ELTON CROSSING/ SITE C - FAMILY
899 ELTON AVENUE
BRONX, NEW YORK

Remedial Action Work Plan

NYSDEC BCP Number: C203073
AKRF Project Number: 11901

Prepared for:

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JUNE 2015

CERTIFICATIONS

I, Michelle Lapin, certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

MICHELLE LAPIN
No. 073934

NYS Professional Engineer #

June 26, 2015
Date

Signature

PE Stamp

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
RAWP	Remedial Action Work Plan
AKRF	AKRF, Inc./ AKRF Engineering, P.C.
BCA	Brownfield Cleanup Agreement
NYSDEC	New York State Department of Environmental Conservation
BCP	Brownfield Cleanup Program
RI	Remedial Investigation
SRI	Supplemental Remedial Investigation
SRIR	Supplemental Remedial Investigation Report
UUSCOs	Unrestricted Use Soil Cleanup Objectives
RRSCO	Restricted Residential Soil Cleanup Objectives
AGV	Air Guidance Value
NYSDOH	New York State Department of Housing
PCE	Tetrachloroethylene
BTEX	VOCs associated with petroleum
VOC	Volatile Organic Compounds
AWQS	Ambient Water Quality Standards
SSDS	Sub-Slab Depressurization System
ECL	Environmental Conservation Law
ELAP	NYS Environmental Laboratory Approval Program
EM	Electromagnetic
GPR	Ground Penetrating Radar
UST	Underground Storage Tank
ESA	Environmental Site Assessment
LBP	Lead-Based Paint
PCB	Polychlorinated Biphenyl
QHHEA	Qualitative Human Health Exposure Assessment
SMP	Site Management Plan
HASP	Health and Safety Plan
CAMP	Construction Air Monitoring Plan
COC	Contaminants of Concern
CPP	Citizen Participation Plan
QAPP	Quality Assurance Project Plan
CQAP	Construction Quality Assurance Plan
QEP	Qualified Environmental Professional
RE	Remedial Engineer
SWPPP	Storm Water Pollution Prevention Plan
COC	Certificate of Completion

EXECUTIVE SUMMARY

Site Description/Physical Setting

This Draft Remedial Action Work Plan (RAWP) has been prepared by AKRF Engineering, P.C. (AKRF) on behalf of Elton Crossing Associates, P.C., (the Volunteer) for the Site. The Site is located at 899 Elton Avenue in the Bronx, New York. The legal definition of the Site is Tax Block 2383, Lots 19, 25, 27, 29, 30, 31, 33, 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street in the Bronx, New York. A Site Location Plan is provided as Figure 1. Lot 19 is developed with an approximately 9,200-square foot vacant, one-story building with a partial cellar, which is anticipated to be demolished in early Summer 2015. The remaining lots are vacant. The Site is located in an area developed with predominantly residential, educational, and commercial uses. A Site Plan is provided as Figure 2.

Elton Crossing Associates, L.P. entered into a Brownfield Cleanup Agreement (BCA) (BCA # C203073-11-14) with the New York State Department of Environmental Conservation (NYSDEC). The BCA was executed by NYSDEC on December 31, 2014. A Draft Remedial Investigation (RI) Report was submitted to NYSDEC as part of the Brownfield Cleanup Program (BCP) application. A Supplemental Remedial Investigation (SRI) was conducted in February and March 2015 to further delineate soil and soil vapor contamination and to determine whether past uses have affected groundwater at the Site. A Draft Supplemental Remedial Investigation Report (SRIR) was submitted to NYSDEC in April 2015. The data compiled from the RI and the SRI were used to prepare this RAWP.

Summary of Past Uses of Site

Historic reports indicated that Lot 19 was developed with: an automobile garage from 1927 to 1940; a factory in 1945; freezer and oven mobile units in 1961; a metal works from at least 1969 to 1978; and Blasco Supply company from 2000 to 2005. Lot 25 was developed with an automobile garage in 1921 and a funeral home from at least 1927 to 1984. Lot 27 was developed with an undertaker and a multi-story residential building from at least 1969 to 1979. Lot 29 was developed with a beauty shop, a lawyers’ office, a dentist, and a multi-story residential building from 1927 to 1971. Lot 35 was developed with the Elton Glass Works, Soenning Plumbing and Heating, and a butcher and glazer in 1927, and stores and a multi-story residential building in 1965. The remaining lots were developed historically as multi-story residences with cellars that likely contained petroleum storage tanks.

Summary of the Remedial Investigation

Soil, groundwater, and soil vapor were investigated as part of the Remedial Investigation (RI) and Supplemental Remedial Investigation (SRI). The analytical results are presented in Tables 1 through 9. Concentration maps showing compounds detected above applicable standards are illustrated on Figures 3 to 5. Below is a summary of RI findings.

Soil:

The VOCs m,p-xylene and o-xylene were detected in soil sample SB-13 (8-10) at concentrations of 583 and 386 parts per billion (ppb), respectively, which are above the respective Unrestricted Use Soil Cleanup Objectives (UUSCOs) of 260 ppb, but below the respective Restricted Residential Soil Cleanup Objectives (RRSCO) of 100,000 ppb. No VOCs were detected at concentrations exceeding RRSCOs. Seven polycyclic aromatic hydrocarbons (PAHs), benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene, were detected in one or more soil samples at concentrations above their respective UUSCOs. Additionally, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene were detected in at least seven soil samples at concentrations above their respective RRSCOs.

The PCB Aroclor 1248 was detected in soil samples SB-13 (0-2) and SB-13 (8-10) at concentrations of 910 ppb and 110 ppb, respectively, exceeding its UUSCO of 100 ppb of total PCBs per sample. Aroclor 1262 was detected at concentrations of 485 ppb and 451 ppb in two soil samples above the 100 ppb UUSCO for total PCBs, and at concentrations of 14,700 ppb and 3,030 ppb in two soil samples, above the 1,000 ppb RRSCO for total PCBs. The pesticides 4,4’-DDD, 4,4’-DDE, 4,4’-DDT, aldrin, alpha-chlordane, dieldrin, endrin, gamma-BHC (lindane), and heptachlor were detected in up to 25 of the soil samples at concentrations exceeding their respective UUSCOs. Additionally, alpha-chlordane, 4,4’-DDE, and dieldrin were detected in four soil samples at concentrations exceeding their respective RRCCOs.

Ten metals, including arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were detected above their respective UUSCOs in 28 soil samples analyzed. Of these metals, arsenic in one sample, barium in twelve samples, cadmium in two samples, copper in one sample, lead in six samples, and mercury in three samples, exceeded their respective RRSCOs.

Soil Vapor:

Up to 31 VOCs were detected in the soil vapor samples. Methylene chloride was detected at a concentration of 77.5 micrograms per cubic meter (µg/m^3), above its Air Guideline Value (AGV) of 60 µg/m^3 established by the New York State Department of Health (NYSDOH). Carbon tetrachloride was also detected above its AGV of 5 µg/m^3, at a concentration of 8.2 µg/m^3 in soil vapor sample SV-1. Tetrachloroethylene (PCE) was detected at a concentration of 111µg/m^3 in sample SSV-1, which is above its NYSDOH AGV of 30 µg/m^3. VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4- and 1,3,5-trimethylbenzene, cyclohexane, n-heptane, n-hexane, 4-ethyltoluene, and 2,2,4-trimethylpentane] were detected at concentrations up to 123,000 µg/m^3. Solvent-related VOCs (including styrene, PCE, and toluene) were detected at concentrations up to 871 µg/m^3. Low level VOC concentrations were also noted in the ambient air sample.

Groundwater:

Chloroform was detected in groundwater sample MW-3 at a concentration of 9.5 micrograms per liter (µg/L), above its Ambient Water Quality Standard (AWQS) of 7 µg/L. It was noted that the VOCs bromodichloromethane and chloroform were detected at low levels below applicable AWQS in the aqueous field blank (not associated with Site groundwater). Fourteen metals were detected in the unfiltered groundwater samples (total metals analysis) and 10 metals were detected in the filtered groundwater samples (dissolved metals analysis). Four total metals (iron, magnesium, manganese, and sodium) and three dissolved metals (iron, magnesium, and sodium) were detected in at least one of the groundwater samples above their respective AWQS. The metals detected above their AWQSs in the total and dissolved groundwater samples are naturally occurring and are typical of groundwater quality in the Bronx.

The remedial investigations concluded that there is some contaminated soil and soil vapor present at the Site. The elevated xylenes seem to be associated with former fuel oil use at the Site. The SVOCs, PCBs, and metals present in the soil, and the VOCs in the soil vapor seem to be attributable to the historic use at the Site and subsequent demolition of the former structures. The elevated levels of pesticides indicate the prior usage of pesticides at the Site and possible storage in the cellar of the former structures.

Qualitative Human Health Exposure Assessment

Exposure pathways for the current Site condition include ingestion and/or dermal contact with exposed soil/fill at the Site to trespassers; inhalation from dust emanating from the Site to trespassers and off-site pedestrians, visitors, cyclists, and adult and child residents; and from inhalation of VOCs from soil gas emanating from the Site entering into the adjoining buildings by off-site construction and commercial workers, and adult and child residents. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface soil/fill to construction workers as these workers could potentially ingest, inhale, or have dermal contact with any exposed impacted fill or soil. Without remediation, once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the subsurface to adult and child residents, maintenance staff, visitors, and commercial workers through cracks or openings in the foundations of the new building and surrounding buildings. There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of surface soil in any landscaped or non-capped areas by adult and child residents, visitors, and trespassers. In addition, there will be a potential exposure pathway from any dust emanating from the Site to off-site pedestrians, visitors, cyclists, and adult and child residents. Implementation of the Remedial Actions outlined in this RAWP will prevent the potential exposure pathways from becoming complete.

Summary of the Remedy

1. Excavation of soil/fill exceeding Track 4 Site Specific Soil Cleanup Objectives (SSSCOs) listed in Table 10 plus additional soil as needed to install the foundation for the proposed new building. The anticipated limits of the proposed soil excavation are shown on Figure 7.

2. Removal of any petroleum storage tanks, fill ports, and vents and any associated grossly contaminated soil, if encountered, in accordance with applicable regulations.
3. Construction and maintenance of an engineered composite cover consisting of (1) a minimum two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas; and (2) concrete building foundations, sidewalks/pathways, and asphalt roadways to prevent human exposure to residual contaminated soil/fill remaining under the Site.
4. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site.
5. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting.
6. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work.
7. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of SSSCOs.
8. Appropriate off-site disposal of all material removed from the Site in accordance with all Federal, State, and local rules and regulations for handling, transport, and disposal. A waste disposal facility(s) will be selected based on the data that has been collected to date. Based on the requirements of the selected facility(s), additional soil waste characterization samples will be collected and analyzed as needed to obtain an approval for soil disposal.
9. Import of materials to be used for backfill and cover in compliance with: (1) the soil cleanup objectives outlined in 6 NYCRR Part 375-6.7(d); and (2) all Federal, State and local rules and regulations for handling and transport of material.
10. A vapor barrier and SSDS will be incorporated into the foundation of the new building as illustrated on Figure 9. The vapor barrier specifications are enclosed as Appendix E.
11. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

Elton Crossing Associates, L.P. entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in December 2014, to investigate and remediate a 0.732-acre property located at 899 Elton Avenue in the Bronx, Bronx County, New York (the Site). Elton Crossing Associates, L.P. is a Volunteer in the Brownfield Cleanup Program (BCP). Residential and commercial use is proposed for the Site. When completed, the Site will contain an approximately 230,000-gross square foot multifamily apartment building containing 199 units of rental housing for low and moderate income families, approximately 8,200 gross square feet (sf) of retail space, 32 surface parking spaces, and various amenities for its residents. Refer to the BCP application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI) conducted in April 2014, and the Supplemental RI (SRI), performed between February and March 2015. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have not yet determined whether this Site poses a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources. In addition, a formal Remedial Design document will not be prepared.

1.1 Site Location and Description

The Site is located in the County of the Bronx, Bronx, New York and is identified as Block 2383, Lots 19, 25, 27, 29, 30, 31, 33, 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street in the Bronx, New York on the New York City Tax Map. Figure 1 shows the Site location. The Site is situated on an approximately 0.732-acre area bounded by East 162nd Street to the north, beyond which are vacant lots and buildings; East 161st Street to the south, beyond which are residential buildings with first floor commercial space; Elton Avenue followed by Boricua College to the east; and residential buildings to the west, followed by Melrose Avenue (see Figure 2). Lot 19 is developed with an approximately 9,200-square foot vacant, one-story building with a partial cellar, which is anticipated to be demolished in early Summer 2015. The remaining lots are vacant. A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 0.732-acre Site is fully described in Appendix A – Metes and Bounds.

1.2 Contemplated Redevelopment Plan

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

The proposed development called Elton Crossing consists of an approximately 230,000-gross square foot multifamily apartment building. In addition to 199 units of rental housing for low and moderate income families, the building will include approximately 8,200 gross square feet of retail space, 32 surface parking spaces, and various amenities for its residents. The preliminary Site Plan of the proposed redevelopment is included as Appendix B.

1.3 Description of Surrounding Property

The Site is abutted by East 162nd Street to the north, beyond which are vacant lots and buildings; East 161st Street to the south, beyond which are residential buildings with first floor commercial space; Elton Avenue followed by Boricua College to the east; and residential buildings to the west, followed by Melrose Avenue. The Harlem River is the nearest water body and is located approximately 1.7 miles south of the Site. The Site is located in a predominantly developed area consisting of residential, educational, commercial, and industrial buildings.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the Remedial Investigation (RI) Report dated April 2014 and the NYSDEC-approved Supplemental RI Work Plan (SRIWP) dated January 2015. The investigations were conducted in April 2014, and between February and March 2015. The Supplemental RI Report (SRIR) was submitted to NYSDEC in April 2015.

2.1 Summary Remedial Investigations Performed

AKRF conducted a Remedial Investigation (RI) at the Site in April 2014 and a supplemental RI in February and March 2015. The initial RI included a geophysical survey and utility mark-outs, the installation of 14 soil borings with the collection and analysis of 27 soil samples, and the installation of 6 soil vapor probes with the collection and analysis of 6 soil vapor samples and 1 ambient air sample. The supplemental RI included the collection of 1 soil sample from a floor drain within the building, the advancement of 3 soil borings with the collection and analysis of 11 soil samples, the installation of 3 bedrock groundwater monitoring wells with the collection and analysis of 3 groundwater samples, and the installation of 1 soil vapor probe with the collection and analysis of 1 soil vapor sample and 1 ambient air sample.

2.1.1 Borings, Wells, and Soil Vapor Probes

2.1.1.1. Soil Borings

Between February 18 and 20, 2014, and on February 25, 2014, 14 soil borings (SB-1 to SB-14) were advanced and on February 18, 19, and 25, 2015, 6 soil borings (SSB-1 through SSB-3 and MW-1 through MW-3) were advanced across the Site. A direct push drill rig was used to advance soil borings SB-1 to SB-14, SSB-1 to SSB-3, and MW-1. A hand auger was used to advance soil boring SB-12 located within the Site building cellar. Soil borings MW-2 and MW-3 were advanced using a Rotosonic drill rig. SB-1, SB-2, and SB-7 were advanced to depths of 7 to 12 feet below grade, SB-3 to SB-6, SB-8 to SB-11, SB-13, and SB-14 were advanced to between and 7 and 15 feet below grade, and SSB-1 to SSB-3 and MW-1 to MW-3 were advanced to bedrock. Bedrock was encountered between 9 and 10 feet below the building slab and between 9 and 17 feet below grade at the vacant portions of the Site. Groundwater was not encountered above bedrock in any of the soil borings.

For the soil borings advanced using a Geoprobe, soil cores were obtained using a stainless steel, macro-core sampler with an internal acetate liner. For the soil borings advanced using the Rotosonic drill rig, soil cores were obtained using a stainless steel casing with an internal disposable plastic liner. Borings were sampled continuously and soil samples were screened for evidence of contamination by visual and olfactory methods and by using a calibrated a photoionization detector (PID), which measures relative concentrations of VOCs in the soil. The PID was calibrated at the beginning of each field day with 100 parts per million (ppm) isobutylene calibration gas. At each boring location, AKRF field personnel recorded and documented subsurface conditions. Petroleum odor, staining, and elevated PID readings in soil headspace were noted in the deep soil sample collected from boring SB-13 at approximately 10 feet below grade and in MW-13 from 16.5 to 17 feet below grade. An unidentified chemical-like odor was also observed in soil boring SB-1 at depths ranging from 11 to 12 feet. The soil boring locations were surveyed using the Global Positioning System (GPS) upon their completion.

2.1.1.2. ***Monitoring Wells***

Three bedrock monitoring wells were installed between February 18 and 26, 2015. A Rotosonic drill rig was used to advance a steel core barrel from grade to bedrock. Once competent bedrock was reached, steel casing was advanced over the core barrel into competent bedrock, sealed with grout, and cured overnight. The following day, a bedrock core barrel was advanced through the casing, and continuous bedrock samples were collected by spinning the coring barrel fitted with a cutting shoe. Drilling continued 10 feet into the groundwater table. After completing the coring process, the core barrel was removed. The wells were finished with protective locking well covers that extended one to two feet above grade.

The wells were developed immediately after installation via surging and pumping. The purge water was monitored for turbidity and water quality indicators (i.e., pH, dissolved oxygen, oxidation-reduction potential, temperature, and specific conductivity) with measurements collected approximately every five minutes. Development continued until turbidity was less than 50 nephelometric turbidity units (NTUs) for three successive readings or until water quality indicators stabilized, or the well went dry, whichever occurred first. The criteria for stabilization were three successive readings within ±10% for pH, temperature, and specific conductivity. Monitoring well MW-1 did not recharge during development; therefore, stabilization could not be achieved. In addition, development water was screened for evidence of contamination by visual and olfactory methods and by using a calibrated PID. No evidence of contamination (i.e., odor, staining, elevated PID readings, etc.) was noted.

2.1.1.3. ***Soil Vapor Probes***

Seven soil vapor sampling probes (SV-1 to SV-6, and SSV-1) were installed using a direct-push drill rig by advancing a 0.75-inch diameter hollow probe rod fitted with an expendable 6-inch long stainless steel screened drive point approximately 5 feet below grade. Dedicated Teflon-lined polyethylene tubing with threaded fittings was connected to the probe. The hollow probe rod was then removed and the boring was backfilled with clean silica sand. Hydrated bentonite was used to fill the remaining void around the sampling tubing to ground surface.

2.1.2 Samples Collected

2.1.2.1. ***Soil Samples***

Thirty-eight soil samples were collected for chemical analysis. One soil sample was collected for chemical analysis from a floor drain within the southern portion of the Site building (Lot 19). One soil sample was collected from MW-3, two soil samples were collected for laboratory analysis from soil borings SB-1 to SB-11 and SB-13 to SB-14, and three soil samples were collected for laboratory analysis from soil borings SSB-1 through SSB-3. As soil boring SB-12 was advanced less than 5 feet below grade, only one soil sample was collected from the boring. In the absence of contamination, soil samples were collected from the 0 to 2 feet below grade interval, the 5 to 10 foot interval, and (for borings with three samples collected) from the boring terminus. As soil borings SB-13 and MW-3 exhibited field evidence of contamination at 10 feet below grade and 16.5 to 17 feet below grade, respectively, samples were collected from these intervals. In addition, one trip blank, one field blank, one blind duplicate, and one matrix spike/matrix spike duplicate (MS/MSD) per every 20 samples were collected. No soil samples were collected from soil borings MW-1 or MW-2, in accordance with the SRIWP. Soil samples collected from soil borings SB-1 to SB-14 and SSB-1 to SSB-3 were analyzed for VOCs, SVOCs, TAL metals, PCBs, and pesticides with Category B deliverables. The soil sample collected from soil boring MW-3 was analyzed for VOCs and SVOCs only.

2.1.2.2. ***Groundwater Samples***

Three groundwater samples (MW-1 to MW-3) were collected for chemical analysis using the low-flow sampling methodology. In addition, one trip blank, one field blank, one blind duplicate, and one MS/MSD were collected. Groundwater samples collected from the wells were analyzed for VOCs using EPA Method 8260, SVOCs using EPA Method 8270, pesticides using EPA Method 8081, PCBs using EPA Method 8082, and TAL metals (6000/7000 series) with Category B deliverables. The groundwater analyses for metals were conducted on both filtered and unfiltered samples; filtering occurred in the field using inline filters.

2.1.2.3. ***Soil Vapor and Ambient Air Samples***

Seven soil vapor samples and two one ambient air samples were collected for chemical analysis. Prior to collection, each sampling point was purged of three sample volumes using a peristaltic pump at a flow rate of approximately 0.1 liters/minute. During purging, an inverted five-gallon bucket was placed over each sampling point and helium gas was introduced through a small hole in the bucket to saturate the atmosphere around the sample port with helium gas. Purged vapors were collected in a Tedlar bag and field-screened for organic vapors using a PID. The purged air was also monitored using a portable helium detector to check for short-circuiting of ambient air into the vapor sampling point. All soil vapor points passed the seal integrity tests with helium readings of ND (Not Detected). A PID reading of 0.3 ppm was recorded at sample location SV-3.

After purging, each probe was connected via Teflon-lined polyethylene tubing to a laboratory-supplied 6-liter SUMMA canister equipped with a flow regulator set to collect a sample over a two-hour sampling period. The ambient air samples (AA-1and SAA-1) were collected concurrently with the soil vapor samples via 6-liter SUMMA canisters for an approximately two-hour sampling period. The ambient air samples were collected to establish background conditions and for comparison purposes. Immediately after opening the flow control valve, the initial SUMMA canister vacuum (inches of mercury) was noted. After approximately two hours, the flow controller valve was closed, the final vacuum noted, and the canister placed in a shipping carton for delivery to the laboratory. All samples were analyzed for VOCs via EPA Method TO-15 with Category B deliverables.

2.1.3 Chemical Analytical Work Performed

Factor	Description
Quality Assurance Officer	The chemical analytical QA/QC was directed by Michelle Lapin, P.E., of AKRF.
Third Party Data Validator	The third-party data validation was performed by Lori Beyer of L.A.B. Validation Corp.
Chemical Analytical Laboratory	Chemical analytical laboratory used in this investigation was Accutest Laboratories of Dayton, New Jersey, a NYS Environmental Laboratory Approval Program (ELAP)-certified laboratory.
Chemical Analytical Methods	Soil analytical methods: • TAL Metals by EPA Method 6000/7000 (rev. 2007) • TCL VOCs by EPA Method 8260C (rev. 2006) • TCL SVOCs by EPA Method 8270D (rev. 2007) • TCL Pesticides by EPA Method 8081B (rev. 2000) • TCL PCBs by EPA Method 8082A (rev. 2000) Groundwater analytical methods: • TAL Metals (total and dissolved) by EPA Method 6000/7000 (rev. 2007) • TCL VOCs by EPA Method 8260C (rev. 2006) • TCL SVOCs by EPA Method 8270D (rev. 2007) • TCL Pesticides by EPA Method 8081B (rev. 2000) • TCL PCBs by EPA Method 8082A (rev. 2000) Soil vapor and ambient air analytical method: • VOCs by EPA Method TO-15

2.1.4 Geophysical Survey and Utility Mark-Outs

On February 18 and 26, 2014, a geophysical survey was conducted throughout the Site by Enviroprobe Service, Inc. (Enviroprobe) to clear the proposed boring locations for subsurface utilities and to locate other potential buried structures. The geophysical survey included both electromagnetic (EM) and ground penetrating radar (GPR) methods. All utility locations were marked out with spray paint prior to the commencement of drilling activities. An anomaly consistent with that of an underground storage tank (UST), measuring approximately 7 feet by 8.5 feet, was detected and delineated on Lot 35 at the rear of the Site building. In addition, field observations identified a vent pipe in the sidewalk adjacent to the Site building.

Utility mark-outs are required by law. The drilling contractors called Dig Safely New York at least three days prior to the start of intrusive work.

2.1.5 Remedial Investigation Findings

Soil, groundwater, and soil vapor analytical results are presented in Tables 1 through 9. Concentration maps showing compounds detected above applicable standards are illustrated on Figures 3 to 5.

Below is a summary of RI findings.

2.1.5.1. ***Soil:***

The VOCs m,p-xylene and o-xylene were detected in soil sample SB-13 (8-10) at concentrations of 583 and 386 parts per billion (ppb), respectively, which is above the respective Unrestricted Use Soil Cleanup Objectives (UUSCOs) of 260 ppb, but below their respective Restricted Residential Soil Cleanup Objectives (RRSCO) of 100,000 ppb. No VOCs were detected at concentrations exceeding RRSCOs. Seven polycyclic aromatic hydrocarbons (PAHs), benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene, were detected in one or more soil samples at concentrations above their respective UUSCOs. Additionally, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene were detected in at least seven soil samples at concentrations above their respective RRSCOs.

The PCB Aroclor 1248 was detected in soil samples SB-13 (0-2) and SB-13 (8-10) at concentrations of 910 ppb and 110 ppb, respectively, exceeding its UUSCO of 100 ppb of total PCBs per sample. Aroclor 1262 was detected at concentrations of 451 ppb and 485 ppb in soil samples SS-1 and SSB-1 (7-9) above the 100 ppb UUSCO for total PCBs, and at concentrations of 14,700 ppb and 3,030 ppb in two soil samples, above the 1,000 ppb RRSCO for total PCBs. The pesticides 4,4’-DDD, 4,4’-DDE, 4,4’-DDT, alpha-chlordane, dieldrin, endrin, gamma-BHC (lindane), and heptachlor were detected in up to 25 of the soil samples at concentrations exceeding their respective UUSCOs. Additionally, alpha-chlordane, 4,4’-DDE, and dieldrin were detected in five soil samples at concentrations exceeding their respective RRCCOs.Ten metals, including arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were detected above their respective UUSCOs in 28 soil samples analyzed. Of these metals, arsenic in one sample, barium in twelve samples, cadmium in two samples, copper in one sample, lead in six samples, and mercury in three samples, exceeded their respective RRSCOs.

