

APPENDIX A GEOTECHNICAL REPORTS

2018 Information

Items Included:

1. Figure 1
2. Borehole logs for Boreholes 201, 202, 205 and 207
3. Report entitled: PRESENTATION OF SITE INVESTIGATION RESULTS, Port Dalhousie Pier dated 05 Oct 2018 by ConeTec Investigations Ltd.

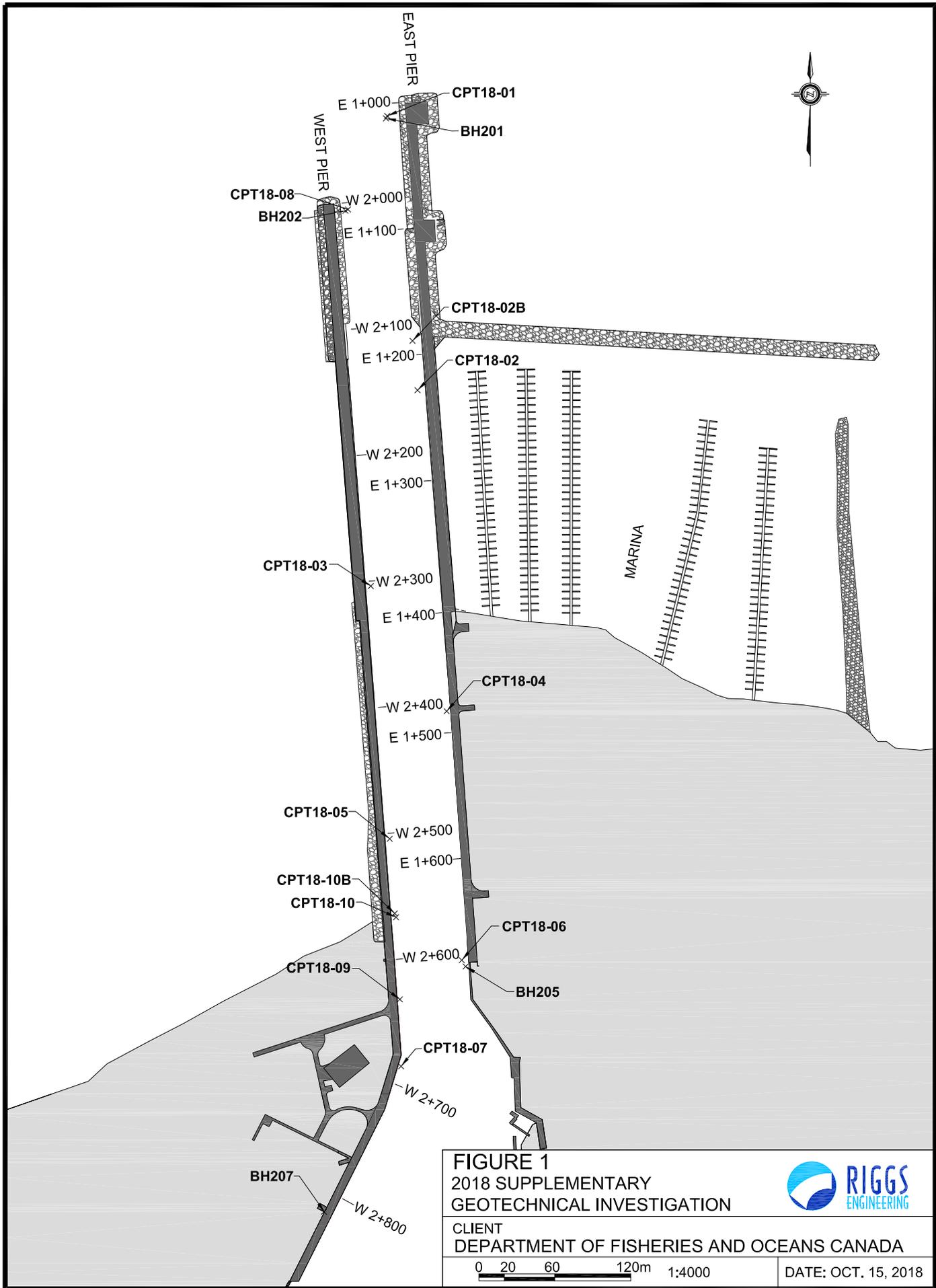


FIGURE 1
 2018 SUPPLEMENTARY
 GEOTECHNICAL INVESTIGATION



CLIENT
 DEPARTMENT OF FISHERIES AND OCEANS CANADA

0 20 60 120m 1:4000

DATE: OCT. 15, 2018

LOG OF BOREHOLE NO. 201

17T 641030E 4785714N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD NW Wash Boring

BORING DATE September 27, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt

SOIL PROFILE			SAMPLES			SHEAR STRENGTH (kPa)				PLASTIC NATURAL LIQUID			UNIT WEIGHT	GROUND WATER OBSERVATIONS AND REMARKS	
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	+ FIELD VANE Δ TORVANE ○ Qu				LIMIT	MOISTURE CONTENT	LIMIT			
						▲ POCKET PENETROMETER ○ Q									
						DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●				WATER CONTENT (%)					
						50	100	150	200	W _p	w	W _L	GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL		
						20	40	60	80				kN/m ³		
0.0	SURFACE ELEVATION 75.83														
	BARGE														
1.0	1.2 74.6														
	WATER														
2.0															
3.0															
4.0															
5.0															
6.0															
7.0															
8.0	7.9														
	8.2		1A	SS	15										
	67.6		1B			●				○	○				
	8.5														
	67.3														
9.0	ORGANIC SILT: Compact, grey organic sandy silt, saturated; occasional decayed wood fragments														
	CLAY TILL/SHALE COMPLEX: Very stiff, reddish brown silty clay till/shale complex, trace sand and gravel, DTPL														
	BOREHOLE TERMINATED AT 8.5 m														
10.0															
11.0															
12.0															
13.0															
14.0															
15.0															

NOTES

LOG OF BOREHOLE NO. 202

17T 640998E 4785641N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD NW Wash Boring

BORING DATE September 27, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt

SOIL PROFILE			SAMPLES			SHEAR STRENGTH (kPa)				PLASTIC NATURAL LIQUID			UNIT WEIGHT	GROUND WATER OBSERVATIONS AND REMARKS	
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	+ FIELD VANE Δ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q				LIMIT	MOISTURE CONTENT	LIMIT			
						50	100	150	200						W _p
						DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●				WATER CONTENT (%)					
						20	40	60	80	10	20	30	40	kN/m ³	GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL
0.0	SURFACE ELEVATION 75.82														
	BARGE														
1.0	1.1 74.7														
	WATER														
7.4															
7.6	ORGANIC SAND: Loose to compact, brown organic sand, some silt to silty, saturated; occasional decayed wood fragments		1A	SS	37										
68.2															
8.0			1B												
67.8	CLAY TILL/SHALE COMPLEX: Dense, reddish brown silty clay till/shale complex, some sand, trace gravel, DTPL BOREHOLE TERMINATED AT 8.0 m														

NOTES

LOG OF BOREHOLE NO. 205

17T 641093E 4785043N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD NW Wash Boring and NQ Diamond Coring

BORING DATE September 25, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt

SOIL PROFILE			SAMPLES			SHEAR STRENGTH (kPa)		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT kN/m ³	GROUND WATER OBSERVATIONS AND REMARKS	
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	+ FIELD VANE Δ TORVANE ○ Qu	▲ POCKET PENETROMETER ○ Q						
						ELEVATION SCALE		WATER CONTENT (%)					
						DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●						GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL	
						50	100	150	200	10	20	30	40
0.0	SURFACE ELEVATION 75.80												
	BARGE												
1.0	1.2 74.6												
	WATER												
8.0	7.9 67.9		1	SS	0 ¹								
	ORGANIC SILT: Very soft, grey organic clayey silt, trace to some sand, WTPL; occasional rootlets, with occasional decayed plant matter, peat, and shells		2	SS	0 ¹								
			3	SS	2								
			4	SS	2								
13.0	12.9 62.9		5	SS	2								
	occasional shale fragments												
15.0	CONTINUED												

NOTES 1. Weight of hammer.

LOG OF BOREHOLE NO. 205

17T 641093E 4785043N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD NW Wash Boring and NQ Diamond Coring

BORING DATE September 25, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt

SOIL PROFILE			SAMPLES			SHEAR STRENGTH (kPa)		PLASTIC NATURAL LIQUID		UNIT WEIGHT	GROUND WATER OBSERVATIONS AND REMARKS
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	+ FIELD VANE Δ TORVANE ○ Qu	LIMIT	MOISTURE CONTENT	LIMIT		
15.0	CONTINUED FROM PREVIOUS PAGE										
60.8	ORGANIC SILT: Soft, grey organic clayey silt, trace to some sand, WTPL; occasional rootlets, with occasional decayed plant matter, peat, shells, and shale fragments		6	SS	2					53	
17.6											
58.2	CLAY TILL/SHALE COMPLEX: Stiff, reddish brown silty clay till/shale complex, some sand, trace gravel, WTPL; numerous shale fragments		7	SS	14						
19.0											
56.8	SHALE: Highly weathered, very fine grained to fissile, thinly laminated, red, poor quality, weak to very weak, shale; very thinly to thinly bedded with slightly weathered to weathered, grey, slightly calcareous, weak to medium strong hard layers		8	SS	50/75 mm						
20.0											
20.6			9	RC							
55.2	BOREHOLE TERMINATED AT 20.6 m										

DEPTH (m)	RUN (m)	REC (%)	RQD (%)	WWR (%)
20.0				
20.6	0.64	96	24	

NOTES 1. Weight of hammer.

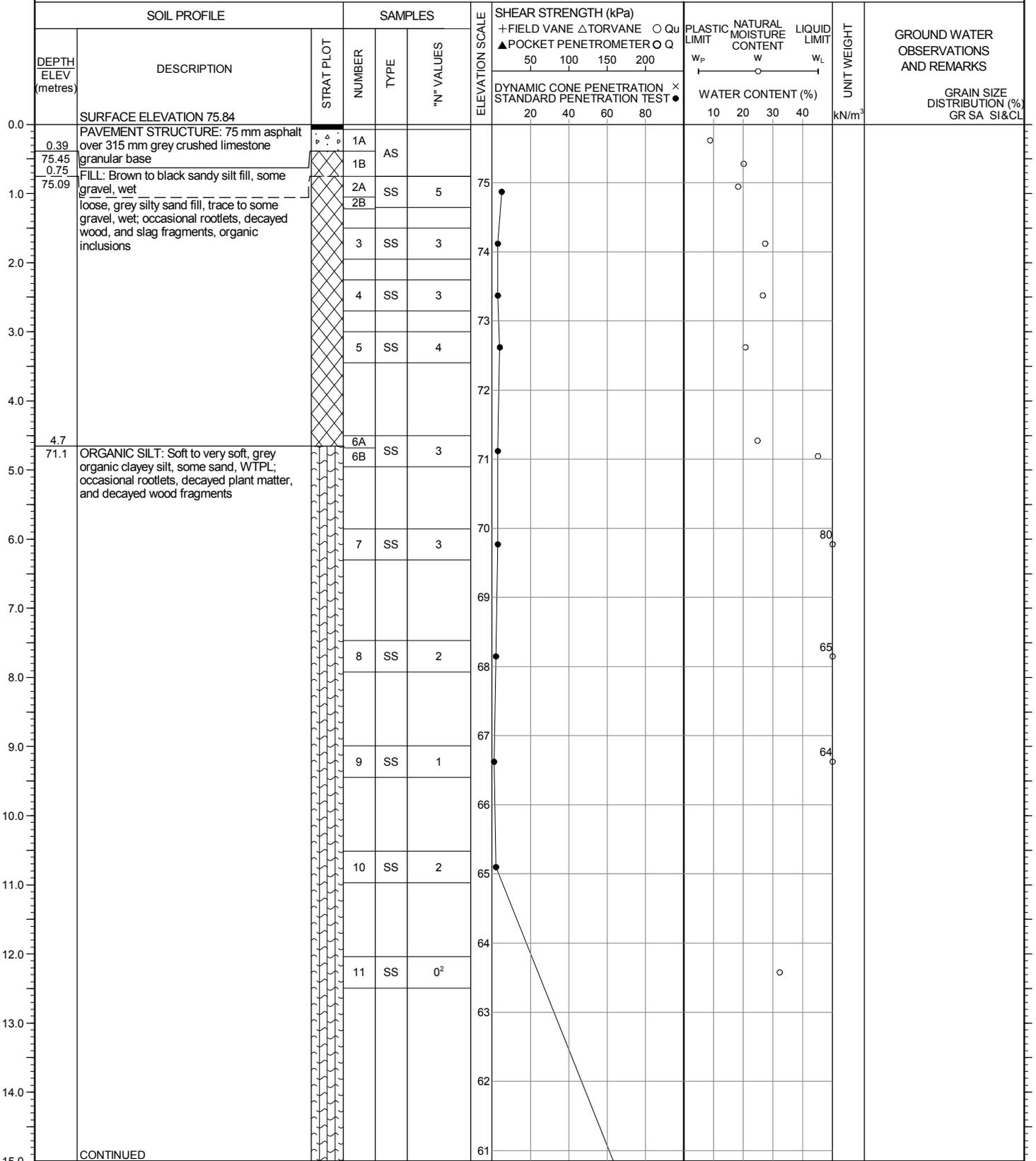
LOG OF BOREHOLE NO. 207

17T 640981E 4784849N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD CFSSA and NW Wash Boring

BORING DATE October 3, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt



NOTES
1. Lake Ontario water level near elevation 74.6 on October 3, 2018
2. Weight of hammer.

LOG OF BOREHOLE NO. 207

17T 640981E 4784849N

PROJECT Port Dalhousie Piers
LOCATION St. Catharines, Ontario
BORING METHOD CFSSA and NW Wash Boring

BORING DATE October 3, 2018

PML REF. 18HF036
ENGINEER M. D. St. Denis
TECHNICIAN K. Pettitt

SOIL PROFILE			SAMPLES			SHEAR STRENGTH (kPa)		PLASTIC NATURAL LIQUID		UNIT WEIGHT	GROUND WATER OBSERVATIONS AND REMARKS	
DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	+ FIELD VANE Δ TORVANE ○ Qu	LIMIT	MOISTURE CONTENT	LIMIT			
						▲ POCKET PENETROMETER ○ Q		w _p	w	w _L		
						×		WATER CONTENT (%)				
						●		10	20	30	40	
								kN/m ³				
								GRAIN SIZE DISTRIBUTION (%)				
								GR SA SI&CL				
15.0 60.8	CONTINUED FROM PREVIOUS PAGE											
	ORGANIC SILT: Very soft, grey organic clayey silt, some sand, WTPL; occasional rootlets, decayed plant matter, and decayed wood fragments		12	SS	0 ²							
16.9 58.9	SHALE: Weathered red shale; with grey hard layers											
			13	SS	75/50 mm							
19.7 56.1	BOREHOLE TERMINATED AT 19.7 m		14	WS								
											Upon completion of augering, free water at 1.2 m, cave to 4.4 m	

NOTES 1. Lake Ontario water level near elevation 74.6 on October 3, 2018
2. Weight of hammer.

PRESENTATION OF SITE INVESTIGATION RESULTS

Port Dalhousie Pier

Prepared for:

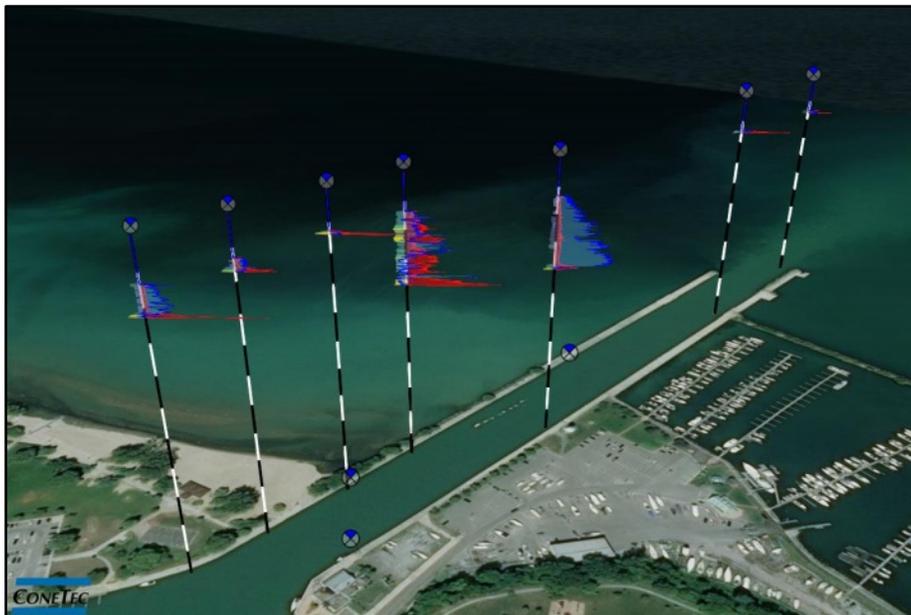
Peto MacCallum Ltd.

ConeTec Job No: 18-05063

Project Start Date: 26-Sep-2018

Project End Date: 28-Sep-2018

Report Date: 05-Oct-2018



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Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Investigations Ltd. for Peto MacCallum Ltd. at the Port Dalhousie Pier in St. Catherines, Ontario. The program consisted of 12 cone penetration tests (CPT).

Project Information

Project	
Client	Peto MacCallum Ltd.
Project	Port Dalhousie Pier
ConeTec project number	18-05063

An aerial overview from Google Earth including the CPT test locations is presented below.



Rig Description	Deployment System	Test Type
Portable Barge	CME 75 drill rig	CPT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT	Consumer grade GPS	26917

Cone Penetration Test (CPT)	
Depth reference	Depths are referenced to the existing deck surface at the time of testing.
Tip and sleeve data offset	0.1 meter This has been accounted for in the CPT data files.
Additional plots	Advanced and Soil Behaviour Type (SBT) scatter plots are included in the data release package.

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm ²)	Sleeve Area (cm ²)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
408:T1500F15U500	408	15	225	1500	15	500
Cone 408 was used for all CPT soundings.						

Calculated Parameters	
Additional information	<p>The Normalized Soil Behaviour Type (SBT-Q_{tn}) classification chart (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPT parameters were generated and are provided in Excel format files in the release folder. The CPT calculated parameters are based on values of corrected tip (q_t), sleeve friction (f_s) and pore pressure (u_2). Effective stresses are calculated based on unit weights that have been assigned to the individual soil behavior type zones, user defined unit weight profiles and the assumed equilibrium pore pressure profile.</p> <p>Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behaviour Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).</p>

Limitations

This report has been prepared for the exclusive use of Peto MacCallum Ltd. (Client) for the project titled "Port Dalhousie Pier". The report's contents may not be relied upon by any other party without the express written permission of ConeTec Investigations Ltd. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

Cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd., a subsidiary of ConeTec.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in 5 cm², 10 cm² and 15 cm² tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first appendix. The 15 cm² penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm² piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u₂" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meets or exceeds those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

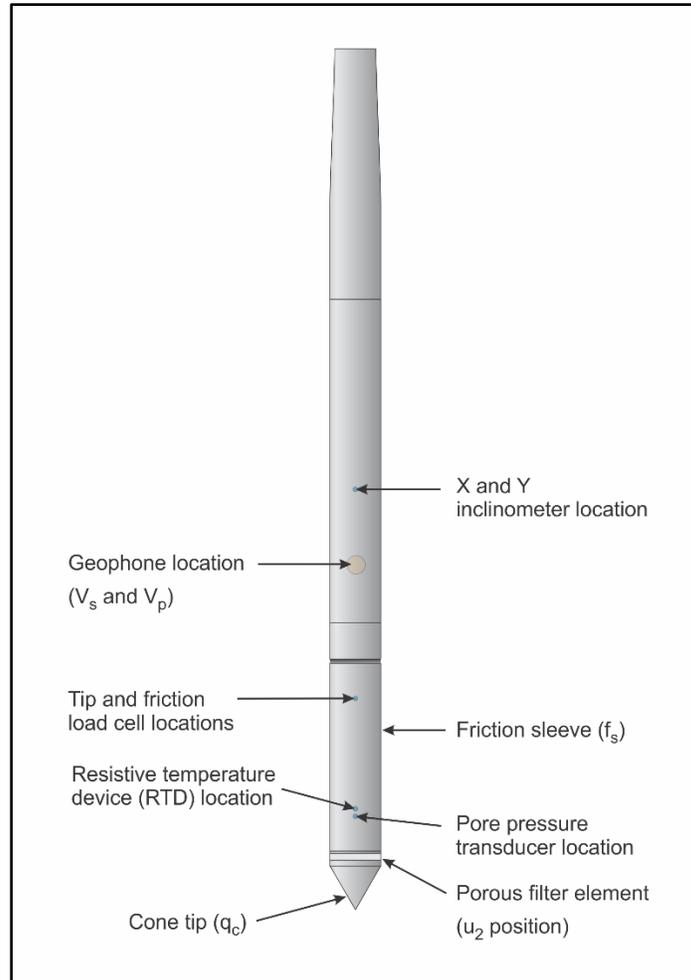


Figure CPTu. Piezocone Penetrometer (15 cm²)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording interval is 2.5 cm; custom recording intervals are possible.

The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerine or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 38.1 mm are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson et al. (1986) and Robertson (1990, 2009). It should be noted that it is not always possible to accurately identify a soil behaviour type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behaviour type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al. (1986):

$$q_t = q_c + (1-a) \cdot u_2$$

where: q_t is the corrected tip resistance

q_c is the recorded tip resistance

u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)

a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (R_f) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of files with calculated geotechnical parameters were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the methods used is also included in the data release folder.

For additional information on CPTu interpretations and calculated geotechnical parameters, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

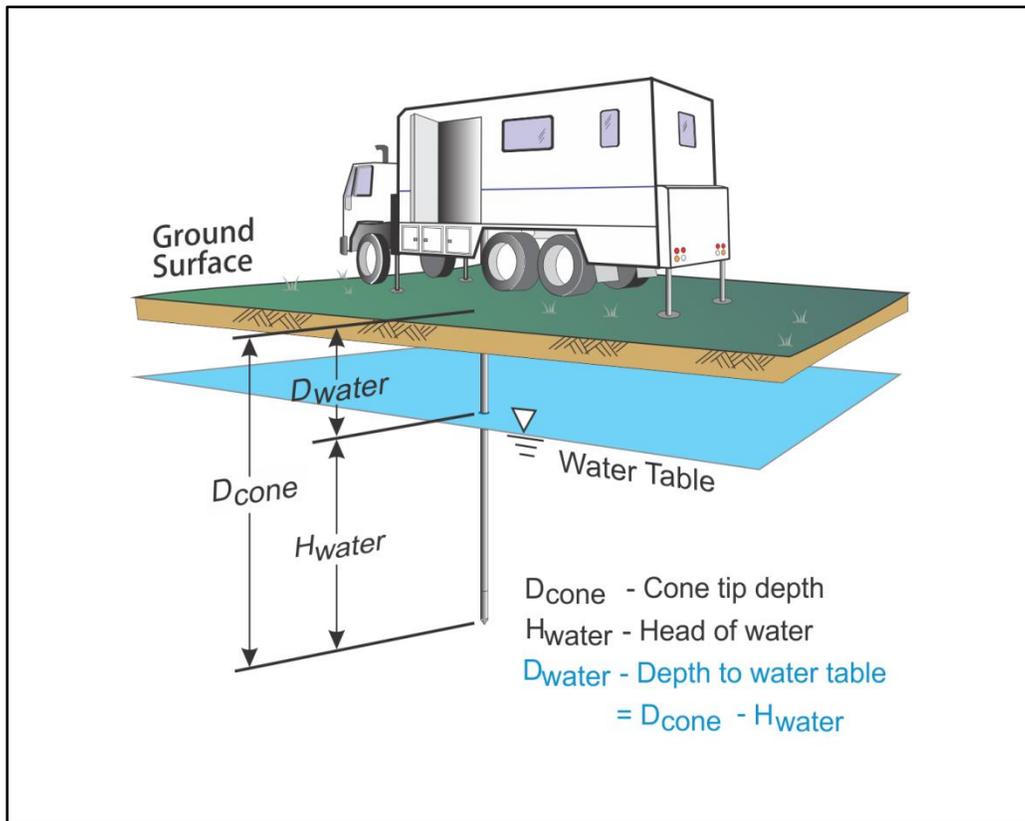


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behaviour.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

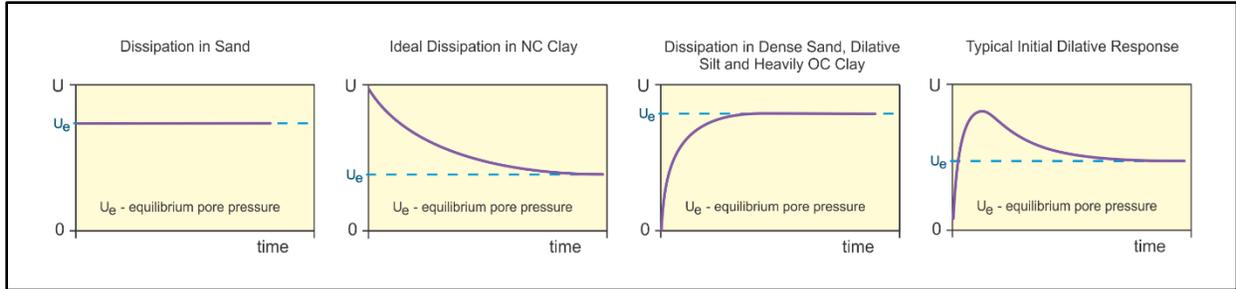


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve in Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100} . In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100} . A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T^*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

- T^* is the dimensionless time factor (Table Time Factor)
- a is the radius of the cone
- I_r is the rigidity index
- t is the time at the degree of consolidation

Table Time Factor. T^* versus degree of dissipation (Teh and Houlsby (1991))

Degree of Dissipation (%)	20	30	40	50	60	70	80
$T^* (u_2)$	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50} , dissipation tests must be taken to a pressure less than u_{50} . The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100} . To estimate u_{50} , both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby (1991)), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50} . In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r , the equilibrium pore pressure and the effect of an initial dilatatory response on calculating t_{50} , other methods should be applied to confirm the results for c_h .

