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May 19, 2017 ***Via Email***

Mr. James Moras, P.E.
Section Chief
Section C, Remedial Bureau B
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015
james.moras@dec.ny.gov

RE: Supplemental Scope of Work
Saint-Gobain Performance Plastics
1 Liberty Street
Village of Hoosick Falls, Rensselaer County
DEC Site No.: 442048

Dear Mr. Moras:

This letter provides the proposed plan for supplemental hydrogeologic investigations to further define the overall nature and extent of Perfluorinated Compound (PFC) impacts within deeper portions of the overburden mantling the project site, and shallow and deep portions of the overburden aquifer at off-site locations surrounding the site. It also includes planned activities in response to an identified buried drum, and further investigative activities for the open lands along the western part of the site.

The following scope of work has been developed based on the findings of Cone Penetration Testing (CPT) investigations completed in March 2017. Other supplemental investigations are planned based on on-going evaluations of the data, and requests from Department staff as presented herein. The supplemental investigations will be completed in accordance with the protocols within the approved Site Characterization Work Plan.

Cone Penetration Testing
Cone Penetration Testing (CPT) was performed to assess the subsurface conditions prior to the installation of deeper monitoring well pairs at each of the existing site monitoring wells couplets within the site (see Attachment D). In particular the CPT was performed to determine if groundwater saturated granular deposits are present deeper in the formation above either glacial till and/or bedrock and if present, to select

depths/elevation intervals for the placement of the well screens. The CPT has identified potential water bearing layers within the overburden for use in defining groundwater monitoring well screen intervals.
The subsurface conditions present at the site were investigated between March 8 and March 10, 2017 through the advancement of nine (9) cone penetration tests. This work was performed by ConeTec, Inc, of West Berlin, New Jersey. From review of the Normalized Cone Penetration Test Plots prepared by ConeTec (Attachment A), the overburden conditions may be generally summarized as follows (in descending order below the ground surface):

- Silt & Clay
- Sand
- Interbedded Sand/Silt/Clay
- Sand
- Refusal on Possible Glacial Till or Bedrock

Irrespective of the ground surface elevation, at nearly all locations the silt and clay deposit was encountered extending to approximate elevations ranging from 405 feet to 410 feet. The thickness of the silt and clay deposits ranges from approximately 57 feet at CPT17-MW09 to approximately 82 feet at CPT17-MW05. Near the base of this deposit, discrete seams of sand and silt appear to become more numerous before transitioning to a deposit of sand. In general, the thickness of this upper sand deposit was approximately 10 to 12 feet, and some seams of silt and clay appear to be present throughout it. Underlying the sand is an interbedded deposit of sand, silt and clay, with numerous partings/seams/layers throughout its depth. At several of the CPT locations, discrete layers of sand with thicknesses ranging from 2 feet to 5 feet were present. The approximate thickness of the interbedded deposit was 15 feet and overlies a second, lower sand deposit. Similar to the upper sand deposit, some seams/layers of silt and clay were present within this sand deposit. The thickness of this deposit ranged from approximately 8 feet to as much as 15 feet. At those locations where the lower sand deposit was present, refusal to further advancement of the CPT was encountered immediately underlying the deposit. The nature of refusal is unknown, although it may have been due to dense glacial till or upon weathered bedrock.

At CPT locations CPT17MW06, -MW07, -MW08 & -MW09, the interbedded deposit and lower sand deposit were not encountered prior to refusal.

Scope of Supplemental Investigations

Based upon our review of the CPT data, the depth intervals presented in Table 1 are believed to be granular in nature and, due to their presence below the static groundwater table, likely to be water bearing. It should be noted that discrete water bearing seams/layers having a thickness of less than 1 foot are likely present within the base of the silt and clay deposit as well as throughout the interbedded deposit. However, for the purposes of these recommendations, these seams/layers are not included as part of the supplemental investigations. The findings of the CPT investigations are presented in the report entitled, "*Presentation of Site Investigation Results*", (ConTec), dated March 13, 2017 (Attachment A). The appendix of Normalized Cone Penetration Test Plots (with Elevations) identifies each of the layers referenced in Table 1 below.

For the deeper monitoring well installations, wells with 5-10 feet 2-inch diameter PVC screens in the upper "water-bearing, permeable interval" at CPT17MW01 through MW05, and in the lower interval at locations CPT17MW06 through MW09 would be constructed. The **bold** elevations presented in Table 1 represent the screen interval that will be targeted at each location. The monitoring wells will be installed with conventional flush joint casing in a similar manner as the previously installed monitoring wells.

The rationale behind only one well per location is that it avoids the risk of cross-contamination from installing multiple wells in the same borehole, especially where there is little vertical separation between the two distinct permeable zones apparent at CPT locations CPT17MW01 through MW05. If the upper permeable zone in CPT17MW01 through MW05 has elevated PFCs and more detail is needed on concentrations above refusal (assumed to be bedrock), a separate well could be installed at a later date.

Table 1: Summary of Water Bearing Intervals

CPT Location	Water Bearing Intervals (Elevation, feet)
CPT17-MW01	**405 to 395**; 380 to 368
CPT17-MW02	**405 to 392**; 385 to 382; 376 to 369
CPT17-MW03	**408 to 395**; 391 to 386; 380 to 369
CPT17-MW04	**405 to 397**; 391 to 387; 382 to 368
CPT17-MW05	**404 to 394**; 390 to 386; 381 to 371
CPT17-MW06	412 to 410; **404 to 392**
CPT17-MW07	**411 to 403**
CPT17-MW08	414 to 410; **404 to 396**
CPT17-MW09	**424 to 418**

The installation of the deep monitoring wells will be completed in conformance with the existing Site Characterization (SC) Work Plan. As continuous soil sampling was completed to the termination depths of each of the previously installed monitoring wells, the drill casing will be advanced to these respective depths without sampling. Continuous two-foot sampling will begin at these depths to the termination depths of the borings. Flush joint casing will be utilized for advancing the boreholes rather than hollow augers, as previously employed for the monitoring well installations. The annuli above the top of the 2-inch diameter PVC screened interval and the filter pack (~2 feet above the top of the screen) will be sealed with a 2-foot thick layer of bentonite chips and then tremie grouted to grade with a cement/bentonite grout.

Installation of bedrock monitoring wells is not proposed at this time. Potential installation of bedrock wells will be evaluated based on the groundwater and soil analytical results and the findings from installation of deep monitoring wells. Following development, each monitoring wells will be purged and sampled in accordance with the approved SC Work Plan. Groundwater samples will be analyzed for PFCs, VOCs, SVOCs, Pesticides, PCB, TAL Metals, TOC, and major cations and anions along with the requisite quality control samples. The locations and elevations of the monitoring wells will be surveyed following installation and tied into the existing survey datum. Slug tests for the purposes of estimating hydraulic conductivity will be performed at each new monitoring well location following the groundwater sampling event.

Off-Site Monitoring Wells

Off-site monitoring wells are proposed to be installed to further define the overall nature and extent of PFC impacts to groundwater surrounding the site. The monitoring wells will be installed as shallow and deep overburden monitoring well couplets in accordance with the existing SC Work Plan. As a radial pattern of groundwater flow is apparent within the site, 11 off-site locations surrounding the site have been selected for completion as depicted in the figure presented in Attachment D. The locations for the additional monitoring wells have been biased to the right-of –ways of surrounding Village streets. Locations that cannot be installed within the Village road right-of-ways will be completed within private property. Access agreements will need to be established with the owners of the properties on which monitoring wells are proposed. If access agreements cannot be established, alternative monitoring well locations will be selected in consultation with the Department.

Groundwater samples will be analyzed for PFCs, VOCs, SVOCs, Pesticides, PCB, TAL Metals, TOC, and major cations and anions along with the requisite quality control samples. The locations and elevations of the monitoring wells will be surveyed

following installation and tied into the existing survey datum. Slug tests for the purposes of estimating hydraulic conductivity will be performed at each new monitoring well location following the groundwater sampling event.

Creek Water and Sediment Sampling
The small creek flowing through the western section of the site seasonally discharges off-site in a northerly direction and ultimately discharges to the Hoosic River approximately 2,000 feet northeast of the site. PFOA was detected in on-site surface water sample SW-04 (07/20/16) at a concentration of 1,900 parts per trillion (ppt). This sample was collected from the on-site creek just prior to its discharge off-site. Based on this finding, surface water and sediment samples will be collected from off-site locations within the creek channel. Surface water and sediment samples will be collected at approximate 500-foot intervals, with a bias to sampling creek locations where sediment load deposition is most predominant (see Attachment B). Surface water samples will again be collected from surface water sampling location SW-04 and within the creek immediately upstream of the southern property line (along with a sediment sample), and at the confluence with the Hoosic River. The surface water and sediment samples will be analyzed for PFCs, VOCs, SVOCs, Pesticides, PCB, TAL Metals, TOC, and major cations and anions in accordance with the approved SC Work Plan.

Utility Line Evaluation
Tracing and video inspection of most of the storm water buried piping has been completed. As the facility is not in possession of drawings depicting the waste water piping, identification, tracing and video inspection of the waste water systems and piping throughout the facility will be performed. This will include waste water lines exiting the buildings and the piping runs to the municipal sewer discharge locations. The purpose of the inspections is to confirm that all waste water lines are connected to the municipal sewer system and to evaluate the physical condition of the pipes and their connections. If suspected pipe compromises are identified, further investigation at these locations will be performed through appropriate means under a supplemental work plan. A scaled site wide facility map of the storm and waste water line will be developed as part of this task.

Soil Vapor Survey
A soil vapor survey will be conducted in general accordance with the New York State Department of Health (DOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (Final), dated October 2006, and published updates. Ten (10) soil vapor sampling points will be installed around the perimeter of the site building structure as depicted on the attach site map (Attachment D). The points will be spaced

approximately equidistant around the building perimeter with bias toward adjacent residences. The soil vapor sampling points will be established at depths approximately 4-feet below the building footing depths (approximately 4-feet). As such, the soil vapor points will be installed to depths of approximately 8-feet below ground surface depending on where the points are constructed within the site and allowing for proper construction without encountering groundwater. Ambient air samples will also be collected simultaneously with the soil vapor samples to evaluate the extent to which outdoor air quality may influence the soil vapor samples. One ambient outdoor air sampling point will be collected within the southern and eastern site quadrants, and one within the eastern and northern site quadrants. The soil vapor and ambient air samples will be analyzed for volatile organic compounds by EPA Method TO-15.

Drum Removal and Exploratory Test Pits
Based on the geophysical survey work completed in December 2017, anomalies which would be identified as suspect buried metallic materials were not identified other than an in area along the southern property line (see Attachment C). Visual inspection of this anomaly suggests it is related to various surface deposited metal debris. As the geophysical survey did not identify the known buried drum location material, the findings of the survey are considered to be inconclusive. Therefore, further intrusive investigation of the western portion of the site is proposed.

The following generally describes the work to be performed in relation to the known buried drum, and further investigation of the western portion of the site for identification of other possible buried materials. If the proposed approach is acceptable to the Department, specific plans for the work, including a site control and contingency plan and activity specific health and safety plans will be developed for review by the Department.

The buried drum previously identified within the western portion of the site will be removed by MC Environmental Services, Inc. (MCES). Portions of the drum content will be sampled for waste characterization analysis, as well as PFC analysis. All of the drum contents will be indefinitely preserved for future testing and analysis. At this time, the drum carcass will also be retained in an appropriately sized over-pack drum and stored at the site indefinitely for future reference. C.T. Male personnel will be on-site full time to observe and document the removal efforts.

Following drum removal, soil samples will be collected from locations beneath and surrounding the drum and submitted for PFC and full TCL/TAL analysis. Three (3) soil samples are planned at this time, but the actual number may be adjusted in the field at the time of the work, depending on what is encountered during drum removal.

Following the completion of the drum removal, an exploratory test pit investigation will be completed within the referenced area identified on the attached figure (Attachment D). The test pits will be performed as continuous trenches with a small track mounted excavator. The trenches will be advanced to a depth of approximately four (4) feet in an intersecting grid pattern. If evidence of deleterious fill materials or subjectively impacted materials/soils is identified on the basis of subjective observations including Photoionization Detector (PID) measurements and organoleptic perception, the locations will be staked, logged and located via GPS. If the identified materials do not necessitate a change in the planned removal or site control procedures, they would be addressed at the time of discovery. If identified material(s) require modification to the work and site control procedures, the material(s) will be left in place until the remaining excavations have been completed. Modified methods for the removal of these materials would then be prepared for implementation as a separate work task.

Upon your acceptance of the supplemental work tasks, we will schedule the monitoring well work for completion as soon as practicable, and prepare the drum removal and trench exploration plans. If you have any questions or require any additional information, please contact the undersigned at your convenience.

Respectfully submitted,
C.T. MALE ASSOCIATES

Kirk Moline
Managing Geologist

Enc.
- Attachment A: Presentation of Site Investigation Results-CPT
- Attachment B: Creek Water and Sediment Sampling Locations Map
- Attachment C: EM Survey Report
- Attachment D: Area of Exploratory Test Trenches, Soil Vapor Sampling Locations, CPT Locations & Proposed Off-Site Monitoring Wells

c:
- Edward Canning, SGPP
- Christopher Angier, P.E. SGPP
- Christopher R. Gibson, Esq. Archer &Greiner

Susan Edward, NYSDEC
Krista Anders, Ph.D. NYSDOH
Dolores A. Tuohy, Esq., NYSDEC
Daniel Reilly, P.E. C.T. Male
Ray Wuolo, P.E., Barr Engineering
John, McAuliffe, Honeywell

C.T. MALE ASSOCIATES

ATTACHMENT A
PRESENTATION OF SITE INVESTIGATION RESULTS-CPT

PRESENTATION OF SITE INVESTIGATION RESULTS

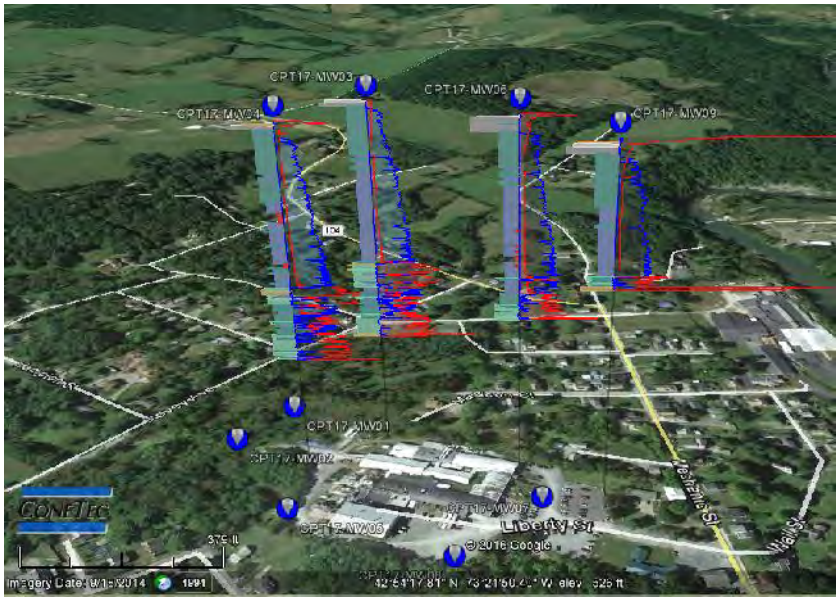
SGPP-Liberty
Hoosick Falls, New York

Prepared for:

C.T. Male Associates

ConeTec Job No: 17-53028

Project Start Date: 8-Mar-2017
Project End Date: 10-Mar-2017
Report Date: 13-Mar-2017



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Introduction

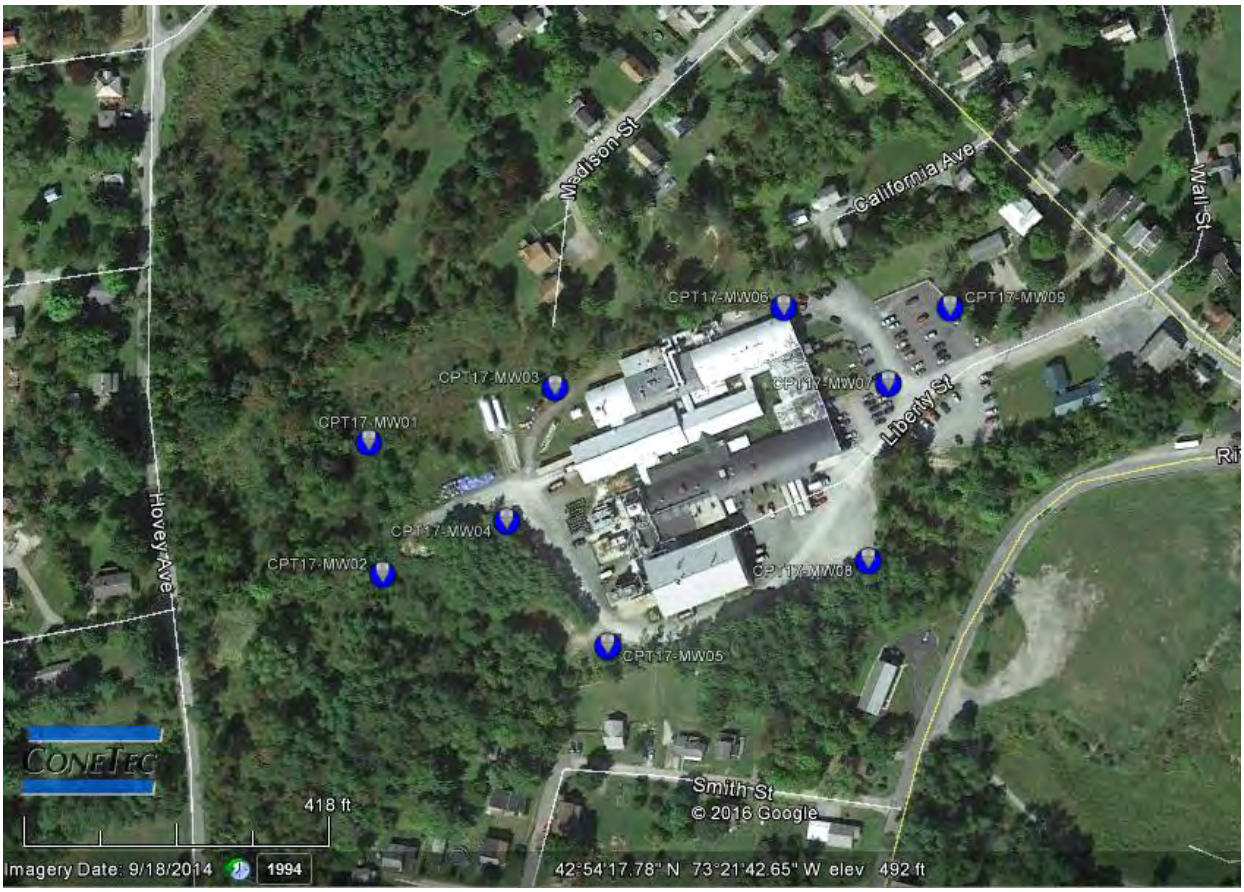
The enclosed report presents the results of a piezocone penetration testing (CPTu or CPT) program carried out at the Saint Gobain Performance Plastics (SGPP) site located at 1 Liberty Street in Hoosick Falls, New York. The site investigation program was conducted by ConeTec Inc. (ConeTec), under contract to C.T. Male Associates of Latham, New York.

A total of 9 cone penetration tests were completed at 9 locations. The CPT program was performed to evaluate the subsurface soil conditions. CPT sounding locations were selected and numbered under supervision of C.T. Male personnel (Mr. Jonathan Dippert).

Project Information

Project	
Client	C.T. Male Associates
Project	SGPP-Liberty, Hoosick Falls, NY
ConeTec project number	17-53028

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



Rig Description	Deployment System	Test Type
CPT Truck Rig	25 ton truck mounted (twin cylinders)	CPT
CPT Track Rig	20 ton track 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	Fourteen pore pressure dissipation tests were completed primarily to determine the phreatic surface.
Additional Comments	None.

Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
468:T1500F15U500	468	15	225	1500	15	500

Limitations

This report has been prepared for the exclusive use of C.T. Male Associates (Client) for the project titled "SGPP-Liberty, Hoosick Falls, NY". 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.

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

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 both 10 cm^2 and 15 cm^2 tip base area configurations in order to maximize signal resolution for various soil conditions. 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.

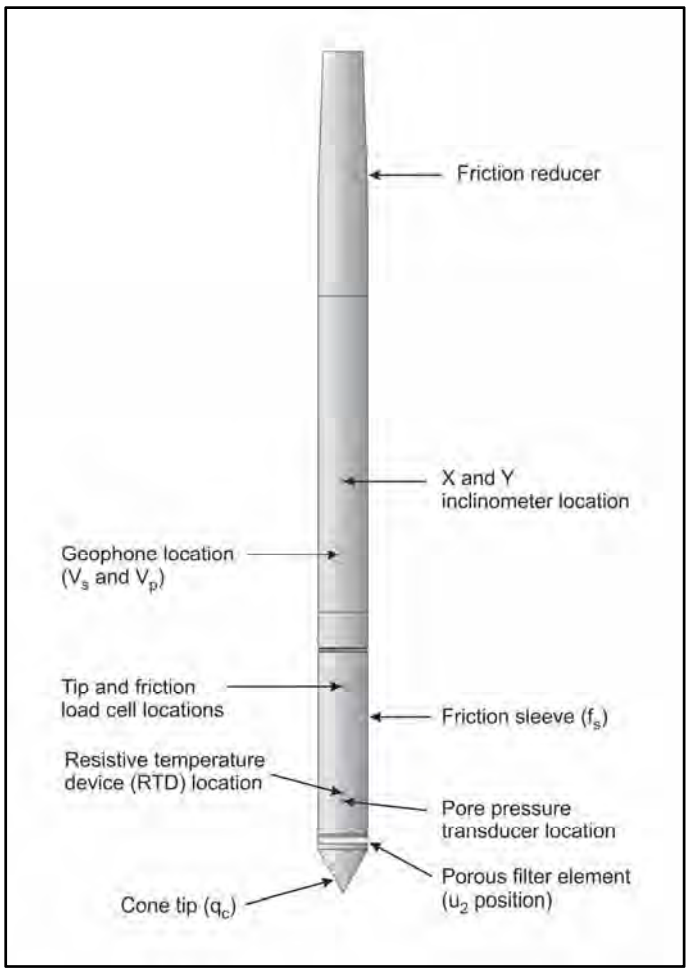


Figure CPTu. Piezocone Penetrometer (15 cm^2)

The ConeTec data acquisition systems consist of a Windows based computer and a signal 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 intervals are either 2.5 cm or 5.0 cm depending on project requirements; 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 or glycerin 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 (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil 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 interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is included in an appendix.

For additional information on CPTu interpretations, 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).

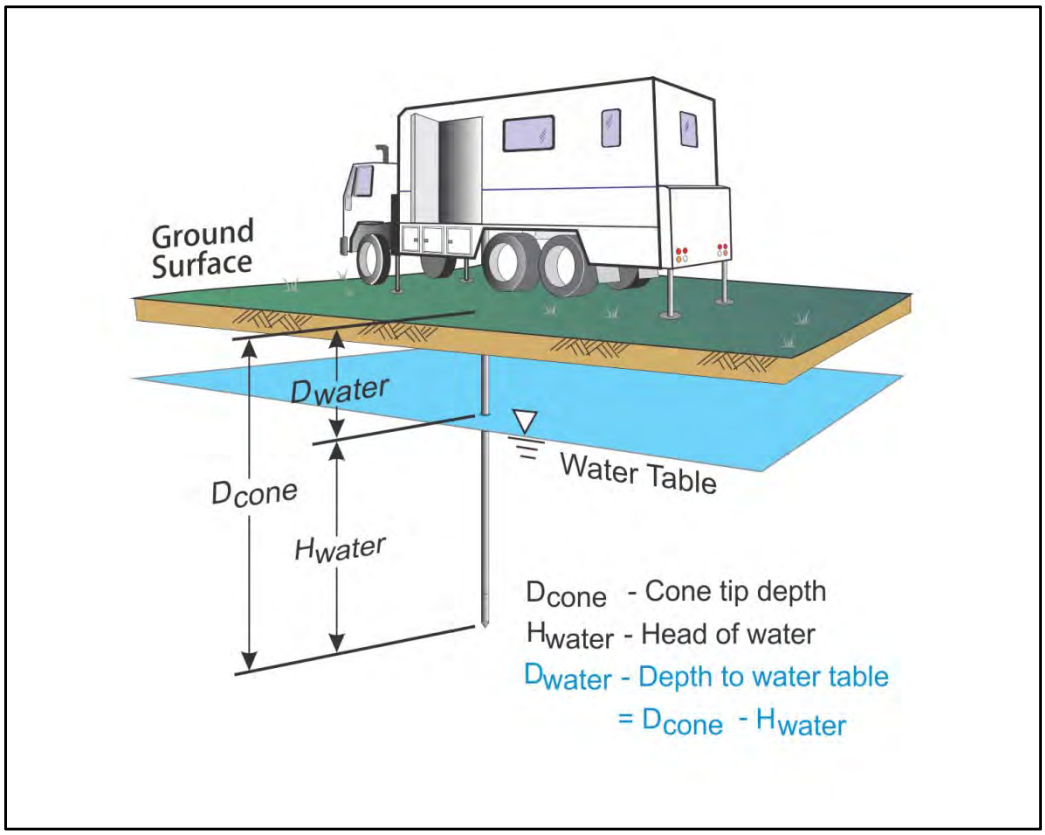


Figure PPD-1. Pore pressure dissipation test setup

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.

