

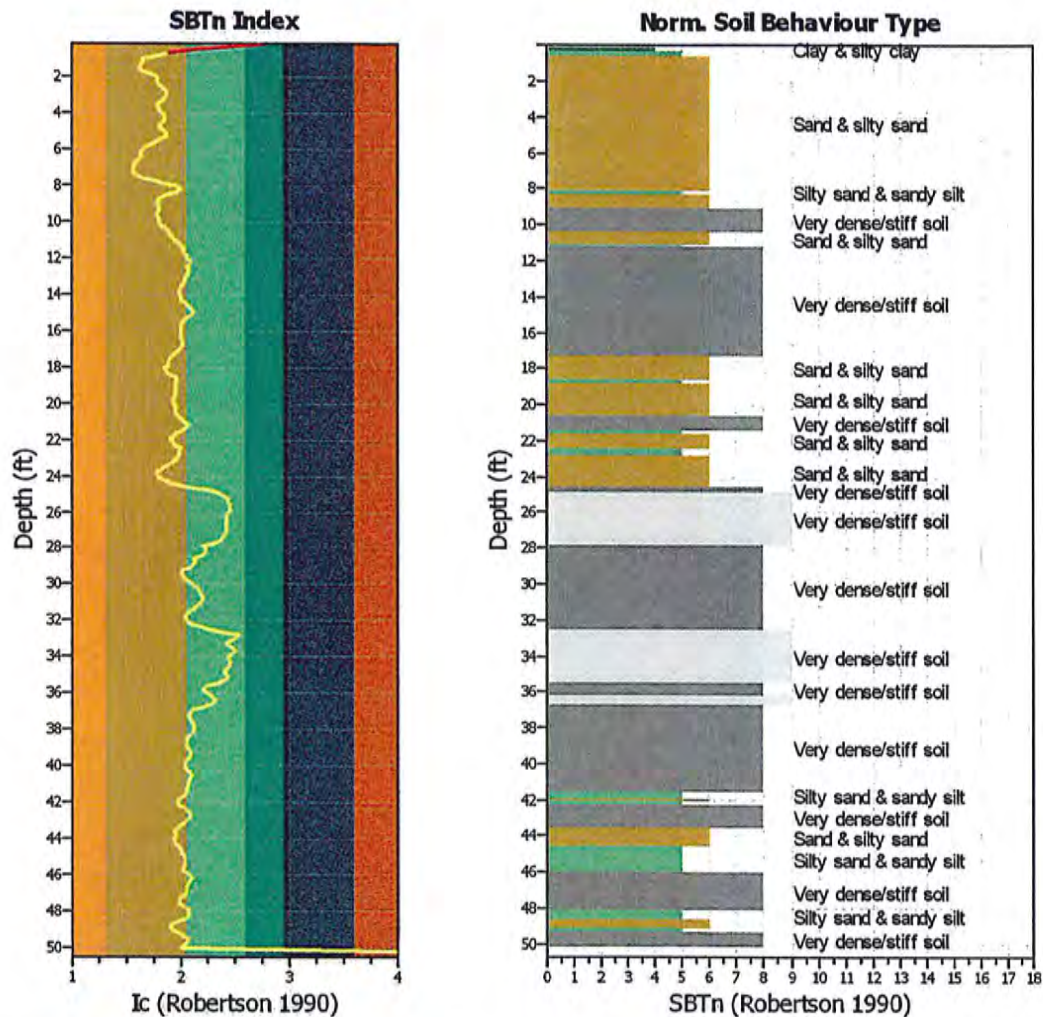
TRANSITION LAYER DETECTION ALGORITHM REPORT

Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vice-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c . Transitions typically occur when the rate of change of I_c is fast (i.e. ΔI_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.



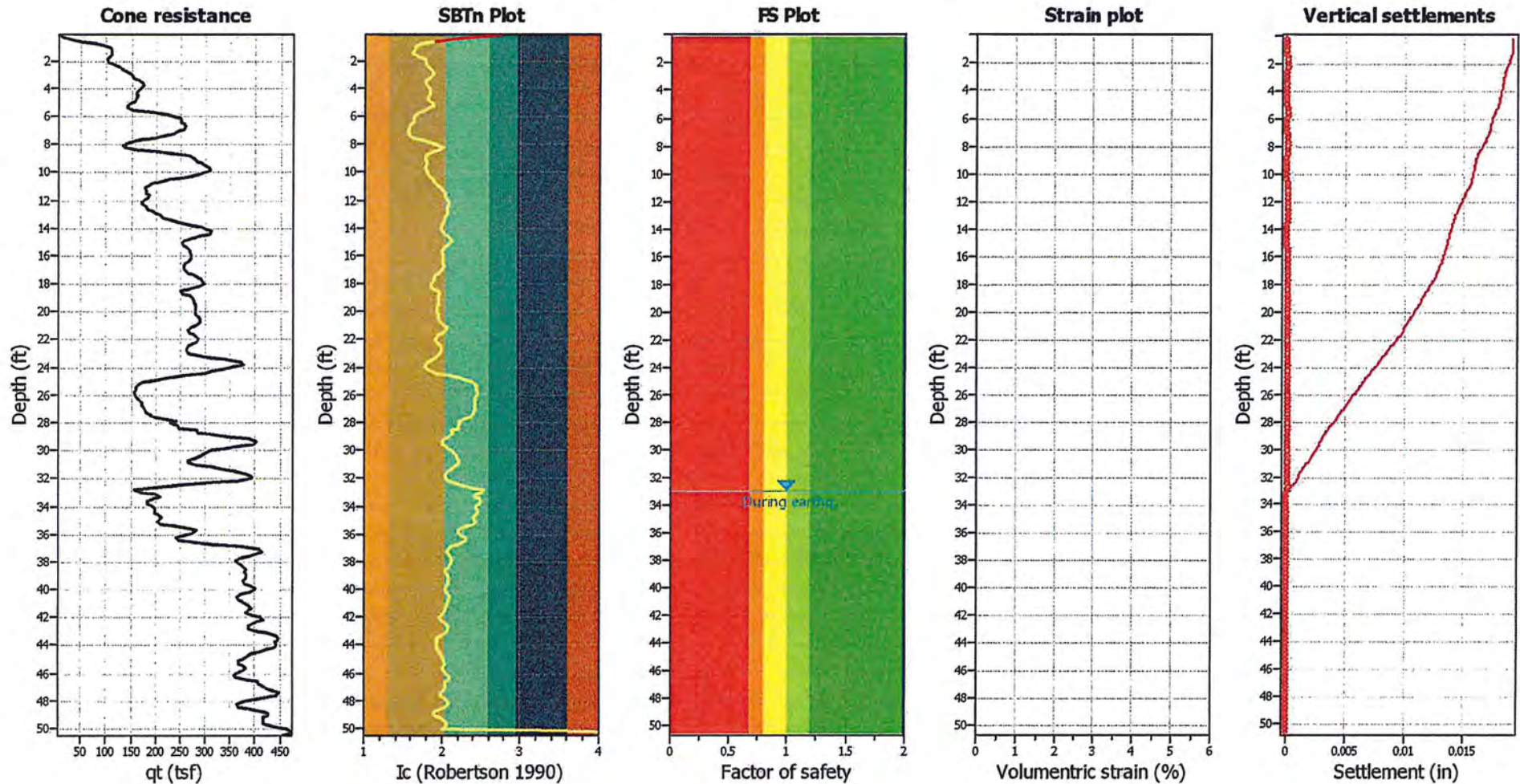
Transition layer algorithm properties

I_c minimum check value: 1.70
 I_c maximum check value: 3.00
 I_c change ratio value: 0.0250
 Minimum number of points in layer: 4

General statistics

Total points in CPT file: 308
 Total points excluded: 5
 Exclusion percentage: 1.62%
 Number of layers detected: 1

Estimation of post-earthquake settlements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

LIQUEFACTION ANALYSIS REPORT

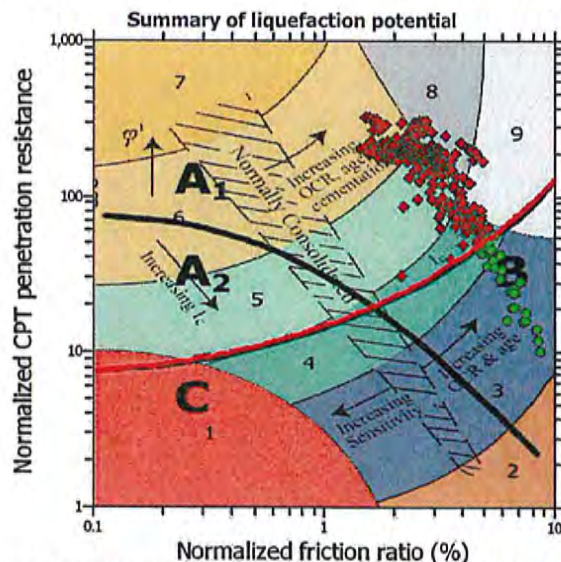
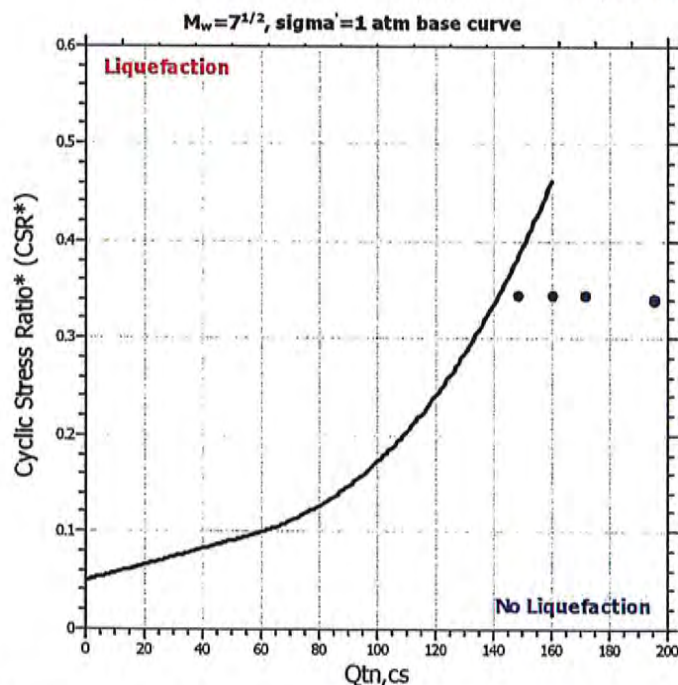
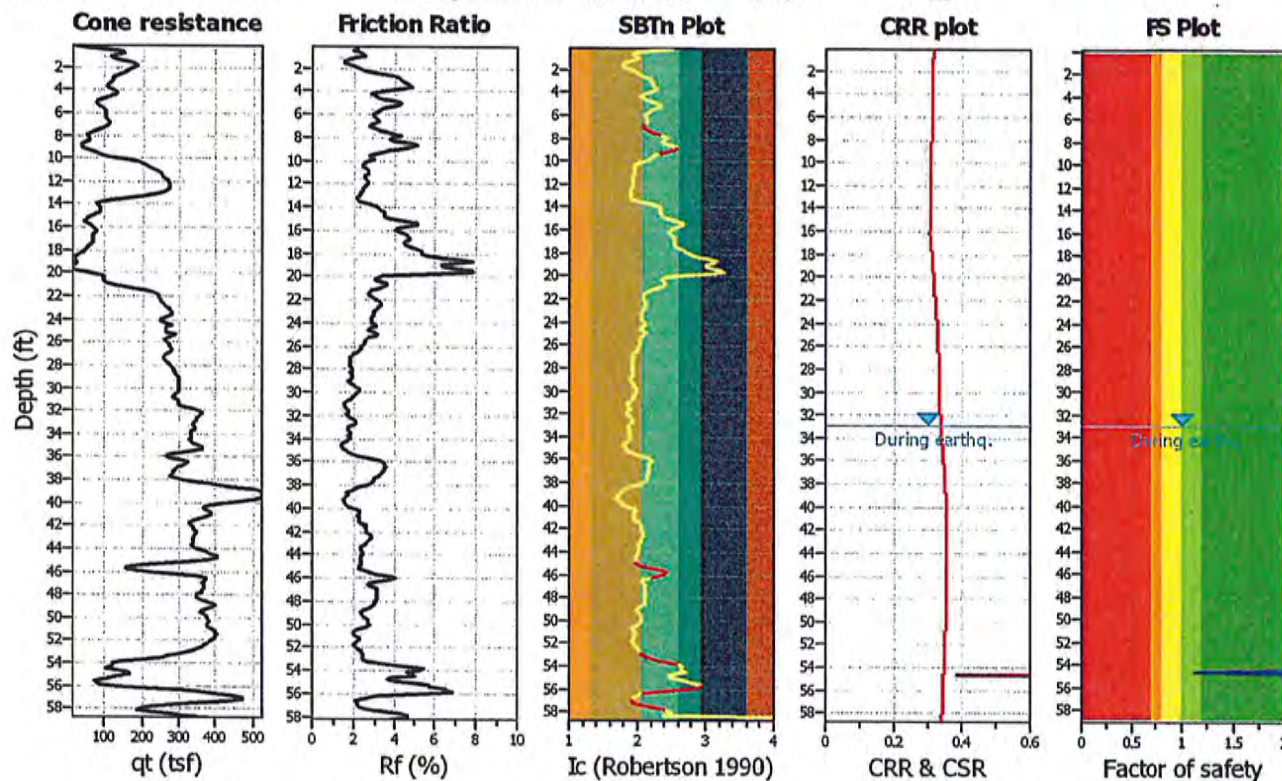
Project title : 332-12 Regenerate Power