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

REFERENCES

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- Mayne, P.W. and Peuchen, J., 2012, "Unit weight trends with cone resistance in soft to firm clays", *Geotechnical and Geophysical Site Characterization 4*, Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.
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- Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", *Geotechnique*, 41(1): 17-34.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots
- Soil Behaviour Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots



Job No: 18-05063
 Client: Peto MacCallum Ltd.
 Project: Port Dalhousie Pier
 Start Date: 26-Sep-2018
 End Date: 28-Sep-2018

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface ¹ (m)	Deck to Water (m)	Deck to Mudline ² (m)	Final Depth ³ (m)	Northing ⁴ (m)	Easting (m)	Refer to Notation Number
CPT18-01	18-05063_CP01	27-Sep-2018	408:T1500F15U500	1.1	1.14	7.6	8.200	4785716	641031	5
CPT18-02	18-05063_CP02	26-Sep-2018	408:T1500F15U500	1.2	1.20	7.5	7.800	4785499	641055	5
CPT18-02B	18-05063_CP02B	27-Sep-2018	408:T1500F15U500	1.2	1.16	7.3	7.700	4785538	641051	5
CPT18-03	18-05063_CP03	27-Sep-2018	408:T1500F15U500	1.2	1.19	6.8	18.950	4785344	641018	
CPT18-04	18-05063_CP04	26-Sep-2018	408:T1500F15U500	1.2	1.20	6.8	20.250	4785245	641078	
CPT18-05	18-05063_CP05	27-Sep-2018	408:T1500F15U500	1.1	1.13	6.6	19.900	4785144	641033	
CPT18-06	18-05063_CP06	26-Sep-2018	408:T1500F15U500	1.2	1.16	8.7	18.950	4785048	641090	5
CPT18-07	18-05063_CP07	27-Sep-2018	408:T1500F15U500	1.2	1.15	6.6	11.250	4784964	641042	
CPT18-08	18-05063_CP08	27-Sep-2018	408:T1500F15U500	1.1	1.14	7.5	7.625	4785642	641000	5
CPT18-09	18-05063_CP09	28-Sep-2018	408:T1500F15U500	1.1	1.15	6.4	8.425	4785017	641041	
CPT18-10	18-05063_CP10	28-Sep-2018	408:T1500F15U500	1.2	1.17	6.4	6.875	4785082	641038	
CPT18-10B	18-05063_CP10B	28-Sep-2018	408:T1500F15U500	1.2	1.17	7.5	19.900	4785085	641037	

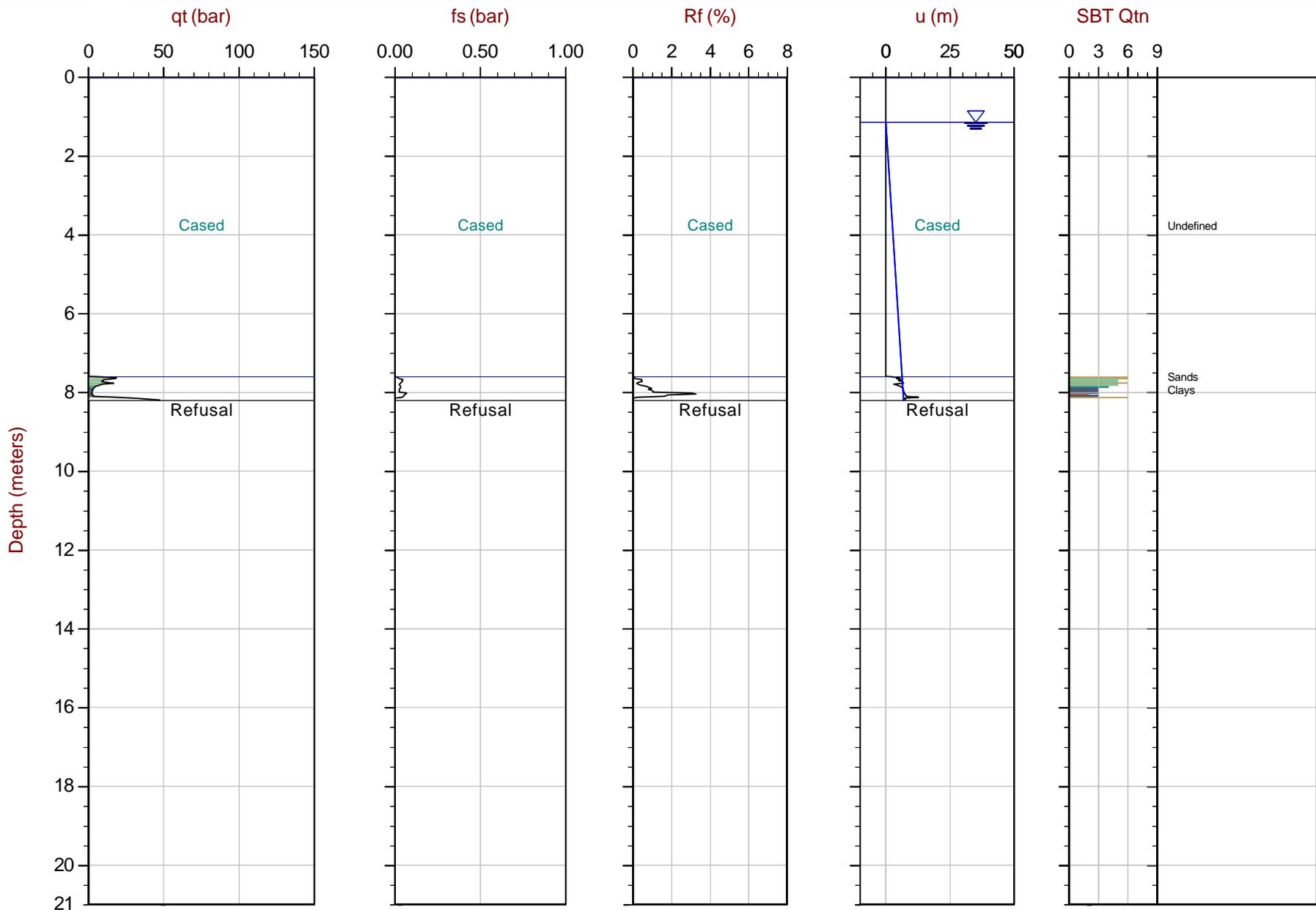
1. The assumed phreatic surface was based on pore pressure dissipation tests, unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. Deck to mudline depths were measured using a dip tape.
3. Depths are referenced to the deck level at the time of testing.
4. Coordinates were acquired using consumer grade GPS equipment in datum: NAD 1983 / UTM Zone 17 North.
5. The assumed phreatic surface was based on field measurements of deck to water.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 15:16
Site: Port Dalhousie Pier

Sounding: CPT18-01
Cone: 408:T1500F15U500



Max Depth: 8.200 m / 26.90 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP01.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785716mE: 641031m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

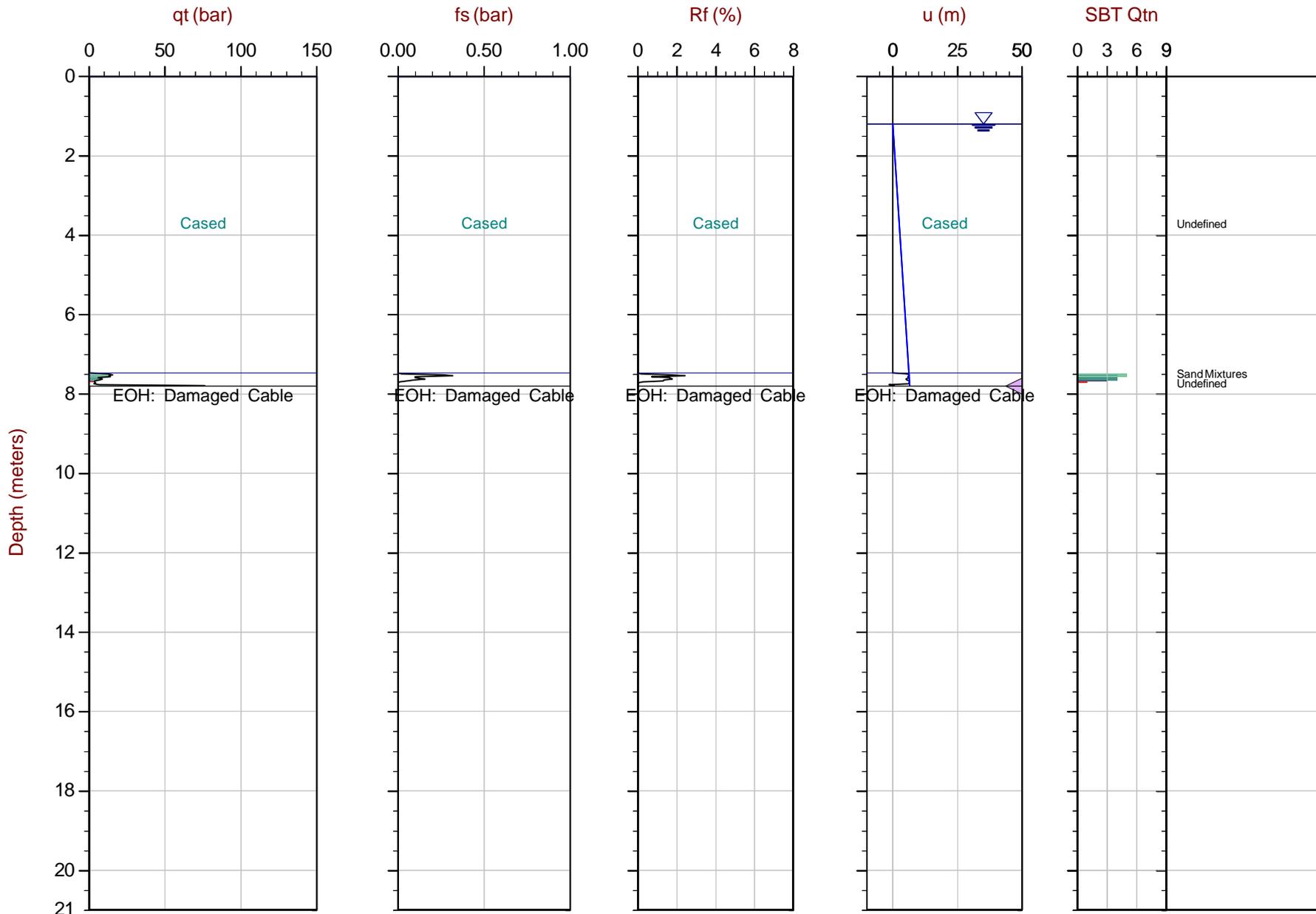
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 13:32
Site: Port Dalhousie Pier

Sounding: CPT18-02
Cone: 408:T1500F15U500



Max Depth: 7.800 m / 25.59 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP02.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785499m E: 641055m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

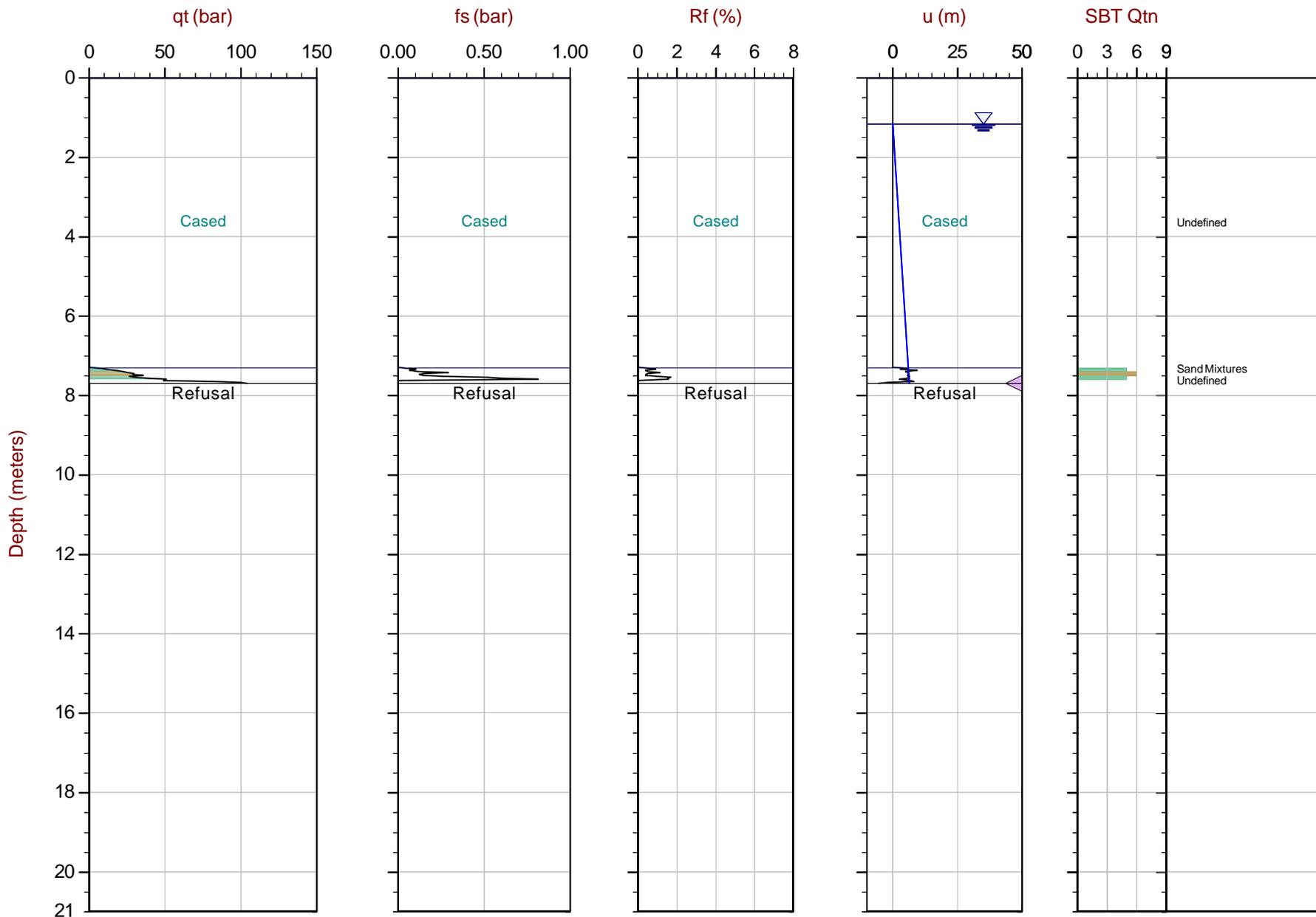
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 17:34
Site: Port Dalhousie Pier

Sounding: CPT18-02B
Cone: 408:T1500F15U500



Max Depth: 7.700 m / 25.26 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP02B.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785538mE: 641051m
Sheet No: 1 of 1

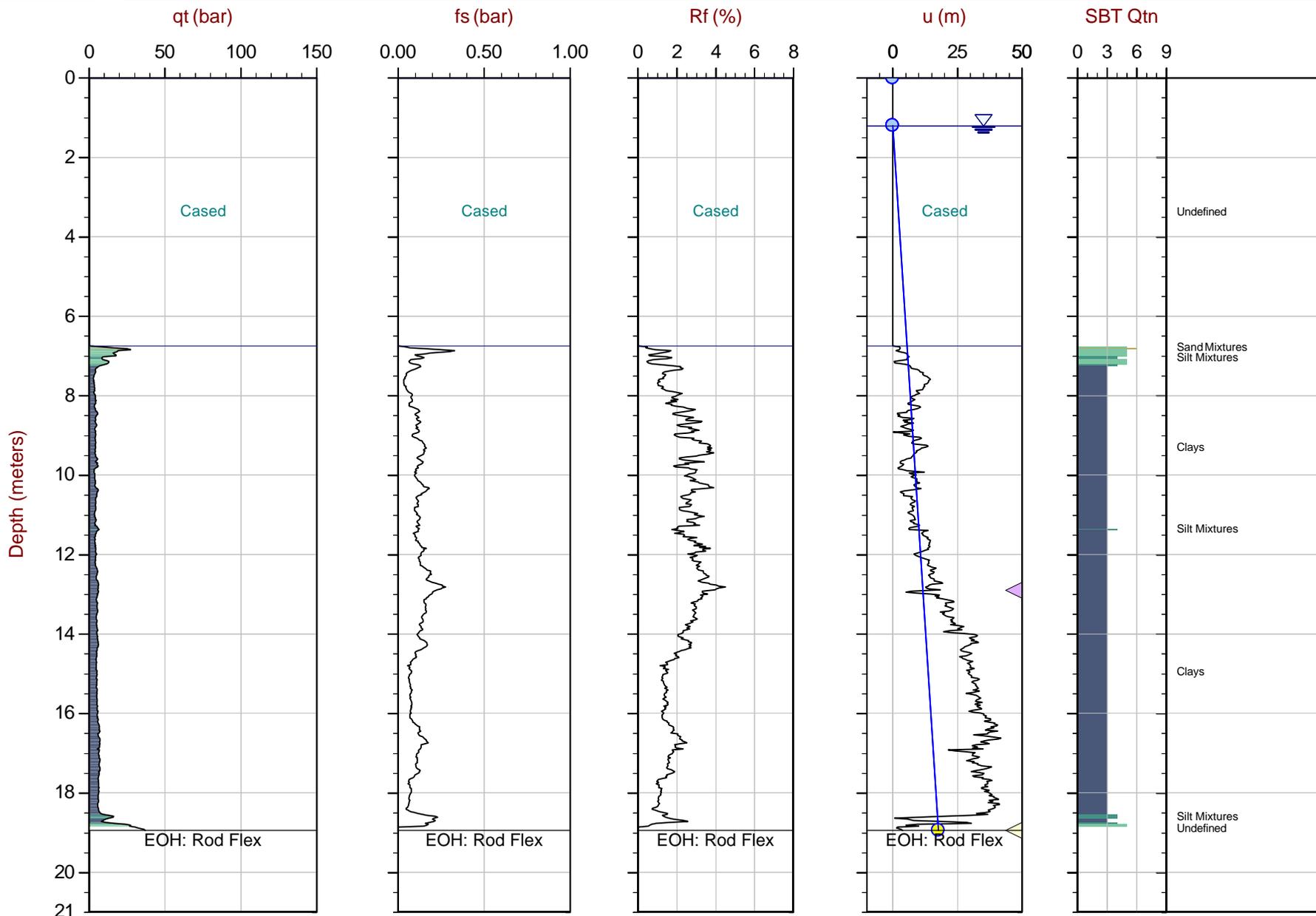
Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 12:52
Site: Port Dalhousie Pier

Sounding: CPT18-03
Cone: 408:T1500F15U500



Max Depth: 18.950 m / 62.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP03.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785344m E: 641018m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

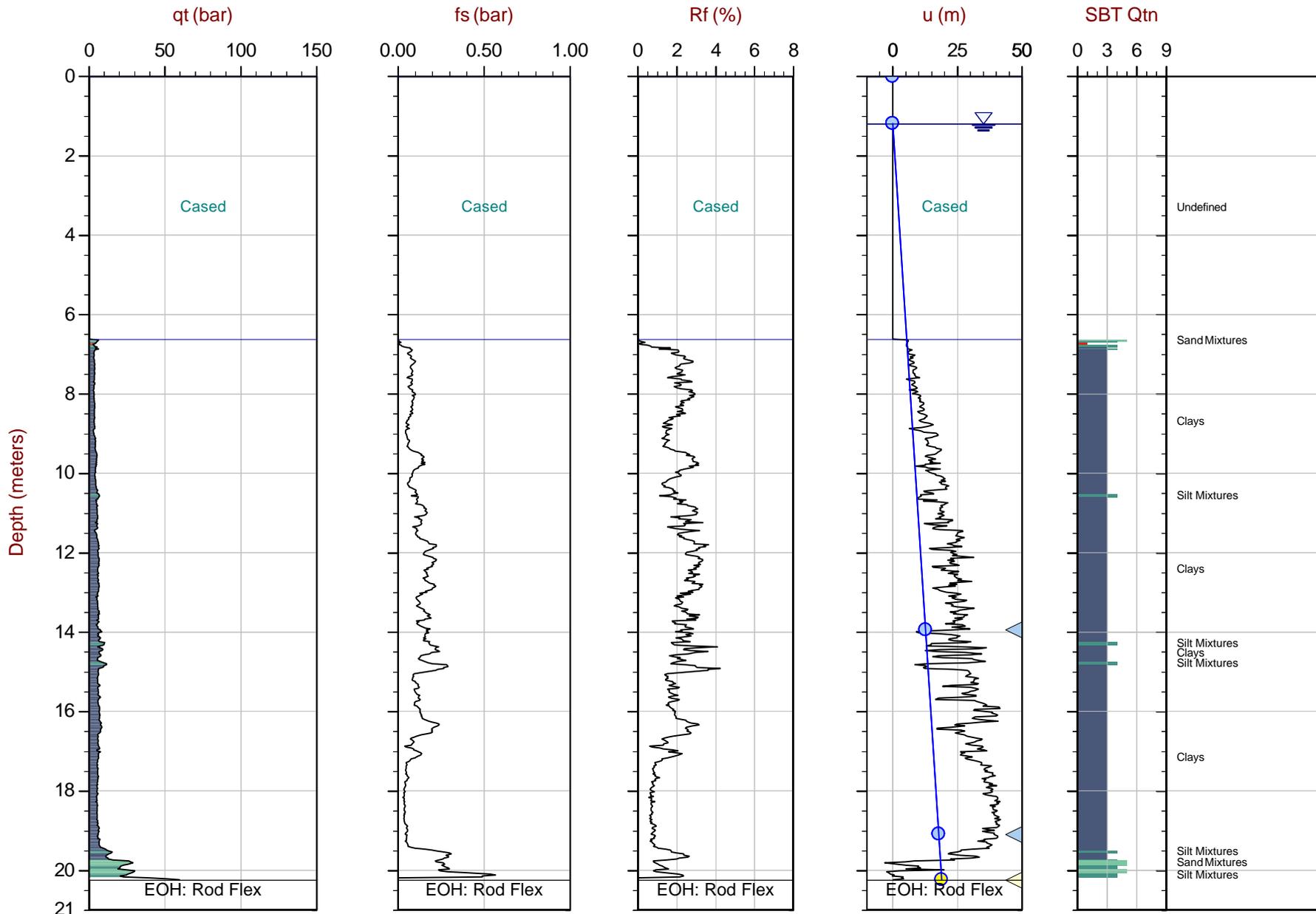
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 10:46
Site: Port Dalhousie Pier

Sounding: CPT18-04
Cone: 408:T1500F15U500



Max Depth: 20.250 m / 66.44 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP04.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785245m E: 641078m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

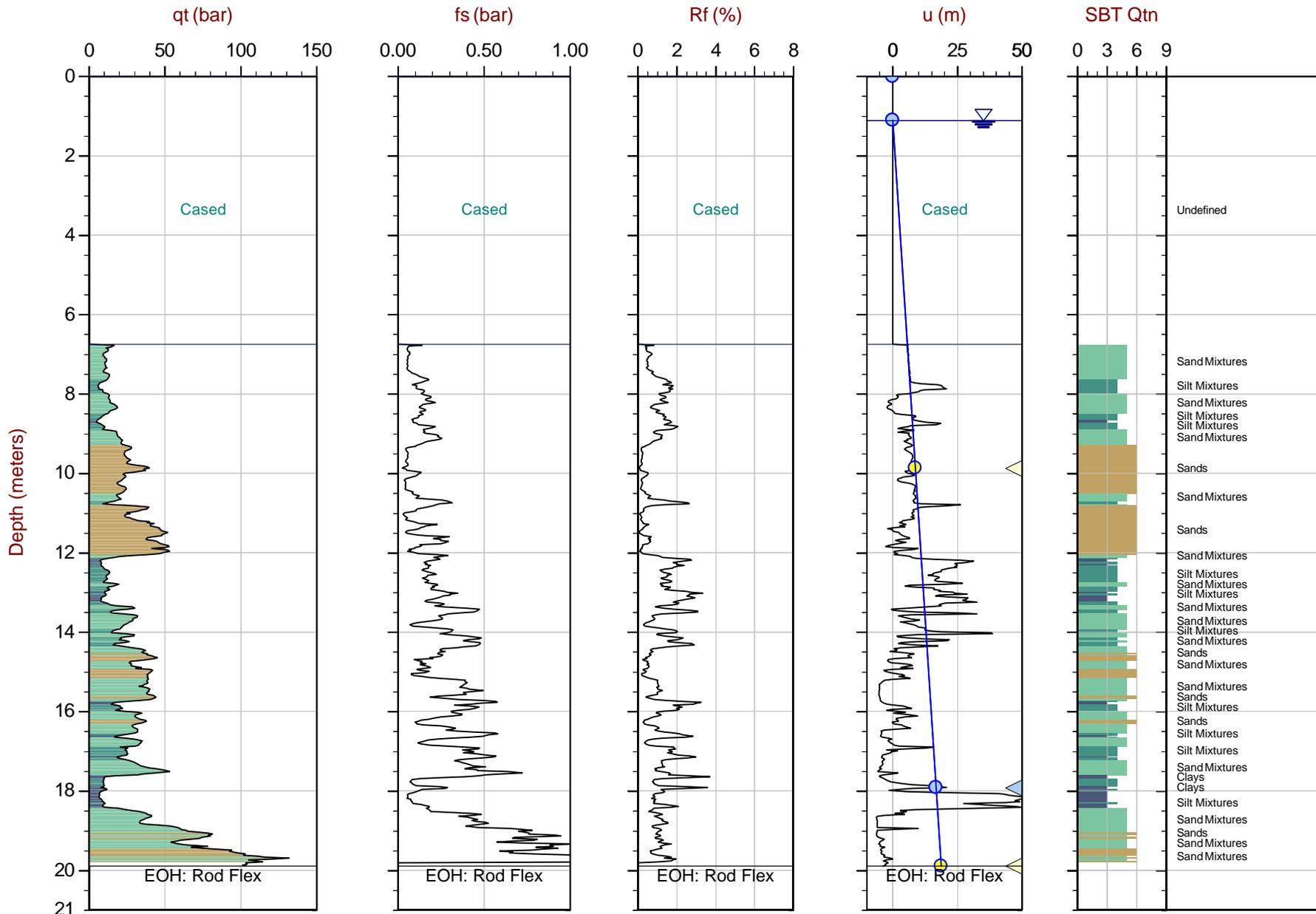
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 10:49
Site: Port Dalhousie Pier

Sounding: CPT18-05
Cone: 408:T1500F15U500



Max Depth: 19.900 m / 65.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP05.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785144m E: 641033m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

