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ENGINEERING GEOLOGY
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Luglio 2024

Monticelli d'Ongina
Provincia di Piacenza

ALLEGATO 4
VERIFICHE A LIQUEFAZIONE

Impianto di produzione di energia elettrica da fonte fotovoltaica

Committente

Geologi
Dr. Carlo Caleffi
Dr. Francesco Cerutti

Collaboratori
Dr. Matteo Bertolotti

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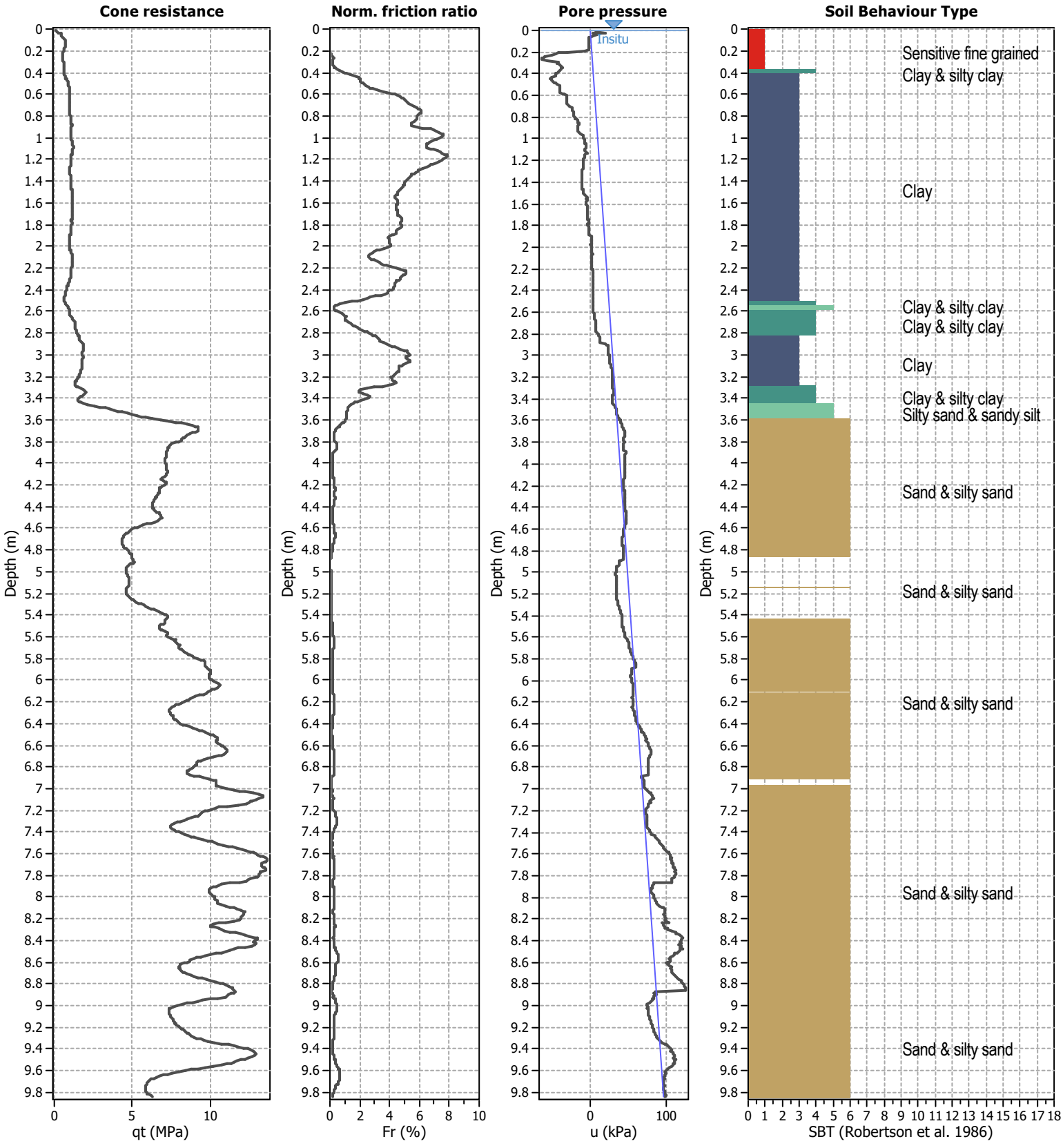
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.10
Total depth: 9.84 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.00 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
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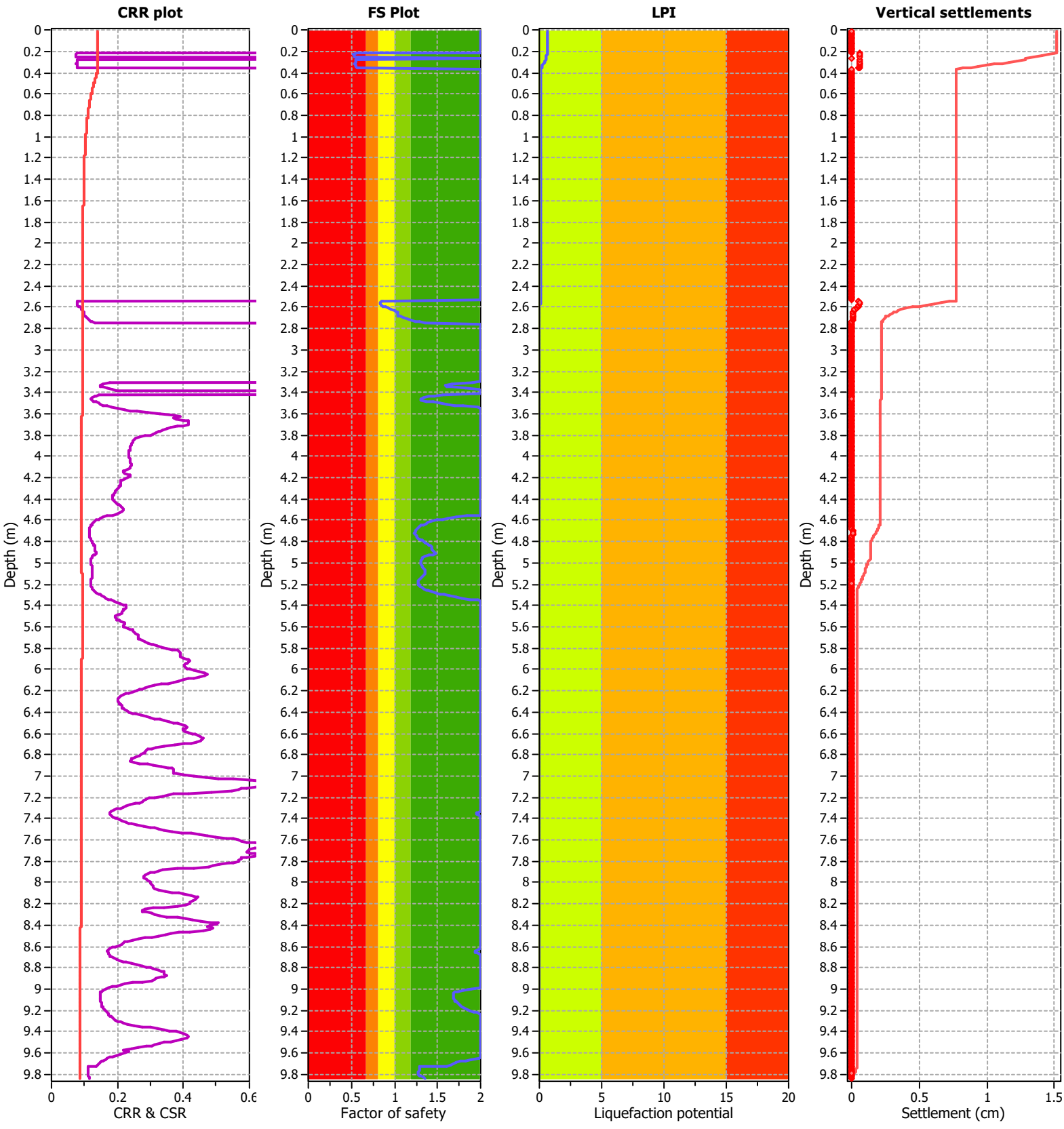
CPT: 1.10
Total depth: 9.84 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.00 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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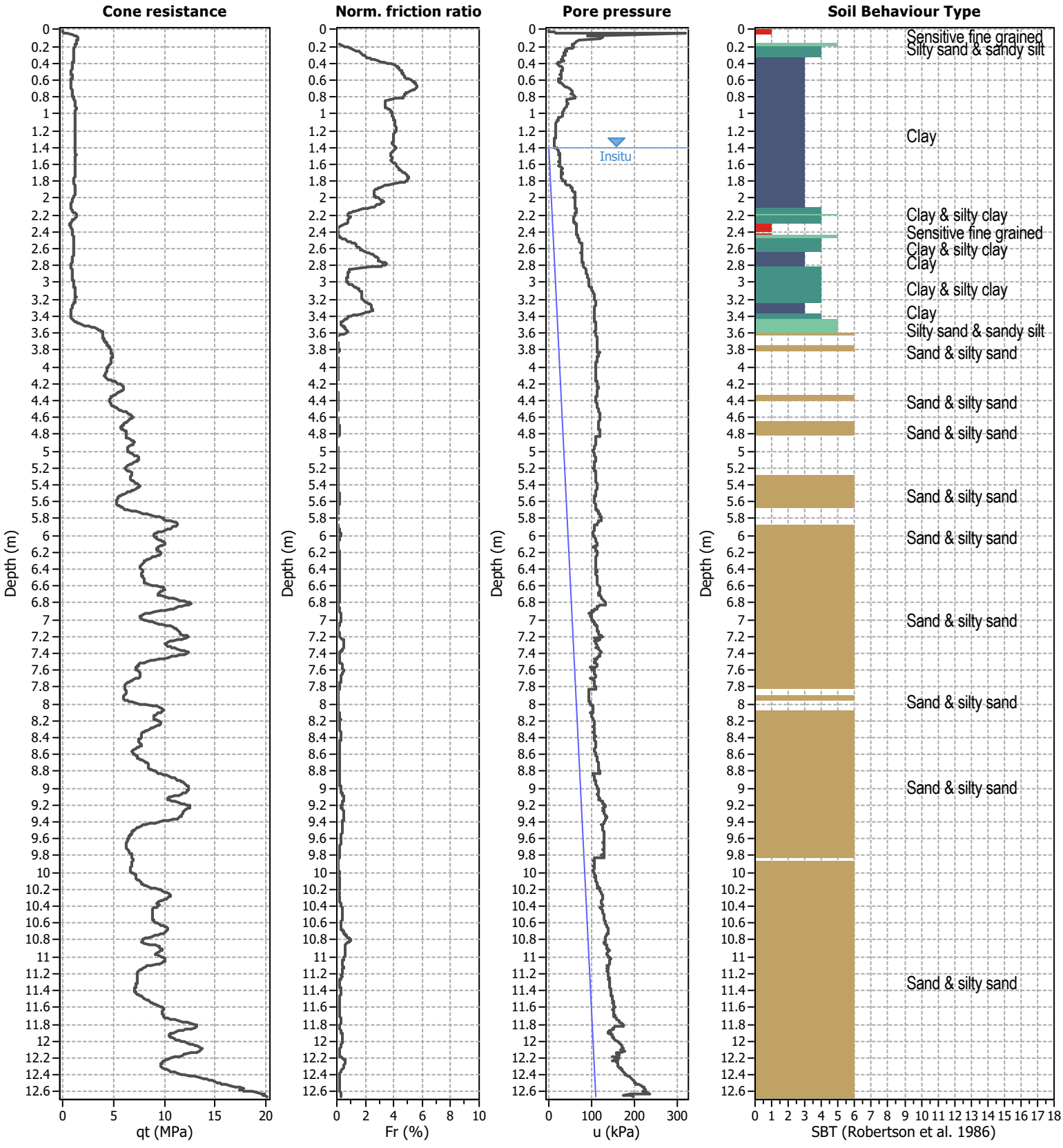
