PRESENTATION OF SITE INVESTIGATION RESULTS

Balzano Marine Terminal
Camden, New Jersey

Prepared for:

Earth Engineering

ConeTec Job No: 21-53-22727

Project Start Date: 16-Jul-2021
Project End Date: 16-Jul-2021
Report Date: 27-Jul-2021

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Introduction

The enclosed report presents the results of a piezocone penetration testing (CPTu or CPT) program carried out at the Balzano Marine Terminal located in Camden, New Jersey. The site investigation program was conducted by ConeTec Inc. (ConeTec), under contract to Earth Engineering of East Norriton, Pennsylvania.

A total of 6 cone penetration tests were completed at 4 locations (CPT21-03 was offset two times due to shallow refusal). The CPT program was performed to evaluate the subsurface soil conditions. CPT sounding locations were selected and numbered under supervision of Earth Engineering personnel (Mark Friedrichsen).

Project Information

Project	
Client	Earth Engineering
Project	Balzano Marine Terminal, Camden, NJ
ConeTec project number	21-53-22727

A map from CESIUM including the CPT test locations is presented below.

Rig Description	Deployment System	Test Type
CPT Truck Rig	25 ton truck mounted (twin cylinders)	CPT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT	GPS (GlobalSat MR-350)	32618 (WGS 84 / UTM North)

Cone Penetration Test (CPT)	
Depth reference	Ground surface at the time of the investigation.
Tip and sleeve data offset	0.1 meter. This has been accounted for in the CPT data files.
Pore pressure dissipation (PPD) tests	Eight pore pressure dissipation tests were completed to determine the phreatic surface and consolidation characteristics.
Additional plots	Advanced and Soil Behavior 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 (bar)
612:T1500F15U35	612	15	225	1500	15	35
Cone 612 was used for each sounding.						

Calculated Geotechnical Parameters Tables	
Additional information	The Normalized Soil Behavior Type Chart based on Q_{tn} (SBT Qtn) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPT parameters have been generated and are provided in Excel format files in the release folder. The CPT parameter calculations are based on values of corrected tip resistance (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 and the assumed equilibrium pore pressure profile. Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behavior Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).

Limitations

This report has been prepared for the exclusive use of Earth Engineering (Client) for the project titled "Balzano Marine Terminal, Camden, NJ". The report's contents may not be relied upon by any other party without the express written permission of 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 two geophone sensors for recording seismic signals. All signals are amplified and measured with minimum 16 bit resolution down hole within the cone body, and the signals are sent to the surface using a high bandwidth, error corrected digital interface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm^2 and 15 cm^2 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 cm^2 penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm^2 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 "u_2" 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 meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

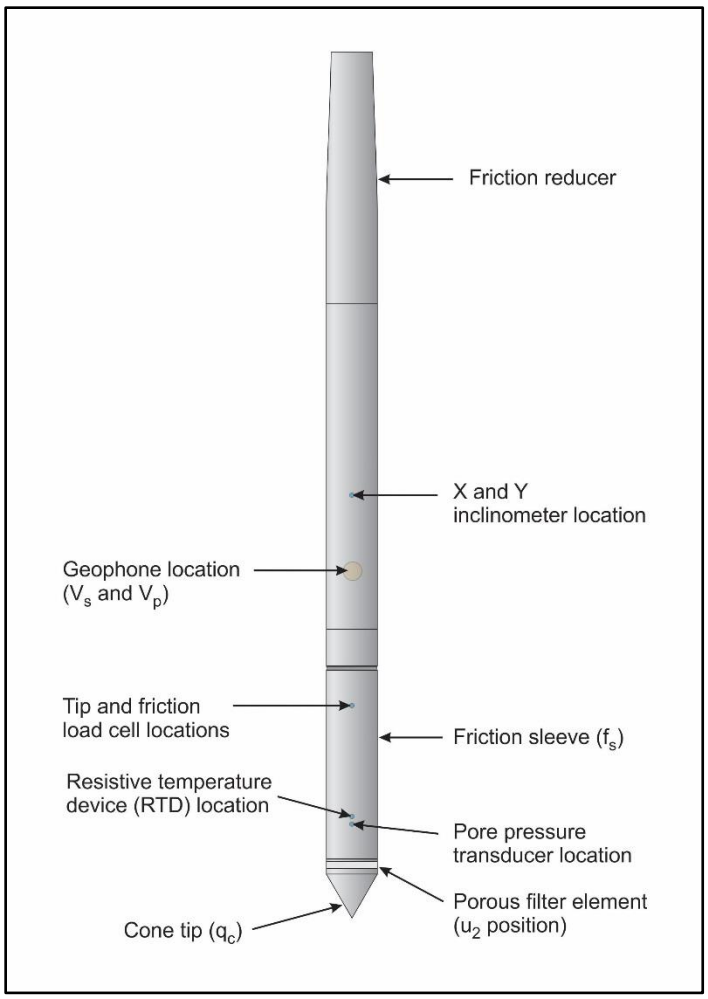

Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal interface box and power supply. The signal interface combines depth increment signals, seismic trigger signals and the downhole digital data. This combined data is then sent to the Windows based computer for collection and presentation. 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 glycerin 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 1.5 inches 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
- 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 behavior type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior 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):

$$q_t = q_c + (1\text{-}a) \bullet u_2$$

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 (Rf) 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).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, “Cone Penetration Testing in Geotechnical Practice”, Blackie Academic and Professional.

Mayne, P.W., 2013, “Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests”, Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

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.

Mayne, P.W., 2014, “Interpretation of geotechnical parameters from seismic piezocone tests”, CPT’14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, “Use of Piezometer Cone Data”, Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, “Soil Classification Using the Cone Penetration Test”, Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, “Interpretation of cone penetration tests – a unified approach”, Canadian Geotechnical Journal, Volume 46: 1337-1355.

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).

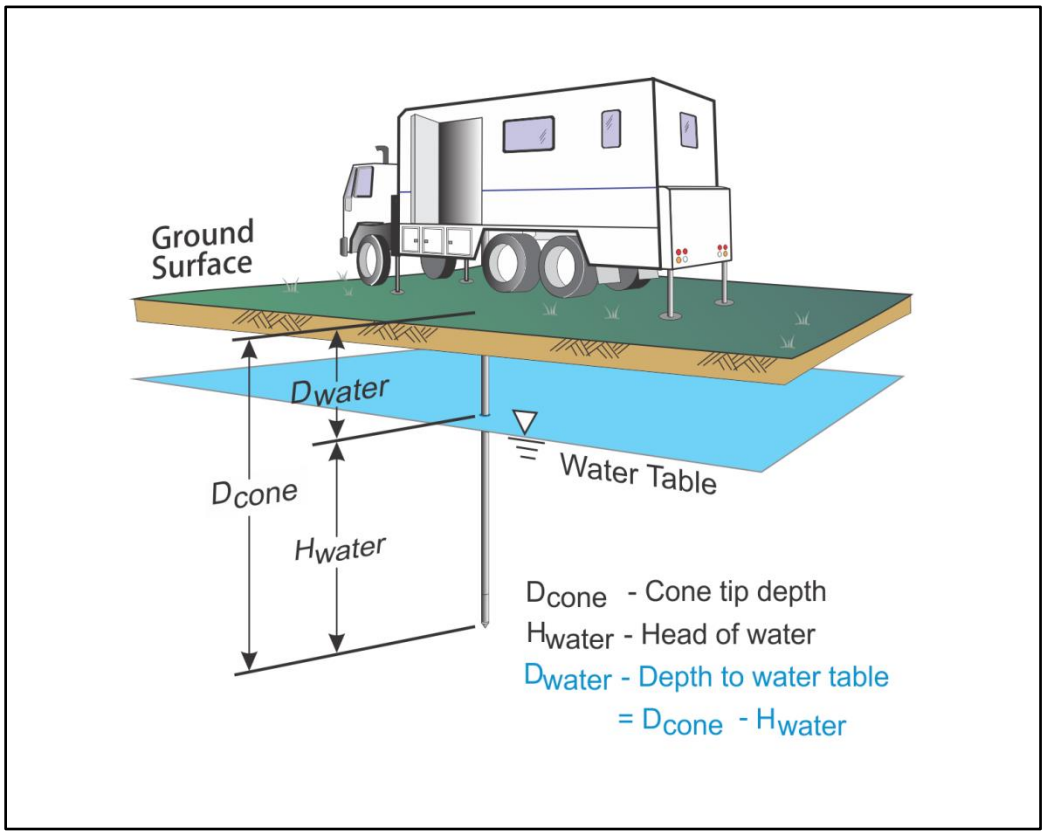

Figure PPD-1. Pore pressure dissipation test setup

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

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 dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

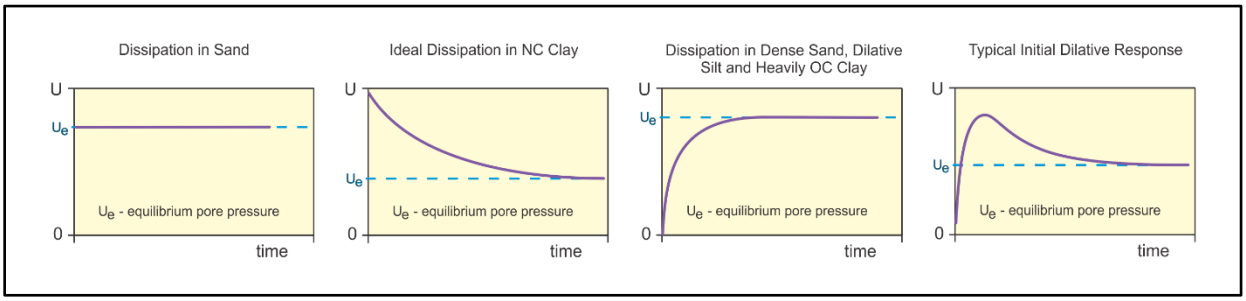

Figure PPD-2. Pore pressure dissipation curve examples

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 dilatory 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 dilatory 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

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381.

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 with Ic, Su(Nkt), Phi and N1(60)Ic
- Soil Behavior Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	21-53-22727
Client:	Earth Engineering
Project:	Balzano Marine Terminal, Camden, NJ
Start Date:	16-Jul-2021
End Date:	16-Jul-2021

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)
CPT21-01	21-53-22727_CP01	16-Jul-2021	612:T1500F15U35	5.9	50.61	4420419	488718
CPT21-02	21-53-22727_CP02	16-Jul-2021	612:T1500F15U35	6.7	50.85	4420375	488712
CPT21-03	21-53-22727_CP03	16-Jul-2021	612:T1500F15U35	4.7	20.01	4420338	488707
CPT21-03A	21-53-22727_CP03A	16-Jul-2021	612:T1500F15U35	4.1	18.04	4420334	488706
CPT21-03B	21-53-22727_CP03B	16-Jul-2021	612:T1500F15U35	4.0	29.20	4420335	488706
CPT21-04	21-53-22727_CP04	16-Jul-2021	612:T1500F15U35	6.4	50.28	4420313	488708
Totals	6 soundings				218.99		

1. The assumed phreatic surface was based on pore pressure dissipation tests. Hydrostatic data was used for the calculated parameters.
2. Coordinates were acquired using a MR-350 GlobalSat GPS Receiver in datum: WGS84 / UTM Zone 18 North.

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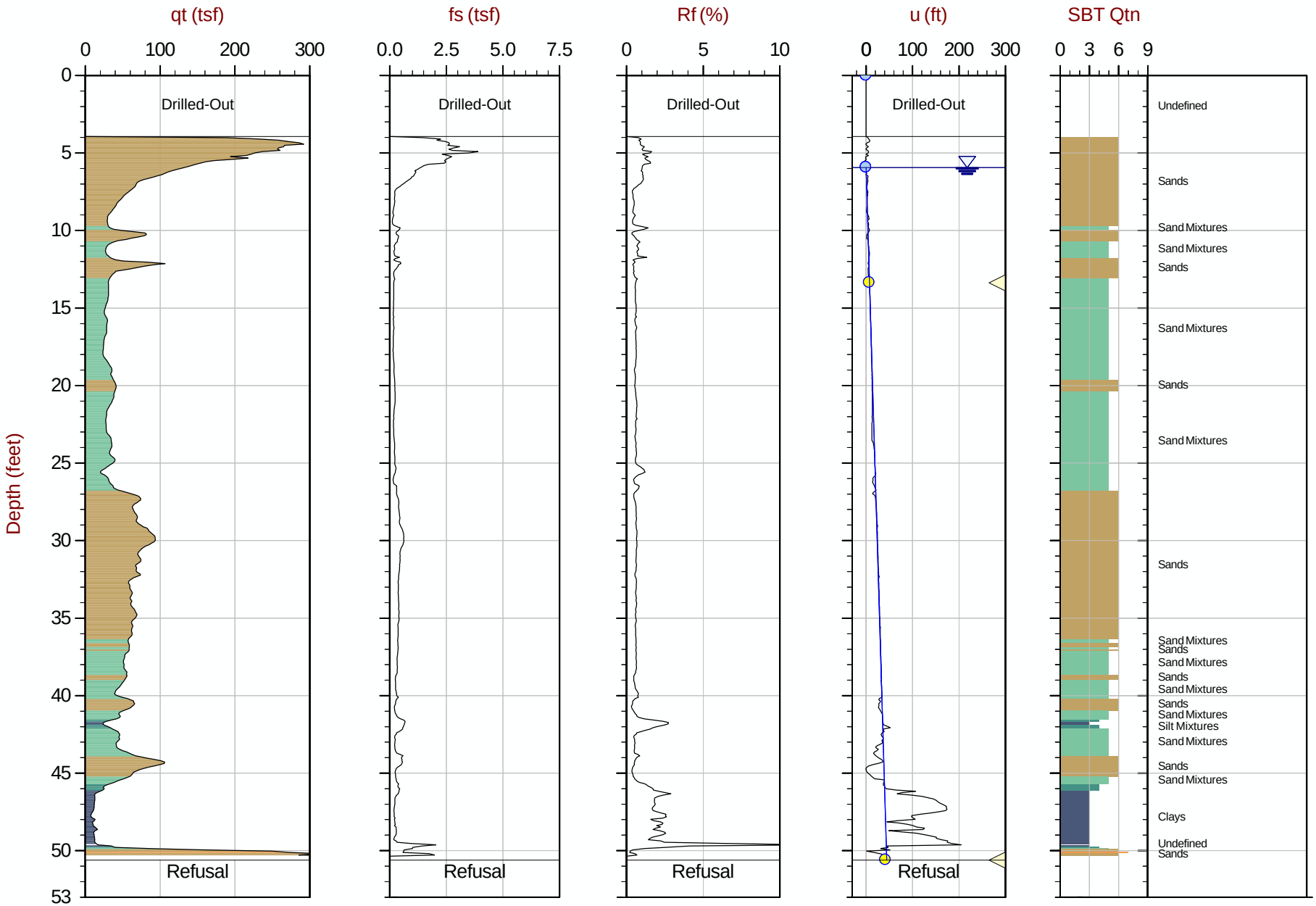
Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35



Max Depth: 15.425 m / 50.61 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420419m E: 488718m

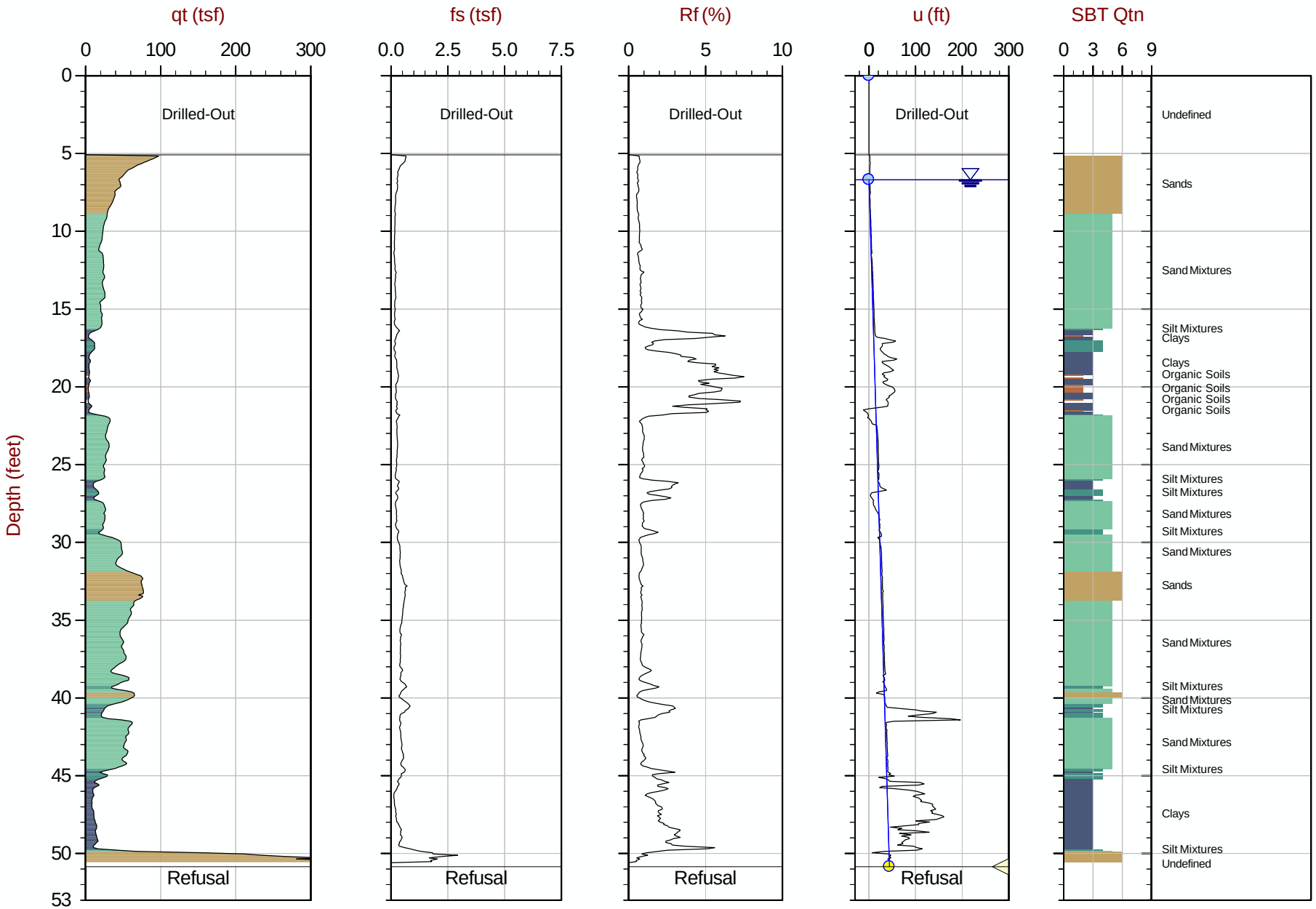
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35



Max Depth: 15.500 m / 50.85 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420375m E: 488712m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

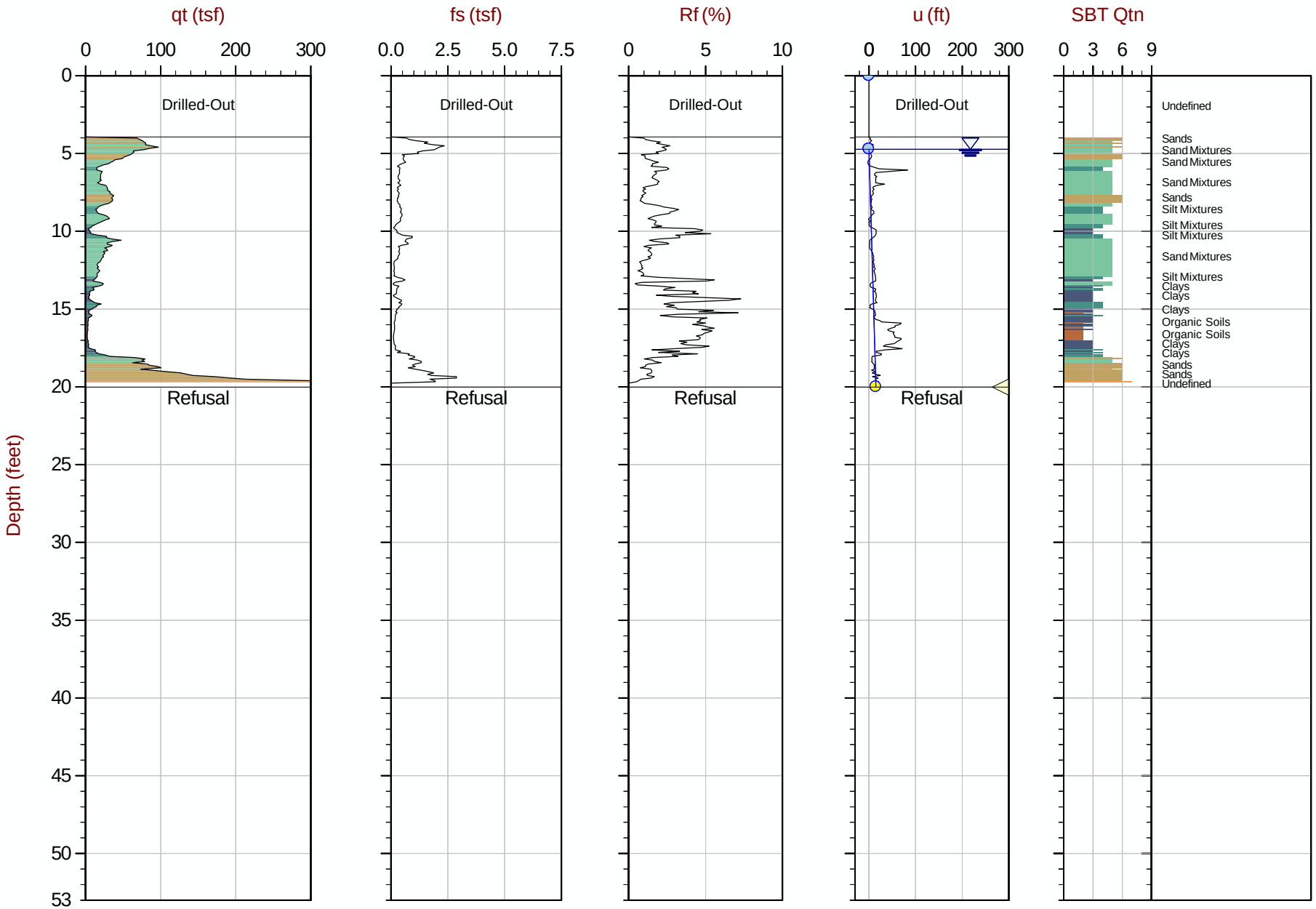
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420338m E: 488707m

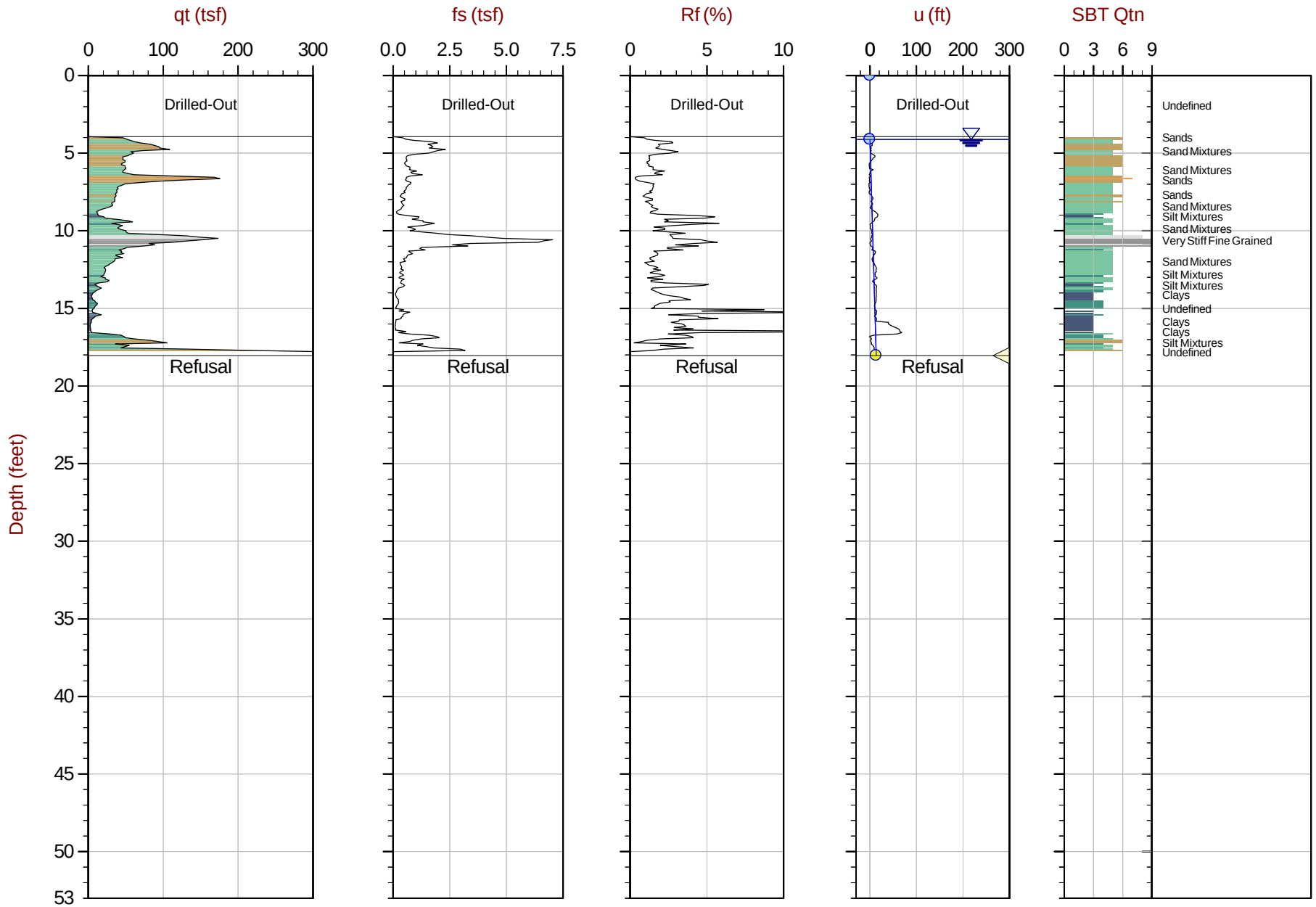
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03A.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420334m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

