MOAKLEY PARK:
PRELIMINARY RESILIENCY DESIGN

MVP GRANT FINAL REPORT

SEPTEMBER 2020

Mayor Martin J. Walsh

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PROJECT INTRODUCTION

The Moakley Park Preliminary Resilience Design project is an important part of the City of Boston's goal of advancing climate readiness along Boston's shoreline through continued development of the Moakley Park Vision Plan, completed in January of 2019. Moakley Park is located at the start of a major flood pathway into four neighborhoods, posing an opportunity to become a legacy park using nature-based solutions to address climate vulnerabilities. This project will serve as a model for municipalities across the Commonwealth looking to integrate climate resilience planning and construction phasing into waterfront open space design. The re-envisioned Moakley Park takes on climate change threats by creating a coastal protection system to address flood risk, designing sustainable stormwater management green infrastructure that manages current and future rainfall, expanding education and engagement of Bostonians on climate hazards and action, adding substantial new tree canopy, and preparing outdoor facilities for climate change and for new programs to attract and diversify park users. Additionally, it creates a more ecologically diverse and sustainable landscape and explicitly addresses issues of inclusion and access to the harbor.

The Boston Parks and Recreation Department (BPRD) has led the completion of this grant-funded work in the past 12 months. The project has resulted in a preliminary design, technical analysis, pre-permitting assessment, Community Engagement, and Schematic Design Flood Protection of Moakley Park to set up the project for construction documentation and phased construction. The thee primary tasks are the following: Task 1- Resilience Preliminary Design, Task 2- Community Engagement, and Task 3- Schematic Design Flood Protection and Relevant Earthworks. For more detailed information, refer to the Appendix which includes all deliverables organized by task and sub-task.

BASELINE TECHNICAL ANALYSIS

Sub-Task 1.1 Technical analysis +
Sub-Task 1.2 Pre-Permitting Feasibility Assessment

To further advance the vision plan for Moakley Park, a series of technical studies were conducted from August through November of 2019. The primary intent of these studies was to obtain a baseline understanding of existing conditions in order to inform future design decisions and clarify potential conflicts. Key studies included Coastal resilience assessment using the Boston Harbor Flood Risk Model, Hydrologic and Hydraulic modeling based on BOAA National Resource Services and City of Boston projected rainfall intensities, Field exploration program including environmental and geotechnical subsurface investigations and an Assessment of current soil and groundwater conditions including sampling and laboratory analysis. The results of the above investigations were presented in a series of deliverables, as identified in Appendix under Sub-Task 1.1 Technical Analysis.

Additionally, due to the complexity of the project and number of regulatory bodies involved, a detailed evaluation of future permitting needs was conducted to develop a comprehensive strategy for advancing through construction. The results of the baseline investigations informed the Landscape Design and Engineering Refinements, as further discussed below.

LANDSCAPE RESILIENCE DESIGN AND ENGINEERING REFINEMENTS

Sub-Task 1.3 Stormwater and Coastal Defense Strategies +
Sub-Task 1.4 Landscape Resilience Design and Engineering Refinements + Costs

From December 2019 through May 2020 the design team integrated the technical analysis into a refined landscape design proposal, now grounded with the site-specific existing conditions. Based on the constraints revealed, the team developed three alternative alignments for the flood management system. These options were explored to understand the implications of reducing fill to avoid on-site settlement, to avoid conflicts with underground utilities, and to prioritize tree conservation. The option selected for advancement was most similar to the Vision Plan layout, see Sub-Task 1.4A: Revised Conceptual Plan in Appendix.

Concurrent to this process, the design team work iteratively with Nitsch Engineering to develop a revised stormwater management plan that incorporates both gray and green infrastructure (see Sub-Task 1.3B: Updated Stormwater Management Plan in Appendix). Based on the beach nourishment proposal and analysis completed by the coastal flood modeling engineers, Woods Hole Group, the Design Flood Elevation for the project site was able to be reduced from 23.5 BCB to 21.5 BCB, see 1.3A: Updated Coastal Defense Strategy in Appendix.

In April, a phasing plan was developed with a particular focus on an early implementation of the first phase that addresses short-term flood risks. A cost estimate was developed to capture the fully proposed design based on landscape typologies, as well as by phase. See Sub-Task 1.4: Landscape Resilience Design and Engineering Refinements + Costs in appendix for phasing plan and cost estimate.

SCHEMATIC DESIGN FLOOD PROTECTION + RELEVANT EARTHWORKS
Sub-Task 3.2 Schematic Design for Flood Protection Park and Berm Infrastructure

Building upon previous concept refinement, berm design and engineering were advanced both within the park as well as with respect to tie-ins to regional infrastructure. Preliminary schematic-level design was developed to prepare for federal, state, and local permitting, required for implementation and future construction. This phase occurred from February through July of 2020. A Preliminary Schematic Design package was developed to document preferred alternatives for the berm alignment and relevant adjacent earthworks within the park, and region-level protection alignment identified above including a grading plan and 6 cross-sections. A memorandum accompanies this to summarize settlement, slope stability, seepage and an outline of alternative construction strategies to offset additional load associated with the proposed landscape design. Key deliverables associated with these focus areas are presented in the Appendix under Sub-Task 3.2: Schematic Design for Flood Protection Park and Berm Infrastructure.

RESILIENCY IMPLEMENTATION, COORDINATION + PERMITTING
Sub-Task 3.1 District-level Climate Resiliency Coordination
Sub-Task 3.3 Environmental and Regulatory Review Initiation

District-level Climate Resiliency Coordination

Meetings with area stakeholders and property owners were held to align the proposed flood protections beyond park boundaries, and incorporate the proposed improvements within the greater regional flood protection for the district occurred throughout the last 12 months of the project. These stakeholders include the following: Bayside Mixed-Use development team, Mary Ellen McCormack development team, Boston Housing Authority, South Boston Neighborhood House, Climate Ready Dorchester team, MWRA, and BWSC. Two memorandums were developed in this phase. One, to explore the considerations for BPRD when entering into a MOU agreement for resiliency infrastructure. The second summarizes meetings and coordination that took place during this phase. These memorandums can be found in the Appendix: Sub-Task 3.1 District-level Climate Resiliency Coordination.

Environmental and Regulatory Review Initiation

In June 2020, an initial meeting with regulatory agencies was held to discuss the regulatory approach and permitting requirements for the project. Following these meetings, a preferred permitting pathway with each agency was developed, and design considerations requiring future discussions were identified. Further information regarding the regulatory meetings can be found in the deliverables associated with Subtask 3.3 of the Appendix.

COMMUNITY ENGAGEMENT

Sub-Task 2.1 Multi-faceted engagement strategy focused on climate resiliency education and community building +
Sub-Task 2.2A: Analysis of public input and interactions

Over the course of the last year, the design team has partnered with South Boston Neighborhood House and Boston Harbor Now (BHN) to broaden outreach and gain support for the project. Engagement activities included attendance at a variety of neighborhood events, focus group conversations, as well as on-site activities. For a complete list of events, presentations and virtual outreach strategies see Appendix: Sub-Task 2.1 Multi-faceted engagement strategy.

During the COVID pandemic, the engagement approach in the last few months was thoughtfully tailored to accommodate social distancing measures. The team, working with Greenovate and BHN, virtually engaged with stakeholders and the local community through virtual public forums, distribution of online survey and interactive material, and provided regular project updates through social media. For a more detailed description of events, community input and how that has been reflected in the design, see Sub-Task 2.2: Analysis of public input and interactions of the Appendix.

CONCLUSION

In the last 12 month, the Moakley Park Vision Plan has been refined to reflect both the technical constraints of the site, and the needs of the surrounding neighborhood. A great effort has also been made to ensure that this landscape is well-integrated into a resilient coastline for South Boston for generations to come. The attached appendix includes all deliverables organized by task as outlined in the MVP 2019 Grant.

APPENDIX

APPENDIX

FINAL DELIVERABLES BY TASK

List below is linked to deliverable within the document

Task 1: Resilience Preliminary Design

Sub-Task 1.1 Technical Analysis

- 1.1A: Preliminary Geotechnical Recommendations Report
- 1.1.B: Environmental Findings Report outlining the results of the Phase I ESA and LS
- 1.1C: Hydrological Modeling Memo
- 1.1D: Coastal Resilience Simulation Memo

Sub-Task 1.2 Pre-Permitting Feasibility Assessment

- 1.2A: Permit Matrix, which will include a narrative of each permit necessary, reasoning for permit inclusion, a schedule, and anticipated fee for permitting each alternative

Sub-Task 1.3 Stormwater and Coastal Defense Strategies

- 1.3A: Updated Coastal Defense Strategy including construction toolkit
- 1.3B: Updated Stormwater Management Plan

Sub-Task 1.4 Landscape Resilience Design and Engineering Refinements + Costs

- 1.4A: Revised Conceptual Plan including grading, connectivity, edge conditions, soils, phasing plan and cost estimates.
- 1.4B: Climate Standards Memo

Task 2: Community Engagement

Sub-Task 2.1 Multi-faceted engagement strategy

- 2.1A: Public presentations, site activations, event tabling, updated Online strategy

Sub-Task 2.2 Analysis of public input and interactions

- 2.2A: Outreach coverage diagrams and outreach modification memos

Task 3: Schematic Design Flood Protection + Relevant Earthworks

Sub-Task 3.1 District-level Climate Resiliency Coordination

- 3.1A: Presentations and coordination memo
- 3.1B: Draft MOU/ MOA

Sub-Task 3.2 Schematic Design for Flood Protection Park and Berm Infrastructure

- 3.2A: Design package including two design strategies showing critical resilience alignments on-site and off-site, berm detailing, and interim flood strategies.

Sub-Task 3.3 Environmental and Regulatory Review Initiation

- 3.3A: Pre-application meetings
- 3.3B: Review and revision memos

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS REPORT

WESTON & SAMPSON + WSP

- GEOTECHNICAL REPORT + TRC FORM
- PEER REVIEW

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

Stoss Landscape Urbanism
Weston & Sampson Project No. 2190828

December 11, 2019

Stoss Landscape Urbanism
c/o Ms. Cheri Ruane, RLA
Weston & Sampson
85 Devonshire Street, 3rd Floor
Boston, Massachusetts 02109

RE: Geotechnical Feasibility Study
Proposed Moakley Park Improvements
Boston, Massachusetts

INTRODUCTION

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to present this letter report summarizing our geotechnical feasibility study for the proposed improvements to Joe Moakley Park in Boston, Massachusetts. The purpose of our feasibility study was to complete conceptual level subsurface explorations and geotechnical analyses to provide a discussion of geotechnical considerations for the proposed project.

The geotechnical considerations and recommendations presented in this report are based on our understanding of the proposed project as described herein, subsurface conditions encountered at discrete exploration locations, available record plans, and our discussions with you. Additional explorations, laboratory testing, analyses, and recommendations will be necessary as design progresses and for final design. Information on the use of this report is provided in the document titled "Important Information about this Geotechnical Engineering Report" by Geoprofessional Business Association (GBA), Inc., included as *Attachment F*.

SITE DESCRIPTION

Existing Conditions

Joe Moakley Park (formerly known as Columbia Park) is an approximately 60-acre, waterfront park (hereinafter the "Site") located in the "South Boston" neighborhood of Boston, Massachusetts as shown in *Figure 1 – Locus Map.* The Site is generally bordered by Columbia Road to the north, Old Colony Avenue/Columbia Road to the west, Kosciuszko "K" Circle to the south, and William J Day Boulevard to the east, with Carson public beach beyond.

Most of the Site is filled land, claimed from Dorchester Bay in the late 1800s and early 1900s. Portions of the Site were reportedly used briefly as a coal yard and a dump in the early 1900s. Columbia Park was established in the early 1920's, generally situated in the Site's present footprint. Refer to *Attachment A* for select historic maps of the Site.

Existing Site features include a multi-use athletic track and field with reinforced concrete bleachers, four basketball courts, three tennis courts, playground areas, nine baseball/softball fields, two soccer fields, a roller hockey rink, asphalt paved parking areas and walking paths, a preschool building and a restroom facility. The Site is predominately grass-covered with trees partially outlining the athletic fields and playground areas. The Carson Beach area and associated food service, restroom facilities, maintenance buildings, and a walking path are located directly east of the Site.

Existing site grades are relatively level throughout most of the Site and generally range in elevation (El.) from about El. 12 ft. to El. 16 ft, except outside of the bleachers area to the south, where grades range from about El. 18 ft. to El. 28 ft. Elevations provided in this report are in feet and reference the Boston City Base Datum (BCB).

There are several large underground utilities that traverse the Site as shown in *Figure 2 – Site Plan*. Generally oriented in an east-west direction are the Boston Water and Sewer's (BWSC) 102-inch diameter Vale Street Overflow, and 124-inch by 75-inch Kemp Street Overflow, a 78-inch by 78-inch brick drain line to the north and a 78-inch by 96-inch brick drain line to the south. A 116-inch by 87-inch Massachusetts Water Resources Authority (MWRA) utility line ("Columbus Park Connection") traverses the Site in a north to south direction along the eastern portion of the Site. Invert elevations of these existing utilities are currently unknown, but reportedly may be up to about 30 ft. below existing grades.

PROJECT DESCRIPTION AND UNDERSTANDING

Based on the January 2019 Vision Plan by Boston Parks and Recreation, we understand that Site improvements include generally modernizing the park, while filling and raising grades to prevent flooding as part of climate resiliency planning for South Boston. New park features will likely include baseball, softball, little-league, soccer, football, and multi-use sports fields, a track and field, a performance/viewing slope, multiple play areas, a water play park, stormwater detention facilities, a beach promenade and festival area, and several passive spaces. Stormwater storage areas are proposed below proposed athletic fields.

Proposed structures include a field house with restrooms, an overlook/shelter, and a restaurant. A below-grade parking structure is also being considered. Due to the preliminary nature of design at the time of this report, the location, size and height of these structures are currently not available. We understand that the existing features at the Site will be demolished in their entirety. However, the major subsurface utilities will remain.

As part of resiliency planning, a viewing slope or "levee" is being considered generally in a north to south direction along the eastern portion of the Site. Proposed grades generally include filling the Site, and may include new grades up to about 10 feet above existing grades along the proposed levee.

SUBSURFACE CONDITIONS

Geologic Setting

Most of the Site was once in Dorchester Harbor, and was filled. Surficial geology information available from the Massachusetts Office of Geographic Information (Mass GIS) indicates soils at the Site consist of floodplain alluvium and sand and gravel deposits, with depth to bedrock ranging between 50 and 200 feet. Post-glacial, organic-rich estuarine sediments and peat typically lie above older post-glacial bay deposits consisting of Boston Blue Clay.

Bedrock is mapped by the United States Geologic Survey (USGS) as part of the Roxbury Conglomerate that consists of conglomerate, sandstone, siltstone, argillite, and melaphyre. Bedrock mapping further indicates that there is a fault intruded by an igneous dike on the northern portion of the Site.

Subsurface Explorations

Borings

Eighteen (18) borings (B-1, B-2, B-4, B-6 to B-8, B-10 to B-21) were completed at the Site between August 13 and September 11, 2019, at the approximate locations shown on ***Figure 2 – Site Plan***. The borings were drilled by New England Boring Contractors of Brockton, Massachusetts using an All-Terrain Vehicle (ATV) mounted drill rig and drive-and-wash drilling methods. The borings were generally advanced to depths ranging from 20 ft. to 41 ft. below existing ground surface. Three (3) borings (B-6, B-13 and B-20) were advanced to depths ranging between 170 ft. and 224 ft. In boring B-2, drilling refusal was encountered and a bedrock core (NX-size) was completed to a depth of 70 ft. Eleven (11) groundwater monitoring wells were installed in completed boreholes. Excess soil cuttings from the boreholes were placed in drums for off-site disposal by others.

Standard Penetration Tests (SPTs) were completed in each boring by driving a 24-inch-long, 1-3/8 inch inside diameter (2 in. outside diameter) split spoon sampler with a 140 lb. automatic hammer falling 30 inches per blow. Hammer blows per 6 inches of sampler penetration (for 24 inches) were recorded. The blow counts (or N values) for the middle 12 inches are combined and designated as the SPT blow count, which is correlated to soil consistencies and engineering soil properties. Four (4) undisturbed Shelby Tube samples were obtained in the fine-grained soils (i.e., silt and clay) encountered in select borings. The SPTs were generally performed every 2 feet through the existing fill and organic soil layers and every 5 feet thereafter. In the deep borings, the sampling intervals were increased to at least 10 feet or greater. SPT (sampler) refusal is defined as more than 100 hammer blows for less than six inches of sampler penetration. Drilling refusal is defined as no discernable roller bit advance over a period of approximately five minutes.

Weston & Sampson staff observed drilling activities in the field and prepared logs for each boring. Subsurface conditions encountered in the borings are described in the following sections and in the boring logs included in *Attachment B*. Rock core photographs are included in *Attachment C*.

Test Pits

Twelve (12) test pits (TP-1 through TP-12) were excavated to depths up to about 10 ft. by New England Boring Contractors on September 12 and September 13, 2019. The test pits were excavated using a CASE 580 rubber-tire backhoe. The approximate test pit locations are shown in *Figure 2*. A Weston & Sampson geotechnical professional observed the test pit excavations and prepared the test pit logs included as *Attachment D*.

Subsurface Conditions in Explorations

The major soil groups encountered in the borings are described below, in order of their occurrence with depth from ground surface. Variations may occur and should be expected outside of the boring locations. Refer to the exploration logs for detailed descriptions of the soil samples collected.

Surface Materials – The ground surface at the borings and test pit locations was generally grass-covered with 6 to 18 inches of topsoil, typically consisting of medium to fine sand, some silt, and trace organics (roots). Topsoil was not observed in TP-5, TP-9, B-6, B-10 and B-19B.

Fill – Fill consisting of soil mixed with debris was encountered in all boring and test pit locations to depths ranging between 8 to 22 ft. The Fill generally consisted of either fine to coarse Sand, with varying amounts of silt (trace to silty), with organic material and debris, or Silt and Clay with varying amounts of sand (trace to some), trace to little gravel with organic material and debris. The observed debris included, slag, ash, wood, glass, concrete, asphalt, metal, pottery, leather, brick, coal and organics. Organic soil layers were also encountered within the Fill in borings B-6, B-8 and B-12. The consistency of the Fill was generally very loose to loose (granular soils) and very soft to soft (fine grained soils), except in the upper 5 ft, which was generally denser/stiffer.

Organic Soils – Fine-grained organic soils were encountered in B-1, B-2, B-11, B-14 and B-15, below the fill. The layer thickness encountered was generally about 4 ft or less. The organic soils generally consisted of very soft to soft organic silt with varying amounts of clay and sand (trace to some) and fibrous material or roots.

Native Sand, Silt – Native soils consisting of sand or silt were encountered below the fill and organic soils in B-4, B-6, B-7, B-10, B-11 through B-17, B-19B and B-20. The sand layer generally consisted of loose to medium dense fine to coarse sand with varying amounts of silt and gravel (trace to some). The thickness of the sand layer was generally 10 feet or less with the exception of B-6 and B-20, where the sand thickness was 56 feet and 23 feet, respectively. The silt layer generally consisted of very soft to soft silt, some clay with varying amounts of sand (little to some) and trace shell fragments. The thickness of the silt layer was generally 8 feet or less with the

exception of B-7 where the thickness was 16 feet. A strong organic odor was noted in the majority of the samples collected from these layers.

Clay – Very soft to very stiff clay was encountered in all borings, except B-18 which was terminated in the fill layer. The clay layer consisted of gray, gray-brown clay, with trace to some sand and trace to some gravel. In B-2, B-6, B-13 and B-20 the clay layer was fully penetrated and ranged in thickness from 36.5 feet to 196 feet. The clay layer was interbedded with Sands at greater depths in boring B-13 and B-20. The clay layer was not fully penetrated in the other borings.

Glacial Till – A layer of possible glacial till was encountered in B-6 and B-13 based on the observed slow drilling penetration rates and intermittent roller bit grinding indicating the possible presence of cobbles and boulders. The glacial till was encountered at a depth of 164 feet in B-6 and 218 feet in B-13. SPT tests were not completed due to the depth of the borings, but based on the slow rate of drilling the relative density of this stratum is expected to be dense to very dense.

Bedrock – Bedrock was encountered in B-2, and rock coring performed between depths of 62 to 70 feet. Bedrock consisted of slightly weathered, very hard, fine to medium grained, gray to black, Diabase that was highly to moderately fractured with sub-horizontal to subvertical joints. Rock Quality Designation (RQD) values ranged between 22 and 87 percent.

Groundwater – Groundwater was generally encountered in the borings during drilling at depths ranging from about 4 to 7 feet based on the observation of wet samples and observations during drilling. Groundwater depths of 12.5 feet and 9 feet were observed in B-19B and B-20, respectively, which were drilled at had higher ground surface elevations. Stabilized water levels, measured from instrumented ground monitoring wells, will be summarized and transmitted in a separate document by others.

Groundwater levels should be expected to fluctuate with season, variations in precipitation, construction in the area, and other factors. Perched groundwater conditions could exist close to the ground surface, especially during and after extended periods of wet weather.

Geotechnical Laboratory Testing

Geotechnical laboratory testing included organic content, moisture content, Atterberg Limits and grain size analyses on select samples to determine particle size distributions, confirm field classifications, and evaluate suitability of the material for reuse as fill. Consolidation testing was completed on samples obtained from Shelby Tubes collected in B-13 and B-20 to determine compressibility parameters for use in preliminary settlement analyses. Laboratory testing was performed by GeoTesting Express of Acton, Massachusetts and the results are included in *Attachment E*.

PRELIMINARY GEOTECHNICAL CONSIDERATIONS

General

The Site is underlain by compressible soils (loose/soft fill, organic soils and clays) of variable thickness and composition, which are prone to settlement under new loads. Therefore, geotechnical considerations for design and construction of the proposed improvements include settlement and related impacts to new and existing area structures, utilities and roadways. To accommodate settlement, new site features (e.g., levees, structures, utilities, etc.) should be designed as flexible structures with a high movement tolerance or be supported on foundations designed to mitigate settlement.

These geotechnical considerations are further discussed in the following sections. Additional geotechnical explorations, analyses, and laboratory testing will be required to provide design level geotechnical recommendations once site grading, building locations and structural loadings have been determined.

Settlement Estimates

An increase in site grades and structure loads will induce settlement of the existing compressible fill, organic soils and clays underlying the Site. Settlement is anticipated to be greatest along the eastern portion of the Site, where proposed grades/levees are highest.

A preliminary settlement evaluation was performed using the program Settle3D by Rocscience, Inc. Material properties used in the analyses were based on laboratory testing results of samples collected during our site explorations as well as typical values for similar materials in the area. Results of the preliminary settlement analyses for the highest fill area (levees) indicate settlement exceeding 2 feet over a 40-year time period. The magnitude of settlement is anticipated to be greatest where the clay stratum is thickest and the in-situ pathway for porewater pressure dissipation is the longest.

Site Grading Considerations

Site grade increases and associated settlement of the compressible soils will result in the settlement of the existing below grade utilities at similar rates as the surrounding soils. Therefore, grade increases near existing utilities to remain should be constructed in a manner that limits disturbance and impacts to the utilities.

Preliminarily, grade increases greater than 1 ft in height should be placed outside of an influence zone defined by a plane extending a distance of 5 ft horizontally away from the bottom outside edge of a utility, then up and away at 1H:1V slope to limit the settlement, and lateral and vertical pressures on the utility. Additional analyses are required to define this minimum distance as design progresses.

Where grade increases cannot be limited to be outside this influence zone, settlement and stress increase effects should be limited by the use of deep foundations, ground improvement elements, lightweight fill, cut-off walls, or a combination of these methods. Sleeving or bridging over the utilities should consider settlement of soils below the utilities. Relocation of critical utilities below areas of proposed grade increases should also be considered.

It is noted that due to the density of the existing fill, ground improvement elements such as stone columns (also known by the trademarked names Geopiers®, Rammed Aggregate Piers®, and Vibro Piers™) are not considered viable foundation support alternatives.

Along the eastern portion of the Site where proposed grade increases will act as a levee, design solutions should consider buoyancy (of lightweight fill), and seepage through and underneath the levee, to keep the Site dry of ocean effects during storm events.

Outside of the proposed levee area, on the "dry side" of the levee, site grade increases maybe accomplished with lightweight fill. If the project schedule can accommodate additional earthwork time, preloading and/or surcharging may also be considered. Preloading and/or surcharging would include placement of fill in areas of proposed structures or grade increases up to several months prior to construction to allow some portion of settlement to occur. The height of fill should be equal to (preloading) or greater (surcharging) than the maximum pressures generated by the proposed grade changes or structural loads. The preloading and/or surcharging should be performed in conjunction with a settlement monitoring program to evaluate rates and magnitudes of resulting settlement. Although preloading and/or surcharging would reduce post construction settlement, preloading would not significantly reduce long-term settlement of the organic and clay soils. Preloading and/or surcharging should also consider settlement of existing utilities to remain and should be applied outside of the utility influence zone describe above.

Liquefaction Potential

The consistency of fill material at the Site includes very loose, wet, fine sands, which could be prone to liquefaction under earthquake loading conditions. The possibility and effect of dynamic settlement due to liquefaction needs to be further evaluated during subsequent design phases based on the results of additional explorations, laboratory testing, structural design information of proposed buildings and groundwater and tidal information.

Building Foundation Alternatives

It is understood that proposed structures may include a field house with restrooms, an overlook/ shelter, a restaurant, and a below-grade parking garage. Support of the proposed buildings on the existing fill and organics is not recommended due to the high risk of large total and differential settlements as described above. Foundation alternatives include deep foundations that extend through the fill and organic soils into native soils or shallow foundations supported on ground improvement (such as rigid inclusions) to reduce differential settlements that could damage structures.

For the proposed below grade parking garage structure, depending on the garage depth, location and loads, deep foundations or a mat foundation should be considered. Its construction will likely require sheet piling or slurry diaphragm walls as excavation support to facilitate the excavation below groundwater levels. Bracing, groundwater controls and basal heave considerations will be required.

Additional Explorations and Analyses

Our explorations were completed at widely spaces locations in accessible areas in the general vicinity of the proposed site development. Conceptual design layouts are still being evaluated and the locations of levees, structures, and other site features have not been finalized. Additional explorations and geotechnical analyses will be required to develop final design geotechnical recommendations for foundation, ground improvement, slope stability and earthwork design. In addition, future explorations should include Cone Penetrometer Test (CPT) soundings and geophysical surface wave test (such as MASW – Multi-Channel Analysis of Surface Waves) to further evaluate subsurface conditions and seismic design parameters.

LIMITATIONS

We have completed this geotechnical feasibility study for use by Stoss Landscape Urbanism and the Boston Parks and Recreation Department for this site and project only. The information herein may be used for preliminary cost estimating and/or alternative analyses but is not considered sufficient for design or bidding and should not be construed as a warranty of subsurface conditions.

Additional geotechnical explorations and analyses will be required for final design. We have made observations only at the locations and only to the stated depths. These observations do not reflect soil types, strata thicknesses, water levels or seepage that may exist between or below preliminary observations. Our recommendations are not applicable to other areas of the site.

If any changes are made to the anticipated locations, loads, grading, configurations, or construction timing, the conclusions and recommendations contained herein may not be applicable, and we should be consulted. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, is given. Additional information about interpretation and use of this report is included in ***Attachment F***.

It has been a pleasure assisting you with this project and we look forward to our continued involvement. Please call if you have any questions.

Very truly yours,
WESTON & SAMPSON, INC.

Stephen Spink, PE
Senior Geotechnical Project Manager

Tulin H. Fuselier, PE
Geotechnical Practice Leader

ATTACHMENTS

Figure 1	Locus Map
Figure 2	Site Plan
Attachment A	Historic Site Plans
Attachment B	Boring Logs
Attachment C	Rock Core Photographs
Attachment D	Test Pit Logs
Attachment E	Geotechnical Laboratory Test Results
Attachment F	Important Information about your Geotechnical Engineering Report

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FIGURES

FIGURE 1
CITY OF BOSTON, MASSACHUSETTS
MOAKLEY PARK

LOCUS MAP

0 2,000 4,000 **Feet**

Weston & Sampson

Path: \\wse03.local\WSE\Depts\GISdata\Client\Boston MA\Project\2190828\LocusMap.mxd **User:** GannonR **Saved:** 11/27/2019 8:54:08 AM **Opened:** 11/27/2019 8:54:38 AM

PLAN REFERENCES

1. PARKS AND RECREATION DEPARTMENT
   BOSTON, MASSACHUSETTS, COLUMBUS PARK
   LAYOUT & DRAINAGE
   BY CAMP DRESSER & McKEE, INC
   SCALE: 1"=30', DATE: JUNE, 1993
2. PARKS AND RECREATION DEPARTMENT
   BOSTON, MASSACHUSETTS, COLUMBUS PARK
   GRADING AND UTILITIES PLAN
   BY STORCH ASSOCIATES
   SCALE: 1"=20'-0", DATE: 10-7-74
3. CITY OF BOSTON PARKS & RECREATION DEPARTMENT
   COLUMBUS PARK, SOUTH BOSTON
   SITE PLAN EXISTING WORK
   SCALE: AS NOTED, DATE: MAY 15, 1973
4. SOUTH BOSTON BEACHES REHABILITATION
   METROPOLITAN DISTRICT COMMISSION
   CONTRACT NO. P95-1784-CIA
   BY CAROL R. JOHNSON ASSOCIATES, INC.
   WATER MAIN IMPROVEMENTS
   SCALE: 1"=40', DATE: 05-01-98
   SHEETS W-01 AND W-02
5. BOSTON WATER AND SEWER COMMISSION
   BWSC MAP 18L 17L, AND 19K 19L 18K
   SCALE" 1"=100', PRINTED: SEPTEMBER 13, 2007
6. KEMP ST. EXTENSION OF OVERFLOW
   FROM EXISTING SEWER EASTERLY, SOUTH BOSTON
   PLAN AND PROFILE
   SCALE" 1"=20' HORIZONTAL, 1"=50' VERTICAL
   STAMPED: CITY OF BOSTON STREET DEPARTMENT
   SEWER DIVISION
   DATE: MAY 21, 1910
7. MASSACHUSETTS WATER RESOURCES AUTHORITY
   BOSO86 - GRADING PLAN
   NORTH DORCHESTER BAY CSO STORAGE TUNNEL
   SCALE" 1"=40'-0"
   SHEET NO. 87 OF 238
   DRAWING NO. C-129
8. MASSACHUSETTS WATER RESOURCES AUTHORITY
   BOSO87 - SITE UTILITY PLAN
   NORTH DORCHESTER BAY CSO STORAGE TUNNEL
   SCALE" 1"=20'
   SHEET NO. 99 OF 238
   DRAWING NO. C-152
9. CITY OF BOSTON PARK DEPARTMENT
   WATER AND SEWER LINES AT COLUMBUS
   PARK, SOUTH BOSTON
   SCALE" 1"=100'
   SHEET NO. 99 OF 238
   DRAWING NO. C-152
10. PARKS AND RECREATION DEPARTMENT
    BOSTON, MASSACHUSETTS, COLUMBUS PARK
    UPGRADING EXISTING WATER CONDITIONS
    SCALE: 1"=20'-0", DATE: FEBRUARY, 1989
11. KEYSPAN ENERGY DELIVERY
    PLANS 255, 256, 261, 264 AND 908
12. NSTAR ELECTRIC
    VARIOUS PLANS
13. MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
    PLAN 0194 AND 0195
14. BOSTON TRANSPORTATION DEPARTMENT
    NSTAR ELECTRIC COMPANY PROPOSED 345kV CONDUIT
    BY VANASSE HANGEN BRUSTLIN, INC.
15. COMCAST
16. PLAN SHOWING CITY OF BOSTON ROADS AND LANDS
    TRANSFERRED TO METROPOLITAN DISTRICT COMMISSION
    UNDER PROVISIONS OF CHAPTER 570 ACT OF 1955,
    CITY OF BOSTON, COLUMBIA RD., OLD COLONY AVE.
    SOUTH BOSTON
    PREPARED BY: JAMES W. HALEY, CHIEF ENGINEER,
    SURVEY DIVISION, PUBLIC WORKS DEPARTMENT
    DATED: MARCH 14, 1956, SCALE: 1"=100'
    CITY OF BOSTON LAYOUT NO. L-8709
17. WILLIAM J. DAY BOULEVARD, SOUTH BOSTON &
    DORCHESTER DISTRICTS, PLAN OF LAND TO BE TAKEN
    FROM THE CITY OF BOSTON BOARD OF PARK
    COMMISSIONERS UNDER THE PROVISIONS OF
    CHAPTER 509, ACTS OF 1949
    PREPARED BY: BENJAMIN W. FINK, DIRECTOR OF PARK
    ENGINEERING, COMMONWEALTH OF MASSACHUSETTS
    METROPOLITAN DISTRICT COMMISSION, PARKS DIVISION
    DATED: JANUARY 10, 1962, SCALE: 1"=100'
    MDC PLAN NOS. 38224 V.T. & 38225 V.T.
18. COLUMBIA ROAD, FRANKLIN PARK TO MARINE PARK
    PREPARED BY: WILLIAM JACKSON, CITY ENGINEER
    DATED: JUNE 10, 1877, SCALE: 1"=40'
    CITY OF BOSTON LAYOUT NO. L-2876
19. MASSACHUSETTS WATER RESOURCES AUTHORITY
    NORTH DORCHESTER BAY CSO STORAGE TUNNEL
    MWRA CONTRACT NO. 6244
    PREPARED BY: PARSONS BRINKERHOFF QUADE &
    DOUGLAS, INC., METCALF & EDDY AND BRYANT
    ASSOCIATES, INC.
    DATED: AUGUST 8, 2005, SCALE: 1"=40'
    PLAN BOOK 2006, PAGE 916

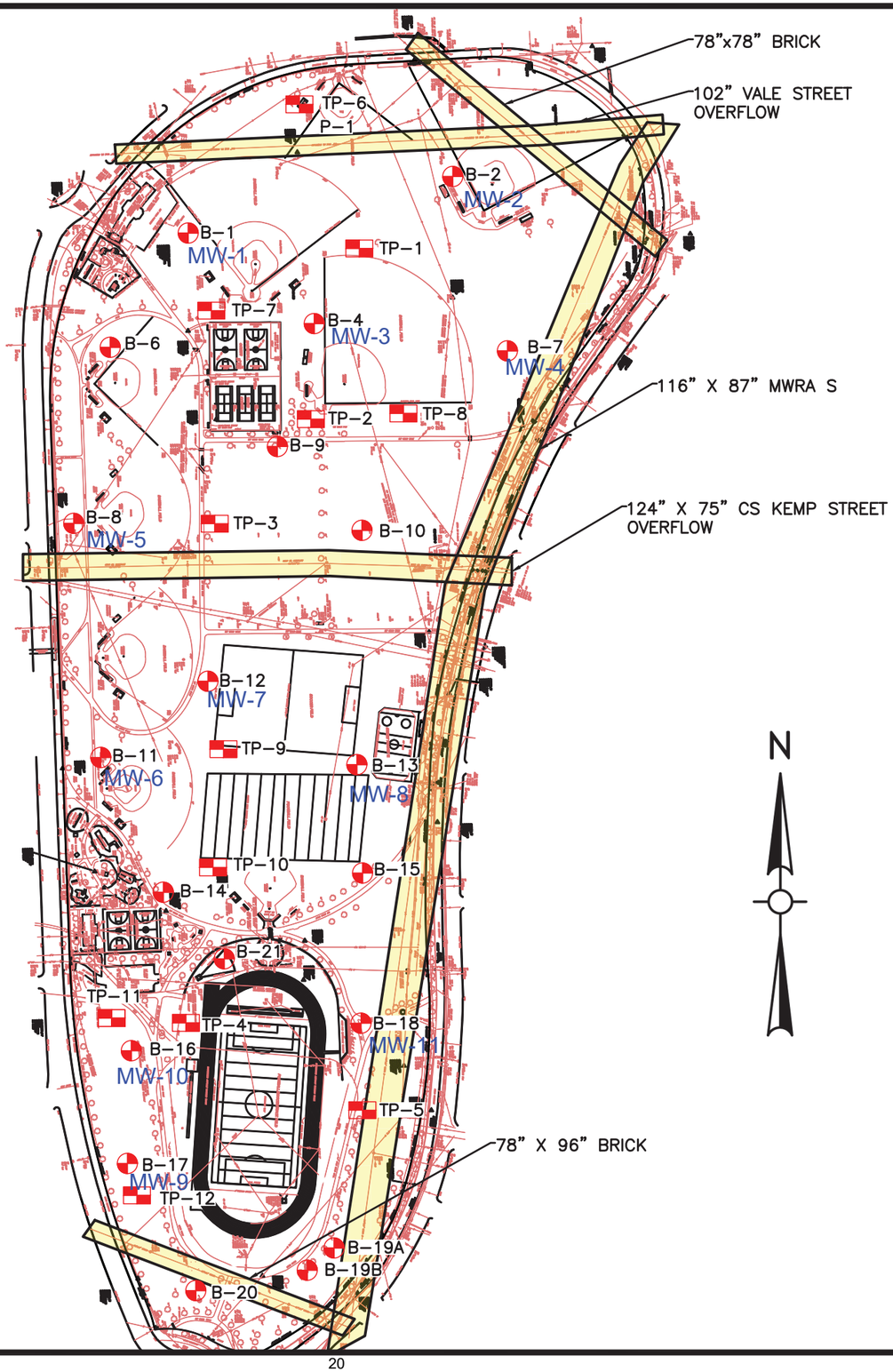
PLAN NOTES

1. THIS PLAN IS BASED ON THE CITED RECORD DESCRIPTIONS, ADDITIONAL REFERENCES AND SOURCES AS NOTED, AND AN ON-THE-GROUND SURVEY MADE SEPTEMBER, OCTOBER AND NOVEMBER, 2007 AND PARTIALLY UPDATED IN JUNE 2008 TO OBTAIN TOPOGRAPHICAL DATA WITHIN MWRA CONSTRUCTION AREAS AND IN APRIL 2009 TO SHOW THE LOCATION OF PROPERTY LINES.
2. COORDINATES, IN U.S. SURVEY FEET, ARE IN THE MASSACHUSETTS COORDINATE SYSTEM, MAINLAND ZONE, REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83/CORS), AS DETERMINED BY SMC'S NETWORK OF G.P.S. OBSERVATIONS, BASED ON THE FOLLOWING NATIONAL GEODETIC SURVEY (NGS) CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS): WMTS (WOBURN, MA) (NGS DATABASE ID AJ4072), FMTS (FRAMINGHAM, MA) (NGS DATABASE ID D10964) AND XMTS (FOXBORO, MA) (NGS DATABASE ID D10968).
3. PROPERTY LINE WAS COMPILED FROM AVAILABLE RECORD PLANS AND BASED ON THE LIMITED MONUMENTATION FOUND.
4. RECORD EASEMENTS, INCLUDING ANY CREATED BY MWRA CONTRACT NO. 6244, ARE NOT SHOWN ON THIS SURVEY. AS-BUILT RECORD DATA FOR MWRA PROJECT UNAVAILABLE AT TIME OF SURVEY.
5. ELEVATIONS, IN U.S. SURVEY FEET, ARE REFERENCED TO THE BOSTON CITY BASE AS DEFINED BY MASSACHUSETTS HIGHWAY DEPARTMENT BENCHMARK #213D.
6. SUBSURFACE UTILITY LINES AND FEATURES, AS SHOWN HEREON, WERE COMPILED FROM FIELD EVIDENCE AND/OR AVAILABLE RECORD INFORMATION (SEE REFERENCES), AND THEIR LOCATIONS ARE ONLY APPROXIMATE. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD.

SMC ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.

BEFORE DESIGNING FUTURE CONNECTIONS, THE APPROPRIATE UTILITIES MUST BE CONSULTED.

BEFORE CONSTRUCTION, ALL UTILITIES, PUBLIC AND PRIVATE, MUST BE NOTIFIED (SEE MASSACHUSETTS GENERAL LAWS, CHAPTER 82 SECTION 40).
CALL "DIG SAFE" 1-888-DIG-SAFE.
(888-344-7233).



N

NOTES:

1. THIS FIGURE IS BASED ON A COMPILATION OF EXISTING RECORD PLANS AND UTILITY INFORMATION. REFER TO THE "PLAN REFERENCES" AND "PLAN NOTES" FOR ADDITIONAL INFORMATION.
2. BORINGS WERE COMPLETED BY NEW ENGLAND BORING CONTRACTORS, INC. BETWEEN AUGUST 13 AND SEPTEMBER 11, 2019, AS OBSERVED BY WESTON & SAMPSON.
3. PROPOSED BORINGS B-3, B-5 AND B-9 WERE NOT COMPLETED.
4. TEST PITS WERE EXCAVATED BY NEW ENGLAND BORING CONTRACTORS, INC. ON SEPTEMBER 12 AND 13, 2019, AS OBSERVED BY WESTON & SAMPSON.
5. BORING AND TEST PIT LOCATIONS SHOWN ARE BASED ON GPS SURVEY COMPLETED BY WESTON & SAMPSON.
6. EXISTING UTILITY LOCATIONS ARE APPROXIMATE.

LEGEND:

B-1	WSE BORING DESIGNATION AND APPROXIMATE LOCATION
TP-1	WSE TEST PIT DESIGNATION AND APPROXIMATE LOCATION

300 150 0 300 600

SCALE: 1"=300'

FIGURE 2

MOAKLEY PARK
BOSTON, MA

SITE PLAN

DESIGNED BY:	MDM	CHECKED BY:	STS	DATE:	DECEMBER 2019

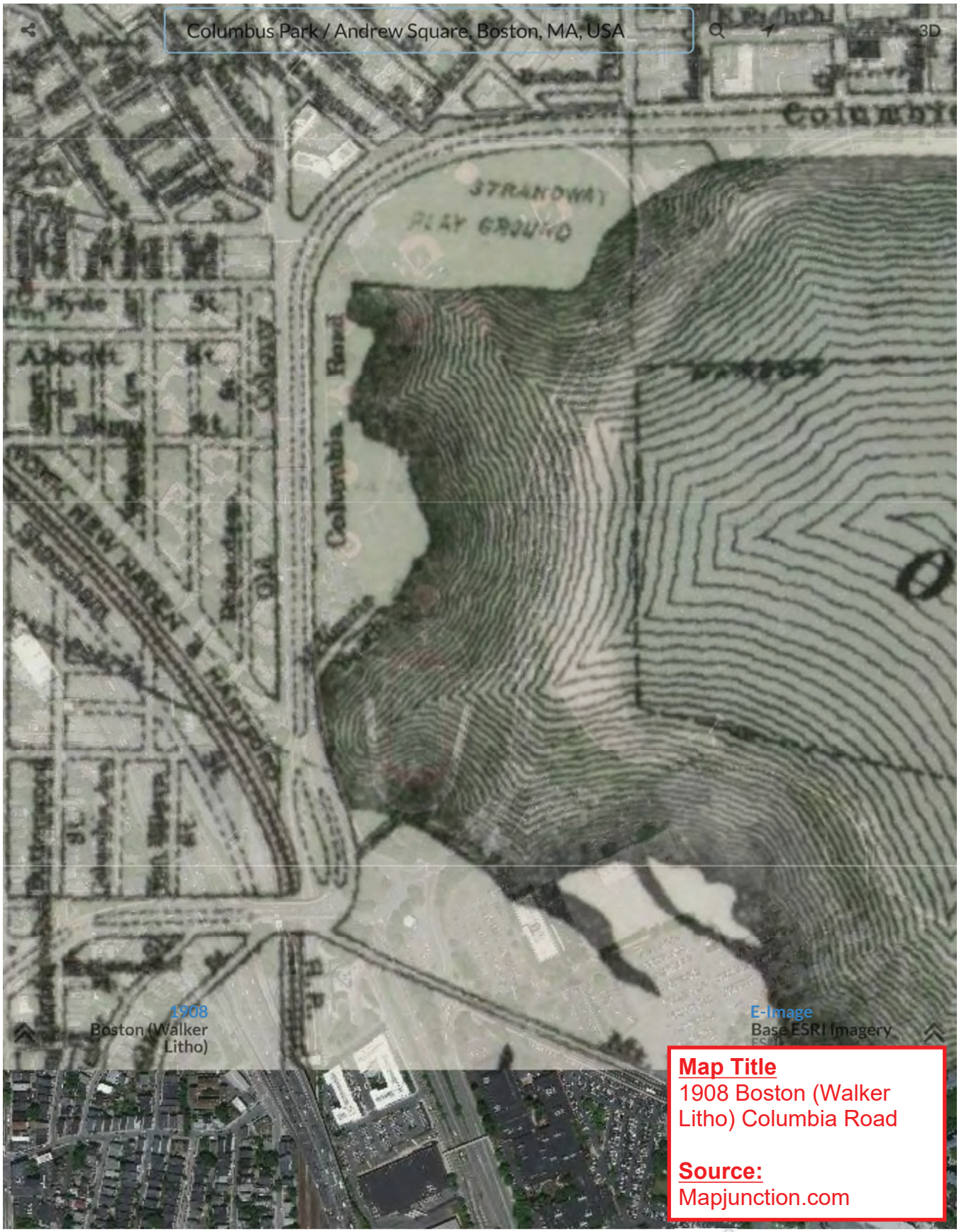
Weston & Sampson

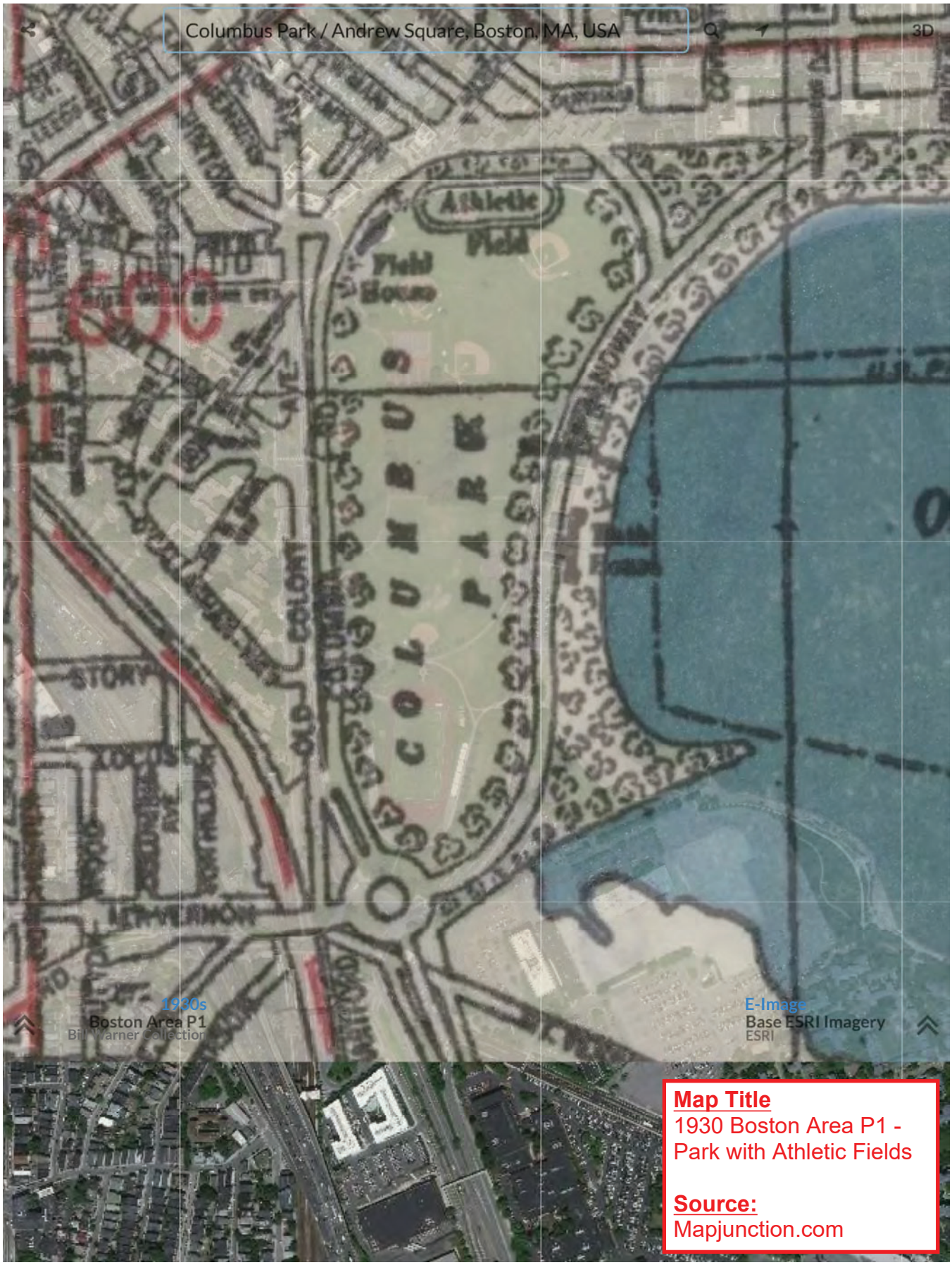
\\wse03.local\WSE\Projects\MA\Boston MA\Moakley Park\Geotechnical\Site Plan\For Report\Moakley Park Exploration Plan SAMPLING PLAN.dwg

ATTACHMENT A

Historical Site Plans

Columbus Park / Andrew Square, Boston, MA, USA
KML
3D
1874
"South Boston and
Dorchester Hopkins
Atlas
E-Image
Base ESRI Imagery
ESRI
Map Title
1874 South Boston and
Dorchester Hopkins Atlas
Source:
Mapjunction.com


Columbus Park / Andrew Square, Boston, MA, USA
3D
1908
Boston (Walker Litho)
E-Image
Base ESRI Imagery
Map Title
1908 Boston (Walker Litho) Columbia Road
Source:
Mapjunction.com
esri
Leaflet | ESRI ©



Leaflet | ESRI ©, Bill Warner Collection ©

Leaflet | ESRI ©, MassGIS ©

ATTACHMENT B

Boring Logs

BORING NUMBER: **B-1**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.1 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/29/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/30/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/29/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
2		6, 7, 10, 8	17	20/24		Top 8" - Brown, fine SAND with some organics (roots), some silt, some gravel; moist. [TOPSOIL] Bottom 12" - Medium dense, dark brown, fine to coarse SAND, some debris (slag, ash, coal), little silt, trace organics (roots); moist.	Casing refusal at 1.0 ft. on possible obstruction. Boring offset 2.5 ft. north. Roller bit grinding from approximately 2.0 to 3.0 ft.
13 4		3, 7, 3, 1	10	12/24		Top 7" - Loose, gray-brown, fine to coarse SAND, some debris (slag, coal, ash), little silt; moist. [FILL] Bottom 5" - Dark brown, fine to medium sandy SILT with some organics (wood, fibers), trace debris (slag); moist. [FILL]	
11 6		1, 2, 2, 1	4	11/24		Loose, gray-brown, fine to coarse SAND, some debris (slag, ash, ceramic, glass), some silt, trace gravel; moist. [FILL]	(Based on wet samples)
9 8		1, 2, 2, 2	4	8/24	FILL	Loose, gray-brown, fine to coarse SAND, some debris (slag, ash, wood), some silt, little gravel; wet. [FILL] - With 3" layer of white silt (possible lime).	Roller bit grinding from approximately 7.0 to 7.5 ft.
7 10		3, 2, 2, 1	4	0/24		No recovery. - With ash, slag, ceramic, and glass in 3" sampler tip.	Advanced 3" sampler (poor recovery).
5 12		1, 0, 1, 0	1	0/24		No recovery. - With wood, slag, and glass in 3" sampler tip.	Advanced 3" sampler (poor recovery).
3 14		WOH/12", 0, 1, 0	1	24/24		Very soft, dark brown, ORGANIC SILT (with shell fragments and fibers), trace fine sand; wet; with strong organic odor.	Organic Content = 22%
1 16		WOH/18", 0, 0, 1	0	11/24	ORG. SILT	Very soft, dark brown, SILT with some organics (shell fragments, fibers), trace fine sand; wet; with strong organic odor.	Switched to open hole at 14.0 ft.
-1 18		WOH/6", 4, 9, 11	13	22/24		Top 10" - Blue-gray, silty CLAY, little fine to coarse sand, trace gravel; wet. Bottom 12" - Stiff, mottled gray and brown, clayey SILT, trace fine sand; wet.	Pocket Penetrometer (PP) = 0.75, >4.5 TSF Torvane (TV) = 0.20, 0.60 TSF
-3 20		4, 10, 16, 18	26	13/24	CLAY	Very stiff, brown, clayey SILT, trace fine sand; wet.	PP = >4.5 TSF TV = 1.3 TSF
-5						End of boring at 20.0 ft. Groundwater monitoring well (MW-1) installed to 15.0 ft.	

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-2**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin/ A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/30/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/3/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/3/2019
Depth: 4 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks
2		3, 8, 5, 7	13	17/24		Top 6" - Dark brown, fine to medium SAND, some silt, trace organics (roots); moist. [TOPSOIL] Bottom 11" - Medium dense, brown, fine to coarse SAND, little silt, little debris (coal, ash, slag, glass), trace gravel, trace organics (roots); moist. [FILL]	
13 4		6, 7, 3, 3	10	14/24		Medium dense, gray-brown, fine to coarse SAND, some silt, some debris (slag, coal, ash, brick, glass), trace gravel; moist. [FILL]	(Based on wet samples)
11 6		1, 0, 1, 0	1	6/24		Very loose, gray-brown, fine to coarse SAND, some debris (slag, coal, ash, glass), little gravel, little silt; wet. [FILL]	
9 8		WOH/18" 0, 0, 1	0	0/24		No recovery. - With slag, coal, leather, ceramic, glass, and gravel in 3" sampler tip.	Advanced 3" sampler (poor recovery).
7 10		1, 1, 0, 1	1	0/24		No recovery. - With wood and glass in 3" sampler tip.	Advanced 3" sampler (poor recovery).
5 12		WOH/24" 0, 0, 0	0	3/24	FILL	Very soft, gray-brown, SILT with some clay, little debris (ceramic), little fine to coarse sand; wet. [FILL]	
3 14		WOH/24" 0, 0, 0	0	5/24		Very soft, gray-brown, SILT with some clay and organics (shell fragments), little fine to medium sand; wet; with strong organic odor. [FILL]	
1 16		WOH/24" 0, 0, 0	0	21/24		Very soft, gray-brown, SILT with some clay, trace fine sand, trace organics (shell fragments); wet; with strong organic odor. [FILL]	Pocket Penetrometer (PP) = <0.1 TSF Torvane (TV) = 0.05 TSF Advanced shelby tube (ST-1) from 14.0 to 16.3 ft. (at nearby offset location). PP = 0.3 TSF TV = 0.20 TSF
-1 18		WOH/24" 0, 0, 0	0	19/24		Very soft, gray-brown, SILT with some clay, little fine sand, trace organics (shell fragments, fibers); wet. [FILL]	
-3 20		WOH/18" 0, 0, 1	0	24/24		Top 17" - Very soft, gray-brown, SILT with some clay, some fine sand, trace organics (shell fragments, fibers); wet. [FILL]	PP = 0.4 TSF TV = 0.15 TSF
-5		WOH/12" 0, 1, 5	1	24/24	ORG. SILT CLAY	Bottom 7" - Dark brown, ORGANIC SILT (with shell fragments and fibers), trace fine sand; wet; with strong organic odor. Top 18" - Dark brown, ORGANIC SILT (with shell fragments and fibers), trace fine sand; wet; with strong organic odor. Bottom 6" - Gray-brown, silty CLAY, little fine sand, trace gravel, trace	Organic Content = 27% PP = 0.75, 0.9 TSF TV = 0.10, 0.25 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin/ A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/30/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/3/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
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	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL
In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/3/2019
Depth: 4 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24						organics (shell fragments, fibers); wet.	
-9 / 26		3 7 7 7	14	21/24		Stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = >4.5 TSF TV = 0.80 TSF
-11 / 28							
-13 / 30		3 5 6 8	11	24/24		Stiff, yellow-brown, silty CLAY, trace fine sand; wet.	PP = 0.75 TSF TV = 0.20 TSF Switched to open hole at 29.0 ft.
-15 / 32							
-17 / 34					CLAY		
-19 / 36		2 4 4 5	8	24/24		Medium stiff, gray-brown, silty CLAY, little fine sand; wet.	PP = 1.5 tsf TV = 0.30 tsf
-21 / 38							
-23 / 40		1 1 2 1	3	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = 2.5 TSF TV = 0.20 TSF
-25 / 42							
-27							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin/ A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/30/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/3/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/3/2019
Depth: 4 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	
46 / -31					CLAY	
48 / -33						
50 / -35						
52 / -37						
54 / -39						
56 / -41						
58 / -43						
60 / -45		21 28 100/2"	-	11/14		Very dense, dark gray, GRAVEL, some fine to coarse sand, little silt, wet. (Possible weathered bedrock)
62 / -47					BEDROCK	Very hard, slightly weathered, fine- to medium-grained, gray to black, DIABASE (igneous), highly fractured, subhorizontal to subvertical joint, subhorizontal to vertical foliation. Core time per foot (min): 4.75, 5.25, 6.0 RQD = 22%
64 / -49				13/36		Very hard, slightly weathered, fine- to medium-grained, gray to black, brown on weathered surface, DIABASE (igneous), moderately

Roller bit grinding and slow drilling (with partial loss of wash fluid) on possible weathered bedrock from approximately 58.0 to 62.0 ft.

Approximately 500 psi down-pressure.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin/ A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/30/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/3/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
68 / *-53*				59/60	BEDROCK	fractured, subhorizontal to subvertical joint, subhorizontal to vertical foliation. Core time per foot (min): 3.5, 2.5, 3.75, 3.5, 3.25 RQD = 87%
70 / *-55*						End of boring at 70.0 ft. Groundwater monitoring well (MW-2) installed to 15.5 ft. (at nearby offset location).

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/3/2019
Depth: 4 ft. +/-

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/29/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/29/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/29/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks
2		3 4 4 2	8	14/24		Top 6" - Dark brown, silty fine SAND with some organics (roots); moist. [TOPSOIL] Bottom 8" - Loose, gray-brown, fine to coarse SAND, some debris (ash, coal, ceramic, glass), little silt, little gravel; moist. [FILL]	
12 / 4		1 2 2 2	4	14/24		Loose, brown, fine to coarse SAND, some debris (ash, coal, ceramic, glass), little silt, little gravel; moist. [FILL]	
10 / 6		3 5 3 2	8	12/24		Top 7" - Loose, orange-brown, fine to coarse SAND, some debris (ash, ceramic, glass), little silt, little gravel; moist. [FILL] Bottom 5" - Gray, fine to coarse SAND, some debris (slag, ash, glass), some gravel, little silt; moist. [FILL]	(Based on wet samples)
8 / 8		1 2 1 2	3	9/24	FILL	Very loose, gray-brown, fine to coarse SAND, some debris (slag, ash, glass), little gravel, little silt; wet. [FILL]	
6 / 10		3 2 1 1	3	8/24		Very loose, dark gray to black, fine to coarse SAND, some silt, little debris (ceramic, glass, ash), little gravel; wet. [FILL]	
4 / 12		1 1 0 2	1	0/24		No recovery. - With leather, glass, and slag in 3" sampler tip.	Advanced 3" sampler (poor recovery). Roller bit grinding from approximately 10.5 to 11.5 ft.
2 / 14		1 1 0 1	1	0/24		No recovery. - With glass and slag in 3" sampler tip.	Advanced 3" sampler (poor recovery).
0 / 16		2 3 3 6	6	7/24	SAND	Loose, brown, fine to coarse SAND, trace silt, trace gravel; wet; with strong organic odor. - With brick fragments in the top of spoon.	
-2 / 18		2 4 8 8	12	18/24		Top 6" - Blue-gray, silty CLAY, trace fine sand, trace organics (roots); wet Bottom 12" - Stiff, brown, silty CLAY, trace fine sand; wet.	Pocket Penetrometer (PP) = 1.75, 4.0 TSF Torvane (TV) = 0.50, 0.45 TSF
-4 / 20		4 5 5 6	10	19/24	CLAY	Stiff, brown, silty CLAY, trace fine sand; wet.	PP = 2.75 TSF TV = 0.50 TSF Switched to open hole at 19.0 ft.
-6							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/29/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/29/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/29/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24							
-10 / 26		3 3 4 5	7	24/24	CLAY	Medium stiff, brown, silty CLAY, trace fine sand; wet.	PP = 1.5 TSF TV = 0.30 TSF
-12 / 28							
-14 / 30		WOH/12" 0 1 4	1	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = 0.25 TSF TV = 0.10 TSF
-16						End of boring at 31.0 ft. Groundwater monitoring well (MW-3) installed to 15.0 ft.	

10 20 30 40
7 36
1 21 36

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 9/4/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/6/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
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	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%	trace organics	< 5%
	trace	0 - 10%		

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL
In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/4/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots (SPT N-Value)	Remarks and Additional Tests
2		1, 4, 5, 6	9	10/24	FILL	Loose, dark brown to black, fine to coarse SAND, some gravel, little silt, trace debris (slag); moist. [FILL]	9	
12 / 4		3, 2, 8, 12	10	12/24		Medium dense, gray-brown, fine to coarse SAND, little gravel, little debris (slag, ash, brick, wood), little silt; moist. [FILL]	10	
10 / 6		4, 5, 3, 2	8	9/24		Loose, red-brown, fine to coarse SAND, some debris (glass, brick, ash), little silt; moist; with petroleum-like odor. [FILL]	8	Roller bit grinding from approximately 4.0 to 6.0 ft.
8 / 8		3, 2, 3, 2	5	3/24		DEBRIS (glass, brick, slag); moist to wet.	5	(Based on wet samples)
6 / 10		1, 1, 1, 1	2	12/24		Soft, gray-brown, ORGANIC SILT (with fibers), little fine sand, trace debris (glass); wet; with petroleum-like odor. [FILL]	2, >>152	Organic Content = 24%
4 / 12		1, 0, 1, 1	1	24/24		Very soft, gray-brown, ORGANIC SILT (with fibers), little fine sand, trace debris (brick, glass, slag); wet. [FILL]	1	
2 / 14		1, 2, 1, 2	3	21/24		Very loose, gray, silty fine to medium SAND, little debris (slag), trace gravel, trace organics (fibers); wet. [FILL]	3	
0 / 16		1, 2, 9, 10	11	24/24		Top 11": Gray, silty fine to coarse SAND, little gravel, trace debris (metal); wet. [FILL] Bottom 13": Stiff, gray-brown, clayey SILT, little fine sand; wet.	11	
-2 / 18		5, 8, 13, 18	21	23/24		Very stiff, brown, silty CLAY, trace fine sand; wet.	21, 31	Pocket Penetrometer (PP) = 4.5 TSF Torvane (TV) = 0.40 TSF
-4 / 20		4, 6, 6, 9	12	24/25	CLAY	Stiff, brown, CLAY with some silt, trace fine sand; wet.	12, 34	PP = 1.5 TSF TV = 0.25 TSF
-6								

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
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		> 30	Hard

GENERAL NOTES

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CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 9/4/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/6/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

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some	20 - 35%	(soil name) with some organics	5 - 15%	
little	10 - 20%	trace organics	< 5%	
trace	0 - 10%			

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/4/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24 / -10 / 26		WOH/12" / 0 / 1 / 4	1	24/24	CLAY	Very soft, gray-brown, silty CLAY, some fine to medium sand; wet.	PP = 0.5 TSF TV = 0.20 TSF
-12 / 28 / -14							
30 / -16		1 / 3 / 4 / 5	7	20/24		Loose, brown, fine to medium SAND, some silt; wet.	<#200 Sieve = 23%
32 / -18 / 34							
-20 / 36		5 / 4 / 7 / 6	11	17/24	SAND	Medium dense, brown, fine to medium SAND, little silt; wet.	<#200 Sieve = 16%
-22 / 38 / -24							
40 / -26		3 / 3 / 4 / 4	7	19/24		Loose, gray, silty fine SAND; wet.	<#200 Sieve = 46%
42 / -28							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/6/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
46 / -32		2, 5, 6, 9	11	24/24	SAND	Medium dense, gray, silty fine SAND; wet.
48 / -34						
50 / -36		1, 0, 3, 7	3	24/24	SILT	Soft, gray, SILT with some clay, some fine sand; wet.
52 / -38						
54 / -40						
56 / -42						
58 / -44						
60 / -46		4, 7, 8, 10	15	23/24	SAND	Medium dense, gray, silty fine SAND; wet.
62 / -48						
64 / -50						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40

11
26
3
15
24

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/4/2019
Depth: 6 ft. +/-

<#200 Sieve = 48%

<#200 Sieve = 38%

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
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N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/6/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/4/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
68 / -54						
70 / -56		6 12 10 8	22	22/24		Medium dense, gray, fine SAND, little silt; wet.
72 / -58					SAND	
74 / -60						
76 / -62						
78 / -64						
80 / -66		7 16 20 24	36	24/24		Dense, gray, fine to medium SAND, some silt; wet.
82 / -68						
84 / -70					CLAY	
86 / -72						

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/6/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
90 / -76						
92 / -78						
94 / -80						
96 / -82						
98 / -84						
100 / -86		WOR/24" (0, 0, 0)	0	24/24	CLAY	Very soft, gray-brown, SILT with some clay, little fine sand; wet.
102 / -88						
104 / -90						
106 / -92				26/30		
108 / -94						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%	trace organics	< 5%
trace	0 - 10%		

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40

0 29

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/4/2019
Depth: 6 ft. +/-

PP = >0.1 TSF
TV = 0.15 TSF

Advanced shelby tube (ST-1) from 105.0 to 107.3 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
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4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
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		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
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W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/6/2019

Depth, ft. / *Elevation*
Sample Type
Blows on Sampler/6" / *Blows on Casing/12"*
N-Value, Blows/ft.
Sample Recovery, in. / **Sampler Penetration, in.**
Strata Description and Graphic Log

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

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little	10 - 20%		
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Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

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WOR = Weight of rods
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Groundwater Observations
Date: 9/4/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
112 / -98								
114 / -100								
116 / -102								
118 / -104								
120 / -106		WOR/24" 0 0 0	0	24/24	CLAY	Very soft, gray-brown, silty CLAY, trace fine sand; wet.	0 18 31 36	PP = >0.1 TSF TV = 0.15 TSF
122 / -108								
124 / -110								
126 / -112								
128 / -114								
130 / -116								

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
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- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

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0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
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CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/6/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
134 / -120					
136 / -122					
138 / -124					
140 / -126					
142 / -128					CLAY
144 / -130					
146 / -132					
148 / -134					
150 / -136					
152 / -138					

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
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	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
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P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/4/2019
Depth: 6 ft. +/-

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
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N-VALUE RELATIONSHIPS

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		> 30	Hard

GENERAL NOTES

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CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/4/2019
OTHER EQUIPMENT: -
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PL = Plastic limit, %
MC = Moisture content, %
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PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

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P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/4/2019
Depth: 6 ft. +/-

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
156 / *-142*								
158 / *-144*								
160 / *-146*		WOR/24" 0 0 0	0	24/24	CLAY	Very soft, gray-brown, silty CLAY, trace fine sand; wet.	0	PP = >0.1 TSF TV = 0.05 TSF
162 / *-148*								
164 / *-150*						Possible GLACIAL TILL.		Slow drilling on possible glacial till and intermittent roller bit grinding on possible cobbles/boulders from approximately 164.0 to 170.0 ft.
166 / *-152*								
168 / *-154*								
170 / *-156*						End of boring at 170.0 ft.		

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
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N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
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4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
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		> 30	Hard

GENERAL NOTES

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BORING NUMBER: **B-7**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 13.8 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/28/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/28/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		3 5 8 8	13	20/24		Top 7" - Dark brown, fine to medium silty SAND, trace organics (roots), trace debris (foam); moist. [TOPSOIL] Bottom 13" - Stiff, gray-brown, SILT, some fine to coarse sand, little gravel, trace debris (ash, coal); moist. [FILL]
12 4		10 14 9 10	23	14/24		Medium dense, gray-brown, fine to coarse SAND, some silt, little debris (coal, ash, brick), trace gravel; moist. [FILL] - With isolated pieces of gray silt.
10 6		5 11 3 1	14	1/24		Stiff, dark gray, SILT, some fine to coarse sand, some debris (brick, concrete, slag, ash, coal), trace organics (shell fragments); wet. [FILL]
8 8		WOH/24" 0 0 0	0	21/24	FILL	Very soft, gray, SILT with some clay, trace fine sand, trace organics (fibers); wet. [FILL]
6 10		WOH/24" 0 0 0	0	15/24		Very soft, gray, SILT with some clay, little fine sand, trace organics (wood); wet. [FILL]
4 12		WOH/24" 0 0 0	0	24/24		Very soft, gray, SILT with some clay, little fine sand, trace organics (shell fragments); wet. [FILL] - With wood at top of spoon.
2 14		WOH/24" 0 0 0	0	24/24		Very soft, gray, SILT with some clay, little fine sand, trace organics (shell fragments, fibers); wet. [FILL]
0 16		WOH/24" 0 0 0	0	22/24		Very soft, dark gray to black, SILT with some clay and organics (fibers, shell fragments), little fine to medium sand; wet; with strong organic odor.
-2 18		WOH/24" 0 0 0	0	24/24		Very soft, gray-brown, SILT with some clay, trace fine sand, trace organics (shell fragments, fibers); wet; with strong organic odor.
-4 20		WOH/24" 0 0 0	0	24/24	SILT	Very soft, gray-brown, SILT with some clay, little fine sand, trace organics (shell fragments, fibers), ; wet; with strong organic odor.
-6						

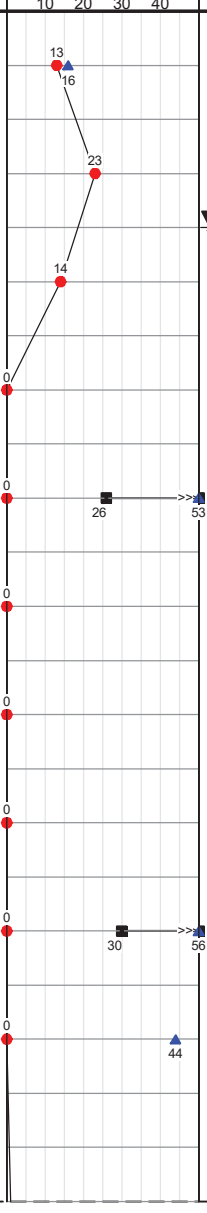
Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/28/2019
Depth: 4 ft. +/-

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 13.8 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/28/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/28/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/28/2019
Depth: 4 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24 / -10							
26		1 1 1 1	2	6/24	SILT	Very soft, gray-brown, SILTwith some clay, little fine sand, trace organics (shell fragments); wet; with strong organic odor.	No pocket penetrometer and torvane measurement due to sample irregularities.
28 / -12							
30 / -14		WOH/6" 3 7 8	10	24/24		Top 8" - Gray-brown, SILT with some clay, some fine to medium sand, trace gravel, trace organics (shell fragments, fibers); wet. Bottom 16" - Stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 3.0 TSF TV = 0.45 TSF Switched to 3" roller bit at 29.0 ft.
32 / -16							
34 / -18					CLAY		
36 / -20		WOH/18" 0 0 3	0	24/24		Very soft, gray, CLAY with some silt, trace fine sand; wet.	PP = 0.6 TSF TV = 0.20 TSF
-22						End of boring at 36.0 ft. Groundwater monitoring well (MW-4) installed to 14.0 ft.	

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-8**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** A. Naslas
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 9/9/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/10/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		2, 6, 7, 5	13	14/24		Loose, dark brown, fine to coarse SAND, some gravel, little silt, trace debris (brick, slag), trace organics (roots); moist. [TOPSOIL]
13 / 4		9, 21, 16, 22	37	16/24		Dense, brown, fine to coarse SAND, little gravel, little silt, little debris (slag, brick); moist. [FILL]
11 / 6		18, 4, 2, 2	6	7/24		Loose, gray-brown, fine to coarse SAND, little silt, little debris (wood, brick, slag); moist; with petroleum-like odor. [FILL]
9 / 8		1, 1, 1, 1	2	2/24		DEBRIS (glass, brick, ceramic); moist to wet.
7 / 10		WOH/18", 0, 0, 1	0	24/24	FILL	Very soft, dark gray, SILT with some organics (fibers), trace fine sand; wet. [FILL]
5 / 12		WOH/18", 0, 0, 1	0	24/24		Very soft, dark gray, SILT with some orgaqnics (fibers), trace fine sand; wet. [FILL]
3 / 14		WOH/24", 0, 0, 0	0	24/24		Very soft, gray, SILT with some organics (fibers), trace fine sand; wet. [FILL]
1 / 16		WOH/18", 0, 0, 2	0	13/24		Very soft, gray, SILT with some organics (fibers), little fine sand; wet. [FILL]
-1 / 18		WOH/12", 0, 4, 8	4	22/24		Medium stiff, gray, SILT with some organics (shell fragments, fibers), little debris (brick), little fine sand; wet. [FILL]
-3 / 20		12, 12, 10, 9	22	16/24	CLAY	Very stiff, gray-brown, SILT, little fine sand; wet.
-5						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%		trace organics	< 5%
	trace	0 - 10%			

Data Plots

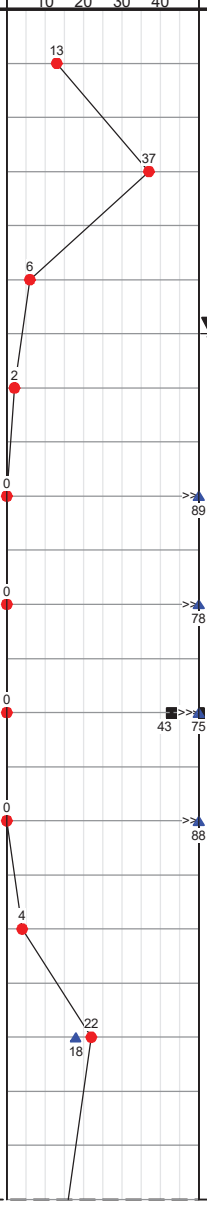
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data

SPT N-Value

10 20 30 40



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Roller bit grinding from approximately 4.0 to 6.0 ft.

(Based on wet samples)

Organic Content = 9%

Groundwater Observations

Date: 9/9/2019
Depth: 6 ft. +/-

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: A. Naslas
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/9/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/10/2019

Depth, ft. *Elevation*	Sample Type	Blows on Sampler/6" *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
24						
-9		4			CLAY	Medium stiff, gray-brown, silty CLAY, little fine to medium sand; wet.
		4	10	24/24		
26		6				
		6				
-11						End of boring at 26.0 ft. Groundwater monitoring well (MW-5) installed to 18.0 ft.

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

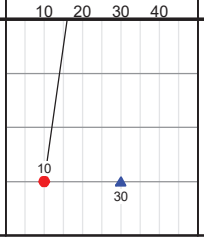
Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/9/2019
Depth: 6 ft. +/-

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:42 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-10**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/28/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/28/2019

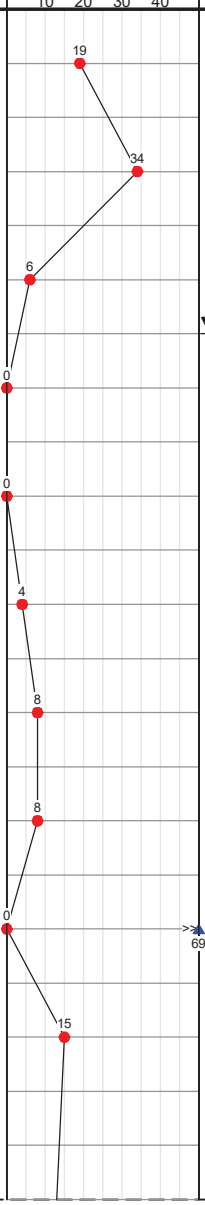
Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		5, 9, 10, 12	19	15/24	FILL	Top 10" - Medium dense, brown, fine to coarse SAND, little gravel, little silt, trace organics (roots, wood); moist. [FILL] Bottom 5" - Gray-brown, fine to coarse SAND, some silt, little gravel, trace debris (slag, ash, brick); moist. [FILL]
13 / 4		10, 15, 19, 16	34	12/24		Dense, gray-brown, fine to coarse SAND, some gravel, little silt, trace debris (ash, brick); moist. [FILL]
11 / 6		10, 4, 2, 3	6	12/24		Medium stiff, gray-brown, clayey SILT, little fine to coarse sand, trace gravel, trace debris (concrete, slag); moist. [FILL]
9 / 8		WOH/18", 0, 0, 1	0	24/24		Very soft, gray-brown, clayey SILT, little fine sand, trace organics (fibers, shell fragments); wet. [FILL]
7 / 10		WOH/24", 0, 0, 0	0	17/24		Very soft, gray-brown, SILT with some clay, trace fine sand, trace organics (fibers, shell fragments); wet. [FILL]
5 / 12		1, 2, 2, 4	4	23/24		Top 17" - Very soft, gray-brown, SILT with some clay, trace fine sand; wet. [FILL] Bottom 6" - Black, fine to coarse SAND, some debris (coal, ash, slag, brick, wood, glass), little gravel, little silt; wet. [FILL]
3 / 14		2, 4, 4, 4	8	3/24		DEBRIS (wood, glass, brick, concrete); wet; with petroleum-like odor. - With concrete in 3" sampler tip.
1 / 16		2, 2, 6, 3	8	5/24		DEBRIS (Brick, slag, ash, ceramic, glass, metal, wood); wet.
-1 / 18		WOH/18", 0, 0, 1	0	14/24	SILT	Very soft, gray-brown, SILT with some clay, some fine to medium sand, trace organics (fibers); wet; with strong organic odor.
-3 / 20		6, 6, 9, 10	15	16/24	SAND	Top 6" - Brown, fine to coarse SAND, trace silt; wet; with strong organic odor. Bottom 10" - Medium dense, gray, fine to medium SAND, some silt; wet; with strong organic odor.
-5						

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/28/2019
Depth: 6 ft. +/-

Gravel = 27%
Sand = 57%
Fines = 16%
Roller bit grinding from approximately 2.0 to 4.5 ft.

(Based on wet samples)
Pocket Penetrometer (PP) = <0.1 TSF
Torvane (TV) = 0.10 TSF

PP = <0.1 TSF
TV = 0.05 TSF

PP = 0.1 TSF
TV = 0.10 TSF

Intermittent roller bit grinding from approximately 11.5 to 15.0 ft.
Advanced 3" sampler (poor recovery).

Loss of wash fluid at approximatly 14.0 ft.

PP = 0.4 TSF
TV = 0.15 TSF
Switched to open hole at 16.0 ft.

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/28/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/28/2019

Depth, ft. *Elevation*	Sample Type	Blows on Sampler/6" *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
24					SAND	
-9		4				
		5	11	22/24	CLAY	Stiff, gray-brown, silty CLAY, trace fine sand; wet.
26		6				
		7				
-11						End of boring at 26.0 ft.

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40

11
30

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/28/2019
Depth: 6 ft. +/-

Roller bit grinding from approximately 22.0 to 22.5 ft.

Lithology change based on clay cuttings in wash fluid.

PP = 3.5 TSF
TV = 0.65 TSF

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

Weston & Sampson

BORING NUMBER: **B-11**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.8 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/10/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/10/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/10/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
2		6 10 9 9	19	12/24		Medium dense, brown, gravelly fine to medium SAND, some silt, trace organics (roots); moist. [TOPSOIL]	
13 4		7 5 5 5	10	14/24		Top 8" - Medium dense, brown, fine to medium SAND, some silt, trace debris (ash), with cobble fragments; moist. [FILL] Bottom 6" - Brown, fine to coarse SAND, some debris (coal, ash, slag, brick, ceramic), some silt, trace gravel; moist. [FILL]	Roller bit grinding from approximately 3.0 to 5.0 ft.
11 6		4 1 1 2	2	12/24	FILL	Top 9" - DEBRIS (Coal, slag, and ash); moist. Bottom 3" - Very soft, gray, SILT with some clay, some fine to coarse sand, trace gravel; moist. [FILL]	
9 8		3 2 1 1	3	0/24		No recovery.	(Based on wet samples) Advanced 3" sampler (no recovery). Slag, ceramic, metal in wash fluid.
7 10		WOH/24" 0 0 0	0	19/24		Very soft, dark brown, ORGANIC SILT (with fibers), trace fine sand; wet; with strong organic odor.	
5 12		WOH/24" 0 0 0	0	24/24	ORG. SILT	Very soft, dark brown to black, ORGANIC SILT (with fibers), some silt, trace fine sand; wet; with petroleum-like odor.	Organic Content = 34%
3 14		4 7 13 15	20	15/24		Medium dense, gray-brown, fine to coarse SAND, little gravel, trace silt; wet; with strong organic odor.	
1 16					SAND		
-1 18		3 7 12 13	19	20/24		Very stiff, brown, clayey SILT, trace fine sand; wet.	Lithology change based on clay cuttings in wash fluid. Pocket Penetrometer (PP) = >4.5 TSF Torvane (TV) = 0.70 TSF Switched to open hole at 17.0 ft.
-3					CLAY		
20 -5		3 3 4 4	7	24/24		Top 6" - Brown, clayey SILT, trace fine sand; wet. Bottom 14" - Medium stiff, gray-brown, silty CLAY, little fine sand; wet.	PP = 3.0, 2.0 TSF TV = 0.55, 0.40 TSF

End of boring at 21.0 ft. Groundwater monitoring well (MW-6) installed to 15.0 ft.

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-12**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 14.1 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/10/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/11/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		4, 6, 8, 6	14	16/24		Top 10" - Medium dense, brown, fine to medium SAND, some silt, little gravel, trace debris (slag), trace organics (roots); moist. [TOPSOIL] Bottom 6" - Gray-brown, SILT, some fine to medium sand, trace debris (ash); moist.
12 4		5, 5, 9, 10	14	10/24		Medium dense, brown to black, fine to coarse SAND, some debris (slag, ash), little silt, trace gravel; moist. [FILL]
10 6		5, 5, 5, 14	10	12/24		Medium dense, gray-brown, fine to coarse SAND, some debris (wood, slag, ash), little silt, little gravel; moist. [FILL]
8 8		5, 3, 1, 1	4	3/24		DEBRIS (Wood, slag, glass, ceramic); moist to wet.
6 10		2, 1, 1, 2	2	9/24	FILL	Top 3" - DEBRIS (Wood, slag, metal); moist to wet. Bottom 6" - Very soft, dark brown, SILT with some organics (fibers), little fine to medium sand; wet. [FILL]
4 12		WOH/24", 0, 0, 0	0	24/24		Very soft, dark brown, ORGANIC SILT (with fibers), little fine to medium sand, trace gravel; wet. [FILL]
2 14		WOH/18", 0, 0, 5	0	5/24		Very soft, dark brown, fine to medium sandy ORGANIC SILT, some debris (wood, glass); wet. [FILL]
0 16		WOH/6", 2, 8, 11	10	13/24		Top 3" - Dark brown to black, SILT with some organics, some fine to medium sand, trace debris (glass, wood); wet. Bottom 10" - Medium dense, gray, fine to coarse SAND, little silt; wet; with strong organic odor.
-2 18		6, 8, 9, 15	17	19/24	SAND	Top 13" - Medium dense, gray, silty fine to medium SAND; wet; with strong organic odor. Bottom 6" - Yellow-brown, fine to coarse SAND, trace silt, trace gravel; wet.
-4 20		6, 10, 13, 22	23	20/24	CLAY	Top 8" - Gray, SILT, some fine sand; wet. Bottom 12" - Very stiff, brown, SILT with some clay, trace fine sand; wet.
-6						

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

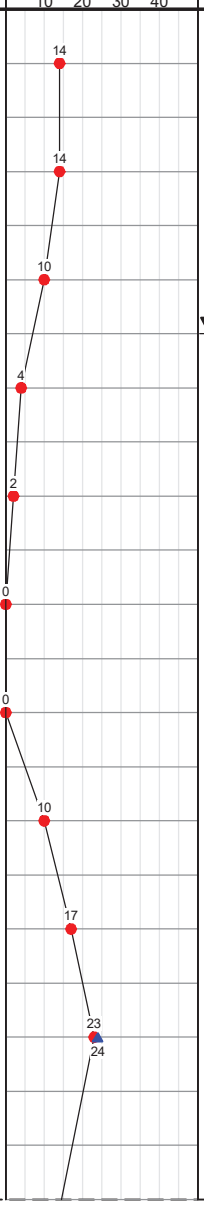
Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/10/2019
Depth: 6 ft. +/-

(Based on wet samples)
Partial loss of wash fluid at approximately 6.0 ft.
Sudden change in color of wash fluid at approximately 6.5 ft. with strong organic odor.

Organic Content = 30%

Pocket Penetrometer (PP) = >4.5 TSF
Torvane (TV) = 0.90 TSF
Switched to open hole at 19.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 14.1 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 9/10/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 9/11/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 9/10/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24							
-10		3					
		3	6	24/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 1.0 TSF
		3				- with 1" seams of gray fine sandy silt.	TV = 0.35 TSF
26		5					
-12					CLAY		
28							
-14							
		WOH/18"					
30		0	0	24/24		Very soft, gray-brown, CLAY with some silt, trace fine sand; wet.	PP = 0.75 TSF
-16		0					TV = 0.25 TSF
		3					

In-Situ Test Data: 10 20 30 40; 6; 35; 0; 37

End of boring at 31.0 ft. Groundwater monitoring well (MW-7) installed to 15.0 ft.

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-13**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism	**PROJECT:** Proposed Moakley Park Improvements	**LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828	**LOCATION:** Boston, MA	**CHECKED BY:** S. Spink
CONTRACTOR: New England Boring Contractors	**DRILLING METHOD:** Cased, Drive-and-Wash	**BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz	**CASING/AUGER SIZE:** HW (4" ID) Casing	**GROUND ELEV:** 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)	**SAMPLING METHOD:** Standard penetration test (SPT)	**DATE STARTED:** 8/22/2019
OTHER EQUIPMENT: -	**SAMPLER HAMMER:** 140-lb. automatic hammer	**DATE COMPLETED:** 8/26/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks
2		5, 8, 6, 7	14	7/24		Medium dense, dark brown, fine to medium SAND, some silt, trace organics (roots); moist. [TOPSOIL] - With cobble in spoon tip.	
13 / 4		3, 6, 5, 7	11	14/24		Stiff, mottled gray and brown, SILT with some clay, some fine sand, trace debris (glass, ash); moist. [FILL]	<#200 Sieve = 69%
11 / 6		2, 1, 2, 2	3	16/24		Top 12" - Soft, mottled gray and brown, SILT with some clay, some fine sand, trace gravel, trace debris (ash); moist. [FILL] Bottom 4" - Gray, silty CLAY with some organics (shell fragments), little fine to medium sand; wet. [FILL]	(Based on wet samples)
9 / 8		WOH/12", 0, 1, 3	1	17/24	FILL	Top 8" - Gray-brown, silty CLAY with some organics (shell fragments), little fine to medium sand; wet. [FILL] Bottom 9" - Very loose, gray, fine to medium sandy SILT with some organics (shell fragments); wet. [FILL]	
7 / 10		3, 2, 2, 4	4	9/24		Loose, gray, fine to coarse SAND, little silt, trace gravel, trace organics (shell fragments); wet. [FILL] - With isolated pieces of gray silty clay.	
5 / 12		2, 3, 1, 1	4	9/24		Loose, gray, fine to medium SAND, trace silt, trace organics (shell fragments); wet. [FILL]	
3 / 14		WOH/6", 3, 3, 6	6	18/24		Top 8" - Dark gray, silty fine to medium SAND, trace organics (shell fragments); wet; with strong organic odor. Bottom 10" - Loose, brown, fine to coarse SAND, trace silt; wet.	
1 / 16		3, 5, 8, 10	13	11/24		Medium dense, brown, fine to coarse SAND, trace silt; wet.	
-1 / 18		4, 9, 8, 10	17	11/24	SAND	Medium dense, gray, fine to coarse SAND, trace gravel, trace silt; wet.	
-3 / 20		4, 4, 5, 7	9	12/24		Loose, gray, fine to coarse SAND, little gravel, trace silt, trace organics (shell fragments); wet.	<#200 Sieve = 4%
-5					CLAY		Lithology change based on clay cuttings in wash fluid.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/22/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/26/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/22/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
24 / -9								
26 / -11		2 2 4 4	6	24/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	6 19 29 47	Pocket Penetrometer (PP) = 1.25 TSF Torvane (TV) = 0.40 TSF Switched to open hole at 24.0 ft.
28 / -13								
30 / -15		WOH/6" 1 2 2	3	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet.	3 30	PP = 1.0 TSF TV = 0.30 TSF
32 / -17					CLAY			
34 / -19		WOH/6" 1 4 3	5	24/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	5 33	PP = 0.75 TSF TV = 0.30 TSF
36 / -21								
38 / -23				27/30			25 39 >>>	Advanced shelby tube (ST-1) from 38.0 to 40.3 ft.
40 / -25		WOH/6" 1 4 3	5	23/24		Medium stiff, gray-brown, CLAY with some silt, trace fine sand; wet.	5	PP = 0.5 TSF TV = 0.20 TSF
42 / -27								

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
46 / -31							
48 / -33							
50 / -35							
52 / -37							
54 / -39					CLAY		
56 / -41							
58 / -43							
60 / -45		WOH/18" 0 0 1	0	24/24		Very soft, gray-brown, silty CLAY, little fine sand; wet. - With 0.5" seams of gray fine sand with some silty clay.	PP = 0.25 TSF TV = 0.10 TSF
62 / -47							
64 / -49							

0
32

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/22/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/26/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
68 / -53								
70 / -55								
72 / -57								
74 / -59								
76 / -61					CLAY			
78 / -63								
80 / -65		WOR/18" 0 0 WOH/6"	0	24/24		Very soft, gray-brown, CLAY with some silt, trace fine sand; wet.	0 33	PP = 0.25 TSF TV = 0.10 TSF
82 / -67								
84 / -69								
86 / -71								

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
90 / -75						
92 / -77						
94 / -79						
96 / -81						
98 / -83						
100 / -85		WOR/18" 0 0 WOH/6"	0	24/24	CLAY	Very soft, gray-brown, silty CLAY, trace fine sand; wet.
102 / -87						
104 / -89						
106 / -91						
108 / -93						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

0
20 3840

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

PP = >0.1 TSF
TV = 0.05 TSF

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
112 / -97						
114 / -99						
116 / -101						
118 / -103						
120 / -105					CLAY	
122 / -107						
124 / -109						
126 / -111						
128 / -113						
130 / -115		WOR/24" 0 0 0	0	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet. - With 1/16" seam of gray fine sand.

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

0
30

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

PP = 0.15 TSF
TV = 0.15 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/22/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/26/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
134 / -119					CLAY
136 / -121					
138 / -123					
140 / -125					
142 / -127					
144 / -129					
146 / -131					SANDY CLAY
148 / -133					
150 / -135					
152 / -137					

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Lithology change based on fine to medium sand observed in wash fluid.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
156 / -141						
158 / -143						
160 / -145		WOR/18" 0 0 1	0	24/24	SANDY CLAY	Very soft, gray-brown, silty CLAY, trace fine sand; wet. - With 2-3" seams of gray fine sandy clay with some silt.
162 / -147						
164 / -149						
166 / -151						
168 / -153						
170 / -155						
172 / -157						
174 / -159						

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40
0
22 34 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

PP = 0.4 TSF
TV= 0.25 TSF

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
178 / *-163*					SANDY CLAY	
180 / *-165*						
182 / *-167*						
184 / *-169*						
186 / *-171*						
188 / *-173*						
190 / *-175*		WOR/24" - 0 0 0		24/0		No recovery.
192 / *-177*						
194 / *-179*						
196 / *-181*						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Switched to 3" roller bit at 189.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
200 / -185					
202 / -187					
204 / -189					
206 / -191					
208 / -193					SANDY CLAY
210 / -195					
212 / -197					
214 / -199					
216 / -201					
218 / -203					

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%	trace organics	< 5%
trace	0 - 10%		

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

Possible GLACIAL TILL or WEATHERED BEDROCK.

Slow drilling on possible glacial till and intermittent roller bit grinding on possible cobbles/boulders from approximately 217.7 to 224.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/22/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/26/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
222 / *-207*						
224 / *-209*						End of boring at 224.0 ft. Groundwater monitoring well (MW-8) installed to 14.0 ft. (at nearby offset location).

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/22/2019
Depth: 5 ft. +/-

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-14**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/20/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/21/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		8 5 5 7	10	17/24		Top 13" - Loose, dark brown, fine to coarse SAND, some silt, some gravel, trace debris (ash), trace organics (roots); moist. [TOPSOIL] Bottom 4" - Yellow-brown, fine to coarse SAND, trace silt; moist. [FILL]
13 4		5 3 3 5	6	17/24		Top 12" - Medium stiff, brown, SILT, some fine sand, trace organics (roots); moist. [FILL] Bottom 5" - Dark gray to black, GRAVEL, little fine to coarse sand, little silt, trace debris (brick, possible asphalt); moist; with strong asphalt odor. [FILL]
11 6		6 4 4 1	8	11/24	FILL	Top 3" - Dark gray to black, GRAVEL, some fine to coarse sand, trace silt, trace debris (possible asphalt); moist; with strong asphalt odor. [FILL] Bottom 8" - Loose, gray, silty fine to coarse SAND, little gravel, trace debris (slag); wet. [FILL]
9 8		1 1 1 2	2	0/24		No recovery. - With slag in 3" sampler tip.
7 10		2 WOH/18" 0 0		15/24		Top 6" - Dark gray, fine to coarse SAND, some gravel, little silt, trace debris (slag, wood); wet. [FILL] Bottom 9" - Very soft, brown, SILT with some organics (fibers, roots), little fine sand; wet; with strong organic odor.
5 12		WOH/24" 0 0 0	0	0/24	SILT	No recovery.
3 14		WOH/12" 0 1 3	1	22/24		Top 8" - Dark brown, clayey SILT with some organics (shell fragments, fibers, roots), trace gravel, trace fine sand; wet; with strong organic odor. Bottom 14" - Very soft, blue-gray, CLAY with some silt, trace fine sand; wet.
1 16		4 7 9 13	16	22/24		Very stiff, brown, silty CLAY, trace fine sand; wet.
-1 18		4 8 9 12	17	24/24	CLAY	Very stiff, brown, silty CLAY, trace fine sand; wet.
-3 20		6 6 8 10	14	24/24		Stiff, brown, silty CLAY, trace fine sand; wet. - With 1/16" seams of gray fine to medium sand.
-5						

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

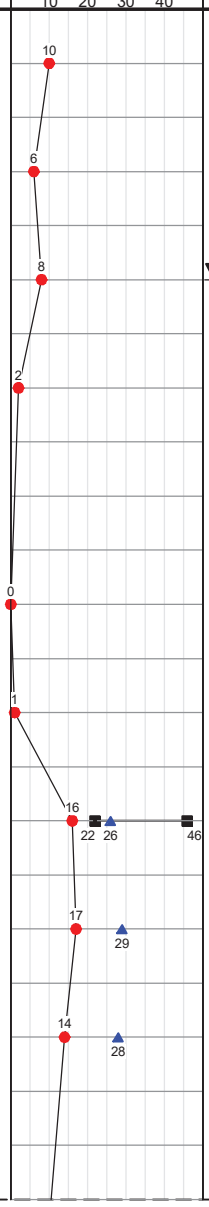
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data

SPT N-Value

10 20 30 40



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/20/2019
Depth: 5 ft. +/-

Roller bit grinding from approximately 2.5 to 3.5 ft.

(Based on wet samples)

Roller bit grinding from approximately 5.5 to 6.0 ft. Advanced 3" sampler (poor recovery).

Organic Content = 11%

Pocket Penetrometer (PP) = 1.75 TSF
Torvane (TV) = 0.5 TSF
PP = >4.5 TSF
TV = 0.75 TSF

PP = >4.5 TSF
TV = 0.65 TSF

PP = 2.5 TSF
TV = 0.45 TSF
Switched to open hole at 19.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 15.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/20/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/21/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

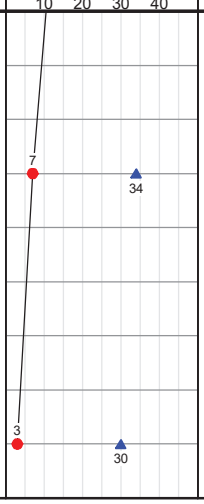
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/20/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24							
-9 / 26		3 3 4 4	7	7/24	CLAY	Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 0.5 TSF TV = 0.20 TSF
-11 / 28							
-13 / 30		WOH/12" 0 3 2	3	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet. - With 1/16" seams of gray fine sand.	PP = 0.75 TSF TV = 0.30 TSF
-15						End of boring at 31.0 ft.	



END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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BORING NUMBER: **B-15**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism	**PROJECT:** Proposed Moakley Park Improvements	**LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828	**LOCATION:** Boston, MA	**CHECKED BY:** S. Spink
CONTRACTOR: New England Boring Contractors	**DRILLING METHOD:** Cased, Drive-and-Wash	**BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz	**CASING/AUGER SIZE:** HW (4" ID) Casing	**GROUND ELEV:** 16 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)	**SAMPLING METHOD:** Standard penetration test (SPT)	**DATE STARTED:** 8/27/2019
OTHER EQUIPMENT: -	**SAMPLER HAMMER:** 140-lb. automatic hammer	**DATE COMPLETED:** 8/27/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/27/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks
2		3, 7, 8, 10	15	5/24		Medium dense, dark brown, fine to coarse SAND, some silt, trace organics (roots); moist. [TOPSOIL] - With cobble in spoon tip.	
14 / 4		6, 11, 15, 11	26	15/24		Top 5" - Tan, fine to medium SAND, some silt, trace debris (ash, slag); moist. [FILL] Bottom 10" - Medium dense, dark gray, fine to coarse SAND, some debris (slag, coal, ash), little silt, trace gravel; moist. [FILL]	Roller bit grinding from approximately 2.0 to 3.0 ft.
12 / 6		3, 2, 3, 2	5	15/24		Medium stiff, gray-brown, silty CLAY, little fine to medium sand; moist. [FILL]	
10 / 8		2, 3, 5, 4	8	20/24		Top 8" - Gray-brown, silty CLAY, little fine to medium sand, little debris (slag), trace gravel; wet. [FILL] Bottom 12" - Medium dense, gray, fine to medium SAND, little silt; wet. [FILL]	(Based on wet samples)
8 / 10		WOR/12", 0, WOH/12", 0		23/24	FILL	Very loose, gray, silty fine to medium SAND, trace organics (shell fragments), trace debris (ash); wet. [FILL]	
6 / 12		WOR/6", WOH/18", 0, 0		22/24		Top 5" - Gray, silty fine to coarse SAND, trace organics (shell fragments), trace debris (slag); wet. [FILL] Bottom 17" - Very soft, gray-brown, SILT with some clay, some fine to medium sand, trace organics (shell fragments); wet. [FILL]	Pocket penetrometer measurement = 0.3 TSF Torvane measurement = 0.20 TSF
4 / 14		WOH/12", 0, 4, 2	4	17/24		Loose, gray, fine to medium SAND, little silt, trace organics (shell fragments); wet. [FILL] Middle 4" - Gray-brown, SILT with some clay, little fine sand; wet. [FILL]	
2 / 16		WOH/24", 0, 0, 0	0	23/24		Top 18" - Very loose, gray, fine to medium sandy SILT with some clay, trace organics (shell fragments), trace debris (slag), trace gravel (angular); wet. [FILL] Bottom 5" - Dark gray to black, ORGANIC SILT (with shell fragments), little fine sand, trace gravel; wet; with strong organic odor. Soft, gray-brown, fine sandy SILT, trace organics (shell fragments); wet; with strong organic odor.	<#200 Sieve = 53%
0 / 18		1, 1, 1, 2	2	20/24			
-2 / 20		WOH/18", 0, 0, 3	0	24/24	SILT	Very soft, gray-brown to black, SILT, some fine to medium sand, trace organics (shell fragments); wet; with strong organic odor.	Organic Content = 3% Switched to open hole at 19.0 ft.
-4							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT NUMBER: 2190828
PROJECT: Proposed Moakley Park Improvements
LOCATION: Boston, MA
LOGGED BY: B. Goffin
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
FOREMAN/DRILLER: J. Mietkiewicz
DRILL RIG TYPE: ATV (Diedrich D-50)
OTHER EQUIPMENT: -
DRILLING METHOD: Cased, Drive-and-Wash
CASING/AUGER SIZE: HW (4" ID) Casing
SAMPLING METHOD: Standard penetration test (SPT)
SAMPLER HAMMER: 140-lb. automatic hammer
BORING LOCATION: See attached plan
GROUND ELEV: 16 ft. +/- (BCB)
DATE STARTED: 8/27/2019
DATE COMPLETED: 8/27/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
In-Situ Test Data
SPT N-Value

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/27/2019
Depth: 6 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24					SILT		Lithology change based on clay cuttings in wash fluid.
-8 / 26		3 3 4 4	7	24/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	Pocket Penetrometer (PP) =2.0 TSF Torvane (TV) = 0.50 TSF
-10 / 28							
-12 / 30		WOH/6" 2 2 3	4	24/24	CLAY	Medium stiff, gray-brown, silty CLAY, trace fine sand; wet. - With 1/16" seams of brown fine to medium sand.	PP = 1.0 TSF TV = 0.40 TSF
-14 / 32							
-16 / 34							
-18 / 36		WOH/12" 0 2 3	2	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet. - With 1/4" seams of gray fine to medium sand.	PP = 0.75 TSF TV = 0.30 TSF
-20						End of boring at 36.0 ft.	

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-16**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 18.7 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/19/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/19/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		3 5 11 4	16	15/24		Medium dense, dark brown, fine to medium SAND, some gravel, little silt, trace debris (brick), trace organics (roots); moist. [TOPSOIL]
17 4		4 3 3 4	6	14/24		Loose, brown, fine to coarse SAND, some silt, little gravel, trace debris (ash); moist. [FILL] - With isolated pieces of gray silt.
15 6		2 4 8 8	12	17/24		Top 9" - Stiff, gray, fine sandy SILT, trace debris (ash, metal); moist. [FILL] Bottom 8" - Tan, fine to coarse SAND, trace silt; moist. [FILL]
13 8		4 5 6 5	11	14/24		Medium dense, brown, fine to coarse SAND, trace silt, trace gravel; moist to wet. [FILL] - With isolated pieces of gray silt.
11 10		WOH/24" 0 0 0	0	15/24	FILL	Very loose, gray, fine SAND, some silt; wet. [FILL]
9 12		WOH/6" 2 3 3	5	15/24		Top 5" - Gray, fine sandy SILT with some silt, trace organics (shell fragments, fibers); wet. [FILL] Bottom 10" - Medium stiff, brown, clayey SILT, trace fine sand; wet. [FILL]
7 14		1 1 3 4	4	14/24		Medium stiff, gray-brown to gray, fine to coarse sandy SILT with some clay, little gravel, trace organics (shell fragments); wet. [FILL]
5 16		2 4 4 4	8	14/24		Stiff, gray-brown to gray, fine to coarse sandy CLAY with some silt, little gravel, trace organics (shell fragments); wet. [FILL]
3 18		WOH/12" 0 3 4	3	0/24	SILT	Soft, gray-brown, clayey SILT, some fine to coarse sand, little gravel, trace organics (shell fragments); wet; with strong organic odor.
1 20		2 3 5 11	8	16/24	SAND	Loose, gray, fine to medium SAND, some clayey silt; wet; with strong organic odor.
-1						

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40

16 6 12 11 0 5 4 8 3 8 21

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/19/2019
Depth: 7 ft. +/-

Roller bit grinding from approximately 1.0 to 2.0 ft.

Gravel = 17%
Sand = 58%
Fines = 25%

(Based on wet samples)

Advanced 3" sampler.
Roller bit grinding from approximately 16.0 to 18.0 ft.

<#200 Sieve = 52%

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 18.7 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/19/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/19/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/19/2019
Depth: 7 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24					SAND		Lithology change based on clay cuttings in wash fluid.
-5 / 26		11, 13, 15, 14	28	22/24		Very stiff, gray-brown, silty CLAY, trace fine sand; wet.	Pocket Penetrometer (PP) = 3.75 TSF Torvane (TV) = 0.65 TSF Switched to open hole at 24.0 ft.
-7 / 28		2, 4, 4, 5	8	23/24		Stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 1.75 TSF TV = 0.45 TSF
-9					CLAY		
30 / -11		WOH/6", 3, 3, 5	6	23/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 1.25 TSF TV = 0.45 TSF
32							
-13 / 34		WOH/6", 2, 2, 4	4	24/24		Medium stiff, gray-brown, CLAY with some silt, trace fine sand; wet.	PP = 0.75 TSF TV = 0.30 TSF
-15						End of boring at 34.0 ft. Groundwater monitoring well (MW-10) installed to 15.0 ft.	

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-17**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism	**PROJECT:** Proposed Moakley Park Improvements	**LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828	**LOCATION:** Boston, MA	**CHECKED BY:** S. Spink
CONTRACTOR: New England Boring Contractors	**DRILLING METHOD:** Cased, Drive-and-Wash	**BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz	**CASING/AUGER SIZE:** HW (4" ID) Casing	**GROUND ELEV:** 18.9 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)	**SAMPLING METHOD:** Standard penetration test (SPT)	**DATE STARTED:** 8/17/2019
OTHER EQUIPMENT: -	**SAMPLER HAMMER:** 140-lb. automatic hammer	**DATE COMPLETED:** 8/17/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%	trace organics	< 5%
trace	0 - 10%		

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/17/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
2		2 5 7 7	12	9/24		Loose, brown, fine SAND, some silt, little debris (slag), trace gravel, trace organics (roots); moist. [TOPSOIL]	12	Roller bit grinding from approximately 1.0 to 2.5 ft.
17 4		3 2 2 8	4	15/24		Loose, brown, silty fine to medium SAND, some gravel, trace debris (ash), trace organics (roots); moist. [FILL]	4	Gravel = 25% Sand = 40% Fines = 36%
15 6		6 10 9 10	19	16/24		Top 10" - Medium dense, brown, fine to medium SAND, little silt, trace debris (slag); moist to wet; with oxidation/staining. [FILL] Bottom 6" - Gray, silty fine SAND; wet. [FILL]	19	(Based on wet samples)
13 8		4 2 2 7	4	17/24		Top 10" - Loose, gray, fine sandy SILT; wet. [FILL] Bottom 7" - Brown, fine to coarse SAND, little gravel, trace silt; wet. [FILL]	4	
11 10 9		1 1 1 6	2	2/24	FILL	Very soft, gray-brown, SILT with some clay, little fine sand, trace gravel; wet. [FILL] - With metal piece in sampler tip.	2	
12 7 14								Roller bit grinding from approximately 11.0 to 16.0 ft.
5 16		15 5 3 2	8	17/24		Stiff, gray SILT with some clay, some fine to medium sand, trace gravel; wet. [FILL]	8	Partial loss of wash fluid at approximatelty 13.5 ft.
3 18 1								Assumed lithology change.
20 -1		2 3 7 5	10	1/24	SAND	Gray-brown, silty fine to medium SAND, trace gravel, trace organics (shell fragments, fibers); wet; with strong organic odor.	10	Advanced 3" sampler.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 18.9 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/17/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/17/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/17/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
24					SAND			Lithology change based on clay cuttings in wash fluid.
-5 / 26		3 3 4 5	7	18/24	CLAY	Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	7, 26	Pocket Penetrometer (PP) = 2.25 TSF Torvane (TV) = 0.40 TSF Switched to open hole at 24.0 ft.
-7 / 28								
-9 / 30		WOH/12" 0 4 4	4	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet.	4, 35	PP = 1.0 TSF TV = 0.35 TSF
-11						End of boring at 31.0 ft. Groundwater monitoring well (MW-9) installed to 13.0 ft.		

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-18**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 19.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 9/11/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 9/11/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		4 16 21 24	37	21/24		Top 6" - Dark brown, silty fine to medium SAND, trace gravel, trace debris (slag), trace organics (roots); moist. [TOPSOIL] Bottom 15" - Dense, brown, fine to coarse SAND, some gravel, little silt, trace debris (ash, coal); moist. [FILL]
17 4		16 10 10 8	20	17/24		Top 8" - Brown to red, fine to coarse SAND, some debris (brick), little gravel, little silt; moist. [FILL] Bottom 9" - Very stiff, gray-brown, SILT, little fine to medium sand, trace gravel, trace debris (brick, ash, slag), trace organics (roots); moist. [FILL]
15 6		1 5 14 13	19	19/24		Top 13" - Very stiff, gray-brown, SILT, little fine to medium sand, little gravel, trace debris (ash); moist. [FILL] Bottom 6" - Dark brown, fine to coarse SAND, little debris (slag, ash), little gravel, little silt; moist. [FILL]
13 8		5 5 3 2	8	9/24		Loose, dark gray to brown, fine to coarse SAND, some gravel, little debris (possible asphalt), trace silt; wet; with strong asphalt odor. [FILL]
11 10		1 WOH/18" 0 0		7/24	FILL	Very soft, gray-brown, clayey SILT, little fine to medium sand; wet. [FILL]
9 12		WOH/24" 0 0 0	0	24/24		Very soft, gray-brown, clayey SILT, trace fine sand; wet. [FILL]
7 14		WOH/24" 0 0 0	0	24/24		Very soft, gray-brown, clayey SILT, trace fine sand; wet. [FILL]
5 16		WOH/24" 0 0 0	0	13/24		Very soft, gray-brown, clayey SILT, trace debris (slag), trace fine sand; wet. [FILL]
3						End of boring at 16.0 ft. due to mechanical issues. Groundwater monitoring well (MW-11) installed to 15.0 ft.

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

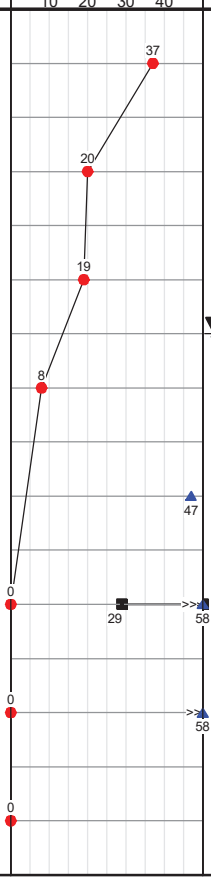
Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 9/11/2019
Depth: 6 ft. +/-

Roller bit grinding from approximately 2.0 to 4.0 ft.

Roller bit grinding from approximately 5.0 to 6.0 ft. (Based on wet samples)

No pocket penetrometer and torvane measurement due to sample irregularities.

Pocket Penetrometer (PP) = 2.25 TSF
Torvane (TV) = 0.40 TSF

PP = 2.25 TSF
TV = 0.40 TSF

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-19A**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 21.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/17/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/17/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
2		3 7 7 6	14	12/24		Medium dense, dark brown, fine to coarse SAND, some silt, little gravel, little debris (ash, slag), trace organics (roots); moist. [TOPSOIL]
19 4		6 5 8 7	13	14/24	FILL	Medium dense, gray-brown, fine to coarse SAND, little gravel, little silt, trace debris (ash); moist. [FILL]
17 6		6 9 34 11	43	21/24		Top 7" - Black, fine to coarse SAND, trace gravel, trace silt, with possible asphalt millings; moist; with strong asphalt odor. [FILL] Bottom 14" - Medium dense, gray-brown, silty fine to coarse SAND, some debris (ash, glass, brick), trace gravel; moist. [FILL]
15						Casing refusal at 5.2 ft. End of boring. Offset to boring B-19B.

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

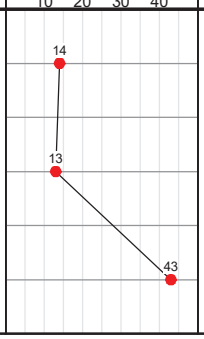
Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value



Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Gravel = 15%
Sand = 73%
Fines = 12%

Partial loss of wash fluid at approximately 4.5 ft.

Groundwater Observations

Date: 8/17/2019
Depth: Not observed

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

BORING NUMBER: **B-19B**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism	**PROJECT:** Proposed Moakley Park Improvements	**LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828	**LOCATION:** Boston, MA	**CHECKED BY:** S. Spink
CONTRACTOR: New England Boring Contractors	**DRILLING METHOD:** Cased, Drive-and-Wash	**BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz	**CASING/AUGER SIZE:** HW (4" ID) Casing	**GROUND ELEV:** 24.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)	**SAMPLING METHOD:** Standard penetration test (SPT)	**DATE STARTED:** 8/19/2019
OTHER EQUIPMENT: -	**SAMPLER HAMMER:** 140-lb. automatic hammer	**DATE COMPLETED:** 8/20/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%	
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%	
some	20 - 35%	(soil name) with some organics	5 - 15%	
little	10 - 20%			
trace	0 - 10%	trace organics	< 5%	

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/20/2019
Depth: 12.5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
2 22						Refer to B-19A boring log.		Roller bit grinding from approximately 3.0 to 4.0 ft.
4 20								
6 18								
8 16		5 6 5 7	11	16/24		Stiff, brown, SILT, little fine sand, little gravel, trace debris (ash, wood); moist. [FILL]	11	
10 14		5 6 8 5	14	1/24		Stiff, mottled gray and brown, SILT with some clay, some fine to coarse sand, trace gravel; moist. [FILL]	14	Roller bit grinding from approximately 8.5 to 9.0 ft. Advanced 3" sampler.
12 12					FILL			(Based on wet samples)
14 10		4 3 5 8	8	8/24		Loose, gray, silty fine to coarse SAND, little gravel, trace organics (shell fragments); wet. [FILL]	8	
16 8								
18 6								
20 4		WOH/24" 0 0 0	0	19/24		Very soft, gray, silty CLAY, trace fine sand, trace debris (wood); wet. [FILL]	0	Pocket Penetrometer (PP) = <0.1 TSF Torvane (TV) = 0.1 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 24.2 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/19/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/20/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/20/2019
Depth: 12.5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
24					FILL		Assumed lithology change.
0 26		3 13 16 19	29	20/24	SAND	Medium dense, gray, fine to medium SAND, little silt, trace gravel; wet; with strong organic odor.	
-2 28							
-4 30		5 11 11 13	22	20/24		Very stiff, gray-brown, silty CLAY, trace fine sand; wet.	Lithology change based on clay cuttings in wash. PP = 3.5 TSF TV = 0.55 TSF Switched to open hole at 29.0 ft. PP = 3.5 TSF TV = 0.55 TSF
-6 32							
-8 34							
-10 36		WOH/6" 3 3 5	6	24/24	CLAY	Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.	PP = 1.25 TSF TV = 0.35 TSF
-12 38							
-14 40		WOH/12" 0 3 3	3	24/24		Soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = 0.5 TSF TV = 0.25 TSF
-16						End of boring at 41.0 ft.	

