.47	0.55	0.45	6.76	0.02	0.06
6.49	0.55	0.45	6.75	0.02	0.06	6.51	0.55	0.45	6.74	0.02	0.06
6.53	0.56	0.44	6.73	0.02	0.06	6.55	0.57	0.43	6.72	0.02	0.06
6.57	0.57	0.43	6.71	0.02	0.06	6.59	0.58	0.42	6.70	0.02	0.06
6.61	0.57	0.43	6.69	0.02	0.06	6.63	0.57	0.43	6.68	0.02	0.06
6.65	0.57	0.43	6.67	0.02	0.06	6.67	0.56	0.44	6.66	0.02	0.06
6.69	0.56	0.44	6.65	0.02	0.06	6.71	0.55	0.45	6.64	0.02	0.06
6.73	0.56	0.44	6.63	0.02	0.06	6.75	0.57	0.43	6.62	0.02	0.06
6.77	0.58	0.42	6.61	0.02	0.06	6.79	0.58	0.42	6.60	0.02	0.06
6.81	0.58	0.42	6.59	0.02	0.06	6.83	0.57	0.43	6.58	0.02	0.06
6.85	0.58	0.42	6.57	0.02	0.06	6.87	0.59	0.41	6.56	0.02	0.05
6.89	0.61	0.39	6.55	0.02	0.05	6.91	0.63	0.37	6.54	0.02	0.05
6.93	0.64	0.36	6.53	0.02	0.05	6.95	0.59	0.41	6.52	0.02	0.05
6.97	0.53	0.47	6.51	0.02	0.06	6.99	0.50	0.50	6.50	0.02	0.07
7.01	2.00	0.00	6.49	0.02	0.00	7.03	2.00	0.00	6.48	0.02	0.00
7.05	2.00	0.00	6.47	0.02	0.00	7.07	2.00	0.00	6.46	0.02	0.00
7.09	2.00	0.00	6.45	0.02	0.00	7.11	2.00	0.00	6.44	0.02	0.00
7.13	2.00	0.00	6.43	0.02	0.00	7.15	2.00	0.00	6.42	0.02	0.00
7.17	2.00	0.00	6.41	0.02	0.00	7.19	2.00	0.00	6.40	0.02	0.00
7.21	2.00	0.00	6.39	0.02	0.00	7.23	2.00	0.00	6.38	0.02	0.00
7.25	2.00	0.00	6.37	0.02	0.00	7.27	2.00	0.00	6.36	0.02	0.00
7.29	2.00	0.00	6.35	0.02	0.00	7.31	2.00	0.00	6.34	0.02	0.00
7.33	2.00	0.00	6.33	0.02	0.00	7.35	2.00	0.00	6.32	0.02	0.00
7.37	2.00	0.00	6.31	0.02	0.00	7.39	2.00	0.00	6.30	0.02	0.00
7.41	2.00	0.00	6.29	0.02	0.00	7.43	2.00	0.00	6.28	0.02	0.00
7.45	2.00	0.00	6.27	0.02	0.00	7.47	2.00	0.00	6.26	0.02	0.00
7.49	2.00	0.00	6.25	0.02	0.00	7.51	2.00	0.00	6.24	0.02	0.00
7.53	2.00	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.15	0.02	0.00
7.73	2.00	0.00	6.14	0.02	0.00	7.75	2.00	0.00	6.13	0.02	0.00
7.77	2.00	0.00	6.12	0.02	0.00	7.79	2.00	0.00	6.11	0.02	0.00
7.81	2.00	0.00	6.10	0.02	0.00	7.83	2.00	0.00	6.09	0.02	0.00
7.85	2.00	0.00	6.08	0.02	0.00	7.87	2.00	0.00	6.07	0.02	0.00
7.89	2.00	0.00	6.06	0.02	0.00	7.91	2.00	0.00	6.05	0.02	0.00
7.93	2.00	0.00	6.04	0.02	0.00	7.95	2.00	0.00	6.03	0.02	0.00
7.97	2.00	0.00	6.02	0.02	0.00	7.99	2.00	0.00	6.01	0.02	0.00
8.01	2.00	0.00	6.00	0.02	0.00	8.03	2.00	0.00	5.99	0.02	0.00
8.05	2.00	0.00	5.98	0.02	0.00	8.07	2.00	0.00	5.97	0.02	0.00
8.09	2.00	0.00	5.96	0.02	0.00	8.11	2.00	0.00	5.95	0.02	0.00
8.13	2.00	0.00	5.94	0.02	0.00	8.15	2.00	0.00	5.93	0.02	0.00
8.17	2.00	0.00	5.92	0.02	0.00	8.19	2.00	0.00	5.91	0.02	0.00
8.21	2.00	0.00	5.90	0.02	0.00	8.23	2.00	0.00	5.89	0.02	0.00
8.25	2.00	0.00	5.88	0.02	0.00	8.27	2.00	0.00	5.87	0.02	0.00
8.29	2.00	0.00	5.86	0.02	0.00	8.31	2.00	0.00	5.85	0.02	0.00
8.33	2.00	0.00	5.84	0.02	0.00	8.35	2.00	0.00	5.83	0.02	0.00
8.37	2.00	0.00	5.82	0.02	0.00	8.39	2.00	0.00	5.81	0.02	0.00
8.41	2.00	0.00	5.80	0.02	0.00	8.43	2.00	0.00	5.79	0.02	0.00
8.45	2.00	0.00	5.78	0.02	0.00	8.47	2.00	0.00	5.77	0.02	0.00
8.49	2.00	0.00	5.76	0.02	0.00	8.51	2.00	0.00	5.75	0.02	0.00
8.53	2.00	0.00	5.74	0.02	0.00	8.55	2.00	0.00	5.73	0.02	0.00
8.57	2.00	0.00	5.72	0.02	0.00	8.59	2.00	0.00	5.71	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.83	2.00	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	2.00	0.00	5.55	0.02	0.00
8.93	2.00	0.00	5.54	0.02	0.00	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	2.00	0.00	5.48	0.02	0.00	9.07	2.00	0.00	5.47	0.02	0.00
9.09	2.00	0.00	5.46	0.02	0.00	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.18	2.00	0.00	5.41	0.02	0.00
9.20	2.00	0.00	5.40	0.02	0.00	9.22	2.00	0.00	5.39	0.02	0.00
9.24	2.00	0.00	5.38	0.02	0.00	9.26	2.00	0.00	5.37	0.02	0.00
9.28	2.00	0.00	5.36	0.02	0.00	9.30	2.00	0.00	5.35	0.02	0.00
9.32	2.00	0.00	5.34	0.02	0.00	9.34	2.00	0.00	5.33	0.02	0.00
9.36	2.00	0.00	5.32	0.02	0.00	9.38	2.00	0.00	5.31	0.02	0.00
9.40	2.00	0.00	5.30	0.02	0.00	9.42	2.00	0.00	5.29	0.02	0.00
9.44	2.00	0.00	5.28	0.02	0.00	9.46	2.00	0.00	5.27	0.02	0.00
9.48	2.00	0.00	5.26	0.02	0.00	9.50	2.00	0.00	5.25	0.02	0.00
9.52	2.00	0.00	5.24	0.02	0.00	9.54	2.00	0.00	5.23	0.02	0.00
9.56	2.00	0.00	5.22	0.02	0.00	9.58	2.00	0.00	5.21	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.60	2.00	0.00	5.20	0.02	0.00	9.62	2.00	0.00	5.19	0.02	0.00
9.64	2.00	0.00	5.18	0.02	0.00	9.66	2.00	0.00	5.17	0.02	0.00
9.68	2.00	0.00	5.16	0.02	0.00	9.70	2.00	0.00	5.15	0.02	0.00
9.72	2.00	0.00	5.14	0.02	0.00	9.74	2.00	0.00	5.13	0.02	0.00
9.76	2.00	0.00	5.12	0.02	0.00	9.78	2.00	0.00	5.11	0.02	0.00
9.80	2.00	0.00	5.10	0.02	0.00	9.82	2.00	0.00	5.09	0.02	0.00
9.84	2.00	0.00	5.08	0.02	0.00	9.86	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	2.00	0.00	4.59	0.02	0.00
10.84	2.00	0.00	4.58	0.02	0.00	10.86	2.00	0.00	4.57	0.02	0.00
10.88	2.00	0.00	4.56	0.02	0.00	10.90	2.00	0.00	4.55	0.02	0.00
10.92	2.00	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.97	2.00	0.00	4.51	0.02	0.00
10.99	2.00	0.00	4.50	0.02	0.00	11.01	2.00	0.00	4.49	0.02	0.00
11.03	2.00	0.00	4.48	0.02	0.00	11.05	2.00	0.00	4.47	0.02	0.00
11.07	2.00	0.00	4.46	0.02	0.00	11.09	2.00	0.00	4.45	0.02	0.00
11.11	2.00	0.00	4.44	0.02	0.00	11.13	2.00	0.00	4.43	0.02	0.00
11.15	2.00	0.00	4.42	0.02	0.00	11.17	2.00	0.00	4.41	0.02	0.00
11.19	2.00	0.00	4.40	0.02	0.00	11.21	2.00	0.00	4.39	0.02	0.00
11.23	2.00	0.00	4.38	0.02	0.00	11.25	2.00	0.00	4.37	0.02	0.00
11.27	2.00	0.00	4.36	0.02	0.00	11.29	2.00	0.00	4.35	0.02	0.00
11.31	2.00	0.00	4.34	0.02	0.00	11.33	2.00	0.00	4.33	0.02	0.00
11.35	2.00	0.00	4.32	0.02	0.00	11.37	2.00	0.00	4.31	0.02	0.00
11.39	2.00	0.00	4.30	0.02	0.00	11.41	2.00	0.00	4.29	0.02	0.00
11.43	2.00	0.00	4.28	0.02	0.00	11.45	2.00	0.00	4.27	0.02	0.00
11.47	2.00	0.00	4.26	0.02	0.00	11.49	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.51	2.00	0.00	4.24	0.02	0.00	11.53	2.00	0.00	4.23	0.02	0.00
11.55	2.00	0.00	4.22	0.02	0.00	11.57	2.00	0.00	4.21	0.02	0.00
11.59	2.00	0.00	4.20	0.02	0.00	11.61	2.00	0.00	4.19	0.02	0.00
11.63	2.00	0.00	4.18	0.02	0.00	11.65	2.00	0.00	4.18	0.02	0.00
11.67	2.00	0.00	4.17	0.02	0.00	11.69	2.00	0.00	4.16	0.02	0.00
11.71	2.00	0.00	4.15	0.02	0.00	11.73	2.00	0.00	4.14	0.02	0.00
11.75	2.00	0.00	4.13	0.02	0.00	11.77	2.00	0.00	4.12	0.02	0.00
11.79	2.00	0.00	4.11	0.02	0.00	11.81	2.00	0.00	4.10	0.02	0.00
11.83	2.00	0.00	4.09	0.02	0.00	11.85	2.00	0.00	4.08	0.02	0.00
11.87	2.00	0.00	4.07	0.02	0.00	11.89	2.00	0.00	4.06	0.02	0.00
11.91	2.00	0.00	4.05	0.02	0.00	11.93	2.00	0.00	4.04	0.02	0.00
11.95	2.00	0.00	4.03	0.02	0.00	11.97	2.00	0.00	4.02	0.02	0.00
11.99	2.00	0.00	4.01	0.02	0.00						

Overall liquefaction potential: 4.06

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

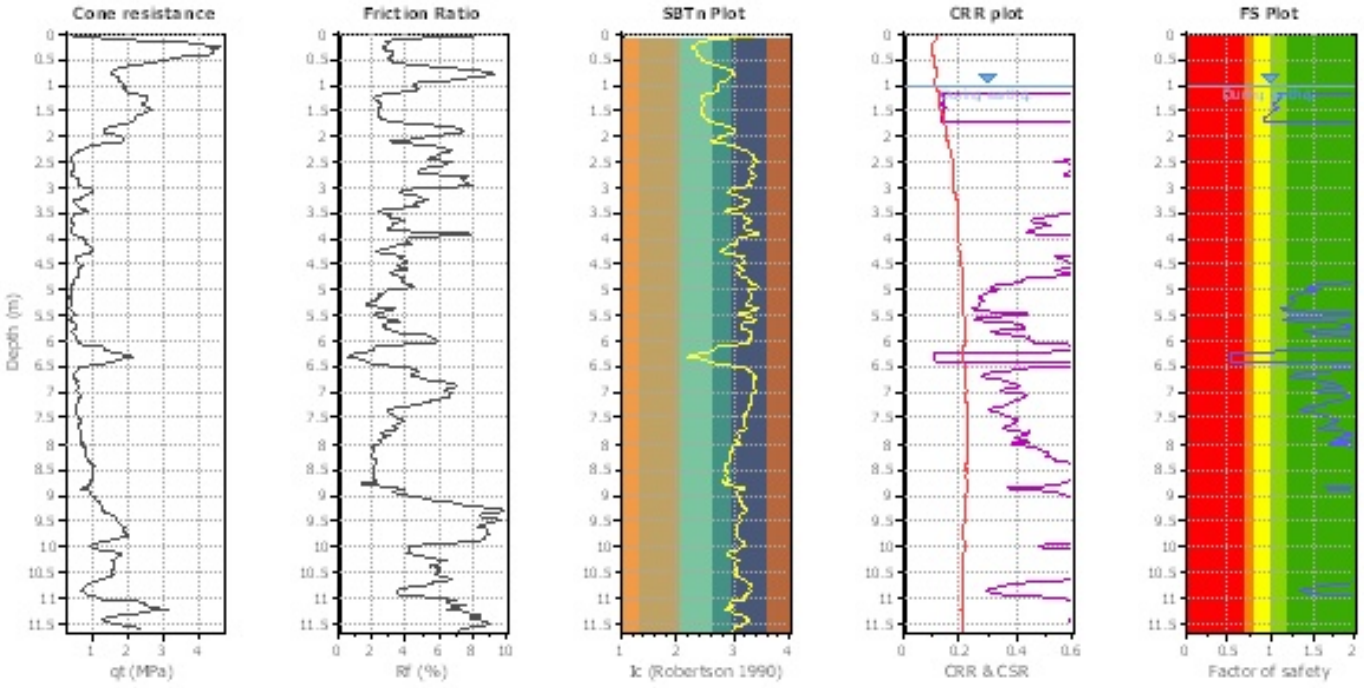
LIQUEFACTION ANALYSIS REPORT

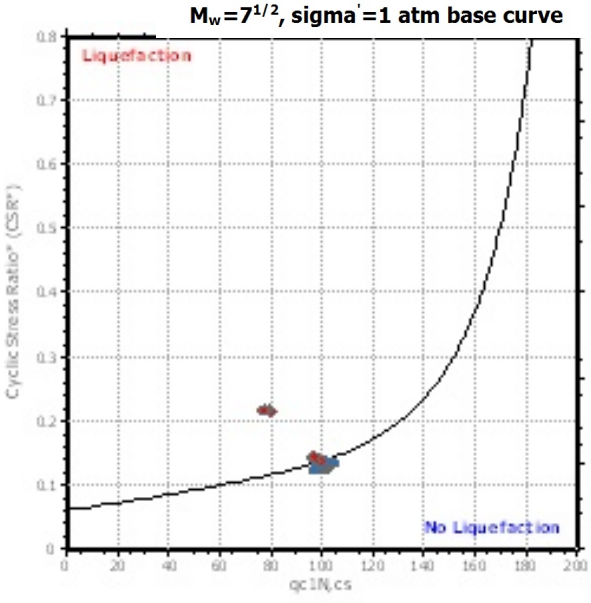
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

