SUPPLEMENTAL GEOTECHNICAL REPORT
BEACON ISLAND PARCEL
TOWN OF BETHLEHEM, NEW YORK

Dente File No. FDE-17-121

Prepared For:

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GBC GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

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APPENDICES

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SUPPLEMENTAL GEOTECHNICAL REPORT
BEACON ISLAND PARCEL
TOWN OF BETHLEHEM, NEW YORK

I. INTRODUCTION

This report presents the results of a supplemental geotechnical investigation and preliminary evaluation for the proposed development of the Beacon Island parcel in the town of Bethlehem, New York. The investigation and evaluation were conducted in general accord with our proposal number PFDE-17-85 which was accepted by Bergmann Associates of Albany, New York. Our services included the following:

- Site reconnaissance by a Geotechnical Engineer,
- Layout and completion of two test borings by our affiliate, ACME Boring,
- Layout and completion of cone penetrometer and shear wave velocity testing at five locations by ConeTec, Inc. of West Berlin, New Jersey,
- Laboratory testing to determine consolidation characteristics and/or index properties of representative soil samples obtained from the test borings,
- Review of the *Preliminary Geotechnical Evaluation and Interpretive Report* for the site prepared by CME Associates, Inc., 4/05/2017,
- Review of the *Phase II Environmental Site Assessment Report* for the site prepared by Bergmann Associates, 4/16/2017,
- Preparation of this report which presents a summary of the site investigations and provides our preliminary conclusions and guideline recommendations with respect to the geotechnical aspects of the proposed development.

It should be understood that this report was prepared, in part, on the basis of a limited number of site explorations. The explorations were made at discrete locations and the overburden soils and bedrock sampled at specific depths. Conditions are only known at the locations and through the depths investigated. Conditions at other locations and depths may be different, and these differences may impact upon the conclusions reached and the recommendations offered.

Planning for the project was in the initial stages at the time this report was prepared and, as such, the conclusions and recommendations presented herein should be considered preliminary. As planning for site development progresses, additional investigations should be performed and the recommendations contained herein refined as required.

A sheet entitled *"Important Information about this Geotechnical Engineering Report"* prepared by the Geotechnical Business Council is presented following the title page of this report. This sheet should never be separated from this report and be carefully reviewed as it sets the only context within which this report should be used.

This report was prepared for informational purposes only and should not be considered part of the contract documents. It should be made available to interested parties in its entirety only. Should the data contained in this report not be adequate for the contractor's purposes, the contractor may make their own investigations, tests and analyses for use in bid preparation.

The recommendations offered in this report concerning the control of surface and subsurface waters, moisture or vapor membranes address conventional Geotechnical Engineering aspects only and are not to be construed as recommendations for controlling or providing an environment that would prohibit or control infestations of the structure or its surroundings with mold or other biological agents. Similarly, the recommendations do not address environmental concerns related to handling, disposal, reuse, or construction upon the historic fills, coal ash spoils, and any other foreign matter present at the site.

II. SITE AND PROJECT DESCRIPTION

A brief history and description of the project site are presented in the previously referenced CME and Bergmann reports. Presented in this report's appendices are a recent aerial photograph, USGS topographic maps (dated 1893 and 1980), and U.S Army Corps of Engineers (COE) Maps of the Hudson River (dated 1928, 1936, and 1961). These are provided to assist the reader in reviewing the current condition of the site and filling that has occurred over the years, as described below, to form the present day site grades.

Based upon the CME and Bergmann reports, supplemented by information we obtained, it is known that the site was once an island near the west shore of the Hudson River immediately south of the Port of Albany. Island Creek (a.k.a. Normans Kill) which originally flowed along the west side of the island was filled in sometime between 1936 and 1961 based upon our review of COE Maps of the Hudson River. The creek was diverted in an east direction and now forms the north end of the site. Additional filling with fly or coal ash was placed on the site in the 1950 to 1970's time frame - the COE map dated 1961 labels the site as a "Niagara Mohawk Power Corp Disposal Area".

The site is now a combinations of woods, open fields and brush covered areas with a strip of low lying wet areas present along the west side where the creek was filled. A railroad line crosses through the west side of the site in a north-south direction. The rails remain as do an engine and several rail cars. The bridge which formerly carried the railroad over the Normans Kill on the north end of the site is no longer present. A series of sheet pile and round pile dikes form the east side of the site along the Hudson River shore according to the COE maps. The west side of the site is adjoined by a Niagara Mohawk Power Corporation overhead power line easement.

It is our understanding that the Port of Albany is evaluating options for development of the project site. Initially, the development may include light-weight manufacturing and/or warehouse buildings with associated site improvements including roads, parking lots, and utilities. For preliminary planning purposes, we assume that the floor loads for the new buildings will be less than 500 psf and building column loads less than 200 kips.

III. SUBSURFACE CONDITIONS

The subsurface conditions at the site were originally investigated in February 2017 through the completion of eight test borings and installation of three groundwater monitoring wells by CME Associates and twelve test pit excavations by Bergmann Associates. To supplement these investigations, two standard test borings were completed by our affiliate, ACME Boring, and cone penetrometer and shear wave velocity testing were conducted at five locations by ConeTec, Inc. The approximate locations of the original and our supplemental testing are shown on the maps and plans in this report's appendices.

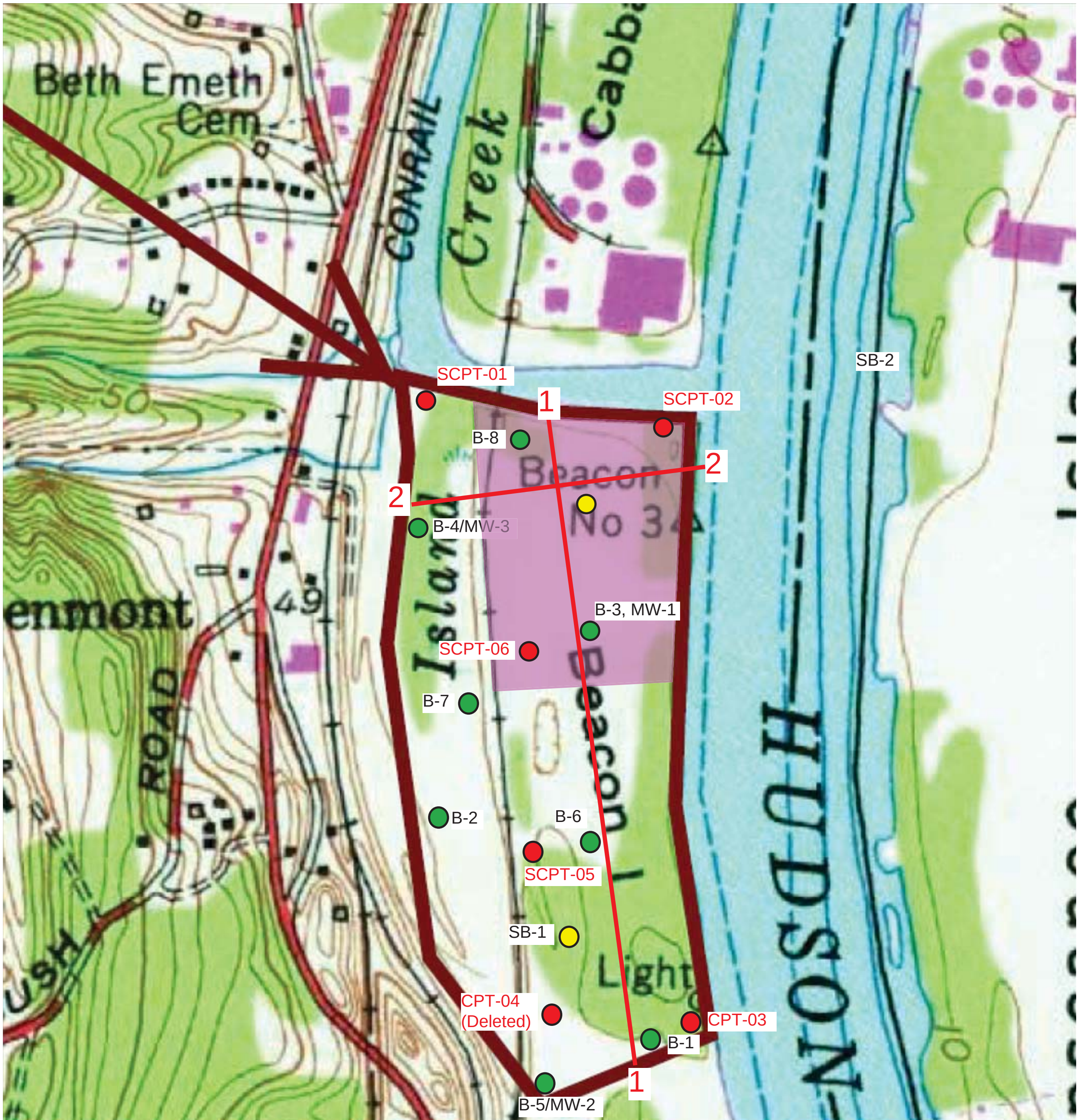
As expected, the original and supplemental investigations revealed various depths of fill material overlying, in sequence with depth; river sediments, alluvial sands, glacio-lacustrine silt and clay, glacial till, and shale bedrock. Subsurface Profiles were prepared and are presented on the following pages to illustrate, in a generalized manner, the relatively complex conditions that were encountered across the site. The approximate profile locations are shown on the 1980 USGS topographic map.

Fill Materials and River Sediments

The thickness of the fill layer ranged from about 6 to as much as 23 feet at the test locations. As shown on the subsurface profiles, three primary types of fill exist at the site including; (1) Miscellaneous Fill composed of varying mixtures of sand, gravel, silt and clay; (2) Ash Fill composed of silt, fine sand, ash and coal mixtures; and (3) River Sediments and/or Fill composed of fine sand, silt, and/or clay with organic matter.

The Miscellaneous Fills were judged to be of a loose to compact relative density based upon standard penetration "N" values. These fills were predominantly located in the north portion of the island east of the existing rail line. The thickness of this layer ranged from nil to about 16 feet. Based upon empirical correlations with the standard penetration "N" values, the Miscellaneous Fill soil's friction angle was estimated in the range of 28 to 33 degrees. Using the cone penetrometer results, higher friction angles of 30 to greater than 36 degrees were estimated for these materials.

The Ash Fills were loose to very loose, with "N" values typically in the range of 0 to 11. These fills were most prevalent on the south side of the site, west of the existing railroad in the former creek channel, and possibly within a thin arm of the Hudson River which once separated Beacon Island from Cabbage Island as shown on the USGS



LEGEND

SB-1, Test Boring by Dente

SCPT-01, Seismic Cone Penetrometer Test by ConeTec, CPT denote cone test with no seismic testing.

B-1, Test Boring by CME Associates, MW denotes well location.

1 —— 1 Generalized Subsurface Profile Line

<table>
<tr><td colspan="3">DENTE GROUP
594 Broadway - Watervliet, New York 12189
Voice 518-266-0310 Fax 518-266-9238</td></tr>
<tr><td>**Scale: N.T.S.**</td><td rowspan="2">**1980 HISTORICAL TOPO MAP**
Beacon Island Parcel
Glenmont, New York</td><td>**Drawn By: NA**</td></tr>
<tr><td>**Dated: 7/07/2017**</td><td>**Drawing No. 1**</td></tr>
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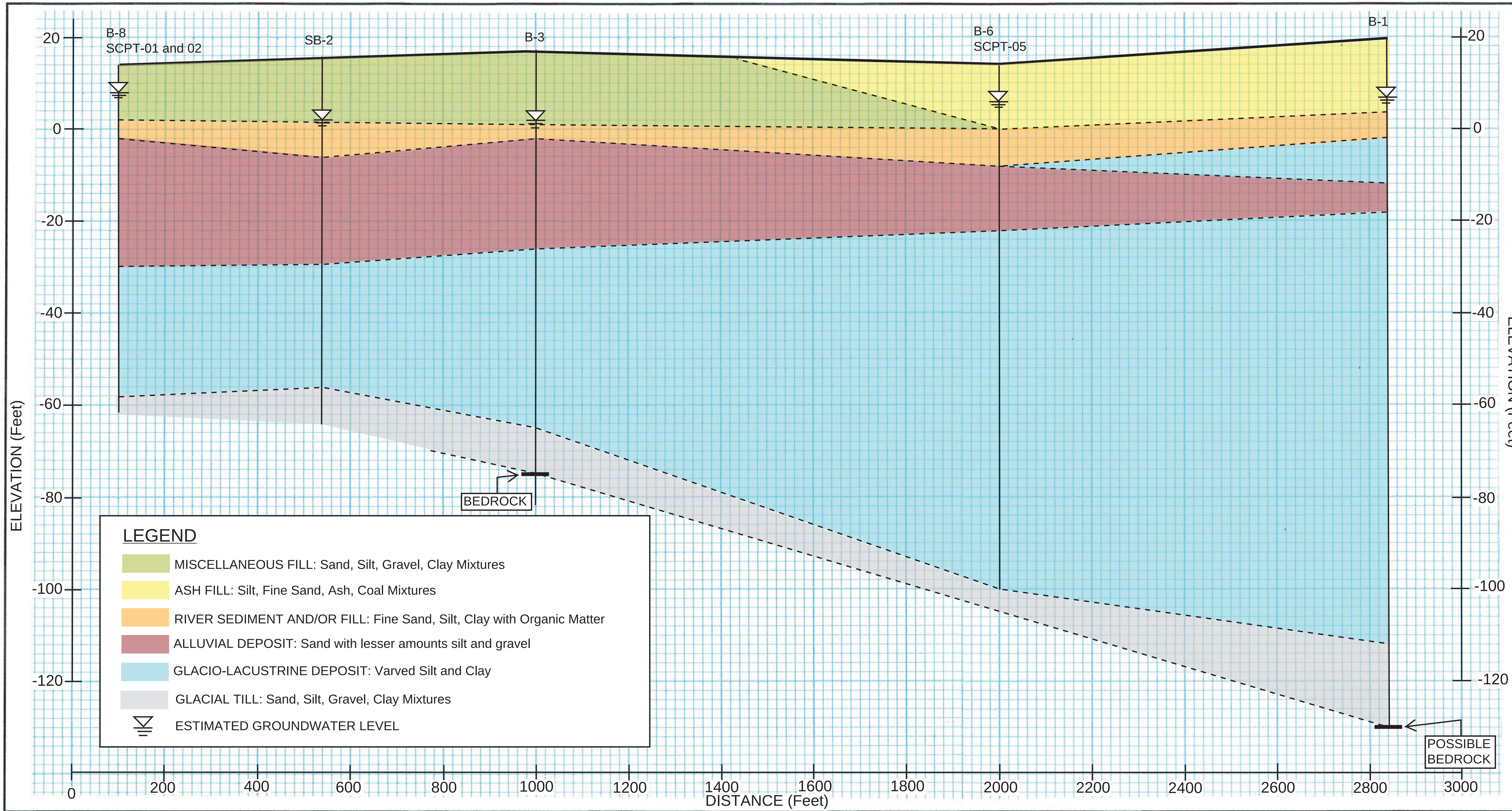

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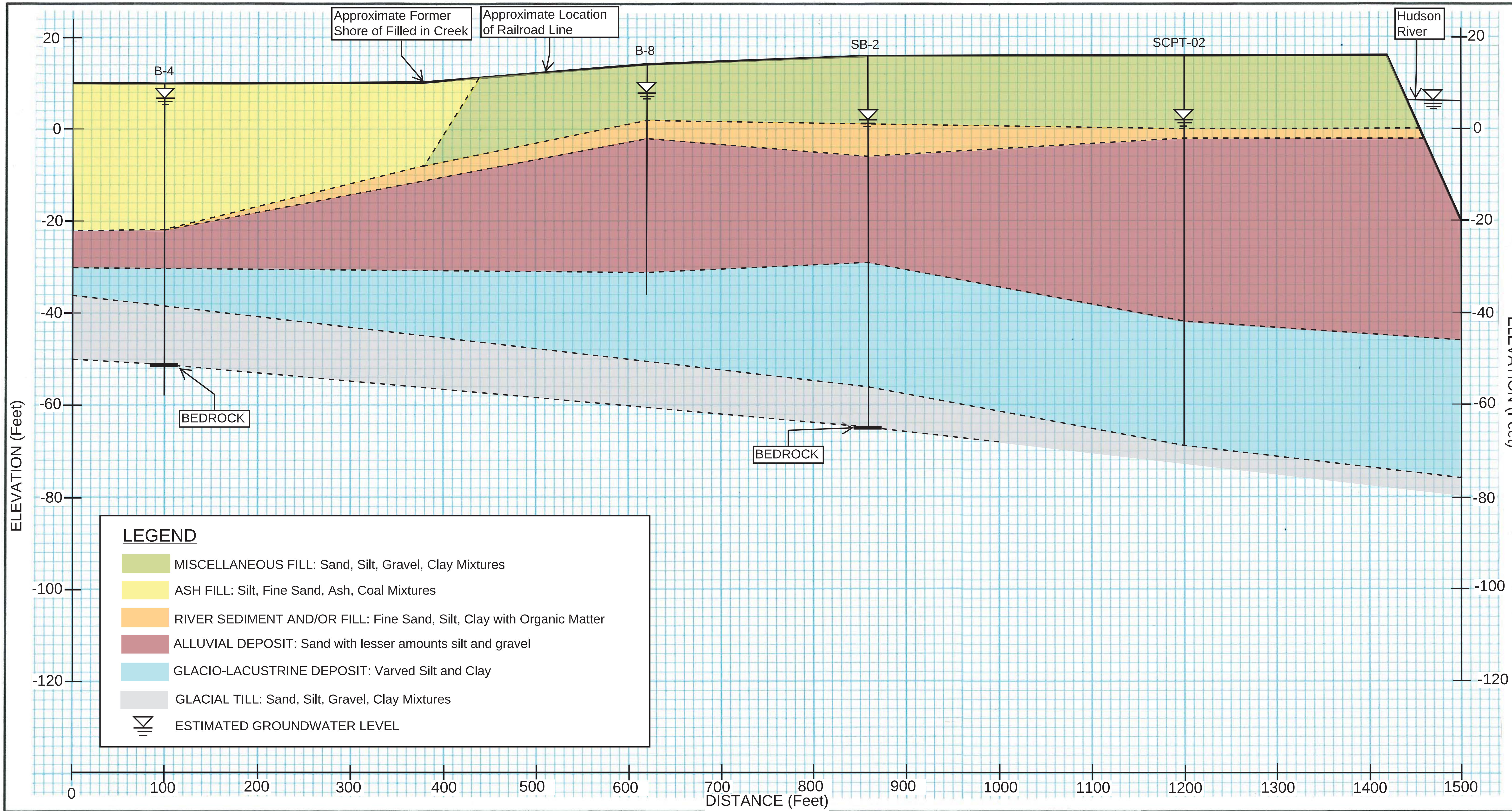
NOTES:
1. Subsurface conditions are known only at the discrete test boring locations. The subsurface conditions can vary in an unknown manner between the test locations and they may differ from the approximate inferred stratification lines shown on the cross-section.

2. Groundwater levels were measured at the time of investigations under the conditions noted on the subsurface logs. Groundwater conditions can vary seasonally and in response to changes in land use.

3. Refer to the individual subsurface logs for the actual subsurface conditions at each discrete test location.

GENERALIZED SUBSURFACE PROFILE NO. 1	
BEACON ISLAND PARCEL	
TOWN OF BETHLEHEM, NEW YORK	
DATE: July 14, 2017	DRAWN BY: ECG
SCALE: As Shown	DRAWING NO. 2



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NOTES:

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GENERALIZED SUBSURFACE PROFILE NO. 2

BEACON ISLAND PARCEL

TOWN OF BETHLEHEM, NEW YORK

DATE: July 14, 2017 | DRAWN BY: ECG

SCALE: As Shown | DRAWING NO. 3

topographic map dated 1893. The thickness of this layer ranged from nil to 23 feet. Based upon empirical correlations with the standard penetration “N” values, the Ash Fill material’s friction angle was estimated to be 25 to less than 20 degrees. Using the cone penetrometer results, higher friction angles of 26 to greater than 30 degrees were estimated for these materials.

The Miscellaneous and Ash Fills were typically underlain by a nil to 10 foot thick layer of River Sediments and/or Fill. It was not possible to distinguish between natural River Sediments and similar type materials which may have been placed as fill - possibly from dredging, thus the two are presented as a single layer on the subsurface profiles. The non-cohesive sand and silt portions were of a loose relative density and the cohesive silt and clay were of a soft to very soft consistency based upon the standard penetration “N” values.

Alluvial Soils

A layer of alluvial sand with variable amounts of gravel and silt was present beneath the River Sediments. The thickness of this layer ranged from less than 6 to as much as 40 feet. The soils were judged to be of a loose to firm relative density based upon the standard penetration “N” values. Based upon empirical correlations with the standard penetration “N” values, the friction angle for the Alluvial Soils was estimated in the range of about 28 to 33 degrees. Using the cone penetrometer results, higher friction angles of 32 to greater than 36 degrees were estimated for these materials.

Glacio-Lacustrine Silt and Clay

Beneath the Alluvial Soils was a sequence of Glacio-Lacustrine Silt and Clay. This layer was thinnest, less than 8 feet, in the northwest portion of the site and it increased to over 100 feet thick at the southeast corner of the site.

Based upon the standard penetration “N” values, the silt and clay was judged to be of a soft to very soft consistency. Basic index testing of these soils, i.e., moisture contents and Atterberg Limits, could be interpreted as evidence that these soils are normally consolidated and thus, highly compressible. However, based on our knowledge of this soil deposit it is known that the silt and clay has been pre-consolidated to pressures well above the existing overburden stress. This was confirmed by laboratory consolidation testing conducted by GeoTesting Express, the results of which are present in Appendix F. This testing found that a sample obtained in the upper 10 feet of this silt and clay layer was pre-consolidated to about 4,500 pounds per square foot (psf) above the existing overburden stress. With increasing depth the pre-consolidation pressure typically diminishes to between 500 and 750 psf and then remains relatively constant through the very deep silt and clay layers.

Cone penetrometer testing within the silt and clay layer has also shown that the soils are of higher strength than would be expected based upon the very low standard penetration “N” values, with estimated undrained shear strengths in the range of 600 to 1,600 psf. Shear strengths estimated by empirical correlations with the “N” values would be in the range of 500 to less than 250 psf.

Glacial Till
Glacial till soils were found beneath the Glacio-Lacustrine Silt and Clay soils. The thickness of the till layer was only determined in a few locations where it varied between 10 and 20 feet. The till consisted of compact to very compact mixtures of sand, gravel, silt, and clay. The cone tests presumably on or near the surface of the till layer.

Shale Bedrock
Shale bedrock was found beneath the glacial till soils in three locations. The depth to rock ranged from about 80 to as deep as 148 feet in CME boring B-1. The rock depths appear shallowest on the north and west sides of the site and increase to the east towards the Hudson River and in a south direction across the site.

Groundwater
Groundwater was found at variable depths of less than 2 to about 14 feet below the existing ground surface. This corresponds to groundwater elevations in the approximate range of 3 to 14 feet. The high water elevation in the adjoining Hudson River is about 6 feet. Groundwater elevations at the site should vary with seasonal fluctuations in precipitation and runoff and with rising and falling water levels in the Hudson River. Tidal changes in the Hudson River will also influence groundwater levels to some degree daily.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. General Site Evaluation

The project site is mantled with up to 20 feet or more of fill materials and underlying river sediments of variable composition and density. In their existing condition, the fills and sediments are not considered suitable for support of conventional shallow foundations and slab-on-grade construction.

Several methods including deep dynamic compaction, rigid inclusions, surcharges, and partial undercuts with surface stabilization, may be considered to improve the fills and sediments in-place for support of lightly loaded structures and pavements which are not highly sensitive to settlement as detailed below. For the purposes of this discussion, lightly loaded structures are assumed to have floor loads less than 500 psf and column loads less than 200 kips. Heavier structures and those sensitive to settlement may require pile support pending our evaluation of the structure location, loading, settlement tolerance, and supplemental investigations.

In developing methods to improve the site for construction it was determined that the deep layers of glacio-lacustrine silt and clay are of relatively low compressibility and thus of minimal concern with regard to settlement under the weight of new fills and buildings. Of greater concern are the upper sequences of existing fill and river sediments which exhibit significantly higher compressibility characteristics.

It has been determined that the deep layers of glacio-lacustrine silt and clay which are present at the project site have been pre-consolidated to pressures above the existing overburden stresses. The added stress from new fills less than about 10 feet deep and lightly loaded buildings will induce consolidation of the silt and clay layers which should occur within a time period of about 4 to 8 weeks and result in ground surface settlements less than one inch. Concerns with settlements induced by consolidation of the silt and clay layer can be addressed by placing fills and allowing them to set for a 4 to 8 week time period prior to construction of foundations and floor slabs.

Of more concern is the settlement induced by consolidation of existing fills and river sediments under the weight of new fills, which could be several inches under the fill and building loads defined above. This concern is addressed in the Ground Improvement Methods discussion in the following report section.

B. Seismic Design Considerations

Shear wave velocity testing was conducted in several of the cone penetrometer test locations. Based upon the test results, Seismic Site Class D may be assumed for the area where DDC is performed or rigid inclusions are constructed to improve the existing fills. Elsewhere, Seismic Site Class E should be assumed for preliminary design purposes.

The cone penetrometer data was also used to evaluate the potential for liquefaction of the soils during an earthquake. This evaluation was conducted using the computer program LiqueyPro, Version 4 by CivilTech Software. For this analysis, we assumed an earthquake magnitude 6.0 and peak ground acceleration on rock equal to 0.09g based on a seismic deaggregation for the site we obtained from the USGE Earthquake Hazards website. Our analyses determined that the factor of safety against liquefaction should exceed the minimum accepted values of 1.0 to 1.2. It should be understood that while it is not expected that the soils will liquefy, they may consolidate in response to the earthquake motions resulting in ground surface settlements that could be on the order of one to two inches.

C. Ground Improvement Methods

The various options which may be considered to improve the existing fills and sediments for conventional shallow spread foundations and slab-on-grade design are described as follows.

Deep Dynamic Compaction

It is our opinion that deep dynamic compaction (DDC) may be considered to densify the materials defined as “Miscellaneous Fill” on the Subsurface Profiles. These fills are composed predominately of varying mixtures of silt, sand, gravel and clay. For preliminary planning purposes, the area where this type of improvement may be considered is highlighted in purple on the 1980 USGS topograhic map and is located at the north end of the site east of the existing rail line. This area can and should be modified based upon supplemental subsurface investigations.

For preliminary planning purposes, it should be assumed that DDC is not feasible where deep layers of very loose Ash Fill and River Sediments/Fill are present along the former creek channel west of the rail line and in the south portion of the site. However, because DDC is of relatively low cost, consideration should be given to attempting this method in selected test pad areas located over the deep Ash Fills and, if successful, this form of ground modification can possibly be expanded to greater areas of the site.

Test borings and/or cone testing before and after the DDC treatment are typically used as a basis to evaluate the effectiveness.

The DDC program should be designed by a specialty contractor to achieve a specified criteria. In this case it should be feasible to specify that the fills be improved to limit settlement of foundations to less than one inch when designed for a 3,000 psf bearing pressure and settlement of floor slabs to less than one-half inch with loads less than 500 psf. The DDC work can also be extended to improve areas along sensitive buried utilities and pavements to limit their settlement.

For preliminary planning purposes, the cost for DDC work is typically in the range of $1 to $2 per square foot with mobilization/demobilization in the range of $30,000 to $50,000.

Rigid Inclusions

Rigid inclusions are a type of rammed aggregate or cast in place concrete or grouted piers which are formed by drilling though a weak soil layer and filling the hole by vertically ramming thin lifts of aggregate which may have cement added or consist entirely of grout or concrete in very weak soils. The inclusions stiffen and improve settlement and bearing capacity characteristics of the soil mass within which they are formed. At the project site, the rigid inclusions are feasible to improve the deep layers of very loose Ash Fill and River Sediments/Fill found predominately in the former creek channel west of the existing rail line and in the south end of the site.

Similar to the DDC, the inclusions and their spacings are designed by a specialty contractor based upon the soil conditions and requirements for construction. In this case it should be feasible to specify that the fills be improved to limit settlement of foundations to less than one inch when designed for a 4,000 psf bearing pressure and settlement of floor slabs to less than one-half inch with loads less than 500 psf.

The cost for rigid inclusion ground improvement is significantly greater than the DDC work, and may be on the order of $10 to $20 per square foot. If used in conjunction with a surcharge program, as detailed below, it may be possible to limit the rigid inclusion use to foundation areas only and employ a surcharge program for the floor slab areas in an effort to minimize costs.

Removal and Replacement of Existing Fill

Complete removal and replacement of existing fills and underlying River Sediments/Fills is not considered feasible due to the depths of these materials and groundwater conditions. However, partial undercuts may be required in areas where DDC appears feasible and in new pavement areas.

For planning purposes it should be assumed that excavated materials cannot be reused beneath new buildings or pavements and they should preferably be used in landscape areas and in surcharges as needed. An imported Structural Fill should be used to backfill undercuts and as fill beneath buildings and pavements.

Surcharges

Surcharges may be considered to reduce long-term settlement of floor slabs and/or pavements. The height of the surcharge should be selected if possible to double the expected final stress on the ground imposed by the weights of new fill and buildings.

Prior to placing the surcharges settlement plates should be installed and monitored routinely by a licensed land surveyor. The surcharge must remain in place until its removal is approved by a Geotechnical Engineer based upon his review of the settlement data. It should be assumed that the surcharges must remain in place for at least several months, which may be accelerated with wick drains. These extended surcharge times should be considered in long term planning for the site development.

Surficial Stabilization

In new pavement areas and along utility lines, surficial stabilization of the existing fills can be considered, possibly in conjunction with a surcharge program. The surface stabilization would entail proof-rolling of the subgrades with a large roller and investigation of any soft areas to determine the cause and evaluate depths of undercutting and replacement which may be required. In this case, the Owner must accept some degree of risk that long-term settlements may occur and require periodic maintenance.

D. Pile Foundations

Pile foundations may be considered as an option to or in conjunction with the ground improvements methods detailed above for heavy or settlement sensitive structures. Based upon the site conditions, it is our opinion that steel H-piles driven to end bearing in glacial till and/or bedrock are suitable for support of relatively heavy loads with axial capacities exceeding 200 kips for an HP 12X74 section. The pile length may be on the order of 60 to 90 feet on the north end of the site. On the south end of the site the depths to till/rock increases and the H-piles would be more costly with lengths now extending greater than 100 to 140 or more feet.

Friction type piles, auger cast and/or timber, may be feasible in areas where thick alluvial sand deposits are present. These piles would have much lower capacities, in the range of 20 to 40 kips. Because the thickness and continuity of the alluvial sand layer may vary significantly across the site and may differ from that inferred on the Subsurface Profiles, supplemental investigation would be required to determine whether they are suitable for use and as a basis for their design. We do not recommend friction piles which develop their capacity within the deep glacio-lacustrine silt and clay soils.

V. SUMMARY

To summarize our preliminary evaluation;

1. The site is mantled with up to 23 feet of fill which is not, without modification or improvement, suitable for support of conventional shallow spread foundations and slab-on-grade design.

2. It appears that the fills at the north end of the site east of the existing rail line can be improved with deep dynamic compaction (DDC) to support lightly loaded buildings. Some partial undercuts and replacements of the fills may also be required.

3. In other areas of the site where deep layers of Ash Fill and/or River Sediments are present, DDC may not be feasible and ground improvement with more costly rigid inclusions would then be required, possibly in conjunction with a surcharge program, to prepare the areas for support of lightly loaded structures. Because DDC is of relatively low cost, consideration should be given to attempting this method in test pad(s) in the deep Ash Fill areas and, if successful, DDC can be expanded to greater areas of the site.

4. Heavily loaded structures and/or those sensitive to settlement may require pile support. Steel H-piles driven to end bearing in glacial till or bedrock are feasible with axial capacities exceeding 200 kips. Pile lengths could vary from 60 to 80 feet in the north end of the site to well over 100 feet at the south end. Other methods to support these structures can be evaluated based upon the structure location, loads, and tolerance to settlement.

5. Surcharges and surficial stabilization of subgrade can be employed in non-building areas where new pavements or utilities are planned to minimize settlements.

As planning for site development progresses, additional investigations should be performed and the recommendations contained herein refined accordingly.

VI. CLOSURE

This report was prepared for specific application to the project site and construction planned using methods and practices common to Geotechnical Engineering in the area and at the time it was prepared. No other warranties expressed or implied are made.

Should questions arise or if we may be of any other service, please contact us at your convenience.

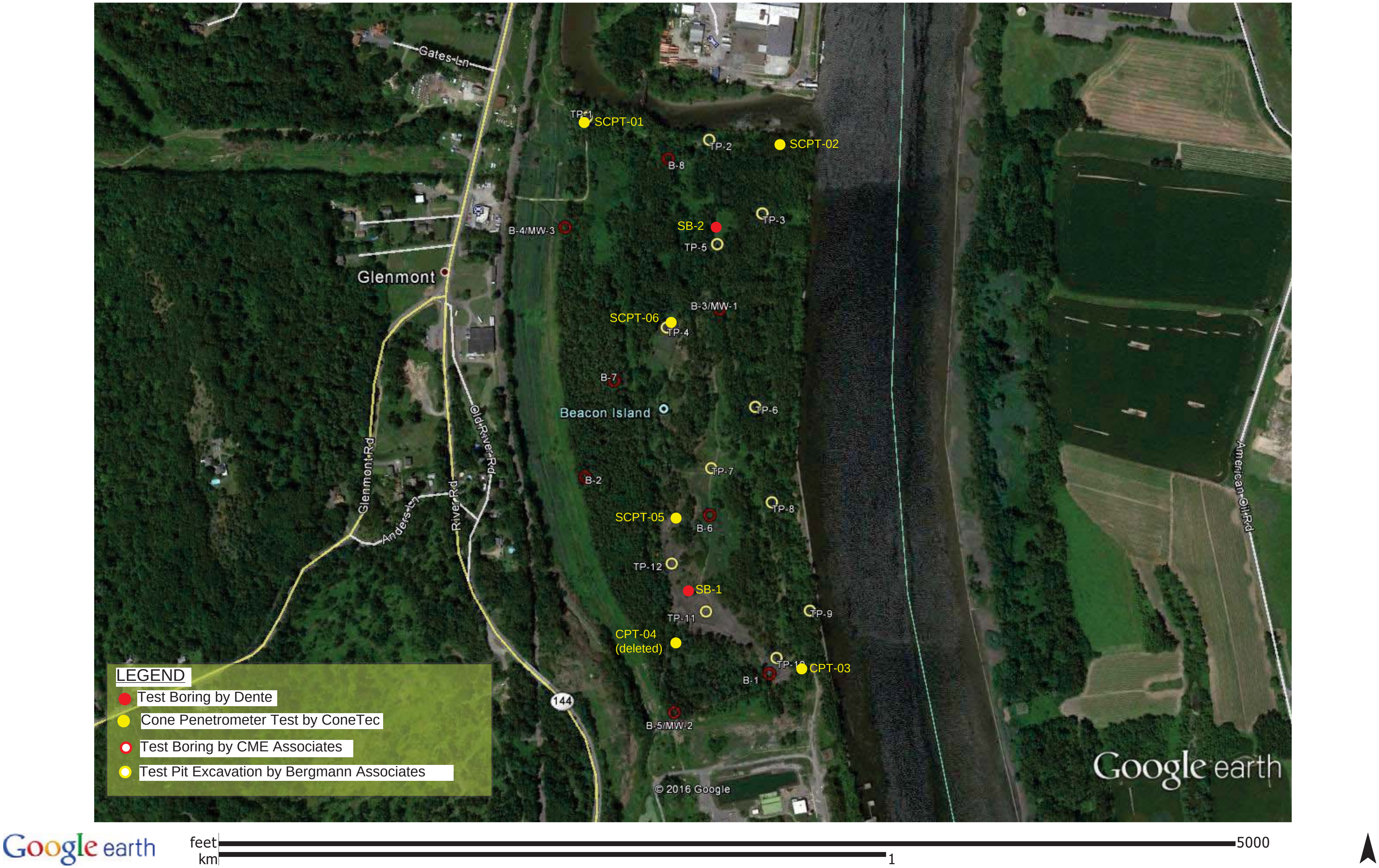
Prepared By,

Edward C. Gravelle, P.E.
Senior Project Manager

Fred A. Dente, P.E
Group Manager

APPENDIX A
AERIAL PHOTOGRAPH

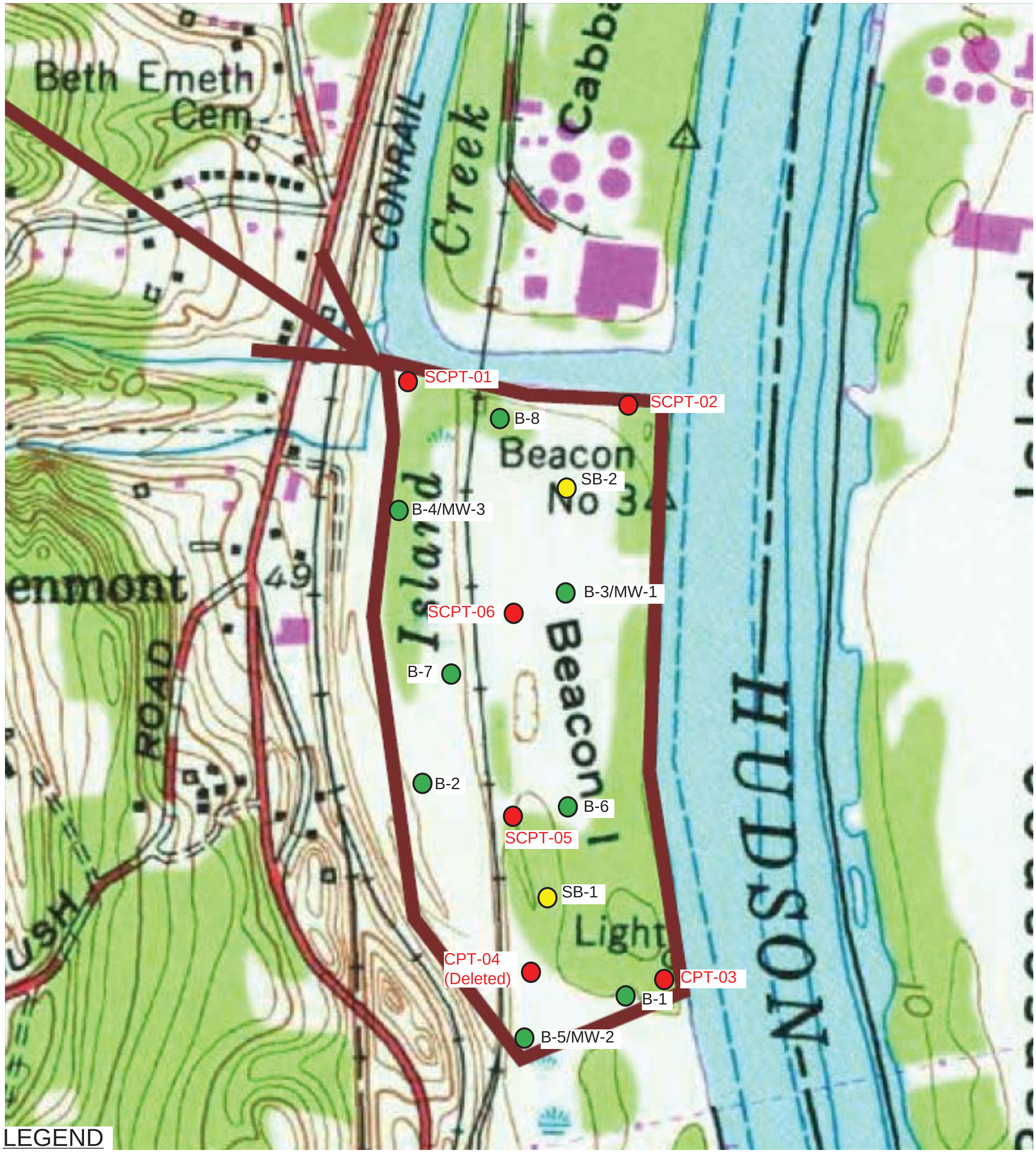
Beacon Island Parcel
Town of Bethlehem, NY



Gates Ln
TP-1
SCPT-01
TP-2
SCPT-02
B-8
SB-2
TP-3
B-4/MW-3
TP-5
Glenmont
SCPT-06
B-3/MW-1
TP-4
B-7
Beacon Island
TP-6
Glenmont Rd
Old River Rd
River Rd
Anders Ln
TP-7
B-2
TP-8
SCPT-05
B-6
TP-12
SB-1
TP-11
TP-9
CPT-04
(deleted)
TP-10
CPT-03
B-1
144
B-5/MW-2
American Oil Rd
© 2016 Google
Google earth
LEGEND
Test Boring by Dente
Cone Penetrometer Test by ConeTec
Test Boring by CME Associates
Test Pit Excavation by Bergmann Associates
Google earth
feet
km
5000
1

APPENDIX B
USGS TOPOGRAPHIC MAPS
(1893 and 1980)

Beacon Island Parcel
Town of Bethlehem, NY



LEGEND

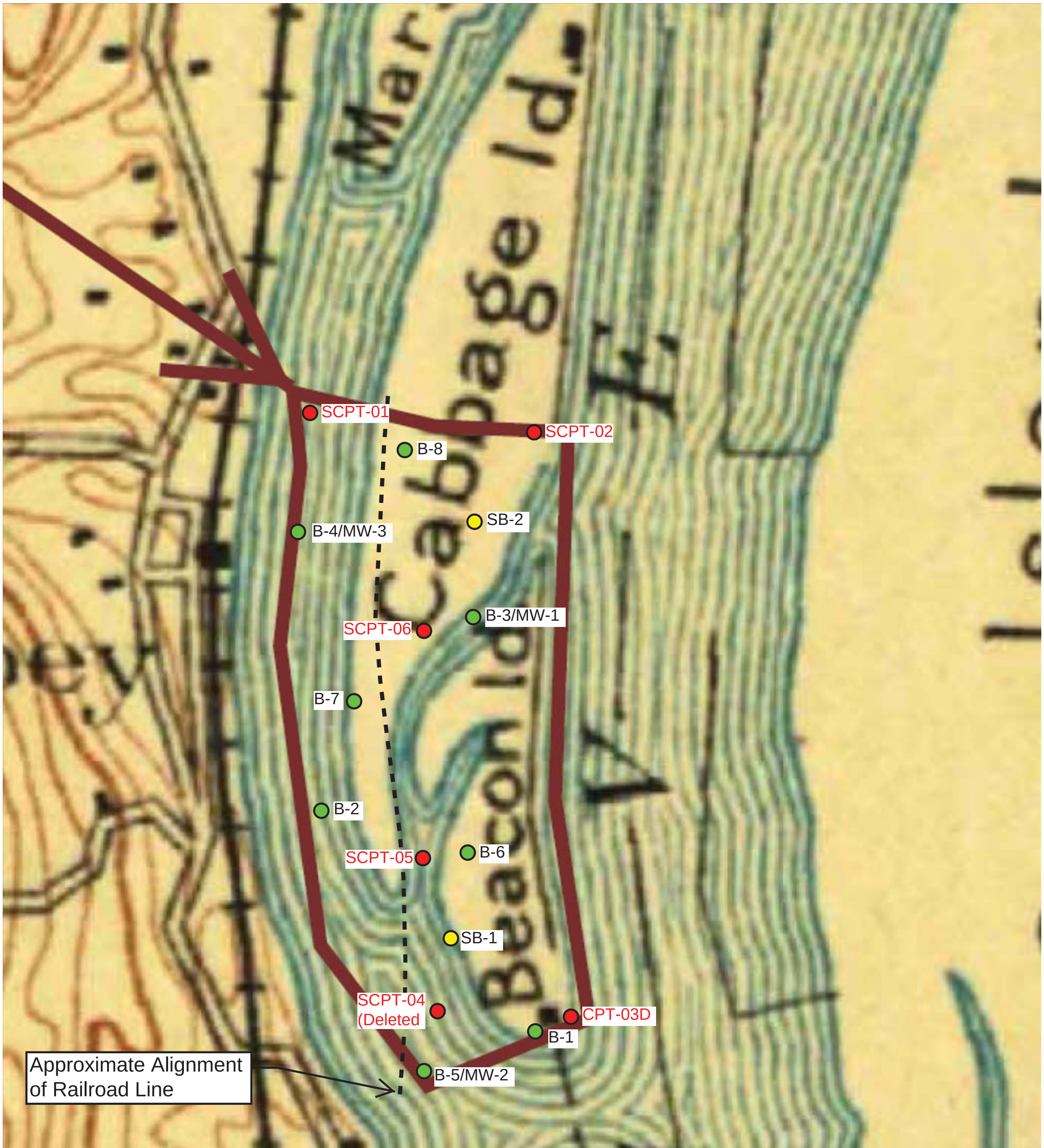
- SB-1, Test Boring by Dente
- SCPT-01, Seismic Cone Penetrometer Test by ConeTec, CPT denote cone test with no seismic testing.
- B-1, Test Boring by CME Associates, MW denotes well location.

DENTE GROUP

594 Broadway - Watervliet, New York 12189

Voice 518-266-0310 Fax 518-266-9238

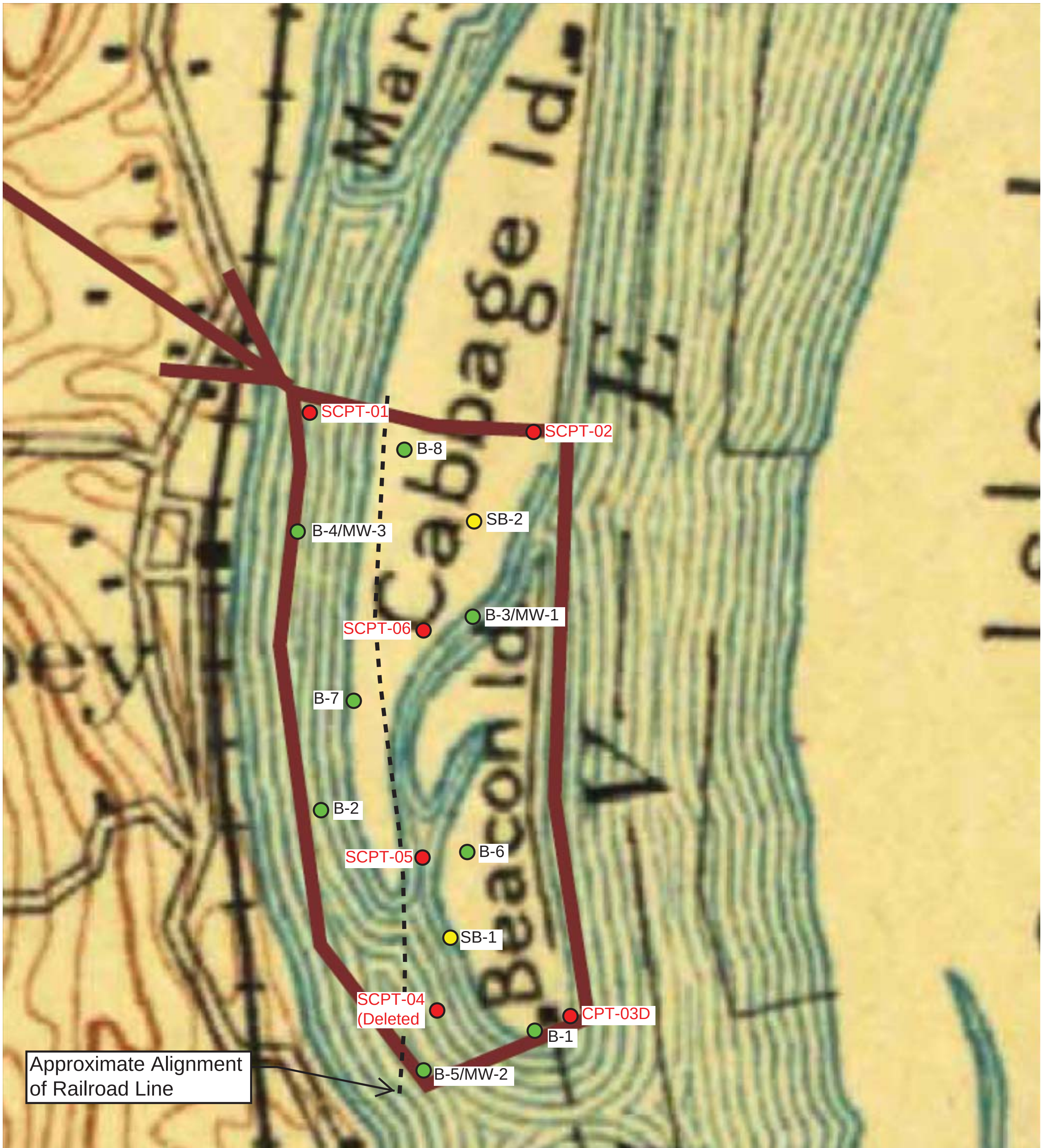
Scale: N.T.S.	**1980 HISTORICAL TOPO MAP** **Beacon Island Parcel** **Glenmont, New York**	**Drawn By: NA**
Dated: 7/07/2017		**Drawing No. 1**



LEGEND

- SB-1, Test Boring by Dente
- SCPT-02, Seismic Cone Penetrometer Test by ConeTec, CPT denotes cone test with no seismic testing.
- B-6, Test Boring by CME Associates, MW denotes well location.

DENTE GROUP **594 Broadway - Watervliet, New York 12189** **Voice 518-266-0310 Fax 518-266-9238**		
Scale: N.T.S.	**1893 HISTORICAL TOPO MAP** **Beacon Island Parcel** **Glenmont, New York**	**Drawn By: NA**
Dated: 7/07/2017		**Drawing No. 1**



LEGEND

- SB-1, Test Boring by Dente
- SCPT-02, Seismic Cone Penetrometer Test by ConeTec, CPT denotes cone test with no seismic testing.
- B-6, Test Boring by CME Associates, MW denotes well location.

DENTE GROUP

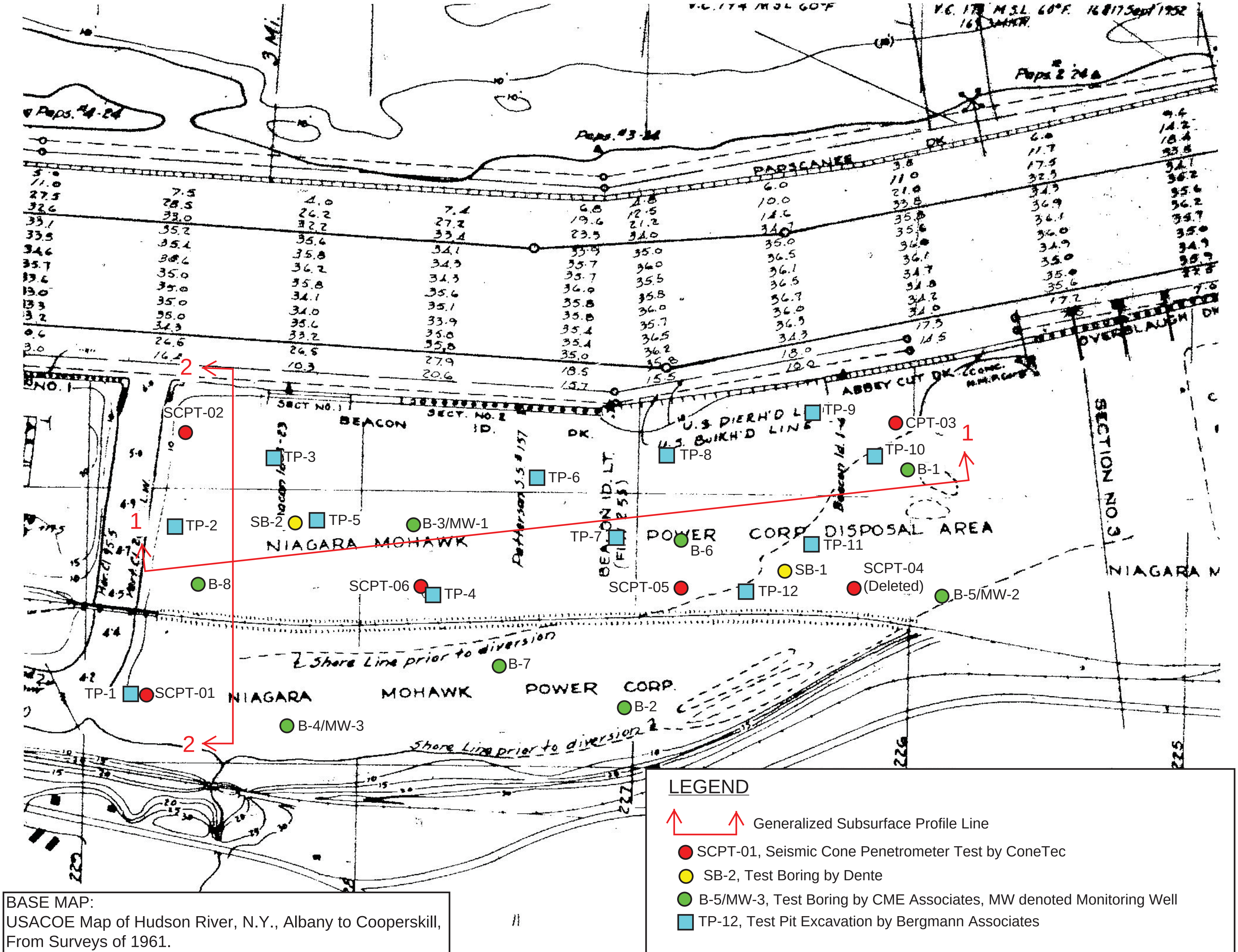
594 Broadway - Watervliet, New York 12189

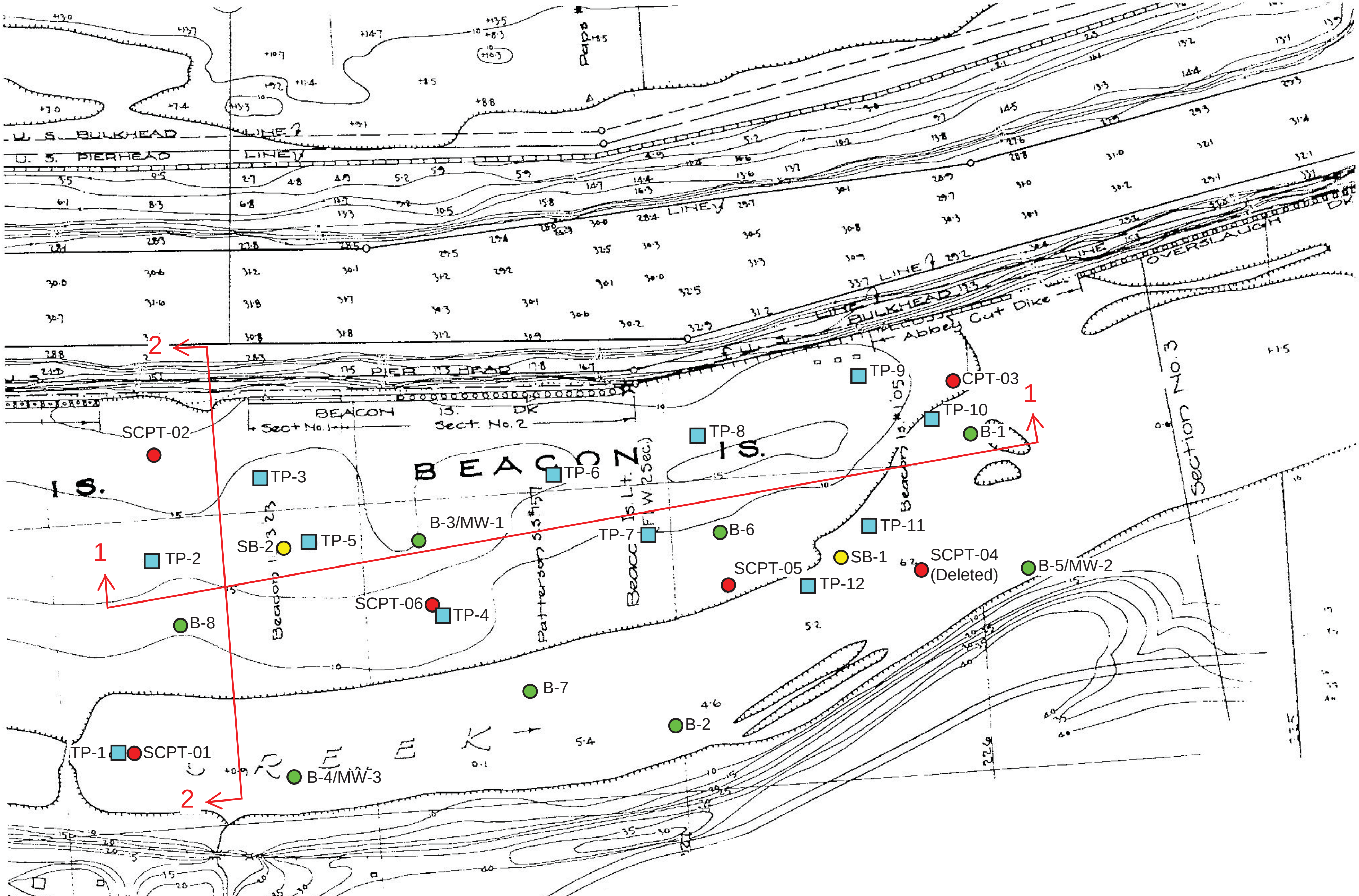
Voice 518-266-0310 Fax 518-266-9238

Scale: N.T.S.	**1893 HISTORICAL TOPO MAP** **Beacon Island Parcel** **Glenmont, New York**	**Drawn By: NA**
Dated: 7/07/2017		**Drawing No. 1**

APPENDIX C
USACOE HUDSON RIVER MAPS
(1928, 1936, and 1961)

Beacon Island Parcel
Town of Bethlehem, NY


SCPT-02
TP-3
TP-6
TP-8
TP-9
CPT-03
TP-10
B-1
TP-2
SB-2
TP-5
B-3/MW-1
TP-7
B-6
TP-11
SB-1
SCPT-04
(Deleted)
B-8
SCPT-06
TP-4
SCPT-05
TP-12
B-5/MW-2
B-7
TP-1
SCPT-01
B-2
B-4/MW-3
NIAGARA MOHAWK POWER CORP. DISPOSAL AREA
NIAGARA MOHAWK POWER CORP.
Shore Line prior to diversion
BEACON ID. DK.
SECT. NO. 1
SECT. NO. 2
U.S. PIERH'D LINE
U.S. BULKH'D LINE
ABBEY CUT DK.
OVERSLAUGH
PAPSCANEE
SECTION NO 3
LEGEND
Generalized Subsurface Profile Line
SCPT-01, Seismic Cone Penetrometer Test by ConeTec
SB-2, Test Boring by Dente
B-5/MW-3, Test Boring by CME Associates, MW denoted Monitoring Well
TP-12, Test Pit Excavation by Bergmann Associates
BASE MAP:
USACOE Map of Hudson River, N.Y., Albany to Cooperskill,
From Surveys of 1961.



LEGEND

Generalized Subsurface Profile Line

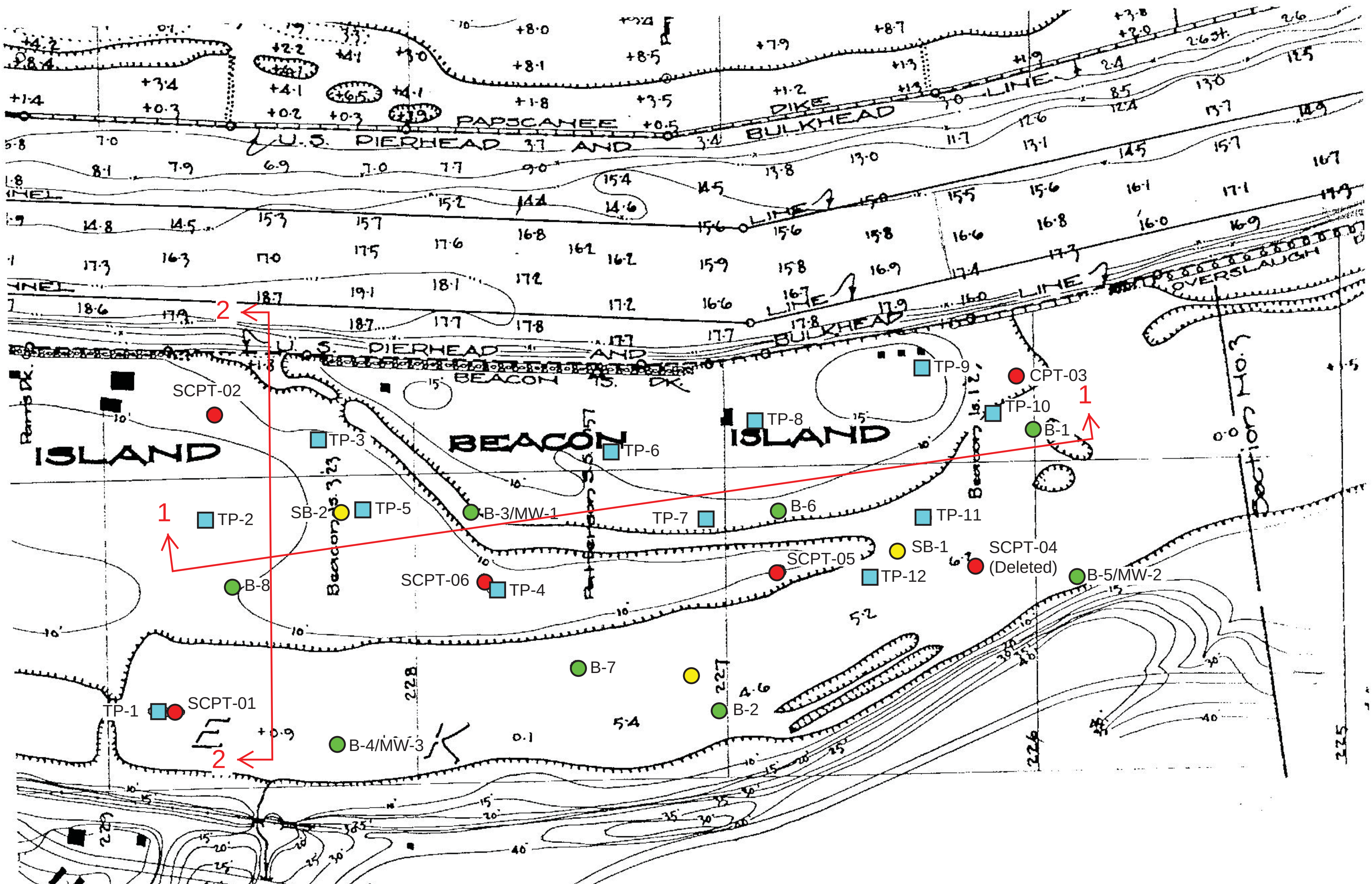
SCPT-01, Seismic Cone Penetrometer Test by ConeTec

SB-1, Test Boring by Dente

B-5/MW-2, Test boring by CME Associates, MW denotes Monitoring Well

TP-10, Test Pit Excavation by Bergmann Associates

BASE MAP:
USACOE Map of Hudson River, N.Y., Albany to Cooperskill,
From Surveys of 1936.



LEGEND

Generalized Subsurface Profile Line

SCPT-01, Seismic Cone Penetrometer Test by ConeTec

SB-1, Test Boring By Dente

B-3/MW-1, Test Boring By CME Associates, MW denotes Monitoring Well

TP-9, Test Pit Excavation by Bergmann Associates

BASE MAP:
USACOE Map of Hudson River, N.Y., Albany to Cooperskill,
From Surveys of 1928.

APPENDIX D
TEST BORING LOGS AND KEY

Beacon Island Parcel
Town of Bethlehem, NY

INTERPRETATION OF SUBSURFACE LOGS

The Subsurface Logs present observations and the results of tests performed in the field by the Driller, Technicians, Geologists and Geotechnical Engineers as noted. Soil/Rock Classifications are made visually, unless otherwise noted, on a portion of the materials recovered through the sampling process and may not necessarily be representative of the materials between sampling intervals or locations.

The following defines some of the terms utilized in the preparation of the Subsurface Logs.

SOIL CLASSIFICATIONS

Soil Classifications are visual descriptions on the basis of the Unified Soil Classification ASTM D-2487 and USBR, 1973 with additional comments by weight of constituents by BUHRMASTER. The soil density or consistency is based on the penetration resistance determined by ASTM METHOD D1586. Soil Moisture of the recovered materials is described as DRY, MOIST, WET or SATURATED.

SIZE DESCRIPTION		RELATIVE DENSITY/CONSISTENCY (basis ASTM D1586)			
SOIL TYPE	PARTICLE SIZE	GRANULAR SOIL		COHESIVE SOIL	
BOULDER	> 12	DENSITY	BLOWS/FT.	CONSISTENCY	BLOWS/FT.
COBBLE	3" - 12"	LOOSE	< 10	VERY SOFT	< 3
GRAVEL-COARSE	3" - 3/4"	FIRM	11 - 30	SOFT	4 - 5
GRAVEL - FINE	3/4" - #4	COMPACT	31 - 50	MEDIUM	6 - 15
SAND - COARSE	#4 - #10	VERY COMPACT	50 +	STIFF	16 - 25
SAND - MEDIUM	#10 - #40			HARD	25 +
SAND - FINE	#40 - #200				
SILT/NONPLASTIC	< #200				
CLAY/PLASTIC	< #200				

SOIL STRUCTURE		RELATIVE PROPORTION OF SOIL TYPES	
STRUCTURE	DESCRIPTION	DESCRIPTION	% OF SAMPLE BY WEIGHT
LAYER	6" THICK OR GREATER	AND	35 - 50
SEAM	6" THICK OR LESS	SOME	20 - 35
PARTING	LESS THAN 1/4" THICK	LITTLE	10 - 20
VARVED	UNIFORM HORIZONTAL PARTINGS OR SEAMS	TRACE	LESS THAN 10

Note that the classification of soils or soil like materials is subject to the limitations imposed by the size of the sampler, the size of the sample and its degree of disturbance and moisture.

ROCK CLASSIFICATIONS

Rock Classifications are visual descriptions on the basis of the Driller's, Technician's, Geologist's or Geotechnical Engineer's observations of the coring activity and the recovered samples applying the following classifications.