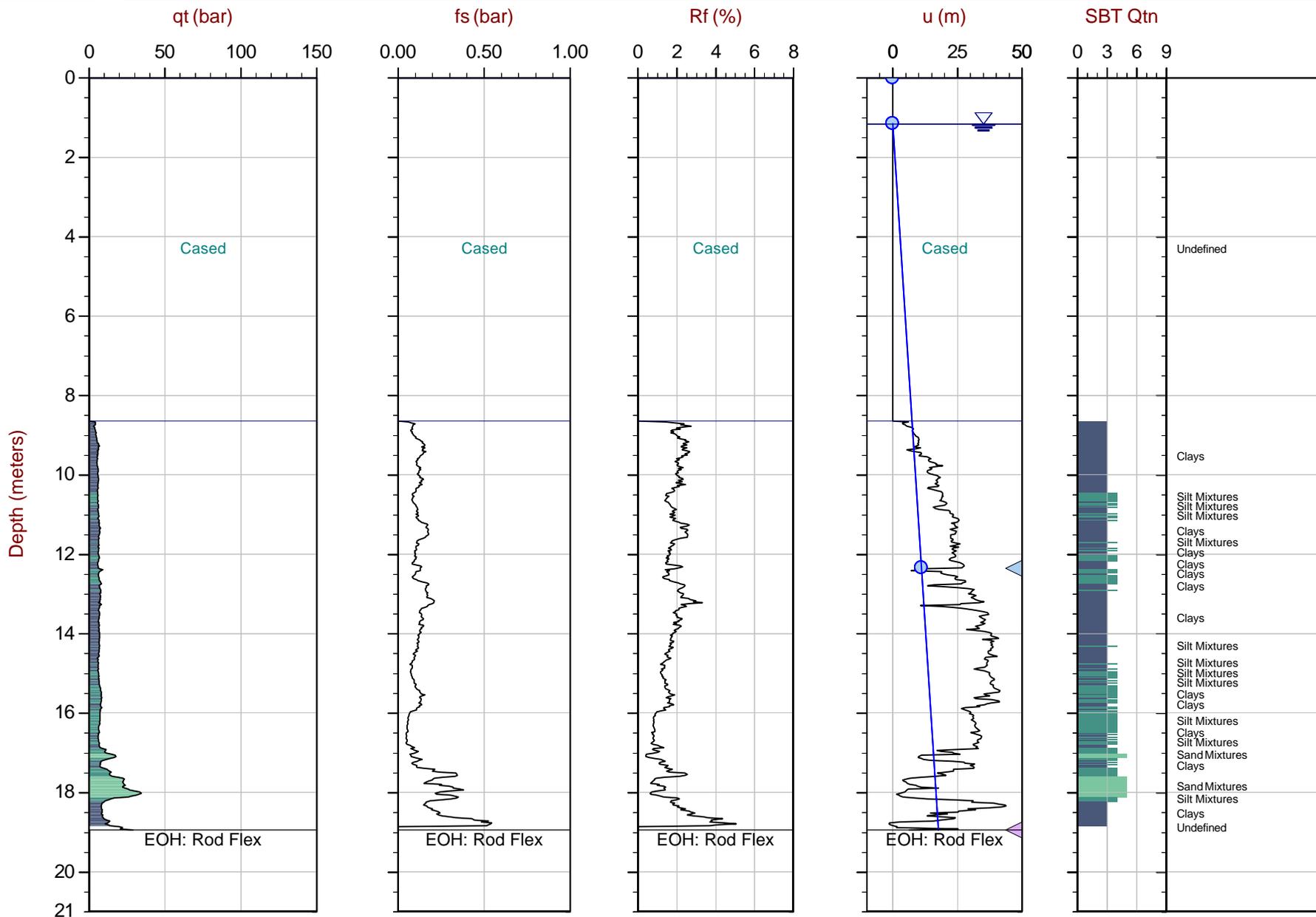
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 08:39
Site: Port Dalhousie Pier

Sounding: CPT18-06
Cone: 408:T1500F15U500



Max Depth: 18.950 m / 62.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP06.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785048m E: 641090m
Sheet No: 1 of 1

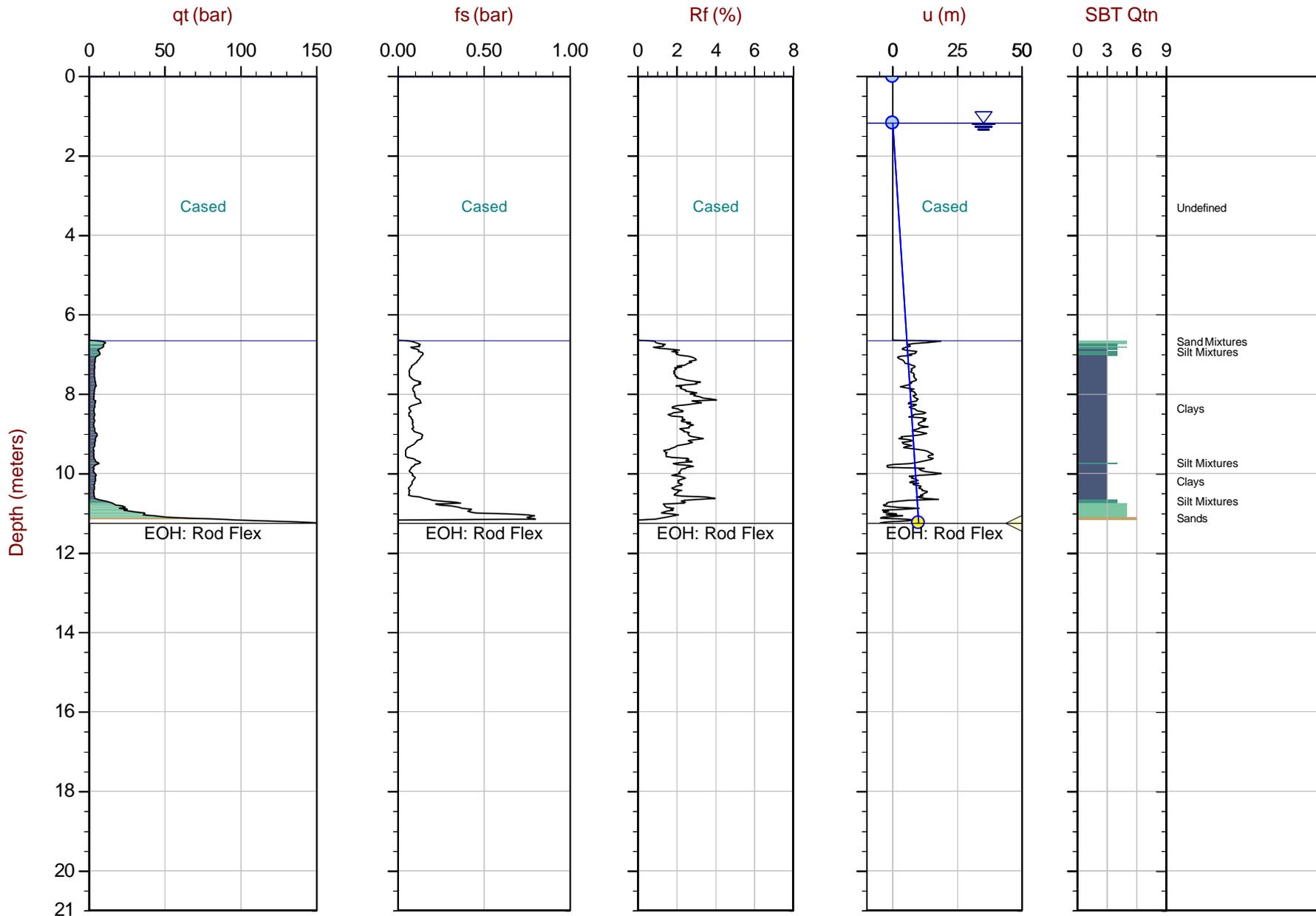
Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 09:36
Site: Port Dalhousie Pier

Sounding: CPT18-07
Cone: 408:T1500F15U500



Max Depth: 11.250 m / 36.91 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP07.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4784964mE: 641042m
Sheet No: 1 of 1

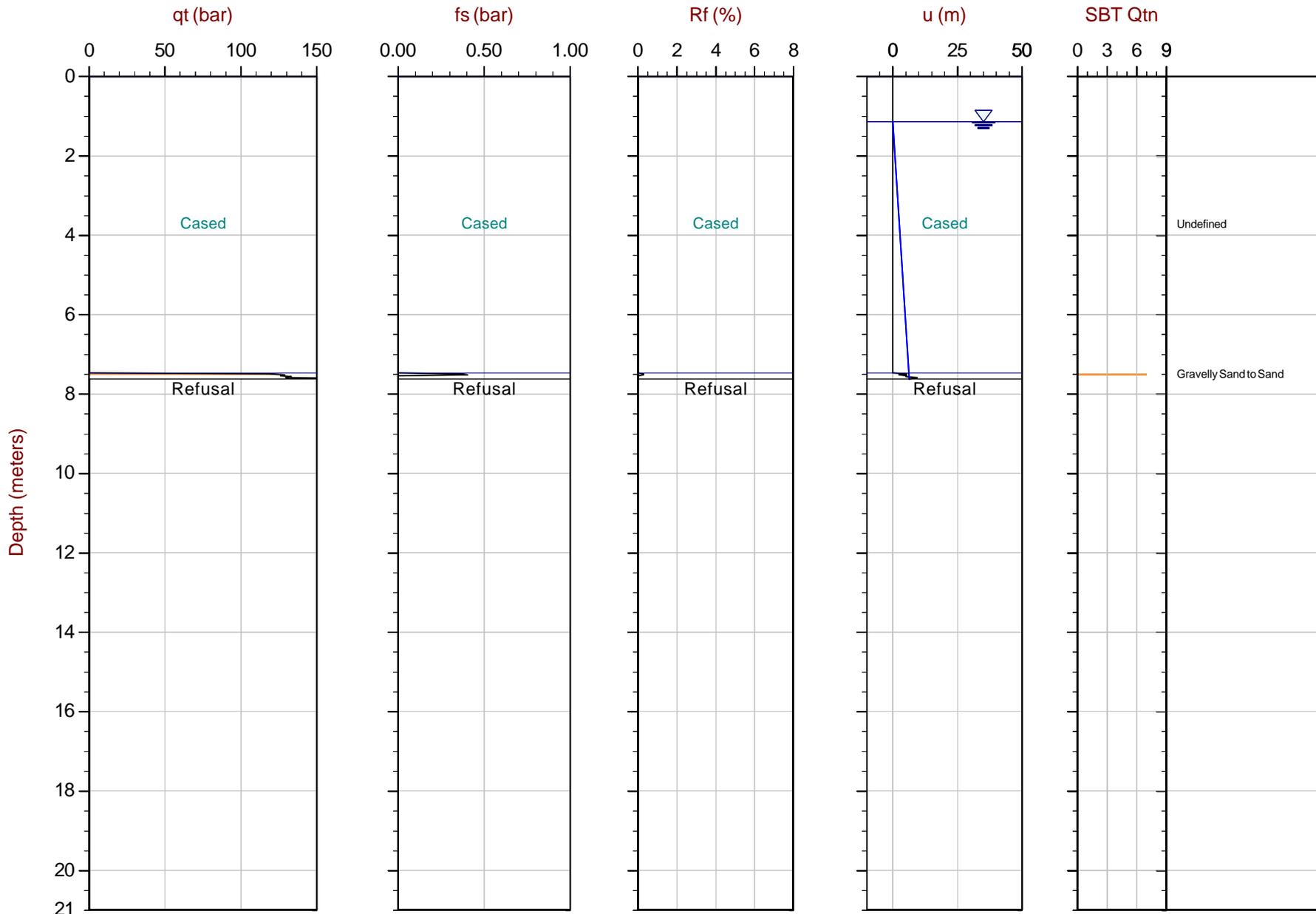
Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 16:17
Site: Port Dalhousie Pier

Sounding: CPT18-08
Cone: 408:T1500F15U500



Max Depth: 7.625 m / 25.02 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP08.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785642m E: 641000m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

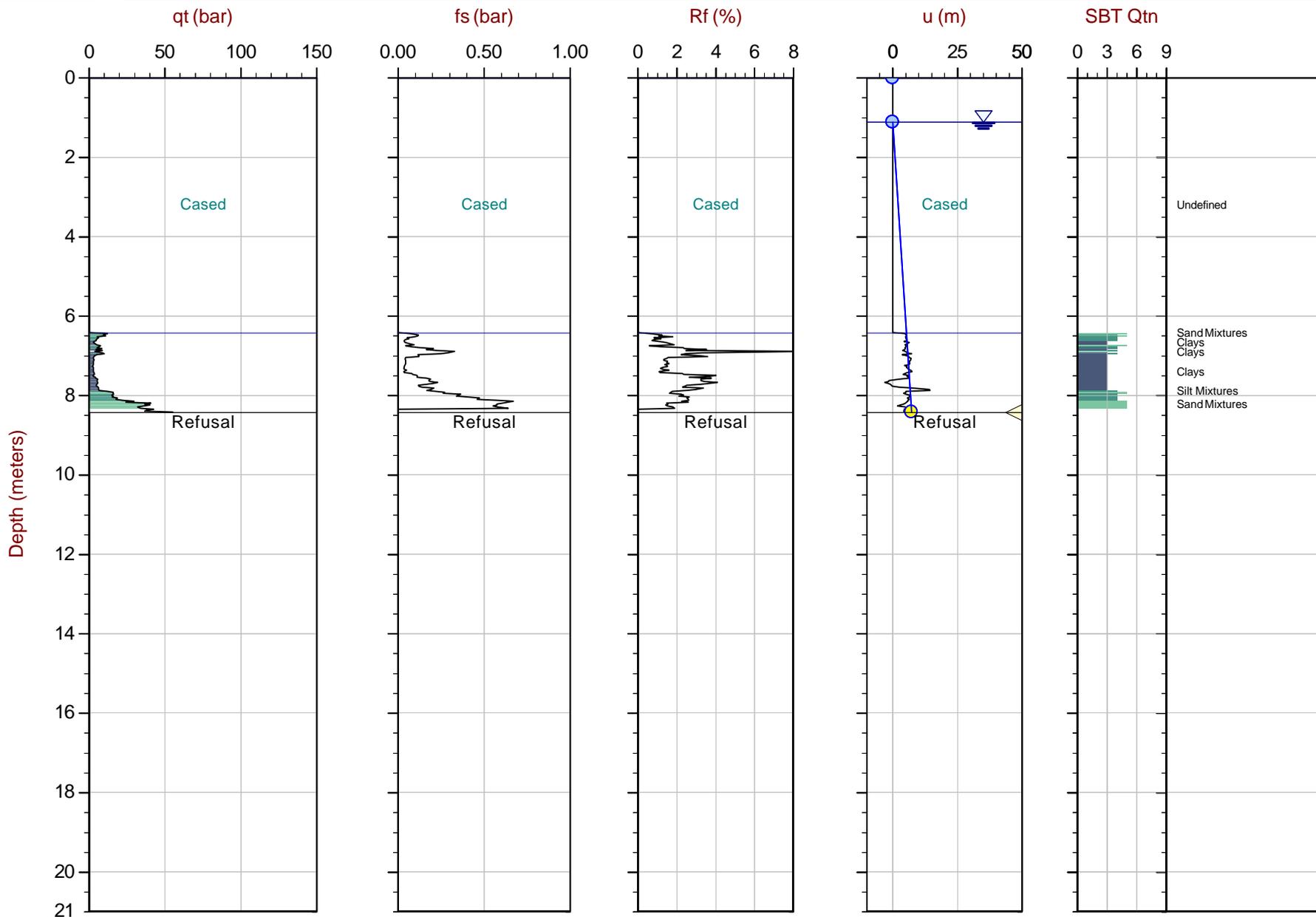
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-28 08:36
Site: Port Dalhousie Pier

Sounding: CPT18-09
Cone: 408:T1500F15U500



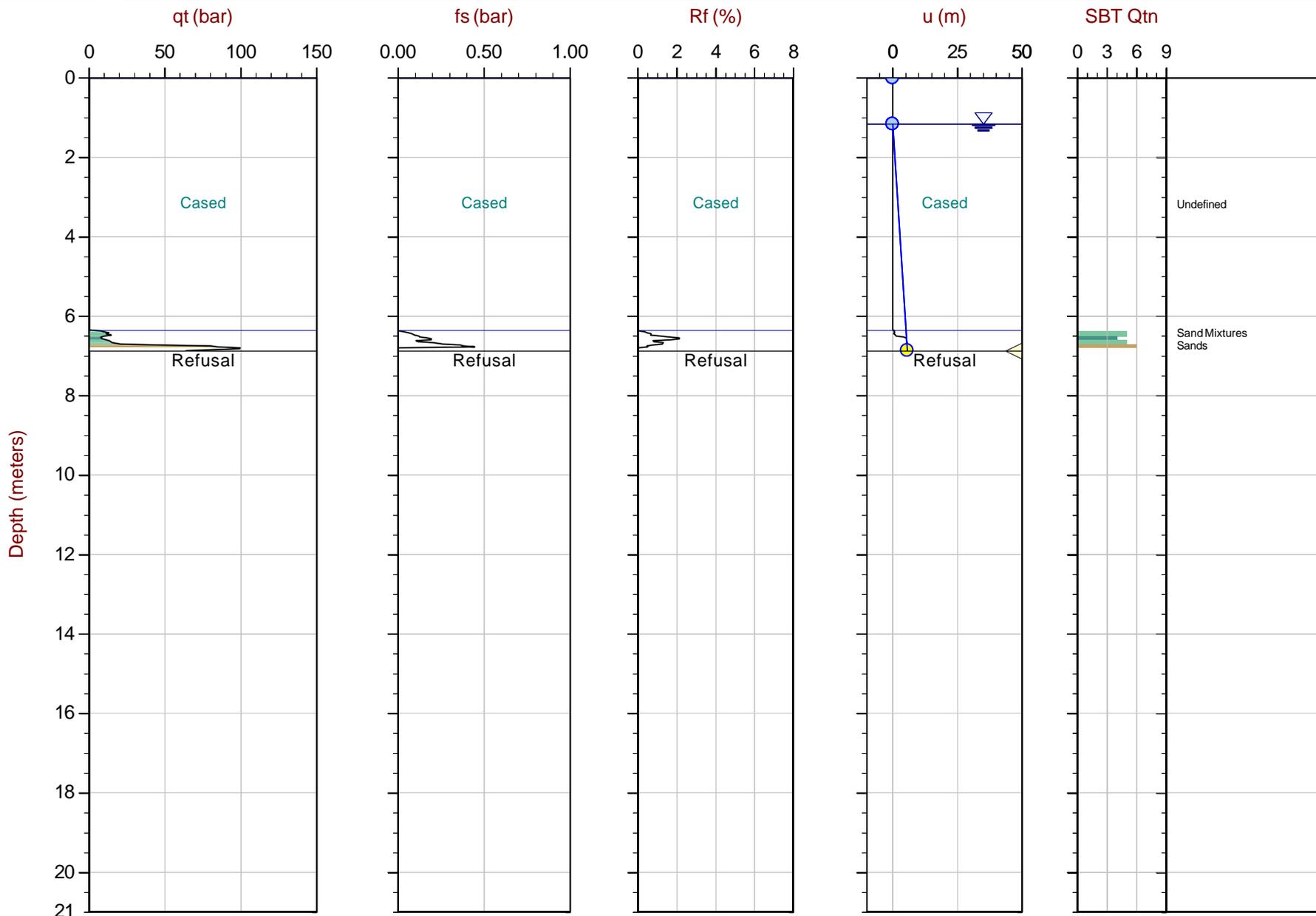
Max Depth: 8.425 m / 27.64 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP09.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785017mE: 641041m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 6.875 m / 22.56 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: EveryPoint

File: 18-05063_CP10.COR
 Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
 Coords: UTM17N: 4785082mE: 641038m
 SheetNo: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

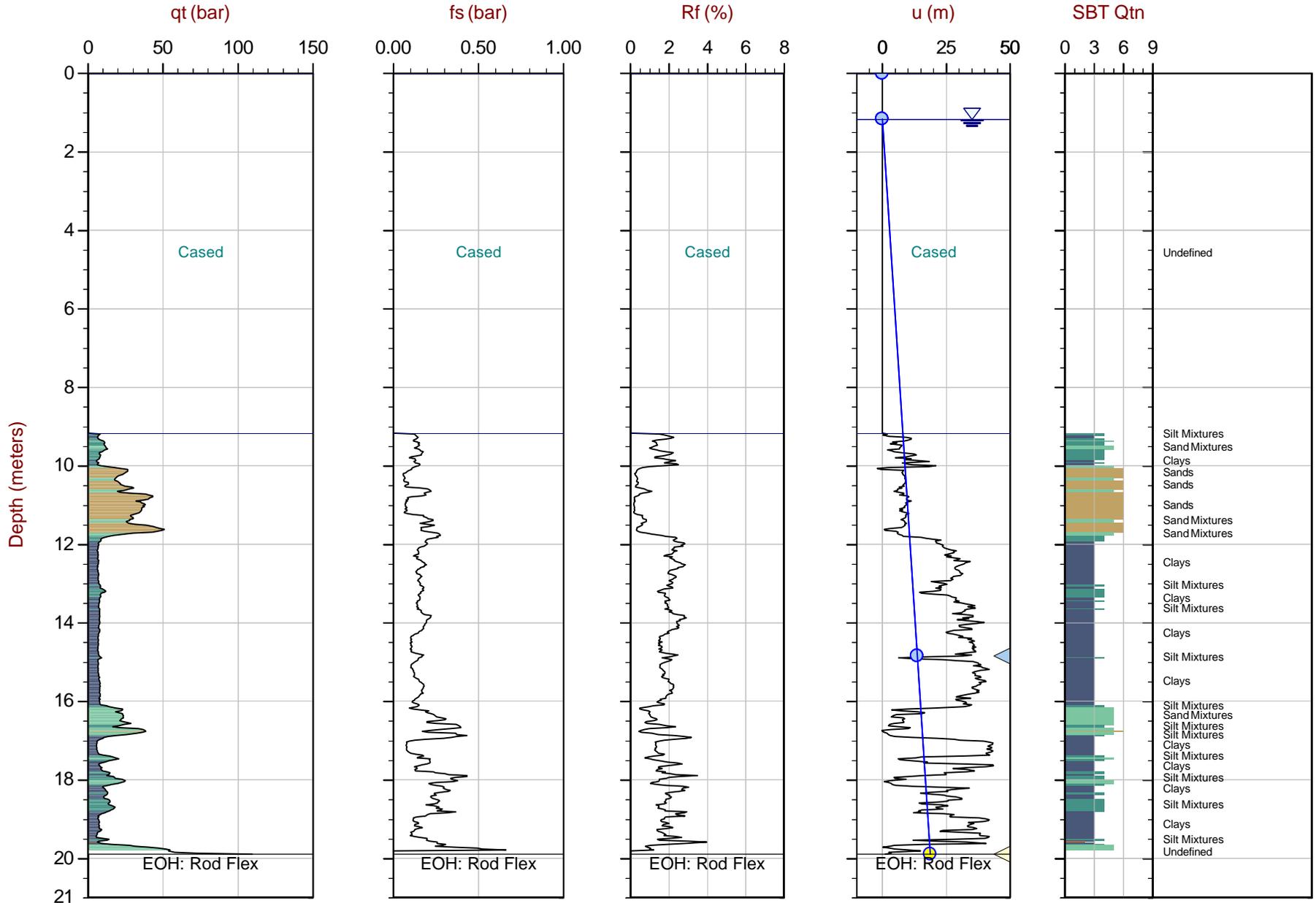
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-28 11:25
Site: Port Dalhousie Pier

Sounding: CPT18-10B
Cone: 408:T1500F15U500



Max Depth: 19.900 m / 65.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 18-05063_CP10B.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785085m E: 641037m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

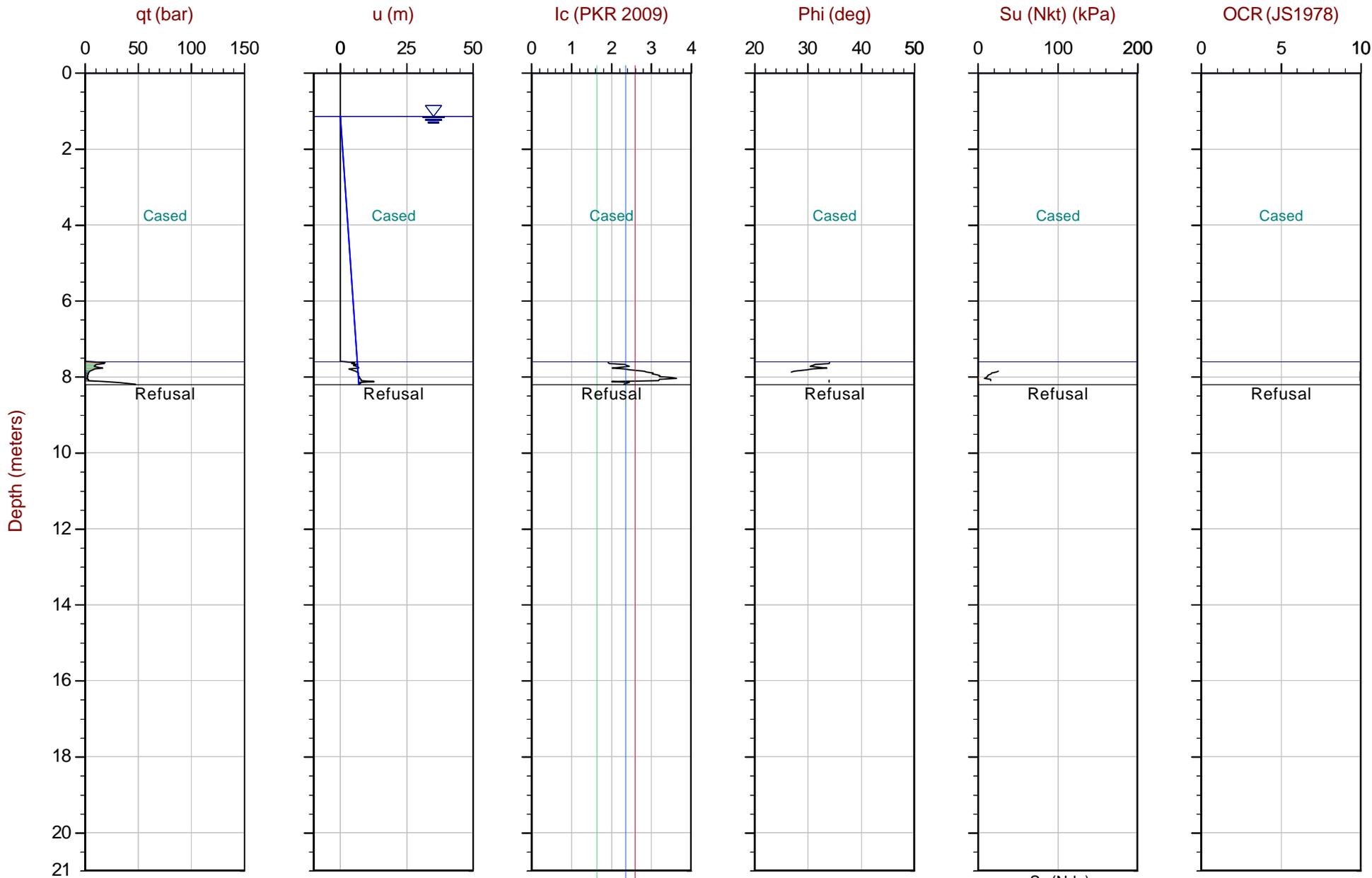
Advanced Cone Penetration Test Plots



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 15:16
Site: Port Dalhousie Pier

Sounding: CPT18-01
Cone: 408:T1500F15U500



Max Depth: 8.200 m / 26.90 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP01.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785716mE: 641031m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

