ISS Remedial Design Work Plan

December 22, 2024

Site:

318 Nevins Street
Brooklyn, New York
New York City Tax Map Designation: Block 439, Lot 1
NYSDEC BCP Site # C224350

Prepared for:

Gowanus 300 Nevins Street LLC
19 West 24th Street, 12h Floor
New York, NY 10010

Submitted to:

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7020

IE Project Number:
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1.0 INTRODUCTION

Impact Environmental Engineering and Geology, PLLC (IEEG) has prepared this In-Situ Soil Stabilization (ISS) Remedial Design Work Plan (ISS RDWP) for 318 Nevins Street, Brooklyn, New York (Site) on behalf of Gowanus 300 Nevins Street LLC, the Volunteer, under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). Gowanus Douglass Street LLC entered into a Brownfield Cleanup Agreement (BCA), Index No. C224350-03-22, with the NYSDEC on April 29, 2022. This Site was assigned BCP number C224350.

1.1 Site Description

The Site is located southwest of the intersection of Union Street and Nevins Street in the Gowanus neighborhood of Brooklyn, New York. Refer to **Figure 1** for the Site Location Map. The Site is situated in an urban area, and surrounding parcels are used for a combination of residential, commercial, and light industrial/manufacturing purposes.

The Site occupies approximately 102,070 square feet (sf), approximately 2.342 acres, and prior to excavation work the elevation of the property ranged from +11 to +16 (NAVD-88) feet. The Site is in a mixed-use area characterized by industrial, residential and commercial properties. The Site is zoned Manufacturing District (M1-4) with Medium Density Residential (R7-2) with a Special Purpose District (G) designation.

The property address is identified as 318 Nevins Street, Brooklyn, New York and consists of a single parcel of land assigned as New York City County Tax Map Designation; Block 439, Lot 1.

1.2 Site Use

Based on the Sanborn Maps, the Site was used for lumber yards from 1886 up to 1915. Kopper's Seaboard Coke Co. is depicted as the occupant of the north Site parcel and the south parcel was Brooklyn Nevins Coal Co., Morton Coal Co. and Hy-Grade Magnet over the period from circa 1922 until the 1950s. During this time, the Site was used as a yard designed to receive coal or coke from barges, screen and deliver to trucks for distribution to consumers. The most recent on-site structure was reportedly constructed in 1958 and was occupied by a motor freight station from the 1960s through the late 1970s. Subsequently, the building was utilized by NY Telephone Co, Bell Atlantic and Verizon.

Based on other historical information available for the Site, the Manhattan Commissary Inc. leased the property in 2012 which is primarily operated for food sales under numerous vendors identified as: Venditti,

Tacos Limos, Tacos Lupita, Tacos El Poblanito, Tacos El Chicken and Tacos Pollo Loco. These vendors operated at the Site until its recent sale on December 30, 2021.

The Sanborn maps reviewed for historical site usage also identified off-site parcels to the north and northeast of the site labelled as the Fulton Municipal Gas co in 1879. These parcels ranged from 0.06 miles to 0.11 miles hydraulically upgradient of the site and showed hydrogen tanks, gas holders, gasometers, purifiers, condenser, gasoline house, naphtha tanks, purge tank, etc. On the parcels. The 1904, 1915 and 1922 Sanborn maps show these parcels labelled as the Brooklyn Union Gas co. (Fulton Municipal Branch) but were not listed on the 1938 Sanborn map. IEEG also reviewed the Final Remedial Investigation Report prepared by GEI consultants (GEI for the Fulton Municipal Works Former Manufactured Gas Plant (MGP) site dated July 2012. The report indicates the MGP operations started in 1879, MGP operations merged in 1895 and became the Brooklyn Union Gas Co, and operation ceased in 1929 (operated for 36 years). The GEI report documents petroleum, naphtha and coal tar contamination present in soil and groundwater beneath former MGP parcels are the source of the area wide coal tar dense non aqueous phase liquid (DNAPL) distribution detected in saturated soil beneath the site along the Gowanus Canal. There is no historical use of the site that would have contributed to the MGP coal tar.

1.3 Environmental Background

Under the NYSDEC BCP, the Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated May 11, 2022, Revised September 22, 2022, and a Supplemental RI Work Plan dated December 8, 2022 for delineation of MGP coal tar which was revised December 22, 2022. The RI was conducted on September 23, 2022, September 26 through 30, 2022, October 3 through 7, 2022 and October 10 through 12, 2022. The Supplemental RI for delineation of MGP coal tar beneath the Site was conducted from December 23, 2022 through January 30, 2023. The Remedial Investigation Report (RIR) was submitted to NYSDEC on November 10, 2022 and revised to include the supplemental RI data. The Revised RIR was submitted on June 14, 2023. To further investigate and delineate the coal tar NAPL contamination detected in SB-16 and SB-17 during the RI, 63 additional soil borings were advanced to terminal depths that varied between 30 to 60-feet BGS on the west and northwest portion of the Site. Coal tar NAPL was identified in 42 of the SRI deep soil borings at depths ranging from a minimum of 20 feet BGS to a maximum depth of 35 feet BGS.

A NAPL/GCM Mobility Assessment Work Plan, dated March 6, 2023, proposed the installation of five (5) more cluster wells in addition to the existing SB-16 and SB-17 cluster wells installed as part of the RI. The

additional cluster wells, designated as NMAW-1 (A-C) through NMAW-5 (A-C) were installed during the period of March 28 through April 11, 2023. The SB-16, SB-17 and the NMAW-1 through NMAW-5 cluster wells were gauged and sampled for dissolved-phase TCL/TAL constituents during the period of May 10 through May 16, 2023. During the gauging event, NAPL was detected in NMAW-1B, NMAW-1C, NMAW-4B and NMAW-4C.

The Gowanus Canal adjoins the Site to the immediate west and is a United States Environmental Protection Agency (USEPA) Superfund Site (EPA ID: NYN000206222). The September 2013 Record of Decision (ROD) for the Gowanus Canal remedial action includes, but is not limited to the following:

- "Dredging of the entire column of hazardous substance-contaminated sediments which have accumulated above the native sediments in the upper and mid-reaches of the canal."
- "In-situ stabilization (ISS) of those native sediments in select areas in the upper and mid-reaches of the canal contaminated with high levels of nonaqueous phase liquid (NAPL). "
- "Construction of a multilayered cap in the upper and mid-reaches of the canal to isolate and prevent the migration of polycyclic aromatic hydrocarbons (PAHs) and residual NAPL from native sediments."

According to the USEPA ROD, "bank-stored tar" is documented at the same elevation as tar in the canal, suggesting that it migrated from upland source areas along the canal and re-infiltrated along the banks of the canal. The coal tar NAPL present in deep saturated soil beneath the northwest portion of Site migrated through preferential pathways from the off-site former Fulton Municipal Works Manufactured Gas Plant (MGP) parcels located approximately 325 feet to the north and northeast of the Site. Since NAPL saturated soil was detected and delineated on the northwest portion of the Site adjacent to the Canal, the NYSDEC required remedial action for the 318 Nevins Site to incorporate a remedy to mitigate the coal tar NAPL potential impacts to the Gowanus Canal.

1.4 Site Geologic and Hydrogeologic Setting

The Site-specific geology consist of fill material comprised of brown silty sand with gravel, and anthropogenic material such as brick fragments, plastic and slag down to approximately for much of the Site with fill material extending to approximately 9 feet below grade surface (BGS). The urban fill material is described as brown silty sand with gravel and anthropogenic material described as concrete, brick and asphalt fragments, wood, and some slag. Below the fill material, the soil is described as silty sand with gray clay, trace gravel and some organics in some borings at depths ranging from approximately 9 to 13

feet BGS followed by non-continuous gray clay encounter at depths ranging from approximately 10 to 13 feet BGS. For the borings that were advanced beyond 20 feet BGS, the soil is described as silt to fine sand, some clay which transitions to medium to coarse sand until the terminal depth of the boring.

The Site adjoins the Gowanus Canal to the west which historically was a tidal creek with wetlands/lowland marsh areas prior to urban development in the mid-1800s. The creek was dredged to construct the canal and hardened shoreline. Dredge spoils were deposited behind the hardened shoreline followed by the historic fill material to allow for the general industrialized development of the area. Alluvial/marsh deposits lie below the fill and are composed of alluvial sand deposits, peat, organic silts and clays (marsh deposits). The alluvial/marsh deposits are associated with the original wetlands complex that was present when the native area was altered. This depositional sequence is supported by the presence of sand, organic material, and clay in on-Site soil borings. No bedrock was documented during the advancement of the environmental soil borings at the Site. Damp to wet soil at the capillary fringe to the water table interface was detected at approximately 6-7 feet BGS in the Site soil borings.

The Gowanus canal discharges to Gowanus Bay and Upper New York Bay to the southwest and is a tidally influenced channel with a tidal cycle of two high tides and two low tides of unequal height each day that has a vertical tidal range of approximately 4.7 to 5.7 feet. The primary aquifer beneath the Gowanus Canal and surrounding upland areas is identified as the Upper Glacial Aquifer, which is generally a thick sequence of glacial deposits that includes beds of silt, sand and clay associated with alluvial/marsh sediments along coastal areas. The Upper Glacial Aquifer at the Site appears to be unconfined. In the Upper Glacial Aquifer, regional groundwater flows to the west/southwest toward Gowanus Canal. The depth to groundwater beneath the ranges from approximately 5.0 to 6.5 feet BGS and groundwater flow at the Site is to the west-southwest; however, the tidal fluctuations (oscillations) of the Gowanus Canal are likely to have some influence on groundwater flow.

2.0 REMEDIAL ACTION

2.1 Remedial Action Objectives

The Remedial Action Objectives (RAOs) identified for the Site, as documented in the DD, are as follows:

- **Groundwater**

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Prevent the discharge of contaminants to surface water.
- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

- **Soil**

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

- **Soil Vapor**

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.2 Remedial Action Description

The main Track 4 Restricted-Residential Use remedies selected for the Site are generally described as follows:

- A 2-foot excavation cut to remove soil exceeding Part 375 Restricted Residential (RR) Soil Cleanup Objectives (SCOs);
- Deeper hot spot excavation for locations where a contaminant exceeds the Part 375 the protection of groundwater SCOs in shallow fill material/soil and is detected in groundwater beneath the Site;
- ISS treatment Columns will be completed to address on-site NAPL present under a portion of the north building footprint. ISS will be performed to treat the NAPL area above an elevation of

NAVD88-19' where soil auger mixing can be completed outside of the underground obstructions related to the bulkhead.

- In-Situ Geochemical Stabilization (ISGS) and/or permeation grouting are being evaluated to treat NAPL where underground obstructions related to the bulkhead are present.

Based on the proposed use of the ISS technology at the Site, an ISS Treatability Study and Pilot Test Work Plan dated October 6, 2023 was submitted to the NYSDEC for review and approval. A NYSDEC letter dated November 3, 2023 provided comments for the Pilot Test Work Plan portion of the October 6, 2023 submittal. Since the comments provided pertained to the pilot test, IEEG requested authorization to proceed with the treatability study via an email dated November 3, 2023. The NYSDEC provided authorization to proceed with the treatability study in an email response dated November 3, 2023. The ISS treatability Study and Pilot Test Work Plan dated November 8, 2023 was resubmitted to the NYSDEC with revisions to the pilot test portion in accordance with the NYSDEC November 3, 2023 comment letter.

On November 17, 2023, IEEG followed up on the status of the submittal to which the NYSDEC responded that the document was received and in queue for review. On January 5, 2024, the NYSDEC was notified via email that the Bench Scale Treatability Study results were not favorable for unconfined compressive strength (UCS). The collection of supplemental soil samples to run additional mix designs and re-run 2 initial mixes (adding more water) was proposed in accordance with the approved ISS Treatability Study Work Plan. The proposed mix formulations and schedule for the collection of supplemental soil was approved by the NYSDEC the same day.

A total of eleven (11) cured mix samples were prepared and submitted to Atlantic Testing Laboratories of New York, (ATL), a materials and engineering testing laboratory, for analysis of unconfined compressive strength (UCS) by ASTM Method D 2166 and permeability by ASTM Method D 5084. Representative mix sample cylinders for each formulation were tested for the 7-day cure time, 14-day cure time and the 28-day cure time. ATL tested the cured mix samples to evaluate their ability to effectively maintain a minimum UCS requirement of at least 50 pounds per square inch (PSI) and minimum permeability requirement of $1.0E^{-06}$ centimeters per second (cm/sec). The ISS Bench Scale Treatability Study Results and Pilot Test Work Plan were submitted to the NYSDEC on March 14, 2024, downloaded for review by the NYSDEC on March 28, 2024 and a comments letter issued by the NYSDEC on April 10, 20214. The NYSDEC comments were addressed in the ISS Bench Scale Treatability Study Results and Pilot Test Work Plan which was resubmitted on April 25, 2024. The NYSDEC approved this submittal on May 7, 2024.

3.0 ISS PILOT TESTING

The purpose of ISS pilot testing is to verify the optimal reagent blend required for soil solidification to meet the permeability requirement of $1.0E^{-06}$ cm/sec and compressive strength requirement of at least 50 PSI. Cascade Environmental of Westhampton, New Jersey (Cascade) was selected as the contractor to complete the ISS pilot testing.

Initial Pilot Test

In accordance with the ISS Bench Scale Treatability Study Results and Pilot Test Work Plan Dated April 25, 2024, Cascade completed the initial ISS pilot test treatment columns on July 2 and 3, 2024. Wet Mix samples 5R, 7 and 8 were pilot tested using a 6-foot diameter auger to complete two columns at three (3) locations. One designated reagent mix was tested at the three pilot test locations.

Table 1: Initial Pilot Test Reagent Mix Formulations

Mix Batch Identification	GGBFS (Grade 120)	Portland Cement	Total Reagent Addition %
A	6.5	2.5	9.0
B	4.0	6.0	10.0
C	5.0	6.0	11.0

The wet mix QA/QC data for Mix B did not meet the criteria for permeability; however, the Mix A and Mix C wet mix samples met the criteria for permeability and unconfined compressive strength (UCS) as summarized in the Table below.

Table 2: Initial Pilot Test Wet Mix Laboratory Data Summary Table

Date Column Completed	Mix ID	Wet Mix Collection Depth	Age Days	Unconfined Compressive Strength PSI	Permeability K (cm/sec)	Associated Core Log
7/2/2024	C125 (Mix C)	26	7	137.2	4.90E-07	C1-C2 OL1 & OL2
			14	181.4	3.70E-07	
			28	241.3	4.80E-07	
7/2/2024	C129 (Mix A)	27	7	287.6	3.90E-07	A1-A2 OL A1C
			14	349.5	3.50E-07	
			28	468.8	2.80E-07	
7/2/2024	C132 (Mix B)	22	7	83.6	1.20E-06	B1-B2 OL
			14	122.9	1.60E-06	
			28	105.9	1.60E-06	

Note: Green font indicates passing result for unconfined compressive strength (UCS) and permeability.

Cascade/Aquifer Drilling and Testing (ADT) completed QA/QC split spoon cores using a Geoprobe through the treatment columns for NYSDEC inspection during the period from July 17 to 23, 2024. The cores were advanced through either the center or an overlap area of treatment columns. The NYSDEC identified unsatisfactory core sections (including free NAPL and sections of un-consolidated material) and indicated additional performance documentation was necessary. Due to QA/QC concerns identified by the NYSDEC, Cascade/ADT completed additional cores using Sonic drilling for Mix A and Mix C treatment columns on August 21, 2024.

The coring events completed suggested ISS pilot test treatment produced columns with intervals of well mixed, homogeneous treated material with less dense sections and visible NAPL encapsulated in the treated material. Also, peat material was noted encapsulated in the ISS matrix.

The NYSDEC reviewed wet mix data for hydraulic conductivity and unconfined compressive strength and the coring documentation and concluded that the ISS pilot test treatment columns were not sufficiently treated or cured to meet the remedial objectives.

Cascade Environmental consulted Dr. Paul Lear, their retained expert in soil stabilization/solidification technologies, to evaluate the pilot test data and core information. Their collaboration resulted in the preparation of a memorandum by Dr Lear regarding his findings. A recommendation was produced for decreasing the advancement and retrieval rates of the auger, which would force more reagent material into the target depths, which would improve treatment effectiveness.

A supplemental pilot test was proposed to evaluate the performance of Mix C+ reagent with adjustments to the advancement and retrieval rates, as well as new reagents Mix D and Mix E.

Supplemental Pilot Test

The Supplemental ISS Pilot Test Work Plan, dated September 25, 2024, was approved by the NYSDEC on October 2, 2024. The supplemental pilot test included the completion of six (6) overlapping ISS treatment columns at three (3) locations, one per the proposed reagent mix as shown on **Figure 2**. The installation of the supplemental pilot test treatment columns was initiated by Cascade on October 4, 2024 and was completed on October 11, 2024.

The three (3) reagents utilized for the supplemental Pilot Test consisted of varying percentages (%) of Ground Granulated Blast Furnace Slag (GGBFS) and Portland Cement (PC). The grade of GGBFS used for all the pilot test mixing was Grade 120. The Type of Portland cement used for all pilot test mixing was

Type I. All reagents were provided by Lafarge-Holcim. A total of eighteen (18) ISS treatment columns were completed and the proposed reagent mixes are summarized in the table below.

Table 3: Supplemental Pilot Test Reagent Mix Formulation

Mix Batch Identification	GGBFS (Grade 120)	Portland Cement	Total Reagent Addition %
C+	7.0 %	8.0 %	15.0
D	5.0 %	8.0 %	13.0
E	6.0 %	9.0 %	15.0

3.1 Supplemental Pilot Test Implementation

Cascade located the selected column locations for the pilot test via professional survey data that was geo-referenced. The ISS pilot test treatment columns were advanced from the bottom of the 2-foot cut excavation down to the target depth of NAVD88 -19 feet. Wood obstructions were encountered during advancement of the supplemental ISS pilot test columns 152 and 162.

The batch mix plant and the Bauer BG36 rig with an 8-foot auger were utilized by Cascade for this subsequent pilot test. The reagents were mixed at the on-Site batch plant and distributed to the rig and auger during this pilot test. The rotary drill rig injected the selected reagent during the advancement and retraction of the auger. The reagent is pumped through the RFD rod or bar to the mixing auger. The rotary drill rig is equipped with a gyroscopic system that adjusts to ensure precise vertical alignment is maintained and has a computerized display screen located in the drill rig operator's cab to monitor and notify the operator of the reagent injection pressure, flow, auger rotation speed, and auger advancement interval. The rig is equipped with stabilization and leveling equipment to ensure the rig auger is positioned over the predetermined center point location of a column.

ISS columns treated with reagent Mix C+ included columns 152, 153, 154, 160, 161 and 162. These columns were completed using two mixing passes consisting of a down stroke and an up stroke for each pass to the terminal depth. The advancement rates were amended for Mix C+ to target the 10 to 18 foot and the 26 to 28-foot intervals which were targeted for peat and potential NAPL product. Refer to the table below for the advancement rates.

CRS proposed solution to identified concerns from 8.21.2024 Second Nevins Street ISS Coring Event

Intreval			ISS	Concern		First Pass			Second Pass	
						First Advance	First Retreat		Second Advance	Second Retreat
0	-	2	Completed ISS [0-28'bgs / 7.5'-(-)20.5'amsl]		DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
2	-	4			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
4	-	6			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
6	-	8			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
8	-	10			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
10	-	12		Organics	CRS Prop.	1' per min	3' per min	DEC req.	3' per min	5' per min
12	-	14		Staining	CRS Prop.	1' per min	3' per min	DEC req.	3' per min	5' per min
14	-	16		Staining	CRS Prop.	1' per min	3' per min	CRS Prop.	1' per min	3' per min
16	-	18		High Organic	CRS Prop.	1' per min	3' per min	CRS Prop.	1' per min	3' per min
18	-	20			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
20	-	22			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
22	-	24			DEC req.	2' per min	5' per min	DEC req.	3' per min	5' per min
24		26			CRS Prop.	1' per min	3' per min	CRS Prop.	1' per min	3' per min
26		28		Organic + Staining	CRS Prop.	1' per min	3' per min	CRS Prop.	1' per min	3' per min
28		30	Native Sand w/ Product							
30		32	Native Clay							

CASCADE

ISS columns treated with reagent Mix D included columns 209, 210, 211, 238, 239 and 240, and Mix E reagent was utilized for treatment columns 142, 143, 144,170,171 and 172. These columns were completed using two mixing passes consisting of a down stroke and an up stroke for each pass. The auger advance/extraction to the terminal depth was completed at originally designated consistent rates while maintaining auger rotation speed and grout flow. The initial pass (advanced full column depth and retracted) was drilled at a penetration rate not to exceed 2 feet per minute (fpm), and a withdrawal rate not to exceed-5 fpm. A secondary full pass was then completed at a penetration rate not to exceed 3-fpm, and a withdrawal rate not to exceed 5-fpm.

The nozzles on the grout bar of the auger distributed the reagent slurry during the advancement and retraction. Generally, the auger mixes and advances downward to the terminal depth at a consistent rate while maintaining auger rotation speed and grout flow.; however, when the programmed auto execute on the drill rig is engaged, minor adjustments may be made based on the Site conditions encountered such as in the case of the Mix C+ reagent.

The six (6) supplemental pilot test soil mixing columns were installed in an alternating pattern for each representative reagent mix, so the second soil treatment column for each mix was advanced with sufficient overlap with the adjoining column of the same reagent the following day. The process was repeated until the pilot test soil treatment columns were complete.

To mitigate odors during the pilot test, Atmos Foam was used during the intrusive work associated with the auger/drilling equipment and/or spoils management to address the nuisance odors and/or vapors.

The ISS spoils were managed by allowing the swell material to solidify and then staged in a stockpile. The stockpile was treated with odor suppressant foam and covered until transport and disposal of this material can be arranged with an approved disposal facility. The foam was reapplied to the stockpile per the manufacturer's recommendations.

Waste characterization samples will be collected from the stockpiled swell as required by the proposed disposal facility(ies) and submitted to the selected laboratory for analysis. The waste characterization sample results will be submitted to the designated disposal facility for their approval, and the facility acceptance package will be submitted to the NYSDEC for review and authorization to proceed.

Cascade's supplemental pilot test performance data table is provided in **Appendix A** which includes the design column description, mix description and batching calculations, production values and grout volume calculations as well as quality control data.

Single Column Mixing (SCM) reports were submitted to IEC by Cascade for treatment columns completed for each reagent mix and are provided in **Appendix B**. The following table provides an evaluation of the average advancement and withdrawal rates for the pilot test columns based on the available SCM reports.

Table 4: Supplemental Pilot Test Columns Average Advancement/Withdrawal Rates						
Treatment Column SCM	**Pass**	**Advancement Time (Minutes)**	**Average Advancement Rate (Feet/Minute)**	**Withdrawal Time (Minutes)**	**Average Withdrawal Rate (Feet/Minute)**	**Mix Reagent ID**
152a	1	30:05	0.71	15:00	1.93	C+
152b	2	26:00	1.03	7:10	1.80	
153a	1	34:32	0.79	34:00	0.80	
153b	2	20:00	1.35	11:00	2.45	
154a	1	25:00	1.08	17:14	1.57	
154b	2	22:00	1.23	14:54	1.85	
160a	1	53:00	0.51	21:17	1.28	
160b[1]	2	27:00	1.00	12:14	2.22	
160c	3	89:00	0.30	14:12	1.92	
161a	1	72:00	0.38	11:11	2.25	
161b	2	24:00	1.13	15:23	1.80	
162a	1	57:00	0.47	18:23	1.48	
162b	2	24:00	1.13	12:29	2.20	
209a	1	32:00	0.84	10:19	2.65	D
209b	2	13:35	2.00	26:00	1.04	
210a	1	23:00	1.17	10:30	2.62	
210b	2	12:02	2.21	09:30	2.90	
211a	1	32:49	0.84	08:00	3.38	
211b	2	11:50	2.35	10:08	2.68	
238a	1	18:22	1.48	20.00	1.35	
238b	2	24:50	1.10	08:50	3.18	
239a	1	28:30	1.00	17:30	1.56	
239b	2	16:01	1.69	16:00	1.69	
240a	1	27:00	1.00	9:22	2.93	
240b	2	14:19	1.90	25:15	1.05	

Table 4: Supplemental Pilot Test Columns Average Advancement/Withdrawal Rates Continued

Treatment Column SCM	Pass	Advancement Time (Minutes)	Average Advancement Rate (Feet/Minute)	Withdrawal Time (Minutes)	Average Withdrawal Rate (Feet/Minute)	Mix Reagent ID
142a	1	23:30	1.15	13:47	2.00	E
142b	2	18:45	1.46	18:12	1.49	
C143a	1	26:00	1.04	13:18	2.05	
C143b	2	13:06	2.07	22:00	1.23	
144a	1	23:00	1.17	8:44	3.20	
144b	2	14:30	1.86	22:06	1.22	
170a	1	26:00	1.04	7:58	3.56	
170b	2	15:00	1.80	13:24	2.04	
171a	1	36:33	0.74	10:00	2.70	
171b[2]	2	26:00	1.02	05:34	3.61	
171c	3	15:00	1.80	12:08	2.25	
172a	1	37:00	0.73	9:57	2.82	
172b	2	15:31	1.76	83:00	0.33	

Notes:
[1] Column 160b did not achieve the required depth on second pass and was redrilled and is shown as treatment column 160c.
[2] Column 171b did not achieve the required depth on second pass and was redrilled and is shown as treatment column 171c.

The retrieved SCM reports indicated the Mix C+ first pass advancement rates averaged 0.65 feet per minute (fpm) and the first pass retraction rates averaged 1.55 fpm. The second pass advancement rate averaged 1.15 fpm and the second pass withdrawal rate averaged 2.05 fpm. The first and second pass advancement and retraction average rates were less than those proposed for Mix C+.

The Mix D first pass advancement rates averaged 1.06 fpm and the first pass retraction rates averaged 2.42 fpm. The second pass advancement rate averaged 1.88 fpm and the second pass withdrawal rate averaged 2.09 fpm. The first and second pass advancement and extraction rates are within the proposed advancement rates.

The Mix E first pass advancement rates averaged 1.0 fpm and the first pass retraction rates averaged 2.72 fpm. The second pass advancement rate averaged 1.66 fpm and the second pass withdrawal rate averaged 1.65 fpm. The first and second pass advancement and extraction rates are within the proposed advancement rates.

The first and second pass mix times for each column are summarized in the table below:

Table 5: Supplemental Pilot Test Column Mix Times

Column ID	Mix ID	First Pass Production Time (Min)	Second Pass Production Time (Min)	Third Pass Production Time (Min)	Total Combined Production Time (Min)	Non-Advancement Time (Min)	Adjusted Production Time
152	C+	1:05:53	41:10	-	1:47:03	-18**	1:29:03
153		1:08:32	31:00	-	1:39:32		
154		42:14	36:54	-	1:19:08		
160[1]		1:14:17	39:14	1:43:12	1:53:31*		
161		1:23:11	39:23	-	2:02:34	-9**	1:53:34
162		1:15:23	36:29	-	1:51:52		
209	D	42:19	39:35	-	1:21:54		
210		33:30	21:32	-	55:02		
211		40:49	28:58	-	1:09:47		
238		31:37	38:22	-	1:09:59		
239		45:10	32:01	-	1:17:11		
240		36:22	39:34	-	1:15:56		
142	E	36:47	36:57	-	1:13:44		
143		39:18	35:06	-	1:14:24		
144		31:44	36:36	-	1:08:20		
170		34:58	28:24	-	1:03:22		
171[1]		46:33	51:34	28:08	1:38:07*	-19**	1:19:07
172		46:57	1:38:31	NA	2:25:28		

Notes: [1]Did not achieve targeted depth on second pass, third pass required.
*Does not include the third pass production time in Total Combined Production Time
**Non-advancement rate indicates time auger was at stationary interval without advancement/retraction

The combined first and second pass mix times for Mix C+ columns ranged from 1:19:08 at column 154 to 2:02:32 at column 161. The combined first and second pass mix times for Mix D were 55:10 at column 219 to

1:21:54 for column 209. The combined first and second pass mix times for Mix D columns ranged from 1:03:22 at column 170 to 2:25:28 at column 172.

Pilot test columns drilled on any given site are subject to the Site-specific conditions related to stratigraphy, fill material, former structure foundations and so forth. During the supplemental pilot test, fill material with brick and concrete fragments, organic material, and wood pieces were encountered during treatment column advancement all of which can affect the treatment column installation. The variations in the mixing time frames presented from the supplemental pilot test reflect the differences in the time required to complete the columns.

The swell generated from the ISS pilot test treatment columns was allowed to solidify, was stockpiled and covered with poly. Waste characterization samples were collected as required by the proposed disposal facility and submitted to Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (Phoenix) for analysis. The waste characterization sample results were submitted to disposal facilities for acceptance approval. Upon acceptance, the solidified swell material will be transported for disposal. The disposal manifests will be included in the Final Engineering Report (FER).

3.2 Pilot Test QA/QC Sample Collection and Results

During the supplemental pilot test quality assurance/quality control (QA/QC) wet mix samples were collected from treatment columns C152 (Mix C+), C238 (Mix D) and C172 (Mix E) at varying depths for comparison to remedial performance criteria metrics. The samples were initially collected by Cascade on October 4, 7 and 10, 2024 using a sampling tool connected to a graduated rod that was positioned to depth using the drill rig.

The QA/QC wet mix samples were collected from distinct depths that represent the NAPL/GCM saturated zone subject to ISS. The wet mix samples were collected in accordance with the NYSDEC QA/QC and the Pilot Test Work Plan.

The sample collection tool and other equipment as needed were decontaminated using a power washer over a small pit lined with 20 mil Stego Wrap to collect the liquid and solids generated. Due to the small volume of liquid generated, the material was added to the swell stockpile once solidified per NYSDEC approval.

3.2.1 QA/QC Samples

A total of three (3) wet mix samples were collected, one per the pilot test mix location. The retrieved wet mix was placed and rodded into several 3-inch by 6-inch plastic cylinder molds from each of the treatment columns for physical testing.

Initial compressive strength (UCS) measurements using a pocket penetrometer were collected from all treatment column wet mix samples. The pocket penetrometer results indicated the day 2 results were greater than 4.0 (maximum interval that can be measured); therefore, measurements were not collected for subsequent week 1 cure times.

Wet mix samples, from each of the treatment columns, were also allowed to cure for 7-days, 14-days and 28-days, and the sample cylinders were submitted to Atlantic Testing Laboratory, geotechnical testing laboratory (ATL), a geotechnical, materials modification and hydraulics laboratory, and analyzed for unconfined compressive strength by ASTM Method D 2166 and permeability by ASTM Method D 5084.

3.2.2 QA/QC Sample Results

The results of the 7-day, 14-day, 22-day and/or the 28-day laboratory analysis for UCS and permeability results are presented in the following sections. The UCS and permeability laboratory results for day 7, 14, 22 and/or 28 cure time samples were submitted to ATL are summarized in the table below.

Table 6: Supplemental Pilot Test Wet Mix Sample Results

Date Column Completed	Mix ID	Wet Mix Collection Depth	Age Days	Unconfined Compressive Strength PSI	Permeability K (cm/sec)	Associated Core Log
10/4/2024	C152 (Mix C+)	24	7	50.6	2.30E-07	152-153 OL 153-160-161 OL
			14	69.3	8.40E-08	
			28	116.9	5.1E-07	
10/7/2024	C238 (Mix D)	20	7	126.4	9.40E-07	239-240 OL 238-239 OL 209-210-240 OL 210-211-239 OL
			14	204.8	6.40E-07	
			28	301.5	4.0E-07	
10/10/2024	C172 (Mix E)	19	7	39.3	7.40E-07	144-143-170 OL 144-143-170 OL
			14	34.9	1.5E-07	
			22	69.8	NA	
			28	70.7	6.2E-08	

Notes: Green Font Indicates Passing Value
NA – Not analyzed

The results are discussed below:

- The 7-day cure time samples indicate that Mix C+ and Mix D met the UCS 50 PSI criteria; however, Mix E did not meet the 50 PSI. The permeability for the 7-day cure time passed for the three (3) mixes.
- The 14-day cure time samples indicate the UCS passed for Mixes C+ and Mix D again but Mix E did not meet the 50 PSI requirement. The permeability for the 14-day cure time passed for Mixes C+, D and Mix E.
- A 22-day cure time sample for Mix E was run for UCS only and passed the UCS criteria of 50 PSI. No other samples were run for the 22-day cure time analysis.
- The 28-day cure time samples for Mix C+, Mix D and Mix E have all passed the UCS and permeability criteria.

The ATL laboratory reports for the pilot test wet mix samples are provided in **Appendix C.**

3.2.3 Cores Drill Borings

Following completion of the treatment columns, Cascade contracted with Aquifer Drilling and Testing of Mineola, New York (ADT) to complete nine (9) cores through the treatment column overlap to collect core samples for NYSDEC inspection. Core drilled borings were completed on October 21 and 22, 2024 using a track mounted rig with sonic capabilities for PQ rock coring and core drilled borings were completed on October 24 and 25, 2024 using a truck mounted rig for slow rotation rock coring. The cores were advanced through the overlap areas of treatment columns. The required recovery per the NYSDEC In-Situ Solidification QA/QC document is 60% or greater from any core barrel on the boring run. Upon completion of the core, the borehole was grouted back to the surface. The core boring logs are provided in **Appendix D** and the core photo logs are provided in **Appendix E.** The core boring locations are shown in **Figure 2.**

The following split spoon cores are described in the following sections:

- 152-153 OL (Mix C+)
- 152-160-161 OL (Mix C+)
- 238-239 OL (Mix D)
- 210-211-239 OL (Mix D)
- 209-210-240 OL (Mix D)
- 239-240 OL (Mix D)
- 144-143-170 OL (Mix E)
- 142-143 OL (Mix E)

Mix C+ Cores 152-153 OL and 153-160-161 OL_were advanced on October 24, 2024, though the overlap areas to a terminal depth of 30 feet bgs. The cores were advanced through the treatment column extent which was completed to a depth of 27 feet.

- 0-5': Dark gray, well mixed, treated, hard broken up at top with concrete, wood, shell fragments and/or gravel at top to hard segmented sections with trace fill, wood and/or shell fragments. Some broken up/segmented material. Recovery was 70 and 81.7 percent (%).
- 5-10': Dark gray, well mixed, treated, hard segmented sections with trace wood and shell fragments, 98.3 and 100% recovery.
- 10-15': Dark gray, well mixed, treated, fine grain, hard, segmented sections to broken up hard pieces with trace wood, brick and/or shell fragments, 71.7 and 91.6% recovery. Some material broken up pieces.
- 15-20': Dark gray to very dark gray, mixed to less mixed, treated, hard, segmented with trace peat to less dense material with hard pieces, 93.3 to 100% recovery. Some encapsulated NAPL/GCM within the 19-20'interval in 152-153 OL
- 20-25': Dark gray to very dark gray, mixed to less mixed, treated, hard fine grain segments with trace peat and/or shell fragments, 73.3 and 80% recovery. Some encapsulated NAPL/GCM sheen at bottom in 152-153 OL.
- 25-27': From 25 to 27', dark gray, well mixed, treated, hard fine grain segments with trace peat or shells to less dense granular and hard pieces. Terminal depth of the treatment column at 27'. From 27 to 30', dark gray, less dense native soil below the treatment column with some NAPL on core exterior in 152-153 OL. Total recovery 61.7 to 76.6%.

Mix D Cores 238-239 OL, 210-211-239 OL, 209-210-240 OL and 239-240 OL were advanced during the periods of October 21, 22 and/or 25, 2024 though the overlap areas to a terminal depth of 30 feet bgs. The cores were advanced through the treatment column extent which was completed to a depth of 27 feet.

- 0-5': Gray to dark gray, treated, mixed, broken up / segmented hard to brittle pieces to less dense and granular with trace wood, fill - gravel and brick, peat and shell fragments, 66.6 to 86.7% recovery.
- 5-10': Brown to dark gray, treated, mixed, hard brittle segmented/ broken up to less dense material with trace fill, wood pieces. Recovery ranged from 70 to 81.7%.
- 10-15': Dark gray, treated, mixed, hard to brittle segmented / broken up to less dense with

trace peat, wood and shell fragments, and/or some clay. Recovery ranged from 73.3 to 91.7%.

- 15-20': Dark gray, mixed, treated, hard segmented to brittle and broken up sections with some fill, wood and shell fragments, trace peat. Recovery ranged from 85 to 100%.
- 20-25': Dark gray, mixed, treated, hard segmented to brittle broken up and/or less cured, with trace fill, peat and wood pieces. NAPL detected to encapsulated, sheen. Recovery did not meet the 60% criteria for cores 209-210-240 OL (22%) and 238-230 OL (30%) at 20 – 25 feet.
- 25-30': Dark gray, mixed, treated, hard segmented to broken up to less dense with trace clay. Encapsulated and visible NAPL/GMC and sheen observed in two cores are 25-27 feet. Recovery ranged from 75 to 83%; however, 239-240 OL at 25-27 feet was 58.3% which did not meet the 60% criteria.

Mix E Cores 144-143-170 OL and 142-143 OL were advanced during the periods of October 24, 2024, though the overlap areas to a terminal depth of 30 feet bgs. The cores were advanced through the treatment column extent which was completed to a depth of 27 feet.

- 0-5': Dark gray, mixed, treated, hard broken up to segmented sections with trace fill, wood pieces and shell fragments. Recovery ranged from 70 to 81.7%.
- 5-10': Dark gray, mixed, treated, hard segmented sections with trace fill, wood pieces and/or shell fragments. Recovery was 100% for this core interval for both cores.
- 10-15': Gray to dark gray, mixed, treated, hard segmented to broken up with wood pieces, trace fill and shell and peat fragments, less dense bottom section for 142-143 OL with trace clay and trace NAPL/GCM, slight metallic sheen. Recovery ranged from 78.3 to 80%.
- 15-20': Dark gray, mixed, treated, hard segments with trace fill, wood pieces, shell and peat fragments with less dense section w/hard pieces at 142-143 OL at bottom and brittle fragment pieces at bottom of 144-143-170 OL. Encapsulated NAPL/GCM with some sheening observed at middle to lower sections. Recovery was 100% for this core interval for both cores.
- 20-25': Gray to dark gray, mixed, treated, hard segmented to broken up/fragments with peat. Encapsulated NAPL/GCM with slight sheen at middled and/or bottom section. Recovery 63.4 to 73.3%.
- 25-30': Dark gray, mixed, treated, hard segmented to broken up fragments with trace peat. Encapsulated NAPL/GMC w/some sheen observed in two cores are 25-27 feet. From 27 to 30’,

brown native soil below the treatment column to dark gray/treated. Recovery raged from 60 to 78.3%.

The required recovery per the NYSDEC In-Situ Solidification QA/QC document is 60% or greater from any core section on the boring run. Upon completion of the core, the borehole was grouted back to the surface.

The cores collected from the Mix C+, Mix D and Mix E pilot test treatment columns have shown the following:

- Wet mix data for the reagent Mix C+, D and E have passed the permeability requirement of $1.0E^{-06}$ cm/sec and compressive strength requirement of at least 50 PSI.
- Mixes C+ and Mix E met the NYSDEC QA/QC 60% recovery rate, whereas Mix D failed at cores 238-239 OL at 20-25' interval, 239-240 OL at 25-27' interval, and the 209-210-240 OL at the 20-25' interval.
- Despite the mechanical changes made for Mix C+, less mixing was noted for Mix C+ within the 15-20' and 20-25' intervals.
- Mix D had a greater number of brittle and less cured intervals than the Mix C+ and the Mix E reagents.
- Mix E demonstrated the best mixing observed out of the reagents tested.
- The NAPL/GCM in Mix D ranged from visible non-treated NAPL product to encapsulated NAPL/GMC with sheen. No visible NAPL/GCM product was observed and was encapsulated with little sheen for Mix C+ and Mix E. The NAPL treatment was better for Mix C+ and Mix E.
- Wood fragments and peat material were also noted encapsulated in the ISS matrix for the three mixes.
- Trace to fragments of peat material less than ½ inch in diameter were observed in the cores suggesting that the mixing energy employed by the ISS treatment was sufficient to break up the material and distribute it within the ISS matrix.

3.2.4 Mix Recommendation

The reagents utilized for the supplemental pilot test were comprised of varying percentages of PC and GGBF that react to form a solid matrix. The QA/QC data includes collection of post treatment samples from newly mixed columns and post treatment cores through cured columns. The pilot test QA/QC data collected provides a means to evaluate the performance of reagent mixes utilized in terms of strength and permeability of the solidified soils.

The ISS remedial performance objectives for the Site are a permeability (K) requirement of $1.0E^{-06}$ centimeters per second (cm/sec) and unconfined compressive strength (UCS) requirement of at least 50 pounds per square inch (PSI). Based on a review of the QA/QC data collected, Mix E (6% Grade 120 GGBF and 15% Type 1 PC) is the recommended reagent for full scale application. The supplemental pilot test treatment columns which do not meet the NYSDEC approval will be over drilled and remixed with the selected reagent mix.

4.0 ISS REMEDIAL DESIGN WORK PLAN

The ISS technology has been recognized as a suitable remedy for stabilizing the coal tar NAPL mass beneath the Site by increasing compressive strength, lowering permeability of the treatment zone, and reducing contaminant mobility. This Remedial Design Work Plan (RDWP) for the Site provides the ISS column layout, implementation details and QA/QC and performance monitoring requirements for the full-scale ISS implementation.

The Site occupies and area of approximately 102,070 sf and the designated ISS Treatment area consists of 8,100 sf. To facilitate the ISS implementation at the Site, a two-foot cut excavation will be completed across the ISS treatment footprint of the Site. To reduce the toxicity and mobility of the coal tar NAPL inside the perimeter of the Site, ISS will be implemented he 2-foot cut elevation down to approximately NAVD – 19 feet.

4.1 ISS Treatment Footprint

The footprint of the proposed full scale ISS treatment area shown in the RAWP has been modified to include the TF-4 hot spot and portions of EP-42 and EP-43. NYSDEC approved including TF-4 on February 1, 2024 and requested an updated design plan indicating the extent of the ISS area, which is included in this work plan. Refer to **Figure 3** for the locations of TF-4, EP-42 and EP-43. The majority of Grids EP-42 and EP-43 were included within the ISS treatment zone; therefore, the east portion of these grids will be included within the treatment are footprint. The portion of EP-42 and EP-43 that are outside the NAPL line will be treated to 15 feet below the 2-foot excavation cut. The extent of treatment to fifteen (15) feet bgs was used as a conservative treatment depth based the known historic fill extent to approximately ten (10) to twelve (12) feet bgs, the adjacent grids EP-57 and EP-58 passing confirmation sampling at eight (8) feet bgs and proximal RI soil data from SP-10 which indicated soil quality meeting protection of groundwater SCOs for contaminants of concern at eight (8) and fifteen (15) feet bgs.

The ISS technology is suitable since soil solidification will lower solubility, mobility and toxicity for the treatment of the TF-4, EP-42 and EP-43 for contaminants of concern (COCs), which primarily include PAHs and metals above the Part 375 PGW SCO. The soil solidification will meet the permeability or hydraulic conductivity requirement of $1.0E^{-06}$ cm/sec and compressive strength requirement of at least 50 PSI), which provides for the long-term isolation of the COCs.

The full-scale layout of the treatment columns is shown in **Figure 2**. The layout shows that the ISS column installation will be completed using an 8-foot diameter auger and provide overlap of the columns. The layout accounts for a minimum of 1-foot overlap of the treatment columns. Site construction activities will not be performed in the NAPL treatment area without the remedial engineer of record providing to the NYSDEC that the remedial action objectives are completed in that area and the NYSDEC has provided concurrence.