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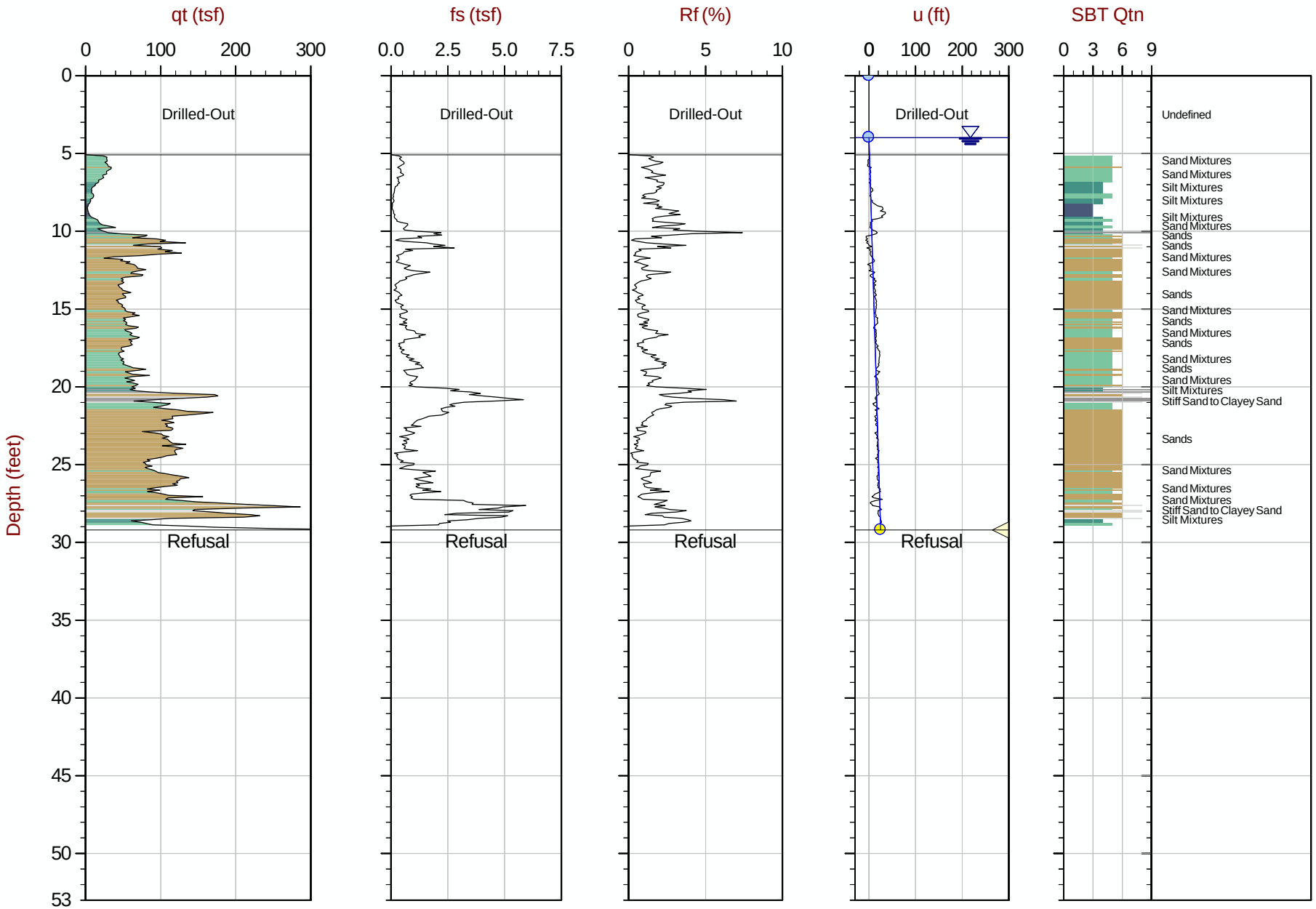
Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35



Max Depth: 8.900 m / 29.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420335m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

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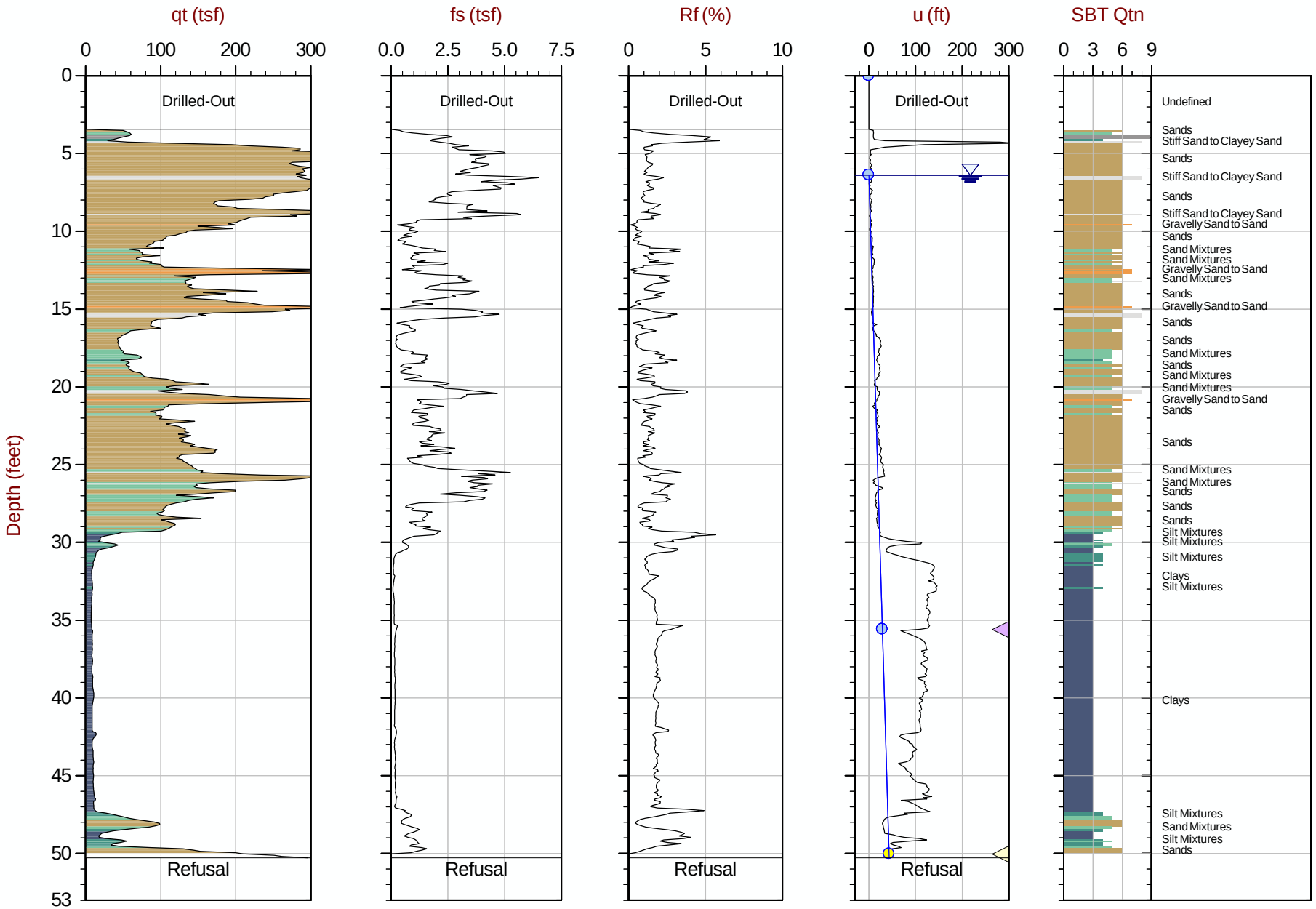
Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35



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

File: 21-53-22727_CP04.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420313m E: 488708m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

Advanced Cone Penetration Plots with Ic, Su(Nkt), Phi and N1(60)Ic

CONETEC

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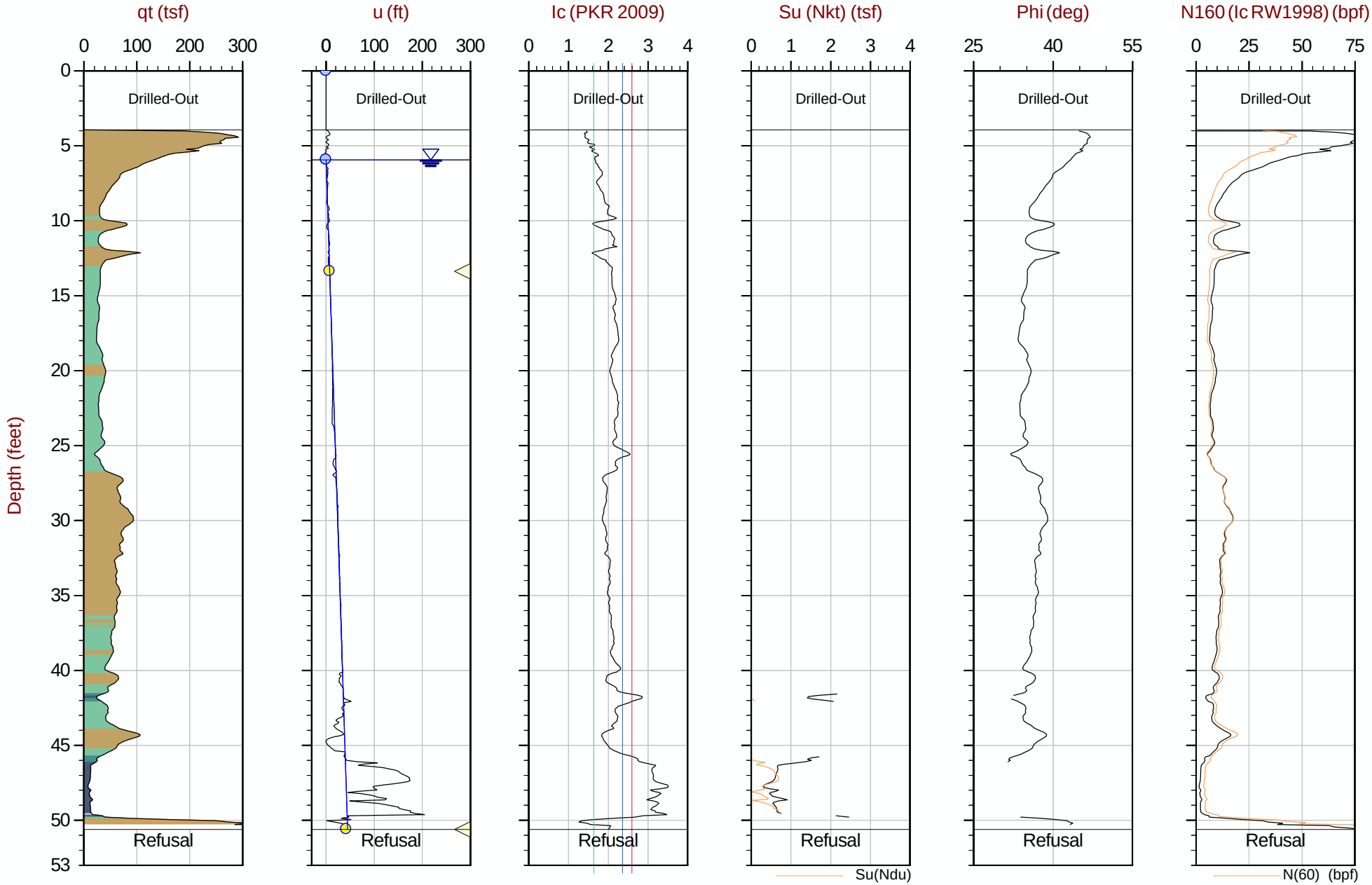
Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35



Max Depth: 15.425 m / 50.61 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP01.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420419m E: 488718m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

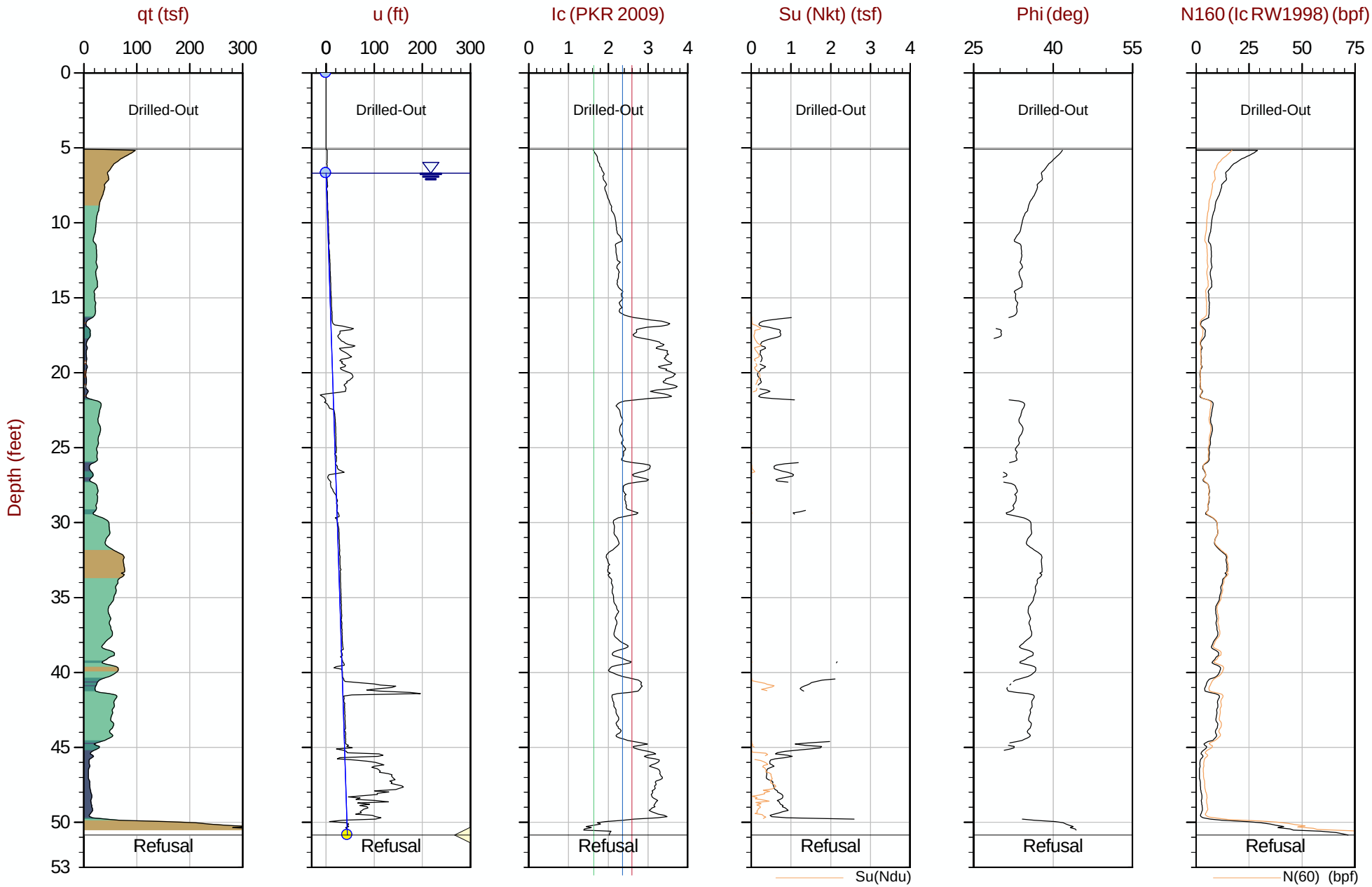
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35



Max Depth: 15.500 m / 50.85 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP02.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420375m E: 488712m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

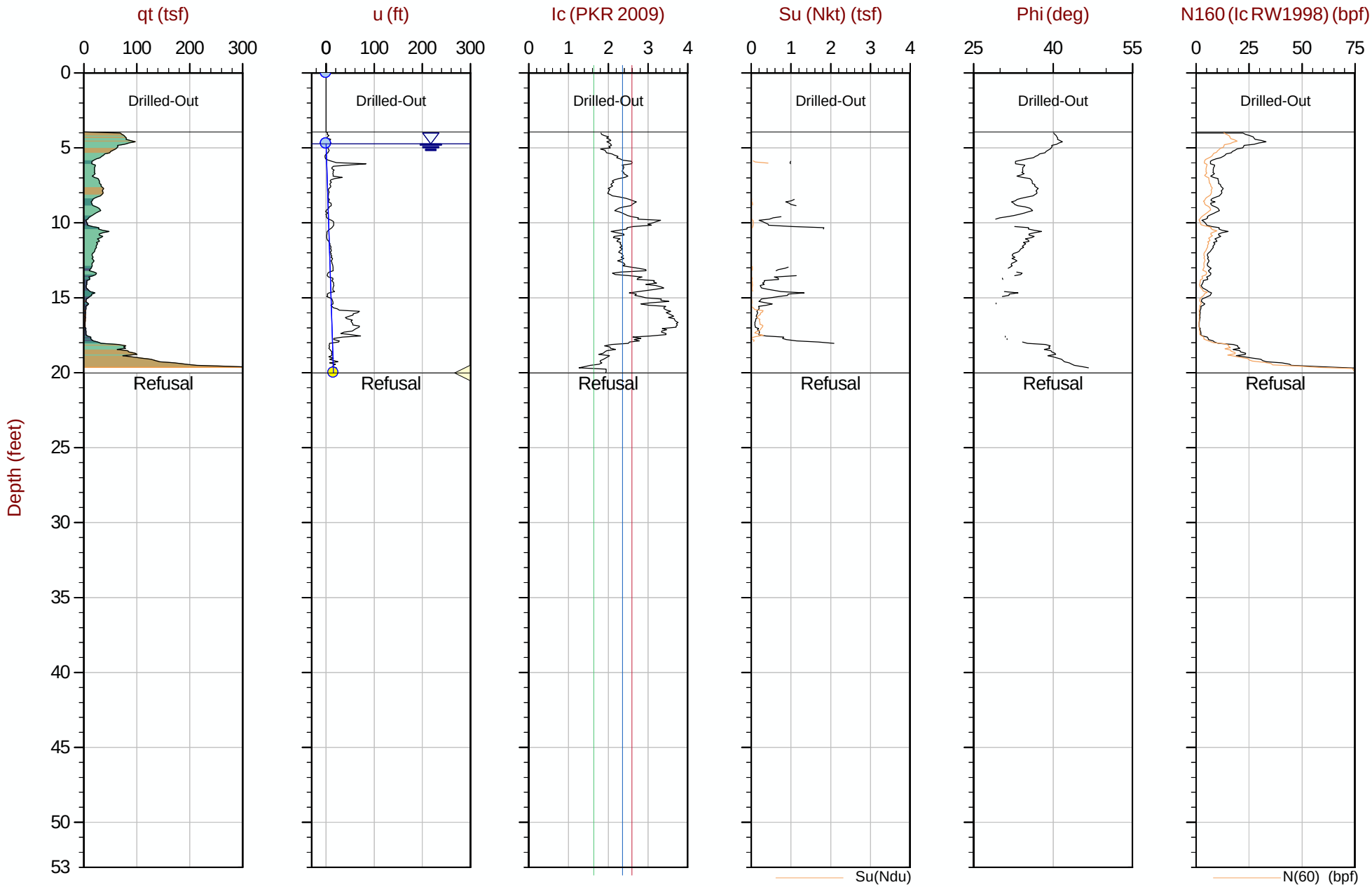
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420338m E: 488707m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

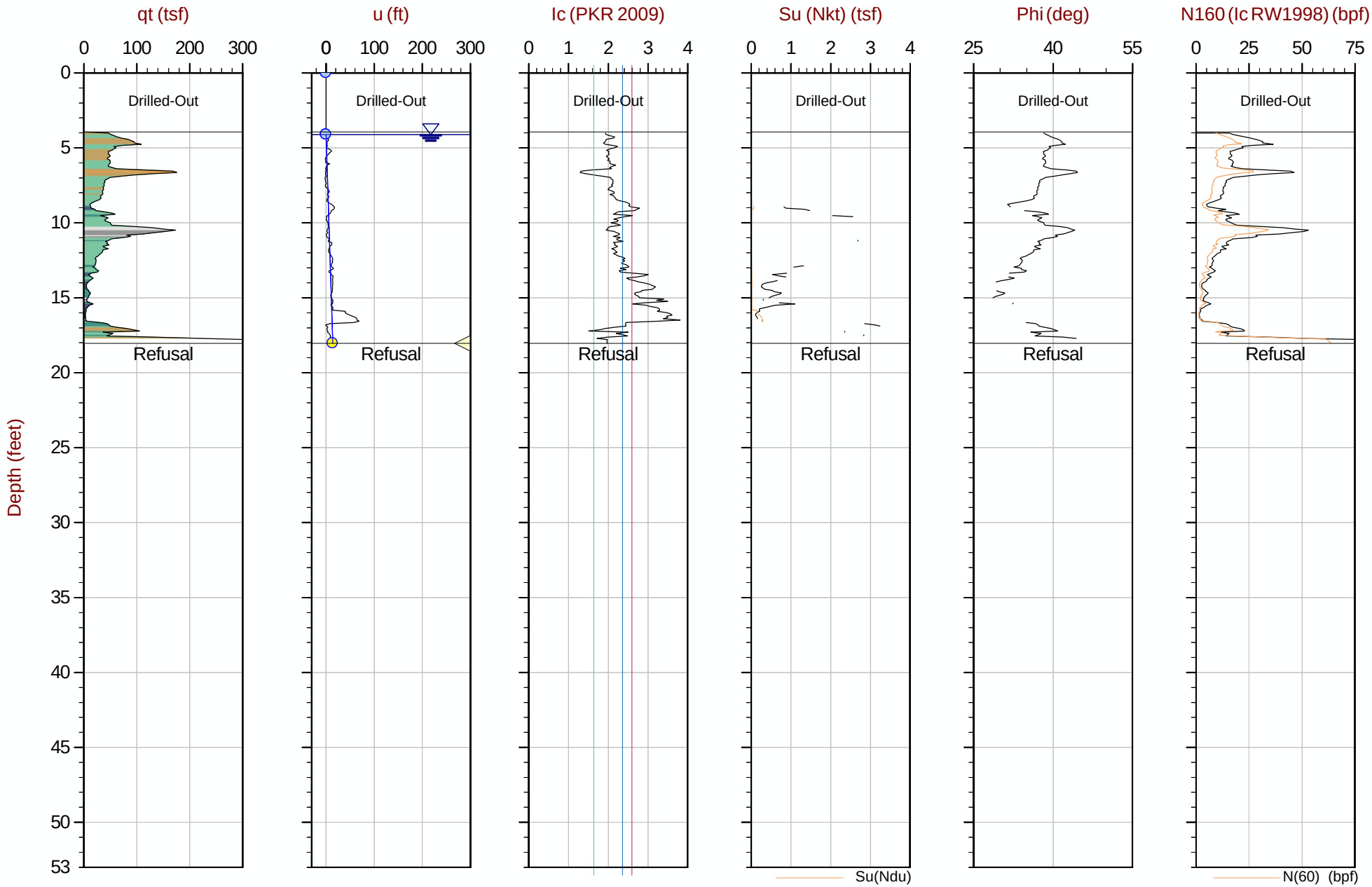
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03A.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420334m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

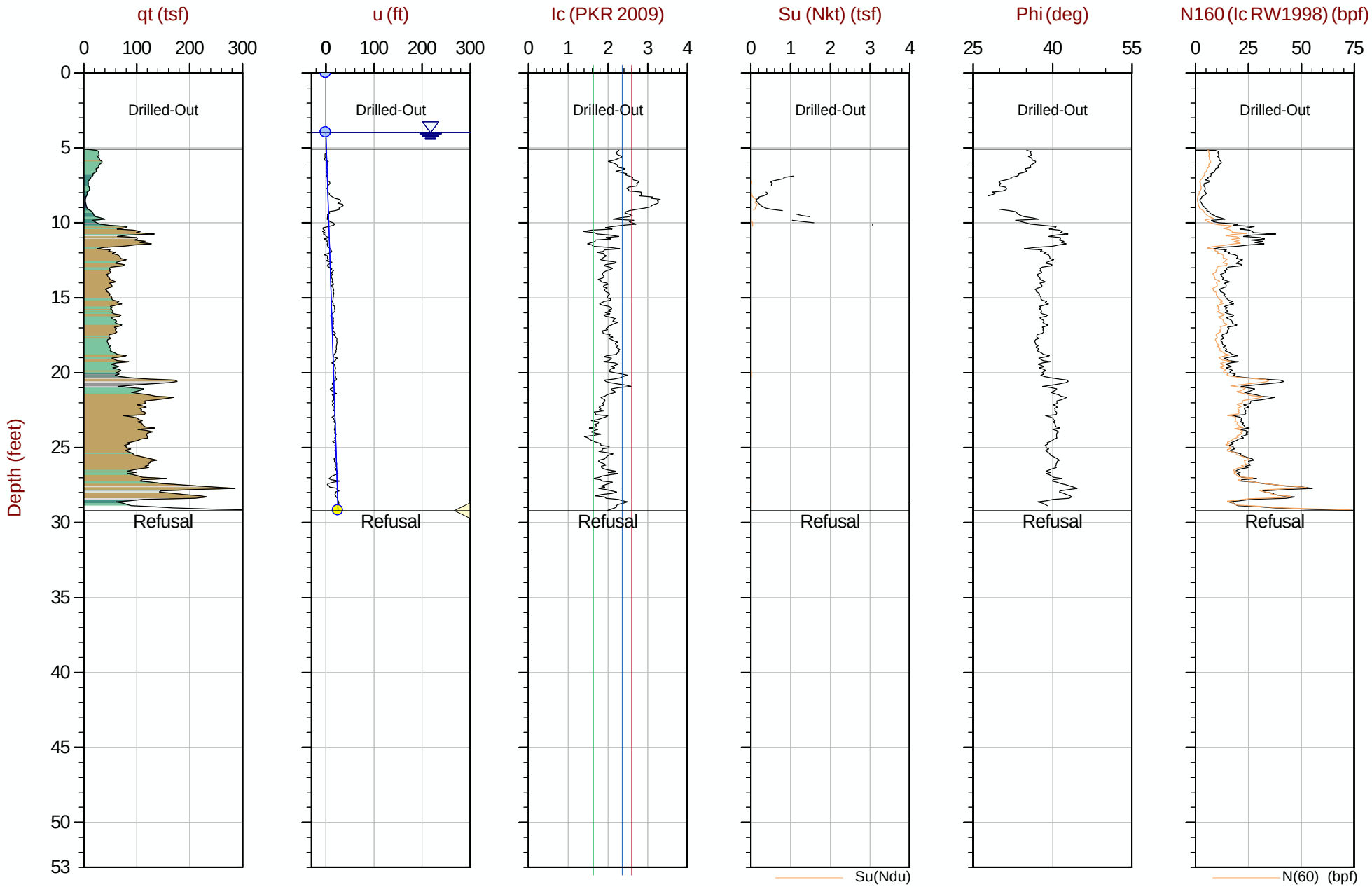
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35



Max Depth: 8.900 m / 29.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03B.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420335m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