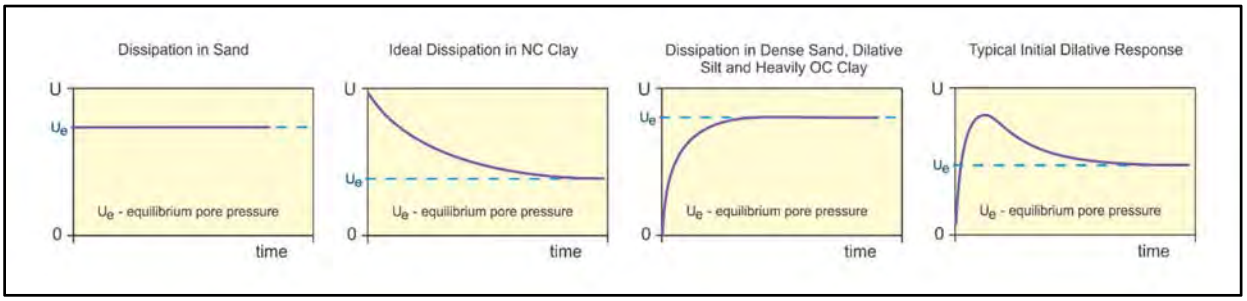


Figure PPD-2. Pore pressure dissipation curve examples

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 of 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 Elevation Cone Penetration Test Plots
- Normalized Cone Penetration Test Elevation Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots (with Elevations)

Job No:	17-53028
Client:	C.T. Male Associates
Project:	SGPP-Liberty, Hoosick Falls, NY
Start Date:	08-Mar-2017
End Date:	10-Mar-2017

CONE PENETRATION TEST SUMMARY

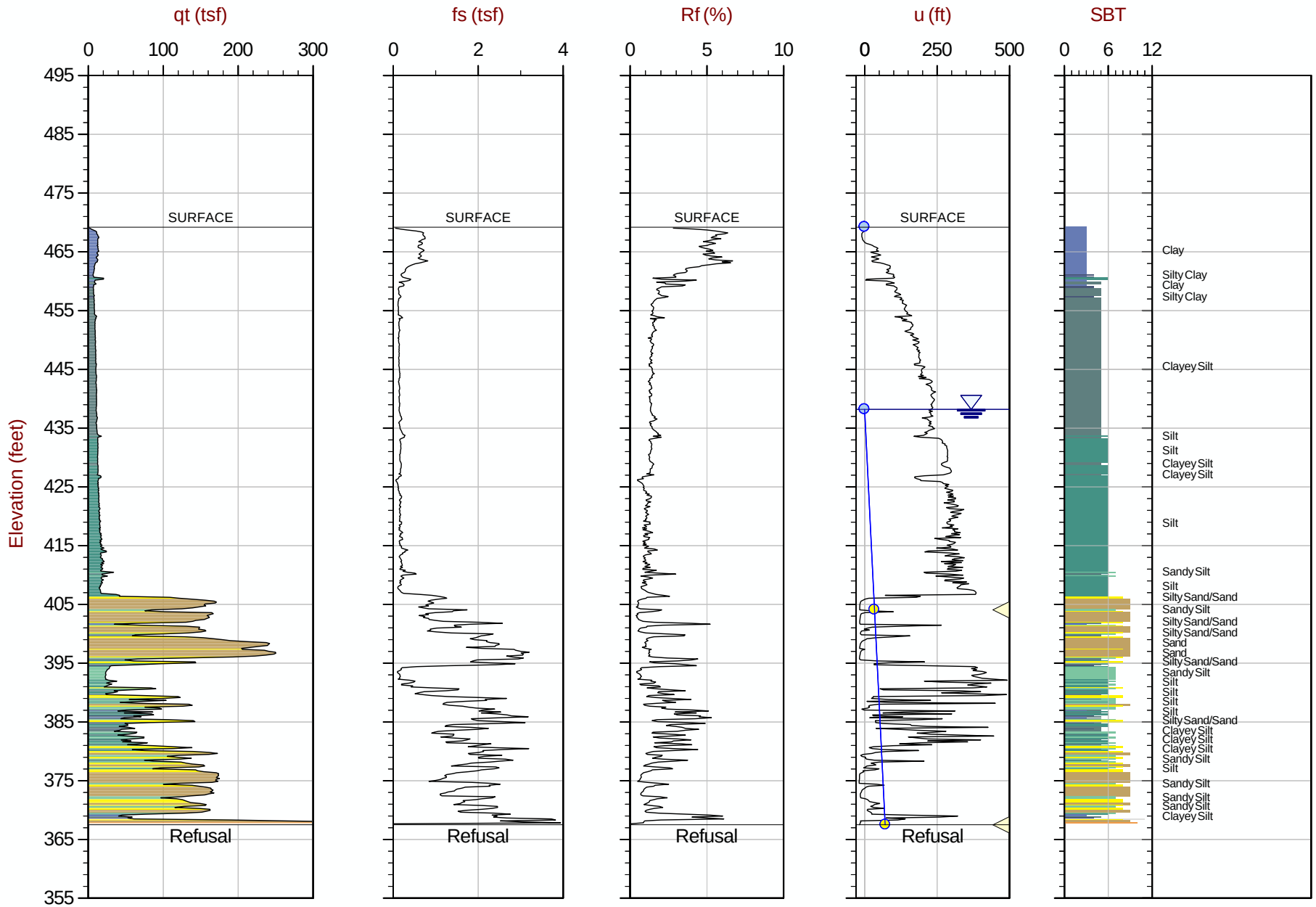
Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Northing[2] (m)	Easting (m)	Elevation (ft)	Refer to Notation Number
CPT17-MW01	17-53028_CP01	8-Mar-2017	468:T1500F15U500	31.0	101.71	4751631	633883	469.20	
CPT17-MW02	17-53028_CP02	8-Mar-2017	468:T1500F15U500	31.7	107.45	4751576	633890	469.66	
CPT17-MW03	17-53028_CP03	8-Mar-2017	468:T1500F15U500	43.0	117.29	4751655	633961	486.30	4
CPT17-MW04	17-53028_CP04	9-Mar-2017	468:T1500F15U500	46.0	115.16	4751599	633942	482.78	
CPT17-MW05	17-53028_CP05	9-Mar-2017	468:T1500F15U500	52.8	122.21	4751548	633985	489.42	
CPT17-MW06	17-53028_CP06	10-Mar-2017	468:T1500F15U500	64.1	96.29	4751691	634056	487.59	
CPT17-MW07	17-53028_CP07	9-Mar-2017	468:T1500F15U500	72.8	85.14	4751660	634100	486.82	
CPT17-MW08	17-53028_CP08	9-Mar-2017	468:T1500F15U500	72.5	91.86	4751586	634093	486.62	
CPT17-MW09	17-53028_CP09	10-Mar-2017	468:T1500F15U500	72.0	65.45	4751692	634125	483.23	
Totals	9 soundings				902.55				

1. Assumed phreatic surface depths were determined from the pore pressure data unless otherwise noted. Hydrostatic data were used for calculated parameters.
2. Coordinates are WGS 84 / UTM Zone 18 and were collected using a MR-350 GlobalSat GPS Receiver.
3. Elevations were provided by the client.
4. Assumed phreatic surface estimated from the dynamic pore pressure response.
5. No phreatic surface detected

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 09:57
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW01
Cone: 468:T1500F15U500



Max Depth: 31.000 m / 101.70 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751631m E: 633883m Elev: 469.20ft

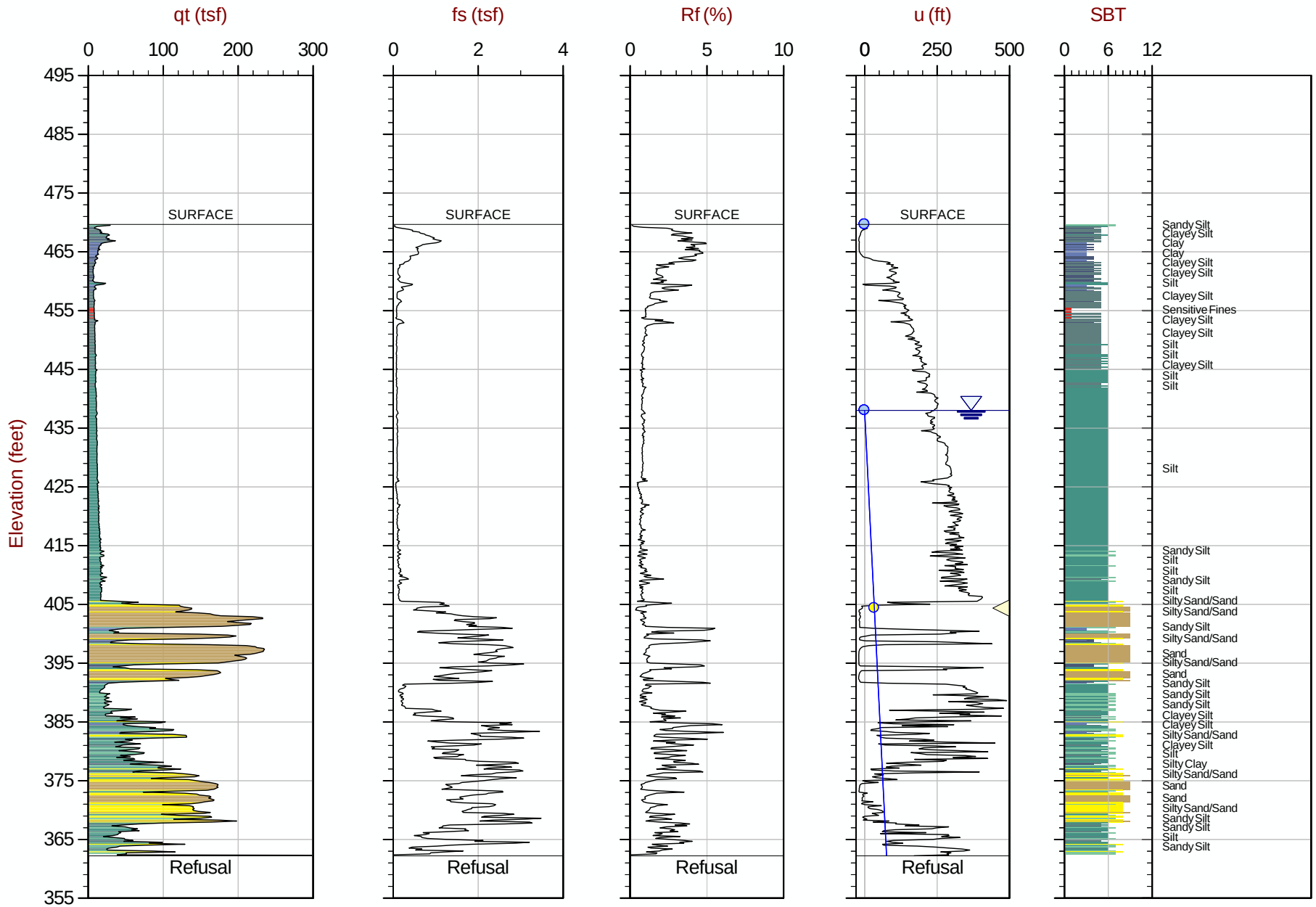
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 11:44
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW02
Cone: 468:T1500F15U500



Max Depth: 32.750 m / 107.45 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP02.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751576m E: 633890m Elev: 469.66ft

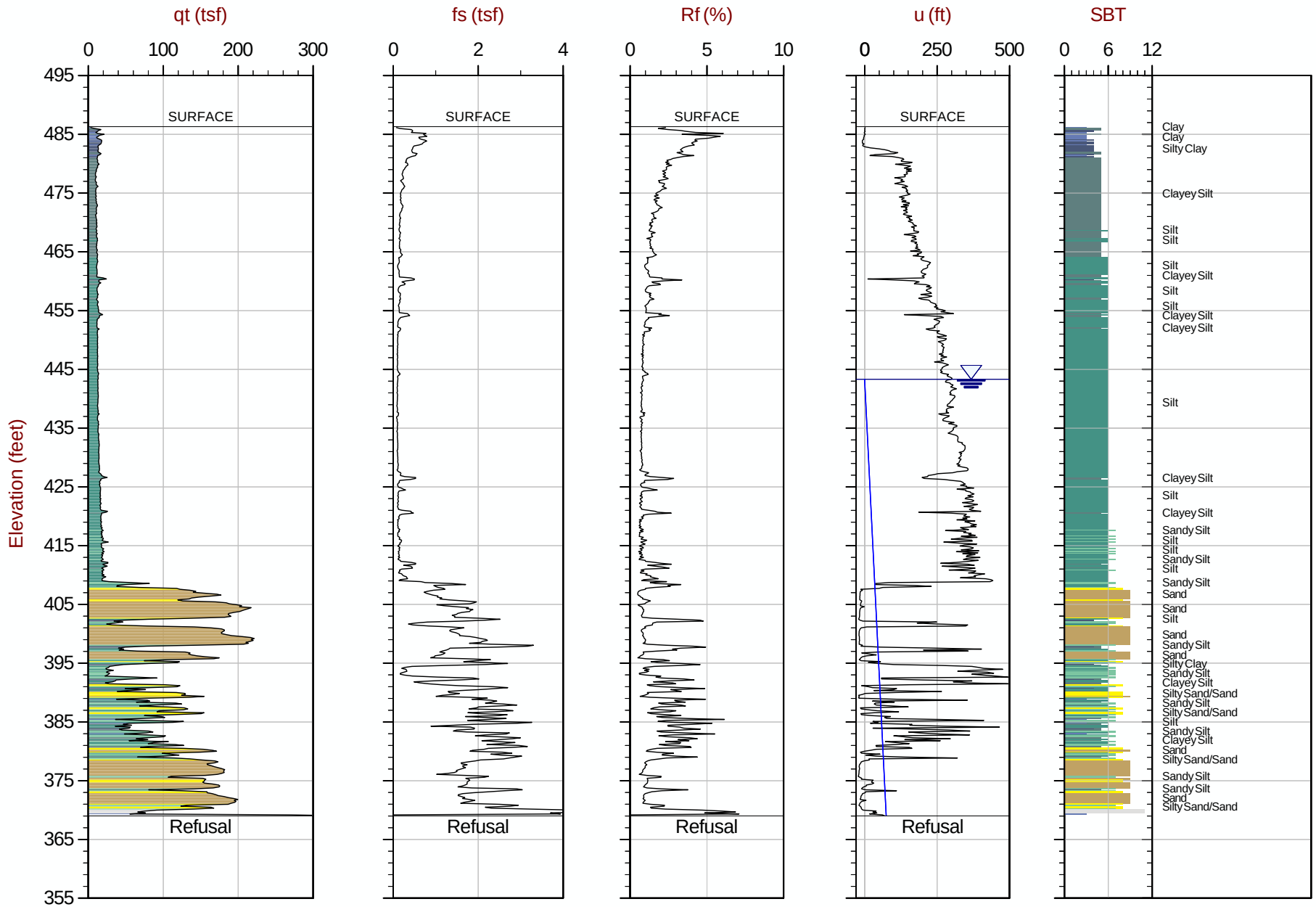
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 15:28
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW03
Cone: 468:T1500F15U500



Max Depth: 35.750 m / 117.29 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751655m E: 633961m Elev: 486.30ft

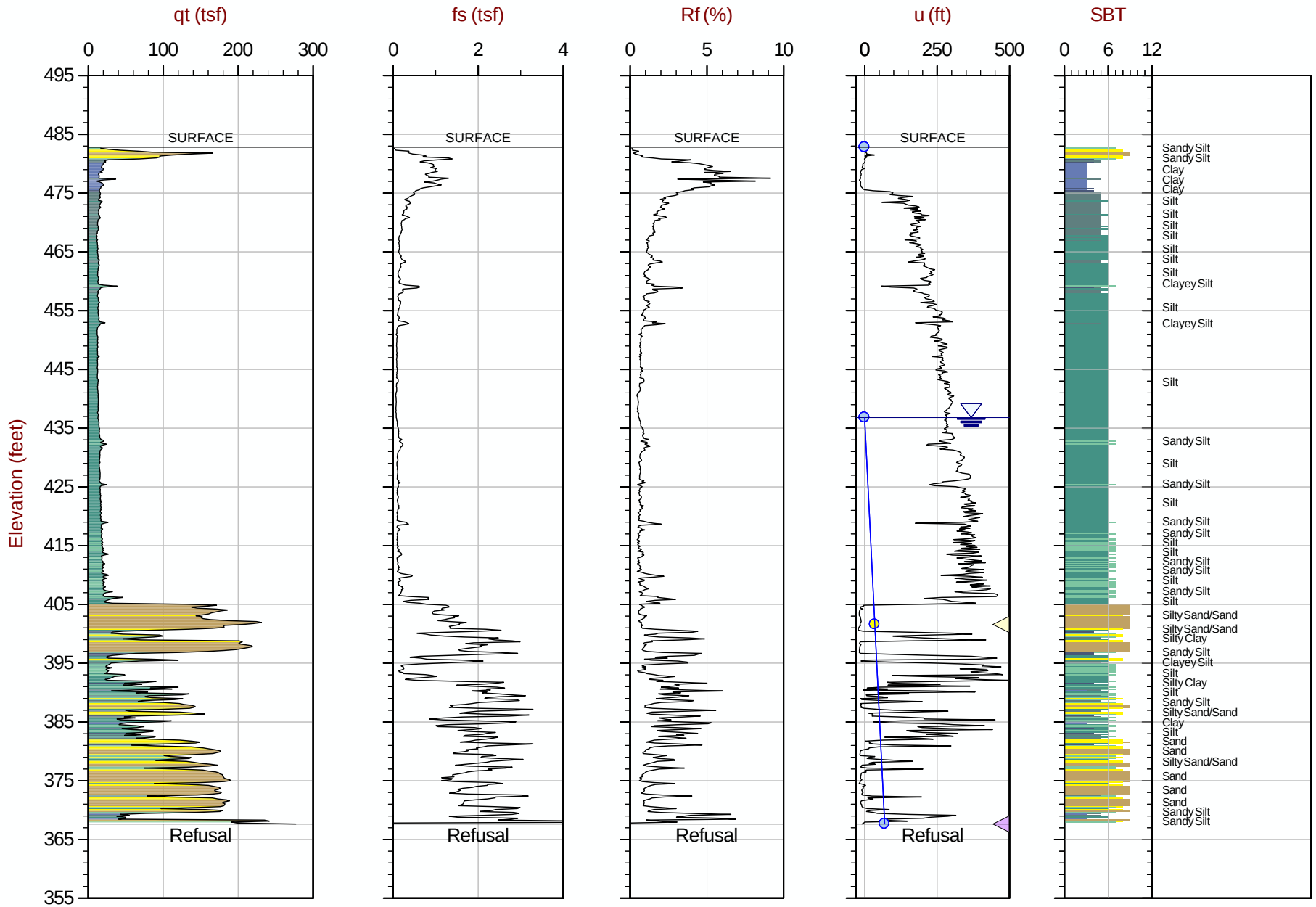
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 08:18
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW04
Cone: 468:T1500F15U500



Max Depth: 35.100 m / 115.16 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP04.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751599m E: 633942m Elev: 482.78ft

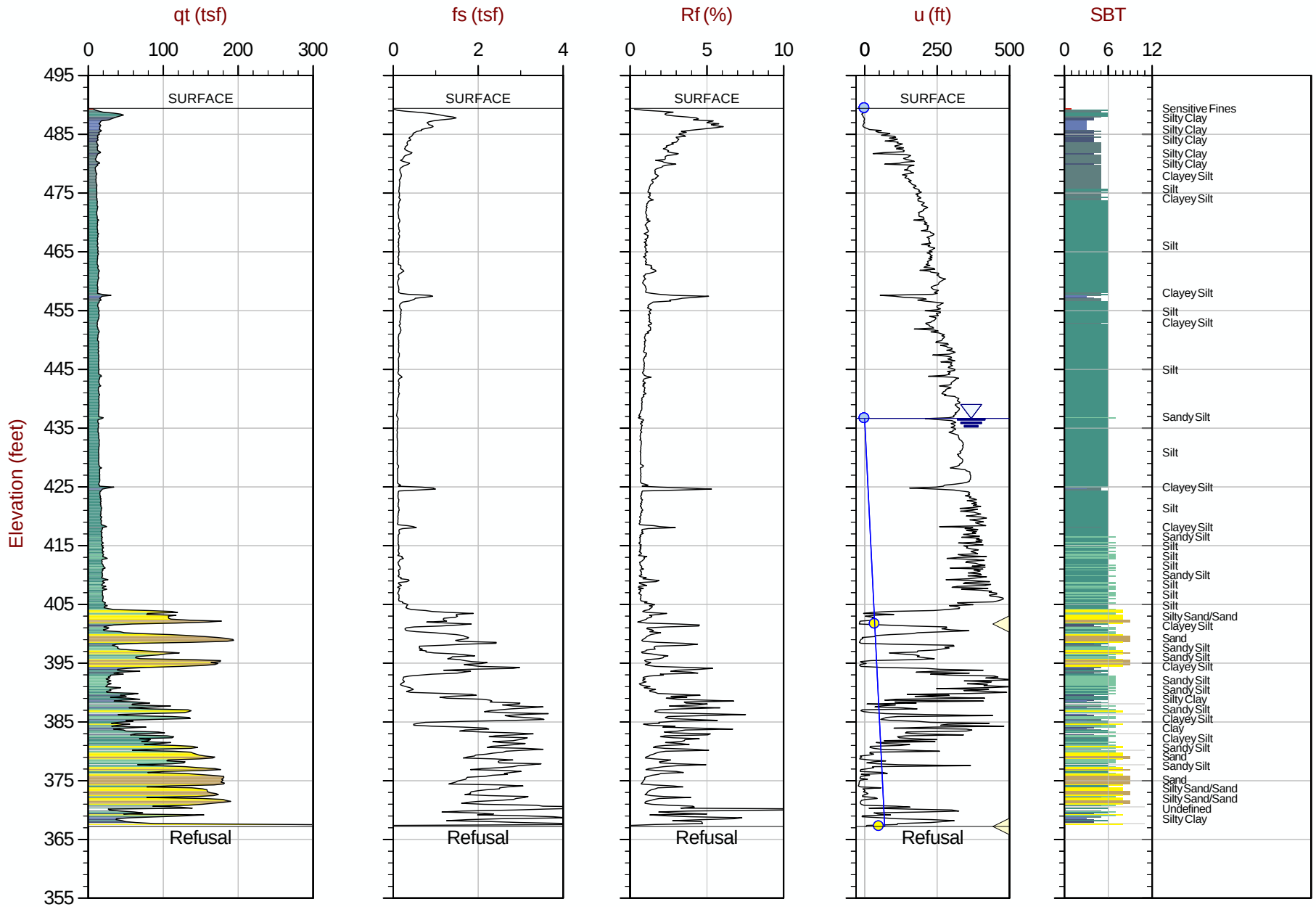
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 10:15
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW05
Cone: 468:T1500F15U500



Max Depth: 37.250 m / 122.21 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP05.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751548m E: 633985m Elev: 489.42ft

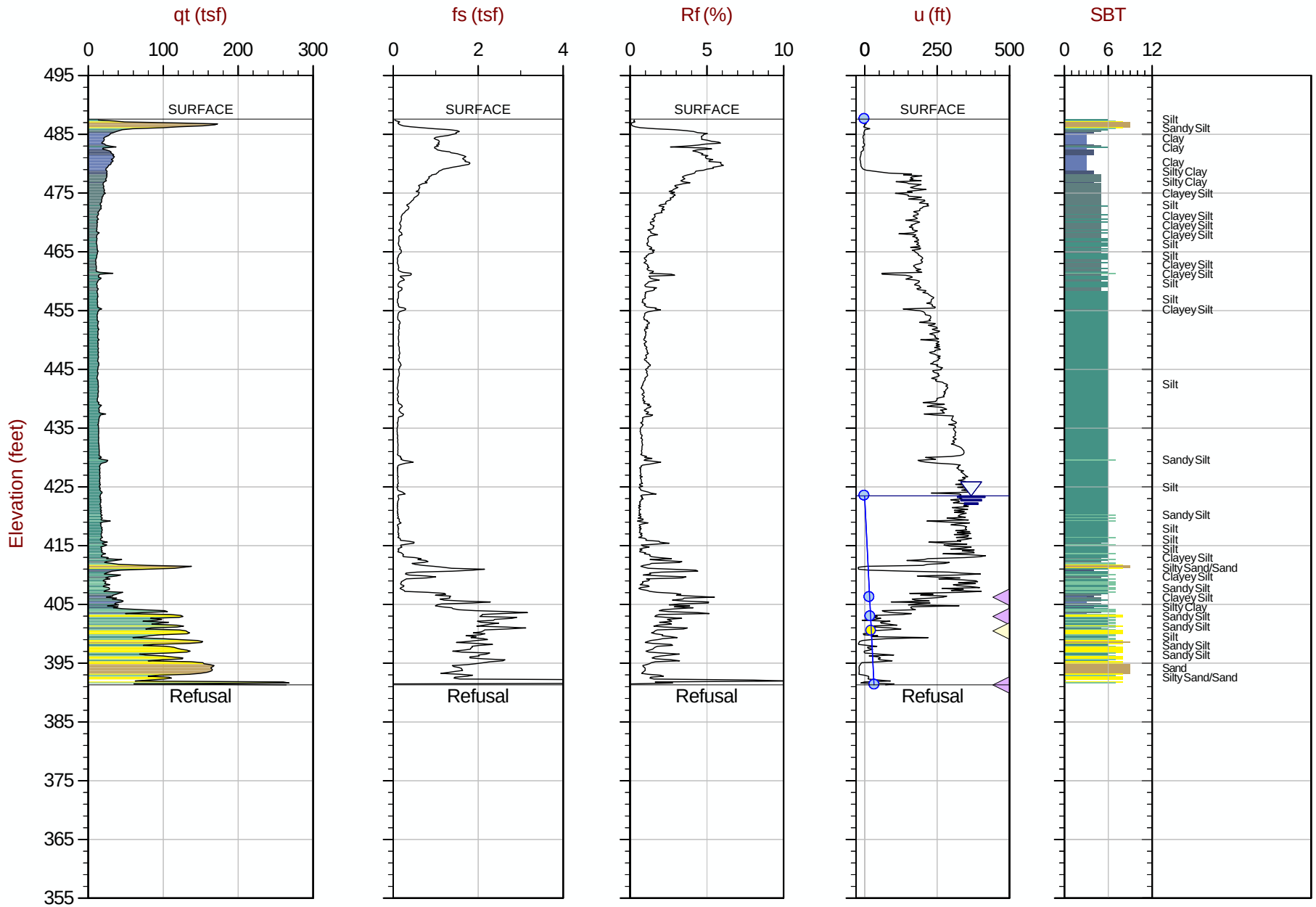
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-10 10:09
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: 468:T1500F15U500



Max Depth: 29.350 m / 96.29 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP06.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751690m E: 634056m Elev: 487.59ft