4.2 Foundation Pile Installation Correction

Building foundation piles were installed within the ISS NAPL treatment area on the east portion of the ISS treatment area in grid 8 and at the southeast corner of the TF-4 hot spot located within grid 9 in March and April 2024 (3/14, 3/15, 3/18, 3/22 and 4/9). Corrective measures were evaluated and the over-drilling/removal of the foundation piles in the referenced areas will be completed to facilitate installation of the ISS treatment columns within the designated ISS treatment zone.

A total of seven (7) previously installed foundation piles (containing #5 rebar reinforcement cages) will be over-drilled/removed to a depth of approximately thirty (30) feet bgs (NAVD88 -20 feet), which is one (1) foot deeper than the required terminal depth of the ISS column installation. The foundation piles will be broken up and abandoned in-situ using a Bauer BG 36 track mounted hydraulic drilling rig equipped with a 2-foot diameter rotary drill head. The displacement radius of the rebar from the over drilling is expected to be approximately the same radius of the drilling head (2'). It is expected that most of the rebar will be removed during over-drilling so that it will not impact ISS auger production work. The drilling head will be advanced between 5' to 10' at a time, breaking through the grout and rebar, backing out the head to remove rebar wrapped around it and then going back in for the next 5' to 10' until the necessary depth of the pile is removed. The location of these foundation piles is shown in **Figure 2**. Incidental spoils may be generated, therefore Atmos foam will be utilized during the drilling process, where required. Should any material come to the surface during extraction of the drilling head it will be stockpiled on poly, coated with Atmos foam, covered with poly pending until disposal is coordinated. The over drilled foundation pile borings will filled with grout using a tremie pipe or similar installation method. The remaining vertical portion of the pile will remain in-place.

The ISS treatment column installation will begin outside the areas where the foundation piles are located. Once the sequencing of ISS treatment column installation is in proximity to each of the foundation pile locations, the foundation piles will be over-drilled to proceed with full-scale ISS installation.

If it is determined that over-drilling of the foundation piles installed within the NAPL treatment area as outlined in the corrective actions above prevent or impede proper solidification of source material during ISS activities, an alternative corrective action plan will be prepared and submitted to NYSDEC for approval (e.g., permeation grouting).

4.3 ISS Treatment Means and Methods

The following section refers to the techniques, materials, and procedures used to complete the full-scale ISS treatment. The ISS will be implemented using the auger method to mix the selected reagent Mix E into the contaminated soil column down to the terminal treatment depths required. The selected contractor to complete the full-scale ISS is Cascade, who will mobilize and assemble the batch plant, Bauer BG36 rig and auger at the Site for the pilot test. The ISS treatment columns will be geolocated using GPS equipment which has been localized into the site control and benchmarks.

Auger mixing ISS treatment is an equipment intensive process. Prior to starting the full-scale ISS treatment columns, Cascade will start up and test the ISS equipment components and prepare a working platform for the rig. Cascade will maintain redundant equipment and replacement parts on-Site that will be installed in response to any clogging issues that may occur.

The Bauer rotary drill rig will be equipped with an 8-foot diameter auger and can pump the selected Mix E reagent through the RFD rod or bar to the connected auger during advancement (downward stroke) and retraction (upward stroke). The rotary drill rig is equipped with an automated gyroscopic system that adjusts to ensure precise vertical alignment is maintained and has a computerized display screen located in the drill rig operator's cab to monitor and notify the operator of the reagent injection pressure, auger rotation speed, and auger advancement interval. The processor designated for the rig was replaced by Bauer and the rig functions and recording capabilities using the B-Tronic system are fully functional. The rig is equipped with stabilization and leveling equipment to ensure the auger is positioned over the predetermined center point location of a column. The nozzles will be used on the grout bar of the auger to increase slurry velocity and overall mixing energy. Cascade will also use drill rig mats during the full-scale ISS implementation to ensure rig stability.

The reagent pump rate will be adjusted to account for a minimum of two auger passes per column as well as Site conditions encountered. During the first auger pass, approximately 25% of the Mix E reagent will be applied on the downward stroke and 25% on the upward stroke; and during the second pass, 25% of the Mix E reagent will be applied on the downward stroke and 25% on the upward stroke. The application percentages of the reagent may require adjustment and balancing. The calculated reagent mix for each treatment column will be recorded in the production log. The ISS contractor will maintain strict process quality control throughout the full-scale ISS implementation.

These Mix E columns will be completed using two mixing passes consisting of a down stroke and an up stroke for each pass. The auger advance/extraction to the terminal depth was completed at designated consistent rates while maintaining auger rotation speed and grout flow. The initial pass (advanced full column depth and retracted) will be drilled at a penetration rate not to exceed 2 feet per minute (fpm), and a withdrawal rate not to exceed-5 fpm. A secondary full pass will then be completed at a penetration rate not to exceed 3-fpm, and a withdrawal rate not to exceed 5-fpm.

The installation of the treatment columns typically alternates between primary and secondary columns to allow for binding time between advancement of the overlapping treatment columns. Once the binding time is acceptable, the secondary soil treatment column will be advanced with sufficient overlap with adjacent columns such that no soil within the ISS area is untreated. The process is repeated until the ISS treatment columns have been completed.

Site air monitoring will be completed in accordance with the Community Air Monitoring Plan (CAMP) approved as part of the RAWP. The NYSDEC approved CAMP document is provided in **Appendix F** To mitigate odor during the full-scale ISS implementation, Atmos Foam will be available on the Site and used during intrusive work associated with the auger/drilling equipment and/or spoils management to address the nuisance odors and/or vapors.

4.4 ISS Contractor Responsibilities

The qualified ISS contractor will be responsible for:

- Mobilization and demobilization of rig and equipment.
- Equipment assembly, layout and staging areas.
- Operation and maintenance of rig and equipment.

- Operation of the drill rig recording data during ISS column advancement and retraction. If there are problems with the recording data, the ISS contractor will stop working to correct the issue.
- Production logs must be provided daily from the drill rig recording data.
- Reagent batch calculations.
- Supply of reagent materials and batch mixing.
- Procedures for preparing ISS mixtures, proportions and sequencing.
- Maintaining sufficient batch volume to allow for uninterrupted ISS work each day.
- Document the number of soil mixing passes required at each column for homogenization.
- Equipment cleaning methods, and cleaning fluids/material generated is contained.
- Labelling and tracking treated soil volume which must account for volumetric reduction due to overlap with adjacent columns, column depths, and coordinates and mapping of ISS columns.
- Documentation of material swell, handling methods and Stockpiling.
- Documentation of modifications or deviations from the approved ISS Full-Scale plan.
- Collection and curing of wet mix samples for field testing using pocket penetrometer and lab testing to confirm efficacy of the treatment.
- Collection of the QA/QC cores.

The general contractor for the Site, Broadway Construction Group, has provided and will continue vibration monitoring at the Site until the remedial action and Site cap are completed.

4.5 Obstruction Handling Procedures

The two-foot cut excavation has been completed on the north portion of the Site as the ISS full scale implementation starts on the excavated north portion of the Site. In preparation for the full-scale ISS treatment column advancement, the Site construction contractor will attempt to identify the location of most obstructions not related to the bulkhead so they can be removed in advance of angering of the treatment columns.

The procedure that will be followed when an obstruction is identified in the ISS treatment area, is as follows:

- Cascade will attempt to remove obstructions encountered within 15 feet bgs of the ISS treatment column starting depth. Once the required equipment is in place for obstruction removal, the ISS contractor will attempt to remove the obstruction for 30 minutes.

- Should an obstruction be encountered at depth greater than 15 feet below the ISS treatment column starting depth, the ISS auger will attempt to drill through and/or shift the obstruction to allow for auger advancement for a period of 30 minutes.
- Should the auger continue to meet refusal due to the obstruction at depth greater than 15 feet below the ISS treatment column starting depth after the 30-minute period, the NYSDEC will be notified of the terminal depth achieved for the ISS treatment column for NYSDEC review and approval. The NYSDEC will make a determination on whether the vertical limits of the adjacent columns need to be extended to encompass the obstruction.
- Should an obstruction extend beyond the lateral perimeter of the treatment column by a distance greater than one times the auger diameter (lateral limits of solidification) and removal cannot be achieved after 30 minutes, the obstruction will be left in place and the NYSDEC will be notified of the terminal depth. The NYSDEC will make a determination on whether the vertical limits of the adjacent columns need to be extended to encompass the obstruction.
- The NYSDEC will be immediately notified if the ISS contractor is unable to complete treatment columns to the required design depth.

4.6 ISS Equipment Decontamination and Swell Management

The reagent mixed soil adhering to the ISS auger and rig tooling will be cleaned off over the treatment column completed. The sampling tool will be decontaminated using a power washer, and the decon water and mix residuals will be collected in a temporary lined decon pad. Once solidified, the material will be placed in the swell stockpile and any residual liquid will be placed in a 55-gallon drum and labeled as to the contents.

The volume increase or bulking that occurs above grade from the mixing of soil with reagent, commonly referred to as swelling, is estimated at 15 to 20% which will be contained on the Site through pre-excavation to 2 feet bgs. The volume increase will be managed in terms of the requirements for the new building foundation piles/slab. ISS spoils management will be completed by staging stockpiles, covering the stockpiles with odor suppressant foam as well as covering stockpiles until transport and disposal of this material can be arranged with an approved disposal facility. The foam will be reapplied to stockpiles per the manufacturer's recommendations which may include reapplication on non-workdays and weekends. Two Atmos foam applicators will be in use during stockpiling activities to ensure the swell pile and ISS area are sufficiently covered during operation. Should one or both of the Atmos foam applicators

be inoperable, ISS mixing, and movement of the swell material will be paused until odor suppressant foam can be readily applied using both applicators.

Waste characterization samples will be collected as required by the proposed disposal facility(ies) and submitted to the selected environmental laboratory for analysis. The waste characterization sample results will be submitted to the designated disposal facility for their approval, and the facility acceptance package will be submitted to the NYSDEC for review and authorization to proceed. Trucks authorized to transport the ISS spoils must have tight impermeable covers.

4.7 Daily Reporting

IEEG will provide daily oversight and documentation of the ISS daily activities completed at the Site. IEEG will also notify the NYSDEC when quality assurance/quality control (QA/QC) core sampling will be conducted.

Daily reports will be submitted to the NYSDEC which include:

- Total number of columns completed each day.
- Site map updated daily to show completed and new columns with associated identification information.
- Columns that overlapped.
- Progress schedule and percent complete.
- Modifications to the progress schedule.
- Deviation from the plan and cause, and performance concerns identified/corrected.
- Quality Assurance/Quality Control (QA/QC) samples collected.
- Photographs of ISS activities.
- ISS production log from each day must be included in the daily field reports and will include the column locations, depth, time records inclusive of mixing time per interval, reagent addition per interval, injection pressure, injection rate, rotational speed, advance rate and batch details that include reagents and water added and the usage rate.

5.0 Quality Assurance/Quality Control (QA/QC)

The collection of QA/QC samples allows the ISS contractor to identify optimization of the selected mix ratio to meet the project goals. During the full-scale ISS, Cascade will collect wet mix samples of treated

media and core samples in accordance with the criteria provided by the NYSDEC. The QA/QC samples are discussed in the following sections.

5.1 Wet Mix Sample Collection and Analysis

Wet mix samples will be collected from the edge of treatment column at a rate of one (1) set per 500 cubic yards of treated area for QA/QC and performance criteria evaluation. The wet mix samples will be collected by the ISS contractor for field testing and for laboratory analysis using a hydraulic sampler which has been calibrated to ensure accurate samples collection depths. The Cascade sampler tool will be capable of reaching a depth of approximately 30 feet bgs. The sampler will be adequate to reach the bottom of the deepest ISS column at 27 feet below the two-foot excavation cut. A minimum of 50% of the wet mix samples collected will be from the bottom 10 feet of the treatment column.

The retrieved wet mix will be visually inspected and evaluated to ensure complete mixing is achieved based on color, homogeneity, and absence of free product. A sufficient volume of representative wet mix samples will be collected for each set to fill a minimum of eight (8) cylinder molds that are 6-inches long by 3-inches in diameter. The samples will be capped and cured in a secure location where they will not be disturbed. Curing samples will also be protected from freezing, as applicable.

Following 24-hour curing time, a pocket penetrometer will be used to gauge the apparent early strengths achieved, as well as on 24-hour intervals thereafter (e.g. 1, 2, 3, 5 and 7 days). Cured samples will be transported to an approved geotechnical laboratory for unconfined compressive strength and permeability testing, which will be conducted on the 7-day 14-day and 28-day cure time samples.

The 7-day, 14-day and 28-day cure samples will be submitted to Atlantic Testing Laboratories, in Poughkeepsie and Canton, New York (Atlantic). The samples will be tested for unconfined compressive strength (UCS) and for permeability (hydraulic conductivity). The sample testing methods are summarized in the table below.

Test Methods

Analysis Type	Analysis Method
Unconfined Compressive Strength	ASTM Method D 2166
Permeability	ASTM Method D 5084

5.2 Core Sample Collection and Evaluation

ISS QA/QC core samples will be collected for visual inspection after a minimum cure time of at least 7 days. Cores will be drilled the length of the ISS treatment column at a frequency of 1 every 1,500 square feet of treatment area (one per grid). Additional QA/QC cores may be required by the NYSDEC in additional grids as necessary. Should the necessary core material not be provided on the second attempt, the NYSDEC may determine that the column/location fails the QA/QC requirements. **Figure 2** shows the 1,500 square foot core grid plan. The NYSDEC will be notified of the collection of core samples 7-days in advance and the NYSDEC will select the core boring locations.

Core samples will be collected in accordance with the drilling methods described in the NYSDEC In Situ Solidification QA/QC document as provided in **Appendix G**. The cores collected will not be longer than five (5) feet, and the preferred drilling option to collect the core samples is rock core drilling as was performed during the pilot test QA/QC cores. The completed core borings will be filled with grout upon completion in accordance with the NYSDEC In Situ Solidification QA/QC document.

The recovery for the core run must be 60% or greater to meet the NYSDEC ISS QA/QC requirements. If recovery is less than 60% from any of the core runs, one (1) new core must be drilled adjacent to the previous location. If the recovery from the second adjacent core continues to be less than 60%, the contractor may abandon the location. The NYSDEC may determine that the treatment column does not meet the QA/QC requirement, and repair, remixing, and/or other applicable means will be evaluated and implemented subject to NYSDEC approval. A representative number of successfully completed cores will be provided. All cores collected from the pilot test and full-scale ISS implementation will be retained on the Site.

5.3 Contingency Plan

The ISS contractor will make real time adjustments to the mix design with NYSDEC approval based on actual field conditions encountered, visual observations of mixed sample material and performance sample results. The field testing of the early cure samples with a pocket penetrometer is a means for early monitoring which would indicate the need to adjust the ISS mix formulation (reagent additions) or water to reagent ratios. The NYSDEC will be notified in a separate email of all adjustments made for ISS installation. Additional QA/QC may be required based on the NYSDEC's review.

The proposed advancement rates and auger rotation speed are expected to improve the quality of the column mixing during the full-scale ISS implementation resulting in columns meeting the QA/QC requirements. Should the QA/QC data collected during the full-scale ISS identify an "unsatisfactory condition" after evaluation with the ISS contractor and the NYSDEC, the over drilling/remixing, isolation by permeation grouting and/or other applicable means will be evaluated and implemented subject to NYSDEC approval. Permeation grouting will not be approved by the NYSDEC until all other means to remove failing columns have been exhausted. This determination will be made as early in the process as possible. It is typical to understand the mix performance by day 14 of the column installation process.

6.0 Weather Stand Down

Lightning can travel long distances through metal, which is an excellent conductor of electricity. In the event of a storm with lightning, the crew will stand down until 30 minutes after the last lightning strike. This is a health and safety measure.

7.0 SCHEDULING AND REPORTING

Upon NYSDEC approval of this ISS RDWP, a schedule for implementation of the full-scale ISS for the Site will be provided. The schedule and 7-day advance notifications will be submitted to the NYSDEC. Daily field reports as described in the ISS full scale implementation section will be submitted to the NYSDEC to document daily ISS field activities including QA/QC inspections and sample collection. The NYSDEC will be notified of ISS QA/QC wet sample collection activities 72 hours prior to those activities and a minimum of 7-days in advance for core sample collection. The NYSDEC will be immediately notified of performance issues identified during the visual inspections of the mixed soils, field testing and confirmation soil mix sample testing to ensure modifications to the mix and/or remixing are implemented.

Based on the QA/QC data evaluation, optimization will be evaluated, as needed. Should the NYSDEC deem any of the columns installed under the Full Scale unsatisfactory based on review of the results of the ISS, the deficient mass(es) will be removed and replaced. The replaced sections are also subject to the QA/QC requirements and NYSDEC approval. The full-scale ISS will not begin until NYSDEC has approved the RDWP.

Sincerely,

IMPACT ENVIRONMENAL ENGINEERING AND GEOLOGY, PLLC

Xin Yuan, P.E. 12/22/2024

NYS Professional Engineer #096444 Date Signature

FIGURES

318 Nevins Street, Brooklyn, NY

ISS Remedial Design Work Plan

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

Figure 1

318 Nevins Street, Brooklyn, NY

Site Location Map

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

Governor Hugh L Carey Tunnel
Governors Island
KIMMEL RD
Buttermilk Channel
NEW YORK CO
KINGS CO
COLUMBIA ST
SACKETT ST
South Brooklyn
HAMILTON AVE
278
HENRY ST
HICKS ST
BOERUM PL
ADAMS ST
50
LIVINGSTON ST
FULTON ST
STATE ST
DEKALB AV
100
ST FELIX ST
FORT GREENE PL
S ELLIOTT PL
S PORTLAND AVE
KANE ST
SMITH ST
WYCKOFF ST
BERGEN ST
DEAN ST
ATLANTIC AVE
FLATBUSH AVE
DEGRAW ST
South Brooklyn
NEVINS ST
DOUGLASS ST
BUTLER ST
BALTIC ST
CARROLL ST
1ST PL
SACKETT ST
HOYT ST
Union Street Bridge
Carroll Street Bridge
Third Street Bridge
SITE
Raritan Bay
COMMERCIAL WHARF
VAN BRUNT ST
KING ST
RICHARDS ST
DWIGHT ST
Red Hook
CONOVER ST
COFFEY ST
VAN DYKE ST
BEARD ST
DIKEMAN ST
Red Hook
Y LBROOKN QUEENS EXPY
COURT ST
Culver Viaduct
LORRAINE ST
BAY ST
CLINTON ST
COURT ST
HAMILTON AVE
03
03
PO
2ND AVE
3RD AVE
6TH ST
8TH ST
OP
9TH ST
10TH ST
11TH ST
12TH ST
13TH ST
Park Slope
PRESIDENT ST
BERKELEY PL
3RD ST
1ST ST
2ND ST
GARFIELD PL
4TH ST
5TH ST
7TH AVE
PARK W

PROJECT
NORTH

NOTES:

SITE LOCATION MAP

318 Nevins Street
Brooklyn, New York

Figure 1

PROJECT NO.	15977-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	JDP
DATE:	6/6/2023
SCALE:	N.T.S.

REVISIONS

IMPACT ENVIRONMENTAL ENGINEERING AND GEOLOGY PLLC

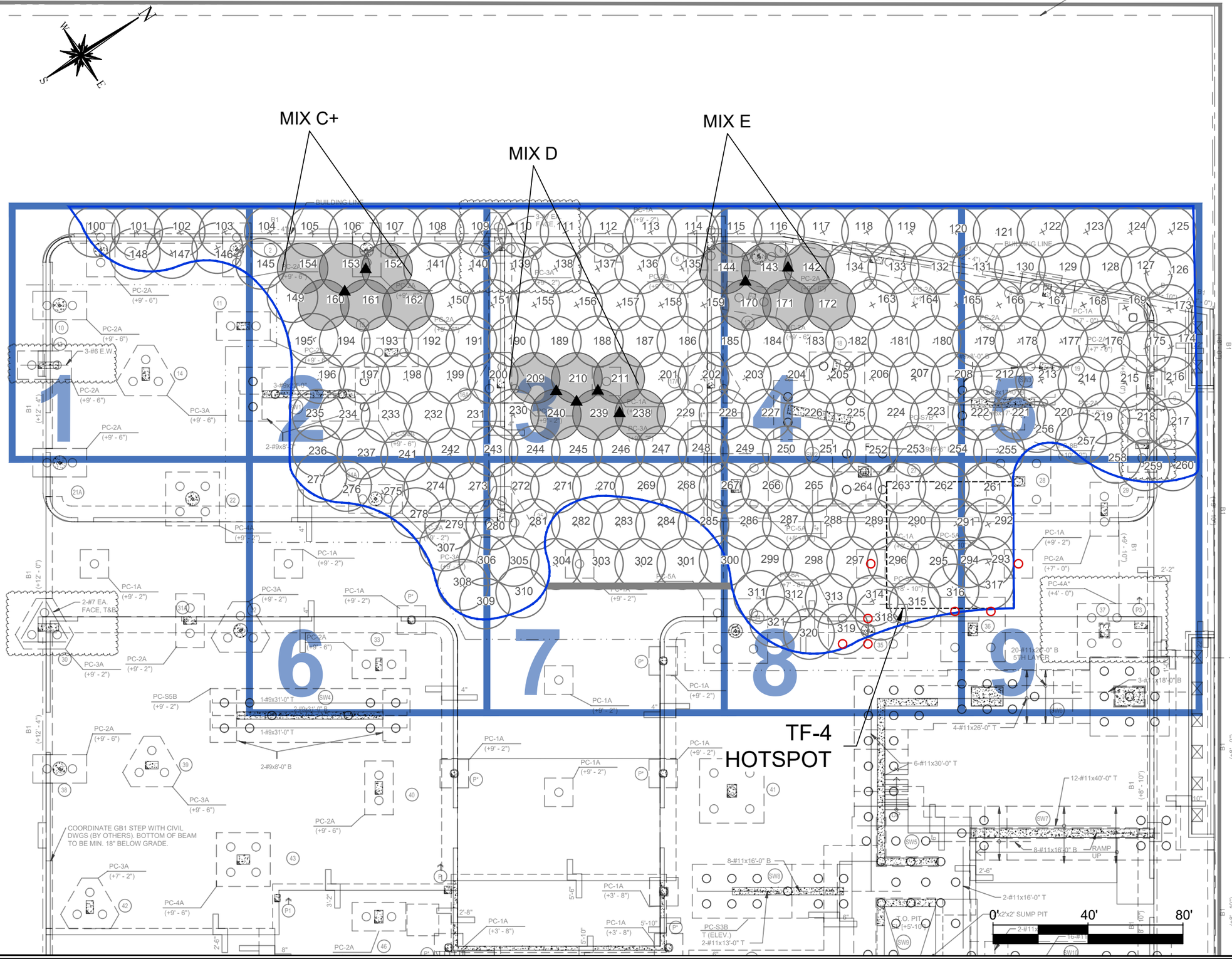
170 KEYLAND COURT
BOHEMIA, NEW YORK 11716
TEL (631) 269-8800
FAX (631) 269-1599

Figure 2

318 Nevins Street, Brooklyn, NY

Supplemental Pilot Test Locations and
Full Scale ISS Layout with Foundation
Pile Locations, QA/QC Core Grid Plan
Overlay and Pilot Test QA/QC Core
Boring Locations

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599



LEGEND

- ISS COLUMN (8FT - DIA.) DEPTH BGS VARIES
- ISS PILOT TEST LOCATION
- ISS GRID
- NAPL/GCM DELINEATION ISS BOUNDARY
- FOUNDATION PILES
- QA/QC PILOT TEST CORES

SUPPLEMENTAL PILOT TEST LOCATIONS AND FULL SCALE ISS LAYOUT WITH FOUNDATION PILE LOCATIONS, QA/QC CORE GRID PLAN OVERLAY AND PILOT TEST QA/QC CORE BORING LOCATIONS

300 Nevins Street
Brooklyn, New York
BLOCK: 439 LOT: 1

Figure 2

PROJECT NO.	15977-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	KK
DATE:	1/19/2024
SCALE:	1" = 40'
REVISIONS	

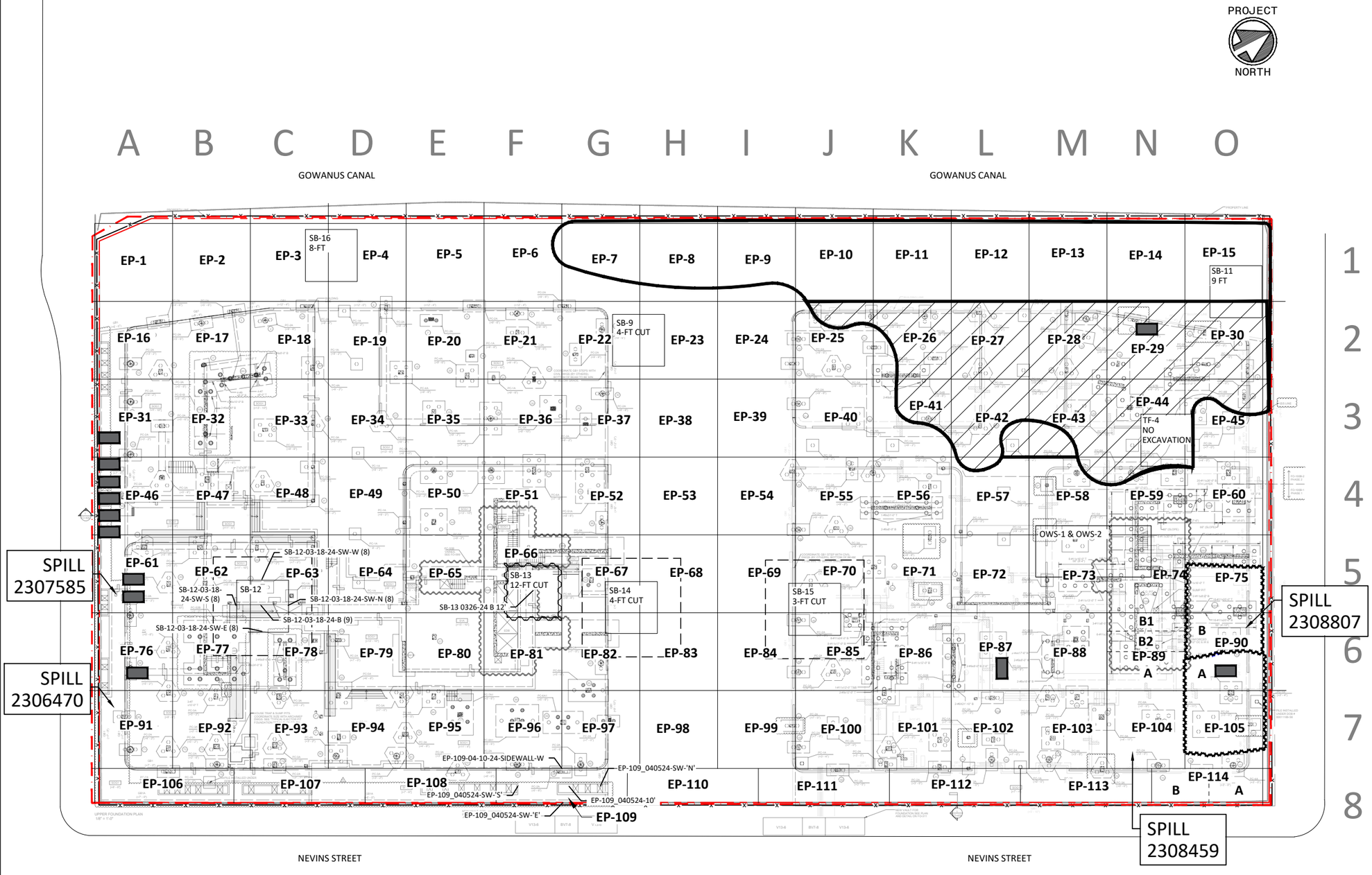
IMPACT ENVIRONMENTAL ENGINEERING AND GEOLOGY PLLC
170 KEYLAND COURT
BOHEMIA, NEW YORK 11716
TEL (631) 269-8800
FAX (631) 269-1599

Figure 3

318 Nevins Street, Brooklyn, NY

Alphanumeric Grid for Soil Excavation with Building Foundations Shown

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599



LEGEND

- PROPERTY LINE
- EXCAVATION SLOPE
- ISS/ISGS TREATMENT AREA
- UST LOCATION

ALPHANUMERIC GRID FOR SOIL EXCAVATION WITH BUILDING FOUNDATIONS

318 Nevins Street
Brooklyn, New York

Figure 3

PROJECT NO.	15977-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	KK
DATE:	3/25/2024
SCALE:	1" = 40'

REVISIONS

IMPACT ENVIRONMENTAL ENGINEERING AND GEOLOGY PLLC
170 KEYLAND COURT
BOHEMIA, NEW YORK 11716
TEL (631) 269-8800
FAX (631) 269-1599

APPENDICES

318 Nevins Street, Brooklyn, NY

ISS Remedial Design Work Plan

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

Appendix A

318 Nevins Street, Brooklyn, NY

Cascade Supplemental Pilot Test Performance
Data Summary Table

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

GOWANUS NEVINS STREET ISS REMEDIATION
AUGER MIXING METHODS
QC and PRODUCTION REPORT; BROOKLYN, NY

300 NEVINS STREET

Column ID No.	Date	Core Date + 7	No. of Overlaps	Column Diameter (ft)	Column Area (sf)	Overlap Area (sf)	Total Overlap Area (sf)	Effective Column Area (sf)	Top of Column Datum (AMSL ft)	Bottom Depth of Column (AMSL ft)	Design Column Length (ft)	Design Column Volume (cf)	Design Column Volume (cy)	Design Column Dry Wt (lbs)	Mixing Passes	Water to Reagent Ratio	Slag %	Cement %	Water %	Total Water Weight (lbs)	Total Water Weight (kg)	Total Water (gallons)	Water Per Batch (gallons)	Water Per Batch (lb)	Water Per Batch (kg)	Slag Per Batch (lb)	Slag Per Batch (kg)	Cement Per Batch (lb)	Cement Per Batch (kg)	Batch Weight (lb)	Batch Weight (kg)	Slag Addition (lb)	Cement Addition (lb)	Water Addition (gallons)	Design Batches per Column	Actual Batches	Column Length (ft)	Volume Mixed (CY)
Mix C+																																						
154	10/4/2024	10/11/2024	0	8	50.24	2.9	0	50.24	8	-19	27	1356.48	50.24	142430	2	1.25	5.00%	6.00%	13.75%	19,584.18	8,881.43	2,348.22	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	7121.5	8545.8	2,348.22	13.05	15.00	28	52.101
152	10/4/2024	10/11/2024	0	8	50.27	2.9	0	50.27	7.91667	-19	26.91667	1353.101	50.115	142076	2	1.25	5.00%	6.00%	13.75%	19,535.39	8,859.30	2,342.37	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	7103.8	8524.5	2,342.37	13.01	15.00	28	52.132
161	10/15/2024	10/22/2024	4	8	50.27	2.9	11.6	38.67	7.75	-19	26.75	1034.423	38.312	108614	2	1.25	5.00%	6.00%	13.75%	14,934.47	6,772.78	1,790.70	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	5430.7	6516.9	1,790.70	9.95	10.00	28	40.102
160	10/15/2024	10/22/2024	2	8	50.24	2.9	5.8	44.44	7.75	-19	26.75	1188.77	44.029	124821	2	1.25	5.00%	6.00%	13.75%	17,162.87	7,783.36	2,057.90	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	6241	7489.3	2,057.90	11.43	12.00	28	46.086
162	10/9/2024	10/16/2024	1	8	50.27	2.9	2.9	47.37	7.91667	-19	26.91667	1275.043	47.224	133879	2	1.25	5.00%	6.00%	13.75%	18,408.43	8,348.22	2,207.25	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	6694	8032.8	2,207.25	12.26	13.00	28	49.124
153	10/8/2024	10/15/2024	4	8	50.27	2.9	11.6	38.67	7.83333	-19	26.83333	1037.645	38.431	108953	2	1.25	5.00%	6.00%	13.75%	14,981.00	6,793.88	1,796.28	180	1501.2	680.79	545.89	247.56	655.07	297.07	2,702.16	1,225.43	5447.6	6537.2	1,796.28	9.98	11.00	28	40.102
Mix D																																						
240	10/7/2024	10/14/2024	0	8	50.27	2.9	0	50.27	7.75	-19	26.75	1344.723	49.805	141196	2	1.25	5.00%	8.00%	16.25%	22,944.33	10,405.25	2,751.12	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	7059.8	11296	2,751.12	15.28	16.00	28	52.132
238	10/7/2024	10/14/2024	0	8	50.27	2.9	0	50.27	7.58333	-19	26.58333	1336.344	49.494	140316	2	1.25	5.00%	8.00%	16.25%	22,801.37	10,340.42	2,733.98	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	7015.8	11225	2,733.98	15.19	16.00	28	52.132
210	10/9/2024	10/16/2024	1	8	50.27	2.9	2.9	47.37	7.75	-19	26.75	1267.148	46.931	133050	2	1.25	5.00%	8.00%	16.25%	21,620.70	9,804.99	2,592.41	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	6652.5	10644	2,592.41	14.40	15.00	28	49.124
209	10/11/2024	10/18/2024	1	8	50.27	2.9	2.9	47.37	7.75	-19	26.75	1267.148	46.931	133050	2	1.25	5.00%	8.00%	16.25%	21,620.70	9,804.99	2,592.41	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	6652.5	10644	2,592.41	14.40	16.00	28	49.124
211	10/11/2024	10/18/2024	2	8	50.27	2.9	5.8	44.47	7.66667	-19	26.66667	1185.867	43.921	124516	2	1.25	5.00%	8.00%	16.25%	20,233.85	9,176.05	2,426.12	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	6225.8	9961.3	2,426.12	13.48	17.00	28	46.117
239	10/8/2024	10/15/2024	4	8	50.27	2.9	11.6	38.67	7.75	-19	26.75	1034.423	38.312	108614	2	1.25	5.00%	8.00%	16.25%	17,649.83	8,004.20	2,116.29	180	1501.2	680.79	461.91	209.48	739.05	335.16	2,702.16	1,225.43	5430.7	8689.1	2,116.29	11.76	12.00	28	40.102
Mix E																																						
144	10/7/2024	10/14/2024	0	8	50.27	2.9	0	50.27	7.16667	-19	26.16667	1315.398	48.718	138117	2	1.25	6.00%	9.00%	18.75%	25,896.90	11,744.25	3,105.14	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	8287	12431	3,105.14	17.25	18.00	28	52.132
142	10/8/2024	10/15/2024	0	8	50.27	2.9	0	50.27	7.33333	-19	26.33333	1323.777	49.029	138997	2	1.25	6.00%	9.00%	18.75%	26,061.85	11,819.05	3,124.92	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	8339.8	12510	3,124.92	17.36	18.00	28	52.132
171	10/15/2024	10/22/2024	1	8	50.27	2.9	2.9	47.37	7.25	-19	26.25	1243.463	46.054	130564	2	1.25	6.00%	9.00%	18.75%	24,480.67	11,101.98	2,935.33	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	7833.8	11751	2,935.33	16.31	19.00	28	49.124
172	10/10/2024	10/17/2024	2	8	50.27	2.9	5.8	38.67	7.25	-19	26.25	1015.088	37.596	106584	2	1.25	6.00%	9.00%	18.75%	19,984.54	9,062.99	2,396.23	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	6395.1	9592.6	2,396.23	13.31	14.00	28	40.102
170	10/15/2024	10/22/2024	2	8	50.27	2.9	5.8	44.47	7.25	-19	26.25	1167.338	43.235	122570	2	1.25	6.00%	9.00%	18.75%	22,981.96	10,422.32	2,755.63	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	7354.2	11031	2,755.63	15.31	16.00	28	46.117
143	10/9/2024	10/16/2024	2	8	50.27	2.9	5.8	38.67	7.25	-19	26.25	1015.088	37.596	106584	2	1.25	6.00%	9.00%	18.75%	19,984.54	9,062.99	2,396.23	180	1501.2	680.79	480.38	217.85	720.58	326.78	2,702.16	1,225.43	6395.1	9592.6	2,396.23	13.31	14.00	28	40.102

Printed:

Appendix B

318 Nevins Street, Brooklyn, NY SCM

Reports for Treatment Columns and

NYSDEC Approval for TF-4

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

SCM Report

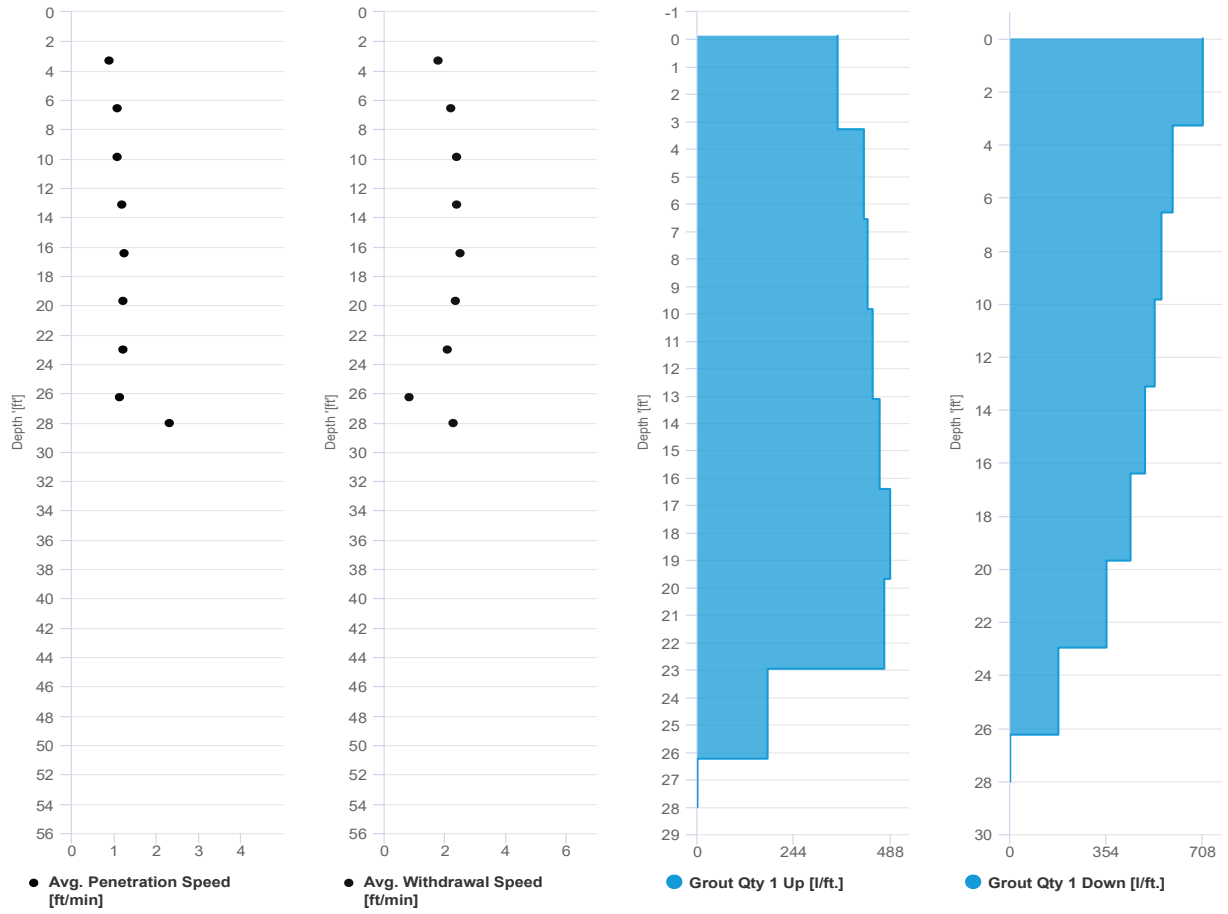
CASCADE

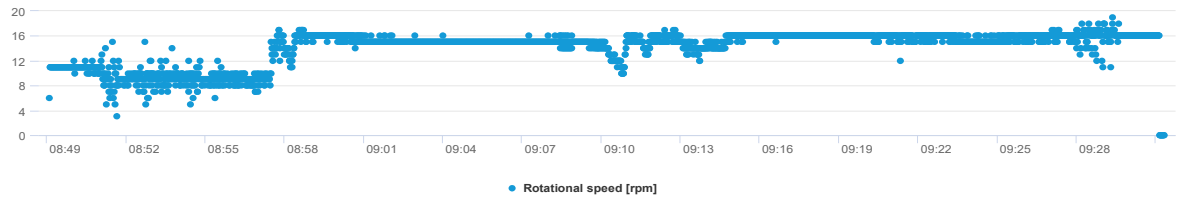
		Element name Project number	**154a**
		Start date	10/04/2024
Drilling rig	BG36H_5625		

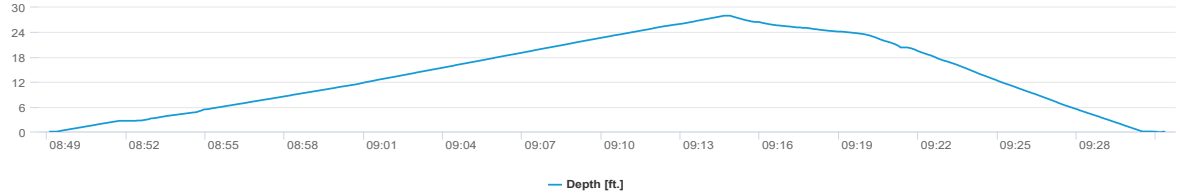
Details

Max. depth	28.018 ft.
Volume/m 1	10.241 ft³

Start time	08:49 AM
End Date	10/04/2024
End time	09:31 AM
Production duration	00:42:14
Final depth time	09:14 AM
Total suspension quantity	86.168 ft³