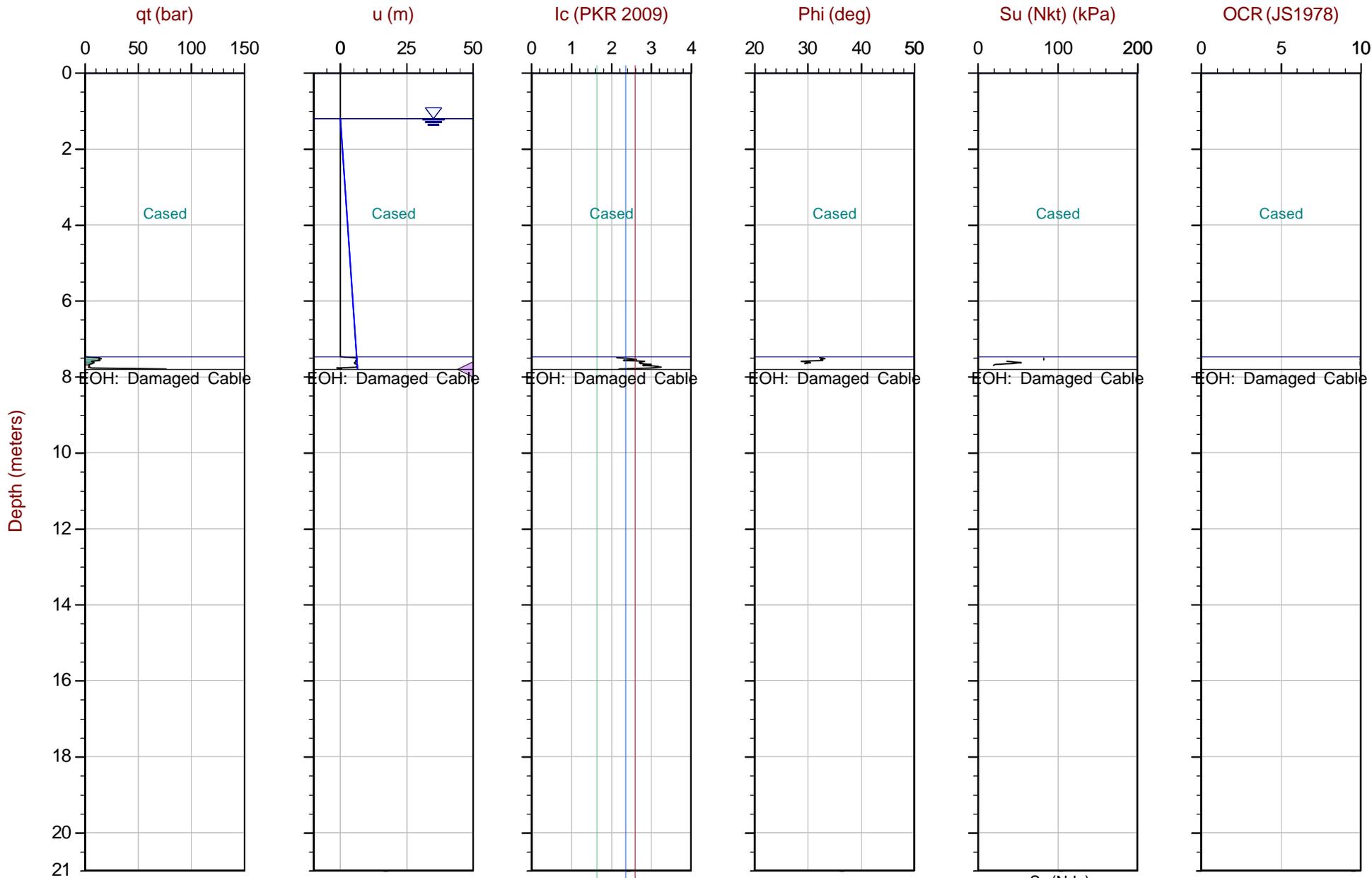
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 13:32
Site: Port Dalhousie Pier

Sounding: CPT18-02
Cone: 408:T1500F15U500



Max Depth: 7.800 m / 25.59 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP02.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
SuNkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785499m E: 641055m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

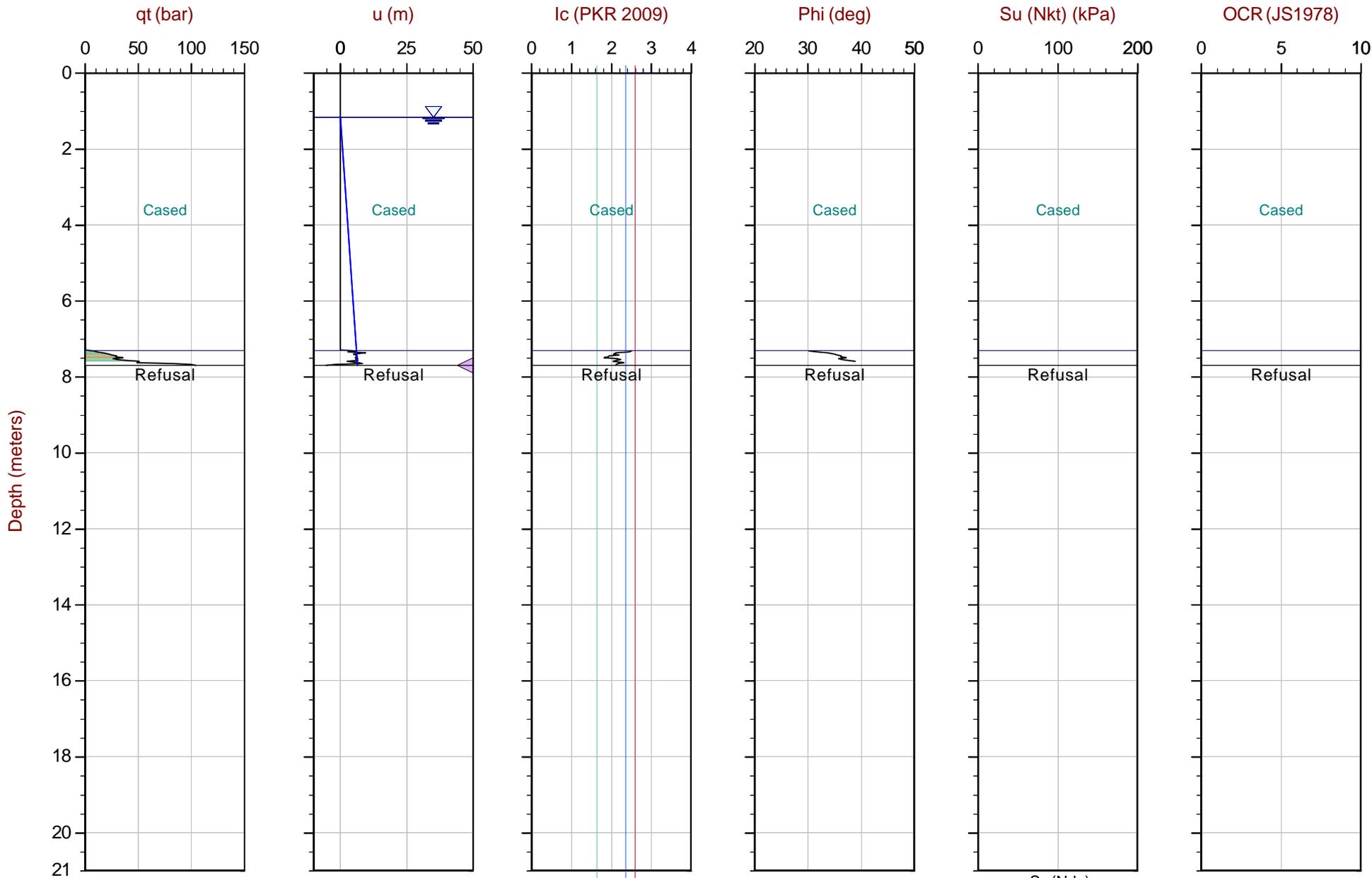
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 17:34
Site: Port Dalhousie Pier

Sounding: CPT18-02B
Cone: 408:T1500F15U500



Max Depth: 7.700 m / 25.26 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP02B.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
SuNkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785538mE: 641051m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

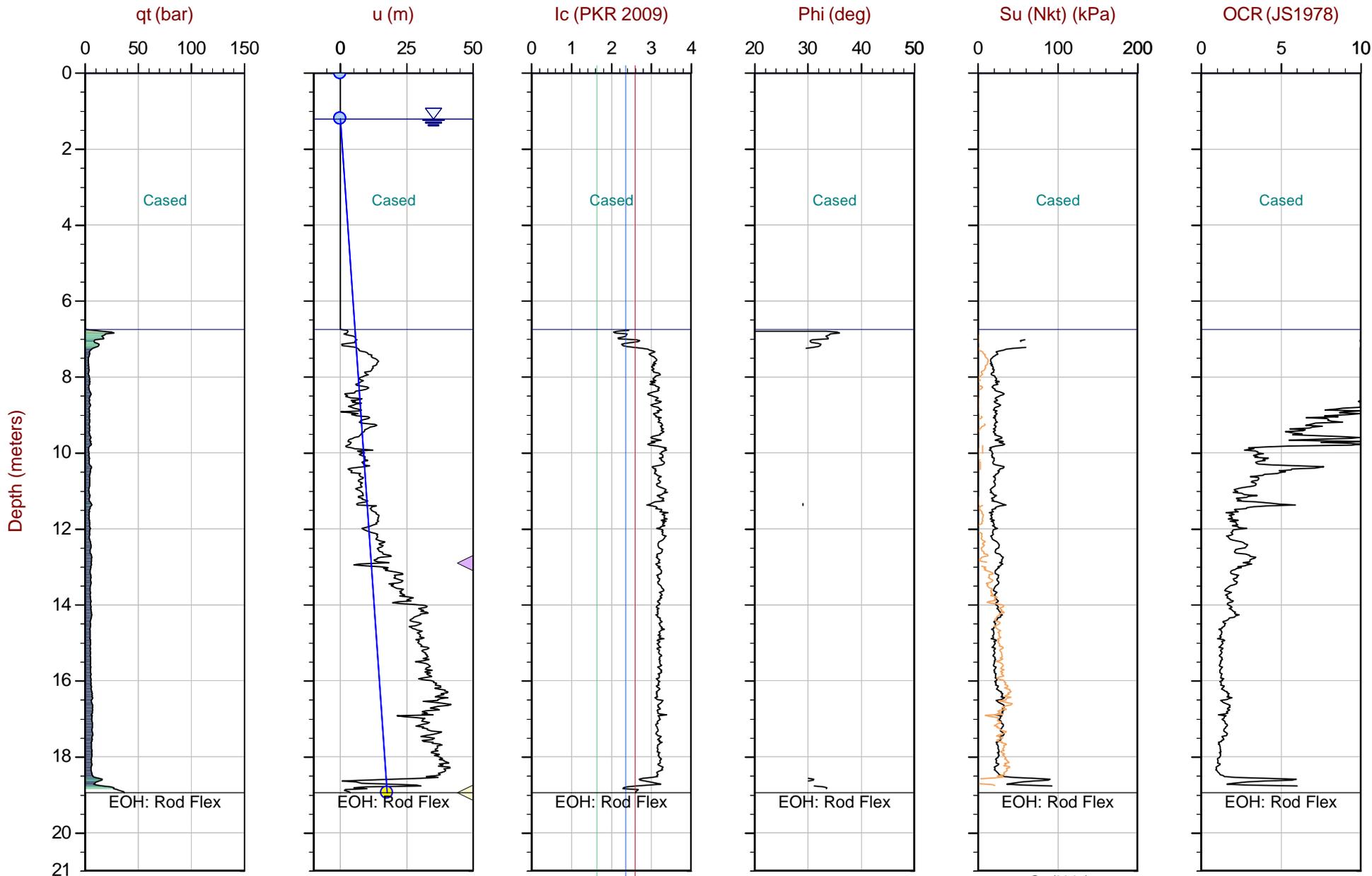
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 12:52
Site: Port Dalhousie Pier

Sounding: CPT18-03
Cone: 408:T1500F15U500



Max Depth: 18.950 m / 62.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP03.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
SuNkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785344mE: 641018m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

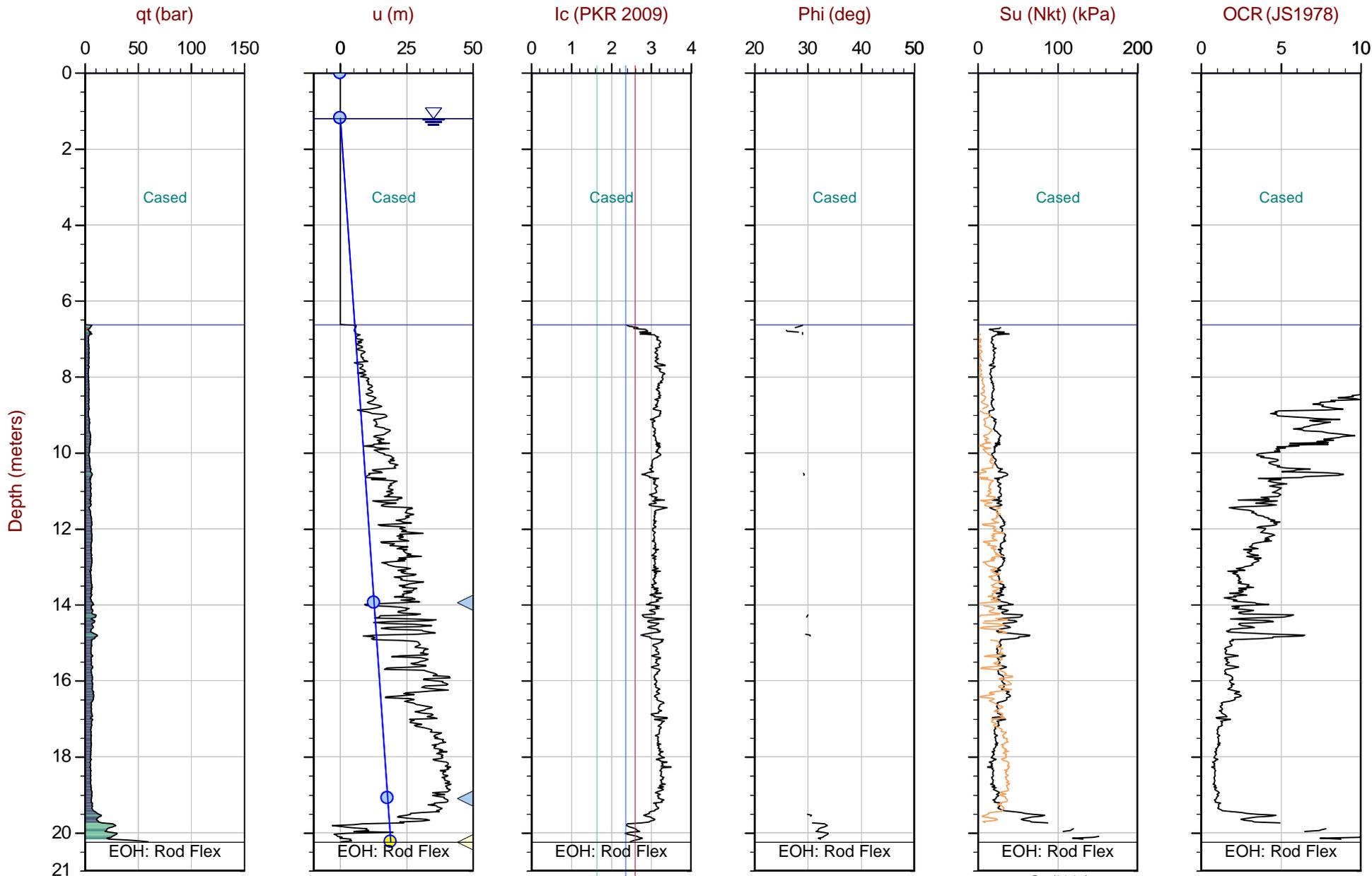
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 10:46
Site: Port Dalhousie Pier

Sounding: CPT18-04
Cone: 408:T1500F15U500



Max Depth: 20.250 m / 66.44 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP04.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785245m E: 641078m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq achieved ▲ Dissipation, Ueq not achieved ▲ Dissipation, Ueq assumed — Hydrostatic Line

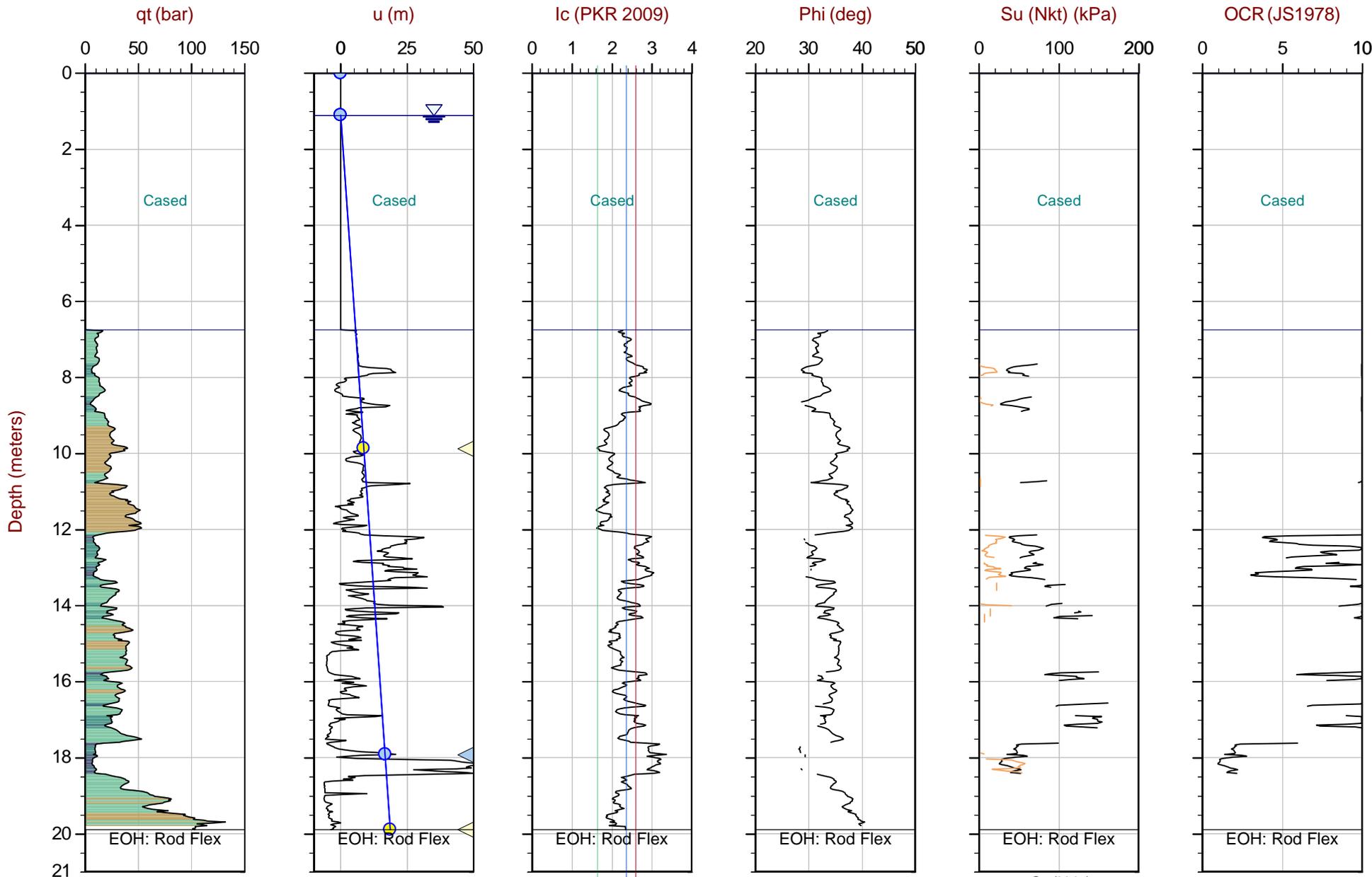
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 10:49
Site: Port Dalhousie Pier

Sounding: CPT18-05
Cone: 408:T1500F15U500



Max Depth: 19.900 m / 65.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP05.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785144mE: 641033m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

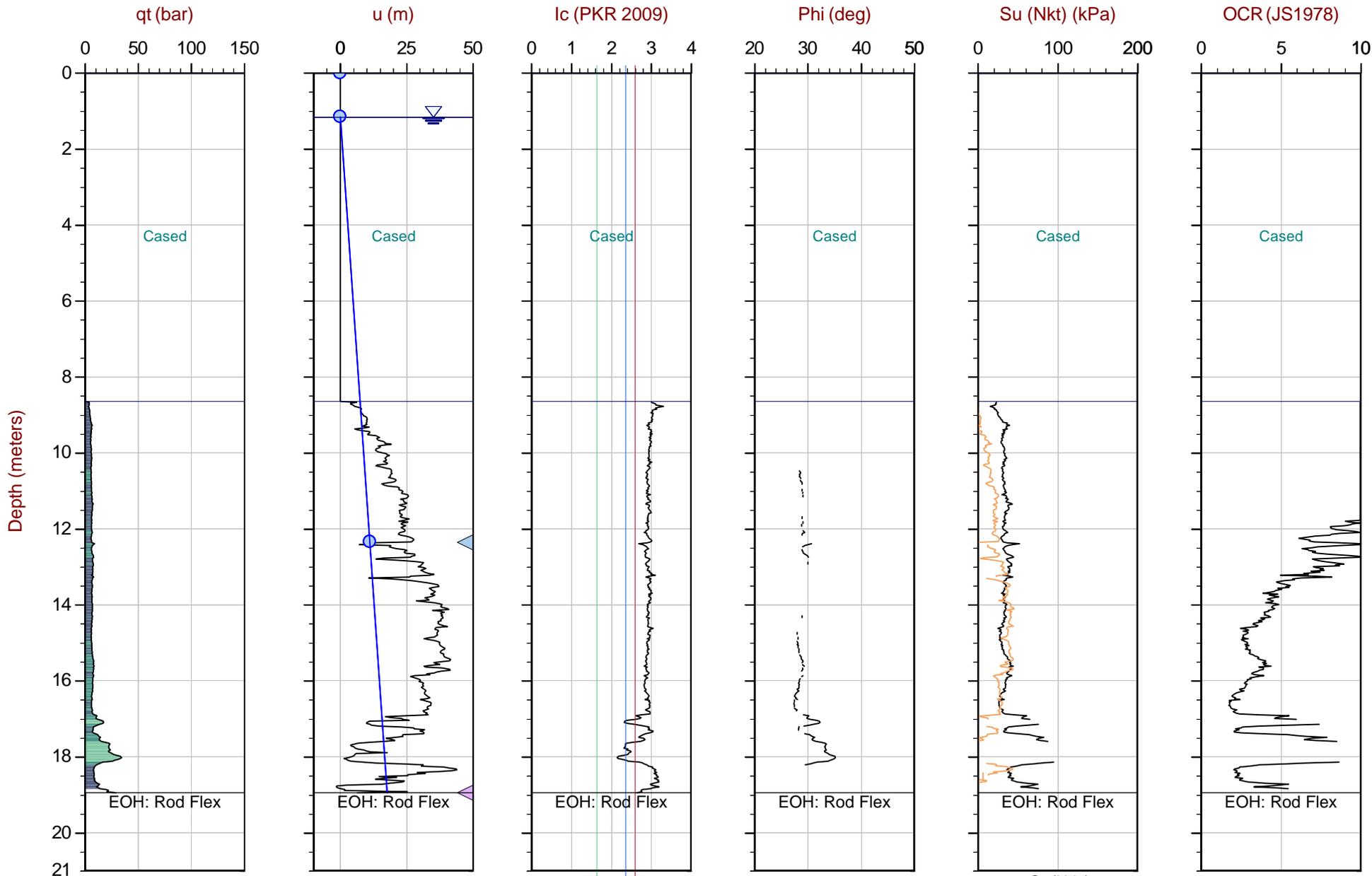
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-26 08:39
Site: Port Dalhousie Pier

Sounding: CPT18-06
Cone: 408:T1500F15U500



Max Depth: 18.950 m / 62.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP06.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785048m E: 641090m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

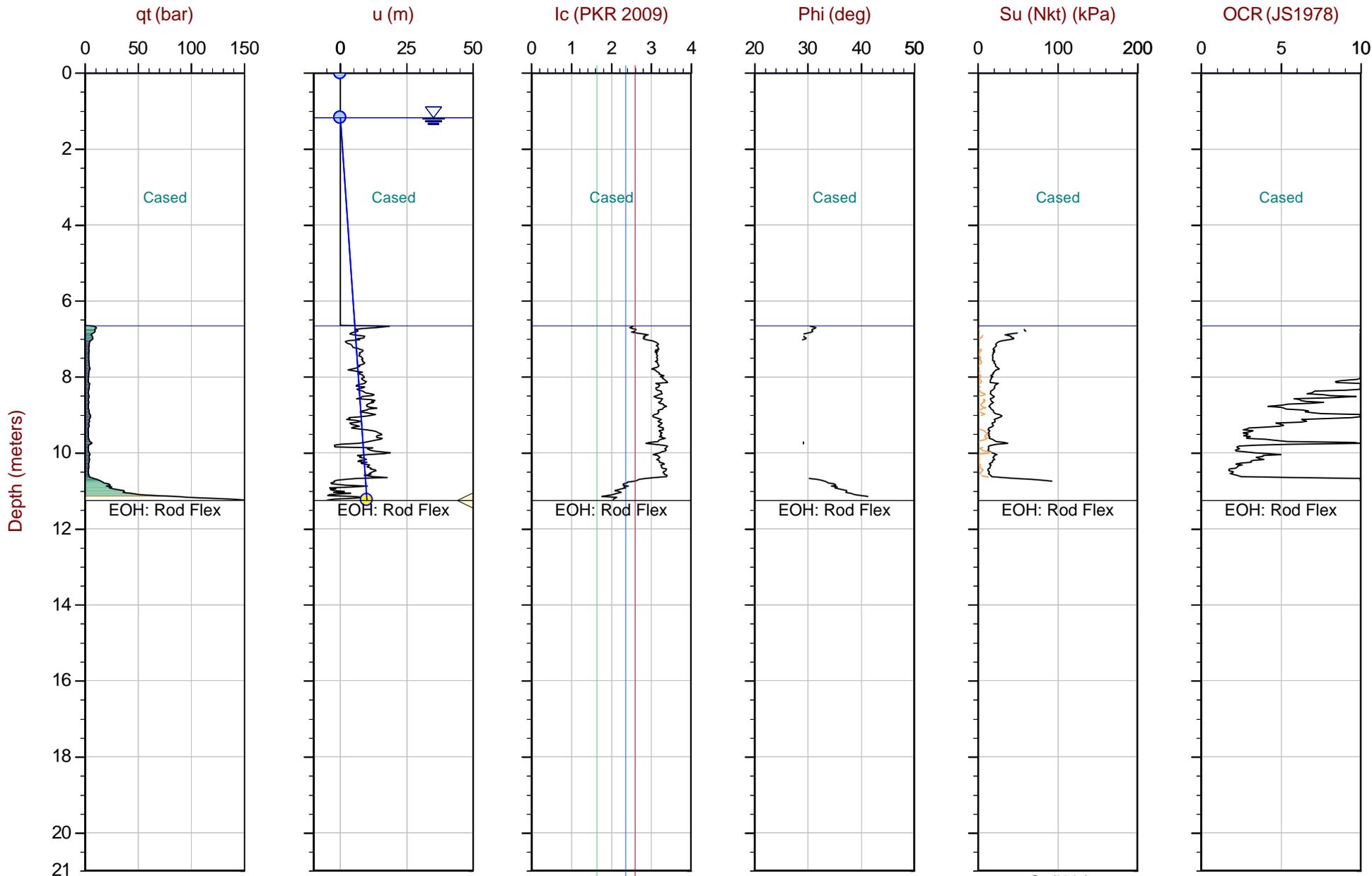
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 09:36
Site: Port Dalhousie Pier