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.20
Total depth: 12.66 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.40 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.40 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.14	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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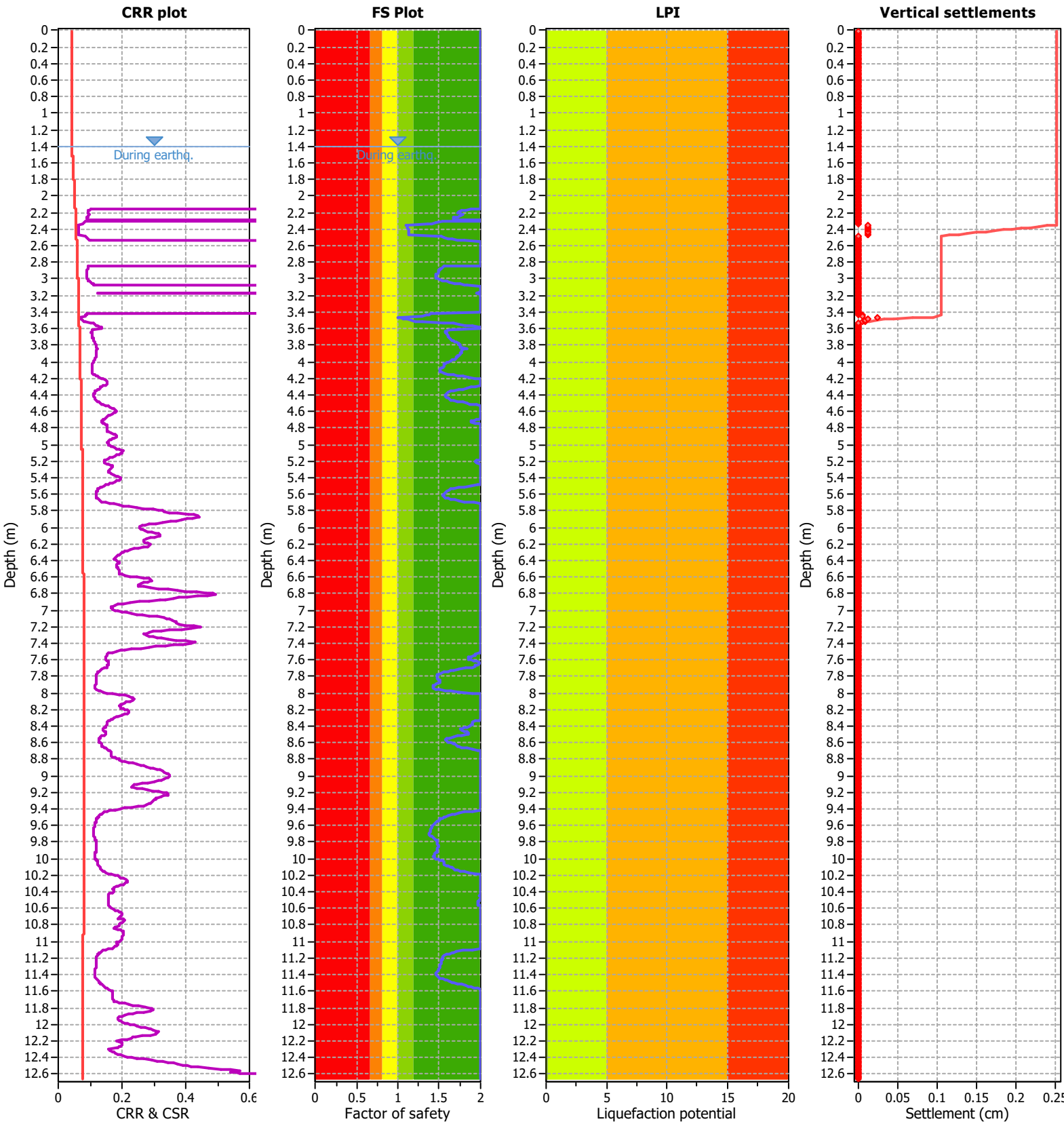
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.20
Total depth: 12.66 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.40 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.40 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.14	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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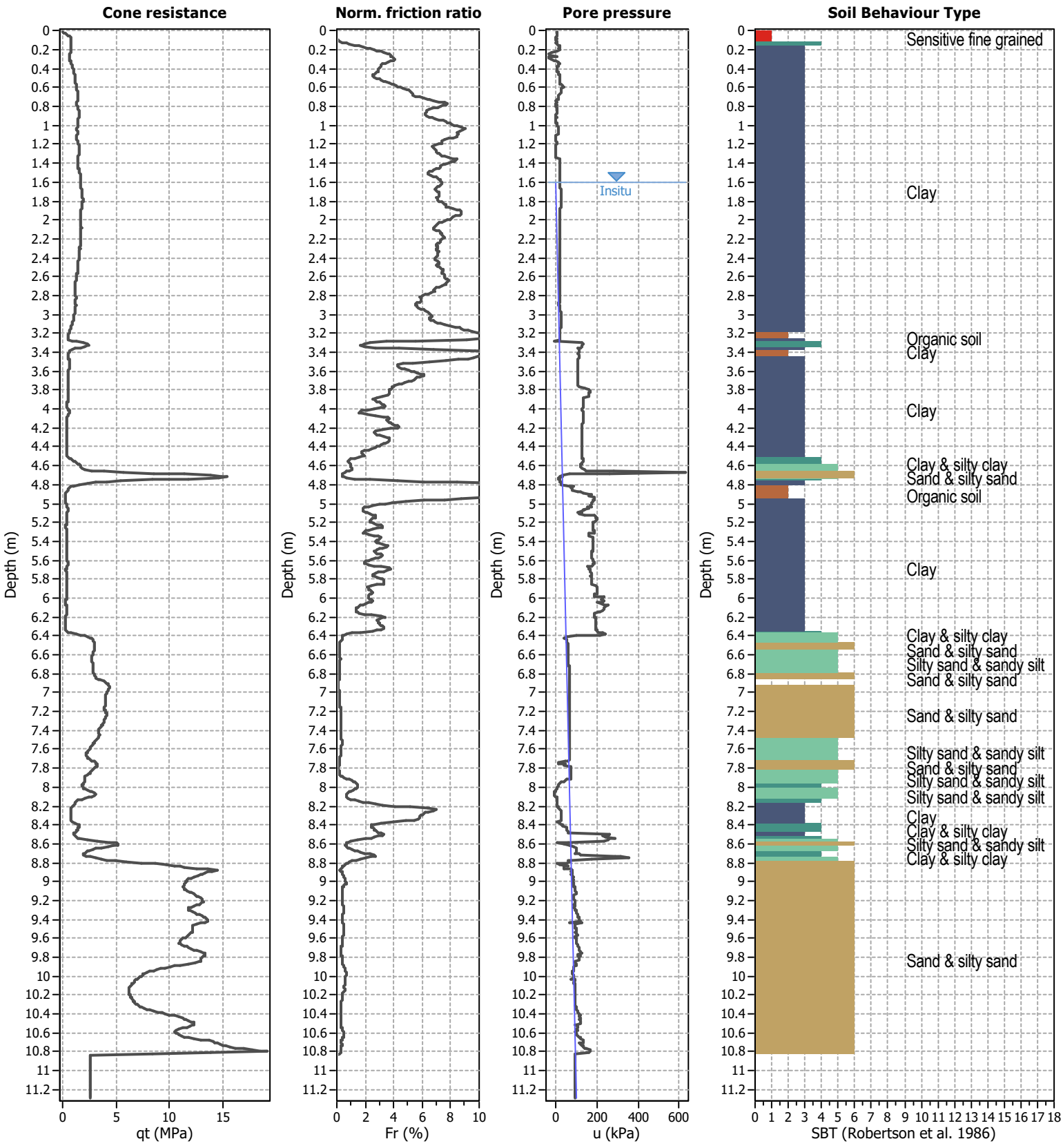
Project: Impianto di prodzione di energia elettrica da fonte fotovoltaica
Location: Monticelli d'Ongina

CPT: 1.30