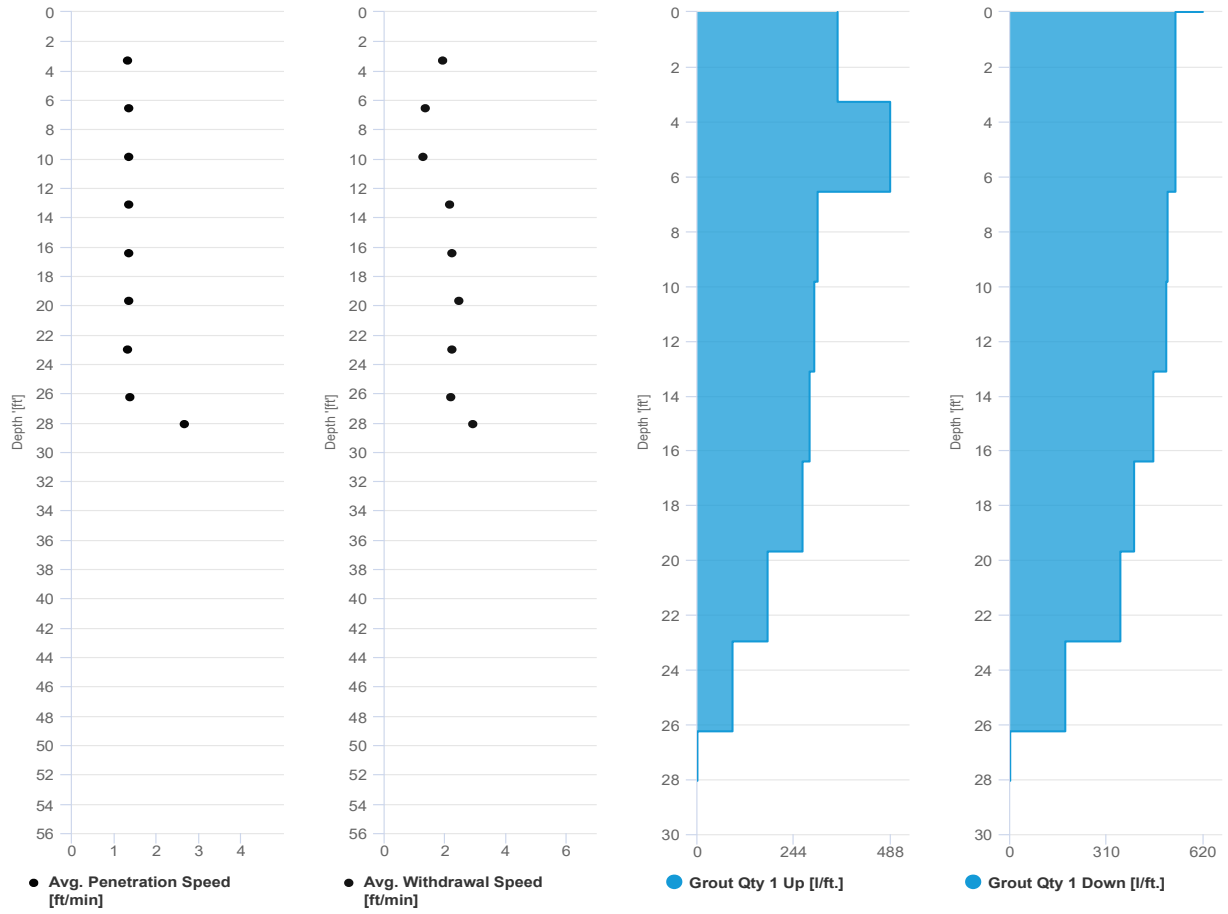
SCM Report

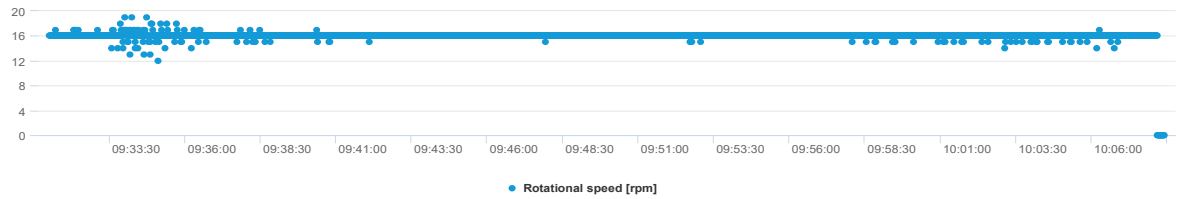
		Element name Project number	**154b**
		Start date	10/04/2024
Drilling rig	BG36H_5625		

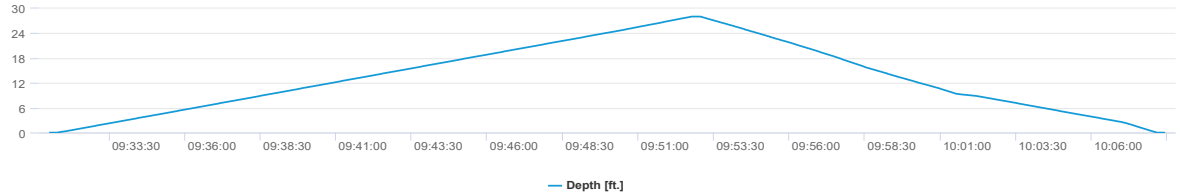
Details

Max. depth	28.051 ft.
Volume/m 1	10.241 ft³

Start time	09:31 AM
End Date	10/04/2024
End time	10:08 AM
Production duration	00:36:54
Final depth time	09:52 AM
Total suspension quantity	88.993 ft³







SCM Report

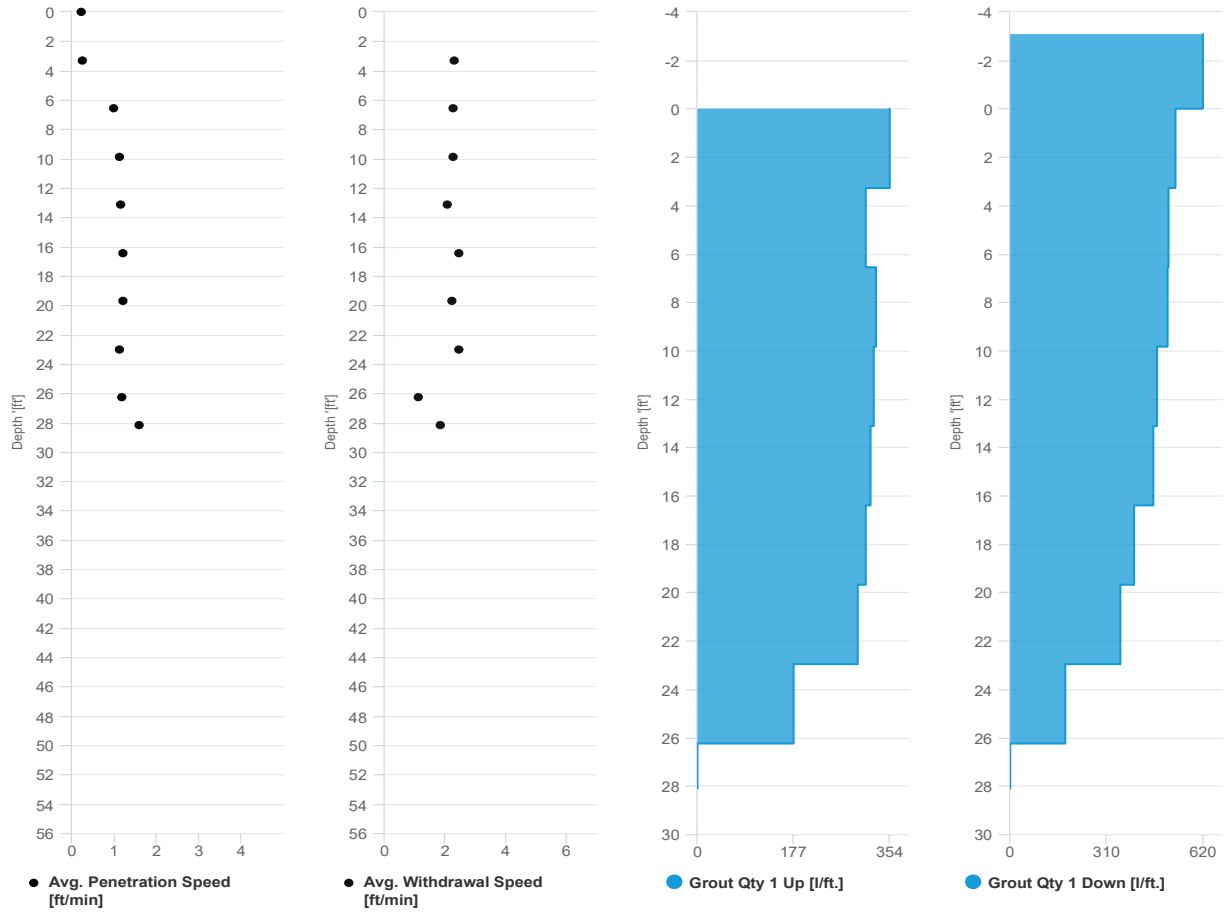
CASCADE

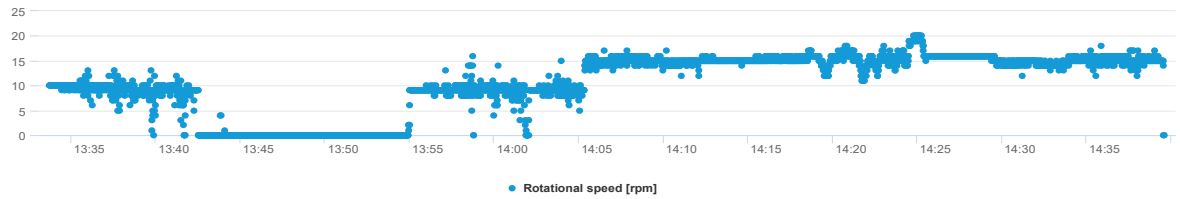
		Element name Project number	**152a**
		Start date	10/04/2024
Drilling rig	BG36H_5625		

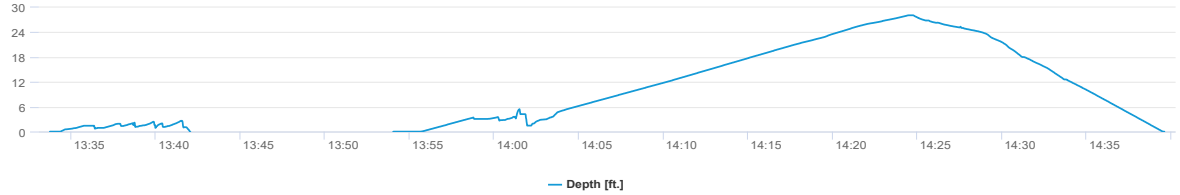
Details

Max. depth	28.117 ft.
Volume/m 1	11.301 ft³

Start time	01:33 PM
End Date	10/04/2024
End time	02:39 PM
Production duration	01:05:53
Final depth time	02:24 PM
Total suspension quantity	96.056 ft³







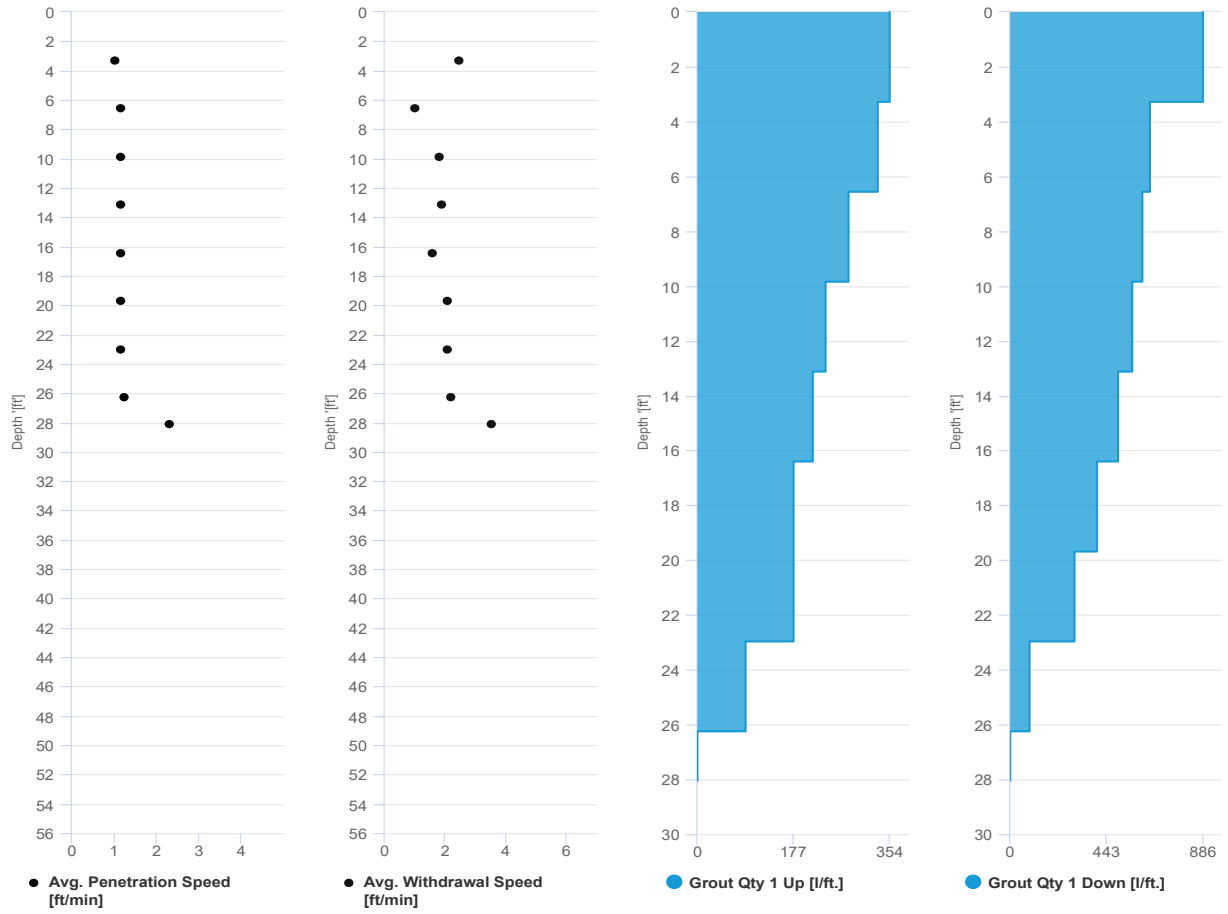
SCM Report

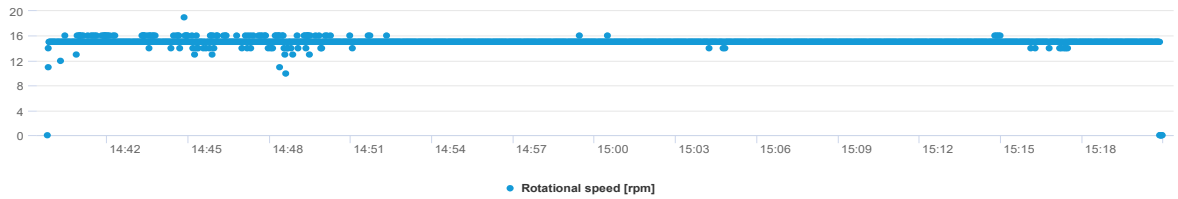
CASCADE

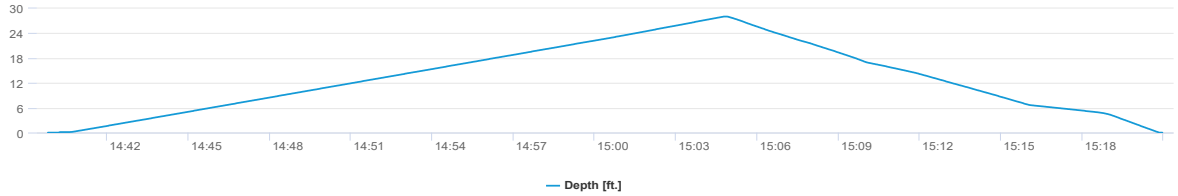
		Element name Project number	**152b**
		Start date	10/04/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	02:39 PM
Volume/m 1	11.301 ft³	End Date	10/04/2024
		End time	03:20 PM
		Production duration	00:41:10
		Final depth time	03:04 PM
		Total suspension quantity	96.056 ft³







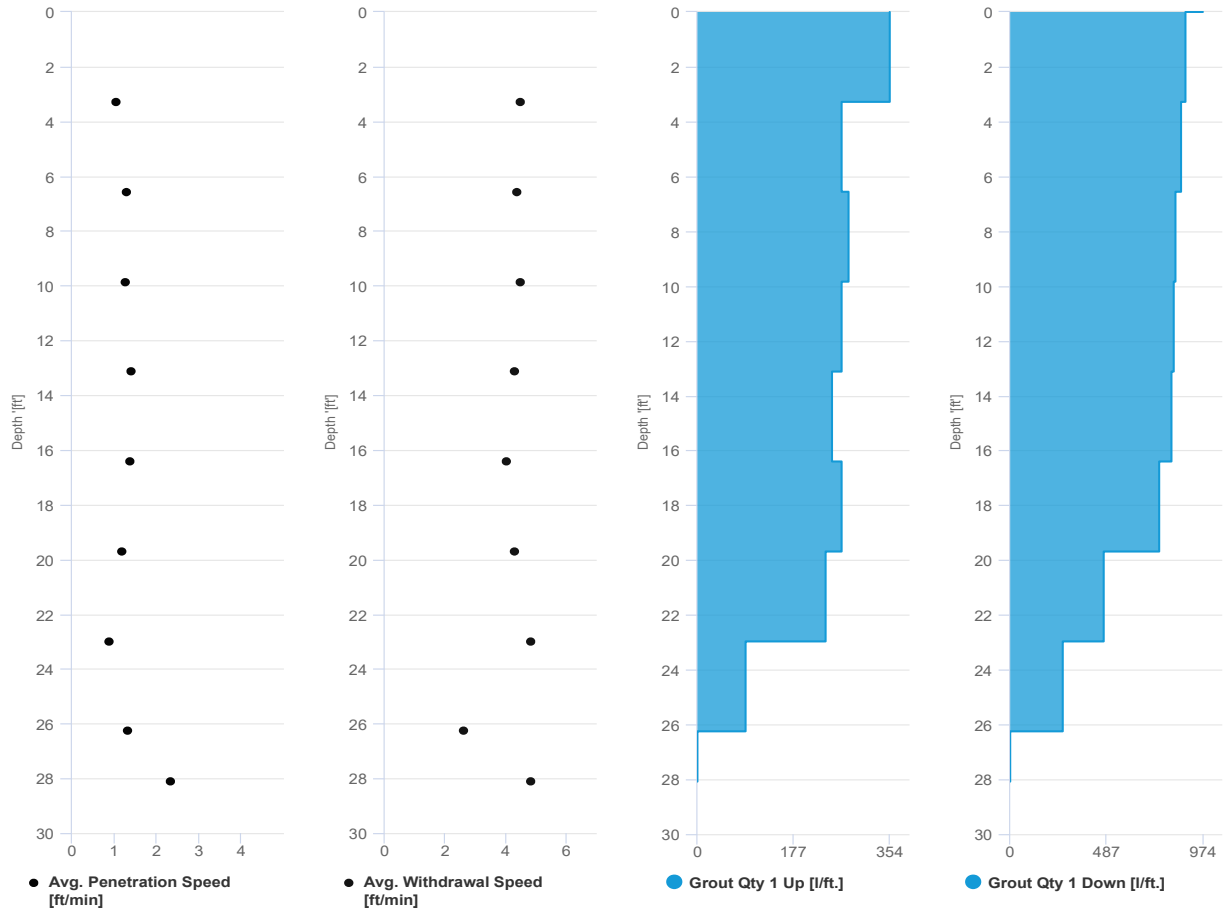
SCM Report

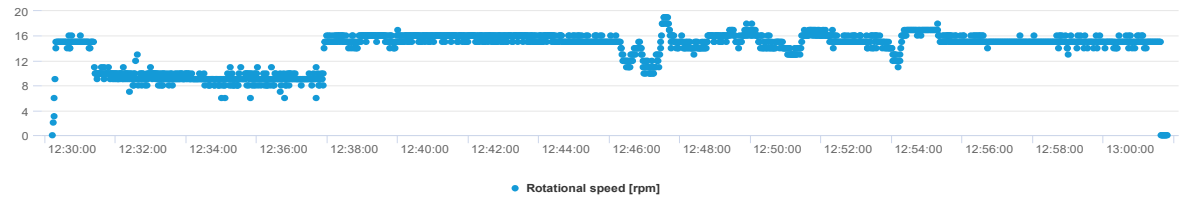
CASCADE

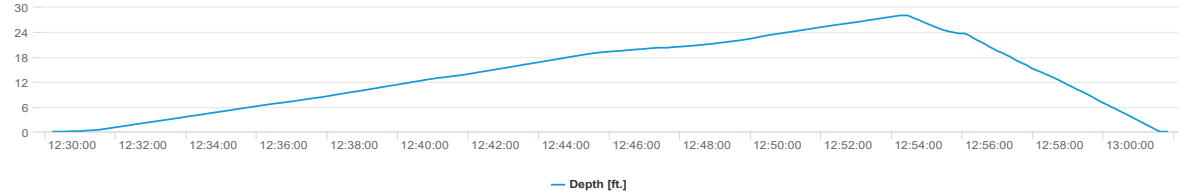
		Element name Project number	**238a**
		Start date	10/07/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.084 ft.	Start time	12:30 PM
Volume/m 1	11.654 ft³	End Date	10/07/2024
		End time	01:01 PM
		Production duration	00:31:37
		Final depth time	12:54 PM
		Total suspension quantity	98.881 ft³



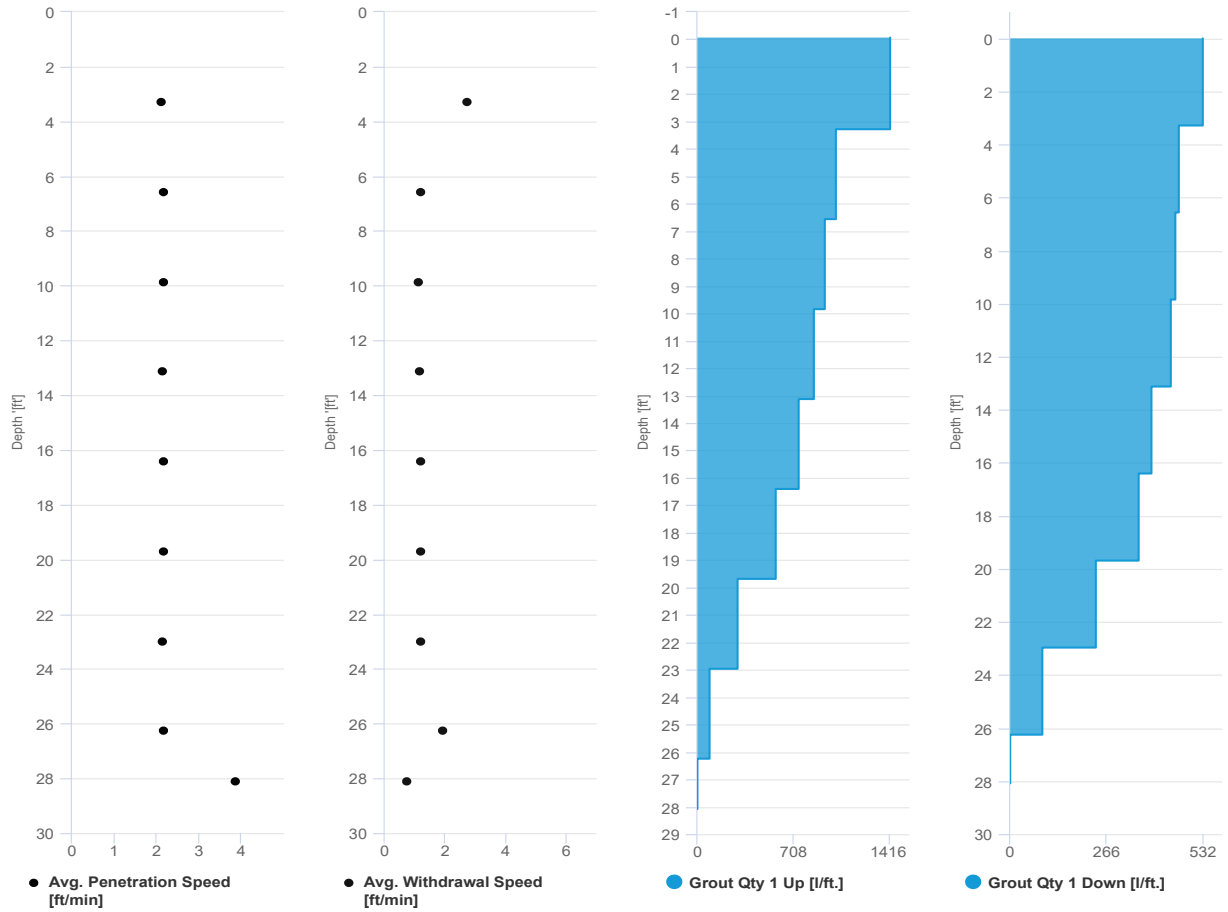


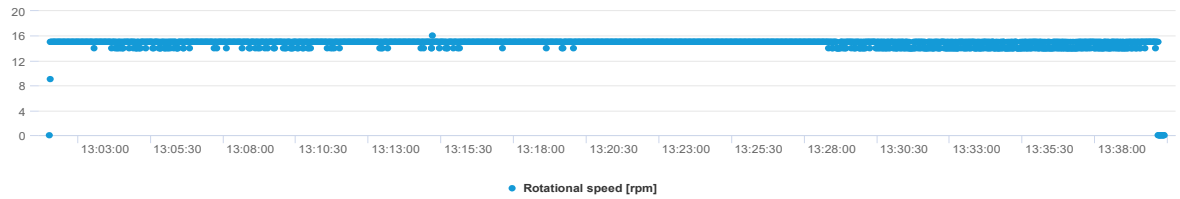


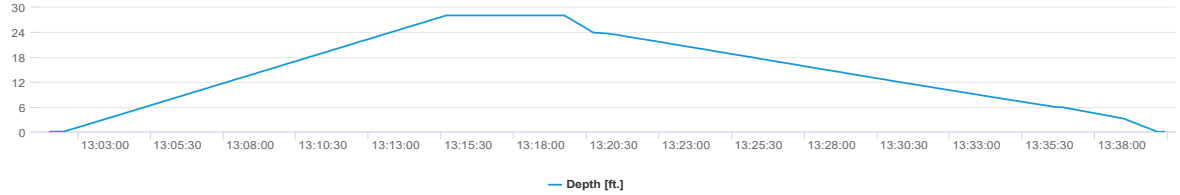
SCM Report

CASCADE

		Element name Project number	**238b**
		Start date	10/07/2024
Drilling rig	BG36H_5625		
Details Max. depth Volume/m 1	 28.084 ft. 14.832 ft³	 Start time End Date End time Production duration Final depth time Total suspension quantity	 01:02 PM 10/07/2024 01:40 PM 00:38:22 01:15 PM 125.72 ft³







SCM Report

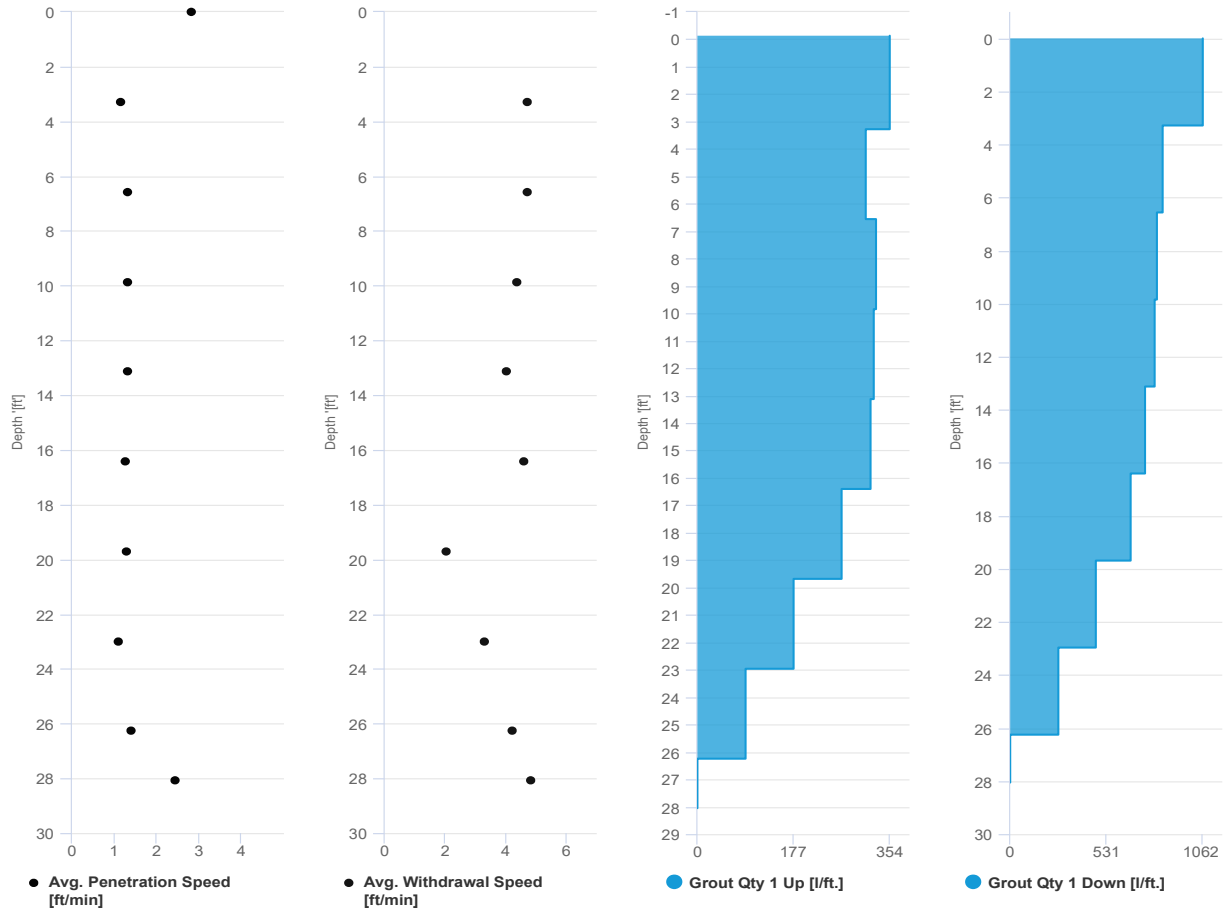
CASCADE

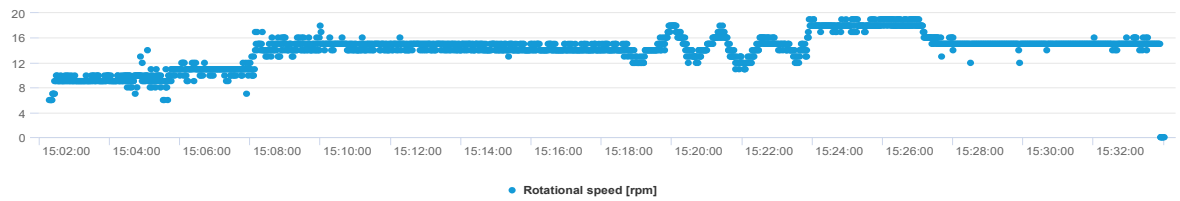
		Element name Project number	**144a**
		Start date	10/07/2024
Drilling rig	BG36H_5625		

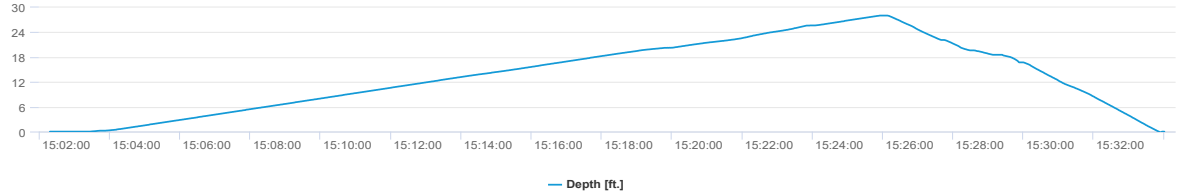
Details

Max. depth	28.051 ft.
Volume/m 1	11.654 ft³

Start time	03:02 PM
End Date	10/07/2024
End time	03:34 PM
Production duration	00:31:44
Final depth time	03:25 PM
Total suspension quantity	100.294 ft³

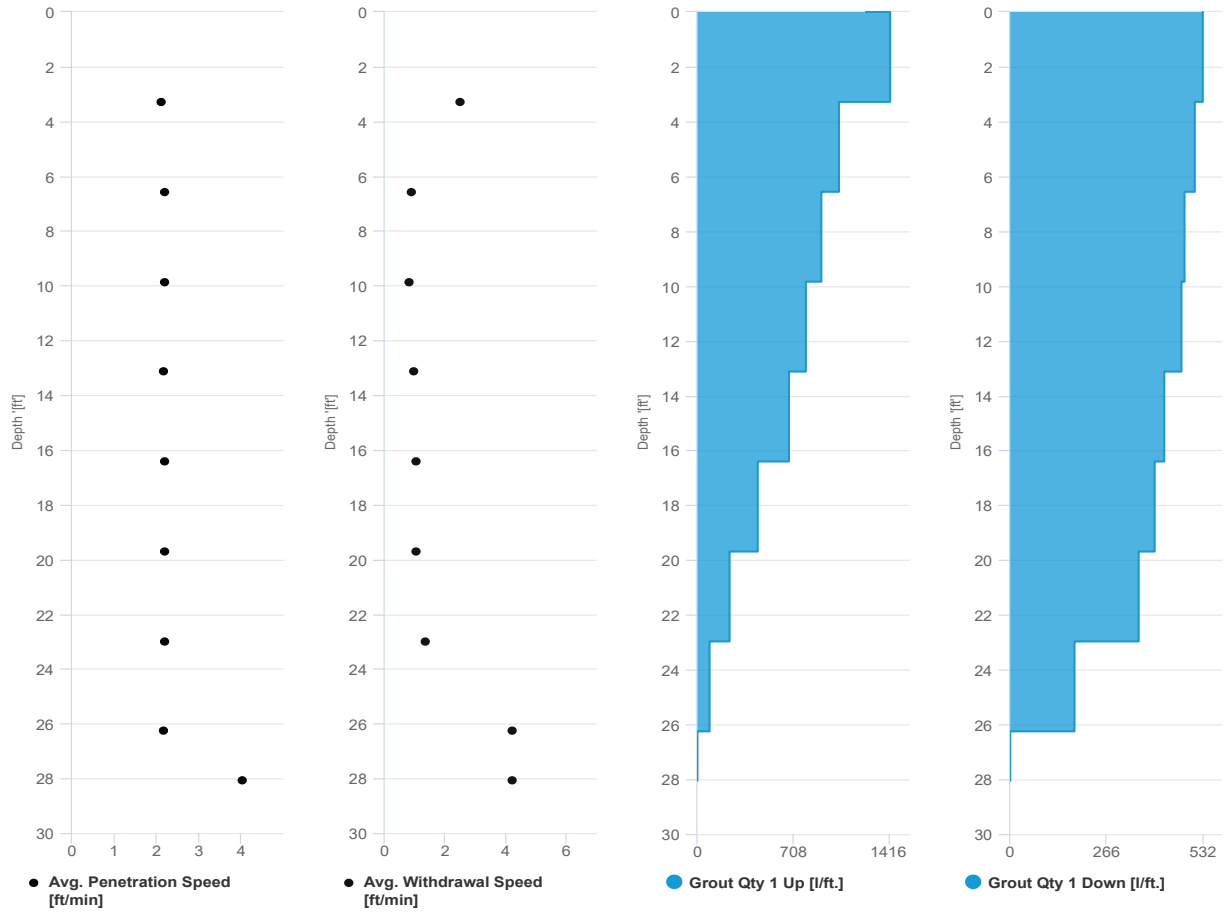


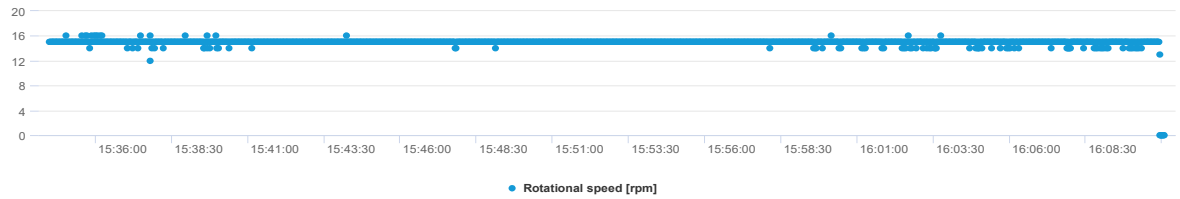


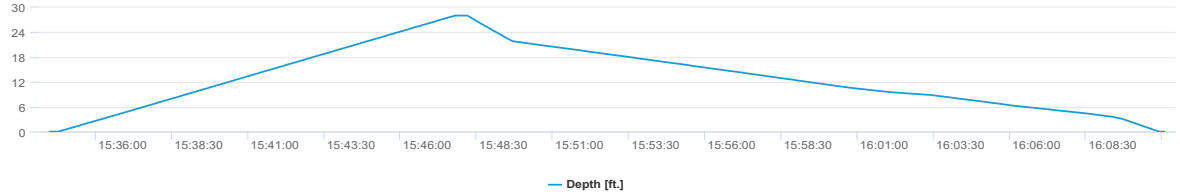


SCM Report

		Element name Project number	**144b**
		Start date	10/07/2024
Drilling rig	BG36H_5625		
Details Max. depth Volume/m 1	 28.051 ft. 15.185 ft³	 Start time End Date End time Production duration Final depth time Total suspension quantity	 03:34 PM 10/07/2024 04:11 PM 00:36:36 03:47 PM 129.958 ft³







SCM Report

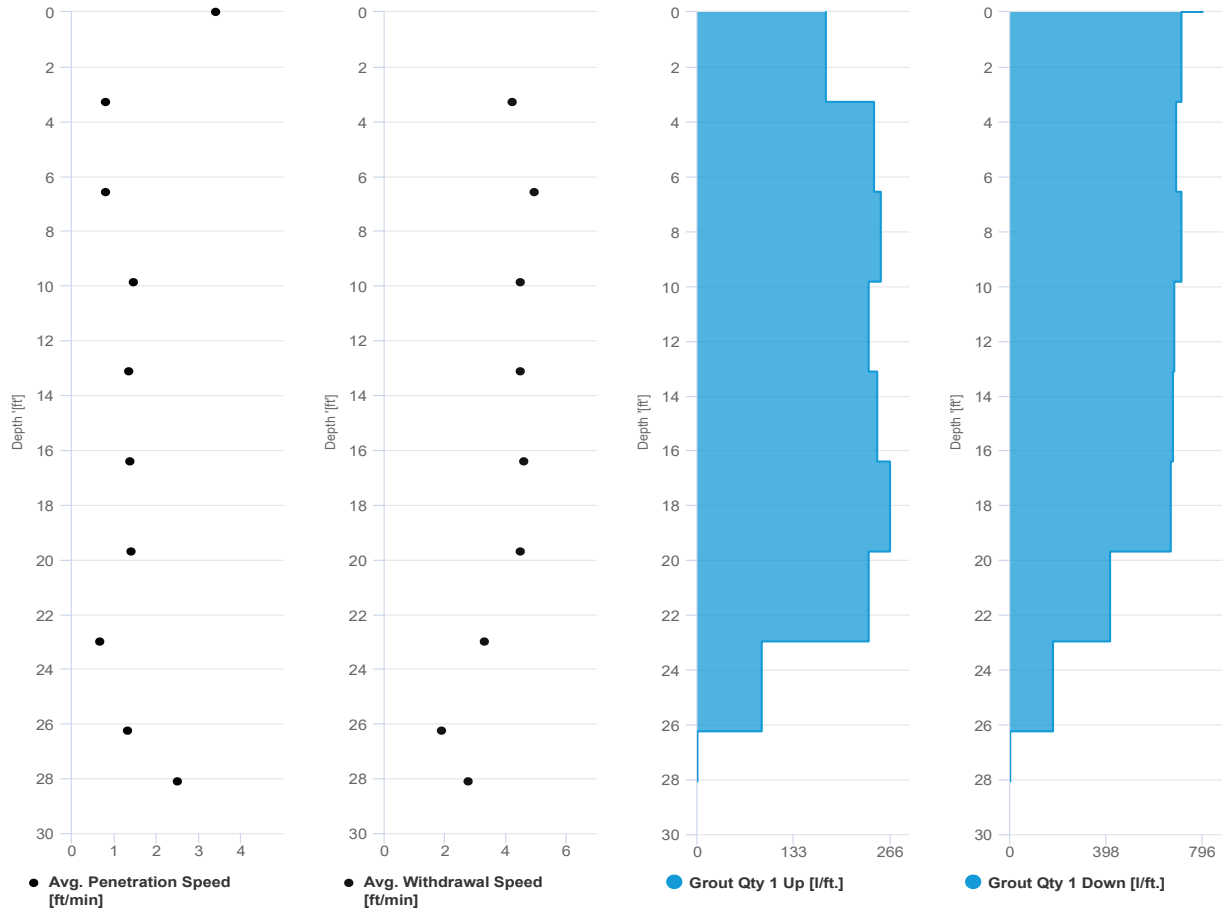
CASCADE

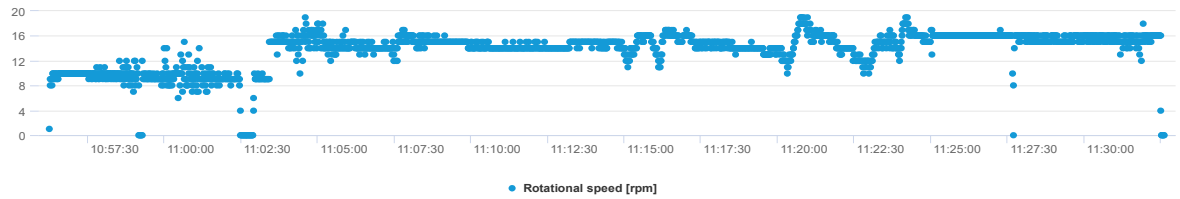
		Element name Project number	**240a**
		Start date	10/07/2024
Drilling rig	BG36H_5625		

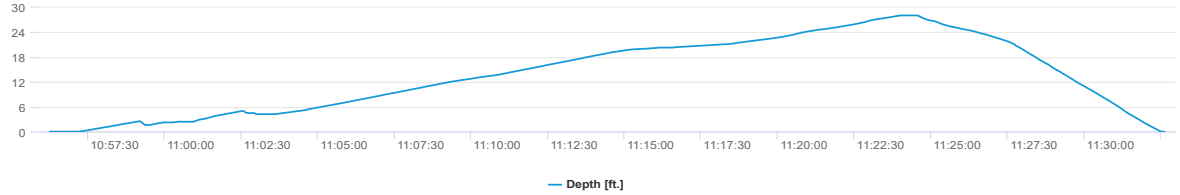
Details

Max. depth	28.084 ft.
Volume/m 1	10.241 ft³

Start time	10:56 AM
End Date	10/07/2024
End time	11:32 AM
Production duration	00:36:22
Final depth time	11:24 AM
Total suspension quantity	87.58 ft³