CLASSIFICATION TERM	DESCRIPTION
VERY HARD	NOT SCRATCHED BY KNIFE
HARD	SCRATCHED WITH DIFFICULTY
MEDIUM HARD	SCRATCHED EASILY
SOFT	SCRATCHED WITH FINGERNAIL
VERY WEATHERED	DISINTEGRATED WITH NUMEROUS SOIL SEAM
WEATHERED	SLIGHT DISINTEGRATION, STAINING, NO SEAMS
SOUND	NO EVIDENCE OF ABOVE
MASSIVE	ROCK LAYER GREATER THAN 36" THICK
THICK BEDDED	ROCK LAYER 12" - 36"
BEDDED	ROCK LAYER 4" - 12"
THIN BEDDED	ROCK LAYER 1" - 4"
LAMINATED	ROCK LAYER LESS THAN 1"
FRACTURES	NATURAL BREAKS AT SOME ANGLE TO BEDS

Core sample recovery is expressed as percent recovered of total sampled. The ROCK QUALITY DESIGNATION (RQD) is the total length of core sample pieces exceeding 4" length divided by the total core sample length for N size cored.

GENERAL

- Soil and Rock classifications are made visually on samples recovered. The presence of Gravel, Cobbles and Boulders will influence sample recovery classification density/consistency determination.
- Groundwater, if encountered, was measured and its depth recorded at the time and under the conditions as noted.
- Topsoil or pavements, if present, were measured and recorded at the time and under the conditions as noted.
- Stratification Lines are approximate boundaries between soil types. These transitions may be gradual or distinct and are approximated.

DENTE GROUP, A TERRACON COMPANY	SUBSURFACE LOG **SB-1.1**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/21/17	FINISH: 6/22/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		**BLOWS ON SAMPLER**					**CLASSIFICATION / OBSERVATIONS**
DEPTH	#	6"	12"	18"	24"	N	
	1	WH	WH				**FILL:** Black Fly ASH
				1	1	1	**(MOIST, LOOSE)**
	2	WH	WH				Dark Gray SILT, trace decayed wood, Moist
				WH	WH	WH	
	3	WH	WH				Dark Gray and White Varved SILT, Wet
5'				WH	WH	WH	
	4	WR	WR				Gray SILT, trace fine sand and organic
				WH	WH	WH	matter, Wet
	5	WR	WR				Black Organic SILT, Very Moist
				WH	WH	WH	
10'	6	WH	WH				Grayish Brown SILT, trace clay, trace
				WH	WH	WH	organic matter, Wet
	7	WH	WH				Similar
				WH	WH	WH	**(MOIST TO WET, VERY SOFT / LOOSE)**
	8	WH	1				Grayish Brown Fine SAND, trace silt, Wet
15'				1	2	2	
	9	1	2				Similar
				3	4	5	**(WET, LOOSE)**
	10	WR	WH				Dark Gray Fine SAND and SILT, occasional
				1	1	1	decayed organic matter, Wet
20'	11	1	1				**(WET, LOOSE)**
				1	3	2	Gray F-M SAND, trace coarse sand and
							silt, Wet
25'	12	3	3				Grayish Brown F-M SAND, trace silt, Wet
				4		7	

DENTE GROUP, A TERRACON COMPANY | SUBSURFACE LOG **SB-1.2**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/21/17	FINISH: 6/22/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		**BLOWS ON SAMPLER**					**CLASSIFICATION / OBSERVATIONS**
DEPTH	#	6"	12"	18"	24"	N	
	13	1	1				Dark Gray F-M SAND, trace to Some
				2		3	Gravel, trace silt, Wet
							(WET, LOOSE)
35'	14	WH	WH				Gray Varved SILT and CLAY, Wet
				WH		WH	
	15	Tube Sample - 38' to 40' Recovery = 24"					
40'	16	WH	WH				Similar
				WH		WH	
45'	17	WR	WH				Similar
				WH		WH	
	18	Tube Sample - 48' to 50' Recovery = 20"					
50'	19	WR	WH				Similar
				WH		WH	
55'	20	WR	WH				Similar
				WH		WH	
	21	Tube Sample - 58' to 60' Recovery = 24"					

DENTE GROUP, A TERRACON COMPANY	SUBSURFACE LOG **SB-1.3**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/21/17	FINISH: 6/22/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		**BLOWS ON SAMPLER**					**CLASSIFICATION / OBSERVATIONS**
DEPTH	#	6"	12"	18"	24"	N	
	22	WH	WH				Gray Varved SILT and CLAY, Wet
				WH		WH	**(WET, VERY SOFT)**
							Boring Ended at 61.5'
							Groundwater at 10.1' below grade after
65'							leaving augers in place overnight at 20'.
70'							
75'							
80'							
85'							

DENTE GROUP, A TERRACON COMPANY	SUBSURFACE LOG **SB-2.1**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/19/17	FINISH: 6/21/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		**BLOWS ON SAMPLER**					**CLASSIFICATION / OBSERVATIONS**
DEPTH	#	6"	12"	18"	24"	N	
	1	2	3				**POSSIBLE FILL:** Grayish Brown SILT,
				3	4	6	Some Clay, Moist
	2	4	5				Brown Mottled SILT and CLAY with
				5	6	10	inclusions Gray SAND, SILT and GRAVEL
	3	2	4				Similar with occasional fragments decayed
5'				7	9	11	wood
	4	10	13				Gray SILT and CLAY with seams Gray F-M
				11	10	24	SAND, Little Silt, Moist
	5	2	5				Similar
				7	8	12	
10'	6	3	6				Similar
				6	8	12	
	7	8	6				Brown F-M SAND, trace silt
				6	4	12	
	8	3	4				**(MOIST, MEDIUM TO STIFF / FIRM)**
15'				3	3	7	Dark Gray to Brown SILT, trace clay, trace
	9	1	2				organic matter, Very Moist
				3	3	5	
	10	WH	WH				Similar, Wet
				WH	3	WH	
20'	11	WH	1/12"				Similar with seams Gray F-M SAND
				-	1	1	**(VERY MOIST TO WET, LOOSE)**
25'	12	2	3				Gray F-M SAND, trace silt, Wet
				3		6	

DENTE GROUP, A TERRACON COMPANY	SUBSURFACE LOG **SB-2.2**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/19/17	FINISH: 6/21/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		BLOWS ON SAMPLER					CLASSIFICATION / OBSERVATIONS
DEPTH	#	6"	12"	18"	24"	N	
	13	3	3				Dark Grayish Brown Fine SAND, Little Silt, with occasional thin seams decayed organic matter, Wet
				4		7	
35'	14	3	4				Gray Layered Fine and F-M SAND, trace silt, Wet
				6		10	
40'	15	2	2				Gray F-C SAND and Fine Gravel, trace silt, Wet
				4		6	
							(WET, LOOSE)
45'	16	1	1				Gray Varved SILT and CLAY, Wet
				2		3	
	17	Tube Sample - 48' to 50' Recovery = 24"					
50'	18	WH	WH				Similar
				WH		WH	
55'	19	WH	WH				Similar
				WH		WH	

DENTE GROUP, A TERRACON COMPANY	SUBSURFACE LOG **SB-2.3**

PROJECT: Beacon Island Parcel	**DATE**	START: 6/19/17	FINISH: 6/21/17

LOCATION: Town of Bethlehem, NY	**METHODS:** 4-1/4" I.D. Hollow Stem Augers
CLIENT: Bergmann Associates	with ASTM D1586 and D1587 Sampling
JOB NUMBER: FDE-17-121	**SURFACE ELEVATION:**
DRILL TYPE: CME 55 ATV Mounted Rig	**CLASSIFICATION:** E. Gravelle, PE

SAMPLE		**BLOWS ON SAMPLER**					**CLASSIFICATION / OBSERVATIONS**
DEPTH	#	6"	12"	18"	24"	N	
	20	WH	WH				Gray Varved SILT and CLAY, Wet
				WH		WH	
65'	21	WR	WH				Similar
				2		2	
	22	Tube Sample - 68' to 70' Recovery = 0"					
70'	23	WH	WH				Gray SILT, Little to trace clay, Wet
				WH		WH	**(WET, VERY SOFT)**
75'	24	14	28				Gray SILT, SAND and GRAVEL, trace clay,
				42		70	Wet
							(WET, VERY COMPACT)
80'	25	7	100/.3'			REF	2" SAND over Gray SHALE Fragments, Wet
							Boring Ended at 80.8' with Spoon Refusal
							Groundwater at 13.7' below grade after
							sample #9 was obtained.
85'							

APPENDIX E
CONETEC TEST REPORT

Beacon Island Parcel
Town of Bethlehem, NY

PRESENTATION OF SITE INVESTIGATION RESULTS

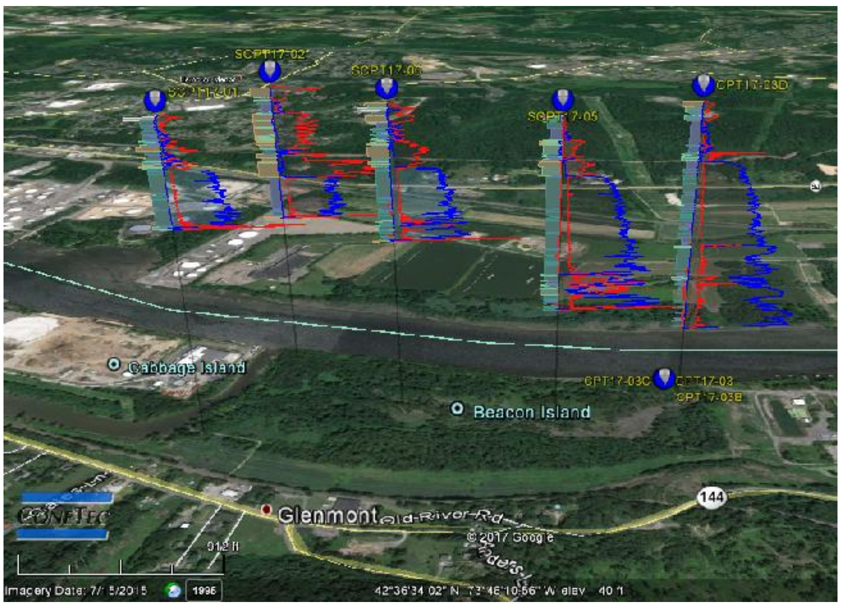
Port of Albany
Albany, New York

Prepared for:

Dente Engineering

ConeTec Job No: 17-53073

Project Start Date: 12-Jun-2017
Project End Date: 13-Jun-2017
Report Date: 14-Jun-2017



Prepared by:

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Email: conetecNJ@conetec.com
www.conetec.com
www.conetecdataservices.com

CONETEC

Introduction

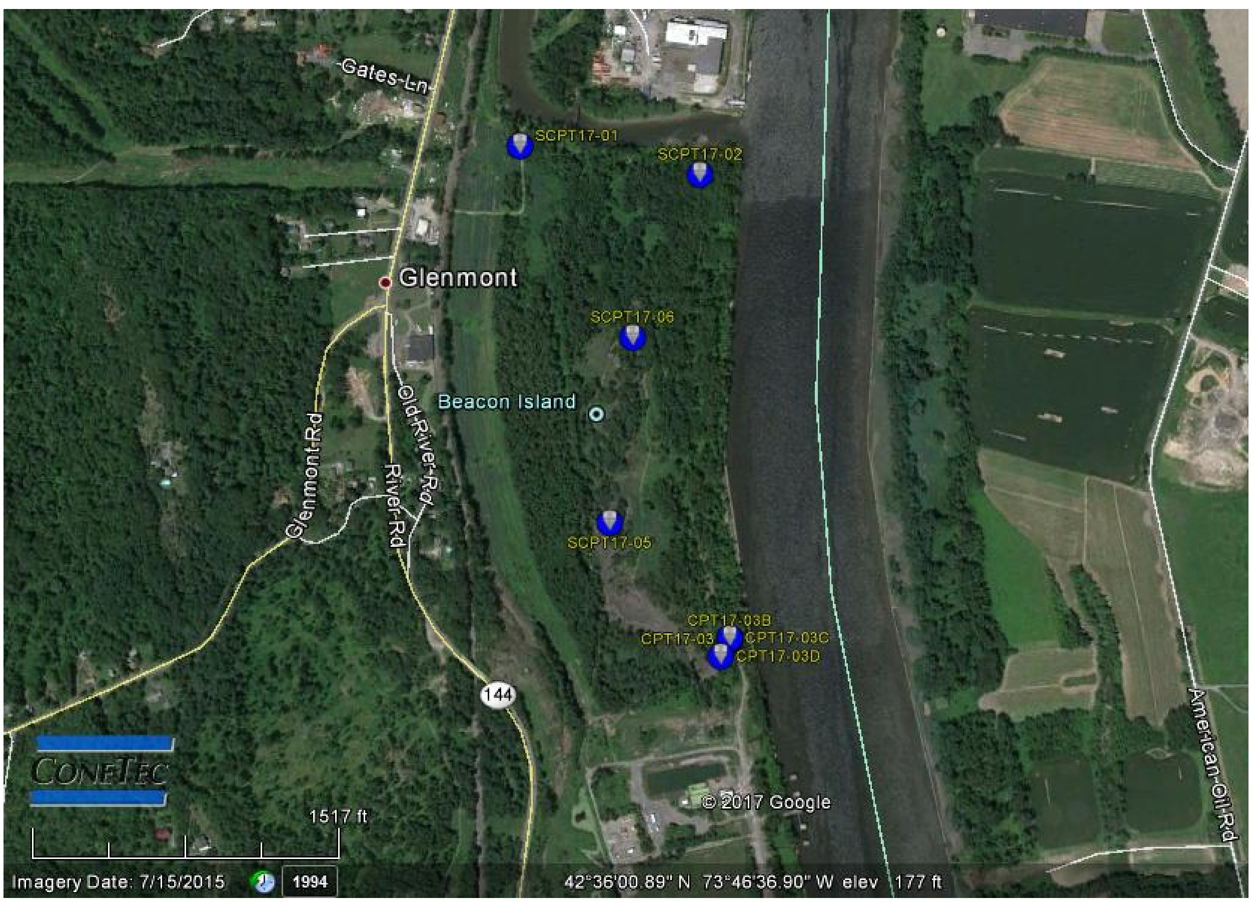
The enclosed report presents the results of a cone penetration testing (CPTU or CPT) and seismic piezocone penetration testing (SCPTu or SCPT) program carried out at the proposed new Port of Albany to be located in Albany, New York. The site investigation program was conducted by ConeTec Inc. (ConeTec), under contract to Dente Engineering (Dente) of Watervliet, New York.

A total of 4 cone penetration tests and 4 seismic cone penetration tests were completed at 5 locations (there were 3 shallow refusals that were offset and reattempted until target depth was achieved). The CPT and SCPT program was performed to evaluate the subsurface soil conditions. CPT and SCPT sounding locations were selected and numbered under supervision of Dente personnel (Mr. Ed Gravelle).

Project Information

Project	
Client	Dente Engineering
Project	Port of Albany, Albany, NY
ConeTec project number	17-53073

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



Rig Description	Deployment System	Test Type
CPT Track Rig	20 ton track mounted (twin cylinders)	CPT and SCPT

Coordinates		
Test Type	Collection Method	EPSG Number
CPT and SCPT	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	Five pore pressure dissipation tests were completed to determine the phreatic surface and the consolidation characteristics.
Additional Comments	Shear wave velocity tests were conducted at various depth intervals at four locations.

Cone Description	Cone Number	Cross Sectional Area (cm^2)	Sleeve Area (cm^2)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
226:T1500F15U500	226	15	225	1500	15	500
469:T1500F15U500	469	15	225	1500	15	500

Limitations

This report has been prepared for the exclusive use of Dente Engineering (Client) for the project titled "Port of Albany, Albany, 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.

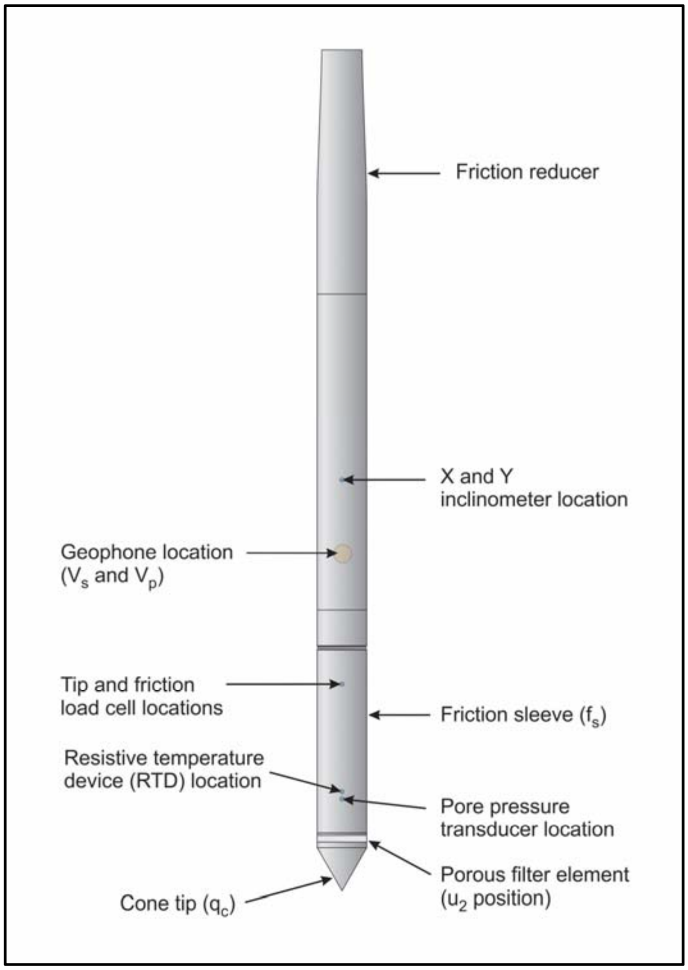


Figure CPTu. Piezocone Penetrometer (15 cm^2)

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:

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

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.

Shear wave velocity testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave (Vp) velocity is also determined.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that triggers the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

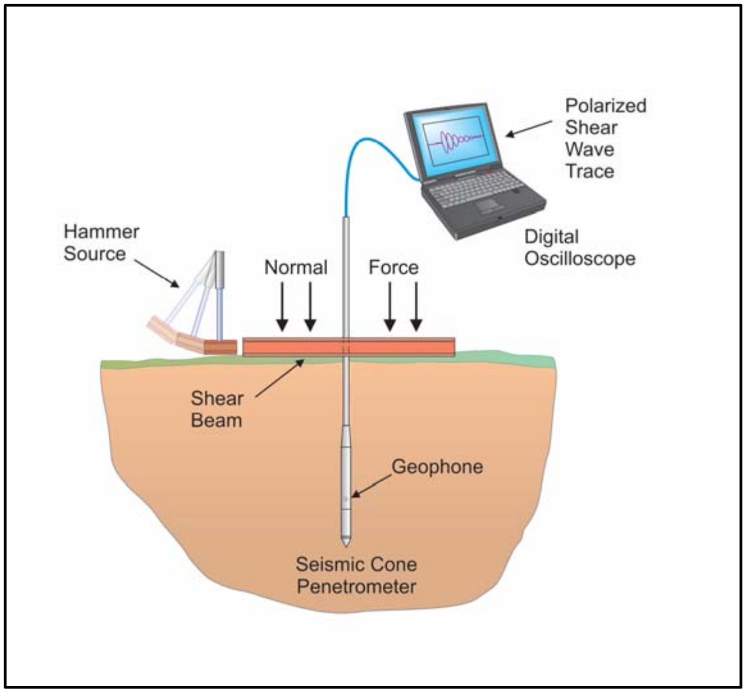


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Multiple wave traces are recorded for quality control purposes. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et.al. (1986).

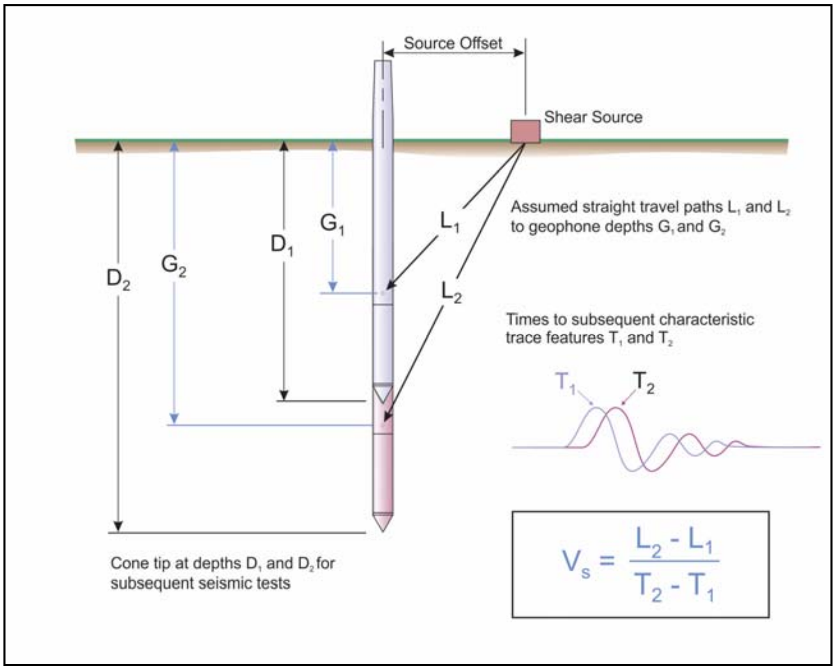


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

The average shear wave velocity to a depth of 100 feet (30 meters) ($\bar{v}_s$) has been calculated and provided for all applicable soundings using the following equation presented in ASCE, 2010.

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{v_{si}}}$$

where: $\bar{v}_s$ = average shear wave velocity ft/s (m/s)
d_i = the thickness of any layer between 0 and 100 ft (30 m)
v_{si} = the shear wave velocity in ft/s (m/s)
$\sum_{i=1}^{n} d_i$ = 100 ft (30 m)

Average shear wave velocity, $\bar{v}_s$ is also referenced to V_{s100} or V_{s30}.

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

American Society of Civil Engineers (ASCE), 2010, "Minimum Design Loads for Buildings and Other Structures", Standard ASCE/SEI 7-10, American Society of Civil Engineers, ISBN 978-0-7844-1085-1, Reston, Virginia.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

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).

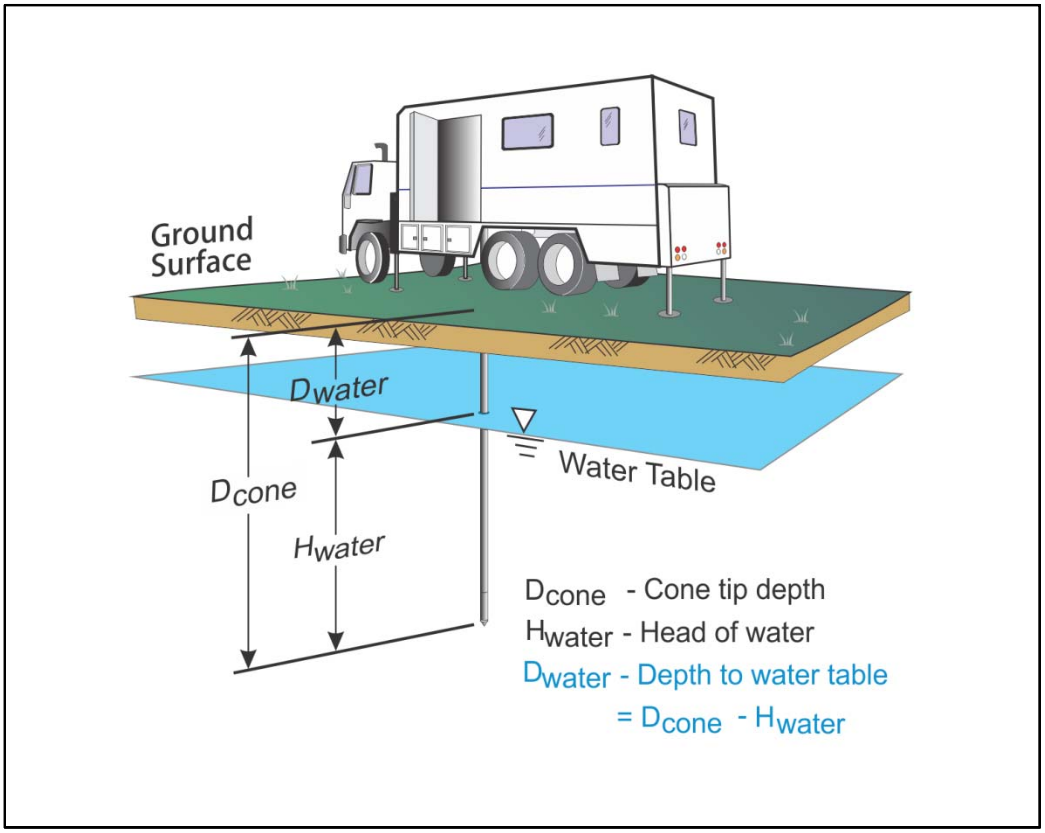


Figure PPD-1. Pore pressure dissipation test setup

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.

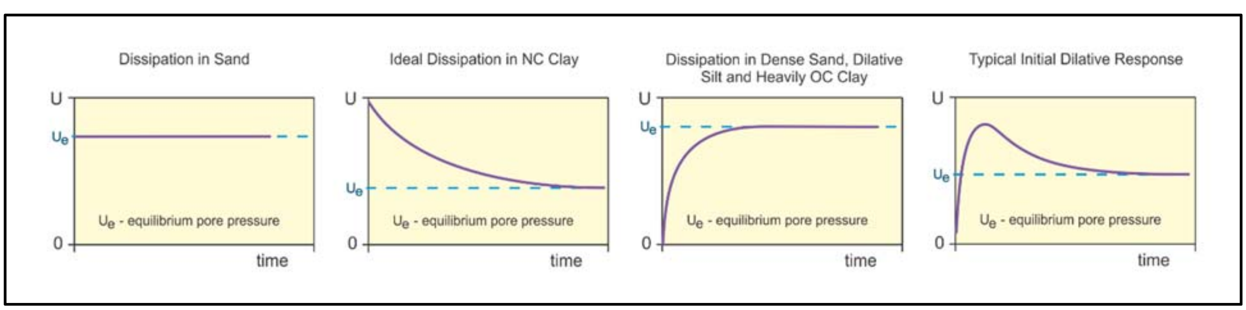


Figure PPD-2. Pore pressure dissipation curve examples

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 Standard Cone Penetration Test Plots
- Normalized Cone Penetration Test Plots
- Seismic Cone Penetration Test Plots
- Seismic Cone Penetration Test Tabular Results
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and

Standard Cone Penetration Test Plots

Job No:	17-53073
Client:	Dente Engineering
Project:	Port of Albany, Albany, NY
Start Date:	12-Jun-2017
End Date:	13-Jun-2017

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing[2] (m)	Easting (m)	Refer to Notation Number
SCPT17-01	17-53073_SP01	12-Jun-2017	469:T1500F15U500	6.6	61.84	12	4717928	601113	
SCPT17-02	17-53073_SP02	12-Jun-2017	226:T1500F15U500	14.1	84.65	8	4717882	601401	
CPT17-03	17-53073_CP03	12-Jun-2017	226:T1500F15U500		1.80		4717151	601458	4
CPT17-03B	17-53073_CP03B	12-Jun-2017	226:T1500F15U500		1.97		4717149	601458	4
CPT17-03C	17-53073_CP03C	12-Jun-2017	226:T1500F15U500		1.80		4717153	601458	4
CPT17-03D	17-53073_CP03D	12-Jun-2017	226:T1500F15U500	12.5	144.36		4717124	601444	3
SCPT17-05	17-53073_SP05	13-Jun-2017	226:T1500F15U500	8.7	112.53	22	4717333	601264	3
SCPT17-06	17-53073_SP06	13-Jun-2017	226:T1500F15U500	8.9	82.02	16	4717627	601297	
Totals	8 soundings				490.97	58			

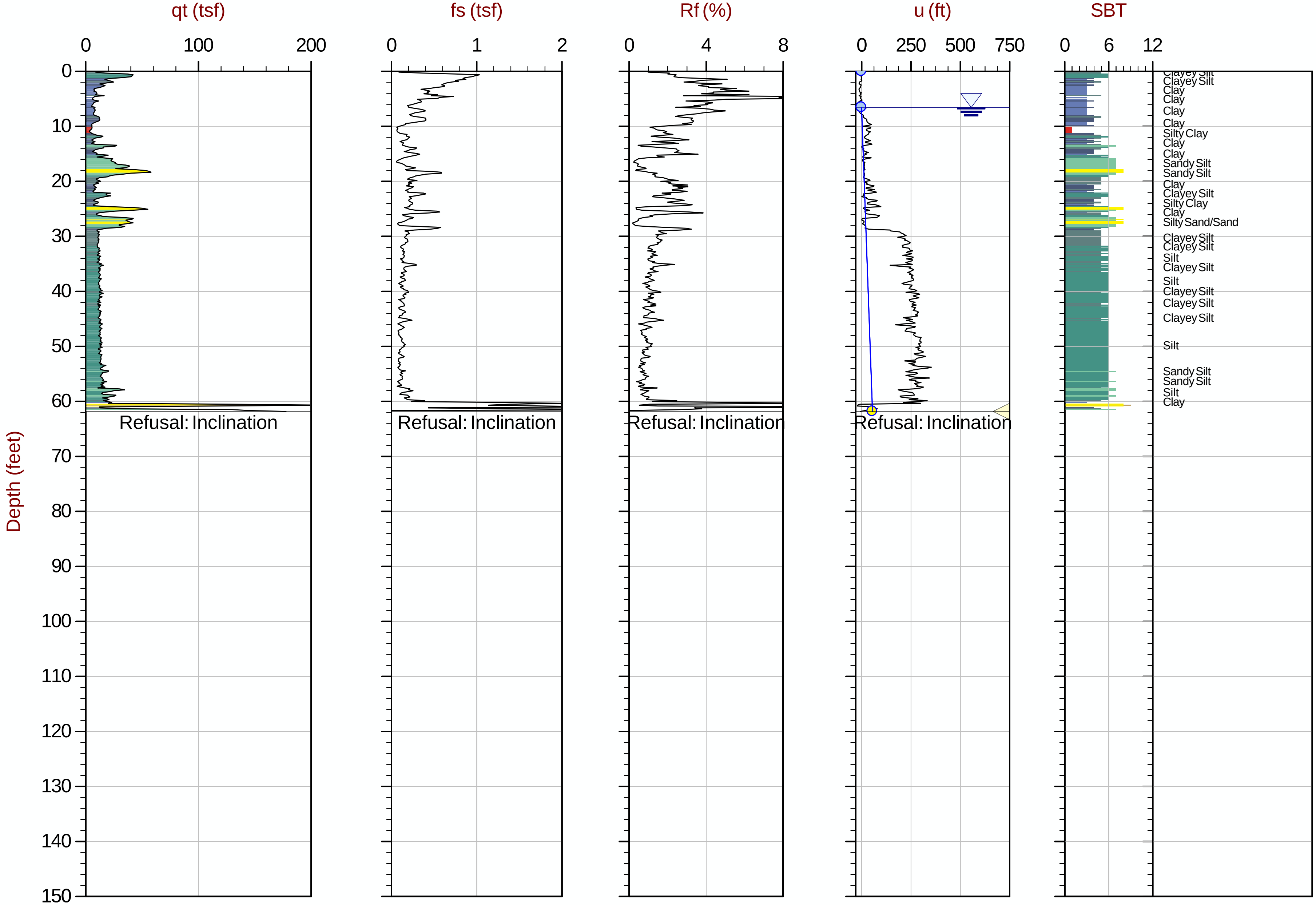
1. Assumed phreatic surface depths were determined from the pore pressure data unless otherwise noted. Hydrostatic data were used for calculated parameters.
2. Coordinates are WGS 84 / UTM Zone 18 and were collected using a MR-350 GlobalSat GPS Receiver.
3. Assumed phreatic surface estimated from the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

CONETEC

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 11:11
Site: Port of Albany, Albany, NY

Sounding: SCPT17-01
Cone: 469:T1500F15U500



Max Depth: 18.850 m / 61.84 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717928m E: 601113m

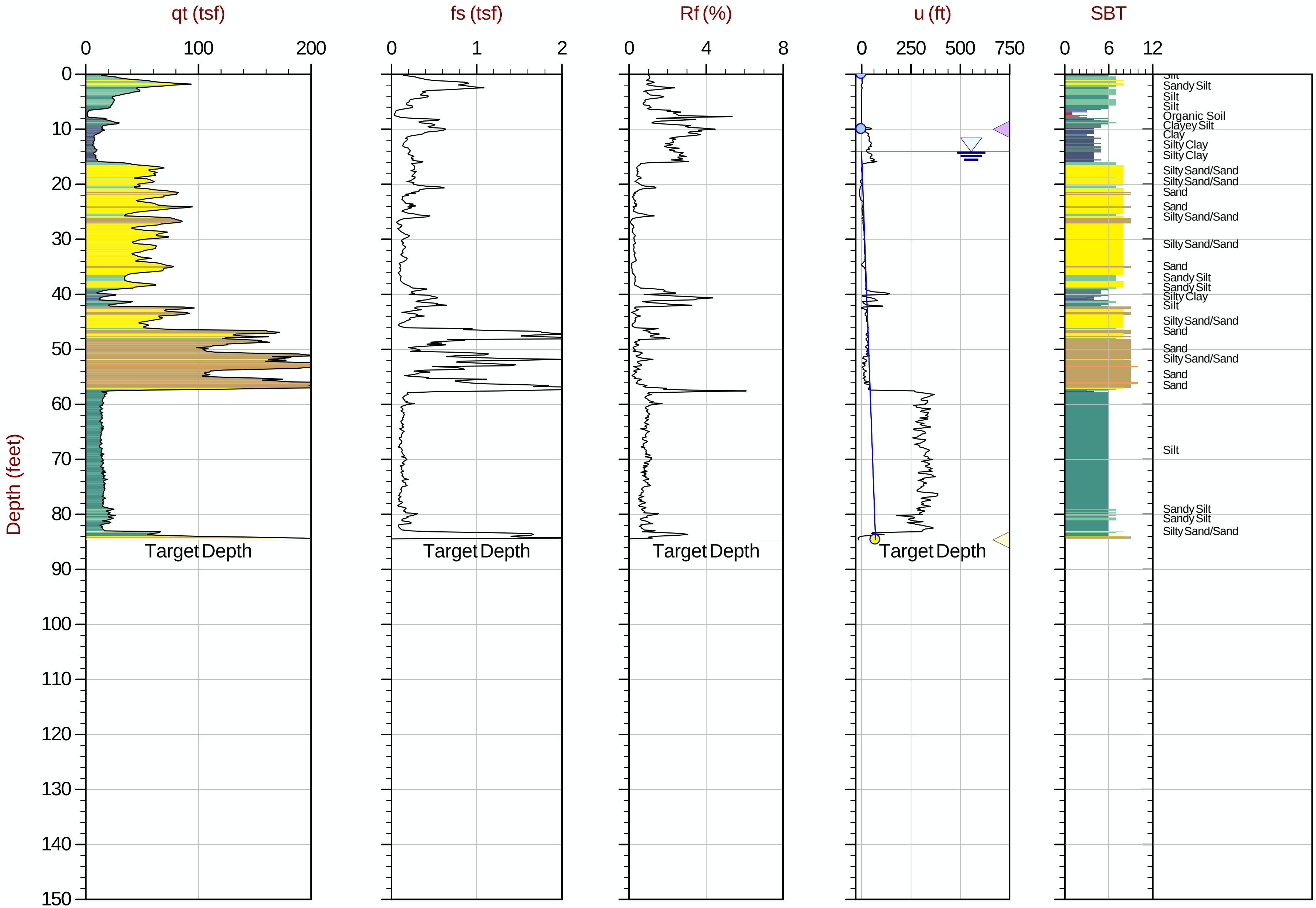
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 13:48
Site: Port of Albany, Albany, NY
Sounding: SCPT17-02
Cone: 226:T1500F15U500



Max Depth: 25.800 m / 84.64 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP02.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717882m E: 601401m

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

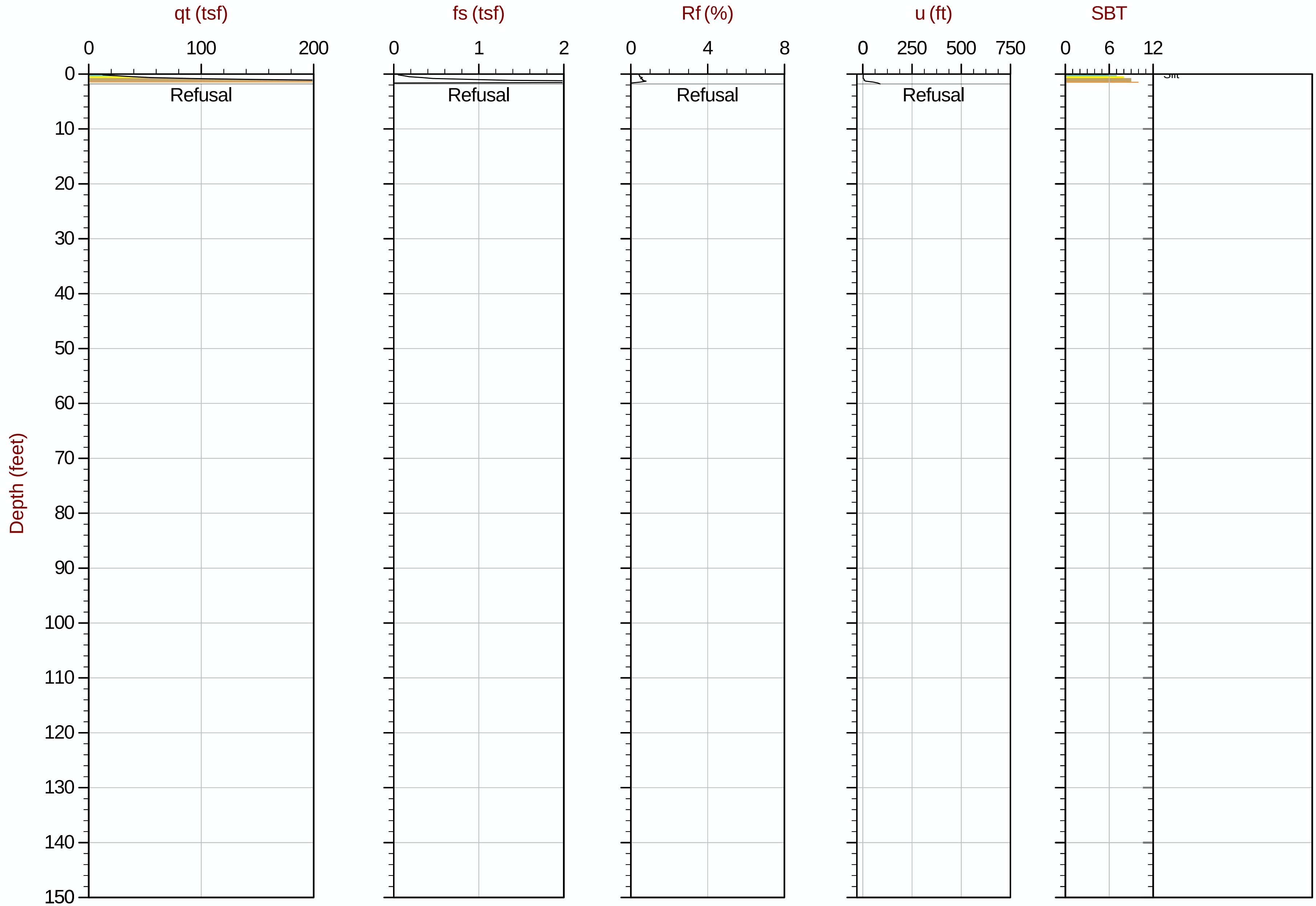
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 15:42
Site: Port of Albany, Albany, NY

Sounding: CPT17-03
Cone: 226:T1500F15U500



Max Depth: 0.550 m / 1.80 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_CP03.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717151m E: 601458m

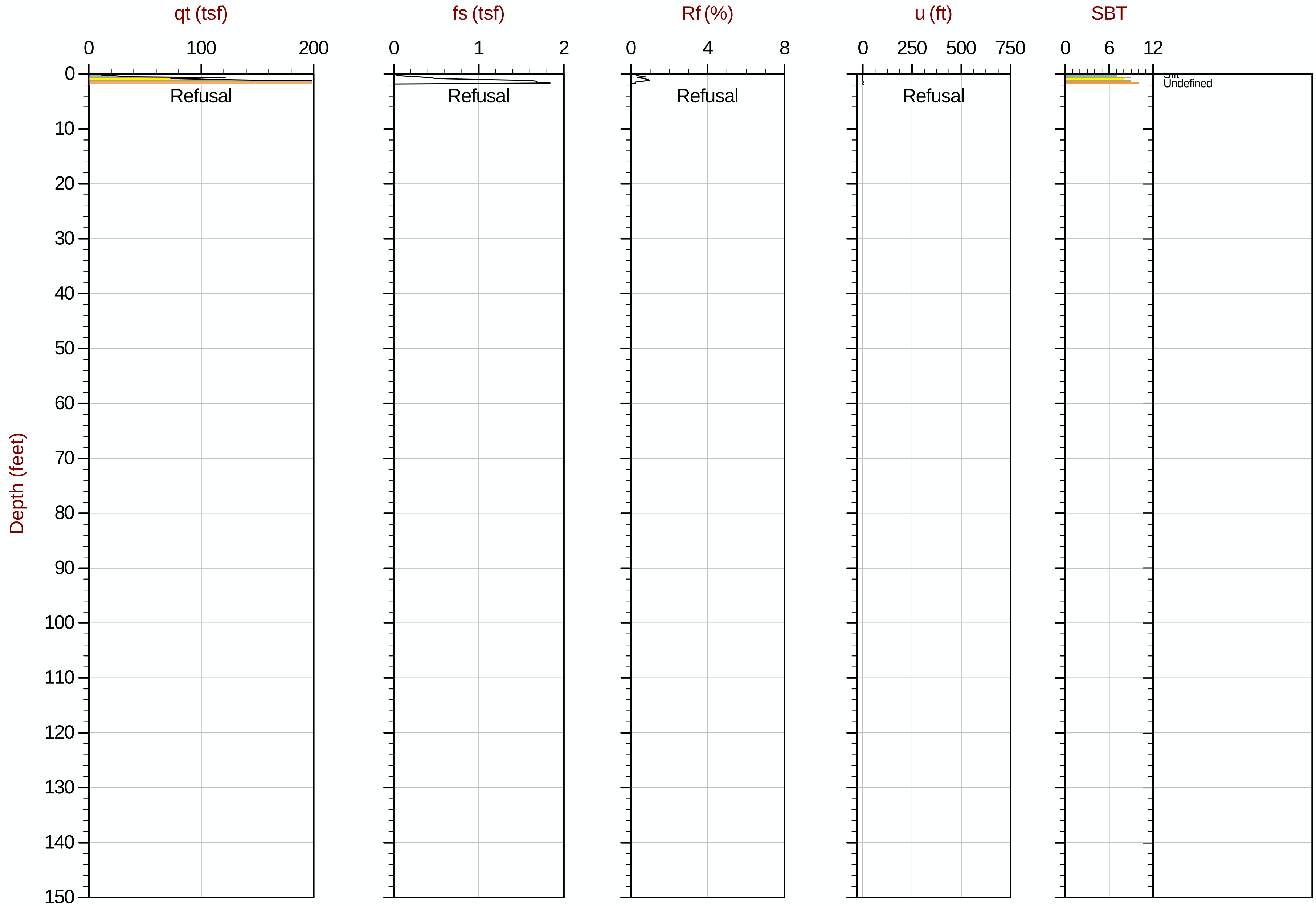
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 15:58
Site: Port of Albany, Albany, NY
Sounding: CPT17-03B
Cone: 226:T1500F15U500



Max Depth: 0.600 m / 1.97 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_CP03B.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717149m E: 601458m

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

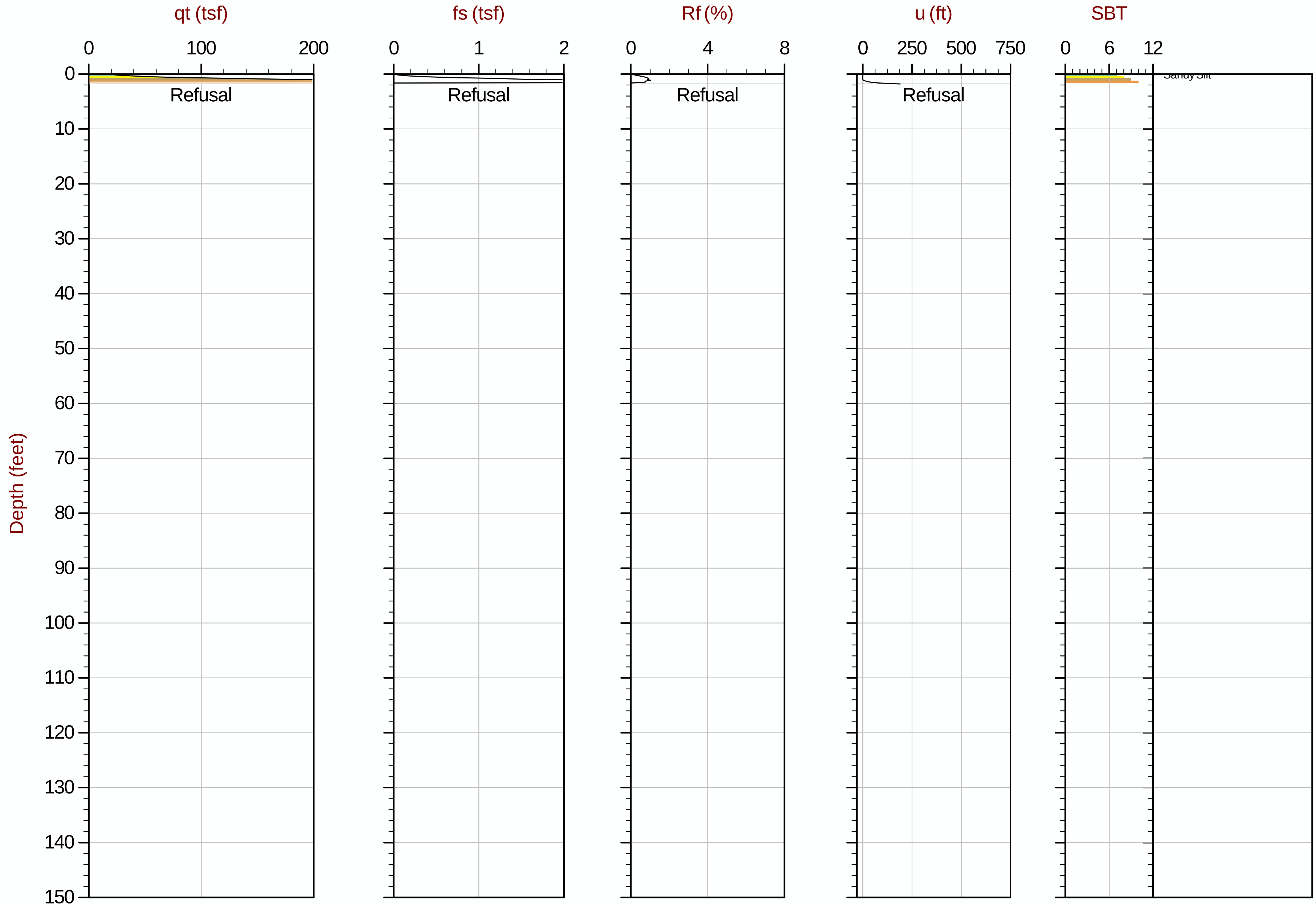
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

ConeTec

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 16:09
Site: Port of Albany, Albany, NY

Sounding: CPT17-03C
Cone: 226:T1500F15U500



Max Depth: 0.550 m / 1.80 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_CP03C.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717153m E: 601458m

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

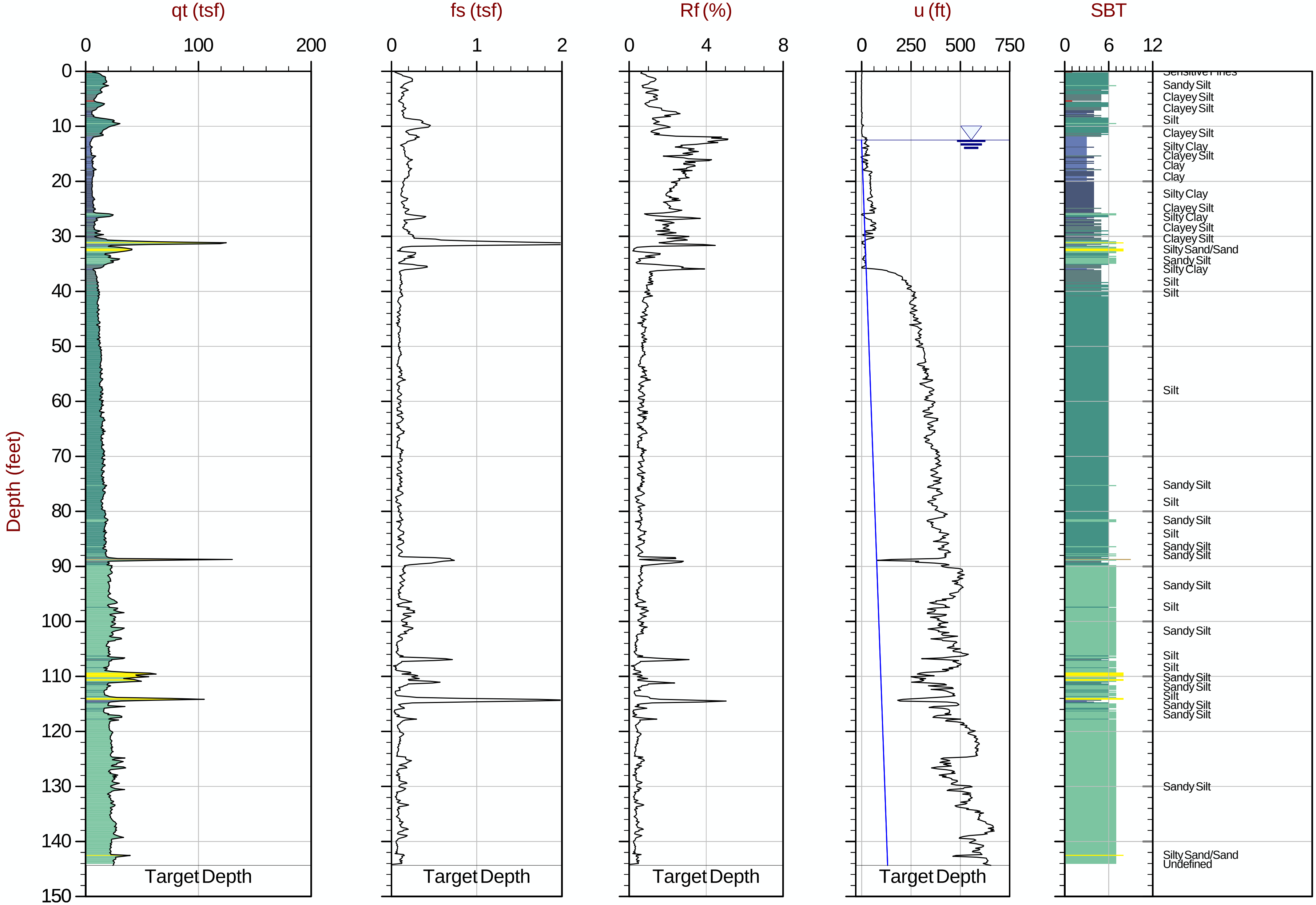
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 16:35
Site: Port of Albany, Albany, NY

Sounding: CPT17-03D
Cone: 226:T1500F15U500



Max Depth: 44.000 m / 144.36 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_CP03D.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717124m E: 601444m

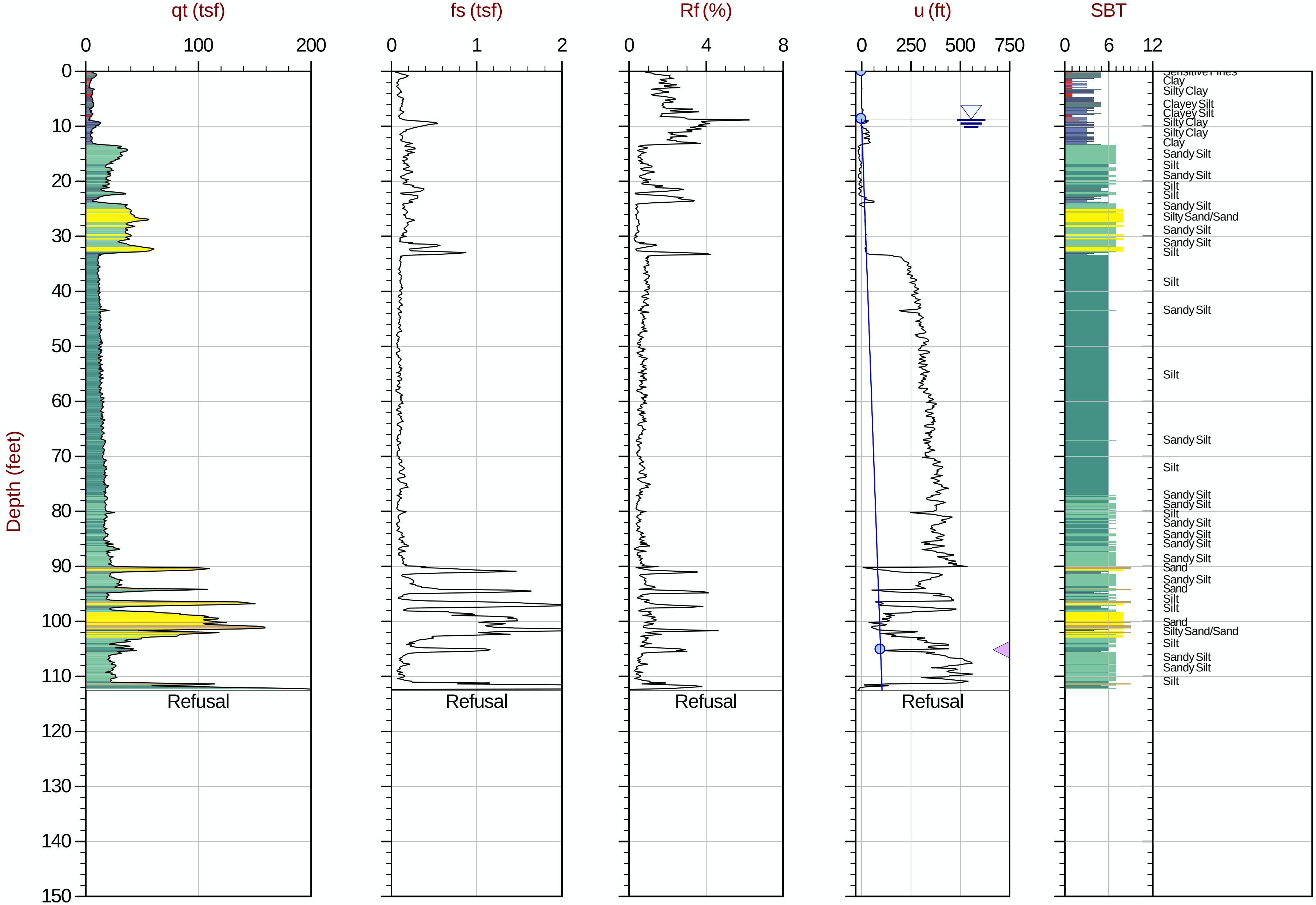
Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-13 08:48
Site: Port of Albany, Albany, NY

Sounding: SCPT17-05
Cone: 226:T1500F15U500



Max Depth: 34.300 m / 112.53 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP05.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717333m E: 601264m

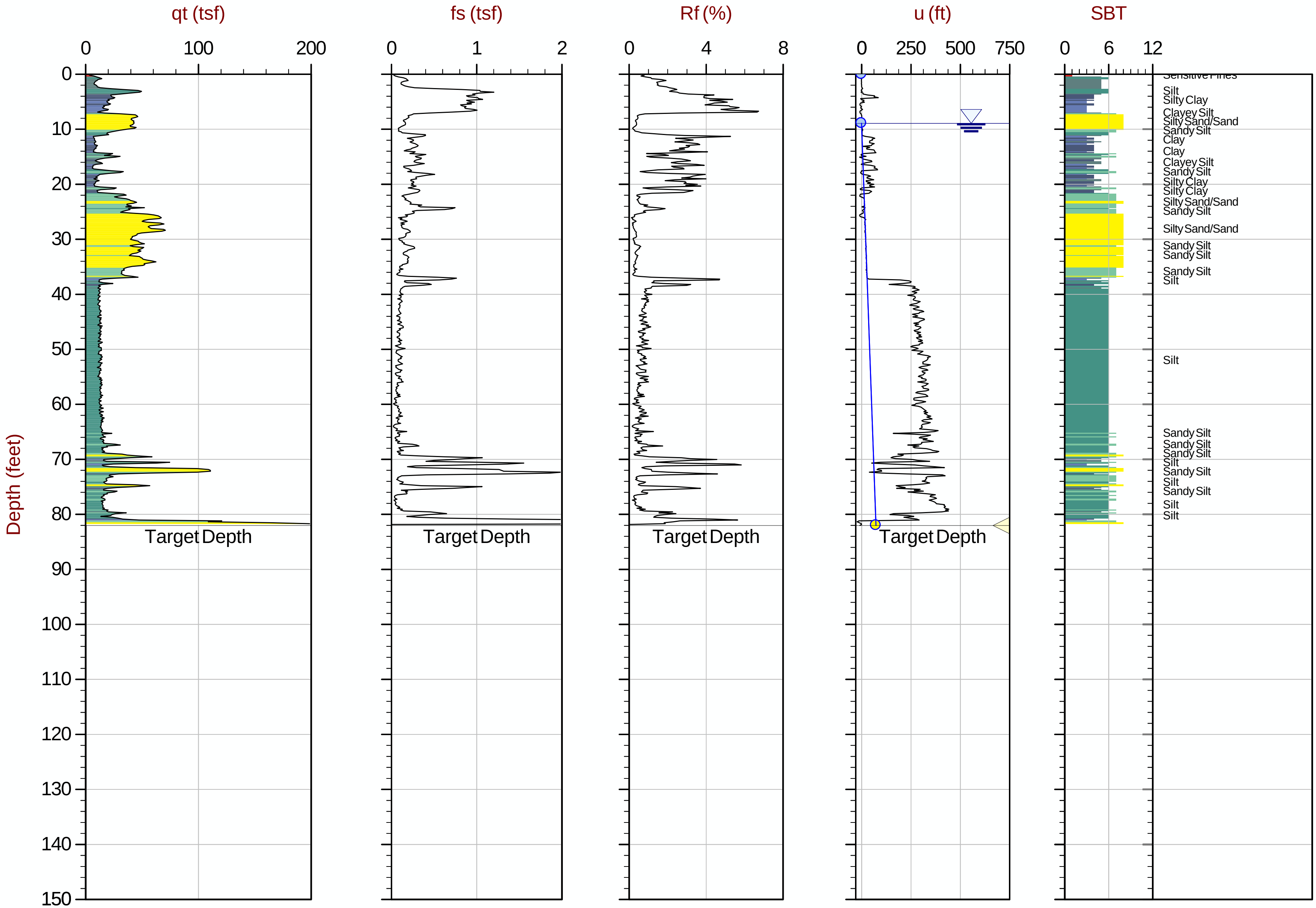
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-13 10:49
Site: Port of Albany, Albany, NY
Sounding: SCPT17-06
Cone: 226:T1500F15U500



Max Depth: 25.000 m / 82.02 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP06.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717627m E: 601297m

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.

