

LOG OF TEST BORING B-5

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density Ring
ST	Shelby Tube	NG	Nuclear Gauge Test
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential		

Date Drilled: 3/28/14 Equipment: Diedrich D-50
 Logged By: TSW Auger Type: 3 1/4 inch Hollow Stem
 Existing Elevation: 663.0 feet Drive Type: 140 lbs/ 30 inches
 Proposed Elevation: 676.0 feet Depth to Water: N/A

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0	663		SM	Colluvium (Qcol): Dark brown, damp, loose, fine- grained, SILTY SAND, slightly micaceous ----- Loose to medium dense.	50/6"	Cal**				
5	658				20	Cal	4.7	94.7		
					13	Cal	5.7	110.8		CP
10	653		SP	Light brown, damp, loose to medium dense, POORLY GRADED SAND, friable.	13	Cal	2.5	99.2		
15	648		SM	Grayish brown, damp, medium dense, fine-to course-grained, SILTY SAND.	25	Cal	10.5	110.2		
20	643		SM	Grayish brown, damp, medium dense, fine grained, SILTY SAND with CLAY.						
			GM	Grayish brown, moist, medium dense, SILTY GRAVEL.	50/3"	Cal	10.1	105.4		
			SC	Grayish brown, moist, medium dense, CLAYEY SAND.						
25	638			----- Light gray.	50/2"	SPT				
			SM	Decomposed Metamorphic Rock (Kjms): Grayish brown, damp, very dense, fine grained, SILTY SAND with gravel to cobble-sized rock.	80/3"	SPT				
30	633			Terminated @ 30'. No seepage or groundwater encountered.						

Notes:

Symbol Legend

▽	Groundwater Level During Drilling
▼	Groundwater Level After Drilling
??	Apparent Seepage
*	No Sample Recovery
**	Erroneous Blow Count (rocks present)

LAKE JENNINGS MARKETPLACE
 LAKE JENNINGS PARK ROAD AND OLDE HWY 80
 SAN DIEGO COUNTY, CALIFORNIA

DATE: JUNE 2014

JOB NO.: 2140061.02

BY: MWL

APPENDIX NO.: A-11



CHRISTIAN WHEELER
 ENGINEERING

LOG OF TEST BORING B-6

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density Ring
ST	Shelby Tube	NG	Nuclear Gauge Test
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential		

Date Drilled: 3/28/14 Equipment: Diedrich D-50
 Logged By: TSW Auger Type: 3 1/4 inch Hollow Stem
 Existing Elevation: 687.0 feet Drive Type: 140 lbs/ 30 inches
 Proposed Elevation: 687.0 feet Depth to Water: N/A

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0	687		SM	Topsoil: Grayish brown, damp, loose, fine- grained, SILTY SAND with gravel to cobble-sized rock..							
			SM	Decomposed Metamorphic Rock (KJms): Light reddish brown, damp, very dense, very fine to fine-grained, SILTY SAND with gravel to cobble-sized rock.							
5	682			Drilling difficulty increased. @ 7'. Grades to fractured rock.							
10	677			Practical drill refusal @ 9.5'. No seepage or groundwater encountered.							
15	672										
20	667										
25	662										
30	657										

Notes:

Symbol Legend

-  Groundwater Level During Drilling
-  Groundwater Level After Drilling
-  Apparent Seepage
-  No Sample Recovery
-  Erroneous Blow Count (rocks present)

LAKE JENNINGS MARKETPLACE
 LAKE JENNINGS PARK ROAD AND OLDE HWY 80
 SAN DIEGO COUNTY, CALIFORNIA

DATE: JUNE 2014

JOB NO.: 2140061.02

BY: MWL

APPENDIX NO.: A-12



CHRISTIAN WHEELER
ENGINEERING

LOG OF TEST BORING B-7

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk Density
SPT	Standard Penetration Test	DR	Density Ring
ST	Shelby Tube	NG	Nuclear Gauge Test
MD	Max Density	DS	Direct Shear
SO4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential		

Date Drilled: 3/28/14 Equipment: Diedrich D-50
 Logged By: TSW Auger Type: 3 1/4 inch Hollow Stem
 Existing Elevation: 690.0 feet Drive Type: 140 lbs/ 30 inches
 Proposed Elevation: 682.0 feet Depth to Water: N/A

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0	690		SM	Topsoil: Gray to brown, damp, loose, fine- grained, SILTY SAND with gravel to cobble-sized rock..							
			SM	Decomposed Metamorphic Rock (Kfms): Light reddish-brown, damp, very dense, SILTY SAND with gravel-sized rock.							
5	685			Drilling difficulty increased.							
				Grades to fractured rock.							
10	680			Practical drill refusal @ 8'. No seepage or groundwater encountered.							
15	675										
20	670										
25	665										
30	660										

Notes:

Symbol Legend

-  Groundwater Level During Drilling
-  Groundwater Level After Drilling
-  Apparent Seepage
-  No Sample Recovery
-  Erroneous Blow Count (rocks present)

LAKE JENNINGS MARKETPLACE
 LAKE JENNINGS PARK ROAD AND OLDE HWY 80
 SAN DIEGO COUNTY, CALIFORNIA

DATE: JUNE 2014

JOB NO.: 2140061.02

BY: MWL

APPENDIX NO.: A-13



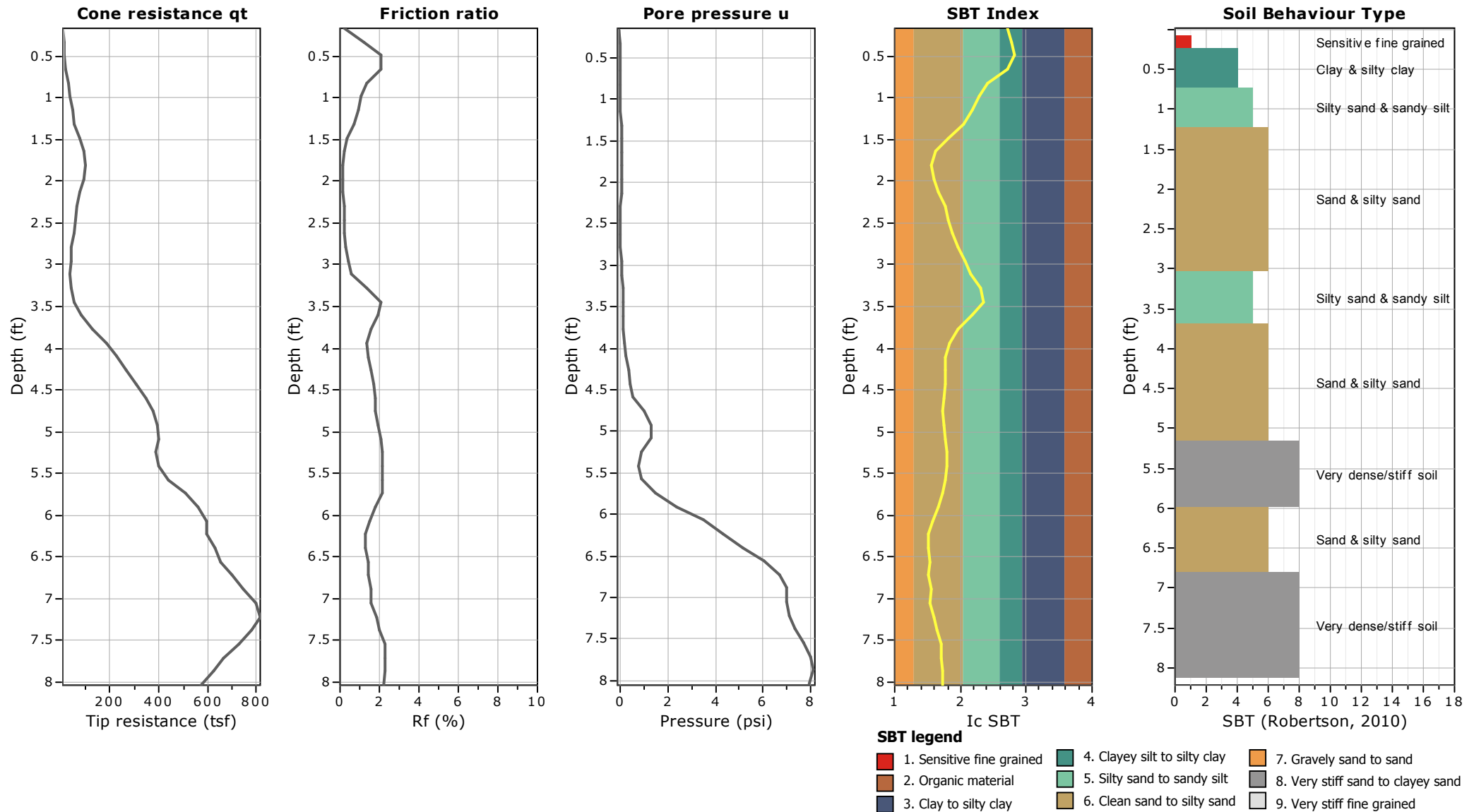
CHRISTIAN WHEELER
 ENGINEERING

APPENDIX B

CPT LOGS

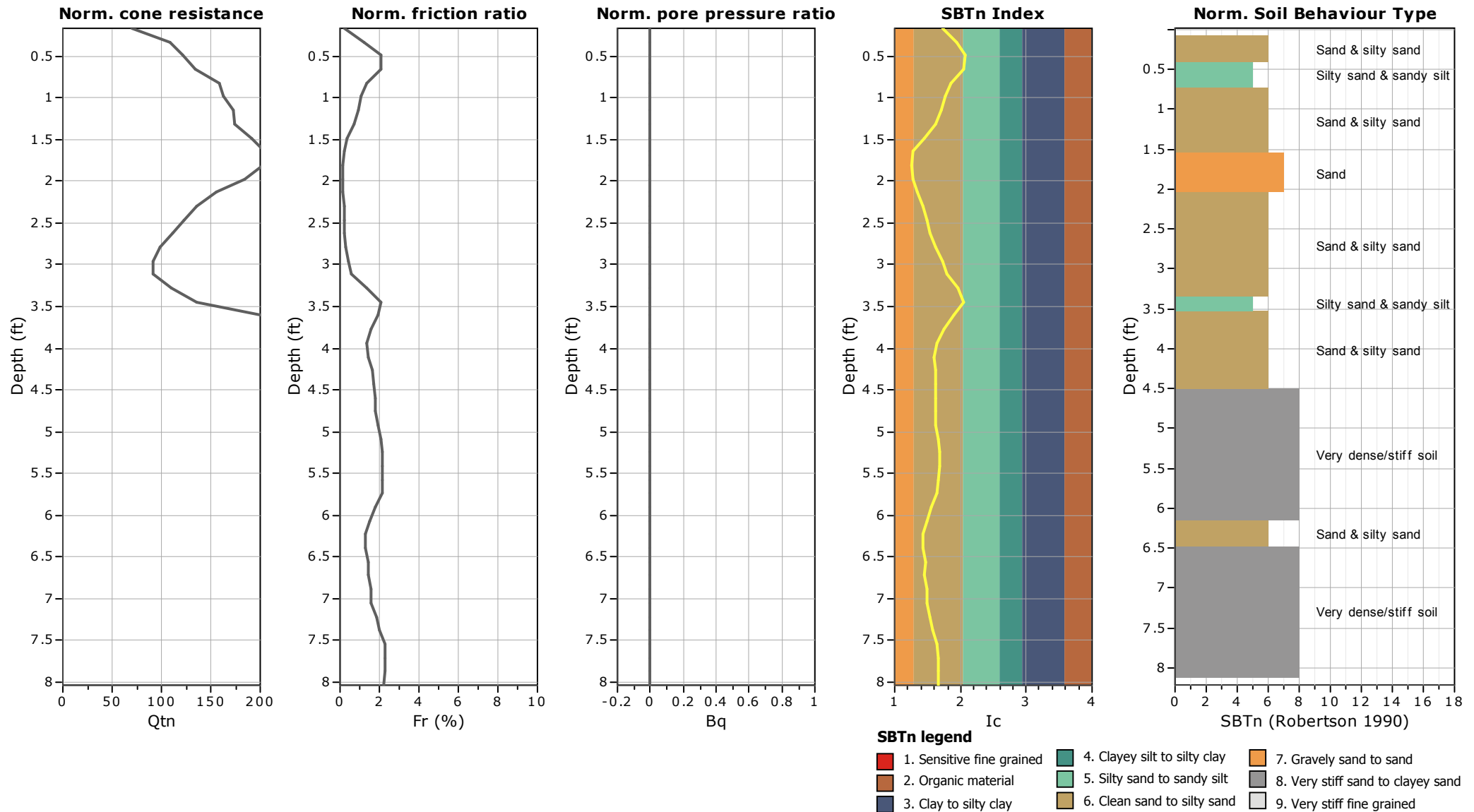
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



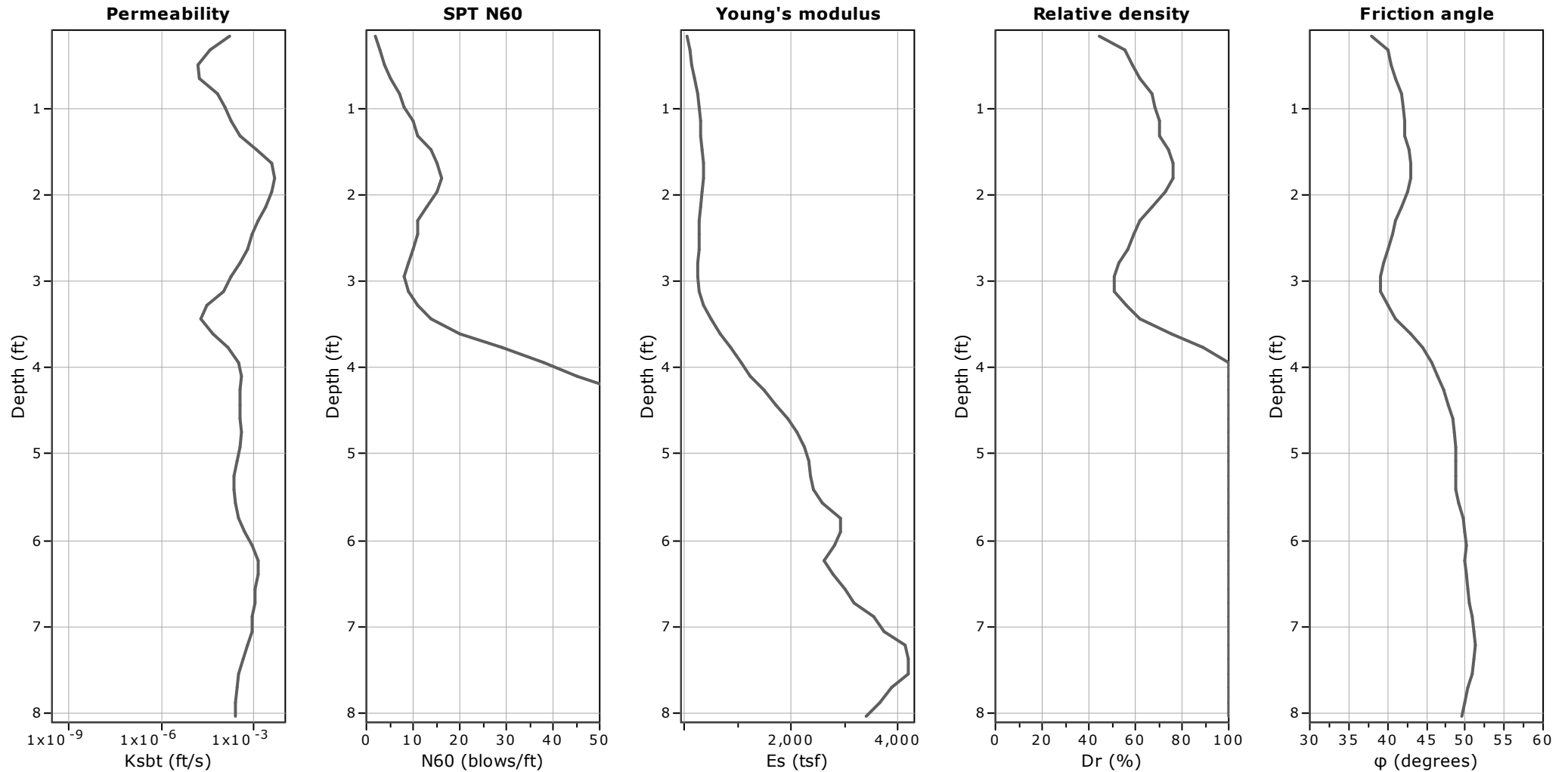
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60} : Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

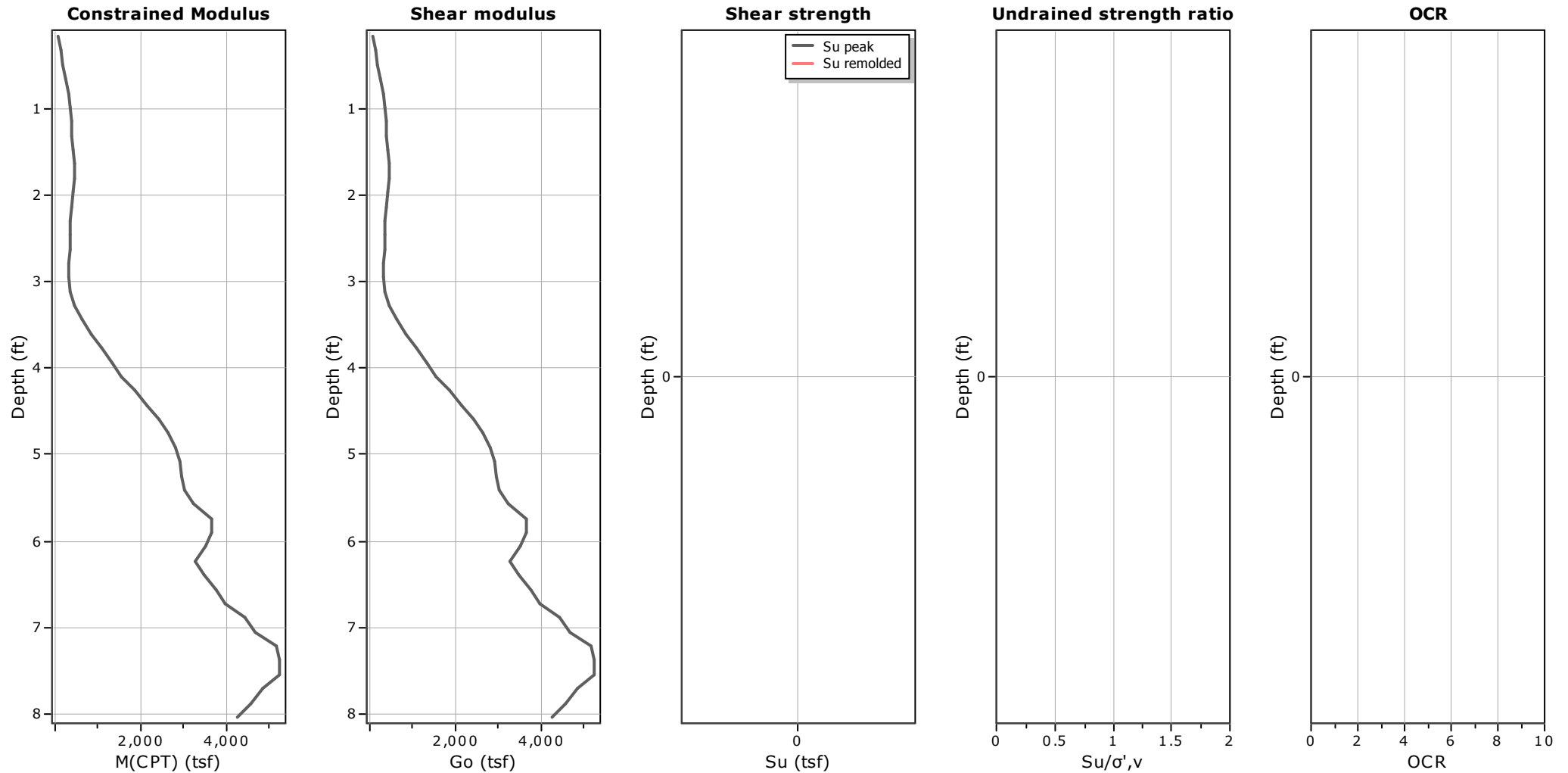
Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

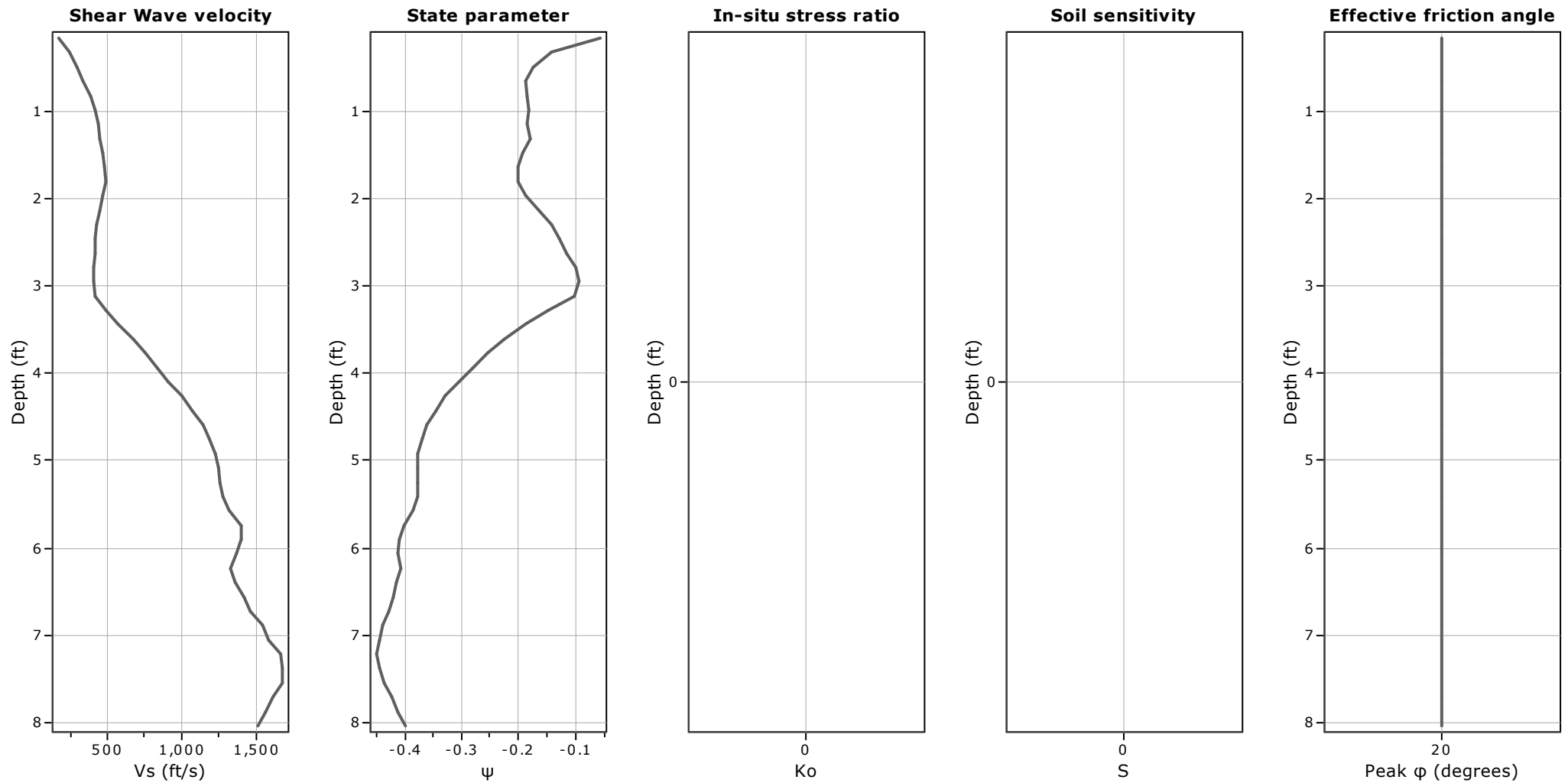
Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



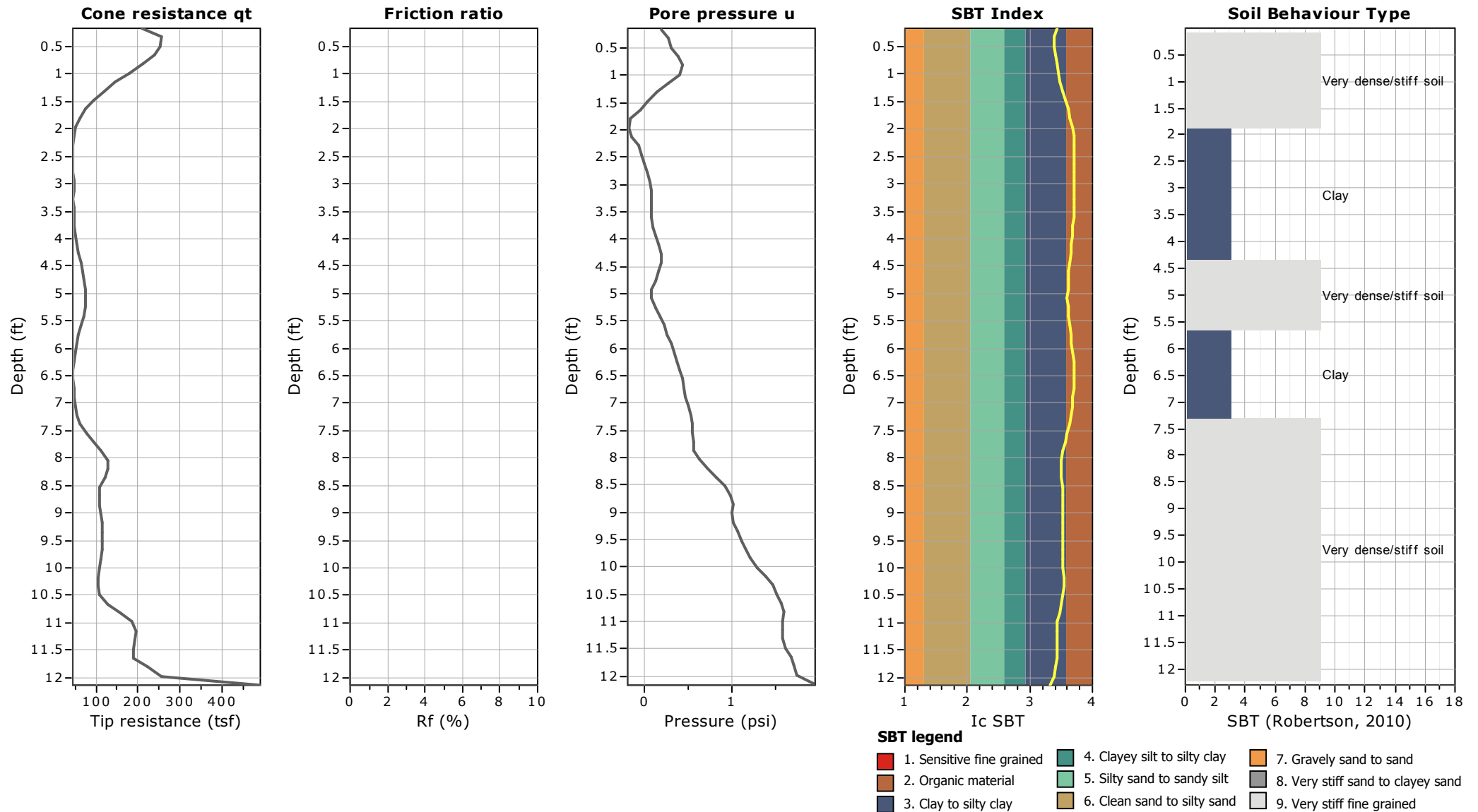
Calculation parameters

Soil Sensitivity factor, Ns: 7.00

—●— User defined estimation data

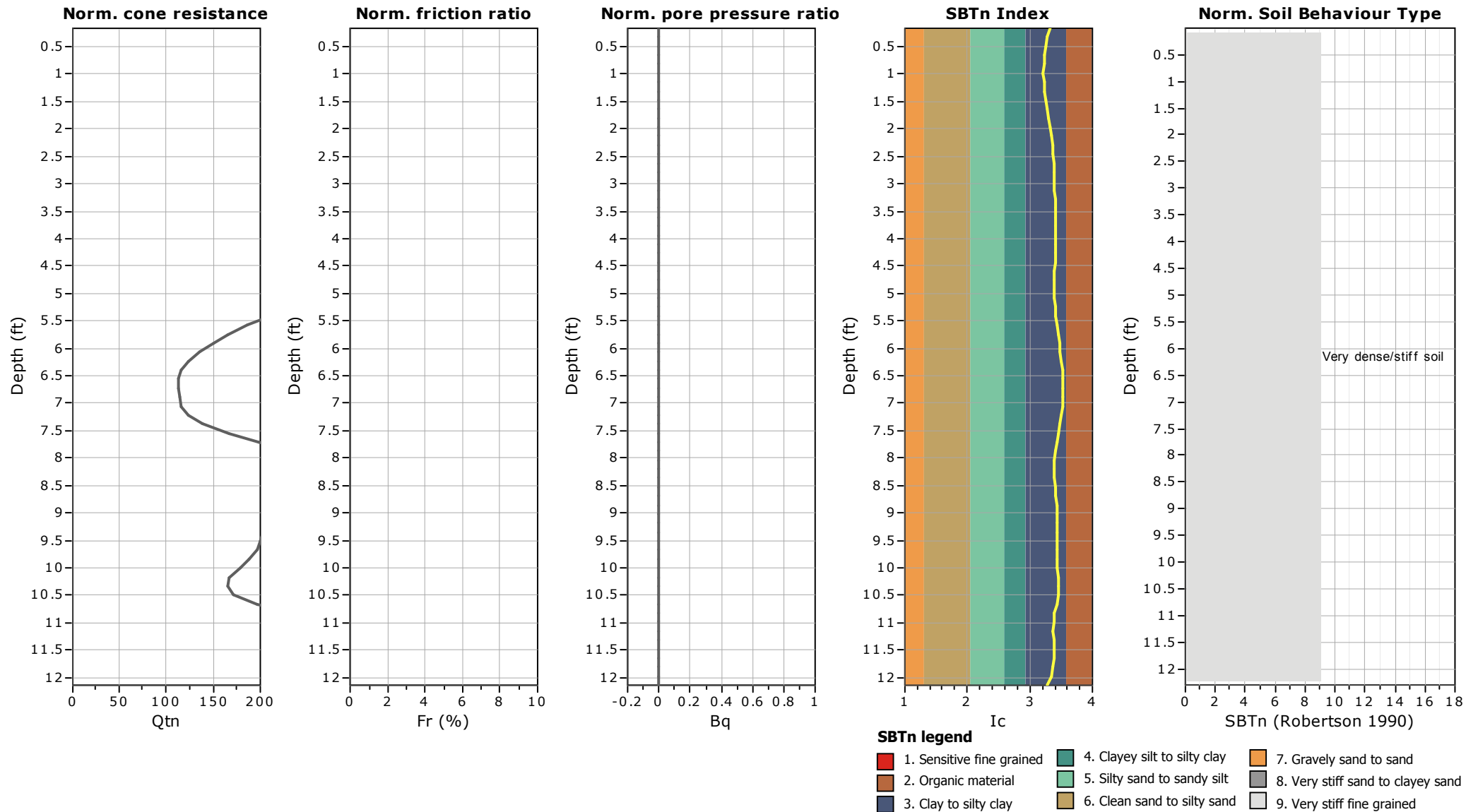
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Christian Wheeler Engineering

3980 Home Avenue
San Diego, CA 92109

CPT: CPT-02

Total depth: 12.14 ft, Date: 3/25/2014

Surface Elevation: 0.00 ft

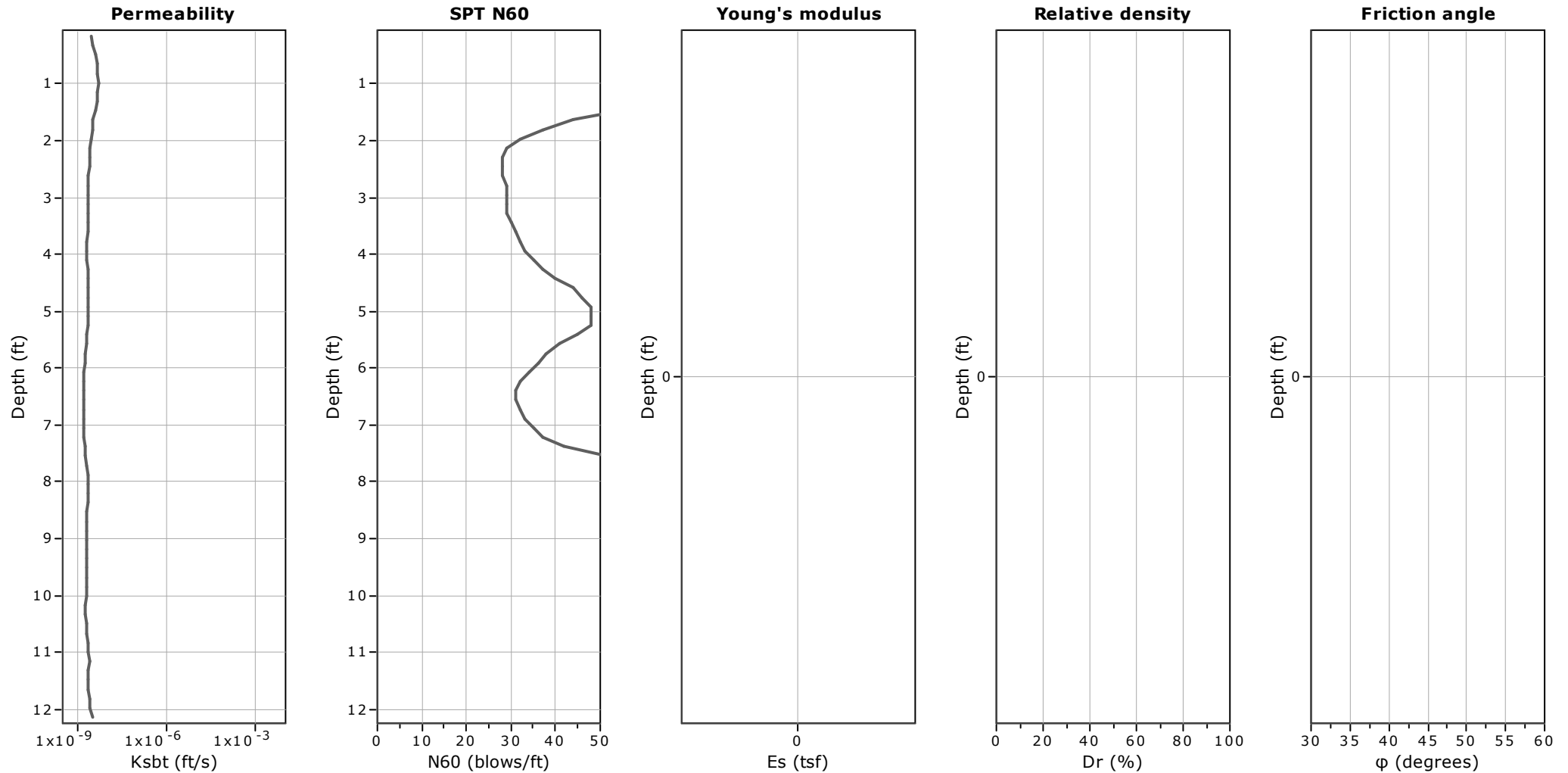
Coords: X:0.00, Y:0.00

Cone Type: Unknown

Cone Operator: Unknown

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

**Calculation parameters**

Permeability: Based on SBT_n

SPT N_{60} : Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

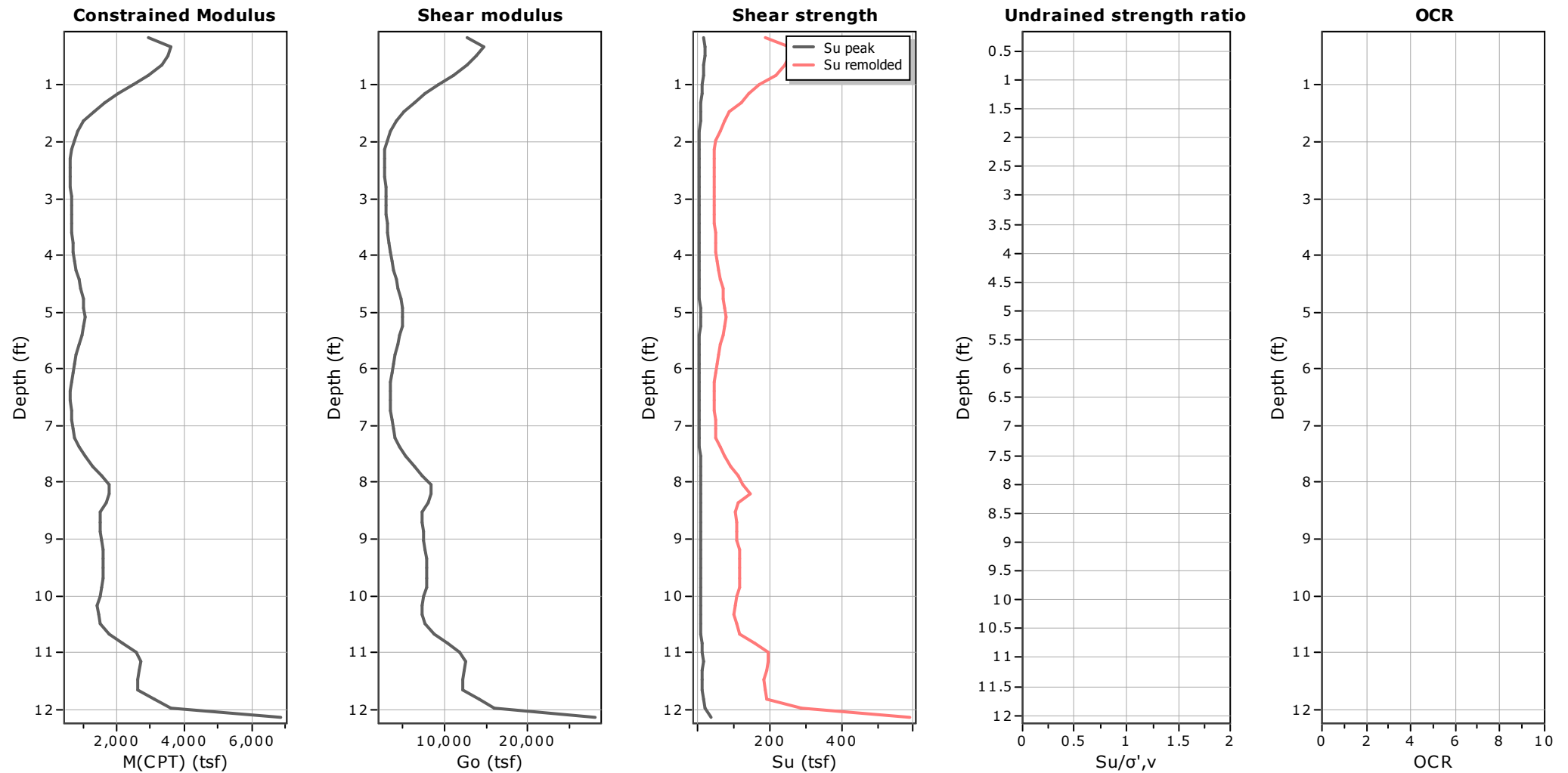
Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{in} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

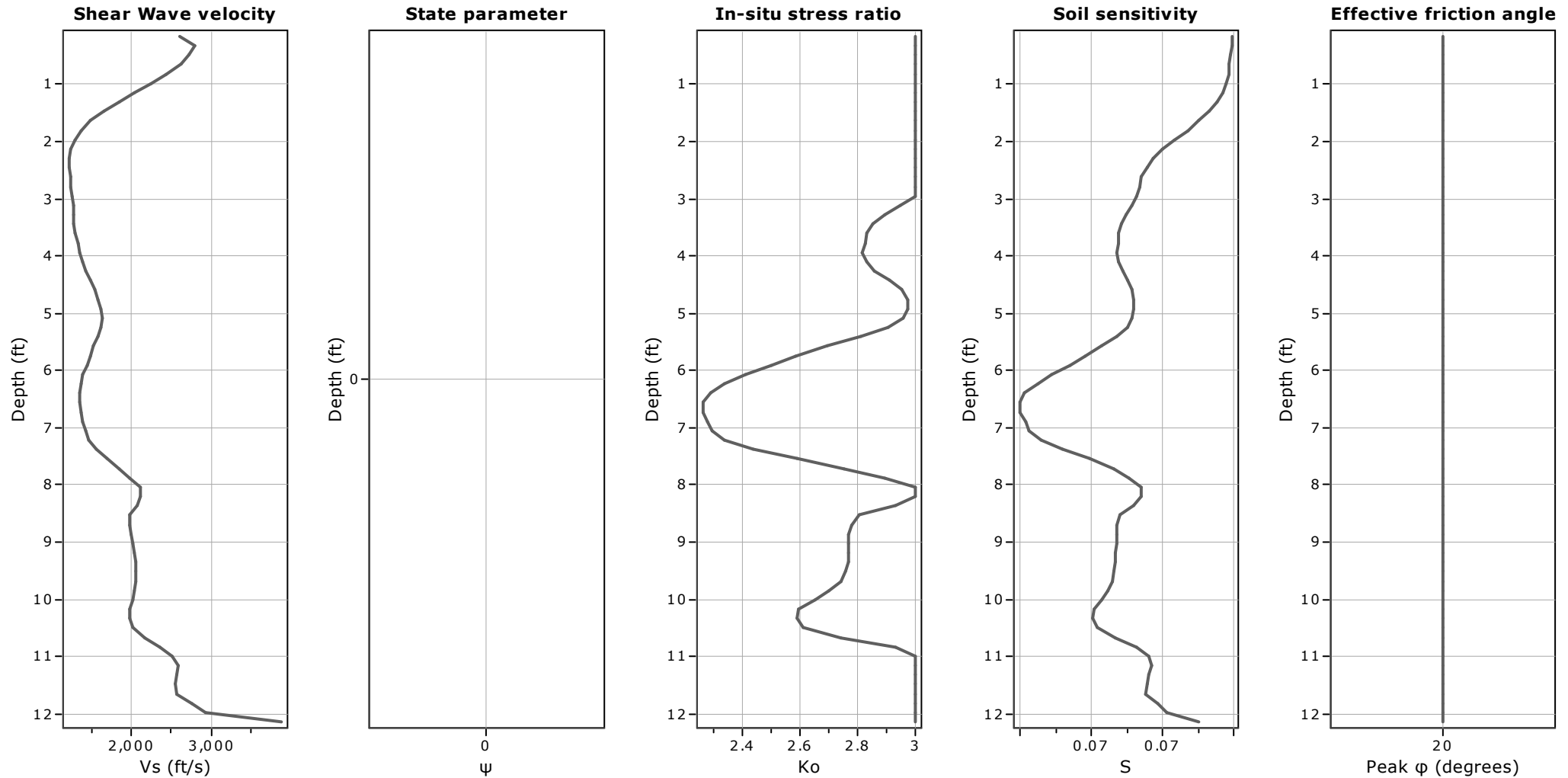
—●— User defined estimation data

Christian Wheeler Engineering

3980 Home Avenue
San Diego, CA 92109

CPT: CPT-02

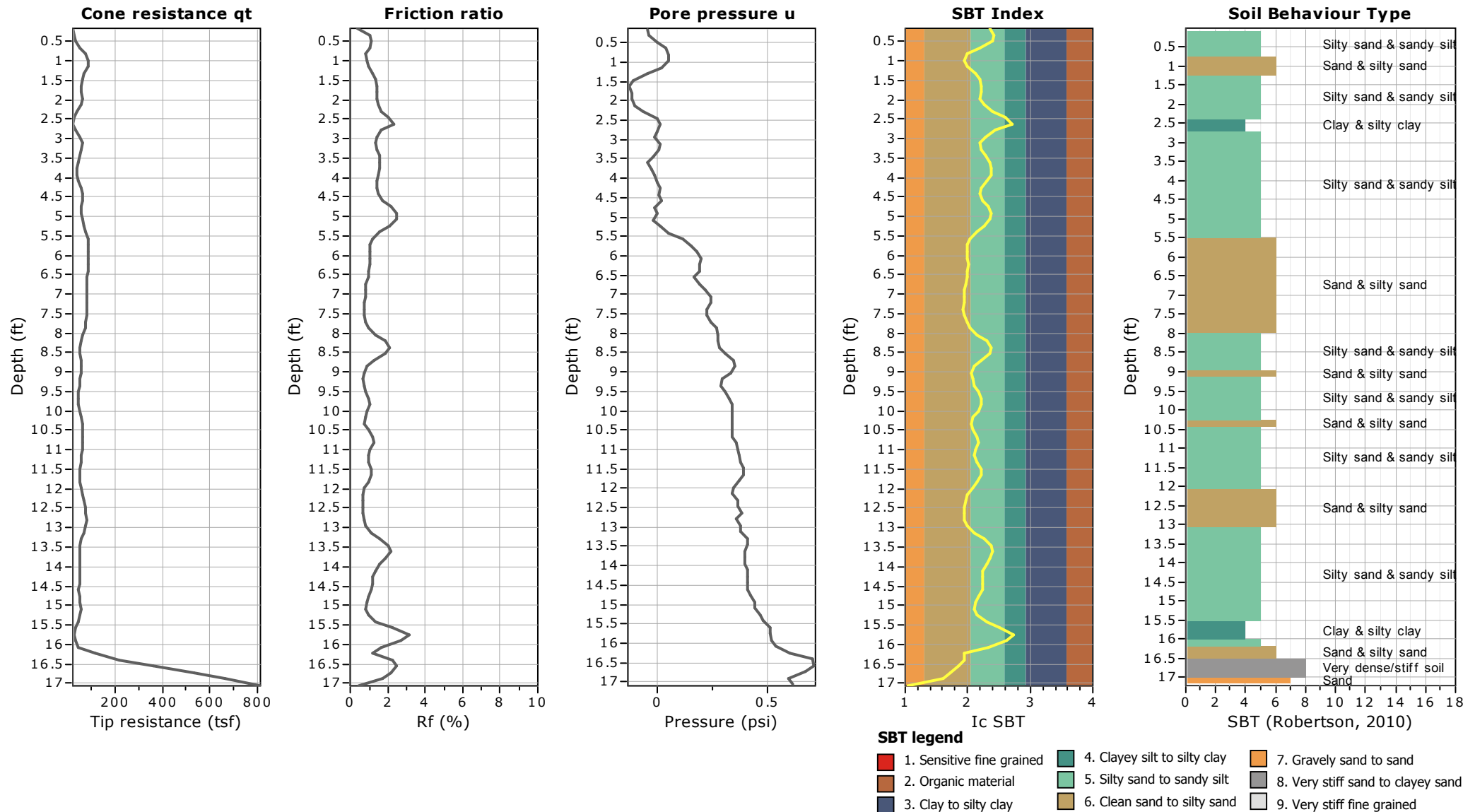
Total depth: 12.14 ft, Date: 3/25/2014
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Unknown
Cone Operator: Unknown

Project: Lake Jennings Marketplace**Location: Lake Jennings Park Road****Calculation parameters**Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

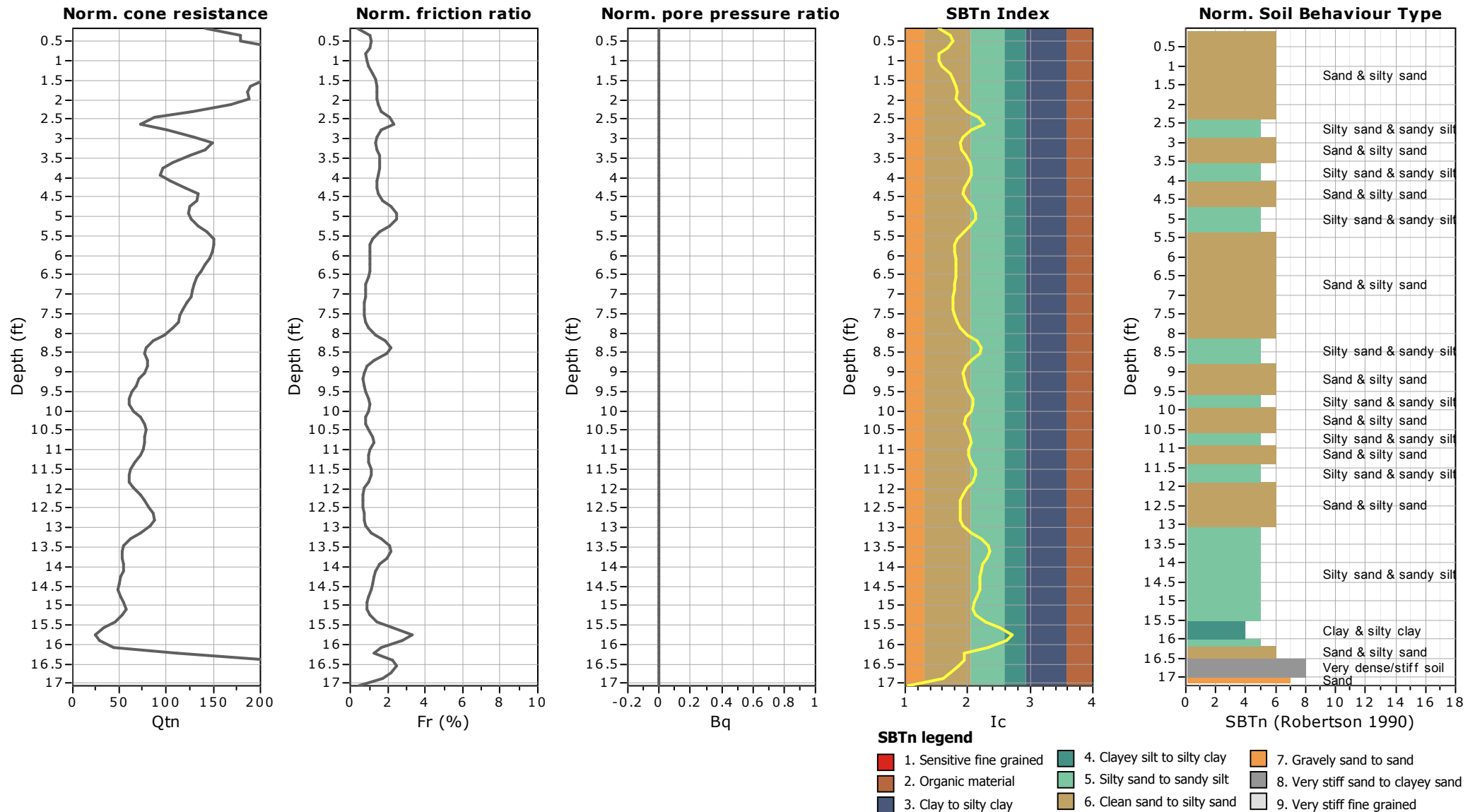
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