Sounding: CPT18-07
Cone: 408:T1500F15U500



Max Depth: 11.250 m / 36.91 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP07.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4784964m E: 641042m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq achieved ▲ Dissipation, Ueq not achieved ▲ Dissipation, Ueq assumed — Hydrostatic Line

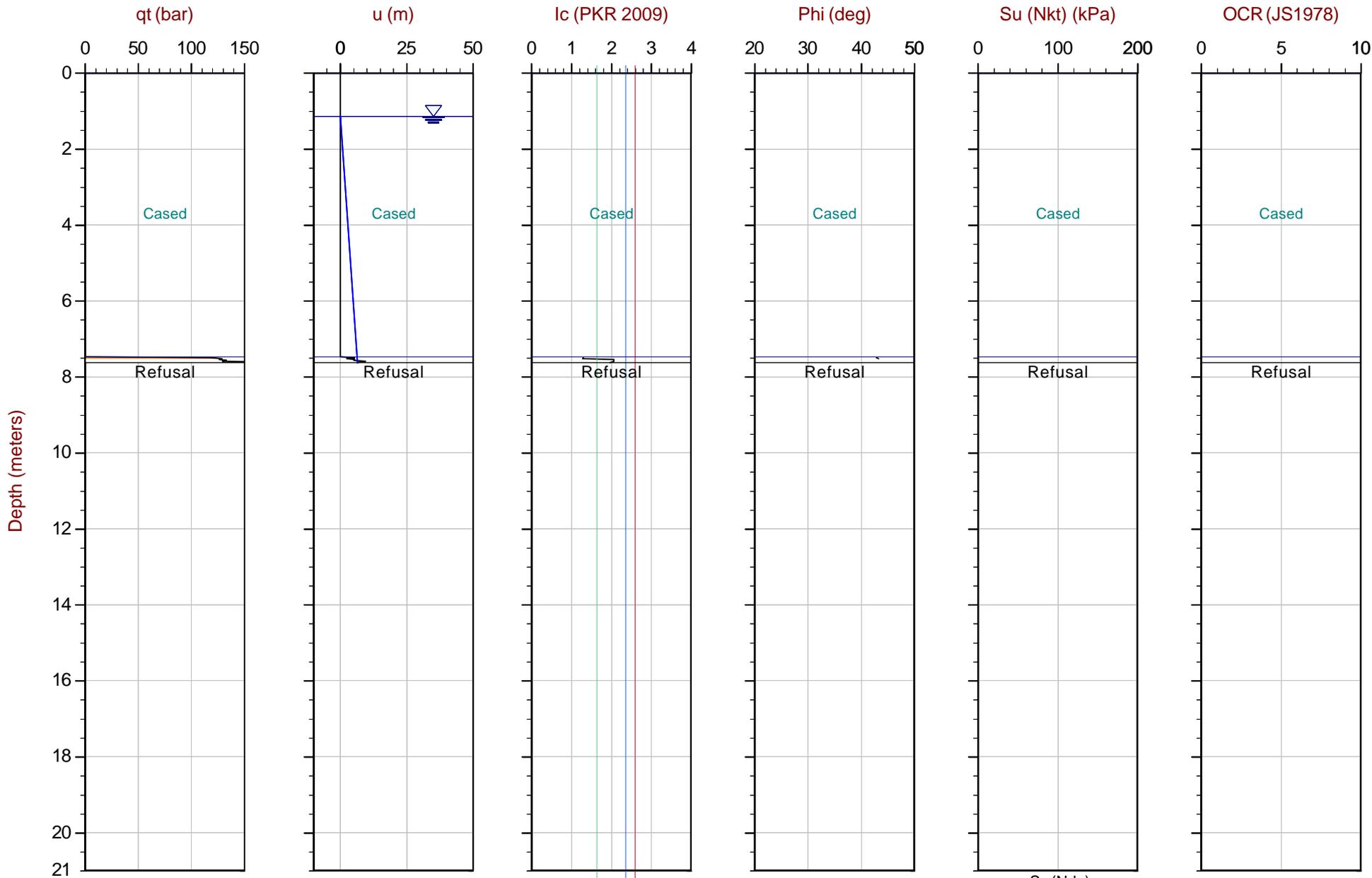
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-27 16:17
Site: Port Dalhousie Pier

Sounding: CPT18-08
Cone: 408:T1500F15U500



Max Depth: 7.625 m / 25.02 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP08.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
SuNkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785642m E: 641000m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

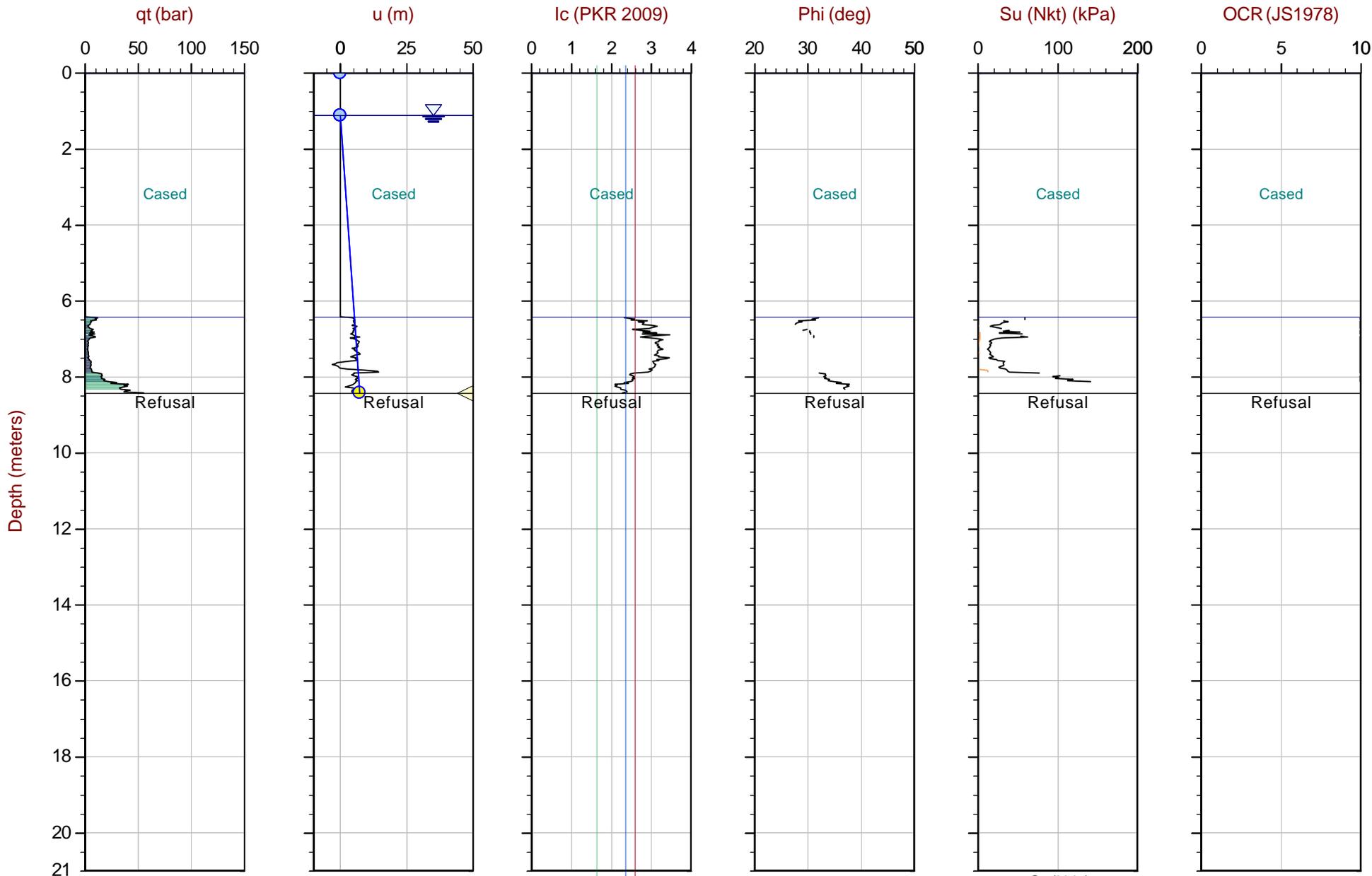
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-28 08:36
Site: Port Dalhousie Pier

Sounding: CPT18-09
Cone: 408:T1500F15U500



Max Depth: 8.425 m / 27.64 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP09.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
SuNkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785017mE: 641041m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

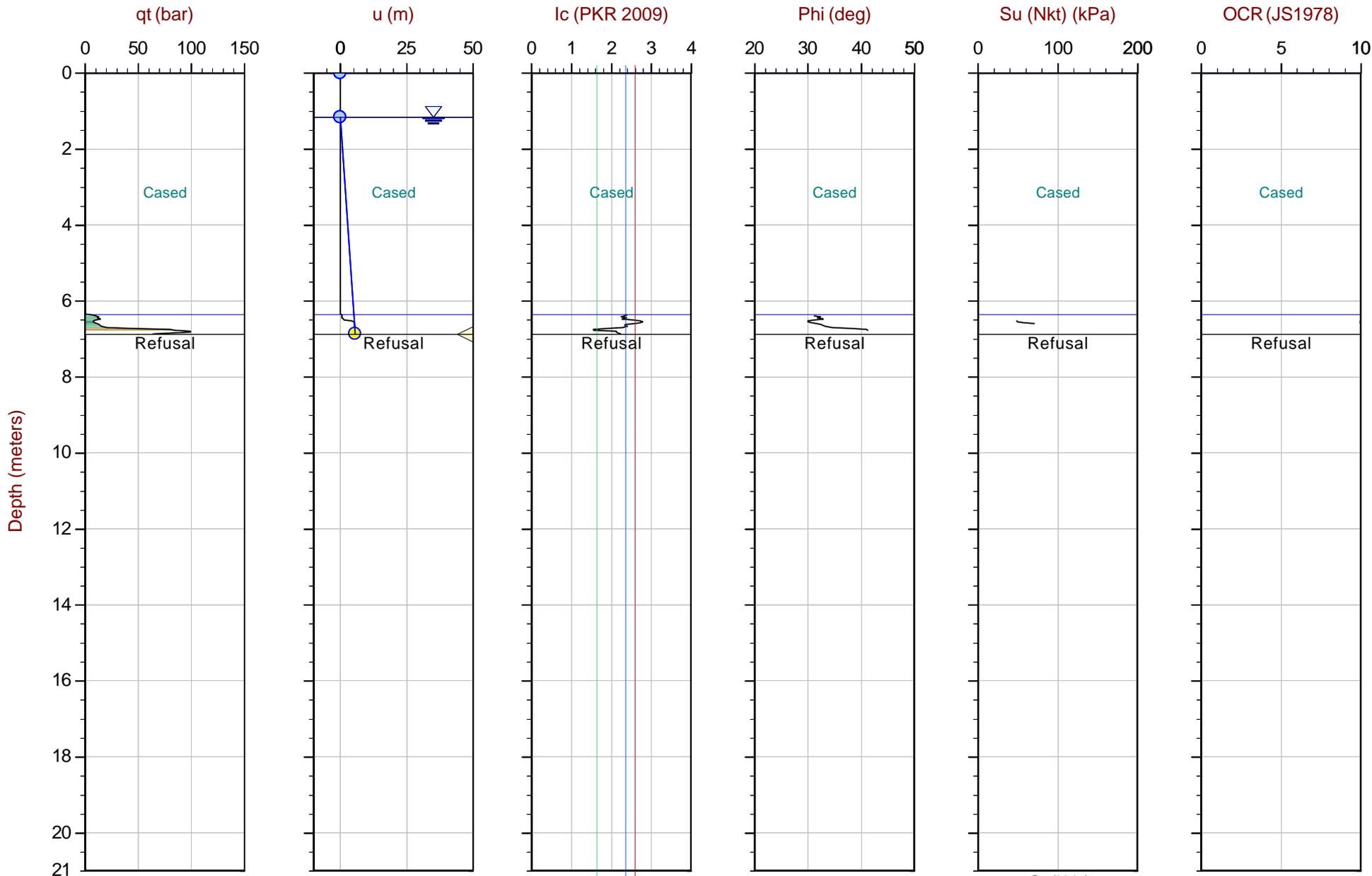
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-28 09:26
Site: Port Dalhousie Pier

Sounding: CPT18-10
Cone: 408:T1500F15U500



Max Depth: 6.875 m / 22.56 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-05063_CP10.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N N: 4785082m E: 641038m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

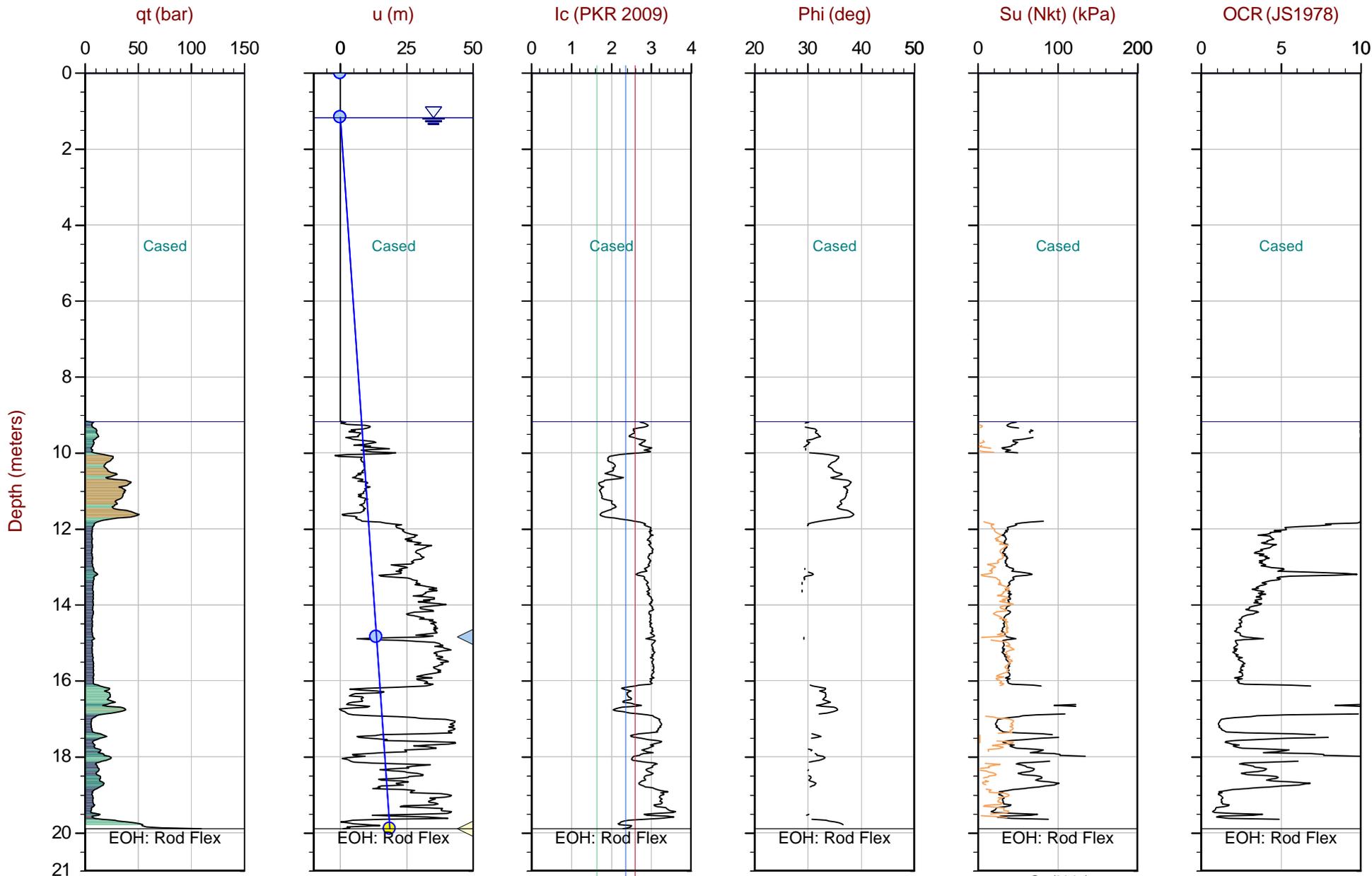
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Peto MacCallum

Job No: 18-05063
Date: 2018-09-28 11:25
Site: Port Dalhousie Pier

Sounding: CPT18-10B
Cone: 408:T1500F15U500



Max Depth: 19.900 m / 65.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

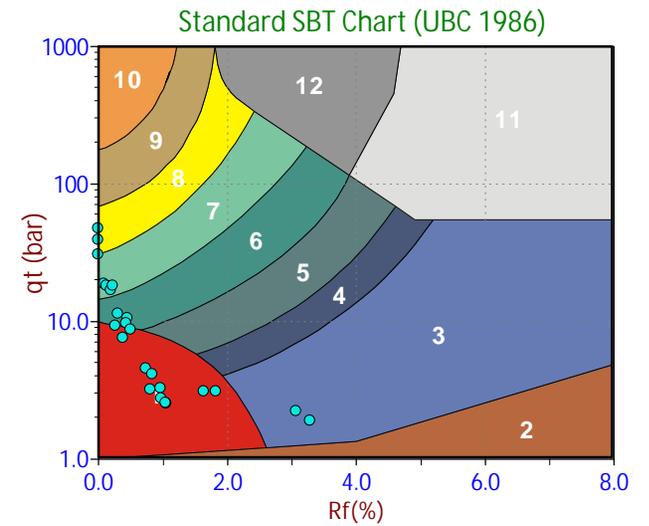
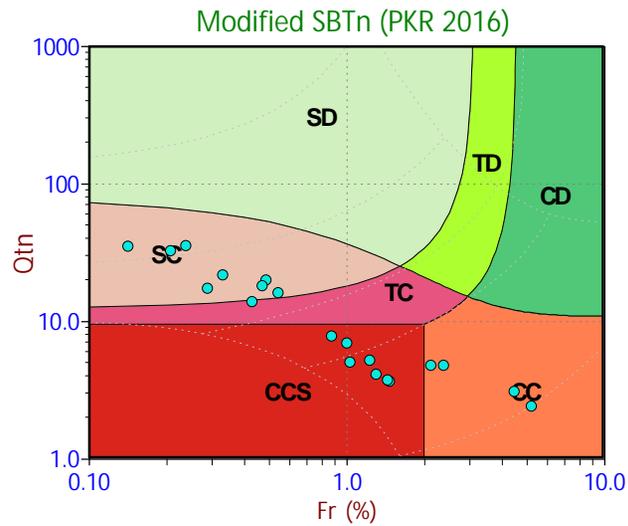
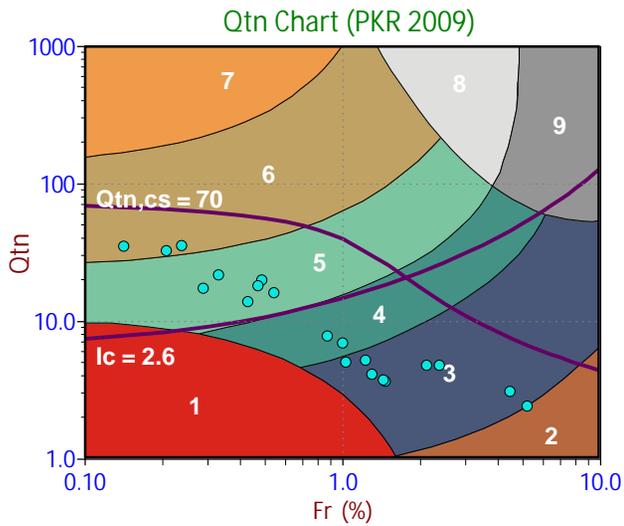
File: 18-05063_CP10B.COR
Unit Wt: SBTQtn (PKR2009), User Defined Layers
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM17N: 4785085mE: 641037m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◁ Dissipation, Ueq achieved ◁ Dissipation, Ueq not achieved ◁ Dissipation, Ueq assumed — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Soil Behaviour Type (SBT) Scatter Plots



Depth Ranges

- >0.0 to 1.5 m
- >1.5 to 3.0 m
- >3.0 to 4.5 m
- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

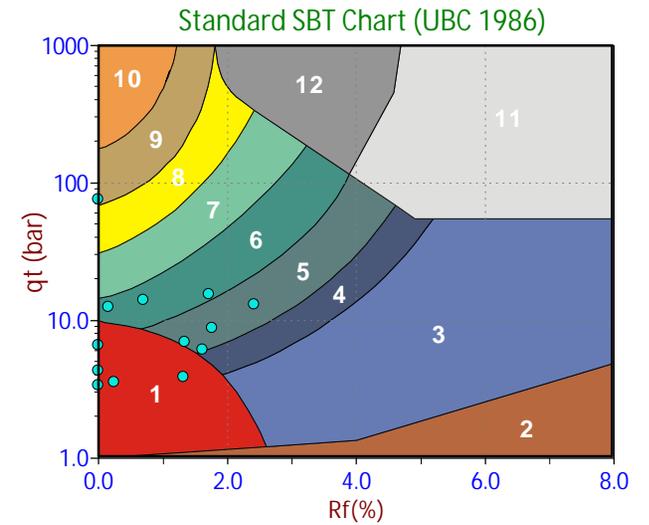
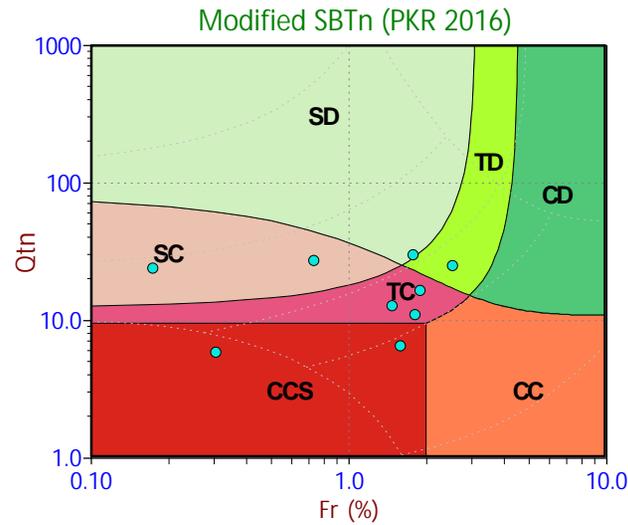
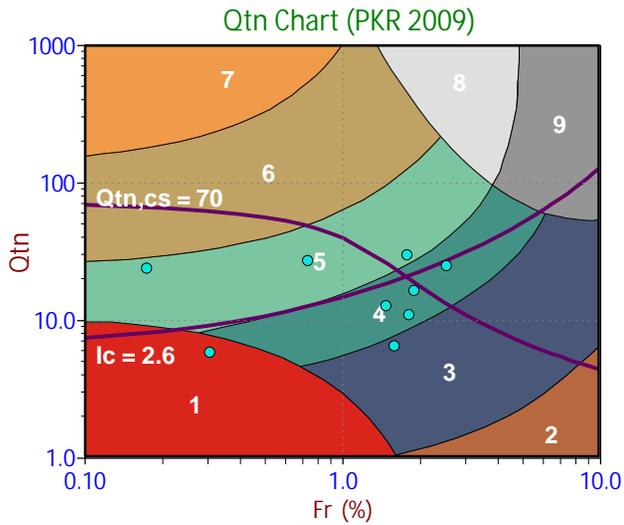
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 1.5 m
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- >6.0 to 7.5 m
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- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

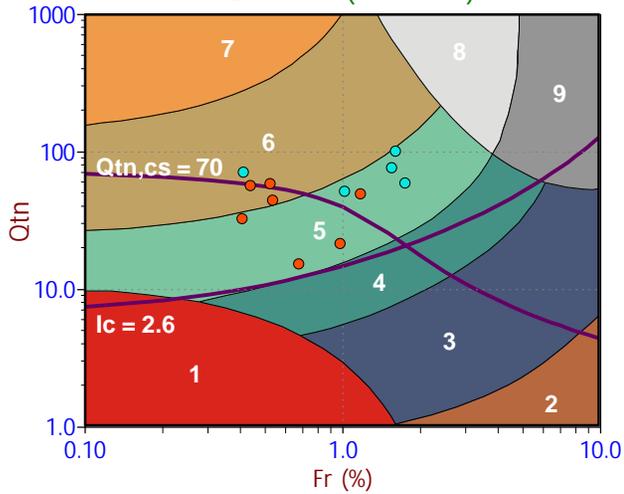
Legend

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- SC (Cont. sand like)
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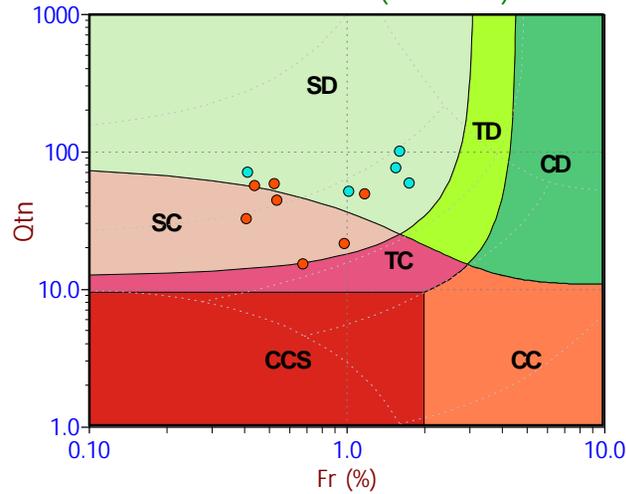
Legend

- Sensitive Fines
- Organic Soil
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- Stiff Fine Grained
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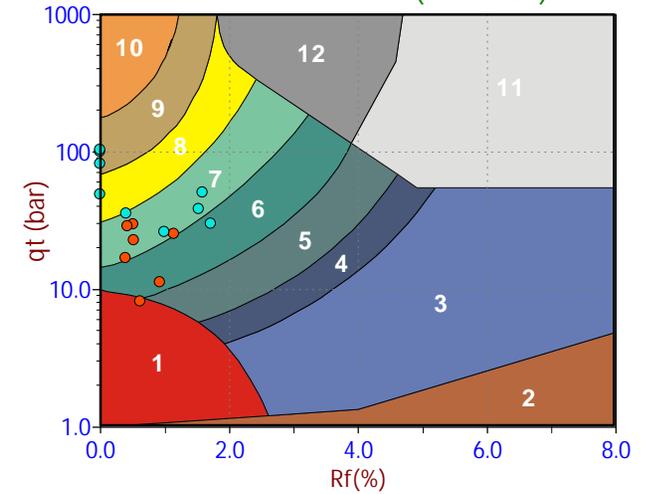
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 1.5 m
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- >10.5 to 12.0 m
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- >15.0 m