Total depth: 11.29 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.60 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.60 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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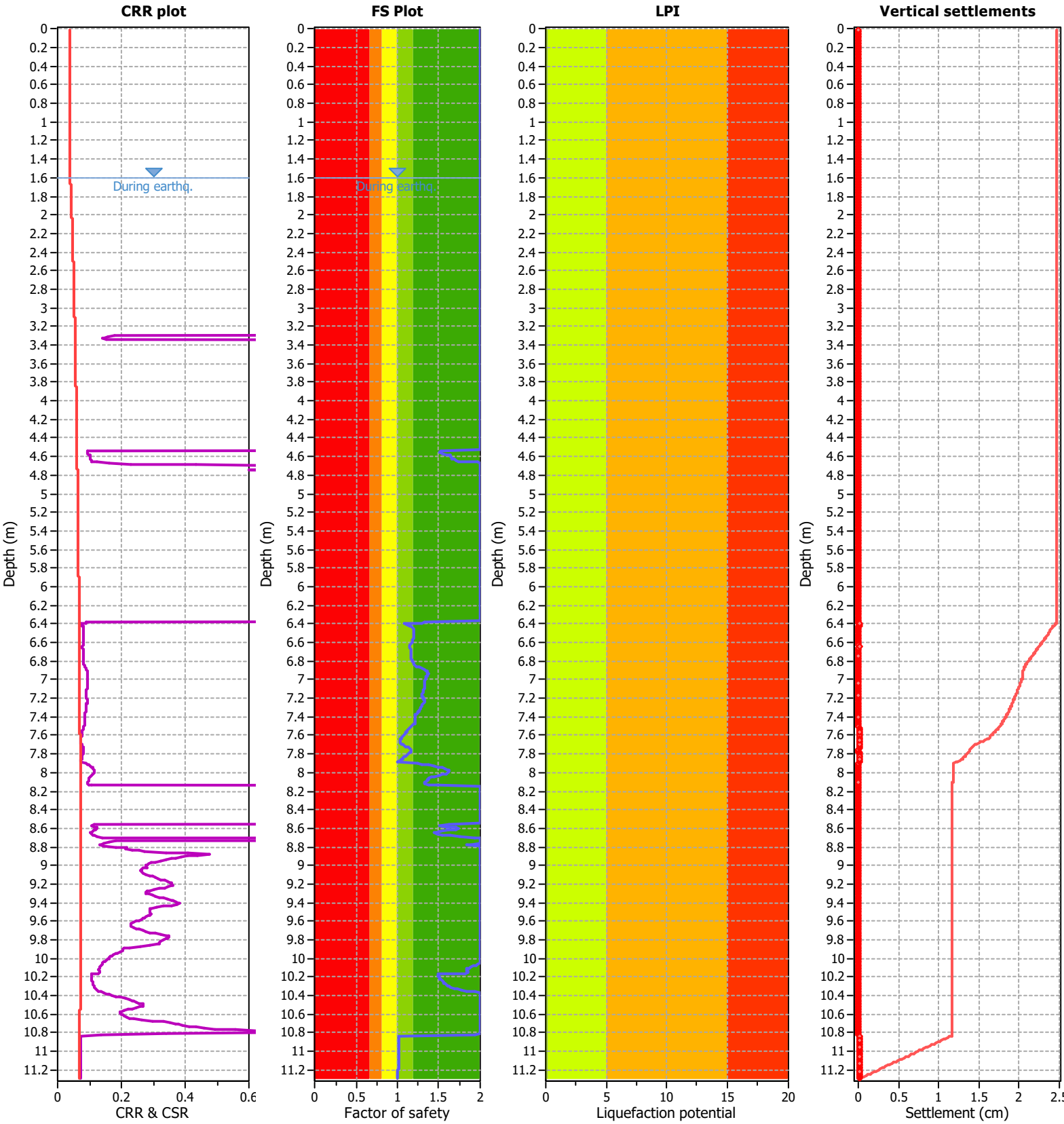
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.30
Total depth: 11.29 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.60 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.60 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
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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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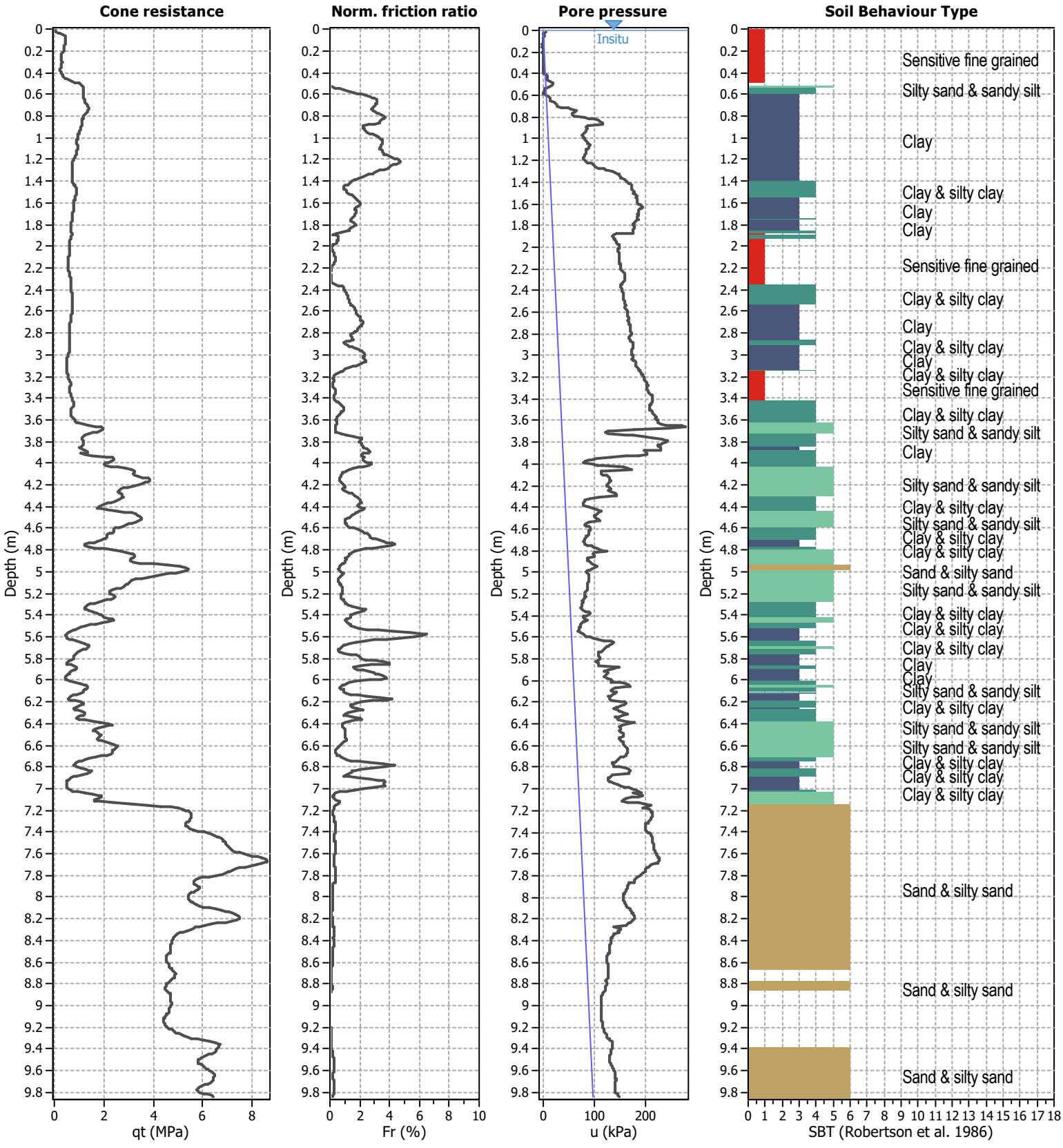
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.40
Total depth: 9.84 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.00 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
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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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CPT: 1.40