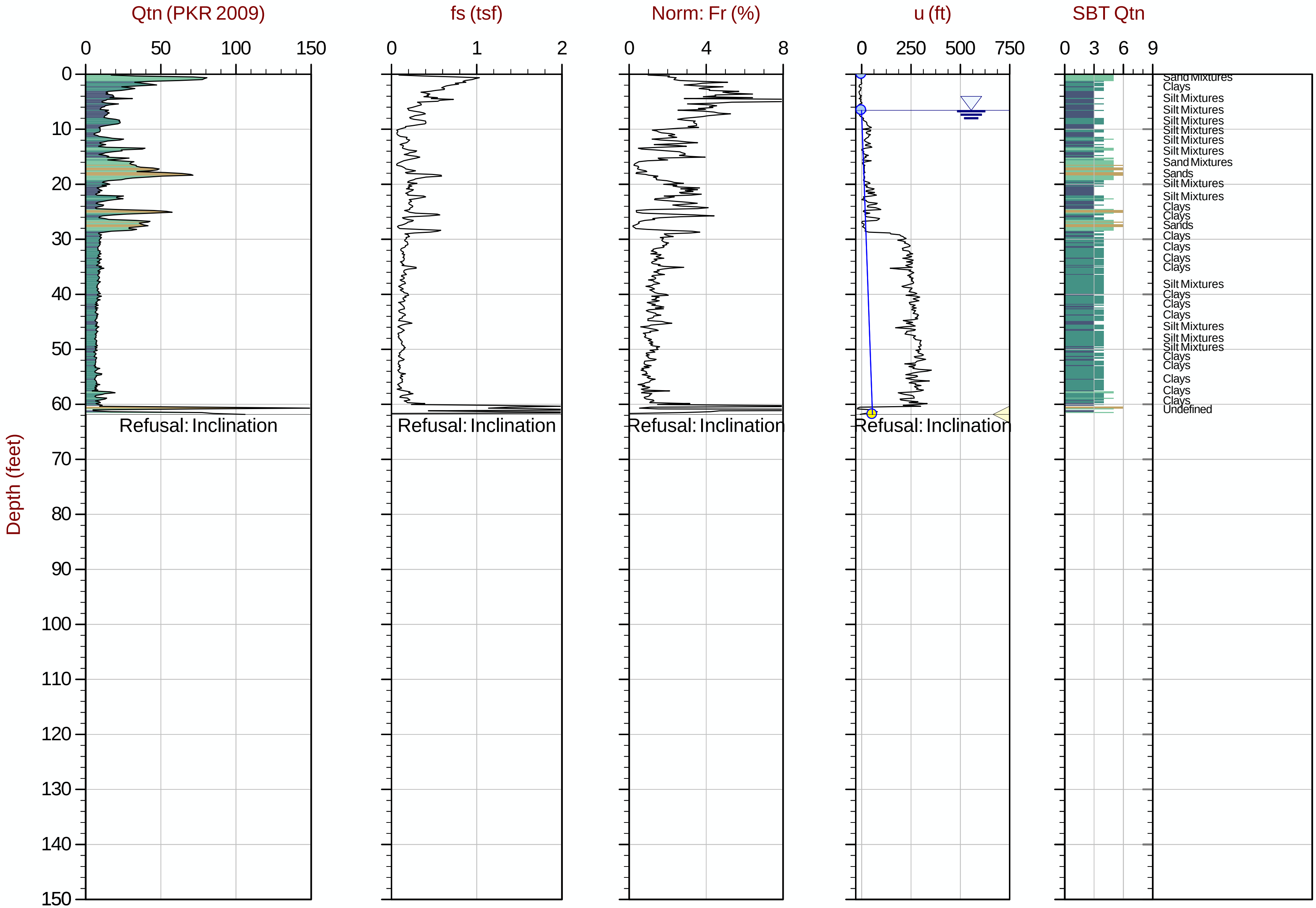
Normalized Cone Penetration Test Plots

CONETEC

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 11:11
Site: Port of Albany, Albany, NY

Sounding: SCPT17-01
Cone: 469:T1500F15U500



Max Depth: 18.850 m / 61.84 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP01.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4717928m E: 601113m

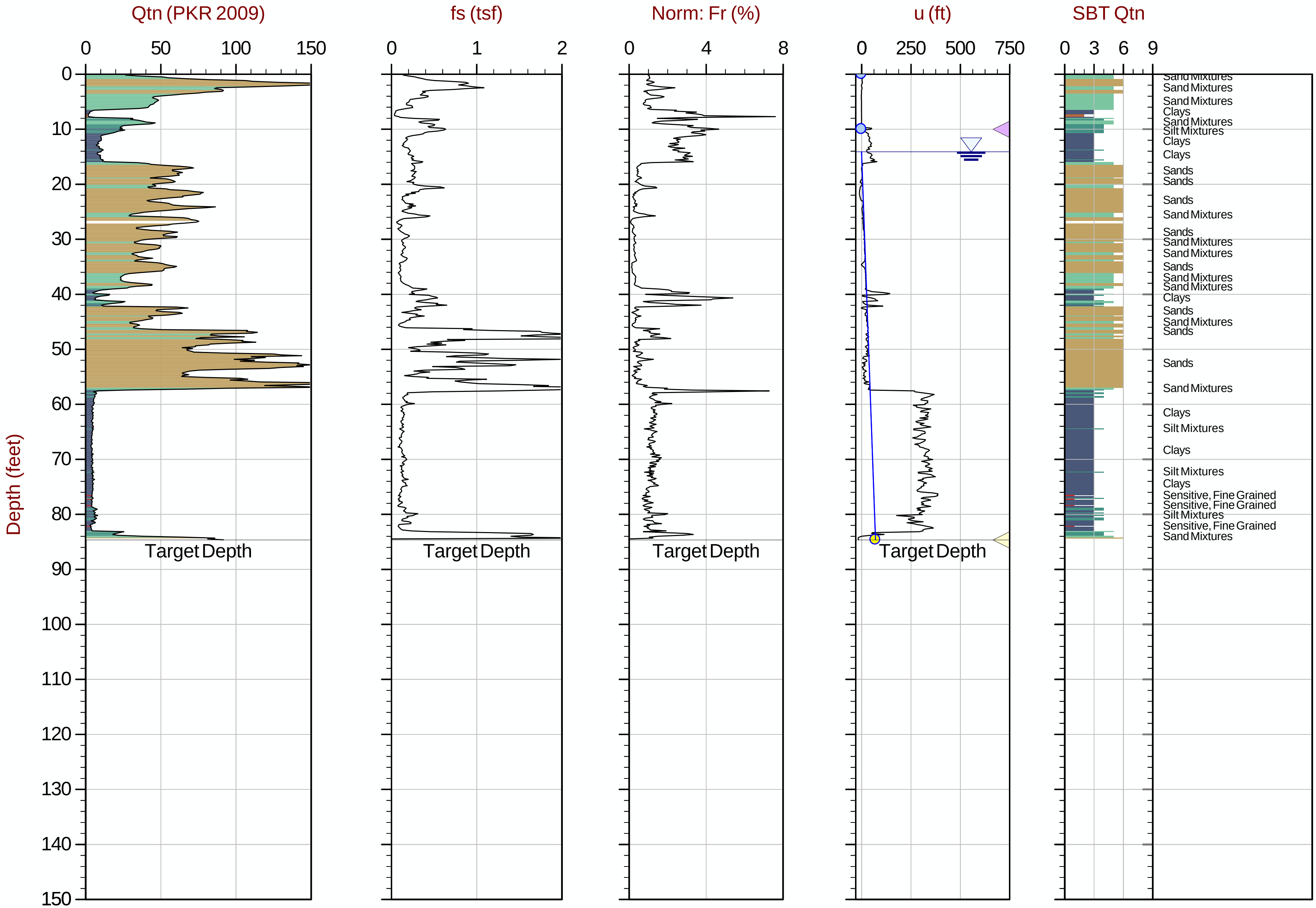
Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 13:48
Site: Port of Albany, Albany, NY

Sounding: SCPT17-02
Cone: 226:T1500F15U500



Max Depth: 25.800 m / 84.64 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP02.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4717882m E: 601401m

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

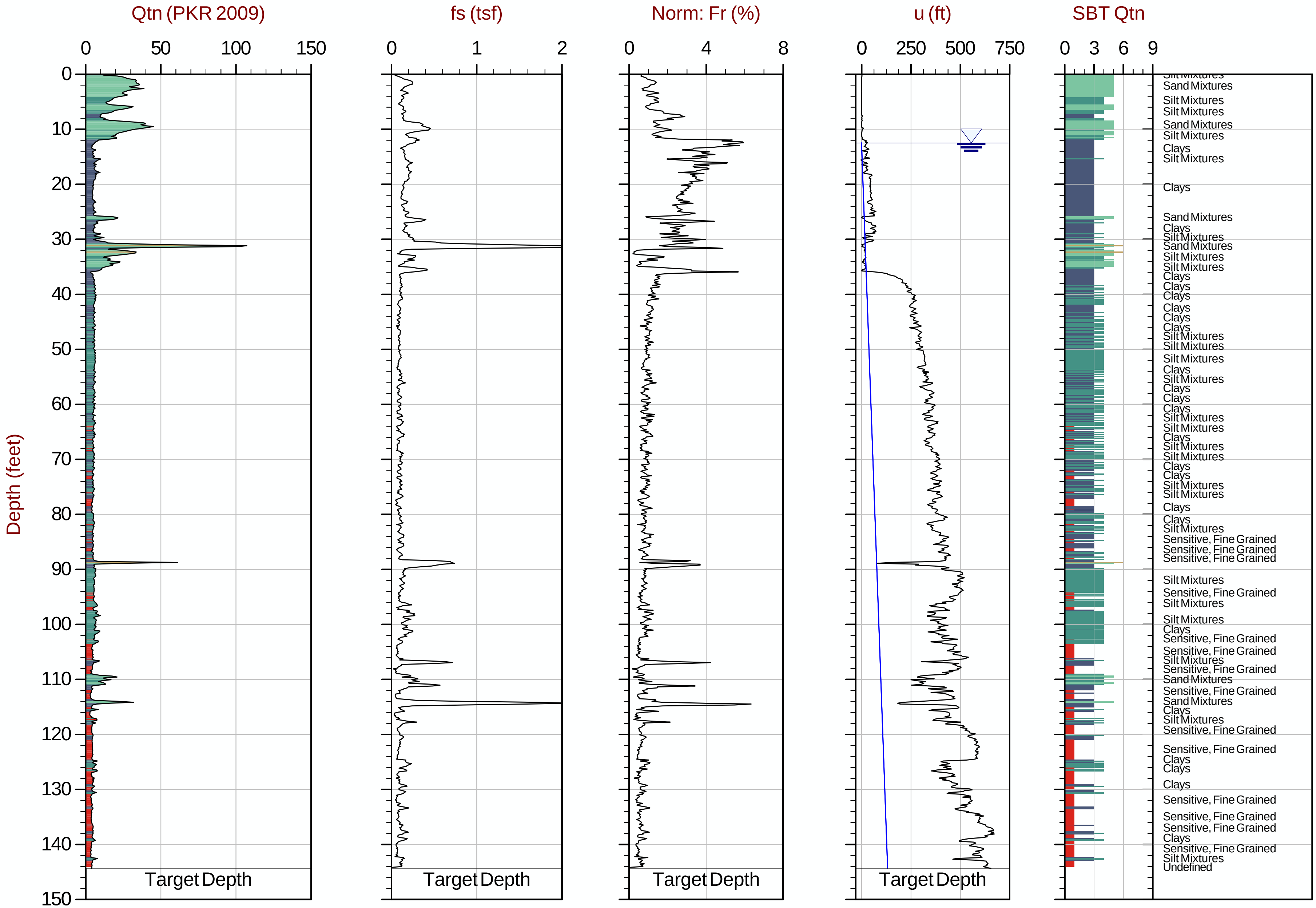
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 16:35
Site: Port of Albany, Albany, NY

Sounding: CPT17-03D
Cone: 226:T1500F15U500



Max Depth: 44.000 m / 144.36 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_CP03D.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4717124m E: 601444m

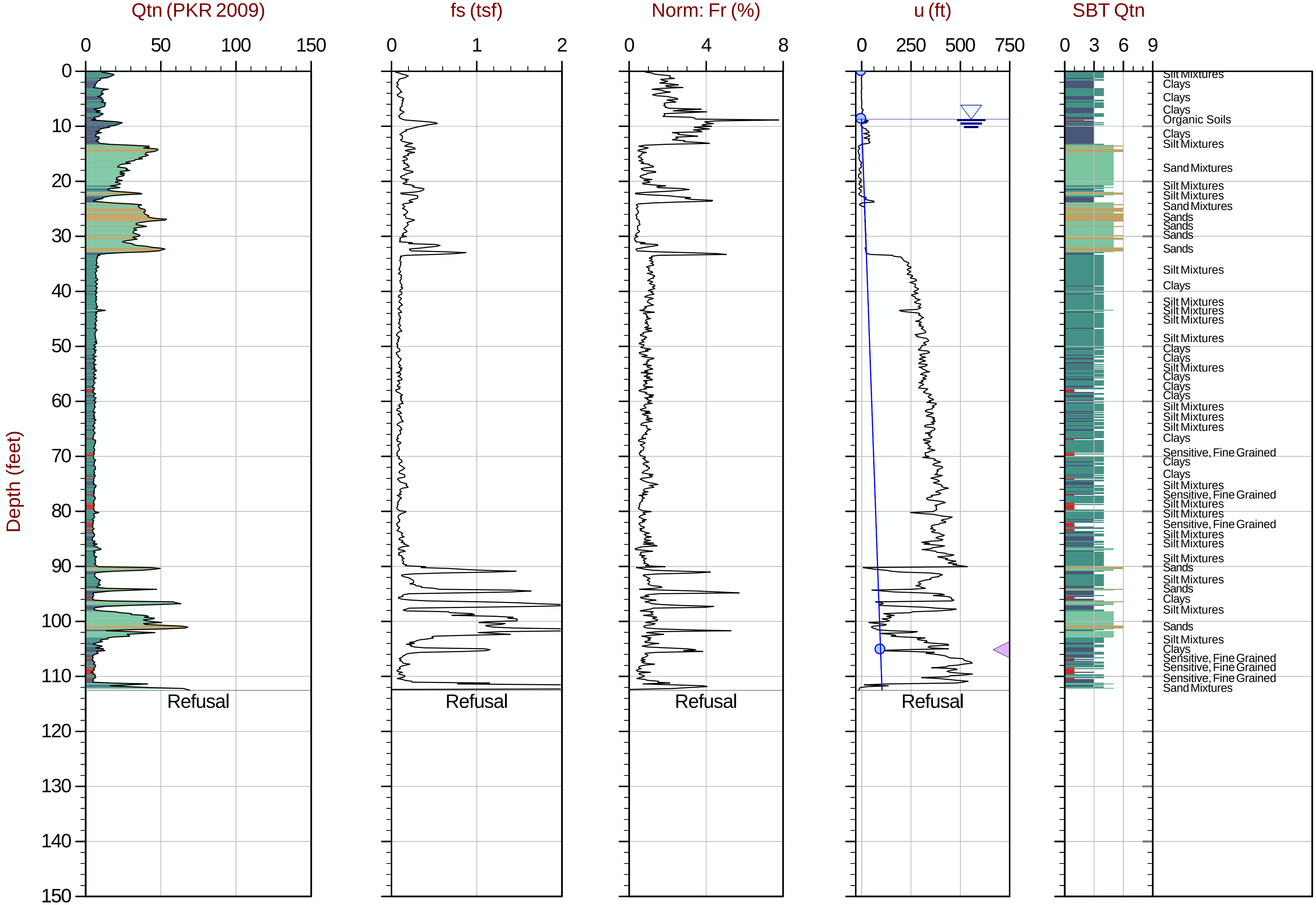
Hydrostatic Line   Ueq   Assumed Ueq   PPD, Ueq achieved   PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-13 08:48
Site: Port of Albany, Albany, NY
Sounding: SCPT17-05
Cone: 226:T1500F15U500



Max Depth: 34.300 m / 112.53 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP05.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4717333m E: 601264m

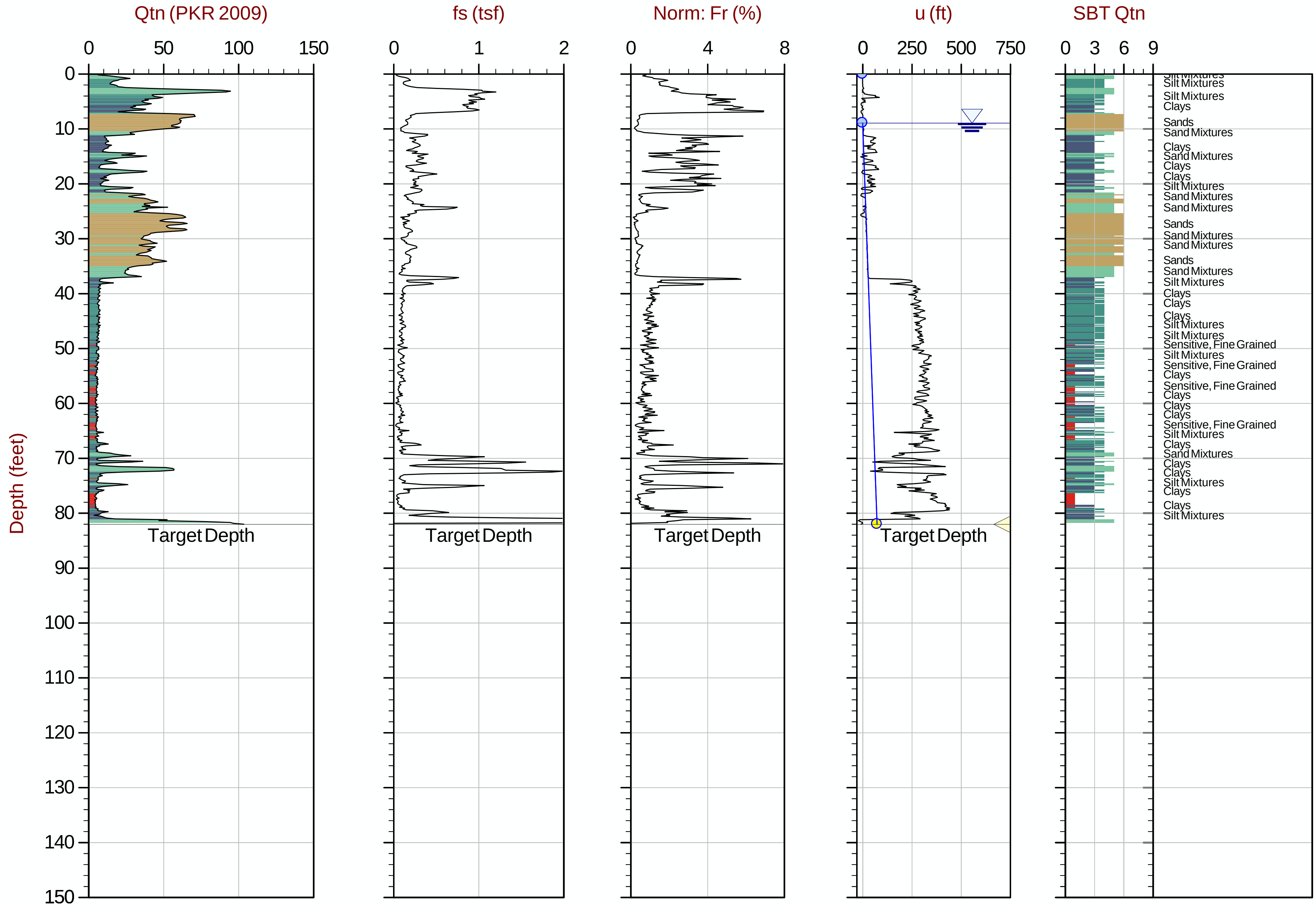
Hydrostatic Line · Ueq · Assumed Ueq · PPD, Ueq achieved · PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-13 10:49
Site: Port of Albany, Albany, NY
Sounding: SCPT17-06
Cone: 226:T1500F15U500



Max Depth: 25.000 m / 82.02 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP06.COR

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4717627m E: 601297m

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

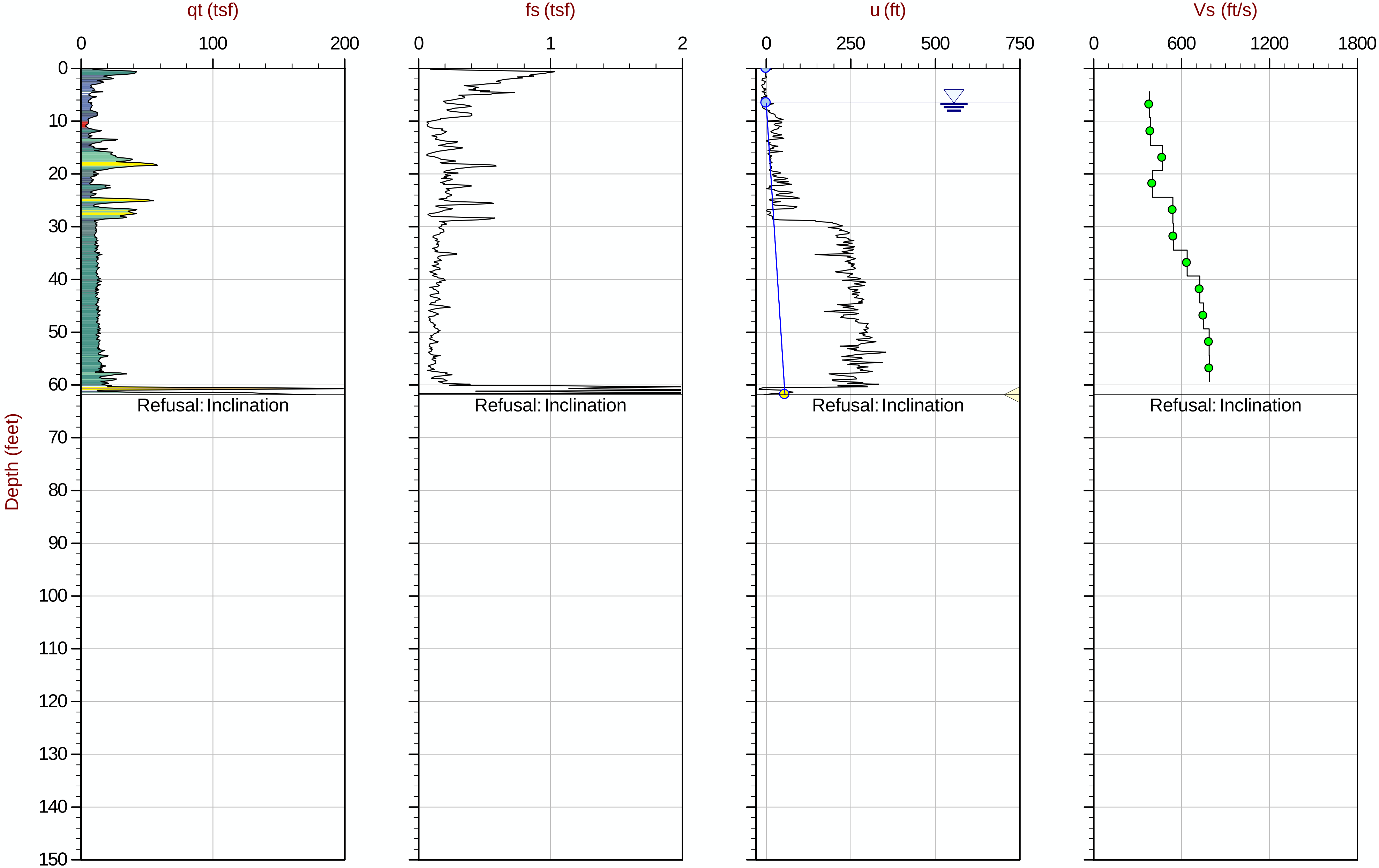
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Plots

ConeTec

CONETEC | *Dente Engineering*

Job No: 17-53073
Date: 2017-06-12 11:11
Site: Port of Albany, Albany, NY
Sounding: SCPT17-01
Cone: 469:T1500F15U500



Max Depth: 18.850 m / 61.84 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP01.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717928m E: 601113m

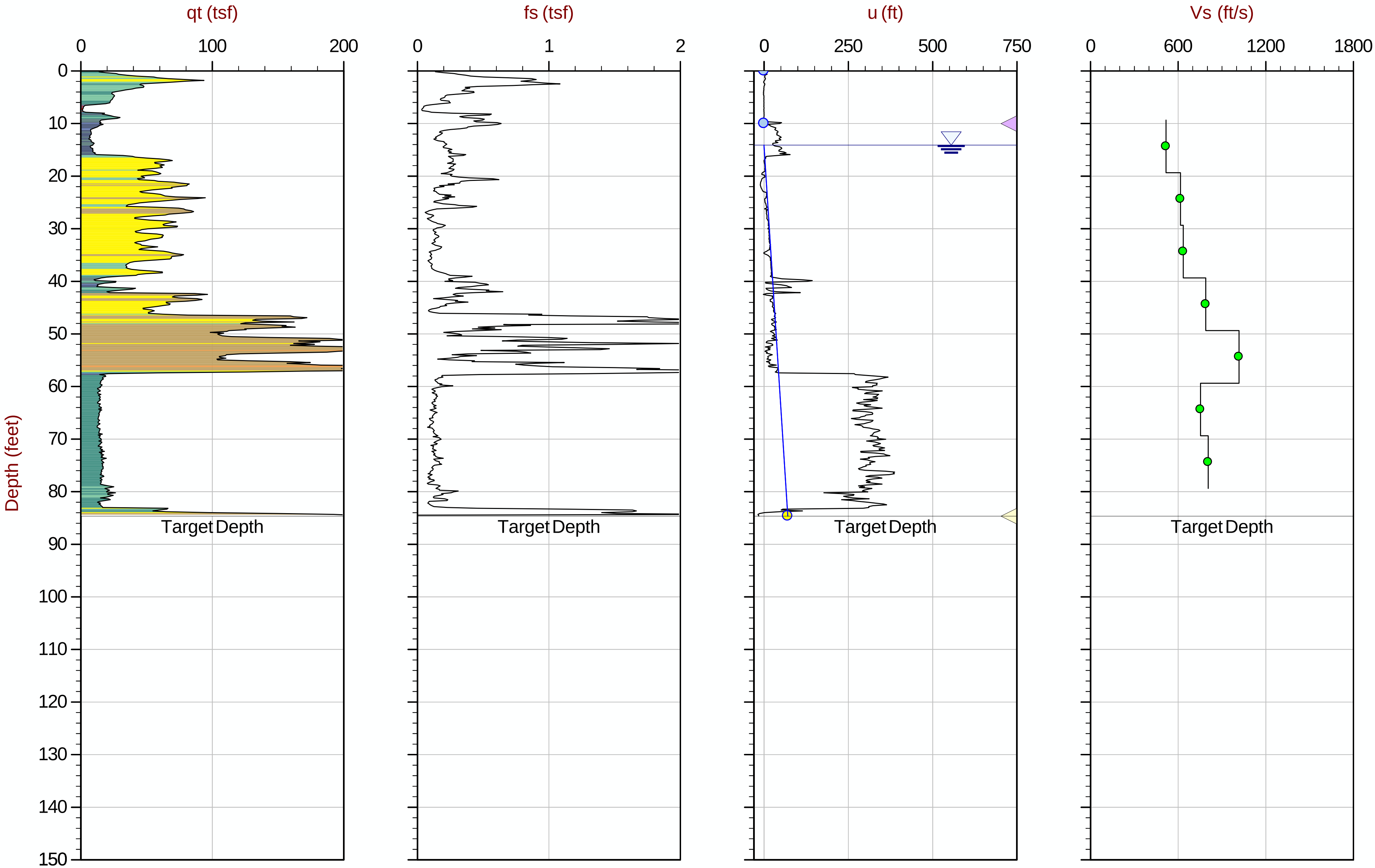
Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-12 13:48
Site: Port of Albany, Albany, NY
Sounding: SCPT17-02
Cone: 226:T1500F15U500



Max Depth: 25.800 m / 84.64 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP02.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717882m E: 601401m

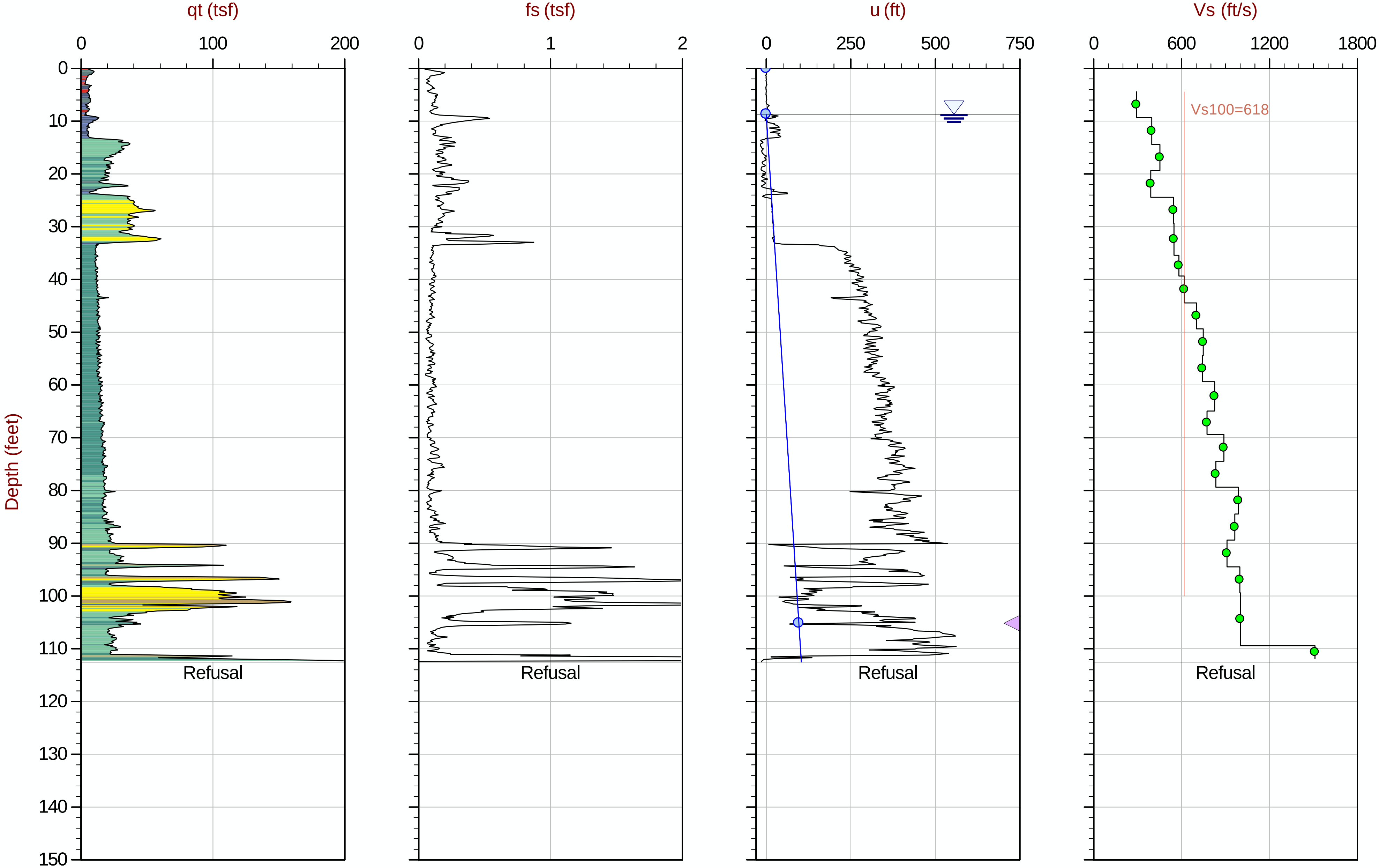
Hydrostatic Line — Ueq — Assumed Ueq — PPD, Ueq achieved — PPD, Ueq not achieved

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

Dente Engineering

Job No: 17-53073
Date: 2017-06-13 08:48
Site: Port of Albany, Albany, NY
Sounding: SCPT17-05
Cone: 226:T1500F15U500



Max Depth: 34.300 m / 112.53 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP05.COR

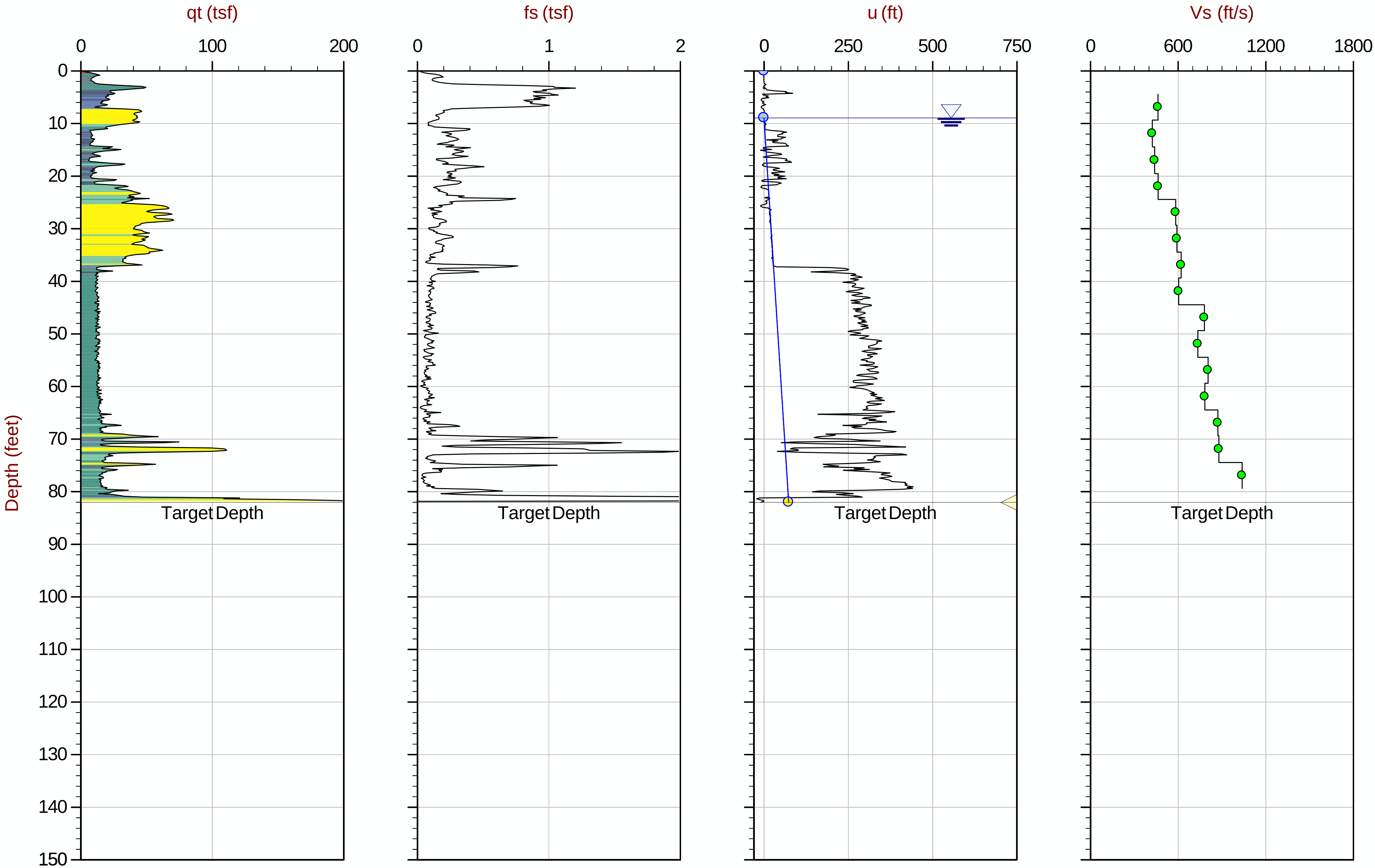
SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717333m E: 601264m

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.

Job No: 17-53073
Date: 2017-06-13 10:49
Site: Port of Albany, Albany, NY
Sounding: SCPT17-06
Cone: 226:T1500F15U500

Dente Engineering



Max Depth: 25.000 m / 82.02 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 17-53073_SP06.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 18 N: 4717627m E: 601297m

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.

Seismic Cone Penetration Test Tabular Results (Vs)

Job No: 17-53073
Client: Dente Engineering
Project: Port of Albany, Albany, NY
Sounding ID: SCPT17-01
Date: 12-May-2017

Seismic Source: Beam
Source Offset (ft): 1.00
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.08	4.43	4.54			
10.01	9.35	9.40	4.86	12.78	381
15.26	14.60	14.63	5.23	13.47	388
20.01	19.36	19.38	4.75	10.13	469
25.10	24.44	24.46	5.08	12.67	401
30.02	29.36	29.38	4.92	9.10	541
35.10	34.45	34.46	5.08	9.33	545
40.03	39.37	39.38	4.92	7.71	638
45.11	44.46	44.47	5.08	7.02	724
50.03	49.38	49.39	4.92	6.56	750
55.12	54.46	54.47	5.08	6.45	788
60.04	59.38	59.39	4.92	6.22	791

Job No: 17-53073
Client: Dente Engineering
Project: Port of Albany, Albany, NY
Sounding ID: SCPT17-02
Date: 12-May-2017

Seismic Source: Beam
Source Offset (ft): 1.00
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
10.01	9.35	9.40			
20.01	19.36	19.38	9.98	19.31	517
30.02	29.36	29.38	10.00	16.23	616
40.03	39.37	39.38	10.00	15.76	635
50.03	49.38	49.39	10.00	12.68	789
60.04	59.38	59.39	10.00	9.83	1017
70.05	69.39	69.40	10.01	13.28	753
80.05	79.40	79.40	10.01	12.42	806

Job No: 17-53073
Client: Dente Engineering
Project: Port of Albany, Albany, NY
Sounding ID: SCPT17-05
Date: 13-May-2017

Seismic Source: Beam
Source Offset (ft): 1.00
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.08	4.43	4.54			
10.01	9.35	9.40	4.86	16.64	292
15.09	14.44	14.47	5.07	12.75	397
20.01	19.36	19.38	4.91	10.87	452
25.10	24.44	24.46	5.08	13.02	390
30.02	29.36	29.38	4.92	9.02	545
36.09	35.43	35.45	6.07	11.07	548
40.03	39.37	39.38	3.94	6.76	582
45.11	44.46	44.47	5.08	8.22	619
50.03	49.38	49.39	4.92	7.01	702
55.12	54.46	54.47	5.08	6.80	748
60.04	59.38	59.39	4.92	6.62	743
65.62	64.96	64.97	5.58	6.75	826
70.05	69.39	69.40	4.43	5.72	774
75.13	74.47	74.48	5.08	5.72	889
80.05	79.40	79.40	4.92	5.90	834
85.14	84.48	84.49	5.09	5.15	988
90.06	89.40	89.41	4.92	5.10	964
95.14	94.49	94.49	5.09	5.59	910
100.07	99.41	99.41	4.92	4.93	998
110.07	109.42	109.42	10.01	9.99	1002
112.53	111.88	111.88	2.46	1.63	1511

CONETEC

Job No: 17-53073
Client: Dente Engineering
Project: Port of Albany, Albany, NY
Sounding ID: SCPT17-06
Date: 13-May-2017

Seismic Source: Beam
Source Offset (ft): 1.00
Source Depth (ft): 0.00
Geophone Offset (ft): 0.66

SCPTu SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (ft)	Geophone Depth (ft)	Ray Path (ft)	Ray Path Difference (ft)	Travel Time Interval (ms)	Interval Velocity (ft/s)
5.08	4.43	4.54			
10.01	9.35	9.40	4.86	10.52	462
15.09	14.44	14.47	5.07	11.99	423
20.18	19.52	19.55	5.08	11.57	439
25.10	24.44	24.46	4.92	10.62	463
30.02	29.36	29.38	4.92	8.44	583
35.10	34.45	34.46	5.08	8.58	592
40.03	39.37	39.38	4.92	7.92	621
45.11	44.46	44.47	5.08	8.42	604
50.03	49.38	49.39	4.92	6.30	780
55.12	54.46	54.47	5.08	6.92	735
60.04	59.38	59.39	4.92	6.11	805
65.12	64.47	64.48	5.08	6.49	783
70.05	69.39	69.40	4.92	5.64	872
75.13	74.47	74.48	5.08	5.78	879
80.05	79.40	79.40	4.92	4.74	1038

Pore Pressure Dissipation Summary and

Pore Pressure Dissipation Plots

	Job No:	17-53073
	Client:	Dente Engineering
	Project:	Port of Albany, Albany, NY
	Start Date:	12-Jun-2017
	End Date:	13-Jun-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)
SCPT17-01	17-53073_SP01.PPD	15	300	61.84	55.27	6.57				
SCPT17-02	17-53073_SP02.PPD	15	500	10.01	0.00		10.01	65	100	10.78
SCPT17-02	17-53073_SP02.PPD	15	400	84.64	70.54	14.10				
SCPT17-05	17-53073_SP05.PPD	15	165	105.15	96.45		8.70	16	100	42.86
SCPT17-06	17-53073_SP06.PPD	15	600	82.02	73.09	8.93				
Totals	5 dissipations		32.8 min							

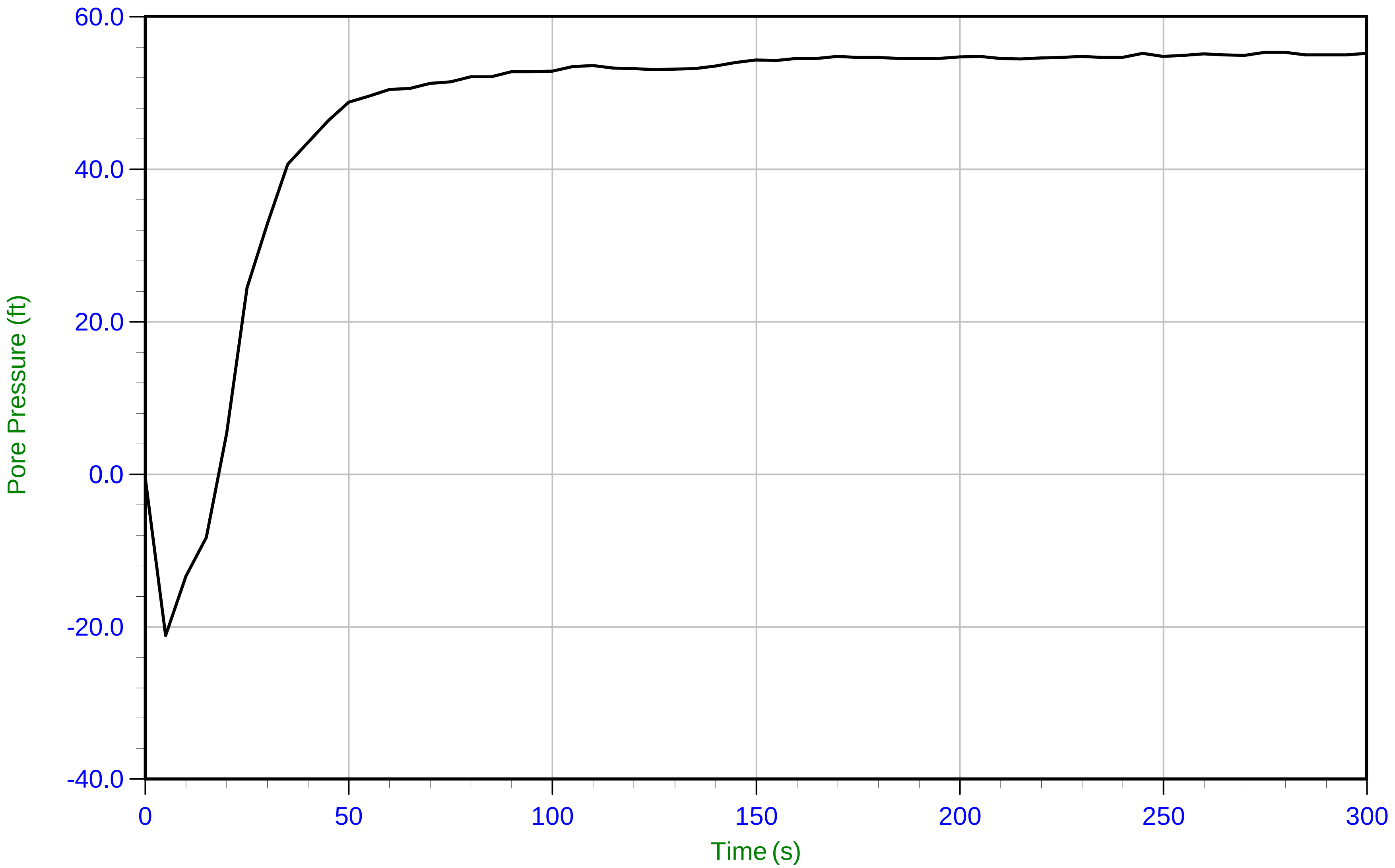
a. Time is relative to where umax occurred

b. Houlsby and Teh, 1991

Dente Engineering

Job No: 17-53073
Date: 06/12/2017 11:11
Site: Port of Albany, Albany, NY

Sounding: SCPT17-01
Cone: 469:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 17-53073_SP01.PPD
Depth: 18.850 m / 61.843 ft
Duration: 300.0 s

U Min: -21.2 ft
U Max: 55.3 ft

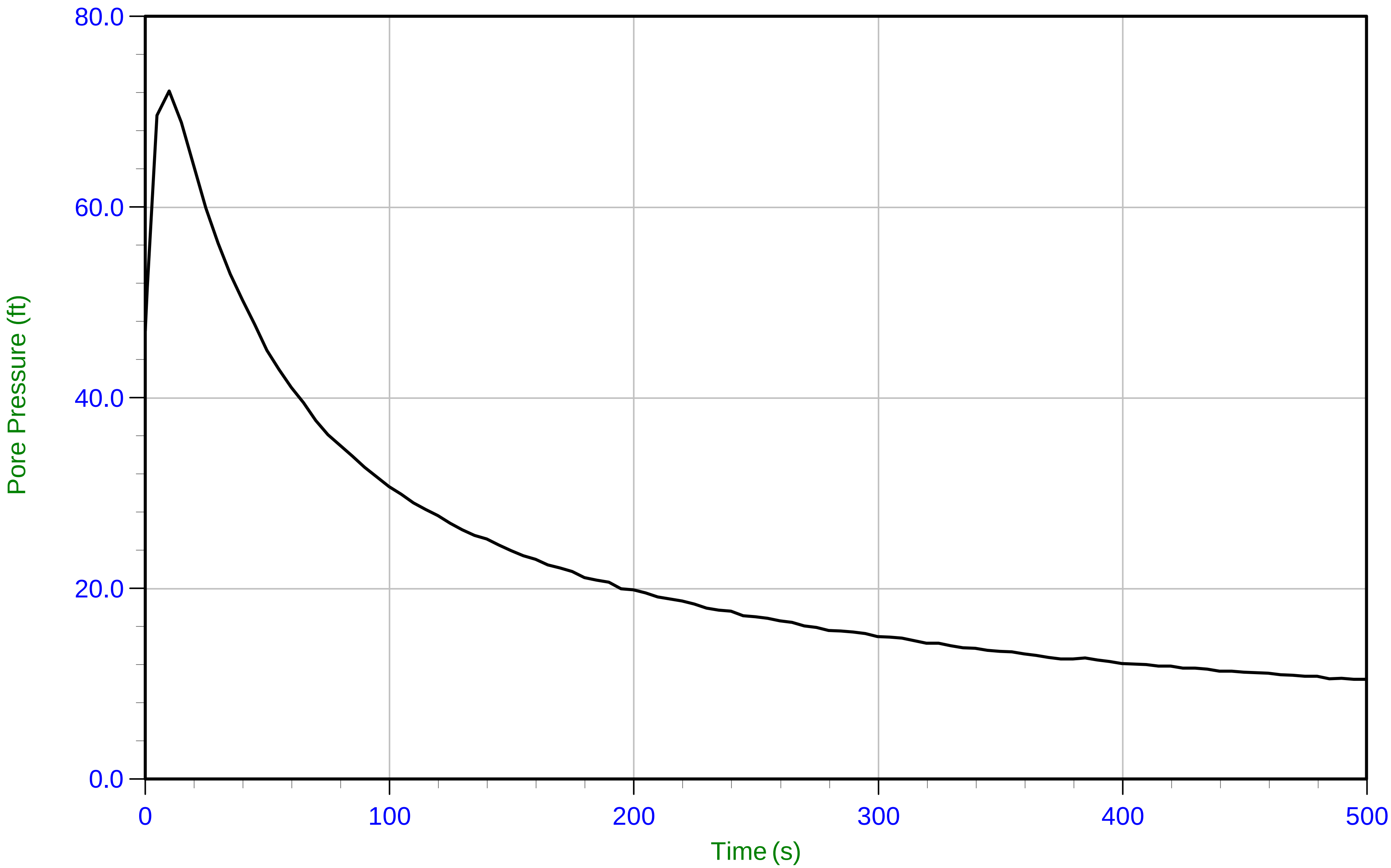
WT: 2.003 m / 6.571 ft
Ueq: 55.3 ft

CONETEC

Dente Engineering

Job No: 17-53073
Date: 06/12/2017 13:48
Site: Port of Albany, Albany, NY

Sounding: SCPT17-02
Cone: 226:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 17-53073_SP02.PPD
Depth: 3.050 m / 10.006 ft
Duration: 500.0 s

U Min: 10.5 ft
U Max: 72.2 ft

WT: 3.050 m / 10.006 ft
Ueq: 0.0 ft
U(50): 36.10 ft

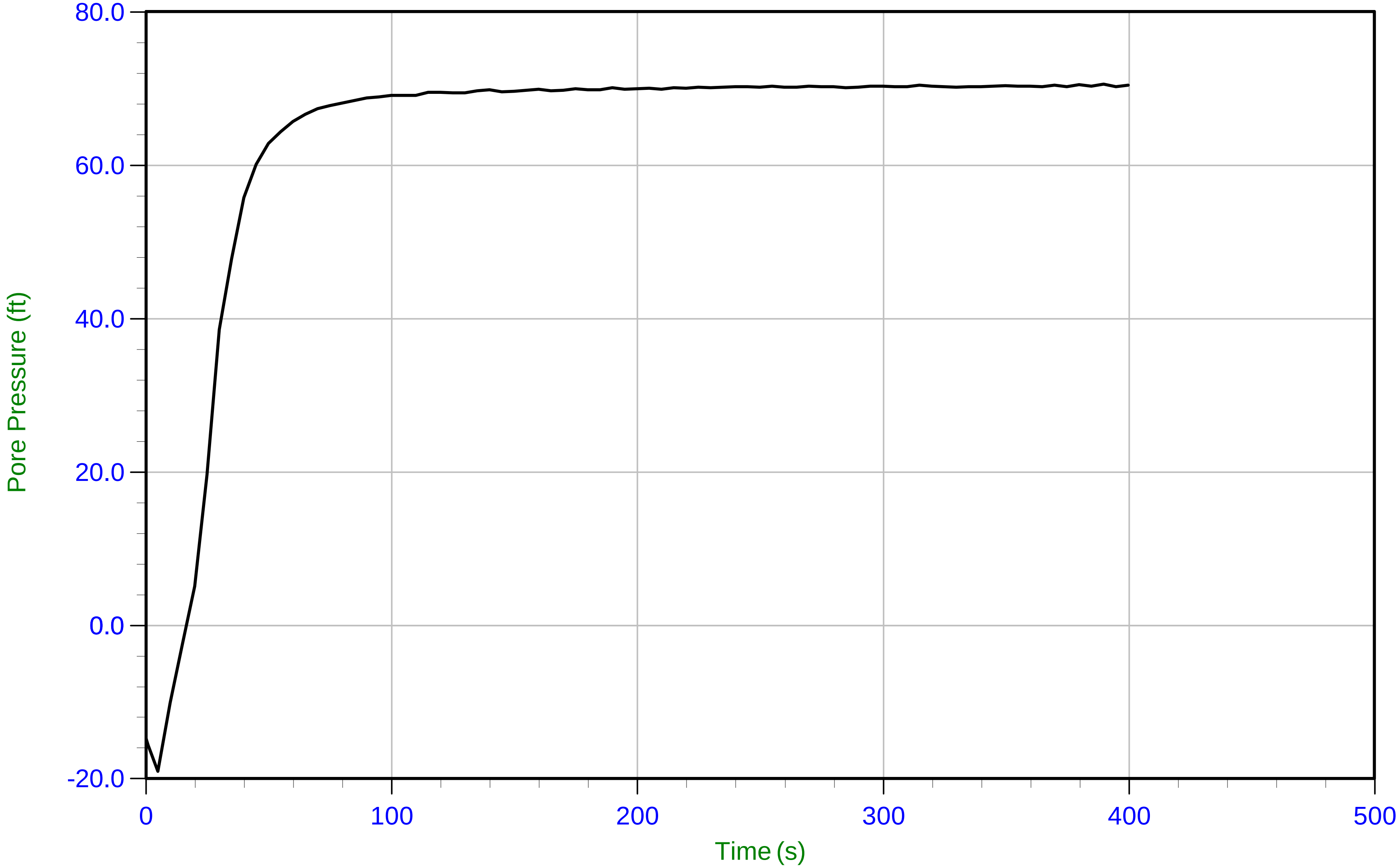
T(50): 65.1 s
Ir: 100
Ch: 10.8 sq cm/min

CONETEC

Dente Engineering

Job No: 17-53073
Date: 06/12/2017 13:48
Site: Port of Albany, Albany, NY

Sounding: SCPT17-02
Cone: 226:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 17-53073_SP02.PPD
Depth: 25.800 m / 84.645 ft
Duration: 400.0 s

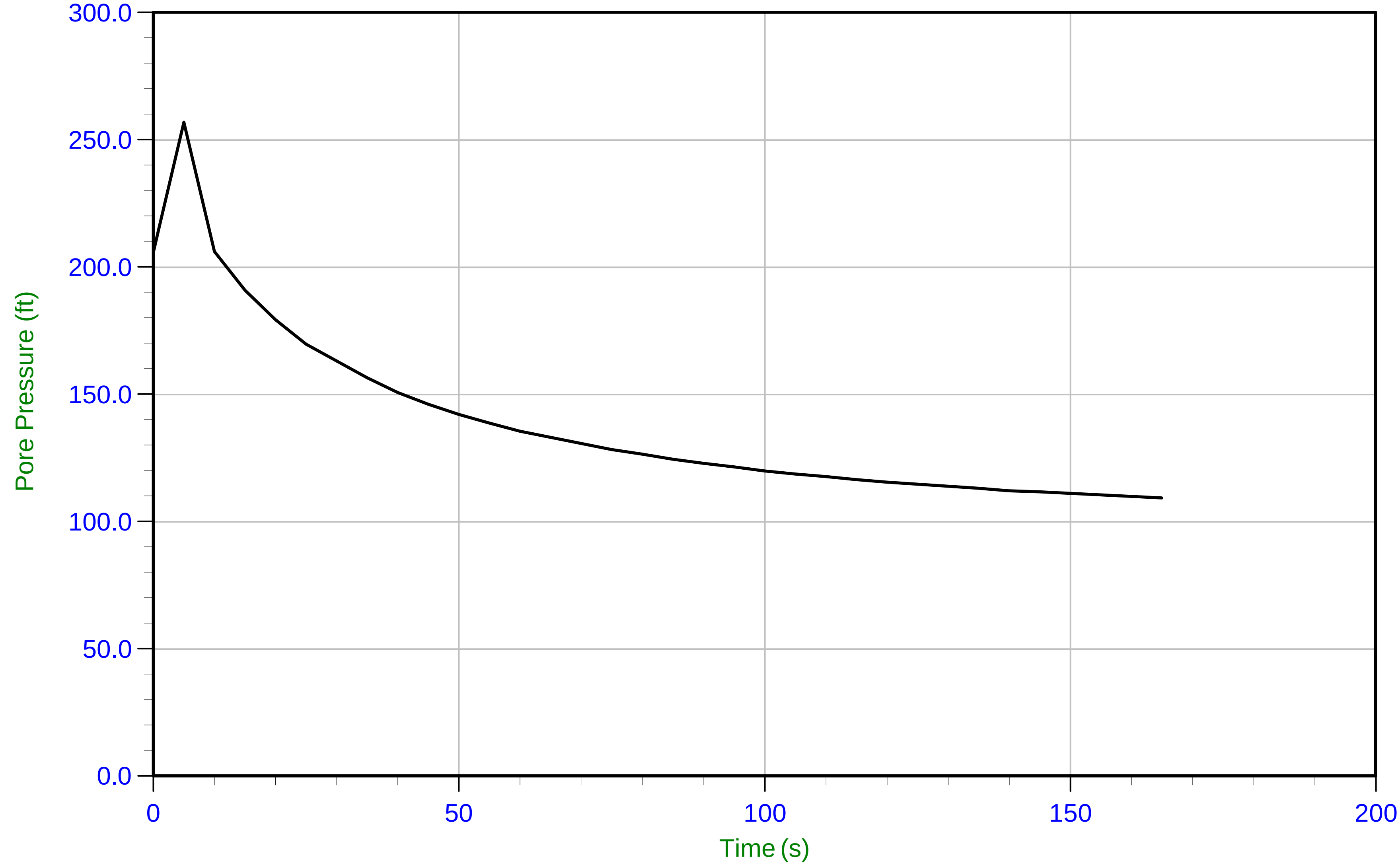
U Min: -19.0 ft
U Max: 70.6 ft

WT: 4.298 m / 14.100 ft
Ueq: 70.5 ft

Dente Engineering

Job No: 17-53073
Date: 06/13/2017 08:48
Site: Port of Albany, Albany, NY

Sounding: SCPT17-05
Cone: 226:T1500F15U500 Area=15 cm²



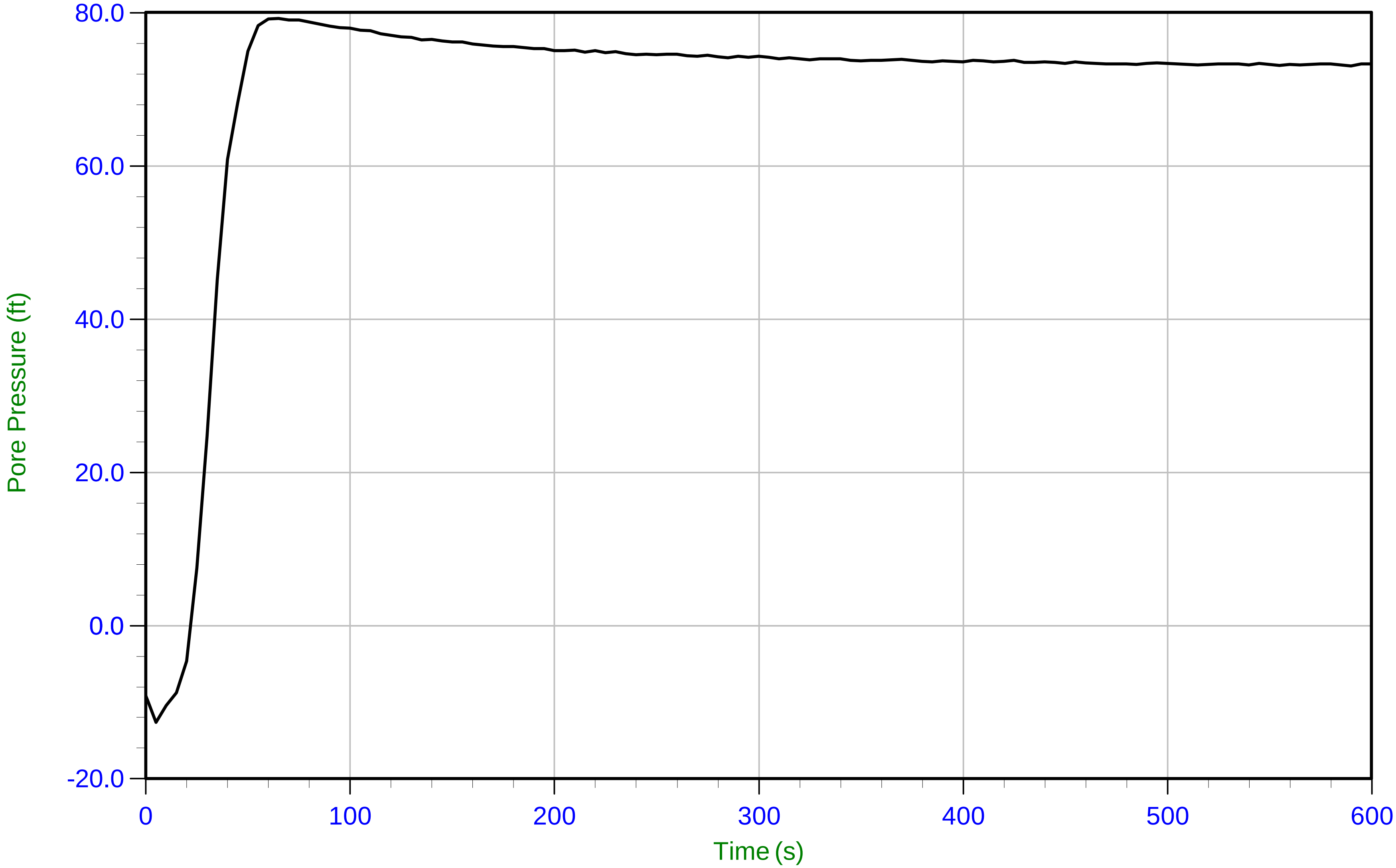
Trace Summary:

Filename: 17-53073_SP05.PPD	U Min: 109.3 ft	WT: 2.652 m / 8.700 ft	T(50): 16.4 s
Depth: 32.050 m / 105.150 ft	U Max: 257.0 ft	Ueq: 96.5 ft	Ir: 100
Duration: 165.0 s		U(50): 176.70 ft	Ch: 42.9 sq cm/min

Dente Engineering

Job No: 17-53073
Date: 06/13/2017 10:49
Site: Port of Albany, Albany, NY

Sounding: SCPT17-06
Cone: 226:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 17-53073_SP06.PPD
Depth: 25.000 m / 82.020 ft
Duration: 600.0 s

U Min: -12.7 ft
U Max: 79.2 ft

WT: 2.722 m / 8.930 ft
Ueq: 73.1 ft

APPENDIX F
GEOTESTING EXPRESS
LABORATORY TEST REPORT

Beacon Island Parcel
Town of Bethlehem, NY

Client:	Dente Engineering				
Project:	Beacon Island Parcel				
Location:	Bethlehem, NY			Project No:	GTX-306651
Boring ID:	---	Sample Type:	---	Tested By:	md
Sample ID:	---	Test Date:	07/06/17	Checked By:	emm
Depth :	---	Test Id:	415613		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
SB-01	Tube	38-40 ft	Moist, dark gray clay	31.6
SB-01	Tube	58-60 ft	Moist, dark gray clay	25.6

Notes: Temperature of Drying : 110º Celsius

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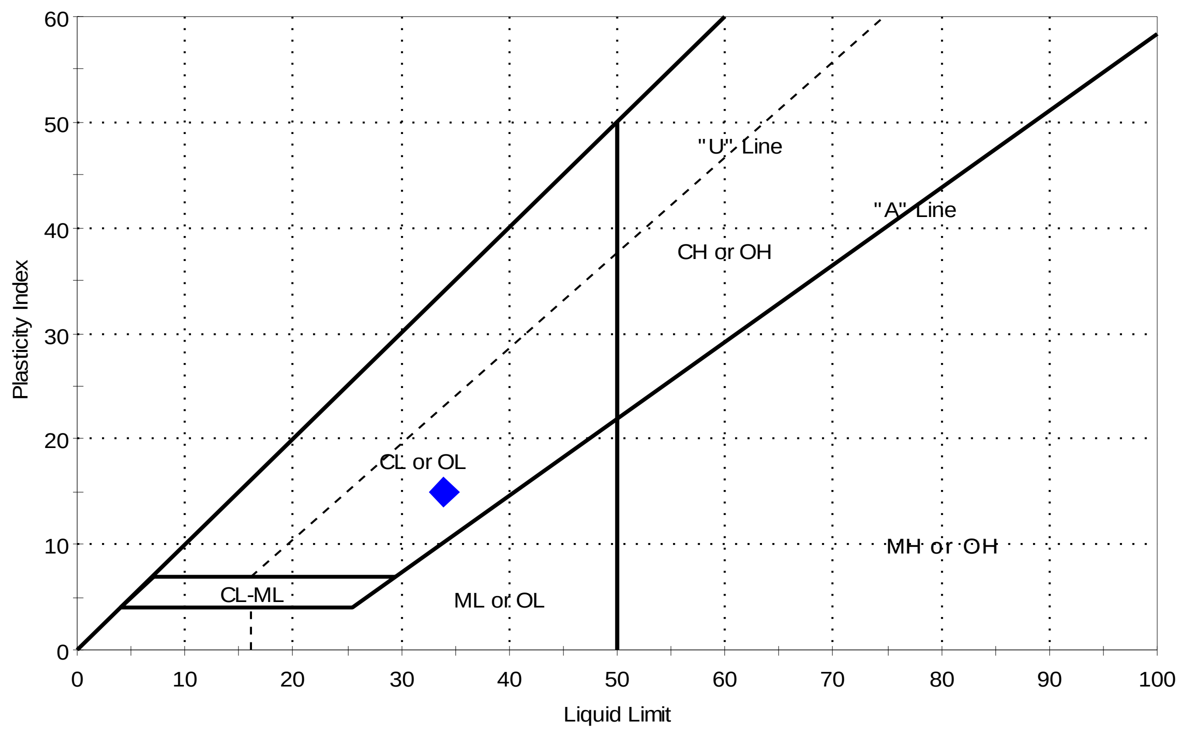
Client:	Dente Engineering		
Project:	Beacon Island Parcel		
Location:	Bethlehem, NY	Project No:	GTX-306651
Boring ID: SB-01	Sample Type: tube	Tested By:	cam
Sample ID: Tube	Test Date: 07/05/17	Checked By:	emm
Depth : 38-40 ft	Test Id: 415610		
Test Comment:	---		
Visual Description:	Moist, dark gray clay		
Sample Comment:	---		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	Tube	SB-01	38-40 ft	32	34	19	15	0.8	

Sample Prepared using the WET method

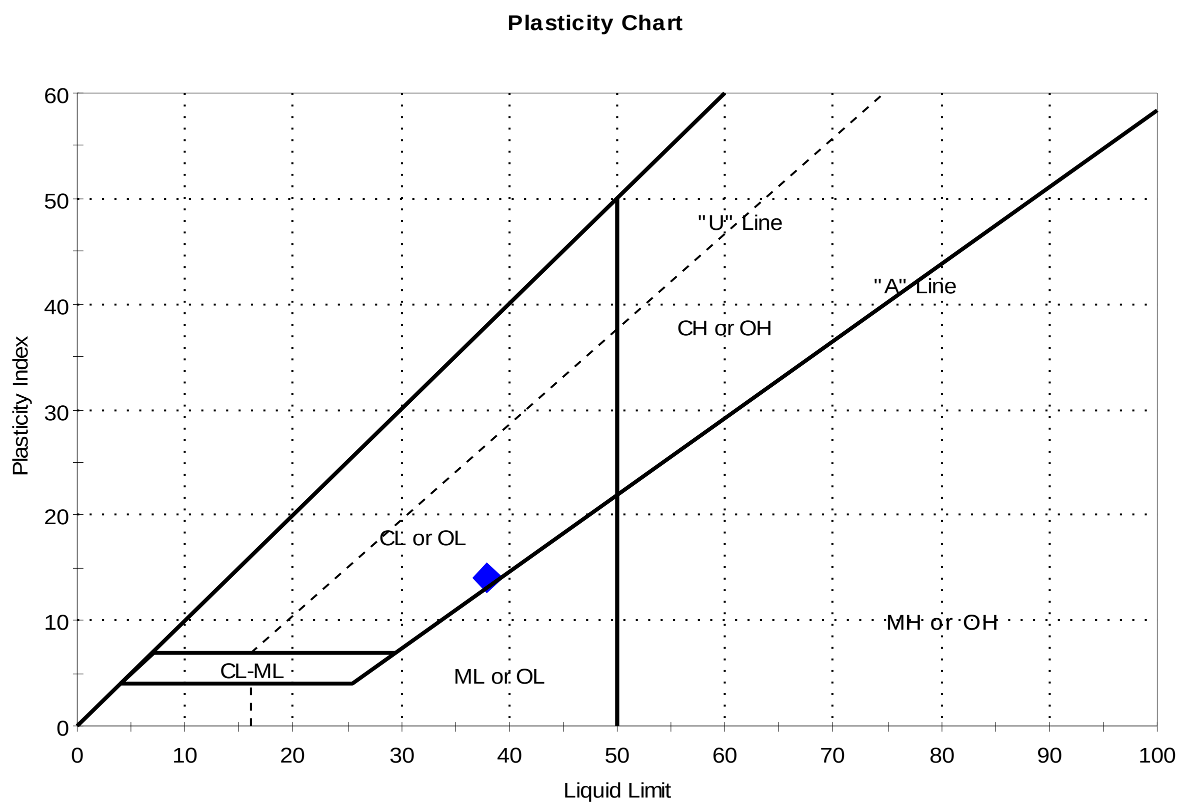
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Dente Engineering				
Project:	Beacon Island Parcel				
Location:	Bethlehem, NY			Project No:	GTX-306651
Boring ID:	SB-01	Sample Type:	tube	Tested By:	cam
Sample ID:	Tube	Test Date:	07/06/17	Checked By:	emm
Depth :	58-60 ft	Test Id:	415611		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	Tube	SB-01	58-60 ft	26	38	24	14	0.1	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: LOW

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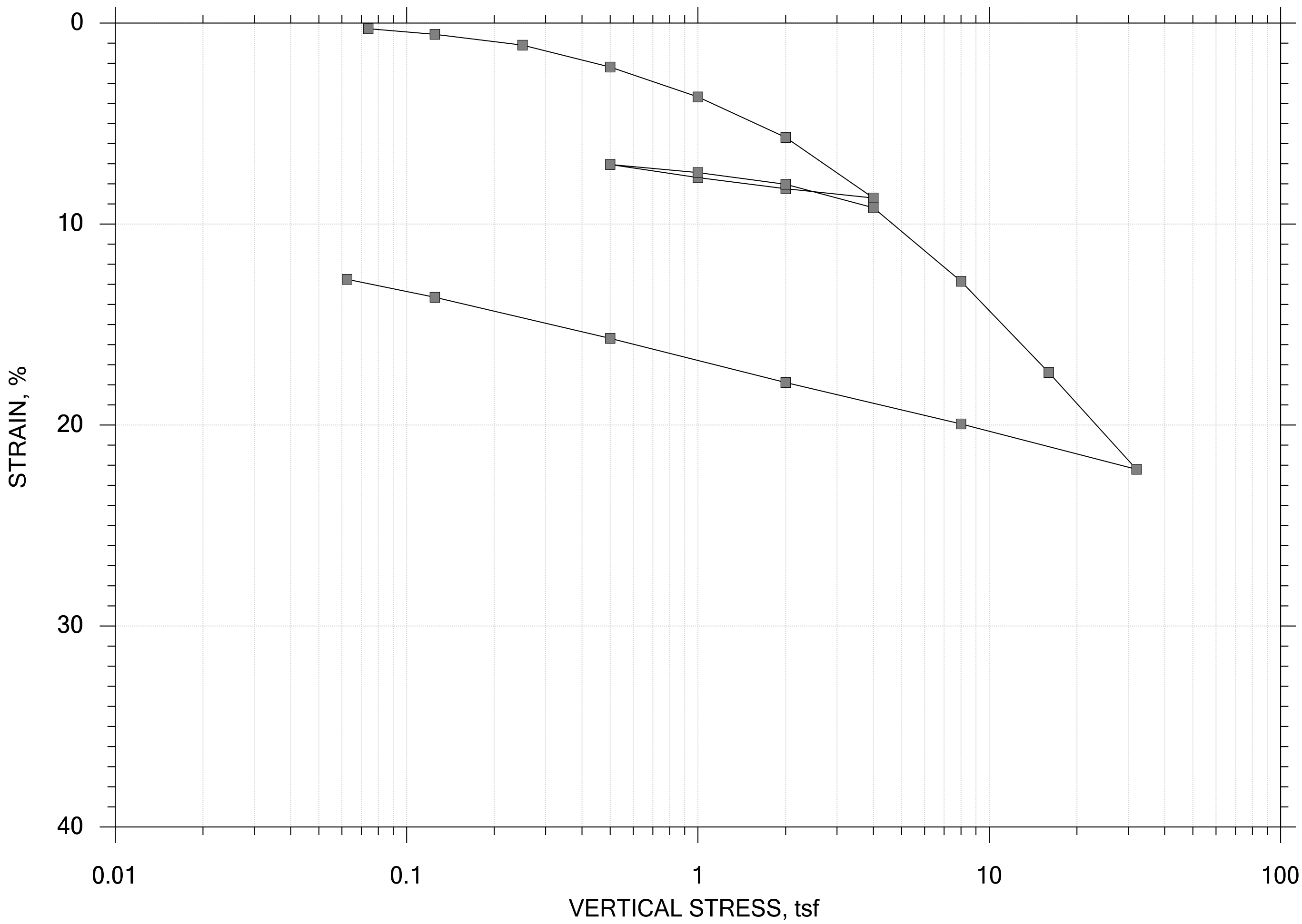
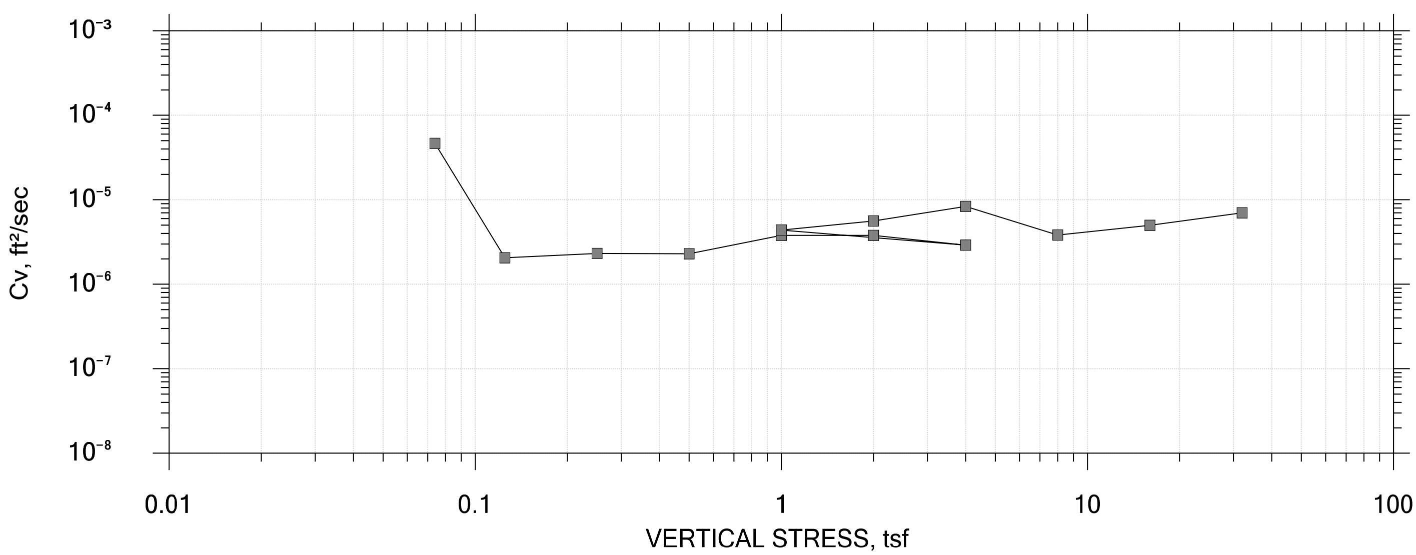
One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