Legend

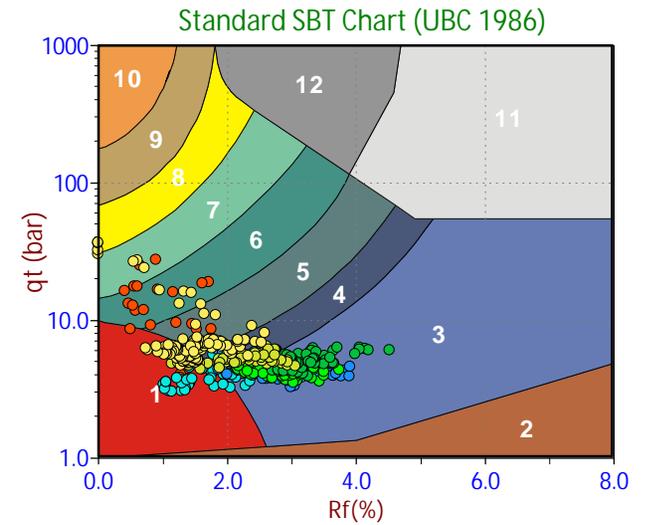
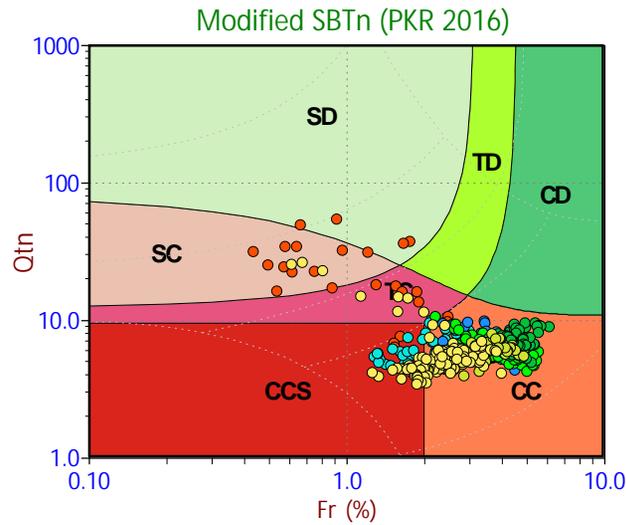
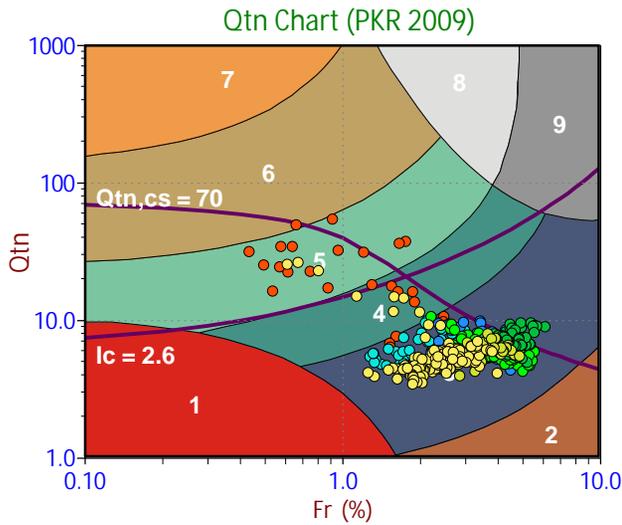
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- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
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- >13.5 to 15.0 m
- >15.0 m

Legend

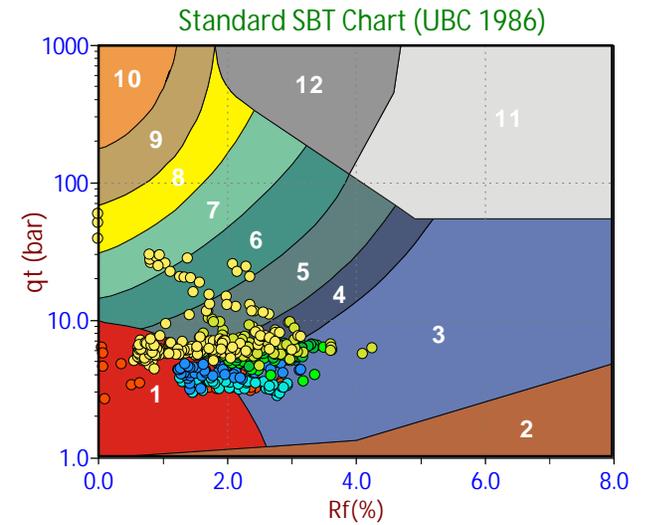
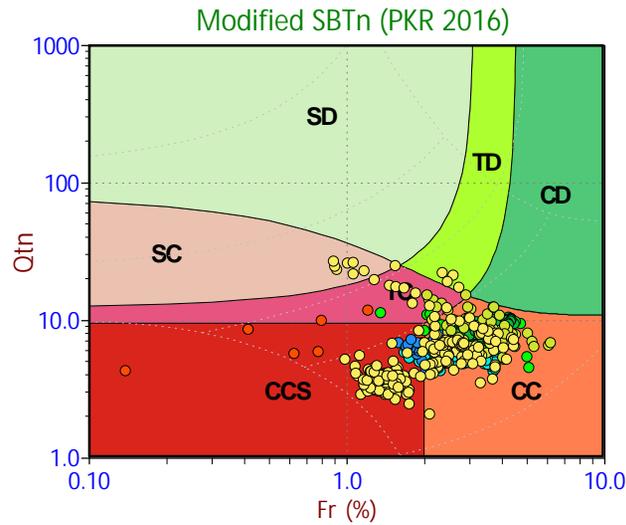
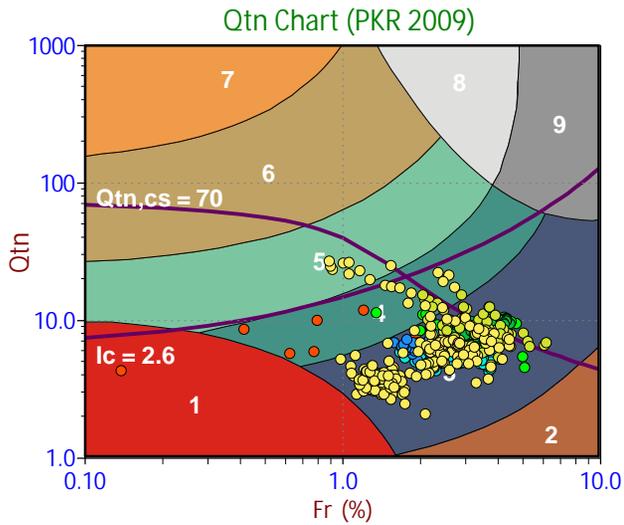
- Sensitive, Fine Grained
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Legend

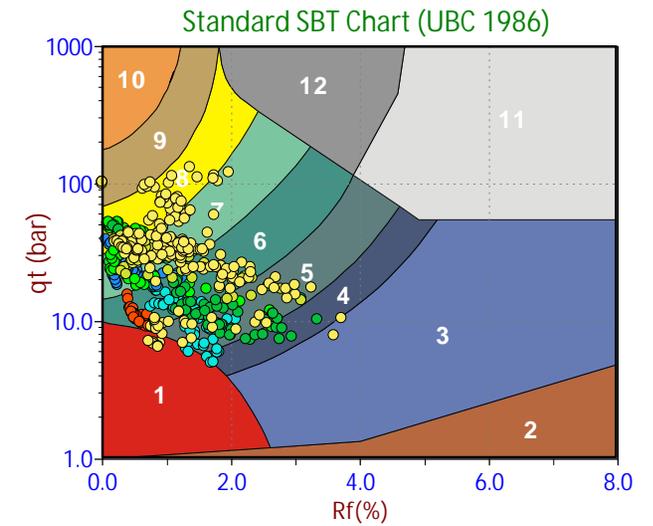
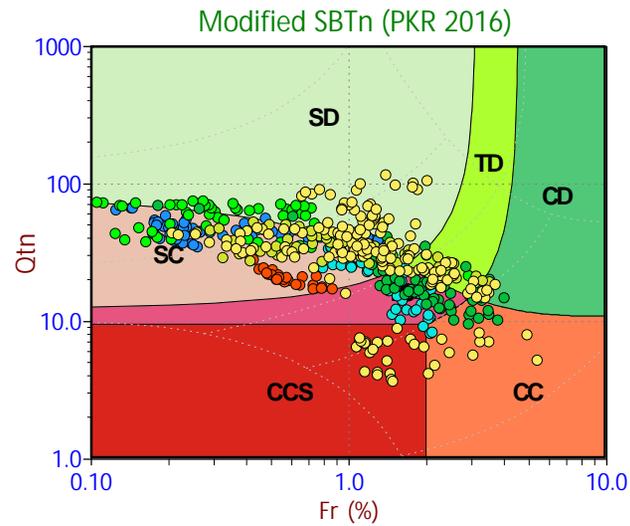
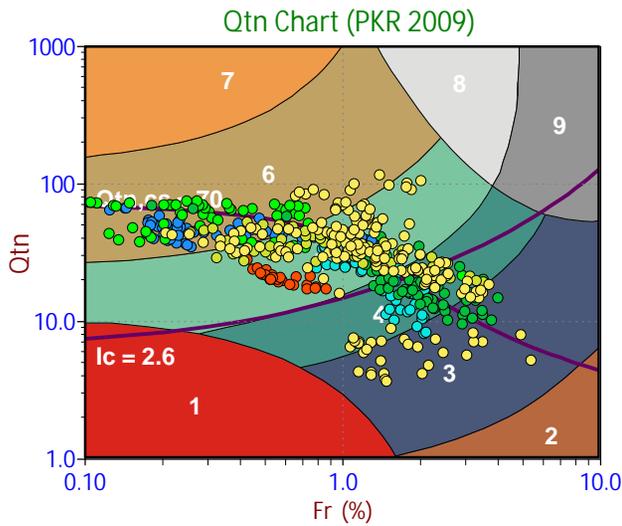
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Legend

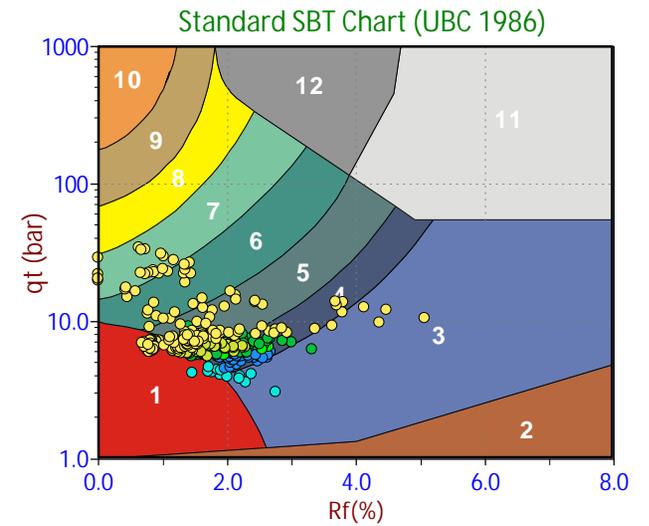
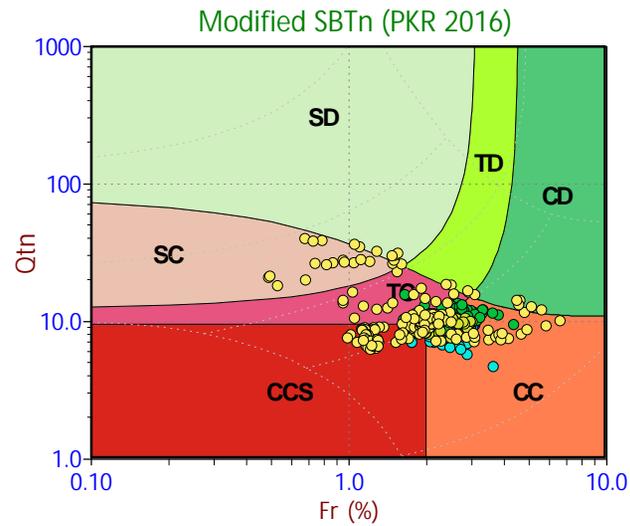
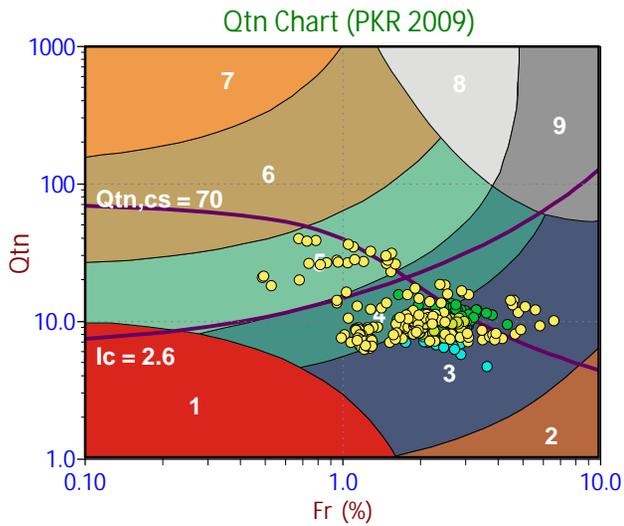
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Legend

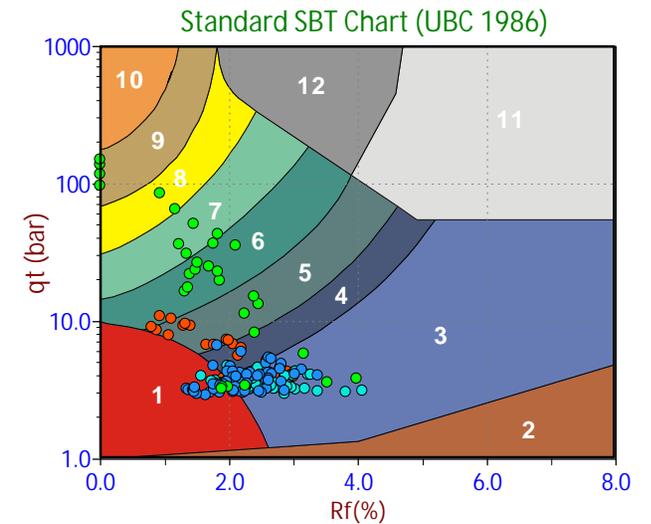
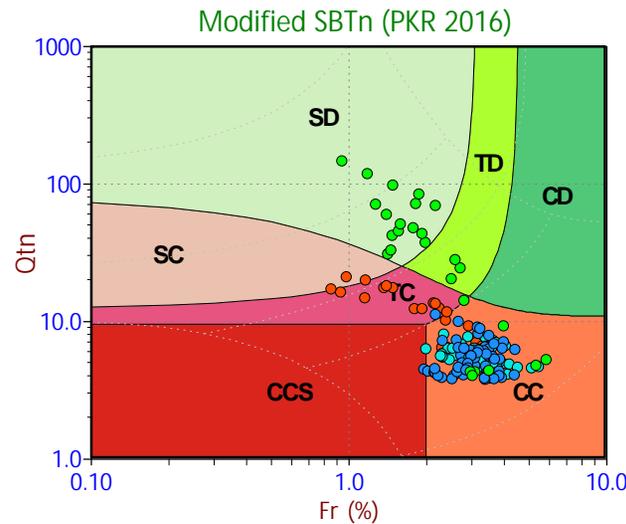
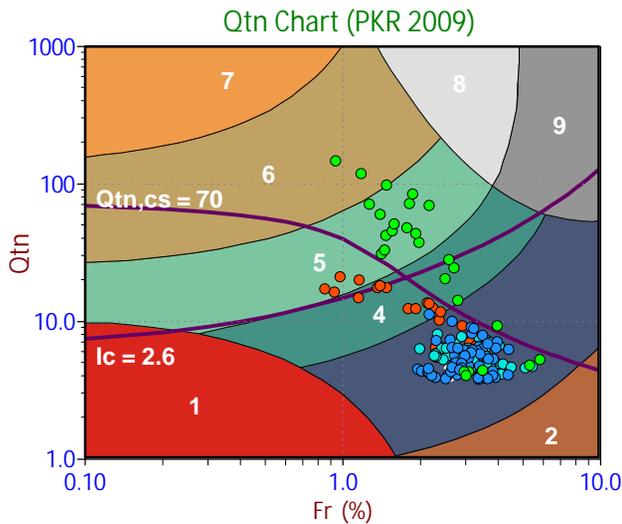
- Sensitive, Fine Grained
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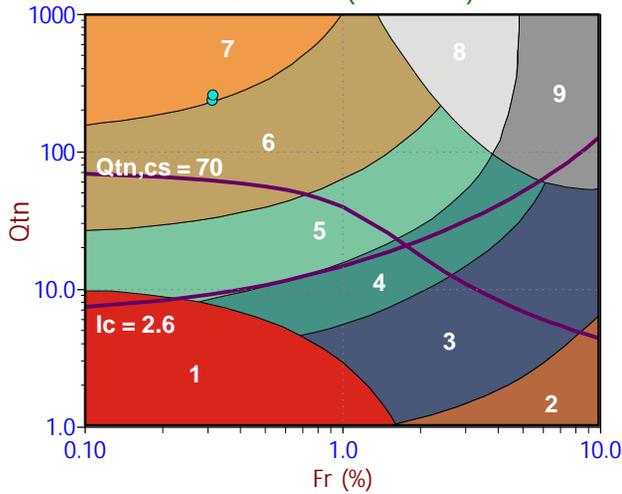
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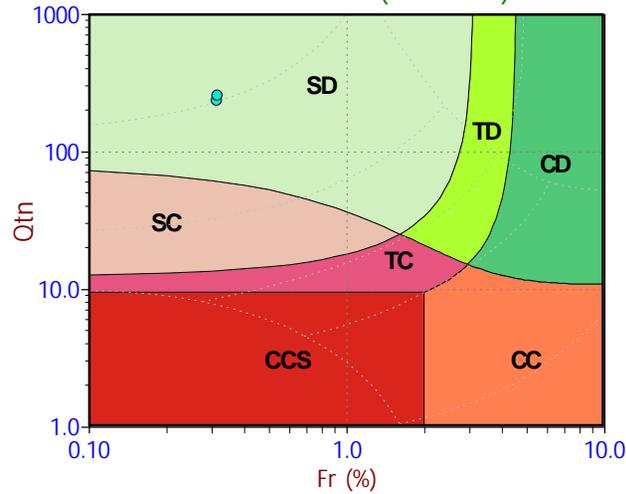
Legend

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- Organic Soil
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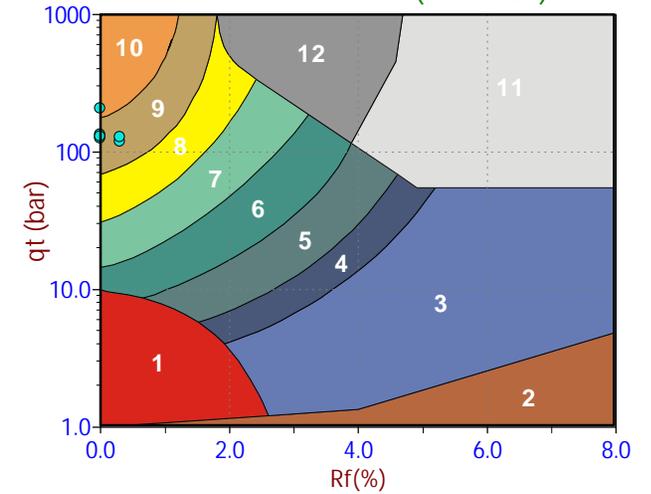
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

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Legend

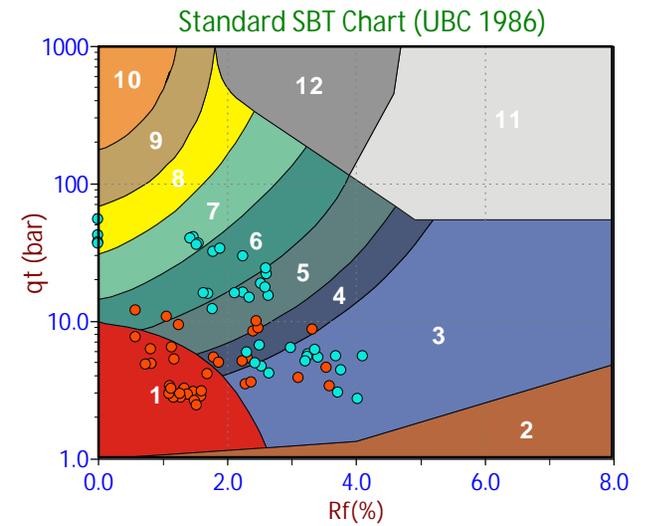
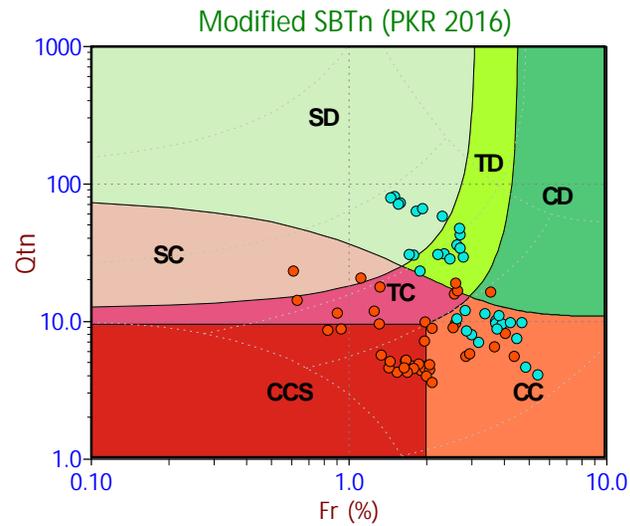
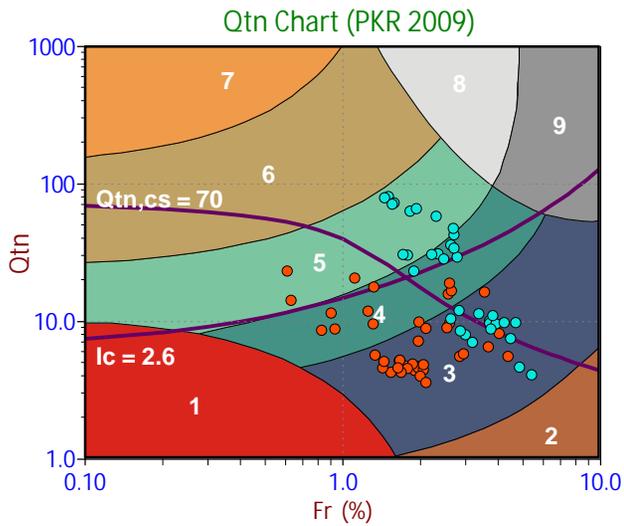
- Sensitive, Fine Grained
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- CCS (Cont. sensitive clay like)
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Legend

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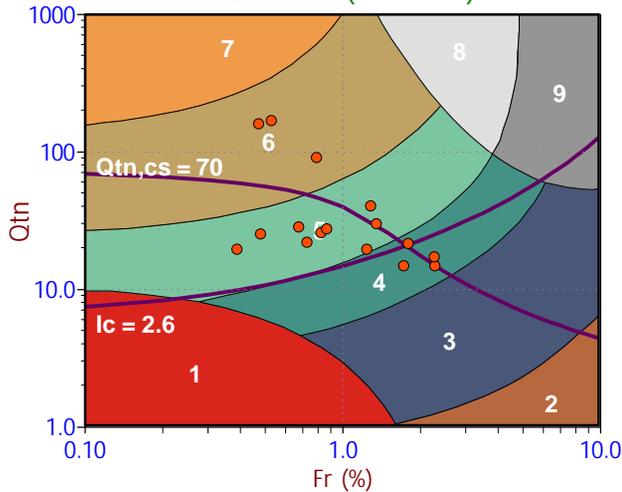
Legend

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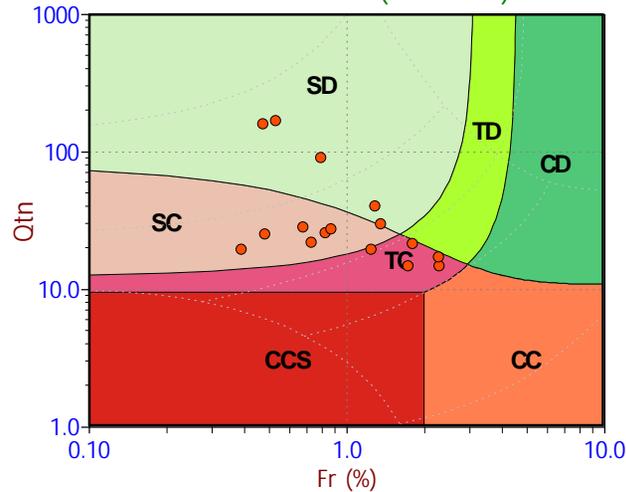
Legend

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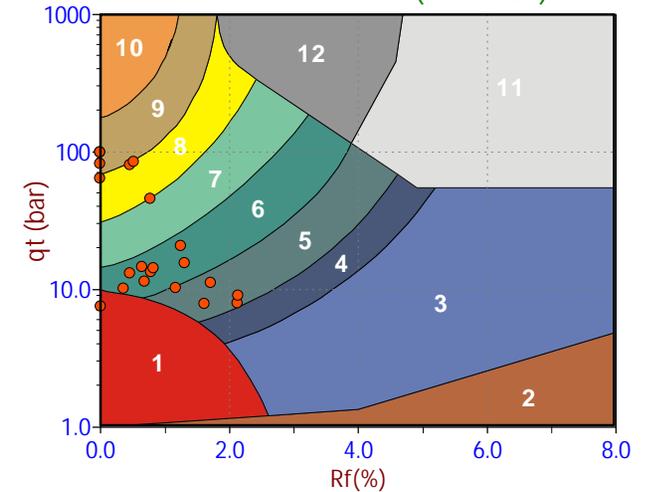
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Legend