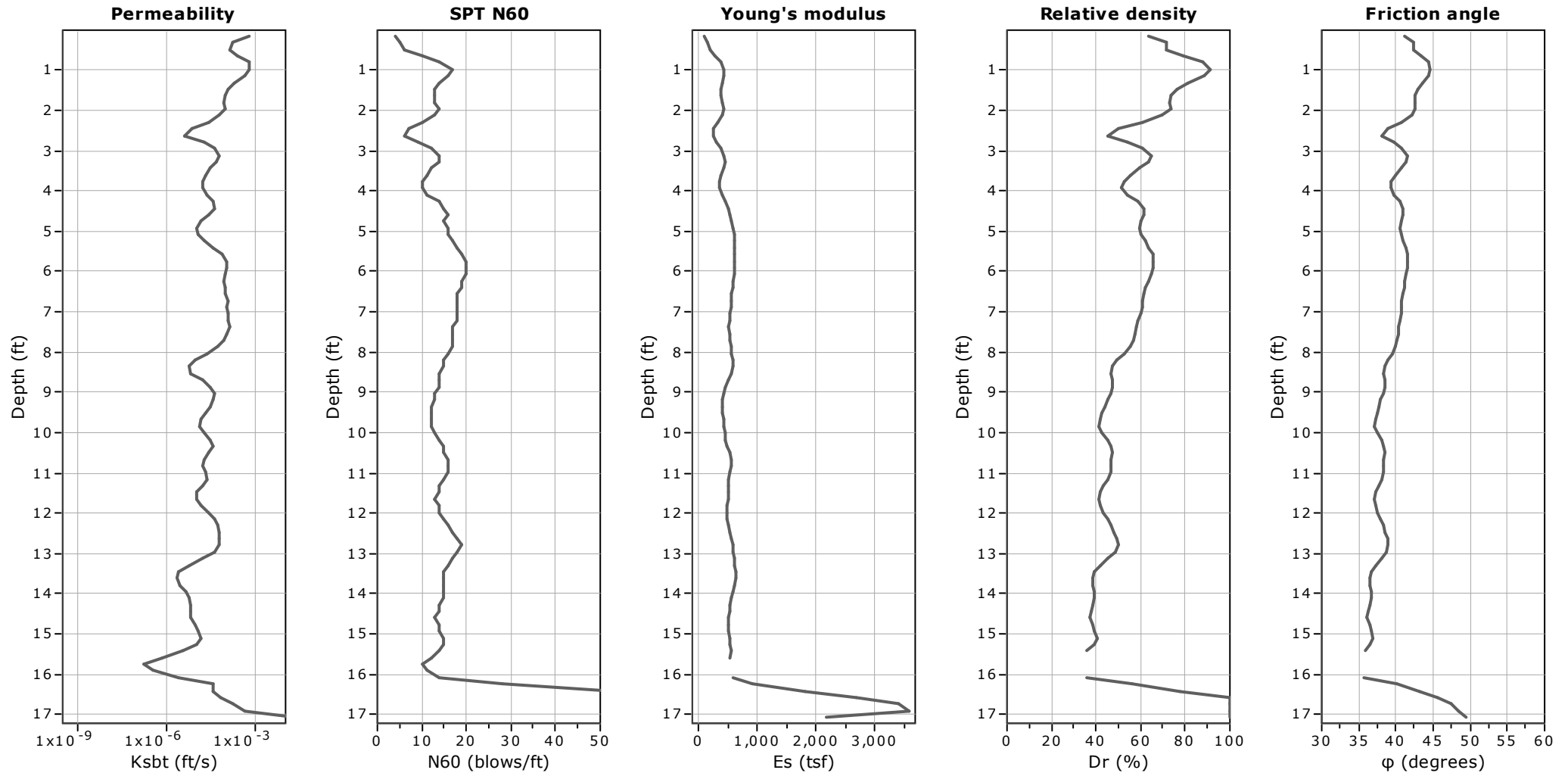
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

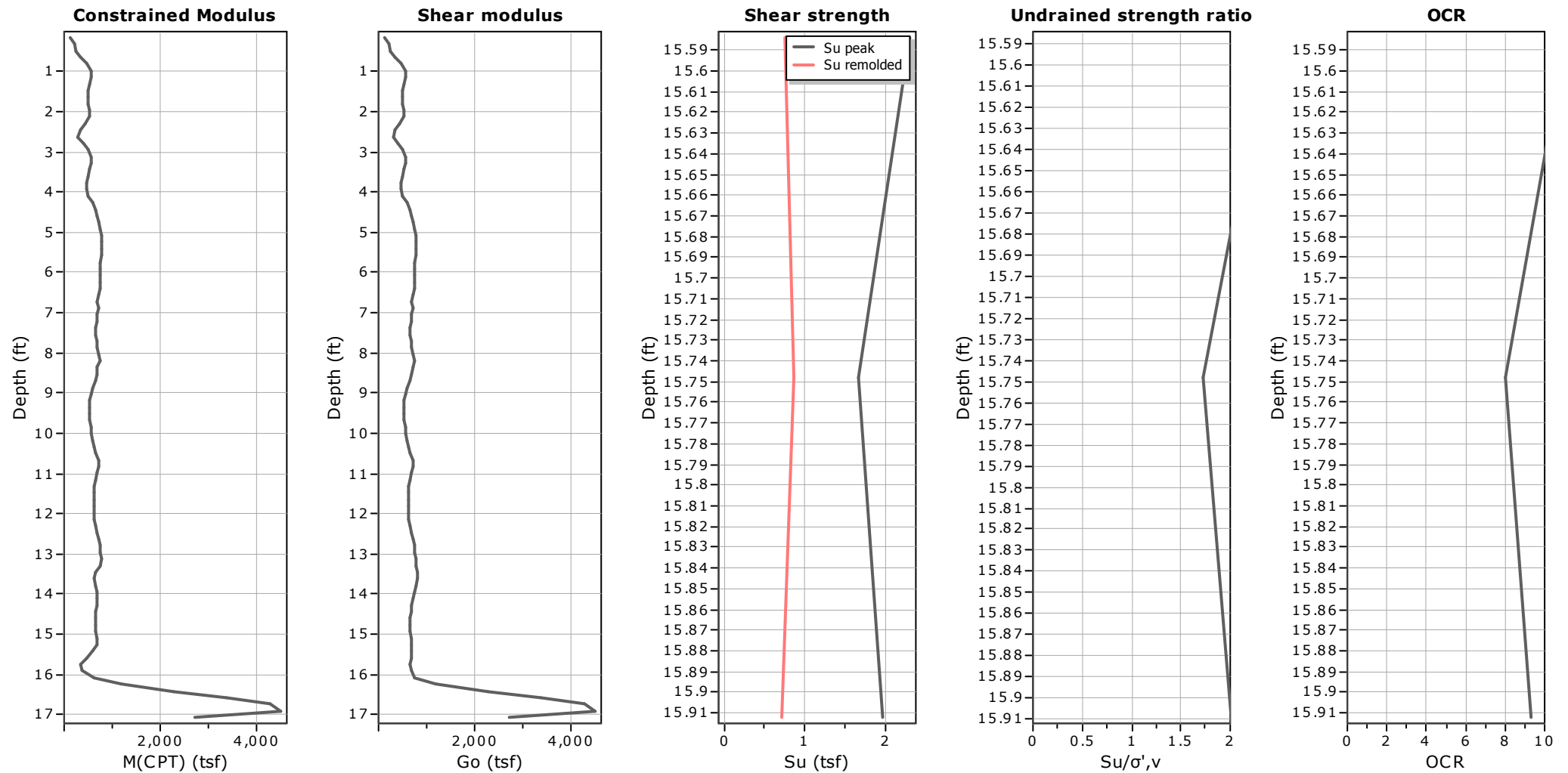
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

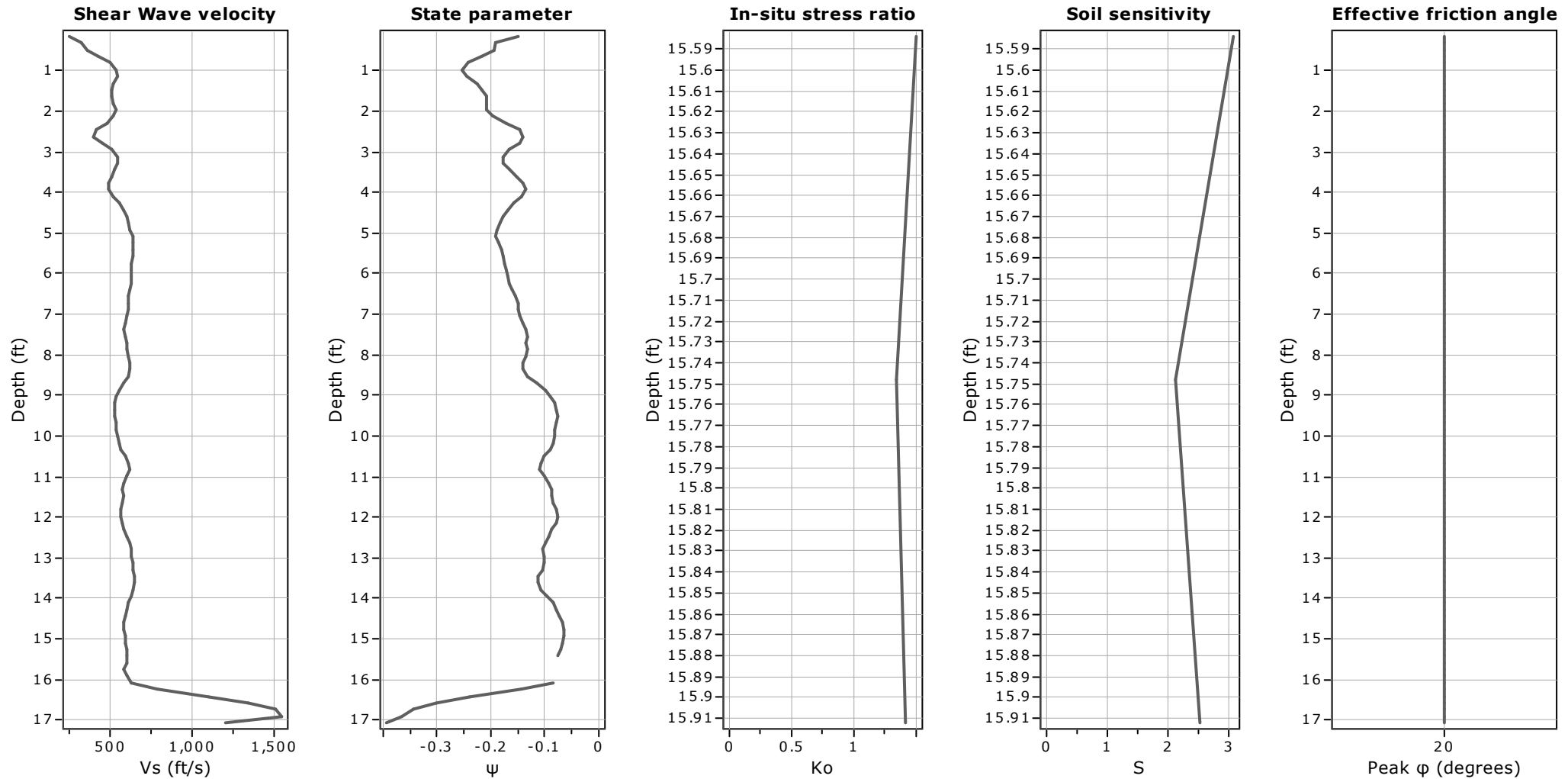
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)Go: Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

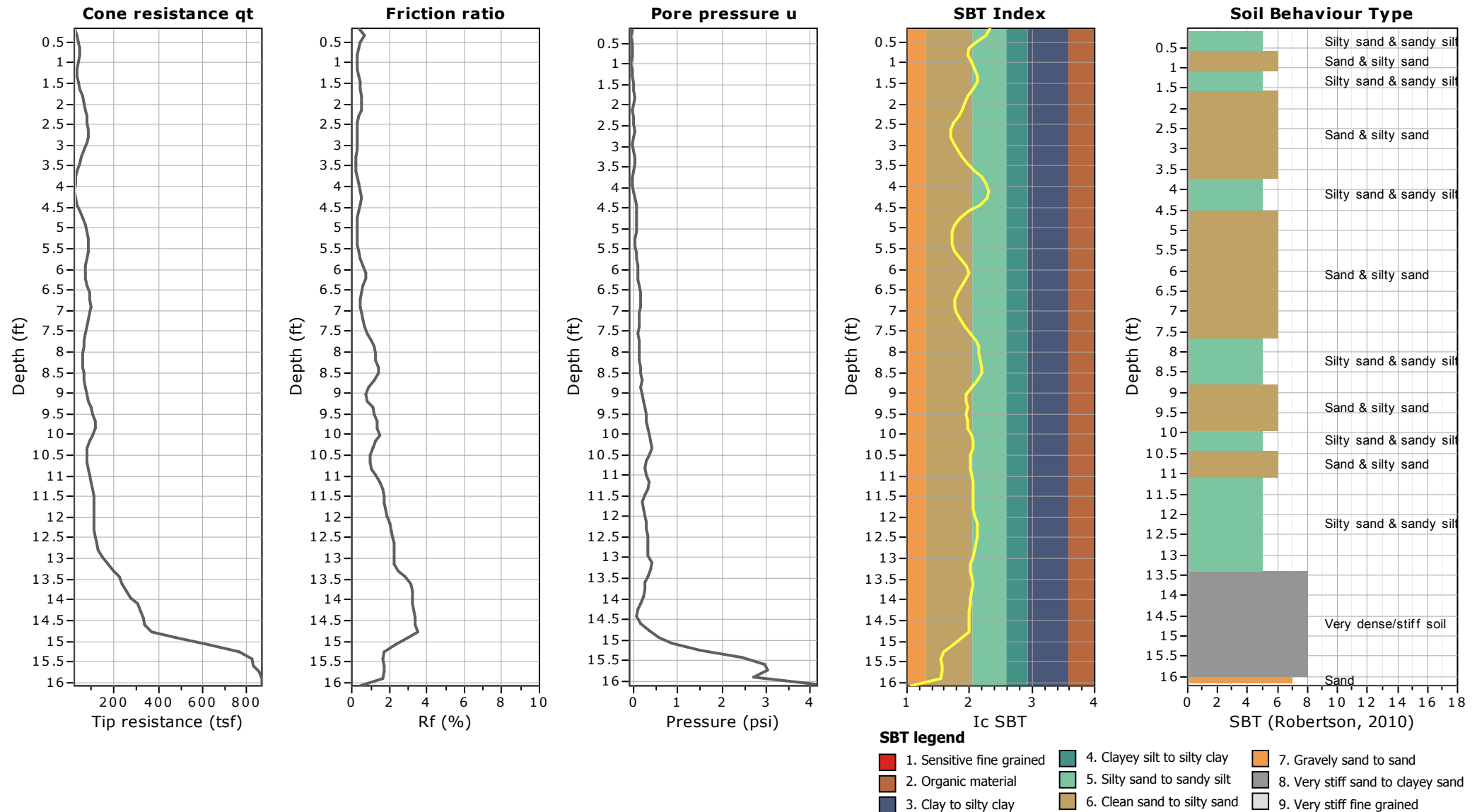
Location: Lake Jennings Park Road

**Calculation parameters**Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

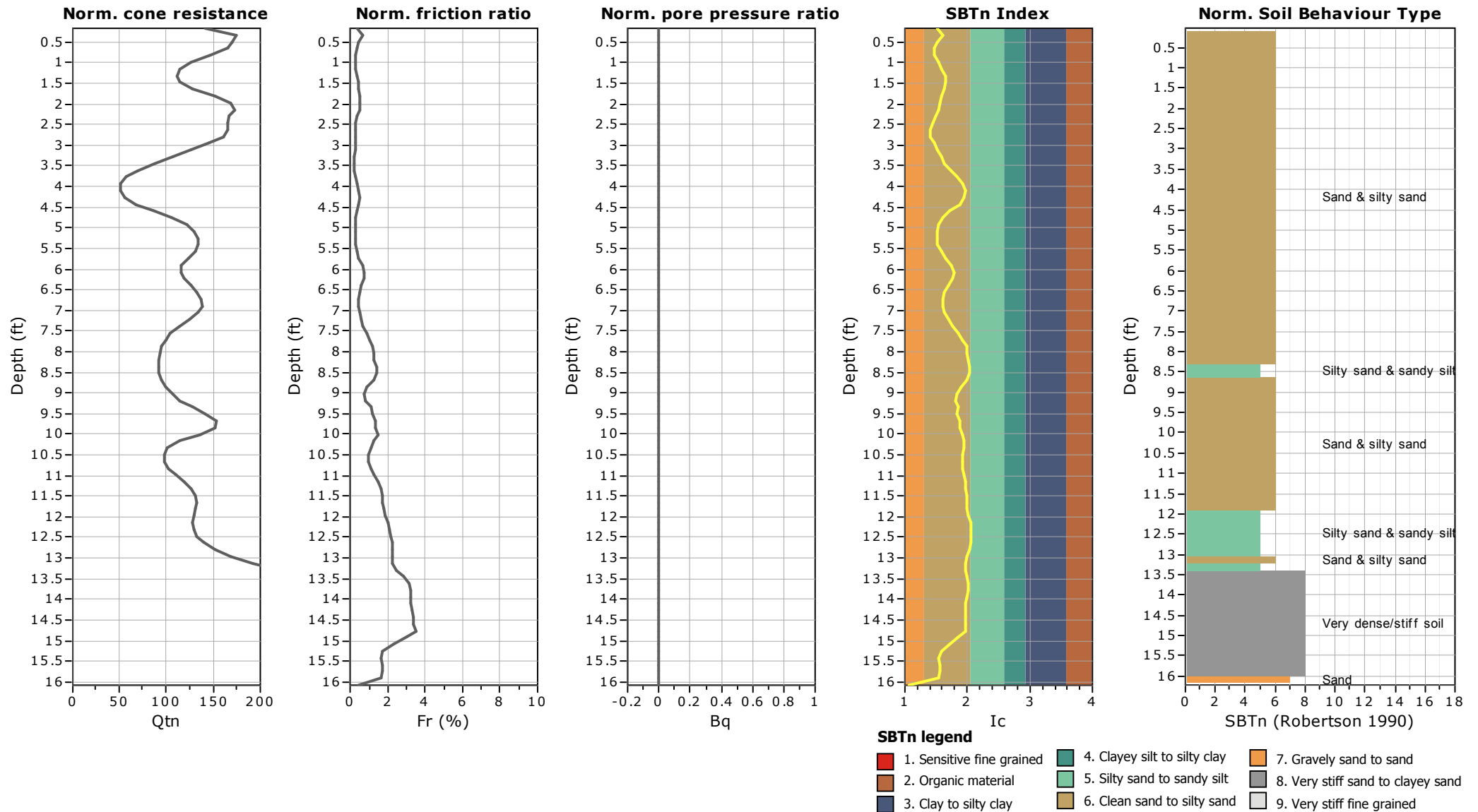
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



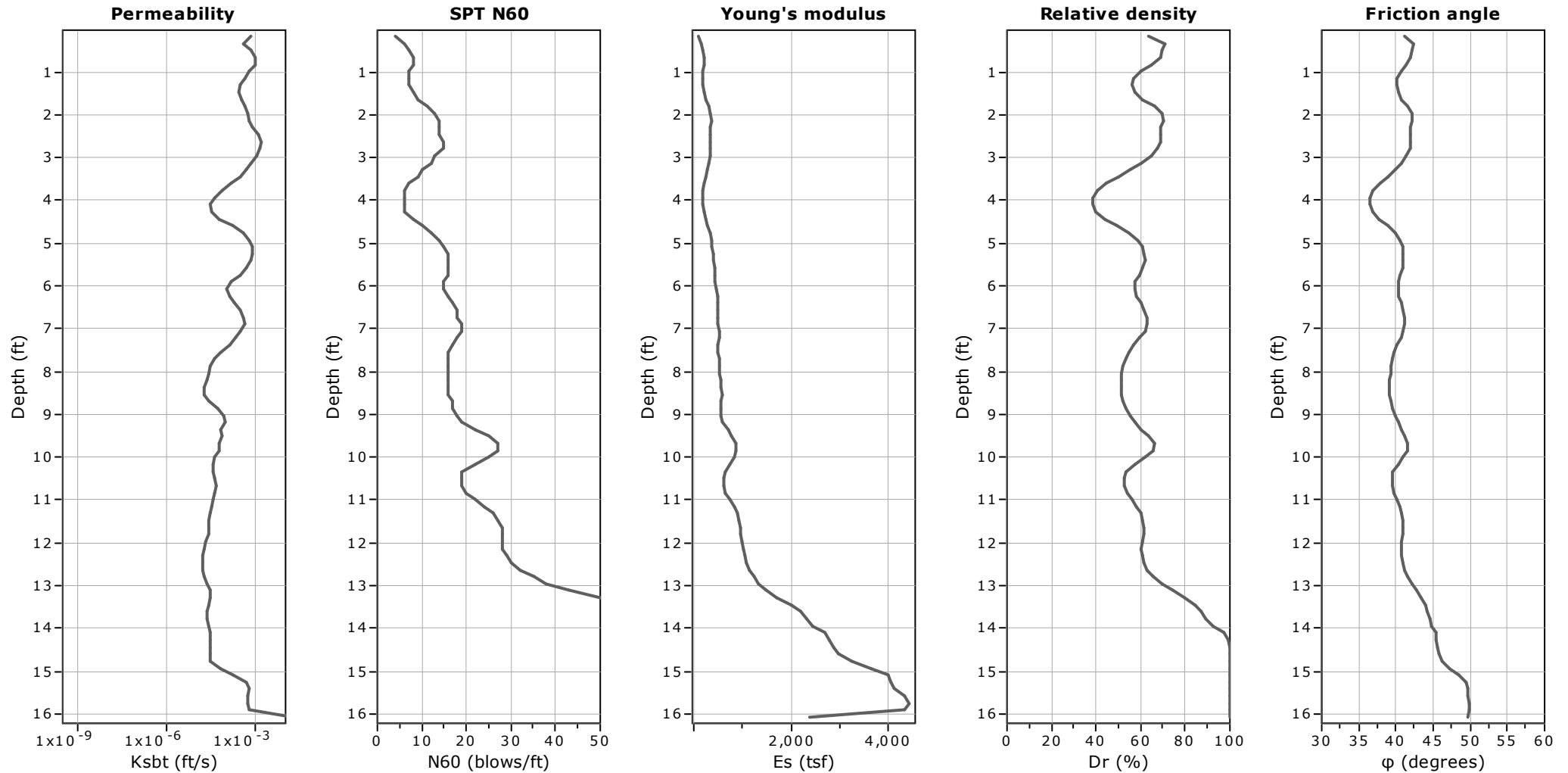
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

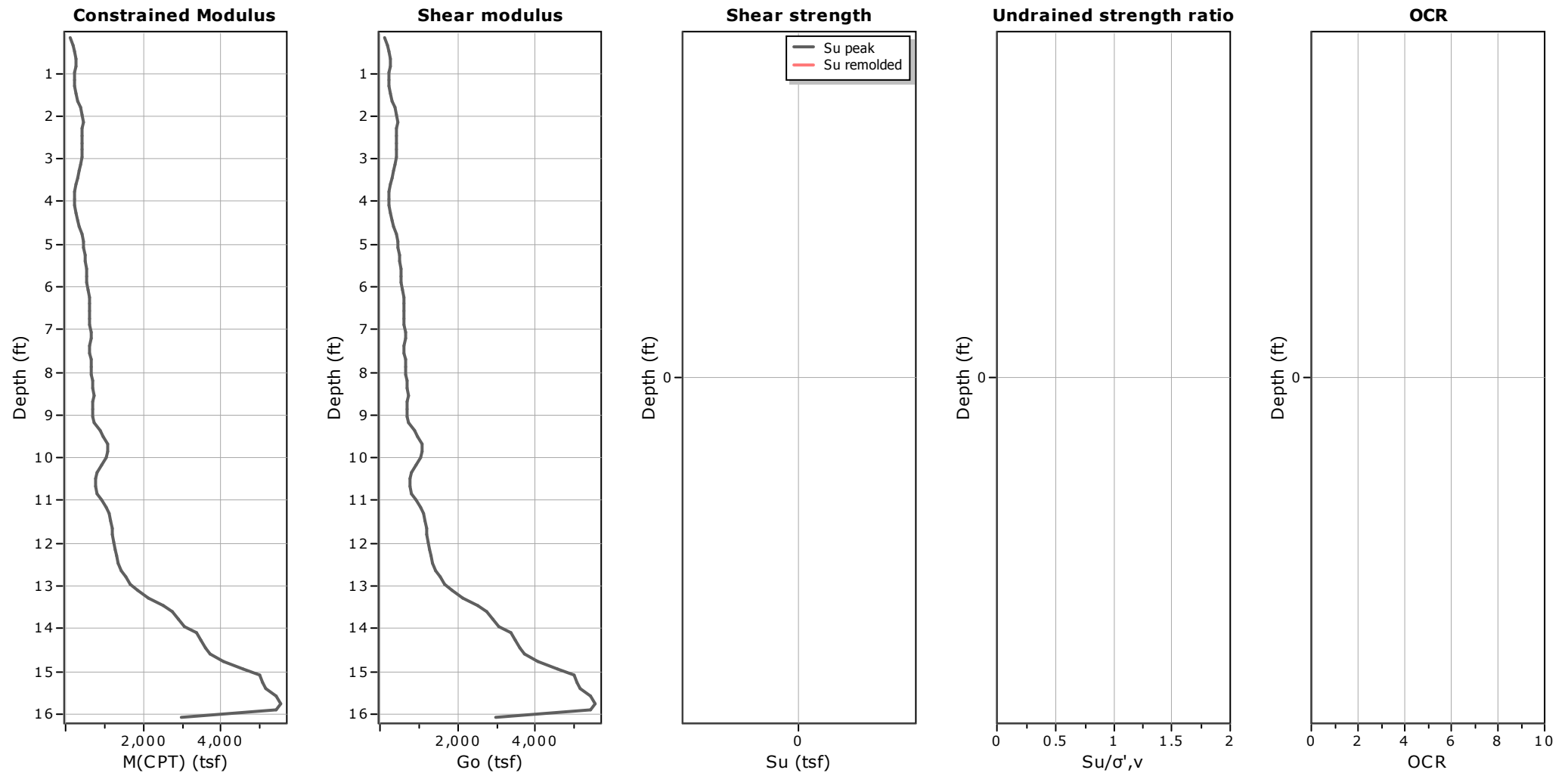
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

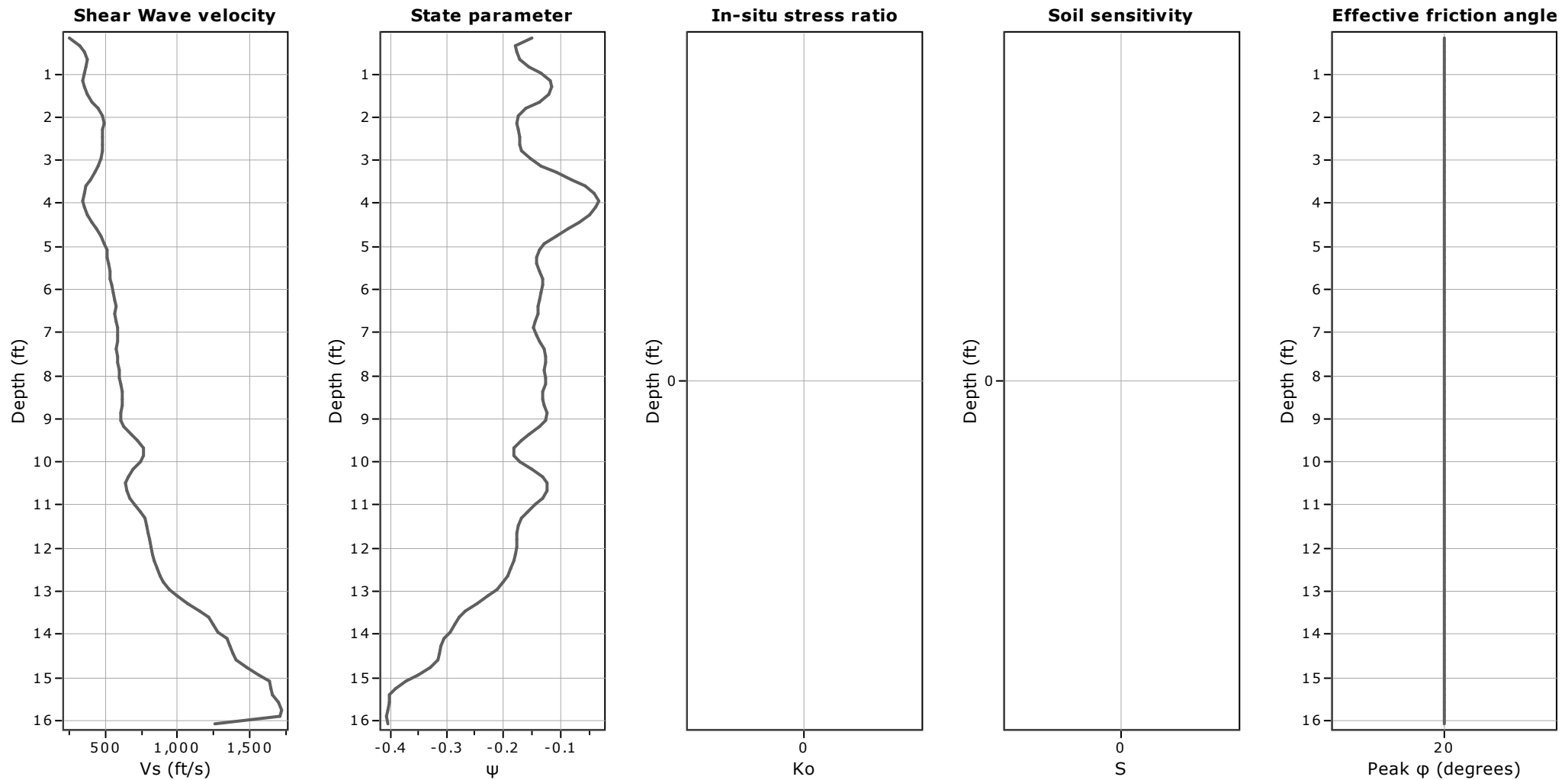
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)Go: Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



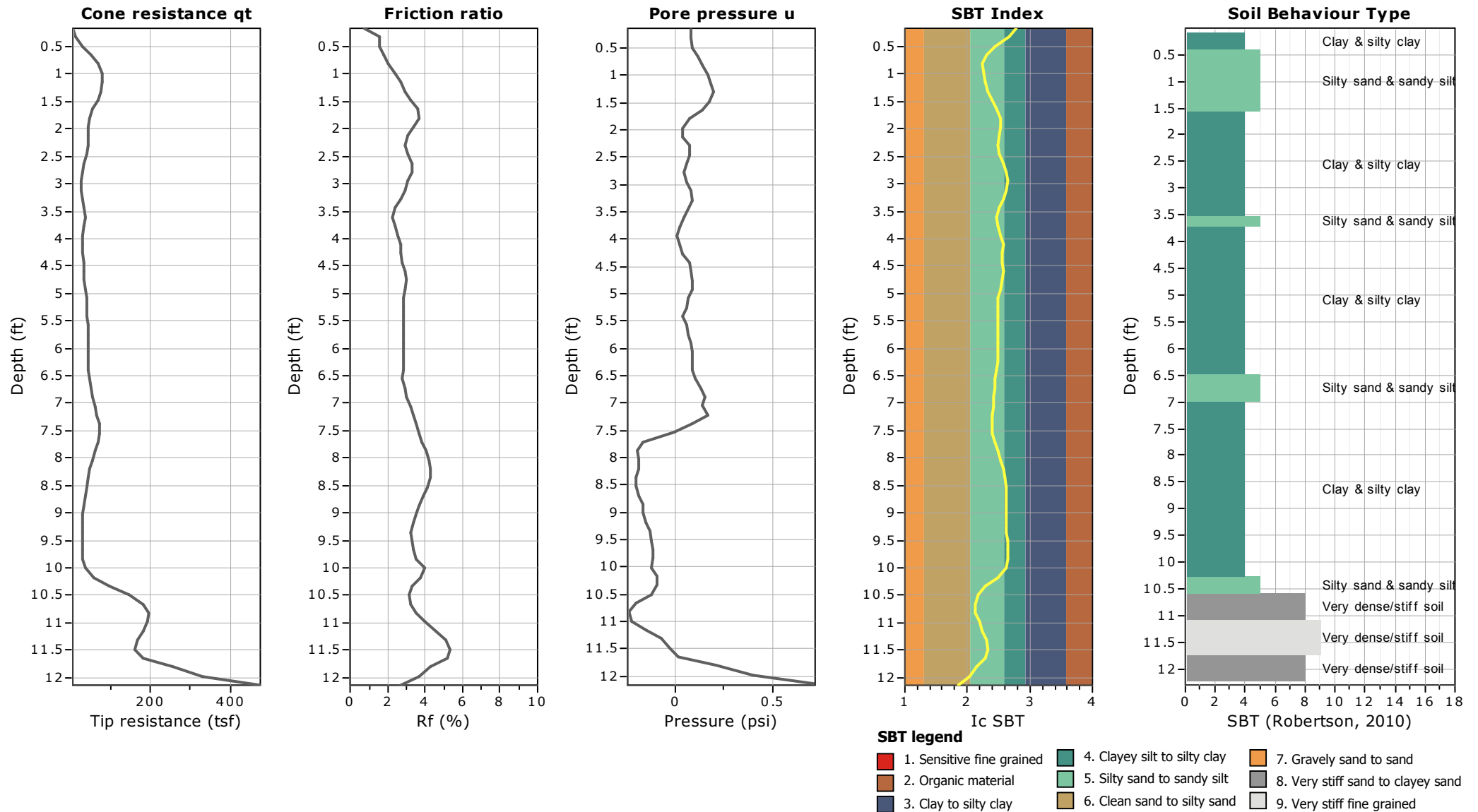
Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

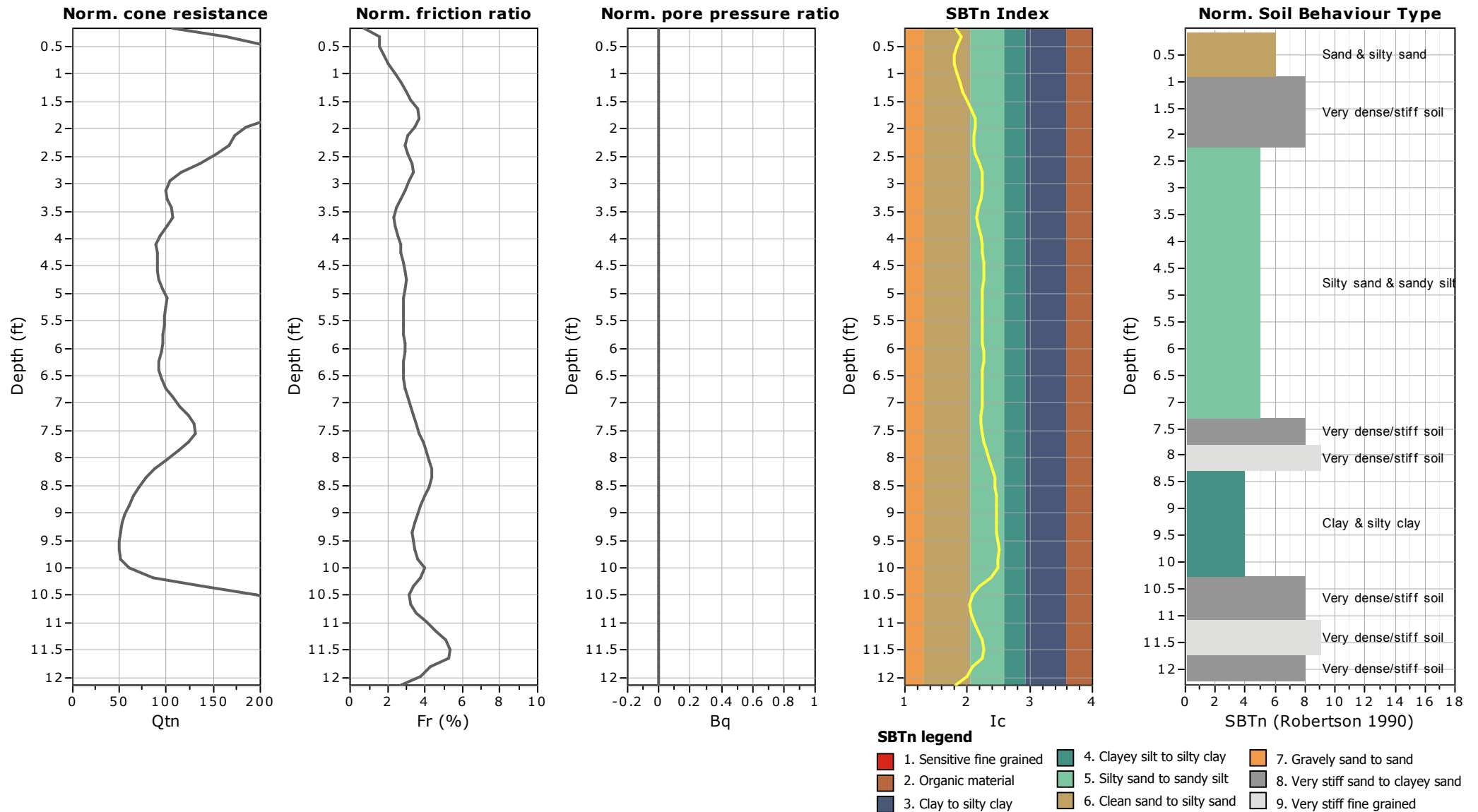
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



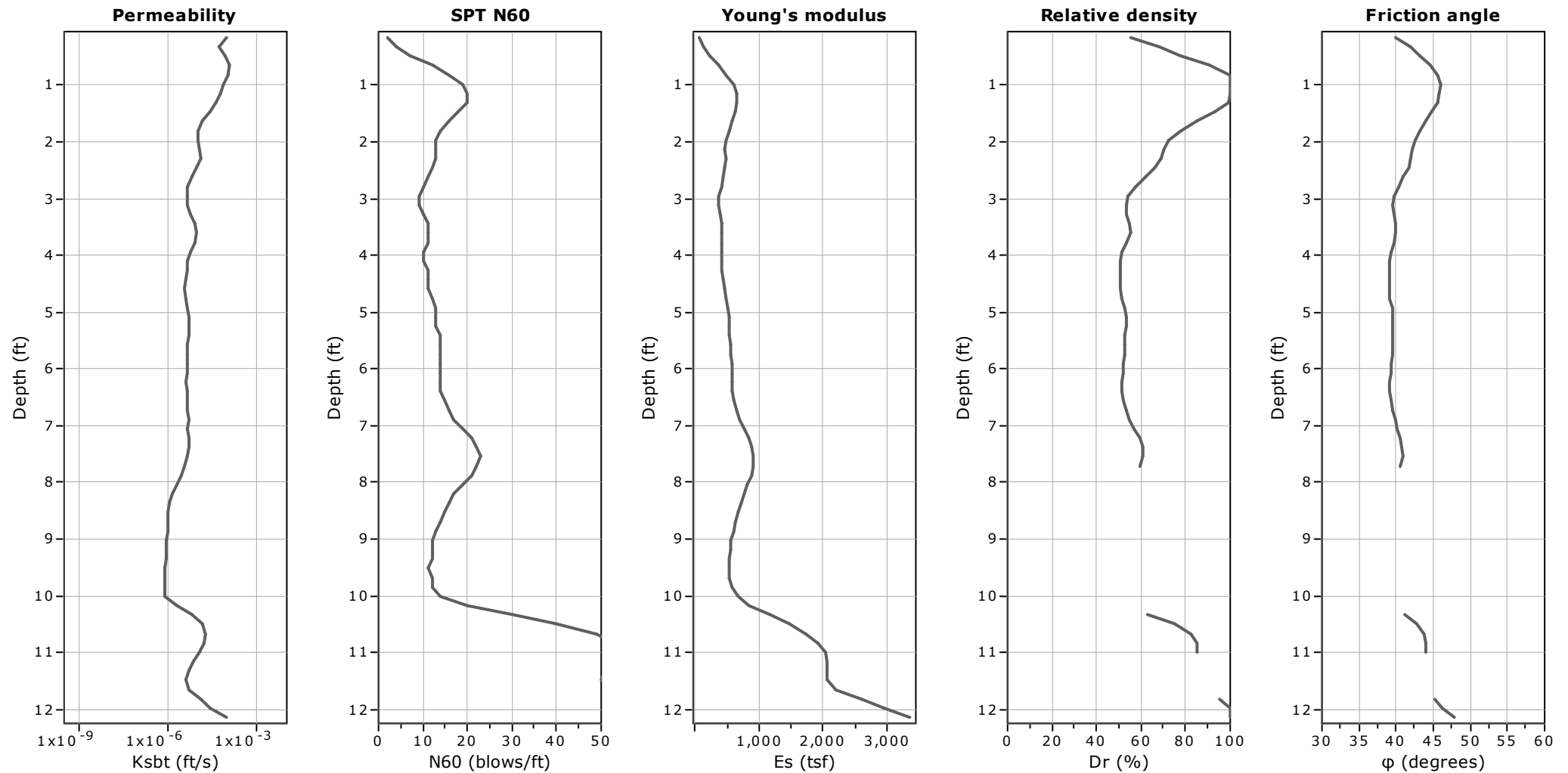
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

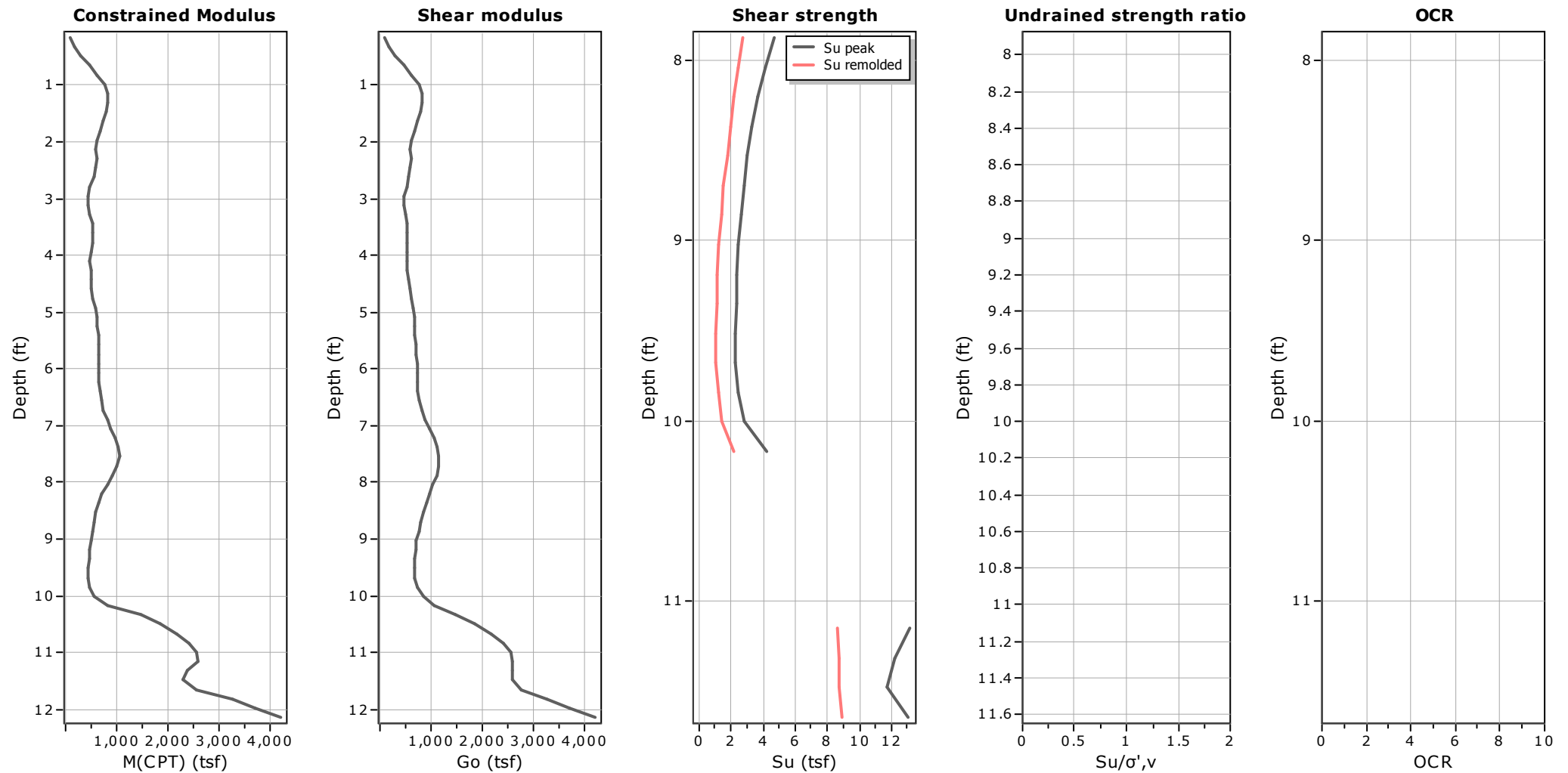
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

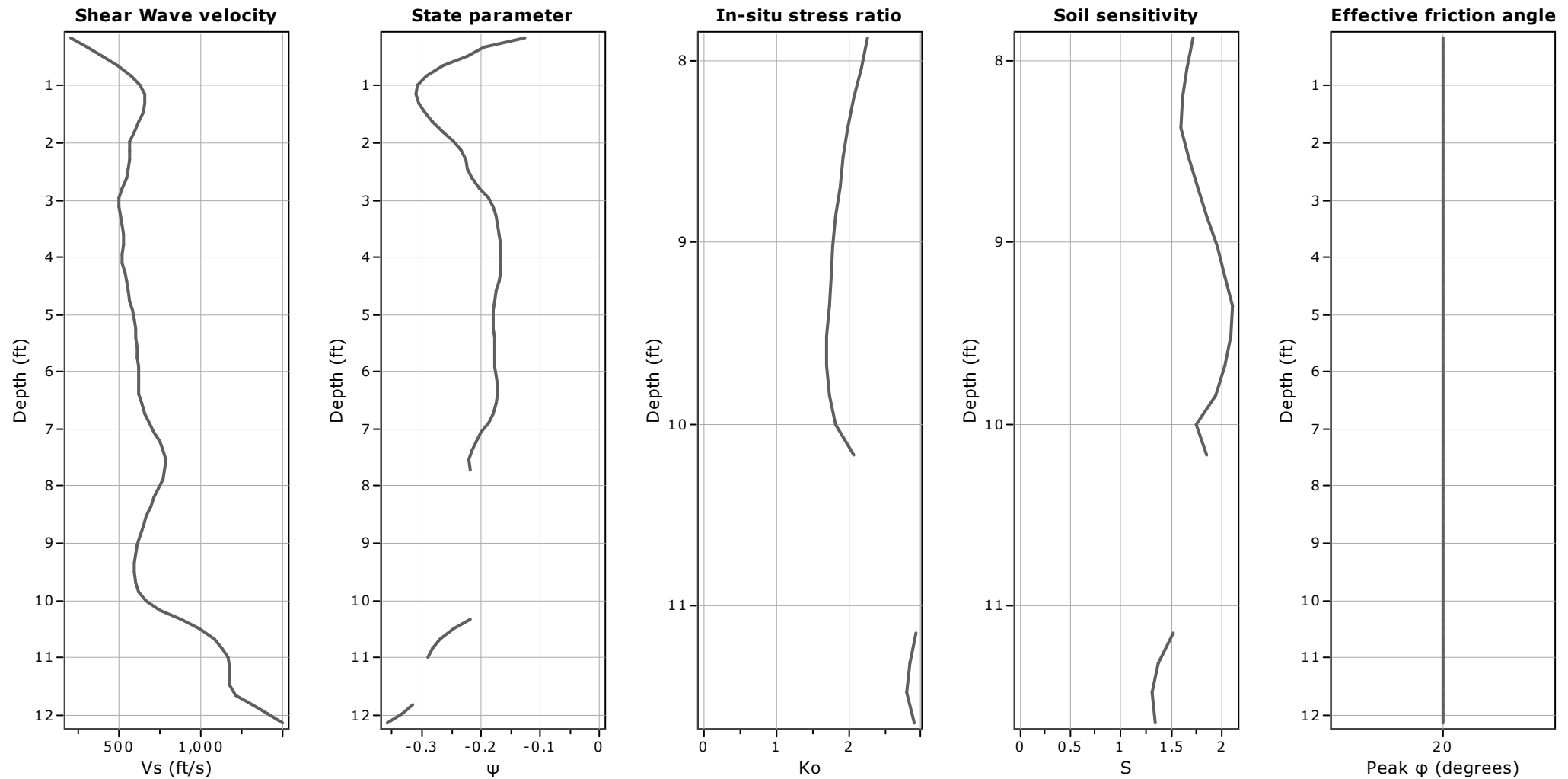
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)Go: Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