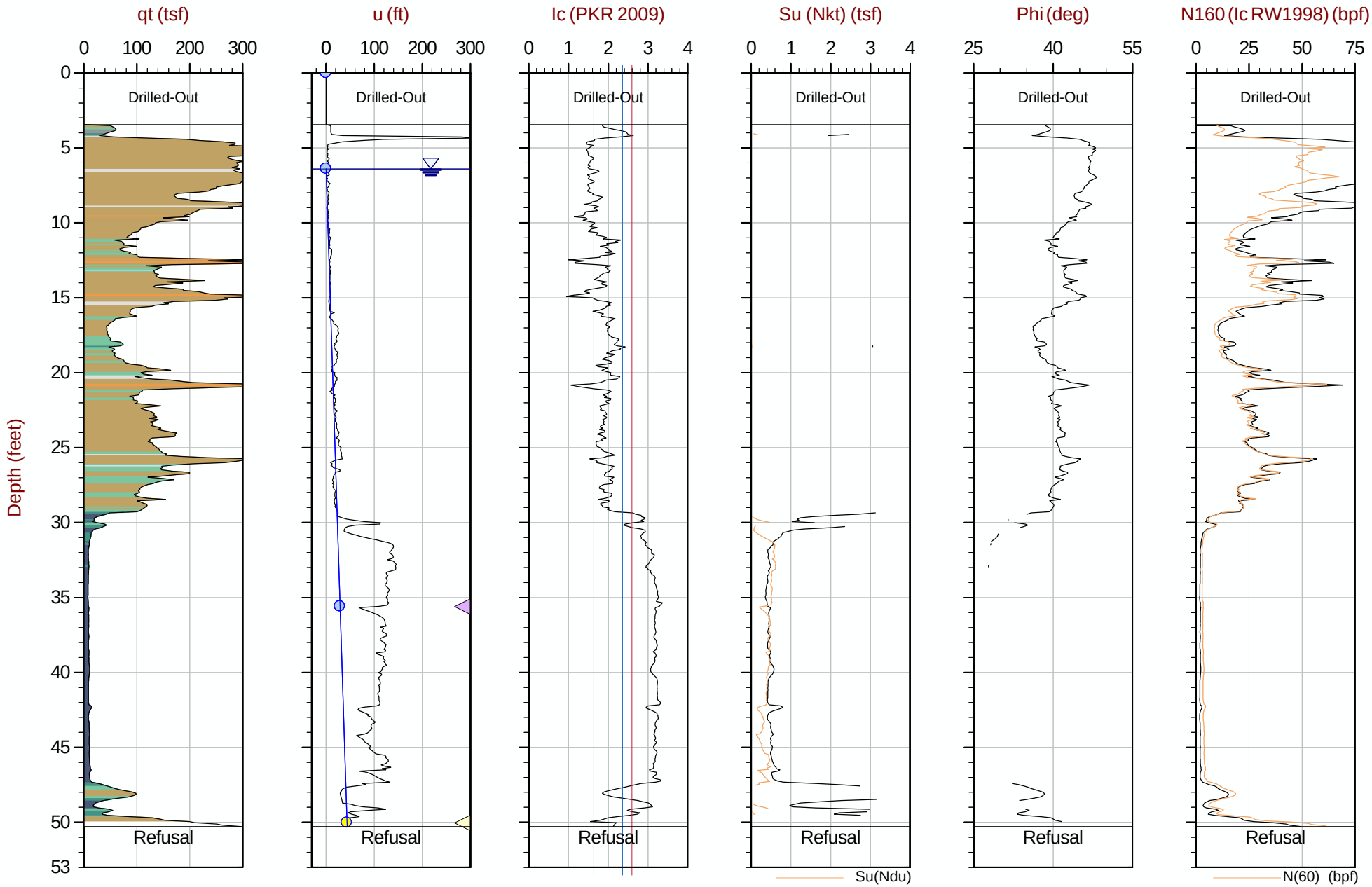
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35



Max Depth: 15.325 m / 50.28 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP04.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420313m E: 488708m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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 Behavior Type (SBT) Scatter Plots

CONETEC

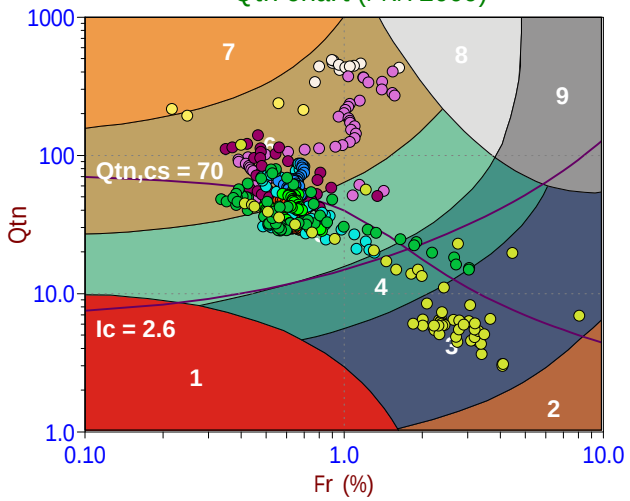
CONETEC

Earth Engineering

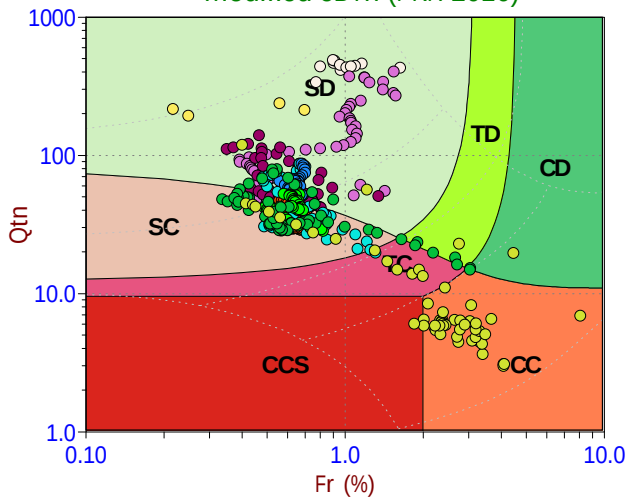
Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35

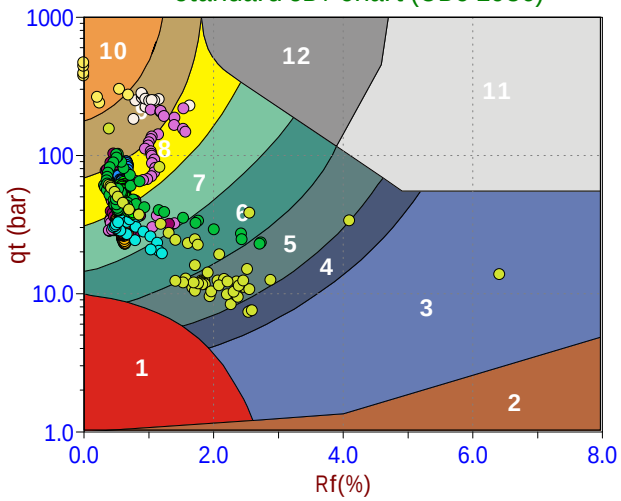
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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

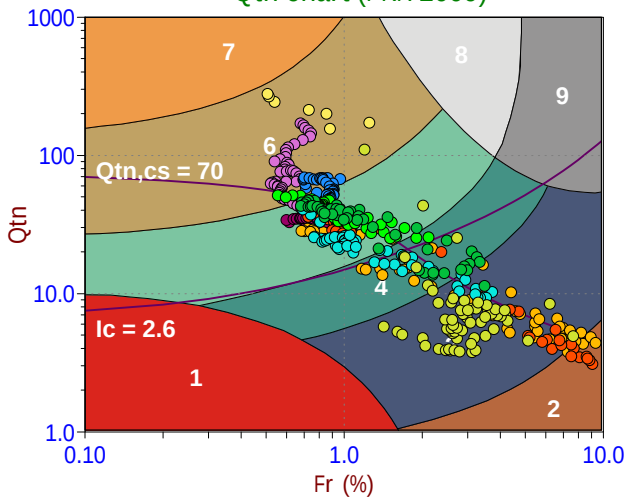
CONETEC

Earth Engineering

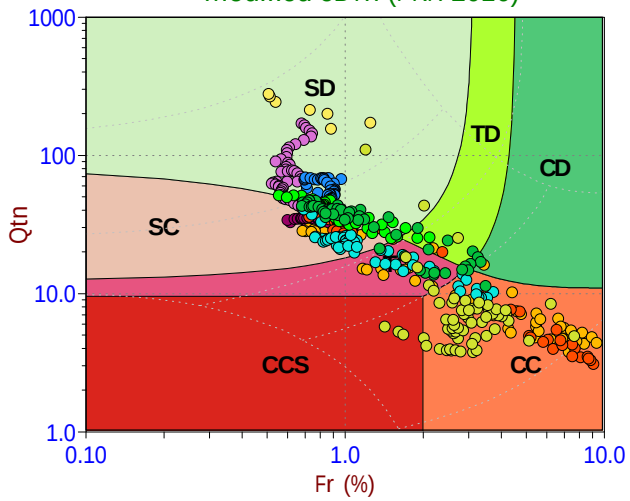
Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35

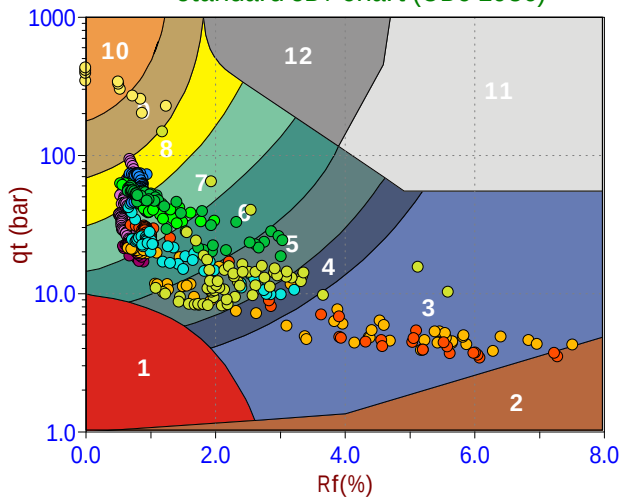
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
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- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend

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Legend

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Legend

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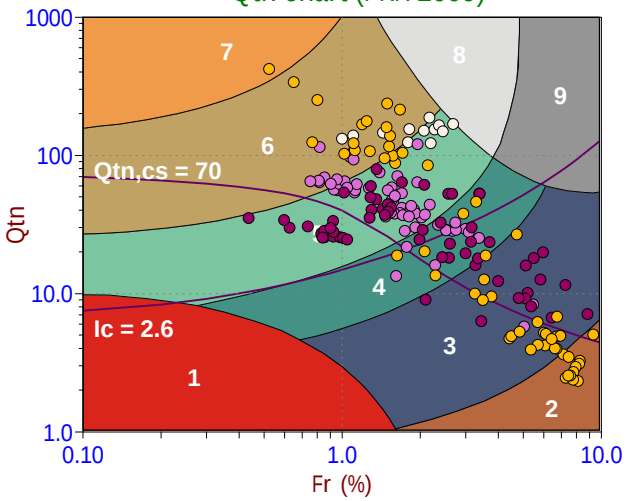
CONETEC

Earth Engineering

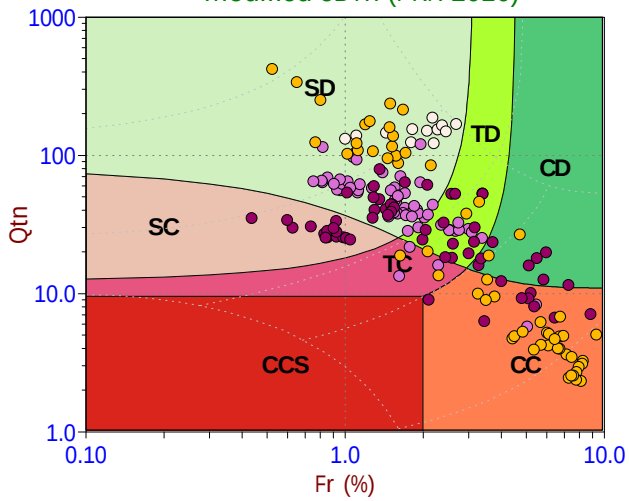
Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35

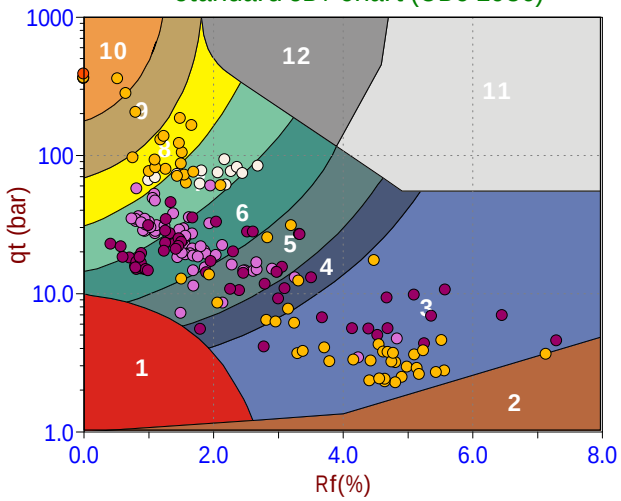
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



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- >5.0 to 10.0 ft
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- >15.0 to 20.0 ft
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- >40.0 to 45.0 ft
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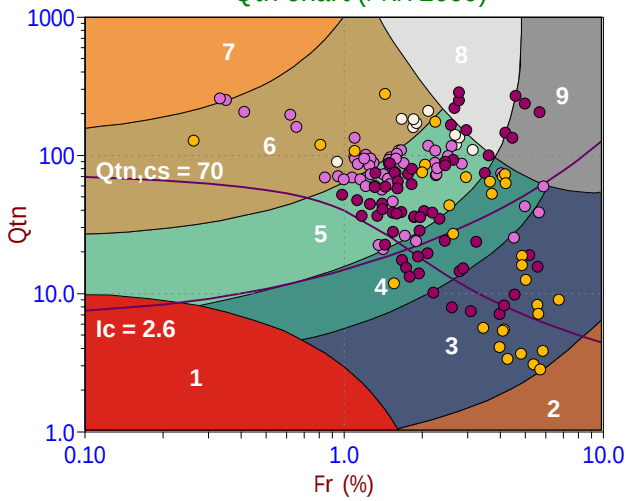
CONETEC

Earth Engineering

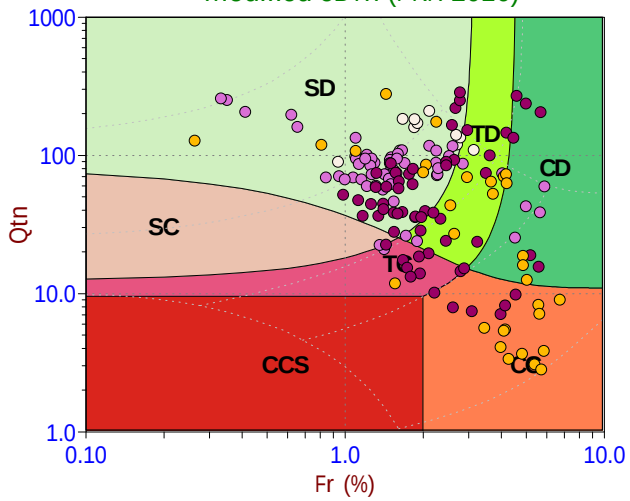
Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35

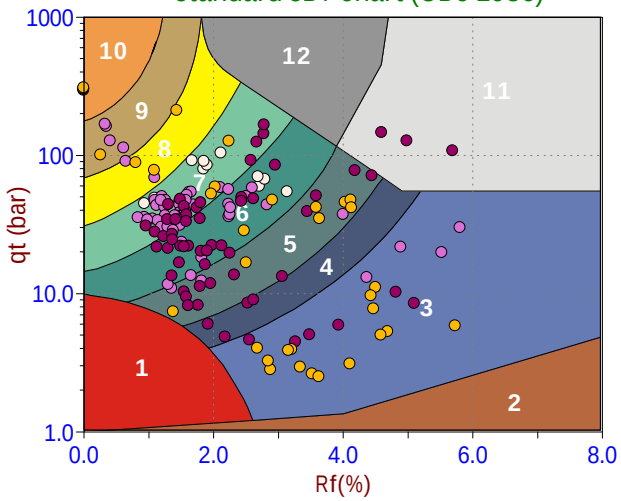
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



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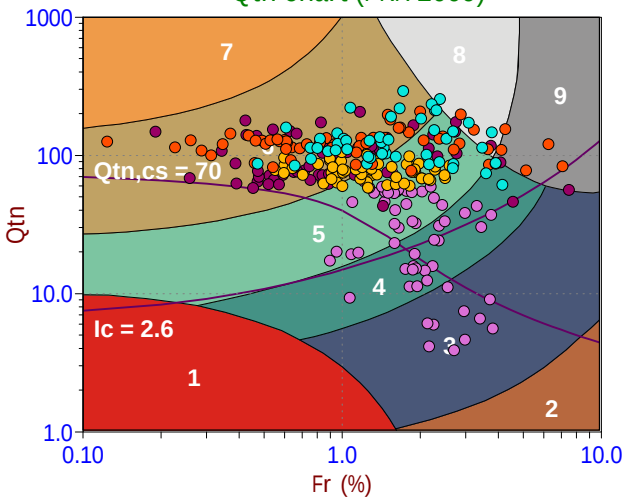
CONETEC

Earth Engineering

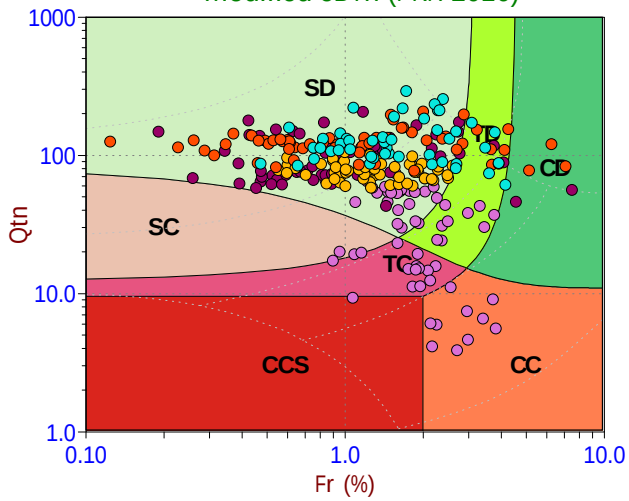
Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35

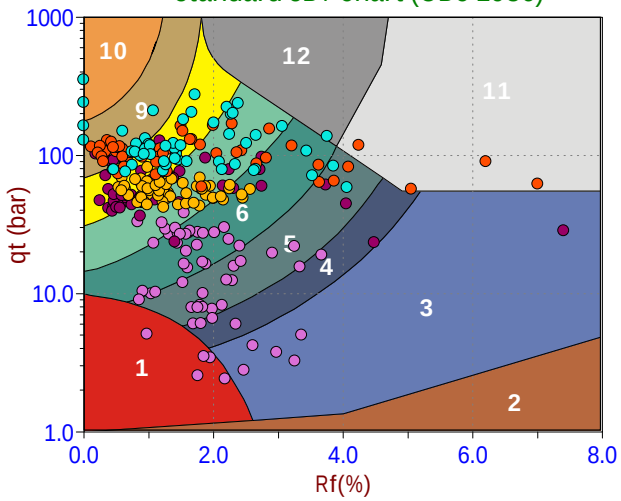
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



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- >15.0 to 20.0 ft
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- Stiff Fine Grained
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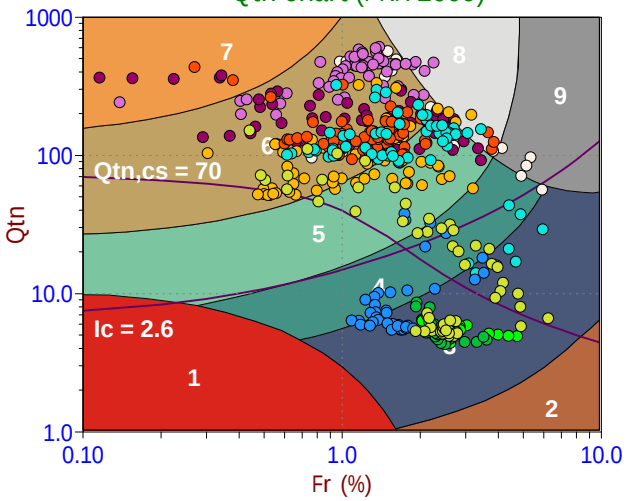
CONETEC

Earth Engineering

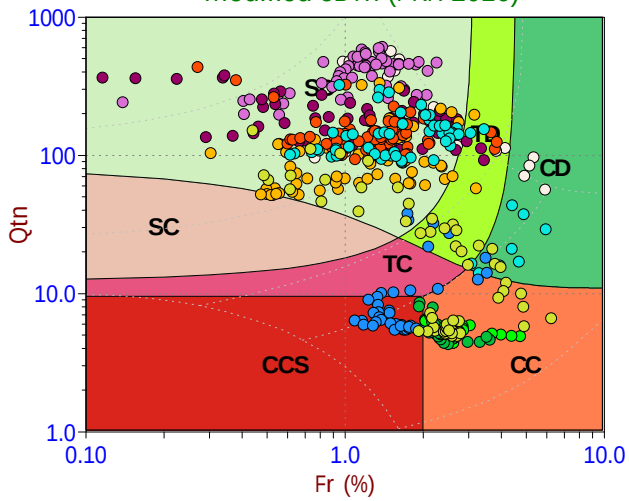
Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35

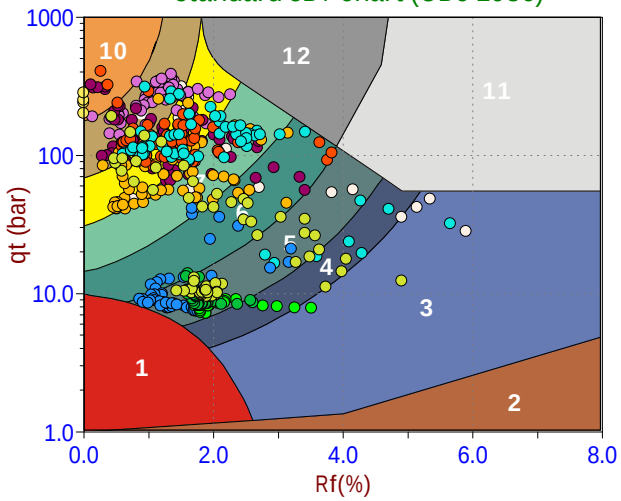
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
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- >20.0 to 25.0 ft
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- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
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Legend

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Legend

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- Organic Soil
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- Sandy Silt
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- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Job No:	21-53-22727
Client:	Earth Engineering
Project:	Balzano Marine Terminal, Camden, NJ
Start Date:	16-Jul-2021
End Date:	16-Jul-2021

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)
CPT21-01	21-53-22727_CP01	15	250	13.37	7.4	5.9				
CPT21-01	21-53-22727_CP01	15	180	50.61	42.1	8.5				
CPT21-02	21-53-22727_CP02	15	400	50.85	44.2	6.7				
CPT21-03	21-53-22727_CP03	15	100	20.01	15.3	4.7				
CPT21-03A	21-53-22727_CP03A	15	150	18.04	13.9	4.1				
CPT21-03B	21-53-22727_CP03B	15	180	29.20	25.2	4.0				
CPT21-04	21-53-22727_CP04	15	400	35.60	29.2		6.4	336	100	2.1
CPT21-04	21-53-22727_CP04	15	410	50.03	43.6	6.4				
Totals	8 dissipations		34.5 min							

a. Time is relative to where umax occurred.

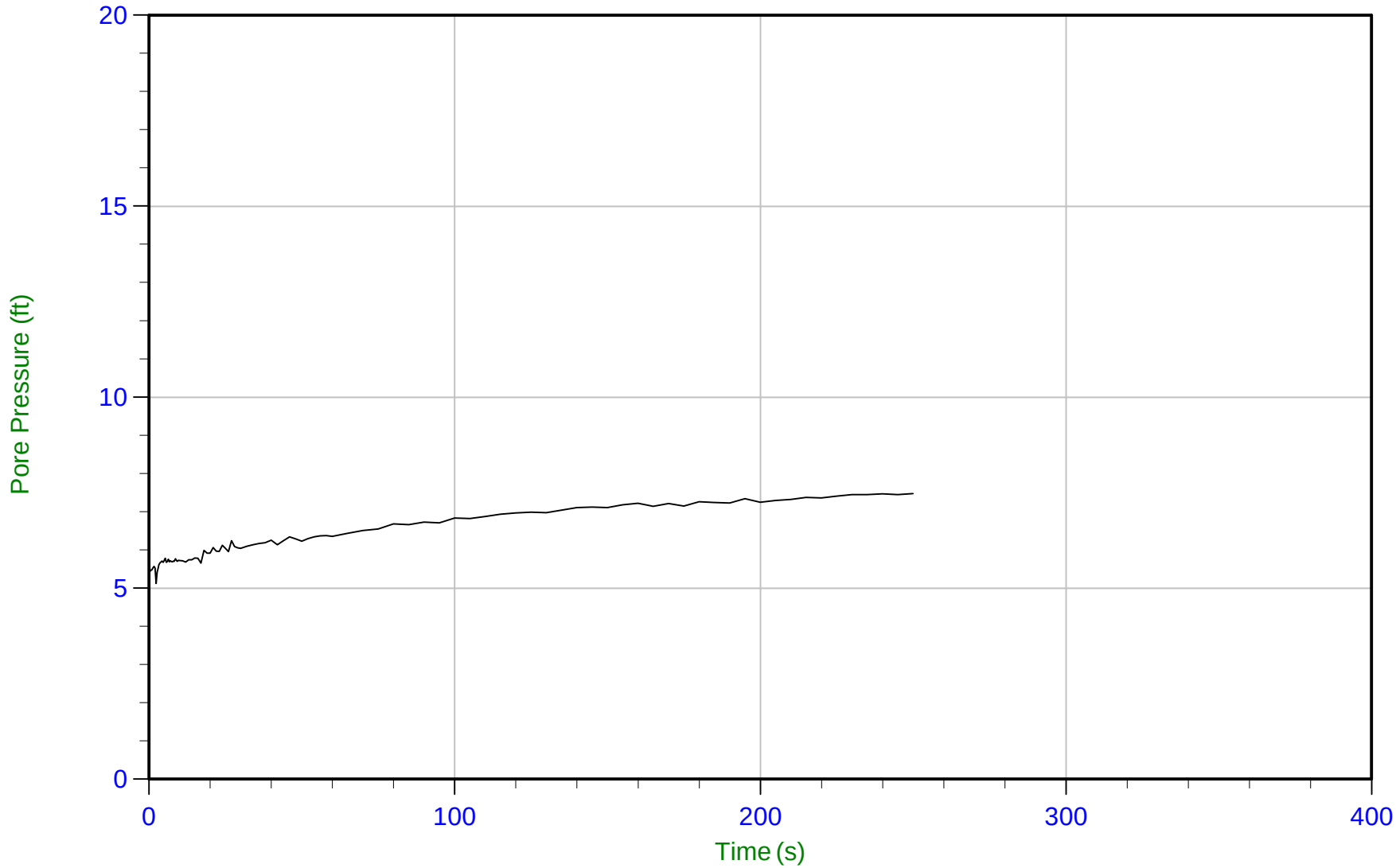
b. Houlsby and Teh, 1991.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP01.ppd2
Depth: 4.075 m / 13.369 ft
Duration: 250.0 s