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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BORING NUMBER: **B-20**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism	**PROJECT:** Proposed Moakley Park Improvements	**LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828	**LOCATION:** Boston, MA	**CHECKED BY:** S. Spink
CONTRACTOR: New England Boring Contractors	**DRILLING METHOD:** Cased, Drive-and-Wash	**BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz	**CASING/AUGER SIZE:** HW (4" ID) Casing	**GROUND ELEV:** 27.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)	**SAMPLING METHOD:** Standard penetration test (SPT)	**DATE STARTED:** 8/13/2019
OTHER EQUIPMENT: -	**SAMPLER HAMMER:** 140-lb. automatic hammer	**DATE COMPLETED:** 8/16/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/12/2019
Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
2		2, 4, 4, 14	8	19/24		Top 7" - Brown, fine SAND, some silt, trace organics (roots), trace debris (glass); moist. [TOPSOIL] Bottom 12" - Loose, brown, fine to medium SAND, some debris (brick, slag, coal ash, glass), little silt, trace gravel; moist. [FILL]	
25 / 4		6, 14, 14, 6	28	10/24		Medium dense, gray-brown, fine to coarse SAND, little silt, little debris (brick, slag, coal ash), little gravel; moist. [FILL]	
23 / 6		5, 5, 4, 3	9	7/24	FILL	Loose, gray-brown, fine to coarse SAND, some gravel, some silt, trace debris (brick, slag); moist. [FILL]	Gravel = 34% Sand = 42% Fines = 24%
21 / 8		13, 4, 4, 4	8	0/24		No recovery.	
19 / 10		3, 5, 4, 4	9	14/24		Top 6" - Light gray, fine to coarse SAND, little gravel, little silt; moist to wet. [FILL] Bottom 8" - Medium stiff, brown, silty CLAY, little fine to coarse sand; wet. [FILL]	▼ (Based on wet samples)
17 / 12							
15 / 14							Assumed lithology change.
13 / 16		4, 6, 3, 4	9	10/24	SAND	Loose, gray, fine to coarse SAND, little silt, trace organics (shell fragments); wet.	<#200 Sieve = 10%
11 / 18							
9 / 20		3, 6, 4, 6	10	11/24		Loose, gray, fine to medium SAND, little silt, trace gravel, trace organics (shell fragments); wet. - With 1.5" layers of gray clayey silt.	Gravel = 8.4% Sand = 79.7% Fines = 11.9%
7							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 27.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/13/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/16/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%	trace organics	< 5%
trace	0 - 10%		

Data Plots
Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %
PL MC LL
In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests
WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/12/2019
Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
24						
3 / 26	X	11, 13, 10, 6	23	11/24	SAND	Medium dense, brown, gravelly fine to coarse SAND, little silt; wet.
1 / 28						
-1 / 30	X	9, 12, 17, 21	29	15/24		Medium dense, gray-brown, fine to medium SAND, trace silt, trace gravel; wet.
-3 / 32						
-5 / 34						
-7 / 36	X	9, 14, 9, 8	23	13/24		Top 10" - Medium dense, gray, fine to medium SAND, trace silt; wet.
-9 / 38					CLAY	Bottom 3" - Brown, silty CLAY, trace fine sand; wet.
-11 / 40	X	1, 2, 3, 5	5	24/24		Medium stiff, gray-brown, silty CLAY, trace fine sand; wet.
-13 / 42						
-15						

Pocket penetrometer (PP) = 1.5 TSF
Switched to open hole at 39.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03\LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
FOREMAN/DRILLER: J. Mietkiewicz | **CASING/AUGER SIZE:** HW (4" ID) Casing | **GROUND ELEV:** 27.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50) | **SAMPLING METHOD:** Standard penetration test (SPT) | **DATE STARTED:** 8/13/2019
OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/16/2019

Sample Description

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	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
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P200 = Percent passing the #200 sieve
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Groundwater Observations
Date: 8/12/2019
Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
46 / -19		WOH/6" (1, 4, 4)	5	0/24		No recovery.	
48 / -21							
50 / -23		WOH/12" (0, 1, 3)	1	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = 0.5 TSF
52 / -25							
54 / -27					CLAY		
56 / -29							
58 / -31							
60 / -33		WOH/24" (0, 0, 0)	0	14/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = <0.1 TSF
62 / -35							
64 / -37				28/30			Advanced shelby tube (ST-1) from 62.0 to 64.3 ft.
		WOH/18" (0, 0)	0	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = 0.2 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

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N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
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4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

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CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
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OTHER EQUIPMENT: - | **SAMPLER HAMMER:** 140-lb. automatic hammer | **DATE COMPLETED:** 8/16/2019

Sample Description
General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

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Data Plots
Laboratory Test Data:
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MC = Moisture content, %
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In-Situ Test Data
SPT N-Value
10 20 30 40

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Date: 8/12/2019
Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks
		3					
68 / -41							
70 / -43		WOR/18" 0 0 WOH/6"	0	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = <0.1 TSF
72 / -45							
74 / -47							
76 / -49					CLAY		
78 / -51							
80 / -53		WOR/18" 0 0 WOH/6"	0	24/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	PP = <0.1 TSF
82 / -55							
84 / -57							
86 / -59							

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

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Weston & Sampson

CLIENT: Stoss Landscape Urbanism | **PROJECT:** Proposed Moakley Park Improvements | **LOGGED BY:** B. Goffin
PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
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Groundwater Observations
Date: 8/12/2019
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Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
90 / -63		WOR/24" 0 0 0	0	18/24		Very soft, gray-brown, silty CLAY, trace fine sand; wet.	0 35	PP = <0.1 TSF
92 / -65								
94 / -67								
96 / -69								
98 / -71								
100 / -73		WOR/24" 0 0 0	0	19/24	CLAY	Very soft, gray-brown, silty CLAY, little fine sand; wet.	0 17 26 29	PP = 0.2 TSF
102 / -75								
104 / -77								
106 / -79								
108 / -81								

LOG CONTINUED ON NEXT PAGE

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		> 30	Hard

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PROJECT NUMBER: 2190828 | **LOCATION:** Boston, MA | **CHECKED BY:** S. Spink

CONTRACTOR: New England Boring Contractors | **DRILLING METHOD:** Cased, Drive-and-Wash | **BORING LOCATION:** See attached plan
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SPT N-Value
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Groundwater Observations
Date: 8/12/2019
Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
112 / -85					
114 / -87					
116 / -89					
118 / -91					
120 / -93		WOR/24" 0 0 0	0	24/24	CLAY
122 / -95					
124 / -97					
126 / -99					
128 / -101					
130 / -103					

Very soft, gray-brown, silty CLAY, trace fine sand; wet.
- With 1/16" seams of gray fine to medium sand.

Roller bit grinding from approximately 112.0 to 112.5 ft.

PP = <0.1 TSF

0 27

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

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Groundwater Observations

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Depth: 9 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
134 / -107					
136 / -109					
138 / -111					
140 / -113		WOR/6" 19 11 10	30	24/24	Very stiff, gray-brown, silty CLAY, little fine to coarse sand; wet. - With 6" layer of gray fine to medium sand, trace silt.
142 / -115					CLAY
144 / -117					
146 / -119					
148 / -121					
150 / -123					
152 / -125					

PP = <0.1 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

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MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

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Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
156 / -129					CLAY			Lithology change based on fine to medium sand observed in wash fluid.
158 / -131								
160 / -133		WOR/24" 0 0 0	0	23/24		Top 11" - Gray, fine to medium SAND, some clayey silt, trace gravel; wet. Bottom 12" - Very soft, gray-brown, silty CLAY, little fine to coarse sand; wet.	0	PP = 0.2 TSF
162 / -135								
164 / -137								
166 / -139					SANDY CLAY			
168 / -141								Roller bit grinding from approximately 168.5 to 169.5 ft. with subsequent partial loss of wash fluid.
170 / -143								
172 / -145								
174 / -147								

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 27.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/13/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/16/2019

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log
178 / -151					
180 / -153		WOR/6" 5 14 19	19	15/24	
182 / -155					
184 / -157					
186 / -159					SANDY CLAY
188 / -161					
190 / -163					
192 / -165					
194 / -167					
196 / -169					

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils	
GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
some	20 - 35%	(soil name) with some organics	5 - 15%
little	10 - 20%		
trace	0 - 10%	trace organics	< 5%

Top 8" - Gray-brown, fine to medium sandy CLAY with some silt; wet.
Bottom 7" - Gray, fine to medium SAND, little silt; wet.

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40

19

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/12/2019
Depth: 9 ft. +/-

Switched to 3" roller bit at 179.0 ft.

Roller bit grinding from approximately 190.5 to 191.0 ft.

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 27.3 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/13/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/16/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description
200						Roller bit grinding and slow drilling on possible weathered bedrock from approximately 198.5 to 200.1 ft.
-173						Roller bit refusal on possibe bedrock at 200.1 ft. End of boring.

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value
10 20 30 40

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/12/2019
Depth: 9 ft. +/-

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

Weston & Sampson

BORING NUMBER: B-21

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 16.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/21/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/21/2019

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

In-Situ Test Data
SPT N-Value

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations
Date: 8/21/2019
Depth: 5 ft. +/-

Depth, ft. / Elevation	Sample Type	Blows on Sampler/6" / Blows on Casing/12"	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Remarks and Additional Tests
2		9 11 7 7	18	16/24		Top 6" - Tan, gravelly fine to coarse SAND, little silt, trace organics (roots); moist. [TOPSOIL] Bottom 10" - Medium dense, dark brown, fine to coarse SAND, little silt, little gravel, trace organics (roots), trace debris (ash); moist. [FILL]	
14 4		5 4 6 6	10	9/24		Stiff, gray-brown, fine to coarse sandy SILT, little debris (slag, ash), trace gravel; moist. [FILL]	Roller bit grinding from approximately 2.0 to 3.0 ft.
12 6		2 2 3 1	5	14/24		Top 11" - Loose, gray-brown, fine to coarse SAND, some gravel, little to some silt, trace debris (brick, ash); moist to wet; with oxidation/staining. [FILL] Bottom 3" - Gray, clayey SILT, some fine sand; wet. [FILL]	Partial loss of wash fluid at approximately 4.0 ft. (Based on wet samples)
10 8		WOH/12" 0 1 1	1	21/24	FILL	Very soft, gray, clayey SILT, some fine sand, trace organics (shell fragments); wet.	
8 10		WOH/12" 0 1 1	1	10/24		Very loose, gray, silty fine to medium SAND, trace organics (shell fragments); wet. [FILL]	
6 12 4 14							Lithology change based on clay cuttings in wash fluid. Pocket Penetrometer (PP) = 1.5, >4.5 TSF Torvane (TV) = 0.50, 1.20 TSF
2 16		WOH/6" 6 7 13	13	17/24		Top 8" - Blue-gray, silty CLAY, little fine sand; wet. Bottom 9" - Very stiff, gray-brown, silty CLAY, trace fine sand; wet.	
0 18 -2					CLAY		Switched to open hole at 18.0 ft.
20 -4		4 5 6 8	11	24/24		Stiff, brown, CLAY with some silt, little fine sand; wet.	PP = 3.5 TSF TV = 0.65 TSF

LOG CONTINUED ON NEXT PAGE

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
DRILLING METHOD: Cased, Drive-and-Wash
BORING LOCATION: See attached plan
FOREMAN/DRILLER: J. Mietkiewicz
CASING/AUGER SIZE: HW (4" ID) Casing
GROUND ELEV: 16.4 ft. +/- (BCB)
DRILL RIG TYPE: ATV (Diedrich D-50)
SAMPLING METHOD: Standard penetration test (SPT)
DATE STARTED: 8/21/2019
OTHER EQUIPMENT: -
SAMPLER HAMMER: 140-lb. automatic hammer
DATE COMPLETED: 8/21/2019

Depth, ft. / *Elevation*	Sample Type	Blows on Sampler/6" / *Blows on Casing/12"*	N-Value, Blows/ft.	Sample Recovery, in. / Sampler Penetration, in.	Strata Description and Graphic Log	Sample Description	Data Plots	Remarks and Additional Tests
24 *-8* 26 *-10*		1 1 3 4	4	24/24	CLAY	Medium stiff, gray-brown, clayey SILT, little fine sand; wet. - With 1/16" seams of gray fine sand. End of boring at 26.0 ft.		PP = 0.75 TSF TV = 0.30 TSF

Sample Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil			Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%		PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Data Plots

Laboratory Test Data:
PL = Plastic limit, %
MC = Moisture content, %
LL = Liquid limit, %

PL MC LL

In-Situ Test Data
SPT N-Value

10 20 30 40
4
33

Remarks and Additional Tests

WOR = Weight of rods
WOH = Weight of hammer
P200 = Percent passing the #200 sieve
OC = Organic content, %
LVSS = Shear strength from laboratory vane shear test, tsf

Groundwater Observations

Date: 8/21/2019
Depth: 5 ft. +/-

END OF BORING LOG

SAMPLE LEGEND

- Standard split spoon sampler driven w/ 140-lb. hammer (24" long, 2" OD, 1-3/8" ID)
- Thin-walled tube sampler pushed w/ rig hydraulics (30" long, 3" ID)
- NX rock core sampler advanced using rotary drilling methods (5' long, 3" ID)
- Modified split spoon sampler driven w/ 140-lb. hammer (24" long, 3" OD, 2-3/8" ID)

N-VALUE RELATIONSHIPS

N-VALUE BLOWS/FT.	DENSITY OF GRANULAR SOILS	N-VALUE BLOWS/FT.	CONSISTENCY OF COHESIVE SOILS
0 - 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - MODIFIED - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:43 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\BORINGS\WORKING DRAFT BORING LOGS.GPJ

ATTACHMENT C

Rock Core Photographs

Rock core shown dry (top) and wet (bottom).

Rock Core Photographs

Proposed Moakley Park Improvements
Boston, MA

Weston & Sampson

ATTACHMENT D

Test Pit Logs

Weston & Sampson

TEST PIT NUMBER: **TP-1**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 14.9 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

9.5 ft. +/-
Plan Sketch (NTS)
3 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 / 13	FILL	(10") Dark brown, fine to coarse SAND, some silt, little gravel, trace organics (roots); moist. [TOPSOIL] Gray-brown, fine to coarse SAND, little debris (slag, ash, glass, metal), little gravel, little silt, with few cobbles; moist. [FILL]	Minor caving observed below approximately 0.8 ft.
		End of test pit at 2.7 ft. No seepage observed.	Percolation testing performed by Pine & Swallow Associates from reportedly 28 to 34 in.

Photo 1 - Overview of test pit (looking northwest).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:50 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 14 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

Plan Sketch (NTS)
10.5 ft. +/-
2.5 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: 7.2 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 / 12		(9") Brown, fine to coarse SAND, little silt, trace gravel, trace organics (roots), trace debris (plastic); moist. [TOPSOIL] Brown, gravelly fine to coarse SAND, little debris (ash, coal, glass, wood, plastic), little silt, with common cobbles; moist.	Minor caving observed below approximately 0.7 ft.
4 / 10	FILL	Light gray, fine to coarse SAND, some debris (ash, coal, slag), little silt, little gravel, with occasional cobbles; moist. [FILL]	Percolation testing performed by Pine & Swallow Associates from reportedly 36 to 42 in.
6 / 8		Brown, fine to coarse SAND, some debris (ash, slag, glass, porcelain, chalk), little silt, trace gravel, trace organics (roots); moist. [FILL] Blue-gray, fine to coarse SAND, some debris (ash, slag, glass, brick), little silt, little gravel, trace organics (shell fragments); moist. [FILL]	Moderate caving observed below approximately 4.9 ft.
			▼ Slow seepage observed below approximately 7.2 ft.

End of test pit at 7.5 ft.

Photo 1 - Overview of test pit (looking southwest).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:50 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

Weston & Sampson

TEST PIT NUMBER: **TP-3**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 15.2 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

12 ft. +/-
Plan Sketch (NTS)
2.5 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 / 13		(12") Dark brown, fine to medium SAND, some silt, little gravel, trace organics (roots), with occasional cobbles; moist. [TOPSOIL] Brown, gravelly fine to coarse SAND, little debris (brick, glass, ash), trace organics (roots up to 1", shell fragments), trace silt; with common demolition rubble (concrete blocks up to 24"), common cobbles; moist. [FILL]	Moderate caving observed from approximately 1.0 to 2.5 ft.
4 / 11	FILL	Black, fine to coarse SAND, some debris (ash, slag, coal, metal, glass, wood, ceramic), little silt, little gravel, with few cobbles; moist. [FILL]	
6 / 9		Light gray, silty fine to medium SAND, trace debris (ash); moist. [FILL] - With isolated pieces of light blue silt with little sand.	
		End of test pit at 7.3 ft. No seepage observed.	

Photo 1 - Overview of test pit (looking northwest).

Photo 2 - Demolition rubble encountered at approximately 2.0 ft. (field book for reference).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:50 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

Weston & Sampson

TEST PIT NUMBER: **TP-4**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 16.1 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/12/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/12/2019

10.5 ft. +/-
Plan Sketch (NTS)
2.5 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/12/2019
Depth: 6.3 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description
2 / 14	FILL	(6") Dark brown, fine to coarse SAND, some silt, little gravel, trace debris (glass, slag), trace organics (roots); moist. [TOPSOIL] Brown, fine to coarse SAND, some gravel, little silt, trace debris (ash), with few cobbles; moist. [FILL]
4 / 12		Brown, clayey SILT, little fine to medium sand; moist; with oxidation/staining. [FILL]
6 / 10		Gray-brown, clayey SILT, trace fine sand; wet. [FILL]
		Gray, fine to coarse SAND, trace silt; wet. [FILL] - With isolated pieces of gray silty clay. End of test pit at 7.2 ft.

▼ Moderate seepage and severe caving observed below approximately 6.3 ft.

Photo 1 - Overview of test pit (looking south).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:50 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

TEST PIT NUMBER: **TP-5**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT NUMBER: 2190828
PROJECT: Proposed Moakley Park Improvements
LOCATION: Boston, MA
LOGGED BY: B. Goffin
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
OPERATOR: K. Smith
EXCAVATOR: CASE 580 Super N Backhoe
BUCKET TYPE: 2-ft.-wide toothed bucket
TEST PIT LOCATION: See attached plan.
GROUND ELEVATION: 22.6 ft. +/- (BCB)
DATE STARTED: 9/12/2019
DATE COMPLETED: 9/12/2019

Plan Sketch (NTS)

11.5 ft. +/-

3 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/12/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
0 22.6	FILL	Brown, fine to coarse SAND, little gravel, little silt, trace organics (roots up to 1.5", shell fragments), trace debris (cinders), with common cobbles; moist. [FILL]	
2 21	FILL	Dark brown, fine to coarse SAND, some debris (brick, slag, coal, glass, metal, leather), little gravel, little silt, with numerous demolition rubble (concrete blocks up to 20"), few cobbles; moist. [FILL]	Severe caving observed from approximately 2.0 to 5.0 ft.
4 19	FILL	Brown, fine to coarse SAND, some debris (brick, slag, ash, glass, wood, metal), little gravel, little silt, with common cobbles; moist. [FILL]	
6 17			
8 15		End of test pit at 8.2 ft. No seepage observed.	

Photo 1 - Overview of test pit (looking west).

Photo 2 - Demolition rubble encountered at approximately 1.5 ft. (field book for reference).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:50 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

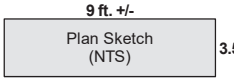
Weston & Sampson

TEST PIT NUMBER: **TP-6**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 14.9 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

Plan Sketch (NTS)



Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description
		(8") Brown, fine to medium SAND, some silt, little gravel, trace organics (roots); moist. [TOPSOIL]
2 / 13	FILL	Yellow-brown to brown, gravelly fine to coarse SAND, trace silt, trace debris (ceramic), with common cobbles; moist. [FILL]
		Dark brown, fine to coarse SAND, some debris (brick, slag, coal, ash, glass, metal, etc.), little gravel, little silt, with occasional cobbles and boulders (up to 14"); moist. [FILL]

End of test pit at 2.4 ft. No seepage/caving observed.

Percolation testing performed by Pine & Swallow Associates from reportedly 32 to 38 in.

Photo 1 - Overview of test pit (looking southeast).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

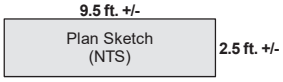
W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:51 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

TEST PIT NUMBER: **TP-7**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 13.9 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

Plan Sketch (NTS)



Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
▼ Depth: 5.9 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
0	TOPS.	(11") Dark brown, fine to medium SAND, some silt, trace gravel, trace organics (roots), trace debris (glass); moist. [TOPSOIL]	
2 / 12	FILL	Gray-brown, fine to coarse SAND, some debris (coal, slag, ash, brick, metal), some gravel, trace silt, with few cobbles; moist. [FILL]	Percolation testing performed by Pine & Swallow Associates from reportedly 15 to 21 in.
4 / 10		Dark brown, fine to coarse SAND, some debris (slag, ash, wood, glass, leather, possible asphalt), little gravel, little silt; moist; with strong asphalt odor. [FILL]	
6 / 8		Black, fine to coarse SAND, some debris (slag, ash, brick, wood, glass, textile), some silt, little gravel; wet. [FILL]	Moderate caving observed below approximately 4.5 ft. ▼ Fast seepage observed below approximately 5.9 ft.
		End of test pit at 6.8 ft.	

Photo 1 - Overview of test pit (looking northeast).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

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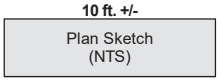
Weston & Sampson

TEST PIT NUMBER: **TP-8**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 13.6 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

Plan Sketch (NTS)



Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 / 12	FILL	(10") Dark brown, fine to medium SAND, some silt, trace gravel, trace organics (roots); moist. [TOPSOIL] Brown, gravelly fine to coarse SAND, trace debris (brick, glass, porcelain), trace silt, with few cobbles; moist. [FILL]	Possible concrete slab encountered at 1.9 ft.

End of test pit at 2.8 ft. No seepage/caving observed.

Photo 1 - Overview of test pit (looking northwest).

Photo 2 - Possible concrete slab encountered at approximately 1.9 ft. (field book for reference).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

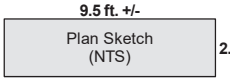
W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:51 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

TEST PIT NUMBER: **TP-9**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 14.6 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/13/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/13/2019

Plan Sketch (NTS)



Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil		Organic Soils		
	GRAVEL, SAND, SILT, CLAY	> 50%	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%	organic (soil name)	15 - 50%
	some	20 - 35%	(soil name) with some organics	5 - 15%
	little	10 - 20%		
	trace	0 - 10%	trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/13/2019
Depth: 5.5 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 13	FILL	Brown, fine to coarse SAND, little gravel, little silt, trace debris (brick), trace organics (roots up to 1.5"), with few cobbles, occasional boulder (up to 20"); moist. [FILL]	Black pocket of ash and cinders in the southeastern corner of the excavation from approximately 2.0 to 2.5 ft. Percolation testing performed by Pine & Swallow Associates from reportedly 25 to 30 in.
4 11		Gray-brown, fine to coarse SAND, some gravel, little debris (ash, slag, coal, glass), trace silt, with occasional cobbles; moist to wet. [FILL]	Moderate caving observed below approximately 3.8 ft.
6 9		End of test pit at 6.3 ft.	▼ Fast seepage observed below approximately 5.5 ft.

Photo 1 - Overview of test pit (looking northeast).

Photo 2 - Boulder encountered at approximately 2.0 ft. (field book for reference).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

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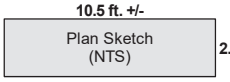
TEST PIT NUMBER: **TP-10**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 14.4 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/12/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/12/2019

Plan Sketch (NTS)



Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/12/2019
Depth: 4.9 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description
0 / 14		(14") Dark brown, silty fine to medium SAND, little gravel, trace organics (roots), trace debris (plastic); moist. [TOPSOIL]
2 / 12	FILL	Yellow-brown, fine to medium SAND, little silt; moist; with oxidation/staining. [FILL] - With isolated pieces of brown silt with some clay.
4 / 10		Dark gray, clayey SILT, some fine sand, trace organics (roots); wet; with strong organic odor. [FILL]
6 / 8		Black, fine to coarse SAND, some debris (ash, slag, coal, brick), some gravel, trace silt; wet. [FILL]
		End of test pit at 6.1 ft.

Fast seepage observed below approximately 4.9 ft.

Severe caving observed below approximately 5.5 ft.

Photo 1 - Overview of test pit (looking southwest).

Photo 2 - Debris encountered from approximately 3.7 to 6.1 ft.

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

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TEST PIT NUMBER: **TP-11**

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 16 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/12/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/12/2019

11 ft. +/-
Plan Sketch (NTS)
2.5 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/12/2019
Depth: 5.8 ft. +/-

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
0 / 16	FILL	(6") Dark brown, fine to coarse SAND, some silt, little gravel, trace organics (roots), trace debris (plastic), with occasional cobbles; moist. [TOPSOIL]	
2 / 14	FILL	Dark brown, fine to coarse SAND, some silt, some gravel, trace debris (ash, glass, brick), with few cobbles; moist. [FILL]	
4 / 12	FILL	Mottled gray and brown, clayey SILT, little fine to medium sand, trace organics (fibers); moist. [FILL]	
	FILL	Yellow-brown, fine to medium SAND, little silt, with occasional cobbles; moist. [FILL]	Severe caving observed below approximately 3.6 ft.
	FILL	- With isolated pieces of gray clayey silt.	
6 / 10	FILL	Gray, silty fine to medium SAND with some clay, trace debris (slag); wet. [FILL]	▼ Slow seepage observed below approximately 5.8 ft.
8 / 8		End of test pit at 8.0 ft.	

Photo 1 - Overview of test pit (looking north).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:51 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

TEST PIT NUMBER: **TP-12**

Weston & Sampson

CLIENT: Stoss Landscape Urbanism
PROJECT: Proposed Moakley Park Improvements
LOGGED BY: B. Goffin
PROJECT NUMBER: 2190828
LOCATION: Boston, MA
CHECKED BY: S. Spink

CONTRACTOR: New England Boring Contractors
TEST PIT LOCATION: See attached plan.
OPERATOR: K. Smith
GROUND ELEVATION: 20.6 ft. +/- (BCB)
EXCAVATOR: CASE 580 Super N Backhoe
DATE STARTED: 9/12/2019
BUCKET TYPE: 2-ft.-wide toothed bucket
DATE COMPLETED: 9/12/2019

11 ft. +/-
Plan Sketch (NTS)
2.5 ft. +/-

Material Description

General Format: Density/consistency, color, classification name (secondary PRIMARY, additional); moisture, additional information. [UNIT NAME and/or ORIGIN]

Soil Classification Name Guide based on Constituent Percentages

Mineral Soil	GRAVEL, SAND, SILT, CLAY	> 50%	Organic Soils	PEAT	> 50%
	gravelly, sandy, silty, clayey	35 - 50%		organic (soil name)	15 - 50%
	some	20 - 35%		(soil name) with some organics	5 - 15%
	little	10 - 20%			
	trace	0 - 10%		trace organics	< 5%

Remarks and Tests

P200 = Percent passing the #200 sieve
MC = Moisture content, %
LL = Liquid limit, %
PL = Plastic limit, %
OC = Organic content, %

Groundwater Observations

Date: 9/12/2019
Depth: Not observed

Depth, ft. / Elevation	Strata Description and Graphic Log	Material Description	Remarks and Tests
2 / 19		(12") Dark brown, fine to medium SAND, some silt, trace gravel, trace debris (brick), trace organics (roots); moist. [TOPSOIL]	
4 / 17	FILL	Brown, fine to coarse SAND, some gravel, little silt, little debris (glass, ash, slag, brick), with few cobbles, occasional boulders (up to 16"); moist. [FILL] - With isolated pieces of gray clayey silt.	
6 / 15		Light brown, fine to medium SAND, little silt, with few cobbles; moist. [FILL]	Minor caving observed below approximately 4.4 ft. Black pocket of cinders in the northeastern corner of the excavation from approximately 4.7 to 5.7 ft.
8 / 13		Gray, clayey SILT, some fine sand; moist. [FILL]	Severe caving observed below approximately 6.1 ft.

End of test pit at 9.8 ft. No seepage observed.

Photo 1 - Overview of test pit (looking northwest).

Photo 2 - Boulders encountered at approximately 4.0 ft. (field book for reference).

GENERAL NOTES

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
2. Relative soil densities and consistencies, where noted, are estimates based on visual observation only.
3. Water level observations were made at time of excavation. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements were made.
4. Composite grab samples of each soil stratum were collected for storage and/or laboratory testing.

W&S TEST PIT LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 12/11/19 14:52 - \\WSE03.LOCAL\WSE\PROJECTS\MA\BOSTON MA\MOAKLEY PARK\GEOTECHNICAL\FIELD\TEST PITS\WORKING DRAFT TEST PIT LOGS.GPJ

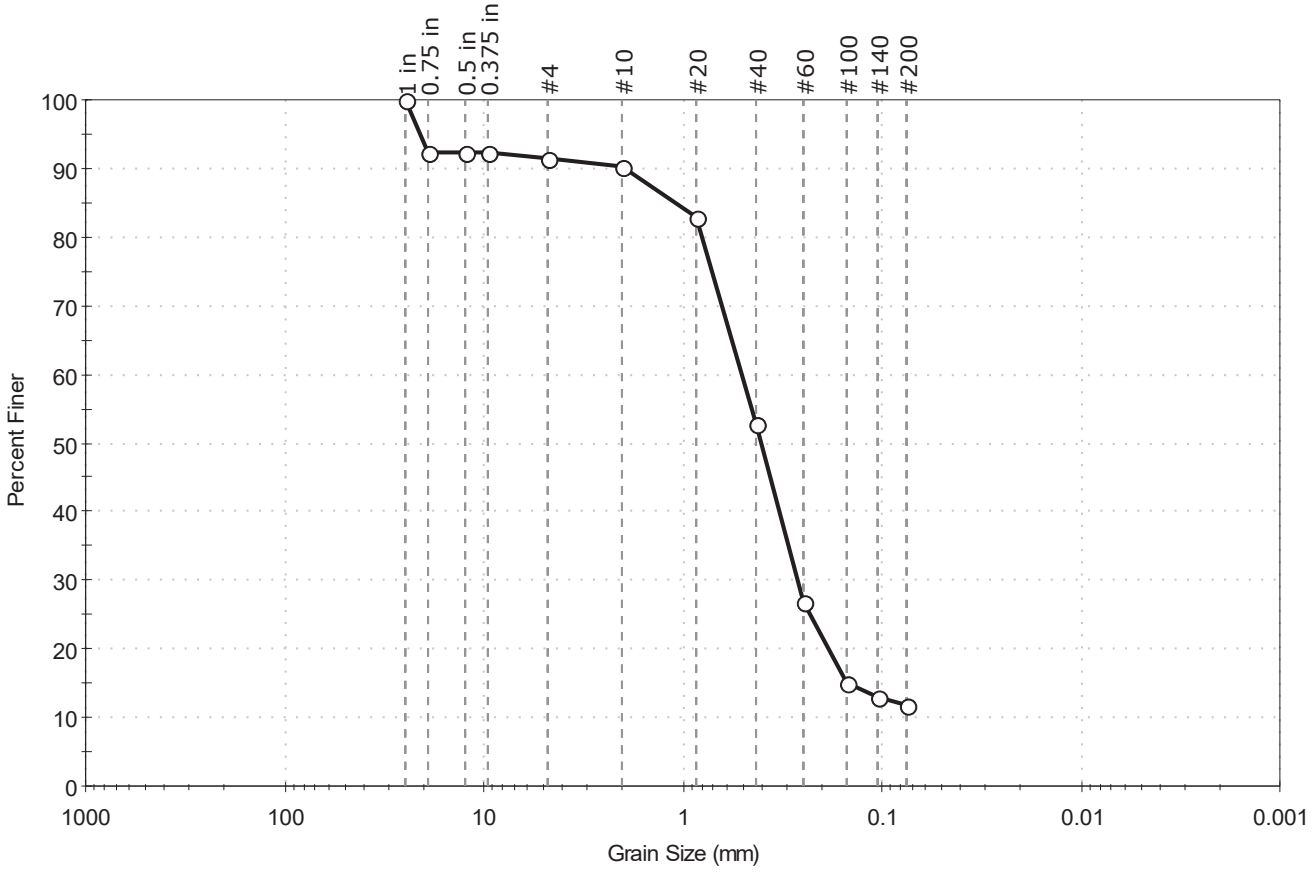
ATTACHMENT E

Laboratory Test Results

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-20	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-7	Test Date:	08/27/19	Checked By:	bfs
Depth :	19-21	Test Id:	519460		
Test Comment:	---				
Visual Description:	Moist, light gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	8.4	79.7	11.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	92		
0.5 in	12.50	92		
0.375 in	9.50	92		
#4	4.75	92		
#10	2.00	90		
#20	0.85	83		
#40	0.42	53		
#60	0.25	27		
#100	0.15	15		
#140	0.11	13		
#200	0.075	12		

Coefficients

D_{85} = 1.0934 mm D_{30} = 0.2663 mm
D_{60} = 0.5010 mm D_{15} = 0.1475 mm
D_{50} = 0.4007 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

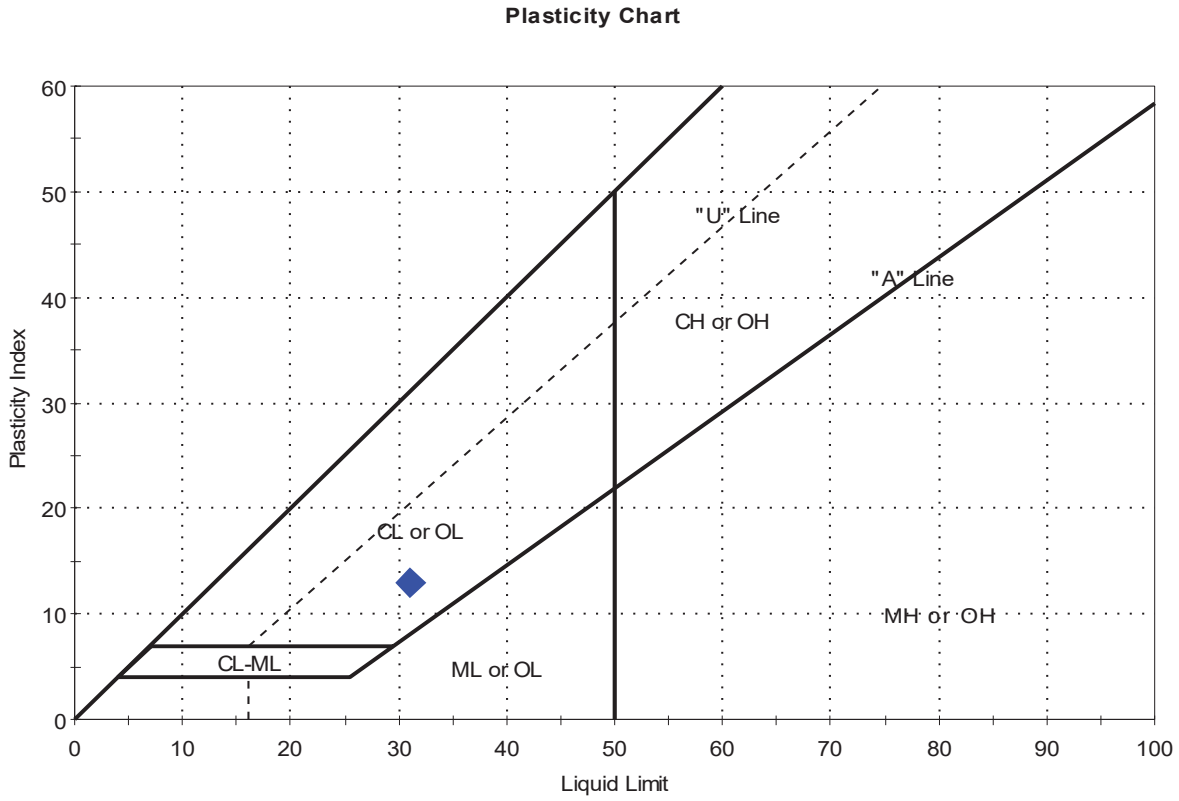
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-20	Sample Type:	tube	Tested By:	cam
Sample ID:	ST-1	Test Date:	08/23/19	Checked By:	bfs
Depth :	61-63	Test Id:	519462		
Test Comment:	---				
Visual Description:	Wet, olive 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
◆	ST-1	B-20	61-63	38	31	18	13	1.5	

Sample Prepared using the WET method

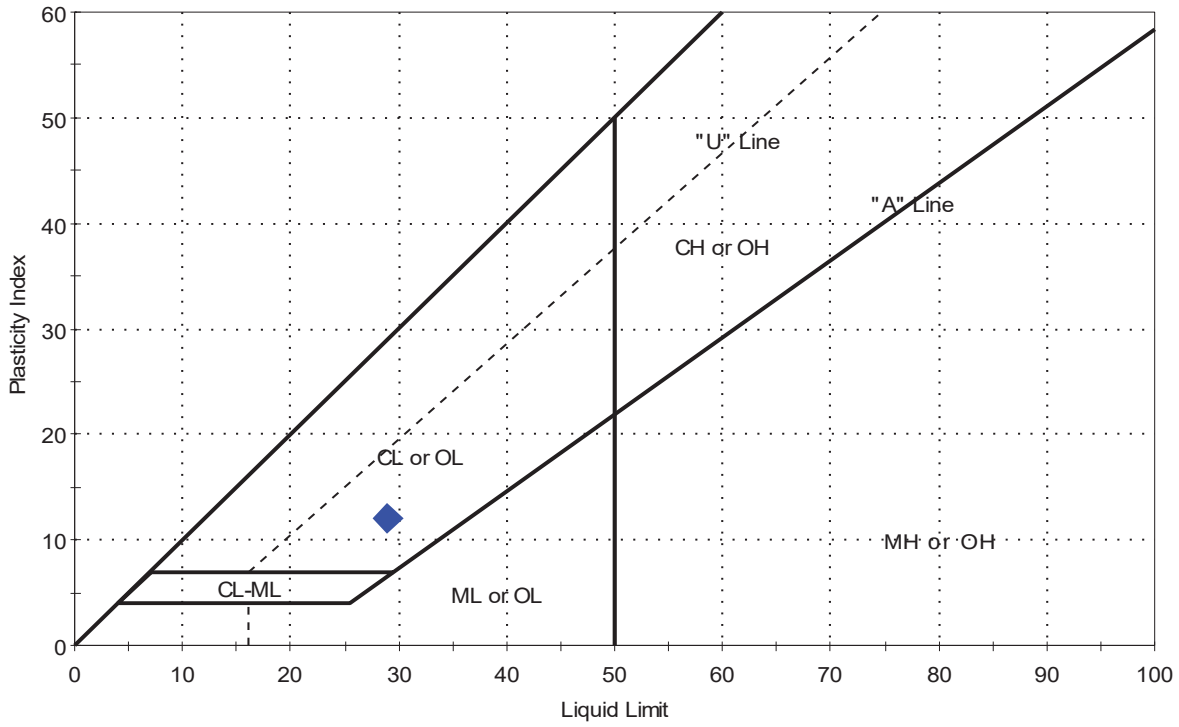
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-20	Sample Type:	jar	Tested By:	cam
Sample ID:	S-19	Test Date:	08/26/19	Checked By:	bfs
Depth :	99-101	Test Id:	519461		
Test Comment:	---				
Visual Description:	Moist, light 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
◆	S-19	B-20	99-101	26	29	17	12	0.8	

Sample Prepared using the WET method

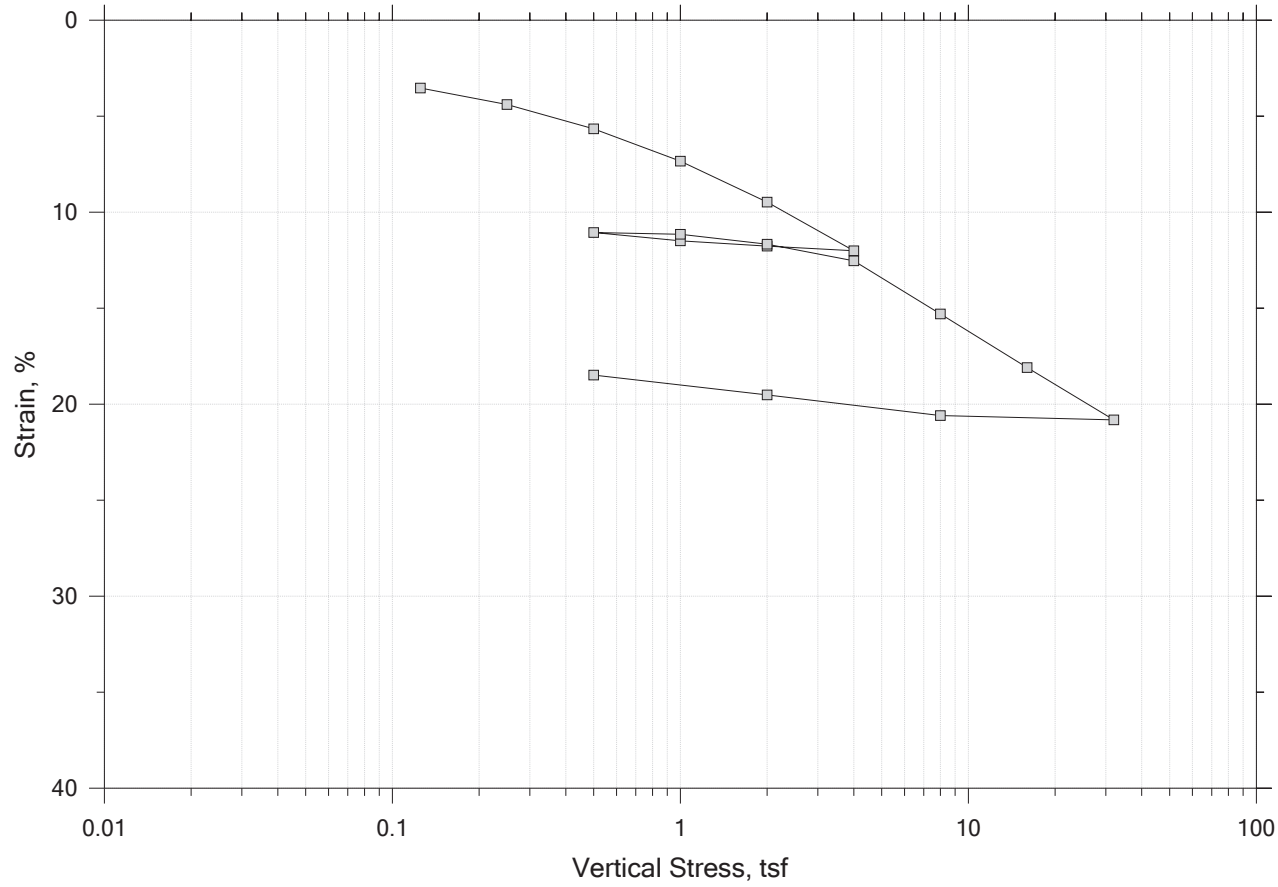
Dry Strength: VERY HIGH

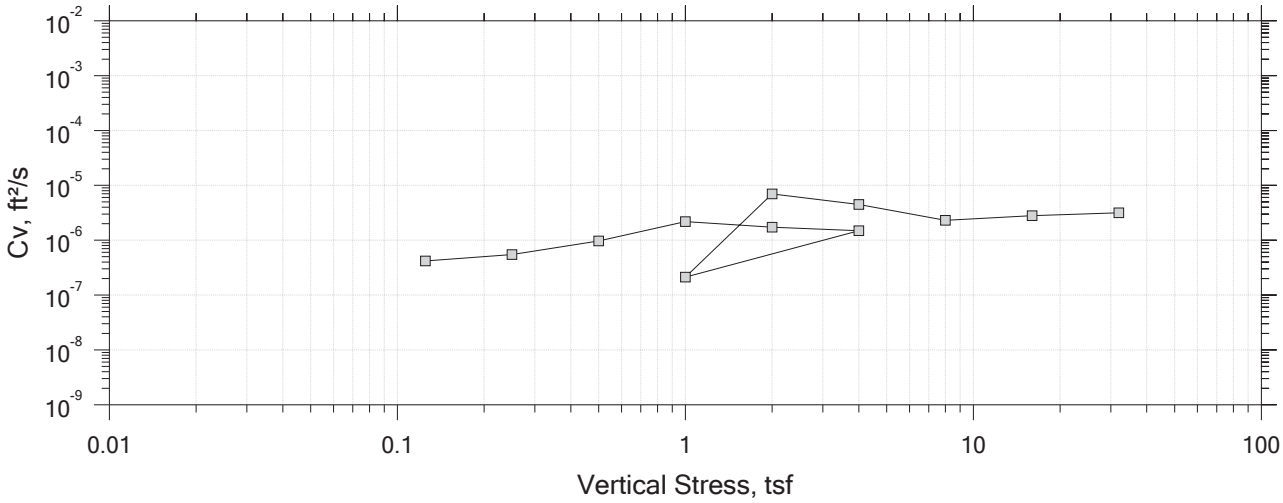
Dilatancy: SLOW

Toughness: LOW

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

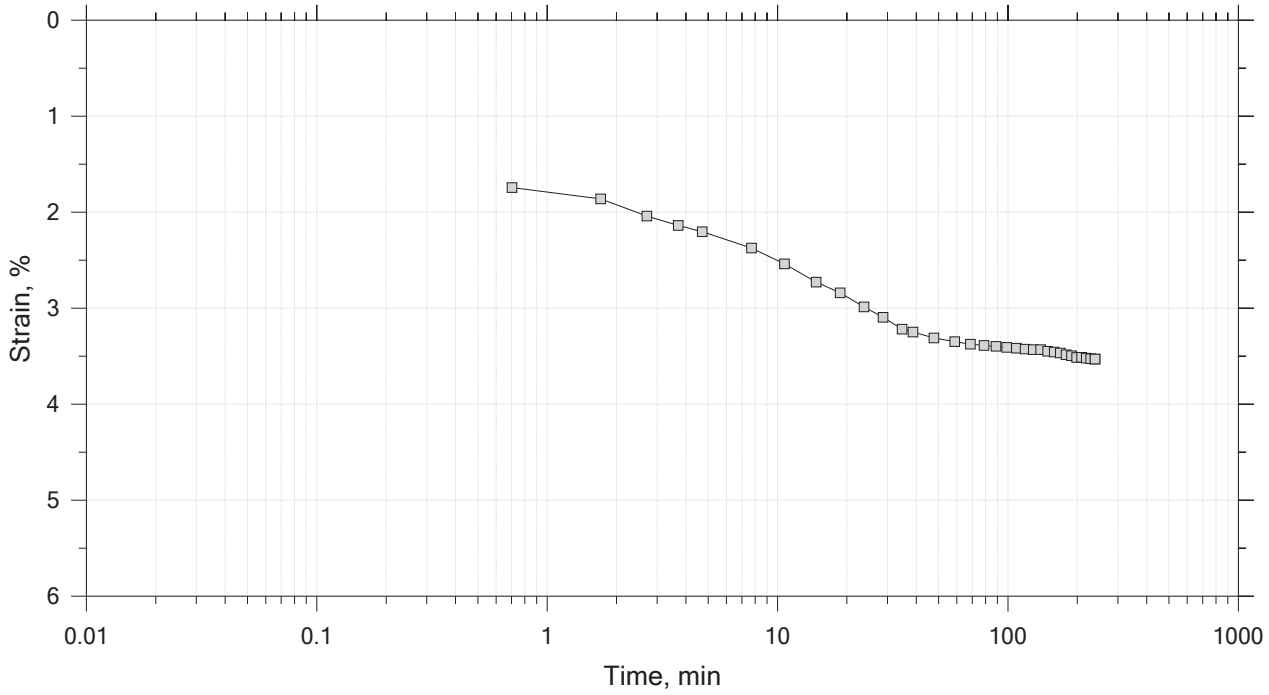


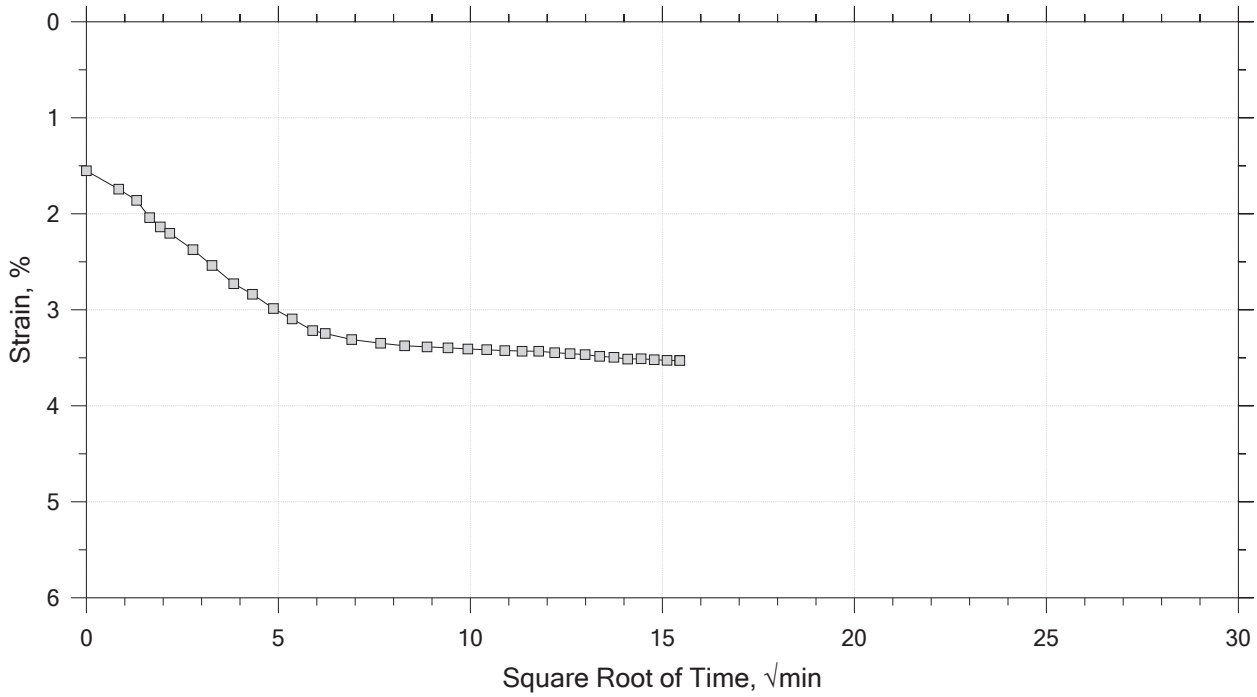


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 18
Constant Load Step
Stress: 0.125 tsf

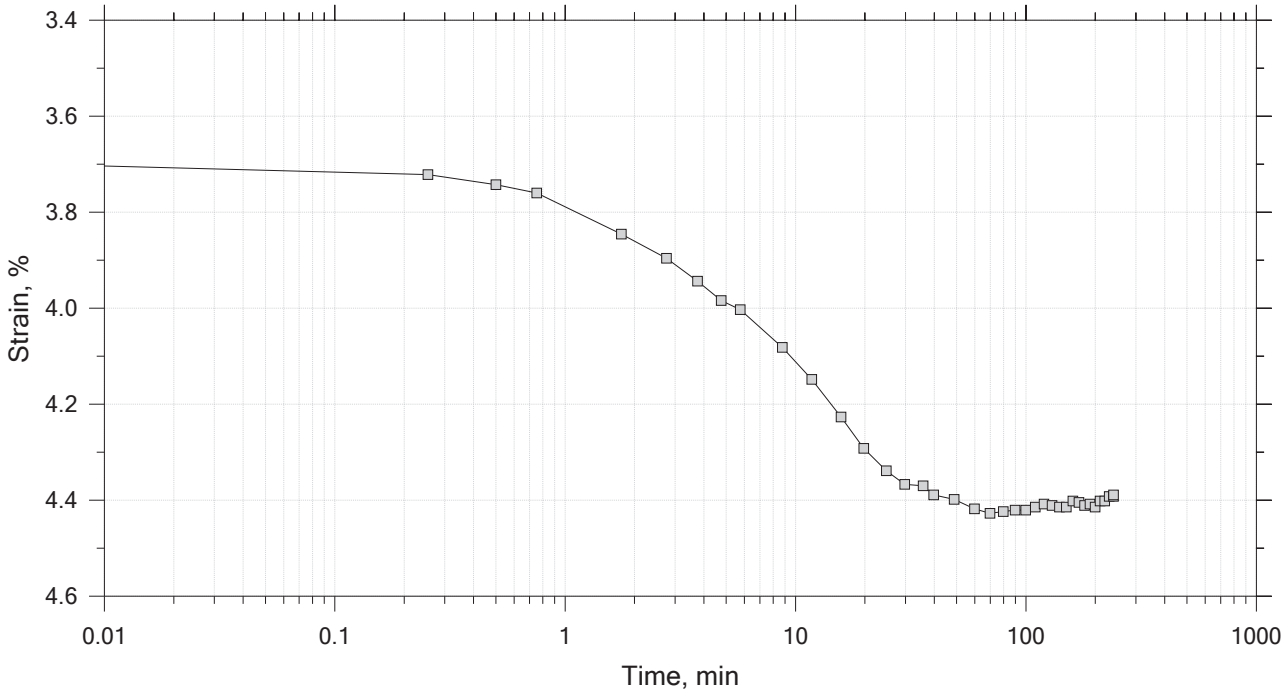


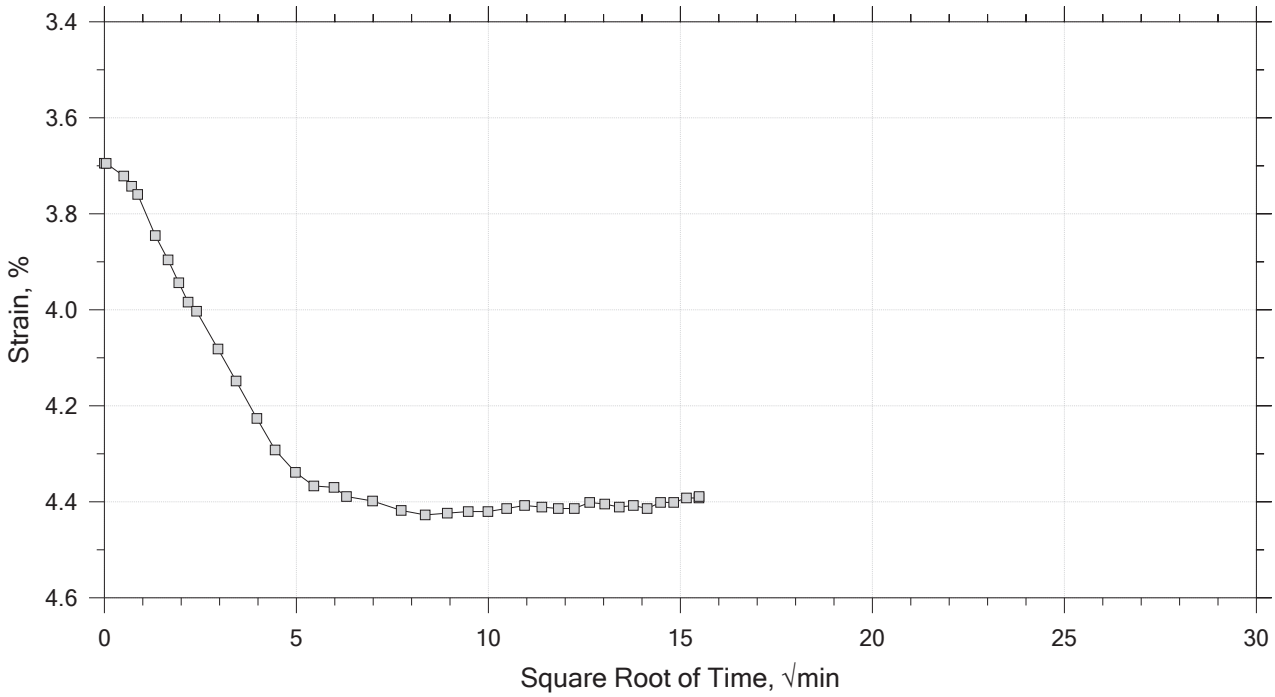


GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-20	Tested By: trm	Checked By: njh/anm
	Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Wet, olive gray clay		
	Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 18
Constant Load Step
Stress: 0.25 tsf





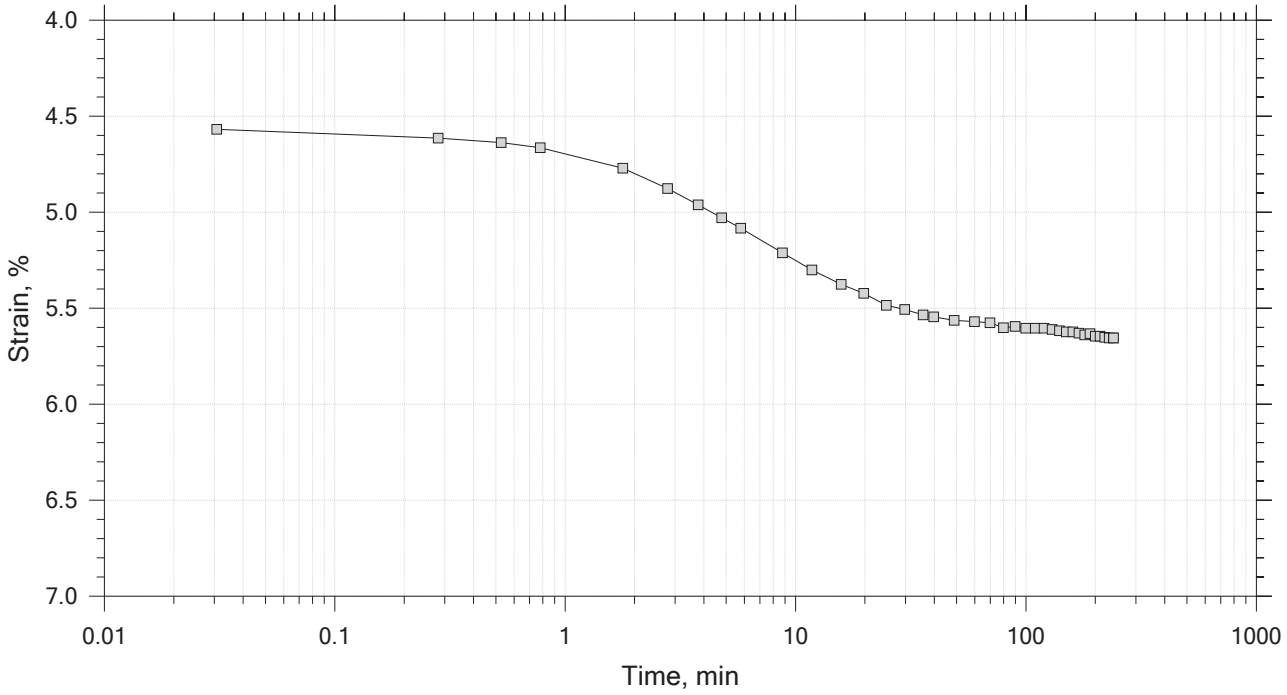
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

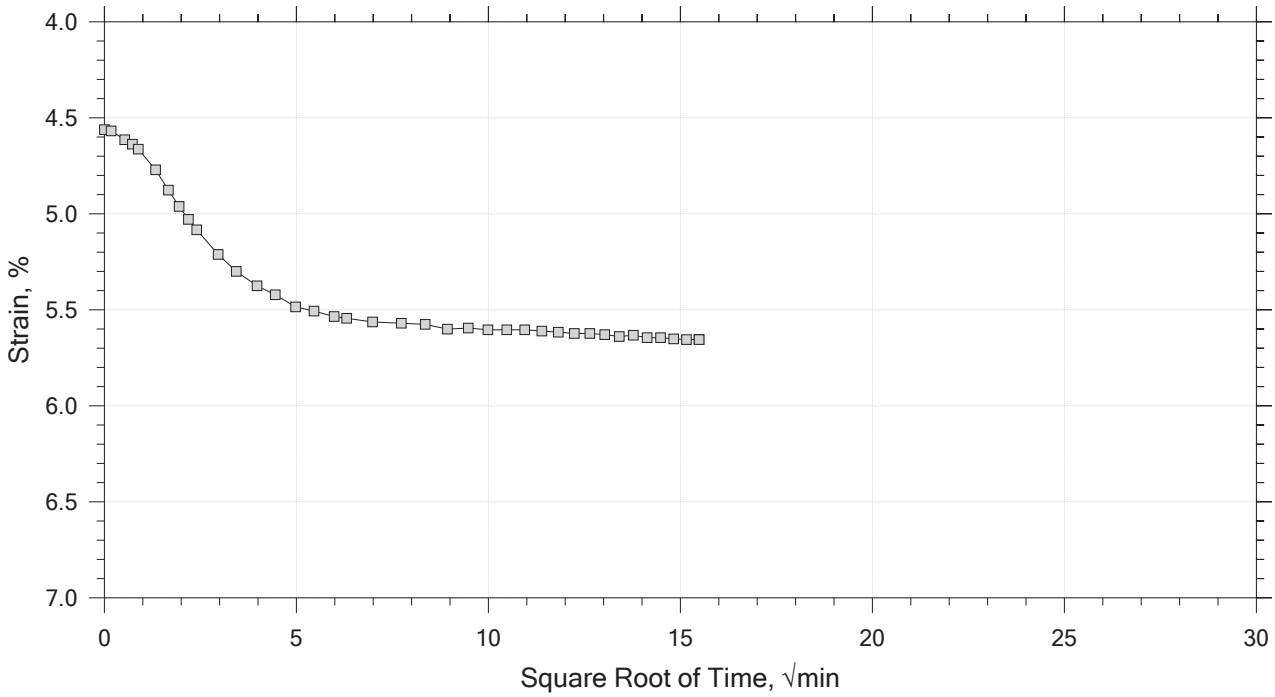
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 18

Constant Load Step

Stress: 0.5 tsf





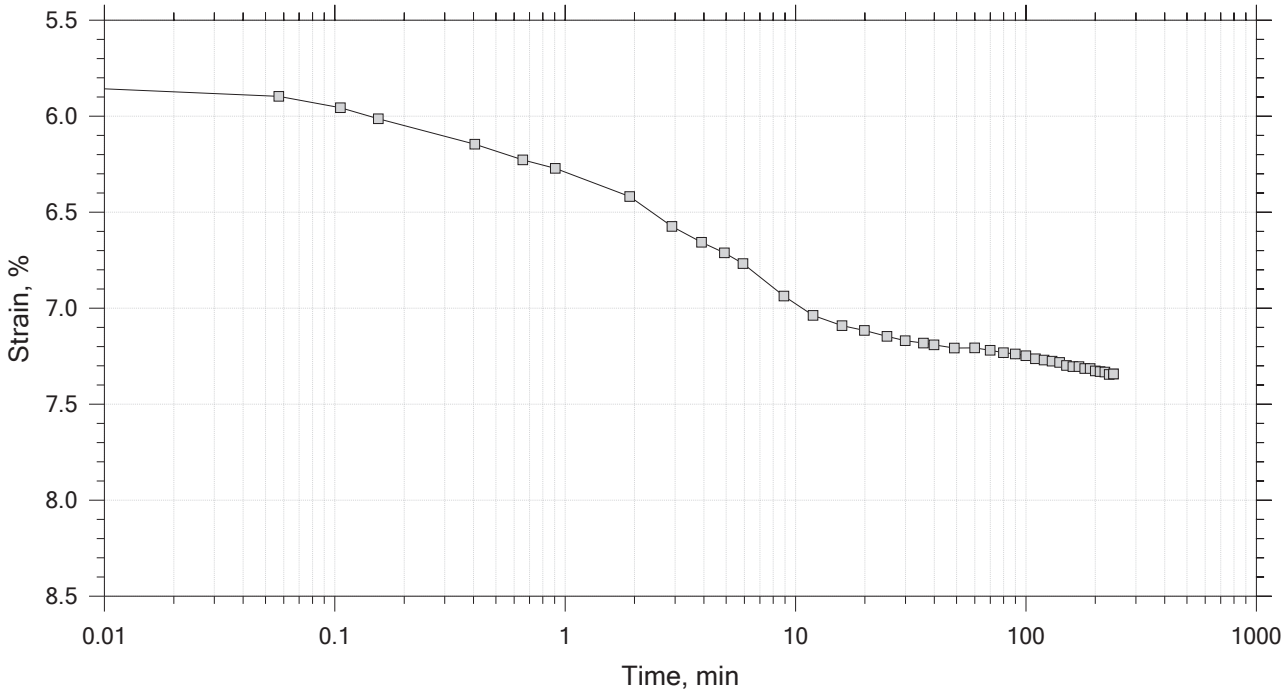
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

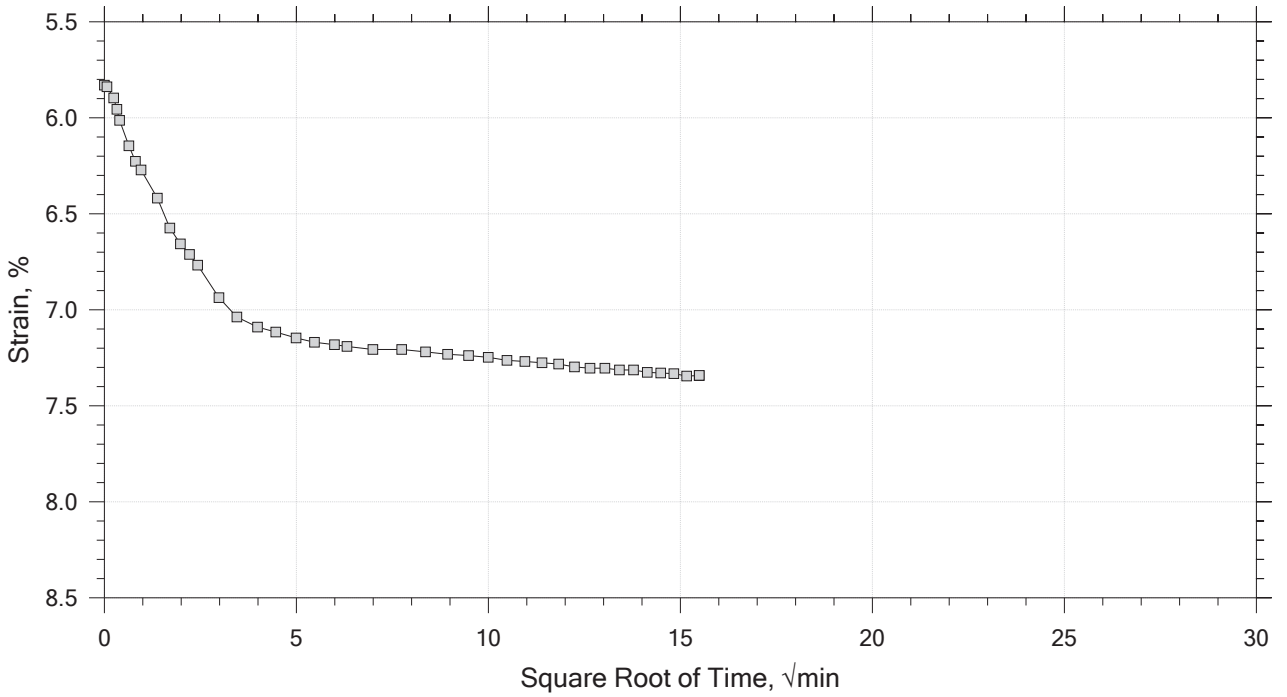
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 18

Constant Load Step

Stress: 1 tsf

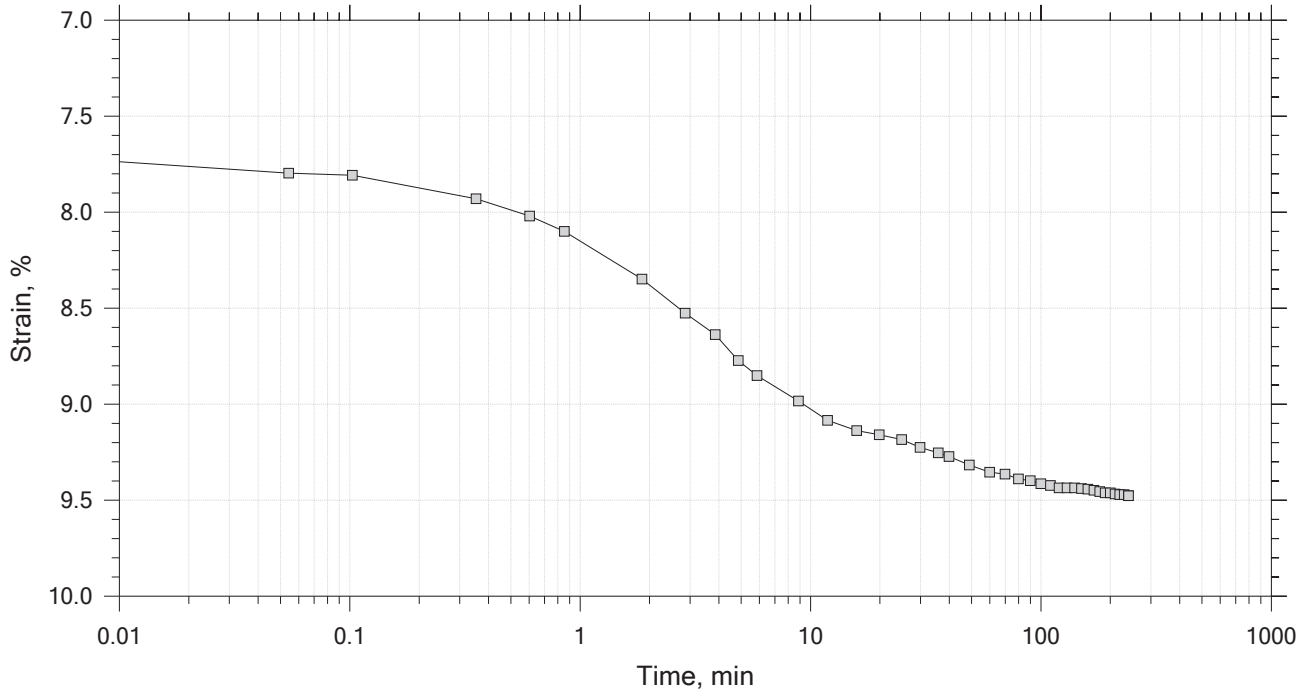


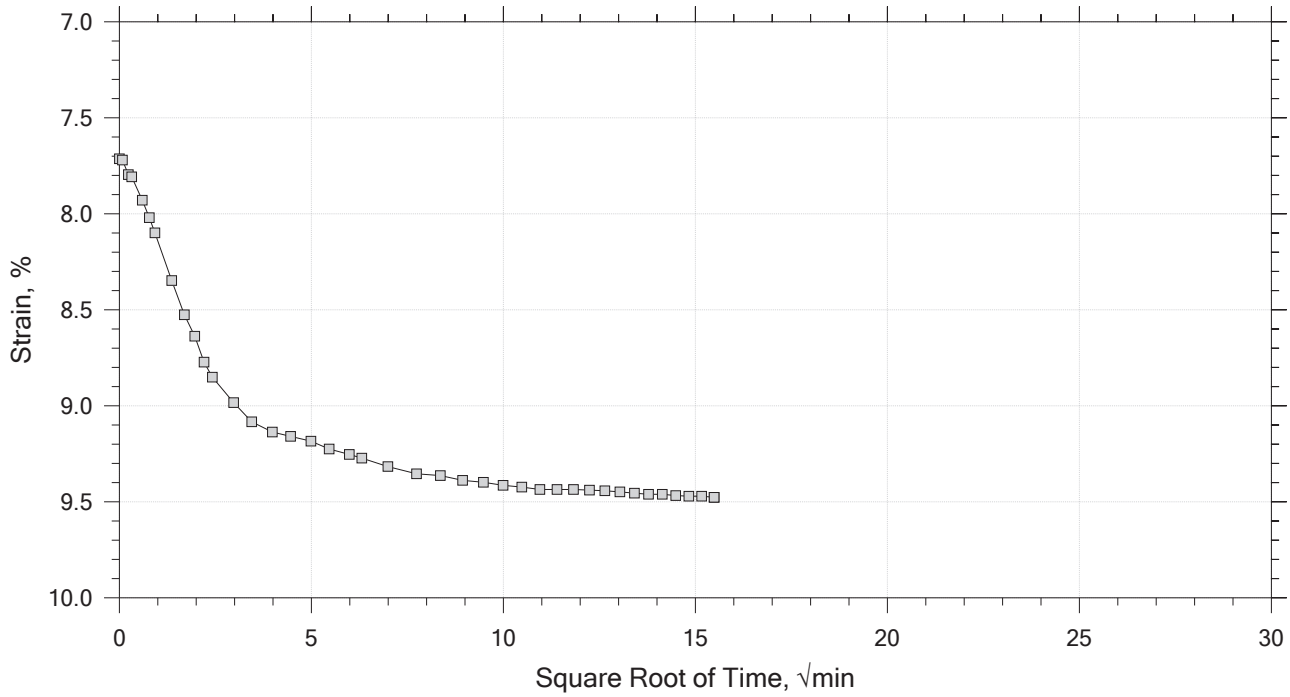


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 18
Constant Load Step
Stress: 2 tsf





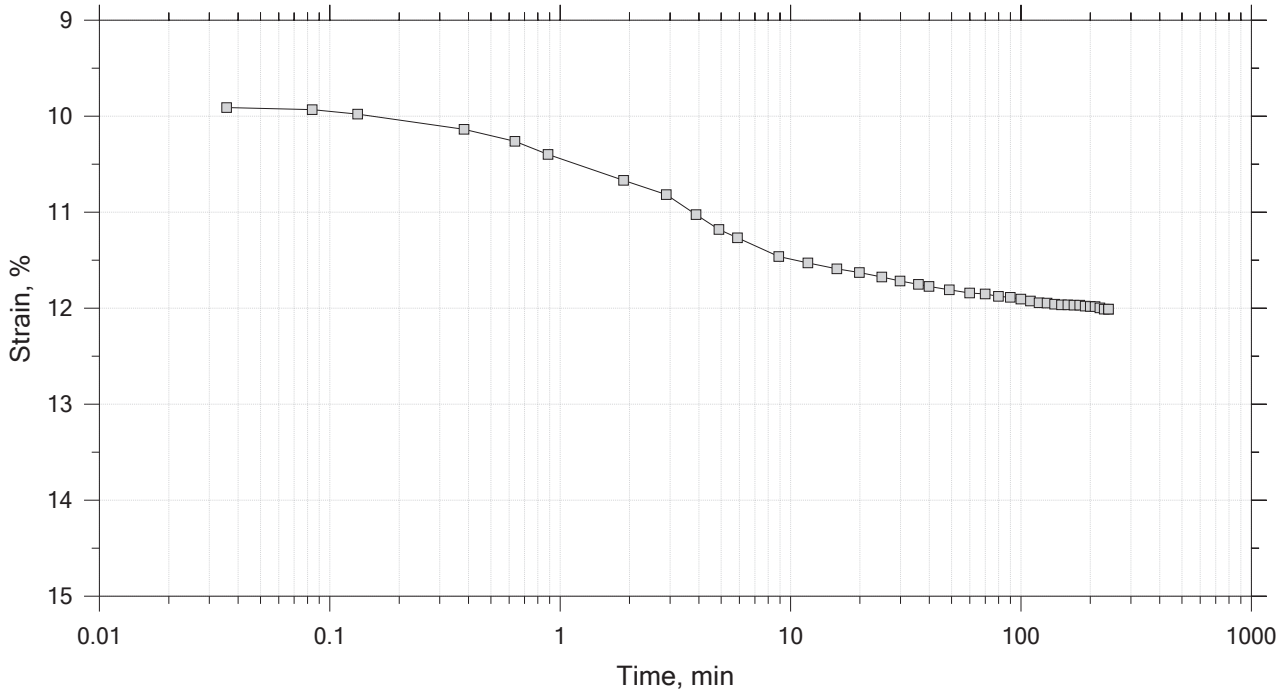
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

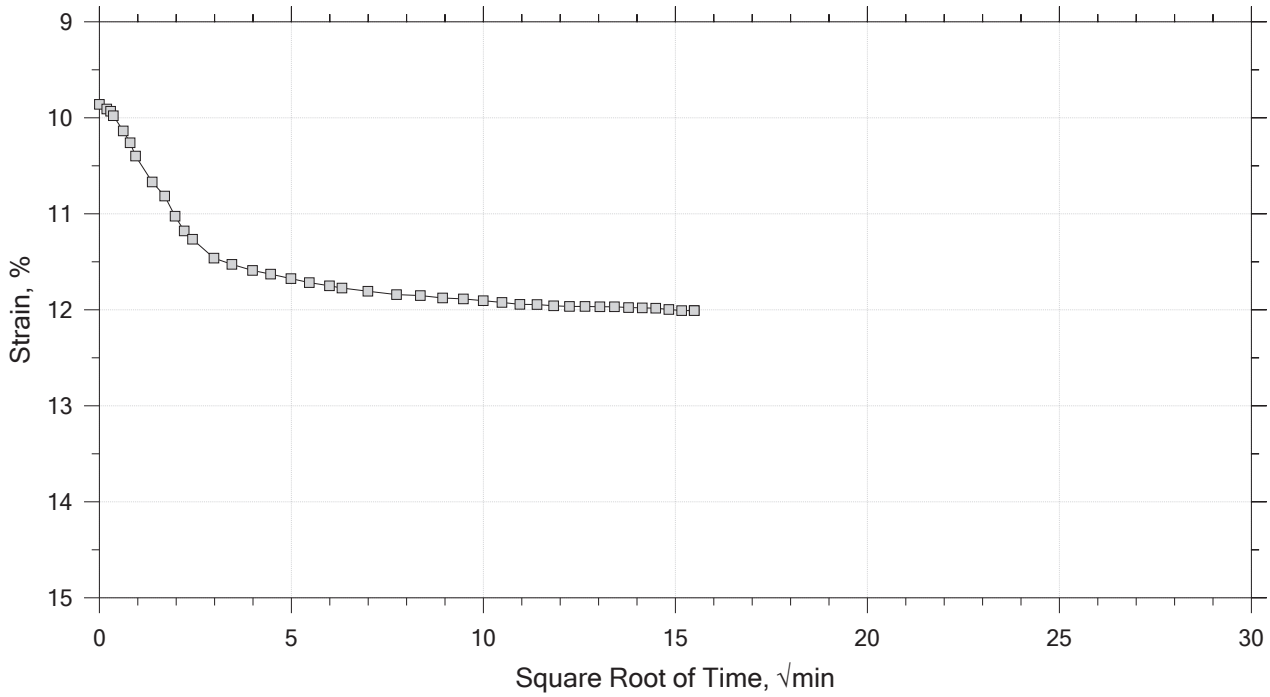
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 18

Constant Load Step

Stress: 4 tsf





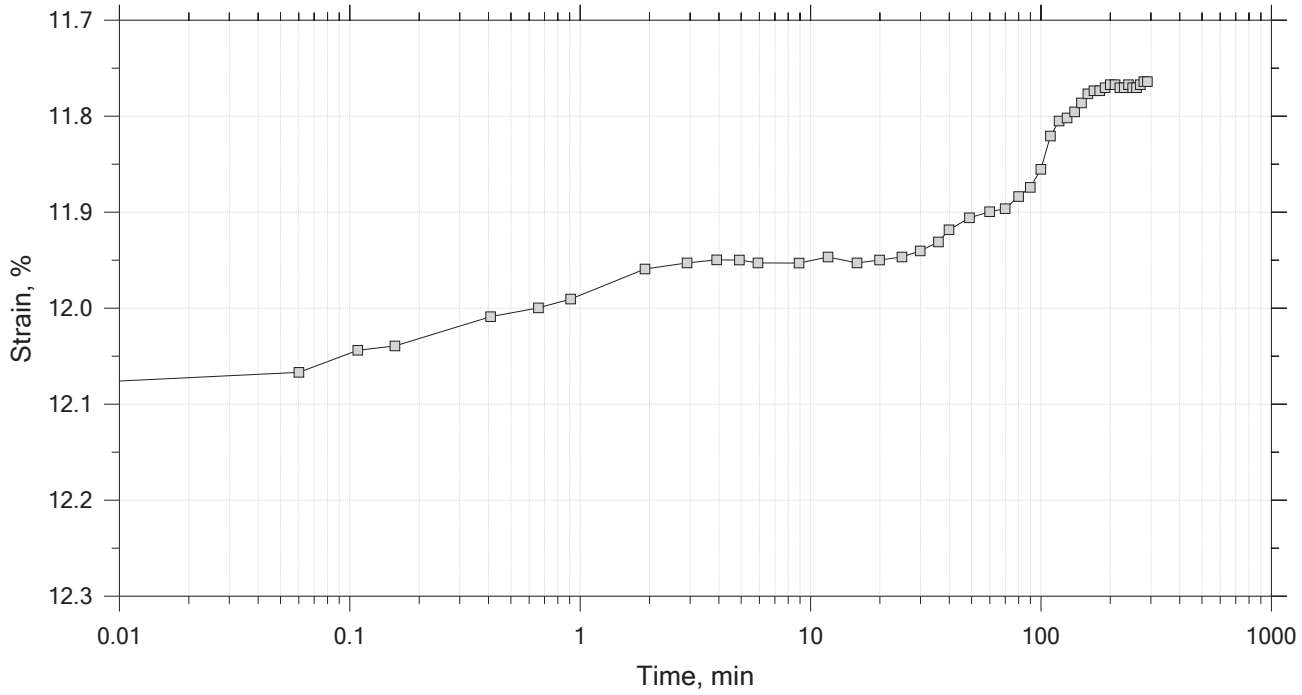
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

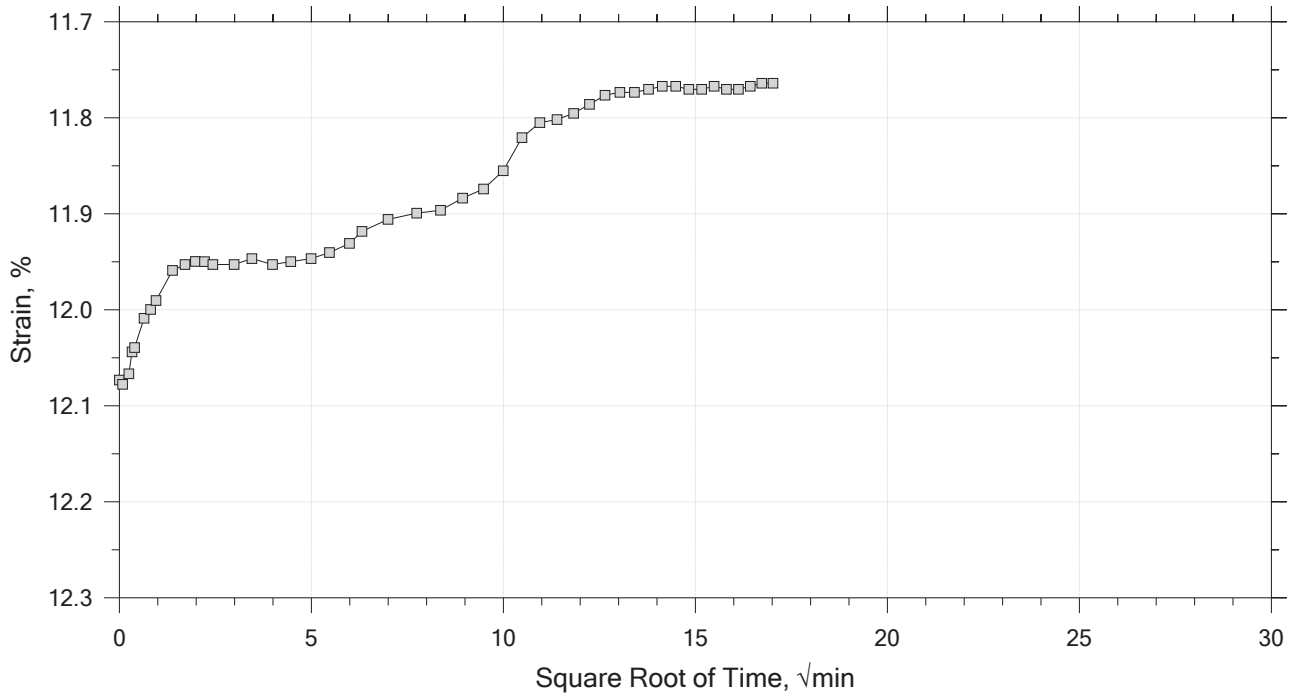
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 18

Constant Load Step

Stress: 2 tsf

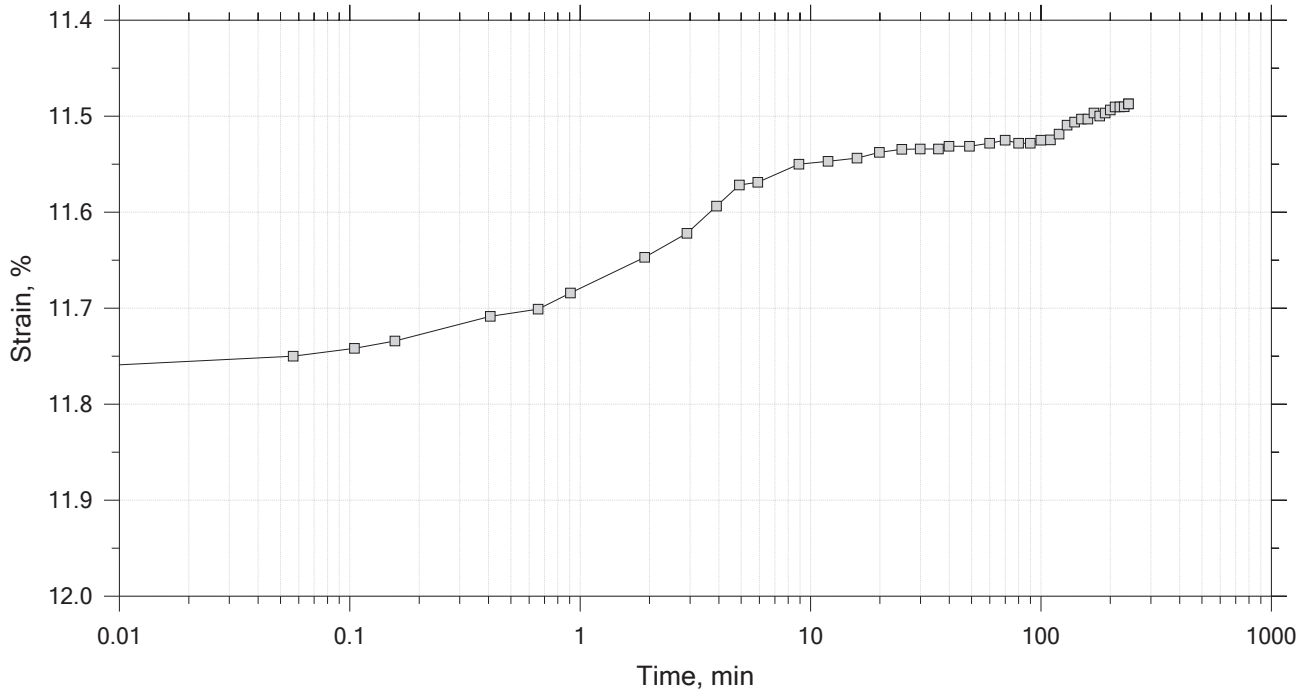


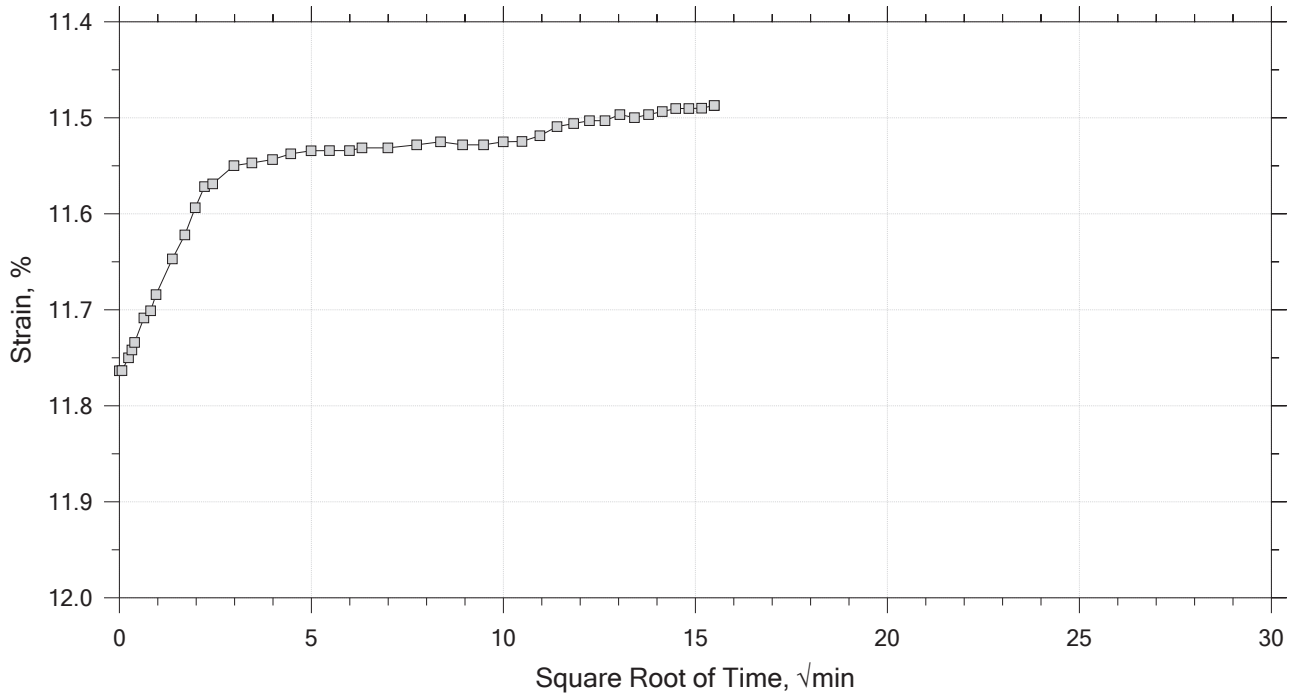


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 18
Constant Load Step
Stress: 1 tsf

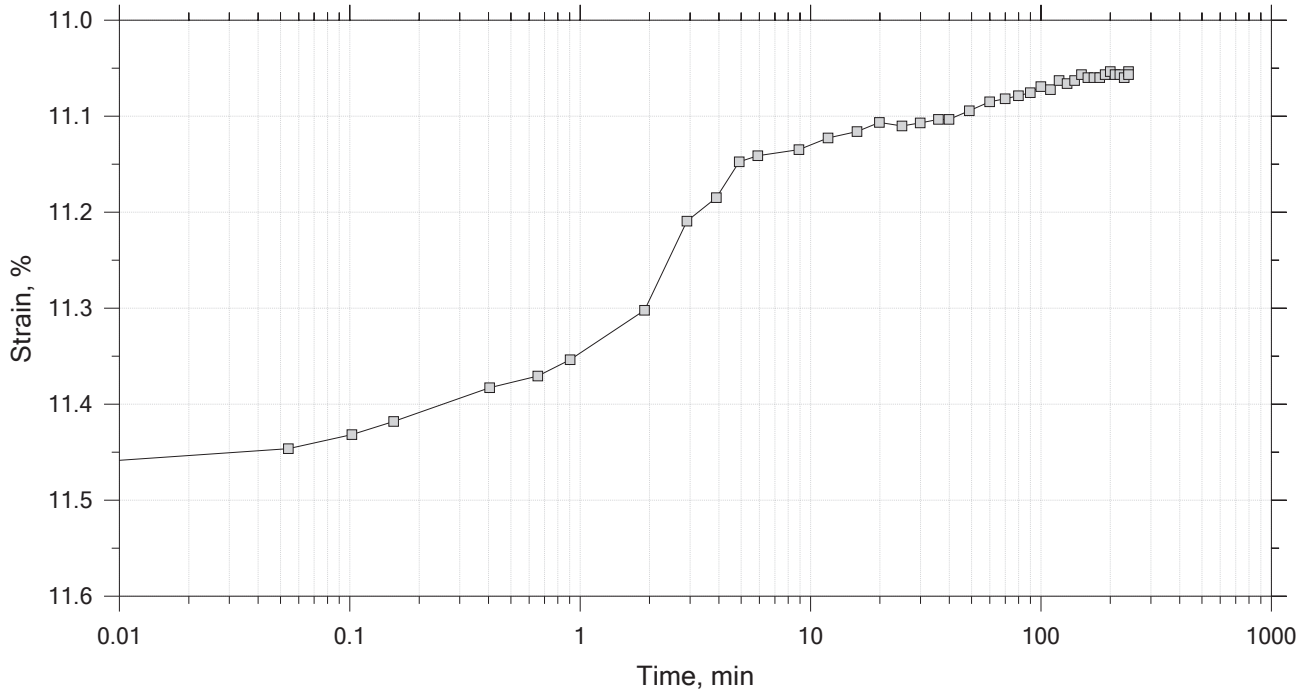


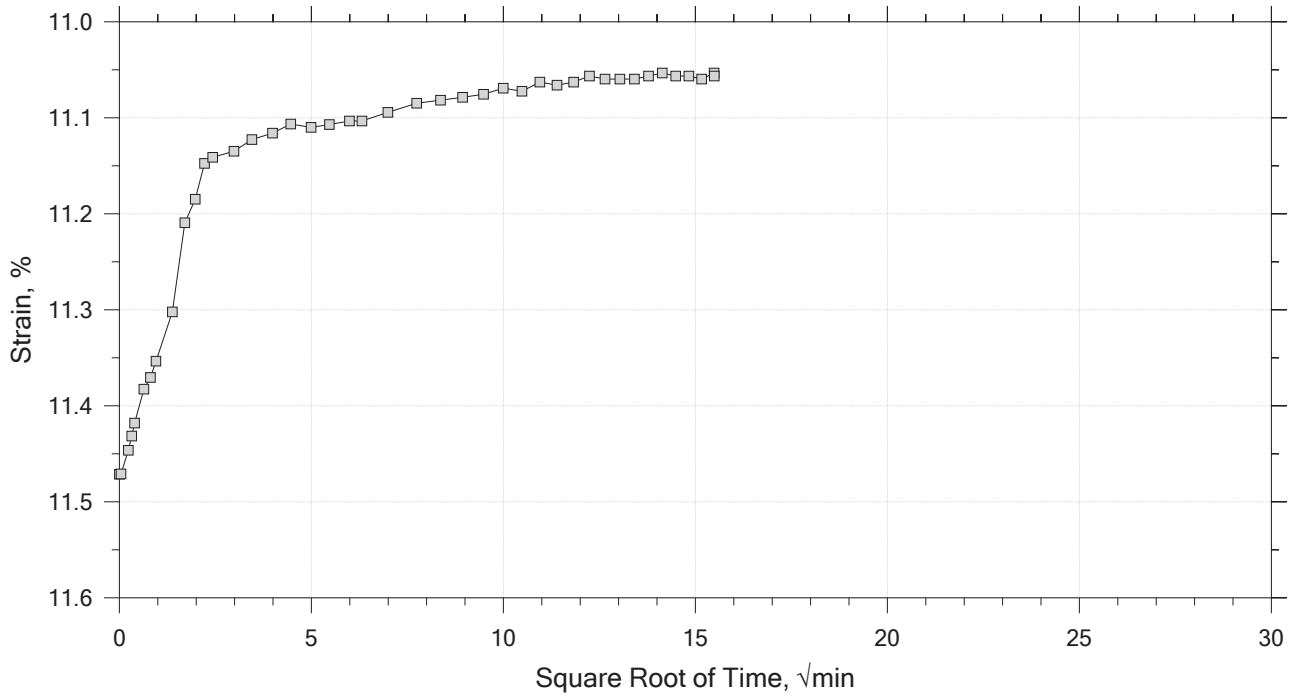


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 18
Constant Load Step
Stress: 0.5 tsf

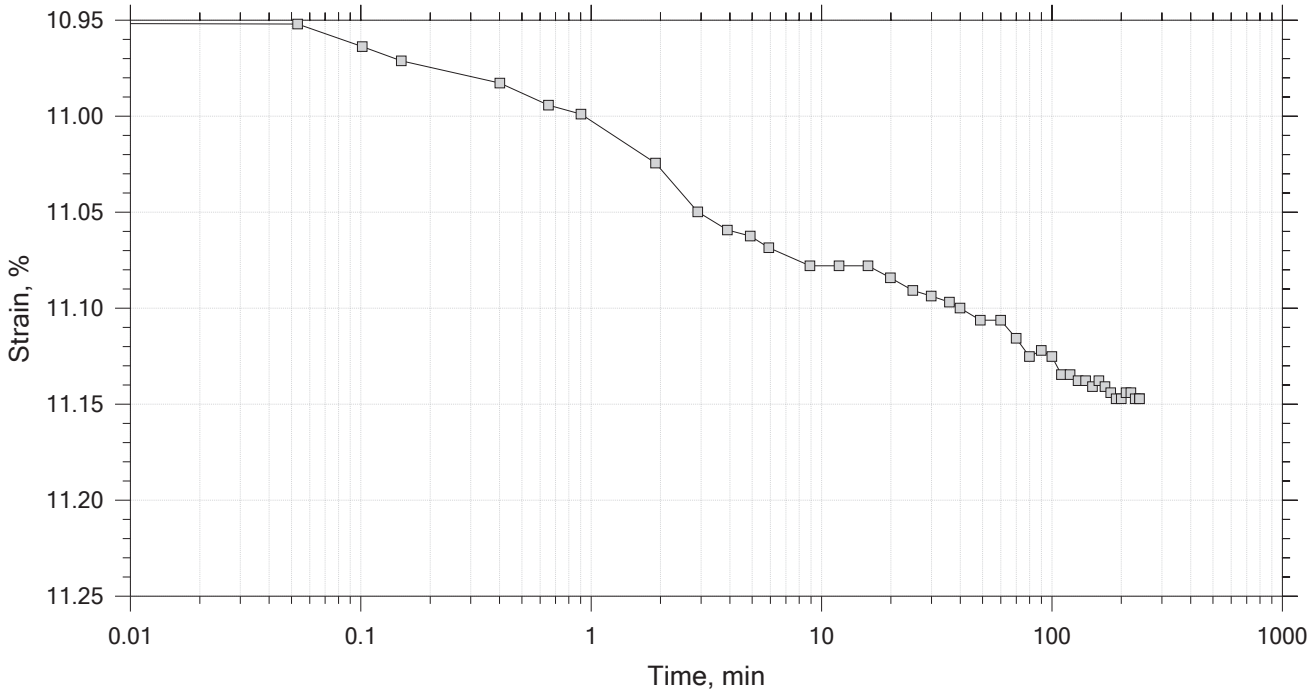


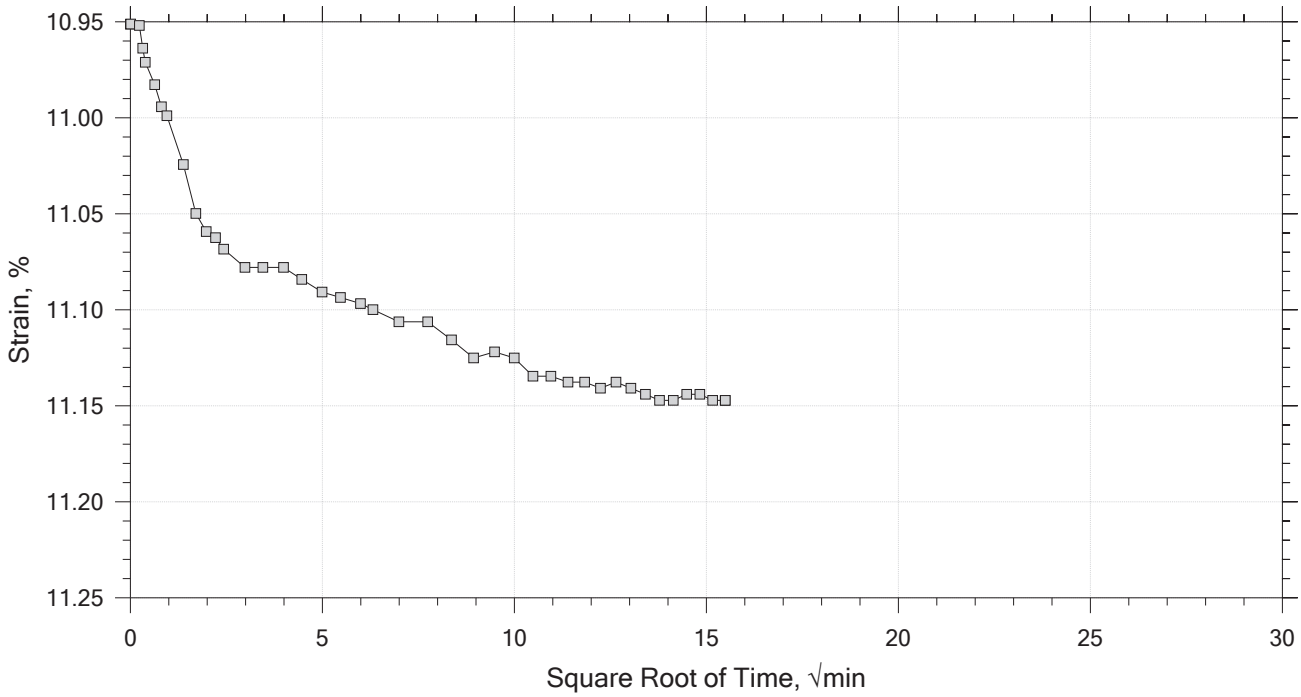


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 18
Constant Load Step
Stress: 1 tsf

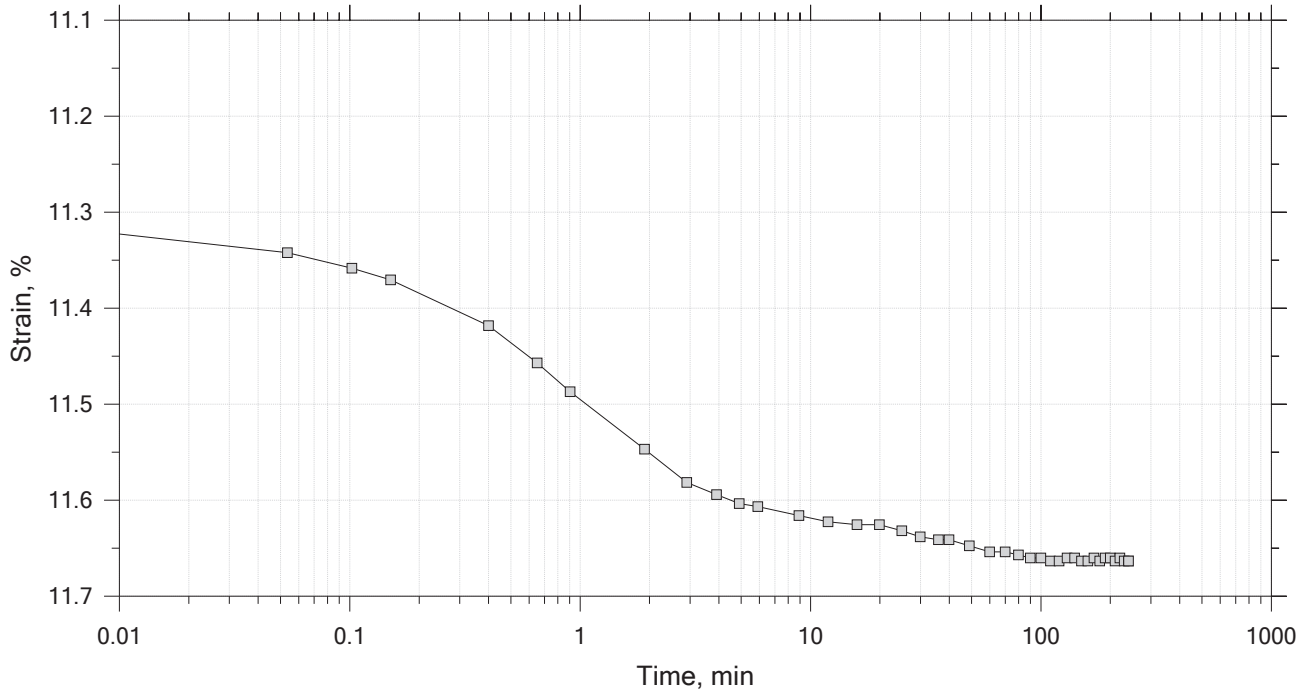


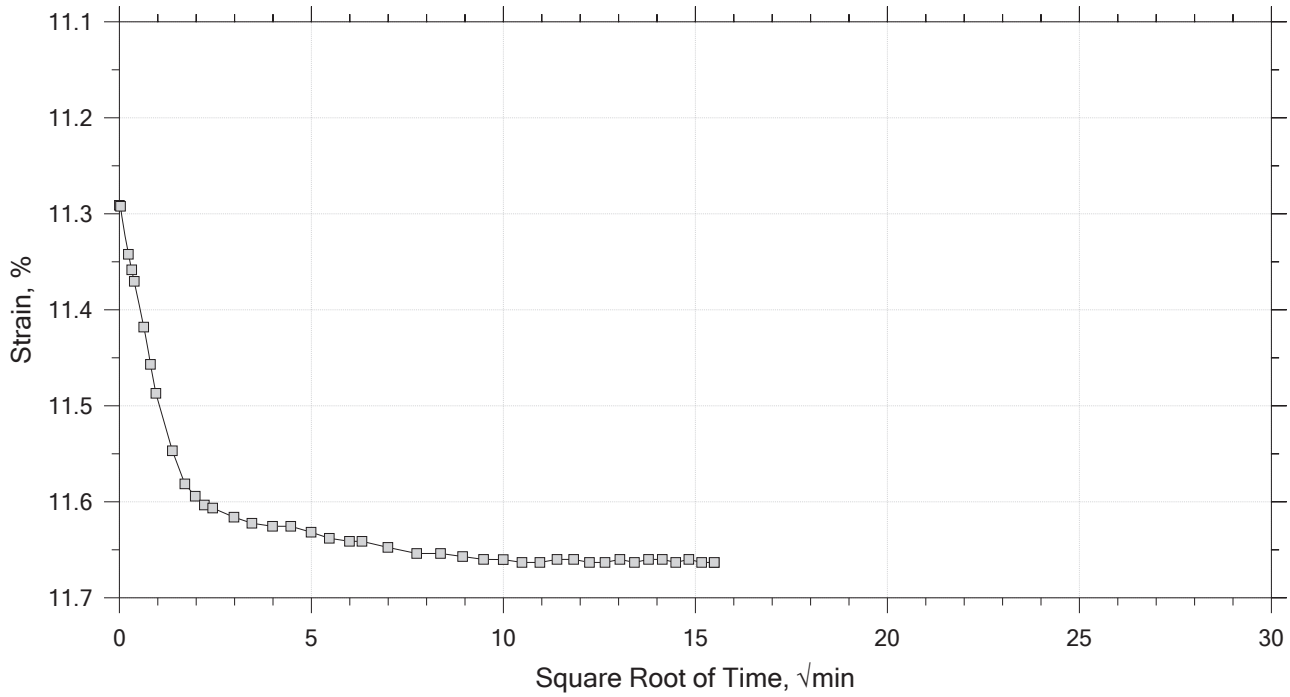


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 18
Constant Load Step
Stress: 2 tsf

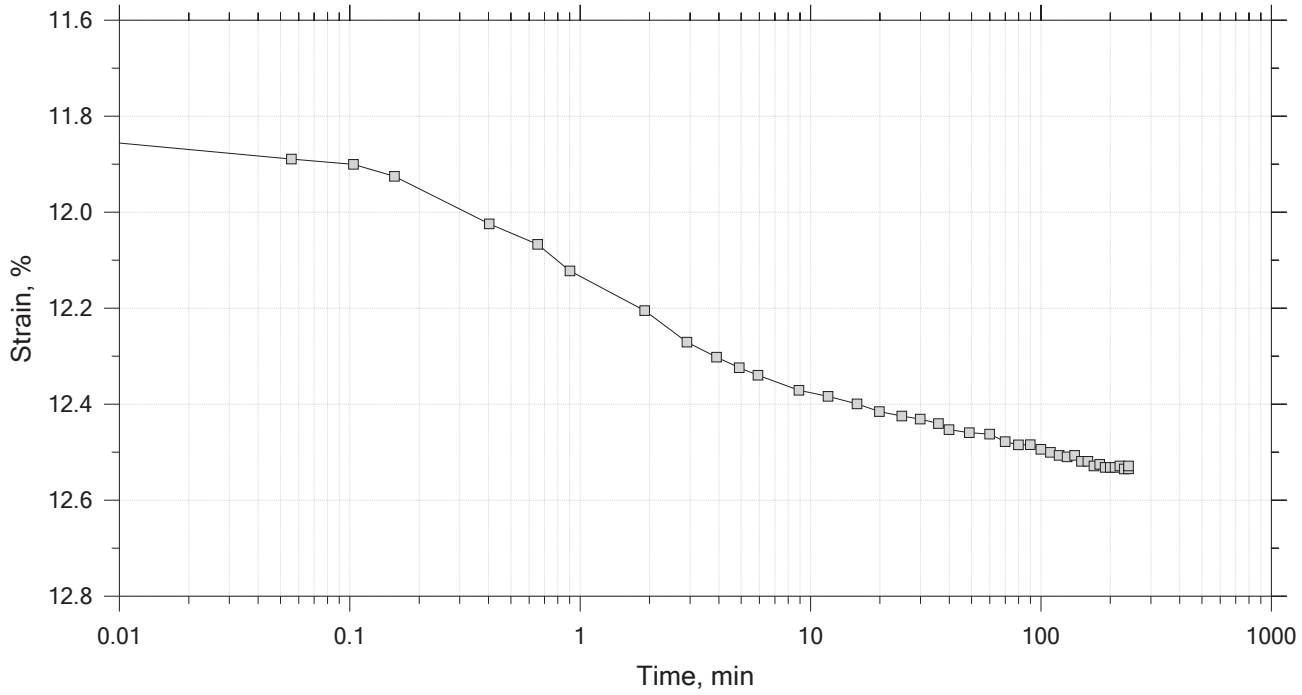


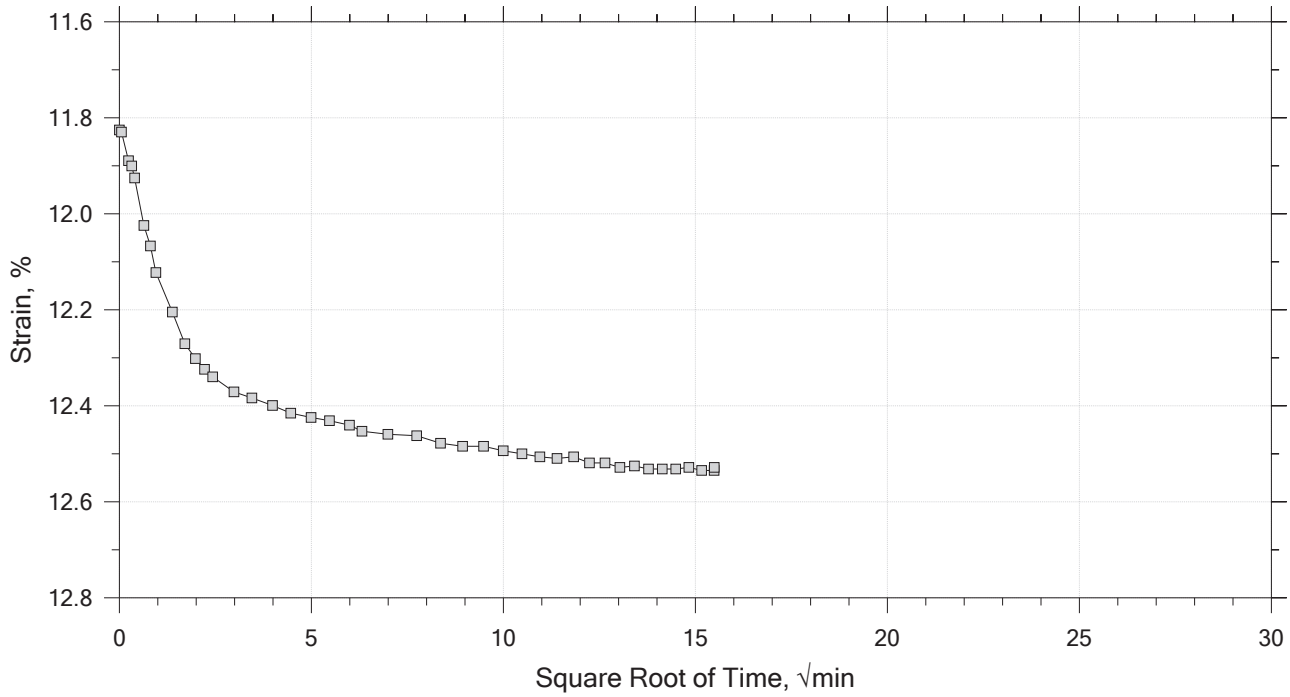


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 18
Constant Load Step
Stress: 4 tsf

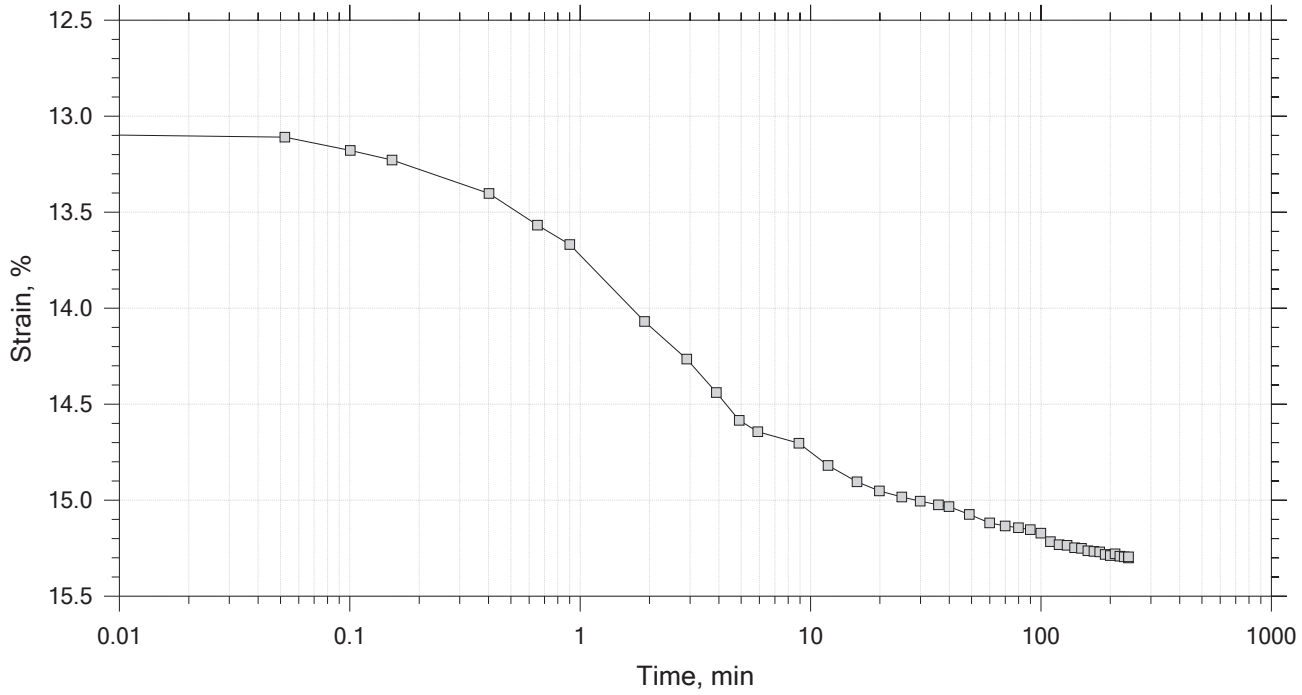


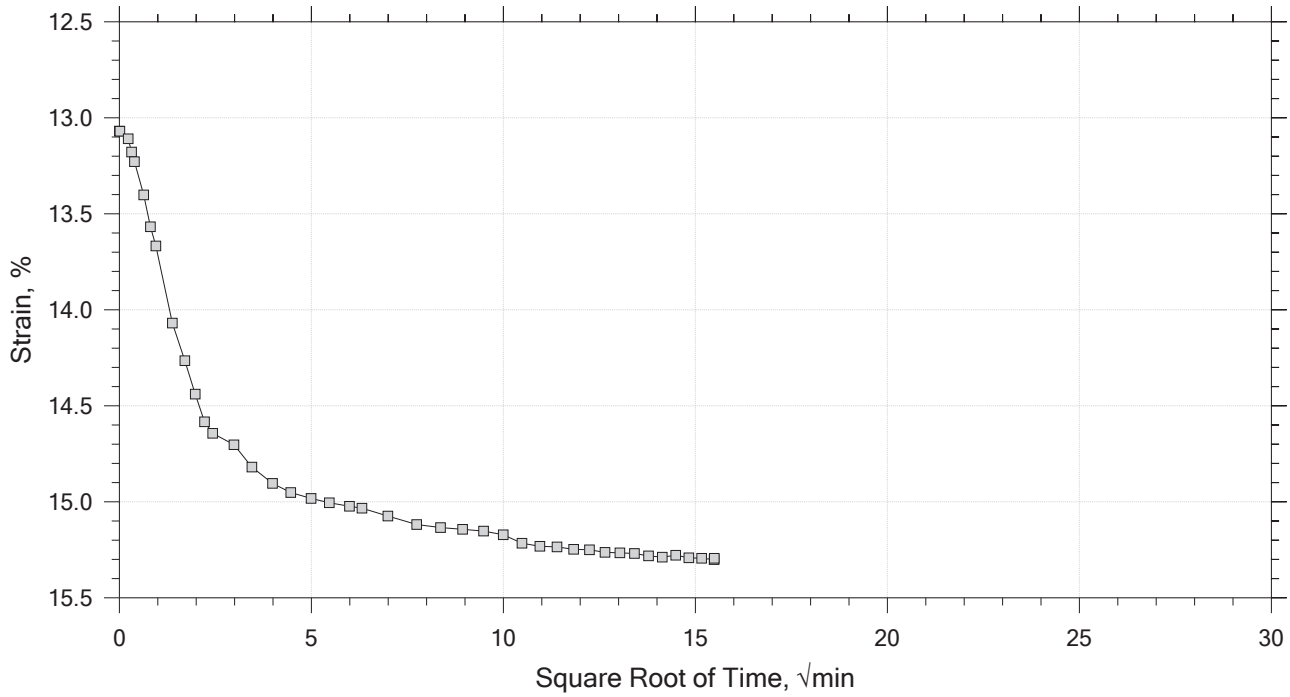


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 18
Constant Load Step
Stress: 8 tsf

