Jessica Phillips
Project Manager
Site Investigation and Remediation

April 23, 2020

Mr. Gerry Pratt
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Subject: Holder Pad Soil Pre-Characterization Work Plan
Nassau Ave & Sheridan Blvd Property
Former Inwood Gas Holder Site
Inwood, Nassau County, New York
NYSDEC Site No.: 1-30-121, Order on Consent Index #: A2-0552-0606

Dear Mr. Pratt:

This Holder Pad Soil Pre-Characterization Work Plan (Work Plan) has been prepared by National Grid for a portion of the Former Inwood Gas Holder facility (Site) located in Inwood, Nassau County, New York (Figure 1). National Grid is preparing to upgrade their natural gas distribution facility on the Site which will require redevelopment of an area of interest (AOI) located in the northeastern portion of the site. Site activities, performed as part of the redevelopment, will take place on the AOI which includes the existing foundation of the former Gas Holder and a 100-feet buffer zone around the former Gas Holder foundation (Figure 2). This Work Plan has been prepared only for the locations that will be a part of the redevelopment activities for the Site.

Based on the available information from the Remedial Investigation (RI) and prior investigation work in the area of the former holder pad where the proposed redevelopment is planned, there is no indication that any remedial action would be required in this portion of the Site other than the existing Site Management Plan. In addition, the planned redevelopment work is anticipated to be temporary in nature. Any subsurface impacts noted in this Work Plan that are inconsistent with historical findings can be addressed as an Interim Remedial Measure (IRM) during or following the proposed investigation work and prior to or during site redevelopment.

The Work Plan is developed pursuant to the Multi-site Order on Consent and administrative settlement between National Grid and the New York State Department of Environmental Conservation (NYSDEC), Index # A2-0552-0606 (NYSDEC, 2007), and in accordance with applicable guidelines of the NYSDEC and the New York State Department of Health (NYSDOH).

Environmental Department, 175 East Old Country Road, Hicksville, New York 11801
T: (516) 581-7313 ■ F: (516) 545-2582 ■ jessica.phillips@nationalgrid.com ■ www.nationalgrid.com

The AOI has been delineated for Site constituents of concerns (COCs) via multiple remedial investigations. Site COCs include benzene, toluene, ethylbenzene, and xylenes (BTEX), polyaromatic hydrocarbons (PAHs), cyanide, and RCRA metals. In accordance with the NYSDEC-approved Interim Site Management Plan (ISMP, NYSDEC, 2016), the primary objective of this Work Plan is to evaluate the risk of exposure for the construction workers and future facility workers to COCs from the former site operations. This Work Plan provides background information regarding historical site use and current conditions, summarizes the results of the investigations conducted in the AOI, and provides details of the proposed activities and the methods and procedures by which the anticipated activities will be completed.

SITE HISTORY AND DESCRIPTION

The Site is located to the southwest of the intersection of Sheridan Boulevard and Nassau Avenue in Inwood, Nassau County, New York (Figure 1). The Site encompasses approximately 27 acres, and is bounded by Nassau Avenue and Waterfront Boulevard to the north, Sheridan Boulevard to the east, to the west by Cerro Street, a building operated by the Village of Inwood, and a projected extension of Alameda Avenue, and to the south by Motts Basin, a tributary to Jamaica Bay (Figure 1). The Site is secured by a chain link fence and numerous gates. The majority of the Site is undeveloped and overgrown with trees and brush. The concrete foundations of the former 6,000,000 cubic feet water sealed gas holder, pump house, boiler house, and engine room are located in the northeastern area of the parcel, which forms the AOI for this scope. Two concrete supports indicate the former location of nine horizontal liquid propane tanks in the east central portion of the Site. A National Grid natural gas metering and regulation station is in operation and located east of the holder foundation and adjacent to Sheridan Boulevard. Adjacent to the former gas holder area, to the north and east, eight gasoline filling stations or garages with gasoline tanks are located up gradient and within one block of the Site.

INVESTIGATION ACTIVITIES

Soil remediation took place in 1996 in the northeast portion of the Site including the AOI (shown in Figure 2). The remediation included removal of soils impacted with lead to a depth of 36” below ground surface (bgs) (Earth Tech Closure Certification Report, 1997). Multiple investigations have taken place within the AOI from 1993 to 2011 including a comprehensive remedial investigation detailed in the RI Report (AECOM, 2011). The RI included completion of soil borings, excavation of test pits, installation of monitoring wells, and collection of soil and groundwater analytical samples to establish the baseline impacts in soil and groundwater. A Site specific Health & Safety Plan (HASP) was created by AECOM in 2010 prior to completion of all RI activities. A supplemental RI was also conducted (AECOM, 2017) in an area south of the former holder pad (outside the AOI) to further delineate the MGP-related impacts. Table 1 presents a list of investigative locations completed within the AOI and summarizes the results of the investigations including visual and olfactory observations and results of analytical samples.

In summary;

- Visual Observations: Petroleum-like odors were observed in the top ten feet at locations around the former holder within the AOI. Naphthalene-like odors were observed at a depth of 5 to 7 feet in the southern portion of the AOI. Non-aqueous phase liquids (NAPL) were not observed in any of the investigative locations within the AOI. The distribution of visual and olfactory observations across the AOI is shown on Figure 3, and the logs from soil borings and monitoring wells advanced in the AOI are included in Attachment A.

- Soil: With the exception of SB-31, none of the analytical samples collected within the AOI had detections of COC in exceedance of the NYSDEC Part 375-6 Commercial Use Soil Cleanup Objectives (SCOs). Lead and arsenic were detected in exceedance of the commercial SCO in one analytical soil sample collected in SB-31 from 2 to 3.5 feet bgs. Figure 3 presents the results of the soil analytical samples collected within the AOI.

- Groundwater: COCs in Shallow and Intermediate/Deep groundwater within the AOI are shown in Figure 4 and compared to the NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGV) – Technical operation Guidance Series (TOGS) 1.1.1. There were no detections of COCs that exceeded AWQSGV. Groundwater analytical samples collected from wells GW-14 and MW-13I had detections of Methyl tert-butyl ether (MtBE) and chlorinated volatile organic compounds (VOCs) that exceeded AWQSGV. MtBE and chlorinated VOCs are suspected to originate from an upgradient off-site source(s) and are not associated with the former MGP operations.

SCOPE OF WORK

The principal activities will include the collection and analysis of representative samples of subsurface soil. The proposed sampling locations for the AOI are shown on Figure 5. The discussion of investigation activities has been grouped by environmental media of concern or field task in the following sections.

UNDERGROUND UTILITY CLEARANCE

Prior to the start of any intrusive fieldwork, clearance of underground utilities will be performed. The drilling contractor will contact Dig Safely New York to arrange for the marking of all underground utilities coming into the site in the vicinity of the proposed soil boring and monitoring well locations. The Site is a private property and Dig Safely New York will not mark on private property. Copies of available sewer and water maps from the vicinity will also be obtained and reviewed during underground utility clearance procedures. Following review of the utilities in the area, AECOM will contract a private company to locate all underground electric and gas utilities in the vicinity of each proposed subsurface sampling location using geophysical methods (ground penetrating radar and electromagnetic scans). Lastly, all boring/well locations will be hand or vacuum excavated to a depth of 5 feet bgs to check for potential utilities not located by geophysical methods.

COMMUNITY AIR MONITORING PROGRAM

Community air monitoring requires real-time monitoring for VOCs, particulates (*i.e.*, dust), and odors at the upwind and downwind perimeter of each designated work area when certain activities are in progress at the AOI. The community air monitoring 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 work activities. The Community Air Monitoring Plan (CAMP) methods and procedures are included in Attachment B. The CAMP is adopted from the NYSDEC-approved ISMP (AECOM, 2016) and specifies action levels which require increased monitoring, corrective actions to abate emissions, and/or work shutdown for the Work Plan. Photoionization detectors (PIDs) used to monitor VOCs will be equipped with a 10.6eV lamp.

BOREHOLE ADVANCEMENT

Twelve (12) soil borings will be advanced approximately 50 feet apart across the AOI to ensure spatial distribution of data collection (Figure 5). Four (4) borings will be completed within the former Gas holder foundation and five (5) borings will be completed in areas of known future redevelopment activities, which includes borings along the transect of the proposed pipeline installation that extends south-east outside the 100' buffer zone. Since the redevelopment work may result in some localized dewatering during the pipeline installation, up to two groundwater grab samples will be collected from select borings adjacent to the proposed pipeline to support groundwater management alternatives. Locations of soil borings may be adjusted in the field based on underground utilities, obstructions or changes in locations of redevelopment activities. The target completion depths for soil borings will be 10 feet bgs. In addition, there will be five (5) proposed borings for National Grid gas operations – three of the borings will be concrete cores, and two will be geotechnical borings (marked in red on Figure 5).

Once the locations are cleared by soft-dig methods to a minimum of 5 feet bgs, soil borings will be advanced with a direct-push (Geoprobe™) drilling rig equipped with Macro-Core™ samplers. Soil samples will be logged by a geologist or scientist who will record such data as the presence of fill material or subsurface structures, the nature of each geologic unit encountered, observations regarding moisture content, the results of PID soil headspace readings, and visual and olfactory observations regarding the presence of hydrocarbon-like or other residuals.

A total of two soil samples are proposed for laboratory analysis from each soil boring. The purpose of these samples is to delineate areas of impacted soils for redevelopment activities, and to estimate the quantities of soil that may require disposal and treatment either prior to or during redevelopment activities. An analytical soil sample will be collected from each five-foot interval. If impacts are observed, each sample will be collected from the two-foot interval with the greatest PID readings and visual/olfactory observations. If no impacts are observed, the sample will be collected from the center of the five-foot interval. The soil samples will be submitted for laboratory analysis for the following parameters:

- Target Compound List (TCL) Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) SW-846 Method 8260B;
- TCL Semi-Volatile Organic Compounds (SVOCs) by USEPA SW-846 Method 8270C;
- Resource Conservation and Recovery Act (RCRA) 8 Metals by USEPA SW-846 Method 6000-7000 Series; and,
- Free Cyanide by USEPA SW-846 Method 9014.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLING

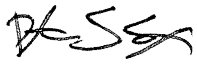
Field and laboratory quality control samples for the soil characterization will be collected and analyzed to document the accuracy and precision of the samples. The QA/QC samples include trip blanks, field equipment blanks, field duplicates and matrix spikes, and matrix spike duplicates. The data quality level for the investigation will be consistent with procedures outlined in the NYSDEC Analytical Services Protocol (ASP) July 2005 methodologies. A full ASP Category B data package will be prepared by the laboratory for all samples. The data will be reviewed, and a Data Usability Summary Report (DUSR) will be prepared by a qualified chemist.

Additional activities to be completed during the soil characterization work are:

- Investigation-derived waste management
- Survey of final boring locations
- Letter report documenting soil characterization activities, including soil boring logs and DUSR

Unless otherwise specified above, these activities will be conducted in accordance with the methods, procedures, and documents presented in the NYSDEC-approved RI Work Plan and ISMP. National Grid is tentatively scheduled to initiate this work in May 2020. Thank you in advance for your prompt review of this Work Plan. If you have any questions, please contact me at (516-581-7313) or via e-mail at jessica.phillips@nationalgrid.com.

Yours sincerely,

 **for**

Jessica Phillips

Project Manager

Enclosure

cc: D. Hettrick, NYSDOH (Electronic Copy Only)
S. Aldridge, National Grid (Electronic Copy Only)
A. Kushnir, National Grid (Electronic Copy Only)
S. Pandya, AECOM (Electronic Copy Only)
S. Mantri, AECOM (Electronic Copy Only)
P. Cox, AECOM (Electronic Copy Only)

Attachments

Table

Table 1 - Summary of Subsurface Soil Sampling

Figures

Figure 1 - Site Layout
Figure 2 - Existing Investigation Locations within 100 Foot Radius Off the Holder Footprint
Figure 3 - Summary of Existing Data for Soil
Figure 4 - Summary of Groundwater Results
Figure 5 - Proposed Soil Characterization Borings

Attachments

Attachment A - Historic Soil and Monitoring Well Boring Logs
Attachment B – Community Air Monitoring Plan

References

AECOM, 2017. Remedial Investigation Report Addendum (No. 1), National Grid K – Inwood Holder, Nassau County, New York, Site ID: 130121, Order on Consent Index #: A2-0552-0606, April, 2017.

AECOM, 2016. Draft Interim Site Management Plan, Former Inwood Gas Holder Site (K – Inwood), Inwood, New York NYSDEC Site No.: 1-30-121, Order on Consent Index #: A2-0522, June 1, 2016.

AECOM, 2014. Remedial Investigation Report, Former Inwood Gas Holder Site, Inwood, New York, NYSDEC Site No.: 1-30-121, Index # A2-0552-0606, May 2014.

Earthtech, 1997. Closure Certification Report, Inwood Gas Holder Site, Inwood, New York, January 1997.

Table

Table 1
Summary of Subsurface Soil Sampling

Boring	Visual/Olfactory (ft bgs)	Lab Analytical Summary (Depth of sample collection, ft bgs)
SB-1	None	No Exceedances* (3'-5', 13'-15', 28-30')
SB-2	None	No Exceedances* (3'-5', 13'-15', 28-30')
SB-3	Yes (2'-5')	No Exceedances* (5'-7', 17'-18.5')
SB-4	Yes (5'-7')	No Exceedances* (3'-5', 7'-9', 18'-20')
SB-26	Yes (4.5'-4.8')	No Exceedances* (3'-3.5', 7-8', 33-35')
SB-29	Yes (4'-8')	No Exceedances* (7'-8.5', 17'-18.5')
SB-30	None	No Exceedances* (5'-7', 18.5'-20')
SB-31	None	No Exceedances* (2'-3.5', 13.5'-15')
SB-52	Yes (1.5'-7.5', 8.5'-10')	No Exceedances* (2'-3', 5'-7', 10'-12', 35'-38')
SB-54	None	No Exceedances* (3'-4', 5'-7', 35'-36')
TP-11	Yes (6'-7')	No Exceedances* (6.5'-7')
TP-16	None	NS
TP-17	Yes (2'-5')	No Exceedances* (4'-5')
TP-18	Yes (4'-5')	NS

	No exceedances in lab analytical results
	Petroleum-like staining or odor
	Napthalene-like staining or odor
NS	Not Sampled
*	All results based on screening with NYSDEC Commerical SCOs

Figures

Alameda Ave
Knoll St
Cerro St
Cherry St
Craft St
Nassau Ave
Waterfront Blvd
Sheridan Blvd
Motts Basin

FORMER GAS HOLDER (6,000,000 CUBIC FEET CAPACITY)

FORMER BOILER HOUSE

NATURAL GAS TRANSFER STATION

FORMER ENGINE ROOM

FORMER PUMP HOUSE

FORMER PROPANE TANKS

Legend

Property Boundary
Access Road
Historic Structures
Waterfront

1 inch = 120 feet

0 60 120 240 Feet

N

AECOM

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Site Layout

Date: 3/13/2020	Drawn: JB	Job #: 60137359		Figure 1

File: P:\Jobs\Rem_Eng\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_1_ Site Layout.mxd

Nassau Avenue

Sheridan Boulevard

GW13
MW13I
GW14
MW14I
SB-31
SB-52
MW52I
MW52S
SB-26
SB-30
TP-16
SB-2
SB-1
TP-17
SB-3
MW4I
MW4S
SB-4
TP-18
SB-29
BH-32
BH-33
TP-11
BH-23
BH-31

Legend

- Pre-RI Groundwater Monitoring Well Location
- RI Groundwater Monitoring Well Location
- RI Soil Boring Location
- Bore Hole Location
- RI Test Pit Location
- Investigation Zone 100 Feet Off the Former Gas Holder Area
- Area of Lead in Soil Remediation Excavation and Backfill 0.5-3.0 Feet (1996)
- Property Boundary
- Access Road
- Waterfront
- Historic Structures
- Approximate Limit of Clearing
- Curblines
- Building

Notes
SB - Soil Boring locations, AECOM 2010/2011 RI
MW - Groundwater Monitoring Wells, AECOM 2010 RI
GW - Groundwater Monitoring Wells, pre- AECOM 2010 RI
BH - Bore Hole locations, LILCO 1993 Investigations
TP - Test Pits, AECOM 2010/2011 RI

1 Inch = 50 Feet
0 25 50 100 Feet

N

AECOM

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Existing Investigation Locations within 100 Foot Radius Off the Holder Footprint

Date: 3/13/2020 | Drawn: JB | Job #: 60137359 | Figure 2

File: P:\Jobs\Rem_Eng\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_2_Existing_Investigation_Locations_within_100_Foot_Radius_Off_the_Holder_Footprint.mxd