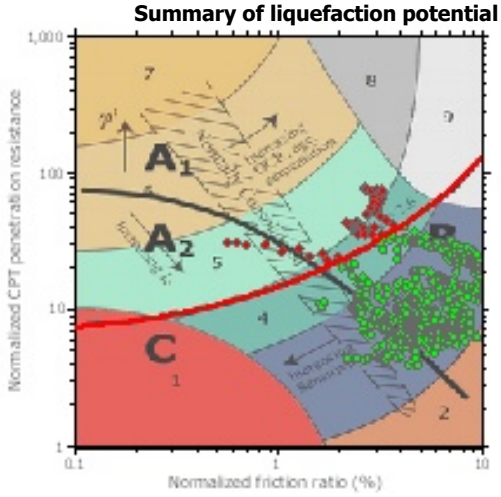
CPT file : CPTU01

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

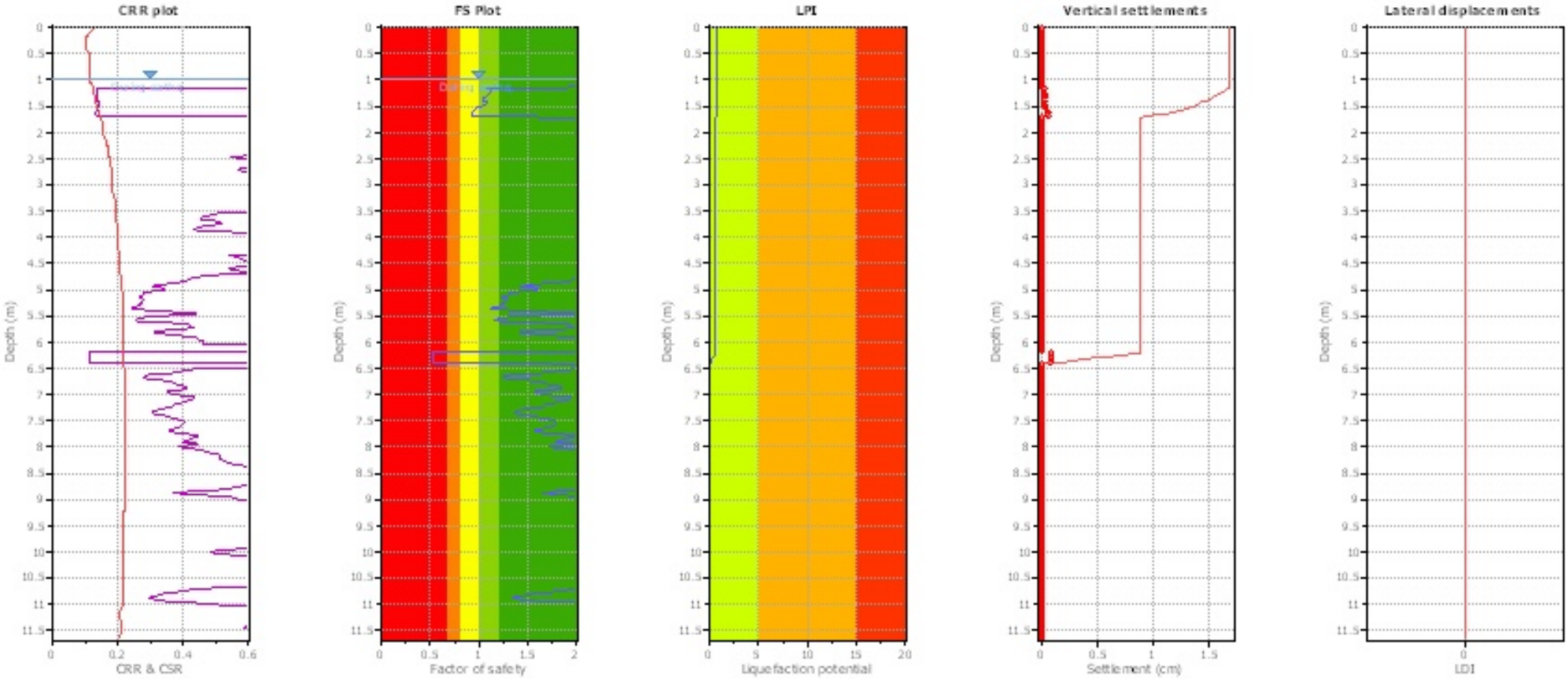






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	1.09	0.00	9.42	0.02	0.00
1.18	1.11	0.00	9.41	0.02	0.00	1.20	1.13	0.00	9.40	0.02	0.00
1.22	1.13	0.00	9.39	0.02	0.00	1.24	1.11	0.00	9.38	0.02	0.00
1.26	1.10	0.00	9.37	0.02	0.00	1.28	1.10	0.00	9.36	0.02	0.00
1.30	1.10	0.00	9.35	0.02	0.00	1.32	1.08	0.00	9.34	0.02	0.00
1.34	1.07	0.00	9.33	0.02	0.00	1.36	1.04	0.00	9.32	0.02	0.00
1.38	1.04	0.00	9.31	0.02	0.00	1.40	1.05	0.00	9.30	0.02	0.00
1.42	1.07	0.00	9.29	0.02	0.00	1.44	1.09	0.00	9.28	0.02	0.00
1.46	1.08	0.00	9.27	0.02	0.00	1.48	1.06	0.00	9.26	0.02	0.00
1.50	1.04	0.00	9.25	0.02	0.00	1.52	1.02	0.00	9.24	0.02	0.00
1.54	0.99	0.01	9.23	0.02	0.00	1.56	0.97	0.03	9.22	0.02	0.00
1.58	0.96	0.04	9.21	0.02	0.01	1.60	0.94	0.06	9.20	0.02	0.01
1.62	0.93	0.07	9.19	0.02	0.01	1.64	0.92	0.08	9.18	0.02	0.01
1.66	0.92	0.08	9.17	0.02	0.01	1.68	0.92	0.08	9.16	0.02	0.01
1.70	0.92	0.08	9.15	0.02	0.01	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.67	2.00	0.00	8.66	0.02	0.00
2.69	2.00	0.00	8.65	0.02	0.00	2.71	2.00	0.00	8.64	0.02	0.00
2.73	2.00	0.00	8.63	0.02	0.00	2.75	2.00	0.00	8.62	0.02	0.00
2.77	2.00	0.00	8.61	0.02	0.00	2.79	2.00	0.00	8.60	0.02	0.00
2.81	2.00	0.00	8.59	0.02	0.00	2.83	2.00	0.00	8.58	0.02	0.00
2.85	2.00	0.00	8.57	0.02	0.00	2.87	2.00	0.00	8.56	0.02	0.00
2.89	2.00	0.00	8.55	0.02	0.00	2.91	2.00	0.00	8.54	0.02	0.00
2.93	2.00	0.00	8.53	0.02	0.00	2.95	2.00	0.00	8.52	0.02	0.00
2.97	2.00	0.00	8.51	0.02	0.00	2.99	2.00	0.00	8.50	0.02	0.00
3.01	2.00	0.00	8.49	0.02	0.00	3.03	2.00	0.00	8.48	0.02	0.00
3.05	2.00	0.00	8.47	0.02	0.00	3.07	2.00	0.00	8.46	0.02	0.00
3.09	2.00	0.00	8.45	0.02	0.00	3.11	2.00	0.00	8.44	0.02	0.00
3.13	2.00	0.00	8.43	0.02	0.00	3.15	2.00	0.00	8.42	0.02	0.00
3.17	2.00	0.00	8.41	0.02	0.00	3.19	2.00	0.00	8.40	0.02	0.00
3.21	2.00	0.00	8.39	0.02	0.00	3.23	2.00	0.00	8.38	0.02	0.00
3.25	2.00	0.00	8.37	0.02	0.00	3.27	2.00	0.00	8.36	0.02	0.00
3.29	2.00	0.00	8.35	0.02	0.00	3.31	2.00	0.00	8.34	0.02	0.00
3.33	2.00	0.00	8.33	0.02	0.00	3.35	2.00	0.00	8.32	0.02	0.00
3.37	2.00	0.00	8.31	0.02	0.00	3.39	2.00	0.00	8.30	0.02	0.00
3.41	2.00	0.00	8.29	0.02	0.00	3.43	2.00	0.00	8.28	0.02	0.00
3.45	2.00	0.00	8.27	0.02	0.00	3.47	2.00	0.00	8.26	0.02	0.00
3.49	2.00	0.00	8.25	0.02	0.00	3.51	2.00	0.00	8.24	0.02	0.00
3.53	2.00	0.00	8.23	0.02	0.00	3.55	2.00	0.00	8.22	0.02	0.00
3.57	2.00	0.00	8.21	0.02	0.00	3.59	2.00	0.00	8.20	0.02	0.00
3.61	2.00	0.00	8.19	0.02	0.00	3.63	2.00	0.00	8.18	0.02	0.00
3.65	2.00	0.00	8.17	0.02	0.00	3.67	2.00	0.00	8.17	0.02	0.00
3.69	2.00	0.00	8.16	0.02	0.00	3.71	2.00	0.00	8.15	0.02	0.00
3.73	2.00	0.00	8.14	0.02	0.00	3.75	2.00	0.00	8.13	0.02	0.00
3.77	2.00	0.00	8.12	0.02	0.00	3.79	2.00	0.00	8.11	0.02	0.00
3.81	2.00	0.00	8.10	0.02	0.00	3.83	2.00	0.00	8.09	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.85	2.00	0.00	8.08	0.02	0.00	3.87	2.00	0.00	8.07	0.02	0.00
3.89	2.00	0.00	8.06	0.02	0.00	3.91	2.00	0.00	8.05	0.02	0.00
3.93	2.00	0.00	8.04	0.02	0.00	3.95	2.00	0.00	8.03	0.02	0.00
3.97	2.00	0.00	8.02	0.02	0.00	3.99	2.00	0.00	8.01	0.02	0.00
4.01	2.00	0.00	8.00	0.02	0.00	4.03	2.00	0.00	7.99	0.02	0.00
4.05	2.00	0.00	7.98	0.02	0.00	4.07	2.00	0.00	7.97	0.02	0.00
4.09	2.00	0.00	7.96	0.02	0.00	4.11	2.00	0.00	7.95	0.02	0.00
4.13	2.00	0.00	7.94	0.02	0.00	4.15	2.00	0.00	7.93	0.02	0.00
4.17	2.00	0.00	7.92	0.02	0.00	4.19	2.00	0.00	7.91	0.02	0.00
4.21	2.00	0.00	7.90	0.02	0.00	4.23	2.00	0.00	7.89	0.02	0.00
4.25	2.00	0.00	7.88	0.02	0.00	4.27	2.00	0.00	7.87	0.02	0.00
4.29	2.00	0.00	7.86	0.02	0.00	4.31	2.00	0.00	7.85	0.02	0.00
4.33	2.00	0.00	7.84	0.02	0.00	4.35	2.00	0.00	7.83	0.02	0.00
4.37	2.00	0.00	7.82	0.02	0.00	4.38	2.00	0.00	7.81	0.02	0.00
4.40	2.00	0.00	7.80	0.02	0.00	4.42	2.00	0.00	7.79	0.02	0.00
4.44	2.00	0.00	7.78	0.02	0.00	4.46	2.00	0.00	7.77	0.02	0.00
4.48	2.00	0.00	7.76	0.02	0.00	4.50	2.00	0.00	7.75	0.02	0.00
4.52	2.00	0.00	7.74	0.02	0.00	4.54	2.00	0.00	7.73	0.02	0.00
4.56	2.00	0.00	7.72	0.02	0.00	4.58	2.00	0.00	7.71	0.02	0.00
4.60	2.00	0.00	7.70	0.02	0.00	4.62	2.00	0.00	7.69	0.02	0.00
4.64	2.00	0.00	7.68	0.02	0.00	4.66	2.00	0.00	7.67	0.02	0.00
4.68	2.00	0.00	7.66	0.02	0.00	4.70	2.00	0.00	7.65	0.02	0.00
4.72	2.00	0.00	7.64	0.02	0.00	4.74	2.00	0.00	7.63	0.02	0.00
4.76	2.00	0.00	7.62	0.02	0.00	4.78	2.00	0.00	7.61	0.02	0.00
4.80	2.00	0.00	7.60	0.02	0.00	4.82	1.98	0.00	7.59	0.02	0.00
4.84	1.94	0.00	7.58	0.02	0.00	4.86	1.84	0.00	7.57	0.02	0.00
4.88	1.70	0.00	7.56	0.02	0.00	4.90	1.57	0.00	7.55	0.02	0.00
4.92	1.46	0.00	7.54	0.02	0.00	4.94	1.43	0.00	7.53	0.02	0.00
4.96	1.53	0.00	7.52	0.02	0.00	4.98	1.60	0.00	7.51	0.02	0.00
5.00	1.61	0.00	7.50	0.02	0.00	5.02	1.47	0.00	7.49	0.02	0.00
5.04	1.36	0.00	7.48	0.02	0.00	5.06	1.32	0.00	7.47	0.02	0.00
5.08	1.31	0.00	7.46	0.02	0.00	5.10	1.31	0.00	7.45	0.02	0.00
5.12	1.27	0.00	7.44	0.02	0.00	5.14	1.23	0.00	7.43	0.02	0.00
5.16	1.25	0.00	7.42	0.02	0.00	5.18	1.28	0.00	7.41	0.02	0.00
5.20	1.30	0.00	7.40	0.02	0.00	5.22	1.28	0.00	7.39	0.02	0.00
5.24	1.26	0.00	7.38	0.02	0.00	5.26	1.25	0.00	7.37	0.02	0.00
5.28	1.26	0.00	7.36	0.02	0.00	5.30	1.24	0.00	7.35	0.02	0.00
5.32	1.21	0.00	7.34	0.02	0.00	5.34	1.14	0.00	7.33	0.02	0.00
5.36	1.11	0.00	7.32	0.02	0.00	5.38	1.13	0.00	7.31	0.02	0.00
5.39	1.28	0.00	7.30	0.02	0.00	5.41	1.55	0.00	7.29	0.02	0.00
5.43	1.84	0.00	7.28	0.02	0.00	5.45	2.00	0.00	7.27	0.02	0.00
5.47	1.99	0.00	7.26	0.02	0.00	5.49	1.77	0.00	7.25	0.02	0.00
5.51	1.49	0.00	7.24	0.02	0.00	5.53	1.30	0.00	7.23	0.02	0.00
5.55	1.20	0.00	7.22	0.02	0.00	5.57	1.16	0.00	7.21	0.02	0.00
5.59	1.20	0.00	7.20	0.02	0.00	5.61	1.34	0.00	7.19	0.02	0.00
5.63	1.59	0.00	7.18	0.02	0.00	5.65	1.81	0.00	7.17	0.02	0.00
5.67	1.94	0.00	7.16	0.02	0.00	5.69	1.93	0.00	7.15	0.02	0.00
5.71	1.96	0.00	7.14	0.02	0.00	5.73	1.99	0.00	7.13	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.75	1.86	0.00	7.12	0.02	0.00	5.77	1.62	0.00	7.11	0.02	0.00
5.79	1.44	0.00	7.10	0.02	0.00	5.81	1.42	0.00	7.10	0.02	0.00
5.83	1.49	0.00	7.09	0.02	0.00	5.85	1.54	0.00	7.08	0.02	0.00
5.87	1.67	0.00	7.07	0.02	0.00	5.89	1.85	0.00	7.06	0.02	0.00
5.91	1.99	0.00	7.05	0.02	0.00	5.93	2.00	0.00	7.04	0.02	0.00
5.95	2.00	0.00	7.03	0.02	0.00	5.97	2.00	0.00	7.02	0.02	0.00
5.99	2.00	0.00	7.01	0.02	0.00	6.01	2.00	0.00	7.00	0.02	0.00
6.03	2.00	0.00	6.99	0.02	0.00	6.05	2.00	0.00	6.98	0.02	0.00
6.07	2.00	0.00	6.97	0.02	0.00	6.09	2.00	0.00	6.96	0.02	0.00
6.11	2.00	0.00	6.95	0.02	0.00	6.13	2.00	0.00	6.94	0.02	0.00
6.15	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	0.52	0.48	6.90	0.02	0.07
6.22	0.52	0.48	6.89	0.02	0.06	6.24	0.53	0.47	6.88	0.02	0.06
6.26	0.53	0.47	6.87	0.02	0.06	6.28	0.53	0.47	6.86	0.02	0.06
6.30	0.54	0.46	6.85	0.02	0.06	6.32	0.54	0.46	6.84	0.02	0.06
6.34	0.54	0.46	6.83	0.02	0.06	6.36	0.53	0.47	6.82	0.02	0.06
6.38	0.53	0.47	6.81	0.02	0.06	6.40	0.52	0.48	6.80	0.02	0.06
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	2.00	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	1.99	0.00	6.74	0.02	0.00
6.54	1.84	0.00	6.73	0.02	0.00	6.56	1.77	0.00	6.72	0.02	0.00
6.58	1.67	0.00	6.71	0.02	0.00	6.60	1.53	0.00	6.70	0.02	0.00
6.62	1.40	0.00	6.69	0.02	0.00	6.64	1.29	0.00	6.68	0.02	0.00
6.66	1.25	0.00	6.67	0.02	0.00	6.68	1.25	0.00	6.66	0.02	0.00
6.70	1.29	0.00	6.65	0.02	0.00	6.72	1.41	0.00	6.64	0.02	0.00
6.74	1.51	0.00	6.63	0.02	0.00	6.76	1.62	0.00	6.62	0.02	0.00
6.77	1.65	0.00	6.61	0.02	0.00	6.79	1.69	0.00	6.60	0.02	0.00
6.81	1.73	0.00	6.59	0.02	0.00	6.83	1.78	0.00	6.58	0.02	0.00
6.85	1.84	0.00	6.57	0.02	0.00	6.87	1.85	0.00	6.56	0.02	0.00
6.89	1.82	0.00	6.55	0.02	0.00	6.91	1.72	0.00	6.54	0.02	0.00
6.93	1.62	0.00	6.53	0.02	0.00	6.95	1.57	0.00	6.52	0.02	0.00
6.97	1.58	0.00	6.51	0.02	0.00	6.99	1.65	0.00	6.50	0.02	0.00
7.01	1.76	0.00	6.49	0.02	0.00	7.03	1.88	0.00	6.48	0.02	0.00
7.05	1.94	0.00	6.48	0.02	0.00	7.07	1.95	0.00	6.47	0.02	0.00
7.09	1.93	0.00	6.46	0.02	0.00	7.11	1.88	0.00	6.45	0.02	0.00
7.13	1.82	0.00	6.44	0.02	0.00	7.15	1.77	0.00	6.43	0.02	0.00
7.17	1.74	0.00	6.42	0.02	0.00	7.19	1.69	0.00	6.41	0.02	0.00
7.21	1.67	0.00	6.40	0.02	0.00	7.23	1.66	0.00	6.39	0.02	0.00
7.25	1.62	0.00	6.38	0.02	0.00	7.27	1.55	0.00	6.37	0.02	0.00
7.29	1.47	0.00	6.36	0.02	0.00	7.30	1.42	0.00	6.35	0.02	0.00
7.32	1.37	0.00	6.34	0.02	0.00	7.34	1.37	0.00	6.33	0.02	0.00
7.36	1.40	0.00	6.32	0.02	0.00	7.38	1.45	0.00	6.31	0.02	0.00
7.40	1.52	0.00	6.30	0.02	0.00	7.42	1.58	0.00	6.29	0.02	0.00
7.44	1.63	0.00	6.28	0.02	0.00	7.46	1.67	0.00	6.27	0.02	0.00
7.48	1.72	0.00	6.26	0.02	0.00	7.50	1.76	0.00	6.25	0.02	0.00
7.52	1.80	0.00	6.24	0.02	0.00	7.54	1.79	0.00	6.23	0.02	0.00
7.56	1.78	0.00	6.22	0.02	0.00	7.58	1.77	0.00	6.21	0.02	0.00
7.60	1.76	0.00	6.20	0.02	0.00	7.62	1.73	0.00	6.19	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.64	1.68	0.00	6.18	0.02	0.00	7.66	1.63	0.00	6.17	0.02	0.00
7.68	1.60	0.00	6.16	0.02	0.00	7.70	1.58	0.00	6.15	0.02	0.00
7.72	1.60	0.00	6.14	0.02	0.00	7.74	1.72	0.00	6.13	0.02	0.00
7.75	1.88	0.00	6.12	0.02	0.00	7.77	1.99	0.00	6.11	0.02	0.00
7.79	2.00	0.00	6.10	0.02	0.00	7.81	1.94	0.00	6.09	0.02	0.00
7.83	1.91	0.00	6.08	0.02	0.00	7.85	1.87	0.00	6.07	0.02	0.00
7.87	1.83	0.00	6.06	0.02	0.00	7.89	1.78	0.00	6.05	0.02	0.00
7.91	1.91	0.00	6.04	0.02	0.00	7.93	1.97	0.00	6.03	0.02	0.00
7.95	1.98	0.00	6.03	0.02	0.00	7.97	1.80	0.00	6.02	0.02	0.00
7.99	1.72	0.00	6.01	0.02	0.00	8.01	1.73	0.00	6.00	0.02	0.00
8.03	1.83	0.00	5.99	0.02	0.00	8.05	1.97	0.00	5.98	0.02	0.00
8.07	2.00	0.00	5.97	0.02	0.00	8.09	2.00	0.00	5.96	0.02	0.00
8.11	2.00	0.00	5.95	0.02	0.00	8.13	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.51	2.00	0.00	5.74	0.02	0.00
8.53	2.00	0.00	5.73	0.02	0.00	8.55	2.00	0.00	5.72	0.02	0.00
8.57	2.00	0.00	5.71	0.02	0.00	8.59	2.00	0.00	5.70	0.02	0.00
8.61	2.00	0.00	5.69	0.02	0.00	8.63	2.00	0.00	5.68	0.02	0.00
8.65	2.00	0.00	5.67	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.82	2.00	0.00	5.59	0.02	0.00
8.84	2.00	0.00	5.58	0.02	0.00	8.86	1.65	0.00	5.57	0.02	0.00
8.88	1.72	0.00	5.56	0.02	0.00	8.90	1.82	0.00	5.55	0.02	0.00
8.92	2.00	0.00	5.54	0.02	0.00	8.94	2.00	0.00	5.53	0.02	0.00
8.96	2.00	0.00	5.52	0.02	0.00	8.98	2.00	0.00	5.51	0.02	0.00
9.00	2.00	0.00	5.50	0.02	0.00	9.02	2.00	0.00	5.49	0.02	0.00
9.04	2.00	0.00	5.48	0.02	0.00	9.06	2.00	0.00	5.47	0.02	0.00
9.08	2.00	0.00	5.46	0.02	0.00	9.10	2.00	0.00	5.45	0.02	0.00
9.11	2.00	0.00	5.44	0.02	0.00	9.13	2.00	0.00	5.43	0.02	0.00
9.15	2.00	0.00	5.42	0.02	0.00	9.17	2.00	0.00	5.41	0.02	0.00
9.19	2.00	0.00	5.40	0.02	0.00	9.21	2.00	0.00	5.39	0.02	0.00
9.23	2.00	0.00	5.38	0.02	0.00	9.25	2.00	0.00	5.37	0.02	0.00
9.27	2.00	0.00	5.37	0.02	0.00	9.29	2.00	0.00	5.36	0.02	0.00
9.31	2.00	0.00	5.35	0.02	0.00	9.33	2.00	0.00	5.34	0.02	0.00
9.35	2.00	0.00	5.33	0.02	0.00	9.37	2.00	0.00	5.32	0.02	0.00
9.39	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.65	2.00	0.00	5.17	0.02	0.00	9.67	2.00	0.00	5.16	0.02	0.00
9.69	2.00	0.00	5.15	0.02	0.00	9.71	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.79	2.00	0.00	5.11	0.02	0.00
9.81	2.00	0.00	5.10	0.02	0.00	9.83	2.00	0.00	5.09	0.02	0.00
9.85	2.00	0.00	5.08	0.02	0.00	9.87	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.13	2.00	0.00	4.93	0.02	0.00
10.15	2.00	0.00	4.92	0.02	0.00	10.17	2.00	0.00	4.91	0.02	0.00
10.19	2.00	0.00	4.90	0.02	0.00	10.21	2.00	0.00	4.89	0.02	0.00
10.23	2.00	0.00	4.89	0.02	0.00	10.25	2.00	0.00	4.88	0.02	0.00
10.27	2.00	0.00	4.87	0.02	0.00	10.29	2.00	0.00	4.86	0.02	0.00
10.31	2.00	0.00	4.85	0.02	0.00	10.33	2.00	0.00	4.84	0.02	0.00
10.34	2.00	0.00	4.83	0.02	0.00	10.36	2.00	0.00	4.82	0.02	0.00
10.38	2.00	0.00	4.81	0.02	0.00	10.40	2.00	0.00	4.80	0.02	0.00
10.42	2.00	0.00	4.79	0.02	0.00	10.44	2.00	0.00	4.78	0.02	0.00
10.46	2.00	0.00	4.77	0.02	0.00	10.48	2.00	0.00	4.76	0.02	0.00
10.50	2.00	0.00	4.75	0.02	0.00	10.52	2.00	0.00	4.74	0.02	0.00
10.54	2.00	0.00	4.73	0.02	0.00	10.55	2.00	0.00	4.72	0.02	0.00
10.57	2.00	0.00	4.71	0.02	0.00	10.59	2.00	0.00	4.70	0.02	0.00
10.61	2.00	0.00	4.69	0.02	0.00	10.63	2.00	0.00	4.68	0.02	0.00
10.65	2.00	0.00	4.67	0.02	0.00	10.67	2.00	0.00	4.67	0.02	0.00
10.69	2.00	0.00	4.66	0.02	0.00	10.71	2.00	0.00	4.65	0.02	0.00
10.73	1.90	0.00	4.64	0.02	0.00	10.75	1.78	0.00	4.63	0.02	0.00
10.76	1.68	0.00	4.62	0.02	0.00	10.78	1.58	0.00	4.61	0.02	0.00
10.80	1.54	0.00	4.60	0.02	0.00	10.82	1.49	0.00	4.59	0.02	0.00
10.84	1.43	0.00	4.58	0.02	0.00	10.86	1.35	0.00	4.57	0.02	0.00
10.88	1.34	0.00	4.56	0.02	0.00	10.90	1.40	0.00	4.55	0.02	0.00
10.92	1.51	0.00	4.54	0.02	0.00	10.94	1.64	0.00	4.53	0.02	0.00
10.96	1.81	0.00	4.52	0.02	0.00	10.97	2.00	0.00	4.51	0.02	0.00
10.99	2.00	0.00	4.50	0.02	0.00	11.01	2.00	0.00	4.49	0.02	0.00
11.03	2.00	0.00	4.48	0.02	0.00	11.05	2.00	0.00	4.47	0.02	0.00
11.07	2.00	0.00	4.47	0.02	0.00	11.09	2.00	0.00	4.46	0.02	0.00
11.11	2.00	0.00	4.45	0.02	0.00	11.13	2.00	0.00	4.44	0.02	0.00
11.15	2.00	0.00	4.43	0.02	0.00	11.16	2.00	0.00	4.42	0.02	0.00
11.18	2.00	0.00	4.41	0.02	0.00	11.20	2.00	0.00	4.40	0.02	0.00
11.22	2.00	0.00	4.39	0.02	0.00	11.24	2.00	0.00	4.38	0.02	0.00
11.26	2.00	0.00	4.37	0.02	0.00	11.28	2.00	0.00	4.36	0.02	0.00
11.30	2.00	0.00	4.35	0.02	0.00	11.32	2.00	0.00	4.34	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.34	2.00	0.00	4.33	0.02	0.00	11.35	2.00	0.00	4.32	0.02	0.00
11.37	2.00	0.00	4.31	0.02	0.00	11.39	2.00	0.00	4.30	0.02	0.00
11.41	2.00	0.00	4.29	0.02	0.00	11.43	2.00	0.00	4.28	0.02	0.00
11.45	2.00	0.00	4.28	0.02	0.00	11.47	2.00	0.00	4.27	0.02	0.00
11.49	2.00	0.00	4.26	0.02	0.00	11.51	2.00	0.00	4.25	0.02	0.00
11.53	2.00	0.00	4.24	0.02	0.00	11.54	2.00	0.00	4.23	0.02	0.00
11.56	2.00	0.00	4.22	0.02	0.00	11.58	2.00	0.00	4.21	0.02	0.00
11.60	2.00	0.00	4.20	0.02	0.00	11.62	2.00	0.00	4.19	0.02	0.00
11.64	2.00	0.00	4.18	0.02	0.00						

Overall liquefaction potential: 0.79

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

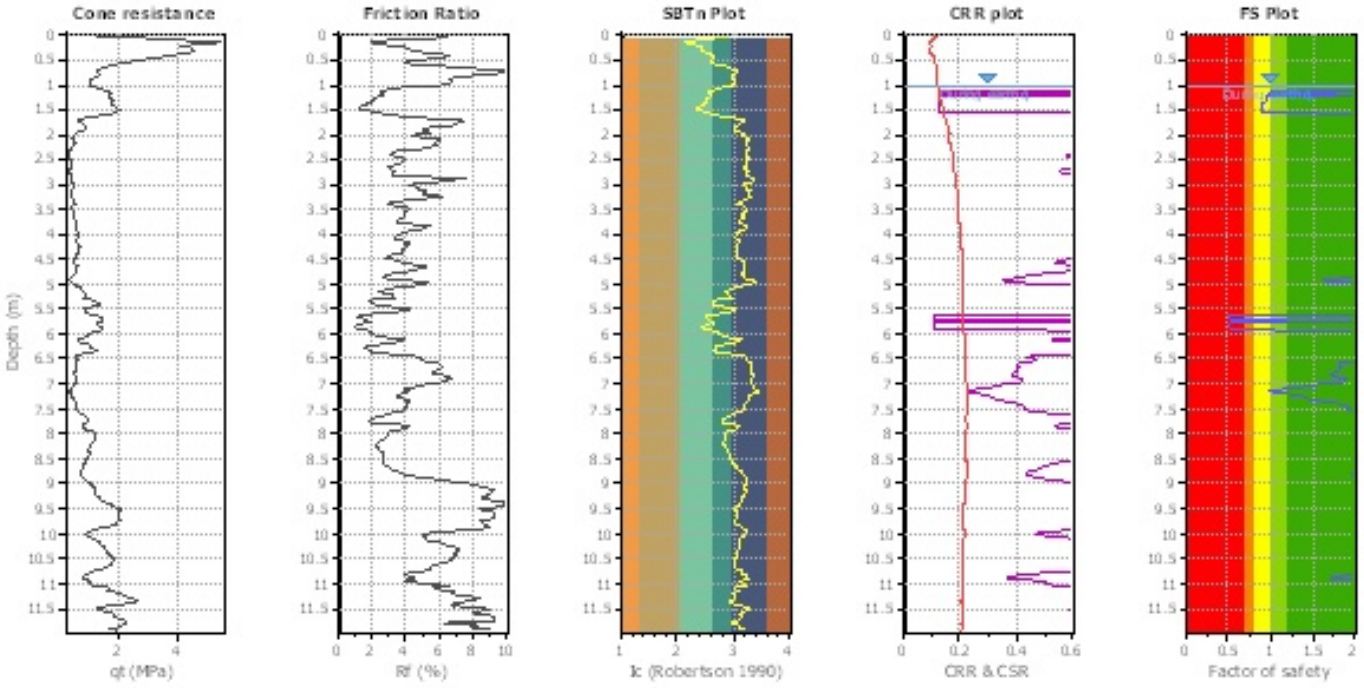
LIQUEFACTION ANALYSIS REPORT

Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

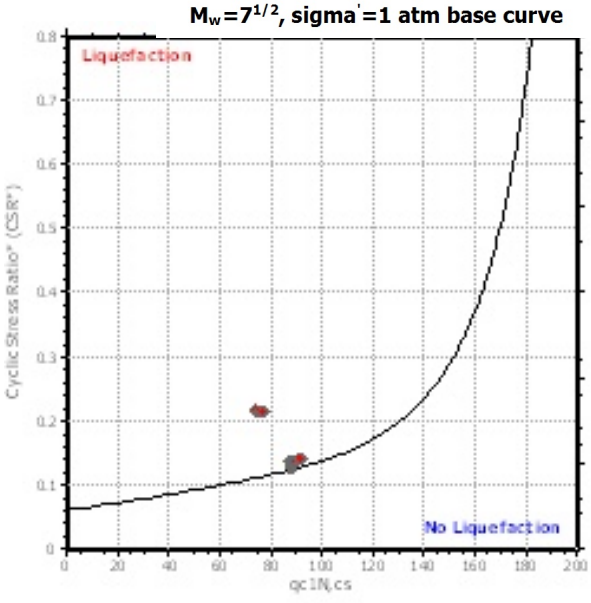
CPT file : CPTU02

Input parameters and analysis data

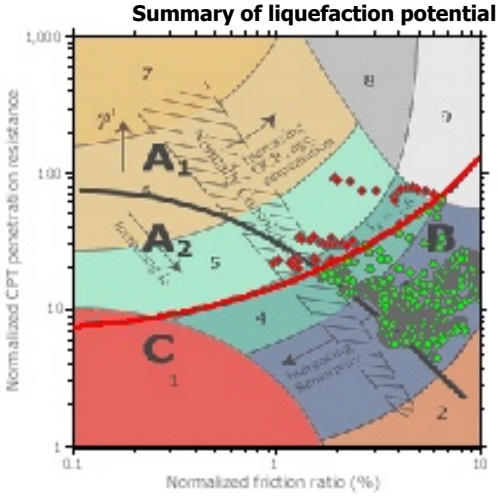
Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