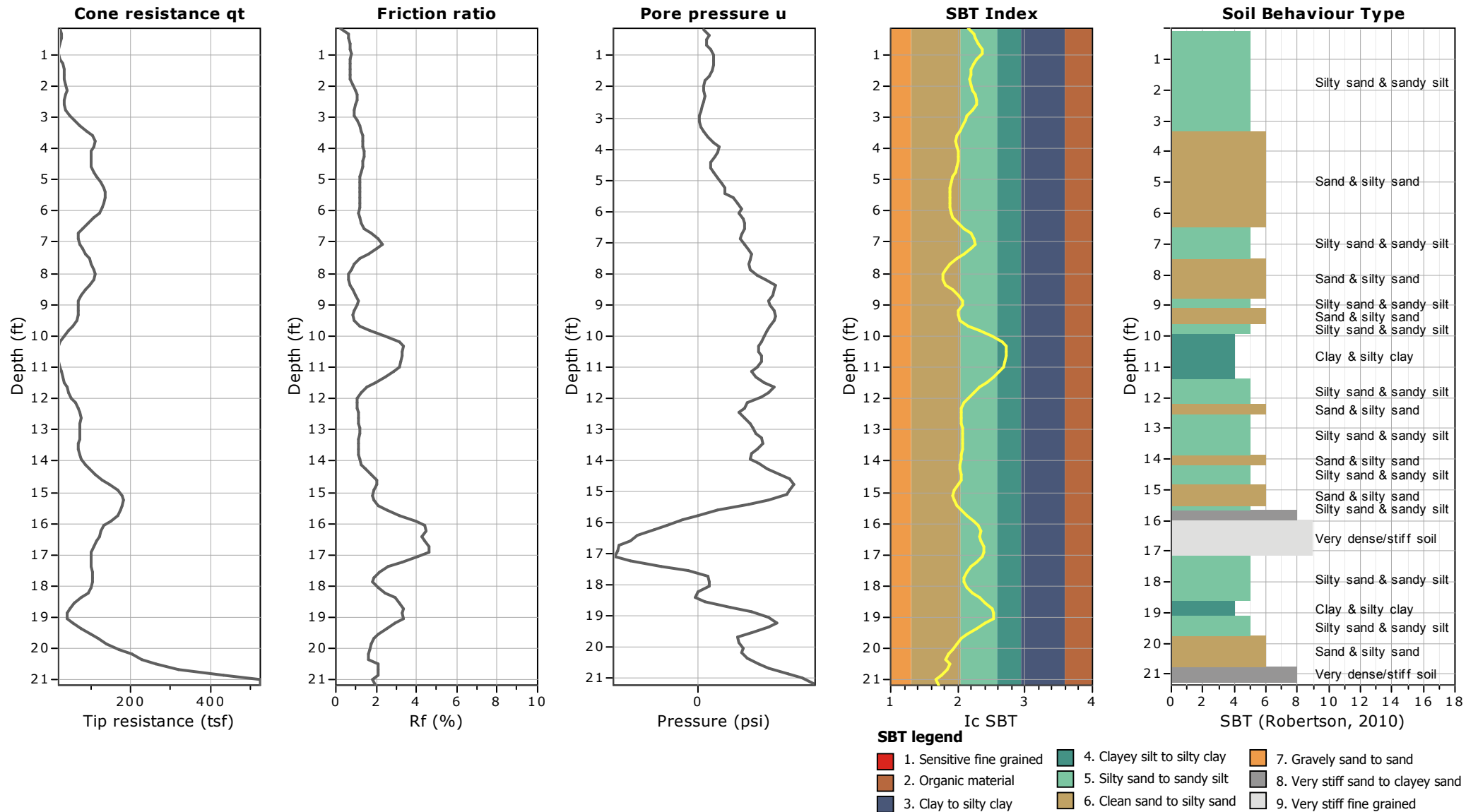
Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

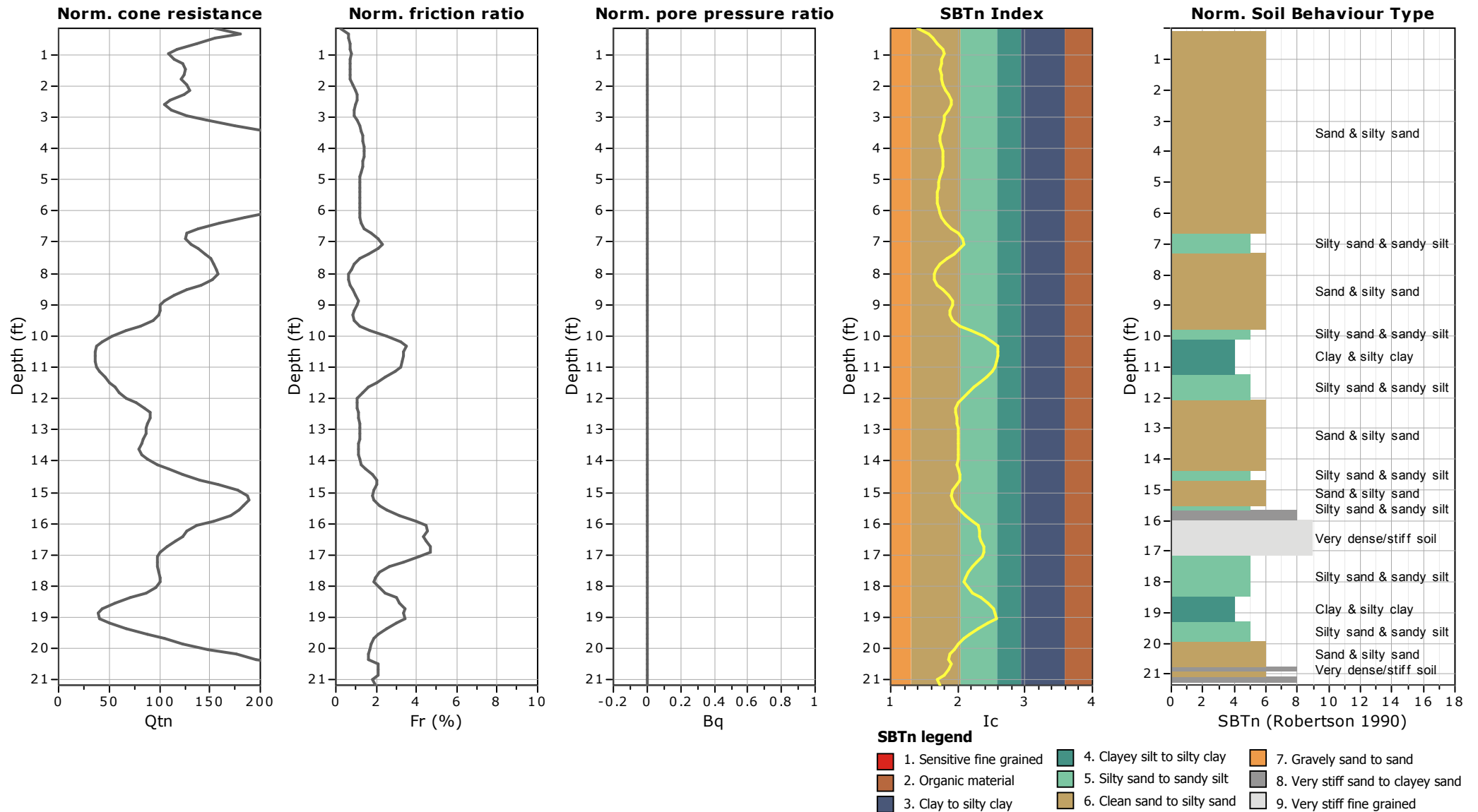
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



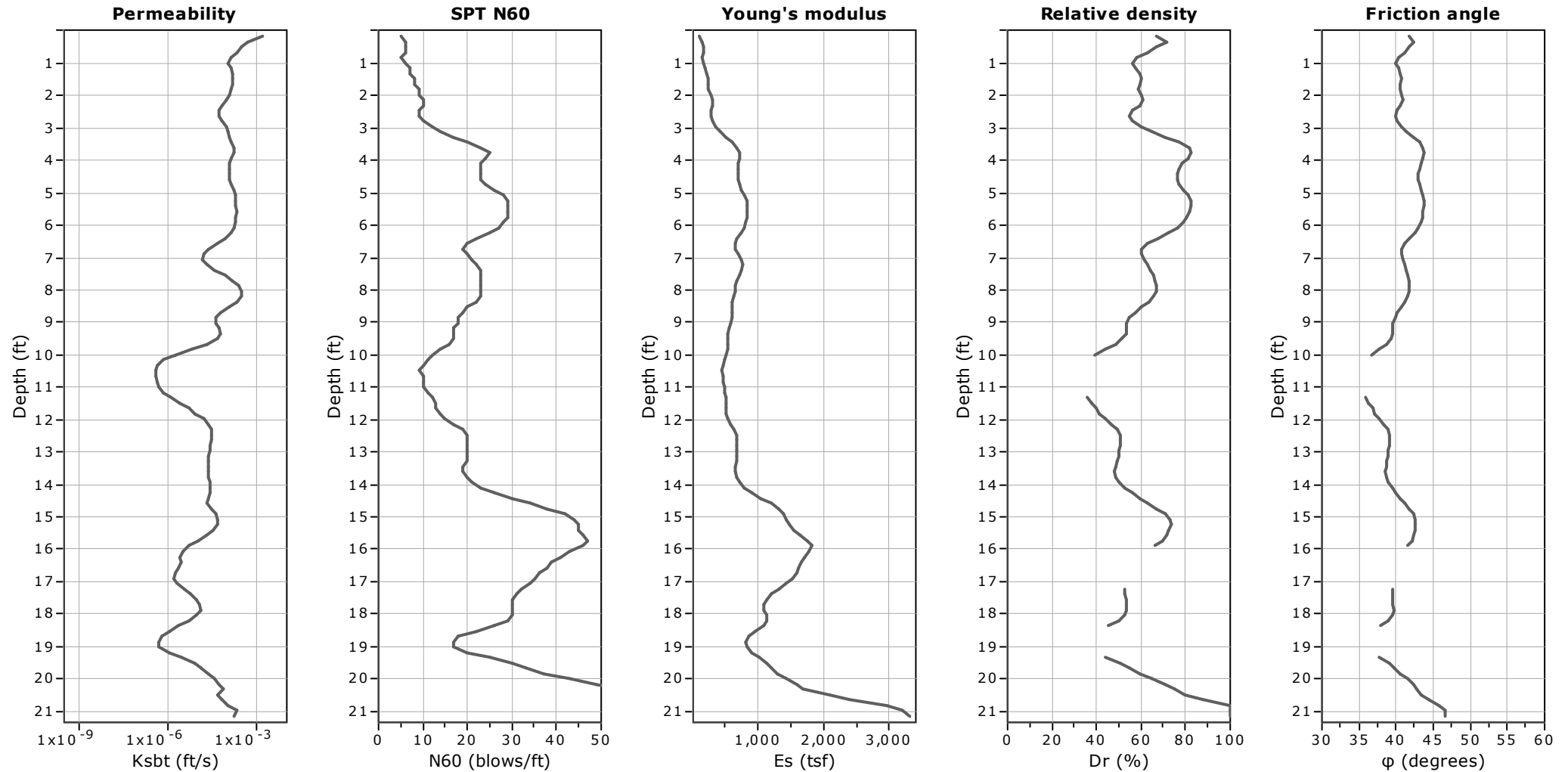
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

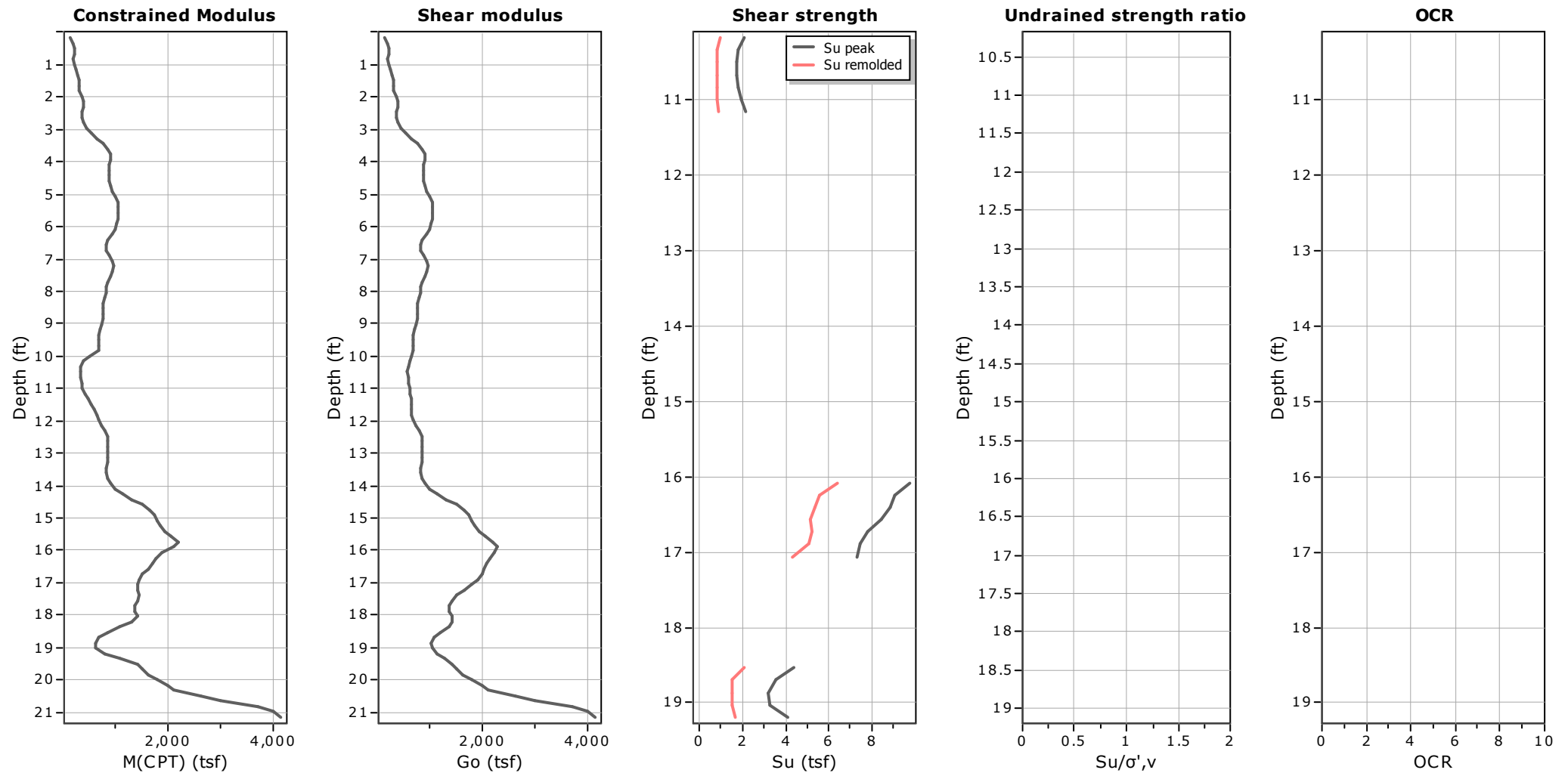
**Calculation parameters**Permeability: Based on SBT_nSPT N₆₀: Based on I_c and q_tYoung's modulus: Based on variable alpha using I_c (Robertson, 2009)Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhavy & Mayne (1990)

● — User defined estimation data

Project: Lake Jennings Marketplace

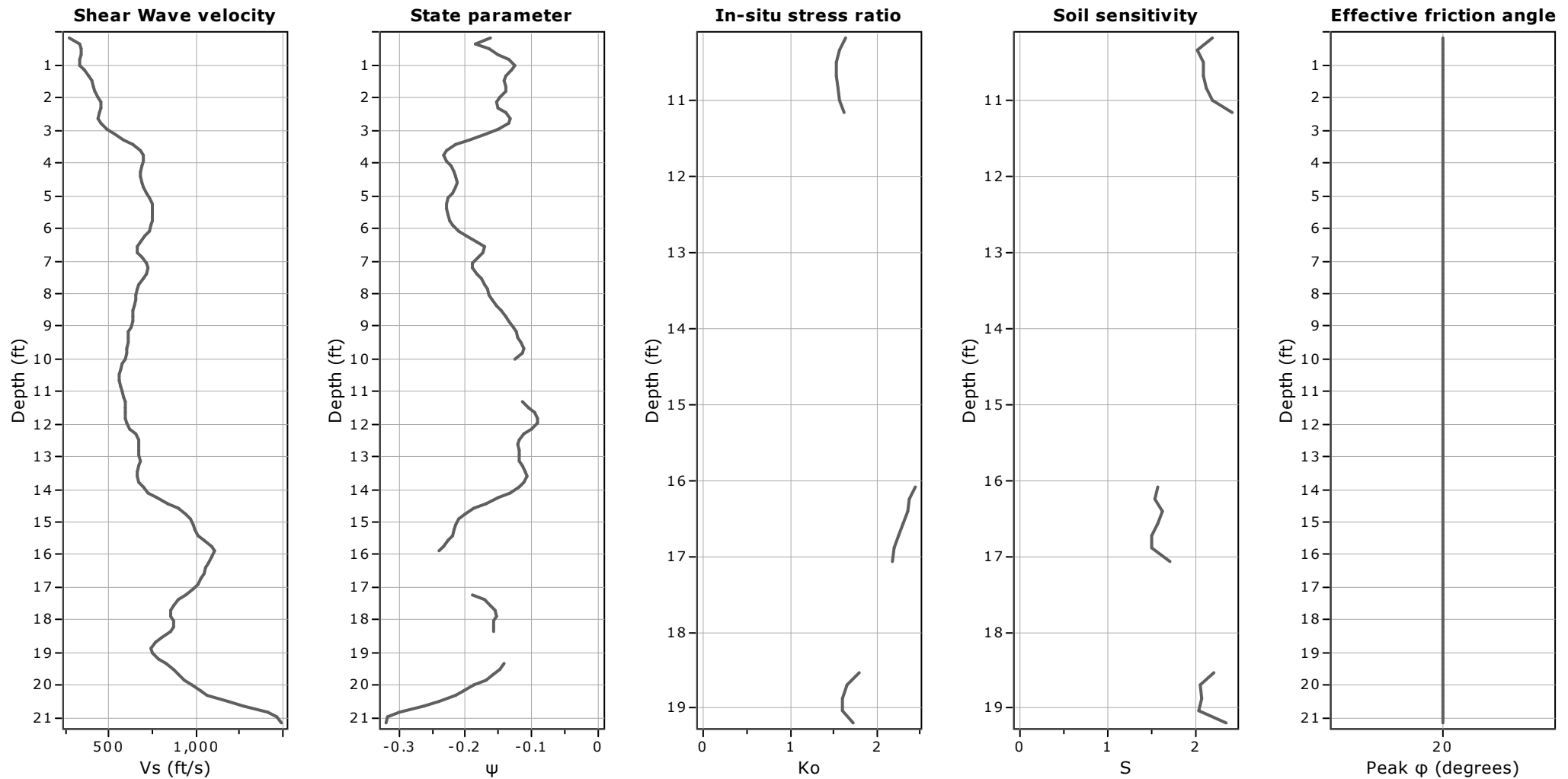
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)Go: Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



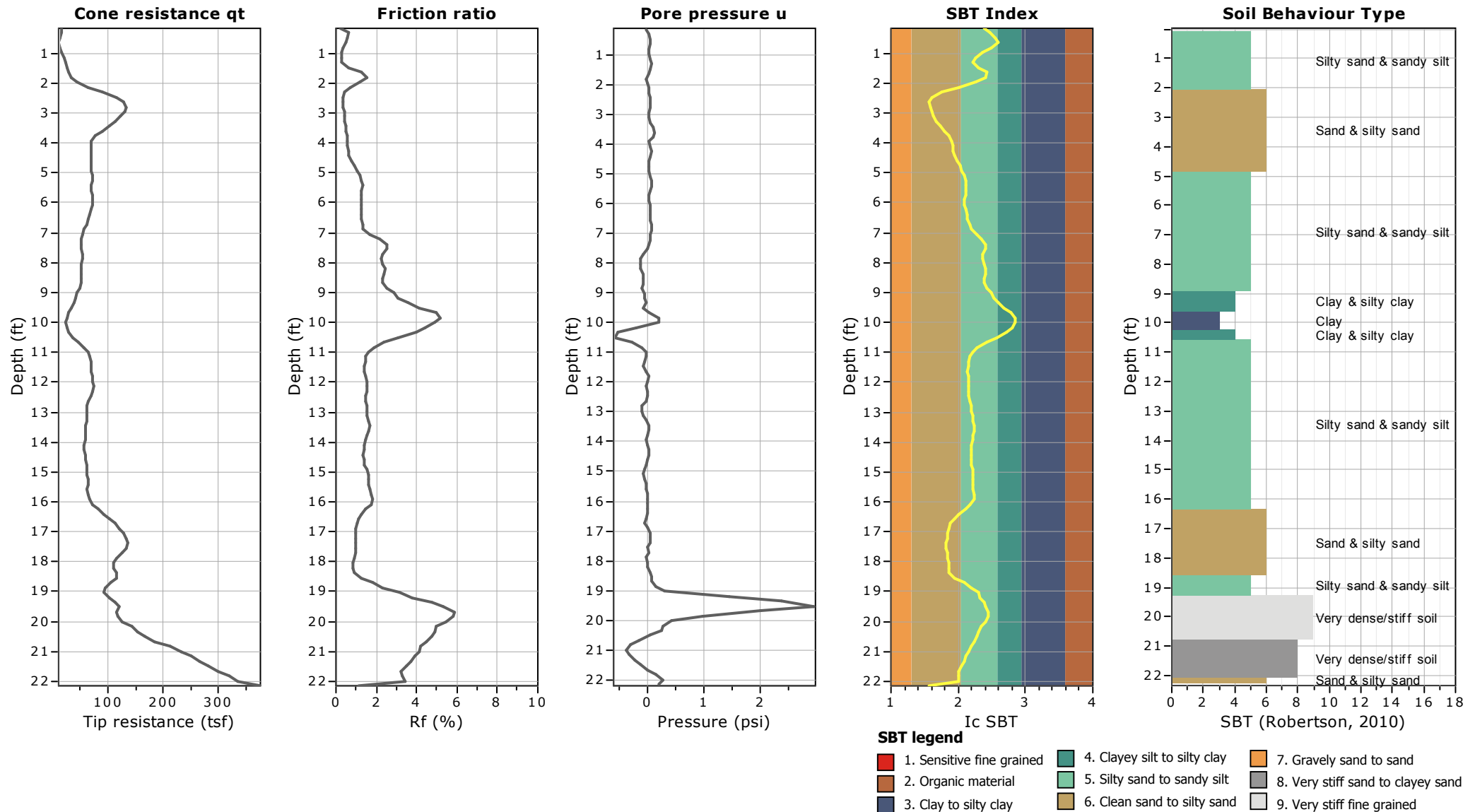
Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

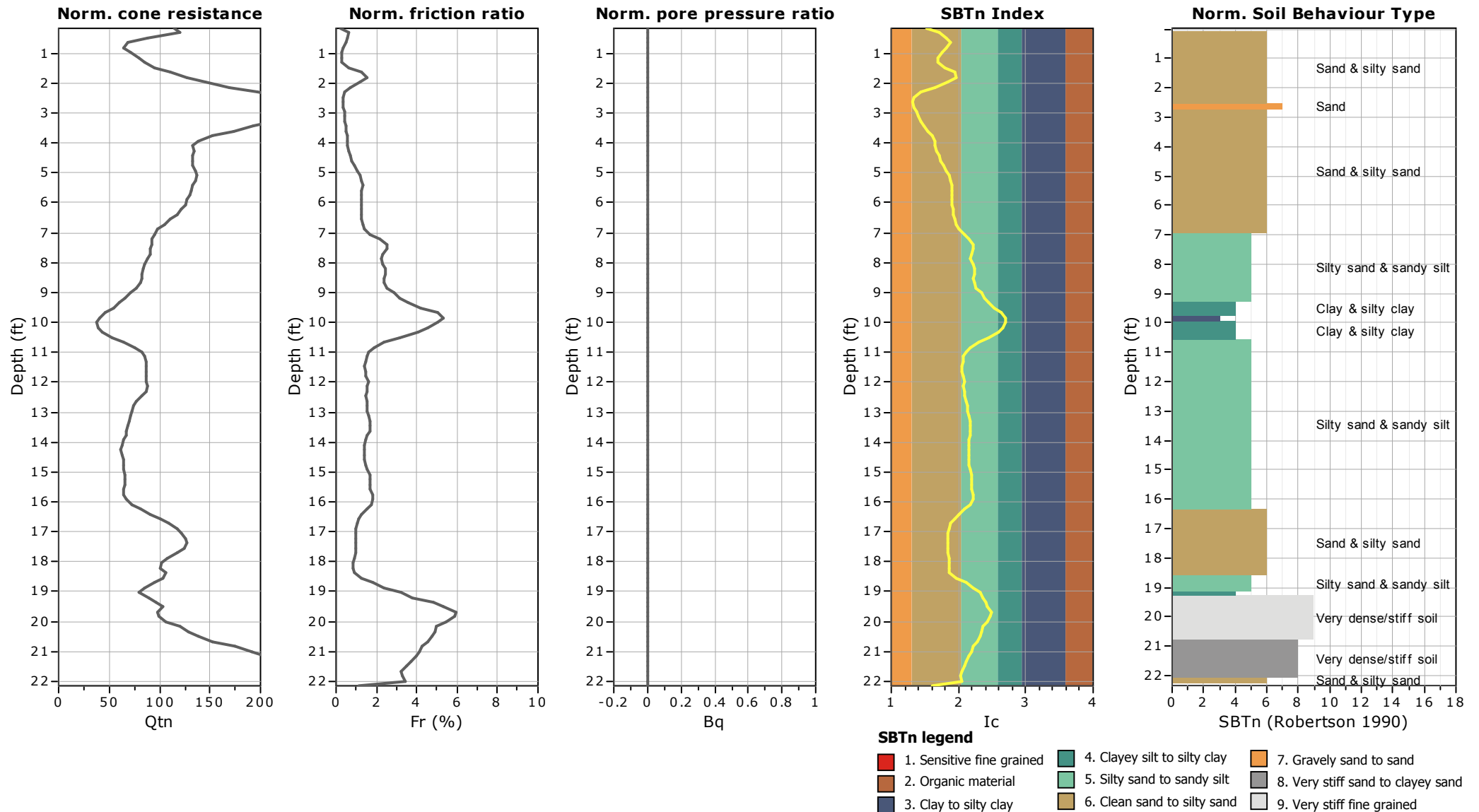
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



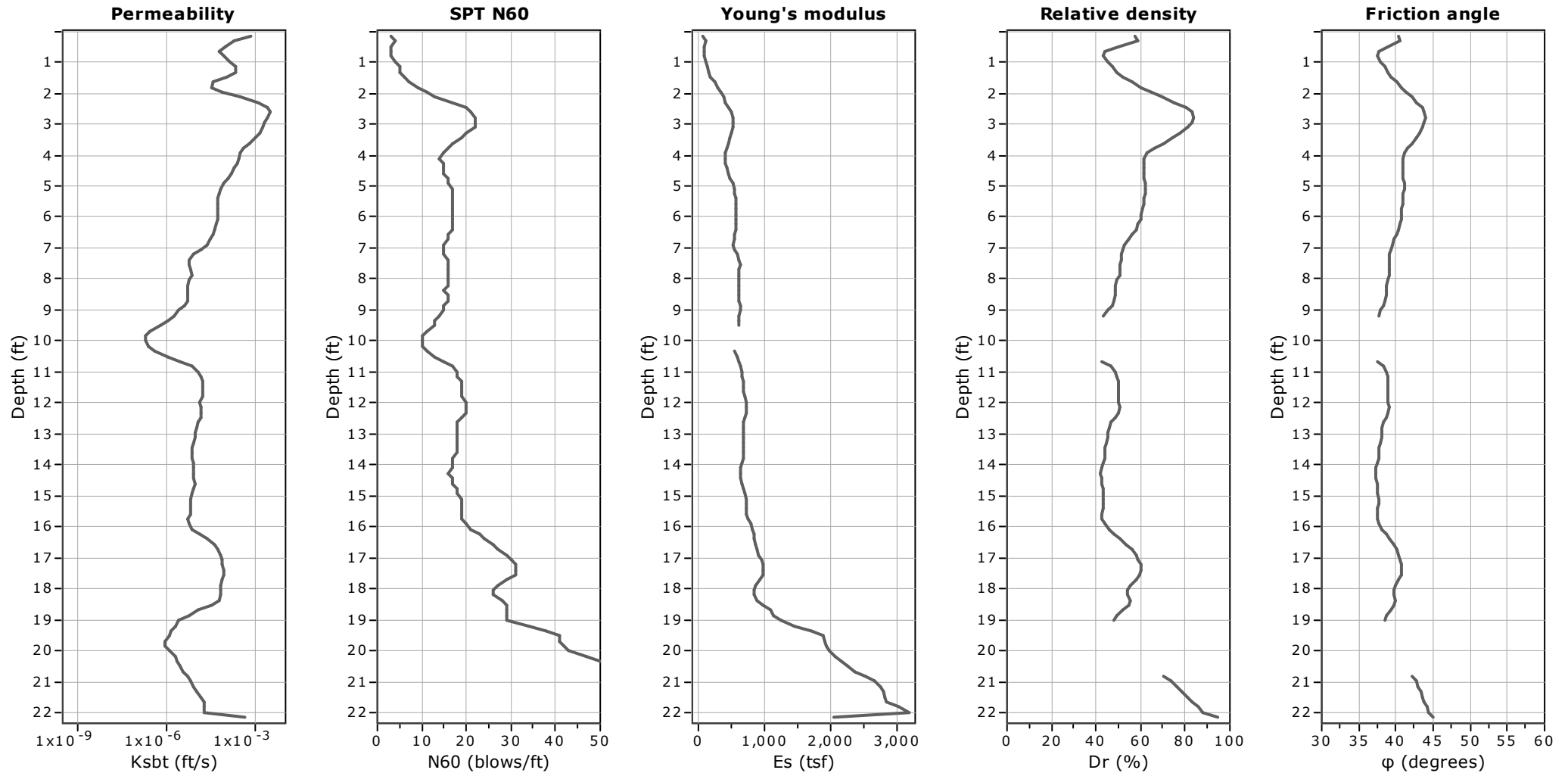
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

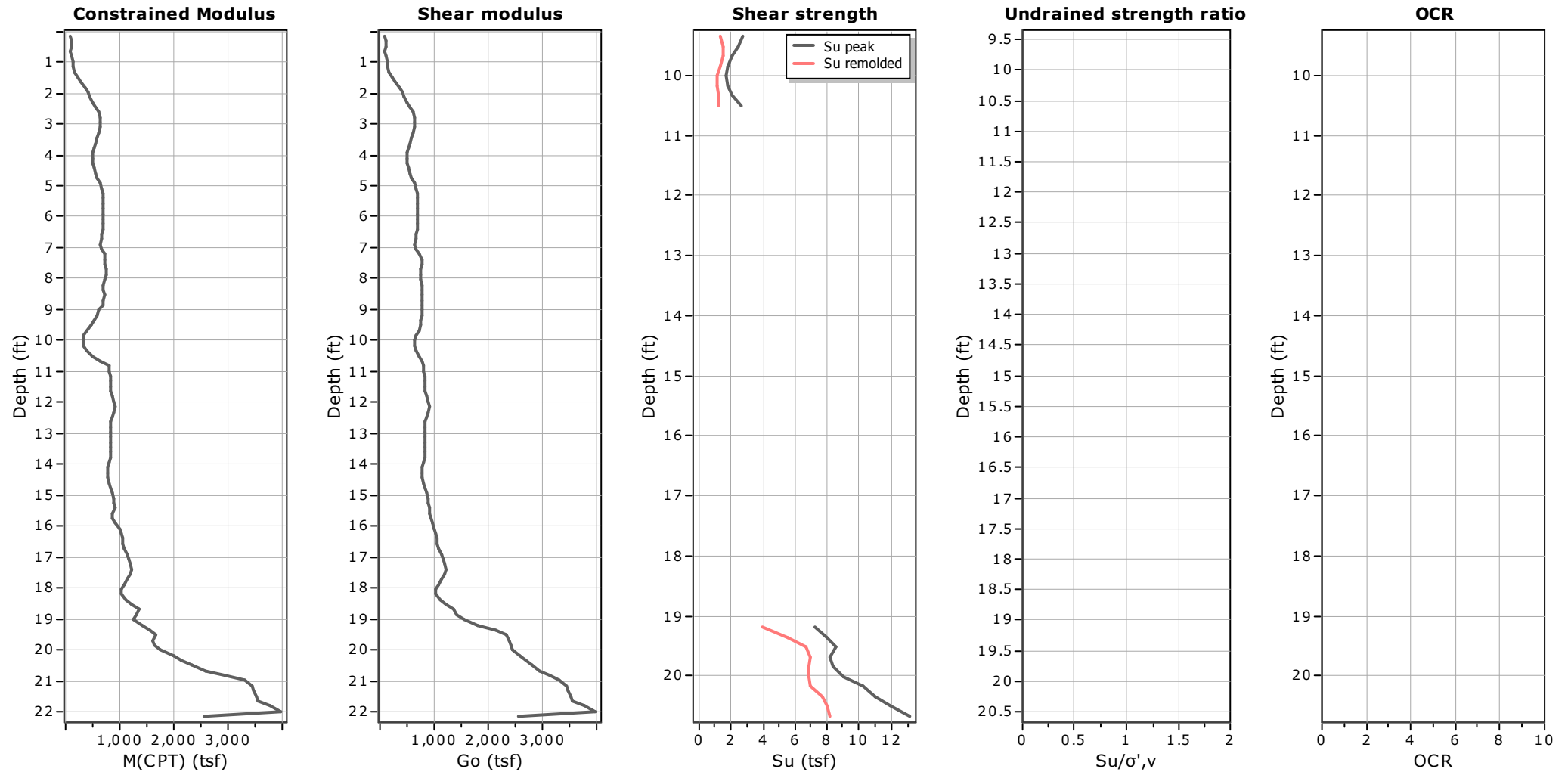
Relative desnisty constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

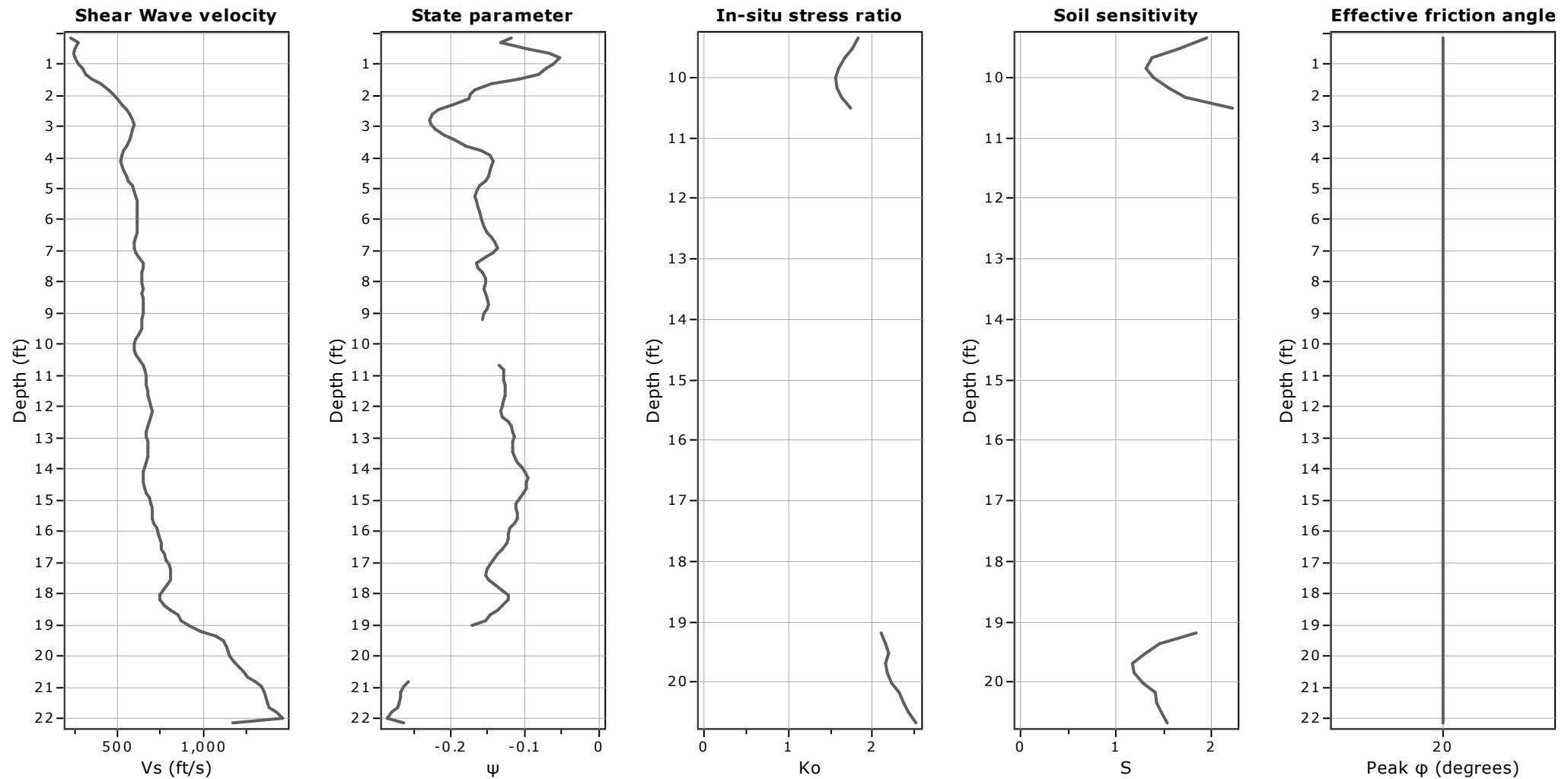
Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



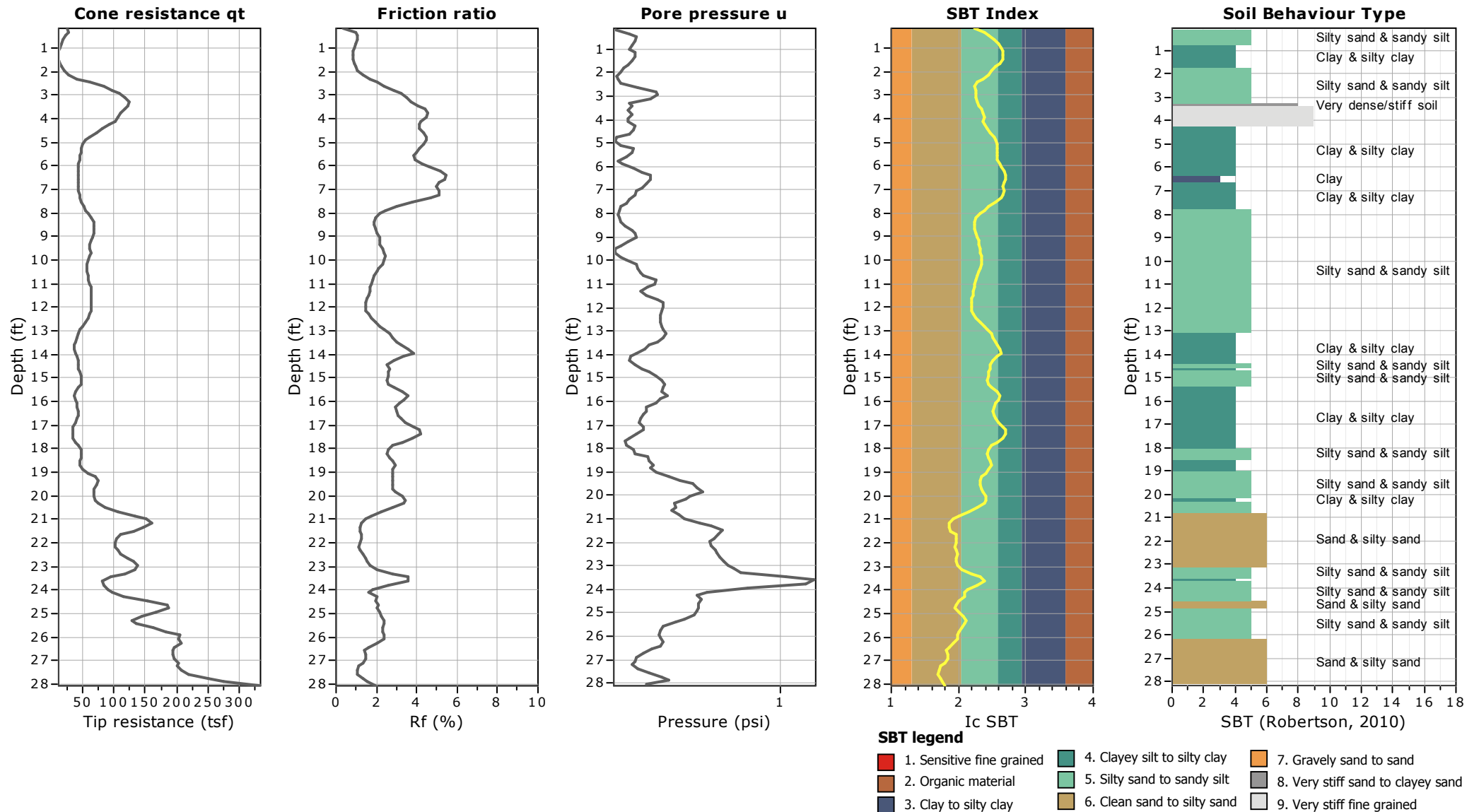
Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

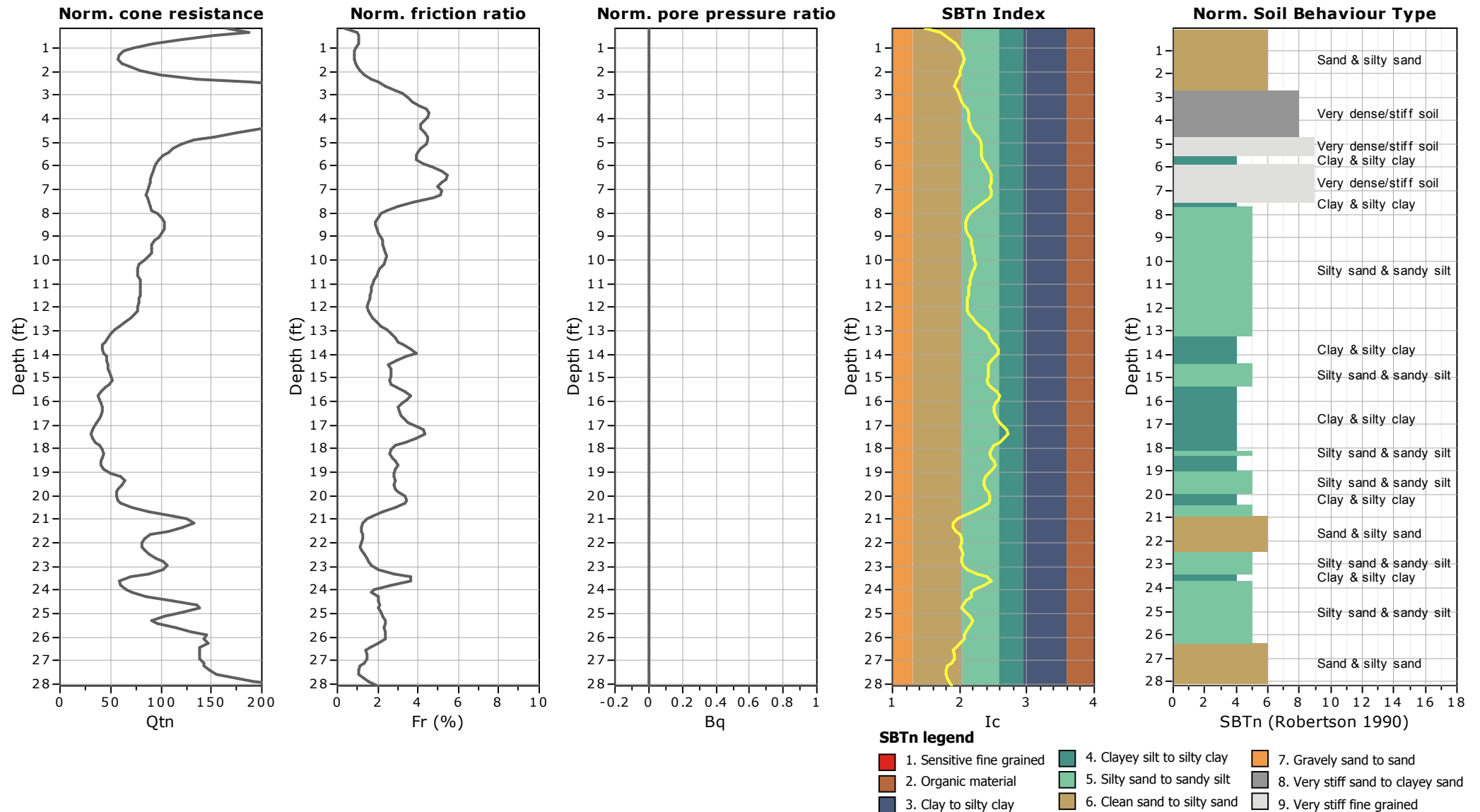
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



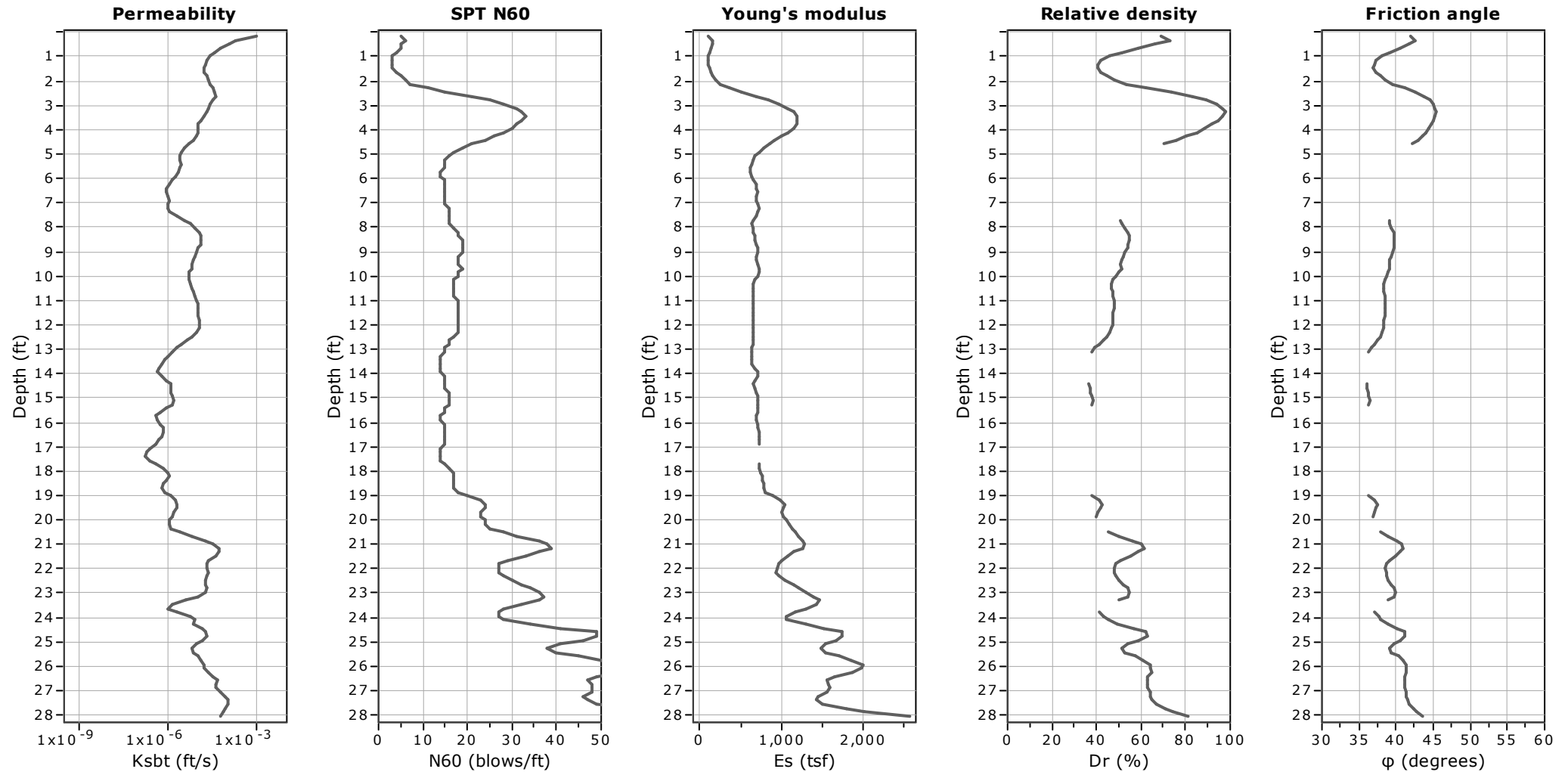
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