u Min: 5.1 ft
u Max: 7.5 ft
u Final: 7.5 ft

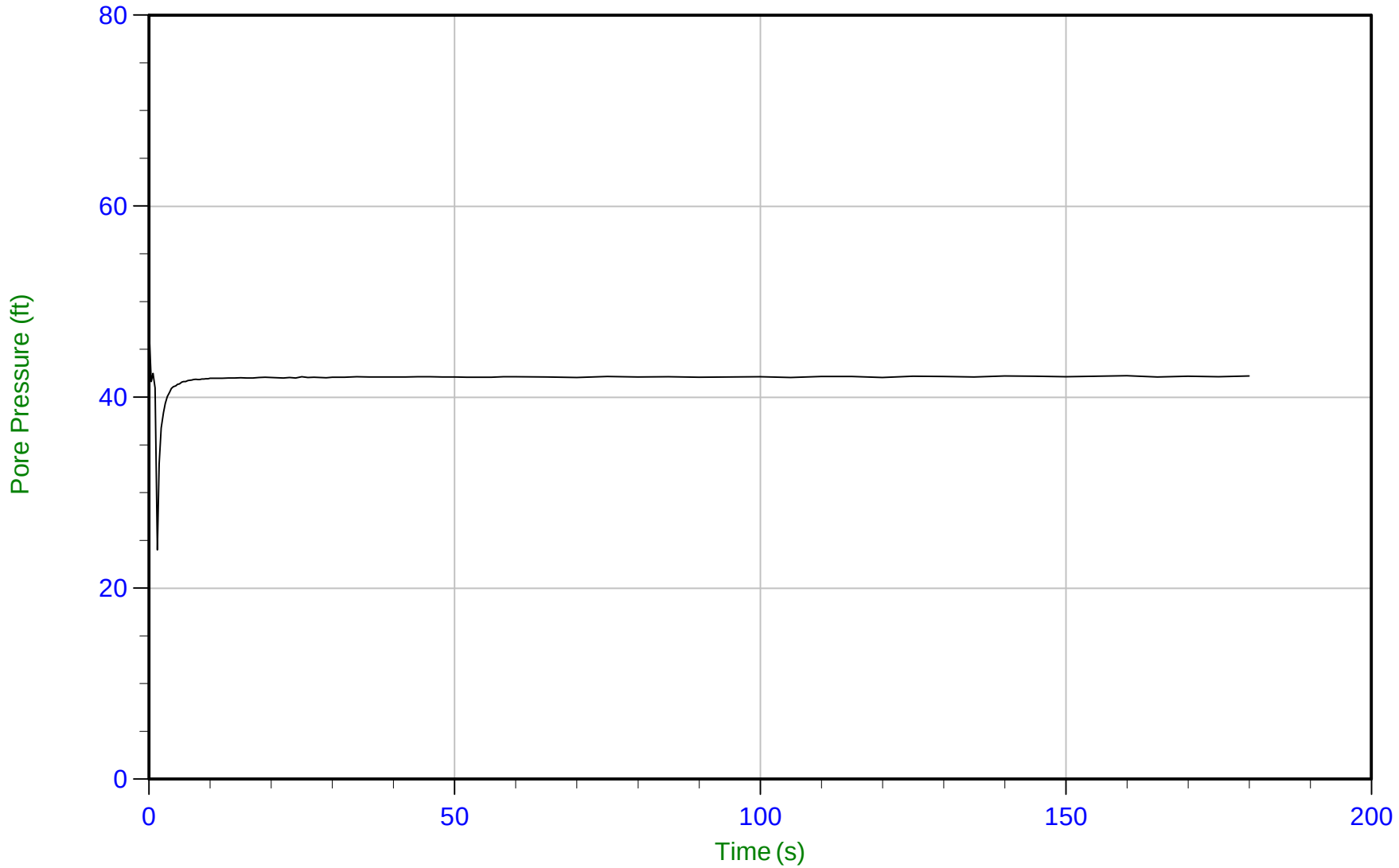
WT: 1.810 m / 5.938 ft
Ueq: 7.4 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP01.ppd2
Depth: 15.425 m / 50.606 ft
Duration: 180.0 s

u Min: 24.0 ft
u Max: 47.3 ft
u Final: 42.2 ft

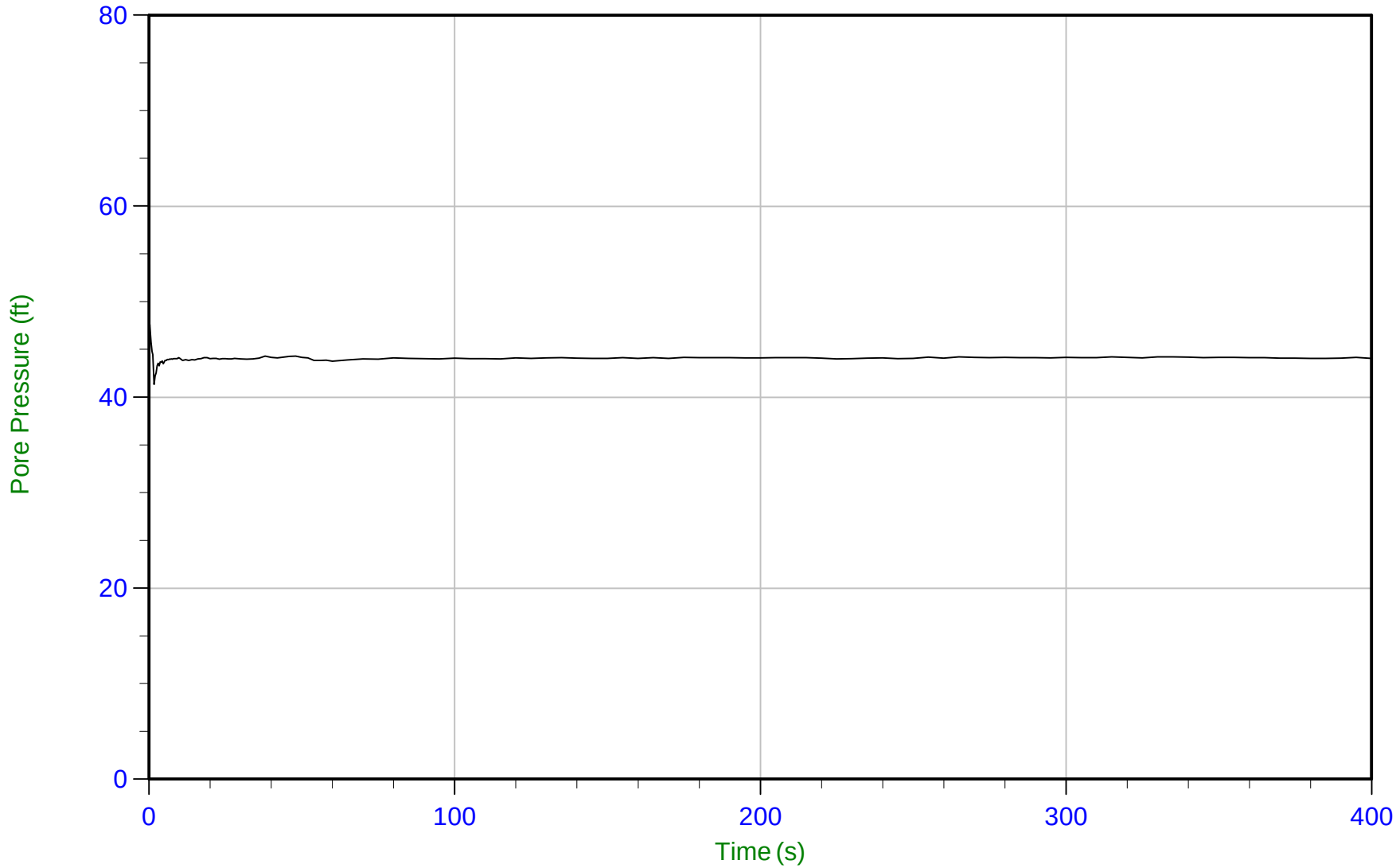
WT: 2.586 m / 8.484 ft
Ueq: 42.1 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP02.ppd2
Depth: 15.500 m / 50.852 ft
Duration: 400.0 s

u Min: 41.3 ft
u Max: 47.6 ft
u Final: 44.1 ft

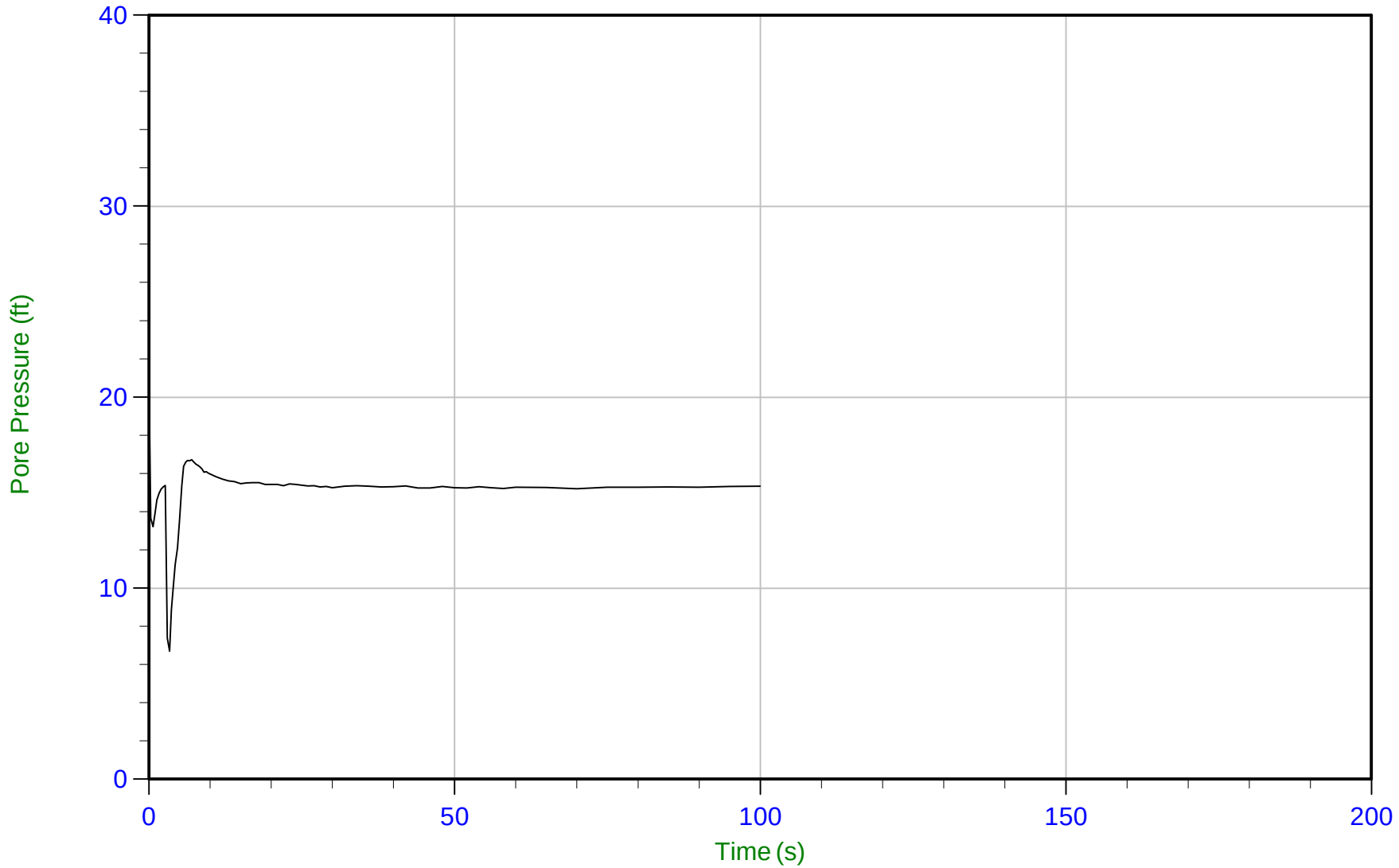
WT: 2.040 m / 6.692 ft
Ueq: 44.2 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03.ppd2
Depth: 6.100 m / 20.013 ft
Duration: 100.0 s

u Min: -7.4 ft
u Max: 20.6 ft
u Final: 15.3 ft

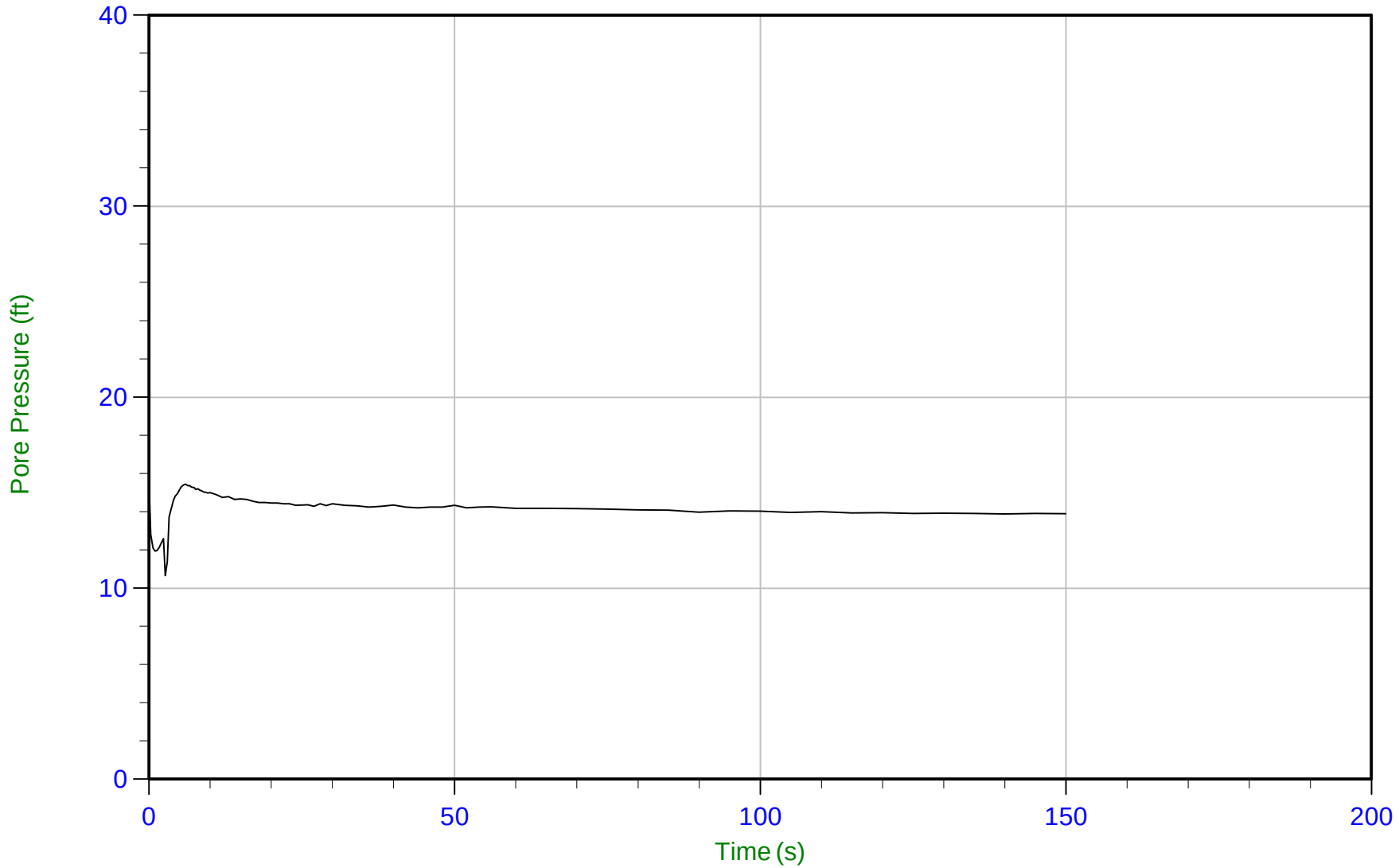
WT: 1.441 m / 4.726 ft
Ueq: 15.3 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03A.ppd2
Depth: 5.500 m / 18.044 ft
Duration: 150.0 s

u Min: 10.7 ft
u Max: 15.4 ft
u Final: 13.9 ft

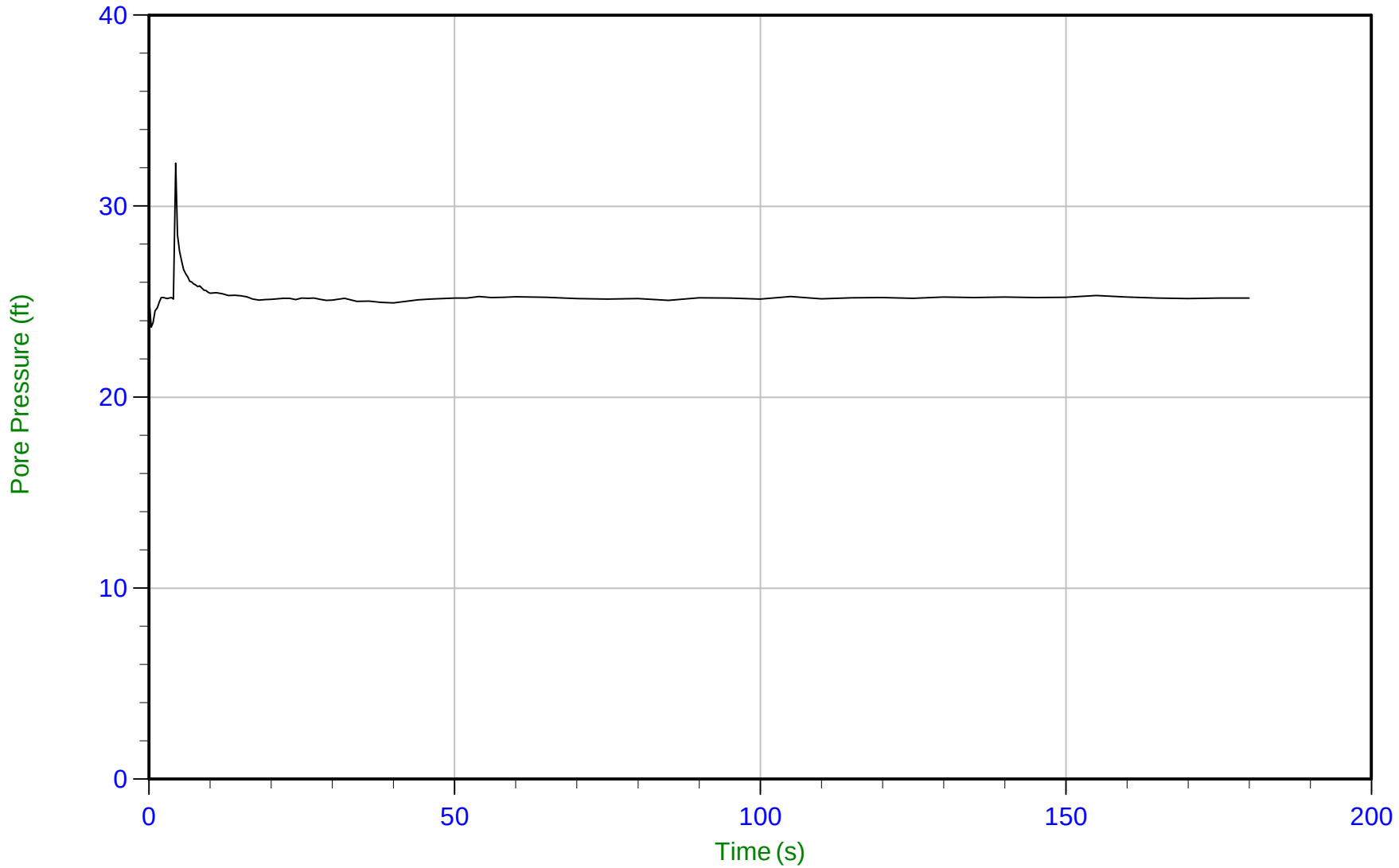
WT: 1.255 m / 4.117 ft
Ueq: 13.9 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03B.ppd2
Depth: 8.900 m / 29.199 ft
Duration: 180.0 s

u Min: 23.7 ft
u Max: 32.3 ft
u Final: 25.2 ft

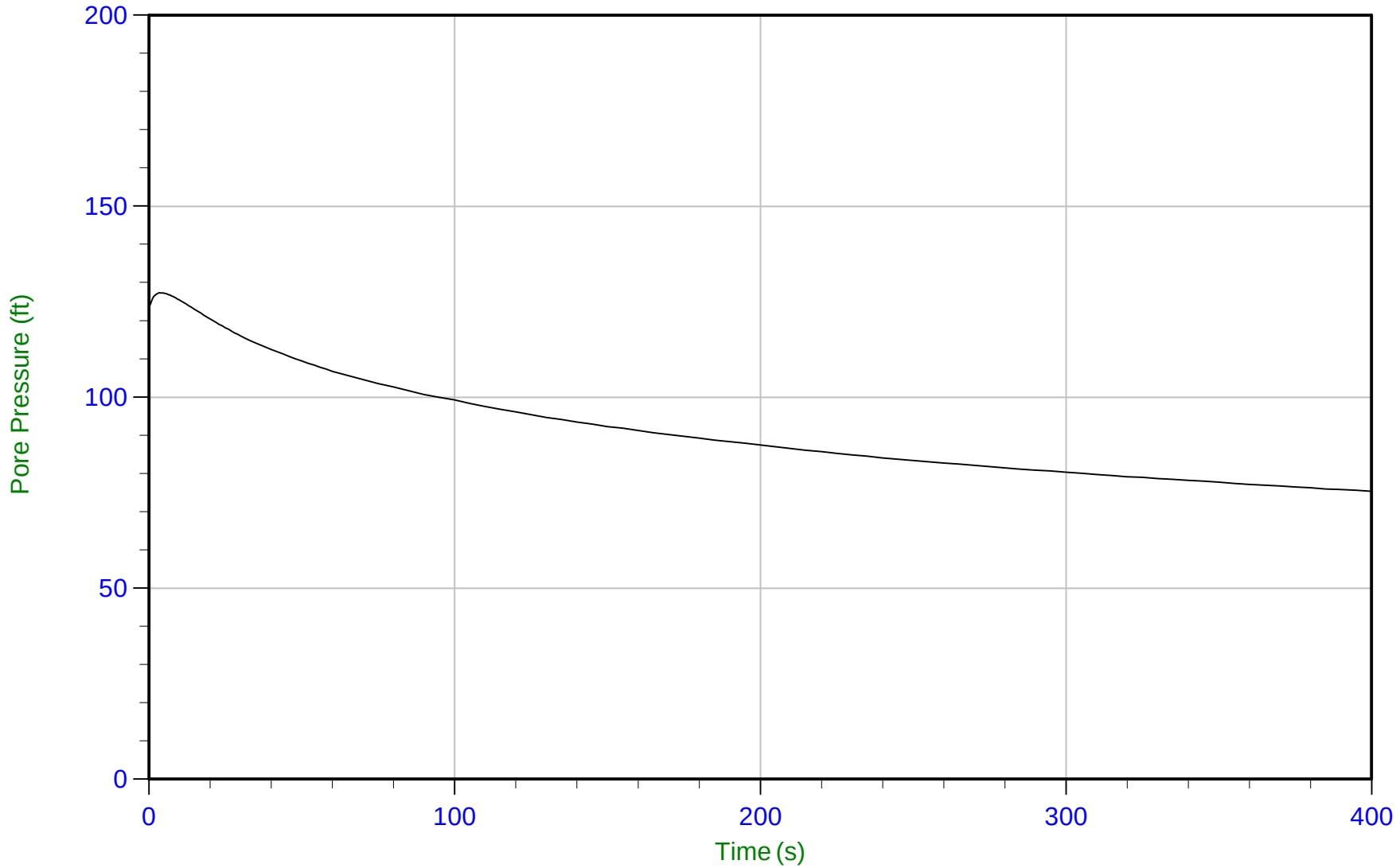
WT: 1.212 m / 3.976 ft
Ueq: 25.2 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP04.ppd2
Depth: 10.850 m / 35.597 ft
Duration: 400.0 s

u Min: 75.4 ft
u Max: 127.4 ft
u Final: 75.4 ft

WT: 1.951 m / 6.402 ft
Ueq: 29.2 ft
U(50): 78.28 ft

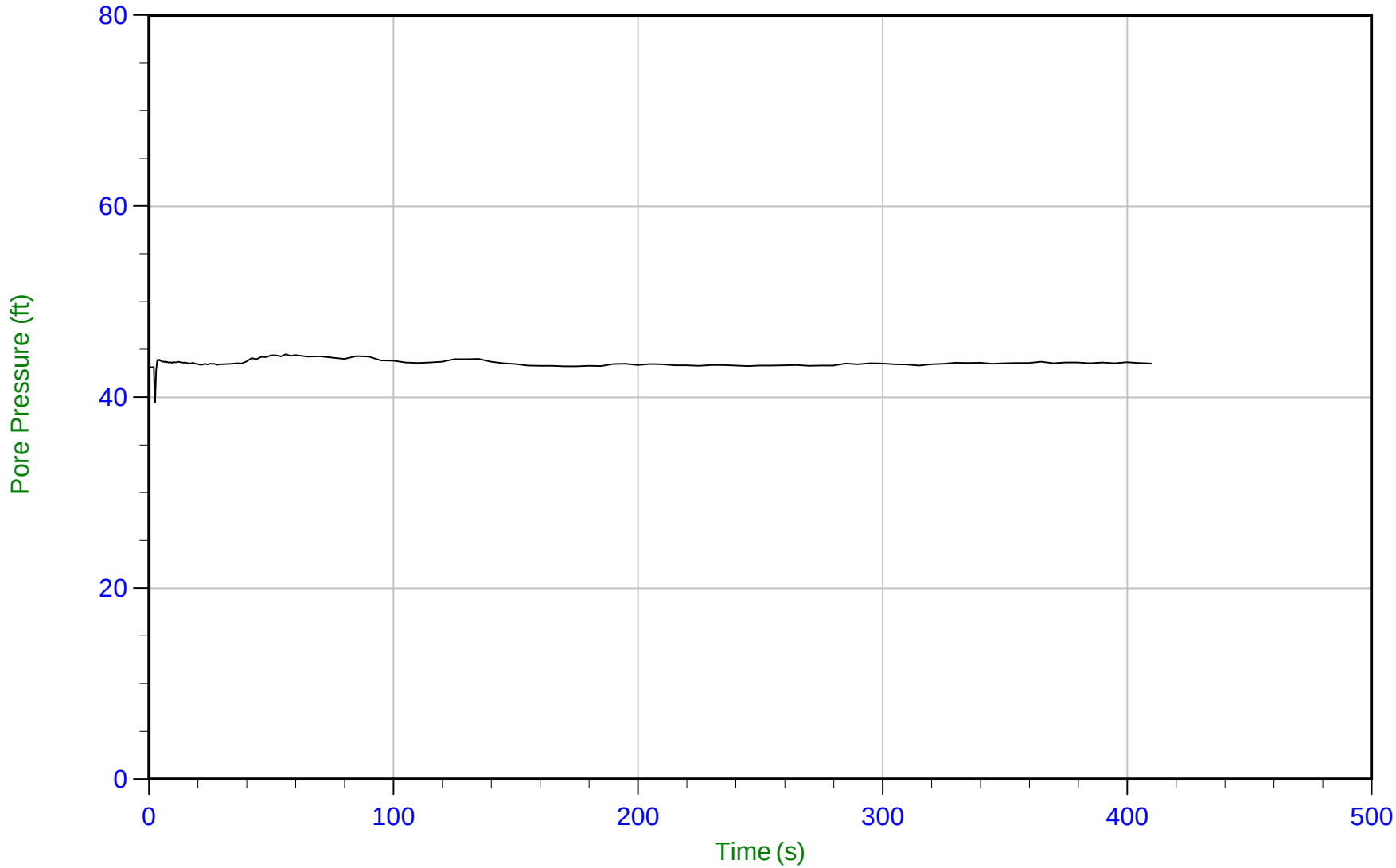
T(50): 335.7 s
Ir: 100
Ch: 2.1 cm²/min

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP04.ppd2
Depth: 15.250 m / 50.032 ft
Duration: 410.0 s