$M_w=7^{1/2}$, sigma'=1 atm base curve

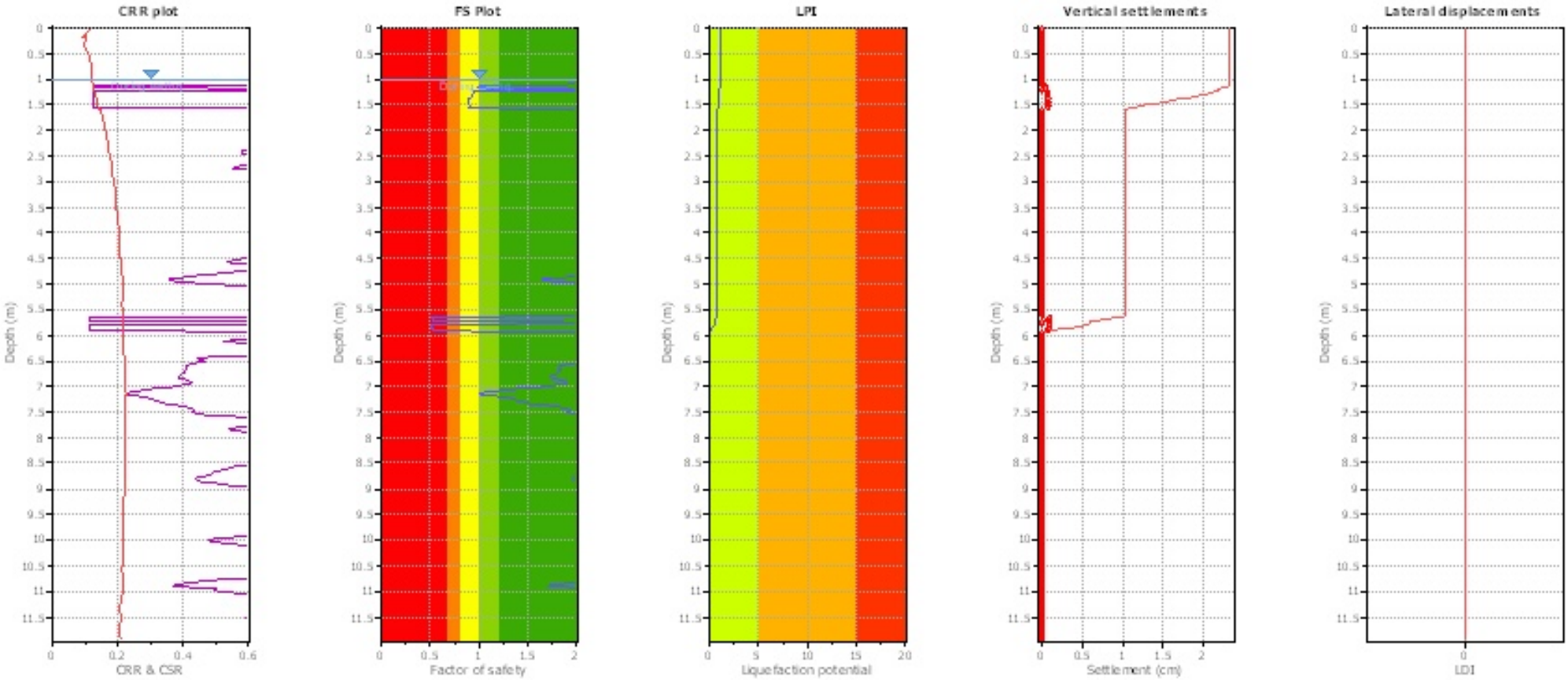


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	1.00	0.00	9.44	0.02	0.00
1.14	1.00	0.00	9.43	0.02	0.00	1.16	0.99	0.01	9.42	0.02	0.00
1.18	0.97	0.03	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	0.95	0.05	9.38	0.02	0.01
1.26	0.95	0.05	9.37	0.02	0.01	1.28	0.95	0.05	9.36	0.02	0.01
1.30	0.94	0.06	9.35	0.02	0.01	1.32	0.94	0.06	9.34	0.02	0.01
1.34	0.93	0.07	9.33	0.02	0.01	1.36	0.91	0.09	9.32	0.02	0.02
1.38	0.90	0.10	9.31	0.02	0.02	1.40	0.90	0.10	9.30	0.02	0.02
1.42	0.90	0.10	9.29	0.02	0.02	1.44	0.90	0.10	9.28	0.02	0.02
1.46	0.89	0.11	9.27	0.02	0.02	1.48	0.90	0.10	9.26	0.02	0.02
1.50	0.90	0.10	9.25	0.02	0.02	1.52	0.91	0.09	9.24	0.02	0.02
1.54	0.91	0.09	9.23	0.02	0.02	1.56	0.90	0.10	9.22	0.02	0.02
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	1.96	0.00	7.57	0.02	0.00	4.88	1.83	0.00	7.56	0.02	0.00
4.90	1.72	0.00	7.55	0.02	0.00	4.92	1.64	0.00	7.54	0.02	0.00
4.94	1.68	0.00	7.53	0.02	0.00	4.96	1.81	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	0.51	0.49	7.18	0.02	0.07
5.66	0.52	0.48	7.17	0.02	0.07	5.68	0.52	0.48	7.16	0.02	0.07
5.70	0.53	0.47	7.15	0.02	0.07	5.72	0.53	0.47	7.14	0.02	0.07
5.74	2.00	0.00	7.13	0.02	0.00	5.76	2.00	0.00	7.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	2.00	0.00	7.11	0.02	0.00	5.80	0.51	0.49	7.10	0.02	0.07
5.82	0.51	0.49	7.09	0.02	0.07	5.84	0.51	0.49	7.08	0.02	0.07
5.86	0.52	0.48	7.07	0.02	0.07	5.88	0.52	0.48	7.06	0.02	0.07
5.90	0.53	0.47	7.05	0.02	0.07	5.92	0.52	0.48	7.04	0.02	0.07
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	2.00	0.00	6.95	0.02	0.00	6.12	2.00	0.00	6.94	0.02	0.00
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	2.00	0.00	6.90	0.02	0.00
6.22	2.00	0.00	6.89	0.02	0.00	6.24	2.00	0.00	6.88	0.02	0.00
6.26	2.00	0.00	6.87	0.02	0.00	6.28	2.00	0.00	6.86	0.02	0.00
6.30	2.00	0.00	6.85	0.02	0.00	6.32	2.00	0.00	6.84	0.02	0.00
6.34	2.00	0.00	6.83	0.02	0.00	6.36	2.00	0.00	6.82	0.02	0.00
6.38	2.00	0.00	6.81	0.02	0.00	6.40	2.00	0.00	6.80	0.02	0.00
6.42	2.00	0.00	6.79	0.02	0.00	6.44	2.00	0.00	6.78	0.02	0.00
6.46	1.99	0.00	6.77	0.02	0.00	6.48	2.00	0.00	6.76	0.02	0.00
6.50	2.00	0.00	6.75	0.02	0.00	6.52	2.00	0.00	6.74	0.02	0.00
6.54	2.00	0.00	6.73	0.02	0.00	6.56	1.95	0.00	6.72	0.02	0.00
6.58	1.87	0.00	6.71	0.02	0.00	6.60	1.82	0.00	6.70	0.02	0.00
6.62	1.83	0.00	6.69	0.02	0.00	6.64	1.84	0.00	6.68	0.02	0.00
6.66	1.84	0.00	6.67	0.02	0.00	6.68	1.82	0.00	6.66	0.02	0.00
6.70	1.83	0.00	6.65	0.02	0.00	6.71	1.82	0.00	6.64	0.02	0.00
6.73	1.81	0.00	6.63	0.02	0.00	6.75	1.79	0.00	6.62	0.02	0.00
6.77	1.75	0.00	6.61	0.02	0.00	6.79	1.74	0.00	6.60	0.02	0.00
6.81	1.73	0.00	6.59	0.02	0.00	6.83	1.75	0.00	6.58	0.02	0.00
6.85	1.78	0.00	6.57	0.02	0.00	6.87	1.84	0.00	6.56	0.02	0.00
6.89	1.88	0.00	6.55	0.02	0.00	6.91	1.90	0.00	6.54	0.02	0.00
6.93	1.89	0.00	6.53	0.02	0.00	6.95	1.86	0.00	6.52	0.02	0.00
6.97	1.78	0.00	6.51	0.02	0.00	6.99	1.70	0.00	6.50	0.02	0.00
7.01	1.59	0.00	6.49	0.02	0.00	7.03	1.49	0.00	6.48	0.02	0.00
7.05	1.38	0.00	6.47	0.02	0.00	7.07	1.26	0.00	6.46	0.02	0.00
7.09	1.16	0.00	6.45	0.02	0.00	7.11	1.05	0.00	6.44	0.02	0.00
7.13	1.01	0.00	6.43	0.02	0.00	7.15	1.03	0.00	6.42	0.02	0.00
7.17	1.10	0.00	6.41	0.02	0.00	7.19	1.20	0.00	6.40	0.02	0.00
7.21	1.29	0.00	6.39	0.02	0.00	7.23	1.35	0.00	6.38	0.02	0.00
7.25	1.39	0.00	6.37	0.02	0.00	7.27	1.41	0.00	6.36	0.02	0.00
7.29	1.44	0.00	6.35	0.02	0.00	7.31	1.47	0.00	6.34	0.02	0.00
7.33	1.53	0.00	6.33	0.02	0.00	7.35	1.61	0.00	6.32	0.02	0.00
7.37	1.70	0.00	6.31	0.02	0.00	7.39	1.78	0.00	6.30	0.02	0.00
7.41	1.86	0.00	6.29	0.02	0.00	7.43	1.91	0.00	6.28	0.02	0.00
7.45	1.94	0.00	6.27	0.02	0.00	7.47	1.91	0.00	6.26	0.02	0.00
7.49	1.90	0.00	6.25	0.02	0.00	7.51	1.92	0.00	6.24	0.02	0.00
7.53	1.98	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	2.00	0.00	6.11	0.02	0.00	7.79	2.00	0.00	6.10	0.02	0.00
7.81	2.00	0.00	6.09	0.02	0.00	7.83	2.00	0.00	6.08	0.02	0.00
7.85	2.00	0.00	6.07	0.02	0.00	7.87	2.00	0.00	6.06	0.02	0.00
7.89	2.00	0.00	6.05	0.02	0.00	7.91	2.00	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	2.00	0.00	6.00	0.02	0.00
8.01	2.00	0.00	5.99	0.02	0.00	8.03	2.00	0.00	5.98	0.02	0.00
8.05	2.00	0.00	5.97	0.02	0.00	8.07	2.00	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	2.00	0.00	5.83	0.02	0.00	8.35	2.00	0.00	5.82	0.02	0.00
8.37	2.00	0.00	5.81	0.02	0.00	8.39	2.00	0.00	5.80	0.02	0.00
8.41	2.00	0.00	5.79	0.02	0.00	8.43	2.00	0.00	5.78	0.02	0.00
8.45	2.00	0.00	5.77	0.02	0.00	8.47	2.00	0.00	5.76	0.02	0.00
8.49	2.00	0.00	5.75	0.02	0.00	8.51	2.00	0.00	5.74	0.02	0.00
8.53	2.00	0.00	5.73	0.02	0.00	8.55	2.00	0.00	5.72	0.02	0.00
8.57	2.00	0.00	5.71	0.02	0.00	8.59	2.00	0.00	5.70	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	1.96	0.00	5.61	0.02	0.00
8.81	1.96	0.00	5.60	0.02	0.00	8.83	1.97	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	2.00	0.00	5.55	0.02	0.00
8.93	2.00	0.00	5.54	0.02	0.00	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	2.00	0.00	5.48	0.02	0.00	9.07	2.00	0.00	5.47	0.02	0.00
9.09	2.00	0.00	5.46	0.02	0.00	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.19	2.00	0.00	5.41	0.02	0.00
9.21	2.00	0.00	5.40	0.02	0.00	9.23	2.00	0.00	5.39	0.02	0.00
9.25	2.00	0.00	5.38	0.02	0.00	9.27	2.00	0.00	5.37	0.02	0.00
9.29	2.00	0.00	5.36	0.02	0.00	9.31	2.00	0.00	5.35	0.02	0.00
9.33	2.00	0.00	5.34	0.02	0.00	9.35	2.00	0.00	5.33	0.02	0.00
9.37	2.00	0.00	5.32	0.02	0.00	9.39	2.00	0.00	5.31	0.02	0.00
9.41	2.00	0.00	5.30	0.02	0.00	9.43	2.00	0.00	5.29	0.02	0.00
9.45	2.00	0.00	5.28	0.02	0.00	9.47	2.00	0.00	5.27	0.02	0.00
9.49	2.00	0.00	5.26	0.02	0.00	9.51	2.00	0.00	5.25	0.02	0.00
9.53	2.00	0.00	5.24	0.02	0.00	9.55	2.00	0.00	5.23	0.02	0.00
9.57	2.00	0.00	5.22	0.02	0.00	9.59	2.00	0.00	5.21	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.61	2.00	0.00	5.20	0.02	0.00	9.63	2.00	0.00	5.19	0.02	0.00
9.65	2.00	0.00	5.18	0.02	0.00	9.67	2.00	0.00	5.17	0.02	0.00
9.69	2.00	0.00	5.16	0.02	0.00	9.71	2.00	0.00	5.15	0.02	0.00
9.73	2.00	0.00	5.14	0.02	0.00	9.75	2.00	0.00	5.13	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.78	2.00	0.00	5.11	0.02	0.00
9.80	2.00	0.00	5.10	0.02	0.00	9.82	2.00	0.00	5.09	0.02	0.00
9.84	2.00	0.00	5.08	0.02	0.00	9.86	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	1.99	0.00	4.59	0.02	0.00
10.84	1.86	0.00	4.58	0.02	0.00	10.86	1.78	0.00	4.57	0.02	0.00
10.88	1.73	0.00	4.56	0.02	0.00	10.90	1.72	0.00	4.55	0.02	0.00
10.92	1.96	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.98	2.00	0.00	4.51	0.02	0.00
11.00	2.00	0.00	4.50	0.02	0.00	11.02	2.00	0.00	4.49	0.02	0.00
11.04	2.00	0.00	4.48	0.02	0.00	11.06	2.00	0.00	4.47	0.02	0.00
11.08	2.00	0.00	4.46	0.02	0.00	11.10	2.00	0.00	4.45	0.02	0.00
11.12	2.00	0.00	4.44	0.02	0.00	11.14	2.00	0.00	4.43	0.02	0.00
11.16	2.00	0.00	4.42	0.02	0.00	11.18	2.00	0.00	4.41	0.02	0.00
11.20	2.00	0.00	4.40	0.02	0.00	11.22	2.00	0.00	4.39	0.02	0.00
11.24	2.00	0.00	4.38	0.02	0.00	11.26	2.00	0.00	4.37	0.02	0.00
11.28	2.00	0.00	4.36	0.02	0.00	11.29	2.00	0.00	4.35	0.02	0.00
11.31	2.00	0.00	4.34	0.02	0.00	11.33	2.00	0.00	4.33	0.02	0.00
11.35	2.00	0.00	4.32	0.02	0.00	11.37	2.00	0.00	4.31	0.02	0.00
11.39	2.00	0.00	4.30	0.02	0.00	11.41	2.00	0.00	4.29	0.02	0.00
11.43	2.00	0.00	4.28	0.02	0.00	11.45	2.00	0.00	4.27	0.02	0.00
11.47	2.00	0.00	4.26	0.02	0.00	11.49	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.51	2.00	0.00	4.24	0.02	0.00	11.53	2.00	0.00	4.23	0.02	0.00
11.55	2.00	0.00	4.22	0.02	0.00	11.57	2.00	0.00	4.21	0.02	0.00
11.59	2.00	0.00	4.20	0.02	0.00	11.61	2.00	0.00	4.19	0.02	0.00
11.63	2.00	0.00	4.18	0.02	0.00	11.65	2.00	0.00	4.17	0.02	0.00
11.67	2.00	0.00	4.16	0.02	0.00	11.69	2.00	0.00	4.15	0.02	0.00
11.71	2.00	0.00	4.14	0.02	0.00	11.73	2.00	0.00	4.13	0.02	0.00
11.75	2.00	0.00	4.12	0.02	0.00	11.77	2.00	0.00	4.11	0.02	0.00
11.79	2.00	0.00	4.10	0.02	0.00	11.81	2.00	0.00	4.09	0.02	0.00
11.83	2.00	0.00	4.08	0.02	0.00	11.85	2.00	0.00	4.07	0.02	0.00
11.87	2.00	0.00	4.07	0.02	0.00	11.89	2.00	0.00	4.06	0.02	0.00
11.91	2.00	0.00	4.05	0.02	0.00	11.93	2.00	0.00	4.04	0.02	0.00

Overall liquefaction potential: 1.09

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

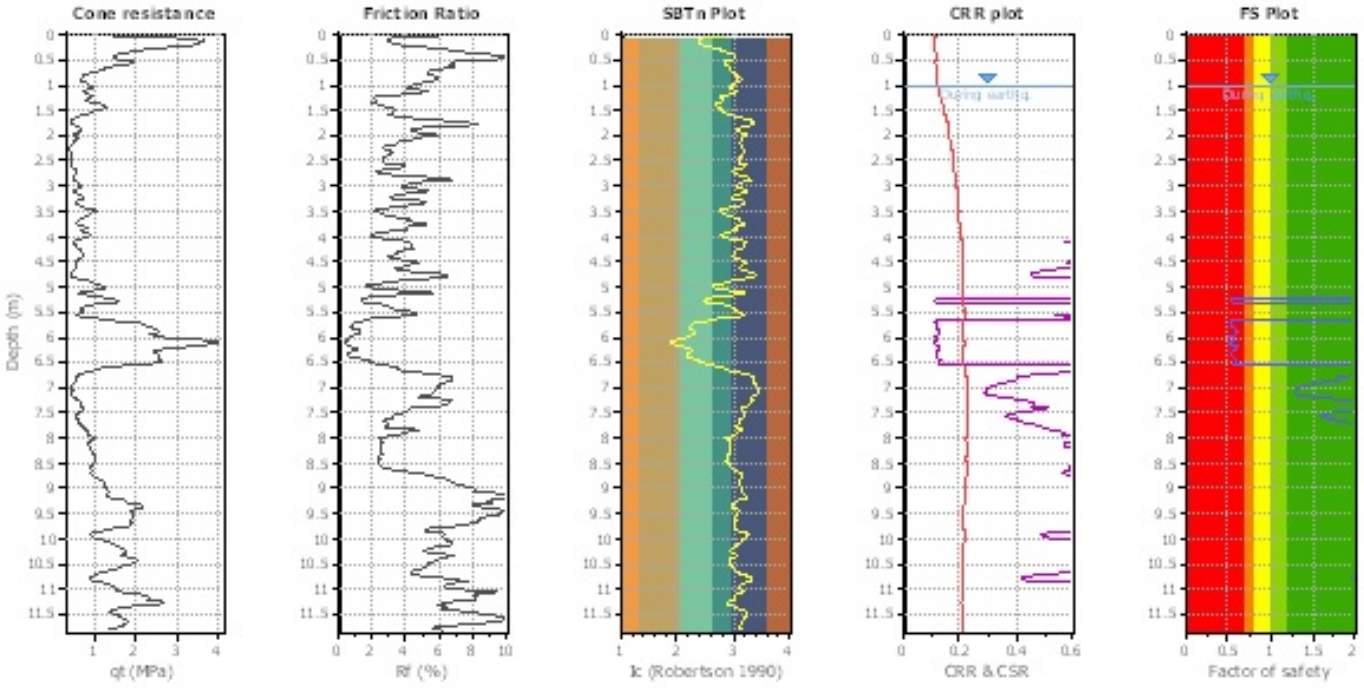
LIQUEFACTION ANALYSIS REPORT

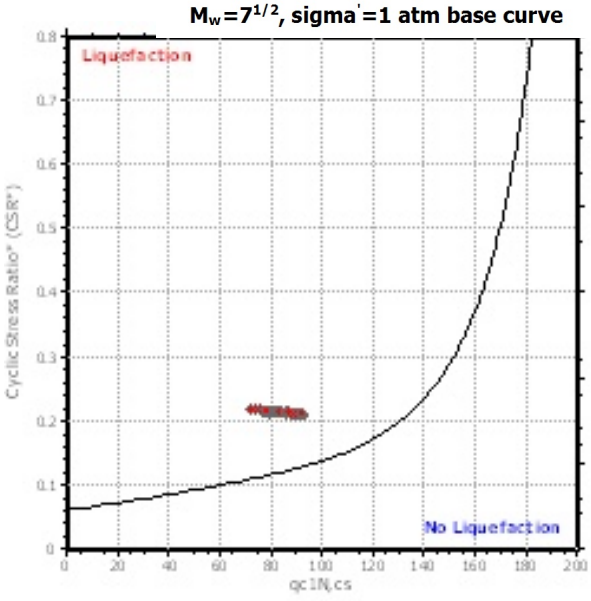
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

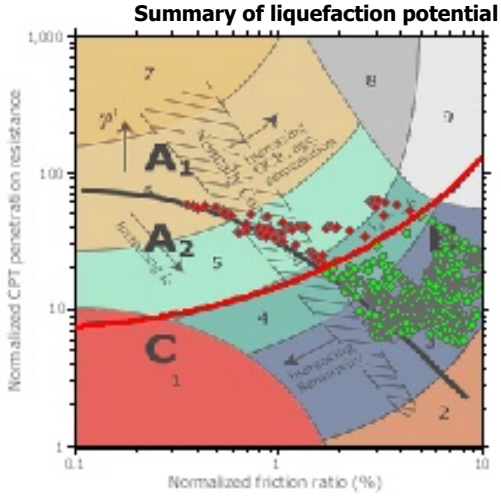
CPT file : CPTU03

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

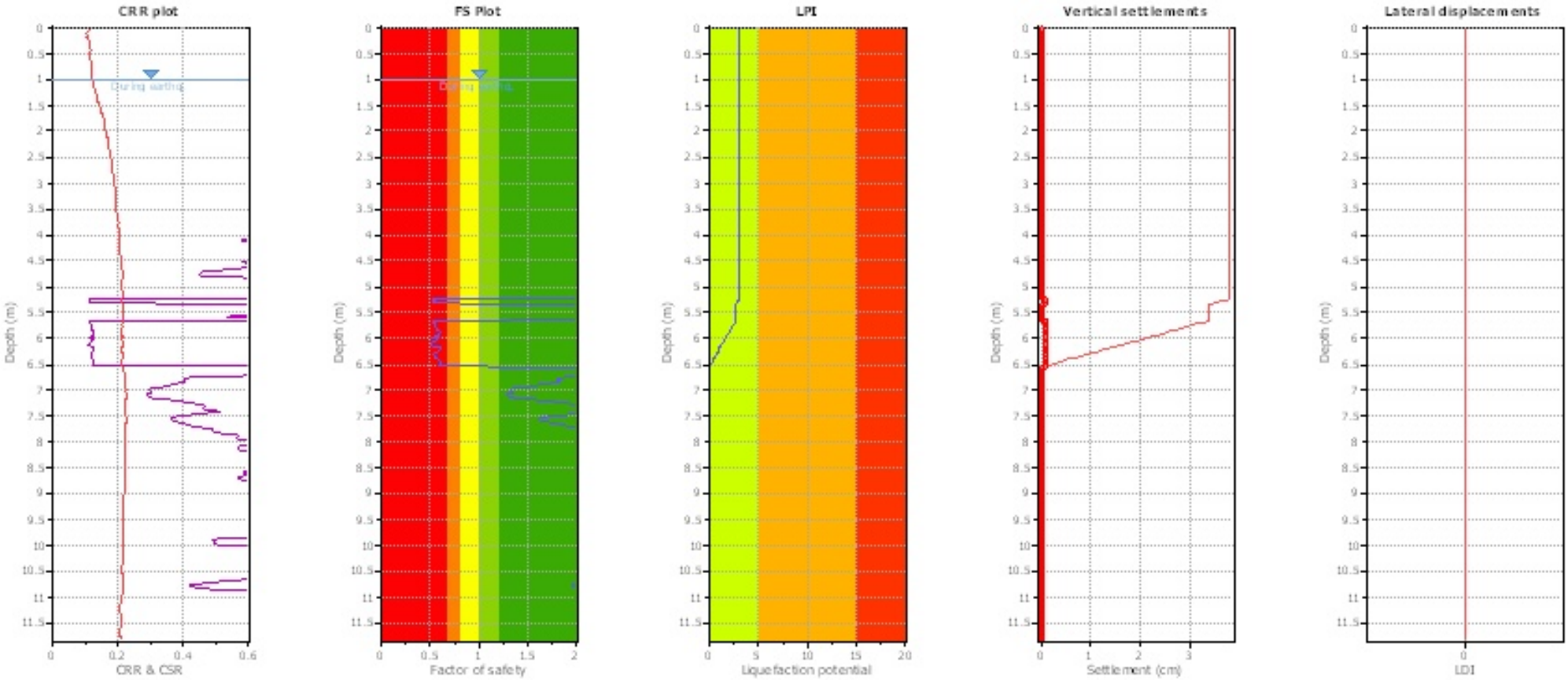






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	0.53	0.47	7.38	0.02	0.07
5.26	0.54	0.46	7.37	0.02	0.07	5.28	0.55	0.45	7.36	0.02	0.07
5.30	0.54	0.46	7.35	0.02	0.07	5.32	0.54	0.46	7.34	0.02	0.07
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	2.00	0.00	7.27	0.02	0.00	5.48	2.00	0.00	7.26	0.02	0.00
5.50	2.00	0.00	7.25	0.02	0.00	5.52	2.00	0.00	7.24	0.02	0.00
5.54	2.00	0.00	7.23	0.02	0.00	5.56	2.00	0.00	7.22	0.02	0.00
5.58	2.00	0.00	7.21	0.02	0.00	5.60	2.00	0.00	7.20	0.02	0.00
5.62	2.00	0.00	7.19	0.02	0.00	5.64	2.00	0.00	7.18	0.02	0.00
5.66	0.52	0.48	7.17	0.02	0.07	5.68	0.54	0.46	7.16	0.02	0.07
5.70	0.54	0.46	7.15	0.02	0.07	5.72	0.55	0.45	7.14	0.02	0.06
5.74	0.55	0.45	7.13	0.02	0.06	5.76	0.56	0.44	7.12	0.02	0.06