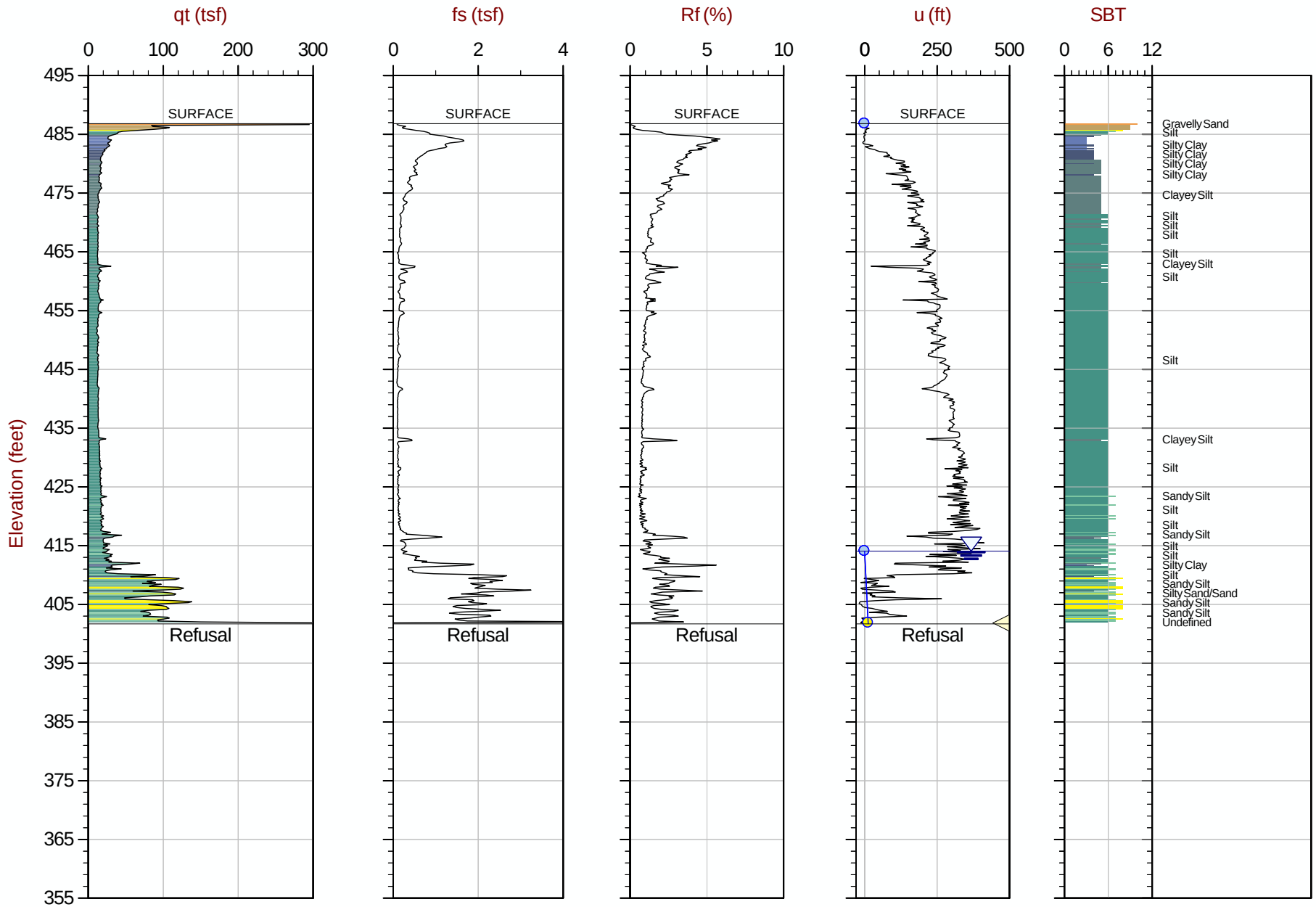
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 14:15
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW07
Cone: 468:T1500F15U500



Max Depth: 25.950 m / 85.14 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP07.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751660m E: 634100m Elev: 486.82ft

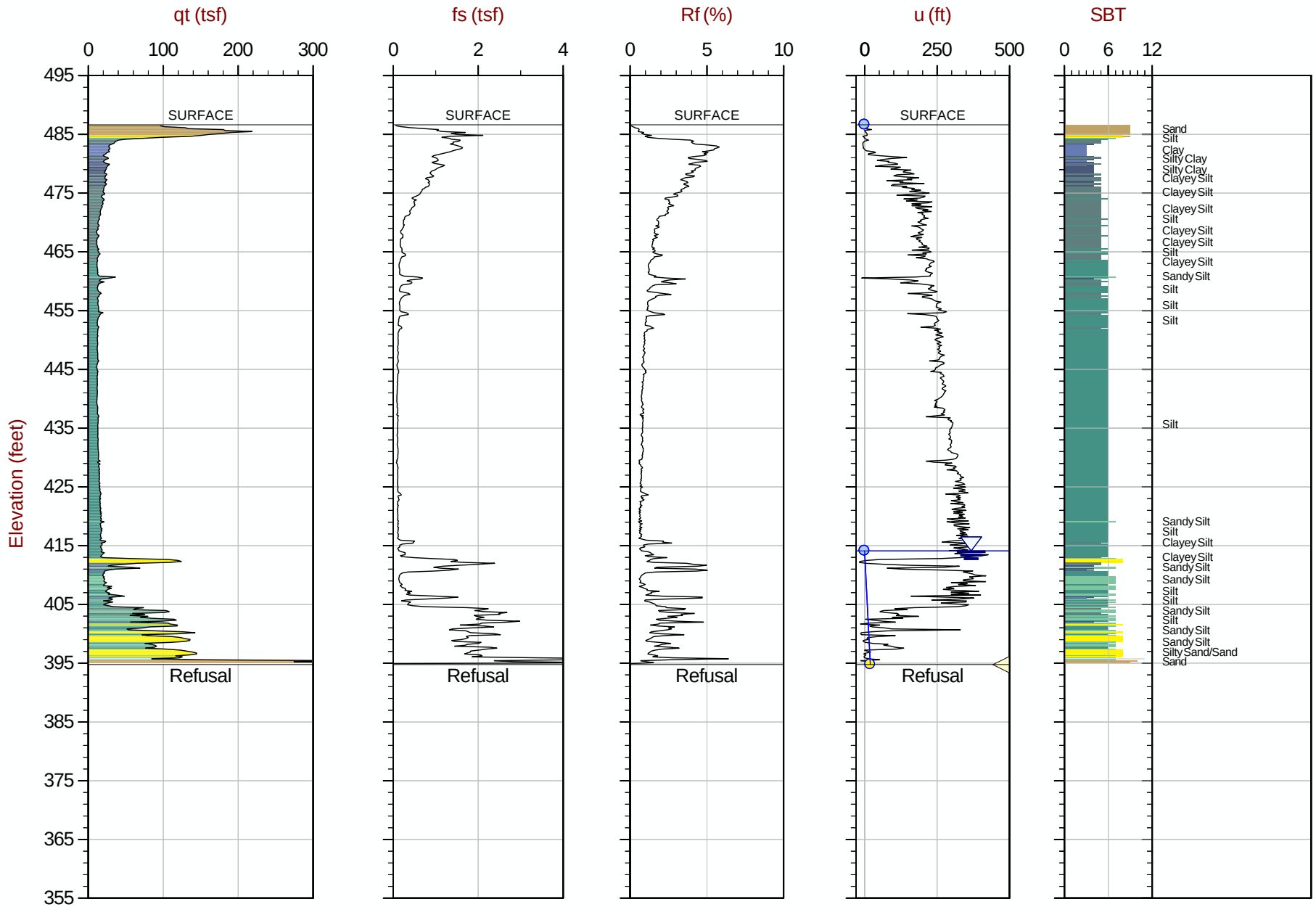
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 12:02
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW08
Cone: 468:T1500F15U500



Max Depth: 28.000 m / 91.86 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP08.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751586m E: 634093m Elev: 486.62ft

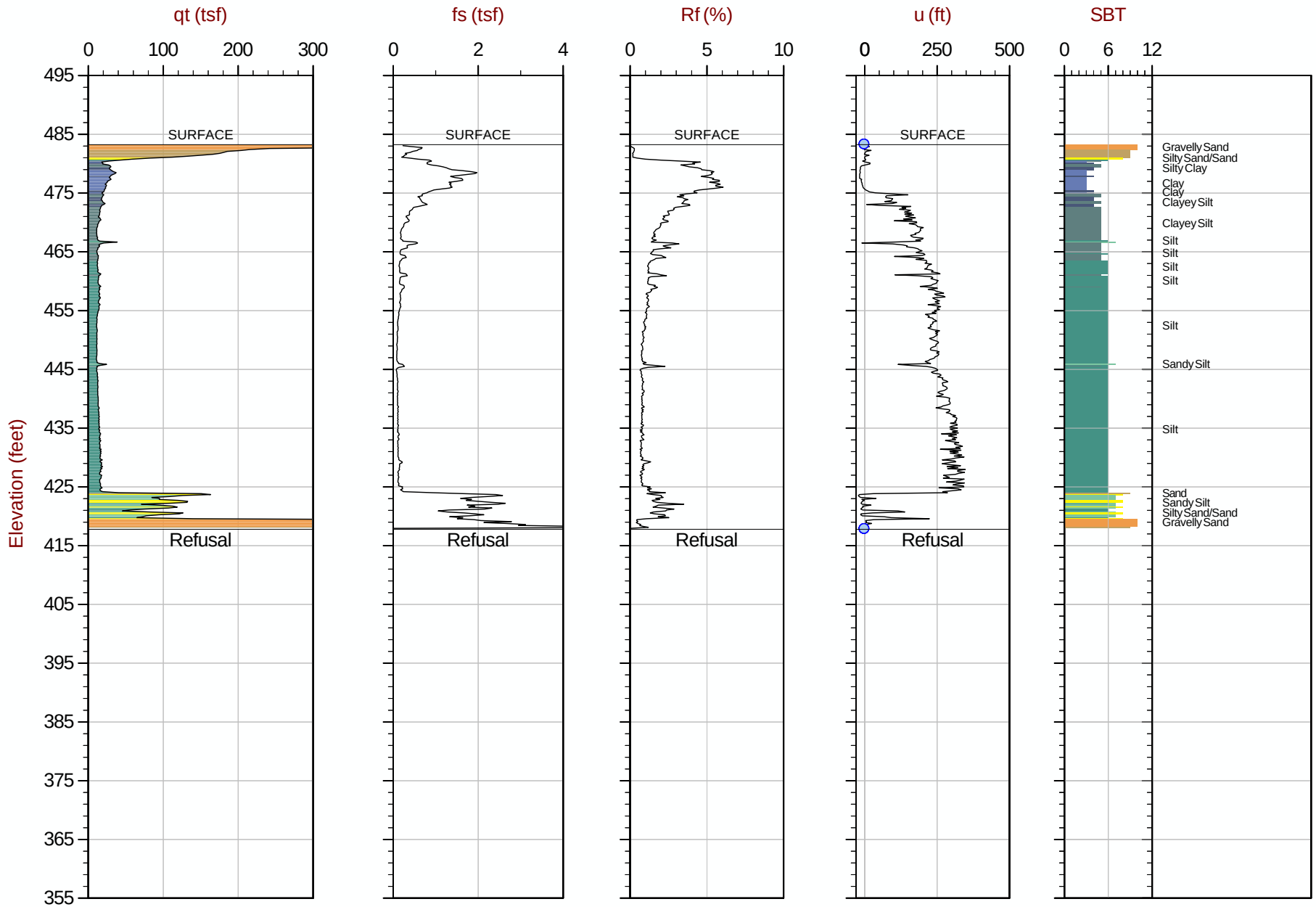
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-10 08:16
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW09
Cone: 468:T1500F15U500



Max Depth: 19.950 m / 65.45 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP09.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4751692m E: 634125m Elev: 483.23ft

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.

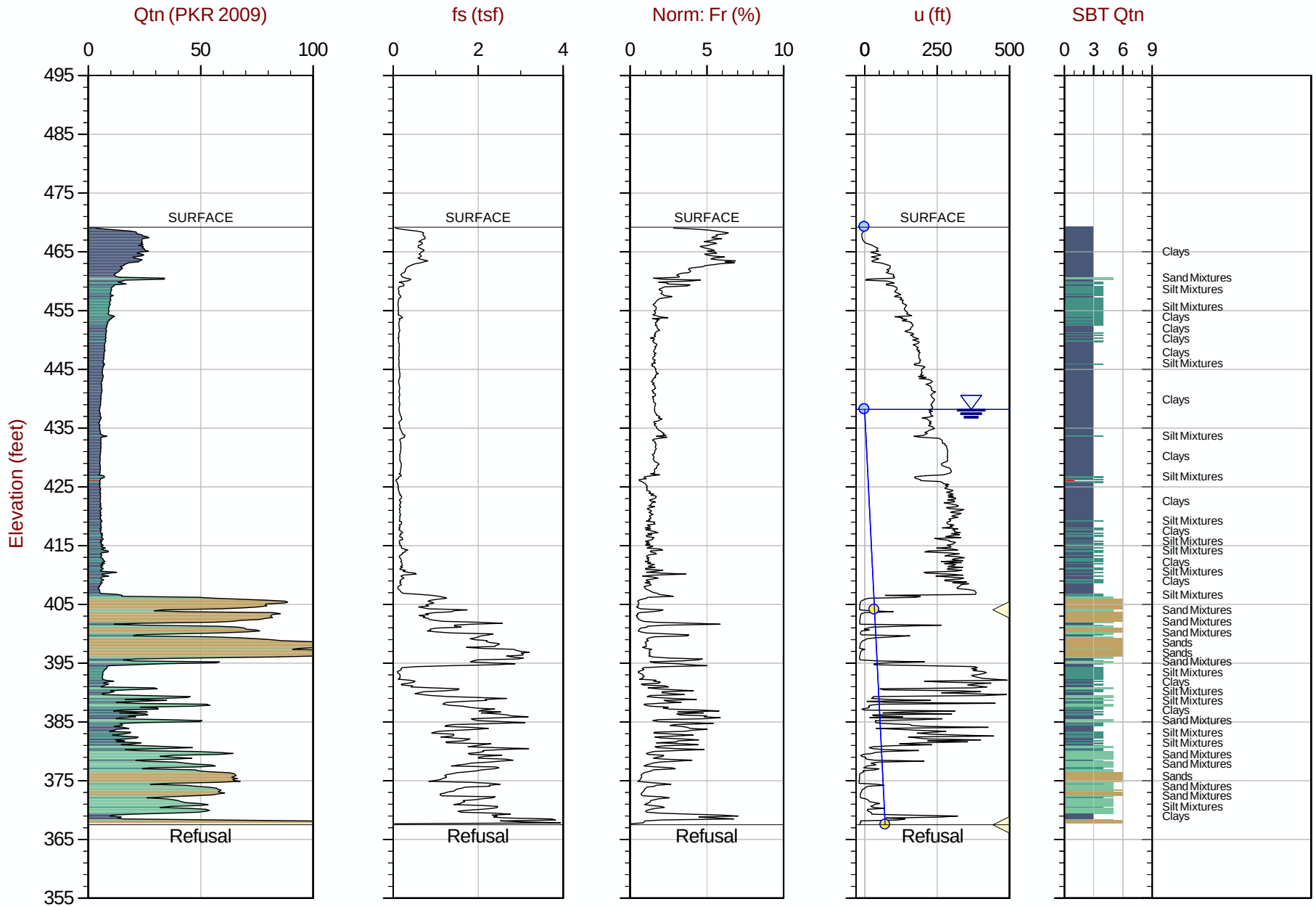
Normalized Cone Penetration Test Plots

(with Elevations)

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 09:57
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW01
Cone: 468:T1500F15U500



Max Depth: 31.000 m / 101.70 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP01.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751631m E: 633883m Elev: 469.20ft

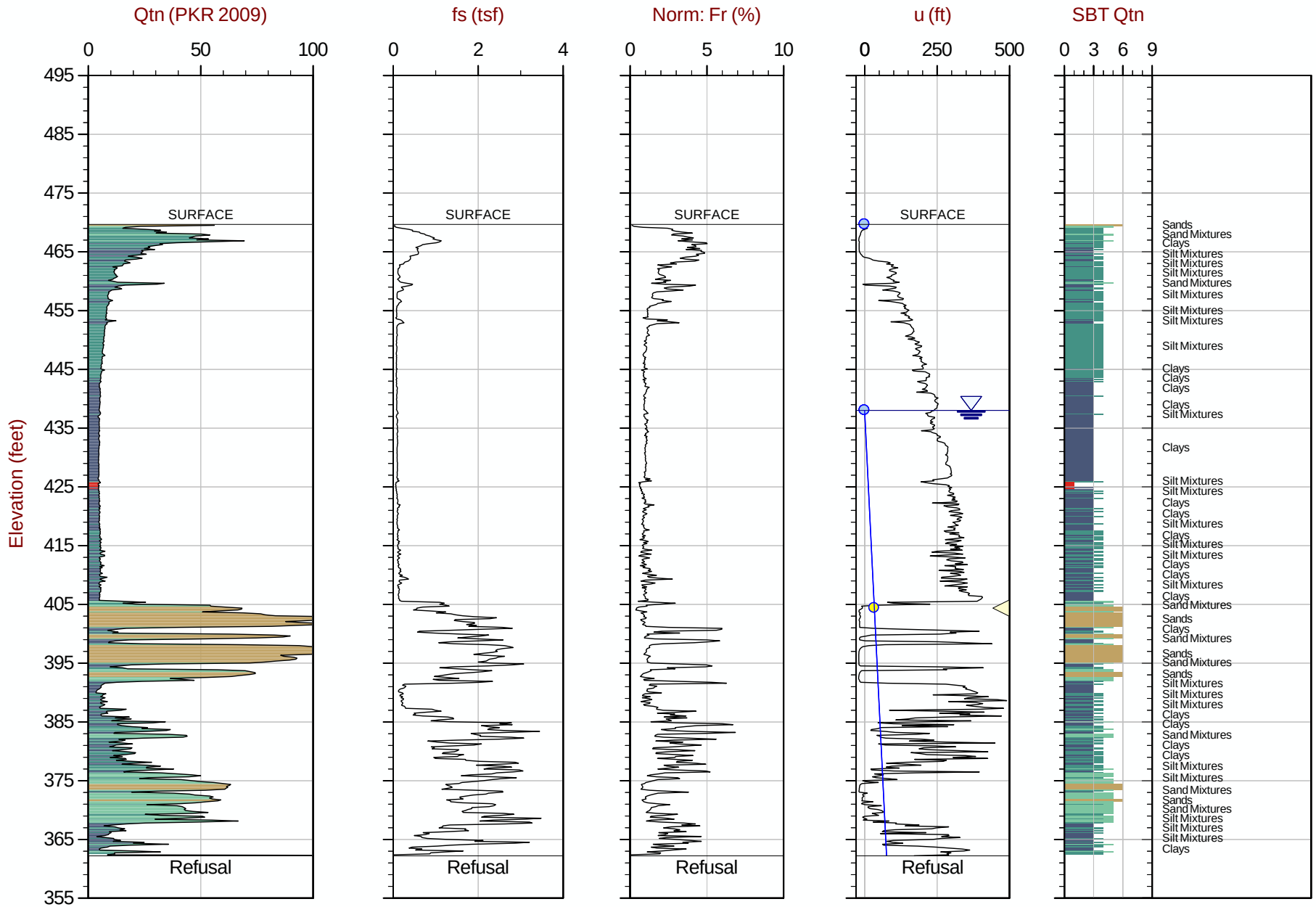
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 11:44
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW02
Cone: 468:T1500F15U500



Max Depth: 32.750 m / 107.45 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP02.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751576m E: 633890m Elev: 469.66ft

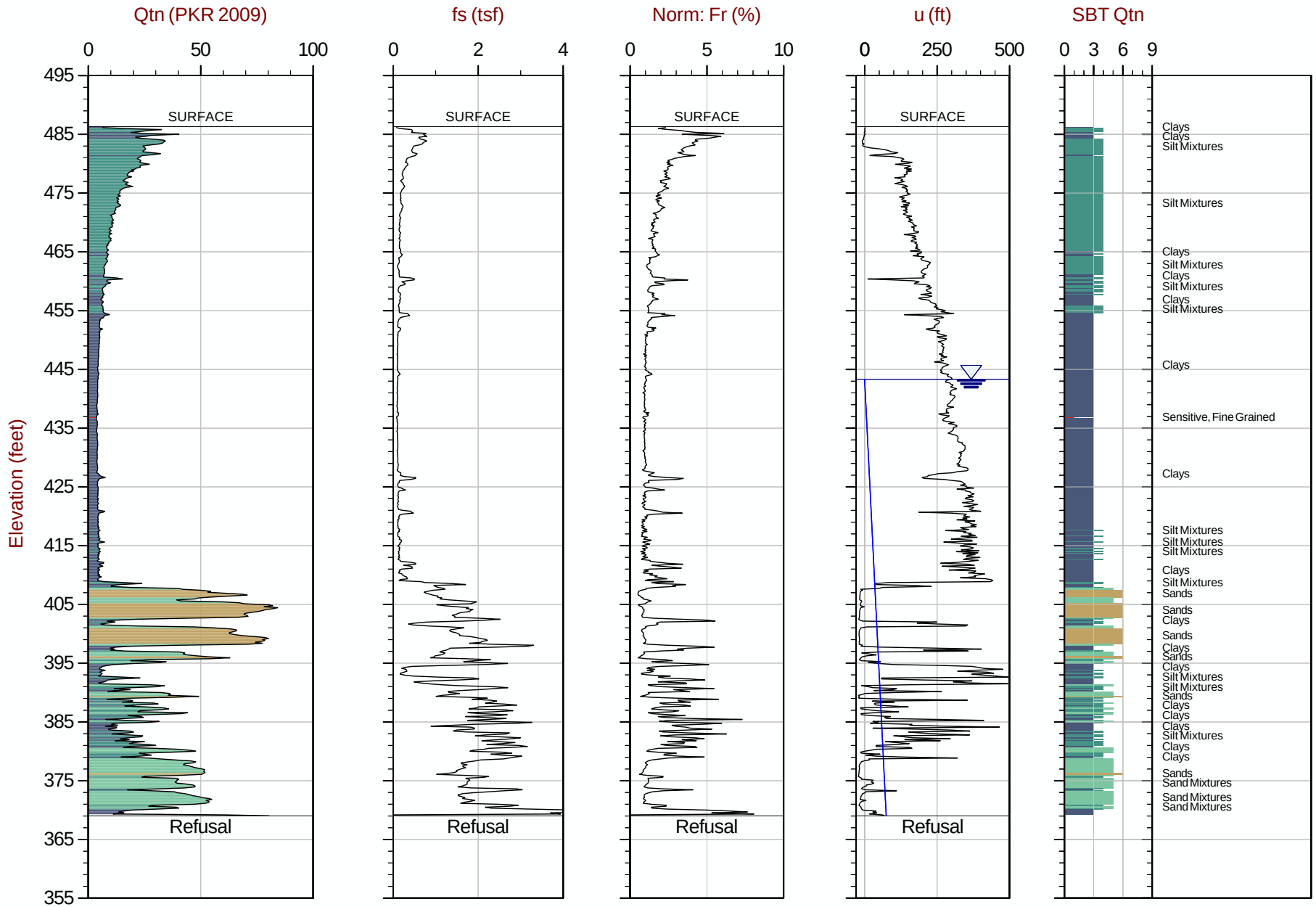
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-08 15:28
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW03
Cone: 468:T1500F15U500



Max Depth: 35.750 m / 117.29 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP03.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751655m E: 633961m Elev: 486.30ft

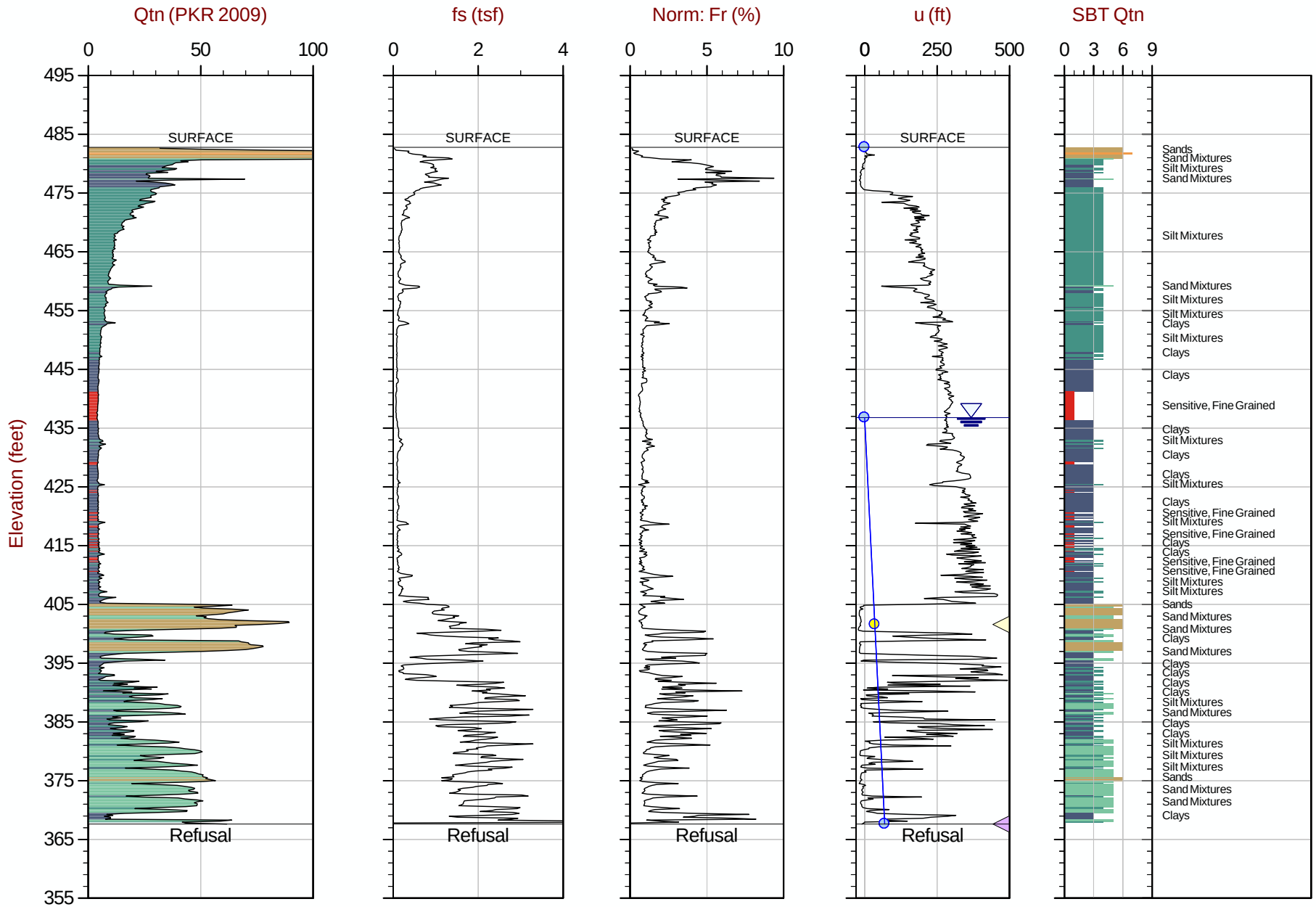
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 08:18
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW04
Cone: 468:T1500F15U500