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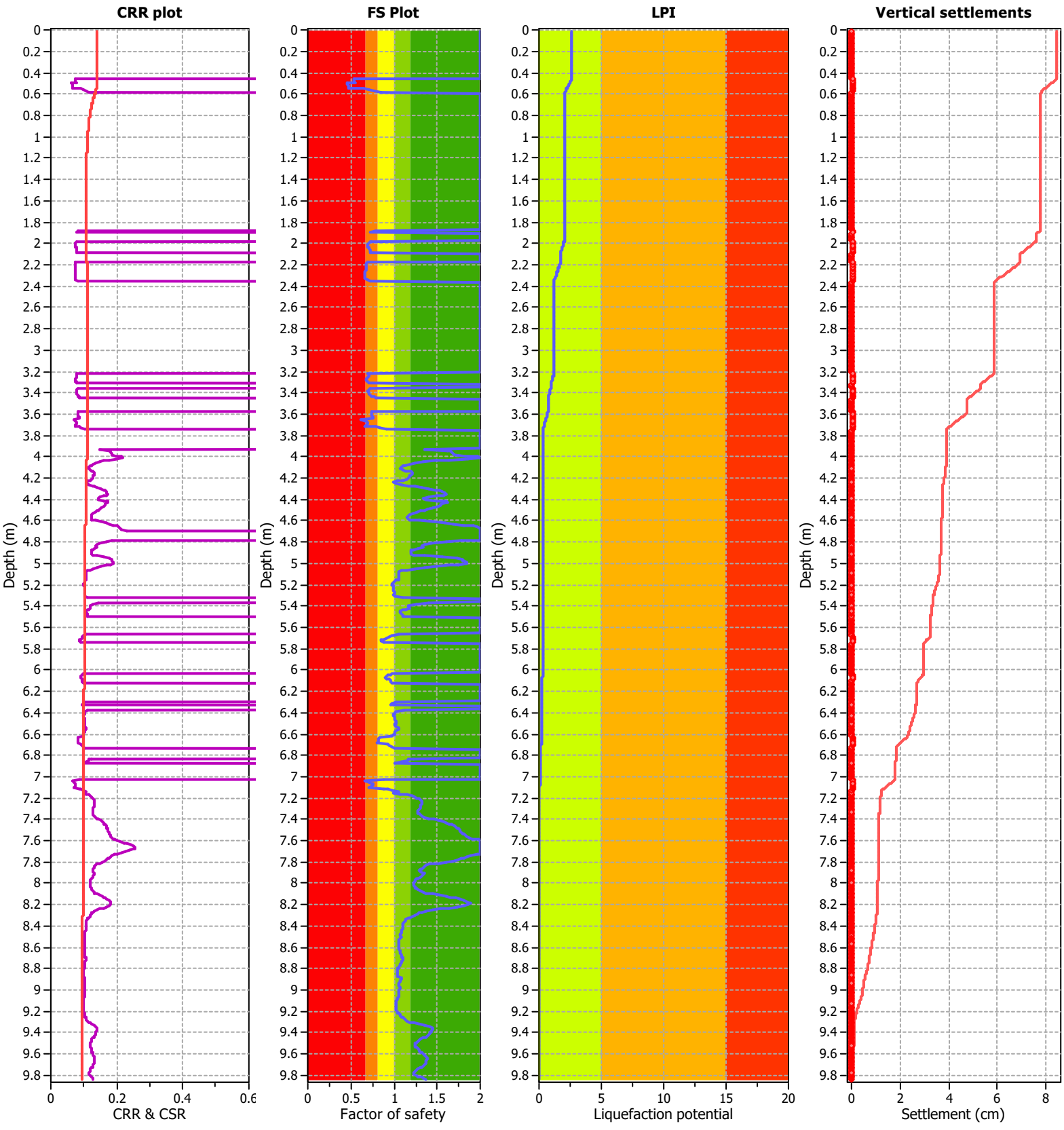

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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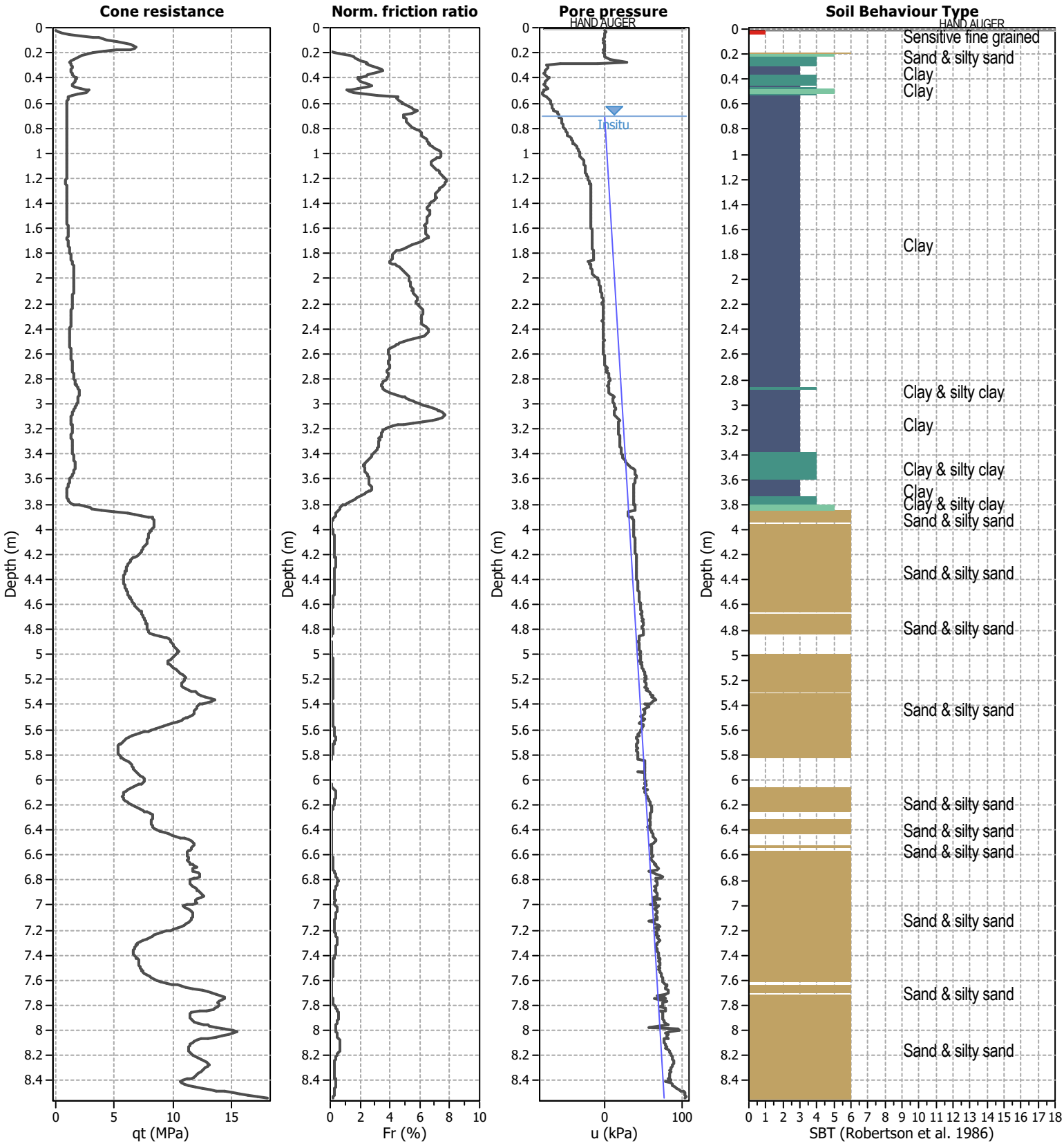
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.50
Total depth: 8.54 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.70 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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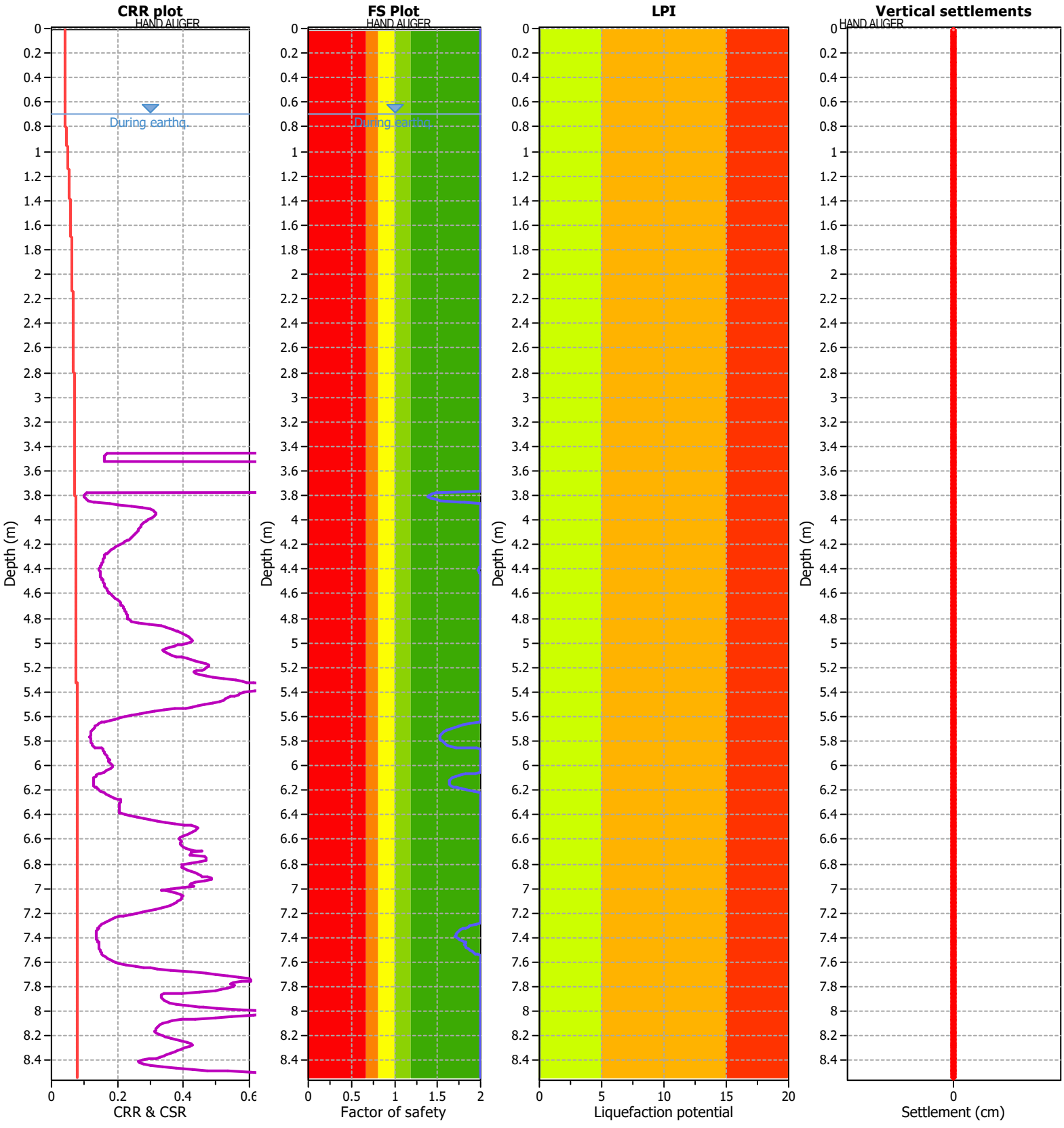
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.50
Total depth: 8.54 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.70 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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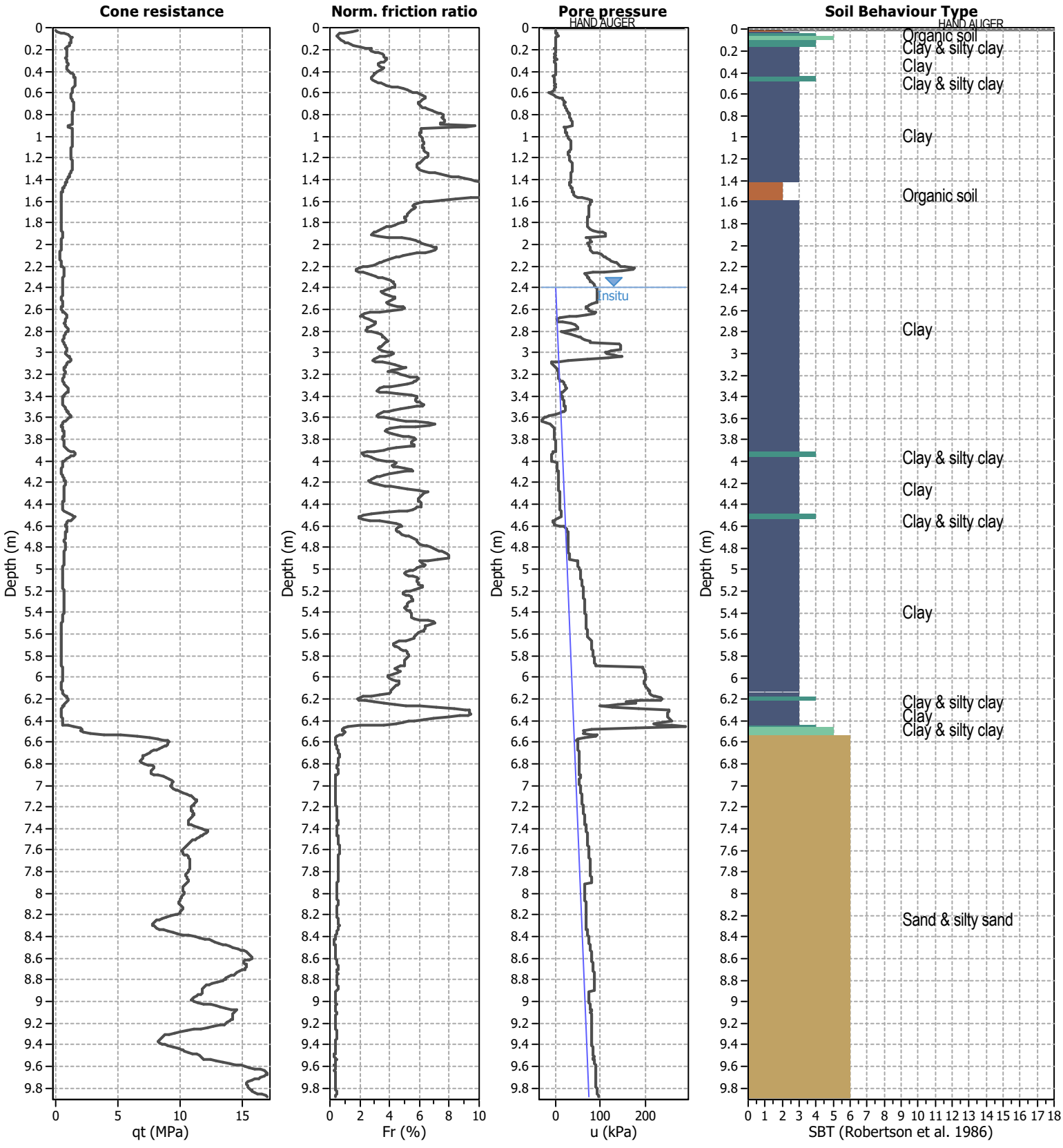
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.60