2.1.5.2. ***Soil Vapor:***

Up to 31 VOCs were detected in the soil vapor samples. Methylene chloride was detected at a concentration of 77.5 micrograms per cubic meter (µg/m^3), above its Air Guideline Value (AGV) of 60 µg/m^3 established by the New York State Department of Health (NYSDOH). Carbon tetrachloride was also detected above its AGV of 5 µg/m^3, at a concentration of 8.2 µg/m^3 in soil vapor sample SV-1. Tetrachloroethylene (PCE) was detected at a concentration of 111 µg/m^3 in sample SSV-1, which is above its NYSDOH AGV of 30 µg/m^3. VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4- and 1,3,5-trimethylbenzene, cyclohexane, n-heptane, n-hexane, 4-ethyltoluene, and 2,2,4-trimethylpentane] were detected at concentrations up to 123,000 µg/m^3. Solvent-related VOCs [including styrene, PCE, and toluene] were detected at concentrations up to 871 µg/m$^{3.}$ Low level VOC concentrations were also noted in the ambient air sample.

2.1.5.3. Groundwater:

Chloroform was detected in groundwater sample MW-3 at a concentration of 9.5 micrograms per liter (µg/L), above its Ambient Water Quality Standard (AWQS) of 7 µg/L. It was noted that the VOCs bromodichloromethane and chloroform were detected at low levels below applicable AWQS in the aqueous field blank (not associated with Site groundwater). Fourteen metals were detected in the unfiltered groundwater samples (total metals analysis) and 10 metals were detected in the filtered groundwater samples (dissolved metals analysis). Four total metals (iron, magnesium, manganese, and sodium) and three dissolved metals (iron, magnesium, and sodium) were detected in at least one of the groundwater samples above their respective AWQS. The metals detected above their AWQSs in the total and dissolved groundwater samples are naturally occurring and are typical of groundwater quality in the Bronx.

The remedial investigations concluded that there is some contaminated soil and soil vapor present at the Site. The elevated xylenes seem to be associated with former fuel oil use at the Site. The SVOCs, PCBs, and metals present in the soil, and the VOCs in the soil vapor seem to be attributable to the historic use at the Site and subsequent demolition of the former structures. The elevated levels of pesticides indicate the prior usage of pesticides at the Site and possible storage in the cellar of the former structures.

2.2 Significant Threat

The NYSDEC and NYSDOH have not yet determined whether this Site poses a significant threat to human health and the environment. Notice of that determination will be provided for public review.

2.3 Site History

2.3.1 Past Uses and Ownership

Historic reports indicated that Lot 19 was developed historically with: an automobile garage from 1927 to 1940; a factory in 1945; freezer and oven mobile units in 1961; a metal works from at least 1969 to 1978; and Blasco Supply company from 2000 to 2005. Lot 25 was developed historically with an automobile garage in 1921 and a funeral home from at least 1927 to 1984. Lot 27 was developed historically with an undertaker and a multi-story residential building from at least 1969 to 1979. Lot 29 was developed historically with a beauty shop, a lawyers' office, a dentist, and a multi-story residential building from 1927 to 1971. Lot 35 was developed historically with the Elton Glass Works, Soenning Plumbing and Heating, and a butcher and glazer in 1927, and stores and a multi-story residential building in 1965. The other lots were developed historically as multi-story residences with cellars that likely contained petroleum storage tanks.

2.3.2 Phase I and Geotechnical Reports

Phase I Environmental Site Assessment, Melrose Commons Site C, Bronx, New York, Environmental Health Investigations, Inc., February 2011

The Phase I Environmental Site Assessment (ESA) identified several on-site and off-site conditions that may have affected the Site. The identified conditions included the historic usage of the Site as a factory, metal works, automobile garage, glass works, freezer and oven mobile unit warehouse, glazer, plumbing and heating store, undertaker, beauty shop, dentist, and as a funeral home. The use of oils and other petroleum-containing fluids, acids, solvents, formaldehyde, phenol, and methanol, and heavy metals are commonly associated with these historic uses. Suspect asbestos-containing materials (ACM), suspect lead-based paint (LBP), suspect mercury-containing fluorescent light bulbs, and suspect polychlorinated biphenyl (PCB)-containing fluorescent light ballasts were also identified in the building at Lot 19. The surrounding area was historically mixed-use and included: a gasoline station, auto repair facilities and a paint store south of the Site on East 161st Street; a dry cleaner west of the Site on East 161st Street; and a Brownfield Cleanup Program site south of the Site across East 161st Street.

The Phase I ESA also noted that, due to past residential development at the Site, there is a possibility that underground storage tanks (USTs) may exist at the Site. However, no information regarding the status of former or current petroleum storage tanks on the Site was included in the Phase I ESA.

Geotechnical Investigation, East 161st Street and Elton Avenue, Bronx, New York, Tectonic Engineering and Surveying Consultants, February 2014

Tectonic Engineering and Surveying Consultants (Tectonic) conducted a geotechnical engineering study of the Site. The investigation included the advancement of 46 test borings and probes (B-1 through B-46) and the excavation of 4 test pits (TP-1 through TP-4). Two observation wells were installed in borings B-20 and B-35. It is noted that one of the installed wells was dry. According to Tectonic’s report, uncontrolled fill was reported to depths ranging from 2 to 14 feet below grade, generally consisting of sand with varying amounts of silt and gravel. The fill was underlain by native soil typically encountered between 4 and 13 feet below grade, generally consisting of sand with varying amounts of silt and gravel with cobbles and boulders. In several borings and test pits, abundant brick, debris, and refuse were encountered at depths extending to bedrock. The top of bedrock (marble) was encountered at depths ranging from 7.5 to 23 feet below grade. Groundwater was observed within bedrock at elevations ranging from approximately 20.4 to 20.5 feet below grade.

2.3.3 Sanborn Maps

Historical maps were reviewed for indications of uses (or other evidence) suggesting hazardous materials generation, usage or disposal on or near the Site. Specifically, Sanborn Fire Insurance Maps from 1891, 1951, 1969, 1980, 1989, and 2001 were reviewed.

1891

The Site was developed with several unlabeled structures and a garage.

The surrounding area was developed with unlabeled one, two, and three-story structures and garages. The Harlem Railroad was shown east-adjacent to the Site. Vacant buildings and hay and grain storage were shown on the north-adjacent block. Stables and the 33rd Police Station Precinct were shown south of the Site.

1951

Lot 27 was developed with an undertaker on the first floor with apartments, stores, and an office. Lot 19 was developed with a warehouse. The remainder of the lots was developed with residential dwellings and apartments.

The Site block was developed with commercial and residential spaces, an automotive repair, and Embassy Ball Rooms. Floor Scraping Supplies with shellac mixing and a garage and automotive repair shop with two gasoline tanks were shown on the north-adjacent block. A printing store, a carpentry shop, and a bottling works with a gasoline tank were shown on the south-adjacent block. Land in the surrounding area was shown developed with commercial and residential properties, with some manufacturing, industrial, and automotive uses.

1969

Lot 19 was shown as a metal works and as a factory (delivery). The remainder of the Site remained similar to the 1951 map.

A filling station was shown south of the Site across East 161st Street. The remainder of the surrounding area remained similar to the 1951 map.

1980

Lot 19 was listed as a factory (delivery). Lots 25, 29, 30, and 31 were shown as undeveloped lots. The remainder of the Site remained similar to the 1969 map.

The filling station south of the Site shown on the 1969 map was no longer depicted. The remainder of the surrounding area remained similar to the 1969 map.

1989

Lot 19 remained similar to the 1980 map. A small unlabeled structure was shown on Lot 27 and the undertaker was no longer shown. Lots 33, 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street were shown as undeveloped lots.

The surrounding area remained similar to the 1980 map.

2001

The Site was shown in its current configuration. Lot 19 was developed with a factory (delivery) building. The remaining lots at the Site were shown as vacant land.

The surrounding area remained similar to the 1989 map.

To summarize, the Site was developed with several small structures by 1891. The existing building on Lot 19 was constructed between 1891 and 1951. Lot 27 was developed with an undertaker with an office and a store between 1951 and 1984. The remainder of the Site was developed with unspecified structures prior to 1981, and residential buildings between 1951 and 1969, which were demolished between 1984 and 1989; these lots remain vacant.

The surrounding area was developed with a mix of industrial, manufacturing, commercial, warehouse, residential, and automotive-related uses since the early 1900's, with fewer industrial uses and more commercial and residential uses in the late 20th and early 21st centuries. Nearby historical uses that may have affected subsurface conditions beneath the Site include automotive repair shops, gasoline filling stations, garages with gasoline USTs, and various manufacturing and industrial uses. Sanborn maps are enclosed as Appendix C.

2.4 Geological Conditions

Surface topography is generally level, except for a slight slope on the northeastern corner of the Site that descends towards East 162nd Street. Based on reports compiled by the U.S. Geological Survey (Central Park Quadrangle), the Site lies at an elevation of approximately 30 feet above the National Geodetic Vertical Datum of 1929 (an approximation of sea level).

Soil observed during the remedial investigations consisted primarily of sand with varying amounts of gravel and silt. Fill was observed in the soil borings from grade, up to six feet below grade and contained sand, gravel, glass, brick, and concrete. The fill was underlain by apparent native sand and gravel underlain by bedrock encountered between 9 and 17 feet below grade. Suspect contamination (e.g., PID readings, staining, and odors) was observed directly above bedrock in boring MW-3 from 16.5 to 17 feet below grade. Geologic sections are included in the Geotechnical Investigation Report, enclosed as Appendix D.

Groundwater was encountered within bedrock fractures between 14.72 and 17.15 feet below grade at the Site. Site-specific groundwater flow is generally to the northwest. Regional groundwater flow is generally to the south towards the Harlem River, located approximately 1.7 miles south of the Site. Groundwater in the Bronx is not used as a source of drinking water. A groundwater contour map is enclosed as Figure 6.

2.5 Contamination Conditions

The data compiled during RI and SRI were compared to the following standards, criteria, and guidance to determine the nature and extent of the contamination area associated with the Site:

- **Soil** –NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential SCOs (RRSCOs);
- **Groundwater –** Class GA (Drinking Water) AWQS; and
- **Soil Vapor –** NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

2.5.1 Conceptual Model of Site Contamination

The existing contamination at the Site appears to be related to the various historic uses that occurred throughout the Site over time. The contamination at the Site appears to be mostly in shallow soil with a few exceptions; petroleum contamination in deeper soil on Lot 29 and pesticide, PCB, and heavy metals contamination in soil within the floor drain on Lot 19 and in deeper soil in pockets throughout the Site. The petroleum contamination appears to be related to the former fuel oil use at the Site. The SVOCs and metals present and chemical-like odor observed in the soil, and the VOCs in the soil vapor seem to be attributable to the historic use at the Site and subsequent demolition of the former structures. The elevated levels of pesticides indicate the prior usage of pesticides at the Site and possible storage in the cellar of the former structures. Currently, the contaminants in the soil do not appear to be migrating and have not affected groundwater. However, when organic compounds are exposed to air, contamination can evaporate from the soil and migrate in a vapor phase through the pore spaces in unsaturated soil. The vapors can build up beneath structures such as pavement and building foundations. The affected media for the existing or potential releases at the Site includes soil and soil vapor.

2.5.2 Description of Areas of Concern

- Suspect USTs

An on-site geophysical investigation conducted on February 18 and 26, 2014 detected an anomaly on Lot 35 consistent with that of a petroleum storage tank, measuring approximately 7 feet by 8.5 feet at the rear of the Site building. In addition, a vent pipe was observed on the sidewalk north-adjacent to the building, indicating a petroleum storage tank may be present at the Site.

- Unrecorded Historic Spills

Petroleum-related compounds were detected in the soil and soil vapor, and PCE was detected in the soil vapor at the Site. In addition, slight petroleum odors and elevated PID readings were noted in soil on Lot 30, from 8 to 17 feet below grade during the remedial investigations. Based on the analytical results from the RI, surface or subsurface spills from the Site's historic usage may have occurred.

2.5.3 Identification of Standards, Criteria and Guidance

The following remedial standards, criteria, and guidelines (SCGs) apply to the project, and are the performance criteria used to determine if the RAOs have been met.

- Soil Vapor – The soil vapor analytical results were compared using NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- Soil – 6 NYCRR Part 375, Unrestricted Use and Restricted Use SCOs (December 2006); NYCRR Part 371 - Identification and Listing of Hazardous Wastes; 6 NYCRR Part 376 - Land Disposal Restrictions; and, NYCRR Part 360 - Solid Waste Management Facilities
- Groundwater – 6 NYCRR Parts 700-706 – Water Quality Standards (June 1998), and TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations

In addition, the following SCGs are applicable to the remedial program at the Site:

- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – May 2010
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004
- New York State Department of Health (NYSDOH) Generic CAMP
- DER-23 (January 2010)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)
- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied with in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the Site.

2.5.4 Soil/Fill Contamination

The RIR and SRIR documented that soil throughout the Site is contaminated with polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and heavy metals. In addition, there is some petroleum contaminated soil from approximately 8 to 17 feet below grade on Lot 29.

2.5.4.1. ***Summary of Soil/Fill Data***

The VOCs m,p-xylene and o-xylene were detected in soil sample SB-13 (8-10) at concentrations of 583 and 386 ppb, respectively, which is above the respective UUSCOs of 260 ppb, but below their respective RRSCO of 100,000 ppb. No VOCs were detected at concentrations exceeding RRSCOs. Seven polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene] were detected in one or more soil samples at concentrations above their respective UUSCOs. Additionally, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno[1,2,3-cd]pyrene were detected in at least seven soil samples at concentrations above their respective RRSCOs.

The PCB Aroclor 1248 was detected in soil samples SB-13 (0-2) and SB-13 (8-10) at concentrations of 910 ppb and 110 ppb, respectively, exceeding its UUSCO of 100 ppb of total PCBs per sample. Aroclor 1262 was detected at concentrations of 451 ppb and 485 ppb in two soil samples above the 100 ppb UUSCO for total PCBs, and at concentrations of 14,700 ppb and 3,030 ppb in two soil samples, above the 1,000 ppb RRSCO for total PCBs. The pesticides 4,4’-DDD, 4,4’-DDE, 4,4’-DDT, aldrin, alpha-chlordane, dieldrin, endrin, gamma-BHC (lindane), and heptachlor were detected in up to 25 of the soil samples at concentrations exceeding their respective UUSCOs. Additionally, alpha-chlordane, 4,4’-DDE, and dieldrin were detected in five soil samples at concentrations exceeding their respective RRCCOs.

Ten metals, including arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were detected above their respective UUSCOs in 28 soil samples analyzed. Of these metals, arsenic in one sample, barium in twelve samples, cadmium in two samples, copper in one sample, lead in six samples, and mercury in three samples, exceeded their respective RRSCOs.

2.5.4.2. Comparison of Soil/Fill with SCGs

The results of laboratory data presented in the RI indicate that soil is a media of concern. The following compounds of concern were detected above the 6NYCRR Part 375 Unrestricted Use SCOs (UUSCOs) in the on-site soil materials: m,p-xylene, o-xylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno[1,2,3-cd]pyrene, Aroclor 1248, Aroclor 1262, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, dieldrin, endrin, gamma-BHC (lindane), heptachlor, arsenic, barium, cadmium, copper, lead, mercury, nickel, silver and zinc.

Based on this comparison to regulatory criteria, two VOCs, seven SVOCs, two PCBs, eight pesticides, and nine heavy metals exceed the SCOs for unrestricted use under 6 NYCRR Part 375 – Table 6.8(a). These compounds appear to be linked to the historic uses of the Site. Tables 1 through 4 show exceedances of UUSCOs for all soil at the Site. Figure 3 is a concentration exceedance map that shows the location and summarizes exceedances from UUSCOs for all soil/fill.

2.5.5 On-Site Groundwater Contamination

2.5.5.1. Summary of Groundwater Data

No contamination other than naturally occurring metals (iron, magnesium, manganese, and sodium) is present in the groundwater.

2.5.5.2. Comparison of Groundwater with SCGs

Chloroform was detected in groundwater sample MW-3 at a concentration of 9.5 micrograms per liter (µg/L), above its AWQS of 7 µg/L. It was noted that the VOCs bromodichloromethane and chloroform were detected at low levels below applicable AWQS in the aqueous field blank (not associated with Site groundwater); therefore, this is not an indication of Site contamination. Fourteen metals were detected in the unfiltered groundwater samples (total metals analysis) and ten metals were detected in the filtered groundwater samples (dissolved metals analysis). Four total metals (iron, magnesium, manganese, and sodium) and three dissolved metals (iron, magnesium, and sodium) were detected in at least one of the groundwater samples above their respective AWQS. The metals detected above their AWQSs in the total and dissolved groundwater samples are naturally occurring and are typical of groundwater quality in the Bronx. A table that indicates exceedances from GA groundwater standards in monitor wells prior to the remedy is shown in Tables 5-8. A concentration exceedance map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in Figure 4.

2.5.6 On-Site Soil Vapor Contamination

The results indicate petroleum-related VOCs and chlorinated solvents exist in the subsurface soil vapor and are linked to the Site’s former petroleum and industrial uses.

2.5.6.1. Comparison of Soil Vapor with SCGs

Up to 31 VOCs were detected in the soil vapor samples. Methylene chloride was detected at a concentration of 77.5 µg/m^3, above its AGV of 60 µg/m^3 established by NYSDOH. Carbon tetrachloride was also detected above its AGV of 5 µg/m^3, at a concentration of 8.2 µg/m^3 in soil vapor sample SV-1. PCE was detected at a concentration of 111 µg/m^3 in sample SSV-1, which is above its NYSDOH AGV of 30 µg/m^3. VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4- and 1,3,5-trimethylbenzene, cyclohexane, n-heptane, n-hexane, 4-ethyltoluene, and 2,2,4-trimethylpentane] were detected at concentrations up to 123,000 µg/m3. Solvent-related VOCs [including styrene, tetrachloroethylene (PCE), and toluene] were detected at concentrations up to 871 µg/m^3.

A table of soil vapor data collected prior to the remedy is shown in Table 9. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in Figure 5.

2.6 Environmental and Public Health Assessments

2.6.1 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

The RI and SRI as described in the RIR and SRIR are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA). The QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site’s exposed or potentially exposed population. The sampling data from the RI and supplemental RI were evaluated to determine whether there is any health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

2.7 Contaminants of Concern in Respective Media

Based on the results of the RI and SRI, the contaminants of concern are:

Soil:

- The VOCs m,p-Xylene and o-Xylene were detected above their respective UUSCOs.
- The SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected above their respective UUSCOs and/or RRSCOs.
- The metals arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc were detected above their respective UUSCOs and/or RRSCOs.
- PCB Aroclor 1262 was detected above the UUSCO and RRSCO for total PCBs.
- The pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, alpha-Chlordane, dieldrin, endrin, gamma-BHC (Lindane), and heptachlor were detected above their respective UUSCOs and/or RRSCOs.

Groundwater:

- The VOC chloroform was detected in groundwater above AWQS.
- Total metals, including iron, manganese, magnesium, and sodium and dissolved metals, including iron, magnesium, and sodium, exceeded AWQS.

Soil Vapor:

- The VOCs carbon tetrachloride, methylene chloride, and tetrachloroethylene (PCE) were detected above their respective AGVs.
- VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4- and 1,3,5-trimethylbenzene, ethanol, ethylbenzene, heptane, hexane, m,p-xylene, and o-xylene,] were detected at concentrations up to 123,000 µg/m^3 and solvent-related VOCs (including styrene, PCE, and toluene) were detected at concentrations up to 871 µg/m^3.

2.8 Potential Routes of Exposure

The five elements of an exposure pathway are:

1. The source of contamination;
2. The environmental media and transport mechanisms;
3. The point of exposure;
4. The route of exposure; and
5. The receptor population.

These elements of an exposure pathway may be based on past, present, or future events. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future.

2.9 Exposure Route

An exposure route is the mechanism by which a receptor comes into contact with a chemical. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, soil, or building materials.

2.10 Potential Receptors

The Site is currently occupied by a vacant warehouse building and vacant lots. The area immediately surrounding the Site is predominantly residential, commercial, and industrial in nature. The proposed future use of the Site is residential with retail use. The land use in the surrounding area is anticipated to remain residential/commercial since several new residential/commercial projects are under construction in the neighborhood.

On-Site Receptors: As the Site is currently vacant and the on-site building is not occupied, the only on-site potential sensitive receptors are trespassers.

During redevelopment of the Site, the on-site potential sensitive receptors will include construction workers and inspectors. Once the Site is redeveloped, the on-site potential sensitive receptors will include: adult and child residents, maintenance staff, and commercial workers.

Off-Site Receptors: Potential off-site receptors within a 0.25-mile radius of the Site include: adult and child residents, commercial and construction workers, students, pedestrians, trespassers, and cyclists, based on the following:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

2.11 Existence of Human Health Exposure Pathways

This evaluation consists of the following components: contaminant source; contaminant release and transport mechanism; point of exposure; route of exposure; and receptor population.

On-Site Existing Conditions: Although the Site is fenced and locked, there is a potential exposure pathway from surface soil/fill to trespassers.

Off-Site Existing Conditions: There is an existing potential exposure pathway from VOCs in soil gas to enter into the adjoining buildings as a result of any basement floor or lower wall openings/cracks. The indoor air quality at the adjoining properties may be susceptible to contamination from subsurface vapor intrusion attributable to VOCs emitted from the Site. The potential receptors from such a migration pathway into the building would be to off-site construction and commercial workers, and adult and child residents. The primary route of exposure would be inhalation. There is also a potential exposure pathway from any dust emanating from the Site to off-site pedestrians, visitors, cyclists, and adult and child residents.

On-Site Future Conditions: Once redevelopment activities begin, there will be a potential exposure pathway from construction workers coming into direct contact with surface and subsurface soils as a result of construction and excavation activities. In addition, on-site construction workers potentially could ingest or inhale dust from any exposed impacted soil and fill. Similarly, off-site receptors could be exposed to dust and vapors from on-site activities.

Once the redevelopment of the Site has been completed (assuming no remediation) there will be a potential exposure pathway to adult and child residents, maintenance staff, and commercial workers from the inhalation of any potential off-gassing of VOC vapors from the subsurface. The VOC vapors could migrate from residual compounds in the soil and/or groundwater and enter the building through any cracks or openings in the foundation. There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of surface soil/fill in any landscaped or non-capped areas by adult and child residents, visitors, and trespassers.

Off-Site Future Conditions: There is a potential exposure pathway from soil gas emanating from the subsurface to enter into the adjoining buildings as a result of any basement floor or lower wall openings/cracks. The indoor air quality at the adjoining properties would be susceptible to contamination from subsurface vapor intrusion. Off-site commercial workers and adult or child residents could potentially inhale these vapors. There will also be a potential exposure pathway from any dust emanating from the Site to off-site pedestrians, visitors, cyclists, and adult and child residents.

2.12 Overall Human Health Exposure Assessment

Exposure pathways for the current Site condition include ingestion and/or dermal contact with exposed soil/fill at the Site to trespassers; inhalation from dust emanating from the Site to trespassers and off-site pedestrians, visitors, cyclists, and adult and child residents; and from inhalation of VOCs from soil gas emanating from the Site entering into the adjoining buildings by off-site construction and commercial workers, and adult and child residents. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface soil/fill to construction workers as these workers could potentially ingest, inhale or have dermal contact with any exposed impacted fill or soil. Without remediation, once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the subsurface to adult and child residents, maintenance staff, visitors, and commercial workers through cracks or openings in the foundations of the new building and surrounding buildings. There will also be a potential exposure pathway from dermal contact, inhalation, or ingestion of surface soil in any landscaped or non-capped areas by adult and child residents, visitors, and trespassers. In addition, there will be a potential exposure pathway from any dust emanating from the Site to off-site pedestrians, visitors, cyclists, and adult and child residents. Implementation of the Remedial Actions outlined in this RAWP will prevent the potential exposure pathways from becoming complete.

2.13 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.13.1 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

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

2.13.2 Soil Vapor

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

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 Evaluation of Remedial Alternatives

This section includes a review of remediation alternatives that were considered for the remedy phase of the BCP. The purpose of completing the alternatives analysis is to identify, evaluate and select a remedy to address the contamination identified by the RIR and SRIR. The RAOs for soil include source removal to prevent the potential for exposure and contaminant migration. The RAOs for soil vapor include preventing soil vapor from entering the proposed new Site building. The following performance measures were used to complete the evaluation of remedial alternatives:

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidelines (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

The following remedial standards, criteria, and guidelines (SCGs) apply to the project, and are the performance criteria used to determine if the RAOs have been met.

- Soil Vapor – The soil vapor analytical results were compared using NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- Soil – 6 NYCRR Part 375, Track 1 Unrestricted Use SCOs and Restricted Use SCOs (December 2006); NYCRR Part 371 - Identification and Listing of Hazardous Wastes; 6 NYCRR Part 376 - Land Disposal Restrictions; and, NYCRR Part 360 - Solid Waste Management Facilities
- Groundwater – 6 NYCRR Parts 700-706 – Water Quality Standards (June 1998), and TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations

In addition, the following SCGs are applicable to the remedial program at the Site:

- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – May 2010
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004
- New York State Department of Health (NYSDOH) Generic CAMP
- DER-23 (January 2010)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)
- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied with in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the Site.

3.2 Remedial Alternative 1 – No Further Action

This alternative consists of allowing the Site to remain in its current condition. No remedial activities would occur under this Remedy.

1. Protection of human health and the environment – not satisfied as the potential for exposure to contaminated soil, and the potential for vapor intrusion would still exist.
2. Compliance with standards, criteria, and guidelines (SCGs) – not satisfied as contaminants would remain in soil at concentrations that exceed NYSDEC Part 375 SCOs.
3. Short-term effectiveness and impacts – not satisfied as there would be no measures in place to protect workers or the surrounding community from exposure to the existing contaminated soil.
4. Long-term effectiveness and permanence – not satisfied as potential exposure pathways identified in the QHHEA would remain.
5. Reduction of toxicity, mobility, or volume of contaminated material – not satisfied as exposure pathways identified in the QHHEA would remain.
6. Implementability – very feasible as no personnel or regulatory approvals would be needed, and natural attenuation would be the only remedial plan utilized.
7. Cost effectiveness – very cost effective to proceed with no further action, but this criterion is not satisfied as it requires a comparison of cost to long/short term effectiveness and toxicity reduction, which would not be achieved.
8. Community acceptance – not satisfied because the potential exposure pathways identified in the QHHEA as well as the contamination would remain.
9. Land use – not satisfied as the Site is considered to be an unattractive blight on the community in its current condition. The Melrose Commons Urban Renewal Plan calls for the Site to be redeveloped into a multi-story affordable housing building with retail space. As this alternative will allow the contamination and potential exposure pathways identified in the QHHEA to remain, the Site would remain in a vacant and unsuitable condition since redevelopment would most likely not occur.