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	0.55	0.45	7.11	0.02	0.06	5.80	0.56	0.44	7.10	0.02	0.06
5.82	0.57	0.43	7.09	0.02	0.06	5.84	0.58	0.42	7.08	0.02	0.06
5.86	0.59	0.41	7.07	0.02	0.06	5.88	0.60	0.40	7.06	0.02	0.06
5.90	0.59	0.41	7.05	0.02	0.06	5.92	0.59	0.41	7.04	0.02	0.06
5.94	0.58	0.42	7.03	0.02	0.06	5.96	0.59	0.41	7.02	0.02	0.06
5.98	0.51	0.49	7.01	0.02	0.07	6.00	0.59	0.41	7.00	0.02	0.06
6.02	0.57	0.43	6.99	0.02	0.06	6.04	0.56	0.44	6.98	0.02	0.06
6.06	0.55	0.45	6.97	0.02	0.06	6.08	0.53	0.47	6.96	0.02	0.07
6.10	0.51	0.49	6.95	0.02	0.07	6.12	0.50	0.50	6.94	0.02	0.07
6.14	0.53	0.47	6.93	0.02	0.07	6.16	0.55	0.45	6.92	0.02	0.06
6.18	0.60	0.40	6.91	0.02	0.06	6.20	0.61	0.39	6.90	0.02	0.05
6.22	0.60	0.40	6.89	0.02	0.05	6.24	0.59	0.41	6.88	0.02	0.06
6.26	0.58	0.42	6.87	0.02	0.06	6.28	0.57	0.43	6.86	0.02	0.06
6.30	0.55	0.45	6.85	0.02	0.06	6.32	0.54	0.46	6.84	0.02	0.06
6.34	0.55	0.45	6.83	0.02	0.06	6.36	0.55	0.45	6.82	0.02	0.06
6.38	0.55	0.45	6.81	0.02	0.06	6.40	0.57	0.43	6.80	0.02	0.06
6.42	0.59	0.41	6.79	0.02	0.06	6.44	0.60	0.40	6.78	0.02	0.05
6.46	0.61	0.39	6.77	0.02	0.05	6.48	0.61	0.39	6.76	0.02	0.05
6.50	0.61	0.39	6.75	0.02	0.05	6.52	0.60	0.40	6.74	0.02	0.05
6.54	0.57	0.43	6.73	0.02	0.06	6.56	2.00	0.00	6.72	0.02	0.00
6.58	2.00	0.00	6.71	0.02	0.00	6.60	2.00	0.00	6.70	0.02	0.00
6.62	2.00	0.00	6.69	0.02	0.00	6.64	2.00	0.00	6.68	0.02	0.00
6.66	2.00	0.00	6.67	0.02	0.00	6.68	2.00	0.00	6.66	0.02	0.00
6.70	2.00	0.00	6.65	0.02	0.00	6.72	2.00	0.00	6.64	0.02	0.00
6.74	2.00	0.00	6.63	0.02	0.00	6.76	1.90	0.00	6.62	0.02	0.00
6.78	1.81	0.00	6.61	0.02	0.00	6.80	1.80	0.00	6.60	0.02	0.00
6.82	1.83	0.00	6.59	0.02	0.00	6.84	1.83	0.00	6.58	0.02	0.00
6.86	1.78	0.00	6.57	0.02	0.00	6.88	1.70	0.00	6.56	0.02	0.00
6.90	1.61	0.00	6.55	0.02	0.00	6.92	1.55	0.00	6.54	0.02	0.00
6.94	1.49	0.00	6.53	0.02	0.00	6.96	1.44	0.00	6.52	0.02	0.00
6.98	1.34	0.00	6.51	0.02	0.00	7.00	1.32	0.00	6.50	0.02	0.00
7.02	1.33	0.00	6.49	0.02	0.00	7.04	1.36	0.00	6.48	0.02	0.00
7.06	1.32	0.00	6.47	0.02	0.00	7.08	1.30	0.00	6.46	0.02	0.00
7.10	1.29	0.00	6.45	0.02	0.00	7.12	1.29	0.00	6.44	0.02	0.00
7.14	1.33	0.00	6.43	0.02	0.00	7.16	1.40	0.00	6.42	0.02	0.00
7.18	1.50	0.00	6.41	0.02	0.00	7.20	1.61	0.00	6.40	0.02	0.00
7.22	1.74	0.00	6.39	0.02	0.00	7.24	1.85	0.00	6.38	0.02	0.00
7.26	1.95	0.00	6.37	0.02	0.00	7.28	2.00	0.00	6.36	0.02	0.00
7.30	2.00	0.00	6.35	0.02	0.00	7.32	2.00	0.00	6.34	0.02	0.00
7.34	2.00	0.00	6.33	0.02	0.00	7.36	2.00	0.00	6.32	0.02	0.00
7.38	2.00	0.00	6.31	0.02	0.00	7.40	2.00	0.00	6.30	0.02	0.00
7.42	2.00	0.00	6.29	0.02	0.00	7.44	2.00	0.00	6.28	0.02	0.00
7.46	1.99	0.00	6.27	0.02	0.00	7.48	1.87	0.00	6.26	0.02	0.00
7.50	1.78	0.00	6.25	0.02	0.00	7.52	1.71	0.00	6.24	0.02	0.00
7.54	1.64	0.00	6.23	0.02	0.00	7.56	1.61	0.00	6.22	0.02	0.00
7.58	1.62	0.00	6.21	0.02	0.00	7.60	1.67	0.00	6.20	0.02	0.00
7.62	1.74	0.00	6.19	0.02	0.00	7.64	1.78	0.00	6.18	0.02	0.00
7.66	1.81	0.00	6.17	0.02	0.00	7.68	1.84	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.70	1.92	0.00	6.15	0.02	0.00	7.72	2.00	0.00	6.14	0.02	0.00
7.74	2.00	0.00	6.13	0.02	0.00	7.76	2.00	0.00	6.12	0.02	0.00
7.78	2.00	0.00	6.11	0.02	0.00	7.80	2.00	0.00	6.10	0.02	0.00
7.82	2.00	0.00	6.09	0.02	0.00	7.84	2.00	0.00	6.08	0.02	0.00
7.86	2.00	0.00	6.07	0.02	0.00	7.88	2.00	0.00	6.06	0.02	0.00
7.90	2.00	0.00	6.05	0.02	0.00	7.92	2.00	0.00	6.04	0.02	0.00
7.94	2.00	0.00	6.03	0.02	0.00	7.96	2.00	0.00	6.02	0.02	0.00
7.98	2.00	0.00	6.01	0.02	0.00	8.00	2.00	0.00	6.00	0.02	0.00
8.02	2.00	0.00	5.99	0.02	0.00	8.04	2.00	0.00	5.98	0.02	0.00
8.06	2.00	0.00	5.97	0.02	0.00	8.08	2.00	0.00	5.96	0.02	0.00
8.10	2.00	0.00	5.95	0.02	0.00	8.12	2.00	0.00	5.94	0.02	0.00
8.14	2.00	0.00	5.93	0.02	0.00	8.16	2.00	0.00	5.92	0.02	0.00
8.18	2.00	0.00	5.91	0.02	0.00	8.20	2.00	0.00	5.90	0.02	0.00
8.22	2.00	0.00	5.89	0.02	0.00	8.24	2.00	0.00	5.88	0.02	0.00
8.26	2.00	0.00	5.87	0.02	0.00	8.28	2.00	0.00	5.86	0.02	0.00
8.30	2.00	0.00	5.85	0.02	0.00	8.32	2.00	0.00	5.84	0.02	0.00
8.34	2.00	0.00	5.83	0.02	0.00	8.36	2.00	0.00	5.82	0.02	0.00
8.38	2.00	0.00	5.81	0.02	0.00	8.40	2.00	0.00	5.80	0.02	0.00
8.42	2.00	0.00	5.79	0.02	0.00	8.44	2.00	0.00	5.78	0.02	0.00
8.46	2.00	0.00	5.77	0.02	0.00	8.48	2.00	0.00	5.76	0.02	0.00
8.50	2.00	0.00	5.75	0.02	0.00	8.52	2.00	0.00	5.74	0.02	0.00
8.54	2.00	0.00	5.73	0.02	0.00	8.56	2.00	0.00	5.72	0.02	0.00
8.58	2.00	0.00	5.71	0.02	0.00	8.60	2.00	0.00	5.70	0.02	0.00
8.62	2.00	0.00	5.69	0.02	0.00	8.64	2.00	0.00	5.68	0.02	0.00
8.66	2.00	0.00	5.67	0.02	0.00	8.68	2.00	0.00	5.66	0.02	0.00
8.70	2.00	0.00	5.65	0.02	0.00	8.72	2.00	0.00	5.64	0.02	0.00
8.74	2.00	0.00	5.63	0.02	0.00	8.76	2.00	0.00	5.62	0.02	0.00
8.78	2.00	0.00	5.61	0.02	0.00	8.80	2.00	0.00	5.60	0.02	0.00
8.82	2.00	0.00	5.59	0.02	0.00	8.84	2.00	0.00	5.58	0.02	0.00
8.86	2.00	0.00	5.57	0.02	0.00	8.88	2.00	0.00	5.56	0.02	0.00
8.90	2.00	0.00	5.55	0.02	0.00	8.92	2.00	0.00	5.54	0.02	0.00
8.94	2.00	0.00	5.53	0.02	0.00	8.96	2.00	0.00	5.52	0.02	0.00
8.98	2.00	0.00	5.51	0.02	0.00	9.00	2.00	0.00	5.50	0.02	0.00
9.02	2.00	0.00	5.49	0.02	0.00	9.04	2.00	0.00	5.48	0.02	0.00
9.06	2.00	0.00	5.47	0.02	0.00	9.08	2.00	0.00	5.46	0.02	0.00
9.10	2.00	0.00	5.45	0.02	0.00	9.12	2.00	0.00	5.44	0.02	0.00
9.14	2.00	0.00	5.43	0.02	0.00	9.16	2.00	0.00	5.42	0.02	0.00
9.18	2.00	0.00	5.41	0.02	0.00	9.20	2.00	0.00	5.40	0.02	0.00
9.22	2.00	0.00	5.39	0.02	0.00	9.24	2.00	0.00	5.38	0.02	0.00
9.26	2.00	0.00	5.37	0.02	0.00	9.28	2.00	0.00	5.36	0.02	0.00
9.30	2.00	0.00	5.35	0.02	0.00	9.32	2.00	0.00	5.34	0.02	0.00
9.34	2.00	0.00	5.33	0.02	0.00	9.36	2.00	0.00	5.32	0.02	0.00
9.38	2.00	0.00	5.31	0.02	0.00	9.40	2.00	0.00	5.30	0.02	0.00
9.42	2.00	0.00	5.29	0.02	0.00	9.44	2.00	0.00	5.28	0.02	0.00
9.46	2.00	0.00	5.27	0.02	0.00	9.48	2.00	0.00	5.26	0.02	0.00
9.50	2.00	0.00	5.25	0.02	0.00	9.52	2.00	0.00	5.24	0.02	0.00
9.54	2.00	0.00	5.23	0.02	0.00	9.56	2.00	0.00	5.22	0.02	0.00
9.58	2.00	0.00	5.21	0.02	0.00	9.60	2.00	0.00	5.20	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.62	2.00	0.00	5.19	0.02	0.00	9.64	2.00	0.00	5.18	0.02	0.00
9.66	2.00	0.00	5.17	0.02	0.00	9.68	2.00	0.00	5.16	0.02	0.00
9.70	2.00	0.00	5.15	0.02	0.00	9.72	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.11	0.02	0.00	9.79	2.00	0.00	5.10	0.02	0.00
9.81	2.00	0.00	5.09	0.02	0.00	9.83	2.00	0.00	5.08	0.02	0.00
9.85	2.00	0.00	5.07	0.02	0.00	9.87	2.00	0.00	5.06	0.02	0.00
9.89	2.00	0.00	5.05	0.02	0.00	9.91	2.00	0.00	5.04	0.02	0.00
9.93	2.00	0.00	5.03	0.02	0.00	9.95	2.00	0.00	5.02	0.02	0.00
9.97	2.00	0.00	5.01	0.02	0.00	9.99	2.00	0.00	5.00	0.02	0.00
10.01	2.00	0.00	4.99	0.02	0.00	10.03	2.00	0.00	4.98	0.02	0.00
10.05	2.00	0.00	4.97	0.02	0.00	10.07	2.00	0.00	4.96	0.02	0.00
10.09	2.00	0.00	4.95	0.02	0.00	10.11	2.00	0.00	4.94	0.02	0.00
10.13	2.00	0.00	4.93	0.02	0.00	10.15	2.00	0.00	4.92	0.02	0.00
10.17	2.00	0.00	4.91	0.02	0.00	10.19	2.00	0.00	4.90	0.02	0.00
10.21	2.00	0.00	4.89	0.02	0.00	10.23	2.00	0.00	4.88	0.02	0.00
10.25	2.00	0.00	4.87	0.02	0.00	10.27	2.00	0.00	4.86	0.02	0.00
10.29	2.00	0.00	4.85	0.02	0.00	10.31	2.00	0.00	4.84	0.02	0.00
10.33	2.00	0.00	4.83	0.02	0.00	10.35	2.00	0.00	4.82	0.02	0.00
10.37	2.00	0.00	4.81	0.02	0.00	10.39	2.00	0.00	4.80	0.02	0.00
10.41	2.00	0.00	4.79	0.02	0.00	10.43	2.00	0.00	4.78	0.02	0.00
10.45	2.00	0.00	4.77	0.02	0.00	10.47	2.00	0.00	4.76	0.02	0.00
10.49	2.00	0.00	4.75	0.02	0.00	10.51	2.00	0.00	4.74	0.02	0.00
10.53	2.00	0.00	4.73	0.02	0.00	10.55	2.00	0.00	4.72	0.02	0.00
10.57	2.00	0.00	4.71	0.02	0.00	10.59	2.00	0.00	4.70	0.02	0.00
10.61	2.00	0.00	4.69	0.02	0.00	10.63	2.00	0.00	4.68	0.02	0.00
10.65	2.00	0.00	4.67	0.02	0.00	10.67	2.00	0.00	4.66	0.02	0.00
10.69	2.00	0.00	4.65	0.02	0.00	10.71	2.00	0.00	4.64	0.02	0.00
10.73	2.00	0.00	4.63	0.02	0.00	10.75	2.00	0.00	4.62	0.02	0.00
10.77	1.96	0.00	4.61	0.02	0.00	10.79	1.96	0.00	4.60	0.02	0.00
10.81	2.00	0.00	4.59	0.02	0.00	10.83	2.00	0.00	4.58	0.02	0.00
10.85	2.00	0.00	4.57	0.02	0.00	10.87	2.00	0.00	4.56	0.02	0.00
10.89	2.00	0.00	4.55	0.02	0.00	10.91	2.00	0.00	4.54	0.02	0.00
10.93	2.00	0.00	4.53	0.02	0.00	10.95	2.00	0.00	4.52	0.02	0.00
10.97	2.00	0.00	4.51	0.02	0.00	10.99	2.00	0.00	4.50	0.02	0.00
11.01	2.00	0.00	4.49	0.02	0.00	11.03	2.00	0.00	4.48	0.02	0.00
11.05	2.00	0.00	4.47	0.02	0.00	11.07	2.00	0.00	4.46	0.02	0.00
11.09	2.00	0.00	4.45	0.02	0.00	11.11	2.00	0.00	4.44	0.02	0.00
11.13	2.00	0.00	4.43	0.02	0.00	11.15	2.00	0.00	4.42	0.02	0.00
11.17	2.00	0.00	4.41	0.02	0.00	11.19	2.00	0.00	4.40	0.02	0.00
11.21	2.00	0.00	4.39	0.02	0.00	11.23	2.00	0.00	4.38	0.02	0.00
11.25	2.00	0.00	4.37	0.02	0.00	11.27	2.00	0.00	4.36	0.02	0.00
11.29	2.00	0.00	4.35	0.02	0.00	11.31	2.00	0.00	4.34	0.02	0.00
11.33	2.00	0.00	4.33	0.02	0.00	11.35	2.00	0.00	4.32	0.02	0.00
11.37	2.00	0.00	4.31	0.02	0.00	11.39	2.00	0.00	4.30	0.02	0.00
11.41	2.00	0.00	4.29	0.02	0.00	11.43	2.00	0.00	4.28	0.02	0.00
11.45	2.00	0.00	4.27	0.02	0.00	11.47	2.00	0.00	4.26	0.02	0.00
11.49	2.00	0.00	4.25	0.02	0.00	11.51	2.00	0.00	4.24	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.53	2.00	0.00	4.23	0.02	0.00	11.55	2.00	0.00	4.22	0.02	0.00
11.57	2.00	0.00	4.22	0.02	0.00	11.59	2.00	0.00	4.21	0.02	0.00
11.61	2.00	0.00	4.20	0.02	0.00	11.63	2.00	0.00	4.19	0.02	0.00
11.65	2.00	0.00	4.18	0.02	0.00	11.67	2.00	0.00	4.17	0.02	0.00
11.69	2.00	0.00	4.16	0.02	0.00	11.71	2.00	0.00	4.15	0.02	0.00
11.73	2.00	0.00	4.14	0.02	0.00	11.75	2.00	0.00	4.13	0.02	0.00
11.77	2.00	0.00	4.12	0.02	0.00	11.79	2.00	0.00	4.11	0.02	0.00
11.81	2.00	0.00	4.10	0.02	0.00						

Overall liquefaction potential: 3.05

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

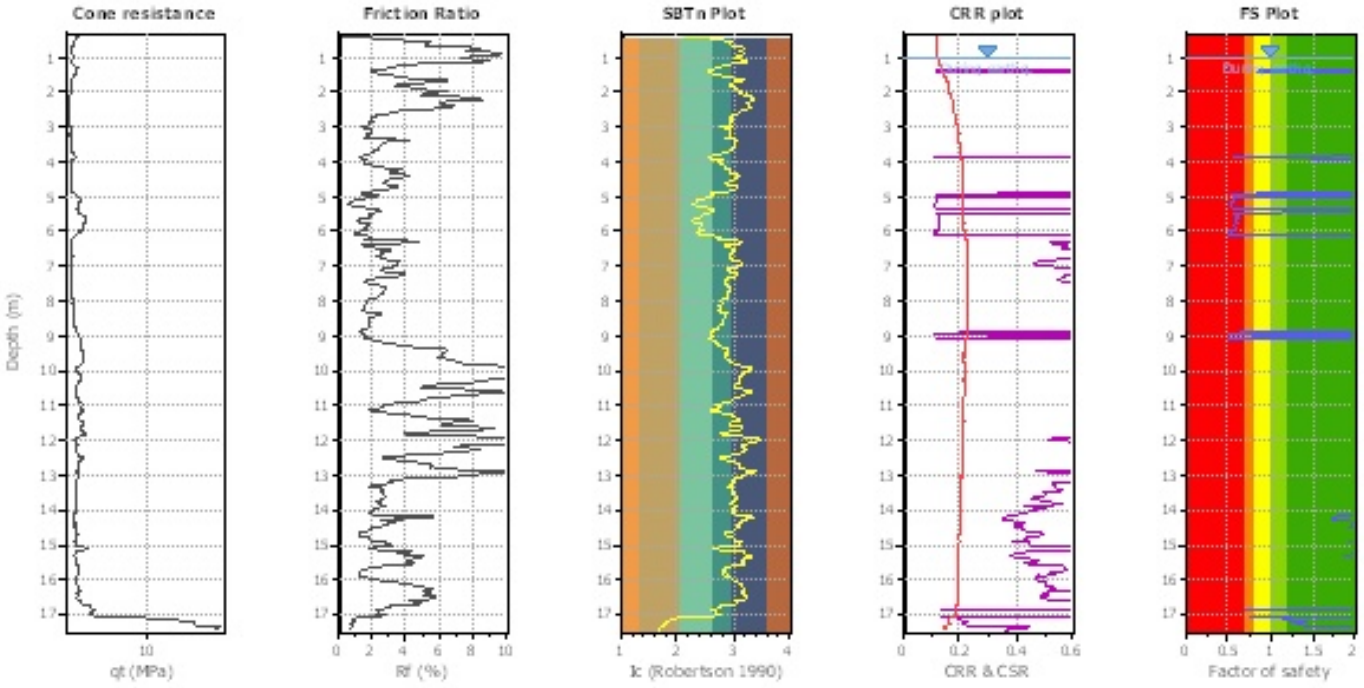
LIQUEFACTION ANALYSIS REPORT

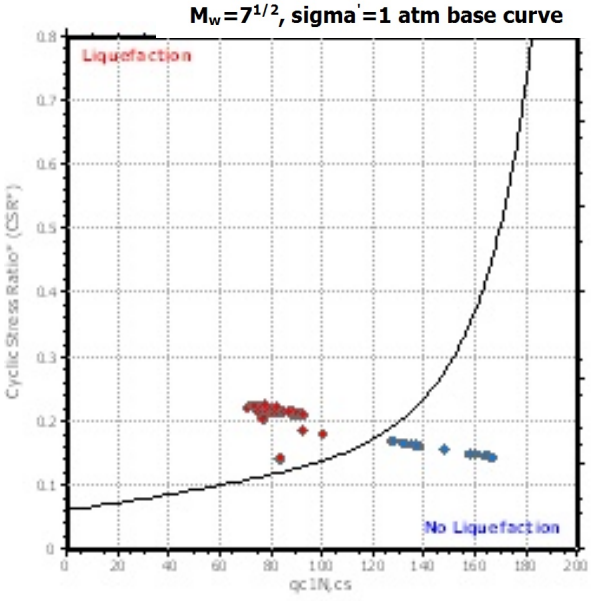
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

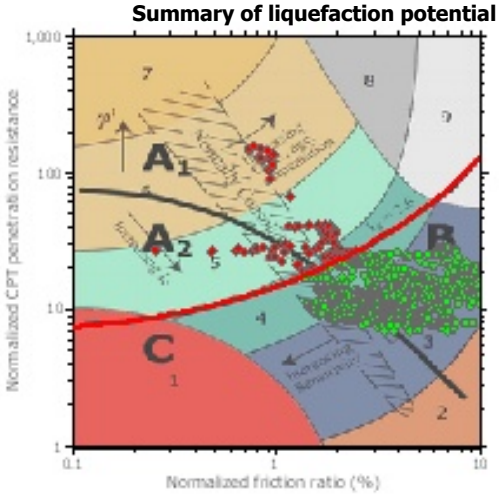
CPT file : CPTU04

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

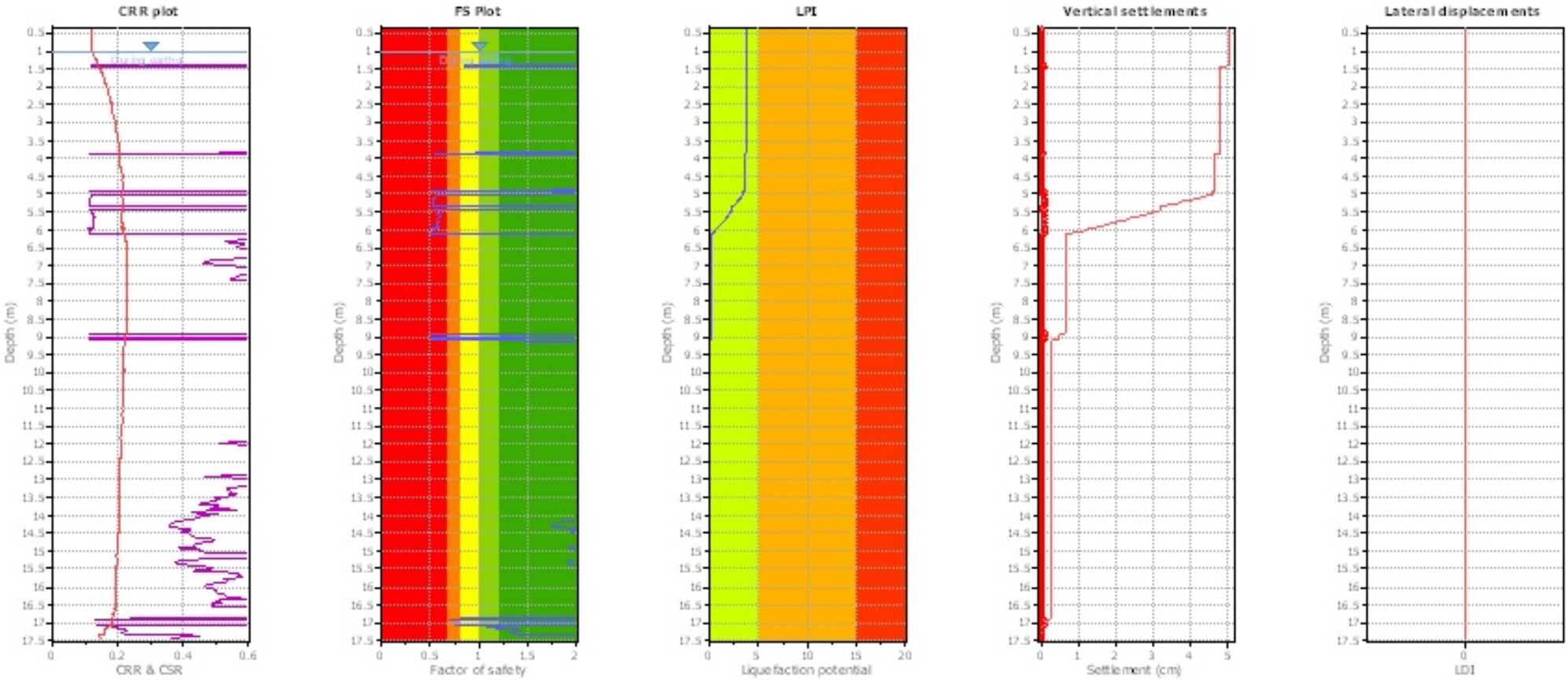






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	0.86	0.14	9.31	0.02	0.03	1.40	0.85	0.15	9.30	0.02	0.03
1.42	0.85	0.15	9.29	0.02	0.03	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00
3.86	0.56	0.44	8.07	0.02	0.07	3.88	0.56	0.44	8.06	0.02	0.07
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	0.52	0.48	7.54	0.02	0.07
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	0.56	0.44	7.49	0.02	0.07	5.04	0.56	0.44	7.48	0.02	0.07
5.06	0.56	0.44	7.47	0.02	0.07	5.08	0.56	0.44	7.46	0.02	0.07
5.10	0.55	0.45	7.45	0.02	0.07	5.12	0.55	0.45	7.44	0.02	0.07
5.14	0.54	0.46	7.43	0.02	0.07	5.16	0.53	0.47	7.42	0.02	0.07
5.18	0.53	0.47	7.41	0.02	0.07	5.20	0.52	0.48	7.40	0.02	0.07
5.22	0.52	0.48	7.39	0.02	0.07	5.24	0.53	0.47	7.38	0.02	0.07
5.26	0.53	0.47	7.37	0.02	0.07	5.28	0.53	0.47	7.36	0.02	0.07
5.30	0.54	0.46	7.35	0.02	0.07	5.32	0.54	0.46	7.34	0.02	0.07
5.34	0.54	0.46	7.33	0.02	0.07	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	2.00	0.00	7.28	0.02	0.00
5.46	0.54	0.46	7.27	0.02	0.07	5.48	0.55	0.45	7.26	0.02	0.07
5.50	0.56	0.44	7.25	0.02	0.06	5.52	0.56	0.44	7.24	0.02	0.06
5.54	0.58	0.42	7.23	0.02	0.06	5.56	0.59	0.41	7.22	0.02	0.06
5.58	0.60	0.40	7.21	0.02	0.06	5.60	0.61	0.39	7.20	0.02	0.06
5.62	0.62	0.38	7.19	0.02	0.06	5.64	0.61	0.39	7.18	0.02	0.06
5.66	0.60	0.40	7.17	0.02	0.06	5.68	0.59	0.41	7.16	0.02	0.06
5.70	0.58	0.42	7.15	0.02	0.06	5.72	0.59	0.41	7.14	0.02	0.06
5.74	0.59	0.41	7.13	0.02	0.06	5.76	0.60	0.40	7.12	0.02	0.06
5.78	0.60	0.40	7.11	0.02	0.06	5.80	0.59	0.41	7.10	0.02	0.06
5.82	0.58	0.42	7.09	0.02	0.06	5.84	0.57	0.43	7.08	0.02	0.06
5.86	0.57	0.43	7.07	0.02	0.06	5.88	0.58	0.42	7.06	0.02	0.06
5.90	0.58	0.42	7.05	0.02	0.06	5.92	0.59	0.41	7.04	0.02	0.06
5.94	0.59	0.41	7.03	0.02	0.06	5.95	0.60	0.40	7.02	0.02	0.06
5.97	0.49	0.51	7.01	0.02	0.07	5.99	0.57	0.43	7.00	0.02	0.06
6.01	0.53	0.47	6.99	0.02	0.07	6.03	0.52	0.48	6.98	0.02	0.07
6.05	0.51	0.49	6.97	0.02	0.07	6.07	0.50	0.50	6.96	0.02	0.07
6.09	0.50	0.50	6.95	0.02	0.07	6.11	0.50	0.50	6.94	0.02	0.07