Total depth: 9.88 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.40 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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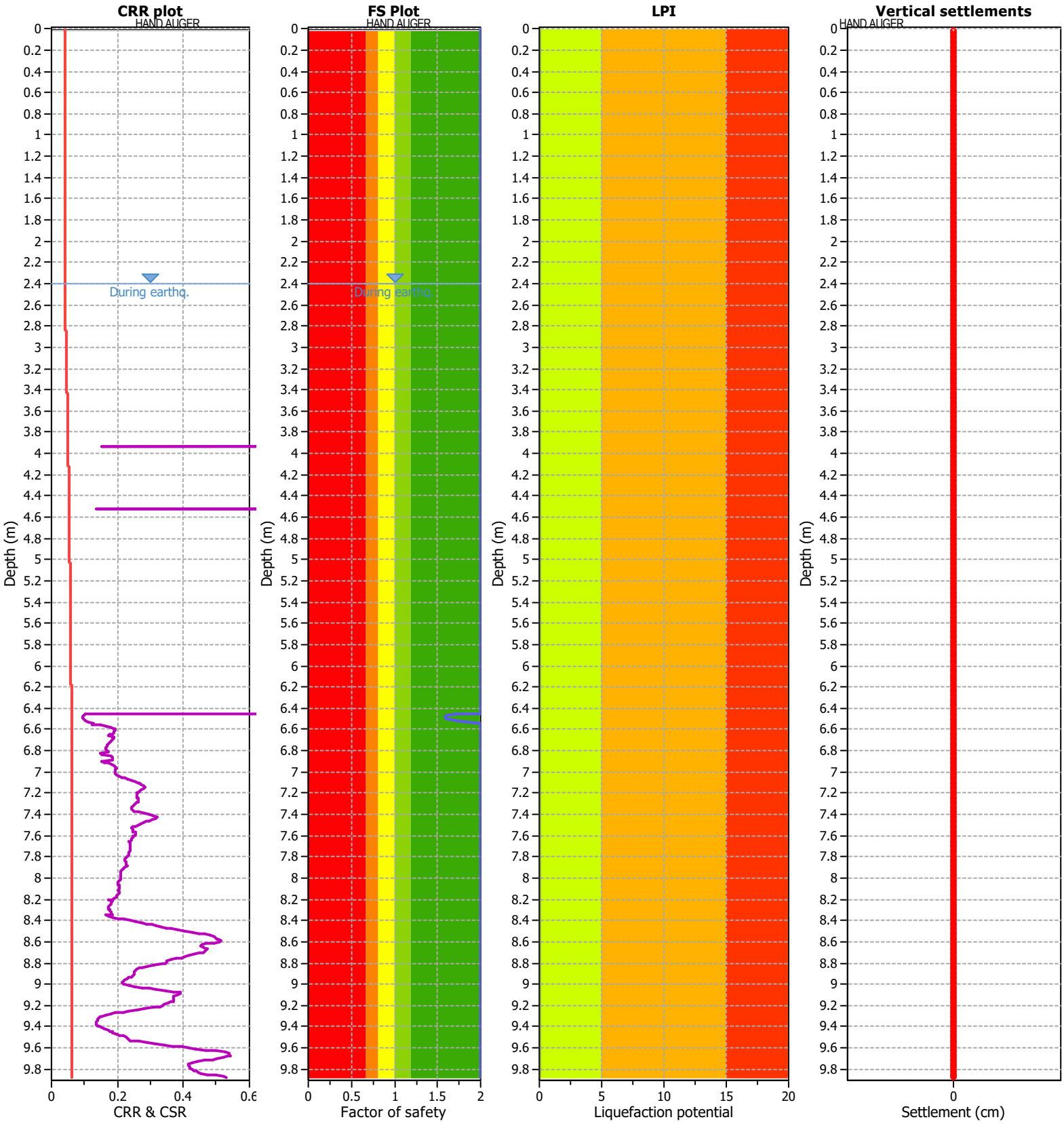
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.60
Total depth: 9.88 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.40 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.40 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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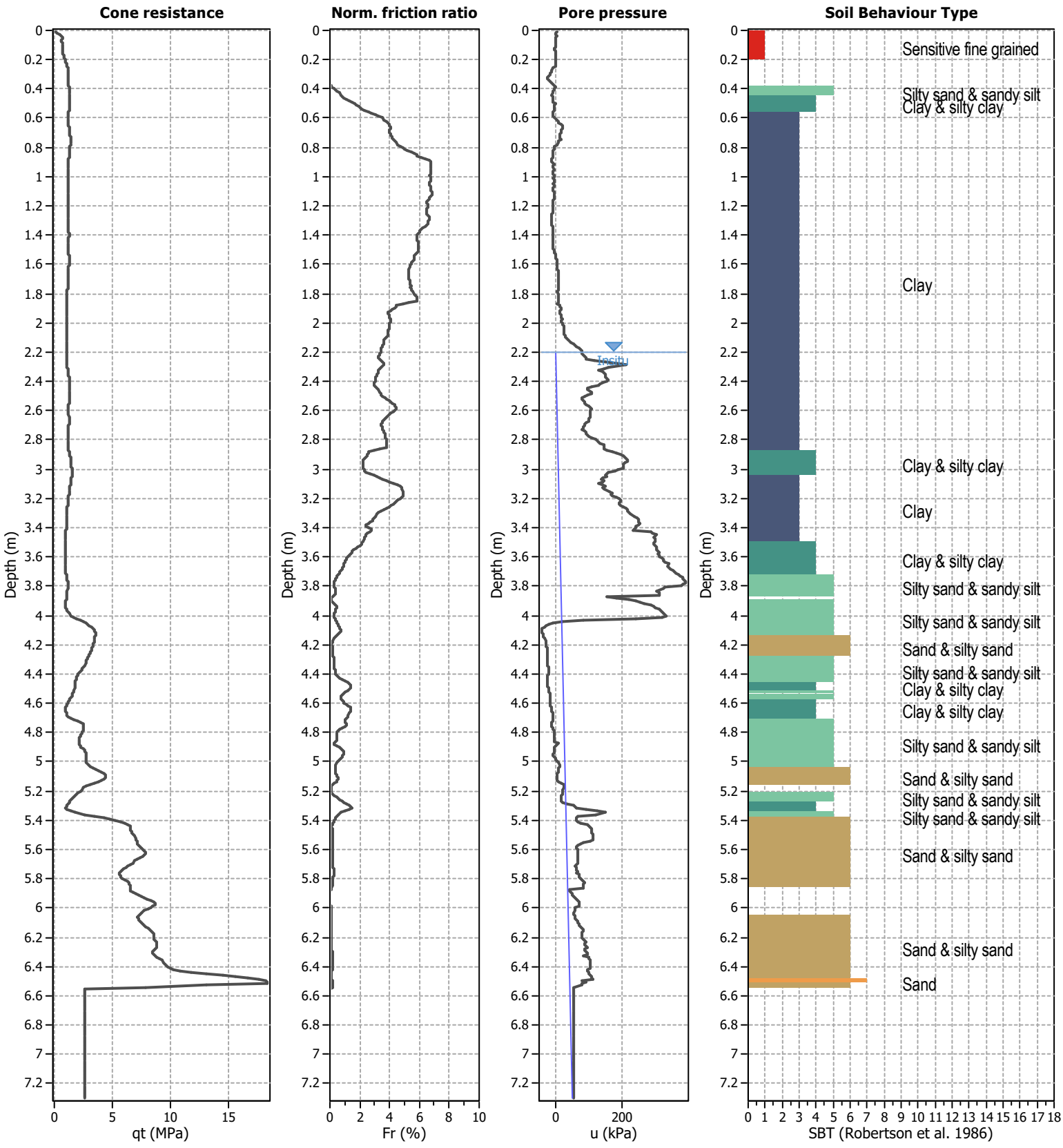
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.70
Total depth: 7.30 m



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Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.20 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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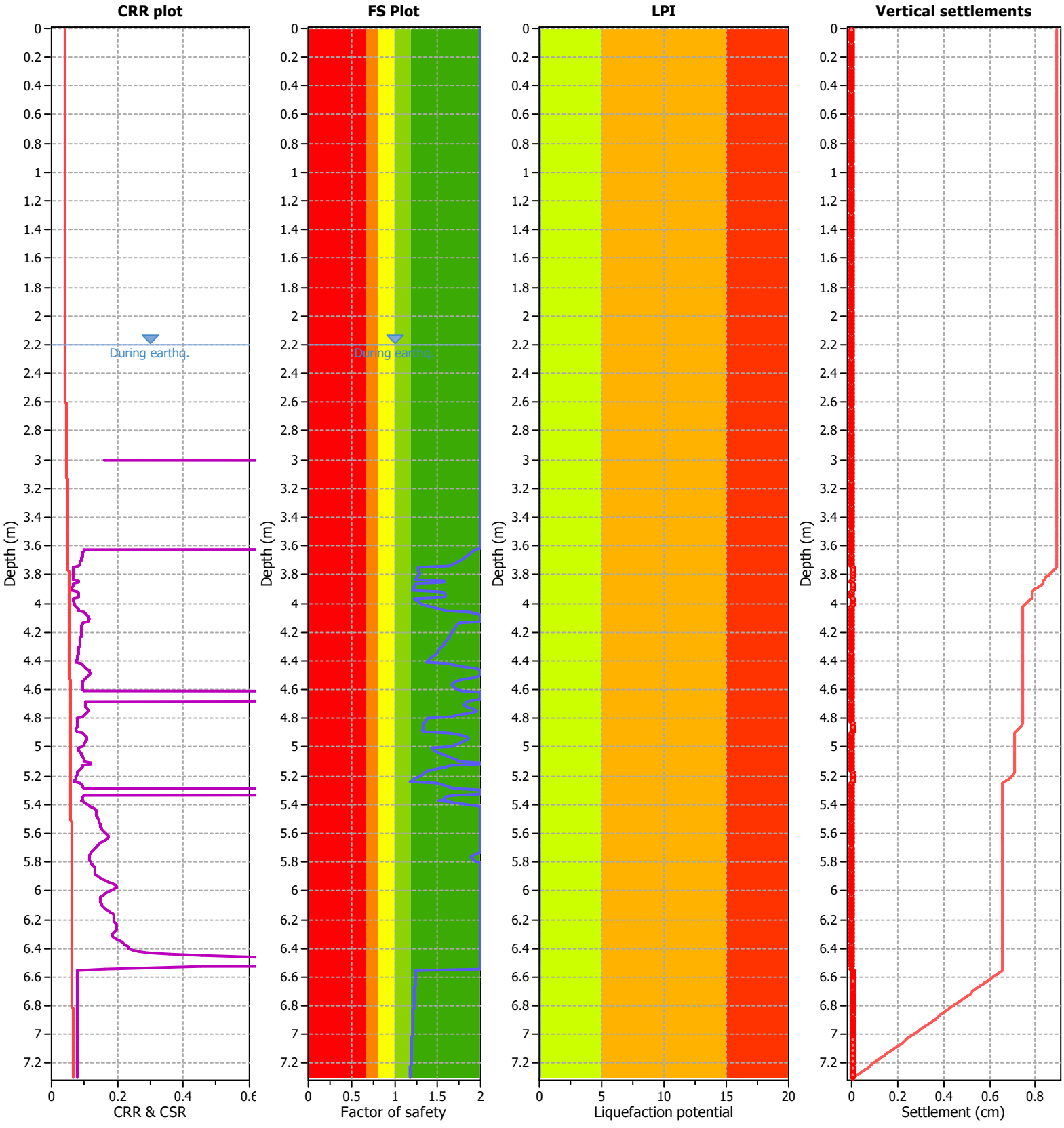
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.70