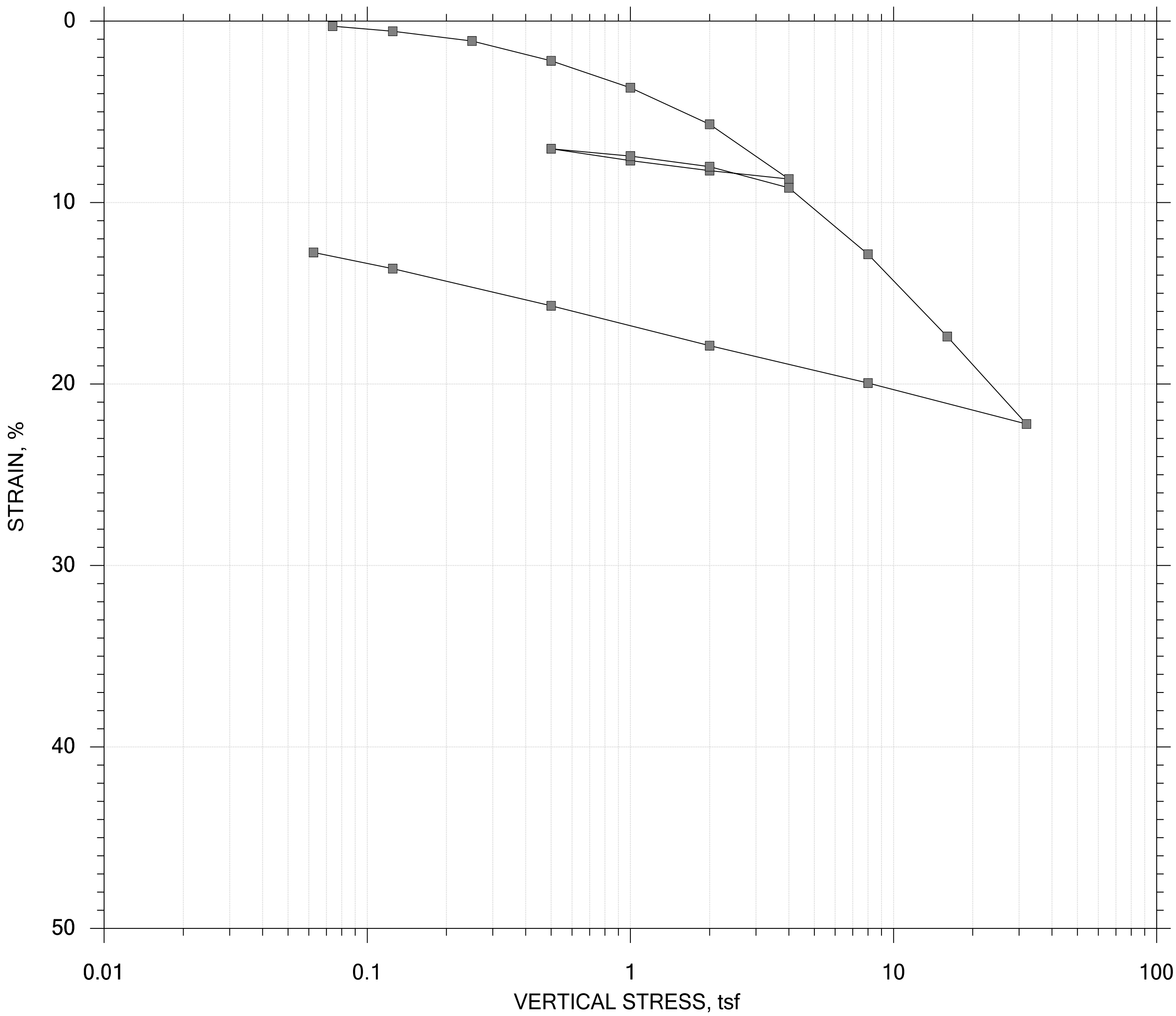




GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	31.10	23.61
Preconsolidation Stress: ---				Dry Unit Weight, pcf	91.991	104.54
Compression Ratio: ---				Saturation, %	97.95	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	0.88	0.65
LL: 34	PL: 19	PI: 15	GS: 2.77			

GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: Beacon Island Parcel
Location: Bethlehem, NY
Project No.: GTX-306651
Boring No.: SB-01
Tested By: md
Checked By: njh
Sample No.: Tube
Test Date: 06/27/17
Depth: 38-40 ft
Test No.: IP-1
Sample Type: intact
Elevation: ---

Soil Description: Moist, dark gray clay
Remarks: System JJ, Swell Pressure = 0.0739 tsf

Estimated Specific Gravity: 2.77
Liquid Limit: 34
Specimen Diameter: 2.50 in
Initial Void Ratio: 0.879
Plastic Limit: 19
Initial Height: 1.00 in
Final Void Ratio: 0.654
Plasticity Index: 15
Final Height: 0.88 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-431	RING		C-2025
Wt. Container + Wet Soil, gm	192.54	264.52	255.64	152.83
Wt. Container + Dry Soil, gm	148.36	227.65	227.65	125.24
Wt. Container, gm	8.3700	109.12	109.12	8.3900
Wt. Dry Soil, gm	139.99	118.53	118.53	116.85
Water Content, %	31.56	31.10	23.61	23.61
Void Ratio	---	0.879	0.654	---
Degree of Saturation, %	---	97.95	100.00	---
Dry Unit Weight, pcf	---	91.991	104.54	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: Beacon Island Parcel
Location: Bethlehem, NY
Project No.: GTX-306651
Boring No.: SB-01
Tested By: md
Checked By: njh
Sample No.: Tube
Test Date: 06/27/17
Depth: 38-40 ft
Test No.: IP-1
Sample Type: intact
Elevation: ---

Soil Description: Moist, dark gray clay
Remarks: System JJ, Swell Pressure = 0.0739 tsf

Displacement at End of Increment

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/tsf	k ft/day
1	0.0739	0.002769	0.874	0.277	143.978	1.70e-007	3.75e-002	1.72e-005
2	0.125	0.005539	0.869	0.554	13.854	1.76e-006	5.42e-002	2.57e-004
3	0.250	0.01093	0.859	1.09	12.000	2.01e-006	4.31e-002	2.34e-004
4	0.500	0.02186	0.838	2.19	9.956	2.38e-006	4.37e-002	2.81e-004
5	1.00	0.03668	0.811	3.67	5.368	4.31e-006	2.96e-002	3.44e-004
6	2.00	0.05685	0.773	5.68	6.223	3.58e-006	2.02e-002	1.95e-004
7	4.00	0.08702	0.716	8.70	6.422	3.29e-006	1.51e-002	1.34e-004
8	2.00	0.08235	0.725	8.24	0.515	3.99e-005	2.33e-003	2.51e-004
9	1.00	0.07686	0.735	7.69	3.269	6.36e-006	5.49e-003	9.41e-005
10	0.500	0.07035	0.747	7.04	5.048	4.17e-006	1.30e-002	1.47e-004
11	1.00	0.07439	0.740	7.44	4.932	4.28e-006	8.07e-003	9.31e-005
12	2.00	0.08022	0.729	8.02	3.156	6.62e-006	5.83e-003	1.04e-004
13	4.00	0.09188	0.707	9.19	2.311	8.87e-006	5.83e-003	1.39e-004
14	8.00	0.1284	0.638	12.8	5.154	3.77e-006	9.13e-003	9.29e-005
15	16.0	0.1738	0.553	17.4	2.899	6.10e-006	5.68e-003	9.34e-005
16	32.0	0.2220	0.462	22.2	2.114	7.47e-006	3.01e-003	6.06e-005
17	8.00	0.1994	0.505	19.9	0.373	4.10e-005	9.41e-004	1.04e-004
18	2.00	0.1788	0.543	17.9	5.164	3.12e-006	3.43e-003	2.89e-005
19	0.500	0.1568	0.585	15.7	13.675	1.24e-006	1.47e-002	4.92e-005
20	0.125	0.1364	0.623	13.6	63.158	2.83e-007	5.44e-002	4.15e-005
21	0.0625	0.1274	0.640	12.7	126.947	1.46e-007	1.44e-001	5.65e-005

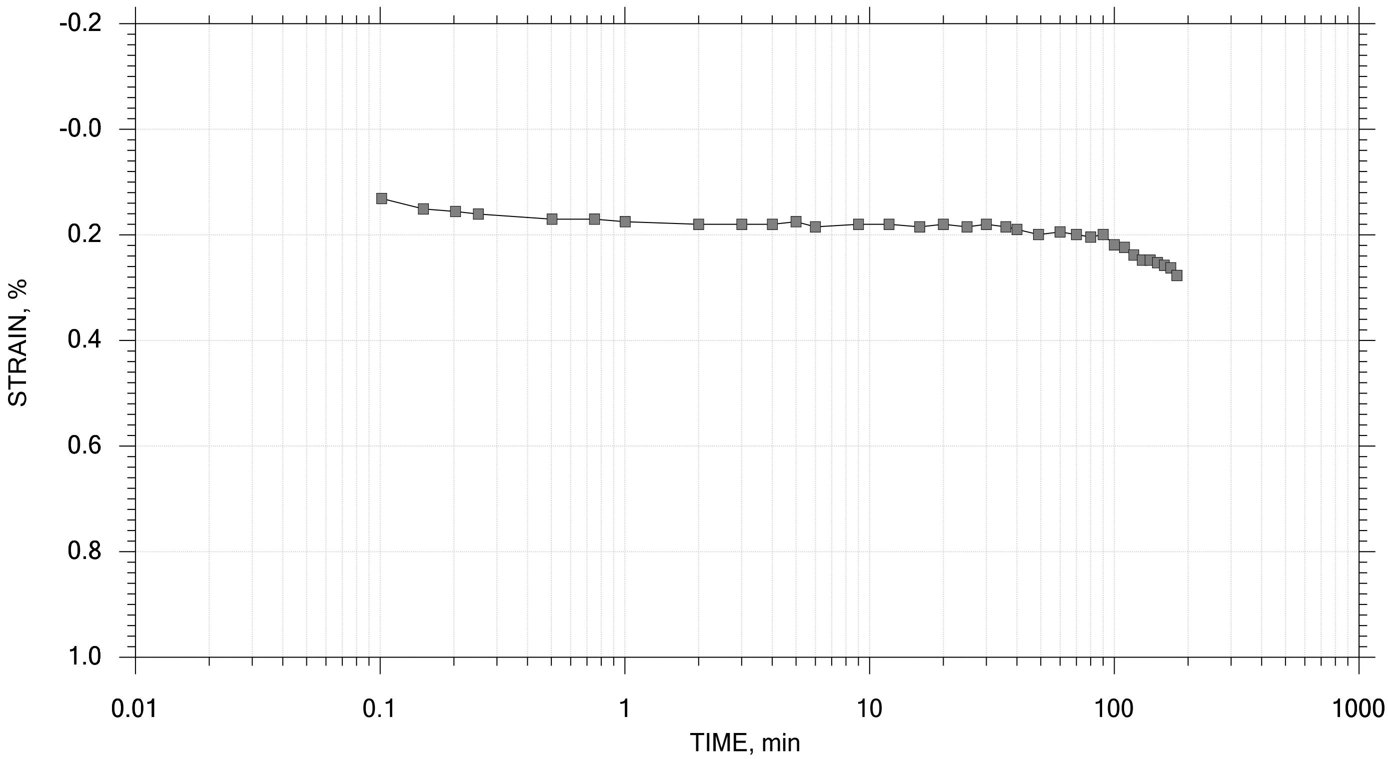
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0739	0.002769	0.874	0.277	0.000	0.00e+000	3.75e-002	0.00e+000	0.00e+000
2	0.125	0.005539	0.869	0.554	0.000	0.00e+000	5.42e-002	0.00e+000	0.00e+000
3	0.250	0.01093	0.859	1.09	2.163	2.59e-006	4.31e-002	3.02e-004	0.00e+000
4	0.500	0.02186	0.838	2.19	2.274	2.43e-006	4.37e-002	2.86e-004	0.00e+000
5	1.00	0.03668	0.811	3.67	1.489	3.61e-006	2.96e-002	2.88e-004	0.00e+000
6	2.00	0.05685	0.773	5.68	1.329	3.90e-006	2.02e-002	2.12e-004	0.00e+000
7	4.00	0.08702	0.716	8.70	1.896	2.59e-006	1.51e-002	1.05e-004	0.00e+000
8	2.00	0.08235	0.725	8.24	0.000	0.00e+000	2.33e-003	0.00e+000	0.00e+000
9	1.00	0.07686	0.735	7.69	0.000	0.00e+000	5.49e-003	0.00e+000	0.00e+000
10	0.500	0.07035	0.747	7.04	0.000	0.00e+000	1.30e-002	0.00e+000	0.00e+000
11	1.00	0.07439	0.740	7.44	0.000	0.00e+000	8.07e-003	0.00e+000	0.00e+000
12	2.00	0.08022	0.729	8.02	0.000	0.00e+000	5.83e-003	0.00e+000	0.00e+000
13	4.00	0.09188	0.707	9.19	0.533	8.93e-006	5.83e-003	1.40e-004	0.00e+000
14	8.00	0.1284	0.638	12.8	1.272	3.55e-006	9.13e-003	8.74e-005	0.00e+000
15	16.0	0.1738	0.553	17.4	0.943	4.36e-006	5.68e-003	6.67e-005	0.00e+000
16	32.0	0.2220	0.462	22.2	0.579	6.33e-006	3.01e-003	5.14e-005	0.00e+000
17	8.00	0.1994	0.505	19.9	0.000	0.00e+000	9.41e-004	0.00e+000	0.00e+000
18	2.00	0.1788	0.543	17.9	0.000	0.00e+000	3.43e-003	0.00e+000	0.00e+000
19	0.500	0.1568	0.585	15.7	0.000	0.00e+000	1.47e-002	0.00e+000	0.00e+000
20	0.125	0.1364	0.623	13.6	0.000	0.00e+000	5.44e-002	0.00e+000	0.00e+000
21	0.0625	0.1274	0.640	12.7	30.648	1.40e-007	1.44e-001	5.44e-005	0.00e+000

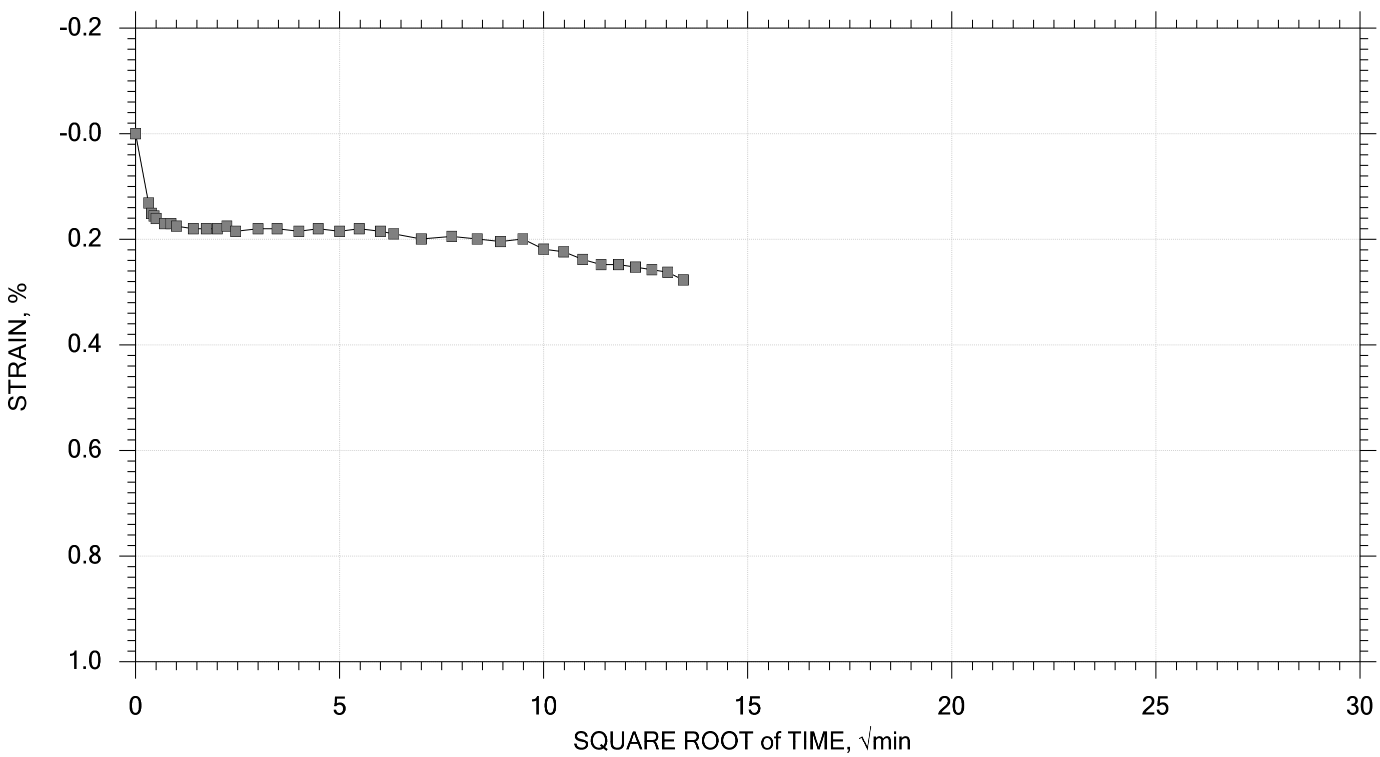
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Volume Step 1 of 21

Stress: 0.073882 tsf





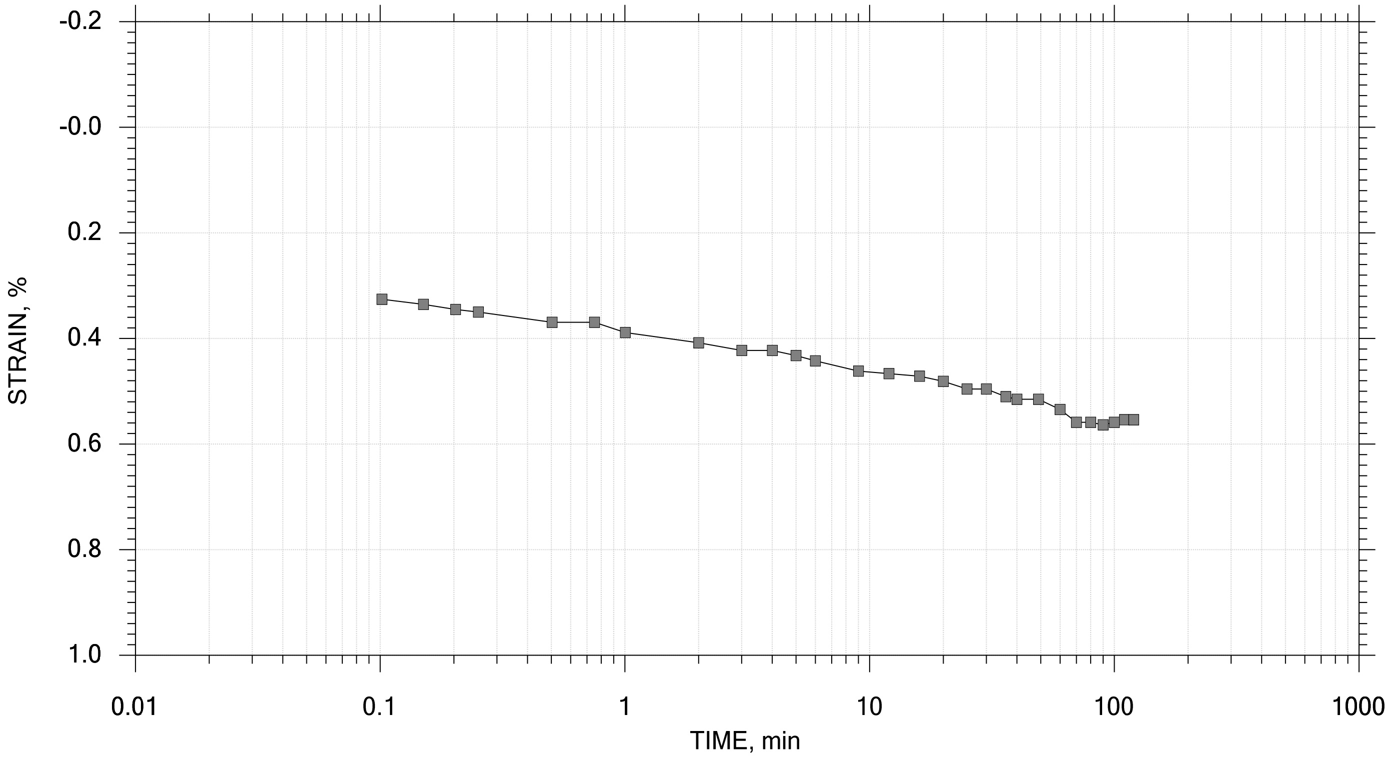
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

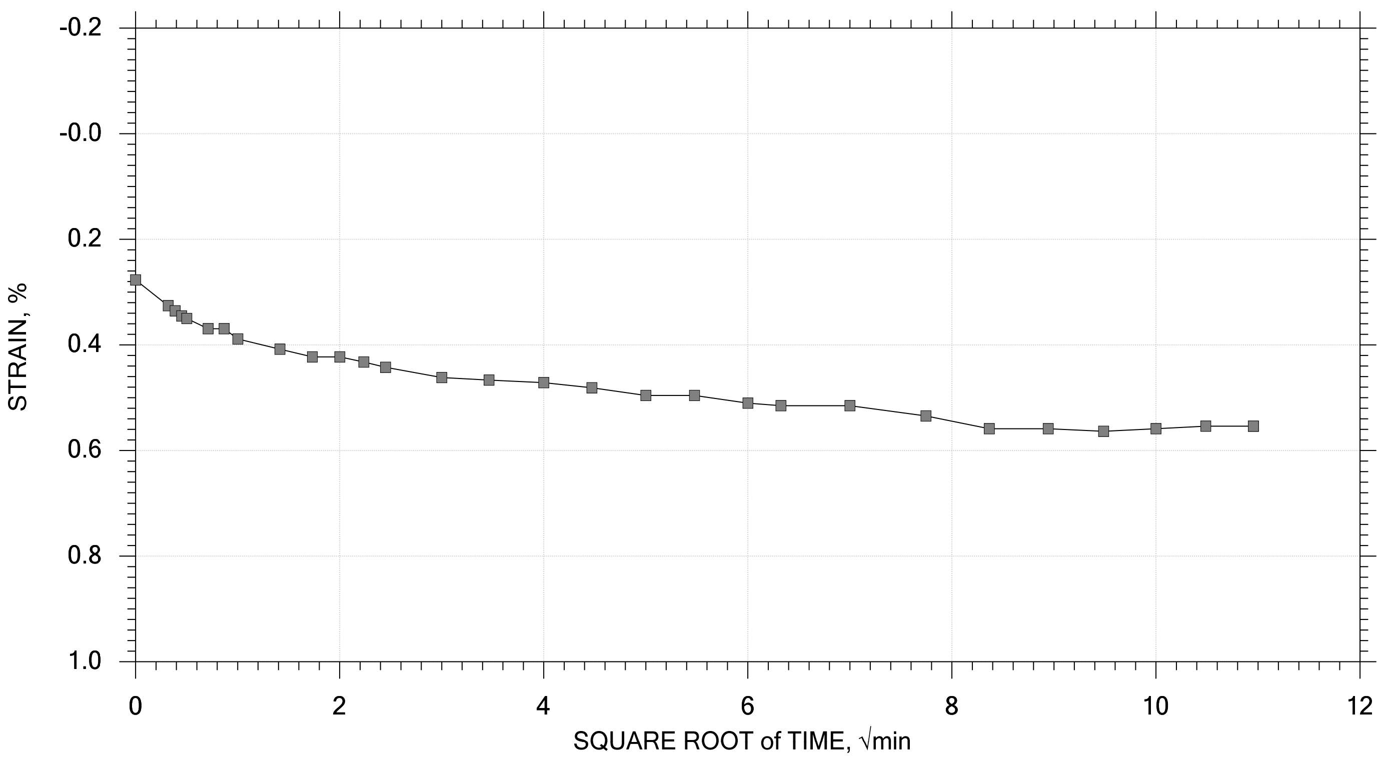
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 21

Stress: 0.125 tsf





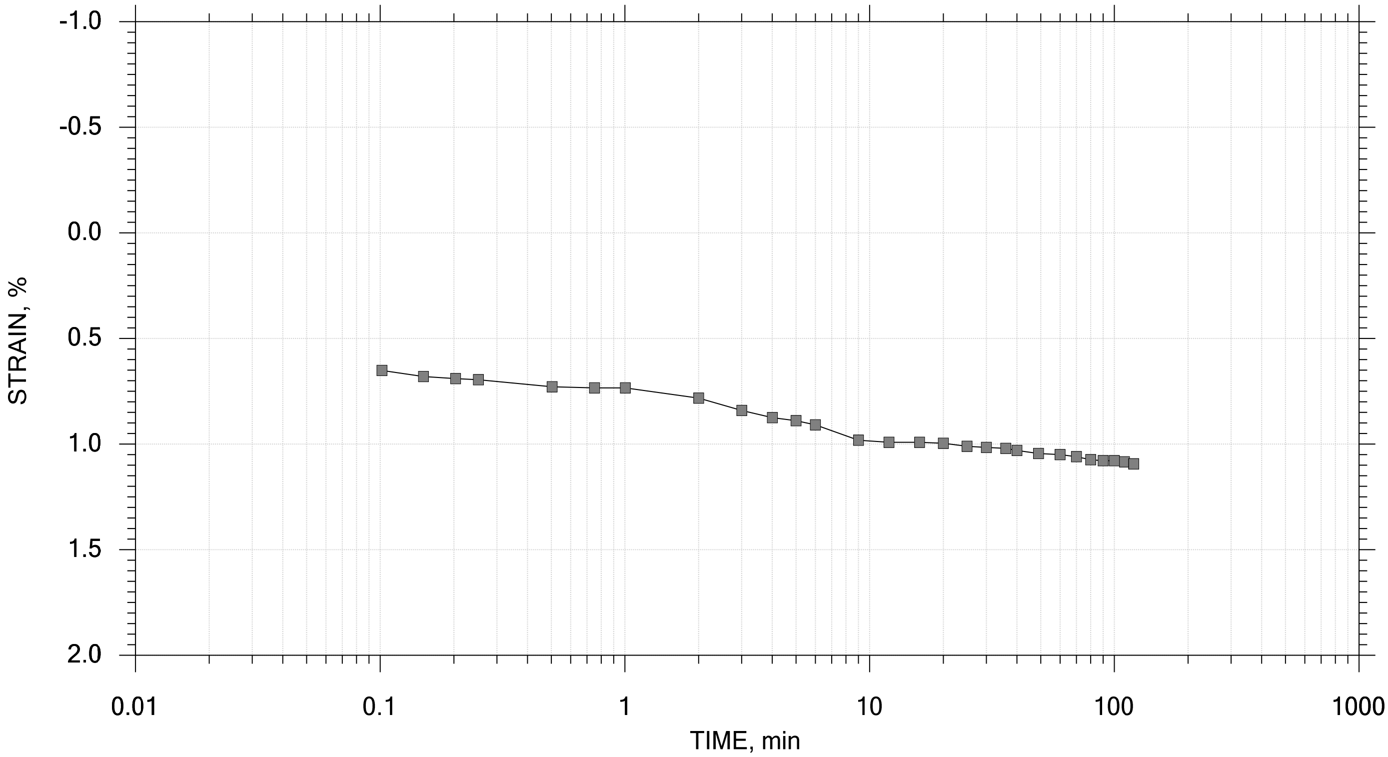
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

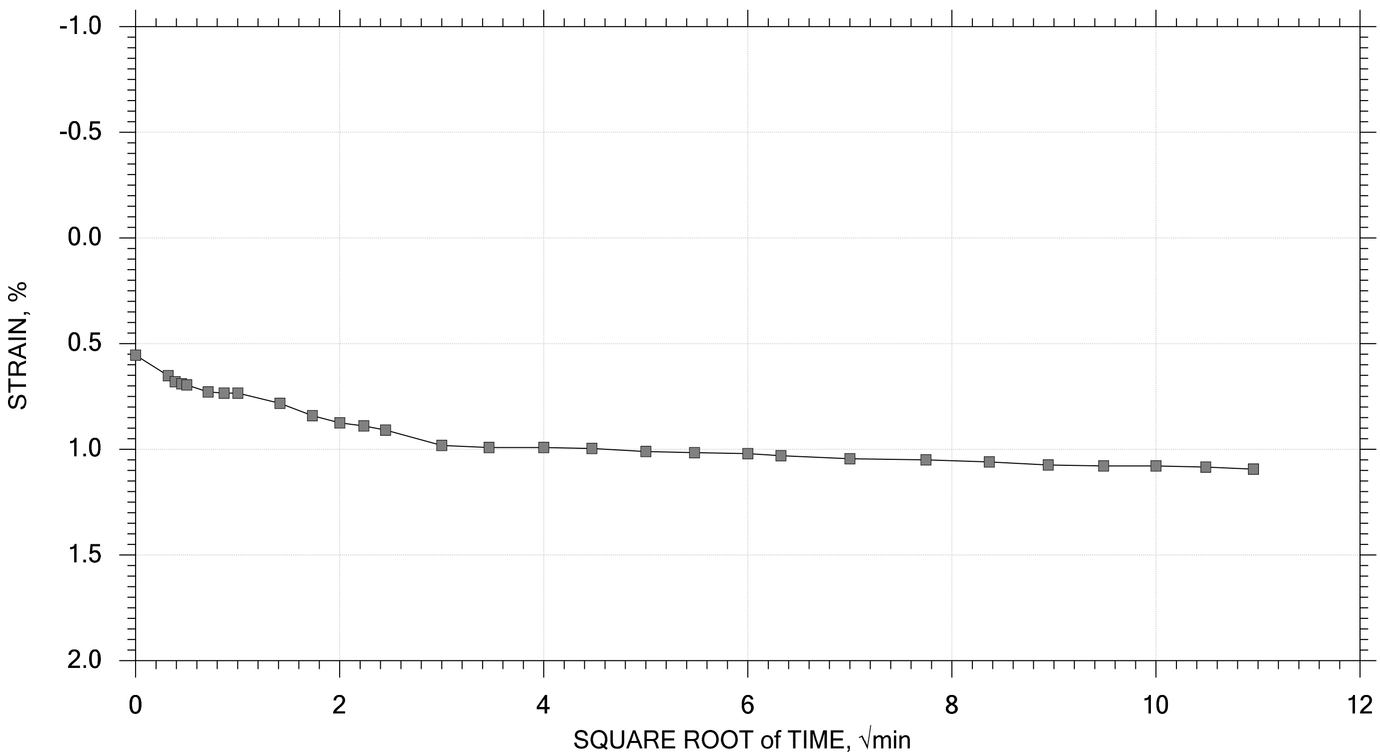
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 21

Stress: 0.25 tsf





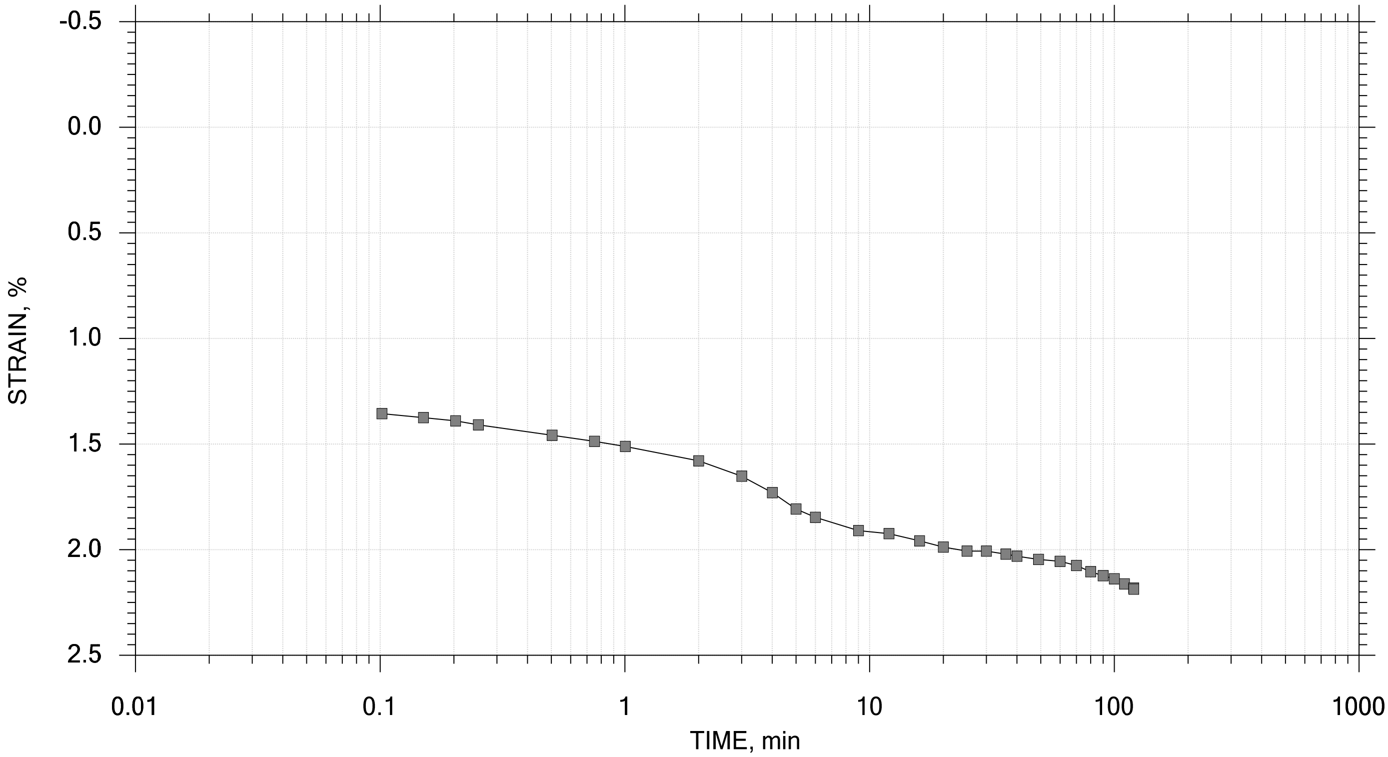
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

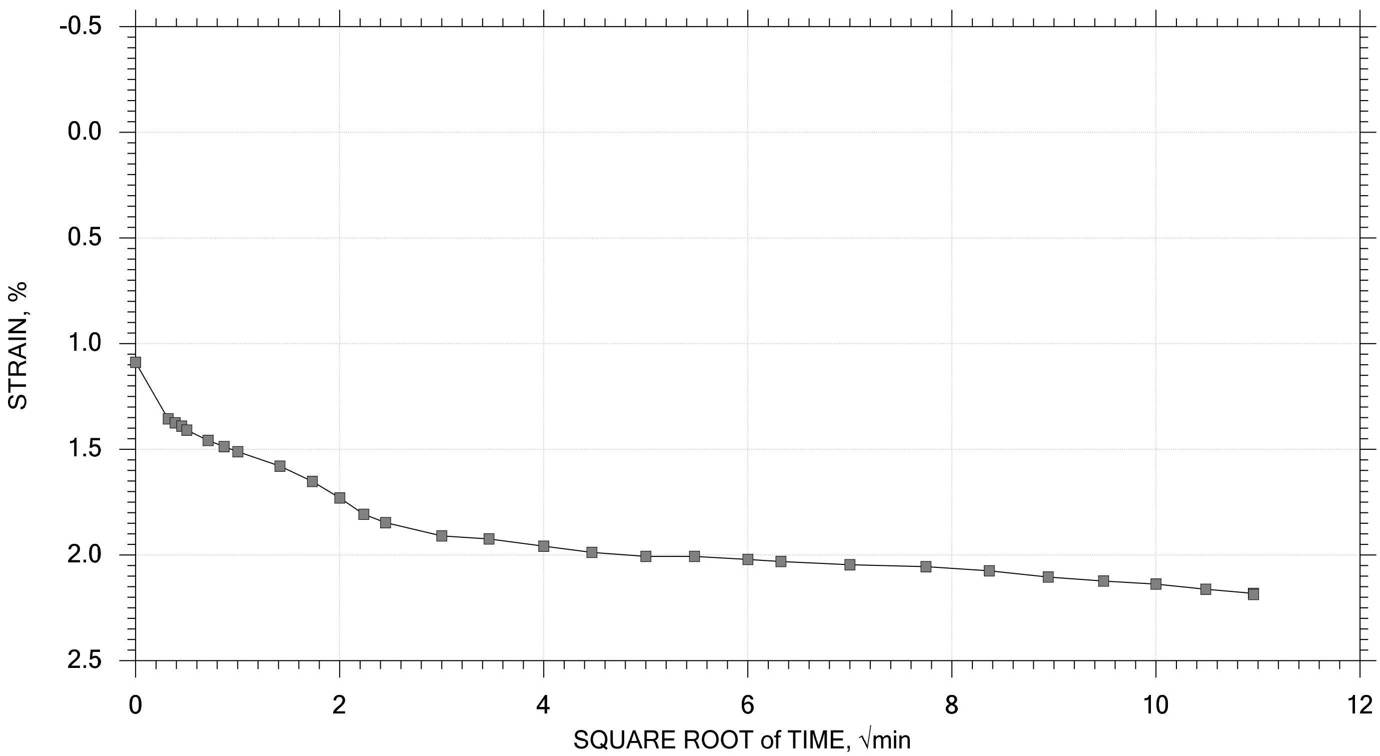
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 21

Stress: 0.5 tsf





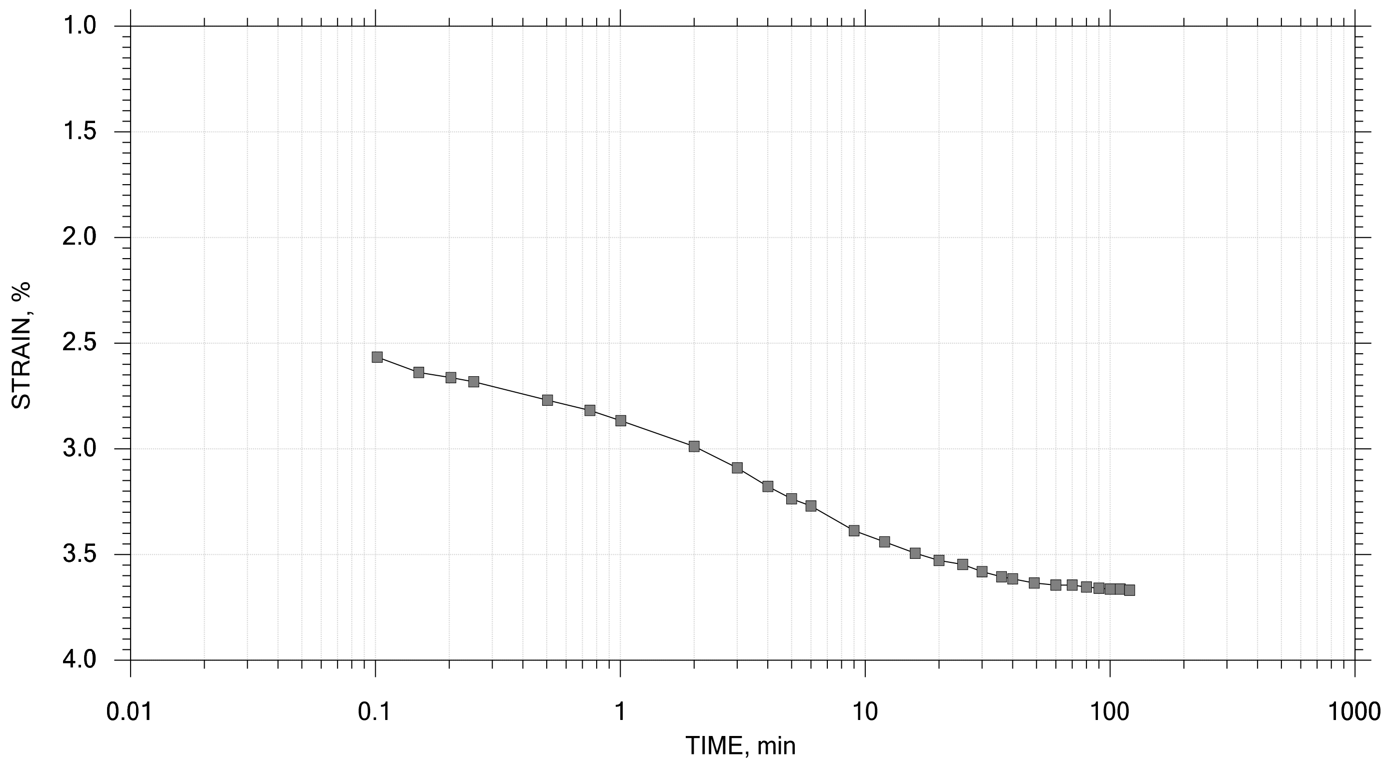
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

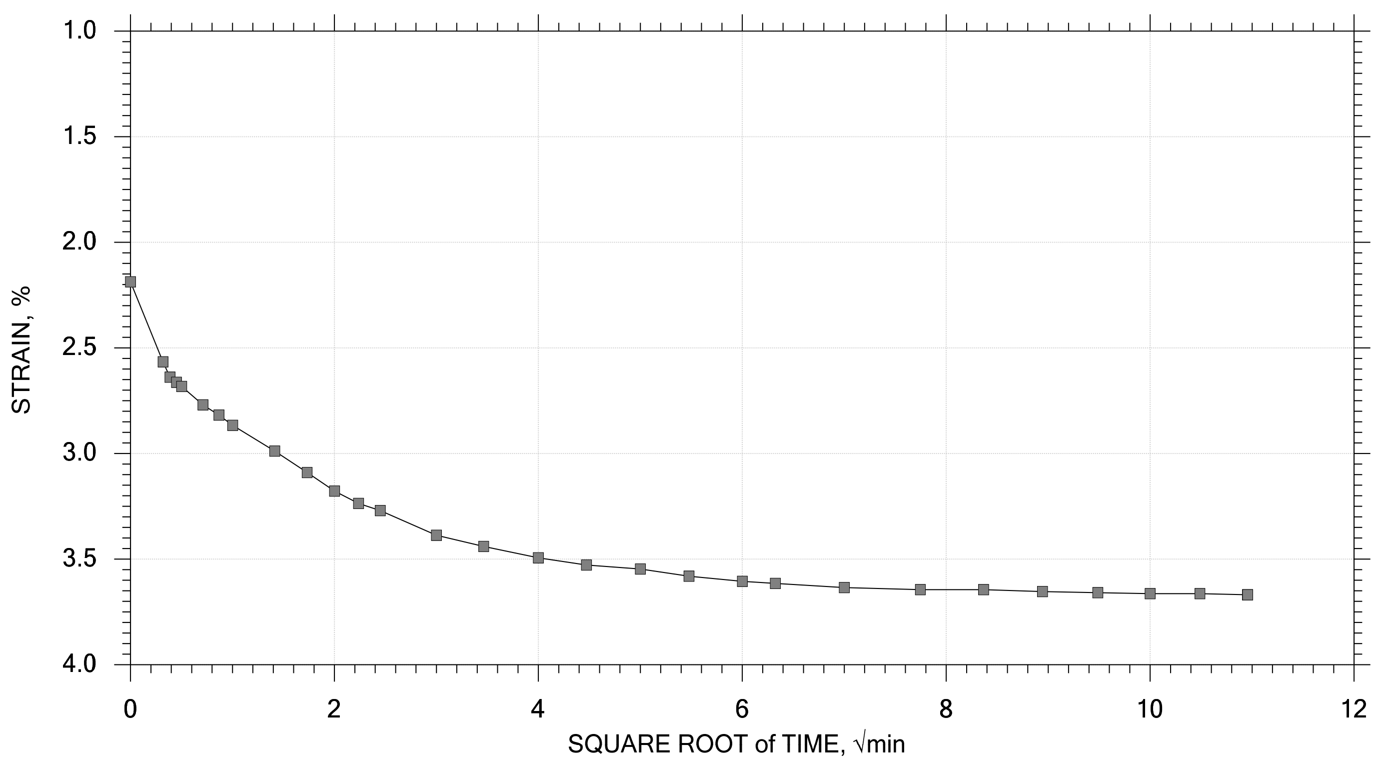
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 21

Stress: 1 tsf





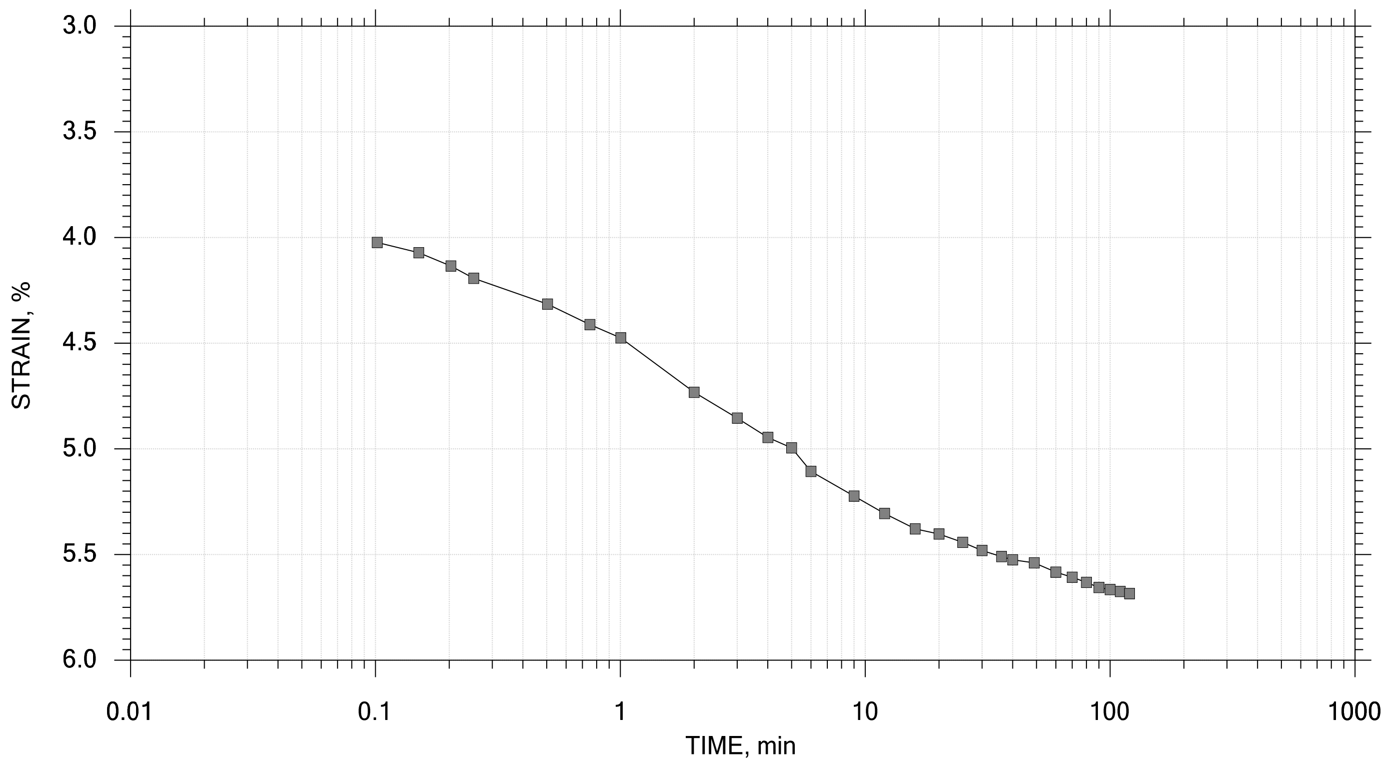
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

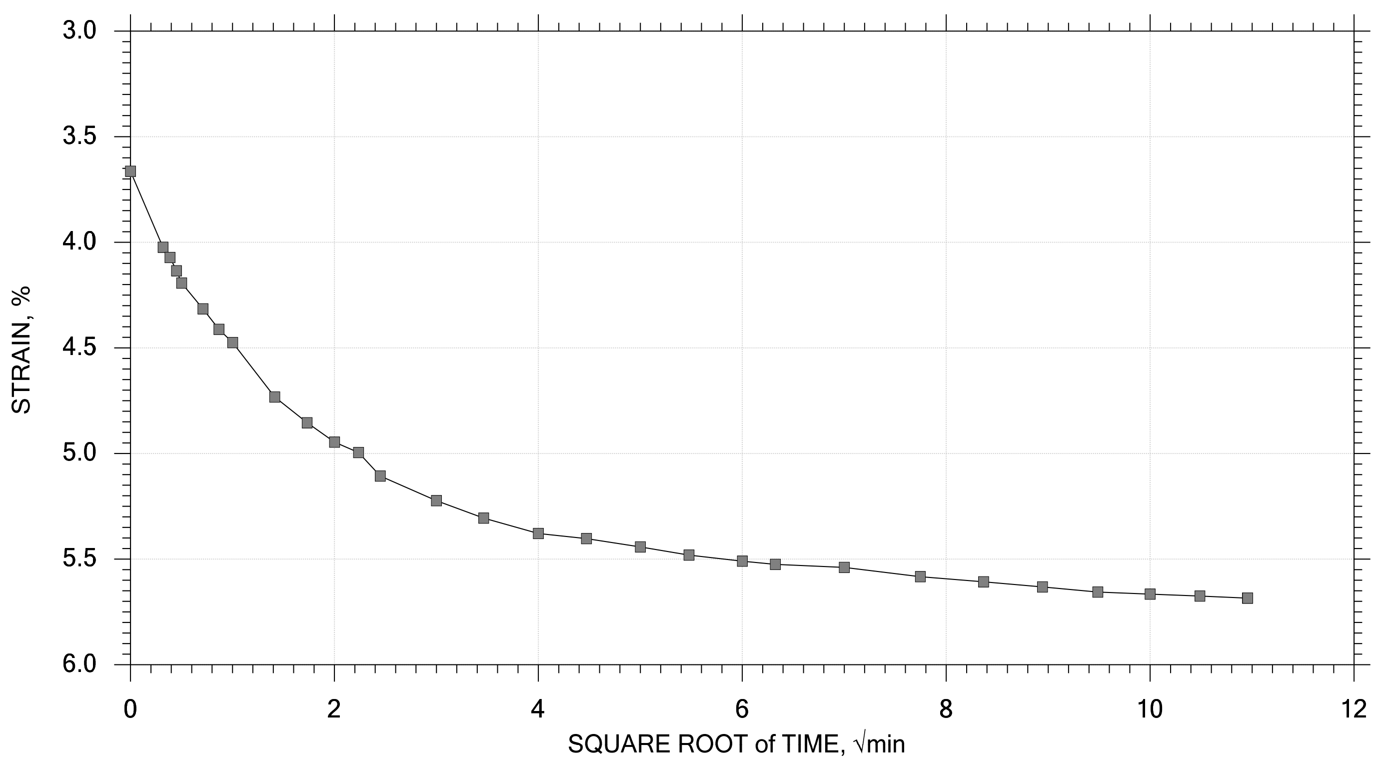
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 21

Stress: 2 tsf





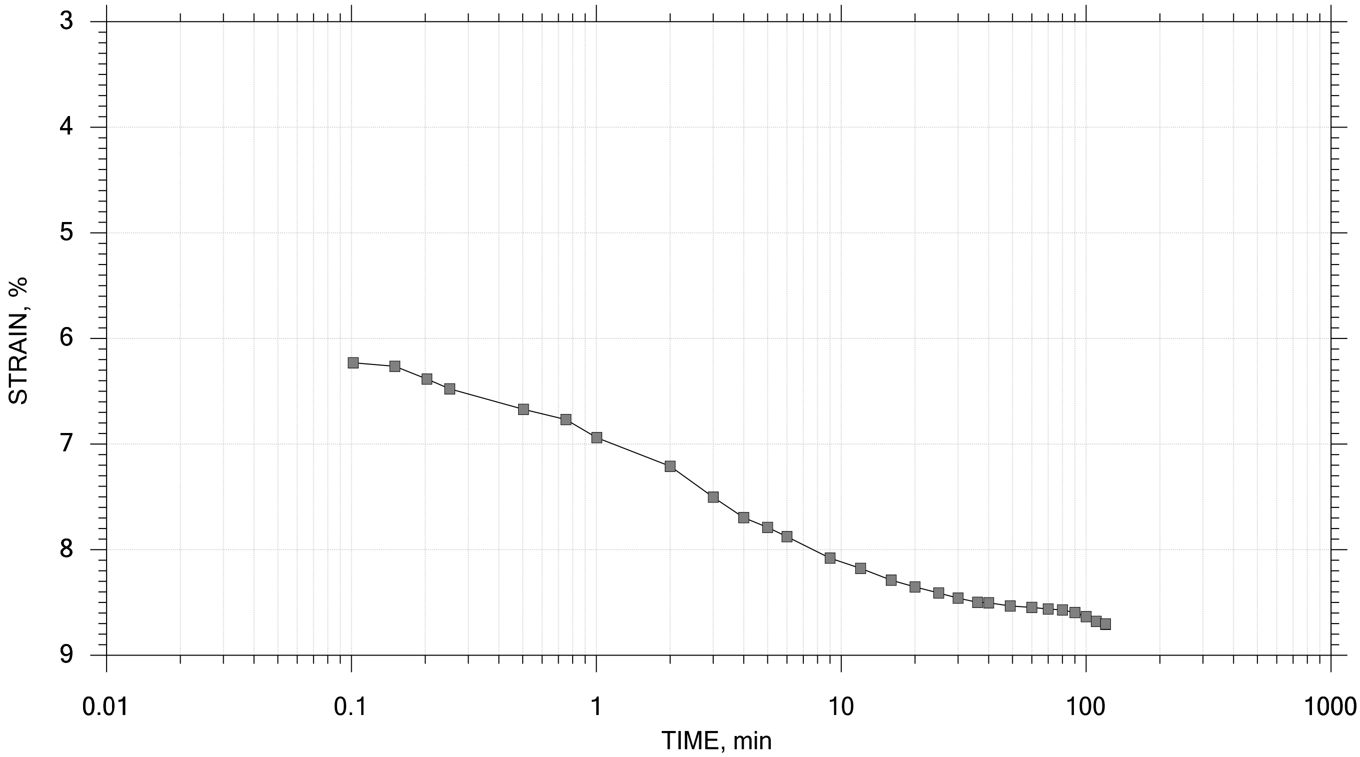
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

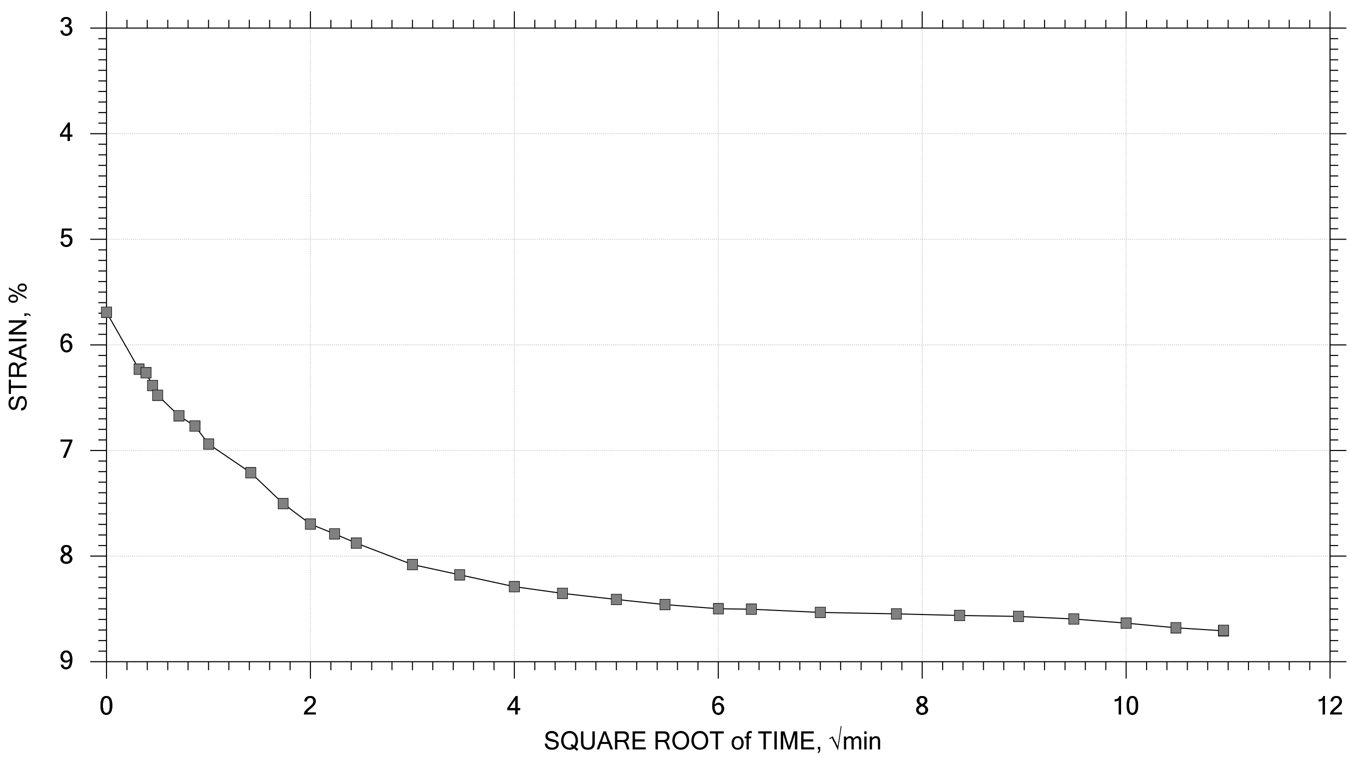
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 21

Stress: 4 tsf





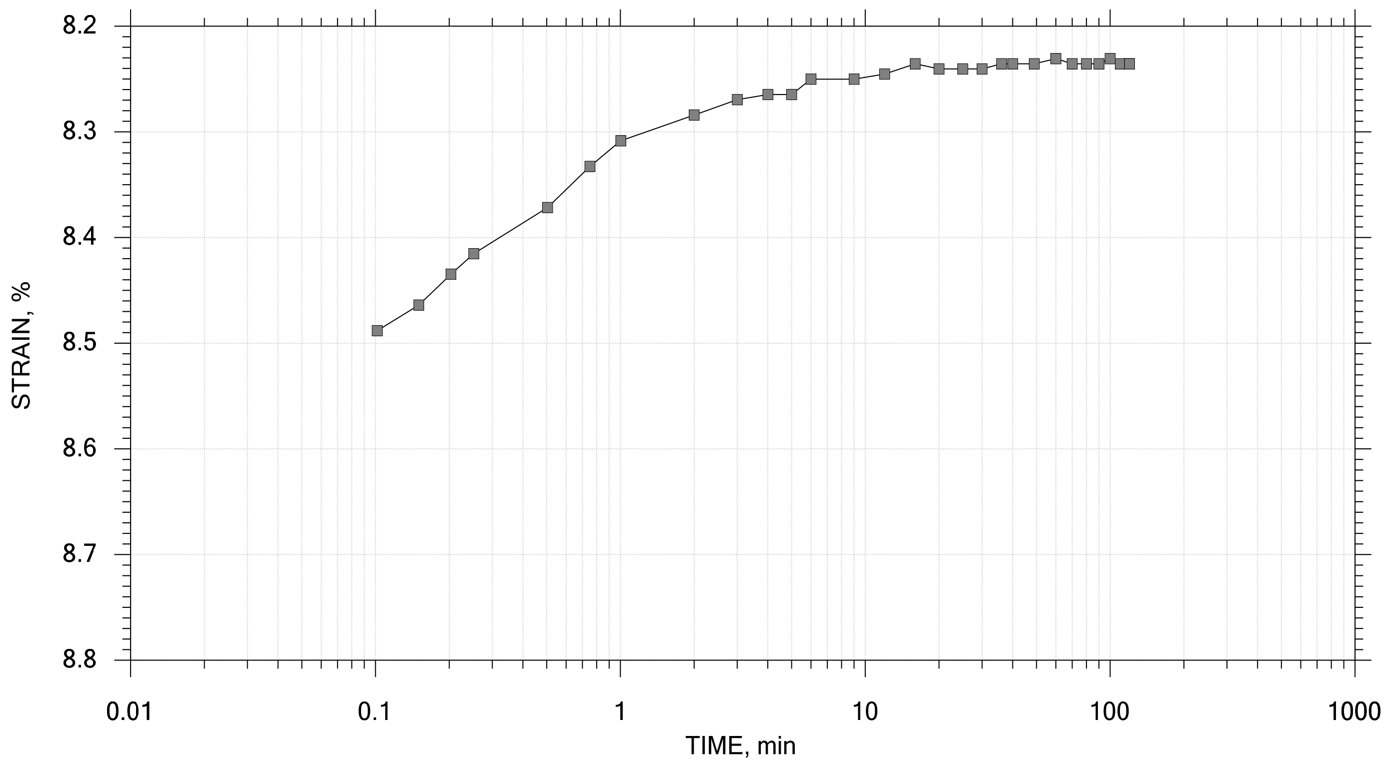
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

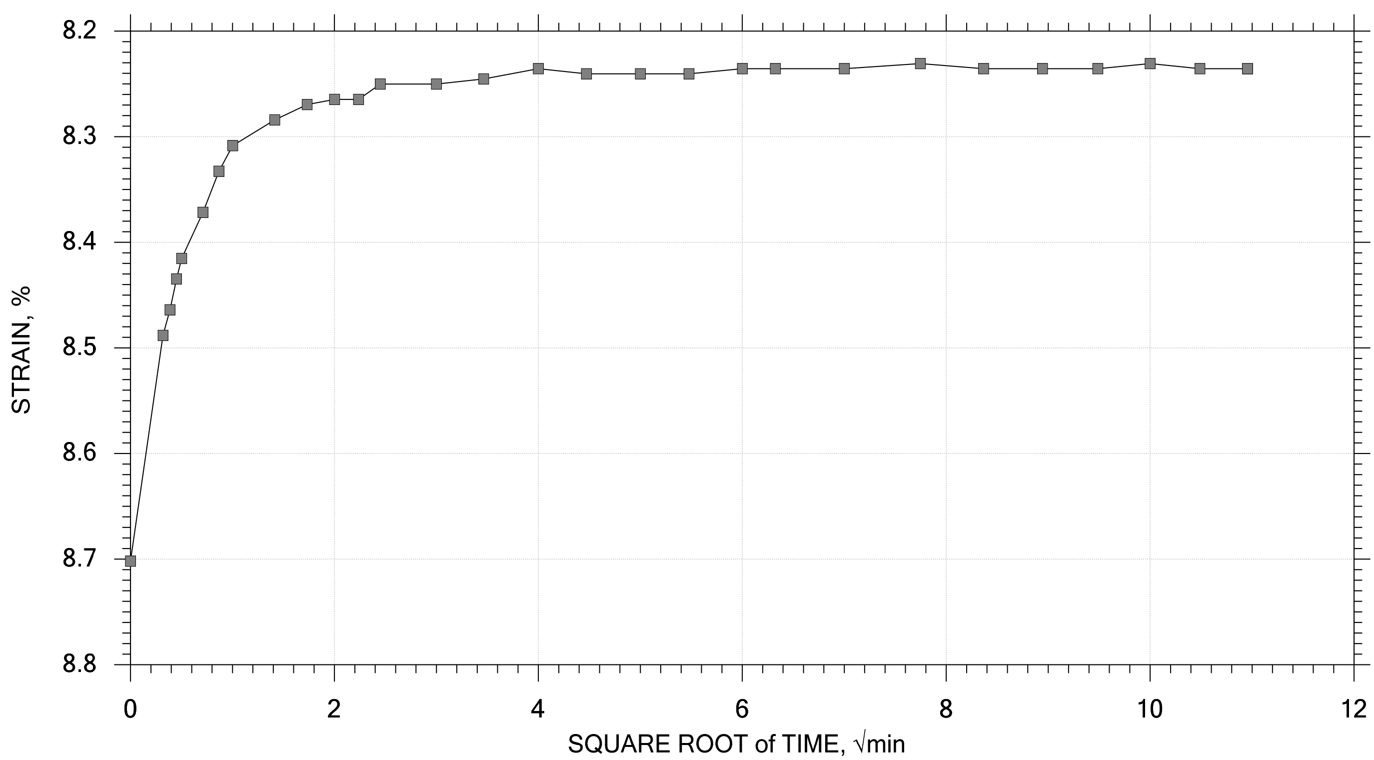
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 21