Sample Location	NYSDEC Part 375-6 Commercial	SB-26	SB-26	SB-26
Sample Date		4/7/2010	4/7/2010	4/7/2010
Sample Interval (feet)		3.0-3.5	7.0-9.0	33.0-35.0
Total BTEX	NL	ND	0.015	ND
Total VOCs	NL	ND	0.132	0.076
Total PAHs	500	1.73	ND	ND
Total SVOCs	NL	1.83	ND	ND
Inorganic Compounds (mg/Kg)				
Arsenic	16	3.4 J	1.9 J	6.7 J
Barium	400	54.7	6.6 J	20.9 J
Chromium	1500	22.4	8.7	21.3
Lead	1000	41.5	11.8	<0.21 U
Mercury	2.8	0.088 J	<0.024 U	<0.023 U

Sample Location	NYSDEC Part 375-6 Commercial	SB-31
Sample Date		4/29/2010
Sample Interval (feet)		2-3.5
Total BTEX	NL	0.017
Total VOCs	NL	0.081
Total PAHs	500	0.684
Total SVOCs	NL	0.684
Inorganic Compounds (mg/Kg)		
Arsenic	16	40.4 J
Lead	1000	4390 J

Sample Location	NYSDEC Part 375-6 Commercial	SB-52	SB-52	SB-52	SB-52	SB-52
Sample Date		10/6/2011	10/6/2011	10/6/2011	10/6/2011	10/6/2011
Sample Interval (feet)		2.0-3.0	5.0-7.0	10.0-12.0 D	35.0-38.0	35.0-38.0 D
Total BTEX	NL	ND	ND	ND	ND	ND
Total VOCs	NL	0.04169	0.0425	0.0045	0.0633	0.0483
Total PAHs	500	0.07	ND	ND	ND	ND
Total SVOCs	NL	0.07	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)						
Arsenic	16	6.8	8.2	<1.2 U	12.8	13.1
Barium	400	3.4 J	2.7 J	1.5 J	28.1 J	32.5 J
Chromium	1500	2.7	3.5	4.3	36.4	44
Lead	1000	3.4	2.9	1.1 J	15.7	14.3

Sample Location	NYSDEC Part 375-6 Commercial	SB-04	SB-04	SB-04
Sample Date		4/5/2010	4/7/2010	4/7/2010
Sample Interval (feet)		3.0-5.0	7.0-9.0	18.0-20.0
Total BTEX	NL	ND	0.345	ND
Total VOCs	NL	0.003	0.492	0.031
Total PAHs	500	0.34	ND	0.091
Total SVOCs	NL	0.46	0.53	0.091
Inorganic Compounds (mg/Kg)				
Arsenic	16	4.0 J	4.6 J	4.1 J
Barium	400	33.9	16.9 J	28.9
Chromium	1500	13.7	19.1 J	16.7
Lead	1000	33	13.0 J	32
Mercury	2.8	0.044 J	<0.085 UJ	0.023 J

Sample Location	NYSDEC Part 375-6 Commercial	TP-17
Sample Date		4/23/2010
Sample Interval (feet)		4.0-5.0
Total BTEX	NL	0.397
Total VOCs	NL	0.397
Total PAHs	500	1.506
Total SVOCs	NL	1.506
Inorganic Compounds (mg/Kg)		
Arsenic	16	0.037 J
Barium	400	4.2 J
Chromium	1500	4.7 J
Lead	1000	2.3 J

Sample Location	NYSDEC Part 375-6 Commercial	SB-03	SB-03
Sample Date		4/28/2010	4/28/2010
Sample Interval (feet)		5.0-7.0	17.0-18.5
Total BTEX	NL	ND	ND
Total VOCs	NL	0.004	0.008
Total PAHs	500	ND	ND
Total SVOCs	NL	ND	ND
Inorganic Compounds (mg/Kg)			
Arsenic	16	7.4 J	1.7 J
Barium	400	25.9	48.8
Cadmium	9.3	0.60 J	0.16 J
Chromium	1500	16.1 J	13.4 J
Lead	1000	69.4 J	6.8 J

Sample Location	NYSDEC Part 375-6 Commercial	TP-11
Sample Date		4/23/2010
Sample Interval (feet)		6.5-7.0
Total BTEX	NL	0.027
Total VOCs	NL	0.109
Total PAHs	500	ND
Total SVOCs	NL	ND
Inorganic Compounds (mg/Kg)		
Arsenic	16	3.0 J
Barium	400	38.9 J
Chromium	1500	11.4 J
Lead	1000	38.5 J

Sample Location	NYSDEC Part 375-6 Commercial	SB-29	SB-29	SB-29
Sample Date		4/28/2010	4/28/2010	4/28/2010
Sample Interval (feet)		7.0-8.5	7.0-8.5 D	17.0-18.5
Total BTEX	NL	ND	ND	ND
Total VOCs	NL	0.018	0.022	0.008
Total PAHs	500	ND	1.93	ND
Total SVOCs	NL	ND	1.93	ND
Inorganic Compounds (mg/Kg)				
Arsenic	16	0.89 J	1.9 J	0.75 J
Barium	400	23.7	25.9	3.8 J
Cadmium	9.3	0.084 J	0.089 J	<0.038 U
Chromium	1500	7.2 J	9.1	4.8 J
Lead	1000	20.3 J	23.0 J	1.6 J

Nassau Avenue

Sheridan Boulevard

SB-26 (4.5'-4.8')

SB-30

TP-16

SB-2

SB-1

SB-31 (2.2'-5')

SB-52 (1.5'-7.5', 8.5'-10')

TP-17 (2'-5')

SB-3 (2'-5')

TP-18 (4'-5')

SB-4 (5'-7')

SB-29 (4'-8')

BH-32

BH-33

TP-11 (6'-7')

BH-23

Legend

- No Analytical Results Exceeding the NYSDEC Commercial SCO's

Visual and Olfactory Impacts

- Naphthalene-like Staining or Odor
- Petroleum-like Staining or Odor
- Boring Location
- RI Test Pit Location
- Former Gas Holder Area with 100 Foot Radius Off the Footprint
- Area of Lead in Soil Remediation Excavation and Backfill 0.5-3.0 Feet (1996)
- Property Boundary
- Access Road
- Waterfront
- Historic Structures
- Approximate Limit of Clearing
- Curblines
- Building
- (2'-5') Depth of Impacts Observed in feet Below Ground Surface

Notes

Analytical summary boxes shown only for samples with visual and olfactory impacts.
Only Site COI's with detection are shown for Inorganics.
SB - Soil Boring locations, AECOM 2010/2011 RI
MW - Groundwater Monitoring Wells, AECOM 2010 RI
GW - Groundwater Monitoring Wells, pre- AECOM 2010 RI
BH - Bore Hole locations, LILCO 1993 Investigations
TP - Test Pits, AECOM 2010/2011 RI

1 Inch = 50 Feet

0 25 50 100 Feet

N

AECOM

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Summary of Existing Data for Soil

Date: 3/13/2020 | Drawn: JB | Job #: 60137359 | Figure 3

File: P:\Jobs\Rem_Eng\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_3_Summary_of_Existing_Data_for_Soil.mxd

Sample Location	NYSDEC Groundwater Guidance or Standard Value	MW-13I
Well Screen Interval		17 - 27 Feet
Sample Date		12/14/2011
Total BTEX (ug/L)	NL	ND
VOCs (ug/L)		
Methyl tert-butyl ether	5	**13**
Total VOCs (ug/L)	NL	**13**
Total PAHs (ug/L)	NL	ND
Total SVOCs (ug/L)	NL	ND
Inorganic Compounds (ug/L)	NL	ND
Cyanide, Total (ug/L)	200	ND

Sample Location	NYSDEC Groundwater Guidance or Standard Value	GW-14
Well Screen Interval		
Sample Date		12/14/2011
Total BTEX (ug/L)	NL	ND
VOCs (ug/L)		
Tetrachloroethene	5	**6**
cis-1,2-Dichloroethene	5	**3.4**
Total VOCs (ug/L)	NL	***13.58***
Total PAHs (ug/L)	NL	ND
Total SVOCs (ug/L)	NL	ND
Total PCBs (ug/L)	0.09	NA
Inorganic Compounds (ug/L)		
Arsenic	25	**14.7**
Manganese	300	NA
Iron	300	NA
Sodium	20000	NA
Cyanide, Total (ug/L)	200	ND

Nassau Avenue

GW13
MW13I
GW14
MW14I
MW52I
MW52S
MW4I
MW4S

Sheridan Boulevard

Legend

- No Compounds Detected above Ambient Water Quality Standards and Guidance Values - Technical Operation Guidance Series (TOGS) 1.1.1
- One or More Compounds Detected above Ambient Water Quality Standards and Guidance Values - Technical Operation Guidance Series (TOGS) 1.1.1
- Pre-RI Groundwater Monitoring Well Location
- RI Groundwater Monitoring Well Location
- Former Gas Holder Area with 100 Foot Radius Off the Footprint
- Area of Lead in Soil Remediation Excavation and Backfill 0.5-3.0 Feet (1996)
- Property Boundary
- Access Road
- Waterfront
- Historic Structures
- Approximate Limit of Clearing
- Curblines
- Building

AECOM

Notes
Results based on 2011 sampling analytical data.
MW - Groundwater Monitoring Wells, AECOM 2010 RI
GW - Groundwater Monitoring Wells, pre- AECOM 2010 R

1 Inch = 50 Feet
0 25 50 100 Feet

N

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Summary of Groundwater Results

Date: 3/13/2020 | Drawn: JB | Job #: 60137359 | Figure 4

File: P:\Jobs\Rem_Eng\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_4_Summary_of_Groundwater_Results.mxd

Legend

- Proposed Soil Characterization Boring, up to 10 feet below ground surface (subject to change based on location accessibility)
- Proposed Gas Operations Geotechnical Boring Location
- Historic RI Boring Location
- Pre-RI Groundwater Monitoring Well Location
- RI Groundwater Monitoring Well Location
- Historic RI Test Pit Location
- Proposed Redevelopment Area and Gas Line
- Former Gas Holder Area with 100 Foot Radius Off the Footprint
- Area of Lead in Soil Remediation Excavation and Backfill 0.5-3.0 Feet (1996)
- Property Boundary
- Access Road
- Waterfront
- Historic Structures
- Curblines
- Building

Note
Proposed gas operations geotechnical boring locations are subject to change based on CNG station design.

1 Inch = 50 Feet
0 25 50 100 Feet

N

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Proposed Soil Characterization Borings

Date: 4/22/2020	Drawn: JB	Job #: 60137359		Figure 5

File: P:\Jobs\Rem_Eng\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_5_Proposed_Soil_Characterization_Borings.mxd

Attachments

Attachment A

Historic Soil and Monitoring Well Boring Logs

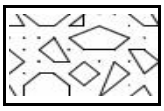
Soil and Test Pit Boring Logs

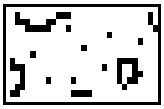
AECOM
125 Broad Street, 16th Floor
New York, NY 10004

Boring Log Legend

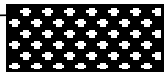
Project Name: Former Inwood Gas Holder Site
Project Number: 60137359
Location: Queens, NY
Client: National Grid

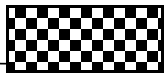
Stratigraphy

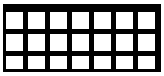

Fill


(GW) Well Graded Gravel

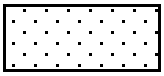
Meadow Mat

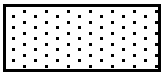

(PT) Fibrous and Friable Peat

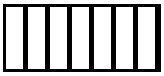

(OH) Organic Clay


(SM) Silty Sand


(SC) Clayey Sand


(SW) Well Graded Sand

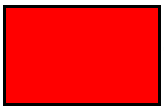

(SP) Poorly Graded Sand

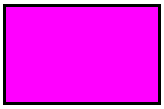

(ML) Sandy Silty


(CL) Clay and Silty Clay of Low Plasticity


(CH) Clay and Silty Clay of High Plasticity

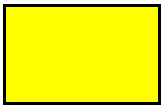
Visual Impacts


Tar Saturated


Coated Material, Lenses


Hardened Tar

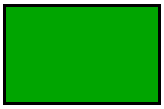

Blebs, Globs, Sheen


Staining, Odor


Petroleum Impacts Saturation & Sheen


Petroleum Impacts Staining & Odor


Purifier Waste & Odor


No Observed Impacts

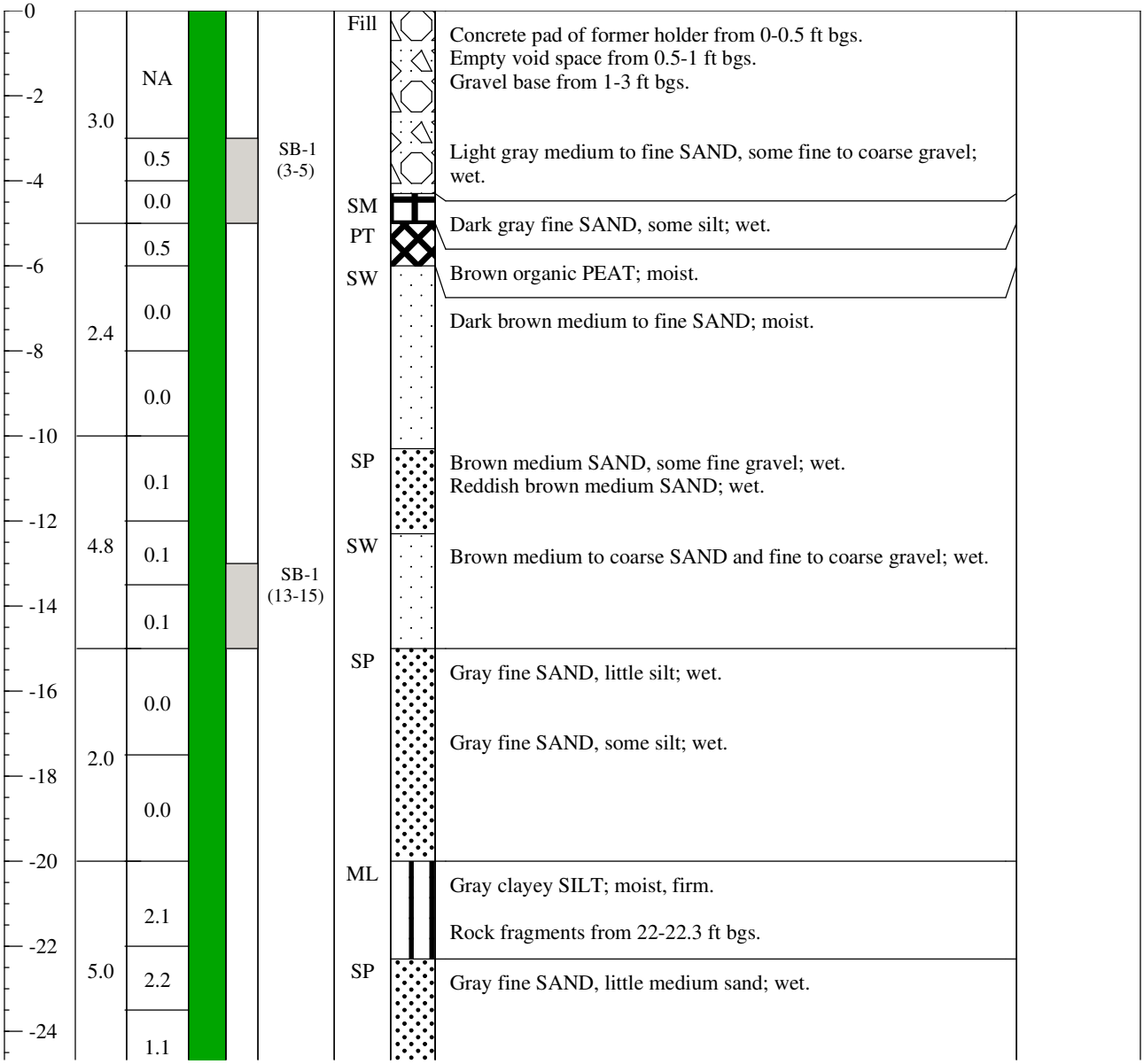
Definitions:

1.) NA - Not Applicable
2.) ft - feet
3.) bgs - below ground surface
4.) SAA - Same As Above
5.) NAVD 88 - North American Vertical Datum of 1988
6.) ppm - parts per million
7.) PID - Photo Ionization Meter
8.) U.S.C.S. - Unified Soil Classification System
9.) NAPL - Non-Aqueous Phase Liquid

Boring ID: SB-1

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 13, 2010
Boring Location: East side of the holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 5.926
Total Depth: 40 ft bgs
Logged By: Jesse Japitana



Comments: Soil samples SB-1(3-5), SB-1(13-15) and SB-1(28-30) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-1

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 13, 2010
Boring Location: East side of the holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 5.926
Total Depth: 40 ft bgs
Logged By: Jesse Japitana

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
-26	3.6	1.7						Dark gray fine SAND, little shell fragments; wet.	
-28		1.5			SB-1 (28-30)				
-30		1.9						Dark gray fine SAND, little shell fragments; wet.	
-32	4.9	2.0				ML		Gray clayey SILT; moist, stiff.	
-34		2.0							
-36		2.0						Gray clayey SILT; moist, stiff.	
-38	5.0	1.5							
-40		1.5						Boring terminated at 40 ft bgs.	