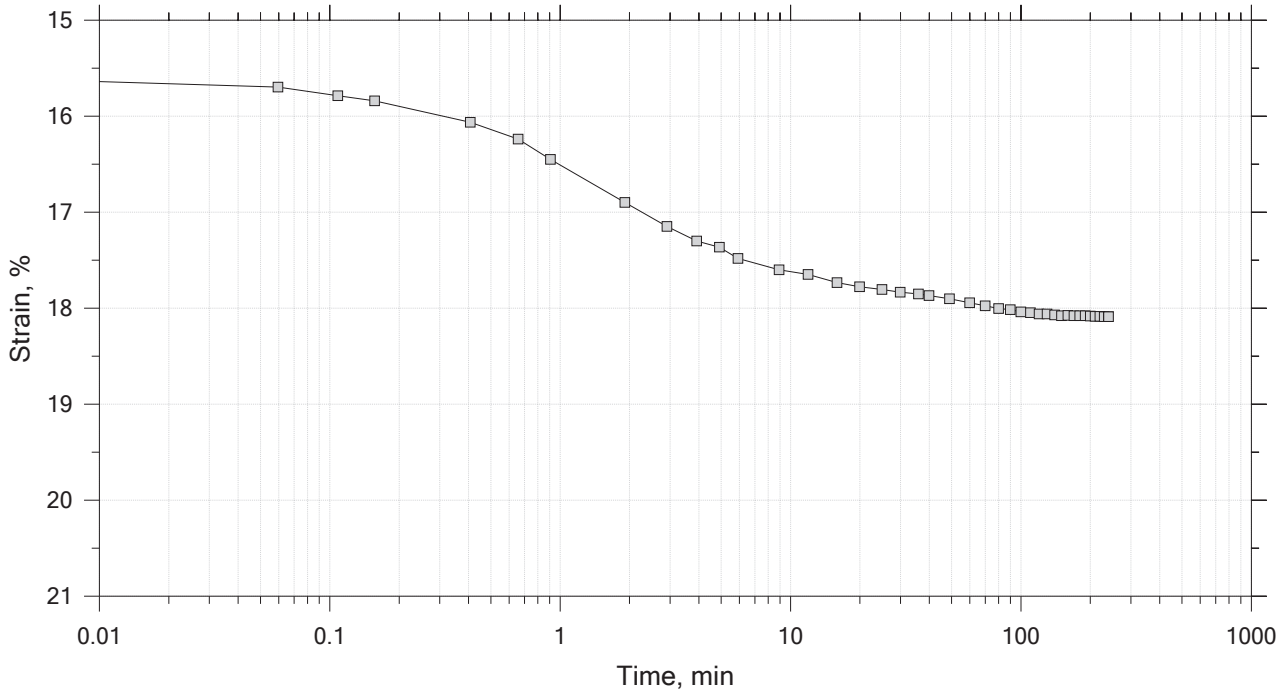


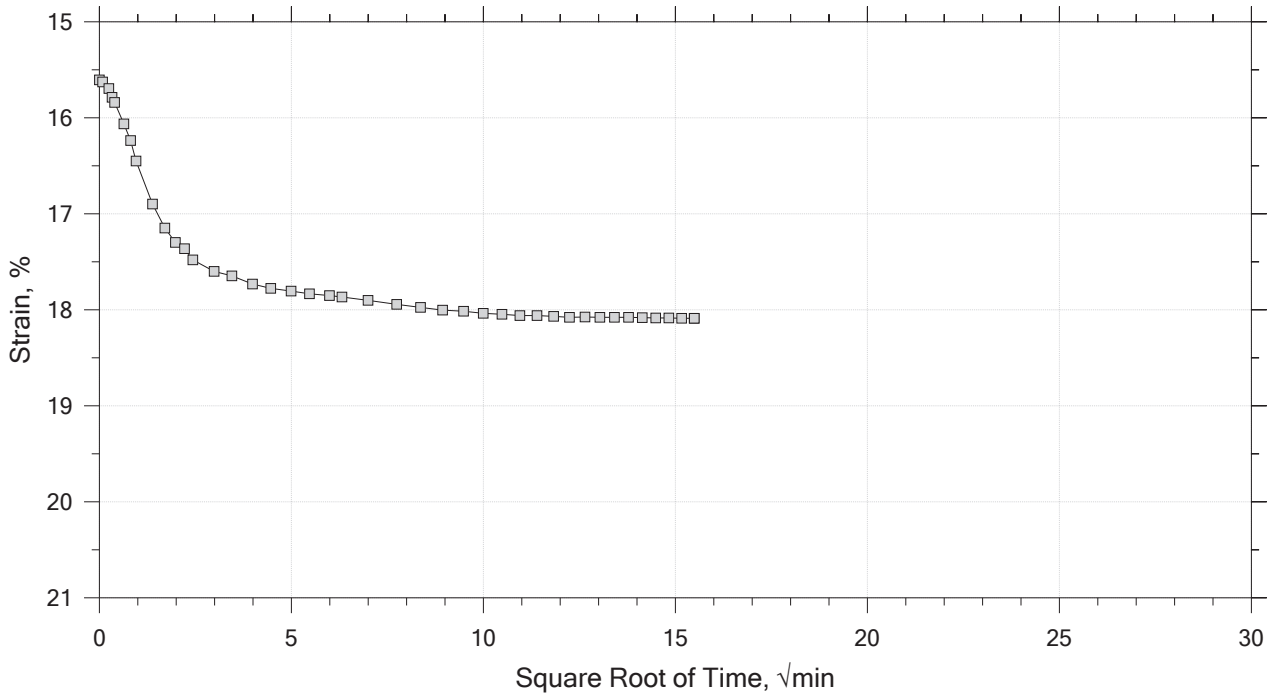


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 18
Constant Load Step
Stress: 16 tsf

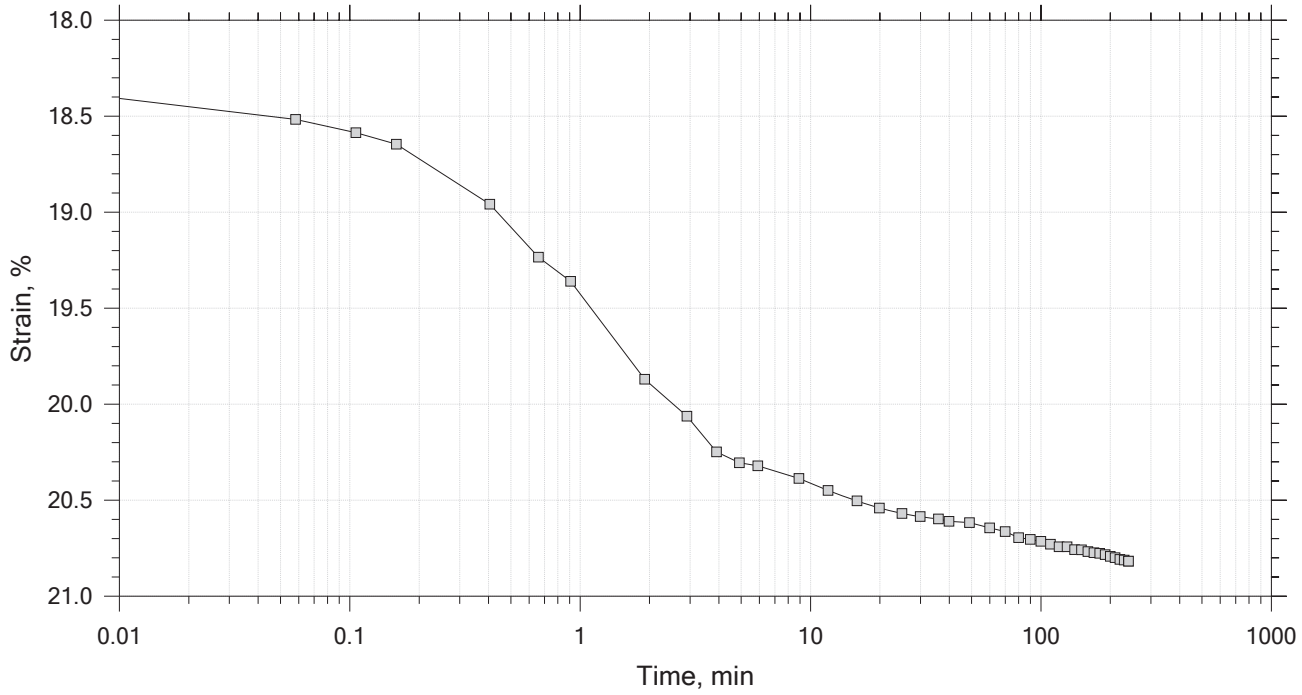


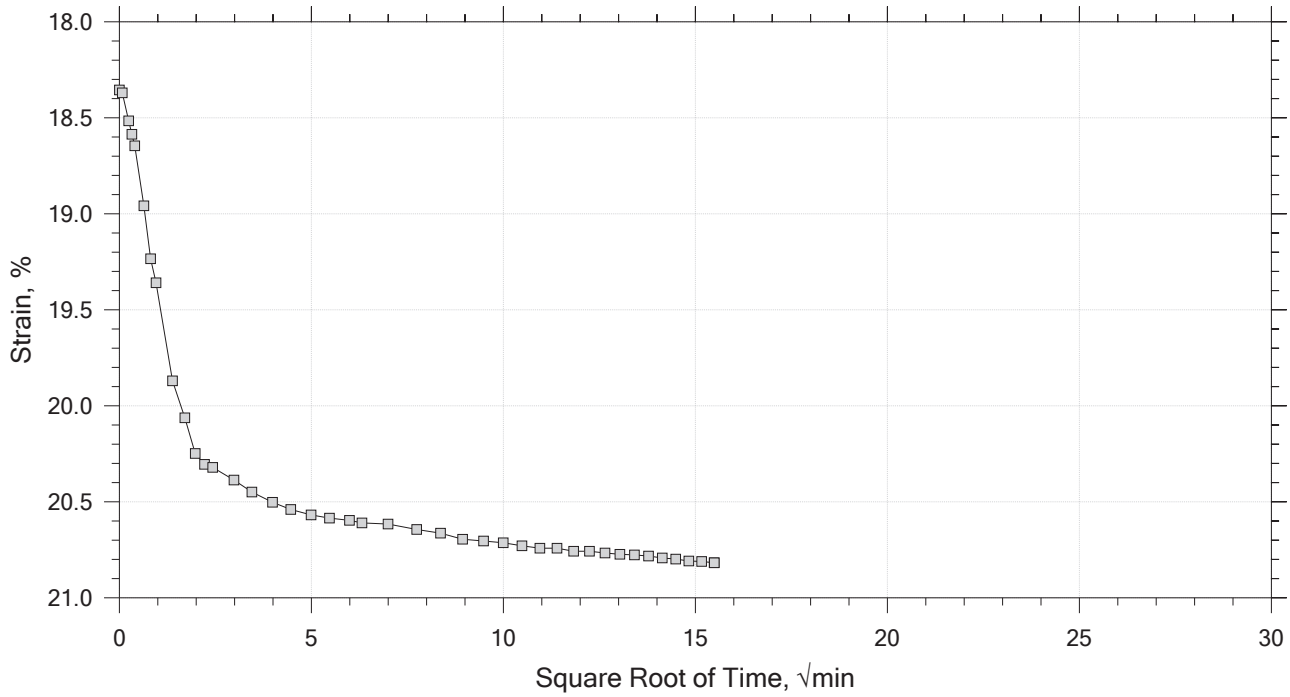


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 18
Constant Load Step
Stress: 32 tsf

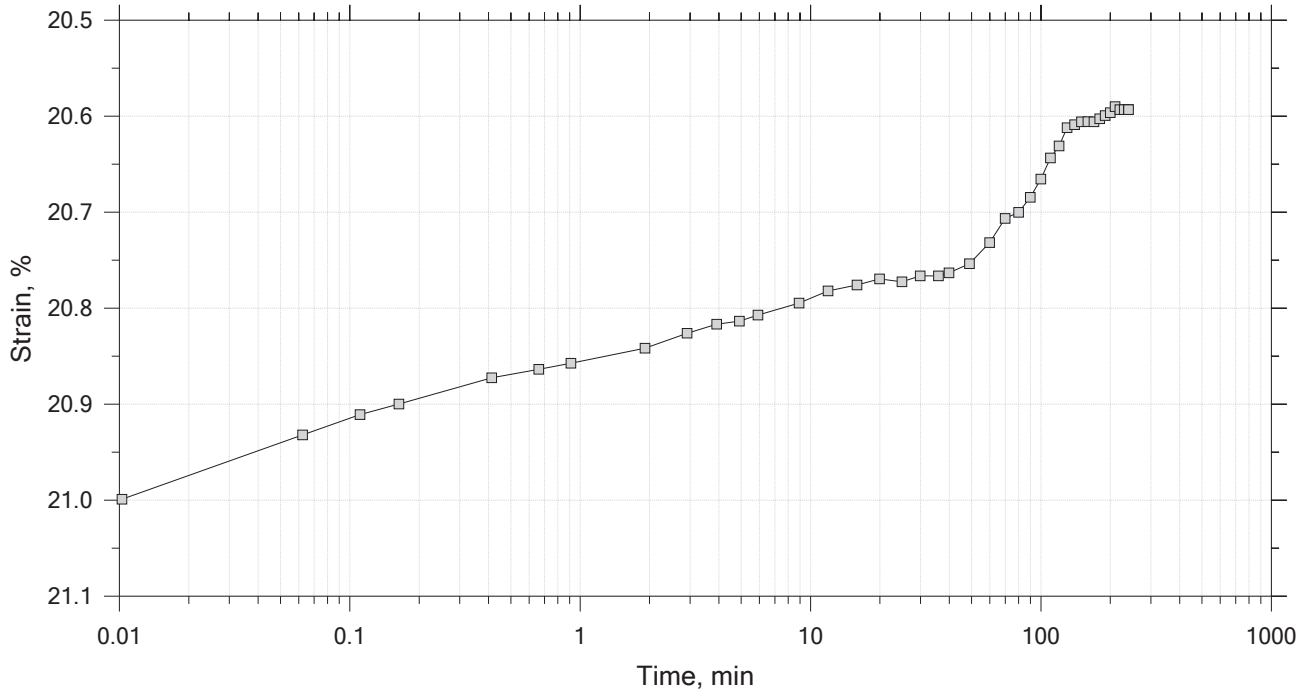


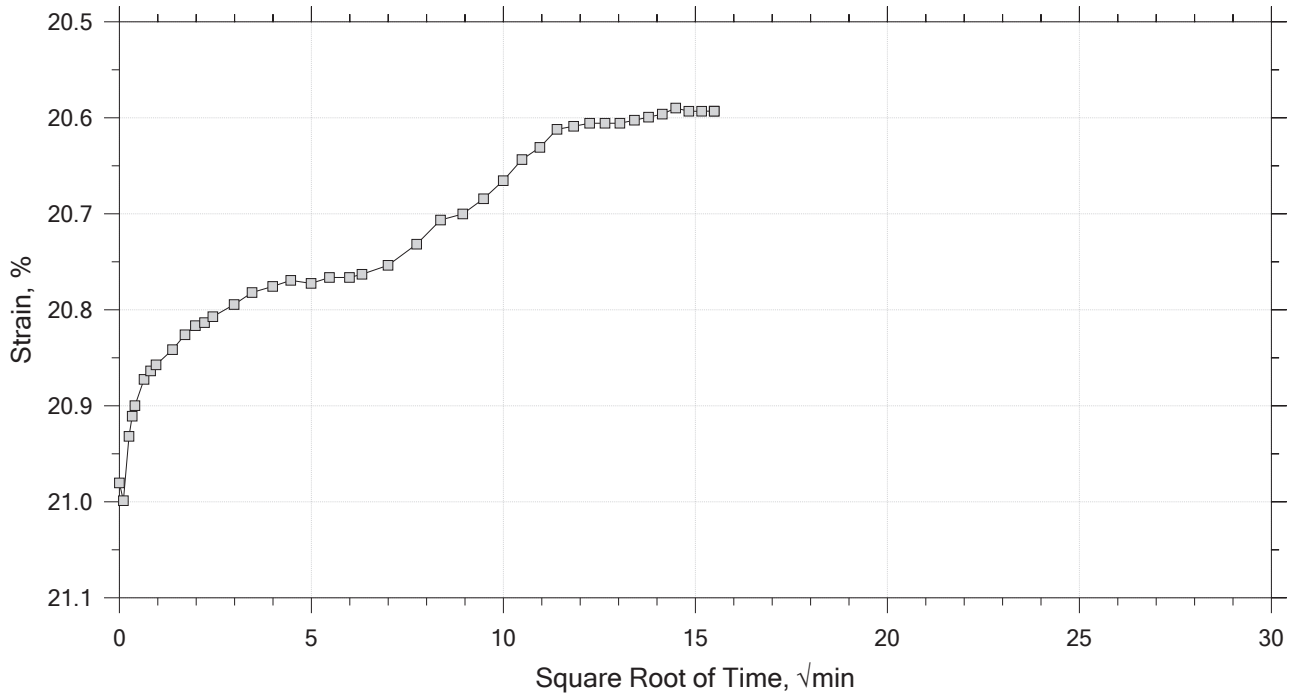


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 16 of 18
Constant Load Step
Stress: 8 tsf

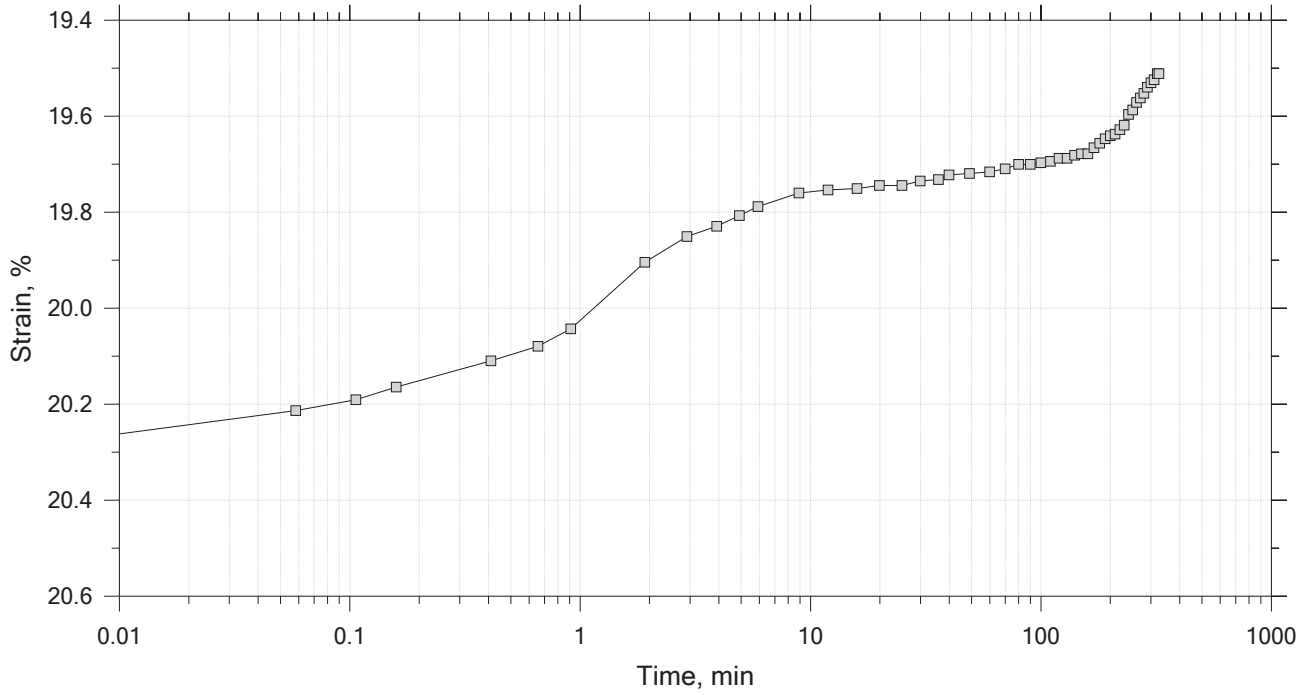


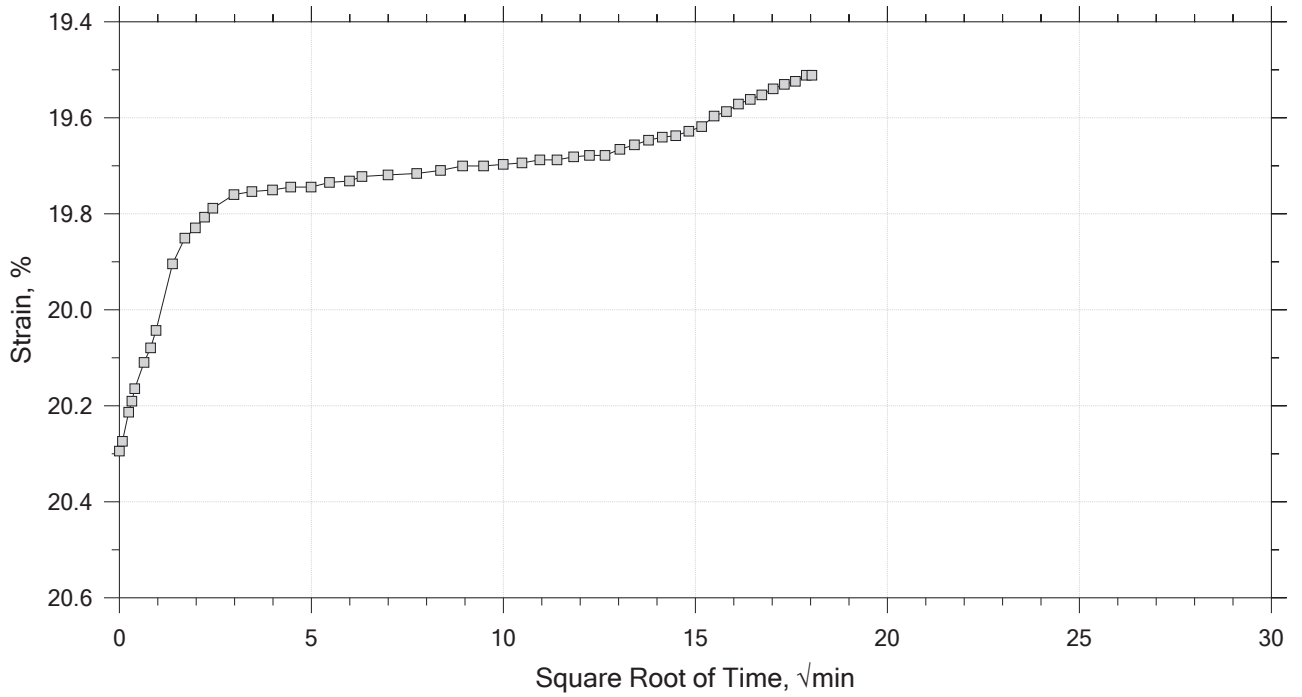


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 17 of 18
Constant Load Step
Stress: 2 tsf

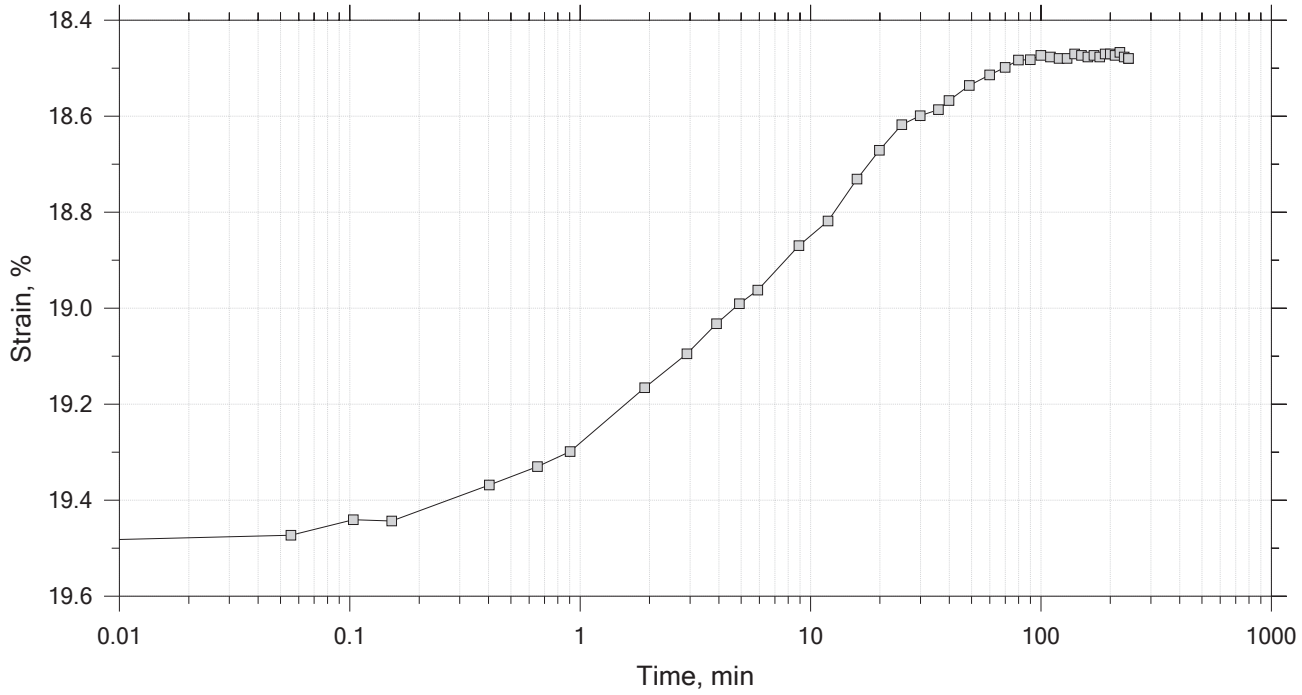


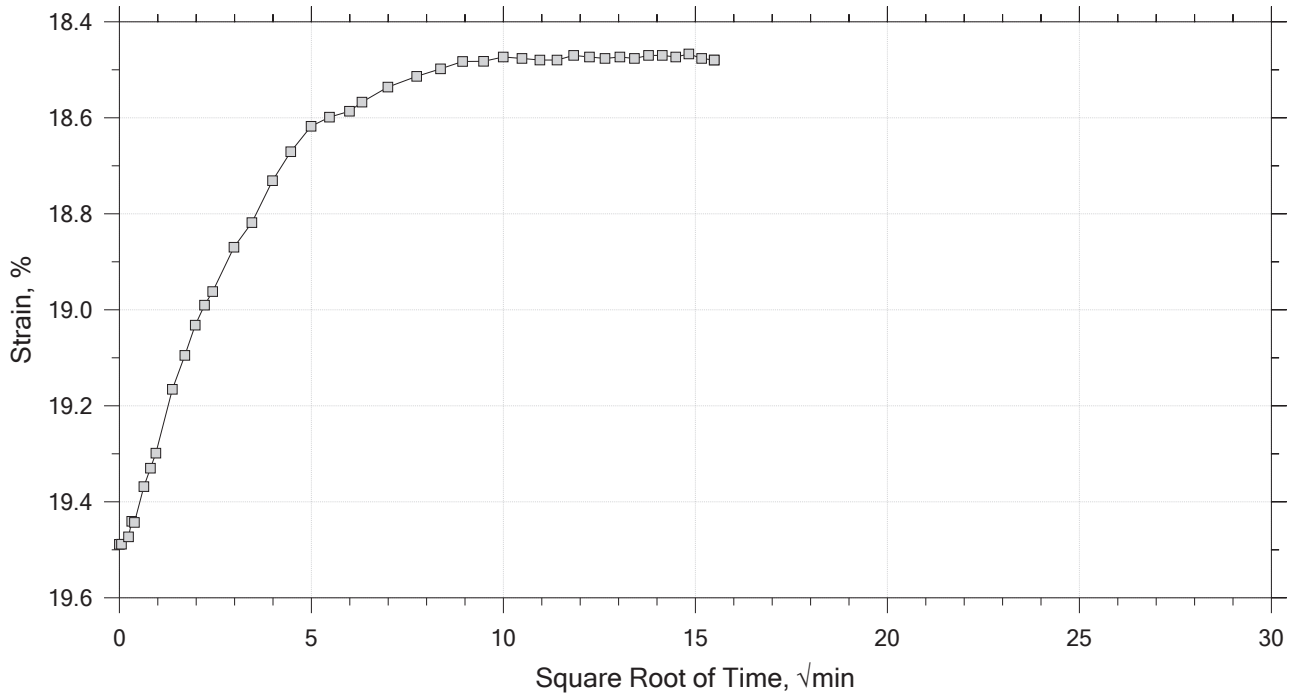


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 18 of 18
Constant Load Step
Stress: 0.5 tsf





Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-20	Tested By: trm	Checked By: njh/anm
Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
Test No.: IP-1	Sample Type: intact	Elevation: ---
Description: Wet, olive gray clay		
Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.68	Liquid Limit: 31
Initial Height: 1.00 in	Initial Void Ratio: 0.753	Plastic Limit: 18
Final Height: 0.85 in	Final Void Ratio: 0.49	Plasticity Index: 13

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	B2443	RING		C-191
Mass Container, gm	9.12	108.76	108.76	11.13
Mass Container + Wet Soil, gm	142	266.01	254.07	152.84
Mass Container + Dry Soil, gm	105.62	231.58	231.58	130.91
Mass Dry Soil, gm	96.5	122.82	122.82	119.78
Water Content, %	37.70	28.03	18.31	18.31
Void Ratio	---	0.75	0.49	---
Degree of Saturation, %	---	99.64	100.00	---
Dry Unit Weight, pcf	---	95.321	112.14	---

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.

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-20	Tested By: trm	Checked By: njh/anm
	Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Wet, olive gray clay		
	Remarks: System LTIII-A		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.125	0.03529	0.691	3.53	12.523	4.39e-07	2.82e-01	3.34e-04	0.00e+00
2	0.250	0.04389	0.676	4.39	0.000	0.00e+00	6.88e-02	0.00e+00	0.00e+00
3	0.500	0.05655	0.654	5.65	4.760	1.08e-06	5.06e-02	1.48e-04	0.00e+00
4	1.00	0.07342	0.624	7.34	2.388	2.09e-06	3.37e-02	1.90e-04	0.00e+00
5	2.00	0.09477	0.587	9.48	2.504	1.91e-06	2.13e-02	1.10e-04	0.00e+00
6	4.00	0.1201	0.542	12.0	2.886	1.57e-06	1.27e-02	5.37e-05	0.00e+00
7	2.00	0.1176	0.547	11.8	0.000	0.00e+00	1.23e-03	0.00e+00	0.00e+00
8	1.00	0.1149	0.552	11.5	0.000	0.00e+00	2.77e-03	0.00e+00	0.00e+00
9	0.500	0.1106	0.559	11.1	2.237	2.01e-06	8.61e-03	4.66e-05	0.00e+00
10	1.00	0.1115	0.558	11.1	0.000	0.00e+00	1.81e-03	0.00e+00	0.00e+00
11	2.00	0.1166	0.549	11.7	0.000	0.00e+00	5.16e-03	0.00e+00	0.00e+00
12	4.00	0.1253	0.533	12.5	1.105	3.99e-06	4.33e-03	4.65e-05	0.00e+00
13	8.00	0.1529	0.485	15.3	1.827	2.31e-06	6.92e-03	4.31e-05	0.00e+00
14	16.0	0.1809	0.436	18.1	1.403	2.82e-06	3.49e-03	2.65e-05	0.00e+00
15	32.0	0.2082	0.388	20.8	1.249	2.96e-06	1.71e-03	1.36e-05	0.00e+00
16	8.00	0.2059	0.392	20.6	0.000	0.00e+00	9.36e-05	0.00e+00	0.00e+00
17	2.00	0.1951	0.411	19.5	0.000	0.00e+00	1.80e-03	0.00e+00	0.00e+00
18	0.500	0.1848	0.429	18.5	0.000	0.00e+00	6.88e-03	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-20	Tested By: trm	Checked By: njh/anm
	Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Wet, olive gray clay		
	Remarks: System LTIII-A		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.125	0.03529	0.691	3.53	55.882	4.24e-07	2.82e-01	3.23e-04
2	0.250	0.04389	0.676	4.39	38.856	5.82e-07	6.88e-02	1.08e-04
3	0.500	0.05655	0.654	5.65	25.822	8.57e-07	5.06e-02	1.17e-04
4	1.00	0.07342	0.624	7.34	9.094	2.36e-06	3.37e-02	2.15e-04
5	2.00	0.09477	0.587	9.48	14.282	1.44e-06	2.13e-02	8.30e-05
6	4.00	0.1201	0.542	12.0	13.846	1.41e-06	1.27e-02	4.82e-05
7	2.00	0.1176	0.547	11.8	189.908	1.00e-07	1.23e-03	3.32e-07
8	1.00	0.1149	0.552	11.5	9.898	1.94e-06	2.77e-03	1.45e-05
9	0.500	0.1106	0.559	11.1	8.756	2.21e-06	8.61e-03	5.12e-05
10	1.00	0.1115	0.558	11.1	79.081	2.45e-07	1.81e-03	1.20e-06
11	2.00	0.1166	0.549	11.7	2.994	6.43e-06	5.16e-03	8.95e-05
12	4.00	0.1253	0.533	12.5	4.955	3.83e-06	4.33e-03	4.46e-05
13	8.00	0.1529	0.485	15.3	9.255	1.96e-06	6.92e-03	3.66e-05
14	16.0	0.1809	0.436	18.1	7.335	2.32e-06	3.49e-03	2.19e-05
15	32.0	0.2082	0.388	20.8	5.546	2.87e-06	1.71e-03	1.32e-05
16	8.00	0.2059	0.392	20.6	187.614	8.22e-08	9.36e-05	2.08e-08
17	2.00	0.1951	0.411	19.5	243.782	6.43e-08	1.80e-03	3.13e-07
18	0.500	0.1848	0.429	18.5	16.301	9.88e-07	6.88e-03	1.83e-05

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-20	Tested By: trm	Checked By: njh/anm
	Sample No.: ST-1	Test Date: 8/22/19	Depth: 61-63 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Wet, olive gray clay		
	Remarks: System LTIII-A		
	Displacement at End of Increment		

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	---	Sample Type:	---	Tested By:	md
Sample ID:	---	Test Date:	10/25/19	Checked By:	jsc
Depth :	---	Test Id:	527896		

Laboratory Determination of Density (Unit Weight) of Soil Specimens by ASTM D7263

Boring ID	Sample ID	Depth	Visual Description	Bulk Density pcf	Moisture Content %	Dry Density pcf	*
B-2	ST- 1	14-16.3 ft	Moist, gray clay	97.15	64.02	59.23	(1)
B-13	ST- 1	38-40.3 ft	Moist, gray clay	110.0	38.98	79.17	(2)

* Sample Comments

(1): Method B-Cylinder, Intact

(2): Method B-Cylinder, Intact

Notes: Moisture Content determined by ASTM D2216.

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	---	Sample Type:	---	Tested By:	cam
Sample ID:	---	Test Date:	10/24/19	Checked By:	jsc
Depth :	---	Test Id:	527894		

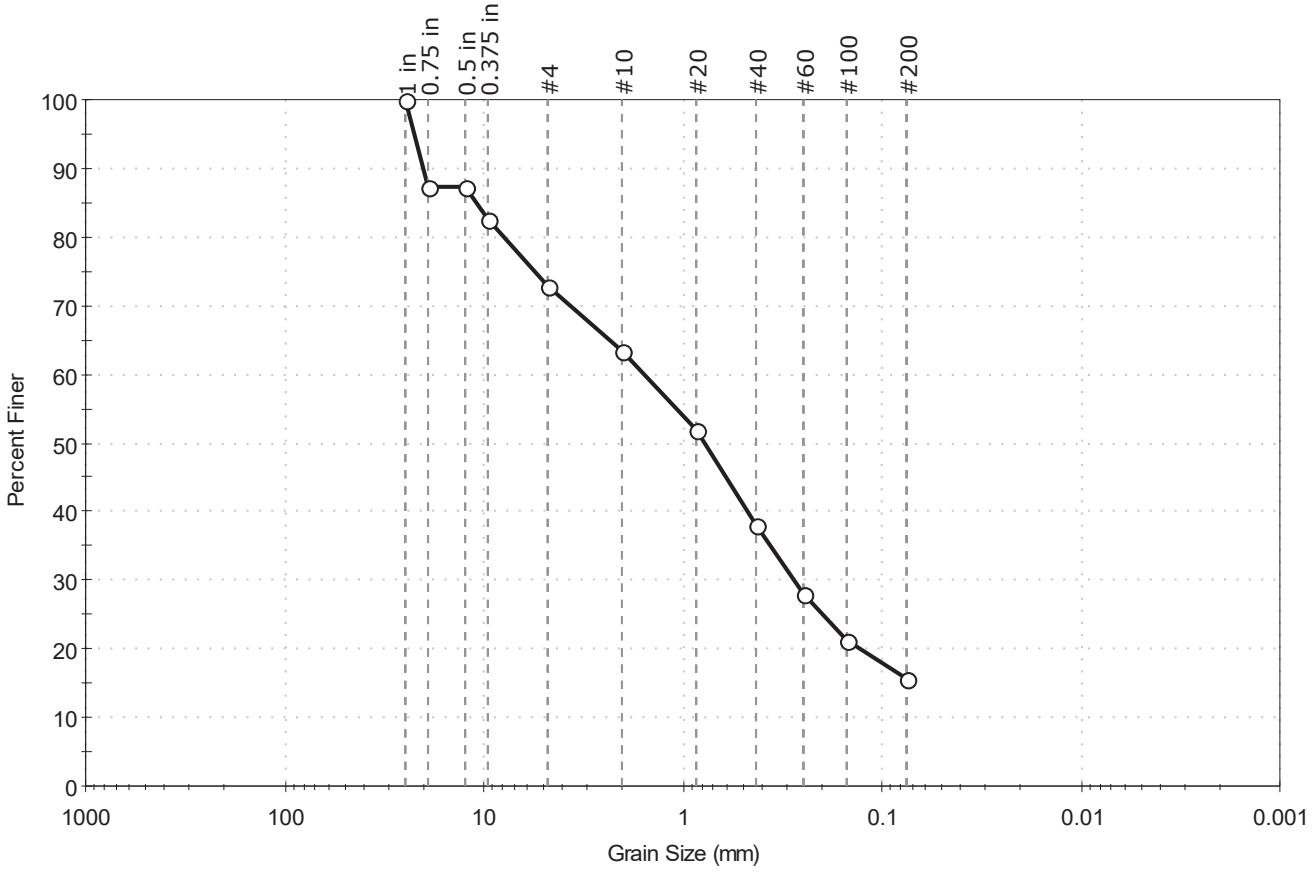
Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	Sample ID	Depth	Description	Moisture Content,%	Ash Content,%	Organic Matter,%
B-1	S-7	12-14 ft	Moist, very dark brown silt with organics	155	78.4	21.6
B-2	S-11	20-22 ft top 18 ft	Moist, very dark brown silt with organics	160	73.4	26.6
B-6	S-5	8-10 ft	Moist, dark brown silt with organics	152	76.3	23.7
B-7	S-10	18-20 ft	Moist, gray silty sand	44	96.9	3.1
B-8	S-5	8-10 ft	Moist, dark brown silt with organics	89	91.0	9.0
B-11	S-6	10-12 ft	Moist, dark brown silt with organics	217	66.4	33.6
B-12	S-6	10-12 ft	Moist, dark brown silt with organics	147	70.0	30.0
B-14	S-5	9-10 ft	Moist, gray silt with organics	100	89.2	10.8
B-15	S-10	18-20 ft	Moist, dark gray silt	36	97.4	2.6

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass; dried to a constant mass at temperature of 105º C
Ash content and organic matter determined by Method C; dried to constant mass at temperature 440º C

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-10	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2	Test Date:	10/25/19	Checked By:	jsc
Depth :	2-4 ft	Test Id:	527881		
Test Comment:	---				
Visual Description:	Moist, dark grayish brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	27.2	57.0	15.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	87		
0.5 in	12.50	87		
0.375 in	9.50	83		
#4	4.75	73		
#10	2.00	63		
#20	0.85	52		
#40	0.42	38		
#60	0.25	28		
#100	0.15	21		
#200	0.075	16		

Coefficients

D_{85} = 10.9264 mm D_{30} = 0.2764 mm

D_{60} = 1.5530 mm D_{15} = N/A

D_{50} = 0.7712 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

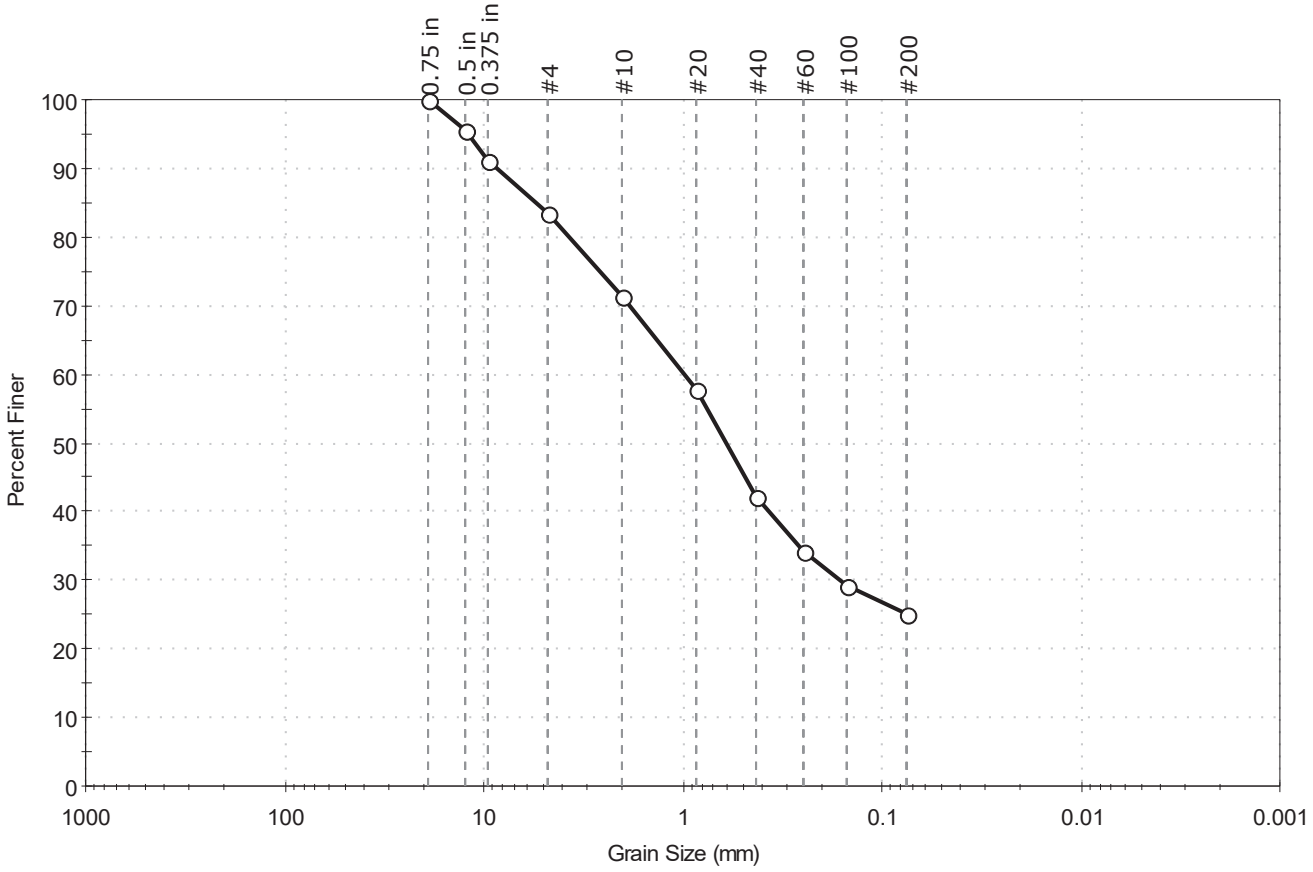
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-16	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2	Test Date:	10/25/19	Checked By:	jsc
Depth :	2-4 ft	Test Id:	527882		
Test Comment:	---				
Visual Description:	Moist, grayish brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	16.5	58.5	25.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	91		
#4	4.75	83		
#10	2.00	71		
#20	0.85	58		
#40	0.42	42		
#60	0.25	34		
#100	0.15	29		
#200	0.075	25		

Coefficients

D_{85} = 5.4530 mm D_{30} = 0.1619 mm

D_{60} = 0.9711 mm D_{15} = N/A

D_{50} = 0.6009 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

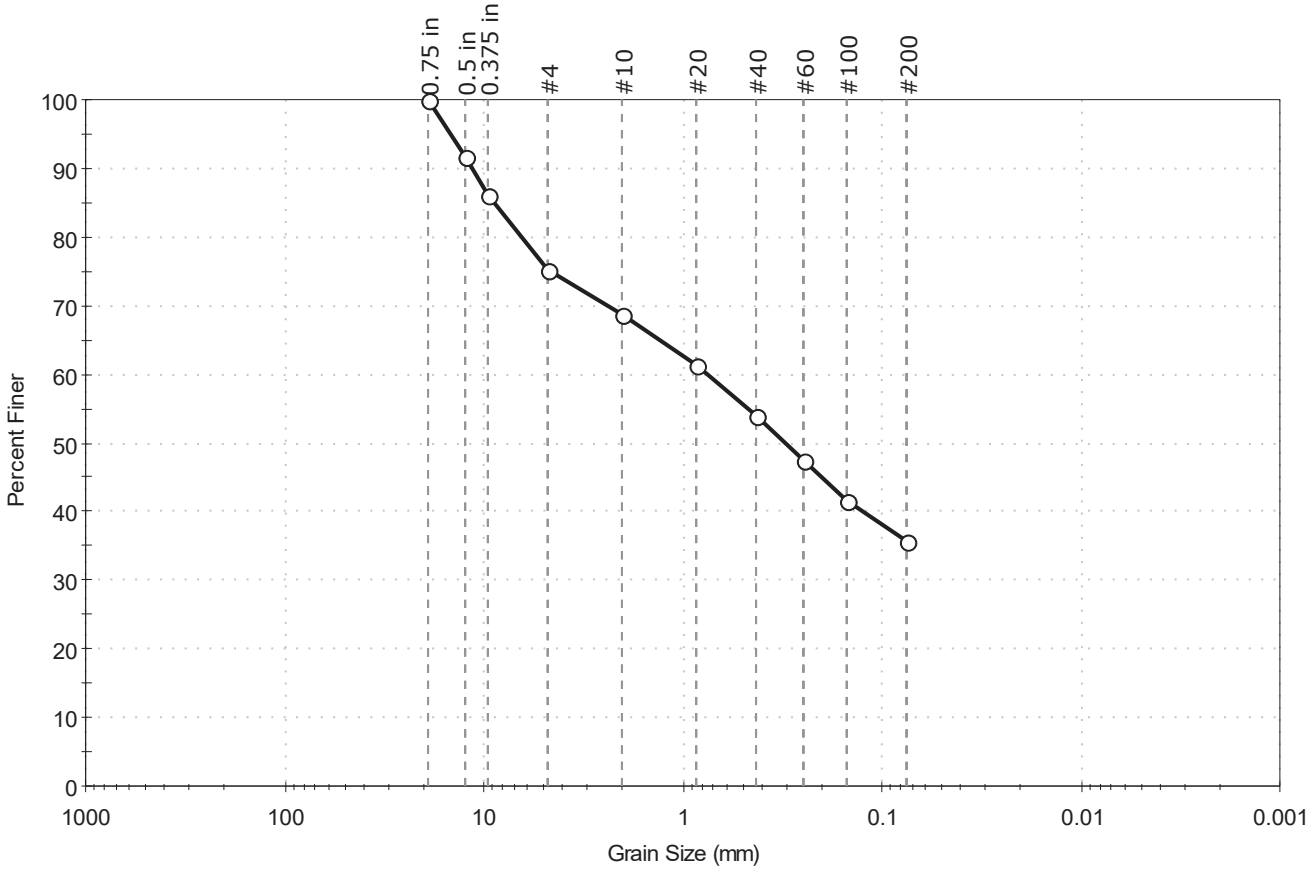
Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-17	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2	Test Date:	10/25/19	Checked By:	jsc
Depth :	2-4 ft	Test Id:	527883		

Test Comment: ---
Visual Description: Moist, dark grayish brown silty sand with gravel
Sample Comment: ---

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	24.8	39.6	35.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	92		
0.375 in	9.50	86		
#4	4.75	75		
#10	2.00	69		
#20	0.85	61		
#40	0.42	54		
#60	0.25	47		
#100	0.15	42		
#200	0.075	36		

Coefficients

D_{85} = 8.8777 mm D_{30} = N/A
D_{60} = 0.7482 mm D_{15} = N/A
D_{50} = 0.3081 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

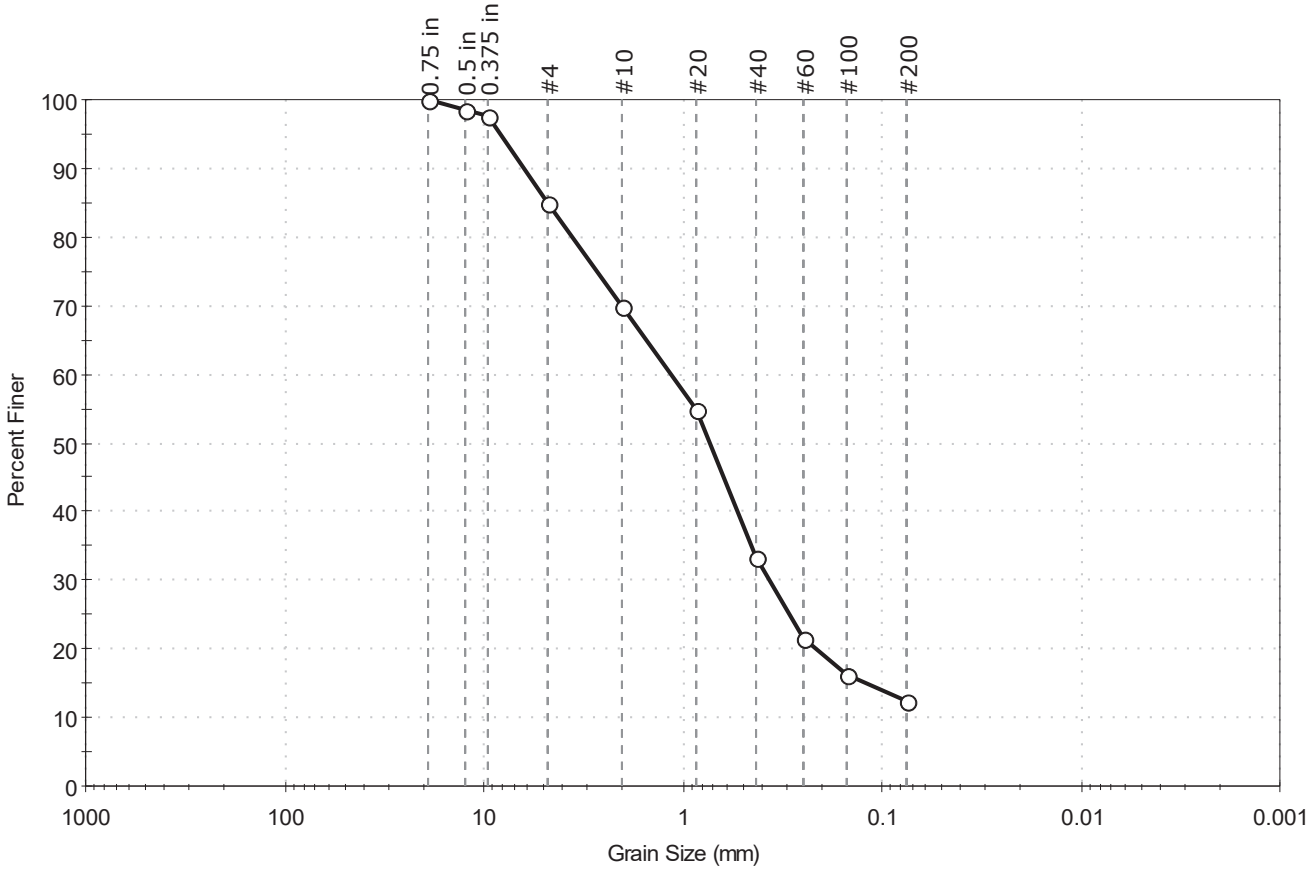
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED
Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-19A	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-2	Test Date:	10/25/19	Checked By:	jsc
Depth :	2-4 ft	Test Id:	527884		
Test Comment:	---				
Visual Description:	Moist, grayish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	14.9	72.9	12.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	98		
#4	4.75	85		
#10	2.00	70		
#20	0.85	55		
#40	0.42	33		
#60	0.25	22		
#100	0.15	16		
#200	0.075	12		

Coefficients

D_{85} = 4.7244 mm
D_{30} = 0.3650 mm
D_{60} = 1.1427 mm
D_{15} = 0.1217 mm
D_{50} = 0.7271 mm
D_{10} = N/A
C_u = N/A
C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

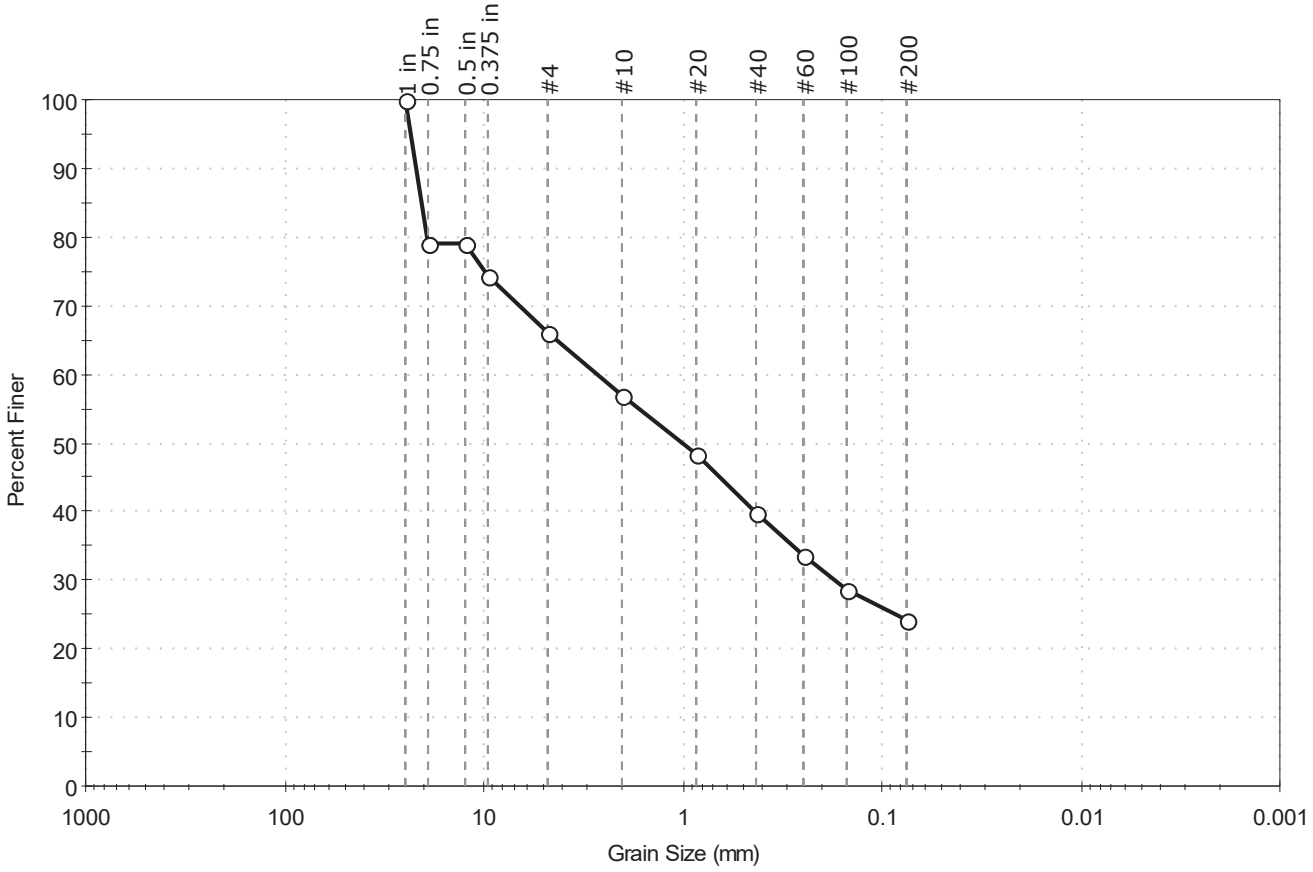
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-20	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-3	Test Date:	10/25/19	Checked By:	jsc
Depth :	4-6 ft	Test Id:	527885		
Test Comment:	---				
Visual Description:	Moist, dark grayish brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	34.1	41.7	24.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	79		
0.5 in	12.50	79		
0.375 in	9.50	74		
#4	4.75	66		
#10	2.00	57		
#20	0.85	48		
#40	0.42	40		
#60	0.25	34		
#100	0.15	28		
#200	0.075	24		

Coefficients

D_{85} = 20.5305 mm	D_{30} = 0.1745 mm
D_{60} = 2.6672 mm	D_{15} = N/A
D_{50} = 1.0071 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

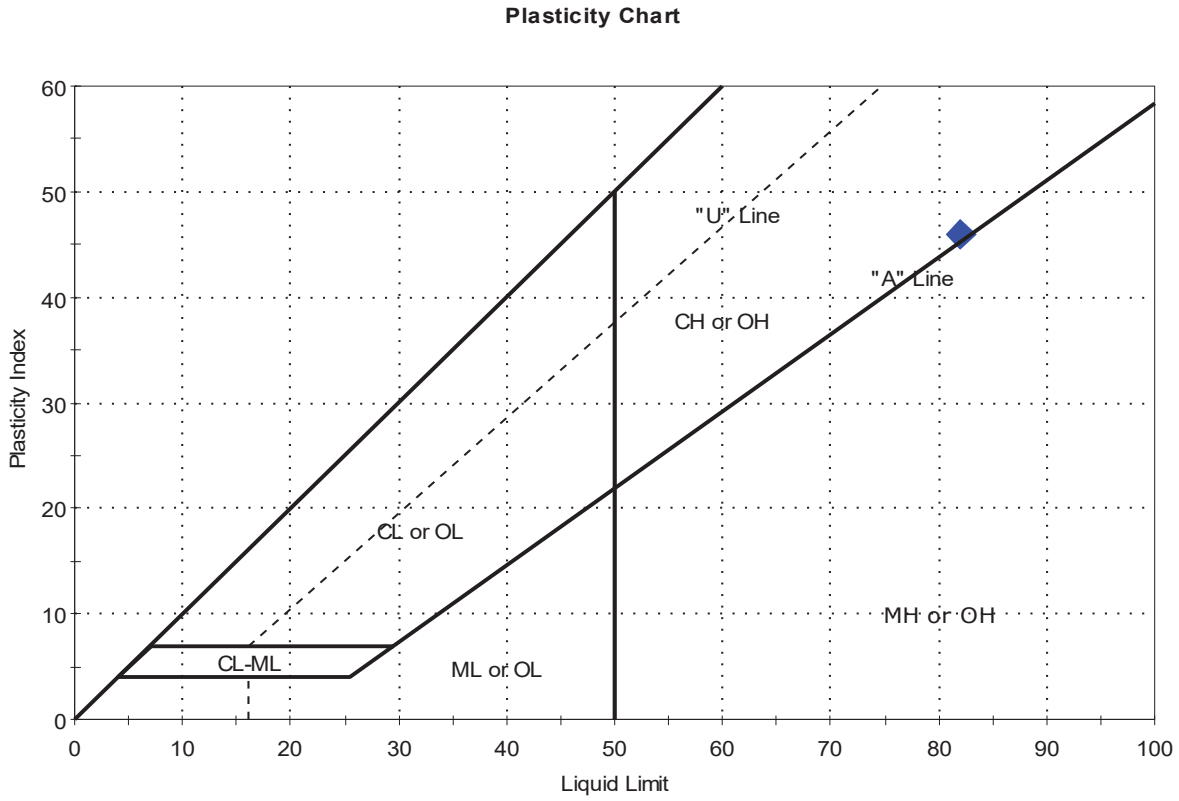
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-2	Sample Type:	jar	Tested By:	cam
Sample ID:	ST-1	Test Date:	10/25/19	Checked By:	jsc
Depth :	14-16.3 ft	Test Id:	527879		
Test Comment:	---				
Visual Description:	Moist, 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
◆	ST-1	B-2	14-16.3 ft	64	82	36	46	0.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

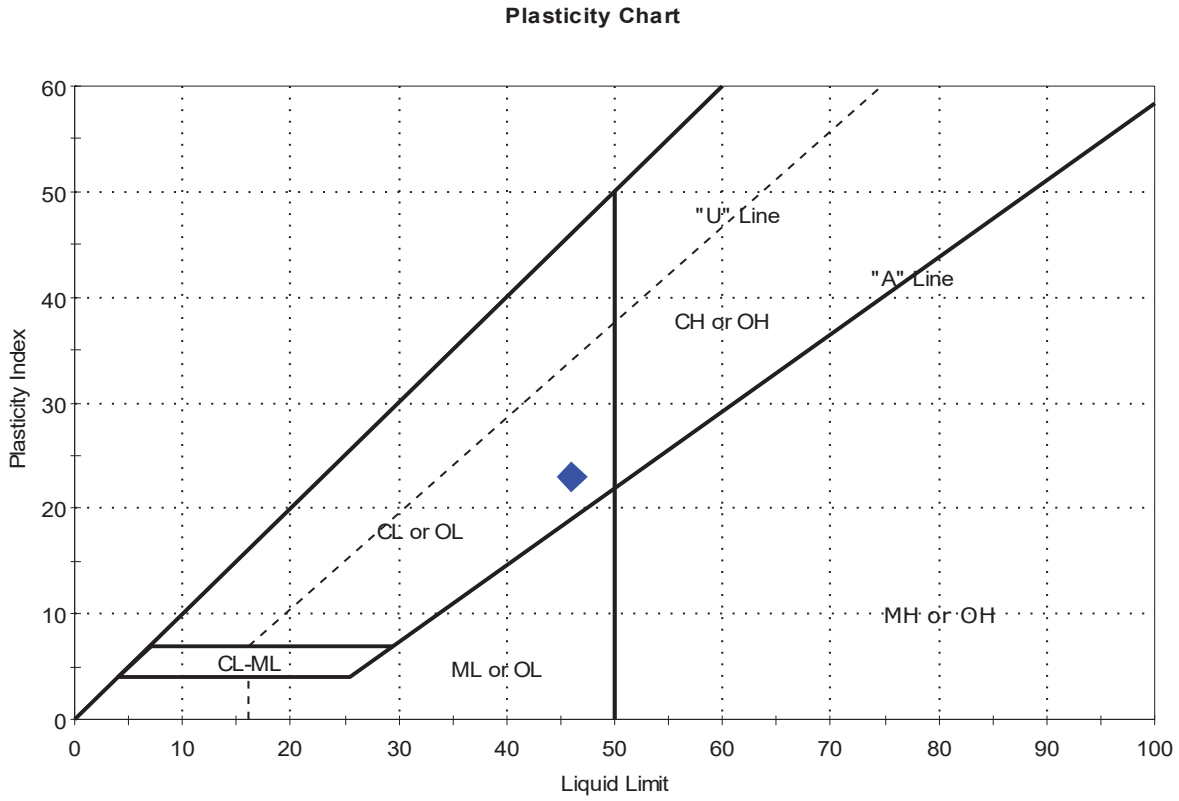
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-2	Sample Type:	jar	Tested By:	cam
Sample ID:	S-12	Test Date:	10/28/19	Checked By:	jsc
Depth :	24-26 ft	Test Id:	527866		
Test Comment:	---				
Visual Description:	Moist, greenish 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
◆	S-12	B-2	24-26 ft	28	46	23	23	0.2	

Sample Prepared using the WET method

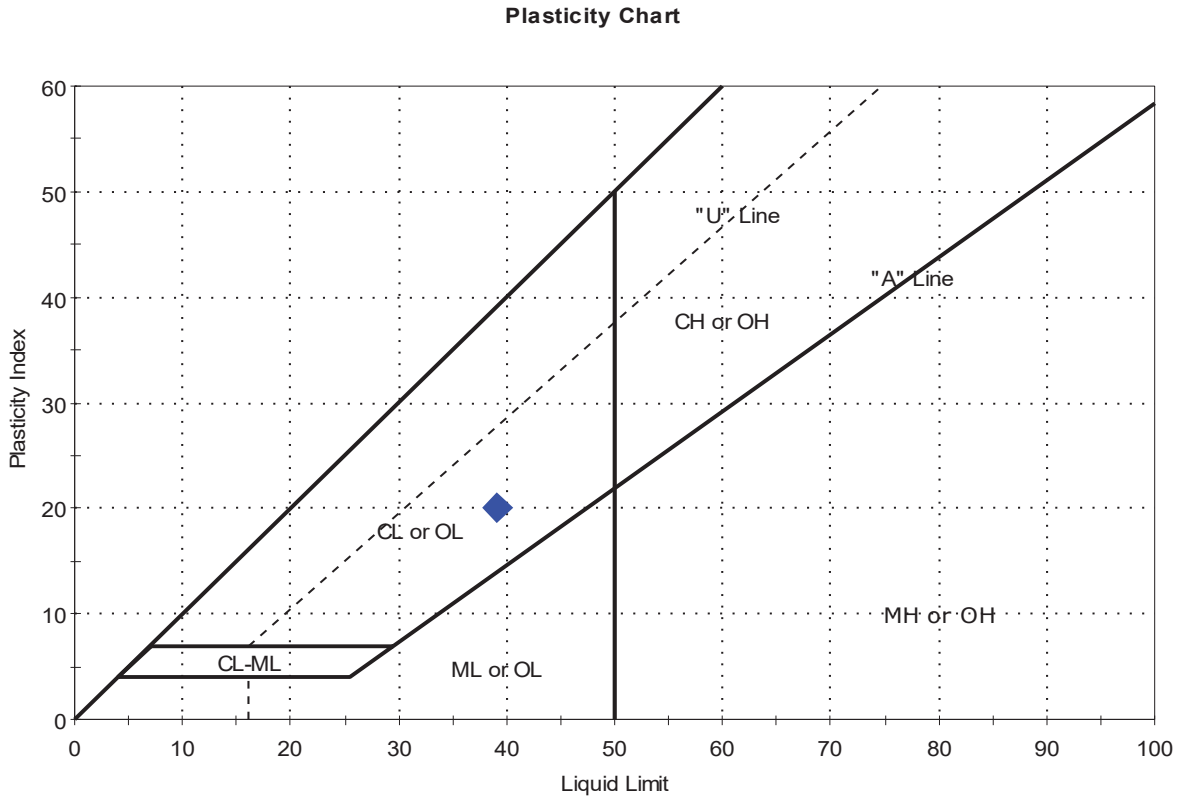
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-2	Sample Type:	jar	Tested By:	cam
Sample ID:	S-15	Test Date:	10/29/19	Checked By:	jsc
Depth :	39-41 ft	Test Id:	527867		
Test Comment:	---				
Visual Description:	Moist, 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
◆	S-15	B-2	39-41 ft	29	39	19	20	0.5	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

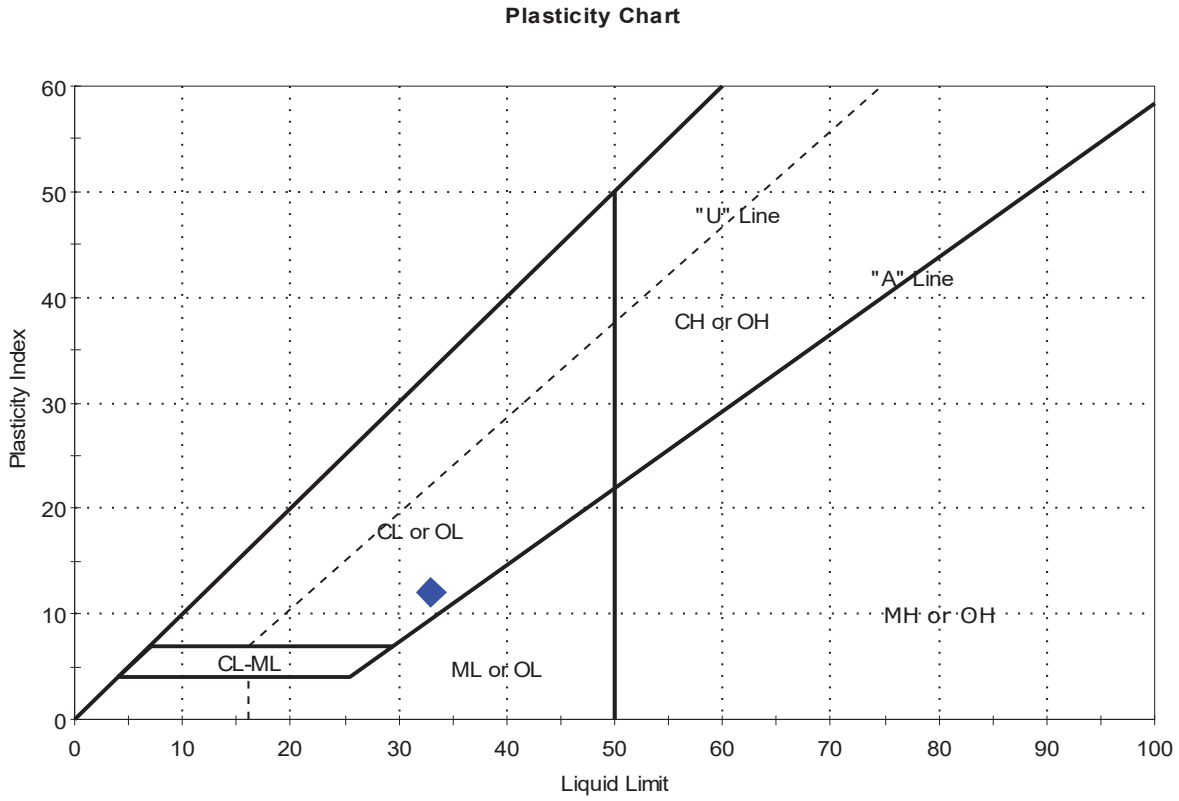
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-4	Sample Type:	jar	Tested By:	cam
Sample ID:	S-12	Test Date:	10/29/19	Checked By:	jsc
Depth :	29-31 ft	Test Id:	527868		
Test Comment:	---				
Visual Description:	Moist, 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
◆	S-12	B-4	29-31 ft	36	33	21	12	1.2	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

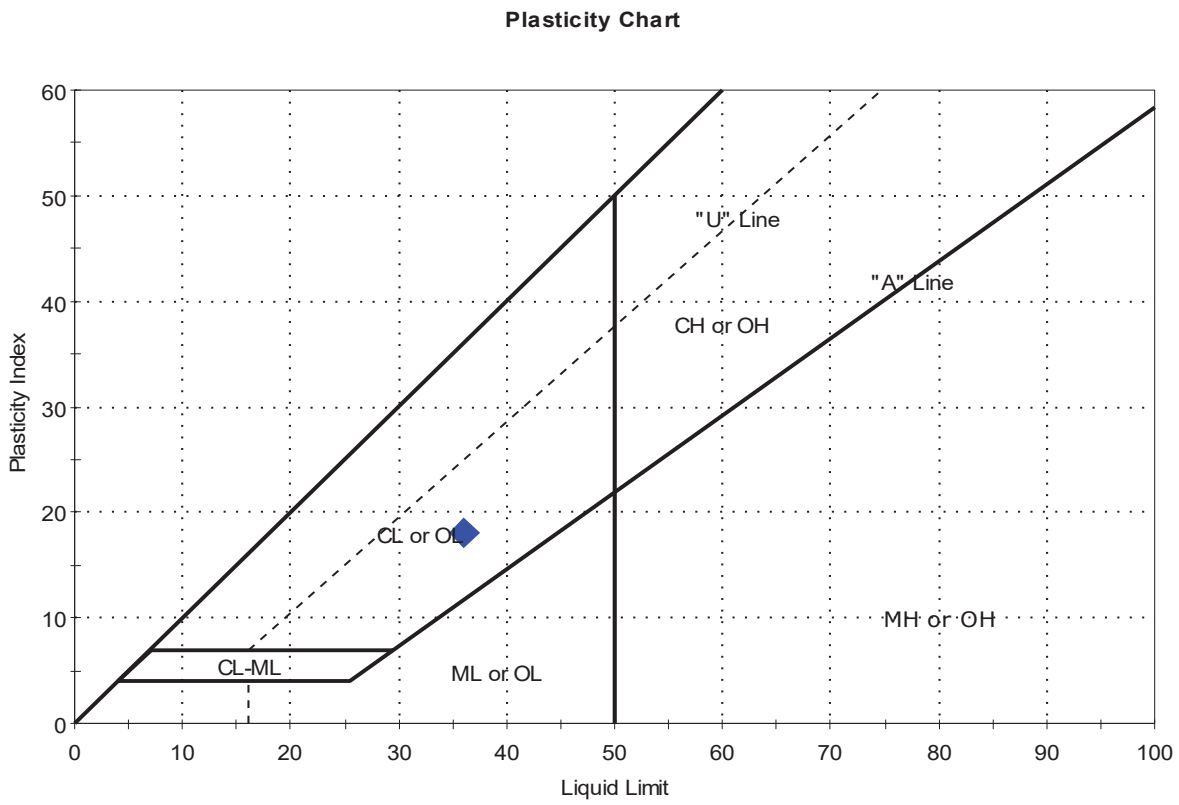
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-6	Sample Type:	jar	Tested By:	cam
Sample ID:	S-21	Test Date:	10/29/19	Checked By:	jsc
Depth :	119-121 ft	Test Id:	527869		
Test Comment:	---				
Visual Description:	Moist, 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
◆	S-21	B-6	119-121 ft	31	36	18	18	0.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

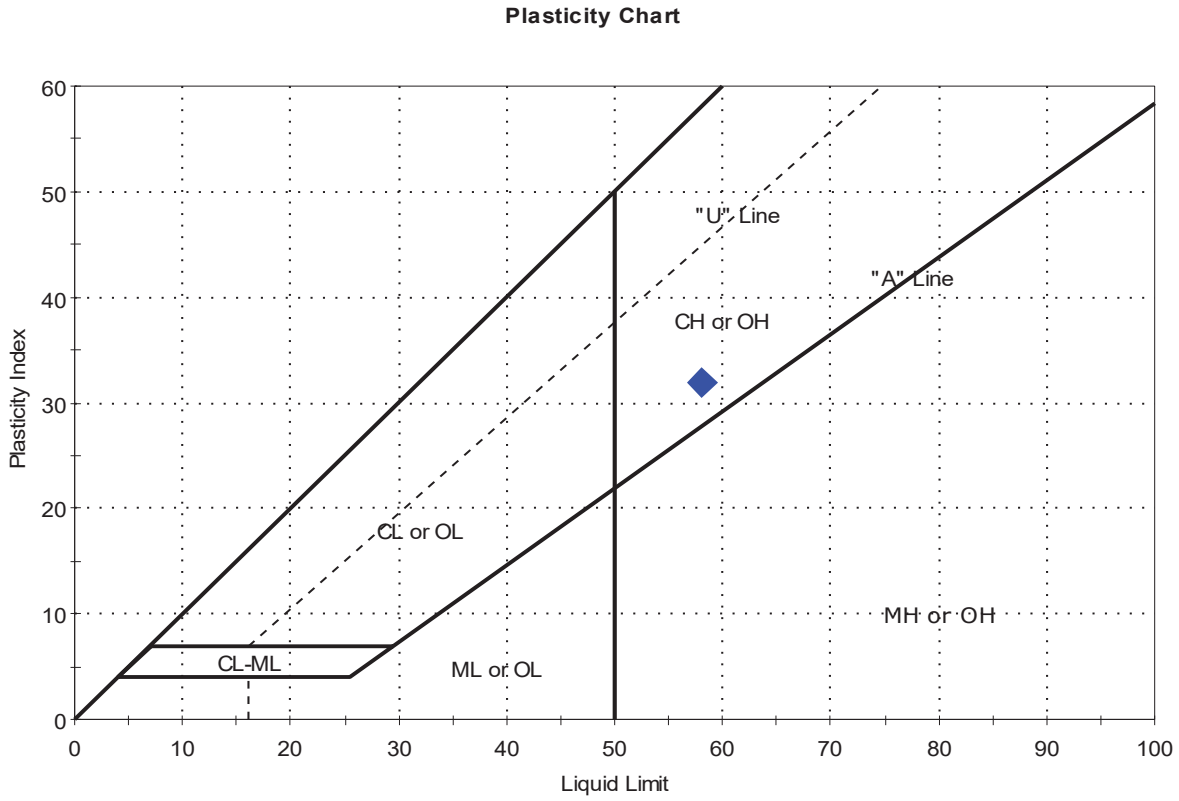
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-7	Sample Type:	jar	Tested By:	cam
Sample ID:	S-5	Test Date:	10/25/19	Checked By:	jsc
Depth :	8-10 ft	Test Id:	527870		
Test Comment:	---				
Visual Description:	Moist, 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
◆	S-5	B-7	8-10 ft	53	58	26	32	0.8	

Sample Prepared using the WET method

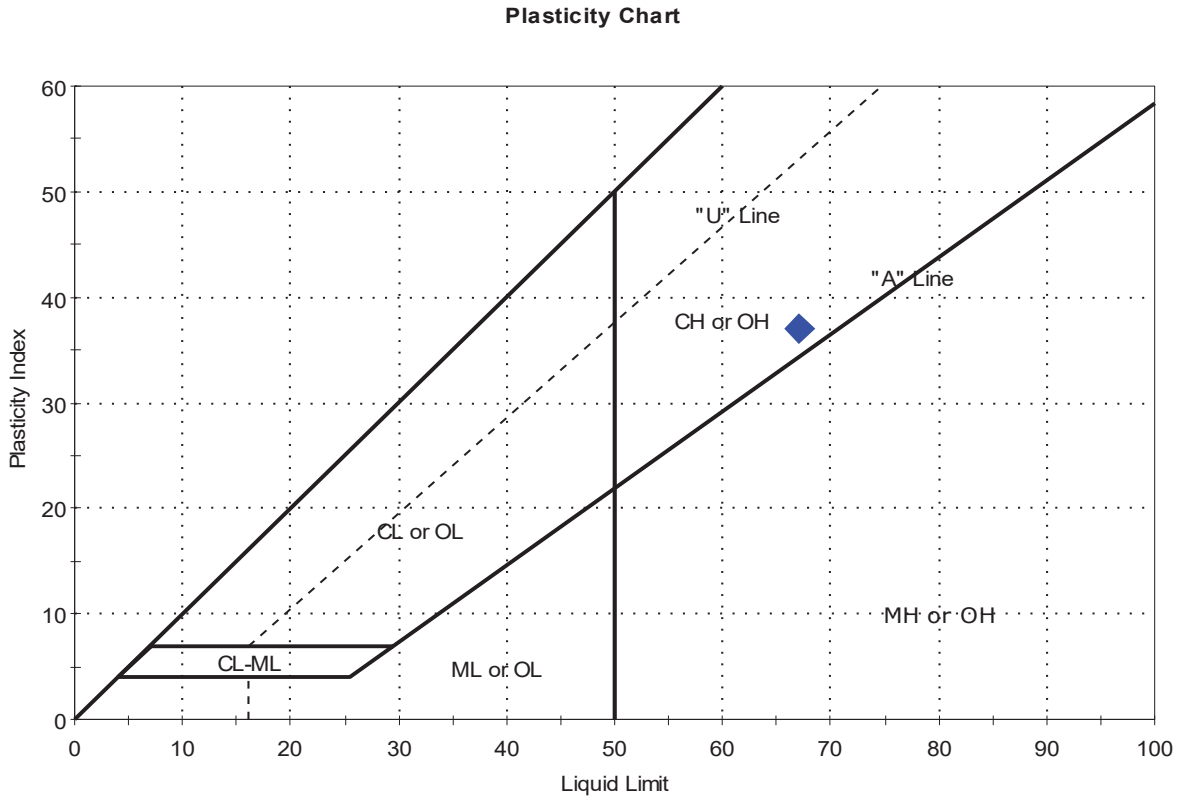
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-7	Sample Type:	jar	Tested By:	cam
Sample ID:	S-9	Test Date:	10/29/19	Checked By:	jsc
Depth :	16-18 ft	Test Id:	527871		
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
◆	S-9	B-7	16-18 ft	56	67	30	37	0.7	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

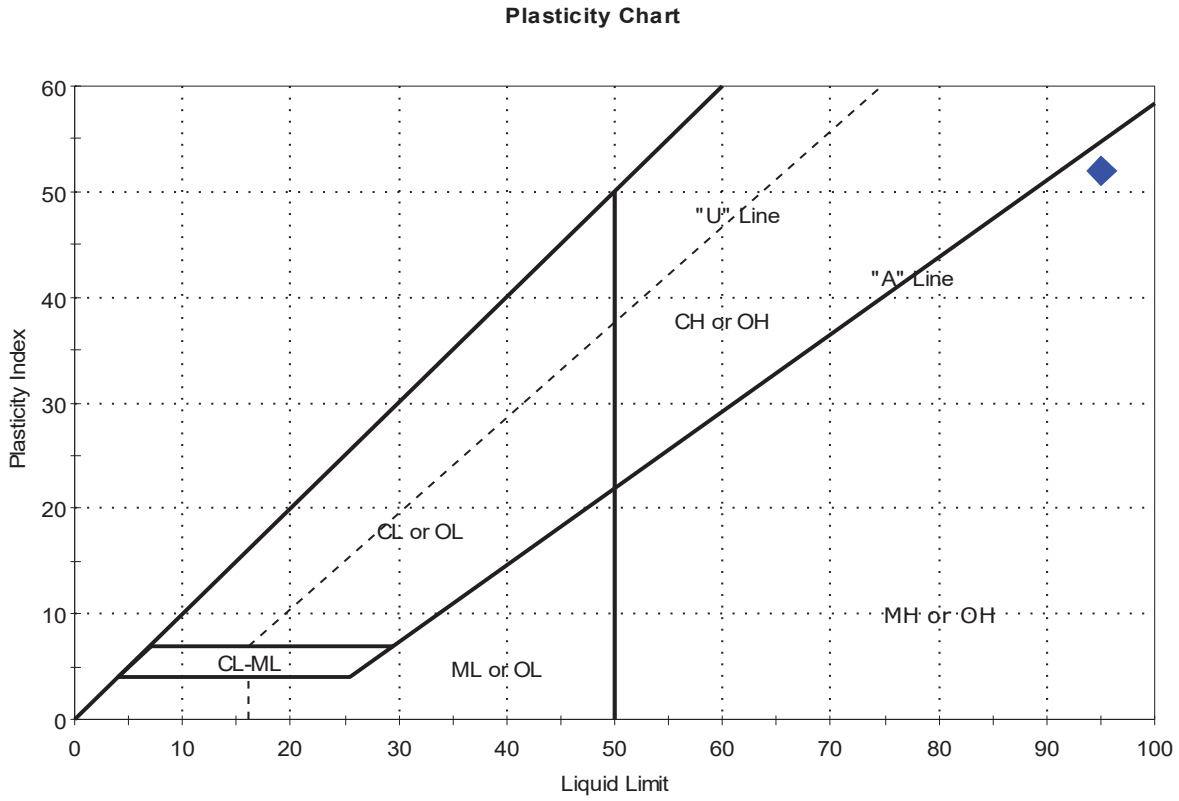
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-8	Sample Type:	jar	Tested By:	cam
Sample ID:	S-7	Test Date:	10/29/19	Checked By:	jsc
Depth :	12-14 ft	Test Id:	527872		
Test Comment:	---				
Visual Description:	Moist, dark gray silt				
Sample Comment:	Sample contains organics				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S-7	B-8	12-14 ft	75	95	43	52	0.6	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

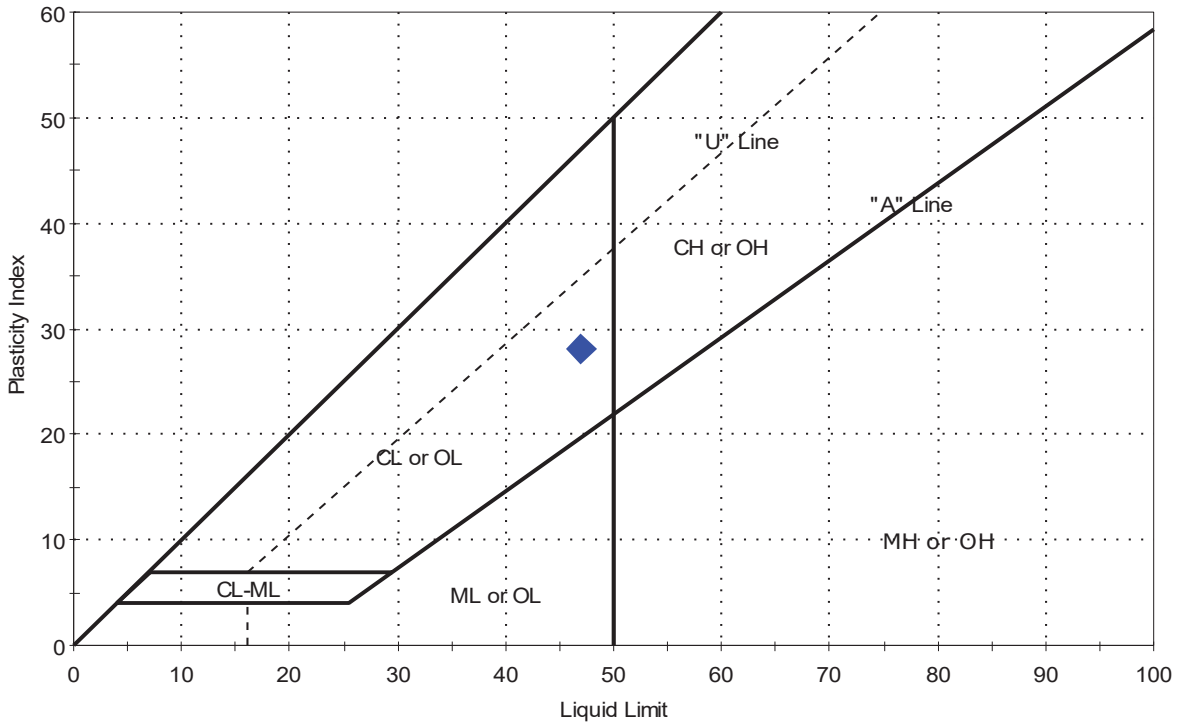
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-13	Sample Type:	jar	Tested By:	cam
Sample ID:	S-11	Test Date:	10/29/19	Checked By:	jsc
Depth :	24-26 ft	Test Id:	527873		
Test Comment:	---				
Visual Description:	Moist, olive gray silt				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S-11	B-13	24-26 ft	29	47	19	28	0.3	

Sample Prepared using the WET method

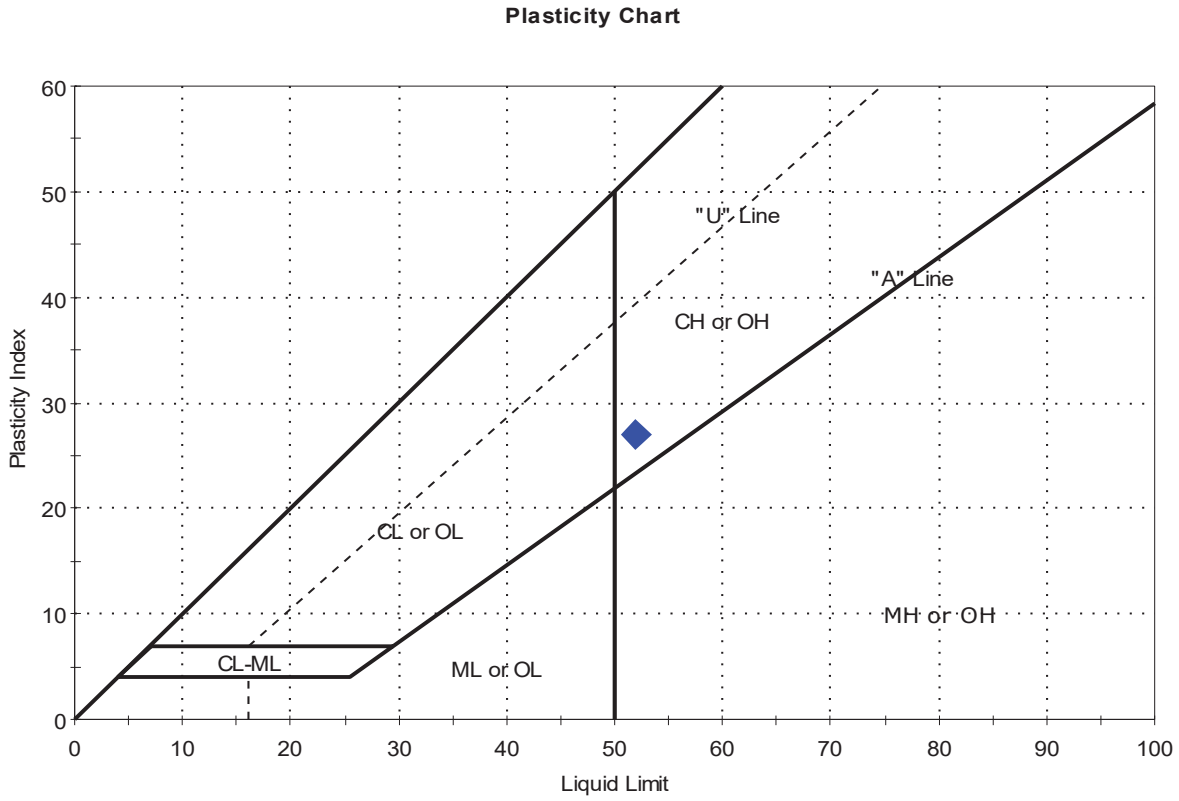
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-13	Sample Type:	jar	Tested By:	cam
Sample ID:	ST-1	Test Date:	10/28/19	Checked By:	jsc
Depth :	38-40.3 ft	Test Id:	527880		
Test Comment:	---				
Visual Description:	Moist, 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
◆	ST-1	B-13	38-40.3 ft	39	52	25	27	0.5	

Sample Prepared using the WET method

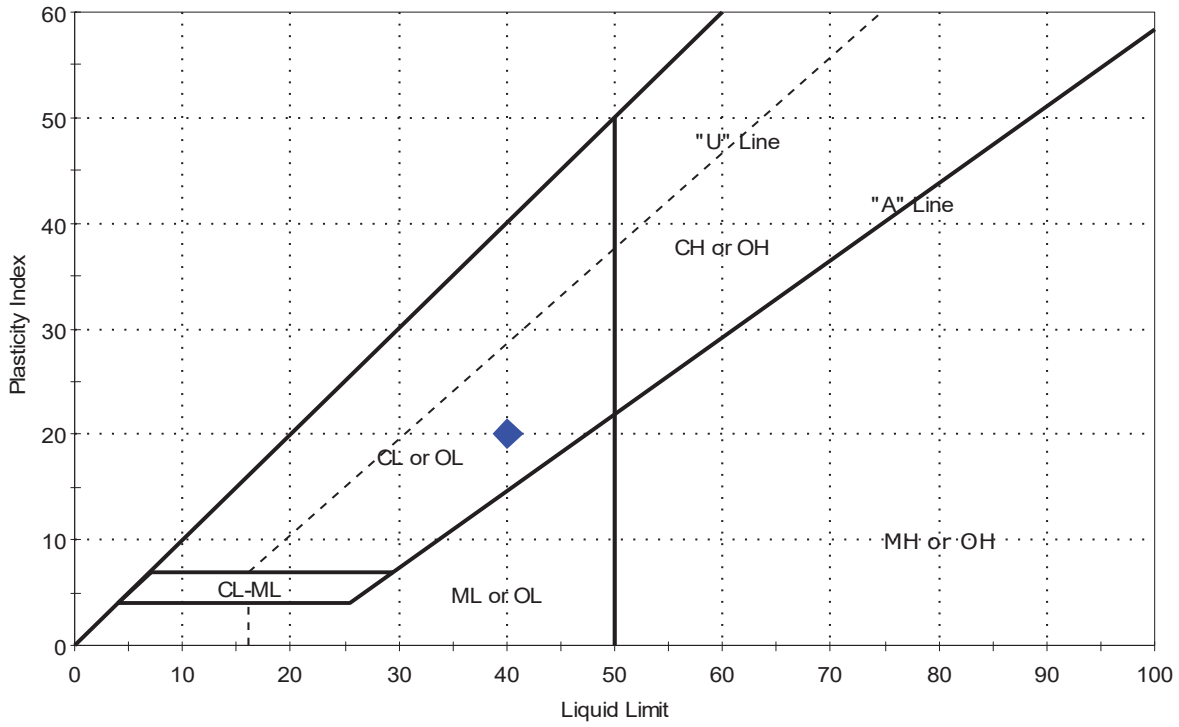
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-13	Sample Type:	jar	Tested By:	cam
Sample ID:	S-17	Test Date:	10/28/19	Checked By:	jsc
Depth :	99-101 ft	Test Id:	527874		
Test Comment:	---				
Visual Description:	Moist, gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



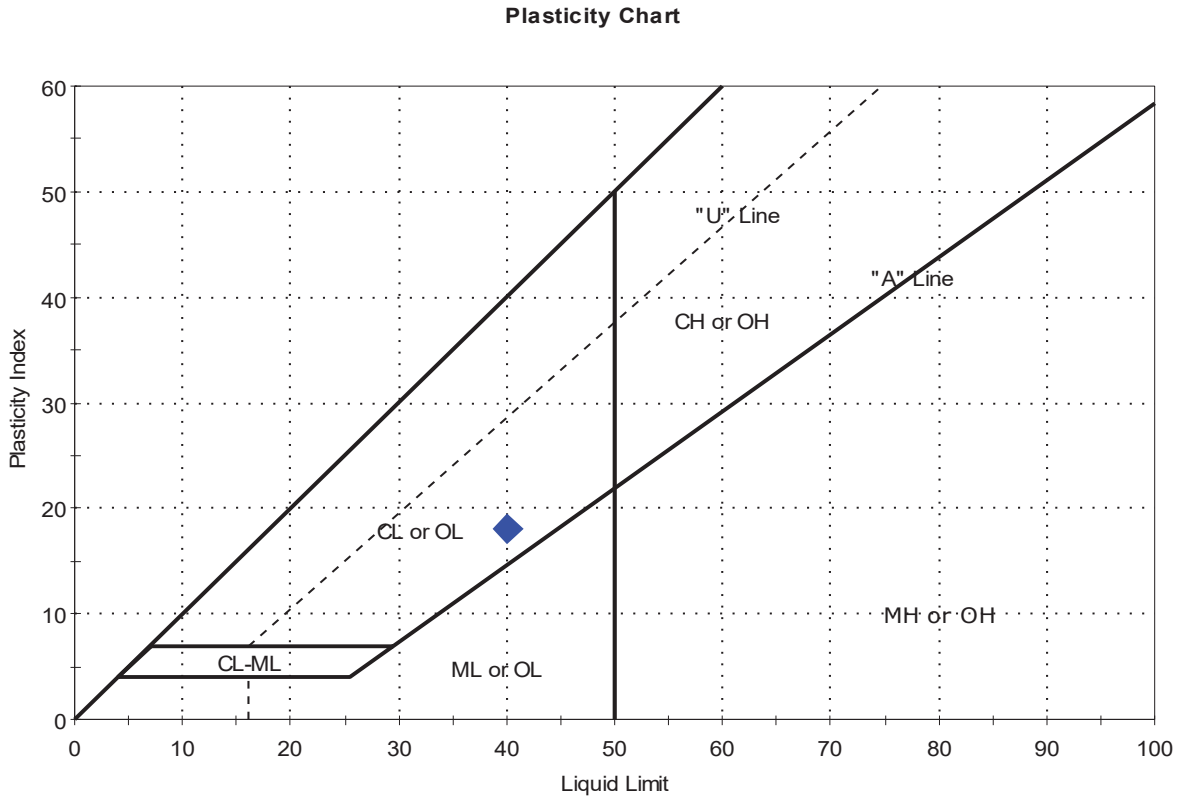
Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S-17	B-13	99-101 ft	38	40	20	20	0.9	

Sample Prepared using the WET method

Dry Strength: n/a
Dilatancy: SLOW
Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-13	Sample Type:	jar	Tested By:	cam
Sample ID:	S-19	Test Date:	10/28/19	Checked By:	jsc
Depth :	159-161 ft	Test Id:	527875		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	S-19	B-13	159-161 ft	34	40	22	18	0.7	

Sample Prepared using the WET method

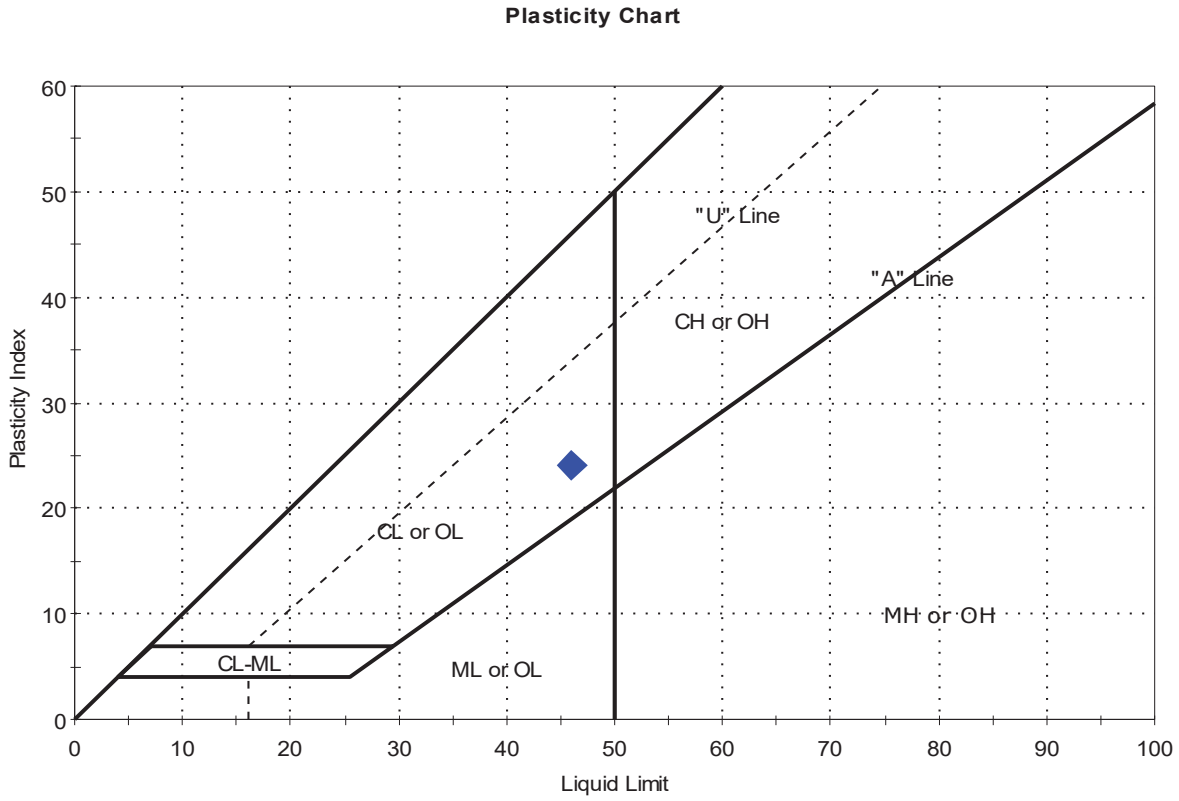
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-14	Sample Type:	jar	Tested By:	cam
Sample ID:	S-8	Test Date:	10/29/19	Checked By:	jsc
Depth :	14-16 ft	Test Id:	527876		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	S-8	B-14	14-16 ft	26	46	22	24	0.2	

Sample Prepared using the WET method

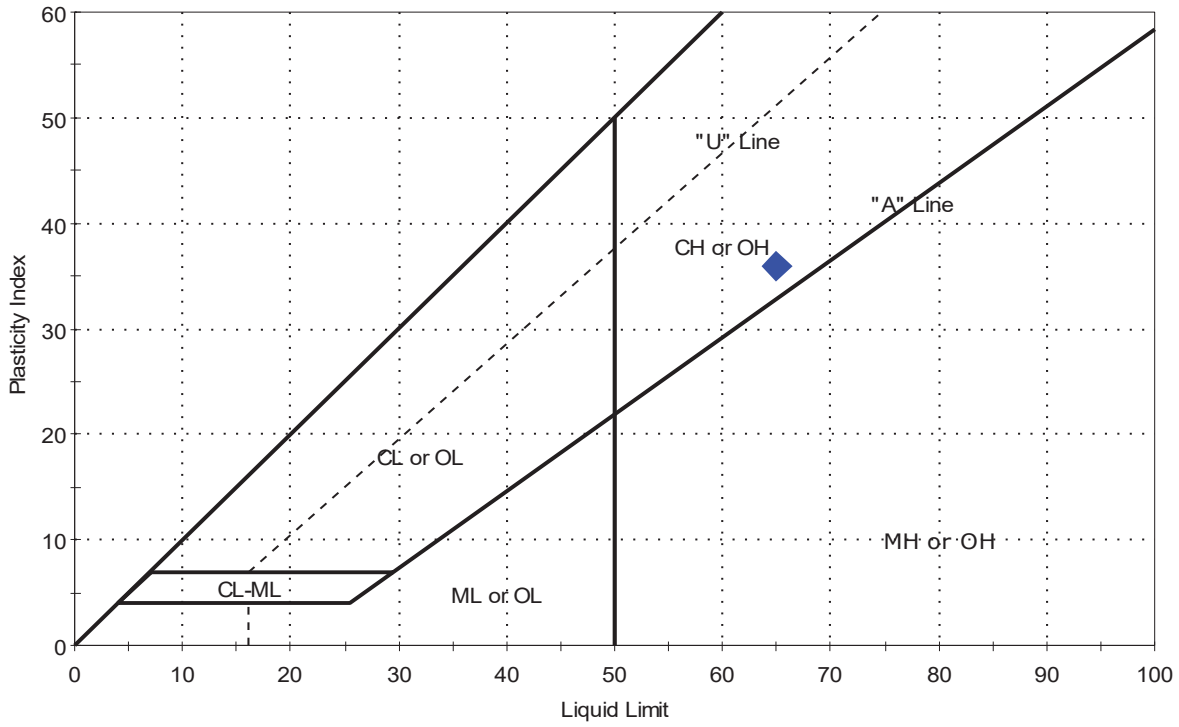
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-18	Sample Type:	jar	Tested By:	cam
Sample ID:	S-6	Test Date:	10/25/19	Checked By:	jsc
Depth :	10-12 ft	Test Id:	527877		
Test Comment:	---				
Visual Description:	Moist, 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
◆	S-6	B-18	10-12 ft	58	65	29	36	0.8	

Sample Prepared using the WET method

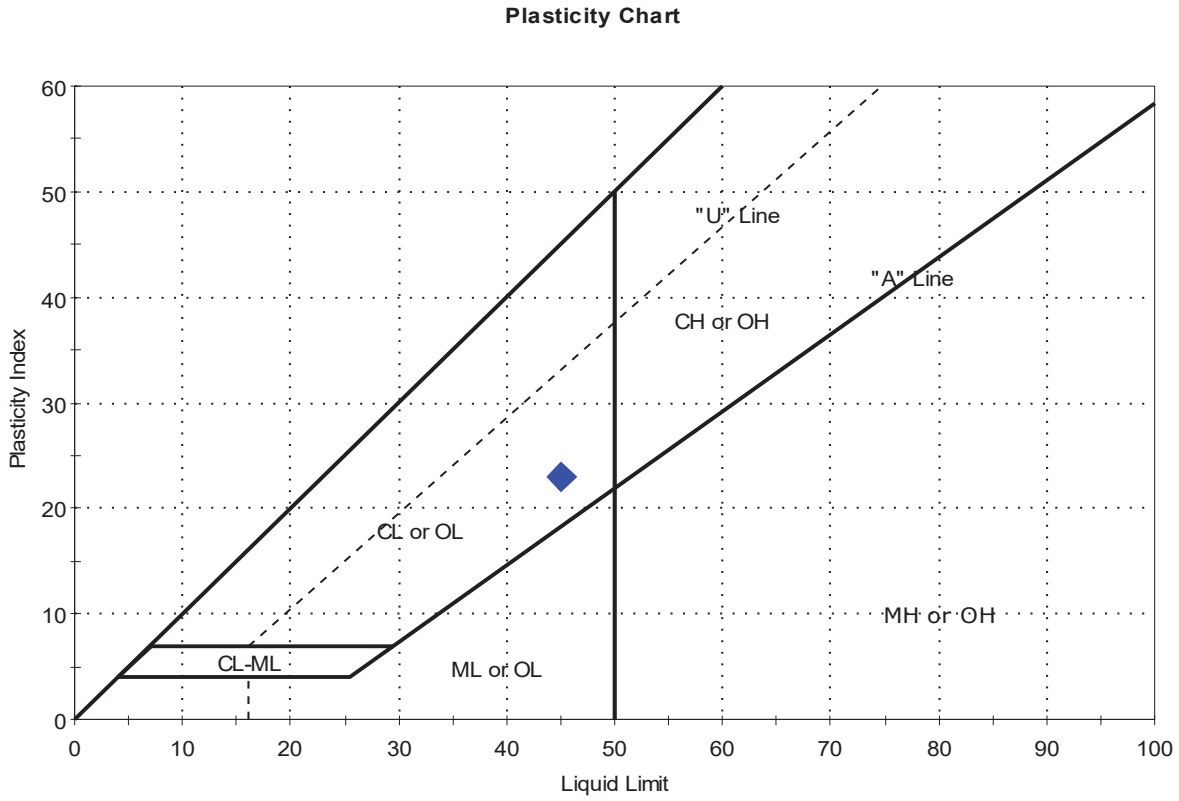
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Weston & Sampson Engineers				
Project:	Moakley Park Improvements				
Location:	Boston, MA			Project No:	GTX-310495
Boring ID:	B-20	Sample Type:	jar	Tested By:	cam
Sample ID:	S-17	Test Date:	10/28/19	Checked By:	jsc
Depth :	79-81 ft	Test Id:	527878		
Test Comment:	---				
Visual Description:	Moist, olive 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
◆	S-17	B-20	79-81 ft	38	45	22	23	0.7	

Sample Prepared using the WET method

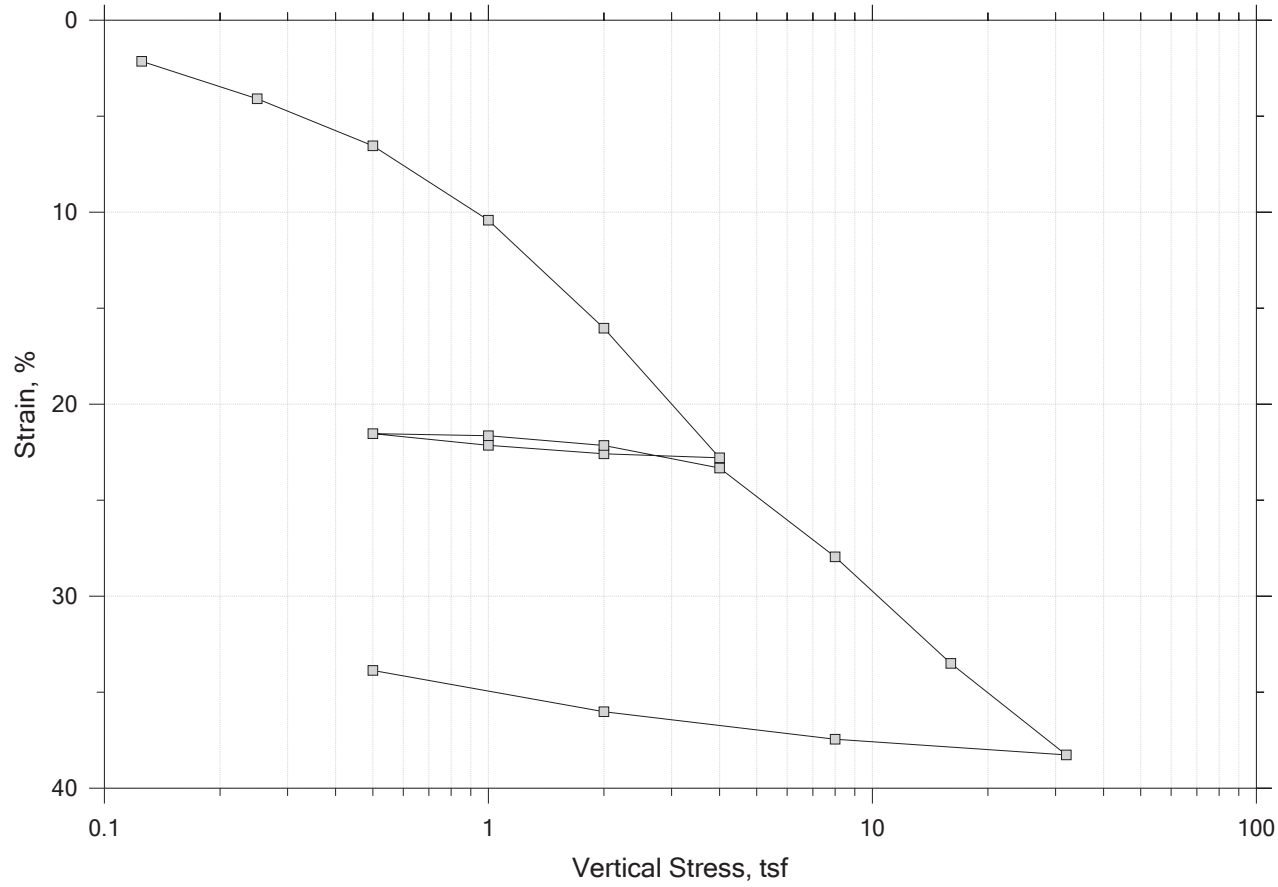
Dry Strength: VERY HIGH

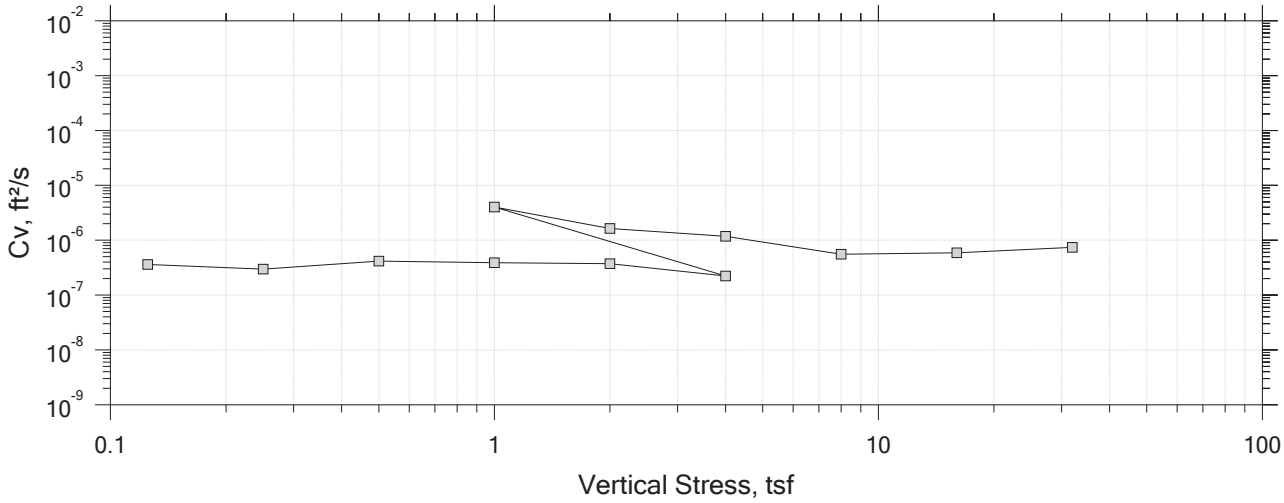
Dilatancy: SLOW

Toughness: LOW

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

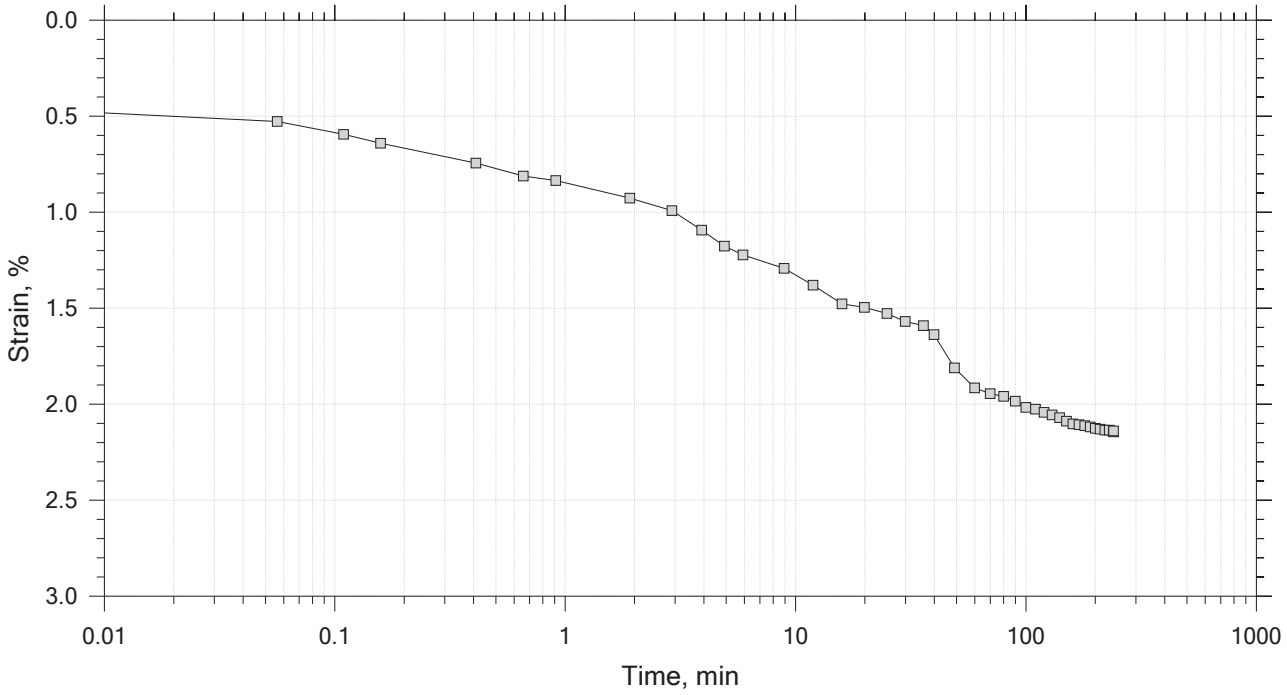


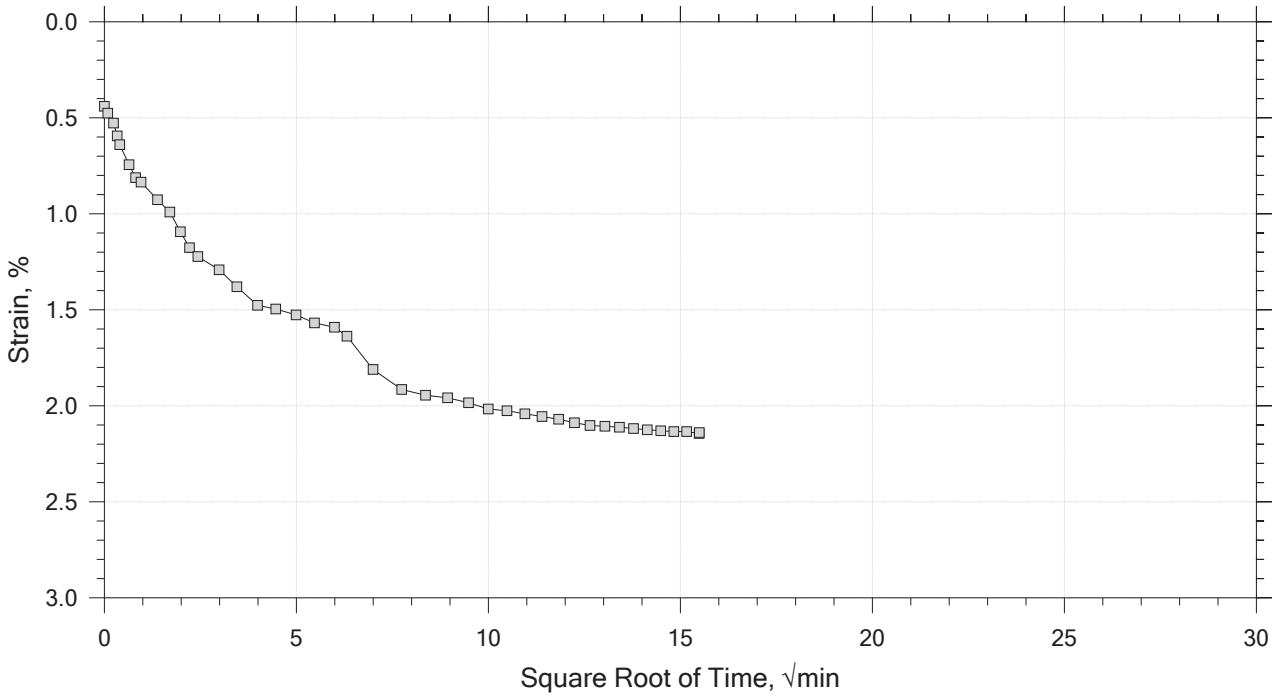


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		
Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 18
Constant Load Step
Stress: 0.125 tsf