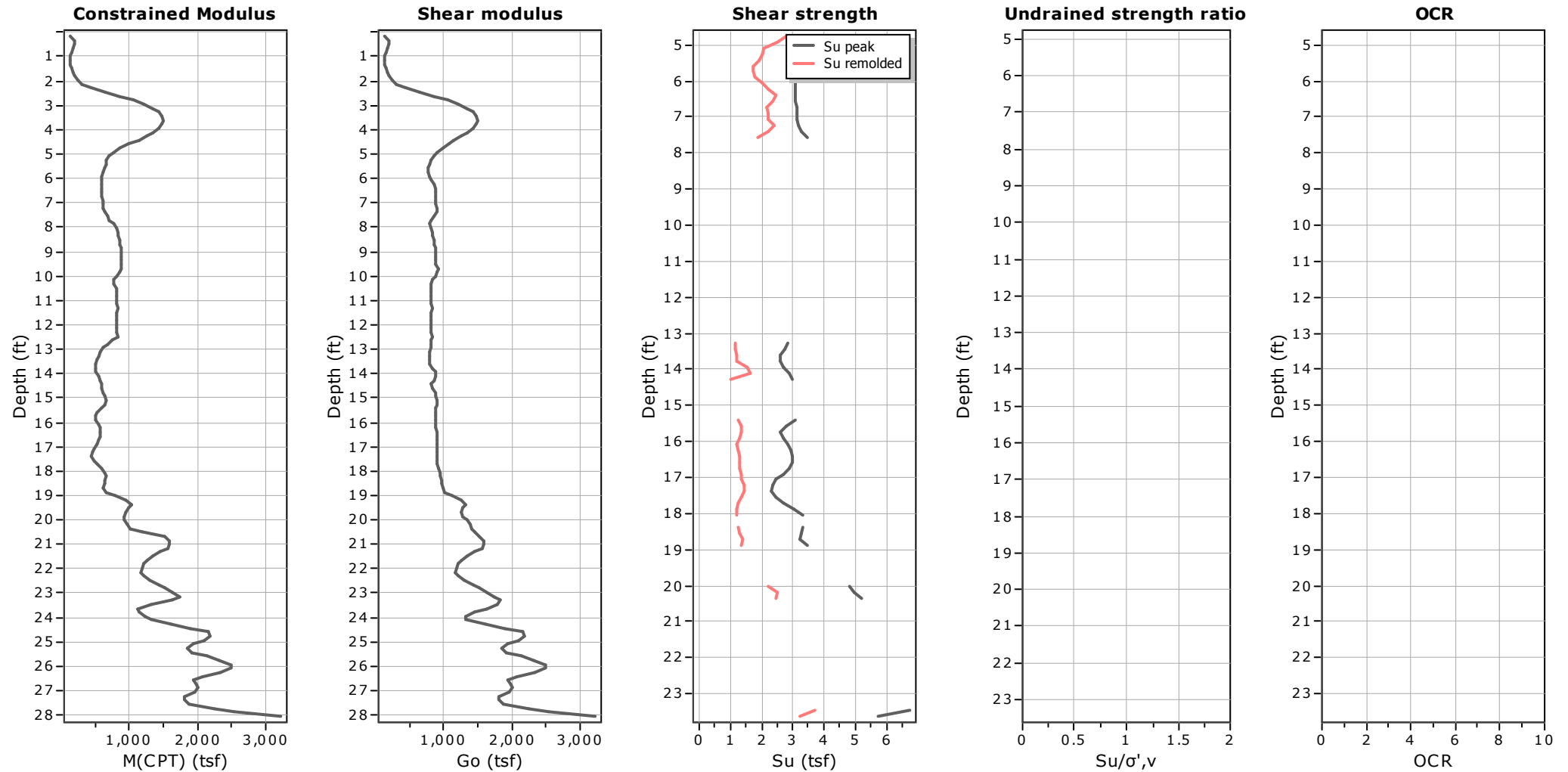
**Calculation parameters**Permeability: Based on SBT_nSPT N₆₀: Based on I_c and q_tYoung's modulus: Based on variable alpha using I_c (Robertson, 2009)Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{in} (Robertson, 2009)

G_o : Based on variable α using I_c (Robertson, 2009)

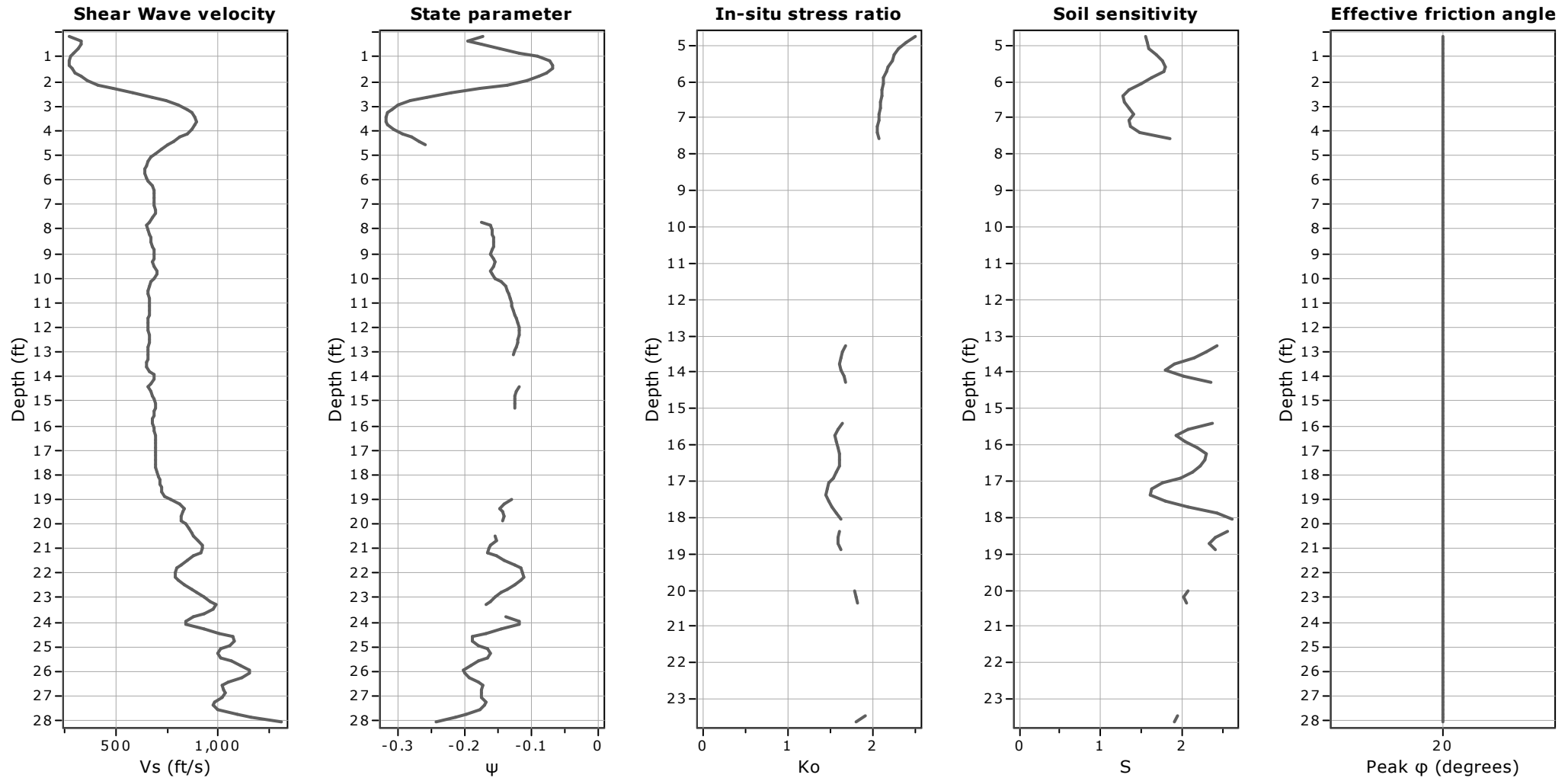
Undrained shear strength cone factor for clays, N_{kt} : 14

OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



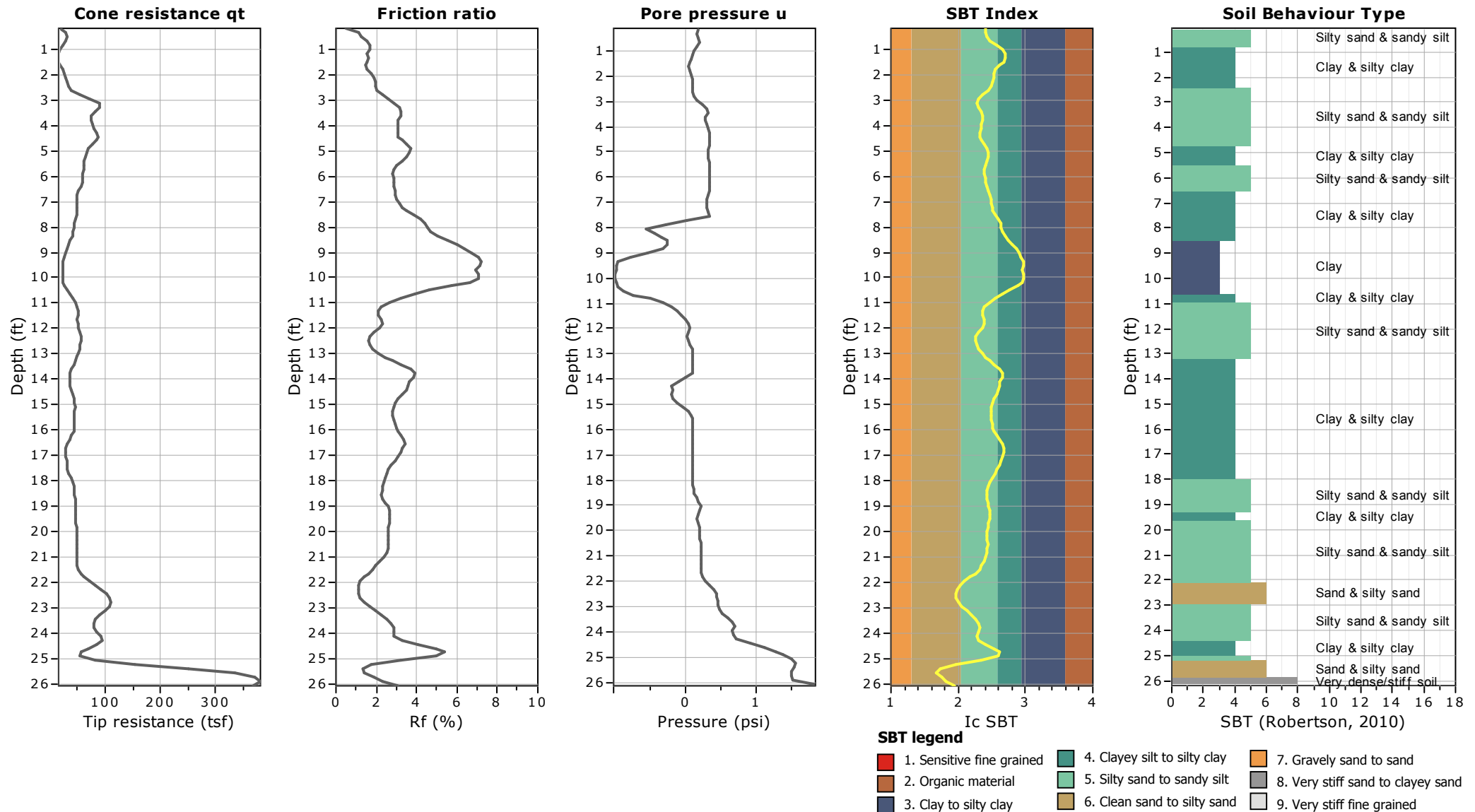
Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

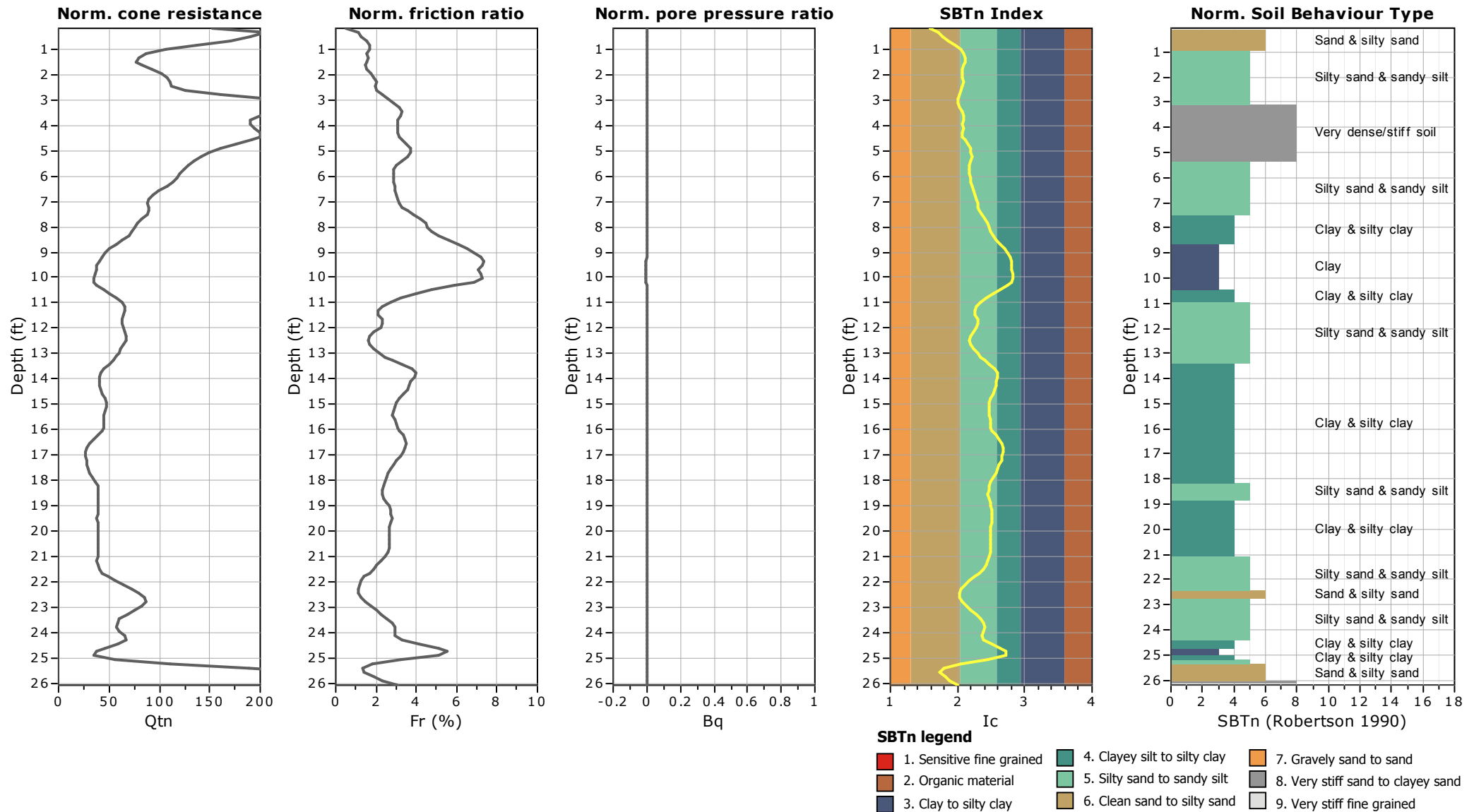
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



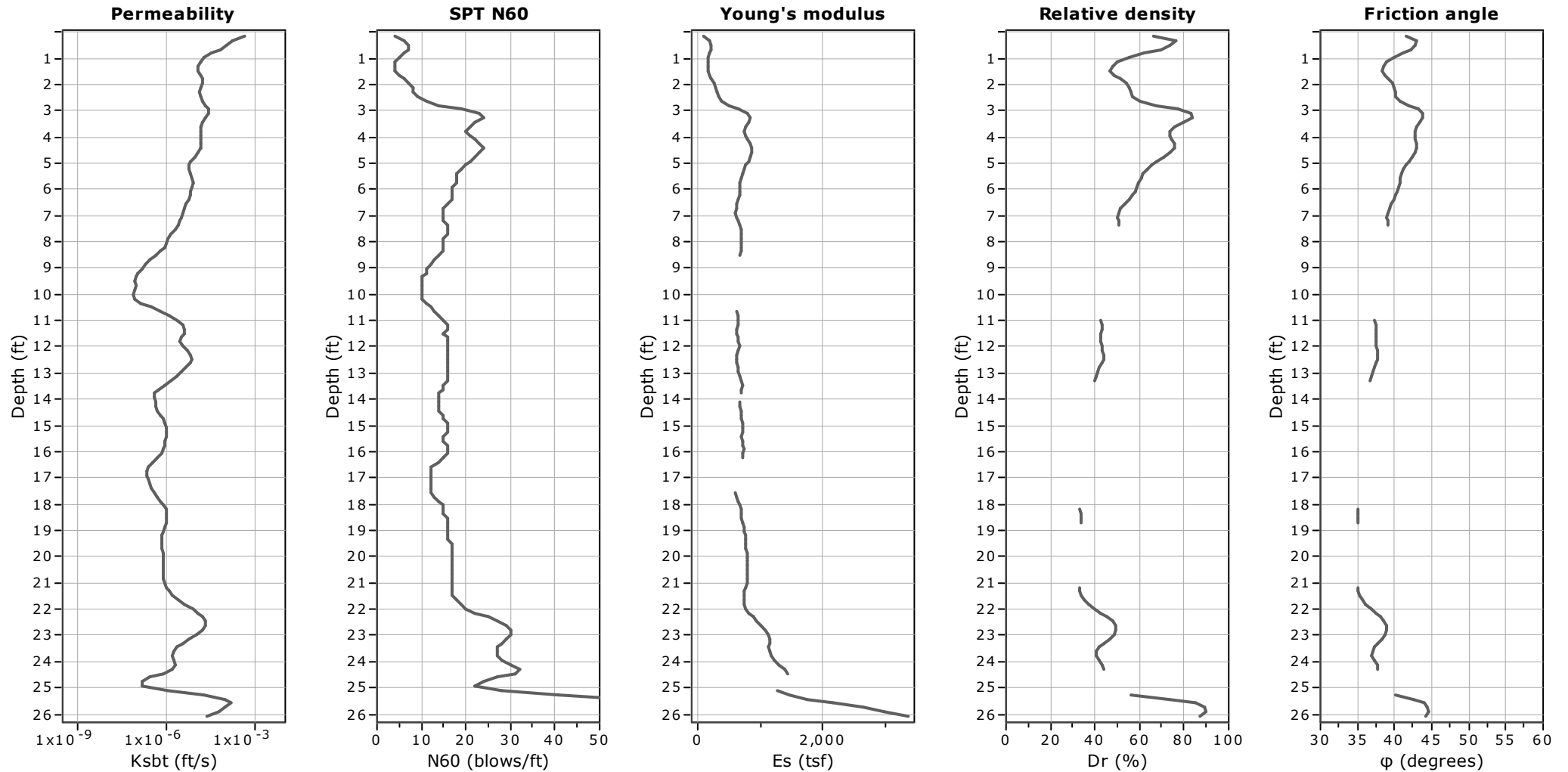
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

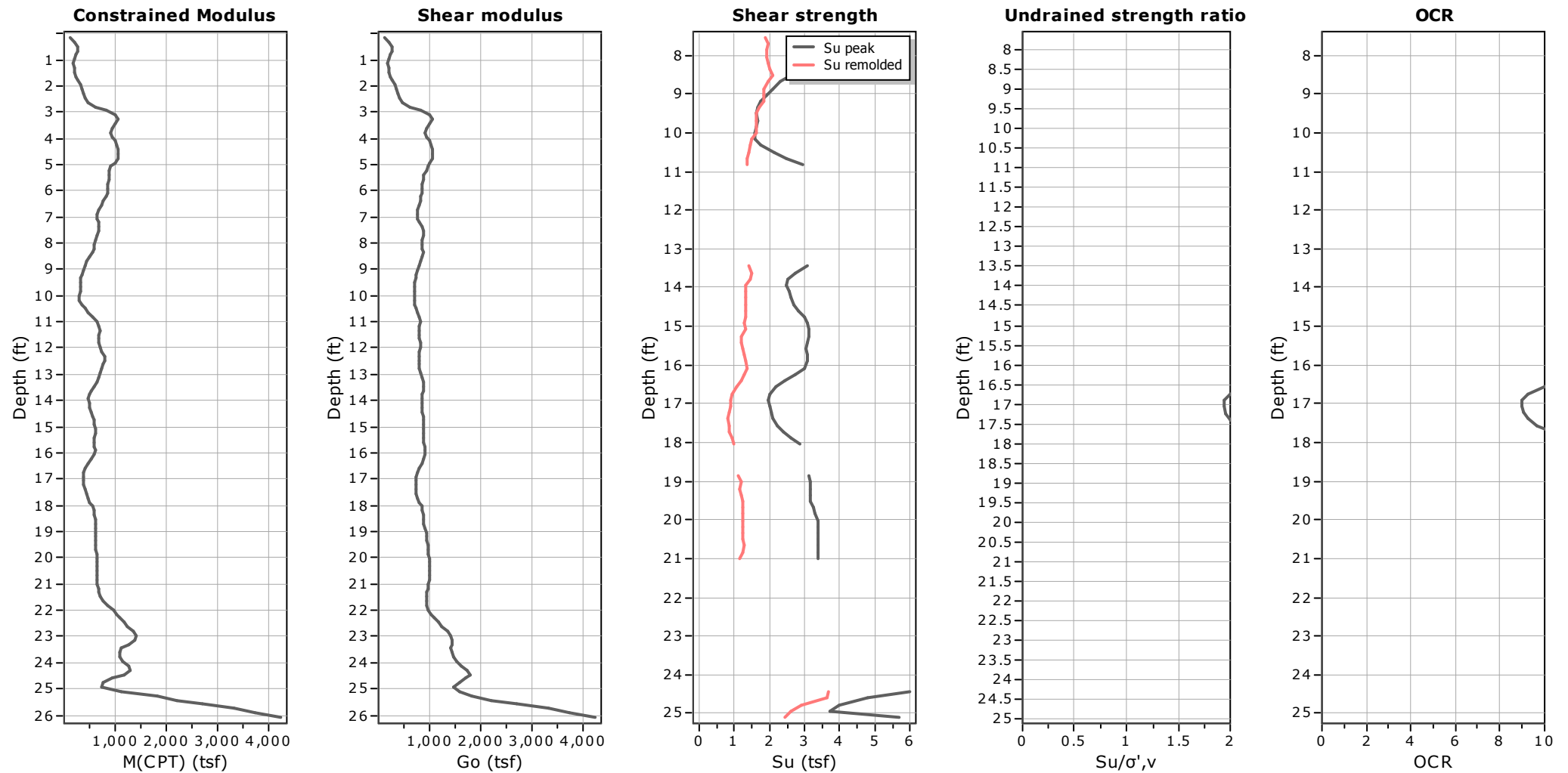
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

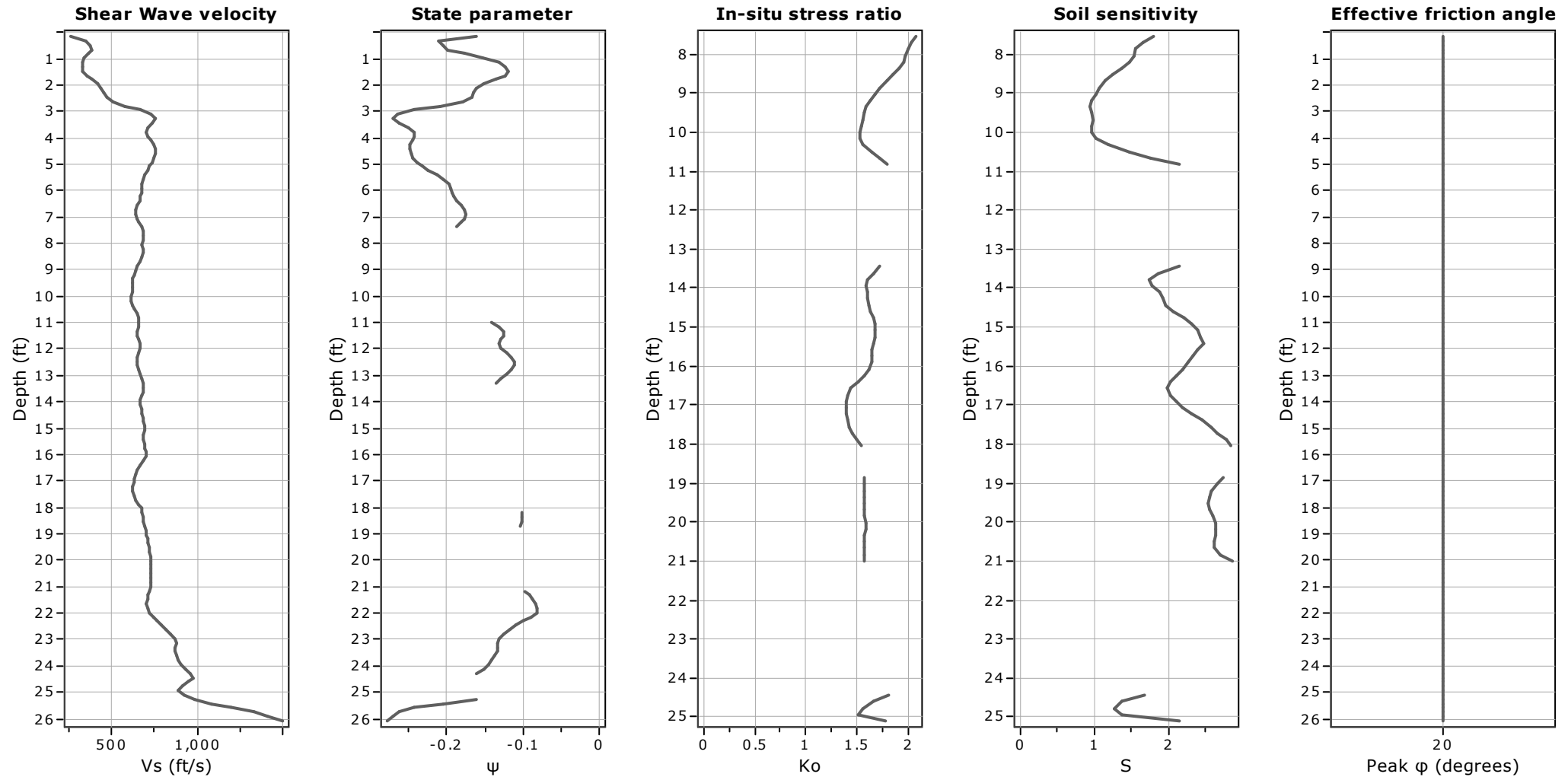
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)Go: Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

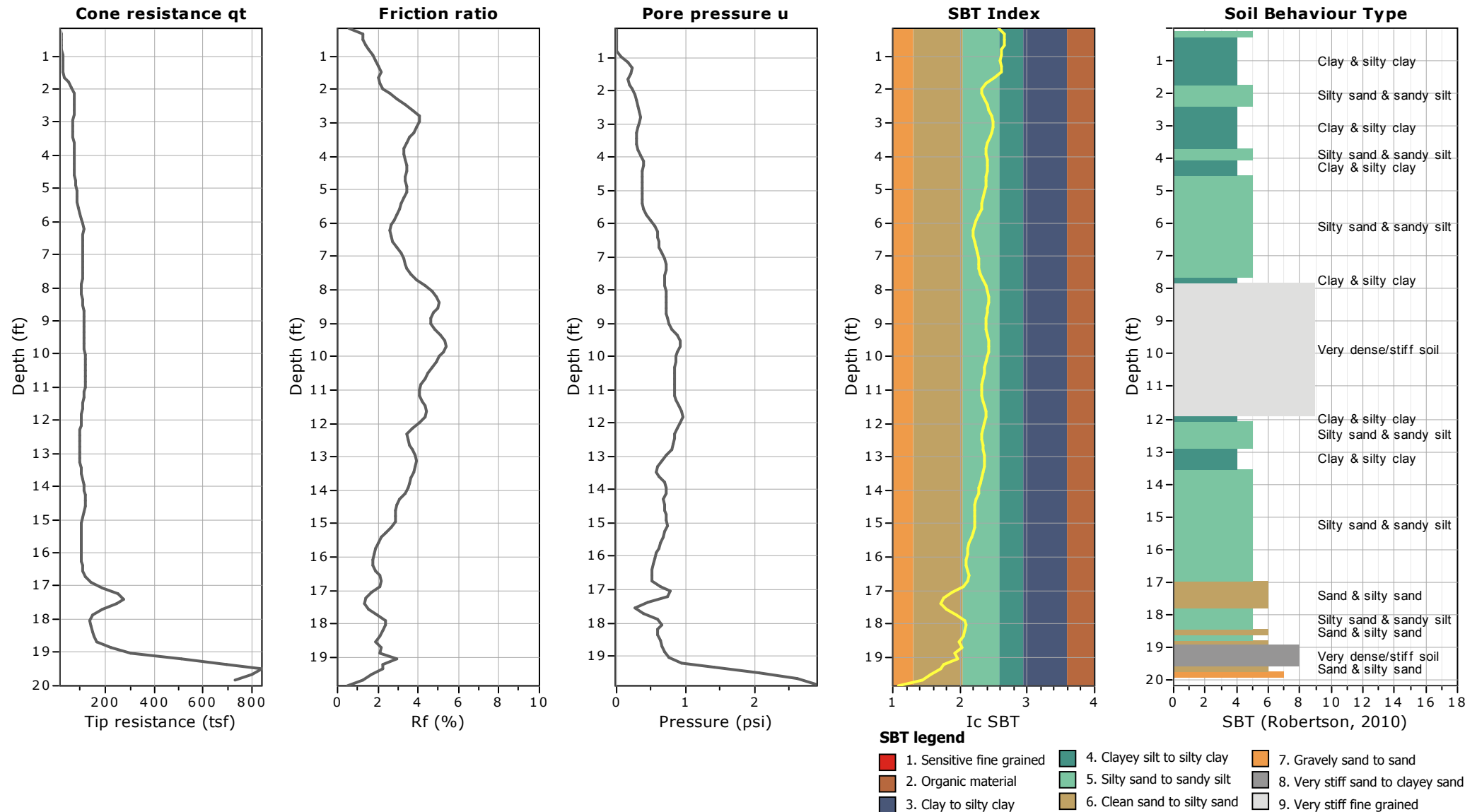
Location: Lake Jennings Park Road

**Calculation parameters**Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

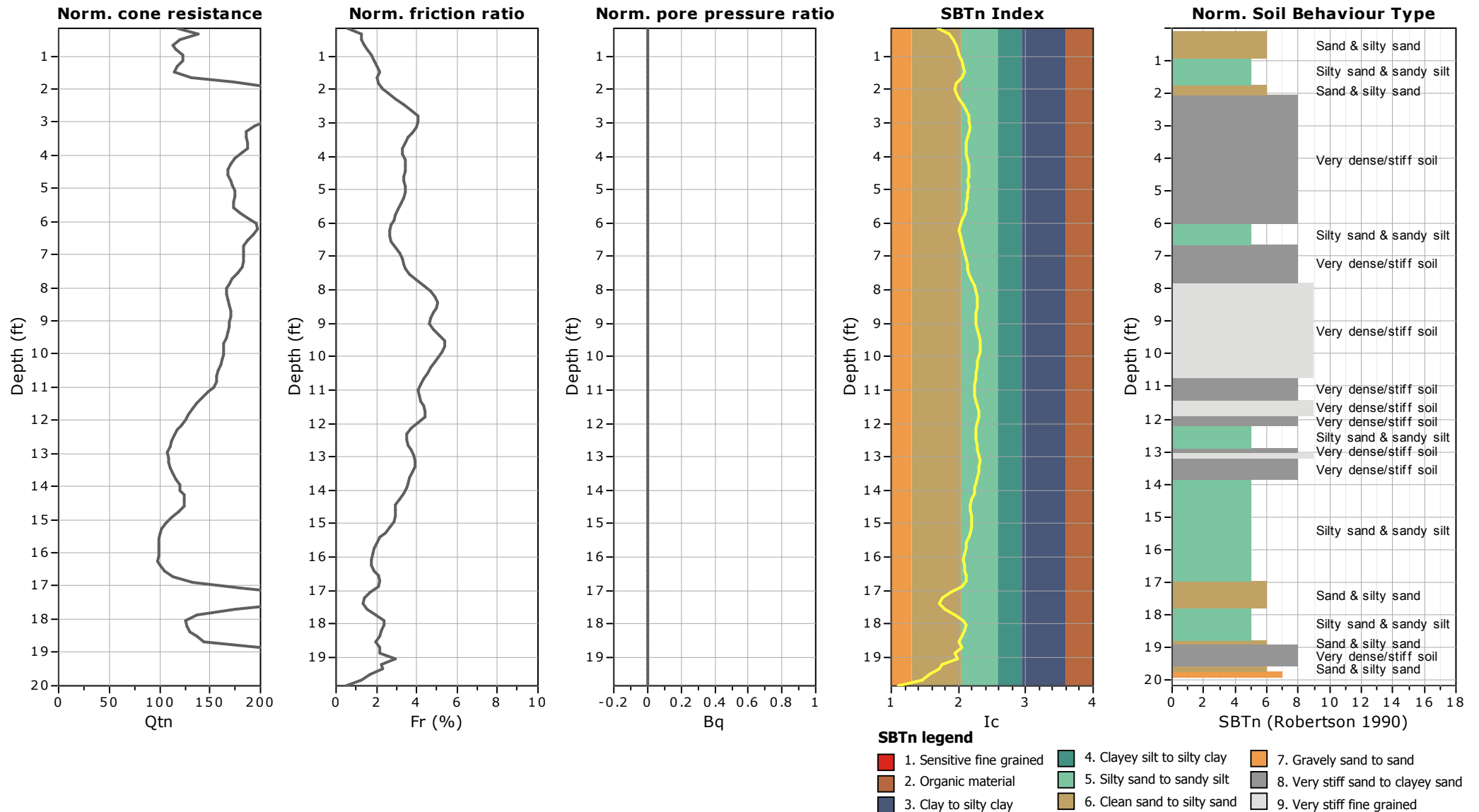
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



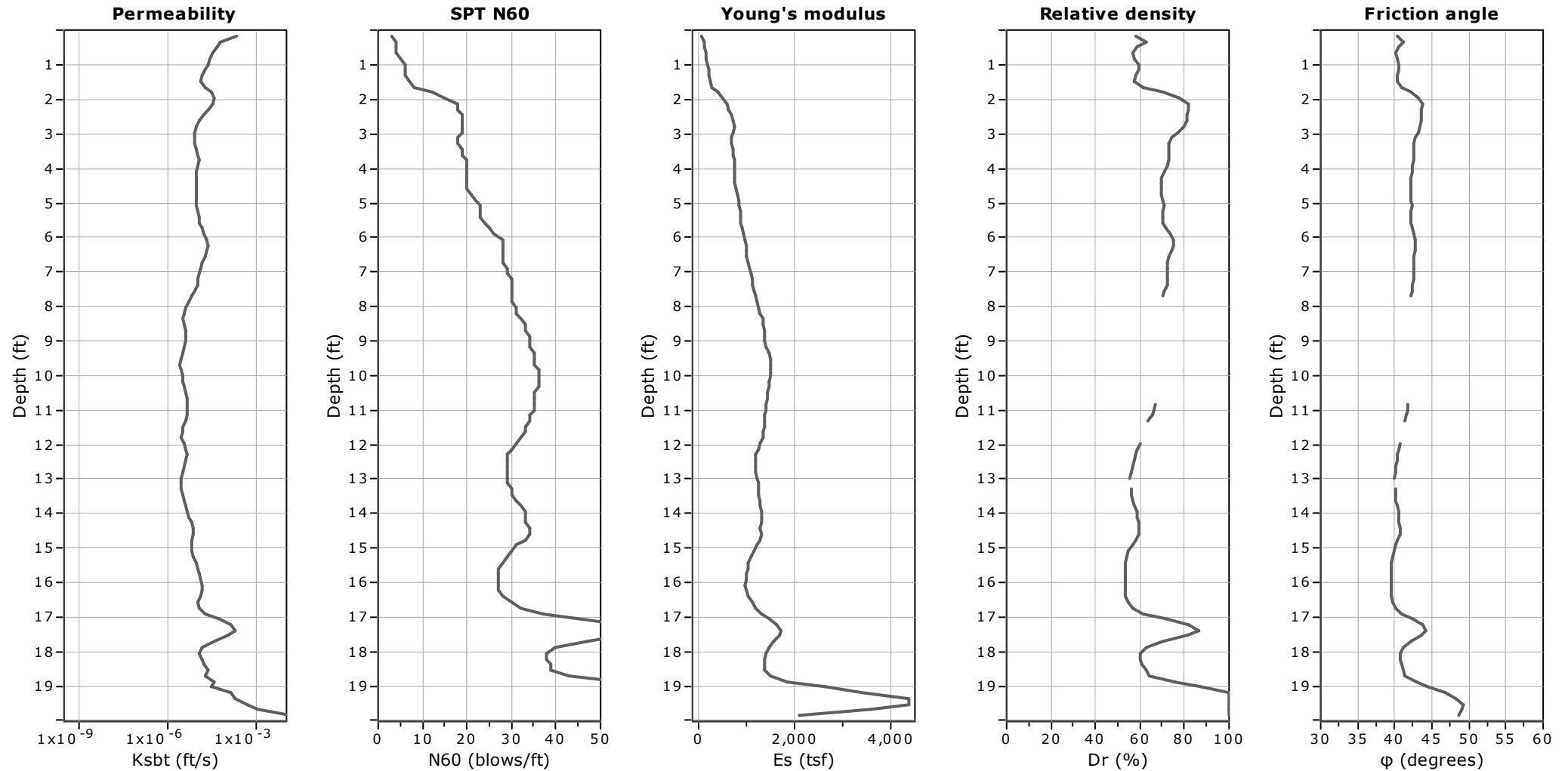
Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

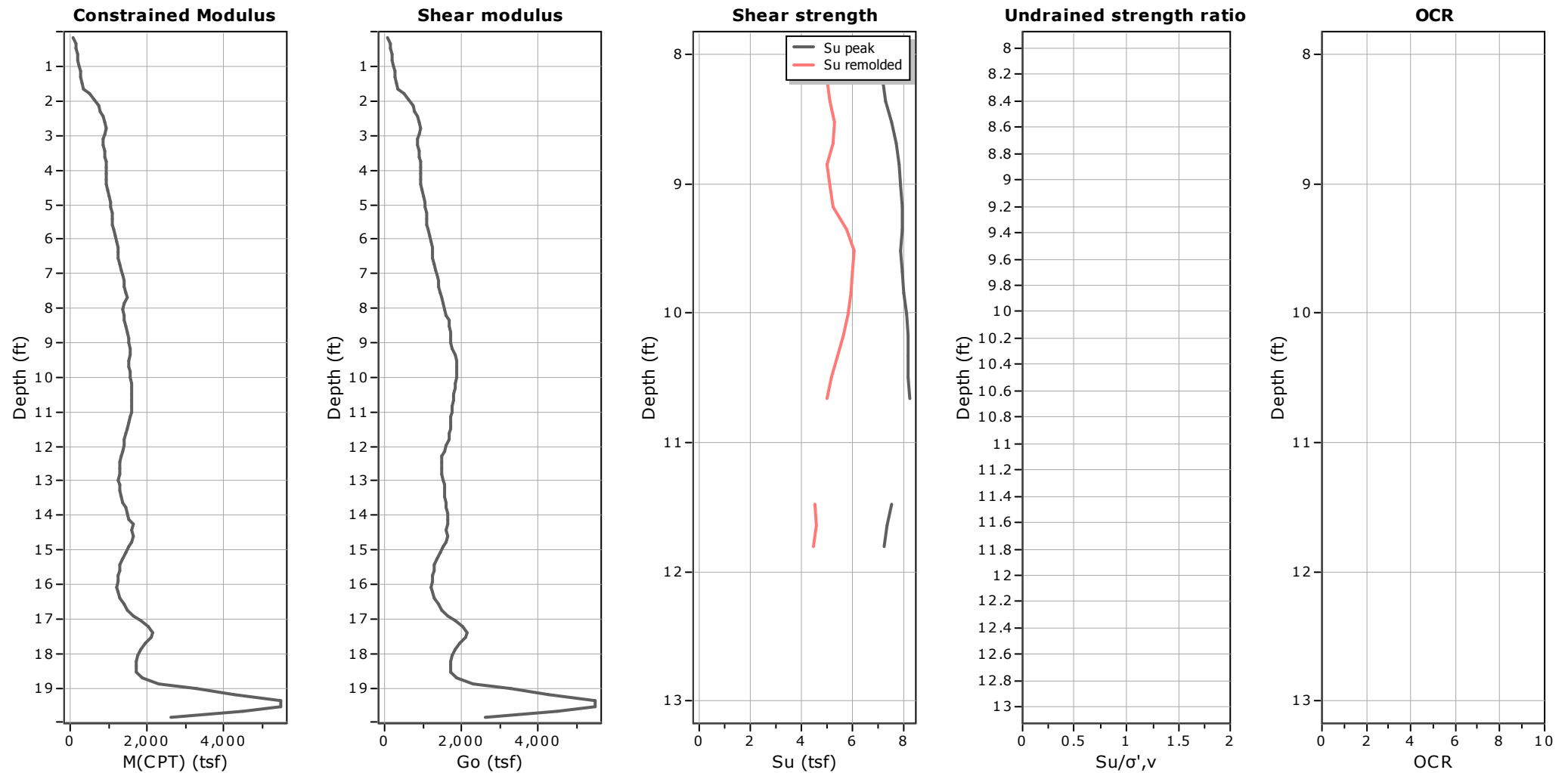
Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhavy & Mayne (1990)

—●— User defined estimation data

Project: Lake Jennings Marketplace

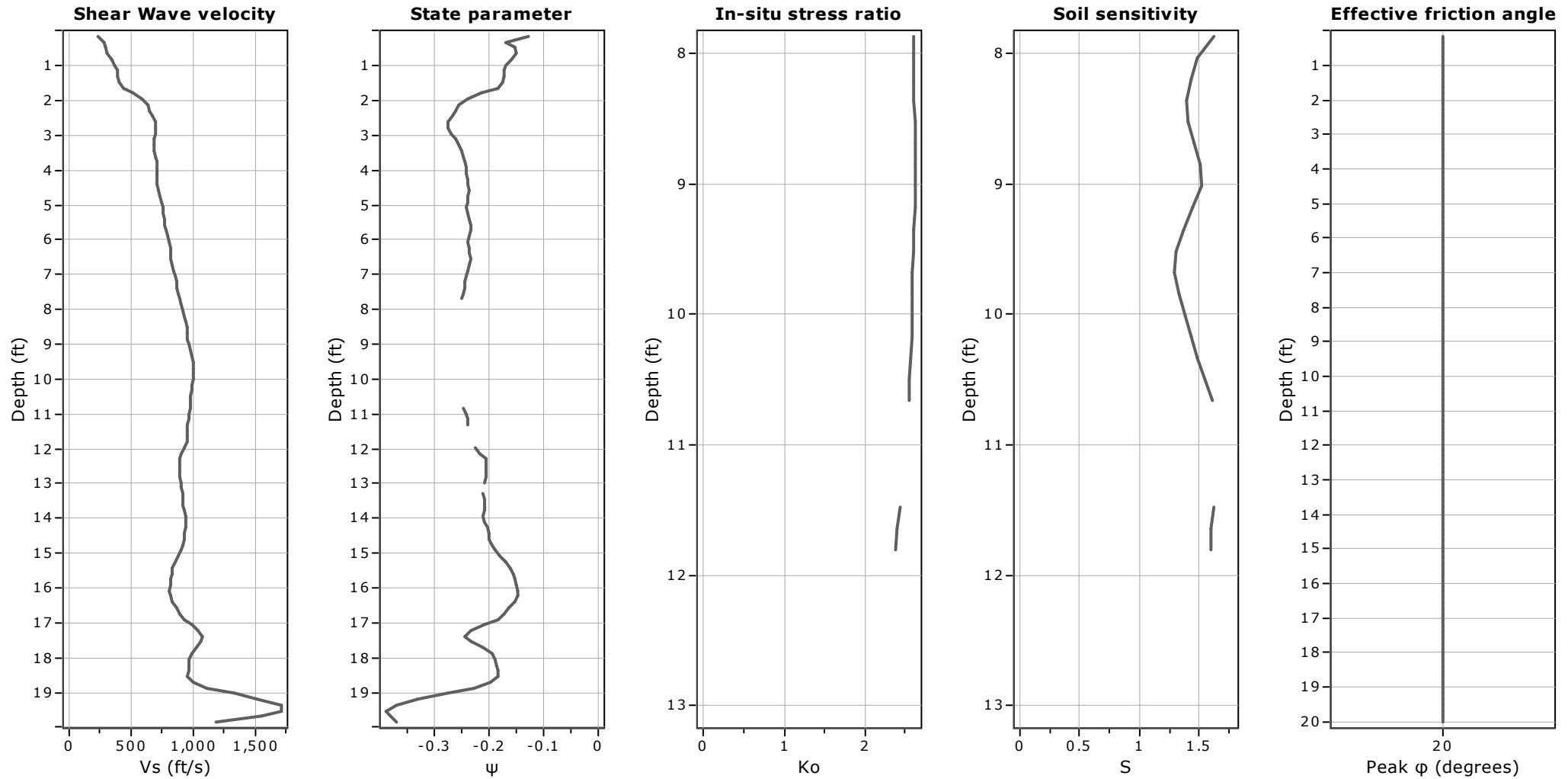
Location: Lake Jennings Park Road

**Calculation parameters**Constrained modulus: Based on variable α using I_c and Q_{in} (Robertson, 2009) G_o : Based on variable α using I_c (Robertson, 2009)Undrained shear strength cone factor for clays, N_{kt} : 14OCR factor for clays, N_{kt} : 0.33

—●— User defined estimation data

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road



Calculation parameters

Soil Sensitivity factor, N_s : 7.00

—●— User defined estimation data

APPENDIX C

SCS&T DATA

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION	GROUP SYMBOL	TYPICAL NAMES		
I. COARSE GRAINED, more than half of material is larger than No. 200 sieve size.				
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW Well graded gravels, gravel-sand mixtures, little or no fines.		
		GP Poorly graded gravels, gravel sand mixtures, little or no fines.		
	GRAVELS WITH FINES (Appreciable amount of fines)	GM Silty gravels, poorly graded gravel-sand-silt mixtures.		
		GC Clayey gravels, poorly graded gravel-sand, clay mixtures.		
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW Well graded sand, gravelly sands, little or no fines.		
		SP Poorly graded sands, gravelly sands, little or no fines.		
	SANDS WITH FINES (Appreciable amount of fines)	SM Silty sands, poorly graded sand and silty mixtures.		
		SC Clayey sands, poorly graded sand and clay mixtures.		
II. FINE GRAINED, more than half of material is smaller than No. 200 sieve size.				
SILTS AND CLAYS Liquid Limit less than 50	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.		
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.		
	OL	Organic silts and organic silty clays or low plasticity.		
SILTS AND CLAYS Liquid Limit greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.		
	CH	Inorganic clays of high plasticity, fat clays.		
	OH	Organic clays of medium to high plasticity.		
III. HIGHLY ORGANIC SOILS				
	PT	Peat and other highly organic soils.		
<table><tr><td> ∇ - Water level at time of excavation or as indicated US - Undisturbed, driven ring sample or tube sample SC - Sand Cone CON - Consolidation EI - Expansion Index MS - Maximum Size of Particle MAX - Maximum Density ST - Shelby Tube SPT - Standard Penetration Sample pH - pH & Resistivity SF/CL - Sulfate & Chloride </td><td> CK - Undisturbed chunk sample ☒ - Bulk Sample SP - Standard penetration sample DS - Direct Shear SA - Sieve Analysis PI - Plastic Index RC - Relative Compaction UC - Unconfined Compression TX - Triaxial Compression RS - Ring Shear AL - Atterberg Limits </td></tr></table>			∇ - Water level at time of excavation or as indicated US - Undisturbed, driven ring sample or tube sample SC - Sand Cone CON - Consolidation EI - Expansion Index MS - Maximum Size of Particle MAX - Maximum Density ST - Shelby Tube SPT - Standard Penetration Sample pH - pH & Resistivity SF/CL - Sulfate & Chloride	CK - Undisturbed chunk sample ☒ - Bulk Sample SP - Standard penetration sample DS - Direct Shear SA - Sieve Analysis PI - Plastic Index RC - Relative Compaction UC - Unconfined Compression TX - Triaxial Compression RS - Ring Shear AL - Atterberg Limits
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**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE: 2

LOG OF EXPLORATORY TRENCH NUMBER T-1

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 675

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND	X	X			
2							
3							
4	SM	DECOMPOSED METAMORPHIC ROCK: Light brownish-tan, humid, dense, SILTY SAND					
5		----- Very dense					
6		Practical refusal at 5 feet					
7							
8							
9							
10							

**SC
ST**

**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 3

LOG OF EXPLORATORY TRENCH NUMBER T-2

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 681

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	FILL: Brown, humid, loose, SILTY SAND with COBBLE, MS = 10"					
2	SM	DECOMPOSED METAMORPHIC: Grayish-tan to light brown, humid, dense, SILTY SAND					
3							
4		Practical refusal at 3½ feet					
5		MS=Maximum Size					
6							
7							
8							
9							
10							



SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 4

LOG OF EXPLORATORY TRENCH NUMBER T-3

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 675

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND	CK				
2		Contact slopes 8°SE					
3	SM	DECOMPOSED METAMORPHIC ROCK: Light reddish-brown tan, humid, dense, SILTY SAND					
4		Practical refusal at 3½ feet					
5		SE=Southeast					
6							
7							
8							
9							
10							



**SOUTHERN CALIFORNIA
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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 5

LOG OF EXPLORATORY TRENCH NUMBER T-4

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 659

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 13

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	TOPSOIL: Dark brown, humid, loose, SILTY SAND					
2	SM	COLLUVIUM: Dark brown, humid, loose, SILTY SAND					
3							
4							
5							
6							
7							
8							
13		Groundwater	CK		13.6	90.4	
15							

Trench ended at 15 feet



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LAKE JENNINGS VILLAGE

BY: DBA DATE: 1/04/2006

JOB NUMBER: 0511183-1 PLATE NO.: 6

LOG OF EXPLORATORY TRENCH NUMBER T-5

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 660

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
2	SM	DECOMPOSED METAMORPHIC ROCK: Light brown to grayish-tan, humid, dense, SILTY SAND					
3							
4							
5		Practical refusal at 4 feet					
6							
7							
8							
9							
10							

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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 7

LOG OF EXPLORATORY TRENCH NUMBER T-6

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 670

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	FILL: Brown, humid, loose, SILTY SAND					
2							
3							
4							
5	ML	COLLUVIUM: Dark reddish-brown, very moist, soft, VERY SANDY SILT with CLAY					
6			CK		20.3	89.3	
7							
8			CK		19.5	96.9	
15							
16		Trench ended at 15½ feet					

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**SOUTHERN CALIFORNIA
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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 8