Stress: 2 tsf





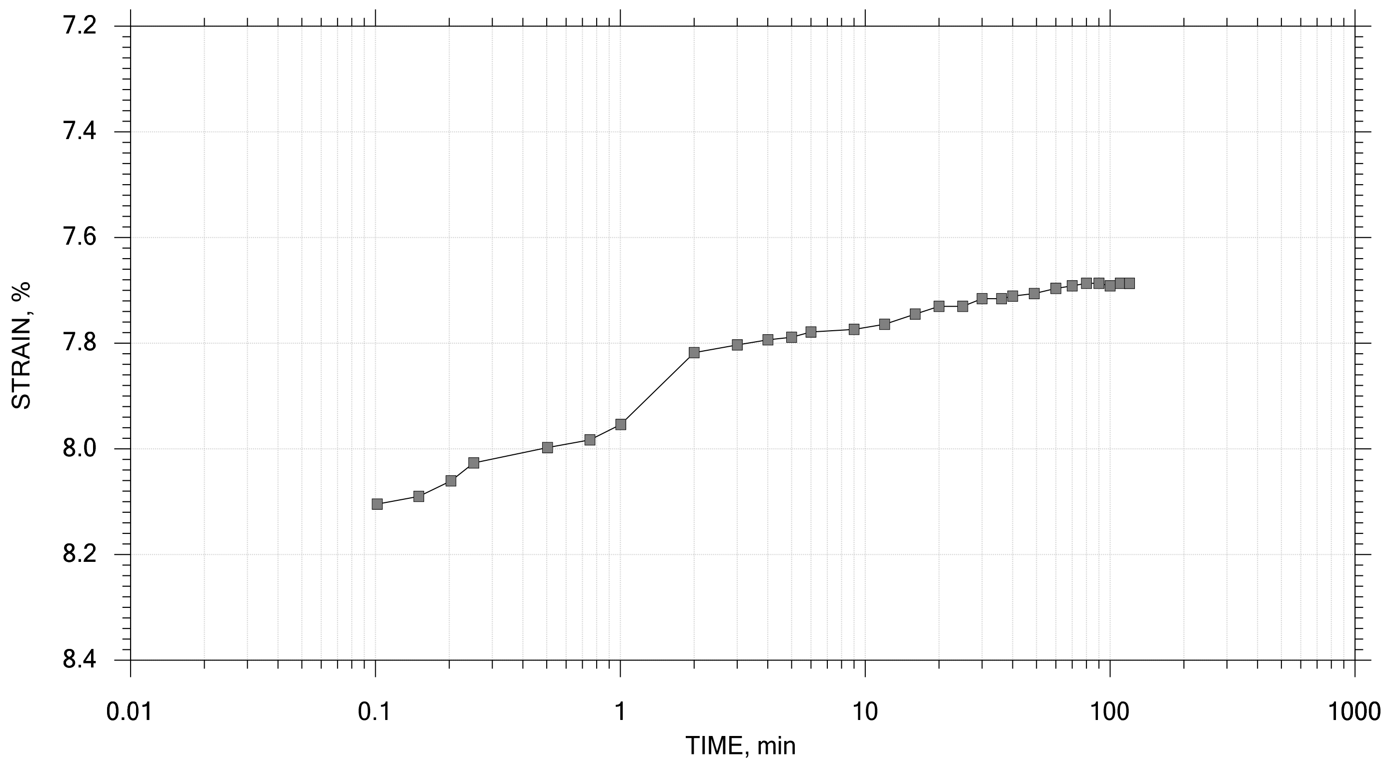
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

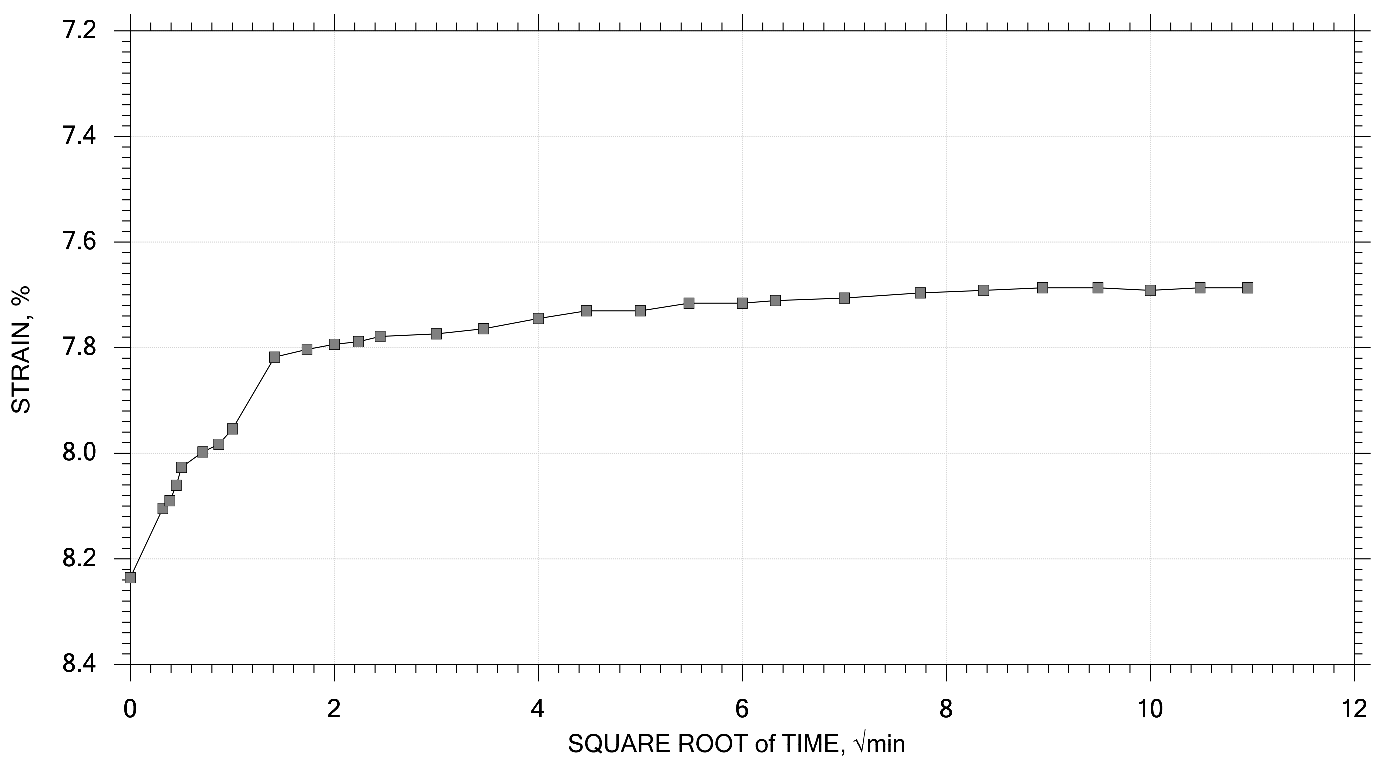
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 21

Stress: 1 tsf





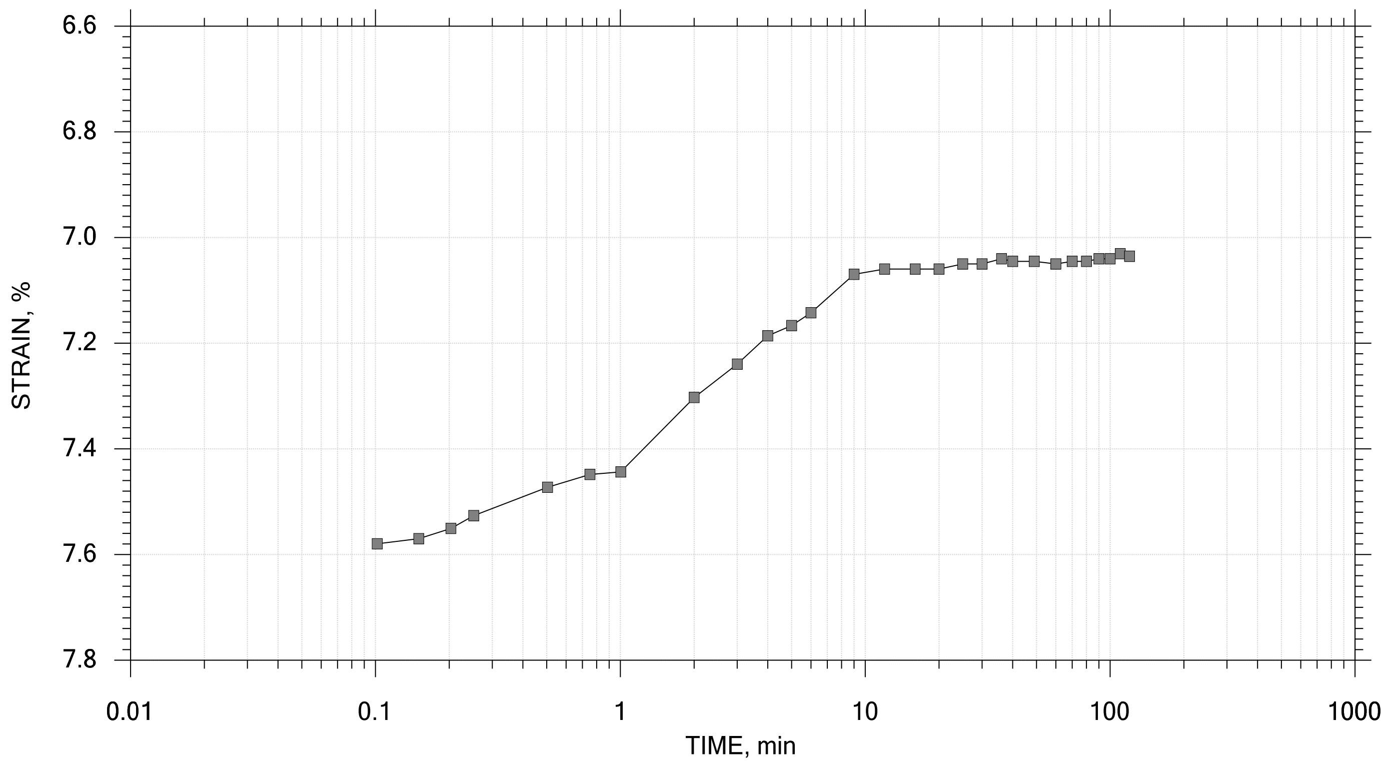
Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
Boring No.: SB-01	Tested By: md	Checked By: njh
Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
Depth: 38-40 ft	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System JJ, Swell Pressure = 0.0739 tsf		

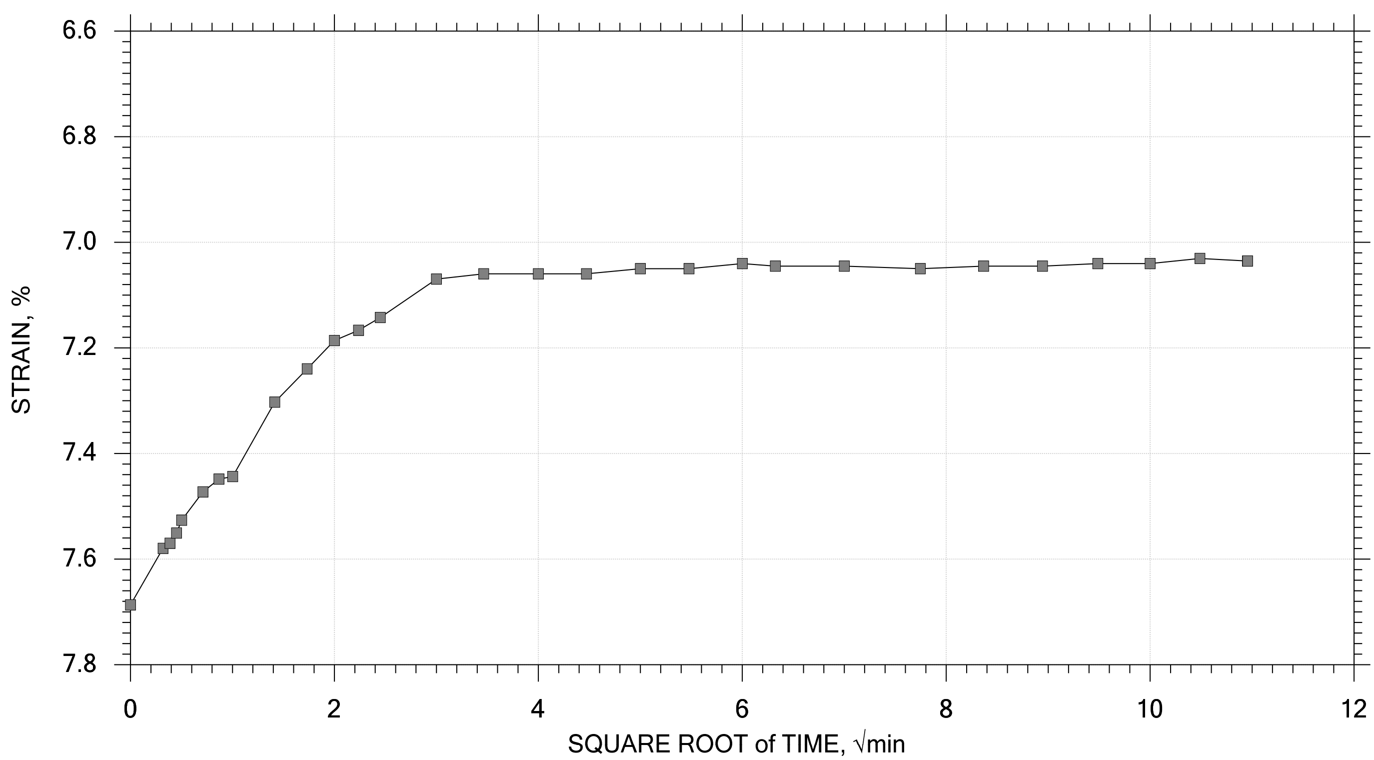
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 21

Stress: 0.5 tsf





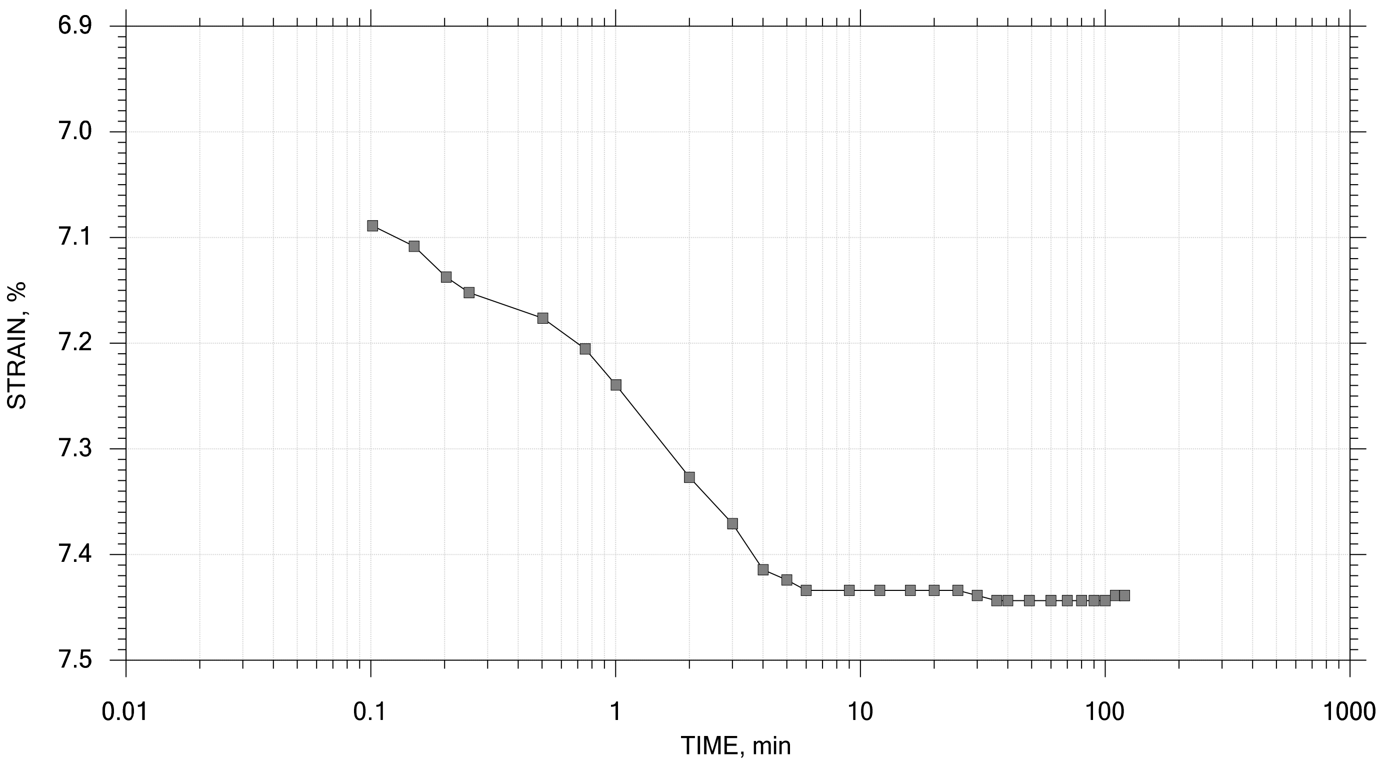
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

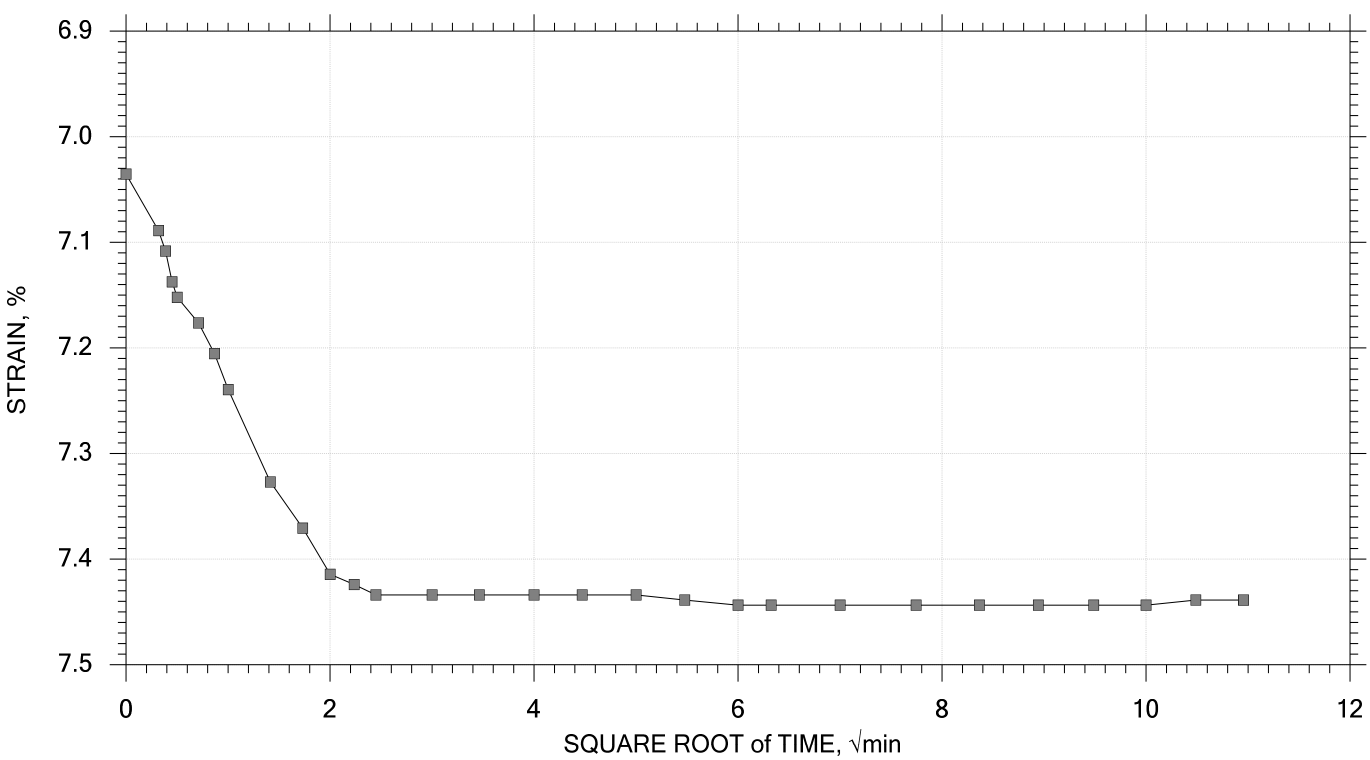
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 21

Stress: 1 tsf





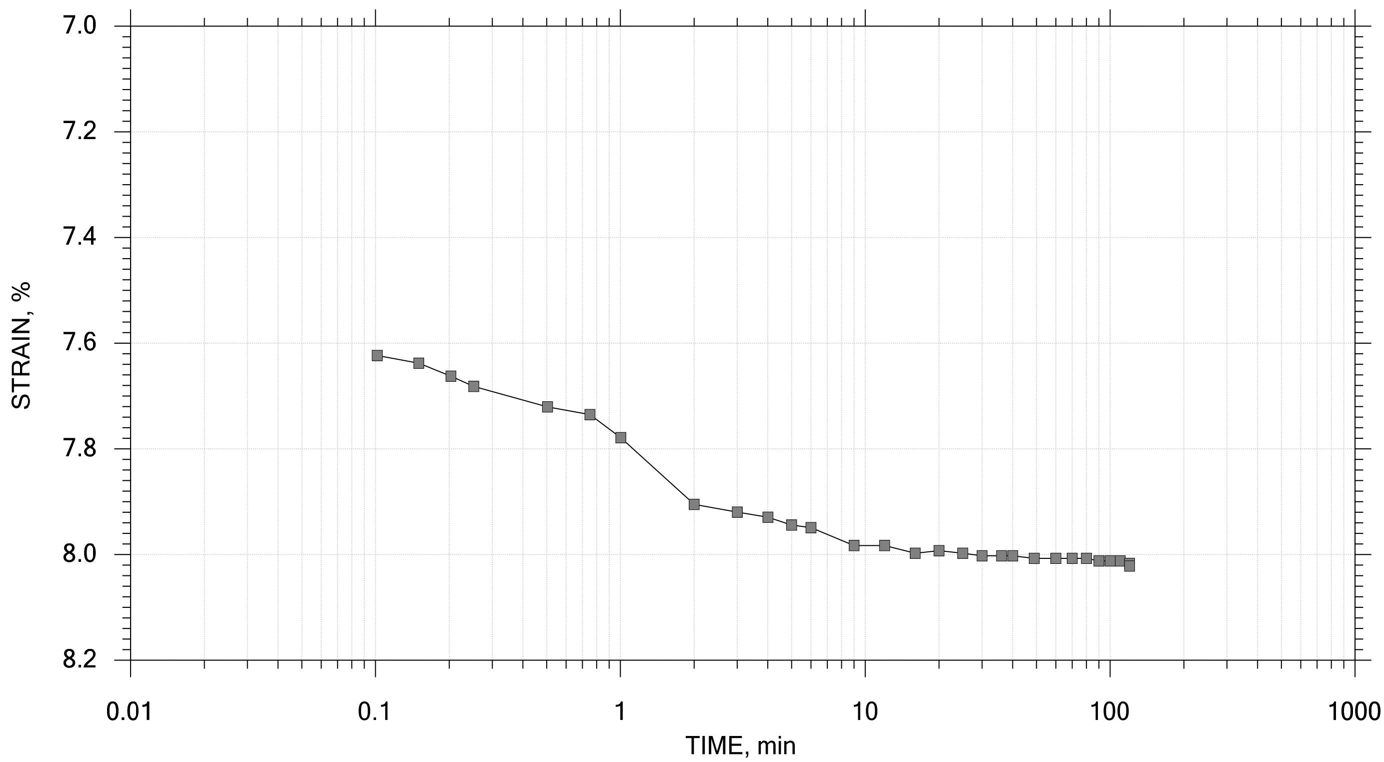
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

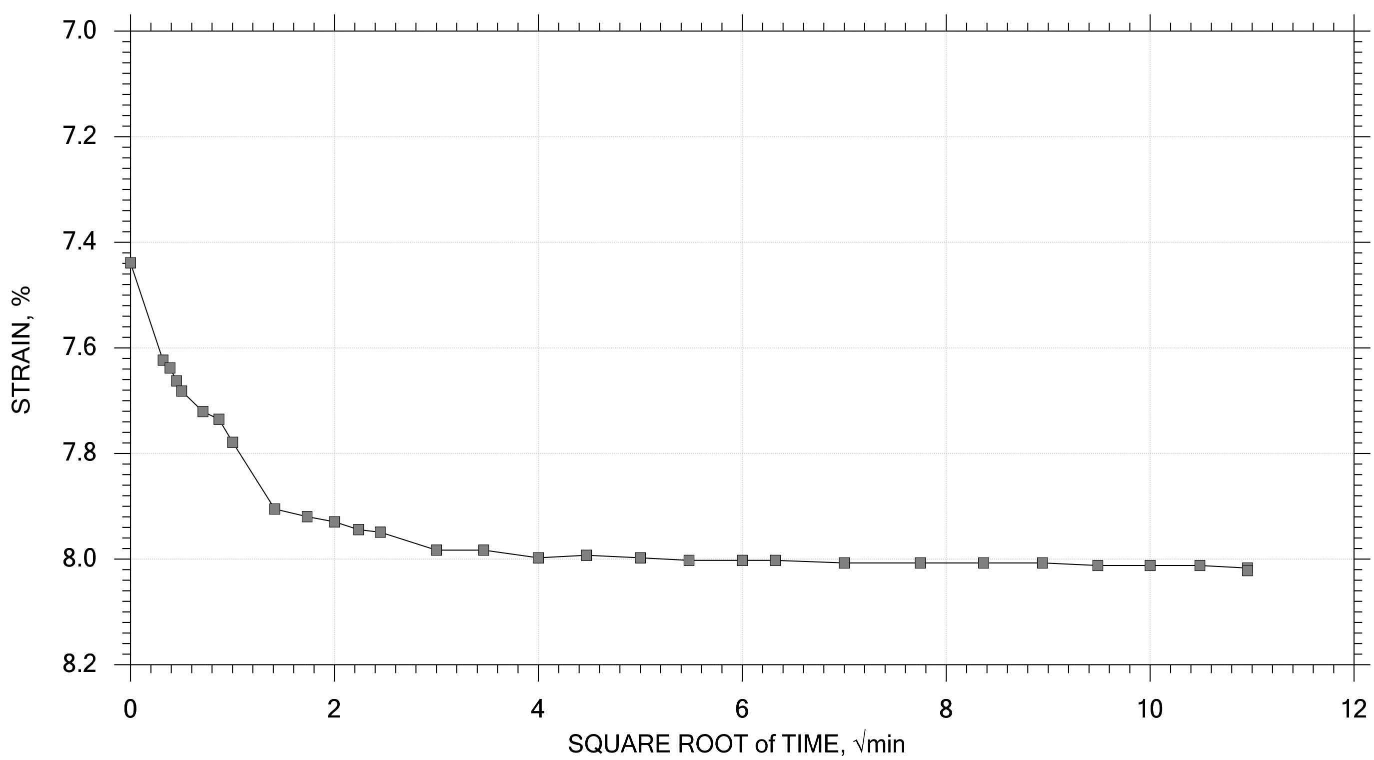
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 21

Stress: 2 tsf





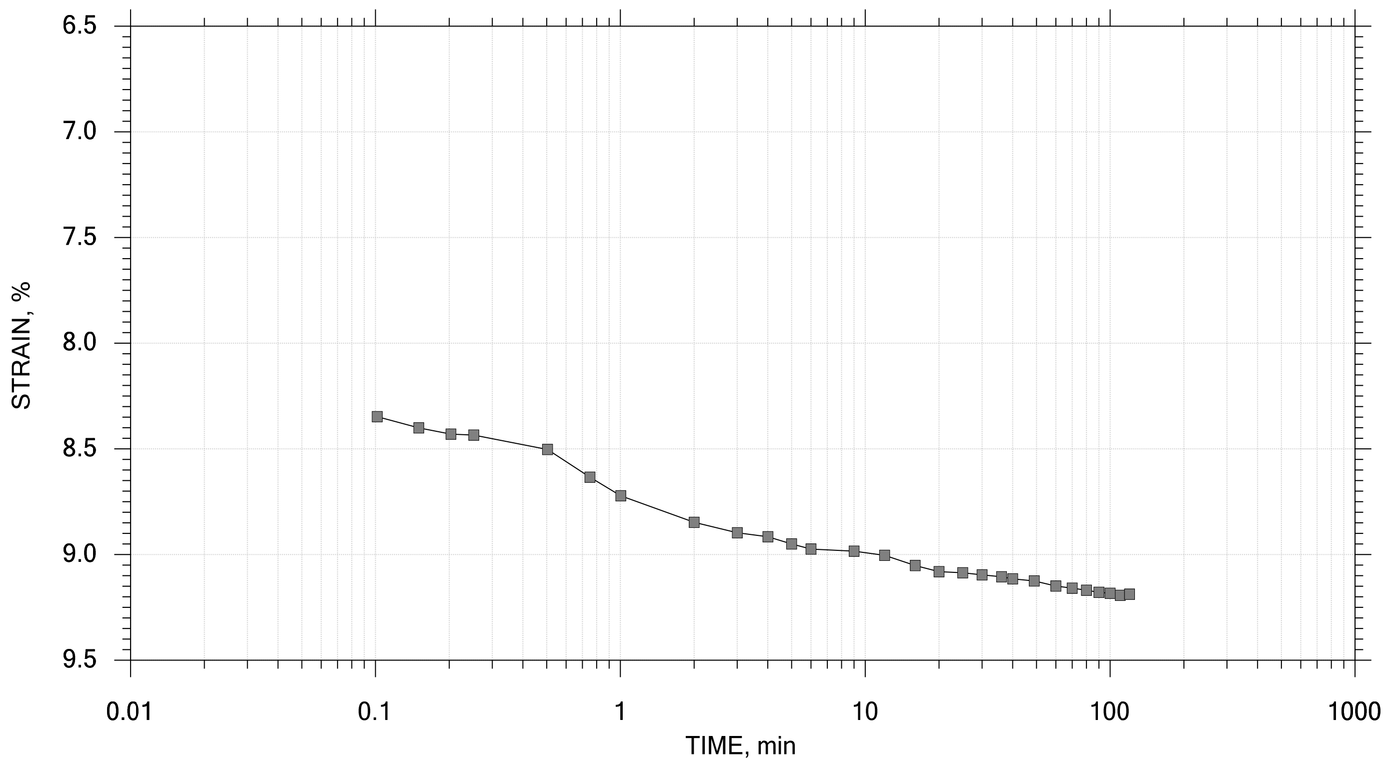
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

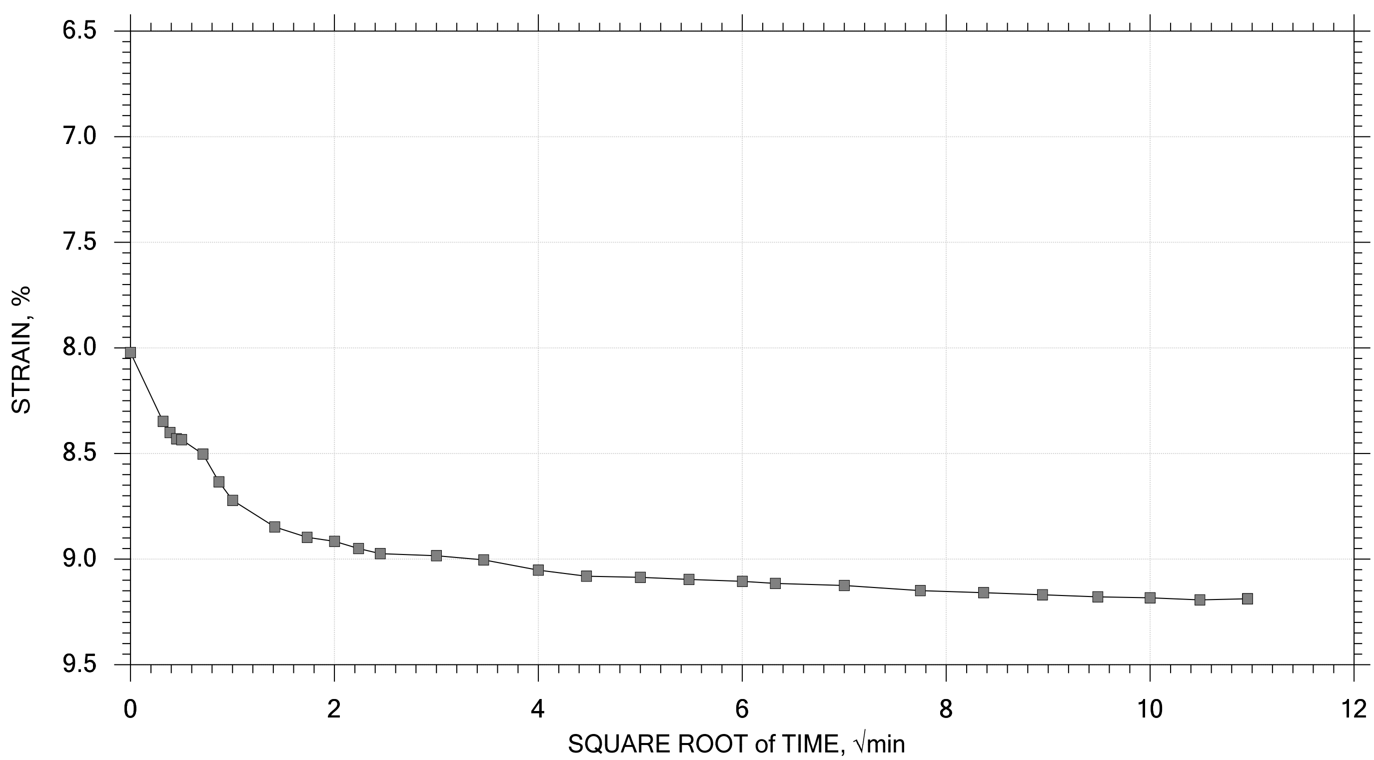
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 21

Stress: 4 tsf





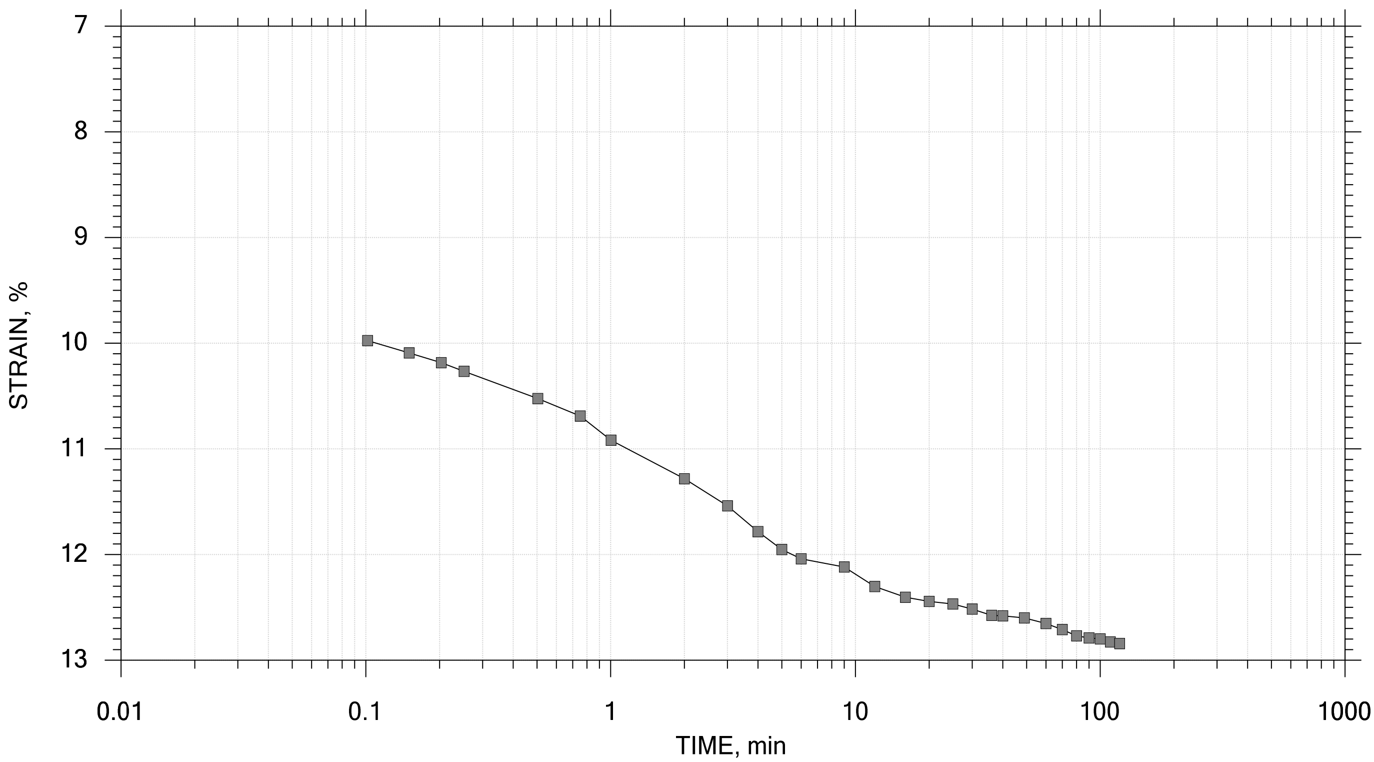
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

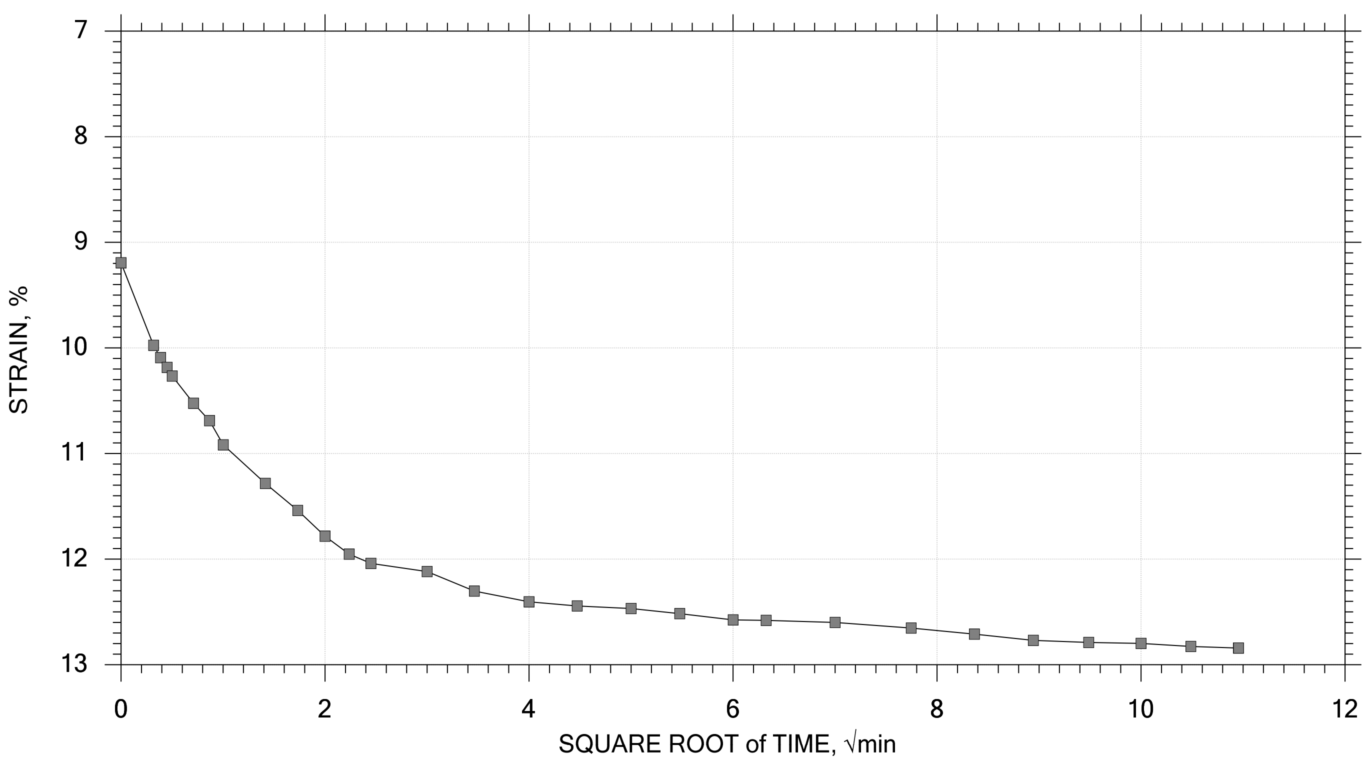
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 21

Stress: 8 tsf





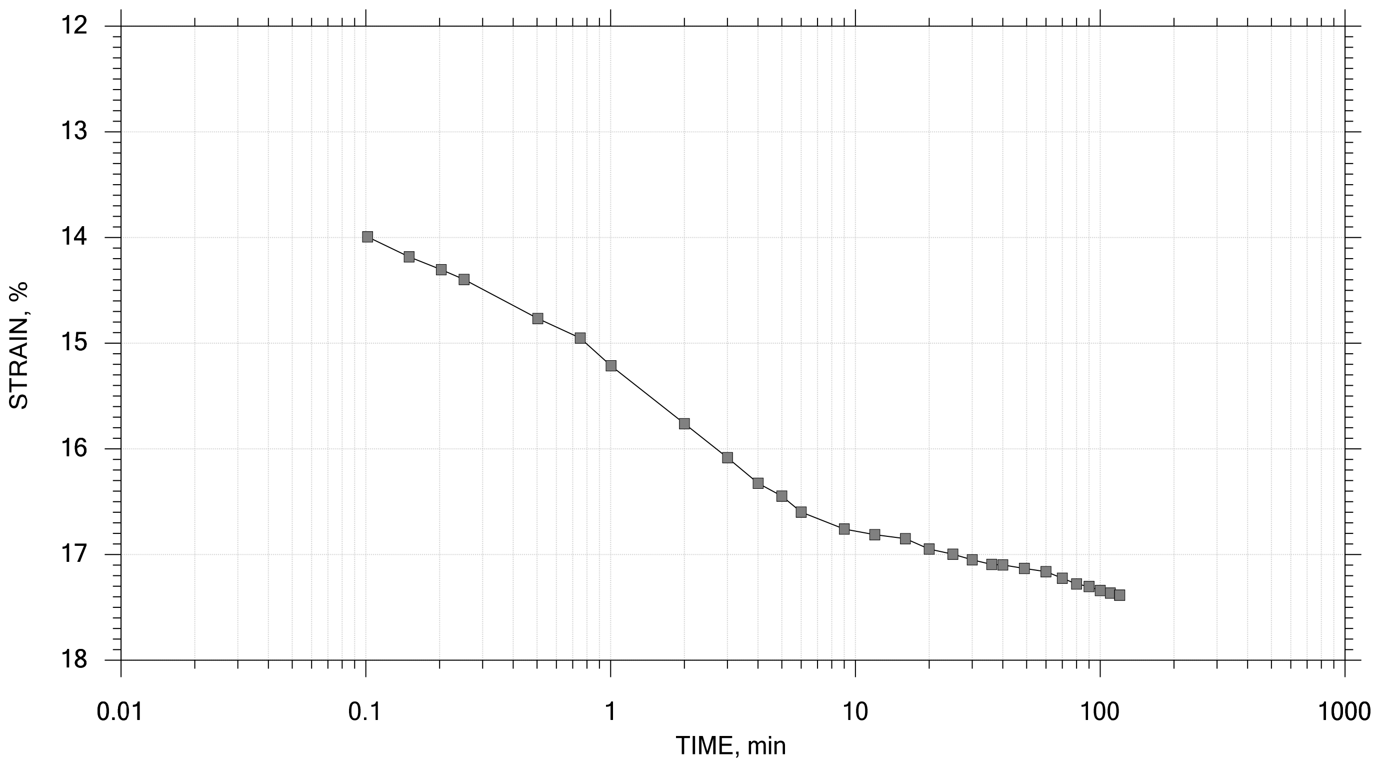
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

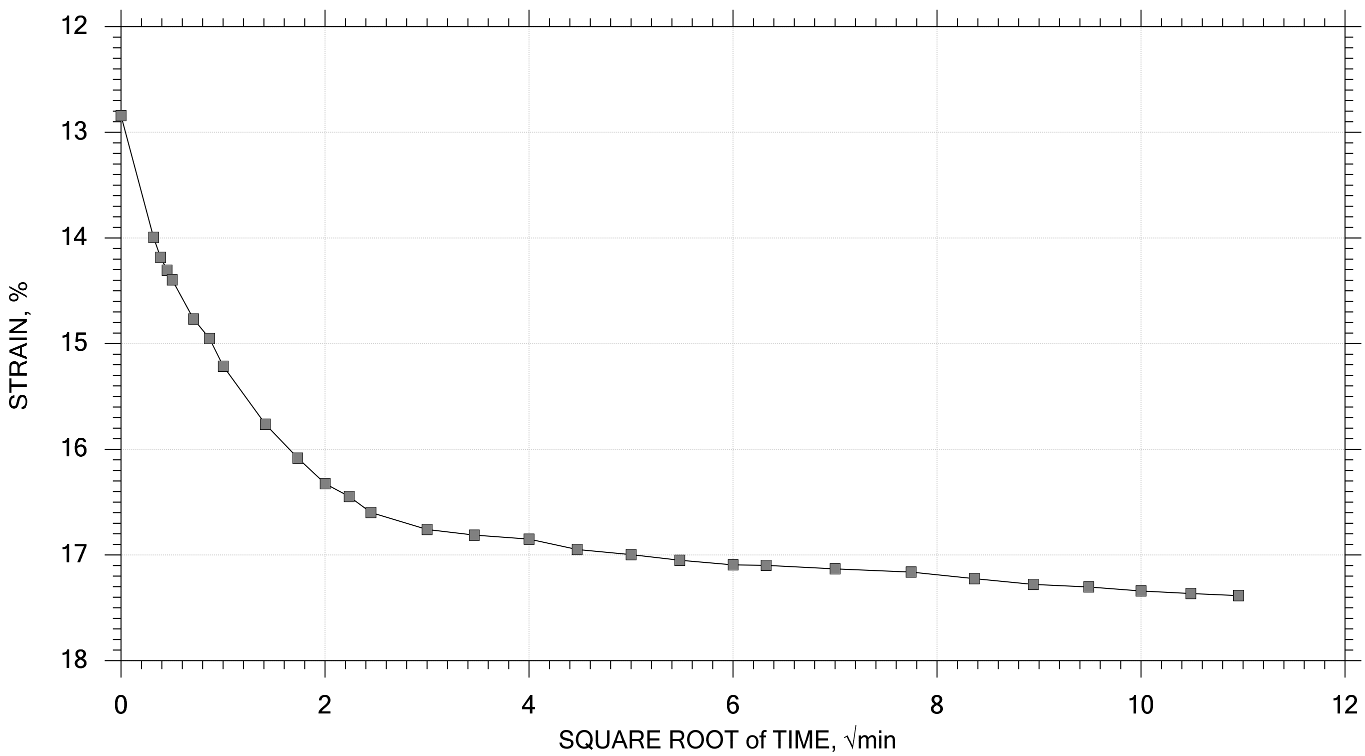
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 21

Stress: 16 tsf





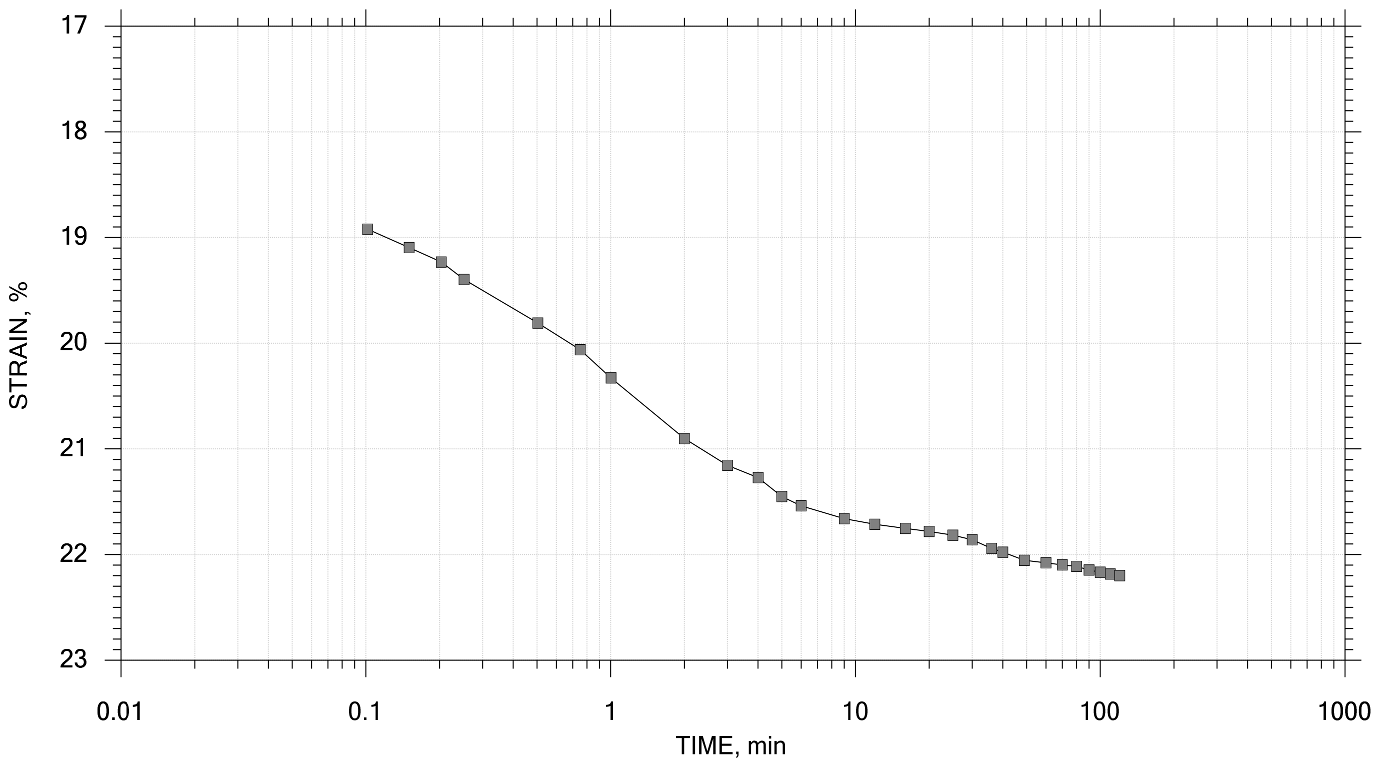
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

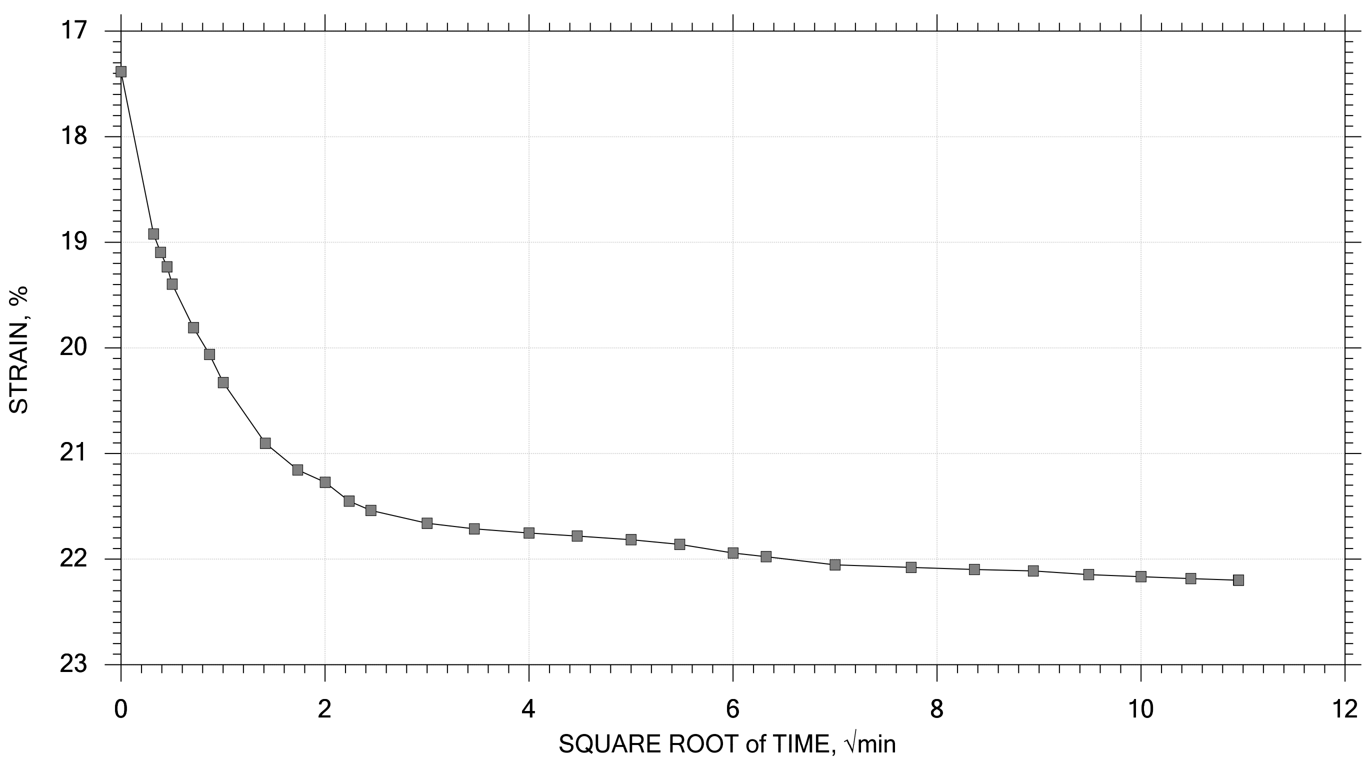
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 16 of 21

Stress: 32 tsf





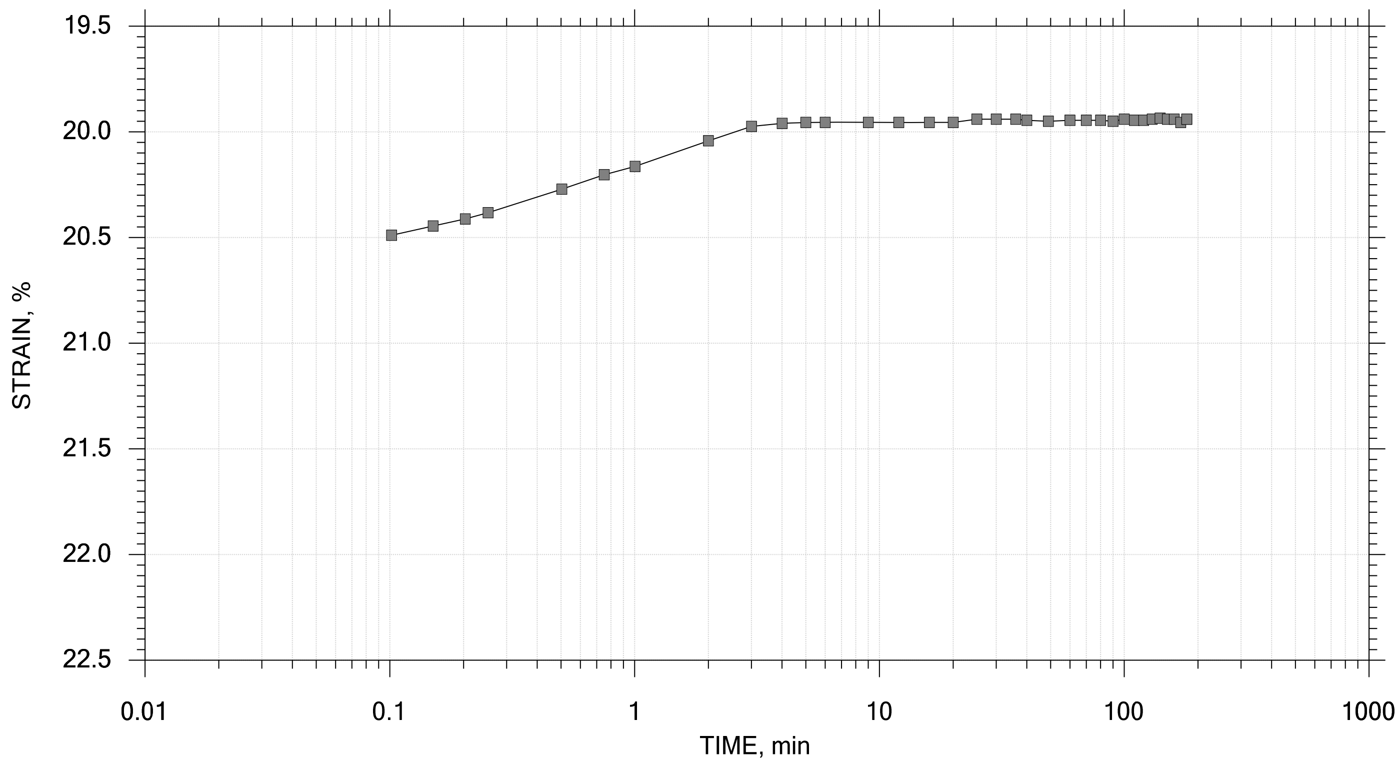
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

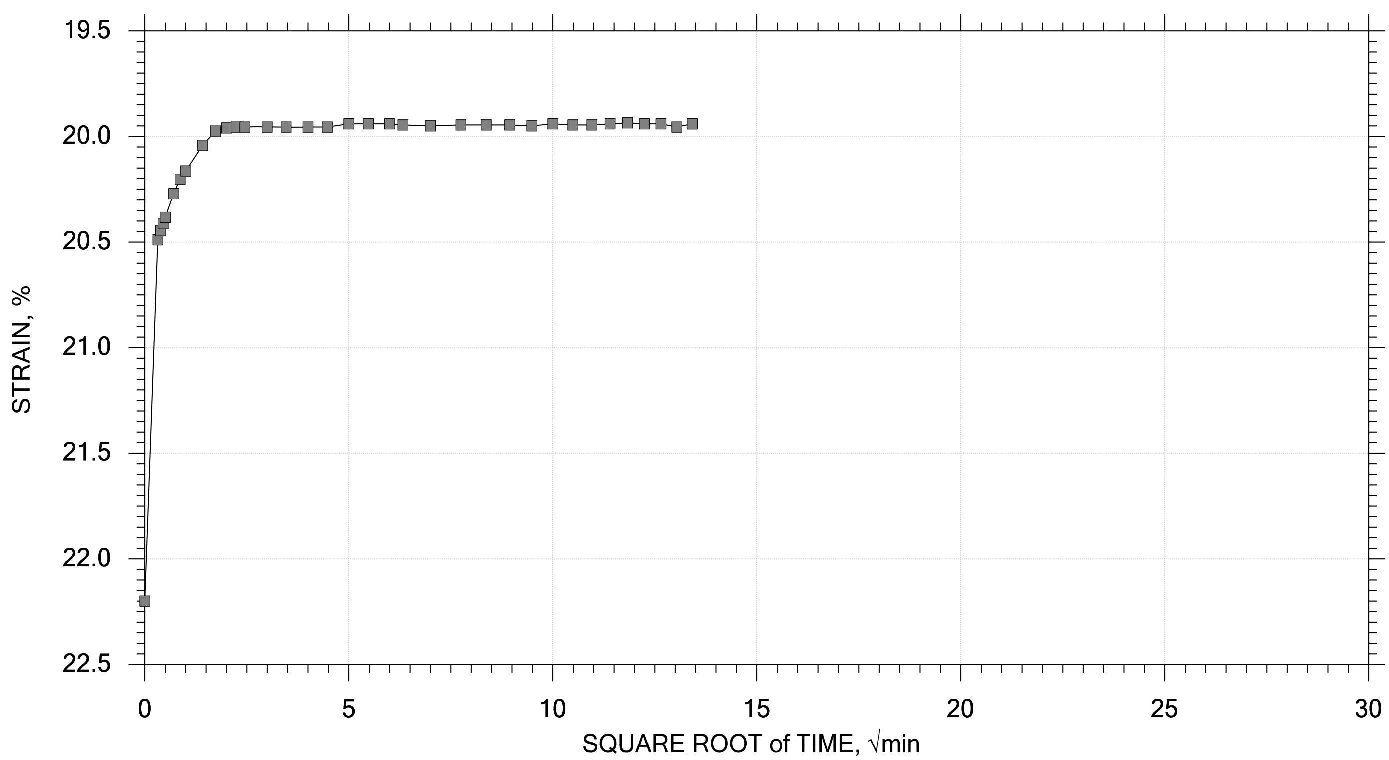
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 17 of 21

Stress: 8 tsf





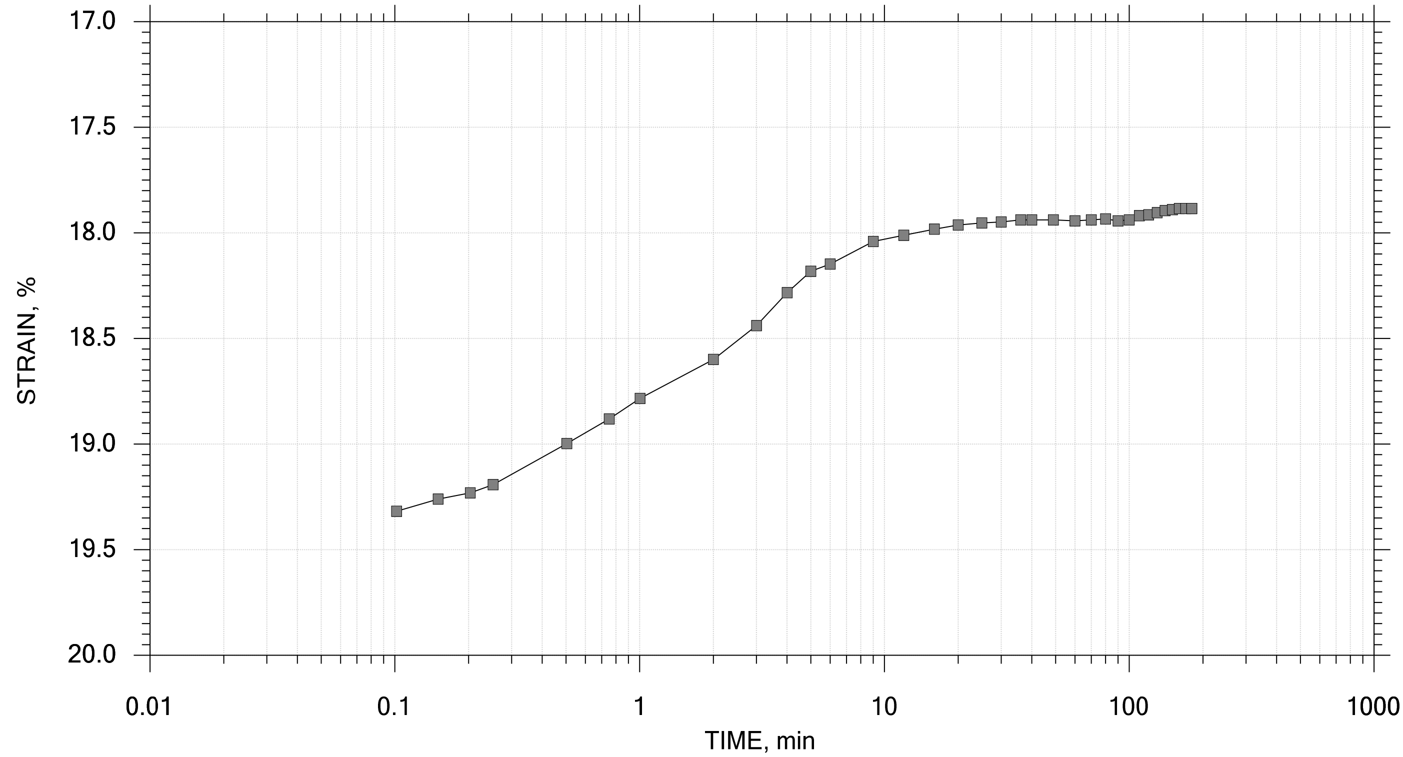
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

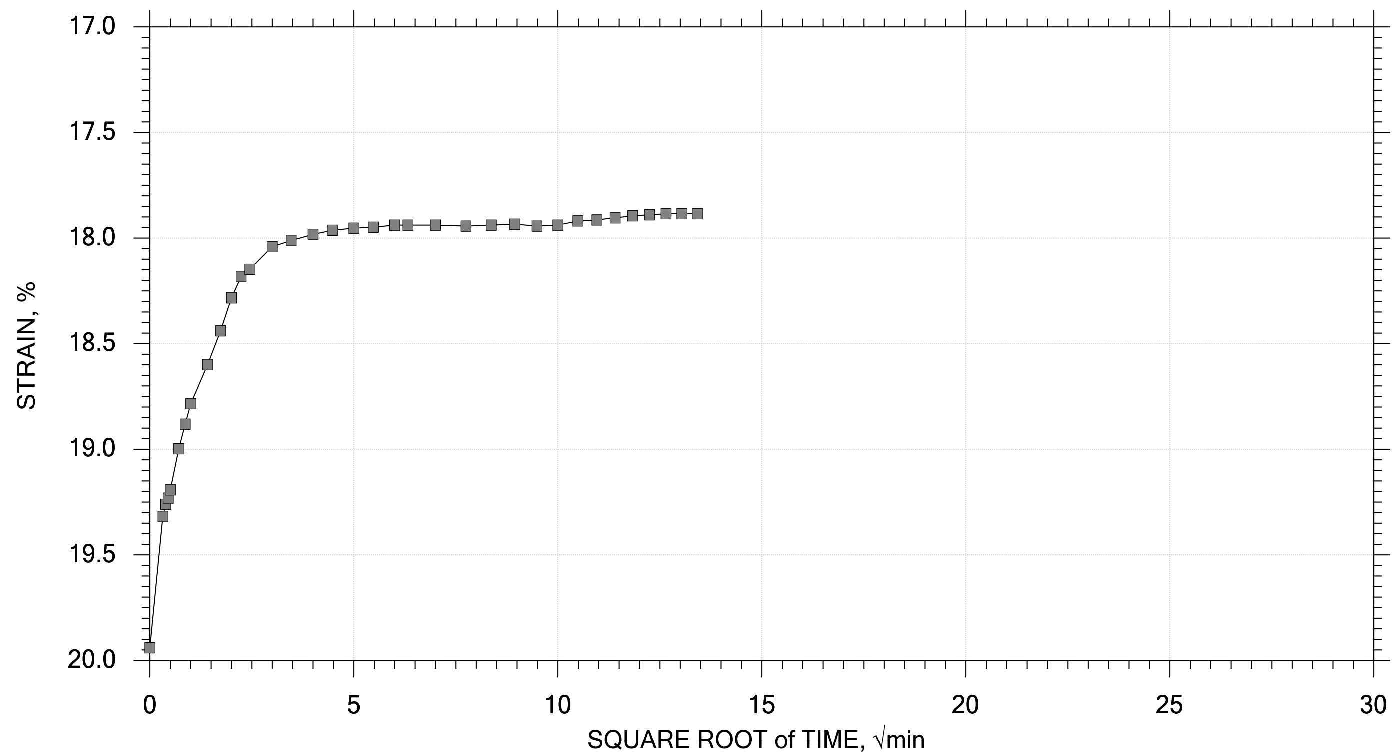
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 18 of 21