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
6.13	2.00	0.00	6.93	0.02	0.00	6.15	2.00	0.00	6.92	0.02	0.00
6.17	2.00	0.00	6.91	0.02	0.00	6.19	2.00	0.00	6.90	0.02	0.00
6.21	2.00	0.00	6.89	0.02	0.00	6.23	2.00	0.00	6.88	0.02	0.00
6.25	2.00	0.00	6.87	0.02	0.00	6.27	2.00	0.00	6.86	0.02	0.00
6.29	2.00	0.00	6.85	0.02	0.00	6.31	2.00	0.00	6.84	0.02	0.00
6.33	2.00	0.00	6.83	0.02	0.00	6.35	2.00	0.00	6.82	0.02	0.00
6.37	2.00	0.00	6.81	0.02	0.00	6.39	2.00	0.00	6.80	0.02	0.00
6.41	2.00	0.00	6.79	0.02	0.00	6.43	2.00	0.00	6.78	0.02	0.00
6.45	2.00	0.00	6.77	0.02	0.00	6.47	2.00	0.00	6.76	0.02	0.00
6.49	2.00	0.00	6.75	0.02	0.00	6.51	2.00	0.00	6.74	0.02	0.00
6.53	2.00	0.00	6.73	0.02	0.00	6.55	2.00	0.00	6.72	0.02	0.00
6.57	2.00	0.00	6.71	0.02	0.00	6.59	2.00	0.00	6.70	0.02	0.00
6.61	2.00	0.00	6.69	0.02	0.00	6.63	2.00	0.00	6.68	0.02	0.00
6.65	2.00	0.00	6.67	0.02	0.00	6.67	2.00	0.00	6.66	0.02	0.00
6.69	2.00	0.00	6.65	0.02	0.00	6.71	2.00	0.00	6.64	0.02	0.00
6.73	2.00	0.00	6.63	0.02	0.00	6.75	2.00	0.00	6.62	0.02	0.00
6.77	2.00	0.00	6.61	0.02	0.00	6.79	2.00	0.00	6.60	0.02	0.00
6.81	2.00	0.00	6.59	0.02	0.00	6.83	2.00	0.00	6.58	0.02	0.00
6.85	2.00	0.00	6.57	0.02	0.00	6.87	2.00	0.00	6.56	0.02	0.00
6.89	2.00	0.00	6.55	0.02	0.00	6.91	2.00	0.00	6.54	0.02	0.00
6.93	2.00	0.00	6.53	0.02	0.00	6.95	2.00	0.00	6.52	0.02	0.00
6.97	2.00	0.00	6.51	0.02	0.00	6.99	2.00	0.00	6.50	0.02	0.00
7.01	2.00	0.00	6.49	0.02	0.00	7.03	2.00	0.00	6.48	0.02	0.00
7.05	2.00	0.00	6.47	0.02	0.00	7.07	2.00	0.00	6.46	0.02	0.00
7.09	2.00	0.00	6.45	0.02	0.00	7.11	2.00	0.00	6.44	0.02	0.00
7.13	2.00	0.00	6.43	0.02	0.00	7.15	2.00	0.00	6.42	0.02	0.00
7.17	2.00	0.00	6.41	0.02	0.00	7.19	2.00	0.00	6.40	0.02	0.00
7.21	2.00	0.00	6.39	0.02	0.00	7.23	2.00	0.00	6.38	0.02	0.00
7.25	2.00	0.00	6.37	0.02	0.00	7.27	2.00	0.00	6.36	0.02	0.00
7.29	2.00	0.00	6.35	0.02	0.00	7.31	2.00	0.00	6.34	0.02	0.00
7.33	2.00	0.00	6.33	0.02	0.00	7.35	2.00	0.00	6.32	0.02	0.00
7.37	2.00	0.00	6.31	0.02	0.00	7.39	2.00	0.00	6.30	0.02	0.00
7.41	2.00	0.00	6.29	0.02	0.00	7.43	2.00	0.00	6.28	0.02	0.00
7.45	2.00	0.00	6.27	0.02	0.00	7.47	2.00	0.00	6.26	0.02	0.00
7.49	2.00	0.00	6.25	0.02	0.00	7.51	2.00	0.00	6.24	0.02	0.00
7.53	2.00	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	2.00	0.00	6.11	0.02	0.00	7.79	2.00	0.00	6.10	0.02	0.00
7.81	2.00	0.00	6.09	0.02	0.00	7.83	2.00	0.00	6.08	0.02	0.00
7.85	2.00	0.00	6.07	0.02	0.00	7.87	2.00	0.00	6.06	0.02	0.00
7.89	2.00	0.00	6.05	0.02	0.00	7.91	2.00	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	2.00	0.00	6.00	0.02	0.00
8.01	2.00	0.00	5.99	0.02	0.00	8.03	2.00	0.00	5.98	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
8.05	2.00	0.00	5.97	0.02	0.00	8.07	2.00	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	2.00	0.00	5.83	0.02	0.00	8.35	2.00	0.00	5.82	0.02	0.00
8.37	2.00	0.00	5.81	0.02	0.00	8.39	2.00	0.00	5.80	0.02	0.00
8.41	2.00	0.00	5.79	0.02	0.00	8.43	2.00	0.00	5.78	0.02	0.00
8.45	2.00	0.00	5.77	0.02	0.00	8.47	2.00	0.00	5.76	0.02	0.00
8.49	2.00	0.00	5.76	0.02	0.00	8.51	2.00	0.00	5.75	0.02	0.00
8.53	2.00	0.00	5.74	0.02	0.00	8.55	2.00	0.00	5.73	0.02	0.00
8.57	2.00	0.00	5.72	0.02	0.00	8.59	2.00	0.00	5.71	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.83	2.00	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	0.49	0.51	5.55	0.02	0.06
8.93	0.49	0.51	5.54	0.02	0.06	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	0.50	0.50	5.48	0.02	0.05	9.07	0.53	0.47	5.47	0.02	0.05
9.09	0.51	0.49	5.46	0.02	0.05	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.19	2.00	0.00	5.41	0.02	0.00
9.21	2.00	0.00	5.40	0.02	0.00	9.23	2.00	0.00	5.39	0.02	0.00
9.25	2.00	0.00	5.38	0.02	0.00	9.27	2.00	0.00	5.37	0.02	0.00
9.29	2.00	0.00	5.36	0.02	0.00	9.31	2.00	0.00	5.35	0.02	0.00
9.33	2.00	0.00	5.34	0.02	0.00	9.35	2.00	0.00	5.33	0.02	0.00
9.37	2.00	0.00	5.32	0.02	0.00	9.39	2.00	0.00	5.31	0.02	0.00
9.41	2.00	0.00	5.30	0.02	0.00	9.43	2.00	0.00	5.29	0.02	0.00
9.45	2.00	0.00	5.28	0.02	0.00	9.47	2.00	0.00	5.27	0.02	0.00
9.49	2.00	0.00	5.26	0.02	0.00	9.51	2.00	0.00	5.25	0.02	0.00
9.53	2.00	0.00	5.24	0.02	0.00	9.55	2.00	0.00	5.23	0.02	0.00
9.57	2.00	0.00	5.22	0.02	0.00	9.59	2.00	0.00	5.21	0.02	0.00
9.61	2.00	0.00	5.20	0.02	0.00	9.63	2.00	0.00	5.19	0.02	0.00
9.65	2.00	0.00	5.18	0.02	0.00	9.67	2.00	0.00	5.17	0.02	0.00
9.69	2.00	0.00	5.16	0.02	0.00	9.71	2.00	0.00	5.15	0.02	0.00
9.73	2.00	0.00	5.14	0.02	0.00	9.75	2.00	0.00	5.13	0.02	0.00
9.77	2.00	0.00	5.12	0.02	0.00	9.79	2.00	0.00	5.11	0.02	0.00
9.81	2.00	0.00	5.10	0.02	0.00	9.83	2.00	0.00	5.09	0.02	0.00
9.85	2.00	0.00	5.08	0.02	0.00	9.87	2.00	0.00	5.07	0.02	0.00
9.89	2.00	0.00	5.06	0.02	0.00	9.91	2.00	0.00	5.05	0.02	0.00
9.93	2.00	0.00	5.04	0.02	0.00	9.95	2.00	0.00	5.03	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.97	2.00	0.00	5.02	0.02	0.00	9.99	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	2.00	0.00	4.59	0.02	0.00
10.84	2.00	0.00	4.58	0.02	0.00	10.86	2.00	0.00	4.57	0.02	0.00
10.88	2.00	0.00	4.56	0.02	0.00	10.90	2.00	0.00	4.55	0.02	0.00
10.92	2.00	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.98	2.00	0.00	4.51	0.02	0.00
11.00	2.00	0.00	4.50	0.02	0.00	11.02	2.00	0.00	4.49	0.02	0.00
11.04	2.00	0.00	4.48	0.02	0.00	11.06	2.00	0.00	4.47	0.02	0.00
11.08	2.00	0.00	4.46	0.02	0.00	11.10	2.00	0.00	4.45	0.02	0.00
11.12	2.00	0.00	4.44	0.02	0.00	11.14	2.00	0.00	4.43	0.02	0.00
11.16	2.00	0.00	4.42	0.02	0.00	11.18	2.00	0.00	4.41	0.02	0.00
11.20	2.00	0.00	4.40	0.02	0.00	11.22	2.00	0.00	4.39	0.02	0.00
11.24	2.00	0.00	4.38	0.02	0.00	11.26	2.00	0.00	4.37	0.02	0.00
11.28	2.00	0.00	4.36	0.02	0.00	11.30	2.00	0.00	4.35	0.02	0.00
11.32	2.00	0.00	4.34	0.02	0.00	11.34	2.00	0.00	4.33	0.02	0.00
11.36	2.00	0.00	4.32	0.02	0.00	11.38	2.00	0.00	4.31	0.02	0.00
11.40	2.00	0.00	4.30	0.02	0.00	11.42	2.00	0.00	4.29	0.02	0.00
11.44	2.00	0.00	4.28	0.02	0.00	11.46	2.00	0.00	4.27	0.02	0.00
11.48	2.00	0.00	4.26	0.02	0.00	11.50	2.00	0.00	4.25	0.02	0.00
11.52	2.00	0.00	4.24	0.02	0.00	11.54	2.00	0.00	4.23	0.02	0.00
11.56	2.00	0.00	4.22	0.02	0.00	11.58	2.00	0.00	4.21	0.02	0.00
11.60	2.00	0.00	4.20	0.02	0.00	11.62	2.00	0.00	4.19	0.02	0.00
11.64	2.00	0.00	4.18	0.02	0.00	11.66	2.00	0.00	4.17	0.02	0.00
11.68	2.00	0.00	4.16	0.02	0.00	11.70	2.00	0.00	4.15	0.02	0.00
11.72	2.00	0.00	4.14	0.02	0.00	11.74	2.00	0.00	4.13	0.02	0.00
11.76	2.00	0.00	4.12	0.02	0.00	11.78	2.00	0.00	4.11	0.02	0.00
11.80	2.00	0.00	4.10	0.02	0.00	11.82	2.00	0.00	4.09	0.02	0.00
11.84	2.00	0.00	4.08	0.02	0.00	11.85	2.00	0.00	4.07	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.87	2.00	0.00	4.06	0.02	0.00	11.89	2.00	0.00	4.05	0.02	0.00
11.91	2.00	0.00	4.04	0.02	0.00	11.93	2.00	0.00	4.03	0.02	0.00
11.95	2.00	0.00	4.02	0.02	0.00	11.97	2.00	0.00	4.01	0.02	0.00
11.99	2.00	0.00	4.00	0.02	0.00	12.01	2.00	0.00	3.99	0.02	0.00
12.03	2.00	0.00	3.98	0.02	0.00	12.05	2.00	0.00	3.97	0.02	0.00
12.07	2.00	0.00	3.96	0.02	0.00	12.09	2.00	0.00	3.95	0.02	0.00
12.11	2.00	0.00	3.94	0.02	0.00	12.13	2.00	0.00	3.93	0.02	0.00
12.15	2.00	0.00	3.92	0.02	0.00	12.17	2.00	0.00	3.91	0.02	0.00
12.19	2.00	0.00	3.90	0.02	0.00	12.21	2.00	0.00	3.89	0.02	0.00
12.23	2.00	0.00	3.88	0.02	0.00	12.25	2.00	0.00	3.87	0.02	0.00
12.27	2.00	0.00	3.86	0.02	0.00	12.29	2.00	0.00	3.85	0.02	0.00
12.31	2.00	0.00	3.84	0.02	0.00	12.33	2.00	0.00	3.83	0.02	0.00
12.35	2.00	0.00	3.82	0.02	0.00	12.37	2.00	0.00	3.81	0.02	0.00
12.39	2.00	0.00	3.80	0.02	0.00	12.41	2.00	0.00	3.79	0.02	0.00
12.43	2.00	0.00	3.78	0.02	0.00	12.45	2.00	0.00	3.77	0.02	0.00
12.47	2.00	0.00	3.76	0.02	0.00	12.49	2.00	0.00	3.75	0.02	0.00
12.51	2.00	0.00	3.74	0.02	0.00	12.53	2.00	0.00	3.73	0.02	0.00
12.55	2.00	0.00	3.73	0.02	0.00	12.57	2.00	0.00	3.72	0.02	0.00
12.59	2.00	0.00	3.71	0.02	0.00	12.61	2.00	0.00	3.70	0.02	0.00
12.63	2.00	0.00	3.69	0.02	0.00	12.65	2.00	0.00	3.68	0.02	0.00
12.67	2.00	0.00	3.67	0.02	0.00	12.69	2.00	0.00	3.66	0.02	0.00
12.71	2.00	0.00	3.65	0.02	0.00	12.73	2.00	0.00	3.64	0.02	0.00
12.75	2.00	0.00	3.63	0.02	0.00	12.77	2.00	0.00	3.62	0.02	0.00
12.79	2.00	0.00	3.61	0.02	0.00	12.81	2.00	0.00	3.60	0.02	0.00
12.83	2.00	0.00	3.59	0.02	0.00	12.85	2.00	0.00	3.58	0.02	0.00
12.87	2.00	0.00	3.57	0.02	0.00	12.89	2.00	0.00	3.56	0.02	0.00
12.91	2.00	0.00	3.55	0.02	0.00	12.93	2.00	0.00	3.54	0.02	0.00
12.95	2.00	0.00	3.53	0.02	0.00	12.97	2.00	0.00	3.52	0.02	0.00
12.99	2.00	0.00	3.51	0.02	0.00	13.01	2.00	0.00	3.50	0.02	0.00
13.03	2.00	0.00	3.49	0.02	0.00	13.05	2.00	0.00	3.48	0.02	0.00
13.07	2.00	0.00	3.47	0.02	0.00	13.09	2.00	0.00	3.46	0.02	0.00
13.11	2.00	0.00	3.45	0.02	0.00	13.13	2.00	0.00	3.44	0.02	0.00
13.15	2.00	0.00	3.43	0.02	0.00	13.16	2.00	0.00	3.42	0.02	0.00
13.18	2.00	0.00	3.41	0.02	0.00	13.20	2.00	0.00	3.40	0.02	0.00
13.22	2.00	0.00	3.39	0.02	0.00	13.24	2.00	0.00	3.38	0.02	0.00
13.26	2.00	0.00	3.37	0.02	0.00	13.28	2.00	0.00	3.36	0.02	0.00
13.30	2.00	0.00	3.35	0.02	0.00	13.32	2.00	0.00	3.34	0.02	0.00
13.34	2.00	0.00	3.33	0.02	0.00	13.36	2.00	0.00	3.32	0.02	0.00
13.38	2.00	0.00	3.31	0.02	0.00	13.40	2.00	0.00	3.30	0.02	0.00
13.42	2.00	0.00	3.29	0.02	0.00	13.44	2.00	0.00	3.28	0.02	0.00
13.46	2.00	0.00	3.27	0.02	0.00	13.48	2.00	0.00	3.26	0.02	0.00
13.50	2.00	0.00	3.25	0.02	0.00	13.52	2.00	0.00	3.24	0.02	0.00
13.54	2.00	0.00	3.23	0.02	0.00	13.56	2.00	0.00	3.22	0.02	0.00
13.58	2.00	0.00	3.21	0.02	0.00	13.60	2.00	0.00	3.20	0.02	0.00
13.62	2.00	0.00	3.19	0.02	0.00	13.64	2.00	0.00	3.18	0.02	0.00
13.66	2.00	0.00	3.17	0.02	0.00	13.68	2.00	0.00	3.16	0.02	0.00
13.70	2.00	0.00	3.15	0.02	0.00	13.72	2.00	0.00	3.14	0.02	0.00
13.74	2.00	0.00	3.13	0.02	0.00	13.76	2.00	0.00	3.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
13.78	2.00	0.00	3.11	0.02	0.00	13.80	2.00	0.00	3.10	0.02	0.00
13.82	2.00	0.00	3.09	0.02	0.00	13.84	2.00	0.00	3.08	0.02	0.00
13.86	2.00	0.00	3.07	0.02	0.00	13.88	2.00	0.00	3.06	0.02	0.00
13.90	2.00	0.00	3.05	0.02	0.00	13.92	2.00	0.00	3.04	0.02	0.00
13.94	2.00	0.00	3.03	0.02	0.00	13.96	2.00	0.00	3.02	0.02	0.00
13.98	2.00	0.00	3.01	0.02	0.00	14.00	2.00	0.00	3.00	0.02	0.00
14.02	2.00	0.00	2.99	0.02	0.00	14.04	2.00	0.00	2.98	0.02	0.00
14.06	2.00	0.00	2.97	0.02	0.00	14.08	2.00	0.00	2.96	0.02	0.00
14.10	2.00	0.00	2.95	0.02	0.00	14.12	2.00	0.00	2.94	0.02	0.00
14.14	1.96	0.00	2.93	0.02	0.00	14.16	1.93	0.00	2.92	0.02	0.00
14.18	1.91	0.00	2.91	0.02	0.00	14.20	1.86	0.00	2.90	0.02	0.00
14.22	1.80	0.00	2.89	0.02	0.00	14.24	1.77	0.00	2.88	0.02	0.00
14.25	1.75	0.00	2.87	0.02	0.00	14.27	1.76	0.00	2.86	0.02	0.00
14.29	1.76	0.00	2.85	0.02	0.00	14.31	1.78	0.00	2.84	0.02	0.00
14.33	1.83	0.00	2.83	0.02	0.00	14.35	1.94	0.00	2.82	0.02	0.00
14.37	2.00	0.00	2.81	0.02	0.00	14.39	2.00	0.00	2.80	0.02	0.00
14.41	2.00	0.00	2.79	0.02	0.00	14.43	1.98	0.00	2.78	0.02	0.00
14.45	1.94	0.00	2.77	0.02	0.00	14.47	1.96	0.00	2.76	0.02	0.00
14.49	2.00	0.00	2.75	0.02	0.00	14.51	2.00	0.00	2.74	0.02	0.00
14.53	2.00	0.00	2.73	0.02	0.00	14.55	2.00	0.00	2.72	0.02	0.00
14.57	2.00	0.00	2.71	0.02	0.00	14.59	2.00	0.00	2.70	0.02	0.00
14.61	2.00	0.00	2.69	0.02	0.00	14.63	2.00	0.00	2.68	0.02	0.00
14.65	2.00	0.00	2.67	0.02	0.00	14.67	2.00	0.00	2.66	0.02	0.00
14.69	2.00	0.00	2.65	0.02	0.00	14.71	2.00	0.00	2.64	0.02	0.00
14.73	2.00	0.00	2.64	0.02	0.00	14.75	2.00	0.00	2.63	0.02	0.00
14.77	2.00	0.00	2.62	0.02	0.00	14.79	2.00	0.00	2.61	0.02	0.00
14.81	2.00	0.00	2.60	0.02	0.00	14.83	2.00	0.00	2.59	0.02	0.00
14.85	2.00	0.00	2.58	0.02	0.00	14.87	2.00	0.00	2.57	0.02	0.00
14.89	1.93	0.00	2.56	0.02	0.00	14.91	1.94	0.00	2.55	0.02	0.00
14.93	1.97	0.00	2.54	0.02	0.00	14.95	2.00	0.00	2.53	0.02	0.00
14.97	2.00	0.00	2.52	0.02	0.00	14.99	2.00	0.00	2.51	0.02	0.00
15.01	2.00	0.00	2.50	0.02	0.00	15.03	2.00	0.00	2.49	0.02	0.00
15.05	2.00	0.00	2.48	0.02	0.00	15.07	2.00	0.00	2.47	0.02	0.00
15.09	2.00	0.00	2.46	0.02	0.00	15.11	2.00	0.00	2.45	0.02	0.00
15.13	2.00	0.00	2.44	0.02	0.00	15.15	2.00	0.00	2.43	0.02	0.00
15.17	2.00	0.00	2.42	0.02	0.00	15.18	2.00	0.00	2.41	0.02	0.00
15.20	2.00	0.00	2.40	0.02	0.00	15.22	2.00	0.00	2.39	0.02	0.00
15.24	2.00	0.00	2.38	0.02	0.00	15.26	1.98	0.00	2.37	0.02	0.00
15.28	1.93	0.00	2.36	0.02	0.00	15.30	1.90	0.00	2.35	0.02	0.00
15.32	1.90	0.00	2.34	0.02	0.00	15.34	1.91	0.00	2.33	0.02	0.00
15.36	1.97	0.00	2.32	0.02	0.00	15.38	2.00	0.00	2.31	0.02	0.00
15.40	2.00	0.00	2.30	0.02	0.00	15.42	2.00	0.00	2.29	0.02	0.00
15.44	2.00	0.00	2.28	0.02	0.00	15.46	2.00	0.00	2.27	0.02	0.00
15.48	2.00	0.00	2.26	0.02	0.00	15.50	2.00	0.00	2.25	0.02	0.00
15.52	2.00	0.00	2.24	0.02	0.00	15.54	2.00	0.00	2.23	0.02	0.00
15.56	2.00	0.00	2.22	0.02	0.00	15.58	2.00	0.00	2.21	0.02	0.00
15.60	2.00	0.00	2.20	0.02	0.00	15.62	2.00	0.00	2.19	0.02	0.00
15.64	2.00	0.00	2.18	0.02	0.00	15.66	2.00	0.00	2.17	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
15.68	2.00	0.00	2.16	0.02	0.00	15.70	2.00	0.00	2.15	0.02	0.00
15.72	2.00	0.00	2.14	0.02	0.00	15.74	2.00	0.00	2.13	0.02	0.00
15.76	2.00	0.00	2.12	0.02	0.00	15.78	2.00	0.00	2.11	0.02	0.00
15.80	2.00	0.00	2.10	0.02	0.00	15.82	2.00	0.00	2.09	0.02	0.00
15.84	2.00	0.00	2.08	0.02	0.00	15.86	2.00	0.00	2.07	0.02	0.00
15.88	2.00	0.00	2.06	0.02	0.00	15.90	2.00	0.00	2.05	0.02	0.00
15.92	2.00	0.00	2.04	0.02	0.00	15.94	2.00	0.00	2.03	0.02	0.00
15.96	2.00	0.00	2.02	0.02	0.00	15.98	2.00	0.00	2.01	0.02	0.00
16.00	2.00	0.00	2.00	0.02	0.00	16.02	2.00	0.00	1.99	0.02	0.00
16.03	2.00	0.00	1.98	0.02	0.00	16.05	2.00	0.00	1.97	0.02	0.00
16.07	2.00	0.00	1.96	0.02	0.00	16.09	2.00	0.00	1.95	0.02	0.00
16.11	2.00	0.00	1.94	0.02	0.00	16.13	2.00	0.00	1.93	0.02	0.00
16.15	2.00	0.00	1.92	0.02	0.00	16.17	2.00	0.00	1.91	0.02	0.00
16.19	2.00	0.00	1.90	0.02	0.00	16.21	2.00	0.00	1.89	0.02	0.00
16.23	2.00	0.00	1.88	0.02	0.00	16.25	2.00	0.00	1.87	0.02	0.00
16.27	2.00	0.00	1.86	0.02	0.00	16.29	2.00	0.00	1.85	0.02	0.00
16.31	2.00	0.00	1.84	0.02	0.00	16.33	2.00	0.00	1.83	0.02	0.00
16.35	2.00	0.00	1.82	0.02	0.00	16.37	2.00	0.00	1.81	0.02	0.00
16.39	2.00	0.00	1.80	0.02	0.00	16.41	2.00	0.00	1.80	0.02	0.00
16.43	2.00	0.00	1.79	0.02	0.00	16.45	2.00	0.00	1.78	0.02	0.00
16.47	2.00	0.00	1.77	0.02	0.00	16.49	2.00	0.00	1.76	0.02	0.00
16.51	2.00	0.00	1.75	0.02	0.00	16.53	2.00	0.00	1.74	0.02	0.00
16.55	2.00	0.00	1.73	0.02	0.00	16.57	2.00	0.00	1.72	0.02	0.00
16.59	2.00	0.00	1.71	0.02	0.00	16.61	2.00	0.00	1.70	0.02	0.00
16.63	2.00	0.00	1.69	0.02	0.00	16.65	2.00	0.00	1.68	0.02	0.00
16.67	2.00	0.00	1.67	0.02	0.00	16.69	2.00	0.00	1.66	0.02	0.00
16.71	2.00	0.00	1.65	0.02	0.00	16.73	2.00	0.00	1.64	0.02	0.00
16.75	2.00	0.00	1.63	0.02	0.00	16.76	2.00	0.00	1.62	0.02	0.00
16.78	2.00	0.00	1.61	0.02	0.00	16.80	2.00	0.00	1.60	0.02	0.00
16.82	2.00	0.00	1.59	0.02	0.00	16.84	2.00	0.00	1.58	0.02	0.00
16.86	2.00	0.00	1.57	0.02	0.00	16.88	0.70	0.30	1.56	0.02	0.01
16.90	2.00	0.00	1.55	0.02	0.00	16.92	2.00	0.00	1.54	0.02	0.00
16.94	2.00	0.00	1.53	0.02	0.00	16.96	2.00	0.00	1.52	0.02	0.00
16.98	2.00	0.00	1.51	0.02	0.00	17.00	2.00	0.00	1.50	0.02	0.00
17.02	2.00	0.00	1.49	0.02	0.00	17.04	2.00	0.00	1.48	0.02	0.00
17.06	2.00	0.00	1.47	0.02	0.00	17.08	0.76	0.24	1.46	0.02	0.01
17.10	1.14	0.00	1.45	0.02	0.00	17.12	1.25	0.00	1.44	0.02	0.00
17.14	1.16	0.00	1.43	0.02	0.00	17.16	1.24	0.00	1.42	0.02	0.00
17.18	1.34	0.00	1.41	0.02	0.00	17.20	1.42	0.00	1.40	0.02	0.00
17.22	1.43	0.00	1.39	0.02	0.00	17.24	1.41	0.00	1.38	0.02	0.00
17.26	1.38	0.00	1.37	0.02	0.00	17.28	1.31	0.00	1.36	0.02	0.00
17.30	1.40	0.00	1.35	0.02	0.00	17.32	1.78	0.00	1.34	0.02	0.00
17.34	2.00	0.00	1.33	0.02	0.00	17.36	2.00	0.00	1.32	0.02	0.00
17.38	2.00	0.00	1.31	0.02	0.00	17.40	2.00	0.00	1.30	0.02	0.00
17.42	2.00	0.00	1.29	0.02	0.00	17.43	2.00	0.00	1.28	0.02	0.00
17.45	2.00	0.00	1.27	0.02	0.00						

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 3.82

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

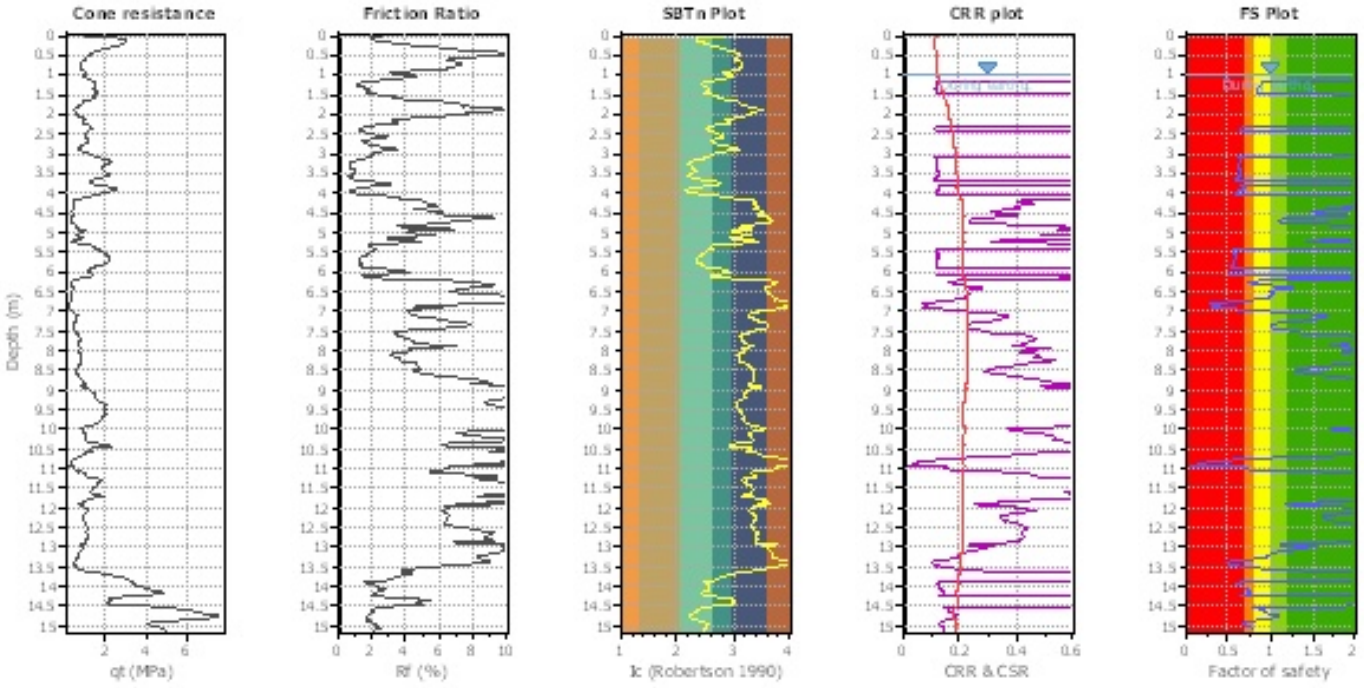
LIQUEFACTION ANALYSIS REPORT

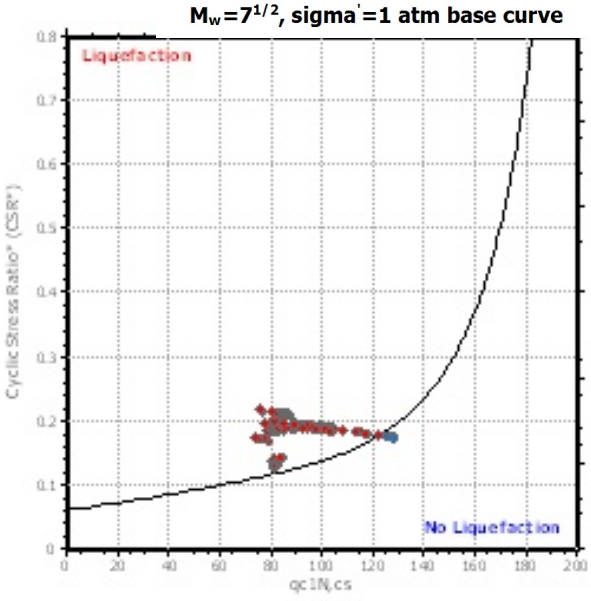
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