Max Depth: 35.100 m / 115.16 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP04.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751599m E: 633942m Elev: 482.78ft

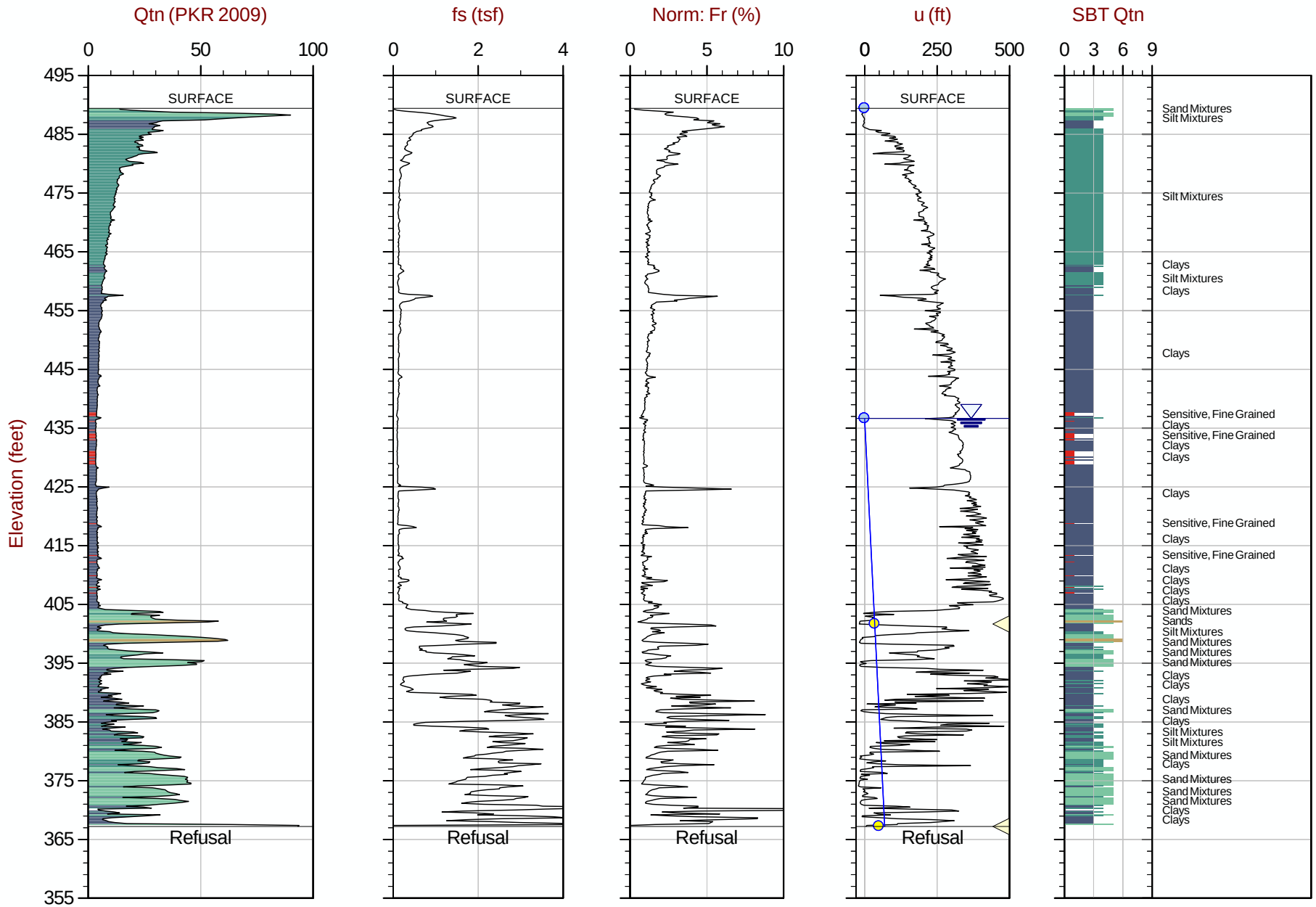
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 10:15
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW05
Cone: 468:T1500F15U500



Max Depth: 37.250 m / 122.21 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP05.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751548m E: 633985m Elev: 489.42ft

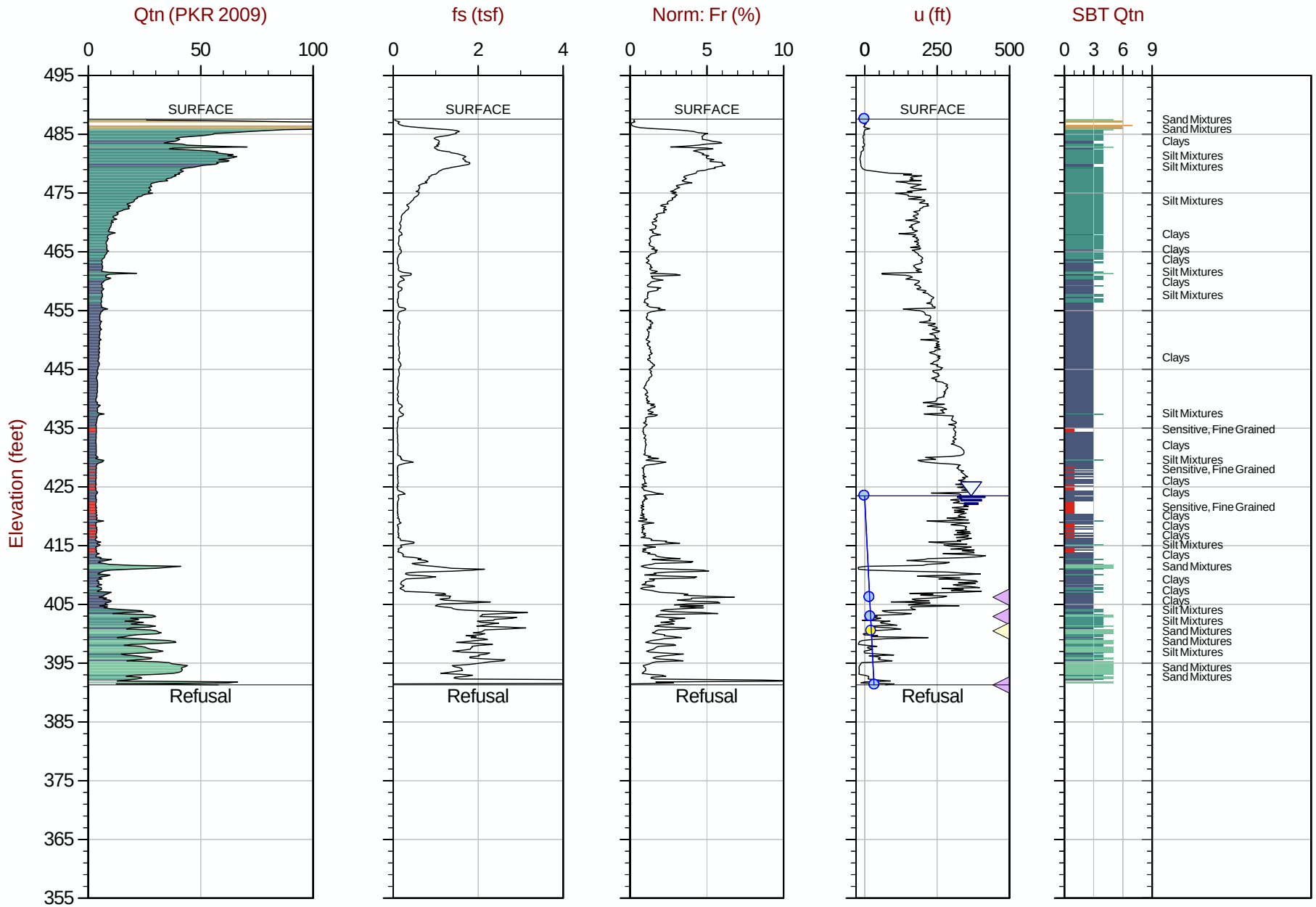
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-10 10:09
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: 468:T1500F15U500



Max Depth: 29.350 m / 96.29 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP06.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751690m E: 634056m Elev: 487.59ft

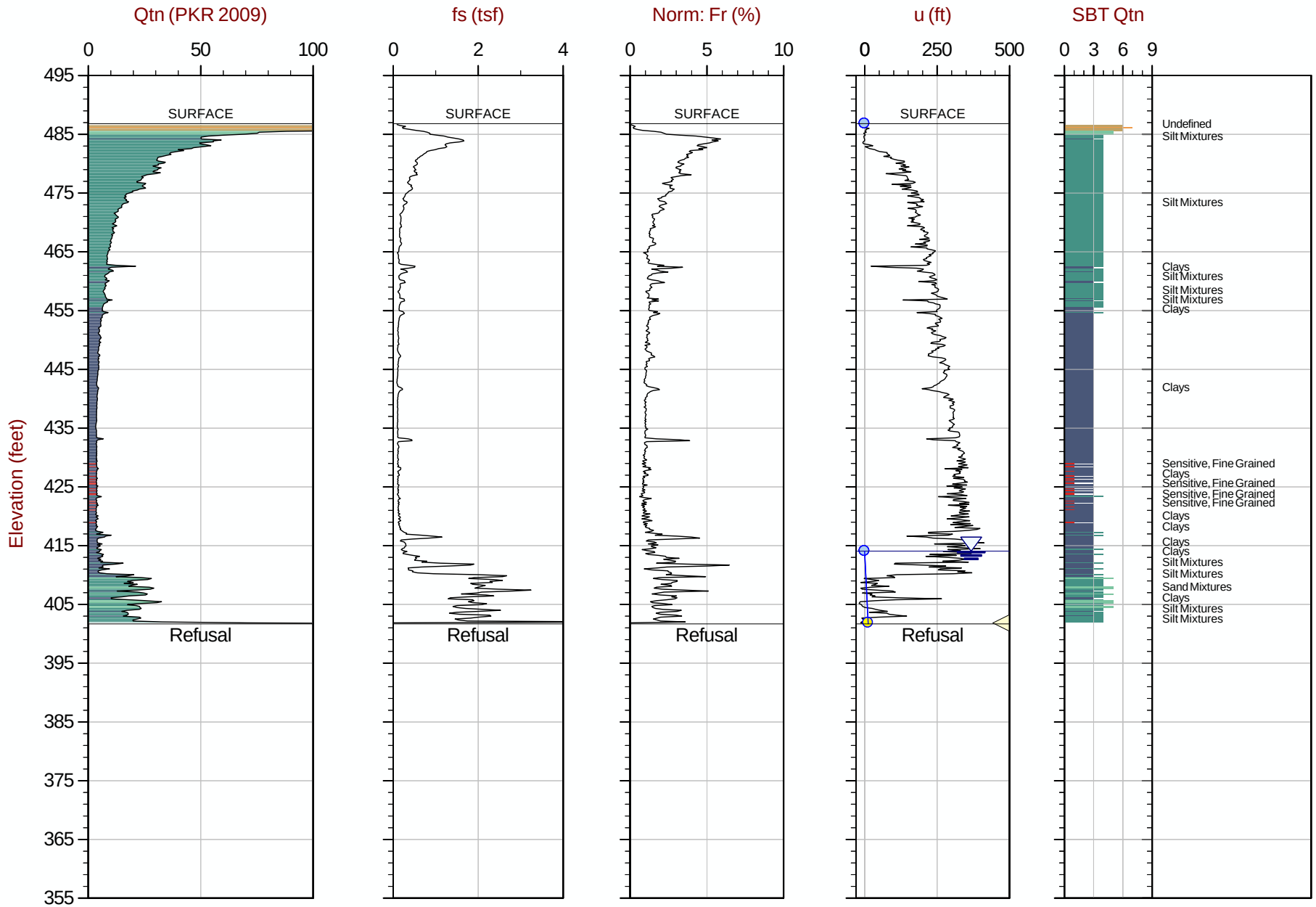
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 14:15
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW07
Cone: 468:T1500F15U500



Max Depth: 25.950 m / 85.14 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP07.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751660m E: 634100m Elev: 486.82ft

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

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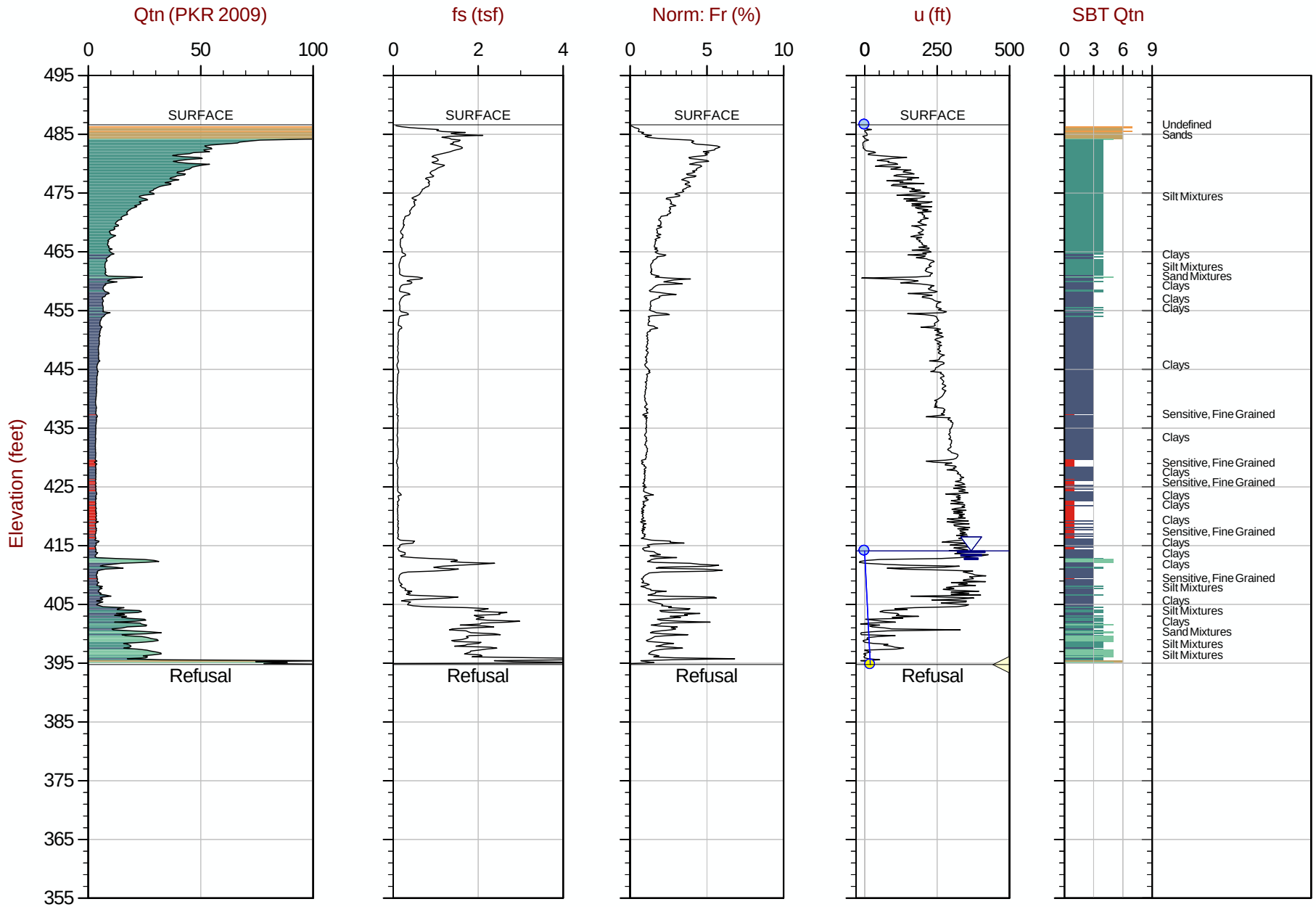
C.T. Male Associates

Job No: 17-53028
Date: 2017-03-09 12:02
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW08
Cone: 468:T1500F15U500



Max Depth: 28.000 m / 91.86 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP08.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751586m E: 634093m Elev: 486.62ft

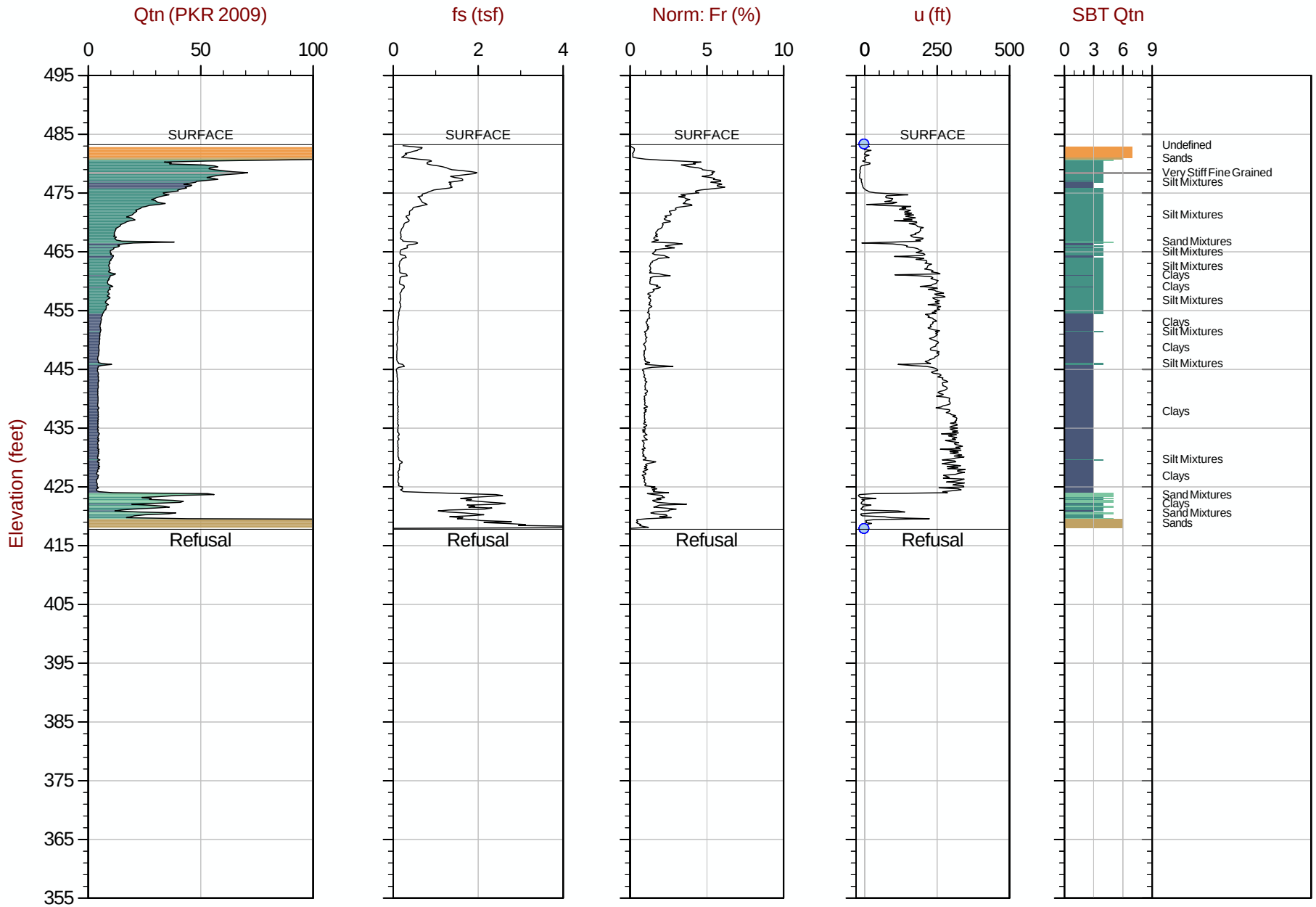
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

C.T. Male Associates

Job No: 17-53028
Date: 2017-03-10 08:16
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW09
Cone: 468:T1500F15U500



Max Depth: 19.950 m / 65.45 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53028_CP09.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4751692m E: 634125m Elev: 483.23ft

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.

Pore Pressure Dissipation Summary and

Pore Pressure Dissipation Plots

CONETEC

Job No:	17-53028
Client:	C.T. Male Associates
Project:	SGPP-Liberty, Hoosick Falls, NY
Start Date:	08-Mar-2017
End Date:	10-Mar-2017

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)
CPT17-MW01	17-53028_CP01.PPD	15	400	65.12	34.11	31.02				
CPT17-MW01	17-53028_CP01.PPD	15	200	101.70	72.00	29.70				
CPT17-MW02	17-53028_CP02.PPD	15	200	65.29	33.63	31.65				
CPT17-MW04	17-53028_CP04.PPD	15	300	81.20	35.20	46.00				
CPT17-MW04	17-53028_CP04.PPD	15	760	115.16	69.16		46.00	125	100	5.62
CPT17-MW05	17-53028_CP05.PPD	15	400	87.76	34.98	52.78				
CPT17-MW05	17-53028_CP05.PPD	15	300	122.21	49.49	72.72				
CPT17-MW06	17-53028_CP06.PPD	15	400	81.36	17.24		64.12	18	100	39.33
CPT17-MW06	17-53028_CP06.PPD	15	135	84.64	20.52		64.12	5	100	145.56
CPT17-MW06	17-53028_CP06.PPD	15	300	87.11	22.98	64.12		7	100	106.20
CPT17-MW06	17-53028_CP06.PPD	15	300	96.29	34.17		62.12			
CPT17-MW07	17-53028_CP07.PPD	15	305	84.97	12.22	72.75				
CPT17-MW08	17-53028_CP08.PPD	15	300	91.86	19.35	72.52				
CPT17-MW09	17-53028_CP09.PPD	15	300	65.45	0.02	65.43				
Totals	14 dissipations		76.7 min							

a. Time is relative to where umax occurred

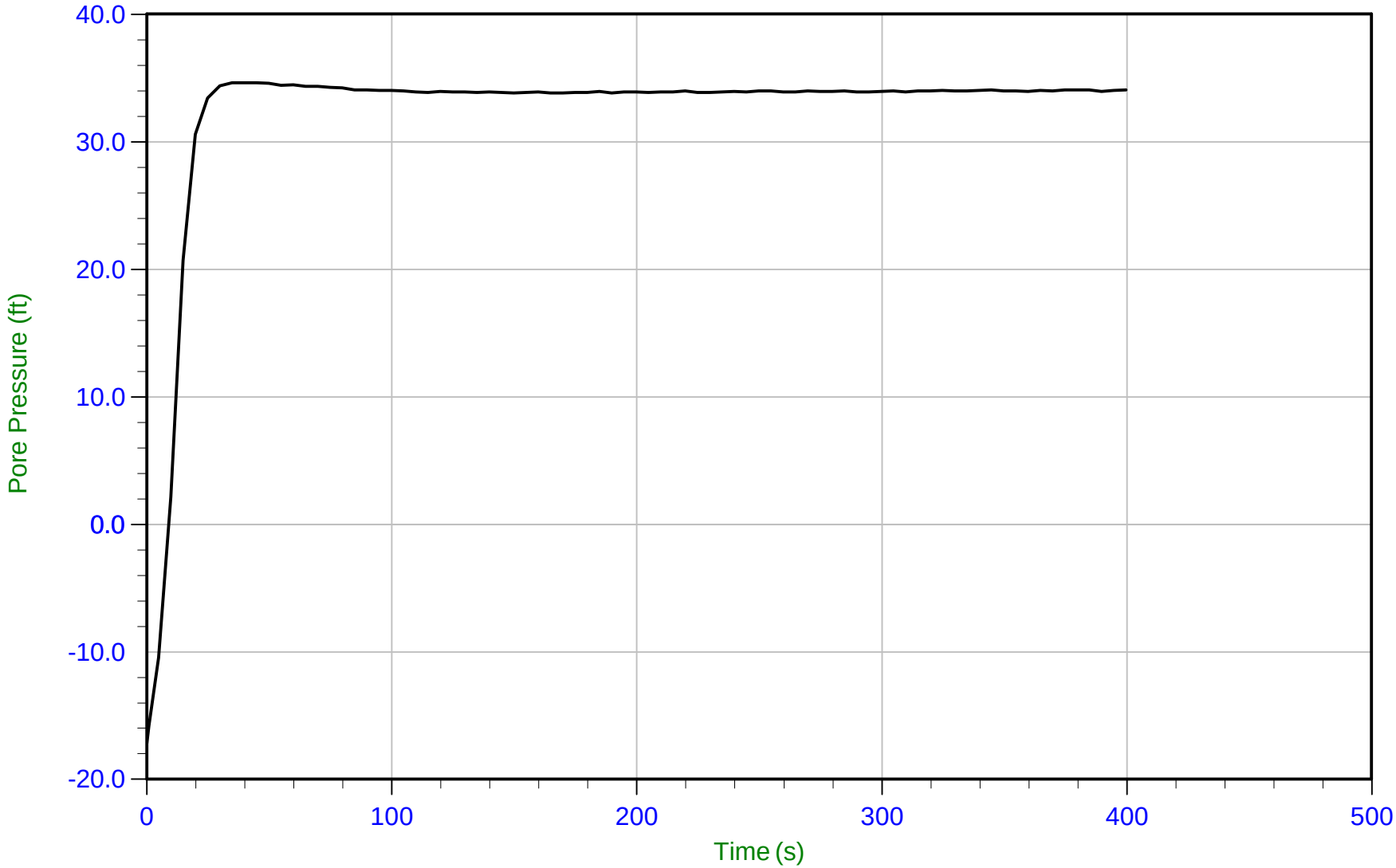
b. Houlsby and Teh, 1991

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 08-Mar-2017 09:57:37
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW01
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP01.PPD
Depth: 19.850 m / 65.124 ft
Duration: 400.0 s