Location : Ocitillo Wells

CPT file : 2

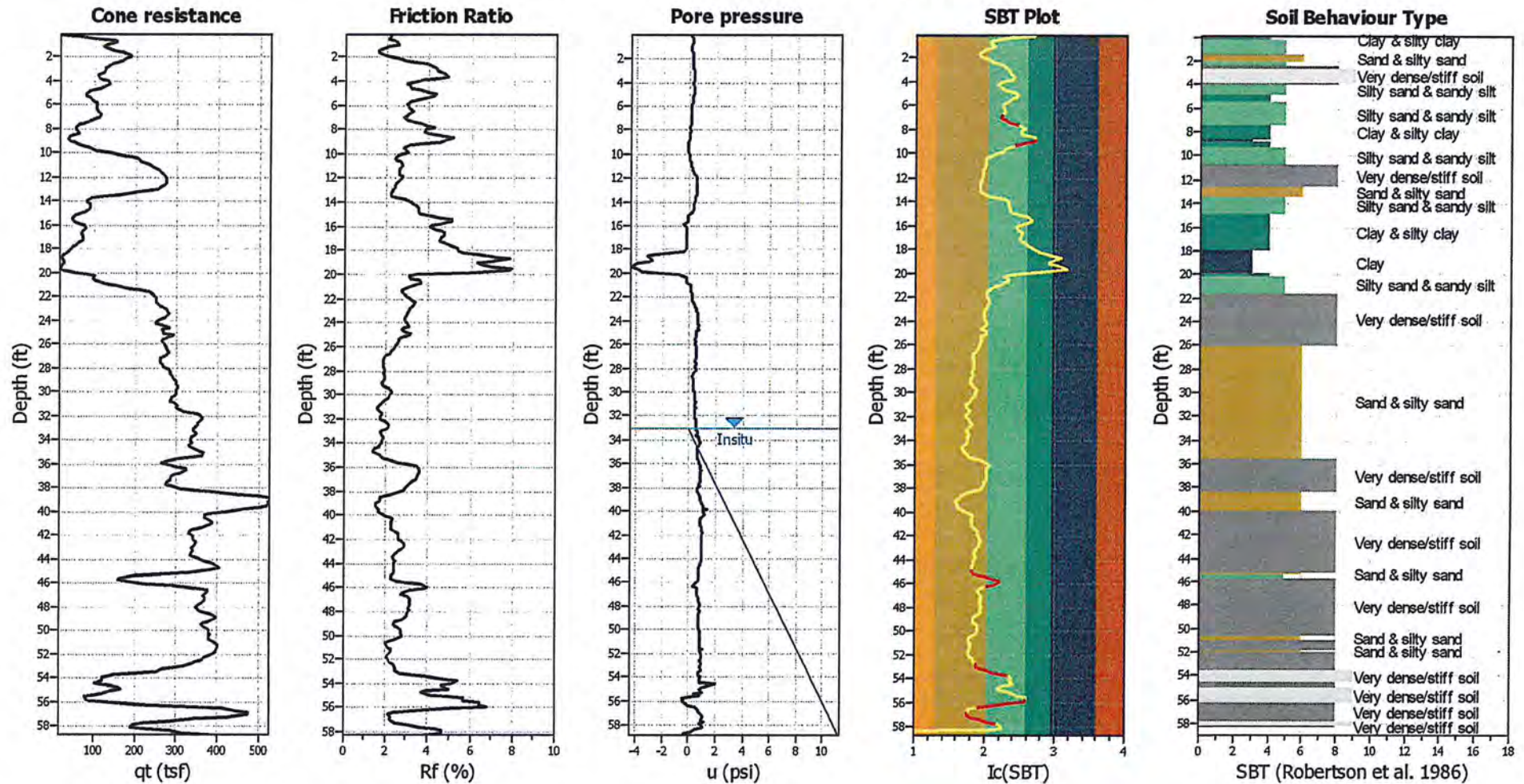
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	33.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	33.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.62	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A2: 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

CPT basic interpretation plots



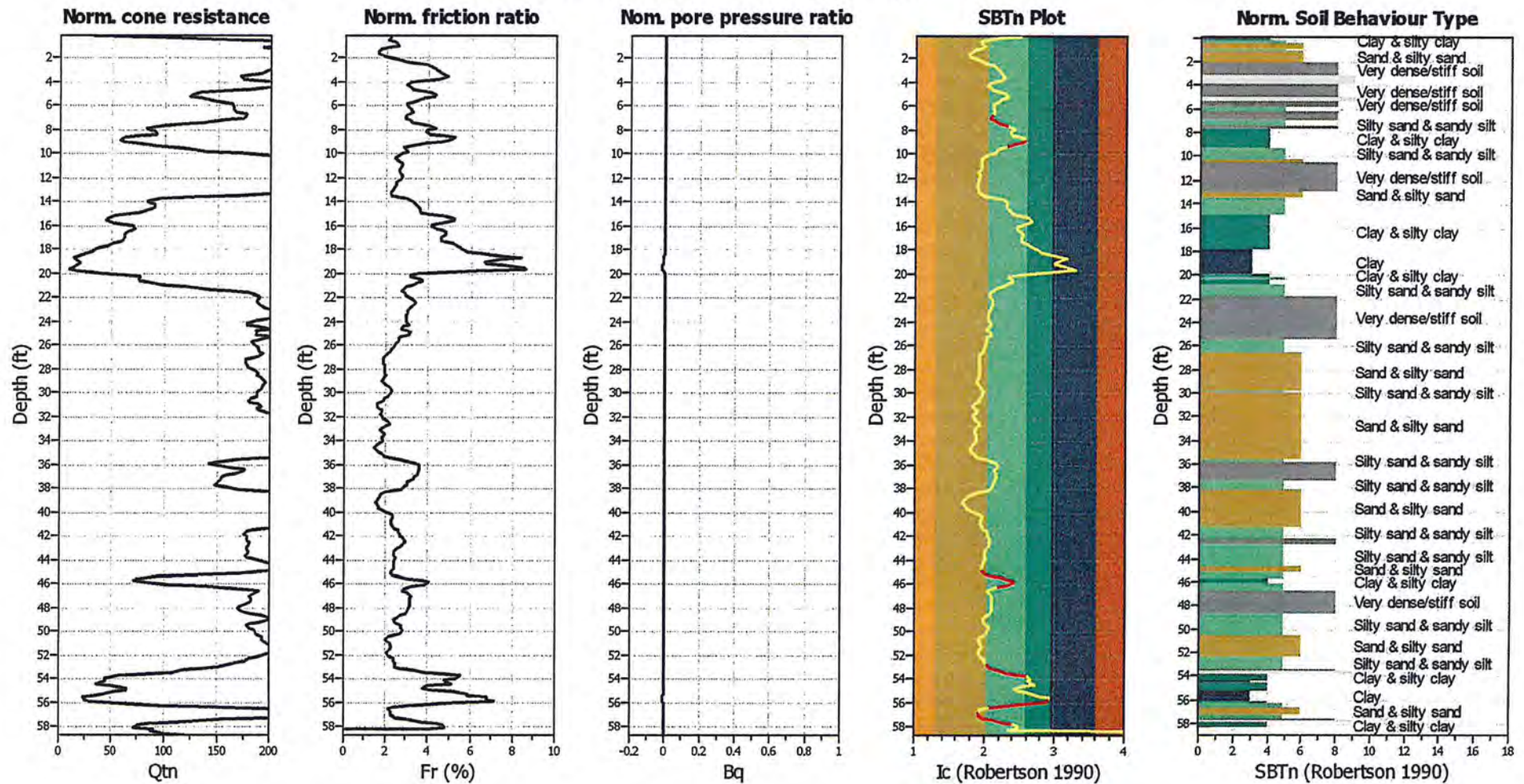
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _o applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

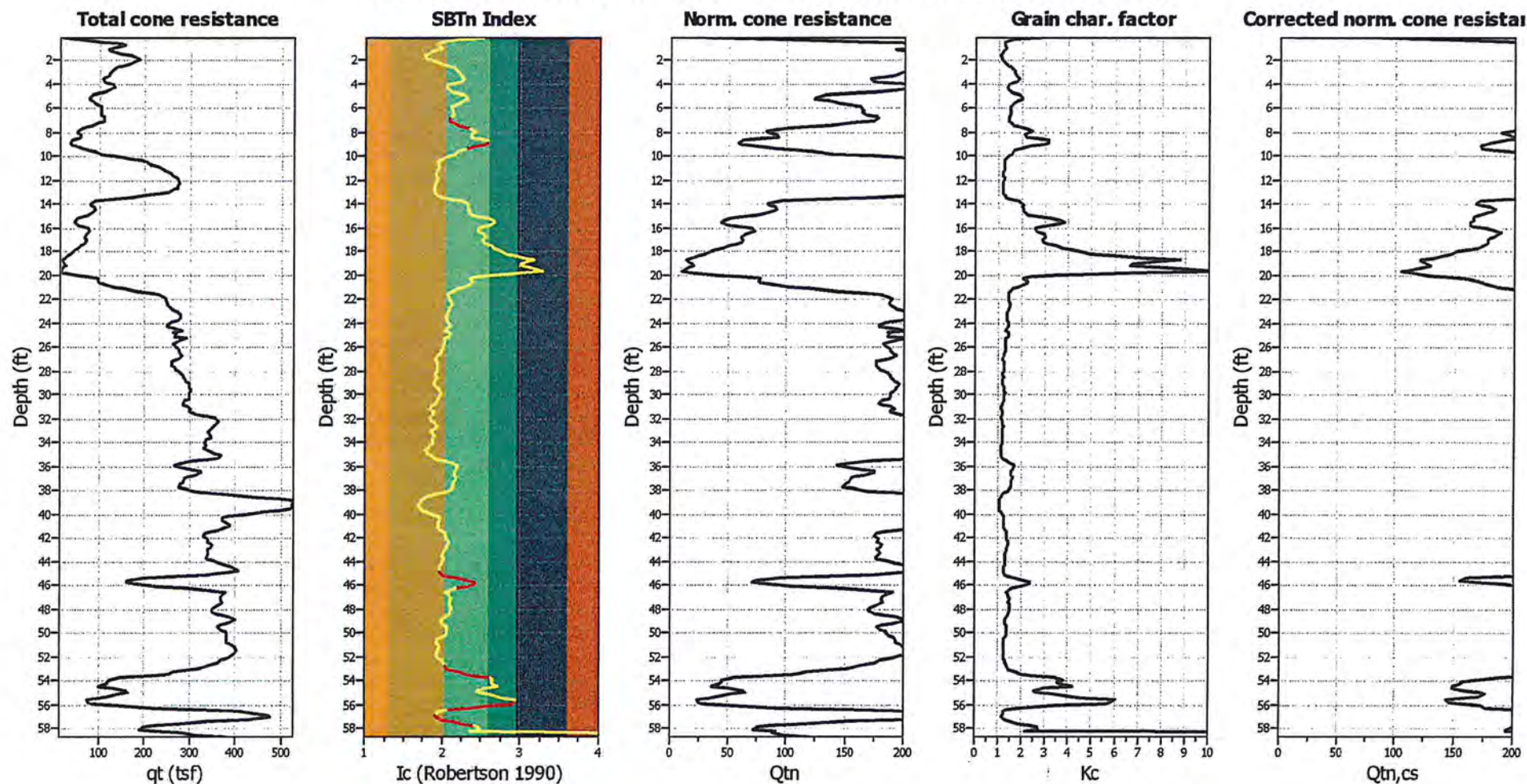
CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_p applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