3.3 Remedial Alternative 2 – Track 1 (UUSCOs)

This alternative would include removal and/or treatment of all contaminated soil and soil vapor to comply with UUSCOs. This would include, but is not limited to, demolition of the existing building, excavation of all material Site-wide above bedrock including any petroleum storage tanks, fill ports, and vent lines.

1. Protection of human health and the environment – satisfied as it would achieve the RAOs.
2. Compliance with standards, criteria, and guidelines (SCGs) – satisfied as all contamination would be removed and all RAOs would be achieved.
3. Short-term effectiveness and impacts – effective in reducing soil contamination in the short-term as all contaminated soil will be removed from the Site. There is, however, a risk of short-term impacts to Site workers and the community as the process of excavating contaminated soil may cause the release of dust and organic vapors. This risk can be controlled by employing health and safety procedures during remediation and construction.

4. Long-term effectiveness and permanence – satisfied as potential exposure pathways identified in the QHHEA would no longer remain and RAOs would be achieved.
5. Reduction of toxicity, mobility, or volume of contaminated material – As all of the contaminated soil at the Site would be removed; the toxicity, mobility, and the volume of contaminants would be greatly reduced.
6. Implementability – complicated, but implementable. This alternative will require excavation of the entire Site down to bedrock, which is significantly beyond the anticipated foundation depth of the proposed structure. In addition, underpinning of the adjacent structure along East 162nd Street will be likely needed.
7. Cost effectiveness – least cost-effective as it will require extensive excavation, significantly beyond the anticipated foundation depth of the proposed structure, down to bedrock. In addition, significant volumes of clean fill or aggregate would need to be imported to bring the Site elevation up to development depth.

As bedrock is approximately 9 to 17 feet below grade, based on the dimensions of the Site, in order to achieve Track 1, approximately 25,000 cubic yards of soil would need to be excavated from the Site for off-site disposal. Using a conversion factor of 1.5, this equals approximately 37,500 tons. The market rate for the transportation and disposal of non-hazardous, regulated soil ranges from $40-$70 per ton. Using this range, the soil disposal for this amount of contaminated soil would be on the order of $1,500,000 – $2,625,000. As the elevation of the foundation of the proposed new building ranges from 0 to 12 feet, approximately 17,000 cubic yards of clean fill will then need to be imported. Using a market rate of $15 per cubic yard, this equals $255,000. The market rate for removing one petroleum storage tank and a vent line is $8,000.

Inspection, testing, oversight, and reporting associated with this alternative are estimated at a rate of 10% of total costs ($2,888,000) or approximately $288,800. In order to perform an excavation of this magnitude, excessive shoring, sheeting, and underpinning would have to be performed for the adjacent building and existing roadways for an estimated cost of $200,000. The cost for this alternative was estimated by combining these figures for an approximate total of $3,376,800. This assumes the remedial work will be performed concurrent with the planned redevelopment of the Site.

1. Community acceptance – satisfied, as this alternative would result in the cleanup of the Site for unrestricted use, which would allow for redevelopment of the Site in accordance with the Melrose Commons Urban Renewal Plan.
2. Land use – satisfied, as this alternative would result in the cleanup of the Site for unrestricted use, which would allow for redevelopment of the Site in accordance with the Melrose Commons Urban Renewal Plan.

3.4 Remedial Alternative 3 – Track 4 (Site-Specific Soil Cleanup Objectives)

Alternative 3 involves excavation and off-site disposal of soil above Site-Specific Soil Cleanup Objectives (SSSCOs) including the top two feet Site-wide, removal of any petroleum storage tanks and associated fill port and vent pipes where encountered, collection of end-point samples, installation of an engineered composite cover system including a two-foot clean fill buffer over all landscaped/non-covered areas, and a vapor barrier and sub-slab depressurization system (SSDS). A BCP Track 4 cleanup allows for institutional and engineering controls to be implemented for long-term management of the Site and to prevent future exposure to any residual contamination. As such, an environmental easement would be recorded for the Site to implement the controls and a Site Management Plan (SMP) would be prepared to specify maintenance of the Site cover, future soil handling requirements, operation and maintenance procedures, and land use restrictions. Periodic inspection and reporting would be required to verify that the restrictions and requirements included in the easement remain in place and effective. The SSSCOs are enclosed as Table 10.

1. Protection of human health and the environment – satisfied as all soil above SSSCOs including the top two feet site-wide would be excavated and removed from the Site, a composite cover system including a two-foot clean fill buffer with a demarcation barrier would be installed over all landscaped/non-capped areas to prevent any residents from exposure to contaminated materials. A vapor barrier and SSDS would be incorporated into the proposed structure to prevent volatile vapors from entering and accumulating within the new structure. Any petroleum storage tanks and vent lines/fill ports encountered will also be removed.
2. Compliance with standards, criteria, and guidelines – satisfied as RAOs would be achieved by removing the potential for human and environmental exposures to chemical constituents above SSSCOs.
3. Short-term effectiveness and impacts – satisfied, as this alternative would be effective in reducing soil contaminant levels in the short term since soil exceeding SSSCOs as well as any petroleum storage tanks, fill ports, and vent lines encountered will be removed from the Site. Mitigation measures included in the RAWP, including the HASP and CAMP, would protect and limit exposure of workers and the surrounding community to contaminated soil, dust, and/or soil vapors during soil removal.
4. Long-term effectiveness and permanence – satisfied, as removal of soil above SSSCOs with implementation of engineering and institutional controls would limit exposure of future occupants to contaminated soil and/or vapors, thus achieving the RAOs.
5. Reduction of toxicity, mobility, or volume of contaminated material – satisfied, as approximately 2,300 cubic yards (3,450 tons) of soil for remedial excavation and a total of 8,000 cubic yards (12,000 tons) of soil for remedial excavation and foundation construction would be removed; the volume of contaminants would be greatly reduced. The residual contaminated soil will be covered by the composite cover system/two feet of clean fill buffer, thereby reducing the mobility of contaminants in the soil. In addition, the remedial actions will greatly reduce the source contributing to soil vapor. Incorporation of a vapor barrier and an SSDS into the proposed structure will reduce its mobility with respect to migrating into the structure.
6. Implementability – satisfied, as contaminated soil removal can be completed in a short timeframe and the equipment and personnel needed to perform the proposed remedial actions are readily available. The materials needed to construct the proposed vapor barrier in accordance with ASTM standards are available. The SSDS will be constructed of readily available PVC and cast iron or another approved pipe. The majority of the soil to be excavated and disposed of off-site is expected to be

classified as non-hazardous, regulated soil. Landfill/beneficial re-use space for these types of materials is readily available.

7. Cost effectiveness – satisfied, as this alternative is the most cost effective. Under this alternative, approximately 12,000 tons of soil will be excavated and disposed of off-site. The market rate for the transportation and disposal of non-hazardous, regulated soil ranges from $40 to $70 per ton. Using this range, the soil disposal for this project would be on the order of $480,000 – $840,000. Approximately 2,000 cubic yards of clean fill will need to be imported to install the two-foot clean fill buffer proposed for the Site. Using a market rate of $15 per cubic yard, this equals $30,000. The market rate for removing one petroleum storage tank and a vent line is $8,000. The market rate for purchase and installation of a vapor barrier is approximately $2-3 per square foot. The estimated cost of the vapor barrier is therefore $70,000. The market rate for installation of an SSDS for the proposed Site buildings is $50,000. Inspection, testing and reporting associated with this work was estimated at a rate of 10% of total costs or approximately $99,800. The cost for this alternative was estimated by combining these figures for an approximate total of $1,097,800. This assumes the work will be performed concurrent with the planned Site redevelopment.
8. Community acceptance – satisfied, as this alternative would result in the cleanup of the Site while allowing for its redevelopment in accordance with the Melrose Commons Urban Renewal Plan.
9. Land use – satisfied, as this alternative would result in the cleanup of the Site while allowing for its redevelopment in accordance with the Melrose Commons Urban Renewal Plan.

3.5 Selection of the Preferred Remedy

3.5.1 Selection of the Preferred Alternative

Remedial Alternative 1 (no action) allows the Site to remain in its current condition. This remedial alternative was reviewed and found to be unacceptable since it would not achieve the RAOs. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 2 (Track 1) was also reviewed and found to be unacceptable. While this remedial alternative would achieve the RAOs, it is not cost-effective from a redevelopment standpoint. The cost to remove all soil down to bedrock would make the redevelopment of the Site into an affordable housing building economically unfeasible. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 3 (Track 4) is the only remedial alternative that achieves the RAOs while being cost-effective. After careful consideration with respect to the evaluation criteria listed, Remedial Alternative 3 is determined to be the preferred remedy since it adequately addresses the subsurface contamination with the most cost-effective approach.

3.5.2 Zoning

The proposed redevelopment complies with the current zoning for this Site.

3.5.3 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed redevelopment plan matches well with other recent developments in the area, which include residential and commercial properties, and will meet all of the goals of the Melrose Commons Urban Renewal Plan.

3.5.4 Surrounding Property Uses

The proposed redevelopment matches well with other recent developments in the area, which include residential and commercial properties. Other land uses in the area include multi-story residences and commercial properties.

3.5.5 Citizen Participation

A Citizen Participation Plan (CPP) has been developed for this Site. See section 4.1.8 for more details on the CPP.

3.5.6 Environmental Justice Concerns

The proposed redevelopment plan will resolve concerns in connection with the Site’s current blighted condition and any presence of on-site transients, while providing affordable housing, community resources, and open space. Currently, there are no known Environmental Justice Concerns at the Site.

3.5.7 Land Use Designations

The proposed redevelopment plan complies with the current land use designation for this Site.

3.5.8 Population Growth Patterns

The population of the City of New York is expected to increase in the future. This project will help provide necessary affordable housing units to meet that need.

3.5.9 Accessibility to Existing Infrastructure

The Site is located within close proximity to NYC subway and bus lines. The area is also supplied with municipal sewers and water, electric, telephone, natural gas, and fiber-optic lines.

3.5.10 Proximity to Cultural Resources

The Site is in close proximity to many cultural resources including Yankee Stadium, the Bronx Zoo, and the Bronx Botanical Gardens, as well as many museums and theaters in Manhattan that are easily accessed via public transportation.

3.5.11 Proximity to Natural Resources

The Site is located in the area of the South Bronx that does not contain a significant source of natural resources. However, natural resources such as parks and the waterfront are easily accessible from the Site via public transportation.

3.5.12 Off-Site Groundwater Impacts

The Applicant for this project entered into the BCP as a Volunteer. As such, the RI and SRI were limited to on-site. Based on the collection of on-site groundwater data, off-site groundwater impacts are not anticipated.

3.5.13 Proximity to Floodplains

The Site is not located within a floodplain.

3.5.14 Geography and Geology of the Site

Surface topography is generally level, except for a slight slope on the northeastern corner of the Site that descends towards East 162nd Street. Based on reports compiled by the U.S. Geological Survey (Central Park Quadrangle), the Site lies at an elevation of approximately 30 feet above the National Geodetic Vertical Datum of 1929 (an approximation of sea level).

Soil observed during the investigation consisted primarily of sand with varying amounts of gravel and silt. Fill was observed in the soil borings from grade, up to six feet below grade and contained sand, gravel, glass, brick, and concrete. The fill was underlain by apparent native sand and gravel underlain by bedrock encountered between 9 and 17 feet below grade.

3.5.15 Current Institutional Controls

Currently, there are no known institutional controls on the Site.

3.6 Summary of Selected Remedial Actions

- Excavation of soil/fill exceeding Track 4 SSSCOs listed in Table 10 plus additional soil as needed to install the foundation for the new building proposed for the Site. The anticipated limits of the proposed soil excavation are shown on Figure 7.
- Removal of any petroleum storage tanks, fill ports, and vents and any associated grossly contaminated soil, if encountered, in accordance with applicable regulations.
- Construction and maintenance of an engineered composite cover consisting of (1) a minimum two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas; and (2) concrete building foundations, sidewalks/pathways, and asphalt roadways to prevent human exposure to residual contaminated soil/fill remaining under the Site.
- Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site.
- Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting.
- Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work.

- Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of SSSCOs;
- Appropriate off-site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal. A waste disposal facility(s) will be selected based on the data that has been collected to date. Based on the requirements of the selected facility(s), additional soil waste characterization samples will be collected and analyzed as needed to obtain an approval for soil disposal.
- Import of materials to be used for backfill and cover in compliance with: (1) the soil cleanup objectives outlined in 6 NYCRR Part 375-6.7(d); and (2) all Federal, State and local rules and regulations for handling and transport of material.
- A vapor barrier and SSDS will be incorporated into the foundation of the new building as illustrated on Figure 9. The vapor barrier specifications are enclosed as Appendix E.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.
- Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP and the Department-issued Decision Document. All deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

4.1.1 Site-Specific Health & Safety Plan (HASP)

A Site-specific HASP and CAMP have been prepared for the Site and are enclosed as Appendix F. All remedial work performed under this plan will be in compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA. Community air monitoring will be conducted during all intrusive Site activities in compliance with the NYSDOH Generic CAMP.

Work zone monitoring will be performed for the health and safety of workers in accordance with action levels and guidance outlined in the HASP. Community air monitoring will be performed at the perimeter of the Site during soil remediation and any tank removal activities. Community air monitoring will be performed periodically (at a minimum once per hour) on a roving basis based upon wind direction and the location of the intrusive work.

The HASP, CAMP, and requirements defined in this RAWP pertain to all remediation work performed at the Site until the issuance of a Certificate of Completion (COC). The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The Site Safety Coordinator will be Amy Jordan. A resume will be provided to NYSDEC prior to the start of remedial construction. Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

Any sampling associated with this project will be conducted in accordance with the Quality Assurance Project Plan (QAPP) included in Appendix G, which details field screening and sampling methodologies, and sample submittal and reporting requirements. The QAPP includes the project team responsible for implementing the remediation requirements and provisions set forth in this RAWP.

4.1.3 Construction Quality Assurance Plan (CQAP)

The CQAP will provide a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedial construction is in conformance with the remediation objectives and specifications. The following procedures will be employed:

- A Qualified Environmental Professional (QEP) under the direct supervision of the Remedial Engineer (RE) will be on-site during remedial action to monitor particulates and organic vapor in accordance with the CAMP. Any exceedances will be reported to the NYSDEC and NYSDOH in the daily reports.
- A QEP will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The QEP will document all remedial activities in the daily report. This document will be forwarded to the Field Supervisor on a daily basis and to the PM and the RE on a weekly basis.
- A QEP will screen the excavation with a PID during intrusive activities. All readings will be noted in the record. Elevated readings will be reported to the NYSDEC and NYSDOH in the daily reports.
- A QEP will collect the excavation endpoint samples in accordance with the Plan.
- The RE or his designee will be on-site during the installation of the SSDS piping and the vapor barrier to ensure proper installation.
- After the SSDS piping, vapor barrier, and concrete slab have been installed, the RE will supervise the performance of an on-site pilot test to confirm coverage and to select the correct make and model for the SSDS blower.

After the fans are installed, the RE will supervise the performance of a start-up test to confirm the system is working properly and to make any necessary adjustments.

4.1.4 Soil/Materials Management Plan (SoMP)

A Soil/Materials Management Plan (SoMP) is included in Section 5.4 of this document. The SoMP includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal. It also includes all of the procedures that will be applied to assure effective, nuisance-free performance in compliance with all applicable Federal, State, and local laws and regulations.

4.1.5 Stormwater Pollution Prevention Plan (SWPPP)

A Site-specific Stormwater Pollution Prevention Plan (SWPPP) that conforms to the requirements of NYSDEC Division of Water guidelines and New York State regulations will be prepared prior to the start of the remedial action.

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Erosion and sediment control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance, equipment decontamination, drainage inlet protection, and dust suppression. The RE, or his or her representative, will conduct routine inspections, any repairs and/or maintenance of control measures will be completed in a timely fashion to maintain the controls in proper working order. All vehicles leaving the project Site will be inspected to ensure that no soil adheres to the wheels or undercarriage of the vehicle leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

4.1.6 Community Air Monitoring Plan (CAMP)

The CAMP was prepared as part of the Site-specific HASP, which is enclosed as Appendix F.

4.1.7 Contractors Site Operations Plan (SOP);

The RE has reviewed all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirms that they are in compliance with this RAWP. The RE is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Citizen Participation Plan

A Project Fact Sheet describing the approved plan for remedial action will be forwarded to persons on the Project contact list in accordance with the NYSDEC and NYSDOH-approved CPP dated January 2015.

A certification of mailing to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The following local document repository has been established for this Site and contains all applicable project documents:

Melrose Library
910 Morris Avenue (at E. 162nd St.)
Bronx, NY 10451
(718) 588-0110

Hours:

Sunday: Closed

Monday: 10:00am – 7:00pm

Tuesday: 10:00am – 6:00pm

Wednesday: 10:00am – 7:00pm

Thursday: 10:00am – 6:00pm

Friday: 10:00am – 5:00pm

Saturday: 10:00am – 5:00pm

The approved CPP for this project is attached in Appendix H.

5.0 GENERAL REMEDIAL CONSTRUCTION INFORMATION

5.1 Project Organization

Personnel responsible for implementation of the RAWP are included on the organization chart enclosed as Figure 10. Resumes of key personnel involved in the Remedial Action are included in Appendix I.

5.1.1 Remedial Engineer (RE)

The RE for this project will be Michelle Lapin, P.E. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the Elton Crossing/Melrose Site C- Family Site (NYSDEC BCA Index No. C203073-11-14, Site No. C23073). The RE will certify in the Final Engineering Report that the remedial activities were observed by QEPs under her supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other RE certification requirements are listed later in this RAWP.

The RE will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the Final Engineering Report.

The RE will provide the certifications listed in Section 10.1 in the Final Engineering Report.

5.1.2 Remedial Action Construction Schedule

The following estimated schedule has been prepared for the project:

Activity	Anticipated Completion Date
Submit RAWP	May 2015
Complete 45-Day Comment Period	June 25, 2015
RAWP Approved	June 26, 2015
Real Estate/Construction Closing	June 29, 2015
Begin Implementing RAWP	July 1, 2015
Submit Draft SMP	May 2016
Execution of Easement	July 2016
Submit Draft Final Engineering Report	August 2016
Receive Certificate of Completion	December 2016

The actual schedule may differ depending on such factors as contractor availability, Site constraints, complexity of data collected, and access coordination. The NYSDEC Project Manager will be notified of significant changes to the schedule.

5.1.3 Work Hours

The hours for operation of remedial construction will conform to all applicable code requirements, including the New York City Building Department and any variances that they may issue. The NYSDEC will be notified by the Volunteer of any variances issued by the Building Department. NYSDEC reserves the right to deny alternate remedial construction hours.

5.1.4 Site Security and Traffic Control

The Site will be completely closed from public access by using secured construction fencing. No unauthorized personnel will be able to access the Site. During off hours, the action portions of the Site will be completely enclosed within a locked gate, if necessary. It is not anticipated that traffic will be disrupted beyond normal contractor vehicle traffic going to and from the Site during construction. Any sidewalk closures that are required during the course of construction/remediation activities will be conducted in accordance with New York City Department of Transportation Permits.

5.1.5 Contingency Plan

A contingency plan has been developed to describe the procedures to be followed upon discovery of an unknown source of contamination or AOC that may require remediation (USTs, stained soil, drums, etc.). The identification of an unknown source structure or unexpected contaminated media discovered by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic reports. If USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soil, etc. Chemical analytical work will be for full scan parameters (TAL metals, TCL volatiles and semi-volatiles, TCL pesticides, and PCBs). These analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval. Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's PM. These findings will be also included in daily and periodic electronic reports.

5.1.6 Worker Training and Monitoring

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All construction personnel upon entering the Site must attend a brief training meeting, its purpose being to:

- Make workers aware of the potential hazards they may encounter;
- Instruct workers on how to identify potential hazards;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;

- Make workers aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Construction personnel will be responsible for identifying potential hazards in the work zone. The project manager will be responsible for insuring that the training is conducted. Others who enter the Site must be accompanied by a suitably-trained construction worker.

5.1.7 Agency Approvals

The Volunteer has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the Site as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional, and national governmental permits, certificates, or other approvals or authorizations required to perform the remedial and development work is attached in Table 11. This list includes a citation of the law, statute, or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Engineering Report.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

5.1.8 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

5.1.9 Pre-Construction Meeting with NYSDEC

A pre-construction meeting with the NYSDEC will be scheduled prior to the start of major construction activities.

5.1.10 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the Site-Specific HASP provided in Appendix F. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

5.1.11 Remedial Action Costs

The total estimated cost of the Remedial Action is $1,097,800. An itemized and detailed summary of estimated costs for all remedial activities will be submitted as an Appendix to the Final Engineering Report (FER).

5.2 Site Preparation

Prior to conducting any intrusive activities for Site remediation activities, the work zone(s), designated entry points, soil stockpile staging areas, decontamination zones, and truck routes will be established, as applicable. The Site plan will be updated as necessary to reflect any changes in operations during the course of the intrusive work. Dust control measures, if necessary, will be implemented. Additional details of Site preparation activities are provided in the following sections.

5.2.1 Mobilization

Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking excavation areas will be performed prior to undertaking any Site remediation activities.

5.2.2 Erosion and Sedimentation Controls

Erosion and sediment control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state and local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance, equipment decontamination, drainage inlet protection, and dust suppression. The RE, or his or her representative, will conduct routine inspections, any repairs and/or maintenance of control measures will be completed in a timely fashion to maintain the controls in proper working order. All vehicles leaving the project Site will be inspected to ensure that no soil adheres to the wheels or undercarriage of the vehicle leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

5.2.3 Stabilized Construction Entrance(s)

A crushed stone path will be constructed at all truck entrances for the Site. All trucks will drive over this path prior to leaving so that they do not get recontaminated prior to departure from the Site. A laborer with a hose connected to a NYC fire hydrant will check the trucks as they leave. The hose will be used to wash off soil from the truck tires and body as it leaves the Site.

5.2.4 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain any local, State, or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the RE. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

5.2.5 Sheeting and Shoring

Appropriate management of structural stability of on-site or off-site structures during on-site activities include excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Volunteer and its contractors must obtain any local, State, or Federal permits or approvals that may be required to perform work under this Plan. Further, the Volunteer and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

5.2.6 Equipment and Material Staging

Staging and storage of equipment and materials will be contained within the secured Site. By the nature of the work involved in this project, equipment and materials will be moved to different areas within the secured Site as work progresses.

5.2.7 Decontamination Area

A decontamination area will be established adjacent to the work areas. The floor of the decontamination area will be covered with 6-mil plastic sheeting as necessary and bermed to prevent spreading of decontamination fluids or potential discharge to the ground surface.

All equipment in direct contact with known or potentially contaminated material will be either dedicated or decontaminated prior to handling less contaminated material or removal from the Site. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with federal, state and local regulations. Personnel performing this task will wear the proper personal protective equipment (PPE) as prescribed in the HASP.

5.2.8 Site Fencing

The Site will be secured with a locking fence that will be placed around the entire perimeter. During all remedial activities access to the Site will be limited and all persons entering the Site will be required to sign a log book and meet all applicable health and safety requirements. The Site will be secured during non-working hours. If necessary, security patrols will be implemented during non-working hours.

5.2.9 Demobilization

Restoration of the excavation work will include backfilling and general site earthwork to prepare for construction of the foundation elements and parking area. Upon completion of the remedial excavation work, any waste materials (i.e., plastic sheet, absorbent pads) and the decontamination pad will be removed from the Site for proper disposal.

5.3 Reporting

All daily and monthly Reports will be included in the Final Engineering Report.

5.3.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Figure 11.

The NYSDEC-assigned project number will appear on all reports.

5.3.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

5.3.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the Final Engineering Report.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

5.3.4 Complaint Management Plan

A log of all complaints from the public regarding nuisance or other Site conditions will be compiled by the Project Director. All complaints will be reported in the Daily Reports.

5.3.5 Deviations from the Remedial Action Work Plan

All deviations from the RAWP will require prior approval from NYSDEC. These deviations will be recorded in both the monthly progress reports and in the FER. At a minimum, the report of the deviation will include the following:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP; and
- Effect of the deviations on overall remedy.

6.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

The removal of materials from the Site will include: (1) excavation and off-site disposal of soil as shown on Figure 7; (2) removal of petroleum storage tanks, fill ports, and vents (if encountered); and (3) removal of building materials from demolition. It is estimated that 12,000 tons of contaminated soil will be removed from the Site and disposed of at a facility licensed to accept such material.

6.1 Soil Cleanup Objectives

The remedy selected for this Site includes a Track 4 cleanup to comply with SSSCOs and implementation of certain EC/ICs.

The Soil Cleanup Objectives for this Site are listed in Table 10.

The SCOs are protective of human health and the environment and are justified based on the planned remedial activities and future Site use. It is anticipated that all excavation end-point soil samples will meet the SSSCOs.

Soil and materials management on-site and off-site will be conducted in accordance with the Soil Management Plan as described below. UST closures will, at a minimum, conform to criteria defined in DER-10.

6.2 Remedial Performance Evaluation (Post Excavation End-Point Sampling)

Excavation end-point samples will be obtained as shown on Figure 8. Additional post excavation soil samples will be collected around any tanks encountered on the Site. The sampling frequency will conform to those outlined in DER-10.

6.2.1 End-Point Sampling Frequency

Based on the sampling frequency discussed in Section 5.4 of DER-10, end point sampling will include one bottom soil sample for every 900 square feet across the Site and one sidewall sample for every 30 linear feet around the perimeter of the Site. In addition, a total of five endpoint samples consisting of four sidewalls and one bottom sample will be obtained from the excavation around the any petroleum storage tanks encountered.

6.2.2 Methodology

The excavation endpoint samples will be collected using a decontaminated stainless steel sampling trowel, hand auger, or an unused wooden tongue depressor and placed directly into pre-sterilized laboratory issued containers. The sample containers will be properly labeled and immediately placed on ice within a cooler. Sample time and location will be recorded on a chain of custody. The samples will be submitted to an ELAP-certified laboratory for analysis of VOCs via EPA Method 8260, PAHs via EPA Method 8270, target compound list (TCL) Pesticides via EPA Method 8081, PCBs, and heavy metals using EPA Method 6000/7000 series. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. The laboratory will compile and submit the data package using NYSDEC ASP Category B deliverables. Further details regarding the specific sampling methodology and analytical procedures are presented in the QAPP (Appendix B).

6.2.3 Reporting of Results

The analytical results of the end-point samples will be tabulated and compared to the SSSCOs. The tabulated data as well as the laboratory reports will be included in the FER. All analytical data will be submitted in EDD format.