U Min: -17.2 ft
U Max: 34.6 ft

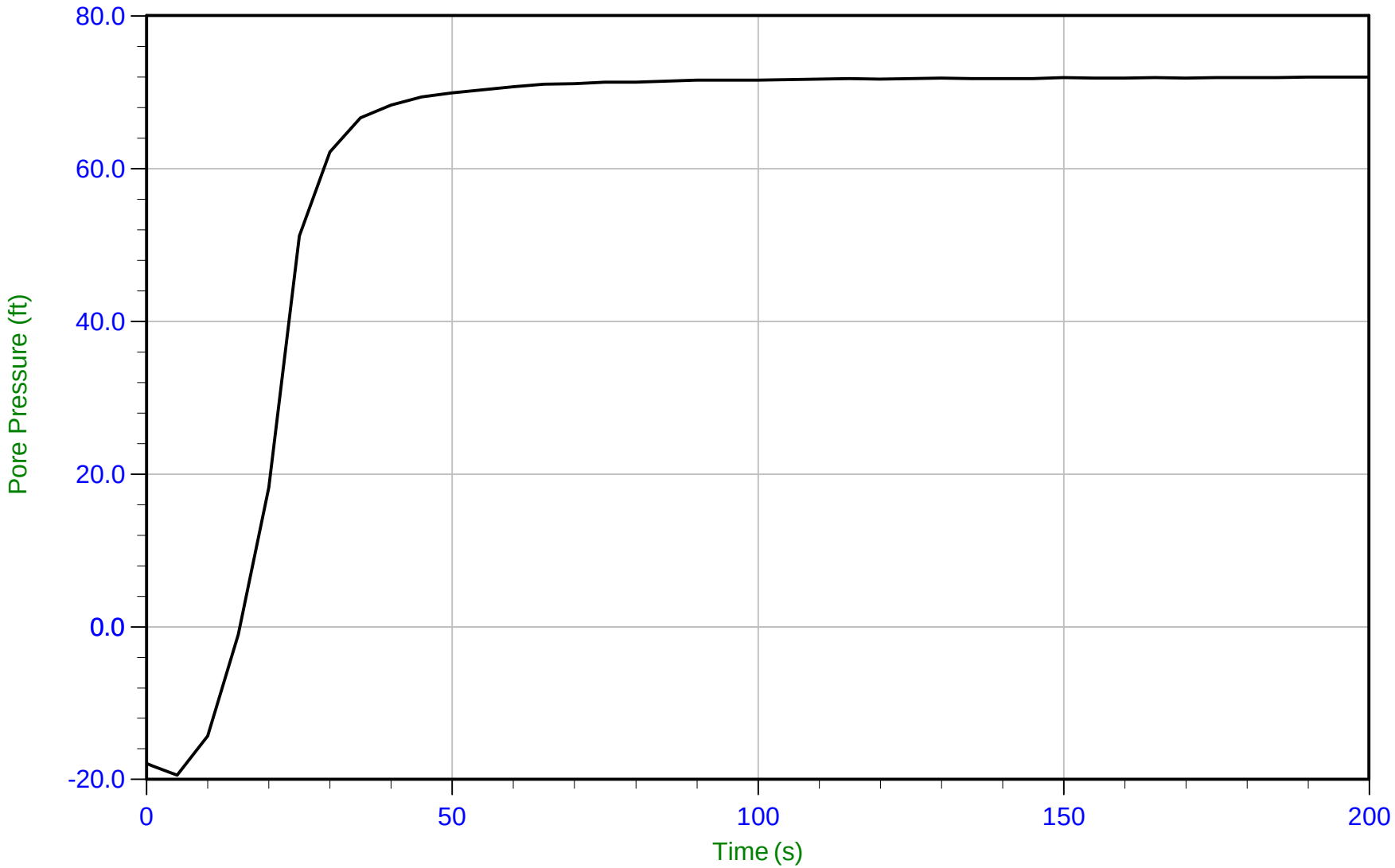
WT: 9.454 m / 31.017 ft
Ueq: 34.1 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 08-Mar-2017 09:57:37
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW01
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP01.PPD
Depth: 31.000 m / 101.705 ft
Duration: 200.0 s

U Min: -19.5 ft
U Max: 72.0 ft

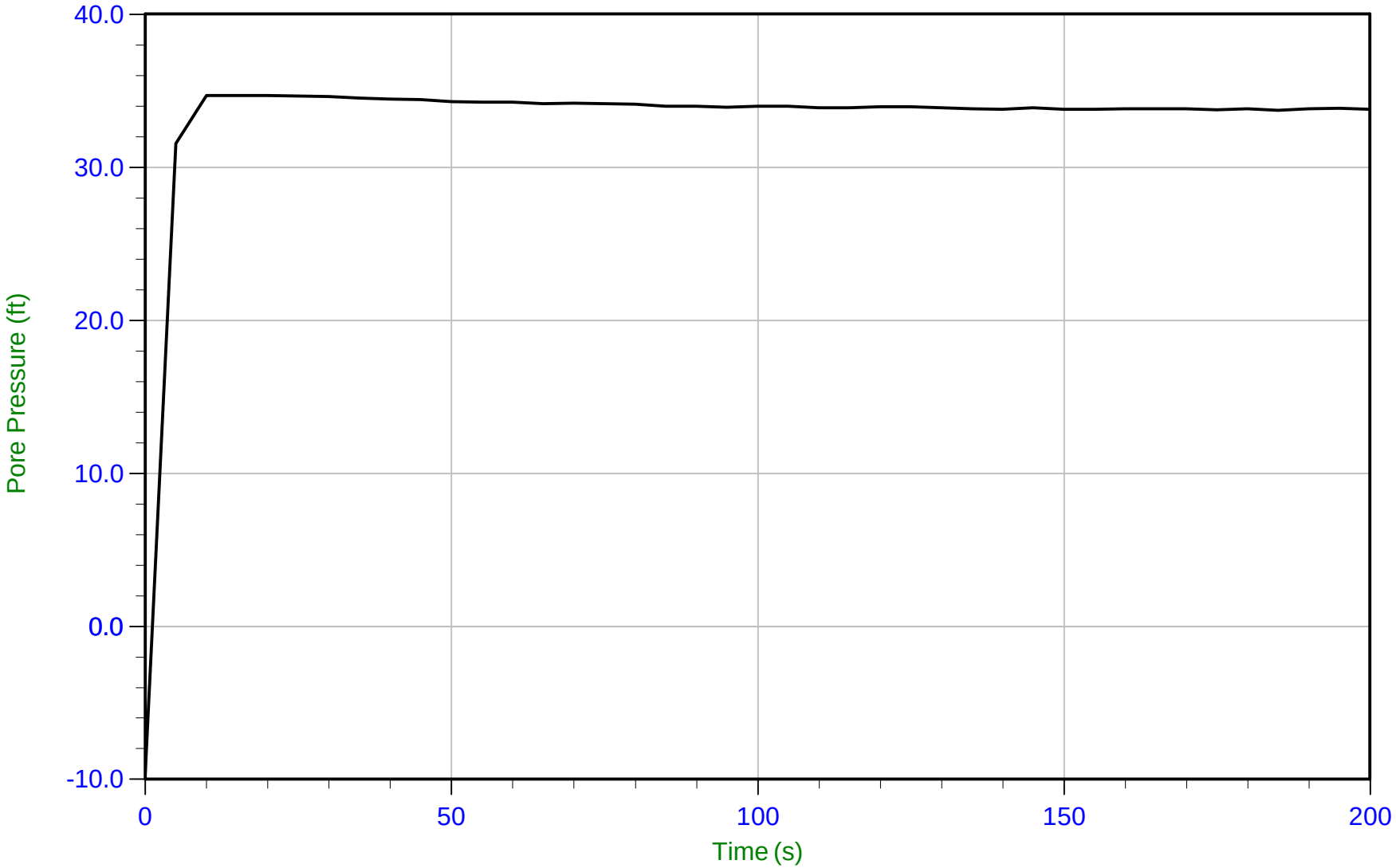
WT: 9.054 m / 29.704 ft
Ueq: 72.0 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 08-Mar-2017 11:44:05
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW02
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP02.PPD
Depth: 19.900 m / 65.288 ft
Duration: 200.0 s

U Min: -9.6 ft
U Max: 34.7 ft

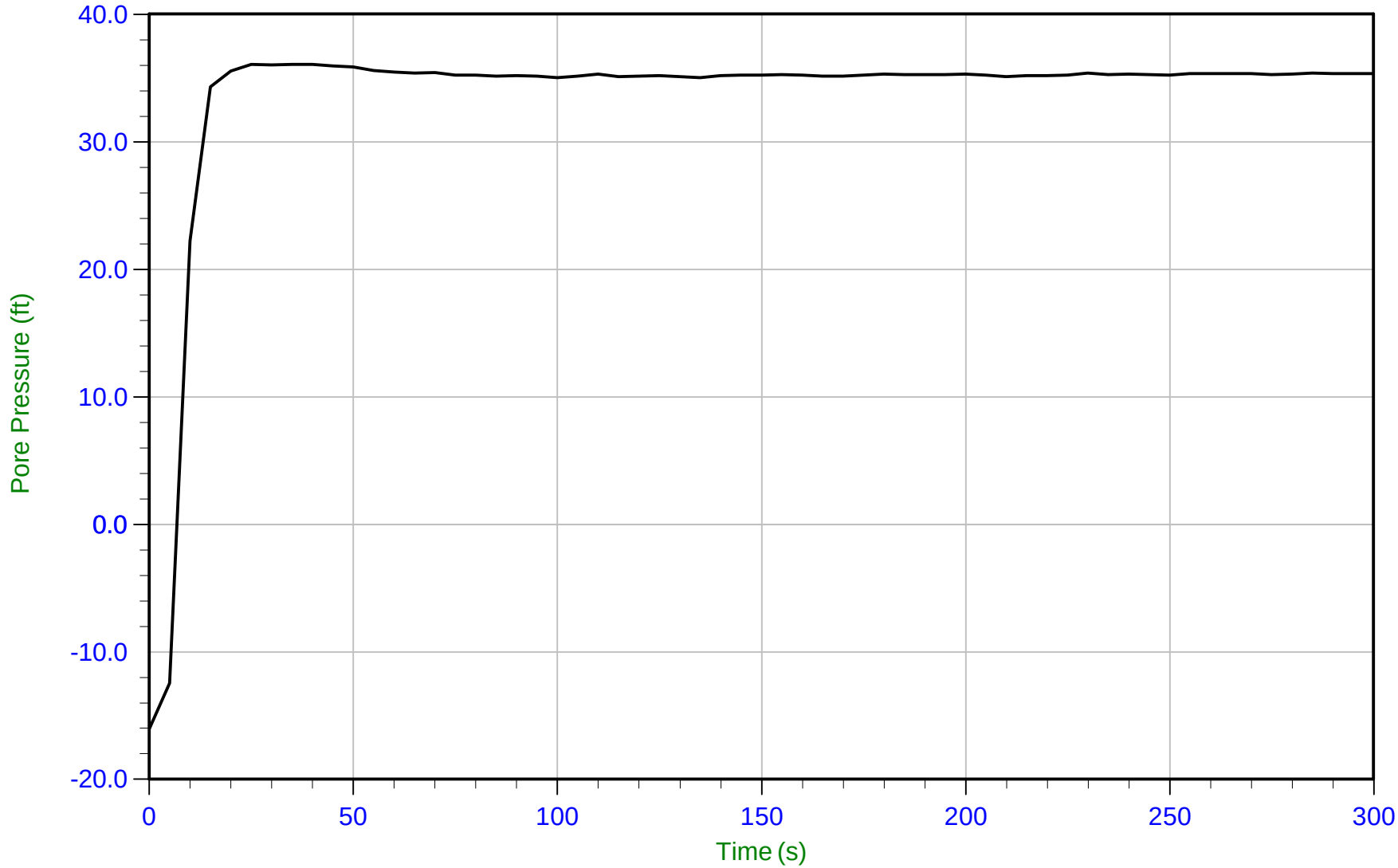
WT: 9.648 m / 31.653 ft
Ueq: 33.6 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 08:18:26
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW04
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP04.PPD
Depth: 24.750 m / 81.200 ft
Duration: 300.0 s

U Min: -16.1 ft
U Max: 36.1 ft

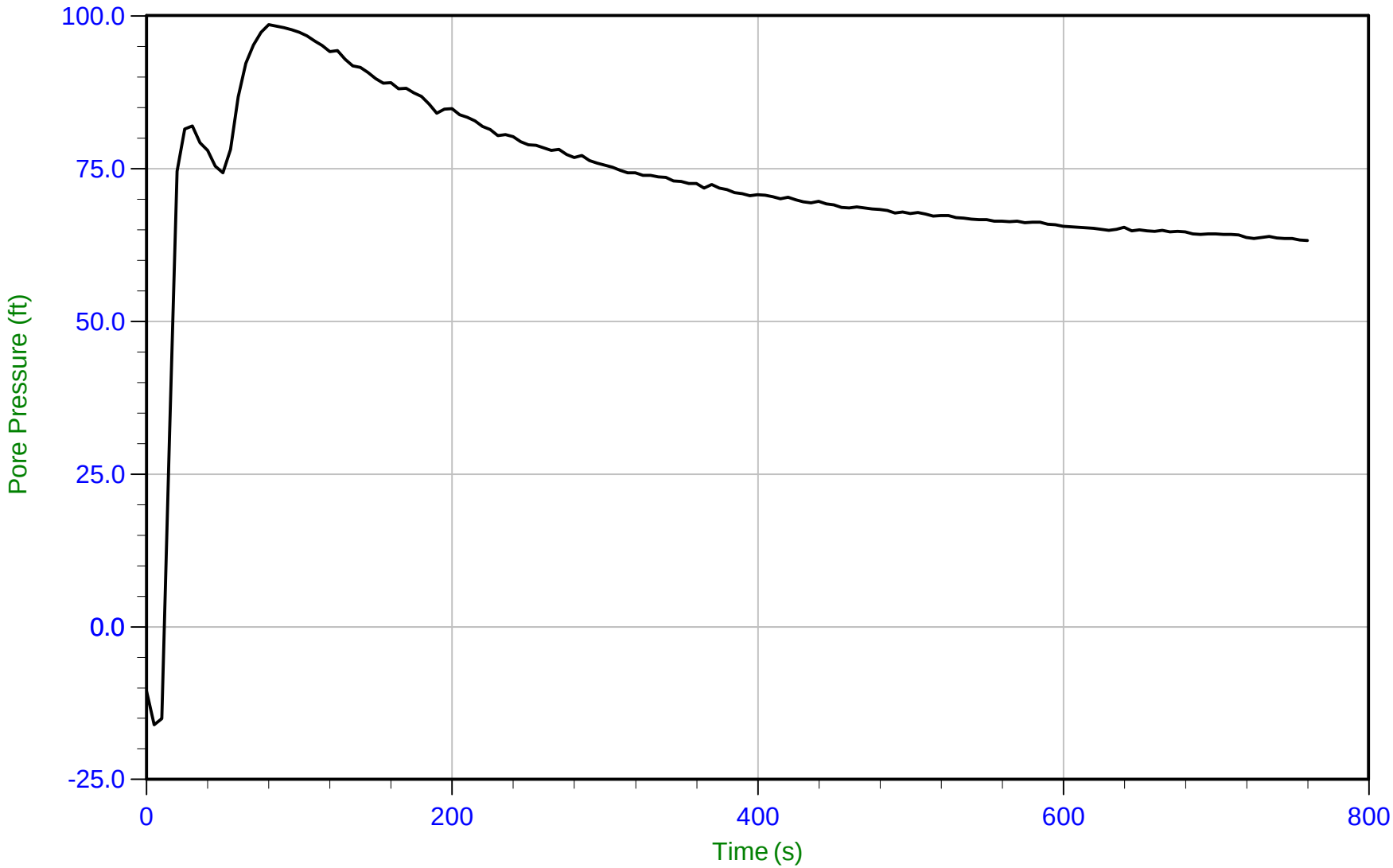
WT: 14.021 m / 46.000 ft
Ueq: 35.2 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 08:18:26
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW04
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP04.PPD
Depth: 35.100 m / 115.156 ft
Duration: 760.0 s

U Min: -16.1 ft
U Max: 98.5 ft

WT: 14.021 m / 46.000 ft
Ueq: 69.2 ft
U(50): 83.84 ft

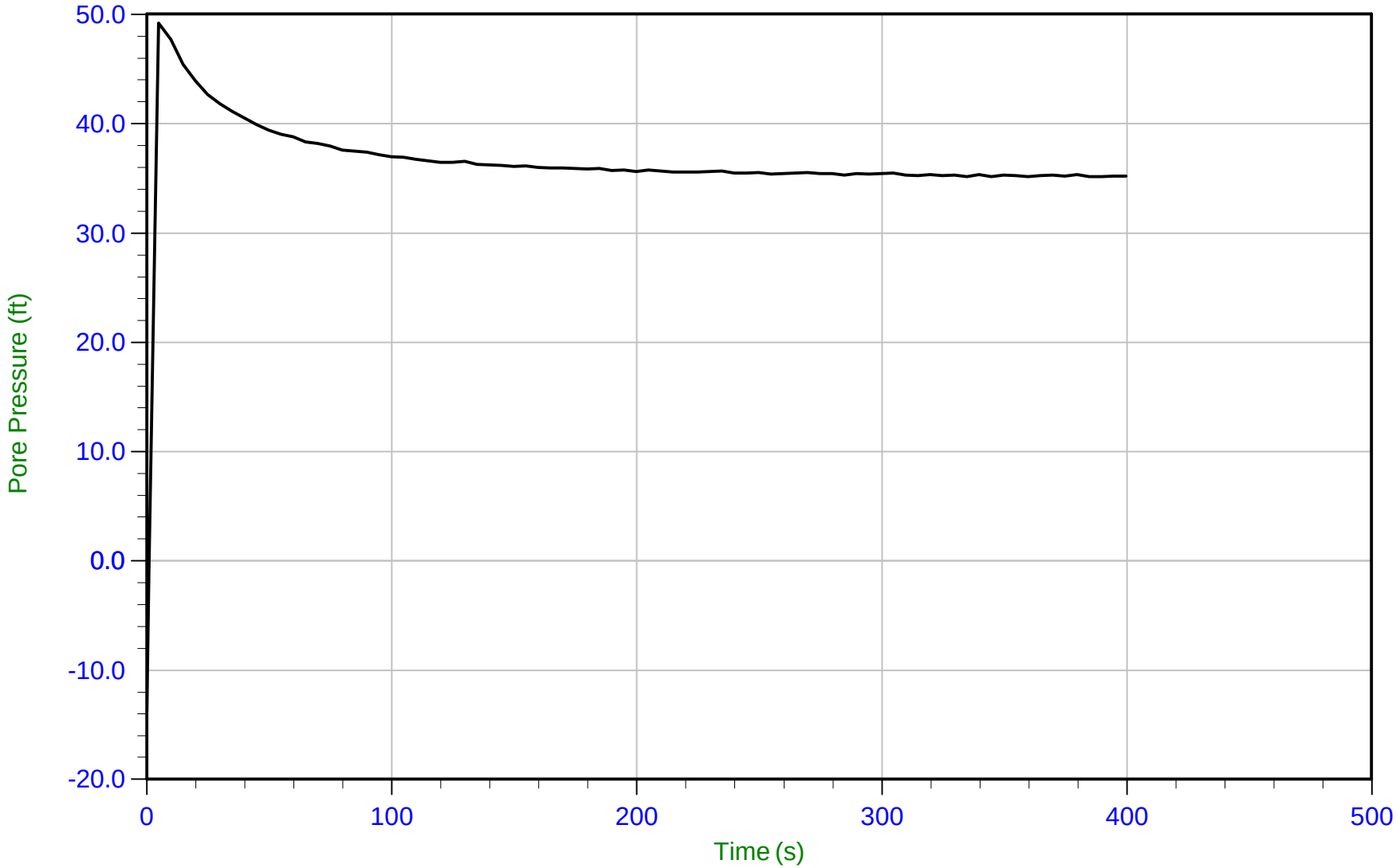
T(50): 124.9 s
Ir: 100
Ch: 5.6 sq cm/min

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 10:15:17
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW05
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP05.PPD
Depth: 26.750 m / 87.761 ft
Duration: 400.0 s

U Min: -13.8 ft
U Max: 49.2 ft

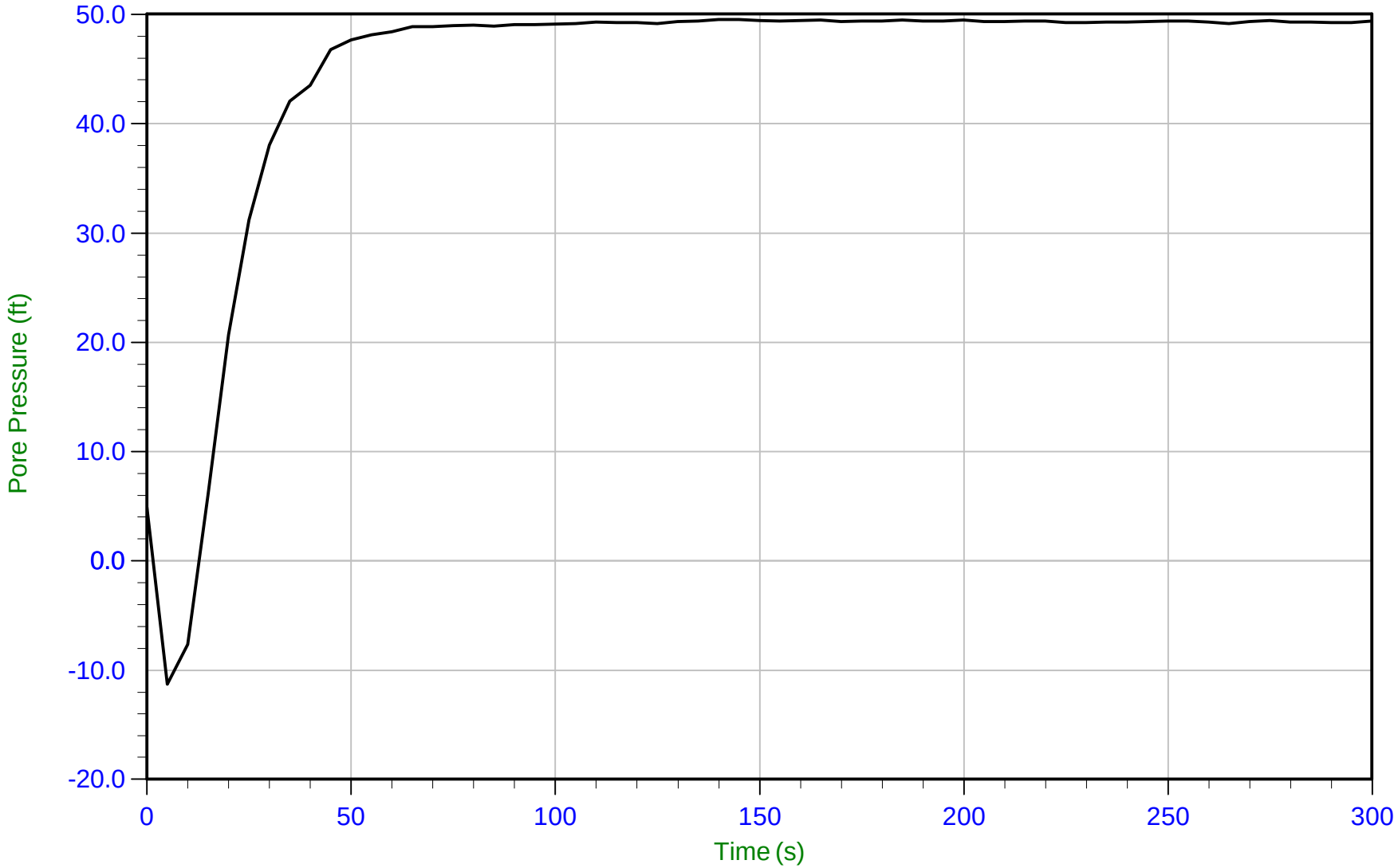
WT: 16.088 m / 52.780 ft
Ueq: 35.0 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 10:15:17
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW05
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP05.PPD
Depth: 37.250 m / 122.210 ft
Duration: 300.0 s