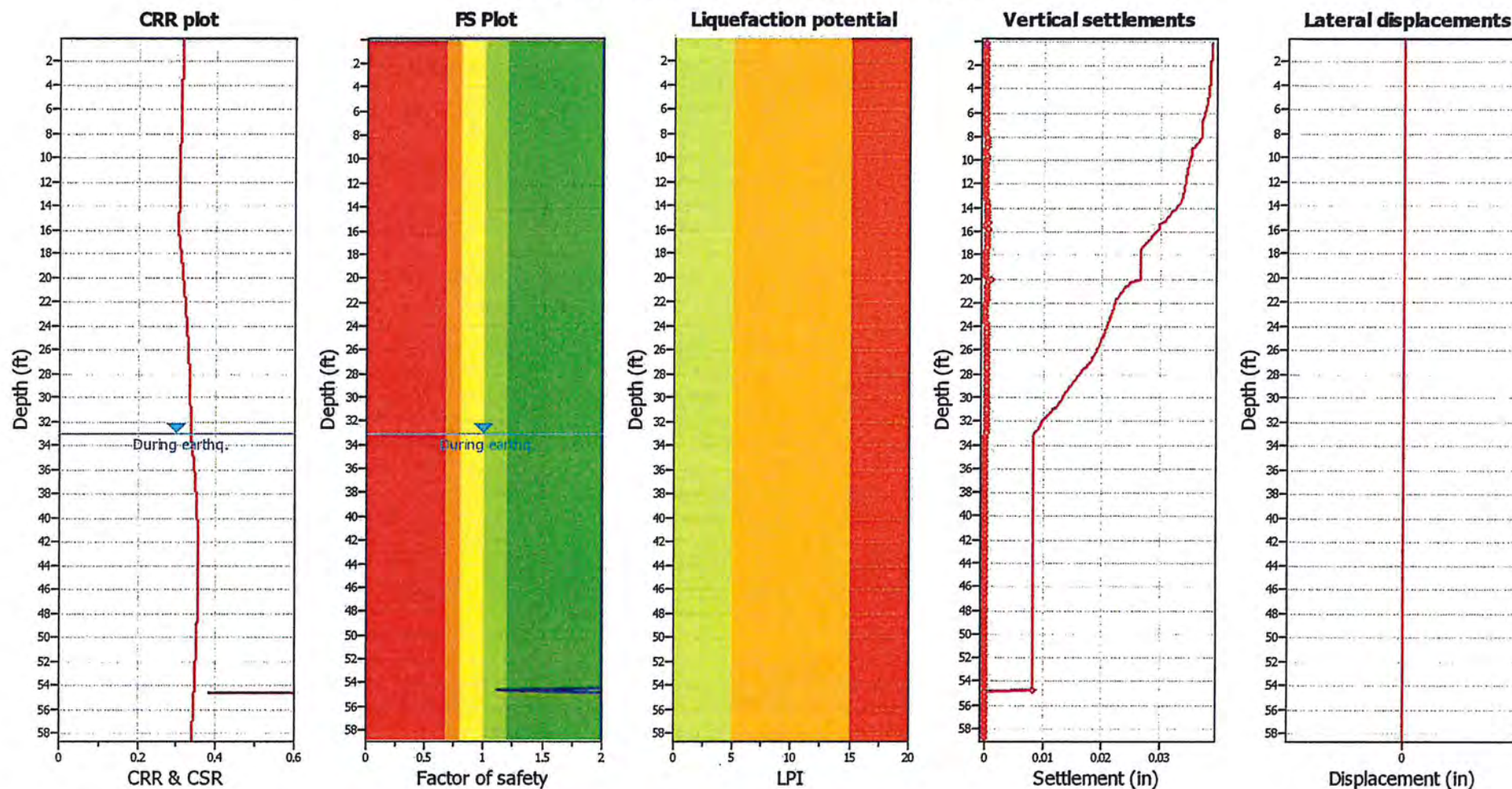
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _c applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (Insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

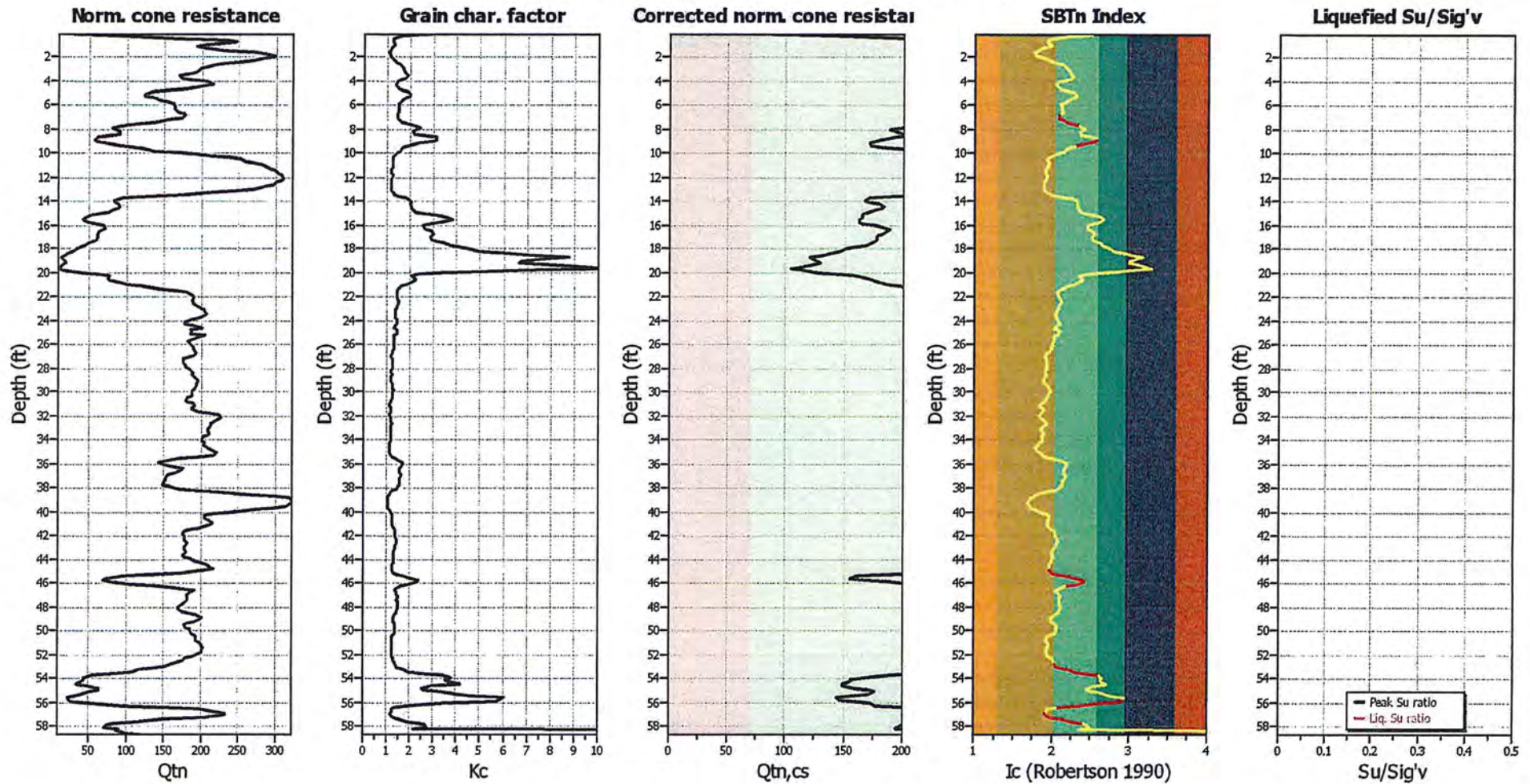
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liquefaction are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Green	Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_p applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

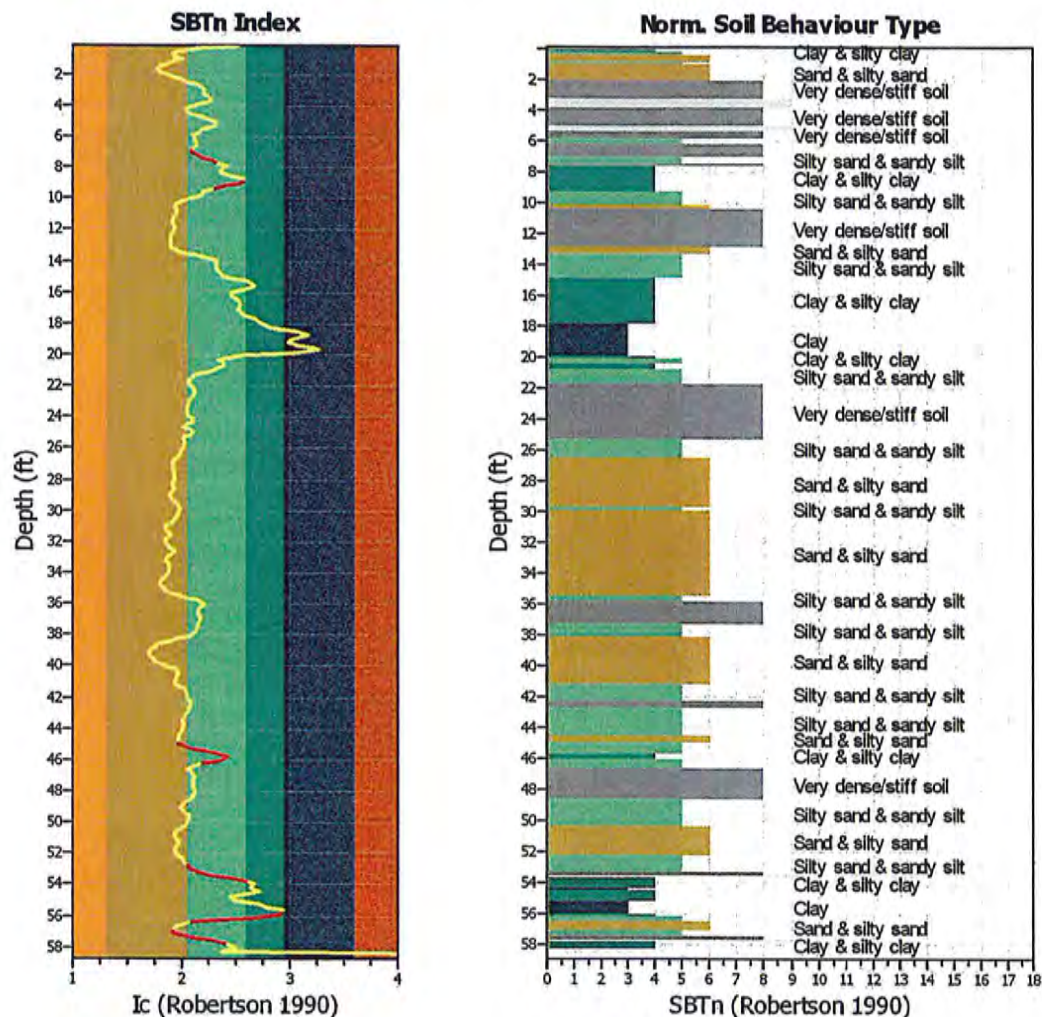
TRANSITION LAYER DETECTION ALGORITHM REPORT

Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vice-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c . Transitions typically occur when the rate of change of I_c is fast (i.e. ΔI_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.