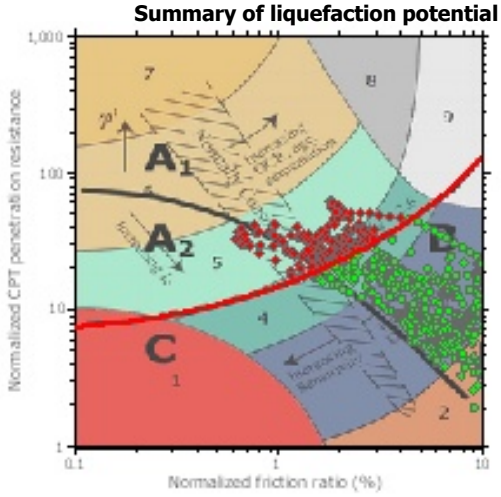
CPT file : CPTU05

Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

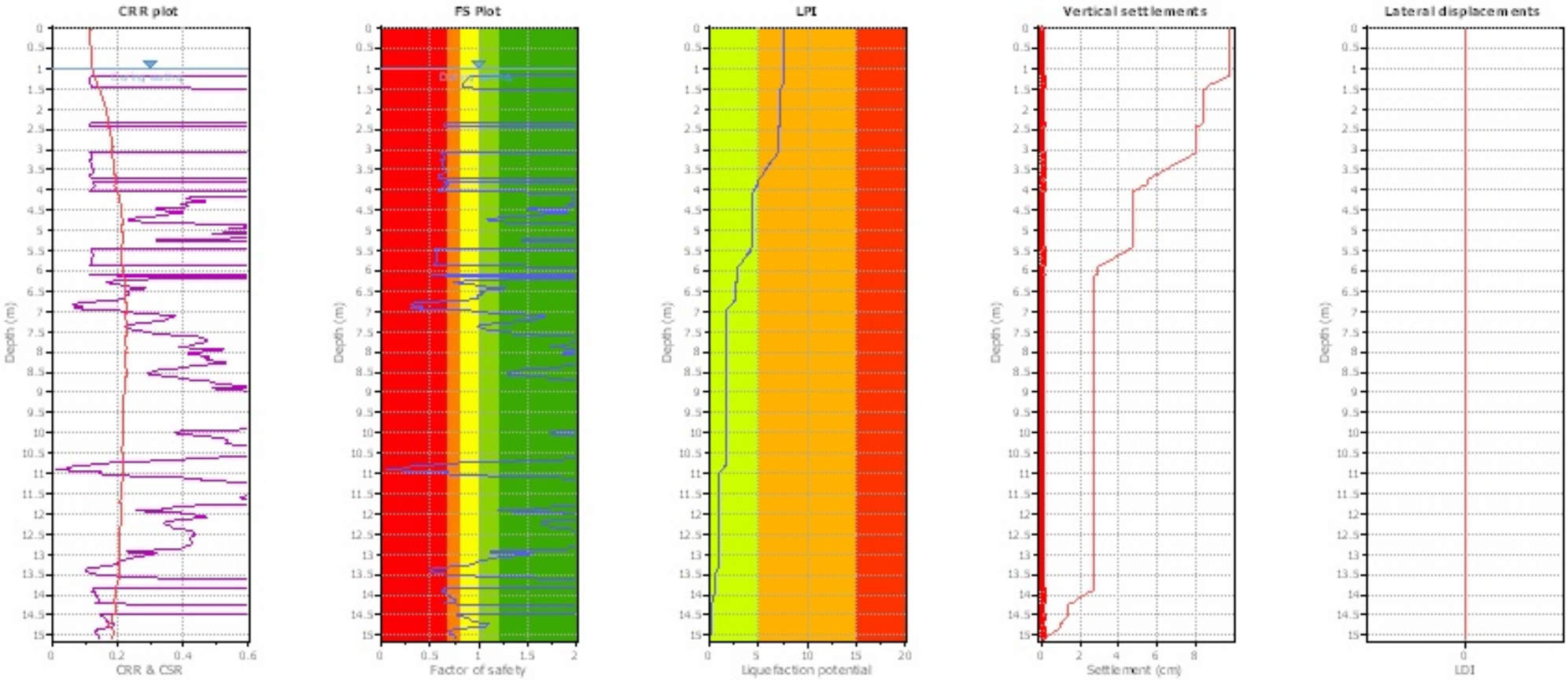






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	0.92	0.08	9.42	0.02	0.02
1.18	0.92	0.08	9.41	0.02	0.02	1.20	0.91	0.09	9.40	0.02	0.02
1.22	0.90	0.10	9.39	0.02	0.02	1.24	0.89	0.11	9.38	0.02	0.02
1.26	0.88	0.12	9.37	0.02	0.02	1.28	0.87	0.13	9.36	0.02	0.02
1.30	0.87	0.13	9.35	0.02	0.02	1.32	0.86	0.14	9.34	0.02	0.03
1.34	0.85	0.15	9.33	0.02	0.03	1.36	0.84	0.16	9.32	0.02	0.03
1.38	0.84	0.16	9.31	0.02	0.03	1.40	0.84	0.16	9.30	0.02	0.03
1.42	0.84	0.16	9.29	0.02	0.03	1.44	0.85	0.15	9.28	0.02	0.03
1.46	0.85	0.15	9.27	0.02	0.03	1.48	0.84	0.16	9.26	0.02	0.03
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	0.67	0.33	8.83	0.02	0.06	2.36	0.67	0.33	8.82	0.02	0.06
2.38	0.66	0.34	8.81	0.02	0.06	2.40	0.64	0.36	8.80	0.02	0.06
2.42	0.64	0.36	8.79	0.02	0.06	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	0.62	0.38	8.46	0.02	0.06
3.10	0.63	0.37	8.45	0.02	0.06	3.12	0.64	0.36	8.44	0.02	0.06
3.14	0.64	0.36	8.43	0.02	0.06	3.16	0.65	0.35	8.42	0.02	0.06
3.18	0.65	0.35	8.41	0.02	0.06	3.20	0.65	0.35	8.40	0.02	0.06
3.22	0.65	0.35	8.39	0.02	0.06	3.24	0.64	0.36	8.38	0.02	0.06
3.26	0.62	0.38	8.37	0.02	0.06	3.28	0.62	0.38	8.36	0.02	0.06
3.30	0.63	0.37	8.35	0.02	0.06	3.32	0.63	0.37	8.34	0.02	0.06
3.34	0.63	0.37	8.33	0.02	0.06	3.36	0.62	0.38	8.32	0.02	0.06
3.38	0.62	0.38	8.31	0.02	0.06	3.40	0.62	0.38	8.30	0.02	0.06
3.42	0.63	0.37	8.29	0.02	0.06	3.44	0.64	0.36	8.28	0.02	0.06
3.46	0.65	0.35	8.27	0.02	0.06	3.48	0.65	0.35	8.26	0.02	0.06
3.50	0.66	0.34	8.25	0.02	0.06	3.52	0.66	0.34	8.24	0.02	0.06
3.54	0.66	0.34	8.23	0.02	0.06	3.56	0.66	0.34	8.22	0.02	0.06
3.58	0.64	0.36	8.21	0.02	0.06	3.60	0.62	0.38	8.20	0.02	0.06
3.62	0.60	0.40	8.19	0.02	0.07	3.64	0.59	0.41	8.18	0.02	0.07
3.66	0.59	0.41	8.17	0.02	0.07	3.68	0.58	0.42	8.16	0.02	0.07
3.70	0.58	0.42	8.15	0.02	0.07	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	0.65	0.35	8.09	0.02	0.06	3.84	0.68	0.32	8.08	0.02	0.05

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	0.70	0.30	8.07	0.02	0.05	3.88	0.69	0.31	8.06	0.02	0.05
3.90	0.68	0.32	8.05	0.02	0.05	3.92	0.65	0.35	8.04	0.02	0.06
3.94	0.64	0.36	8.03	0.02	0.06	3.96	0.61	0.39	8.02	0.02	0.06
3.98	0.61	0.39	8.01	0.02	0.06	4.00	0.60	0.40	8.00	0.02	0.06
4.02	0.59	0.41	7.99	0.02	0.07	4.04	0.59	0.41	7.98	0.02	0.07
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	1.96	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	1.89	0.00	7.83	0.02	0.00	4.36	1.88	0.00	7.82	0.02	0.00
4.38	1.96	0.00	7.81	0.02	0.00	4.40	1.98	0.00	7.80	0.02	0.00
4.42	1.86	0.00	7.79	0.02	0.00	4.44	1.65	0.00	7.78	0.02	0.00
4.46	1.49	0.00	7.77	0.02	0.00	4.48	1.48	0.00	7.76	0.02	0.00
4.50	1.54	0.00	7.75	0.02	0.00	4.52	1.70	0.00	7.74	0.02	0.00
4.54	1.84	0.00	7.73	0.02	0.00	4.56	1.92	0.00	7.72	0.02	0.00
4.58	1.85	0.00	7.71	0.02	0.00	4.60	1.72	0.00	7.70	0.02	0.00
4.62	1.59	0.00	7.69	0.02	0.00	4.64	1.47	0.00	7.68	0.02	0.00
4.66	1.34	0.00	7.67	0.02	0.00	4.68	1.22	0.00	7.66	0.02	0.00
4.70	1.14	0.00	7.65	0.02	0.00	4.72	1.09	0.00	7.64	0.02	0.00
4.74	1.09	0.00	7.63	0.02	0.00	4.76	1.11	0.00	7.62	0.02	0.00
4.78	1.20	0.00	7.61	0.02	0.00	4.80	1.40	0.00	7.60	0.02	0.00
4.82	1.72	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	1.64	0.00	7.39	0.02	0.00	5.24	1.44	0.00	7.38	0.02	0.00
5.26	1.73	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	2.00	0.00	7.29	0.02	0.00	5.44	0.55	0.45	7.28	0.02	0.06
5.46	0.57	0.43	7.27	0.02	0.06	5.48	0.57	0.43	7.26	0.02	0.06
5.50	0.56	0.44	7.25	0.02	0.06	5.52	0.57	0.43	7.24	0.02	0.06
5.54	0.57	0.43	7.23	0.02	0.06	5.56	0.58	0.42	7.22	0.02	0.06
5.58	0.58	0.42	7.21	0.02	0.06	5.60	0.58	0.42	7.20	0.02	0.06
5.62	0.58	0.42	7.19	0.02	0.06	5.64	0.58	0.42	7.18	0.02	0.06
5.66	0.58	0.42	7.17	0.02	0.06	5.68	0.57	0.43	7.16	0.02	0.06
5.70	0.58	0.42	7.15	0.02	0.06	5.72	0.57	0.43	7.14	0.02	0.06
5.74	0.57	0.43	7.13	0.02	0.06	5.76	0.57	0.43	7.12	0.02	0.06

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.78	0.56	0.44	7.11	0.02	0.06	5.80	0.56	0.44	7.10	0.02	0.06
5.82	0.55	0.45	7.09	0.02	0.06	5.84	0.54	0.46	7.08	0.02	0.07
5.86	0.53	0.47	7.07	0.02	0.07	5.88	0.52	0.48	7.06	0.02	0.07
5.90	2.00	0.00	7.05	0.02	0.00	5.92	2.00	0.00	7.04	0.02	0.00
5.94	2.00	0.00	7.03	0.02	0.00	5.96	2.00	0.00	7.02	0.02	0.00
5.98	2.00	0.00	7.01	0.02	0.00	6.00	2.00	0.00	7.00	0.02	0.00
6.02	2.00	0.00	6.99	0.02	0.00	6.04	2.00	0.00	6.98	0.02	0.00
6.06	2.00	0.00	6.97	0.02	0.00	6.08	2.00	0.00	6.96	0.02	0.00
6.10	0.52	0.48	6.95	0.02	0.07	6.12	0.52	0.48	6.94	0.02	0.07
6.14	2.00	0.00	6.93	0.02	0.00	6.16	2.00	0.00	6.92	0.02	0.00
6.18	2.00	0.00	6.91	0.02	0.00	6.20	1.91	0.00	6.90	0.02	0.00
6.22	1.31	0.00	6.89	0.02	0.00	6.24	0.92	0.08	6.88	0.02	0.01
6.26	0.76	0.24	6.87	0.02	0.03	6.28	0.74	0.26	6.86	0.02	0.04
6.30	0.80	0.20	6.85	0.02	0.03	6.32	0.87	0.13	6.84	0.02	0.02
6.34	0.92	0.08	6.83	0.02	0.01	6.36	0.99	0.01	6.82	0.02	0.00
6.38	1.07	0.00	6.81	0.02	0.00	6.40	1.20	0.00	6.80	0.02	0.00
6.42	1.28	0.00	6.79	0.02	0.00	6.44	1.25	0.00	6.78	0.02	0.00
6.46	1.16	0.00	6.77	0.02	0.00	6.48	1.06	0.00	6.76	0.02	0.00
6.50	1.01	0.00	6.75	0.02	0.00	6.52	1.01	0.00	6.74	0.02	0.00
6.54	1.02	0.00	6.73	0.02	0.00	6.56	1.04	0.00	6.72	0.02	0.00
6.58	1.04	0.00	6.71	0.02	0.00	6.60	1.02	0.00	6.70	0.02	0.00
6.62	0.99	0.01	6.69	0.02	0.00	6.64	0.99	0.01	6.68	0.02	0.00
6.66	0.99	0.01	6.67	0.02	0.00	6.68	0.99	0.01	6.66	0.02	0.00
6.70	0.92	0.08	6.65	0.02	0.01	6.72	0.82	0.18	6.64	0.02	0.02
6.74	0.69	0.31	6.63	0.02	0.04	6.76	0.57	0.43	6.62	0.02	0.06
6.78	0.45	0.55	6.61	0.02	0.07	6.80	0.35	0.65	6.60	0.02	0.09
6.82	0.29	0.71	6.59	0.02	0.09	6.84	0.29	0.71	6.58	0.02	0.09
6.86	0.32	0.68	6.57	0.02	0.09	6.88	0.36	0.64	6.56	0.02	0.08
6.90	0.43	0.57	6.55	0.02	0.07	6.92	0.31	0.69	6.54	0.02	0.09
6.94	0.45	0.55	6.53	0.02	0.07	6.96	0.58	0.42	6.52	0.02	0.05
6.97	0.92	0.08	6.51	0.02	0.01	6.99	0.97	0.03	6.50	0.02	0.00
7.01	1.03	0.00	6.49	0.02	0.00	7.03	1.14	0.00	6.48	0.02	0.00
7.05	1.30	0.00	6.47	0.02	0.00	7.07	1.47	0.00	6.46	0.02	0.00
7.09	1.60	0.00	6.45	0.02	0.00	7.11	1.67	0.00	6.44	0.02	0.00
7.13	1.66	0.00	6.43	0.02	0.00	7.15	1.63	0.00	6.42	0.02	0.00
7.17	1.60	0.00	6.41	0.02	0.00	7.19	1.56	0.00	6.40	0.02	0.00
7.21	1.51	0.00	6.39	0.02	0.00	7.23	1.44	0.00	6.38	0.02	0.00
7.25	1.36	0.00	6.37	0.02	0.00	7.27	1.24	0.00	6.36	0.02	0.00
7.29	1.15	0.00	6.35	0.02	0.00	7.31	1.08	0.00	6.34	0.02	0.00
7.33	1.03	0.00	6.33	0.02	0.00	7.35	0.99	0.01	6.32	0.02	0.00
7.37	0.99	0.01	6.31	0.02	0.00	7.39	1.01	0.00	6.30	0.02	0.00
7.41	1.02	0.00	6.29	0.02	0.00	7.43	1.07	0.00	6.28	0.02	0.00
7.45	1.13	0.00	6.27	0.02	0.00	7.47	1.20	0.00	6.26	0.02	0.00
7.49	1.25	0.00	6.25	0.02	0.00	7.51	1.31	0.00	6.24	0.02	0.00
7.53	1.36	0.00	6.23	0.02	0.00	7.55	1.43	0.00	6.22	0.02	0.00
7.57	1.55	0.00	6.21	0.02	0.00	7.59	1.73	0.00	6.20	0.02	0.00
7.61	1.90	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.14	0.02	0.00
7.73	2.00	0.00	6.13	0.02	0.00	7.75	2.00	0.00	6.12	0.02	0.00
7.77	2.00	0.00	6.11	0.02	0.00	7.79	1.95	0.00	6.10	0.02	0.00
7.81	1.93	0.00	6.09	0.02	0.00	7.83	1.91	0.00	6.08	0.02	0.00
7.85	1.86	0.00	6.07	0.02	0.00	7.87	1.79	0.00	6.06	0.02	0.00
7.89	1.73	0.00	6.05	0.02	0.00	7.91	1.98	0.00	6.04	0.02	0.00
7.93	2.00	0.00	6.03	0.02	0.00	7.95	2.00	0.00	6.02	0.02	0.00
7.97	2.00	0.00	6.01	0.02	0.00	7.99	1.95	0.00	6.00	0.02	0.00
8.01	1.86	0.00	5.99	0.02	0.00	8.03	1.85	0.00	5.98	0.02	0.00
8.05	1.88	0.00	5.97	0.02	0.00	8.07	1.96	0.00	5.96	0.02	0.00
8.09	2.00	0.00	5.95	0.02	0.00	8.11	2.00	0.00	5.94	0.02	0.00
8.13	2.00	0.00	5.93	0.02	0.00	8.15	2.00	0.00	5.92	0.02	0.00
8.17	2.00	0.00	5.91	0.02	0.00	8.19	2.00	0.00	5.90	0.02	0.00
8.21	2.00	0.00	5.89	0.02	0.00	8.23	2.00	0.00	5.88	0.02	0.00
8.25	2.00	0.00	5.87	0.02	0.00	8.27	2.00	0.00	5.86	0.02	0.00
8.29	2.00	0.00	5.85	0.02	0.00	8.31	2.00	0.00	5.84	0.02	0.00
8.33	1.97	0.00	5.83	0.02	0.00	8.35	1.90	0.00	5.82	0.02	0.00
8.37	1.80	0.00	5.81	0.02	0.00	8.39	1.70	0.00	5.80	0.02	0.00
8.41	1.59	0.00	5.79	0.02	0.00	8.43	1.52	0.00	5.78	0.02	0.00
8.45	1.44	0.00	5.77	0.02	0.00	8.47	1.38	0.00	5.76	0.02	0.00
8.49	1.34	0.00	5.75	0.02	0.00	8.51	1.30	0.00	5.74	0.02	0.00
8.53	1.29	0.00	5.73	0.02	0.00	8.55	1.31	0.00	5.72	0.02	0.00
8.57	1.39	0.00	5.71	0.02	0.00	8.59	1.50	0.00	5.70	0.02	0.00
8.61	1.61	0.00	5.69	0.02	0.00	8.63	1.70	0.00	5.68	0.02	0.00
8.65	1.78	0.00	5.67	0.02	0.00	8.67	1.90	0.00	5.66	0.02	0.00
8.69	2.00	0.00	5.65	0.02	0.00	8.71	2.00	0.00	5.64	0.02	0.00
8.73	2.00	0.00	5.63	0.02	0.00	8.75	2.00	0.00	5.62	0.02	0.00
8.77	2.00	0.00	5.61	0.02	0.00	8.79	2.00	0.00	5.60	0.02	0.00
8.81	2.00	0.00	5.59	0.02	0.00	8.83	2.00	0.00	5.58	0.02	0.00
8.85	2.00	0.00	5.57	0.02	0.00	8.87	2.00	0.00	5.56	0.02	0.00
8.89	2.00	0.00	5.55	0.02	0.00	8.91	2.00	0.00	5.54	0.02	0.00
8.93	2.00	0.00	5.53	0.02	0.00	8.95	2.00	0.00	5.52	0.02	0.00
8.97	2.00	0.00	5.51	0.02	0.00	8.99	2.00	0.00	5.50	0.02	0.00
9.01	2.00	0.00	5.49	0.02	0.00	9.03	2.00	0.00	5.48	0.02	0.00
9.05	2.00	0.00	5.47	0.02	0.00	9.07	2.00	0.00	5.46	0.02	0.00
9.09	2.00	0.00	5.45	0.02	0.00	9.11	2.00	0.00	5.44	0.02	0.00
9.13	2.00	0.00	5.43	0.02	0.00	9.15	2.00	0.00	5.42	0.02	0.00
9.17	2.00	0.00	5.41	0.02	0.00	9.19	2.00	0.00	5.40	0.02	0.00
9.21	2.00	0.00	5.39	0.02	0.00	9.23	2.00	0.00	5.38	0.02	0.00
9.25	2.00	0.00	5.37	0.02	0.00	9.27	2.00	0.00	5.36	0.02	0.00
9.29	2.00	0.00	5.35	0.02	0.00	9.31	2.00	0.00	5.34	0.02	0.00
9.33	2.00	0.00	5.33	0.02	0.00	9.35	2.00	0.00	5.32	0.02	0.00
9.37	2.00	0.00	5.31	0.02	0.00	9.39	2.00	0.00	5.30	0.02	0.00
9.41	2.00	0.00	5.29	0.02	0.00	9.43	2.00	0.00	5.28	0.02	0.00
9.45	2.00	0.00	5.27	0.02	0.00	9.47	2.00	0.00	5.26	0.02	0.00
9.49	2.00	0.00	5.25	0.02	0.00	9.51	2.00	0.00	5.24	0.02	0.00
9.53	2.00	0.00	5.23	0.02	0.00	9.55	2.00	0.00	5.22	0.02	0.00
9.57	2.00	0.00	5.21	0.02	0.00	9.59	2.00	0.00	5.20	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.61	2.00	0.00	5.19	0.02	0.00	9.63	2.00	0.00	5.18	0.02	0.00
9.65	2.00	0.00	5.17	0.02	0.00	9.67	2.00	0.00	5.16	0.02	0.00
9.69	2.00	0.00	5.15	0.02	0.00	9.71	2.00	0.00	5.14	0.02	0.00
9.73	2.00	0.00	5.13	0.02	0.00	9.75	2.00	0.00	5.12	0.02	0.00
9.77	2.00	0.00	5.11	0.02	0.00	9.79	2.00	0.00	5.10	0.02	0.00
9.81	2.00	0.00	5.09	0.02	0.00	9.83	2.00	0.00	5.08	0.02	0.00
9.85	2.00	0.00	5.07	0.02	0.00	9.87	2.00	0.00	5.06	0.02	0.00
9.89	2.00	0.00	5.05	0.02	0.00	9.91	2.00	0.00	5.04	0.02	0.00
9.93	2.00	0.00	5.03	0.02	0.00	9.95	2.00	0.00	5.02	0.02	0.00
9.97	1.79	0.00	5.01	0.02	0.00	9.99	1.71	0.00	5.00	0.02	0.00
10.01	1.76	0.00	4.99	0.02	0.00	10.03	1.84	0.00	4.98	0.02	0.00
10.05	1.96	0.00	4.97	0.02	0.00	10.07	2.00	0.00	4.96	0.02	0.00
10.09	2.00	0.00	4.95	0.02	0.00	10.11	2.00	0.00	4.94	0.02	0.00
10.13	2.00	0.00	4.93	0.02	0.00	10.15	2.00	0.00	4.92	0.02	0.00
10.17	2.00	0.00	4.91	0.02	0.00	10.19	2.00	0.00	4.90	0.02	0.00
10.21	2.00	0.00	4.89	0.02	0.00	10.23	2.00	0.00	4.88	0.02	0.00
10.25	2.00	0.00	4.87	0.02	0.00	10.27	2.00	0.00	4.86	0.02	0.00
10.29	2.00	0.00	4.85	0.02	0.00	10.31	2.00	0.00	4.85	0.02	0.00
10.33	2.00	0.00	4.84	0.02	0.00	10.35	2.00	0.00	4.83	0.02	0.00
10.37	2.00	0.00	4.82	0.02	0.00	10.39	2.00	0.00	4.81	0.02	0.00
10.41	2.00	0.00	4.80	0.02	0.00	10.43	2.00	0.00	4.79	0.02	0.00
10.45	2.00	0.00	4.78	0.02	0.00	10.47	2.00	0.00	4.77	0.02	0.00
10.49	2.00	0.00	4.76	0.02	0.00	10.51	2.00	0.00	4.75	0.02	0.00
10.53	2.00	0.00	4.74	0.02	0.00	10.55	2.00	0.00	4.73	0.02	0.00
10.57	2.00	0.00	4.72	0.02	0.00	10.59	2.00	0.00	4.71	0.02	0.00
10.61	2.00	0.00	4.70	0.02	0.00	10.63	2.00	0.00	4.69	0.02	0.00
10.65	1.90	0.00	4.68	0.02	0.00	10.67	1.70	0.00	4.67	0.02	0.00
10.69	1.50	0.00	4.66	0.02	0.00	10.71	1.28	0.00	4.65	0.02	0.00
10.73	1.05	0.00	4.64	0.02	0.00	10.75	0.80	0.20	4.63	0.02	0.02
10.77	0.61	0.39	4.62	0.02	0.04	10.79	0.47	0.53	4.61	0.02	0.05
10.81	0.38	0.62	4.60	0.02	0.06	10.83	0.29	0.71	4.59	0.02	0.07
10.85	0.24	0.76	4.58	0.02	0.07	10.87	0.22	0.78	4.57	0.02	0.07
10.89	0.22	0.78	4.56	0.02	0.07	10.91	0.05	0.95	4.55	0.02	0.09
10.93	0.24	0.76	4.54	0.02	0.07	10.95	0.37	0.63	4.53	0.02	0.06
10.97	0.69	0.31	4.52	0.02	0.03	10.99	0.66	0.34	4.51	0.02	0.03
11.01	0.71	0.29	4.50	0.02	0.03	11.03	0.82	0.18	4.49	0.02	0.02
11.05	1.00	0.00	4.48	0.02	0.00	11.07	1.27	0.00	4.47	0.02	0.00
11.09	1.62	0.00	4.46	0.02	0.00	11.11	1.92	0.00	4.45	0.02	0.00
11.13	2.00	0.00	4.44	0.02	0.00	11.15	2.00	0.00	4.43	0.02	0.00
11.17	2.00	0.00	4.42	0.02	0.00	11.19	2.00	0.00	4.41	0.02	0.00
11.21	2.00	0.00	4.40	0.02	0.00	11.23	2.00	0.00	4.39	0.02	0.00
11.25	2.00	0.00	4.38	0.02	0.00	11.27	2.00	0.00	4.37	0.02	0.00
11.29	2.00	0.00	4.36	0.02	0.00	11.31	2.00	0.00	4.35	0.02	0.00
11.33	2.00	0.00	4.34	0.02	0.00	11.35	2.00	0.00	4.33	0.02	0.00
11.37	2.00	0.00	4.32	0.02	0.00	11.39	2.00	0.00	4.31	0.02	0.00
11.41	2.00	0.00	4.30	0.02	0.00	11.43	2.00	0.00	4.29	0.02	0.00
11.45	2.00	0.00	4.28	0.02	0.00	11.47	2.00	0.00	4.27	0.02	0.00
11.49	2.00	0.00	4.26	0.02	0.00	11.51	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.53	2.00	0.00	4.24	0.02	0.00	11.55	2.00	0.00	4.23	0.02	0.00
11.57	2.00	0.00	4.22	0.02	0.00	11.59	2.00	0.00	4.21	0.02	0.00
11.61	2.00	0.00	4.20	0.02	0.00	11.63	2.00	0.00	4.19	0.02	0.00
11.65	2.00	0.00	4.18	0.02	0.00	11.67	2.00	0.00	4.17	0.02	0.00
11.69	2.00	0.00	4.16	0.02	0.00	11.71	2.00	0.00	4.15	0.02	0.00
11.73	2.00	0.00	4.14	0.02	0.00	11.75	2.00	0.00	4.13	0.02	0.00
11.77	2.00	0.00	4.12	0.02	0.00	11.79	2.00	0.00	4.11	0.02	0.00
11.81	2.00	0.00	4.10	0.02	0.00	11.83	1.81	0.00	4.09	0.02	0.00
11.85	1.64	0.00	4.08	0.02	0.00	11.87	1.57	0.00	4.07	0.02	0.00
11.89	1.59	0.00	4.06	0.02	0.00	11.91	1.20	0.00	4.05	0.02	0.00
11.93	1.31	0.00	4.04	0.02	0.00	11.95	1.38	0.00	4.03	0.02	0.00
11.97	1.87	0.00	4.02	0.02	0.00	11.98	1.86	0.00	4.01	0.02	0.00
12.00	1.90	0.00	4.00	0.02	0.00	12.02	2.00	0.00	3.99	0.02	0.00
12.04	2.00	0.00	3.98	0.02	0.00	12.06	2.00	0.00	3.97	0.02	0.00
12.08	2.00	0.00	3.96	0.02	0.00	12.10	2.00	0.00	3.95	0.02	0.00
12.12	1.94	0.00	3.94	0.02	0.00	12.14	1.82	0.00	3.93	0.02	0.00
12.16	1.75	0.00	3.92	0.02	0.00	12.18	1.68	0.00	3.91	0.02	0.00
12.20	1.64	0.00	3.90	0.02	0.00	12.22	1.62	0.00	3.89	0.02	0.00
12.24	1.64	0.00	3.88	0.02	0.00	12.26	1.66	0.00	3.87	0.02	0.00
12.28	1.70	0.00	3.86	0.02	0.00	12.30	1.72	0.00	3.85	0.02	0.00
12.32	1.74	0.00	3.84	0.02	0.00	12.34	1.78	0.00	3.83	0.02	0.00
12.36	1.85	0.00	3.82	0.02	0.00	12.38	1.93	0.00	3.81	0.02	0.00
12.40	1.98	0.00	3.80	0.02	0.00	12.42	2.00	0.00	3.79	0.02	0.00
12.44	2.00	0.00	3.78	0.02	0.00	12.46	2.00	0.00	3.77	0.02	0.00
12.48	2.00	0.00	3.76	0.02	0.00	12.50	2.00	0.00	3.75	0.02	0.00
12.52	2.00	0.00	3.74	0.02	0.00	12.54	2.00	0.00	3.73	0.02	0.00
12.56	2.00	0.00	3.72	0.02	0.00	12.58	2.00	0.00	3.71	0.02	0.00
12.60	2.00	0.00	3.70	0.02	0.00	12.62	2.00	0.00	3.69	0.02	0.00
12.64	2.00	0.00	3.68	0.02	0.00	12.66	2.00	0.00	3.67	0.02	0.00
12.68	2.00	0.00	3.66	0.02	0.00	12.70	2.00	0.00	3.65	0.02	0.00
12.72	2.00	0.00	3.64	0.02	0.00	12.74	2.00	0.00	3.63	0.02	0.00
12.76	2.00	0.00	3.62	0.02	0.00	12.78	2.00	0.00	3.61	0.02	0.00
12.80	1.99	0.00	3.60	0.02	0.00	12.82	1.96	0.00	3.59	0.02	0.00
12.84	1.91	0.00	3.58	0.02	0.00	12.86	1.81	0.00	3.57	0.02	0.00
12.88	1.69	0.00	3.56	0.02	0.00	12.90	1.13	0.00	3.55	0.02	0.00
12.92	1.11	0.00	3.54	0.02	0.00	12.94	1.12	0.00	3.53	0.02	0.00
12.96	1.57	0.00	3.52	0.02	0.00	12.98	1.53	0.00	3.51	0.02	0.00
13.00	1.46	0.00	3.50	0.02	0.00	13.02	1.40	0.00	3.49	0.02	0.00
13.04	1.35	0.00	3.48	0.02	0.00	13.06	1.27	0.00	3.47	0.02	0.00
13.08	1.20	0.00	3.46	0.02	0.00	13.10	1.13	0.00	3.45	0.02	0.00
13.12	1.08	0.00	3.44	0.02	0.00	13.14	1.05	0.00	3.43	0.02	0.00
13.16	1.02	0.00	3.42	0.02	0.00	13.18	0.98	0.02	3.41	0.02	0.00
13.20	0.97	0.03	3.40	0.02	0.00	13.22	0.96	0.04	3.39	0.02	0.00
13.24	0.95	0.05	3.38	0.02	0.00	13.26	0.91	0.09	3.37	0.02	0.01
13.28	0.85	0.15	3.36	0.02	0.01	13.30	0.76	0.24	3.35	0.02	0.02
13.32	0.65	0.35	3.34	0.02	0.02	13.34	0.57	0.43	3.33	0.02	0.03
13.36	0.53	0.47	3.32	0.02	0.03	13.38	0.50	0.50	3.31	0.02	0.03
13.40	0.50	0.50	3.30	0.02	0.03	13.42	0.51	0.49	3.29	0.02	0.03