Total depth: 7.30 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.20 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.20 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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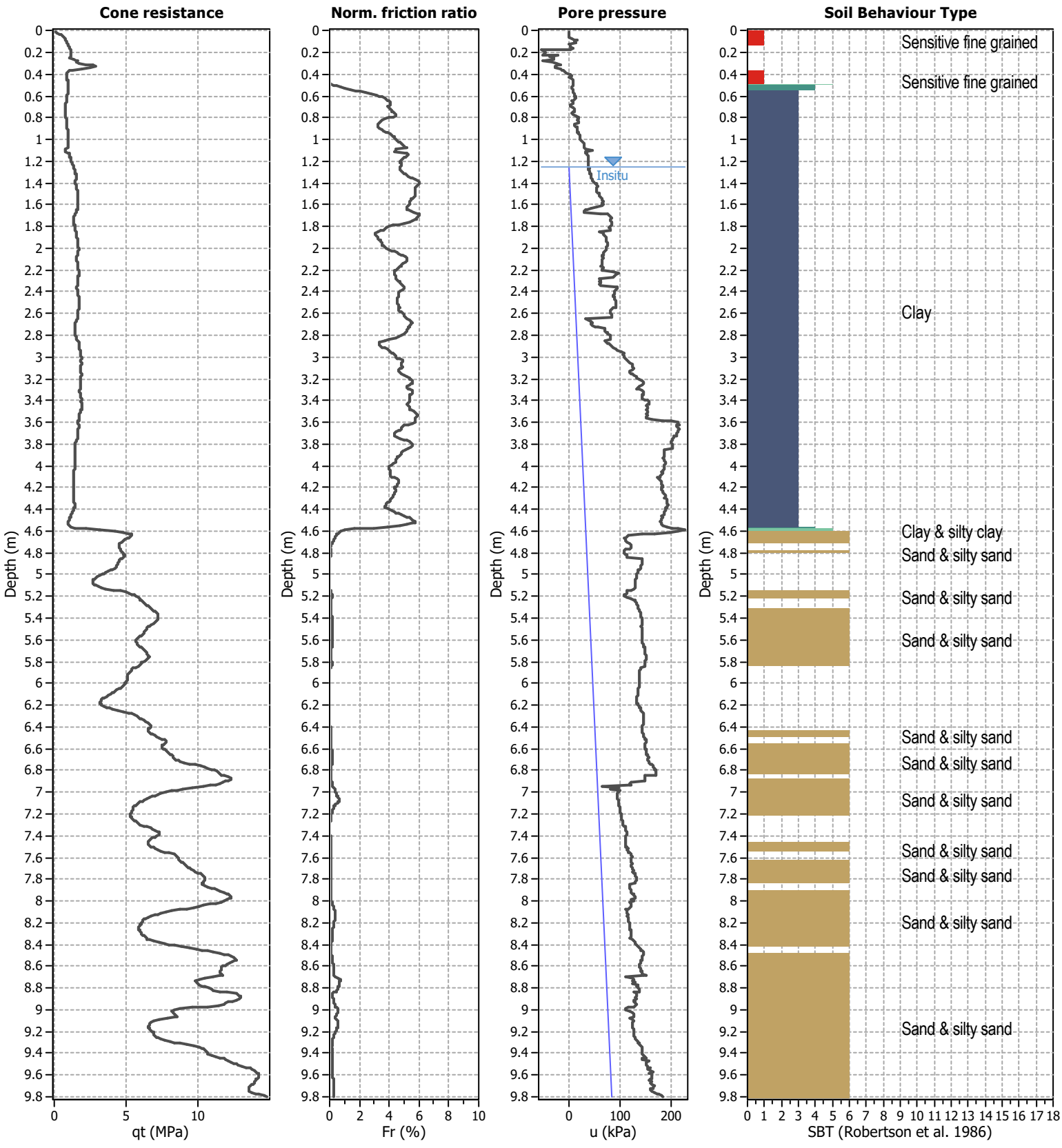
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.80
Total depth: 9.80 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.25 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.25 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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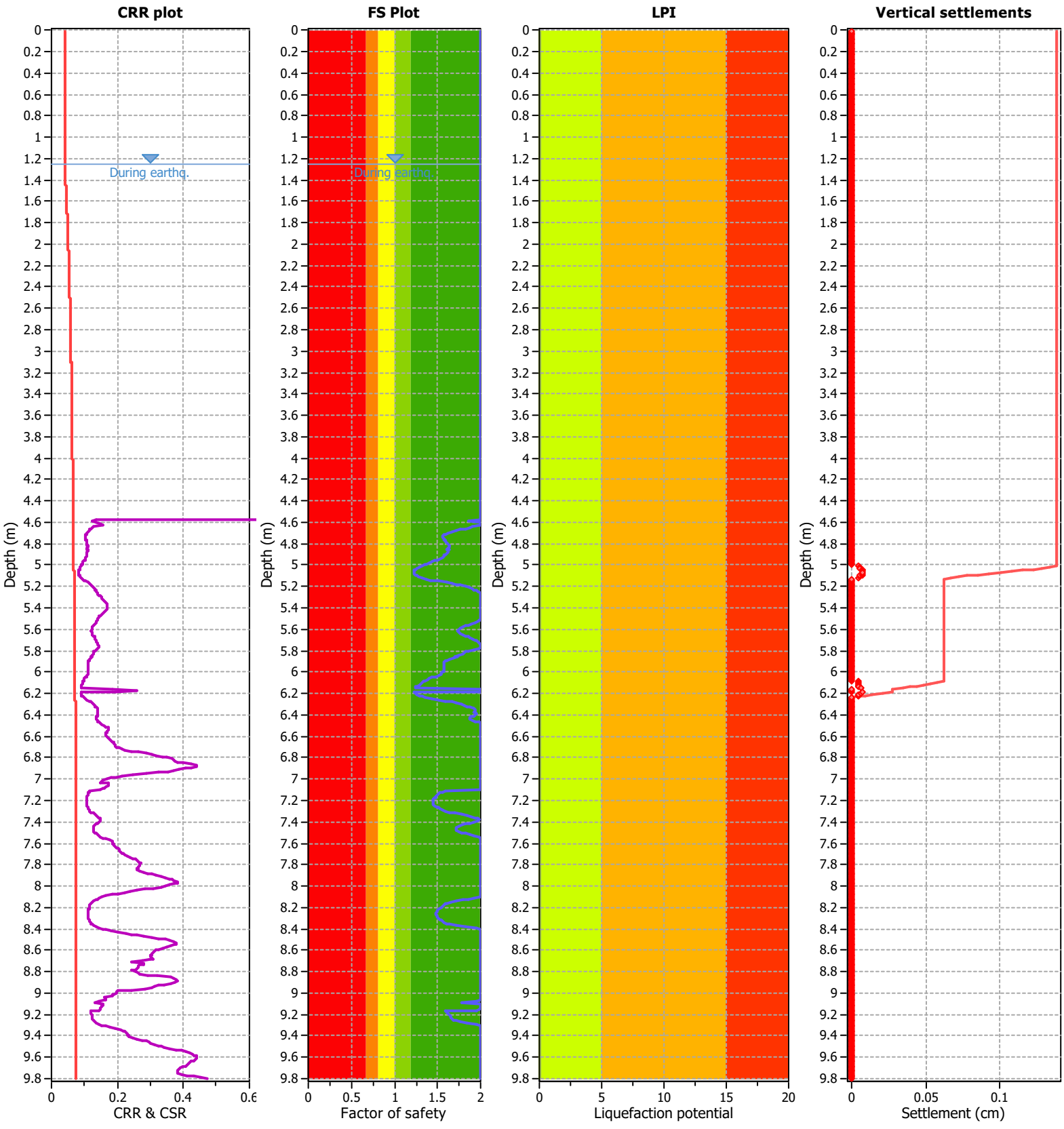
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 1.80
Total depth: 9.80 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	1.25 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	1.25 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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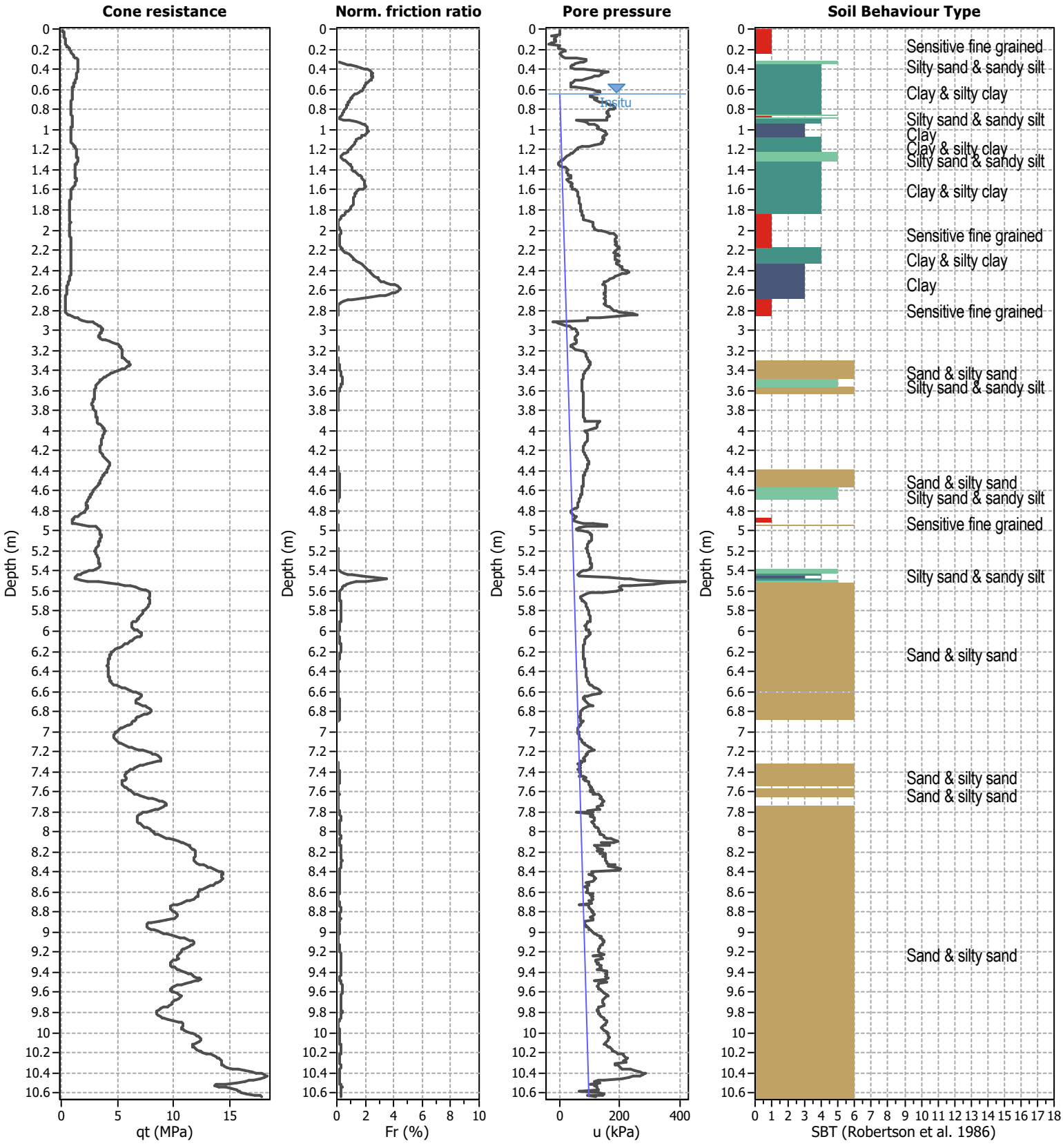
Project: Impianto di prodzione di energia elettrica da fonte fotovoltaica
Location: Monticelli d'Ongina

CPT: 3.10