Stress: 2 tsf





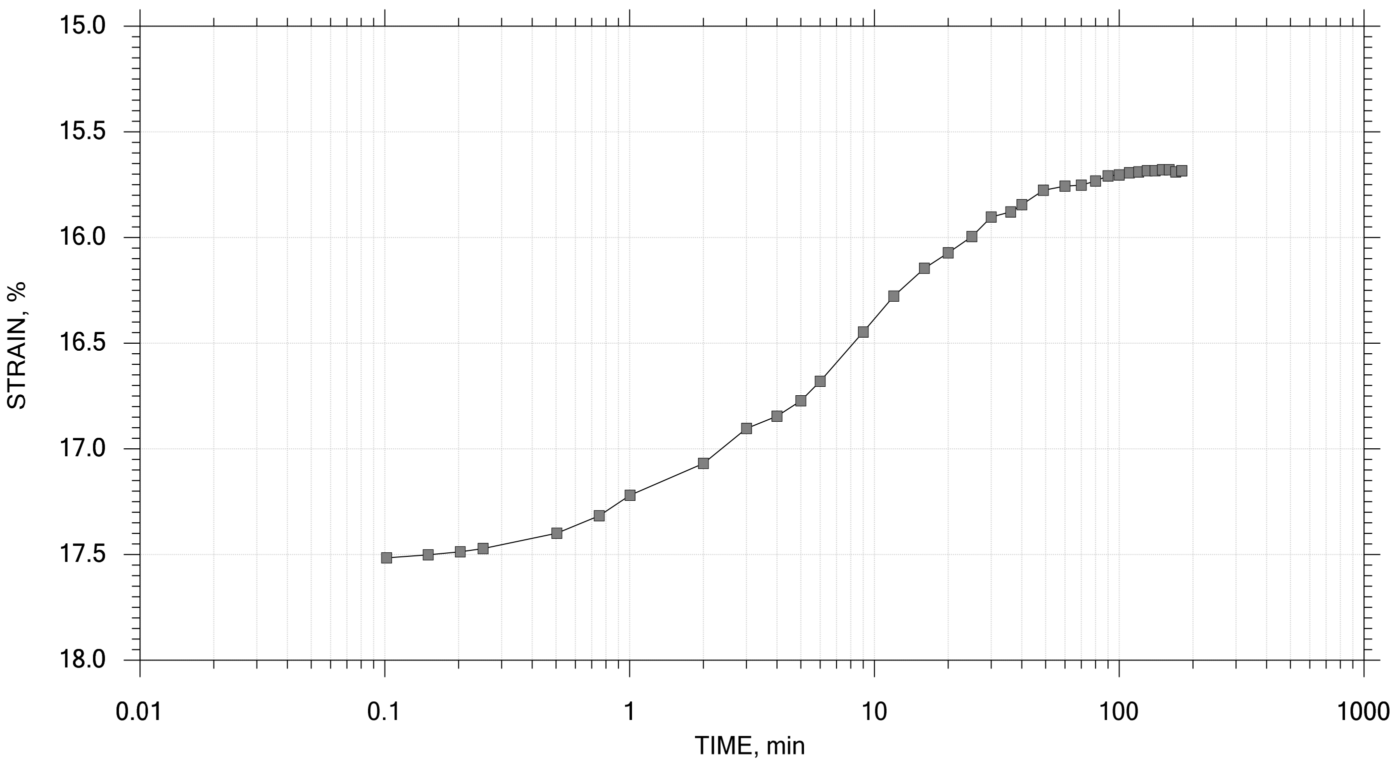
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

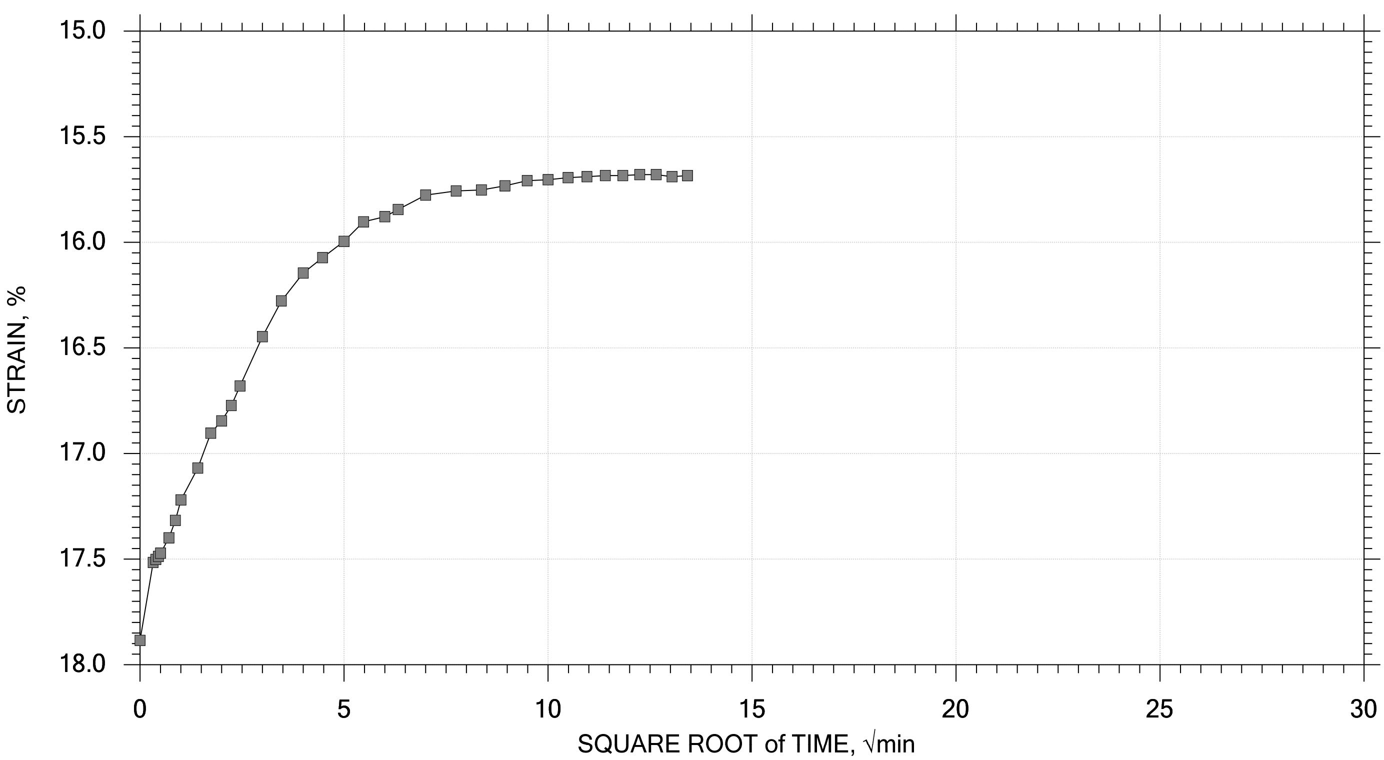
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 19 of 21

Stress: 0.5 tsf





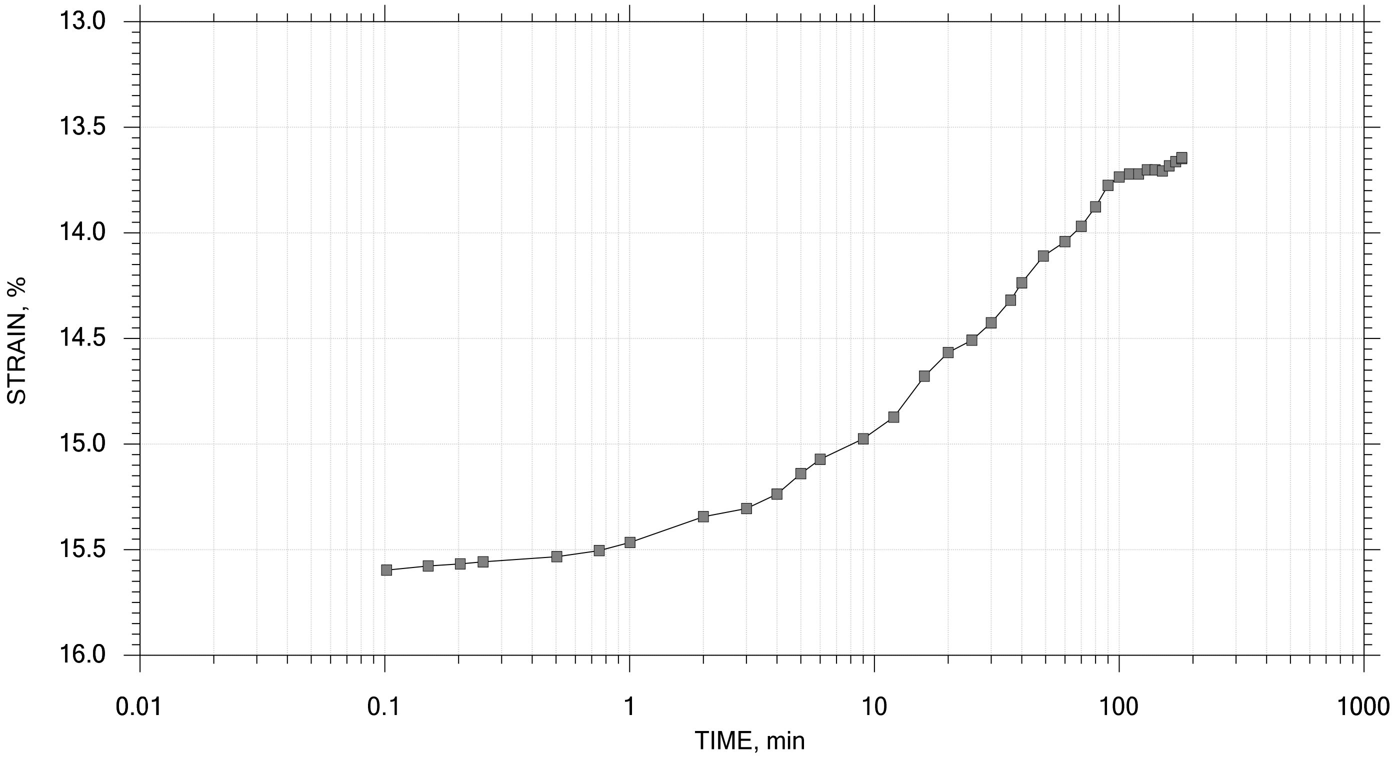
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

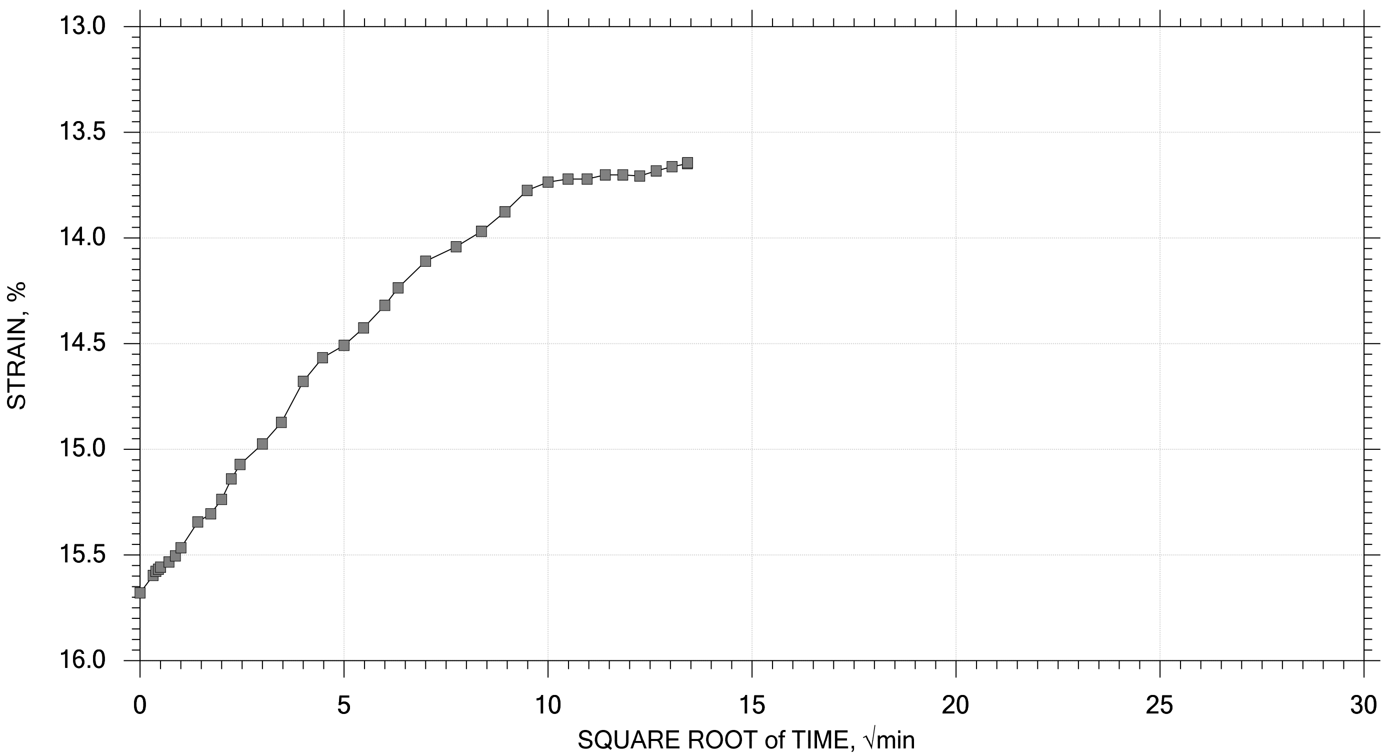
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 20 of 21

Stress: 0.125 tsf





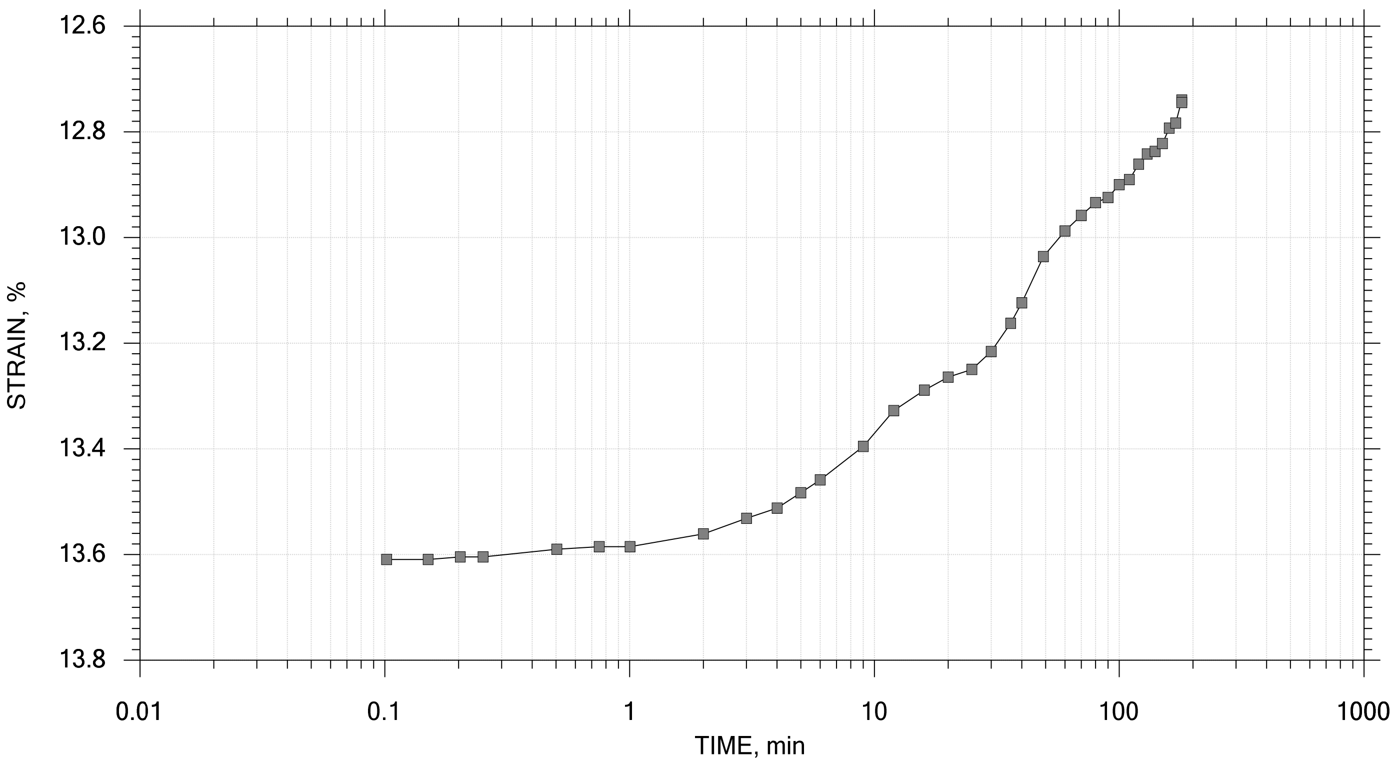
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

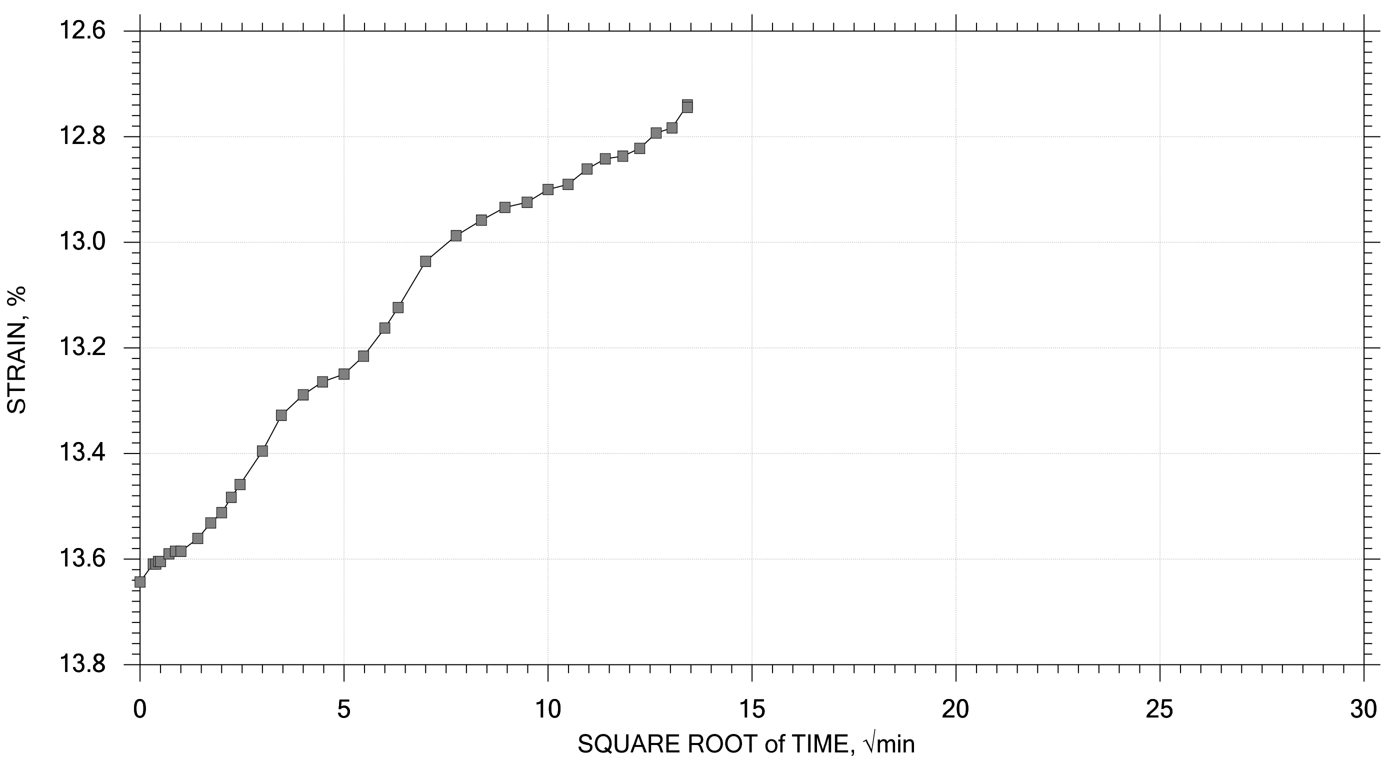
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 21 of 21

Stress: 0.0625 tsf

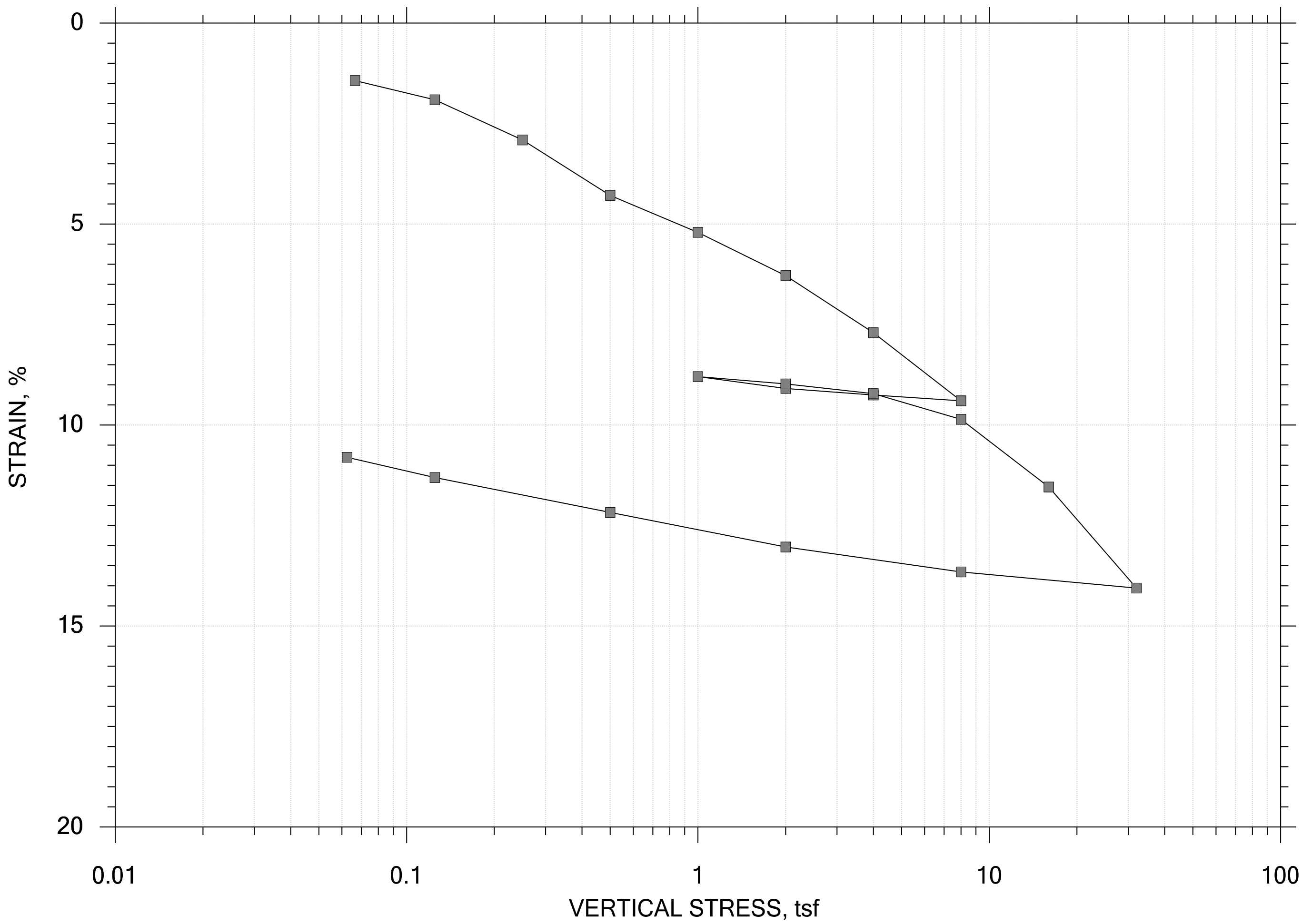


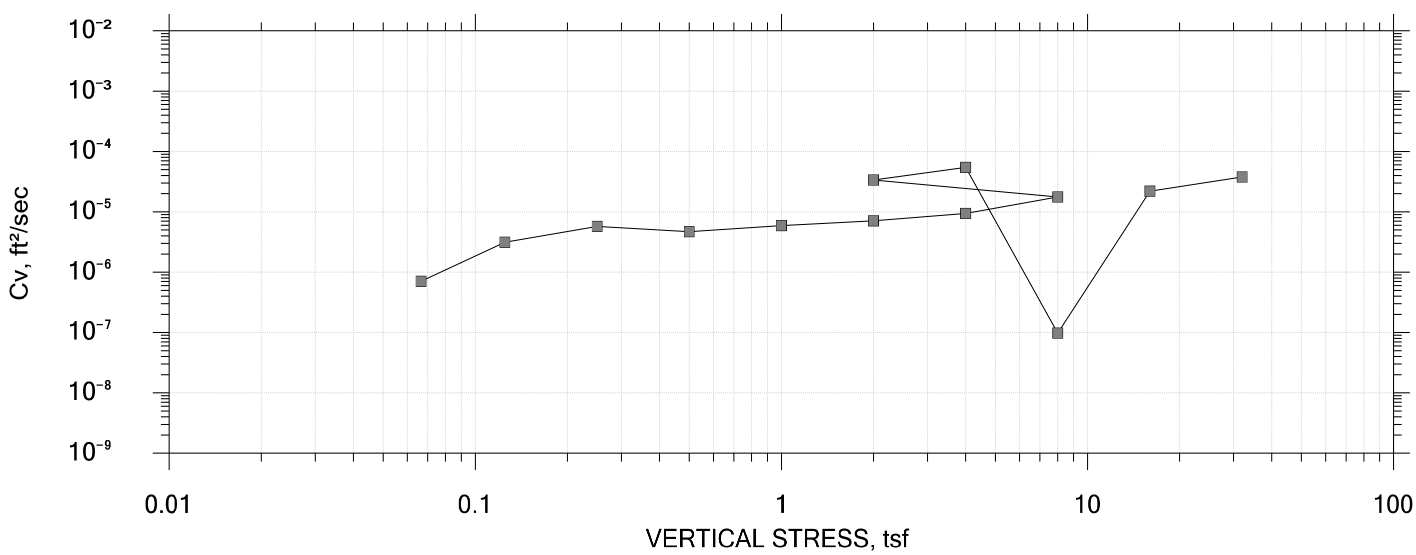


GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-1
	Depth: 38-40 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System JJ, Swell Pressure = 0.0739 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

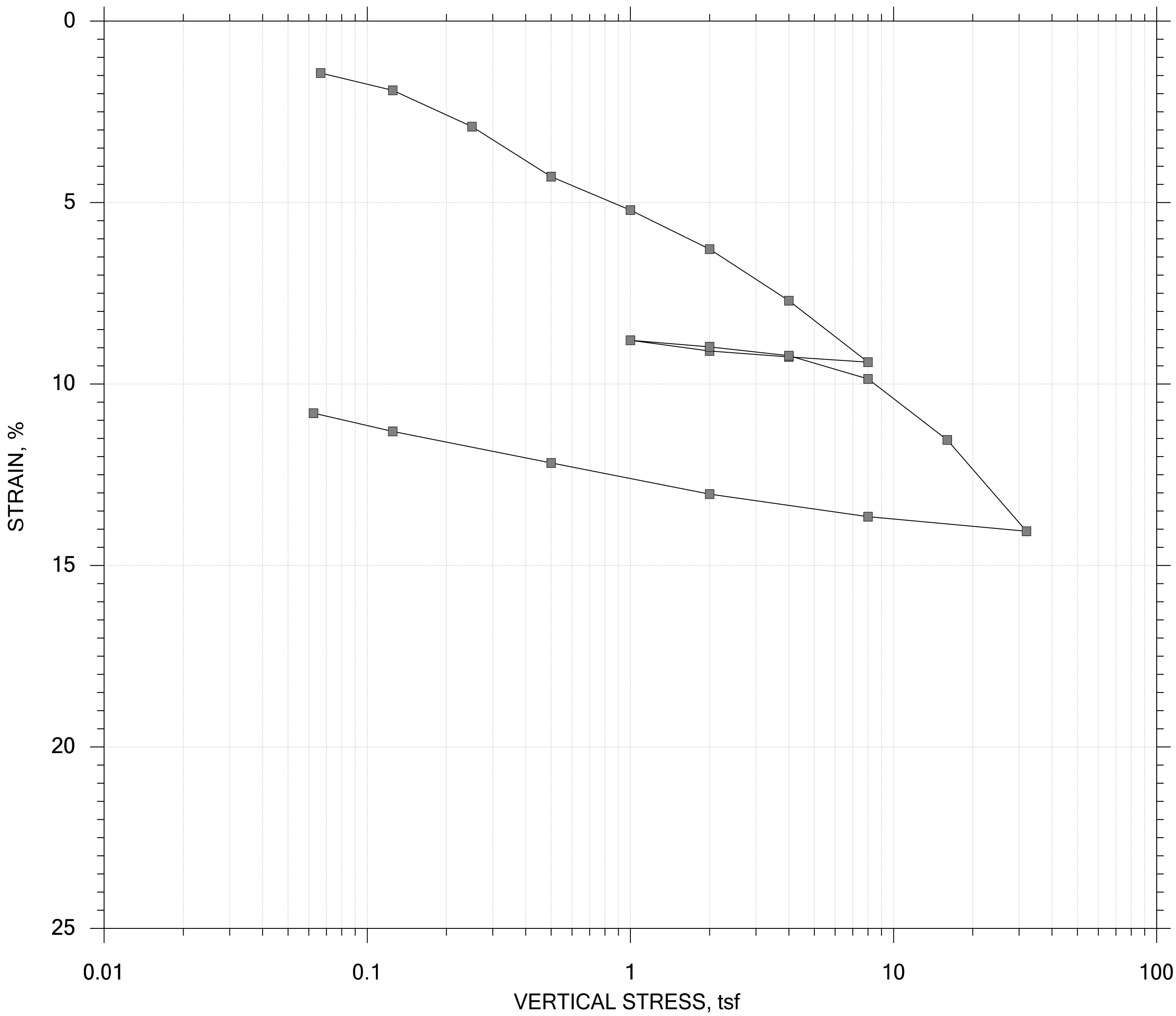




GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	25.13	19.01
Preconsolidation Stress: ---				Dry Unit Weight, pcf	102.02	113.35
Compression Ratio: ---				Saturation, %	99.99	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	0.70	0.53
LL: 38	PL: 24	PI: 14	GS: 2.77			

GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: Beacon Island Parcel
Location: Bethlehem, NY
Project No.: GTX-306651
Boring No.: SB-01
Tested By: md
Checked By: njh
Sample No.: Tube
Test Date: 06/27/17
Depth: 58-60 ft
Test No.: IP-2
Sample Type: intact
Elevation: ---

Soil Description: Moist, dark gray clay
Remarks: System S, Swell Pressure = 0.0665 tsf

Estimated Specific Gravity: 2.77
Liquid Limit: 38
Specimen Diameter: 2.50 in
Initial Void Ratio: 0.697
Plastic Limit: 24
Initial Height: 1.00 in
Final Void Ratio: 0.527
Plasticity Index: 14
Final Height: 0.90 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-1789	RING		C-1091
Wt. Container + Wet Soil, gm	221.53	275.93	267.89	163.39
Wt. Container + Dry Soil, gm	178.06	242.89	242.89	138.61
Wt. Container, gm	8.3200	111.44	111.44	8.2900
Wt. Dry Soil, gm	169.74	131.45	131.45	130.32
Water Content, %	25.61	25.13	19.01	19.01
Void Ratio	---	0.697	0.527	---
Degree of Saturation, %	---	99.99	100.00	---
Dry Unit Weight, pcf	---	102.02	113.35	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: Beacon Island Parcel
Location: Bethlehem, NY
Project No.: GTX-306651
Boring No.: SB-01
Tested By: md
Checked By: njh
Sample No.: Tube
Test Date: 06/27/17
Depth: 58-60 ft
Test No.: IP-2
Sample Type: intact
Elevation: ---

Soil Description: Moist, dark gray clay
Remarks: System S, Swell Pressure = 0.0665 tsf

Displacement at End of Increment

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/tsf	k ft/day
1	0.0665	0.01430	0.673	1.43	30.414	7.95e-007	2.15e-001	4.61e-004
2	0.125	0.01907	0.665	1.91	8.731	2.72e-006	8.14e-002	5.97e-004
3	0.250	0.02909	0.648	2.91	4.351	5.37e-006	8.01e-002	1.16e-003
4	0.500	0.04284	0.624	4.28	4.292	5.31e-006	5.50e-002	7.89e-004
5	1.00	0.05208	0.609	5.21	4.057	5.49e-006	1.85e-002	2.73e-004
6	2.00	0.06283	0.590	6.28	2.754	7.92e-006	1.07e-002	2.29e-004
7	4.00	0.07705	0.566	7.70	2.052	1.03e-005	7.11e-003	1.98e-004
8	8.00	0.09396	0.538	9.40	1.424	1.44e-005	4.23e-003	1.64e-004
9	4.00	0.09250	0.540	9.25	0.504	4.01e-005	3.66e-004	3.95e-005
10	2.00	0.09090	0.543	9.09	0.583	3.47e-005	7.99e-004	7.49e-005
11	1.00	0.08793	0.548	8.79	1.188	1.71e-005	2.97e-003	1.37e-004
12	2.00	0.08976	0.545	8.98	0.659	3.09e-005	1.83e-003	1.52e-004
13	4.00	0.09218	0.541	9.22	0.477	4.25e-005	1.21e-003	1.39e-004
14	8.00	0.09858	0.530	9.86	198.401	1.01e-007	1.60e-003	4.37e-007
15	16.0	0.1154	0.501	11.5	1.126	1.74e-005	2.10e-003	9.85e-005
16	32.0	0.1406	0.459	14.1	0.603	3.09e-005	1.57e-003	1.31e-004
17	8.00	0.1365	0.465	13.7	0.383	4.75e-005	1.68e-004	2.15e-005
18	2.00	0.1303	0.476	13.0	0.592	3.12e-005	1.04e-003	8.71e-005
19	0.500	0.1217	0.490	12.2	4.327	4.33e-006	5.73e-003	6.69e-005
20	0.125	0.1130	0.505	11.3	17.272	1.11e-006	2.32e-002	6.92e-005
21	0.0625	0.1080	0.514	10.8	32.445	5.98e-007	8.05e-002	1.30e-004

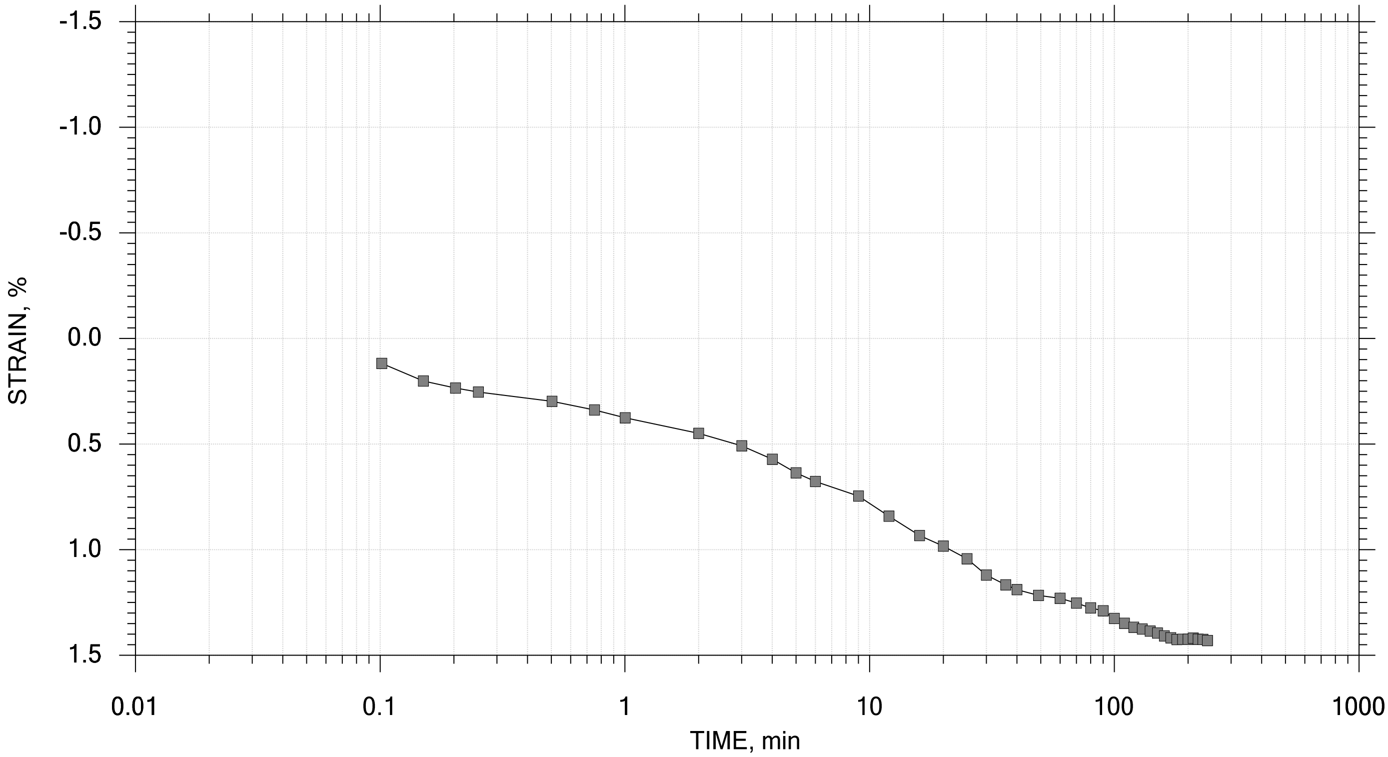
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0665	0.01430	0.673	1.43	8.932	6.29e-007	2.15e-001	3.65e-004	0.00e+000
2	0.125	0.01907	0.665	1.91	1.716	3.21e-006	8.14e-002	7.05e-004	0.00e+000
3	0.250	0.02909	0.648	2.91	0.000	0.00e+000	8.01e-002	0.00e+000	0.00e+000
4	0.500	0.04284	0.624	4.28	0.000	0.00e+000	5.50e-002	0.00e+000	0.00e+000
5	1.00	0.05208	0.609	5.21	0.871	5.94e-006	1.85e-002	2.96e-004	0.00e+000
6	2.00	0.06283	0.590	6.28	0.778	6.51e-006	1.07e-002	1.89e-004	0.00e+000
7	4.00	0.07705	0.566	7.70	0.615	8.02e-006	7.11e-003	1.54e-004	0.00e+000
8	8.00	0.09396	0.538	9.40	0.229	2.08e-005	4.23e-003	2.37e-004	0.00e+000
9	4.00	0.09250	0.540	9.25	0.000	0.00e+000	3.66e-004	0.00e+000	0.00e+000
10	2.00	0.09090	0.543	9.09	0.000	0.00e+000	7.99e-004	0.00e+000	0.00e+000
11	1.00	0.08793	0.548	8.79	0.000	0.00e+000	2.97e-003	0.00e+000	0.00e+000
12	2.00	0.08976	0.545	8.98	0.000	0.00e+000	1.83e-003	0.00e+000	0.00e+000
13	4.00	0.09218	0.541	9.22	0.000	0.00e+000	1.21e-003	0.00e+000	0.00e+000
14	8.00	0.09858	0.530	9.86	0.000	0.00e+000	1.60e-003	0.00e+000	0.00e+000
15	16.0	0.1154	0.501	11.5	0.191	2.38e-005	2.10e-003	1.35e-004	0.00e+000
16	32.0	0.1406	0.459	14.1	0.109	3.96e-005	1.57e-003	1.68e-004	0.00e+000
17	8.00	0.1365	0.465	13.7	0.000	0.00e+000	1.68e-004	0.00e+000	0.00e+000
18	2.00	0.1303	0.476	13.0	0.000	0.00e+000	1.04e-003	0.00e+000	0.00e+000
19	0.500	0.1217	0.490	12.2	1.216	3.58e-006	5.73e-003	5.53e-005	0.00e+000
20	0.125	0.1130	0.505	11.3	3.019	1.47e-006	2.32e-002	9.19e-005	0.00e+000
21	0.0625	0.1080	0.514	10.8	10.661	4.23e-007	8.05e-002	9.18e-005	0.00e+000

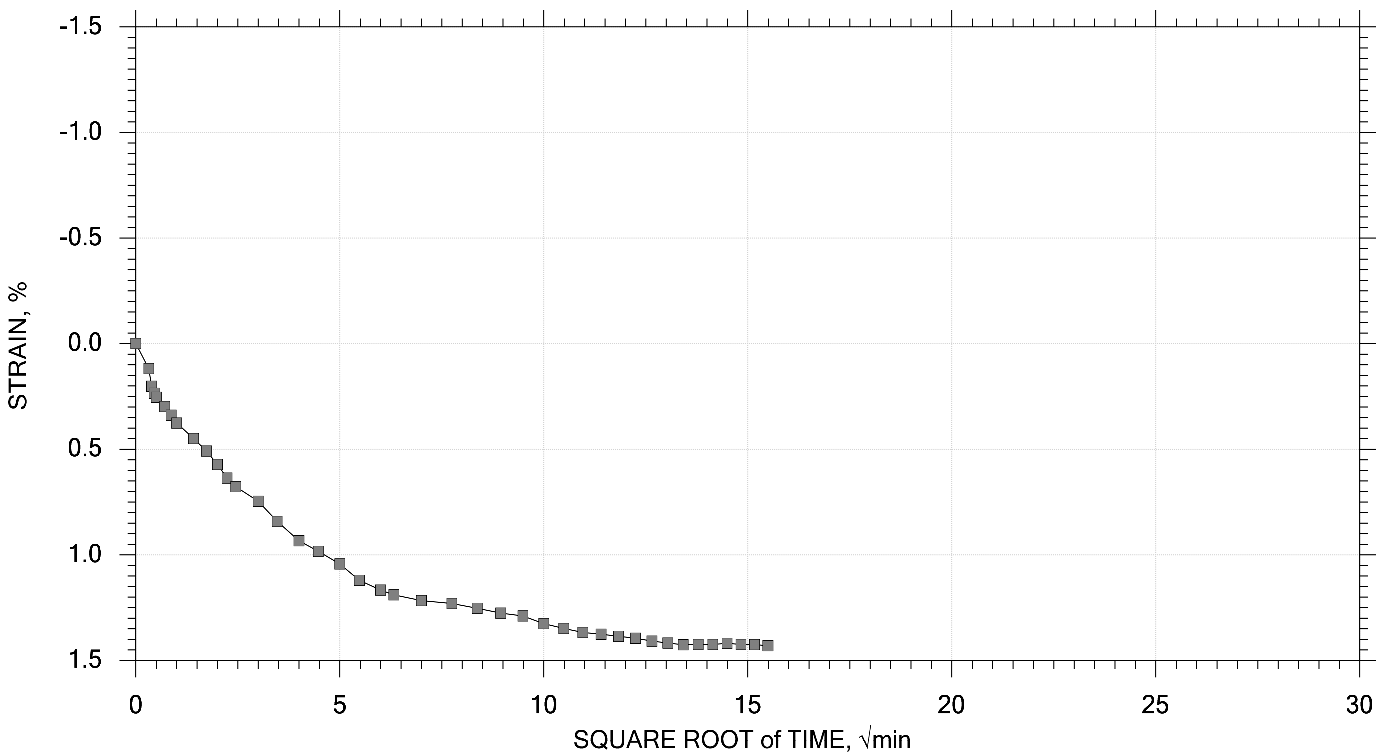
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Volume Step 1 of 21

Stress: 0.066485 tsf





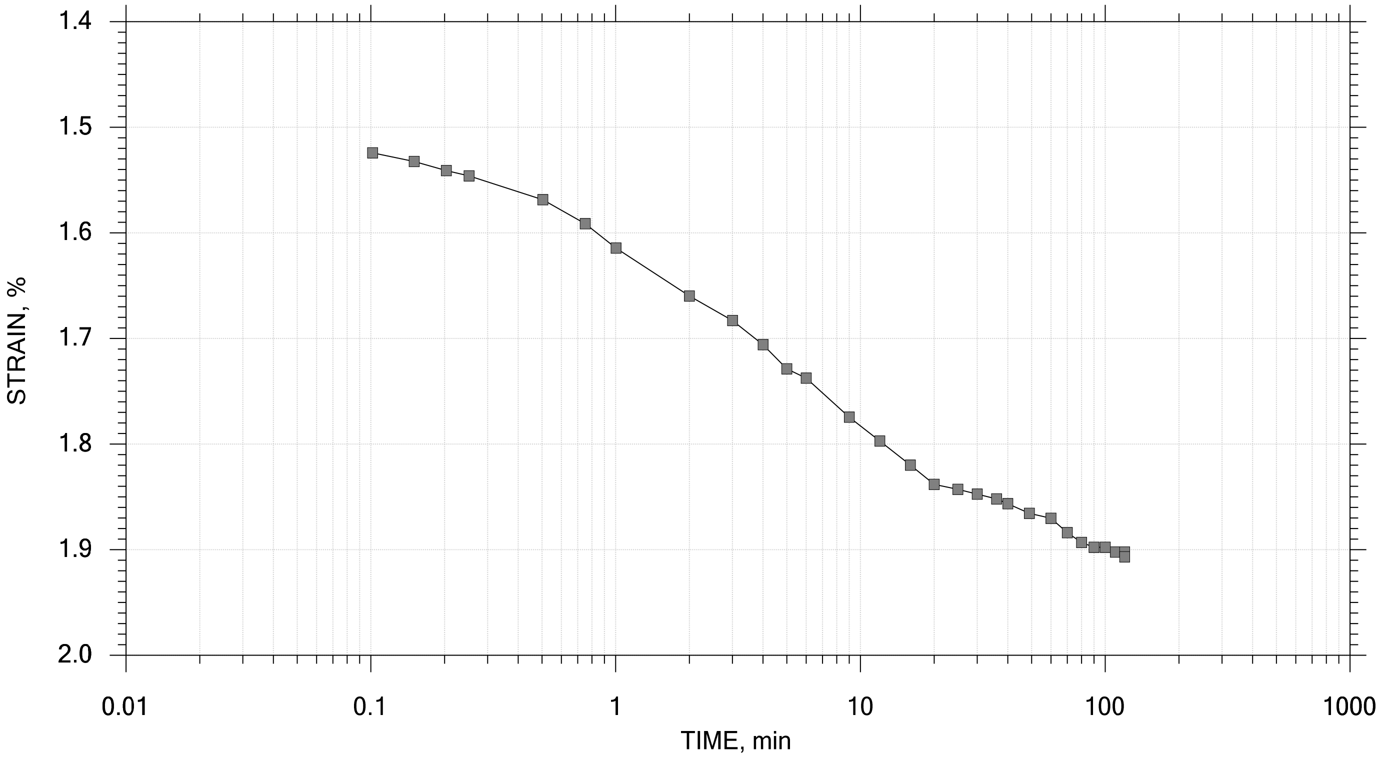
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

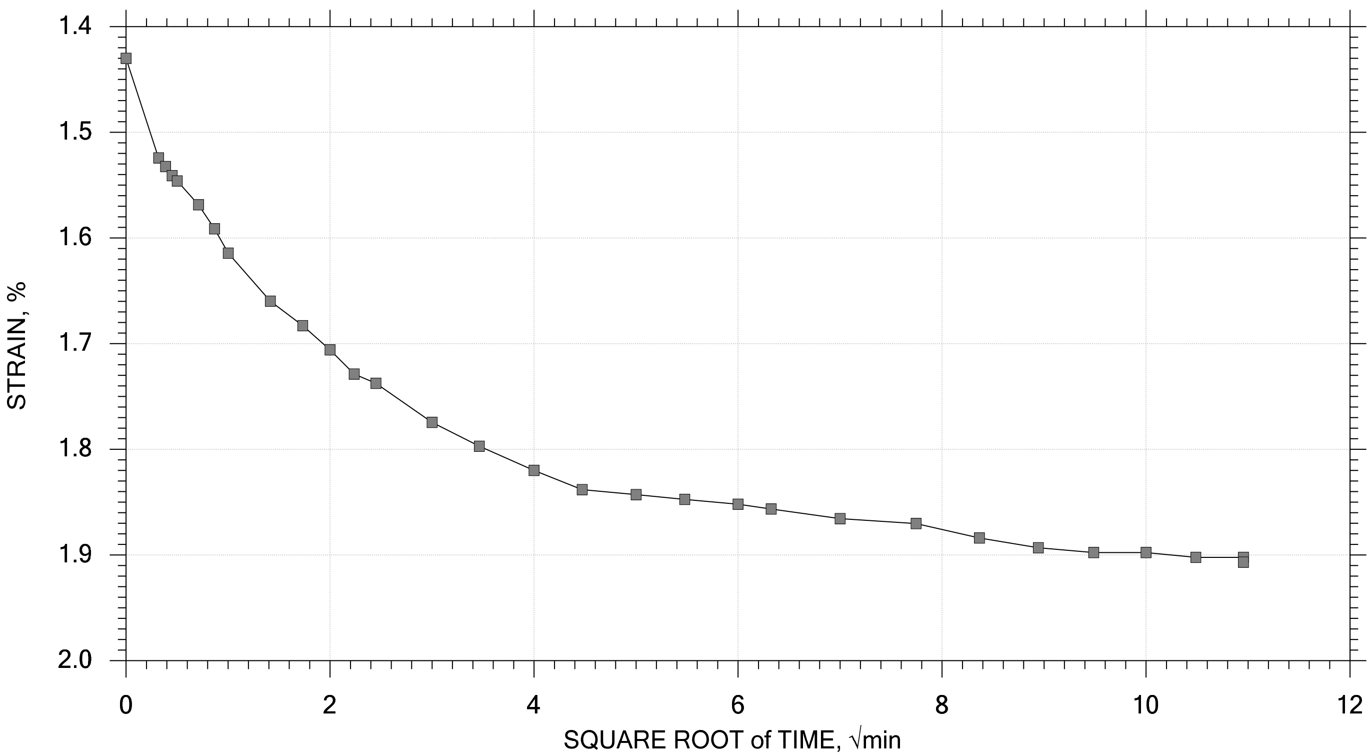
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 21

Stress: 0.125 tsf





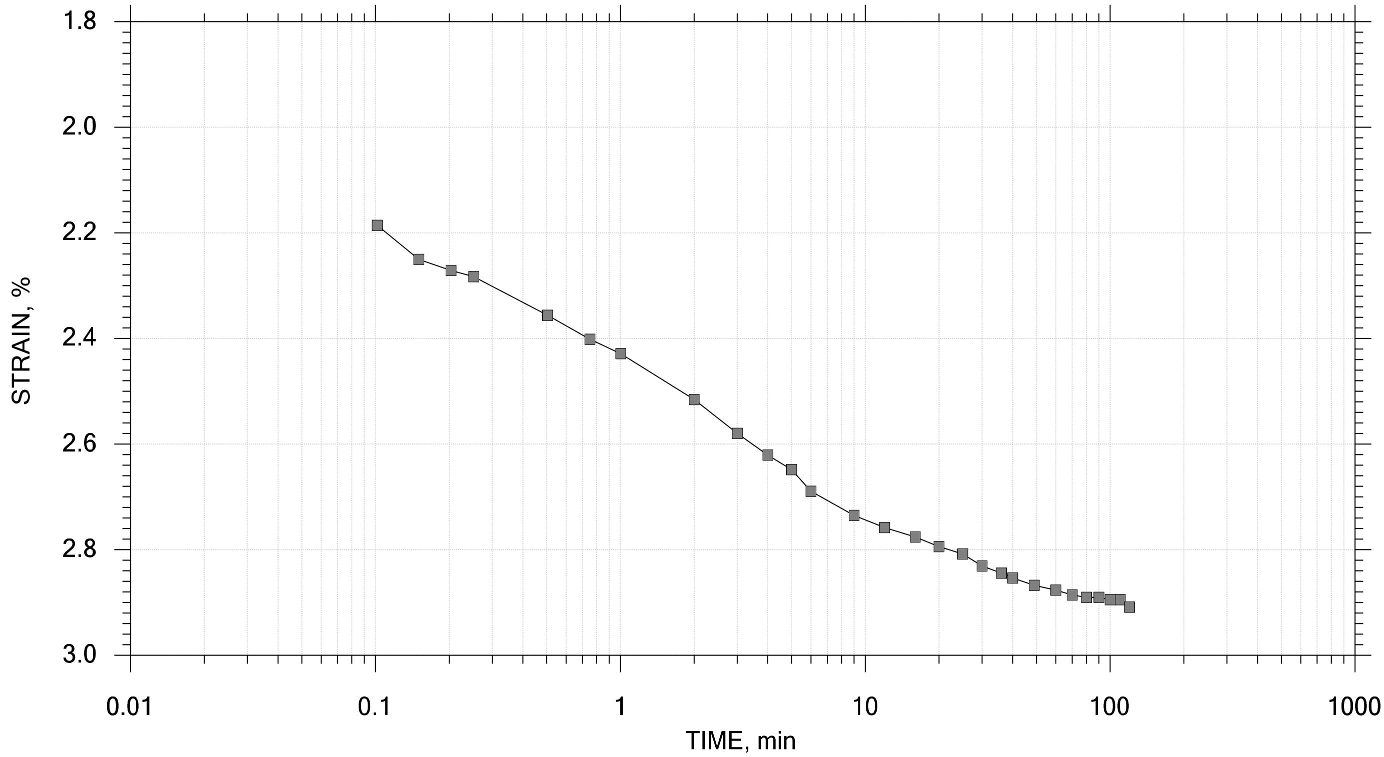
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

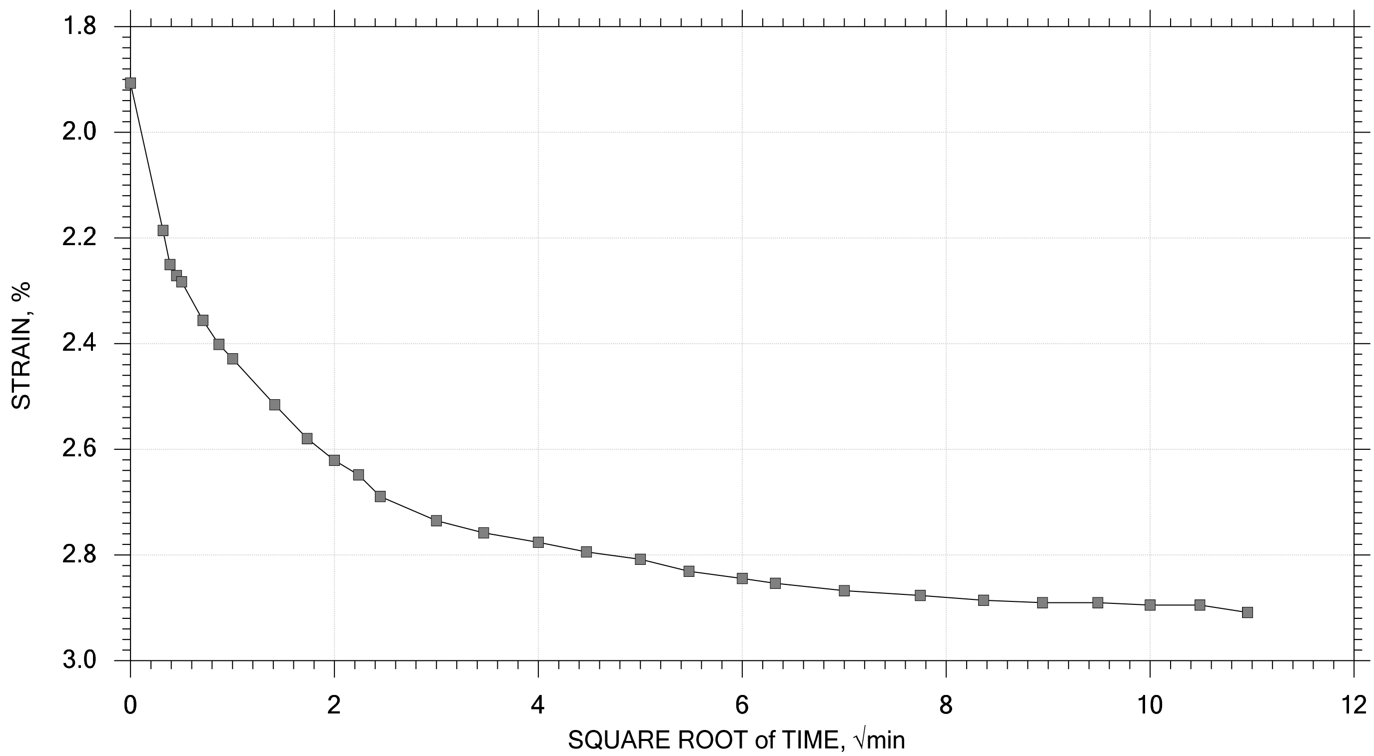
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 21

Stress: 0.25 tsf





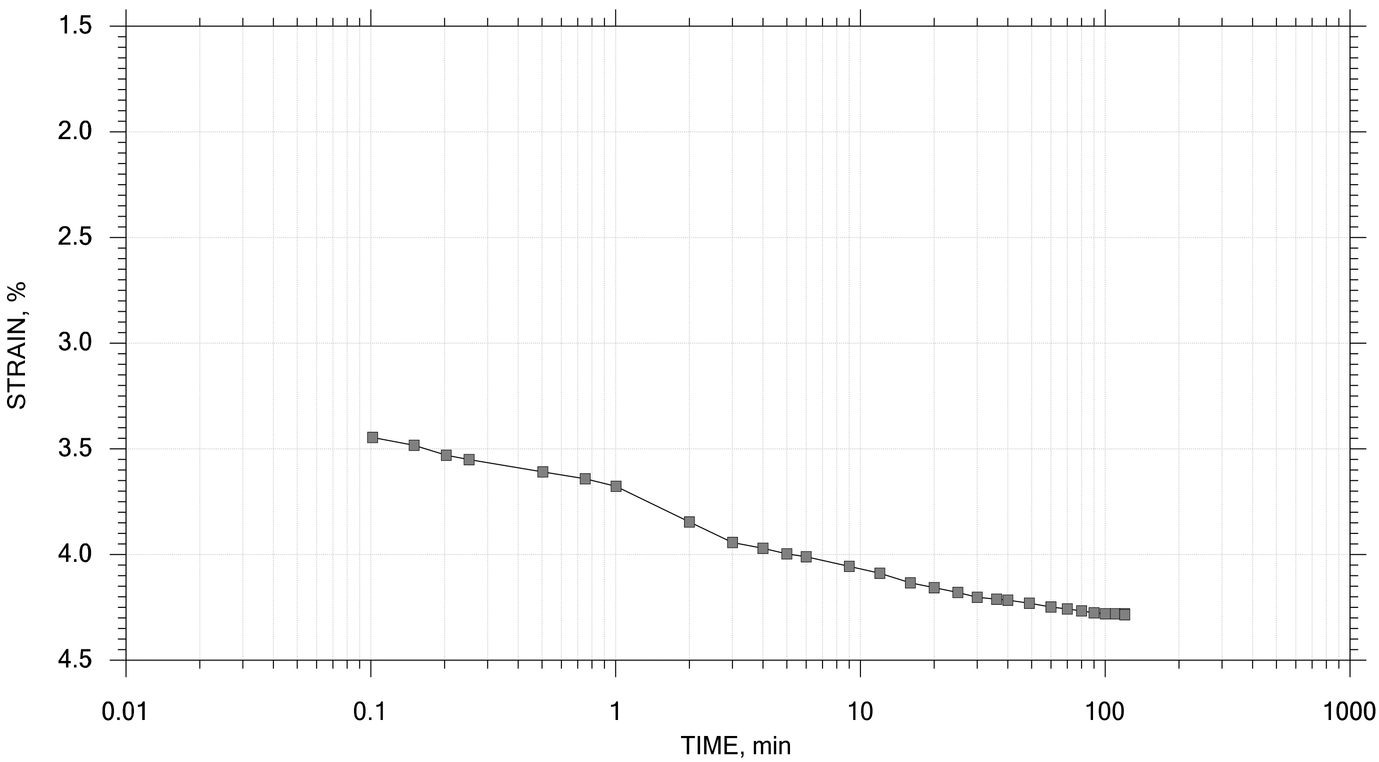
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

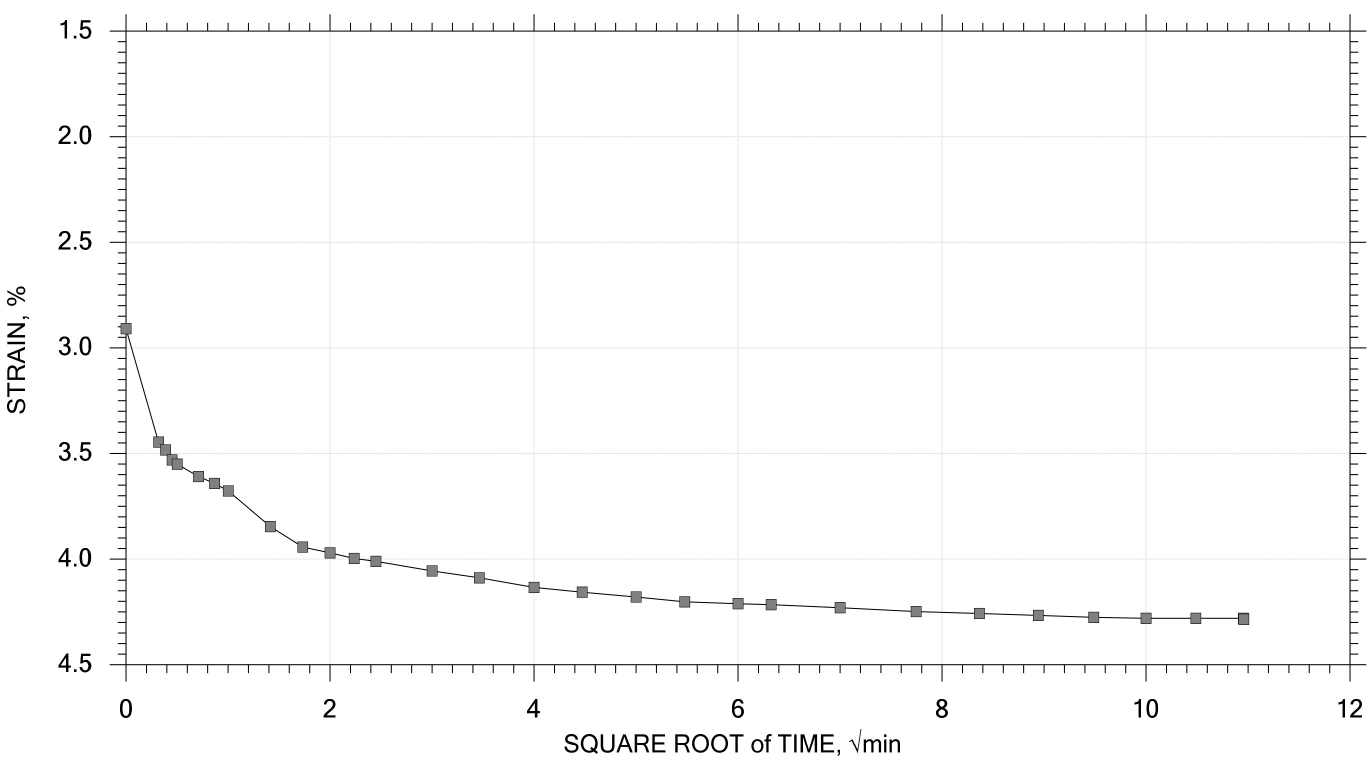
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 21

Stress: 0.5 tsf





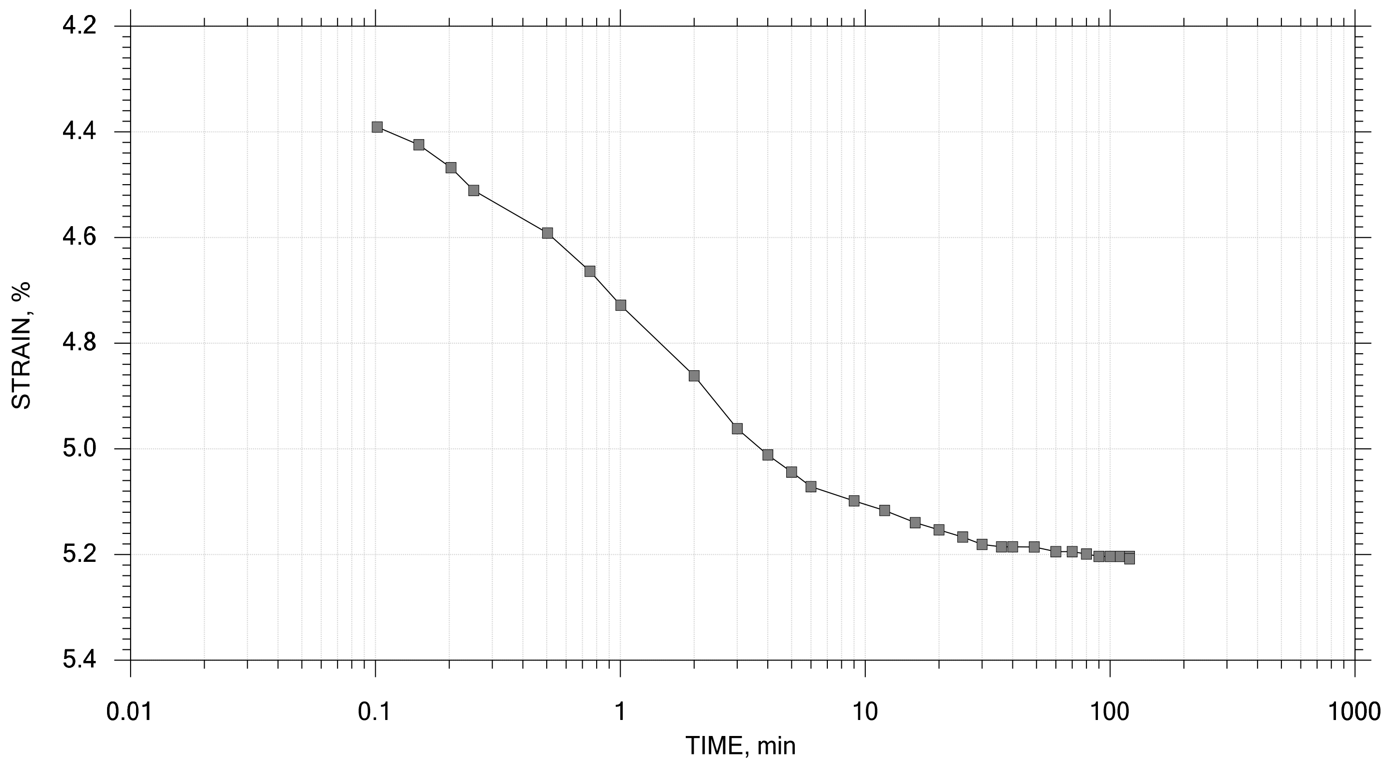
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