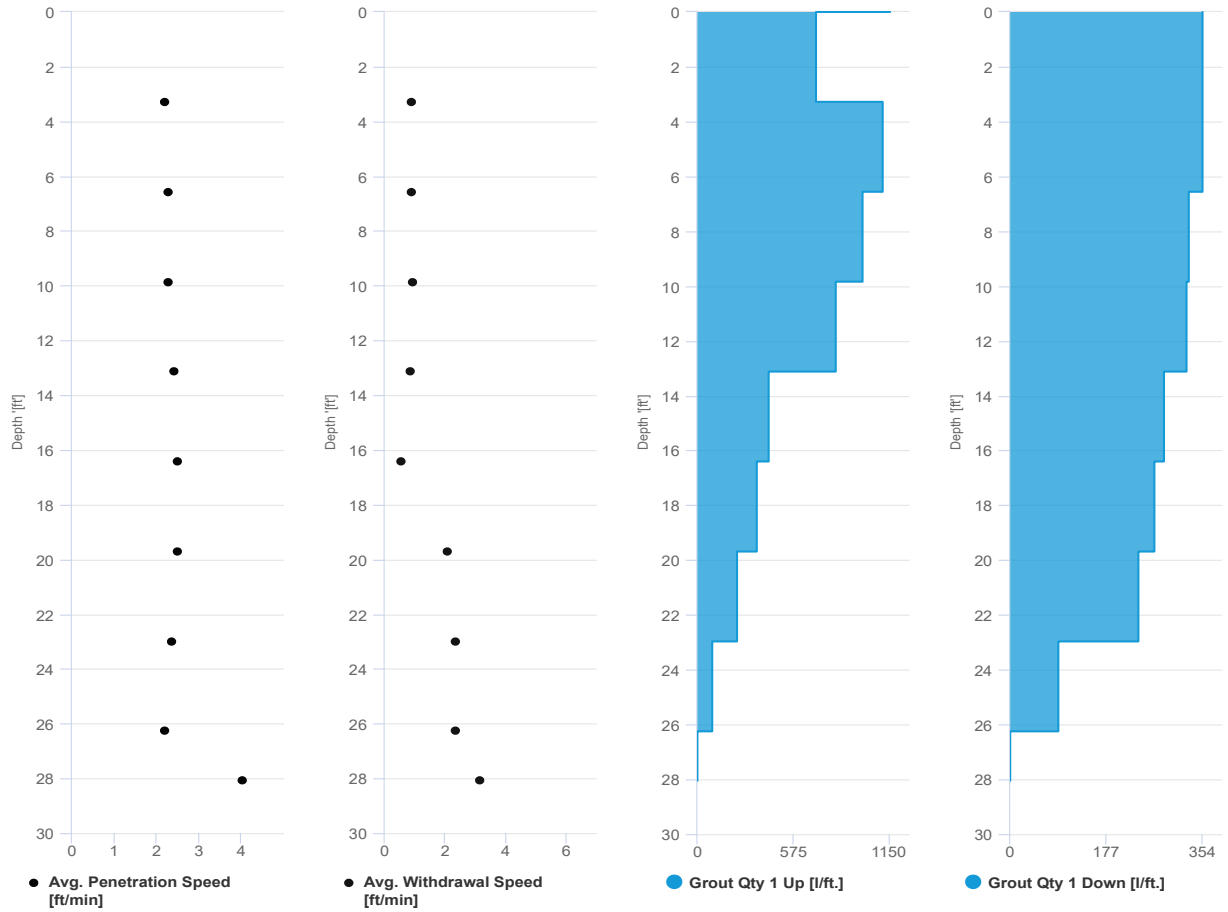
SCM Report

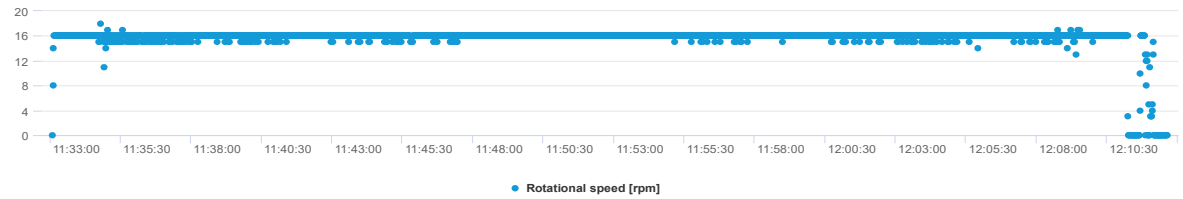
CASCADE

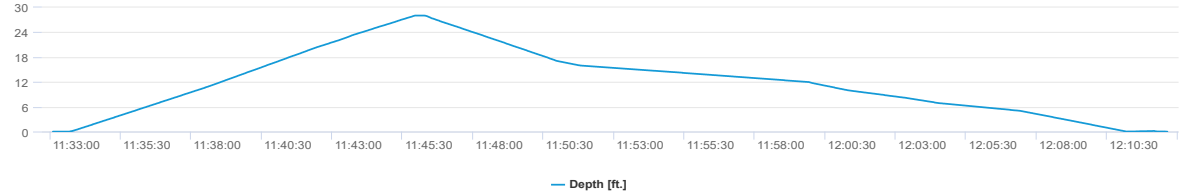
		Element name Project number	**240b**
		Start date	10/07/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	11:33 AM
Volume/m 1	15.538 ft³	End Date	10/07/2024
		End time	12:12 PM
		Production duration	00:39:34
		Final depth time	11:45 AM
		Total suspension quantity	132.783 ft³

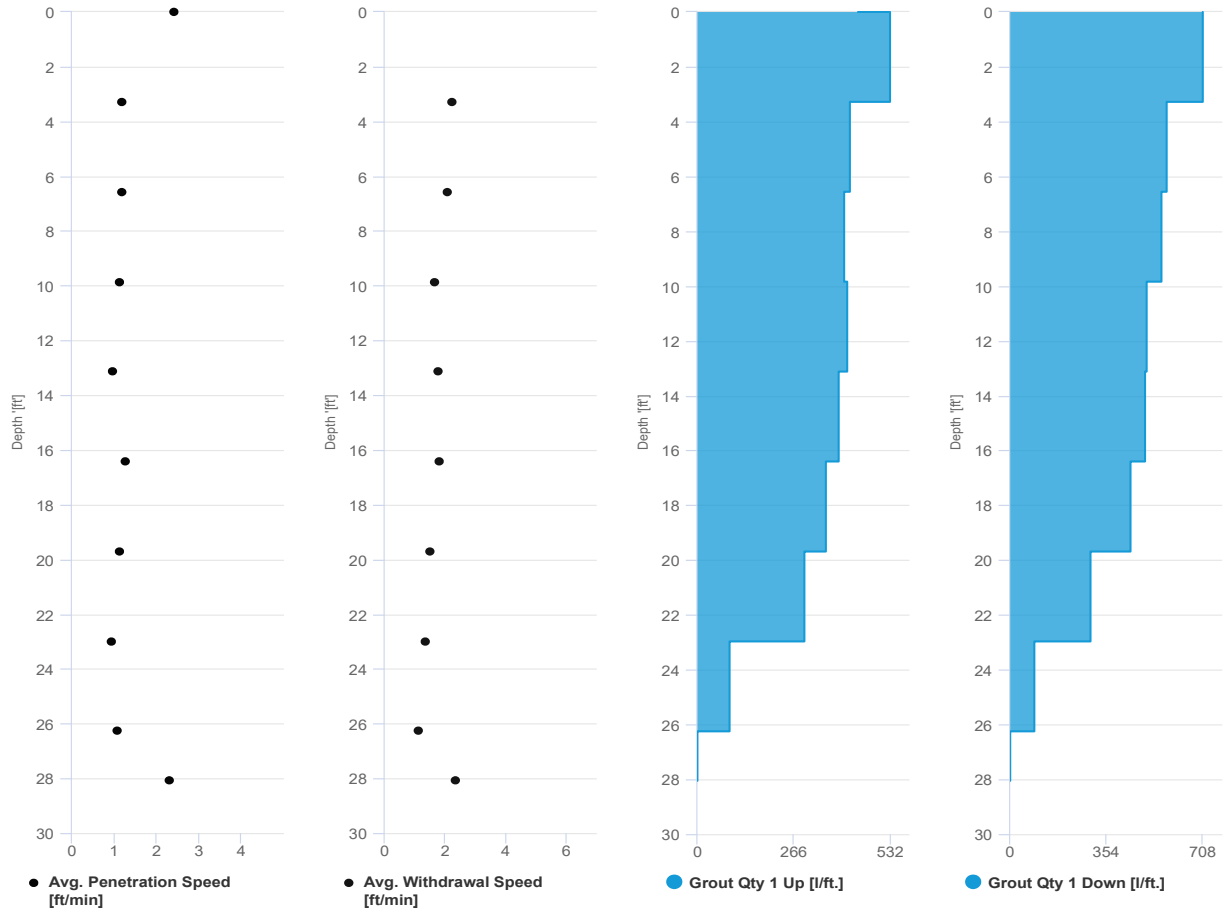


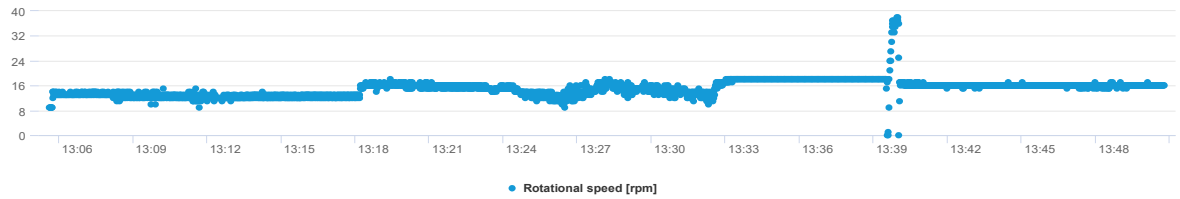


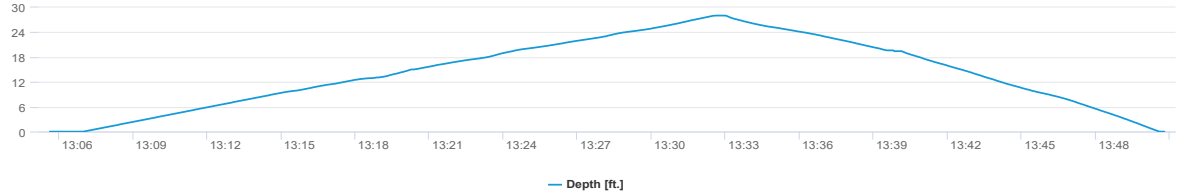


SCM Report

		Element name Project number	**239a**
		Start date	10/08/2024
Drilling rig	BG36H_5625		
Details Max. depth Volume/m 1	 28.051 ft. 10.241 ft³	Start time End Date End time Production duration Final depth time Total suspension quantity	01:05 PM 10/08/2024 01:50 PM 00:45:10 01:32 PM 86.168 ft³





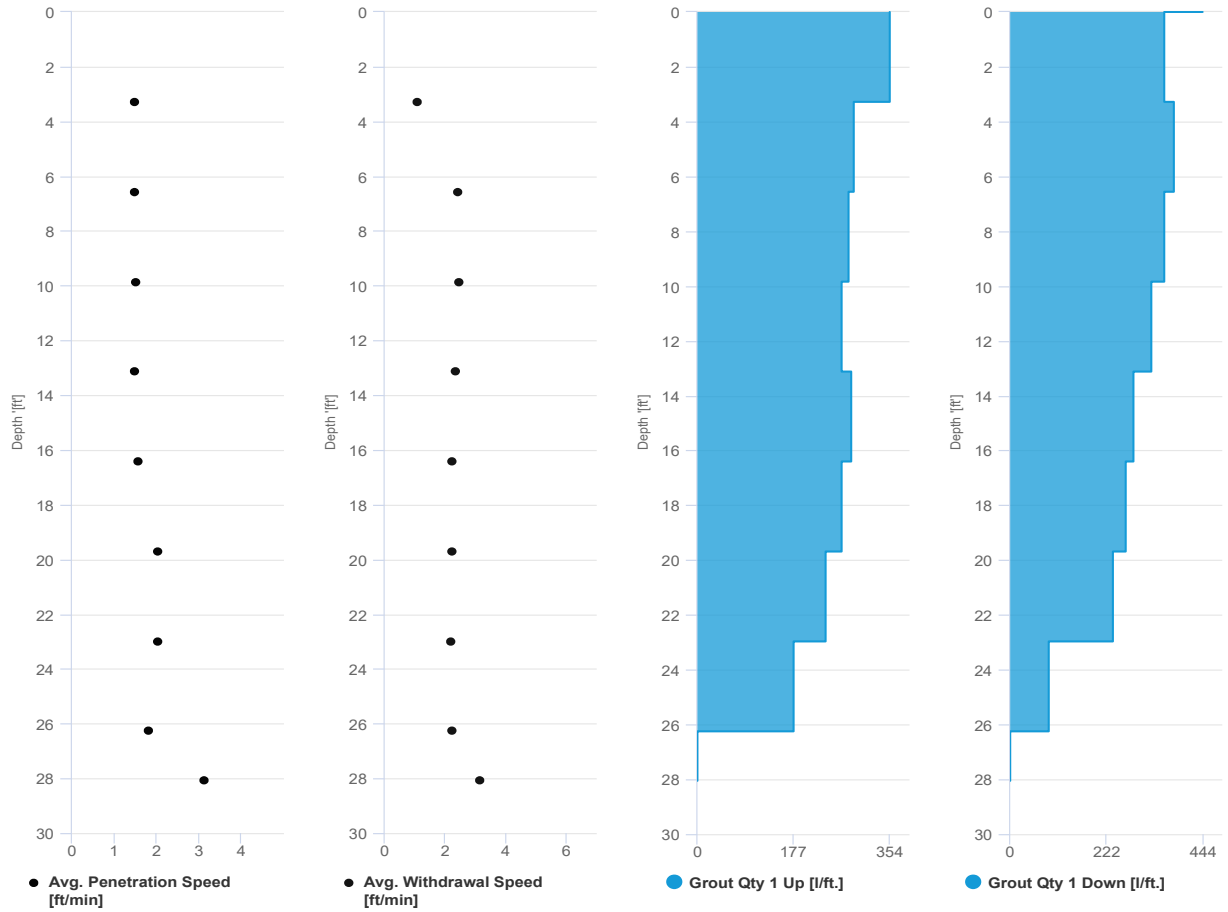


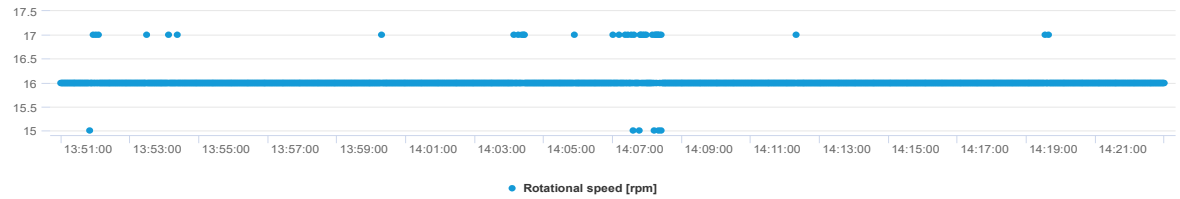
SCM Report

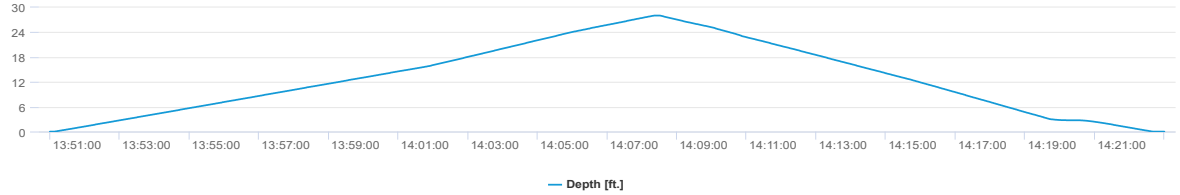
		Element name Project number	**239b**
		Start date	10/08/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	01:51 PM
Volume/m 1	7.769 ft³	End Date	10/08/2024
		End time	02:23 PM
		Production duration	00:32:01
		Final depth time	02:08 PM
		Total suspension quantity	64.979 ft³







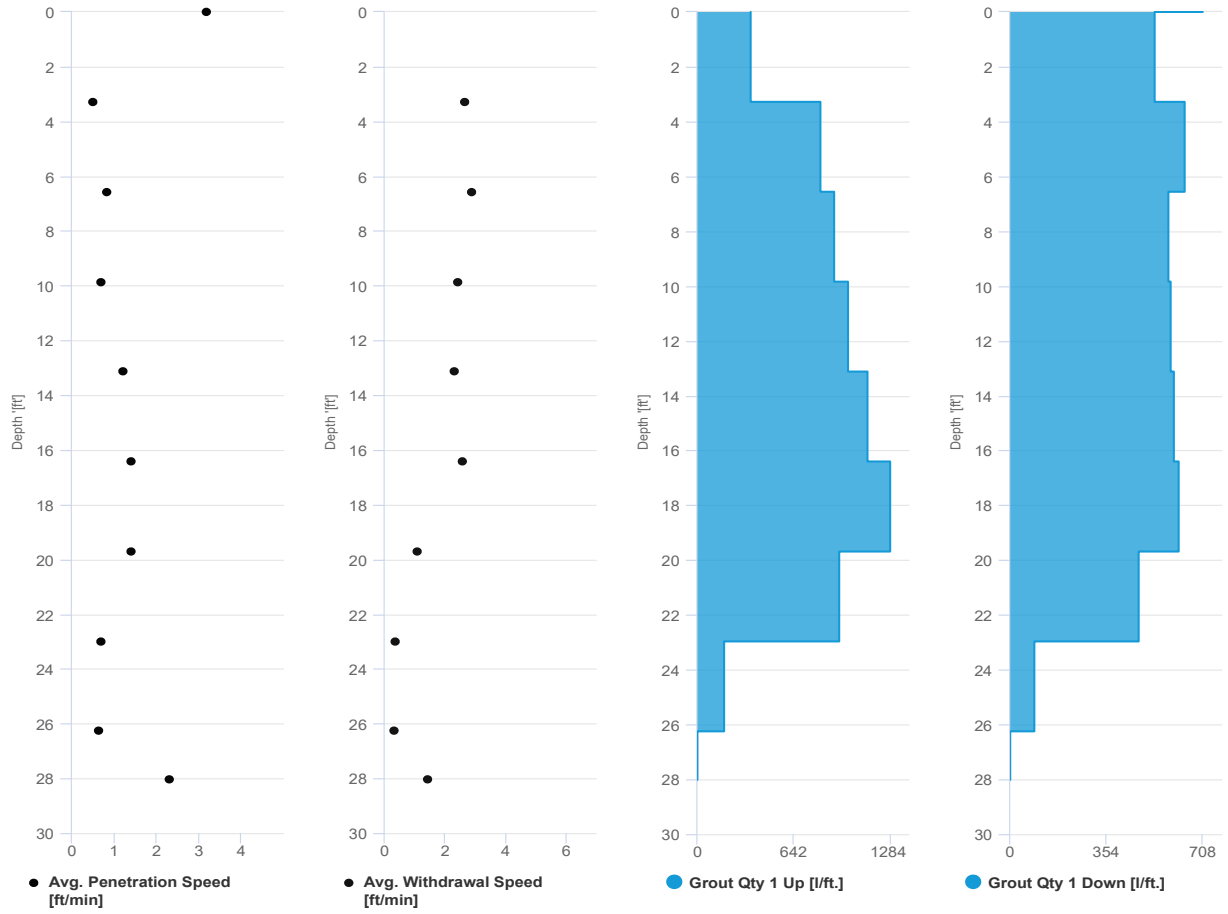
SCM Report

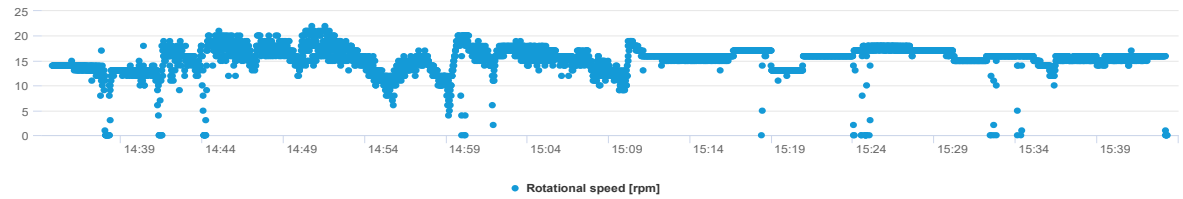
CASCADE

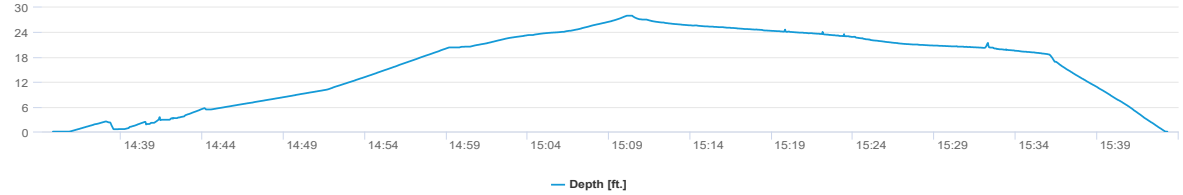
		Element name Project number	**153a**
		Start date	10/08/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.018 ft.	Start time	02:34 PM
Volume/m 1	14.126 ft³	End Date	10/08/2024
		End time	03:43 PM
		Production duration	01:08:32
		Final depth time	03:10 PM
		Total suspension quantity	121.483 ft³







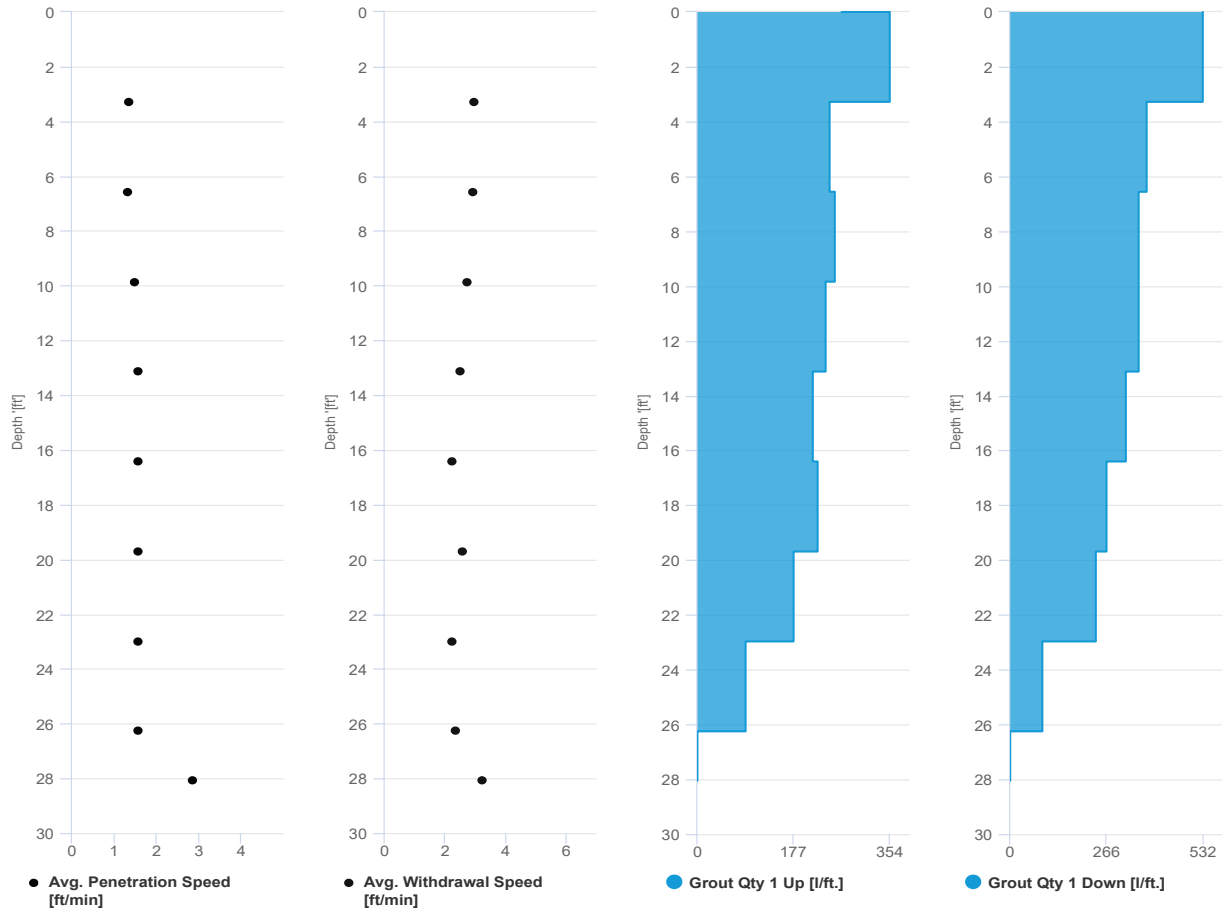
SCM Report

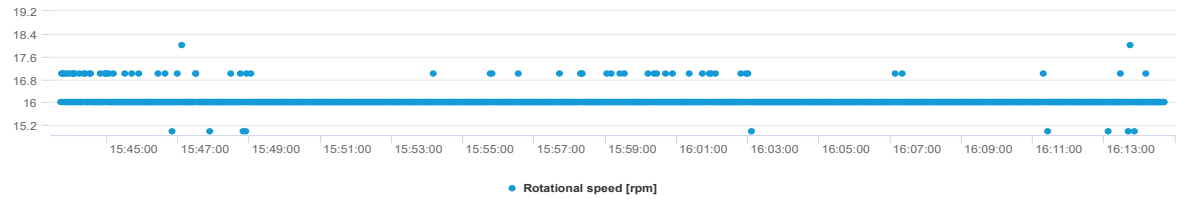
		Element name Project number	**153b**
		Start date	10/08/2024
Drilling rig	BG36H_5625		

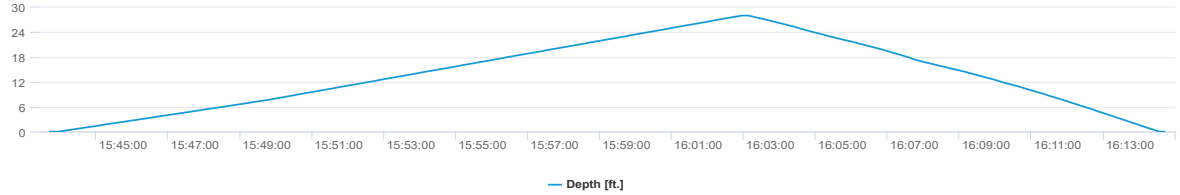
Details

Max. depth	28.051 ft.
Volume/m 1	6.003 ft³

Start time	03:43 PM
End Date	10/08/2024
End time	04:14 PM
Production duration	00:31:00
Final depth time	04:02 PM
Total suspension quantity	52.266 ft³







SCM Report

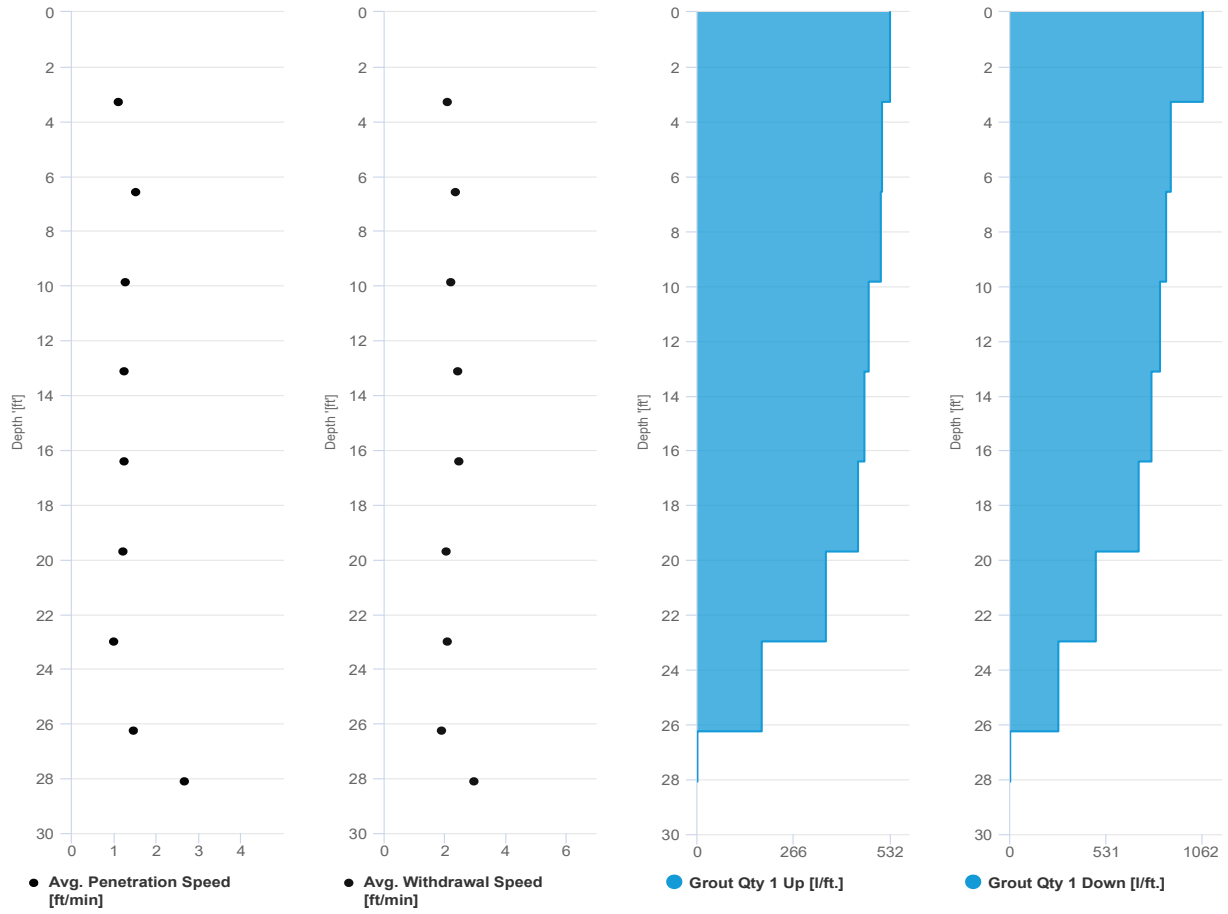
CASCADE

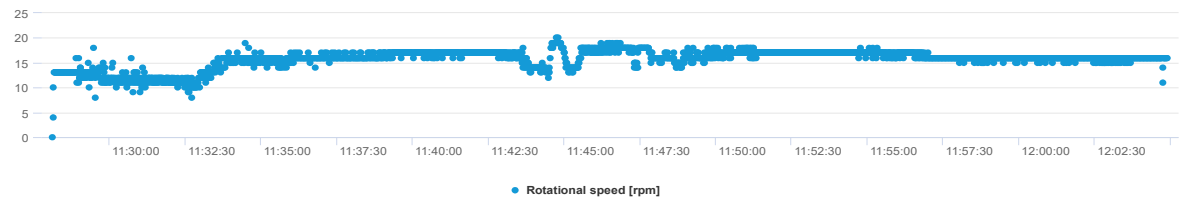
		Element name Project number	**142a**
		Start date	10/08/2024
Drilling rig	BG36H_5625		

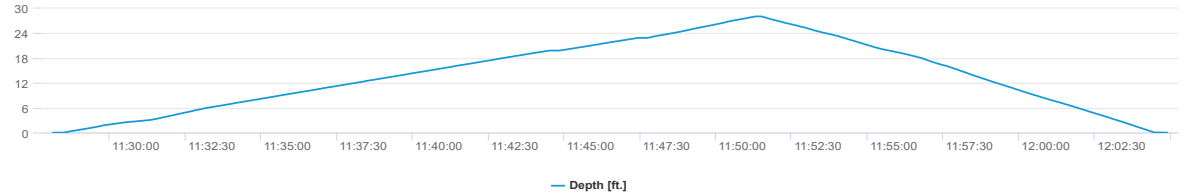
Details

Max. depth	28.084 ft.
Volume/m 1	13.42 ft³

Start time	11:28 AM
End Date	10/08/2024
End time	12:04 PM
Production duration	00:36:47
Final depth time	11:51 AM
Total suspension quantity	115.832 ft³







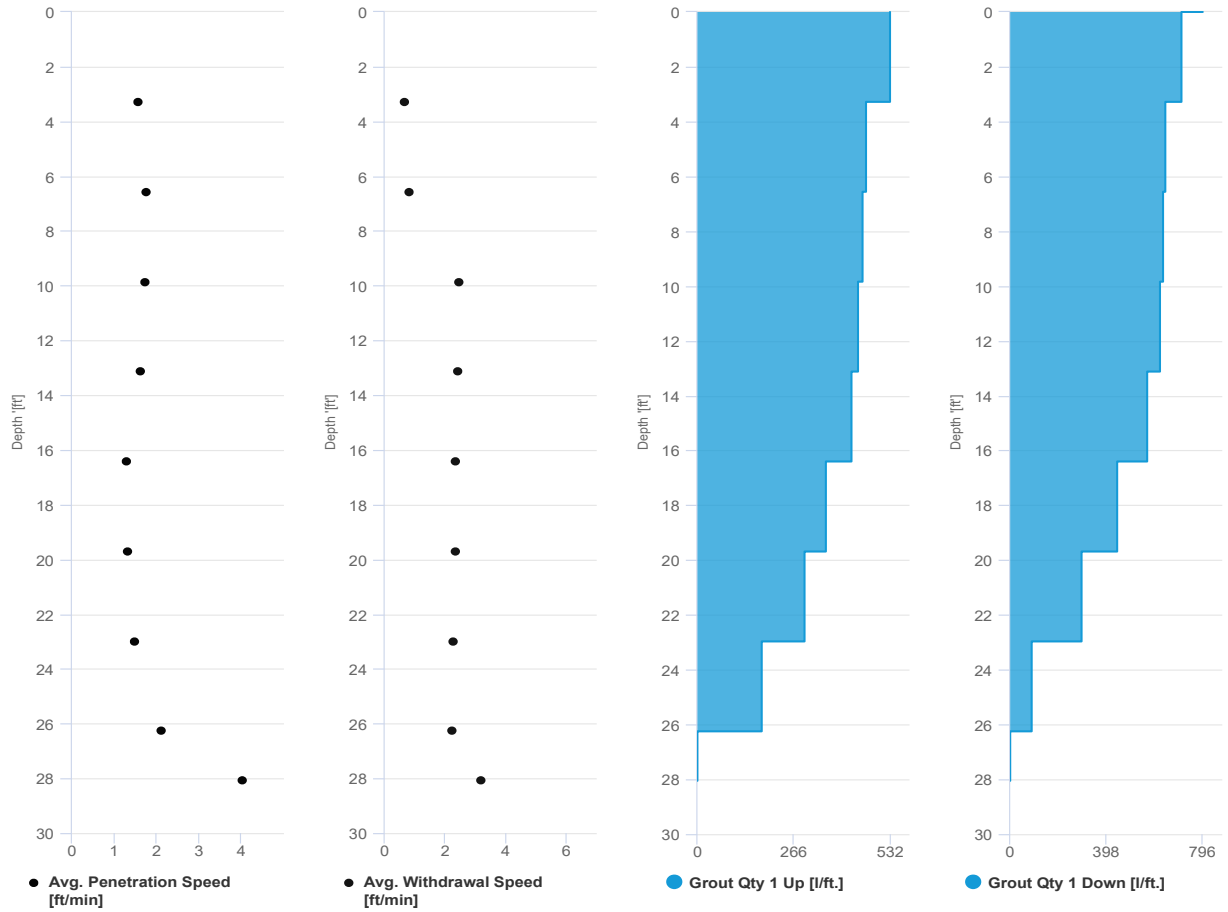
SCM Report

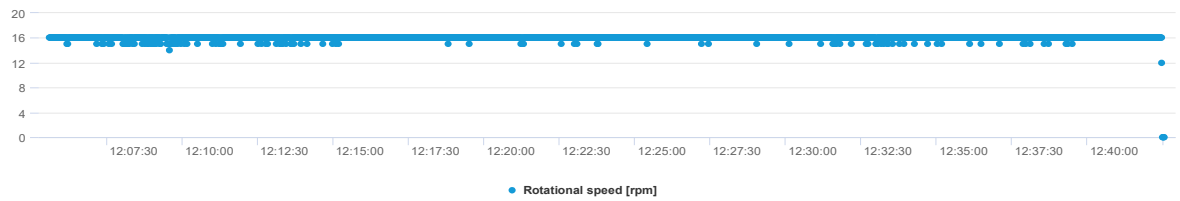
		Element name Project number	**142b**
		Start date	10/08/2024
Drilling rig	BG36H_5625		

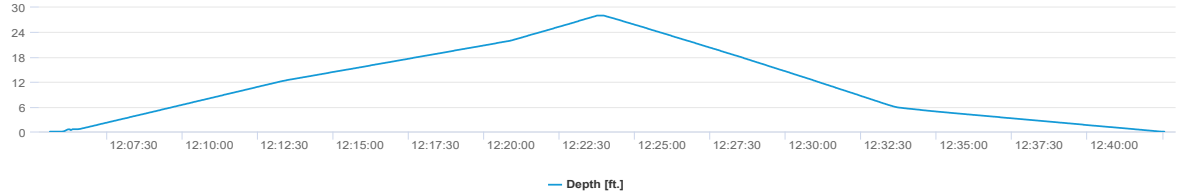
Details

Max. depth	28.051 ft.
Volume/m 1	13.773 ft³

Start time	12:05 PM
End Date	10/08/2024
End time	12:42 PM
Production duration	00:36:57
Final depth time	12:23 PM
Total suspension quantity	117.245 ft³







SCM Report

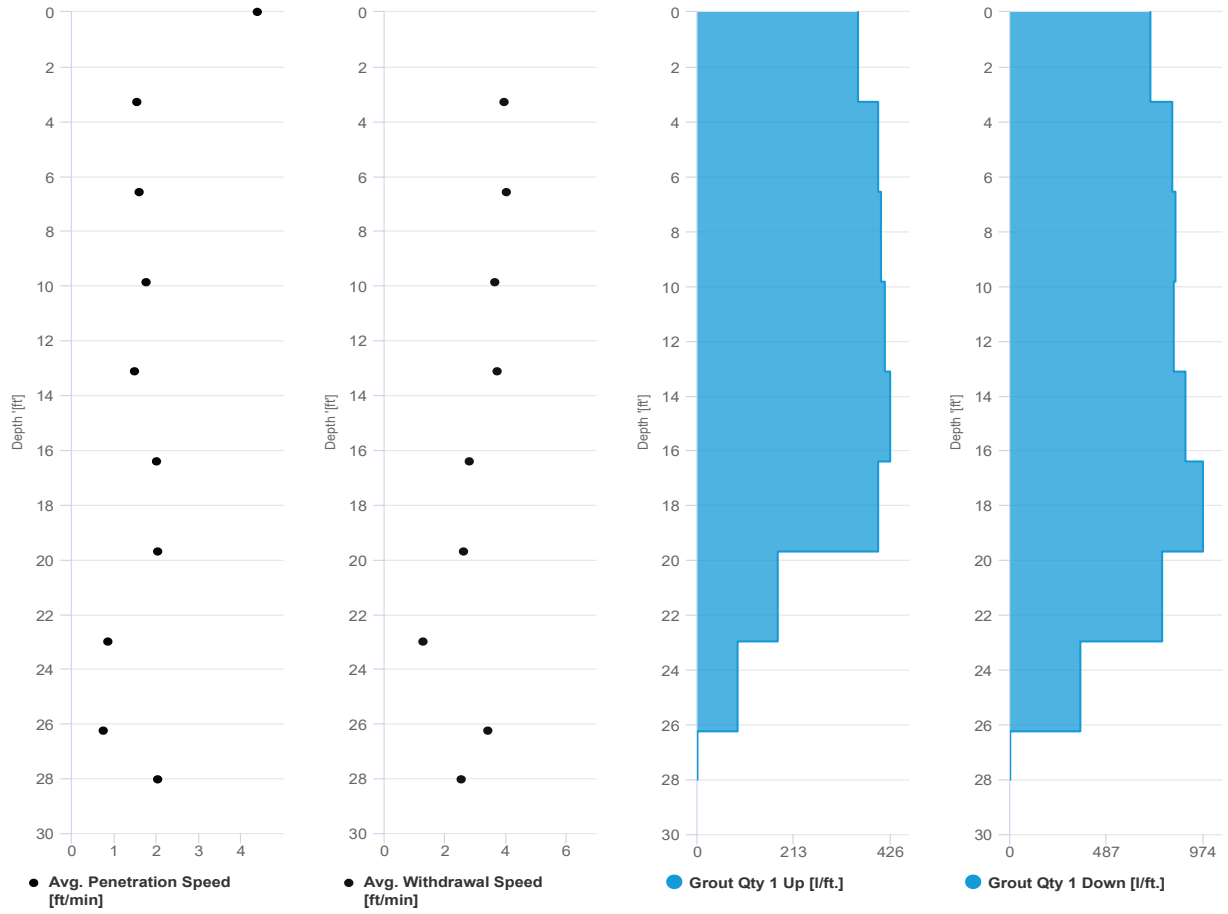
CASCADE

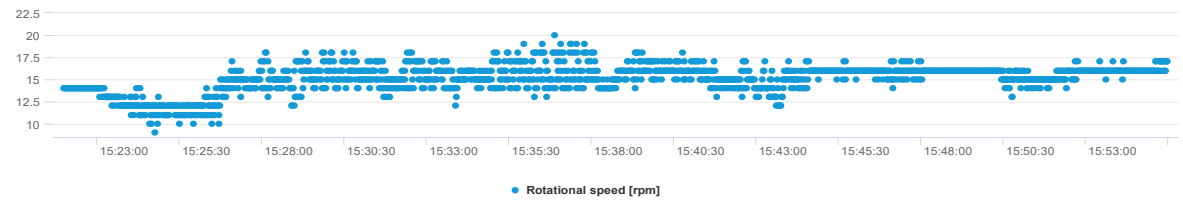
		Element name Project number	**210a**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

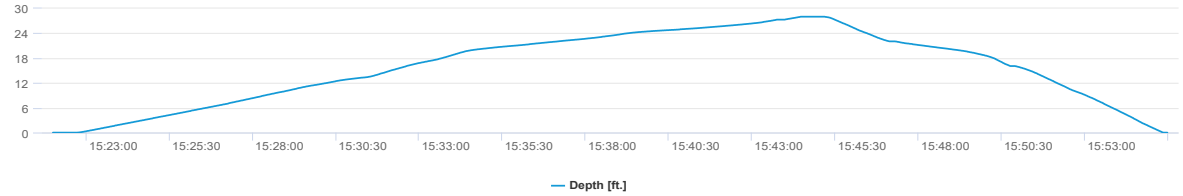
Details

Max. depth	28.018 ft.
Volume/m 1	11.654 ft³

Start time	03:22 PM
End Date	10/09/2024
End time	03:55 PM
Production duration	00:33:30
Final depth time	03:44 PM
Total suspension quantity	100.294 ft³







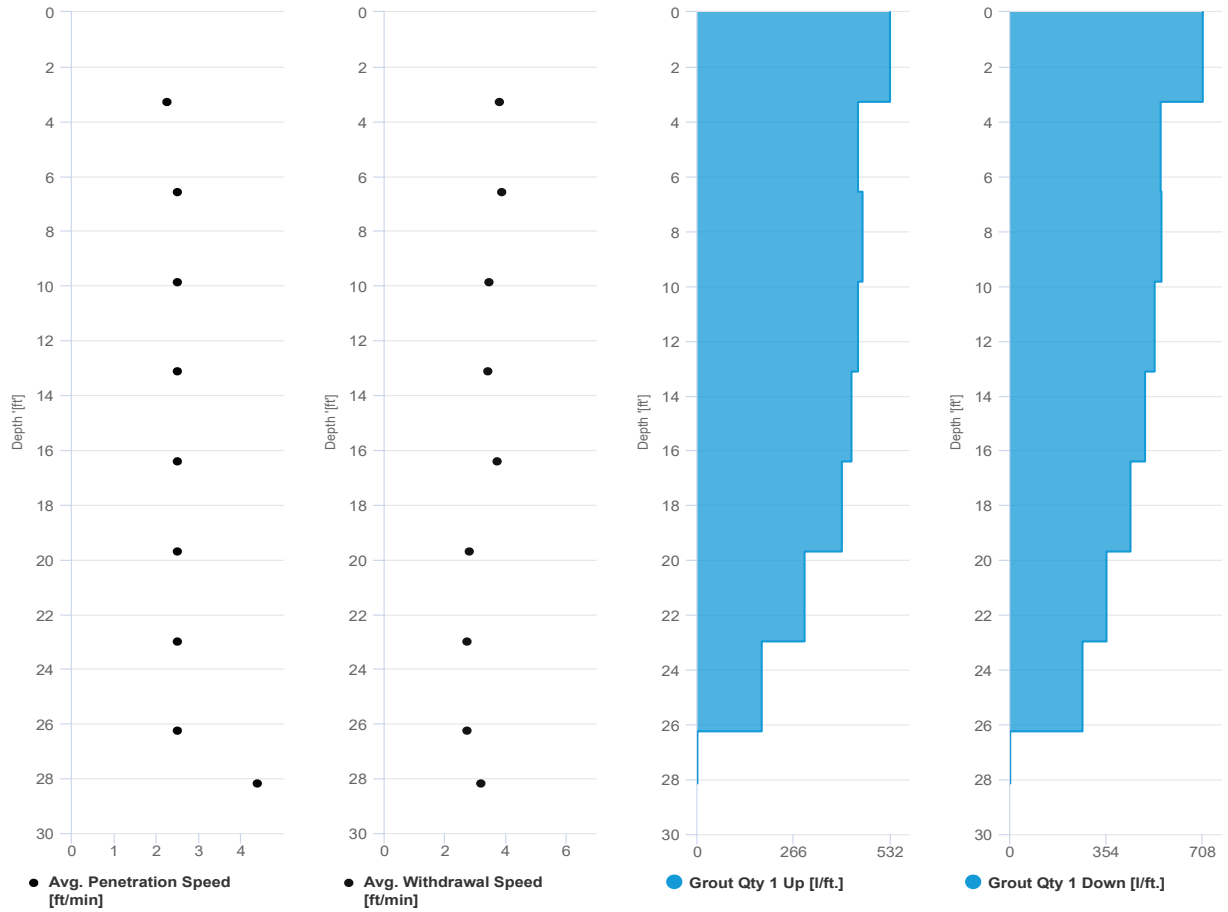
SCM Report

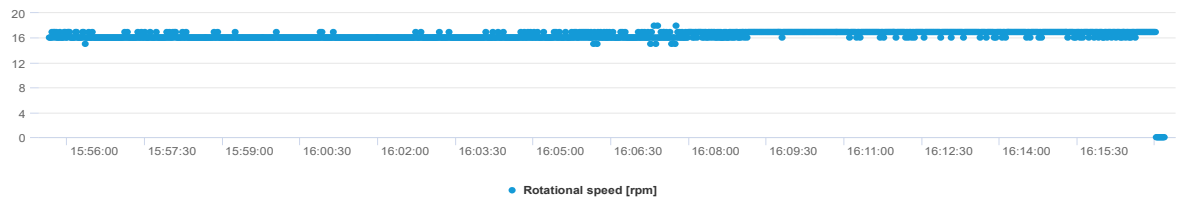
		Element name Project number	**210b**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