Comments: Soil samples SB-1(3-5), SB-1(13-15) and SB-1(28-30) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-2

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 13, 2010
Boring Location: Western side of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 5.936
Total Depth: 40 ft bgs
Logged By: Jesse Japitana

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
0						Fill		Concrete pad of former holder from 0-0.5 ft bgs. Empty void space from 0.5-1 ft bgs. Gravel base from 1.0-3 ft bgs.	
-2	1.6	NA			SB-2 (3-5)				
-4		0.0						Brown fine to medium SAND; wet, moderately loose.	
-6	3.0	1.6							
-8		0.9				SP		Brownish gray fine SAND, little silt; wet.	
-10		1.5							
-12	4.0	2.3							
-14		2.2			SB-2 (13-15)				
		2.0				SW		Reddish brown medium to coarse SAND; wet. Brown fine to medium SAND, some fine to coarse gravel; wet.	
-16	1.7	1.9				SP		Brownish gray fine SAND; wet, moderately dense.	
-18		1.9							
-20		1.9							
-22	4.8	0.8				ML		Gray clayey SILT; moist, moderately stiff.	
-24		0.8							
		0.8				SP		Gray fine SAND, little medium sand; wet.	

Comments: Soil samples SB-2(3-5), SB-2(13-15) and SB-2(28-30) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-2

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 13, 2010
Boring Location: Western side of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 5.936
Total Depth: 40 ft bgs
Logged By: Jesse Japitana

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
-26	3.4	1.8			SB-2 (28-30)	SP		Gray medium SAND; wet, loose.	
-28		1.6						Dark gray fine to medium SAND; moist.	
-30		1.5						No recovery from 30-35 ft bgs.	
-32	0.0	NA							
-34						ML		Dark gray clayey SILT; moist, stiff.	
-36	4.8	1.1							
-38		1.1							
-40		0.8						Boring terminated at 40 ft bgs.	

Comments: Soil samples SB-2(3-5), SB-2(13-15) and SB-2(28-30) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-3

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 28, 2010
Boring Location: 15 ft east of the concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 6.324
Total Depth: 25 ft bgs
Logged By: Jesse Japitana

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
0	NA	NA				Fill		Brown fine to coarse SAND, trace gravel; moist.	This boring was advanced through test pit TP-17 from 0-5 ft bgs.
-2								Brown fine to coarse SAND, trace gravel and brick fragments; wet. Some black hydrocarbon like staining and moderate hydrocarbon like odor from 2-5 ft bgs.	
-4		15.6							
-6	4.6	3.4			SB-3 (5-7)	SM		Gray fine SAND, some silt; wet, loose.	
								Gray fine SAND and Silt, wet, moderately stiff.	
-8		8.7				PT		Brown organic PEAT; wet.	
		3.6				SM		Reddish brown fine to medium SAND; wet, loose.	
-10	4.9	1.1				SP		Brown fine to medium SAND, little fine to coarse gravel; wet.	
-12		1.3						Brown medium to coarse SAND, some fine to coarse gravel; wet.	
-14		1.1							
-16	4.9	0.8						Brown fine to medium SAND, little fine to coarse gravel; wet.	
-18		0.8			SB-3 (17-18.5)	SM		Gray fine SAND, some silt; moist, firm.	
		0.8							
-20	4.9	0.8				ML		Gray clayey SILT; moist, soft to moderately stiff.	
-22		0.8				SM		Gray fine to medium SAND, little silt; moist.	
-24								Boring terminated at 25 ft bgs.	

Comments: Soil samples SB-3(5-7) and SB-3(17-18.5) were analyzed for VOCs, SVOCs, metals and cyanide. This boring was advanced through test pit TP-17. Analytical sample,TP-17-01-4-5, was collected from TP-17, from the depth of 4-5 ft bgs.

Boring ID: SB-3

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 28, 2010
Boring Location: 15 ft east of the concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 6.324
Total Depth: 25 ft bgs
Logged By: Jesse Japitana

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks

Comments: Soil samples SB-3(5-7) and SB-3(17-18.5) were analyzed for VOCs, SVOCs, metals and cyanide. This boring was advanced through test pit TP-17. Analytical sample,TP-17-01-4-5, was collected from TP-17, from the depth of 4-5 ft bgs.

Boring ID: SB-4

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 7, 2010
Boring Location: 10 ft south of the concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 9.985
Total Depth: 50 ft bgs
Logged By: Jesse Lloyd

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
0		2.0				Fill		Brownish orange fine to coarse SAND, trace silt and gravel; moist.	Pre-cleared from 0-5 ft bgs
		1.0							
-2	NA	6.8			SB-4 (3-5)			Becomes wet at 2 ft bgs.	
-4		8.3				SP		Gray fine to medium SAND; wet, slight naphthalene odor.	
-6		7.6			SB-4 (7-9)	PT		Brown oraganic PEAT; wet.	
-8	3.5	3.9				SP		Gray fine SAND; wet.	
-10		5.4						Gray fine SAND, trace medium and coarse sand; wet.	
-12		5.2				SW		Orange brown fine to coarse SAND; wet, grading coarser with depth.	
-14	4.1	6.7						Orangish brown coarse SAND, little fine to medium gravel; wet.	
-16		6.6						Brown fine to coarse SAND; wet.	
-18	4.2	6.9				SP		Brown and orangish brown fine SAND; wet.	
-20		6.1			SB-4 (18-20)			Brown and orangish brown fine SAND, little silt; wet.	
-22		4.5				ML		Gray clayey SILT, trace fine sand; moist, stiff.	
-24	4.7	6.2				SP		Dark gray fine SAND, trace silt; wet.	
		6.2							
		5.8							

Comments: Soil samples SB-4 (3-5), SB-4(7-9) and SB-4(18-20) were analyzed for VOCs, SVOCs, metals and cyanide.
Boring location was pre-cleared with hand tools from 0-5 ft bgs on April 5, 2010.

Boring ID: SB-4

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 7, 2010
Boring Location: 10 ft south of the concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 9.985
Total Depth: 50 ft bgs
Logged By: Jesse Lloyd

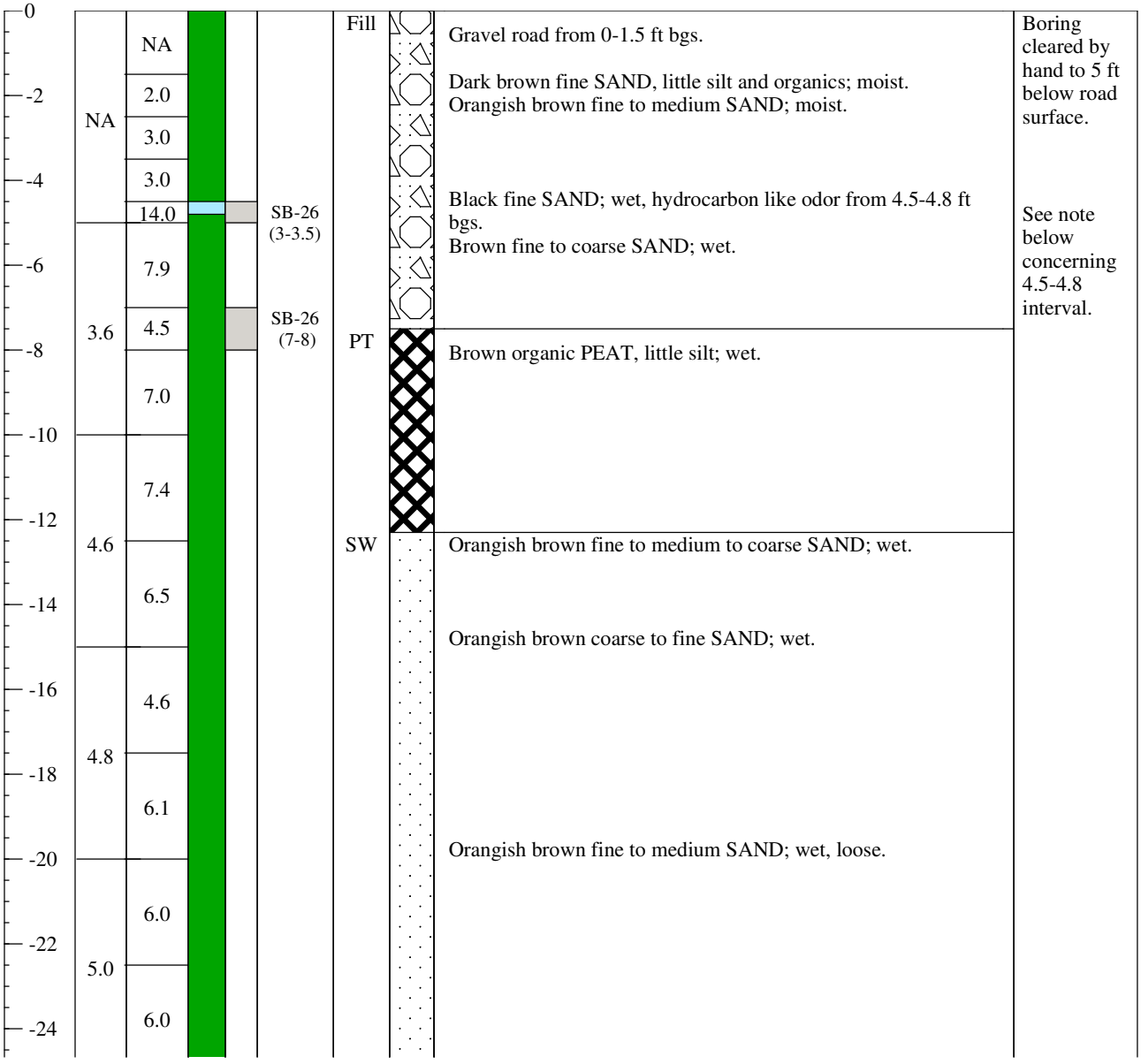
Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
-26								Dark gray fine SAND, trace silt and medium sand; wet.	
-28	4.7	7.3							
-30		5.5						Dark gray fine SAND, little silt, trace shells; wet, grading finer with depth.	
-32	4.5	6.5							
-34						ML		Dark gray SILT, little fine sand, trace shells; wet.	
-36		6.0						Gray clayey SILT; moist to dry, stiff.	
-38	0.0	5.6							
-40		5.2						Gray clayey SILT; dry, stiff.	
-42	4.8	5.2							
-44									
-46		5.2				SW		Gray find to medium SAND; wet.	
-48	1.5								
-50								Boring terminated at 50 ft bgs.	

Comments: Soil samples SB-4 (3-5), SB-4(7-9) and SB-4(18-20) were analyzed for VOCs, SVOCs, metals and cyanide.
Boring location was pre-cleared with hand tools from 0-5 ft bgs on April 5, 2010.

Boring ID: SB-26

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 7, 2010
Boring Location: 80 ft west of former holder
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 7.506
Total Depth: 40 ft bgs
Logged By: Jesse Lloyd

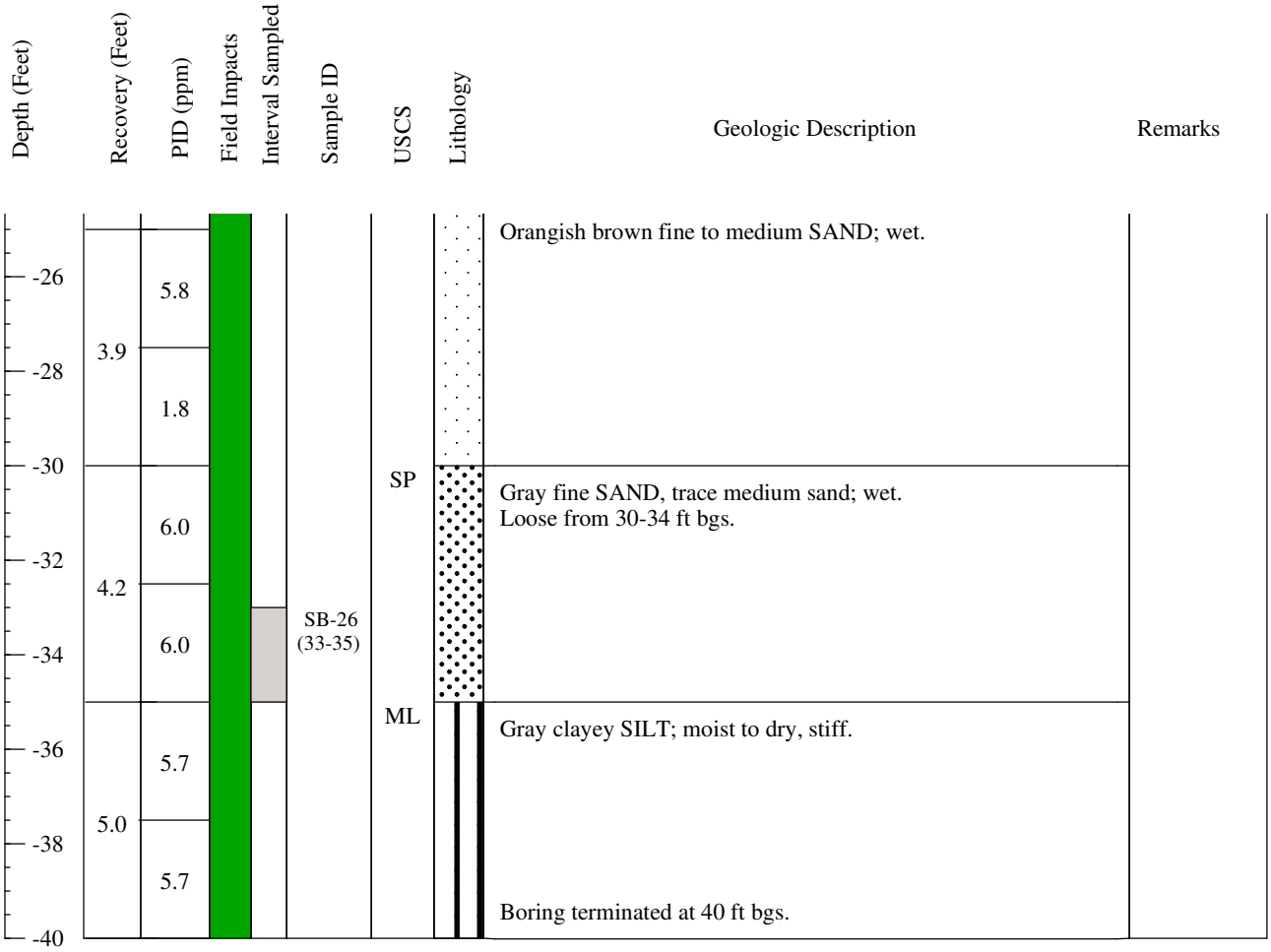


Comments: Soil samples SB-26(3-3.5), SB-26(7-8) and SB-26(33-35) were analyzed for VOCs, SVOCs, metals and cyanide. Note* - Sample SB-26(3-3.5) was taken from 3-3.5 ft below ground surface, but was taken from 4.5-5 ft in the boring because the boring was advanced through the new, 1 ft thick, gravel road.

Boring ID: SB-26

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 7, 2010
Boring Location: 80 ft west of former holder
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 7.506
Total Depth: 40 ft bgs
Logged By: Jesse Lloyd



Comments: Soil samples SB-26(3-3.5), SB-26(7-8) and SB-26(33-35) were analyzed for VOCs, SVOCs, metals and cyanide. Note* - Sample SB-26(3-3.5) was taken from 3-3.5 ft below ground surface, but was taken from 4.5-5 ft in the boring because the boring was advanced through the new, 1 ft thick, gravel road.