LOG OF EXPLORATORY TRENCH NUMBER T-7

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 669

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND ----- Moist Trench ended at 13½ feet					
2							
3							
4							
5							
6							
7							
8							
13							
14							

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SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 9

LOG OF EXPLORATORY TRENCH NUMBER T-8

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft):

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
2							
3							
4							
5			CK		13.7	93.1	
6							
7	SM	DECOMPOSED METAMORPHIC ROCK: Grayish-olive, humid, dense, SILTY SAND					
8							
9							
10		Trench ended at 9½ feet					

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LAKE JENNINGS VILLAGE

BY: DBA DATE: 1/4/2006

JOB NUMBER: 0511183-1 PLATE NO.: 10

LOG OF EXPLORATORY TRENCH NUMBER T-9

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 669

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
2							
3		Moist					
4							
5							
6							
7							
8							
9		Grayish-brown, humid					
10							

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**SOUTHERN CALIFORNIA
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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 11

LOG OF EXPLORATORY TRENCH NUMBER T-9 (Continued)

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 669

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
11	SM	Grayish-brown, humid, loose, SILTY SAND					
12							
13							
13	SM	DECOMPOSED METAMORPHIC ROCK: Grayish-tan, humid, dense, SILTY SAND					
14							
15		Practical refusal at 14 feet					
16							
17							
18							
19							
20							

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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2005

JOB NUMBER: 0511183-1

PLATE NO.: 12

LOG OF EXPLORATORY TRENCH NUMBER T-10

Date Excavated: 10-03-05

Logged by: MM

Equipment: Backhoe

Project Manager: DBA

Surface Elevation (ft): 667

Depth to Water (ft): 16

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
1							
2							
3							
4							
5			CK		11.2	102.4	
6							
7							
8							
9							
10	ML	Dark brown, very moist, soft, VERY SANDY SILT					

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**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 13

LOG OF EXPLORATORY TRENCH NUMBER T-10 (Continued)

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 667

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 16

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
11	ML	Dark brown, very moist, soft, VERY SANDY SILT					
12	SM&ML	Very SILTY SAND to very SANDY SILT	CK		21.8	103.4	
13							
14							
15							
16		Groundwater					
17		Trench ended at 16 feet					
18							
19							
20							



SOUTHERN CALIFORNIA
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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 14

LOG OF EXPLORATORY TRENCH NUMBER T-11

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 661

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 16½

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
2							
3							
4			CK		12.1	95.7	
5							
6							
7							
8							
9							
10							



**SOUTHERN CALIFORNIA
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LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 15

LOG OF EXPLORATORY TRENCH NUMBER T-11 (Continued)

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 661

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 16½

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
11	SM	Brown, humid, loose, SILTY SAND					
12							
13			CK		18.6	103.0	
14							
15							
16							
16.5		Groundwater					
17		Trench ended at 17 feet					
18							
19							
20							

SC
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SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 16

LOG OF EXPLORATORY TRENCH NUMBER T-12

Date Excavated: 10-03-05

Equipment: Backhoe

Surface Elevation (ft): 672

Logged by: MM

Project Manager: DBA

Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
		2" ASPHALTIC CONCRETE					
1	SM	COLLUVIUM: Brown, humid, loose, SILTY SAND					
2							
3							
4							
		Contact 2° to 4° SE					
5	SM	DECOMPOSED METAMORPHIC ROCK: Gray, humid, very dense, SILTY SAND					
6		Trench ended at 5 feet					
7		SE= Southeast					
8							
9							
10							



SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 17

LOG OF EXPLORATORY TRENCH NUMBER T-13

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 688 to 681*

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	FILL: Light brown, humid, loose, SILTY SAND	CK				
2							
3		Sloping contact					
4	SC	SUBSOIL: Dark brown, humid, medium dense, CLAYEY SAND					
5	SM	DECOMPOSED METAMORPHIC ROCK: Grayish-brown, humid, very dense, SILTY SAND					
6							
7		Trench ended at 6 feet *Trench in slope, top of slope elevation = 690'					
8							
9							
10							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 18

LOG OF EXPLORATORY TRENCH NUMBER T-14

Date Excavated: 10-03-05
 Equipment: Backhoe
 Surface Elevation (ft): 669

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 3½

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	ML	COLLUVIUM: Dark brown, moist, soft, SANDY SILT					
2							
3							
4							
4		Seepage at contact					
5	SM	DECOMPOSED METAMORPHIC ROCK: Grayish-tan, humid, very dense, SILTY SAND					
5		Practical refusal at 4½ feet					
6							
7							
8							
9							
10							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA DATE: 01/04/2006
 JOB NUMBER: 0511183-1 PLATE NO.: 19

LOG OF EXPLORATORY TRENCH NUMBER T-15

Date Excavated: 01-07-99

Logged by: JM

Equipment: Backhoe

Project Manager: DBA

Surface Elevation (ft):

Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	SUBSOIL: Brown, moist, loose to medium dense, SILTY SAND	CK	X			
2							
3	GM	METAMORPHIC ROCK: Light gray to brown, dry, very dense, SILTY SANDY GRAVEL and COBBLE, MS=5"					
4							
5		Refusal at 4 feet					
6		MS=Maximum Size					
7							
8							
9							
10							



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 20

LOG OF EXPLORATORY TRENCH NUMBER T-16

Date Excavated: 01-07-99
 Equipment: Backhoe
 Surface Elevation (ft):

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	TOPSOIL: Dark brown, moist, loose, SILTY SAND					
2							
6	SM	COLLUVIUM: Brown, moist, medium dense, SILTY SAND					
6		Reddish-brown	CK	X	10.1	102.2	
8							
9		Humid		X			
10							
11							
12		Moist to wet	CK		11.4	111.4	
13	SM	METAMORPHIC ROCK: Gray, dry, very dense, SILTY SAND with GRAVEL and COBBLE					
14							

Refusal at 14 feet



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 21

LOG OF EXPLORATORY TRENCH NUMBER T-17

Date Excavated: 01-07-99
 Equipment: Backhoe
 Surface Elevation (ft): 676

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	TOPSOIL: Dark brown, moist, loose, SILTY SAND					
2							
6	SM	COLLUVIUM: Reddish-brown, moist, loose to medium dense, SILTY SAND		X			
8		Moist					
9		Grayish-brown					
10		Humid, some GRAVEL and COBBLE, MS=6"					
11							
12	SM	METAMORPHIC ROCK: Gray, dry, very dense, SILTY SAND with GRAVEL and COBBLE					
13							
14		Refusal at 13½ feet					

MS=Maximum Size



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA DATE: 1/4/2006

JOB NUMBER: 0511183-1 PLATE NO.: 22

LOG OF EXPLORATORY TRENCH NUMBER T-18

Date Excavated: 01-07-99
 Equipment: Backhoe
 Surface Elevation (ft): 678

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
1	SM	TOPSOIL: Dark brown, humid to moist, loose, SILTY SAND	CK		17.5	102.8	
2	SM	SUBSOIL: Brown, very moist, loose to medium dense, SILTY SAND with GRAVEL					
3	SM	DECOMPOSED METAMORPHIC ROCK: Reddish-brown and brown, humid, very dense, SILTY SAND					
4							
5	GM	METAMORPHIC ROCK: Light gray to brown, dry, very dense, SILTY SANDY GRAVEL and COBBLE, MS=5"					
6							
7		Refusal at 6 1/2 feet					
8		MS=Maximum Size					
9							
10							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 23

LOG OF EXPLORATORY TRENCH NUMBER T-19

Date Excavated: 01-07-99
 Equipment: Backhoe
 Surface Elevation (ft): 674

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
	SM	TOPSOIL: Dark brown, humid to moist, loose, SILTY SAND					
1							
	SM	COLLUVIUM: Brown, moist, loose to medium dense, SILTY SAND with GRAVEL					
2							
3							
4							
5							
	SM	Reddish-brown and brown, very moist, medium dense, SILTY SAND					
6							
7							
	SM	METAMORPHIC ROCK: Light gray to brown, dry, very dense, SILTY SANDY GRAVEL and COBBLE, MS=5"					
8							
		Refusal at 8 feet					
9		MS=Maximum Size					
10							



SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 24

LOG OF EXPLORATORY TRENCH NUMBER T-20

Date Excavated: 01-07-99
 Equipment: Backhoe
 Surface Elevation (ft): 674

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft):

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
			UNDISTURBED	BULK			
	SM	COLLUVIUM: Dark brown, moist, loose, SILTY SAND					
1	SM	Dark brown, very moist, loose to medium dense, SILTY SAND					
2				X			
3							
4							
5	SM	Reddish-brown, moist, medium dense, SILTY SAND					
6							
7							
8		Brown					
10							
15							

Trench ended at 15 feet



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 25

LOG OF EXPLORATORY TRENCH NUMBER T-21

Date Excavated: 01/07/99
 Equipment: CME 55
 Surface Elevation (ft): 679

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
0	SM	TOPSOIL: Dark brown, humid, loose, SILTY SAND					
2	SM	COLLUVIUM: Dark brown, moist, loose to medium dense, SILTY SAND					
4							
6							
8							
10		Some rock fragments (MS=4")					
12	SW	Coarse grain sand with gravel					
14		Trench ended at 13 feet					
16		MS=Maximum size					
18							
20							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA	DATE: 1/4/2006
JOB NUMBER: 0511183-1	PLATE NO.: 26

LOG OF EXPLORATORY TRENCH NUMBER T-22

Date Excavated: 01/07/99
 Equipment: CME 55
 Surface Elevation (ft): 677

Logged by: JM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
2	SM	TOPSOIL: Dark brown, humid, loose, SILTY SAND					
		METAMORPHIC ROCK: Gray, very dense rock					
4		Refusal at 2 feet					
6							
8							
10							
12	SW						
14							
16							
18							
20							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: JM

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 27

LOG OF EXPLORATORY BORING NUMBER B-1

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 678

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
2	SM	COLLUVIUM: Dark brown, humid, loose, SILTY SAND					
4	SM	DECOMPOSED METAMORPHIC ROCK: Olive gray, humid, very dense, SILTY SAND	US		18/6" 50/6"		
6			US		79/7"		
8		Refusal at 7½ feet					
10							
12							
14							
16							
18							
20							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 01/04/2006

JOB NUMBER: 0511183-1

PLATE NO.: 28

LOG OF EXPLORATORY BORING NUMBER B-2

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 692

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
	GP	FILL: Brown, sandy GRAVEL					
2							
	SM	DECOMPOSED METAMORPHIC ROCK: Olive gray, humid, very dense, SILTY SAND	US		50/3"		
4							
		No sample	SPT		50/0		
6		Refusal at 5½ feet					
8							
10							
12							
14							
16							
18							
20							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 29

LOG OF EXPLORATORY BORING NUMBER B-3

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 667

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
2	SM	COLLUVIUM: Dark brown, humid, loose, SILTY SAND (disturbed-possible shallow fill)					
4			US		13		
6		Brown	US		20	17.0	103.9
8							
10			US		12	19.8	110.1
12							
14							
16	SM	DECOMPOSED METAMORPHIC ROCK: Gray, humid, very dense, SILTY SAND	US		50/3"		
18		Refusal at 16 feet	SPT		50/4"		
20							



SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 30

LOG OF EXPLORATORY BORING NUMBER B-4

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 662

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 17

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
	SM	COLLUVIUM: Dark brown, humid, loose, SILTY SAND (disturbed - possible shallow fill)					
2							
4		Medium dense	US		31		
6		Brown, medium dense	US		29		
8							
10		Dark brown, loose	US		13	9.8	106.7
12							
14		Dense, SILTY SAND with trace of clay					
16			US		51		
17		Groundwater					
20			US		53		

**SC
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**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 31

LOG OF EXPLORATORY BORING NUMBER B-4 (Continued)

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 662

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 17

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
	SW	Brown, saturated, dense, coarse grain SAND with GRAVEL					
22							
	SM	DECOMPOSED METAMORPHIC ROCK: Gray olive, humid, very dense, SILTY SAND					
24							
		Refusal at 23½ feet					
26							
28							
30							
32							
34							
36							
38							
40							



SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA DATE: 1/4/2006
 JOB NUMBER: 0511183-1 PLATE NO.: 32

LOG OF EXPLORATORY BORING NUMBER B-5

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 673

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 18

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
	SM	COLLUVIUM: Dark brown, humid, loose, SILTY SAND (disturbed-possible shallow fill)					
2			US		48	8.6	109.4
4							
6			US		31		
8							
10		Porous	US		28	7.4	112.9
12							
14							
16		Wet	US		17	16.0	111.5
18		Groundwater					
20							

**SC
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**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 33

LOG OF EXPLORATORY BORING NUMBER B-5 (Continued)

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 673

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): 18

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT (pcf)
			UNDISTURBED	BULK			
22	SM	Light brown, saturated, dense, SILTY SAND with gravel	US		59	14.2	118.5
24							
26			US		56	19.9	103.4
28							
30	SM/ SW	DECOMPOSED METAMORPHIC ROCK: Light brown, wet, dense, SLIGHTLY SILTY SAND to SAND with trace of SILT and GRAVEL					
32							
34		Refusal at 30½ feet					
36							
38							
40							



**SOUTHERN CALIFORNIA
 SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE 34

LOG OF EXPLORATORY BORING NUMBER B-6

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 656

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
2	SM	COLLUVIUM: Dark reddish brown, humid, loose, SILTY SAND with trace of CLAY Loose to medium dense	US		24	17.4	116.1
4							
6							
8							
10	SM	DECOMPOSED METAMORPHIC ROCK: Grayish-olive, humid, very dense, SILTY SAND, disturbed sample	US		50/6"		
12							
14		Refusal at 11 feet					
16							
18							
20							

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SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA DATE: 1/4/2006

JOB NUMBER: 0511183-1 PLATE NO.: 35

LOG OF EXPLORATORY BORING NUMBER B-7

Date Excavated: 10-06-05

Logged by: MM

Equipment: CME 55

Project Manager: DBA

Surface Elevation (ft): 682

Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
		2" ASPHALTIC CONCRETE					
2	SM	DECOMPOSED METAMORPHIC ROCK: Gray, humid, very dense, SILTY SAND, grades to fractured rock					
4							
6							
8							
		Refusal at 8 feet					
10							
12							
14							
16							
18							
20							



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 36

LOG OF EXPLORATORY BORING NUMBER B-8

Date Excavated: 10-06-05
 Equipment: CME 55
 Surface Elevation (ft): 682

Logged by: MM
 Project Manager: DBA
 Depth to Water (ft): N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES		PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WEIGHT
			UNDISTURBED	BULK			
		2" ASPHALTIC CONCRETE					
2	SM	DECOMPOSED METAMORPHIC ROCK: Gray, humid, very dense, SILTY SAND, grades to fractured rock					
4							
6							
8							
		Refusal at 9 feet					
10							
12							
14							
16							
18							
20							

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**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/4/2006

JOB NUMBER: 0511183-1

PLATE NO.: 37

MAXIMUM DENSITY & OPTIMUM MOISTURE CONTENT

METHOD - A

ASTM - D 1557-00

SAMPLE	DESCRIPTION	MAXIMUM DENSITY (pcf)	OPTIMUM MOISTURE (pcf)
T2 @ 1½' - 3½'	Light Brown, Silty Sand	122.7	9.4
T8 @ 1' - 6'	Dark Brown, Silty Sand	126.8	9.9
T16 @ 3' - 4'	Brown, Silty Sand	126.5	10.9
B5 @ 1' - 6'	Brown, Silty Sand	133	7.8

EXPANSION INDEX TEST RESULTS

Sample	T6 @ 5' - 10½'	B5 @ 1' - 6'
Condition	Remolded	Remolded
Initial Moisture Content (%)	9.9	8.2
Initial Density (pcf)	109.5	117.2
Final Moisture Content (%)	20.0	16.8
Normal Stress (psf)	145	144.7
Expansion Index	42.0	32

**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

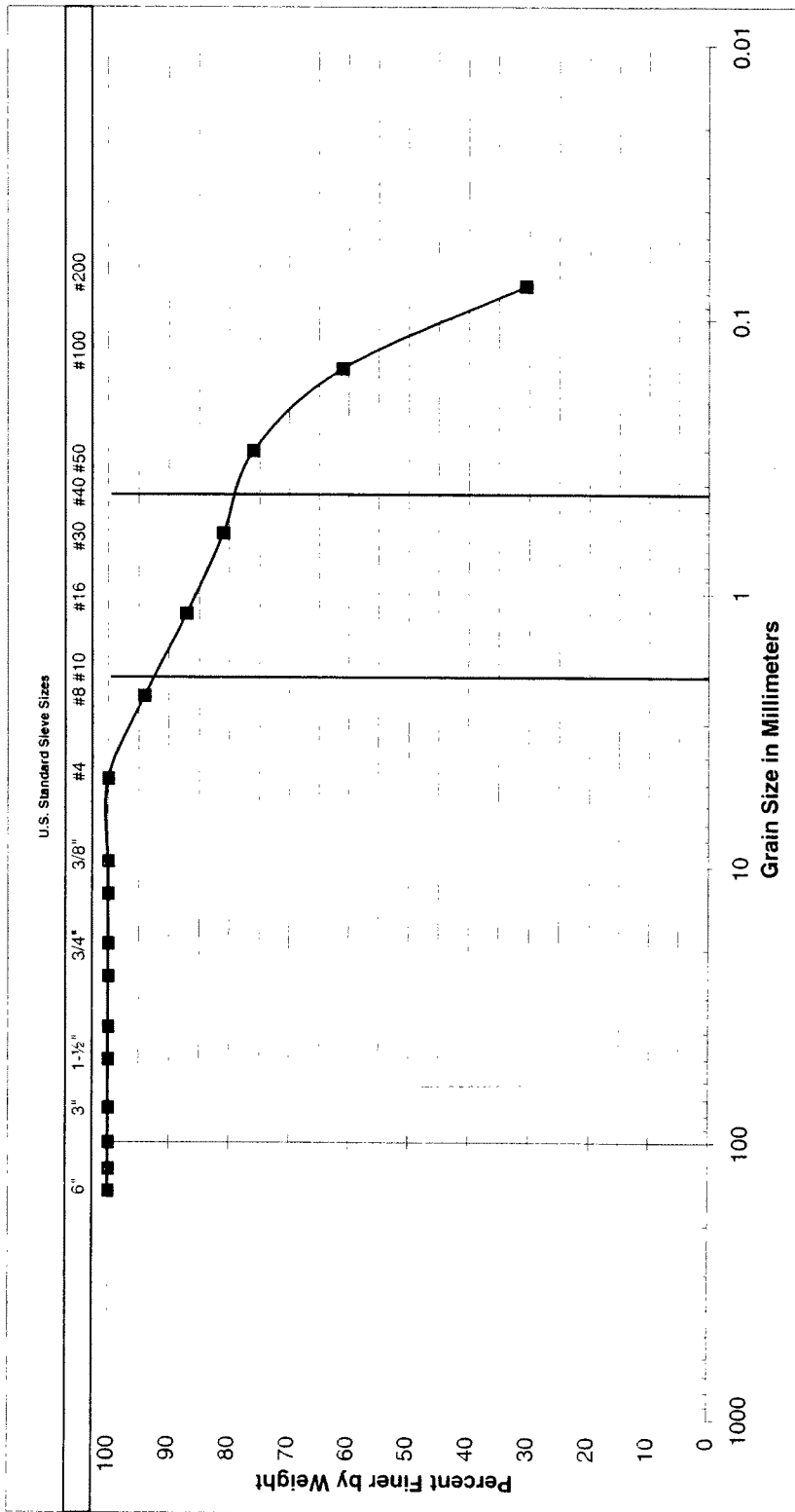
LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/12/2006

JOB No.: 051183-1

PLATE: 38



Cobbles	Gravel		Sand		Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION	
T2@1.5-3.5	

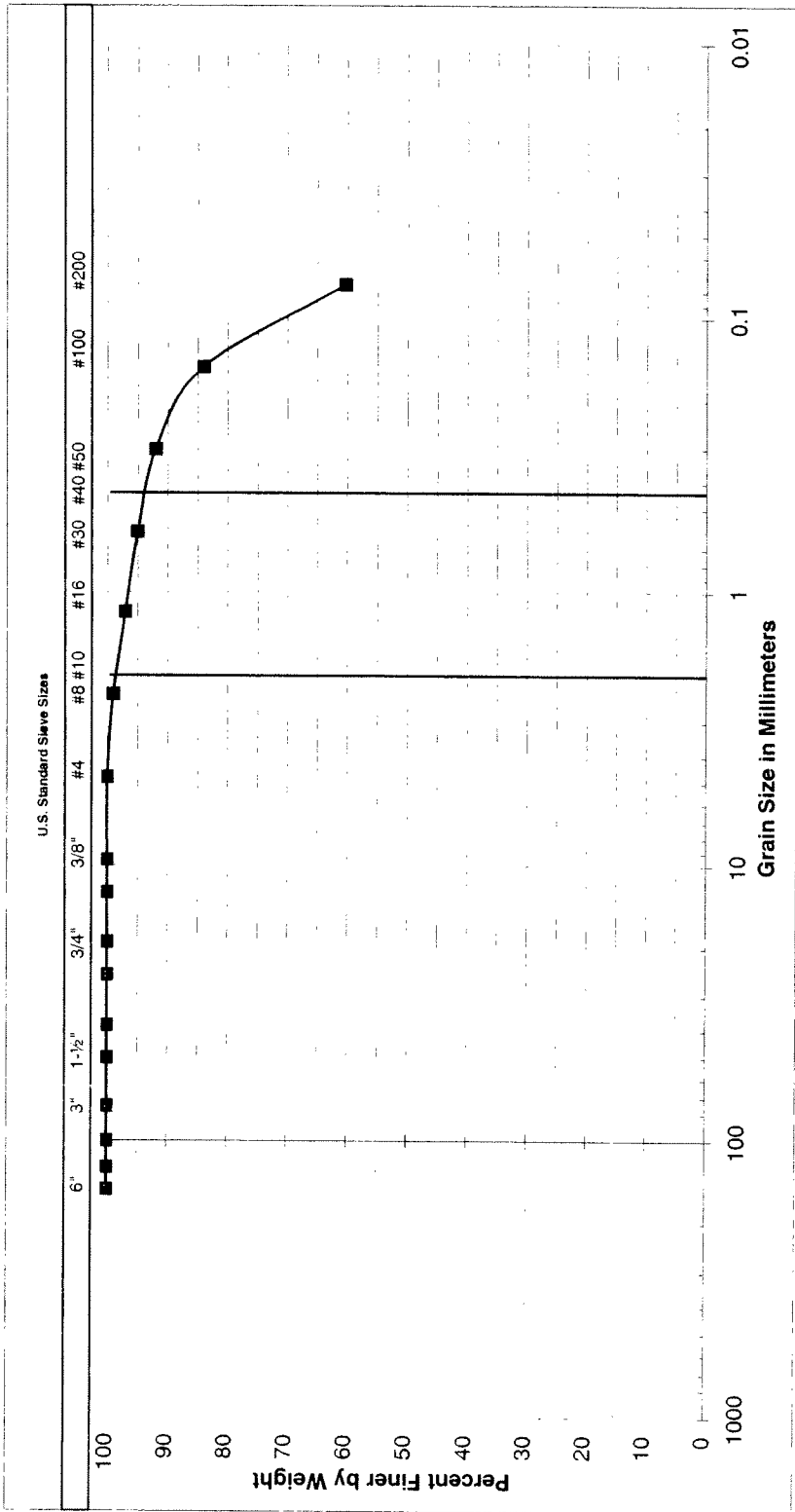
UNIFIED SOIL CLASSIFICATION:	
DESCRIPTION	SM SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	
PLASTIC LIMIT	
PLASTICITY INDEX	

SC
ST

SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE			
By	DBA	Date	1/12/06
Job Number	0511183-1	Plate	39



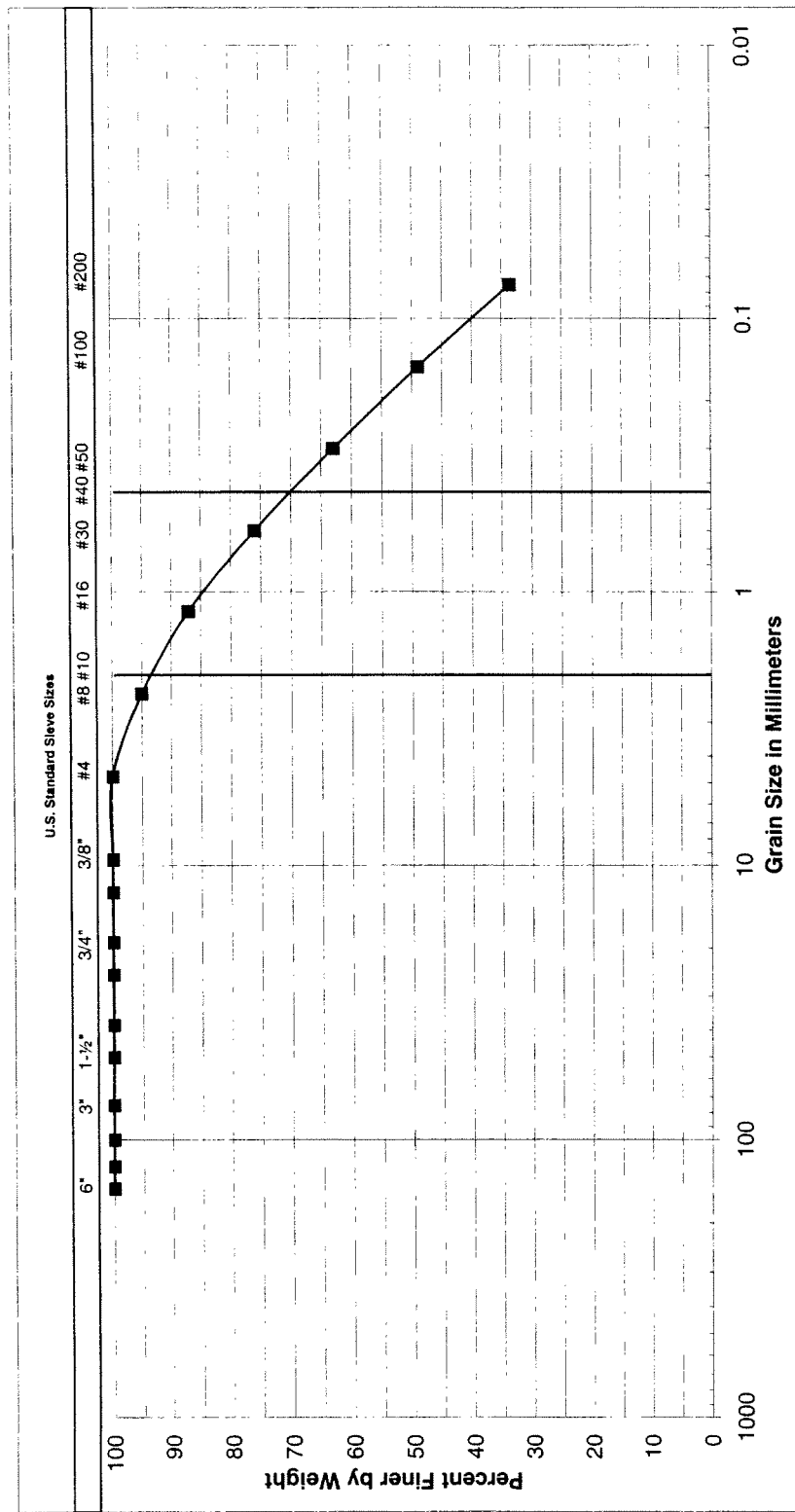
Cobbles	Gravel		Sand		Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
T6 @ 5-10.5

UNIFIED SOIL CLASSIFICATION:	ML
DESCRIPTION	SANDY SILT WITH CLAY

ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX

SC ST	SOUTHERN CALIFORNIA SOIL & TESTING, INC.		LAKE JENNINGS VILLAGE	
	By	DBA	Date	1/12/06
	Job Number	0511183-1	Plate	40



Cobbles	Gravel		Sand			Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine		

SAMPLE LOCATION
T8@1-6

UNIFIED SOIL CLASSIFICATION:
DESCRIPTION

SM
SILTY SAND

ATTERBERG LIMITS

LIQUID LIMIT

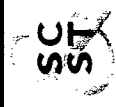
PLASTIC LIMIT

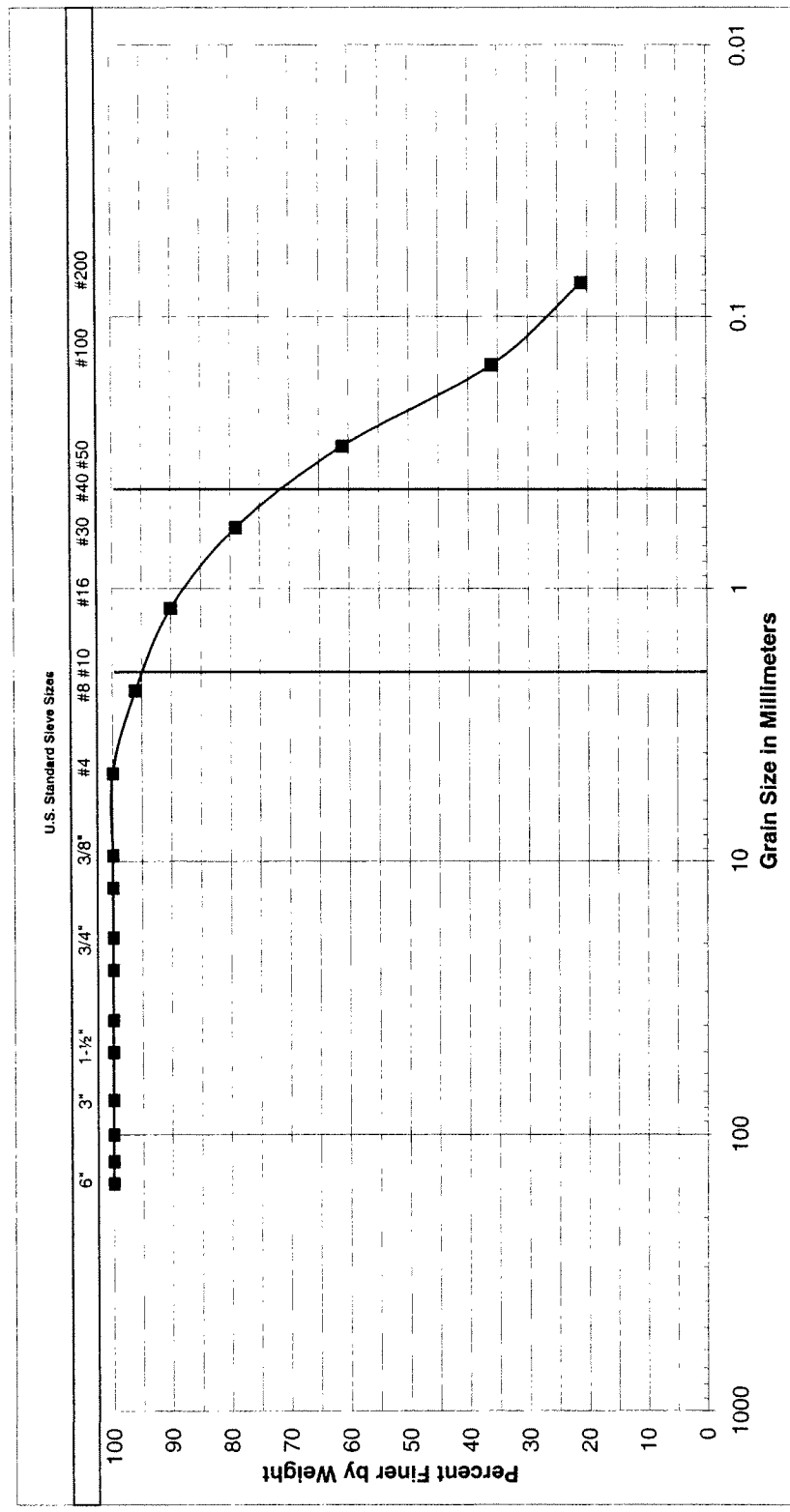
PLASTICITY INDEX

SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

By	DBA	Date	1/12/06
Job Number	0511183-1	Plate	41





Cobbles	Gravel		Sand		Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
T9@9-12.5

UNIFIED SOIL CLASSIFICATION:
DESCRIPTION

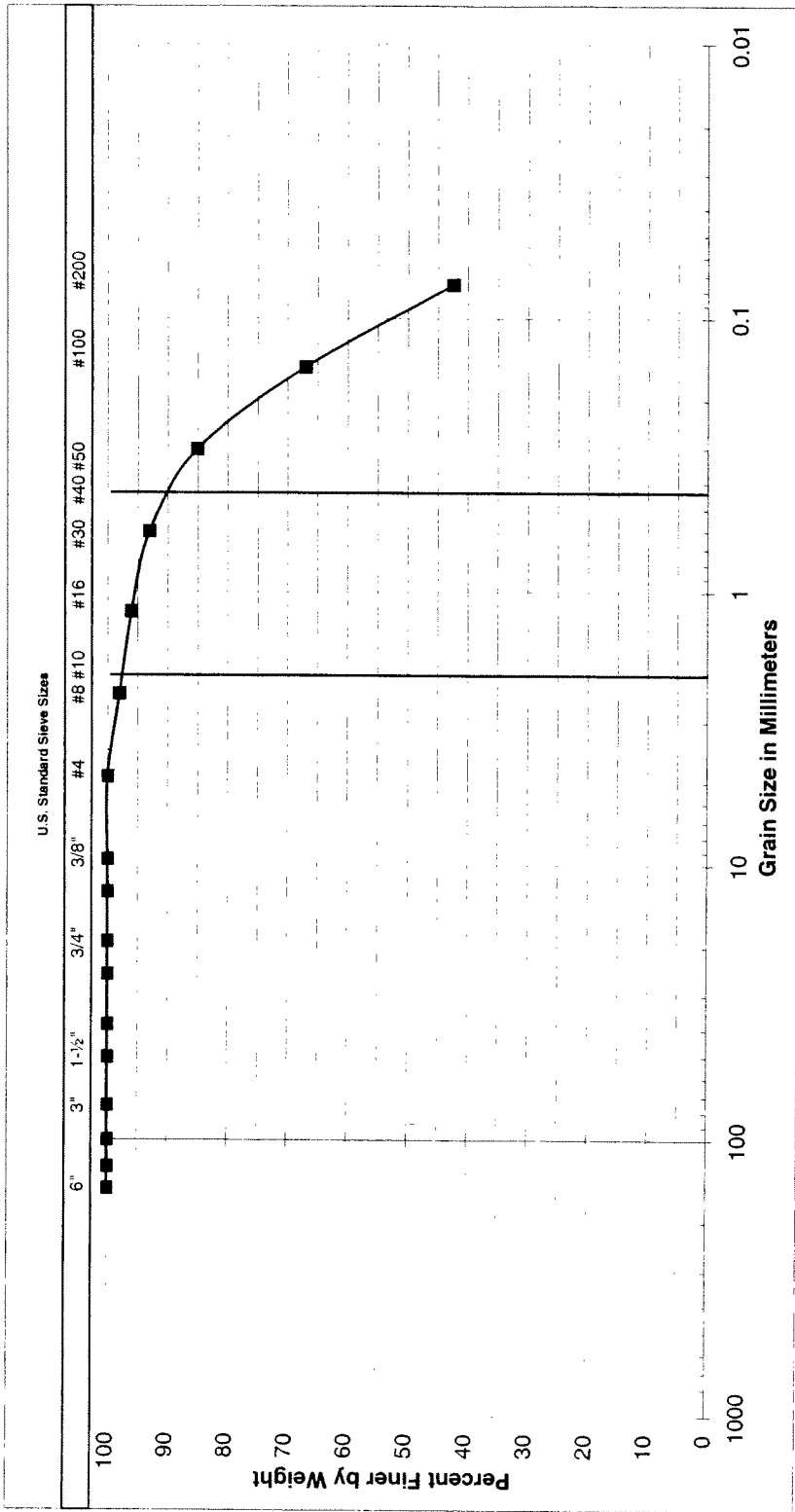
ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX

**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

By	DBA	Date	1/12/06
Job Number	0511183-1	Plate	43





Cobbles	Gravel		Sand			Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine		

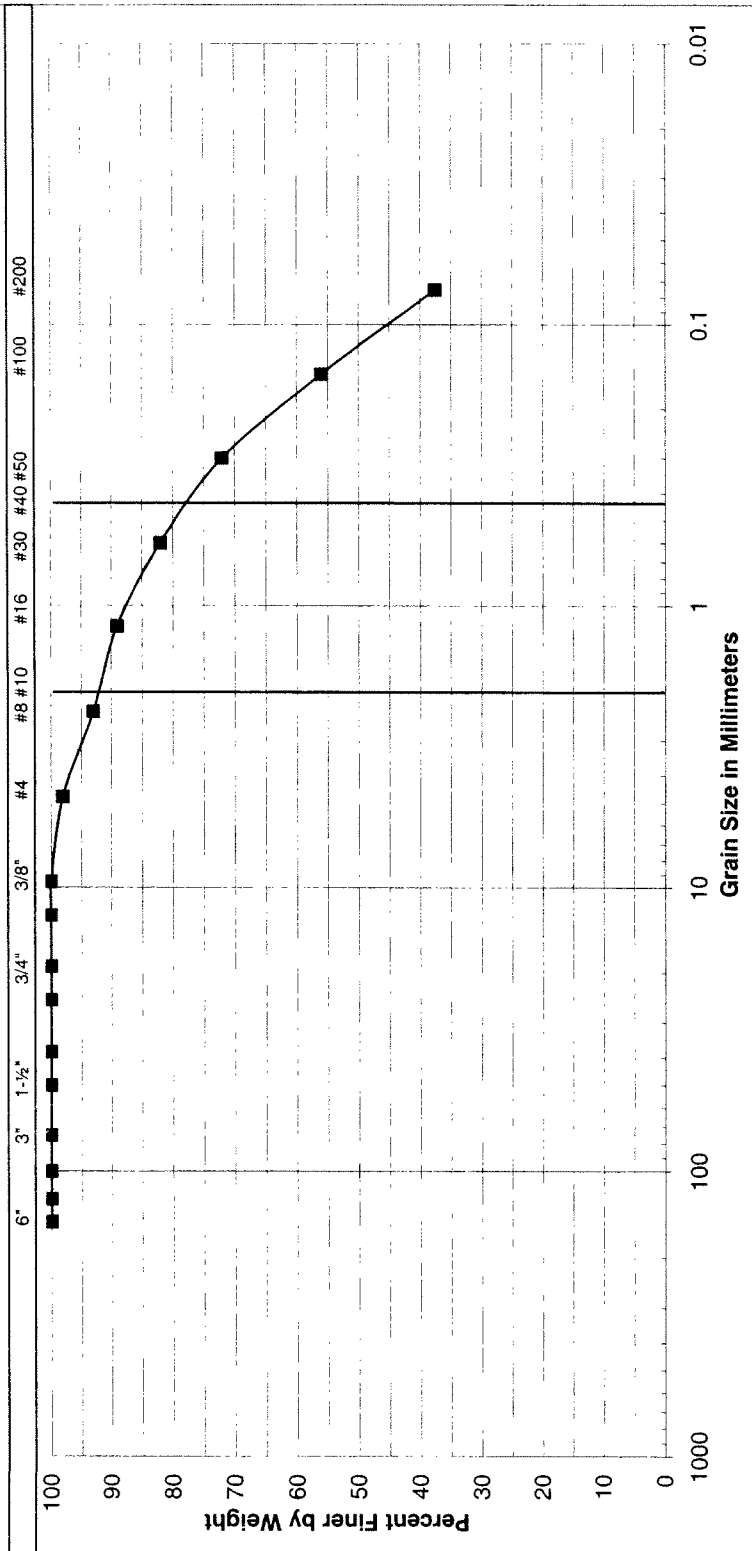
SAMPLE LOCATION
T10@10-11

UNIFIED SOIL CLASSIFICATION:	ML
DESCRIPTION	SANDY SILT

ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX

SC ST	SOUTHERN CALIFORNIA SOIL & TESTING, INC.		LAKE JENNINGS VILLAGE	
	By	DBA	Date	2/21/06
	Job Number	0511183-1	Plate	44

U.S. Standard Sieve Sizes



Cobbles	Gravel		Sand		Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
T11@1-7

UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

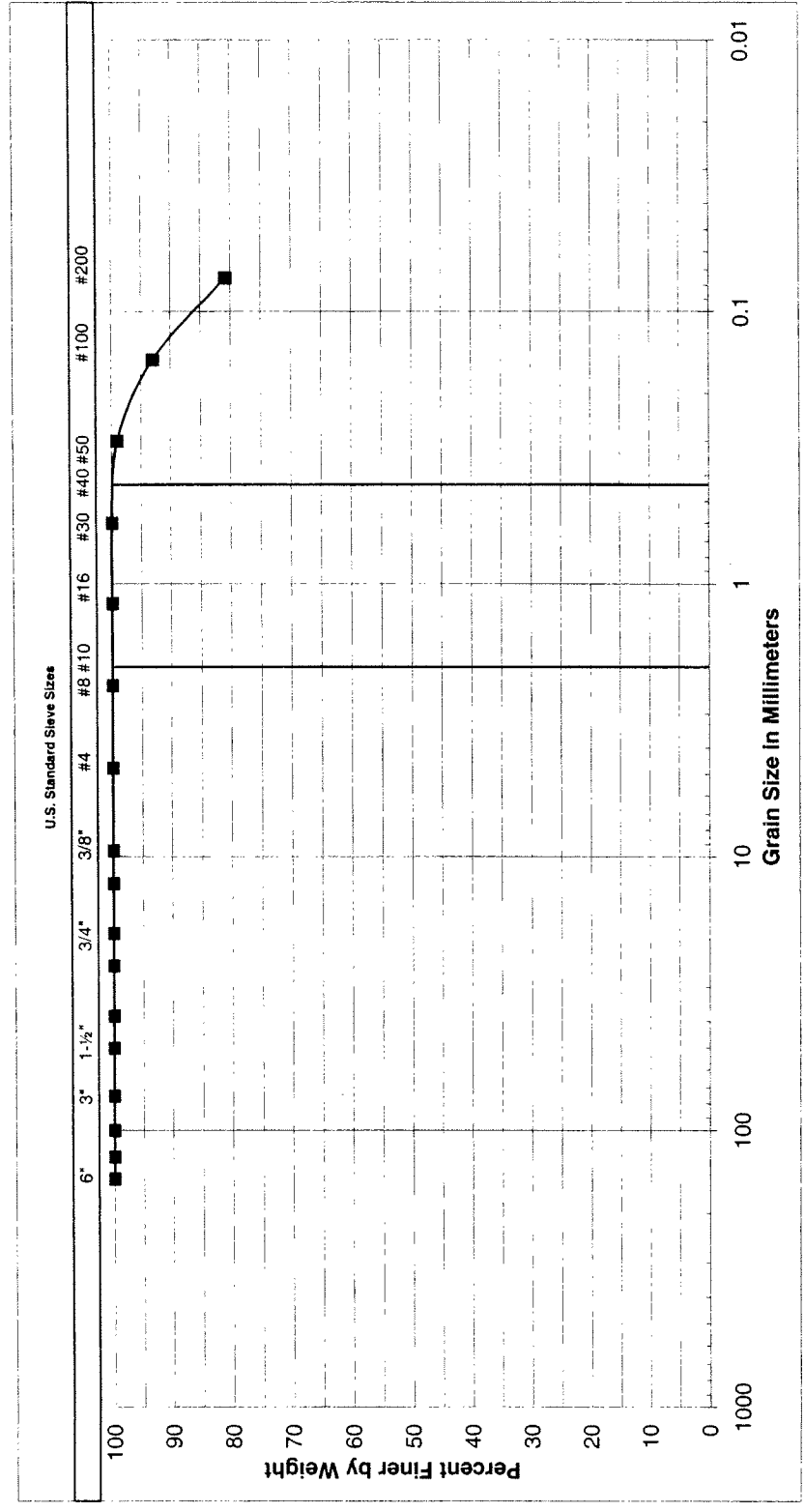
ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX

SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

By	DBA	Date	1/12/06
Job Number	0511183-1	Plate	45





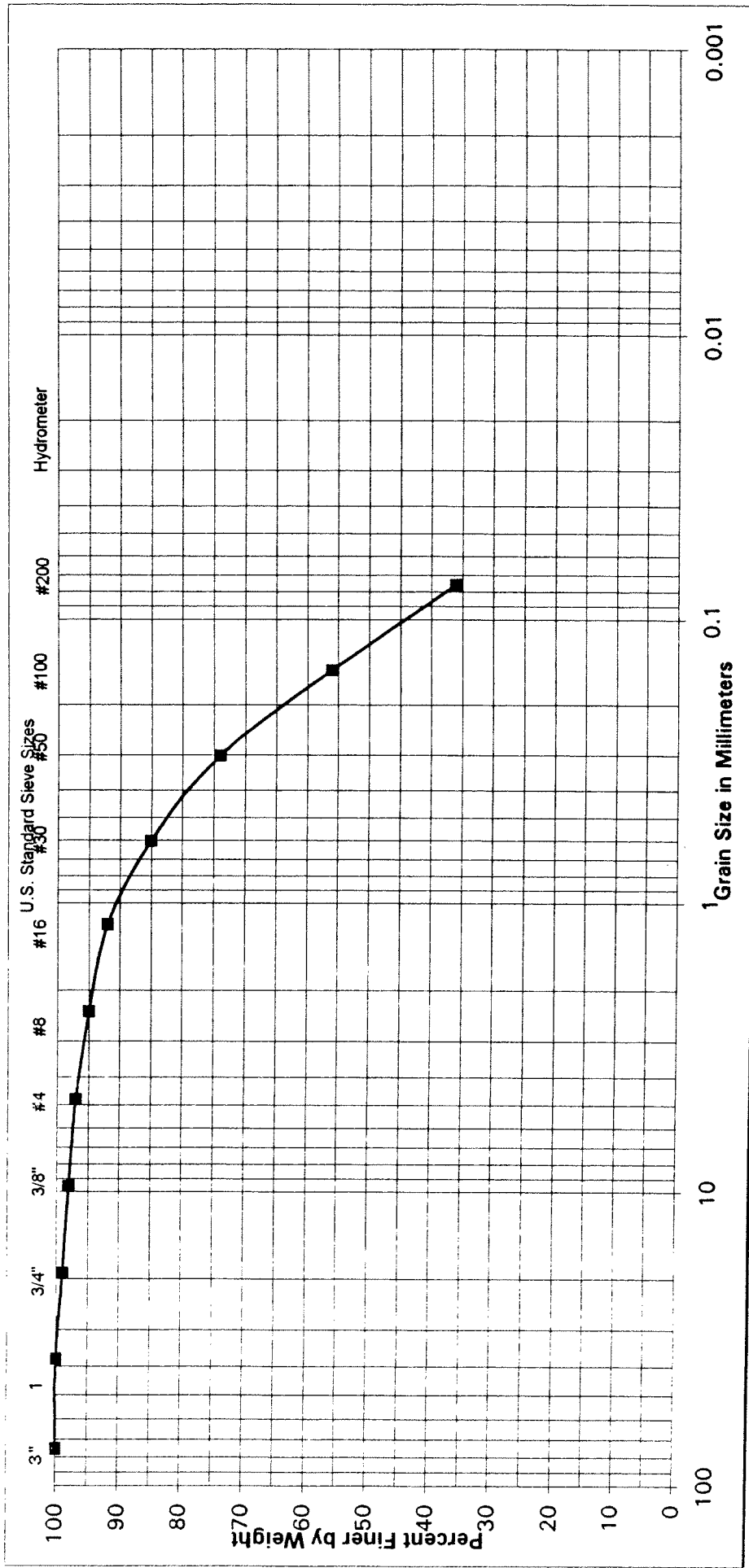
Cobbles	Gravel		Sand		Silt or Clay	
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
T14@0-3.5

UNIFIED SOIL CLASSIFICATION:	ML
DESCRIPTION	SANDY SILT

ATTERBERG LIMITS
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX

SOUTHERN CALIFORNIA SOIL & TESTING, INC.		LAKE JENNINGS VILLAGE	
		By DBA	Date
		Job Number	Plate
		0511183-1	46



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
GRAVEL		SAND			

SAMPLE
EXPLORATION NUMBER: T16
SAMPLE LOCATION: 3'-4'

UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION:	SILTY SAND

ATTERBERG LIMITS
LIQUID LIMIT:
PLASTIC LIMIT:
PLASTICITY INDEX:

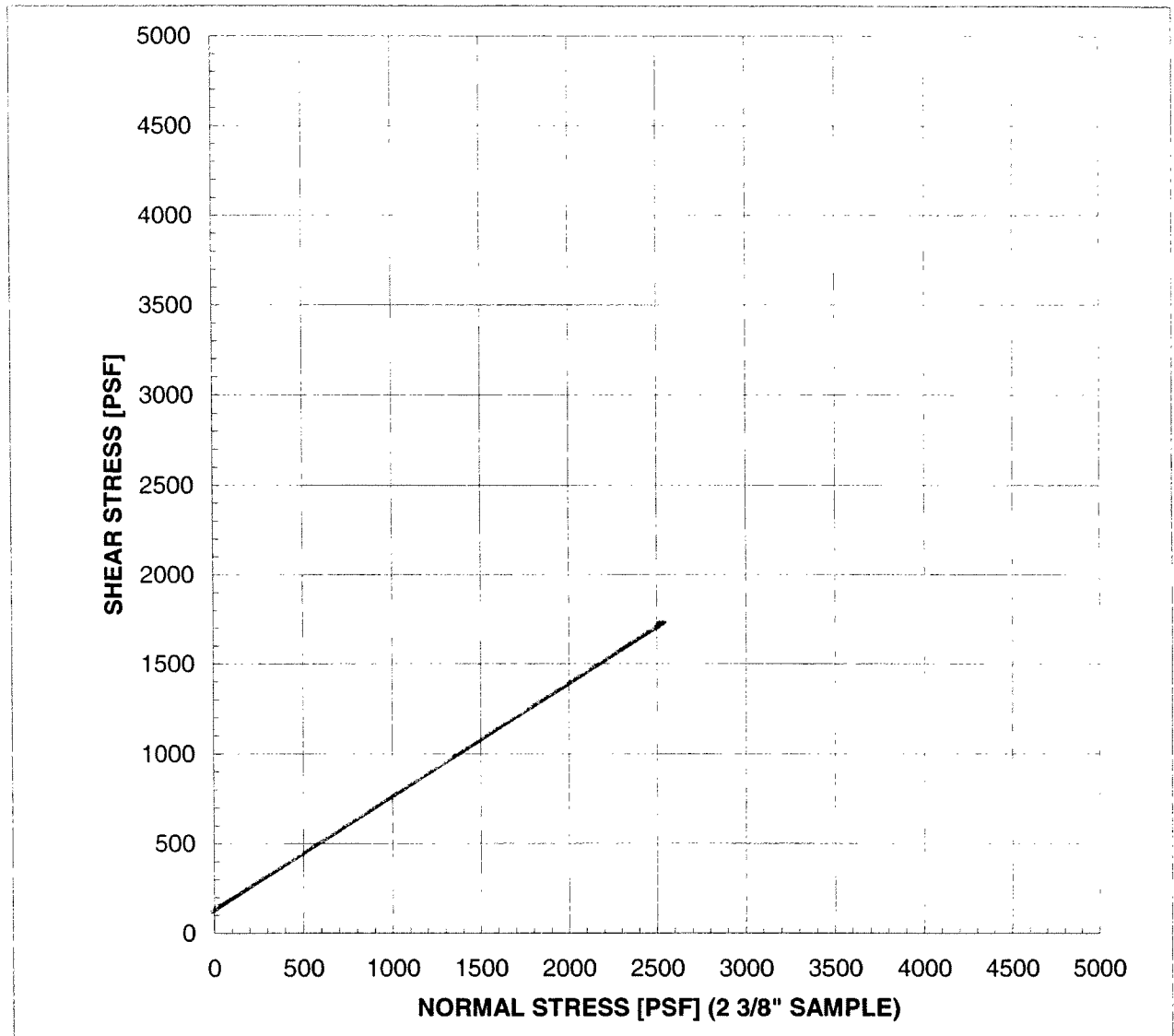
**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**



LAKE JENNINGS VILLAGE

By	DBA	Date	1/13/06
Job Number	0511183-1	Plate	47

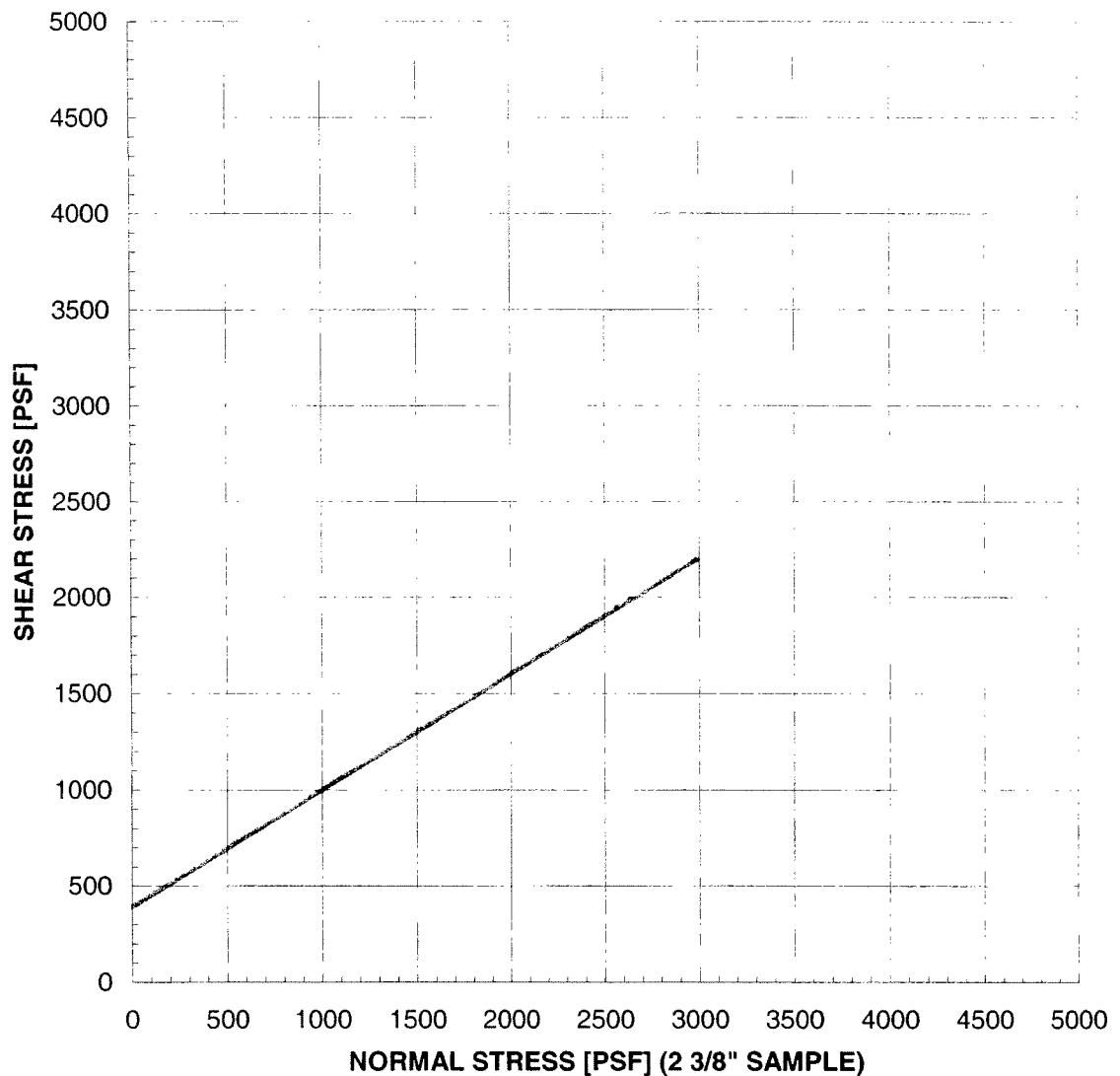
DIRECT SHEAR SUMMARY



SAMPLE	DESCRIPTION	ANGLE OF INTERNAL FRICTION (°)	COHESION INTERCEPT (PSF)
T2 @ 1½'-3½'	Remolded to 90%	33	150

 SOUTHERN CALIFORNIA SOIL & TESTING, INC.	LAKE JENNINGS VILLAGE		
	BY: DBA	DATE:	12-27-05
	JOB NUMBER: 0511183-1	PLATE NO.:	48

DIRECT SHEAR SUMMARY



SAMPLE	DESCRIPTION	ANGLE OF INTERNAL FRICTION (°)	COHESION INTERCEPT (PSF)
T8 @ 1'-6"	Remolded to 90%	30	400



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

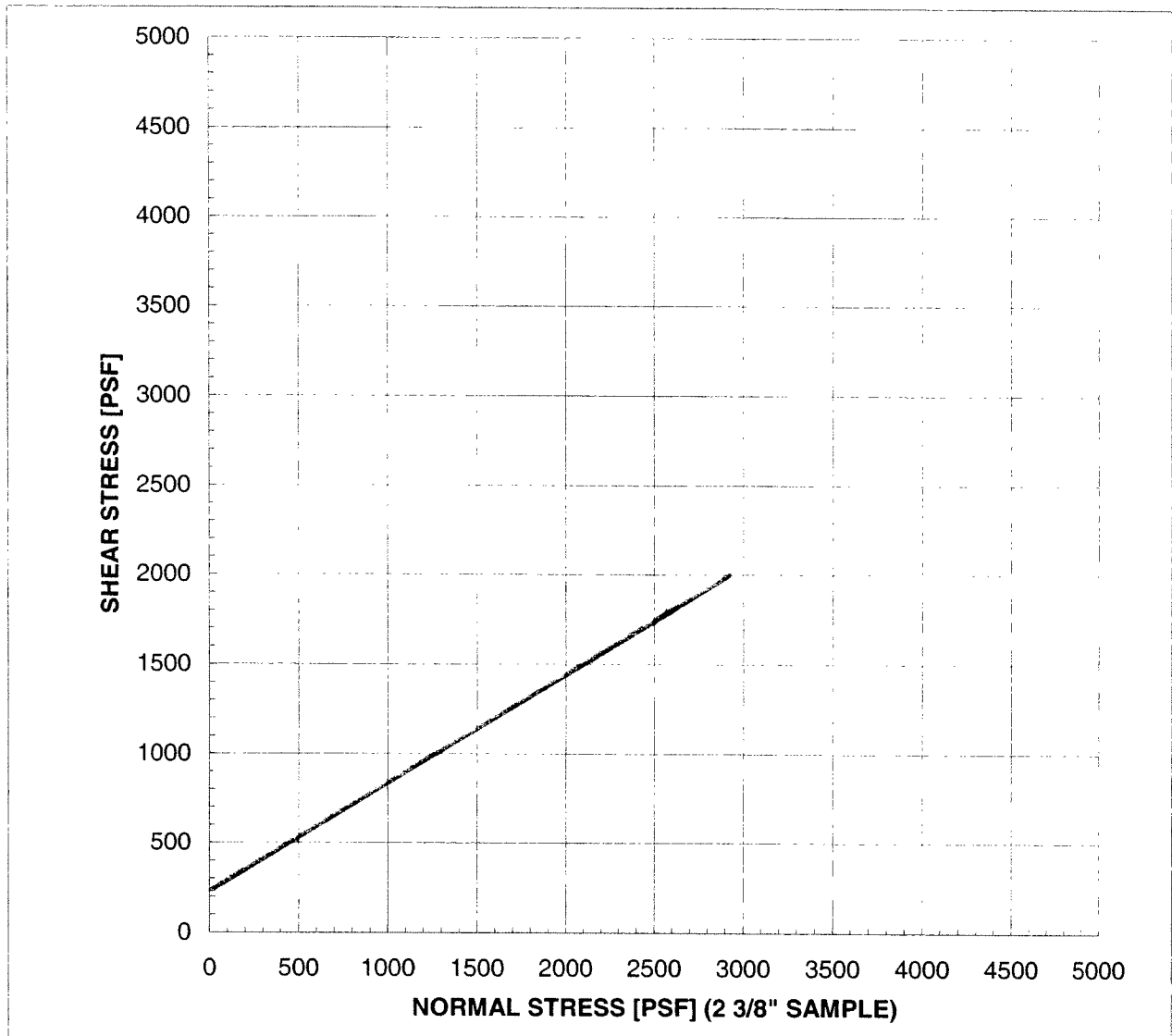
BY: DBA

DATE: 12-27-05

JOB NUMBER: 0511183-1

PLATE NO.: 49

DIRECT SHEAR SUMMARY



SAMPLE	DESCRIPTION	ANGLE OF INTERNAL FRICTION (°)	COHESION INTERCEPT (PSF)
B5	Remolded to 90%	31	250



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

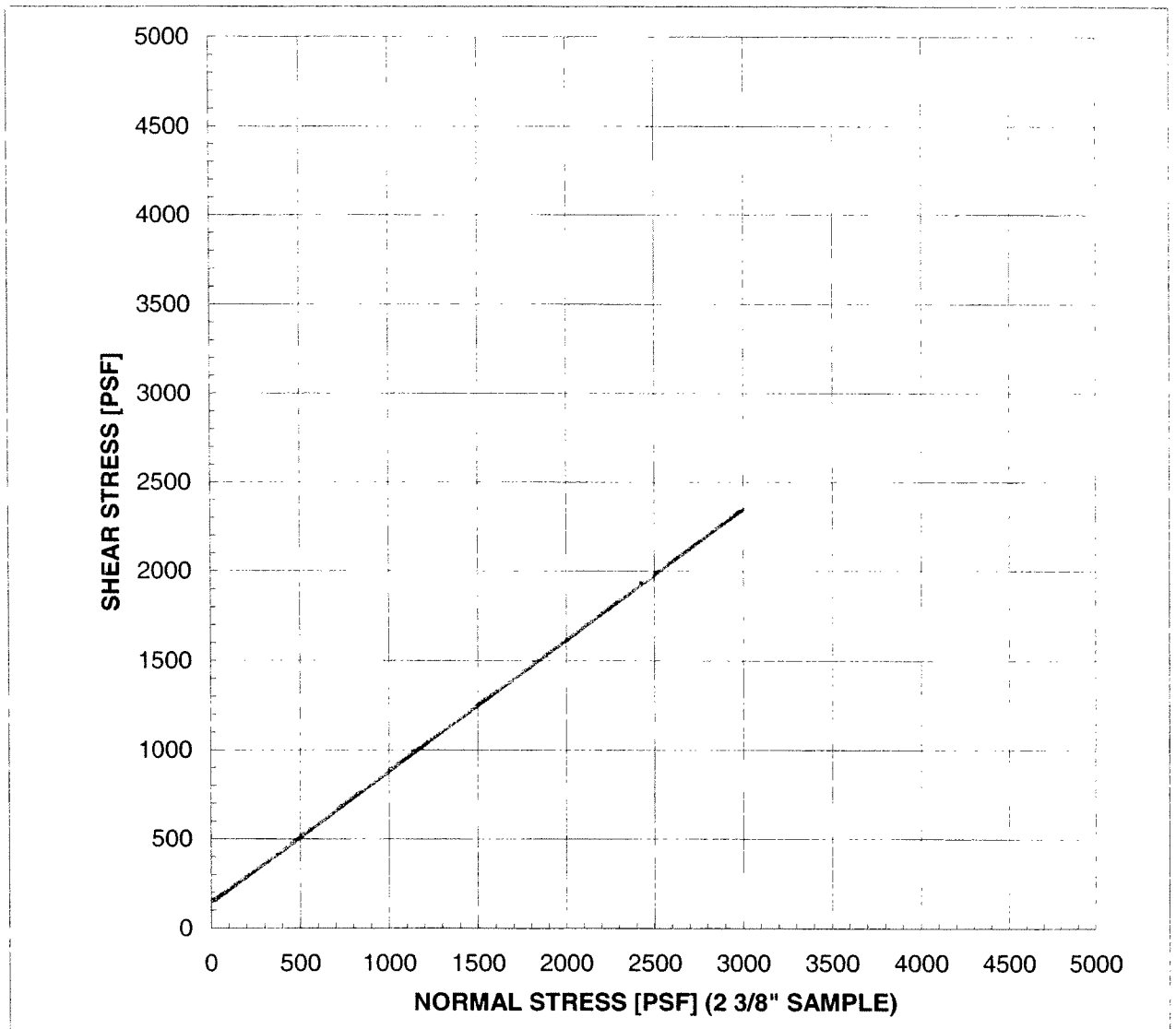
BY: DBA

DATE: 12-27-05

JOB NUMBER: 0511183-1

PLATE NO.: 50

DIRECT SHEAR SUMMARY



SAMPLE	DESCRIPTION	ANGLE OF INTERNAL FRICTION (°)	COHESION INTERCEPT (PSF)
T16 @ 3'-4'	Remolded to 90%	36	150



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA	DATE: 12-27-05
JOB NUMBER: 0511183-1	PLATE NO.: 51

SINGLE POINT CONSOLIDATION TEST RESULT

SAMPLE NO.	T4@7½'	T6@5½'	T6@7½'	T7@5½'
INITIAL MOISTURE (%)	13.6	20.3	19.5	15.1
INITIAL DENSITY (PCF)	90.4	89.4	96.9	104.7
CONSOLIDATION BEFORE WATER ADDED (%)	3.5	2.9	4.4	2.4
CONSOLIDATION AFTER WATER ADDED (%)	9.9	3.9	4.5	2.6
FINAL MOISTURE (%)	22.3	29.4	22.0	18.6
AXIAL LOAD (KSF)	2.86	2.86	2.86	2.86



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/12/2006

JOB NUMBER: 0511183-1

PLATE NO.:

52

SINGLE POINT CONSOLIDATION TEST RESULT

SAMPLE NO.	T8@4½'	T10@4½'	T10@11½'	T11@3½'
INITIAL MOISTURE (%)	13.7	11.2	21.8	12.1
INITIAL DENSITY (PCF)	93.1	102.4	103.4	95.7
CONSOLIDATION BEFORE WATER ADDED (%)	2.5	2.4	5.0	1.5
CONSOLIDATION AFTER WATER ADDED (%)	3.4	3.4	5.0	3.2
FINAL MOISTURE (%)	24.5	20.0	19.7	23.2
AXIAL LOAD (KSF)	2.86	2.86	2.86	2.86



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE:

1/12/2006

JOB NUMBER: 0511183-1

PLATE NO.:

53

SINGLE POINT CONSOLIDATION TEST RESULT

SAMPLE NO.	T11@12½'	T16@3'	T18@2'	
INITIAL MOISTURE (%)	18.6	10.1	17.5	
INITIAL DENSITY (PCF)	103.0	102.2	102.8	
CONSOLIDATION BEFORE WATER ADDED (%)	3.8	3.9	3.1	
CONSOLIDATION AFTER WATER ADDED (%)	3.7	7.2	3.9	
FINAL MOISTURE (%)	19.4	23.6	20.6	
AXIAL LOAD (KSF)	2.86	2.58	2.58	



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE:

1/12/2006

JOB NUMBER: 0511183-1

PLATE NO.:

54

SINGLE POINT CONSOLIDATION TEST RESULT

SAMPLE NO.	B3@6'	B3@11'	B4@6'	B4@11'
INITIAL MOISTURE (%)	17.0	19.8	10.6	9.8
INITIAL DENSITY (PCF)	103.9	110.1	105.2	106.7
CONSOLIDATION BEFORE WATER ADDED (%)	1.3	3.8	1.6	1.8
CONSOLIDATION AFTER WATER ADDED (%)	1.3	3.8	3.3	1.9
FINAL MOISTURE (%)	25.7	18.8	20.9	18.7
AXIAL LOAD (KSF)	2.86	2.86	2.86	2.86



**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 1/13/2006

JOB NUMBER: 0511183-1

PLATE NO.:

55

LABORATORY REPORT

Telephone (619) 425-1993 Fax 425-7917 Established 1928

CLARKSON LABORATORY AND SUPPLY INC.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
ANALYTICAL AND CONSULTING CHEMISTS

Date: October 20, 2005
Purchase Order Number: 0511183
Sales Order Number: 81069
Account Number: SOU

To:-----*
Southern California Soil & Testing
P.O. Box 600627
San Diego, CA 92160
Attention: Raleigh Easton

Laboratory Number: S08961 Customers Phone: 280-4321
Fax: 280-4717

Sample Designation:-----*
One soil sample received on 10/18/05, taken from 0511183
marked as T2@1.5-3.5.

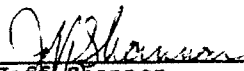
Analysis By California Test 643, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 8.1

Water Added (ml)	Resistivity (ohm-cm)
50	40,748
50	23,380
50	16,032
50	10,688
50	9,352
50	7,348
50	6,480
50	7,348
50	8,684

66 years to perforation for a 16 gauge metal culvert.
85 years to perforation for a 14 gauge metal culvert.
118 years to perforation for a 12 gauge metal culvert.
151 years to perforation for a 10 gauge metal culvert.
184 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417 0.001%
Water Soluble Chloride Calif. Test 422 0.002%


Jeff Shannon
JS/arr

SC
ST

SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA	DATE: 12/27/2005
JOB NUMBER: 0511183-1	PLATE: 56

L A B O R A T O R Y R E P O R T

Telephone (619) 425-1993 Fax 425-7917 Established 1928

CLARKSON LABORATORY AND SUPPLY INC.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
ANALYTICAL AND CONSULTING CHEMISTS

Date: October 20, 2005
Purchase Order Number: 0511183
Sales Order Number: 81069
Account Number: SOU

To:

Southern California Soil & Testing
P.O. Box 600627
San Diego, CA 92160
Attention: Raleigh Easton

Laboratory Number: S08962 Customers Phone: 280-4321
Fax: 280-4717

Sample Designation:

One soil sample received on 10/18/05, taken from 0511183
marked as T8@1-6.

Analysis By California Test 643, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 8.7

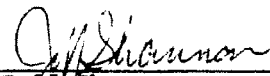
Water Added (ml)

Resistivity (ohm-cm)

50	20,708
50	8,016
50	3,941
50	2,338
50	1,870
50	2,138
50	2,271

40 years to perforation for a 16 gauge metal culvert.
51 years to perforation for a 14 gauge metal culvert.
71 years to perforation for a 12 gauge metal culvert.
91 years to perforation for a 10 gauge metal culvert.
111 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417	0.006%
Water Soluble Chloride Calif. Test 422	0.004%



Jeff Shannon
JS/arr

**SC
ST**

**SOUTHERN CALIFORNIA
SOIL & TESTING, INC.**

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 12.27.2005

JOB NUMBER: 0511183-1

PLATE: 57

LABORATORY REPORT

Telephone (619) 425-1993 Fax 425-7917 Established 1928

CLARKSON LABORATORY AND SUPPLY INC.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
ANALYTICAL AND CONSULTING CHEMISTS

Date: October 20, 2005
Purchase Order Number: 0511183
Sales Order Number: 81069
Account Number: SOU

To:

-----*
Southern California Soil & Testing
P.O. Box 600627
San Diego, CA 92160
Attention: Raleigh Easton

Laboratory Number: S08963 Customers Phone: 280-4321
Fax: 280-4717

Sample Designation:

-----*
One soil sample received on 10/18/05, taken from 0511183
marked as B5@1-6.

Analysis By California Test 643, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 8.6

Water Added (ml)

Resistivity (ohm-cm)

50	18,036
50	7,348
50	2,338
50	2,004
50	2,138
50	2,204

41 years to perforation for a 16 gauge metal culvert.
53 years to perforation for a 14 gauge metal culvert.
73 years to perforation for a 12 gauge metal culvert.
93 years to perforation for a 10 gauge metal culvert.
114 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417	0.001%
Water Soluble Chloride Calif. Test 422	0.007%



Jeff Shannon
JS/arr

SC
ST

SOUTHERN CALIFORNIA
SOIL & TESTING, INC.

LAKE JENNINGS VILLAGE

BY: DBA

DATE: 12.27.2005

JOB NUMBER: 0511183-1

PLATE: 58

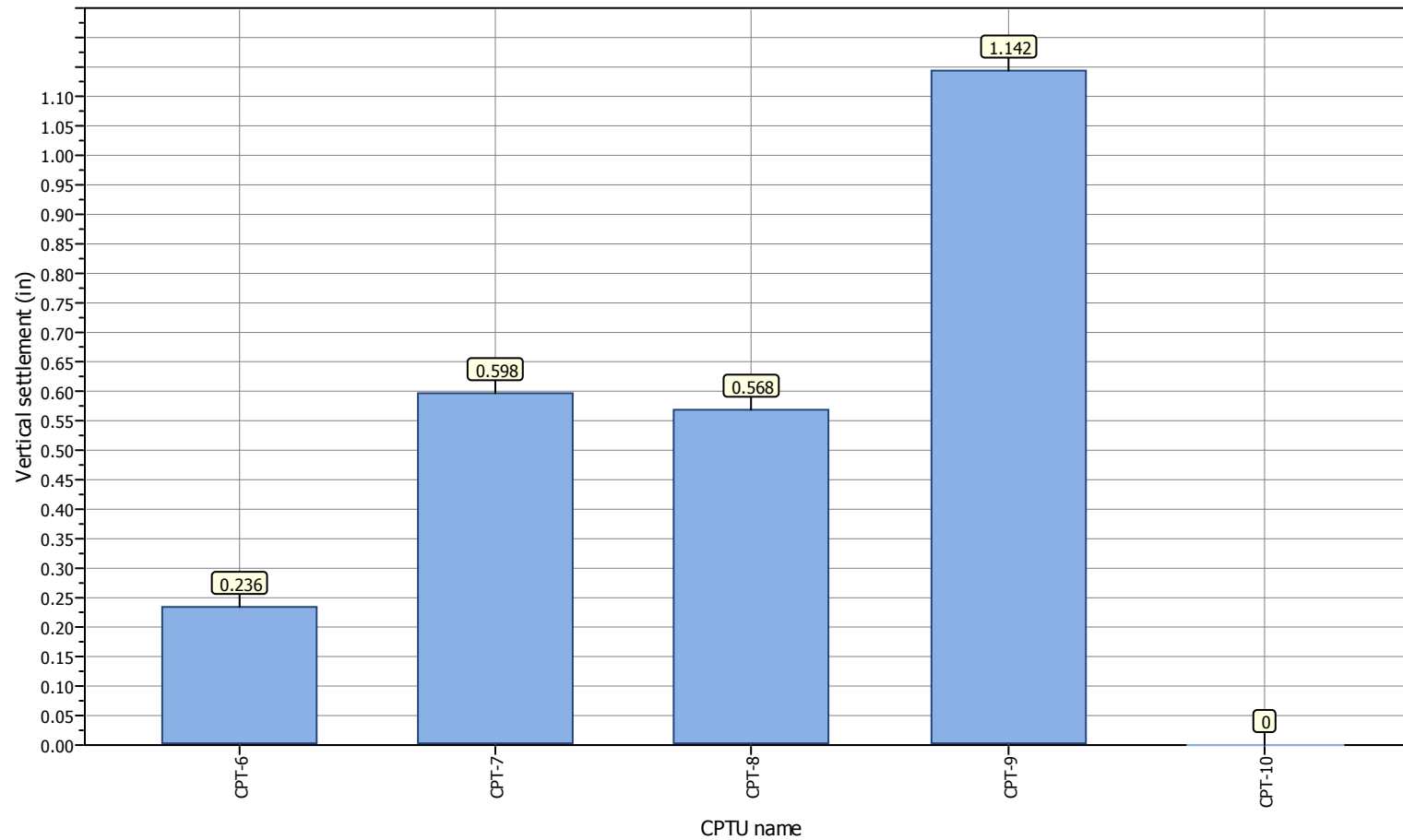
APPENDIX D

LIQUEFACTION ANALYSIS

Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

Overall vertical settlements report



LIQUEFACTION ANALYSIS REPORT

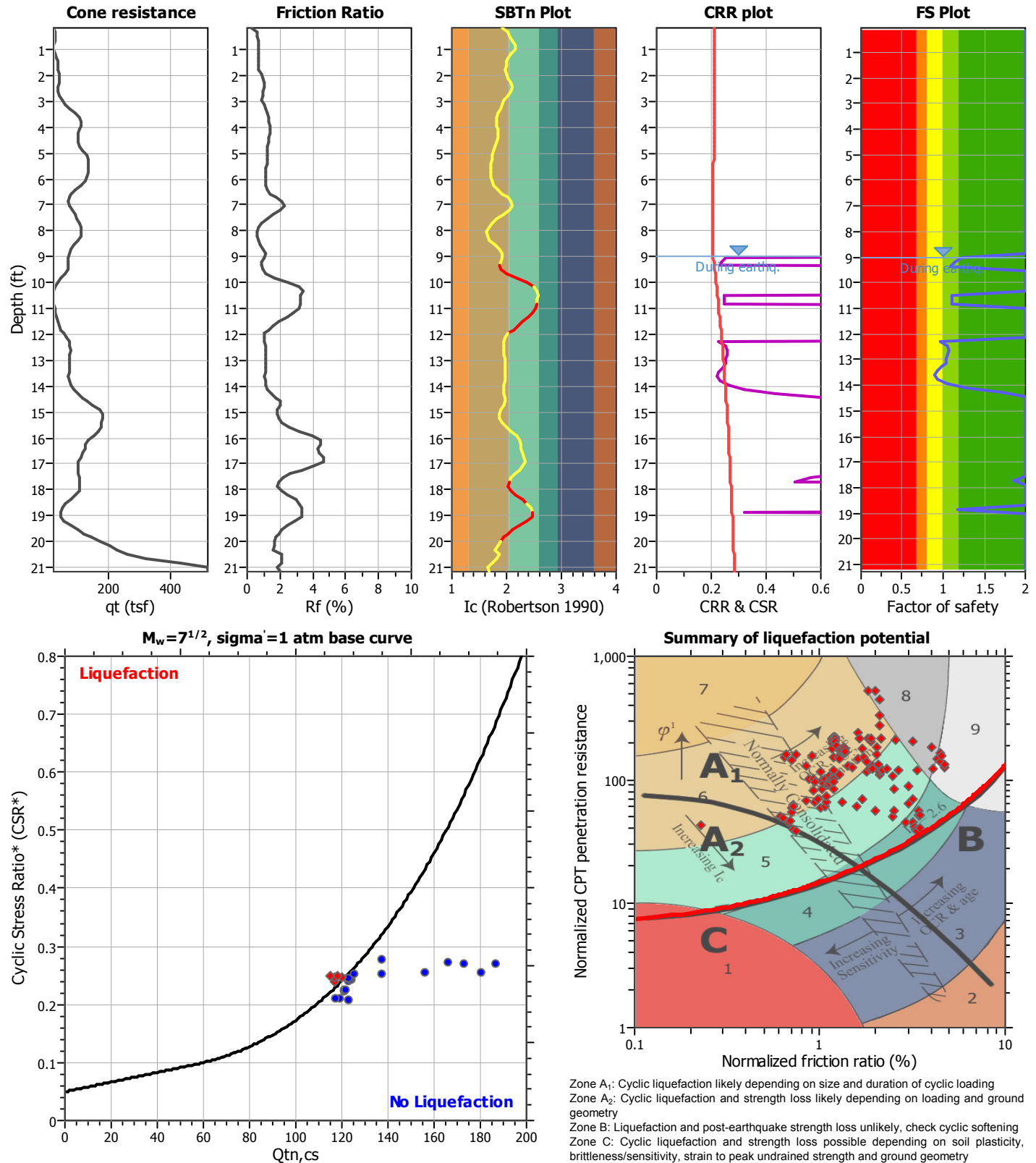
Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

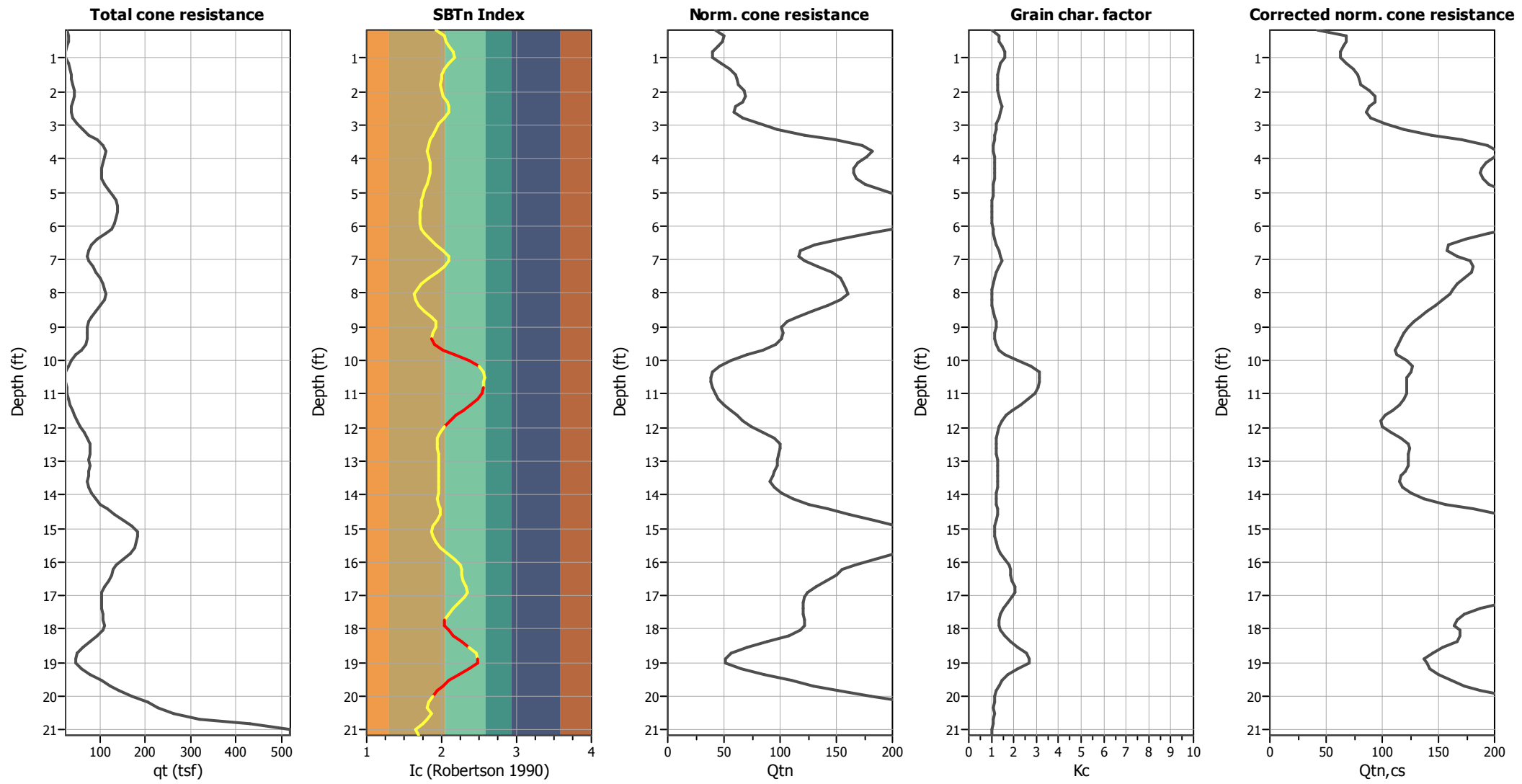
CPT file : CPT-6

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	9.00 ft	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 :	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



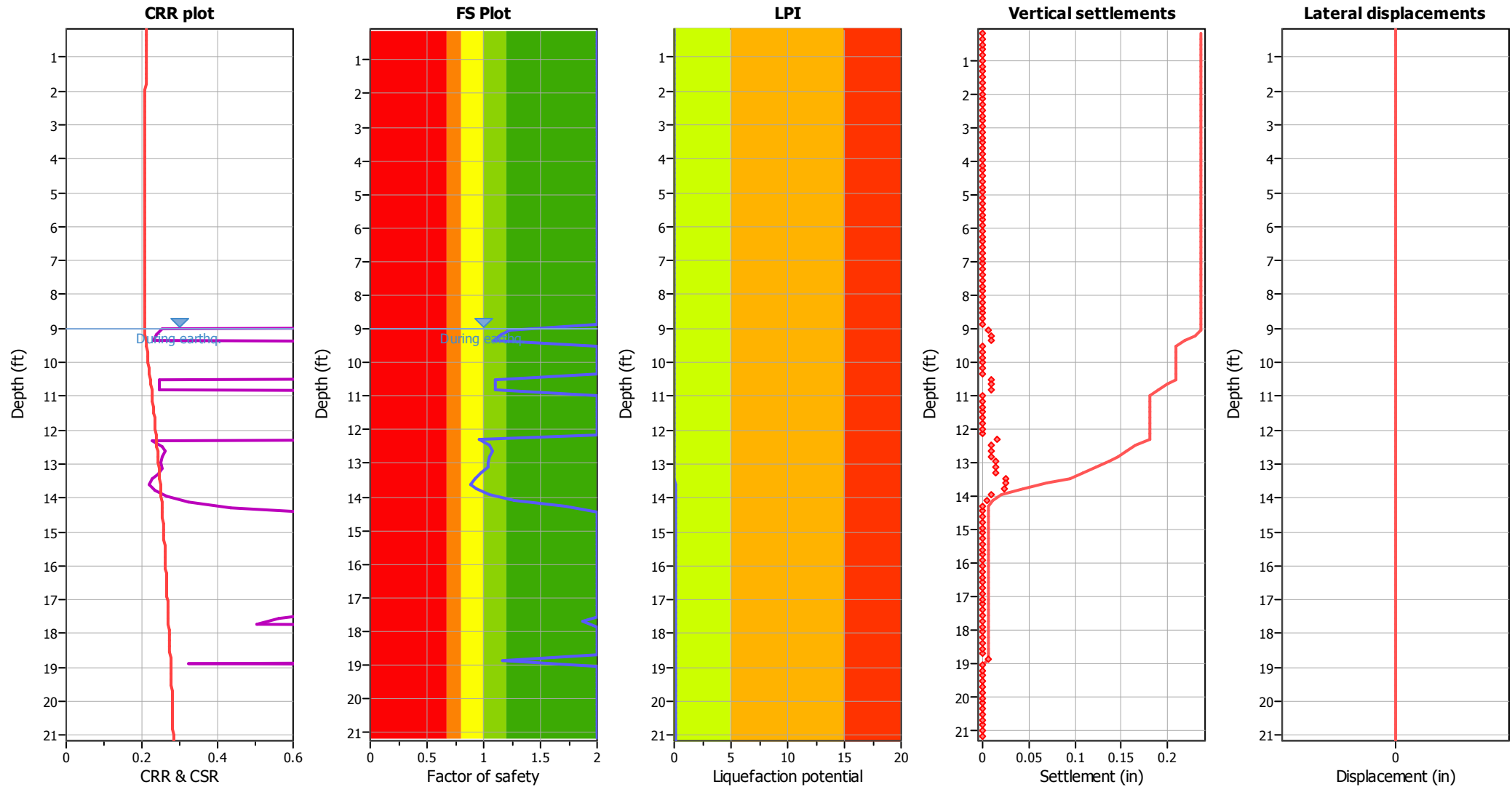
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	9.00 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 _g applied:	Yes
Earthquake magnitude M _w :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 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.):	9.00 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 :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 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 liq. are equally likely
Light 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

LIQUEFACTION ANALYSIS REPORT

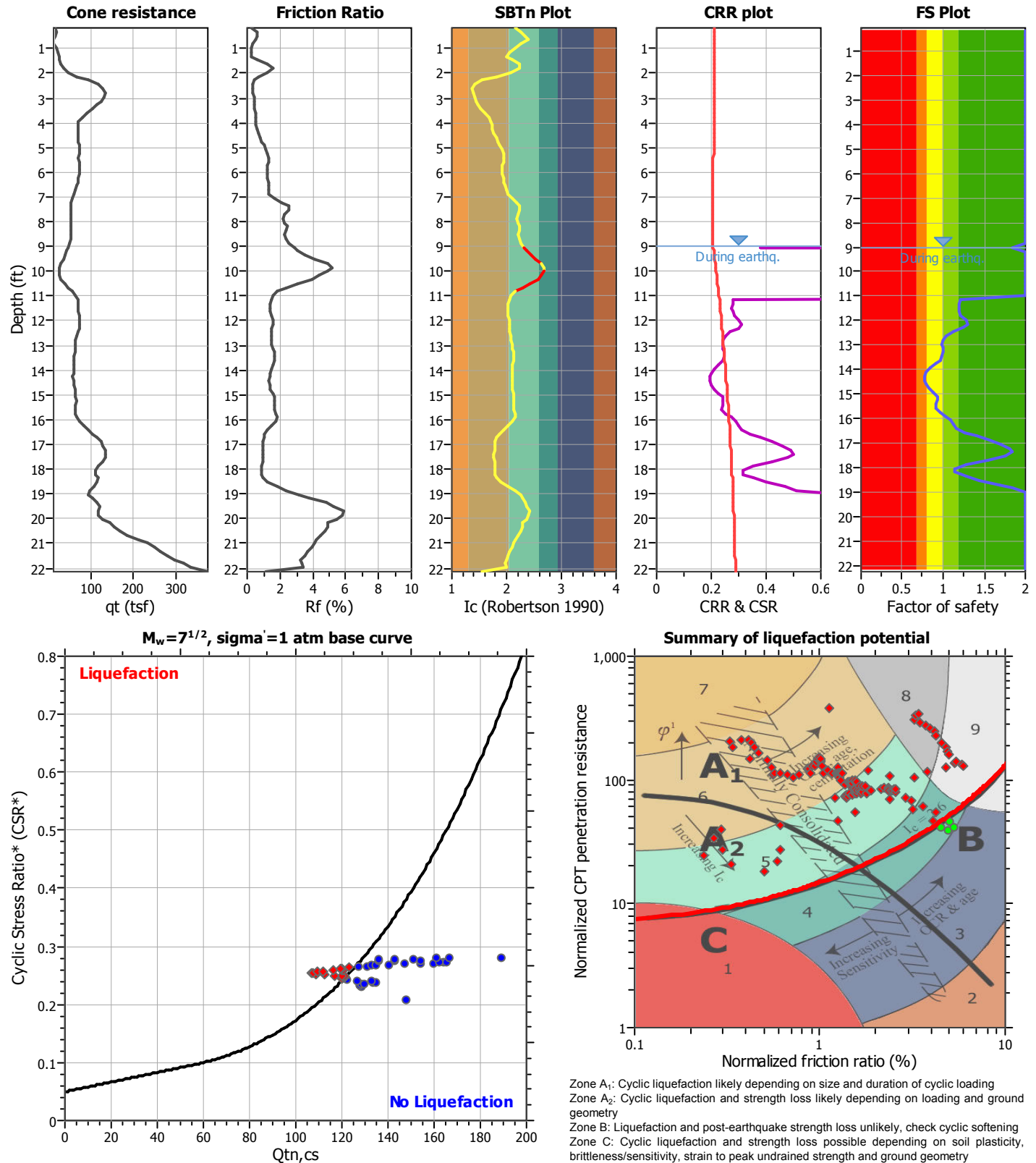
Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

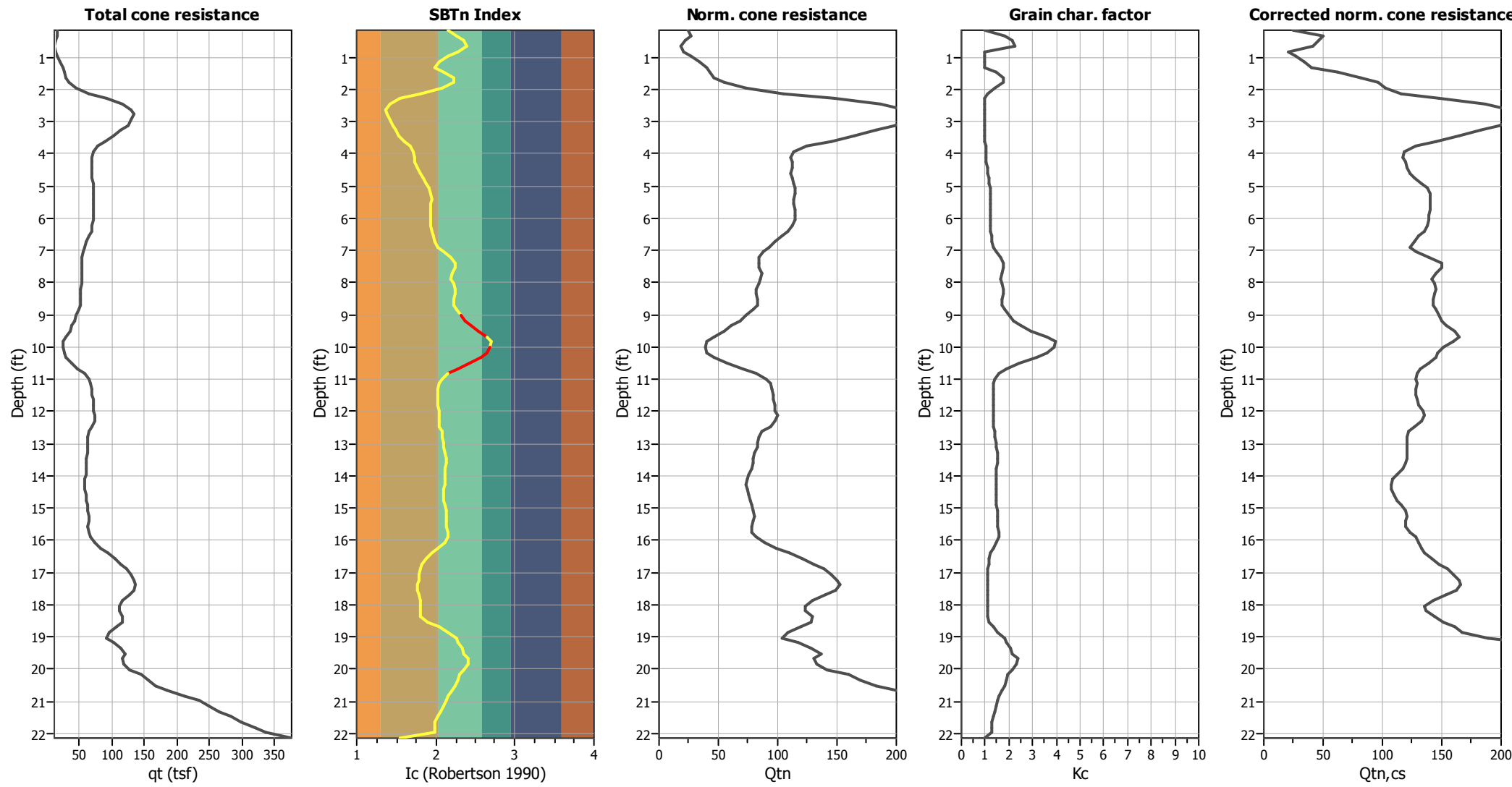
CPT file : CPT-7

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	9.00 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 :	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.40	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



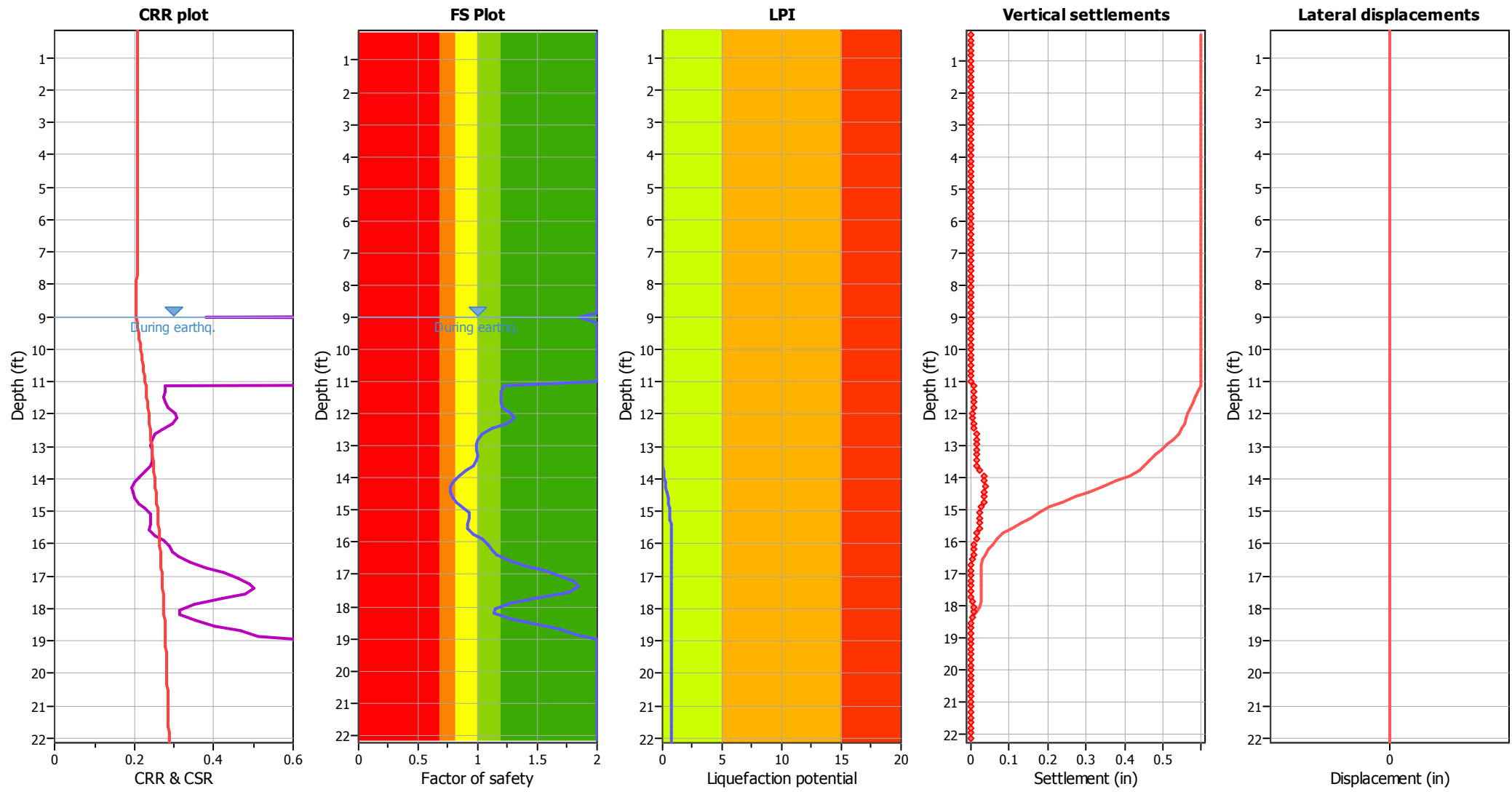
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	9.00 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 _g applied:	Yes
Earthquake magnitude M _w :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 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.):	9.00 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 _g applied:	Yes
Earthquake magnitude M _w :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 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 liq. are equally likely
Light 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