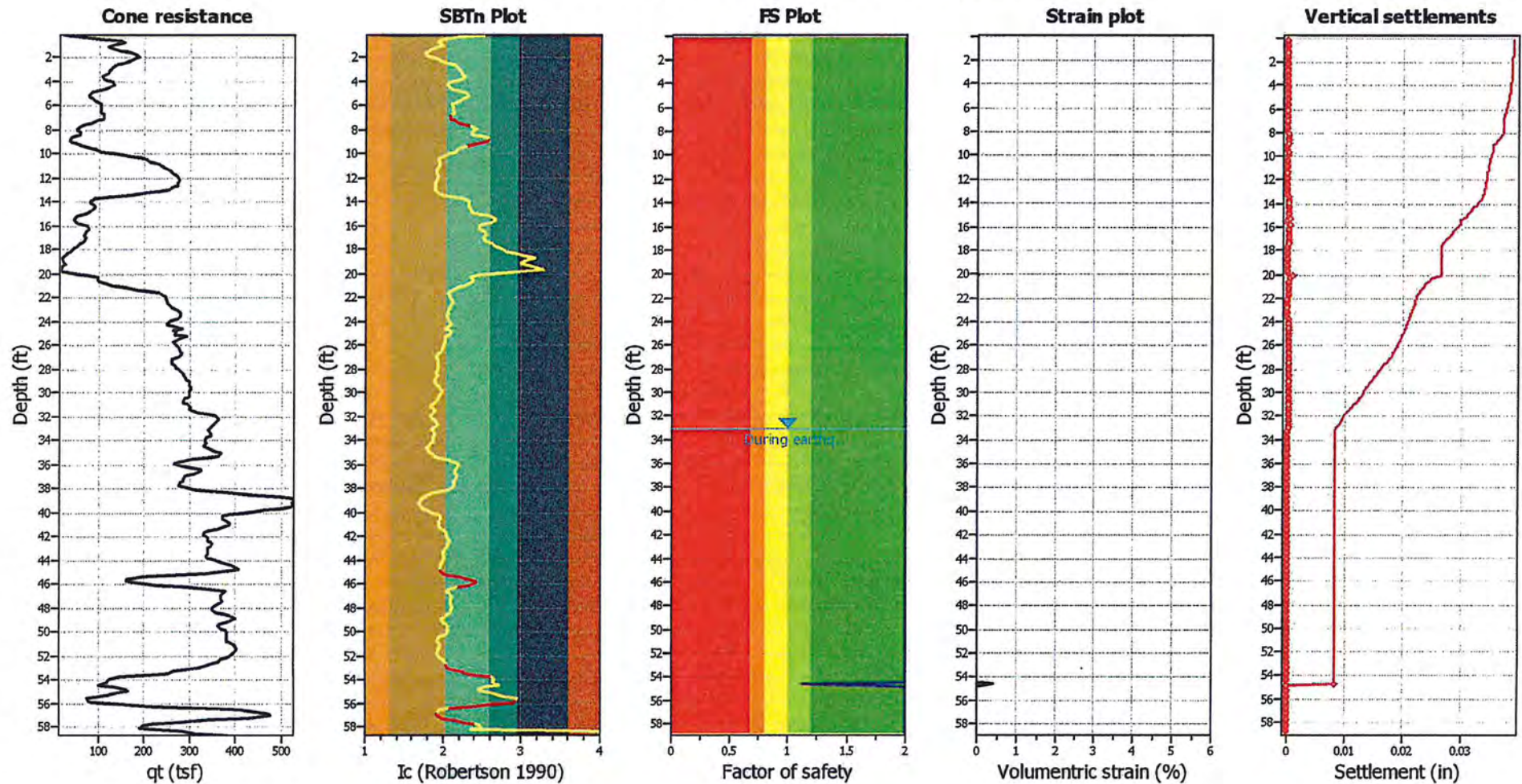
Transition layer algorithm properties

I_c minimum check value: 1.70
 I_c maximum check value: 3.00
 I_c change ratio value: 0.0250
 Minimum number of points in layer: 4

General statistics

Total points in CPT file: 358
 Total points excluded: 37
 Exclusion percentage: 10.34%
 Number of layers detected: 7

Estimation of post-earthquake settlements



Abbreviations

q_t : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

LIQUEFACTION ANALYSIS REPORT

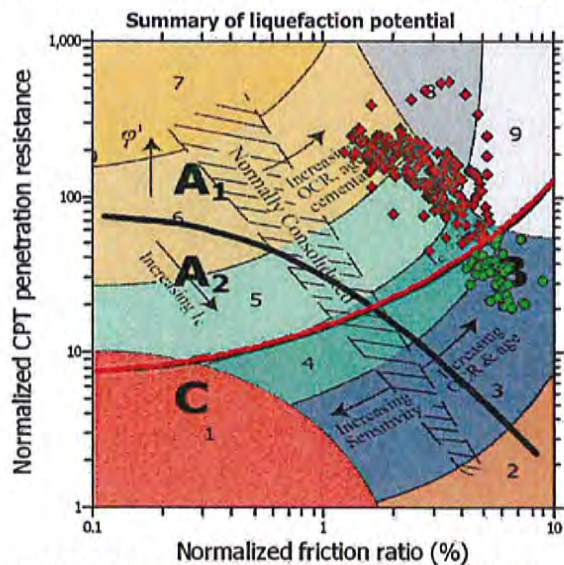
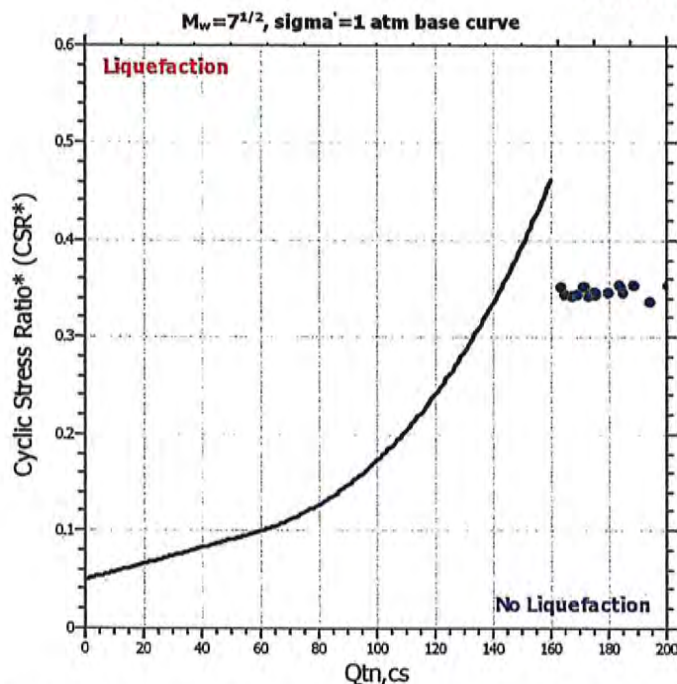
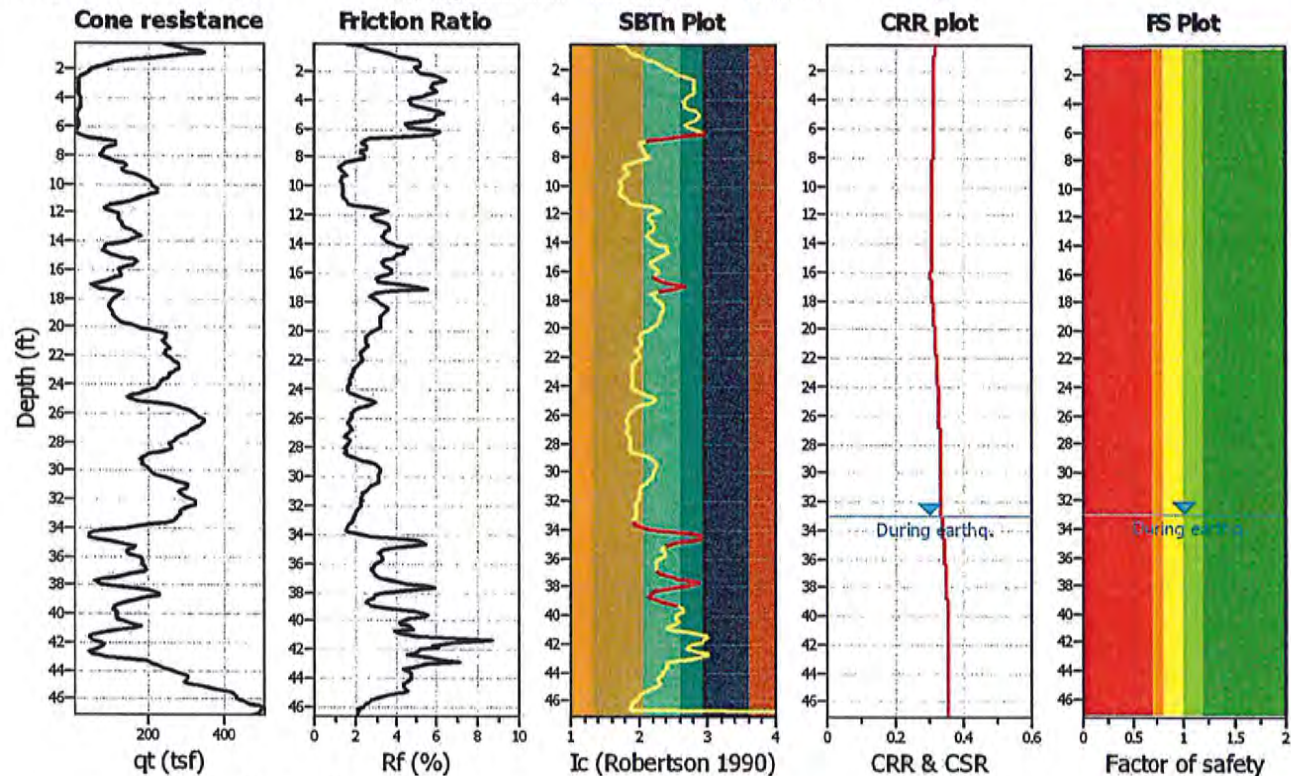
Project title : 332-12 Regenerate Power