Boring ID: SB-29

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 28, 2010
Boring Location: 10 ft south of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 5.827
Total Depth: 25 ft bgs
Logged By: Jesse Lloyd

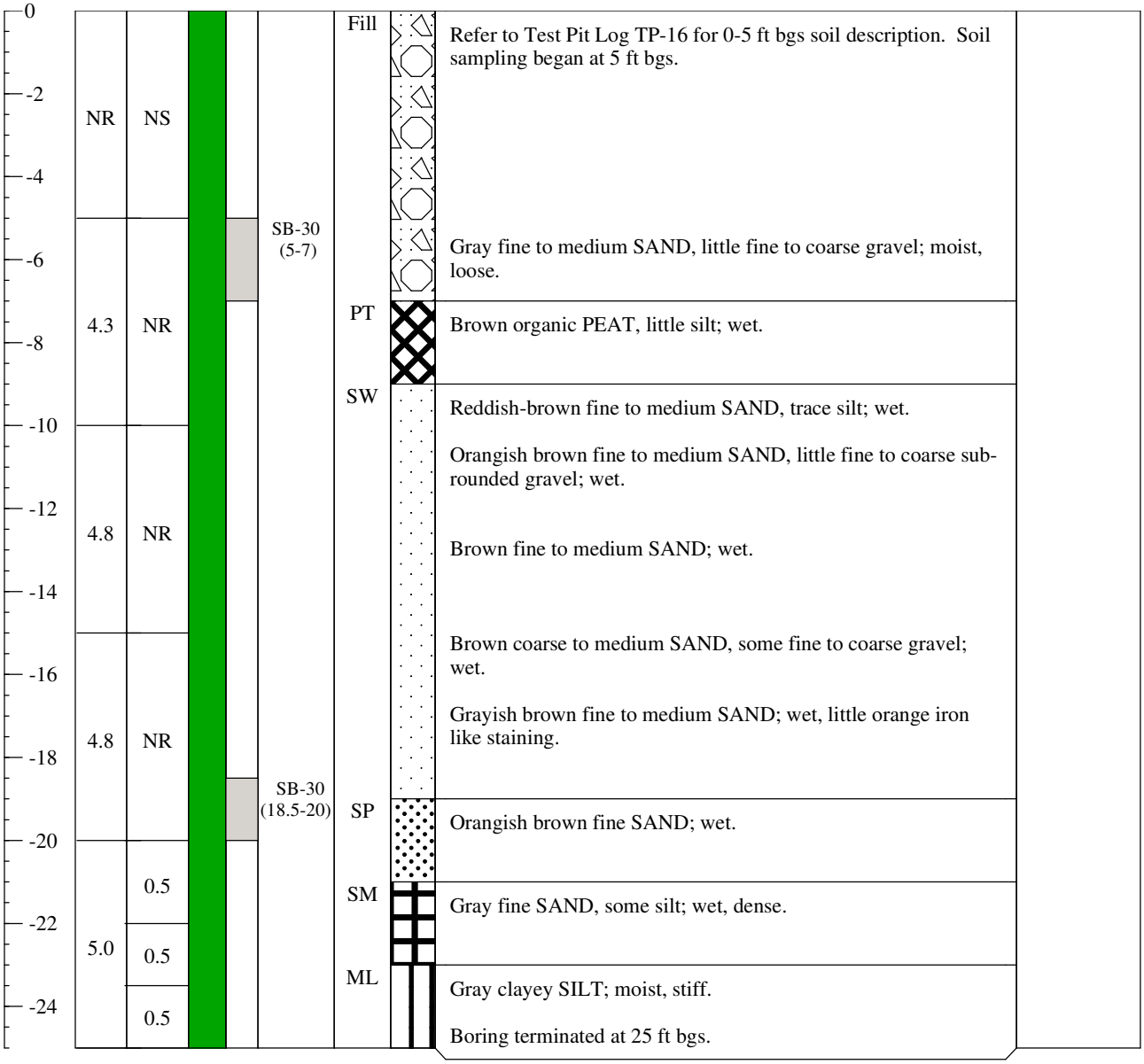
Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	USCS	Lithology	Geologic Description	Remarks
0	NA	NA				Fill		Brown fine to coarse SAND, little fine to coarse gravel; moist.	Boring advanced through test pit TP-18.
-2									
-4		15.2						Black fine to medium SAND, little fine to coarse sub-angular gravel; moist, some black hydrocarbon like staining and odor from 4-5 ft bgs.	
-6	3.9	1.5						Brown fine to medium SAND; wet, trace black hydrocarbon like staining and very slight hydrocarbon like odor from 5-8 ft bgs.	
-8		1.5			SB-29 (7-8.5)				
-10		0.8						Concrete from 9-9.5 ft bgs.	
-12	5.0	0.8				SW		Black fine to medium SAND, some wood fragments; wet.	
-14		0.8						Gray fine to medium SAND; wet.	
-16		0.4						Brown fine to medium SAND, little fine to coarse sub-rounded gravel; wet.	
-18	3.7	0.4			SB-29 (17-18.5)			Brown fine to medium SAND, little fine to coarse gravel; wet.	
-20		0.4				ML		Gray clayey SILT; moist, moderately stiff.	
-22	5.0	0.5							
-24		0.5				SW		Gray fine to medium SAND; wet. Boring terminated at 25 ft bgs.	

Comments: Soil samples SB-29(7-8.5), and SB-29(17-18.5) were analyzed for VOCs, SVOCs, metals and cyanide.
Boring was advanced through test pit TP-18 from 0-5 ft bgs.

Boring ID: SB-30

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 18, 2010
Boring Location: Western edge of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 6.440
Total Depth: 25 ft bgs
Logged By: Jesse Japitana

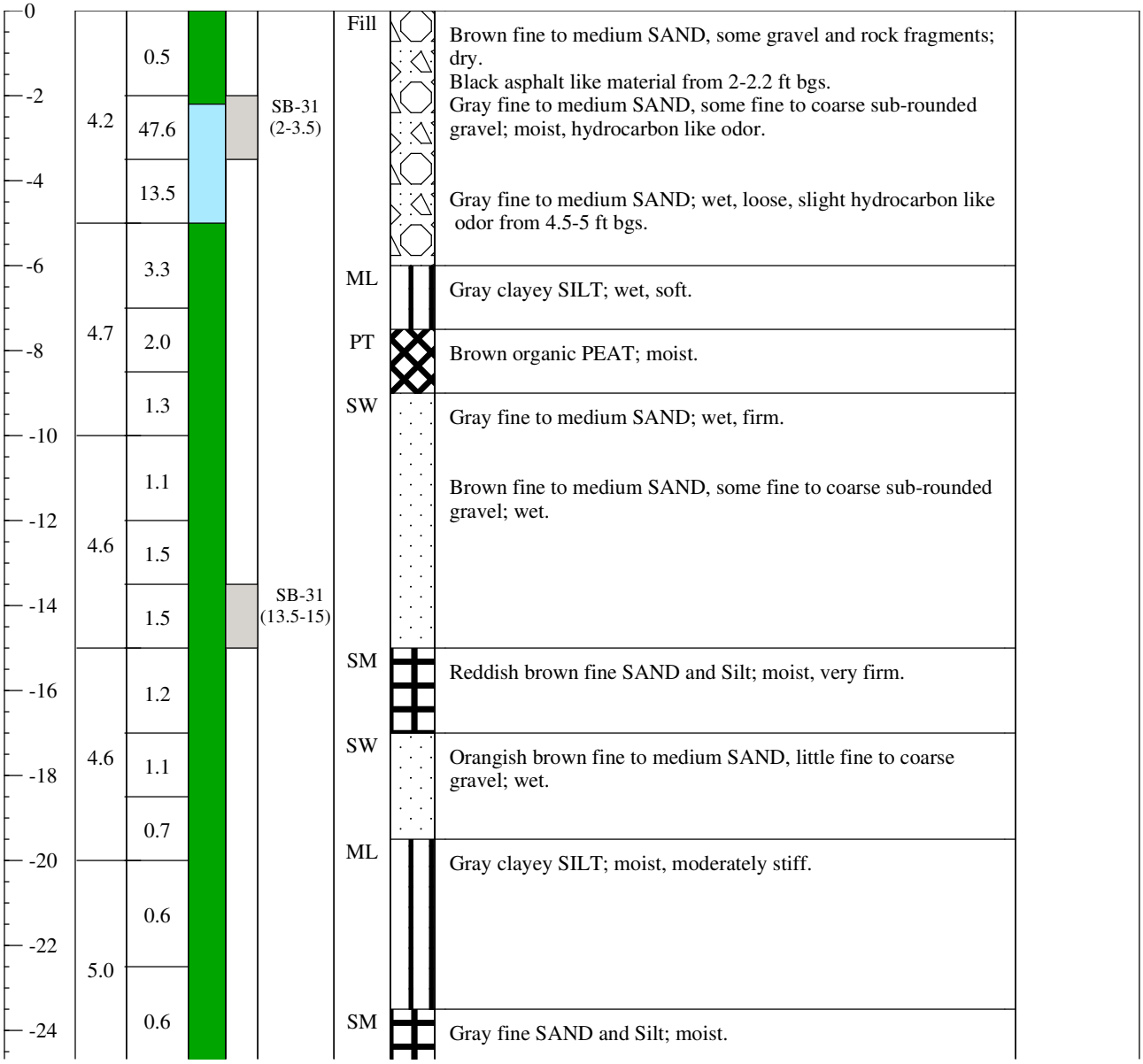


Comments: Soil samples SB-30(5-7) and SB-30(18.5-20) were analyzed for VOCs, SVOCs, metals and cyanide.
NS - Not sampled, NR - Not recorded

Boring ID: SB-31

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 29, 2010
Boring Location: 15 ft east of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 6.323
Total Depth: 30 ft bgs
Logged By: Jesse Japitana

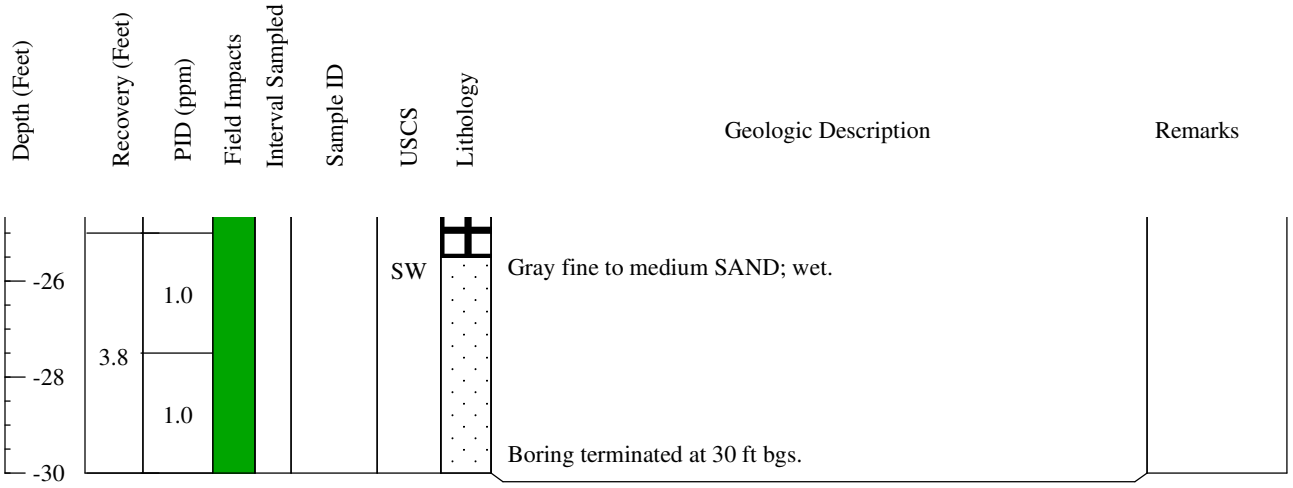


Comments: Soil samples SB-31(2-3.5) and SB-31(13.5-15) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-31

Project Name: Inwood Former Gas Holder Site
Client/Project Number: National Grid / 60137359
Date Started/Completed: April 29, 2010
Boring Location: 15 ft east of concrete holder pad
Drilling Company/Drill Rig Fenley and Nicol / Geoprobe 7700

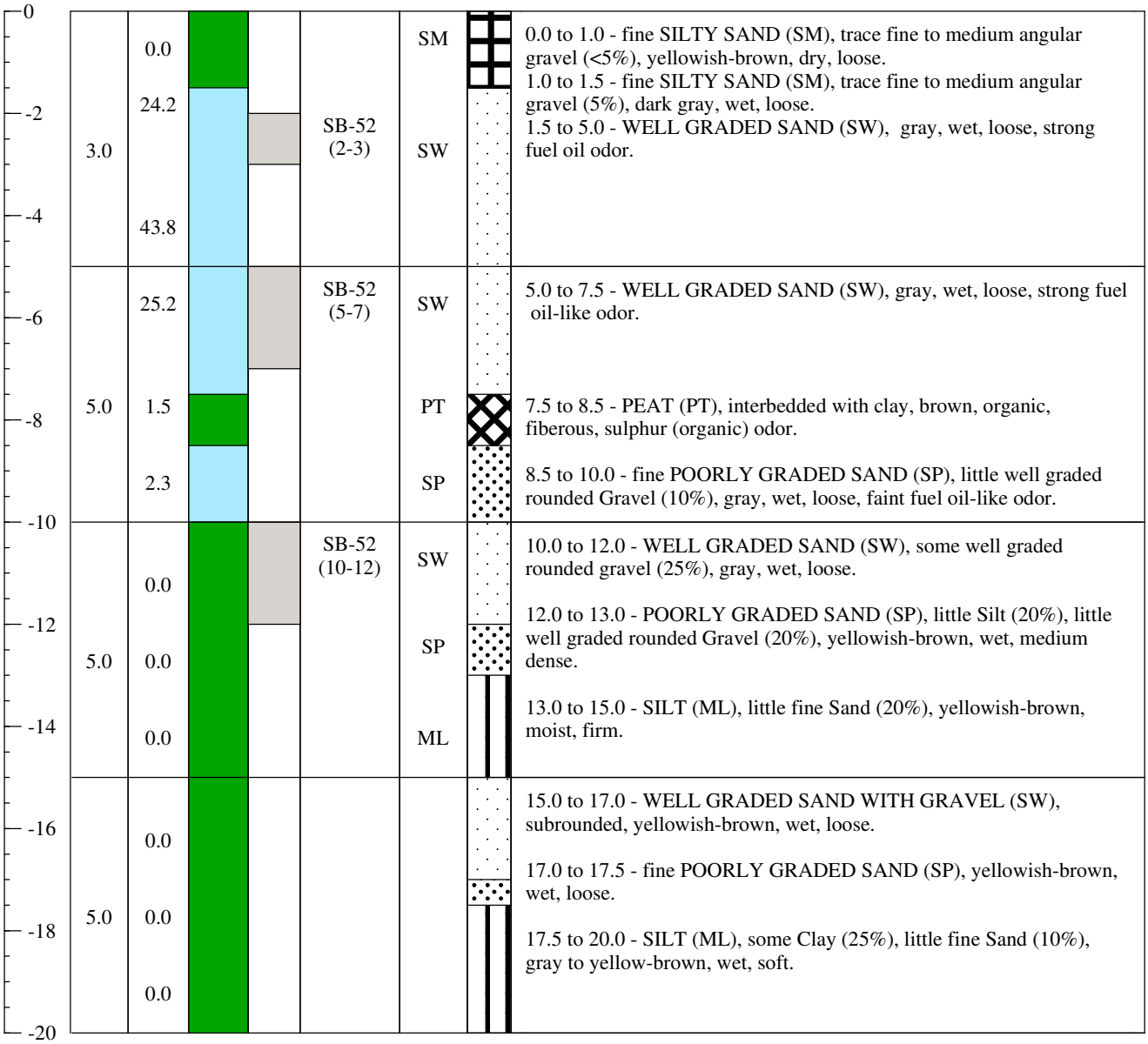
Drilling Method: Direct Push, Discrete Sampler
Sampling Method: 5 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): 6.323
Total Depth: 30 ft bgs
Logged By: Jesse Japitana



Comments: Soil samples SB-31(2-3.5) and SB-31(13.5-15) were analyzed for VOCs, SVOCs, metals and cyanide.

Boring ID: SB-52

Project Name: Former Inwood Gas Holder Site	**Drilling Company:** Fenley and Nicol	**Water Level:** ~1.0 ft bgs
Project Number: 60137359	**Drilling Method:** Geoprobe	**Total Depth:** 40 ft
Client: National Grid	**Sampling Method:** Disposable plastic liner	**Ground Elevation:** 6.10' NAVD 88
Date Pre-Cleared:	**Boring Diameter:** 6 inches	**Converted To Well (Y/N):** No
Date Started/Completed: 10/06/2011	**Logged By:** Eric Acs	**Well ID:** NA



Comments: Soil samples SB-52(2-3), SB-52(5-7), SB-52(10-12) and SB-52(35-38) were analyzed for VOCs, SVOCs, metals, and cyanide. Duplicate sample collected from SB-52(35-38).