6.2.4 QA/QC

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision, and completeness requirements will be addressed by the laboratory for all data generated. Collected samples will be appropriately packaged, placed in coolers, and shipped or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved to maintain a temperature of 4° C. Decontamination of non-dedicated sampling equipment will consist of the following: gently tap or scrape to remove adhered soil; rinse with tap water; wash with Alconox® detergent solution and scrub; rinse with tap water; rinse with distilled or deionized water; prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

One trip blank, one field blank, one blind duplicate sample, and one MS/MSD will be collected per every 20 samples and submitted for analysis during the end-point sampling event. The field blank(s), blind duplicate(s), and MS/MSD(s) will include all of the parameters included in the sample analysis while the trip blank will be limited to VOCs.

6.2.5 DUSR

A qualified data validator (third-party) will review the endpoint sample laboratory reports and prepare a Data Usability Summary Report (DUSR). The DUSR will be included in the FER.

6.2.6 Reporting of End-Point Data in FER

The FER will include a detailed description of endpoint sampling activities, data summary tables, concentration map showing endpoint sample locations and concentrations, DUSR, and laboratory reports. Chemical labs used for all end-point sample results and contingency sampling (if any) will be NYSDOH ELAP certified. End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of every 30 linear feet. Bottom samples will be collected at a rate of one for every 900 square feet, except around any tanks encountered where different sampling frequency is required. The tank excavation endpoint samples will be collected in accordance with the frequency outlined in DER- 10. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

6.3 Estimated Material Removal Quantities

The removal of materials from the Site will include: (1) excavation and off-site disposal of soil to comply with SSSCOs plus additional soil/fill as needed for the proposed foundation as shown on Figure 11; (2) removal of any petroleum storage tanks, fill ports, and vent lines encountered; and (3) removal of building materials from demolition. It is estimated that 12,000 tons of contaminated soil will be removed from the Site and disposed of at a facility licensed to accept such material. The proposed excavation is shown on Figure 7. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 2,000 cubic yards.

6.4 Soil/Materials Management Plan

The Soil/Materials Management Plan describes the procedures to be performed during the handling of soil/fill materials on-site during all intrusive work.

6.4.1 Soil Screening Methods

Visual, olfactory, and PID soil screening and assessment will be performed by a QEP or experienced field geologist under the direction of the RE during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, RI, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e., those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

6.4.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A dedicated water hose connected to a fire hydrant will be available on-site for dust control.

6.4.3 Materials Excavation and Load Out

The Remedial Engineer or a QEP under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the contractor and/or RE. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The RE will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site sediment tracking.

The RE will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The RE will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial

Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

6.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes are indicated on Figure 12. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site are shown in Figure 12. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport;.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

6.4.5 Materials Disposal Off-Site

Disposal locations will be established at a later date and will be reported to the NYSDEC Project Manager (PM).

Approximately 12,000 tons of soil are expected to be disposed off-site. Waste characterization samples will be collected prior to commencing construction activities. Based on the waste characterization results, a properly permitted waste disposal facility will be selected for off-site disposal. The disposal facility information including location will be reported to the NYSDEC PM prior to commencing the disposal activities.

All soil/fill excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to

NYSDEC's PM. Unregulated off-site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from RE or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-site or off-site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State, and Federal regulations.

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

6.4.6 Materials Reuse On-Site

Chemical criteria for on-site reuse of material have been established. All of the materials to be reused on the Site will comply with Part 375 RRSCOs as acceptable to NYSDEC/NYSDOH. The RE will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-site. Demolition material from buildings is not proposed to be reused on-site at this time. Concrete crushing or processing on-site will be prohibited. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will also be prohibited for reuse on-site.

Contaminated on-site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final Site Management Plan.

6.4.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-site.

Discharge of water generated during remedial construction to surface waters (i.e., a local pond, stream, or river) is prohibited without a SPDES permit.

6.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Engineering Report and the Site Management Plan.

6.4.9 Backfill from Off-Site Sources

The proposed redevelopment plans include the importation of clean fill. The importation of clean fill from off-site source(s) will be needed to backfill overexcavated areas as part of the Remedial Action as well as in specific locations as part of the two-foot clean fill buffer to be placed over all non-covered, landscaped areas. Further, as noted in Section 5.4.8, a highly visible demarcation barrier (such as an orange plastic construction fence or equivalent) will be installed beneath the two feet of clean fill/top soil cap. All materials proposed for import onto the Site will be approved by the RE and will be in compliance with provisions in this RAWP prior to receipt at the Site. All imported soil will comply with the lower of the protection of groundwater or the protection of public health SCOs for restricted residential use as outlined in 6 NYCRR Part 375-6.7(d) and table 375-6.8(b).

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The Final Engineering Report will include the following certification by the RE: "I certify that all import of soils from off-site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

All imported soil will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for Restricted Residential use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. Non-compliant soil will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soil that meets 'exempt' fill requirements under 6 NYCRR Part 360, but does not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site. Trucks entering the Site with imported soil will be securely covered with tight fitting covers.

6.4.10 Stormwater Pollution Prevention

A Site-specific Stormwater Pollution Prevention Plan (SWPPP) that conforms to the requirements of NYSDEC Division of Water guidelines and New York State regulations will be prepared prior to the start of the remedial action. The plan will mention the following:

- Barriers will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.
- Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.
- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.
- Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters
- Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

6.4.11 Contingency Plan

It is anticipated that petroleum storage tanks and vents may be encountered and, therefore, removed from the Site in accordance with applicable regulations.

If additional underground tanks or other previously unidentified contaminant sources are found during on-site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soil, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides, and PCBs). These analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to

NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

6.4.12 Community Air Monitoring Plan

A Site-specific HASP containing a CAMP has been prepared for this Site and is enclosed as Appendix F. Community air monitoring will be conducted during all intrusive Site activities in compliance with the NYSDOH Generic CAMP. Real-time air monitoring for volatile compounds and dust at the perimeter of the exclusion zone will be performed as described below.

6.4.12.1. VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of samples. Periodic monitoring may include obtaining measurements upon arrival at a location and upon leaving the location.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities, including excavation activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with an 11.7 eV lamp capable of calculating 15-minute running average concentrations. The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

6.4.12.2. ***Dust Monitoring***

Continuous monitoring for particulate will be conducted during all ground intrusive activities, which will involve the measurement of respirable dust. Community air monitoring for dust particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}). The dust monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. An inspection of the roving monitors will be conducted on at least an hourly basis. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on site for NYSDOH and/or NYSDEC review. If the downwind particulate concentrations are greater than 100 micrograms per cubic meter ($\mu g/m^3$) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 150 $\mu g/m^3$ above the background (upwind concentration) and provided that no visible dust is migrating from the work area. If particulate levels persist at 150 $\mu g/m^3$ above the background, work must be stopped until dust suppression measures bring particulate levels to below 150 $\mu g/m^3$ above background.

6.4.12.3. ***Major Vapor Emission Response Plan***

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work Site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period;

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

6.4.13 Odor, Dust, and Nuisance Control Plan

The Final Engineering Report will include the following certification by the Remedial Engineer: “I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan.”

6.4.13.1. Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include use of a PID meter to screen for VOCs and olfactory observations by Field Technicians. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer’s Remedial Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

6.4.13.2. __Dust Control Plan__

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated hose connected to a fire hydrant. The hose will be equipped with a nozzle capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soil vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water spraying.

6.4.13.3. __Other Nuisances__

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

7.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil and soil vapor will exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have three primary EC systems. These are: (1) an engineered composite cover system consisting of concrete building slabs/foundation walls, sidewalks/pathways, asphalt covered parking areas, and a two-foot clean fill buffer; (2) 15-mil vapor barrier; and (3) SSDS.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of both Track 1 SCOs and SSSCOs.

8.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of concrete covered sidewalks/pathways, concrete building slabs/foundations, asphalt parking areas, and a two-foot clean fill buffer with a demarcation barrier. The two-foot clean fill buffer above the demarcation barrier will consist of imported soil that will comply with the lower of the protection of groundwater or the protection of public health SCOs for restricted residential use as outlined in 6 NYCRR Part 375-6.7(d) and table 375-6.8(b) in accordance with the requirements stated in Section 5.4.9. Maintenance of this composite cover system will be described in the SMP in the FER. In addition, a Soil and Underground Structure Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete. A map showing the aerial distribution of each of the cover types to be built at the Site is included in Figure 13.

9.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

The results of the soil vapor sampling conducted during the RI, showed the presence of VOCs in the soil vapor. To prevent residual soil vapor from entering the new building's interior, installation of an engineered plastic vapor barrier as well as an active SSDS will be included in the construction of the new building's foundation.

9.1 Vapor Barrier

A Stego™ 15-mil vapor barrier or equivalent membrane that meets or exceeds ASTM's E-1745 standard for installation of a vapor barrier between granular fill and concrete will be selected. The membrane will be installed in accordance with the manufacturer's installation procedures. Prior to pouring the concrete slab, the PE will visit the Site to inspect and photograph the installed material. In addition, the elevation(s) of the vapor barrier will be recorded by a licensed surveyor for inclusion on an "as built" drawing prepared by the PE. A set of the installation photos in addition to the "as built" drawings will be included in the FER. The manufacturer's specifications for the vapor barrier are enclosed as Appendix E.

9.2 Sub-Slab Depressurization System (SSDS)

An active SSDS will be installed to mitigate the potential for soil vapor intrusion. The SSDS will maintain a negative pressure by inducing vacuum underneath the entire slab, which comprises the subsurface beneath the first floor slab and the subsurface beneath the basement slab in the northeastern portion of the Site, while allowing the vapors below the concrete slab to vent without intruding into the building. The SSDS will consist of horizontal trenches filled with dedicated subsurface depressurization lines (perforated PVC) throughout the treatment area, which will be connected to vertical risers that extend above the roof of the building to suction fans. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The proposed SSDS and vapor barrier layout and detail is illustrated on Figure 9.

The target areas for the SSDS are the approximately 5,000 SF sub-slab zone beneath the partial basement in the northeastern portion of the Site, and the approximately 12,000-SF sub-slab zone beneath the first floor concrete slab in the southern and southeastern portions of the Site. Slotted PVC SSDS piping will extend throughout the treatment areas and will be connected, via a network of aboveground piping, to roof-mounted suction fans which will apply negative pressure to the treatment areas to vent contaminated vapors.

The SSDS to be installed under this RAWP consists of:

1. One slotted depressurization pipe in the northeastern portion of the Site connected to vertical riser pipe VR-1; and
2. Three slotted depressurization pipes in the southern and southeastern portions of the Site, connected to vertical riser pipes VR-2A, VR-2B, and VR-2C.

During Site construction, ¾-inch gas permeable aggregate (GPA) stone bedding will be installed under, around, and above all SSDS piping to promote the generation of vacuum throughout the treatment area. Though communication testing is not applicable for new construction, the installation of GPA in the treatment areas is expected to promote favorable subsurface conditions for vacuum generation. Four vacuum monitoring points, MP-1, MP-2, MP-3 and MP-4, will be installed at the perimeter of the treatment areas to be used as vacuum monitoring locations following installation and startup of the SSDS.

VR-1 and VR-2A/2B/2C will be connected to suction fans SF-1 and SF-2, respectively. Based on the treatment area volumes, SF-1 shall be capable of operating at 250 cubic feet per minute (CFM) and 5 inches of water column (inH_2O) vacuum (IPF CMV Eco 200 or equivalent). SF-2 shall be capable of operating at 400 CFM and 5 inches of water column vacuum (IPF CMV Eco 300 or equivalent).

The vacuum capabilities of the proposed fans are intended to overcome frictional losses within the subsurface and aboveground piping and induce a minimum vacuum of 0.004 in H_2O at the vacuum monitoring points. The installation of the vapor barrier as part of Site remediation is expected to assist the SSDS in generating subsurface vacuum by creating an upper boundary which will prohibit sub-slab vapors from escaping the treatment area.

SSDS piping will consist of 4-inch diameter PVC pipe with 0.020-inch slots, with some solid PVC connection piping between the slotted segments and the vertical riser pipe connection.

Vertical riser pipes VR-1, VR-2A, VR-2B, and VR-2C will consist of 4-inch galvanized steel piping with the following SSDS pipe accessories: vacuum and air flow rate gauges, sampling ports, differential pressure switches (to be connected to the building alarm system), and throttling valves. Vertical riser pipes VR-2A, VR-2B, and VR-2C will then be manifolded into a single 8-inch galvanized steel pipe, VR-2, with an additional full set of SSDS accessories installed. Any horizontal portions of solid subsurface or above-grade SSDS piping will be pitched down towards the SSDS slotted pipes to minimize accumulation of moisture within SSDS piping.

Following startup and associated system monitoring, the SSDS will operate continuously to eliminate the potential for vapor intrusion.

9.2.1 SSDS Confirmatory Testing

Confirmatory communications testing including monitoring vacuum at the monitoring points will be used to assess induced vacuum conditions throughout the Site. If sub-slab vacuum is not adequately maintained in any portion of the Site, the SSDS will rebalanced by adjusting vacuum and air flow rate conditions in the individual SSDS lines until acceptable vacuum conditions are observed.

9.2.2 SSDS Operations and Maintenance

The SSDS will be inspected at a minimum of once a month, to ensure proper operation, with weekly checks during the first month of operation. Monthly checks will consist of individual SSDS riser pipe gauge readings, suction fan inspections, and alarm checks. More detailed system maintenance instructions will be included in the SMP, discussed in Section 10.2.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER.

10.0 CRITERIA FOR COMPLETION OF REMEDIATION/ TERMINATION OF REMEDIAL SYSTEMS

10.1 Composite Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

10.2 Sub-Slab Depressurization System (SSDS)

The active SSDS will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the SSDS may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

11.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER. A Site-specific Environmental Easement will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the

Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

11.1 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the Remedial Action is complete. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Bronx County Office of the City Register. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Bronx County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Restricted Residential, Commercial or Industrial use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- An engineered composite cover system consisting of asphalt covered parking areas, concrete covered sidewalks/pathways, and concrete building slabs/foundation walls must be inspected, certified and maintained as required in the SMP;
- A soil vapor mitigation system consisting of a SSDS under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

- On-site environmental monitoring devices, including but not limited to, soil vapor/vacuum monitoring points, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; and
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- In-ground vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;
- The Controlled Property may be used for restricted residential, commercial, or industrial use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as unrestricted use without an amendment or extinguishment of this Environmental Easement; and
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

11.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

12.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The Final Engineering Report will include as-built drawings for all constructed elements, calculation and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

The Final Engineering Report will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

12.1 Certifications

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer, Michelle Lapin, P.E., who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Michelle Lapin, P.E., am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Elton Crossing/ Site C-Family (NYSDEC BCA Index No. C203073-11-14 Site No. C203073).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for Elton Crossing/Site C-Family and related amendments.

I certify that the Remedial Action Work Plan dated May 1, 2015 approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the Volunteer for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soil from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

13.0 SCHEDULE

Activity	Anticipated Completion Date
Submit RAWP	May 2015
Complete 45-Day Comment Period	June 25, 2015
RAWP Approved	June 26, 2015
Real Estate/Construction Closing	June 29, 2015
Begin Implementing RAWP	July 1, 2015
Submit Draft SMP	May 2016
Execution of Easement	July 2016
Submit Draft Final Engineering Report	August 2016
Receive Certificate of Completion	December 2016

APPENDIX 1

1.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorus Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)

- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGS FOR REMEDY SELECTION

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York’s Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGS FOR UNDERGROUND STORAGE TANK CLOSURE

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

4.0 SCGS FOR REMEDIAL ACTION

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS (“SPDES Regulations”)
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York’s Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works

- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

5.0 SCGS FOR SITE MANAGEMENT

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

TABLES

Table 1
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Volatile Organic Compounds

Client ID	NYSDEC Part 375 Unrestricted SCO	NYSDEC Part 375 Restricted Residential SCO	SB-1 (0-2)	SB-1 (8-10)	SB-2 (0-2)	SB-2 (8-10)	SB-3 (0-2)	SB-3 (8-10)
Lab Sample ID			**JB60086-1**	**JB60086-2**	**JB60086-3**	**JB60086-4**	**JB60086-5**	**JB60086-6**
Date Sampled			**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1,1-Trichloroethane	**680**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,1,2-Trichloroethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,1-Dichloroethane	**270**	**26,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,1-Dichloroethene	**330**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,2,3-Trichlorobenzene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,2,4-Trichlorobenzene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	10 U	9.6 U	12 U	12 U	13 U	10 U
1,2-Dibromoethane	**NS**	**NS**	1 U	0.96 U	1.2 U	1.2 U	1.3 U	1 U
1,2-Dichlorobenzene	**1,100**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,2-Dichloroethane	**20**	**3,100**	1 U	0.96 U	1.2 U	1.2 U	1.3 U	1 U
1,2-Dichloropropane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,3-Dichlorobenzene	**2,400**	**49,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
1,4-Dichlorobenzene	**1,800**	**13,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
2-Butanone (MEK)	**120**	**100,000**	10 U	9.6 U	12 U	12 U	13 U	10 U
2-Hexanone	**NS**	**NS**	5.2 U	4.8 U	5.9 UJ	5.8 U	6.3 UJ	5.2 UJ
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	5.2 U	4.8 U	5.9 UJ	5.8 U	6.3 UJ	5.2 UJ
Acetone	**50**	**100,000**	10 U	9.6 U	12 U	12 U	13 U	10 U
Benzene	**60**	**4,800**	1 U	0.96 U	1.2 U	1.2 U	1.3 U	1 U
Bromochloromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Bromodichloromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Bromoform	**NS**	**NS**	5.2 U	4.8 U	5.9 UJ	5.8 U	6.3 UJ	5.2 UJ
Bromomethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Carbon disulfide	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Carbon tetrachloride	**760**	**2,400**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Chlorobenzene	**1,100**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Chloroethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Chloroform	**370**	**49,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Chloromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
cis-1,2-Dichloroethene	**250**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
cis-1,3-Dichloropropene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Cyclohexane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Dibromochloromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 UJ	5.8 U	6.3 UJ	5.2 UJ
Dichlorodifluoromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Ethylbenzene	**1,000**	**41,000**	1 U	0.96 U	1.2 U	1.2 U	1 J	1 U
Freon 113	**NS**	**NS**	5.2 U	4.8 U	5.9 UJ	5.8 U	6.3 UJ	5.2 UJ
Isopropylbenzene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
m,p-Xylene	**260**	**100,000**	1 U	0.96 U	1.2 U	1.2 U	5.4	1 U
Methyl Acetate	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Methyl Tert Butyl Ether	**930**	**100,000**	1 U	0.96 U	1.2 U	1.2 U	1.3 U	1 U
Methylcyclohexane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Methylene chloride	**50**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	2 J
o-Xylene	**260**	**100,000**	1 U	0.96 U	1.2 U	1.2 U	3	1 U
Styrene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Tetrachloroethene	**1,300**	**19,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Toluene	**700**	**100,000**	1 U	0.21 J	1.2 U	0.33 J	0.28 J	0.26 J
trans-1,2-Dichloroethene	**190**	**100,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
trans-1,3-Dichloropropene	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Trichloroethene	**470**	**21,000**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Trichlorofluoromethane	**NS**	**NS**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Vinyl chloride	**20**	**900**	5.2 U	4.8 U	5.9 U	5.8 U	6.3 U	5.2 U
Xylene (total)	**NS**	**NS**	1 U	0.96 U	1.2 U	0.34 J	8.4	0.28 J

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/Kg	NYSDEC Part 375 Unrestricted SCO µg/Kg	NYSDEC Part 375 Restricted Residential SCO µg/Kg	SB-4 (0-2) JB60086-7 2/19/2014	SB-4 (8-10) JB60086-8 2/19/2014	SB-5 (0-2) JB60086-9 2/19/2014	SB-5 (8-10) JB60086-10 2/19/2014	SB-6 (0-2) JB60086-11 2/19/2014	SB-6 (5-7) JB60086-12 2/19/2014
1,1,1-Trichloroethane	**680**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,1,2-Trichloroethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,1-Dichloroethane	**270**	**26,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,1-Dichloroethene	**330**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,2,3-Trichlorobenzene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,2,4-Trichlorobenzene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	13 U	11 U	17 U	9.3 U	9.5 U	16 U
1,2-Dibromoethane	**NS**	**NS**	1.3 U	1.1 U	1.7 U	0.93 U	0.95 U	1.6 U
1,2-Dichlorobenzene	**1,100**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,2-Dichloroethane	**20**	**3,100**	1.3 U	1.1 U	1.7 U	0.93 U	0.95 U	1.6 U
1,2-Dichloropropane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,3-Dichlorobenzene	**2,400**	**49,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
1,4-Dichlorobenzene	**1,800**	**13,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
2-Butanone (MEK)	**120**	**100,000**	13 U	11 U	17 U	9.3 U	9.5 U	16 U
2-Hexanone	**NS**	**NS**	6.4 UJ	5.5 UJ	8.6 UJ	4.7 UJ	4.8 UJ	7.9 UJ
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	6.4 UJ	5.5 UJ	8.6 UJ	4.7 UJ	4.8 UJ	7.9 UJ
Acetone	**50**	**100,000**	21.3	11 U	17 U	9.3 U	5.3 J	16 U
Benzene	**60**	**4,800**	1.3 U	1.1 U	1.7 U	0.93 U	0.95 U	1.6 U
Bromochloromethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Bromodichloromethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Bromoform	**NS**	**NS**	6.4 UJ	5.5 UJ	8.6 UJ	4.7 UJ	4.8 UJ	7.9 UJ
Bromomethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Carbon disulfide	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Carbon tetrachloride	**760**	**2,400**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Chlorobenzene	**1,100**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Chloroethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Chloroform	**370**	**49,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Chloromethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
cis-1,2-Dichloroethene	**250**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
cis-1,3-Dichloropropene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Cyclohexane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Dibromochloromethane	**NS**	**NS**	6.4 UJ	5.5 UJ	8.6 UJ	4.7 UJ	4.8 UJ	7.9 UJ
Dichlorodifluoromethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Ethylbenzene	**1,000**	**41,000**	1.3 U	1.1 U	1.7 U	0.93 U	0.21 J	1.6 U
Freon 113	**NS**	**NS**	6.4 UJ	5.5 UJ	8.6 UJ	4.7 UJ	4.8 UJ	7.9 UJ
Isopropylbenzene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
m,p-Xylene	**260**	**100,000**	1.3 U	1.1 U	1.7 U	0.93 U	0.99	1.6 U
Methyl Acetate	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Methyl Tert Butyl Ether	**930**	**100,000**	1.3 U	1.1 U	1.7 U	0.93 U	0.95 U	1.6 U
Methylcyclohexane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Methylene chloride	**50**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	1.8 J	7.9 U
o-Xylene	**260**	**100,000**	1.3 U	1.1 U	1.7 U	0.93 U	0.48 J	1.6 U
Styrene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Tetrachloroethene	**1,300**	**19,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Toluene	**700**	**100,000**	0.36 J	1.1 U	1.7 U	0.93 U	0.95 U	1.6 U
trans-1,2-Dichloroethene	**190**	**100,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
trans-1,3-Dichloropropene	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Trichloroethene	**470**	**21,000**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Trichlorofluoromethane	**NS**	**NS**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Vinyl chloride	**20**	**900**	6.4 U	5.5 U	8.6 U	4.7 U	4.8 U	7.9 U
Xylene (total)	**NS**	**NS**	1.3 U	1.1 U	1.7 U	0.93 U	1.5	1.6 U

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled μg/Kg	NYSDEC Part 375 Unrestricted SCO μg/Kg	NYSDEC Part 375 Restricted Residential SCO μg/Kg	SB-7 (0-2) JB60086-13 2/18/2014	SB-7 (5-7) JB60086-14 2/18/2014	SB-8 (0-2) JB60086-32 2/19/2014	SB-8 (0-2)FD JB60086-15 2/19/2014	SB-8 (7-9) JB60086-16 2/19/2014	SB-8 (7-9)B JB60086-34 2/19/2014
1,1,1-Trichloroethane	**680**	**100,000**	4.6 U	4.8 U	6.7 UJ	5.4 U	6 U	5.6 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,1,2-Trichloroethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,1-Dichloroethane	**270**	**26,000**	4.6 U	4.8 U	6.7 UJ	5.4 U	6 U	5.6 U
1,1-Dichloroethene	**330**	**100,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,2,3-Trichlorobenzene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,2,4-Trichlorobenzene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	9.1 U	9.5 U	13 U	11 U	12 U	11 U
1,2-Dibromoethane	**NS**	**NS**	0.91 U	0.95 U	1.3 U	1.1 U	1.2 U	1.1 U
1,2-Dichlorobenzene	**1,100**	**100,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,2-Dichloroethane	**20**	**3,100**	0.91 U	0.95 U	1.3 U	1.1 U	1.2 U	1.1 U
1,2-Dichloropropane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,3-Dichlorobenzene	**2,400**	**49,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
1,4-Dichlorobenzene	**1,800**	**13,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
2-Butanone (MEK)	**120**	**100,000**	9.1 U	9.5 U	13 UJ	11 U	12 U	11 U
2-Hexanone	**NS**	**NS**	4.6 UJ	4.8 UJ	6.7 UJ	5.4 U	6 U	5.6 U
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	4.6 UJ	4.8 UJ	6.7 UJ	5.4 U	6 U	5.6 U
Acetone	**50**	**100,000**	4.8 J	9.5 U	13 U	11 U	12 U	11 U
Benzene	**60**	**4,800**	0.91 U	0.95 U	1.3 U	1.1 U	1.2 U	1.1 U
Bromochloromethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Bromodichloromethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Bromoform	**NS**	**NS**	4.6 UJ	4.8 UJ	6.7 UJ	5.4 U	6 U	5.6 U
Bromomethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Carbon disulfide	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Carbon tetrachloride	**760**	**2,400**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Chlorobenzene	**1,100**	**100,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Chloroethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Chloroform	**370**	**49,000**	0.32 J	4.8 U	6.7 UJ	5.4 U	6 U	5.6 U
Chloromethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
cis-1,2-Dichloroethene	**250**	**100,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
cis-1,3-Dichloropropene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Cyclohexane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Dibromochloromethane	**NS**	**NS**	4.6 UJ	4.8 UJ	6.7 U	5.4 U	6 U	5.6 U
Dichlorodifluoromethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Ethylbenzene	**1,000**	**41,000**	0.91 U	0.95 U	1.3 UJ	0.25 J	1.2 U	1.1 U
Freon 113	**NS**	**NS**	4.6 UJ	4.8 UJ	6.7 UJ	5.4 U	6 U	5.6 U
Isopropylbenzene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
m,p-Xylene	**260**	**100,000**	0.91 U	0.95 U	1.3 U	1.3	1.2 U	1.1 U
Methyl Acetate	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Methyl Tert Butyl Ether	**930**	**100,000**	0.91 U	0.95 U	1.3 U	1.1 U	1.2 U	1.1 U
Methylcyclohexane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Methylene chloride	**50**	**100,000**	4.6 U	4.8 U	6.7 UJ	5.4 U	6 UJ	2.0 J
o-Xylene	**260**	**100,000**	0.91 U	0.95 U	1.3 U	1.2	1.2 U	1.1 U
Styrene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Tetrachloroethene	**1,300**	**19,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Toluene	**700**	**100,000**	0.91 U	0.3 J	1.3 U	1.1 U	1.2 U	1.1 U
trans-1,2-Dichloroethene	**190**	**100,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
trans-1,3-Dichloropropene	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Trichloroethene	**470**	**21,000**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Trichlorofluoromethane	**NS**	**NS**	4.6 U	4.8 U	6.7 U	5.4 U	65.2 J	5.6 UJ
Vinyl chloride	**20**	**900**	4.6 U	4.8 U	6.7 U	5.4 U	6 U	5.6 U
Xylene (total)	**NS**	**NS**	0.91 U	0.95 U	1.3 U	2.4	1.2 U	1.1 U