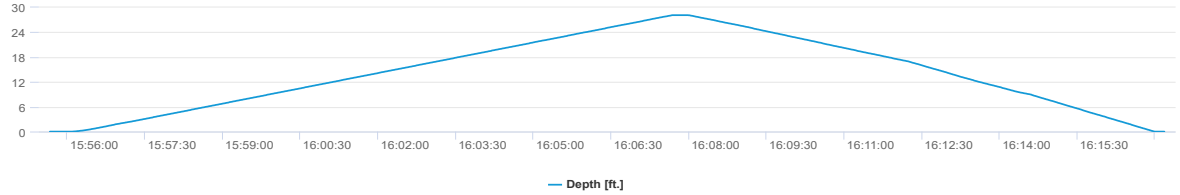
Details

Max. depth	28.15 ft.
Volume/m 1	9.888 ft³

Start time	03:55 PM
End Date	10/09/2024
End time	04:17 PM
Production duration	00:21:32
Final depth time	04:07 PM
Total suspension quantity	86.168 ft³

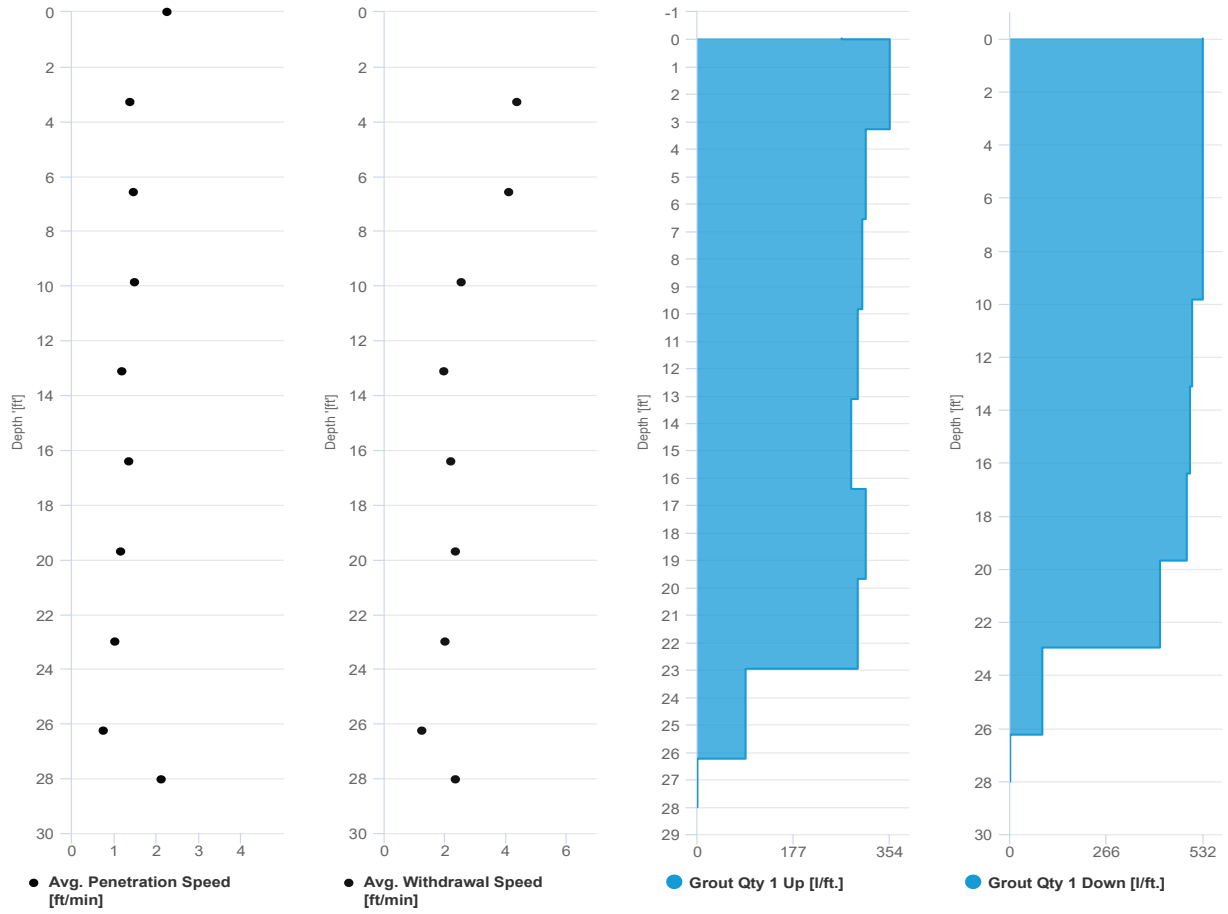


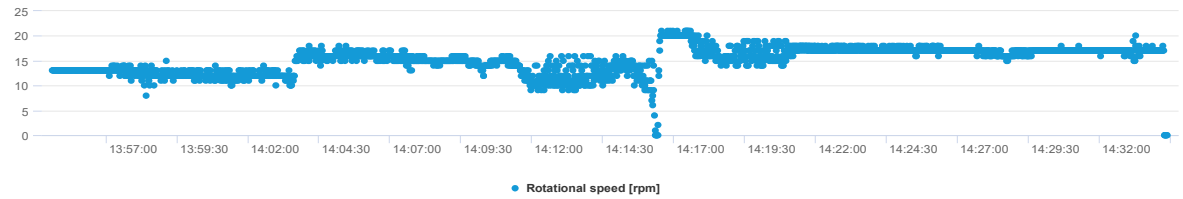


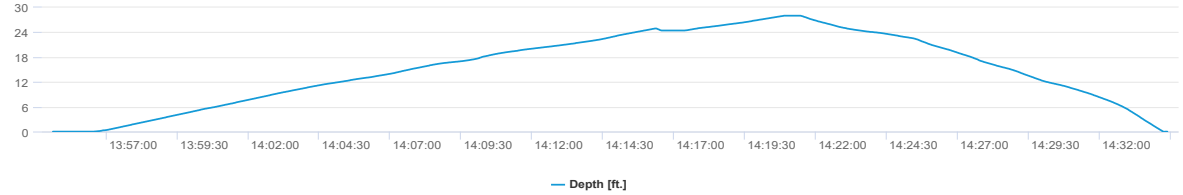


SCM Report

		Element name Project number	**143a**
		Start date	10/09/2024
Drilling rig	BG36H_5625		
Details Max. depth Volume/m 1	 28.018 ft. 7.769 ft³	 Start time End Date End time Production duration Final depth time Total suspension quantity	 01:55 PM 10/09/2024 02:34 PM 00:39:18 02:20 PM 67.804 ft³

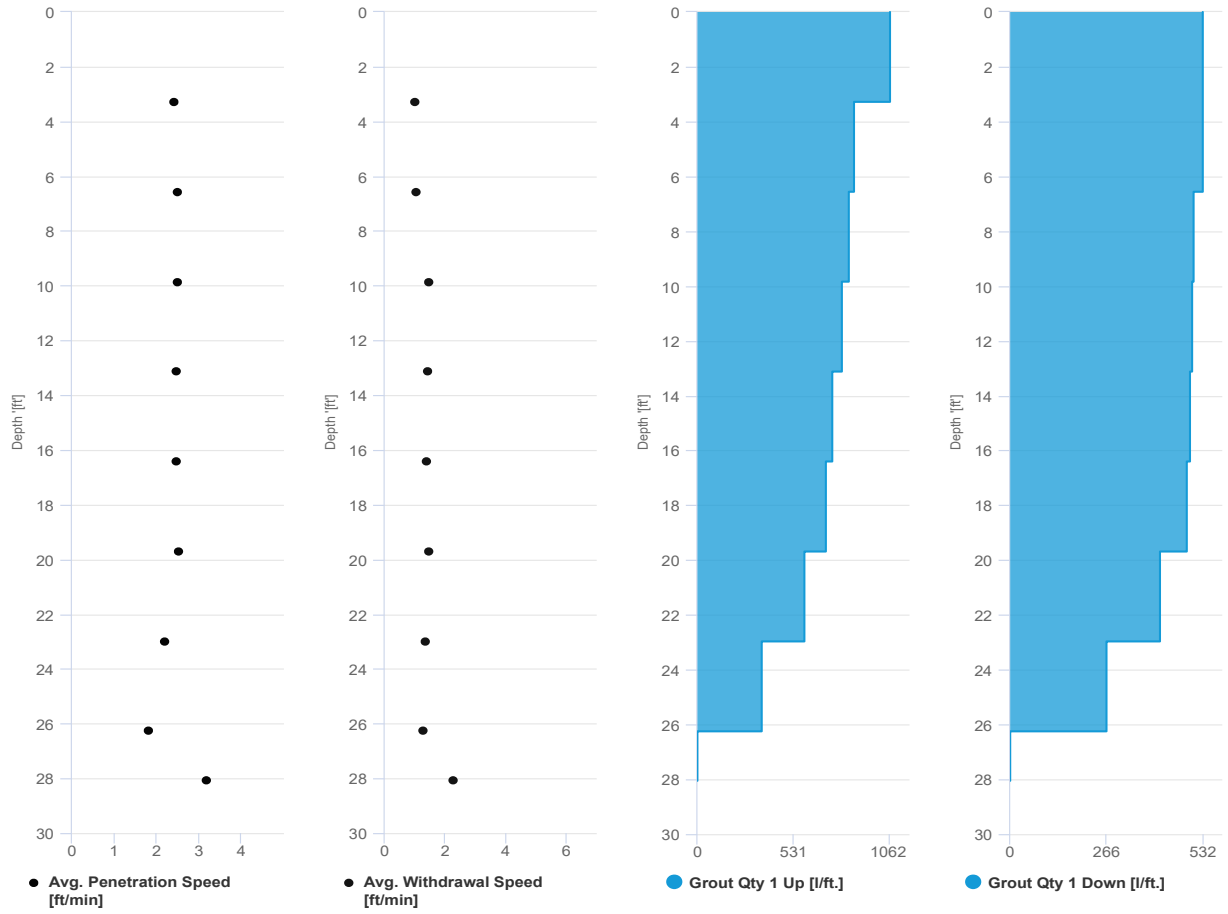


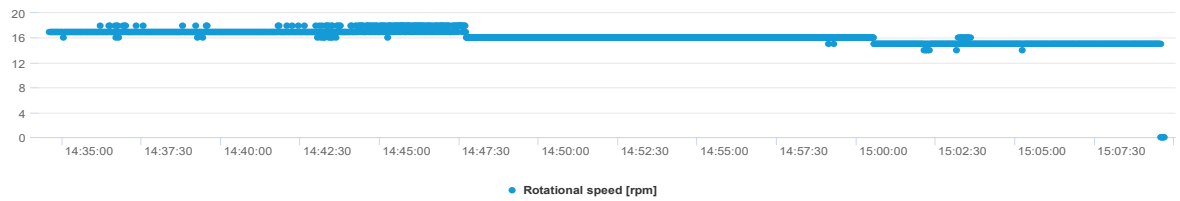


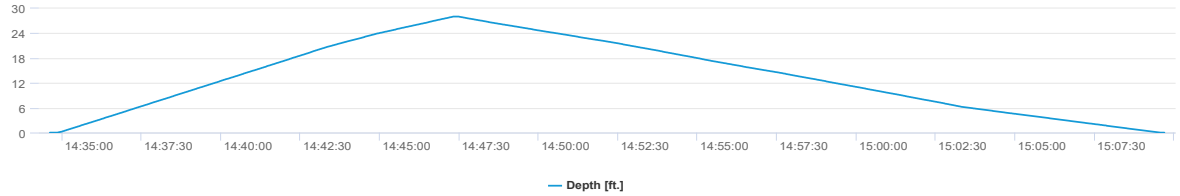


SCM Report

		Element name Project number	**143b**
		Start date	10/09/2024
Drilling rig	BG36H_5625		
Details			
Max. depth	28.051 ft.	Start time	02:34 PM
Volume/m 1	14.479 ft³	End Date	10/09/2024
		End time	03:09 PM
		Production duration	00:35:06
		Final depth time	02:47 PM
		Total suspension quantity	122.895 ft³







SCM Report

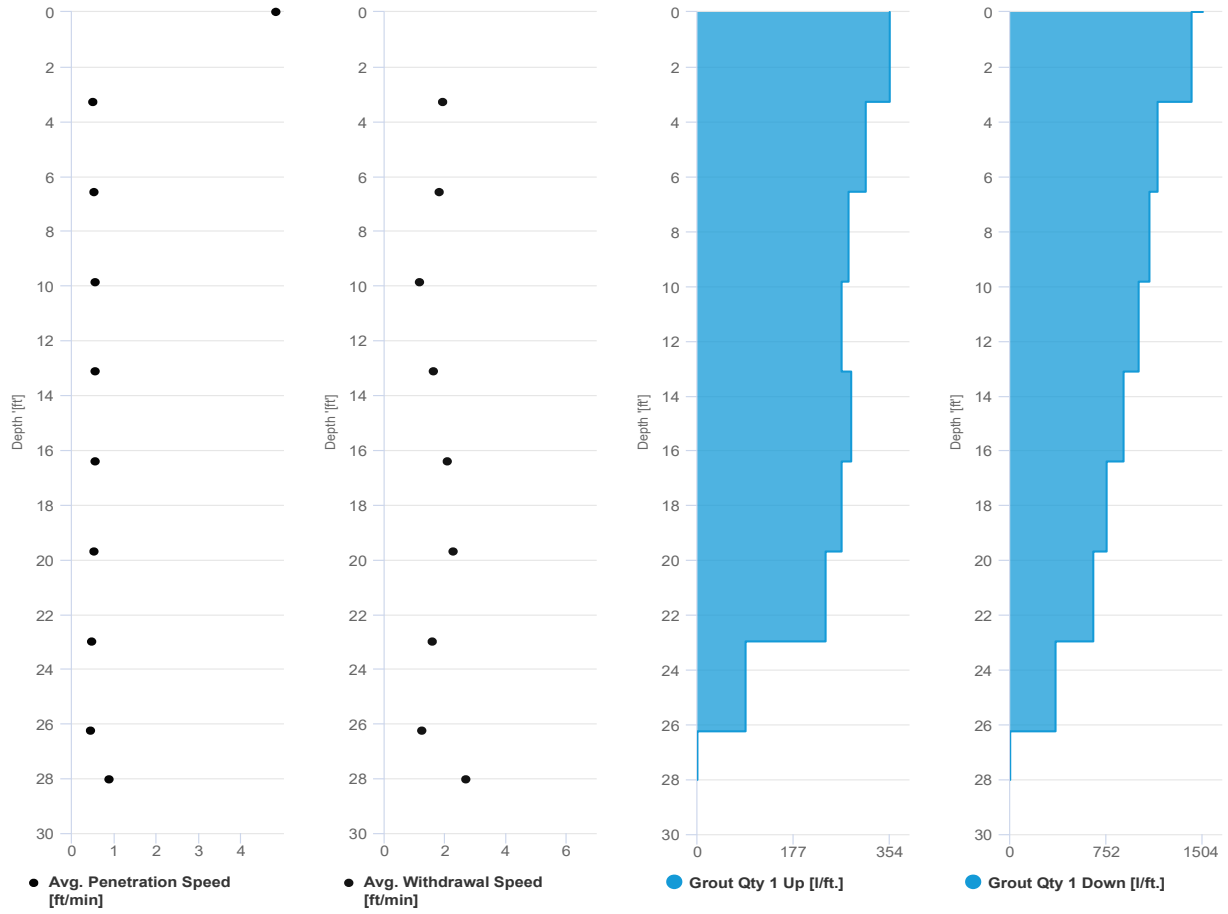
CASCADE

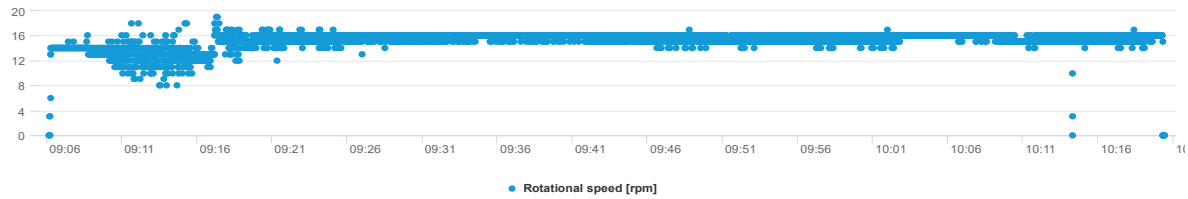
		Element name Project number	**160a**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

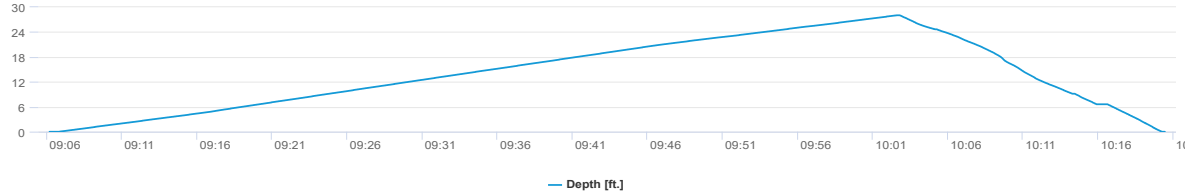
Details

Max. depth	28.018 ft.
Volume/m 1	15.185 ft³

Start time	09:06 AM
End Date	10/09/2024
End time	10:20 AM
Production duration	01:14:17
Final depth time	10:02 AM
Total suspension quantity	128.546 ft³





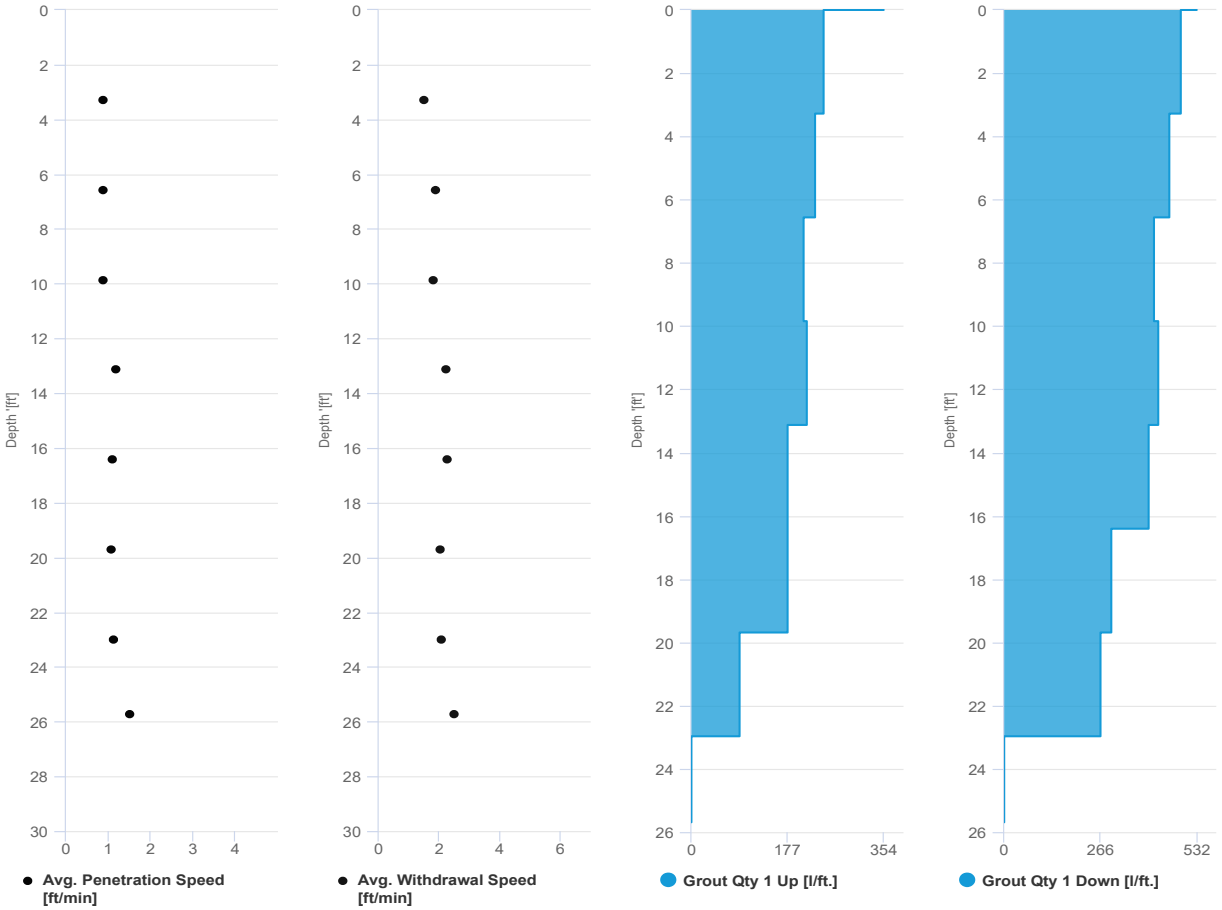


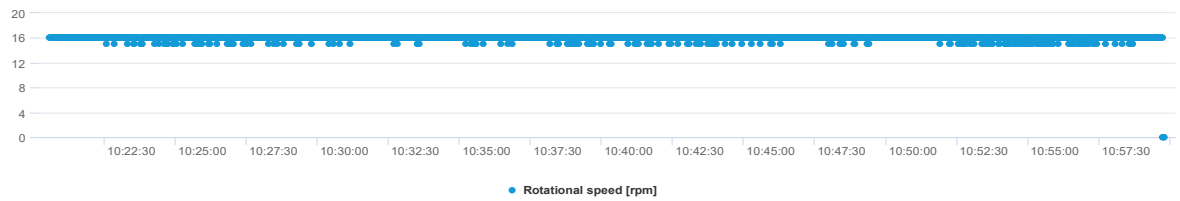
SCM Report

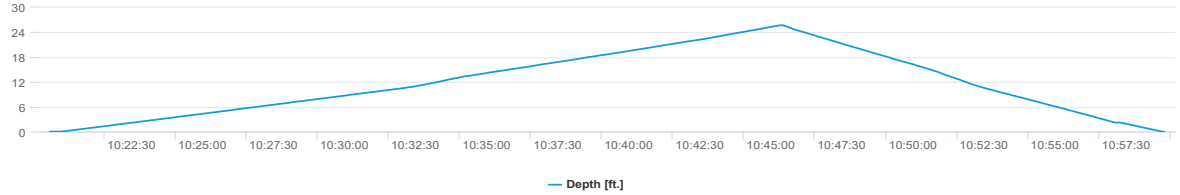
		Element name Project number	**160b**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

Details

Max. depth	25.689 ft.	Start time	10:20 AM
Volume/m 1	7.063 ft³	End Date	10/09/2024
		End time	10:59 AM
		Production duration	00:39:14
		Final depth time	10:46 AM
		Total suspension quantity	55.091 ft³







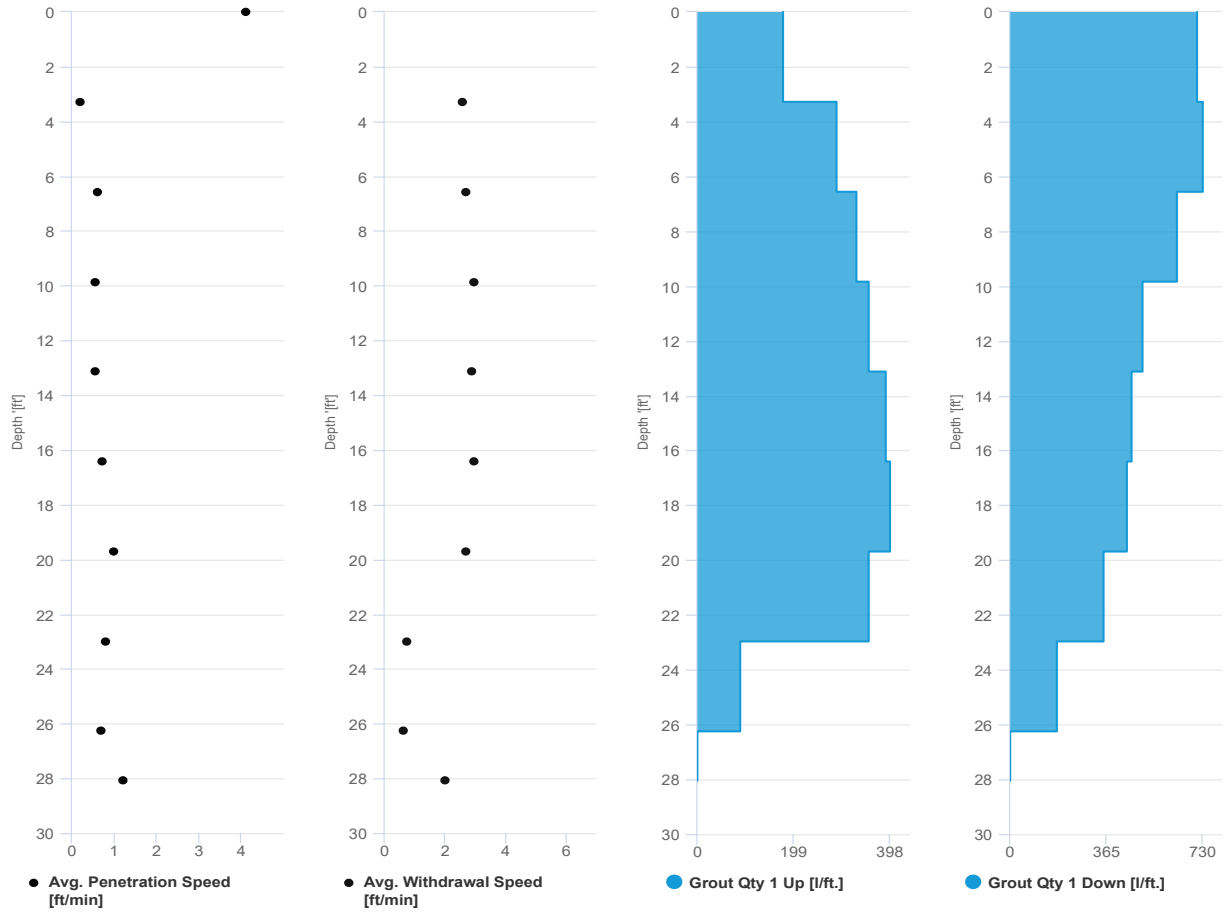
SCM Report

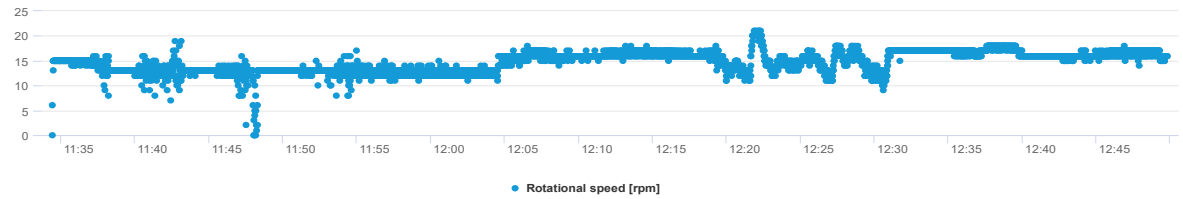
CASCADE

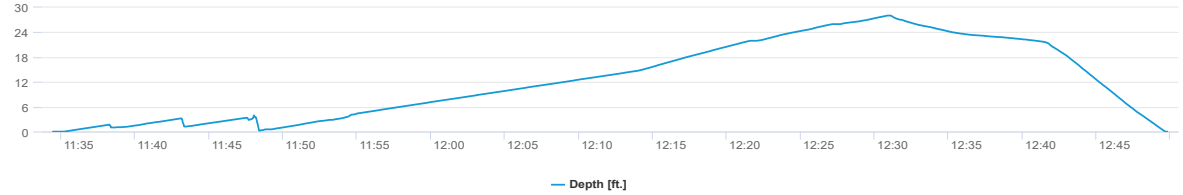
		Element name Project number	**162a**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	11:34 AM
Volume/m 1	12.713 ft³	End Date	10/09/2024
		End time	12:49 PM
		Production duration	01:15:23
		Final depth time	12:30 PM
		Total suspension quantity	110.182 ft³





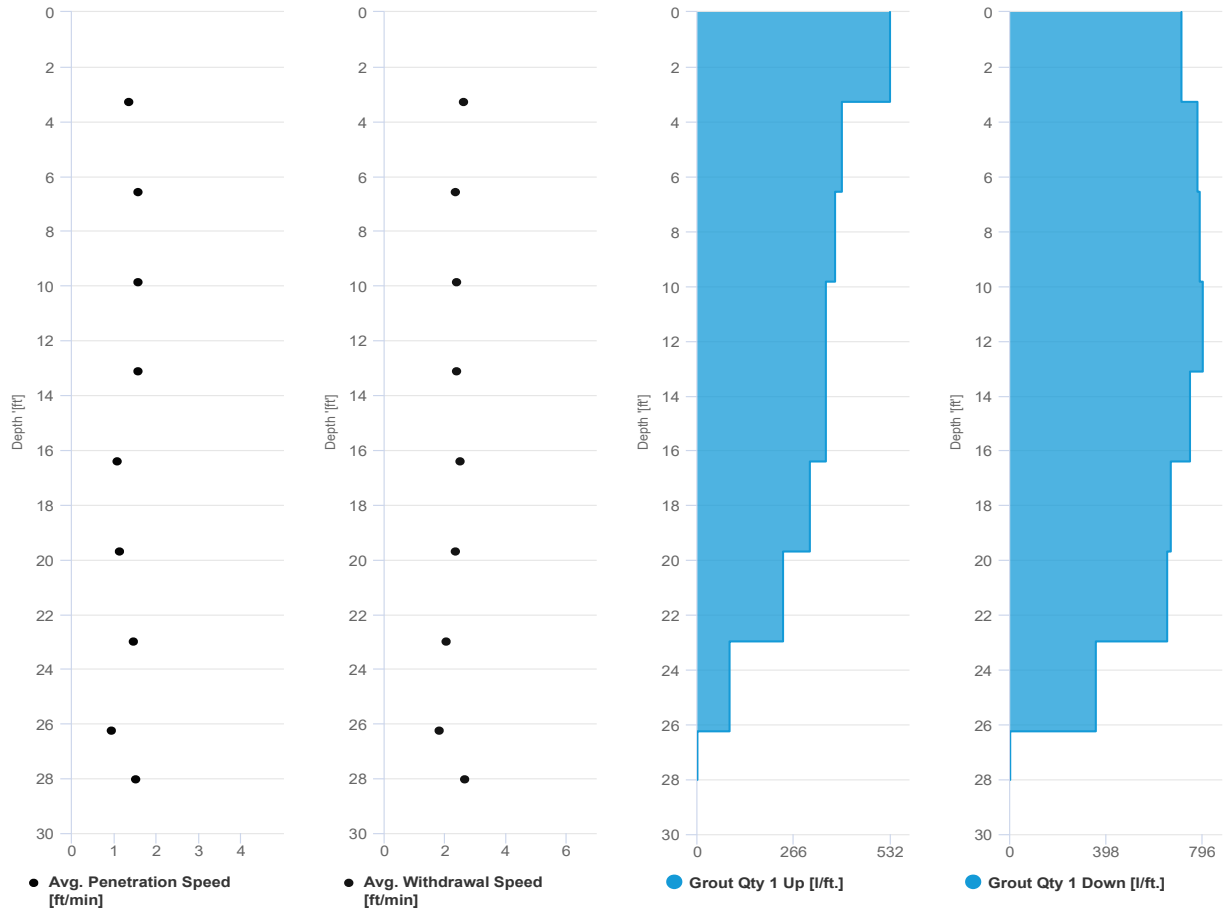


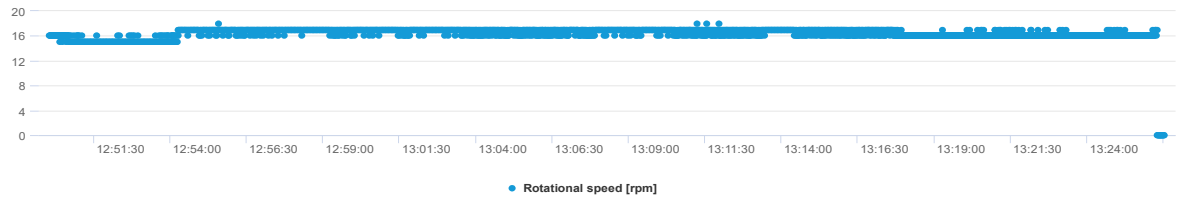
SCM Report

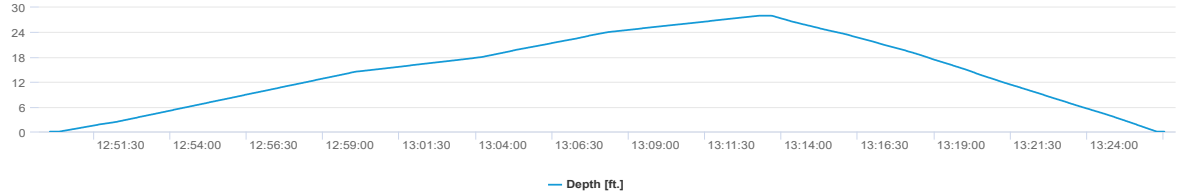
		Element name Project number	**162b**
		Start date	10/09/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.018 ft.	Start time	12:50 PM
Volume/m 1	10.948 ft³	End Date	10/09/2024
		End time	01:26 PM
		Production duration	00:36:29
		Final depth time	01:13 PM
		Total suspension quantity	93.231 ft³







SCM Report

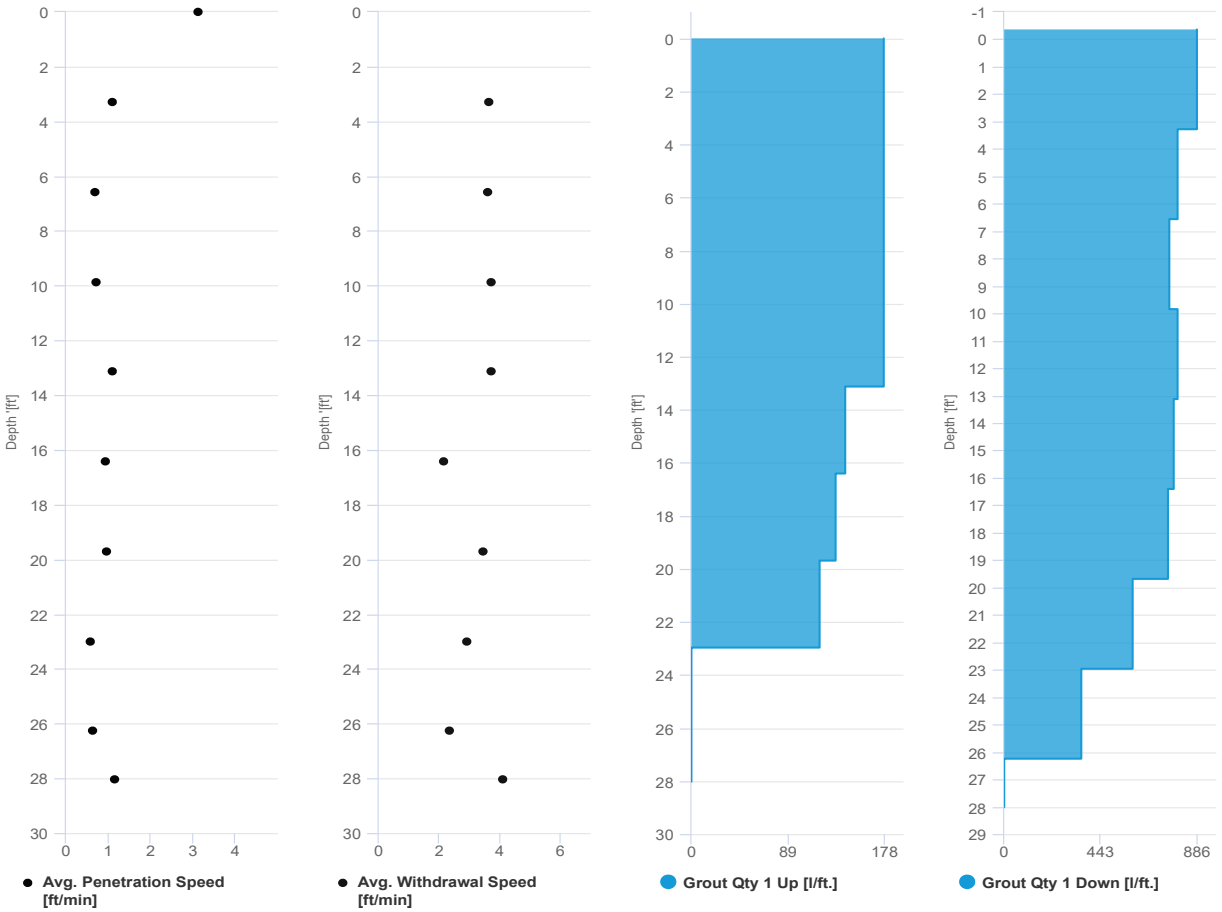
CASCADE

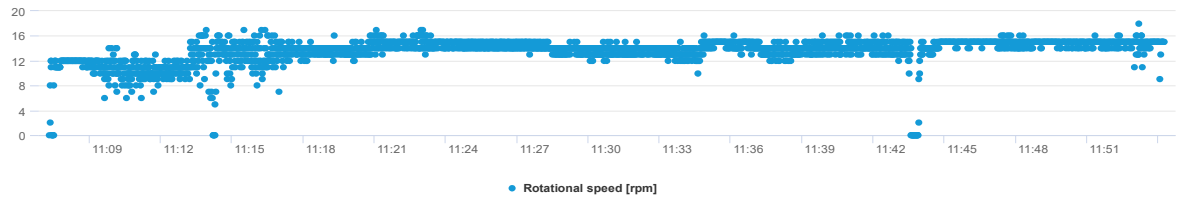
		Element name Project number	**172a**
		Start date	10/10/2024
Drilling rig	BG36H_5625		

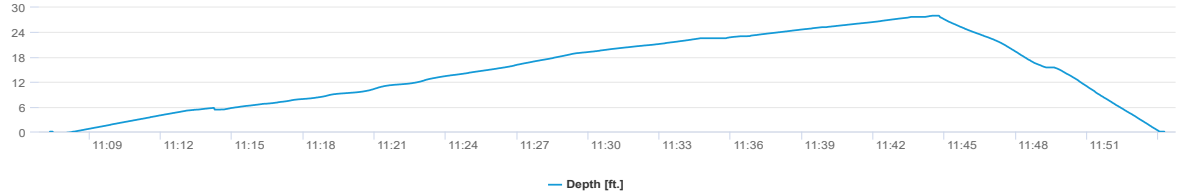
Details

Max. depth	28.018 ft.
Volume/m 1	9.182 ft³

Start time	11:07 AM
End Date	10/10/2024
End time	11:54 AM
Production duration	00:46:57
Final depth time	11:44 AM
Total suspension quantity	79.105 ft³







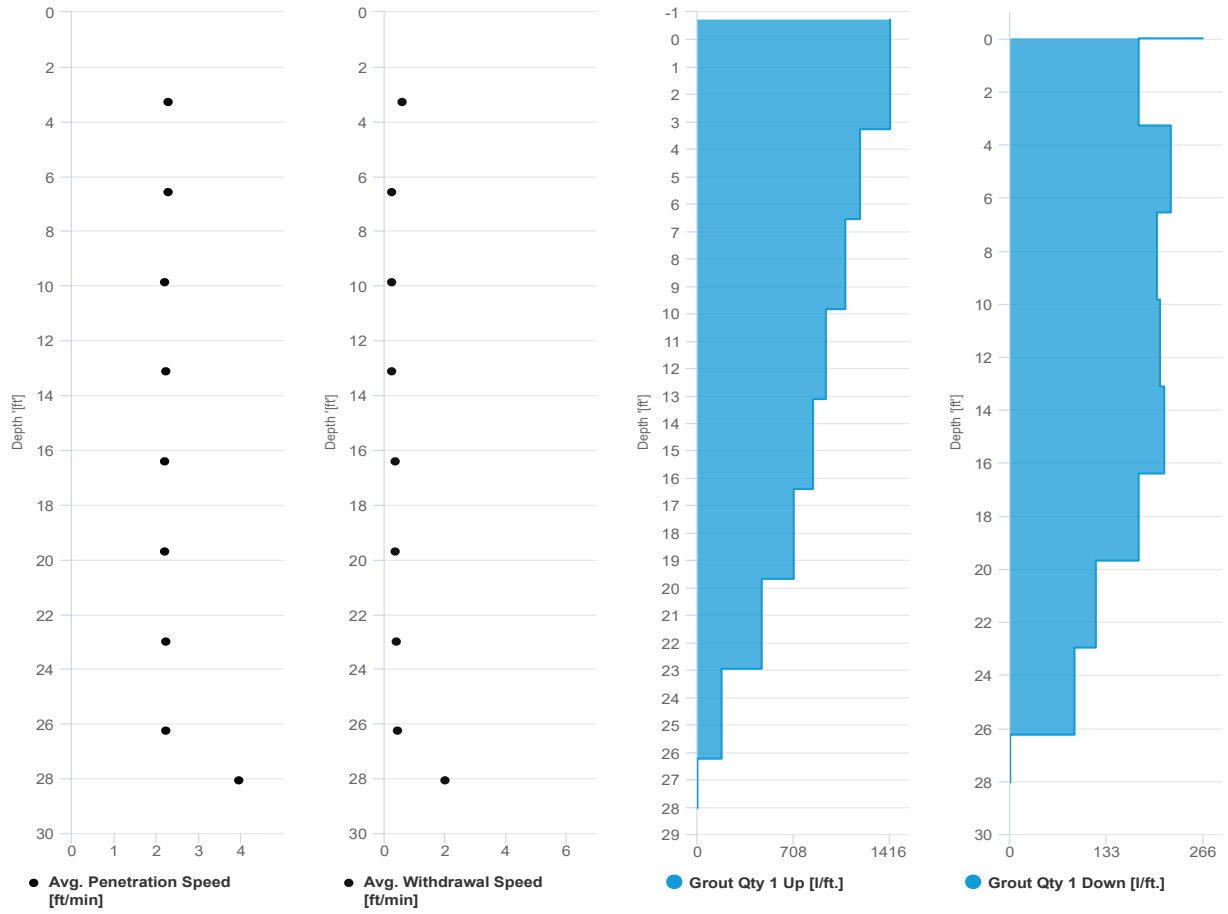
SCM Report

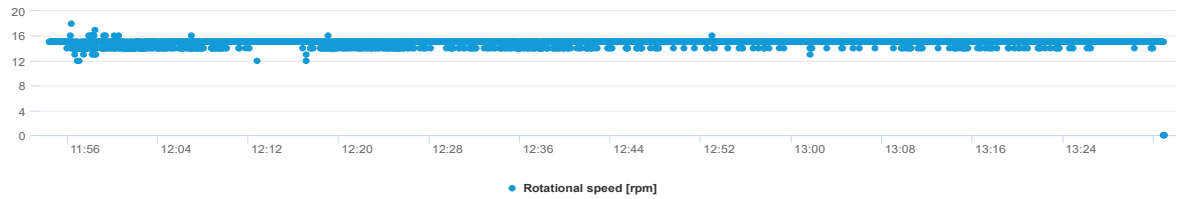
CASCADE

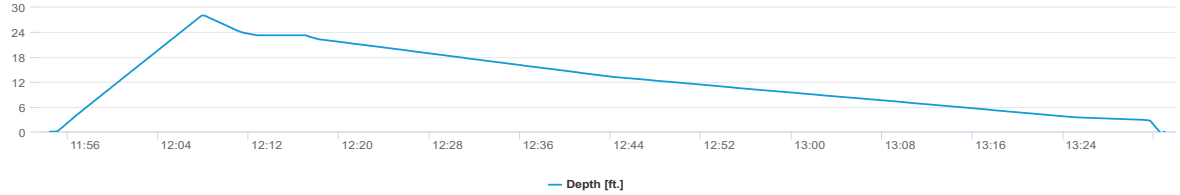
		Element name Project number	**172b**
		Start date	10/10/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	11:54 AM
Volume/m 1	13.42 ft³	End Date	10/10/2024
		End time	01:32 PM
		Production duration	01:38:31
		Final depth time	12:07 PM
		Total suspension quantity	115.832 ft³