Total depth: 10.64 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.65 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.65 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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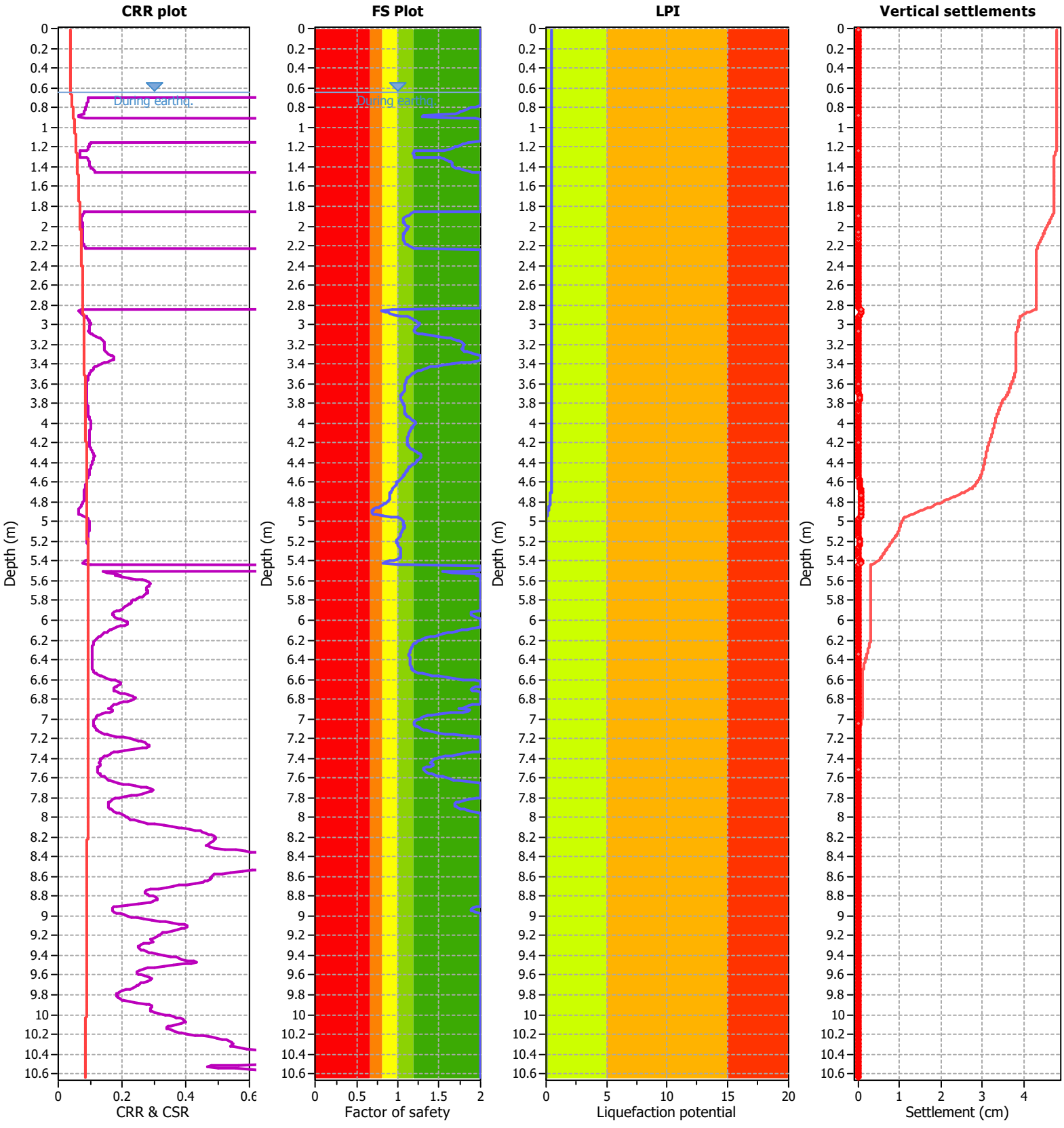
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 3.10
Total depth: 10.64 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.65 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.65 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
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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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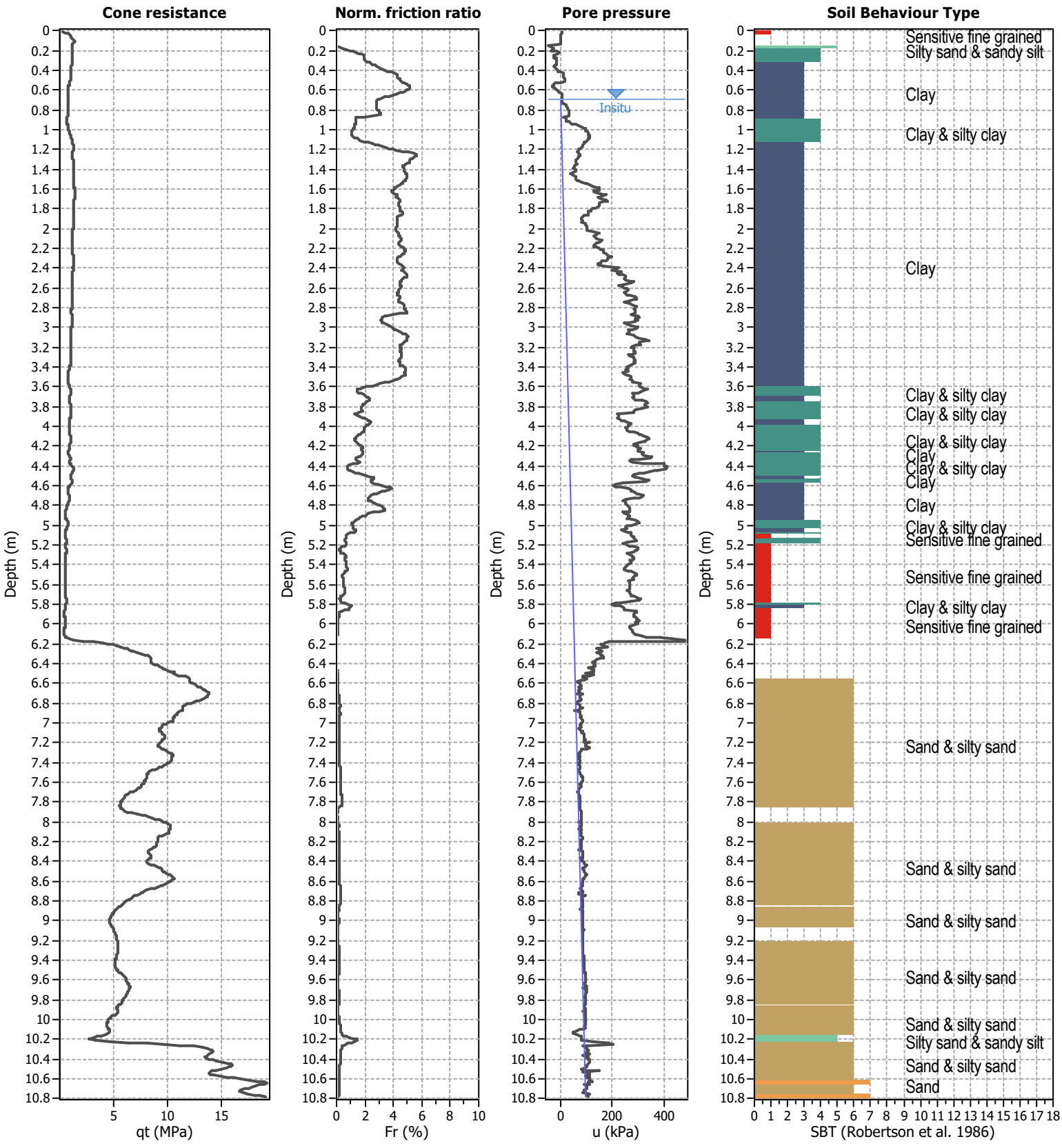
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 3.20
Total depth: 10.78 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.70 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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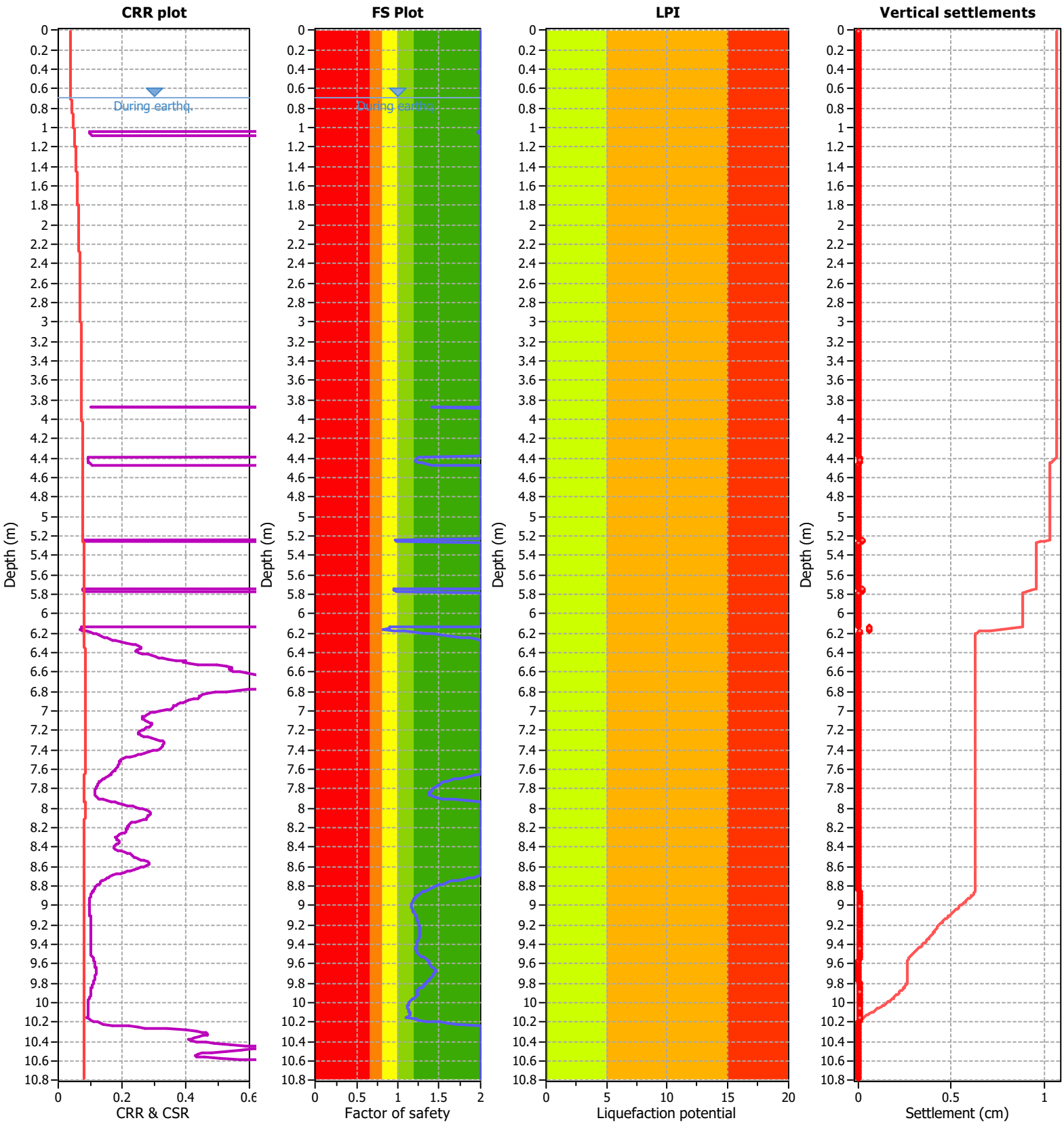