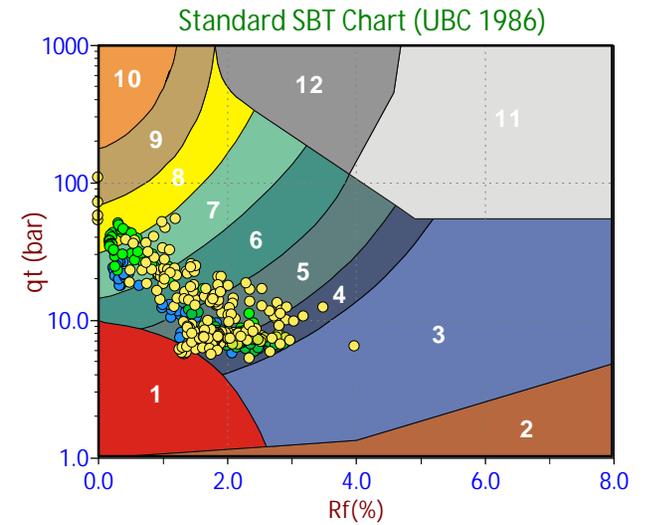
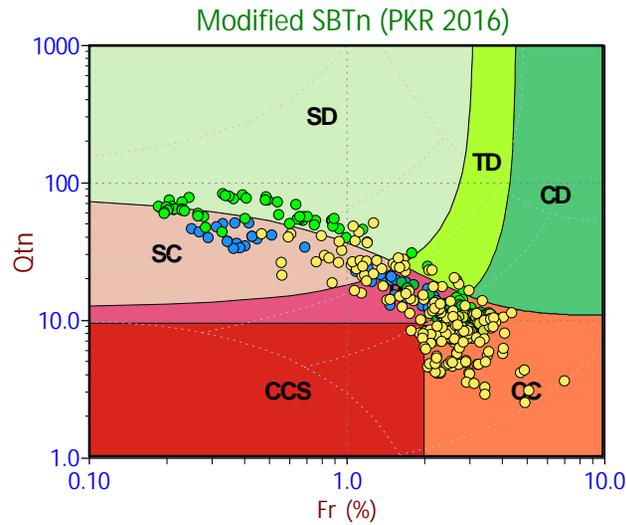
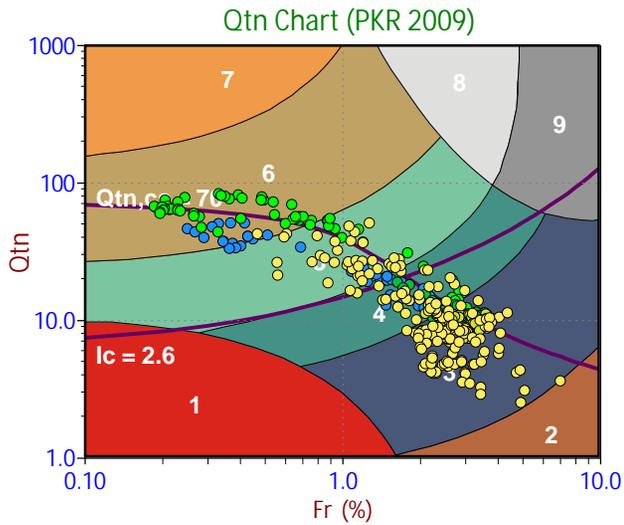
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Legend

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- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

Pore Pressure Dissipation Summary and
Pore Pressure Dissipation Plots



Job No: 18-05063
 Client: Peto MacCallum Ltd.
 Project: Port Dalhousie Pier
 Start Date: 26-Sep-2018
 End Date: 28-Sep-2018

CPT_u PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm ²)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U _{eq} (m)	Calculated Phreatic Surface (m)	Estimated Phreatic Surface (m)	t ₅₀ ^a (s)	Assumed Rigidity Index (I _r)	c _h ^b (cm ² /min)
CPT18-02	18-05063_CP02	15	200	7.800	Not Achieved					
CPT18-02B	18-05063_CP02B	15	175	7.700	Not Achieved					
CPT18-03	18-05063_CP03	15	1000	12.900	Not Achieved					
CPT18-03	18-05063_CP03	15	320	18.950	17.7	1.2				
CPT18-04	18-05063_CP04	15	300	13.950	Not Achieved		1.2	48	100	14.5
CPT18-04	18-05063_CP04	15	725	19.100	Not Achieved		1.2	521	100	1.3
CPT18-04	18-05063_CP04	15	240	20.250	19.1	1.2				
CPT18-05	18-05063_CP05	15	360	9.875	8.8	1.1				
CPT18-05	18-05063_CP05	15	400	17.925	Not Achieved		1.1	204	100	3.4
CPT18-05	18-05063_CP05	15	300	19.900	18.8	1.1				
CPT18-06	18-05063_CP06	15	675	12.350	Not Achieved		1.2	97	100	7.2
CPT18-06	18-05063_CP06	15	400	18.950	Not Achieved					
CPT18-07	18-05063_CP07	15	430	11.250	10.1	1.2				
CPT18-09	18-05063_CP09	15	250	8.425	7.3	1.1				
CPT18-10	18-05063_CP10	15	140	6.875	5.7	1.2				
CPT18-10B	18-05063_CP10B	15	600	14.850	Not Achieved		1.2	146	100	4.8
CPT18-10B	18-05063_CP10B	15	200	19.900	18.7	1.2				

a. Time is relative to where u_{max} occurred

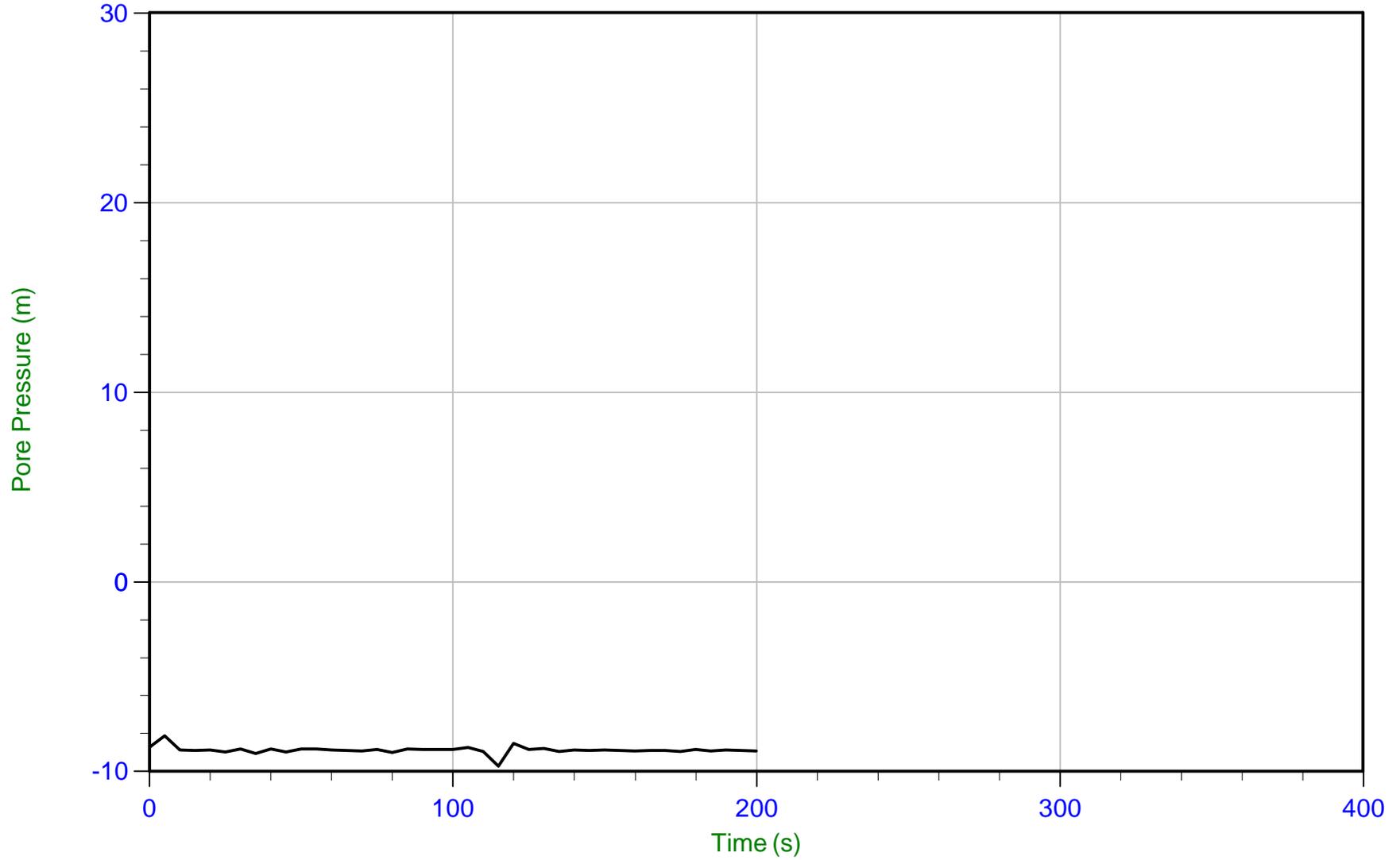
b. Hously and Teh, 1991



Peto MacCallum

Job No: 18-05063
Date: 09/26/2018 13:32
Site: Port Dalhousie Pier

Sounding: CPT18-02
Cone: 408:T1500F15U500 Area=15 cm²



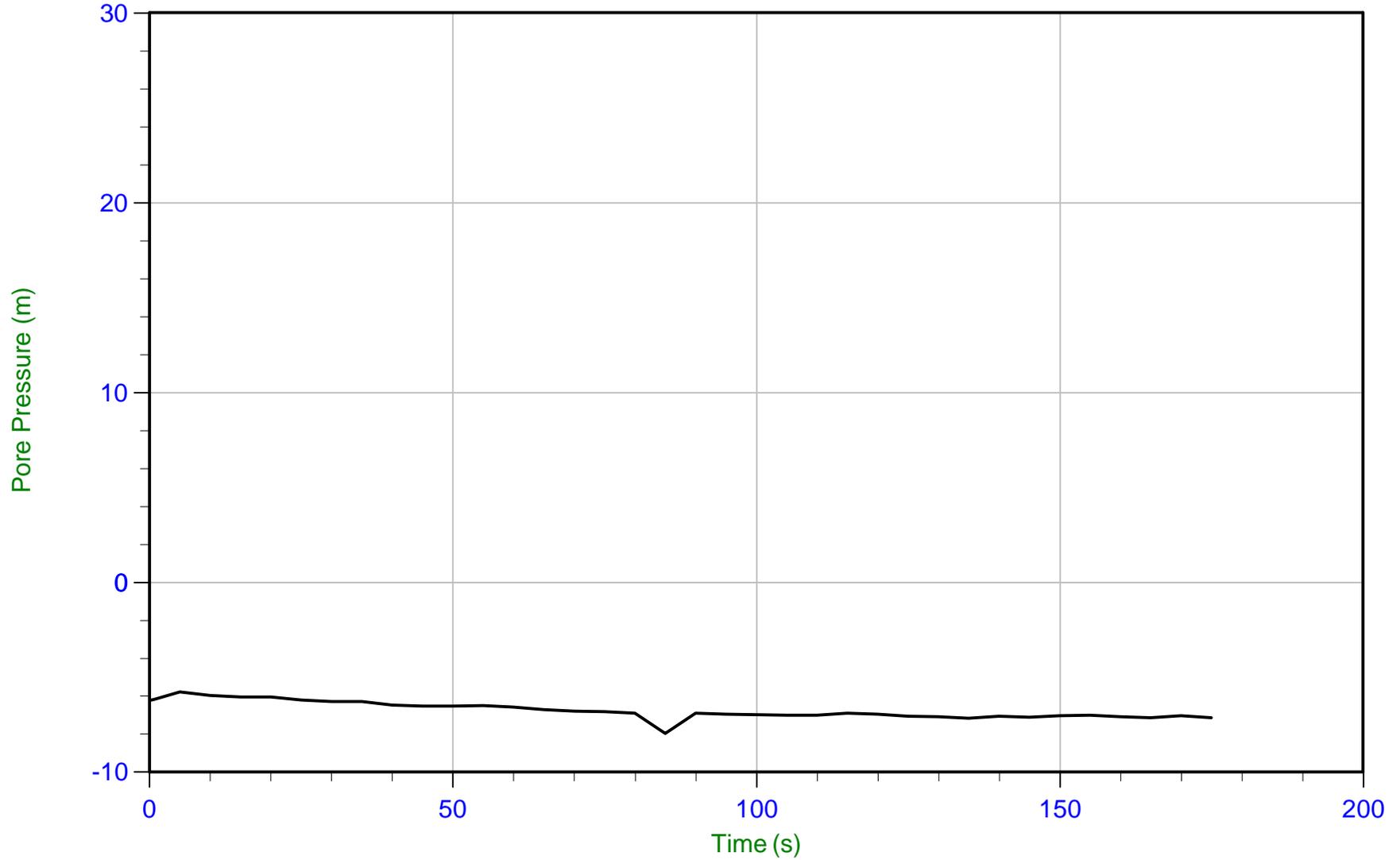
Trace Summary: Filename: 18-05063_CP02.PPF U Min: -9.7 m
Depth: 7.800 m / 25.590 ft U Max: -8.1 m
Duration: 200.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 17:34
Site: Port Dalhousie Pier

Sounding: CPT18-02B
Cone: 408:T1500F15U500 Area=15 cm²



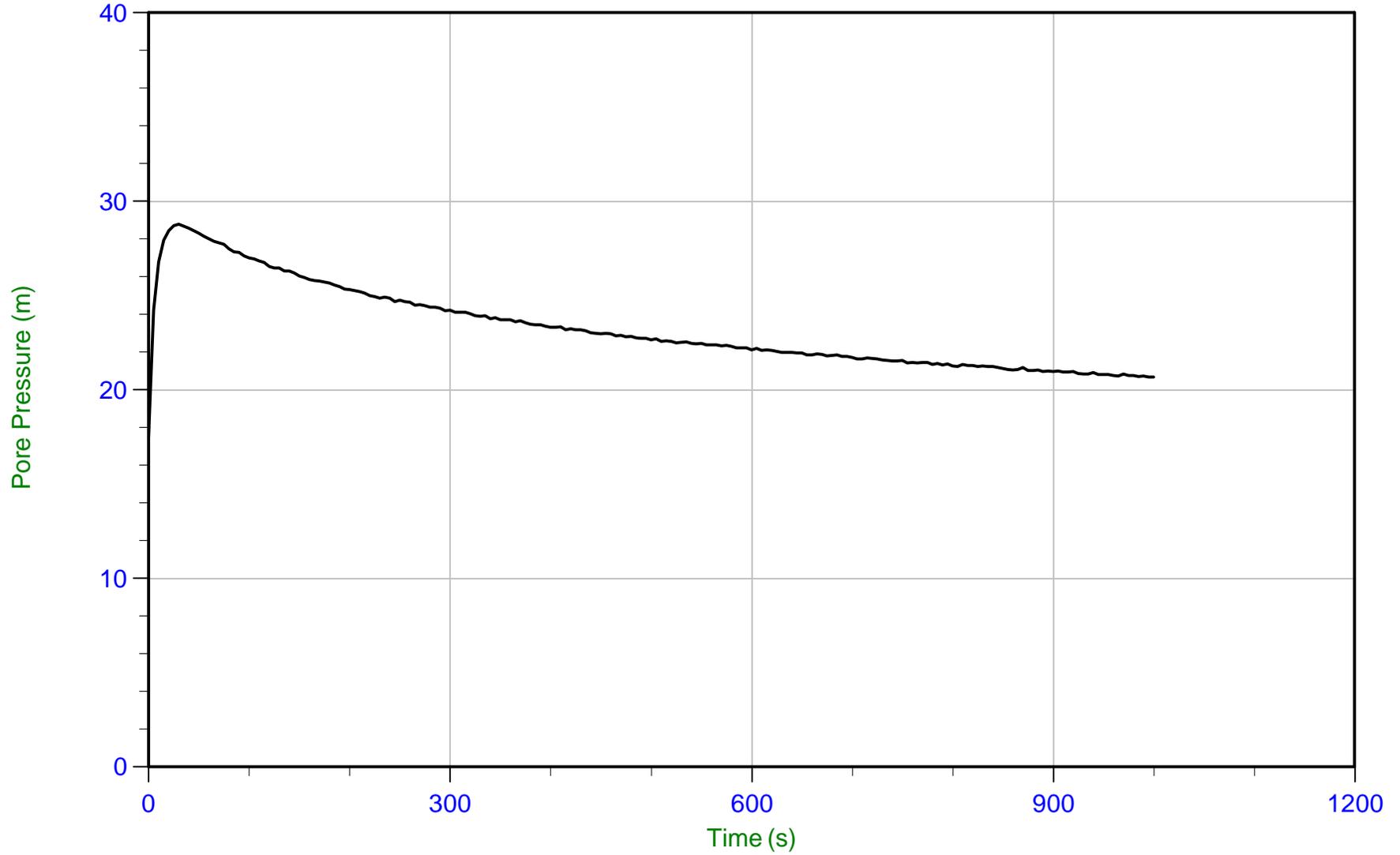
Trace Summary: Filename: 18-05063_CP02B.PPF U Min: -8.0 m
Depth: 7.700 m / 25.262 ft U Max: -5.8 m
Duration: 175.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 12:52
Site: Port Dalhousie Pier

Sounding: CPT18-03
Cone: 408:T1500F15U500 Area=15 cm²



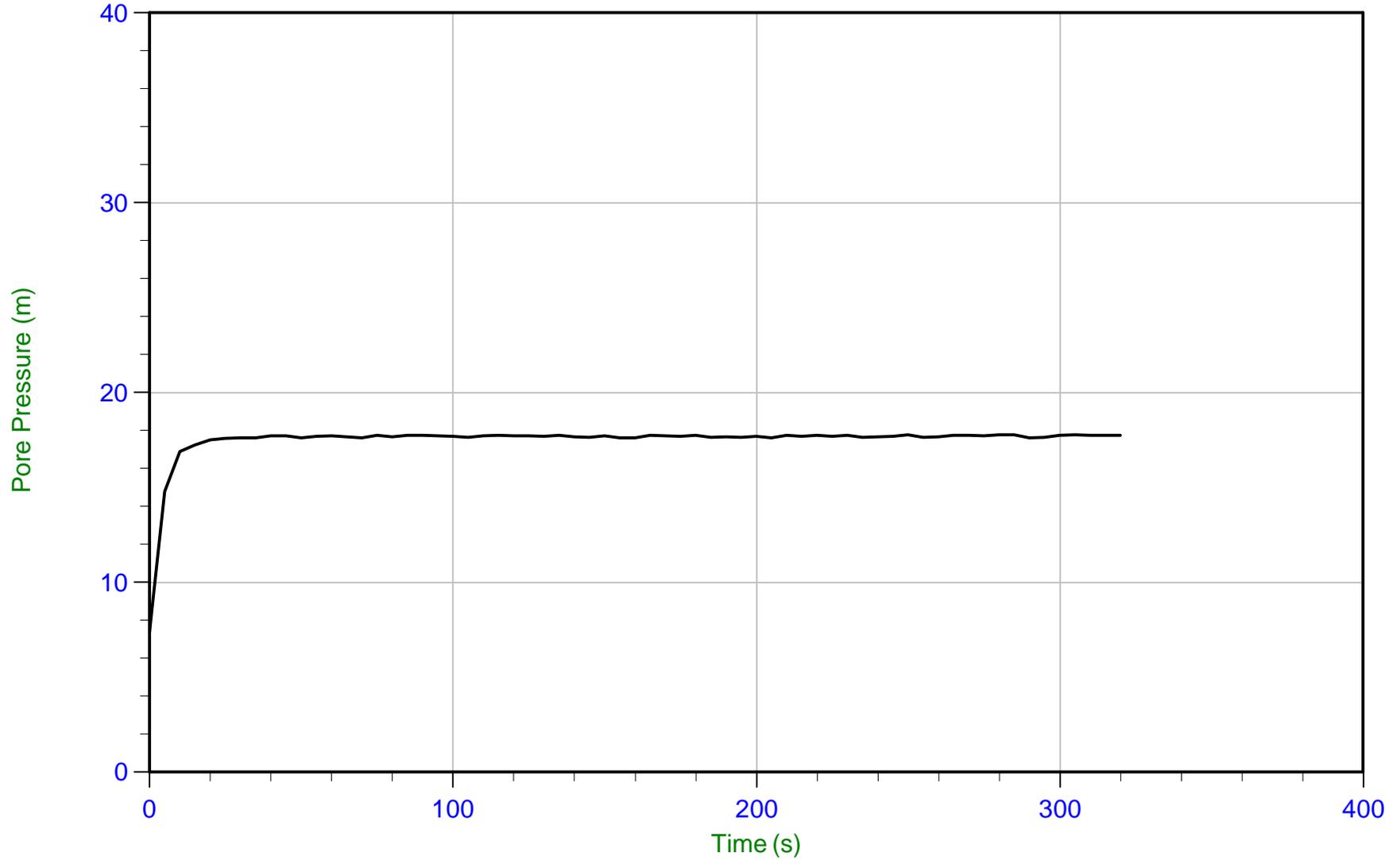
Trace Summary: Filename: 18-05063_CP03.PPF U Min: 17.5 m
Depth: 12.900 m / 42.322 ft U Max: 28.8 m
Duration: 1000.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 12:52
Site: Port Dalhousie Pier

Sounding: CPT18-03
Cone: 408:T1500F15U500 Area=15 cm²



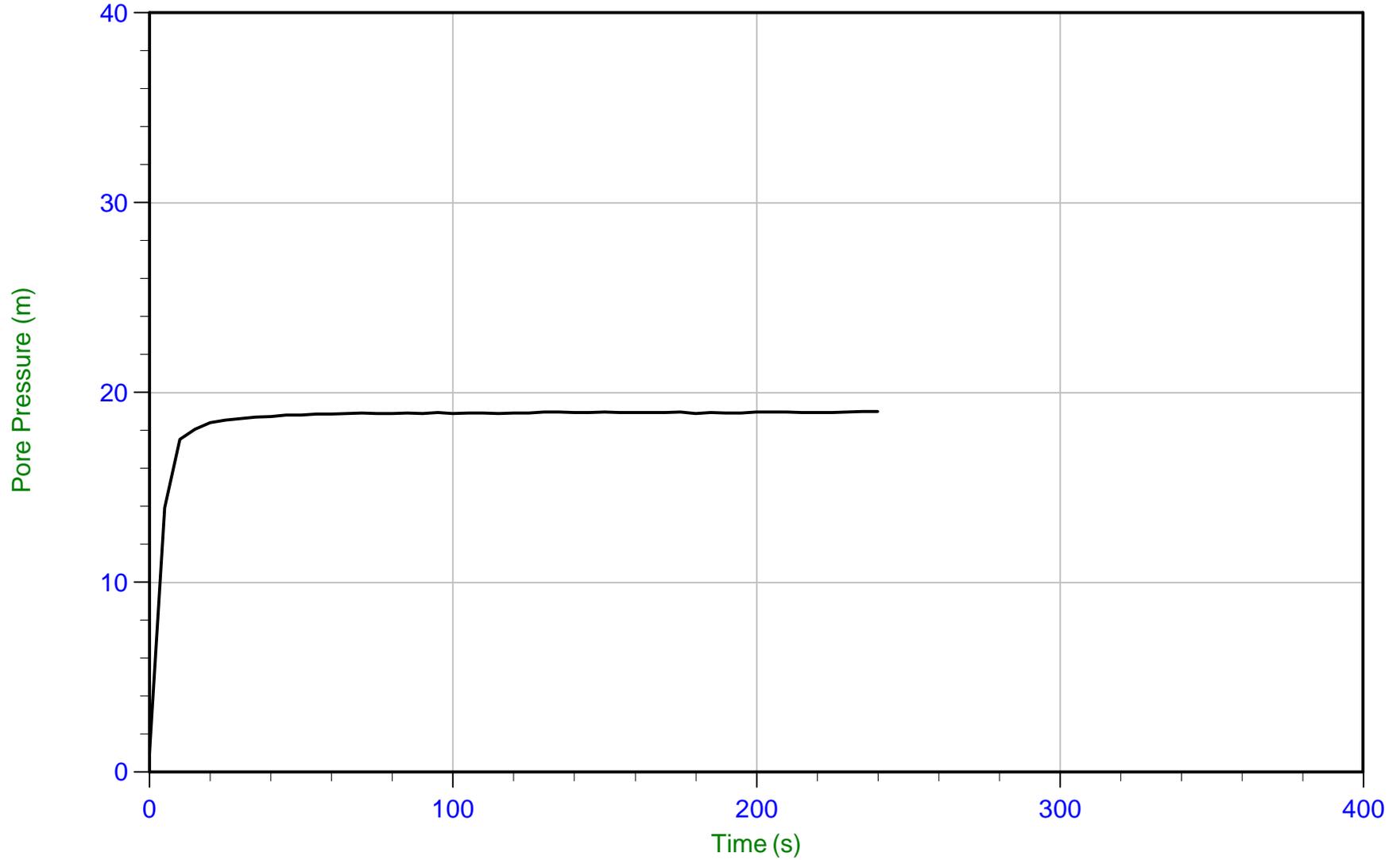
Trace Summary: Filename: 18-05063_CP03.PPF U Min: 7.4 m WT: 1.205 m / 3.952 ft
Depth: 18.950 m / 62.171 ft U Max: 17.8 m Ueq: 17.7 m
Duration: 320.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/26/2018 10:46
Site: Port Dalhousie Pier

Sounding: CPT18-04
Cone: 408:T1500F15U500 Area=15 cm²



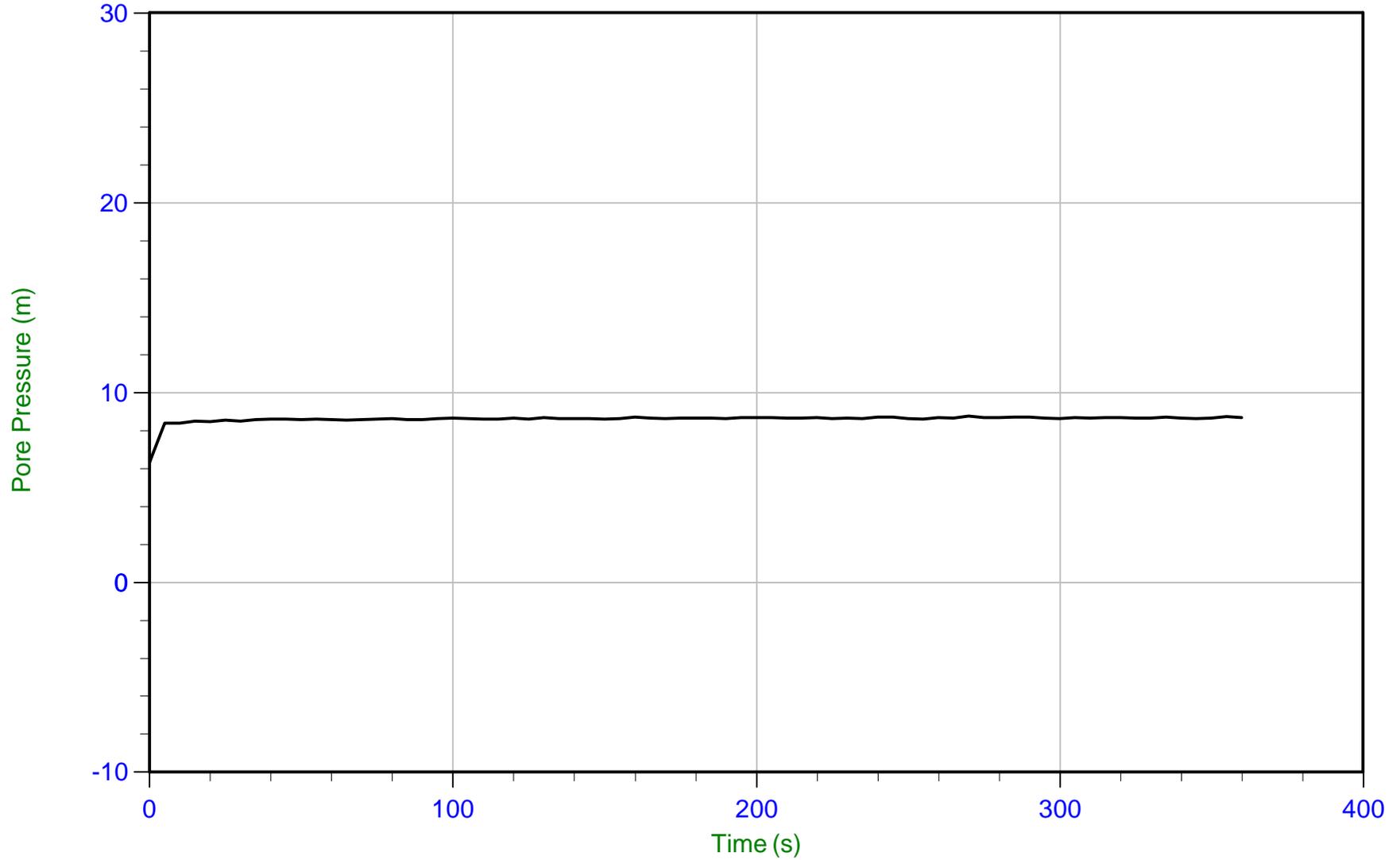
Trace Summary: Filename: 18-05063_CP04.PPF U Min: 1.0 m WT: 1.195 m / 3.922 ft
Depth: 20.250 m / 66.436 ft U Max: 19.0 m Ueq: 19.1 m
Duration: 240.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 10:49
Site: Port Dalhousie Pier