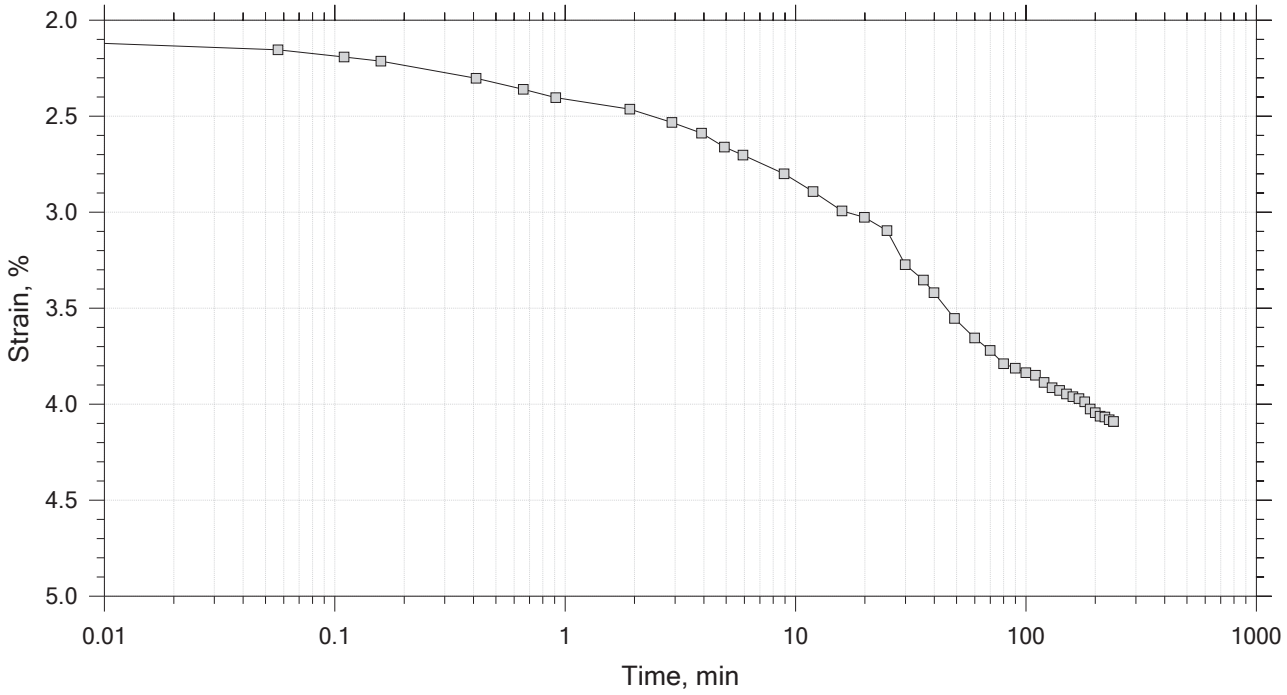


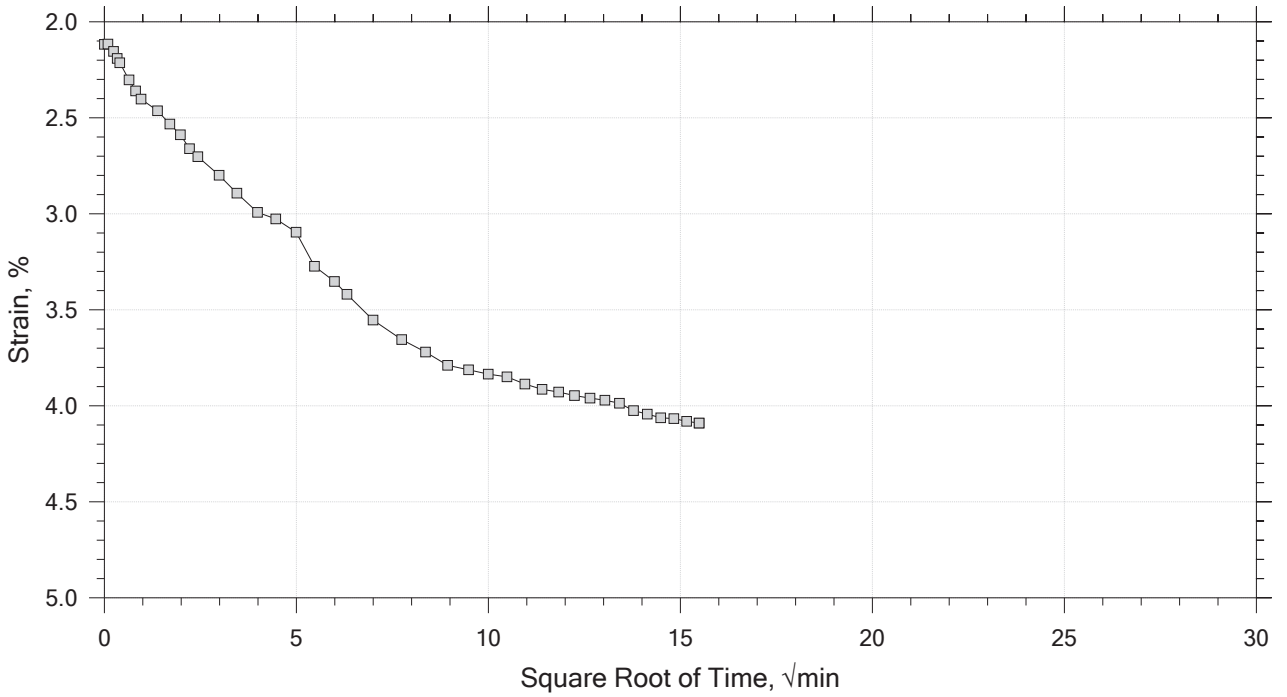


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 18
Constant Load Step
Stress: 0.25 tsf

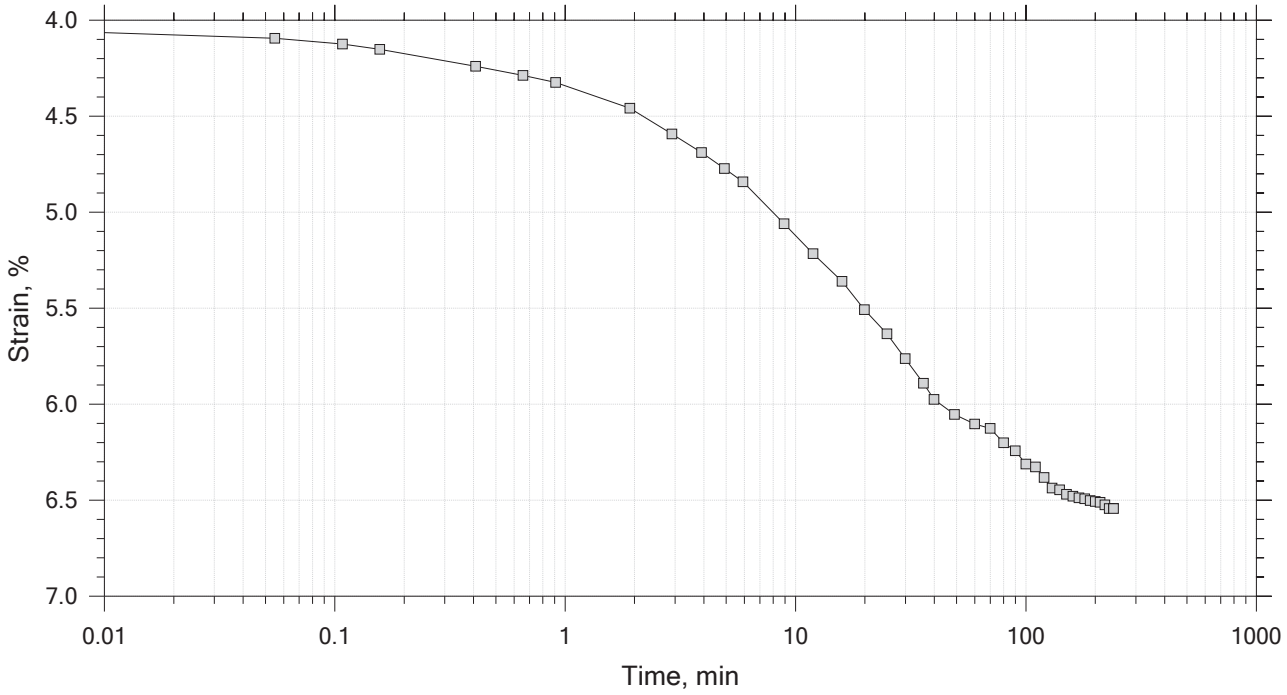


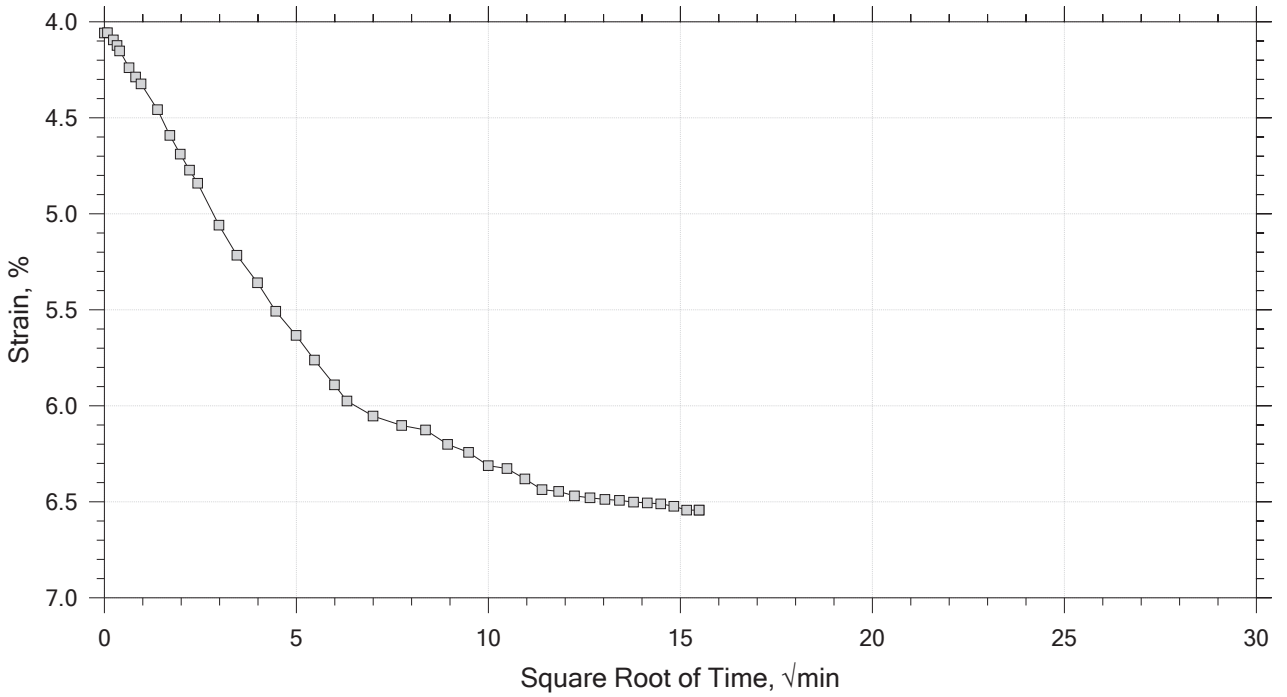


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 18
Constant Load Step
Stress: 0.5 tsf

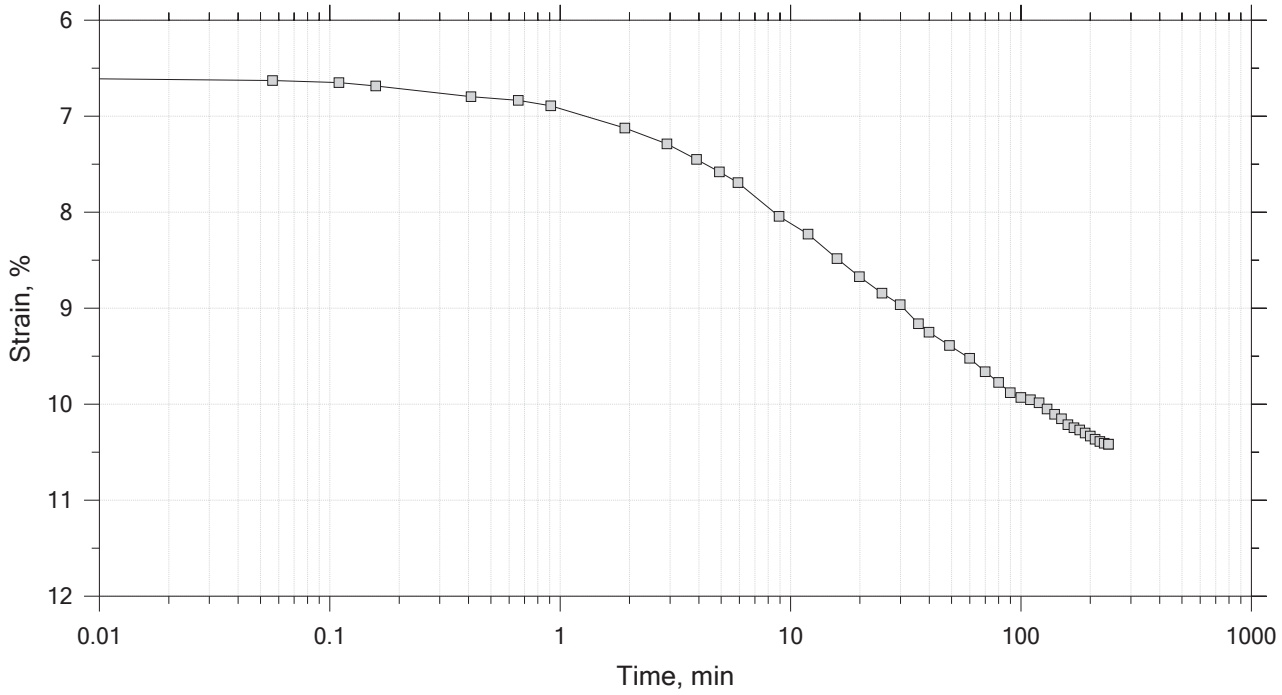


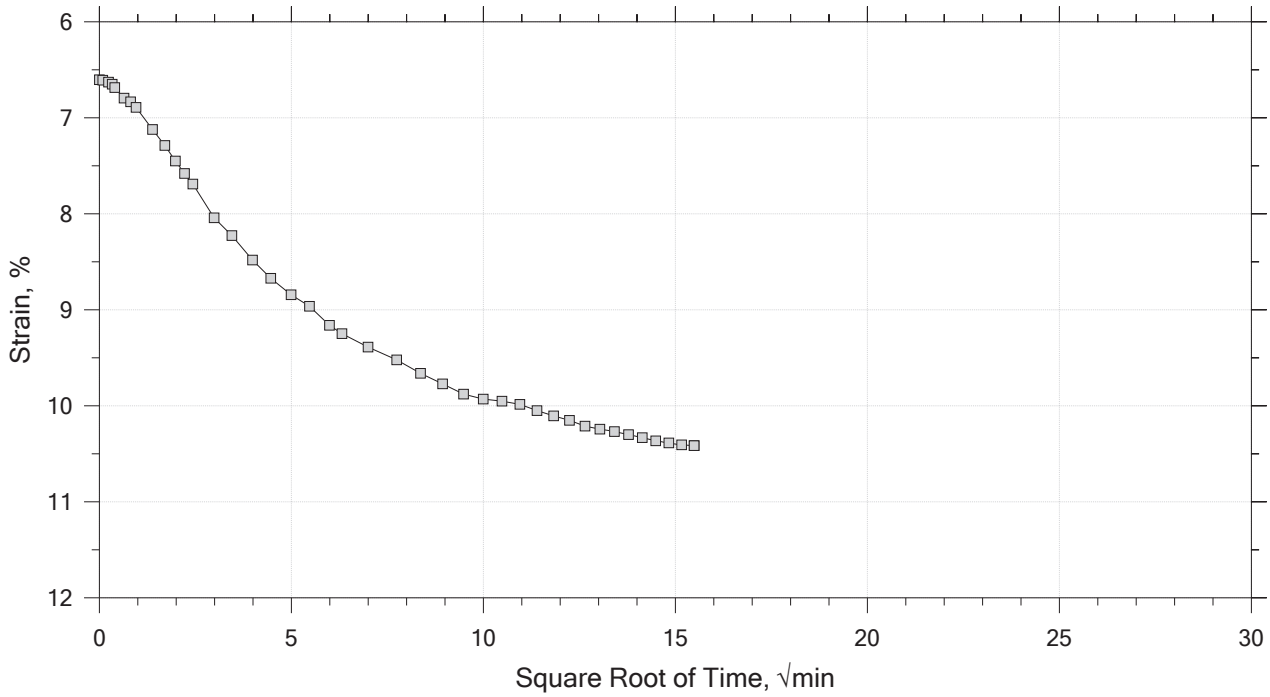


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 18
Constant Load Step
Stress: 1 tsf





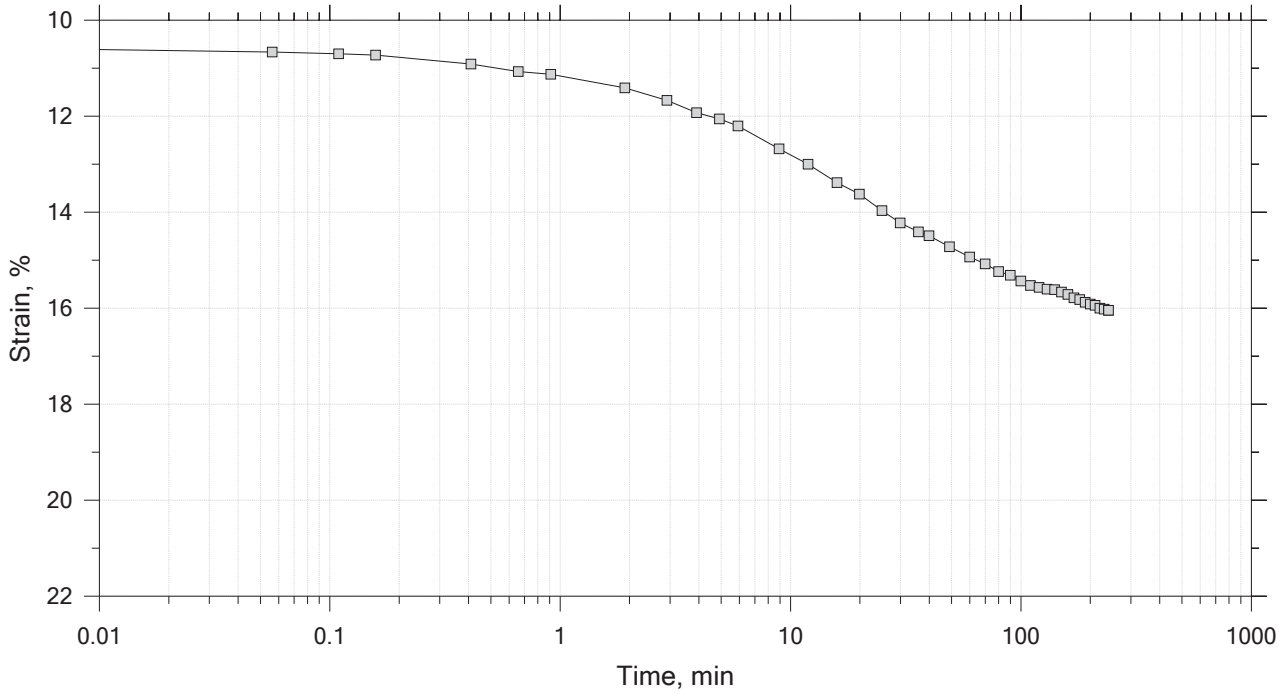
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

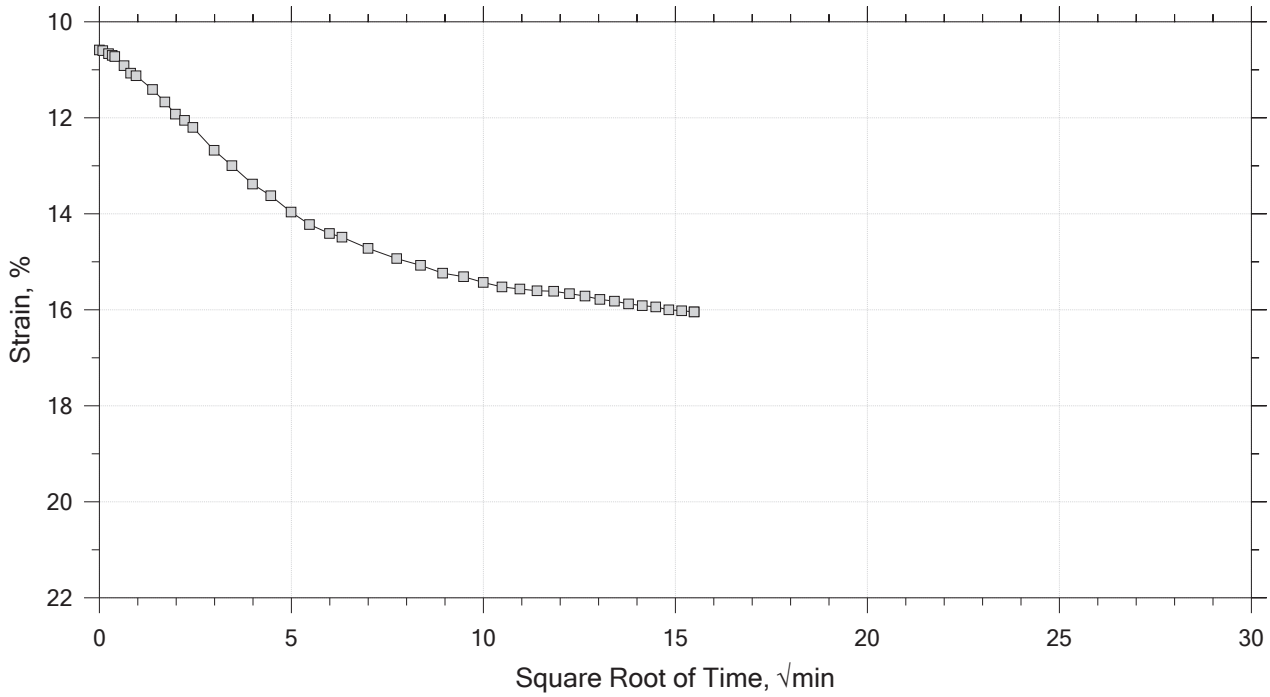
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 18

Constant Load Step

Stress: 2 tsf





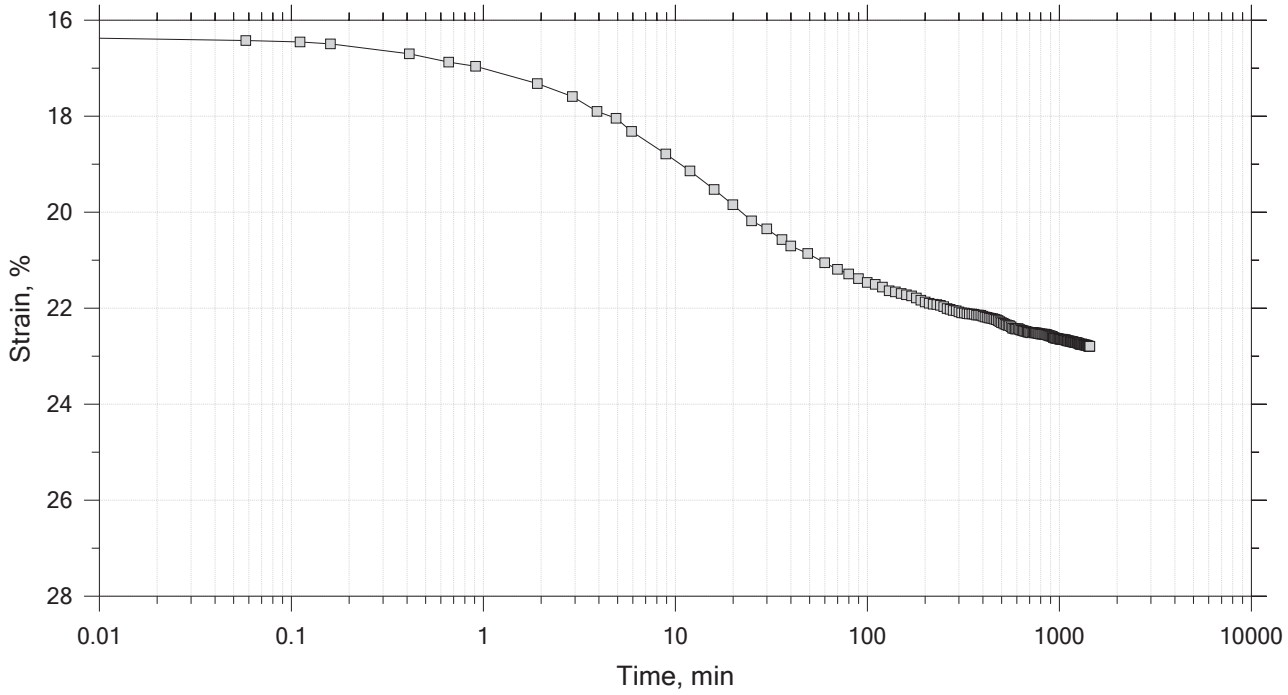
GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-2	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V		

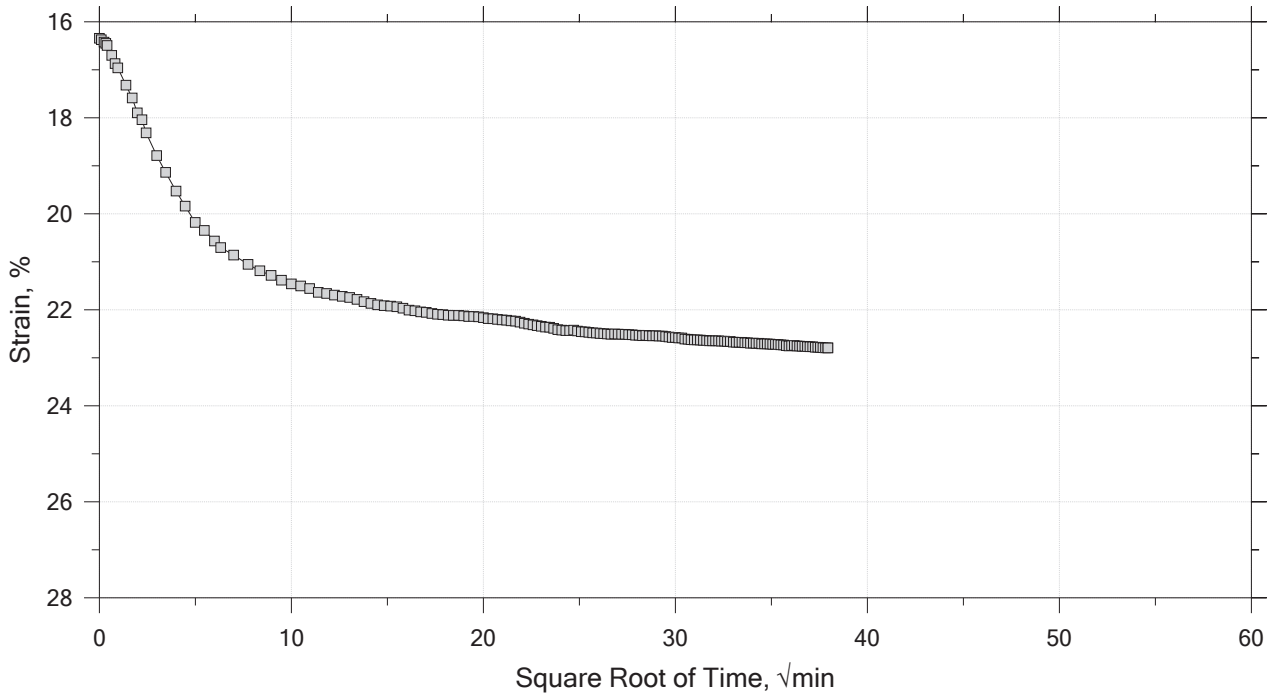
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 18

Constant Load Step

Stress: 4 tsf





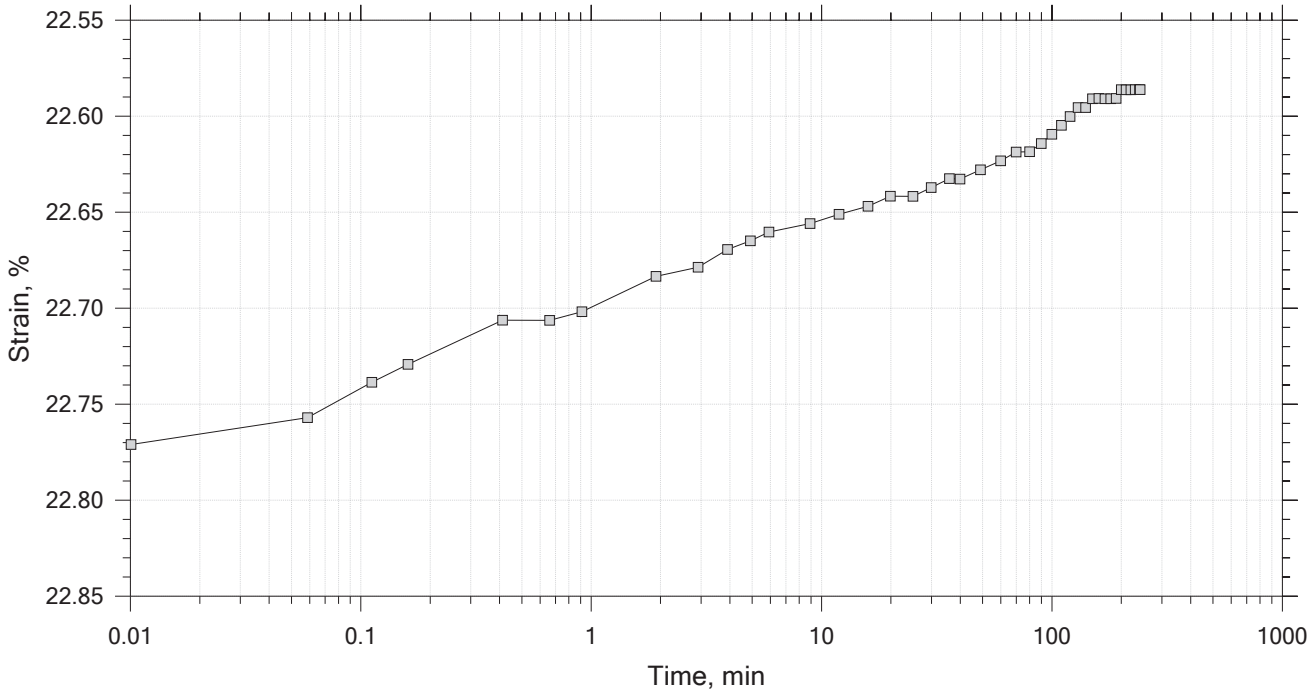
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

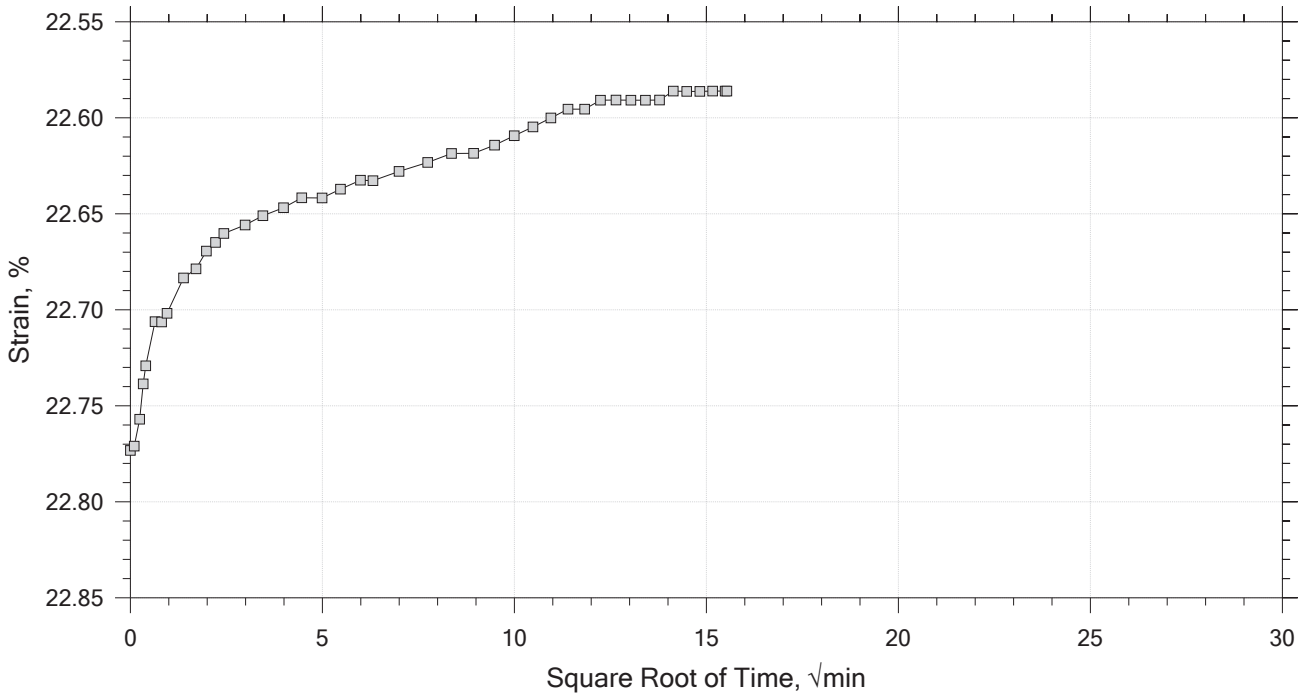
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 18

Constant Load Step

Stress: 2 tsf

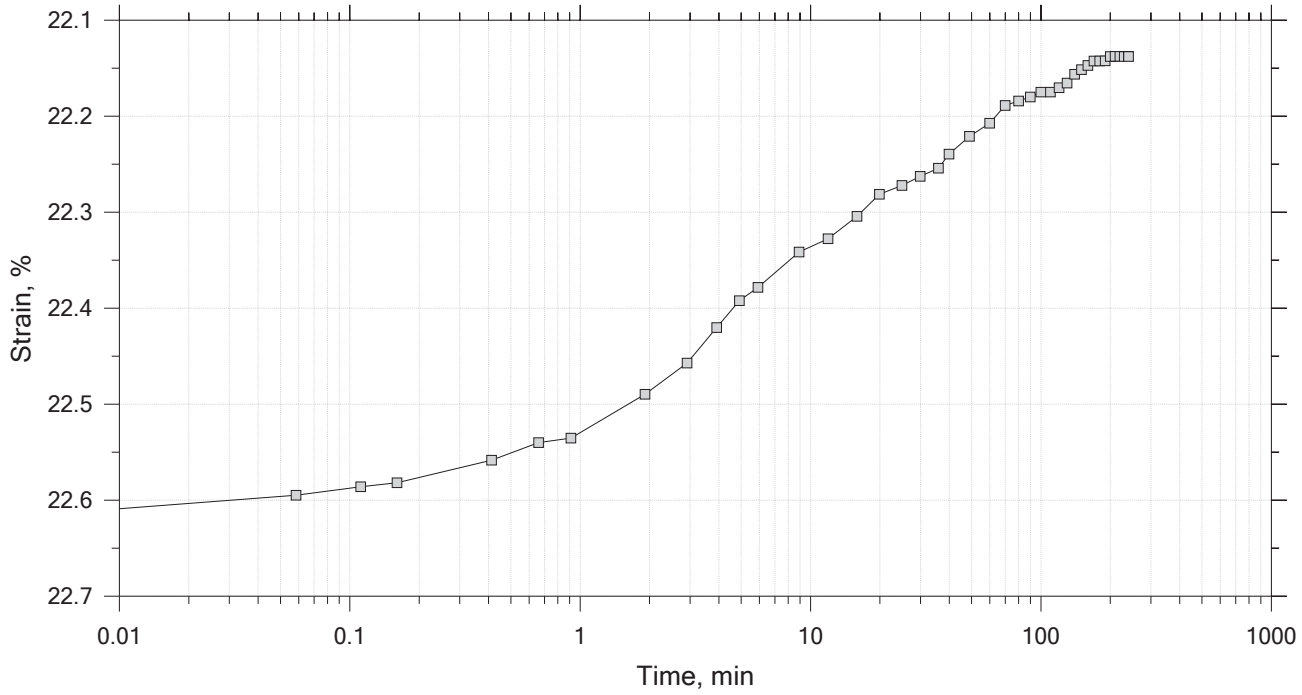


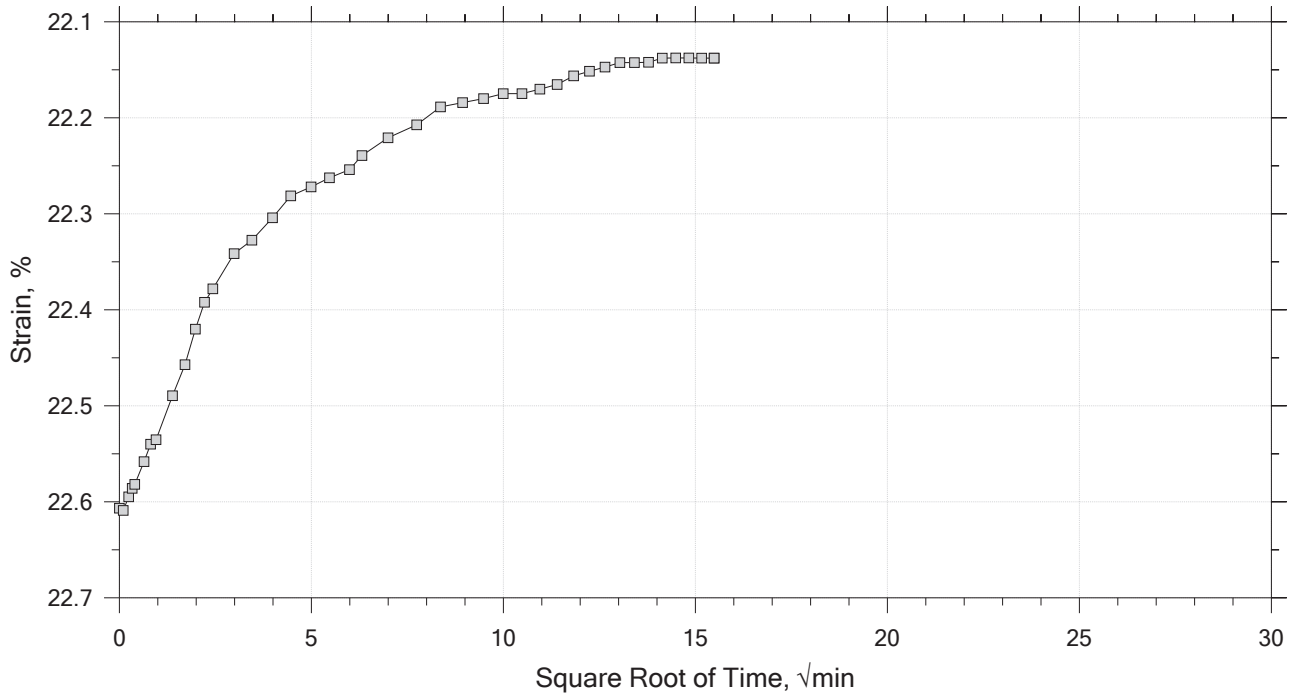


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 18
Constant Load Step
Stress: 1 tsf

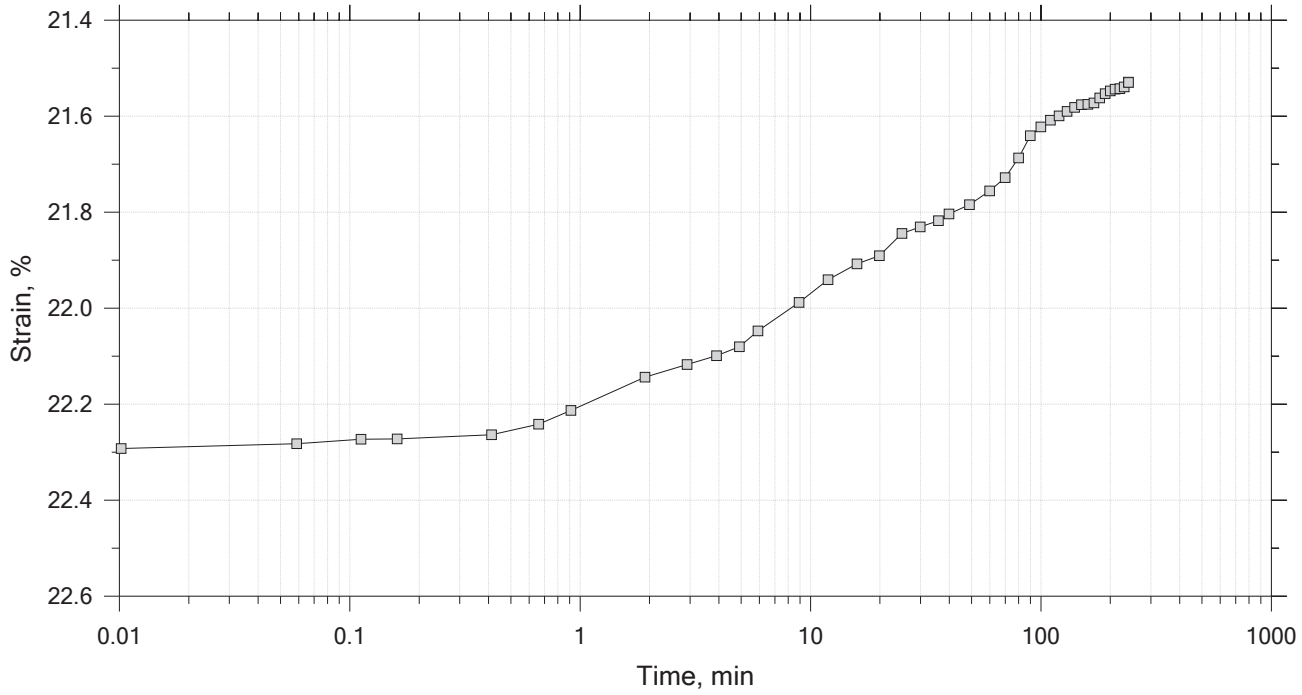


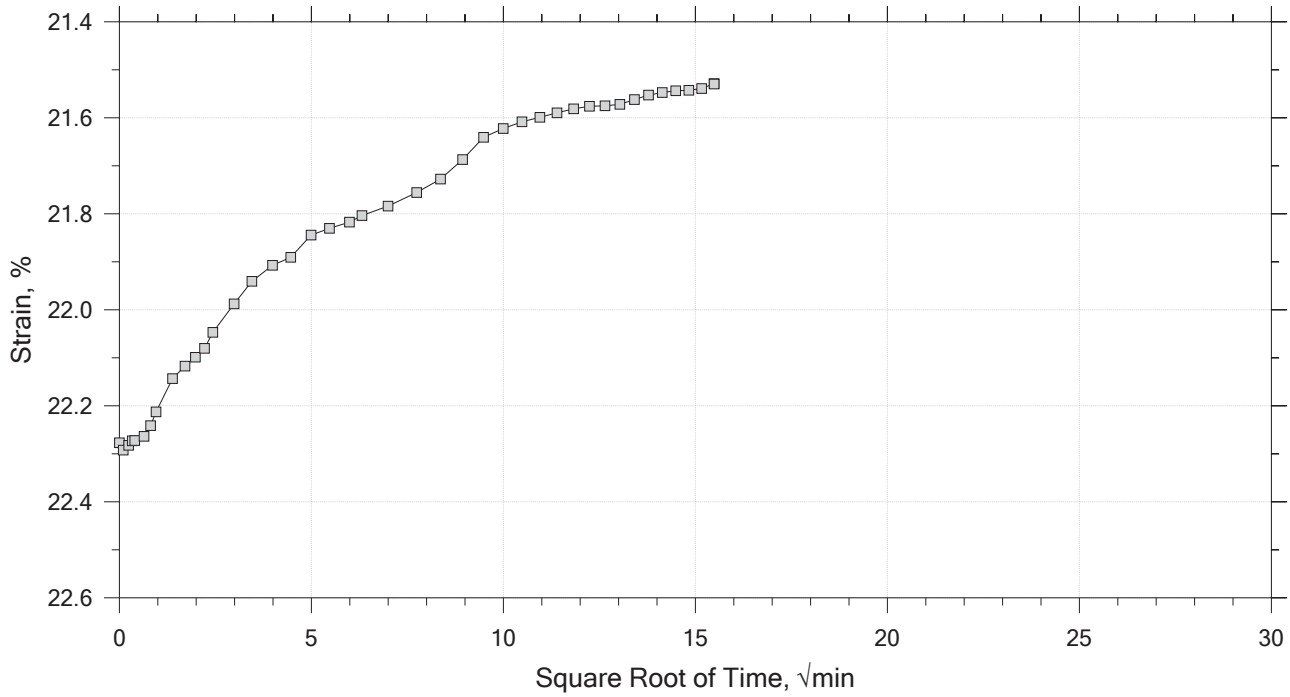


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 18
Constant Load Step
Stress: 0.5 tsf

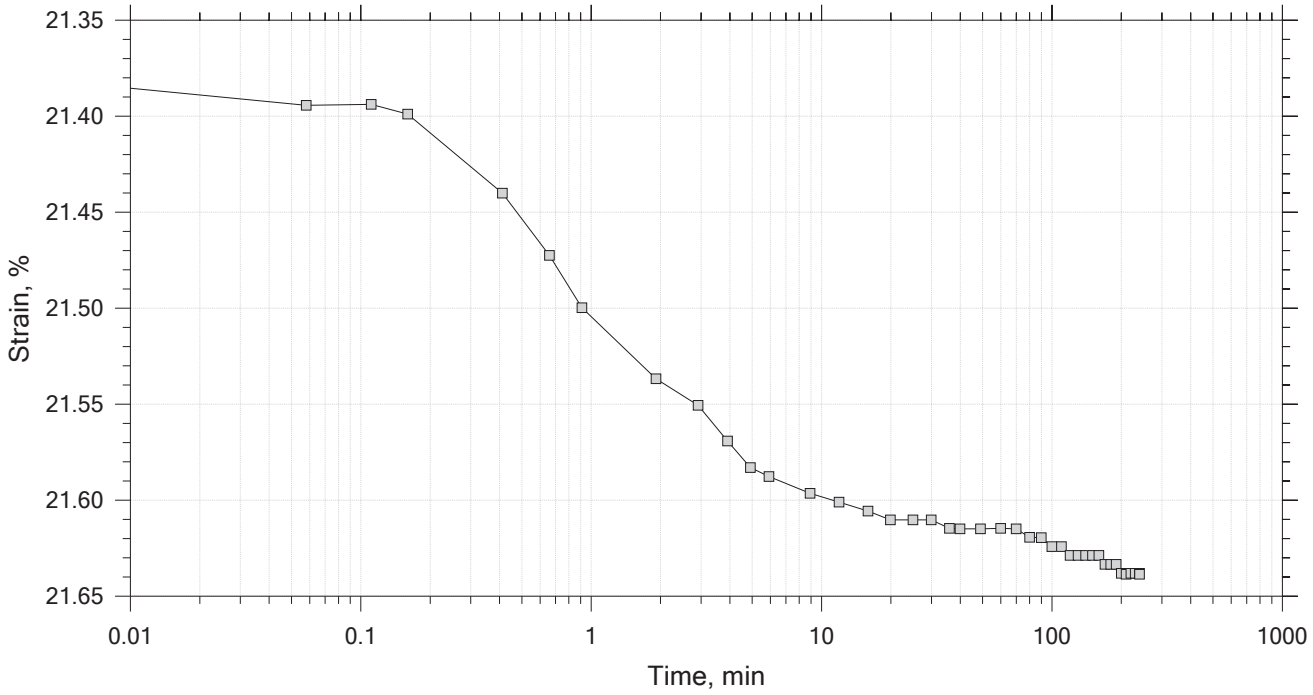


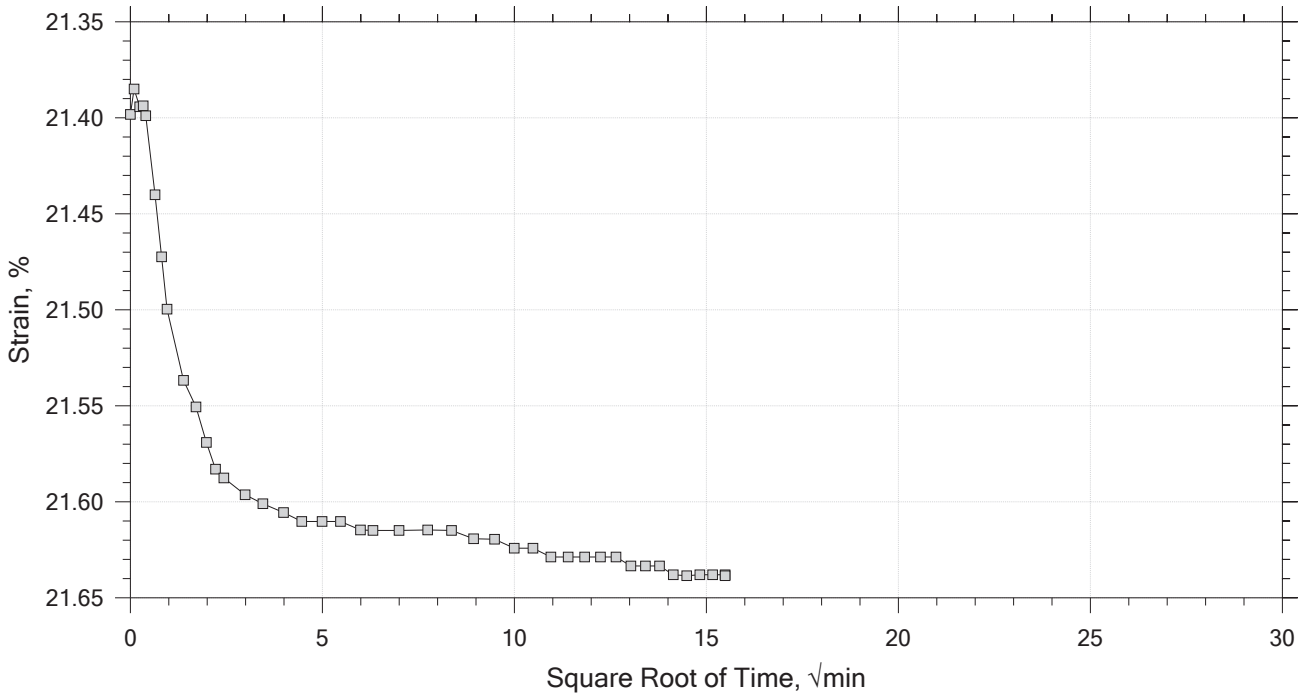


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 18
Constant Load Step
Stress: 1 tsf

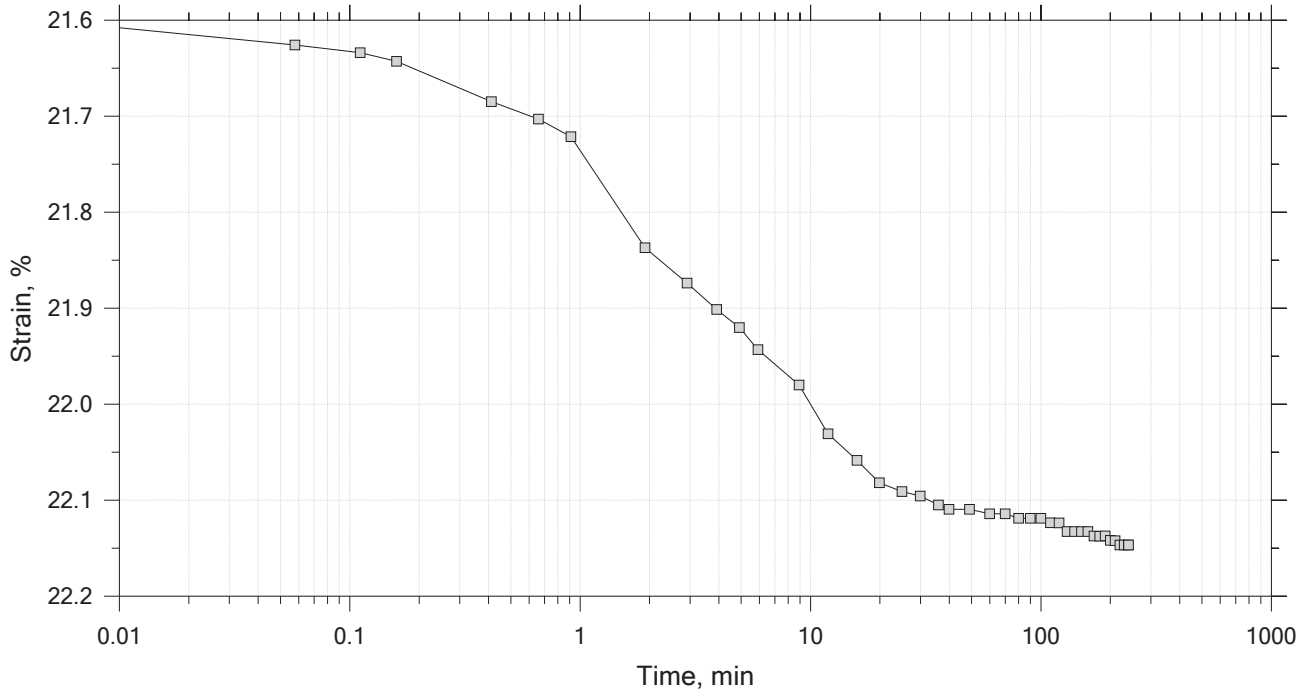


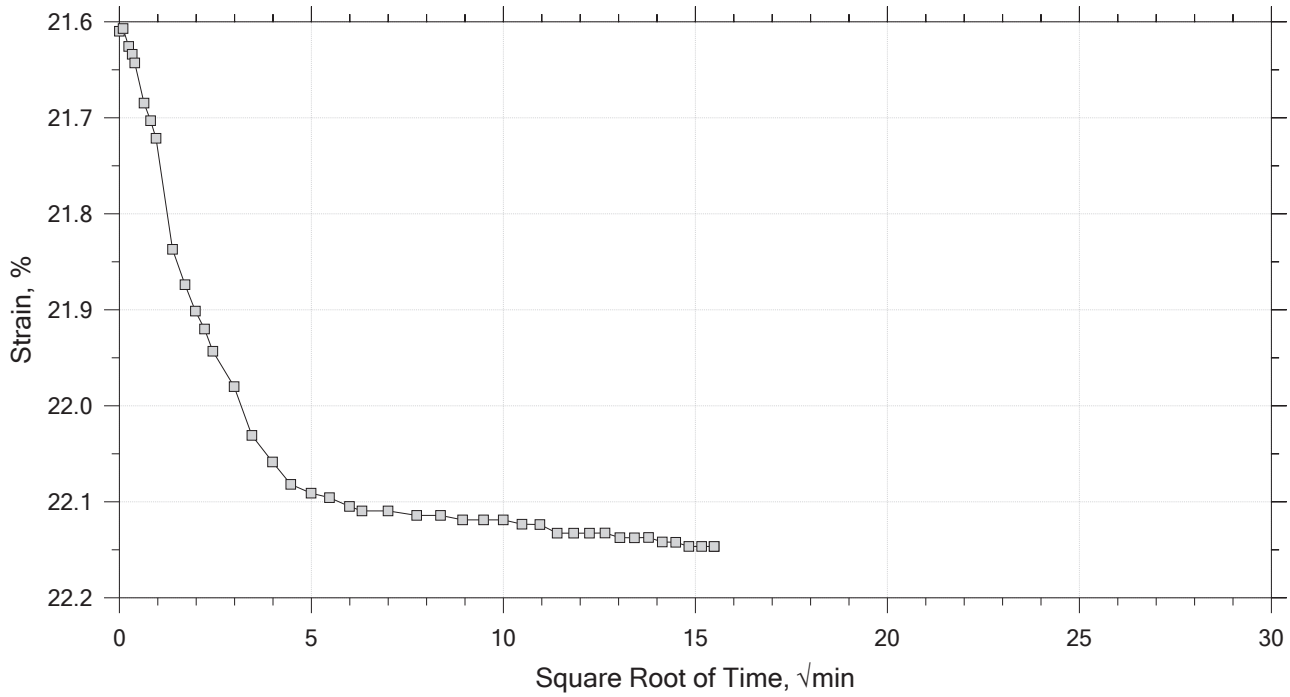


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 18
Constant Load Step
Stress: 2 tsf

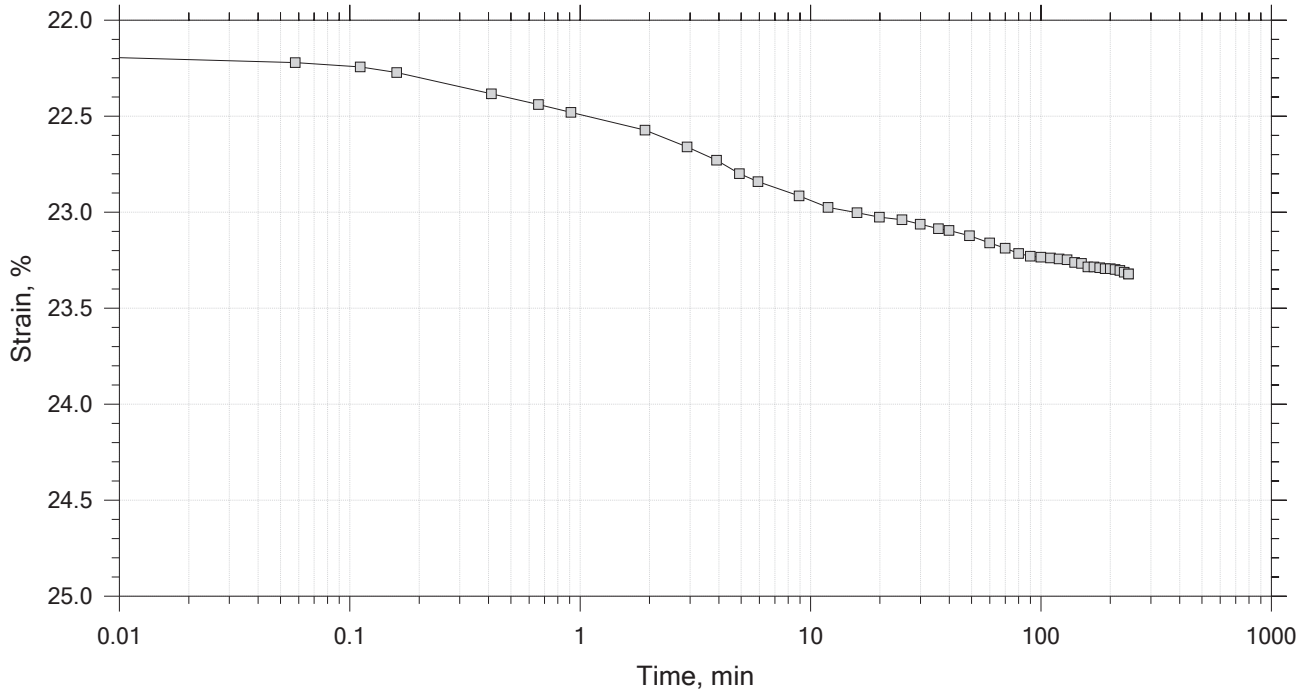


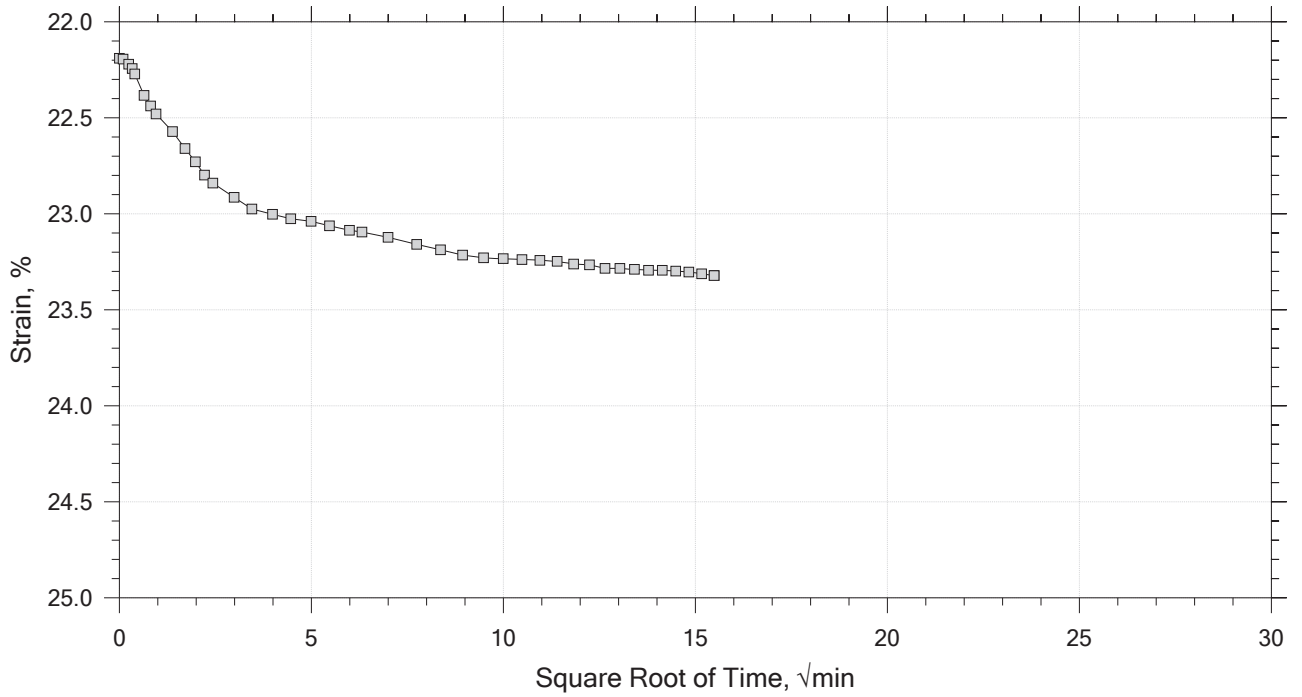


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 18
Constant Load Step
Stress: 4 tsf

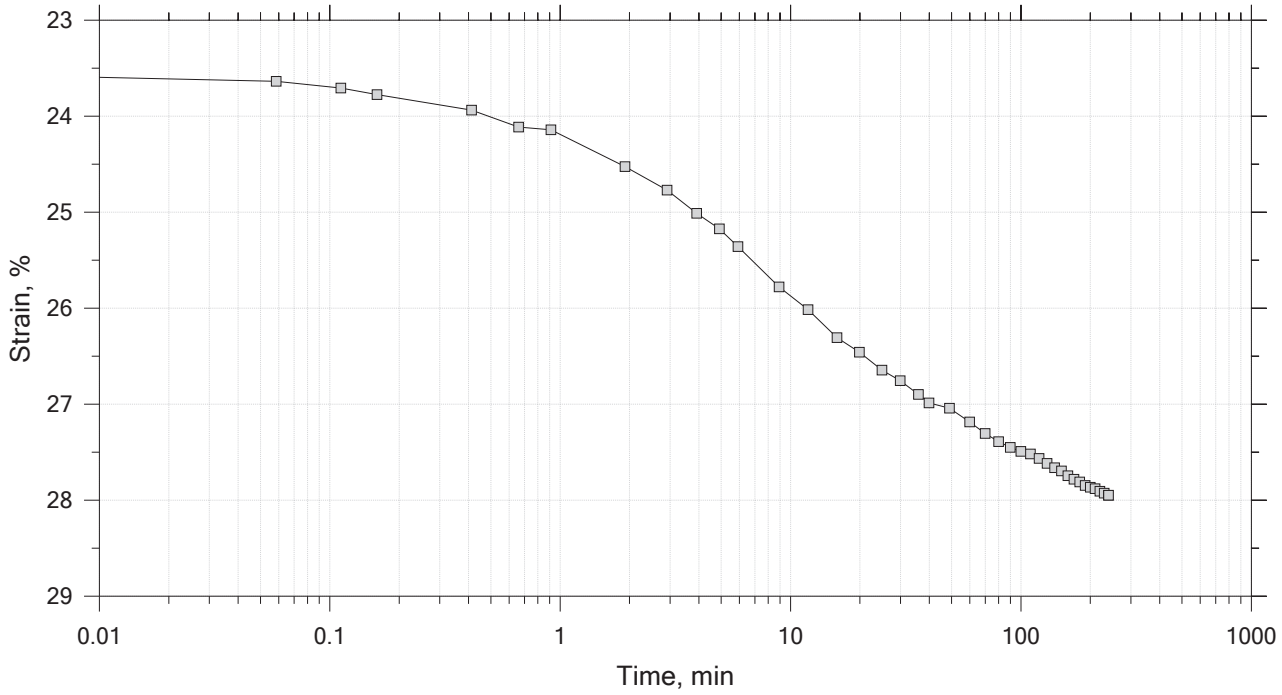


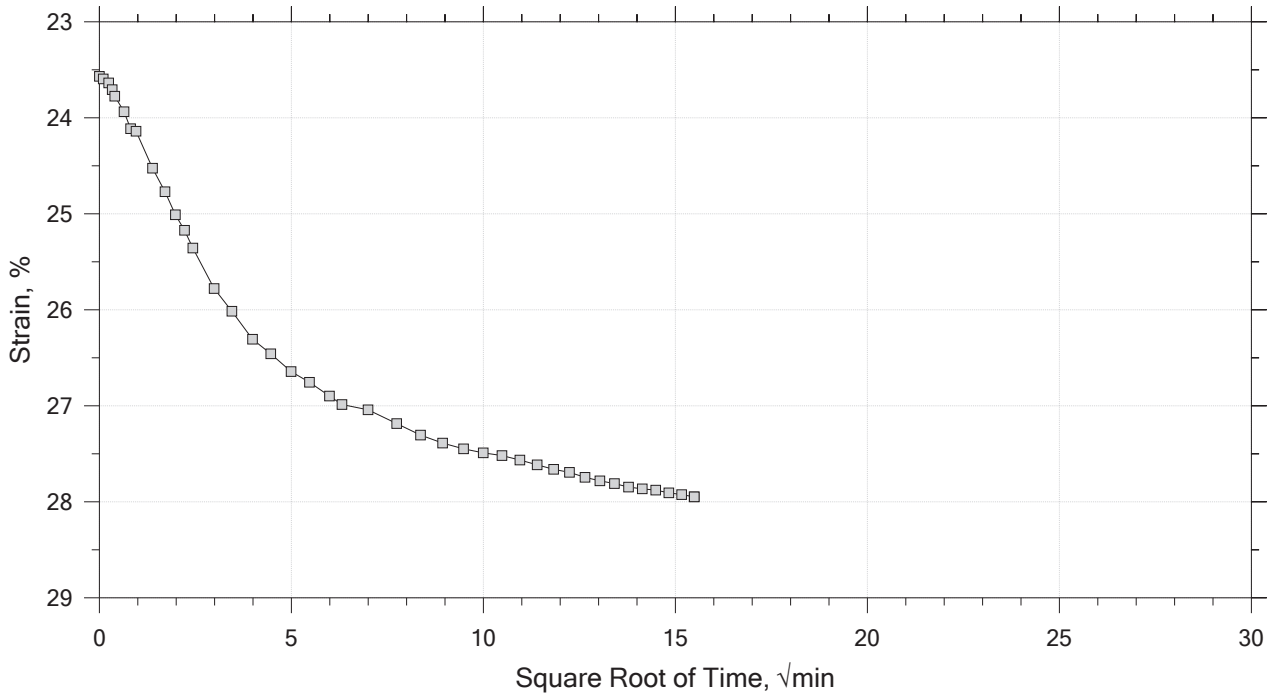


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 18
Constant Load Step
Stress: 8 tsf

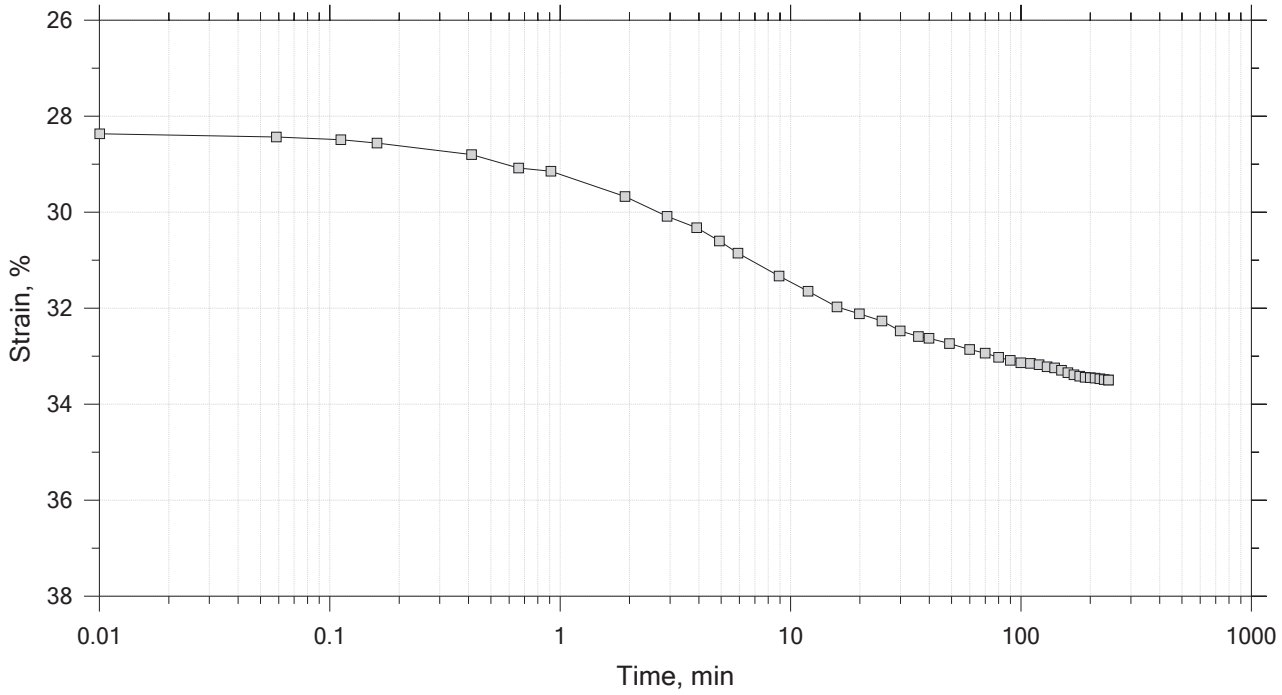


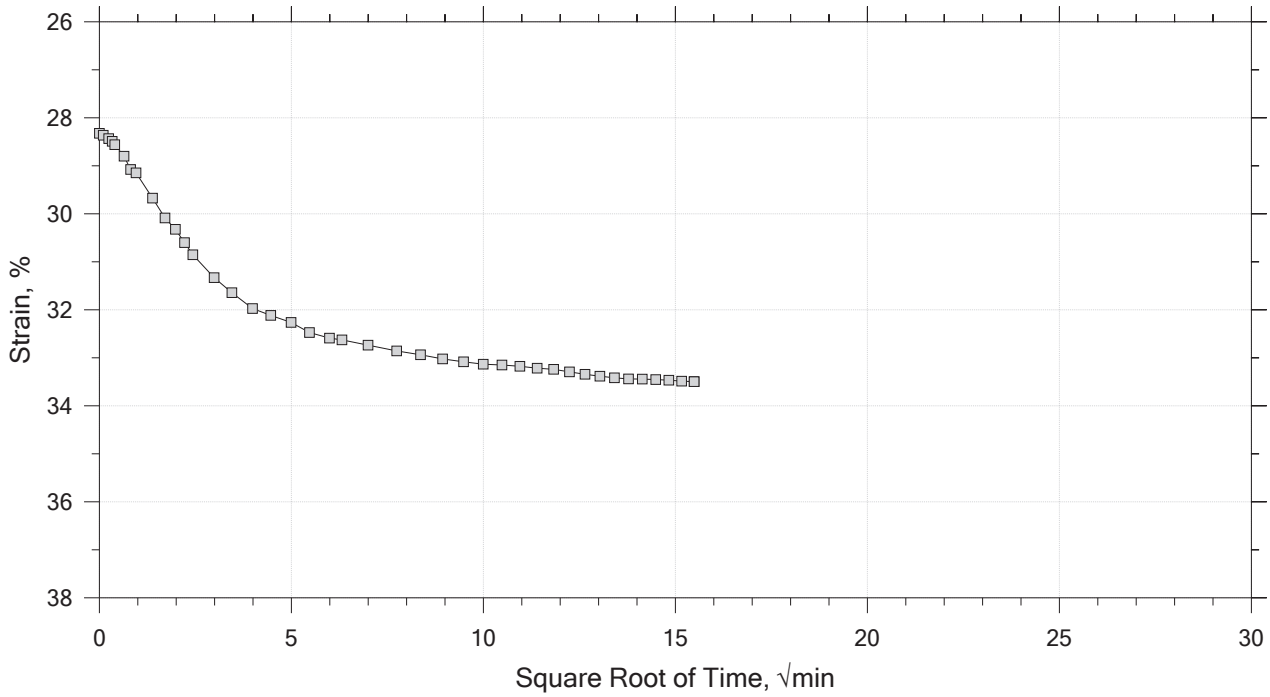


GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-2	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 18
Constant Load Step
Stress: 16 tsf

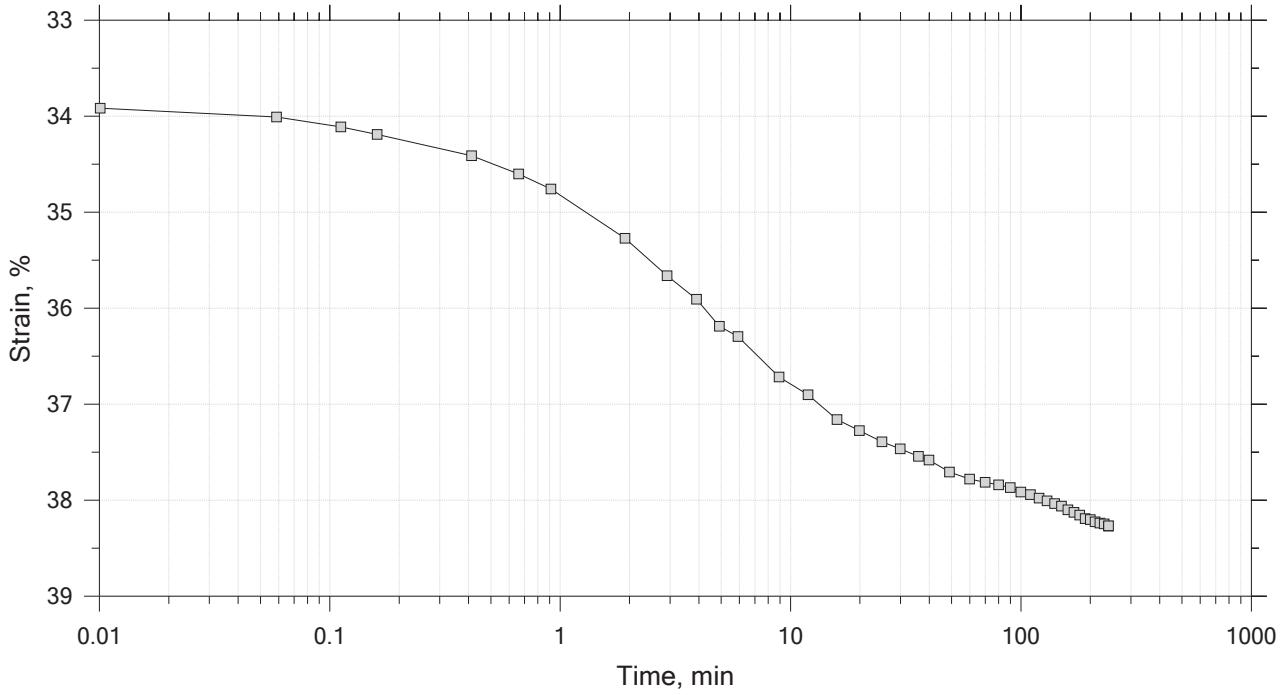


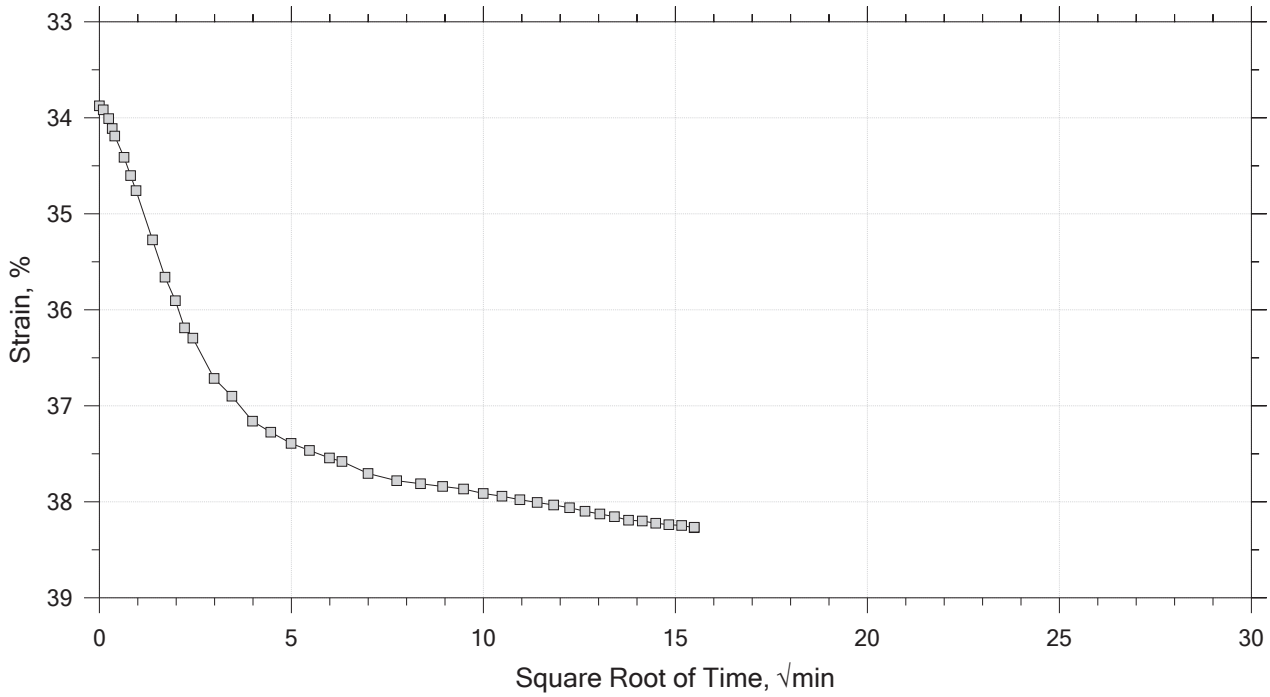


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 18
Constant Load Step
Stress: 32 tsf

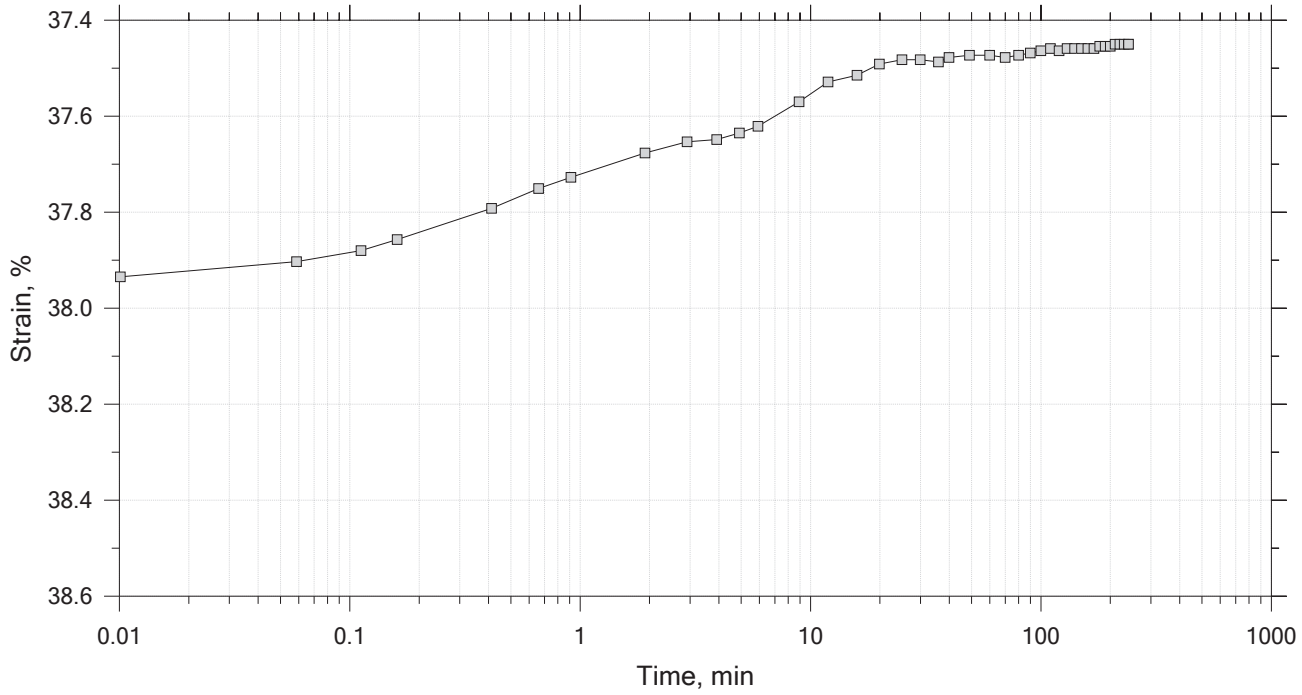


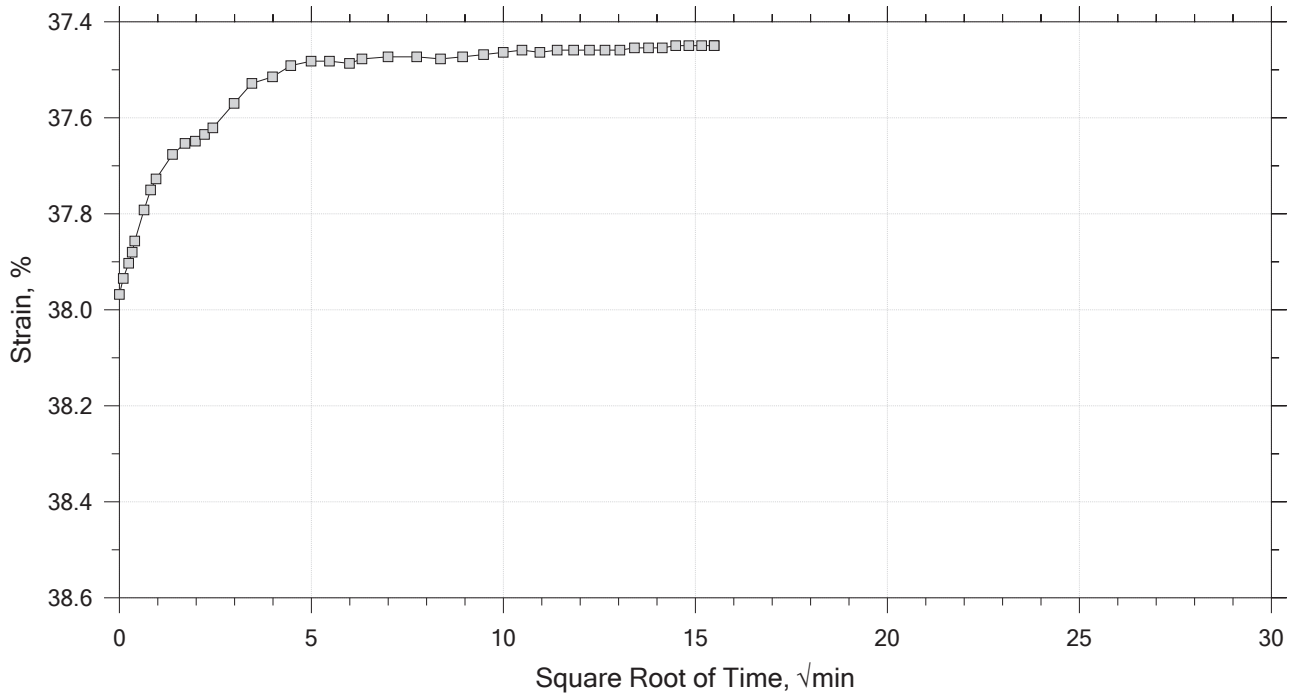


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 16 of 18
Constant Load Step
Stress: 8 tsf

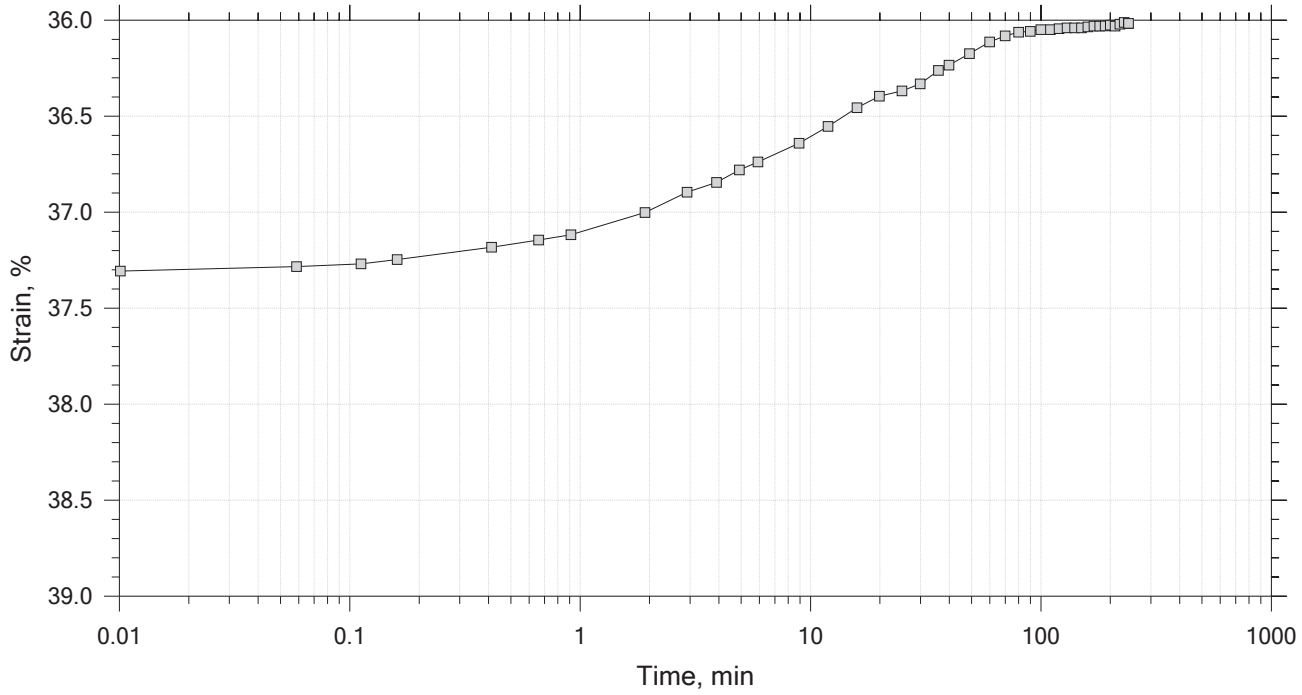


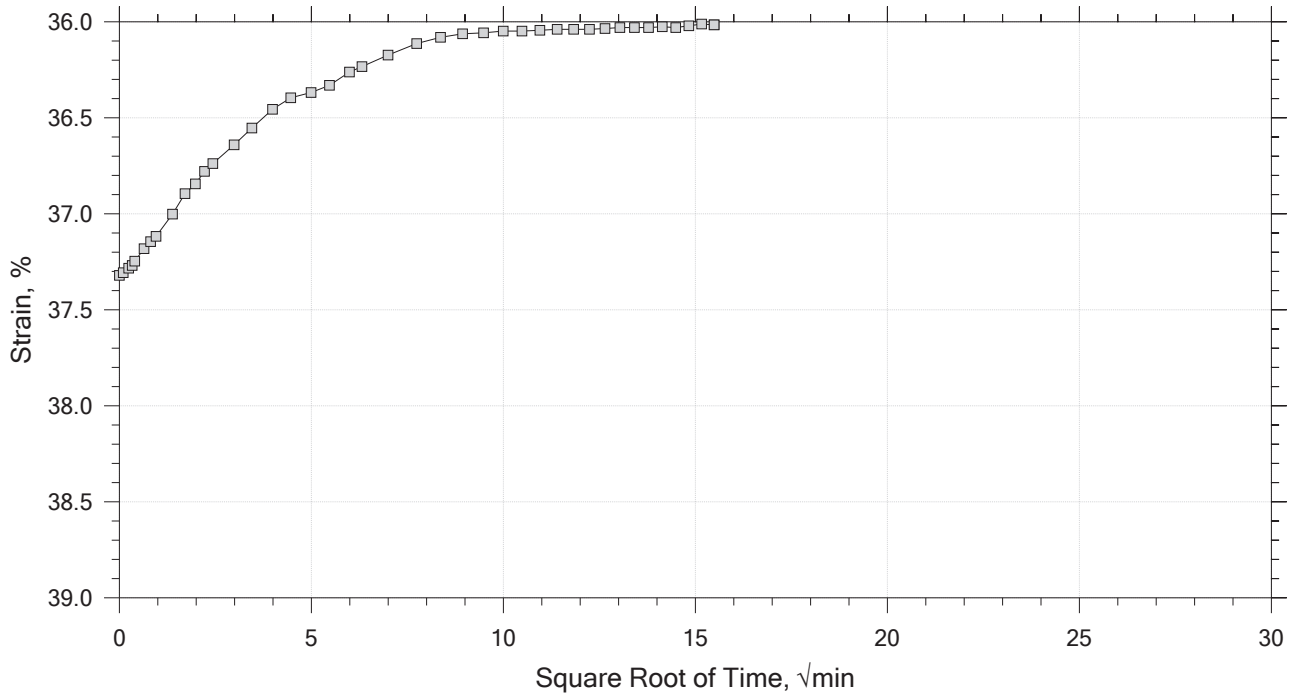


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 17 of 18
Constant Load Step
Stress: 2 tsf

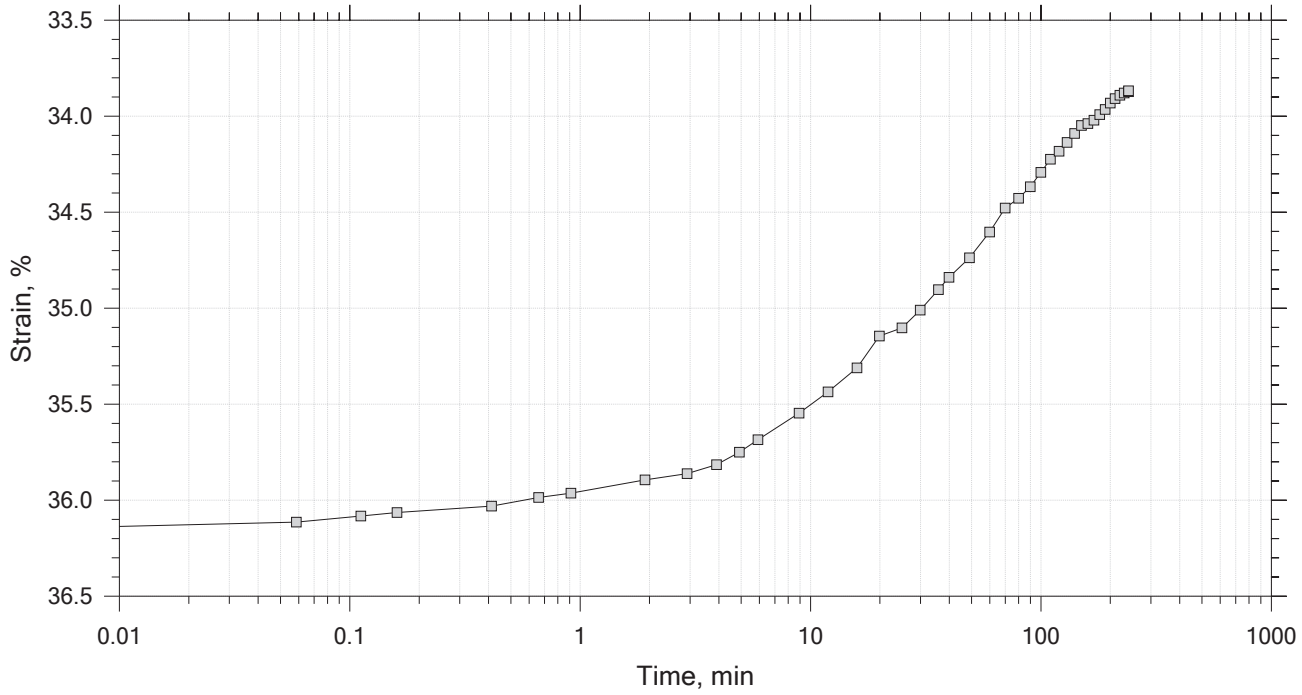


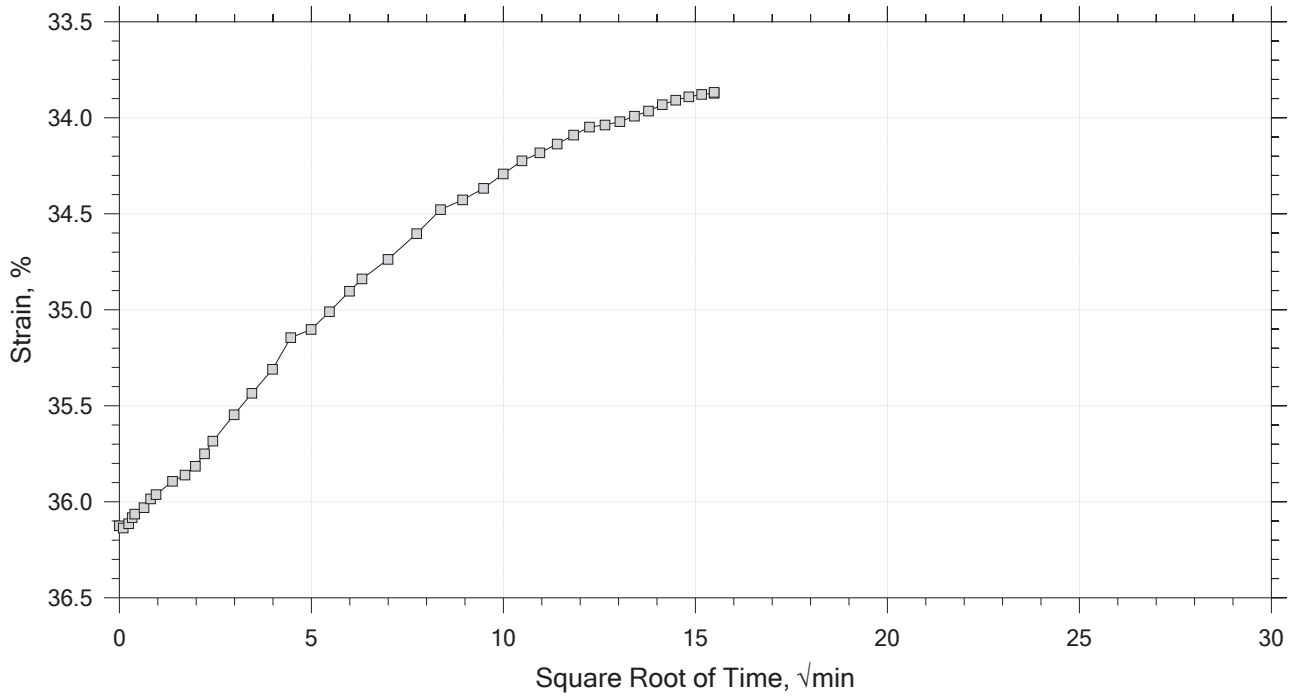


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 18 of 18
Constant Load Step
Stress: 0.5 tsf





Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-2	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---
Description: Moist, gray clay		
Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.70	Liquid Limit: 82
Initial Height: 1.00 in	Initial Void Ratio: 1.76	Plastic Limit: 36
Final Height: 0.70 in	Final Void Ratio: 0.929	Plasticity Index: 46

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	C211	RING		B-2259
Mass Container, gm	8.44	107.99	107.99	8.38
Mass Container + Wet Soil, gm	125.11	237.32	214	111.68
Mass Container + Dry Soil, gm	79.57	186.88	186.88	85.25
Mass Dry Soil, gm	71.13	78.887	78.887	76.87
Water Content, %	64.02	63.94	34.38	34.38
Void Ratio	---	1.76	0.93	---
Degree of Saturation, %	---	98.42	100.00	---
Dry Unit Weight, pcf	---	61.223	87.461	---

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.