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 3.20
Total depth: 10.78 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	0.70 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	0.70 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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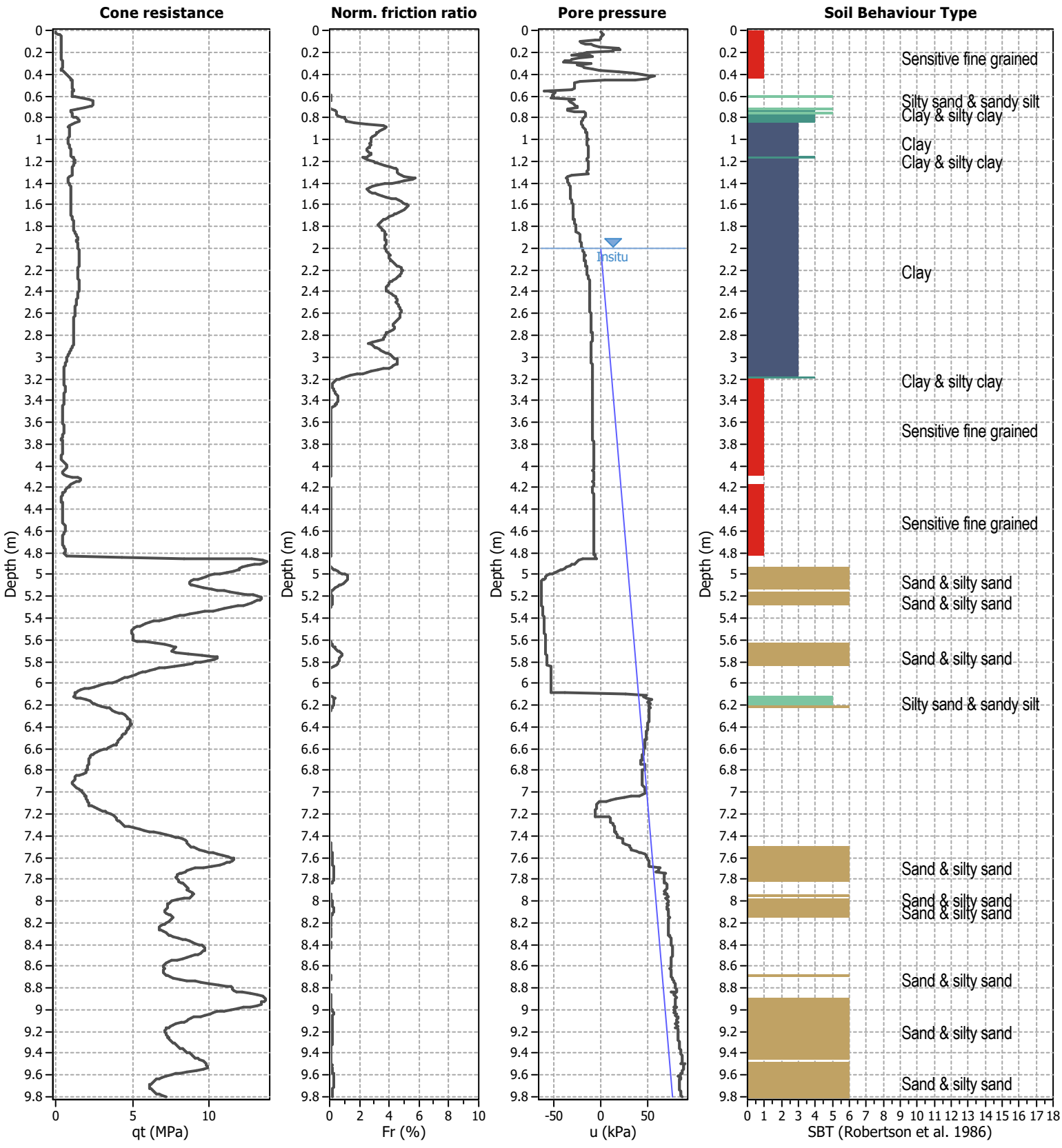
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 3.30
Total depth: 9.80 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.00 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

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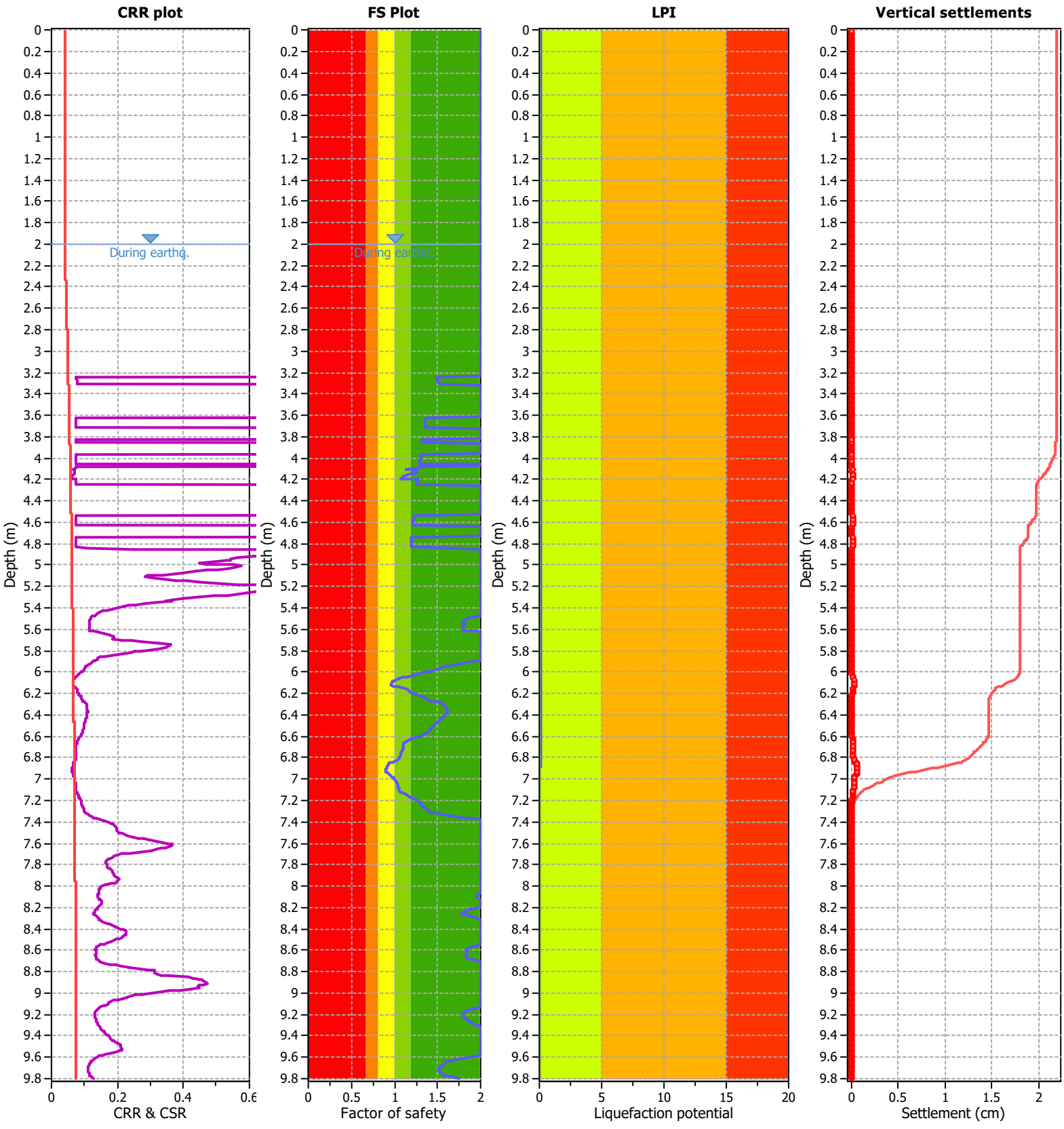
Project: **Impianto di prodzione di energia elettrica da fonte fotovoltaica**
Location: **Monticelli d'Ongina**

CPT: 3.30
Total depth: 9.80 m



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	2.00 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:	5.60	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		