Sounding: CPT18-05
Cone: 408:T1500F15U500 Area=15 cm²



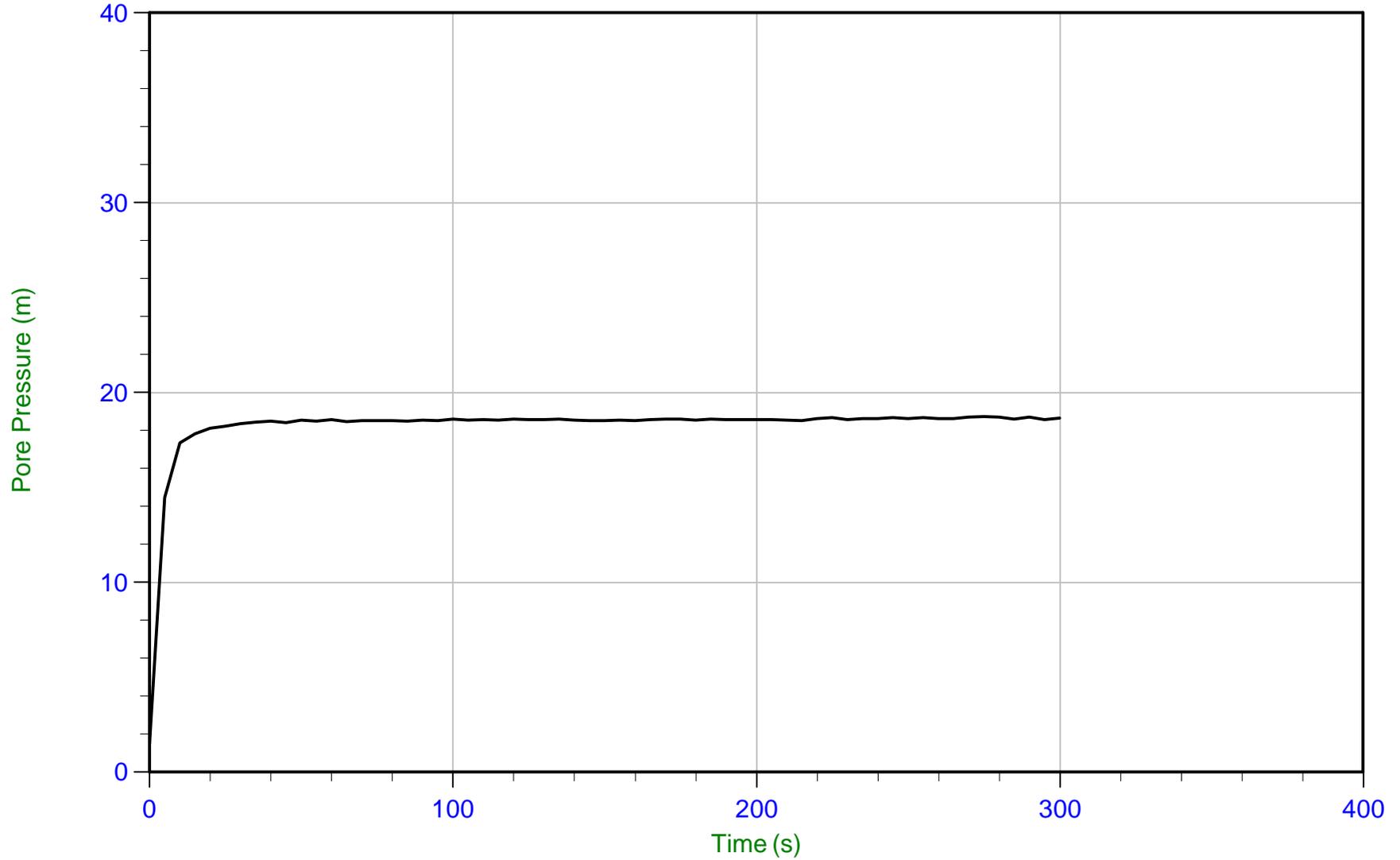
Trace Summary: Filename: 18-05063_CP05.PPF U Min: 6.3 m WT: 1.111 m / 3.646 ft
Depth: 9.875 m / 32.398 ft U Max: 8.7 m Ueq: 8.8 m
Duration: 360.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 10:49
Site: Port Dalhousie Pier

Sounding: CPT18-05
Cone: 408:T1500F15U500 Area=15 cm²



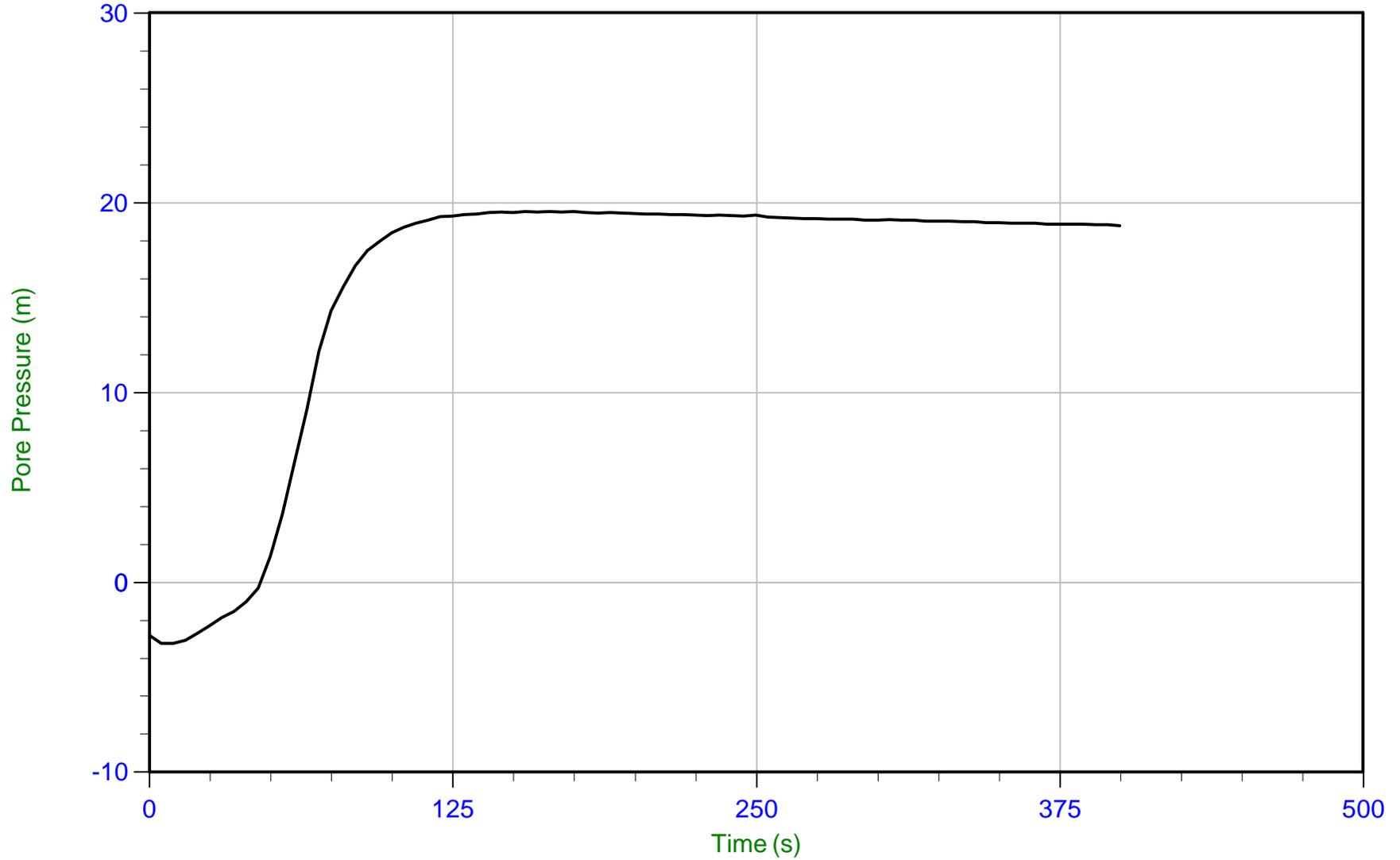
Trace Summary: Filename: 18-05063_CP05.PPF U Min: 1.5 m WT: 1.136 m / 3.728 ft
 Depth: 19.900 m / 65.288 ft U Max: 18.7 m Ueq: 18.8 m
 Duration: 300.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/26/2018 08:39
Site: Port Dalhousie Pier

Sounding: CPT18-06
Cone: 408:T1500F15U500 Area=15 cm²



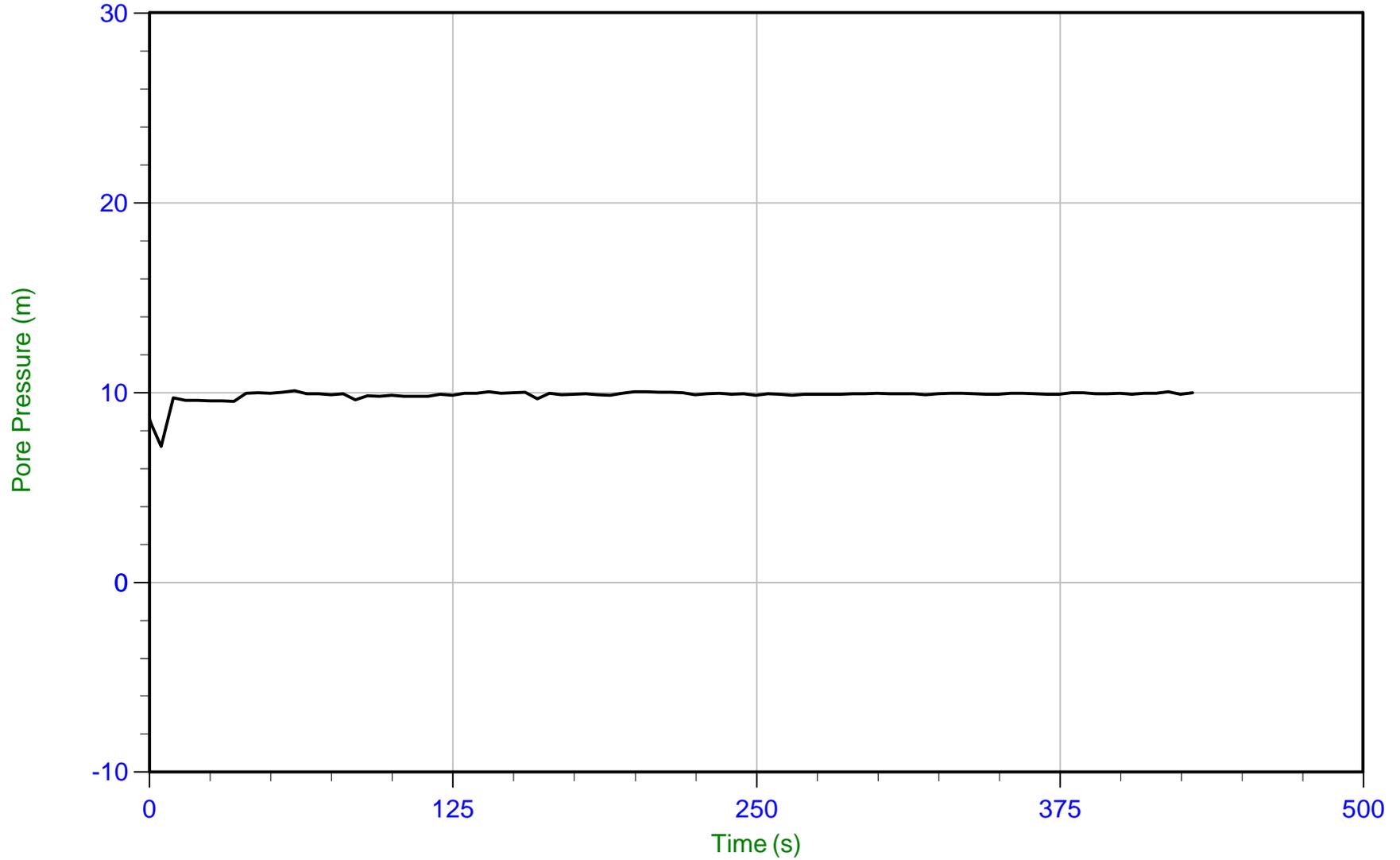
Trace Summary: Filename: 18-05063_CP06.PPF U Min: -3.2 m
Depth: 18.950 m / 62.171 ft U Max: 19.5 m
Duration: 400.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/27/2018 09:36
Site: Port Dalhousie Pier

Sounding: CPT18-07
Cone: 408:T1500F15U500 Area=15 cm²



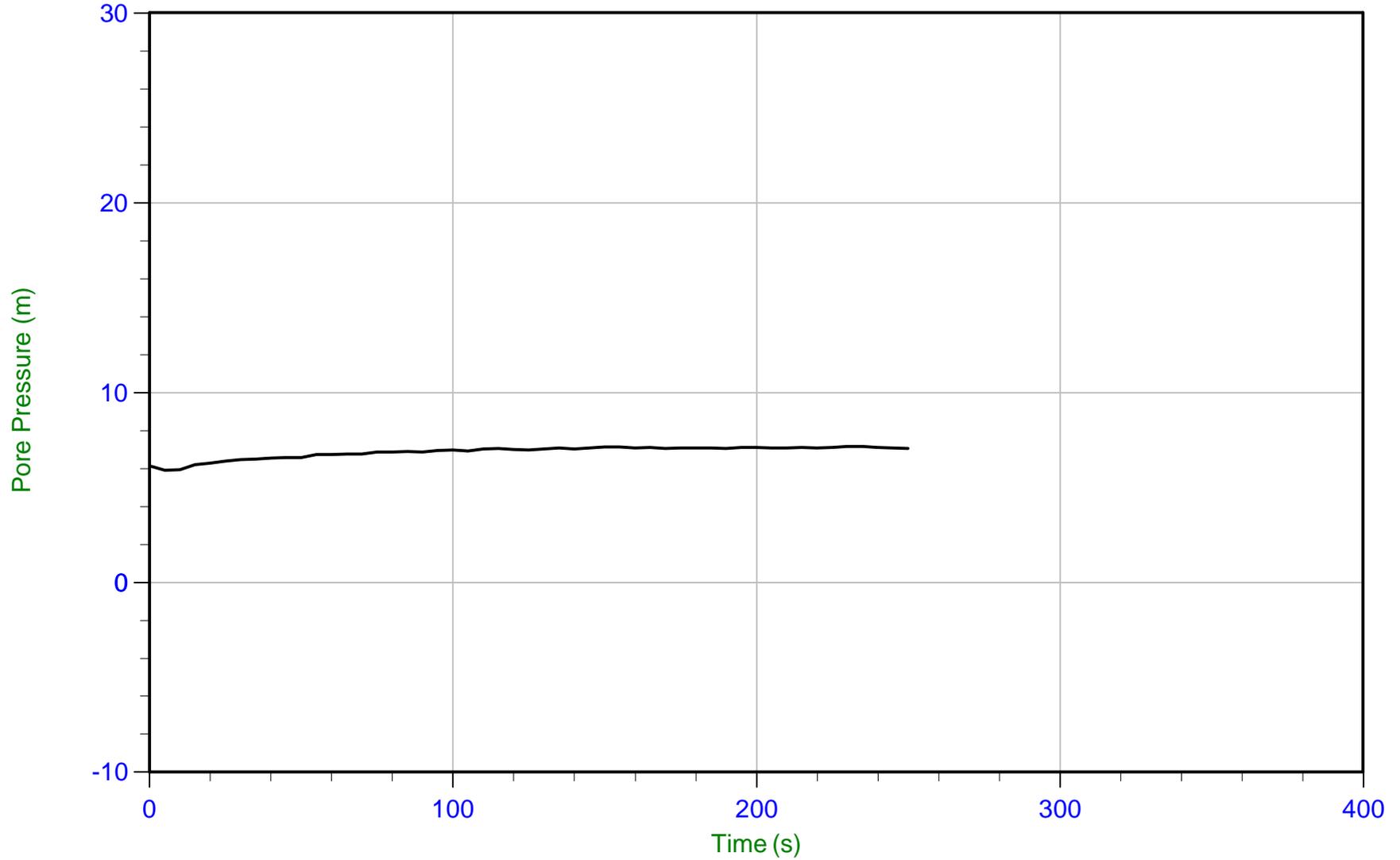
Trace Summary: Filename: 18-05063_CP07.PPF U Min: 7.2 m WT: 1.177 m / 3.862 ft
Depth: 11.250 m / 36.909 ft U Max: 10.1 m Ueq: 10.1 m
Duration: 430.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/28/2018 08:36
Site: Port Dalhousie Pier

Sounding: CPT18-09
Cone: 408:T1500F15U500 Area=15 cm²



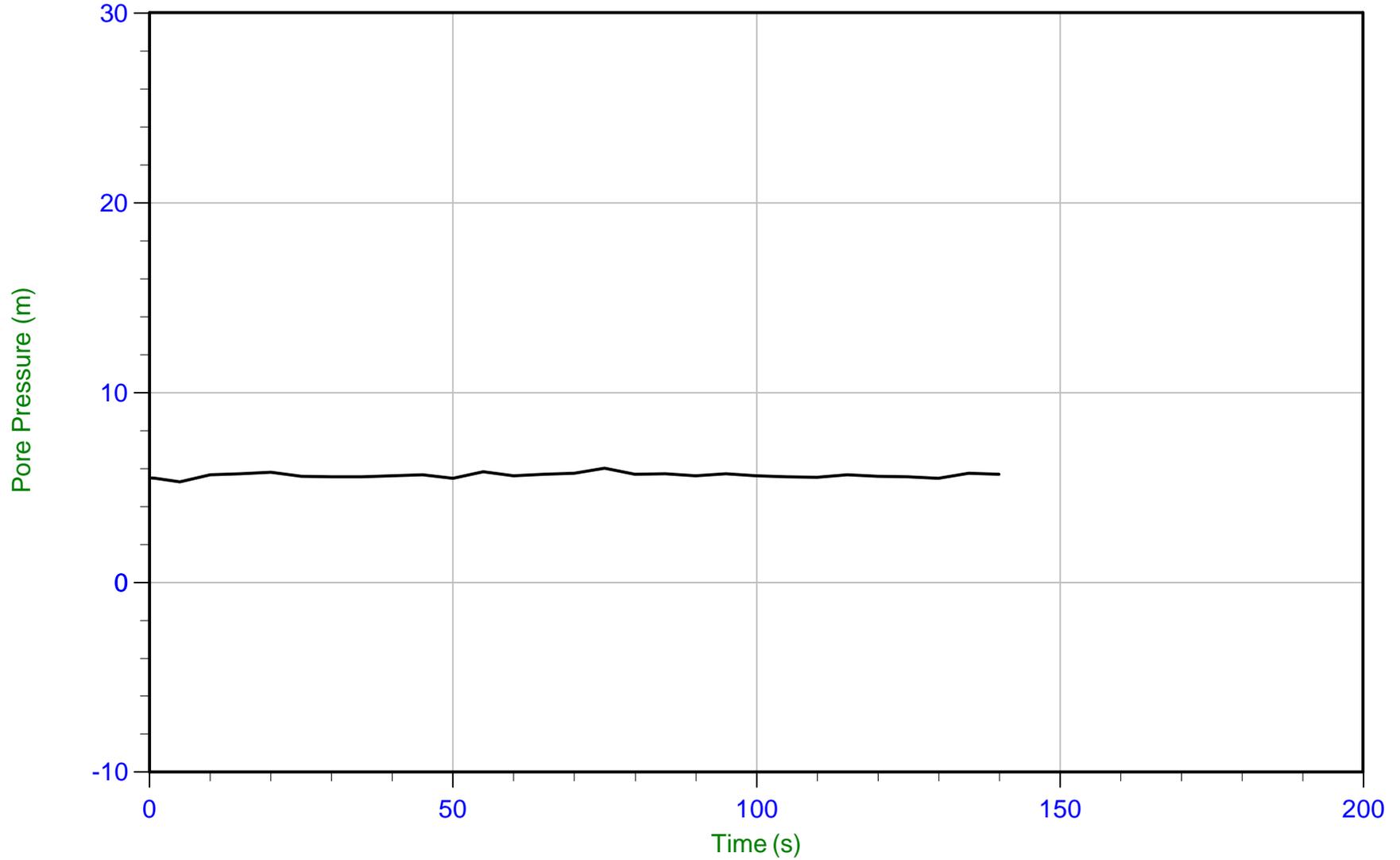
Trace Summary: Filename: 18-05063_CP09.PPF U Min: 5.9 m WT: 1.116 m / 3.661 ft
Depth: 8.425 m / 27.641 ft U Max: 7.2 m Ueq: 7.3 m
Duration: 250.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/28/2018 09:26
Site: Port Dalhousie Pier

Sounding: CPT18-10
Cone: 408:T1500F15U500 Area=15 cm²



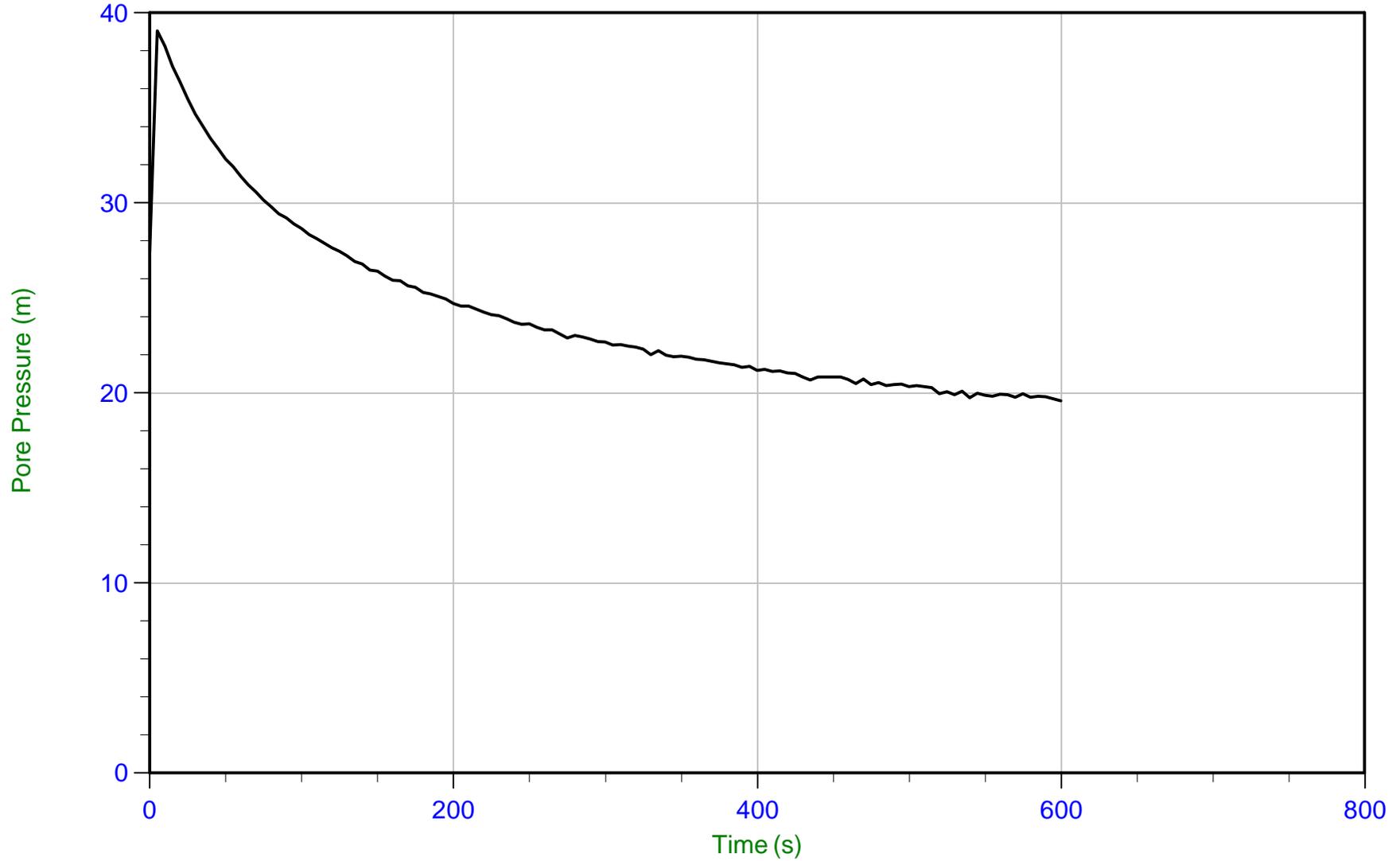
Trace Summary: Filename: 18-05063_CP10.PPF U Min: 5.3 m WT: 1.166 m / 3.825 ft
Depth: 6.875 m / 22.556 ft U Max: 6.0 m Ueq: 5.7 m
Duration: 140.0 s



Peto MacCallum

Job No: 18-05063
Date: 09/28/2018 11:25
Site: Port Dalhousie Pier

Sounding: CPT18-10B
Cone: 408:T1500F15U500 Area=15 cm²



Trace Summary: Filename: 18-05063_CP10B.PPF U Min: 19.6 m WT: 1.170 m / 3.839 ft T(50): 146.0 s
 Depth: 14.850 m / 48.720 ft U Max: 39.1 m Ueq: 13.7 m Ir: 100
 Duration: 600.0 s U(50): 26.37 m Ch: 4.8 cm²/min