Location : Ocitillo Wells

CPT file : 3

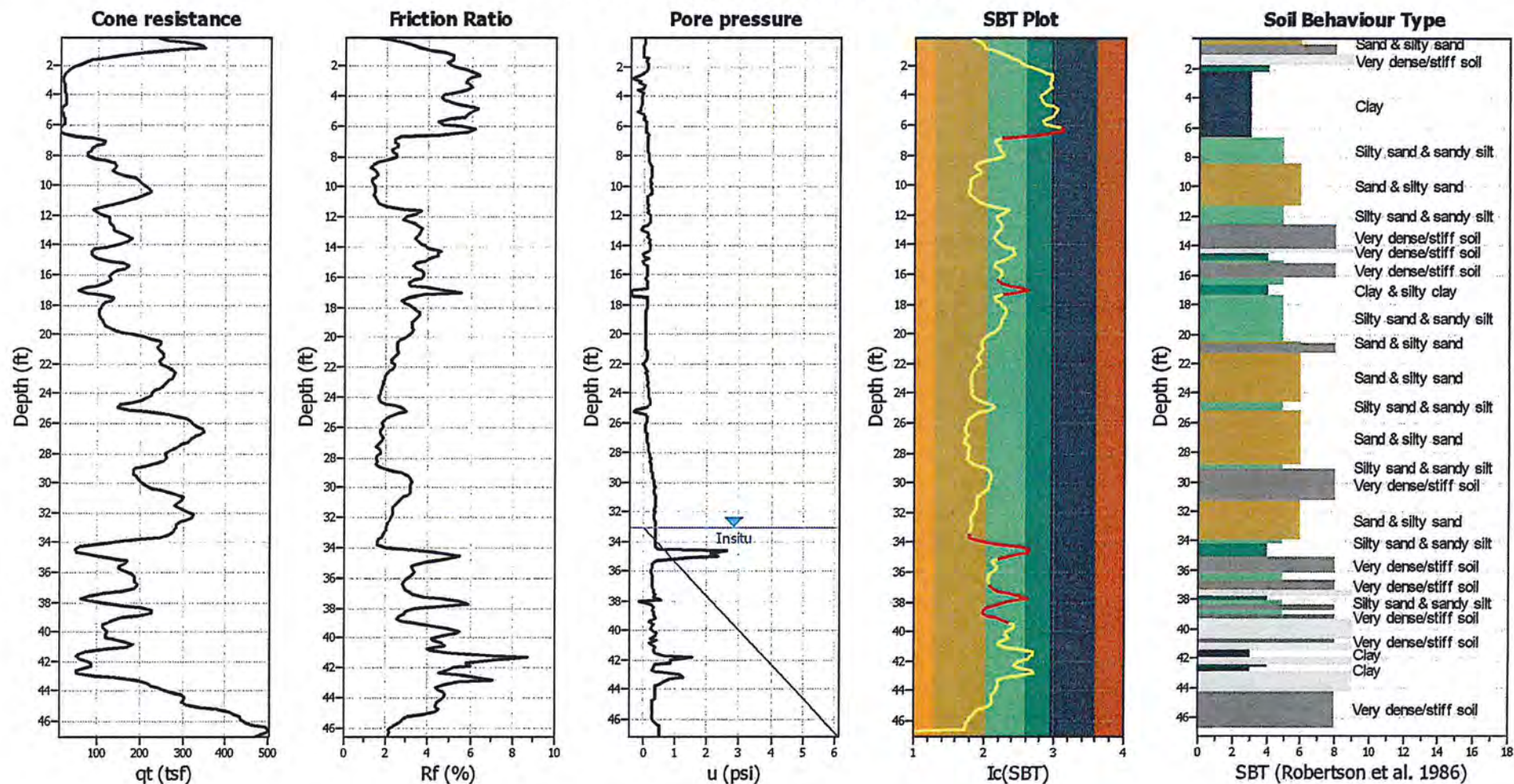
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	33.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	33.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.62	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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

CPT basic interpretation plots



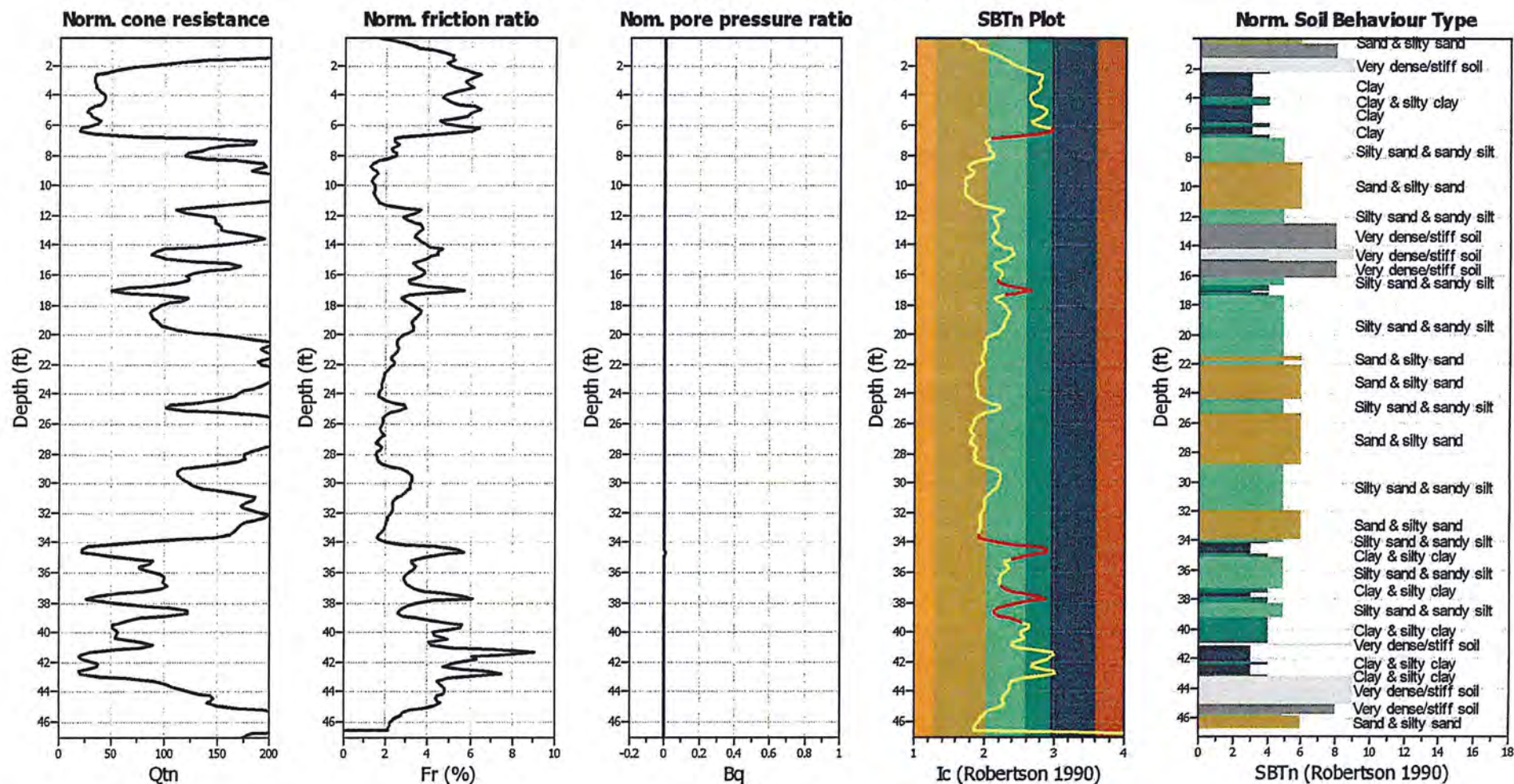
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_p applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (Insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

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

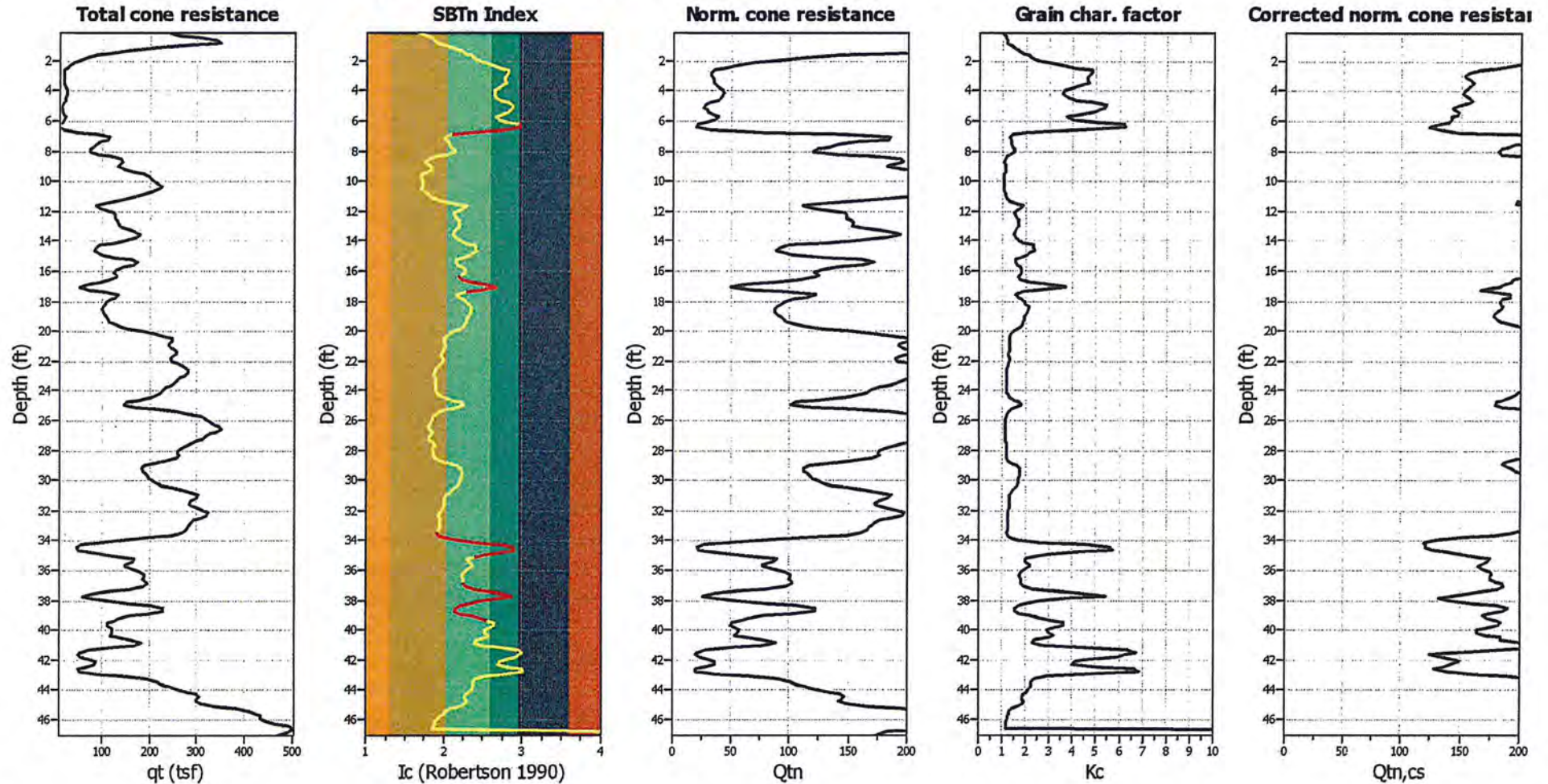
CPT basic interpretation plots (normalized)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