SCM Report

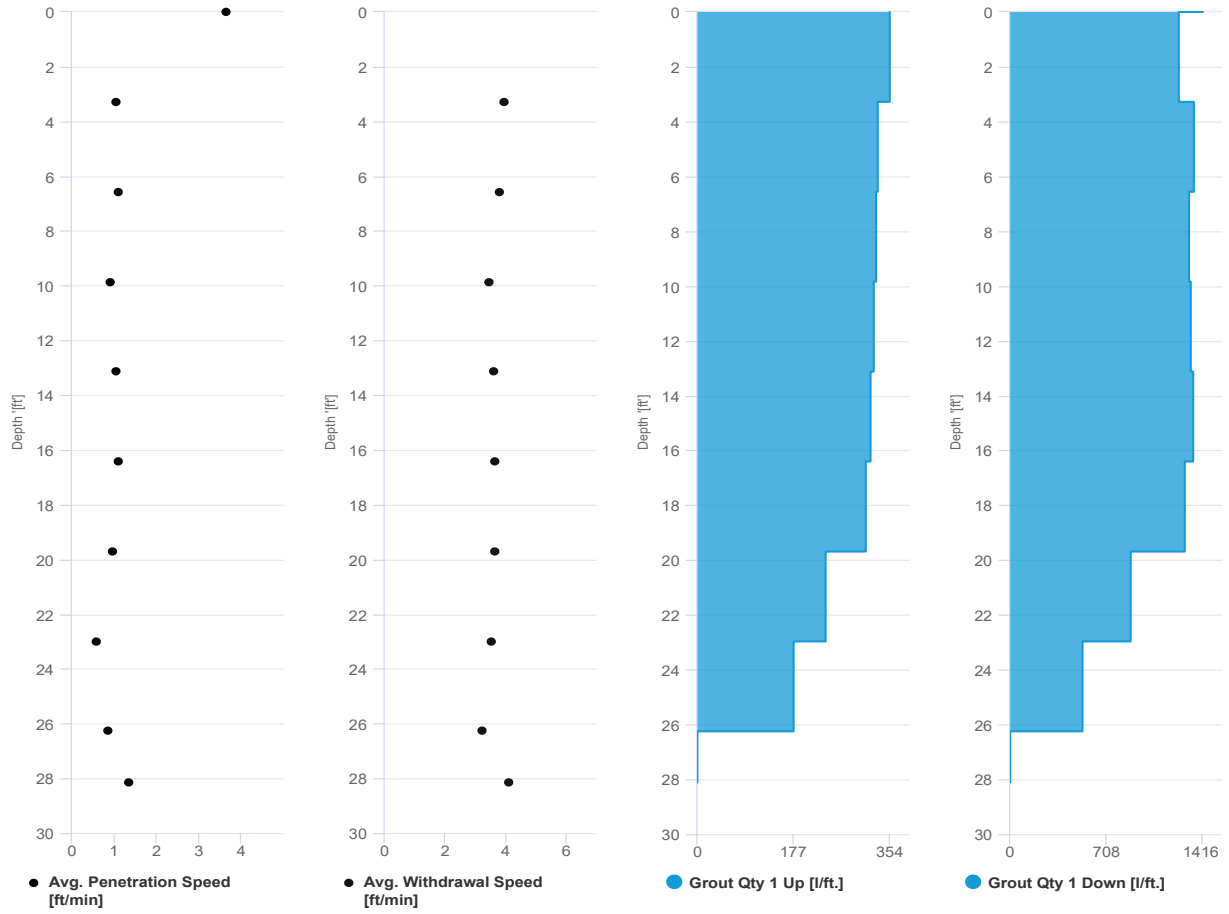
CASCADE

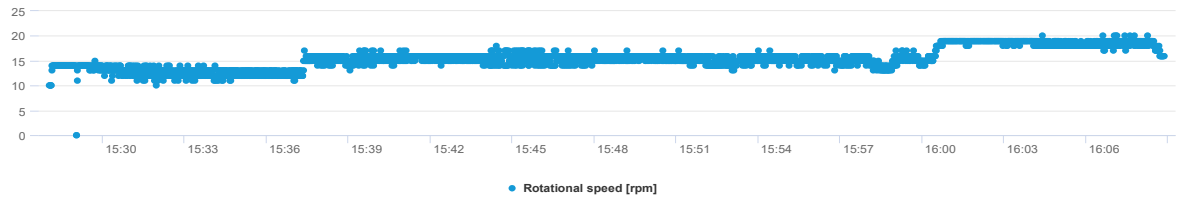
		Element name Project number	**211a**
		Start date	10/11/2024
Drilling rig	BG36H_5625		

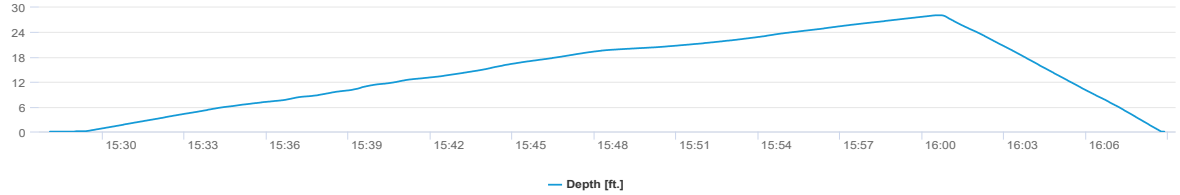
Details

Max. depth	28.117 ft.
Volume/m 1	16.245 ft³

Start time	03:28 PM
End Date	10/11/2024
End time	04:08 PM
Production duration	00:40:49
Final depth time	04:00 PM
Total suspension quantity	139.846 ft³







SCM Report

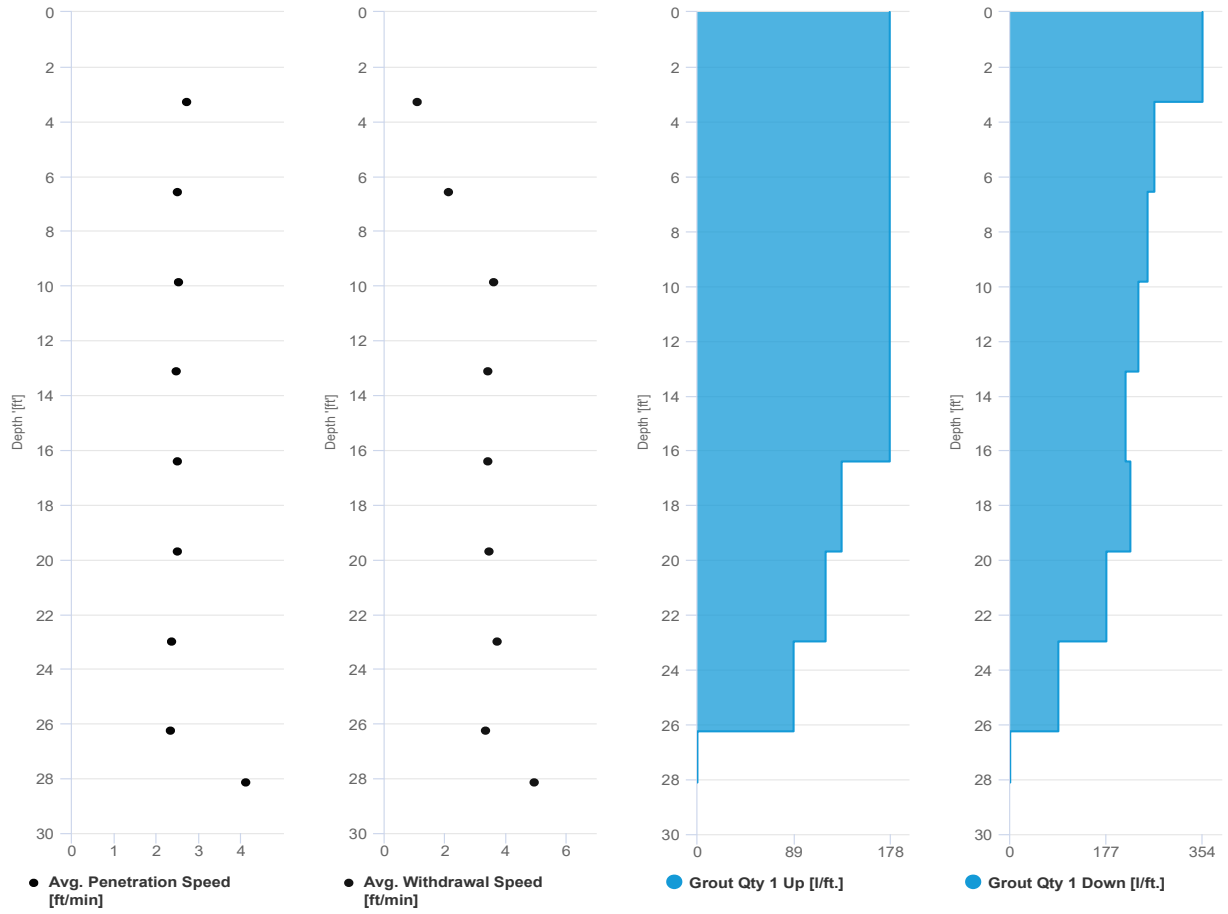
CASCADE

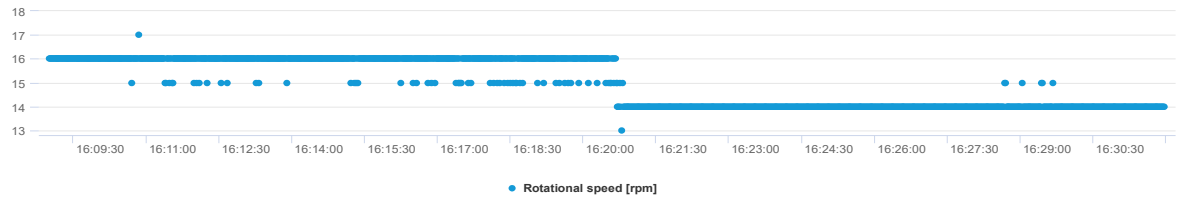
		Element name Project number	**211b**
		Start date	10/11/2024
Drilling rig	BG36H_5625		

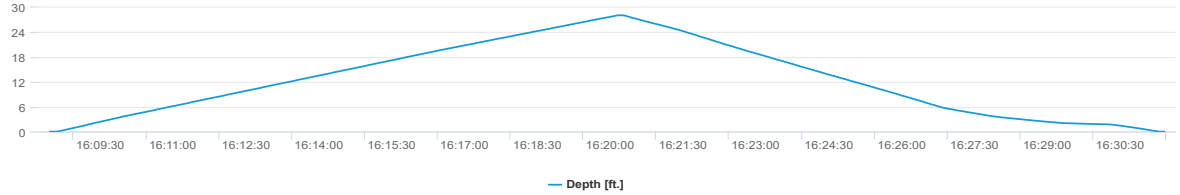
Details

Max. depth	28.117 ft.
Volume/m 1	5.65 ft³

Start time	04:09 PM
End Date	10/11/2024
End time	04:31 PM
Production duration	00:22:58
Final depth time	04:20 PM
Total suspension quantity	49.441 ft³







SCM Report

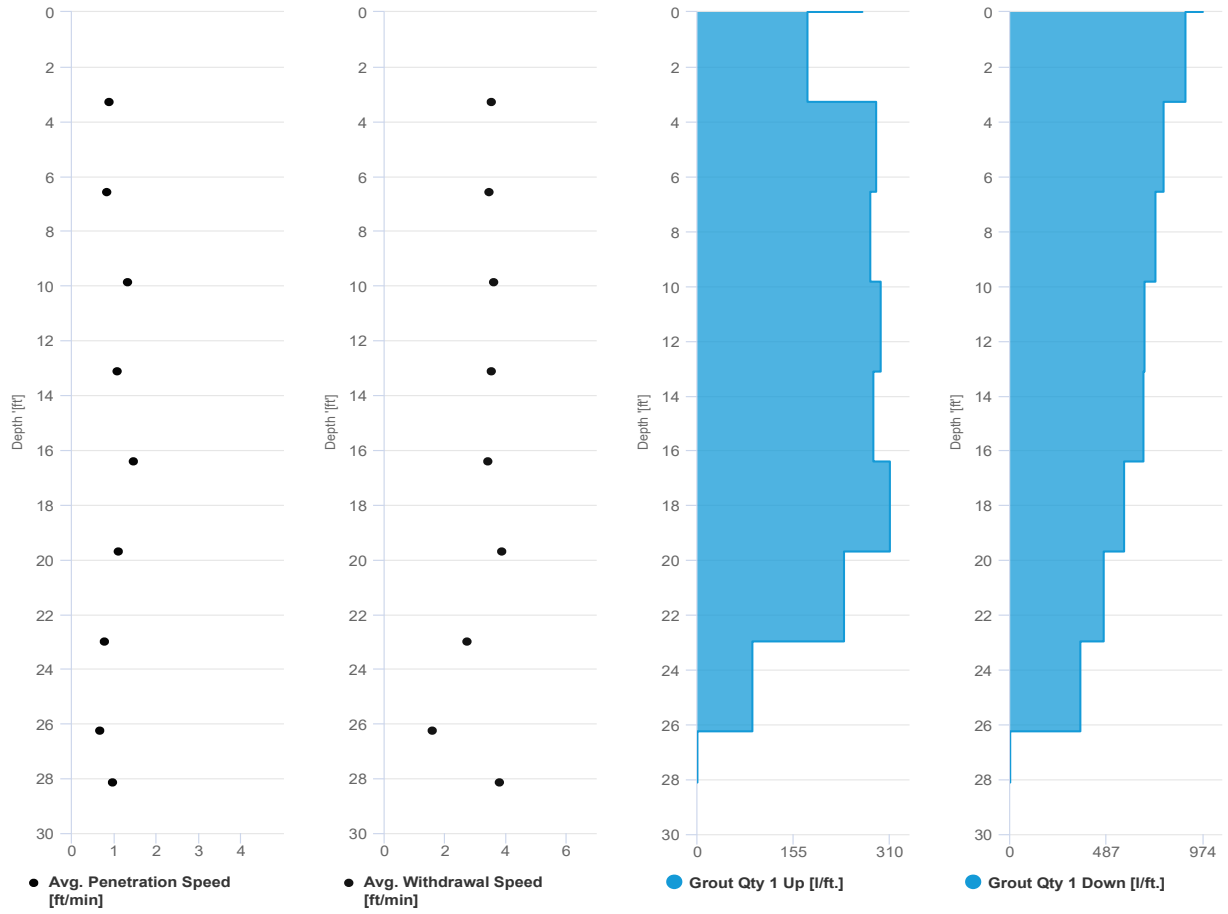
CASCADE

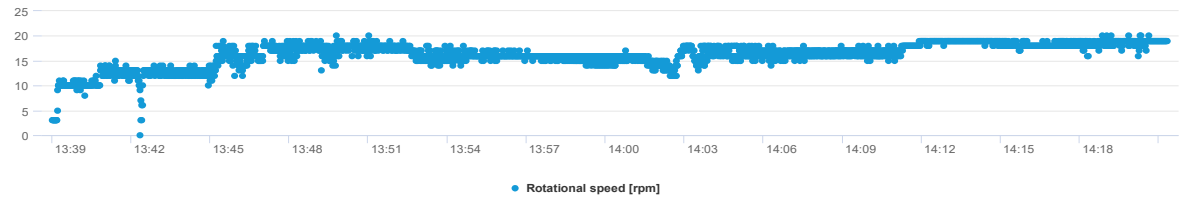
		Element name Project number	**209a**
		Start date	10/11/2024
Drilling rig	BG36H_5625		

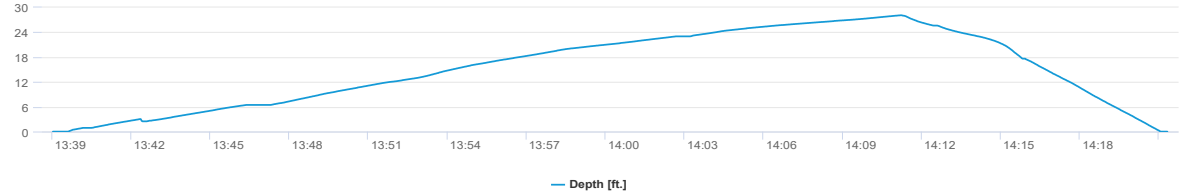
Details

Max. depth	28.117 ft.
Volume/m 1	10.948 ft³

Start time	01:39 PM
End Date	10/11/2024
End time	02:21 PM
Production duration	00:42:19
Final depth time	02:11 PM
Total suspension quantity	94.643 ft³







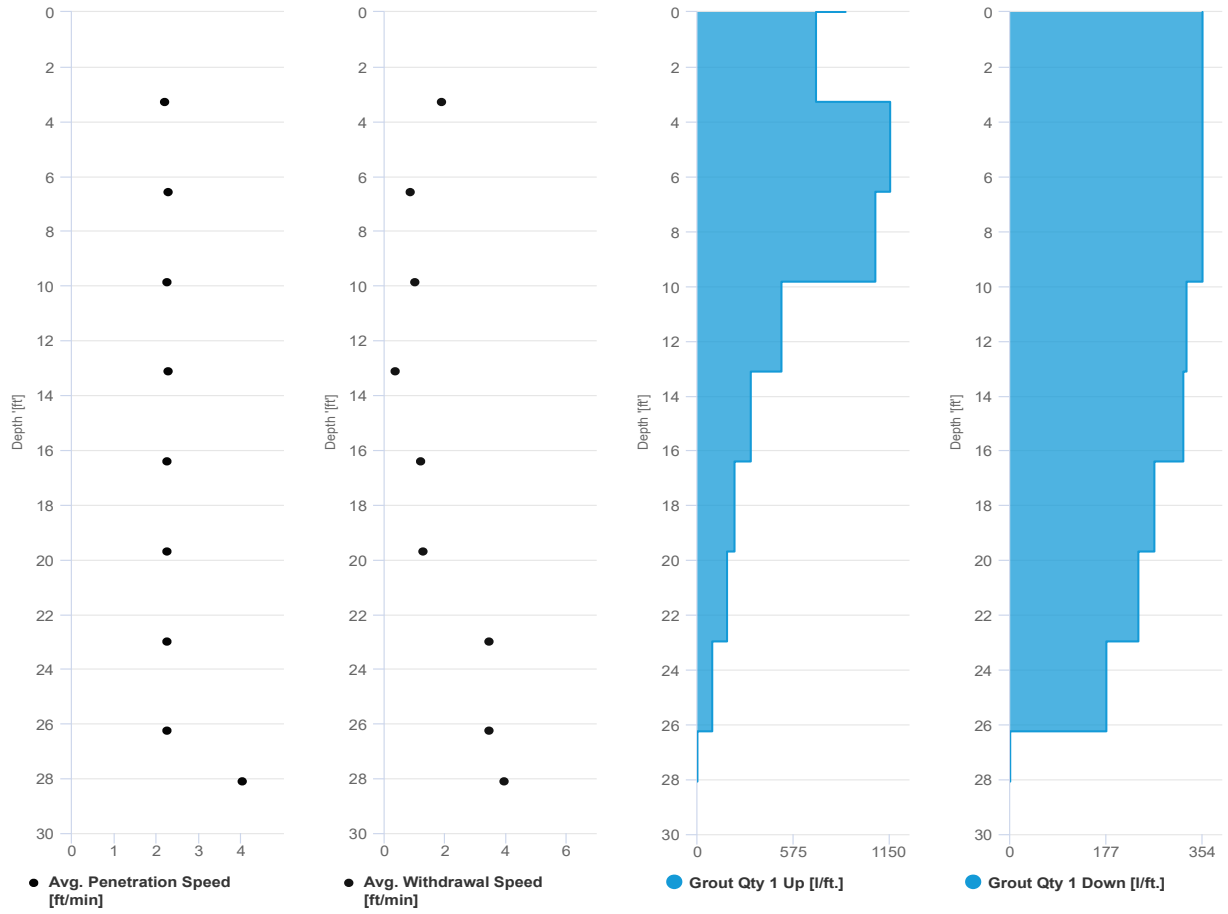
SCM Report

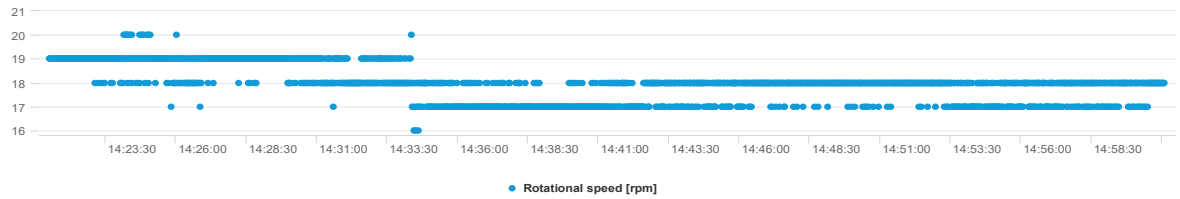
CASCADE

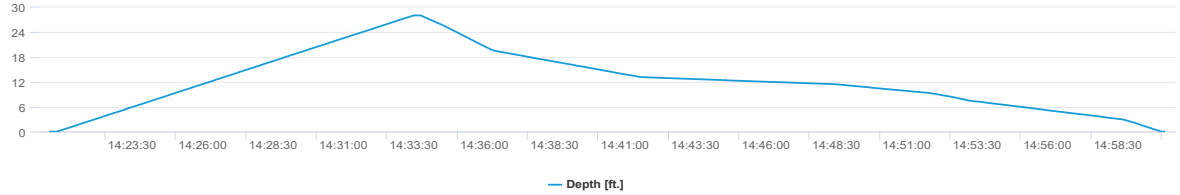
		Element name Project number	**209b**
		Start date	10/11/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.084 ft.	Start time	02:21 PM
Volume/m 1	15.185 ft³	End Date	10/11/2024
		End time	03:01 PM
		Production duration	00:39:35
		Final depth time	02:34 PM
		Total suspension quantity	129.958 ft³







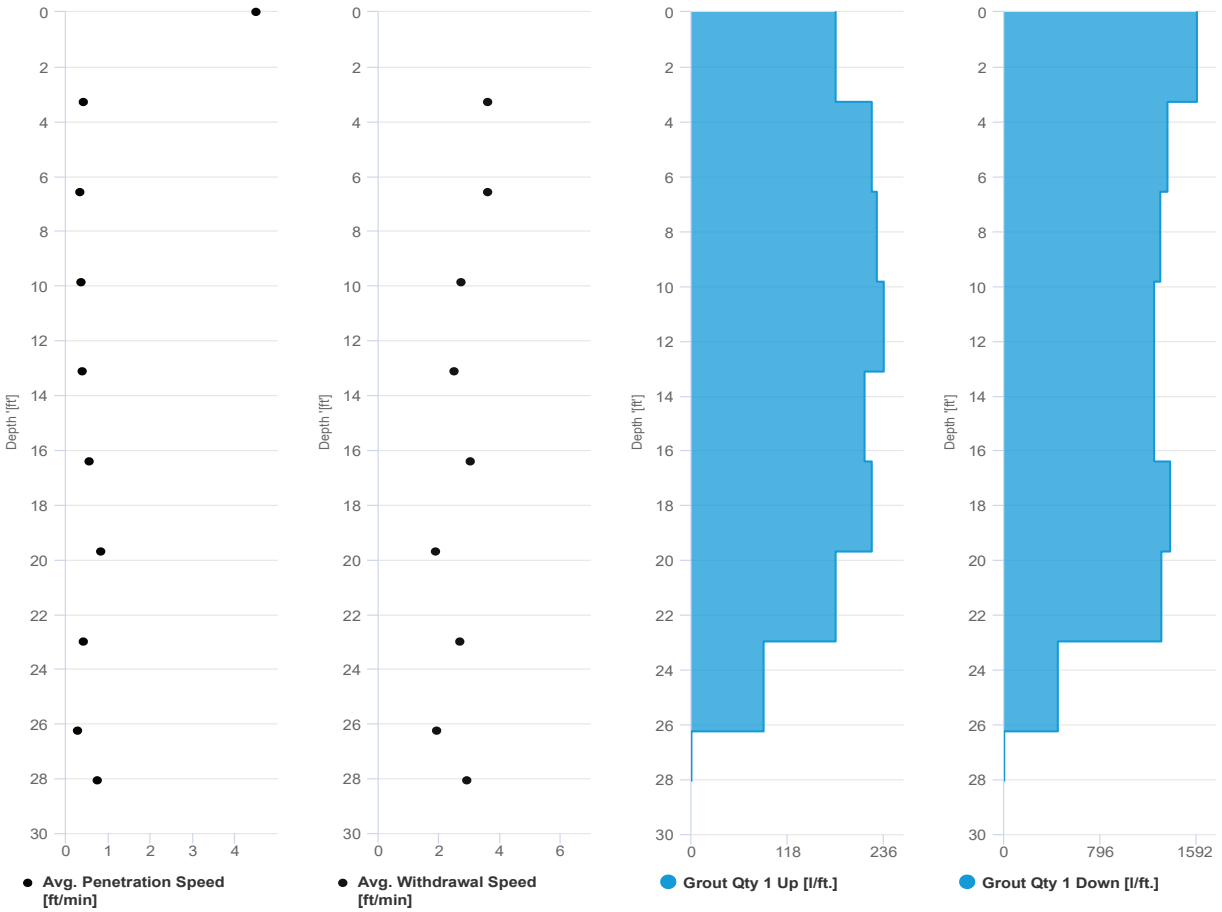
SCM Report

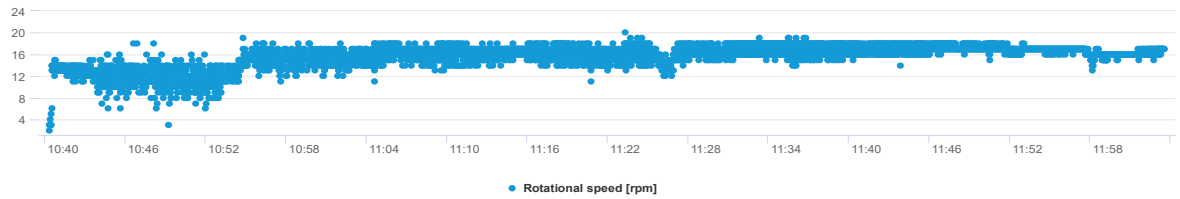
CASCADE

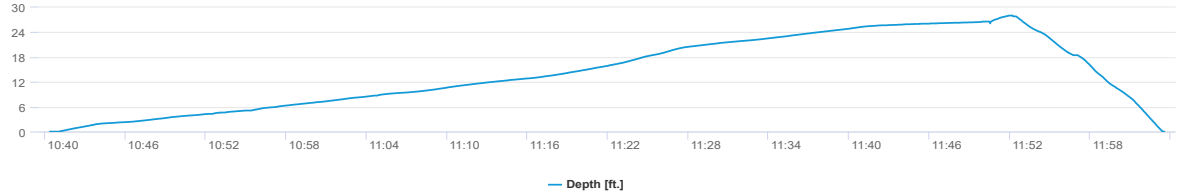
		Element name Project number	**161a**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	10:40 AM
Volume/m 1	14.479 ft³	End Date	10/15/2024
		End time	12:03 PM
		Production duration	01:23:11
		Final depth time	11:51 AM
		Total suspension quantity	124.308 ft³







SCM Report

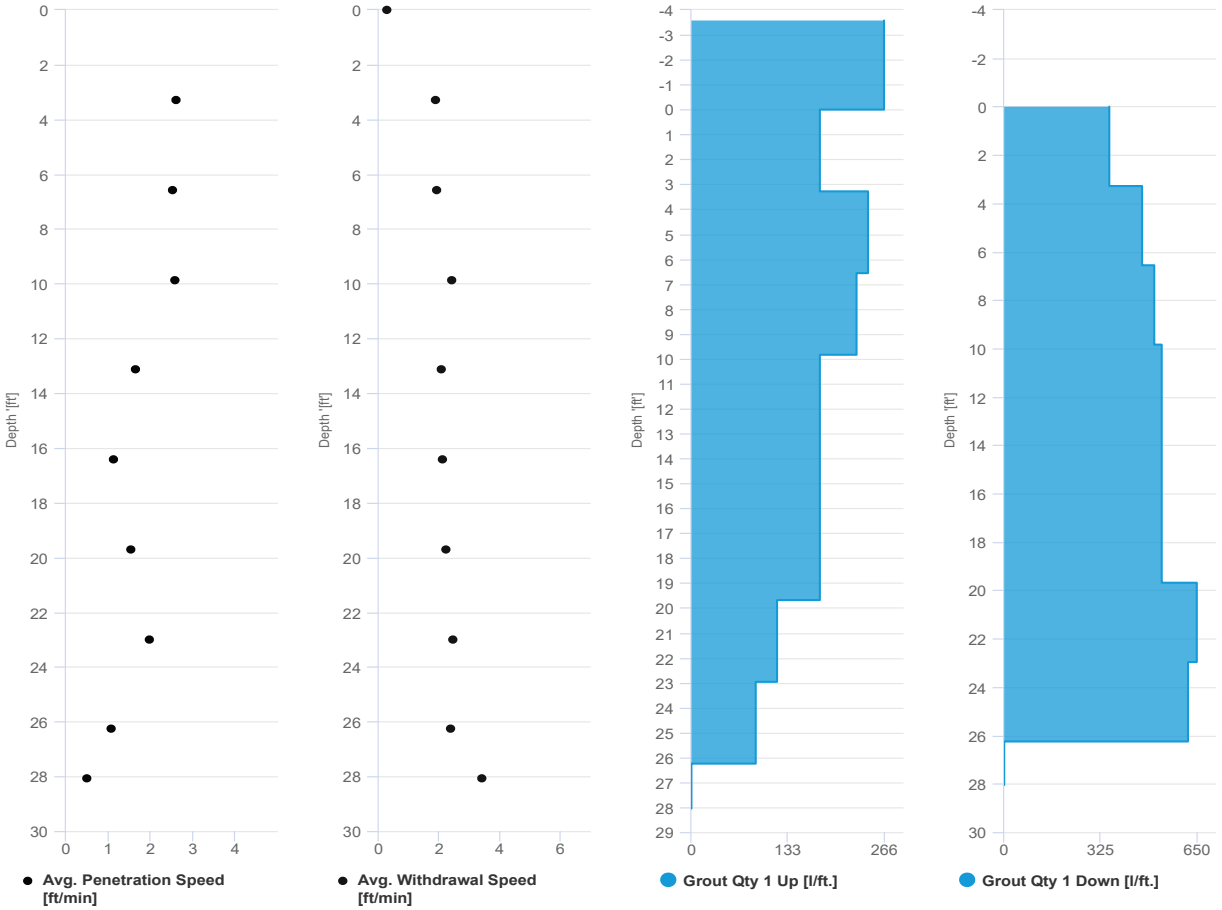
CASCADE

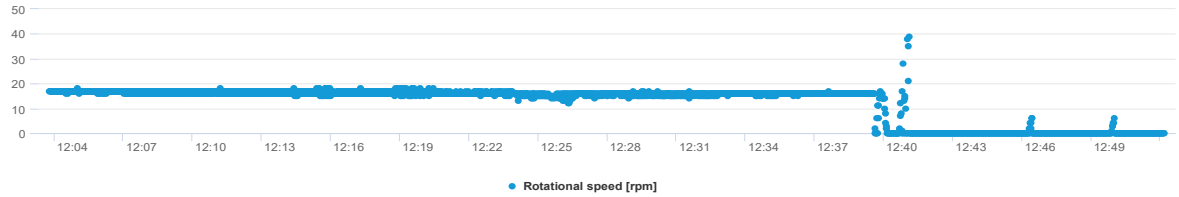
		Element name Project number	**161b**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

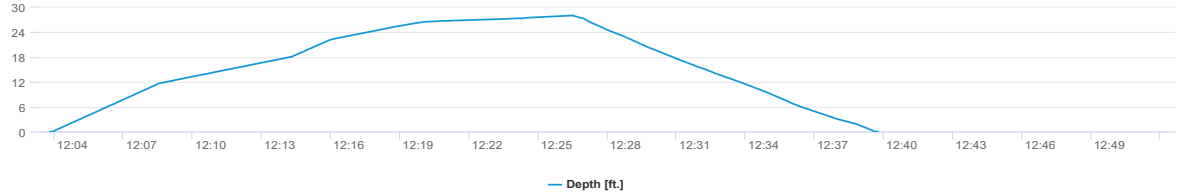
Details

Max. depth	28.051 ft.
Volume/m 1	6.71 ft³

Start time	12:03 PM
End Date	10/15/2024
End time	12:52 PM
Production duration	00:48:23
Final depth time	12:26 PM
Total suspension quantity	57.916 ft³







SCM Report

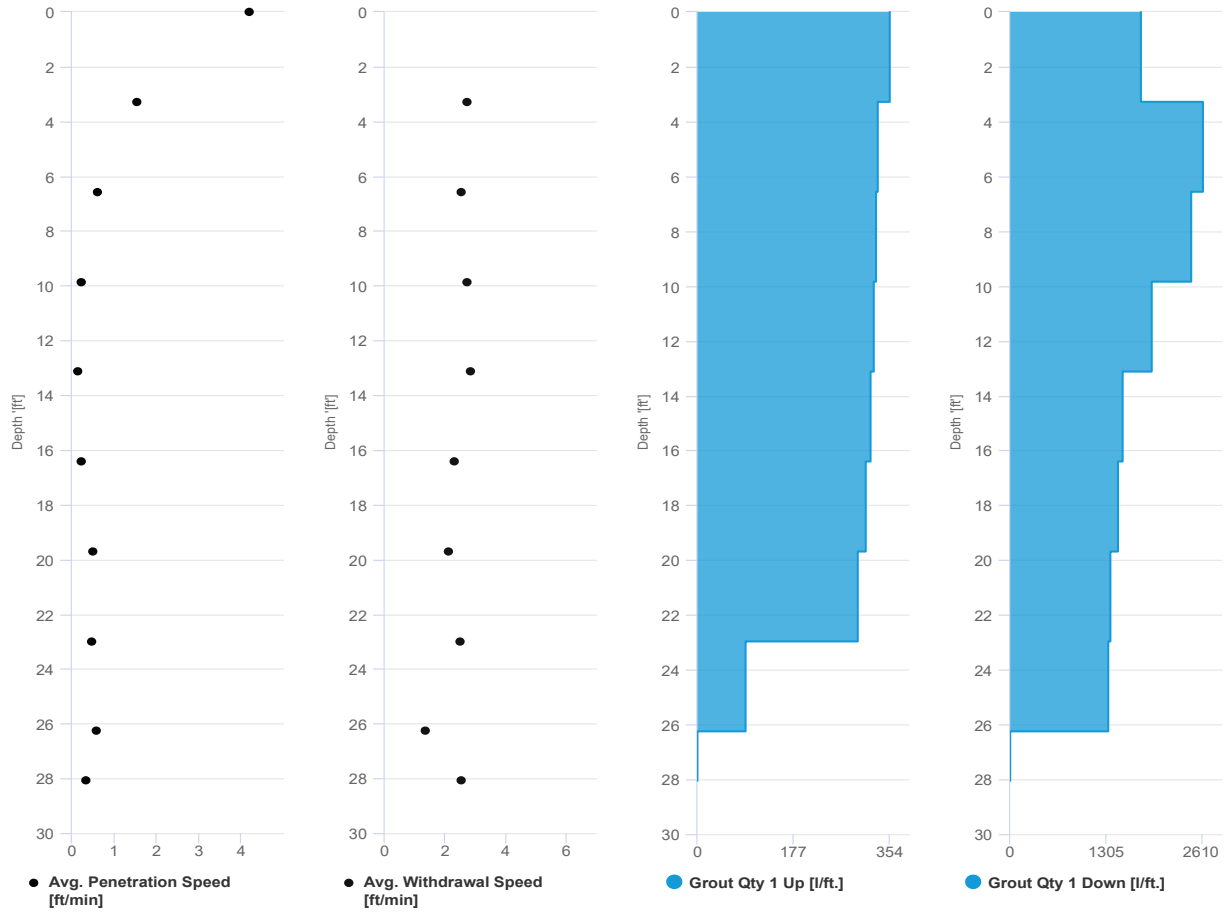
CASCADE

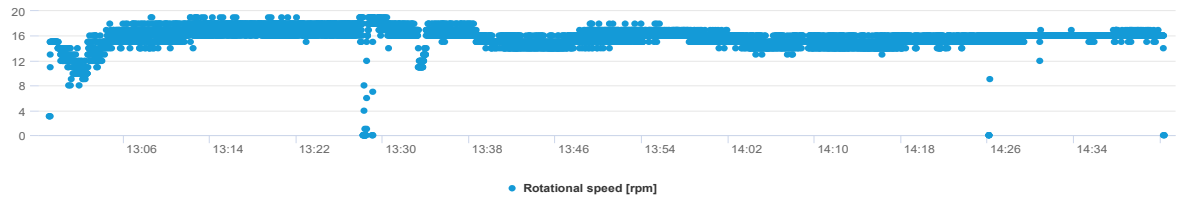
		Element name Project number	**160c**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

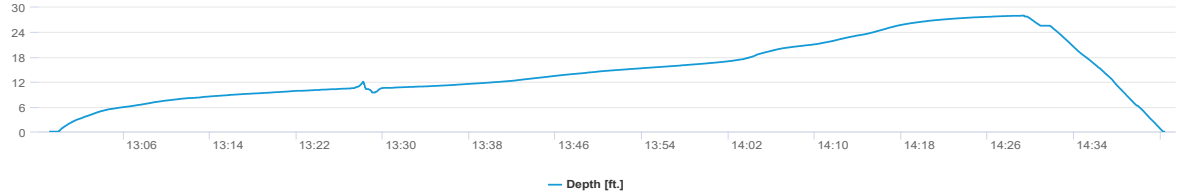
Details

Max. depth	28.051 ft.
Volume/m 1	24.72 ft³

Start time	12:59 PM
End Date	10/15/2024
End time	02:42 PM
Production duration	01:43:12
Final depth time	02:29 PM
Total suspension quantity	210.476 ft³







SCM Report

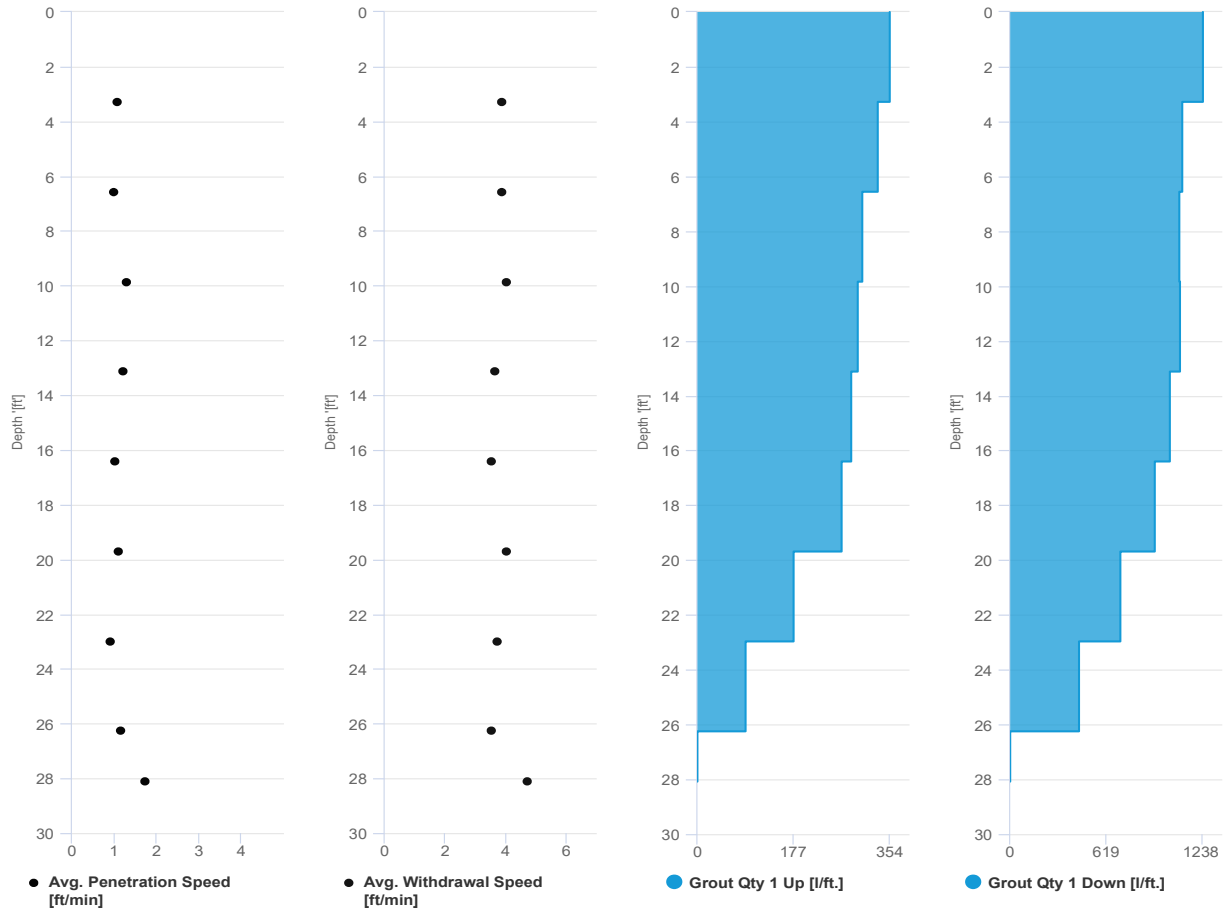
CASCADE

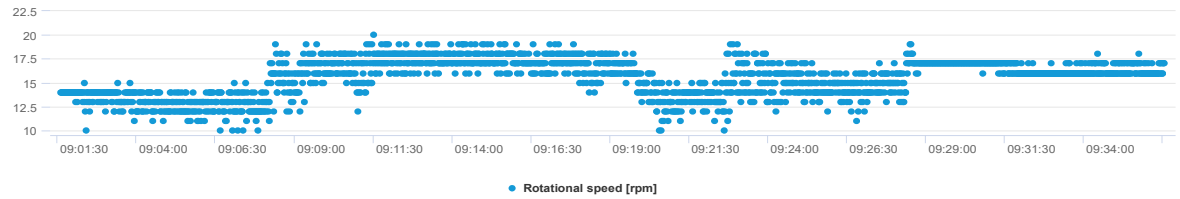
		Element name Project number	**170a**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