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
13.44	0.54	0.46	3.28	0.02	0.03	13.46	0.58	0.42	3.27	0.02	0.03
13.48	0.63	0.37	3.26	0.02	0.02	13.50	0.70	0.30	3.25	0.02	0.02
13.52	0.81	0.19	3.24	0.02	0.01	13.54	0.96	0.04	3.23	0.02	0.00
13.56	1.14	0.00	3.22	0.02	0.00	13.58	1.41	0.00	3.21	0.02	0.00
13.60	1.78	0.00	3.20	0.02	0.00	13.62	2.00	0.00	3.19	0.02	0.00
13.64	2.00	0.00	3.18	0.02	0.00	13.66	2.00	0.00	3.17	0.02	0.00
13.68	2.00	0.00	3.16	0.02	0.00	13.70	2.00	0.00	3.15	0.02	0.00
13.72	2.00	0.00	3.14	0.02	0.00	13.74	2.00	0.00	3.13	0.02	0.00
13.76	2.00	0.00	3.12	0.02	0.00	13.78	2.00	0.00	3.11	0.02	0.00
13.80	2.00	0.00	3.10	0.02	0.00	13.82	2.00	0.00	3.09	0.02	0.00
13.84	2.00	0.00	3.08	0.02	0.00	13.86	0.64	0.36	3.07	0.02	0.02
13.88	0.63	0.37	3.06	0.02	0.02	13.90	0.65	0.35	3.05	0.02	0.02
13.92	0.61	0.39	3.04	0.02	0.02	13.94	0.66	0.34	3.03	0.02	0.02
13.96	0.67	0.33	3.02	0.02	0.02	13.97	0.67	0.33	3.01	0.02	0.02
13.99	0.68	0.32	3.00	0.02	0.02	14.01	0.69	0.31	2.99	0.02	0.02
14.03	0.70	0.30	2.98	0.02	0.02	14.05	0.71	0.29	2.97	0.02	0.02
14.07	0.72	0.28	2.96	0.02	0.02	14.09	0.74	0.26	2.95	0.02	0.02
14.11	0.75	0.25	2.94	0.02	0.01	14.13	0.77	0.23	2.93	0.02	0.01
14.15	0.76	0.24	2.92	0.02	0.01	14.17	0.75	0.25	2.91	0.02	0.01
14.19	0.72	0.28	2.90	0.02	0.02	14.21	0.68	0.32	2.89	0.02	0.02
14.23	0.64	0.36	2.88	0.02	0.02	14.25	2.00	0.00	2.87	0.02	0.00
14.27	2.00	0.00	2.86	0.02	0.00	14.29	2.00	0.00	2.85	0.02	0.00
14.31	2.00	0.00	2.84	0.02	0.00	14.33	2.00	0.00	2.83	0.02	0.00
14.35	2.00	0.00	2.82	0.02	0.00	14.37	2.00	0.00	2.81	0.02	0.00
14.39	2.00	0.00	2.80	0.02	0.00	14.41	2.00	0.00	2.79	0.02	0.00
14.43	2.00	0.00	2.78	0.02	0.00	14.45	2.00	0.00	2.77	0.02	0.00
14.47	2.00	0.00	2.76	0.02	0.00	14.49	2.00	0.00	2.75	0.02	0.00
14.51	0.77	0.23	2.74	0.02	0.01	14.53	0.81	0.19	2.73	0.02	0.01
14.55	0.89	0.11	2.72	0.02	0.01	14.57	0.86	0.14	2.71	0.02	0.01
14.59	0.91	0.09	2.70	0.02	0.00	14.61	0.92	0.08	2.69	0.02	0.00
14.63	0.92	0.08	2.68	0.02	0.00	14.65	0.93	0.07	2.67	0.02	0.00
14.67	1.00	0.00	2.66	0.02	0.00	14.69	1.09	0.00	2.65	0.02	0.00
14.71	1.10	0.00	2.64	0.02	0.00	14.73	1.11	0.00	2.63	0.02	0.00
14.75	1.07	0.00	2.62	0.02	0.00	14.77	1.06	0.00	2.62	0.02	0.00
14.79	1.00	0.00	2.61	0.02	0.00	14.81	0.92	0.08	2.60	0.02	0.00
14.83	0.81	0.19	2.59	0.02	0.01	14.85	0.75	0.25	2.58	0.02	0.01
14.87	0.73	0.27	2.57	0.02	0.01	14.89	0.72	0.28	2.56	0.02	0.01
14.91	0.67	0.33	2.55	0.02	0.02	14.93	0.70	0.30	2.54	0.02	0.01
14.95	0.71	0.29	2.53	0.02	0.01	14.97	0.72	0.28	2.52	0.02	0.01
14.99	0.74	0.26	2.51	0.02	0.01	15.01	0.75	0.25	2.50	0.02	0.01
15.03	0.77	0.23	2.49	0.02	0.01	15.05	0.77	0.23	2.48	0.02	0.01
15.07	0.77	0.23	2.47	0.02	0.01	15.09	0.77	0.23	2.46	0.02	0.01

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI

Overall liquefaction potential: 7.73

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Dott. Geol. Lorenzo Del Maschio
Via Camogli 59
41125 Modena

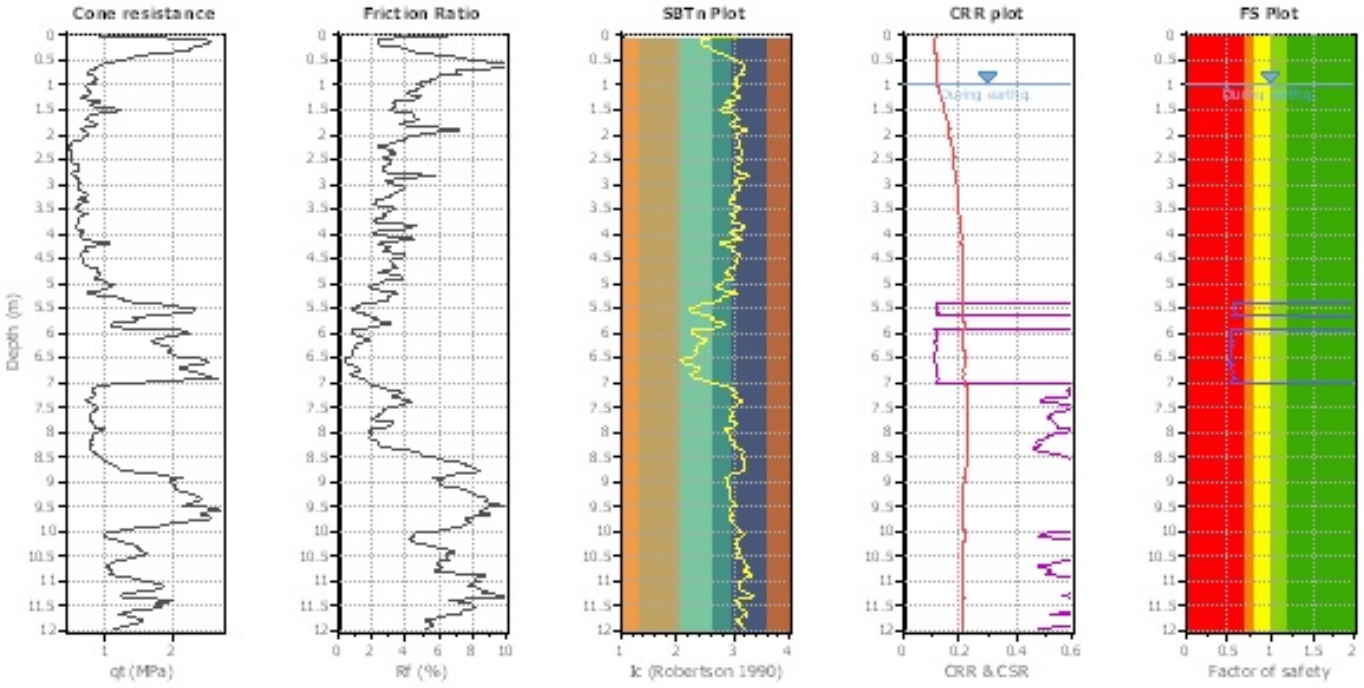
LIQUEFACTION ANALYSIS REPORT

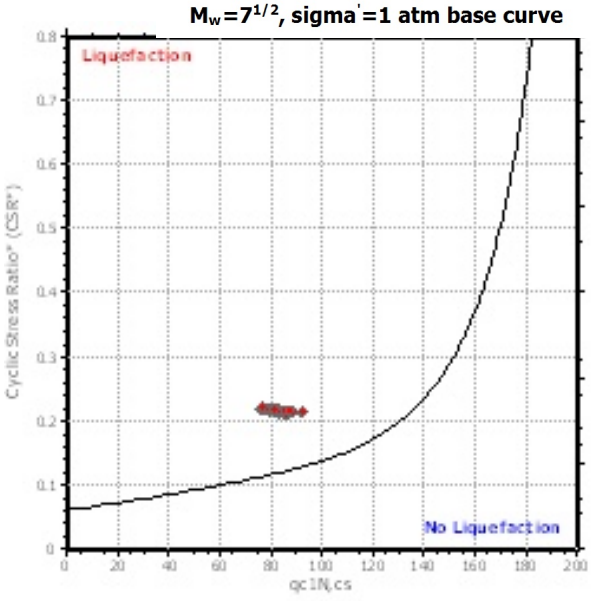
Project title : Lavori di ripristino della sponda del lago-Area di riequilibrio ecologico San Matteo **Location : Medolla**

CPT file : CPTU06

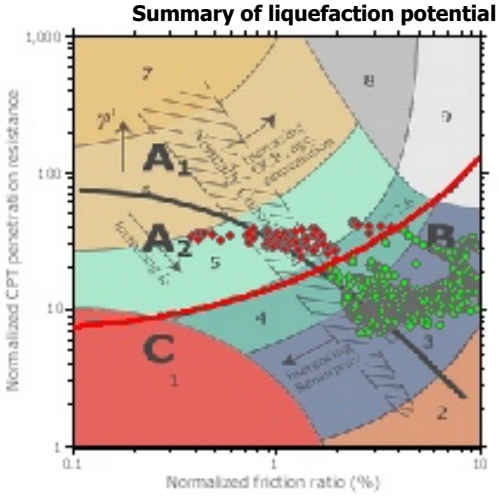
Input parameters and analysis data

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	Sand & Clay
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.14	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method
Peak ground acceleration:	0.22	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		





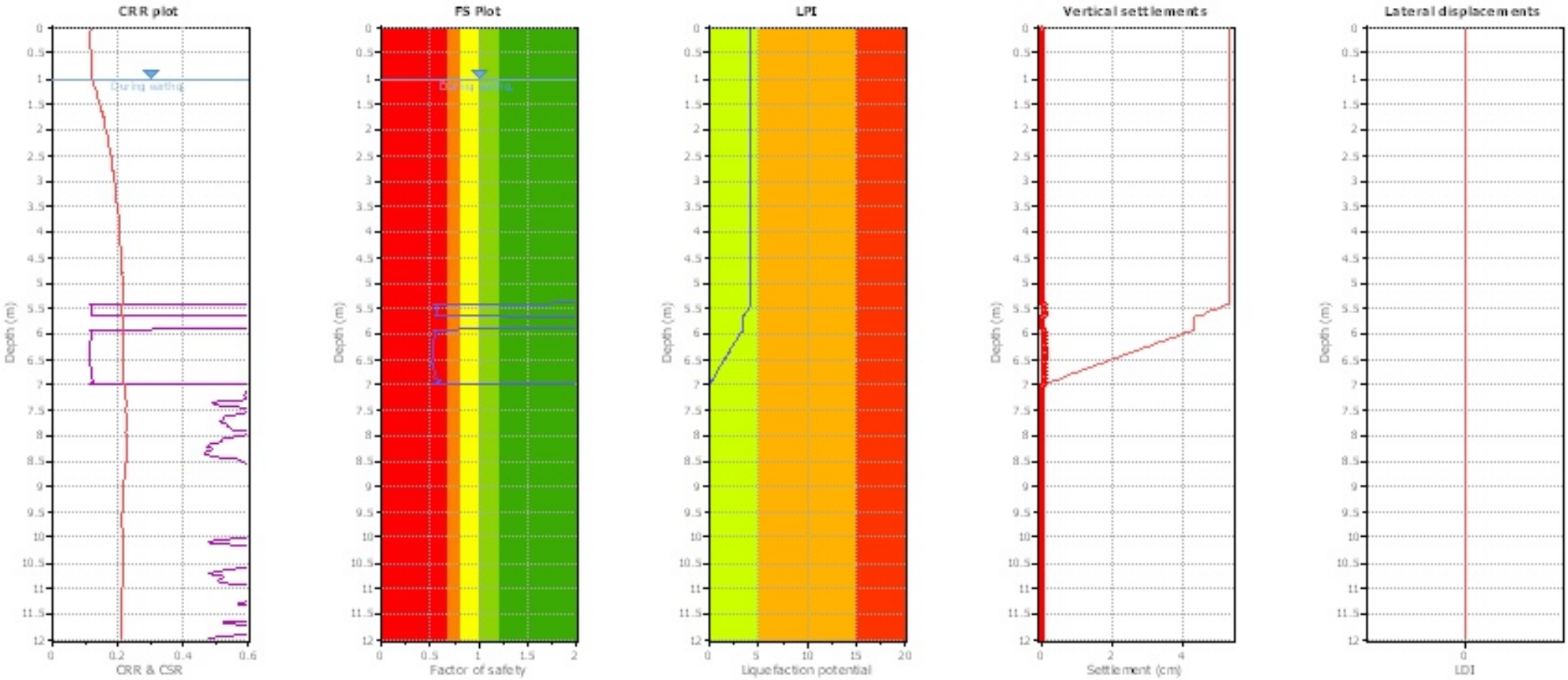
$M_w=7^{1/2}$, sigma'=1 atm base curve



Summary of liquefaction potential

Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.14	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sand & Clay
Peak ground acceleration:	0.22	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.00 m	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Liquefaction Potential Index calculation data ::