U Min: -11.3 ft
U Max: 49.5 ft

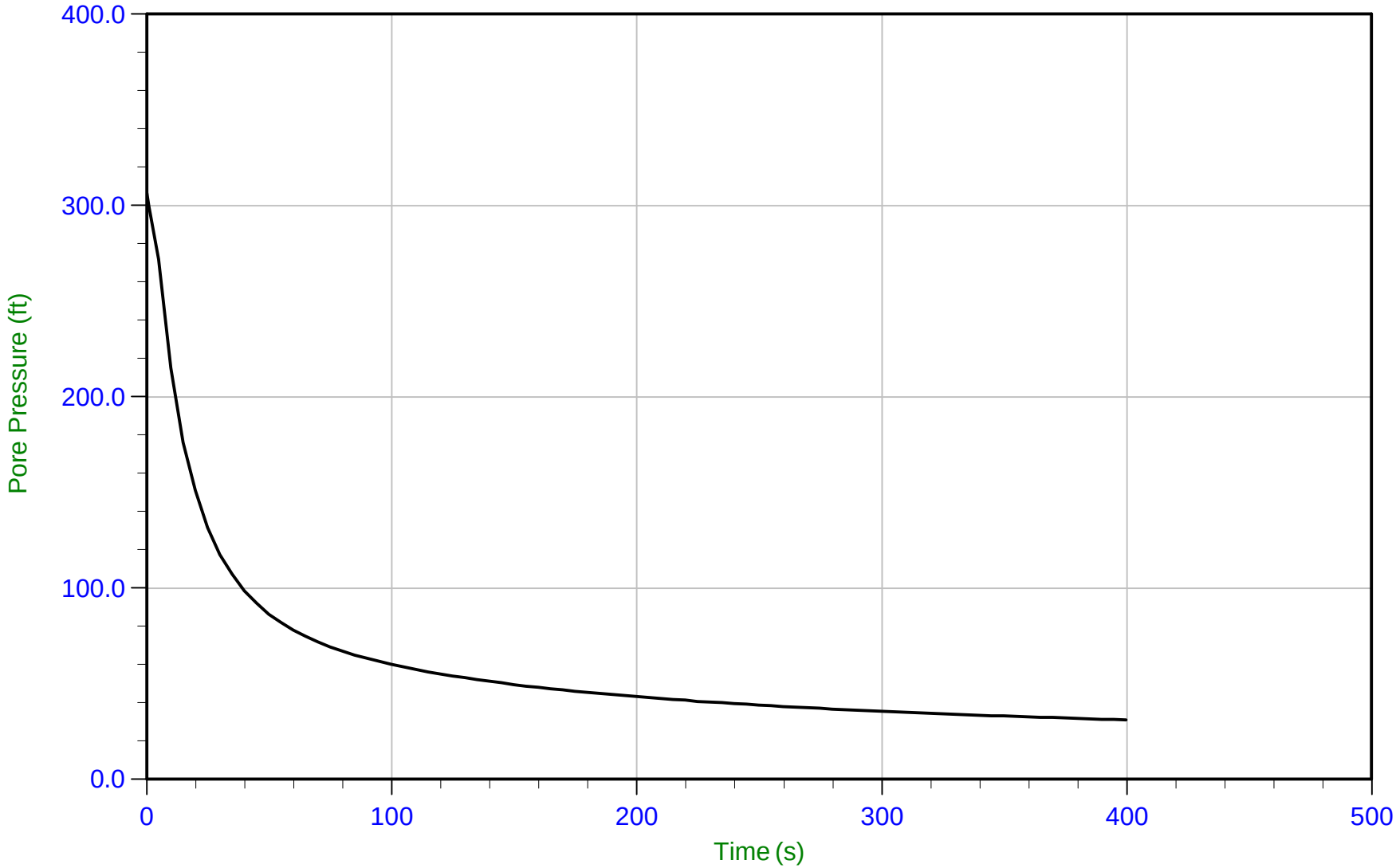
WT: 22.165 m / 72.719 ft
Ueq: 49.5 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 10-Mar-2017 10:09:52
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP06.PPD
Depth: 24.800 m / 81.364 ft
Duration: 400.0 s

U Min: 31.1 ft
U Max: 306.5 ft

WT: 19.545 m / 64.124 ft
Ueq: 17.2 ft
U(50): 161.89 ft

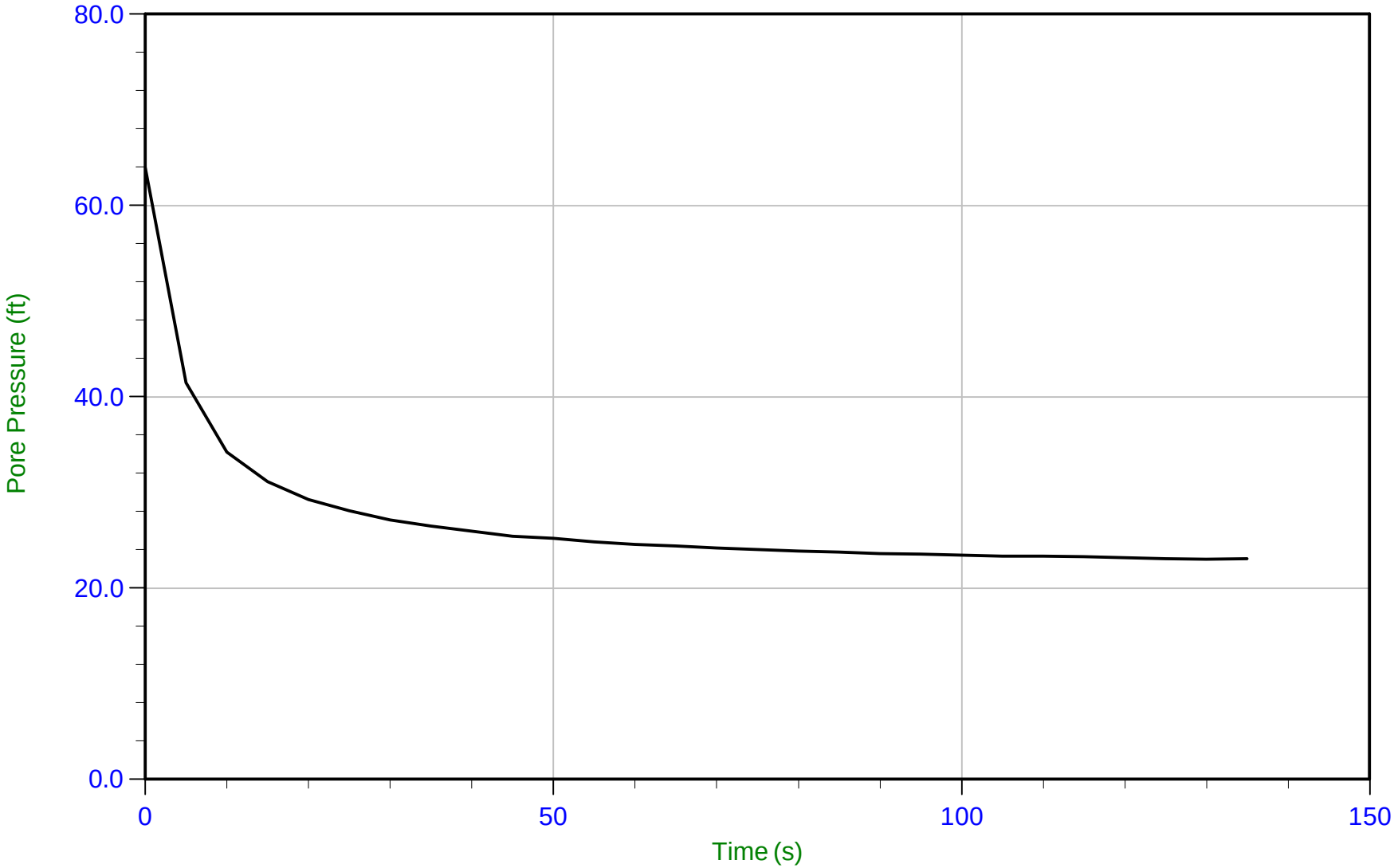
T(50): 17.8 s
Ir: 100
Ch: 39.3 sq cm/min

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 10-Mar-2017 10:09:52
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP06.PPD
Depth: 25.800 m / 84.645 ft
Duration: 135.0 s

U Min: 23.0 ft
U Max: 64.0 ft

WT: 19.545 m / 64.124 ft
Ueq: 20.5 ft
U(50): 42.26 ft

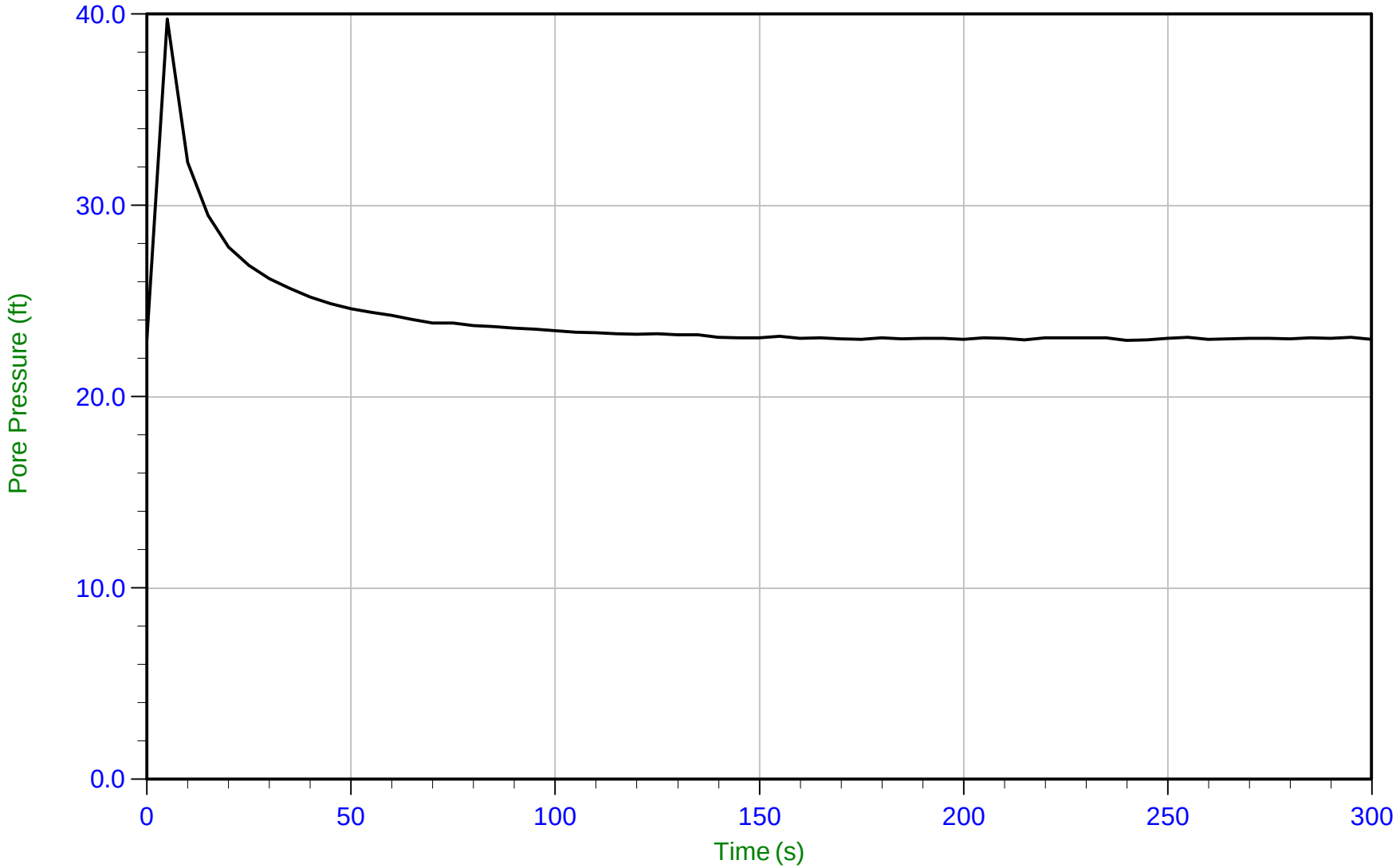
T(50): 4.8 s
Ir: 100
Ch: 145.6 sq cm/min

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 10-Mar-2017 10:09:52
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP06.PPD
Depth: 26.550 m / 87.105 ft
Duration: 300.0 s

U Min: 22.9 ft
U Max: 39.7 ft

WT: 19.545 m / 64.124 ft
Ueq: 23.0 ft
U(50): 31.36 ft

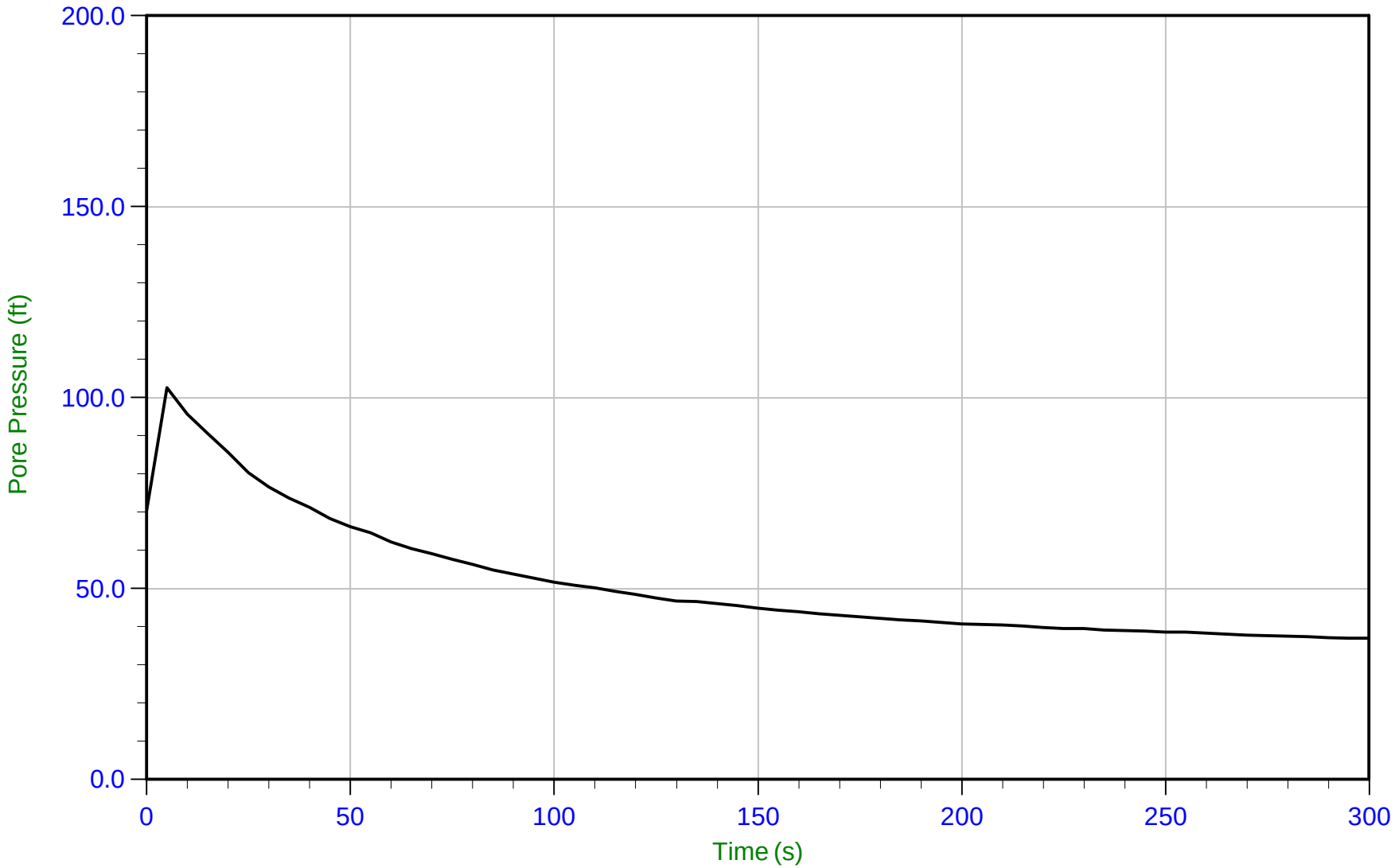
T(50): 6.6 s
Ir: 100
Ch: 106.2 sq cm/min

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 10-Mar-2017 10:09:52
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW06
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP06.PPD
Depth: 29.350 m / 96.291 ft
Duration: 300.0 s

U Min: 37.1 ft
U Max: 198.3 ft

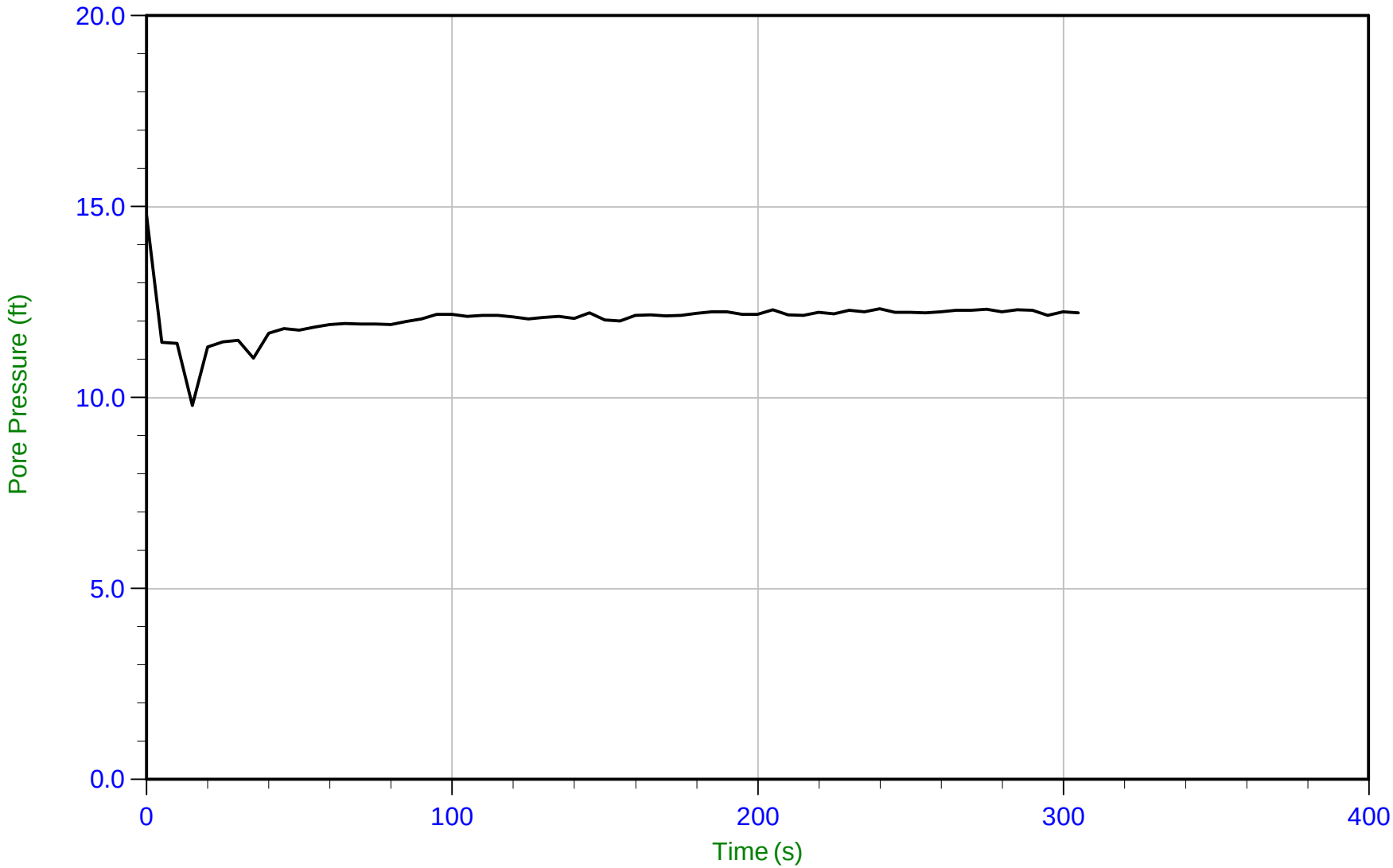
WT: 18.935 m / 62.124 ft
Ueq: 34.2 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 14:15:52
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW07
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP07.PPD
Depth: 25.900 m / 84.973 ft
Duration: 305.0 s

U Min: 9.8 ft
U Max: 14.8 ft

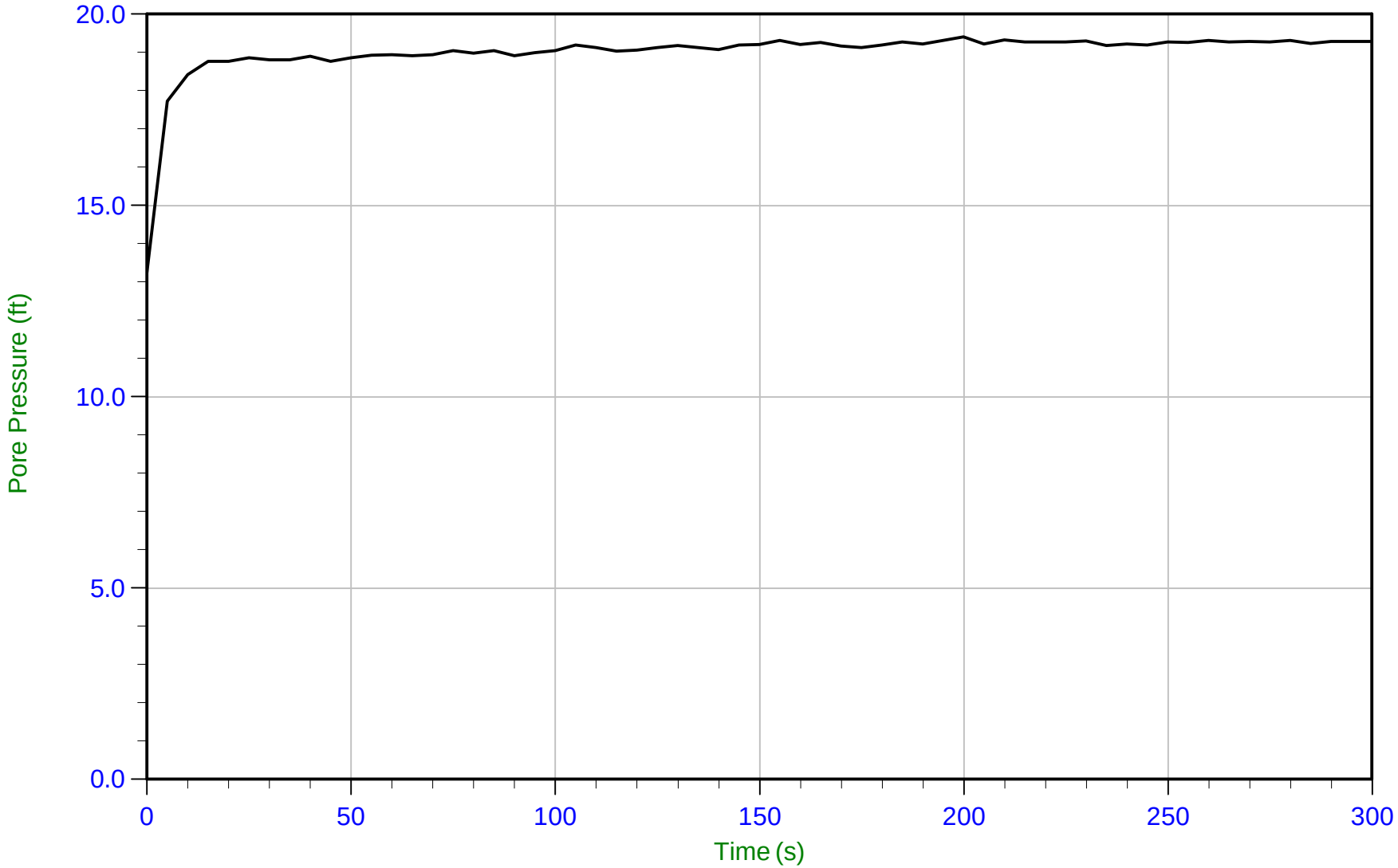
WT: 22.176 m / 72.755 ft
Ueq: 12.2 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 09-Mar-2017 12:02:23
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW08
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP08.PPD
Depth: 28.000 m / 91.862 ft
Duration: 300.0 s

U Min: 13.3 ft
U Max: 19.4 ft

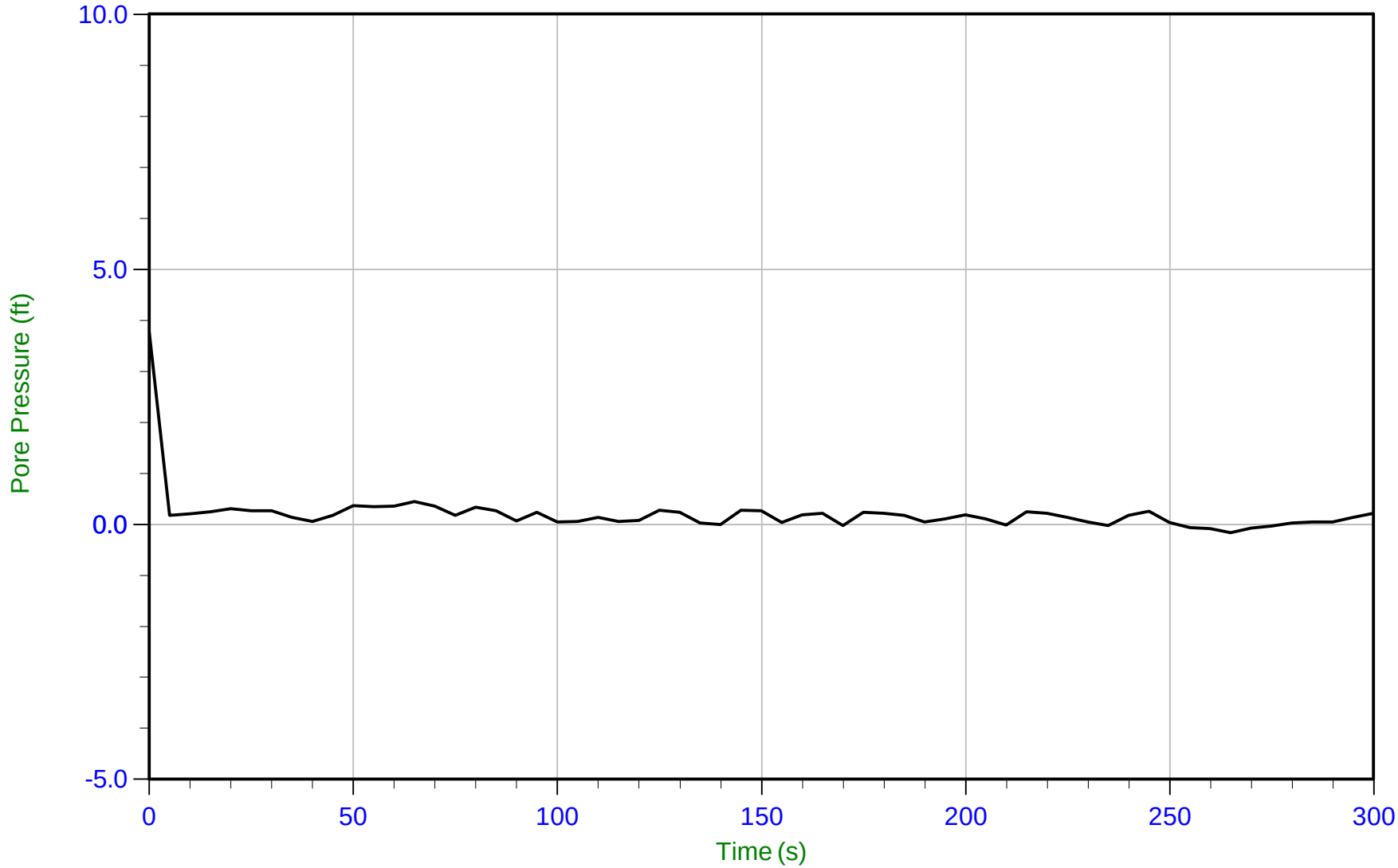
WT: 22.104 m / 72.517 ft
Ueq: 19.3 ft

CONETEC

C.T. Male Associates

Job No: 17-53028
Date: 10-Mar-2017 08:16:28
Site: SGPP-Liberty, Hoosick Falls, NY

Sounding: CPT17-MW09
Cone: AD468 Area=15 cm²



Trace Summary:

Filename: 17-53028_CP09.PPD
Depth: 19.950 m / 65.452 ft
Duration: 300.0 s

U Min: -0.2 ft
U Max: 3.8 ft

WT: 19.944 m / 65.434 ft
Ueq: 0.0 ft

ATTACHMENT B
CREEK WATER AND SEDIMENT SAMPLING LOCATIONS MAP

SW

SW / SED

SW / SED

SW / SED

SW / SED

SW

SW / SED

KOKLEY AVE

CUMMINGS ST

WHITE ST

HURLEY ST

DAVIS ST

WALL ST

HOVEY AVE

ELDRIDGE ST

MANTON ST

MADISON ST

MECHANIC ST

CALIFORNIA AVE

SEWARD ST

LIBERTY ST

HAMPTON ST

SMITH ST

SCHOOL ST

WALLACE ST

MARTIN ST

RIVER RD

SCOTT ST

SHAW ST

0 100 200 FT

1 inch = 200 feet

Approximate Location of Proposed Surface Water Sampling Location

Approximate Location of Proposed Surface Water and Sediment Sampling Location

Creek (Approximate)

Project Site Location

Village of Hoosick Falls Boundary

Project Number: 14.4756
Data Source: NYSGIS Clearinghouse
Projection: State Plane NAD83 NYE (Feet)
Date: May 18, 2017
File: SaintGobain_LibertyStCreekSEDSW11x17.mxd
GIS: C Secor

Map Note: The locations and features depicted on this map are approximate and do not represent a field survey.