Boring ID: SB-52

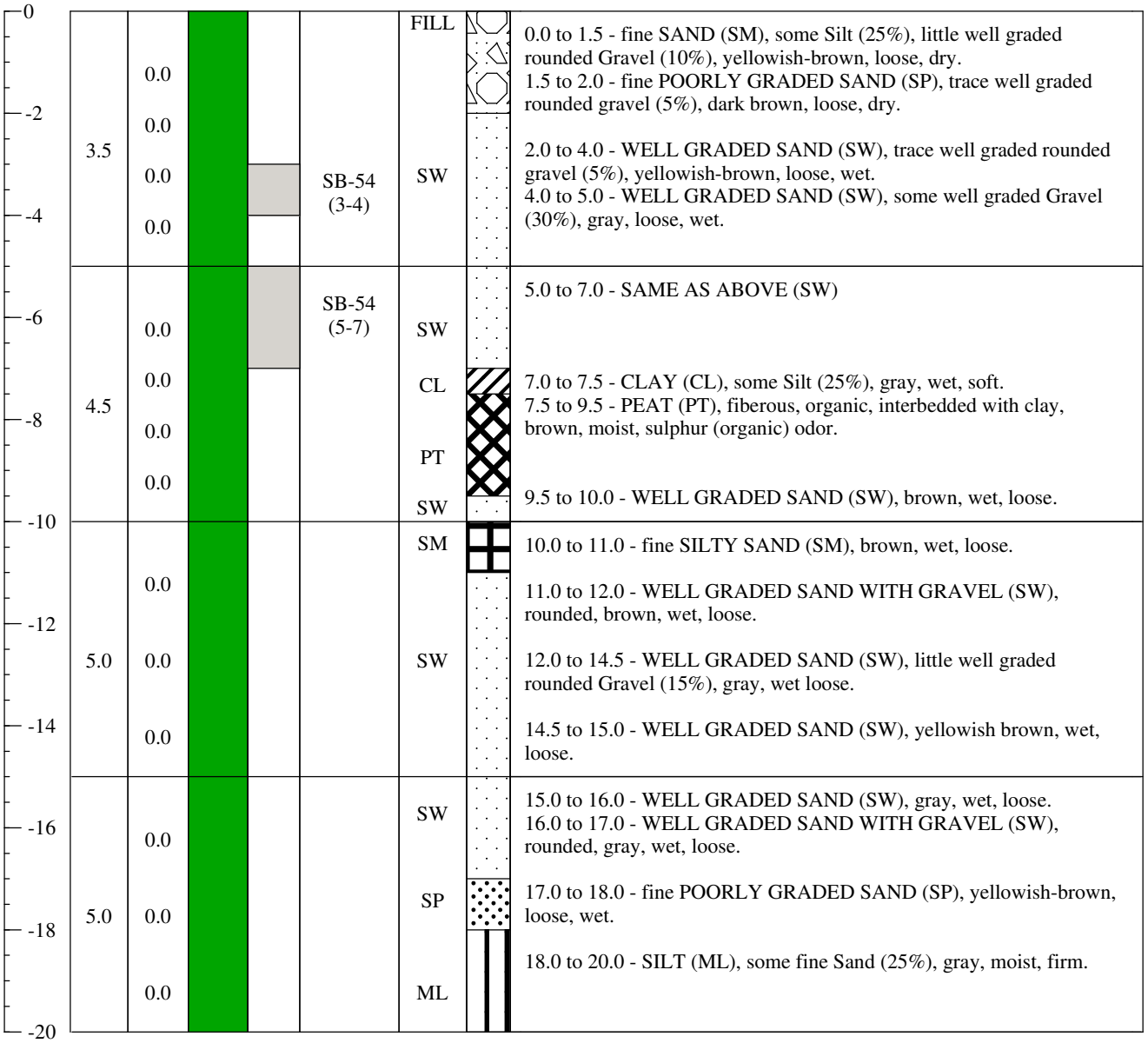
Project Name: Former Inwood Gas Holder Site	**Drilling Company:** Fenley and Nicol	**Water Level:** ~1.0 ft bgs
Project Number: 60137359	**Drilling Method:** Geoprobe	**Total Depth:** 40 ft
Client: National Grid	**Sampling Method:** Disposable plastic liner	**Ground Elevation:** 6.10' NAVD 88
Date Pre-Cleared:	**Boring Diameter:** 6 inches	**Converted To Well (Y/N):** No
Date Started/Completed: 10/06/2011	**Logged By:** Eric Acs	**Well ID:** NA

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	U.S.C.S	Lithology	Geologic Description
-20								
	5.0	0.0				CL		20.0 to 22.0 - CLAY (CL), gray, moist, soft to firm, cohesive.
-22		0.0				ML		22.0 to 24.0 - SILT (ML), some Clay (25%), little fine Sand (10%), gray, moist to wet, soft.
-24		0.0				SM		24.0 to 25.0 - fine SILTY SAND (SM), gray, wet, loose.
-26	4.0	0.0				SP		25.0 to 30.0 - fine POORLY GRADED SAND (SP), gray, wet, loose to medium dense.
-28								
-30								
	5.0	0.0				SP		30.0 to 33.0 - fine POORLY GRADED SAND (SP), gray, wet, loose.
-32		0.0				SM		33.0 to 34.0 - fine SILTY SAND (SM), trace shell fragments (<5%), gray, wet, loose.
-34		0.0				CL		34.0 to 35.0 - CLAY (CL), gray, moist, firm, cohesive.
-36	5.0	0.0			SB-52 (35-38)	CL		35.0 to 40.0 - CLAY (CL), gray, moist, firm, cohesive.
-38								
-40								Boring terminated at 40 ft bgs.

Comments: Soil samples SB-52(2-3), SB-52(5-7), SB-52(10-12) and SB-52(35-38) were analyzed for VOCs, SVOCs, metals, and cyanide. Duplicate sample collected from SB-52(35-38).

Boring ID: SB-54

Project Name: Former Inwood Gas Holder Site	**Drilling Company:** Fenley and Nicol	**Water Level:** ~2 ft bgs
Project Number: 60137359	**Drilling Method:** Geoprobe	**Total Depth:** 40 feet
Client: National Grid	**Sampling Method:** Disposable plastic liner	**Ground Elevation:** 6.36' NAVD 88
Date Pre-Cleared:	**Boring Diameter:** 6 inches	**Converted To Well (Y/N):** No
Date Started/Completed: 10/10/2011	**Logged By:** Eric Acs	**Well ID:** NA



Comments: Soil samples SB-54(3-4), SB-54(5-7), and SB-54(35-36) were analyzed for VOCs, SVOCs, metals, and cyanide.

Boring ID: SB-54

Project Name: Former Inwood Gas Holder Site	**Drilling Company:** Fenley and Nicol	**Water Level:** ~2 ft bgs
Project Number: 60137359	**Drilling Method:** Geoprobe	**Total Depth:** 40 feet
Client: National Grid	**Sampling Method:** Disposable plastic liner	**Ground Elevation:** 6.36' NAVD 88
Date Pre-Cleared:	**Boring Diameter:** 6 inches	**Converted To Well (Y/N):** No
Date Started/Completed: 10/10/2011	**Logged By:** Eric Acs	**Well ID:** NA

Depth (Feet)	Recovery (Feet)	PID (ppm)	Field Impacts	Interval Sampled	Sample ID	U.S.C.S	Lithology	Geologic Description
-20	5.0	0.0				SW		20.0 to 20.5 - WELL GRADED SAND (SW), trace fine rounded gravel (<5%), brown, wet, loose.
-22		0.0				CL		20.5 to 23.5 - CLAY (CL), brown to gray, firm, moist, cohesive.
-24		0.0				ML		23.5 to 25.0 - SILT (ML), some fine Sand (35%), trace clay (10%), gray, moist to wet, soft to firm.
-26	5.0	0.0				SP		25.0 to 28.0 - fine POORLY GRADED SAND (SP), some Silt (30%), gray, wet, loose.
-28								28.0 to 30.0 - fine POORLY GRADED SAND (SP), gray, wet, loose.
-30		0.0						
-32	5.0	0.0				SP		30.0 to 35.0 - fine POORLY GRADED SAND (SP), little Silt (15%), trace shell fragments (10%), gray, wet, loose.
-34								
-36	5.0	0.0			SB-54 (35-36)	CL		35.0 to 40.0 - CLAY (CL), gray, moist, firm, cohesive.
-38								
-40								Boring terminated at 40 ft bgs.

Comments: Soil samples SB-54(3-4), SB-54(5-7), and SB-54(35-36) were analyzed for VOCs, SVOCs, metals, and cyanide.

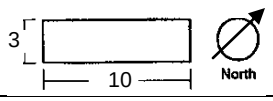
AECOM

TEST PIT LOG

Project Number: 60137359.420	Date: 4/23/10 1115	Test Pit: TP-11
Project Name: National Grid - Former Inwood Holder Site	Contractor: Fenley&Nicol	Total Depth: 7 feet
Location: Inwood (Queens) New York		Ground Elevation: 5.713
Equipment Used: Backhoe		Logged By: TRA
Remarks:		

PID (ppm)	Depth Feet	Sample Type & No.	Sample Depth Range	Soil & Rock Description and Comments
	0			0 - 1' Brown GRAVELLY SAND, well graded, loose, moist, no odors (FILL)
	1			1 - 2' Gray SAND, well sorted, trace silt, loose, no odors (FILL)
	2			
				2 - 5' Brown GRAVELLY SAND, well graded, loose, saturated, no odors (FILL)
	5			5 - 6' PEAT/Meadow Marsh, organic odors, saturated
21.2	6	TP11-01-6.5-7	6.5-7'	6 -7' Brown GRAVELLY SAND, well graded, loose, very slight naphtha-like odor, PID reading 21.2 ppm (FILL)
	7			

Test Pit Plan



Groundwater

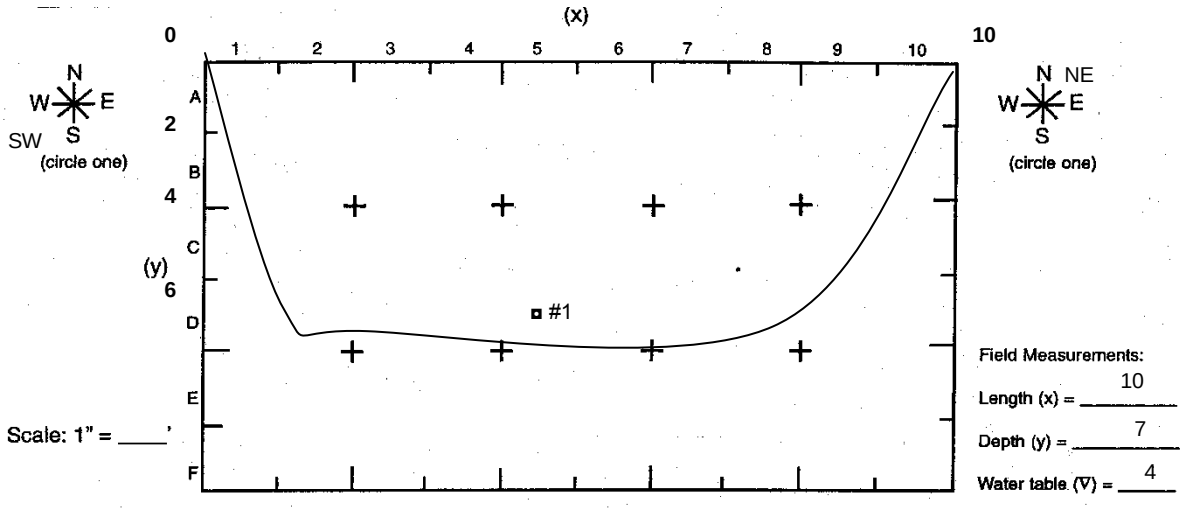
Date	Time (Hrs. after Completion)	Depth (Feet)
4/23/10	1145	4

AECOM

TEST PIT PROFILE LOG

Project Number: 60137359.420	Test Pit No.: TP11
Project Name: National Grid – Former Inwood Holder Site	Date: 4/23/10
Project Location: Inwood (Queens) New York	Logged By: TRA

Field Sketch:



Sample Summary:

Sample	Sample I.D.	Time	Depth (ft)	Hor. Loc.	Matrix	Misc. Information	PID	
1	TP11-01-6.5-7	1130	6.5-7'	D5	Soil		21.2	
2								
3								
4								
5								
6								
7								

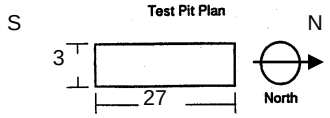
AECOM

TEST PIT LOG

Project Number: 60137359.420	Date: 4/23/10	Test Pit: TP-16
Project Name: National Grid - Former Inwood Holder Site	Contractor: Fenley&Nicol	Total Depth: 5 ft
Location: Inwood (Queens) New York		Ground Elevation: 6.394 ft
Equipment Used: Backhoe		Logged By: TRA
Remarks: Located Along West Edge of Concrete Holder Base		

PID (ppm)	Depth Feet	Sample Type & No.	Sample Depth Range	Soil & Rock Description and Comments
	0			0 – 4' Brown Gravelly SAND, fine to very coarse grained, well graded, gravel ¼" – 2", moist (FILL)
	1	No Samples Collected		
	2			
	3			
78	4			4 – 5' Same as Above, saturated, slight odor (manure-like)
	5			
				Notes: TP-16 oriented North – South 3 feet wide by 27 feet long

Test Pit Plan



Groundwater

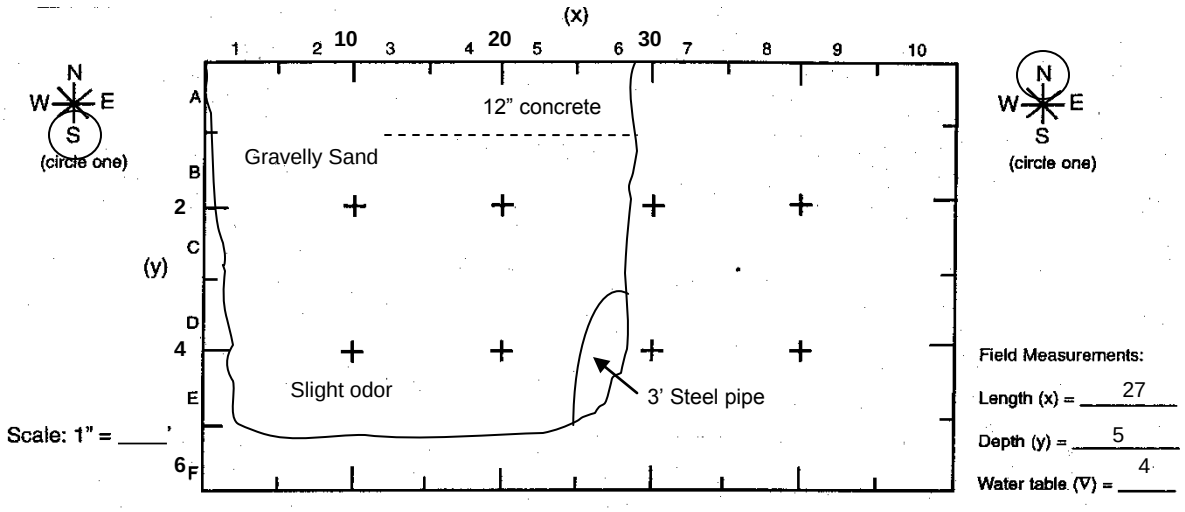
Date	Time (Hrs. after Completion)	Depth (Feet)
4/23/10	14:00	4

AECOM

TEST PIT PROFILE LOG

Project Number: 60137359.420	Test Pit No.: TP-16
Project Name: National Grid – Former Inwood Holder Site	Date: 4/23/10
Project Location: Inwood (Queens) New York	Logged By: TRA

Field Sketch:



Sample Summary: No Samples Collected

Sample	Sample I.D.	Time	Depth(ft)	Hor. Loc.	Matrix	Misc. Information	PID	
1								
2								
3								
4								
5								
6								
7								

AECOM

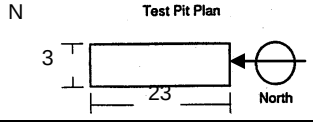
TEST PIT LOG

Project Number: 60137359.420	Date: 4/23/10	Test Pit: TP-17
Project Name: National Grid - Former Inwood Holder Site	Contractor: Fenley&Nicol	Total Depth: 5 ft
Location: Inwood (Queens) New York		Ground Elevation: 6.33 ft
Equipment Used: Backhoe		Logged By: TRA
Remarks: Located Along East Edge of Concrete Holder Base		

PID (ppm)	Depth Feet	Sample Type & No.	Sample Depth Range	Soil & Rock Description and Comments
	0			0 – 2' Light Brown SAND, fine to coarse grained, well graded, trace gravel, moist, no odor (FILL)
	1			
	2			2 – 5' Same as Above, some debris (brick, rock, steel pipes), black staining, no sheen, fuel/grease odor (FILL)
	3			
15.6	4	TP-17-01-4-5	4-5	
	5			