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-2	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.125	0.02139	1.70	2.14	0.000	0.00e+00	1.71e-01	0.00e+00	0.00e+00
2	0.250	0.04090	1.64	4.09	21.244	2.52e-07	1.56e-01	1.06e-04	0.00e+00
3	0.500	0.06543	1.58	6.54	13.404	3.81e-07	9.81e-02	1.01e-04	0.00e+00
4	1.00	0.1042	1.47	10.4	12.790	3.73e-07	7.75e-02	7.80e-05	0.00e+00
5	2.00	0.1604	1.31	16.0	11.958	3.59e-07	5.63e-02	5.45e-05	0.00e+00
6	4.00	0.2279	1.13	22.8	0.000	0.00e+00	3.38e-02	0.00e+00	0.00e+00
7	2.00	0.2259	1.13	22.6	0.000	0.00e+00	1.04e-03	0.00e+00	0.00e+00
8	1.00	0.2214	1.15	22.1	3.985	8.62e-07	4.48e-03	1.04e-05	0.00e+00
9	0.500	0.2153	1.16	21.5	0.000	0.00e+00	1.22e-02	0.00e+00	0.00e+00
10	1.00	0.2164	1.16	21.6	0.845	4.15e-06	2.18e-03	2.44e-05	0.00e+00
11	2.00	0.2215	1.15	22.1	1.833	1.90e-06	5.08e-03	2.60e-05	0.00e+00
12	4.00	0.2332	1.11	23.3	2.850	1.19e-06	5.88e-03	1.89e-05	0.00e+00
13	8.00	0.2795	0.986	27.9	5.710	5.52e-07	1.16e-02	1.72e-05	0.00e+00
14	16.0	0.3350	0.833	33.5	4.465	6.13e-07	6.93e-03	1.15e-05	0.00e+00
15	32.0	0.3827	0.702	38.3	2.770	8.46e-07	2.98e-03	6.80e-06	0.00e+00
16	8.00	0.3745	0.724	37.4	0.000	0.00e+00	3.40e-04	0.00e+00	0.00e+00
17	2.00	0.3602	0.764	36.0	0.000	0.00e+00	2.39e-03	0.00e+00	0.00e+00
18	0.500	0.3387	0.823	33.9	0.000	0.00e+00	1.43e-02	0.00e+00	0.00e+00

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-2	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

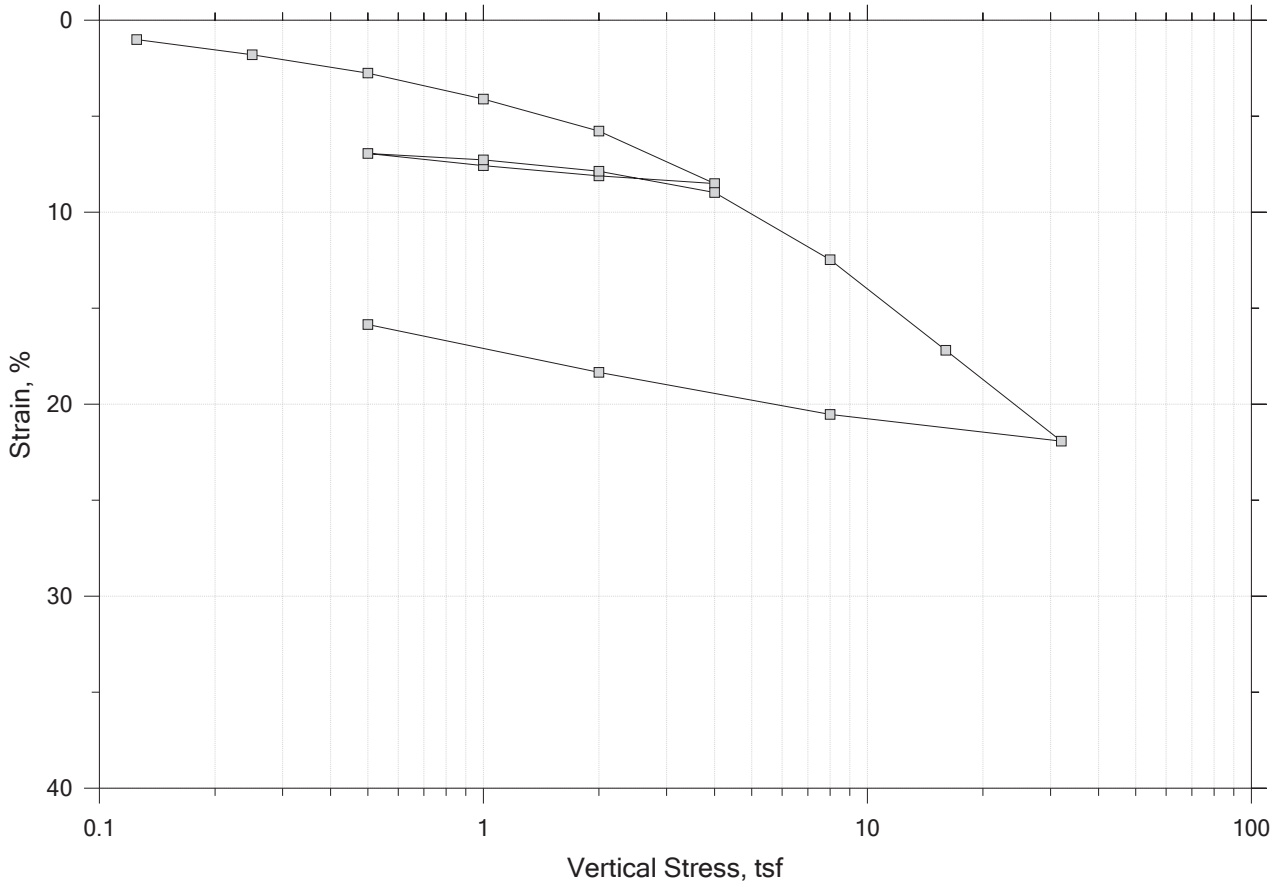
Square Root of Time Coefficients

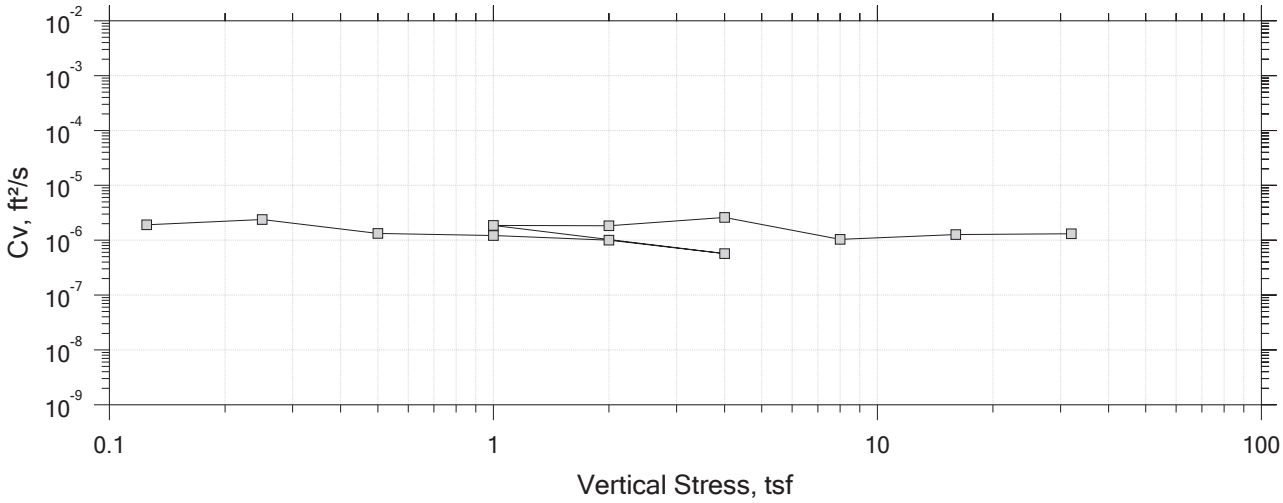
Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.125	0.02139	1.70	2.14	77.198	3.11e-07	1.71e-01	1.44e-04
2	0.250	0.04090	1.64	4.09	55.711	4.13e-07	1.56e-01	1.74e-04
3	0.500	0.06543	1.58	6.54	51.346	4.28e-07	9.81e-02	1.13e-04
4	1.00	0.1042	1.47	10.4	53.822	3.82e-07	7.75e-02	7.98e-05
5	2.00	0.1604	1.31	16.0	49.628	3.72e-07	5.63e-02	5.65e-05
6	4.00	0.2279	1.13	22.8	141.074	1.13e-07	3.38e-02	1.03e-05
7	2.00	0.2259	1.13	22.6	19.861	7.38e-07	1.04e-03	2.07e-06
8	1.00	0.2214	1.15	22.1	22.529	6.56e-07	4.48e-03	7.94e-06
9	0.500	0.2153	1.16	21.5	100.880	1.49e-07	1.22e-02	4.88e-06
10	1.00	0.2164	1.16	21.6	5.891	2.56e-06	2.18e-03	1.50e-05
11	2.00	0.2215	1.15	22.1	13.620	1.10e-06	5.08e-03	1.51e-05
12	4.00	0.2332	1.11	23.3	12.930	1.13e-06	5.88e-03	1.80e-05
13	8.00	0.2795	0.986	27.9	25.319	5.36e-07	1.16e-02	1.67e-05
14	16.0	0.3350	0.833	33.5	21.853	5.39e-07	6.93e-03	1.01e-05
15	32.0	0.3827	0.702	38.3	16.702	6.04e-07	2.98e-03	4.86e-06
16	8.00	0.3745	0.724	37.4	16.410	5.77e-07	3.40e-04	5.29e-07
17	2.00	0.3602	0.764	36.0	22.226	4.42e-07	2.39e-03	2.85e-06
18	0.500	0.3387	0.823	33.9	134.292	7.73e-08	1.43e-02	2.99e-06

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-2	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 14-16.3 ft
	Test No.: IP-2	Sample Type: intact	Elevation: ---
	Description: Moist, gray clay		
	Remarks: System V		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

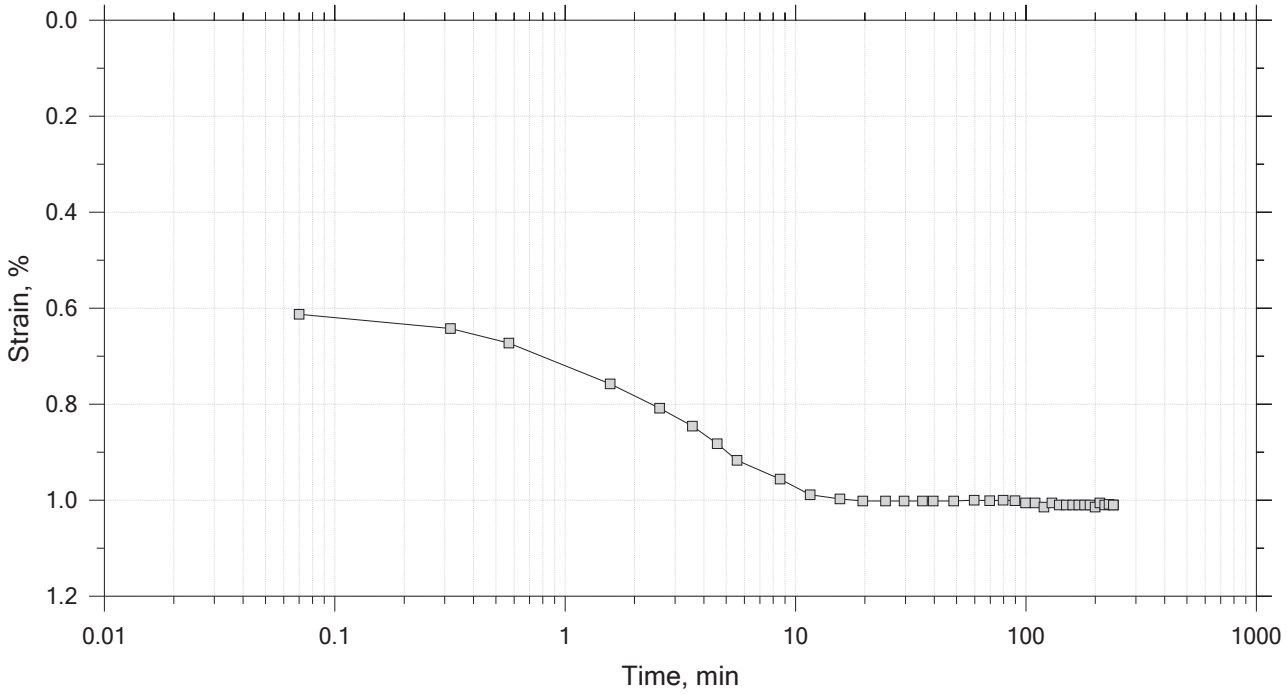


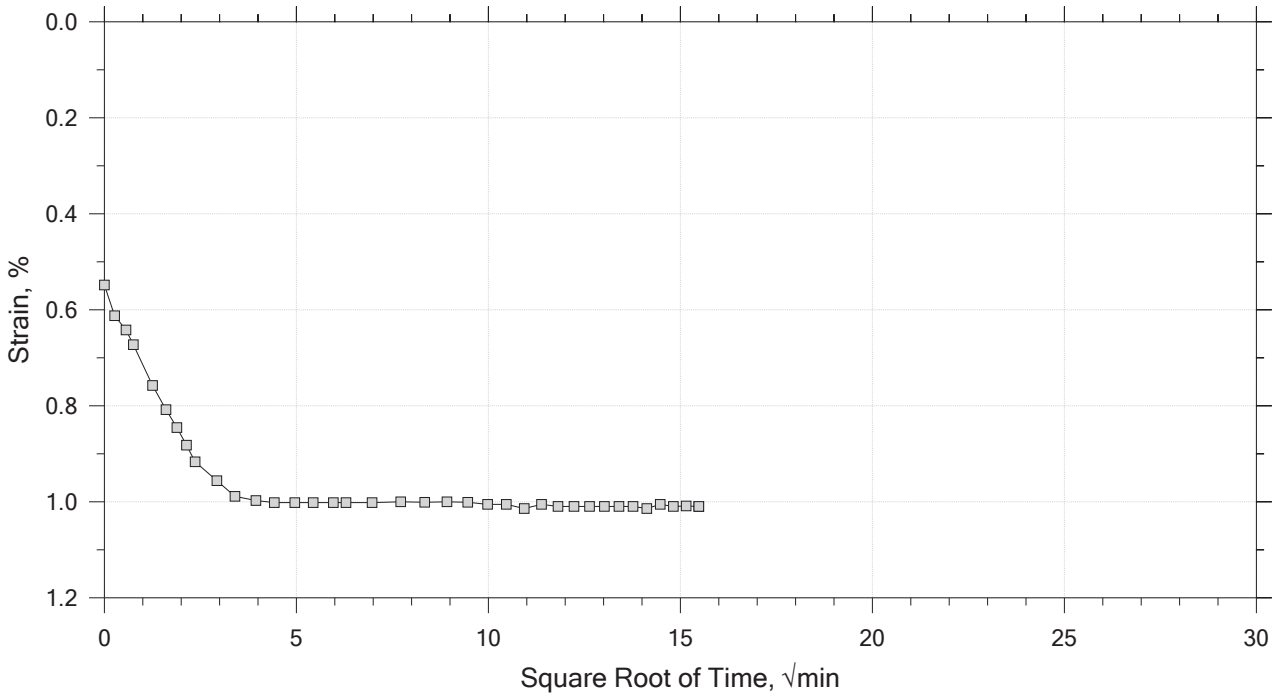


GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 18
Constant Load Step
Stress: 0.125 tsf





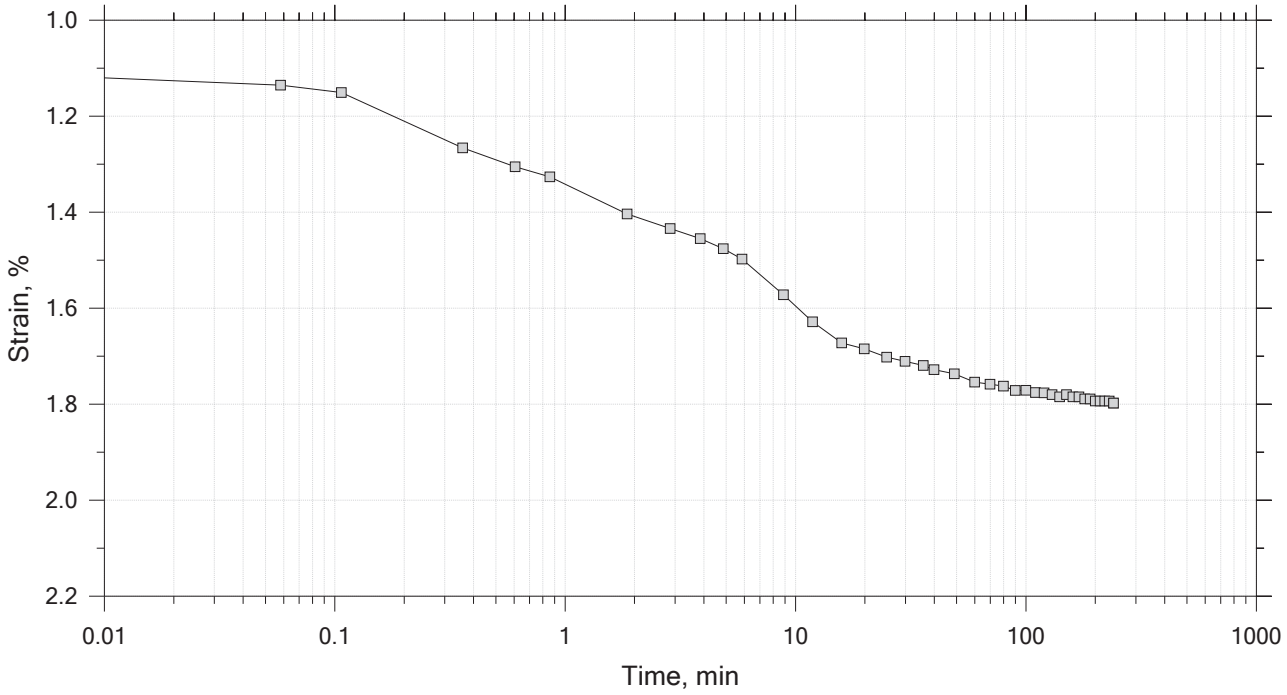
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

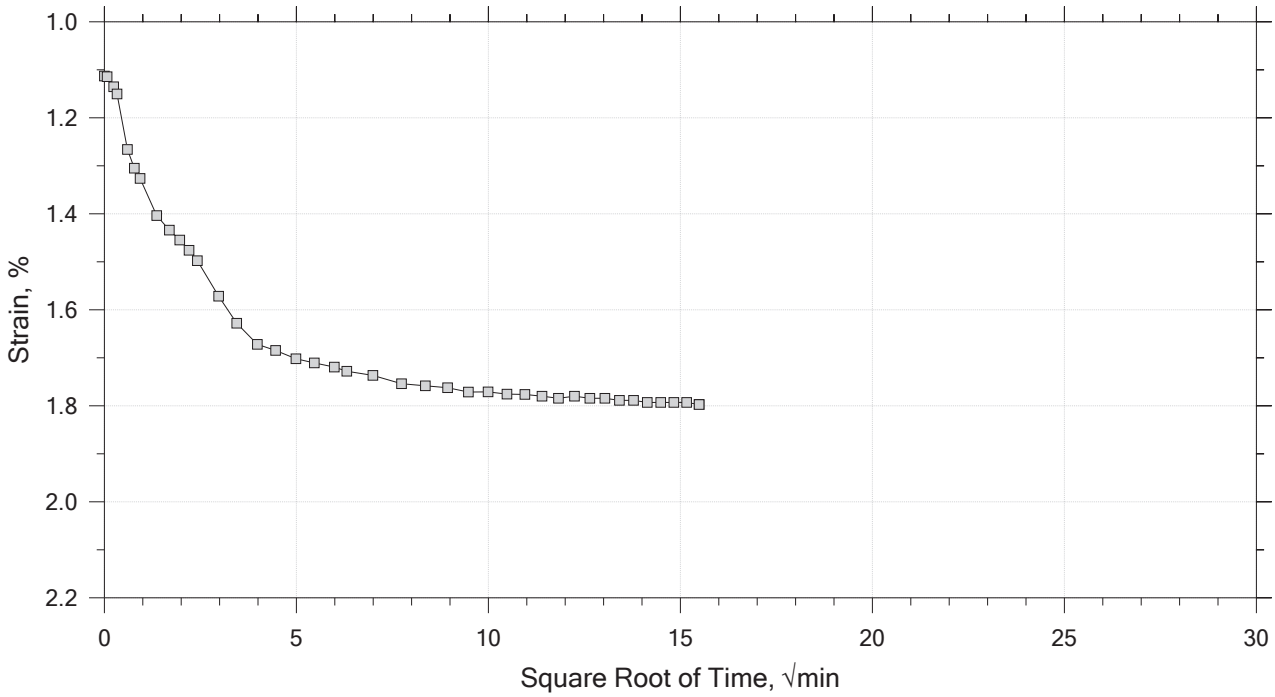
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 18

Constant Load Step

Stress: 0.25 tsf

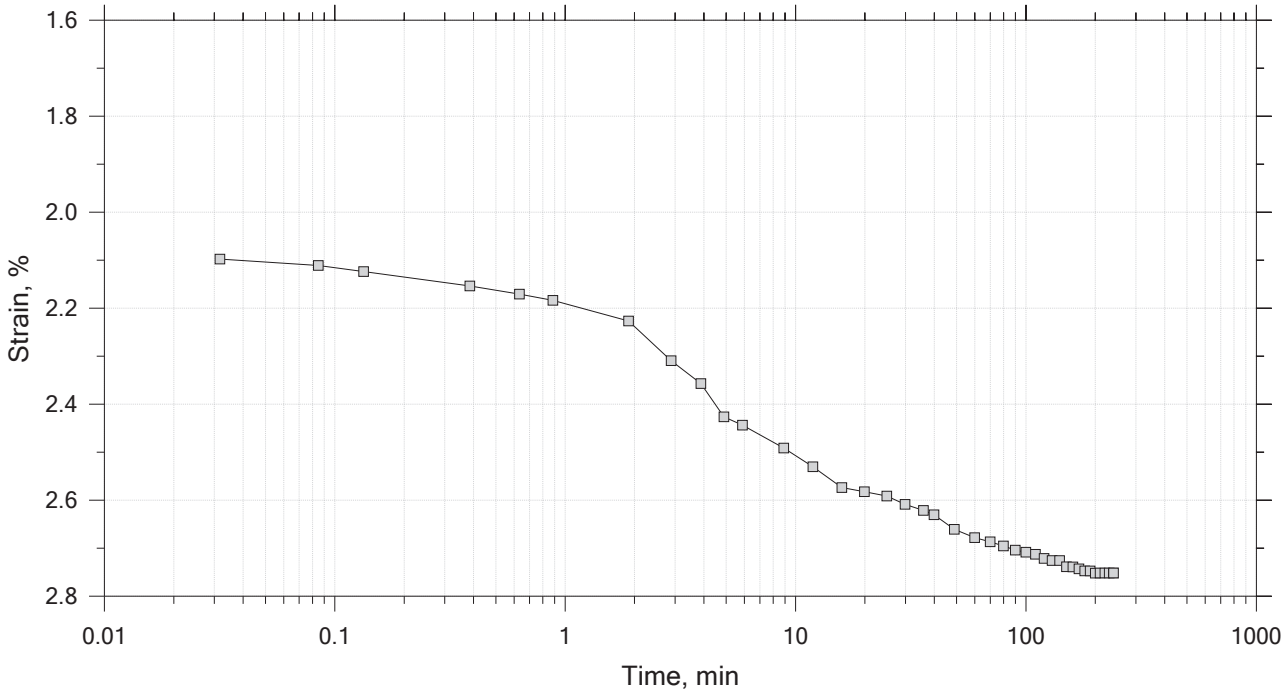


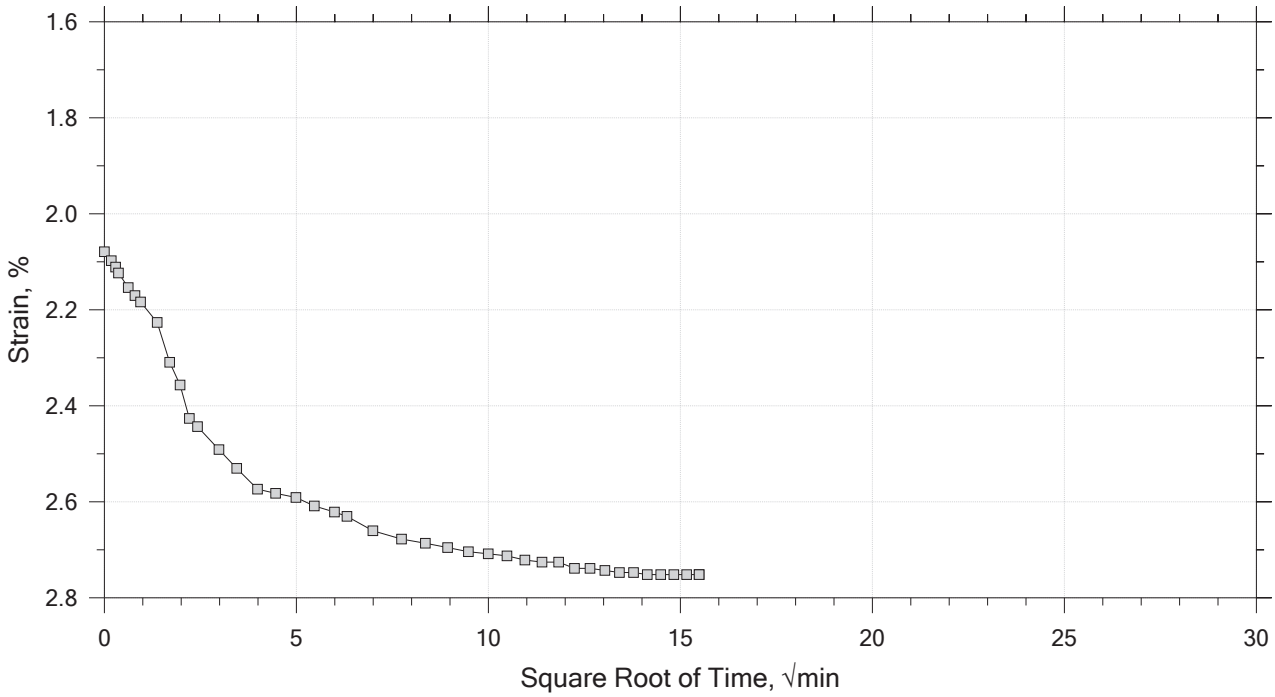


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 18
Constant Load Step
Stress: 0.5 tsf

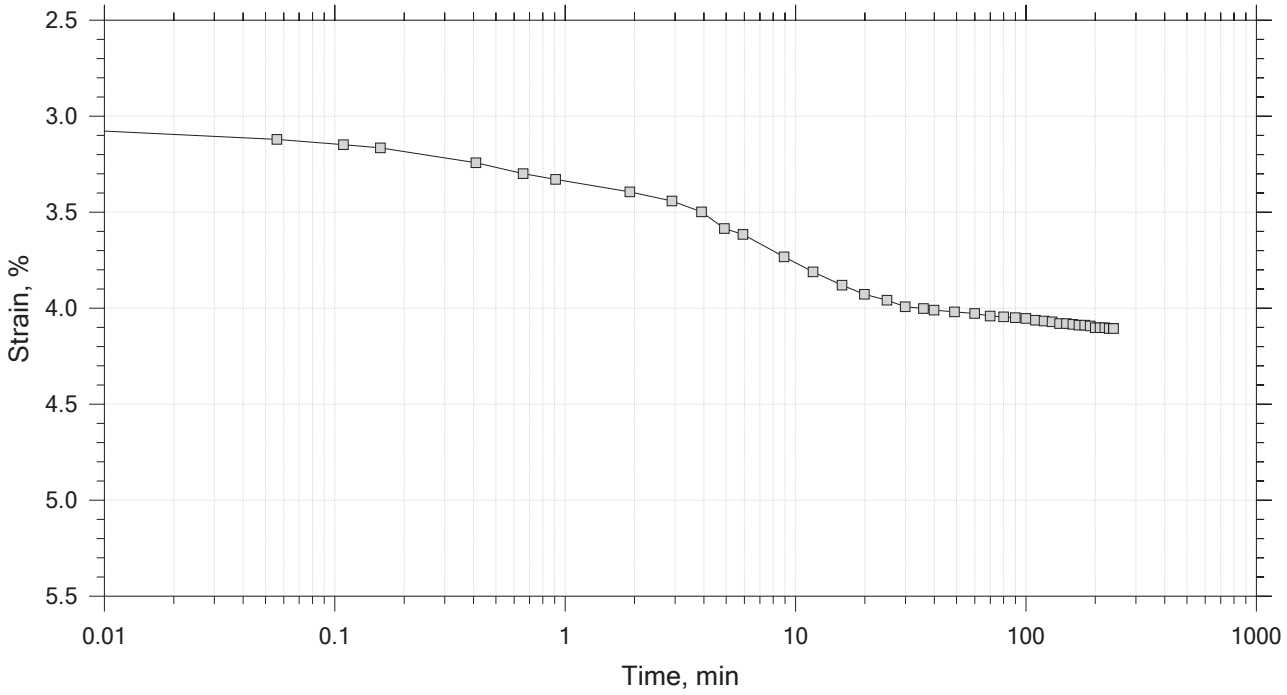


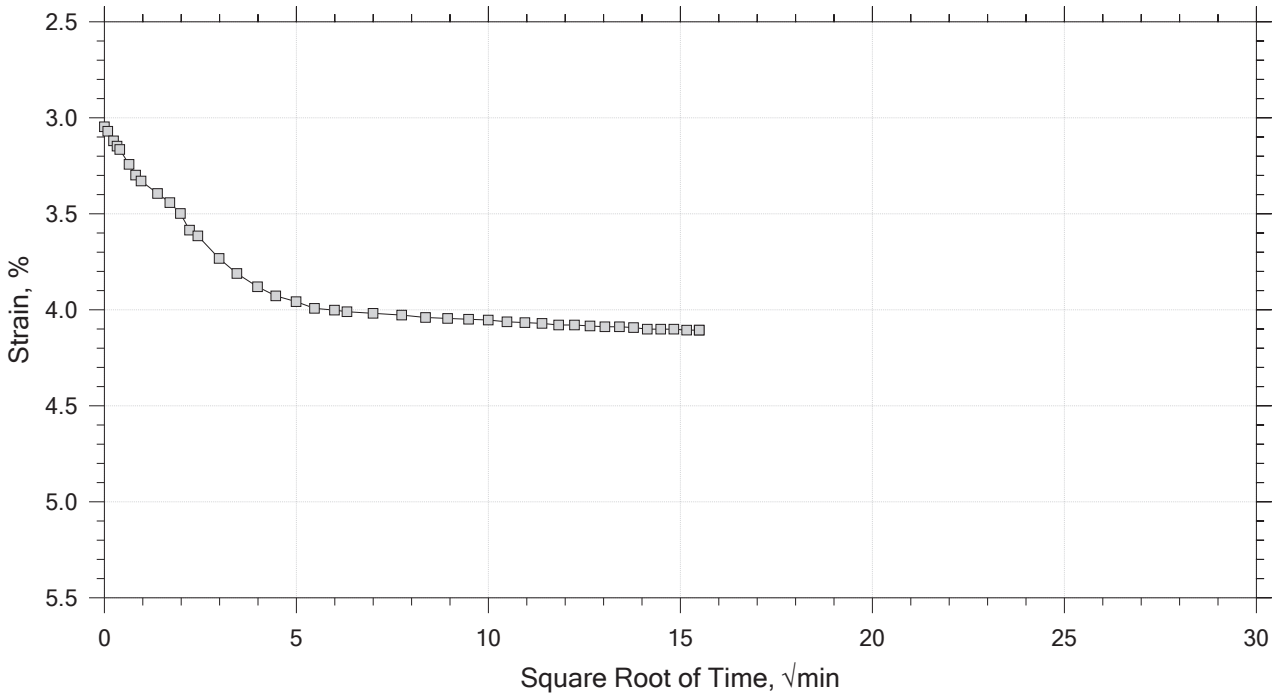


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 18
Constant Load Step
Stress: 1 tsf





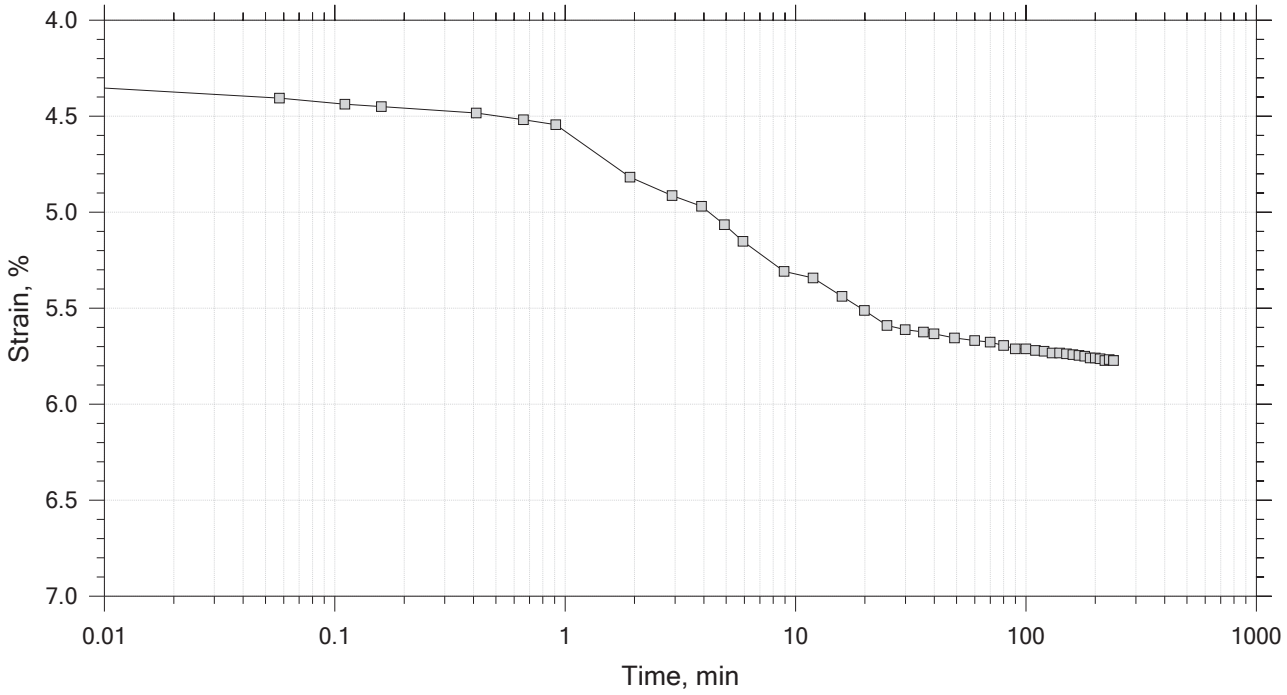
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

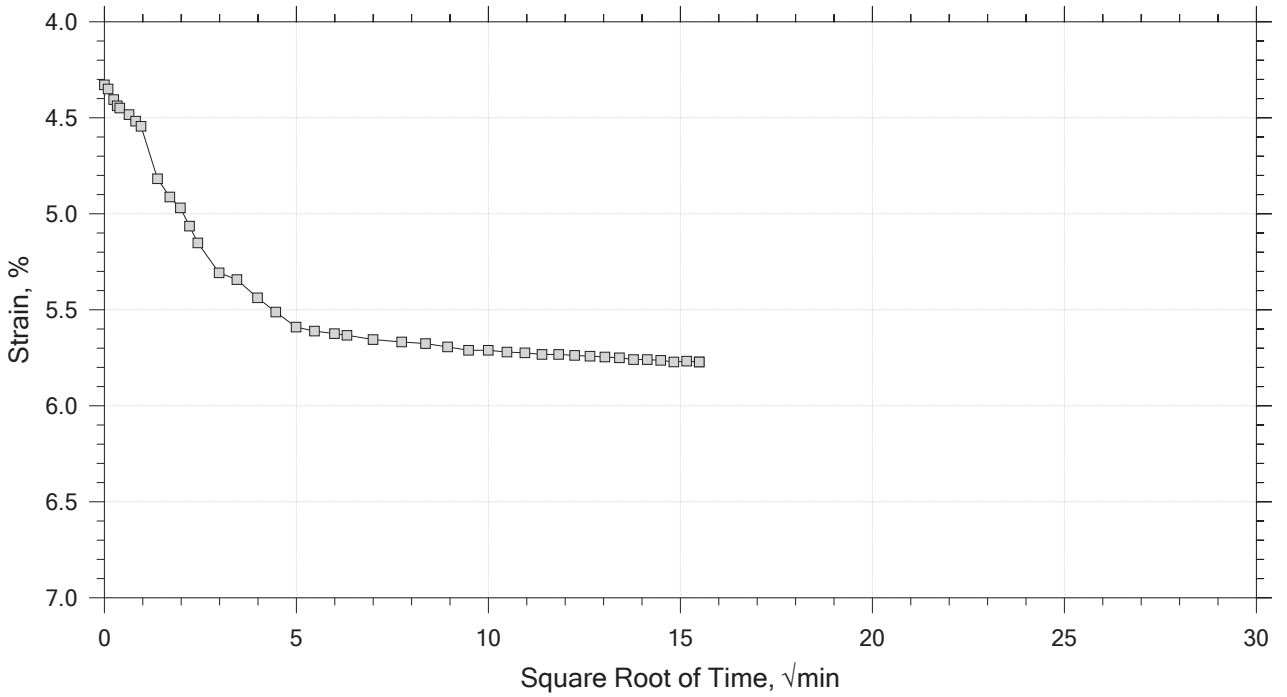
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 18

Constant Load Step

Stress: 2 tsf





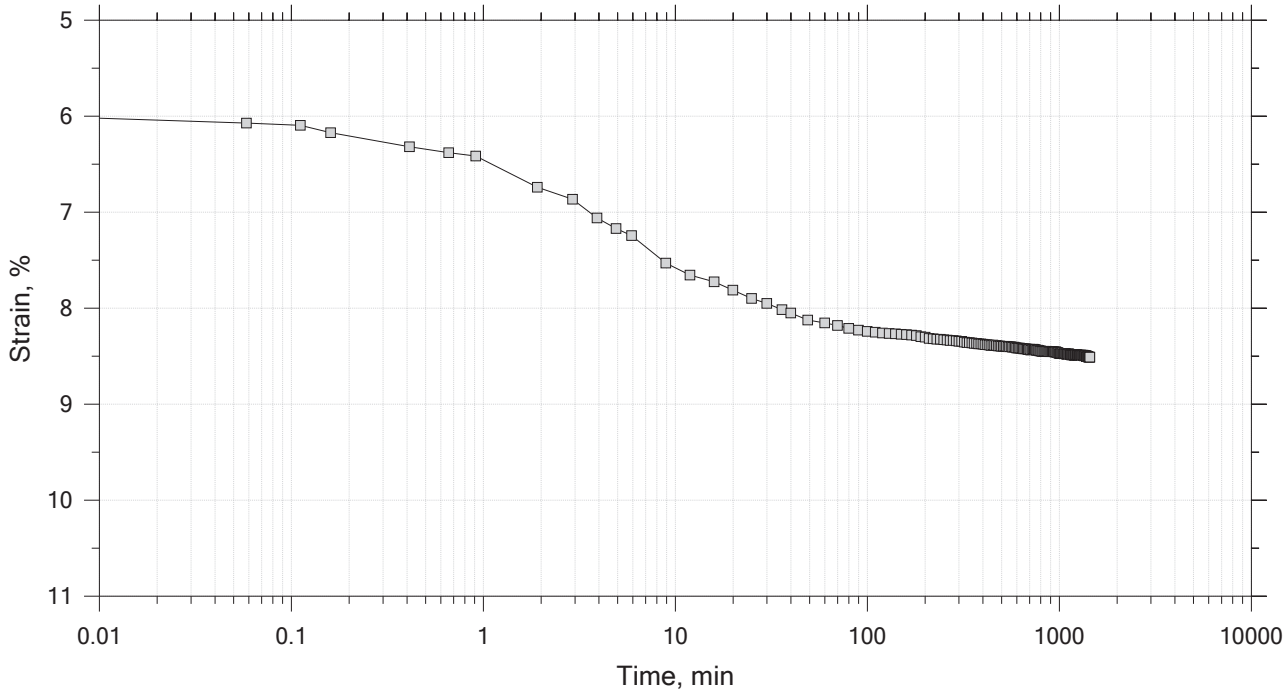
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

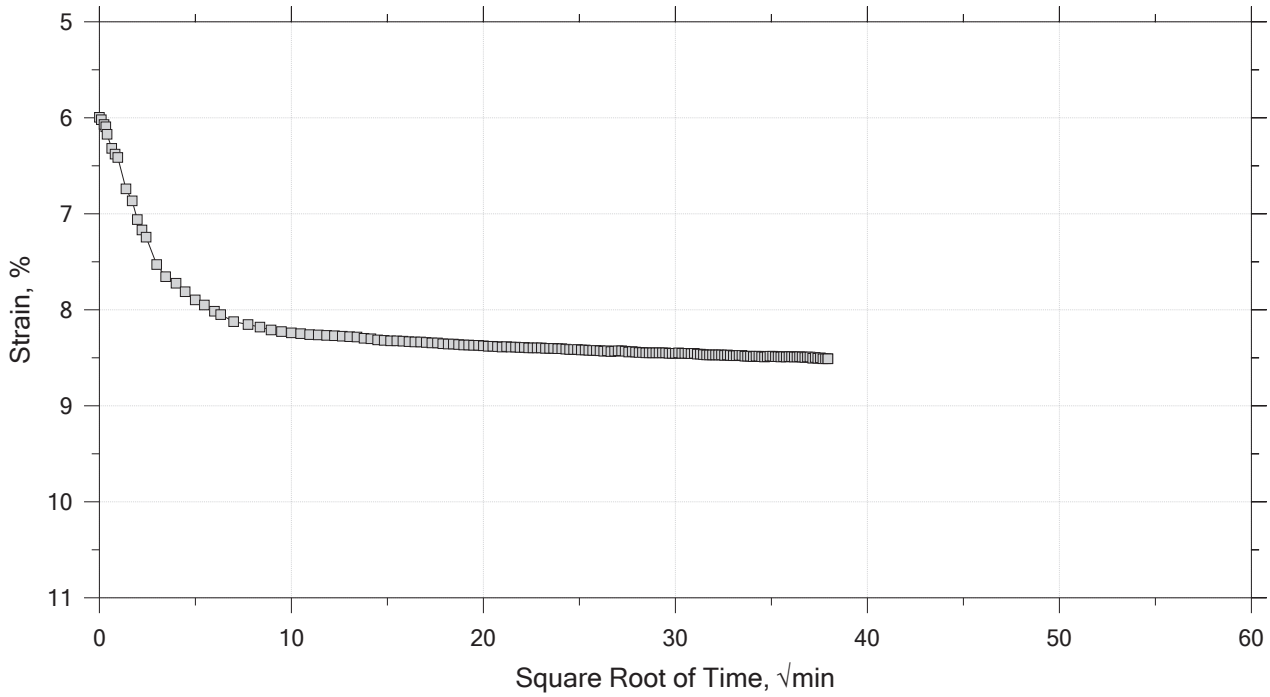
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 18

Constant Load Step

Stress: 4 tsf





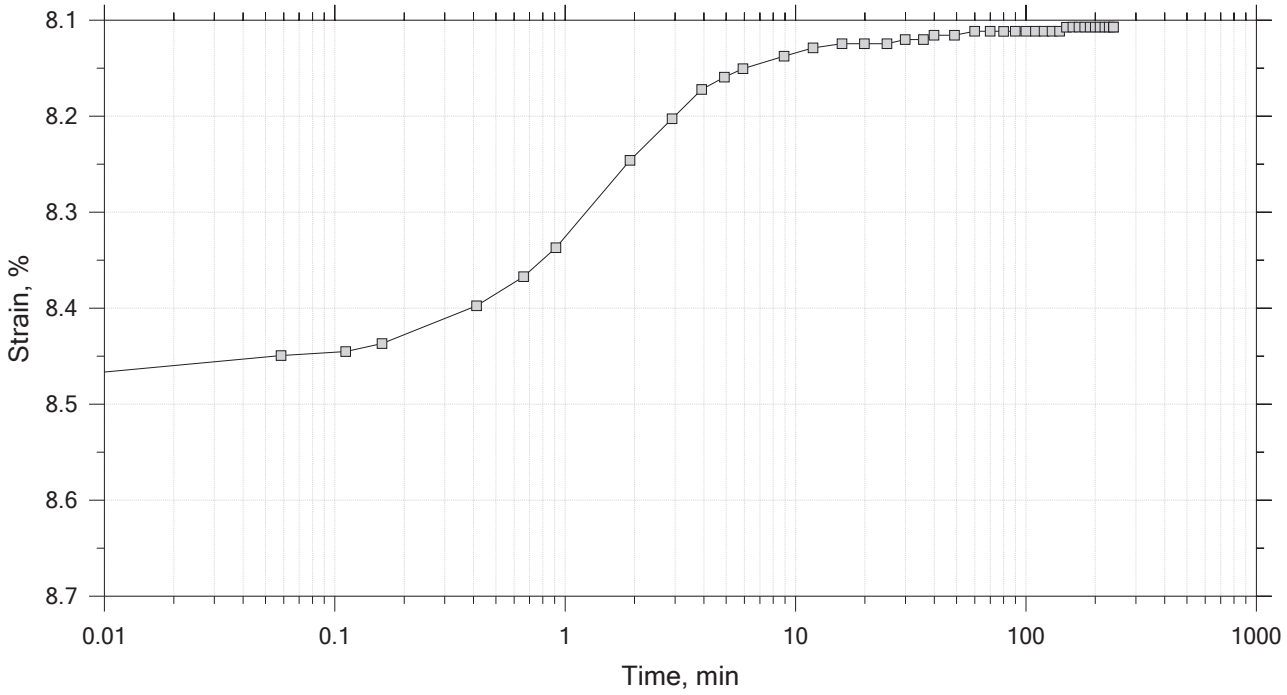
GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		

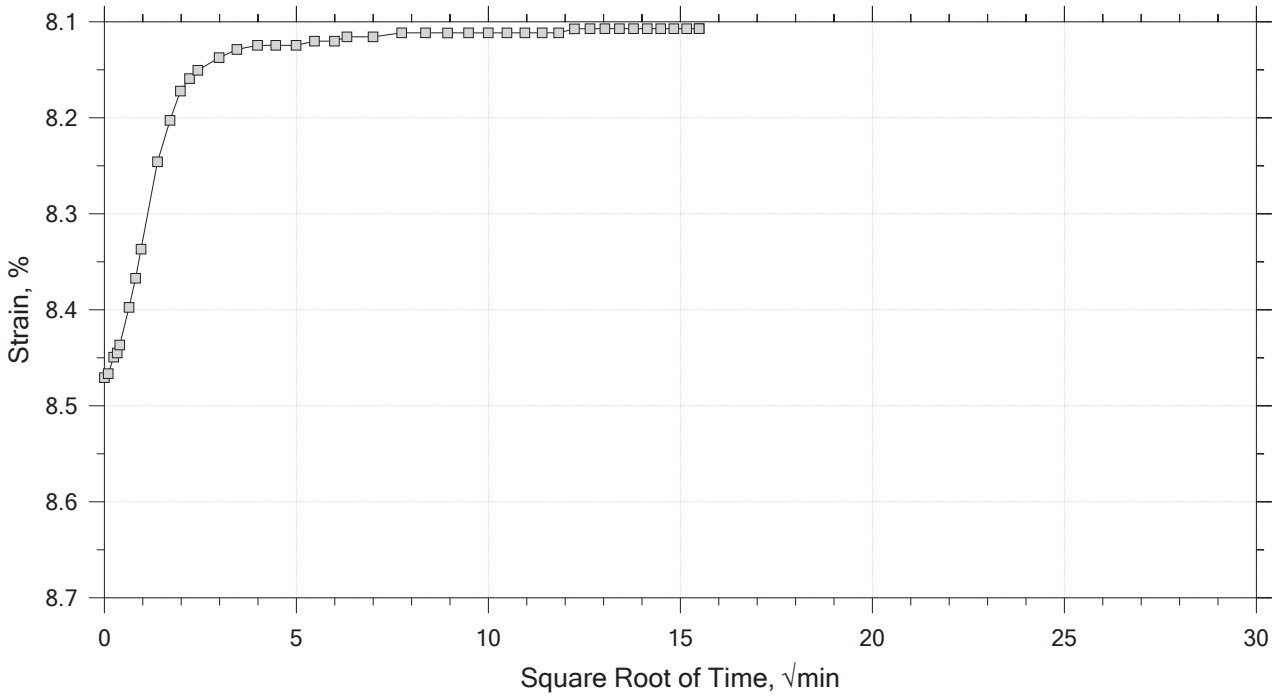
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 18

Constant Load Step

Stress: 2 tsf





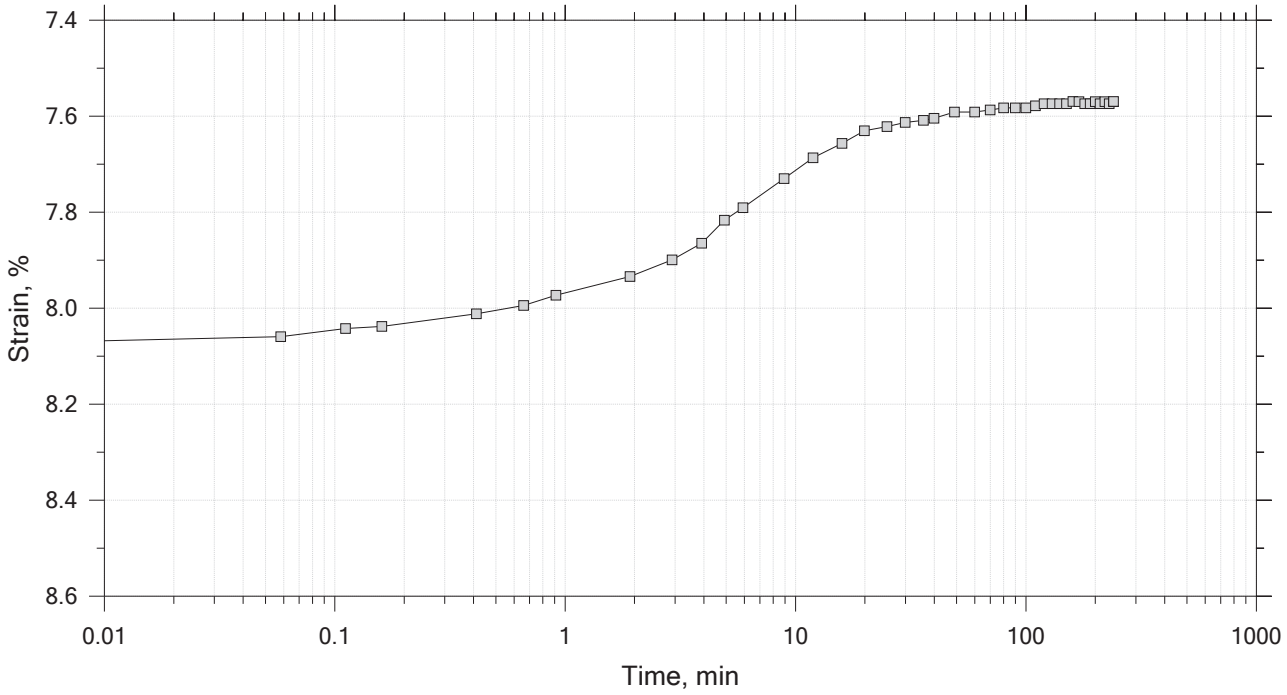
Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

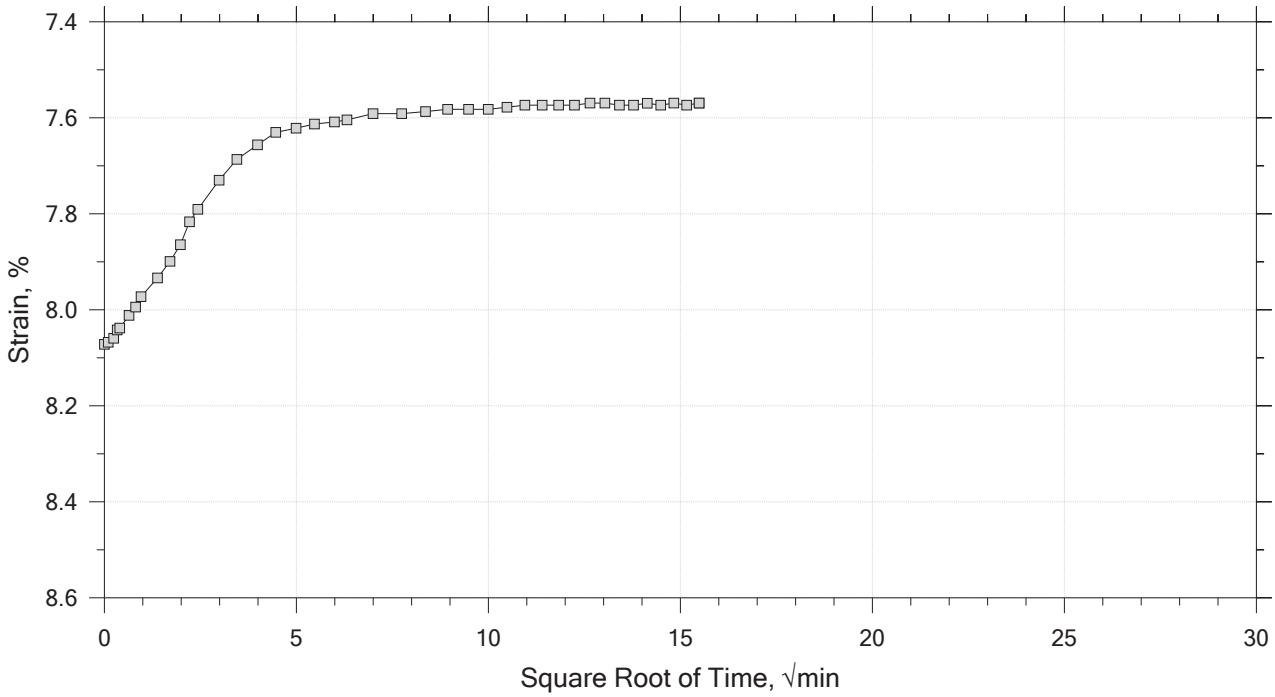
One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 18

Constant Load Step

Stress: 1 tsf

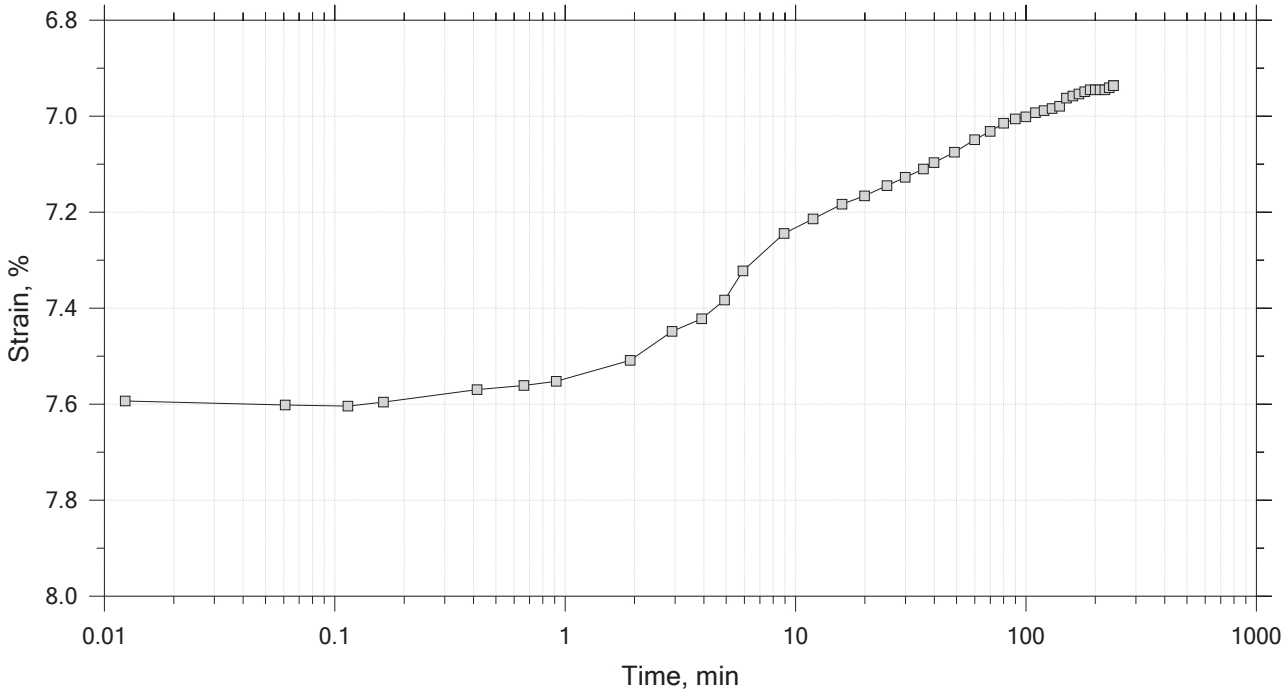


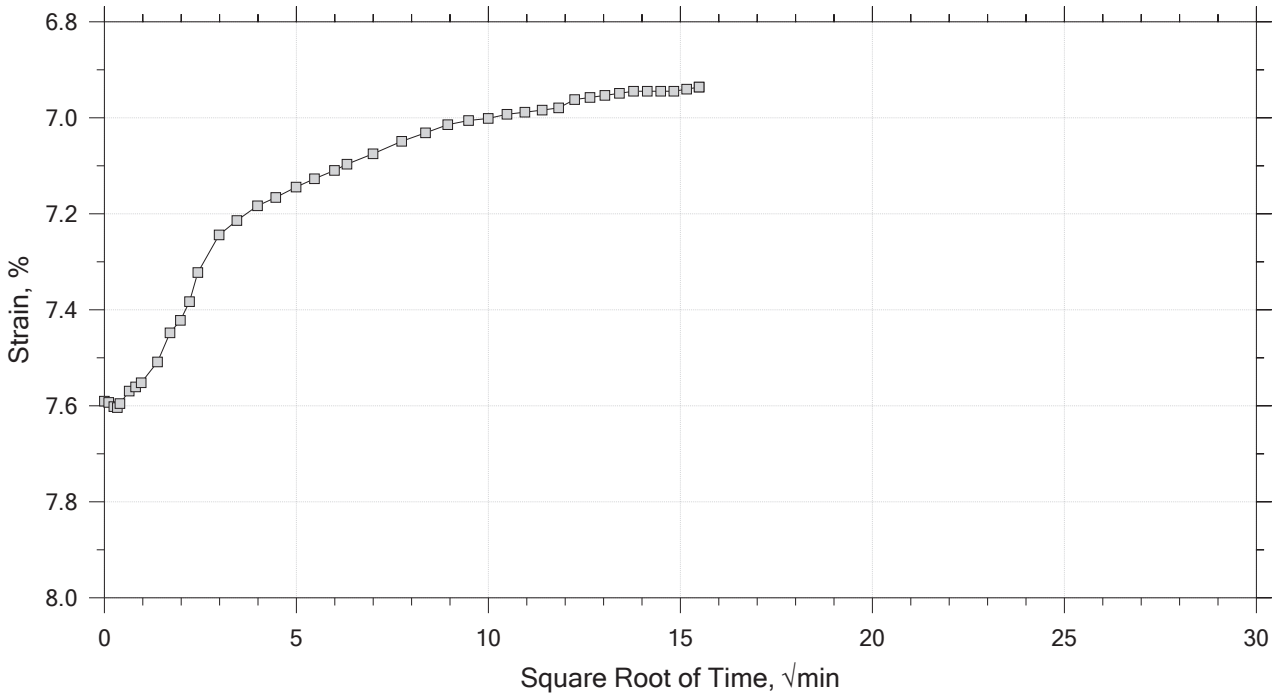


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 18
Constant Load Step
Stress: 0.5 tsf

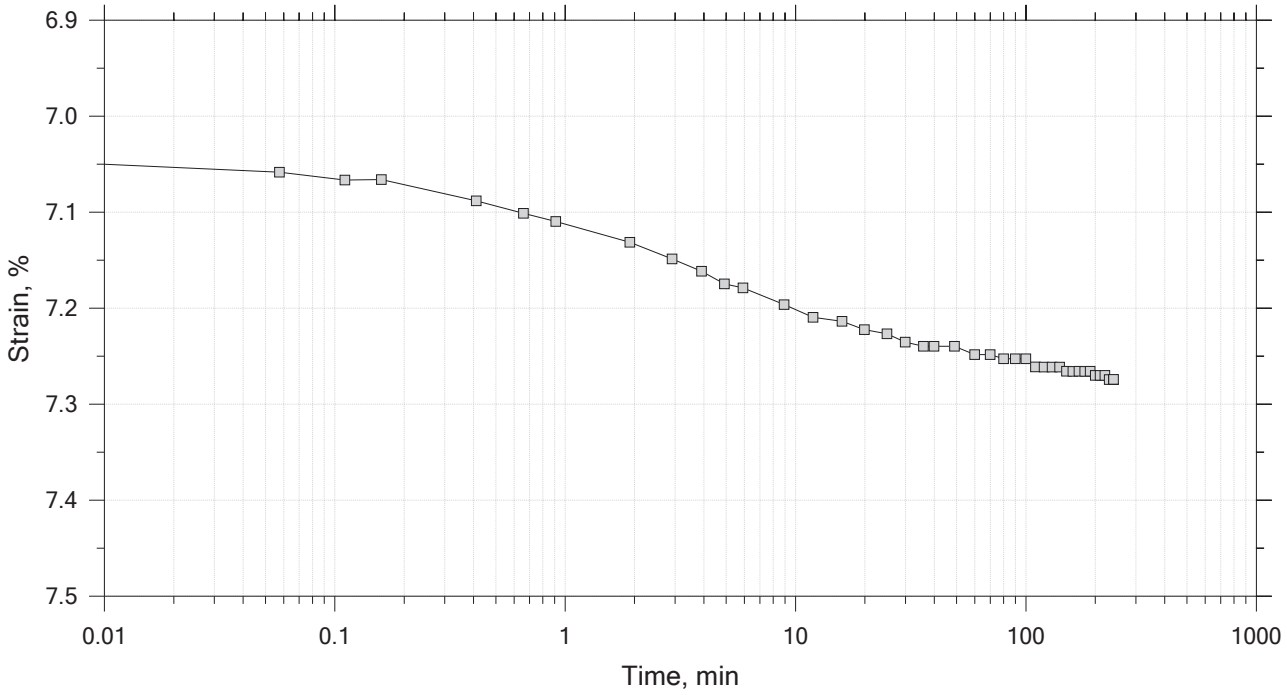


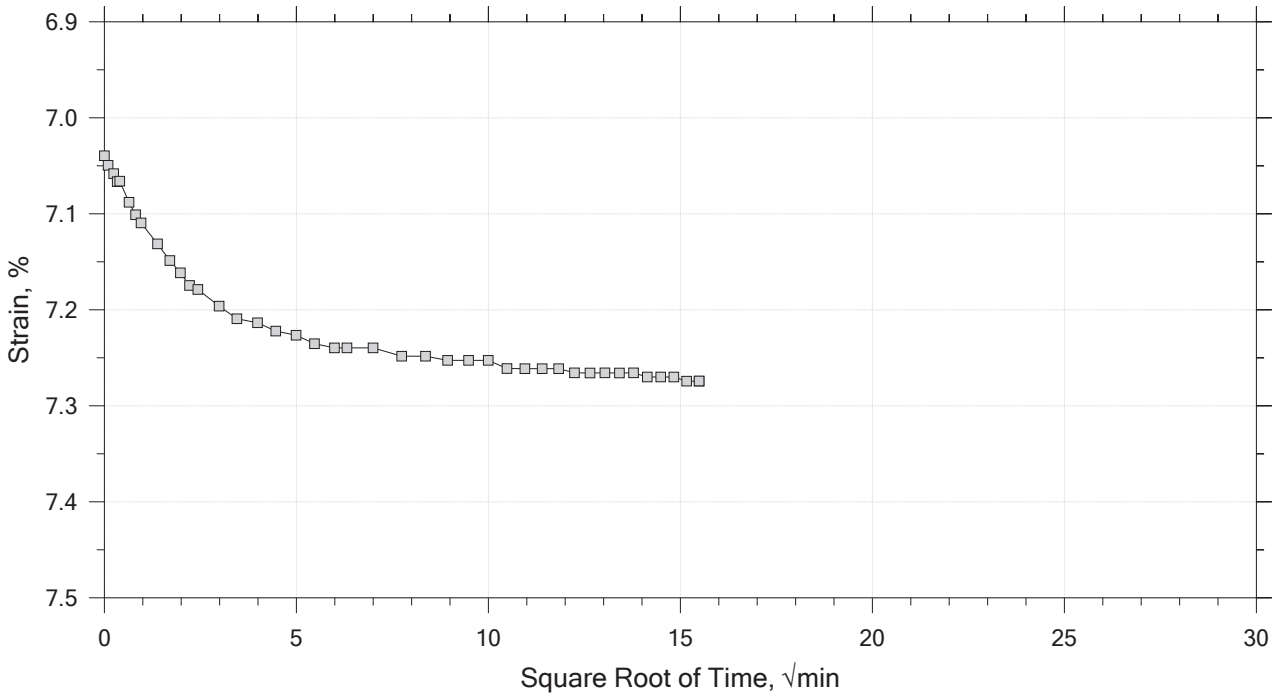


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 18
Constant Load Step
Stress: 1 tsf

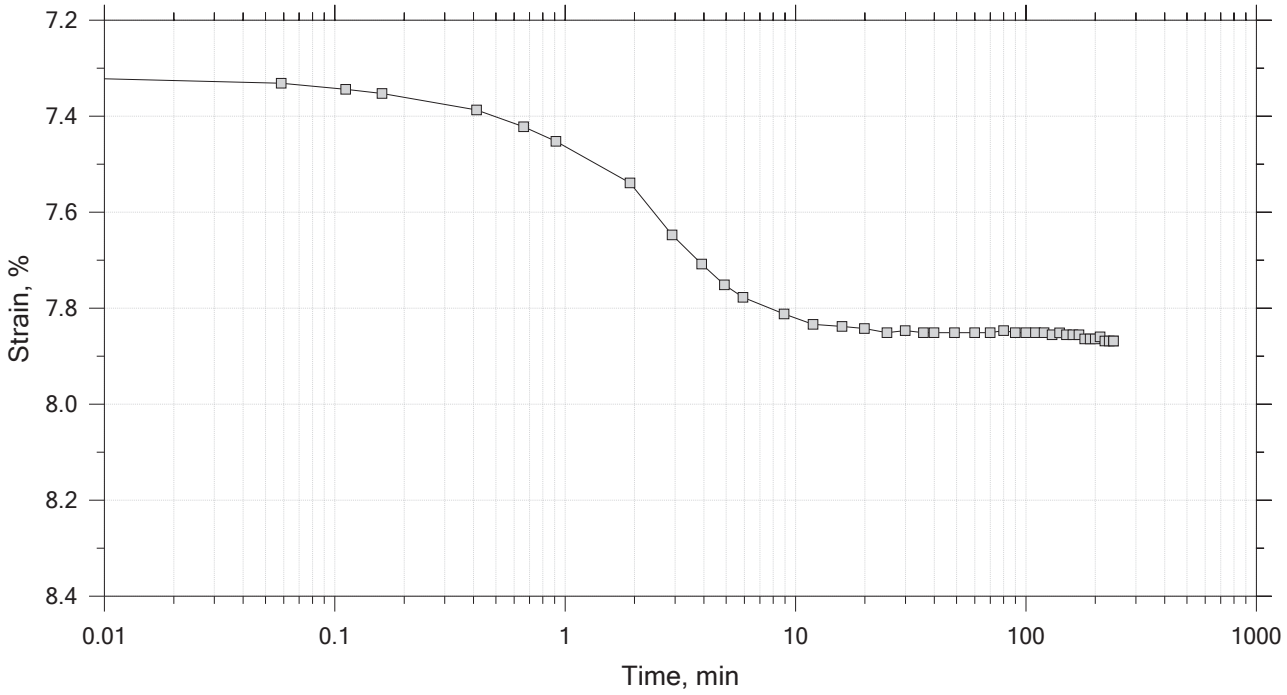


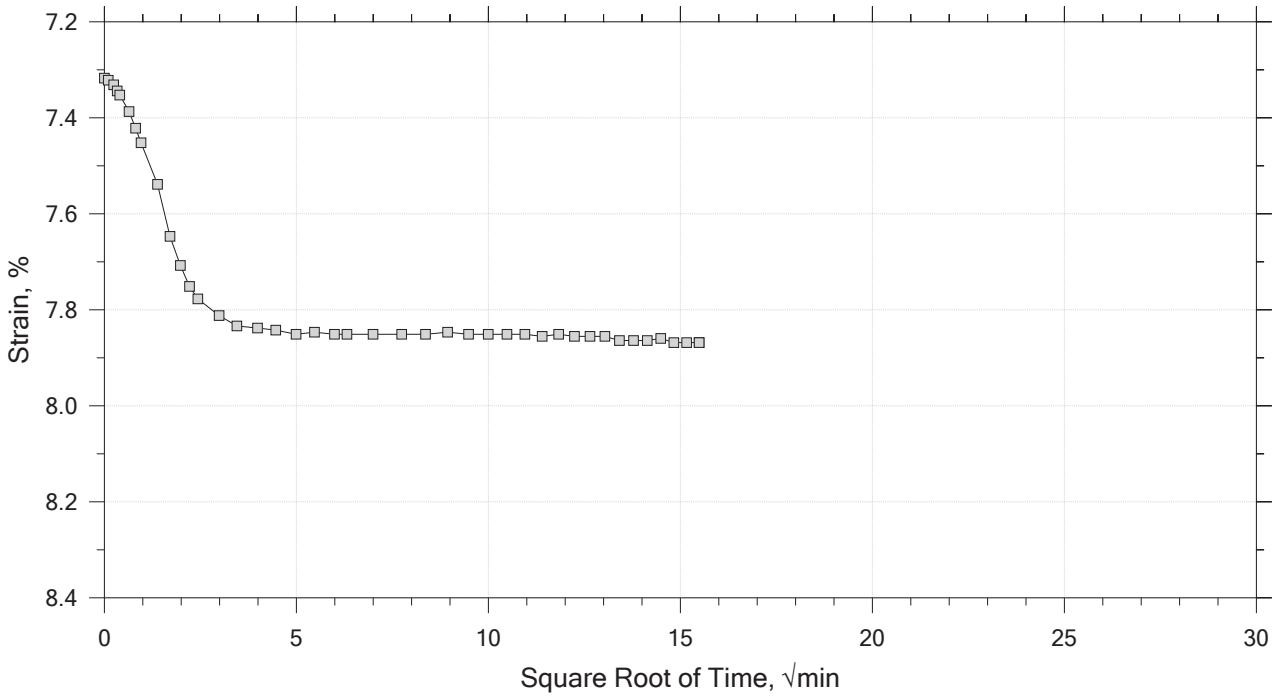


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 18
Constant Load Step
Stress: 2 tsf

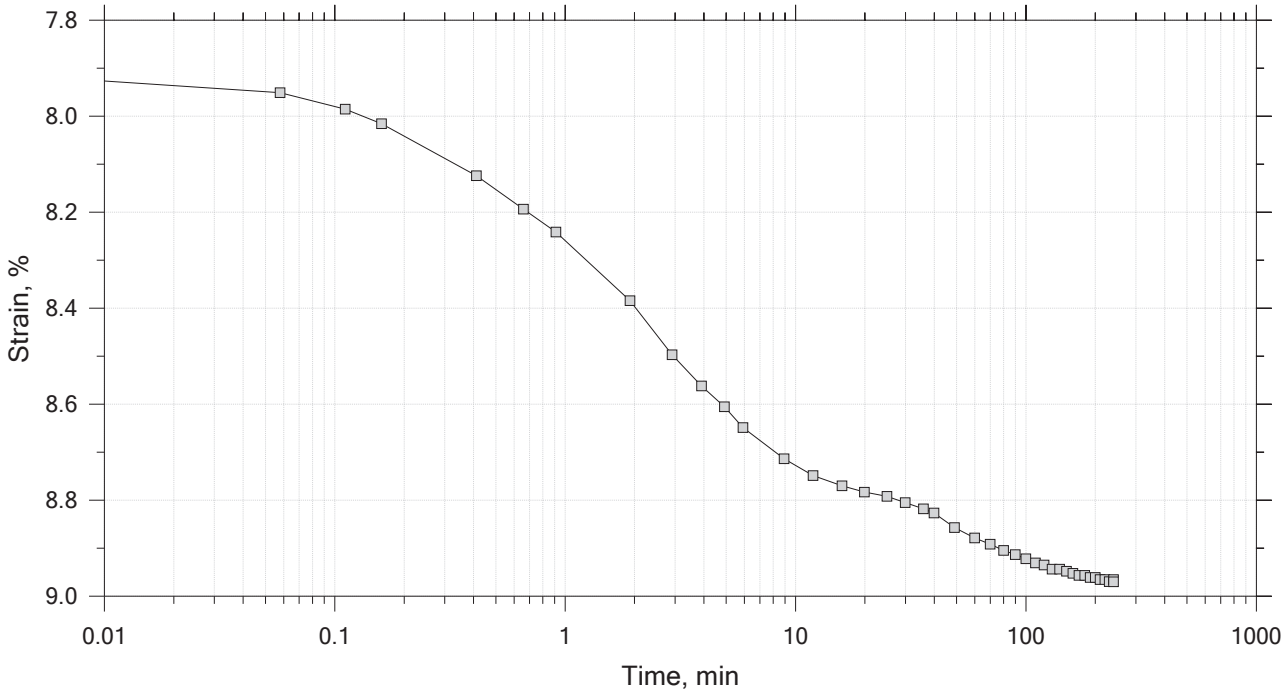


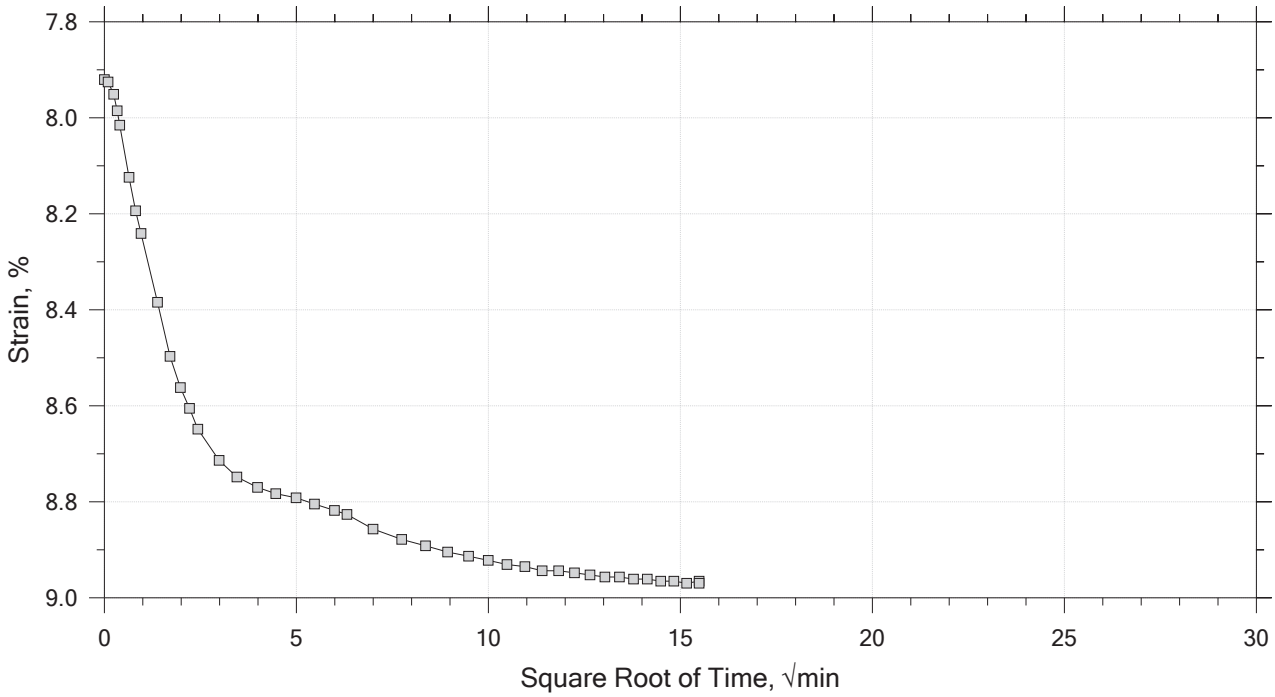


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 18
Constant Load Step
Stress: 4 tsf

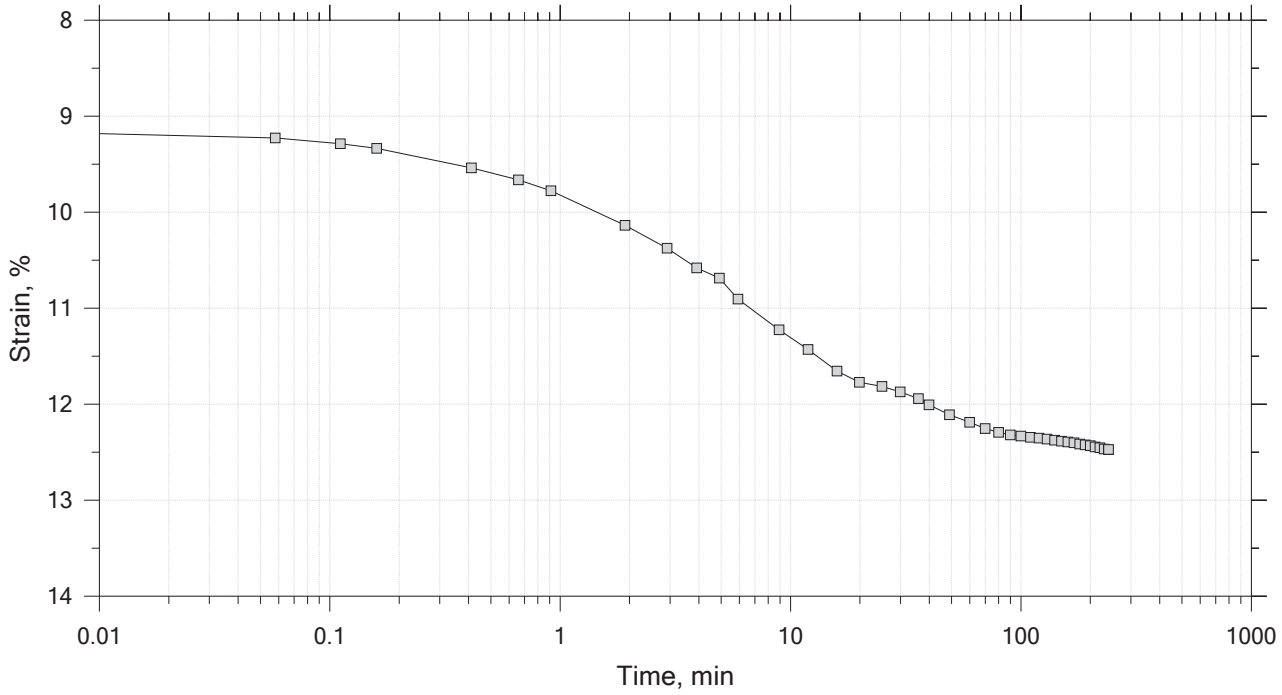


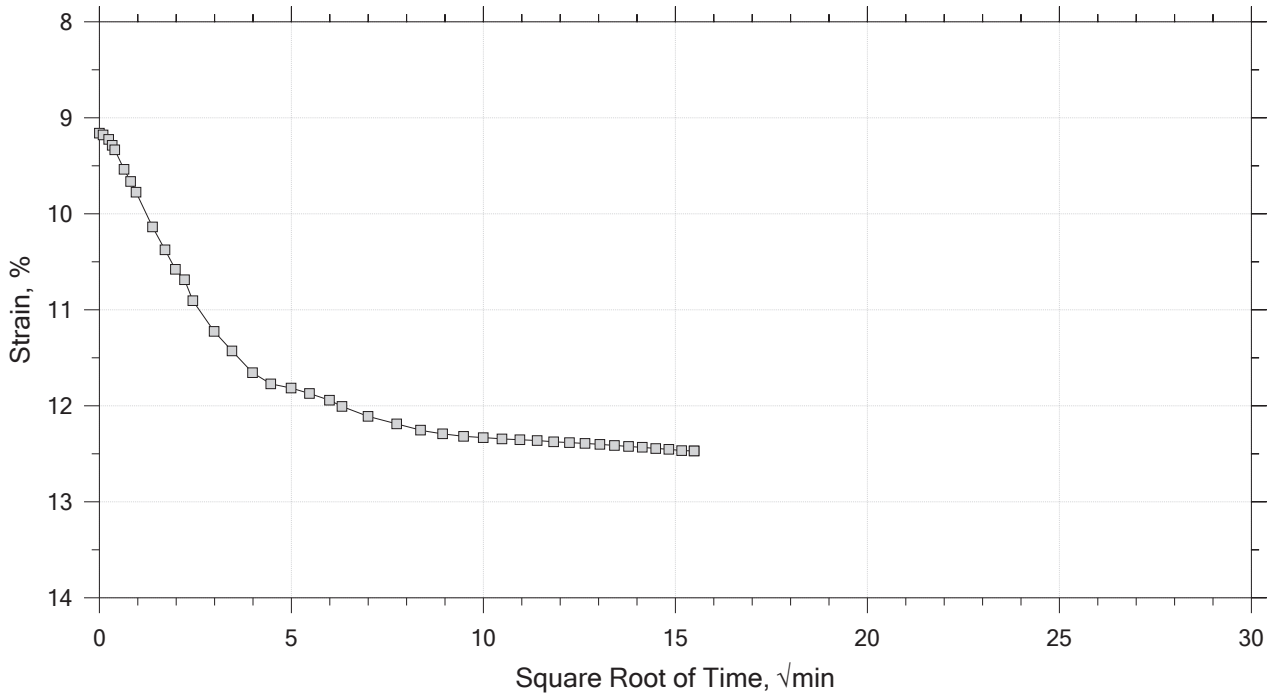


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 18
Constant Load Step
Stress: 8 tsf

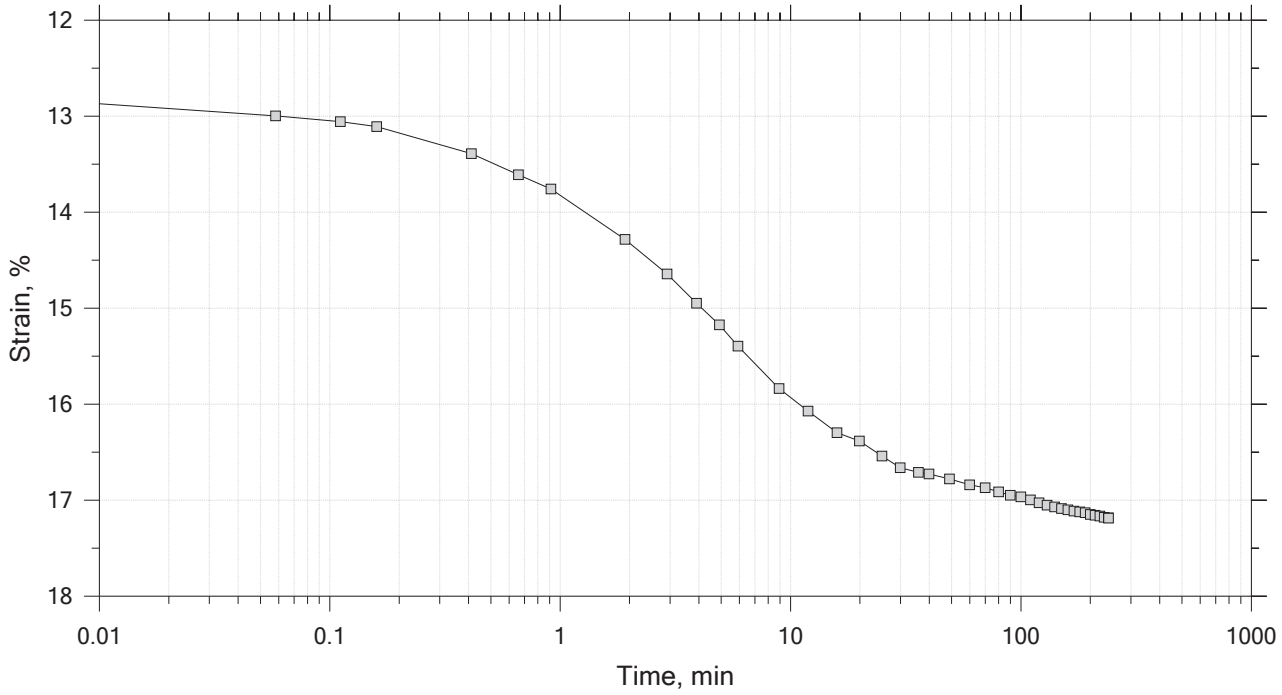


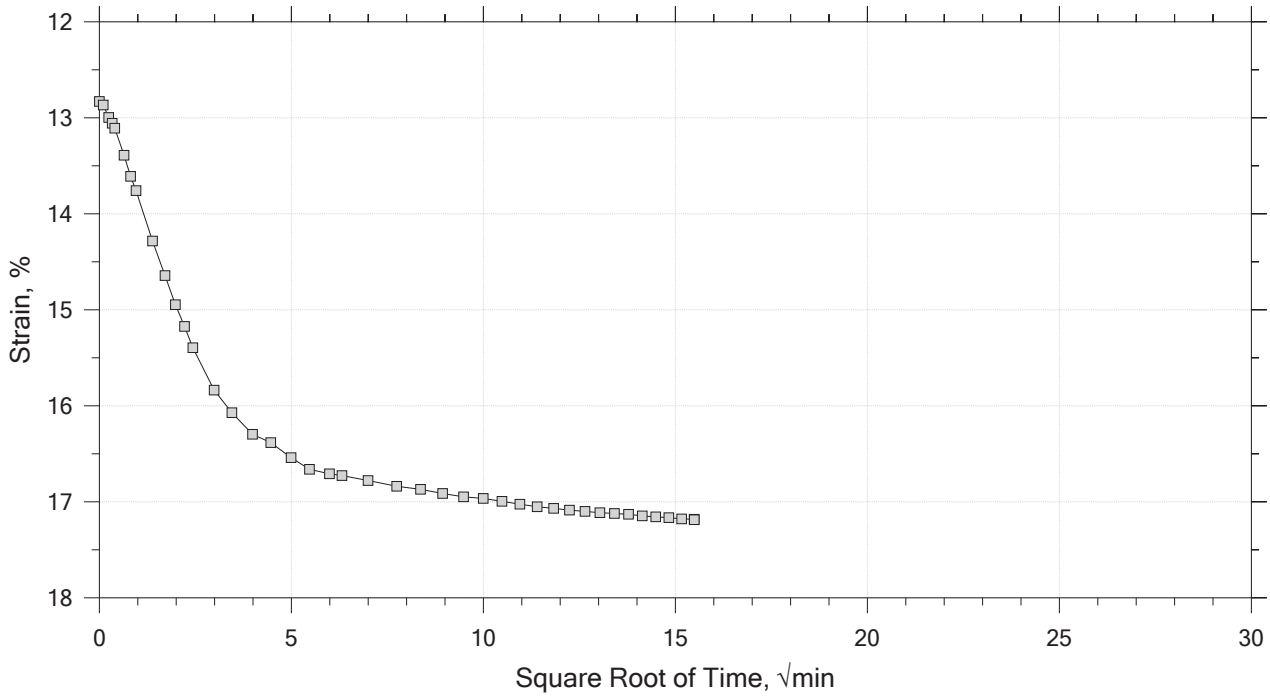


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 18
Constant Load Step
Stress: 16 tsf

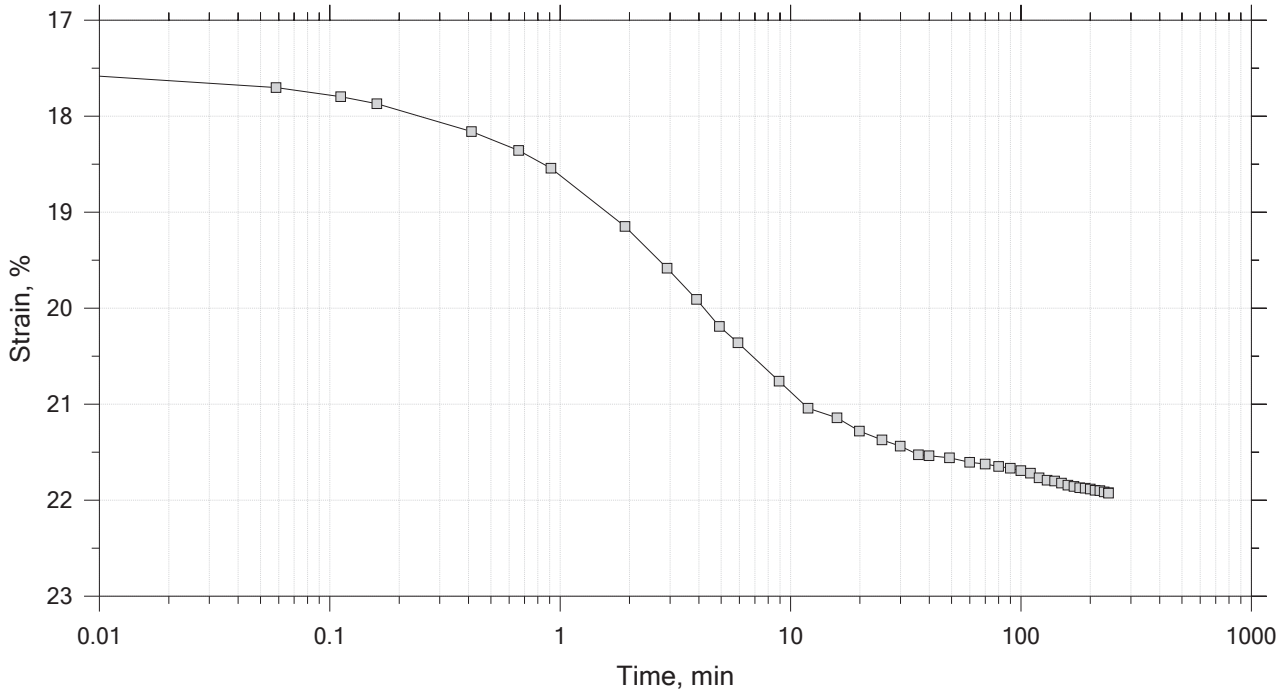


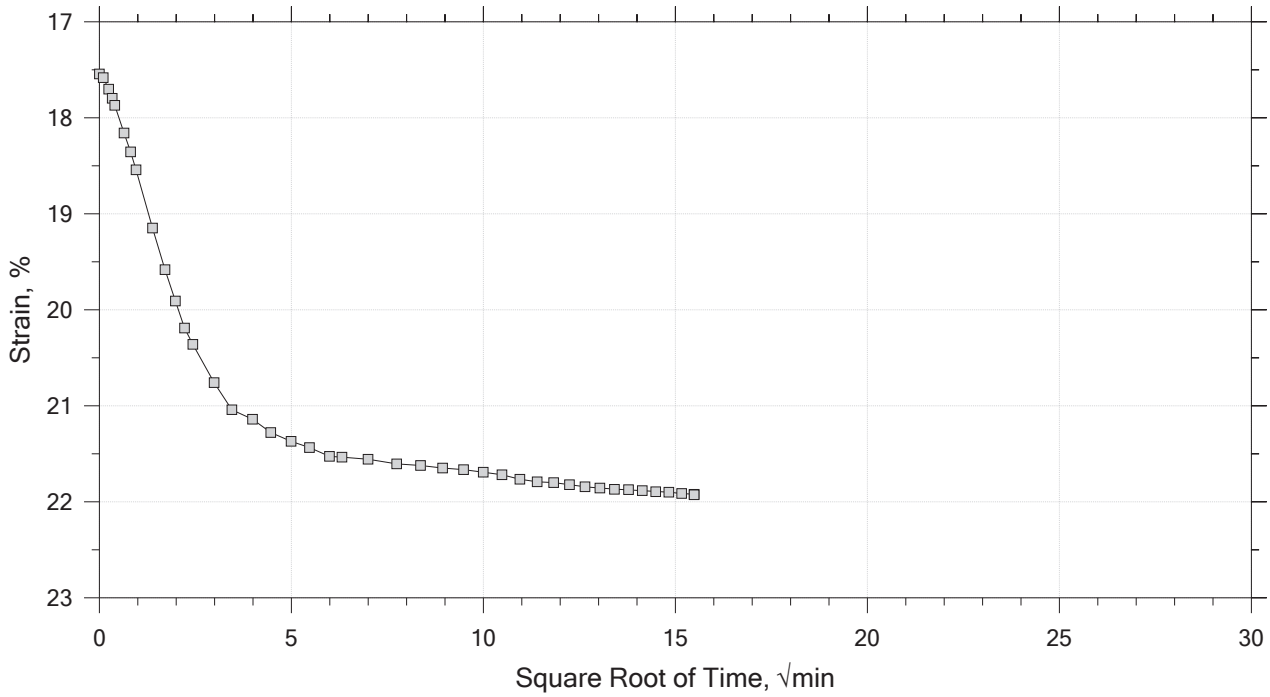


GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 18
Constant Load Step
Stress: 32 tsf

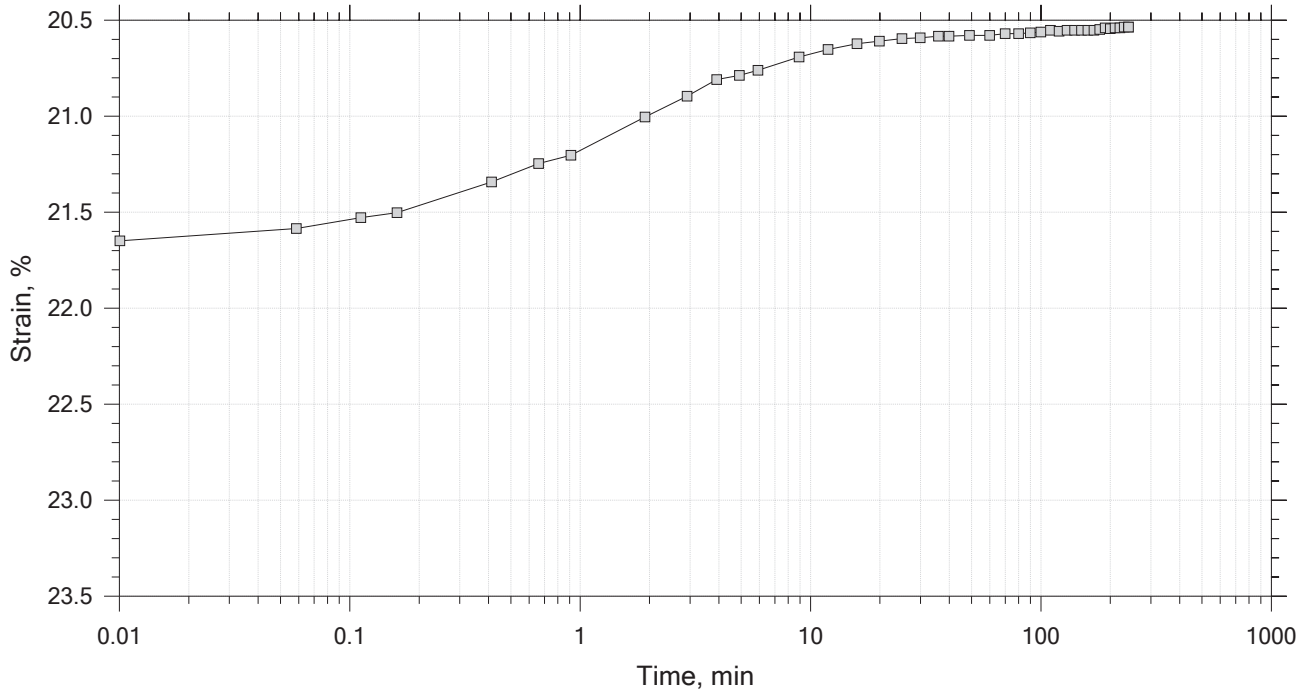


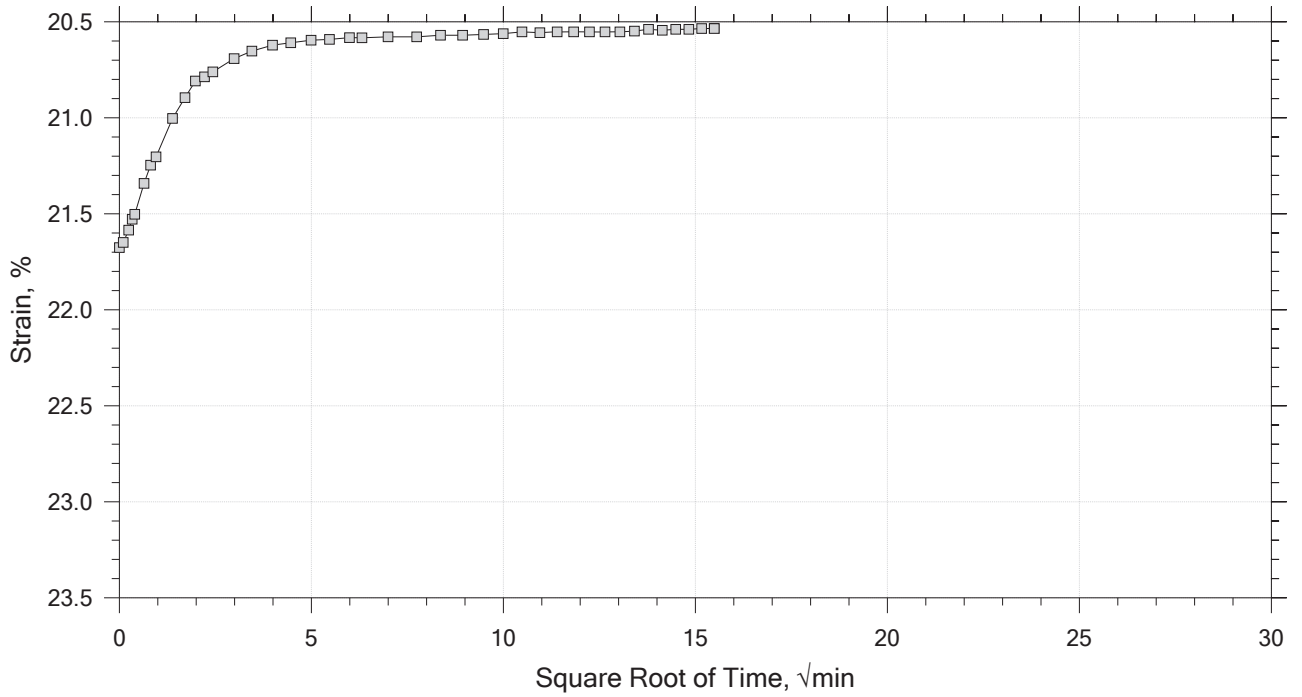


GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 16 of 18
Constant Load Step
Stress: 8 tsf

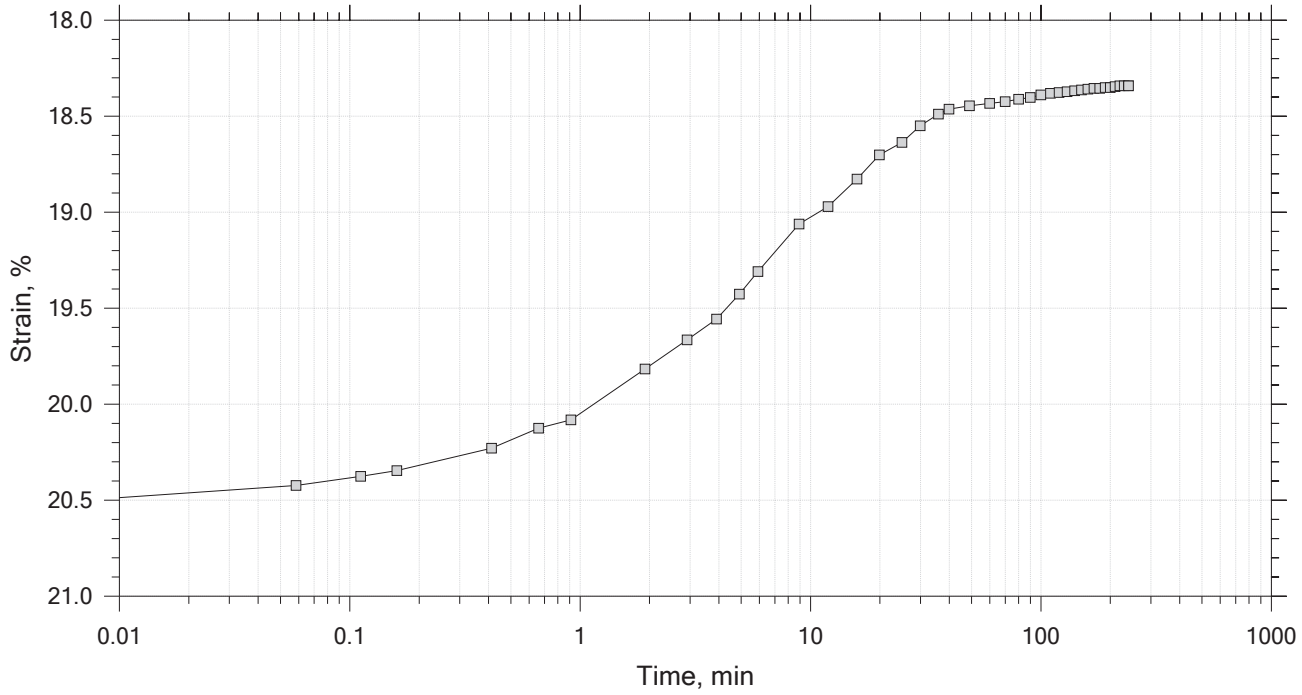


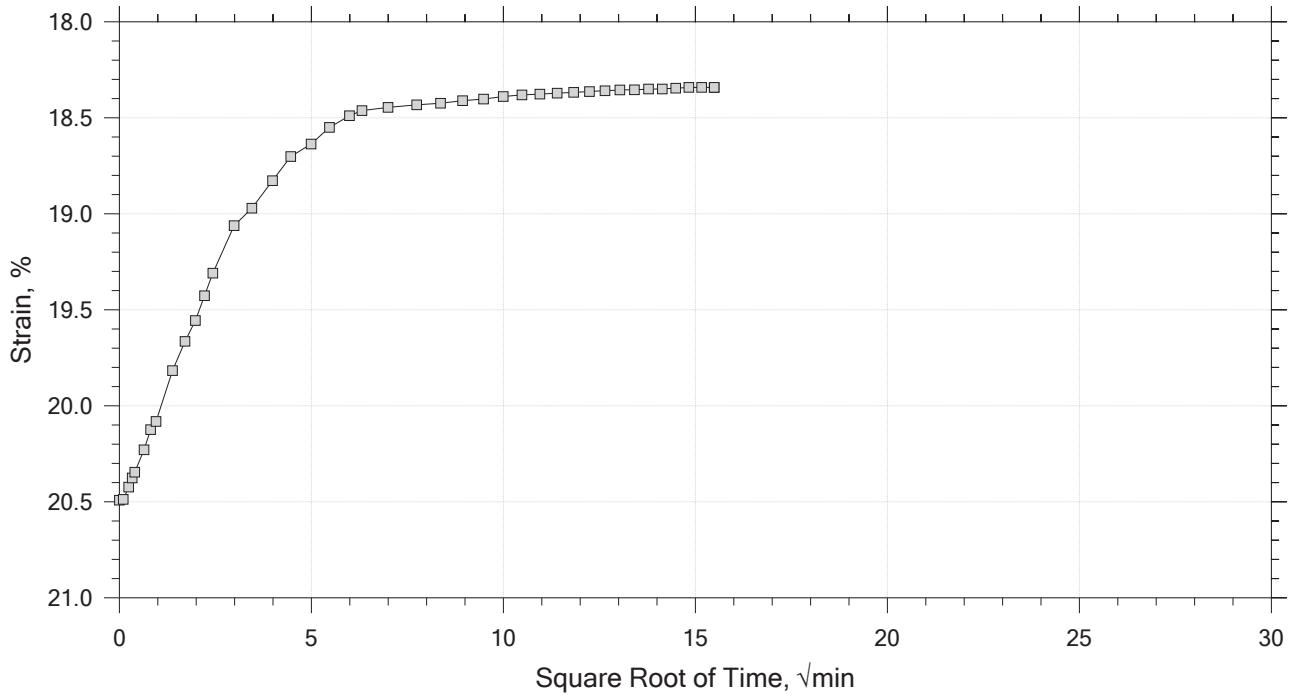


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 17 of 18
Constant Load Step
Stress: 2 tsf

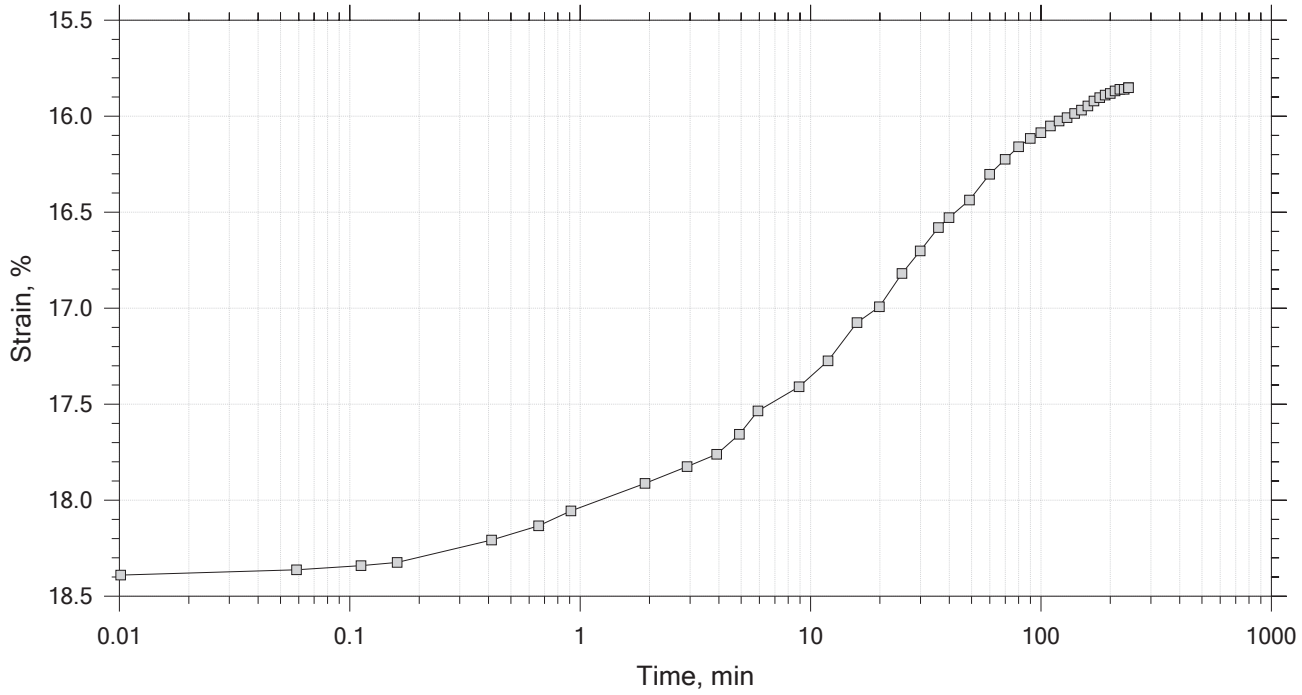


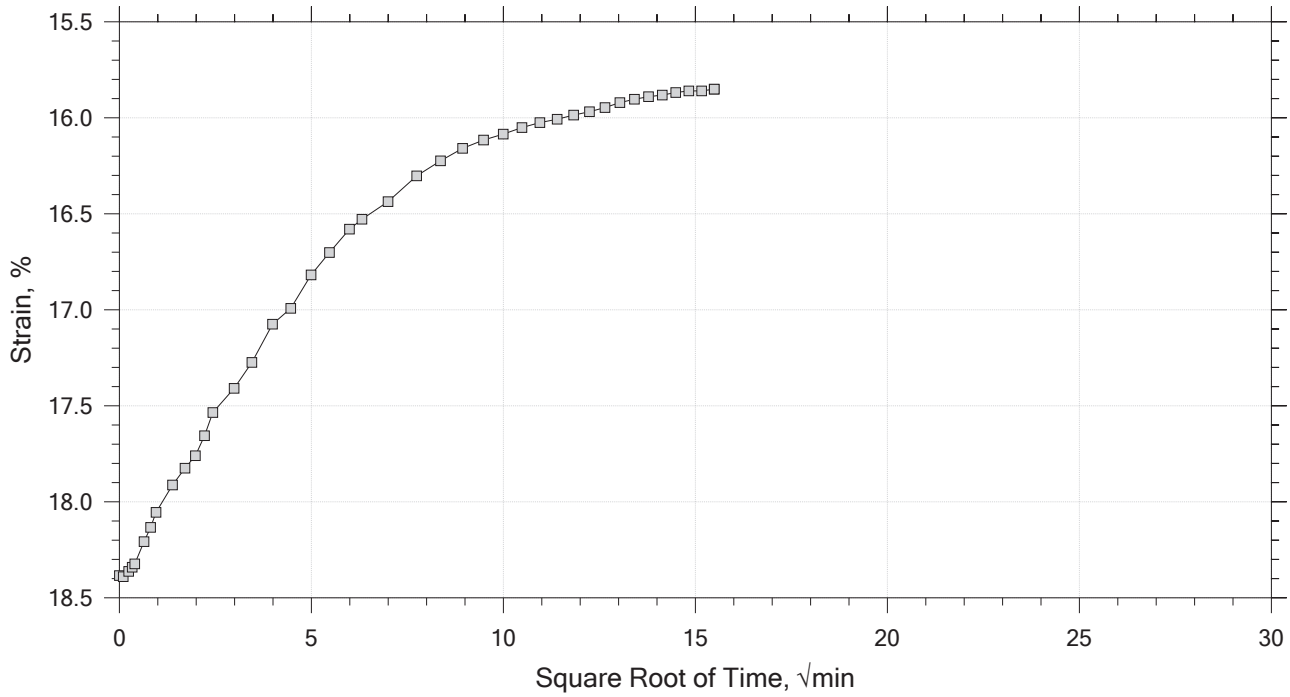


Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 18 of 18
Constant Load Step
Stress: 0.5 tsf





Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
Boring No.: B-13	Tested By: trm	Checked By: anm
Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
Test No.: IP-3	Sample Type: intact	Elevation: ---
Description: Moist, grey clay		
Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.73	Liquid Limit: 52
Initial Height: 1.00 in	Initial Void Ratio: 1.03	Plastic Limit: 25
Final Height: 0.87 in	Final Void Ratio: 0.766	Plasticity Index: 27

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	D644	RING		B-2890
Mass Container, gm	9.99	109.36	109.36	8.64
Mass Container + Wet Soil, gm	105	258.15	248	146.1
Mass Container + Dry Soil, gm	78.35	217.64	217.64	116
Mass Dry Soil, gm	68.36	108.28	108.28	107.36
Water Content, %	38.98	37.41	28.04	28.04
Void Ratio	---	1.03	0.77	---
Degree of Saturation, %	---	99.25	100.00	---
Dry Unit Weight, pcf	---	84.035	96.593	---

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.

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		

One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/s	Mv 1/tsf	k ft/day	Ca %
1	0.125	0.01010	1.01	1.01	0.000	0.00e+00	8.08e-02	0.00e+00	0.00e+00
2	0.250	0.01797	0.994	1.80	0.000	0.00e+00	6.30e-02	0.00e+00	0.00e+00
3	0.500	0.02752	0.974	2.75	4.174	1.30e-06	3.82e-02	1.34e-04	0.00e+00
4	1.00	0.04106	0.947	4.11	4.399	1.21e-06	2.71e-02	8.83e-05	0.00e+00
5	2.00	0.05772	0.913	5.77	4.844	1.06e-06	1.67e-02	4.78e-05	0.00e+00
6	4.00	0.08510	0.857	8.51	0.000	0.00e+00	1.37e-02	0.00e+00	0.00e+00
7	2.00	0.08107	0.865	8.11	1.471	3.26e-06	2.01e-03	1.77e-05	0.00e+00
8	1.00	0.07569	0.876	7.57	0.000	0.00e+00	5.38e-03	0.00e+00	0.00e+00
9	0.500	0.06936	0.889	6.94	5.913	8.29e-07	1.27e-02	2.83e-05	0.00e+00
10	1.00	0.07274	0.882	7.27	2.470	1.99e-06	6.76e-03	3.63e-05	0.00e+00
11	2.00	0.07868	0.870	7.87	0.000	0.00e+00	5.94e-03	0.00e+00	0.00e+00
12	4.00	0.08970	0.848	8.97	1.870	2.56e-06	5.51e-03	3.80e-05	0.00e+00
13	8.00	0.1247	0.777	12.5	4.455	1.02e-06	8.75e-03	2.41e-05	0.00e+00
14	16.0	0.1719	0.681	17.2	2.992	1.38e-06	5.89e-03	2.20e-05	0.00e+00
15	32.0	0.2193	0.585	21.9	2.545	1.45e-06	2.96e-03	1.16e-05	0.00e+00
16	8.00	0.2054	0.613	20.5	1.285	2.75e-06	5.80e-04	4.30e-06	0.00e+00
17	2.00	0.1834	0.658	18.3	4.556	8.12e-07	3.66e-03	8.01e-06	0.00e+00
18	0.500	0.1585	0.708	15.9	13.578	2.89e-07	1.66e-02	1.29e-05	0.00e+00

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

Step	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft²/s	Mv 1/tsf	k ft/day
1	0.125	0.01010	1.01	1.01	12.691	1.91e-06	8.08e-02	4.17e-04
2	0.250	0.01797	0.994	1.80	11.754	2.03e-06	6.30e-02	3.45e-04
3	0.500	0.02752	0.974	2.75	19.054	1.23e-06	3.82e-02	1.27e-04
4	1.00	0.04106	0.947	4.11	17.538	1.30e-06	2.71e-02	9.53e-05
5	2.00	0.05772	0.913	5.77	25.974	8.54e-07	1.67e-02	3.84e-05
6	4.00	0.08510	0.857	8.51	125.722	1.68e-07	1.37e-02	6.21e-06
7	2.00	0.08107	0.865	8.11	8.668	2.38e-06	2.01e-03	1.29e-05
8	1.00	0.07569	0.876	7.57	24.511	8.50e-07	5.38e-03	1.23e-05
9	0.500	0.06936	0.889	6.94	30.735	6.87e-07	1.27e-02	2.35e-05
10	1.00	0.07274	0.882	7.27	13.065	1.62e-06	6.76e-03	2.96e-05
11	2.00	0.07868	0.870	7.87	12.426	1.69e-06	5.94e-03	2.70e-05
12	4.00	0.08970	0.848	8.97	8.300	2.48e-06	5.51e-03	3.68e-05
13	8.00	0.1247	0.777	12.5	19.197	1.02e-06	8.75e-03	2.40e-05
14	16.0	0.1719	0.681	17.2	16.386	1.09e-06	5.89e-03	1.73e-05
15	32.0	0.2193	0.585	21.9	14.479	1.10e-06	2.96e-03	8.76e-06
16	8.00	0.2054	0.613	20.5	5.029	3.03e-06	5.80e-04	4.73e-06
17	2.00	0.1834	0.658	18.3	19.603	8.12e-07	3.66e-03	8.01e-06
18	0.500	0.1585	0.708	15.9	42.525	3.97e-07	1.66e-02	1.78e-05

GeoTesting EXPRESS	Project: Moakley Park Improvements	Location: Boston, MA	Project No.: GTX-310495
	Boring No.: B-13	Tested By: trm	Checked By: anm
	Sample No.: ST-1	Test Date: 10/23/19	Depth: 38-40.3 ft
	Test No.: IP-3	Sample Type: intact	Elevation: ---
	Description: Moist, grey clay		
	Remarks: System Y		
	Displacement at End of Increment		

ATTACHMENT F

"Important Information About This Geotechnical Engineering Report" by GBA

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.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in 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.

Geotechnical-Engineering 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 given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives 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 this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- 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. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include 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.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering 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 subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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Technical Review Committee (TRC) Form

PROJECT: Moakley Park Master Plan

TASK NUMBER: 1.1: Baseline Technical Assessment

SUB-TASK NUMBER: 1.1O: Geotechnical Analyses & Final Report

CLIENT: Boston Parks & Recreation Department

DATE: 12/11/2019

This form is intended to: 1) be completed by the TRC reviewer(s) at each stage of deliverable review; 2) assure that the deliverable satisfies the project team's quality standards; 3) reduce the project team's exposure to liability by detecting and correcting gross negligence and errors and; 4) reduce the possibility of future extra work due to errors and omissions on our part. The sub-task leader is responsible for hosting a kick-off meeting at the start of each task and the designated TRC reviewer must attend the kick-off meeting. This form is required for all project deliverables, but not necessarily all sub-tasks. This form should be attached to draft and final project deliverables.

Deliverable Description: 1.1O: Geotechnical Analyses & Final Report

Deliverable Type (Interim or Final): Interim; work completed to date includes critical predecessors:

- 1.1G: Subsurface Exploration Program
- 1.1H: Soil & Materials Testing

TRC Review Team:

Tulin Fuselier, Geotechnical Practice Leader
Weston & Sampson
979-979-5999
fuseliert@wseinc.com

Design Team: (generally the sub-task lead & others key contributors)

Steve Sprink, Sr. Project Manager
Weston & Sampson
508-698-3034 x7423
spinks@wseinc.com

TRC Hours Spent Reviewing Project: 8

Date for Meeting with Team to Discuss Resolution of Comments, if Required: 12/11/2019

Major Comments on Project Review: Datum update from NAVD 88 to BCB on logs. Inclusion of more appendices in the report.

FINAL DELIVERABLE REVIEW SIGN-OFF SHEET

This sign-off is intended to ensure that all members of the project team are satisfied that they have adequately reviewed the attached deliverable, and that the deliverable can be used by others for project advancement.

By signing this sheet, the reviewers indicate that they have completed an independent final review of the deliverable and feel that, pending execution of all changes recommended by the reviewer, the deliverable represents industry best practices and can be considered final. The sub-task lead shall initiate the form. The Principal-in Charge shall be the last to sign-off. Copies of the original and the draft deliverables shall be saved in the SharePoint folder directory.

	NAME	SIGNATURE	DATE
Project Director			
Project Manager			
Sub-task Lead	Steve Spink		12/11/2019
TRC Reviewer	Tulin Fuselier		12/11/2019
TRC Reviewer			
Principal-in-Charge			

June 01, 2020

Marin Braco
Stoss Landscape Urbanism
54 Old Colony Avenue, Third Floor
Boston, MA 02127

Subject: Moakley Park Improvements - WSP Peer Review of Weston & Sampson Geotechnical Feasibility Study

Dear Ms. Braco:

WSP has completed their geotechnical peer review of the Weston and Sampson's Geotechnical Feasibility Study Report, dated December 11, 2019 for the subject project. Documents provided to WSP for this peer review included:

1. The subject 2019 Geotechnical Feasibility Study Report prepared by Weston & Sampson containing
   - Subsurface investigations (SPT-borings, test pits, and monitoring wells)
   - Geotechnical materials testing (grain size analyses, moisture content, Atterberg limits, and incremental consolidation testing)
   - Documentation of subsurface conditions encountered, summary of analyses, and preliminary feasibility level recommendations for construction of proposed site features.
2. Calculations of preliminary settlement estimates (provided as backup to the conclusions presented within the Weston and Sampson report).
3. The Moakley Park Vision Plan Final Report, dated January 2019.

This memorandum presents the conclusions resulting from our peer review of the Geotechnical Feasibility Study Report based on the purpose of the feasibility study to be as stated therein which is to complete conceptual level subsurface explorations and geotechnical analyses to provide a discussion of geotechnical considerations for the proposed project.

DISCUSSION AND CONCLUSIONS

GENERAL:

In general, the content within the Feasibility Study Report is noted to be consistent with the conceptual settlement analysis performed.

SETTLEMENT ANALYSIS:

Within Section 1.0 of the settlement analysis, a couple of minor labeling errors are noted. The Grading Plan is stated to be Figure 1 but it is labeled as Figure 2 and the Site Plan is stated to be Figure 2 but it is labeled as Figure 1.

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With the very limited exploration program that was performed, it is noted that layer thicknesses assumed needed to be based on interpolation/projection and soil properties assumed were based largely on existing Central Artery (CA/T) test data for consolidation settlement parameters and on typical values from Bowles for elastic settlement with references included for each. WSP has reviewed these included references and other additional references and concur that the values assumed for the various parameters are consistent with the references and are generally reasonable assumptions for this preliminary level of analysis in advance of more site specific test data to be obtained as part of future additional subsurface exploration.

Within Section 2.0 of the settlement analysis, a 1.5 Over-Consolidation-Ratio (OCR) is assumed for the Organic Silt layer. It is noted that this selected value is based on a singular test sample obtained as part of the completed preliminary test boring program. While the test data may be site specific, it is a singular measurement and given the geologic history, it would seem more appropriate to assume a 1.0 OCR for this layer since it seems unlikely there would have been any past event that could have resulted in over consolidation of the layer. A lower OCR for this layer would likewise result in a greater estimate of total settlement. However, given the relative thinness of this layer the resulting change would likely be minor.

Within Section 2.0 of the settlement analysis, the very soft to soft clay (below the clay crust) is described as normally consolidated and consistent with that description a 1.0 OCR is assumed. While a 1.0 OCR may be an appropriate value to assume for this preliminary analysis given the very limited site specific test data, it should be noted that future site specific lab test data may likely indicate or support the use of a higher OCR value for this layer which would likewise result in a lesser estimate of total settlement albeit probably in the same general order of magnitude. Once more site-specific test data is obtained settlement estimates can be updated accordingly.

Given that the present design is only conceptual and there are minimal known details of the proposed improvements, the provided settlement analysis in Section 3.0 seems to have assumed an increase in grade across the site utilizing regular weight soil fill and without the inclusion of any below grade open space such as an underground parking garage or underground storage. For this conceptual level of design these assumptions seem appropriate. Overall the provided preliminary analysis of post-construction settlement seems to have been performed appropriately and with reasonable and appropriate inputs given the very limited site-specific consolidation test data. The estimated total settlement seems within a reasonable magnitude for this conceptual level and needs to be updated during final design with detailed embankment loading cases and site-specific consolidation testing data.

GEOTECHNICAL FEASIBILITY STUDY REPORT:

Existing Conditions:

It is stated that portions of the site were reportedly used briefly as a coal yard and a dump in the early 1900s. It is not evident by this statement alone what type of materials were dumped here aside from coal nor is it evident if the use of the term dump refers to temporary above grade dumping or to possible permanent landfill dumping. For thoroughness sake and to the extent that it may influence design, it is recommended that clarification be made indicating the basis of this reported site use as a dump and provision of any additional details if available.

It is stated that “Existing site grades are relatively level throughout most of the Site and generally range in elevation from about 12 ft. to 16 ft, except outside of the bleachers area to the south, where grades range from about 18 ft. to 28 ft.” Correspondingly, within the provided settlement analysis it seems a slightly different range is stated for the existing site grade (i.e. elevation 8 to 12 in the settlement analysis versus the 12 to 16 stated in the report). This apparent/possible discrepancy in existing grade elevations should be reconciled.

Project Description and Understanding:

It is stated that due to the preliminary nature of design at the time of this report, the location, size and height of structures such a proposed underground garage and underground storage are currently not available. As commented on above regarding the settlement analysis, given that the present design is only conceptual and there are minimal known details of the proposed improvements, the provided settlement analysis seems to have assumed an increase in grade across the site utilizing regular weight soil fill and without the inclusion of any below grade open space such as an underground parking garage or underground storage. For this conceptual level of design these assumptions seem appropriate.

It is stated that the existing features at the site will be demolished in their entirety, but major subsurface utilities will remain. With the collection of additional subsurface data and design advancement, consideration should probably be given to possible utility replacements since it may be preferable to solutions required if allowed to remain in place.

Subsurface Exploration:

In general, the subsurface exploration program followed industry standards and the soil descriptions are reasonable based on the findings from the soil borings and laboratory testing.

Preliminary Geotechnical Considerations - General:

It is it stated that to accommodate settlement, new site features (e.g., levees, structures, utilities, etc.) should be designed as flexible structures with a high movement tolerance or be supported on foundations designed to mitigate settlement. We concur with this statement, based on the magnitude of the preliminary estimate of settlements for an assumed condition of all proposed grades being accomplished with the placement of regular weight earth fill.

We concur, with the statement here and throughout the report, that additional geotechnical explorations, laboratory testing, analyses, and recommendations will be necessary to provide design level geotechnical recommendations once site grading, building locations and structural loadings have been determined.

Preliminary Geotechnical Considerations – Settlement Estimates and Site Grading:

It is stated that an increase in site grades and structure loads will induce settlement of the existing compressible soils and that settlement is anticipated to be greatest along the eastern portion of the site, where proposed grades/levees are highest and will result in the settlement of the existing below grade utilities at similar rates as the surrounding soils and therefore, grade increases near existing utilities to remain should be constructed in a manner that limits disturbance and impacts to the utilities. It is noted that there are either no known details of the existing utility foundations or if known they are not discussed. Presumably the existing utilities are likely all without formal foundations (i.e. likely supported directly by the existing soils immediately beneath) and therefore subject to adverse impact of disturbance and movement resulting from any settlement of the overall soil mass.

While settlement estimates may be updated based on additional exploration and inclusion of more detail with regard to proposed structures etc. it would seem that the primary takeaway of the current settlement analysis is that the order of magnitude of estimated settlements is generally greater than any acceptable level if existing utilities are to remain without design measures being taken to isolate the existing utilities and limit the impacts thereupon.

In an effort to limit the impacts to the existing utilities, it is stated that preliminarily, grade increases greater than 1 ft in height should be placed outside of an influence zone defined by a plane extending a distance of 5 ft horizontally away from the bottom outside edge of a utility, then up and away at 1H:1V slope to limit the settlement, and lateral and vertical pressures on the utility. While we concur with this statement, it seems the layout of the proposed structures, grade increases and existing utilities are not such that this approach could be utilized satisfactorily, at least not to any great extent.

In an effort to limit the impacts to the existing utilities, it is also stated that where grade increases cannot be limited to be outside the above influence zone, settlement and stress increase effects to the existing utilities should be limited with utilization by one or a combination of the following methods:

- deep foundations,
- ground improvement elements,
- lightweight fill,
- cut-off walls,
- sleeving or bridging over (with consideration of soil settlement beneath)

We concur that the above are appropriate methods to consider utilizing to limit settlement and stress increase effects to the existing utilities. The final selection of methods should be based on the allowable settlements of each utility type, construction schedule, and cost.

It is stated that the relocation of critical utilities below areas of proposed grade increases should also be considered. We concur. As commented above under Preliminary Geotechnical Considerations – General, while it may be the intent that all major subsurface utilities will remain, a utility replacement or relocation may be a preferable solution if allowed.

It is stated that along the eastern portion of the site where proposed grade increases will act as a levee, design solutions should consider buoyancy (of lightweight fill), and seepage through and underneath the levee. Additionally, buoyancy/uplift will also need to be considered anywhere lightweight fill may be utilized and where open spaces are to be created below grade such as for the proposed below-grade parking garage and underground storage structures.

Preloading and/or surcharging of the site is presented as an option and if performed that it would need to consider settlement of existing utilities to remain and be applied outside of the utility influence zone as describe above. While we concur, it seems that its utilization would be very limited given the layout of the existing utilities and the current intent for them to remain in place.

Liquefaction Potential:

We agree, at stated, that the consistency of fill material at the site includes very loose, wet, fine sands, which could be prone to liquefaction under earthquake loading conditions and will need to be further evaluated during subsequent design phases based on the results of additional explorations, laboratory testing, structural design information of proposed buildings and groundwater and tidal information. While the presence of potentially liquefiable soils at the site appears to primarily within the fill stratum, it seems, based on the borings performed, that some soils outside of the fill may also be susceptible to liquefaction and will need to likewise be evaluated.

Building Foundation Alternatives

We concur, as stated, that support of the proposed buildings on the existing fill and organics is not recommended due to the high risk of large total and differential settlements and therefore deep foundations extending through the fill and organic soils or shallow foundations supported on ground improvement (such as rigid inclusions) are appropriate.

Regarding the proposed below-grade parking garage structure, it is stated that, depending on the garage depth, location and loads, deep foundations or a mat foundation should be considered and construction will likely require sheet piling or slurry diaphragm walls as excavation support to facilitate the excavation below groundwater levels. We concur with this statement and while it was made specific to a parking garage structure it is presumed to likewise be potentially applicable to any proposed underground storage space depending upon the sizing being considered.

Additional Explorations and Analyses

With the very limited scope of the preliminary subsurface explorations, we agree with the report recommendation that additional explorations and geotechnical analyses will be required to develop final design geotechnical recommendations for foundation, ground improvement, slope stability and earthwork design. Additionally, we agree with the report recommendation that future explorations include Cone Penetrometer Test (CPT) soundings and geophysical surface wave test (such as MASW – Multi-Channel Analysis of Surface Waves) to further evaluate subsurface conditions and seismic design parameters as both are cost effective means of exploration.