u Min: 39.5 ft
u Max: 44.5 ft
u Final: 43.5 ft

WT: 1.951 m / 6.402 ft
Ueq: 43.6 ft

Advanced Cone Penetration Plots with Ic, Su(Nkt), Phi and N1(60)Ic

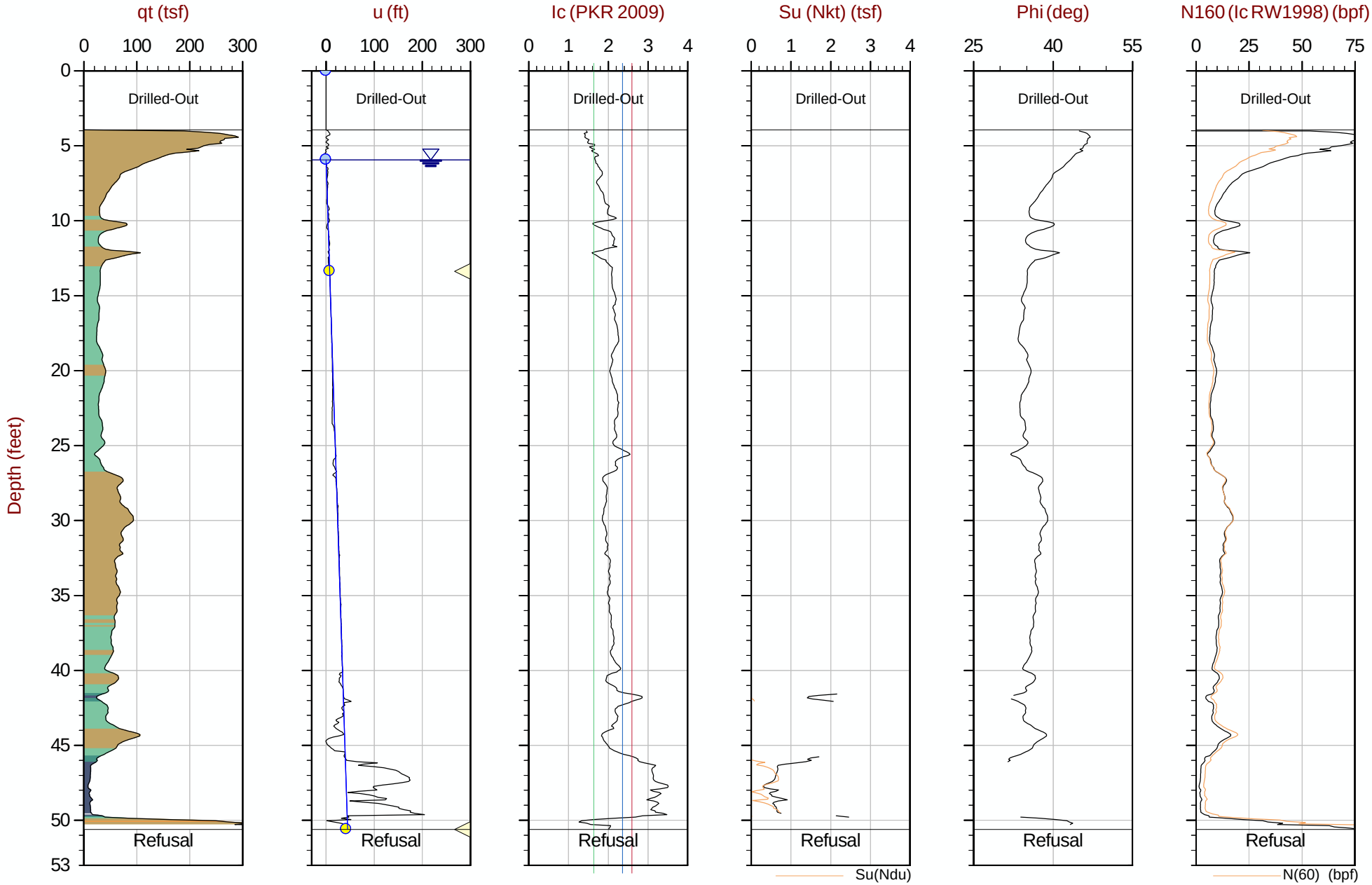
CONETEC

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35



Max Depth: 15.425 m / 50.61 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP01.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420419m E: 488718m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

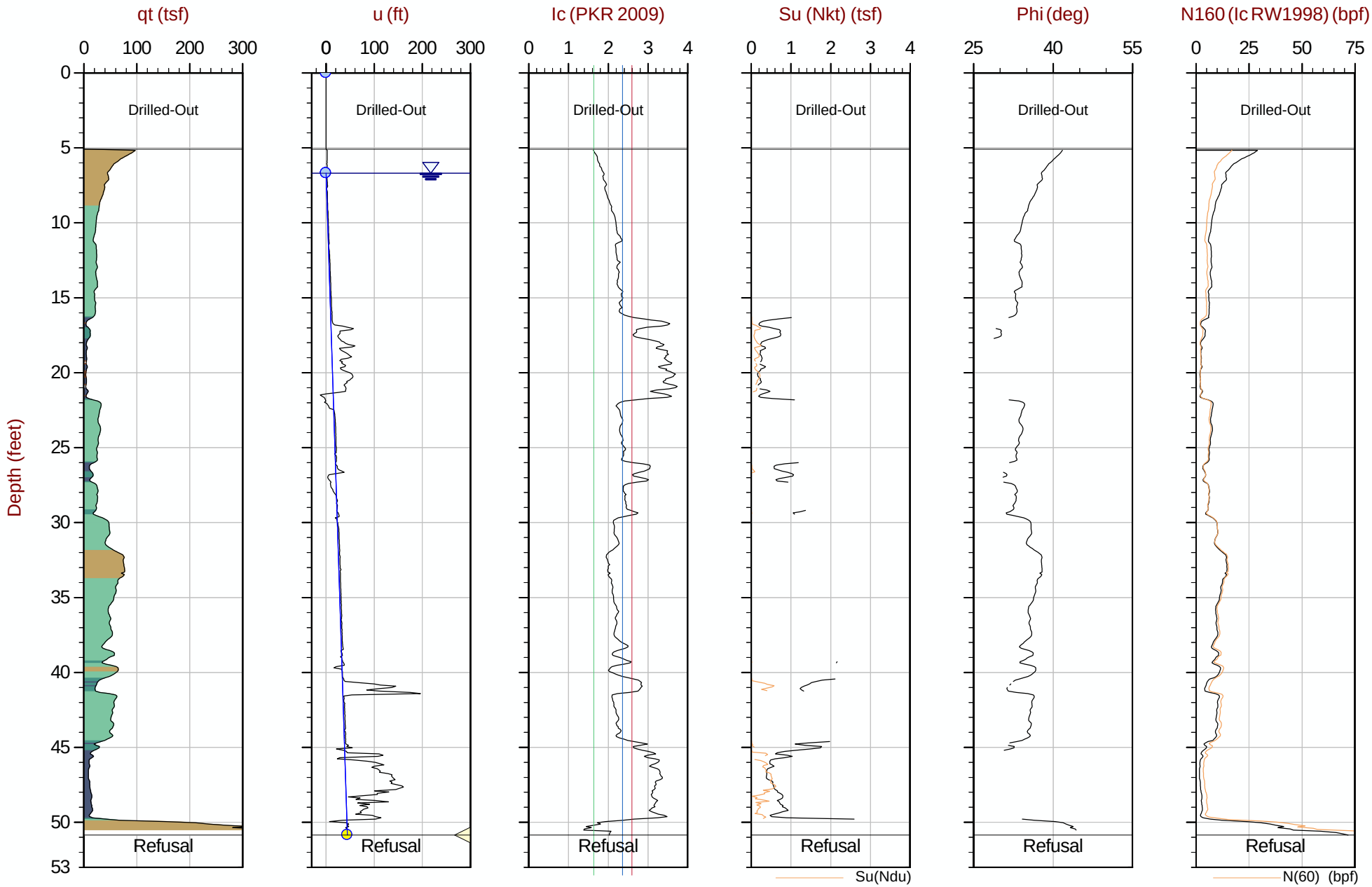
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35



Max Depth: 15.500 m / 50.85 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP02.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420375m E: 488712m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

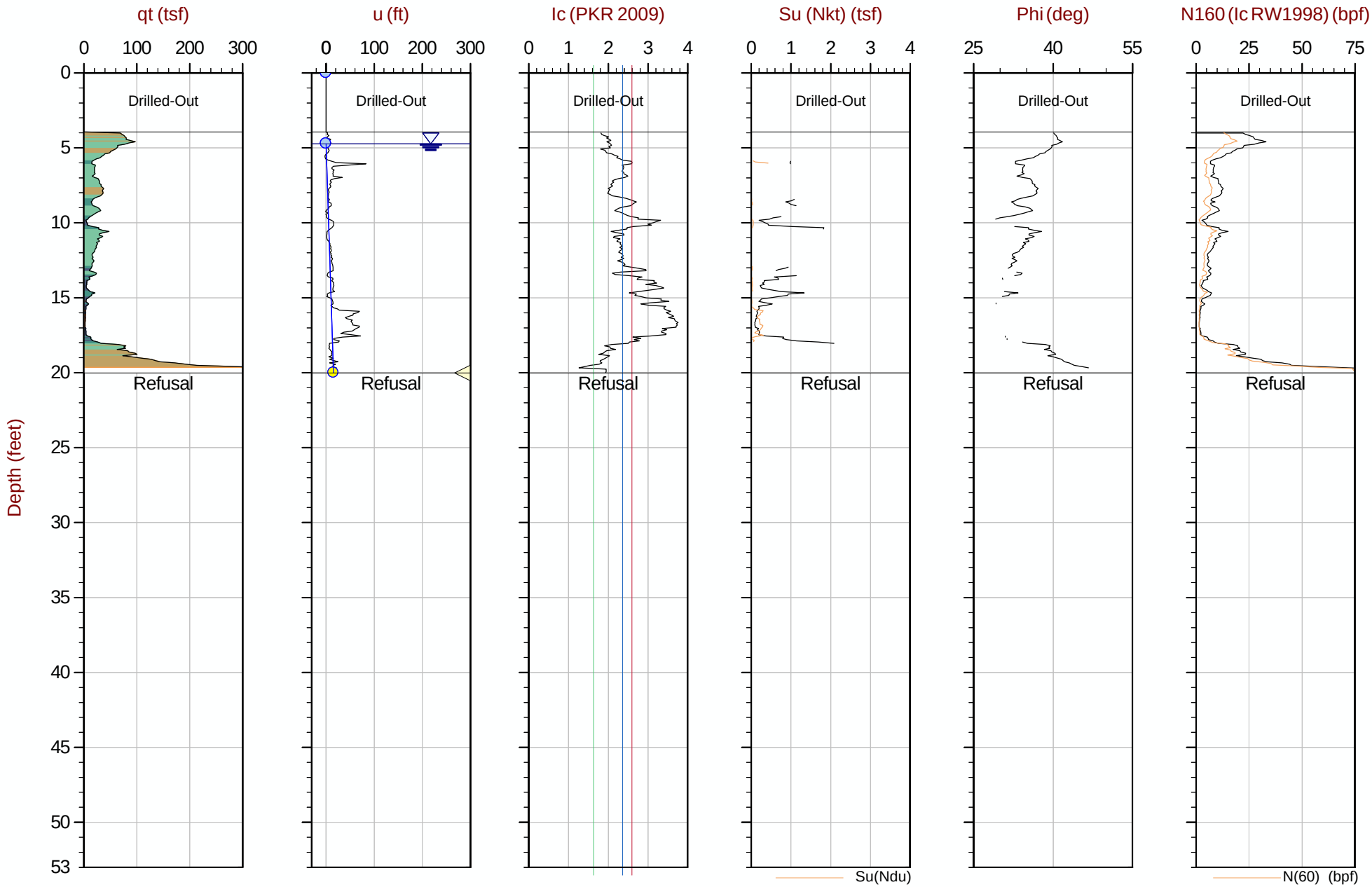
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420338m E: 488707m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

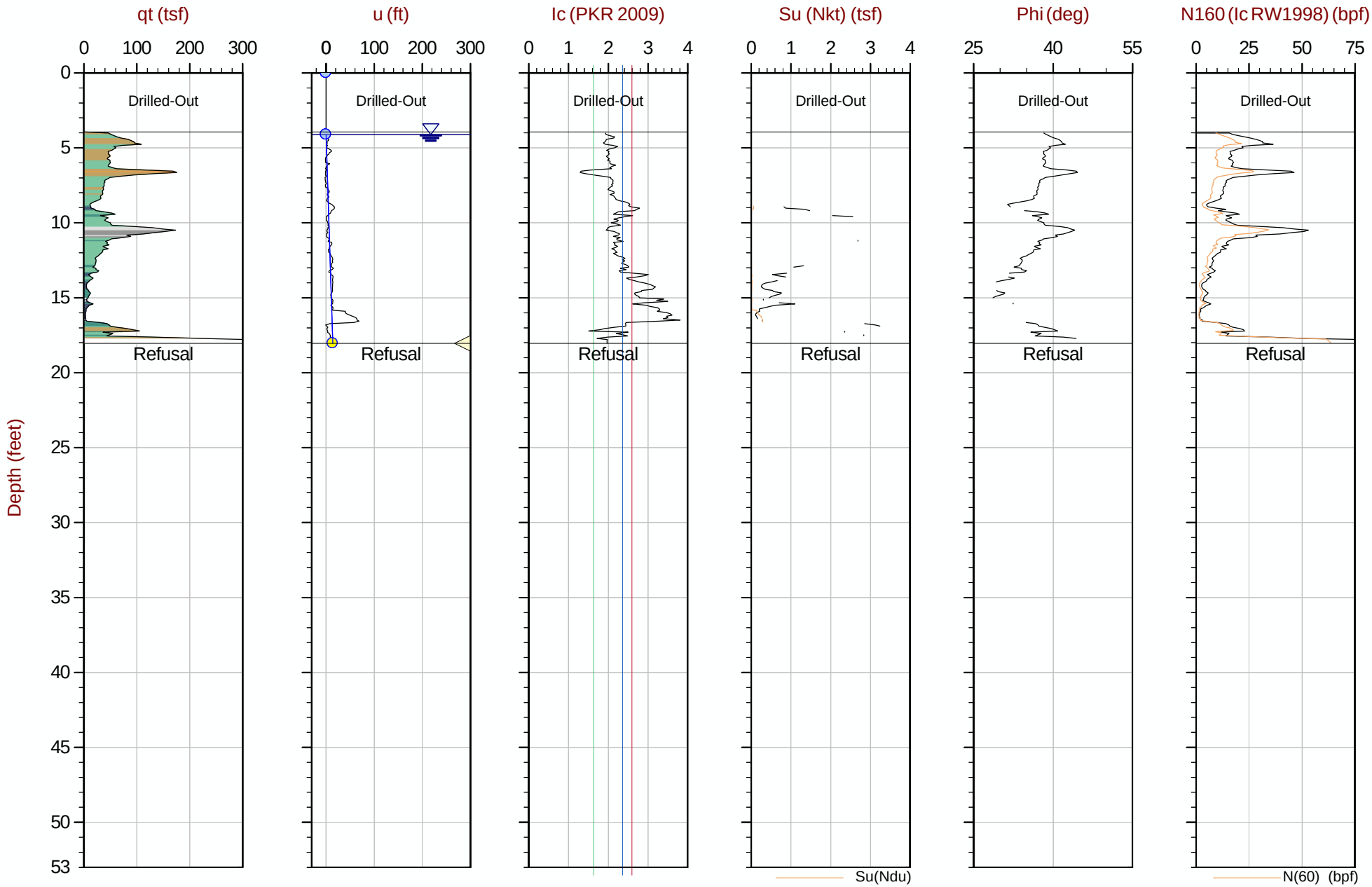
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03A.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420334m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

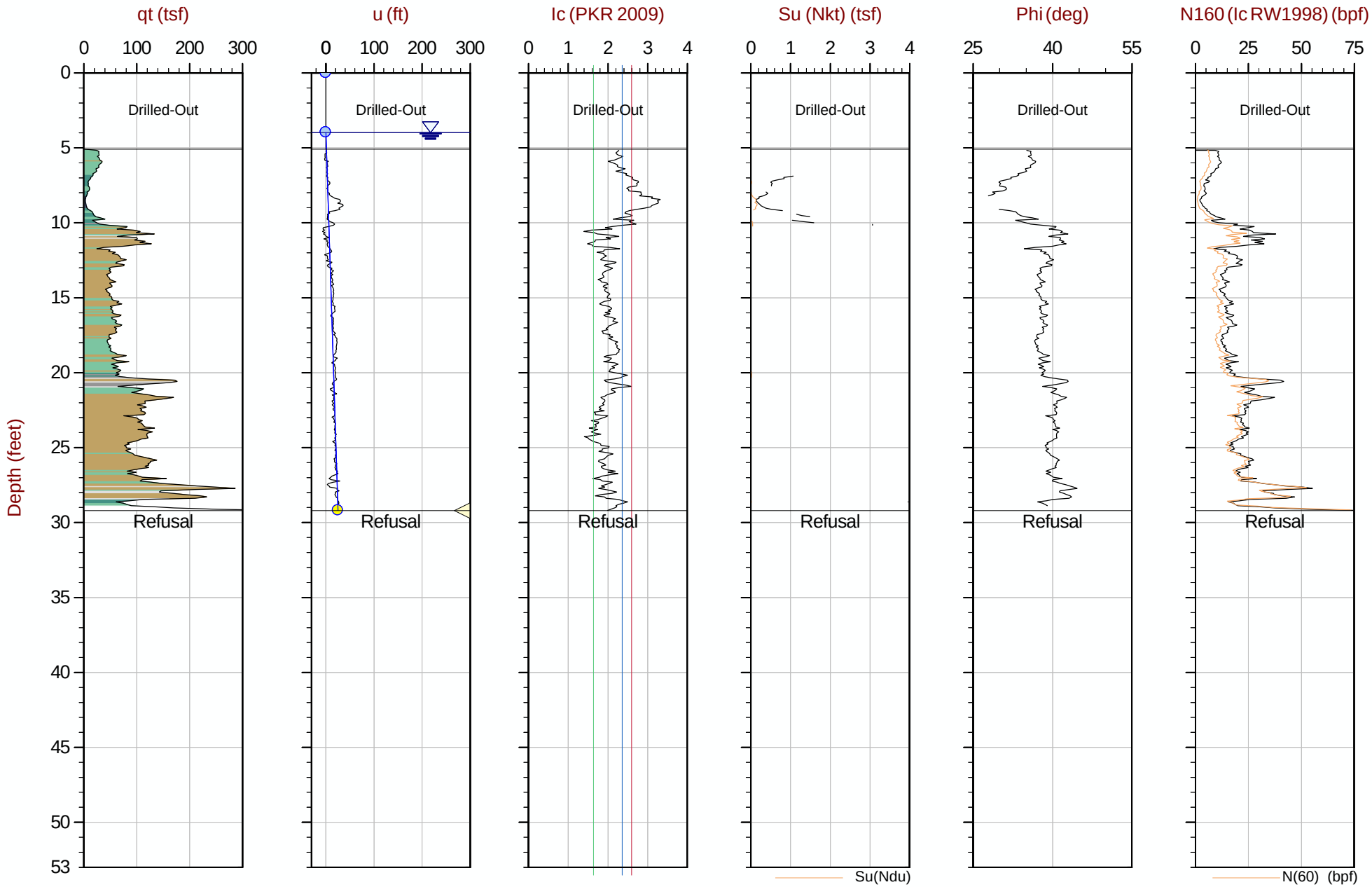
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35



Max Depth: 8.900 m / 29.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03B.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420335m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

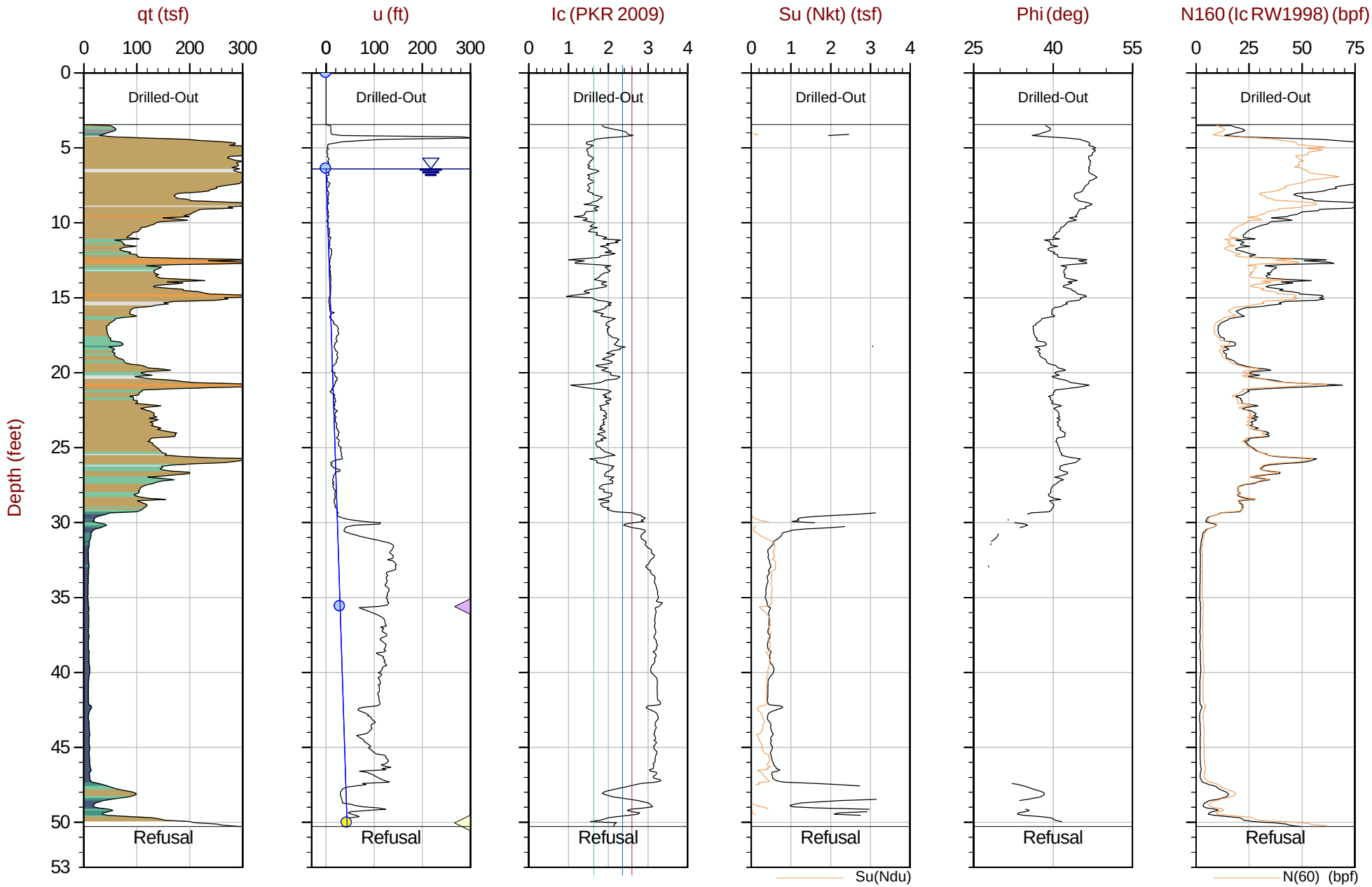
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35



Max Depth: 15.325 m / 50.28 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP04.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 6.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420313m E: 488708m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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 Behavior Type (SBT) Scatter Plots

CONETEC

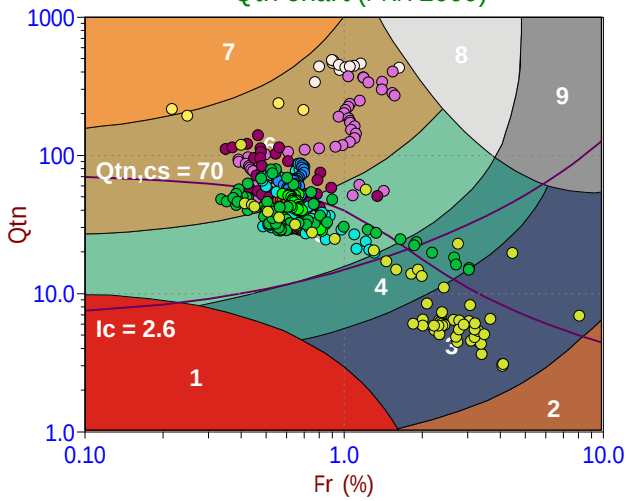
CONETEC

Earth Engineering

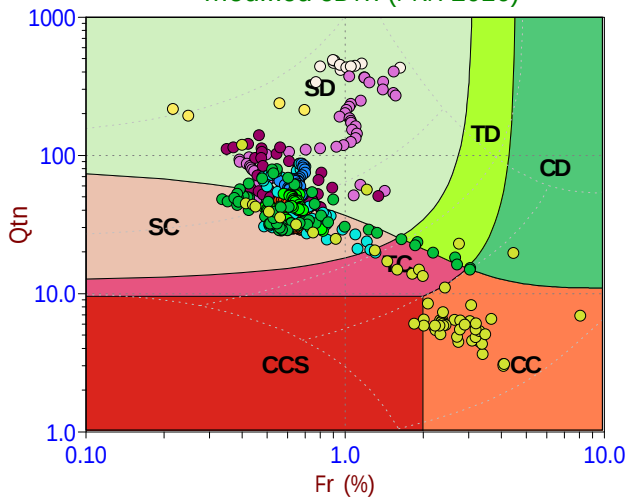
Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35

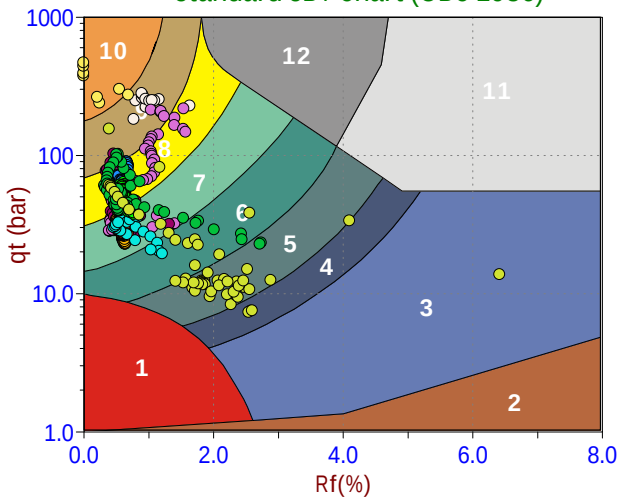
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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