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Volatile Organic Compounds

Client ID	NYSDEC Part 375 Unrestricted SCO	NYSDEC Part 375 Restricted Residential SCO	SB-9 (0-2)	SB-9 (8-10)	SB-10 (0-2)	SB-10 (0-2)B	SB-10 (8-10)	SB-10 (8-10)FD
Lab Sample ID			JB60086-17	JB60086-36	JB60086-37	JB60086-35	JB60086-33	JB60086-20
Date Sampled			2/19/2014	2/25/2014	2/25/2014	2/19/2014	2/19/2014	2/19/2014
µg/Kg	µg/Kg	µg/Kg						
1,1,1-Trichloroethane	**680**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,1,2-Trichloroethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,1-Dichloroethane	**270**	**26,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,1-Dichloroethene	**330**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,2,3-Trichlorobenzene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,2,4-Trichlorobenzene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	12 U	8.8 U	10 U	14 U	9.3 U	12 U
1,2-Dibromoethane	**NS**	**NS**	1.2 U	0.88 U	1 U	1.4 U	0.93 U	1.2 U
1,2-Dichlorobenzene	**1,100**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,2-Dichloroethane	**20**	**3,100**	1.2 U	0.88 U	1 U	1.4 U	0.93 U	1.2 U
1,2-Dichloropropane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,3-Dichlorobenzene	**2,400**	**49,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
1,4-Dichlorobenzene	**1,800**	**13,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
2-Butanone (MEK)	**120**	**100,000**	12 U	8.8 UR	10 UR	14 U	9.3 U	12 U
2-Hexanone	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Acetone	**50**	**100,000**	12 U	8.8 UR	10 UR	14 U	9.3 U	12 U
Benzene	**60**	**4,800**	1.2 U	0.88 U	1 U	1.4 U	0.93 U	1.2 U
Bromochloromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Bromodichloromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Bromoform	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Bromomethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Carbon disulfide	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Carbon tetrachloride	**760**	**2,400**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Chlorobenzene	**1,100**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Chloroethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Chloroform	**370**	**49,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Chloromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
cis-1,2-Dichloroethene	**250**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
cis-1,3-Dichloropropene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Cyclohexane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Dibromochloromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Dichlorodifluoromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Ethylbenzene	**1,000**	**41,000**	1.2 U	0.88 U	1 UJ	1.0 J	0.93 U	1.2 U
Freon 113	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Isopropylbenzene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
m,p-Xylene	**260**	**100,000**	1.2 U	0.88 U	1 UJ	4.9 J	0.93 U	1.2 U
Methyl Acetate	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Methyl Tert Butyl Ether	**930**	**100,000**	1.2 U	0.88 U	1 U	1.4 U	0.93 U	1.2 U
Methylcyclohexane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Methylene chloride	**50**	**100,000**	2.4 J	4.4 U	5.1 UJ	3.6 J	4.6 UJ	3.3 J
o-Xylene	**260**	**100,000**	1.2 U	0.88 U	1 UJ	3.3 J	0.93 U	1.2 U
Styrene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Tetrachloroethene	**1,300**	**19,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Toluene	**700**	**100,000**	1.2 U	0.88 U	1 U	1.4 U	0.93 U	1.2 U
trans-1,2-Dichloroethene	**190**	**100,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
trans-1,3-Dichloropropene	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Trichloroethene	**470**	**21,000**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Trichlorofluoromethane	**NS**	**NS**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Vinyl chloride	**20**	**900**	6.2 U	4.4 U	5.1 U	6.8 U	4.6 U	6.2 U
Xylene (total)	**NS**	**NS**	1.2 U	0.88 U	1 UJ	8.2 J	0.93 U	1.2 U

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Volatile Organic Compounds

Client ID	NYSDEC	NYSDEC	SB-11 (0-2)	SB-11 (8-10)	SB-12 (0-2)	SB-13 (0-2)	SB-13 (8-10)
Lab Sample ID	Part 375	Part 375	JB60086-21	JB60086-22	JB60086-23	JB60086-24	JB60086-25
Date Sampled	Unrestricted SCO	Restricted Residential SCO	2/19/2014	2/19/2014	2/18/2014	2/19/2014	2/19/2014
µg/Kg	µg/Kg	µg/Kg					
1,1,1-Trichloroethane	**680**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,1,2-Trichloroethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,1-Dichloroethane	**270**	**26,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,1-Dichloroethene	**330**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,2,3-Trichlorobenzene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,2,4-Trichlorobenzene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	10 U	11 U	13 U	12 U	580 U
1,2-Dibromoethane	**NS**	**NS**	1 U	1.1 U	1.3 U	1.2 U	58 U
1,2-Dichlorobenzene	**1,100**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,2-Dichloroethane	**20**	**3,100**	1 U	1.1 U	1.3 U	1.2 U	58 U
1,2-Dichloropropane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,3-Dichlorobenzene	**2,400**	**49,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
1,4-Dichlorobenzene	**1,800**	**13,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
2-Butanone (MEK)	**120**	**100,000**	10 U	11 U	13 U	12 U	580 UR
2-Hexanone	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Acetone	**50**	**100,000**	10 U	11 U	13 U	12 U	580 UR
Benzene	**60**	**4,800**	1 U	1.1 U	1.3 U	1.2 U	58 U
Bromochloromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Bromodichloromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Bromoform	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Bromomethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Carbon disulfide	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Carbon tetrachloride	**760**	**2,400**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Chlorobenzene	**1,100**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Chloroethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Chloroform	**370**	**49,000**	5.2 U	5.4 U	0.58 J	6.1 U	290 U
Chloromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
cis-1,2-Dichloroethene	**250**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
cis-1,3-Dichloropropene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Cyclohexane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Dibromochloromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Dichlorodifluoromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Ethylbenzene	**1,000**	**41,000**	1 U	1.1 U	1.3 U	1.2 U	27.5 J
Freon 113	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Isopropylbenzene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	123 J
m,p-Xylene	**260**	**100,000**	1 U	1.1 U	1.3 U	1.2 U	**583**
Methyl Acetate	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Methyl Tert Butyl Ether	**930**	**100,000**	1 U	1.1 U	1.3 U	1.2 U	58 U
Methylcyclohexane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	13.8 J
Methylene chloride	**50**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
o-Xylene	**260**	**100,000**	1 U	1.1 U	1.3 U	1.2 U	**386**
Styrene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Tetrachloroethene	**1,300**	**19,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Toluene	**700**	**100,000**	1 U	1.1 U	1.3 U	1.2 U	58 U
trans-1,2-Dichloroethene	**190**	**100,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
trans-1,3-Dichloropropene	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Trichloroethene	**470**	**21,000**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Trichlorofluoromethane	**NS**	**NS**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Vinyl chloride	**20**	**900**	5.2 U	5.4 U	6.3 U	6.1 U	290 U
Xylene (total)	**NS**	**NS**	1 U	1.1 U	1.3 U	1.2 U	969

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Volatile Organic Compounds

Client ID	NYSDEC Part 375 Unrestricted SCO	NYSDEC Part 375 Restricted Residential SCO	SB-14 (0-2)	SB-14 (8-10)	SSB-1 (0-2)	SSB-1 (5-7)	SSB-1 (7-9)	SSB-2 (0-2)
Lab Sample ID			**JB60086-26**	**JB60086-27**	**JB88935-1**	**JB88935-2**	**JB88935-3**	**JB88935-4**
Date Sampled			**2/19/2014**	**2/19/2014**	**2/25/2015**	**2/25/2015**	**2/25/2015**	**2/25/2015**
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1,1-Trichloroethane	**680**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,1,2-Trichloroethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,1-Dichloroethane	**270**	**26,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,1-Dichloroethene	**330**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,2,3-Trichlorobenzene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,2,4-Trichlorobenzene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	12 U	10 U	20 U	19 U	12 U	9.9 U
1,2-Dibromoethane	**NS**	**NS**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
1,2-Dichlorobenzene	**1,100**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,2-Dichloroethane	**20**	**3,100**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
1,2-Dichloropropane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,3-Dichlorobenzene	**2,400**	**49,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
1,4-Dichlorobenzene	**1,800**	**13,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
2-Butanone (MEK)	**120**	**100,000**	12 U	10 U	20 R	19 R	12 R	9.9 R
2-Hexanone	**NS**	**NS**	6.2 U	5 U	9.8 R	9.4 R	5.8 R	5 R
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	6.2 U	5 U	9.8 R	9.4 R	5.8 R	5 R
Acetone	**50**	**100,000**	12 U	10 U	13.2 J+	34.4 J+	9.3 J+	9.9 R
Benzene	**60**	**4,800**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
Bromochloromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Bromodichloromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Bromoform	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Bromomethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Carbon disulfide	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Carbon tetrachloride	**760**	**2,400**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Chlorobenzene	**1,100**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Chloroethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Chloroform	**370**	**49,000**	6.2 U	5 U	9.8 U	0.51 J	5.8 U	5 U
Chloromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
cis-1,2-Dichloroethene	**250**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
cis-1,3-Dichloropropene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Cyclohexane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Dibromochloromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Dichlorodifluoromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Ethylbenzene	**1,000**	**41,000**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
Freon 113	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Isopropylbenzene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
m,p-Xylene	**260**	**100,000**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
Methyl Acetate	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Methyl Tert Butyl Ether	**930**	**100,000**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
Methylcyclohexane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Methylene chloride	**50**	**100,000**	6.2 U	2 J	9.8 U	9.4 U	5.8 U	5 U
o-Xylene	**260**	**100,000**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
Styrene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Tetrachloroethene	**1,300**	**19,000**	6.2 U	5 U	9.8 U	0.93 J	0.67 J	5 U
Toluene	**700**	**100,000**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U
trans-1,2-Dichloroethene	**190**	**100,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
trans-1,3-Dichloropropene	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Trichloroethene	**470**	**21,000**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Trichlorofluoromethane	**NS**	**NS**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Vinyl chloride	**20**	**900**	6.2 U	5 U	9.8 U	9.4 U	5.8 U	5 U
Xylene (total)	**NS**	**NS**	1.2 U	1 U	2 U	1.9 U	1.2 U	0.99 U

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/Kg	NYSDEC Part 375 Unrestricted SCO µg/Kg	NYSDEC Part 375 Restricted Residential SCO µg/Kg	SSB-X JB88935-7 2/25/2015	SSB-2 (5-7) JB88935-5 2/25/2015	SSB-2 (8-10) JB88935-6 2/25/2015	SSB-3 (0-2) JB88935-8 2/26/2015	SSB-3 (5-7) JB88935-9 2/26/2015	SSB-3 (7.5-9.5) JB88935-10 2/26/2015
1,1,1-Trichloroethane	**680**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,1,2-Trichloroethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,1-Dichloroethane	**270**	**26,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,1-Dichloroethene	**330**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,2,3-Trichlorobenzene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,2,4-Trichlorobenzene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	11 U	11 U	11 U	12 U	9.4 U	10 U
1,2-Dibromoethane	**NS**	**NS**	1.1 U	1.1 U	1.1 U	1.2 U	0.94 U	1 U
1,2-Dichlorobenzene	**1,100**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,2-Dichloroethane	**20**	**3,100**	1.1 U	1.1 U	1.1 U	1.2 U	0.94 U	1 U
1,2-Dichloropropane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,3-Dichlorobenzene	**2,400**	**49,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
1,4-Dichlorobenzene	**1,800**	**13,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
2-Butanone (MEK)	**120**	**100,000**	11 R	11 R	11 R	12 R	9.4 R	10 R
2-Hexanone	**NS**	**NS**	5.5 R	5.4 R	5.5 R	6 R	4.7 R	5 R
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	5.5 R	5.4 R	5.5 R	6 R	4.7 R	5 R
Acetone	**50**	**100,000**	11 R	11 R	23.9 J+	12 R	9.4 R	10 R
Benzene	**60**	**4,800**	1.1 U	1.1 U	1.1 U	1.2 U	0.94 U	1 U
Bromochloromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Bromodichloromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Bromoform	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Bromomethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Carbon disulfide	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Carbon tetrachloride	**760**	**2,400**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Chlorobenzene	**1,100**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Chloroethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Chloroform	**370**	**49,000**	5.5 U	5.4 U	0.45 J	6 U	4.7 U	5 U
Chloromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
cis-1,2-Dichloroethene	**250**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
cis-1,3-Dichloropropene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Cyclohexane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Dibromochloromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Dichlorodifluoromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Ethylbenzene	**1,000**	**41,000**	1.1 U	1.1 U	1.1 U	1.2 U	0.94 U	1 U
Freon 113	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Isopropylbenzene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	0.49 J	5 U
m,p-Xylene	**260**	**100,000**	1.1 U	1.1 U	1.1 U	0.5 J	0.27 J	1 U
Methyl Acetate	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Methyl Tert Butyl Ether	**930**	**100,000**	1.1 U	1.1 U	1.1 U	1.2 U	0.94 U	1 U
Methylcyclohexane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Methylene chloride	**50**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
o-Xylene	**260**	**100,000**	1.1 U	1.1 U	1.1 U	0.33 J	0.94 U	1 U
Styrene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Tetrachloroethene	**1,300**	**19,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Toluene	**700**	**100,000**	1.1 U	1.1 U	0.23 J	1.2 U	0.94 U	1 U
trans-1,2-Dichloroethene	**190**	**100,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
trans-1,3-Dichloropropene	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Trichloroethene	**470**	**21,000**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Trichlorofluoromethane	**NS**	**NS**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Vinyl chloride	**20**	**900**	5.5 U	5.4 U	5.5 U	6 U	4.7 U	5 U
Xylene (total)	**NS**	**NS**	1.1 U	1.1 U	1.1 U	0.83 J	0.27 J	1 U

Table 1
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Volatile Organic Compounds

Client ID	NYSDEC	NYSDEC	MW-3 (16.5-17)	SS-1	TRIP BLANK	TRIP BLANK	FIELD BLANK	FIELD BLANK	FB20150226	TB20150226
Lab Sample ID	Part 375	Part 375	JB88569-1	JB88569-2	JB60086-28	JB60086-29	JB60086-30	JB60086-31	JB88935-12	JB88935-11
Date Sampled	Unrestricted SCO	Restricted Residential SCO	2/18/2015	2/19/2015	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/26/2015	2/26/2015
µg/Kg	µg/Kg	µg/Kg			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1,1,1-Trichloroethane	**680**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	**270**	**26,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	**330**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	**NS**	**NS**	56 U	12 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	**NS**	**NS**	5.6 U	1.2 U	1 U	1 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	**1,100**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	**20**	**3,100**	5.6 U	1.2 UJ	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	**2,400**	**49,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	**1,800**	**13,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
2-Butanone (MEK)	**120**	**100,000**	56 R	12 R	10 U	10 U	10 UR	10 UR	10 R	10 R
2-Hexanone	**NS**	**NS**	28 R	5.9 R	5 UJ	5 UJ	5 U	5 U	5 R	5 R
4-Methyl-2-pentanone(MIBK)	**NS**	**NS**	28 R	5.9 R	5 UJ	5 UJ	5 U	5 U	5 R	5 R
Acetone	**50**	**100,000**	32.6 J+	12 R	10 U	10 U	10 UR	10 UR	10 R	10 R
Benzene	**60**	**4,800**	5.6 U	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	**NS**	**NS**	28 U	5.9 UJ	5 U	5 U	1 U	1 U	1 U	1 U
Bromoform	**NS**	**NS**	28 U	5.9 UJ	5 UJ	5 UJ	4 U	4 U	4 U	4 U
Bromomethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	2 U	2 U	2 U	2 U
Carbon disulfide	**NS**	**NS**	15.3 J	5.9 U	5 U	5 U	2 U	2 U	2 U	2 U
Carbon tetrachloride	**760**	**2,400**	28 U	5.9 UJ	5 U	5 U	1 U	1 U	1 U	1 U
Chlorobenzene	**1,100**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Chloroethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 UJ	1 UJ
Chloroform	**370**	**49,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Chloromethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 UJ	1 UJ
cis-1,2-Dichloroethene	**250**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Cyclohexane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	**NS**	**NS**	28 U	5.9 UJ	5 UJ	5 UJ	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	**1,000**	**41,000**	2.9 J	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
Freon 113	**NS**	**NS**	28 U	5.9 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U
Isopropylbenzene	**NS**	**NS**	2.7 J	5.9 U	5 U	5 U	2 U	2 U	2 U	2 U
m,p-Xylene	**260**	**100,000**	2.8 J	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tert Butyl Ether	**930**	**100,000**	5.6 U	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	**NS**	**NS**	1.1 J	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**50**	**100,000**	28 U	5.9 U	5 U	5 U	2 U	2 U	2 U	2 U
o-Xylene	**260**	**100,000**	4.7 J	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	**1,300**	**19,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Toluene	**700**	**100,000**	1 J	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	**190**	**100,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	**NS**	**NS**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Trichloroethene	**470**	**21,000**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	**NS**	**NS**	28 U	5.9 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	**20**	**900**	28 U	5.9 U	5 U	5 U	1 U	1 U	1 UJ	1 UJ
Xylene (total)	**NS**	**NS**	7.5	1.2 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Semivolatile Organic Compounds

Client ID	**NYSDEC**	**NYSDEC**	**SB-1 (0-2)**	**SB-1 (8-10)**	**SB-2 (0-2)**	**SB-2 (8-10)**	**SB-3 (0-2)**	**SB-3 (8-10)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-1**	**JB60086-2**	**JB60086-3**	**JB60086-4**	**JB60086-5**	**JB60086-6**
Date Sampled	**Unrestricted**	**Restricted**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential SCO**	**1**	**1**	**1**	**2**	**1**	**4**
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1'-Biphenyl	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
1,2,4,5-Tetrachlorobenzene	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
1,4-Dioxane	**100**	**13,000**	35 U	35 U	38 U	71 U	36 U	37 U
2,3,4,6-Tetrachlorophenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2,4,5-Trichlorophenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2,4,6-Trichlorophenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2,4-Dichlorophenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2,4-Dimethylphenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2,4-Dinitrophenol	**NS**	**NS**	700 U	690 U	750 U	1400 UJ	720 U	730 UJ
2,4-Dinitrotoluene	**NS**	**NS**	35 U	35 U	38 U	71 U	36 U	37 U
2,6-Dinitrotoluene	**NS**	**NS**	35 U	35 U	38 U	71 U	36 U	37 U
2-Chloronaphthalene	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
2-Chlorophenol	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
2-Methylnaphthalene	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	63.3 J
2-Methylphenol	**330**	**100,000**	70 U	69 U	75 U	140 U	72 U	73 U
2-Nitroaniline	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
2-Nitrophenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
3&4-Methylphenol	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
3,3'-Dichlorobenzidine	**NS**	**NS**	70 UJ	69 U	75 UJ	140 U	72 U	73 UJ
3-Nitroaniline	**NS**	**NS**	180 UJ	170 U	190 UJ	350 U	180 U	180 UJ
4,6-Dinitro-o-cresol	**NS**	**NS**	700 U	690 U	750 R	1400 U	720 U	730 U
4-Bromophenyl phenyl ether	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
4-Chloro-3-methyl phenol	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
4-Chloroaniline	**NS**	**NS**	180 UJ	170 U	190 UJ	350 U	180 U	180 UJ
4-Chlorophenyl phenyl ether	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
4-Nitroaniline	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
4-Nitrophenol	**NS**	**NS**	350 U	350 U	380 U	710 U	360 U	370 U
Acenaphthene	**20,000**	**100,000**	35 U	35 U	69.4	71 U	36 U	207
Acenaphthylene	**100,000**	**100,000**	35 U	35 U	157	71 U	36 U	267
Acetophenone	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
Anthracene	**100,000**	**100,000**	35 U	35 U	248	71 U	36 U	809
Atrazine	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Benzaldehyde	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
Benzo(a)anthracene	**1,000**	**1,000**	35 U	35 U	**1,150**	71 U	36 U	**2,720**
Benzo(a)pyrene	**1,000**	**1,000**	35 U	35 U	**1,300**	71 U	36 U	**2,770**
Benzo(b)fluoranthene	**1,000**	**1,000**	35 U	35 U	**1,660**	71 U	36 U	**3,010**
Benzo(g,h,i)perylene	**100,000**	**100,000**	35 U	35 U	866	71 U	36 U	1,510
Benzo(k)fluoranthene	**800**	**3,900**	35 U	35 U	582	71 U	36 U	**1,120**
bis(2-Chloroethoxy)methane	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
bis(2-Chloroethyl)ether	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
bis(2-Chloroisopropyl)ether	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
bis(2-Ethylhexyl)phthalate	**NS**	**NS**	70 U	69 U	179	140 U	72 U	63.1 J
Butyl benzyl phthalate	**NS**	**NS**	70 U	69 U	40.7 J	140 U	72 U	73 U
Caprolactam	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 UJ
Carbazole	**NS**	**NS**	70 U	69 U	135	140 U	72 U	336
Chrysene	**1,000**	**3,900**	35 U	35 U	**1,380**	71 U	36 U	**2,910**
Dibenzo(a,h)anthracene	**330**	**330**	35 U	35 U	235	71 U	36 U	**462**
Dibenzofuran	**7,000**	**59,000**	70 U	69 U	42 J	140 U	72 U	102
Diethyl phthalate	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Dimethyl phthalate	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Di-n-butyl phthalate	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Di-n-octyl phthalate	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Fluoranthene	**100,000**	**100,000**	35 U	35 U	2,540	71 U	36 U	4,530 D
Fluorene	**30,000**	**100,000**	35 U	35 U	61.1	71 U	36 U	252
Hexachlorobenzene	**330**	**1,200**	70 U	69 U	75 U	140 U	72 U	73 U
Hexachlorobutadiene	**NS**	**NS**	35 U	35 U	38 U	71 U	36 U	37 U
Hexachlorocyclopentadiene	**NS**	**NS**	350 U	350 U	380 U	710 UJ	360 U	370 U
Hexachloroethane	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
Indeno(1,2,3-cd)pyrene	**500**	**500**	35 U	35 U	**918**	71 U	36 U	**1,680**
Isophorone	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
Naphthalene	**12,000**	**100,000**	35 U	35 U	25 J	71 U	36 U	93.6
Nitrobenzene	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
N-Nitroso-di-n-propylamine	**NS**	**NS**	70 U	69 U	75 U	140 U	72 U	73 U
N-Nitrosodiphenylamine	**NS**	**NS**	180 U	170 U	190 U	350 U	180 U	180 U
Pentachlorophenol	**800**	**6,700**	350 U	350 U	380 U	710 U	360 U	370 U
Phenanthrene	**100,000**	**100,000**	35 U	35 U	1,320	71 U	36 U	2,570
Phenol	**330**	**100,000**	70 U	69 U	75 U	140 U	72 U	73 U
Pyrene	**100,000**	**100,000**	35 U	35 U	2,160	71 U	36 U	4,480 D

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Semivolatile Organic Compounds