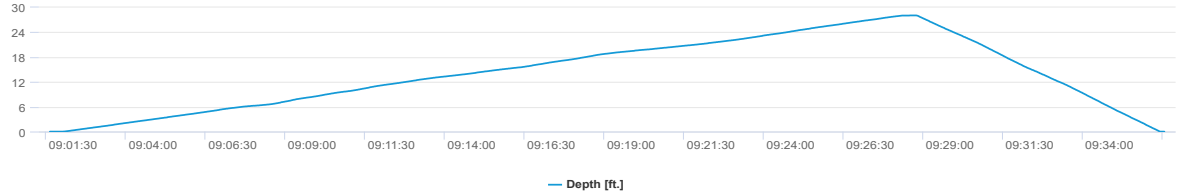
Details

Max. depth	28.084 ft.
Volume/m 1	14.126 ft³

Start time	09:01 AM
End Date	10/15/2024
End time	09:36 AM
Production duration	00:34:58
Final depth time	09:28 AM
Total suspension quantity	121.483 ft³







SCM Report

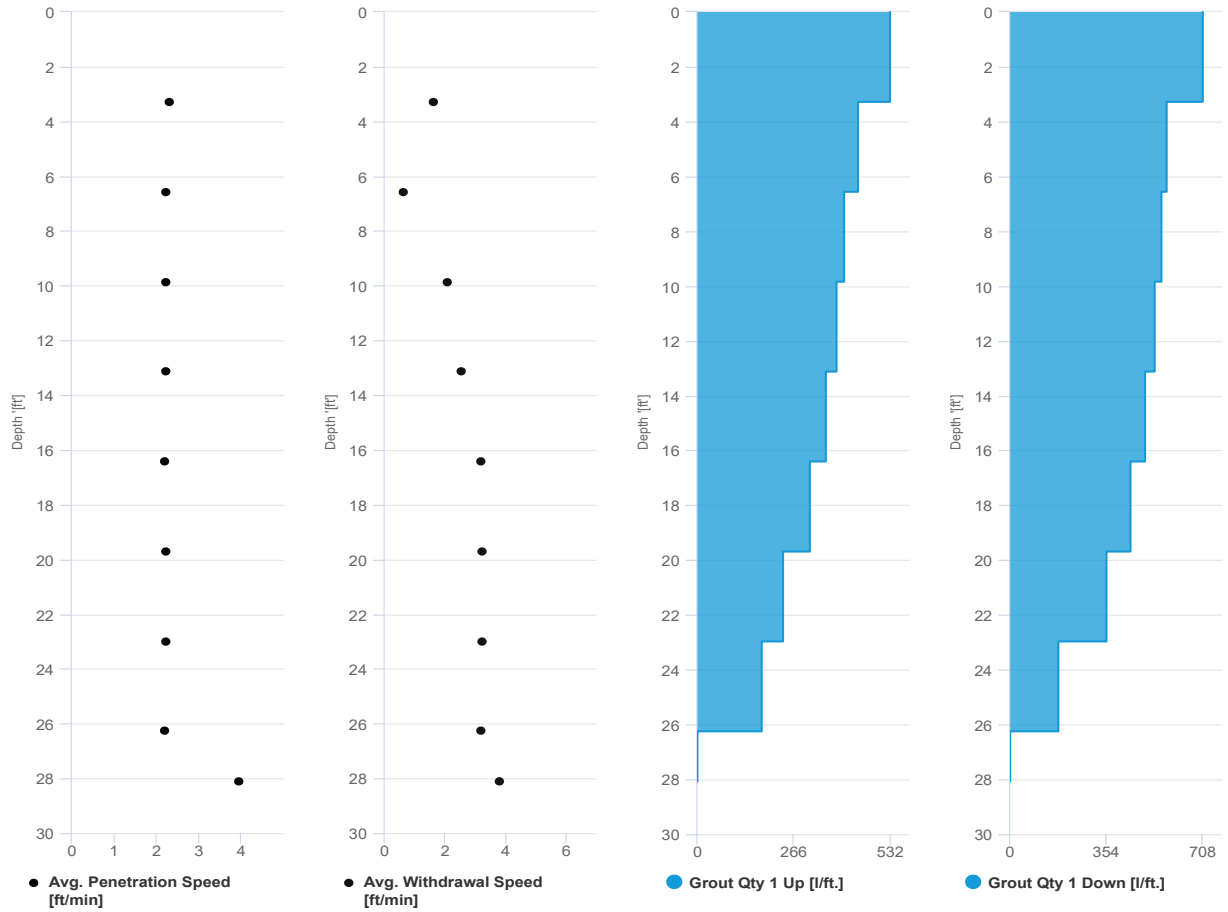
CASCADE

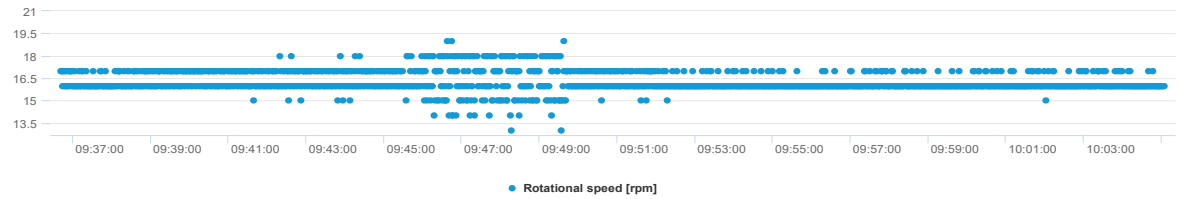
		Element name Project number	**170b**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

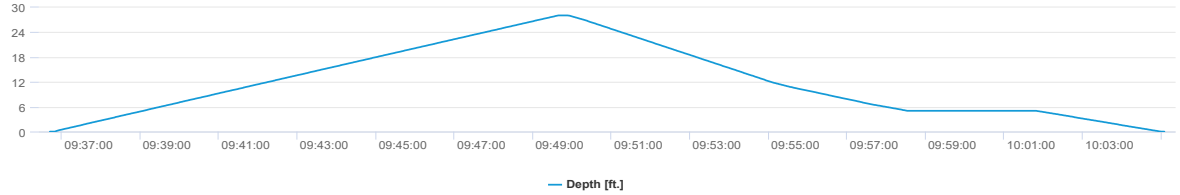
Details

Max. depth	28.084 ft.
Volume/m 1	10.948 ft³

Start time	09:36 AM
End Date	10/15/2024
End time	10:05 AM
Production duration	00:28:24
Final depth time	09:49 AM
Total suspension quantity	94.643 ft³







SCM Report

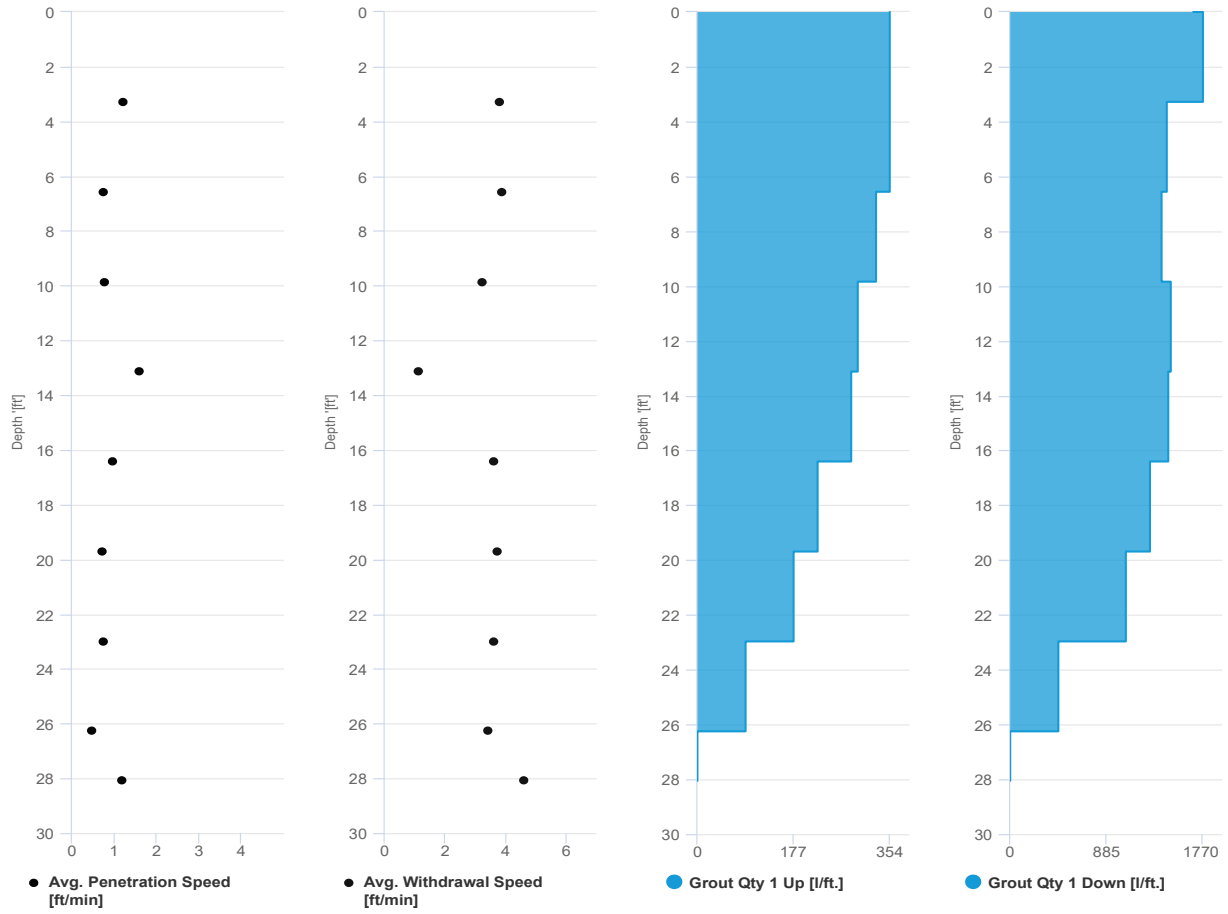
CASCADE

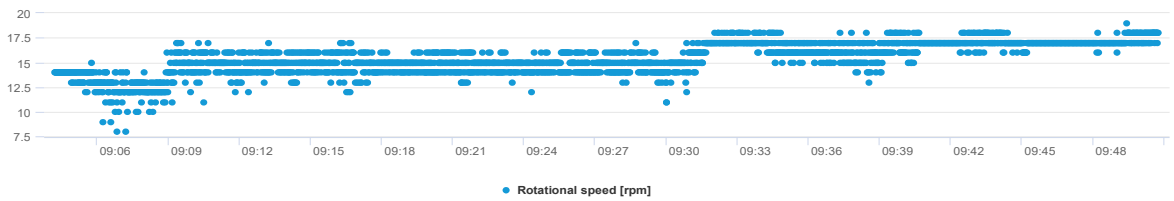
		Element name Project number	**171a**
		Start date	10/14/2024
Drilling rig	BG36H_5625		

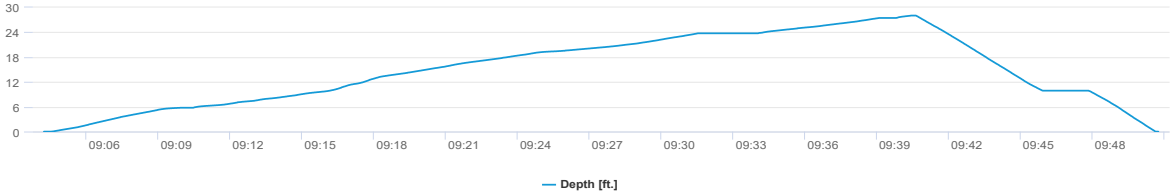
Details

Max. depth	28.051 ft.
Volume/m 1	17.304 ft³

Start time	09:04 AM
End Date	10/14/2024
End time	09:50 AM
Production duration	00:46:33
Final depth time	09:40 AM
Total suspension quantity	146.909 ft³







SCM Report

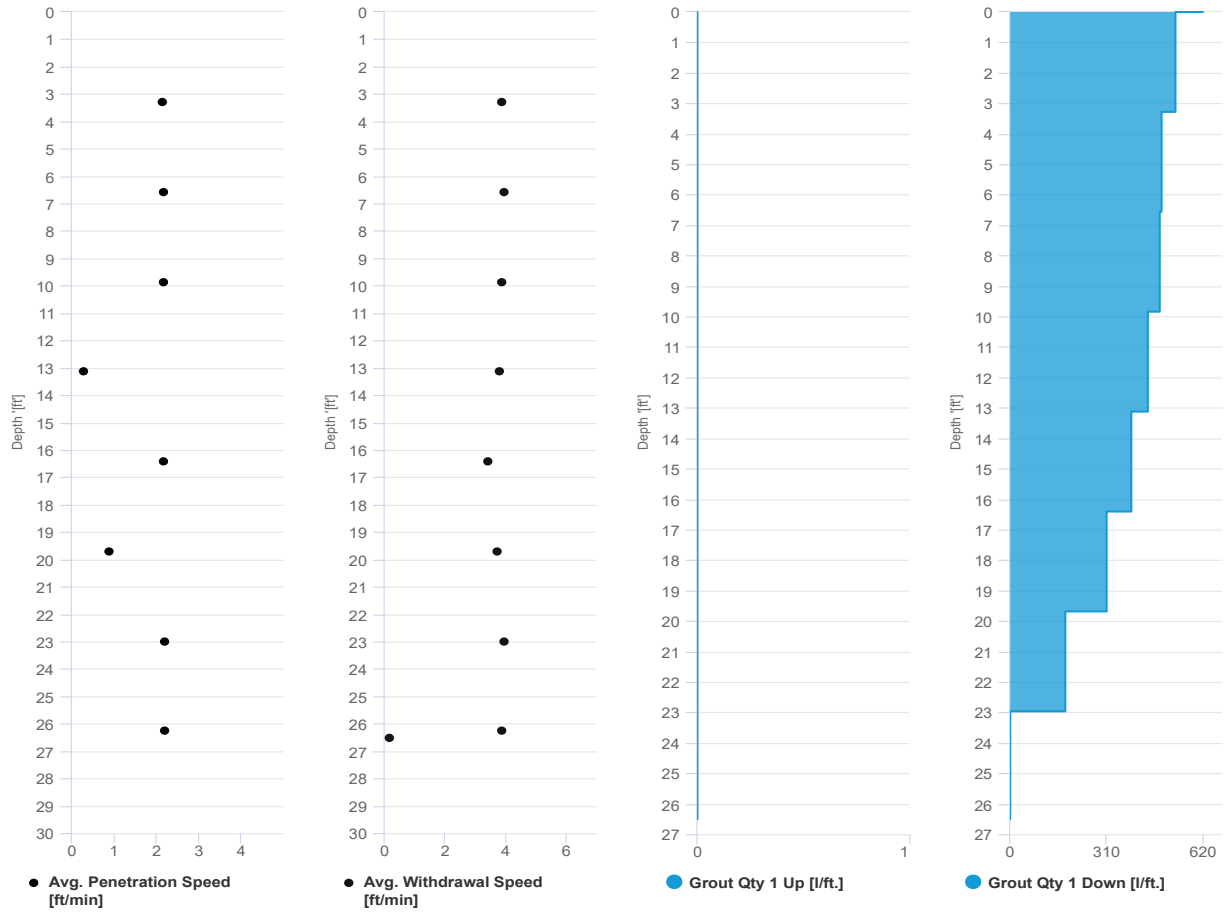
CASCADE

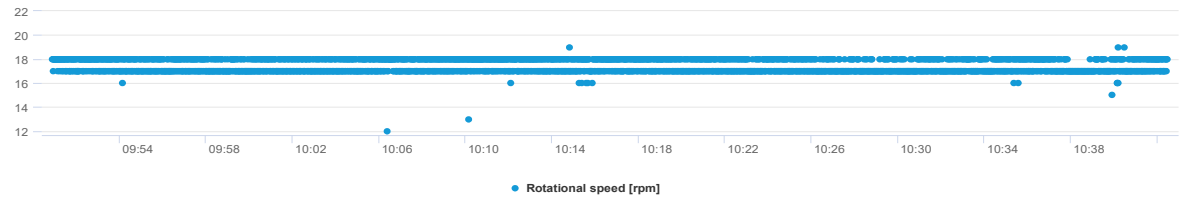
		Element name Project number	**171b**
		Start date	10/14/2024
Drilling rig	BG36H_5625		

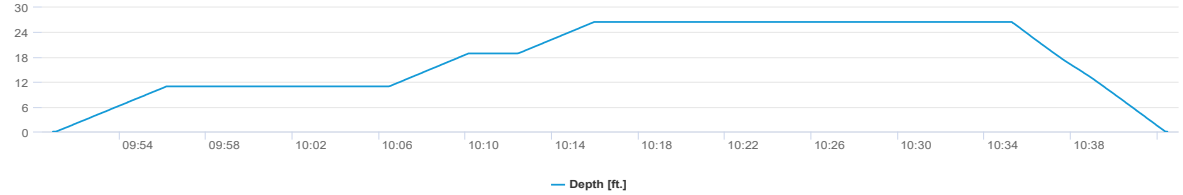
Details

Max. depth	26.509 ft.
Volume/m 1	4.944 ft³

Start time	09:50 AM
End Date	10/14/2024
End time	10:42 AM
Production duration	00:51:34
Final depth time	10:15 AM
Total suspension quantity	40.965 ft³







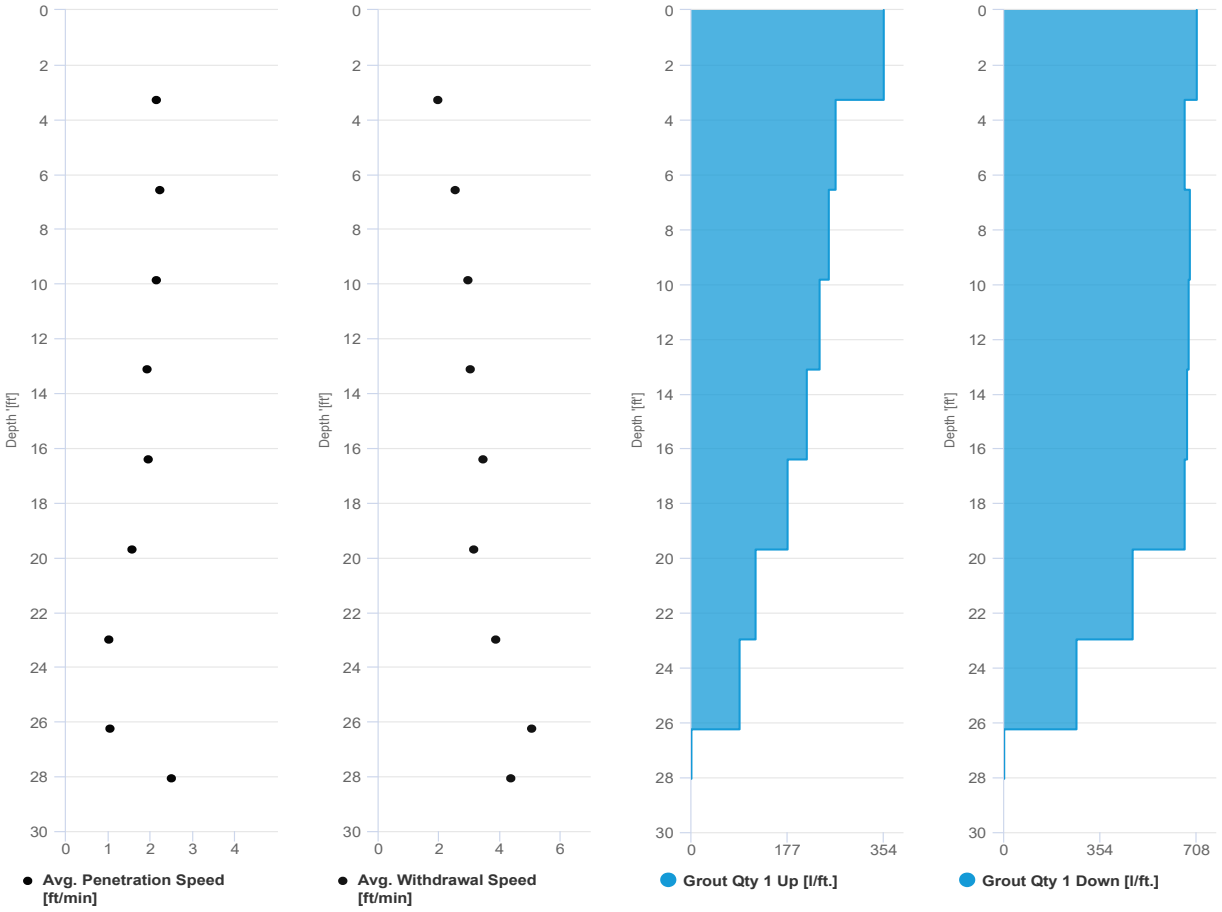
SCM Report

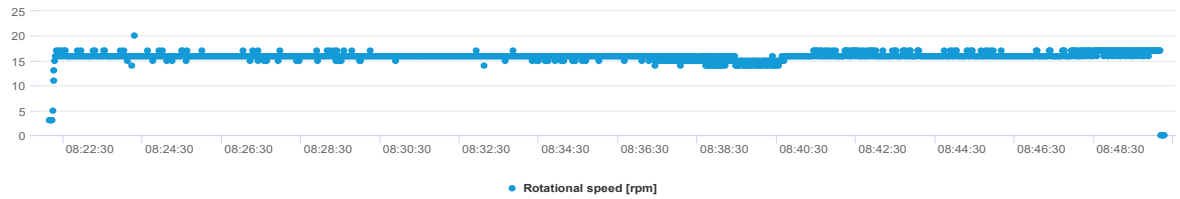
CASCADE

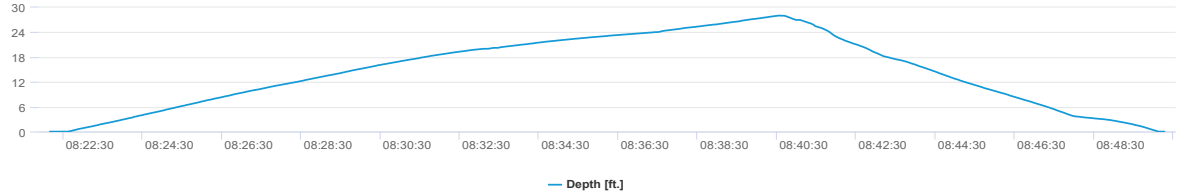
		Element name Project number	**171c**
		Start date	10/15/2024
Drilling rig	BG36H_5625		

Details

Max. depth	28.051 ft.	Start time	08:22 AM
Volume/m 1	9.535 ft³	End Date	10/15/2024
		End time	08:50 AM
		Production duration	00:28:08
		Final depth time	08:40 AM
		Total suspension quantity	81.93 ft³







Kevin Kleaka, PG

From: Fischer, Aaron G (DEC) <Aaron.Fischer@dec.ny.gov>
Sent: Thursday, February 1, 2024 12:29 PM
To: Kevin Kleaka, PG
Cc: Dudek, Heidi M (DEC); Diana Posten; Juliana de la Fuente, PG; Deyette, Scott (DEC)
Subject: RE: 318 Nevins Street (C224350) - ISS/ISGS Treatment Area

Hi Kevin,

I met with management to discuss. Please submit an updated design plan explaining the extents of the ISS area and how the ISS will achieve the remedial action objectives for hot-spot TS-4.

Thank you,
Aaron

Aaron Fischer, E.I.T
he/him/his
Assistant Environmental Engineer, Remedial Bureau B/Section D
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, Albany, NY 12233-5060
Phone: 518-402-9805 | Direct: (518) 598-7799 | aaron.fischer@dec.ny.gov
www.dec.ny.gov | | |

NEW YORK STATE | Department of Environmental Conservation

From: Kevin Kleaka, PG <kkleaka@impactenvironmental.com>
Sent: Thursday, January 25, 2024 5:02 PM
To: Fischer, Aaron G (DEC) <Aaron.Fischer@dec.ny.gov>
Cc: Dudek, Heidi M (DEC) <heidi.dudek@dec.ny.gov>; Diana Posten <dposten@impactenvironmental.com>; Juliana de la Fuente, PG <Jdelafuente@impactenvironmental.com>
Subject: RE: 318 Nevins Street (C224350) - ISS/ISGS Treatment Area

HI Aaron,
Can you please let me know on my email below so I can advise the applicant? Thanks,

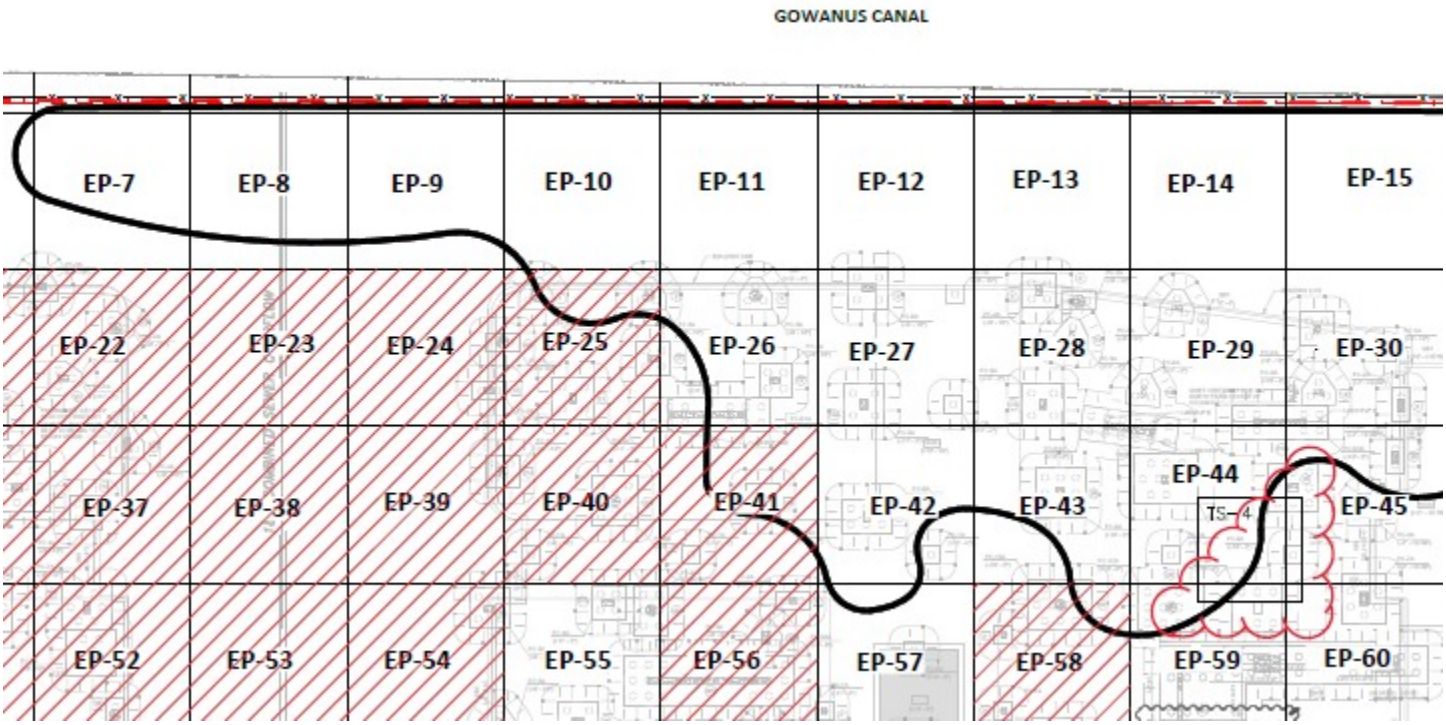
KEVIN KLEAKA, PG | Exec. Vice President
O: 631-269-8800 x129 C: 516-805-8892

From: Kevin Kleaka, PG <kkleaka@impactenvironmental.com>
Sent: Tuesday, January 23, 2024 11:26 AM

To: Fischer, Aaron G (DEC) <Aaron.Fischer@dec.ny.gov>
Cc: Dudek, Heidi M (DEC) <heidi.dudek@dec.ny.gov>; Diana Posten <dposten@impactenvironmental.com>; Juliana de la Fuente, PG <Jdelafuente@impactenvironmental.com>
Subject: 318 Nevins Street (C224350) - ISS/ISGS Treatment Area

Hi Aaron,
In a prior meeting with the Department, we discussed that no additional material is required to be excavated beyond the 2' cut in the areas of ISS and ISGS treatment zones, even if the end point results exceed PGSCO's for contaminants of concern. Can you please confirm?

Also, the Applicant is interested in expanding the ISS treatment area to include hot spot TS-4 (which is partially already in the ISS treatment area) and not conduct the excavation – see below. Please confirm this is acceptable. This would be documented/included in the full-scale plan. Thank you,



KEVIN KLEAKA, PG | Exec. Vice President
O: 631-269-8800 x129 C: 516-805-8892
170 Keyland Court, Bohemia, NY 11716
Our email policies

Appendix C

318 Nevins Street, Brooklyn, NY

ATL Laboratory Reports

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 21, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 7 **Specimen Description:** Intact **Percent Compaction:** NA
Sample ID: C-152 **Sample Classification:** Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.466	0.469
Sample Length (in)	2.250	2.250
Sample Diameter (in)	2.034	2.035
Area (in^2)	3.250	3.253
Volume (in^3)	7.31	7.32
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	37.1	38.1
Dry Unit Weight	80.2	80.2

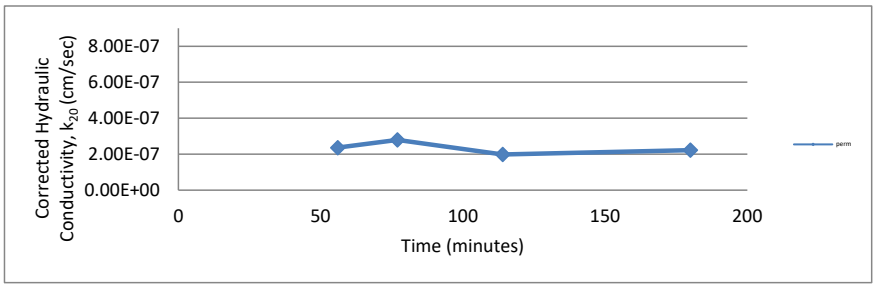
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	2	5.0	5.0	24.61	24.61	2.3E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 10/21/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 22, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 14 **Specimen Description:** Intact **Percent Compaction:** NA
Sample ID: C-152 **Sample Classification:** Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.477	0.481
Sample Length (in)	2.259	2.260
Sample Diameter (in)	2.041	2.042
Area (in^2)	3.272	3.274
Volume (in^3)	7.39	7.40
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	36.8	37.9
Dry Unit Weight	81.5	81.4

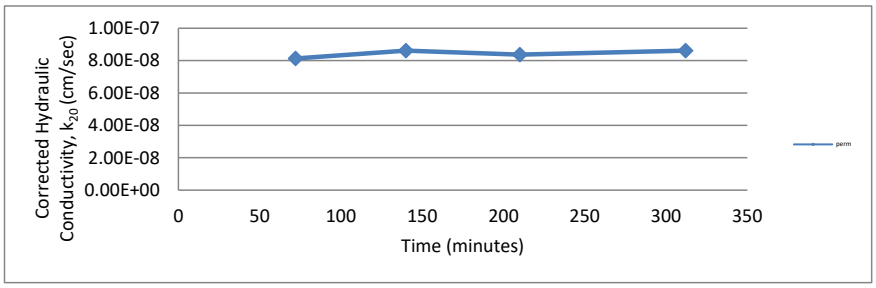
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	2	5.0	5.0	24.51	24.51	8.4E-08

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 10/25/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 17, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-152
Cylinder Age (days): 7

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.03
Specimen Diameter (in.)	2.03
Avg. Height-to-Diameter Ratio	1.99
Dry Unit Weight (pcf)	80.3
Water Content (%)	37.4
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	50.6
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 10/21/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 21, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-152
Cylinder Age (days): 14

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.06
Specimen Diameter (in.)	2.05
Avg. Height-to-Diameter Ratio	1.98
Dry Unit Weight (pcf)	81.5
Water Content (%)	33.8
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	69.3
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 10/21/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-109-10-24
Report Date: November 4, 2024
Date Recieved: October 23, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 28 **Specimen Description:** Intact **Percent Compaction:** NA
Sample ID: C-152 **Sample Classification:** Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.469	0.471
Sample Length (in)	2.250	2.268
Sample Diameter (in)	2.051	2.051
Area (in^2)	3.304	3.303
Volume (in^3)	7.43	7.49
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	34.7	35.5
Dry Unit Weight	80.9	80.3

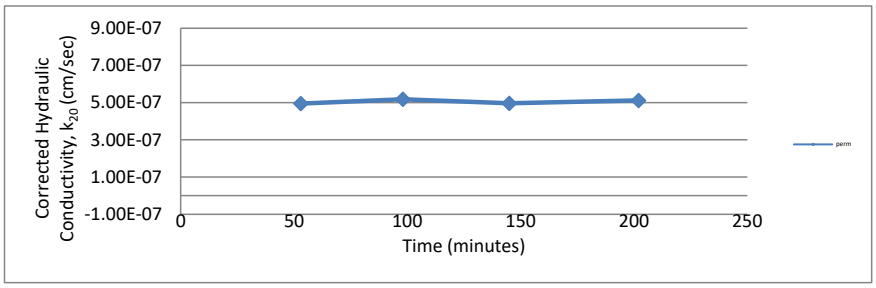
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	1	5.0	5.0	12.21	12.21	5.1E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 11/04/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-109-10-24
Report Date: November 4, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-152
Cylinder Age (days): 28

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.05
Specimen Diameter (in.)	2.04
Avg. Height-to-Diameter Ratio	1.98
Dry Unit Weight (pcf)	81.0
Water Content (%)	35.2
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	116.9
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 11/4/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 25, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-172
Cylinder Age (days): 14

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.03
Specimen Diameter (in.)	2.04
Avg. Height-to-Diameter Ratio	1.98
Dry Unit Weight (pcf)	73.2
Water Content (%)	44.5
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	34.9
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 10/25/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 22, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 7
Specimen Description: Intact
Percent Compaction: NA
Sample ID: C-172
Sample Classification: Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.443	0.446
Sample Length (in)	2.252	2.251
Sample Diameter (in)	2.017	2.019
Area (in^2)	3.194	3.202
Volume (in^3)	7.19	7.21
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	45.2	46.2
Dry Unit Weight	73.3	73.2

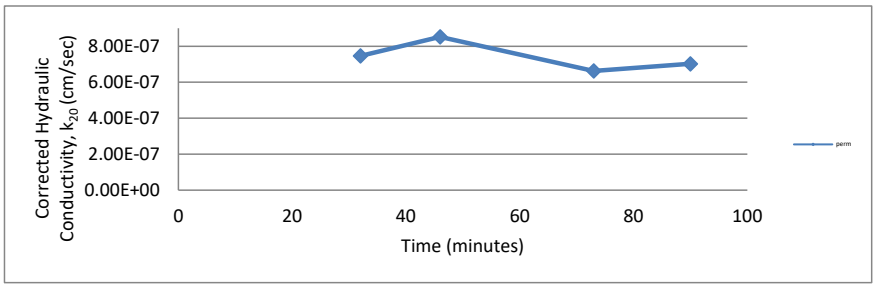
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	1	5.0	5.0	12.30	12.30	7.4E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 10/25/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 30, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 14
Specimen Description: Intact
Percent Compaction: NA
Sample ID: C-172
Sample Classification: Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.458	0.463
Sample Length (in)	2.295	2.295
Sample Diameter (in)	2.029	2.029
Area (in^2)	3.234	3.234
Volume (in^3)	7.42	7.42
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	41.4	43.2
Dry Unit Weight	75.3	75.3

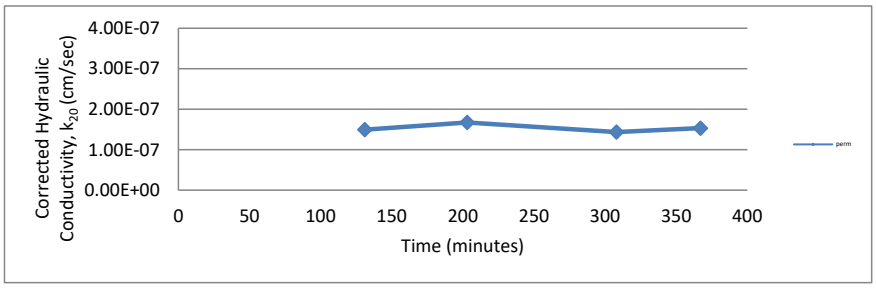
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	2	5.0	5.0	24.13	24.13	1.5E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 11/04/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 18, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-172
Cylinder Age (days): 7

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.03
Specimen Diameter (in.)	2.02
Avg. Height-to-Diameter Ratio	1.99
Dry Unit Weight (pcf)	74.2
Water Content (%)	43.6
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	39.3
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____

Date: 10/21/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-109-10-24
Report Date: November 1, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-172
Cylinder Age (days): 22

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.02
Specimen Diameter (in.)	2.05
Avg. Height-to-Diameter Ratio	1.96
Dry Unit Weight (pcf)	77.6
Water Content (%)	36.3
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	69.8
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____

Date: 11/1/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 21, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 7
Specimen Description: Intact
Percent Compaction: NA
Sample ID: C-238
Sample Classification: Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.456	0.461
Sample Length (in)	2.262	2.261
Sample Diameter (in)	2.044	2.044
Area (in^2)	3.282	3.282
Volume (in^3)	7.42	7.42
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	43.1	44.8
Dry Unit Weight	74.1	74.2

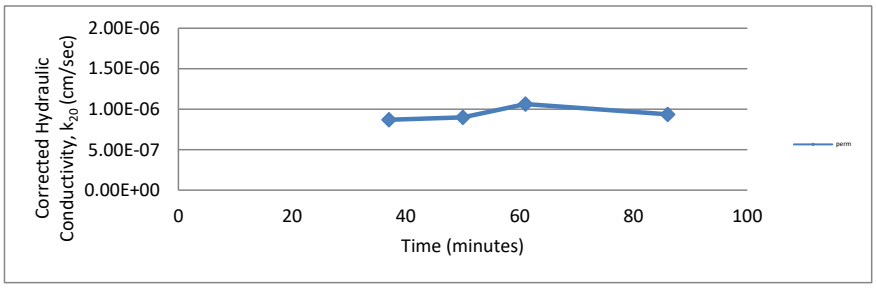
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	1	5.0	5.0	12.25	12.25	9.4E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 10/25/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 25, 2024
Date Recieved: October 16, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 14
Specimen Description: Intact
Percent Compaction: NA
Sample ID: C-238
Sample Classification: Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.436	0.442
Sample Length (in)	2.182	2.182
Sample Diameter (in)	2.042	2.042
Area (in^2)	3.276	3.274
Volume (in^3)	7.15	7.14
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	43.8	45.9
Dry Unit Weight	73.2	73.3

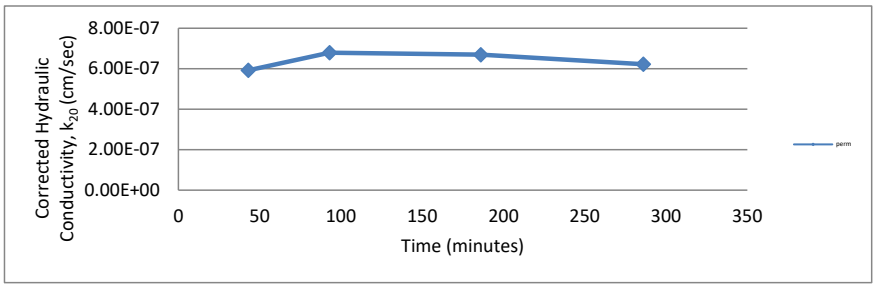
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	1	5.0	5.0	12.69	12.69	6.4E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 10/25/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 17, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-238
Cylinder Age (days): 7

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	3.99
Specimen Diameter (in.)	2.04
Avg. Height-to-Diameter Ratio	1.95
Dry Unit Weight (pcf)	74.1
Water Content (%)	42.0
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	126.4
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 10/21/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-106-10-24
Report Date: October 22, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-238
Cylinder Age (days): 14

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	3.99
Specimen Diameter (in.)	2.05
Avg. Height-to-Diameter Ratio	1.94
Dry Unit Weight (pcf)	73.5
Water Content (%)	42.2
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	204.8
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____ Date: 10/25/2024

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-109-10-24
Report Date: November 5, 2024
Date Recieved: October 23, 2024

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM D 5084

Cylinder Age (Days): 28 **Specimen Description:** Intact **Percent Compaction:** NA
Sample ID: C-238 **Sample Classification:** Soil-Cement Cylinder

Sample Information

	Initial	Final
Weight (lbs)	0.463	0.470
Sample Length (in)	2.310	2.312
Sample Diameter (in)	2.044	2.045
Area (in^2)	3.281	3.283
Volume (in^3)	7.58	7.59
Specific Gravity (Assumed)	2.65	2.65
Moisture Content (%)	42.1	44.4
Dry Unit Weight	74.2	74.1

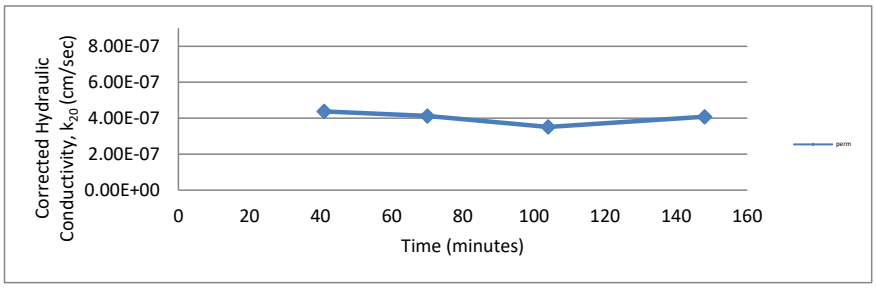
Test Conditions

Permeant Liquid	Water
Test Method	A
Saturation (%)	100
Temperature (°C)	24
Max Dry Density (pcf)	--
Optimum Moisture (%)	--

Test Data

Average Confining Pressure (psi)	Average Back Pressure (psi)	Average Differential Head (psi)	Minimum Effective Stress (psi)	Maximum Effective Stress (psi)	Range of Hydraulic Gradient		Average Corrected Hydraulic Conductivity k20 (cm/sec)
					Minimum	Maximum	
40	35	1	5.0	5.0	11.97	11.97	4.0E-07

Corrected Hydraulic Conductivity versus Time



Reviewed by: _____ Date: 11/06/24

ATLANTIC TESTING LABORATORIES

Client: Cascade Environmental
Project: Nevins Street ISS
Client Project Number: 260-231016