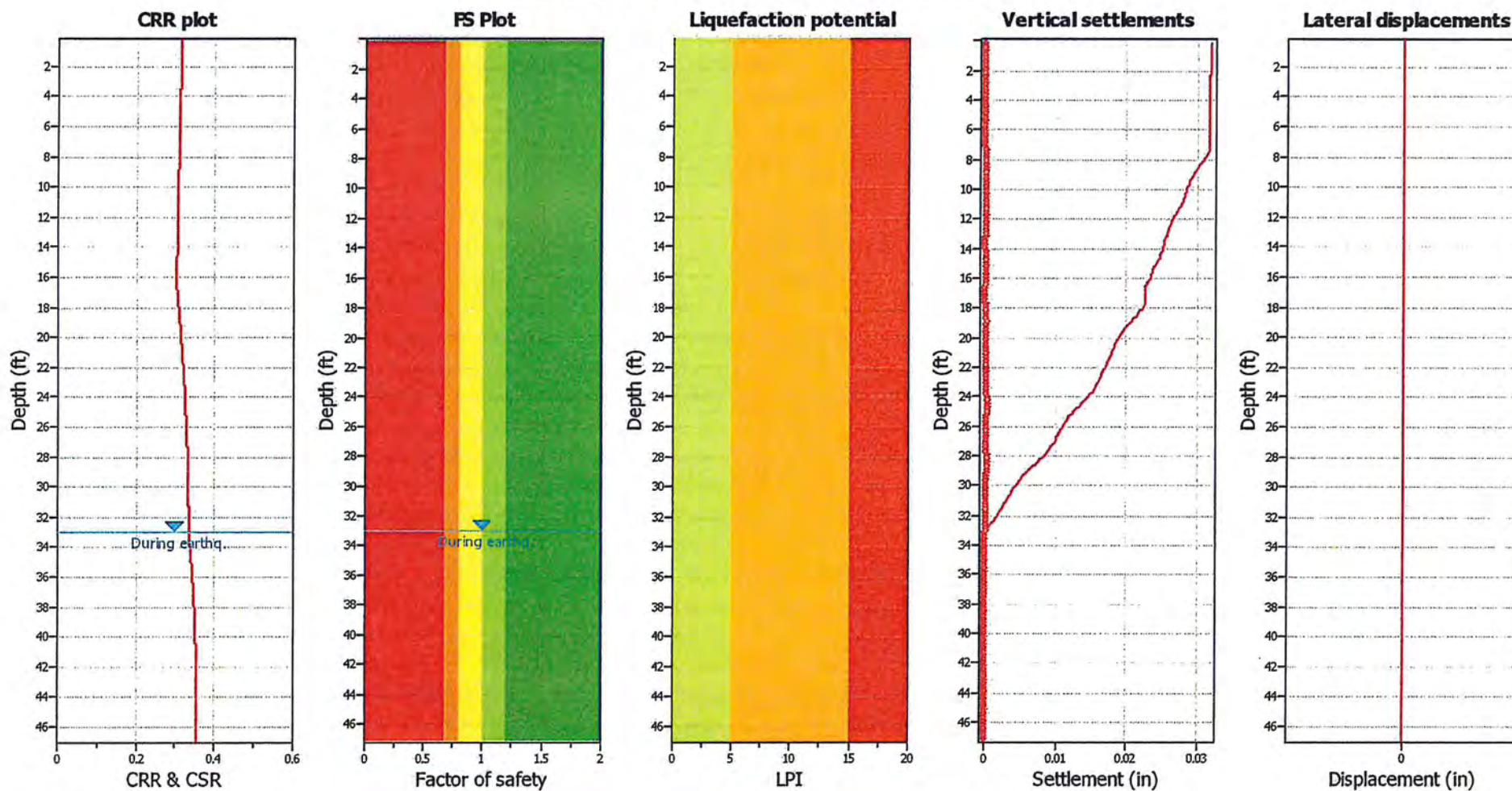
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _c applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (instlu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on I_c value	I_c cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

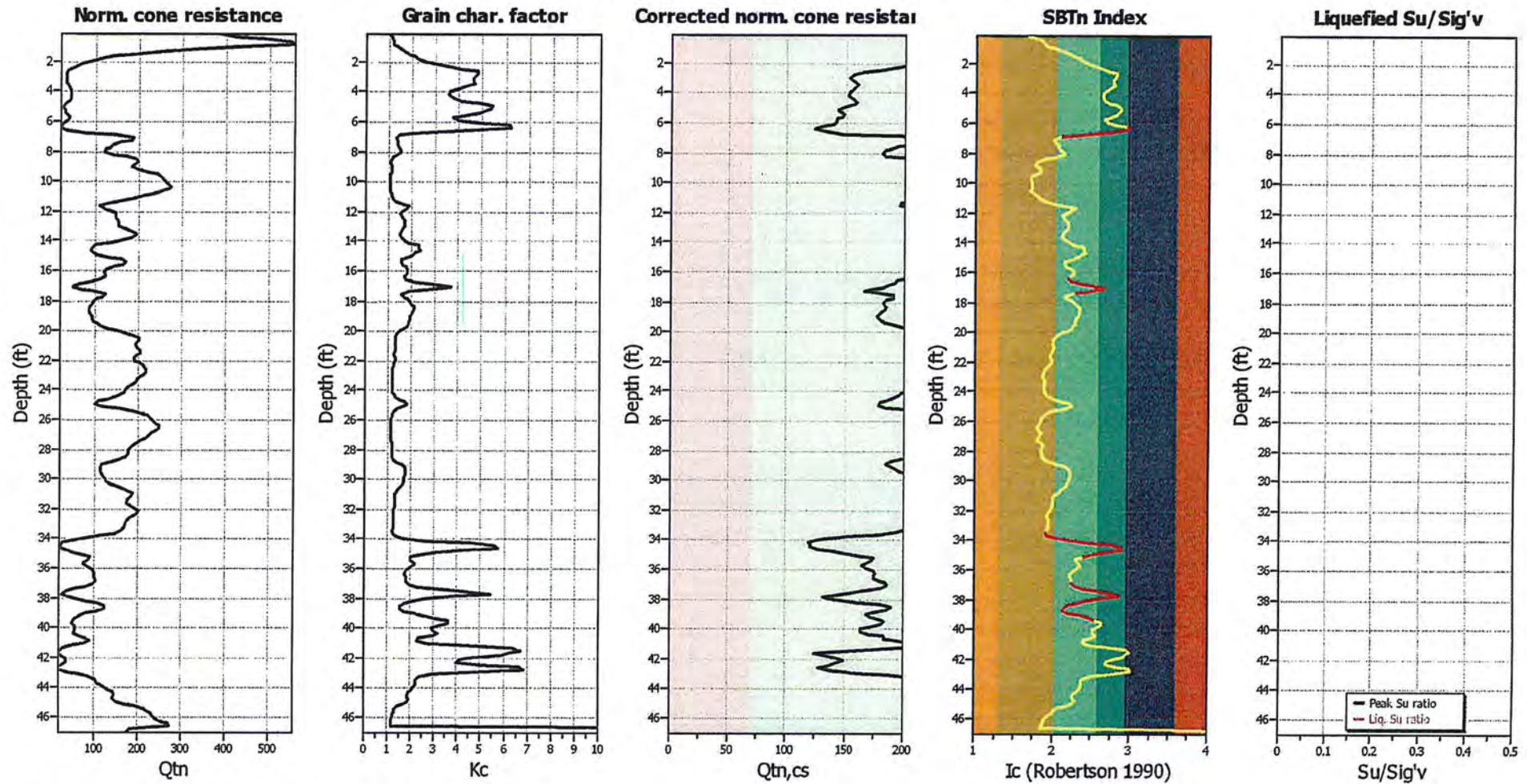
F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liquefaction are equally likely
Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _c applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	No
Depth to water table (Insitu):	33.00 ft	Fill height:	N/A	Limit depth:	N/A

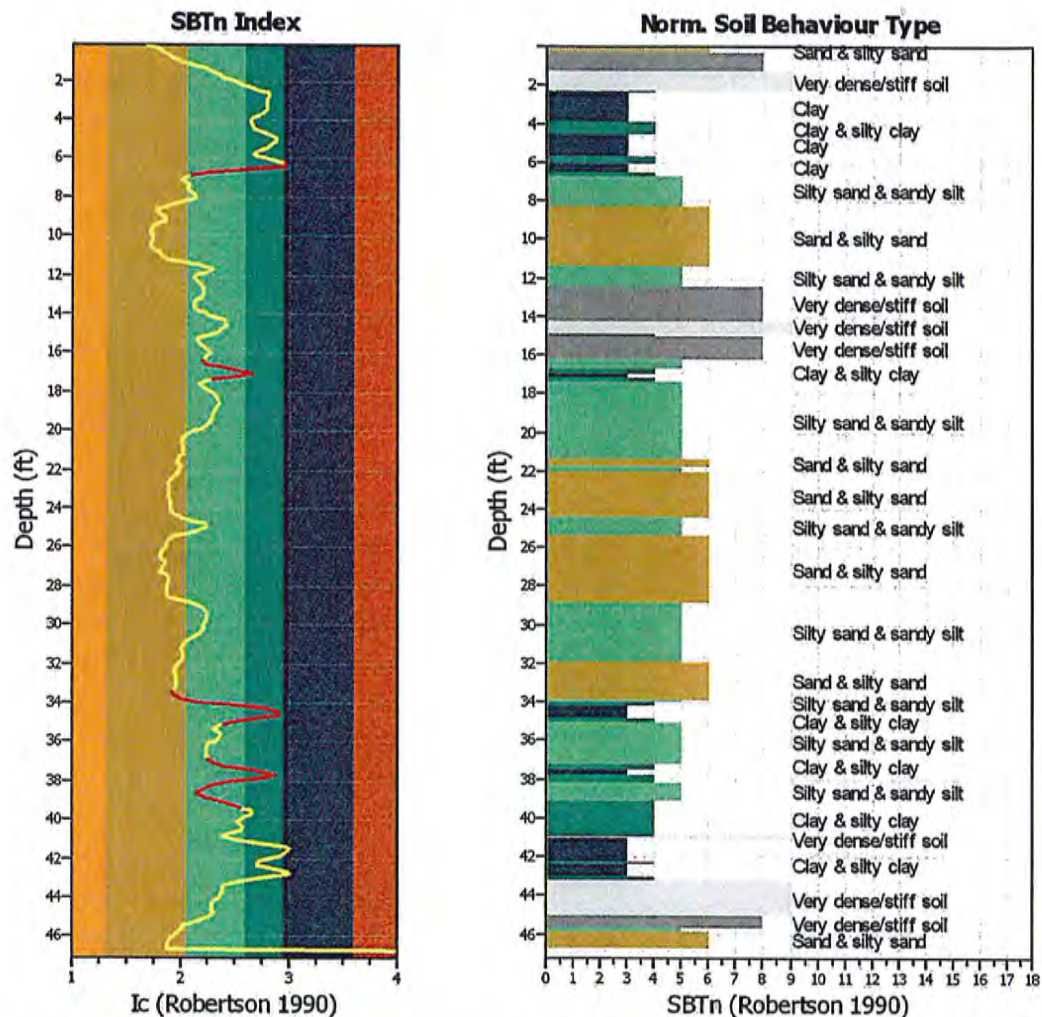
TRANSITION LAYER DETECTION ALGORITHM REPORT

Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vice-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c . Transitions typically occur when the rate of change of I_c is fast (i.e. ΔI_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.



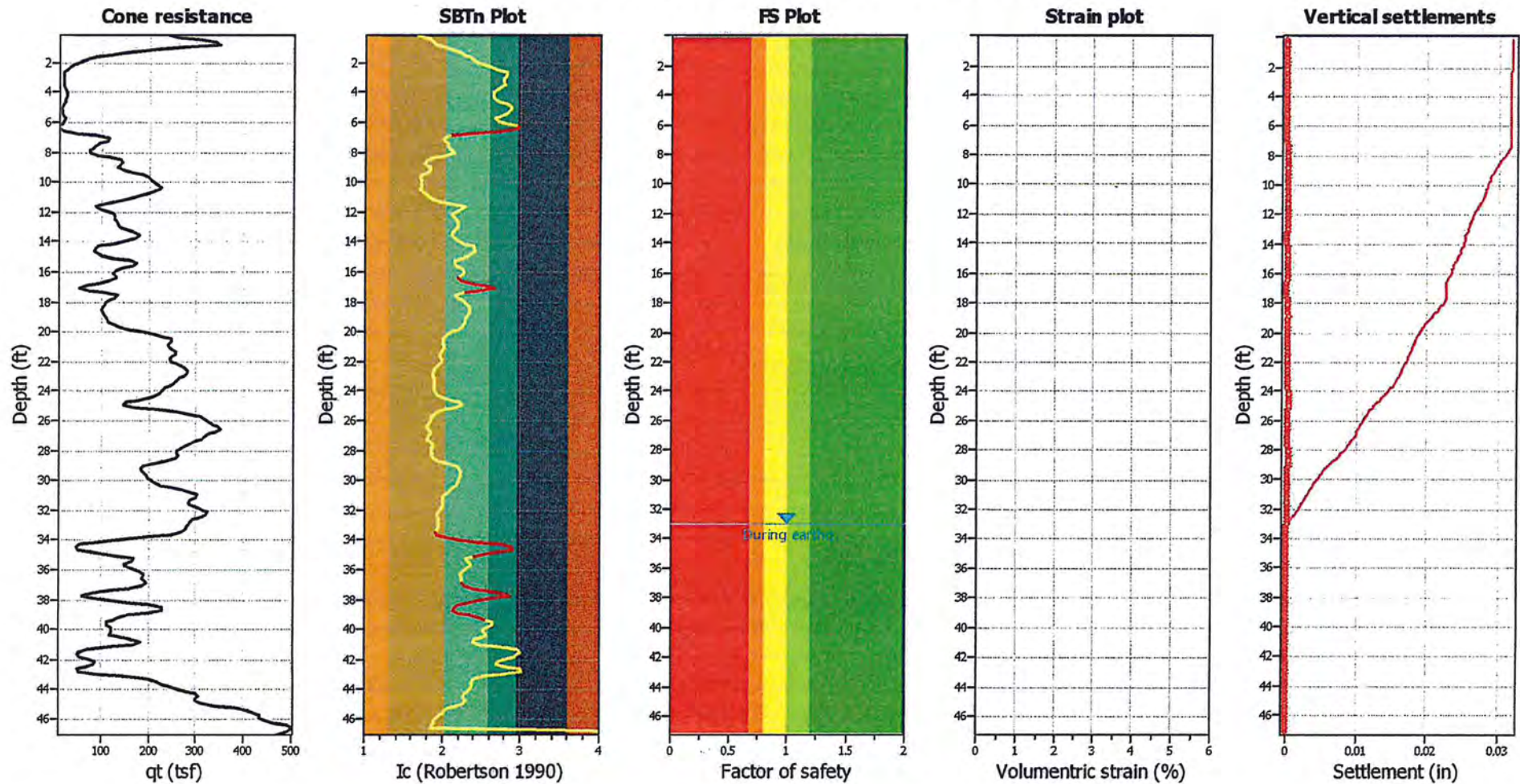
Transition layer algorithm properties

I_c minimum check value:	1.70
I_c maximum check value:	3.00
I_c change ratio value:	0.0250
Minimum number of points in layer:	4