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
0.02	2.00	0.00	9.99	0.02	0.00	0.04	2.00	0.00	9.98	0.02	0.00
0.06	2.00	0.00	9.97	0.02	0.00	0.08	2.00	0.00	9.96	0.02	0.00
0.10	2.00	0.00	9.95	0.02	0.00	0.12	2.00	0.00	9.94	0.02	0.00
0.14	2.00	0.00	9.93	0.02	0.00	0.16	2.00	0.00	9.92	0.02	0.00
0.18	2.00	0.00	9.91	0.02	0.00	0.20	2.00	0.00	9.90	0.02	0.00
0.22	2.00	0.00	9.89	0.02	0.00	0.24	2.00	0.00	9.88	0.02	0.00
0.26	2.00	0.00	9.87	0.02	0.00	0.28	2.00	0.00	9.86	0.02	0.00
0.30	2.00	0.00	9.85	0.02	0.00	0.32	2.00	0.00	9.84	0.02	0.00
0.34	2.00	0.00	9.83	0.02	0.00	0.36	2.00	0.00	9.82	0.02	0.00
0.38	2.00	0.00	9.81	0.02	0.00	0.40	2.00	0.00	9.80	0.02	0.00
0.42	2.00	0.00	9.79	0.02	0.00	0.44	2.00	0.00	9.78	0.02	0.00
0.46	2.00	0.00	9.77	0.02	0.00	0.48	2.00	0.00	9.76	0.02	0.00
0.50	2.00	0.00	9.75	0.02	0.00	0.52	2.00	0.00	9.74	0.02	0.00
0.54	2.00	0.00	9.73	0.02	0.00	0.56	2.00	0.00	9.72	0.02	0.00
0.58	2.00	0.00	9.71	0.02	0.00	0.60	2.00	0.00	9.70	0.02	0.00
0.62	2.00	0.00	9.69	0.02	0.00	0.64	2.00	0.00	9.68	0.02	0.00
0.66	2.00	0.00	9.67	0.02	0.00	0.68	2.00	0.00	9.66	0.02	0.00
0.70	2.00	0.00	9.65	0.02	0.00	0.72	2.00	0.00	9.64	0.02	0.00
0.74	2.00	0.00	9.63	0.02	0.00	0.76	2.00	0.00	9.62	0.02	0.00
0.78	2.00	0.00	9.61	0.02	0.00	0.80	2.00	0.00	9.60	0.02	0.00
0.82	2.00	0.00	9.59	0.02	0.00	0.84	2.00	0.00	9.58	0.02	0.00
0.86	2.00	0.00	9.57	0.02	0.00	0.88	2.00	0.00	9.56	0.02	0.00
0.90	2.00	0.00	9.55	0.02	0.00	0.92	2.00	0.00	9.54	0.02	0.00
0.94	2.00	0.00	9.53	0.02	0.00	0.96	2.00	0.00	9.52	0.02	0.00
0.98	2.00	0.00	9.51	0.02	0.00	1.00	2.00	0.00	9.50	0.02	0.00
1.02	2.00	0.00	9.49	0.02	0.00	1.04	2.00	0.00	9.48	0.02	0.00
1.06	2.00	0.00	9.47	0.02	0.00	1.08	2.00	0.00	9.46	0.02	0.00
1.10	2.00	0.00	9.45	0.02	0.00	1.12	2.00	0.00	9.44	0.02	0.00
1.14	2.00	0.00	9.43	0.02	0.00	1.16	2.00	0.00	9.42	0.02	0.00
1.18	2.00	0.00	9.41	0.02	0.00	1.20	2.00	0.00	9.40	0.02	0.00
1.22	2.00	0.00	9.39	0.02	0.00	1.24	2.00	0.00	9.38	0.02	0.00
1.26	2.00	0.00	9.37	0.02	0.00	1.28	2.00	0.00	9.36	0.02	0.00
1.30	2.00	0.00	9.35	0.02	0.00	1.32	2.00	0.00	9.34	0.02	0.00
1.34	2.00	0.00	9.33	0.02	0.00	1.36	2.00	0.00	9.32	0.02	0.00
1.38	2.00	0.00	9.31	0.02	0.00	1.40	2.00	0.00	9.30	0.02	0.00
1.42	2.00	0.00	9.29	0.02	0.00	1.44	2.00	0.00	9.28	0.02	0.00
1.46	2.00	0.00	9.27	0.02	0.00	1.48	2.00	0.00	9.26	0.02	0.00
1.50	2.00	0.00	9.25	0.02	0.00	1.52	2.00	0.00	9.24	0.02	0.00
1.54	2.00	0.00	9.23	0.02	0.00	1.56	2.00	0.00	9.22	0.02	0.00
1.58	2.00	0.00	9.21	0.02	0.00	1.60	2.00	0.00	9.20	0.02	0.00
1.62	2.00	0.00	9.19	0.02	0.00	1.64	2.00	0.00	9.18	0.02	0.00
1.66	2.00	0.00	9.17	0.02	0.00	1.68	2.00	0.00	9.16	0.02	0.00
1.70	2.00	0.00	9.15	0.02	0.00	1.72	2.00	0.00	9.14	0.02	0.00
1.74	2.00	0.00	9.13	0.02	0.00	1.76	2.00	0.00	9.12	0.02	0.00
1.78	2.00	0.00	9.11	0.02	0.00	1.80	2.00	0.00	9.10	0.02	0.00
1.82	2.00	0.00	9.09	0.02	0.00	1.84	2.00	0.00	9.08	0.02	0.00
1.86	2.00	0.00	9.07	0.02	0.00	1.88	2.00	0.00	9.06	0.02	0.00
1.90	2.00	0.00	9.05	0.02	0.00	1.92	2.00	0.00	9.04	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
1.94	2.00	0.00	9.03	0.02	0.00	1.96	2.00	0.00	9.02	0.02	0.00
1.98	2.00	0.00	9.01	0.02	0.00	2.00	2.00	0.00	9.00	0.02	0.00
2.02	2.00	0.00	8.99	0.02	0.00	2.04	2.00	0.00	8.98	0.02	0.00
2.06	2.00	0.00	8.97	0.02	0.00	2.08	2.00	0.00	8.96	0.02	0.00
2.10	2.00	0.00	8.95	0.02	0.00	2.12	2.00	0.00	8.94	0.02	0.00
2.14	2.00	0.00	8.93	0.02	0.00	2.16	2.00	0.00	8.92	0.02	0.00
2.18	2.00	0.00	8.91	0.02	0.00	2.20	2.00	0.00	8.90	0.02	0.00
2.22	2.00	0.00	8.89	0.02	0.00	2.24	2.00	0.00	8.88	0.02	0.00
2.26	2.00	0.00	8.87	0.02	0.00	2.28	2.00	0.00	8.86	0.02	0.00
2.30	2.00	0.00	8.85	0.02	0.00	2.32	2.00	0.00	8.84	0.02	0.00
2.34	2.00	0.00	8.83	0.02	0.00	2.36	2.00	0.00	8.82	0.02	0.00
2.38	2.00	0.00	8.81	0.02	0.00	2.40	2.00	0.00	8.80	0.02	0.00
2.42	2.00	0.00	8.79	0.02	0.00	2.44	2.00	0.00	8.78	0.02	0.00
2.46	2.00	0.00	8.77	0.02	0.00	2.48	2.00	0.00	8.76	0.02	0.00
2.50	2.00	0.00	8.75	0.02	0.00	2.52	2.00	0.00	8.74	0.02	0.00
2.54	2.00	0.00	8.73	0.02	0.00	2.56	2.00	0.00	8.72	0.02	0.00
2.58	2.00	0.00	8.71	0.02	0.00	2.60	2.00	0.00	8.70	0.02	0.00
2.62	2.00	0.00	8.69	0.02	0.00	2.64	2.00	0.00	8.68	0.02	0.00
2.66	2.00	0.00	8.67	0.02	0.00	2.68	2.00	0.00	8.66	0.02	0.00
2.70	2.00	0.00	8.65	0.02	0.00	2.72	2.00	0.00	8.64	0.02	0.00
2.74	2.00	0.00	8.63	0.02	0.00	2.76	2.00	0.00	8.62	0.02	0.00
2.78	2.00	0.00	8.61	0.02	0.00	2.80	2.00	0.00	8.60	0.02	0.00
2.82	2.00	0.00	8.59	0.02	0.00	2.84	2.00	0.00	8.58	0.02	0.00
2.86	2.00	0.00	8.57	0.02	0.00	2.88	2.00	0.00	8.56	0.02	0.00
2.90	2.00	0.00	8.55	0.02	0.00	2.92	2.00	0.00	8.54	0.02	0.00
2.94	2.00	0.00	8.53	0.02	0.00	2.96	2.00	0.00	8.52	0.02	0.00
2.98	2.00	0.00	8.51	0.02	0.00	3.00	2.00	0.00	8.50	0.02	0.00
3.02	2.00	0.00	8.49	0.02	0.00	3.04	2.00	0.00	8.48	0.02	0.00
3.06	2.00	0.00	8.47	0.02	0.00	3.08	2.00	0.00	8.46	0.02	0.00
3.10	2.00	0.00	8.45	0.02	0.00	3.12	2.00	0.00	8.44	0.02	0.00
3.14	2.00	0.00	8.43	0.02	0.00	3.16	2.00	0.00	8.42	0.02	0.00
3.18	2.00	0.00	8.41	0.02	0.00	3.20	2.00	0.00	8.40	0.02	0.00
3.22	2.00	0.00	8.39	0.02	0.00	3.24	2.00	0.00	8.38	0.02	0.00
3.26	2.00	0.00	8.37	0.02	0.00	3.28	2.00	0.00	8.36	0.02	0.00
3.30	2.00	0.00	8.35	0.02	0.00	3.32	2.00	0.00	8.34	0.02	0.00
3.34	2.00	0.00	8.33	0.02	0.00	3.36	2.00	0.00	8.32	0.02	0.00
3.38	2.00	0.00	8.31	0.02	0.00	3.40	2.00	0.00	8.30	0.02	0.00
3.42	2.00	0.00	8.29	0.02	0.00	3.44	2.00	0.00	8.28	0.02	0.00
3.46	2.00	0.00	8.27	0.02	0.00	3.48	2.00	0.00	8.26	0.02	0.00
3.50	2.00	0.00	8.25	0.02	0.00	3.52	2.00	0.00	8.24	0.02	0.00
3.54	2.00	0.00	8.23	0.02	0.00	3.56	2.00	0.00	8.22	0.02	0.00
3.58	2.00	0.00	8.21	0.02	0.00	3.60	2.00	0.00	8.20	0.02	0.00
3.62	2.00	0.00	8.19	0.02	0.00	3.64	2.00	0.00	8.18	0.02	0.00
3.66	2.00	0.00	8.17	0.02	0.00	3.68	2.00	0.00	8.16	0.02	0.00
3.70	2.00	0.00	8.15	0.02	0.00	3.72	2.00	0.00	8.14	0.02	0.00
3.74	2.00	0.00	8.13	0.02	0.00	3.76	2.00	0.00	8.12	0.02	0.00
3.78	2.00	0.00	8.11	0.02	0.00	3.80	2.00	0.00	8.10	0.02	0.00
3.82	2.00	0.00	8.09	0.02	0.00	3.84	2.00	0.00	8.08	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
3.86	2.00	0.00	8.07	0.02	0.00	3.88	2.00	0.00	8.06	0.02	0.00
3.90	2.00	0.00	8.05	0.02	0.00	3.92	2.00	0.00	8.04	0.02	0.00
3.94	2.00	0.00	8.03	0.02	0.00	3.96	2.00	0.00	8.02	0.02	0.00
3.98	2.00	0.00	8.01	0.02	0.00	4.00	2.00	0.00	8.00	0.02	0.00
4.02	2.00	0.00	7.99	0.02	0.00	4.04	2.00	0.00	7.98	0.02	0.00
4.06	2.00	0.00	7.97	0.02	0.00	4.08	2.00	0.00	7.96	0.02	0.00
4.10	2.00	0.00	7.95	0.02	0.00	4.12	2.00	0.00	7.94	0.02	0.00
4.14	2.00	0.00	7.93	0.02	0.00	4.16	2.00	0.00	7.92	0.02	0.00
4.18	2.00	0.00	7.91	0.02	0.00	4.20	2.00	0.00	7.90	0.02	0.00
4.22	2.00	0.00	7.89	0.02	0.00	4.24	2.00	0.00	7.88	0.02	0.00
4.26	2.00	0.00	7.87	0.02	0.00	4.28	2.00	0.00	7.86	0.02	0.00
4.30	2.00	0.00	7.85	0.02	0.00	4.32	2.00	0.00	7.84	0.02	0.00
4.34	2.00	0.00	7.83	0.02	0.00	4.36	2.00	0.00	7.82	0.02	0.00
4.38	2.00	0.00	7.81	0.02	0.00	4.40	2.00	0.00	7.80	0.02	0.00
4.42	2.00	0.00	7.79	0.02	0.00	4.44	2.00	0.00	7.78	0.02	0.00
4.46	2.00	0.00	7.77	0.02	0.00	4.48	2.00	0.00	7.76	0.02	0.00
4.50	2.00	0.00	7.75	0.02	0.00	4.52	2.00	0.00	7.74	0.02	0.00
4.54	2.00	0.00	7.73	0.02	0.00	4.56	2.00	0.00	7.72	0.02	0.00
4.58	2.00	0.00	7.71	0.02	0.00	4.60	2.00	0.00	7.70	0.02	0.00
4.62	2.00	0.00	7.69	0.02	0.00	4.64	2.00	0.00	7.68	0.02	0.00
4.66	2.00	0.00	7.67	0.02	0.00	4.68	2.00	0.00	7.66	0.02	0.00
4.70	2.00	0.00	7.65	0.02	0.00	4.72	2.00	0.00	7.64	0.02	0.00
4.74	2.00	0.00	7.63	0.02	0.00	4.76	2.00	0.00	7.62	0.02	0.00
4.78	2.00	0.00	7.61	0.02	0.00	4.80	2.00	0.00	7.60	0.02	0.00
4.82	2.00	0.00	7.59	0.02	0.00	4.84	2.00	0.00	7.58	0.02	0.00
4.86	2.00	0.00	7.57	0.02	0.00	4.88	2.00	0.00	7.56	0.02	0.00
4.90	2.00	0.00	7.55	0.02	0.00	4.92	2.00	0.00	7.54	0.02	0.00
4.94	2.00	0.00	7.53	0.02	0.00	4.96	2.00	0.00	7.52	0.02	0.00
4.98	2.00	0.00	7.51	0.02	0.00	5.00	2.00	0.00	7.50	0.02	0.00
5.02	2.00	0.00	7.49	0.02	0.00	5.04	2.00	0.00	7.48	0.02	0.00
5.06	2.00	0.00	7.47	0.02	0.00	5.08	2.00	0.00	7.46	0.02	0.00
5.10	2.00	0.00	7.45	0.02	0.00	5.12	2.00	0.00	7.44	0.02	0.00
5.14	2.00	0.00	7.43	0.02	0.00	5.16	2.00	0.00	7.42	0.02	0.00
5.18	2.00	0.00	7.41	0.02	0.00	5.20	2.00	0.00	7.40	0.02	0.00
5.22	2.00	0.00	7.39	0.02	0.00	5.24	2.00	0.00	7.38	0.02	0.00
5.26	2.00	0.00	7.37	0.02	0.00	5.28	2.00	0.00	7.36	0.02	0.00
5.30	2.00	0.00	7.35	0.02	0.00	5.32	2.00	0.00	7.34	0.02	0.00
5.34	2.00	0.00	7.33	0.02	0.00	5.36	2.00	0.00	7.32	0.02	0.00
5.38	2.00	0.00	7.31	0.02	0.00	5.40	2.00	0.00	7.30	0.02	0.00
5.42	0.54	0.46	7.29	0.02	0.07	5.44	0.55	0.45	7.28	0.02	0.07
5.46	0.57	0.43	7.27	0.02	0.06	5.48	0.57	0.43	7.26	0.02	0.06
5.50	0.57	0.43	7.25	0.02	0.06	5.52	0.57	0.43	7.24	0.02	0.06
5.54	0.56	0.44	7.23	0.02	0.06	5.56	0.57	0.43	7.22	0.02	0.06
5.58	0.58	0.42	7.21	0.02	0.06	5.60	0.58	0.42	7.20	0.02	0.06
5.62	0.57	0.43	7.19	0.02	0.06	5.63	0.56	0.44	7.18	0.02	0.06
5.65	0.55	0.45	7.17	0.02	0.06	5.67	2.00	0.00	7.16	0.02	0.00
5.69	2.00	0.00	7.15	0.02	0.00	5.71	2.00	0.00	7.14	0.02	0.00
5.73	2.00	0.00	7.13	0.02	0.00	5.75	2.00	0.00	7.12	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
5.77	2.00	0.00	7.11	0.02	0.00	5.79	2.00	0.00	7.10	0.02	0.00
5.81	2.00	0.00	7.09	0.02	0.00	5.83	2.00	0.00	7.08	0.02	0.00
5.85	2.00	0.00	7.07	0.02	0.00	5.87	2.00	0.00	7.06	0.02	0.00
5.89	2.00	0.00	7.05	0.02	0.00	5.91	0.52	0.48	7.04	0.02	0.07
5.93	0.53	0.47	7.03	0.02	0.07	5.95	0.55	0.45	7.02	0.02	0.06
5.97	0.56	0.44	7.01	0.02	0.06	5.99	0.56	0.44	7.00	0.02	0.06
6.01	0.55	0.45	6.99	0.02	0.06	6.03	0.55	0.45	6.98	0.02	0.06
6.05	0.55	0.45	6.97	0.02	0.06	6.07	0.55	0.45	6.96	0.02	0.06
6.09	0.55	0.45	6.95	0.02	0.06	6.11	0.54	0.46	6.94	0.02	0.06
6.13	0.54	0.46	6.93	0.02	0.06	6.15	0.54	0.46	6.92	0.02	0.06
6.17	0.53	0.47	6.91	0.02	0.06	6.19	0.53	0.47	6.90	0.02	0.06
6.21	0.53	0.47	6.89	0.02	0.06	6.23	0.53	0.47	6.88	0.02	0.06
6.25	0.53	0.47	6.87	0.02	0.06	6.27	0.54	0.46	6.86	0.02	0.06
6.29	0.54	0.46	6.85	0.02	0.06	6.31	0.54	0.46	6.84	0.02	0.06
6.33	0.53	0.47	6.83	0.02	0.06	6.35	0.53	0.47	6.82	0.02	0.06
6.37	0.53	0.47	6.81	0.02	0.06	6.39	0.53	0.47	6.80	0.02	0.06
6.41	0.53	0.47	6.79	0.02	0.06	6.43	0.53	0.47	6.78	0.02	0.06
6.45	0.53	0.47	6.77	0.02	0.06	6.47	0.53	0.47	6.76	0.02	0.06
6.49	0.52	0.48	6.75	0.02	0.06	6.51	0.51	0.49	6.74	0.02	0.07
6.53	0.51	0.49	6.73	0.02	0.07	6.55	0.51	0.49	6.72	0.02	0.07
6.57	0.52	0.48	6.71	0.02	0.06	6.59	0.52	0.48	6.70	0.02	0.06
6.61	0.52	0.48	6.69	0.02	0.06	6.63	0.53	0.47	6.68	0.02	0.06
6.65	0.54	0.46	6.67	0.02	0.06	6.67	0.54	0.46	6.66	0.02	0.06
6.69	0.54	0.46	6.65	0.02	0.06	6.71	0.54	0.46	6.64	0.02	0.06
6.73	0.55	0.45	6.63	0.02	0.06	6.75	0.55	0.45	6.62	0.02	0.06
6.77	0.56	0.44	6.61	0.02	0.06	6.79	0.56	0.44	6.60	0.02	0.06
6.81	0.55	0.45	6.59	0.02	0.06	6.83	0.54	0.46	6.58	0.02	0.06
6.85	0.54	0.46	6.57	0.02	0.06	6.87	0.56	0.44	6.56	0.02	0.06
6.89	0.58	0.42	6.55	0.02	0.06	6.91	0.60	0.40	6.54	0.02	0.05
6.93	0.60	0.40	6.53	0.02	0.05	6.95	0.57	0.43	6.52	0.02	0.06
6.97	0.54	0.46	6.51	0.02	0.06	6.99	0.51	0.49	6.50	0.02	0.06
7.01	2.00	0.00	6.49	0.02	0.00	7.03	2.00	0.00	6.48	0.02	0.00
7.05	2.00	0.00	6.47	0.02	0.00	7.07	2.00	0.00	6.46	0.02	0.00
7.09	2.00	0.00	6.45	0.02	0.00	7.11	2.00	0.00	6.44	0.02	0.00
7.13	2.00	0.00	6.43	0.02	0.00	7.15	2.00	0.00	6.42	0.02	0.00
7.17	2.00	0.00	6.41	0.02	0.00	7.19	2.00	0.00	6.40	0.02	0.00
7.21	2.00	0.00	6.39	0.02	0.00	7.23	2.00	0.00	6.38	0.02	0.00
7.25	2.00	0.00	6.37	0.02	0.00	7.27	2.00	0.00	6.36	0.02	0.00
7.29	2.00	0.00	6.35	0.02	0.00	7.31	2.00	0.00	6.34	0.02	0.00
7.33	2.00	0.00	6.33	0.02	0.00	7.35	2.00	0.00	6.32	0.02	0.00
7.37	2.00	0.00	6.31	0.02	0.00	7.39	2.00	0.00	6.30	0.02	0.00
7.41	2.00	0.00	6.29	0.02	0.00	7.43	2.00	0.00	6.28	0.02	0.00
7.45	2.00	0.00	6.27	0.02	0.00	7.47	2.00	0.00	6.26	0.02	0.00
7.49	2.00	0.00	6.25	0.02	0.00	7.51	2.00	0.00	6.24	0.02	0.00
7.53	2.00	0.00	6.23	0.02	0.00	7.55	2.00	0.00	6.22	0.02	0.00
7.57	2.00	0.00	6.21	0.02	0.00	7.59	2.00	0.00	6.20	0.02	0.00
7.61	2.00	0.00	6.19	0.02	0.00	7.63	2.00	0.00	6.18	0.02	0.00
7.65	2.00	0.00	6.17	0.02	0.00	7.67	2.00	0.00	6.16	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
7.69	2.00	0.00	6.15	0.02	0.00	7.71	2.00	0.00	6.15	0.02	0.00
7.73	2.00	0.00	6.14	0.02	0.00	7.75	2.00	0.00	6.13	0.02	0.00
7.77	2.00	0.00	6.12	0.02	0.00	7.79	2.00	0.00	6.11	0.02	0.00
7.81	2.00	0.00	6.10	0.02	0.00	7.83	2.00	0.00	6.09	0.02	0.00
7.85	2.00	0.00	6.08	0.02	0.00	7.87	2.00	0.00	6.07	0.02	0.00
7.89	2.00	0.00	6.06	0.02	0.00	7.91	2.00	0.00	6.05	0.02	0.00
7.93	2.00	0.00	6.04	0.02	0.00	7.95	2.00	0.00	6.03	0.02	0.00
7.97	2.00	0.00	6.02	0.02	0.00	7.99	2.00	0.00	6.01	0.02	0.00
8.01	2.00	0.00	6.00	0.02	0.00	8.03	2.00	0.00	5.99	0.02	0.00
8.05	2.00	0.00	5.98	0.02	0.00	8.07	2.00	0.00	5.97	0.02	0.00
8.09	2.00	0.00	5.96	0.02	0.00	8.11	2.00	0.00	5.95	0.02	0.00
8.13	2.00	0.00	5.94	0.02	0.00	8.15	2.00	0.00	5.93	0.02	0.00
8.17	2.00	0.00	5.92	0.02	0.00	8.19	2.00	0.00	5.91	0.02	0.00
8.21	2.00	0.00	5.90	0.02	0.00	8.23	2.00	0.00	5.89	0.02	0.00
8.25	2.00	0.00	5.88	0.02	0.00	8.27	2.00	0.00	5.87	0.02	0.00
8.29	2.00	0.00	5.86	0.02	0.00	8.31	2.00	0.00	5.85	0.02	0.00
8.33	2.00	0.00	5.84	0.02	0.00	8.35	2.00	0.00	5.83	0.02	0.00
8.37	2.00	0.00	5.82	0.02	0.00	8.39	2.00	0.00	5.81	0.02	0.00
8.41	2.00	0.00	5.80	0.02	0.00	8.43	2.00	0.00	5.79	0.02	0.00
8.45	2.00	0.00	5.78	0.02	0.00	8.47	2.00	0.00	5.77	0.02	0.00
8.49	2.00	0.00	5.76	0.02	0.00	8.51	2.00	0.00	5.75	0.02	0.00
8.53	2.00	0.00	5.74	0.02	0.00	8.55	2.00	0.00	5.73	0.02	0.00
8.57	2.00	0.00	5.72	0.02	0.00	8.59	2.00	0.00	5.71	0.02	0.00
8.61	2.00	0.00	5.70	0.02	0.00	8.63	2.00	0.00	5.69	0.02	0.00
8.65	2.00	0.00	5.68	0.02	0.00	8.67	2.00	0.00	5.67	0.02	0.00
8.69	2.00	0.00	5.66	0.02	0.00	8.71	2.00	0.00	5.65	0.02	0.00
8.73	2.00	0.00	5.64	0.02	0.00	8.75	2.00	0.00	5.63	0.02	0.00
8.77	2.00	0.00	5.62	0.02	0.00	8.79	2.00	0.00	5.61	0.02	0.00
8.81	2.00	0.00	5.60	0.02	0.00	8.83	2.00	0.00	5.59	0.02	0.00
8.85	2.00	0.00	5.58	0.02	0.00	8.87	2.00	0.00	5.57	0.02	0.00
8.89	2.00	0.00	5.56	0.02	0.00	8.91	2.00	0.00	5.55	0.02	0.00
8.93	2.00	0.00	5.54	0.02	0.00	8.95	2.00	0.00	5.53	0.02	0.00
8.97	2.00	0.00	5.52	0.02	0.00	8.99	2.00	0.00	5.51	0.02	0.00
9.01	2.00	0.00	5.50	0.02	0.00	9.03	2.00	0.00	5.49	0.02	0.00
9.05	2.00	0.00	5.48	0.02	0.00	9.07	2.00	0.00	5.47	0.02	0.00
9.09	2.00	0.00	5.46	0.02	0.00	9.11	2.00	0.00	5.45	0.02	0.00
9.13	2.00	0.00	5.44	0.02	0.00	9.15	2.00	0.00	5.43	0.02	0.00
9.17	2.00	0.00	5.42	0.02	0.00	9.18	2.00	0.00	5.41	0.02	0.00
9.20	2.00	0.00	5.40	0.02	0.00	9.22	2.00	0.00	5.39	0.02	0.00
9.24	2.00	0.00	5.38	0.02	0.00	9.26	2.00	0.00	5.37	0.02	0.00
9.28	2.00	0.00	5.36	0.02	0.00	9.30	2.00	0.00	5.35	0.02	0.00
9.32	2.00	0.00	5.34	0.02	0.00	9.34	2.00	0.00	5.33	0.02	0.00
9.36	2.00	0.00	5.32	0.02	0.00	9.38	2.00	0.00	5.31	0.02	0.00
9.40	2.00	0.00	5.30	0.02	0.00	9.42	2.00	0.00	5.29	0.02	0.00
9.44	2.00	0.00	5.28	0.02	0.00	9.46	2.00	0.00	5.27	0.02	0.00
9.48	2.00	0.00	5.26	0.02	0.00	9.50	2.00	0.00	5.25	0.02	0.00
9.52	2.00	0.00	5.24	0.02	0.00	9.54	2.00	0.00	5.23	0.02	0.00
9.56	2.00	0.00	5.22	0.02	0.00	9.58	2.00	0.00	5.21	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
9.60	2.00	0.00	5.20	0.02	0.00	9.62	2.00	0.00	5.19	0.02	0.00
9.64	2.00	0.00	5.18	0.02	0.00	9.66	2.00	0.00	5.17	0.02	0.00
9.68	2.00	0.00	5.16	0.02	0.00	9.70	2.00	0.00	5.15	0.02	0.00
9.72	2.00	0.00	5.14	0.02	0.00	9.74	2.00	0.00	5.13	0.02	0.00
9.76	2.00	0.00	5.12	0.02	0.00	9.78	2.00	0.00	5.11	0.02	0.00
9.80	2.00	0.00	5.10	0.02	0.00	9.82	2.00	0.00	5.09	0.02	0.00
9.84	2.00	0.00	5.08	0.02	0.00	9.86	2.00	0.00	5.07	0.02	0.00
9.88	2.00	0.00	5.06	0.02	0.00	9.90	2.00	0.00	5.05	0.02	0.00
9.92	2.00	0.00	5.04	0.02	0.00	9.94	2.00	0.00	5.03	0.02	0.00
9.96	2.00	0.00	5.02	0.02	0.00	9.98	2.00	0.00	5.01	0.02	0.00
10.00	2.00	0.00	5.00	0.02	0.00	10.02	2.00	0.00	4.99	0.02	0.00
10.04	2.00	0.00	4.98	0.02	0.00	10.06	2.00	0.00	4.97	0.02	0.00
10.08	2.00	0.00	4.96	0.02	0.00	10.10	2.00	0.00	4.95	0.02	0.00
10.12	2.00	0.00	4.94	0.02	0.00	10.14	2.00	0.00	4.93	0.02	0.00
10.16	2.00	0.00	4.92	0.02	0.00	10.18	2.00	0.00	4.91	0.02	0.00
10.20	2.00	0.00	4.90	0.02	0.00	10.22	2.00	0.00	4.89	0.02	0.00
10.24	2.00	0.00	4.88	0.02	0.00	10.26	2.00	0.00	4.87	0.02	0.00
10.28	2.00	0.00	4.86	0.02	0.00	10.30	2.00	0.00	4.85	0.02	0.00
10.32	2.00	0.00	4.84	0.02	0.00	10.34	2.00	0.00	4.83	0.02	0.00
10.36	2.00	0.00	4.82	0.02	0.00	10.38	2.00	0.00	4.81	0.02	0.00
10.40	2.00	0.00	4.80	0.02	0.00	10.42	2.00	0.00	4.79	0.02	0.00
10.44	2.00	0.00	4.78	0.02	0.00	10.46	2.00	0.00	4.77	0.02	0.00
10.48	2.00	0.00	4.76	0.02	0.00	10.50	2.00	0.00	4.75	0.02	0.00
10.52	2.00	0.00	4.74	0.02	0.00	10.54	2.00	0.00	4.73	0.02	0.00
10.56	2.00	0.00	4.72	0.02	0.00	10.58	2.00	0.00	4.71	0.02	0.00
10.60	2.00	0.00	4.70	0.02	0.00	10.62	2.00	0.00	4.69	0.02	0.00
10.64	2.00	0.00	4.68	0.02	0.00	10.66	2.00	0.00	4.67	0.02	0.00
10.68	2.00	0.00	4.66	0.02	0.00	10.70	2.00	0.00	4.65	0.02	0.00
10.72	2.00	0.00	4.64	0.02	0.00	10.74	2.00	0.00	4.63	0.02	0.00
10.76	2.00	0.00	4.62	0.02	0.00	10.78	2.00	0.00	4.61	0.02	0.00
10.80	2.00	0.00	4.60	0.02	0.00	10.82	2.00	0.00	4.59	0.02	0.00
10.84	2.00	0.00	4.58	0.02	0.00	10.86	2.00	0.00	4.57	0.02	0.00
10.88	2.00	0.00	4.56	0.02	0.00	10.90	2.00	0.00	4.55	0.02	0.00
10.92	2.00	0.00	4.54	0.02	0.00	10.94	2.00	0.00	4.53	0.02	0.00
10.96	2.00	0.00	4.52	0.02	0.00	10.97	2.00	0.00	4.51	0.02	0.00
10.99	2.00	0.00	4.50	0.02	0.00	11.01	2.00	0.00	4.49	0.02	0.00
11.03	2.00	0.00	4.48	0.02	0.00	11.05	2.00	0.00	4.47	0.02	0.00
11.07	2.00	0.00	4.46	0.02	0.00	11.09	2.00	0.00	4.45	0.02	0.00
11.11	2.00	0.00	4.44	0.02	0.00	11.13	2.00	0.00	4.43	0.02	0.00
11.15	2.00	0.00	4.42	0.02	0.00	11.17	2.00	0.00	4.41	0.02	0.00
11.19	2.00	0.00	4.40	0.02	0.00	11.21	2.00	0.00	4.39	0.02	0.00
11.23	2.00	0.00	4.38	0.02	0.00	11.25	2.00	0.00	4.37	0.02	0.00
11.27	2.00	0.00	4.36	0.02	0.00	11.29	2.00	0.00	4.35	0.02	0.00
11.31	2.00	0.00	4.34	0.02	0.00	11.33	2.00	0.00	4.33	0.02	0.00
11.35	2.00	0.00	4.32	0.02	0.00	11.37	2.00	0.00	4.31	0.02	0.00
11.39	2.00	0.00	4.30	0.02	0.00	11.41	2.00	0.00	4.29	0.02	0.00
11.43	2.00	0.00	4.28	0.02	0.00	11.45	2.00	0.00	4.27	0.02	0.00
11.47	2.00	0.00	4.26	0.02	0.00	11.49	2.00	0.00	4.25	0.02	0.00

:: Liquefaction Potential Index calculation data :: (continued)

Depth (m)	FS	F_L	w_z	d_z	LPI	Depth (m)	FS	F_L	w_z	d_z	LPI
11.51	2.00	0.00	4.24	0.02	0.00	11.53	2.00	0.00	4.23	0.02	0.00
11.55	2.00	0.00	4.22	0.02	0.00	11.57	2.00	0.00	4.21	0.02	0.00
11.59	2.00	0.00	4.20	0.02	0.00	11.61	2.00	0.00	4.19	0.02	0.00
11.63	2.00	0.00	4.18	0.02	0.00	11.65	2.00	0.00	4.18	0.02	0.00
11.67	2.00	0.00	4.17	0.02	0.00	11.69	2.00	0.00	4.16	0.02	0.00
11.71	2.00	0.00	4.15	0.02	0.00	11.73	2.00	0.00	4.14	0.02	0.00
11.75	2.00	0.00	4.13	0.02	0.00	11.77	2.00	0.00	4.12	0.02	0.00
11.79	2.00	0.00	4.11	0.02	0.00	11.81	2.00	0.00	4.10	0.02	0.00
11.83	2.00	0.00	4.09	0.02	0.00	11.85	2.00	0.00	4.08	0.02	0.00
11.87	2.00	0.00	4.07	0.02	0.00	11.89	2.00	0.00	4.06	0.02	0.00
11.91	2.00	0.00	4.05	0.02	0.00	11.93	2.00	0.00	4.04	0.02	0.00
11.95	2.00	0.00	4.03	0.02	0.00	11.97	2.00	0.00	4.02	0.02	0.00
11.99	2.00	0.00	4.01	0.02	0.00						

Overall liquefaction potential: 4.24

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

FS: Calculated factor of safety for test point
F_L: 1 - FS
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (m)
LPI: Liquefaction potential index value for test point

Indagini geognostiche - Prove penetrometriche statiche

CPTU01


PAGANI

CPTU02

CPTU03

CPTU04

CPTU05

CPTU06

Indagini geofisiche