Notes:
TP-17 oriented north – south.
3 feet wide by 23 feet long

Test Pit Plan



Groundwater

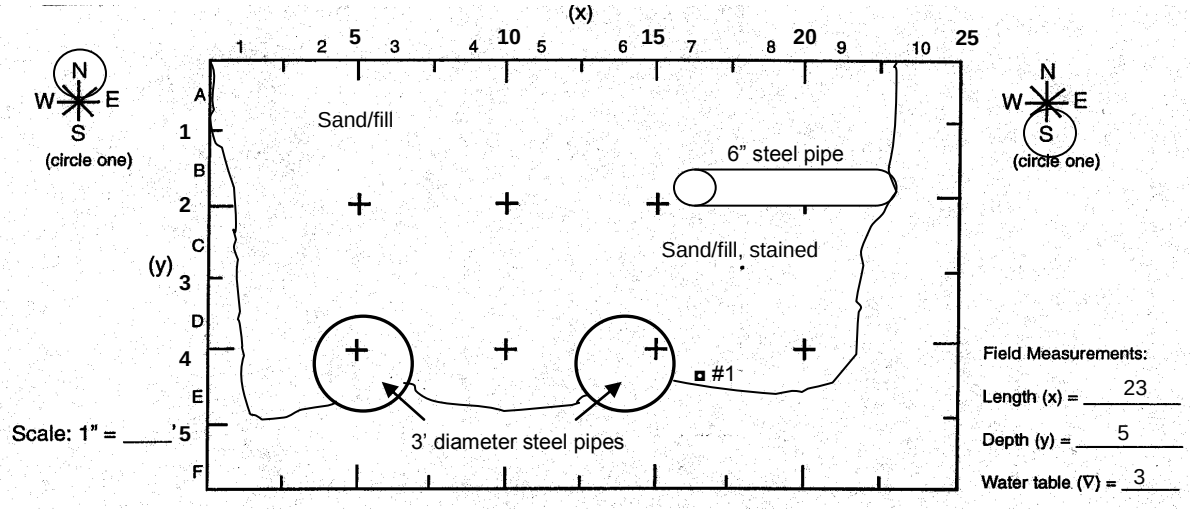
Date	Time (Hrs. after Completion)	Depth (Feet)
4/23/10	09:30	4
4/23/10	13:00	3

AECOM

TEST PIT PROFILE LOG

Project Number: 60137359.420	Test Pit No.: TP-17
Project Name: National Grid – Former Inwood Holder Site	Date: 4/23/10
Project Location: Inwood (Queens) New York	Logged By: TRA

Field Sketch:



Sample Summary:

Sample	Sample I.D.	Time	Depth(ft)	Hor. Loc.	Matrix	Misc. Information	PID	
1	TP17-01-4-5	09:30	4-5	E6	Soil		15.6	
2								
3								
4								
5								
6								
7								

AECOM

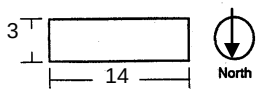
TEST PIT LOG

Project Number: 60137359.420	Date: 4/23/10	Test Pit: TP-18
Project Name: National Grid - Former Inwood Holder Site	Contractor: Fenley&Nicol	Total Depth: 5 ft
Location: Inwood (Queens) New York		Ground Elevation: 5.794 ft
Equipment Used: Backhoe		Logged By: TRA

Remarks: Located Along Southern Edge of Concrete Holder Base

PID (ppm)	Depth Feet	Sample Type & No.	Sample Depth Range	Soil & Rock Description and Comments
	0			0 – 4' Brown Gravelly SAND, fine to very coarse grained, well graded, gravel ¼" – 2", moist, no odor (FILL)
	1			
	2	No Samples Collected		
	3			
15.2	4			4 – 5' Same as Above, black staining, hydrocarbon odor (not naphthalene)
	5			
				Notes: TP-18 oriented East-West 3 feet wide by 14 feet long

Test Pit Plan



Groundwater

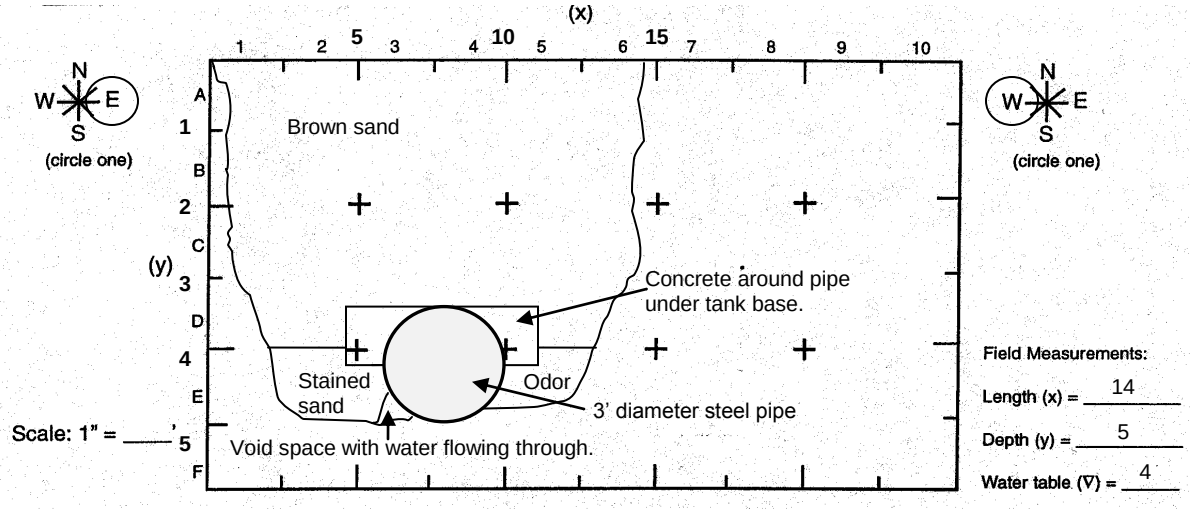
Date	Time (Hrs. after Completion)	Depth (Feet)
4/23/10	14:30	4

AECOM

TEST PIT PROFILE LOG

Project Number: 60137359.420	Test Pit No.: TP-18
Project Name: National Grid – Former Inwood Holder Site	Date: 4/23/10
Project Location: Inwood (Queens) New York	Logged By: TRA

Field Sketch:



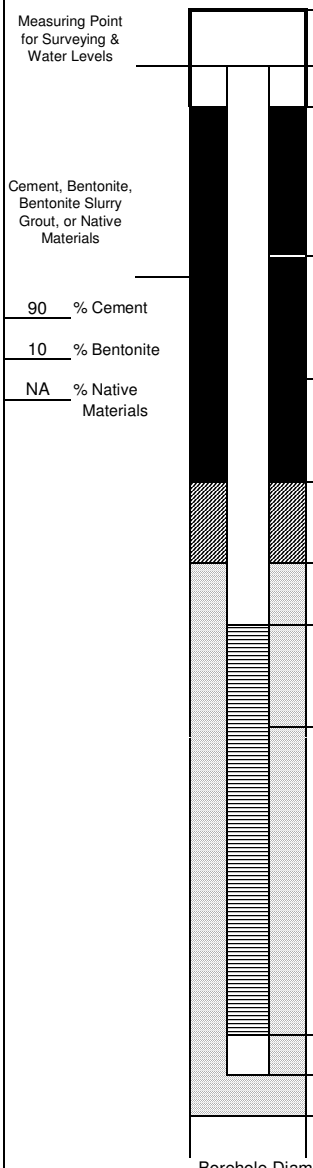
Sample Summary: No Samples Collected

Sample	Sample I.D.	Time	Depth(ft)	Hor. Loc.	Matrix	Misc. Information	PID	
1								
2								
3								
4								
5								
6								
7								

Monitoring Well Boring Logs

AECOM	Client:	National Grid	**Well ID: MW-4I**	
	Project Number:	60137359.420		
	Site Location:	Inwood Former Holder Site	Date Installed:	5/11/2010
	Well Location:	Near former holder pad	Inspector:	Jesse Lloyd
	Method:	4 1/4 " Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Steel Guard Pipe	Stick-up Casing	
Top of Riser Pipe	3'	8.645
Ground Surface (G.S.)	0.0	5.592
Riser Pipe: Length 0-11'; Inside Diameter (ID) 2"; Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	7'	-1.408
Bentonite Seal Thickness 7-9'		
Top of Sand	9'	-3.408
Top of Screen	11'	-5.408
▲ Stabilized Water Level	NA	NA
Screen: Length 11-21'; Inside Diameter (ID) 2"; Slot Size 20 slot; Type of Material Sched. 40 PVC		
Type/Size of Sand #2; Sand Pack Thickness 9-21'		
Bottom of Screen	21'	-15.408
Bottom of Tail Pipe:	21'	-15.408
Bottom of Borehole	21'	-15.408

Borehole Diameter: _____

Approved:

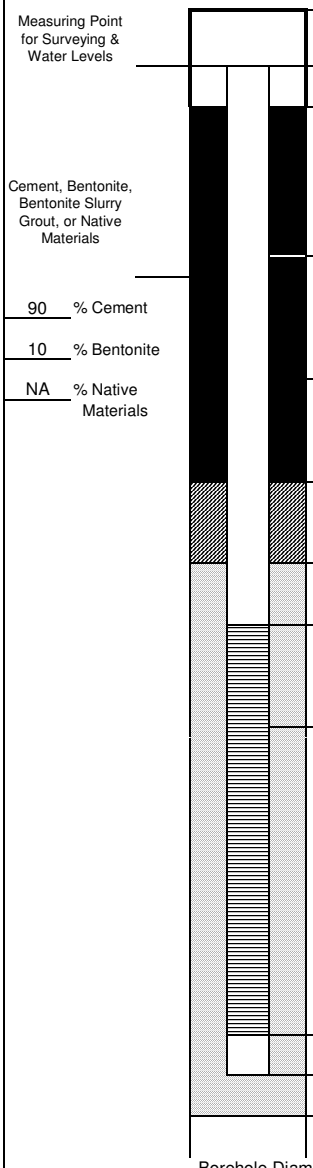
Describe Measuring Point:

Jesse Lloyd
Signature

5/11/2010
Date

AECOM	Client:	National Grid	**Well ID: MW-4R**	
	Project Number:	60137359.420		
	Site Location:	Inwood Former Holder Site	Date Installed:	5/10/2010
	Well Location:	Near Former Holder pad	Inspector:	Jesse Lloyd
	Method:	4 1/4 " Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Steel Guard Pipe	Stick-up Casing	
Top of Riser Pipe	3'	8.740
Ground Surface (G.S.)	0.0	5.755
Riser Pipe: Length 0-2', Inside Diameter (ID) 2", Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	0	5.755
Bentonite Seal Thickness 0-1.5'		
Top of Sand	1.5	4.255
Top of Screen	2.0	3.755
▲ Stabilized Water Level	NA	NA
Screen: Length 2-7', Inside Diameter (ID) 2", Slot Size 20 slot, Type of Material Sched. 40 PVC		
Type/Size of Sand #2, Sand Pack Thickness 1.5-7'		
Bottom of Screen	7'	-2.755
Bottom of Tail Pipe:	7'	-2.755
Bottom of Borehole	7'	-2.755

90 % Cement
10 % Bentonite
NA % Native Materials

Borehole Diameter: _____

Approved:

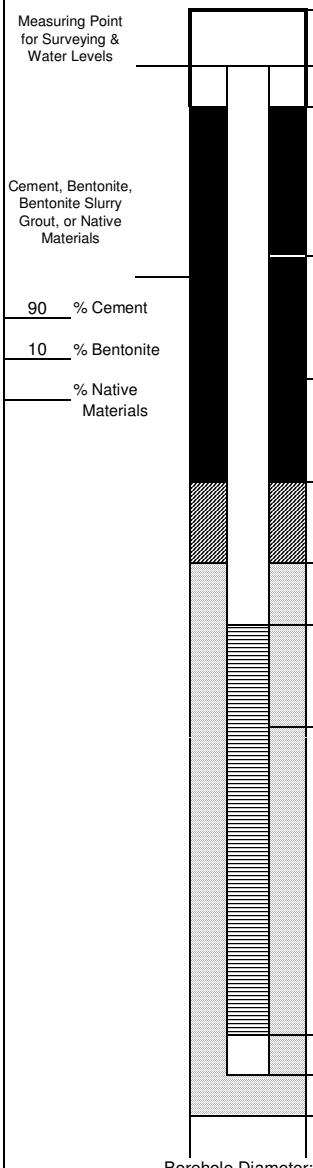
Describe Measuring Point:

Jesse Lloyd
Signature

5/10/2010
Date

AECOM	Client:	National Grid	**Well ID: MW-13I**	
	Project Number:	60137359		
	Site Location:	Inwood Former Holder Site	Date Installed:	9/26/2011
	Well Location:		Inspector:	Eric Acs
	Method:	8" Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Steel Guard Pipe	Stick-up Casing	9.14
Top of Riser Pipe	-2.29	8.79
Ground Surface (G.S.)	0.00	6.50
Riser Pipe: Length 0.0'-17.0'; Inside Diameter (ID) 2"; Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	13.00	-3.86
Bentonite Seal Thickness 13.0'-15.0'		
Top of Sand	15.00	-5.86
Top of Screen	17.00	-7.86
▲ Stabilized Water Level	NA	NA
Screen: Length 17.0'-27.0'; Inside Diameter (ID) 2"; Slot Size 20 slot; Type of Material Sched. 40 PVC		
Type/Size of Sand #2; Sand Pack Thickness 15.0'-29.0'		
Bottom of Screen	27.00	-20.50
Bottom of Tail Pipe:	29.00	-22.50
Bottom of Borehole	29.00	-22.50

Borehole Diameter: 8"

Approved:

Describe Measuring Point:

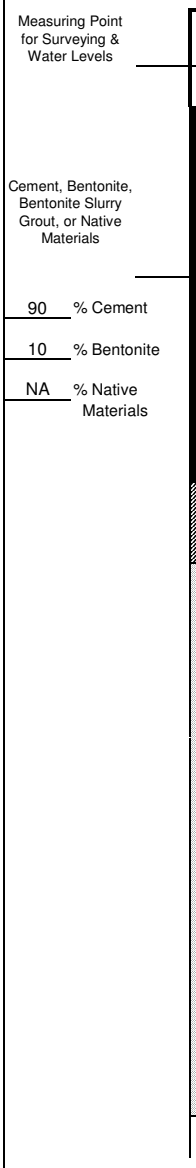
Ground Surface

Eric Acs
Signature

9/26/2011
Date

AECOM	Client:	National Grid	**Well ID: MW-14I**	
	Project Number:	60137359.420		
	Site Location:	Inwood Former Holder Site	Date Installed:	5/12/2010
	Well Location:	East of former holder pad	Inspector:	Jesse Lloyd
	Method:	4 1/4 " Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Steel Guard Pipe	Stick-up Casing	
Top of Riser Pipe	3'	9.479
Ground Surface (G.S.)	0.0	6.408
Riser Pipe: Length 0-11'; Inside Diameter (ID) 2"; Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	7'	-0.592
Bentonite Seal Thickness 7-9'		
Top of Sand	9'	-2.592
Top of Screen	11'	-4.592
▲ Stabilized Water Level	NA	NA
Screen: Length 11-21'; Inside Diameter (ID) 2"; Slot Size 20 slot; Type of Material Sched. 40 PVC		
Type/Size of Sand #2; Sand Pack Thickness 9-21'		
Bottom of Screen	21'	-14.592
Bottom of Tail Pipe:	21'	-14.592
Bottom of Borehole	21'	-14.592

Borehole Diameter: _____

Approved:

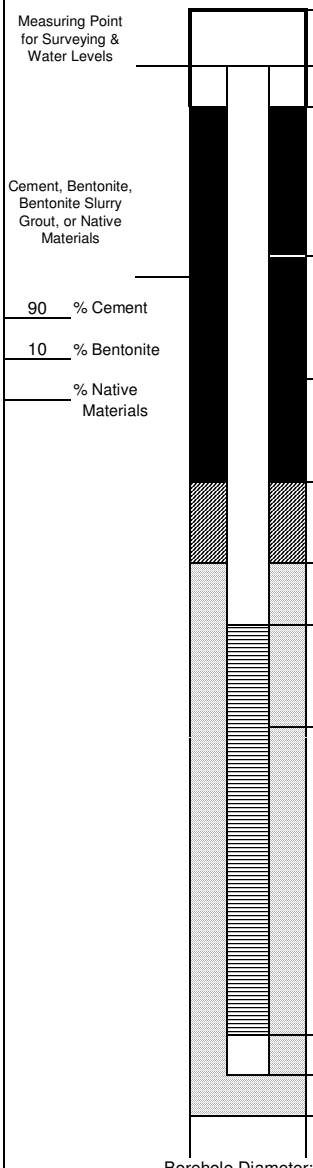
Describe Measuring Point:

Jesse Lloyd
Signature

5/12/2010
Date

AECOM	Client:	National Grid	**Well ID: MW-52I**	
	Project Number:	60137359		
	Site Location:	Inwood Former Holder Site	Date Installed:	10/7/2011
	Well Location:		Inspector:	Eric Acs
	Method:	8" Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Steel Guard Pipe	Stick-up Casing	9.28
Top of Riser Pipe	-2.66	8.92
Ground Surface (G.S.)	0.00	6.26
Riser Pipe: Length 0.0'-13.0'; Inside Diameter (ID) 2"; Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	9.00	-2.74
Bentonite Seal Thickness 9.0'-11.0'		
Top of Sand	11.00	-4.74
Top of Screen	13.00	-6.74
▲ Stabilized Water Level	NA	NA
Screen: Length 13.0'-23.0'; Inside Diameter (ID) 2"; Slot Size 20 slot; Type of Material Sched. 40 PVC		
Type/Size of Sand #2; Sand Pack Thickness 11.0'-25.0'		
Bottom of Screen	23.00	-16.74
Bottom of Tail Pipe:	25.00	-18.74
Bottom of Borehole	25.00	-18.74

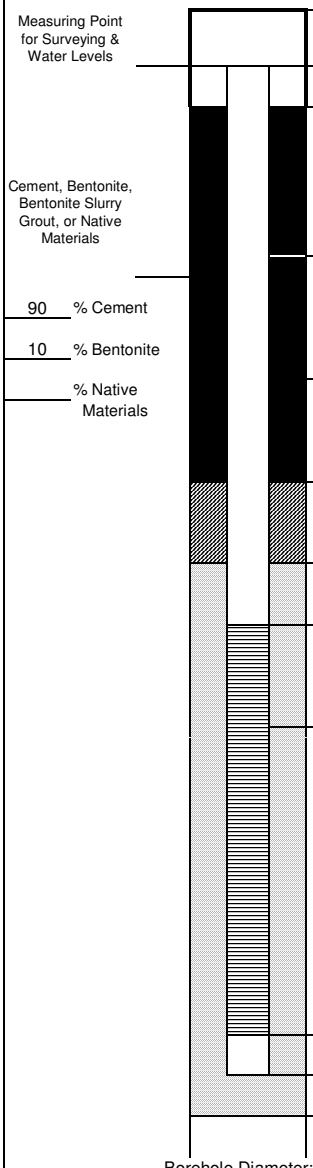
Borehole Diameter: 8"

Approved: Eric Acs (Signature) 10/7/2011 (Date)

Describe Measuring Point: Ground Surface

AECOM	Client:	National Grid	**Well ID: MW-52S**	
	Project Number:	60137359		
	Site Location:	Inwood Former Holder Site	Date Installed:	10/7/2011
	Well Location:		Inspector:	Eric Acs
	Method:	8" Hollow stem augers	Contractor:	Fenley and Nicol

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum NAVD 88
Top of Flush Mount	0	6.10
Top of Riser Pipe	-0.51	5.59
Ground Surface (G.S.)	NA	6.10
Riser Pipe: Length 0.53'-1.0'; Inside Diameter (ID) 2"; Type of Material Sched. 40 PVC		
Bottom of Steel Guard Pipe	NA	NA
Top of Bentonite	0.00	6.1
Bentonite Seal Thickness 0.0'-1.0'		
Top of Sand	1.00	5.1
Top of Screen	1.00	5.10
▲ Stabilized Water Level	NA	NA
Screen: Length 1.0'-11.0'; Inside Diameter (ID) 2"; Slot Size 20 slot; Type of Material Sched. 40 PVC		
Type/Size of Sand #2; Sand Pack Thickness 1.0'-13.0'		
Bottom of Screen	11.00	-4.9
Bottom of Tail Pipe:	13.00	-6.9
Bottom of Borehole	13.00	-6.9

Borehole Diameter: 8"

Approved:

Describe Measuring Point:

Ground Surface

Eric Acs
Signature

10/7/2011
Date

Job Number _____

Fenley & Nicol Co. Inc.

Page 6

3 Brook Avenue, Deer Park, New York 11729 (516) 586-4900 • (718) 204-4993 Environmental Services Di

PROJECT Lilco Gas Holder
CLIENT Lilco
LOCATION Sheridan Blvd. Inwood

DATE 10-13-94
PERMIT NO.
DRILLER S. Omiecz

WELL NO. MW-13 USE
DRILLING METHOD 6"HSA
CASING:
Type PVC FJ Diameter 4" Length 3'
SCREEN:
Type PVC FJ Diameter 4" Slot 020 Length 13'
GRAVEL PACK screen
SECURITY

BORE HOLE DIAMETER 12"
SAMPLE METHOD cuttings
DEPTH TO WATER 4'
TOTAL DEPTH 15'
CASING SEAL Cement to
FINISH

DEPTH BELOW GRADE	SAMPLE NUMBER	BLOWS PER 6" ON SAMPLER	WELL DESIGN	IDENTIFICATION OF SOILS/REMARKS
0				GRAY ASH
13'				FILL
15'				

Number _____

Fenley & Nicol Co. Inc.

Page 8 of

445 Brook Avenue, Deer Park, New York 11729 (516) 586-4900 • (718) 204-4883 Environmental Services Div.

PROJECT Lilco Gas Holder
CLIENT Lilco
LOCATION Sheridan Blvd. Inwood

DATE 10-13-94
PERMIT NO.
DRILLER S. Omuetz

WELL NO. MW-14 USE
DRILLING METHOD 6" HSA
CASING:
Type PVC FJ Diameter 4" Length 5'
SCREEN:
Type PVC FJ Diameter 4" Slot .020 Length 15'
GRAVEL PACK
SECURITY

BORE HOLE DIAMETER 6"
SAMPLE METHOD cuttings
DEPTH TO WATER 9'
TOTAL DEPTH 20'
CASING SEAL
FINISH

DEPTH BELOW GRADE	SAMPLE NUMBER	BLOWS PER 6" ON SAMPLER	WELL DESIGN	IDENTIFICATION OF SOILS/REMARKS
0				
				GRAY ASH
12				
				GRAY MEDIUM SILTY SAND / GRAVEL
15				
				TAN MEDIUM SILTY SAND
20				

Attachment B

Community Air Monitoring Plan

AECOM

Submitted to:
National Grid
Hicksville, New York

Submitted by:
AECOM
New York, New York

Community Air Monitoring Plan (Appendix D of ISMP)

Former Inwood Gas Holder Site
Nassau County, New York
NYSDEC Site Code: 130121

June 2014

Contents

1.0 Introduction 1-1

2.0 Constituents of concern and action levels 2-1

3.0 Air monitoring equipment and methods 3-1

3.1 Volatile organic compounds and benzene monitoring 3-1

3.1.1 Ambient air monitoring 3-1

3.2 Particulate (dust) monitoring 3-1

4.0 Emission control plan 4-1

4.1 Ambient air 4-1

5.0 Odor control procedures 5-1

5.1 Potential sources of odors 5-1

5.2 Odor monitoring 5-1

5.3 General site controls 5-1

5.4 Secondary site controls 5-2

5.5 Record keeping and communication 5-2

6.0 Documentation and reporting 6-1

List of Appendices

Appendix A Vapor Suppression Information

List of Tables

Table 1 Vapor Emission Response Chart 4-2

Table 2 Emergency Contacts and Telephone Numbers 4-3

1.0 Introduction

This document provides the Community Air Monitoring Plan (CAMP) that will be implemented during any site activities covered under the Interim Site Management Plan [(ISMP); AECOM, June 2014] for the Former Inwood Gas Holder Site (site) located in the Inwood, Nassau County, New York. This CAMP has been prepared by AECOM Environment (AECOM) on behalf of National Grid to present the methods and procedures that will be used to evaluate air quality in the immediate vicinity of subsurface activities and provide protection to potential off-site receptors.

The objectives of this CAMP are to:

- Ensure that the airborne concentrations of constituents of concern (COC) are minimized to protect human health and the environment
- Provide an early warning system so that potential emissions can be controlled on-site at the source
- Measure and document the concentrations of airborne COC to confirm compliance with regulatory limits

The community air monitoring will be performed around the local work zone perimeter, and will measure the concentrations of organic vapors and dust during all ground-intrusive activities (soil boring, well installations, excavations, utility work, and test pitting).

This CAMP is Appendix D of the ISMP, is directed primarily toward protection of on-site workers within the designated work zones.

2.0 Constituents of concern and action levels

The site areas potentially have residual subsurface contamination dating from the site's historical use as a Holder facility. The constituents of concern are volatile and semi-volatile organic compounds (VOCs and SVOCs). The primary VOCs of concern are benzene, ethylbenzene, toluene, and xylene (BTEX compounds). VOCs are more volatile than SVOCs and are generally of greater concern when monitoring the air quality during subsurface activities.

Airborne dust is also a concern and must be monitored and controlled due to its ability to co-transport adsorbed constituents and because of its nuisance properties.

Odors, though not necessarily indicative of high constituent concentrations, could create a nuisance (especially when working within or in close proximity to existing buildings and building entrances) and will be monitored and controlled to the extent practicable.

State and federal regulatory agencies have provided action levels for many of these constituents. The action levels are the allowable airborne concentrations above which respiratory protection or other health and safety controls are required. For any subsurface work covered under the SMP, the following levels should not be exceeded for more than 15 consecutive minutes at the downwind perimeter of the project site:

- Benzene 1 part per million (ppm)
- Total VOCs 5 ppm
- Dust 100 micrograms per cubic meter ($\mu g/m^3$)

The action levels cited here are above (in addition to) the background ambient (upwind) concentration.

3.0 Air monitoring equipment and methods

Air quality monitoring will be performed for total VOCs, benzene, and dust as outlined below. Two perimeter locations will be established each day and an air monitoring technician will check the instrumentation at each of these locations frequently during the work. Typically there will be monitoring locations at one upwind project site perimeter location and one downwind perimeter location. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Field personnel will be prepared to monitor multiple locations in the event that there is little wind or if the wind direction changes frequently.

The monitoring instruments will be calibrated at the start of each workday, and again during the day if the performance of an instrument is in question.

3.1 Volatile organic compounds and benzene monitoring

3.1.1 Ambient air monitoring

VOC monitoring will be performed using three field photoionization detectors (PIDs) (RAE Systems MiniRAE or equivalent). The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. The PIDs will be equipped with an audible alarm to indicate exceedance of the action level.

A 15-minute running average concentrations will be calculated, which can then be compared to the action levels. If real-time measurements of total VOCs indicate that the action level is exceeded, the benzene concentration will also be determined at that location using benzene-specific colorimetric tubes. The data will be downloaded at the end of each day, and monitoring records will be kept at the project site during the work in case there is an inquiry or complaint.

PID measurements will be made at one upwind and one downwind location around the work area. The locations of the instruments may be changed during the day to adapt to changing wind directions.

3.2 Particulate (dust) monitoring

Particulate (dust) monitoring will be performed during intrusive activity (drilling, excavation) at the project site. Two particulate monitors (TSI DustTrak or equivalent) will be used for continuous real-time dust monitoring. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. A 15-minute average concentration will be determined. The data will be downloaded at the end of each day, and monitoring records will be kept at the project site during the work in case there is an inquiry or complaint.

Measurements will be made at one upwind and one downwind location around the work area. The locations of the instruments may be changed during the day to adapt to changing wind directions. In addition, fugitive dust migration will be visually assessed during all work activities, and the observations recorded.

4.0 Emission control plan

4.1 Ambient air

Odor, vapor, and dust control will be required for this project due to the close proximity of commercial buildings and public roadways and sidewalks. Table 1 provides a response chart for the monitoring and control of vapor emissions. Table 2 provides a list of emergency contacts.

- If the ambient air concentration of total VOC levels at the downwind perimeter of the work area or exclusion zone exceeds 5 ppm (or the benzene level exceeds 1 ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor levels readily decreases (per instantaneous readings) below 5 ppm (and the benzene level drops below 1 ppm) over background, work activities can resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm (or the benzene level persists over 1 ppm) over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions until the concentrations drop below the action levels, 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 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

Project site perimeter particulate concentrations will also be monitored continuously. In addition, dust migration will be visually assessed during all work activities.

- If the downwind particulate level is 100 µg/m^3 greater than the background (upwind perimeter) level for a 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind particulate levels do not exceed 150 µg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind particulate levels are greater than 150 µg/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 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

Typical emission control measures may include:

- Apply water for dust suppression;
- Relocate operations, if applicable; and
- Reassess the existing control measures.

Table 1 Vapor Emission Response Chart

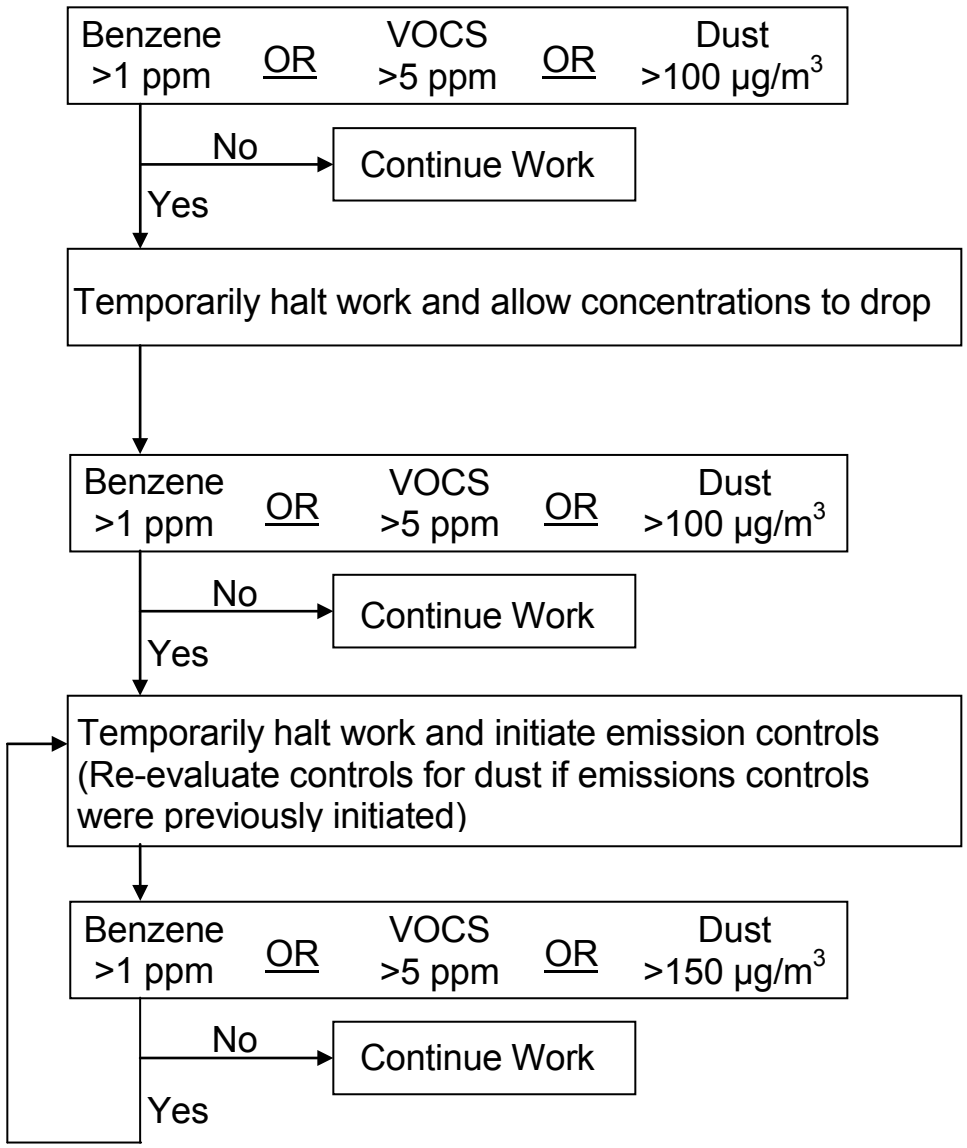


Table 2 Emergency Contacts and Telephone Numbers

Fire:	911	
Police:	911	
Ambulance:	911	
AECOM Environment Contacts	Shail Pandya	(718) 309-5643 cell (212) 798-8513 off
National Grid Contacts	Melissa Reindl	(516) 779-8035 cell (516) 545-3551 off

5.0 Odor control procedures

This section outlines the procedures to be used to control odors that may be generated during the subsurface activities. The remainder of this section is intended to provide site managers, representatives of NYSDEC and New York State Department of Health (NYSDOH), and the public with information summarizing typical odor control options, and to provide some guidance for their implementation. A description of potential sources of odors and methods to be used for odor control is presented in the following sections.

5.1 Potential sources of odors

Generally, the residuals encountered at the Site areas are well defined. They are related to residual coal tar-like materials and petroleum, and principally contain VOCs, polynuclear aromatic hydrocarbons (PAHs), and a number of inorganic constituents, including metal-complexed cyanide compounds, and metals. Constituents of residual materials can produce odor emissions during subsurface activities when they are unearthed during excavations and soil borings/well installations. When this occurs, VOCs and light-end SVOCs can volatilize into the ambient air. Some Site residuals can cause distinctive odors that are similar to mothballs, roofing tar, or asphalt driveway sealer. However, the constituent concentrations generally associated with these odors are typically significantly less than levels that might pose a potential health risk. It is important to note that the CAMP will provide for continual monitoring of VOCs and dust during the fieldwork to monitor for any potential release of constituents which may pose a threat to health.