Client ID	**NYSDEC**	**NYSDEC**	**SB-4 (0-2)**	**SB-4 (8-10)**	**SB-5 (0-2)**	**SB-5 (8-10)**	**SB-6 (0-2)**	**SB-6 (5-7)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-7**	**JB60086-8**	**JB60086-9**	**JB60086-10**	**JB60086-11**	**JB60086-12**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**	**1**	**4**
		SCO						
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1'-Biphenyl	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	53.8 J
1,2,4,5-Tetrachlorobenzene	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
1,4-Dioxane	**100**	**13,000**	37 U	32 U	44 U	34 U	35 U	37 U
2,3,4,6-Tetrachlorophenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2,4,5-Trichlorophenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2,4,6-Trichlorophenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2,4-Dichlorophenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2,4-Dimethylphenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2,4-Dinitrophenol	**NS**	**NS**	730 U	640 U	890 U	690 U	690 U	750 UJ
2,4-Dinitrotoluene	**NS**	**NS**	37 U	32 U	44 U	34 U	35 U	37 U
2,6-Dinitrotoluene	**NS**	**NS**	37 U	32 U	44 U	34 U	35 U	37 U
2-Chloronaphthalene	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
2-Chlorophenol	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
2-Methylnaphthalene	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	91.9
2-Methylphenol	**330**	**100,000**	73 U	64 U	89 U	69 U	69 U	75 U
2-Nitroaniline	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
2-Nitrophenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
3&4-Methylphenol	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
3,3'-Dichlorobenzidine	**NS**	**NS**	73 UJ	64 UJ	89 UJ	69 UJ	69 UJ	75 UJ
3-Nitroaniline	**NS**	**NS**	180 UJ	160 UJ	220 UJ	170 UJ	170 UJ	190 UJ
4,6-Dinitro-o-cresol	**NS**	**NS**	730 U	640 U	890 U	690 U	690 U	750 U
4-Bromophenyl phenyl ether	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
4-Chloro-3-methyl phenol	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
4-Chloroaniline	**NS**	**NS**	180 UJ	160 UJ	220 UJ	170 UJ	170 UJ	190 UJ
4-Chlorophenyl phenyl ether	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
4-Nitroaniline	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
4-Nitrophenol	**NS**	**NS**	370 U	320 U	440 U	340 U	350 U	370 U
Acenaphthene	**20,000**	**100,000**	37 U	32 U	72.3	34 U	35 U	84.6
Acenaphthylene	**100,000**	**100,000**	86.5	44.6	151	34 U	35 U	701
Acetophenone	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
Anthracene	**100,000**	**100,000**	53.7	33.2	322	34 U	35 U	1,140
Atrazine	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
Benzaldehyde	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
Benzo(a)anthracene	**1,000**	**1,000**	291	183	**1,160**	34 U	35 U	**2,240**
Benzo(a)pyrene	**1,000**	**1,000**	414	208	**1,240**	34 U	35 U	**2,150**
Benzo(b)fluoranthene	**1,000**	**1,000**	538	296	**1,460**	34 U	35 U	**2,490**
Benzo(g,h,i)perylene	**100,000**	**100,000**	334	159	911	34 U	35 U	2,270
Benzo(k)fluoranthene	**800**	**3,900**	188	121	503	34 U	35 U	**895**
bis(2-Chloroethoxy)methane	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
bis(2-Chloroethyl)ether	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
bis(2-Chloroisopropyl)ether	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
bis(2-Ethylhexyl)phthalate	**NS**	**NS**	71.2 J	164	331	69 U	69 U	1,930
Butyl benzyl phthalate	**NS**	**NS**	73 U	64 U	109	69 U	69 U	75 U
Caprolactam	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 UJ
Carbazole	**NS**	**NS**	31.1 J	19.8 J	106	69 U	69 U	679
Chrysene	**1,000**	**3,900**	362	237	**1,230**	34 U	35 U	**2,500**
Dibenzo(a,h)anthracene	**330**	**330**	77.8	46.6	237	34 U	35 U	**631**
Dibenzofuran	**7,000**	**59,000**	73 U	64 U	51.3 J	69 U	69 U	412
Diethyl phthalate	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
Dimethyl phthalate	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
Di-n-butyl phthalate	**NS**	**NS**	907	2,490	89 U	69 U	69 U	75 U
Di-n-octyl phthalate	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
Fluoranthene	**100,000**	**100,000**	515	367	2,420	34 U	35 U	5,350 D
Fluorene	**30,000**	**100,000**	37 U	32 U	93.7	34 U	35 U	457
Hexachlorobenzene	**330**	**1,200**	73 U	64 U	89 U	69 U	69 U	75 U
Hexachlorobutadiene	**NS**	**NS**	37 U	32 U	44 U	34 U	35 U	37 U
Hexachlorocyclopentadiene	**NS**	**NS**	370 U	320 U	440 U	340 U	350 U	370 U
Hexachloroethane	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
Indeno(1,2,3-cd)pyrene	**500**	**500**	334	170	**908**	34 U	35 U	**1,780**
Isophorone	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
Naphthalene	**12,000**	**100,000**	37 U	32 U	33.1 J	34 U	35 U	112
Nitrobenzene	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
N-Nitroso-di-n-propylamine	**NS**	**NS**	73 U	64 U	89 U	69 U	69 U	75 U
N-Nitrosodiphenylamine	**NS**	**NS**	180 U	160 U	220 U	170 U	170 U	190 U
Pentachlorophenol	**800**	**6,700**	370 U	320 U	440 U	340 U	350 U	370 U
Phenanthrene	**100,000**	**100,000**	189	140	1,430	34 U	35 U	5,190 D
Phenol	**330**	**100,000**	73 U	64 U	89 U	69 U	69 U	75 U
Pyrene	**100,000**	**100,000**	505	326	2,200	34 U	35 U	4,200 D

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Semivolatile Organic Compounds

Client ID	NYSDEC	NYSDEC	SB-7 (0-2)	SB-7 (5-7)	SB-8 (0-2)	SB-8 (0-2)FD	SB-8 (7-9)	SB-8 (7-9)B
Lab Sample ID	Part 375	Part 375	JB60086-13	JB60086-14	JB60086-32	JB60086-15	JB60086-16	JB60086-34
Date Sampled	Unrestricted	Restricted	2/18/2014	2/18/2014	2/19/2014	2/19/2014	2/19/2014	2/19/2014
Dilution	SCO	Residential SCO	1	1	20	1	4	2
µg/Kg	µg/Kg	µg/Kg						
1,1'-Biphenyl	NS	NS	71 U	65 U	131 J	66 UJ	78 U	74 U
1,2,4,5-Tetrachlorobenzene	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
1,4-Dioxane	100	13,000	35 U	33 U	35 U	33 UJ	39 U	37 U
2,3,4,6-Tetrachlorophenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2,4,5-Trichlorophenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2,4,6-Trichlorophenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2,4-Dichlorophenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2,4-Dimethylphenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2,4-Dinitrophenol	NS	NS	710 U	650 U	700 UJ	660 UJ	780 UJ	740 U
2,4-Dinitrotoluene	NS	NS	35 U	33 U	35 U	33 UJ	39 U	37 U
2,6-Dinitrotoluene	NS	NS	35 U	33 U	35 U	33 UJ	39 U	37 U
2-Chloronaphthalene	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
2-Chlorophenol	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
2-Methylnaphthalene	NS	NS	71 U	65 U	229 J	66 UJ	42.1 J	27.2 J
2-Methylphenol	330	100,000	71 U	65 U	70 U	66 UJ	78 U	74 U
2-Nitroaniline	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
2-Nitrophenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
3&4-Methylphenol	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
3,3'-Dichlorobenzidine	NS	NS	71 UJ	65 U	70 U	66 UJ	78 UJ	74 U
3-Nitroaniline	NS	NS	180 UJ	160 U	170 U	170 UJ	200 UJ	180 U
4,6-Dinitro-o-cresol	NS	NS	710 U	650 U	700 U	660 UJ	780 U	740 U
4-Bromophenyl phenyl ether	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
4-Chloro-3-methyl phenol	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
4-Chloroaniline	NS	NS	180 UJ	160 U	170 U	170 UJ	200 UJ	180 U
4-Chlorophenyl phenyl ether	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
4-Nitroaniline	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
4-Nitrophenol	NS	NS	350 U	330 U	350 U	330 UJ	390 U	370 U
Acenaphthene	20,000	100,000	35 U	33 U	594 J	41.2 J	95.9 J	136 J
Acenaphthylene	100,000	100,000	35 U	33 U	1,560 J	49.5 J	1,180 J	584 J
Acetophenone	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
Anthracene	100,000	100,000	35 U	33 U	2820 J	105 J	998	662
Atrazine	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
Benzaldehyde	NS	NS	180 U	160 U	22.8 J	170 UJ	200 U	180 U
Benzo(a)anthracene	1,000	1,000	35 U	33 U	**6,230 D**	604 J	**4,300 D**	**3,450**
Benzo(a)pyrene	1,000	1,000	35 U	33 U	**6,870 D**	699 J	**4,390 D**	**3,630**
Benzo(b)fluoranthene	1,000	1,000	35 U	33 U	**7,470 D**	779 J	**5,010 D**	**4,380 D**
Benzo(g,h,i)perylene	100,000	100,000	35 U	33 U	3,750 D	453 J	3,110	2,550
Benzo(k)fluoranthene	800	3,900	35 U	33 U	**2,560 J**	298 J	**1,850**	**1,400**
bis(2-Chloroethoxy)methane	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
bis(2-Chloroethyl)ether	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
bis(2-Chloroisopropyl)ether	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
bis(2-Ethylhexyl)phthalate	NS	NS	119	65 U	24,100 JD	66 UJ	363 J	154 J
Butyl benzyl phthalate	NS	NS	71 U	65 U	4,330 D	66 UJ	63.6 J	74 UJ
Caprolactam	NS	NS	71 U	65 U	70 U	66 UJ	78 UJ	74 U
Carbazole	NS	NS	71 U	65 U	1,230 J	30.3 J	284	254
Chrysene	1,000	3,900	35 U	33 U	**6,490 JD**	620 J	**4,790 D**	**3,630**
Dibenzo(a,h)anthracene	330	330	35 U	33 U	**1,340 J**	120 J	**858**	**675**
Dibenzofuran	7,000	59,000	71 U	65 U	849 J	15.6 J	106 J	45.7 J
Diethyl phthalate	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
Dimethyl phthalate	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
Di-n-butyl phthalate	NS	NS	71 U	65 U	4,050 JD	66 UJ	43.8 J	74 UJ
Di-n-octyl phthalate	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
Fluoranthene	100,000	100,000	35 U	33 U	15,000 JD	1110 J	6,630 D	5,450 D
Fluorene	30,000	100,000	35 U	33 U	1,400 J	30.3 J	187	127
Hexachlorobenzene	330	1,200	71 U	65 U	70 U	66 UJ	78 U	74 U
Hexachlorobutadiene	NS	NS	35 U	33 U	35 U	33 UJ	39 U	37 U
Hexachlorocyclopentadiene	NS	NS	350 U	330 U	350 UJ	330 UJ	390 U	370 U
Hexachloroethane	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
Indeno(1,2,3-cd)pyrene	500	500	35 U	33 U	**4,120 JD**	468 J	**3,270**	**2,610**
Isophorone	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
Naphthalene	12,000	100,000	35 U	33 U	418 J	33 UJ	45.6	49.4
Nitrobenzene	NS	NS	71 U	65 U	70 U	66 UJ	78 U	74 U
N-Nitroso-di-n-propylamine	NS	NS	71 U	65 U	70 U	66 UJ	78 U	0
N-Nitrosodiphenylamine	NS	NS	180 U	160 U	170 U	170 UJ	200 U	180 U
Pentachlorophenol	800	6,700	350 U	330 U	350 U	330 UJ	390 U	370 U
Phenanthrene	100,000	100,000	35 U	33 U	10,600 JD	417 J	2,810	1,820
Phenol	330	100,000	71 U	65 U	70 U	66 UJ	78 U	74 U
Pyrene	100,000	100,000	20.3 J	33 U	12,600 JD	1,080 J	6,940 D	5,520 D

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Semivolatile Organic Compounds

Client ID	**NYSDEC**	**NYSDEC**	**SB-9 (0-2)**	**SB-9 (8-10)**	**SB-10 (0-2)**	**SB-10 (0-2)B**	**SB-10 (8-10)**	**SB-10 (8-10)FD**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-17**	**JB60086-36**	**JB60086-37**	**JB60086-35**	**JB60086-33**	**JB60086-20**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/25/2014**	**2/25/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**4**	**1**	**1**
		SCO						
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1'-Biphenyl	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
1,2,4,5-Tetrachlorobenzene	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
1,4-Dioxane	**100**	**13,000**	37 U	33 U	35 U	37 U	32 U	35 U
2,3,4,6-Tetrachlorophenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2,4,5-Trichlorophenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2,4,6-Trichlorophenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2,4-Dichlorophenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2,4-Dimethylphenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2,4-Dinitrophenol	**NS**	**NS**	740 U	670 UJ	700 UJ	740 U	630 U	710 U
2,4-Dinitrotoluene	**NS**	**NS**	37 U	33 U	35 U	37 U	32 U	35 U
2,6-Dinitrotoluene	**NS**	**NS**	37 U	33 U	35 U	37 U	32 U	35 U
2-Chloronaphthalene	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
2-Chlorophenol	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
2-Methylnaphthalene	**NS**	**NS**	74 U	67 U	23.4 J	74 UJ	63 U	71 U
2-Methylphenol	**330**	**100,000**	74 U	67 U	70 U	74 U	63 U	71 U
2-Nitroaniline	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
2-Nitrophenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
3&4-Methylphenol	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
3,3'-Dichlorobenzidine	**NS**	**NS**	74 UJ	67 U	70 U	74 U	63 U	71 UJ
3-Nitroaniline	**NS**	**NS**	190 UJ	170 U	170 U	180 U	160 U	180 UJ
4,6-Dinitro-o-cresol	**NS**	**NS**	740 U	670 U	700 U	740 U	630 U	710 U
4-Bromophenyl phenyl ether	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
4-Chloro-3-methyl phenol	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
4-Chloroaniline	**NS**	**NS**	190 UJ	170 U	170 U	180 U	160 U	180 UJ
4-Chlorophenyl phenyl ether	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
4-Nitroaniline	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
4-Nitrophenol	**NS**	**NS**	370 U	330 UJ	350 UJ	370 U	320 U	350 U
Acenaphthene	**20,000**	**100,000**	37 U	33 U	59 J	153 J	32 U	35 U
Acenaphthylene	**100,000**	**100,000**	24.2 J	33 U	506	680	32 U	35 U
Acetophenone	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
Anthracene	**100,000**	**100,000**	18.2 J	33 U	462 J	930 J	32 U	35 U
Atrazine	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Benzaldehyde	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
Benzo(a)anthracene	**1,000**	**1,000**	85	33 U	**1,810 J**	**4,800 JD**	12.9 J	35 UJ
Benzo(a)pyrene	**1,000**	**1,000**	95.9	33 U	**1,890 J**	**4,990 JD**	13.1 J	35 UJ
Benzo(b)fluoranthene	**1,000**	**1,000**	123	33 U	**2,070**	**5,690 D**	15.3 J	35 UJ
Benzo(g,h,i)perylene	**100,000**	**100,000**	83.2	13.8 J	1,630 J	3,120 J	32 U	35 U
Benzo(k)fluoranthene	**800**	**3,900**	44.3	33 U	614	**1,890** J	32 U	35 U
bis(2-Chloroethoxy)methane	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
bis(2-Chloroethyl)ether	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
bis(2-Chloroisopropyl)ether	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
bis(2-Ethylhexyl)phthalate	**NS**	**NS**	79.3	67 U	2,240 J	107 J	63 U	71 U
Butyl benzyl phthalate	**NS**	**NS**	74 U	67 U	94.3 J	74 UJ	63 U	71 U
Caprolactam	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Carbazole	**NS**	**NS**	74 U	67 U	153 J	332 J	63 U	71 U
Chrysene	**1,000**	**3,900**	88.5	33 U	**2,040**	**5,340 D**	32 U	35 U
Dibenzo(a,h)anthracene	**330**	**330**	20.1 J	33 U	**453**	**822**	32 U	35 U
Dibenzofuran	**7,000**	**59,000**	74 U	67 U	30.4 J	41.1 J	63 U	71 U
Diethyl phthalate	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Dimethyl phthalate	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Di-n-butyl phthalate	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Di-n-octyl phthalate	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Fluoranthene	**100,000**	**100,000**	158	33 U	2,950 J	7,900 JD	17.6 J	21.6 J
Fluorene	**30,000**	**100,000**	37 U	33 U	73.9 J	160 J	32 U	35 U
Hexachlorobenzene	**330**	**1,200**	74 U	67 U	70 U	74 U	63 U	71 U
Hexachlorobutadiene	**NS**	**NS**	37 U	33 U	35 U	37 U	32 U	35 U
Hexachlorocyclopentadiene	**NS**	**NS**	370 U	330 U	350 U	370 U	320 U	350 U
Hexachloroethane	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
Indeno(1,2,3-cd)pyrene	**500**	**500**	87.8	33 U	**1,250 J**	**3,210 J**	32 U	35 U
Isophorone	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
Naphthalene	**12,000**	**100,000**	37 U	33 U	35.2	33.7 J	32 U	35 U
Nitrobenzene	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
N-Nitroso-di-n-propylamine	**NS**	**NS**	74 U	67 U	70 U	74 U	63 U	71 U
N-Nitrosodiphenylamine	**NS**	**NS**	190 U	170 U	170 U	180 U	160 U	180 U
Pentachlorophenol	**800**	**6,700**	370 U	330 UJ	350 UJ	370 U	320 U	350 U
Phenanthrene	**100,000**	**100,000**	56.2	33 U	1,240 J	2,640 J	32 UJ	21.4 J
Phenol	**330**	**100,000**	74 U	67 U	70 U	74 U	63 U	71 U
Pyrene	**100,000**	**100,000**	137	33 U	3,280 J	8,810 JD	17.1 J	19.5 J

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Semivolatile Organic Compounds

Client ID	NYSDEC Part 375 Unrestricted SCO	NYSDEC Part 375 Restricted Residential SCO	SB-11 (0-2)	SB-11 (8-10)	SB-12 (0-2)	SB-13 (0-2)	SB-13 (8-10)
Lab Sample ID			JB60086-21	JB60086-22	JB60086-23	JB60086-24	JB60086-25
Date Sampled			2/19/2014	2/19/2014	2/18/2014	2/19/2014	2/19/2014
Dilution			1	1	1	1	1
µg/Kg	µg/Kg	µg/Kg					
1,1'-Biphenyl	NS	NS	72 U	84 U	71 U	70 U	70 U
1,2,4,5-Tetrachlorobenzene	NS	NS	180 U	210 U	180 U	180 U	180 U
1,4-Dioxane	100	13,000	36 U	42 U	36 U	35 U	35 U
2,3,4,6-Tetrachlorophenol	NS	NS	180 U	210 U	180 U	180 U	180 U
2,4,5-Trichlorophenol	NS	NS	180 U	210 U	180 U	180 U	180 U
2,4,6-Trichlorophenol	NS	NS	180 U	210 U	180 U	180 U	180 U
2,4-Dichlorophenol	NS	NS	180 U	210 U	180 U	180 U	180 U
2,4-Dimethylphenol	NS	NS	180 U	210 U	180 U	180 U	180 U
2,4-Dinitrophenol	NS	NS	720 U	840 U	710 U	700 U	700 U
2,4-Dinitrotoluene	NS	NS	36 U	42 U	36 U	35 U	35 U
2,6-Dinitrotoluene	NS	NS	36 U	42 U	36 U	35 U	35 U
2-Chloronaphthalene	NS	NS	72 U	84 U	71 U	70 U	70 U
2-Chlorophenol	NS	NS	72 U	84 U	71 U	70 U	70 U
2-Methylnaphthalene	NS	NS	72 U	84 U	71 U	46.4 J	54.4 J
2-Methylphenol	330	100,000	72 U	84 U	71 U	70 U	70 U
2-Nitroaniline	NS	NS	180 U	210 U	180 U	180 U	180 U
2-Nitrophenol	NS	NS	180 U	210 U	180 U	180 U	180 U
3&4-Methylphenol	NS	NS	72 U	84 U	71 U	70 U	70 U
3,3'-Dichlorobenzidine	NS	NS	72 UJ	84 UJ	71 U	70 UJ	70 UJ
3-Nitroaniline	NS	NS	180 U	210 U	180 U	180 U	180 U
4,6-Dinitro-o-cresol	NS	NS	720 U	840 U	710 U	700 U	700 U
4-Bromophenyl phenyl ether	NS	NS	72 U	84 U	71 U	70 U	70 U
4-Chloro-3-methyl phenol	NS	NS	180 U	210 U	180 U	180 U	180 U
4-Chloroaniline	NS	NS	180 U	210 U	180 U	180 U	180 U
4-Chlorophenyl phenyl ether	NS	NS	72 U	84 U	71 U	70 U	70 U
4-Nitroaniline	NS	NS	180 U	210 U	180 U	180 U	180 U
4-Nitrophenol	NS	NS	360 U	420 U	360 U	350 U	350 U
Acenaphthene	20,000	100,000	36 U	42 U	36 U	94.2	35 U
Acenaphthylene	100,000	100,000	36 U	42 U	36 U	545	24.1 J
Acetophenone	NS	NS	180 U	210 U	180 U	180 U	180 U
Anthracene	100,000	100,000	36 U	42 U	36 U	649	23 J
Atrazine	NS	NS	72 U	84 U	71 U	70 U	70 U
Benzaldehyde	NS	NS	180 U	210 U	180 U	180 U	180 U
Benzo(a)anthracene	1,000	1,000	59.6	22.8 J	36 U	**2,030**	81.4
Benzo(a)pyrene	1,000	1,000	65.6	42 U	36 U	**1,970**	86.4
Benzo(b)fluoranthene	1,000	1,000	80.2	19.1 J	36 U	**2,460**	111
Benzo(g,h,i)perylene	100,000	100,000	49.5	42 U	36 U	1,580	70.7
Benzo(k)fluoranthene	800	3,900	23.5 J	42 U	36 U	**886**	46.1
bis(2-Chloroethoxy)methane	NS	NS	72 U	84 U	71 U	70 U	70 U
bis(2-Chloroethyl)ether	NS	NS	72 U	84 U	71 U	70 U	70 U
bis(2-Chloroisopropyl)ether	NS	NS	72 U	84 U	71 U	70 U	70 U
bis(2-Ethylhexyl)phthalate	NS	NS	55.5 J	84 U	39.6 J	77.1	854
Butyl benzyl phthalate	NS	NS	72 U	84 U	71 U	159	70 U
Caprolactam	NS	NS	72 U	84 U	71 U	70 U	70 U
Carbazole	NS	NS	72 U	84 U	71 U	265	70 U
Chrysene	1,000	3,900	64.6	20.1 J	36 U	**2,380**	89
Dibenzo(a,h)anthracene	330	330	36 U	42 U	36 U	**531**	16.1 J
Dibenzofuran	7,000	59,000	72 U	84 U	71 U	54.1 J	70 U
Diethyl phthalate	NS	NS	72 U	84 U	71 U	70 U	70 U
Dimethyl phthalate	NS	NS	72 U	84 U	71 U	70 U	70 U
Di-n-butyl phthalate	NS	NS	72 U	84 U	71 U	155	149
Di-n-octyl phthalate	NS	NS	72 U	84 U	71 U	70 U	70 U
Fluoranthene	100,000	100,000	99.8	36.1 J	36 U	3,090	138
Fluorene	30,000	100,000	36 U	42 U	36 U	127	35 U
Hexachlorobenzene	330	1,200	72 U	84 U	71 U	70 U	70 U
Hexachlorobutadiene	NS	NS	36 U	42 U	36 U	35 U	35 U
Hexachlorocyclopentadiene	NS	NS	360 U	420 U	360 U	350 U	350 U
Hexachloroethane	NS	NS	180 U	210 U	180 U	180 U	180 U
Indeno(1,2,3-cd)pyrene	500	500	36.6	42 U	36 U	**1,240**	50.9
Isophorone	NS	NS	72 U	84 U	71 U	70 U	70 U
Naphthalene	12,000	100,000	36 U	42 U	36 U	61.9	30.7 J
Nitrobenzene	NS	NS	72 U	84 U	71 U	70 U	70 U
N-Nitroso-di-n-propylamine	NS	NS	72 U	84 U	71 U	70 U	70 U
N-Nitrosodiphenylamine	NS	NS	180 U	210 U	180 U	180 U	180 U
Pentachlorophenol	800	6,700	360 U	420 U	360 U	350 U	350 U
Phenanthrene	100,000	100,000	56.8	42 U	36 U	2,060	70.5
Phenol	330	100,000	72 U	84 U	71 U	70 U	70 U
Pyrene	100,000	100,000	115	31.9 J	36 U	3,460	148

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Semivolatile Organic Compounds

Client ID	**NYSDEC Part 375**	**NYSDEC Part 375**	**SB-14 (0-2)**	**SB-14 (8-10)**	**SSB-1 (0-2)**	**SSB-1 (5-7)**	**SSB-1 (7-9)**	**SSB-2 (0-2)**
Lab Sample ID			**JB60086-26**	**JB60086-27**	**JB88935-1**	**JB88935-2**	**JB88935-3**	**JB88935-4**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/25/2015**	**2/25/2015**	**2/25/2015**	**2/25/2015**
Dilution	**SCO**	**Residential SCO**	**1**	**1**	**1**	**1**	**1/2 †**	**1**
µg/Kg	**µg/Kg**	**µg/Kg**						
1,1'-Biphenyl	**NS**	**NS**	74 U	66 U	470 U	158 J-	85 U	73 U
1,2,4,5-Tetrachlorobenzene	**NS**	**NS**	180 U	160 U	1,200 U	49.2 J-	210 U	180 U
1,4-Dioxane	**100**	**13,000**	37 U	33 U	240 U	41 U	43 U	36 U
2,3,4,6-Tetrachlorophenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2,4,5-Trichlorophenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2,4,6-Trichlorophenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2,4-Dichlorophenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2,4-Dimethylphenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2,4-Dinitrophenol	**NS**	**NS**	740 U	660 U	4,700 R	810 U	850 U	730 U
2,4-Dinitrotoluene	**NS**	**NS**	37 U	33 U	240 R	41 U	43 U	36 U
2,6-Dinitrotoluene	**NS**	**NS**	37 U	33 U	240 R	41 U	43 U	36 U
2-Chloronaphthalene	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
2-Chlorophenol	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
2-Methylnaphthalene	**NS**	**NS**	25.2 J	66 U	276 J	1,280 J-	68.2 J	73 U
2-Methylphenol	**330**	**100,000**	74 U	66 U	470 U	81 U	85 U	73 U
2-Nitroaniline	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
2-Nitrophenol	**NS**	**NS**	180 U	160 U	1,200 R	200 U	210 U	180 U
3&4-Methylphenol	**NS**	**NS**	74 U	66 U	470 U	81 U	243 J	73 U
3,3'-Dichlorobenzidine	**NS**	**NS**	74 UJ	66 UJ	470 R	81 U	85 U	73 U
3-Nitroaniline	**NS**	**NS**	180 U	160 U	1,200 R	200 U	210 U	180 U
4,6-Dinitro-o-cresol	**NS**	**NS**	740 U	660 U	4,700 R	810 U	850 U	730 U
4-Bromophenyl phenyl ether	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
4-Chloro-3-methyl phenol	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
4-Chloroaniline	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
4-Chlorophenyl phenyl ether	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
4-Nitroaniline	**NS**	**NS**	180 U	160 U	1,200 R	200 U	210 U	180 U
4-Nitrophenol	**NS**	**NS**	370 U	330 U	2,400 R	410 U	430 U	360 U
Acenaphthene	**20,000**	**100,000**	50.4	33 U	240 U	41 U	43 U	36 U
Acenaphthylene	**100,000**	**100,000**	47.2	33 U	119 J	288 J-	130 J	36 U
Acetophenone	**NS**	**NS**	180 U	160 U	163 J	200 U	210 U	180 U
Anthracene	**100,000**	**100,000**	142	33 U	127 J	387 J-	200 J	36 U
Atrazine	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Benzaldehyde	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
Benzo(a)anthracene	**1,000**	**1,000**	462	15.7 J	155 J	342 J-	41.1 J	36 U
Benzo(a)pyrene	**1,000**	**1,000**	435	19.7 J	127 J	340 J-	43 U	36 U
Benzo(b)fluoranthene	**1,000**	**1,000**	526	19 J	186 J	491 J-	43 U	36 U
Benzo(g,h,i)perylene	**100,000**	**100,000**	277	13.7 J	539 R	2,100 J-	529 J	36 U
Benzo(k)fluoranthene	**800**	**3,900**	186	33 U	240 U	155 J-	43 U	36 U
bis(2-Chloroethoxy)methane	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
bis(2-Chloroethyl)ether	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
bis(2-Chloroisopropyl)ether	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
bis(2-Ethylhexyl)phthalate	**NS**	**NS**	43.6 J	66 U	284 J	318 J-	81.3 J	73 U
Butyl benzyl phthalate	**NS**	**NS**	74 U	66 U	1,580 J	1,390	284 J	73 U
Caprolactam	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Carbazole	**NS**	**NS**	67.6 J	66 U	470 U	91.1 J-	20.6 J	73 U
Chrysene	**1,000**	**3,900**	499	33 U	167 J	354 J-	26.7 J	36 U
Dibenzo(a,h)anthracene	**330**	**330**	69	33 U	240 U	**406** J-	98.5 J	36 U
Dibenzofuran	**7,000**	**59,000**	34.9 J	66 U	470 U	103 J-	85 U	73 U
Diethyl phthalate	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Dimethyl phthalate	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Di-n-butyl phthalate	**NS**	**NS**	74 U	66 U	470 U	87.2 J-	85 U	73 U
Di-n-octyl phthalate	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Fluoranthene	**100,000**	**100,000**	878	33 U	124 J	396 J-	22 J	36 U
Fluorene	**30,000**	**100,000**	64.2	33 U	240 U	41 U	43 U	36 U
Hexachlorobenzene	**330**	**1,200**	74 U	66 U	470 U	81 U	85 U	73 U
Hexachlorobutadiene	**NS**	**NS**	37 U	33 U	240 U	41 U	43 U	36 U
Hexachlorocyclopentadiene	**NS**	**NS**	370 U	330 U	2,400 R	410 U	430 U	360 U
Hexachloroethane	**NS**	**NS**	180 U	160 U	1,200 U	200 U	210 U	180 U
Indeno(1,2,3-cd)pyrene	**500**	**500**	227	33 U	420 J	**1,230** J-	55.3 J	36 U
Isophorone	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
Naphthalene	**12,000**	**100,000**	52.4	33 U	164 J	752 J-	43 U	36 U
Nitrobenzene	**NS**	**NS**	74 U	66 U	470 U	81 U	85 U	73 U
N-Nitroso-di-n-propylamine	**NS**	**NS**	74 U	66 U	470 U	81 J-	85 U	73 U
N-Nitrosodiphenylamine	**NS**	**NS**	180 U	160 U	1,200 U	44.8 J-	210 U	180 U
Pentachlorophenol	**800**	**6,700**	370 U	330 U	2,400 U	410 U	430 U	360 U
Phenanthrene	**100,000**	**100,000**	782	33 U	114 J	404 J-	22.9 J	36 U
Phenol	**330**	**100,000**	74 U	66 U	470 U	81 U	85 U	73 U
Pyrene	**100,000**	**100,000**	952	33 U	164 J	283 J-	43 U	36 U