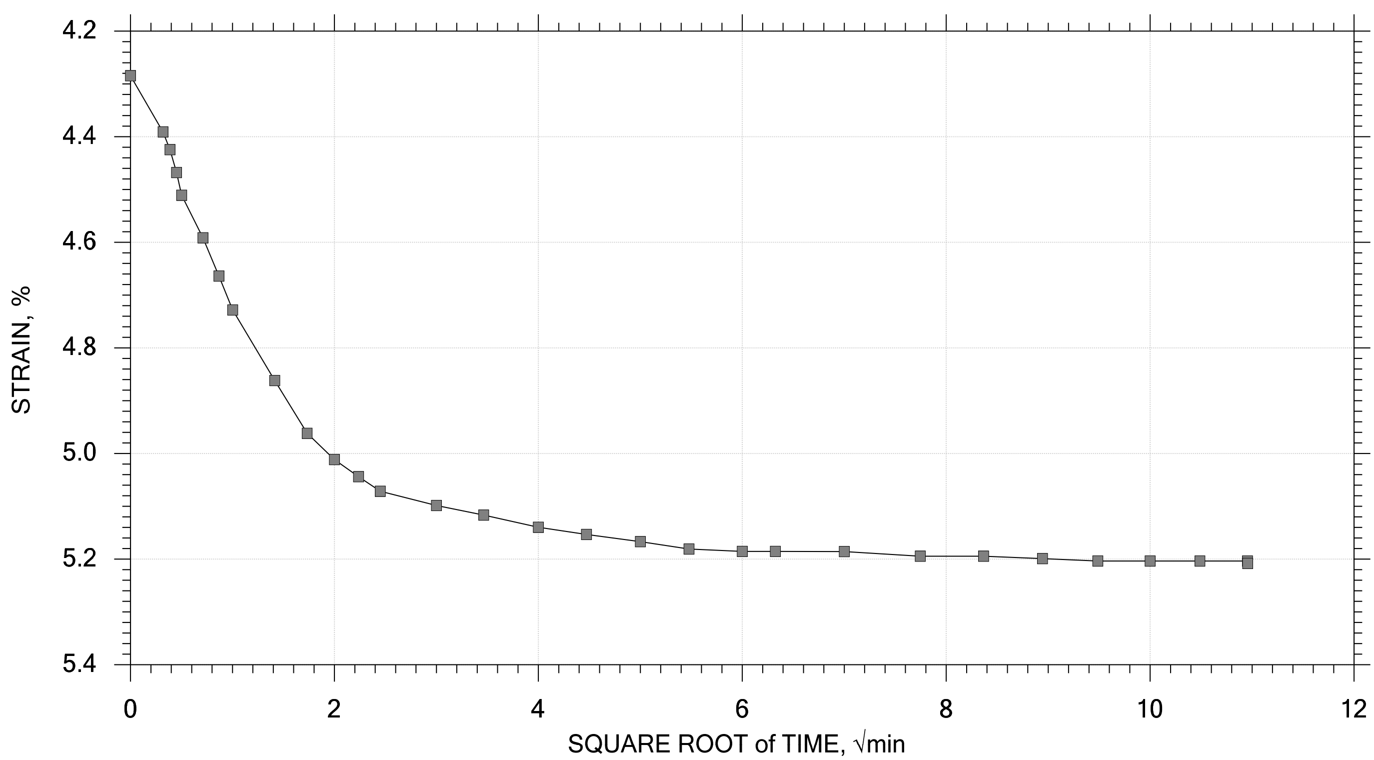
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 21

Stress: 1 tsf





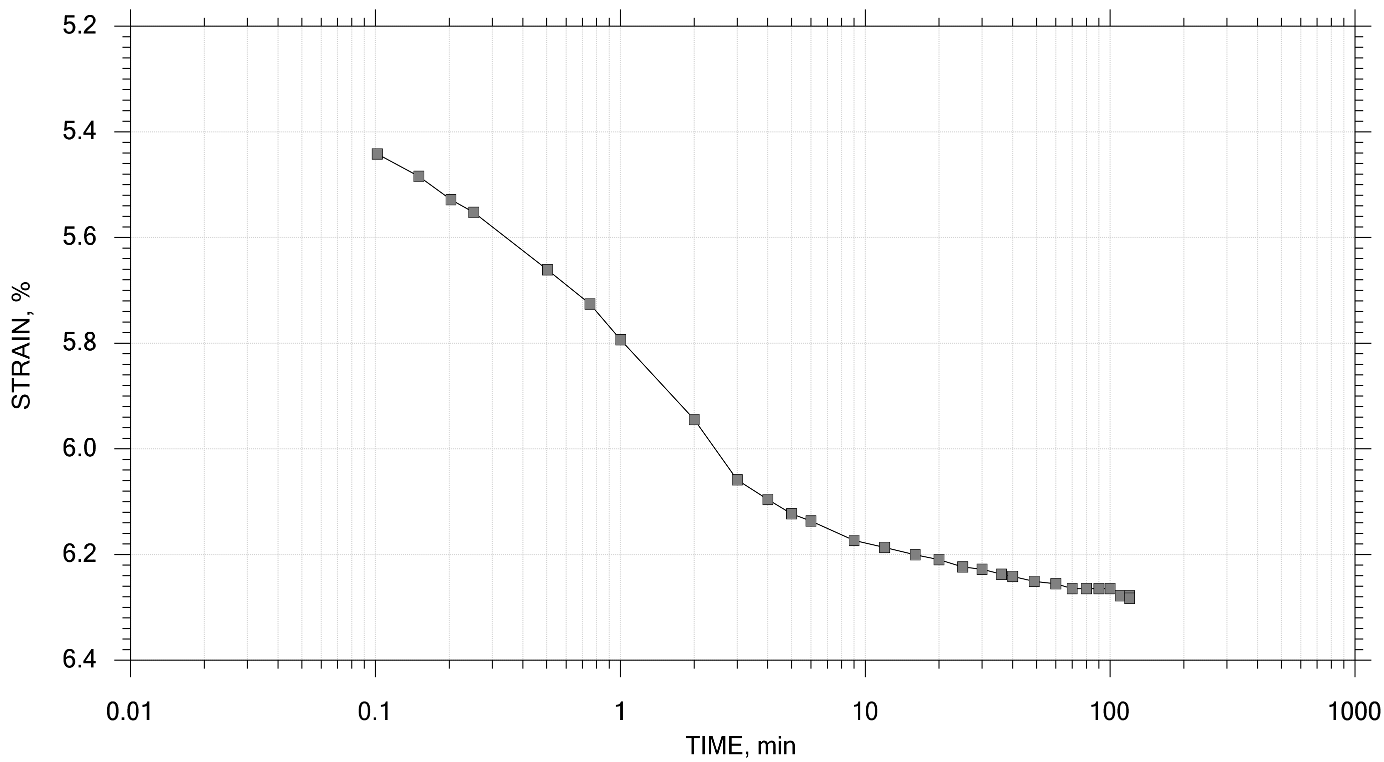
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

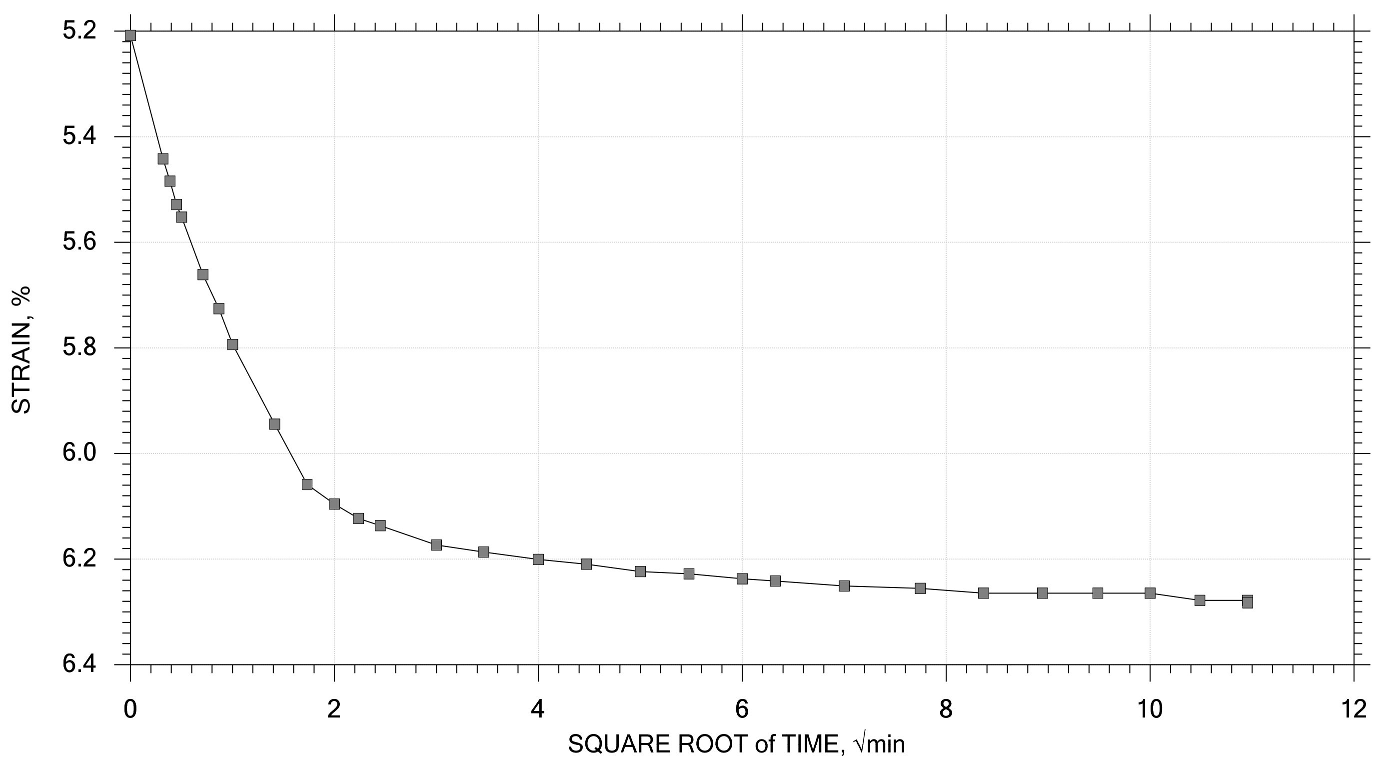
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 21

Stress: 2 tsf





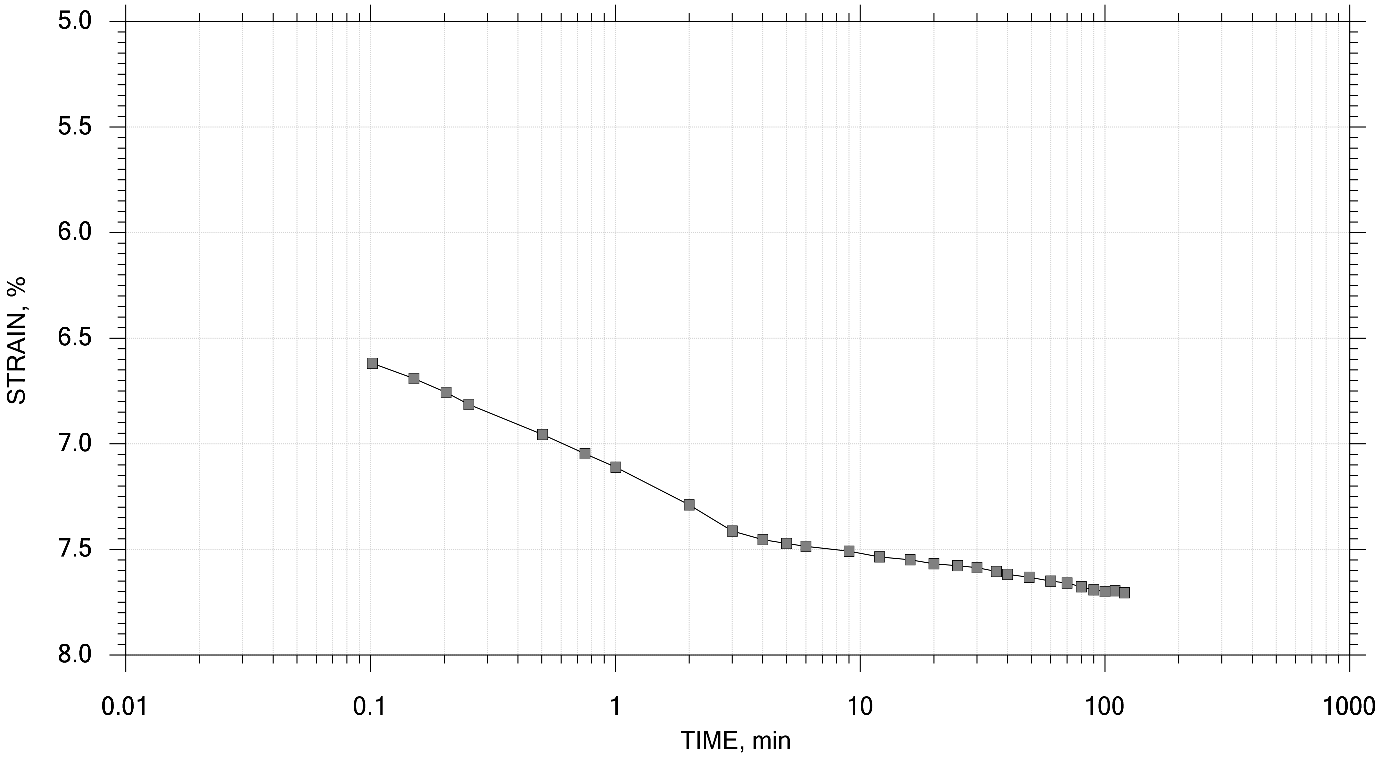
Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
Boring No.: SB-01	Tested By: md	Checked By: njh
Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
Depth: 58-60 ft	Sample Type: intact	Elevation: ---
Description: Moist, dark gray clay		
Remarks: System S, Swell Pressure = 0.0665 tsf		

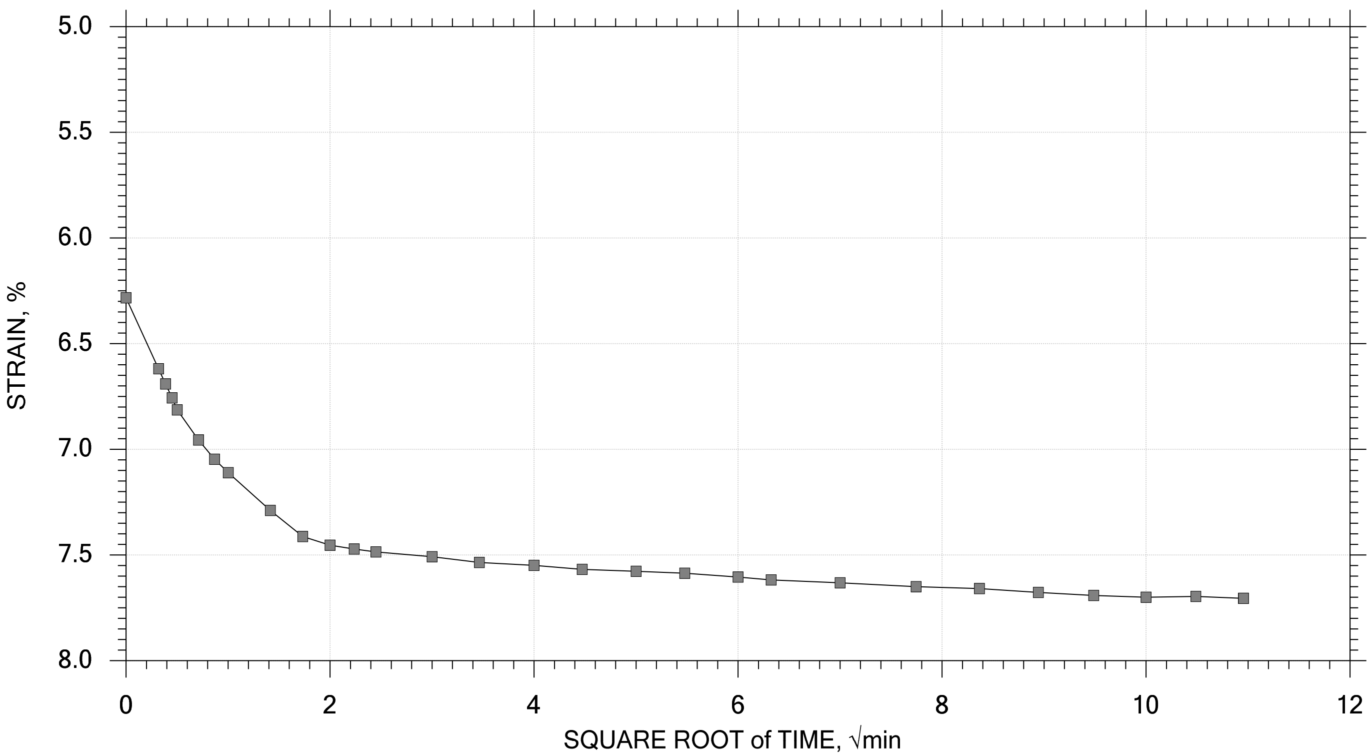
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 21

Stress: 4 tsf





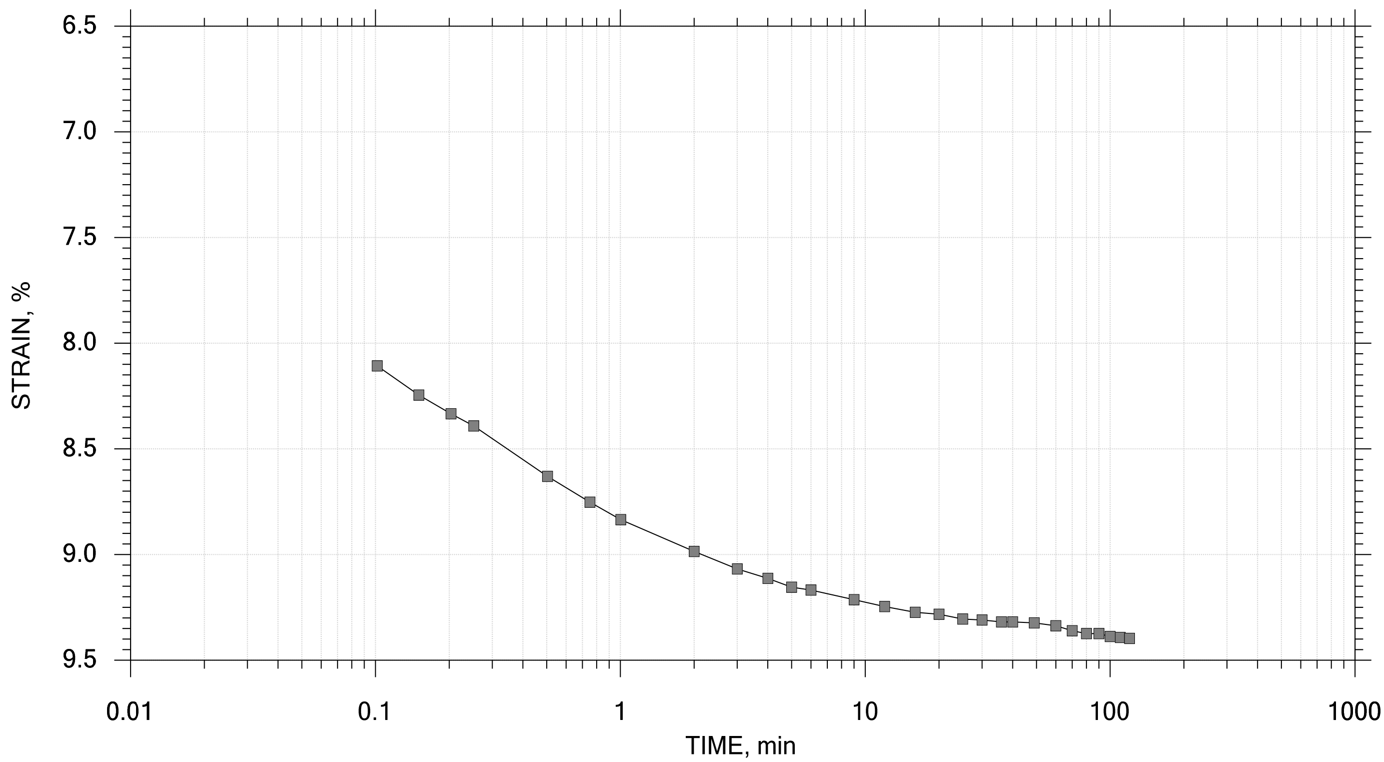
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

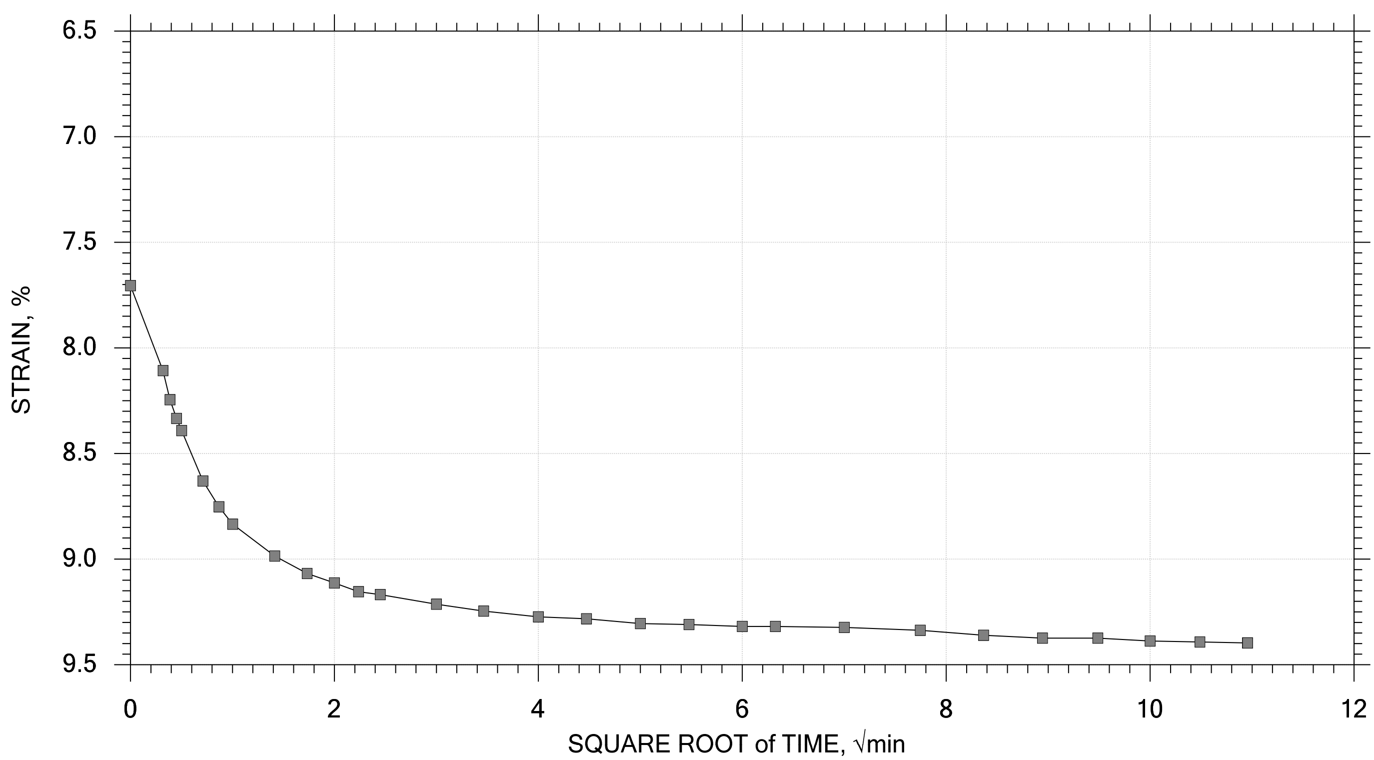
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 21

Stress: 8 tsf





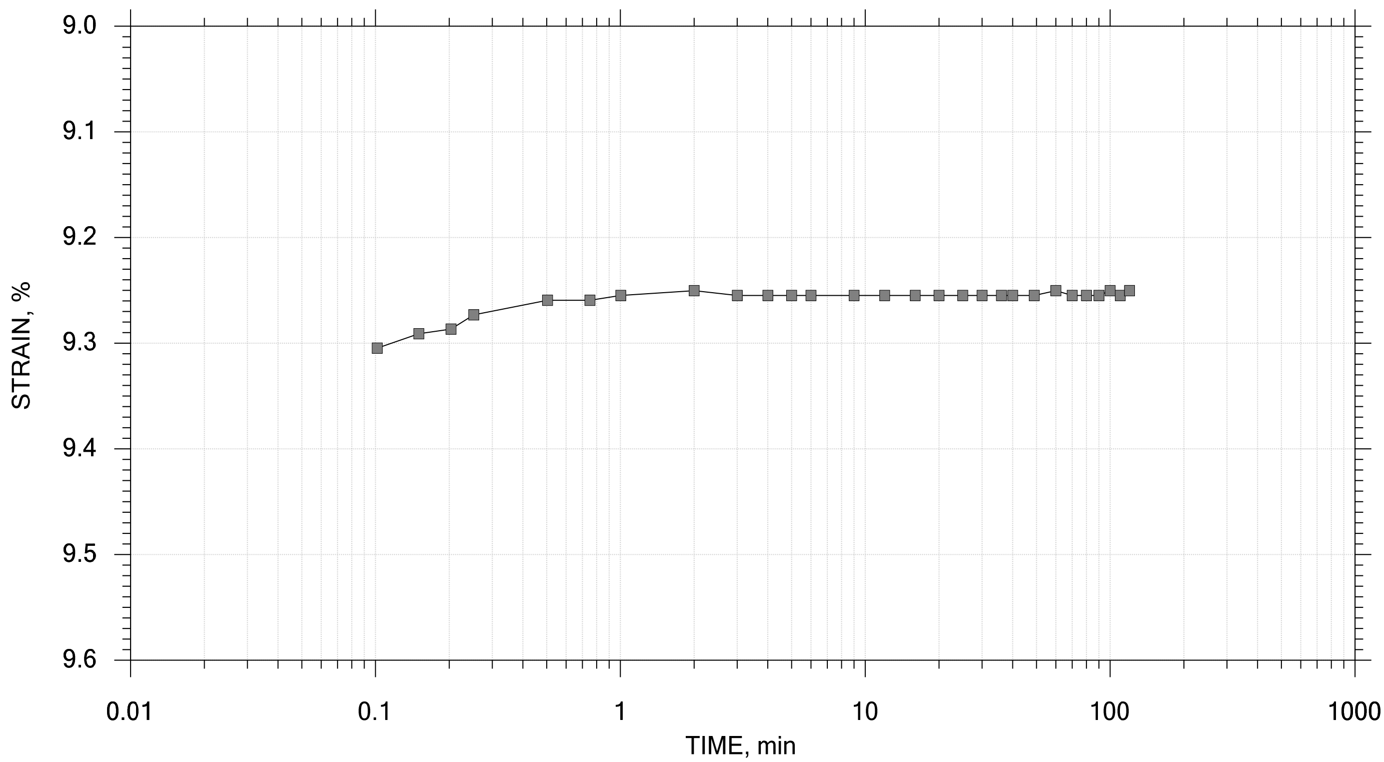
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

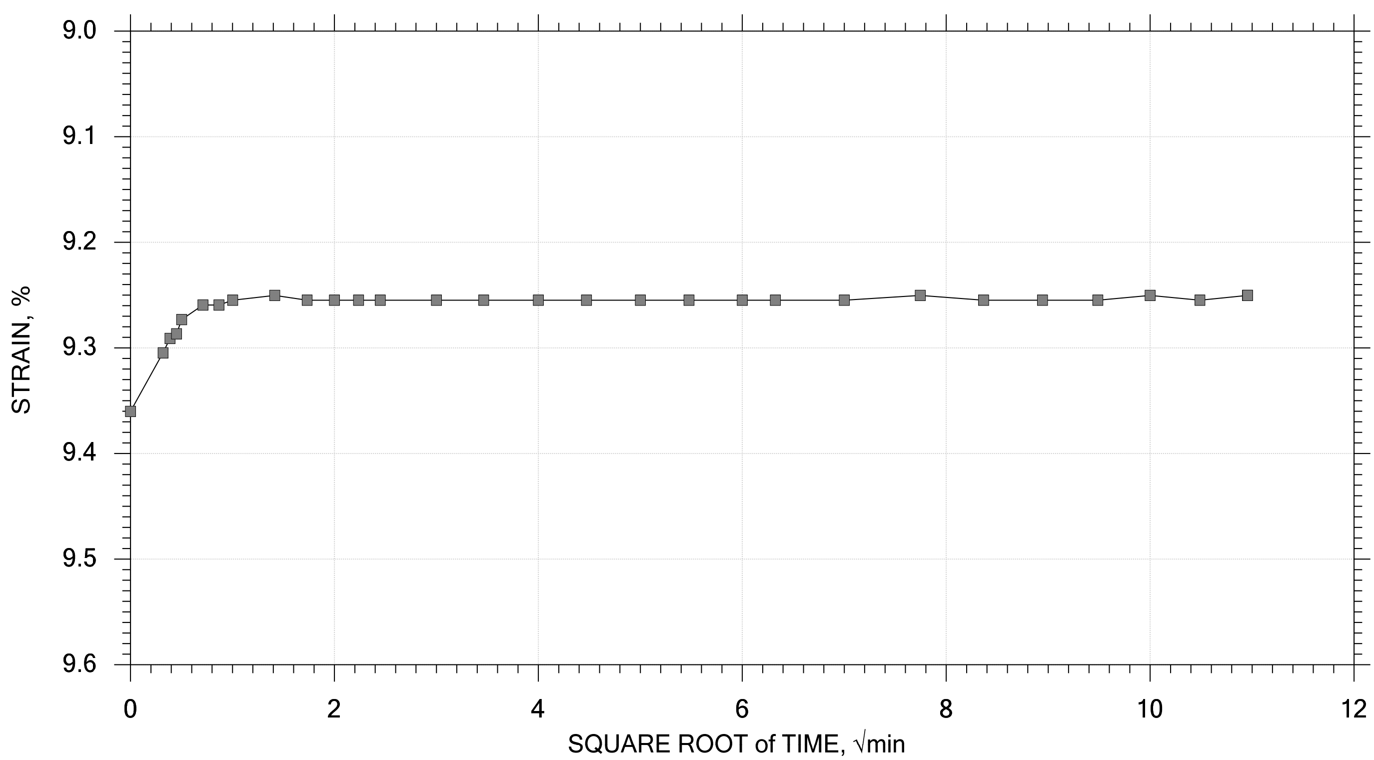
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 21

Stress: 4 tsf





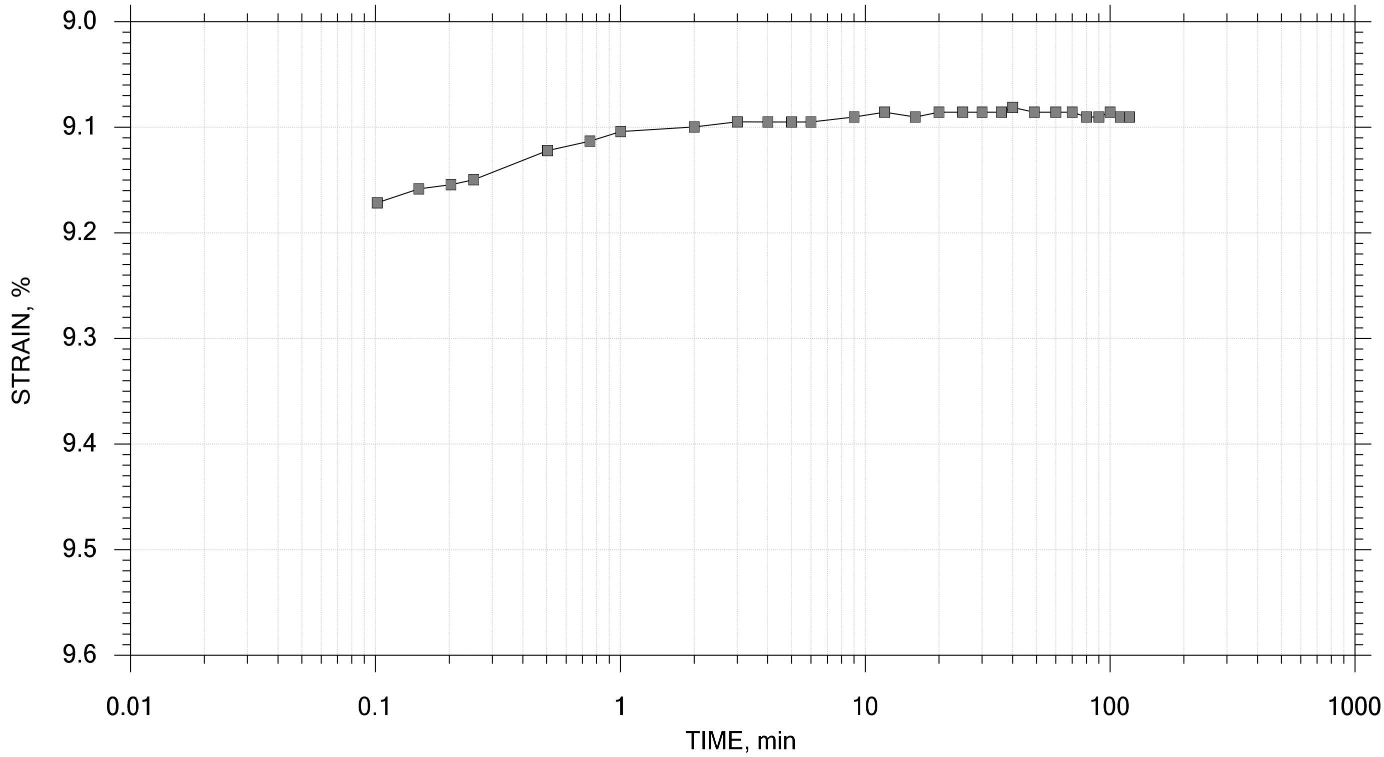
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

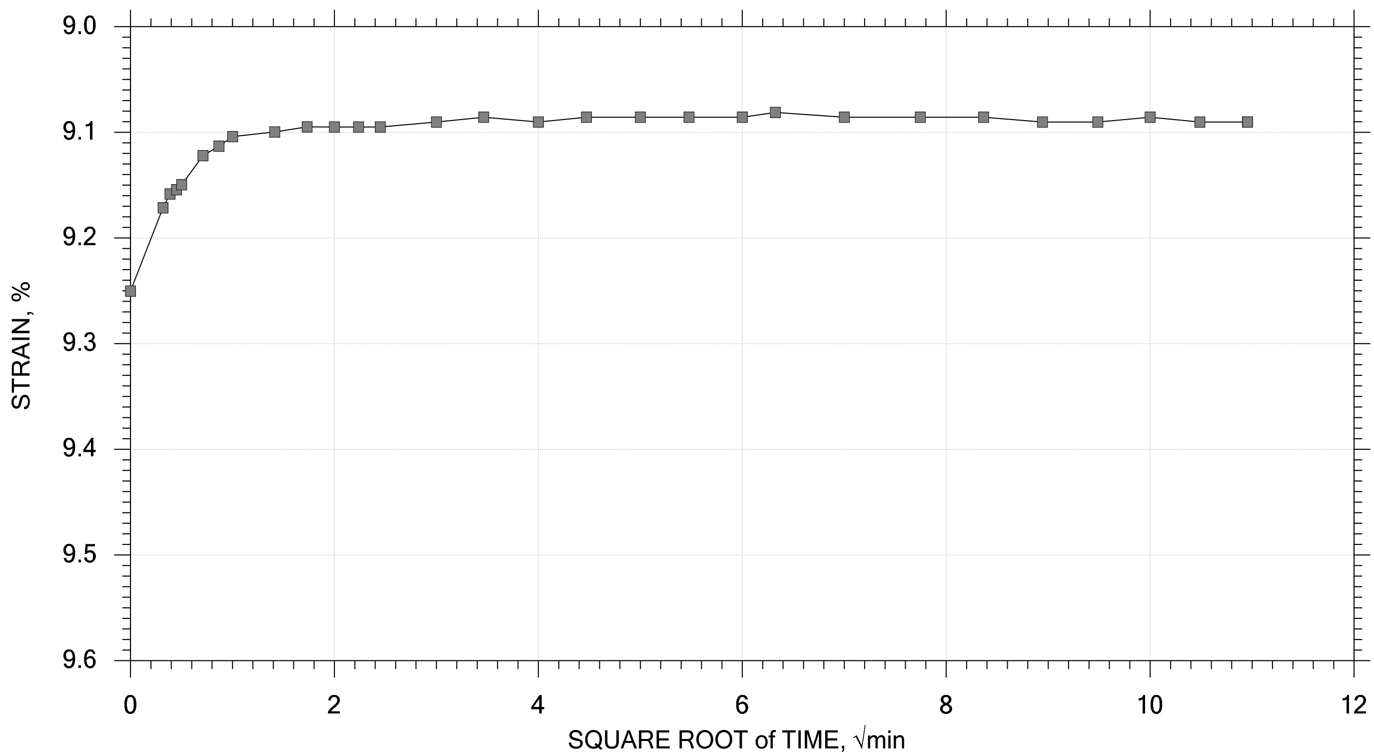
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 21

Stress: 2 tsf





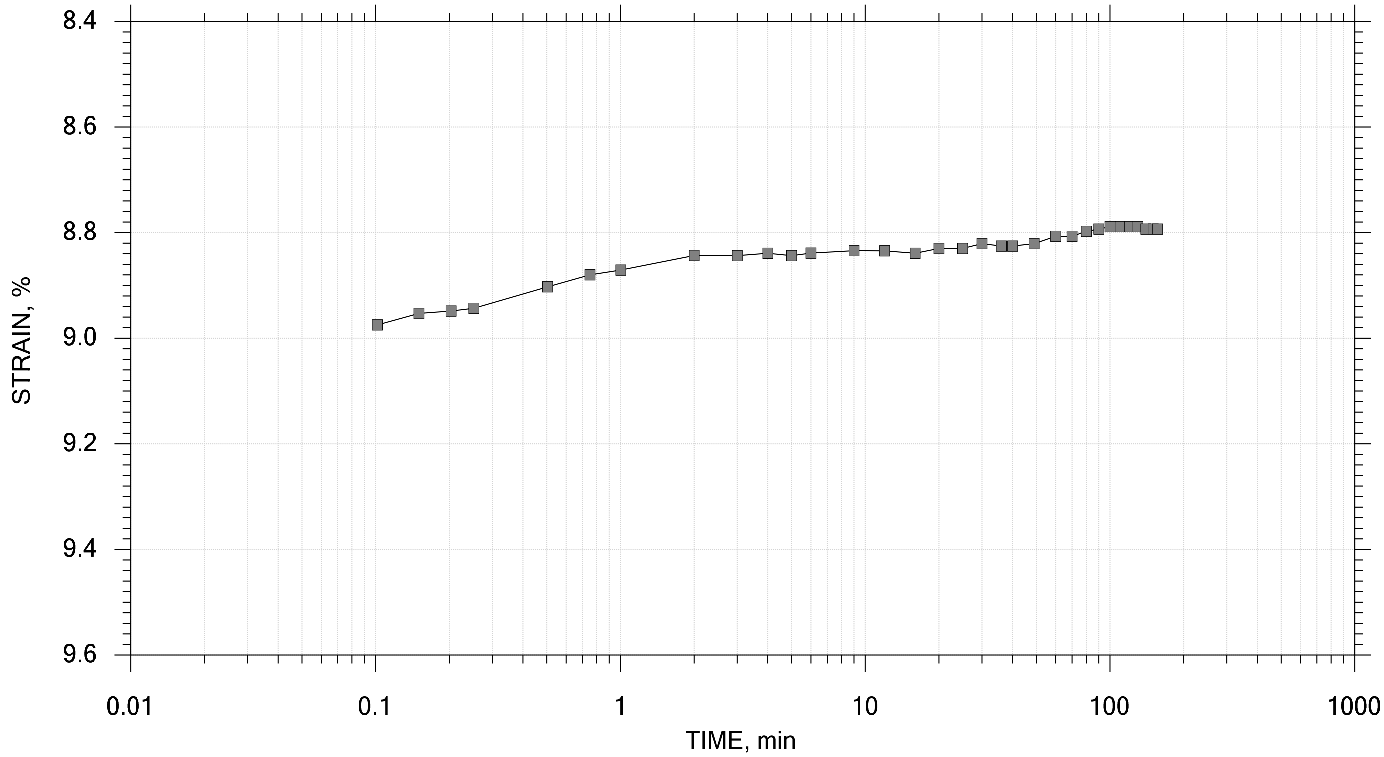
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

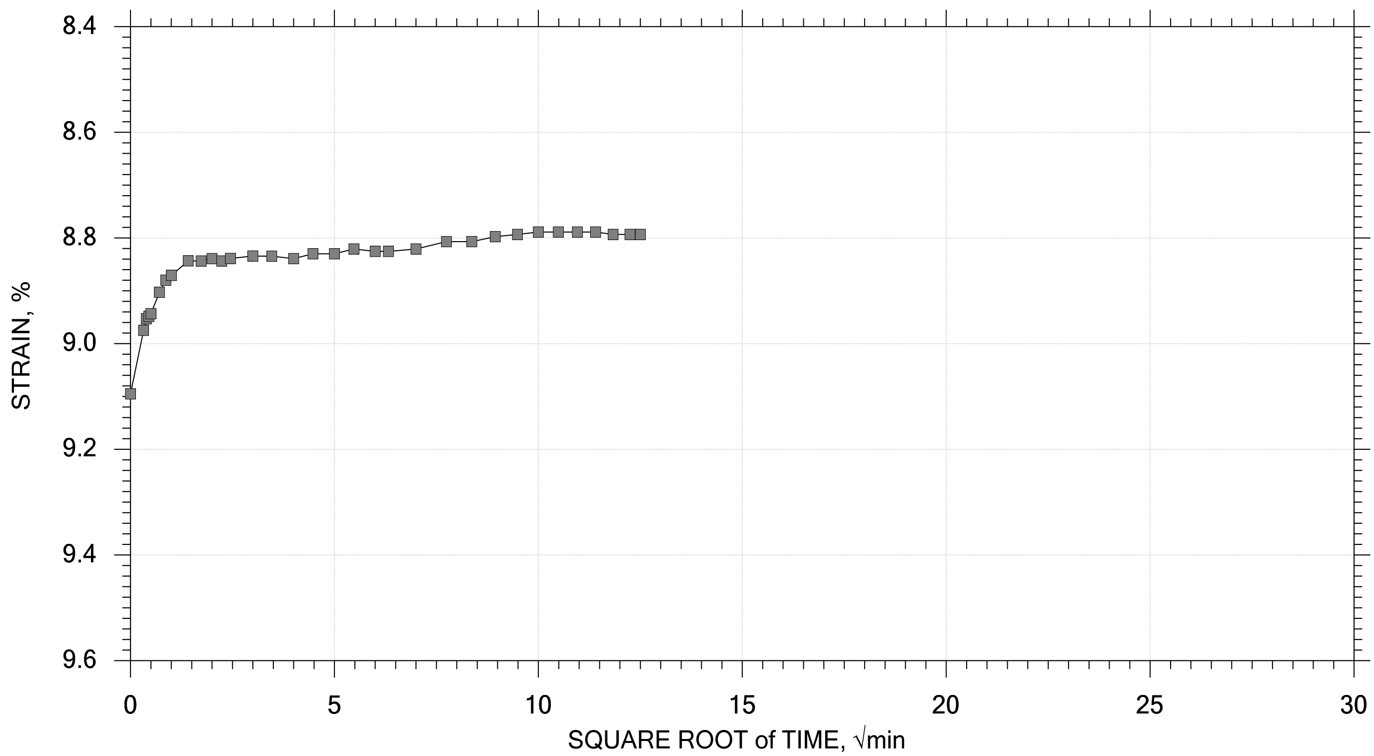
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 21

Stress: 1 tsf





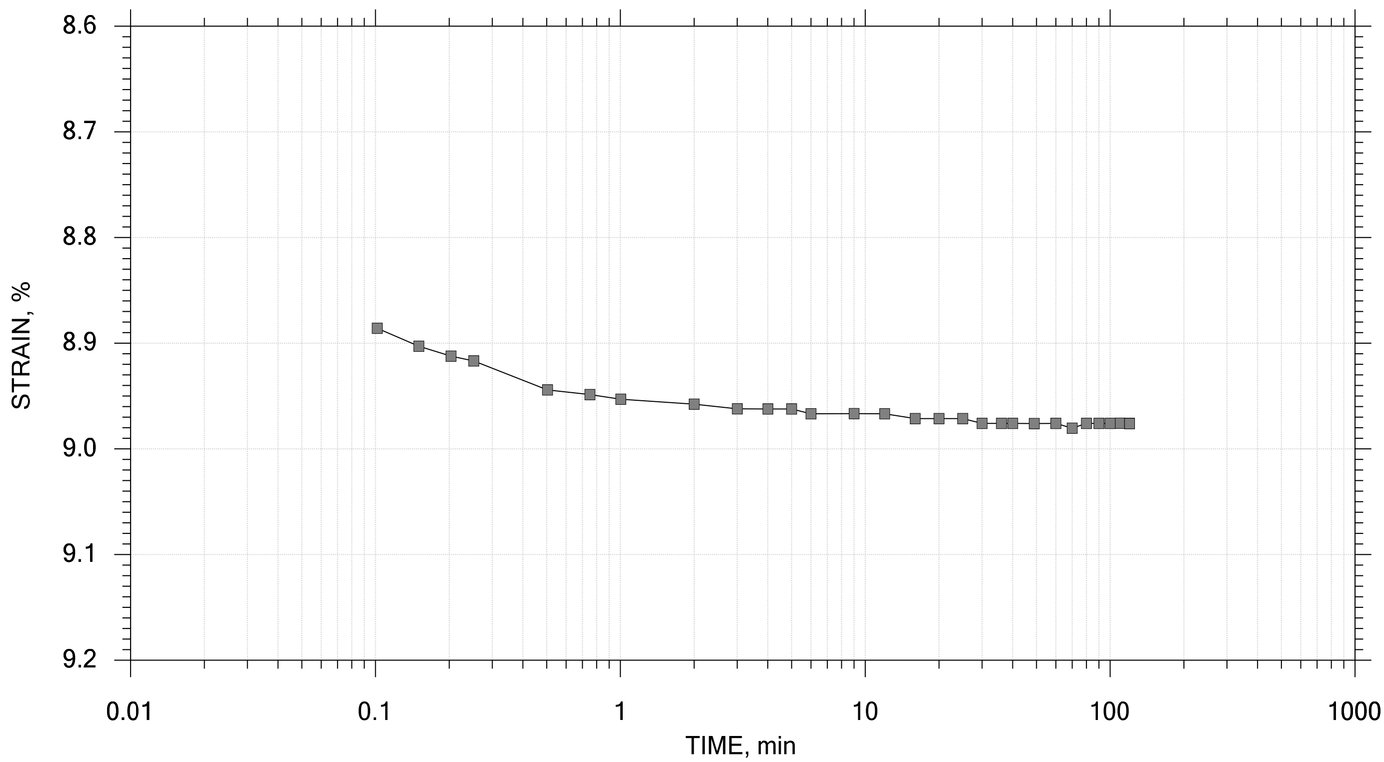
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

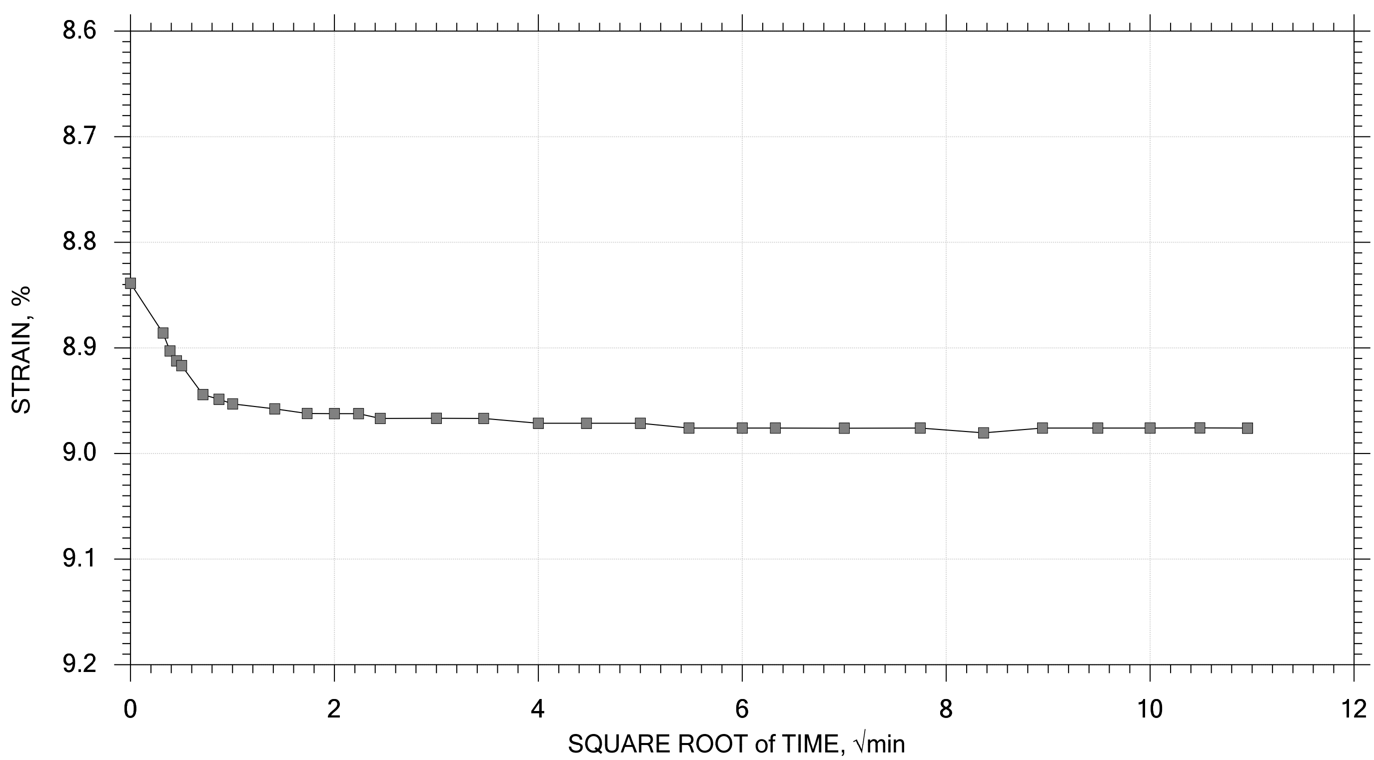
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 21

Stress: 2 tsf





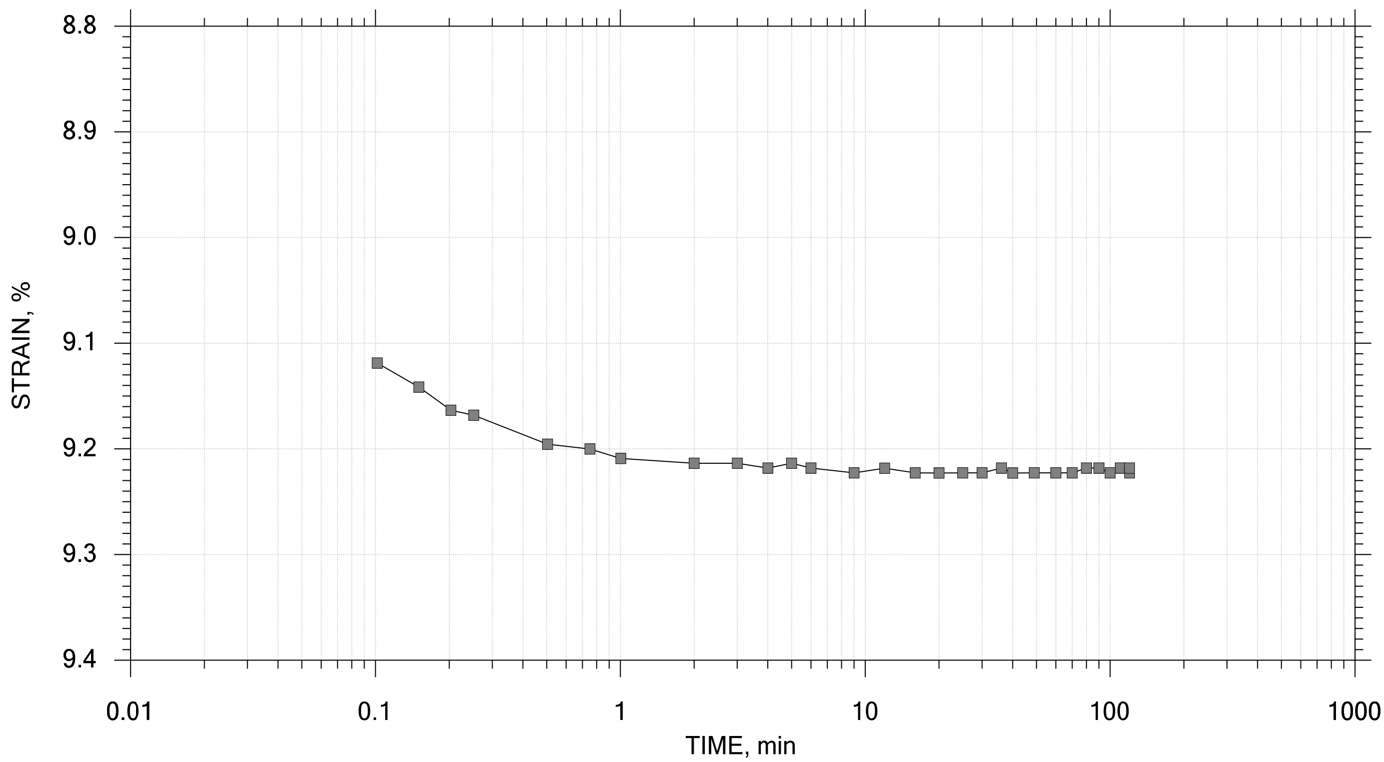
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

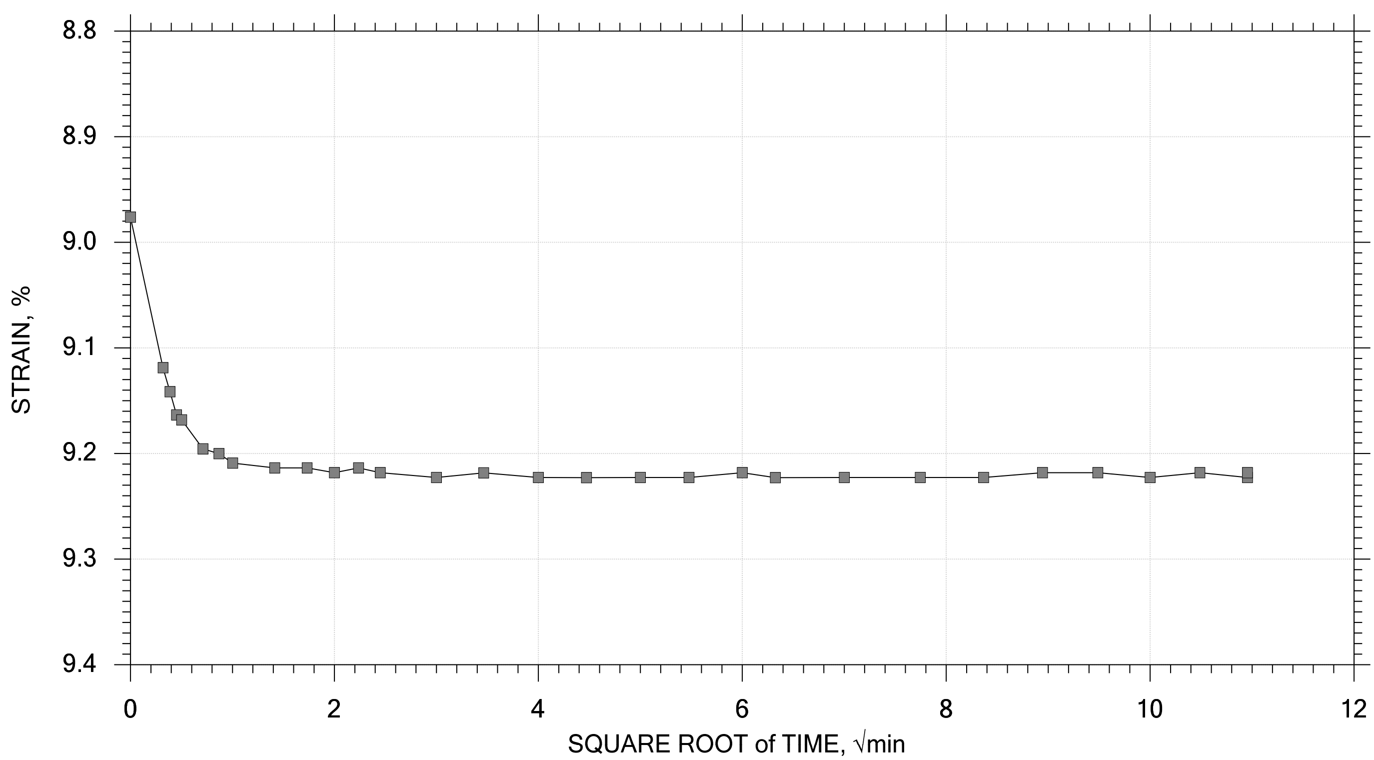
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 21

Stress: 4 tsf





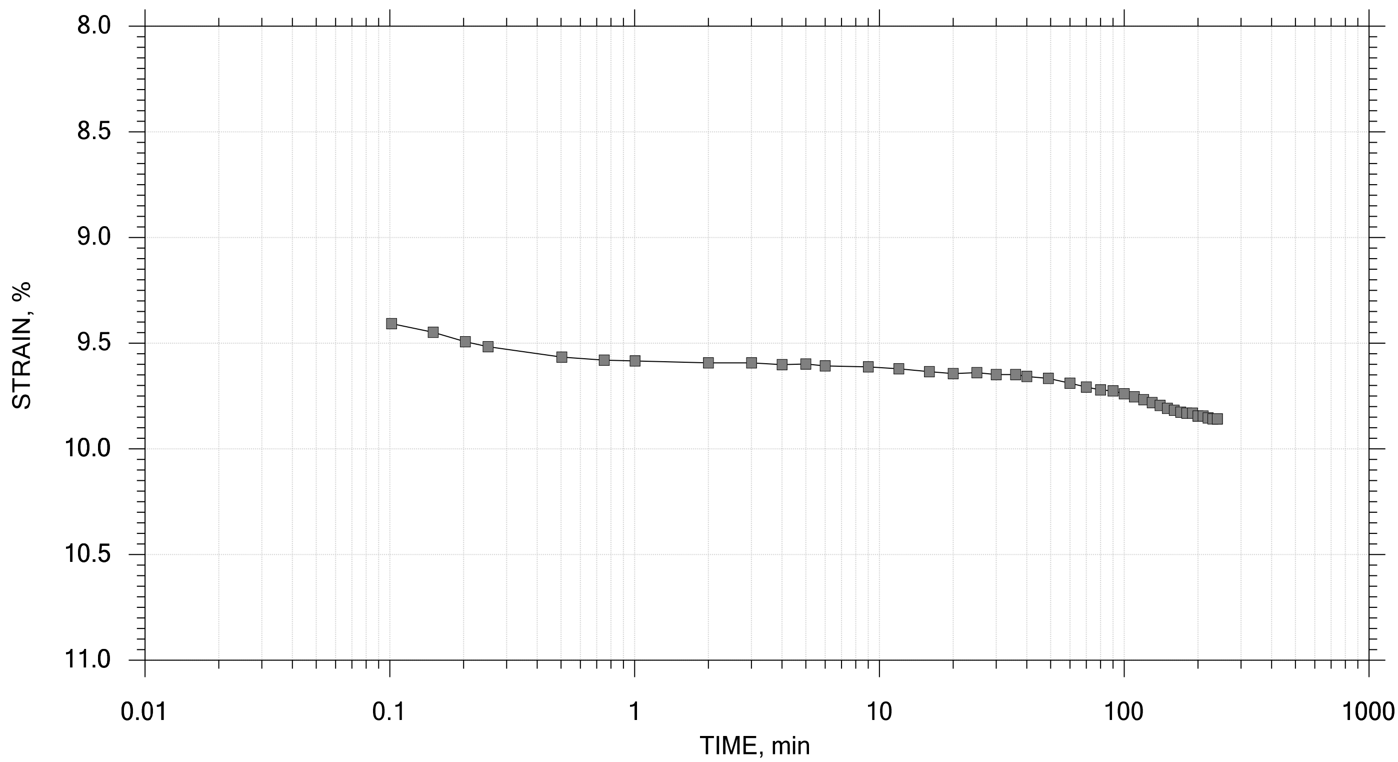
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

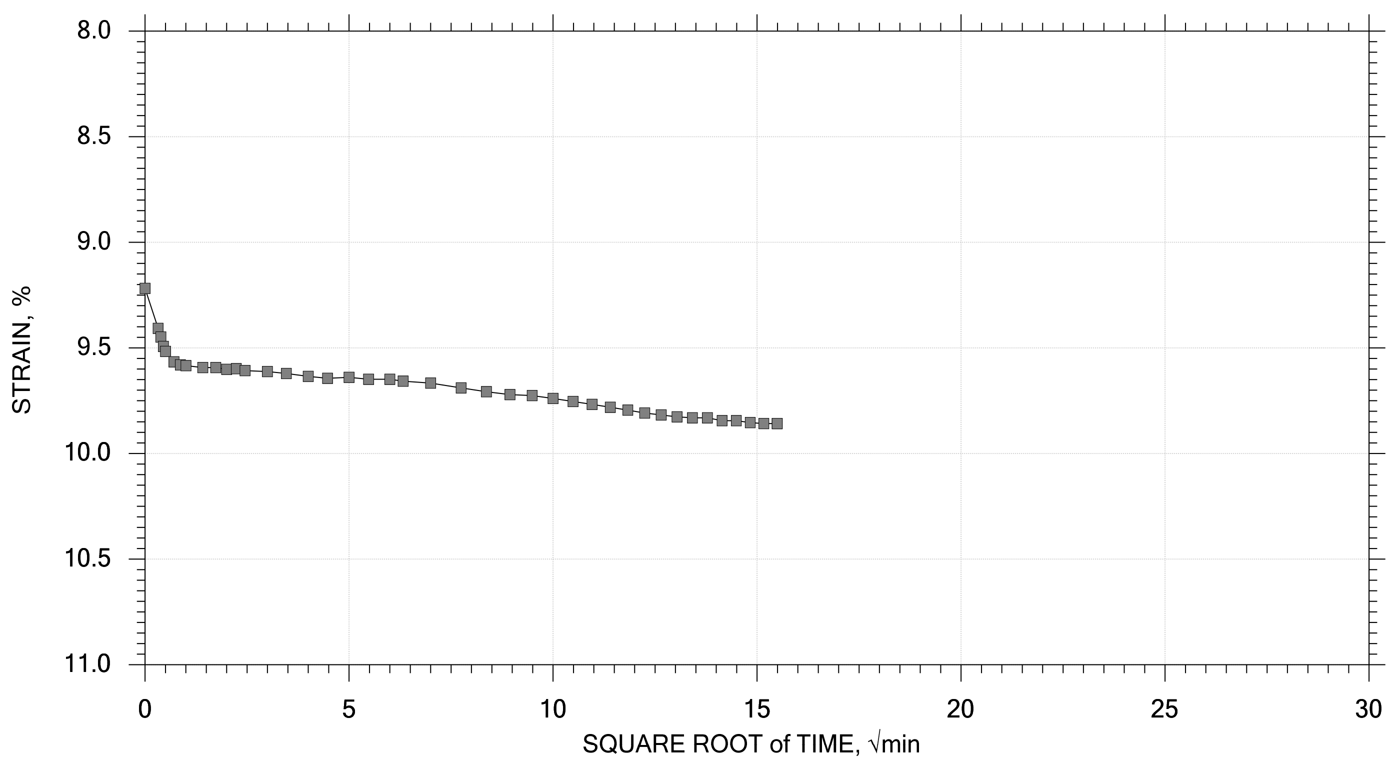
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 21

Stress: 8 tsf





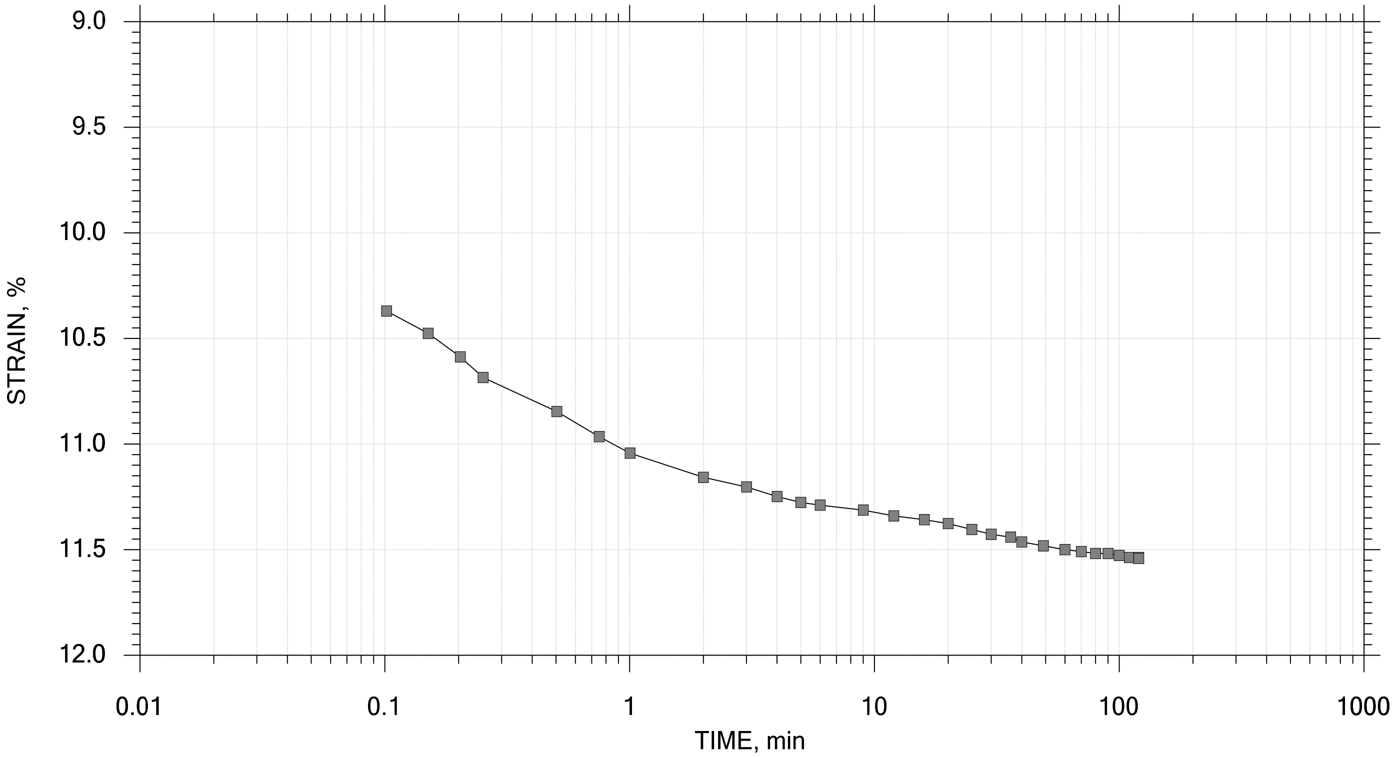
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