5.2 Odor monitoring

The field personnel will record observations of odors generated during the implementation of the subsurface work. When odors attributable to the uncovering of impacted media are generated in the work area during intrusive activities such as soil borings or excavation, observations will also be made at the down-wind limit of the Site, in order to assess the potential for off-site odors. The down-wind odor monitoring will be performed in conjunction with the vapor and dust monitoring program described in this CAMP.

Upon detection of odors at the project site perimeter, site controls, starting in the work area, will be implemented. The site controls described in the following sections will be used to assist with odor mitigation to minimize, and to prevent where practicable, the off-site migration of odors. Due to the short distances between any work area at the project site and the property line or nearby potential receptors, site controls will be implemented proactively when odors are detected in the breathing zone at any work area.

5.3 General site controls

Several general excavation or drilling procedure site controls that will be implemented include:

- Every effort will be made to minimize the amount of time that impacted material is exposed to ambient air at the project site.
- For excavations, it may be possible to move some amount of soil around within the footprint of the excavation in order to minimize the amount of soil removal and subsequent stockpiling of impacted soil at the ground surface. The use of in-excavation stockpiling of excavated soil will be evaluated on a case-by-case basis, and will only be performed with the approval of the

NYSDEC field representative, and will be completed only if it does not impede the collection of subsurface soils or the full delineation of the subsurface features being investigated.

- Drill cuttings from the soil borings will be containerized as soon as possible during completion of each soil boring.
- Loading of excavated debris or soil that has been found by the Site manager to be unsuitable material to return to excavation may generate odors. Every effort will be made to complete this work as quickly as possible and to keep these materials covered at all times.
- Meteorological conditions are also a factor in the generation and migration of odors. Some project site activities may be limited to times when specific meteorological conditions prevail, such as when winds are blowing away from a specific receptor.

5.4 Secondary site controls

If substantial odors still present an issue following implementation of the above procedures, secondary controls will be enacted. The field representative will work through the applicable list of secondary controls until the perimeter odor issues are resolved. The field representative will work closely with National Grid and NYSDEC during this task, if present. Final selection of controls will be dependent on field conditions encountered. Secondary controls include the following:

- For stockpiled impacted soil, temporary tarps or polyethylene covers will be used to control odors.
- The placement of portable barriers close to small active source areas (excavations) can elevate the discharge point of emissions to facilitate dispersion and minimize the effect on downwind receptors. The barriers can be constructed using materials such as plastic “Jersey barriers”, or fence poles and visual barrier fabric/plastic. The barriers are placed as temporary two or three-sided structures around active excavation or other intrusive areas, oriented such that the barriers are placed on the upwind and downwind sides of the source. If only one side of the source can be accessed, then the barrier should be placed on the downwind side.
- Two agents that can be sprayed over impacted soil have been determined to be effective in controlling emissions. They include odor suppressant solution (BioSolve™), and hydro-mulch. These agents may be used where tarps cannot be effectively deployed over the source material, or where tarps are ineffective in controlling odors:
  - BioSolve™ can provide immediate, localized control of odor emissions. Information regarding the preparation and use of BioSolve™ is provided in Appendix A.
  - Hydromulch - Although it is unlikely that it will be necessary, a modified hydromulch slurry may be used to cover inactive sources for extended periods of time (up to several days). The hydromulch, typically cellulose fibers (HydroSealR) is modified by mixing a tackifier (glue) with the mulch and water to form a slurry. It is applied using a standard hydroseed applicator to a thickness of ¼ inch. The material forms a sticky, cohesive, and somewhat flexible cover. Reapplication may be necessary if the applied layer becomes desiccated or begins to crack.

5.5 Record keeping and communication

Similar to readings recorded during the monitoring specified in the CAMP, all odor monitoring results will be recorded in the field log book or other air monitoring forms, and be available for review by the agencies upon request.

The field representative, in consultation with National Grid, will also provide information on odor monitoring and odor management to residents of the neighborhood should they inquire. In the event that odors persist after these efforts, work will be temporarily discontinued until a mutually agreeable solution with National Grid, NYSDEC, and NYSDOH staff can be worked out which allows the work to be completed while minimizing the off-site transport of nuisance odors.

6.0 Documentation and reporting

Data generated during perimeter air monitoring will be recorded in field logs and summarized daily in spreadsheets. The electronic measurements from the PIDs and dust meters will be downloaded each day, reviewed, and archived. Exceedances of the action levels, if any, and the actions to be taken to mitigate the situations, will be discussed immediately with the on-site representatives. Summaries of all air monitoring data will be provided to NYSDEC and NYSDOH in electronic format, as requested.

Appendix A

Vapor Suppression Information

BioSolve®
Hydrocarbon Mitigation Technology

...Is Making A Difference!

VAPOR SUPPRESSION / ODOR CONTROL

BioSolve® offers a relatively simple and cost effective method of suppressing Odors and VOC release from soils, during excavation, loading, stockpiling, etc. The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% BSW solution (1 part **BioSolve®** concentrate to 33 parts water) will be adequate to keep vapor emissions within acceptable limits and control fugitive odor problems on contact. Although, some sites may only require a 2% solution, up to a 6% solution may be recommended on sites with elevated levels or particularly difficult/ mixed stream contaminants are present.

The **BioSolve®** solution should be applied evenly to the soil surface in sufficient quantity to saturate the surface area. As a general rule, use 1-3 litres of **BioSolve®** solution to 1 square metre of surface area. (1 gallon of **BioSolve®** per solution will cover approximately 4-sq. yd. of soil surface area) **BioSolve®** is a water-based surfactant that will apply like water.

BioSolve®, in its concentrated form, is a viscous liquid material that must be diluted with water. A fluorescent red tracing dye is present in the formula allowing **BioSolve®** to be detected during application. Once diluted, **BioSolve®** can be applied with virtually any equipment that can spray water. **BioSolve®** will not harm equipment or clog pipes. For large sites, applicators such as water truck, portable agricultural sprayers, foam inductors & pressure sprayers can be used. For smaller jobs, garden sprayers, water extinguishers or a garden hose with a fertiliser attachment on the nozzle can be used effectively. This characteristic makes **BioSolve®** very adaptable and much most convenient to use in almost any situation. **BioSolve®** is equally effective when used with all types of water (soft, hard, salt or potable).

On stockpiled soil or other soil that will be left undisturbed, a single application of **BioSolve®** to the exposed surfaces may last up to 10 to 14 days or more (depending on environmental conditions). **BioSolve®,** when applied, will form a "cap" of clean soil. If the soil is not disturbed, via weather, movement, etc. this "cap" will remain functional. During excavation, loading or other movement of the soil, it may be required to spray an additional amount of **BioSolve®** to the freshly exposed surface area to keep emissions at an acceptable level.

In case of an extremely high level of emissions, or if the soil is heavily contaminated, it may be necessary to increase the strength of the **BioSolve®** solution or apply more solution per square metre to reduce emissions adequately. It is important that the site be monitored regularly and that the **BioSolve®** solution be reapplied if and when necessary to insure that VOC emissions and odors remain under control.

BioSolve® is packaged and readily available in 55 gallon (208 liter) drums, 5 gallon (19 liter) pails and in 4X1 gallon (3.8 liter X 4) cases. Contact The Westford Chemical Corporation® Toll Free @ 1-800-225-3909, via e-mail at info@biosolve.com or your Local BioSolve distributor for pricing.

BioSolve® should only be used in accordance with all regulatory rules and regulations.

SOIL VAPOR SUPPRESSION UTILIZING BIOSOLVE

BioSolve is being utilized by numerous environmental consultants, response contractors, and fire departments to suppress VOC's & LEL's as well as problem odors. BioSolve encapsulates the source of the vapor rather than temporarily blanketing it like a foam or other physical barrier. Vapor reduction is so fast and effective that BioSolve is used to comply with the tough emission standards regulated by each State.

BioSolve offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling… The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% solution of BioSolve will be adequate to keep vapor emissions within acceptable limits. Dilute BioSolve concentrate with water at a ratio of 1 part BioSolve to 33 parts water to make a 3% solution.

The BioSolve solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well, (as a general rule, 1 gallon of BioSolve solution will cover approximately 4 sq. yd. of soil surface area). BioSolve is not a foam, it is a surfactant based product that will apply like water. The solution may be applied with a hand sprayer, high pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the BioSolve solution (6%) or apply more per sq. yd. to reduce emissions adequately. On stockpiled soil or other soil that will be undisturbed, a single application of BioSolve to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable

levels.It is important that the site be monitored regularly and the BioSolve solution be reapplied if/when necessary to insure that vapor emissions remain at or below acceptable standards.

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION®
P.O. Box 798
Westford, Massachusetts 01886 USA

Ref. No.: 2001
Date: 1/1/2002

Phone: (978) 392-0689
Phone: (508) 878-5895
Emergency Phone-24 Hours: 1-800-225-3909

Fax: (978) 692-3487
Web Site: http://www.BioSolve.com
E-Mail: info@BioSolve.com

SECTION I - IDENTITY

Name:	**BioSolve®**
CAS #:	138757-63-8
Formula:	Proprietary
Chemical Family:	Water Based, Biodegradable, Wetting Agents & Surfactants
HMIS Code:	Health 1, Fire 0, Reactivity 0
HMIS Key:	4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant

---

SECTION II - HAZARDOUS INGREDIENTS

Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000 require listing of hazardous ingredients.

This product does not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California's Prop. 65.

SECTION III - PHYSICAL - CHEMICAL CHARACTERISTICS

Boiling Point	: 265°F	Specific Gravity	: 1.00 +/-.01
Melting Point	: 32°F	Vapor Pressure mm/Hg	: Not Applicable
Surface Tension- 6% Solution	: 29.1 Dyne/cm at 25°C	Vapor Density Air = 1	: Not Applicable
Reactivity with Water	: No	Viscosity - Concentrate	: 490 Centipoise
Evaporation Rate	: >1 as compared to Water	Viscosity - 6% Solution	: 15 Centipoise
Appearance	: Clear Liquid unless Dyed	Solubility in Water	: Complete
Odor	: Pleasant Fragrance	pH	: 9.1+/-.3
Pounds per Gallon	: 8.38		

SECTION IV - FIRE AND EXPLOSION DATA

Special Fire Fighting Procedures	: None	Flammable Limit	: None
Unusual Fire and Explosion Hazards	: None	Auto Ignite Temperature	: None
Solvent for Clean-Up	: Water	Fire Extinguisher Media	: Not Applicable
Flash Point	: None		

SECTION V - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -

Small spills, in an undiluted form, contain. Soak up with absorbent materials.
Large spills, in an undiluted form, dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.

Waste Disposal Procedures -

Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

SECTION VI - HEALTH HAZARDS

Threshold Limit Values: Not applicable
Signs and Symptoms of Over Exposure-

Acute : Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.

Medical Conditions Generally Aggravated by Exposure: Unknown
Carcinogen: No
Emergency First Aid Procedures -

Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.
Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion: Get medical attention.
Inhalation: None considered necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection	: Not necessary	Local Exhaust Required	: No
Ventilation Required	: Normal	Protective Clothing	: Gloves, safety glasses Wash clothing before reuse.

SECTION VIII - PHYSICAL HAZARDS

Stability	: Stable	Incompatible Substances	: None Known
Polymerization	: No	Hazardous Decomposition Products	: None Known

---

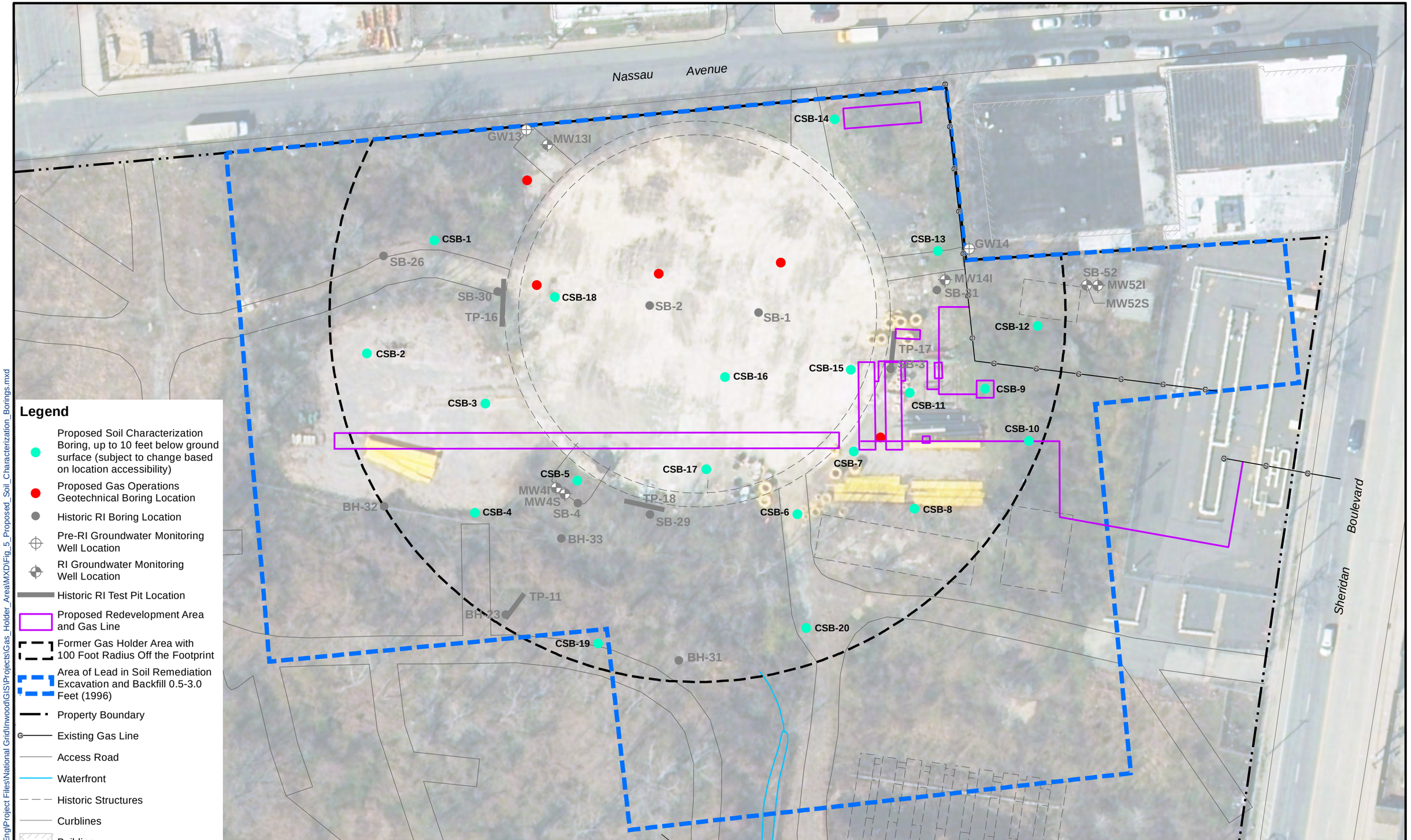
SECTION IX - TRANSPORT & STORAGE

DOT Class	: Not Regulated/Non Hazardous		
Freeze Temperature	: 28°F	Storage	: 35°F-120°F
Freeze Harm	: None (thaw & stir)	Shelf Life	: Unlimited Unopened

---

SECTION X - REGULATORY INFORMATION

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application, which is not described on the Product label or in this Material Safety Data Sheet, is the sole responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation and Massachusetts Right to Know Law.



Legend

- Proposed Soil Characterization Boring, up to 10 feet below ground surface (subject to change based on location accessibility)
- Proposed Gas Operations Geotechnical Boring Location
- Historic RI Boring Location
- Pre-RI Groundwater Monitoring Well Location
- RI Groundwater Monitoring Well Location
- Historic RI Test Pit Location
- Proposed Redevelopment Area and Gas Line
- Former Gas Holder Area with 100 Foot Radius Off the Footprint
- Area of Lead in Soil Remediation Excavation and Backfill 0.5-3.0 Feet (1996)
- Property Boundary
- Existing Gas Line
- Access Road
- Waterfront
- Historic Structures
- Curblines
- Building

AECOM

Note
Proposed gas operations geotechnical boring locations are subject to change based on CNG station design.

1 Inch = 50 Feet

0 25 50 100 Feet

N

National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd
Inwood, NY

Proposed Soil Characterization Borings

Date: 5/6/2020	Drawn: JB	Job #: 60137359		Figure 5

File: P:\Jobs\Rem_Engr\Project Files\National Grid\Inwood\GIS\Projects\Gas_Holder_Area\MXD\Fig_5_Proposed_Soil_Characterization_Borings.mxd