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Semivolatile Organic Compounds

Client ID	**NYSDEC**	**NYSDEC**	**SSB-X**	**SSB-2 (5-7)**	**SSB-2 (8-10)**	**SSB-3 (0-2)**	**SSB-3 (5-7)**	**SSB-3 (7.5-9.5)**	**MW-3 (16.5-17)**
Lab Sample ID	**Part 375**	**Part 375**	**JB88935-7**	**JB88935-5**	**JB88935-6**	**JB88935-8**	**JB88935-9**	**JB88935-10**	**JB88569-1**
Date Sampled	**Unrestricted**	**Restricted**	**2/25/2015**	**2/25/2015**	**2/25/2015**	**2/26/2015**	**2/26/2015**	**2/26/2015**	**2/18/2015**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**	**1/5 †**	**1**	**1**
		SCO							
µg/Kg	**µg/Kg**	**µg/Kg**							
1,1'-Biphenyl	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
1,2,4,5-Tetrachlorobenzene	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
1,4-Dioxane	**100**	**13,000**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
2,3,4,6-Tetrachlorophenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2,4,5-Trichlorophenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2,4,6-Trichlorophenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2,4-Dichlorophenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2,4-Dimethylphenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2,4-Dinitrophenol	**NS**	**NS**	730 U	670 U	720 U	760 U	760 U	750 U	740 U
2,4-Dinitrotoluene	**NS**	**NS**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
2,6-Dinitrotoluene	**NS**	**NS**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
2-Chloronaphthalene	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
2-Chlorophenol	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
2-Methylnaphthalene	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
2-Methylphenol	**330**	**100,000**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
2-Nitroaniline	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
2-Nitrophenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
3&4-Methylphenol	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
3,3'-Dichlorobenzidine	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
3-Nitroaniline	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
4,6-Dinitro-o-cresol	**NS**	**NS**	730 U	670 U	720 U	760 U	760 U	750 U	740 U
4-Bromophenyl phenyl ether	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
4-Chloro-3-methyl phenol	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
4-Chloroaniline	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
4-Chlorophenyl phenyl ether	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
4-Nitroaniline	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
4-Nitrophenol	**NS**	**NS**	360 U	330 U	360 U	380 U	380 U	370 U	370 U
Acenaphthene	**20,000**	**100,000**	36 U	33 U	36 U	38 U	38 U	37 U	671
Acenaphthylene	**100,000**	**100,000**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Acetophenone	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
Anthracene	**100,000**	**100,000**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Atrazine	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Benzaldehyde	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
Benzo(a)anthracene	**1,000**	**1,000**	36 U	33 U	16.2 J	38 U	38 U	37 U	138
Benzo(a)pyrene	**1,000**	**1,000**	36 U	33 U	20.7 J	38 U	38 U	37 U	86.5
Benzo(b)fluoranthene	**1,000**	**1,000**	36 U	33 U	26 J	38 U	38 U	37 U	89.1
Benzo(g,h,i)perylene	**100,000**	**100,000**	36 U	33 U	23.3 J	38 U	38 U	37 U	45
Benzo(k)fluoranthene	**800**	**3,900**	36 U	33 U	36 U	38 U	38 U	37 U	21 J
bis(2-Chloroethoxy)methane	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
bis(2-Chloroethyl)ether	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
bis(2-Chloroisopropyl)ether	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
bis(2-Ethylhexyl)phthalate	**NS**	**NS**	73 U	141	170	76 U	273	75 U	74 U
Butyl benzyl phthalate	**NS**	**NS**	73 U	67 U	72 U	417	7,030 D	75 U	74 U
Caprolactam	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Carbazole	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Chrysene	**1,000**	**3,900**	36 U	33 U	25.7 J	38 U	38 U	37 U	526
Dibenzo(a,h)anthracene	**330**	**330**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Dibenzofuran	**7,000**	**59,000**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Diethyl phthalate	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Dimethyl phthalate	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Di-n-butyl phthalate	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Di-n-octyl phthalate	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Fluoranthene	**100,000**	**100,000**	36 U	33 U	23.4 J	38 U	38 U	37 U	241
Fluorene	**30,000**	**100,000**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Hexachlorobenzene	**330**	**1,200**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Hexachlorobutadiene	**NS**	**NS**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Hexachlorocyclopentadiene	**NS**	**NS**	360 U	330 U	360 U	380 U	380 U	370 U	370 U
Hexachloroethane	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
Indeno(1,2,3-cd)pyrene	**500**	**500**	36 U	33 U	21.2 J	38 U	38 U	37 U	34.3 J
Isophorone	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Naphthalene	**12,000**	**100,000**	36 U	33 U	36 U	38 U	38 U	37 U	37 U
Nitrobenzene	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
N-Nitroso-di-n-propylamine	**NS**	**NS**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
N-Nitrosodiphenylamine	**NS**	**NS**	180 U	170 U	180 U	190 U	190 U	190 U	180 U
Pentachlorophenol	**800**	**6,700**	360 U	330 U	360 U	380 U	380 U	370 U	370 U
Phenanthrene	**100,000**	**100,000**	36 U	33 U	18.6 J	38 U	38 U	37 U	37 U
Phenol	**330**	**100,000**	73 U	67 U	72 U	76 U	76 U	75 U	74 U
Pyrene	**100,000**	**100,000**	36 U	33 U	31.8 J	38 U	38 U	37 U	848

Table 2
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Semivolatile Organic Compounds

Client ID	NYSDEC	NYSDEC	SS-1	FIELD BLANK	FIELD BLANK	FB20150226
Lab Sample ID	Part 375	Part 375	JB88569-2	JB60086-30	JB60086-31	JB88935-12
Date Sampled	Unrestricted	Restricted	2/19/2015	2/19/2014	2/19/2014	2/26/2015
Dilution	SCO	Residential	1	1	1	1
		SCO				
µg/Kg	µg/Kg	µg/Kg		µg/L	µg/L	µg/L
1,1'-Biphenyl	NS	NS	83 U	1 U	1 U	1.1 U
1,2,4,5-Tetrachlorobenzene	NS	NS	210 U	2 U	2 U	2.2 U
1,4-Dioxane	100	13,000	41 U	1 U	1 U	1.1 U
2,3,4,6-Tetrachlorophenol	NS	NS	210 U	5 U	5 U	5.4 U
2,4,5-Trichlorophenol	NS	NS	210 U	5 U	5 U	5.4 U
2,4,6-Trichlorophenol	NS	NS	210 U	5 U	5 U	5.4 U
2,4-Dichlorophenol	NS	NS	210 U	2 U	2 U	2.2 U
2,4-Dimethylphenol	NS	NS	210 R	5 U	5 U	5.4 U
2,4-Dinitrophenol	NS	NS	830 UJ	20 UJ	20 UJ	22 U
2,4-Dinitrotoluene	NS	NS	41 U	1 U	1 U	1.1 U
2,6-Dinitrotoluene	NS	NS	41 U	1 U	1 U	1.1 U
2-Chloronaphthalene	NS	NS	83 U	2 U	2 U	2.2 U
2-Chlorophenol	NS	NS	83 U	5 U	5 U	5.4 U
2-Methylnaphthalene	NS	NS	83 U	1 U	1 U	1.1 U
2-Methylphenol	330	100,000	83 U	2 U	2 U	2.2 U
2-Nitroaniline	NS	NS	210 U	5 UJ	5 U	5.4 U
2-Nitrophenol	NS	NS	210 U	5 U	5 U	5.4 U
3&4-Methylphenol	NS	NS	83 U	2 U	2 U	2.2 U
3,3'-Dichlorobenzidine	NS	NS	83 R	2 U	2 U	2.2 U
3-Nitroaniline	NS	NS	210 UJ	5 U	5 U	5.4 U
4,6-Dinitro-o-cresol	NS	NS	830 U	20 U	20 U	22 U
4-Bromophenyl phenyl ether	NS	NS	83 U	2 U	2 U	2.2 U
4-Chloro-3-methyl phenol	NS	NS	210 U	5 U	5 U	5.4 U
4-Chloroaniline	NS	NS	210 R	5 U	5 U	5.4 U
4-Chlorophenyl phenyl ether	NS	NS	83 U	2 U	2 U	2.2 U
4-Nitroaniline	NS	NS	210 U	5 U	5 UJ	5.4 U
4-Nitrophenol	NS	NS	410 U	10 UJ	10 UJ	11 U
Acenaphthene	20,000	100,000	41 U	1 U	1 U	1.1 U
Acenaphthylene	100,000	100,000	41 U	1 U	1 U	1.1 U
Acetophenone	NS	NS	117 J	2 U	2 U	2.2 U
Anthracene	100,000	100,000	41 U	1 U	1 U	1.1 U
Atrazine	NS	NS	83 U	2 U	2 U	2.2 U
Benzaldehyde	NS	NS	210 U	5 U	5 U	5.4 U
Benzo(a)anthracene	1,000	1,000	35.9 J	1 U	1 U	1.1 U
Benzo(a)pyrene	1,000	1,000	32.4 J	1 U	1 U	1.1 U
Benzo(b)fluoranthene	1,000	1,000	68.3	1 U	1 U	1.1 U
Benzo(g,h,i)perylene	100,000	100,000	63.2	1 U	1 U	1.1 U
Benzo(k)fluoranthene	800	3,900	20.3 J	1 U	1 U	1.1 U
bis(2-Chloroethoxy)methane	NS	NS	83 U	2 U	2 U	2.2 U
bis(2-Chloroethyl)ether	NS	NS	83 U	2 U	2 U	2.2 U
bis(2-Chloroisopropyl)ether	NS	NS	83 U	2 U	2 U	2.2 U
bis(2-Ethylhexyl)phthalate	NS	NS	2,520 R	2 U	2 U	2.2 U
Butyl benzyl phthalate	NS	NS	87.6	2 U	2 U	2.2 U
Caprolactam	NS	NS	83 U	2 U	2 U	2.2 U
Carbazole	NS	NS	83 U	1 U	1 U	1.1 U
Chrysene	1,000	3,900	59.5	1 U	1 U	1.1 U
Dibenzo(a,h)anthracene	330	330	16.2 J	1 U	1 U	1.1 U
Dibenzofuran	7,000	59,000	83 U	5 U	5 U	5.4 U
Diethyl phthalate	NS	NS	83 U	2 U	2 U	2.2 U
Dimethyl phthalate	NS	NS	83 U	2 U	2 U	2.2 U
Di-n-butyl phthalate	NS	NS	152	2 U	2 U	2.2 U
Di-n-octyl phthalate	NS	NS	83 U	2 UJ	2 UJ	2.2 U
Fluoranthene	100,000	100,000	57.6	1 U	1 U	1.1 U
Fluorene	30,000	100,000	41 U	1 U	1 U	1.1 U
Hexachlorobenzene	330	1,200	83 U	1 U	1 U	1.1 U
Hexachlorobutadiene	NS	NS	41 U	1 U	1 U	1.1 U
Hexachlorocyclopentadiene	NS	NS	410 U	10 U	10 U	11 U
Hexachloroethane	NS	NS	210 U	2 U	2 U	2.2 U
Indeno(1,2,3-cd)pyrene	500	500	43.6	1 U	1 U	1.1 U
Isophorone	NS	NS	83 U	2 U	2 U	2.2 U
Naphthalene	12,000	100,000	41 U	1 U	1 U	1.1 U
Nitrobenzene	NS	NS	83 U	2 U	2 U	2.2 U
N-Nitroso-di-n-propylamine	NS	NS	83 U	2 U	2 U	2.2 U
N-Nitrosodiphenylamine	NS	NS	210 U	5 U	5 U	5.4 U
Pentachlorophenol	800	6,700	410 U	10 U	10 U	11 U
Phenanthrene	100,000	100,000	61.3	1 U	1 U	1.1 U
Phenol	330	100,000	83 U	2 U	2 U	2.2 U
Pyrene	100,000	100,000	68.7	1 U	1 U	1.1 U

Table 3
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Metals

Client ID	**NYSDEC**	**NYSDEC**	**SB-1 (0-2)**	**SB-1 (8-10)**	**SB-2 (0-2)**	**SB-2 (8-10)**	**SB-3 (0-2)**	**SB-3 (8-10)**	**SB-4 (0-2)**	**SB-4 (8-10)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-1**	**JB60086-2**	**JB60086-3**	**JB60086-4**	**JB60086-5**	**JB60086-6**	**JB60086-7**	**JB60086-8**
Date Sampled	**Unrestricted**	**Restricted**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1/2 †**
		SCO								
mg/kg	**mg/kg**	**mg/kg**								
Aluminum	**NS**	**NS**	17,600	10,600 J	10,000	12,600	7,590	4,920	7,290	7,600
Antimony	**NS**	**NS**	2.3 U	2.2 UJ	2.3 U	2.3 U	2.3 U	2.4 U	4.1	10.4
Arsenic	**13**	**16**	3.7	2.2	4.9	11.9	5.2	3.3	4.8	6.4
Barium	**350**	**400**	63.5	61.2	313	44.6	**588**	**487**	**592**	**923**
Beryllium	**7.2**	**72**	0.8	0.51	0.48	1.9	0.33	0.47	0.34	0.35
Cadmium	**2.5**	**4.3**	0.57 U	0.55 U	0.58 U	0.58 U	0.58 U	0.6 U	1.9	**6.8**
Calcium	**NS**	**NS**	2,880	8,120	57,800	60,600	63,700	71,400	51,400	28,000
Chromium	**30**	**180**	29.3	25.6	19.4	**33**	17.7	13.4	**34.9**	25.6
Cobalt	**NS**	**NS**	11	7.3	6.8	12.4	5.8 U	6 U	5.6 U	7.3
Copper	**50**	**270**	**60.7**	**267**	27.2	14.8	17.4	14	27.8	**51.9**
Iron	**NS**	**NS**	24,900	15,000 J	19,400	18,600	11,400	8,340	13,200	17,700
Lead	**63**	**400**	11.4	13.7	**201**	11.7	**199**	**97.9**	**598**	**2,760**
Magnesium	**NS**	**NS**	5,590	4,360 J	24,400	57,300	19,400	36,200	24,400	14,600
Manganese	**1,600**	**2,000**	402	277	293	653	194	237	308	294
Mercury	**0.18**	**0.81**	0.036 U	0.034 U	**0.65**	0.033 U	0.13	0.036 U	0.14	**0.95**
Nickel	**30**	**310**	26.5	19.6	15.3	28.4	12.3	11.9	11	19
Potassium	**NS**	**NS**	2,850	2,460	2,000	1,200 U	1,880	1,200 U	1,820	2,120
Selenium	**3.9**	**180**	2.3 U	2.2 U	2.3 U	2.3 U	2.3 U	2.4 U	2.3 U	2.3 U
Silver	**2**	**180**	0.57 U	0.55 U	0.58 U	0.58 U	0.77	0.71	1.1	**17.1**
Sodium	**NS**	**NS**	1,100 U	1,100 U	1,200 U	1,200 U	1,200 U	1,200 U	1,100 U	1,100 U
Thallium	**NS**	**NS**	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U
Vanadium	**NS**	**NS**	40.1	26	26.3	32.2	24.6	13.6	24.1	35.3
Zinc	**109**	**10,000**	53	79.8 J	**197**	70.2	**274**	**273**	**637**	**1,470**

Notes: **† =** Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 3
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Metals

Client ID	NYSDEC	NYSDEC	SB-5 (0-2)	SB-5 (8-10)	SB-6 (0-2)	SB-6 (5-7)	SB-7 (0-2)	SB-7 (5-7)	SB-8 (0-2)	SB-8 (0-2)FD
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-9**	**JB60086-10**	**JB60086-11**	**JB60086-12**	**JB60086-13**	**JB60086-14**	**JB60086-32**	**JB60086-15**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/18/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1/2 ‡**	**1**	**1**	**1**	**1**	**1**	**1/3/5 ‡**	**1/3 ‡**
		SCO								
mg/kg	**mg/kg**	**mg/kg**								
Aluminum	**NS**	**NS**	11,500	5,720	9,240	5,990	11,200	16,500	8,550	10,300
Antimony	**NS**	**NS**	5.4 Ub	2.1 U	2 U	2.5 U	2.2 U	2.1 U	6.7 UJb	2.2 U
Arsenic	**13**	**16**	13 b	2.2	2.1	3.8	3.4	3.6	6.7 UJb	5.5 J
Barium	**350**	**400**	**592**	25	48.2	**2,900**	32.4	75.2	**379 J**	**389**
Beryllium	**7.2**	**72**	0.67	0.42	0.63	0.36	0.55	0.79	0.38	0.49
Cadmium	**2.5**	**4.3**	1.3 Ub	0.52 U	0.51 U	1	0.56 U	0.53 U	2 b	0.54 U
Calcium	**NS**	**NS**	42,200	62,200	54,000	71,700	39,100	2,890	18,300	37,400
Chromium	**30**	**180**	**40.4** b	10.6	17	15.8	**36.9**	**35.3**	27.6 b	19.8
Cobalt	**NS**	**NS**	18.3	5.2 U	7.2	6.8	8.5	12.7	5.6 UJ	7.5 J
Copper	**50**	**270**	**71.5** b	16	**329**	24.6	41	35.6	**54.6 Jb**	31.1
Iron	**NS**	**NS**	89,400	15,600	14,300	10,800	17,000	24,300	81,900 J	18,000 J
Lead	**63**	**400**	**678** b	9.4	24.2	**156**	7	9.9	**667 Jb**	**300 J**
Magnesium	**NS**	**NS**	17,500	48,000	40,100	17,900	37,800	9,340	6,200 J	15,400 J
Manganese	**1,600**	**2,000**	584 b	263	332	242	302	442	269 **Jb**	496 J
Mercury	**0.18**	**0.81**	0.14	0.033 U	0.033 U	0.042 U	0.033 U	0.033 U	**2.2 J**	**1.2 J**
Nickel	**30**	**310**	**31.9**	9.5	16.3	10.1	26.6	**30.5**	10.1	17.1
Potassium	**NS**	**NS**	1,960	1,330	3,180	1,470	1,400	2,790	1,670	1,930
Selenium	**3.9**	**180**	5.4 Ub	2.1 U	2 U	2.5 U	2.2 U	2.1 U	6.7 Ub	2.2 U
Silver	**2**	**180**	1.3 U	0.61	0.51 U	1.5	0.56 U	0.53 U	1.7 UJb	0.59 J
Sodium	**NS**	**NS**	1,300 U	1,000 U	1,000 U	1,200 U	1,100 U	1,100 U	1,100 U	1,100 U
Thallium	**NS**	**NS**	2.7 U	1 U	1 U	1.2 U	1.1 U	1.1 U	3.4 Ub	1.1 U
Vanadium	**NS**	**NS**	48.9	17.3	22.1	24.9	33	41.8	29	26.2
Zinc	**109**	**10,000**	**519** b	60	103	**895**	54.6	56.8	**1,220 Jb**	**214 J**

Notes: † = Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 3
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Metals

Client ID	**NYSDEC**	**NYSDEC**	**SB-8 (7-9)**	**SB-8 (7-9)B**	**SB-9 (0-2)**	**SB-9 (8-10)**	**SB-10 (0-2)**	**SB-10 (0-2)B**	**SB-10 (8-10)**	**SB-10 (8-10)FD**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-16**	**JB60086-34**	**JB60086-17**	**JB60086-36**	**JB60086-37**	**JB60086-35**	**JB60086-33**	**JB60086-20**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/25/2014**	**2/25/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**	**1**	**1/2 ‡**	**1**	**1**
		SCO								
mg/kg	**mg/kg**	**mg/kg**								
Aluminum	**NS**	**NS**	9,590 J	5,200 J	7,600	11,300	11,100 J	10,600 J	8,000 J	19,800 J
Antimony	**NS**	**NS**	2.5 U	2.3 U	2.4 U	2.2 U	2.3 U	4.7 U	2.2 UJ	2.1 U
Arsenic	**13**	**16**	5.8	4.7	8.9	2.2	6.7 J	**18.4 J**	3.5	2.9
Barium	**350**	**400**	**1,580 J**	**554 J**	246	57.8	**999 J**	**716 J**	35.1 J	119 J
Beryllium	**7.2**	**72**	0.44	0.42	0.38	0.67	0.35 J	0.64 J	0.33	0.28
Cadmium	**2.5**	**4.3**	0.9	0.62	0.65	0.55 U	0.87 J	2.2 J	0.54 UJ	0.69 J
Calcium	**NS**	**NS**	53,100	55,200	17,800	4,300	50,400 J	23,000 J	39,200 J	64,900 J
Chromium	**30**	**180**	15.2	12.5	23.3	25.8	19.7 J	**36.5 Jb**	**44.7 J**	**70.2 J**
Cobalt	**NS**	**NS**	6.3 U	6.8	6.3	10.5	5.8 U	9.3	6.4 J	13.2 J
Copper	**50**	**270**	16.1 J	30.3 J	29.5	24	26.3 J	**138 Jb**	9.9	8.1
Iron	**NS**	**NS**	10,900	10,000	46,600	18,800	15,200 J	55,400 J	14,400 J	28,500 J
Lead	**63**	**400**	**465**	**565**	**245**	9.1	**452 J**	**3,530 Jb**	6	6.4
Magnesium	**NS**	**NS**	11,100	9,220	4,920	5,340	8,350 J	13,100 J	26,900 J	56,600 J
Manganese	**1,600**	**2,000**	266	231	425	376	327 J	550 Jb	267	361
Mercury	**0.18**	**0.81**	**0.29**	0.14	0.13	0.034 U	**0.2 J**	**1.8 J**	0.034 U	0.032 U
Nickel	**30**	**310**	10.1	12.5	17.8	23.5	14.6 J	**32.4 J**	18.7 J	**52.3 J**
Potassium	**NS**	**NS**	1,300 U	1,100 U	1,610	3,180	1,490 J	2,920 J	2,600 J	4,210 J
Selenium	**3.9**	**180**	2.5 U	2.3 U	2.8	2.2 U	2.3 U	**5.2 b**	2.2 UJ	2.6 J
Silver	**2**	**180**	1.2	0.84	1	1	1.1 J	1.2 UJb	0.54 U	0.53 U
Sodium	**NS**	**NS**	1,300 U	1,100 U	1,200 U	1,100 U	1,200 U	1,200 U	1,100 U	1,100 U
Thallium	**NS**	**NS**	1.3 U	1.1 U	1.2 U	1.1 U	1.2 U	2.3 Ub	1.1 U	1.1 U
Vanadium	**NS**	**NS**	21.3	18.4	23.9	38.5	23.9 J	63.6 J	28.7 J	61.3 J
Zinc	**109**	**10,000**	**669**	**569**	**431**	77.5	**463 J**	**1,780 Jb**	**124**	96.2

Notes: † = Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 3
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Metals