General statistics

Total points in CPT file:	287
Total points excluded:	41
Exclusion percentage:	14.29%
Number of layers detected:	8

Estimation of post-earthquake settlements



Abbreviations

q_c : Total cone resistance (cone resistance q_c corrected for pore water effects)
 I_c : Soil Behaviour Type Index
 FS: Calculated Factor of Safety against liquefaction
 Volumetric strain: Post-liquefaction volumetric strain

LIQUEFACTION ANALYSIS REPORT

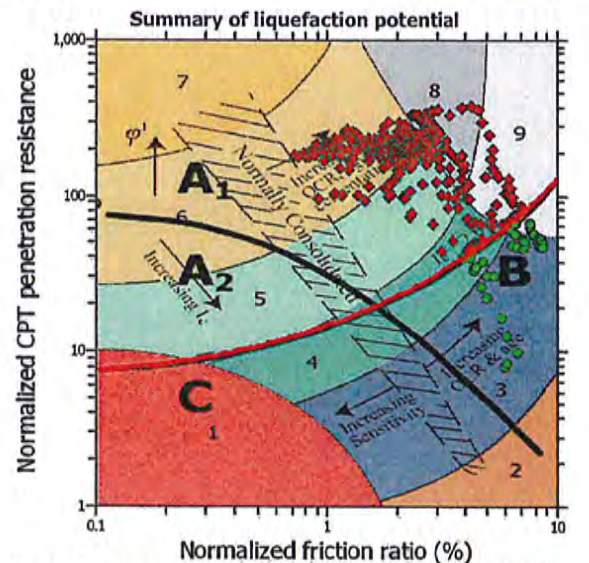
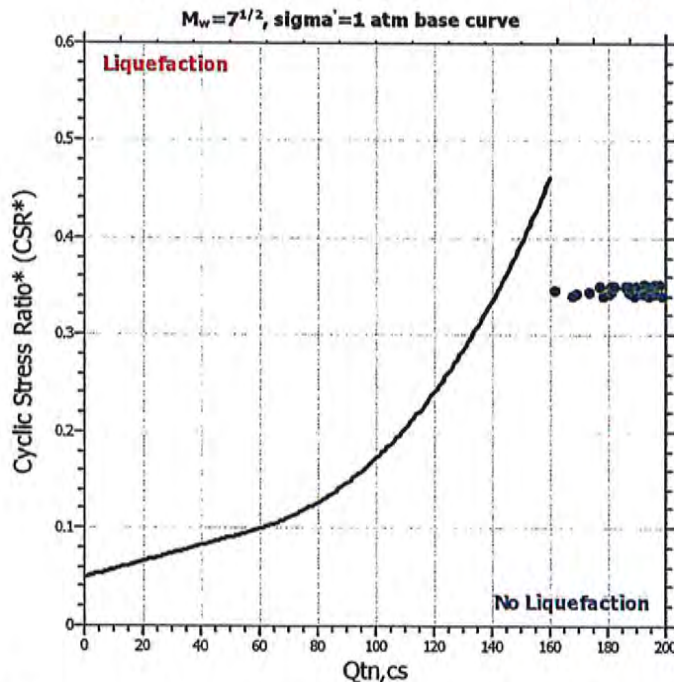
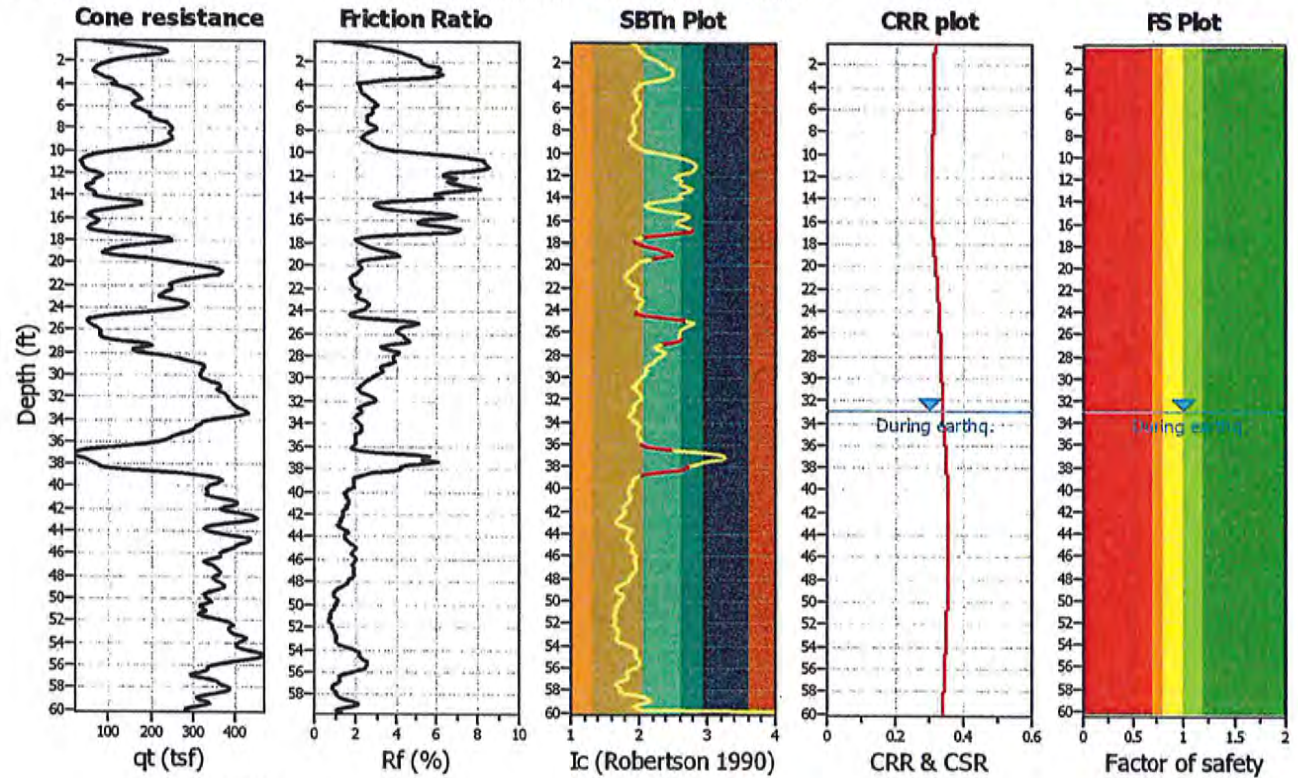
Project title : 332-12 Regenerate Power

Location : Ocitillo Wells

CPT file : 4

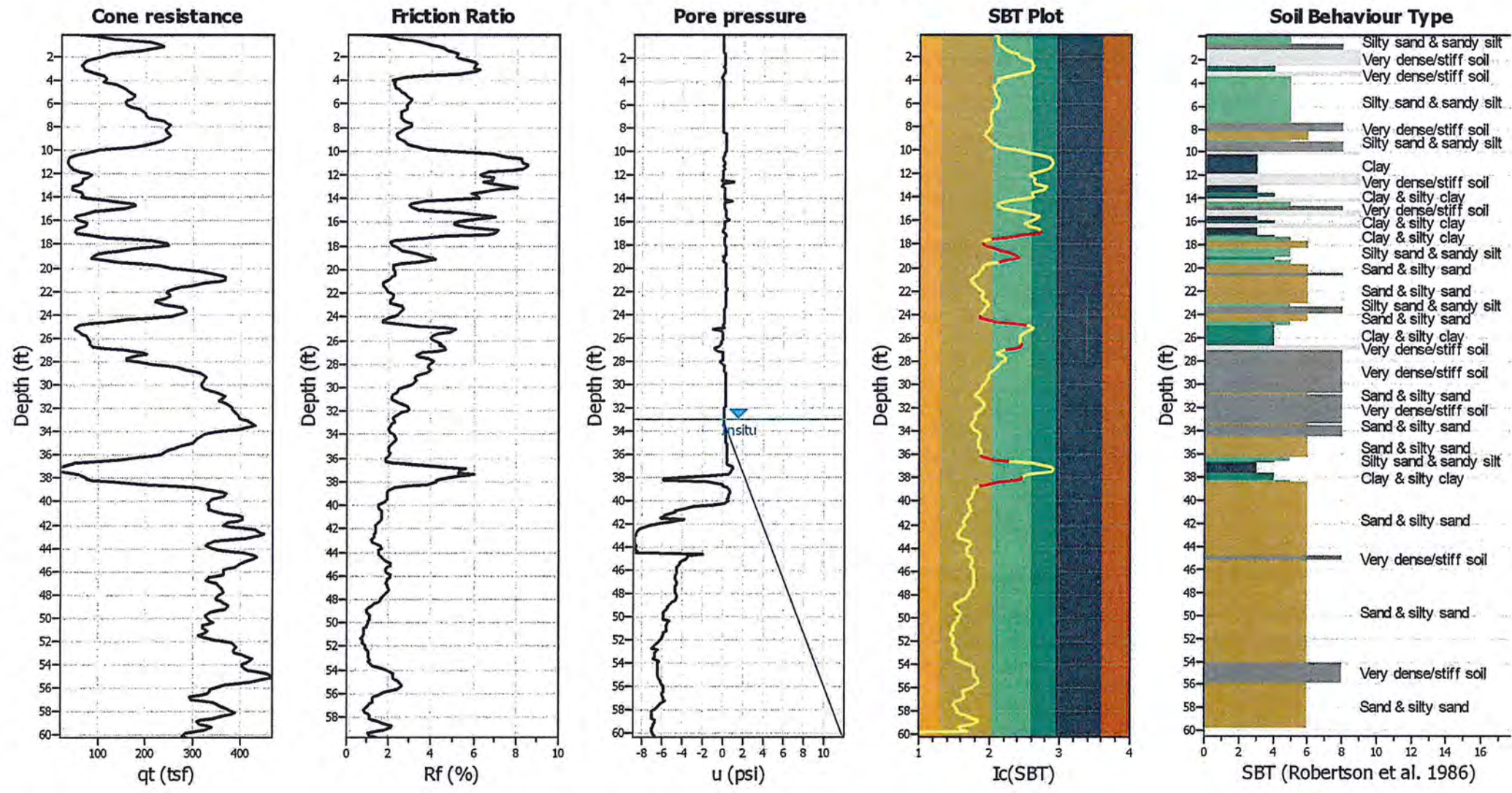
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	33.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	33.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.62	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	58.00 ft
Peak ground acceleration:	0.51	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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