Proposed Sampling Locations
SGPP Liberty Street

Village of Hoosick Falls **Rensselaer County, NY**

C.T. MALE ASSOCIATES
ENGINEERING, SURVEYING, ARCHITECTURE & LANDSCAPE ARCHITECTURE, D.P.C
50 CENTURY HILL DRIVE, LATHAM, NEW YORK 12110
(518) 786-7400 * FAX (518) 786-7299 * WWW.CTMALE.COM
FOUNDED IN 1910

ATTACHMENT C
EM SURVEY REPORT

NYLD Infrastructure Field Report

NEW YORK LEAK DETECTION, INC.

Date: 12-15-2016 Technician: George Williams

Customer: CT Male Associates

Site Address: Saint-Gobain, 1 Liberty St. Hoosick Falls, NY

Contact Person: Jonathan Dippert Phone: Cell 518-469-1183 Phone: _____

Scope of Work: EM Scan to detect for potential buried drums~ 5.7 acres utilizing the Profiler EMP 400 Conductivity Meter in "freeway" collection mode.

Type of Service:

☐ *Leak Detection* ☐ *Utility Location/GPR* ☐ *Video Inspection*

☒ *Infrastructure Assessment* ☒ *Utility Mapping/AutoCAD*

Type of Equipment Used

☒ *Profiler EMP 400* ☐ *RD8000* ☐ MetroTech Vivax vLocPro2

☐ *LC2500 Leak Correlator* ☐ *Noggin 250 mHz* ☐ PosiTector UTG G3

☐ *S-30 Surveyor* ☐ Noggin 500 mHz ☐ *Video Inspection Camera*

☐ *Sonde* ☐ Conquest 1000 mHz ☐ *Helium # Bottles*

☐ *Leica Robotic Total Station* ☒ *Leica GPS* ☐ *Traceable Duct Rodder*

Marking Used

☐ *Paint* ☒ *Flags* ☐ *Chalk*

☐ *Updated existing maps onsite* ☐ *Other:* _____

Instructions from Onsite Contact: Scan indicated area for potential buried drums

Size of Pipe: NA

Ground Cover/Weather Conditions: 3° to 28° 5"-6" snow cover

Site Access/Safety Training: **Expiration Date:** 12-12-17

Saint-Gobain Safety Orientation

Information Transfer

☒ *Information relayed on site to:* Jonathan Dippert ☐ *Hand drawn map (forward to office for digital remake)* ☐ *All markings picked up by surveyors*

NYLD Infrastructure Field Report

NEW YORK LEAK DETECTION, INC.

Travel Hours: 12-12 3hr.00m 12-13 3hr.00m 12-14 3hr.00m 12-16 3hr.00m

Onsite Hours: 12-12 5hr.30m 12-13 7hr.30m 12-14 6hr.30m 12-16 2hr.45m

Mapping/Post Processing: 12-12 0hr.45m 12-15 7hr.00m

Notes/Testing Results:

Area was scanned with the Profiler EMP 400 in freeway mode, conductivity and in phase, to assess for underground UST's or drums. In Phase and Conductivity Modes allows for more focus on metallic targets. The emitted magnetic field is very similar to the received magnetic field. Data is in units of parts per million (PPM) For In Phase and units of milliSiemens per meter (mSm) for conductivity, the higher the reading typically the higher the conductivity unless at the surface then it will be at its lowest. 4 KHz has a depth penetration of about 4 meters and 10 KHz has a depth penetration of about 2 meters. Data collected in an X and Y orientation. Survey performed with 5-6 inches of snow cover temperatures ranged from 3° to 28°. Site is wooded and also contains swamp and marsh land areas. There is substantial undergrowth and some areas of dense vegetation which were unable to be scanned. Utilizing the Profiler EMP 400 scanned designated area no significant spikes observed during the course of the scan on the PDA. Post processing of collected data indicated one area of interest. Some areas contain large metal storage tanks and dumpsters as well as fencing and a propane tank area, metallic building facing, high-voltage electricity and concrete debris in fill areas can give false readings as indicated in the imagery below. Substantial negative parts per million is caused by probable service debris or monitoring wells. Steep sloping could not be scanned.

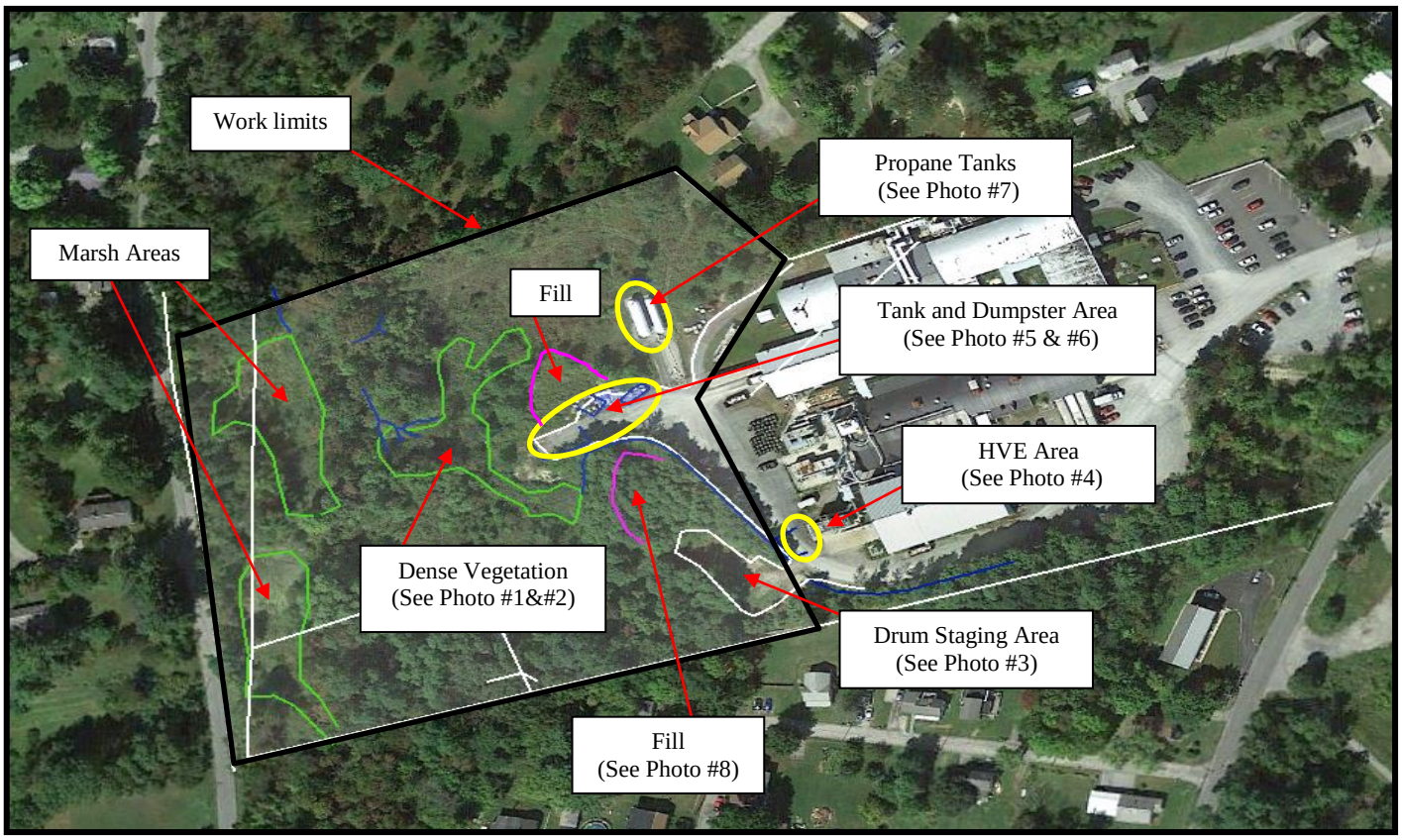


PHOTO #1

PHOTO #2

PHOTO #3

PHOTO #4

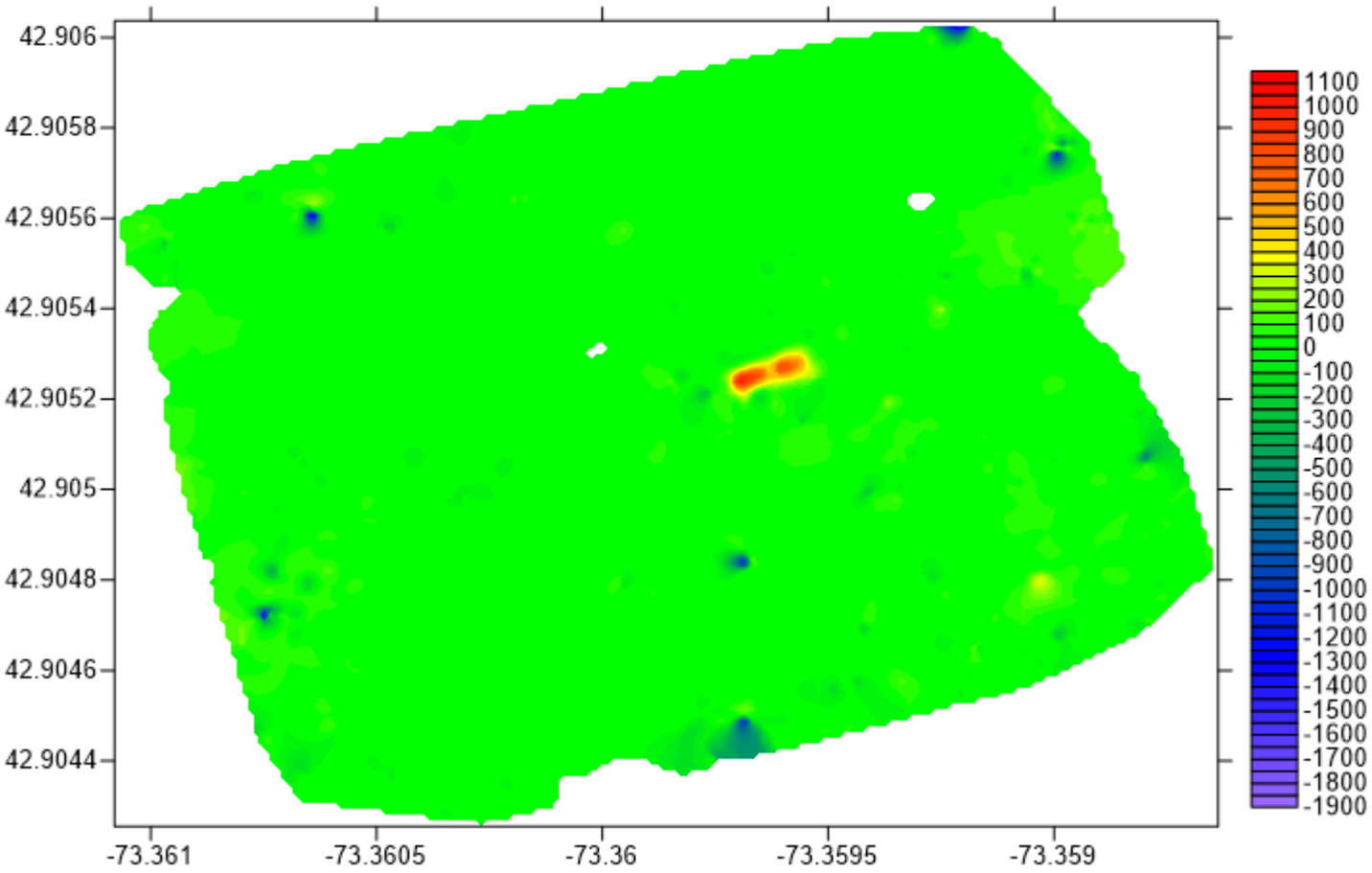
PHOTO #5

PHOTO #6

PHOTO #7

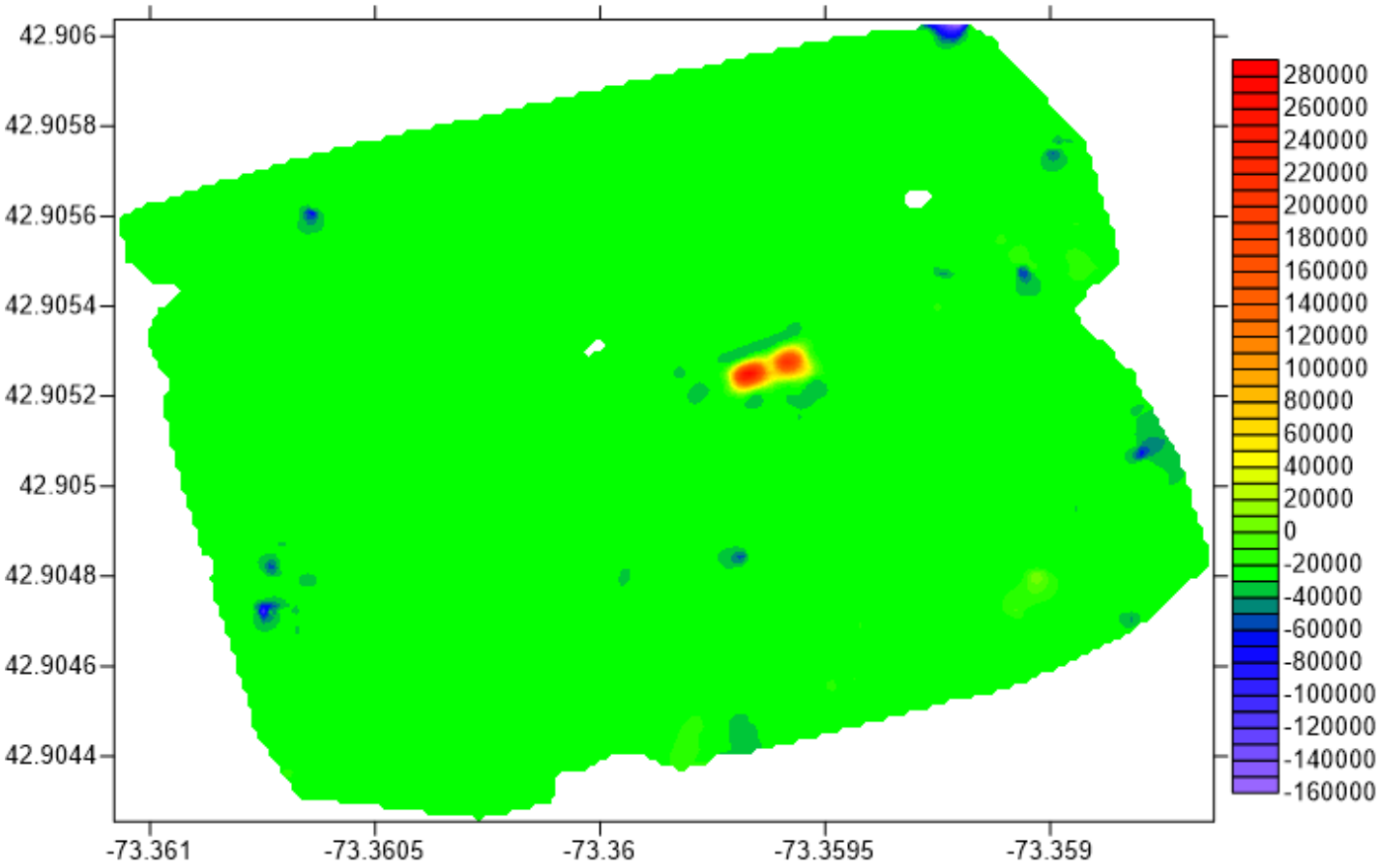
PHOTO #8

CT MALE SAINT GOBAIN 4,000 Hz CONDUCTIVITY "X" ORIENTATION



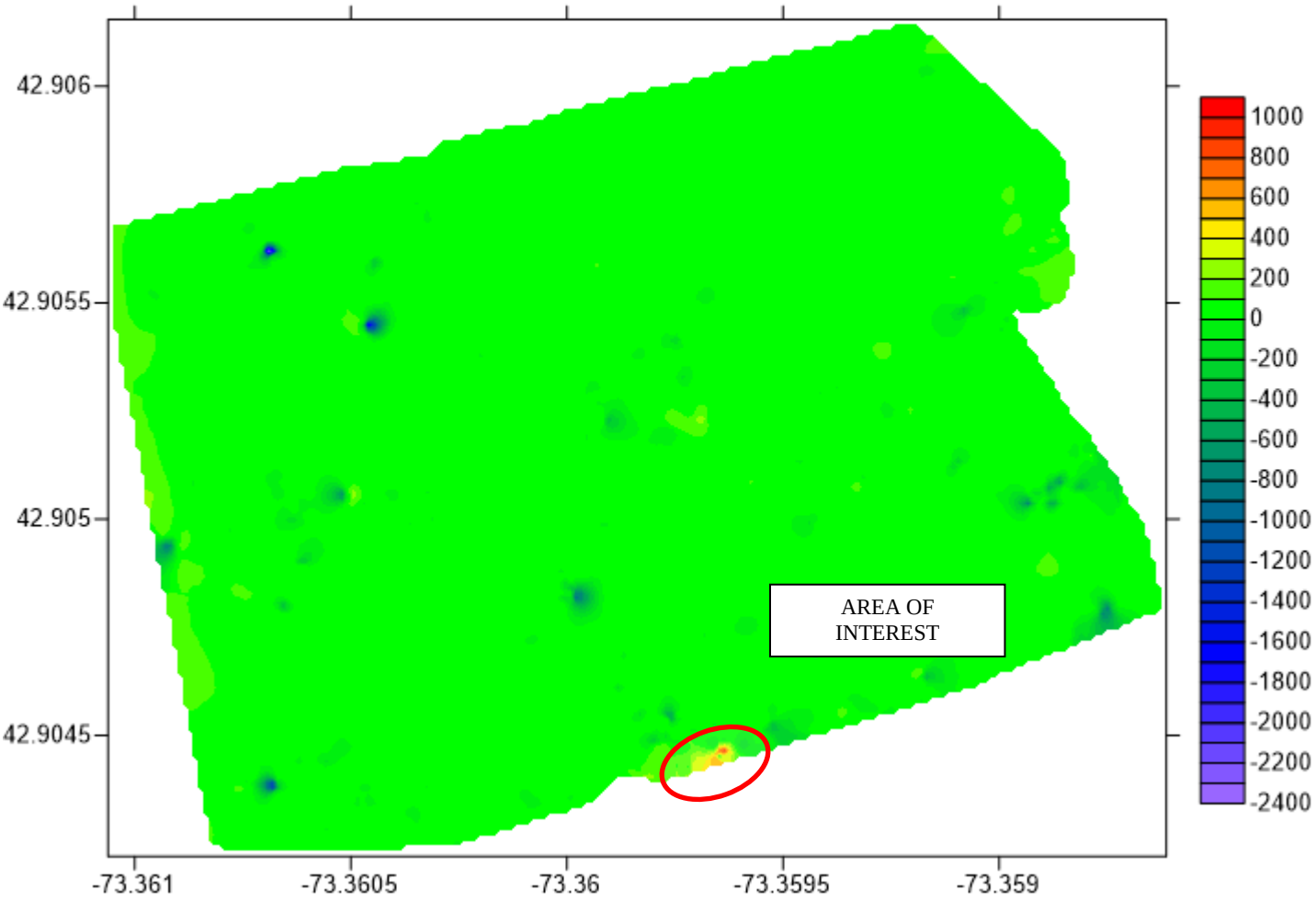
GOOGLE OVERLAY

CT MALE SAINT GOBAIN 4,000 Hz IN PHASE "X" ORIENTATION

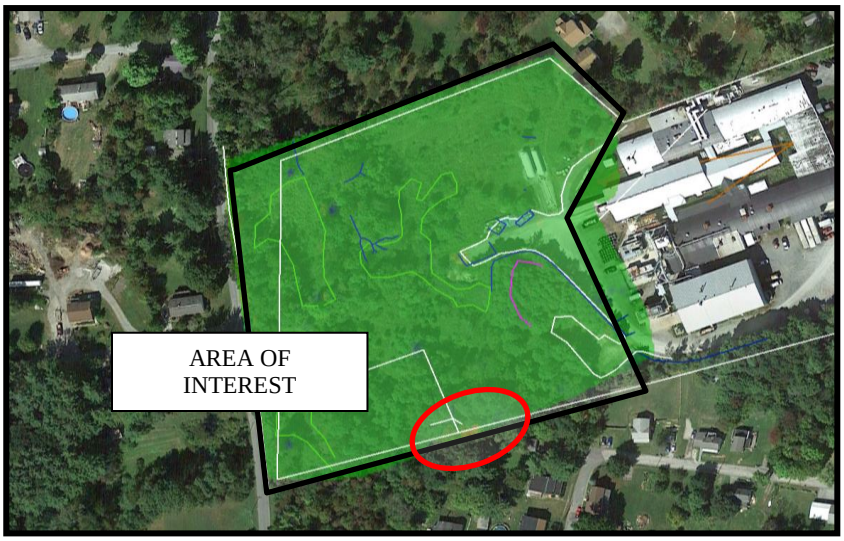


GOOGLE OVERLAY

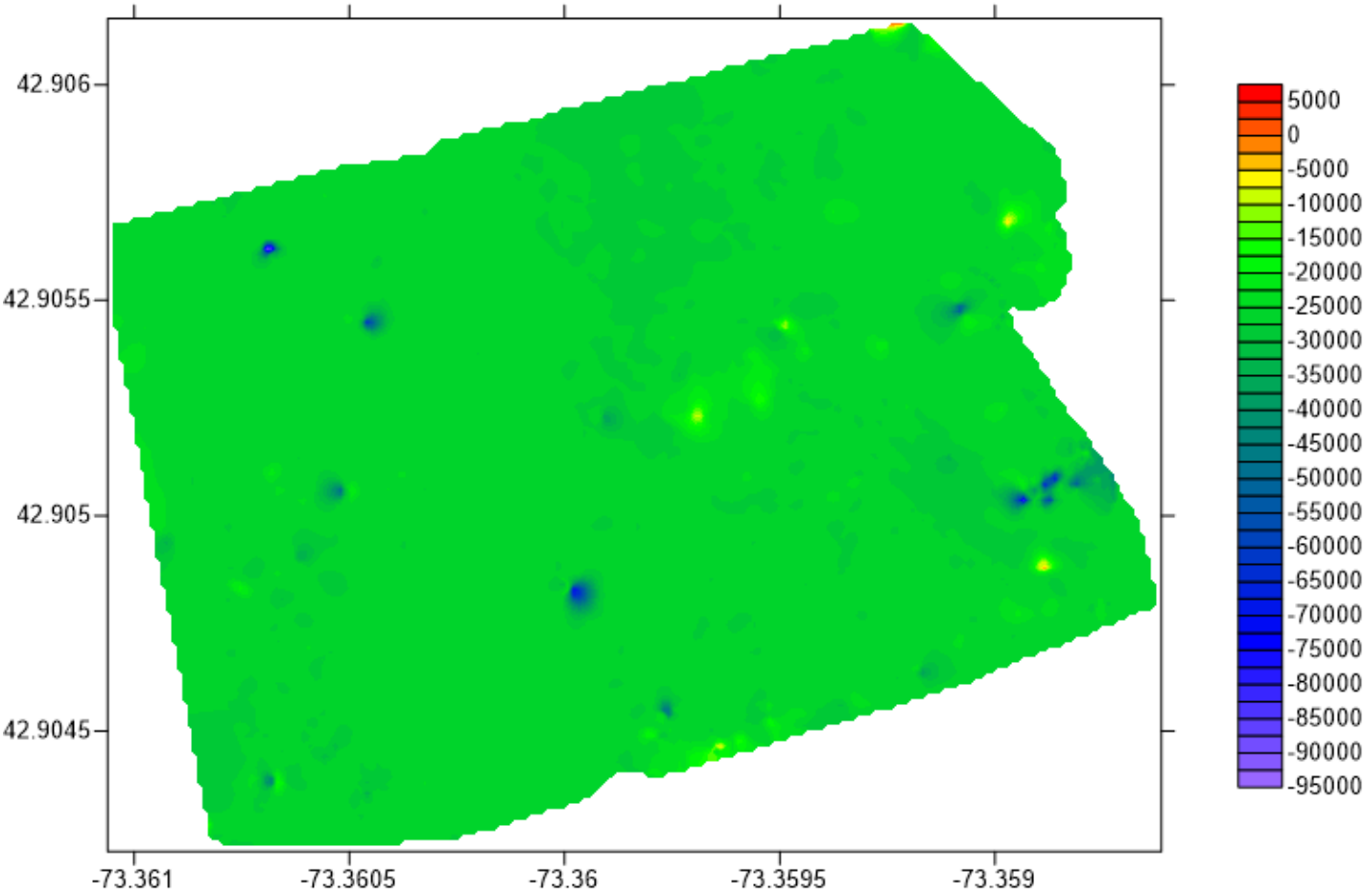
CT MALE SAINT GOBAIN 4,000 Hz CONDUCTIVITY "Y" ORIENTATION