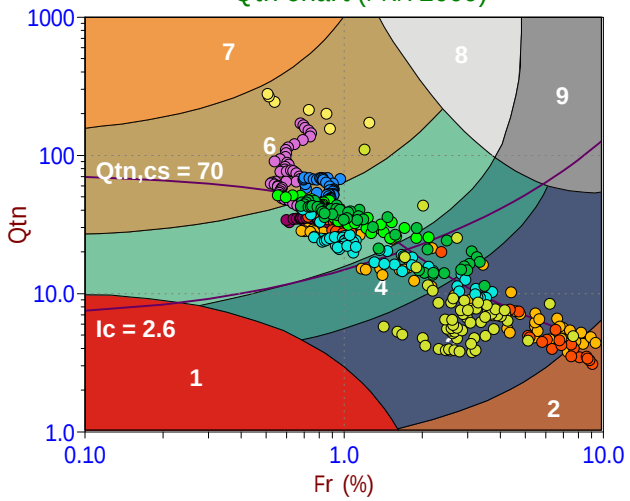
CONETEC

Earth Engineering

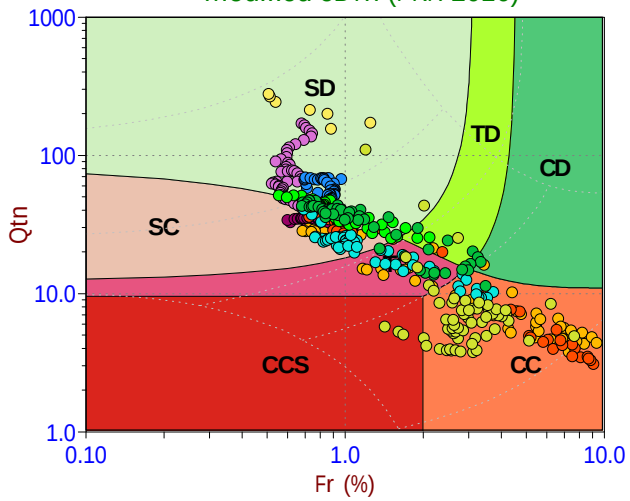
Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35

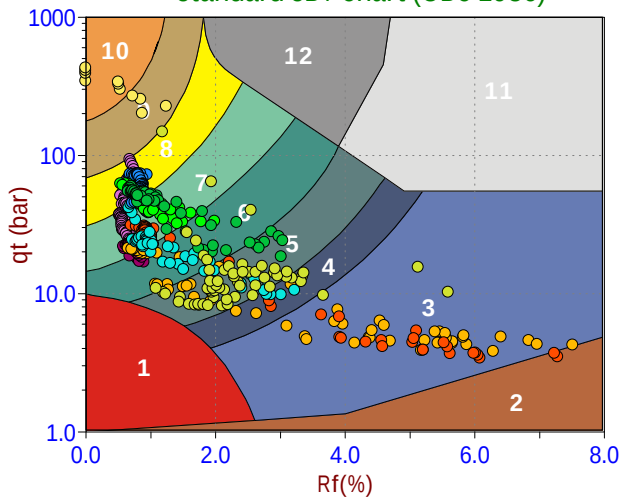
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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

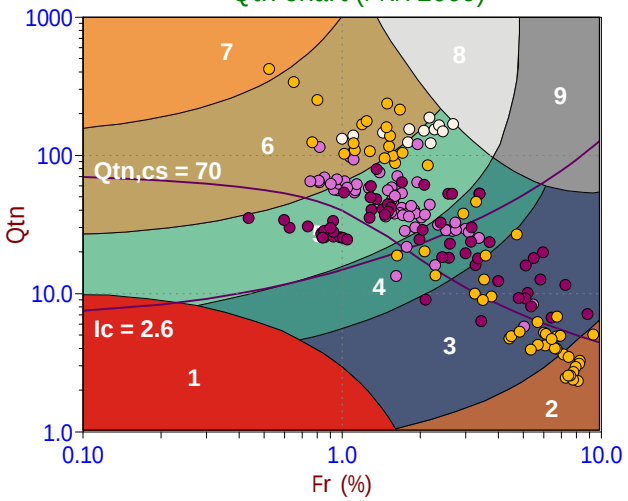
CONETEC

Earth Engineering

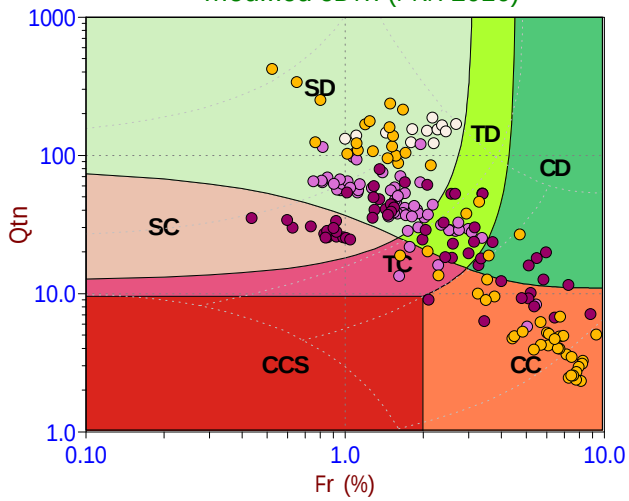
Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35

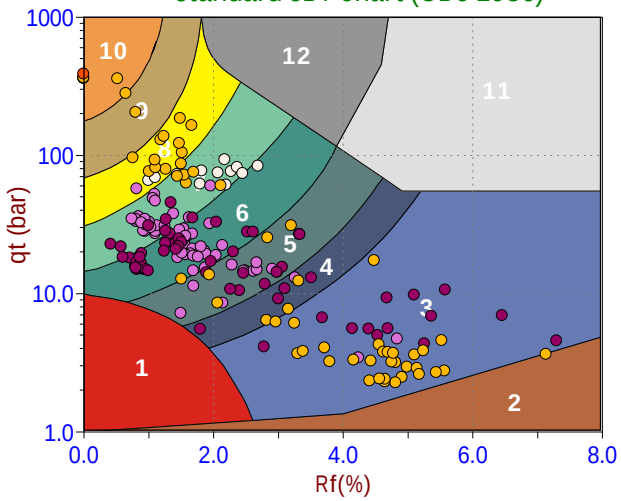
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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

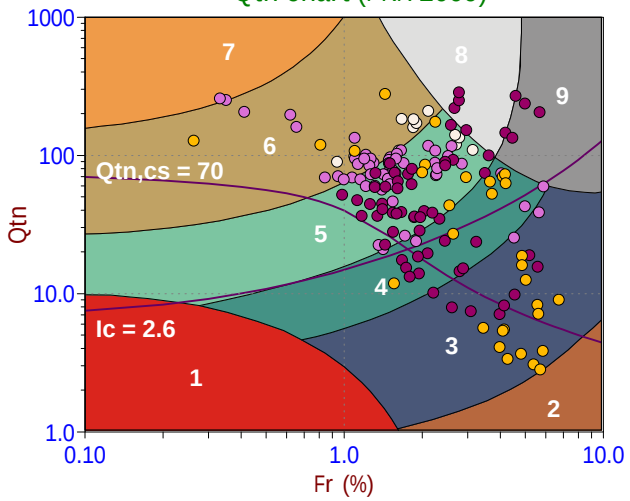
CONETEC

Earth Engineering

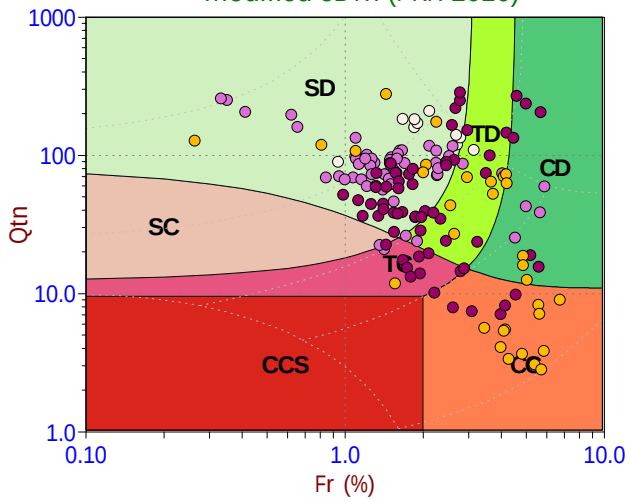
Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35

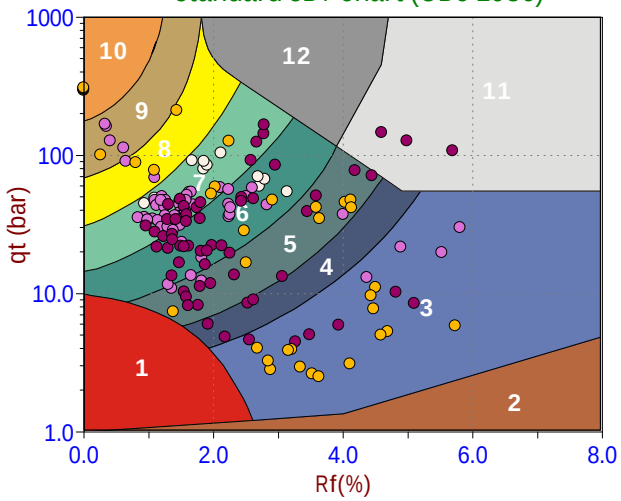
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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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- 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

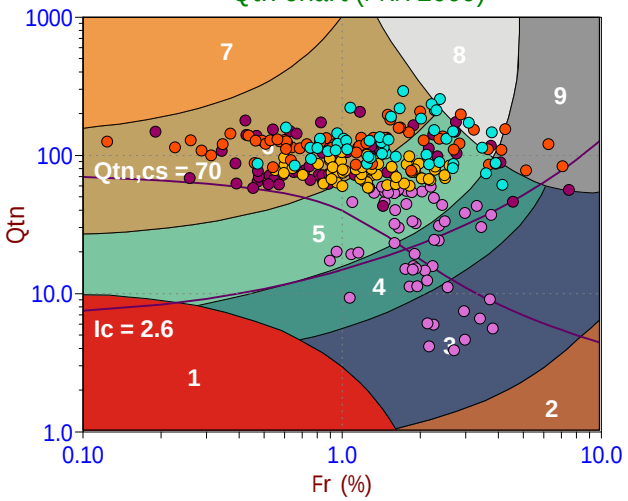
CONETEC

Earth Engineering

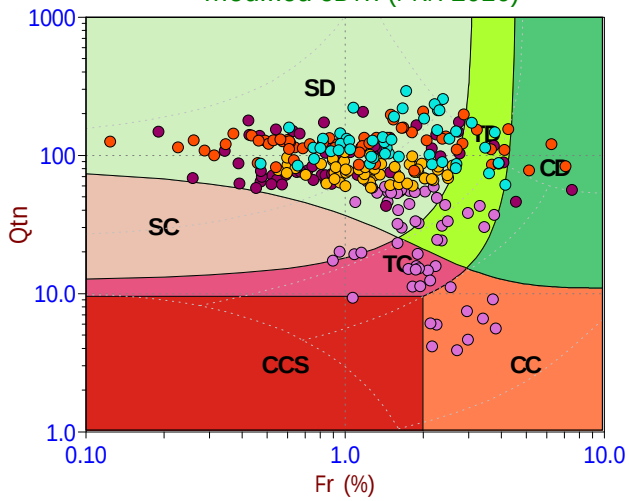
Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35

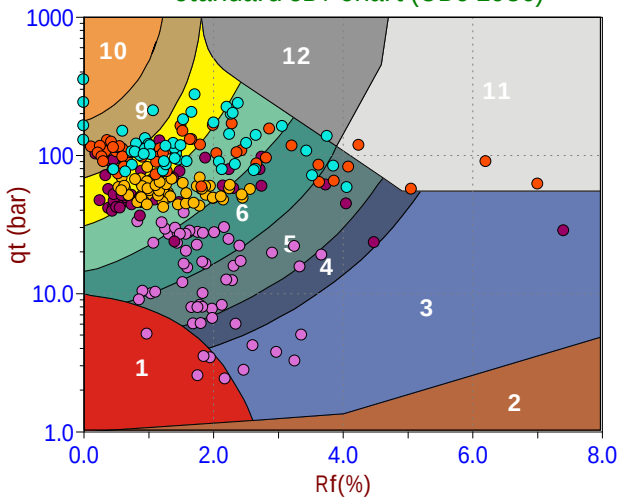
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

Legend

- Sensitive, Fine Grained
- Organic Soils
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- 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

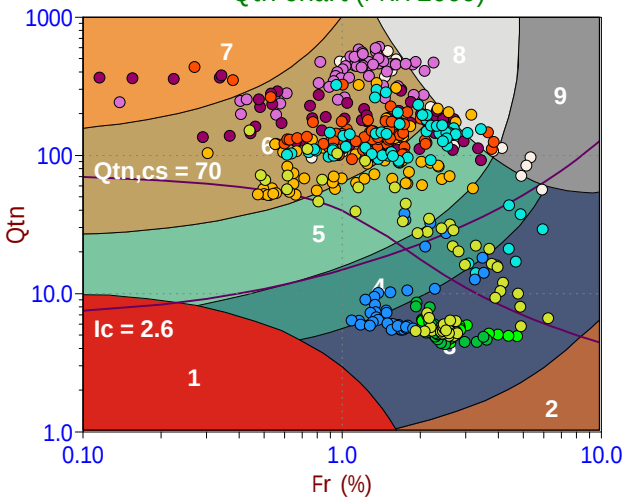
CONETEC

Earth Engineering

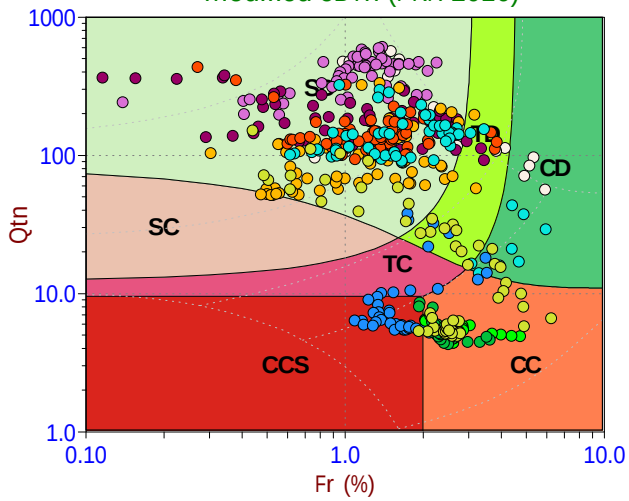
Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35

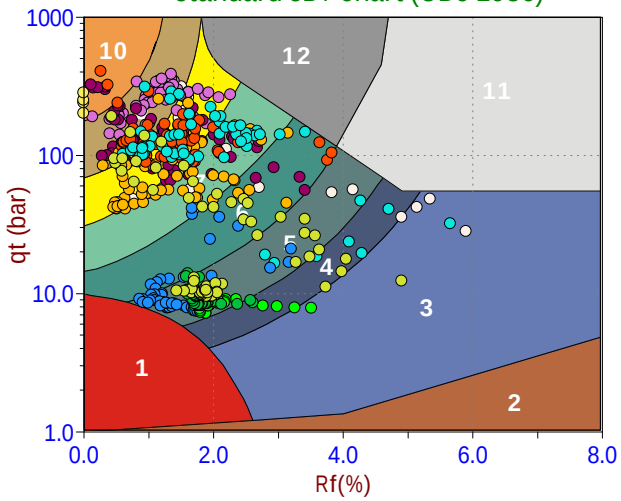
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 5.0 ft
- >5.0 to 10.0 ft
- >10.0 to 15.0 ft
- >15.0 to 20.0 ft
- >20.0 to 25.0 ft
- >25.0 to 30.0 ft
- >30.0 to 35.0 ft
- >35.0 to 40.0 ft
- >40.0 to 45.0 ft
- >45.0 to 50.0 ft
- >50.0 ft

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

Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Job No:	21-53-22727
Client:	Earth Engineering
Project:	Balzano Marine Terminal, Camden, NJ
Start Date:	16-Jul-2021
End Date:	16-Jul-2021

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)
CPT21-01	21-53-22727_CP01	15	250	13.37	7.4	5.9				
CPT21-01	21-53-22727_CP01	15	180	50.61	42.1	8.5				
CPT21-02	21-53-22727_CP02	15	400	50.85	44.2	6.7				
CPT21-03	21-53-22727_CP03	15	100	20.01	15.3	4.7				
CPT21-03A	21-53-22727_CP03A	15	150	18.04	13.9	4.1				
CPT21-03B	21-53-22727_CP03B	15	180	29.20	25.2	4.0				
CPT21-04	21-53-22727_CP04	15	400	35.60	29.2		6.4	336	100	2.1
CPT21-04	21-53-22727_CP04	15	410	50.03	43.6	6.4				
Totals	8 dissipations		34.5 min							

a. Time is relative to where umax occurred.

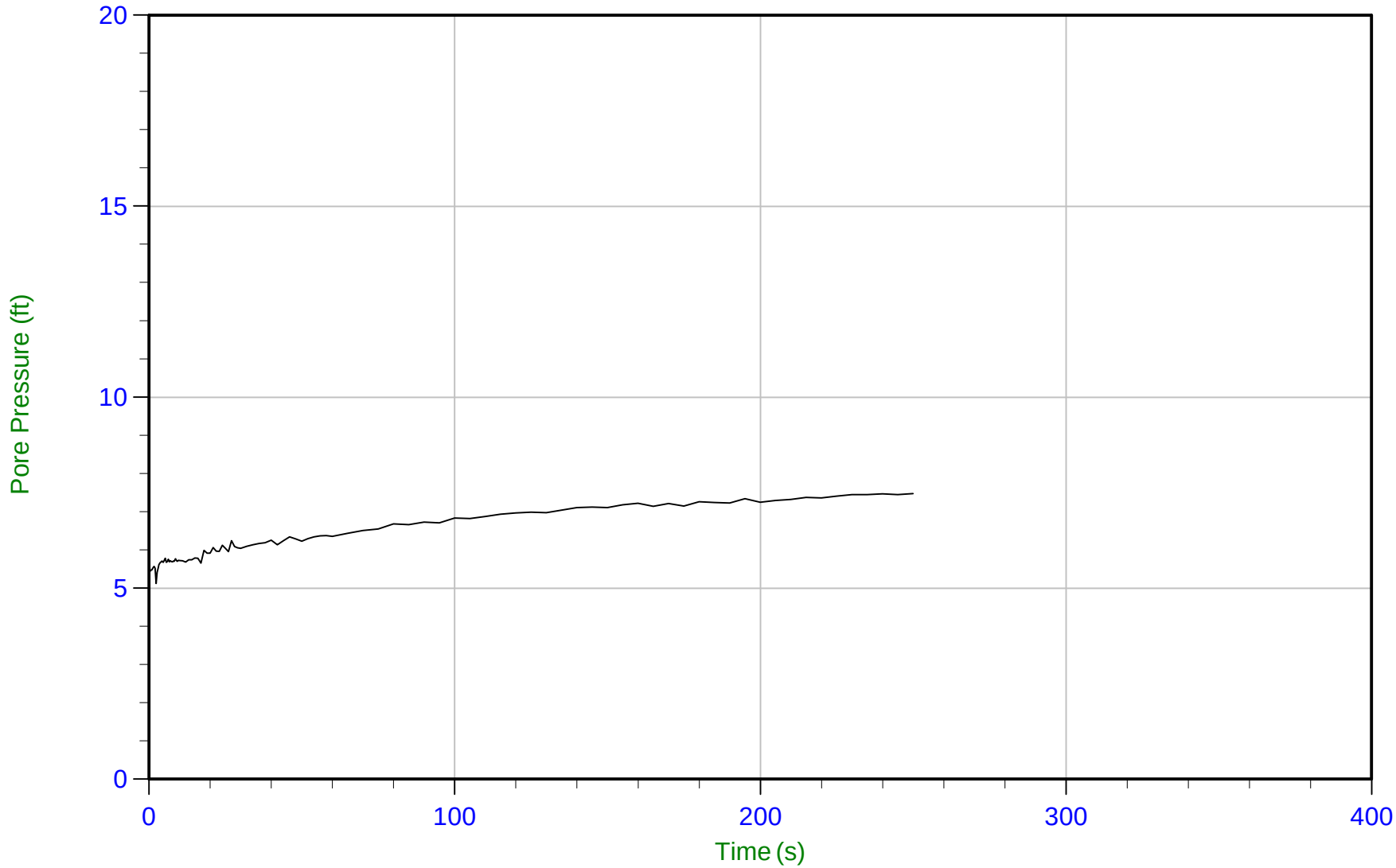
b. Houlsby and Teh, 1991.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP01.ppd2
Depth: 4.075 m / 13.369 ft
Duration: 250.0 s

u Min: 5.1 ft
u Max: 7.5 ft
u Final: 7.5 ft

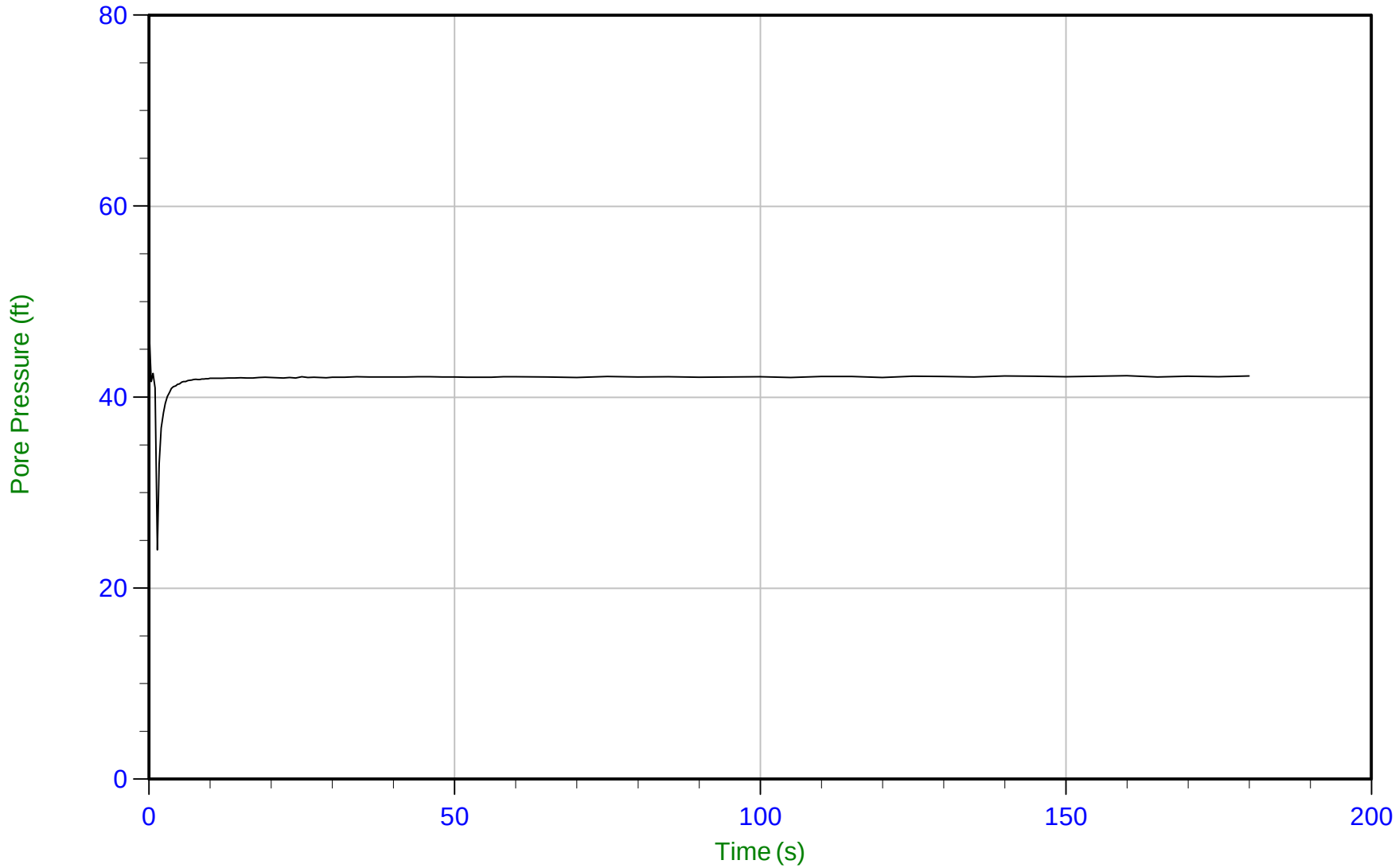
WT: 1.810 m / 5.938 ft
Ueq: 7.4 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP01.ppd2
Depth: 15.425 m / 50.606 ft
Duration: 180.0 s

u Min: 24.0 ft
u Max: 47.3 ft
u Final: 42.2 ft

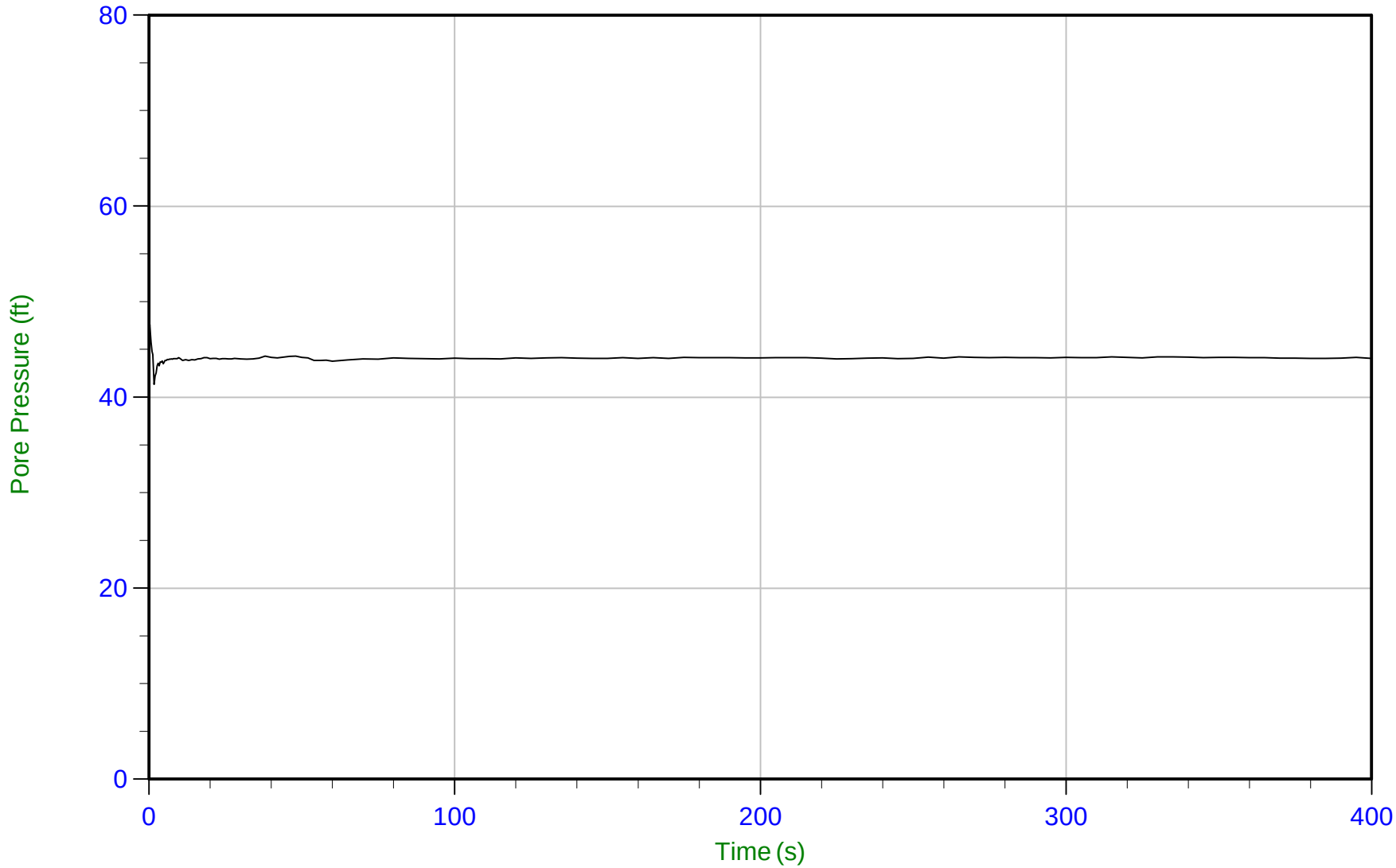
WT: 2.586 m / 8.484 ft
Ueq: 42.1 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP02.ppd2
Depth: 15.500 m / 50.852 ft
Duration: 400.0 s