LIMITATIONS

Services performed by WSP have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession practicing in the same locality and under similar conditions at the time the services were provided. No other representation expressed or implied, an no warranty or guarantee is included or intended in this memorandum or in any opinion, documented or otherwise. Our conclusions and recommendations are based on our review of the documents provided and our understanding of the proposed construction.

Our work has consisted of reviewing provided information for general conformance with current standards of geotechnical engineering practice, completeness, consistency of data with conclusions and to note obvious factual errors. We are not the project geotechnical engineer of record, and our review does not relieve the project design professionals of their professional responsibility.

We trust that this provides the information you require. Please call if you should have any questions.

Sincere regards,

David A. D'Angelo, P.E.
Geotechnical Engineer

ENVIRONMENTAL FINDINGS REPORT

WESTON & SAMPSON

- REPORT OUTLINING THE RESULTS OF THE PHASE I ESA AND LS + TRC FORM

December 13, 2019

Amy Whitesides
Stoss Landscape Urbanism
54 Old Colony Avenue, Third Floor
Boston, Massachusetts 02127

Re: **Phase I Environmental Site Assessment and Limited Subsurface Investigation**
Proposed Moakley Park Improvements
1005 Columbia Road, Boston, Massachusetts 02127

Dear Ms. Whitesides:

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to provide this letter report summarizing the results of our Phase I Environmental Site Assessment (ESA) and Limited Subsurface Investigation (LSI) performed at Joe Moakley Park, located at 1005 Columbia Road in Boston, Massachusetts (the "Site"). A renovation is proposed for Joe Moakley Park which could include underground parking requiring significant soil and groundwater management during construction. The purpose of the ESA/LSI was to evaluate potential regulatory obligations and order of magnitude cost implications for soil and groundwater management due to the presence of oil and/or hazardous material (OHM).

Site Description

Joe Moakley Park (formerly known as Columbus Park) is an approximately 60-acre property used predominately as a public park. It is improved with a multi-use field and jogging track with concrete bleachers, four basketball courts, three tennis courts, playground areas, nine baseball/softball fields, two soccer fields, a roller hockey rink, asphalt paved parking areas and walking paths. The Site also includes a preschool building and a bathroom facility. Figure 1 – Locus Map shows the general location of the Site in Boston and Figure 2 – Site Plan shows pertinent details of the Site and surrounding area. The Site is defined from surrounding neighborhoods by Columbia Road to the west, Babe Ruth Road to the northeast, Kosciuszko Circle to the south and, is separated from Carson Beach and the Atlantic Ocean by William Day Boulevard to the east.

Phase I Environmental Site Assessment (ESA)

Weston & Sampson performed a Phase I ESA of the Site in August 2019 in general accordance with American Society of Testing and Materials (ASTM) 1527-13 guidance to identify environmental concerns and target LSI activities. The Phase I ESA was performed in advance of proposed renovations to the park to identify potential environmental concerns, previous investigations with potentially relevant data, and target LSI assessment efforts. The Phase I ESA identified several Recognized Environmental Conditions (RECs) pursuant to the ASTM 1527-13 standard; the primary RECs are summarized as follows:

- There are two separate reported releases of OHM identified for the Site.
    - Release Tracking Number (RTN) 3-14981 was assigned to the entire Site in March 1997. This RTN was assigned primarily due to the presence of metals and polycyclic aromatic hydrocarbons (PAHs) in Site soils. RTN 3-14891 was closed in June 2006 with a Class A-2 Response Action Outcome (RAO).
    - RTN 3-27573 was assigned in March 2008 to an area in the northeastern corner of the Site after utility work encountered OHM. Sampling results indicated the presence of Extractable Petroleum Hydrocarbons (EPH) and metals in Site soils. RTN 3-27573 was closed in 2018 with the implementation of an Activity and Use Limitation (AUL) in January 2018 and a Permanent Solution with Conditions.

- Historic fill was identified as a REC as the entire Site has been filled. Fill observed during LSI included debris, ash and other construction or anthropogenic material which could contain OHM.

- Nearby historical industrial activity could have resulted in the migration of OHM onto the Site. Petroleum impacts associated with RTN 3-27573 were likely the result of off-Site activity with subsequent contaminant migration onto the Site.

Limited Site Investigation (LSI)

Weston & Sampson performed an LSI at the Site in August and September 2019 to obtain soil and groundwater data to assist in Site design in support of future renovation. Previous assessment conducted in association with RTN 3-14981 characterized risk associated with the entire Site. As such, the scope of the LSI performed was adjusted to characterize Site soil and groundwater that may need to be managed during excavation and dewatering activities, and to evaluate construction related implications due to the presence of OHM. The LSI was performed in general accordance with our March 7, 2019 proposal and included the following:

- The collection of soil samples from Weston & Sampson geotechnical data points;
- Field screening soil samples for the presence of total organic volatiles (TOVs);
- Laboratory analysis of selected soil samples for potential on-site reuse and disposal characterization parameters;
- Collection and analysis of groundwater for Environmental Protection Agency (EPA) Remedial General Permit (RGP) discharge parameters;
- Preparation of a letter report summarizing the findings.

A summary of the LSI is provided below. See Figure 2 for sampling locations.

Soil Boring Installation

Between August 13 and September 11, 2019, nineteen (19) soil borings were advanced at the Site associated with a geotechnical evaluation being conducted by Weston & Sampson. The borings were advanced by New England Boring Contractors of Brockton, Massachusetts to depths up to 224 feet below grade surface (bgs). These borings were advanced using a hollow stem auger (HSA) and drive and wash drilling methodology. A majority of these geotechnical borings were also utilized for environmental characterization and select borings were completed as groundwater monitoring wells

(MW-1 through MW-11) that were subsequently sampled to evaluate groundwater quality. Three additional borings were advanced exclusively for environmental sampling via direct push continuous sampling techniques. The locations sampled were selected to assess subsurface conditions in the vicinity of the proposed future redevelopment. All soil borings were logged and samples were collected by a Weston & Sampson geo-environmental engineer.

In general, soils encountered consisted of a layer of topsoil overlying urban fill soils atop peat and marine sediments. A further description of subsurface stratigraphy is included in Weston & Sampson's Geotechnical Feasability Study dated December 11, 2019 provided under separate cover.

Soil Sample Field Screening and Analysis

Soil samples were field screened for visual and olfactory evidence of OHM and field screened with a photoionization detector (PID) for TOVs. Field screening did not identify visual or olfactory impacts. PID screening did not identify evidence of significant TOVs in Site soil with concentrations of TOVs detected ranging from below the instrument detection limit to 2.3 parts per million by volume (ppmv) with one elevated PID reading recorded at 15.3 ppmv.

A total of 32 composite soil samples from intervals of 0-10 feet bgs and 10-20 feet bgs (or bottom of the boring) were collected from geotechnical boring locations. In addition, 13 discrete soil samples were collected from geotechnical borings and three additional assessment locations; predominately at 0-3 feet bgs. Soil samples were submitted to Contest Analytical Laboratory in East Longmeadow, Massachusetts for analysis including one or more of the following: Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), Polychlorinated Biphenyls (PCBs), MCP 14 Metals, ignitability, pH, conductivity and reactivity. See Table 1 – Composite Soil Analytical Results for soil analytical results for COMM-97-001 disposal characterization. See Table 2 – Discrete Soil Analytical Results for soil analytical results from discrete surficial soil samples. The soil analytical results are summarized as follows:

- As shown in Table 1 – Composite Soil Analytical Results and Table 2 – Discrete Soil Analytical Results, analysis of the soil samples identified the following compounds at concentrations above applicable Massachusetts Contingency Plan (MCP) Reportable Concentration (RC) S-1 standards, followed by the maximum concentration detected:

    - Arsenic, 23 mg/kg
    - Total Chromium, 110 mg/kg
    - Lead, 4,400 mg/kg
    - Zinc, 5,900 mg/kg
    - TPH, 1,300 mg/kg
    - Acenaphthene, 4.9 mg/kg
    - Acenaphthylene, 3 mg/kg
    - Benzo(a)anthracene, 14 mg/kg
    - Benzo(a)pyrene, 12 mg/kg
    - Benzo(b)fluoranthene, 12 mg/kg
    - Dibenzo(a,h)anthracene, 23 mg/kg
    - 2-Methylnapthalene, 2 mg/kg
    - Phenanthrene, 35 mg/kg

- Due to elevated chromium, lead, and mercury, Toxicity Characteristic Leaching Procedure (TCLP) analysis was performed on sixteen (16) of the composite samples to evaluate for

Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste. Three samples failed TCLP analysis for lead (B-4, 0-10'; B-5, 0-10'; B-10, 10-20').

- VOCs and PCBs were not detected above laboratory reporting limits.

Additional Surficial Soil Sampling and Analysis

On November 15, 2019, Weston & Sampson collected four (4) discrete soil samples from previously sampled locations at the Site to evaluate lead in surficial soil. The test pits and boring sampled (TP-1, TP-5, TP-8 and B-5) are located throughout the Site as shown on Figure 2 – Site Plan. The test pits and boring were initially sampled during previous test pitting and soil boring activities in September 2019.

A total of 4 discrete soil samples from the 0-1 foot bgs interval were collected to evaluate lead levels to determine if the soil may remain or be reworked during construction. Soil samples were submitted to Contest Analytical Laboratory in East Longmeadow, Massachusetts. See Table 2 – Discrete Soil Analytical Results for summary of soil analytical results from discrete surficial soil samples.

- As shown in Table 2 – Discrete Soil Analytical Results, analysis of the additional surficial soil samples identified two locations with lead concentrations above applicable MCP RC S-1 standard at 240 mg/kg and 620 mg/kg.

Note that previous assessment activities conducted under RTN 3-14981 had identified lead in surficial soil at an equal concentration (620 mg/kg) and after calculating risk had concluded that a Condition of No Significant Risk was present. The two maximum values detected during the November 15, 2019 target sampling event were also evaluated conducting a 95UCL (upper confidence limit) statistical evaluation and the results suggested the lead exposure at a concentration of 430 mg/kg did not pose an Imminent Hazard condition.

Groundwater Sampling and Analysis

On September 25, 2019, Weston & Sampson collected six (6) groundwater samples from monitoring wells at the Site. The monitoring wells sampled (MW-3, MW-5, MW-6, MW-8, MW-10 and MW-11) are located throughout the Site as shown on Figure 2 – Site Plan and were installed during the previous boring activities in August to September 2019. Note that wells located on the northern portion of the Site did not yield sufficient volume for sample collection, as such, groundwater characterization was limited in this area.

Prior to sampling, groundwater was measured at depths ranging from 3.42 to 11.25 feet bgs. Groundwater samples were then collected using low flow sampling techniques. Parameters including pH, temperature, specific conductivity, dissolved oxygen, oxidation reduction potential (ORP) and turbidity were recorded using a groundwater quality meter. Groundwater samples were submitted to Contest for analysis of EPA RGP parameters to determine if this permit would be required for the treatment and discharge of impacted groundwater generated during construction dewatering activities. Results were also compared to applicable MCP RCGW-2 Standards and Method 1 Clean-up Standards. See Table 3 – RGP Groundwater Analytical Results. The groundwater analytical results are summarized as follows:

- As shown in Table 3 – RGP Groundwater Analytical Results, analysis of the groundwater samples

identified the following compounds at concentration above applicable MCP RC GW-2 standards, followed by the maximum concentration detected as follows:
    - Lead, 59 µg/L
    - Selenium, 120 µg/L

- Comparison to RGP threshold values indicated exceedances for multiple parameters but only acetone and total suspended solids exceeded EPA's Technology Based Effluent Limitations (TBELs). Note that additional sampling of receiving waters and/or adherence to local permits (such as MWRA permits required to utilize their stormwater conveyance system) may be needed to facilitate discharge.

Additional Groundwater Sampling and Analysis

On November 15, 2019, Weston & Sampson re-sampled two monitoring wells (MW-3 and MW-5) as shown in Figure 2. The wells were initially sampled during the previous sampling activities on September 25, 2019 for EPA RGP parameters but suggested total metals exceeded MCP reporting thresholds. The additional groundwater sampling was conducted to evaluate dissolved constituents as is appropriate for comparison to MCP thresholds and evaluate if the detected compounds were attributable to solids within the original EPA RGP sample.

Prior to sampling, groundwater was measured at depths 6.71 and 11.4 feet bgs for MW-3 and MW-5, respectively. Groundwater samples were then collected using low flow sampling techniques. Parameters including pH, temperature, specific conductivity, dissolved oxygen, oxidation reduction potential (ORP) and turbidity were recorded using a groundwater quality meter. Groundwater samples were collected from the monitoring well upon parameter stabilization, field filtered and submitted to Contest for analysis of dissolved lead for MW-3 and dissolved selenium for MW-5.

- As shown in Table 3, analysis of the groundwater samples identified a dissolved lead concentration below MCP RC GW-2 in MW-3. A dissolved selenium concentration above MCP RC GW-2 of 110 µg/L was detected in MW-5.

- Results were also compared to USEPA RGP thresholds which indicated selenium exceeded EPA's Water Quality-Based Effluent Limits (WQBELs) during this additional sampling effort.

Findings

- The concentrations of select contaminants of concern such as metals (predominately zinc) and PAHs were not consistent with OHM documented in previous submittals under RTNs 3-14891 and 3-27573. As such, a new Reportable Condition was identified which requires reporting within 120 days of the potential responsible party obtaining knowledge (reporting deadline would be March 1, 2020).
- Three samples failed TCLP analysis for lead indicating this material would be deemed a characteristic hazardous waste if exported for offsite disposal.
- Five samples contained lead in excess of 2,000 mg/kg indicating surplus soils generated during excavation activities will require out of state disposal.
- Lead is present in surficial Site soils that should be further evaluated and may be unsuitable for re-use during park renovation.
- Exceedances in groundwater were identified that trigger an MCP reportable obligations and

should be reported along with soil exceedances by March 1, 2020.

- Exceedance of RGP threshold values were identified. To manage impacted groundwater during construction, an RGP and local approval to discharge to nearby storm water conduits will be required and treatment will be necessary to allow discharge of impacted groundwater generated during dewatering activities.
- Submittals in accordance with the MCP will be required to perform soil and groundwater management activities during proposed park renovations. The MCP obligations are triggered when working within an active Disposal Site (following reporting of RC exceedances) and also when working within the AUL area associated with RTN 3-27573. The MCP submittal typically used to facilitate construction is a Release Abatement Measure (RAM) Plan with subsequent RAM Status Reports and a Completion Report required as necessary. More complex cases can require more detailed submittals than previously mentioned. Once construction has been completed, Disposal Site closure should be sought which could require additional data collection and risk evaluation.

Recommendations

- Report soil and groundwater exceedances not previously identified to MassDEP by March 1, 2020.
- To further evaluate risk from lead in surficial soil, additional points around both TP-1 and TP-5 should be sampled to determine if locations are single elevated concentrations of lead in surficial soil or possible hotspots of contamination. Risk was addressed in previous MCP submittals prepared for the Site, however, this additional sampling is to further characterize OHM identified during this investigation.
- Sample additional surficial locations (primarily loam in the 0-1 foot bgs interval) with a focus on lead analysis throughout the park to determine if loam is suitable for re-use.
- Three samples failed TCLP analysis for lead indicating surplus soil would be a characteristic hazardous waste if exported for offsite disposal. If export is required, it should be managed as hazardous waste, or stabilization can be performed to re-characterize this material prior to export.

Cost and Schedule Implications

Due to the presence of OHM at the Site, there are cost and schedule implications for the proposed park renovation project associated with soil and groundwater management requirements including handling, treatment, and disposal/discharge for both on-Site re-use and off-Site treatment and disposal. Regulatory submittals to satisfy MCP obligations and an RGP application to treat and discharge dewatering fluids should be prepared and submitted prior to construction to minimize schedule impacts. In our experience, to facilitate the management of OHM impacts during construction, submittals and approvals such as EPA RGP and MCP submittals typically require less than six weeks to prepare and obtain approval, when needed. Soil disposal facility approvals are similarly timely if proper coordination is conducted prior to construction.

Soil disposal costs and schedule implications can be a concern as disposal facility availability and tipping fees can fluctuate seasonally. Both in-state and out-of-state facilities may be needed if significant soil export is required during the project. Soil with minimal OHM present may be eligible for re-use in state at facilities with an approved Administrative Consent Order (ACO) from MassDEP. Soils with TCLP exceedances would be deemed hazardous unless treatment prior to shipping is performed. Soil disposal costs can range from approximately $20/ton to over $200/ton depending on the hazardous

constituents and management and treatment requirements. Note that soils (including the material with the TCLP exceedances) may be selectively reused or encapsulated on-site to reduce risk and, by developing a comprehensive soil management plan utilizing the data obtained during the LSI, significant cost reductions can be realized.

If you have any questions regarding this letter report, please do not hesitate to contact the undersigned at (978) 548-6122.

WESTON & SAMPSON ENGINEERS, INC.

Senior Project Manager

Attachments:

Figure 1 – Locus Map
Figure 2 – Site Plan
Table 1 – Composite Soil Analytical Results
Table 2 – Discrete Soil Analytical Results
Table 3 – RGP Groundwater Analytical Results

Figures

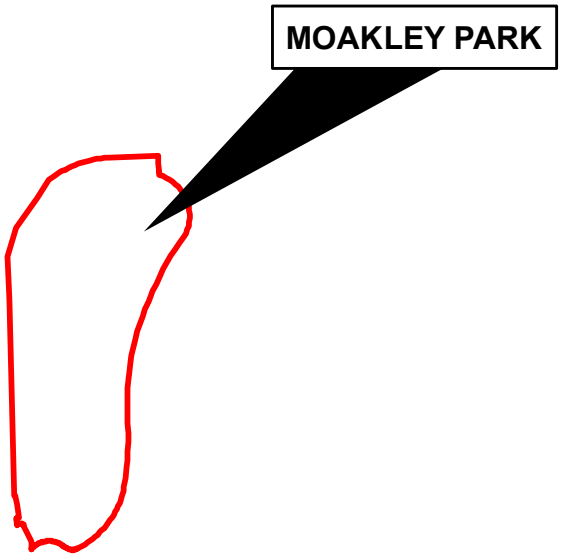

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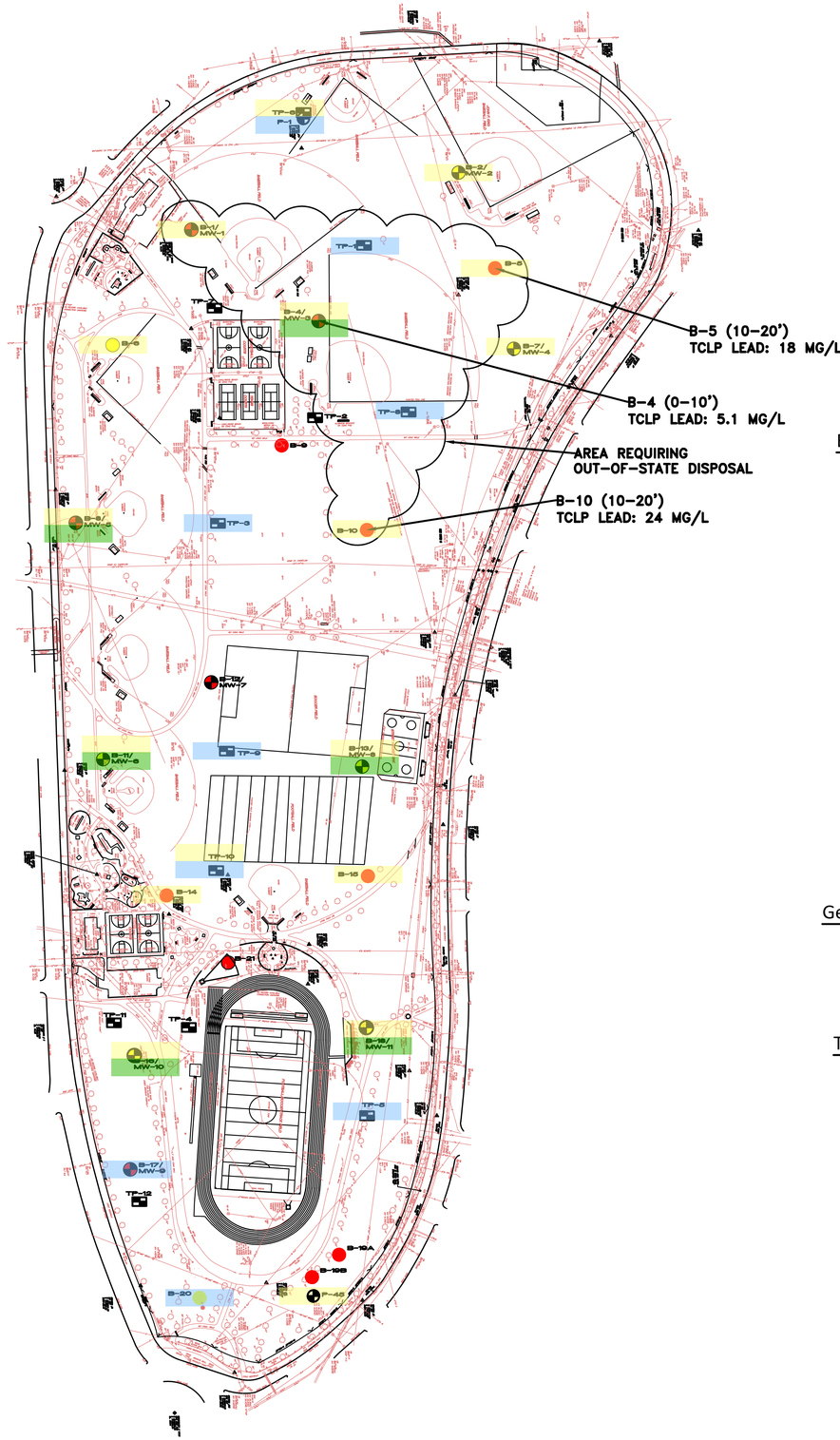
FIGURE 1
MOAKLEY PARK
CITY OF BOSTON, MASSACHUSETTS

LOCUS MAP

0 2,000 4,000 **Feet**

[redacted]

Path: \\wse03.local\WSE\Depts\GISdata\Client\Boston MA\Project\2190828\LocusMap.mxd **User:** GannonR **Saved:** 11/27/2019 8:54:08 AM **Opened:** 11/27/2019 8:54:38 AM



Borings	Depth(s)
B-1	(0-10')
B-2	(0-10'),(10-20')
B-4	(0-10')
B-6	(0-10'),(10-20')
B-7	(0-10'),(10-20')
B-8	(0-10'),(10-20')
B-10	(0-10'),(10-20')
B-11	(0-10'),(10-20')
B-12	(0-10'),(10-20')
B-13	(0-10'),(10-20')
B-14	(0-10'),(10-20')
B-15	(0-10'),(10-20')
B-16	(0-10'),(10-20')
B-17	(0-3'),(19-21')
B-18	(0-10'),(10-16')
B-20	(0-3'),(15-20')

Geoprobes	Depth(s)
B-5	(0-3'), (0-10'), (10-20')
P-1	(0-3'), (0-10'), (10-20')
P-45	(0-10'), (10-20')

Test Pits	Depth(s)
TP-1	(0-3')
TP-3	(0-3'), (3-6')
TP-5	(0-3')
TP-8	(0-2.8')
TP-9	(0-3')
TP-10	(0-3')

LEGEND

Survey Control Station
Stone bound
Concrete bound
Drill hole
PK, nail or cut, spike
Hub & tack
Mass Survey Marker
Punch mark
Monument pin/lead plug
Found
Iron or Rebar
Abandoned
Cplbd
Shrub
Flowbed
Tree line
Evergreen tree
Deciduous tree
Bushes
Fence
Wrought iron fence
Chain link
Guard rail
Curbing(Type)
Miscellaneous concrete
Granite
Stone wall
Cone curb
Steel post
Wood post
Utility pole (bollard)
Flood light
Flag pole
Sign
Parking meter
Bicycle signal
Traffic signal control cabinet
Electric control cabinet
Telephone control cabinet
Electric Manhole
Hand hole
Utility pole
Light pole
Gate
Drain manhole
Catch basin
Top of bank
Tree
Shrub
Corrugated steel pipe
Corrugated metal pipe
Reinforced concrete pipe
Cast iron pipe
Polyethyl cellulate
Bituminous clay pipe
Force main
Gate
Water gate
Hot hand
Water Manhole
Sprinkler control manhole
Water manhole
Electric manhole
Telephone manhole
Sewer manhole
Hydrant
Water line
Sewer line
Combined sewer
Telephone line
Electric line
Gate line
Gas line
Boston Transportation Department
Fire Tone Cable
Traffic Signal
Massachusetts Water Resources Authority
Boston Public Works
Boston sewer
Bore hole
Threshold
Yard drain
Intermediate contour
Index contour
Spot grade

REFERENCES

1. PARKS AND RECREATION DEPARTMENT BOSTON, MASSACHUSETTS, COLUMBUS PARK LAYOUT & DRAINAGE BY CHAS. EMERSON & MANSEL BIG SCALE 1"=20', DATED JUNE, 1963
2. PARKS AND RECREATION DEPARTMENT BOSTON, MASSACHUSETTS, COLUMBUS PARK GRADING AND UTILITIES PLAN BY STORCH ASSOCIATES SCALE 1"=20'-0", DATED 10-7-74
3. CITY OF BOSTON PARKS & RECREATION DEPARTMENT COLUMBUS PARK, SOUTH BOSTON SITE PLAN EXISTING WORK SCALE: AS NOTED, DATED MAY 16, 1973
4. SOUTH BOSTON BEACHES REHABILITATION METROPOLITAN DISTRICT COMMISSION CONTRACT NO. CSE-1705-DR BY CAROL R. JOHNSON ASSOCIATES, INC. SALES MAP REFERENCES SCALE: 1"=20', DATED: 02-04-88 SHEETS S-07 AND S-08
5. BOSTON SEWER AND SEWER COMMISSION BSSC MAP NO. 170, 171, AND 176, 181 SCALE: 1"=200', PRINTED: SEPTEMBER 13, 2007
6. NEW ST. EXTENSION & OVERFLOW FOR COMBINED SEWER EASTERLY, SOUTH BOSTON PLAN AND PROFILE SCALE: 1"=20' HORIZONTAL, 1"=200' VERTICAL STAMPED: CITY OF BOSTON, STREET DEPARTMENT SEWER DIVISION DATED: MAY 31, 1910
7. MASSACHUSETTS SEWER RESOURCES AUTHORITY BOSSO — GRADING PLAN NORTH DORCHESTER BAY CSO STORAGE TUNNEL SCALE: 1"=40' SHEET NO. 37 OF 229 DRAWING NO. C-1-37
8. MASSACHUSETTS SEWER RESOURCES AUTHORITY BOSSO — SITE UTILITY PLAN NORTH DORCHESTER BAY CSO STORAGE TUNNEL SCALE: 1"=20' SHEET NO. 39 OF 229 DRAWING NO. C-1-39
9. CITY OF BOSTON PARK DEPARTMENT SEWER AND SEWER LAND AT COLUMBUS PARK, SOUTH BOSTON SCALE: 1"=40' SHEET NO. 39 OF 229 DRAWING NO. C-1-39
10. PARKS AND RECREATION DEPARTMENT BOSTON, MASSACHUSETTS, COLUMBUS PARK LANDSCAPE IMPROVEMENTS, CONSTRUCTION SCALE: 1"=20'-0", DATED FEBRUARY, 1999
11. KEYSPAN ENERGY DELIVERY PLANS 3063, 3064, 3065 AND 3066
12. NSTAR ELECTRIC VARIOUS PLANS
13. MASSACHUSETTS BAY TRANSPORTATION AUTHORITY PLAN DWG AND DWG
14. BOSTON TRANSPORTATION DEPARTMENT, NSTAR ELECTRIC COMPANY PROPOSED 345kV CONDUIT BY WILDING GRANGE RESTON, INC.
15. COMCAST
16. PLAN SHOWING CITY OF BOSTON ROADS AND LANDS TRANSFERRED TO METROPOLITAN DISTRICT COMMISSION UNDER PROVISIONS OF CHAPTER 670, ACT OF 1892, CITY OF BOSTON, COLUMBIA RD., OLD COLONY AVE. SOUTH BOSTON PREPARED BY JAMES M. HALEY, CHIEF ENGINEER, SURVEY DIVISION, PUBLIC WORKS DEPARTMENT DATED MARCH 14, 1930, SCALE 1"=100' CITY OF BOSTON LAYOUT NO. L-30700
17. WILLIAM J. DAY BOULEVARD, SOUTH BOSTON & DORCHESTER DISTRICTS, PLAN OF LAND TO BE TAKEN FOR THE CITY OF BOSTON BOARD OF PARK COMMISSIONERS UNDER THE PROVISIONS OF CHAPTER 638, ACTS OF 1949 PREPARED BY: BENJAMIN W. PINK, DIRECTOR OF PARK PLANNING, COMMONWEALTH OF MASSACHUSETTS METROPOLITAN DISTRICT COMMISSION, PARKS DIVISION DATED: JANUARY 10, 1955, SCALE 1"=100' MDC PLAN NOS. 35284 W.S. & 35285 W.S.
18. COLUMBIA ROAD, FRANKLIN PARK TO MARINE PARK PREPARED BY: WILLIAM JACKSON, CITY ENGINEER DATED: JUNE 15, 1877, SCALE 1"=40' CITY OF BOSTON LAYOUT NO. L-30578
19. MASSACHUSETTS WATER RESOURCES AUTHORITY, NORTH DORCHESTER BAY CSO STORAGE TUNNEL, MWRA CONTRACT NO. 5314 PREPARED BY: PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC., METCALF & EDDY AND DEWAIT ASSOCIATES, JOINT DATED: AUGUST 6, 2008, SCALE 1"=40' PLAN BOOK 2008, PAGE 910

NOTES

1. THIS PLAN IS BASED ON THE CITED REFERENCES AND ADDITIONAL FIELD SURVEY PERFORMED BY WESTON & SAMPSON AS NOTED, AND AS SHOWN. FIELDWORK WAS COMPLETED AND PHOTOGRAPHED AT A FINER SCALE TO OBTAIN TOPOGRAPHICAL DATA WHERE NEEDED. FIELDWORK OCCURED IN JUNE, 2019 AND WAS USED TO SHOW THE LOCATION OF PROPERTY LINES.
2. COORDINATES, IN U.S. SURVEY FEET, ARE IN THE MASSACHUSETTS MAINLAND ZONE SYSTEM, NAD83(2011). THEY ARE REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83)(2011), AS DETERMINED BY SMRT'S NETWORK OF GNSS CORRECTIONS, BASED ON THE FOLLOWING NATIONAL GEODETIC SURVEY (NGS) CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS): WAIT (WOBURN, MA) (NGS DATABASE 2) AMHT, PATS (PEABODY, MA) (NGS DATABASE 2) (NGS) AND ZBTT (FOXBORO, MA) (NGS DATABASE 2) (NGS).
3. PROPERTY LINE WAS COMPILED FROM AVAILABLE RECORD PLANS AND BASED ON THE LISTED MONUMENTATION FOUND.
4. RECORD EASEMENTS, INCLUDING ANY CREATED BY MEPA, CONTRACT 60, 45A4, ARE NOT SHOWN ON THIS SURVEY. AS-BUILT RECORD DATA FOR UTILITIES PROVIDED UNAVAILABLE AT TIME OF SURVEY.
5. ELEVATIONS, IN U.S. SURVEY FEET, ARE REFERENCED TO THE NORTH AMERICAN DATUM AS DEFINED BY MASSACHUSETTS GEODETIC NETWORK DATUM OF 1988 (NAD88).
6. SUBSURFACE UTILITY LINES AND STRUCTURES AS NOTED ARE COMPILED FROM FIELD MARKINGS, PLANS FOR AVAILABLE RECORD INFORMATION (SEE REFERENCES), AND WHERE SHOWN, ARE ONLY APPROXIMATE. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD.
7. SMRT ASSUMES NO RESPONSIBILITY FOR UTILITIES OMITTED OR INACCURATELY SHOWN.
8. BEFORE DESIGNING FUTURE CONNECTIONS, THE LOCATION OF ALL EXISTING UTILITIES MUST BE CONFIRMED.
9. BEFORE CONSTRUCTION, ALL UTILITIES, PUBLIC AND PRIVATE, MUST BE NOTIFIED (SEE MASSACHUSETTS GENERAL LAWS, CHAPTER 82 SECTION 40). CALL "DIG SAFE" 1-888-DIG-SAFE. (888-344-7233).

EXPLORATION LEGEND

- Boring (35 ft.)
- Deep Boring (100 ft. or Refusal)
- Boring (35 ft.) with Monitoring Well
- Boring (100 ft.) with Monitoring Well
- Geoprobe Boring
- Test Pit
- Comm–97–001 Sample Location
- Discrete Sample Location
- EPA RGP Sample Location

FIGURE 2
MOAKLEY PARK
BOSTON, MA

SITE PLAN

NOVEMBER 2019 SCALE: 1" = 150'

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Reading, MA 01867

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Tables

Table 1
Composite Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATION											
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-P-1 (0'-10') 9/9/2019	COMP-P-1 (10'-20') 9/9/2019	COMP-P-45 (0'-10') 9/9/2019	COMP-P-45 (10'-20') 9/9/2019	COMP-B-1 (0'-10') 8/29/2019	COMP-B-2 (0'-10') 8/30/2019	COMP-B-2 (10'-20') 8/30/2019	COMP-B-4 (0'-10') 8/29/2019	COMP-B-5 (0'-10') 9/9/2019	COMP-B-5 (10'-20') 9/9/2019	COMP-B-6 (0'-10') 9/4/2019	COMP-B-6 (10'-20') 9/4/2019
Metals																	
ANTIMONY	mg/kg	20	20	20	~	<2.3	<2.2	<1.9	<2.1	<2.3	<2.0	<2.6	<2.2	<2.1	<2.5	<2.1	<2.4
ARSENIC	mg/kg	20	20	20	~	**21**	**9.2**	**8.4**	**6.8**	**5.3**	**20**	**6.0**	**22**	**9.4**	**9.4**	**10**	**8.1**
BARIUM	mg/kg	1000	1000	1000	~	**330**	**180**	**73**	**37**	**130**	**380**	**47**	**900**	**400**	**140**	**190**	**81**
BERYLLIUM	mg/kg	90	90	90	~	**0.65**	**0.75**	**0.74**	**0.46**	**0.64**	**0.55**	**0.88**	**0.81**	**0.61**	**0.74**	**0.41**	**1.1**
CADMIUM	mg/kg	70	70	70	~	**1.0**	**0.44**	<0.19	<0.21	**1.4**	**1.1**	**0.30**	**5.0**	**0.80**	**0.68**	**0.79**	**0.24**
CHROMIUM	mg/kg	100	100	100	~	**21**	**30**	**30**	**21**	**15**	**20**	**39**	**41**	**110**	**33**	**37**	**50**
LEAD	mg/kg	200	200	200	~	**2600**	**300**	**110**	**7.6**	**190**	**3100**	**12**	**4400**	**2100**	**310**	**1800**	**23**
MERCURY	mg/kg	20	20	20	~	**0.58**	**0.51**	**0.63**	<0.030	**0.47**	**2.9**	<0.043	**4.0**	**0.96**	**0.41**	**3.2**	<0.037
NICKEL	mg/kg	600	600	600	~	**16**	**21**	**24**	**17**	**30**	**25**	**22**	**27**	**16**	**17**	**13**	**39**
SELENIUM	mg/kg	400	400	400	~	<4.5	<4.4	<3.8	<4.1	<4.6	<4.1	<5.3	<4.4	<4.2	<4.9	<4.1	<4.8
SILVER	mg/kg	100	100	100	~	**1.9**	<0.44	**0.74**	**0.52**	<0.46	<0.41	<0.53	<0.44	<0.42	<0.49	<0.41	<0.48
THALLIUM	mg/kg	8	8	8	~	<2.3	<2.2	<1.9	<2.1	<2.3	<2.0	<2.6	<2.2	<2.1	<2.5	<2.1	<2.4
VANADIUM	mg/kg	400	400	400	~	34	**39**	**44**	**30**	**36**	**24**	**44**	**36**	**27**	**34**	**24**	**62**
ZINC	mg/kg	1000	1000	1000	~	**320**	**130**	**92**	**36**	**890**	**510**	**60**	**2700**	**580**	**280**	**220**	**88**
Toxicity Characteristic Leachate Procedure (TCLP)																	
CHROMIUM	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	NT	<0.050	NT	NT	NT
LEAD	mg/kg	~	~	~	5	**0.7**	**1.2**	ND (0.10)	NT	**0.89**	**0.58**	NT	**5.1**	**18**	<0.10	**1.9**	NT
MERCURY	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	**0.00021**	NT	NT	NT	NT
Volatile Organic Compounds (VOCs)																	
ACETONE	mg/kg	6	50	400	~	<0.11	<4.5	<0.12	<0.11	<0.12	<0.12	<0.16	<0.14	<0.12	<5.1	<0.11	<0.11
TERT-AMYL METHYL ETHER	mg/kg	~	~	~	~	<0.0011	<0.090	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.10	<0.0011	<0.0011
BENZENE	mg/kg	2	40	40	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
BROMOBENZENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
BROMOCHLOROMETHANE	mg/kg	~	~	~	~	<0.0043	<0.090	<0.0046	<0.0045	<0.0025	<0.0049	<0.0032	<0.0028	<0.0050	<0.10	<0.0045	<0.0045
BROMODICHLOROMETHANE	mg/kg	0.1	0.1	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
BROMOFORM	mg/kg	0.1	1	300	~	<0.0043	<0.090	<0.0046	<0.0045	<0.0025	<0.0049	<0.0032	<0.0028	<0.0050	<0.10	<0.0045	<0.0045
BROMOMETHANE	mg/kg	0.5	0.5	30	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
2-BUTANONE (MEK)	mg/kg	4	50	400	~	<0.043	<1.8	<0.046	<0.045	<0.049	<0.049	<0.065	<0.055	<0.050	<2.0	<0.045	<0.045
N-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
SEC-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TERT-BUTYLBENZENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TERT-BUTYLETHYL ETHER	mg/kg	~	~	~	~	<0.0011	<0.045	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051	<0.0011	<0.0011
CARBON DISULFIDE	mg/kg	100	~	~	~	<0.0065	<0.90	<0.0069	<0.0068	<0.0074	<0.0073	**0.013**	<0.0083	<0.0075	<1.0	<0.0068	<0.0067
CARBON TETRACHLORIDE	mg/kg	5	5	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
CHLOROBENZENE	mg/kg	1	3	100	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
CHLORODIBROMOMETHANE	mg/kg	0.005	0.03	20	~	<0.0022	<0.045 *	<0.0023	<0.0023	<0.0012	<0.0024	<0.0016	<0.0014	<0.0025	<0.051 *	<0.0023	<0.0022
CHLOROETHANE	mg/kg	100	~	~	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
CHLOROFORM	mg/kg	0.2	0.2	500	~	<0.0043	<0.18	<0.0046	<0.0045	<0.0049	<0.0049	<0.0065	<0.0055	<0.0050	<0.20	<0.0045	<0.0045
CHLOROMETHANE	mg/kg	100	~	~	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
2-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
4-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,2-DIBROMO-3-CHLOROPROPANE	mg/kg	10	~	~	~	<0.0022	<0.36	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.41	<0.0023	<0.0022
1,2-DIBROMOETHANE (EDB)	mg/kg	0.1	0.1	1	~	<0.0011	<0.045	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051	<0.0011	<0.0011
DIBROMOMETHANE	mg/kg	500	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
DICHLORODIFLUOROMETHANE	mg/kg	1000	~	~	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
1,1-DICHLOROETHANE	mg/kg	0.4	9	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,2-DICHLOROETHANE	mg/kg	0.1	0.1	20	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1-DICHLOROETHYLENE	mg/kg	3	40	500	~	<0.0043	<0.090	<0.0046	<0.0045	<0.0049	<0.0049	<0.0065	<0.0055	<0.0050	<0.10	<0.0045	<0.0045
CIS-1,2-DICHLOROETHYLENE	mg/kg	0.1	0.1	100	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TRANS-1,2-DICHLOROETHYLENE	mg/kg	1	1	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,2-DICHLOROPROPANE	mg/kg	0.1	0.1	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,3-DICHLOROPROPANE	mg/kg	500	~	~	~	<0.0011	<0.045	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051	<0.0011	<0.0011
2,2-DICHLOROPROPANE	mg/kg	0.1	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1-DICHLOROPROPENE	mg/kg	0.01	~	~	~	<0.0043	<0.18 *	<0.0046	<0.0045	<0.0025	<0.0049	<0.0032	<0.0028	<0.0050	<0.20 *	<0.0045	<0.0045
CIS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0011	<0.045 *	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051 *	<0.0011	<0.0011
TRANS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0011	<0.045 *	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051 *	<0.0011	<0.0011
DIETHYL ETHER	mg/kg	100	~	~	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
DIISOPROPYL ETHER	mg/kg	100	~	~	~	<0.0011	<0.045	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051	<0.0011	<0.0011
1,4-DIOXANE	mg/kg	0.2	6	20	~	<0.11	<4.5 *	<0.12	<0.11	<0.12	<0.12	<0.16	<0.14	<0.12	<5.1 *	<0.11	<0.11
ETHYLBENZENE	mg/kg	40	500	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
2-HEXANONE	mg/kg	100	~	~	~	<0.022	<0.90	<0.023	<0.023	<0.025	<0.024	<0.032	<0.028	<0.025	<1.0	<0.023	<0.022
ISOPROPYLBENZENE	mg/kg	1000	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
P-ISOPROPYLTOLUENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
METHYL TERT-BUTYL ETHER (MTBE)	mg/kg	0.1	100	100	~	<0.0043	<0.090	<0.0046	<0.0045	<0.0049	<0.0049	<0.0065	<0.0055	<0.0050	<0.10	<0.0045	<0.0045
METHYLENE CHLORIDE	mg/kg	0.1	4	400	~	<0.011	<0.45 *	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.51 *	<0.011	<0.011
4-METHYL-2-PENTANONE (MIBK)	mg/kg	0.4	50	400	~	<0.022	<0.90 *	<0.023	<0.023	<0.025	<0.024	<0.032	<0.028	<0.025	<1.0 *	<0.023	<0.022
NAPHTHALENE	mg/kg	4	20	500	~	<0.011	<0.45	<0.012	<0.011	<0.0049	<0.012	<0.0065	<0.0055	<0.012	**0.52**	<0.011	<0.011
N-PROPYLBENZENE	mg/kg	100	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
STYRENE	mg/kg	3	4	70	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1,1,2-TETRACHLOROETHANE	mg/kg	0.1	0.1	80	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1,2,2-TETRACHLOROETHANE	mg/kg	0.005	0.02	10	~	<0.0011	<0.045 *	<0.0012	<0.0011	<0.0012	<0.0012	<0.0016	<0.0014	<0.0012	<0.051 *	<0.0011	<0.0011
TETRACHLOROETHYLENE	mg/kg	1	10	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TETRAHYDROFURAN	mg/kg	500	~	~	~	<0.011	<0.36	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.41	<0.011	<0.011
TOLUENE	mg/kg	30	500	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,2,3-TRICHLOROBENZENE	mg/kg	~	~	~	~	<0.0022	<0.36	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.41	<0.0023	<0.0022
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1,1-TRICHLOROETHANE	mg/kg	30	500	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,1,2-TRICHLOROETHANE	mg/kg	0.1	2	40	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TRICHLOROETHYLENE	mg/kg	0.3	0.3	30	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
TRICHLOROFLUOROMETHANE	mg/kg	1000	~	~	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
1,2,3-TRICHLOROPROPANE	mg/kg	100	~	~	~	<0.0043	<0.18	<0.0046	<0.0045	<0.0025	<0.0049	<0.0032	<0.0028	<0.0050	<0.20	<0.0045	<0.0045
1,2,4-TRIMETHYLBENZENE	mg/kg	1000	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
1,3,5-TRIMETHYLBENZENE	mg/kg	10	~	~	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022
VINYL CHLORIDE	mg/kg	0.7	0.7	1	~	<0.011	<0.18	<0.012	<0.011	<0.012	<0.012	<0.016	<0.014	<0.012	<0.20	<0.011	<0.011
M/P-XYLENE	mg/kg	100	100	500	~	<0.0043	<0.18	<0.0046	<0.0045	<0.0049	<0.0049	<0.0065	<0.0055	<0.0050	<0.20	<0.0045	<0.0045
O-XYLENE	mg/kg	100	100	500	~	<0.0022	<0.090	<0.0023	<0.0023	<0.0025	<0.0024	<0.0032	<0.0028	<0.0025	<0.10	<0.0023	<0.0022

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 1
Composite Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATION											
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-P-1 (0'-10')	COMP-P-1 (10'-20')	COMP-P-45 (0'-10')	COMP-P-45 (10'-20')	COMP-B-1 (0'-10')	COMP-B-2 (0'-10')	COMP-B-2 (10'-20')	COMP-B-4 (0'-10')	COMP-B-5 (0'-10')	COMP-B-5 (10'-20')	COMP-B-6 (0'-10')	COMP-B-6 (10'-20')
Semi-Volatile Organic Compounds (SVOCs)					~												
ACENAPHTHENE	mg/kg	4	1000	1000	~	<0.23	<0.23	<0.20	<0.21	<0.23	**0.50**	<0.28	<0.22	<0.22	**0.99**	**1.9**	<0.25
ACENAPHTHYLENE	mg/kg	1	600	10	~	<0.23	<0.23	<0.20	<0.21	<0.23	<0.21	<0.28	<0.22	<0.22	<0.26	**0.39**	<0.25
ACETOPHENONE	mg/kg	1000	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
ANILINE	mg/kg	1000	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
ANTHRACENE	mg/kg	1000	1000	1000	~	**0.63**	<0.23	**0.34**	<0.21	**0.28**	**1.1**	<0.28	**0.44**	<0.22	**2.0**	**5.6**	<0.25
BENZO(A)ANTHRACENE	mg/kg	7	7	7	~	**2.5**	**0.34**	**0.68**	<0.21	**0.72**	**2.1**	<0.28	**1.1**	**0.40**	**2.8**	**9.7**	<0.25
BENZO(A)PYRENE	mg/kg	2	2	2	~	**2.6**	**0.31**	**0.56**	<0.21	**0.68**	**1.9**	<0.28	**1.1**	**0.36**	**2.5**	**8.5**	<0.25
BENZO(B)FLUORANTHENE	mg/kg	7	7	7	~	**3.0**	**0.38**	**0.73**	<0.21	**0.83**	**2.2**	<0.28	**1.3**	**0.43**	**2.8**	**9.3**	<0.25
BENZO(G,H,I)PERYLENE	mg/kg	1000	1000	1000	~	**1.6**	<0.23	**0.29**	<0.21	**0.42**	**1.1**	<0.28	**0.65**	**0.23**	**1.3**	**4.2**	<0.25
BENZO(K)FLUORANTHENE	mg/kg	70	70	70	~	**0.99**	<0.23	**0.26**	<0.21	**0.28**	**0.83**	<0.28	**0.45**	<0.22	**1.0**	**3.1**	<0.25
BIS(2-CHLOROETHOXY)METHANE	mg/kg	500	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
BIS(2-CHLOROETHYL)ETHER	mg/kg	0.7	0.7	8	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
BIS(2-CHLOROISOPROPYL)ETHER	mg/kg	0.7	0.7	30	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	90	90	90	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
4-BROMOPHENYL PHENYL ETHER	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
BUTYLBENZYLPHTHALATE	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
4-CHLOROANILINE	mg/kg	1	100	3	~	<0.90	<0.88	<0.78	<0.82	<0.88	<0.80	<1.1 *	<0.87	<0.84	<1.0	<0.79	<0.96
2-CHLORONAPHTHALENE	mg/kg	1000	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2-CHLOROPHENOL	mg/kg	0.7	100	100	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
CHRYSENE	mg/kg	70	70	70	~	**2.3**	**0.29**	**0.63**	<0.21	**0.67**	**1.9**	<0.28	**1.0**	**0.37**	**2.6**	**9.0**	<0.25
DIBENZ(A,H)ANTHRACENE	mg/kg	0.7	0.7	0.7	~	**0.34**	<0.23	<0.20	<0.21	<0.23	**0.27**	<0.28	<0.22	<0.22	**0.35**	**1.1**	<0.25
DIBENZOFURAN	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	**0.73**	**1.6**	<0.50
DI-N-BUTYLPHTHALATE	mg/kg	50	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
3,3'-DICHLOROBENZIDINE	mg/kg	3	3	3	~	<0.23	<0.23	<0.20	<0.21	<0.23	<0.21	<0.28	<0.22	<0.22	<0.26	<0.20	<0.25
2,4-DICHLOROPHENOL	mg/kg	0.7	60	40	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
DIETHYLPHTHALATE	mg/kg	10	200	300	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2,4-DIMETHYLPHENOL	mg/kg	0.7	100	500	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
DIMETHYLPHTHALATE	mg/kg	0.7	50	600	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2,4-DINITROPHENOL	mg/kg	3	50	50	~	<0.90	<0.88	<0.78	<0.82	<0.88	<0.80	<1.1	<0.87	<0.84	<1.0	<0.79	<0.96
2,4-DINITROTOLUENE	mg/kg	0.7	2	2	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2,6-DINITROTOLUENE	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
DI-N-OCTYLPHTHALATE	mg/kg	1000	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	mg/kg	50	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
FLUORANTHENE	mg/kg	1000	1000	1000	~	**5.1**	**0.51**	**1.7**	<0.21	**1.6**	**4.5**	<0.28	**2.6**	**1.1**	**7.8**	**24**	**0.28**
FLUORENE	mg/kg	1000	1000	1000	~	**0.25**	<0.23	<0.20	<0.21	<0.23	**0.51**	<0.28	<0.22	<0.22	**1.4**	**2.4**	<0.25
HEXACHLOROBENZENE	mg/kg	0.7	0.7	0.7	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
HEXACHLOROETHANE	mg/kg	0.7	3	50	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
INDENO(1,2,3-CD)PYRENE	mg/kg	7	7	7	~	**1.9**	**0.25**	**0.38**	<0.21	**0.52**	**1.2**	<0.28	**0.83**	**0.27**	**1.7**	**5.9**	<0.25
ISOPHORONE	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2-METHYLNAPHTHALENE	mg/kg	0.7	80	300	~	<0.23	<0.23	<0.20	<0.21	<0.23	<0.21	<0.28	<0.22	<0.22	**0.58**	**0.80**	<0.25
O-CRESOL	mg/kg	500	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
M/P-CRESOL	mg/kg	500	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
NAPHTHALENE	mg/kg	4	20	500	~	<0.23	<0.23	<0.20	<0.21	<0.23	<0.21	<0.28	<0.22	<0.22	**0.86**	**1.6**	<0.25
NITROBENZENE	mg/kg	500	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2-NITROPHENOL	mg/kg	100	~	~	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
4-NITROPHENOL	mg/kg	100	~	~	~	<0.90	<0.88	<0.78	<0.82	<0.88	<0.80	<1.1	<0.87	<0.84	<1.0	<0.79	<0.96
PENTACHLOROPHENOL	mg/kg	3	3	3	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
PHENANTHRENE	mg/kg	10	500	500	~	**2.5**	<0.23	**1.6**	<0.21	**1.2**	**4.2**	<0.28	**1.9**	**0.81**	**9.0**	**20**	**0.29**
PHENOL	mg/kg	1	50	20	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
PYRENE	mg/kg	1000	1000	1000	~	**4.4**	**0.44**	**1.2**	<0.21	**1.3**	**3.8**	<0.28	**2.2**	**0.92**	**5.9**	**18**	**0.26**
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2,4,5-TRICHLOROPHENOL	mg/kg	4	1000	600	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
2,4,6-TRICHLOROPHENOL	mg/kg	0.7	20	20	~	<0.46	<0.45	<0.40	<0.42	<0.45	<0.41	<0.56	<0.45	<0.43	<0.52	<0.41	<0.50
Polychlorinated Biphenyls (PCBs)																	
PCB 1016	mg/kg	1	1	1	~	<0.11	<0.10	<0.093	<0.095	<0.11	<0.093	<0.13	<0.10	<0.10	<0.12	<0.097	<0.12
PCB 1221	mg/kg	1	1	1	~	<0.11	<0.10	<0.093	<0.097	<0.11	<0.093	<0.13	<0.10	<0.098	<0.12	<0.097	<0.12
PCB 1232	mg/kg	1	1	1	~	<0.11	<0.10	<0.094	<0.095	<0.11	<0.093	<0.13	<0.10	<0.10	<0.12	<0.097	<0.12
PCB 1242	mg/kg	1	1	1	~	<0.11	<0.10	<0.093	<0.095	<0.11	<0.093	<0.13	<0.10	<0.098	<0.12	<0.097	<0.12
PCB 1248	mg/kg	1	1	1	~	<0.11	<0.10	<0.093	<0.097	<0.11	<0.093	<0.13	<0.10	<0.10	<0.12	<0.097	<0.12
PCB 1254	mg/kg	1	1	1	~	<0.11	<0.10	<0.094	<0.095	<0.11	<0.093	<0.13	<0.10	<0.098	<0.12	<0.097	<0.12
PCB 1260	mg/kg	1	1	1	~	<0.11	<0.10	<0.094	<0.097	<0.11	<0.093	<0.13	<0.10	<0.10	<0.12	<0.097	<0.12
PCB 1262	mg/kg	1	1	1	~	<0.11	<0.10	<0.094	<0.095	<0.11	<0.093	<0.13	<0.10	<0.098	<0.12	<0.097	<0.12
PCB 1268	mg/kg	1	1	1	~	<0.11	<0.10	<0.094	<0.095	<0.11	<0.093	<0.13	<0.10	<0.10	<0.12	<0.097	<0.12
Total Petroleum Hydrocarbons (TPH)																	
TPH	mg/kg	1000	1000	1000	~	**240**	**72**	**55**	**23**	**140**	**280**	**45**	**170**	**160**	**430**	**980**	**100**
General Chemistry Parameters																	
REACTIVE CYANIDE	mg/kg	~	~	~	~	<4.0	<4.0	<3.9	<3.9	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	<3.9	<4.0
REACTIVE SULFIDE	mg/kg	~	~	~	~	<20	<20	<20	<20	<20	<20	<19	<20	<20	<20	<20	<20
PH	pH Units	~	~	~	~	**6.2**	**7.8**	**7.4**	**7.4**	**8.8**	**6.7**	**8.1**	**7.1**	**7.5**	**8.1**	**8.2**	**7.9**
% Solids	% Weight	~	~	~	~	**73.7**	75.0	**85.0**	**80.0**	**74.1**	**82.3**	**60.4**	**74.3**	**78.8**	**65.8**	82.5	67.9
SPECIFIC CONDUCTANCE	µohms/cm	~	~	~	~	**8.3**	**4.2**	**5.2**	**6.3**	**29**	**4.0**	**76**	**9.2**	**19**	**37**	49	58
FLASHPOINT	°F	~	~	~	~	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**
IGNITABILITY	present/absent	~	~	~	~	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 1
Composite Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATION											
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-B-7 (0'-10') 8/28/2019	COMP-B-7 (10'-20') 8/28/2019	COMP-B-8 (0'-10') 9/9/2019	COMP-B-8 (10'-20') 9/9/2019	COMP-B-10 (0'-10') 8/28/2019	COMP-B-10 (10'-20') 8/28/2019	COMP B-11 (0'-10') 9/10/2019	COMP B-11 (10'-20') 9/10/2019	COMP B-12 (0'-10') 9/10/2019	COMP B-12 (10'-20') 9/11/2019	COMP-B-13 (0'-10') 8/22/2019	COMP-B-13 (10'-20') 8/22/2019
Metals																	
ANTIMONY	mg/kg	20	20	20	~	<1.9	<2.3	<2.1	<2.5	<2.2	<2.6	<3.4	<2.3	<2.4	<2.3	<2.2	<2.0
ARSENIC	mg/kg	20	20	20	~	**4.2**	**5.6**	**5.6**	**6.2**	**3.5**	**23**	**11**	**6.7**	**6.3**	<2.3	**3.5**	<2.0
BARIUM	mg/kg	1000	1000	1000	~	**120**	**61**	**61**	**48**	**52**	**180**	**99**	**87**	**77**	**35**	**61**	**15**
BERYLLIUM	mg/kg	90	90	90	~	**0.73**	**0.87**	**0.52**	**0.88**	**0.69**	**0.79**	**0.78**	**1.0**	**0.62**	**0.50**	**0.76**	**0.23**
CADMIUM	mg/kg	70	70	70	~	**0.30**	**0.35**	**0.41**	**0.33**	<0.22	**12**	**0.63**	**0.29**	**0.53**	<0.23	<0.22	<0.20
CHROMIUM	mg/kg	100	100	100	~	**31**	**40**	**21**	**39**	**33**	**61**	**31**	**46**	**32**	**21**	**36**	**12**
LEAD	mg/kg	200	200	200	~	**1200**	**41**	**150**	**11**	**25**	**3800**	**160**	**12**	**150**	**6.7**	**19**	**9.0**
MERCURY	mg/kg	20	20	20	~	**1.1**	**0.66**	**0.31**	<0.036	**0.083**	**1.8**	**0.078**	<0.037	**0.33**	<0.032	<0.033	**0.034**
NICKEL	mg/kg	600	600	600	~	**20**	**25**	**18**	**22**	**20**	**55**	**25**	**35**	**18**	**15**	**24**	**8.7**
SELENIUM	mg/kg	400	400	400	~	<3.7	<4.6	<4.1	<4.9	<4.3	<5.2	<6.7	<4.6	<4.9	<4.5	<4.4	<3.9
SILVER	mg/kg	100	100	100	~	<0.37	<0.46	<0.41	<0.49	<0.43	**2.9**	<0.67	<0.46	<0.49	<0.45	<0.44	<0.39
THALLIUM	mg/kg	8	8	8	~	<1.9	<2.3	<2.1	<2.5	<2.2	<2.6	<3.4	<2.3	<2.4	<2.3	<2.2	<2.0
VANADIUM	mg/kg	400	400	400	~	**39**	**48**	**30**	**49**	**43**	**38**	**48**	**58**	**42**	**28**	**48**	**16**
ZINC	mg/kg	1000	1000	1000	~	**95**	**78**	**130**	**60**	**62**	**5900**	**130**	**76**	**160**	**39**	**69**	**24**
Toxicity Characteristic Leachate Procedure (TCLP)																	
CHROMIUM	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LEAD	mg/kg	~	~	~	5	**0.39**	NT	**0.1**	NT	NT	**24**	**0.38**	NT	<0.10	NT	NT	NT
MERCURY	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Volatile Organic Compounds (VOCs)																	
ACETONE	mg/kg	6	50	400	~	<0.12	<3.8	<0.10	<0.13	<0.12	<4.2	<0.17	<0.12	<0.12	<0.11	<0.11	<0.10
TERT-AMYL METHYL ETHER	mg/kg	~	~	~	~	<0.0012	<0.075	<0.0010	<0.0013	<0.0012	<0.084	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
BENZENE	mg/kg	2	40	40	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
BROMOBENZENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
BROMOCHLOROMETHANE	mg/kg	~	~	~	~	<0.0023	<0.075	<0.0042	<0.0051	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
BROMODICHLOROMETHANE	mg/kg	0.1	0.1	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
BROMOFORM	mg/kg	0.1	1	300	~	<0.0023	<0.075	<0.0042	<0.0051	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
BROMOMETHANE	mg/kg	0.5	0.5	30	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
2-BUTANONE (MEK)	mg/kg	4	50	400	~	<0.047	<1.5	<0.042	<0.051	<0.047	<1.7	<0.069	<0.049	<0.050	<0.045	<0.046	<0.041
N-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
SEC-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TERT-BUTYLBENZENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TERT-BUTYLETHYL ETHER	mg/kg	~	~	~	~	<0.0012	<0.038	<0.0010	<0.0013	<0.0012	<0.042	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
CARBON DISULFIDE	mg/kg	100	~	~	~	<0.0070	<0.75	<0.0063	<0.0077	<0.0070	<0.84	<0.010	<0.0074	<0.0075	<0.0067	<0.0069	<0.0061
CARBON TETRACHLORIDE	mg/kg	5	5	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
CHLOROBENZENE	mg/kg	1	3	100	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
CHLORODIBROMOMETHANE	mg/kg	0.005	0.03	20	~	<0.0012	<0.038 *	<0.0021	<0.0026	<0.0012	<0.042 *	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
CHLOROETHANE	mg/kg	100	~	~	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
CHLOROFORM	mg/kg	0.2	0.2	500	~	<0.0047	<0.15	<0.0042	<0.0051	<0.0047	<0.17	<0.0069	<0.0049	<0.0050	<0.0045	<0.0046	<0.0041
CHLOROMETHANE	mg/kg	100	~	~	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
2-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
4-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2-DIBROMO-3-CHLOROPROPANE	mg/kg	10	~	~	~	<0.0023	<0.30	<0.0021	<0.0026	<0.0023	<0.34	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2-DIBROMOETHANE (EDB)	mg/kg	0.1	0.1	1	~	<0.0012	<0.038	<0.0010	<0.0013	<0.0012	<0.042	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
DIBROMOMETHANE	mg/kg	500	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
DICHLORODIFLUOROMETHANE	mg/kg	1000	~	~	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
1,1-DICHLOROETHANE	mg/kg	0.4	9	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2-DICHLOROETHANE	mg/kg	0.1	0.1	20	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1-DICHLOROETHYLENE	mg/kg	3	40	500	~	<0.0047	<0.075	<0.0042	<0.0051	<0.0047	<0.084	<0.0069	<0.0049	<0.0050	<0.0045	<0.0046	<0.0041
CIS-1,2-DICHLOROETHYLENE	mg/kg	0.1	0.1	100	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TRANS-1,2-DICHLOROETHYLENE	mg/kg	1	1	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2-DICHLOROPROPANE	mg/kg	0.1	0.1	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,3-DICHLOROPROPANE	mg/kg	500	~	~	~	<0.0012	<0.038	<0.0010	<0.0013	<0.0012	<0.042	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
2,2-DICHLOROPROPANE	mg/kg	0.1	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1-DICHLOROPROPENE	mg/kg	0.01	~	~	~	<0.0023	<0.15 *	<0.0042	<0.0051	<0.0023	<0.17 *	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
CIS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0012	<0.038 *	<0.0010	<0.0013	<0.0012	<0.042 *	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
TRANS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0012	<0.038 *	<0.0010	<0.0013	<0.0012	<0.042 *	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
DIETHYL ETHER	mg/kg	100	~	~	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
DIISOPROPYL ETHER	mg/kg	100	~	~	~	<0.0012	<0.038	<0.0010	<0.0013	<0.0012	<0.042	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
1,4-DIOXANE	mg/kg	0.2	6	20	~	<0.12	<3.8 *	<0.10	<0.13	<0.12	<4.2 *	<0.17	<0.12	<0.12	<0.11	<0.11	<0.10
ETHYLBENZENE	mg/kg	40	500	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
2-HEXANONE	mg/kg	100	~	~	~	<0.023	<0.75	<0.021	<0.026	<0.023	<0.84	<0.034	<0.025	<0.025	<0.022	<0.023	<0.020
ISOPROPYLBENZENE	mg/kg	1000	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
P-ISOPROPYLTOLUENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	**0.084**	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
METHYL TERT-BUTYL ETHER (MTBE)	mg/kg	0.1	100	100	~	<0.0047	<0.075	<0.0042	<0.0051	<0.0047	<0.084	<0.0069	<0.0049	<0.0050	<0.0045	<0.0046	<0.0041
METHYLENE CHLORIDE	mg/kg	0.1	4	400	~	<0.012	<0.38 *	<0.010	<0.013	<0.012	<0.42 *	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
4-METHYL-2-PENTANONE (MIBK)	mg/kg	0.4	50	400	~	<0.023	<0.75 *	<0.021	<0.026	<0.023	<0.84 *	<0.034	<0.025	<0.025	<0.022	<0.023	<0.020
NAPHTHALENE	mg/kg	4	20	500	~	<0.0047	**0.39**	<0.010	<0.013	<0.0047	**0.53**	<0.0069	<0.0049	<0.0050	<0.0045	<0.0046	<0.0041
N-PROPYLBENZENE	mg/kg	100	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
STYRENE	mg/kg	3	4	70	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1,1,2-TETRACHLOROETHANE	mg/kg	0.1	0.1	80	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1,2,2-TETRACHLOROETHANE	mg/kg	0.005	0.02	10	~	<0.0012	<0.038 *	<0.0010	<0.0013	<0.0012	<0.042 *	<0.0017	<0.0012	<0.0012	<0.0011	<0.0011	<0.0010
TETRACHLOROETHYLENE	mg/kg	1	10	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TETRAHYDROFURAN	mg/kg	500	~	~	~	<0.012	<0.30	<0.010	<0.013	<0.012	<0.34	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
TOLUENE	mg/kg	30	500	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2,3-TRICHLOROBENZENE	mg/kg	~	~	~	~	<0.0023	<0.30	<0.0021	<0.0026	<0.0023	<0.34	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1,1-TRICHLOROETHANE	mg/kg	30	500	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,1,2-TRICHLOROETHANE	mg/kg	0.1	2	40	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TRICHLOROETHYLENE	mg/kg	0.3	0.3	30	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
TRICHLOROFLUOROMETHANE	mg/kg	1000	~	~	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
1,2,3-TRICHLOROPROPANE	mg/kg	100	~	~	~	<0.0023	<0.15	<0.0042	<0.0051	<0.0023	<0.17	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,2,4-TRIMETHYLBENZENE	mg/kg	1000	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
1,3,5-TRIMETHYLBENZENE	mg/kg	10	~	~	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020
VINYL CHLORIDE	mg/kg	0.7	0.7	1	~	<0.012	<0.15	<0.010	<0.013	<0.012	<0.17	<0.017	<0.012	<0.012	<0.011	<0.011	<0.010
M/P-XYLENE	mg/kg	100	100	500	~	<0.0047	<0.15	<0.0042	<0.0051	<0.0047	<0.17	<0.0069	<0.0049	<0.0050	<0.0045	<0.0046	<0.0041
O-XYLENE	mg/kg	100	100	500	~	<0.0023	<0.075	<0.0021	<0.0026	<0.0023	<0.084	<0.0034	<0.0025	<0.0025	<0.0022	<0.0023	<0.0020

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
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3. ~ = No Method 1 Standard available
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Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATION											
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-B-7 (0'-10')	COMP-B-7 (10'-20')	COMP-B-8 (0'-10')	COMP-B-8 (10'-20')	COMP-B-10 (0'-10')	COMP-B-10 (10'-20')	COMP B-11 (0'-10')	COMP B-11 (10'-20')	COMP B-12 (0'-10')	COMP B-12 (10'-20')	COMP-B-13 (0'-10')	COMP-B-13 (10'-20')
Semi-Volatile Organic Compounds (SVOCs)					~												
ACENAPHTHENE	mg/kg	4	1000	1000	~	**3.9**	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	**3.3**	**1.0**	<0.22	<0.19
ACENAPHTHYLENE	mg/kg	1	600	10	~	<0.20	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	<0.24	<0.22	<0.22	<0.19
ACETOPHENONE	mg/kg	1000	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
ANILINE	mg/kg	1000	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
ANTHRACENE	mg/kg	1000	1000	1000	~	**7.8**	<0.25	<0.22	<0.26	<0.22	**0.40**	<0.34	<0.25	**4.4**	**1.0**	<0.22	<0.19
BENZO(A)ANTHRACENE	mg/kg	7	7	7	~	**8.7**	**0.49**	**0.48**	<0.26	<0.22	**0.58**	<0.34	<0.25	**4.7**	**0.87**	<0.22	<0.19
BENZO(A)PYRENE	mg/kg	2	2	2	~	**6.5**	**0.36**	**0.48**	<0.26	<0.22	**0.46**	<0.34	<0.25	**5.0**	**0.65**	<0.22	<0.19
BENZO(B)FLUORANTHENE	mg/kg	7	7	7	~	**7.1**	**0.46**	**0.59**	<0.26	<0.22	**0.54**	<0.34	<0.25	**5.4**	**0.68**	<0.22	<0.19
BENZO(G,H,I)PERYLENE	mg/kg	1000	1000	1000	~	**2.6**	<0.25	**0.30**	<0.26	<0.22	<0.27	<0.34	<0.25	**2.4**	**0.29**	<0.22	<0.19
BENZO(K)FLUORANTHENE	mg/kg	70	70	70	~	**2.2**	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	**2.0**	**0.28**	<0.22	<0.19
BIS(2-CHLOROETHOXY)METHANE	mg/kg	500	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
BIS(2-CHLOROETHYL)ETHER	mg/kg	0.7	0.7	8	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
BIS(2-CHLOROISOPROPYL)ETHER	mg/kg	0.7	0.7	30	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	90	90	90	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
4-BROMOPHENYL PHENYL ETHER	mg/kg	100	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
BUTYLBENZYLPHTHALATE	mg/kg	100	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
4-CHLOROANILINE	mg/kg	1	100	3	~	<0.77	<0.95	<0.84	<1.0	<0.84	<1.1 *	<1.3 *	<0.96	<0.93	<0.86	<0.87	<0.75
2-CHLORONAPHTHALENE	mg/kg	1000	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2-CHLOROPHENOL	mg/kg	0.7	100	100	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
CHRYSENE	mg/kg	70	70	70	~	**8.0**	**0.60**	**0.48**	<0.26	<0.22	**0.54**	<0.34	<0.25	**5.2**	**0.70**	<0.22	<0.19
DIBENZ(A,H)ANTHRACENE	mg/kg	0.7	0.7	0.7	~	**0.90**	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	**0.62**	<0.22	<0.22	<0.19
DIBENZOFURAN	mg/kg	100	~	~	~	**3.5**	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	**2.7**	**0.69**	<0.45	<0.39
DI-N-BUTYLPHTHALATE	mg/kg	50	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
3,3'-DICHLOROBENZIDINE	mg/kg	3	3	3	~	<0.20	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	<0.24	<0.22	<0.22	<0.19
2,4-DICHLOROPHENOL	mg/kg	0.7	60	40	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
DIETHYLPHTHALATE	mg/kg	10	200	300	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2,4-DIMETHYLPHENOL	mg/kg	0.7	100	500	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
DIMETHYLPHTHALATE	mg/kg	0.7	50	600	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2,4-DINITROPHENOL	mg/kg	3	50	50	~	<0.77	<0.95	<0.84	<1.0	<0.84	<1.1	<1.3	<0.96	<0.93	<0.86	<0.87	<0.75
2,4-DINITROTOLUENE	mg/kg	0.7	2	2	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2,6-DINITROTOLUENE	mg/kg	100	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
DI-N-OCTYLPHTHALATE	mg/kg	1000	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	mg/kg	50	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
FLUORANTHENE	mg/kg	1000	1000	1000	~	**21**	**0.84**	**1.1**	<0.26	**0.28**	**1.5**	**0.39**	<0.25	**12**	**2.2**	<0.22	<0.19
FLUORENE	mg/kg	1000	1000	1000	~	**4.5**	<0.25	<0.22	<0.26	<0.22	**0.36**	<0.34	<0.25	**3.6**	**0.95**	<0.22	<0.19
HEXACHLOROBENZENE	mg/kg	0.7	0.7	0.7	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
HEXACHLOROETHANE	mg/kg	0.7	3	50	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
INDENO(1,2,3-CD)PYRENE	mg/kg	7	7	7	~	**3.3**	<0.25	**0.37**	<0.26	<0.22	**0.30**	<0.34	<0.25	**3.0**	**0.35**	<0.22	<0.19
ISOPHORONE	mg/kg	100	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2-METHYLNAPHTHALENE	mg/kg	0.7	80	300	~	**2.0**	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	**1.6**	<0.22	<0.22	<0.19
O-CRESOL	mg/kg	500	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
M/P-CRESOL	mg/kg	500	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
NAPHTHALENE	mg/kg	4	20	500	~	**3.7**	<0.25	<0.22	<0.26	<0.22	<0.27	<0.34	<0.25	**0.78**	<0.22	<0.22	<0.19
NITROBENZENE	mg/kg	500	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2-NITROPHENOL	mg/kg	100	~	~	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
4-NITROPHENOL	mg/kg	100	~	~	~	<0.77	<0.95	<0.84	<1.0	<0.84	<1.1	<1.3	<0.96	<0.93	<0.86	<0.87	<0.75
PENTACHLOROPHENOL	mg/kg	3	3	3	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
PHENANTHRENE	mg/kg	10	500	500	~	**29**	**0.57**	**0.68**	<0.26	<0.22	**1.5**	**0.38**	<0.25	**16**	**4.2**	<0.22	<0.19
PHENOL	mg/kg	1	50	20	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
PYRENE	mg/kg	1000	1000	1000	~	**18**	**0.77**	**1.0**	<0.26	**0.26**	**1.2**	**0.37**	<0.25	**10**	**2.0**	<0.22	<0.19
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2,4,5-TRICHLOROPHENOL	mg/kg	4	1000	600	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
2,4,6-TRICHLOROPHENOL	mg/kg	0.7	20	20	~	<0.40	<0.49	<0.43	<0.51	<0.43	<0.54	<0.67	<0.49	<0.48	<0.44	<0.45	<0.39
Polychlorinated Biphenyls (PCBs)																	
PCB 1016	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1221	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1232	mg/kg	1	1	1	~	<0.092	<0.11	<0.10	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1242	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1248	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1254	mg/kg	1	1	1	~	<0.092	<0.11	<0.10	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1260	mg/kg	1	1	1	~	<0.092	<0.11	<0.10	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1262	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
PCB 1268	mg/kg	1	1	1	~	<0.092	<0.11	<0.098	<0.12	<0.095	<0.12	<0.16	<0.11	<0.12	<0.10	<0.10	<0.088
Total Petroleum Hydrocarbons (TPH)																	
TPH	mg/kg	1000	1000	1000	~	**580**	**330**	**380**	**22**	**91**	**1300**	**42**	**27**	**980**	**190**	**38**	**36**
General Chemistry Parameters																	
REACTIVE CYANIDE	mg/kg	~	~	~	~	<4.0	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<4.0	<4.0	<4.0	<4.0
REACTIVE SULFIDE	mg/kg	~	~	~	~	<20	<20	<19	<20	<19	<20	<20	<20	<20	<20	<20	<20
PH	pH Units	~	~	~	~	**7.8**	**7.4**	**7.4**	**7.7**	**9.7**	**8.0**	**7.7**	**7.7**	**7.9**	**7.8**	**7.4**	**8.2**
% Solids	% Weight	~	~	~	~	**84.8**	**68.8**	**78.0**	**65.9**	**77.9**	**60.9**	**50.1**	**68.3**	**69.3**	**75.1**	**75.9**	**86.7**
SPECIFIC CONDUCTANCE	µohms/cm	~	~	~	~	**63**	**130**	**53**	**170**	**25**	**30**	**23**	**87**	**39**	**110**	**9.6**	**10**
FLASHPOINT	°F	~	~	~	~	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**
IGNITABILITY	present/absent	~	~	~	~	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 1
Composite Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATIONS							
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-B-14 (0'-10') 8/20/2019	COMP-B-14 (10'-20') 8/20/2019	COMP-B-15 (0'-10') 8/27/2019	Comp-B-15 (10'-20') 8/27/2019	COMP-B-16 (0'-10') 8/19/2019	COMP-B-16 (10'-20') 8/19/2019	COMP B-18 (0'-10') 9/11/2019	COMP B-18 (10'-16') 9/11/2019
Metals													
ANTIMONY	mg/kg	20	20	20	~	<2.5	<2.7	<1.9	<2.3	<1.9	<2.1	<2.2	<2.6
ARSENIC	mg/kg	20	20	20	~	**7.8**	**4.8**	**5.5**	**6.4**	**3.2**	**3.1**	**6.4**	**8.4**
BARIUM	mg/kg	1000	1000	1000	~	**72**	**76**	**52**	**61**	**33**	**31**	**70**	**62**
BERYLLIUM	mg/kg	90	90	90	~	**0.51**	**1.0**	**0.58**	**0.86**	**0.32**	**0.44**	**0.49**	**0.94**
CADMIUM	mg/kg	70	70	70	~	**0.45**	<0.27	**0.43**	**0.38**	**0.21**	<0.21	**0.70**	**0.49**
CHROMIUM	mg/kg	100	100	100	~	**24**	**45**	**25**	**40**	**17**	**20**	**28**	**43**
LEAD	mg/kg	200	200	200	~	**260**	**15**	**39**	**36**	**29**	**16**	**170**	**17**
MERCURY	mg/kg	20	20	20	~	**0.20**	<0.039	**0.077**	**0.71**	**0.042**	**0.047**	**0.25**	**0.11**
NICKEL	mg/kg	600	600	600	~	**16**	**28**	**19**	**25**	**16**	**15**	**39**	**27**
SELENIUM	mg/kg	400	400	400	~	<5.0	<5.3	<3.8	<4.7	<3.8	<4.3	<4.3	<5.1
SILVER	mg/kg	100	100	100	~	<0.50	<0.53	<0.38	<0.47	<0.38	<0.43	<0.43	<0.51
THALLIUM	mg/kg	8	8	8	~	<2.5	<2.7	<1.9	<2.3	<1.9	<2.1	<2.2	<2.6
VANADIUM	mg/kg	400	400	400	~	**32**	**56**	**32**	**46**	**22**	**29**	**27**	**52**
ZINC	mg/kg	1000	1000	1000	~	**110**	**64**	**93**	**87**	**39**	**48**	**170**	**75**
Toxicity Characteristic Leachate Procedure (TCLP)													
CHROMIUM	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	NT
LEAD	mg/kg	~	~	~	5	**0.41**	NT	NT	NT	NT	NT	<0.10	NT
MERCURY	mg/kg	~	~	~	5	NT	NT	NT	NT	NT	NT	NT	NT
Volatile Organic Compounds (VOCs)													
ACETONE	mg/kg	6	50	400	~	<0.15	<0.16	<0.11	<0.14	<0.11	<0.12	<0.11	<0.14
TERT-AMYL METHYL ETHER	mg/kg	~	~	~	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
BENZENE	mg/kg	2	40	40	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
BROMOBENZENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
BROMOCHLOROMETHANE	mg/kg	~	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
BROMODICHLOROMETHANE	mg/kg	0.1	0.1	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
BROMOFORM	mg/kg	0.1	1	300	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
BROMOMETHANE	mg/kg	0.5	0.5	30	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
2-BUTANONE (MEK)	mg/kg	4	50	400	~	<0.058	<0.063	<0.044	<0.056	<0.043	<0.049	<0.046	<0.054
N-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
SEC-BUTYLBENZENE	mg/kg	~	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TERT-BUTYLBENZENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TERT-BUTYLETHYL ETHER	mg/kg	~	~	~	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
CARBON DISULFIDE	mg/kg	100	~	~	~	<0.0087	<0.0095	<0.0066	<0.0085	<0.0064	<0.0073	<0.0068	<0.0081
CARBON TETRACHLORIDE	mg/kg	5	5	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
CHLOROBENZENE	mg/kg	1	3	100	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
CHLORODIBROMOMETHANE	mg/kg	0.005	0.03	20	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
CHLOROETHANE	mg/kg	100	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
CHLOROFORM	mg/kg	0.2	0.2	500	~	<0.0058	<0.0063	<0.0044	<0.0056	<0.0043	<0.0049	<0.0046	<0.0054
CHLOROMETHANE	mg/kg	100	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
2-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
4-CHLOROTOLUENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2-DIBROMO-3-CHLOROPROPANE	mg/kg	10	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2-DIBROMOETHANE (EDB)	mg/kg	0.1	0.1	1	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
DIBROMOMETHANE	mg/kg	500	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
DICHLORODIFLUOROMETHANE	mg/kg	1000	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
1,1-DICHLOROETHANE	mg/kg	0.4	9	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2-DICHLOROETHANE	mg/kg	0.1	0.1	20	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1-DICHLOROETHYLENE	mg/kg	3	40	500	~	<0.0058	<0.0063	<0.0044	<0.0056	<0.0043	<0.0049	<0.0046	<0.0054
CIS-1,2-DICHLOROETHYLENE	mg/kg	0.1	0.1	100	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TRANS-1,2-DICHLOROETHYLENE	mg/kg	1	1	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2-DICHLOROPROPANE	mg/kg	0.1	0.1	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,3-DICHLOROPROPANE	mg/kg	500	~	~	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
2,2-DICHLOROPROPANE	mg/kg	0.1	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1-DICHLOROPROPENE	mg/kg	0.01	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
CIS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
TRANS-1,3-DICHLOROPROPENE	mg/kg	0.01	0.4	20	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
DIETHYL ETHER	mg/kg	100	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
DIISOPROPYL ETHER	mg/kg	100	~	~	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
1,4-DIOXANE	mg/kg	0.2	6	20	~	<0.15	<0.16	<0.11	<0.14	<0.11	<0.12	<0.11	<0.14
ETHYLBENZENE	mg/kg	40	500	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
2-HEXANONE	mg/kg	100	~	~	~	<0.029	<0.032	<0.022	<0.028	<0.021	<0.024	<0.023	<0.027
ISOPROPYLBENZENE	mg/kg	1000	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
P-ISOPROPYLTOLUENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
METHYL TERT-BUTYL ETHER (MTBE)	mg/kg	0.1	100	100	~	<0.0058	<0.0063	<0.0044	<0.0056	<0.0043	<0.0049	<0.0046	<0.0054
METHYLENE CHLORIDE	mg/kg	0.1	4	400	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
4-METHYL-2-PENTANONE (MIBK)	mg/kg	0.4	50	400	~	<0.029	<0.032	<0.022	<0.028	<0.021	<0.024	<0.023	<0.027
NAPHTHALENE	mg/kg	4	20	500	~	<0.0058	<0.0063	<0.0044	<0.0056	<0.0043	<0.0049	**0.018**	<0.0054
N-PROPYLBENZENE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
STYRENE	mg/kg	3	4	70	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1,1,2-TETRACHLOROETHANE	mg/kg	0.1	0.1	80	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1,2,2-TETRACHLOROETHANE	mg/kg	0.005	0.02	10	~	<0.0015	<0.0016	<0.0011	<0.0014	<0.0011	<0.0012	<0.0011	<0.0014
TETRACHLOROETHYLENE	mg/kg	1	10	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TETRAHYDROFURAN	mg/kg	500	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
TOLUENE	mg/kg	30	500	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2,3-TRICHLOROBENZENE	mg/kg	~	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1,1-TRICHLOROETHANE	mg/kg	30	500	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,1,2-TRICHLOROETHANE	mg/kg	0.1	2	40	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TRICHLOROETHYLENE	mg/kg	0.3	0.3	30	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
TRICHLOROFLUOROMETHANE	mg/kg	1000	~	~	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
1,2,3-TRICHLOROPROPANE	mg/kg	100	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,2,4-TRIMETHYLBENZENE	mg/kg	1000	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
1,3,5-TRIMETHYLBENZENE	mg/kg	10	~	~	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027
VINYL CHLORIDE	mg/kg	0.7	0.7	1	~	<0.015	<0.016	<0.011	<0.014	<0.011	<0.012	<0.011	<0.014
M/P-XYLENE	mg/kg	100	100	500	~	<0.0058	<0.0063	<0.0044	<0.0056	<0.0043	<0.0049	<0.0046	<0.0054
O-XYLENE	mg/kg	100	100	500	~	<0.0029	<0.0032	<0.0022	<0.0028	<0.0021	<0.0024	<0.0023	<0.0027

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 1
Composite Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		TCLP	SAMPLING LOCATIONS							
		RCS-1	S-1/GW-2	S-1/GW-3	TCLP	COMP-B-14 (0'-10')	COMP-B-14 (10'-20')	COMP-B-15 (0'-10')	Comp-B-15 (10'-20')	COMP-B-16 (0'-10')	COMP-B-16 (10'-20')	COMP B-18 (0'-10')	COMP B-18 (10'-16')
Semi-Volatile Organic Compounds (SVOCs)					~								
ACENAPHTHENE	mg/kg	4	1000	1000	~	**4.9**	<0.28	**0.23**	<0.24	<0.19	<0.22	**1.9**	<0.27
ACENAPHTHYLENE	mg/kg	1	600	10	~	<0.25	<0.28	**0.29**	<0.24	<0.19	<0.22	**3.0**	<0.27
ACETOPHENONE	mg/kg	1000	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
ANILINE	mg/kg	1000	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
ANTHRACENE	mg/kg	1000	1000	1000	~	**10**	<0.28	**0.77**	<0.24	<0.19	<0.22	**6.5**	<0.27
BENZO(A)ANTHRACENE	mg/kg	7	7	7	~	**14**	<0.28	**1.4**	<0.24	<0.19	<0.22	**8.7**	<0.27
BENZO(A)PYRENE	mg/kg	2	2	2	~	**12**	<0.28	**1.3**	<0.24	<0.19	<0.22	**7.3**	<0.27
BENZO(B)FLUORANTHENE	mg/kg	7	7	7	~	**12**	<0.28	**1.5**	<0.24	**0.22**	<0.22	**8.1**	<0.27
BENZO(G,H,I)PERYLENE	mg/kg	1000	1000	1000	~	**4.8**	<0.28	**0.63**	<0.24	<0.19	<0.22	**5.1**	<0.27
BENZO(K)FLUORANTHENE	mg/kg	70	70	70	~	**5.7**	<0.28	**0.55**	<0.24	<0.19	<0.22	**4.1**	<0.27
BIS(2-CHLOROETHOXY)METHANE	mg/kg	500	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
BIS(2-CHLOROETHYL)ETHER	mg/kg	0.7	0.7	8	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
BIS(2-CHLOROISOPROPYL)ETHER	mg/kg	0.7	0.7	30	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	90	90	90	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
4-BROMOPHENYL PHENYL ETHER	mg/kg	100	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
BUTYLBENZYLPHTHALATE	mg/kg	100	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
4-CHLOROANILINE	mg/kg	1	100	3	~	<0.97	<1.1 *	<0.76	<0.92	<0.74	<0.85	<0.86	<1.0
2-CHLORONAPHTHALENE	mg/kg	1000	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2-CHLOROPHENOL	mg/kg	0.7	100	100	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
CHRYSENE	mg/kg	70	70	70	~	**13**	<0.28	**1.3**	<0.24	<0.19	<0.22	**7.6**	<0.27
DIBENZ(A,H)ANTHRACENE	mg/kg	0.7	0.7	0.7	~	**2.3**	<0.28	<0.20	<0.24	<0.19	<0.22	**1.3**	<0.27
DIBENZOFURAN	mg/kg	100	~	~	~	**3.5**	<0.56	<0.39	<0.47	<0.38	<0.44	**4.7**	<0.54
DI-N-BUTYLPHTHALATE	mg/kg	50	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
1,2-DICHLOROBENZENE	mg/kg	9	100	300	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
1,3-DICHLOROBENZENE	mg/kg	3	100	100	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
1,4-DICHLOROBENZENE	mg/kg	0.7	1	80	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
3,3'-DICHLOROBENZIDINE	mg/kg	3	3	3	~	<0.25	<0.28	<0.20	<0.24	<0.19	<0.22	<0.22	<0.27
2,4-DICHLOROPHENOL	mg/kg	0.7	60	40	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
DIETHYLPHTHALATE	mg/kg	10	200	300	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2,4-DIMETHYLPHENOL	mg/kg	0.7	100	500	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
DIMETHYLPHTHALATE	mg/kg	0.7	50	600	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2,4-DINITROPHENOL	mg/kg	3	50	50	~	<0.97	<1.1	<0.76	<0.92	<0.74	<0.85	<0.86	<1.0
2,4-DINITROTOLUENE	mg/kg	0.7	2	2	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2,6-DINITROTOLUENE	mg/kg	100	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
DI-N-OCTYLPHTHALATE	mg/kg	1000	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	mg/kg	50	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
FLUORANTHENE	mg/kg	1000	1000	1000	~	**32**	<0.28	**3.4**	<0.24	**0.30**	<0.22	**24**	<0.27
FLUORENE	mg/kg	1000	1000	1000	~	**5.8**	<0.28	**0.38**	<0.24	<0.19	<0.22	**3.9**	<0.27
HEXACHLOROBENZENE	mg/kg	0.7	0.7	0.7	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
HEXACHLOROBUTADIENE	mg/kg	30	30	30	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
HEXACHLOROETHANE	mg/kg	0.7	3	50	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
INDENO(1,2,3-CD)PYRENE	mg/kg	7	7	7	~	**5.8**	<0.28	**0.82**	<0.24	<0.19	<0.22	**4.9**	<0.27
ISOPHORONE	mg/kg	100	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2-METHYLNAPHTHALENE	mg/kg	0.7	80	300	~	**1.3**	<0.28	<0.20	<0.24	<0.19	<0.22	**1.5**	<0.27
O-CRESOL	mg/kg	500	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
M/P-CRESOL	mg/kg	500	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
NAPHTHALENE	mg/kg	4	20	500	~	**1.8**	<0.28	**0.28**	<0.24	<0.19	<0.22	**1.4**	<0.27
NITROBENZENE	mg/kg	500	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2-NITROPHENOL	mg/kg	100	~	~	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
4-NITROPHENOL	mg/kg	100	~	~	~	<0.97	<1.1	<0.76	<0.92	<0.74	<0.85	<0.86	<1.0
PENTACHLOROPHENOL	mg/kg	3	3	3	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
PHENANTHRENE	mg/kg	10	500	500	~	**35**	<0.28	**3.5**	<0.24	**0.23**	<0.22	**31**	<0.27
PHENOL	mg/kg	1	50	20	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
PYRENE	mg/kg	1000	1000	1000	~	**28**	<0.28	**2.8**	<0.24	**0.27**	<0.22	**19**	<0.27
1,2,4-TRICHLOROBENZENE	mg/kg	2	6	700	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2,4,5-TRICHLOROPHENOL	mg/kg	4	1000	600	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
2,4,6-TRICHLOROPHENOL	mg/kg	0.7	20	20	~	<0.50	<0.56	<0.39	<0.47	<0.38	<0.44	<0.44	<0.54
Polychlorinated Biphenyls (PCBs)													
PCB 1016	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1221	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1232	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1242	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1248	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1254	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1260	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1262	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
PCB 1268	mg/kg	1	1	1	~	<0.11	<0.13	<0.090	<0.11	<0.089	<0.098	<0.10	<0.12
Total Petroleum Hydrocarbons (TPH)													
TPH	mg/kg	1000	1000	1000	~	**1200**	**1100**	**100**	**43**	**57**	**55**	**980**	**18**
General Chemistry Parameters													
REACTIVE CYANIDE	mg/kg	~	~	~	~	<4.0	<3.9	<3.9	<3.9	<4.0	<4.0	<4.0	<4.0
REACTIVE SULFIDE	mg/kg	~	~	~	~	<20	<20	<20	<19	<20	<20	<20	<20
PH	pH Units	~	~	~	~	**8.4**	**8.0**	**7.7**	**7.9**	**6.0**	**7.9**	**7.5**	**8.1**
% Solids	% Weight	~	~	~	~	**66.7**	**60.2**	**86.1**	**71.3**	**89.0**	**76.7**	**75.7**	**62.9**
SPECIFIC CONDUCTANCE	µohms/cm	~	~	~	~	**16**	**63**	**9.1**	**31**	**7.0**	**11**	**16**	**190**
FLASHPOINT	°F	~	~	~	~	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**	**> 212**
IGNITABILITY	present/absent	~	~	~	~	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 2
Discrete Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		SAMPLING LOCATION							
		RCS-1	S-1/GW-2	S-1/GW-3	P-1 (0'-3') 9/9/2019	TP-1 (0'-3') 9/13/2019	TP-3 (0'-3') 9/13/2019	TP-3 (3-6) 9/13/2019	TP-5 (0'-3') 9/12/2019	TP-8 (0-2.8) 9/13/2019	TP-9 (0'-3') 9/13/2019	TP-10 (0'-3') 9/12/2019
Extractable Petroleum Hydrocarbons (EPH)												
C9-C18 ALIPHATICS	mg/kg	1000	1000	1000	<11	<11	<11	**13**	<11	<12	<13	<14
C19-C36 ALIPHATICS	mg/kg	3000	3000	3000	**12**	<11	**11**	**180**	**15**	**12**	**15**	<14
C11-C22 AROMATICS	mg/kg	1000	1000	1000	**21**	**21**	**33**	**79**	**26**	**28**	**59**	<14
ACENAPHTHENE	mg/kg	4	1000	1000	**0.17**	<0.11	**0.33**	**0.15**	<0.11	**0.16**	**0.99**	<0.14
ACENAPHTHYLENE	mg/kg	1	600	10	<0.11	<0.11	<0.11	<0.12	<0.11	<0.12	<0.13	<0.14
ANTHRACENE	mg/kg	1000	1000	1000	**0.22**	**0.18**	**0.60**	<0.12	**0.18**	**0.24**	**1.7**	<0.14
BENZO(A)ANTHRACENE	mg/kg	7	7	7	**0.67**	**0.58**	**1.3**	**0.25**	**0.67**	**0.79**	**2.6**	<0.14
BENZO(A)PYRENE	mg/kg	2	2	2	**1.3**	**1.4**	**1.3**	**0.23**	**1.0**	**1.2**	**2.2**	**0.45**
BENZO(B)FLUORANTHENE	mg/kg	7	7	7	**0.88**	**0.80**	**1.5**	**0.24**	**0.88**	**1.0**	**2.7**	<0.14
BENZO(G,H,I)PERYLENE	mg/kg	1000	1000	1000	**0.48**	**0.40**	**0.72**	**0.16**	**0.47**	**0.55**	**1.2**	<0.14
BENZO(K)FLUORANTHENE	mg/kg	70	70	70	**0.32**	**0.28**	**0.53**	<0.12	**0.31**	**0.37**	**0.96**	<0.14
CHRYSENE	mg/kg	70	70	70	**0.78**	**0.72**	**1.4**	**0.28**	**0.80**	**0.94**	**2.8**	<0.14
DIBENZ(A,H)ANTHRACENE	mg/kg	0.7	0.7	0.7	**0.12**	<0.11	**0.20**	<0.12	**0.13**	**0.13**	**0.34**	<0.14
FLUORANTHENE	mg/kg	1000	1000	1000	**1.5**	**1.4**	**3.1**	**0.43**	**1.5**	**1.8**	**6.4**	<0.14
FLUORENE	mg/kg	1000	1000	1000	**0.12**	<0.11	**0.25**	<0.12	**0.11**	<0.12	**0.80**	<0.14
INDENO(1,2,3-CD)PYRENE	mg/kg	7	7	7	**0.46**	**0.39**	**0.80**	**0.13**	**0.43**	**0.50**	**1.3**	<0.14
2-METHYLNAPHTHALENE	mg/kg	0.7	80	300	<0.11	<0.11	<0.11	<0.12	<0.11	<0.12	**0.16**	<0.14
NAPHTHALENE	mg/kg	4	20	500	<0.11	<0.11	<0.11	<0.12	<0.11	<0.12	**0.22**	<0.14
PHENANTHRENE	mg/kg	10	500	500	**1.2**	**0.82**	**2.5**	**0.37**	**0.91**	**1.1**	**6.5**	<0.14
PYRENE	mg/kg	1000	1000	1000	**1.5**	**1.3**	**3.0**	**0.45**	**1.5**	**1.9**	**6.5**	<0.14
Metals												
ANTIMONY	mg/kg	20	20	20	<1.8	<2.0	<1.9	<1.9	<1.8	<2.0	<2.1	<2.3
ARSENIC	mg/kg	20	20	20	**2.9**	**21**	**6.6**	**2.6**	**5.5**	**7.6**	**3.1**	**3.3**
BARIUM	mg/kg	1000	1000	1000	**38**	**180**	**61**	**27**	**77**	**110**	**40**	**37**
BERYLLIUM	mg/kg	90	90	90	**0.32**	**0.69**	**0.57**	<0.19	**0.52**	**0.55**	**0.40**	**0.40**
CADMIUM	mg/kg	70	70	70	**0.29**	**1.6**	**0.49**	<0.19	**0.48**	**0.52**	<0.21	**0.27**
CHROMIUM	mg/kg	100	100	100	**9.9**	**23**	**16**	**9.2**	**22**	**20**	**15**	**16**
LEAD	mg/kg	200	200	200	**86**	**450**	**120**	**31**	**260**	**260**	**57**	**25**
MERCURY	mg/kg	20	20	20	**0.67**	**0.58**	**0.25**	**0.15**	**0.35**	**0.60**	**0.55**	**0.055**
NICKEL	mg/kg	600	600	600	**9.2**	**19**	**15**	**6.6**	**19**	**24**	**13**	**12**
SELENIUM	mg/kg	400	400	400	<3.6	<4.0	<3.8	<3.9	<3.6	<4.1	<4.2	<4.5
SILVER	mg/kg	100	100	100	<0.36	<0.40	<0.38	<0.39	<0.36	<0.41	<0.42	<0.45
THALLIUM	mg/kg	8	8	8	<1.8	<2.0	<1.9	<1.9	<1.8	<2.0	<2.1	<2.3
VANADIUM	mg/kg	400	400	400	**24**	**53**	**40**	**7.0**	**32**	**37**	**22**	**28**
ZINC	mg/kg	1000	1000	1000	**57**	**230**	**95**	**26**	**140**	**140**	**55**	**43**
General Chemistry Parameters												
% Solids	% Weight	~	~	~	**92.0**	**84.5**	**89.7**	**83.0**	**89.5**	**81.7**	**78.4**	**73.7**

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 2
Discrete Soil Analytical Results
Moakley Park
Boston, MA

Parameters	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		SAMPLING LOCATION								
		RCS-1	S-1/GW-2	S-1/GW-3	B-5 (0'-3') 9/9/2019	B-17 (0'-3') 8/16/2019	B-17 (19'-21') 8/16/2019	B-20 (0'-3') 8/12/2019	B-20 (15'-20') 8/12/2019	TP-1 (0'-1') 11/15/2019	TP-5 (0'-1') 11/15/2019	TP-8 (0'-1') 11/15/2019	B-5 (0'-1') 11/15/2019
Extractable Petroleum Hydrocarbons (EPH)										d			
C9-C18 ALIPHATICS	mg/kg	1000	1000	1000	<11	<11	<13	<11	<12	NT	NT	NT	NT
C19-C36 ALIPHATICS	mg/kg	3000	3000	3000	<11	**25**	**43**	**26**	<12	NT	NT	NT	NT
C11-C22 AROMATICS	mg/kg	1000	1000	1000	**24**	**32**	**16**	**66**	<12	NT	NT	NT	NT
ACENAPHTHENE	mg/kg	4	1000	1000	**0.33**	**0.12**	<0.13	**0.74**	<0.12	NT	NT	NT	NT
ACENAPHTHYLENE	mg/kg	1	600	10	<0.11	<0.11	<0.13	<0.11	<0.12	NT	NT	NT	NT
ANTHRACENE	mg/kg	1000	1000	1000	**0.45**	**0.31**	<0.13	**1.4**	<0.12	NT	NT	NT	NT
BENZO(A)ANTHRACENE	mg/kg	7	7	7	**0.91**	**0.81**	<0.13	**2.2**	<0.12	NT	NT	NT	NT
BENZO(A)PYRENE	mg/kg	2	2	2	**1.1**	**2.2**	<0.13	**3.1**	<0.12	NT	NT	NT	NT
BENZO(B)FLUORANTHENE	mg/kg	7	7	7	**1.0**	**1.1**	<0.13	**2.5**	<0.12	NT	NT	NT	NT
BENZO(G,H,I)PERYLENE	mg/kg	1000	1000	1000	**0.49**	**0.47**	<0.13	**1.1**	<0.12	NT	NT	NT	NT
BENZO(K)FLUORANTHENE	mg/kg	70	70	70	**0.38**	**0.37**	<0.13	**0.90**	<0.12	NT	NT	NT	NT
CHRYSENE	mg/kg	70	70	70	**1.1**	**1.0**	<0.13	**2.4**	<0.12	NT	NT	NT	NT
DIBENZ(A,H)ANTHRACENE	mg/kg	0.7	0.7	0.7	**0.14**	**0.14**	<0.13	**0.33**	<0.12	NT	NT	NT	NT
FLUORANTHENE	mg/kg	1000	1000	1000	**2.1**	**2.0**	<0.13	**5.4**	<0.12	NT	NT	NT	NT
FLUORENE	mg/kg	1000	1000	1000	**0.23**	**0.20**	<0.13	**0.68**	<0.12	NT	NT	NT	NT
INDENO(1,2,3-CD)PYRENE	mg/kg	7	7	7	**0.51**	**0.41**	<0.13	**1.3**	<0.12	NT	NT	NT	NT
2-METHYLNAPHTHALENE	mg/kg	0.7	80	300	<0.11	**0.16**	<0.13	**0.19**	<0.12	NT	NT	NT	NT
NAPHTHALENE	mg/kg	4	20	500	**0.17**	**0.41**	<0.13	**0.19**	<0.12	NT	NT	NT	NT
PHENANTHRENE	mg/kg	10	500	500	**2.1**	**1.6**	<0.13	**5.6**	<0.12	NT	NT	NT	NT
PYRENE	mg/kg	1000	1000	1000	**2.1**	**2.0**	<0.13	**5.4**	<0.12	NT	NT	NT	NT
Metals													
ANTIMONY	mg/kg	20	20	20	<1.9	<1.8	<2.2	<1.8	<2.0	NT	NT	NT	NT
ARSENIC	mg/kg	20	20	20	**6.5**	**7.1**	**3.5**	**4.8**	<2.0	NT	NT	NT	NT
BARIUM	mg/kg	1000	1000	1000	**220**	**73**	**18**	**61**	**18**	NT	NT	NT	NT
BERYLLIUM	mg/kg	90	90	90	**0.60**	**0.54**	**0.35**	**0.48**	**0.23**	NT	NT	NT	NT
CADMIUM	mg/kg	70	70	70	**0.62**	<0.18	<0.22	**0.52**	<0.20	NT	NT	NT	NT
CHROMIUM	mg/kg	100	100	100	**21**	**19**	**15**	**22**	**9.9**	NT	NT	NT	NT
LEAD	mg/kg	200	200	200	**1200**	**240**	**7.4**	**200**	**3.8**	**620**	**240**	**89**	**140**
MERCURY	mg/kg	20	20	20	**0.88**	**0.41**	<0.035	**0.53**	<0.031	NT	NT	NT	NT
NICKEL	mg/kg	600	600	600	**15**	**18**	**9.5**	**24**	**7.8**	NT	NT	NT	NT
SELENIUM	mg/kg	400	400	400	<3.8	<3.7	<4.5	<3.7	<4.0	NT	NT	NT	NT
SILVER	mg/kg	100	100	100	<0.38	**1.4**	**0.60**	<0.37	<0.40	NT	NT	NT	NT
THALLIUM	mg/kg	8	8	8	<1.9	<1.8	<2.2	<1.8	<2.0	NT	NT	NT	NT
VANADIUM	mg/kg	400	400	400	**36**	**38**	**18**	**36**	**14**	NT	NT	NT	NT
ZINC	mg/kg	1000	1000	1000	**590**	**130**	**25**	**150**	**19**	NT	NT	NT	NT
General Chemistry Parameters													
% Solids	% Weight	~	~	~	**86.0**	**87.4**	**74.9**	**86.8**	**84.0**	**65.4**	**82.2**	**80.7**	**57.2**

NOTES:
1. <(value) = Not detected above the lab reporting limits shown in parenthesis.
2. NT = Not tested.
3. ~ = No Method 1 Standard available
4. Highlighted values exceed the RCs.
5. Bolded values denote a detection.

Table 3
RGP Groundwater Analytical Results
Moakley Park
Boston, MA

Parameter	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		RGP Concentrations		SAMPLING LOCATION							
		RCGW-2	GW-2	GW-3	TBEL	WQBEL	MW-3 9/25/2019	MW-5 9/25/2019	MW-6 9/25/2019	MW-8 9/25/2019	MW-10 9/25/2019	MW-11 9/25/2019	MW-3 11/15/2019	MW-5 11/15/2019
Inorganics														
AMMONIA AS N	mg/L	10	~	~	~	~	**6.66**	**13.7**	**0.673**	**0.234**	**0.104**	**7.87**	**NT**	**NT**
CHLORIDE	µg/L	~	~	~	~	~	**26**	**8000**	**50**	**13**	**58**	**710**	**NT**	**NT**
CHLORINE, RESIDUAL	µg/L	~	~	~	200	7.5	NT	NT	NT	NT	NT	NT	**NT**	**NT**
TOTAL SUSPENDED SOLIDS	mg/L	~	~	~	30	30	**53**	**14**	**18**	**3.2**	**66**	**95**	**NT**	**NT**
ANTIMONY	µg/L	8000	~	8000	206	640	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	**NT**	**NT**
ARSENIC	µg/L	900	~	900	104	36	**3.3**	**56**	**2.7**	**3.9**	<0.80	**21**	**NT**	**NT**
CADMIUM	µg/L	4	~	4	10.2	8.8	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	**NT**	**NT**
CHROMIUM	µg/L	300	~	300	~	~	**1.3**	**15**	<1.0	**1.0**	<1.0	<5.0	**NT**	**NT**
CHROMIUM III	mg/L	0.6	~	0.6	0.323	0.1	**0.0013**	**0.015**	**0.0**	**0.0010**	**0.0**	**0.0**	**NT**	**NT**
CHROMIUM VI	mg/L	0.3	~	0.3	0.323	0.05	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	**NT**	**NT**
COPPER	µg/L	100000	~	~	242	3.1	**8.9**	**57**	<1.0	<1.0	**2.5**	**38**	**NT**	**NT**
IRON	mg/L	~	~	~	5	~	**23**	**0.79**	**11**	**1.6**	**0.60**	**2.5**	**NT**	**NT**
LEAD	µg/L	10	~	10	160	8.1	**59**	<2.5	<0.50	<0.50	**0.99**	**3.2**	**2.0**	**NT**
MERCURY	mg/L	0.02	~	0.02	0.000739	0.00094	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	**NT**	**NT**
NICKEL	µg/L	200	~	200	1450	8.2	<5.0	<25	<5.0	<5.0	**5.7**	<25	**NT**	**NT**
SELENIUM	µg/L	100	~	100	235.8	71	<5.0	**120**	<5.0	<5.0	**2.4**	**60**	**NT**	**110**
SILVER	µg/L	7	~	7	35.1	1.9	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	**NT**	**NT**
ZINC	µg/L	900	~	900	420	81	**38**	<50	<10	<10	<10	<50	**NT**	**NT**
CYANIDE	mg/L	0.03	~	0.6	178	0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**NT**	**NT**
Non-Halogenated Volatile Organic Carbons (VOCs)														
TOTAL BTEX	µg/L	~	~	~	100	100	**3.779**	**0.098**	**1.749**	**1.504**	**1.484**	**8.889**	**NT**	**NT**
BENZENE	µg/L	1000	1000	10000	5	5	<1.00	<1.00	<1.00	<1.00	<1.00	**0.23**	**NT**	**NT**
1,4-DIOXANE	µg/L	6000	6000	50000	200	200	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	**NT**	**NT**
ACETONE	µg/L	50000	50000	50000	7.97	7.97	**3.71**	<50.0	**1.68**	**1.45**	**1.43**	**8.59**	**NT**	**NT**
PHENOL	mg/L	2	50	2	1.08	0.3	**0.069**	**0.098**	**0.069**	**0.054**	**0.054**	**0.069**	**NT**	**NT**
Halogenated Volatile Organic Carbons (VOCs)														
CARBON TETRACHLORIDE	µg/L	2	2	5000	4.4	1.6	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,2-DICHLOROBENZENE	µg/L	2000	8000	2000	600	600	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,3-DICHLOROBENZENE	µg/L	6000	6000	50000	320	320	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,4-DICHLOROBENZENE	µg/L	60	60	8000	5	5	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
TOTAL DICHLOROBENZENE	µg/L	~	~	~	~	~	<8.00	<8.00	<8.00	<8.00	<8.00	<8.00	**NT**	**NT**
1,1-DICHLOROETHANE	µg/L	2000	2000	20000	70	70	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,2-DICHLOROETHANE	µg/L	5	5	20000	5	5	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,1-DICHLOROETHYLENE	µg/L	80	80	30000	3.2	3.2	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
ETHYLENE DIBROMIDE / 1,2-DIBROMOETHANE (EDB)	µg/L	2	2	50000	0.05	0.05	NT	NT	NT	NT	NT	NT	**NT**	**NT**
METHYLENE CHLORIDE	µg/L	2000	2000	50000	4.6	4.6	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
1,1,1-TRICHLOROETHANE	µg/L	4000	4000	20000	5	5	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
1,1,2-TRICHLOROETHANE	µg/L	900	900	50000	5	5	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
TRICHLOROETHYLENE	µg/L	5	5	5000	5	5	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
TETRACHLOROETHYLENE	µg/L	50	50	30000	5	3.3	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
CIS-1,2-DICHLOROETHYLENE	µg/L	20	20	50000	70	70	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**NT**	**NT**
VINYL CHLORIDE	µg/L	2	2	50000	2	2	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
Non-Halogenated Semi-Volatile Organic Carbons (SVOCs)														
TOTAL PHTHALATES	µg/L	~	~	~	190	~	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	**NT**	**NT**
DIETHYLHEXYL PHTHALATE / BIS(2-ETHYLHEXYL)PHTHALATE (SIM)	µg/L	50000	~	50000	101	2.2	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
TOTAL GROUP I POLYCYCLIC AROMATIC HYDROCARBONS	µg/L	~	~	~	1	~	<0.80	<0.80	<0.80	<0.80	<0.80	**0.20**	**NT**	**NT**
BENZO(A)ANTHRACENE (SIM)	µg/L	1000	~	1000	~	0.0038	<0.050	<0.050	<0.050	<0.050	<0.050	**0.10**	**NT**	**NT**
BENZO(A)PYRENE (SIM)	µg/L	500	~	500	~	0.0038	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**NT**	**NT**
BENZO(B)FLUORANTHENE (SIM)	µg/L	400	~	400	~	0.0038	<0.050	<0.050	<0.050	<0.050	<0.050	**0.10**	**NT**	**NT**
BENZO(K)FLUORANTHENE (SIM)	µg/L	1	~	100	~	0.0038	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**NT**	**NT**
CHRYSENE (SIM)	µg/L	70	~	70	~	0.0038	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**NT**	**NT**
DIBENZ(A,H)ANTHRACENE (SIM)	µg/L	40	~	40	~	0.0038	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**NT**	**NT**
INDENO(1,2,3-CD)PYRENE (SIM)	µg/L	100	~	100	~	0.0038	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	**NT**	**NT**
TOTAL GROUP II POLYCYCLIC AROMATIC HYDROCARBONS	µg/L	~	~	~	100	100	<45.0	<45.0	<45.0	<45.0	<45.0	<45.0	**NT**	**NT**
NAPHTHALENE (SIM)	µg/L	700	700	20000	20	20	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
Halogenated Semi-Volatile Organic Carbons (SVOCs)														
TOTAL POLYCHLORINATED BIPHENYLS (PCBs)	µg/L	5	5	10	0.000064	0.000064	<0.6797	<0.686	<0.6734	<0.6797	<0.700	<0.6797	**NT**	**NT**
PENTACHLOROPHENOL (SIM)	µg/L	200	~	200	1	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**NT**	**NT**
Fuel Parameters														
TOTAL PETROLEUM HYDROCARBONS / SILICA GEL TREATED HEM (SGT-HEM)	mg/L	5	5	5	5	5	NT	NT	NT	NT	NT	NT	**NT**	**NT**
ETHANOL	mg/L	10000	~	~	~	~	NT	NT	NT	NT	NT	NT	**NT**	**NT**
METHYL TERT-BUTYL ETHER (MTBE)	µg/L	5000	50000	50000	70	20	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
TERT-BUTYL ALCOHOL (TBA)	µg/L	10000	~	~	40	120	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	**NT**	**NT**
TERT-AMYL METHYL ETHER (TAME)	µg/L	~	~	~	140	90	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	**NT**	**NT**

NOTES:
1. NT = Not tested.
2. ~ = No standard available

BOLD Parameter detected greater than or equal to laboratory detection limits.
BOLD Parameter detected greater than or equal to applicable standards.

Abbreviations
mg/L = milligrams per liter
µg/L = micrograms per liter
RGP = Remediation General Permit
TBEL = Technology-Based Effluent Limitations
WQBEL = Water Quality-Based Effluent Limitations

Table 3
RGP Groundwater Analytical Results
Moakley Park
Boston, MA

Parameter	Units	Reportable Concentrations (RCs)	MCP - Method 1 Cleanup Standards		RGP Concentrations		SAMPLING LOCATION							
		RCGW-2	GW-2	GW-3	TBEL	WQBEL	MW-3 9/25/2019	MW-5 9/25/2019	MW-6 9/25/2019	MW-8 9/25/2019	MW-10 9/25/2019	MW-11 9/25/2019	MW-3 11/15/2019	MW-5 11/15/2019
Polychlorinated Biphenyls (PCBs)														
PCB 1016	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1221	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1232	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1242	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1248	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1254	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
PCB 1260	µg/L	5	5	10	~	~	<0.0971	<0.0980	<0.0962	<0.0971	<0.100	<0.0971	**NT**	**NT**
Volatile Organic Compounds (VOCs)														
ETHYLBENZENE	µg/L	5000	20000	5000	~	~	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
NAPHTHALENE	µg/L	700	700	20000	~	~	<2.00	<2.00	<2.00	<2.00	<2.00	**3.16**	**NT**	**NT**
TOLUENE	µg/L	40000	50000	40000	~	~	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**NT**	**NT**
M/P-XYLENE	µg/L	3000	3000	5000	~	~	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
O-XYLENE	µg/L	3000	3000	5000	~	~	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**NT**	**NT**
Semi-Volatile Organic Compounds (SVOCs)														
ACENAPHTHENE	µg/L	6000	~	10000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
ACENAPHTHYLENE	µg/L	40	10000	40	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
ANTHRACENE	µg/L	30	~	30	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
BENZIDINE	µg/L	1000	~	~	~	~	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	**NT**	**NT**
BENZO(G,H,I)PERYLENE	µg/L	20	~	20	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
4-BROMOPHENYL PHENYL ETHER	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
BUTYLBENZYLPHTHALATE	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
4-CHLORO-3-METHYLPHENOL	µg/L	100000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
BIS(2-CHLOROETHYL)ETHER	µg/L	30	30	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
BIS(2-CHLOROISOPROPYL)ETHER	µg/L	100	100	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	50000	~	50000	~	~	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**NT**	**NT**
2-CHLORONAPHTHALENE	µg/L	100000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2-CHLOROPHENOL	µg/L	7000	20000	7000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
4-CHLOROPHENYLPHENYL ETHER	µg/L	100000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
DI-N-BUTYLPHTHALATE	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
1,3-DICHLOROBENZENE	µg/L	6000	6000	50000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
1,4-DICHLOROBENZENE	µg/L	60	60	8000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
1,2-DICHLOROBENZENE	µg/L	2000	8000	2000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
3,3'-DICHLOROBENZIDINE	µg/L	2000	~	2000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2,4-DICHLOROPHENOL	µg/L	2000	30000	2000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
DIETHYLPHTHALATE	µg/L	9000	50000	9000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2,4-DIMETHYLPHENOL	µg/L	40000	40000	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
DIMETHYLPHTHALATE	µg/L	50000	50000	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
4,6-DINITRO-2-METHYLPHENOL	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2,4-DINITROPHENOL	µg/L	20000	50000	20000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2,4-DINITROTOLUENE	µg/L	20000	20000	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2,6-DINITROTOLUENE	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
DI-N-OCTYLPHTHALATE	µg/L	100000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	50000	~	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
FLUORANTHENE	µg/L	200	~	200	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
FLUORENE	µg/L	40	~	40	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
HEXACHLOROBENZENE	µg/L	1	1	6000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
HEXACHLOROBUTADIENE	µg/L	50	50	3000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
HEXACHLOROCYCLOPENTADIENE	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
HEXACHLOROETHANE	µg/L	100	100	50000	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
ISOPHORONE	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
NITROBENZENE	µg/L	50000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2-NITROPHENOL	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
4-NITROPHENOL	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
N-NITROSODIMETHYLAMINE	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
N-NITROSODIPHENYLAMINE	µg/L	10000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
N-NITROSO-DI-N-PROPYLAMINE	µg/L	5000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
2-METHYLNAPHTHALENE	µg/L	2000	2000	20000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
PHENANTHRENE	µg/L	10000	~	10000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
O-CRESOL	µg/L	50000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
PHENOL	µg/L	2000	50000	2000	1080	300	<10.0	**14.6**	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
M/P-CRESOL	µg/L	50000	~	~	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
PYRENE	µg/L	20	~	20	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
1,2,4-TRICHLOROBENZENE	µg/L	200	200	50000	~	~	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	**NT**	**NT**
2,4,6-TRICHLOROPHENOL	µg/L	500	5000	500	~	~	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	**NT**	**NT**
General Chemistry Parameters														
SALINITY	SU	~	~	~	~	~	<2	**12**	<2	<2	<2	**2.8**	NT	**NT**

NOTES:
1. NT = Not tested.
2. ~ = No standard available

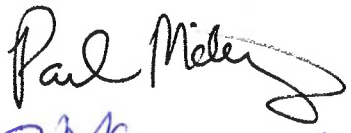
BOLD Parameter detected greater than or equal to laboratory detection limits.
BOLD Parameter detected greater than or equal to applicable standards.