GOOGLE OVERLAY

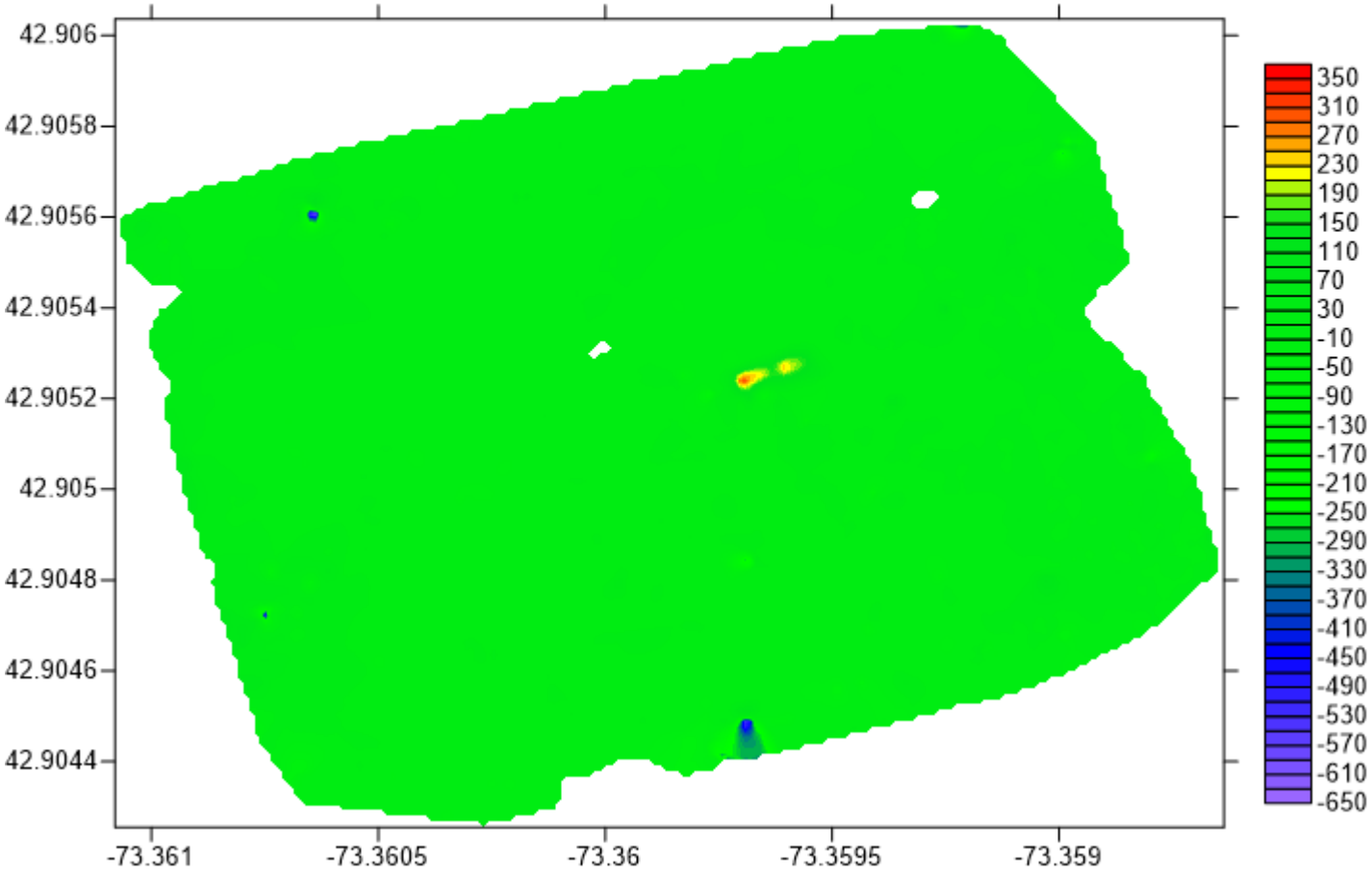


CT MALE SAINT GOBAIN 4,000 Hz IN PHASE "Y" ORIENTATION



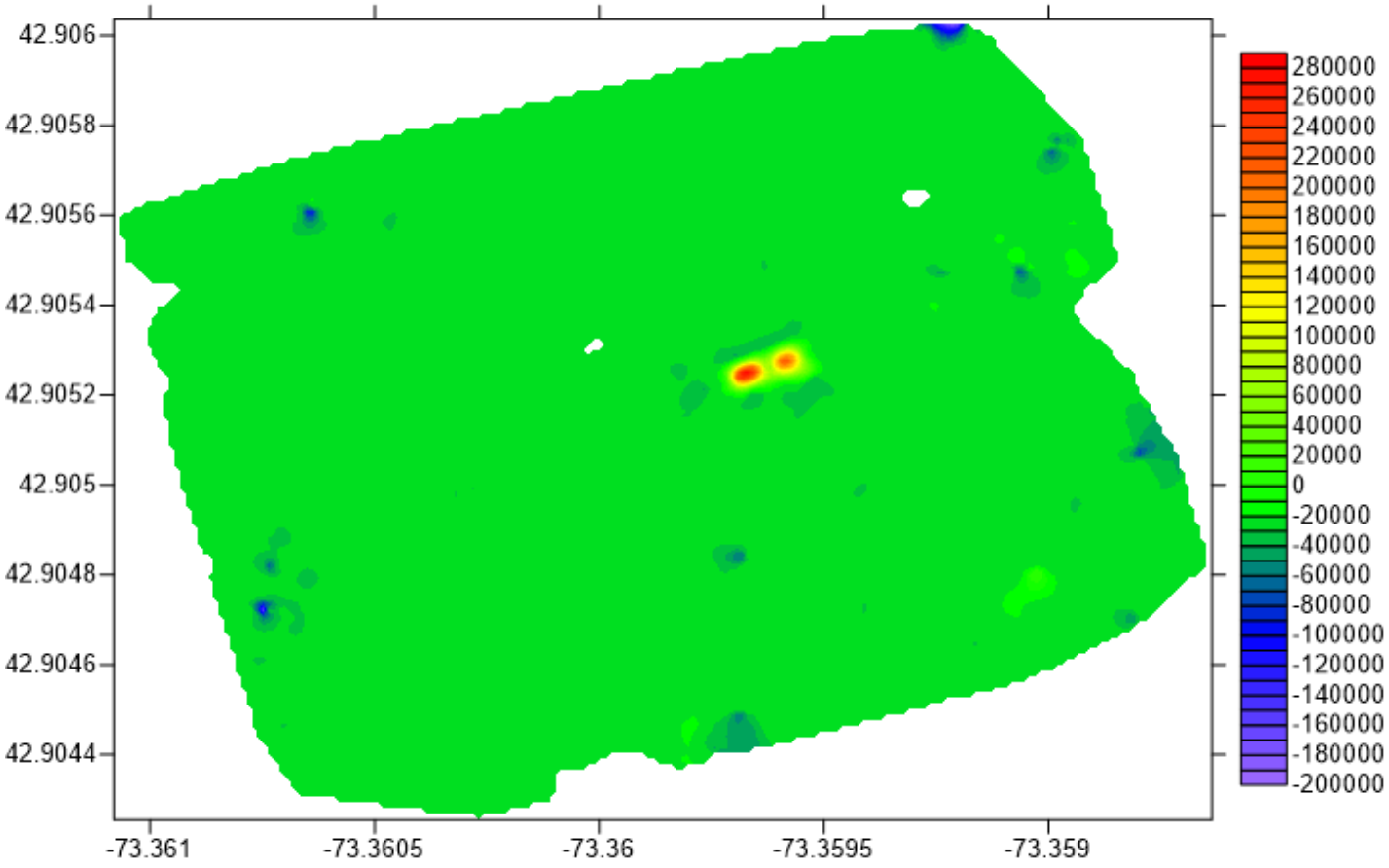
GOOGLE OVERLAY

CT MALE SAINT GOBAIN 10,000 Hz CONDUCTIVITY "X" ORIENTATION



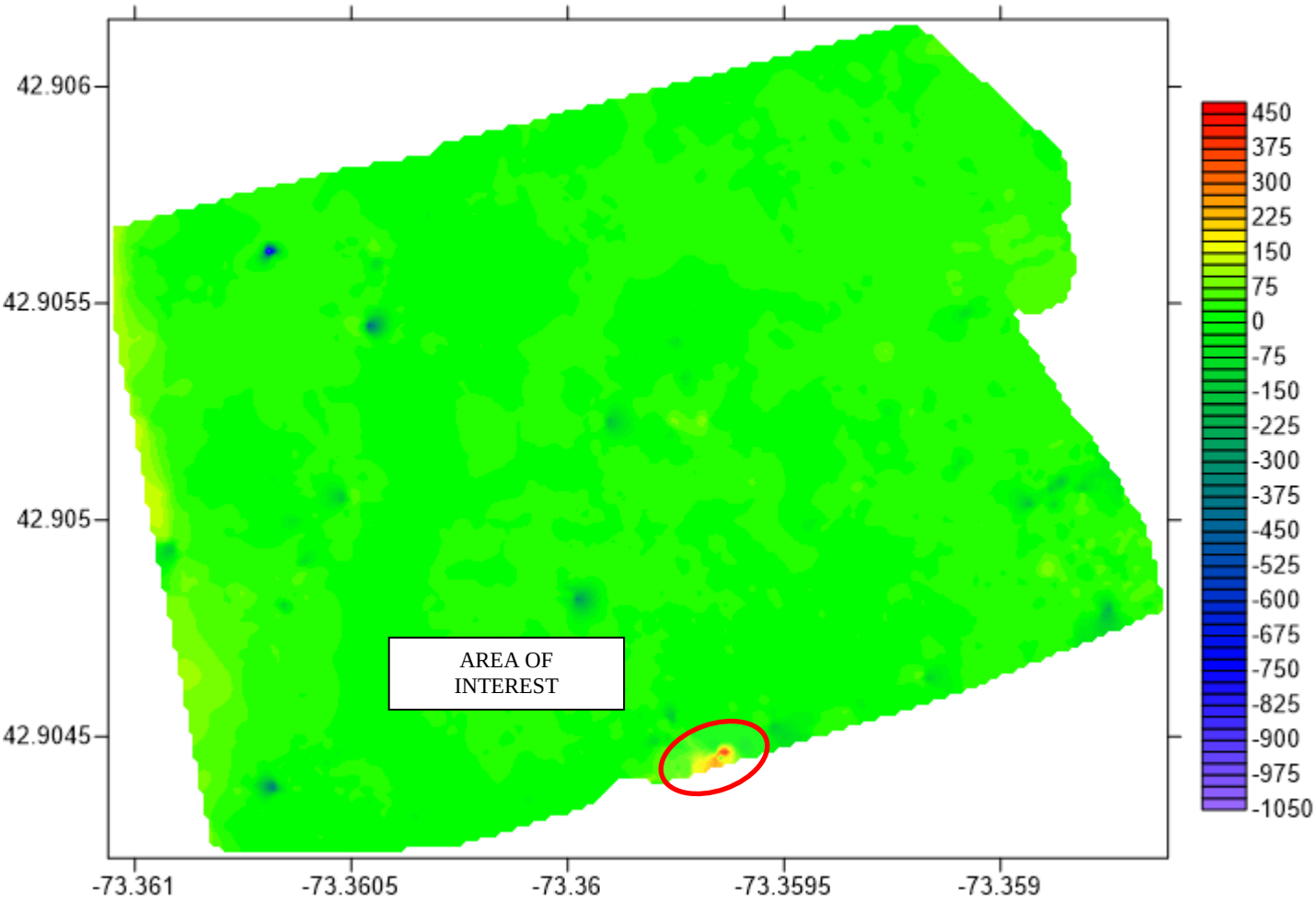
GOOGLE OVERLAY

CT MALE SAINT GOBAIN 10,000 Hz IN PHASE "X" ORIENTATION

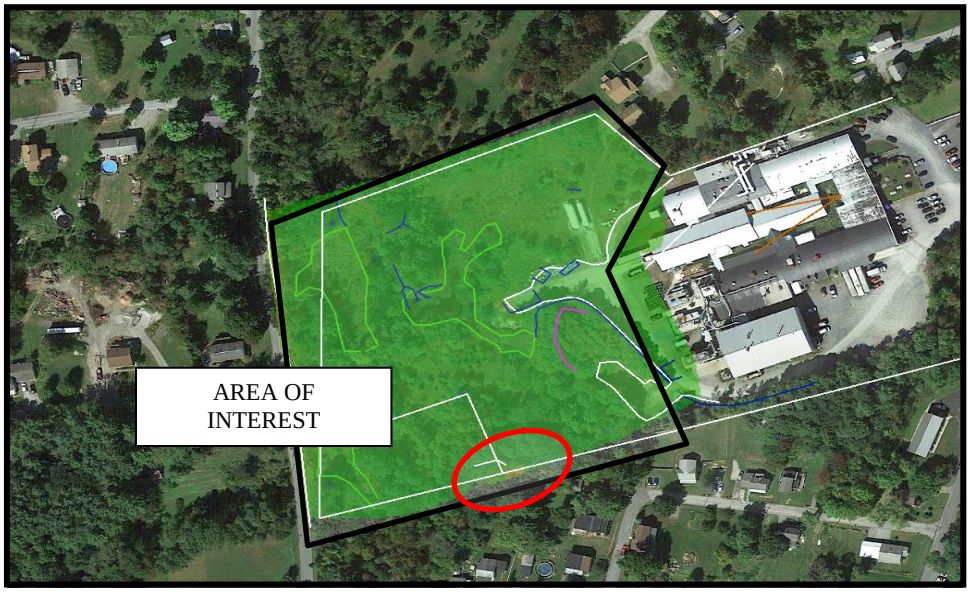


GOOGLE OVERLAY

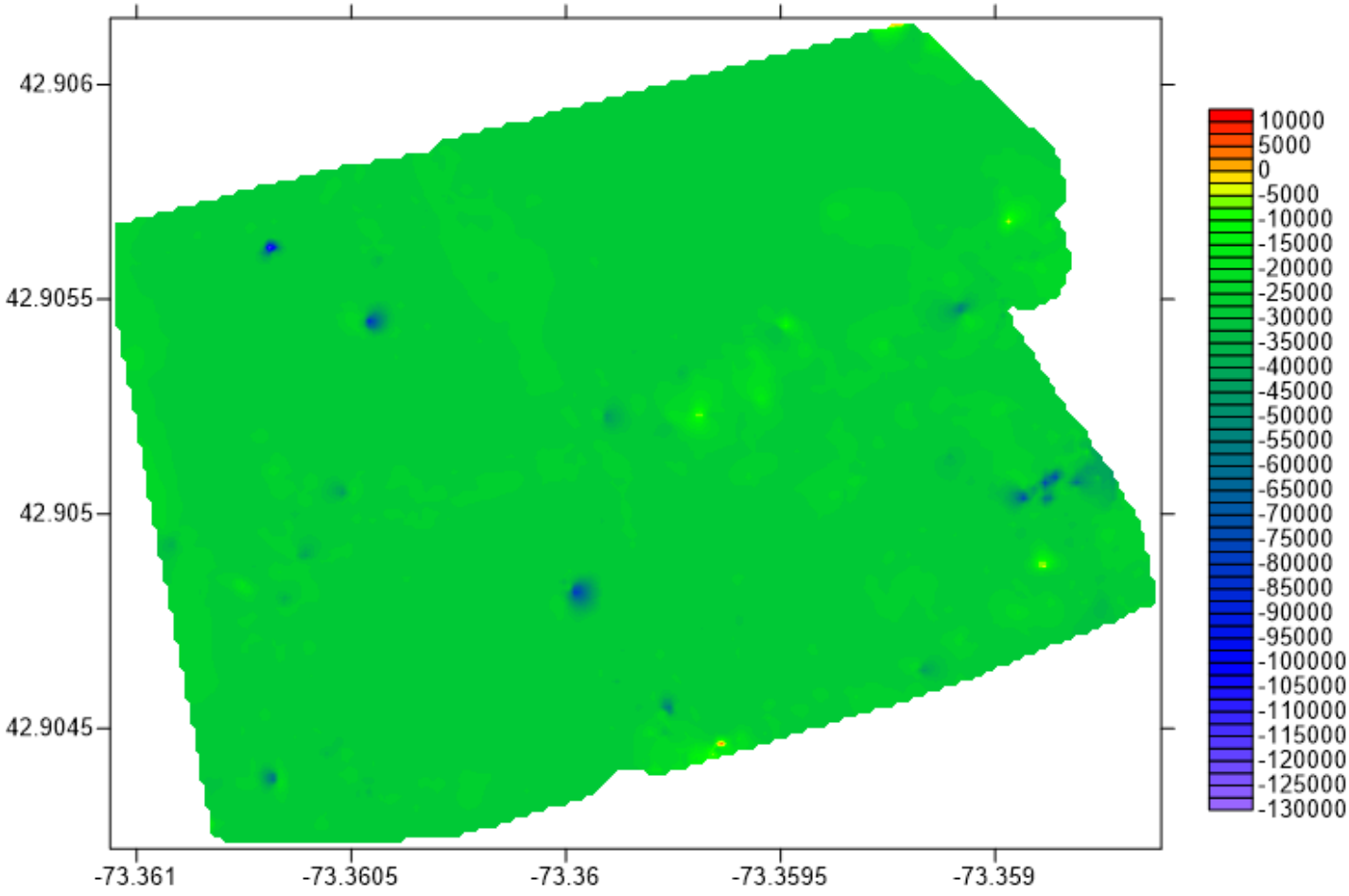
CT MALE SAINT GOBAIN 10,000 Hz CONDUCTIVITY "Y" ORIENTATION



GOOGLE OVERLAY



CT MALE SAINT GOBAIN 10,000 Hz IN PHASE "Y" ORIENTATION



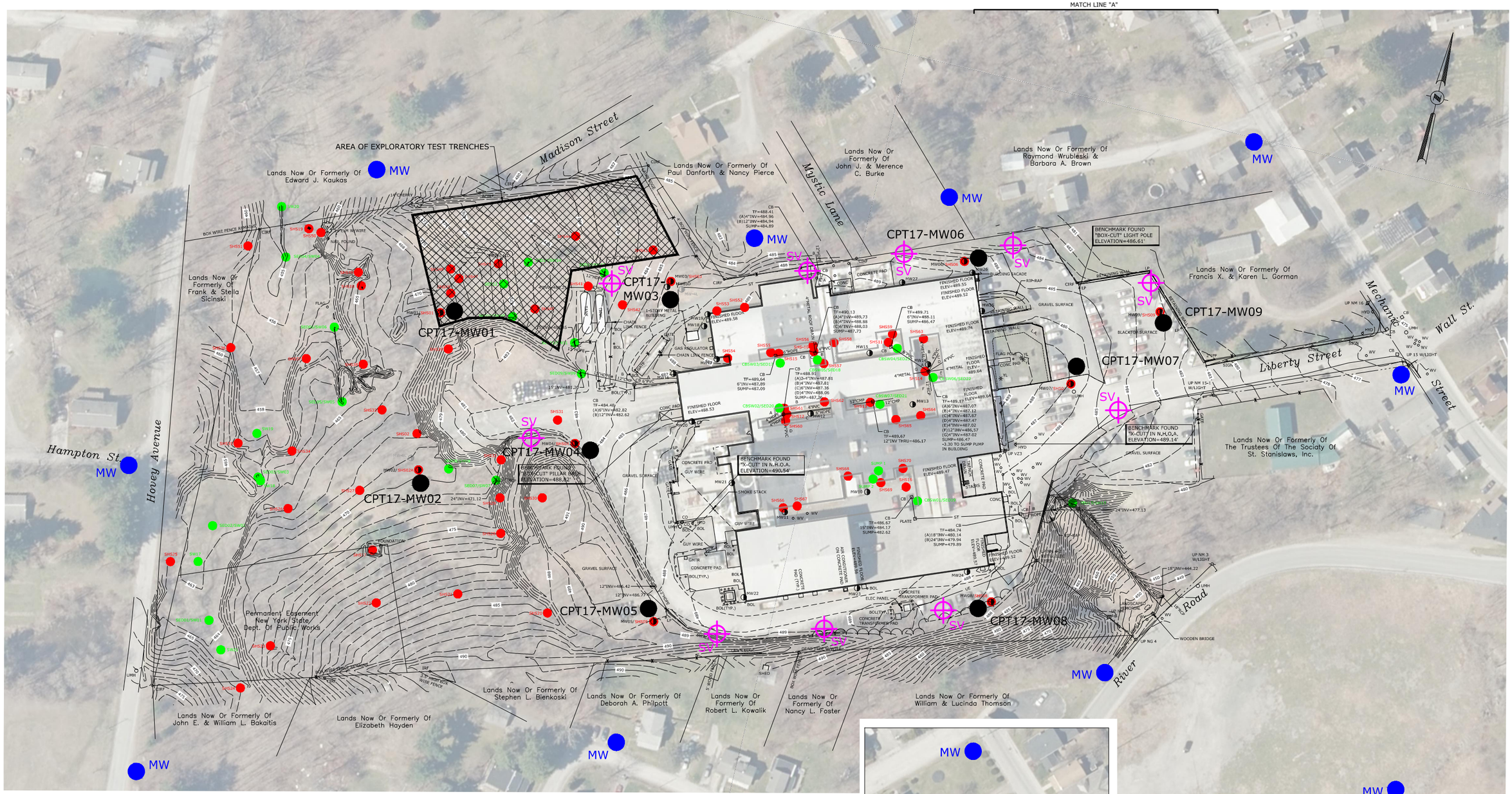
GOOGLE OVERLAY

ATTACHMENT D
Area of Exploratory Test Trenches, Soil Vapor Sampling Locations, CPT Locations & Proposed Off-Site Monitoring Wells

XREFS: NONE

PROJECT NUMBER: 16.6132

CAD DWG: FILE NAME: K:\Projects\16632\Env\Drawings-Maps\fig 1a-areas of expl test trenches.dwg



BAR SCALE

50 0 25 50 100

1 inch = 50 ft.

LEGEND

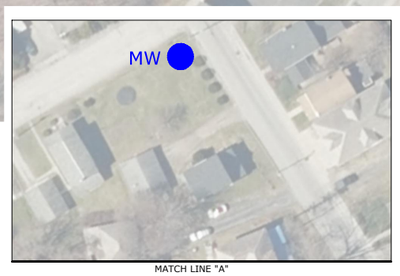
BOL	Bollard		Overhead Wires
CIRF	Capped Iron Rod Found	ST	Storm Line
CBS	Catch Basin	UE	Underground Electric
CO	Cleanout		
GMTR	Gas Meter	SED01/SW01	Location of Surface Water and Sediment Sampling Location (Typical). Those locations co-located with catch basin or sanitary manhole were collected from inside the structure.
GW	Guy Wire	SHS01	Location of Shallow Soil Sampling Location (Typical) Those locations co-located with test borings were completed within ±5 feet from the test boring location.
HYD	Hydrant	MW03	Location of Test Boring and Monitoring Well.
IRF	Iron Rod Found	MW-4L	Location of Monitoring Wells Installed by Others in 1996. Wells to be used to obtain water levels only. No Sampling of these wells (Typical)
LP	Light Pole	SV	Approximate Location of Soil Vapor Sampling Location.
UMH	Unknown Manhole Type	MW	Approximate Location of Shallow & Deep Monitoring Well Cluster
UP	Utility Pole	CPT-MW	Approximate Location of Piezocone Penetration Test
UP	Utility Pole W/Light		
WV	Water Valve		

MAP NOTES:

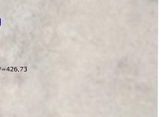
1. Topographic information shown hereon was compiled from an actual field survey conducted during the months of August, September and October, 2016.
2. North orientation is Grid North based on the New York State Plane Coordinate System, East Zone, NAD 83/2011 epoch 2010.00.
3. Vertical datum shown hereon is NAVD 88 (Geoid 12A) and was obtained from RTK GPS observations.
4. Underground facilities, structures, and utilities have been plotted from data obtained from previous maps and record drawings. Surface features such as catch basin rims, manhole covers, water valves, gas valves, etc. are the result of field survey unless noted otherwise. There may be other underground utilities, the existence of which is not known to the undersigned. Size and location of all underground utilities and structures must be verified by the appropriate authorities. Dig Safely New York must be notified prior to conducting test borings, excavation and construction.

MAP REFERENCE:

1. "Map of Lands of Alliedsignal Fluorglas Products Liberty Street Plant" Village of Hoosick Falls, Rensselaer County, New York. prepared by David F. Barrass Land Surveyor for Saint-Gobain Performance Plastics. Dated 8/15/2014, Dwg.No. hf14-1014.



MATCH LINE "A"



PROGRESS PRINT

DATE	REVISIONS RECORD/DESCRIPTION	DRAFTER	CHECK	APPR.
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			

DESIGNED:

DRAFTED : S.WUNSCH

CHECKED : J.DIPPERT

PROJ. NO : 16.6132

SCALE : 1"=50'

DATE : MAY 12, 2017

AREA OF EXPLORATORY TEST TRENCHES & SOIL VAPOR SAMPLING LOCATIONS

SAINT-GOBAIN PERFORMANCE PLASTICS 1 LIBERTY STREET

VILLAGE OF HOOSICK FALLS — RENSSELAER COUNTY, NEW YORK

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SHEET 1 OF 1

DWG. NO: 17-251