CPT basic interpretation plots



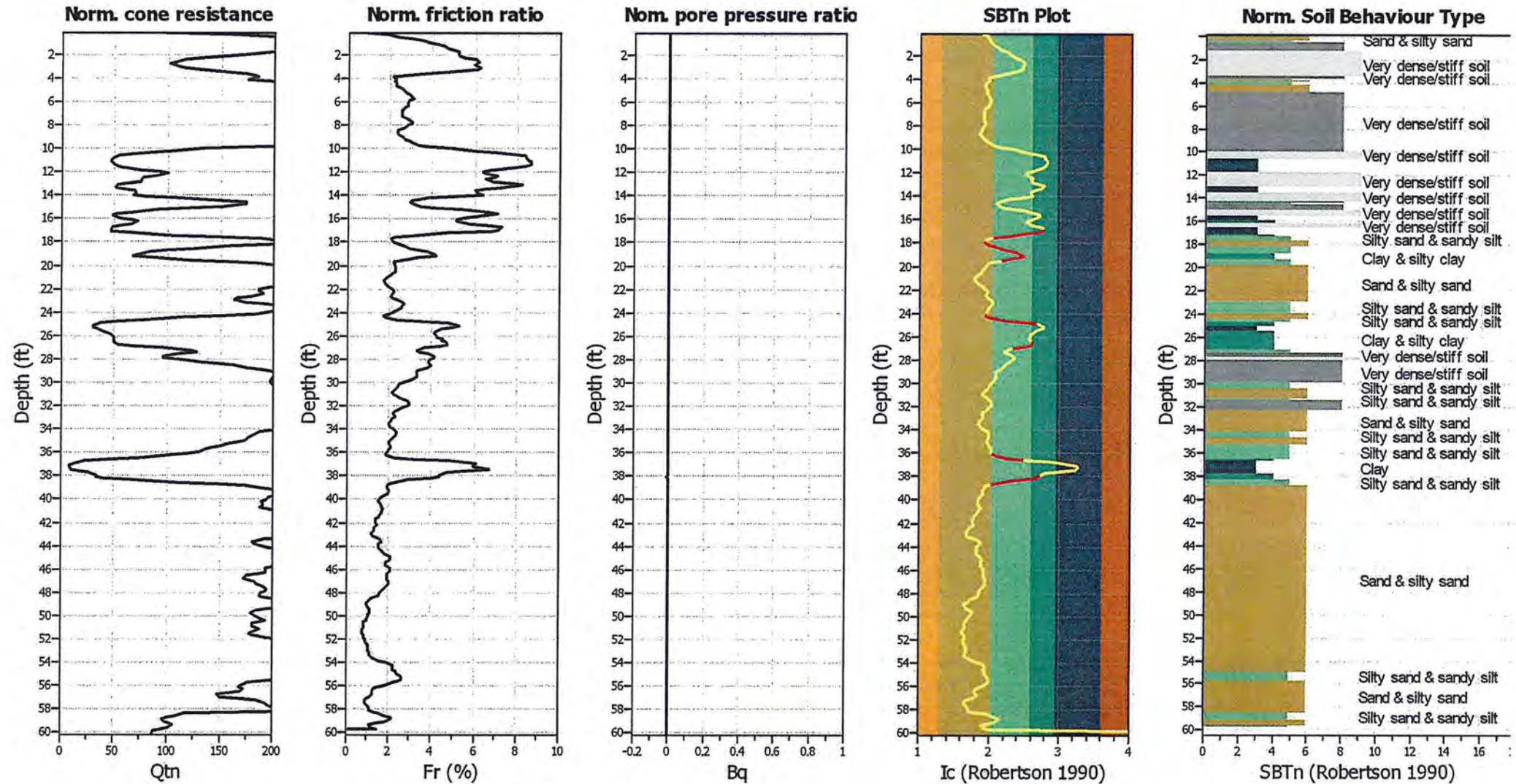
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results Interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _o applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	58.00 ft

SBT legend

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

CPT basic interpretation plots (normalized)



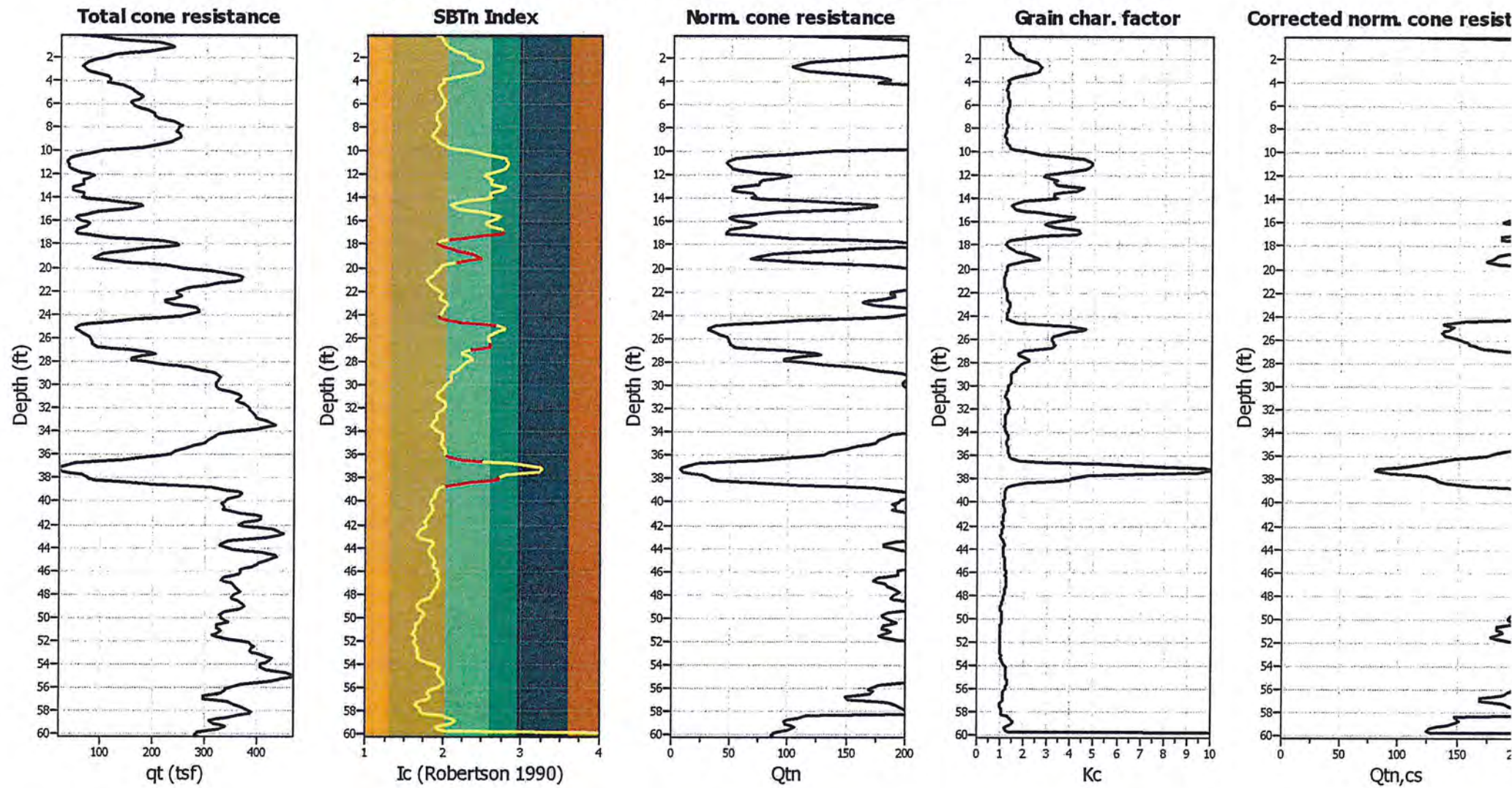
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect, applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _a applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	58.00 ft

SBTn legend

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

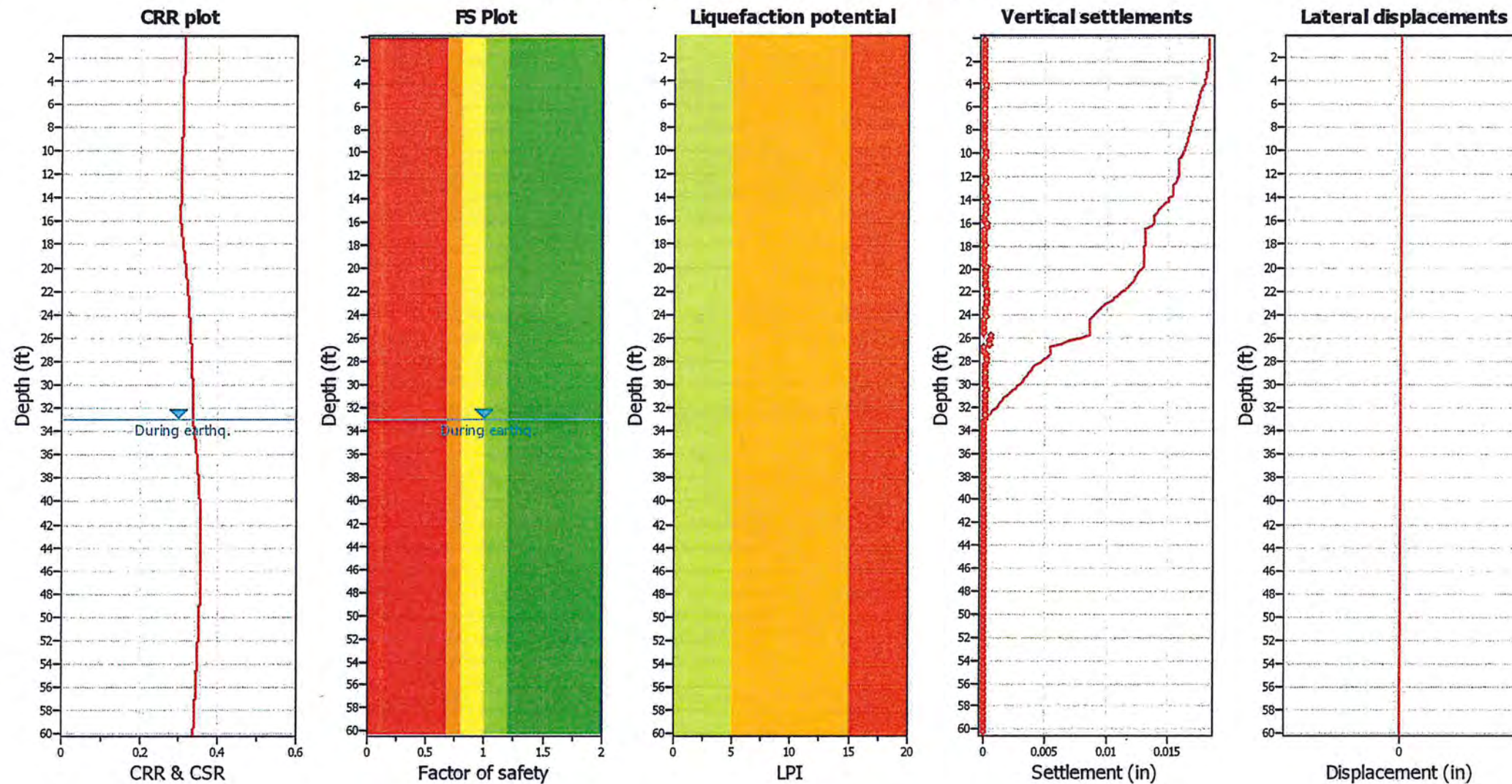
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K _c applied:	Yes
Earthquake magnitude M _w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (Insitu):	33.00 ft	Fill height:	N/A	Limit depth:	58.00 ft

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	33.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect, applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_0 applied:	Yes
Earthquake magnitude M_w :	6.62	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.51	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	33.00 ft	Fill height:	N/A	Limit depth:	58.00 ft

F.S. color scheme

Almost certain it will liquefy
Very likely to liquefy
Liquefaction and no liquefaction are equally likely
Unlike to liquefy
Almost certain it will not liquefy

LPI color scheme

Very high risk
High risk
Low risk