Abbreviations
mg/L = milligrams per liter
µg/L = micrograms per liter
RGP = Remediation General Permit
TBEL = Technology-Based Effluent Limitations
WQBEL = Water Quality-Based Effluent Limitations

FINAL DELIVERABLE REVIEW SIGN-OFF SHEET

This sign-off is intended to ensure that all members of the project team are satisfied that they have adequately reviewed the attached deliverable, and that the deliverable can be used by others for project advancement.

By signing this sheet, the reviewers indicate that they have completed an independent final review of the deliverable and feel that, pending execution of all changes recommended by the reviewer, the deliverable represents industry best practices and can be considered final. The sub-task lead shall initiate the form. The Principal-in Charge shall be the last to sign-off. Copies of the original and the draft deliverables shall be saved in the SharePoint folder directory.

	NAME	SIGNATURE	DATE
Project Director			
Project Manager			
Sub-task Lead	Paul McKinlay		12/16/19
TRC Reviewer	Brian McCormack		12/17/19
TRC Reviewer			
Principal-in-Charge			

HYDROLOGICAL MODELING MEMO

NITSCH ENGINEERING

- ANALYSIS OF EXISTING STORMWATER INFRASTRUCTURE + FLOODING CONDITIONS + TRC FORM

Building better communities with you

Moakley Park Concept Verification: Task 1.1 Stormwater Memorandum

Submitted to Stoss
November 26, 2019
Revised with Postcript
September 18, 2020
Nitsch #12462.1

Nitsch Engineering

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Acronyms

BCB	Boston City Base Datum
BPRD	Boston Parks and Recreation Department
BWSC	Boston Water and Sewer Commission
CSO	Combined Sewer Overflow
H&H	Hydrologic and Hydraulic
HGL	Hydraulic Grade Line
MPSM	Moakley Park Stormwater Model
MWRA	Massachusetts Water Resources Authority
NOAA	National Oceanic and Atmospheric Administration

SECTION 1

Introduction

In 2017, the City of Boston Parks and Recreation Department (BPRD) initiated a transformative project at Moakley Park that redevelops the Park into a vibrant and resilient open space that can reduce the impacts of climate change and sea level rise on the surrounding community. The first phase of the project, the Vision Plan, was completed in early 2018 by the Stoss team. The Vision Plan developed a concept for Moakley Park that proposed an earthen berm into the landscape to reduce the impact of sea level rise and storm surge, relocated playing fields, reconnected the neighborhood with the waterfront, and provided sustainable stormwater management through green infrastructure and underground storage.

Following the completion of the Vision Plan, the project entered a Concept Verification phase (Task 1.1) to further review the existing conditions and Vision Plan conceptual design elements. To support this effort, Nitsch Engineering (Nitsch) performed a preliminary hydraulic and hydrologic (H&H) analysis using PCSWMM to understand how stormwater runoff from upstream of the Park and stormwater runoff from the Park affect each other and create flooded conditions in the Park.

The primary purpose of the preliminary stormwater modeling efforts of Task 1.1 was to better understand the location, conveyance capacity, and overflow contributions of the combined sewer system located within and surrounding Moakley Park, assess various current and future rainfall and tidal conditions, and identify the potential for surcharging within the Park. This technical memorandum is intended to summarize the methodology, data sources, and results of the H&H analysis in Task 1.1 that will lead into the more detailed analysis of the next phase of the Moakley Park Project (Task 1.3). Specifically, the Nitsch scope included:

- Review of the existing site conditions, including the project survey and other relevant documents;
- Review of the results of soil testing and groundwater levels as it pertains to stormwater analysis;
- Review of the Boston Water and Sewer Commission (BWSC) PCSWMM model of Boston to confirm the viability of using the model for the Moakley Park project;
- Further development of the BWSC PCSWMM model to fit the needs of the Moakley Park study, including current and future precipitation and tidal conditions (subsequently referred to as the Moakley Park Stormwater Model – MPSM);
- Calibration of the MPSM using a known storm event;
- Creation of MPSM of two (2) existing conditions and two (2) proposed conditions scenarios, including precipitation and tidal conditions;
- Technical analysis of the MPSM results; and
- Recommendations for further development of the MPSM under the next phase of design (Task 1.3).

SECTION 2

Existing Conditions

2.1 Overall Existing Site

Moakley Park is in the Dorchester area of Boston, Massachusetts. The site is owned by Boston Parks and Recreation and is approximately 57 acres. It is bounded by Columbia Road to the North, William J Day Boulevard to the East, Columbia Road and Old Colony Avenue to the West, and Columbia Circle to the South. Immediately to the east of the William J Day Boulevard is Carson Beach, which borders on Dorchester Bay.

The site contains softball/baseball fields and tennis courts to the north, soccer fields and softball/baseball fields along the center of the site, and a track and football field at the southern end of the site (Figure 1: Site Locus). Most of the site consists of pervious field or play surfaces. The Columbus Park Headhouse, owned by the Massachusetts Water Resources Authority (MWRA), is located at the intersection of Columbia Road and William J Day Boulevard.

Figure 1: Site Locus

2.2 Site Topography

The topography of Moakley Park generally varies between elevation 13 and 17 feet (ft) based on Boston City Base (BCB) datum. A limited area in the southern portion of the site, near the existing track and field, rises to elev. 25 ft BCB. To the west of the Park, the elevations of Columbia Road and Old Colony Avenue generally range between 15 and 18 ft BCB until reaching elevation 29 near Columbus Circle. The elevation at the Columbus Park Headhouse is around 20 ft BCB.

The elevation of William J Day Boulevard generally varies between 15 and 18 ft BCB with the southern portion of the roadway increasing in elevation as it nears Columbus Circle. The developed area to the east of William J Day Boulevard is generally higher in elevation than the roadway (Between elevations 17 and 19 ft BCB) before dropping off to Carson Beach and Dorchester Bay.

2.3 Site Subsurface Conditions

Weston and Sampson performed 18 borings and 12 test pits within Moakley Park to observe the subsurface soil and groundwater conditions. The soil profile was generally found to be variable urban fill over naturally-occurring organics and clay. A sand layer was observed between the fill and organics layers towards the northwest portion of the site. The depth of fill was generally found to be greater in the northern portion of the site than the southern portion. The fill layer was observed to be between 12 and 22 feet deep.

The depth of groundwater in the site was observed between 4 and 8 feet below the surface.

2.4 Existing Stormwater Infrastructure

2.4.1 Columbus Park Headhouse and CSO Outfalls

The Columbus Park Headhouse, owned by MWRA, is located to the north of Moakley Park along Columbia Road and William J Day Boulevard (Figure 2). The headhouse receives combined sewer flow from a substantial portion of the combined sewer system in the eastern portion of Boston. The headhouse is designed to pump 282 cubic feet per second (cfs) of flow to Deer Island for treatment (Sources: Boston Water and Sewer Commission, and MWRA Combined Sewer Overflow Control Plan, Annual Progress Report 2015). Flows larger than 282 cfs are re-routed through diversion structures towards the outfalls, resulting in combined sewer overflows (refer to Section 2.4.3 – Diversion Structures). There are three combined sewer overflow (CSO) outfalls into Dorchester Bay that are located directly east of Moakley Park. There are currently no tide gates located at these outfalls.

2.4.2 Combined Sewers

There are five Boston Water and Sewer Commission combined sanitary sewer and storm mains that cross through the Moakley Park site, two interceptor mains and three overflow mains, as described below (Figure 3: Combined Sewers and Diversion Structures):

- New Boston Main Interceptor: 8.5’ x 8.5’ Combined sewer main that crosses the northwest corner of Moakley Park. The sewer flows from south west to north east and discharges to the Columbus Park headhouse.

- Vale Street Overflow: 6.5’ x 6.5’ Combined sewer main that crosses the northern portion of Moakley Park. The sewer flows from northwest to southeast and discharges through the northernmost outfall to Dorchester Bay that is within the Moakley Park limit of analysis.

Figure 2: MWRA Columbus Park Headhouse and Outfall Locations

- Columbus Park Connection: 9’ x 8.6’ Combined sewer main that crosses into the site at the southernmost area and leaves the site along the northernmost area. The sewer flows from south to north and discharges to the Columbus Park Headhouse.

- Kemp Street Overflow: 10.33’ x 6.25’ Combined sewer that crosses the middle of the site and enters along Old Colony Ave. The sewer flows from west to east and discharges to the middle outfall to Dorchester Bay that is within the Moakley Park limit of analysis.

- Crescent Ave Overflow: 8’ x 8’ Combined sewer that crosses through the southern portion of the site. The sewer flows from west to east and discharges to the southernmost outfall to Dorchester Bay that is within the Moakley Park limit of analysis.

2.4.3 Diversion Structures

There are two diversion structures upstream of the Columbus Park Headhouse on the Vale Street and Kemp Street Overflows (Figure 3). The diversion structures are designed to direct the base sewer flow and low-flow stormwater events to the MWRA Columbus Park Headhouse. In high flow events, the diversion structures are designed to divert overflow through the Kemp Street and Vale Street outfalls at Moakley Park. BWSC indicated that the Columbus Park Headhouse is designed to receive up to the 25-year storm while anything greater than that would be diverted through the Kemp Street and Vale Street outfalls to Dorchester Bay. Refer to Figure 3 above for the locations of these diversion structures.

2.5 Internal Moakley Park Drainage System

Moakley Park contains stormwater infrastructure that consists of area drains, catch basins, manholes, and small diameter pipes (Refer to Appendix D- Draft Survey for the locations and quantity of stormwater infrastructure within Moakley Park). The area drains and catch basins are generally located at low points spread throughout the Park. These park drainage systems connect into the larger BWSC combined sewer mains that cross through the site.

There are Park drainage systems that connect to the Crescent Avenue which discharges to Dorchester Bay, the Kemp Street Overflow which discharges to Dorchester Bay, and the New Boston Main which discharges to the MWRA pump house.

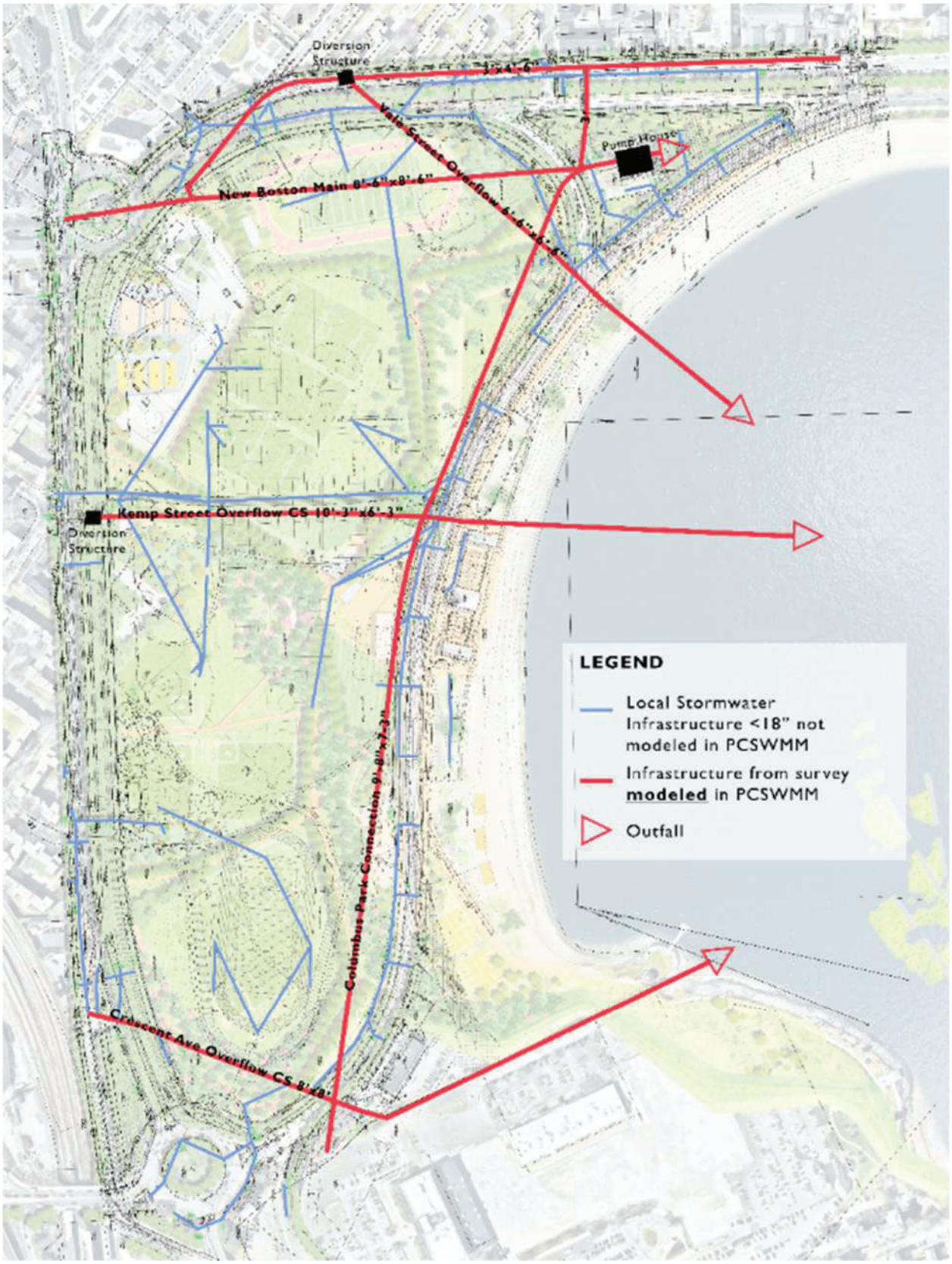


Figure 3: Combined Sewers and Diversion Structures

SECTION 3

BWSC Hydraulic and Hydrologic Model

3.1 Model Background

Boston Water and Sewer Commission (BWSC) developed a PCSWMM model of the City of Boston, including the infrastructure within and upstream of the combined sewers in Moakley Park. Nitsch received a copy of this model on September 26, 2019 for use on the hydraulic and hydrologic model for Moakley Park. The model incorporates combined sewers over 24-inches in diameter and separated storm drains over 36 inches in diameter. The boundary conditions for the BWSC model included a typical Boston tidal time series assigned to each outfall to a coastal area and a pump rate of 282 cfs assigned to the Columbus Park Headhouse outfall.

3.2 Review of BWSC Model

Nitsch reviewed the PCSWMM model components, including the pipes, manholes, and subcatchments, within and near Moakley Park based on the survey for the park. The intent of this exercise was to review the accuracy of information included within the model based on available information, including survey information and record plans so that the model could be used without significant modification for the Moakley Park project.

The pipes and manholes within the model were compared against available site information, including the draft survey prepared by Nitsch issued for Task 1.1. The information was generally consistent with the survey information and therefore was not modified within the model.

Although the BWSC model included the outfall system routed through Moakley Park (Park), the majority of the Park and the Park's drainage infrastructure was not included in the model's subcatchments to the outfalls to Dorchester Bay or the Columbus Park Headhouse. The localized drainage infrastructure from the Park was also not included as part of the model. Figure 4: Tributary Area to the Columbus Park Headhouse, shows the infrastructure and the land cover that was included in the original model that was received from BWSC. The area tributary to the headhouse is shown in blue, the combined sewers are shown in yellow, and the headhouse is circled in yellow.

Nitsch added the Moakley Park area to the model as six new subcatchments (approximately 42.7 acres). Refer to Figure 5: New Subcatchments in Moakley Park for the extent and location of the subcatchment areas. Nitsch delineated the subcatchments based on surveyed topographic information and Park drainage systems. The subcatchments are routed to model junctions (manholes) based on where the Park drainage infrastructure connects to the combined sewers. Based on the survey, it appears that most Moakley Park discharges to the outfall pipes downstream of the combined sewer system diversion structures.

Other than the addition of the six Moakley Park subcatchments, no changes were made to the BWSC model. Moving forward, the model updated BWSC model is referred to as the Moakley Park Stormwater

Model (MPSM).

Figure 4: Tributary Area(blue) to the Columbus Park Headhouse (circled in yellow)

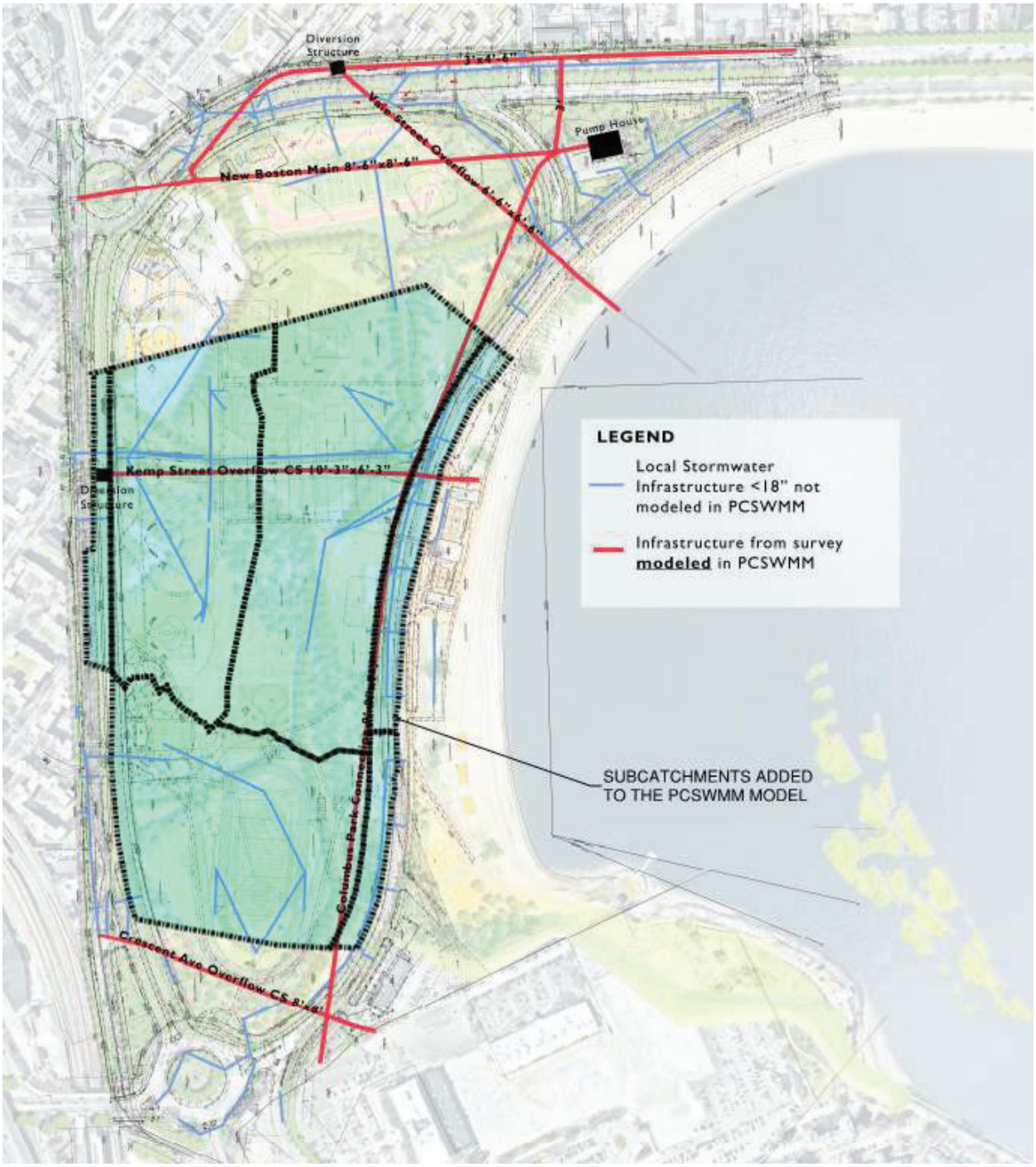


Figure 5: New Subcatchments in Moakley Park (shown in green)

SECTION 4

Model Existing Conditions Test

4.1 Existing Conditions Test Storm Event

To review the consistency of the Moakley Park Stormwater Model (MPSM) with observed conditions, Nitsch created a model scenario for a Nor'easter that caused flooding in the Park. The existing conditions test storm occurred over a 24-hour period from March 1, 2018 at 12 am to March 3, 2018 at 12 am and brought 2.6 inches of rainfall to the Boston area. Nitsch obtained the rainfall record information from the Dorchester-Talbot BWSC rain gauge (https://www.bwsc.org/environment-education/rainfall-garden) and the tidal record information from NOAA Tides and Currents (https://tidesandcurrents.noaa.gov/). The peak water surface elevation during this storm was 15.63 ft BCB and the peak intensity of the rainfall was 0.3 in/hr.

Figure 6: March 2, 2018 Nor'easter

4.2 MPSM Existing Conditions Test Storm Results

The results of the existing conditions test storm event in the MPSM indicated a surcharged condition at the surface in the Vale Street Overflow Combined Sewer system in the northern portion of the site. For the purpose of this study, surcharge refers to a condition where pipe capacity is exceeded by either stormwater or tidal conditions and the hydraulic grade line exceeds the rim elevation of surface structures. The hydraulic grade line represents the potential energy (based on elevation of flow) and pressure energy of the flow along the pipe. The model shows that although the pipes and structure in the Kemp Street Overflow Combined Sewer are surcharged in this storm event, the surcharge condition does

not extend to the surface. Figure 7 shows the water surface elevation profile through the Vale Street Overflow Combined Sewer at the time the pipe surcharges (approx. 12 pm).

The profile also clarifies that there is no water flowing from the upstream combined sewer through the diversion structure (as shown on the far left of Figure 7) as expected, since this was less than a 25-year storm. Therefore, the water that is flowing through the pipe is from the Moakley Park local drainage system or, more substantially, from the tidal condition at the outfall propagating through the pipes. This profile shows the peak storm tidal elevation of 15.63 ft BCB which is above the surface elevation of the structure where flooding is shown.

The location of the surcharge along the Kemp Street Overflow is in the vicinity of flooding observed by Stoss in the northern portion of the Park during the storm event (Figure 8). Stoss also observed flooding other portions of Moakley Park that may be attributed to flooding around the localized drainage system (not in the BWSC/MPSM) or poor drainage conditions at the surface.

The existing conditions test model performance was generally consistent with the observed conditions and therefore accepted for the high-level analysis of the Task 1.1 stormwater scope.

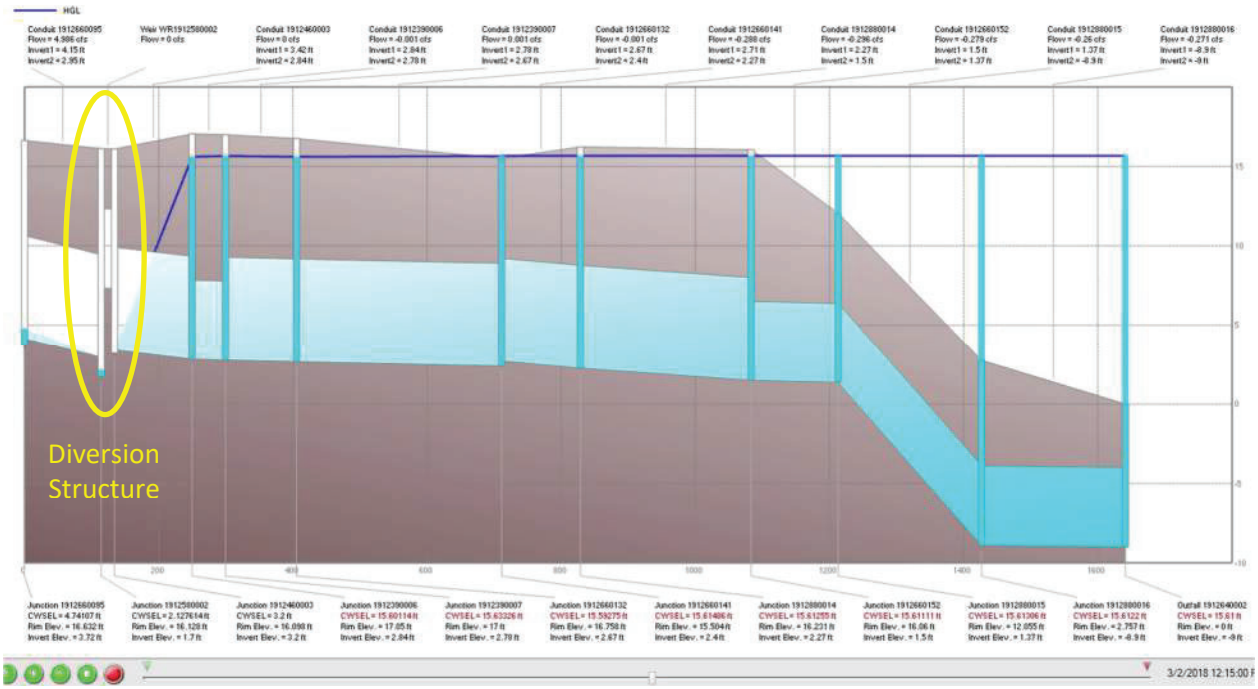


Figure 7: Profile of Vale Street Overflow

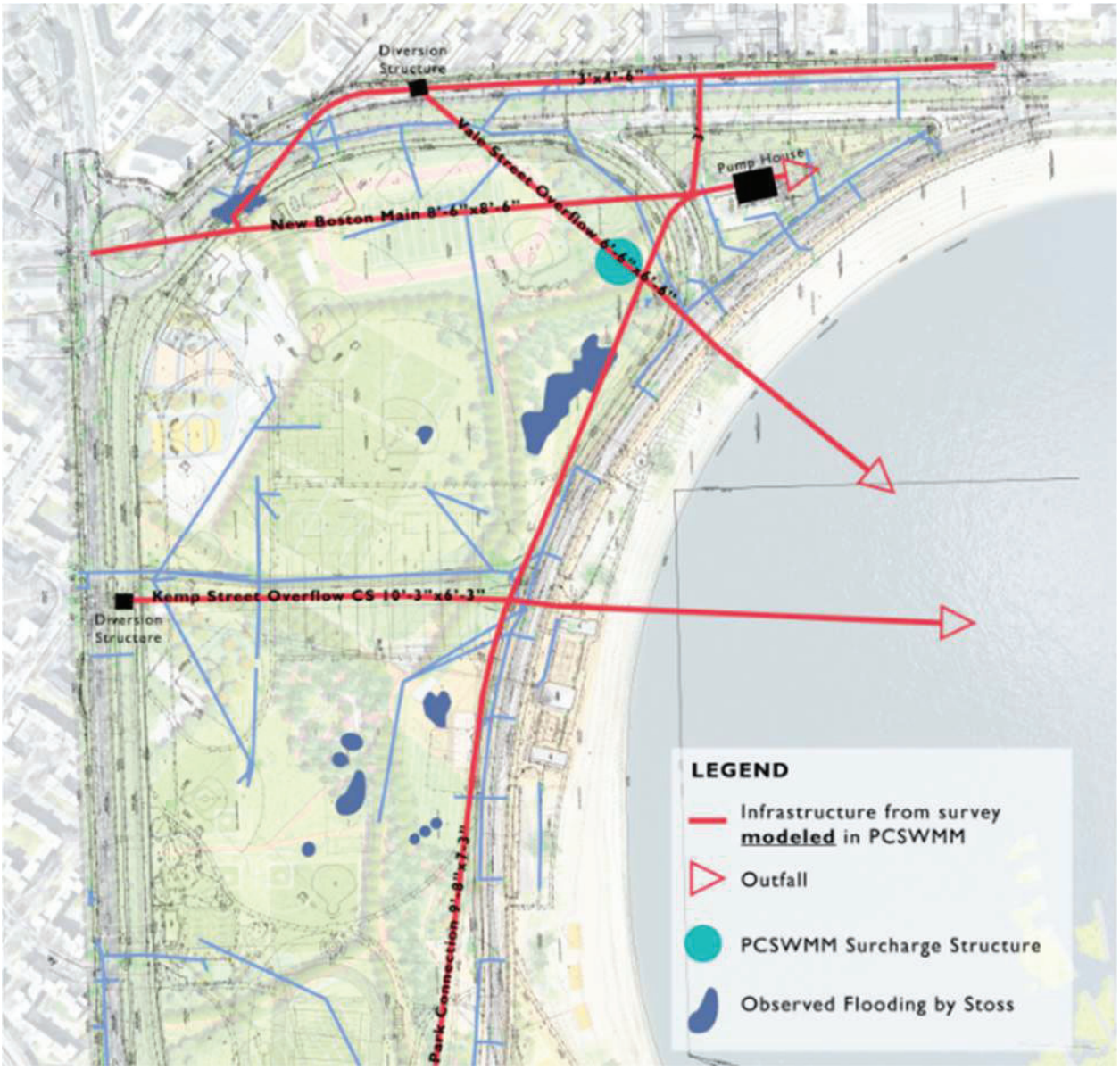


Figure 8: Observed versus projected surface flooding from the March 2, 2018 Nor'easter

SECTION 5

Moakley Park Stormwater Model Scenarios

5.1 MPSM Scenario Selection

Nitsch, in conjunction with Weston and Sampson, selected four (4) combinations of precipitation and tidal conditions to evaluate with the MPSM under Task 1.1:

- Current 10-yr, 24-hr storm event with the current normal tidal conditions;
- Current 10-yr, 24-hr storm event with the tidal conditions observed during Nor'easter Grayson (Nor'easter Grayson occurred on January 7, 2018 and produced the highest recorded tide in Boston and approximates the 100-year storm tidal condition. This event is referred to as Grayson Tidal Condition moving forward);
- Projected 2070 10-yr 24-hr storm event with the projected 2070 spring tidal condition; and
- Projected 2070 10-yr 24-hr storm event with the projected 2070 100-yr nor'easter tidal conditions.

These specific scenarios were selected with the intent of evaluating how the combined sewer system, including the upstream diversion structures and outfall sections within Moakley Park, functioned in various storm conditions.

5.2 Precipitation and Tidal Data Sources

The precipitation and tidal input files were prepared by Nitsch using the data sources outlined in Table 1 below. The tidal and precipitation source data is provided in Appendix C.

Table 1: Summary of Tidal and Precipitation Data Sources

Data Type	Event	Data Source	PCSWMM Input File Created By
Tidal	Normal Tide Conditions, Boston	BWSC	BWSC
	Nor'easter Grayson	NOAA Tides and Currents	Nitsch
	2070 Normal Spring Tides	Woods Hole Group	Nitsch
	2070 100-yr Nor'easter Tides	Woods Hole Group	Nitsch
Precipitation	Current 10-year, 24-hour	SCS Type 3 Distribution (PCSWMM Storm Generator)	Nitsch
	2070 10-year, 24 hour	Weston & Sampson	Nitsch

The current 10-year, 24-hour storm rainfall data is based on the NOAA Atlas 12 rainfall depth and the SCS 24-hr Type III rainfall distribution. The projected 2070 10-year, 24-hour rainfall data was sent to Nitsch by Weston and Sampson. For both events, the rainfall data is provided in 15-minute intervals and is based on an SCS 24-hr Type III rainfall distribution.

The current "normal" tidal conditions were in the model that Nitsch received from BWSC. Record tidal information from Nor'easter Grayson was obtained from NOAA Tides and Currents. Projected 2070 tidal conditions were determined by Woods Hole Group and shared with Nitsch for use in the model.

5.3 Analysis of Results

The MPSM was evaluated for the four (4) selected precipitation and tidal scenarios to (a) identify the locations where structural surcharging occurs, and (b) determine if the primary contribution to the surcharging is caused by tidal conditions or peak flow discharges through the system.

Structure surcharging in the selected scenarios was limited to the Vale Street Overflow and the Kemp Street Overflow. The key findings for each of these locations are summarized below. The MPSM did not identify surcharging along the New Boston Main, Crescent Ave Overflow, or the Columbia Park Connection in the selected scenarios. For all the surface profiles through Moakley Park, refer to Appendix B.

VALE STREET OVERFLOW

Key Findings for Current 10-Year Storm with Normal and Grayson Tidal Conditions

- The Vale Street diversion structure located upstream of the Vale Street Outfall controls flow from upstream areas to the Columbus Park Headhouse. All combined sewer flow in this event was directed through the Headhouse, and no flow from upstream of the diversion structure is directed to the combined sewer overflow through Moakley Park.

- No structure surcharging was identified along the Vale Street Overflow within Moakley Park during the 10-yr storm with a normal tidal event. The peak runoff did not coincide with high tide during this event. The peak elevation of the normal high tide is approximately 9 feet which is lower than the surface elevation of the Park, which is generally between 13 and 17 feet BCB.

- Structure surcharging was identified along the Vale Street Overflow within Moakley Park when the current 10-yr storm is modeled in conjunction with the Grayson tidal event (Figure 9). The peak elevation during Grayson was greater than 16 feet which is higher than the surface elevation of the Park. The peak runoff coincided with the high tide.

Key Findings for Projected 2070 10-Year Storm with Normal Spring and Nor'easter Tidal Conditions

- The diversion structure located upstream of the Vale Street Outfall controls flow from upstream areas to the Columbus Park Headhouse. The maximum peak that can be conveyed through the low flow orifice in the diversion structure is exceeded (the 2070 10-year storm is similar to the present 25-year storm) and overflow from upstream of the diversion structure is directed to the combined sewer overflow through Moakley Park.

- Structure surcharging was identified along the Vale Street Overflow within Moakley Park during both the 2070 normal Spring Tides and 2070 100-yr Nor'easter tidal conditions (Figure 10). The peak elevations of these storms are approximately 17 ft BCB and 20 ft BCB, respectively, both of which are higher than the surface elevations of many of the structures within the Park.

- In 2070, the surcharge at the surface is caused by the tidal condition regardless of the rainfall intensity or depth. During the peak runoff, when tide is not yet at high tide, there is no surface surcharge along the Vale Street Overflow within Moakley Park.

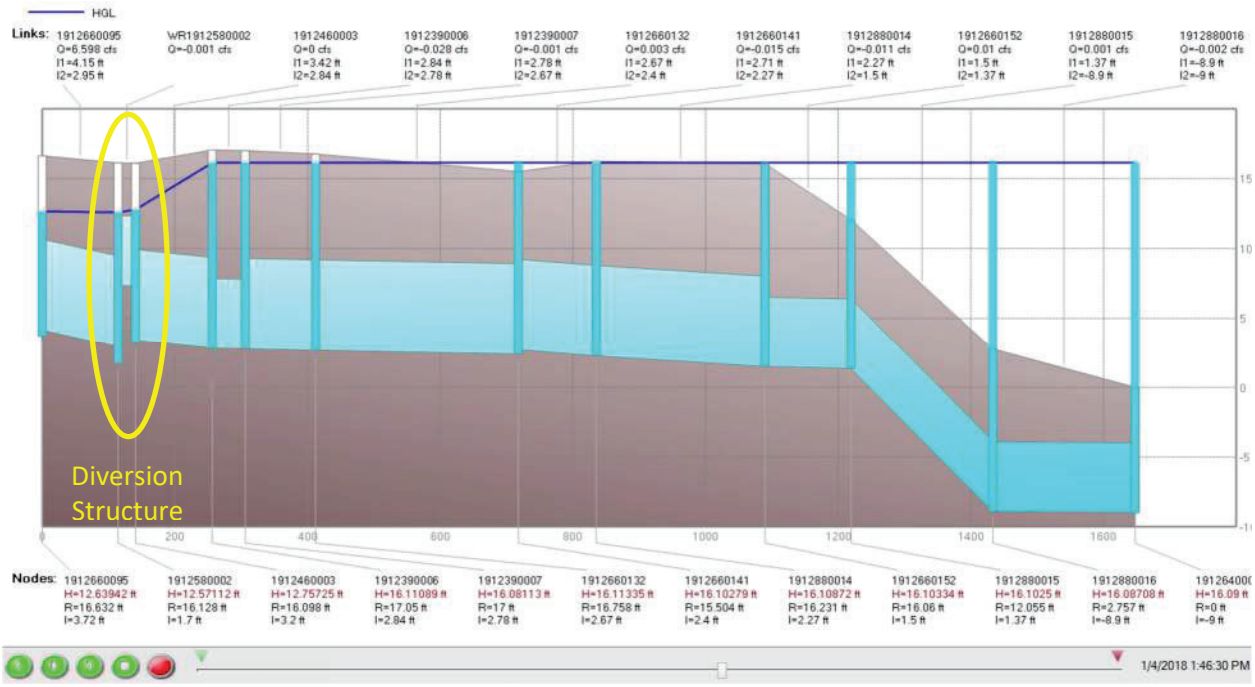


Figure 9: Vale Street Overflow at high tide during current 10-yr storm with Grayson tidal conditions

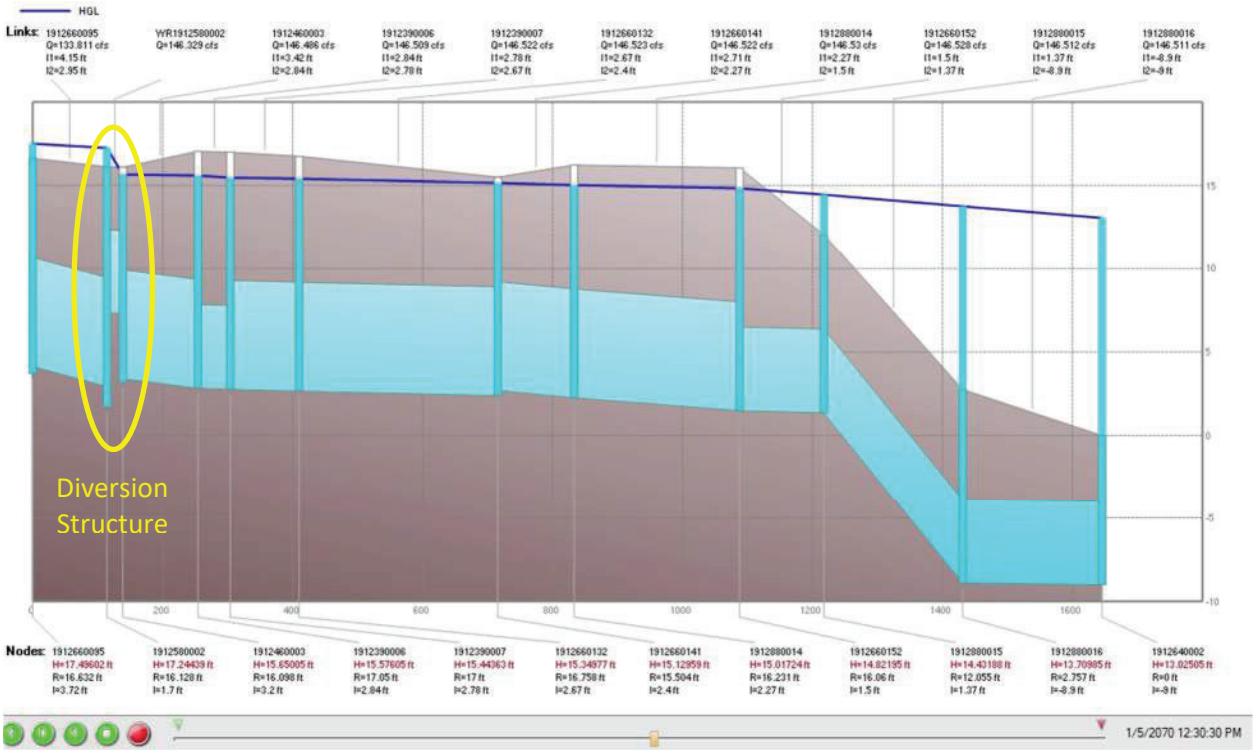


Figure 10: Vale Street Overflow at high tide during the projected 2070 10-yr storm with projected 2070 Normal Spring tides

KEMP STREET OVERFLOW

Key Findings for Current 10 Year Storm with Normal and Grayson Tidal Conditions

- The Kemp Street diversion structure located upstream of the Kemp Street Outfall controls flow from upstream areas to the Columbus Park Headhouse. The maximum peak that can be conveyed through the low flow orifice in the diversion structure is exceeded and overflow from upstream of the diversion structure is directed to the combined sewer overflow through Moakley Park. This occurs when the tidal condition is low.

- No structure surcharging was identified along the Kemp Street Overflow within Moakley Park during the 10-yr storm with a normal tidal event. The peak runoff did not coincide with high tide during this event. The peak elevation of the normal high tide and the peak HGL in the Kemp Street combined sewer is approximately 9 ft BCB which is lower than the average surface elevation of the Park, which is between 13 and 17 ft BCB.

- Structure surcharging was identified along the Kemp Street Overflow within Moakley Park when the current 10-yr storm is modeled in conjunction with the Grayson tidal event. The peak elevation during Grayson was greater than 16 feet which is higher than the surface elevation of the Park.

Key Findings for Projected 2070 10-Year Storm with Normal Spring and Nor'easter Tidal Conditions

- The Kemp Street diversion structure located upstream of the Kemp Street Outfall controls flow from upstream areas to the Columbus Park Headhouse. The maximum peak that can be conveyed through the low flow orifice in the diversion structure is exceeded and overflow from upstream of the diversion structure is directed to the combined sewer overflow through Moakley Park. This occurs even when the tidal condition is low.

- Structure surcharging was identified along the Kemp Street Overflow within Moakley Park during both the 2070 Normal Spring Tides and 2070 100-yr Nor'easter tidal conditions. The peak elevations of these storms were approximately 17 ft BCB and 20 ft BCB, both of which were higher than the surface elevations of many of the structures within the Park.

- In 2070, the surcharge at the surface is caused by the tidal condition regardless of the rainfall intensity or depth. Due to the CSO condition at the Kemp Street Overflow, surcharging may also be associated with stormwater runoff depending on where in the tidal cycle the peak runoff occurs.

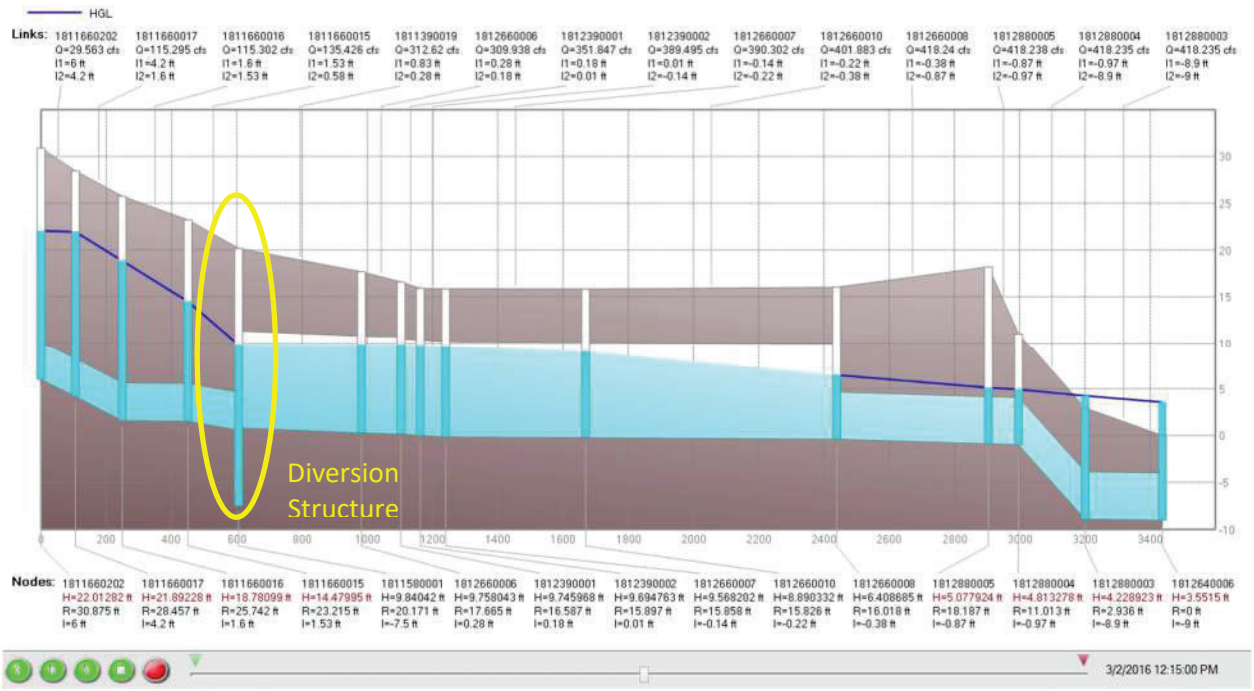


Figure 11: Kemp Street Overflow with the current 10-yr storm rainfall and normal tidal condition

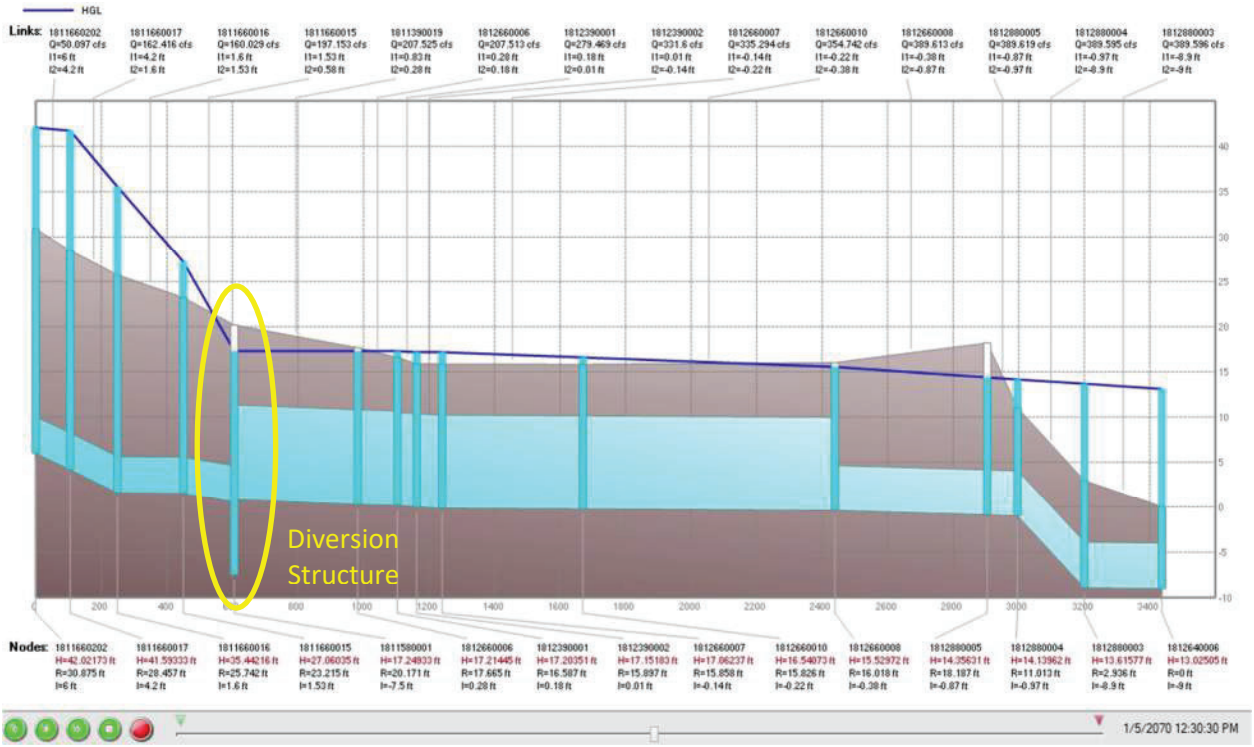


Figure 12: Kemp Street Overflow at high tide during the projected 2070 10-yr storm with projected 2070 Nor'easter tidal conditions

SECTION 6

Summary and Recommendations

6.1 Summary of Preliminary MPSM Results

Table 2 provides a comparison of the existing conditions test storm and the four (4) select storm scenarios, including the peak rainfall intensity, maximum tidal elevation, the alignment of the peak tidal and flow conditions, and the surcharge observations. As shown in Table 2, surcharge occurs in all modeled scenarios except for the current 10-year rainfall event at normal tidal conditions. This is the only tidal event that has a peak tide lower than the lowest elevation of the Park.

Table 2: Comparison of Storm Scenarios

Scenario	Duration	Total Depth (in.)	Peak Rainfall Intensity (in/hr)	Max. Tidal Elevation (ft, BCB)	Alignment of Peaks (Tide/Peak Flow)	Model Surcharge
March 3, 2018 Nor'easter (Existing Conditions Test Storm)	24 hours	2.6	0.3	**15+**	Yes	**Yes**
Current 10-year rainfall, Normal tide	24 hours	5.1	3.3	9+	No	No
Current 10-year rainfall, "Grayson" Nor'easter tide	24 hours	5.1	3.3	**16+**	Yes	**Yes**
2070 10-year rainfall, 2070 Normal tide	24 hours	6.4	3.7	**17+**	No	**Yes**
2070 10-year rainfall, 2070 Nor'easter tide	24 hours	6.4	3.7	**20+**	No	**Yes**

The hydraulic grade line in the highlighted scenarios is driven by the elevation of the high tide. Stormwater contributions to the overflow outlets during the current and 2070 10-year storms are minimal due to the control of the Columbus Park Headhouse and associated diversion structures. However, it is possible that this runoff could exacerbate flooding within Moakley Park if the peak runoff coincided with high tide.

The Vision Plan identifies surface and subsurface storage for stormwater within Moakley Park. The results of the preliminary analysis indicate that the proposed subsurface storage will not be useful unless a tidal control is installed on each of the outfalls to Dorchester Bay. Once tidal controls are introduced, the seawater intrusion into the Moakley Park infrastructure will be prevented; however, the combined sewer overflow and local Moakley Park drainage will require storage that is of adequate size to detain water until the tide gates open.

6.2 Recommendations for Further Analysis

The research, analysis, and findings of Task 1.1 provided preliminary guidance into the context of Moakley Park as part of a regional combined sewer system. Additional collaboration with BWSC and refinement of the MPSM will continue to highlight opportunities for effective and resilient infrastructure to be integrated within Moakley Park. Based on the results of Task 1.1, Nitsch recommends the following next steps for the Moakley Park stormwater analysis:

1. Coordinate with Boston Water and Sewer Commission and Woods Hole Group to identify tidal controls for the outfalls adjacent to Moakley Park and integrate these tidal controls into the MPSM.

2. Clarify the current infrastructure conditions with BWSC to understand the status and planned improvements for the combined system at the northernmost and southernmost areas of the Park.

3. Further coordination with BWSC to understand the diversion structures, specifically the Kemp Street Overflow which is not diverting the 25-year or 10-yr storms to the MWRA pump station. Nitsch will coordinate with BWSC to validate the intent of the diversion structures in current and projected future rainfall events.

4. Discuss the anticipated condition of the Columbus Park Headworks and the combined sewer overflow system in the vicinity of Moakley Park with BWSC.

5. Identify if the MPSM should include more refined drainage system information within Moakley Park. Because of the size of the infrastructure included (pipes 18 inches or larger) the BWSC and MPSM are limited in the locations where surcharge is identified. It is likely that additional surcharging will occur at other drain inlet locations within the low points of the Park and these are not included in the preliminary MPSM.

6. Perform additional scenarios with the MPSM (after addition of tidal controls) to determine the approximate volume of surface and subsurface storage.

7. Expand on the MPSM using PCSWMM 2D to better define the surface inundation within the Park and identify if immediately adjacent off-site areas are contributing stormwater to the Park. Utilize the PCSWMM 2D model in the proposed conditions to understand the impact of the proposed berm.

8. Analyze future tidal conditions to determine if pumps will be needed to dewater subsurface storage.

6.3 Postscript- Conversation with BWSC

After Memo Task 1.1 was completed, the Moakley Park Team and the Boston Parks Department met with BWSC to review the outcome from the stormwater analysis and further discuss the existing site infrastructure. At that time, BWSC informed the Team of interconnections between the BWSC and

MWRA systems that had not been previously disclosed and are not included in the BWSC PCSWMM Model.

In short, the BWSC outfalls flow into the MWRA CSO tunnel located below the eastern edge of the Park. The stormwater analysis in Task 1.1 built upon the BWSC PCSWMM model and modeled various storm scenarios using the BWSC infrastructure data and assumptions provided to the Team prior to the start of Task 1.1. Because the BWSC PCSWMM model does not currently include the MWRA tunnel or tide gates, the Task 1.1 model results indicated that the Vale St Overflow/BOS085 and the Kemp St Overflow/BOS086 discharge into North Dorchester Bay. The conversations with BWSC and MWRA, clarified that these flows would first be intercepted by the MWRA tunnel before overflowing to the Bay, and that tidal flows are not likely to surcharge into the Park because there are tide gates installed as part of the MWRA tunnel.

Because BWSC's PCSWMM model does not yet include some of the key infrastructure elements (i.e. the MWRA tunnel and associated operating procedures), the model results do not accurately reflect the future flood risks at Moakley Park. Therefore, future stormwater analyses for the Moakley Park project will proceed without the use of the BWSC PCSWMM model. For more information regarding the stormwater approach for Task 1.3, refer to Workplan 1.3 Technical memo.

APPENDICES

Appendix A: PCSWMM Existing Conditions Test Storm Profiles

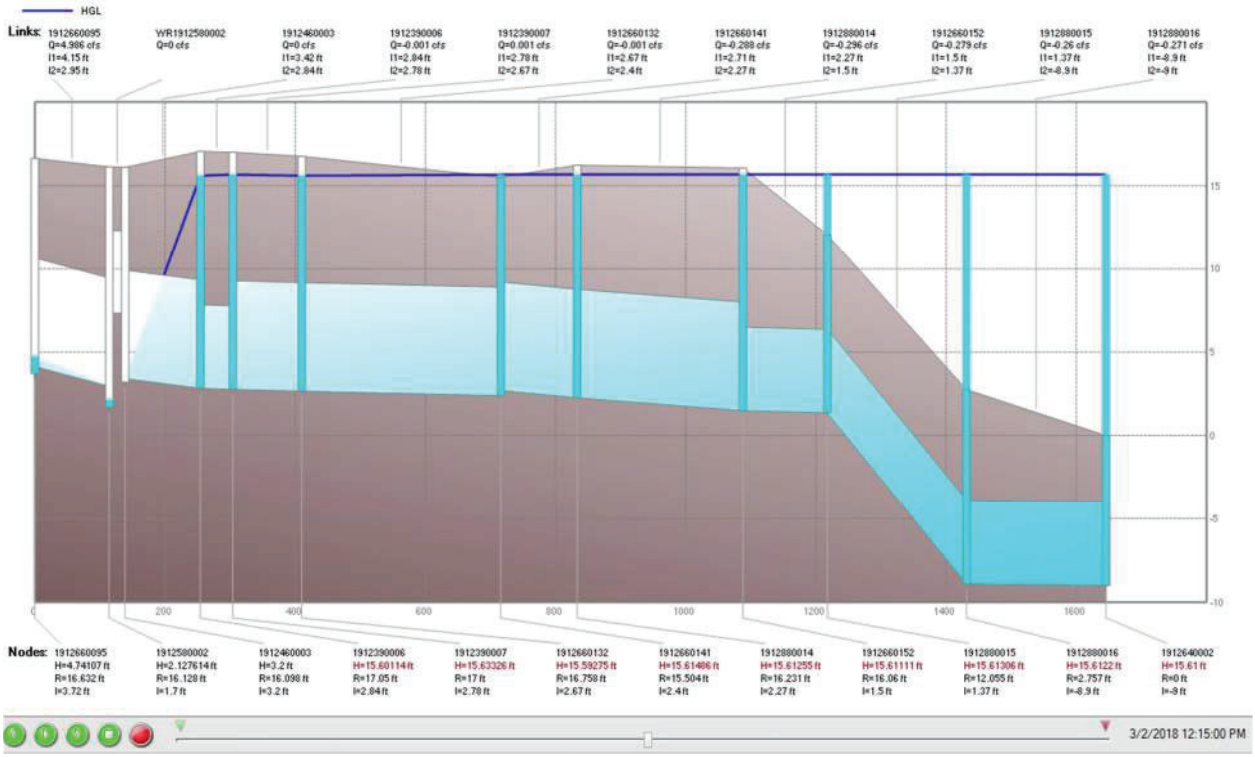
Appendix B: PCSWMM Scenario Profiles

Appendix C: Data Sources and Model Parameters

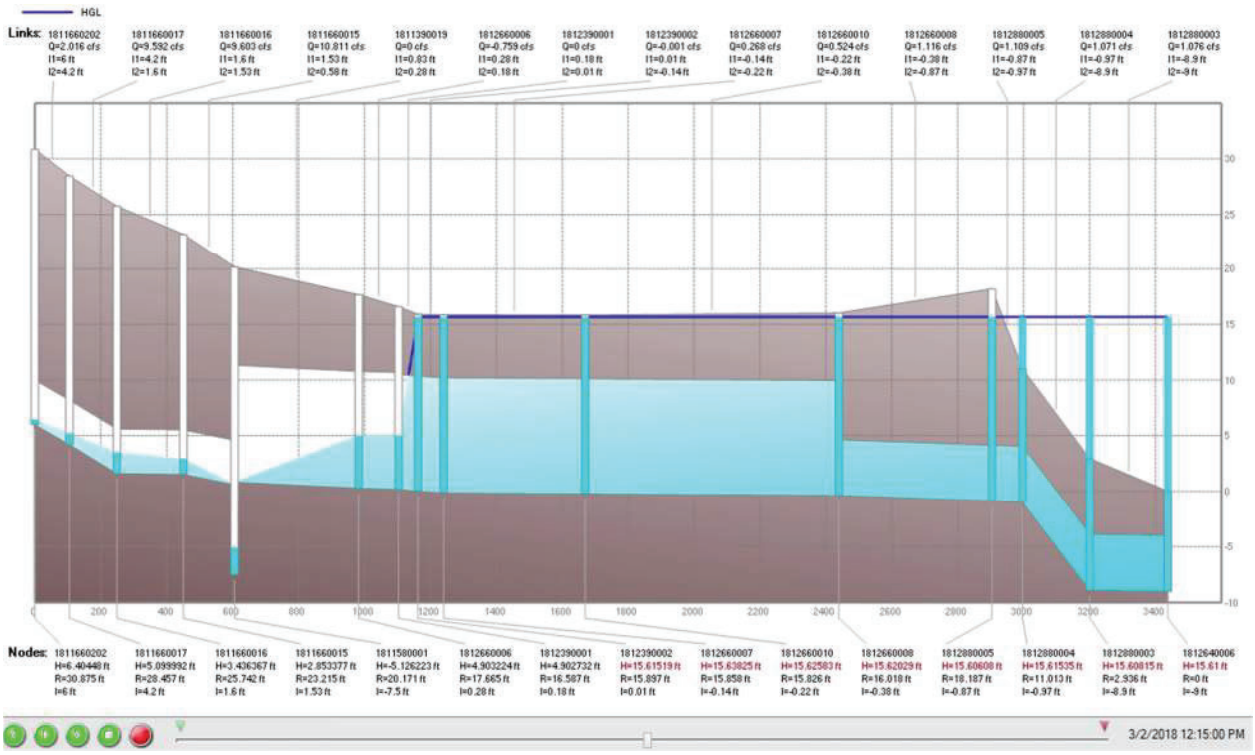
APPENDIX A: PCSWMM EXISTING CONDITIONS TEST PROFILES

March 2, 2018 Nor’easter Existing Test Storm Event

Vale Street Overflow



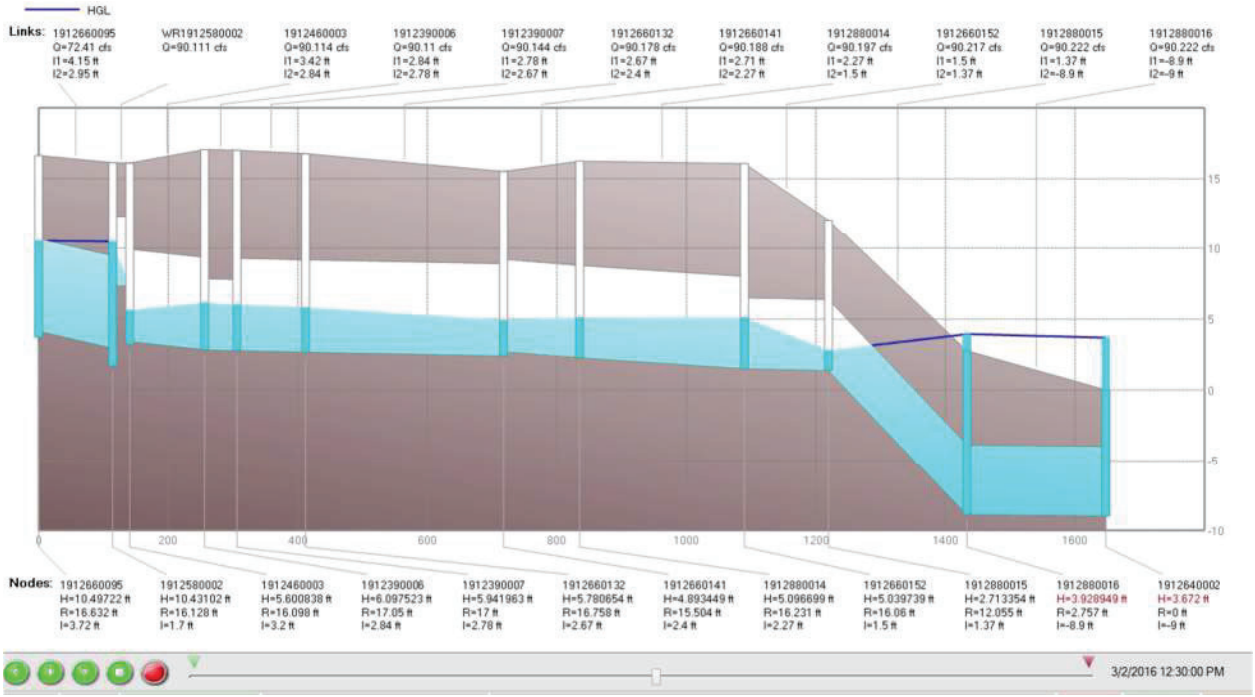
Kent Street Overflow



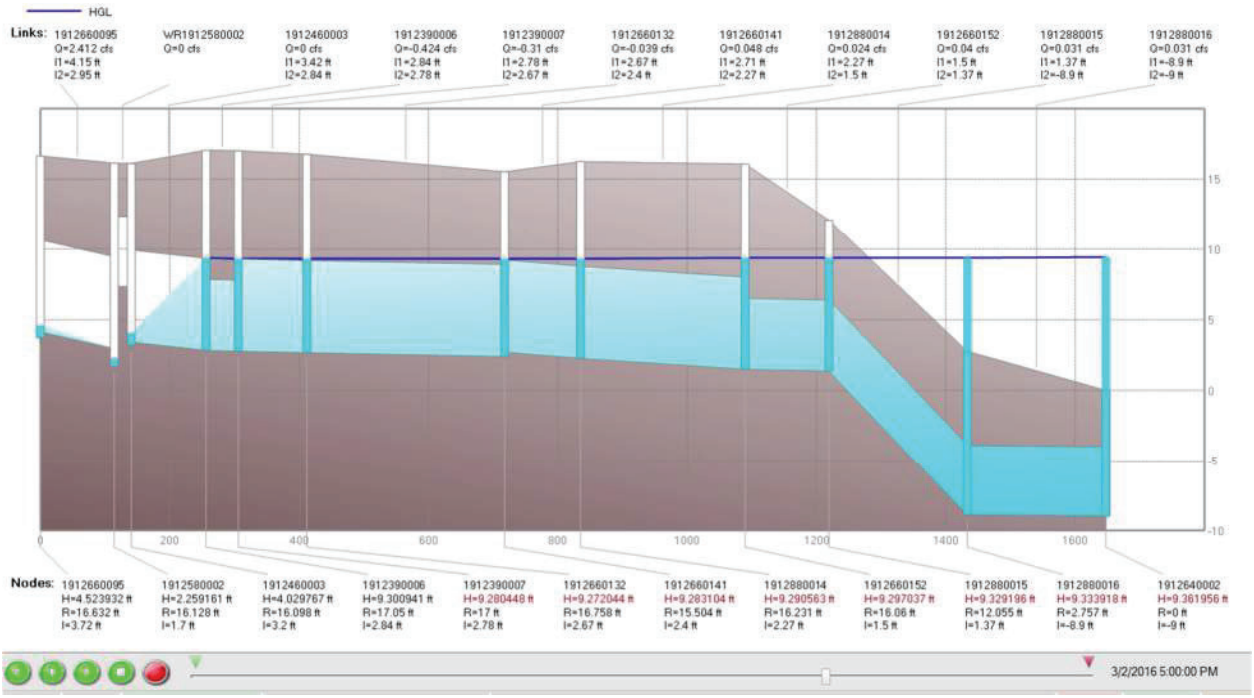
APPENDIX B: PCSWMM SCENARIO PROFILES

Current 10YR Storm with Current Tides

Vale Street Overflow during peak runoff conditions at 12:30 PM

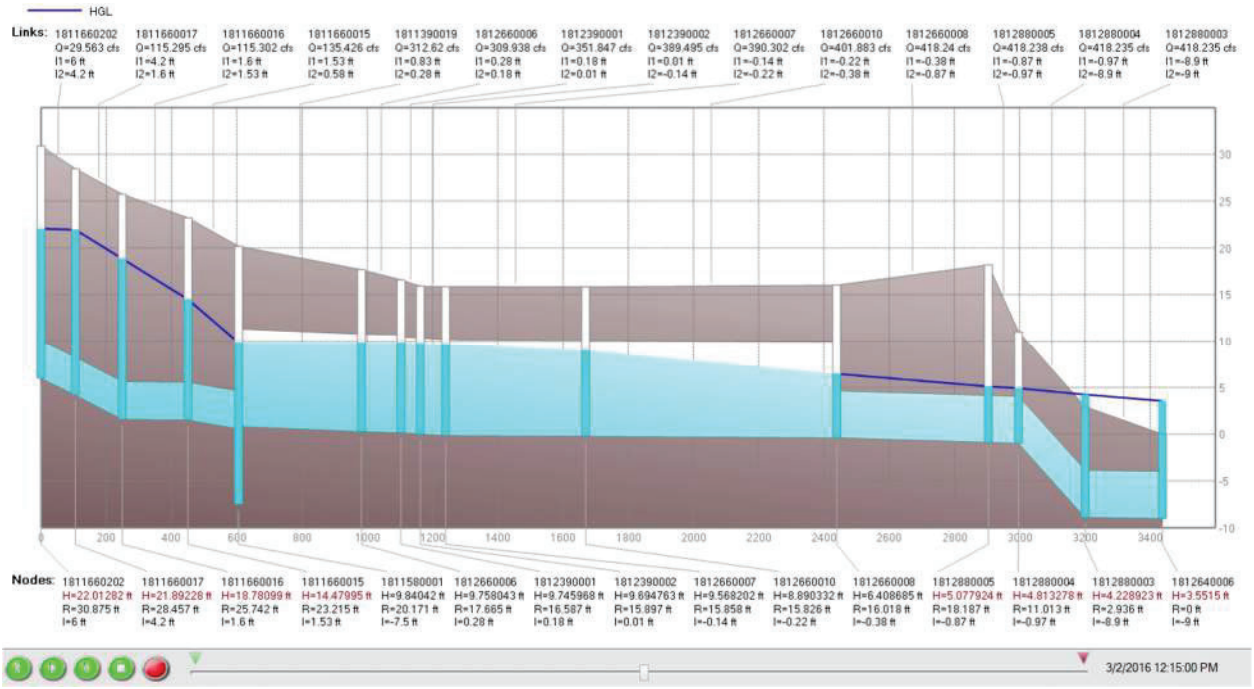


Vale Street Overflow during high tide at 5 PM

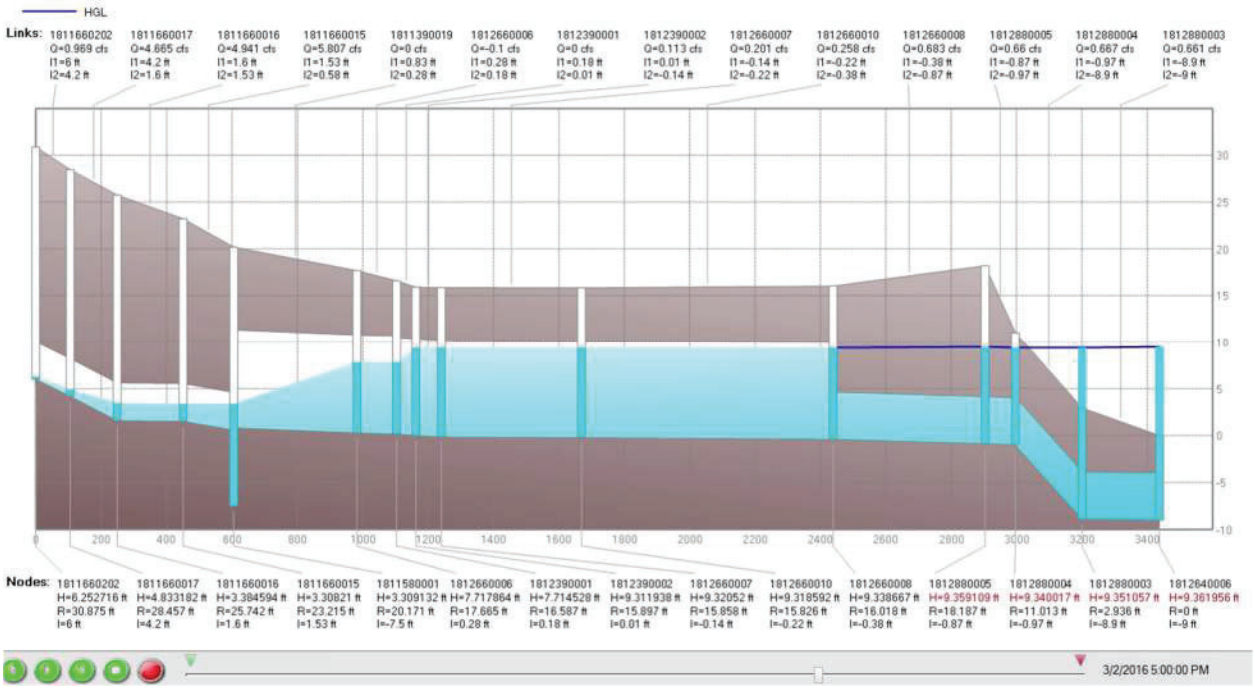


Current 10YR Storm with Current Tides

Kemp Street Overflow during peak runoff conditions at 12:15 PM

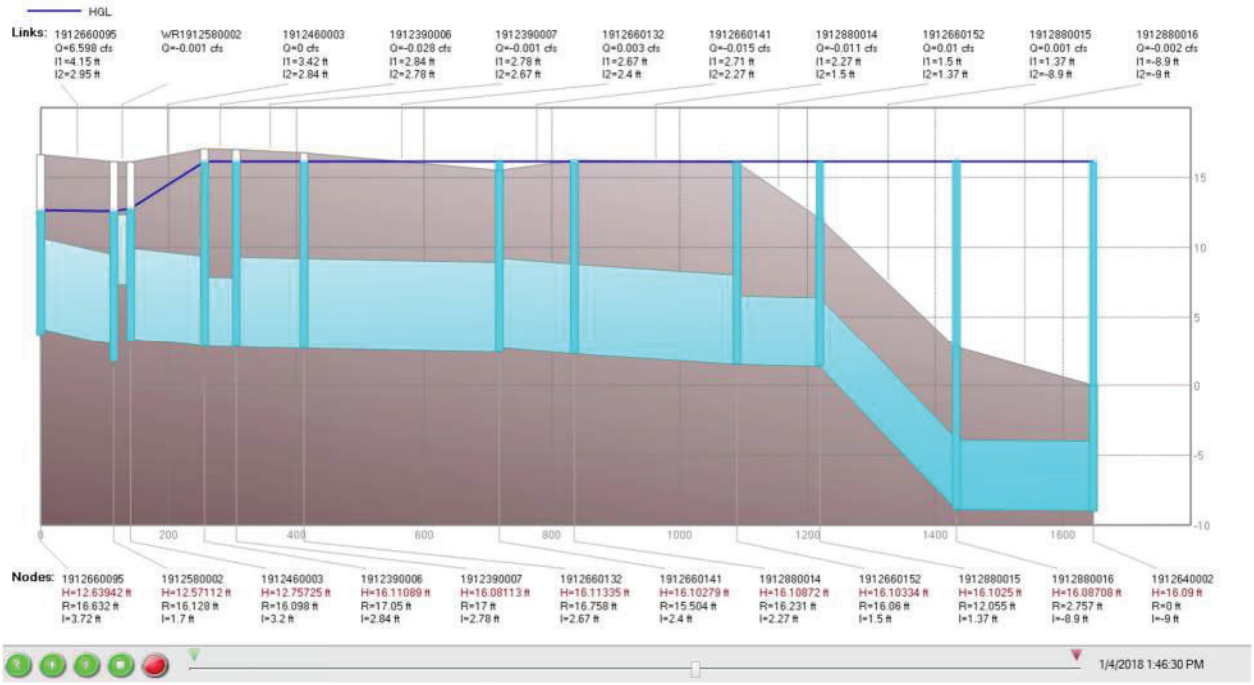


Kemp Street Overflow during high tide at 5 PM

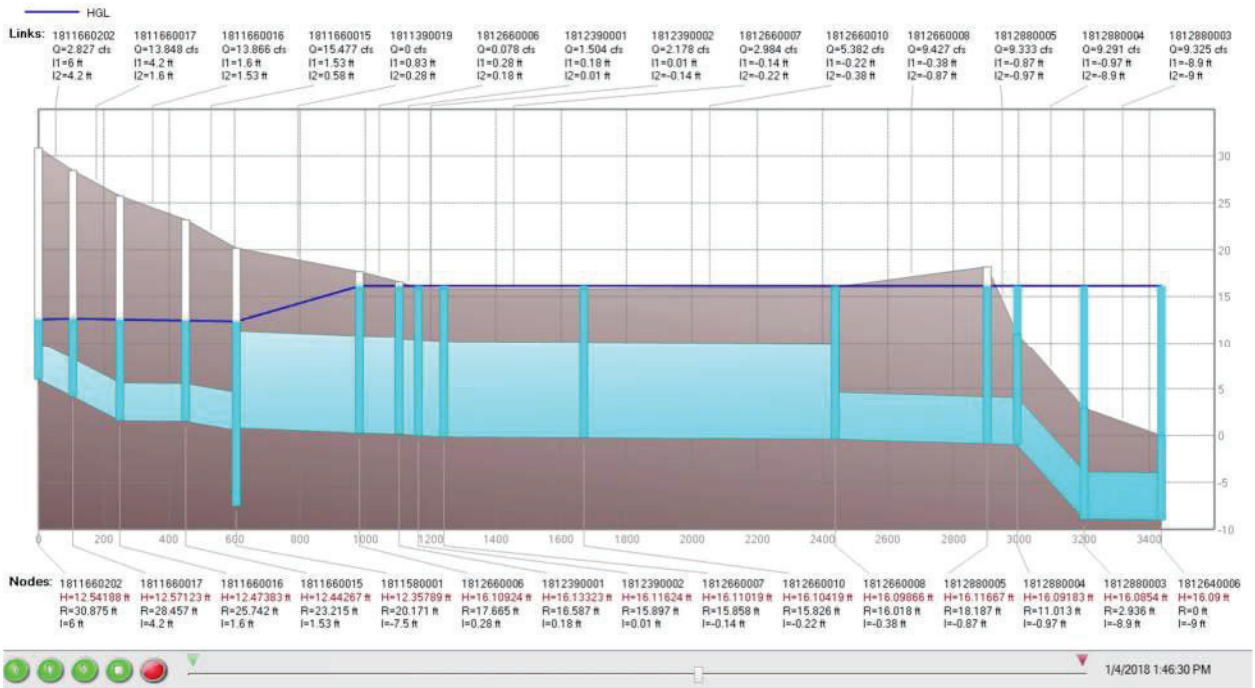


Current 10YR Storm with Grayson Tides

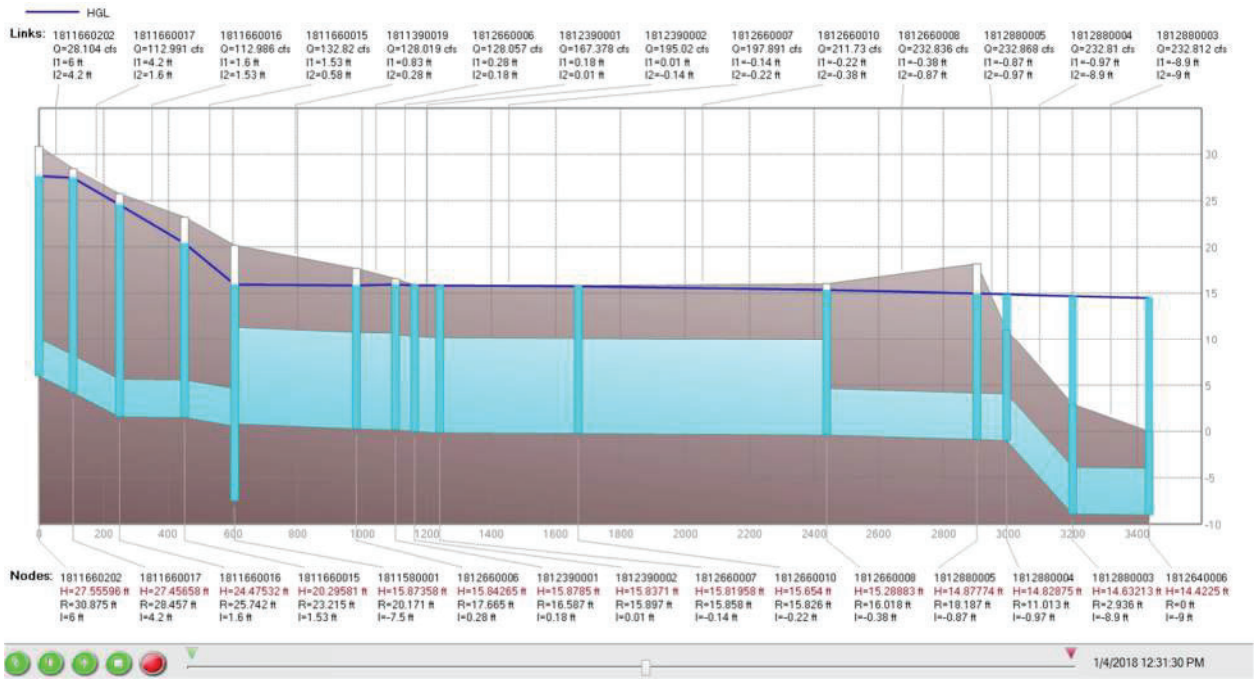
Vale Street Overflow during high tide at 1:46 PM



Kemp Street Overflow during high tide at 1:46 PM

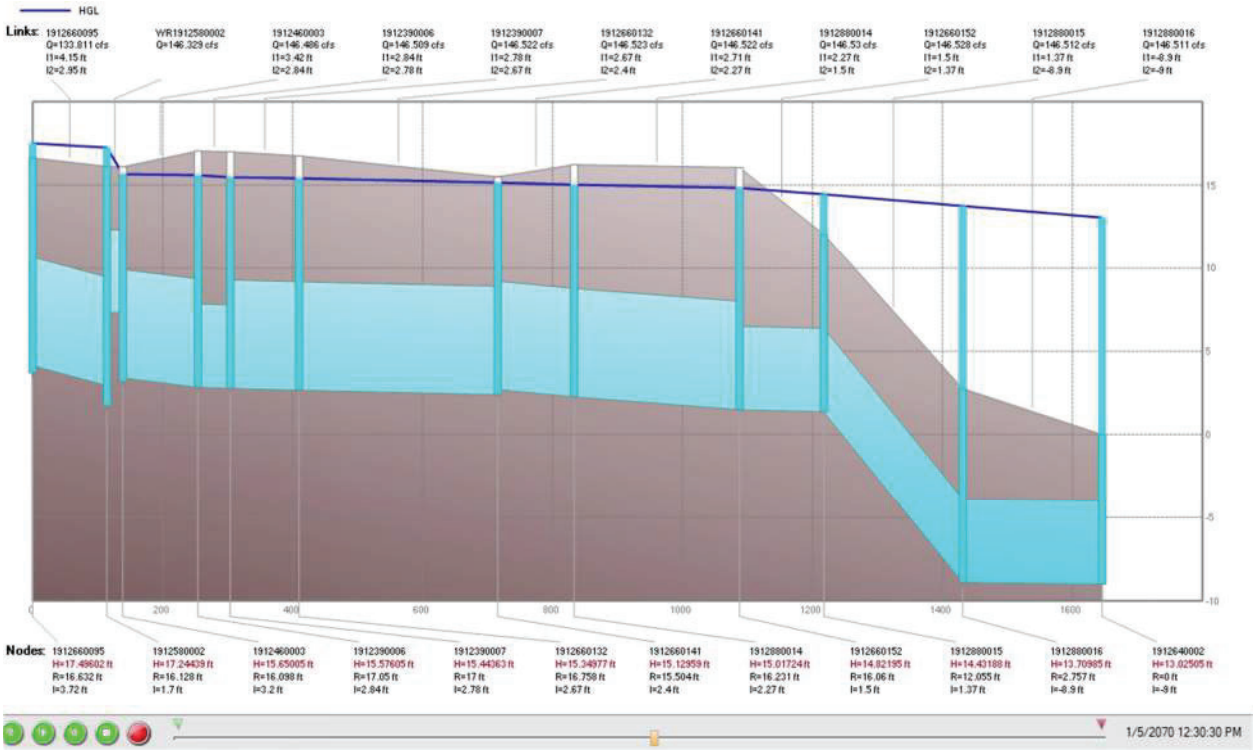


Kemp Street Overflow during peak runoff event near high tide at 12:30 PM

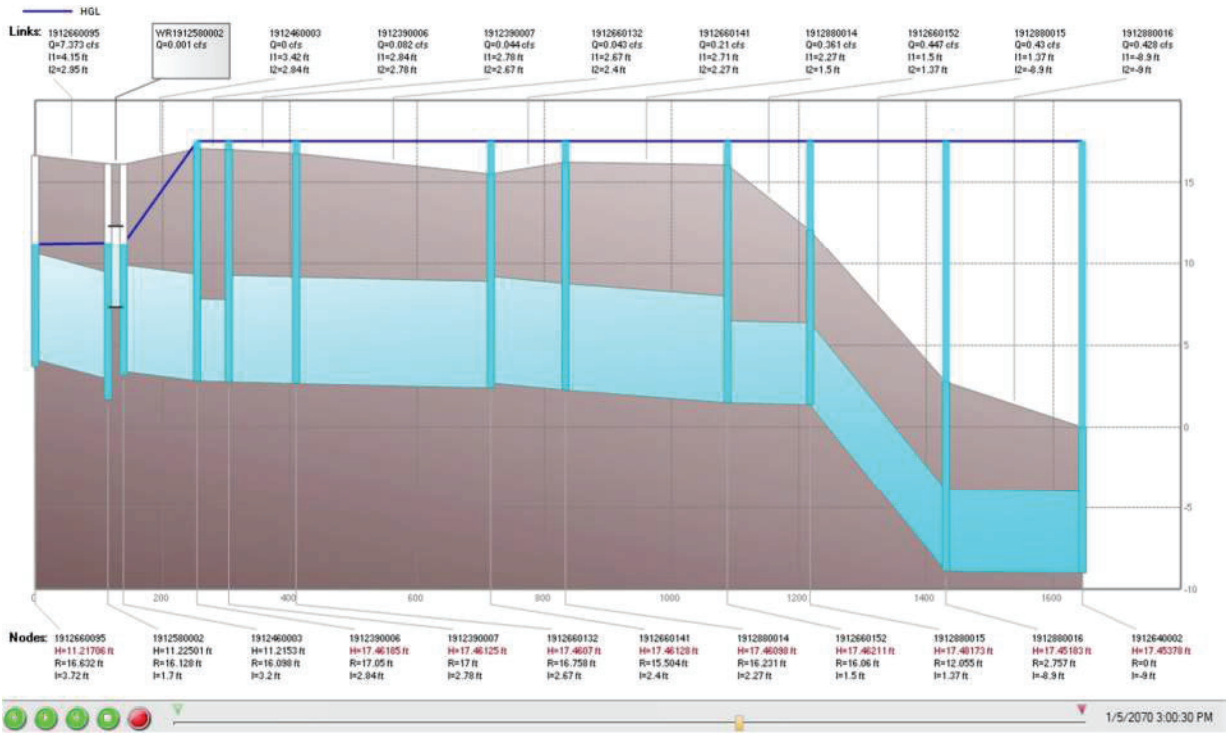


Projected 2070 10YR Storm with 2070 Normal Tides

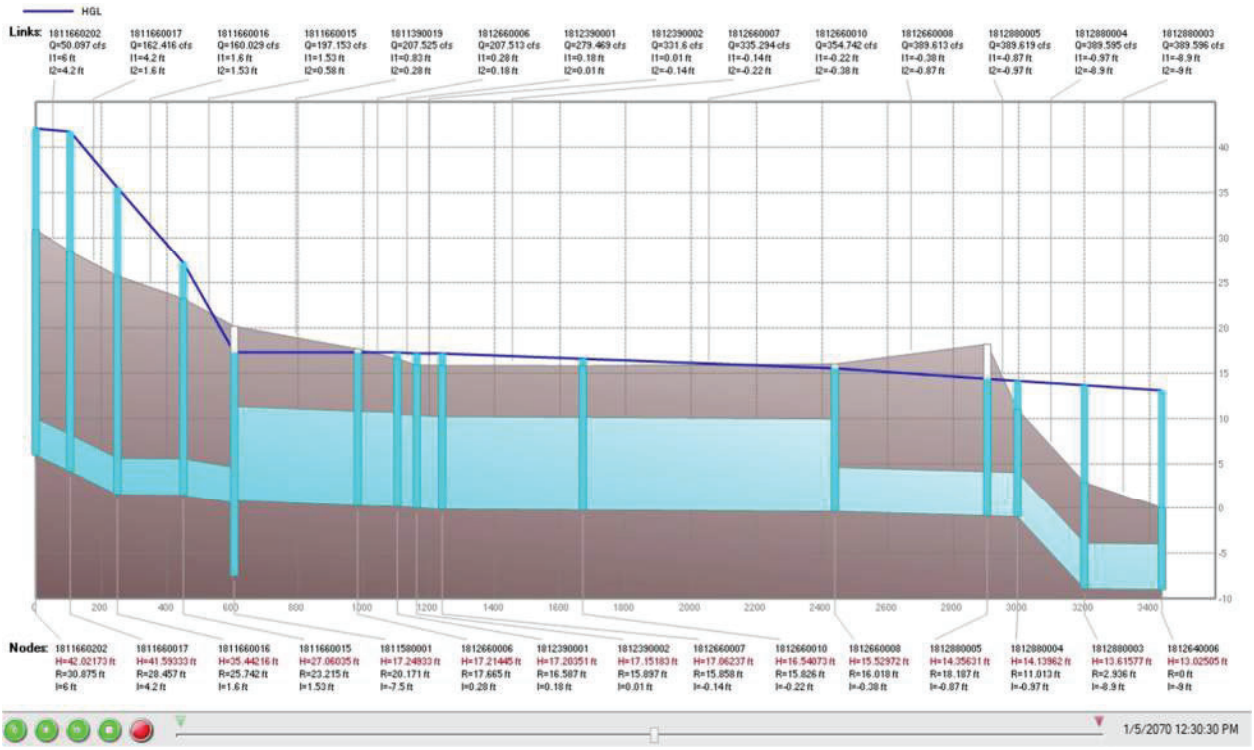
Vale Street Overflow during peak runoff event at 12:30 PM



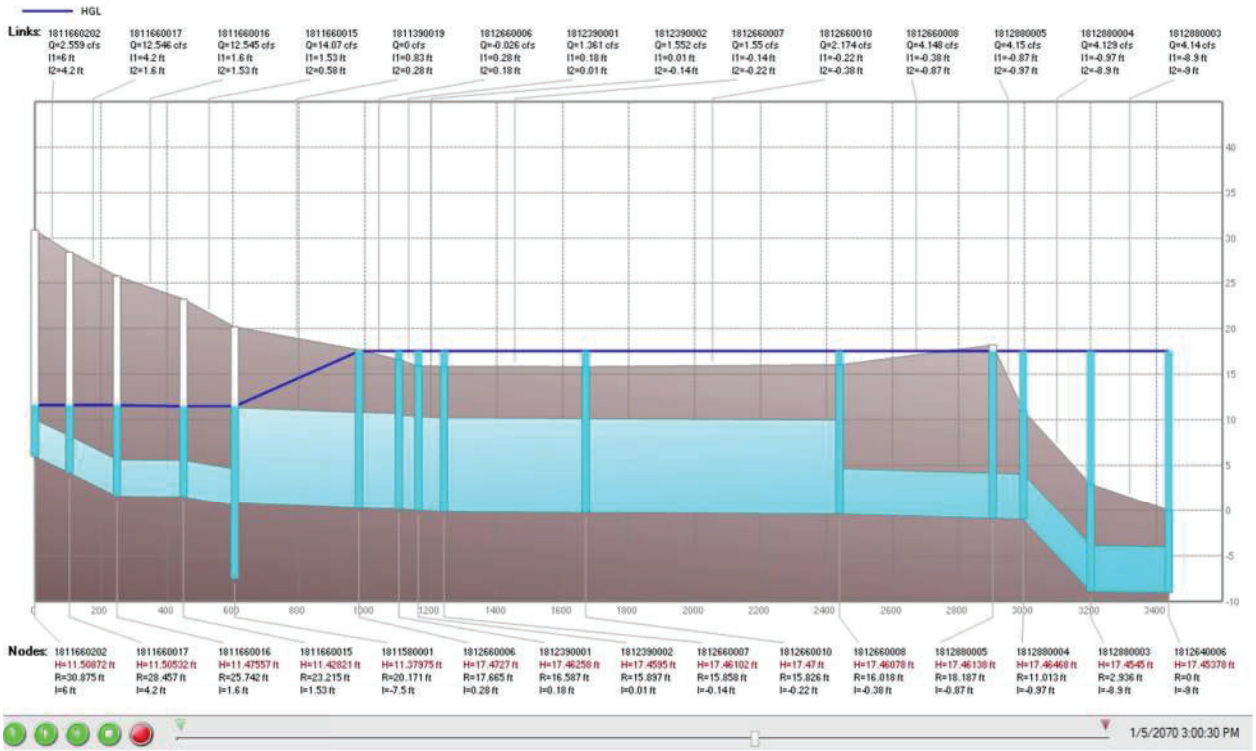
Vale Street Overflow during high tide at 3 PM



Kemp Street Overflow during peak runoff event at 12:30 PM

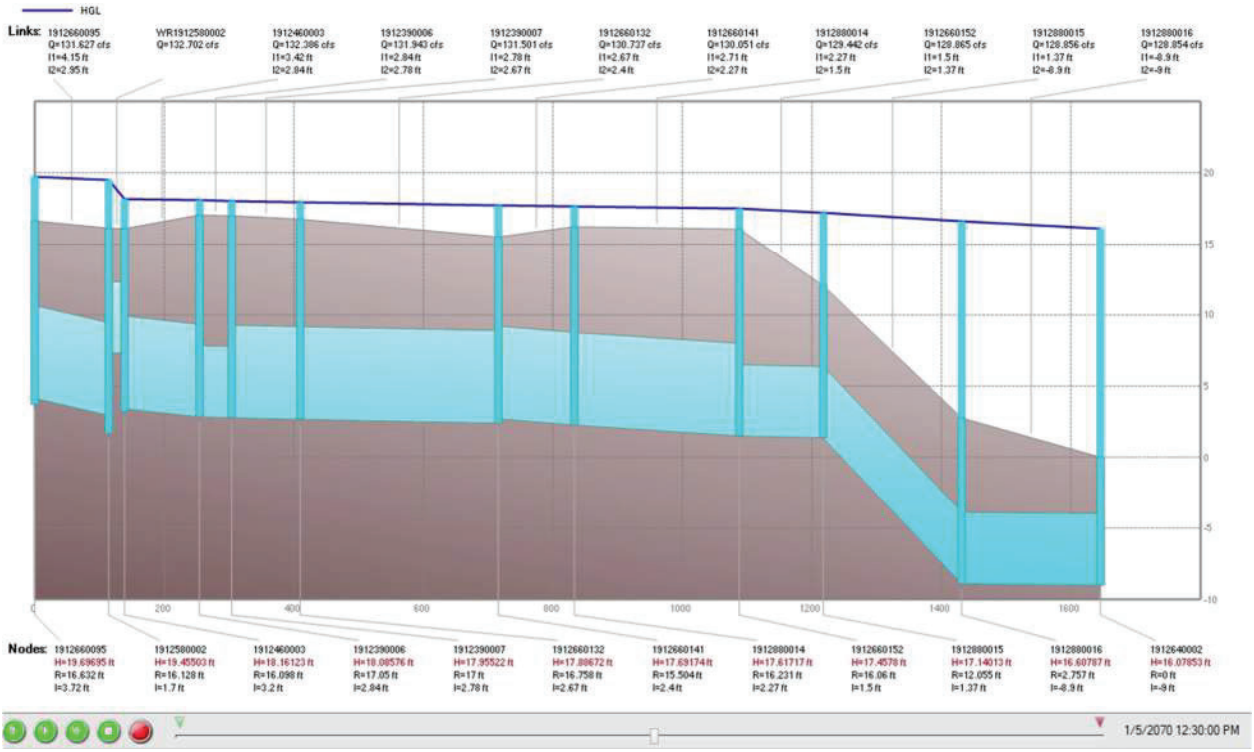


Kemp Street Overflow during high tide at 3 PM

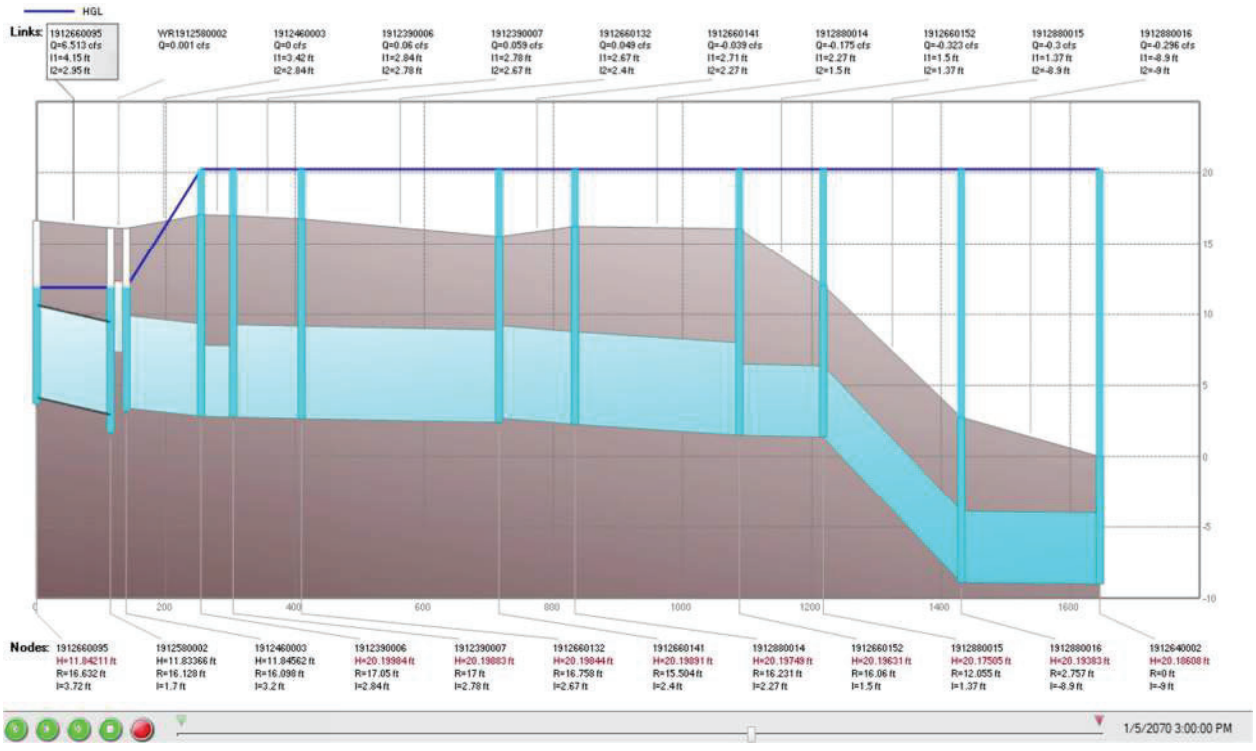


Projected 2070 10YR Storm with 2070 Nor'easter Storm Surge

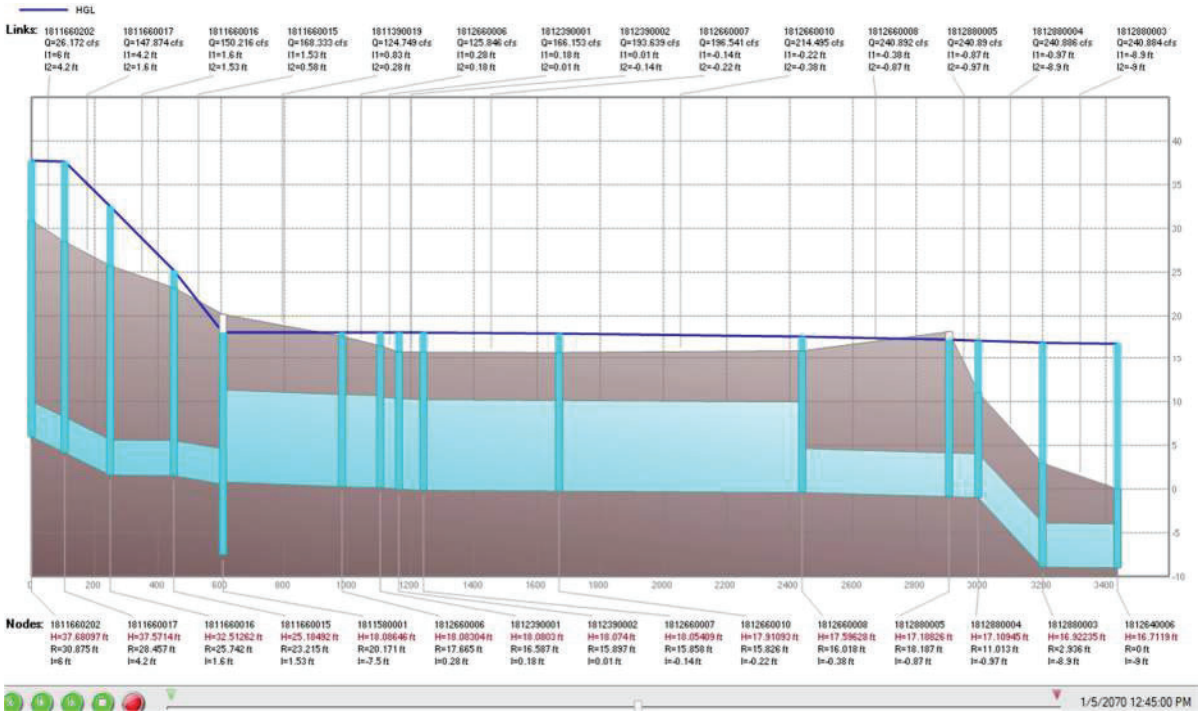
Vale Street Overflow during peak runoff event at 12:30 PM



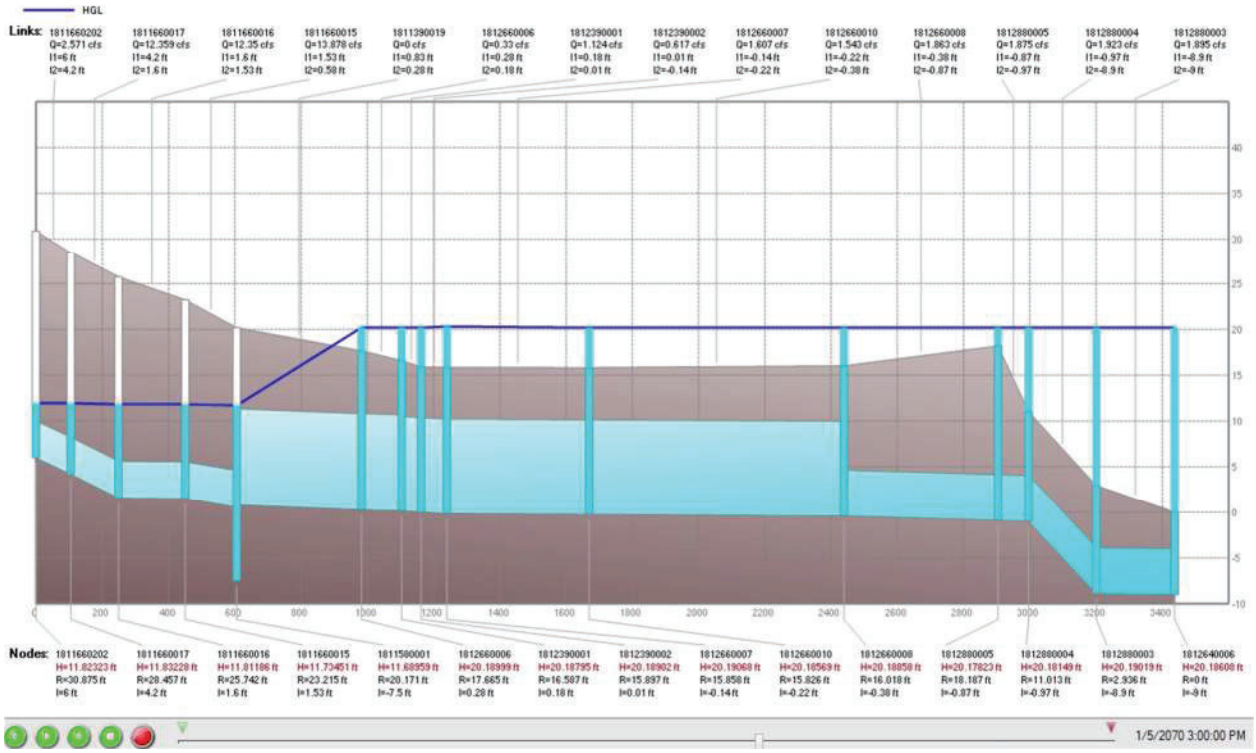
Vale Street Overflow during high tide at 3 PM



Kemp Street Overflow during peak runoff event at 12:45 PM

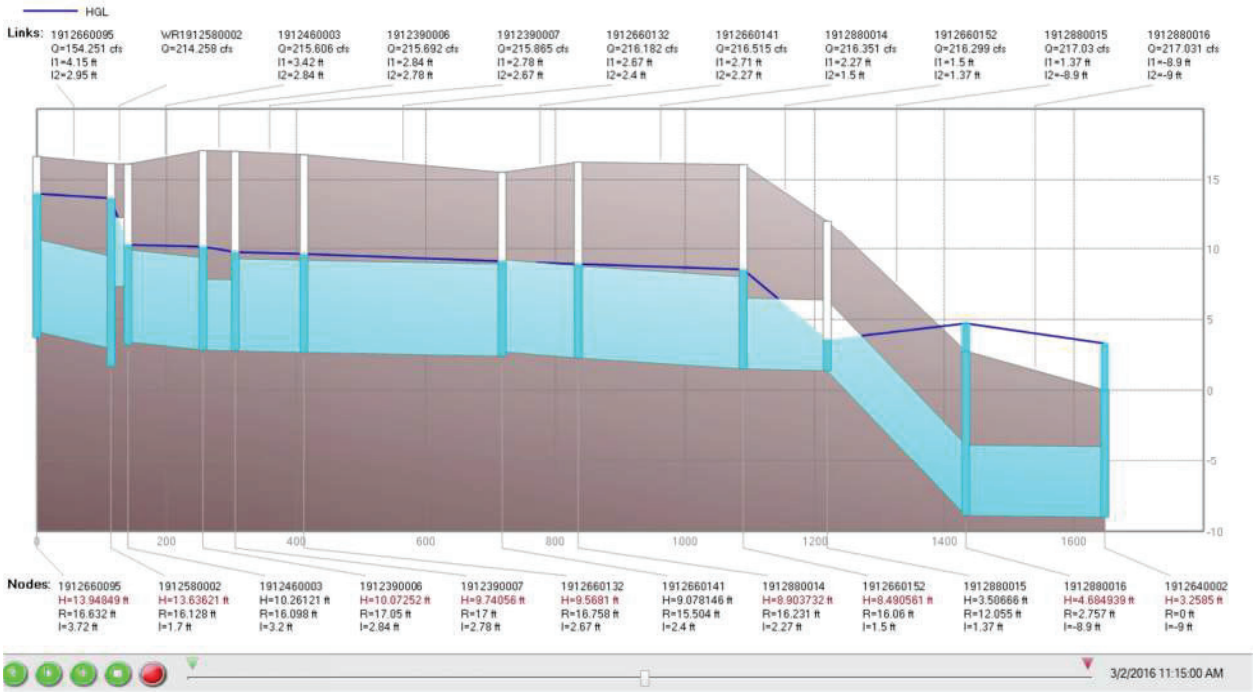


Kemp Street Overflow during high tide at 3 PM

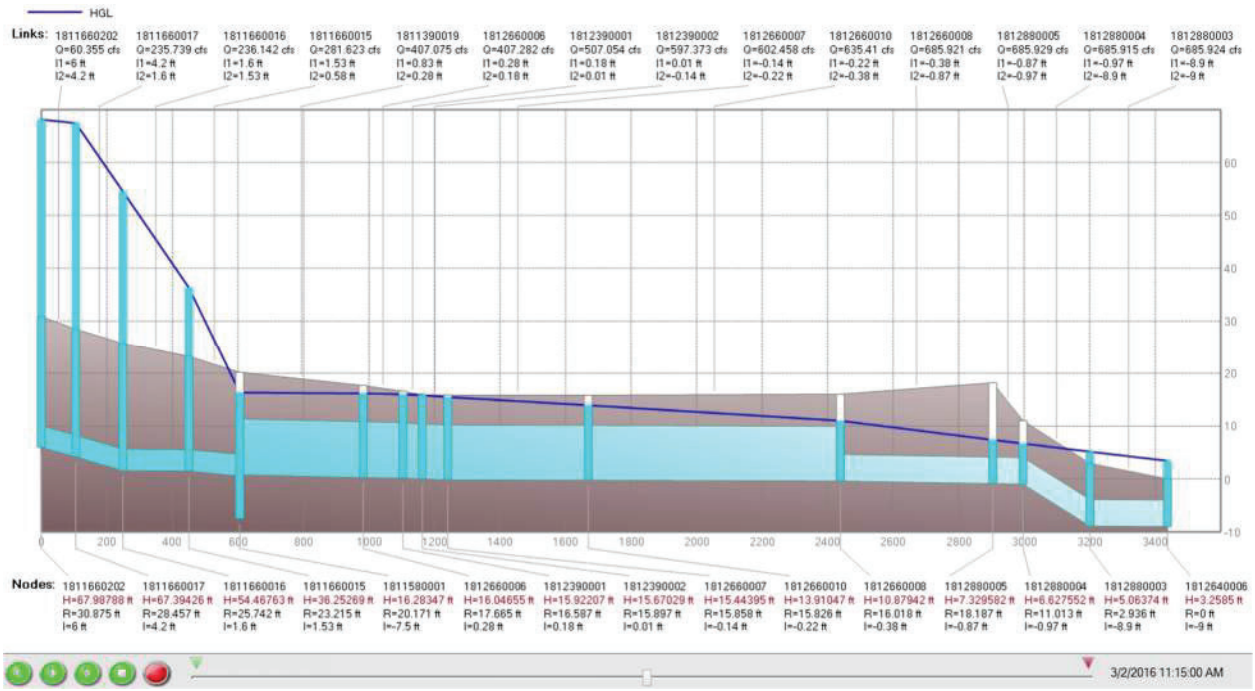


Bonus: Current 100YR Storm with Current Tides

Vale Street Overflow during peak runoff coinciding with low tide at 11:15 AM



Kemp Street Overflow during peak runoff coinciding with low tide at 11:15 AM



APPENDIX C: DATA SOURCES AND MODEL PARAMETERS

Moakley Park Concept Verification Phase - Task 1.1 Stormwater Memorandum
Appendix C - Data Sources and Model Parameters

Model Scenario	File Name	Model Description	Model Purpose	Tidal Input File	Precipitation Input File
Base Model	BWSC SC AND DC Combined Model	Combined sewer and drain file received from BWSC on 09/26/2019	Base Model received from BWSC to serve as baseline for project PCSWMM model	*Not Applicable*	
Calibration Model	BWSC SC and DC with MP Drainage	Base Model + Modified Subcatchments to include Moakley Park	Calibrate Base Model + MP Drainage using known storm event (March 2, 2018)	tidal_height_March_2_2018	March_2018_Callibration
BC Scenario 1	BWSC SC and DC with MP Drainage Current 10YR Storm	Base Model + Modified Subcatchments to include Moakley Park	Evaluate MP conditions in current 10-year precipitation event with normal tidal conditions	tidal_height_bcb	10yr_24yr_SCS
BC Scenario 2	BWSC SC and DC with MP Drainage Current 10YR Storm Grayson Tidal	Base Model + Modified Subcatchments to include Moakley Park	Evaluate MP conditions in current 10-year precipitation event with record tidal conditions during Grayson winter storm (January 4, 2018)	tidal_height_Grayson	10yr_24yr_SCS
BC Scenario 3	BWSC SC and DC with MP Drainage 2070 10 YR Normal Tides	Base Model + Modified Subcatchments to include Moakley Park	Evaluate MP conditions in 2070 10-year precipitation event with 2070 normal spring tidal conditions	tidal_height_2070_sprigntides	10yr_2070_Storm
BC Scenario 4	BWSC SC and DC with MP Drainage 2070 10 YR Storm and 100 YR Storm Surge	Base Model + Modified Subcatchments to include Moakley Park	Evaluate MP conditions in current 10-year precipitation event with normal tidal conditions	tidal_height_2070_Noreaster	10yr_2070_Storm

Moakley Park Concept Verification Phase - Task 1.1 Stormwater Memorandum
Appendix C - Data Sources and Model Parameters

Tidal Data Sources

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep	Notes
tidal_height_bcb	BWSC	BWSC	1/1/16 12:00 AM - 12/31/16 18:00	60 minutes	File used in PCSWMM model obtained from BWSC
tidal_height_March_2_2018	NOAA Tides and Currents	Nitsch	3/2/18 12:00 AM - 11:54 PM	6 minutes	
tidal_height_Grayson	NOAA Tides and Currents	Nitsch	1/4/18 1:30 AM - 1/5/18 1:30 AM	6 minutes	
tidal_height_2070_sprigntides	Woods Hole Group	Nitsch	1/1/70 12:00 AM - 1/14/70 11:54 PM	6 minutes	
tidal_height_2070_Noreaster	Woods Hole Group	Nitsch	1/1/70 12:00 - 1/8/70 21:00	60 minutes	

Precipitation Data Sources

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep	Notes
10yr_24yr_SCS	SCS Type III Distribution, PCSWMM Storm Generator	Nitsch	24 hours relative to simulation	15 minutes	SCS_24h_Type_III_5.15in design storm, total rainfall = 5.15 in, rain units = in/hr.
March_2018_Callibration	BWSC Dot-Talbot	Nitsch	3/2/18 12:00 AM - 11:55 PM	5 minutes	Rainfall on March 2, 2018
10yr_2070_Storm	Weston & Sampson	Nitsch	24 hours relative to simulation	60 minutes	Boston projected 2070 10 year storm rainfall

Precipitation Data for "10yr_24yr_SCS"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
10yr_24yr_SCS	PCSWMM Storm Generator	Nitsch	24 hours relative to simulation	15 minutes

Raw Data from: **PCSWMM Storm Generator**

Date (M/D/Y)	Time (H:M)	Value
	0:00	0.0515
	0:15	0.0515
	0:30	0.0515
	0:45	0.0515
	1:00	0.0515
	1:15	0.0515
	1:30	0.0515
	1:45	0.0515
	2:00	0.0592
	2:15	0.0592
	2:30	0.0592
	2:45	0.0592
	3:00	0.0592
	3:15	0.0592
	3:30	0.0592
	3:45	0.0592
	4:00	0.0747
	4:15	0.0747
	4:30	0.0747
	4:45	0.0747
	5:00	0.0747
	5:15	0.0747
	5:30	0.0747
	5:45	0.0747
	6:00	0.0876
	6:15	0.0876
	6:30	0.0876
	6:45	0.0876
	7:00	0.134
	7:15	0.134
	7:30	0.134
	7:45	0.134
	8:00	0.154
	8:15	0.154
	8:30	0.185
	8:45	0.185
	9:00	0.196
	9:15	0.196
	9:30	0.227
	9:45	0.227
	10:00	0.278
	10:15	0.278
	10:30	0.35
	10:45	0.35
	11:00	0.494
	11:15	0.494
	11:30	0.845
	11:45	3.317
	12:00	2.081

	12:15	2.081
	12:30	0.505
	12:45	0.505
	13:00	0.35
	13:15	0.35
	13:30	0.268
	13:45	0.268
	14:00	0.193
	14:15	0.193
	14:30	0.193
	14:45	0.193
	15:00	0.193
	15:15	0.193
	15:30	0.193
	15:45	0.193
	16:00	0.0914
	16:15	0.0914
	16:30	0.0914
	16:45	0.0914
	17:00	0.0914
	17:15	0.0914
	17:30	0.0914
	17:45	0.0914
	18:00	0.0914
	18:15	0.0914
	18:30	0.0914
	18:45	0.0914
	19:00	0.0914
	19:15	0.0914
	19:30	0.0914
	19:45	0.0914
	20:00	0.0554
	20:15	0.0554
	20:30	0.0554
	20:45	0.0554
	21:00	0.0554
	21:15	0.0554
	21:30	0.0554
	21:45	0.0554
	22:00	0.0554
	22:15	0.0554
	22:30	0.0554
	22:45	0.0554
	23:00	0.0554
	23:15	0.0554
	23:30	0.0554
	23:45	0.0554
	24:00:00	0

Name:

10yr_24hr_SCS

Description:

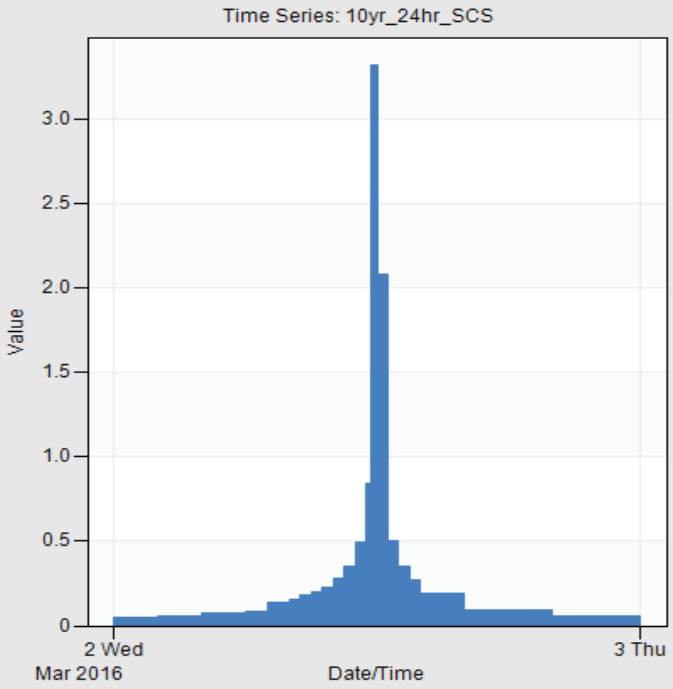
SCS_24h_Type_III_5.15in design storm, total rainfall = 5.15 in, rain units = in/hr.