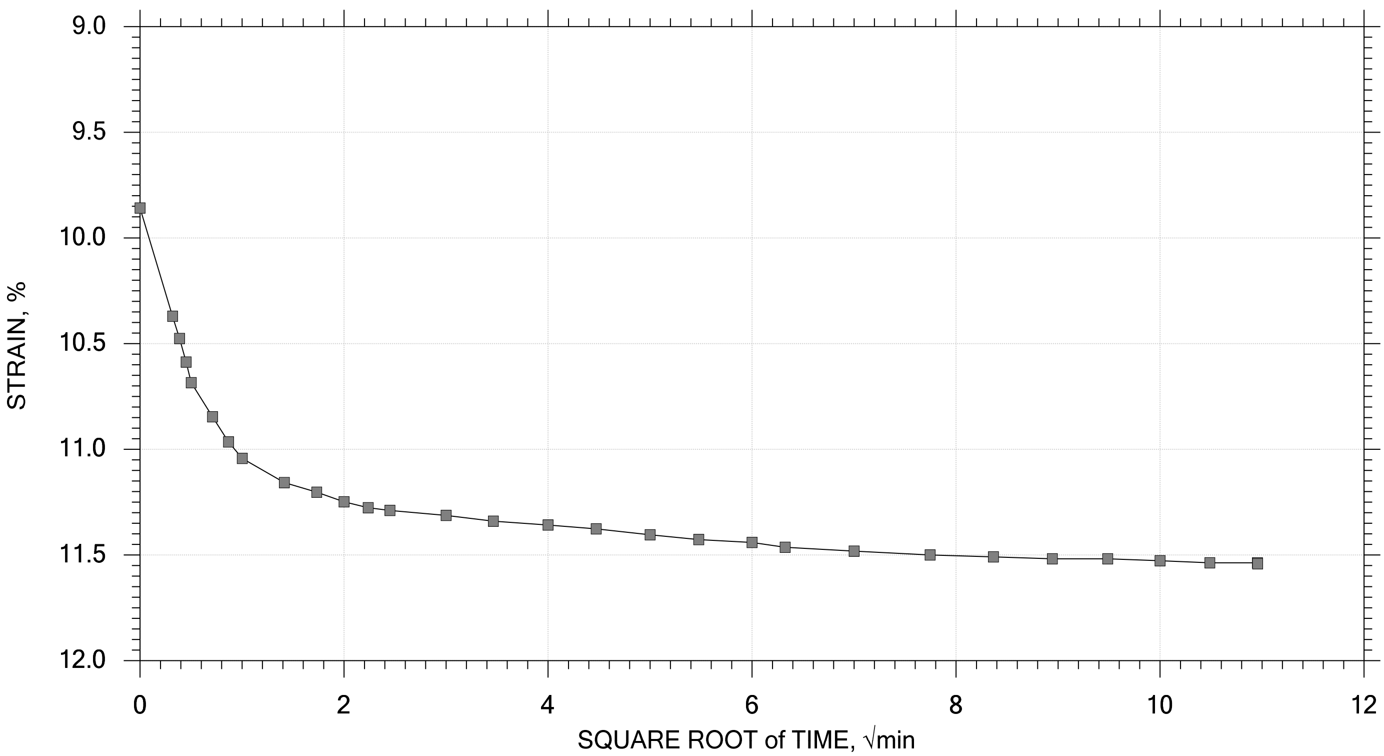
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 21

Stress: 16 tsf





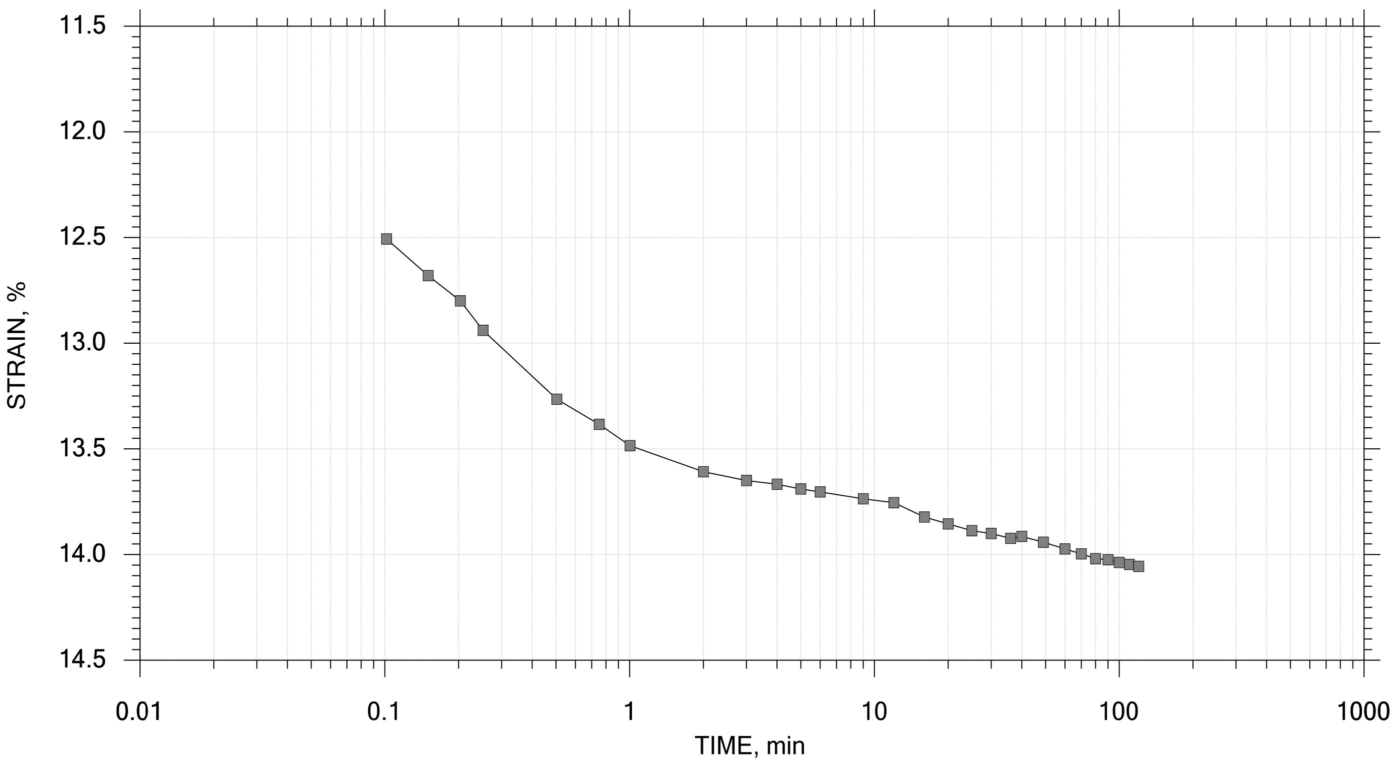
GeoTesting EXPRESS			
	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

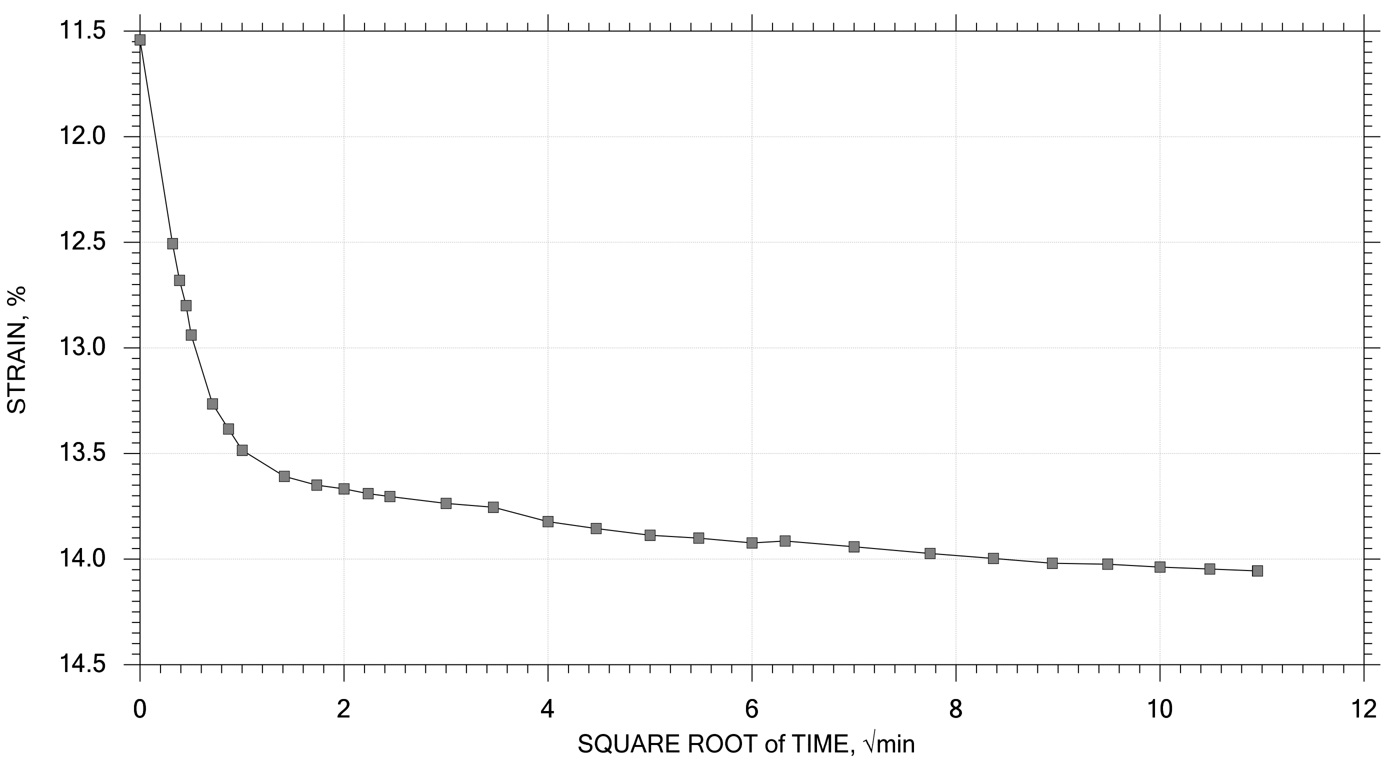
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 16 of 21

Stress: 32 tsf





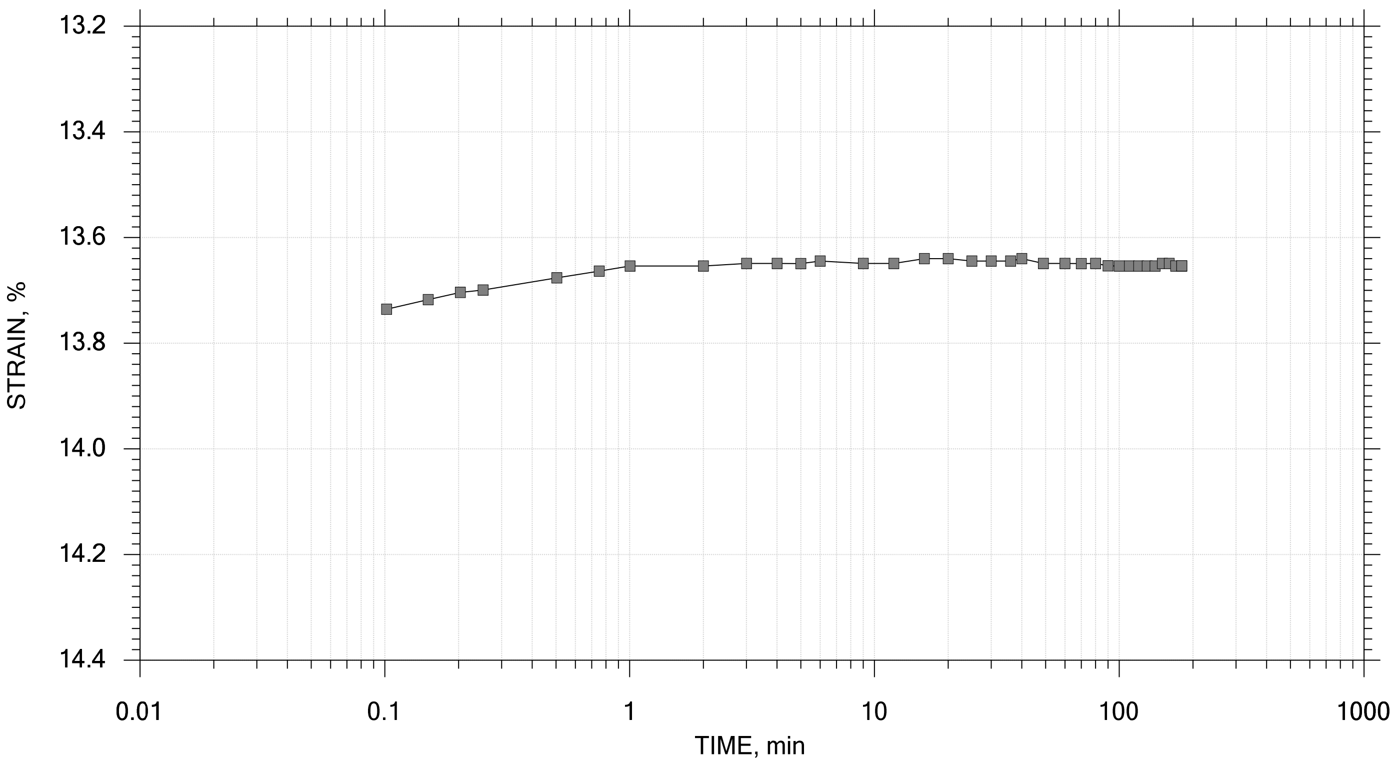
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

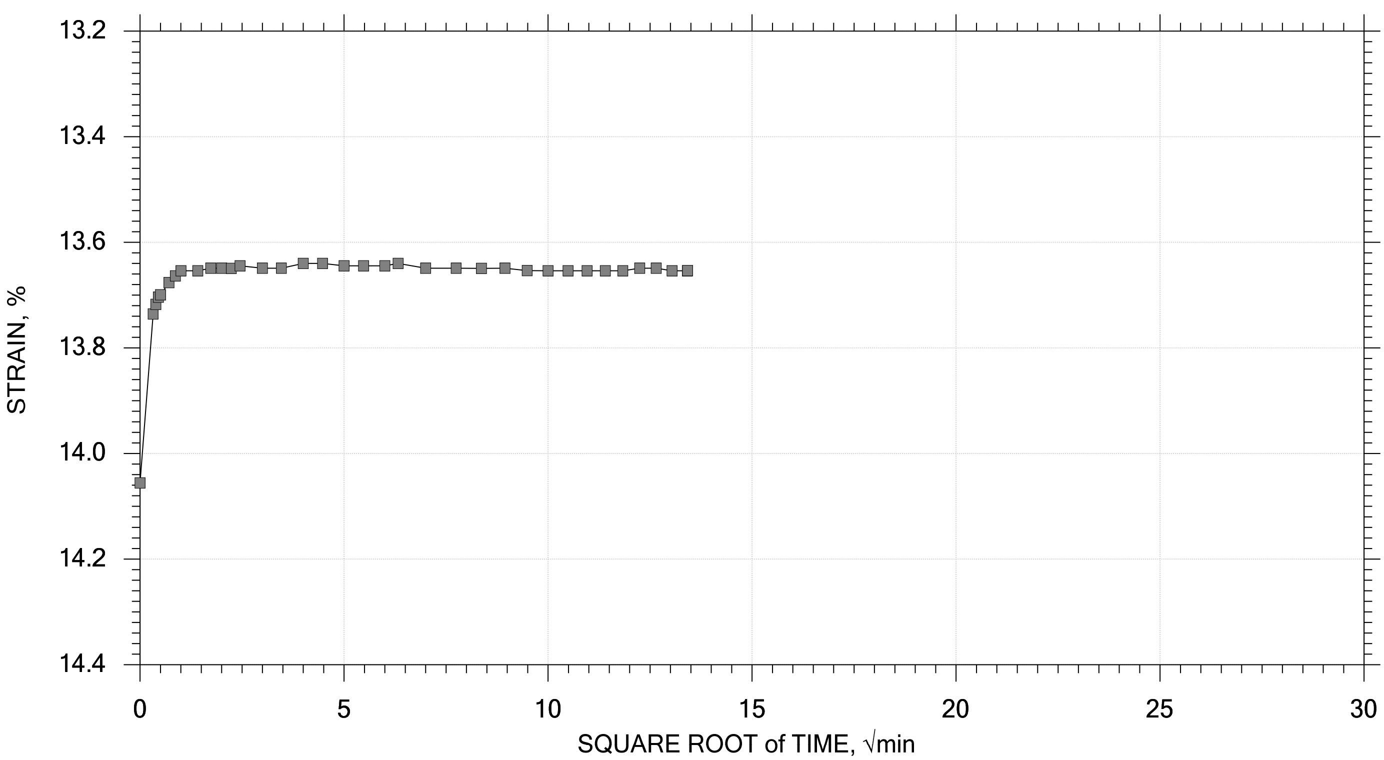
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 17 of 21

Stress: 8 tsf





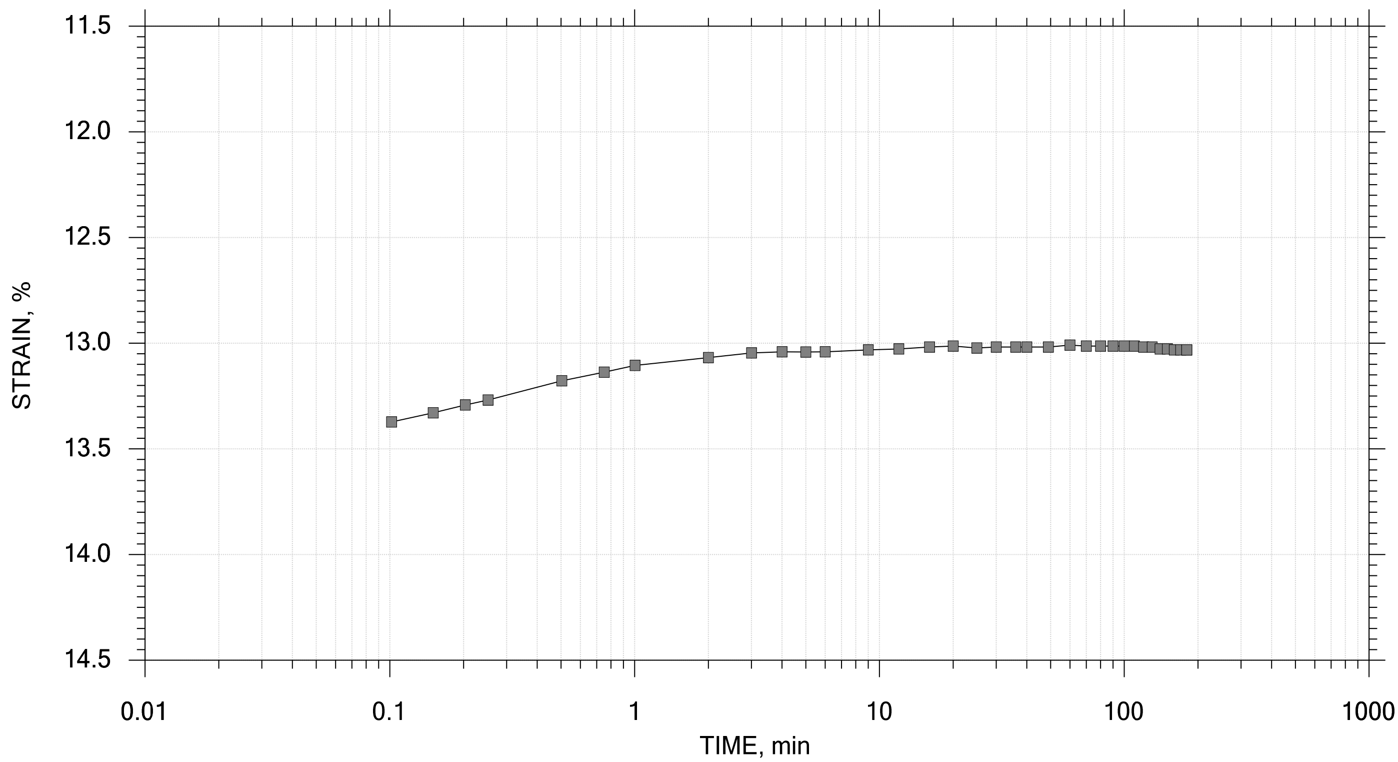
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

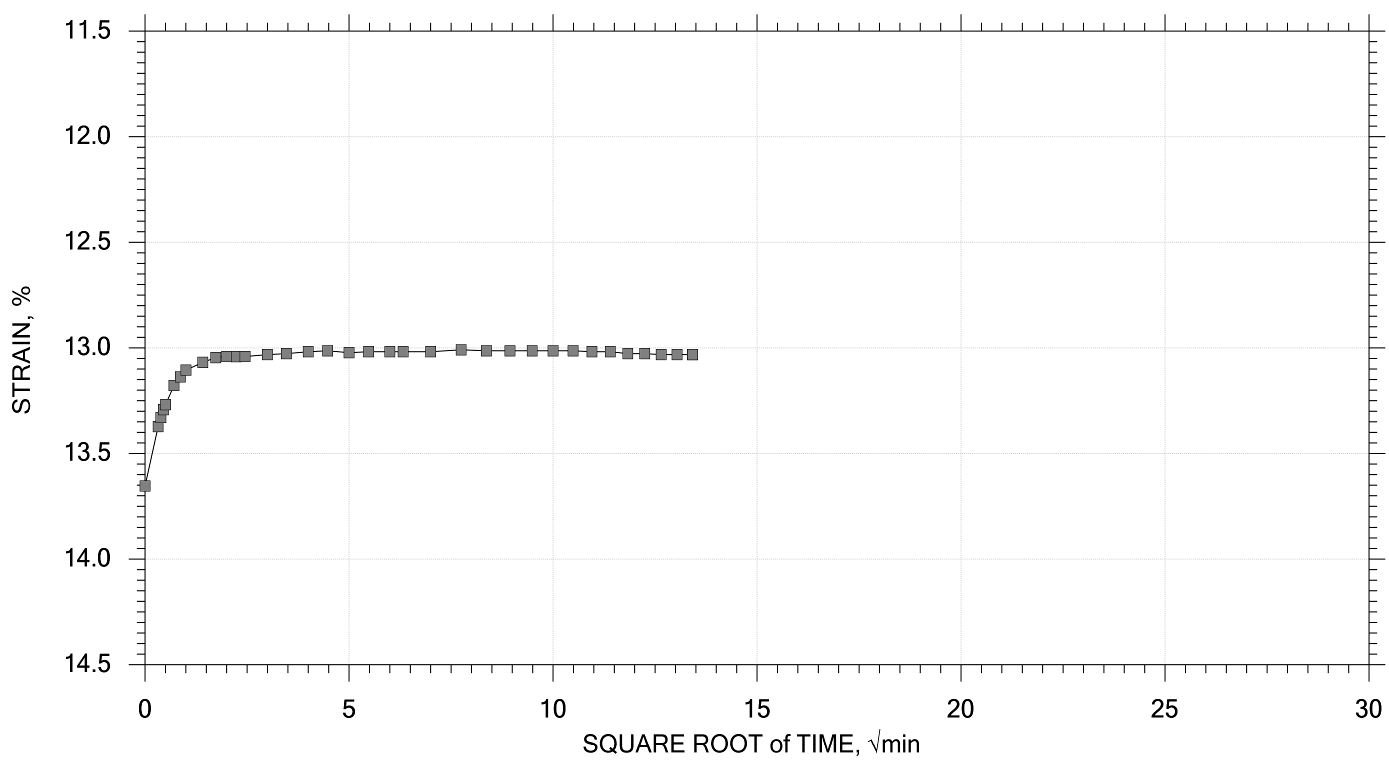
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 18 of 21

Stress: 2 tsf





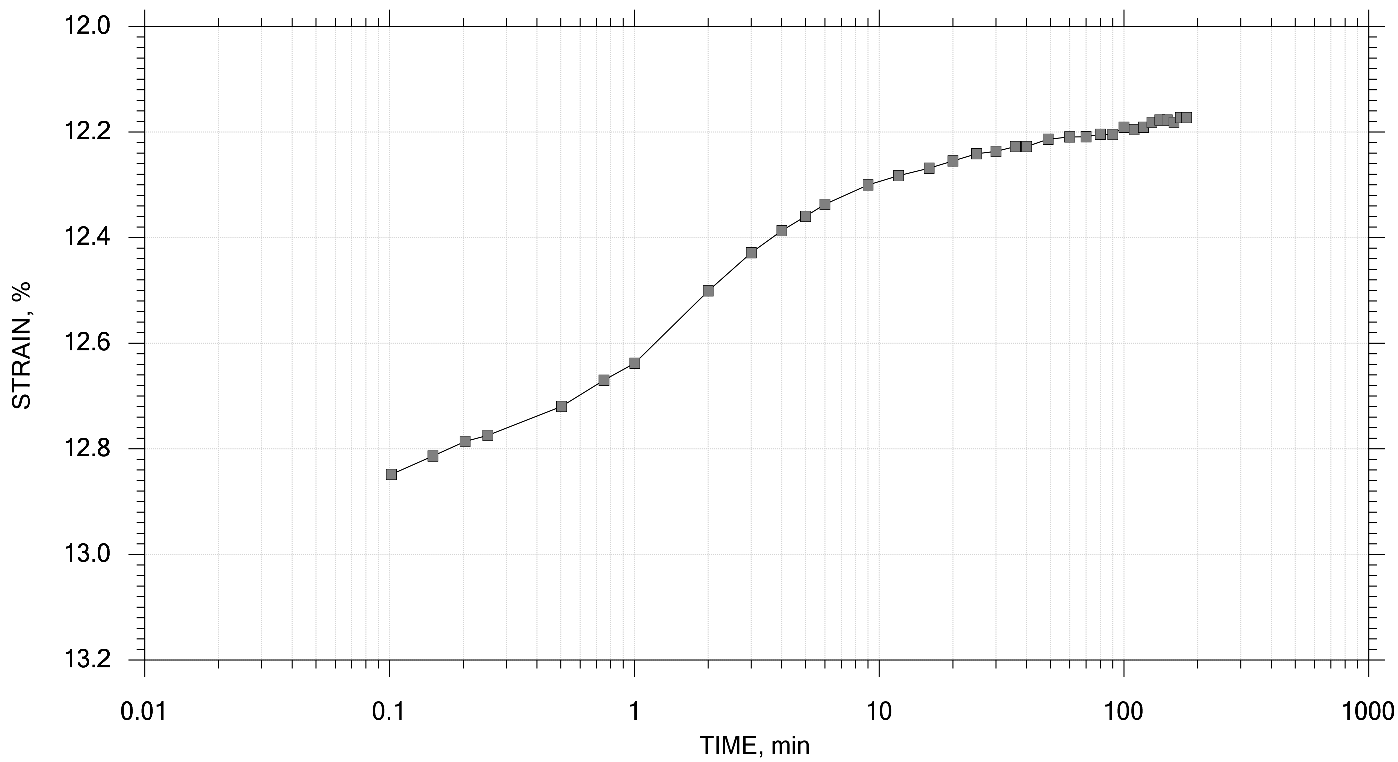
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

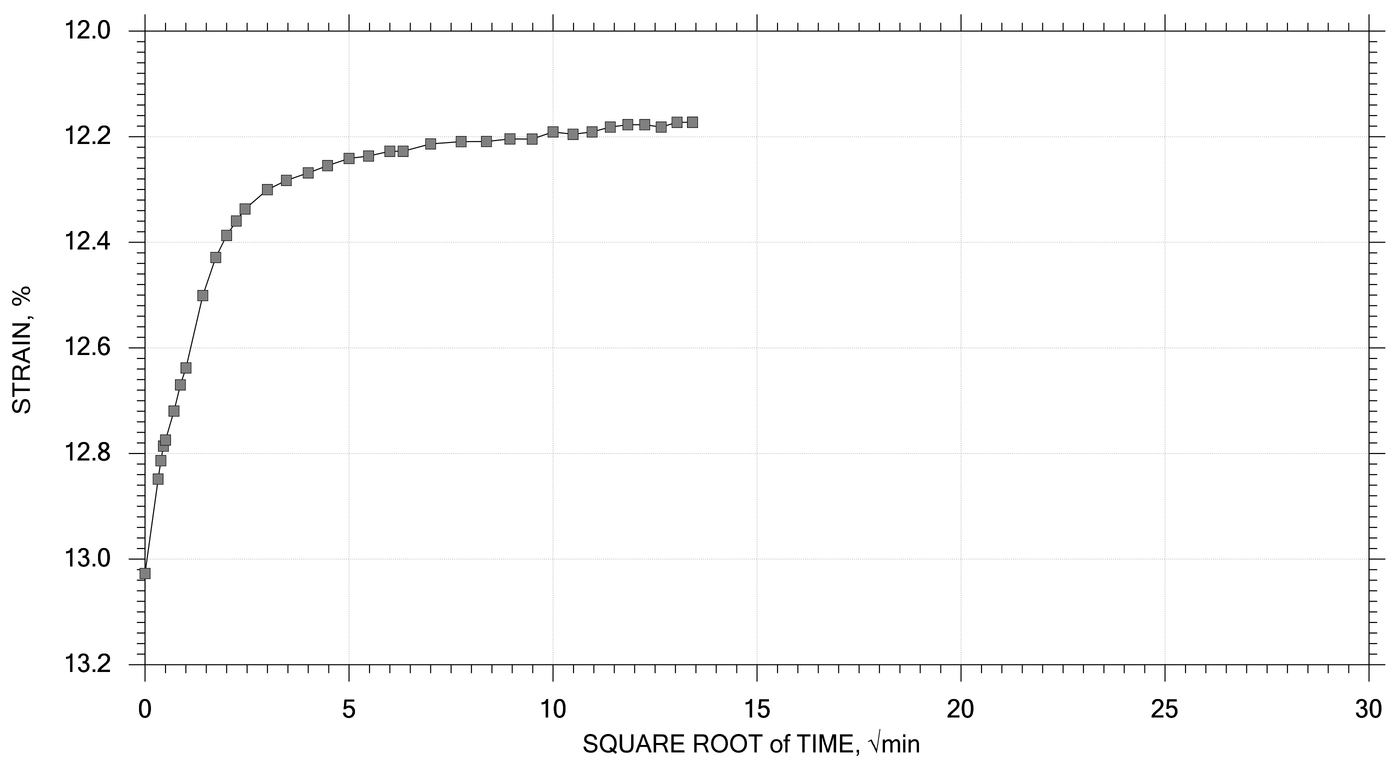
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 19 of 21

Stress: 0.5 tsf





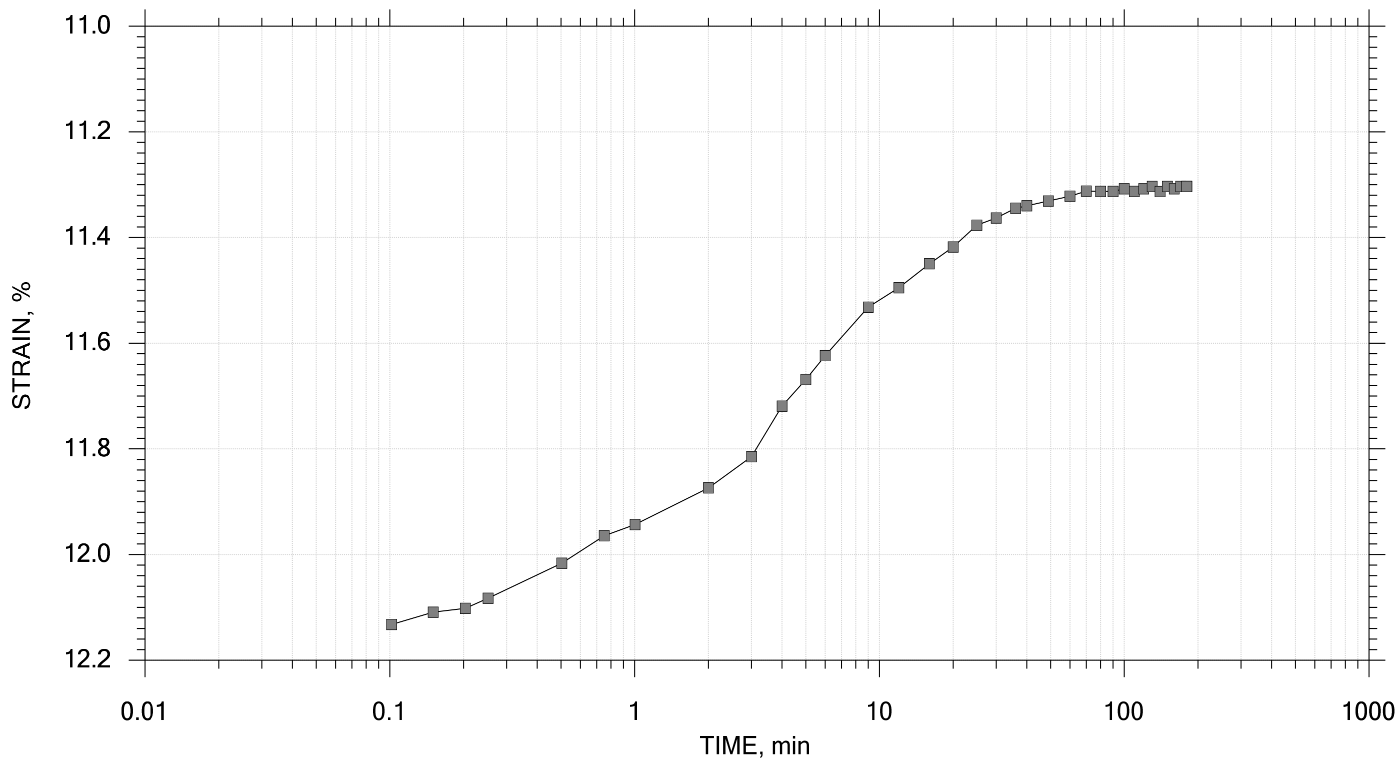
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

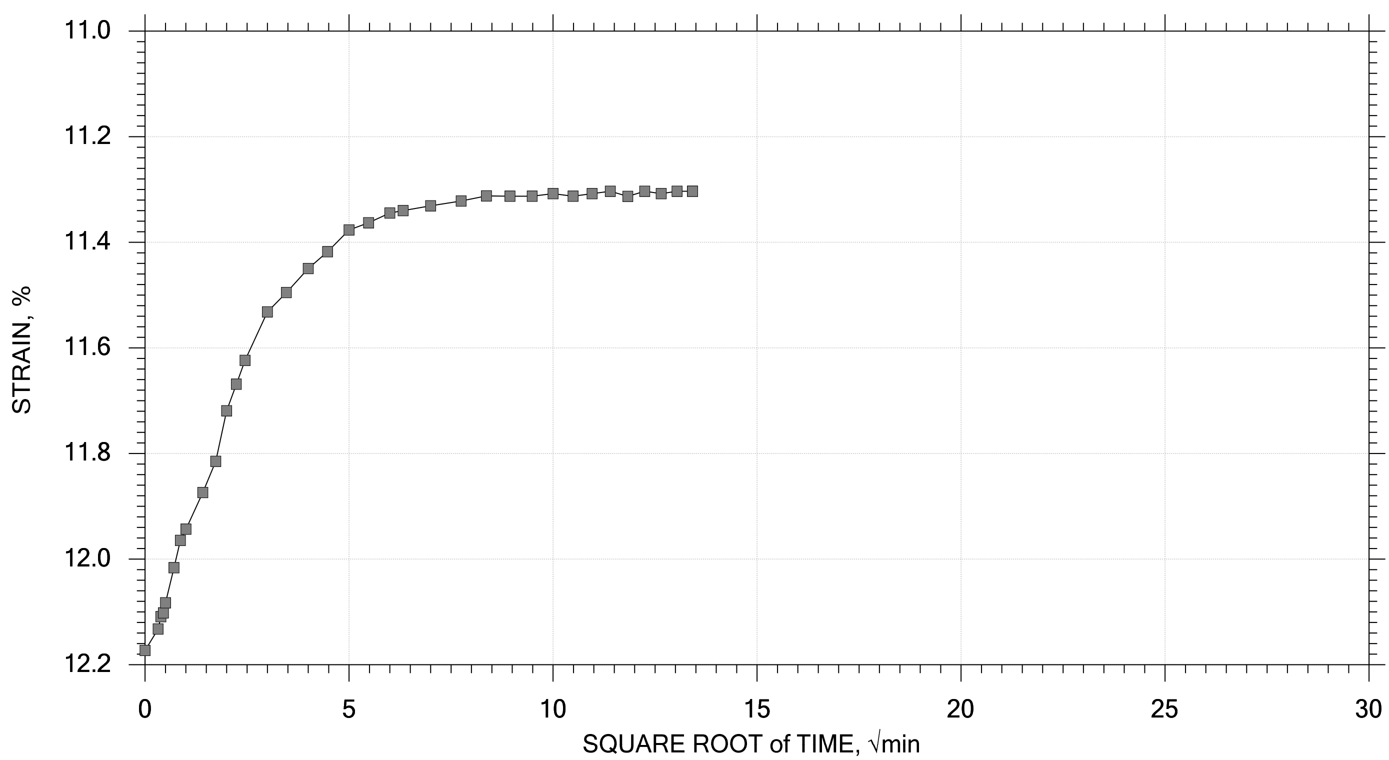
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 20 of 21

Stress: 0.125 tsf





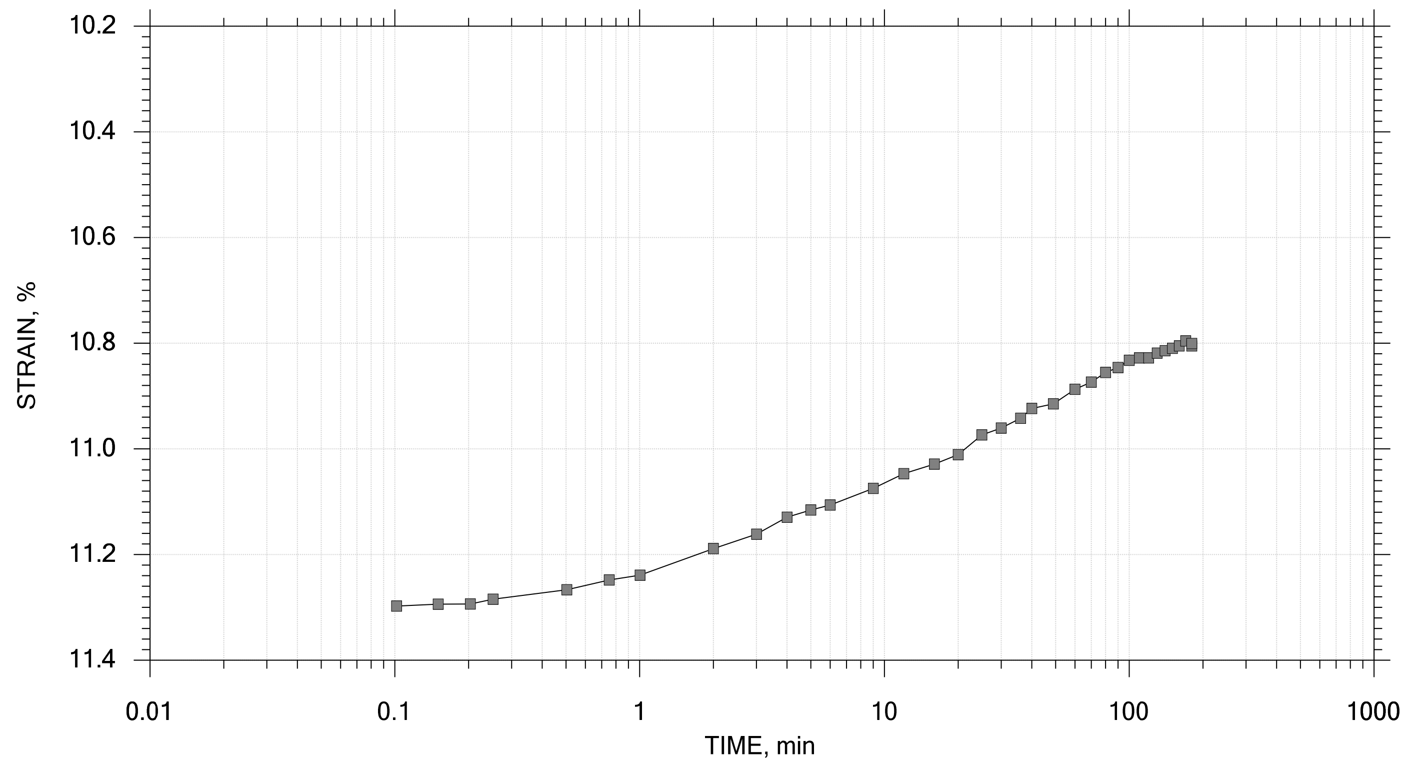
GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

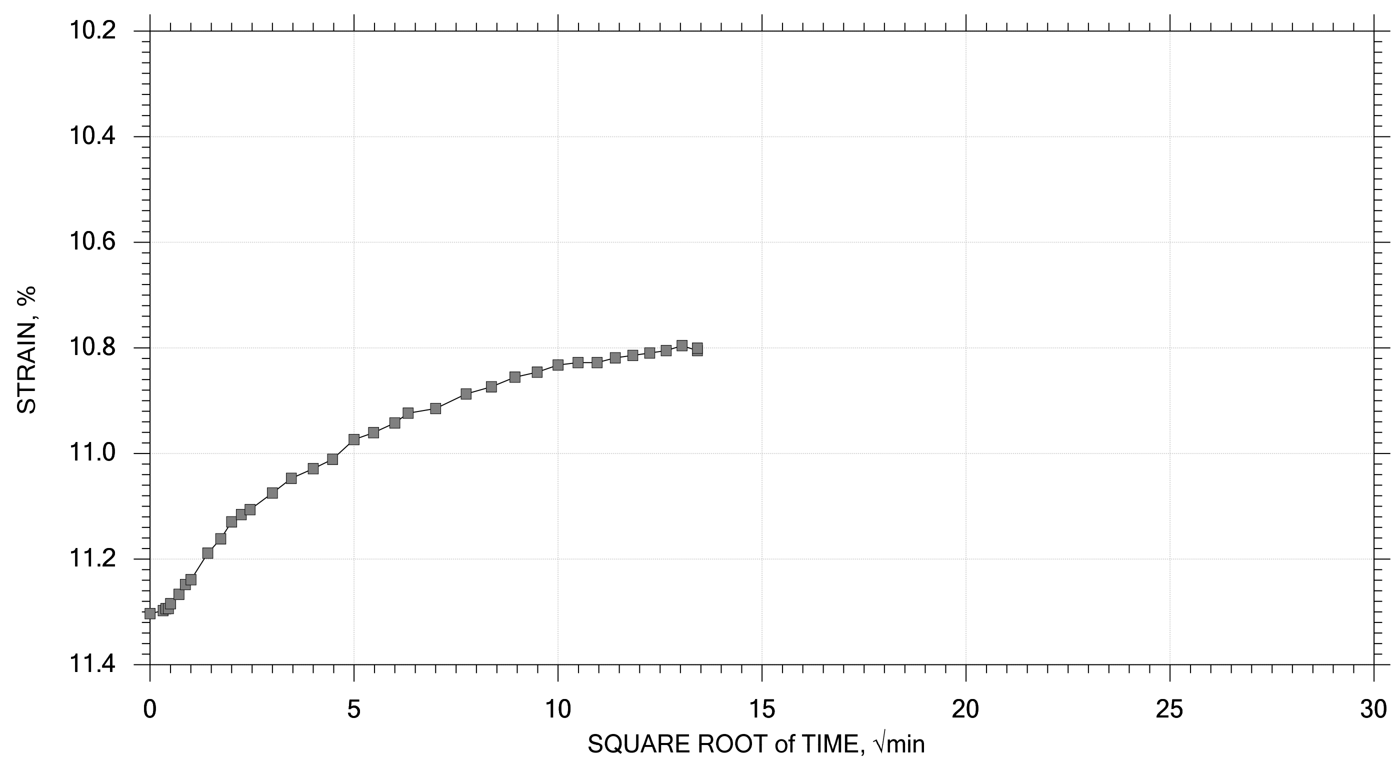
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 21 of 21

Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: Beacon Island Parcel	Location: Bethlehem, NY	Project No.: GTX-306651
	Boring No.: SB-01	Tested By: md	Checked By: njh
	Sample No.: Tube	Test Date: 06/27/17	Test No.: IP-2
	Depth: 58-60 ft	Sample Type: intact	Elevation: ---
	Description: Moist, dark gray clay		
	Remarks: System S, Swell Pressure = 0.0665 tsf		

APPENDIX G
EVERGREEN TESTING
LABORATORY TEST REPORT

Beacon Island Parcel
Town of Bethlehem, NY

Beacon Island Parcel

Town of Bethlehem, NY

Moisture Content Results - ASTM D2216

Boring No.	SB-1 / S-3	SB-1 / S-5	SB-1 / S-7	SB-1 / S-14	SB-1 / S-17	SB-1 / S-19
Sample No.	992	993	994	995	996	997
Sample Depth	4'-6'	8'-10'	12'-14'	35'-36.5'	45'-46.5'	50'-51.5'
Tare Weight	265.10	267.80	264.50	261.90	260.70	259.40
W_S + Tare	474.50	455.60	391.90	476.20	506.50	544.80
W_D + Tare	414.10	396.10	327.70	416.20	437.60	481.60
W_{WATER}	60.40	59.50	64.20	60.00	68.90	63.20
$W_{DRY\ SOIL}$	149.00	128.30	63.20	154.30	176.90	222.20
% Moisture (W_W / W_D)	40.5	46.4	101.6	38.9	38.9	28.4

Boring No.	SB-1 / S-20	SB-1 / S-21				
Sample No.	998	999				
Sample Depth	55'-56.5'	60'-61.5'				
Tare Weight	256.60	259.70				
W_S + Tare	500.20	482.90				
W_D + Tare	429.30	433.70				
W_{WATER}	70.90	49.20				
$W_{DRY\ SOIL}$	172.70	174.00				
% Moisture (W_W / W_D)	41.1	28.3				

Boring No.						
Sample No.						
Sample Depth						
Tare Weight						
W_S + Tare						
W_D + Tare						
W_{WATER}						
$W_{DRY\ SOIL}$						
% Moisture (W_W / W_D)						

DENTE ENGINEERING
594 Broadway
Watervliet, NY 12189
Ph. 518-266-0310
Fax 518-266-9238

Client: Bergmann Associates
File No. FDE-17-121
Date: June 23, 2017

Beacon Island Parcel

Town of Bethlehem, NY

Organic Content Results ASTM D2974

Boring No.	SB-1 / S-3	SB-1 / S-5	SB-1 / S-7			
Sample No.	992	993	994			
Sample Depth	4'-6'	8'-10'	12'-14'			
Tare Weight	138.10	135.20	139.80			
W_S + Tare	154.60	162.80	163.50			
W_A + Tare	153.70	160.80	159.00			
W_S	16.50	27.60	23.70			
W_A	15.60	25.60	19.20			
%ASH = W_A / W_S	94.5	92.8	81.0			
%ORGANICS	5.5	7.2	19.0			

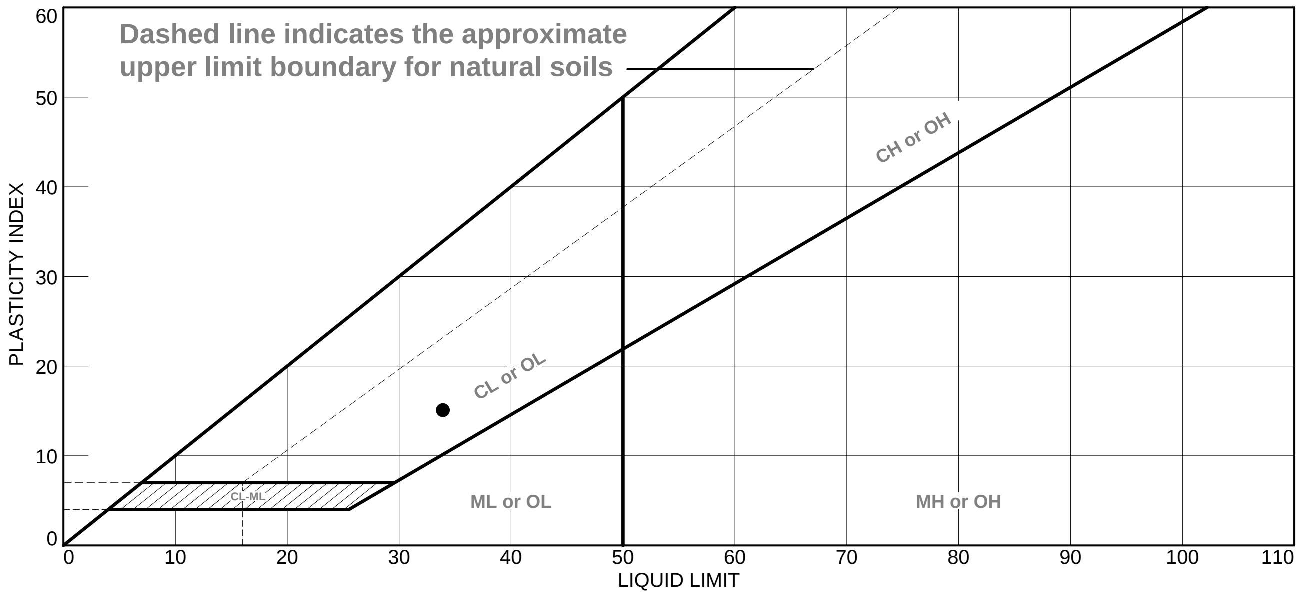
Boring No.						
Sample No.						
Sample Depth						
Tare Weight						
W_S + Tare						
W_A + Tare						
W_S						
W_A						
%ASH = W_A / W_S						
%ORGANICS						

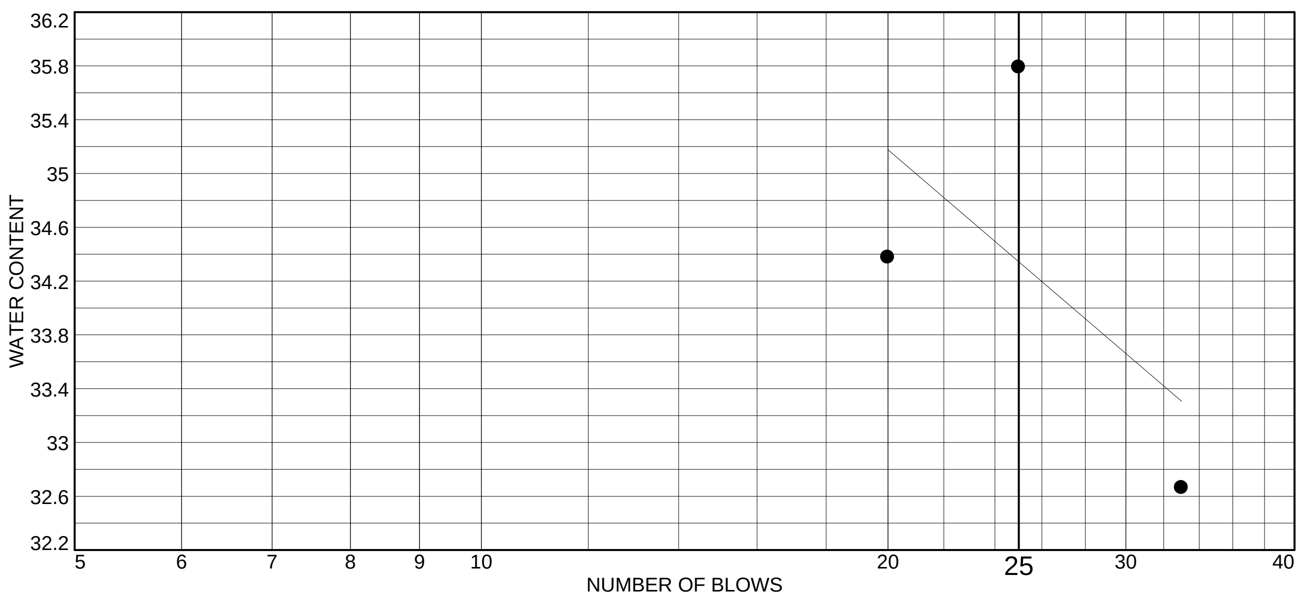
Boring No.						
Sample No.						
Sample Depth						
Tare Weight						
W_S + Tare						
W_A + Tare						
W_S						
W_A						
%ASH = W_A / W_S						
%ORGANICS						

DENTE ENGINEERING
594 Broadway
Watervliet, NY 12189
Ph. 518-266-0310
Fax 518-266-9238

Client: Bergmann Associates
File No. FDE-17-121
Date: June 23, 2017

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	34	19	15			

Project No. FDE-17-121 **Client:** Bergmann Associates

Project: Beacon Island Parcel

Town of Bethlehem, NY

Source of Sample: Soil Borings **Depth:** 45'-46.5'

Sample Number: 996 SB-1/S-17

Remarks:

●Per ASTM D4318

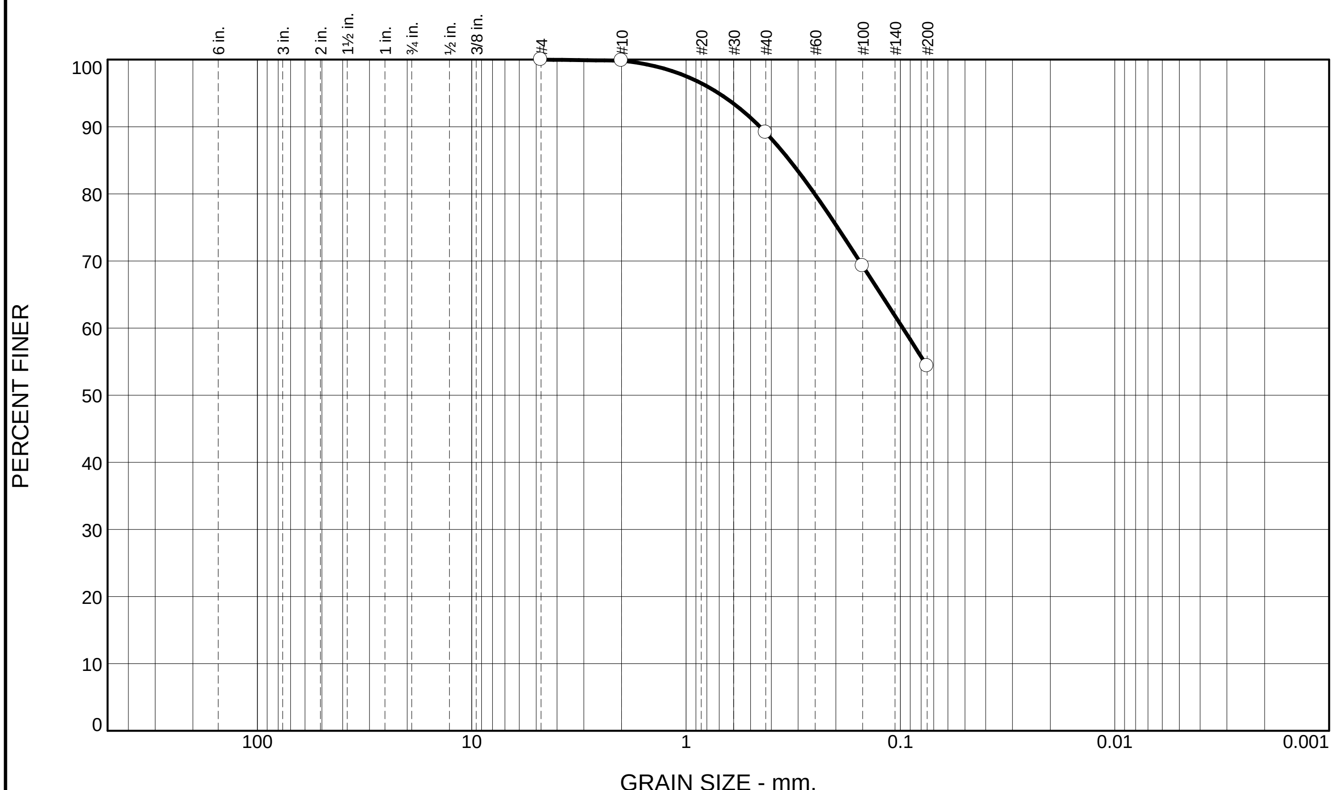
EVERGREEN TESTING, INC.

Watervliet, NY

Figure 996

Tested By: AB **Checked By:** EG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	10.8	34.8	54.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	89.1		
#100	69.3		
#200	54.3		

* (no specification provided)

Material Description

SILT and F-M-C SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.4518 D_{85}= 0.3288 D_{60}= 0.0975
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422 Washed

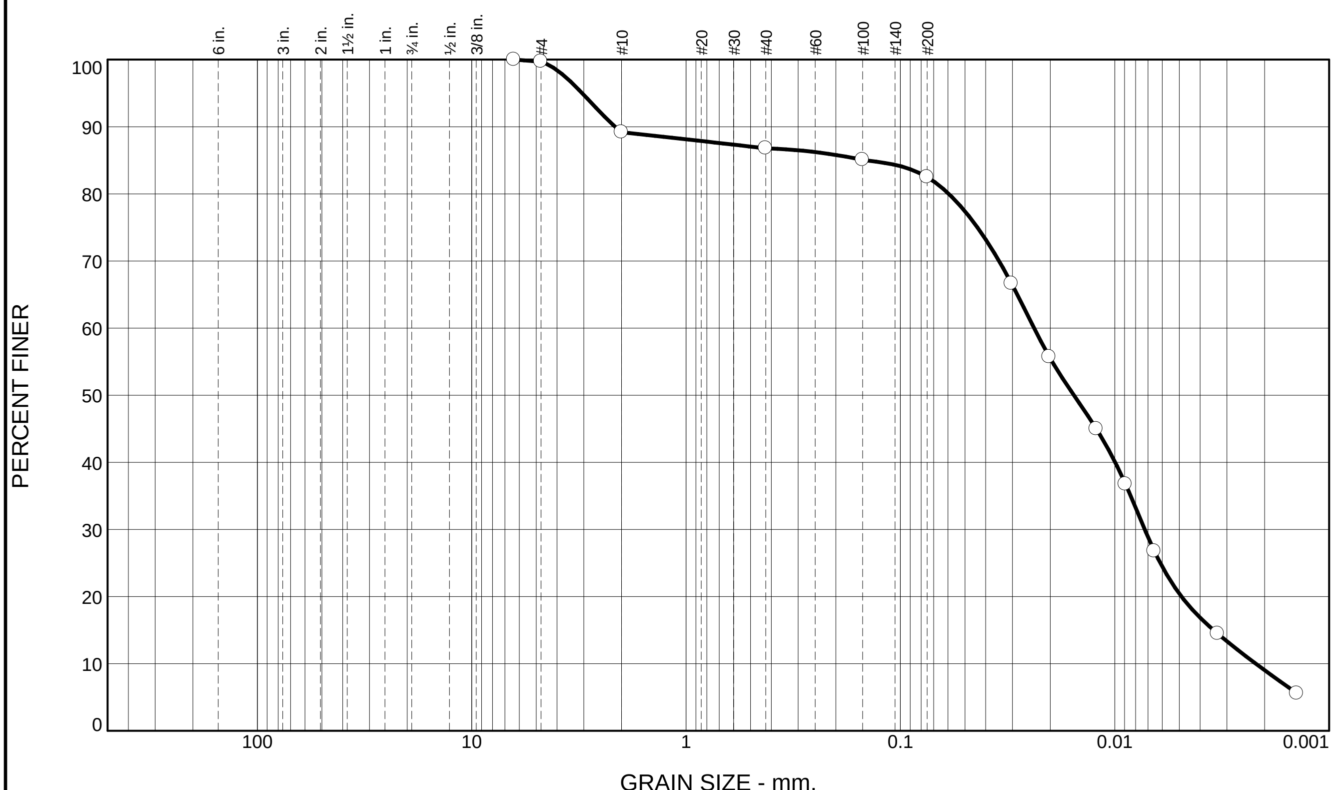
Source of Sample: Soil Borings **Depth:** 4'-6'
Sample Number: 992 SB-1/S-3 **Date:** 6-23-17

EVERGREEN TESTING, INC.
Watervliet, NY

Client: Bergmann Associates
Project: Beacon Island Parcel
Town of Bethlehem, NY
Project No: FDE-17-121 **Figure** 992

Tested By: AB **Checked By:** EG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	10.5	2.4	4.3	62.1	20.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.25"	100.0		
#4	99.7		
#10	89.2		
#40	86.8		
#100	85.1		
#200	82.5		

* (no specification provided)

Material Description

SILT, Some Clay, Little C-F-M Sand, trace fine gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 2.1427 D_{85}= 0.1453 D_{60}= 0.0238
D_{50}= 0.0155 D_{30}= 0.0072 D_{15}= 0.0035
D_{10}= 0.0022 C_u= 10.82 C_c= 1.00

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422 Washed

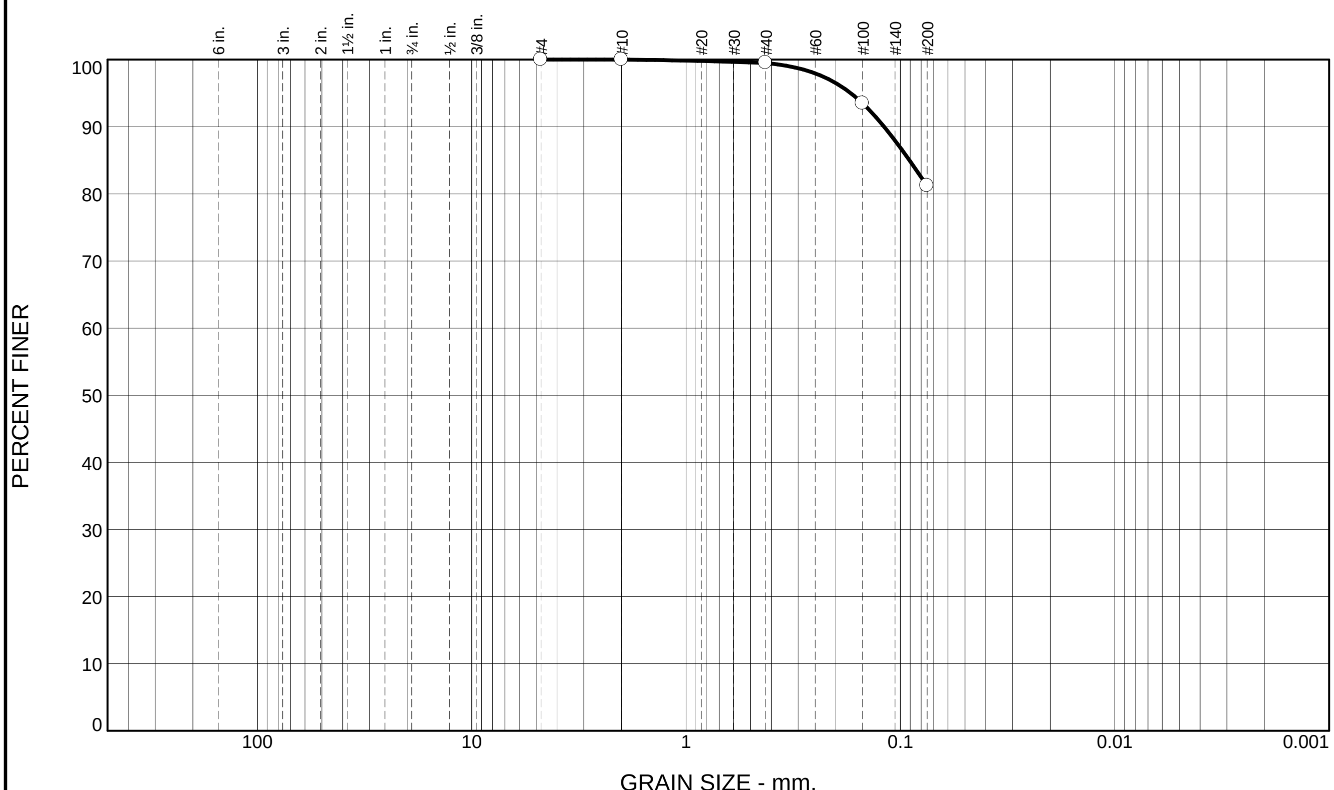
Source of Sample: Soil Borings **Depth:** 8'-10'
Sample Number: 993 SB-1/S-5 **Date:** 6-23-17

EVERGREEN TESTING, INC.
Watervliet, NY

Client: Bergmann Associates
Project: Beacon Island Parcel
Town of Bethlehem, NY
Project No: FDE-17-121 **Figure** 993

Tested By: AB **Checked By:** EG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	18.3	81.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#40	99.5		
#100	93.5		
#200	81.2		

* (no specification provided)

Material Description

SILT, Little F-M Sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1192 D_{85}= 0.0908 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Per ASTM D422 Washed

Source of Sample: Soil Borings **Depth:** 12'-14'
Sample Number: 994 SB-1/S-7 **Date:** 6-23-17

EVERGREEN TESTING, INC.
Watervliet, NY

Client: Bergmann Associates
Project: Beacon Island Parcel
Town of Bethlehem, NY
Project No: FDE-17-121 **Figure** 994

Tested By: AB **Checked By:** EG