LIQUEFACTION ANALYSIS REPORT

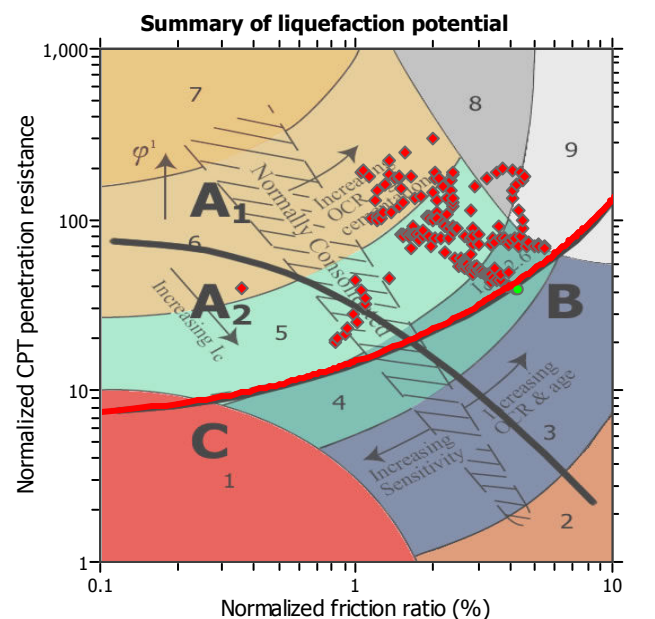
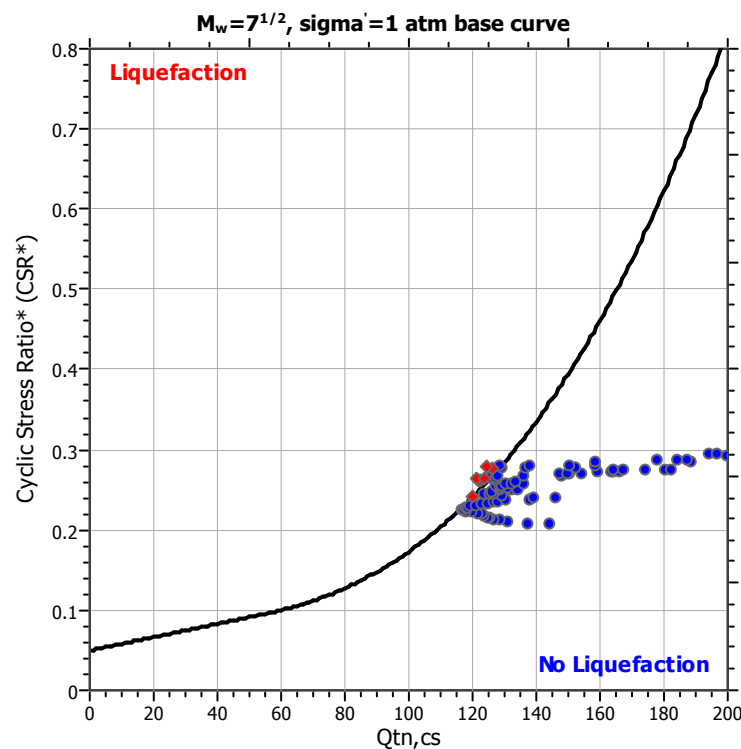
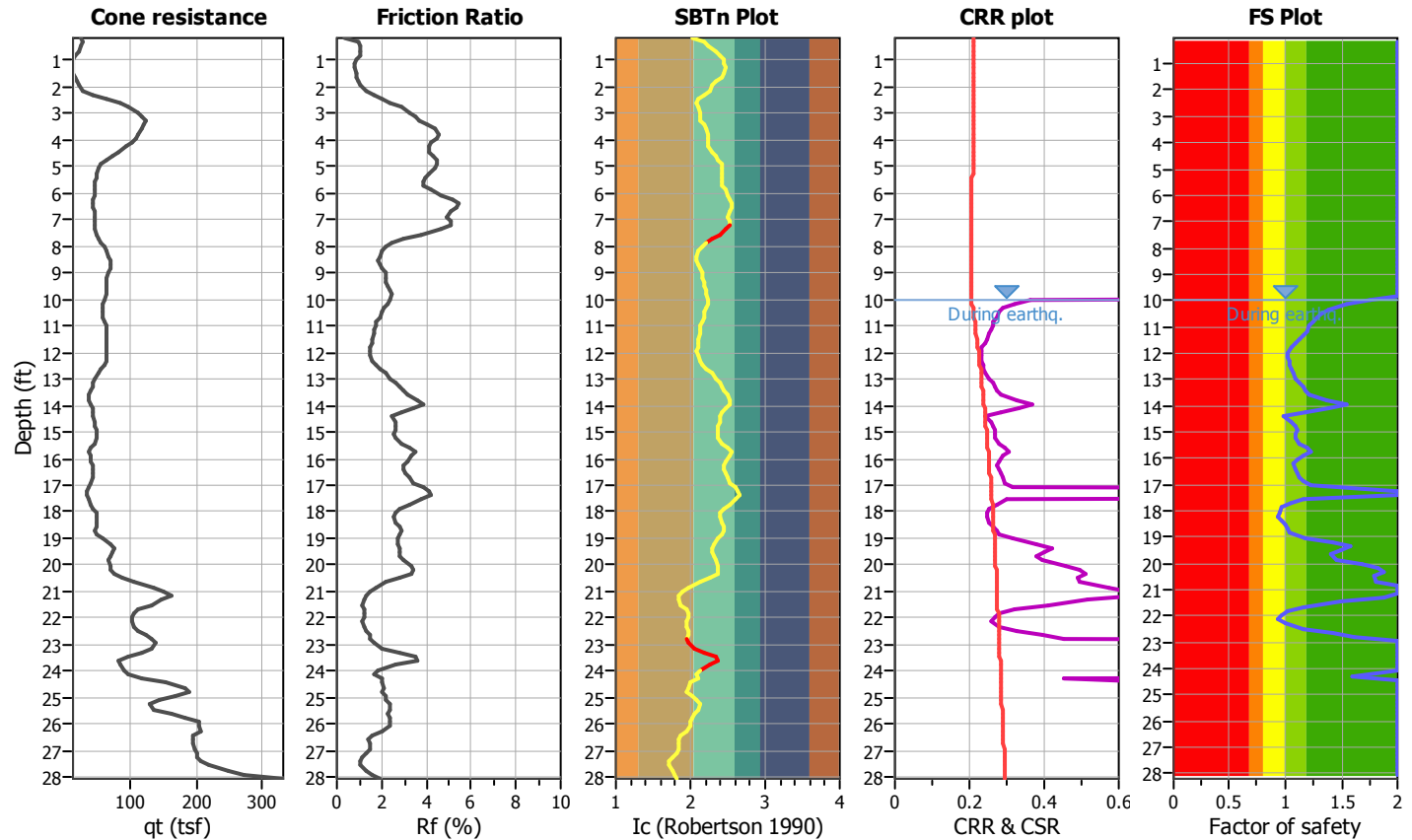
Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

CPT file : CPT-8

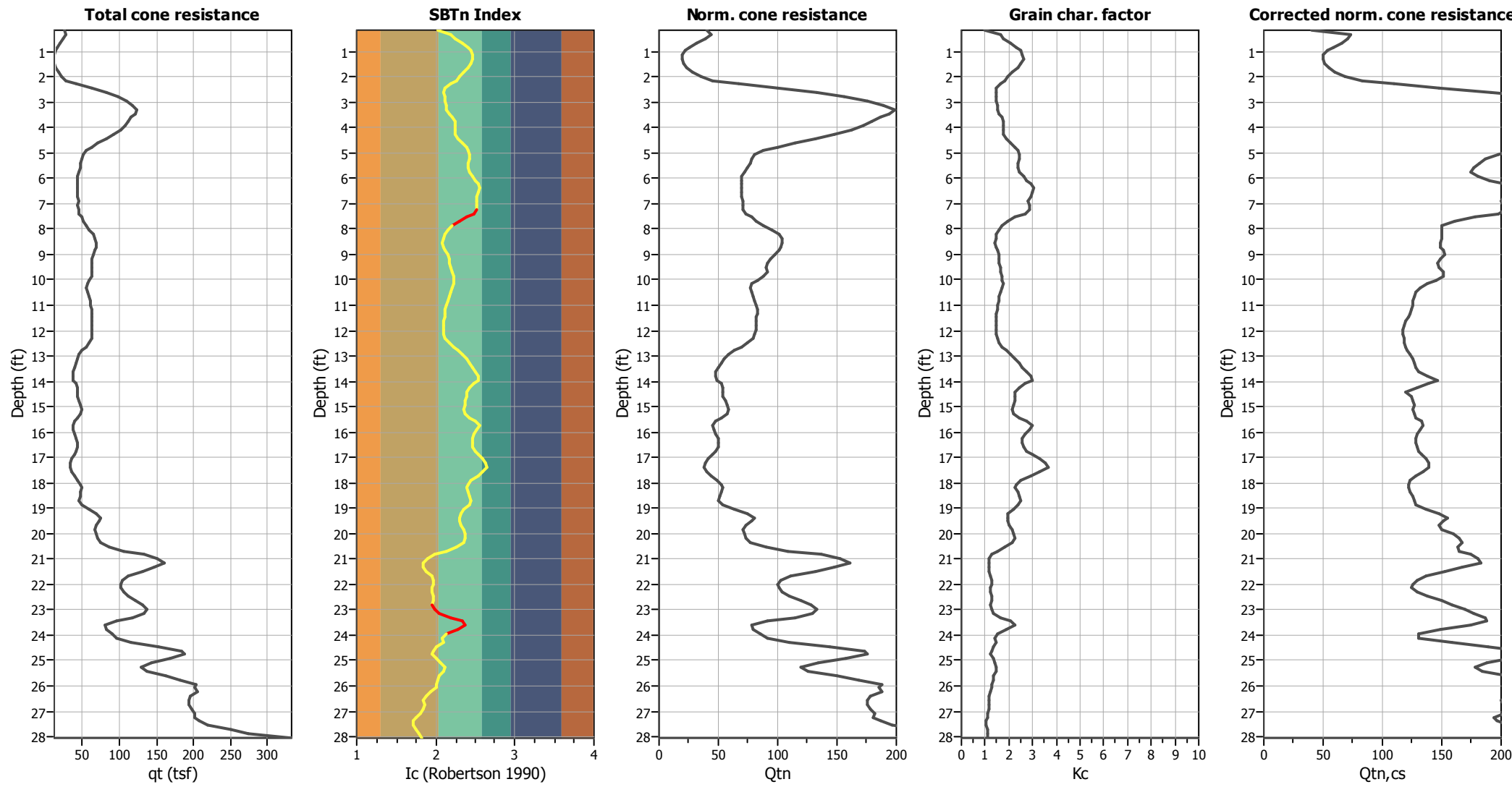
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	10.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	10.00 ft	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 :	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	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

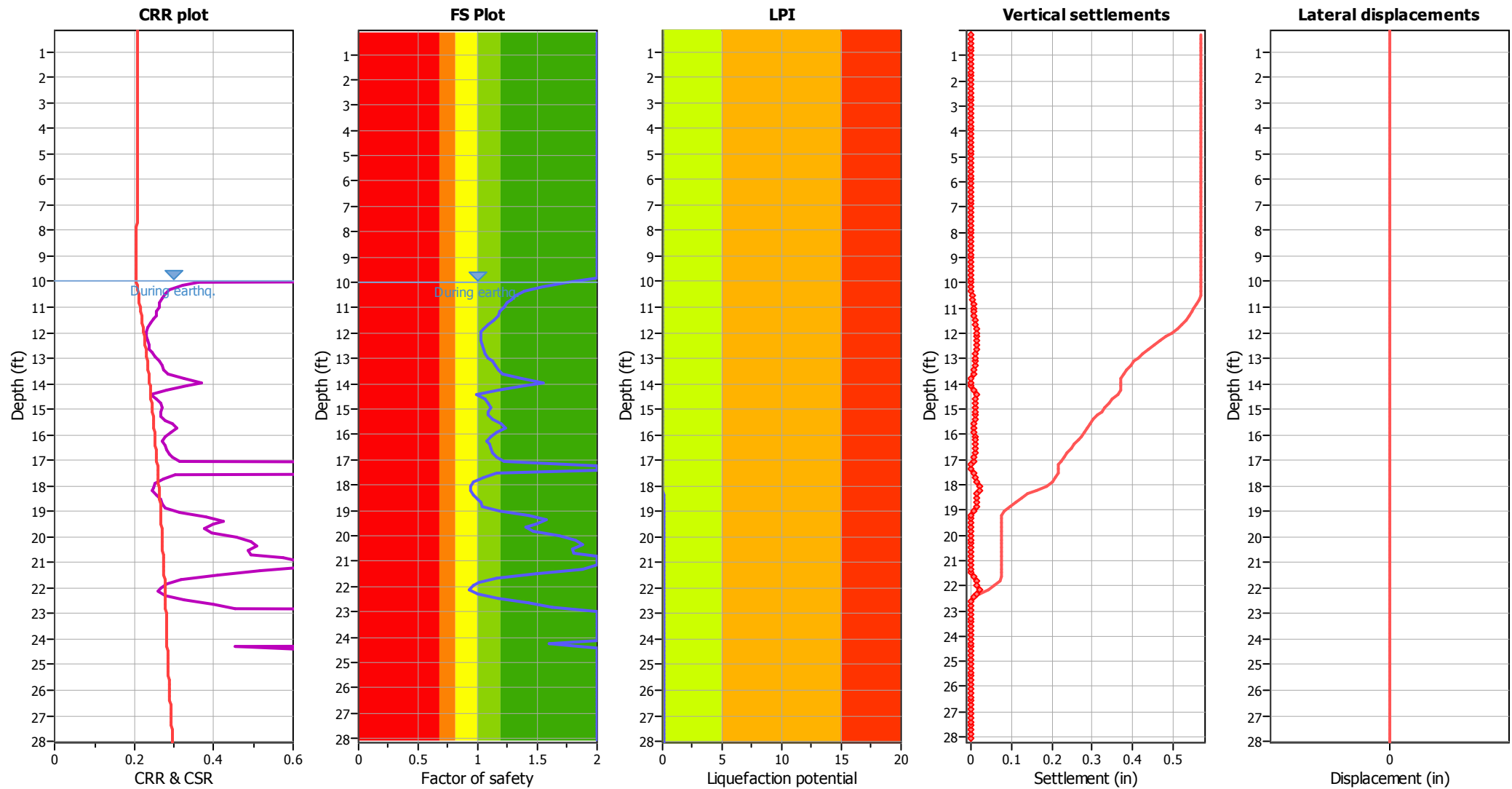
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	10.00 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 _{cs} applied:	Yes
Earthquake magnitude M _w :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 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.):	10.00 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 :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	10.00 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 liq. are equally likely
Light 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

LIQUEFACTION ANALYSIS REPORT

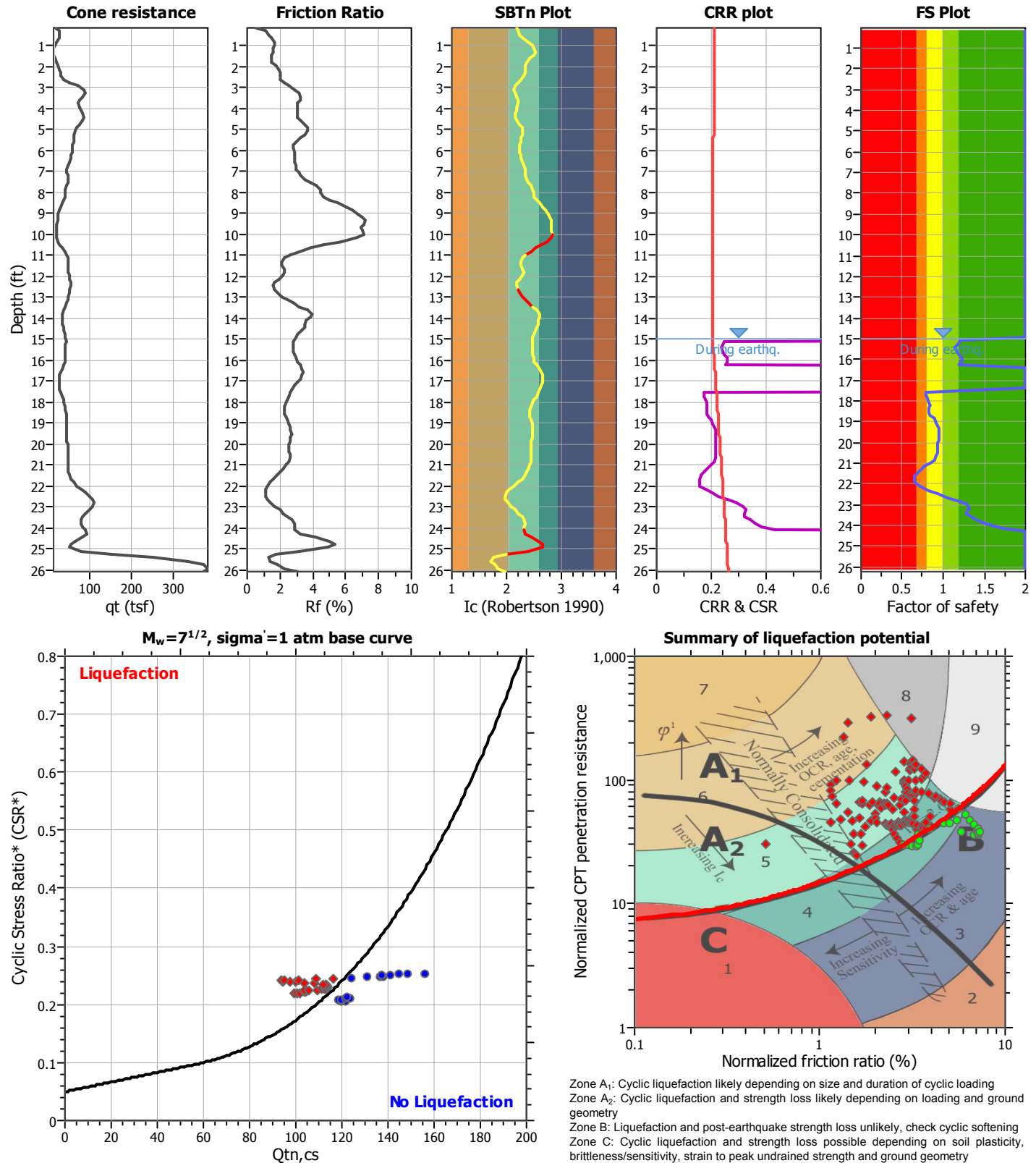
Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

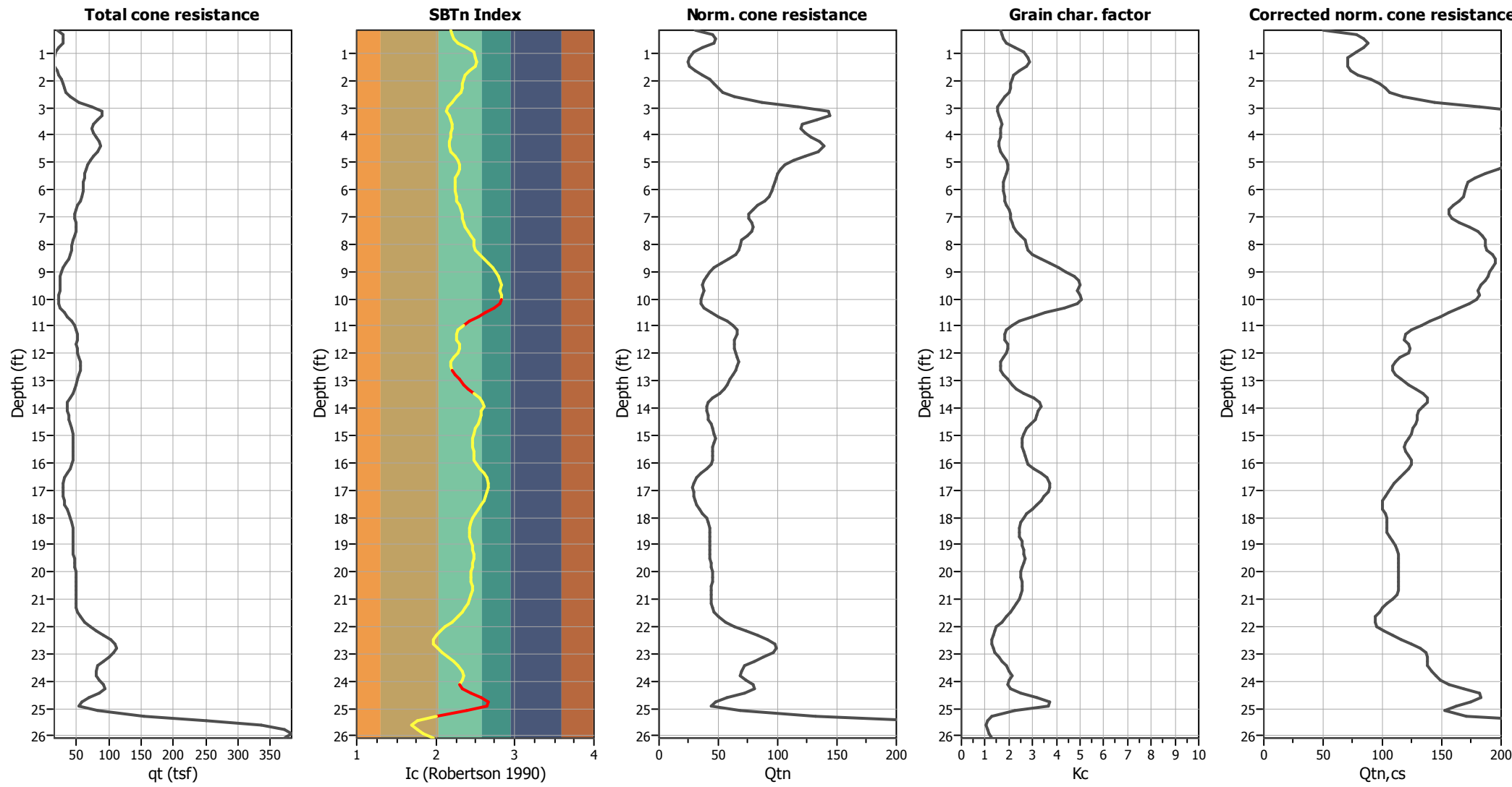
CPT file : CPT-9

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	15.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	15.00 ft	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 :	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



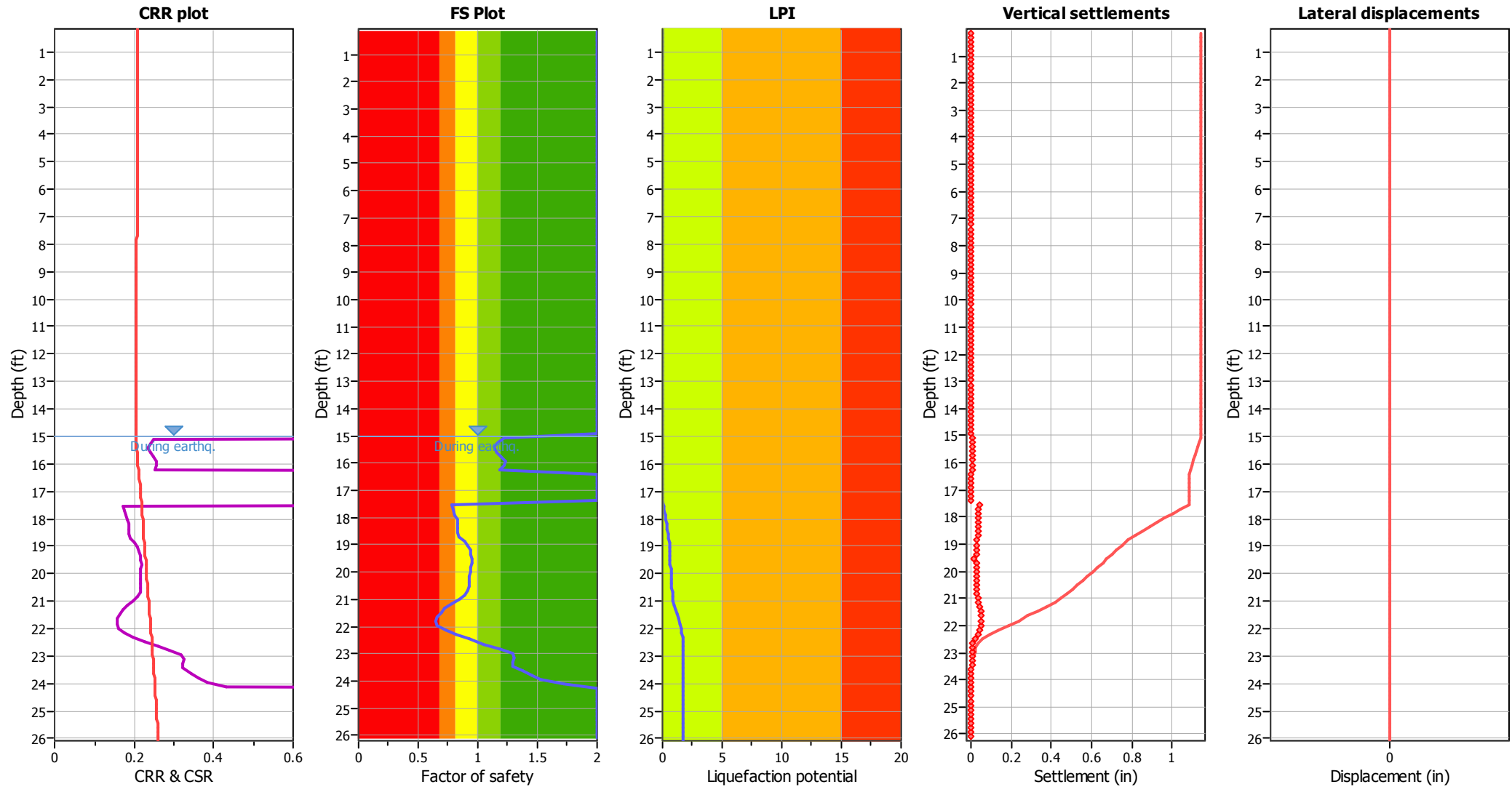
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	15.00 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 :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 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.):	15.00 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 :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	15.00 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 liq. 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

LIQUEFACTION ANALYSIS REPORT

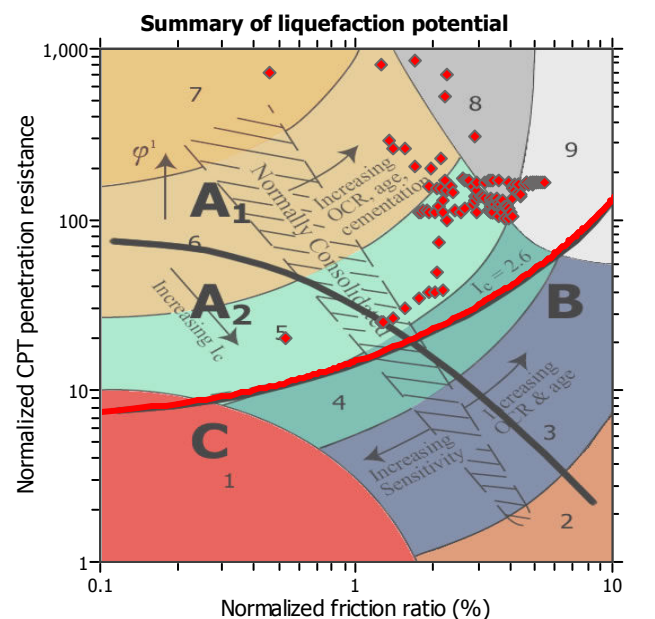
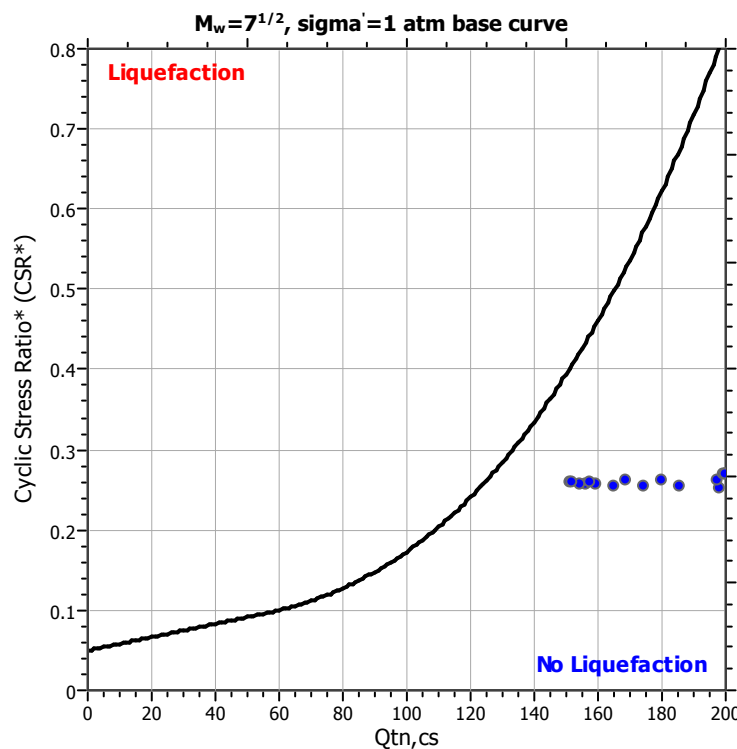
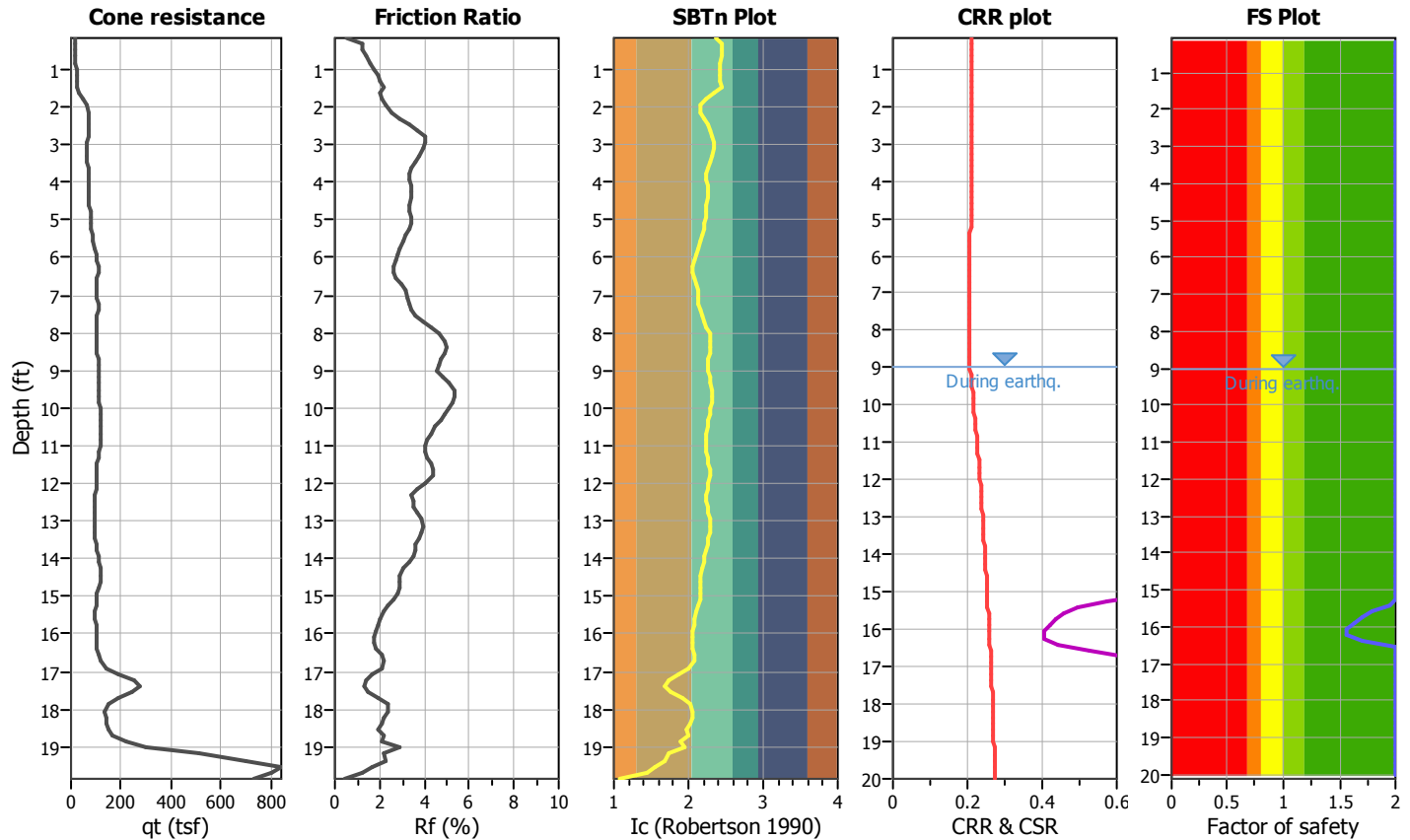
Project title : Lake Jennings Markeplace

Location : Lake Jennings Park Road

CPT file : CPT-10

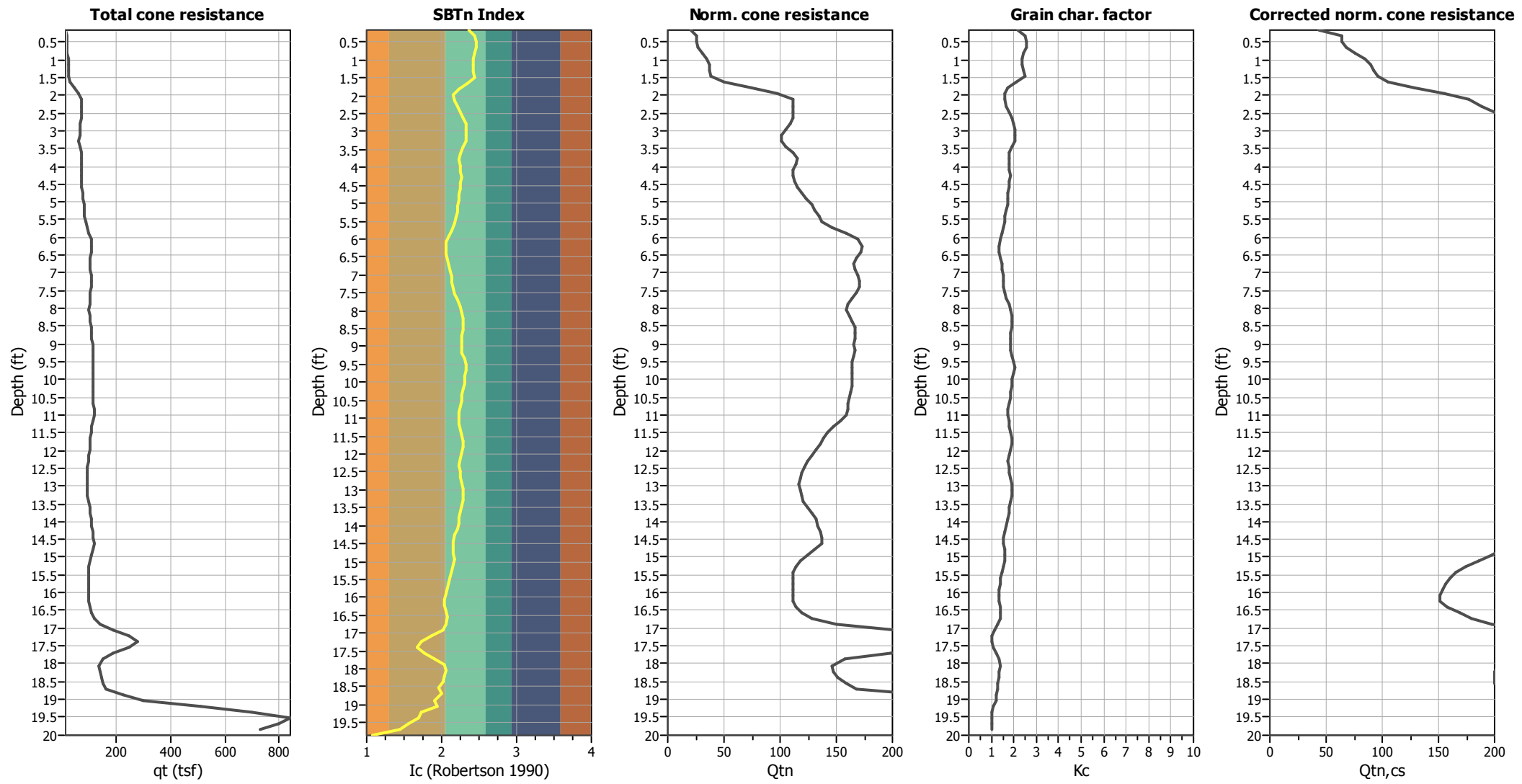
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	9.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	9.00 ft	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 :	6.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.40	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

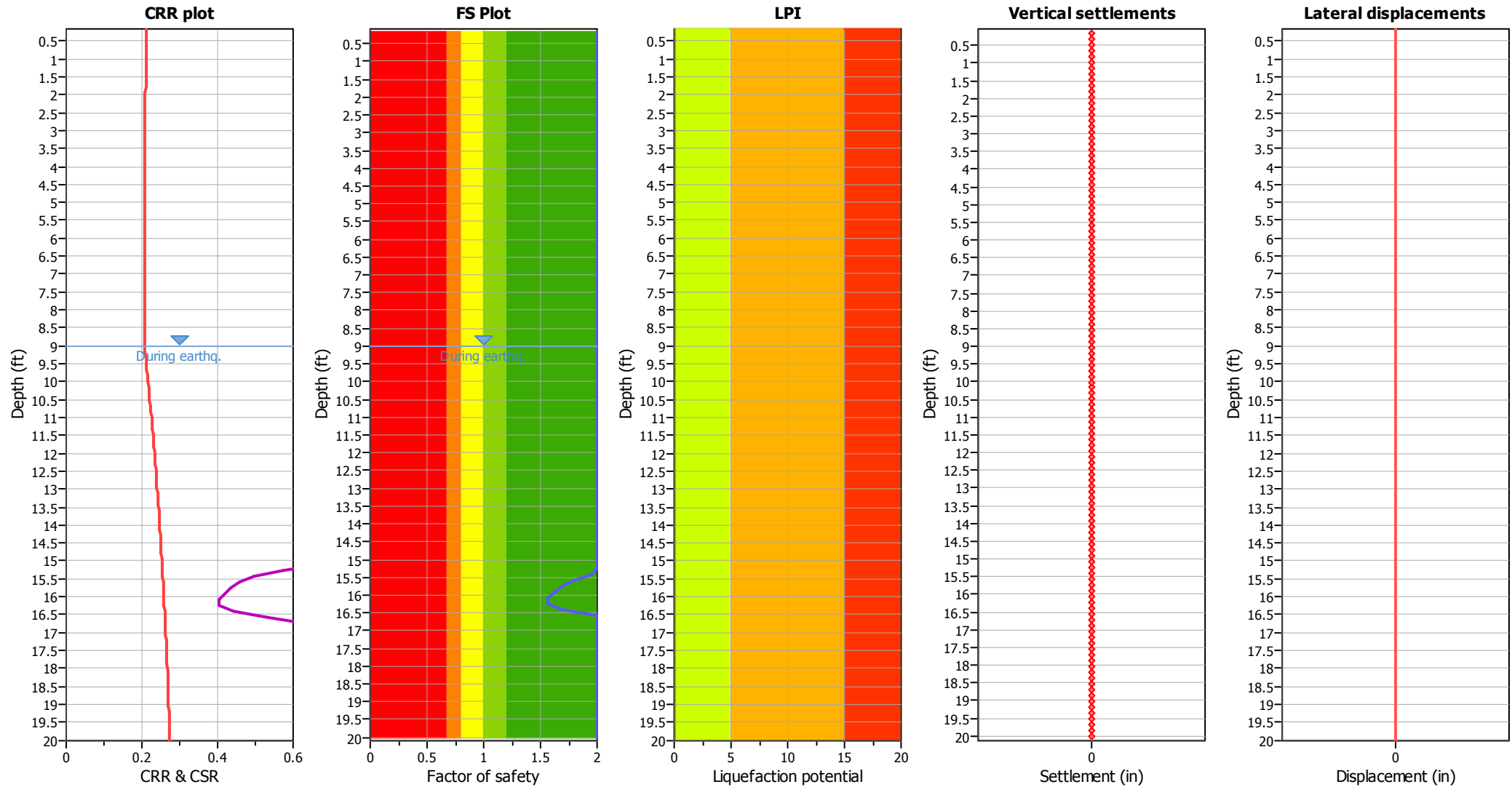
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	9.00 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 _{cs} applied:	Yes
Earthquake magnitude M _w :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 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.):	9.00 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 :	6.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.40	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	9.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

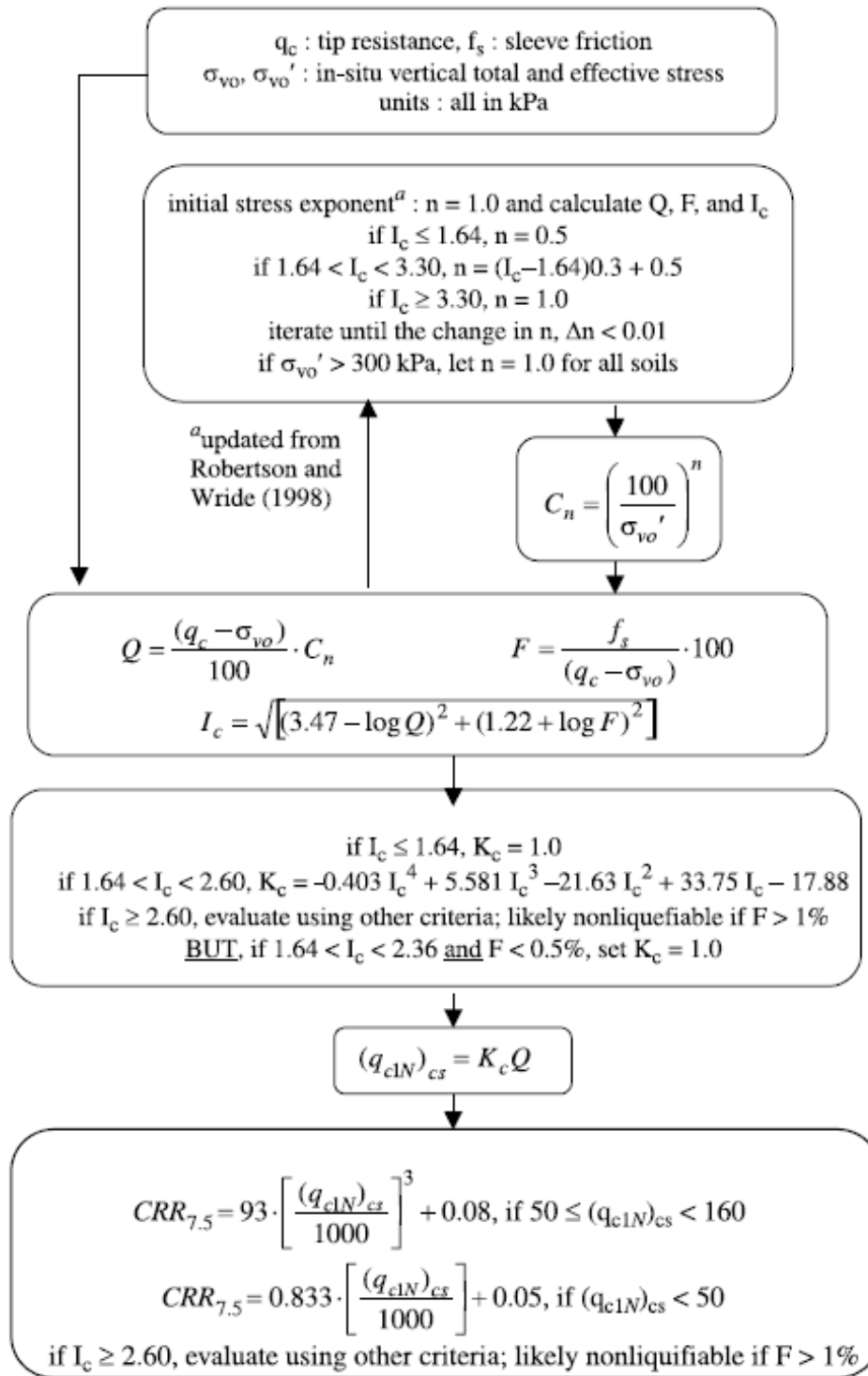
Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

Procedure for the evaluation of soil liquefaction resistance, NCEER (1998)

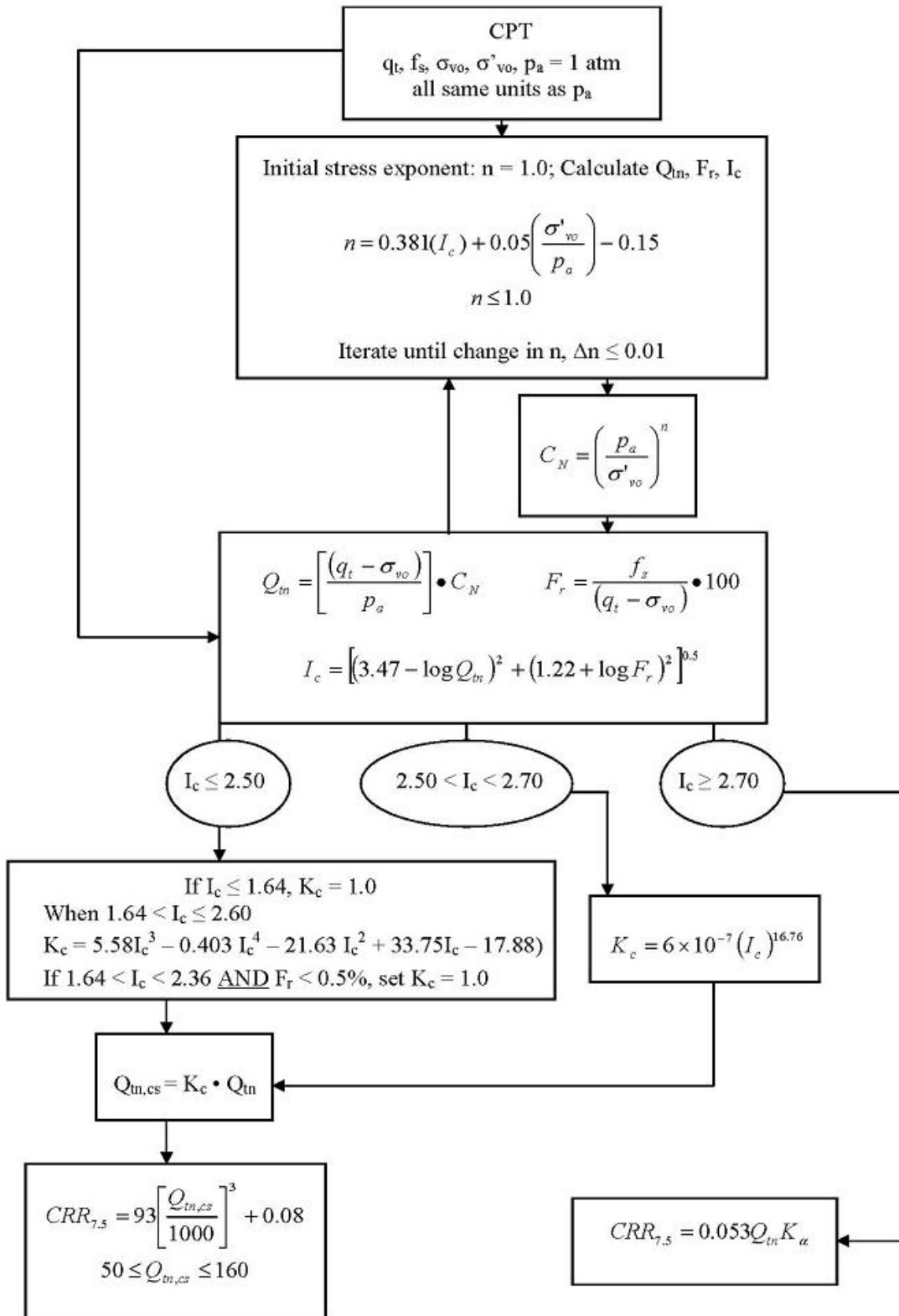
Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. The procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart¹:



¹ "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

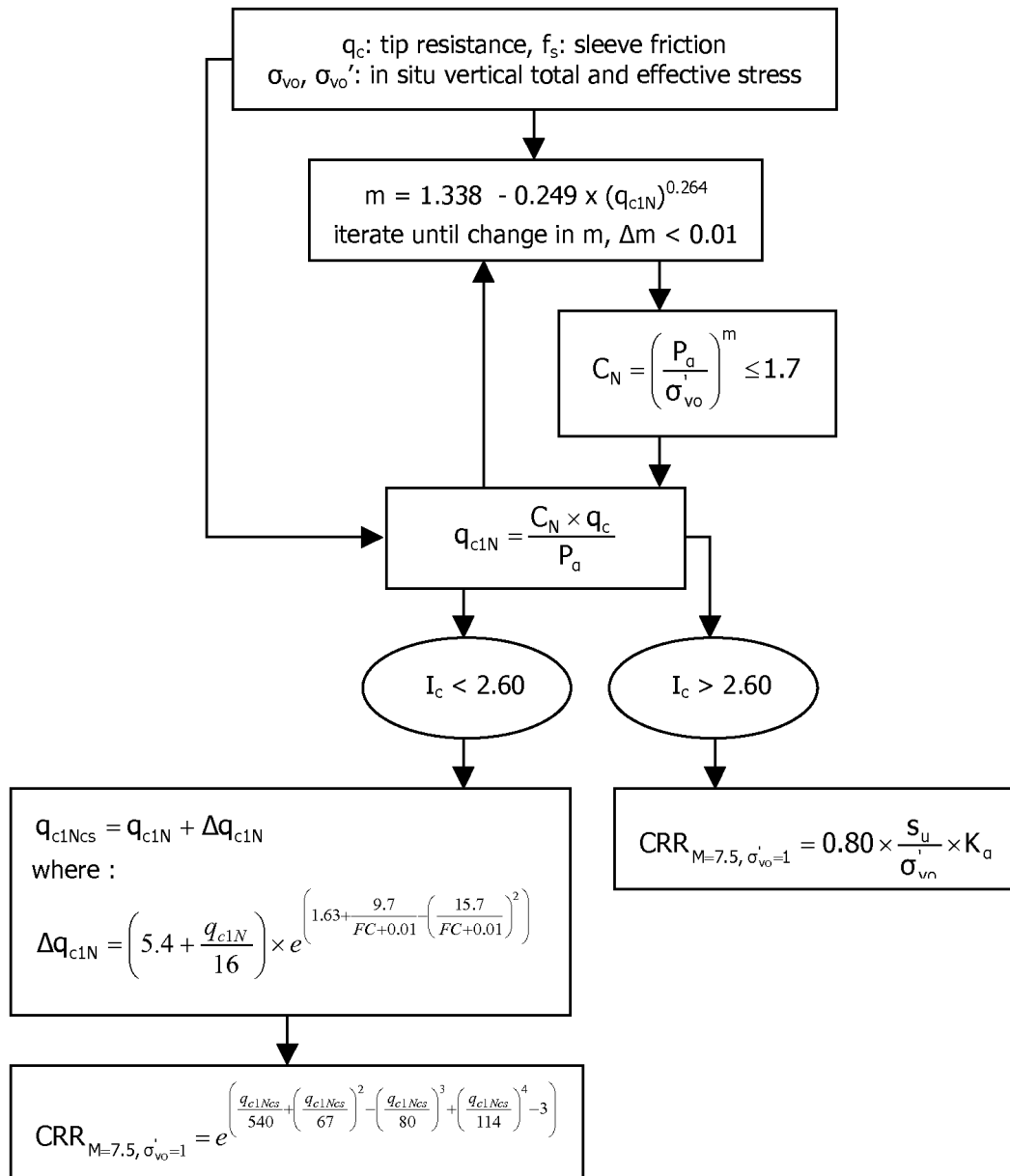
Procedure for the evaluation of soil liquefaction resistance (all soils), Robertson (2010)

Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. This procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart¹:

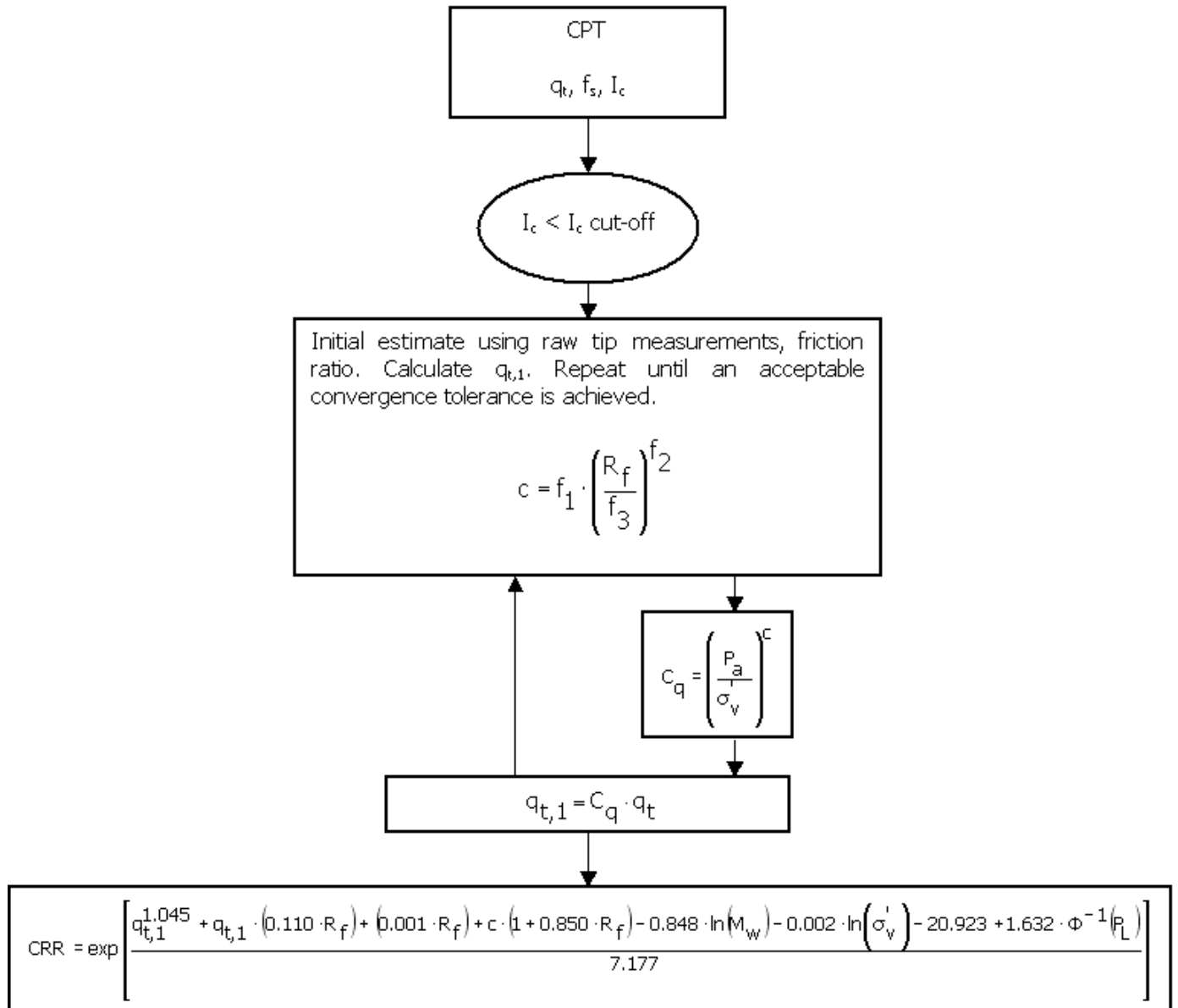


¹ P.K. Robertson, 2009. "Performance based earthquake design using the CPT", Keynote Lecture, International Conference on Performance-based Design in Earthquake Geotechnical Engineering – from case history to practice, IS-Tokyo, June 2009

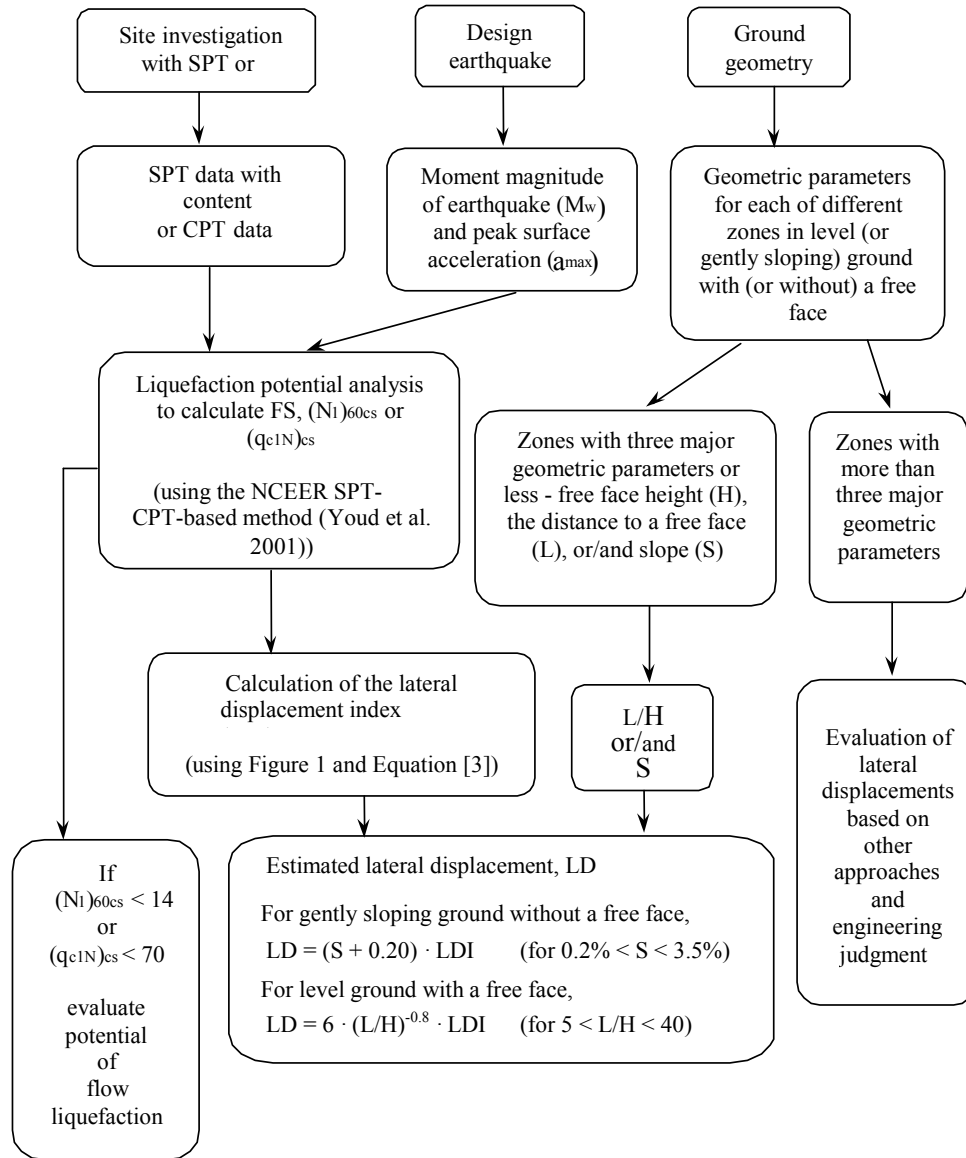
Procedure for the evaluation of soil liquefaction resistance, Idriss & Boulanger (2008)



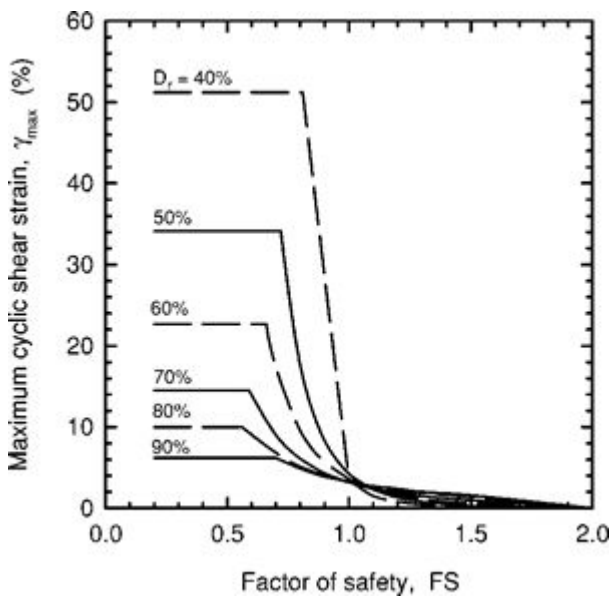
Procedure for the evaluation of soil liquefaction resistance (sandy soils), Moss et al. (2006)



Procedure for the evaluation of liquefaction-induced lateral spreading displacements



¹ Flow chart illustrating major steps in estimating liquefaction-induced lateral spreading displacements using the proposed approach



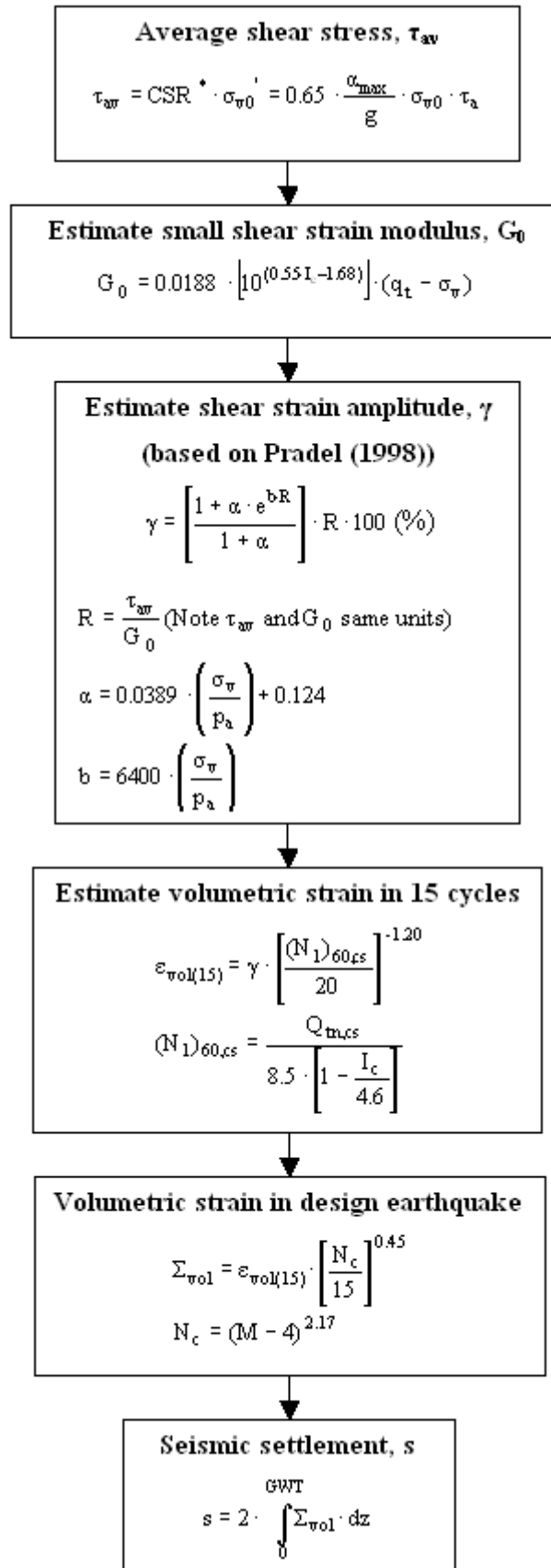
¹ Figure 1

$$LDI = \int_0^{Z_{max}} \gamma_{max} dz$$

¹ Equation [3]

¹ "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the estimation of seismic induced settlements in dry sands



Robertson, P.K. and Lisheng, S., 2010, "Estimation of seismic compression in dry soils using the CPT" FIFTH INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN GEOTECHNICAL EARTHQUAKE ENGINEERING AND SOIL DYNAMICS, Symposium in honor of professor I. M. Idriss, San Diego, CA

Liquefaction Potential Index (LPI) calculation procedure

Calculation of the Liquefaction Potential Index (LPI) is used to interpret the liquefaction assessment calculations in terms of severity over depth. The calculation procedure is based on the methodology developed by Iwasaki (1982) and is adopted by AFPS.

To estimate the severity of liquefaction extent at a given site, LPI is calculated based on the following equation:

$$LPI = \int_0^{20} (10 - 0.5z) \times F_L \times dz$$

where:

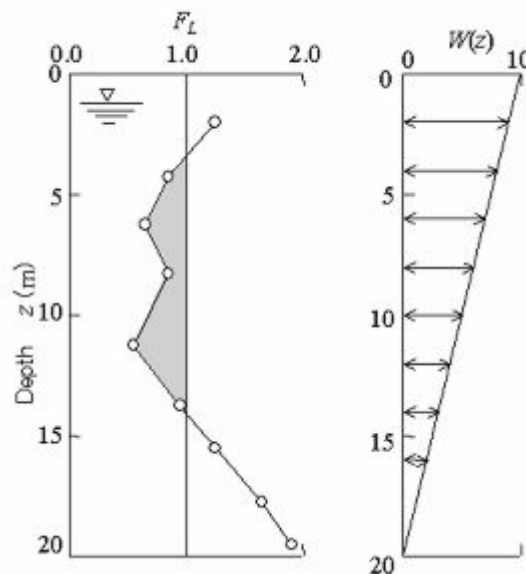
$F_L = 1 - F.S.$ when F.S. less than 1

$F_L = 0$ when F.S. greater than 1

z depth of measurement in meters

Values of LPI range between zero (0) when no test point is characterized as liquefiable and 100 when all points are characterized as susceptible to liquefaction. Iwasaki proposed four (4) discrete categories based on the numeric value of LPI:

- $LPI = 0$: Liquefaction risk is very low
- $0 < LPI \leq 5$: Liquefaction risk is low
- $5 < LPI \leq 15$: Liquefaction risk is high
- $LPI > 15$: Liquefaction risk is very high



Graphical presentation of the LPI calculation procedure

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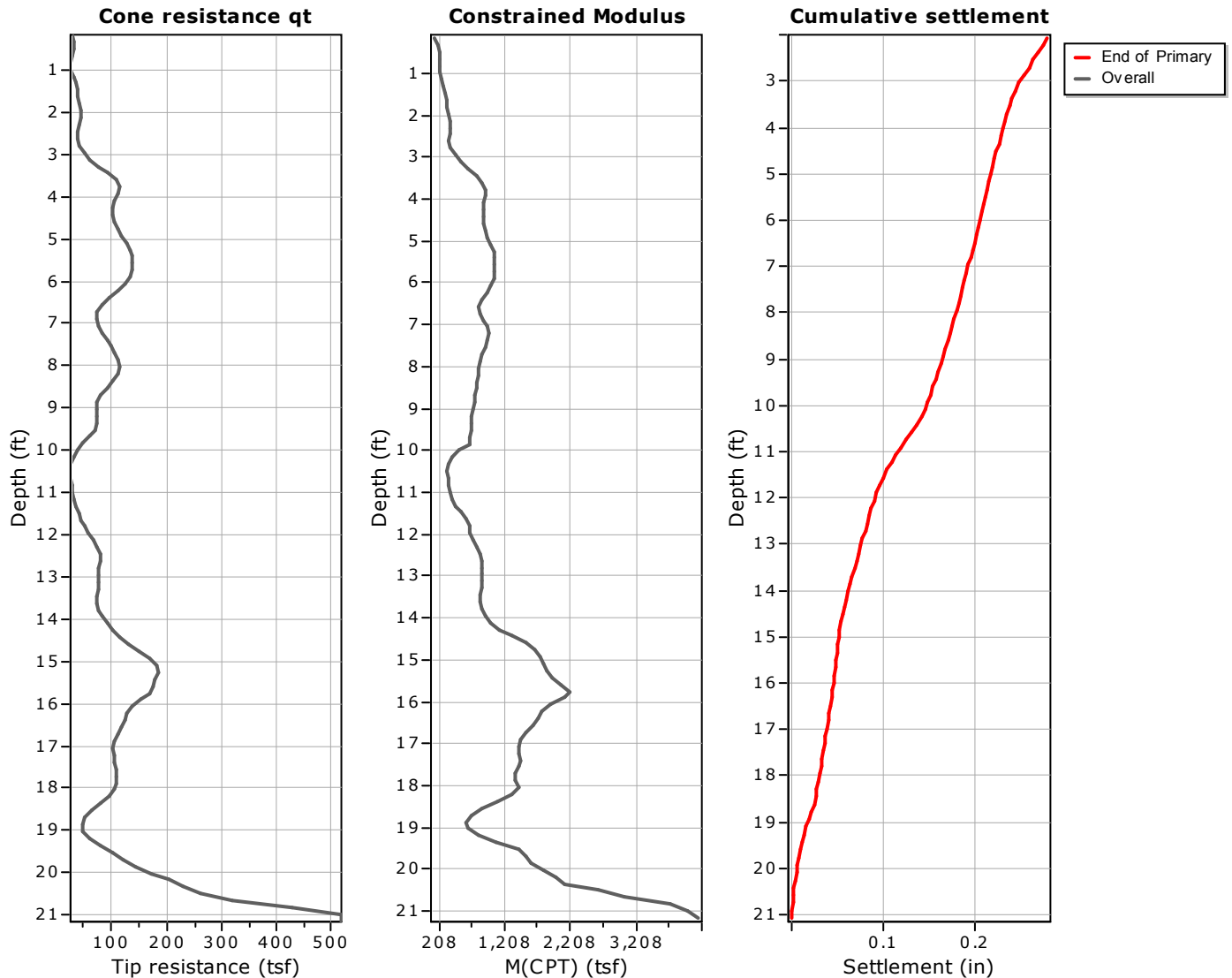
APPENDIX E

SETTLEMENT ANALYSIS

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular

Footing width: 200.00 (ft)

L/B: 1.0

Footing pressure: 1.00 (tsf)

Embedment depth: 2.00 (ft)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: No

Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

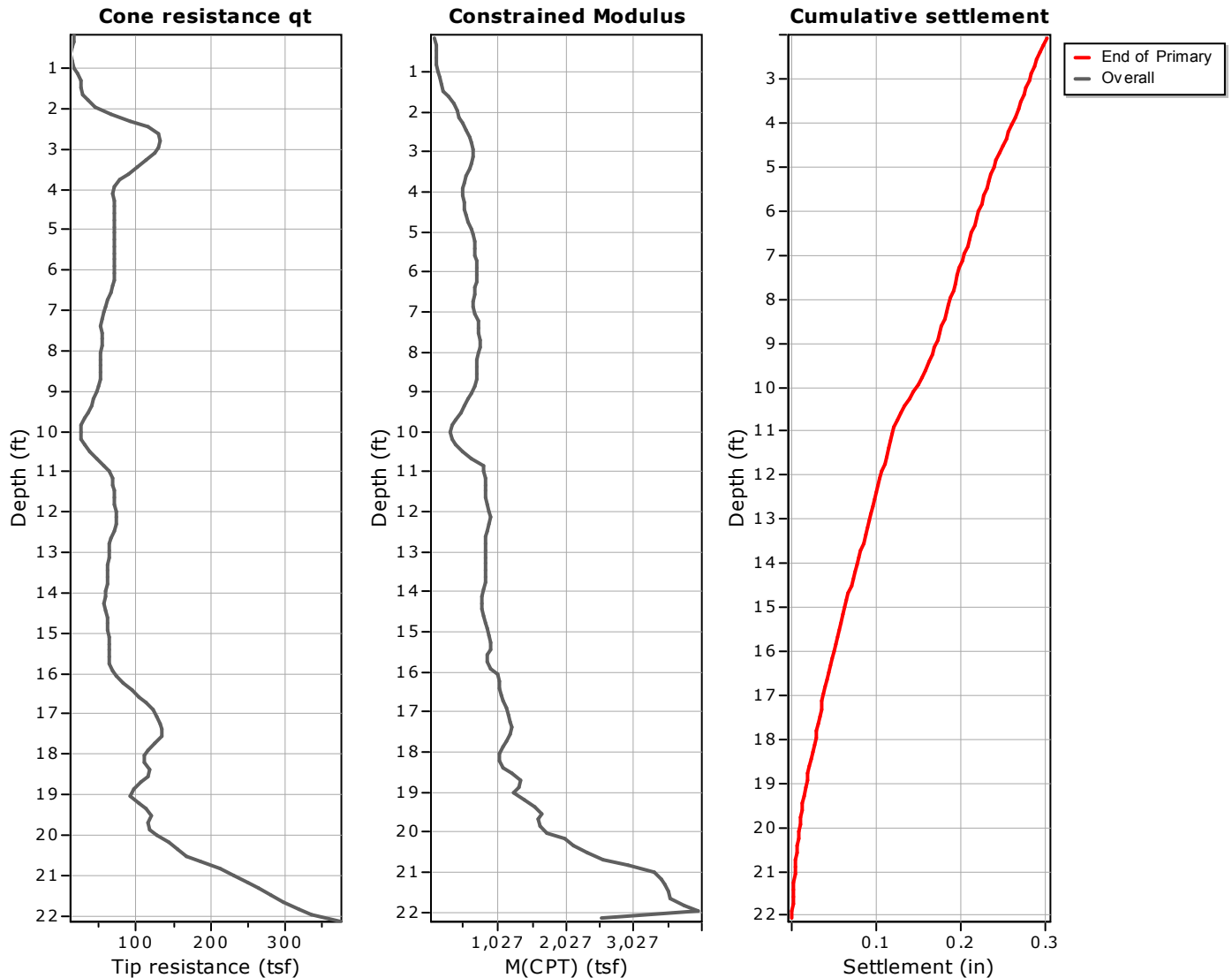
* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular

Footing width: 200.00 (ft)

L/B: 1.0

Footing pressure: 1.00 (tsf)

Embedment depth: 2.00 (ft)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: No

Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

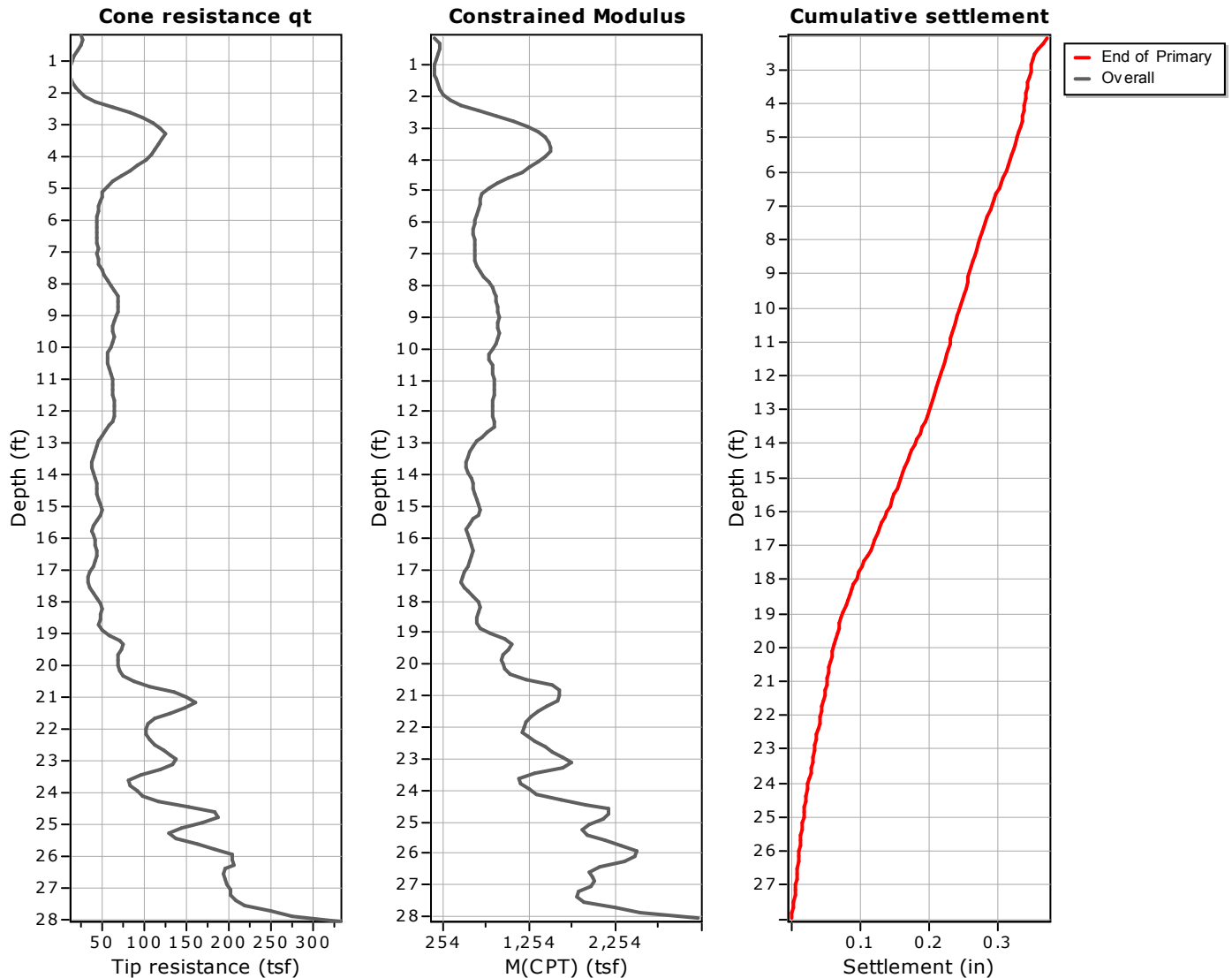
* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular

Footing width: 200.00 (ft)

L/B: 1.0

Footing pressure: 1.00 (tsf)

Embedment depth: 2.00 (ft)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: No

Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

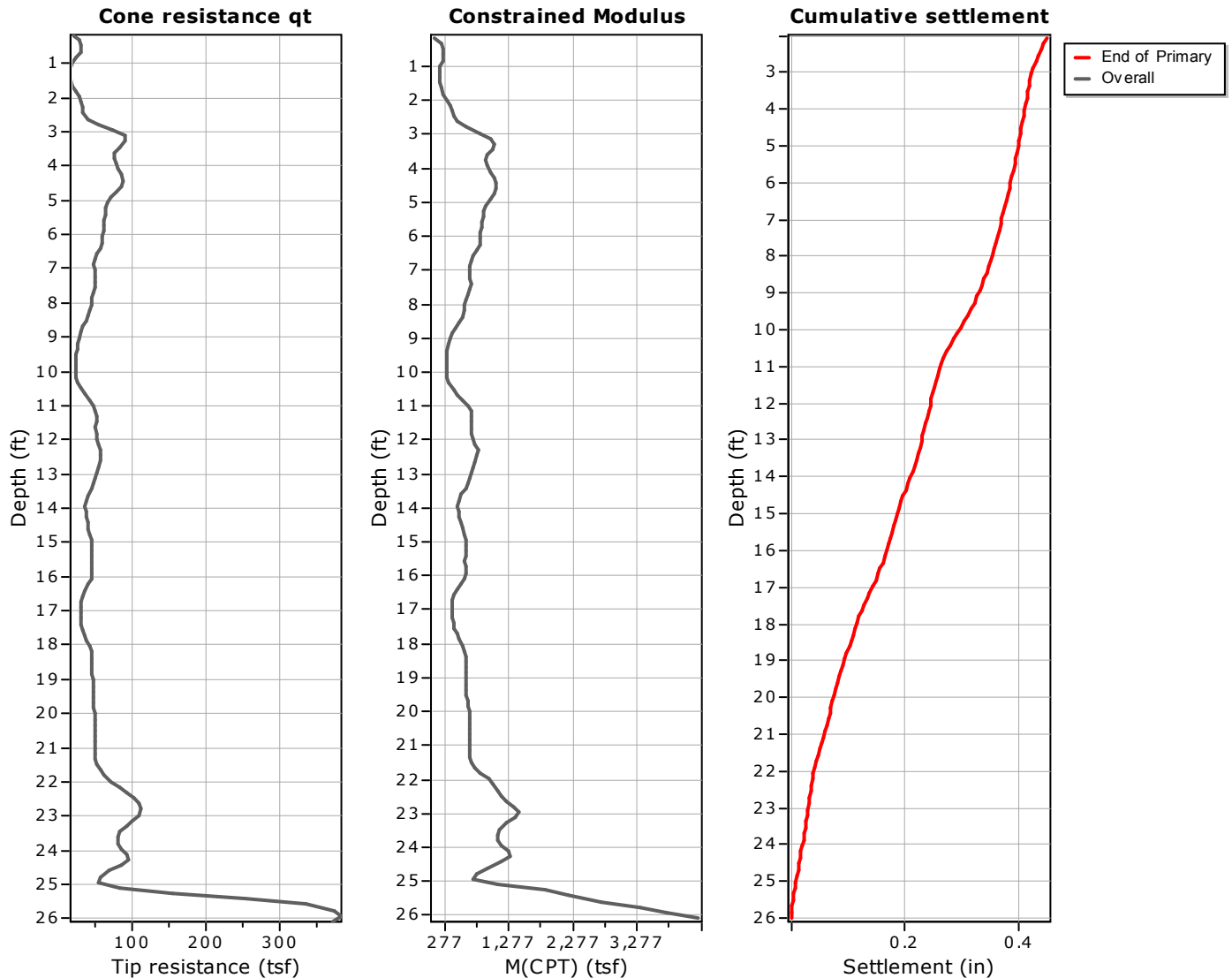
* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

Project: Lake Jennings Marketplace

Location: Lake Jennings Park Road

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular

Footing width: 200.00 (ft)

L/B: 1.0

Footing pressure: 1.00 (tsf)

Embedment depth: 2.00 (ft)

Footing is rigid: No

Remove excavation load: No

Apply 20% rule: No

Calculate secondary settlements: No

Time period for second. settlements: N/A

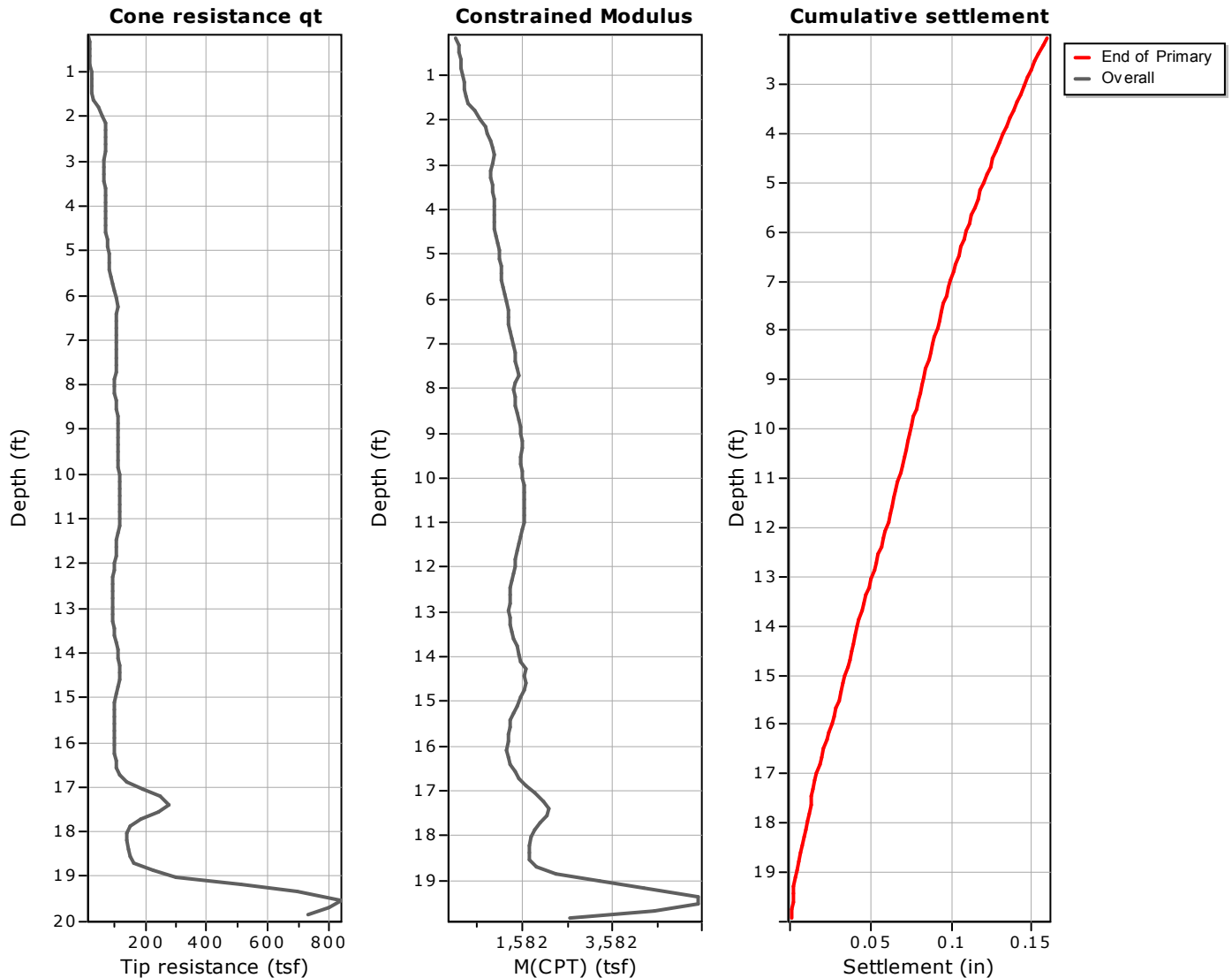
* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
 Footing width: 200.00 (ft)
 L/B: 1.0
 Footing pressure: 1.00 (tsf)
 Embedment depth: 2.00 (ft)
 Footing is rigid: No
 Remove excavation load: No
 Apply 20% rule: No
 Calculate secondary settlements: No
 Time period for second. settlements: N/A

* Primary settlements calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlements calculation is performed according to the following formula:

$$S = C_a \cdot \Delta z \cdot \log(t)$$

APPENDIX F

REFERENCES

REFERENCES

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<http://geohazards.usgs.gov/designmaps/us/application.php>

APPENDIX G

RECOMMENDED GRADING SPECIFICATIONS GENERAL PROVISIONS

RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

LAKE JENNINGS MARKETPLACE
LAKE JENNINGS PARK ROAD AND OLDE HWY 80
SAN DIEGO COUNTY, CALIFORNIA

GENERAL INTENT

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the preliminary geotechnical investigation report and/or the attached Special Provisions are a part of the Recommended Grading Specifications and shall supersede the provisions contained hereinafter in the case of conflict. These specifications shall only be used in conjunction with the geotechnical report for which they are a part. No deviation from these specifications will be allowed, except where specified in the geotechnical report or in other written communication signed by the Geotechnical Engineer.

OBSERVATION AND TESTING

Christian Wheeler Engineering shall be retained as the Geotechnical Engineer to observe and test the earthwork in accordance with these specifications. It will be necessary that the Geotechnical Engineer or his representative provide adequate observation so that he may provide his opinion as to whether or not the work was accomplished as specified. It shall be the responsibility of the contractor to assist the Geotechnical Engineer and to keep him apprised of work schedules, changes and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical report are encountered during the grading operations, the Geotechnical Engineer shall be contacted for further recommendations.

If, in the opinion of the Geotechnical Engineer, substandard conditions are encountered, such as questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction should be stopped until the conditions are remedied or corrected or he shall recommend rejection of this work.

Tests used to determine the degree of compaction should be performed in accordance with the following American Society for Testing and Materials test methods:

Maximum Density & Optimum Moisture Content - ASTM D-1557-91

Density of Soil In-Place - ASTM D-1556-90 or ASTM D-2922

All densities shall be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

PREPARATION OF AREAS TO RECEIVE FILL

All vegetation, brush and debris derived from clearing operations shall be removed, and legally disposed of. All areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching the natural ground, the areas to be filled shall be scarified to a depth of 6 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 6 inches thick should be removed to firm natural ground which is defined as natural soil which possesses an in-situ density of at least 90 percent of its maximum dry density.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground shall be stepped or benched. Benches shall be cut to a firm competent formational soil. The lower bench shall be at least 10 feet wide or 1-1/2 times the equipment width, whichever is greater, and shall be sloped back into the hillside at a gradient of not less than two (2) percent. All other benches should be at least 6 feet wide. The horizontal portion of each bench shall be compacted prior to receiving fill as specified herein for compacted natural ground. Ground slopes flatter than 20 percent shall be benched when considered necessary by the Geotechnical Engineer.

Any abandoned buried structures encountered during grading operations must be totally removed. All underground utilities to be abandoned beneath any proposed structure should be removed from within 10 feet of the structure and properly capped off. The resulting depressions from the above described procedure should be backfilled with acceptable soil that is compacted to the requirements of

the Geotechnical Engineer. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the Geotechnical Engineer so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be backfilled and capped in accordance to the requirements set forth by the Geotechnical Engineer. The top of the cap should be at least 4 feet below finish grade or 3 feet below the bottom of footing whichever is greater. The type of cap will depend on the diameter of the well and should be determined by the Geotechnical Engineer and/or a qualified Structural Engineer.

FILL MATERIAL

Materials to be placed in the fill shall be approved by the Geotechnical Engineer and shall be free of vegetable matter and other deleterious substances. Granular soil shall contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks and expansive or detrimental soils are covered in the geotechnical report or Special Provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the Geotechnical Engineer. Any import material shall be approved by the Geotechnical Engineer before being brought to the site.

PLACING AND COMPACTION OF FILL

Approved fill material shall be placed in areas prepared to receive fill in layers not to exceed 6 inches in compacted thickness. Each layer shall have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer shall be uniformly compacted to the specified minimum degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical investigation report.

When the structural fill material includes rocks, no rocks will be allowed to nest and all voids must be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical report, when applicable.

Field observation and compaction tests to estimate the degree of compaction of the fill will be taken by the Geotechnical Engineer or his representative. The location and frequency of the tests shall be at the Geotechnical Engineer's discretion. When the compaction test indicates that a particular layer is at less than the required degree of compaction, the layer shall be reworked to the satisfaction of the Geotechnical Engineer and until the desired relative compaction has been obtained.

Fill slopes shall be compacted by means of sheepfoot rollers or other suitable equipment. Compaction by sheepfoot roller shall be at vertical intervals of not greater than four feet. In addition, fill slopes at a ratio of two horizontal to one vertical or flatter, should be trackrolled. Steeper fill slopes shall be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations shall result in all fill material six or more inches inward from the finished face of the slope having a relative compaction of at least 90 percent of maximum dry density or the degree of compaction specified in the Special Provisions section of this specification. The compaction operation on the slopes shall be continued until the Geotechnical Engineer is of the opinion that the slopes will be surficially stable.

Density tests in the slopes will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the Geotechnical Engineer or his representative in the form of a daily field report.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no cost to the Owner or Geotechnical Engineer.

CUT SLOPES

The Engineering Geologist shall inspect cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

ENGINEERING OBSERVATION

Field observation by the Geotechnical Engineer or his representative shall be made during the filling and compaction operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. Neither the presence of the Geotechnical Engineer or his representative or the observation and testing shall release the Grading Contractor from his duty to compact all fill material to the specified degree of compaction.

SEASON LIMITS

Fill shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations shall not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God shall be repaired before acceptance of work.

RECOMMENDED GRADING SPECIFICATIONS - SPECIAL PROVISIONS

RELATIVE COMPACTION: The minimum degree of compaction to be obtained in compacted natural ground, compacted fill, and compacted backfill shall be at least 90 percent. For street and

parking lot subgrade, the upper six inches should be compacted to at least 95 percent relative compaction.

EXPANSIVE SOILS: Detrimentially expansive soil is defined as clayey soil which has an expansion index of 50 or greater when tested in accordance with the Uniform Building Code Standard 29-2.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over 6 inches in diameter. Oversized materials should not be placed in fill unless recommendations of placement of such material is provided by the Geotechnical Engineer. At least 40 percent of the fill soils shall pass through a No. 4 U.S. Standard Sieve.

TRANSITION LOTS: Where transitions between cut and fill occur within the proposed building pad, the cut portion should be undercut a minimum of one foot below the base of the proposed footings and recompact as structural backfill. In certain cases that would be addressed in the geotechnical report, special footing reinforcement or a combination of special footing reinforcement and undercutting may be required.

APPENDIX H

REGIONAL, VICINITY AND RESPONSIBILITY AREA MAPS



REGIONAL LOCATION MAP

LAKE JENNINGS MARKETPLACE
LAKE JENNINGS PARK ROAD AND OLDE HIGHWAY 80
SAN DIEGO COUNTY, CALIFORNIA

DATE: OCTOBER 2014

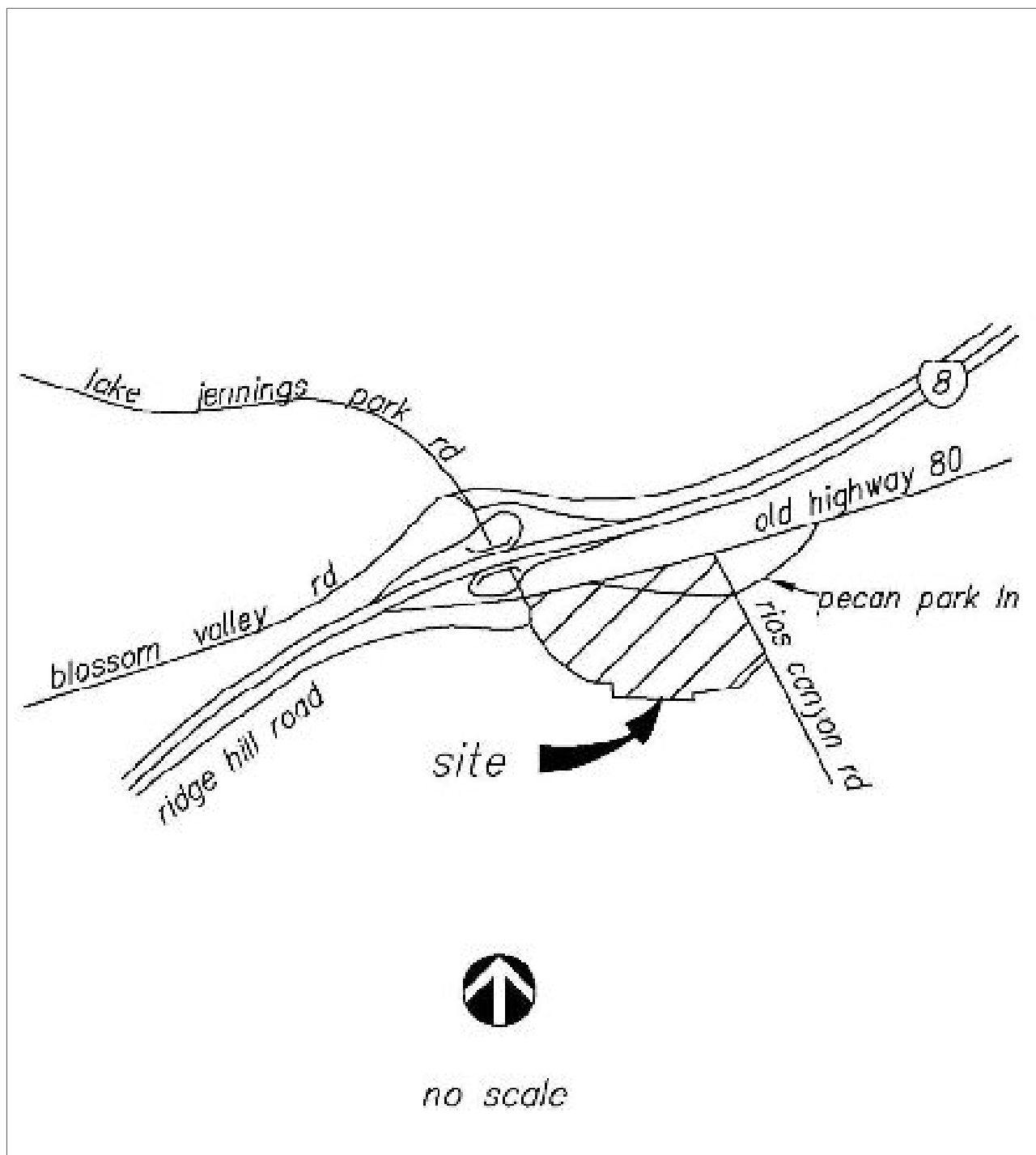
JOB NO.: 2140061.02

BY: MWL

FIGURE NO.: 1



CHRISTIAN WHEELER
ENGINEERING



VICINITY MAP

LAKE JENNINGS MARKETPLACE
LAKE JENNINGS PARK ROAD AND OLDE HIGHWAY 80
SAN DIEGO COUNTY, CALIFORNIA

DATE: OCTOBER 2014

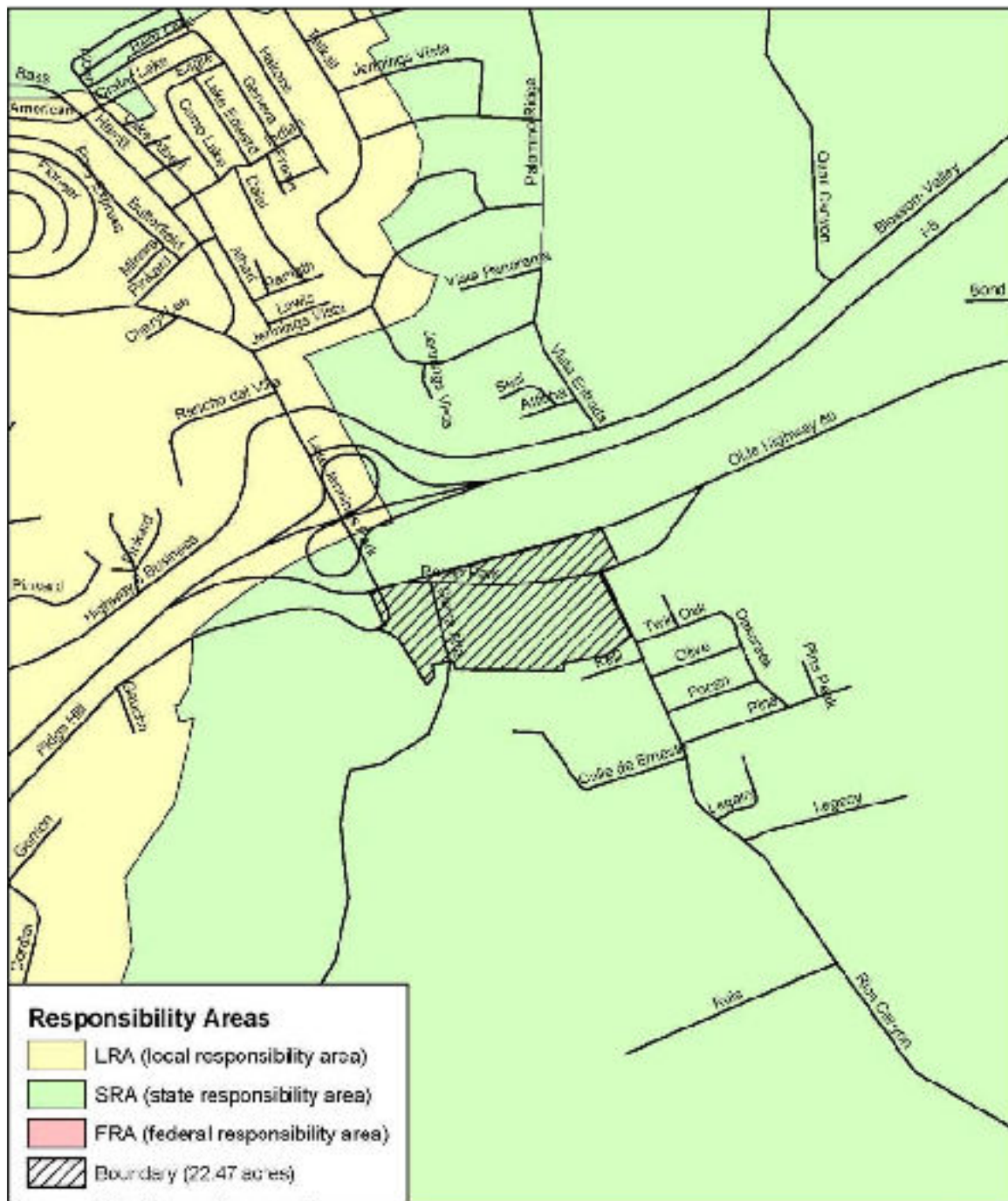
JOB NO.: 2140061.02

BY: MWL

FIGURE NO.: 2



CHRISTIAN WHEELER
ENGINEERING



RESPONSIBILITY AREA MAP

LAKE JENNINGS MARKETPLACE LAKE JENNINGS PARK ROAD AND OLDE HIGHWAY 80 SAN DIEGO COUNTY, CALIFORNIA

DATE:	OCTOBER 2014	JOB NO.:	2140061.02
BY:	MWL	FIGURE NO.:	3



CHRISTIAN WHEELER
ENGINEERING