u Min: 41.3 ft
u Max: 47.6 ft
u Final: 44.1 ft

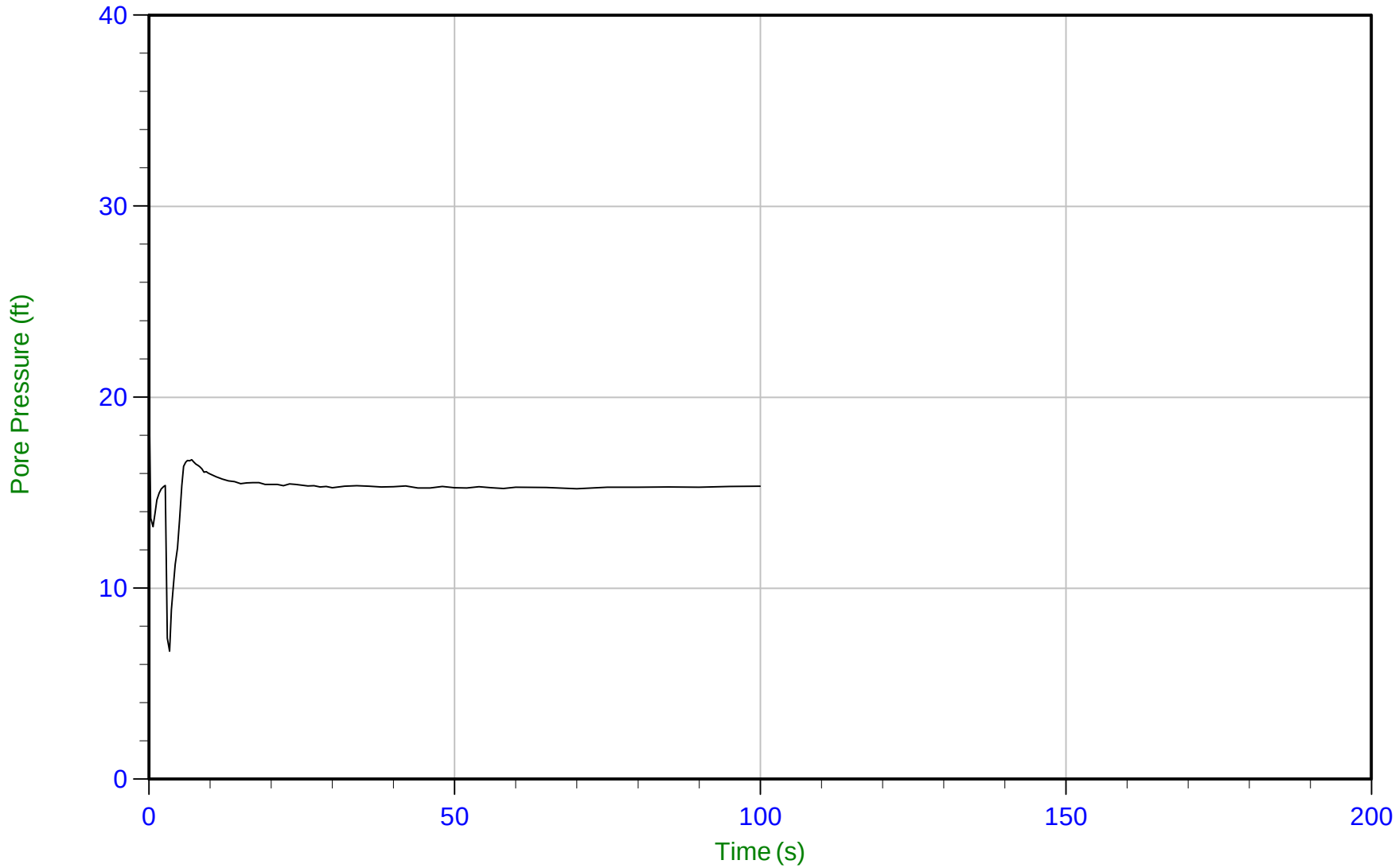
WT: 2.040 m / 6.692 ft
Ueq: 44.2 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03.ppd2
Depth: 6.100 m / 20.013 ft
Duration: 100.0 s

u Min: -7.4 ft
u Max: 20.6 ft
u Final: 15.3 ft

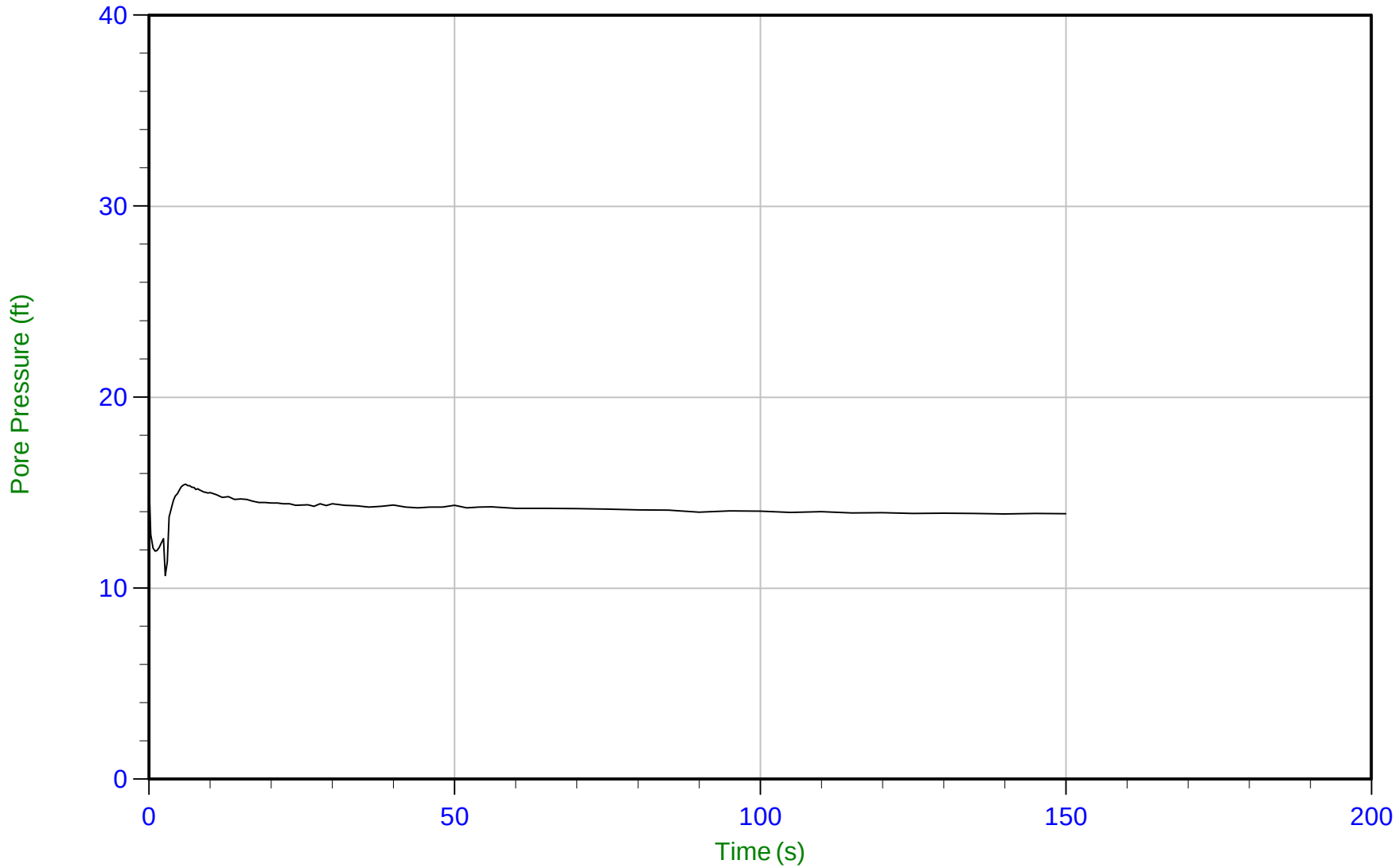
WT: 1.441 m / 4.726 ft
Ueq: 15.3 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03A.ppd2
Depth: 5.500 m / 18.044 ft
Duration: 150.0 s

u Min: 10.7 ft
u Max: 15.4 ft
u Final: 13.9 ft

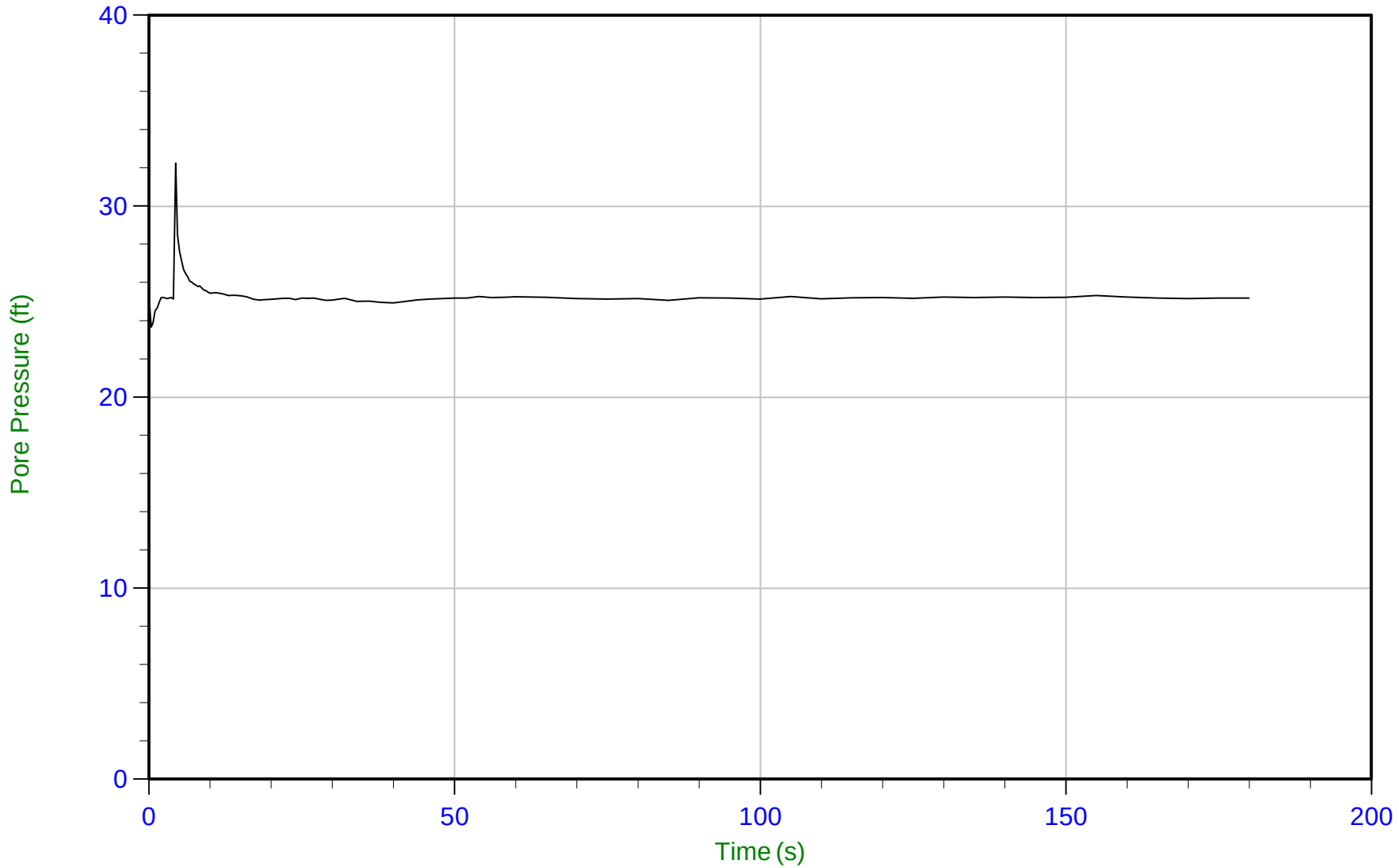
WT: 1.255 m / 4.117 ft
Ueq: 13.9 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP03B.ppd2
Depth: 8.900 m / 29.199 ft
Duration: 180.0 s

u Min: 23.7 ft
u Max: 32.3 ft
u Final: 25.2 ft

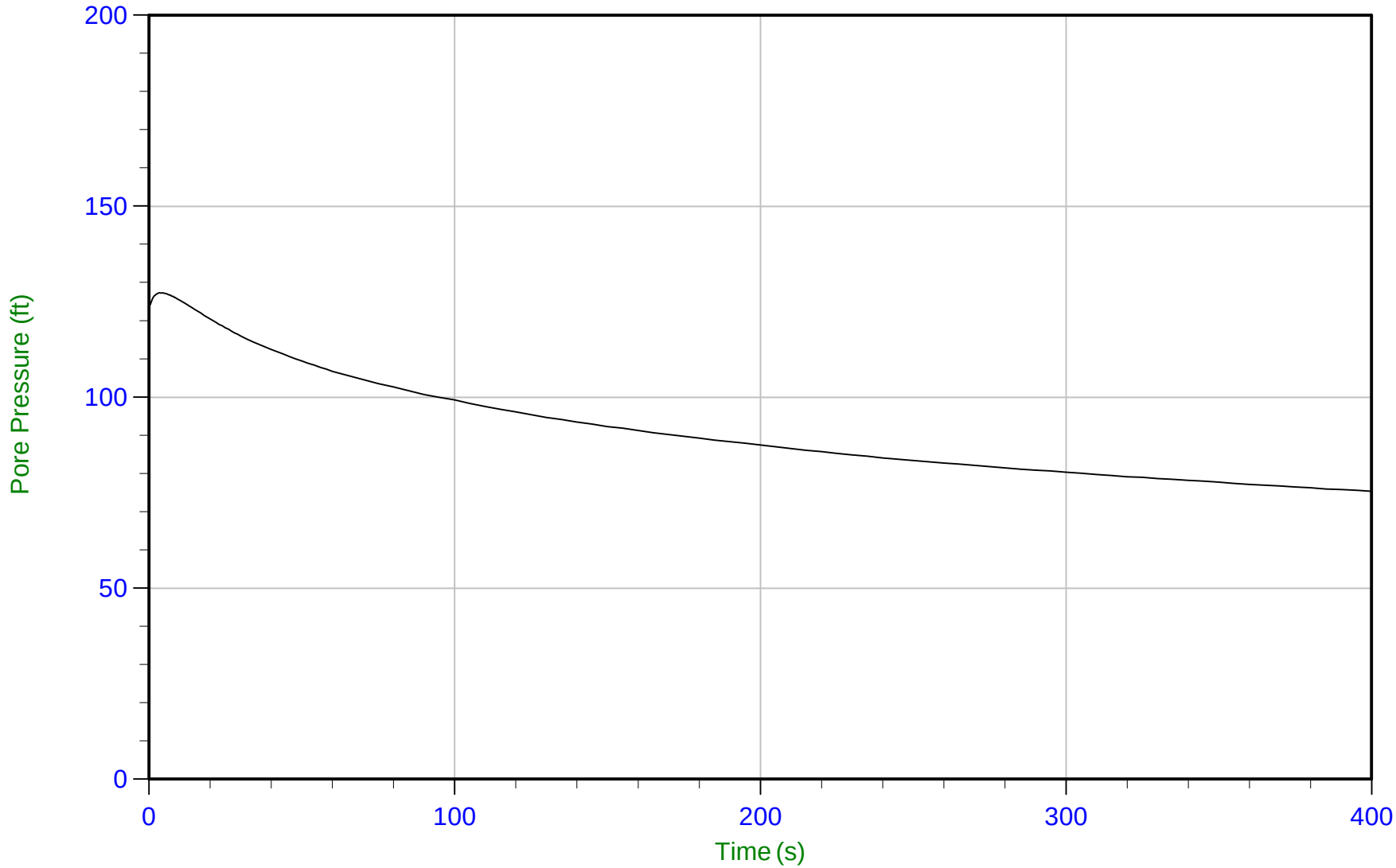
WT: 1.212 m / 3.976 ft
Ueq: 25.2 ft

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP04.ppd2
Depth: 10.850 m / 35.597 ft
Duration: 400.0 s

u Min: 75.4 ft
u Max: 127.4 ft
u Final: 75.4 ft

WT: 1.951 m / 6.402 ft
Ueq: 29.2 ft
U(50): 78.28 ft

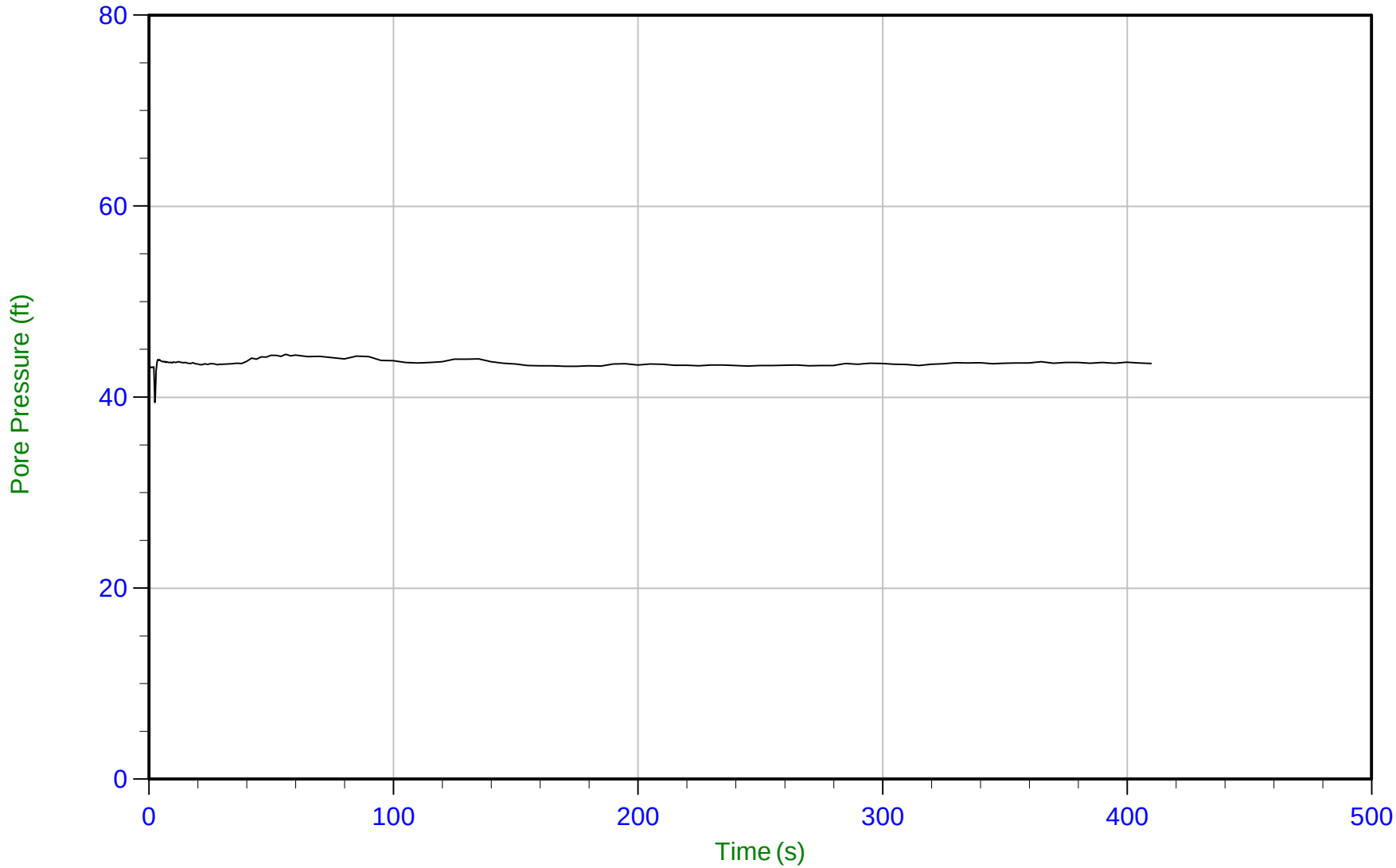
T(50): 335.7 s
Ir: 100
Ch: 2.1 cm²/min

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 07/16/2021 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35 Area=15 cm²



Trace Summary:

Filename: 21-53-22727_CP04.ppd2
Depth: 15.250 m / 50.032 ft
Duration: 410.0 s

u Min: 39.5 ft
u Max: 44.5 ft
u Final: 43.5 ft

WT: 1.951 m / 6.402 ft
Ueq: 43.6 ft

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

CONETEC

Job No:	21-53-22727
Client:	Earth Engineering
Project:	Balzano Marine Terminal, Camden, NJ
Start Date:	16-Jul-2021
End Date:	16-Jul-2021

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting[2] (m)
CPT21-01	21-53-22727_CP01	16-Jul-2021	612:T1500F15U35	5.9	50.61	4420419	488718
CPT21-02	21-53-22727_CP02	16-Jul-2021	612:T1500F15U35	6.7	50.85	4420375	488712
CPT21-03	21-53-22727_CP03	16-Jul-2021	612:T1500F15U35	4.7	20.01	4420338	488707
CPT21-03A	21-53-22727_CP03A	16-Jul-2021	612:T1500F15U35	4.1	18.04	4420334	488706
CPT21-03B	21-53-22727_CP03B	16-Jul-2021	612:T1500F15U35	4.0	29.20	4420335	488706
CPT21-04	21-53-22727_CP04	16-Jul-2021	612:T1500F15U35	6.4	50.28	4420313	488708
Totals	6 soundings				218.99		

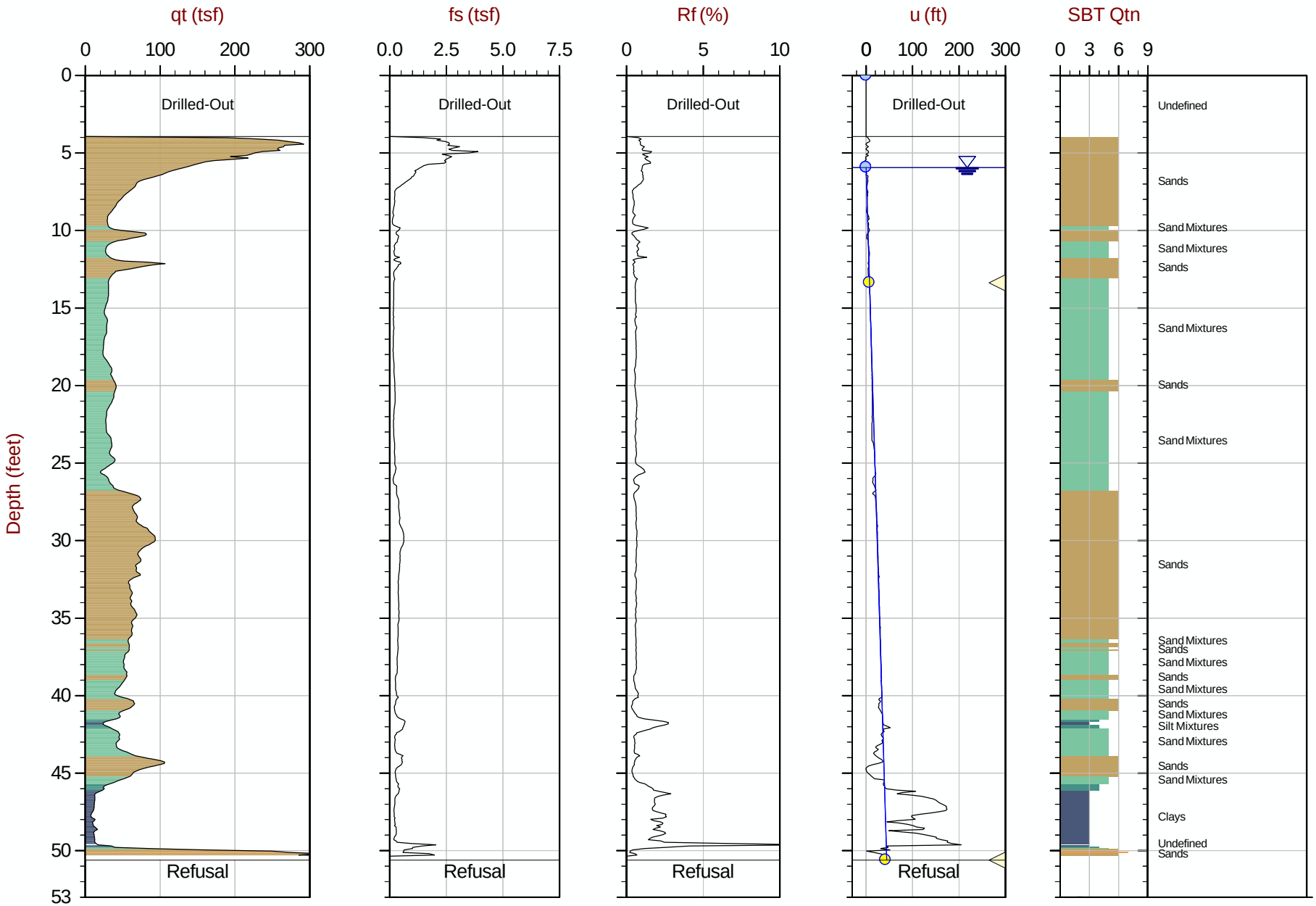
1. The assumed phreatic surface was based on pore pressure dissipation tests. Hydrostatic data was used for the calculated parameters.
2. Coordinates were acquired using a MR-350 GlobalSat GPS Receiver in datum: WGS84 / UTM Zone 18 North.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:02
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-01
Cone: 612:T1500F15U35



Max Depth: 15.425 m / 50.61 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP01.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420419m E: 488718m