Use external data file named below

Enter time series data in the table below

If no dates, times are relative to start of simulation.

Date (M/D/Y)	Time (H:M)	Value
	0:00	0.0515
	0:15	0.0515
	0:30	0.0515
	0:45	0.0515
	1:00	0.0515
	1:15	0.0515
	1:30	0.0515
	1:45	0.0515
	2:00	0.0592
	2:15	0.0592



Precipitation Information for "March_2018_Callibration"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
March_2018_Callibration	BWSC Dot-Talbot	Nitsch	3/2/18 12:00 AM - 11:55 PM	5 minutes

Raw Data from: **BWSC Dot-Talbot**
Retrieved from: https://www.bwsc.org/environment-education/rainfall-garden
Retrieved on: 10/9/2019
Nitsch file location: Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Rainfall Files

Station BWSC Dot-Talbot
Event 2-Mar-18
Total Storm Depth 2.61

PCSWMM Data:

Date	Time	Depth (in.)	Depth Cumulative (in.)
3/2/2018	12:00:00 AM	0	0
3/2/2018	12:05:00 AM	0	0
3/2/2018	12:10:00 AM	0	0
3/2/2018	12:15:00 AM	0	0
3/2/2018	12:20:00 AM	0	0
3/2/2018	12:25:00 AM	0	0
3/2/2018	12:30:00 AM	0	0
3/2/2018	12:35:00 AM	0	0
3/2/2018	12:40:00 AM	0	0
3/2/2018	12:45:00 AM	0	0
3/2/2018	12:50:00 AM	0	0
3/2/2018	12:55:00 AM	0	0
3/2/2018	1:00:00 AM	0	0
3/2/2018	1:05:00 AM	0	0
3/2/2018	1:10:00 AM	0	0
3/2/2018	1:15:00 AM	0	0
3/2/2018	1:20:00 AM	0	0
3/2/2018	1:25:00 AM	0.01	0.01
3/2/2018	1:30:00 AM	0.01	0.02
3/2/2018	1:35:00 AM	0	0.02
3/2/2018	1:40:00 AM	0.01	0.03
3/2/2018	1:45:00 AM	0.01	0.04
3/2/2018	1:50:00 AM	0.01	0.05
3/2/2018	1:55:00 AM	0.01	0.06
3/2/2018	2:00:00 AM	0.01	0.07
3/2/2018	2:05:00 AM	0	0.07
3/2/2018	2:10:00 AM	0	0.07
3/2/2018	2:15:00 AM	0.01	0.08
3/2/2018	2:20:00 AM	0	0.08
3/2/2018	2:25:00 AM	0	0.08
3/2/2018	2:30:00 AM	0	0.08
3/2/2018	2:35:00 AM	0.01	0.09
3/2/2018	2:40:00 AM	0	0.09
3/2/2018	2:45:00 AM	0	0.09
3/2/2018	2:50:00 AM	0	0.09
3/2/2018	2:55:00 AM	0	0.09
3/2/2018	3:00:00 AM	0	0.09
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3/2/2018	3:10:00 AM	0	0.09
3/2/2018	3:15:00 AM	0	0.09
3/2/2018	3:20:00 AM	0.01	0.1
3/2/2018	3:25:00 AM	0	0.1
3/2/2018	3:30:00 AM	0	0.1
3/2/2018	3:35:00 AM	0	0.1
3/2/2018	3:40:00 AM	0	0.1
3/2/2018	3:45:00 AM	0.01	0.11
3/2/2018	3:50:00 AM	0	0.11
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3/2/2018	4:15:00 AM	0.01	0.13
3/2/2018	4:20:00 AM	0	0.13
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3/2/2018	4:30:00 AM	0.01	0.14
3/2/2018	4:35:00 AM	0	0.14
3/2/2018	4:40:00 AM	0.01	0.15
3/2/2018	4:45:00 AM	0	0.15

Date (M/D/Y)	Time (H:M)	Value
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3/2/2018	0:05:00	0
3/2/2018	0:10:00	0
3/2/2018	0:15:00	0
3/2/2018	0:20:00	0
3/2/2018	0:25:00	0
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3/2/2018	0:35:00	0
3/2/2018	0:40:00	0
3/2/2018	0:45:00	0
3/2/2018	0:50:00	0
3/2/2018	0:55:00	0
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3/2/2018	1:30:00	0.02
3/2/2018	1:35:00	0.02
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3/2/2018	2:45:00	0.09
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3/2/2018	4:00:00	0.11
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3/2/2018	4:25:00	0.13
3/2/2018	4:30:00	0.14
3/2/2018	4:35:00	0.14
3/2/2018	4:40:00	0.15
3/2/2018	4:45:00	0.15

3/2/2018	4:50:00 AM	0.01	0.16
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3/2/2018	6:35:00 AM	0.02	0.3
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3/2/2018	6:50:00 AM	0.01	0.34
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3/2/2018	7:10:00 AM	0	0.36
3/2/2018	7:15:00 AM	0.01	0.37
3/2/2018	7:20:00 AM	0.01	0.38
3/2/2018	7:25:00 AM	0	0.38
3/2/2018	7:30:00 AM	0.01	0.39
3/2/2018	7:35:00 AM	0	0.39
3/2/2018	7:40:00 AM	0.01	0.4
3/2/2018	7:45:00 AM	0.01	0.41
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3/2/2018	7:55:00 AM	0.01	0.43
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3/2/2018	8:35:00 AM	0.01	0.58
3/2/2018	8:40:00 AM	0.01	0.59
3/2/2018	8:45:00 AM	0.01	0.6
3/2/2018	8:50:00 AM	0.01	0.61
3/2/2018	8:55:00 AM	0.01	0.62
3/2/2018	9:00:00 AM	0.01	0.63
3/2/2018	9:05:00 AM	0.01	0.64
3/2/2018	9:10:00 AM	0.03	0.67
3/2/2018	9:15:00 AM	0.02	0.69
3/2/2018	9:20:00 AM	0.02	0.71
3/2/2018	9:25:00 AM	0.01	0.72
3/2/2018	9:30:00 AM	0.02	0.74
3/2/2018	9:35:00 AM	0.01	0.75
3/2/2018	9:40:00 AM	0.02	0.77
3/2/2018	9:45:00 AM	0.02	0.79
3/2/2018	9:50:00 AM	0.02	0.81
3/2/2018	9:55:00 AM	0.02	0.83
3/2/2018	10:00:00 AM	0.02	0.85
3/2/2018	10:05:00 AM	0.03	0.88
3/2/2018	10:10:00 AM	0.02	0.9
3/2/2018	10:15:00 AM	0.02	0.92
3/2/2018	10:20:00 AM	0.02	0.94
3/2/2018	10:25:00 AM	0.03	0.97
3/2/2018	10:30:00 AM	0.03	1
3/2/2018	10:35:00 AM	0.02	1.02
3/2/2018	10:40:00 AM	0.01	1.03
3/2/2018	10:45:00 AM	0.02	1.05
3/2/2018	10:50:00 AM	0.03	1.08
3/2/2018	10:55:00 AM	0.03	1.11
3/2/2018	11:00:00 AM	0.01	1.12
3/2/2018	11:05:00 AM	0.02	1.14

3/2/2018	4:50:00	0.16
3/2/2018	4:55:00	0.17
3/2/2018	5:00:00	0.17
3/2/2018	5:05:00	0.17
3/2/2018	5:10:00	0.18
3/2/2018	5:15:00	0.18
3/2/2018	5:20:00	0.18
3/2/2018	5:25:00	0.18
3/2/2018	5:30:00	0.18
3/2/2018	5:35:00	0.18
3/2/2018	5:40:00	0.18
3/2/2018	5:45:00	0.19
3/2/2018	5:50:00	0.19
3/2/2018	5:55:00	0.2
3/2/2018	6:00:00	0.21
3/2/2018	6:05:00	0.21
3/2/2018	6:10:00	0.22
3/2/2018	6:15:00	0.23
3/2/2018	6:20:00	0.25
3/2/2018	6:25:00	0.27
3/2/2018	6:30:00	0.28
3/2/2018	6:35:00	0.3
3/2/2018	6:40:00	0.31
3/2/2018	6:45:00	0.33
3/2/2018	6:50:00	0.34
3/2/2018	6:55:00	0.35
3/2/2018	7:00:00	0.35
3/2/2018	7:05:00	0.36
3/2/2018	7:10:00	0.36
3/2/2018	7:15:00	0.37
3/2/2018	7:20:00	0.38
3/2/2018	7:25:00	0.38
3/2/2018	7:30:00	0.39
3/2/2018	7:35:00	0.39
3/2/2018	7:40:00	0.4
3/2/2018	7:45:00	0.41
3/2/2018	7:50:00	0.42
3/2/2018	7:55:00	0.43
3/2/2018	8:00:00	0.46
3/2/2018	8:05:00	0.48
3/2/2018	8:10:00	0.5
3/2/2018	8:15:00	0.52
3/2/2018	8:20:00	0.54
3/2/2018	8:25:00	0.55
3/2/2018	8:30:00	0.57
3/2/2018	8:35:00	0.58
3/2/2018	8:40:00	0.59
3/2/2018	8:45:00	0.6
3/2/2018	8:50:00	0.61
3/2/2018	8:55:00	0.62
3/2/2018	9:00:00	0.63
3/2/2018	9:05:00	0.64
3/2/2018	9:10:00	0.67
3/2/2018	9:15:00	0.69
3/2/2018	9:20:00	0.71
3/2/2018	9:25:00	0.72
3/2/2018	9:30:00	0.74
3/2/2018	9:35:00	0.75
3/2/2018	9:40:00	0.77
3/2/2018	9:45:00	0.79
3/2/2018	9:50:00	0.81
3/2/2018	9:55:00	0.83
3/2/2018	10:00:00	0.85
3/2/2018	10:05:00	0.88
3/2/2018	10:10:00	0.9
3/2/2018	10:15:00	0.92
3/2/2018	10:20:00	0.94
3/2/2018	10:25:00	0.97
3/2/2018	10:30:00	1
3/2/2018	10:35:00	1.02
3/2/2018	10:40:00	1.03
3/2/2018	10:45:00	1.05
3/2/2018	10:50:00	1.08
3/2/2018	10:55:00	1.11
3/2/2018	11:00:00	1.12
3/2/2018	11:05:00	1.14

3/2/2018	11:10:00 AM	0.01	1.15
3/2/2018	11:15:00 AM	0.02	1.17
3/2/2018	11:20:00 AM	0.02	1.19
3/2/2018	11:25:00 AM	0.02	1.21
3/2/2018	11:30:00 AM	0.02	1.23
3/2/2018	11:35:00 AM	0.02	1.25
3/2/2018	11:40:00 AM	0.02	1.27
3/2/2018	11:45:00 AM	0.02	1.29
3/2/2018	11:50:00 AM	0.02	1.31
3/2/2018	11:55:00 AM	0.02	1.33
3/2/2018	12:00:00 PM	0.02	1.35
3/2/2018	12:05:00 PM	0.01	1.36
3/2/2018	12:10:00 PM	0.02	1.38
3/2/2018	12:15:00 PM	0.02	1.4
3/2/2018	12:20:00 PM	0.02	1.42
3/2/2018	12:25:00 PM	0.02	1.44
3/2/2018	12:30:00 PM	0.02	1.46
3/2/2018	12:35:00 PM	0.02	1.48
3/2/2018	12:40:00 PM	0.02	1.5
3/2/2018	12:45:00 PM	0.02	1.52
3/2/2018	12:50:00 PM	0.02	1.54
3/2/2018	12:55:00 PM	0.01	1.55
3/2/2018	1:00:00 PM	0.02	1.57
3/2/2018	1:05:00 PM	0.01	1.58
3/2/2018	1:10:00 PM	0.02	1.6
3/2/2018	1:15:00 PM	0.02	1.62
3/2/2018	1:20:00 PM	0.01	1.63
3/2/2018	1:25:00 PM	0.02	1.65
3/2/2018	1:30:00 PM	0.01	1.66
3/2/2018	1:35:00 PM	0.01	1.67
3/2/2018	1:40:00 PM	0.02	1.69
3/2/2018	1:45:00 PM	0.01	1.7
3/2/2018	1:50:00 PM	0.02	1.72
3/2/2018	1:55:00 PM	0.02	1.74
3/2/2018	2:00:00 PM	0.02	1.76
3/2/2018	2:05:00 PM	0.01	1.77
3/2/2018	2:10:00 PM	0.01	1.78
3/2/2018	2:15:00 PM	0.01	1.79
3/2/2018	2:20:00 PM	0.02	1.81
3/2/2018	2:25:00 PM	0.01	1.82
3/2/2018	2:30:00 PM	0.01	1.83
3/2/2018	2:35:00 PM	0.02	1.85
3/2/2018	2:40:00 PM	0.01	1.86
3/2/2018	2:45:00 PM	0.02	1.88
3/2/2018	2:50:00 PM	0.01	1.89
3/2/2018	2:55:00 PM	0.02	1.91
3/2/2018	3:00:00 PM	0	1.91
3/2/2018	3:05:00 PM	0.02	1.93
3/2/2018	3:10:00 PM	0.01	1.94
3/2/2018	3:15:00 PM	0.01	1.95
3/2/2018	3:20:00 PM	0.01	1.96
3/2/2018	3:25:00 PM	0.02	1.98
3/2/2018	3:30:00 PM	0.01	1.99
3/2/2018	3:35:00 PM	0.02	2.01
3/2/2018	3:40:00 PM	0.01	2.02
3/2/2018	3:45:00 PM	0.02	2.04
3/2/2018	3:50:00 PM	0.01	2.05
3/2/2018	3:55:00 PM	0.02	2.07
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3/2/2018	4:05:00 PM	0.01	2.09
3/2/2018	4:10:00 PM	0.01	2.1
3/2/2018	4:15:00 PM	0.01	2.11
3/2/2018	4:20:00 PM	0.01	2.12
3/2/2018	4:25:00 PM	0.01	2.13
3/2/2018	4:30:00 PM	0.01	2.14
3/2/2018	4:35:00 PM	0.01	2.15
3/2/2018	4:40:00 PM	0	2.15
3/2/2018	4:45:00 PM	0.01	2.16
3/2/2018	4:50:00 PM	0.01	2.17
3/2/2018	4:55:00 PM	0	2.17
3/2/2018	5:00:00 PM	0.01	2.18
3/2/2018	5:05:00 PM	0	2.18
3/2/2018	5:10:00 PM	0.01	2.19
3/2/2018	5:15:00 PM	0	2.19
3/2/2018	5:20:00 PM	0.01	2.2
3/2/2018	5:25:00 PM	0	2.2

3/2/2018	11:10:00	1.15
3/2/2018	11:15:00	1.17
3/2/2018	11:20:00	1.19
3/2/2018	11:25:00	1.21
3/2/2018	11:30:00	1.23
3/2/2018	11:35:00	1.25
3/2/2018	11:40:00	1.27
3/2/2018	11:45:00	1.29
3/2/2018	11:50:00	1.31
3/2/2018	11:55:00	1.33
3/2/2018	12:00:00	1.35
3/2/2018	12:05:00	1.36
3/2/2018	12:10:00	1.38
3/2/2018	12:15:00	1.4
3/2/2018	12:20:00	1.42
3/2/2018	12:25:00	1.44
3/2/2018	12:30:00	1.46
3/2/2018	12:35:00	1.48
3/2/2018	12:40:00	1.5
3/2/2018	12:45:00	1.52
3/2/2018	12:50:00	1.54
3/2/2018	12:55:00	1.55
3/2/2018	13:00:00	1.57
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3/2/2018	13:10:00	1.6
3/2/2018	13:15:00	1.62
3/2/2018	13:20:00	1.63
3/2/2018	13:25:00	1.65
3/2/2018	13:30:00	1.66
3/2/2018	13:35:00	1.67
3/2/2018	13:40:00	1.69
3/2/2018	13:45:00	1.7
3/2/2018	13:50:00	1.72
3/2/2018	13:55:00	1.74
3/2/2018	14:00:00	1.76
3/2/2018	14:05:00	1.77
3/2/2018	14:10:00	1.78
3/2/2018	14:15:00	1.79
3/2/2018	14:20:00	1.81
3/2/2018	14:25:00	1.82
3/2/2018	14:30:00	1.83
3/2/2018	14:35:00	1.85
3/2/2018	14:40:00	1.86
3/2/2018	14:45:00	1.88
3/2/2018	14:50:00	1.89
3/2/2018	14:55:00	1.91
3/2/2018	15:00:00	1.91
3/2/2018	15:05:00	1.93
3/2/2018	15:10:00	1.94
3/2/2018	15:15:00	1.95
3/2/2018	15:20:00	1.96
3/2/2018	15:25:00	1.98
3/2/2018	15:30:00	1.99
3/2/2018	15:35:00	2.01
3/2/2018	15:40:00	2.02
3/2/2018	15:45:00	2.04
3/2/2018	15:50:00	2.05
3/2/2018	15:55:00	2.07
3/2/2018	16:00:00	2.08
3/2/2018	16:05:00	2.09
3/2/2018	16:10:00	2.1
3/2/2018	16:15:00	2.11
3/2/2018	16:20:00	2.12
3/2/2018	16:25:00	2.13
3/2/2018	16:30:00	2.14
3/2/2018	16:35:00	2.15
3/2/2018	16:40:00	2.15
3/2/2018	16:45:00	2.16
3/2/2018	16:50:00	2.17
3/2/2018	16:55:00	2.17
3/2/2018	17:00:00	2.18
3/2/2018	17:05:00	2.18
3/2/2018	17:10:00	2.19
3/2/2018	17:15:00	2.19
3/2/2018	17:20:00	2.2
3/2/2018	17:25:00	2.2

3/2/2018	5:30:00 PM	0.01	2.21
3/2/2018	5:35:00 PM	0	2.21
3/2/2018	5:40:00 PM	0.01	2.22
3/2/2018	5:45:00 PM	0	2.22
3/2/2018	5:50:00 PM	0.01	2.23
3/2/2018	5:55:00 PM	0	2.23
3/2/2018	6:00:00 PM	0.01	2.24
3/2/2018	6:05:00 PM	0.01	2.25
3/2/2018	6:10:00 PM	0.01	2.26
3/2/2018	6:15:00 PM	0.01	2.27
3/2/2018	6:20:00 PM	0	2.27
3/2/2018	6:25:00 PM	0.01	2.28
3/2/2018	6:30:00 PM	0	2.28
3/2/2018	6:35:00 PM	0	2.28
3/2/2018	6:40:00 PM	0.01	2.29
3/2/2018	6:45:00 PM	0	2.29
3/2/2018	6:50:00 PM	0	2.29
3/2/2018	6:55:00 PM	0	2.29
3/2/2018	7:00:00 PM	0.01	2.3
3/2/2018	7:05:00 PM	0	2.3
3/2/2018	7:10:00 PM	0.01	2.31
3/2/2018	7:15:00 PM	0	2.31
3/2/2018	7:20:00 PM	0.01	2.32
3/2/2018	7:25:00 PM	0	2.32
3/2/2018	7:30:00 PM	0.01	2.33
3/2/2018	7:35:00 PM	0.01	2.34
3/2/2018	7:40:00 PM	0.01	2.35
3/2/2018	7:45:00 PM	0.01	2.36
3/2/2018	7:50:00 PM	0.01	2.37
3/2/2018	7:55:00 PM	0.01	2.38
3/2/2018	8:00:00 PM	0.01	2.39
3/2/2018	8:05:00 PM	0.01	2.4
3/2/2018	8:10:00 PM	0.01	2.41
3/2/2018	8:15:00 PM	0.01	2.42
3/2/2018	8:20:00 PM	0.01	2.43
3/2/2018	8:25:00 PM	0	2.43
3/2/2018	8:30:00 PM	0.01	2.44
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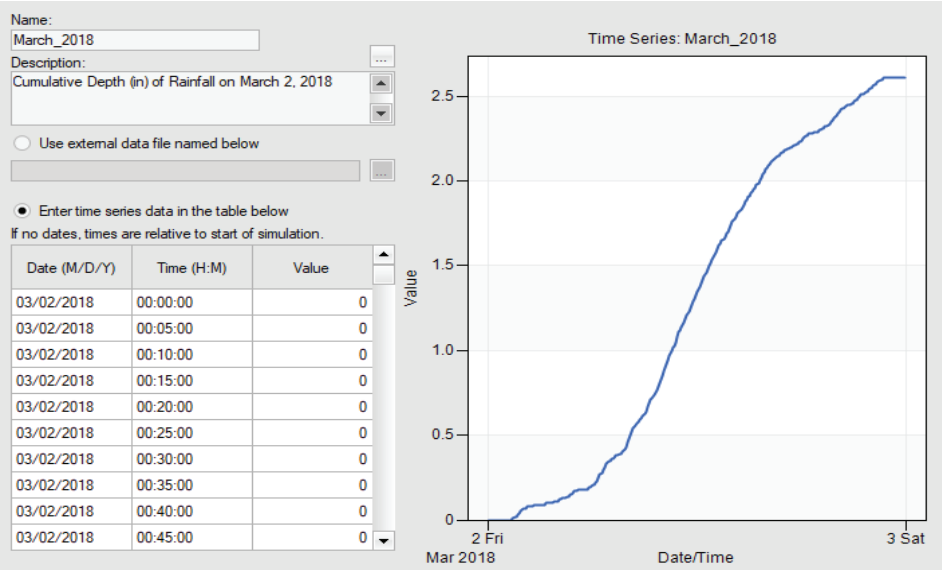
3/2/2018	8:40:00 PM	0	2.45
3/2/2018	8:45:00 PM	0	2.45
3/2/2018	8:50:00 PM	0.01	2.46
3/2/2018	8:55:00 PM	0	2.46
3/2/2018	9:00:00 PM	0.01	2.47
3/2/2018	9:05:00 PM	0.01	2.48
3/2/2018	9:10:00 PM	0	2.48
3/2/2018	9:15:00 PM	0.01	2.49
3/2/2018	9:20:00 PM	0.01	2.5
3/2/2018	9:25:00 PM	0.01	2.51
3/2/2018	9:30:00 PM	0	2.51
3/2/2018	9:35:00 PM	0.01	2.52
3/2/2018	9:40:00 PM	0.01	2.53
3/2/2018	9:45:00 PM	0	2.53
3/2/2018	9:50:00 PM	0.01	2.54
3/2/2018	9:55:00 PM	0.01	2.55
3/2/2018	10:00:00 PM	0	2.55
3/2/2018	10:05:00 PM	0.01	2.56
3/2/2018	10:10:00 PM	0.01	2.57
3/2/2018	10:15:00 PM	0	2.57
3/2/2018	10:20:00 PM	0.01	2.58
3/2/2018	10:25:00 PM	0.01	2.59
3/2/2018	10:30:00 PM	0.01	2.6
3/2/2018	10:35:00 PM	0	2.6
3/2/2018	10:40:00 PM	0.01	2.61
3/2/2018	10:45:00 PM	0	2.61
3/2/2018	10:50:00 PM	0	2.61
3/2/2018	10:55:00 PM	0	2.61
3/2/2018	11:00:00 PM	0	2.61
3/2/2018	11:05:00 PM	0	2.61
3/2/2018	11:10:00 PM	0	2.61
3/2/2018	11:15:00 PM	0	2.61
3/2/2018	11:20:00 PM	0	2.61
3/2/2018	11:25:00 PM	0	2.61
3/2/2018	11:30:00 PM	0	2.61
3/2/2018	11:35:00 PM	0	2.61
3/2/2018	11:40:00 PM	0	2.61
3/2/2018	11:45:00 PM	0	2.61

3/2/2018	17:30:00	2.21
3/2/2018	17:35:00	2.21
3/2/2018	17:40:00	2.22
3/2/2018	17:45:00	2.22
3/2/2018	17:50:00	2.23
3/2/2018	17:55:00	2.23
3/2/2018	18:00:00	2.24
3/2/2018	18:05:00	2.25
3/2/2018	18:10:00	2.26
3/2/2018	18:15:00	2.27
3/2/2018	18:20:00	2.27
3/2/2018	18:25:00	2.28
3/2/2018	18:30:00	2.28
3/2/2018	18:35:00	2.28
3/2/2018	18:40:00	2.29
3/2/2018	18:45:00	2.29
3/2/2018	18:50:00	2.29
3/2/2018	18:55:00	2.29
3/2/2018	19:00:00	2.3
3/2/2018	19:05:00	2.3
3/2/2018	19:10:00	2.31
3/2/2018	19:15:00	2.31
3/2/2018	19:20:00	2.32
3/2/2018	19:25:00	2.32
3/2/2018	19:30:00	2.33
3/2/2018	19:35:00	2.34
3/2/2018	19:40:00	2.35
3/2/2018	19:45:00	2.36
3/2/2018	19:50:00	2.37
3/2/2018	19:55:00	2.38
3/2/2018	20:00:00	2.39
3/2/2018	20:05:00	2.4
3/2/2018	20:10:00	2.41
3/2/2018	20:15:00	2.42
3/2/2018	20:20:00	2.43
3/2/2018	20:25:00	2.43
3/2/2018	20:30:00	2.44
3/2/2018	20:35:00	2.45
3/2/2018	20:40:00	2.45
3/2/2018	20:45:00	2.45
3/2/2018	20:50:00	2.46
3/2/2018	20:55:00	2.46
3/2/2018	21:00:00	2.47
3/2/2018	21:05:00	2.48
3/2/2018	21:10:00	2.48
3/2/2018	21:15:00	2.49
3/2/2018	21:20:00	2.5
3/2/2018	21:25:00	2.51
3/2/2018	21:30:00	2.51
3/2/2018	21:35:00	2.52
3/2/2018	21:40:00	2.53
3/2/2018	21:45:00	2.53
3/2/2018	21:50:00	2.54
3/2/2018	21:55:00	2.55
3/2/2018	22:00:00	2.55
3/2/2018	22:05:00	2.56
3/2/2018	22:10:00	2.57
3/2/2018	22:15:00	2.57
3/2/2018	22:20:00	2.58
3/2/2018	22:25:00	2.59
3/2/2018	22:30:00	2.6
3/2/2018	22:35:00	2.6
3/2/2018	22:40:00	2.61
3/2/2018	22:45:00	2.61
3/2/2018	22:50:00	2.61
3/2/2018	22:55:00	2.61
3/2/2018	23:00:00	2.61
3/2/2018	23:05:00	2.61
3/2/2018	23:10:00	2.61
3/2/2018	23:15:00	2.61
3/2/2018	23:20:00	2.61
3/2/2018	23:25:00	2.61
3/2/2018	23:30:00	2.61
3/2/2018	23:35:00	2.61
3/2/2018	23:40:00	2.61
3/2/2018	23:45:00	2.61

3/2/2018	11:50:00 PM	0	2.61
3/2/2018	11:55:00 PM	0	2.61
Readings as of 10/9/2019 11:02 AM			

3/2/2018	23:50:00	2.61
3/2/2018	23:55:00	2.61



Precipitation Information for "10yr_2070_Storm"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
10yr_2070_Storm	Weston & Sampson	Nitsch	24 hours relative to simulation	15 minutes

Raw Data from: **Weston & Sampson**
Nitsch file location Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Rainfall Files

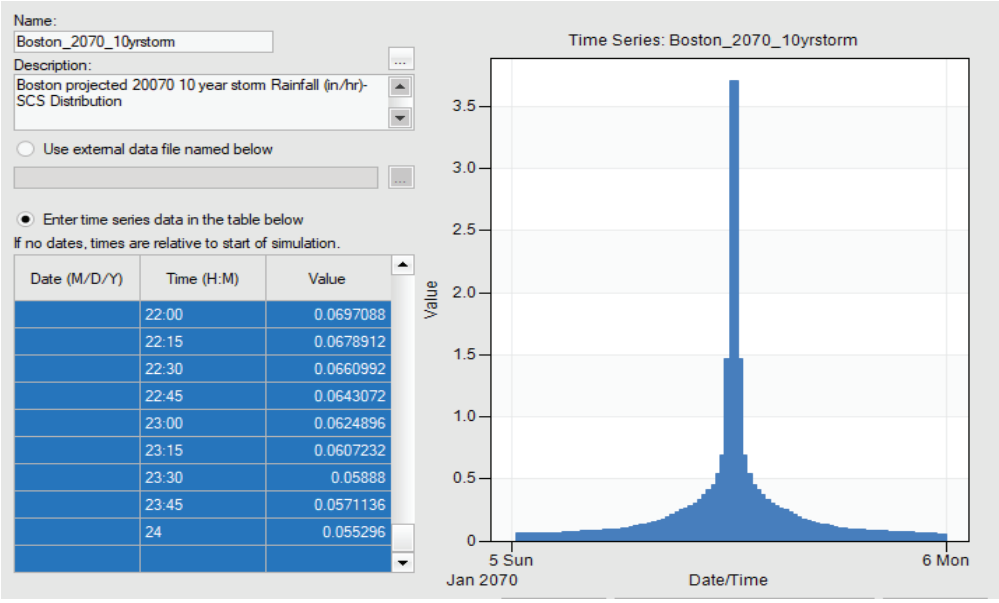
10yr -24 hr 2070s		**6.4**	**in.**	
Duration (hr)	Ratio	Cumulative depth (in.)	Incremental depth (in.)	intensity (in/hr)
0	0	0.00	0.00	0.00
0.25	0.0025	0.02	0.02	0.06
0.5	0.005	0.03	0.02	0.06
0.75	0.0075	0.05	0.02	0.06
1	0.01	0.06	0.02	0.06
1.25	0.0125	0.08	0.02	0.06
1.5	0.015	0.10	0.02	0.06
1.75	0.0175	0.11	0.02	0.06
2	0.02	0.13	0.02	0.06
2.25	0.022547	0.14	0.02	0.07
2.5	0.025188	0.16	0.02	0.07
2.75	0.027922	0.18	0.02	0.07
3	0.03075	0.20	0.02	0.07
3.25	0.033672	0.22	0.02	0.07
3.5	0.036687	0.23	0.02	0.08
3.75	0.039797	0.25	0.02	0.08
4	0.043	0.28	0.02	0.08
4.25	0.046297	0.30	0.02	0.08
4.5	0.049688	0.32	0.02	0.09
4.75	0.053172	0.34	0.02	0.09
5	0.05675	0.36	0.02	0.09
5.25	0.060422	0.39	0.02	0.09
5.5	0.064187	0.41	0.02	0.10
5.75	0.068047	0.44	0.02	0.10
6	0.072	0.46	0.03	0.10
6.25	0.076156	0.49	0.03	0.11
6.5	0.080625	0.52	0.03	0.11
6.75	0.085406	0.55	0.03	0.12
7	0.0905	0.58	0.03	0.13
7.25	0.095906	0.61	0.03	0.14
7.5	0.101625	0.65	0.04	0.15
7.75	0.107656	0.69	0.04	0.15
8	0.114	0.73	0.04	0.16
8.25	0.120859	0.77	0.04	0.18
8.5	0.128437	0.82	0.05	0.19
8.75	0.136734	0.88	0.05	0.21
9	0.14575	0.93	0.06	0.23
9.25	0.155484	1.00	0.06	0.25
9.5	0.165937	1.06	0.07	0.27
9.75	0.177109	1.13	0.07	0.29
10	0.189	1.21	0.08	0.30
10.25	0.202	1.29	0.08	0.33
10.5	0.2165	1.39	0.09	0.37
10.75	0.2325	1.49	0.10	0.41
11	0.25	1.60	0.11	0.45
11.25	0.271125	1.74	0.14	0.54
11.5	0.298	1.91	0.17	0.69
11.75	0.35525	2.27	0.37	1.47
12	0.5	3.20	0.93	3.71
12.25	0.64475	4.13	0.93	3.71
12.5	0.702	4.49	0.37	1.47
12.75	0.728875	4.66	0.17	0.69
13	0.75	4.80	0.14	0.54
13.25	0.7675	4.91	0.11	0.45
13.5	0.7835	5.01	0.10	0.41
13.75	0.798	5.11	0.09	0.37
14	0.811	5.19	0.08	0.33
14.25	0.822891	5.27	0.08	0.30
14.5	0.834062	5.34	0.07	0.29

PCSWMM Data:

Date	Time (H:M)	Value
	0:00	0
	0:15	0.064
	0:30	0.064
	0:45	0.064
	1:00	0.064
	1:15	0.064
	1:30	0.064
	1:45	0.064
	2:00	0.064
	2:15	0.0652032
	2:30	0.0676096
	2:45	0.0699904
	3:00	0.0723968
	3:15	0.0748032
	3:30	0.077184
	3:45	0.079616
	4:00	0.0819968
	4:15	0.0844032
	4:30	0.0868096
	4:45	0.0891904
	5:00	0.0915968
	5:15	0.0940032
	5:30	0.096384
	5:45	0.098816
	6:00	0.1011968
	6:15	0.1063936
	6:30	0.1144064
	6:45	0.1223936
	7:00	0.1304064
	7:15	0.1383936
	7:30	0.1464064
	7:45	0.1543936
	8:00	0.1624064
	8:15	0.1755904
	8:30	0.1939968
	8:45	0.2124032
	9:00	0.2308096
	9:15	0.2491904
	9:30	0.2675968
	9:45	0.2860032
	10:00	0.3044096
	10:15	0.3328
	10:30	0.3712
	10:45	0.4096
	11:00	0.448
	11:15	0.5408
	11:30	0.688
	11:45	1.4656
	12:00	3.7056
	12:15	3.7056
	12:30	1.4656
	12:45	0.688
	13:00	0.5408
	13:15	0.448
	13:30	0.4096
	13:45	0.3712
	14:00	0.3328
	14:15	0.3044096
	14:30	0.2859776

14.75	0.844516	5.40	0.07	0.27
15	0.85425	5.47	0.06	0.25
15.25	0.863266	5.52	0.06	0.23
15.5	0.871562	5.58	0.05	0.21
15.75	0.879141	5.63	0.05	0.19
16	0.886	5.67	0.04	0.18
16.25	0.892344	5.71	0.04	0.16
16.5	0.898375	5.75	0.04	0.15
16.75	0.904094	5.79	0.04	0.15
17	0.9095	5.82	0.03	0.14
17.25	0.914594	5.85	0.03	0.13
17.5	0.919375	5.88	0.03	0.12
17.75	0.923844	5.91	0.03	0.11
18	0.928	5.94	0.03	0.11
18.25	0.931953	5.96	0.03	0.10
18.5	0.935812	5.99	0.02	0.10
18.75	0.939578	6.01	0.02	0.10
19	0.94325	6.04	0.02	0.09
19.25	0.946828	6.06	0.02	0.09
19.5	0.950312	6.08	0.02	0.09
19.75	0.953703	6.10	0.02	0.09
20	0.957	6.12	0.02	0.08
20.25	0.960215	6.15	0.02	0.08
20.5	0.963359	6.17	0.02	0.08
20.75	0.966434	6.19	0.02	0.08
21	0.969437	6.20	0.02	0.08
21.25	0.972371	6.22	0.02	0.08
21.5	0.975234	6.24	0.02	0.07
21.75	0.978027	6.26	0.02	0.07
22	0.98075	6.28	0.02	0.07
22.25	0.983402	6.29	0.02	0.07
22.5	0.985984	6.31	0.02	0.07
22.75	0.988496	6.33	0.02	0.06
23	0.990937	6.34	0.02	0.06
23.25	0.993309	6.36	0.02	0.06
23.5	0.995609	6.37	0.01	0.06
23.75	0.99784	6.39	0.01	0.06
24	1	6.40	0.01	0.06

	14:45	0.2676224
	15:00	0.2491904
	15:15	0.2308096
	15:30	0.2123776
	15:45	0.1940224
	16:00	0.1755904
	16:15	0.1624064
	16:30	0.1543936
	16:45	0.1464064
	17:00	0.1383936
	17:15	0.1304064
	17:30	0.1223936
	17:45	0.1144064
	18:00	0.1063936
	18:15	0.1011968
	18:30	0.0987904
	18:45	0.0964096
	19:00	0.0940032
	19:15	0.0915968
	19:30	0.0891904
	19:45	0.0868096
	20:00	0.0844032
	20:15	0.082304
	20:30	0.0804864
	20:45	0.07872
	21:00	0.0768768
	21:15	0.0751104
	21:30	0.0732928
	21:45	0.0715008
	22:00	0.0697088
	22:15	0.0678912
	22:30	0.0660992
	22:45	0.0643072
	23:00	0.0624896
	23:15	0.0607232
	23:30	0.05888
	23:45	0.0571136
	24	0.055296



Tidal Information for "tidal_height_March_2_2018"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
tidal_height_March_2_2018	NOAA Tides and Currents	Nitsch	3/2/18 12:00 AM - 11:54 PM	6 minutes

Raw Data from: **NOAA Tides and Currents**
Retrieved from: https://tidesandcurrents.noaa.gov/waterlevels.html?id=8443970&units=standard&bdate=20180301&edate=20180304&timezone=GMT&datum=NAVD&interval=6&action=data
Retrieved on: 10/15/2019
Nitsch file location: Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Tidal Files

Datum conversion: Boston City Base (BCB) = NAVD88 + 6.46 feet

RAW DATA				NITSCH CONVERSION			
Date	Time (GMT)	Predicted (ft)	Verified (ft) NAVD	Date	Time (EST)	Date/Time	Verified Height BCB
3/2/2018	4:00	5.209	6.41	3/2/2018	0:00	3/2/18 0:00	12.87
3/2/2018	4:06	5.194	6.36	3/2/2018	0:06	3/2/18 0:06	12.82
3/2/2018	4:12	5.166	6.36	3/2/2018	0:12	3/2/18 0:12	12.82
3/2/2018	4:18	5.123	6.35	3/2/2018	0:18	3/2/18 0:18	12.81
3/2/2018	4:24	5.066	6.29	3/2/2018	0:24	3/2/18 0:24	12.75
3/2/2018	4:30	4.996	6.24	3/2/2018	0:30	3/2/18 0:30	12.7
3/2/2018	4:36	4.912	6.13	3/2/2018	0:36	3/2/18 0:36	12.59
3/2/2018	4:42	4.816	6.02	3/2/2018	0:42	3/2/18 0:42	12.48
3/2/2018	4:48	4.707	5.89	3/2/2018	0:48	3/2/18 0:48	12.35
3/2/2018	4:54	4.586	5.7	3/2/2018	0:54	3/2/18 0:54	12.16
3/2/2018	5:00	4.453	5.49	3/2/2018	1:00	3/2/18 1:00	11.95
3/2/2018	5:06	4.309	5.3	3/2/2018	1:06	3/2/18 1:06	11.76
3/2/2018	5:12	4.153	5.14	3/2/2018	1:12	3/2/18 1:12	11.6
3/2/2018	5:18	3.987	4.96	3/2/2018	1:18	3/2/18 1:18	11.42
3/2/2018	5:24	3.811	4.8	3/2/2018	1:24	3/2/18 1:24	11.26
3/2/2018	5:30	3.624	4.64	3/2/2018	1:30	3/2/18 1:30	11.1
3/2/2018	5:36	3.428	4.47	3/2/2018	1:36	3/2/18 1:36	10.93
3/2/2018	5:42	3.222	4.28	3/2/2018	1:42	3/2/18 1:42	10.74
3/2/2018	5:48	3.008	4.1	3/2/2018	1:48	3/2/18 1:48	10.56
3/2/2018	5:54	2.785	3.88	3/2/2018	1:54	3/2/18 1:54	10.34
3/2/2018	6:00	2.554	3.66	3/2/2018	2:00	3/2/18 2:00	10.12
3/2/2018	6:06	2.316	3.41	3/2/2018	2:06	3/2/18 2:06	9.87
3/2/2018	6:12	2.069	3.15	3/2/2018	2:12	3/2/18 2:12	9.61
3/2/2018	6:18	1.816	2.92	3/2/2018	2:18	3/2/18 2:18	9.38
3/2/2018	6:24	1.556	2.68	3/2/2018	2:24	3/2/18 2:24	9.14
3/2/2018	6:30	1.29	2.44	3/2/2018	2:30	3/2/18 2:30	8.9
3/2/2018	6:36	1.017	2.2	3/2/2018	2:36	3/2/18 2:36	8.66
3/2/2018	6:42	0.739	2.01	3/2/2018	2:42	3/2/18 2:42	8.47
3/2/2018	6:48	0.456	1.73	3/2/2018	2:48	3/2/18 2:48	8.19
3/2/2018	6:54	0.167	1.5	3/2/2018	2:54	3/2/18 2:54	7.96
3/2/2018	7:00	-0.125	1.21	3/2/2018	3:00	3/2/18 3:00	7.67
3/2/2018	7:06	-0.422	0.91	3/2/2018	3:06	3/2/18 3:06	7.37
3/2/2018	7:12	-0.722	0.63	3/2/2018	3:12	3/2/18 3:12	7.09
3/2/2018	7:18	-1.024	0.36	3/2/2018	3:18	3/2/18 3:18	6.82
3/2/2018	7:24	-1.329	0.04	3/2/2018	3:24	3/2/18 3:24	6.5
3/2/2018	7:30	-1.635	-0.27	3/2/2018	3:30	3/2/18 3:30	6.19
3/2/2018	7:36	-1.941	-0.55	3/2/2018	3:36	3/2/18 3:36	5.91
3/2/2018	7:42	-2.247	-0.8	3/2/2018	3:42	3/2/18 3:42	5.66
3/2/2018	7:48	-2.552	-1.06	3/2/2018	3:48	3/2/18 3:48	5.4
3/2/2018	7:54	-2.854	-1.34	3/2/2018	3:54	3/2/18 3:54	5.12
3/2/2018	8:00	-3.153	-1.6	3/2/2018	4:00	3/2/18 4:00	4.86
3/2/2018	8:06	-3.447	-1.88	3/2/2018	4:06	3/2/18 4:06	4.58
3/2/2018	8:12	-3.735	-2.18	3/2/2018	4:12	3/2/18 4:12	4.28
3/2/2018	8:18	-4.017	-2.43	3/2/2018	4:18	3/2/18 4:18	4.03
3/2/2018	8:24	-4.289	-2.64	3/2/2018	4:24	3/2/18 4:24	3.82
3/2/2018	8:30	-4.553	-2.9	3/2/2018	4:30	3/2/18 4:30	3.56
3/2/2018	8:36	-4.805	-3.14	3/2/2018	4:36	3/2/18 4:36	3.32
3/2/2018	8:42	-5.045	-3.34	3/2/2018	4:42	3/2/18 4:42	3.12
3/2/2018	8:48	-5.272	-3.53	3/2/2018	4:48	3/2/18 4:48	2.93
3/2/2018	8:54	-5.484	-3.7	3/2/2018	4:54	3/2/18 4:54	2.76
3/2/2018	9:00	-5.681	-3.85	3/2/2018	5:00	3/2/18 5:00	2.61
3/2/2018	9:06	-5.861	-3.99	3/2/2018	5:06	3/2/18 5:06	2.47
3/2/2018	9:12	-6.024	-4.14	3/2/2018	5:12	3/2/18 5:12	2.32
3/2/2018	9:18	-6.168	-4.29	3/2/2018	5:18	3/2/18 5:18	2.17
3/2/2018	9:24	-6.294	-4.42	3/2/2018	5:24	3/2/18 5:24	2.04
3/2/2018	9:30	-6.4	-4.55	3/2/2018	5:30	3/2/18 5:30	1.91
3/2/2018	9:36	-6.487	-4.68	3/2/2018	5:36	3/2/18 5:36	1.78
3/2/2018	9:42	-6.553	-4.79	3/2/2018	5:42	3/2/18 5:42	1.67
3/2/2018	9:48	-6.6	-4.88	3/2/2018	5:48	3/2/18 5:48	1.58
3/2/2018	9:54	-6.626	-4.92	3/2/2018	5:54	3/2/18 5:54	1.54
3/2/2018	10:00	-6.633	-4.94	3/2/2018	6:00	3/2/18 6:00	1.52
3/2/2018	10:06	-6.62	-4.93	3/2/2018	6:06	3/2/18 6:06	1.53
3/2/2018	10:12	-6.589	-4.87	3/2/2018	6:12	3/2/18 6:12	1.59
3/2/2018	10:18	-6.539	-4.76	3/2/2018	6:18	3/2/18 6:18	1.7
3/2/2018	10:24	-6.471	-4.7	3/2/2018	6:24	3/2/18 6:24	1.76
3/2/2018	10:30	-6.386	-4.56	3/2/2018	6:30	3/2/18 6:30	1.9
3/2/2018	10:36	-6.285	-4.4	3/2/2018	6:36	3/2/18 6:36	2.06
3/2/2018	10:42	-6.169	-4.26	3/2/2018	6:42	3/2/18 6:42	2.2
3/2/2018	10:48	-6.038	-4.03	3/2/2018	6:48	3/2/18 6:48	2.43
3/2/2018	10:54	-5.893	-3.81	3/2/2018	6:54	3/2/18 6:54	2.65
3/2/2018	11:00	-5.735	-3.63	3/2/2018	7:00	3/2/18 7:00	2.83
3/2/2018	11:06	-5.566	-3.41	3/2/2018	7:06	3/2/18 7:06	3.05
3/2/2018	11:12	-5.385	-3.21	3/2/2018	7:12	3/2/18 7:12	3.25
3/2/2018	11:18	-5.193	-2.95	3/2/2018	7:18	3/2/18 7:18	3.51
3/2/2018	11:24	-4.991	-2.69	3/2/2018	7:24	3/2/18 7:24	3.77
3/2/2018	11:30	-4.78	-2.46	3/2/2018	7:30	3/2/18 7:30	4
3/2/2018	11:36	-4.56	-2.22	3/2/2018	7:36	3/2/18 7:36	4.24
3/2/2018	11:42	-4.332	-1.94	3/2/2018	7:42	3/2/18 7:42	4.52
3/2/2018	11:48	-4.096	-1.67	3/2/2018	7:48	3/2/18 7:48	4.79
3/2/2018	11:54	-3.852	-1.38	3/2/2018	7:54	3/2/18 7:54	5.08
3/2/2018	12:00	-3.601	-1.12	3/2/2018	8:00	3/2/18 8:00	5.34
3/2/2018	12:06	-3.343	-0.91	3/2/2018	8:06	3/2/18 8:06	5.55
3/2/2018	12:12	-3.078	-0.66	3/2/2018	8:12	3/2/18 8:12	5.8
3/2/2018	12:18	-2.807	-0.41	3/2/2018	8:18	3/2/18 8:18	6.05
3/2/2018	12:24	-2.53	-0.23	3/2/2018	8:24	3/2/18 8:24	6.23
3/2/2018	12:30	-2.247	0.03	3/2/2018	8:30	3/2/18 8:30	6.49
3/2/2018	12:36	-1.958	0.29	3/2/2018	8:36	3/2/18 8:36	6.75

PCSWMM DATA FILES
(copied from timeseries)

Date (M/D/Y)	Time (H:M)	Value
3/2/2018	0:00:00	12.87
3/2/2018	0:06:00	12.82
3/2/2018	0:12:00	12.82
3/2/2018	0:18:00	12.81
3/2/2018	0:24:00	12.75
3/2/2018	0:30:00	12.7
3/2/2018	0:36:00	12.59
3/2/2018	0:42:00	12.48
3/2/2018	0:48:00	12.35
3/2/2018	0:54:00	12.16
3/2/2018	1:00:00	11.95
3/2/2018	1:06:00	11.76
3/2/2018	1:12:00	11.6
3/2/2018	1:18:00	11.42
3/2/2018	1:24:00	11.26
3/2/2018	1:30:00	11.1
3/2/2018	1:36:00	10.93
3/2/2018	1:42:00	10.74
3/2/2018	1:48:00	10.56
3/2/2018	1:54:00	10.34
3/2/2018	2:00:00	10.12
3/2/2018	2:06:00	9.87
3/2/2018	2:12:00	9.61
3/2/2018	2:18:00	9.38
3/2/2018	2:24:00	9.14
3/2/2018	2:30:00	8.9
3/2/2018	2:36:00	8.66
3/2/2018	2:42:00	8.47
3/2/2018	2:48:00	8.19
3/2/2018	2:54:00	7.96
3/2/2018	3:00:00	7.67
3/2/2018	3:06:00	7.37
3/2/2018	3:12:00	7.09
3/2/2018	3:18:00	6.82
3/2/2018	3:24:00	6.5
3/2/2018	3:30:00	6.19
3/2/2018	3:36:00	5.91
3/2/2018	3:42:00	5.66
3/2/2018	3:48:00	5.4
3/2/2018	3:54:00	5.12
3/2/2018	4:00:00	4.86
3/2/2018	4:06:00	4.58
3/2/2018	4:12:00	4.28
3/2/2018	4:18:00	4.03
3/2/2018	4:24:00	3.82
3/2/2018	4:30:00	3.56
3/2/2018	4:36:00	3.32
3/2/2018	4:42:00	3.12
3/2/2018	4:48:00	2.93
3/2/2018	4:54:00	2.76
3/2/2018	5:00:00	2.61
3/2/2018	5:06:00	2.47
3/2/2018	5:12:00	2.32
3/2/2018	5:18:00	2.17
3/2/2018	5:24:00	2.04
3/2/2018	5:30:00	1.91
3/2/2018	5:36:00	1.78
3/2/2018	5:42:00	1.67
3/2/2018	5:48:00	1.58
3/2/2018	5:54:00	1.54
3/2/2018	6:00:00	1.52
3/2/2018	6:06:00	1.53
3/2/2018	6:12:00	1.59
3/2/2018	6:18:00	1.7
3/2/2018	6:24:00	1.76
3/2/2018	6:30:00	1.9
3/2/2018	6:36:00	2.06
3/2/2018	6:42:00	2.2
3/2/2018	6:48:00	2.43
3/2/2018	6:54:00	2.65
3/2/2018	7:00:00	2.83
3/2/2018	7:06:00	3.05
3/2/2018	7:12:00	3.25
3/2/2018	7:18:00	3.51
3/2/2018	7:24:00	3.77
3/2/2018	7:30:00	4
3/2/2018	7:36:00	4.24
3/2/2018	7:42:00	4.52
3/2/2018	7:48:00	4.79
3/2/2018	7:54:00	5.08
3/2/2018	8:00:00	5.34
3/2/2018	8:06:00	5.55
3/2/2018	8:12:00	5.8
3/2/2018	8:18:00	6.05
3/2/2018	8:24:00	6.23
3/2/2018	8:30:00	6.49
3/2/2018	8:36:00	6.75

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3/2/2018	13:42	1.444	3.69	3/2/2018	9:42	3/2/18 9:42	10.15
3/2/2018	13:48	1.755	3.99	3/2/2018	9:48	3/2/18 9:48	10.45
3/2/2018	13:54	2.063	4.27	3/2/2018	9:54	3/2/18 9:54	10.73
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3/2/2018	14:30	3.773	6.11	3/2/2018	10:30	3/2/18 10:30	12.57
3/2/2018	14:36	4.026	6.43	3/2/2018	10:36	3/2/18 10:36	12.89
3/2/2018	14:42	4.267	6.75	3/2/2018	10:42	3/2/18 10:42	13.21
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3/2/2018	14:54	4.712	7.35	3/2/2018	10:54	3/2/18 10:54	13.81
3/2/2018	15:00	4.915	7.6	3/2/2018	11:00	3/2/18 11:00	14.06
3/2/2018	15:06	5.103	7.78	3/2/2018	11:06	3/2/18 11:06	14.24
3/2/2018	15:12	5.276	7.95	3/2/2018	11:12	3/2/18 11:12	14.41
3/2/2018	15:18	5.435	8.13	3/2/2018	11:18	3/2/18 11:18	14.59
3/2/2018	15:24	5.578	8.24	3/2/2018	11:24	3/2/18 11:24	14.7
3/2/2018	15:30	5.705	8.42	3/2/2018	11:30	3/2/18 11:30	14.88
3/2/2018	15:36	5.816	8.59	3/2/2018	11:36	3/2/18 11:36	15.05
3/2/2018	15:42	5.912	8.7	3/2/2018	11:42	3/2/18 11:42	15.16
3/2/2018	15:48	5.991	8.85	3/2/2018	11:48	3/2/18 11:48	15.31
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3/2/2018	16:12	6.15	9.17	3/2/2018	12:12	3/2/18 12:12	15.63
3/2/2018	16:18	6.15	9.13	3/2/2018	12:18	3/2/18 12:18	15.59
3/2/2018	16:24	6.135	9.12	3/2/2018	12:24	3/2/18 12:24	15.58
3/2/2018	16:30	6.104	9.06	3/2/2018	12:30	3/2/18 12:30	15.52
3/2/2018	16:36	6.059	9.03	3/2/2018	12:36	3/2/18 12:36	15.49
3/2/2018	16:42	5.999	8.92	3/2/2018	12:42	3/2/18 12:42	15.38
3/2/2018	16:48	5.925	8.89	3/2/2018	12:48	3/2/18 12:48	15.35
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3/2/2018	17:24	5.197	8.29	3/2/2018	13:24	3/2/18 13:24	14.75
3/2/2018	17:30	5.032	8.14	3/2/2018	13:30	3/2/18 13:30	14.6
3/2/2018	17:36	4.856	7.99	3/2/2018	13:36	3/2/18 13:36	14.45
3/2/2018	17:42	4.668	7.82	3/2/2018	13:42	3/2/18 13:42	14.28
3/2/2018	17:48	4.47	7.67	3/2/2018	13:48	3/2/18 13:48	14.13
3/2/2018	17:54	4.262	7.47	3/2/2018	13:54	3/2/18 13:54	13.93
3/2/2018	18:00	4.043	7.31	3/2/2018	14:00	3/2/18 14:00	13.77
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3/2/2018	18:12	3.578	6.94	3/2/2018	14:12	3/2/18 14:12	13.4
3/2/2018	18:18	3.333	6.73	3/2/2018	14:18	3/2/18 14:18	13.19
3/2/2018	18:24	3.079	6.51	3/2/2018	14:24	3/2/18 14:24	12.97
3/2/2018	18:30	2.817	6.29	3/2/2018	14:30	3/2/18 14:30	12.75
3/2/2018	18:36	2.547	6.08	3/2/2018	14:36	3/2/18 14:36	12.54
3/2/2018	18:42	2.27	5.86	3/2/2018	14:42	3/2/18 14:42	12.32
3/2/2018	18:48	1.987	5.62	3/2/2018	14:48	3/2/18 14:48	12.08
3/2/2018	18:54	1.697	5.36	3/2/2018	14:54	3/2/18 14:54	11.82
3/2/2018	19:00	1.4	5.1	3/2/2018	15:00	3/2/18 15:00	11.56
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3/2/2018	19:18	0.479	4.24	3/2/2018	15:18	3/2/18 15:18	10.7
3/2/2018	19:24	0.162	3.92	3/2/2018	15:24	3/2/18 15:24	10.38
3/2/2018	19:30	-0.159	3.61	3/2/2018	15:30	3/2/18 15:30	10.07
3/2/2018	19:36	-0.483	3.28	3/2/2018	15:36	3/2/18 15:36	9.74
3/2/2018	19:42	-0.81	3	3/2/2018	15:42	3/2/18 15:42	9.46
3/2/2018	19:48	-1.139	2.69	3/2/2018	15:48	3/2/18 15:48	9.15
3/2/2018	19:54	-1.469	2.41	3/2/2018	15:54	3/2/18 15:54	8.87
3/2/2018	20:00	-1.8	2.11	3/2/2018	16:00	3/2/18 16:00	8.57
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3/2/2018	20:12	-2.46	1.56	3/2/2018	16:12	3/2/18 16:12	8.02
3/2/2018	20:18	-2.787	1.3	3/2/2018	16:18	3/2/18 16:18	7.76
3/2/2018	20:24	-3.111	1.05	3/2/2018	16:24	3/2/18 16:24	7.51
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3/2/2018	20:36	-3.743	0.43	3/2/2018	16:36	3/2/18 16:36	6.89
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3/2/2018	20:48	-4.348	-0.25	3/2/2018	16:48	3/2/18 16:48	6.21
3/2/2018	20:54	-4.637	-0.58	3/2/2018	16:54	3/2/18 16:54	5.88
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3/2/2018	21:12	-5.434	-1.62	3/2/2018	17:12	3/2/18 17:12	4.84
3/2/2018	21:18	-5.672	-1.83	3/2/2018	17:18	3/2/18 17:18	4.63
3/2/2018	21:24	-5.895	-2.11	3/2/2018	17:24	3/2/18 17:24	4.35
3/2/2018	21:30	-6.101	-2.31	3/2/2018	17:30	3/2/18 17:30	4.15
3/2/2018	21:36	-6.29	-2.5	3/2/2018	17:36	3/2/18 17:36	3.96
3/2/2018	21:42	-6.46	-2.65	3/2/2018	17:42	3/2/18 17:42	3.81
3/2/2018	21:48	-6.612	-2.81	3/2/2018	17:48	3/2/18 17:48	3.65
3/2/2018	21:54	-6.744	-2.93	3/2/2018	17:54	3/2/18 17:54	3.53
3/2/2018	22:00	-6.856	-3.05	3/2/2018	18:00	3/2/18 18:00	3.41
3/2/2018	22:06	-6.948	-3.18	3/2/2018	18:06	3/2/18 18:06	3.28
3/2/2018	22:12	-7.02	-3.31	3/2/2018	18:12	3/2/18 18:12	3.15
3/2/2018	22:18	-7.071	-3.45	3/2/2018	18:18	3/2/18 18:18	3.01
3/2/2018	22:24	-7.103	-3.53	3/2/2018	18:24	3/2/18 18:24	2.93
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3/2/2018	22:42	-7.08	-3.62	3/2/2018	18:42	3/2/18 18:42	2.84
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3/2/2018	23:06	-6.8	-3.09	3/2/2018	19:06	3/2/18 19:06	3.37

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3/2/2018	8:48:00	7.26
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3/2/2018	10:00:00	11.02
3/2/2018	10:06:00	11.29
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3/2/2018	13:06:00	15.07
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3/2/2018	13:18:00	14.83
3/2/2018	13:24:00	14.75
3/2/2018	13:30:00	14.6
3/2/2018	13:36:00	14.45
3/2/2018	13:42:00	14.28
3/2/2018	13:48:00	14.13
3/2/2018	13:54:00	13.93
3/2/2018	14:00:00	13.77
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3/2/2018	14:24:00	12.97
3/2/2018	14:30:00	12.75
3/2/2018	14:36:00	12.54
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3/2/2018	15:18:00	10.7
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3/2/2018	15:36:00	9.74
3/2/2018	15:42:00	9.46
3/2/2018	15:48:00	9.15
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3/2/2018	17:48:00	3.65
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3/2/2018	18:00:00	3.41
3/2/2018	18:06:00	3.28
3/2/2018	18:12:00	3.15
3/2/2018	18:18:00	3.01
3/2/2018	18:24:00	2.93
3/2/2018	18:30:00	2.86
3/2/2018	18:36:00	2.86
3/2/2018	18:42:00	2.84
3/2/2018	18:48:00	2.88
3/2/2018	18:54:00	2.99
3/2/2018	19:00:00	3.18
3/2/2018	19:06:00	3.37

3/2/2018	23:12	-6.69	-2.92	3/2/2018	19:12	3/2/18 19:12	3.54
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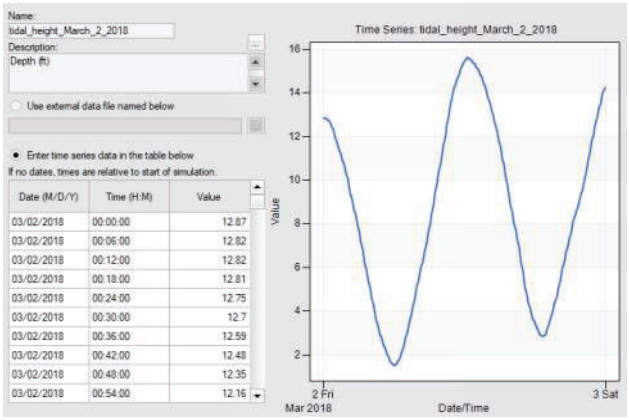
3/2/2018	23:24	-6.428	-2.53	3/2/2018	19:24	3/2/18 19:24	3.93
3/2/2018	23:30	-6.278	-2.38	3/2/2018	19:30	3/2/18 19:30	4.08
3/2/2018	23:36	-6.115	-2.15	3/2/2018	19:36	3/2/18 19:36	4.31
3/2/2018	23:42	-5.942	-2.02	3/2/2018	19:42	3/2/18 19:42	4.44
3/2/2018	23:48	-5.758	-1.8	3/2/2018	19:48	3/2/18 19:48	4.66
3/2/2018	23:54	-5.564	-1.57	3/2/2018	19:54	3/2/18 19:54	4.89
3/3/2018	0:00	-5.36	-1.35	3/2/2018	20:00	3/2/18 20:00	5.11
3/3/2018	0:06	-5.148	-1.07	3/2/2018	20:06	3/2/18 20:06	5.39
3/3/2018	0:12	-4.927	-0.77	3/2/2018	20:12	3/2/18 20:12	5.69
3/3/2018	0:18	-4.697	-0.51	3/2/2018	20:18	3/2/18 20:18	5.95
3/3/2018	0:24	-4.46	-0.28	3/2/2018	20:24	3/2/18 20:24	6.18
3/3/2018	0:30	-4.216	-0.05	3/2/2018	20:30	3/2/18 20:30	6.41
3/3/2018	0:36	-3.963	0.2	3/2/2018	20:36	3/2/18 20:36	6.66
3/3/2018	0:42	-3.704	0.48	3/2/2018	20:42	3/2/18 20:42	6.94
3/3/2018	0:48	-3.438	0.66	3/2/2018	20:48	3/2/18 20:48	7.12
3/3/2018	0:54	-3.166	0.89	3/2/2018	20:54	3/2/18 20:54	7.35
3/3/2018	1:00	-2.887	1.14	3/2/2018	21:00	3/2/18 21:00	7.6
3/3/2018	1:06	-2.602	1.38	3/2/2018	21:06	3/2/18 21:06	7.84
3/3/2018	1:12	-2.311	1.64	3/2/2018	21:12	3/2/18 21:12	8.1
3/3/2018	1:18	-2.015	1.87	3/2/2018	21:18	3/2/18 21:18	8.33
3/3/2018	1:24	-1.715	2.01	3/2/2018	21:24	3/2/18 21:24	8.47
3/3/2018	1:30	-1.41	2.17	3/2/2018	21:30	3/2/18 21:30	8.63
3/3/2018	1:36	-1.102	2.41	3/2/2018	21:36	3/2/18 21:36	8.87
3/3/2018	1:42	-0.791	2.57	3/2/2018	21:42	3/2/18 21:42	9.03
3/3/2018	1:48	-0.479	2.76	3/2/2018	21:48	3/2/18 21:48	9.22
3/3/2018	1:54	-0.165	2.9	3/2/2018	21:54	3/2/18 21:54	9.36
3/3/2018	2:00	0.15	3.14	3/2/2018	22:00	3/2/18 22:00	9.6
3/3/2018	2:06	0.463	3.39	3/2/2018	22:06	3/2/18 22:06	9.85
3/3/2018	2:12	0.775	3.57	3/2/2018	22:12	3/2/18 22:12	10.03
3/3/2018	2:18	1.084	3.93	3/2/2018	22:18	3/2/18 22:18	10.39
3/3/2018	2:24	1.389	4.18	3/2/2018	22:24	3/2/18 22:24	10.64
3/3/2018	2:30	1.69	4.44	3/2/2018	22:30	3/2/18 22:30	10.9
3/3/2018	2:36	1.984	4.8	3/2/2018	22:36	3/2/18 22:36	11.26
3/3/2018	2:42	2.272	5.07	3/2/2018	22:42	3/2/18 22:42	11.53
3/3/2018	2:48	2.551	5.36	3/2/2018	22:48	3/2/18 22:48	11.82
3/3/2018	2:54	2.822	5.61	3/2/2018	22:54	3/2/18 22:54	12.07
3/3/2018	3:00	3.083	5.89	3/2/2018	23:00	3/2/18 23:00	12.35
3/3/2018	3:06	3.333	6.14	3/2/2018	23:06	3/2/18 23:06	12.6
3/3/2018	3:12	3.571	6.36	3/2/2018	23:12	3/2/18 23:12	12.82
3/3/2018	3:18	3.797	6.64	3/2/2018	23:18	3/2/18 23:18	13.1
3/3/2018	3:24	4.01	6.86	3/2/2018	23:24	3/2/18 23:24	13.32
3/3/2018	3:30	4.21	7.05	3/2/2018	23:30	3/2/18 23:30	13.51
3/3/2018	3:36	4.395	7.27	3/2/2018	23:36	3/2/18 23:36	13.73
3/3/2018	3:42	4.566	7.55	3/2/2018	23:42	3/2/18 23:42	14.01
3/3/2018	3:48	4.722	7.6	3/2/2018	23:48	3/2/18 23:48	14.06
3/3/2018	3:54	4.863	7.81	3/2/2018	23:54	3/2/18 23:54	14.27

3/2/2018	19:12:00	3.54
3/2/2018	19:18:00	3.71
3/2/2018	19:24:00	3.93
3/2/2018	19:30:00	4.08
3/2/2018	19:36:00	4.31
3/2/2018	19:42:00	4.44
3/2/2018	19:48:00	4.66
3/2/2018	19:54:00	4.89
3/2/2018	20:00:00	5.11
3/2/2018	20:06:00	5.39
3/2/2018	20:12:00	5.69
3/2/2018	20:18:00	5.95
3/2/2018	20:24:00	6.18
3/2/2018	20:30:00	6.41
3/2/2018	20:36:00	6.66
3/2/2018	20:42:00	6.94
3/2/2018	20:48:00	7.12
3/2/2018	20:54:00	7.35
3/2/2018	21:00:00	7.6
3/2/2018	21:06:00	7.84
3/2/2018	21:12:00	8.1
3/2/2018	21:18:00	8.33
3/2/2018	21:24:00	8.47
3/2/2018	21:30:00	8.63
3/2/2018	21:36:00	8.87
3/2/2018	21:42:00	9.03
3/2/2018	21:48:00	9.22
3/2/2018	21:54:00	9.36
3/2/2018	22:00:00	9.6
3/2/2018	22:06:00	9.85
3/2/2018	22:12:00	10.03
3/2/2018	22:18:00	10.39
3/2/2018	22:24:00	10.64
3/2/2018	22:30:00	10.9
3/2/2018	22:36:00	11.26
3/2/2018	22:42:00	11.53
3/2/2018	22:48:00	11.82
3/2/2018	22:54:00	12.07
3/2/2018	23:00:00	12.35
3/2/2018	23:06:00	12.6
3/2/2018	23:12:00	12.82
3/2/2018	23:18:00	13.1
3/2/2018	23:24:00	13.32
3/2/2018	23:30:00	13.51
3/2/2018	23:36:00	13.73
3/2/2018	23:42:00	14.01
3/2/2018	23:48:00	14.06
3/2/2018	23:54:00	14.27



Tidal Information for "tidal_height_Grayson"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
tidal_height_Grayson	NOAA Tides and Currents	Nitsch	1/4/18 1:30 AM - 1/5/18 1:30 AM	6 minutes

Raw Data from: **NOAA Tides and Currents**
Retrieved from: https://tidesandcurrents.noaa.gov/waterlevels.html?id=8443970&units=standard&bdate=20180301&edate=20180304&timezone=GMT&datum=NAVD&interval=6&action=data
Retrieved on: 10/15/2019
Nitsch file location: Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Tidal Files

Datum conversion: Boston City Base (BCB) = NAVD88 + 6.46 feet

RAW DATA				NITSCH CONVERSION			
Date	Time (GMT)	Predicted (ft)	Verified (ft) NAVD	Date	Time (EST)	Date/Time	Verified Height BCB
1/4/2018	5:30	5.174	5.36	1/4/2018	1:30	1/4/2018 1:30	11.82
1/4/2018	5:36	5.151	5.31	1/4/2018	1:36	1/4/2018 1:36	11.77
1/4/2018	5:42	5.113	5.25	1/4/2018	1:42	1/4/2018 1:42	11.71
1/4/2018	5:48	5.06	5.27	1/4/2018	1:48	1/4/2018 1:48	11.73
1/4/2018	5:54	4.993	5.23	1/4/2018	1:54	1/4/2018 1:54	11.69
1/4/2018	6:00	4.912	5.22	1/4/2018	2:00	1/4/2018 2:00	11.68
1/4/2018	6:06	4.816	5.08	1/4/2018	2:06	1/4/2018 2:06	11.54
1/4/2018	6:12	4.708	5.02	1/4/2018	2:12	1/4/2018 2:12	11.48
1/4/2018	6:18	4.587	4.86	1/4/2018	2:18	1/4/2018 2:18	11.32
1/4/2018	6:24	4.453	4.73	1/4/2018	2:24	1/4/2018 2:24	11.19
1/4/2018	6:30	4.306	4.5	1/4/2018	2:30	1/4/2018 2:30	10.96
1/4/2018	6:36	4.149	4.37	1/4/2018	2:36	1/4/2018 2:36	10.83
1/4/2018	6:42	3.98	4.22	1/4/2018	2:42	1/4/2018 2:42	10.68
1/4/2018	6:48	3.8	4.06	1/4/2018	2:48	1/4/2018 2:48	10.52
1/4/2018	6:54	3.61	3.87	1/4/2018	2:54	1/4/2018 2:54	10.33
1/4/2018	7:00	3.411	3.68	1/4/2018	3:00	1/4/2018 3:00	10.14
1/4/2018	7:06	3.202	3.48	1/4/2018	3:06	1/4/2018 3:06	9.94
1/4/2018	7:12	2.984	3.26	1/4/2018	3:12	1/4/2018 3:12	9.72
1/4/2018	7:18	2.758	2.97	1/4/2018	3:18	1/4/2018 3:18	9.43
1/4/2018	7:24	2.524	2.74	1/4/2018	3:24	1/4/2018 3:24	9.2
1/4/2018	7:30	2.283	2.48	1/4/2018	3:30	1/4/2018 3:30	8.94
1/4/2018	7:36	2.035	2.23	1/4/2018	3:36	1/4/2018 3:36	8.69
1/4/2018	7:42	1.781	2.04	1/4/2018	3:42	1/4/2018 3:42	8.5
1/4/2018	7:48	1.521	1.84	1/4/2018	3:48	1/4/2018 3:48	8.3
1/4/2018	7:54	1.256	1.64	1/4/2018	3:54	1/4/2018 3:54	8.1
1/4/2018	8:00	0.985	1.43	1/4/2018	4:00	1/4/2018 4:00	7.89
1/4/2018	8:06	0.71	1.17	1/4/2018	4:06	1/4/2018 4:06	7.63
1/4/2018	8:12	0.431	0.92	1/4/2018	4:12	1/4/2018 4:12	7.38
1/4/2018	8:18	0.148	0.61	1/4/2018	4:18	1/4/2018 4:18	7.07
1/4/2018	8:24	-0.138	0.28	1/4/2018	4:24	1/4/2018 4:24	6.74
1/4/2018	8:30	-0.426	-0.05	1/4/2018	4:30	1/4/2018 4:30	6.41
1/4/2018	8:36	-0.717	-0.41	1/4/2018	4:36	1/4/2018 4:36	6.05
1/4/2018	8:42	-1.01	-0.73	1/4/2018	4:42	1/4/2018 4:42	5.73
1/4/2018	8:48	-1.304	-1.02	1/4/2018	4:48	1/4/2018 4:48	5.44
1/4/2018	8:54	-1.598	-1.3	1/4/2018	4:54	1/4/2018 4:54	5.16
1/4/2018	9:00	-1.893	-1.59	1/4/2018	5:00	1/4/2018 5:00	4.87
1/4/2018	9:06	-2.186	-1.83	1/4/2018	5:06	1/4/2018 5:06	4.63
1/4/2018	9:12	-2.478	-2.08	1/4/2018	5:12	1/4/2018 5:12	4.38
1/4/2018	9:18	-2.768	-2.36	1/4/2018	5:18	1/4/2018 5:18	4.1
1/4/2018	9:24	-3.055	-2.6	1/4/2018	5:24	1/4/2018 5:24	3.86
1/4/2018	9:30	-3.338	-2.84	1/4/2018	5:30	1/4/2018 5:30	3.62
1/4/2018	9:36	-3.615	-3.06	1/4/2018	5:36	1/4/2018 5:36	3.4
1/4/2018	9:42	-3.887	-3.34	1/4/2018	5:42	1/4/2018 5:42	3.12
1/4/2018	9:48	-4.151	-3.56	1/4/2018	5:48	1/4/2018 5:48	2.9
1/4/2018	9:54	-4.407	-3.74	1/4/2018	5:54	1/4/2018 5:54	2.72
1/4/2018	10:00	-4.653	-3.94	1/4/2018	6:00	1/4/2018 6:00	2.52
1/4/2018	10:06	-4.889	-4.14	1/4/2018	6:06	1/4/2018 6:06	2.32
1/4/2018	10:12	-5.113	-4.32	1/4/2018	6:12	1/4/2018 6:12	2.14
1/4/2018	10:18	-5.324	-4.48	1/4/2018	6:18	1/4/2018 6:18	1.98
1/4/2018	10:24	-5.521	-4.68	1/4/2018	6:24	1/4/2018 6:24	1.78
1/4/2018	10:30	-5.702	-4.89	1/4/2018	6:30	1/4/2018 6:30	1.57
1/4/2018	10:36	-5.867	-5.05	1/4/2018	6:36	1/4/2018 6:36	1.41
1/4/2018	10:42	-6.015	-5.21	1/4/2018	6:42	1/4/2018 6:42	1.25
1/4/2018	10:48	-6.144	-5.35	1/4/2018	6:48	1/4/2018 6:48	1.11
1/4/2018	10:54	-6.255	-5.5	1/4/2018	6:54	1/4/2018 6:54	0.96
1/4/2018	11:00	-6.346	-5.56	1/4/2018	7:00	1/4/2018 7:00	0.9
1/4/2018	11:06	-6.417	-5.59	1/4/2018	7:06	1/4/2018 7:06	0.87
1/4/2018	11:12	-6.467	-5.62	1/4/2018	7:12	1/4/2018 7:12	0.84
1/4/2018	11:18	-6.496	-5.63	1/4/2018	7:18	1/4/2018 7:18	0.83
1/4/2018	11:24	-6.505	-5.61	1/4/2018	7:24	1/4/2018 7:24	0.85
1/4/2018	11:30	-6.493	-5.55	1/4/2018	7:30	1/4/2018 7:30	0.91
1/4/2018	11:36	-6.46	-5.48	1/4/2018	7:36	1/4/2018 7:36	0.98
1/4/2018	11:42	-6.407	-5.39	1/4/2018	7:42	1/4/2018 7:42	1.07
1/4/2018	11:48	-6.335	-5.27	1/4/2018	7:48	1/4/2018 7:48	1.19
1/4/2018	11:54	-6.243	-5.11	1/4/2018	7:54	1/4/2018 7:54	1.35
1/4/2018	12:00	-6.133	-4.94	1/4/2018	8:00	1/4/2018 8:00	1.52
1/4/2018	12:06	-6.006	-4.79	1/4/2018	8:06	1/4/2018 8:06	1.67
1/4/2018	12:12	-5.862	-4.57	1/4/2018	8:12	1/4/2018 8:12	1.89
1/4/2018	12:18	-5.702	-4.38	1/4/2018	8:18	1/4/2018 8:18	2.08
1/4/2018	12:24	-5.527	-4.18	1/4/2018	8:24	1/4/2018 8:24	2.28
1/4/2018	12:30	-5.339	-3.96	1/4/2018	8:30	1/4/2018 8:30	2.5
1/4/2018	12:36	-5.139	-3.77	1/4/2018	8:36	1/4/2018 8:36	2.69
1/4/2018	12:42	-4.926	-3.55	1/4/2018	8:42	1/4/2018 8:42	2.91
1/4/2018	12:48	-4.703	-3.32	1/4/2018	8:48	1/4/2018 8:48	3.14
1/4/2018	12:54	-4.47	-3.06	1/4/2018	8:54	1/4/2018 8:54	3.4
1/4/2018	13:00	-4.229	-2.82	1/4/2018	9:00	1/4/2018 9:00	3.64
1/4/2018	13:06	-3.979	-2.56	1/4/2018	9:06	1/4/2018 9:06	3.9
1/4/2018	13:12	-3.723	-2.3	1/4/2018	9:12	1/4/2018 9:12	4.16
1/4/2018	13:18	-3.459	-1.98	1/4/2018	9:18	1/4/2018 9:18	4.48
1/4/2018	13:24	-3.19	-1.68	1/4/2018	9:24	1/4/2018 9:24	4.78
1/4/2018	13:30	-2.915	-1.39	1/4/2018	9:30	1/4/2018 9:30	5.07
1/4/2018	13:36	-2.636	-1	1/4/2018	9:36	1/4/2018 9:36	5.46
1/4/2018	13:42	-2.352	-0.67	1/4/2018	9:42	1/4/2018 9:42	5.79
1/4/2018	13:48	-2.064	-0.31	1/4/2018	9:48	1/4/2018 9:48	6.15
1/4/2018	13:54	-1.772	0.07	1/4/2018	9:54	1/4/2018 9:54	6.53
1/4/2018	14:00	-1.476	0.42	1/4/2018	10:00	1/4/2018 10:00	6.88
1/4/2018	14:06	-1.178	0.71	1/4/2018	10:06	1/4/2018 10:06	7.17

PCSWMM DATA FILES
(copied from timeseries)

Date (M/D/Y)	Time (H:M)	Value
1/4/2018	1:30	11.82
1/4/2018	1:36	11.77
1/4/2018	1:42	11.71
1/4/2018	1:48	11.73
1/4/2018	1:54	11.69
1/4/2018	2:00	11.68
1/4/2018	2:06	11.54
1/4/2018	2:12	11.48
1/4/2018	2:18	11.32
1/4/2018	2:24	11.19
1/4/2018	2:30	10.96
1/4/2018	2:36	10.83
1/4/2018	2:42	10.68
1/4/2018	2:48	10.52
1/4/2018	2:54	10.33
1/4/2018	3:00	10.14
1/4/2018	3:06	9.94
1/4/2018	3:12	9.72
1/4/2018	3:18	9.43
1/4/2018	3:24	9.2
1/4/2018	3:30	8.94
1/4/2018	3:36	8.69
1/4/2018	3:42	8.5
1/4/2018	3:48	8.3
1/4/2018	3:54	8.1
1/4/2018	4:00	7.89
1/4/2018	4:06	7.63
1/4/2018	4:12	7.38
1/4/2018	4:18	7.07
1/4/2018	4:24	6.74
1/4/2018	4:30	6.41
1/4/2018	4:36	6.05
1/4/2018	4:42	5.73
1/4/2018	4:48	5.44
1/4/2018	4:54	5.16
1/4/2018	5:00	4.87
1/4/2018	5:06	4.63
1/4/2018	5:12	4.38
1/4/2018	5:18	4.1
1/4/2018	5:24	3.86
1/4/2018	5:30	3.62
1/4/2018	5:36	3.4
1/4/2018	5:42	3.12
1/4/2018	5:48	2.9
1/4/2018	5:54	2.72
1/4/2018	6:00	2.52
1/4/2018	6:06	2.32
1/4/2018	6:12	2.14
1/4/2018	6:18	1.98
1/4/2018	6:24	1.78
1/4/2018	6:30	1.57
1/4/2018	6:36	1.41
1/4/2018	6:42	1.25
1/4/2018	6:48	1.11
1/4/2018	6:54	0.96
1/4/2018	7:00	0.9
1/4/2018	7:06	0.87
1/4/2018	7:12	0.84
1/4/2018	7:18	0.83
1/4/2018	7:24	0.85
1/4/2018	7:30	0.91
1/4/2018	7:36	0.98
1/4/2018	7:42	1.07
1/4/2018	7:48	1.19
1/4/2018	7:54	1.35
1/4/2018	8:00	1.52
1/4/2018	8:06	1.67
1/4/2018	8:12	1.89
1/4/2018	8:18	2.08
1/4/2018	8:24	2.28
1/4/2018	8:30	2.5
1/4/2018	8:36	2.69
1/4/2018	8:42	2.91
1/4/2018	8:48	3.14
1/4/2018	8:54	3.4
1/4/2018	9:00	3.64
1/4/2018	9:06	3.9
1/4/2018	9:12	4.16
1/4/2018	9:18	4.48
1/4/2018	9:24	4.78
1/4/2018	9:30	5.07
1/4/2018	9:36	5.46
1/4/2018	9:42	5.79
1/4/2018	9:48	6.15
1/4/2018	9:54	6.53
1/4/2018	10:00	6.88
1/4/2018	10:06	7.17

1/4/2018	14:12	-0.877	1.04	1/4/2018	10:12	1/4/2018 10:12	7.5
1/4/2018	14:18	-0.573	1.3	1/4/2018	10:18	1/4/2018 10:18	7.76
1/4/2018	14:24	-0.267	1.58	1/4/2018	10:24	1/4/2018 10:24	8.04
1/4/2018	14:30	0.041	1.85	1/4/2018	10:30	1/4/2018 10:30	8.31
1/4/2018	14:36	0.35	2.16	1/4/2018	10:36	1/4/2018 10:36	8.62
1/4/2018	14:42	0.659	2.44	1/4/2018	10:42	1/4/2018 10:42	8.9
1/4/2018	14:48	0.97	2.79	1/4/2018	10:48	1/4/2018 10:48	9.25
1/4/2018	14:54	1.28	3.19	1/4/2018	10:54	1/4/2018 10:54	9.65
1/4/2018	15:00	1.589	3.64	1/4/2018	11:00	1/4/2018 11:00	10.1
1/4/2018	15:06	1.896	4.09	1/4/2018	11:06	1/4/2018 11:06	10.55
1/4/2018	15:12	2.201	4.49	1/4/2018	11:12	1/4/2018 11:12	10.95
1/4/2018	15:18	2.502	4.84	1/4/2018	11:18	1/4/2018 11:18	11.3
1/4/2018	15:24	2.799	5.17	1/4/2018	11:24	1/4/2018 11:24	11.63
1/4/2018	15:30	3.092	5.49	1/4/2018	11:30	1/4/2018 11:30	11.95
1/4/2018	15:36	3.378	5.71	1/4/2018	11:36	1/4/2018 11:36	12.17
1/4/2018	15:42	3.657	5.93	1/4/2018	11:42	1/4/2018 11:42	12.39
1/4/2018	15:48	3.928	6.08	1/4/2018	11:48	1/4/2018 11:48	12.54
1/4/2018	15:54	4.19	6.26	1/4/2018	11:54	1/4/2018 11:54	12.72
1/4/2018	16:00	4.443	6.49	1/4/2018	12:00	1/4/2018 12:00	12.95
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1/4/2018	16:24	5.335	7.61	1/4/2018	12:24	1/4/2018 12:24	14.07
1/4/2018	16:30	5.525	7.9	1/4/2018	12:30	1/4/2018 12:30	14.36
1/4/2018	16:36	5.7	8.15	1/4/2018	12:36	1/4/2018 12:36	14.61
1/4/2018	16:42	5.86	8.34	1/4/2018	12:42	1/4/2018 12:42	14.8
1/4/2018	16:48	6.005	8.45	1/4/2018	12:48	1/4/2018 12:48	14.91
1/4/2018	16:54	6.133	8.57	1/4/2018	12:54	1/4/2018 12:54	15.03
1/4/2018	17:00	6.246	8.67	1/4/2018	13:00	1/4/2018 13:00	15.13
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1/4/2018	17:12	6.42	8.94	1/4/2018	13:12	1/4/2018 13:12	15.4
1/4/2018	17:18	6.482	9.13	1/4/2018	13:18	1/4/2018 13:18	15.59
1/4/2018	17:24	6.527	9.29	1/4/2018	13:24	1/4/2018 13:24	15.75
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1/4/2018	17:48	6.54	9.62	1/4/2018	13:48	1/4/2018 13:48	16.08
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1/4/2018	19:18	4.467	7.05	1/4/2018	15:18	1/4/2018 15:18	13.51
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1/4/2018	19:42	3.468	6.14	1/4/2018	15:42	1/4/2018 15:42	12.6
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1/4/2018	19:54	2.919	5.75	1/4/2018	15:54	1/4/2018 15:54	12.21
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1/4/2018	11:54	12.72
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1/4/2018	18:48	3.35
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1/4/2018	19:24	2.12
1/4/2018	19:30	1.91
1/4/2018	19:36	1.72
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1/4/2018	19:54	1.1
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1/4/2018	20:06	0.76
1/4/2018	20:12	0.65
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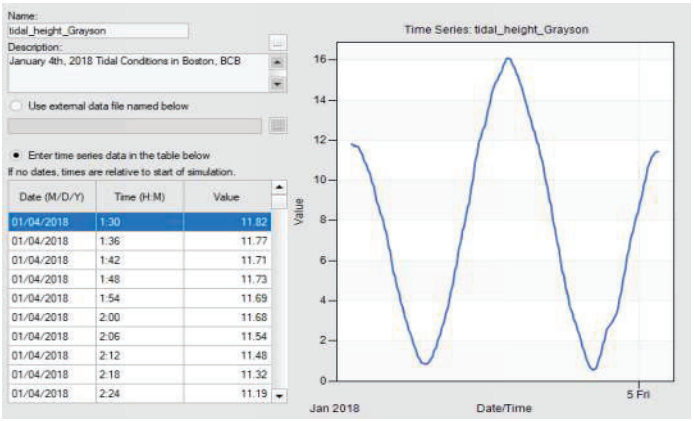
1/5/2018	0:24	9.77
1/5/2018	0:30	10.06
1/5/2018	0:36	10.37
1/5/2018	0:42	10.64
1/5/2018	0:48	10.86
1/5/2018	0:54	11.02
1/5/2018	1:00	11.18
1/5/2018	1:06	11.26
1/5/2018	1:12	11.35
1/5/2018	1:18	11.4
1/5/2018	1:24	11.42
1/5/2018	1:30	11.44



Tidal Information for "tidal_height_2070_sprigntides"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
tidal_height_2070_sprigntides	Woods Hole Group	Nitsch	1/1/70 12:00 AM - 1/14/70 11:54 PM	6 minutes

Raw Data from: **Woods Hole Group**
Received on:
Nitsch file location: Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Tidal Files

Datum conversion: Boston City Base (BCB) = NAVD88 + 6.46 feet

Data provided below for 1/5/70 12:30 AM - 1/6/70 12:30 AM (FOR CONSISTENCY WITH SIMULATION TIME)

Model time (hours)	Moakley Park (ft,NAVD88)	BCB
96.5	6.20	12.66
96.6	6.47	12.93
96.7	6.75	13.21
96.8	7.01	13.47
96.9	7.32	13.78
97	7.61	14.07
97.1	7.89	14.35
97.2	8.12	14.58
97.3	8.32	14.78
97.4	8.48	14.94
97.5	8.61	15.07
97.6	8.75	15.21
97.7	8.90	15.36
97.8	9.07	15.53
97.9	9.23	15.69
98	9.38	15.84
98.1	9.47	15.93
98.2	9.52	15.98
98.3	9.51	15.97
98.4	9.48	15.94
98.5	9.42	15.88
98.6	9.36	15.82
98.7	9.33	15.79
98.8	9.29	15.75
98.9	9.27	15.73
99	9.23	15.69
99.1	9.18	15.64
99.2	9.09	15.55
99.3	8.97	15.43
99.4	8.83	15.29
99.5	8.68	15.14
99.6	8.54	15.00
99.7	8.41	14.87
99.8	8.29	14.75
99.9	8.16	14.62
100	8.02	14.48
100.1	7.84	14.30
100.2	7.64	14.10
100.3	7.41	13.87
100.4	7.17	13.63
100.5	6.94	13.40
100.6	6.73	13.19
100.7	6.53	12.99
100.8	6.33	12.79
100.9	6.13	12.59
101	5.93	12.39
101.1	5.71	12.17
101.2	5.47	11.93
101.3	5.21	11.67
101.4	4.95	11.41
101.5	4.70	11.16
101.6	4.46	10.92
101.7	4.22	10.68
101.8	3.98	10.44
101.9	3.76	10.22

PCSWMM DATA FILES

Date (M/D/Y)	Time (H:M)	Value
1/5/2070	0:30	12.66
1/5/2070	0:36	12.93
1/5/2070	0:42	13.21
1/5/2070	0:48	13.47
1/5/2070	0:54	13.78
1/5/2070	1:00	14.07
1/5/2070	1:06	14.35
1/5/2070	1:12	14.58
1/5/2070	1:18	14.78
1/5/2070	1:24	14.94
1/5/2070	1:30	15.07
1/5/2070	1:36	15.21
1/5/2070	1:42	15.36
1/5/2070	1:48	15.53
1/5/2070	1:54	15.69
1/5/2070	2:00	15.84
1/5/2070	2:06	15.93
1/5/2070	2:12	15.98
1/5/2070	2:18	15.97
1/5/2070	2:24	15.94
1/5/2070	2:30	15.88
1/5/2070	2:36	15.82
1/5/2070	2:42	15.79
1/5/2070	2:48	15.75
1/5/2070	2:54	15.73
1/5/2070	3:00	15.69
1/5/2070	3:06	15.64
1/5/2070	3:12	15.55
1/5/2070	3:18	15.43
1/5/2070	3:24	15.29
1/5/2070	3:30	15.14
1/5/2070	3:36	15.00
1/5/2070	3:42	14.87
1/5/2070	3:48	14.75
1/5/2070	3:54	14.62
1/5/2070	4:00	14.48
1/5/2070	4:06	14.30
1/5/2070	4:12	14.10
1/5/2070	4:18	13.87
1/5/2070	4:24	13.63
1/5/2070	4:30	13.40
1/5/2070	4:36	13.19
1/5/2070	4:42	12.99
1/5/2070	4:48	12.79
1/5/2070	4:54	12.59
1/5/2070	5:00	12.39
1/5/2070	5:06	12.17
1/5/2070	5:12	11.93
1/5/2070	5:18	11.67
1/5/2070	5:24	11.41
1/5/2070	5:30	11.16
1/5/2070	5:36	10.92
1/5/2070	5:42	10.68
1/5/2070	5:48	10.44
1/5/2070	5:54	10.22

102	3.52	9.98
102.1	3.28	9.74
102.2	3.03	9.49
102.3	2.77	9.23
102.4	2.50	8.96
102.5	2.23	8.69
102.6	1.95	8.41
102.7	1.69	8.15
102.8	1.42	7.88
102.9	1.16	7.62
103	0.93	7.39
103.1	0.69	7.15
103.2	0.49	6.95
103.3	0.29	6.75
103.4	0.08	6.54
103.5	-0.10	6.36
103.6	-0.30	6.16
103.7	-0.49	5.97
103.8	-0.64	5.82
103.9	-0.77	5.69
104	-0.89	5.57
104.1	-1.01	5.45
104.2	-1.09	5.37
104.3	-1.15	5.31
104.4	-1.19	5.27
104.5	-1.21	5.25
104.6	-1.21	5.25
104.7	-1.21	5.25
104.8	-1.19	5.27
104.9	-1.16	5.30
105	-1.12	5.34
105.1	-1.06	5.40
105.2	-0.98	5.48
105.3	-0.90	5.56
105.4	-0.80	5.66
105.5	-0.71	5.75
105.6	-0.61	5.85
105.7	-0.50	5.96
105.8	-0.37	6.09
105.9	-0.22	6.24
106	-0.03	6.43
106.1	0.13	6.59
106.2	0.31	6.77
106.3	0.52	6.98
106.4	0.70	7.16
106.5	0.87	7.33
106.6	1.08	7.54
106.7	1.28	7.74
106.8	1.55	8.01
106.9	1.82	8.28
107	2.12	8.58
107.1	2.44	8.90
107.2	2.75	9.21
107.3	3.09	9.55
107.4	3.35	9.81
107.5	3.63	10.09
107.6	3.88	10.34
107.7	4.13	10.59
107.8	4.42	10.88
107.9	4.74	11.20
108	5.05	11.51
108.1	5.37	11.83
108.2	5.69	12.15
108.3	5.99	12.45
108.4	6.27	12.73
108.5	6.54	13.00
108.6	6.82	13.28
108.7	7.10	13.56
108.8	7.41	13.87
108.9	7.73	14.19
109	8.05	14.51
109.1	8.35	14.81

1/5/2070	6:00	9.98
1/5/2070	6:06	9.74
1/5/2070	6:12	9.49
1/5/2070	6:18	9.23
1/5/2070	6:24	8.96
1/5/2070	6:30	8.69
1/5/2070	6:36	8.41
1/5/2070	6:42	8.15
1/5/2070	6:48	7.88
1/5/2070	6:54	7.62
1/5/2070	7:00	7.39
1/5/2070	7:06	7.15
1/5/2070	7:12	6.95
1/5/2070	7:18	6.75
1/5/2070	7:24	6.54
1/5/2070	7:30	6.36
1/5/2070	7:36	6.16
1/5/2070	7:42	5.97
1/5/2070	7:48	5.82
1/5/2070	7:54	5.69
1/5/2070	8:00	5.57
1/5/2070	8:06	5.45
1/5/2070	8:12	5.37
1/5/2070	8:18	5.31
1/5/2070	8:24	5.27
1/5/2070	8:30	5.25
1/5/2070	8:36	5.25
1/5/2070	8:42	5.25
1/5/2070	8:48	5.27
1/5/2070	8:54	5.30
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1/5/2070	9:06	5.40
1/5/2070	9:12	5.48
1/5/2070	9:18	5.56
1/5/2070	9:24	5.66
1/5/2070	9:30	5.75
1/5/2070	9:36	5.85
1/5/2070	9:42	5.96
1/5/2070	9:48	6.09
1/5/2070	9:54	6.24
1/5/2070	10:00	6.43
1/5/2070	10:06	6.59
1/5/2070	10:12	6.77
1/5/2070	10:18	6.98
1/5/2070	10:24	7.16
1/5/2070	10:30	7.33
1/5/2070	10:36	7.54
1/5/2070	10:42	7.74
1/5/2070	10:48	8.01
1/5/2070	10:54	8.28
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1/5/2070	11:12	9.21
1/5/2070	11:18	9.55
1/5/2070	11:24	9.81
1/5/2070	11:30	10.09
1/5/2070	11:36	10.34
1/5/2070	11:42	10.59
1/5/2070	11:48	10.88
1/5/2070	11:54	11.20
1/5/2070	12:00	11.51
1/5/2070	12:06	11.83
1/5/2070	12:12	12.15
1/5/2070	12:18	12.45
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1/5/2070	12:36	13.28
1/5/2070	12:42	13.56
1/5/2070	12:48	13.87
1/5/2070	12:54	14.19
1/5/2070	13:00	14.51
1/5/2070	13:06	14.81

109.2	8.61	15.07
109.3	8.86	15.32
109.4	9.08	15.54
109.5	9.31	15.77
109.6	9.57	16.03
109.7	9.83	16.29
109.8	10.08	16.54
109.9	10.31	16.77
110	10.50	16.96
110.1	10.63	17.09
110.2	10.72	17.18
110.3	10.77	17.23
110.4	10.80	17.26
110.5	10.84	17.30
110.6	10.86	17.32
110.7	10.90	17.36
110.8	10.94	17.40
110.9	10.98	17.44
111	11.00	17.46
111.1	10.97	17.43
111.2	10.89	17.35
111.3	10.77	17.23
111.4	10.64	17.10
111.5	10.50	16.96
111.6	10.39	16.85
111.7	10.30	16.76
111.8	10.21	16.67
111.9	10.12	16.58
112	10.01	16.47
112.1	9.85	16.31
112.2	9.63	16.09
112.3	9.37	15.83
112.4	9.09	15.55
112.5	8.83	15.29
112.6	8.59	15.05
112.7	8.36	14.82
112.8	8.14	14.60
112.9	7.91	14.37
113	7.67	14.13
113.1	7.41	13.87
113.2	7.12	13.58
113.3	6.82	13.28
113.4	6.54	13.00
113.5	6.26	12.72
113.6	5.99	12.45
113.7	5.74	12.20
113.8	5.50	11.96
113.9	5.26	11.72
114	4.99	11.45
114.1	4.70	11.16
114.2	4.42	10.88
114.3	4.12	10.58
114.4	3.82	10.28
114.5	3.51	9.97
114.6	3.24	9.70
114.7	2.94	9.40
114.8	2.66	9.12
114.9	2.41	8.87
115	2.12	8.58
115.1	1.81	8.27
115.2	1.52	7.98
115.3	1.22	7.68
115.4	0.94	7.40
115.5	0.63	7.09
115.6	0.31	6.77
115.7	0.08	6.54
115.8	-0.22	6.24
115.9	-0.48	5.98
116	-0.70	5.76
116.1	-0.86	5.60
116.2	-1.05	5.41
116.3	-1.31	5.15

1/5/2070	13:12	15.07
1/5/2070	13:18	15.32
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1/5/2070	13:30	15.77
1/5/2070	13:36	16.03
1/5/2070	13:42	16.29
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1/5/2070	14:12	17.18
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1/5/2070	14:24	17.26
1/5/2070	14:30	17.30
1/5/2070	14:36	17.32
1/5/2070	14:42	17.36
1/5/2070	14:48	17.40
1/5/2070	14:54	17.44
1/5/2070	15:00	17.46
1/5/2070	15:06	17.43
1/5/2070	15:12	17.35
1/5/2070	15:18	17.23
1/5/2070	15:24	17.10
1/5/2070	15:30	16.96
1/5/2070	15:36	16.85
1/5/2070	15:42	16.76
1/5/2070	15:48	16.67
1/5/2070	15:54	16.58
1/5/2070	16:00	16.47
1/5/2070	16:06	16.31
1/5/2070	16:12	16.09
1/5/2070	16:18	15.83
1/5/2070	16:24	15.55
1/5/2070	16:30	15.29
1/5/2070	16:36	15.05
1/5/2070	16:42	14.82
1/5/2070	16:48	14.60
1/5/2070	16:54	14.37
1/5/2070	17:00	14.13
1/5/2070	17:06	13.87
1/5/2070	17:12	13.58
1/5/2070	17:18	13.28
1/5/2070	17:24	13.00
1/5/2070	17:30	12.72
1/5/2070	17:36	12.45
1/5/2070	17:42	12.20
1/5/2070	17:48	11.96
1/5/2070	17:54	11.72
1/5/2070	18:00	11.45
1/5/2070	18:06	11.16
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1/5/2070	18:18	10.58
1/5/2070	18:24	10.28
1/5/2070	18:30	9.97
1/5/2070	18:36	9.70
1/5/2070	18:42	9.40
1/5/2070	18:48	9.12
1/5/2070	18:54	8.87
1/5/2070	19:00	8.58
1/5/2070	19:06	8.27
1/5/2070	19:12	7.98
1/5/2070	19:18	7.68
1/5/2070	19:24	7.40
1/5/2070	19:30	7.09
1/5/2070	19:36	6.77
1/5/2070	19:42	6.54
1/5/2070	19:48	6.24
1/5/2070	19:54	5.98
1/5/2070	20:00	5.76
1/5/2070	20:06	5.60
1/5/2070	20:12	5.41
1/5/2070	20:18	5.15

116.4	-1.44	5.02
116.5	-1.56	4.90
116.6	-1.68	4.78
116.7	-1.86	4.60
116.8	-1.92	4.54
116.9	-2.08	4.38
117	-2.00	4.46
117.1	-2.16	4.30
117.2	-2.19	4.27
117.3	-2.29	4.17
117.4	-2.18	4.28
117.5	-2.17	4.29
117.6	-2.18	4.28
117.7	-2.22	4.24
117.8	-2.18	4.28
117.9	-2.15	4.31
118	-1.96	4.50
118.1	-1.93	4.53
118.2	-1.85	4.61
118.3	-1.85	4.61
118.4	-1.64	4.82
118.5	-1.56	4.90
118.6	-1.31	5.15
118.7	-1.36	5.10
118.8	-0.98	5.48
118.9	-0.90	5.56
119	-0.62	5.84
119.1	-0.52	5.94
119.2	-0.16	6.30
119.3	-0.02	6.44
119.4	0.28	6.74
119.5	0.52	6.98
119.6	0.78	7.24
119.7	1.00	7.46
119.8	1.24	7.70
119.9	1.62	8.08
120	1.98	8.44
120.1	2.24	8.70
120.2	2.53	8.99
120.3	2.80	9.26
120.4	3.14	9.60
120.5	3.46	9.92
120.6	3.68	10.14
120.7	4.01	10.47
120.8	4.30	10.76
120.9	4.66	11.12
121	4.96	11.42
121.1	5.27	11.73
121.2	5.57	12.03
121.3	5.90	12.36
121.4	6.19	12.65
121.5	6.48	12.94
121.6	6.78	13.24
121.7	7.11	13.57
121.8	7.40	13.86
121.9	7.72	14.18
122	7.98	14.44
122.1	8.21	14.67
122.2	8.40	14.86
122.3	8.57	15.03
122.4	8.72	15.18
122.5	8.90	15.36
122.6	9.09	15.55
122.7	9.28	15.74
122.8	9.46	15.92
122.9	9.59	16.05
123	9.67	16.13
123.1	9.70	16.16
123.2	9.70	16.16
123.3	9.66	16.12
123.4	9.62	16.08
123.5	9.61	16.07

1/5/2070	20:24	5.02
1/5/2070	20:30	4.90
1/5/2070	20:36	4.78
1/5/2070	20:42	4.60
1/5/2070	20:48	4.54
1/5/2070	20:54	4.38
1/5/2070	21:00	4.46
1/5/2070	21:06	4.30
1/5/2070	21:12	4.27
1/5/2070	21:18	4.17
1/5/2070	21:24	4.28
1/5/2070	21:30	4.29
1/5/2070	21:36	4.28
1/5/2070	21:42	4.24
1/5/2070	21:48	4.28
1/5/2070	21:54	4.31
1/5/2070	22:00	4.50
1/5/2070	22:06	4.53
1/5/2070	22:12	4.61
1/5/2070	22:18	4.61
1/5/2070	22:24	4.82
1/5/2070	22:30	4.90
1/5/2070	22:36	5.15
1/5/2070	22:42	5.10
1/5/2070	22:48	5.48
1/5/2070	22:54	5.56
1/5/2070	23:00	5.84
1/5/2070	23:06	5.94
1/5/2070	23:12	6.30
1/5/2070	23:18	6.44
1/5/2070	23:24	6.74
1/5/2070	23:30	6.98
1/5/2070	23:36	7.24
1/5/2070	23:42	7.46
1/5/2070	23:48	7.70
1/5/2070	23:54	8.08
1/6/2070	0:00	8.44
1/6/2070	0:06	8.70
1/6/2070	0:12	8.99
1/6/2070	0:18	9.26
1/6/2070	0:24	9.60
1/6/2070	0:30	9.92
1/6/2070	0:36	10.14
1/6/2070	0:42	10.47
1/6/2070	0:48	10.76
1/6/2070	0:54	11.12
1/6/2070	1:00	11.42
1/6/2070	1:06	11.73
1/6/2070	1:12	12.03
1/6/2070	1:18	12.36
1/6/2070	1:24	12.65
1/6/2070	1:30	12.94
1/6/2070	1:36	13.24
1/6/2070	1:42	13.57
1/6/2070	1:48	13.86
1/6/2070	1:54	14.18
1/6/2070	2:00	14.44
1/6/2070	2:06	14.67
1/6/2070	2:12	14.86
1/6/2070	2:18	15.03
1/6/2070	2:24	15.18
1/6/2070	2:30	15.36
1/6/2070	2:36	15.55
1/6/2070	2:42	15.74
1/6/2070	2:48	15.92
1/6/2070	2:54	16.05
1/6/2070	3:00	16.13
1/6/2070	3:06	16.16
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1/6/2070	3:24	16.08
1/6/2070	3:30	16.07

123.6	9.58	16.04
123.7	9.59	16.05
123.8	9.58	16.04
123.9	9.55	16.01
124	9.50	15.96

1/6/2070	3:36	16.04
1/6/2070	3:42	16.05
1/6/2070	3:48	16.04
1/6/2070	3:54	16.01
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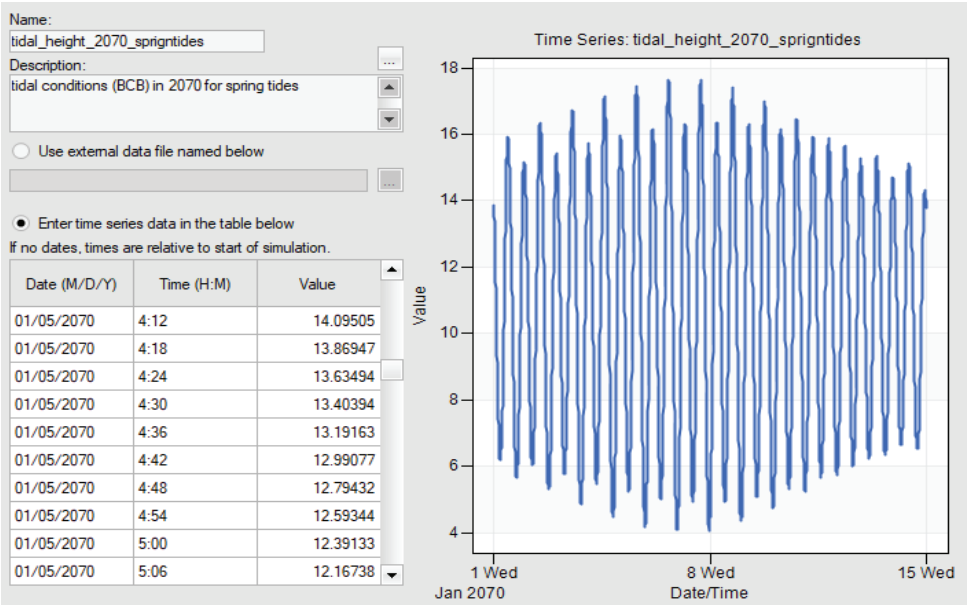

Tidal Information for "tidal_height_2070_Noreaster"

File	Data Source	PCSWMM Input File Created By	Associated Timeframe	Timestep
tidal_height_2070_Noreaster	Woods Hole Group	Nitsch	1/1/70 12:00 - 1/8/70 21:00	60 minutes

Raw Data from: **Woods Hole Group**
Received on:
Nitsch file location: Q:\12462.1 Moakley Next Ph\Planning\Project Data\BWSC Stormwater Model\Tidal Files

Datum conversion: Boston City Base (BCB) = NAVD88 + 6.46 feet

Model time (hours)	Zone 2 (ft,NAVD88)	BCB
0	8.32	14.78
1	6.52	12.98
2	4.34	10.80
3	1.91	8.37
4	-0.31	6.15
5	-1.22	5.24
6	-0.27	6.19
7	0.66	7.12
8	2.99	9.45
9	5.55	12.01
10	7.90	14.36
11	9.36	15.82
12	8.46	14.92
13	7.57	14.03
14	5.77	12.23
15	3.63	10.09
16	1.06	7.52
17	-1.00	5.46
18	-0.57	5.89
19	0.38	6.84
20	2.28	8.74
21	4.18	10.64
22	6.76	13.22
23	8.96	15.42
24	9.45	15.91
25	8.25	14.71
26	6.25	12.71
27	4.32	10.78
28	1.98	8.44
29	0.30	6.76
30	-0.75	5.71
31	-0.08	6.38
32	1.22	7.68
33	3.53	9.99
34	5.94	12.40
35	8.27	14.73
36	9.49	15.95
37	8.89	15.35
38	7.38	13.84
39	5.40	11.86
40	3.05	9.51
41	1.14	7.60
42	-0.69	5.77
43	-0.83	5.63
44	-0.01	6.45
45	1.78	8.24
46	4.73	11.19
47	6.90	13.36
48	8.91	15.37
49	8.73	15.19
50	7.90	14.36
51	6.45	12.91
52	4.02	10.48
53	1.95	8.41
54	-0.04	6.42
55	-0.61	5.85
56	0.26	6.72
57	1.60	8.06
58	4.10	10.56
59	6.44	12.90
60	8.74	15.20
61	9.49	15.95
62	8.85	15.31
63	7.63	14.09
64	5.23	11.69
65	3.13	9.59
66	0.74	7.20
67	-0.32	6.14
68	-0.18	6.28

PCSWMM DATA FILES

Date (M/D/Y)	Time (H:M)	Value
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1/1/2070	3:00	8.366529
1/1/2070	4:00	6.154928
1/1/2070	5:00	5.239583
1/1/2070	6:00	6.190594
1/1/2070	7:00	7.120503
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1/1/2070	9:00	12.01033
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1/1/2070	11:00	15.81929
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72	7.99	14.45
73	9.46	15.92
74	9.66	16.12
75	8.53	14.99
76	6.84	13.30
77	4.70	11.16
78	2.51	8.97
79	0.96	7.42
80	0.45	6.91
81	1.33	7.79
82	2.86	9.32
83	5.32	11.78
84	7.80	14.26
85	9.83	16.29
86	10.50	16.96
87	9.47	15.93
88	7.80	14.26
89	5.72	12.18
90	3.49	9.95
91	1.45	7.91
92	0.54	7.00
93	0.85	7.31
94	2.07	8.53
95	4.30	10.76
96	6.75	13.21
97	9.10	15.56
98	10.56	17.02
99	10.61	17.07
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102	5.90	12.36
103	4.09	10.55
104	2.99	9.45
105	3.19	9.65
106	4.01	10.47
107	5.65	12.11
108	8.35	14.81
109	10.89	17.35
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111	13.73	20.19
112	13.27	19.73
113	12.21	18.67
114	10.43	16.89
115	8.47	14.93
116	6.80	13.26
117	5.69	12.15
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120	7.75	14.21
121	8.69	15.15
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125	9.90	16.36
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128	3.77	10.23
129	2.59	9.05
130	2.61	9.07
131	3.66	10.12
132	5.17	11.63
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135	10.25	16.71
136	9.94	16.40
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140	2.81	9.27
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144	2.66	9.12
145	5.44	11.90
146	7.19	13.65
147	9.30	15.76
148	9.25	15.71
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157	5.19	11.65
158	6.68	13.14
159	9.35	15.81
160	9.43	15.89
161	9.54	16.00
162	7.46	13.92
163	6.00	12.46
164	3.08	9.54
165	1.91	8.37
166	-0.40	6.06
167	0.42	6.88
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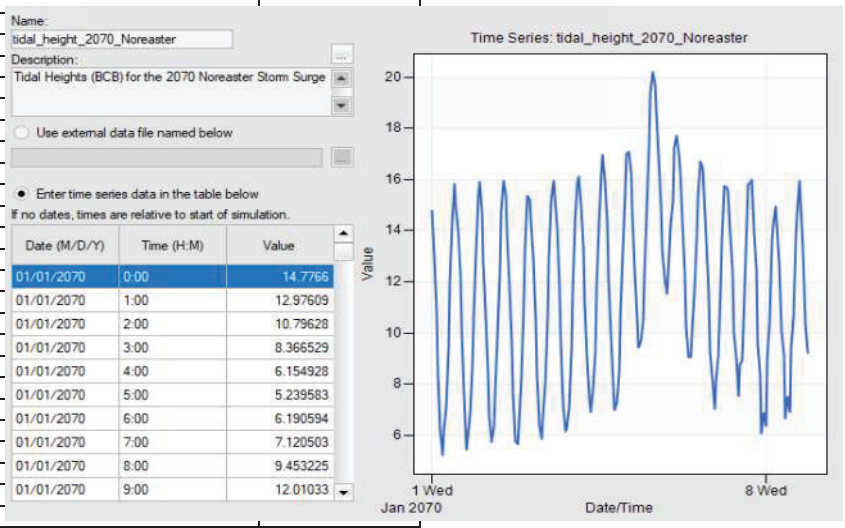

Technical Review Committee (TRC) Form

PROJECT: Moakley Park Master Plan

TASK NUMBER: 1.1: Baseline Technical Assessment

SUB-TASK NUMBER: 1.1L – Hydrologic Modeling

CLIENT: Boston Parks & Recreation Department

DATE: November 26, 2019

This form is intended to: 1) be completed by the TRC reviewer(s) at each stage of deliverable review; 2) assure that the deliverable satisfies the project team's quality standards; 3) reduce the project team's exposure to liability by detecting and correcting gross negligence and errors and; 4) reduce the possibility of future extra work due to errors and omissions on our part. The sub-task leader is responsible for hosting a kick-off meeting at the start of each task and the designated TRC reviewer must attend the kick-off meeting. This form is required for all project deliverables, but not necessarily all sub-tasks. This form should be attached to draft and final project deliverables.

Deliverable Description: 1.1L: Hydrologic Modelling – Preliminary Technical Memorandum

Deliverable Type (Interim or Final): Final

TRC Review Team:

Isabel Kaubisch, Project Manager
Nitsch Engineering
617-338-0063
ikaubisch@nitscheng.com

Sandra Brock, Vice President & Principal
Nitsch Engineering
617-338-0063
sbrock@nitscheng.com

Design Team: (generally the sub-task lead & others key contributors)

Jennifer Johnson, Project Manager
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617-338-0063
jjohnson@nitscheng.com

Brittney Veeck, Senior Project Engineer
Nitsch Engineering
617-338-0063
bveeck@nitscheng.com

TRC Hours Spent Reviewing Project: 4 hours

Date for Meeting with Team to Discuss Resolution of Comments, if Required: Reviewed materials received from TRC Team and reviewed on Monday, November 26, 2019.

Major Comments on Project Review: No major comments received. Comments for clarification within the memorandum were submitted to the Design Team and incorporated into the final version.

FINAL DELIVERABLE REVIEW SIGN-OFF SHEET

This sign-off is intended to ensure that all members of the project team are satisfied that they have adequately reviewed the attached deliverable, and that the deliverable can be used by others for project advancement.

By signing this sheet, the reviewers indicate that they have completed an independent final review of the deliverable and feel that, pending execution of all changes recommended by the reviewer, the deliverable represents industry best practices and can be considered final. The sub-task lead shall initiate the form. The Principal-in Charge shall be the last to sign-off. Copies of the original and the draft deliverables shall be saved in the SharePoint folder directory.

	NAME	SIGNATURE	DATE
Project Director			
Project Manager	Isabel Kaubisch	Isabel Kaubisch	11/26/19
Sub-task Lead	Jennifer Johnson		11/26/19
TRC Reviewer	Isabel Kaubisch	Isabel Kaubisch	11/26/19
TRC Reviewer	Sandra Brock		11·26·19
Principal-in-Charge	Sandra Brock		11:26·19