ATL Report No.: CT4520SL-109-10-24
Report Date: November 5, 2024

Unconfined Compressive Strength of Cohesive Soil
ASTM D 2166

Sample Identification: C-238
Cylinder Age (days): 28

Sample Type: Soil-Cement Cylinder

Height of Specimen (in.)	4.02
Specimen Diameter (in.)	2.05
Avg. Height-to-Diameter Ratio	1.96
Dry Unit Weight (pcf)	73.2
Water Content (%)	42.6
Water Content on:	Entire Sample
Water Content Performed:	After Shear
Unconfined Compressive Strength (psi)	301.5
Avg. Rate of Strain to Failure (%/min)	1.0

Failure Photograph of Specimen

Reviewed by: _____

Date: 11/6/2024

Appendix D

318 Nevins Street, Brooklyn, NY

Supplemental Pilot Test QA/QC Boring Logs

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

ISS CORE LOG

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977 Site/Project Name: Site Address: 318 Nevins Street Weather: Sunny	**Boring ID:** **209-210-240 OL (Mix D)**
Start Date: 10/21/2024	Geologist: TJ/MS	Total Depth: 30'
Start Time: 11:45	Drilling Company: ADT	GW: ~ 7'
Completion Date: 10/21/2024	Driller:	
Completion Time: 12:55	Rig: Track w/Sonic Capabilities, PQ Rock Coring Sampler Type/Len: 5' Sleeve	GPS Coordinates:

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		52" 86.7%		Gray to dark gray, well mixed, treated, granular with broken up hard pieces, trace wood fragments.	
6 – 10		46" 76.7%		Brown to dark gray, well mixed, treated. Segmented to Broken Up Hard Pieces to granular.	
11 – 15		55" 91.7%		Dark gray, well mixed, treated, brittle segmented sections to granular hard fragments with trace peat at middle.	
16 – 20		51" 85.0%		Dark gray, well mixed, treated, less cured middle, segmented to broken up hard pieces.	
21 – 25		13" 22%		Dark gray, well mixed, treated, hard/segmented at top, medium dense at middle w/trace peat, to hard segments w/slight metallic appearance and hard pieces at bottom with water.	A wet mix sample was collected at 24' from Column 240
26 – 30		50" 83%		Dark gray, mixed, treated, medium dense, less cured with hard fragments at top, hard middle. 28-30': Brown Native Soil Below ISS Treatment Column	

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977	**Boring ID:** **210-211-239 OL (Mix D)**
	Site/Project Name:	
	Site Address: 318 Nevins Street	
	Weather: Sunny	
	Geologist: TJ/MS	Total Depth: 30'
Start Date: 10/22/2024	Drilling Company: ADT	GW: ~ 7'
Start Time: 8:40	Driller:	
Completion Date: 10/22/2024	Rig: Track w/Sonic Capabilities, PQ Rock Coring	GPS Coordinates:
Completion Time: 9:30	Sampler Type/Len: Rock Coring, 5' Sleeve	

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		51" 85.0%		Dark gray, well mixed, treated, segmented, brittle to hard sections at top/middle with trace peat to brittle fragments at bottom.	
6 – 10		49" 81.7%		Dark gray, well mixed, treated, hard to brittle w/ trace wood at middle and bottom.	
11 – 15		44" 73.3%		Dark gray, well mixed, treated, less cured top to hard to brittle pieces, trace peat in middle section.	
16 – 20		51" 85.0%		Dark gray, well mixed, treated, segmented to broken up with trace peat at top, fragmented hard and brittle through middle and bottom.	
21 – 25		50" 83.3%		Dark gray, mixed, treated, broken up to segmented, hard to brittle fragments, less cured, NAPL/metallic sheen detected at middle portion.	NAPL/Sheen
26 – 30		45" 75.0%		Dark gray, mixed, treated, pliable, less cured with hard pieces at top, hard at middle and near bottom. 28.5-30': Brown Native Soil Below ISS Treatment Column	

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977	**Boring ID:**	
	Site/Project Name:	**238-239 OL (Mix D)**	
	Site Address: 318 Nevins Street		
	Weather: Sunny		
	Geologist: TJ/MS	Total Depth: 30'	
Start Date: 10/22/2024	Drilling Company: ADT	GW: ~ 7'	
Start Time: 8:40	Driller:		
Completion Date: 10/22/2024	Rig: Track w/Sonic Capabilities, PQ Rock Coring	GPS Coordinates:	
Completion Time: 9:30	Sampler Type/Len: Rock Coring, 5' Sleeve		

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 4		40" 66.6%		Med. gray, mixed, treated. Broken up hard pieces with trace wood and fill at top and hard segments with trace slag and wood at middle to bottom. Trace shell fragments throughout.	
5 – 10		42" 70.0%		Dark gray, mixed, treated. Less dense material 5'-6' with hard pieces, wood chunks and trace gravel at the top; less dense to hard material at middle; and hard material with wood pieces at the bottom.	
10 – 15		52" 86.6%		Dark gray, mixed, treated. Less dense material from 10'-11' with wood fragments and some clay. Hard and segmented with trace wood and shell fragments at middle and bottom.	
15 – 20		60" 100.0%		Dark gray, well mixed, treated. Hard, segmented throughout with wood fragments, trace peat and shell fragments.	
20 – 25		18" 30.0%		Dark gray, well mixed, treated. Hard and segmented with visibly encapsulated NAPL. Trace wood, peat, shell fragments and gravel.	Coal tar odor
25 – 30		49" 81.6%		Dark gray, mixed, treated hard segments w/gravel - peat at top followed by gray-brown, less mixed-less dense interval w/gravel - peat. Hard segmented to 27'w/encapsulated visible NAPL/GCM and peat fragments. 29-30': Dark gray mix/treated to brown native soil at/below ISS Treatment Column	Coal tar odor

Impact Environmental, Inc.
170 Keyland Court
Bohemia, NY 11716
P. (631) 269-8800
F. (631) 269-1599

	Project #: 15977	**Boring ID:**
	Site/Project Name:	
	Site Address: 318 Nevins Street	**152-153 OL (Mix C+)**
	Weather: Sunny	
	Geologist: MS	Total Depth: 30'
Start Date: 10/24/2024	Drilling Company: ADT	GW: ~ 7'
Start Time: 9:00	Driller:	
Completion Date: 10/24/2024	Rig: Truck Mounted, Slow Rotation Rock Coring	GPS Coordinates:
Completion Time: 10:45	Sampler Type/Len: 5' Rock Coring	

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		42" 70.0%		Dark Gray, well mixed, treated. Hard broken up top with concrete, wood and shell fragments to hard segmented middle and bottom sections with brick, wood and shell fragments.	
6 – 10		60" 100.0%		Dark Gray, well mixed, treated. Hard, segmented with trace wood and shell fragments throughout.	
11 – 15		55" 91.6%		Dark Gray, mixed, treated. Hard, segmented/broken up to less dense at 12'-13' with broken hard pieces. Trace brick, wood / shell fragments. Hard broken up pieces at 13' to 14'.	
16 – 20		56" 93.3%		Dark Gray to very dark gray, mixed to less mixed, treated. Hard at top to less dense with peat at 17'-18, followed by less dense material with hard fragments, peat, encapsulated NAPL/GCM at 19'-20'.	
21 – 25		44" 73.3%		Dark to very dark gray, well mixed to less mixed. Hard and segmented upper portion to broken up hard fragments with trace peat and shell fragments, and encapsulated NAPL/GCM at the bottom.	Coal tar odor
26 – 30		46" 76.6%		Dark gray, mixed, treated. Hard segmented at the top. Less dense granular middle followed by hard pieces, NAPL/GCM on core exterior. 29-30': Dark gray, less dense native soil below ISS Treatment Column, NAPL/GMC on exterior.	Coal tar odor

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977	**Boring ID:**
	Site/Project Name:	
	Site Address: 318 Nevins Street	**142-143 OL (Mix E)**
	Weather:	
	Geologist: MS	Total Depth: 29'
Start Date: 10/24/2024	Drilling Company: ADT	GW: ~ 7'
Start Time: 14:57	Driller:	
Completion Date: 10/24/2024	Rig: Truck Mounted, Slow Rotation Rock Coring	GPS Coordinates:
Completion Time: 16:20	Sampler Type/Len: 5' Rock Coring	

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		42" 70.0%		Dark gray, mixed, treated. Broken up hard pieces with wood pieces for upper section to hard segmented pieces with trace fill and shell fragments lower section.	
6 – 10		60" 100.0%		Dark gray, well mixed, treated. Hard segmented with trace wood throughout.	
11 – 15		47" 78.3%		Gray to dark gray, mixed, treated. Broken up hard pieces w/wood pieces at top followed by hard, segmented sections w/ trace fill and wood/shell fragments to broken up hard and less dense pieces at bottom with trace clay and trace NAPL/GCM, slight metallic sheen.	
16 – 20		60" 100.0%		Dark gray, well mixed, treated. Hard segmented sections w/trace fill, wood and shell fragments at top/middle less dense with hard pieces/encapsulated NAPL/GCM at bottom.	Sheening and Odor
21 – 25		33" 63.4%		Dark gray, well mixed, treated. Hard segmented sections w/slight sheen at top and middle. Hard broken pieces w/trace peat and encapsulated NAPL/GCM bottom.	Coal tar odor, Only drilled to 24'
26 – 30		36" 60.0%		Dark gray, well mixed, and treated. Broken up hard pieces at top. Hard to less dense w/NAPLstaining. 29': Hard treated material, no native Soil captured below ISS Treatment Column	Drilled 24' to 29'

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977	**Boring ID:**	
	Site/Project Name:		
	Site Address: 318 Nevins Street	**239-240 OL (Mix D)**	
	Weather:		
	Geologist: MS	Total Depth: 29'	
Start Date: 10/25/2024	Drilling Company: Cascade	GW: ~ 7'	
Start Time: 10:15	Driller:		
Completion Date: 10/25/2024	Rig: Truck Mounted, Slow Rotation Rock Coring	GPS Coordinates:	
Completion Time: 11:40	Sampler Type/Len: 5' Rock Coring		

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		48" 80.0%		Dark gray, mixed, treated. Broken up hard pieces to less dense/granular section with trace wood and fill for upper section. Hard segmented sections w/trace fill, wood and shell pieces for middle / bottom.	
6 – 10		42" 70.0%		Dark gray, well mixed, treated. Hard segmented sections w/trace wood, fill. Hard fragments/fill at 8'-9', wood piece at 9.5'-10'.	
11 – 15		46" 76.7%		Dark gray, mixed, treated. Small pieces at top followed by hard segmented sections w/trace peat and shell fragments.	
16 – 20		52" 86.7"%		Dark gray, well mixed, treated. Hard and segmented sections with trace peat, fill and shell fragments. Brittle at 18'-19'.	
21 – 25		45" 75.0%		Dark gray, well mixed, treated. Wood and gravel with hard fragments at top to hard segmented at middle and bottom with trace gravel and shells.	
26 – 30		35" 58.3%		Dark gray, mixed, treated. Hard fragments at top. Less dense w/trace NAPL/slight sheet at middle. Trace clay 25.5'-26'. Hard segmented at bottom with trace peat. 28'-29": Some hard treated material, no native Soil captured below ISS Treatment Column	Only drilled to 29'. Sheening

Impact Environmental, Inc. 170 Keyland Court Bohemia, NY 11716 P. (631) 269-8800 F. (631) 269-1599	Project #: 15977	**Boring ID:** **144-143-170 OL (Mix E)**	
	Site/Project Name:		
	Site Address: 318 Nevins Street		
	Weather:		
	Geologist: MS	Total Depth: 29'	
Start Date: 10/24/2024	Drilling Company: Cascade	GW: ~ 7'	
Start Time: 17:05	Driller:		
Completion Date: 10/25/2024	Rig: Truck Mounted, Slow Rotation Rock Coring	GPS Coordinates:	
Completion Time: 8:25	Sampler Type/Len: 5' Rock Coring		

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		49" 81.7%		Dark gray, mixed, treated. Broken up hard pieces w/ little gravel at top. Hard segments w/trace fill and shell fragments at middle and bottom.	
6 – 10		60" 100.0%		Dark gray, mixed, treated. Hard segmented sections w/trace fill and shell fragments. Less dense, granular at bottom w/ some peat and trace clay at 9'-10'.	
11 – 15		48" 80.0%		Gray, mixed, treated. Hard segmented sections with trace fill and shell fragments at top / middle. Hard segmented at bottom with some peat fragments at 14'-15'.	Completed drilling to 15' on 10/24/24.
16 – 20		60" 100.0%		Dark gray, mixed, treated. Hard segmented sections with trace fill, shell fragments and peat. Encapsulated NAPL/GCM at middle / bottom, 17-18'. Brittle / fragmented at 19'-19.5'.	
21 – 25		44" 73.3%		Gray to dark gray, mixed, treated. Little sluff with hard fragments and gravel at top. Hard less dense fragments w/peat at middle. Hard segmented at bottom. Encapsulated NAPL/GCM with slight sheen at middle and bottom.	Coal tar odor
26 – 30		47" 78.3%		Dark gray, mixed, treated. Hard fragments w/trace peat at top. Hard segmented w/trace peat and encapsulated NAPL/GCM at middle and bottom. 28'-29": Brown Native Soil Below ISS Treatment Column.	Only drilled to 29'. Sheening

Impact Environmental, Inc.
170 Keyland Court
Bohemia, NY 11716
P. (631) 269-8800
F. (631) 269-1599

	Project #: 15977	**Boring ID:**
	Site/Project Name:	
	Site Address: 318 Nevins Street	**153-160-161 OL (Mix C+)**
	Weather:	
	Geologist: MS	Total Depth: 30'
Start Date: 10/24/2024	Drilling Company: Cascade	GW: ~ 7'
Start Time: 11:32	Driller:	
Completion Date: 10/24/2024	Rig: Truck Mounted, Slow Rotation Rock Coring	GPS Coordinates:
Completion Time: 13:53	Sampler Type/Len: 5' Rock Coring	

Depth (Feet) Below 2' Cut Excavation	Photos	Recovery (Inches/ percentage)	Pen Strength (TSF)	Core Description/ Recovery Percentage	Notes
1 – 5		49" 81.7%		Dark gray, well mixed, treated. Hard fragments w/gravel, wood and fill at top. Hard segmented sections w/ trace fill and shell fragments at middle and bottom.	
6 – 9		59" 98.3%		Dark gray, well mixed, treated. Hard segmented sections w/trace wood and shell fragments throughout.	
10 – 14		43" 71.7%		Dark gray, well mixed, treated. Hard segmented sections w/trace wood.	
15 – 19		60" 100.0%		Dark gray, well mixed, treated. Hard segmented w/some fragments at top. Less dense w/trace peat at middle. Hard segmented sections w/trace peat at bottom.	
20 – 25		48" 80.0%		Dark gray, mixed, treated. Hard fragmented at 20'-21'. Less dense, granular w/encapsulated NAPL/GCM and peat at 21'-22'. Hard segmented sections w/trace peat at middle and bottom.	Coal tar odor
26 – 30		37" 61.7%		Dark gray, well mixed, treated. Hard segmented sections w/trace peat. 28'-29": Some hard treated material, no native Soil captured below ISS Treatment Column	

Appendix E

318 Nevins Street, Brooklyn, NY

Supplemental Pilot Test QA/QC Photo Logs

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

238 C

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238 C: 0’-5’ 10/21/2024

238 C: 5’-10’ 10/21/2024

238 C: 10’-15’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238 C: 15’-20’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238 C: 20’-25’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238 C: 25’-30’ 10/21/2024

209-210-240 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 0’-5’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 5’-10’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 10’-15’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 15’-20’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 20’-25’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

209-210-240 OL: 25’-30’ 10/21/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

210-211-239 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

210-211-239 OL: 0’-5’ 10/22/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

210-211-239 OL: 5’-10’ 10/22/2024

210-211-239 OL: 10’-15’ 10/22/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

210-211-239 OL: 15’-20’ 10/22/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

210-211-239 OL: : 20’-25’ 10/22/2024

210-211-239 OL: 25’-30’ 10/22/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238-239 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238-239 OL: 0’-5’ 10/23/2024

238-239 OL: 5’-10’ 10/23/2024

238-239 OL: 10’-15’ 10/23/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238-239 OL: 15’-20’ 10/23/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238-239 OL: 20’-25’ 10/23/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

238-239 OL: 25’-30’ 10/23/2024

142-143 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

142-143 OL: 0’-5’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

142-143 OL: 5’-10’ 10/24/2024

142-143 OL: 10’-15’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

142-143 OL: 15’-20’ 10/24/2024

142-143 OL: 20’-25’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

142-143 OL: 25’-30’ 10/24/2024

143-144-170 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

143-144-170 OL: 0’-5’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

143-144-170 OL: 5’-10’ 10/24/2024

143-144-170 OL: 10’-15’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

143-144-170 OL: 15’-20’ 10/24/2024

143-144-170 OL: 20’-25’ 10/24/2024

143-144-170 OL: 25’-30’ 10/24/2024

153-160-161 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

153-160-161 OL: 0’-5’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

153-160-161 OL: 5’-10’ 10/24/2024

153-160-161 OL: 10’-15’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

153-160-161 OL: 15’-20’ 10/24/2024

153-160-161 OL: 20’-25’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

153-160-161 OL: 25’-30’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

152-153 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

152-153 OL: 0’-5’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

152-153 OL: 5’-10’ 10/24/2024

152-153 OL: 10’-15’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

152-153 OL: 15’-20’ 10/24/2024

152-153 OL: 20’-25’ 10/24/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

152-153 OL: 25’-30’ 10/24/2024

239-240 OL

318 Nevins Street, Brooklyn, NY

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

239-240 OL: 0’-5’ 10/25/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

239-240 OL: 5’-10’ 10/25/2024

239-240 OL: 10’-15’ 10/25/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

239-240 OL: 15’-20’ 10/25/2024

239-240 OL: 20’-25’ 10/25/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

239-240 OL: 25’-30’ 10/25/2024

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York| 07071 | 631.269.8800

Appendix F

318 Nevins Street, Brooklyn, NY

Community Air Monitoring Plan

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

NYSDEC BROWNFIELD CLEANUP PROGRAM

Community Air Monitoring Plan – BCP # C224350

June 28, 2023

conducted at:

300-344 Nevins Streeet (aka 318 Nevins Street)
Brooklyn, New York
County Tax Map Designation: *Block 439; Lot 1*

Submitted to:

Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York, 12233-7020

Prepared For:

Gowanus 300 Nevins Street LLC
19 West 24th Street, 12th Floor
New York, NY, 10010

IEC Project # 15977

IMPACT ENVIRONMENTAL ENGINEERING AND GEOLOGY, PLLC
170 Keyland Court | Bohemia | New York | 11716 | 631.269.8800

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APPENDICES

LIST OF ACRONYMS

Acronym	Definition
DER	Division of Environmental Remediation
CAMP	Community Air Monitoring Unit
Mcg/m3	Micrograms Per Cubic Meter
NYS DEC	New York State Department of Environmental Conservation
NYS DOH	New York State Department of Health
PID	Photoionization Detector
PM-10	Particulate Matter Less Than 10 Micrometers in Size
PPM	Parts Per Million
VOC	Volatile Organic Compound

CERTIFICATION

I, Xin Yuan am a Professional Engineer (PE) as defined in **§**43-140. I have primary direct responsibility for implementation of the Community Air Management Plan (CAMP) for the (318 Nevins Street, Brooklyn, NY) Site (DEC Site # C224350).

I certify that the CAMP has a plan for handling the prevention of exposure to the public from potential contaminant releases resulting from on-site investigative or remedial activities.

Xin Yuan, P.E.
Name

Signature: Xin Yuan

Date: 6-28-2023

1 INTRODUCTION

Impact Environmental prepared this Community Air Monitoring Plan (CAMP) to protect the community from any potential airborne releases that could result from field activities associated with construction activities for development (foundation installations, support of excavation, etc.) or remediation activities (remedial investigations or remedial action) at the property located at 251 Douglass Street, Brooklyn, New York, herein referred to as the "Site". This work is being performed under the auspices of the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program, DEC Project # C224367. This document has been prepared in accordance with the NYSDEC Program Policy Division of Environmental Remediation (DER)-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

The CAMP is intended to protect off-site receptors and those not directly involved with remedial activities from potential airborne contaminant releases that result directly from investigative or remedial activities.

1.1 Objectives

The overall objectives of this document are as follows:

- Prevent exposure to the public from potential contaminant releases resulting from on-site investigative or remedial activities;
- Specify monitoring and documentation requirements; and
- Provide contingency details.

2 MONITORING

2.1 Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring, or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH. Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas. Exceedances of action levels observed during performance of the CAMP will be reported to the DEC Project Manager and included in the Daily Report.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. APeriodic@ monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

2.2 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppmover background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

2.3 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

2.3.1 Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals

Special Requirements CAMP is required when ground intrusive or soil handling is occurring within 20 feet of potentially exposed individuals or structures, as follows:

1. When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

2. If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be predetermined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

3. If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented

and are successful in reducing the total particulate concentration to 150mcg/m3 or less at the monitoring point.

2.4 Meteorological Monitoring

Meteorological monitoring will take place on a daily basis. It will consist of temperature, wind direction, and general atmospheric conditions (i.e. rain, snow, etc.). These parameters will be evaluated each morning and recorded in the field notebook. Wind direction should be monitored throughout the day so that upwind and downwind sampling locations can be adjusted if necessary. All readings will be recorded and be available for DEC personnel to review.

3 DOCUMENTATION

During the implementation of the CAMP, the following information will be recorded and maintained:

- Climatological conditions including temperature wind direction, and other atmospheric conditions along with the date and time of observations;
- Calibration of field instruments;
- CAMP monitoring locations;
- VOC 15-min readings as well as instantaneous readings, if necessary; All particulate readings; and
- Any exceedances to the response levels and the respective corrective actions.

VOC 1-min readings will be available for review by the State (NEYDEC and NYSDOH) if requested and included in each *Daily Field Report*. Additionally, the DEC will be notified immediately of any exceedances.

APPENDICES

318 Nevins Street, Brooklyn, New York

APPENDIX A
CAMP Daily Status Report Sheet

318 Nevins Street, Brooklyn, New York

IMPACT ENVIRONMENTAL | 170 Keyland Court | Bohemia | New York | 11716 | 631.269.8800

DAILY STATUS REPORT

Prepared by: _____

WEATHER	Snow		Rain		Overcast		Partly Cloudy		Bright Sun	
TEMP.	< 32		32-50		50-70		70-85		> 85	

DEC Project. No.		DEC Site No.		Date:	
Project Name:					

Environmental Consultant: Impact Environmental Closures, Inc 170 Keyland Court Bohemia, NY 11716.	**Environmental Safety Officer:**
General Contractor:	**Site Manager/ Supervisor:**
Work Activities Performed (Since Last Report)	
Working In Area:	

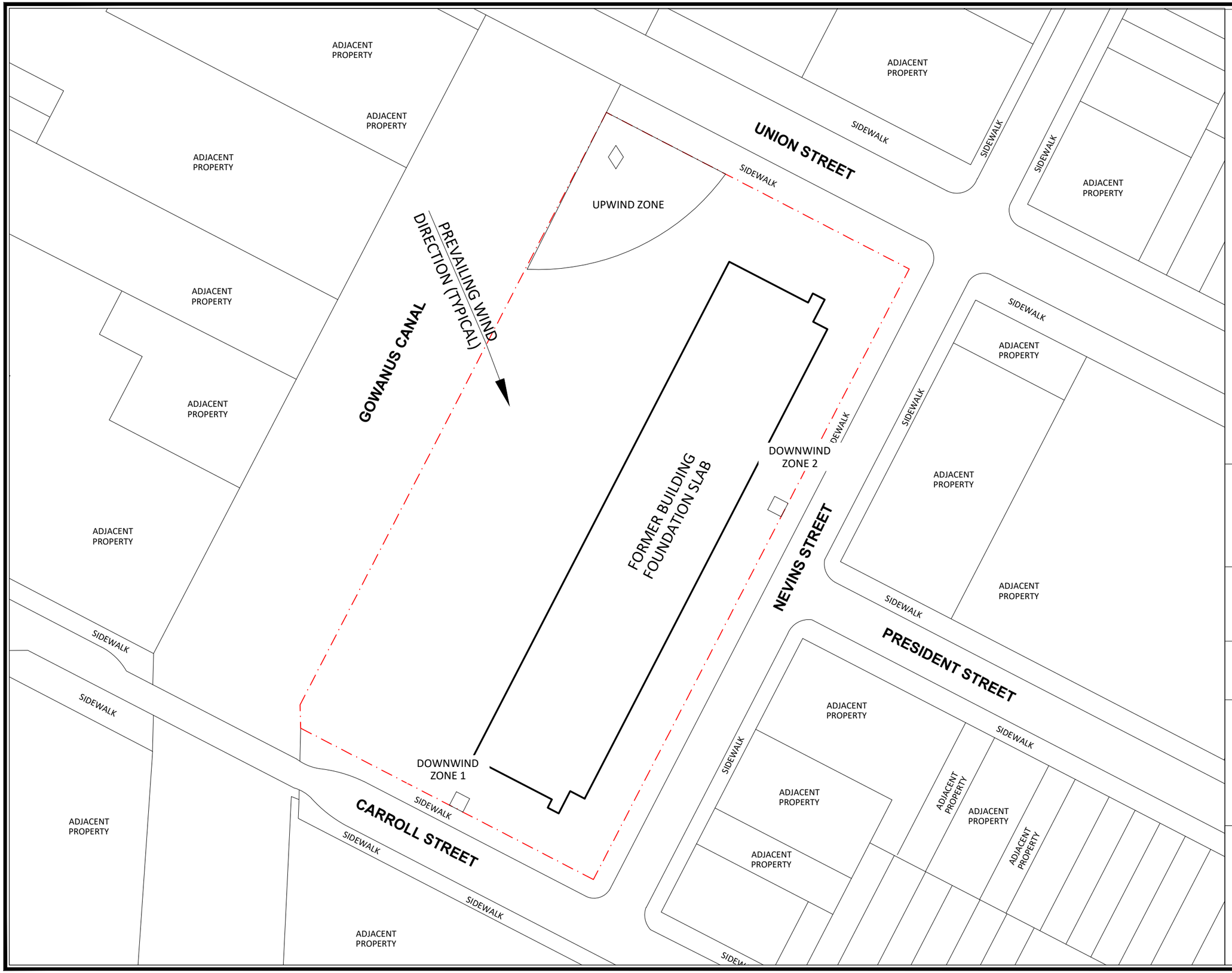
Samples Collected (Since Last Report):
Air Monitoring (Since Last Report): Prestart Conditions – PID = ___0.0__ppm, Dust = _____ mg/m^3@ High Conditions – PID = __0.0__ ppm @ Dust = __mg/m^3 @
Problems Encountered:
Planned Activities for the Next Day/ Week:

SOIL DISPOSAL INFORMATION

Facility #: **Name/ Location:** **Type of Waste:**	Facility:		Facility:		Facility:	
(# of Trucks, # of Cu.Yds.)	Trucks	Cu. Yds.	Trucks	Cu. Yds.	Trucks	Cu. Yds.
Today						
Weekly Total						
Total to Date						

SOIL IMPORTED INFORMATION

Facility #: **Name/ Location:** **Type of Import:**	Facility:		Facility:		Facility:	
(# of Trucks, # of Cu.Yds.)	Trucks	Cu. Yds.	Trucks	Cu. Yds.	Trucks	Cu. Yds.
Today						
Weekly Total						
Total to Date						



NOTES:

CAMP ZONE MAP

318 Nevins Street
Brooklyn, New York

Figure

PROJECT NO.	15977-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	JDF
DATE:	05/02/2023
SCALE:	1" = 60'

REVISIONS

IMPACT ENVIRONMENTAL ENGINEERING AND GEOLOGY PLLC
170 KEYLAND COURT
BOHEMIA, NEW YORK 11716
TEL (631) 269-8800
FAX (631) 269-1599

Site Grid Map

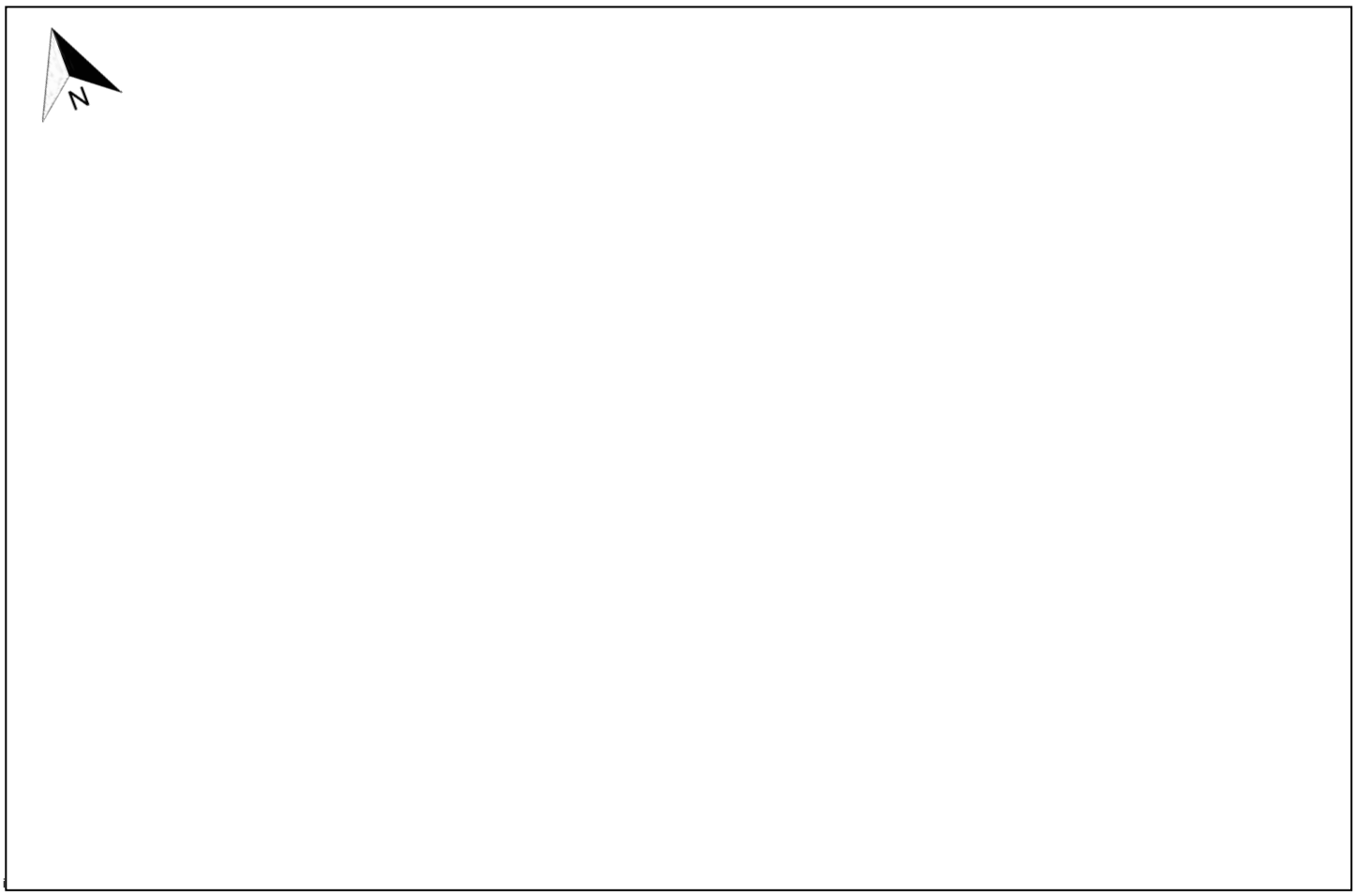


Photo Log

Photo 1 –	
Photo 2-	

Photo 3 –	

APPENDIX B
On-site Dust and Volatile Organic Vapor Monitoring Log

318 Nevins Street, Brooklyn, New York

On- Site Dust and Volatile Organic Vapor Monitoring

Project: _____ Job No.: _____

Location: _____ On-site Personnel: _____

Day & Date: _____ Weather: _____

	AM	PM	Sample Interval: 15 minutes
Wind Direction			Background Reading (particulates) **mg/m^3**
Temperature Range:		°F	Background Reading (organic vapors) **ppm**

Calibration Dates: Particulate Meters: Photoionization Detector:

Action Level/Response: Organic vapors: > 5ppm above background levels/ 15 minute readings

Particulates: 0.100 mg/m^3 above up wind reading/15 minute period

Time	Particulate levels:		ORGANIC VAPOR LEVELS	NOTES
	UPWIND (mg/m^3)	DOWNWIND (mg/m^3)	(ppm)	
0700				
0715				
0730				
0745				
0800				
0815				
0830				
0845				
0900				
0915				
0930				
0945				
1000				
1015				
1030				
1045				
1100				
1115				
1130				
1145				
1200				

Project: _____ Job No.: _____

Location: _____ Day & Date: _____

Time	Particulate levels:		ORGANIC VAPOR LEVELS (ppm)	NOTES
	UPWIND (mg/m^3)	DOWNWIND (mg/m^3)		
1215				
1230				
1245				
1300				
1315				
1330				
1345				
1400				
1415				
1430				
1445				
1500				
1515				
1530				
1545				
1600				
1615				
1630				
1645				
1700				

Appendix G

318 Nevins Street, Brooklyn, NY

NYSDEC In-Situ Stabilization QA/QC Plan

IMPACT ENVIRONMENTAL
170 Keyland Court
Bohemia, New York 11716
TEL: (631) 268-8800
FAX: (631) 269-1599

NYSDEC In-Situ Solidification QA/QC

1.0 GENERAL

1.1 Introduction

Technology Description

In-situ solidification (ISS) is an established remediation treatment technology which can prevent migration of and exposure to certain contaminants in media including soil, sludge, and sediment. The ISS process is increasingly being used within remedial programs in the New York State Department of Environmental Conservation (Department).

ISS is a process that involves the mixing of reagents with contaminated soil to create a low permeability mass which encapsulates the contamination in the soil in place. Bucket excavators augers, or other technologies are used to mix the contaminated media and one or more reagents, entrapping the contaminated material within a low permeability mass. This reduces or eliminates non-aqueous phase liquid (NAPL) mobility and contaminant migration into exposure pathways, thus eliminating the treated area as a source of future exposure or contamination of groundwater, surface water, or vapor.

Complete mixing of the contaminated soil and the ISS reagents must be achieved for the process to be effective and protective of human health and the environment. Incomplete mixing can result in a non-homogenous mass, untreated areas, or large fractures within the ISS mass, which may allow mobility of NAPL and groundwater within the treated areas.

1.2 Document Purpose

The purpose of this document is to provide a method of Quality Assurance (QA)/Quality Control (QC) to ensure the effectiveness of ISS after field implementation is complete. This includes coring, and testing for hydraulic conductivity and unconfined compressive strength. The use of coring for QA/QC may not be suitable for all ISS projects and other QA/QC methods such as excavation/visual inspection will be considered an option on a case by case basis.

Failure to meet QA/QC goals, particularly incomplete mixing, is of greatest concern when it occurs along the edges of the solidified mass. The Department has noted a tendency for DNAPL to accumulate in permeable soils and sediments immediately above the bedrock surface, creating a potential pathway for DNAPL migration. Such zones can be quite difficult to mix adequately, whether using augers or bucket mixing. Thus, attention is required to ensure that “top of rock” zones are thoroughly solidified, and that this solidification is adequately documented.

To ensure the integrity of the treated material, the Department has identified QA/QC procedures, specifically coring, which are essential to ensure that ISS treatment processes are protective of the environment. This document has been developed to provide guidance on a coring program to be conducted to ensure confidence regarding complete mixing and ISS installation in the remedial area.

2.0 EQUIPMENT

2.1 Coring Drilling Method

To allow early coring information to be used for adjusting ISS operations, it is recommended that coring operations be conducted prior to complete curing of the ISS material. For high-strength material, a rock core is frequently required. Driven split spoons (typically using Direct Push tools but potentially using augers as well) may be used to collect core samples of the ISS material for lower strength materials. Rotosonic and compressed air drilling methods have not been successful in obtaining representative core samples.

Cores must be no longer than five (5) feet. If less than 60% of the core material is recovered from any of the coring runs, one (1) new core hole must be drilled adjacent to the previous location. If the recovery from the adjacent core hole continues to be less than 60%, the contractor may abandon the location. This is not intended to justify an inadequate sampling program. A representative number of successfully completed cores must be provided. Close communication with the Department's project manager (PM) is strongly encouraged to discuss and reach concurrence on the coring program.

2.2 Trenching

While trenching has not been used to date, there could potentially be instances where trenching would be a viable alternative. A trenching plan would have to be submitted to the Department during the remedial design. In the event trenching is proposed after the remedial design phase, but prior to field implementation of the ISS, a minimum of two weeks' notice should be provided to the Department for review of the trenching design.

2.3 Sample Collection for strength and permeability

Samples of the mixed soil will be collected while wet and formed into cylinders in accordance with the approved testing methods (ASTM D5084 for hydraulic conductivity, ASTM D2166 or D1633 for unconfined compressive strength). Samples should be collected every 500 cubic yards. Additional sampling may be appropriate on a site-specific basis in areas of particular concern.

3.0 EXECUTION

3.1.1 Coring Implementation

- One core borehole shall be completed for every 5,000 square feet of ISS treatment area, but not less than two bore holes per treatment area.
- To allow early coring information to be incorporated in adjusting ISS operations, the first coring location shall be completed when the ISS treatment project area is no more than 25 percent complete.
- Core borehole locations shall be biased towards areas with the greatest soil contamination, areas where contamination is in direct contact with the bedrock surface, and/or locations where difficulties in the ISS process were encountered.

- Core boreholes shall be placed in locations where individual treatment columns or cells overlap, to the extent possible.
- Core boreholes should be advanced to at least a foot below the monolith design or bedrock, if encountered. If coring reveals previously undocumented areas of contamination, delineation (and remediation, as necessary) of that contamination may be required outside the QA/QC program.
- Cores shall be archived following coring activities. Cores may be discarded upon final inspection by the Department. Following initial inspection, the Department may require cores to be retained to compare to future cores or to document issues that will need to be resolved.
- To allow any needed corrective actions to commence before the monolith cures to a point making corrective action difficult or impossible, core inspection by the Department will occur as soon as possible but not later than 48 hours of the core's collection.
- In order to identify potential areas of concern for the coring program, documentation on the volume/shrinkage of grout obtained during ISS installation shall be reviewed. Areas where excessive grout was lost during ISS implementation should be targeted for coring.

3.1.2 Trenching Implementation

- If trenching is used, it will be completed at the perimeter of the ISS treatment area and locations within the ISS treatment area. The minimum depth of excavation should be the design depth of the ISS treatment.
- If the bottom of the ISS treatment cannot be visually inspected, the Department may require cores to be collected.
- To allow inspection information to be incorporated in adjusting ISS operations, trenching shall commence when the ISS treatment project area is no more than 25 percent complete.

3.1.3 Sample analysis

- Typically, multiple cylinders are collected at each location for testing unconfined compressive strength. This allows testing after 3-5 days to get an initial indication of the strength of the mix, while reserving cylinders for compliance testing after they have achieved full strength (28 days).
- Cylinders tested for hydraulic conductivity in accordance with the approved plans. The maximum permeability should generally be 1x10-6 cm/sec, as measured using ASTM D 5084-00.

3.2 Performance Evaluations

3.2.1 Visual Inspection

Core samples and related equipment will be visually inspected for the following criteria, and the results recorded:

- Visible NAPL
- Non-mechanical induced cracking within the core
- Percent of core sample recovered

In addition, indirect indications of unmixed NAPL should be recorded, such as:

- NAPL coating on drilling tools
- NAPL in drill wash tub, if water-based drilling methods are employed

3.2.2 Performance Concerns

Performance testing must be completed early enough to identify problems. Substandard results cannot be ignored with the intention to "average-out" the results over the course of project. The purpose of this guidance is to detect installation of an inadequate remedy in time to correct the problems and avoid costly retreatment or repairs to ensure effectiveness of the ISS remedy, the following conditions will warrant further attention and will be documented during ISS implementation:

- A continuous layer or seam of NAPL is noted within the core.
- NAPL coating is visible on drilling tools
- Visible NAPL is noted in the drill wash tub
- Unconfined compressive strength below 50 psi
- Hydraulic conductivity greater than 1.0 x 10-6 cm/sec or project specific goal.
- Large sections (> 1 cf) of unmixed material.

If one or more of the above conditions are noted, the Department must be notified to discuss the severity of the problem, the degree of concern, and whether any corrective action will be necessary.

A notification, by itself, does not necessarily mean a corrective action or additional borings or testing are warranted. For instance, small NAPL blebs may be present within properly mixed areas of the ISS monolith, and coring through such a bleb, especially before the monolith has achieved its maximum strength, could result in NAPL coating on drilling tools and/or NAPL in the drill wash water. The first step to determining whether corrective action is required will be to complete additional borings around the area of concern and determine if identified NAPL within the ISS mass is encapsulated, thus eliminating NAPL mobility and impact to the surrounding environment. The results of all the samples taken within a given treatment area cannot be averaged to show compliance. While each sample must satisfy the definition on its own, a single test showing slightly elevated hydraulic conductivity would not necessarily require corrective action for that cell/column, but evaluation to ensure that it is not a systemic problem is required.

If NAPL is detected in the additional borings, particularly on the edges of the ISS monolith, or at the bottom of the ISS monolith, corrective actions may be necessary in order to fully encapsulate the source area.

3.2.3 Corrective Actions

If the ISS installation is deemed unsatisfactory after a collaborative evaluation of the coring program, measures will be put in-place to address the deficiencies and ensure that the remedy is protective of human health and the environment. Such measures may include:

- Repair, re-mixing, or isolation of the concerned area using jet grouting or other suitable method
- Excavation and disposal of the concerned area, where feasible and practicable.

3.2.4 Core Hole/Trench Abandonment

When a core has been drilled from the top to the bottom elevation of the targeted ISS treatment zone, and samples collected, it will be considered complete. Following completion of each coring location, the borings will be filled with grout using tremie methods.

If trenching is used for QA/QC activities, backfill material should meet the approved ISS specifications.

3.3 Field Documentation and Approvals

3.3.1 Field Documentation

Documentation of the ISS QA/QC activities shall be included with the Final Engineering Report (FER). Documentation will include (but not be limited to):

- Figure depicting boring/trenching locations
- Photographs of each core boring/trench referenced
- Type of drilling method or excavator used
- Field coring/trench logs

3.3.2 Department Approval

The Department should be notified of the ISS QA/QC activities as soon as possible, with a minimum of 72 hours' notice or two business days. Department personnel will attempt to be on-site, unless the remedial party is informed otherwise, to inspect the QA/QC activities and provide informal approval or recommend corrective actions.

Following on-site Department inspection of the ISS QA/QC, email correspondence should be sent to the Department project manager which summarizes observations of the coring results. The Department project manager will provide an email reply within 48 hours confirming that the ISS QA/QC objectives have been met. If the Department project manager does not feel the ISS

QA/QC objectives have been adequately satisfied, the response email will include any additional corrective actions required.

3.3.3. Resolution of Disagreements

In the event there is a disagreement regarding the ISS QA/QC program the remedial party will submit a written request for resolution to the project manager's supervisor. The correspondence shall include the ISS QA/QC activities, relevant documentation, and the nature of the dispute. The project manager's supervisor will meet with the Project Manager, Construction Inspector (if applicable) and the Bureau Director to discuss the request. If necessary, a meeting will be arranged which will include the remedial party, Department project manager, supervisor, and the Bureau Director to discuss the matter.

Following the meeting, the supervisor will send correspondence to the remedial party outlining the Department final decision.