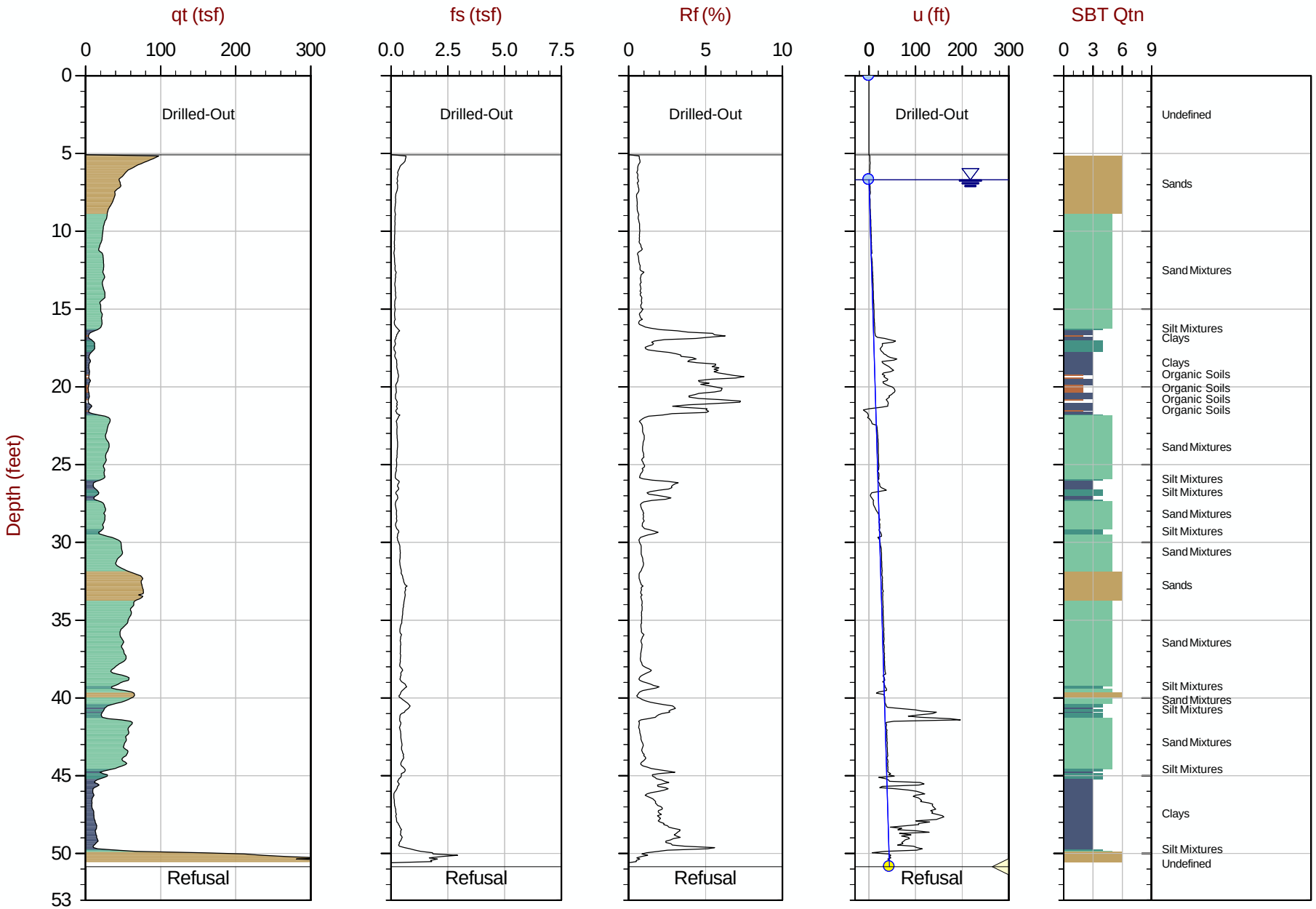
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 12:57
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-02
Cone: 612:T1500F15U35



Max Depth: 15.500 m / 50.85 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP02.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420375m E: 488712m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

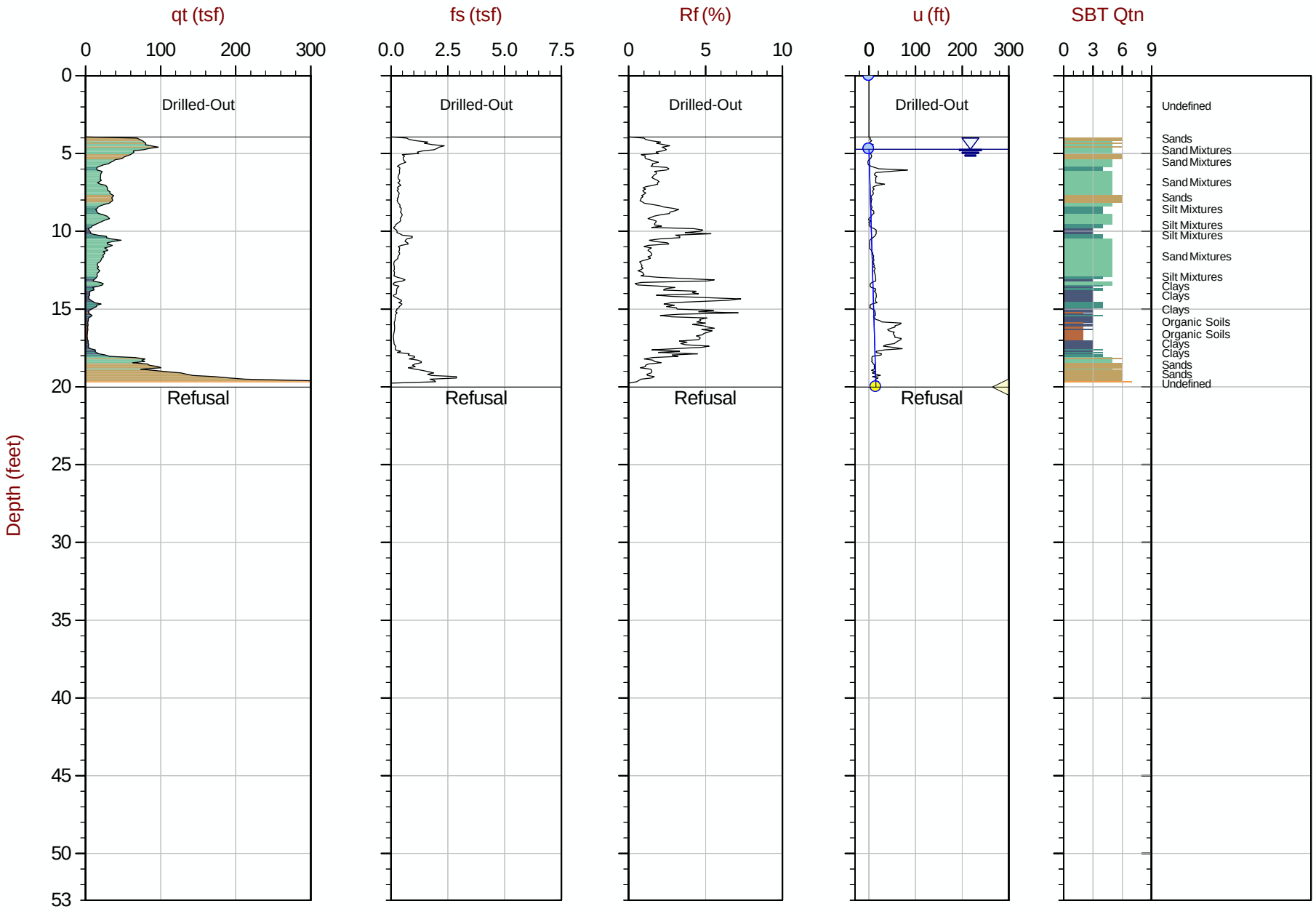
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 10:21
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03
Cone: 612:T1500F15U35



Max Depth: 6.100 m / 20.01 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420338m E: 488707m

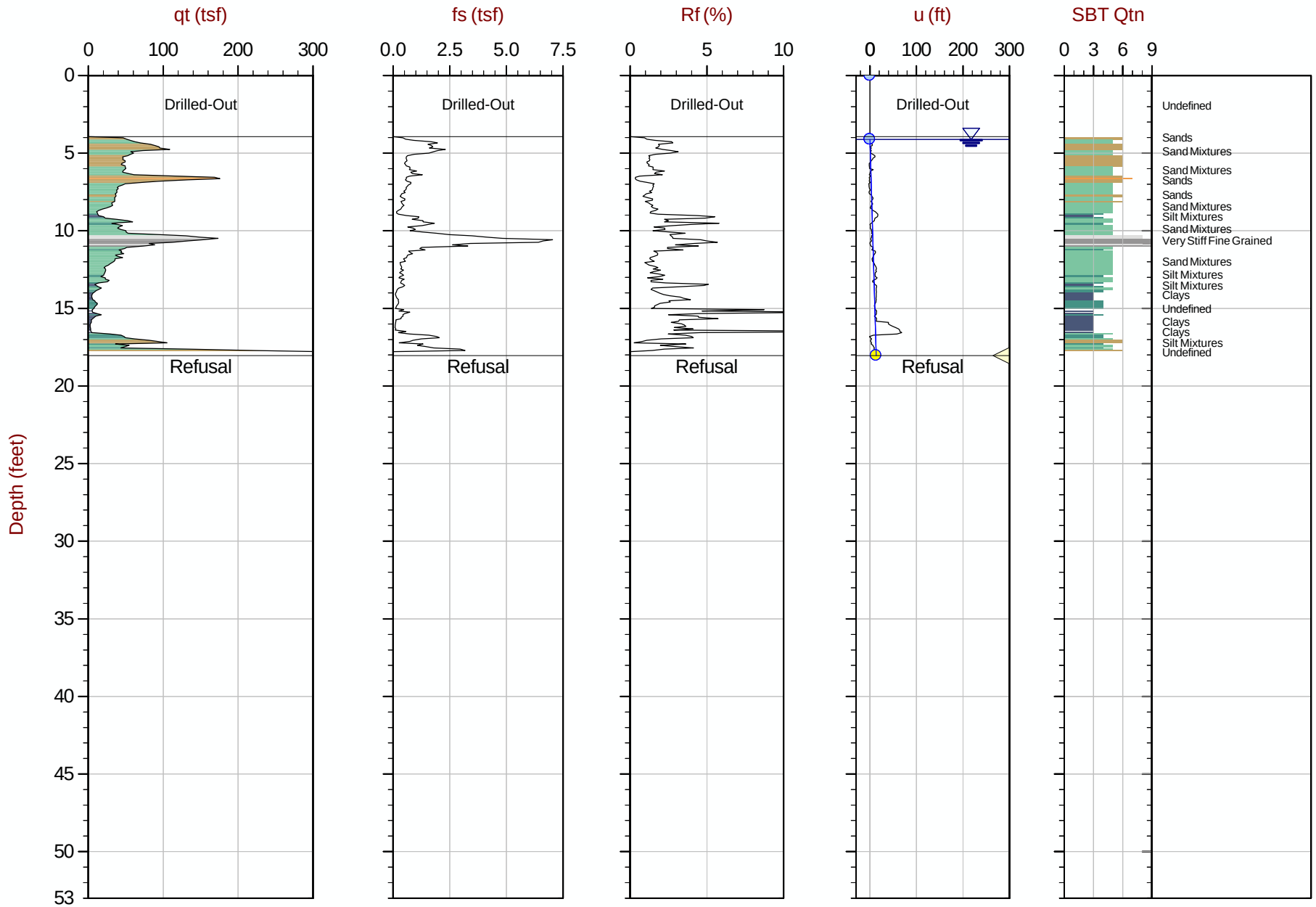
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 11:25
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03A
Cone: 612:T1500F15U35



Max Depth: 5.500 m / 18.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03A.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420334m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

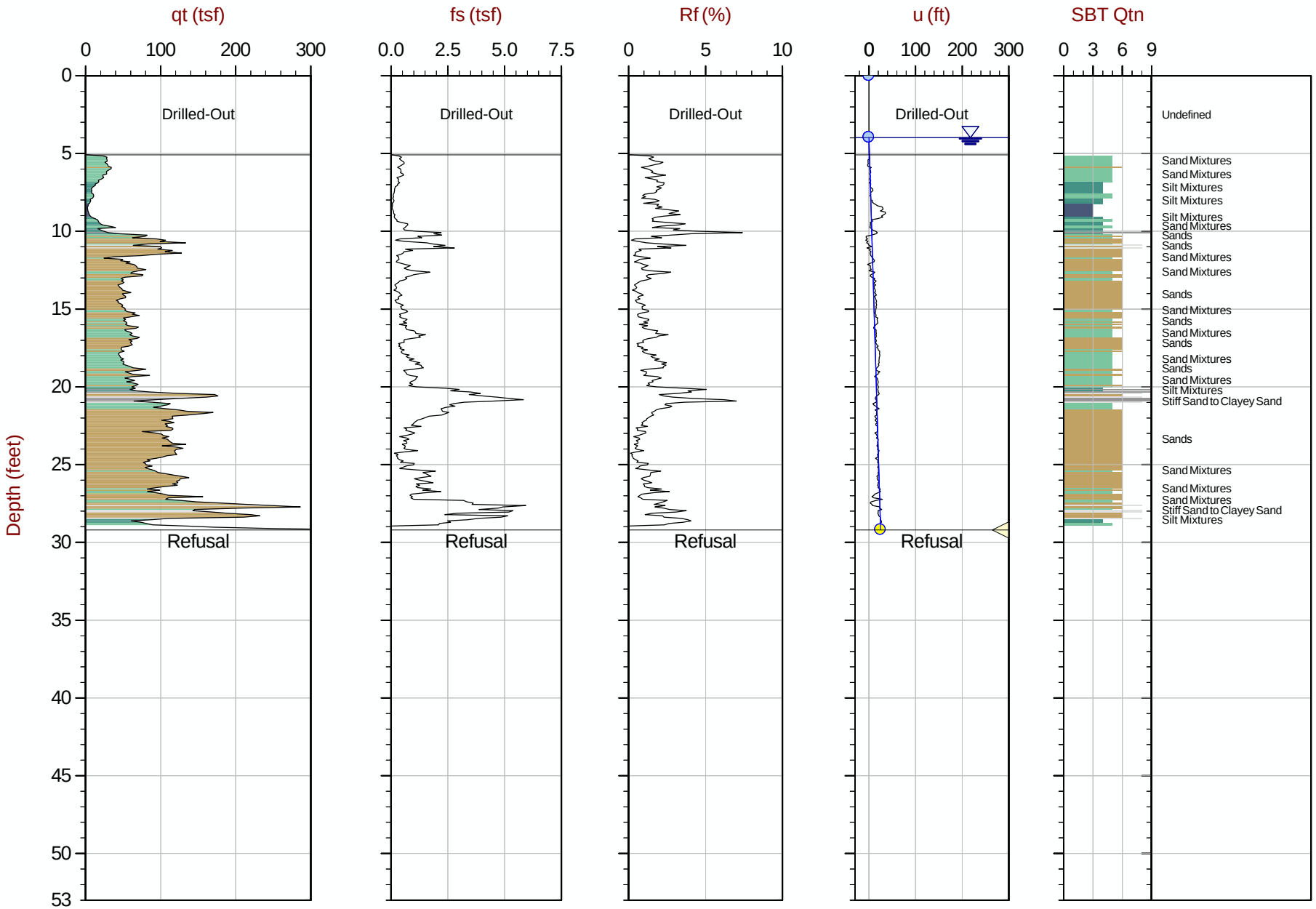
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 13:59
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-03B
Cone: 612:T1500F15U35



Max Depth: 8.900 m / 29.20 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP03B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420335m E: 488706m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

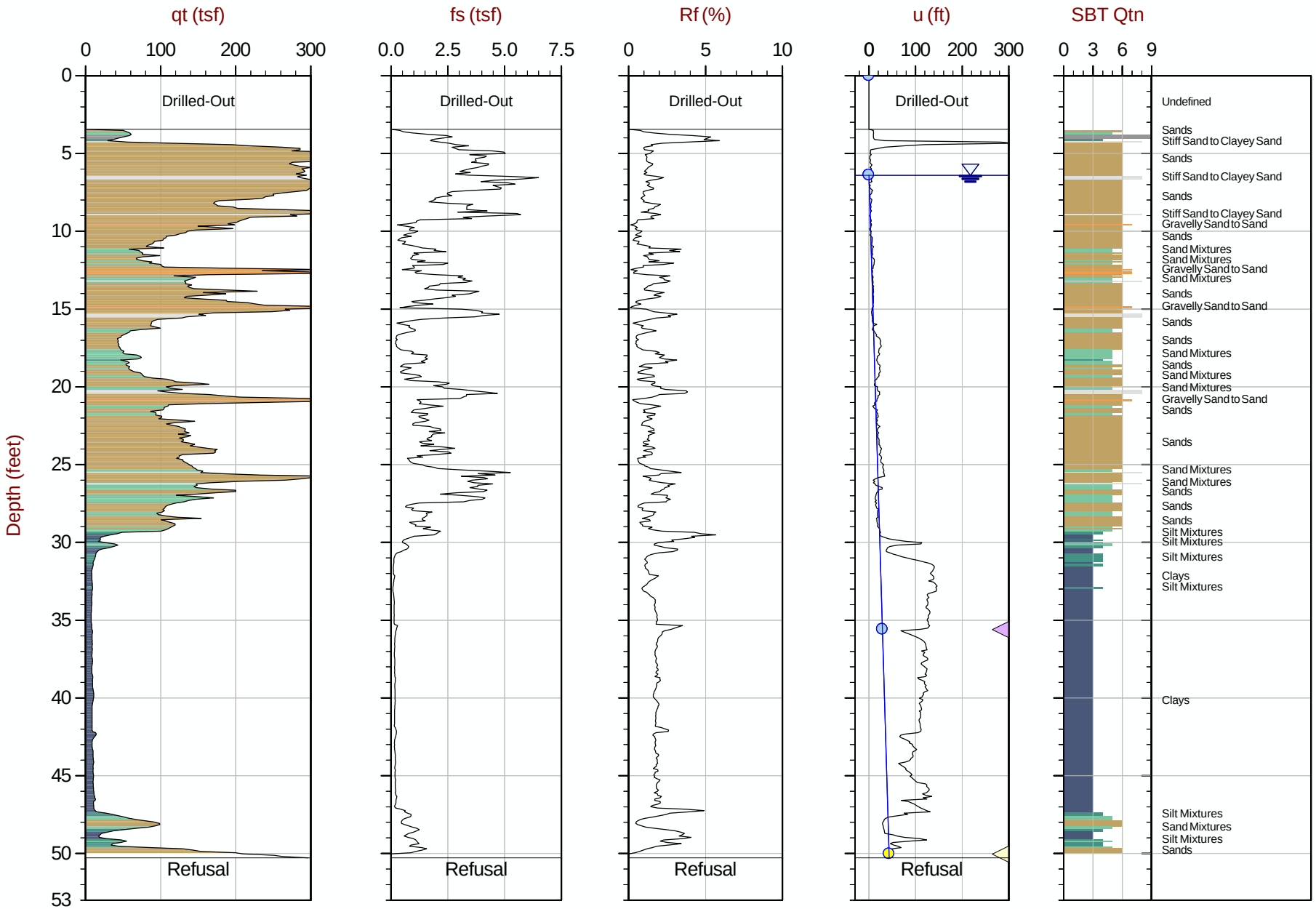
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Earth Engineering

Job No: 21-53-22727
Date: 2021-07-16 08:55
Site: Balzano Marine Terminal, Camden, NJ

Sounding: CPT21-04
Cone: 612:T1500F15U35



Max Depth: 15.325 m / 50.28 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 21-53-22727_CP04.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4420313m E: 488708m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

"EXISTING PILE PLAN")

STONE PLACED IN SINKHOLE.

25+00 | 24+50 | 24+00 | 23+50 | 23+00 | 22+50 | 22+00 | 21+50 | 21+00 | 20+50 | 20+00 | 19+50

A
G-1 G-3

EXIST. CRANE RAILS

MOORING BOLLARD (TYP)

INLET GR 6.65

INLET GR 6.64

6.89 TRAV PKS

INLET GR 6.49

INLET GR 6.30

PLATES

TRACKS

EXIST. WATER METER PIT

CPT-3B

CPT-3A

CPT-3

CPT-4

CPT-2

CPT-1

EXIST. WATER METER PIT

BITUMINOUS PAVING & CONCRETE

EXIST. 21" RCP

50
N 401096.13
E 314840.75
ELEV 7.40

EXIST. STORMWATER COLLECTION JUNCTION BOX

EXIST. WATER QUALITY CHAMBER

EXIST. 5' CIP

APPROX. LOCATION EXIST. ELEC. SERVICE MH (NOT VISIBLE)

APPROX. LOCATION EXIST. ELEC. SERVICE MH (NOT VISIBLE)

EXIST. INLET NOT VISIBLE AT FIELD VISIT 6-23-2021 (COVERED BY STEEL PLATE)

INLET GR 7.15

EXIST. 12" RCP

UNIDENTIFIED UTILITY MH

HIGH CHAIN LINK FENCE

EXIST. LIGHTPOLE W/ STEEL BARRIER

EXIST. 18" RCP

EXIST. 15" RCP

DMH RIM 6.53

EXIST. 15" RCP

APPROX. EXIST. INLET LOCATION (NOT VISIBLE)

EXIST. 54" RCP

EXIST. 12" PVC

ROOF DRAIN (TYP)

GARAGE DOOR

FF=8.78'

FF=8.85'

FF=8.77'

FF=8.69'

FF=8.72'

EXIST. LIGHTPOLE W/ STEEL BARRIER

EXIST. STORMWATER COLLECTION JUNCTION BOX

TRANSIT SHED No.4

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

KEY:

CONE PENETRATION TEST (CPT) LOCATION

BASE PLAN PROVIDED BY: S.T. HUDSON ENGINEERS, INC.

EARTH ENGINEERING INCORPORATED
Geotechnical Engineers & Geologists
115 W. Germantown Pike
East Norriton, PA 19401
(610) 277-0880
FAX (610) 277-0878
www.earthengineering.com

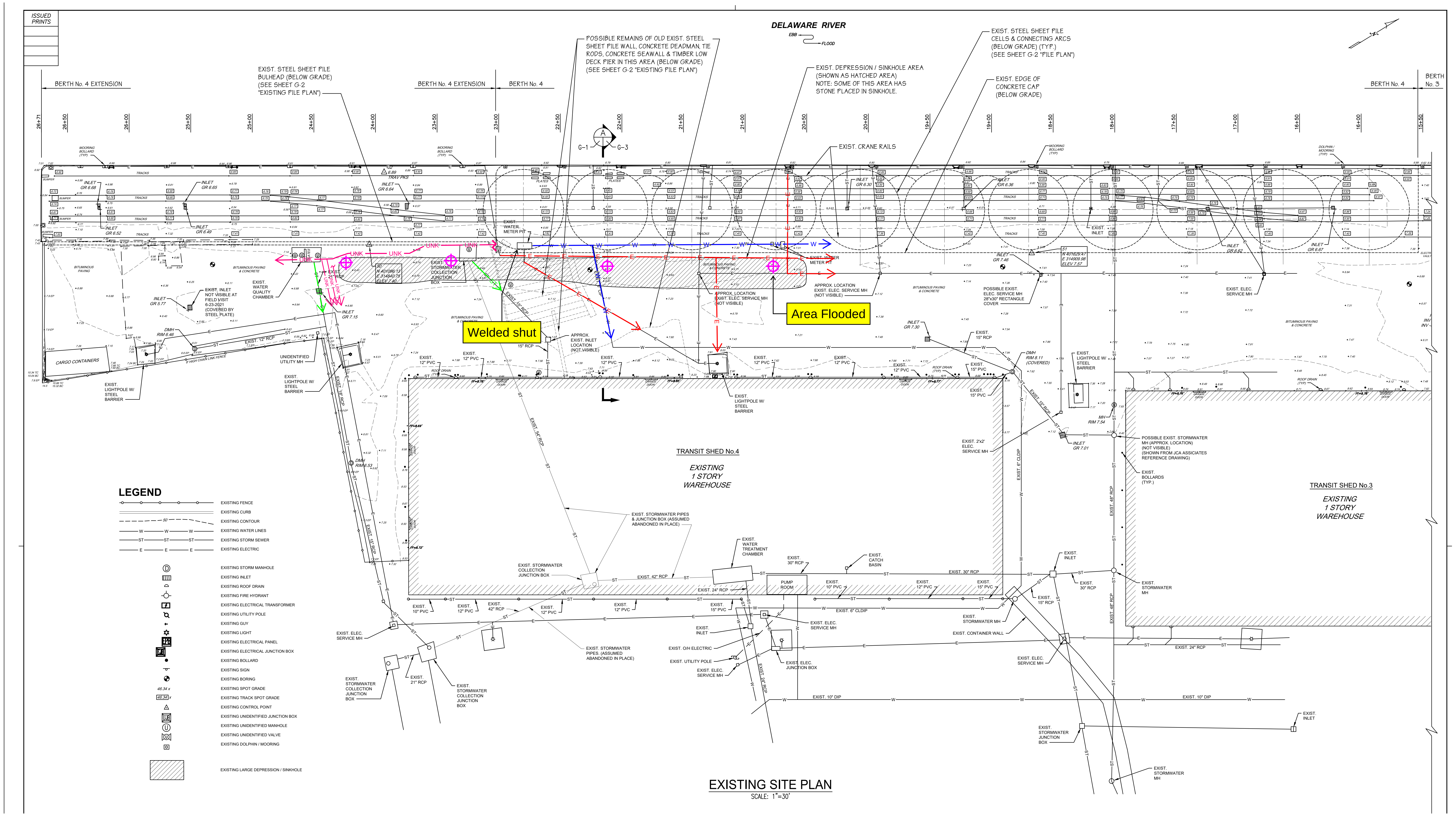
TESTING LOCATION PLAN

PREPARED FOR

BALZANO MARINE TERMINAL

CITY AND COUNTY OF CAMDEN, NEW JERSEY

Scale:	Date:	Drawn By:	Checked By:
1" = 40'	07/21/2021	MTF	DPM
Drawing Number: 33871.00-B-101		Approved By: ---	



TRINITY Subsurface Engineering LLC

1719 Delaware Avenue, Suite 200
Wilmington, DE 19806

(855) 387-4648
www.trinitysubsurface.com

FIELD SKETCH

APWA® UNIFORM COLOR CODE

- E — ELECTRIC
- C — COMMUNICATIONS
- G — GAS
- W — WATER
- ST — STORM SEWER
- SS — SANITARY SEWER
- UNK — UNKNOWN
- - - - ASSUMED LINE LOCATION (NOT CONFIRMED, COLOR CORRESPONDS WITH LINE TYPE)

SYMBOL LEGEND

(COLOR WILL CORRESPOND WITH UTILITY TYPE)

- UTILITY POLE
- MANHOLE
- SITE LIGHT
- TRANSFORMER
- VALVE
- IRRIGATION BOX
- SQUARE INLET
- ROUND INLET
- ROOF DRAIN
- JUNCTION BOX
- CLEANOUT
- WATER VAULT
- FIRE HYDRANT
- GAS METER
- CONTINUOUS LINE
- END OF INFORMATION
- BORING OR TEST HOLE LOCATION

FIELD NOTES

Ground is littered with metal and debris. Used conductive and inductive methods as well as ground penetrating radar to pick up utilities shown on print. Unknowns found with passive methods and GPR.

Note: Utilities closest to locations were marked. Some utilities outside of the 4 locations were not marked out.

Balzano Marine Terminal - Camden NJ	21-5873	07/16/2021	Dan Martin	1 of 1
PROJECT NAME	PROJECT NUMBER	DATE	DRAFTED BY	SHEET NUMBER