Client ID	**NYSDEC**	**NYSDEC**	**SB-11 (0-2)**	**SB-11 (8-10)**	**SB-12 (0-2)**	**SB-13 (0-2)**	**SB-13 (8-10)**	**SB-14 (0-2)**	**SB-14 (8-10)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-21**	**JB60086-22**	**JB60086-23**	**JB60086-24**	**JB60086-25**	**JB60086-26**	**JB60086-27**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**	**1/100 †**	**1**	**1**
		SCO							
mg/kg	**mg/kg**	**mg/kg**							
Aluminum	**NS**	**NS**	10,300	10,700	7,760	8,400	6,930	6,710	6,470
Antimony	**NS**	**NS**	2.2 U	2.5 U	2.3 U	2.2 U	2.3 U	2.4 U	2.1 U
Arsenic	**13**	**16**	3.3	2.5 U	2.3 U	2.4	6	4.2	2.1 U
Barium	**350**	**400**	136	70.1	43.2	**383**	**668**	**2,200**	32.1
Beryllium	**7.2**	**72**	0.43	0.48	0.39	0.27	0.39	0.3	0.42
Cadmium	**2.5**	**4.3**	0.91	0.63 U	0.57 U	0.56 U	0.64	**2.8**	0.52 U
Calcium	**NS**	**NS**	36,000	3,720	18,000	30,600	29,600	92,100	54,000
Chromium	**30**	**180**	20	26.8	23.8	16.1	**31.2**	13.7	15.8
Cobalt	**NS**	**NS**	6.8	6.3 U	7.5	6	8.1	6.1 U	6.1
Copper	**50**	**270**	26.5	11.3	18.9	23.5	**60.8**	17.5	17
Iron	**NS**	**NS**	14,700	13,900	15,500	13,600	30,400	11,400	13,000
Lead	**63**	**400**	**203**	28.3	13	**136**	**220**	**683**	10.8
Magnesium	**NS**	**NS**	12,300	4,670	11,000	5,120	8,240	15,000	40,500
Manganese	**1,600**	**2,000**	247	197	293	224	253	238	211
Mercury	**0.18**	**0.81**	0.16	0.089	0.04	**0.39**	**34.8**	0.1	0.036 U
Nickel	**30**	**310**	20.6	13.1	17.9	9.6	27.2	9.7	13.4
Potassium	**NS**	**NS**	3,360	1,300 U	2,140	4,960	2,420	1,200 U	1,440
Selenium	**3.9**	**180**	2.2 U	2.5 U	2.3 U	2.2 U	2.3 U	2.4 U	2.1 U
Silver	**2**	**180**	0.54 U	0.63 U	0.57 U	**55.1**	1.9	1.3	0.52 U
Sodium	**NS**	**NS**	1,100 U	1,300 U	1,100 U	1,100 U	1,100 U	1,200 U	1,000 U
Thallium	**NS**	**NS**	1.1 U	1.3 U	1.1 U	1.1 U	1.1 U	1.2 U	1 U
Vanadium	**NS**	**NS**	28.7	24.7	27.4	22.7	21.4	17.6	23.6
Zinc	**109**	**10,000**	**153**	42.2	35.5	**192**	**1,220**	**921**	34.6

Notes: † = Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 3
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Metals

Client ID	NYSDEC	NYSDEC	SSB-1 (0-2)	SSB-1 (5-7)	SSB-1 (7-9)	SSB-2 (0-2)	SSB-X	SSB-2 (5-7)	SSB-2 (8-10)
Lab Sample ID	Part 375	Part 375	JB88935-1	JB88935-2	JB88935-3	JB88935-4	JB88935-7	JB88935-5	JB88935-6
Date Sampled	Unrestricted	Restricted	2/25/2015	2/25/2015	2/25/2015	2/25/2015	2/25/2015	2/25/2015	2/25/2015
Dilution	SCO	Residential	1/2/100 †	1/10 †	1	1	1	1	1
		SCO							
mg/kg	mg/kg	mg/kg							
Aluminum	NS	NS	16,100	9,410	10,900	11,300	12,000	13,200	11,500
Antimony	NS	NS	5.2	4.3	2 U	2.2 U	2.3 U	2.2 U	2.3 U
Arsenic	13	16	**16.1** c	**14.5**	4.6	3.3	3	3.1	6
Barium	350	400	**792**	**492**	139	53.6	56.4	70.5	119
Beryllium	7.2	72	0.67	0.56	0.64	0.74	0.7	0.81	0.65
Cadmium	2.5	4.3	**11.9** c	**17.7**	**4.3**	0.55 U	0.57 U	0.55 U	2.1
Calcium	NS	NS	39,700	15,500	6,740	3,030	3,300	6,120	11,800
Chromium	30	180	62.2 c	52.7	32.9	26.5	25.2	36.3	33.2
Cobalt	NS	NS	12.8	9.9	10.5	9.5	9.6	11.3	9.7
Copper	50	270	**198** c	**270**	**95.3**	29.9	31.1	21.9	33.3
Iron	NS	NS	61,400	31,600	30,400	20,000	19,700	23,600	29,600
Lead	63	400	**935** c	**1,940**	**373**	17	27	**100**	**450**
Magnesium	NS	NS	4,940	4,230	6,440	5,500	5,750	6,280	5,570
Manganese	1,600	2,000	456 c	272	229	413	479	415	345
Mercury	0.18	0.81	**44**	**5.3**	**0.82**	0.034 U	0.033 U	0.057	0.13
Nickel	30	310	**34.7**	**43.1**	**30.6**	18.8	20.3	23.3	21.4
Potassium	NS	NS	1,380	1,220	2,290	2,080	2,040	4,440	3,400
Selenium	3.9	180	4 Uc	2 U	2 U	2.2 U	2.3 U	2.2 U	2.3 U
Silver	2	180	1.5 c	1.5	0.9	1.4	1.4	1	0.97
Sodium	NS	NS	1,620	1,000 U	1,000 U	1,100 U	1,100 U	1,100 U	1,100 U
Thallium	NS	NS	2 Uc	1 U	1 U	1.1 U	1.1 U	1.1 U	1.1 U
Vanadium	NS	NS	73.2 c	52.8	33.9	30.2	29.4	35.5	31.1
Zinc	109	10,000	**1,280**	**1,320**	**404**	73	71	99	**633**

Notes: † = Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 3
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Metals

Client ID	**NYSDEC**	**NYSDEC**	**SSB-3 (0-2)**	**SSB-3 (5-7)**	**SSB-3 (7.5-9.5)**	**SS-1**	**FIELD BLANK**	**FIELD BLANK**	**FB20150226**
Lab Sample ID	**Part 375**	**Part 375**	**JB88935-8**	**JB88935-9**	**JB88935-10**	**JB88569-2**	**JB60086-30**	**JB60086-31**	**JB88935-12**
Date Sampled	**Unrestricted**	**Restricted**	**2/26/2015**	**2/26/2015**	**2/26/2015**	**2/19/2015**	**2/19/2014**	**2/19/2014**	**2/26/2015**
Dilution	**SCO**	**Residential**	**1**	**1**	**1/2 †**	**1/2/3 †**	**1**	**1**	**1**
		SCO							
mg/kg	**mg/kg**	**mg/kg**					**mg/L**	**mg/L**	**µg/L**
Aluminum	**NS**	**NS**	14,500	61,500	9,390	6,810	200 U	200 U	200 U
Antimony	**NS**	**NS**	2.3 U	2.3 U	2.3 U	7.4 c	6 U	6 U	6 U
Arsenic	**13**	**16**	4.4	3.9	4.3	**13.3**	3 U	3 U	3 U
Barium	**350**	**400**	51.1	148	66.8	124	200 U	200 U	200 U
Beryllium	**7.2**	**72**	0.66	2.6	1.5	0.22	1 U	1 U	1 U
Cadmium	**2.5**	**4.3**	0.57 U	0.6	0.62	**7.1** c	3 U	3 U	3 U
Calcium	**NS**	**NS**	1,290	16,100	1,530	36,500	5000 U	5000 U	5,000 U
Chromium	**30**	**180**	26.4	61.9	30.1	50.1 c	10 U	10 U	10 U
Cobalt	**NS**	**NS**	8.5	18.5	16.9	25.4	50 U	50 U	50 U
Copper	**50**	**270**	14.4	44.8	36.1	**130** c	10 U	10 U	10 U
Iron	**NS**	**NS**	22,000	38,900	37,200	73,700	100 U	100 U	100 U
Lead	**63**	**400**	8	15	7	**354** c	3 U	3 U	3 U
Magnesium	**NS**	**NS**	4,280	15,400	3,440	3,660	5000 U	5000 U	5,000 U
Manganese	**1,600**	**2,000**	265	450	1,520	547 c	15 U	15 U	15 U
Mercury	**0.18**	**0.81**	0.035 U	0.035 U	0.033 U	0.038 U	0 U	0 U	0.2 U
Nickel	**30**	**310**	16.8	**38.6**	28.3	**35.7**	10 U	10 U	10 U
Potassium	**NS**	**NS**	1,660	6,490	1,290	2,080	10000 U	10000 U	10,000 U
Selenium	**3.9**	**180**	2.3 U	2.3 U	2.3 U	4 Uc	10 U	10 U	10 U
Silver	**2**	**180**	1.4	1.3	0.58 U	1.5 Uc	10 U	10 U	10 U
Sodium	**NS**	**NS**	1,100 U	2,860	1,200 U	1,000	10000 U	10000 U	10,000 U
Thallium	**NS**	**NS**	1.1 U	1.1 U	2.3 Uc	2 Uc	2 U	2 U	2 U
Vanadium	**NS**	**NS**	34.9	95.1	45.4	41.2	50 U	50 U	50 U
Zinc	**109**	**10,000**	35	95	71	**833**	20 U	20 U	20 U

Notes: **† =** Second result is the dilution rate for Mercury.

‡ = The dilution rate varies.

b = Elevated detection limit due to dilution required for high interfering element.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	**NYSDEC**	**NYSDEC**	**SB-1 (0-2)**	**SB-1 (8-10)**	**SB-2 (0-2)**	**SB-2 (8-10)**	**SB-3 (0-2)**	**SB-3 (8-10)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-1**	**JB60086-2**	**JB60086-3**	**JB60086-4**	**JB60086-5**	**JB60086-6**
Date Sampled	**Unrestricted**	**Restricted**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/18/2014**	**2/19/2014**	**2/19/2014**
Dilution	**SCO**	**Residential SCO**	**1**	**1**	**1**	**1**	**1**	**1**
Polychlorinated Biphenyls - µg/Kg	**µg/Kg**	**µg/Kg**						
Aroclor 1016	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1221	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1232	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1242	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1248	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1254	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1260	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1262	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Aroclor 1268	**NS**	**NS**	3.6 U	3.5 U	3.8 U	3.7 U	3.6 U	3.6 U
Total PCBs	**100**	**1,000**	ND	ND	ND	ND	ND	ND

Pesticides - µg/Kg

Dilution			**1**	**5**	**10**	**1**	**20**	**50**
4,4'-DDD	**3.3**	**13,000**	0.069 U	0.067 U	**5.8**	0.073 U	**5.3**	**6.8 J**
4,4'-DDE	**3.3**	**8,900**	0.085 J	**11.5 D**	3.2	0.073 U	**6.9**	**5.4 JD**
4,4'-DDT	**3.3**	**7,900**	0.069 U	0.16 J	**40 D**	0.073 U	**59 D**	**70.1 D**
Aldrin	**5**	**97**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
alpha-BHC	**20**	**480**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
alpha-Chlordane	**94**	**4,200**	0.069 U	0.53	4.5 J	0.073 U	2.7 J	2.9
beta-BHC	**36**	**360**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
delta-BHC	**40**	**100,000**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Dieldrin	**5**	**200**	0.069 U	1.2	**14 D**	0.073 U	**5.5**	**5.2 J**
Endosulfan sulfate	**2,400**	**24,000**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Endosulfan-I	**2,400**	**24,000**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Endosulfan-II	**2,400**	**24,000**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Endrin	**14**	**11,000**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Endrin aldehyde	**NS**	**NS**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Endrin ketone	**NS**	**NS**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
gamma-BHC (Lindane)	**100**	**1,300**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
gamma-Chlordane	**NS**	**NS**	0.069 U	0.66 JN	5 J	0.073 U	3.1 JN	2.4 JN
Heptachlor	**42**	**2,100**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Heptachlor epoxide	**NS**	**NS**	0.069 U	0.067 U	0.072 U	0.073 U	0.07 U	0.069 U
Methoxychlor	**NS**	**NS**	0.14 U	0.98	1.4 U	0.15 U	0.14 U	6.9 U
Toxaphene	**NS**	**NS**	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U	1.7 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	NYSDEC	NYSDEC	SB-4 (0-2)	SB-4 (8-10)	SB-5 (0-2)	SB-5 (8-10)	SB-6 (0-2)	SB-6 (5-7)	SB-7 (0-2)	SB-7 (5-7)
Lab Sample ID	Part 375	Part 375	JB60086-7	JB60086-8	JB60086-9	JB60086-10	JB60086-11	JB60086-12	JB60086-13	JB60086-14
Date Sampled	Unrestricted	Restricted	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/18/2014	2/18/2014
Dilution	SCO	Residential	1	1	1	1	1	1	1	1
		SCO								
Polychlorinated Biphenyls - µg/Kg	µg/Kg	µg/Kg								
Aroclor 1016	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1221	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1232	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1242	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1248	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1254	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1260	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1262	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Aroclor 1268	NS	NS	3.9 U	3.6 U	4.4 U	3.5 U	3.6 U	4.2 U	3.6 U	3.6 U
Total PCBs	100	1,000	ND	ND	ND	ND	ND	ND	ND	ND

Pesticides - µg/Kg

Dilution			100	50	20	1	1	1	1	1
4,4'-DDD	3.3	13,000	**65.9 D**	**49.6**	**37.2**	0.066 U	0.066 U	**4.3 JN**	0.073 U	0.07 U
4,4'-DDE	3.3	8,900	**41.9 D**	**32.8**	**33.6**	0.066 U	0.44	2.1 J	2.8	0.24 J
4,4'-DDT	3.3	7,900	**330 D**	**300**	**143**	0.066 U	0.066 U	2.7 J	0.073 U	0.07 U
Aldrin	5	97	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
alpha-BHC	20	480	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
alpha-Chlordane	94	4,200	1.9 J	3.5 U	12.4	0.066 U	0.066 U	1.1 JN	0.14 JN	0.07 U
beta-BHC	36	360	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.59 JN	0.073 U	0.07 U
delta-BHC	40	100,000	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Dieldrin	5	200	**6.2 J**	**5.6**	**20.8**	0.066 U	0.066 U	4.2 JN	0.16 J	0.07 U
Endosulfan sulfate	2,400	24,000	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Endosulfan-I	2,400	24,000	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Endosulfan-II	2,400	24,000	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Endrin	14	11,000	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Endrin aldehyde	NS	NS	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	1.9 JN	0.073 U	0.07 U
Endrin ketone	NS	NS	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
gamma-BHC (Lindane)	100	1,300	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
gamma-Chlordane	NS	NS	1.7 JN	3.5 U	7.8 J	0.066 U	0.066 U	2.7 J	0.18 JN	0.07 U
Heptachlor	42	2,100	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Heptachlor epoxide	NS	NS	0.069 U	3.5 U	1.6 U	0.066 U	0.066 U	0.076 U	0.073 U	0.07 U
Methoxychlor	NS	NS	14 U	7 U	3.2 U	0.13 U	0.13 U	0.15 U	0.15 U	0.14 U
Toxaphene	NS	NS	1.7 U	87 U	40 U	1.6 U	1.6 U	1.9 U	1.8 U	1.8 U

Notes: a = More than 40 % RPD for detected concentrations between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	**NYSDEC**	**NYSDEC**	**SB-8 (0-2)**	**SB-8 (0-2) FD**	**SB-8 (7-9)**	**SB-8 (7-9)B**	**SB-9 (0-2)**	**SB-9 (8-10)**
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-32**	**JB60086-15**	**JB60086-16**	**JB60086-34**	**JB60086-17**	**JB60086-36**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/25/2014**
Dilution	**SCO**	**Residential SCO**	**1**	**1**	**1**	**1**	**1**	**1**
Polychlorinated Biphenyls - µg/Kg	**µg/Kg**	**µg/Kg**						
Aroclor 1016	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1221	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1232	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1242	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1248	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1254	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1260	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1262	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Aroclor 1268	**NS**	**NS**	3.3 U	3.8 U	3.7 U	3.9 U	3.8 U	3.6 U
Total PCBs	**100**	**1,000**	ND	ND	ND	ND	ND	ND

Pesticides - µg/Kg

Dilution			**100**	**100**	**100**	**100**	**100**	**100**
4,4'-DDD	**3.3**	**13,000**	**4.4 J**	**25 JD**	**58 JD**	**20.7 JD**	**80.5 D**	**29.1 JD**
4,4'-DDE	**3.3**	**8,900**	**7.3 JD**	**5.9 JN**	**61.1 D**	**95.4 D**	**37.4 D**	**214 D**
4,4'-DDT	**3.3**	**7,900**	**150 JD**	**50.4 JD**	**96.7 JD**	**561 JD**	**110 D**	**1,130 D**
Aldrin	**5**	**97**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
alpha-BHC	**20**	**480**	0.64 JN	0.29 JN	1.6 JN	0.079 UJ	0.078 U	0.072 U
alpha-Chlordane	**94**	**4,200**	0.075 UJ	3 J	20.3 D	30.4 D	7.1	40.2 JD
beta-BHC	**36**	**360**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
delta-BHC	**40**	**100,000**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
Dieldrin	**5**	**200**	4.2 J	**8.5 JD**	**29.2 JD**	**26.6 D**	**5.3** JNa	**33.9 D**
Endosulfan sulfate	**2,400**	**24,000**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
Endosulfan-I	**2,400**	**24,000**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
Endosulfan-II	**2,400**	**24,000**	0.075 UJ	1.3 JN	4.4 JN	0.079 UJ	0.078 U	0.072 U
Endrin	**14**	**11,000**	0.075 UJ	12.5 JD	**29.4 JD**	0.079 UJ	0.078 U	0.072 U
Endrin aldehyde	**NS**	**NS**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
Endrin ketone	**NS**	**NS**	0.075 U	0.071 U	0.079 U	0.079 U	0.078 U	0.072 U
gamma-BHC (Lindane)	**100**	**1,300**	0.79 JN	0.071 U	0.079 U	0.079 U	0.078 U	1 JN
gamma-Chlordane	**NS**	**NS**	1.9 JN	2.9 J	12 D	24.7 D	5.5	45.2 D
Heptachlor	**42**	**2,100**	0.49 J	0.071 UJ	0.079 U	0.079 U	0.078 U	0.072 U
Heptachlor epoxide	**NS**	**NS**	0.7 J	0.071 UJ	1.3 J	0.079 UJ	0.078 U	0.072 U
Methoxychlor	**NS**	**NS**	0.15 U	0.14 U	0.16 UJ	23.8 JD	0.16 U	0.14 U
Toxaphene	**NS**	**NS**	1.9 U	1.8 U	2 U	2 U	1.9 U	1.8 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	NYSDEC	NYSDEC	SB-10 (0-2)	SB-10 (0-2)B	SB-10 (8-10)	SB-10 (8-10)FD	SB-11 (0-2)	SB-11 (8-10)	SB-12 (0-2)
Lab Sample ID	Part 375	Part 375	JB60086-37	JB60086-35	JB60086-33	JB60086-20	JB60086-21	JB60086-22	JB60086-23
Date Sampled	Unrestricted	Restricted	2/25/2014	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/19/2014	2/18/2014
Dilution	SCO	Residential	1	1	1	1	1	1	1
		SCO							
Polychlorinated Biphenyls - µg/Kg	µg/Kg	µg/Kg							
Aroclor 1016	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1221	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1232	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1242	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1248	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1254	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1260	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	8.4	4.3 U	3.6 U
Aroclor 1262	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Aroclor 1268	NS	NS	3.8 U	3.8 U	3.4 U	3.5 U	3.7 U	4.3 U	3.6 U
Total PCBs	100	1,000	ND	ND	ND	ND	8.4	ND	ND

Pesticides - µg/Kg

Dilution			20	100	1	1	5	1	1
4,4'-DDD	3.3	13,000	**4.6 D**	**5.4 J**	0.11 J	0.07 UJ	1 Ja	0.079 U	0.065 U
4,4'-DDE	3.3	8,900	**13.9 JD**	**118 JD**	0.67 J	0.07 UJ	2.4	0.079 U	0.2 J
4,4'-DDT	3.3	7,900	**77.8 JD**	**582 JD**	**3.8 J**	0.07 UJ	**14.7 D**	0.079 U	0.13 J
Aldrin	5	97	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
alpha-BHC	20	480	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
alpha-Chlordane	94	4,200	4.9 J	12.9 JD	0.15 J	0.07 UJ	1.3	0.079 U	0.22
beta-BHC	36	360	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
delta-BHC	40	100,000	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Dieldrin	5	200	**7.7 JD**	**36.8 JD**	0.28 Ja	0.07 UJ	1.6	0.079 U	0.17 J
Endosulfan sulfate	2,400	24,000	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Endosulfan-I	2,400	24,000	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Endosulfan-II	2,400	24,000	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Endrin	14	11,000	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Endrin aldehyde	NS	NS	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.12
Endrin ketone	NS	NS	0.073 U	0.073 U	0.14 JNa	0.07 UJ	0.42 Ja	0.079 U	0.065 U
gamma-BHC (Lindane)	100	1,300	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
gamma-Chlordane	NS	NS	5.2	7.4 JD	0.12 J	0.07 UJ	1.3	0.079 U	0.2
Heptachlor	42	2,100	0.073 U	0.073 U	0.064 U	0.07 U	0.074 U	0.079 U	0.065 U
Heptachlor epoxide	NS	NS	0.37 JN	1.2 J	0.064 U	0.07 U	0.099 Ja	0.079 U	0.065 U
Methoxychlor	NS	NS	0.15 U	0.15 U	0.13 U	0.14 U	0.15 U	0.16 U	0.13 U
Toxaphene	NS	NS	1.8 U	1.8 U	1.6 U	1.8 U	1.9 U	2 U	1.6 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	NYSDEC	NYSDEC	SB-13 (0-2)	SB-13 (8-10)	SB-14 (0-2)	SB-14 (8-10)	SSB-1 (0-2)	SSB-1 (5-7)	SSB-1 (7-9)
Lab Sample ID	**Part 375**	**Part 375**	**JB60086-24**	**JB60086-25**	**JB60086-26**	**JB60086-27**	**JB88935-1**	**JB88935-2**	**JB88935-3**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/19/2014**	**2/25/2015**	**2/25/2015**	**2/25/2015**
Dilution	**SCO**	**Residential**	**10**	**1**	**1**	**1**	**1/20 †**	**1/5 †**	**1**
		SCO							
Polychlorinated Biphenyls - µg/Kg	**µg/Kg**	**µg/Kg**							
Aroclor 1016	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1221	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1232	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1242	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1248	**NS**	**NS**	910 D	110	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1254	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1260	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Aroclor 1262	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	14,700 D	3,030 b	485 a
Aroclor 1268	**NS**	**NS**	3.8 U	3.9 U	3.7 U	3.5 U	46 U	40 U	40 U
Total PCBs	**100**	**1,000**	**910**	**110**	ND	ND	**14,700**	**3,030**	**485**

Pesticides - µg/Kg

Dilution			10	10,000	100	1	1/100/500 †	1/100/500 †	1/100/500 †
4,4'-DDD	**3.3**	**13,000**	0.071 U	**2,180 D**	**48.8 D**	0.66	**7,320** D	**7,280**	**2,150**
4,4'-DDE	**3.3**	**8,900**	**4.6 Ja**	**661 D**	**214 D**	1.8	**2,710** D	**1,030**	**530**
4,4'-DDT	**3.3**	**7,900**	**37 D**	**10,400 D**	**610 D**	**3.5**	0.94 U	0.79 U	0.84 U
Aldrin	**5**	**97**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
alpha-BHC	**20**	**480**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
alpha-Chlordane	**94**	**4,200**	1.6 J	0.07 U	30.1 D	0.23 Ja	**19,400** JD	**13,600** a	**8,330** a
beta-BHC	**36**	**360**	0.071 U	0.84 JNa	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
delta-BHC	**40**	**100,000**	0.071 U	1.8 JNa	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
Dieldrin	**5**	**200**	**6.2** JNa	3.6	**74.5 D**	0.8	**8,930** D	**20,300**	**3,210**
Endosulfan sulfate	**2,400**	**24,000**	0.071 U	0.07 U	0.64 JN	0.068 U	0.94 U	0.79 U	0.84 U
Endosulfan-I	**2,400**	**24,000**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
Endosulfan-II	**2,400**	**24,000**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
Endrin	**14**	**11,000**	0.071 U	0.07 U	3.3	0.068 U	**817** D	**834**	**330**
Endrin aldehyde	**NS**	**NS**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
Endrin ketone	**NS**	**NS**	0.071 U	0.07 U	4.9 J	0.25	0.94 U	453	43.1
gamma-BHC (Lindane)	**100**	**1,300**	1.7 Ja	1.4 Ja	0.15 JN	0.068 U	**253** D	**958**	0.84 U
gamma-Chlordane	**NS**	**NS**	2.7 Ja	0.07 U	29 D	0.2	21,600 D	15,200	9,150
Heptachlor	**42**	**2,100**	0.071 U	0.07 U	0.23 JN	0.068 U	0.94 U	0.79 U	**938**
Heptachlor epoxide	**NS**	**NS**	0.071 U	0.07 U	0.071 U	0.068 U	0.94 U	0.79 U	0.84 U
Methoxychlor	**NS**	**NS**	0.14 U	0.14 U	3.8 JN	0.47 Ja	1.9 U	1.6 U	1.7 U
Toxaphene	**NS**	**NS**	1.8 U	1.8 U	1.8 U	1.7 U	23 U	20 U	21 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY
Soil Analytical Results
Polychlorinated Biphenyls & Pesticides

Client ID	NYSDEC	NYSDEC	SSB-2 (0-2)	SSB-X	SSB-2 (5-7)	SSB-2 (8-10)	SSB-3 (0-2)	SSB-3 (5-7)	SSB-3 (7.5-9.5)
Lab Sample ID	Part 375	Part 375	JB88935-4	JB88935-7	JB88935-5	JB88935-6	JB88935-8	JB88935-9	JB88935-10
Date Sampled	Unrestricted	Restricted	2/25/2015	2/25/2015	2/25/2015	2/25/2015	2/26/2015	2/26/2015	2/26/2015
Dilution	SCO	Residential	1	1	1	1	1	1	1
		SCO							
Polychlorinated Biphenyls - µg/Kg	µg/Kg	µg/Kg							
Aroclor 1016	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1221	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1232	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1242	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1248	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1254	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1260	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1262	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Aroclor 1268	NS	NS	36 U	35 U	36 U	36 U	36 U	36 U	37 U
Total PCBs	100	1,000	ND	ND	ND	ND	ND	ND	ND

Pesticides - µg/Kg

Dilution			1	1	1	1	1	1	1
4,4'-DDD	3.3	13,000	1.2	1.2	**7.9**	**6.8**	0.72 U	0.73 U	0.73 U
4,4'-DDE	3.3	8,900	1.9	2.3	**61.2**	**59.3**	2.6	**20.2**	0.73 U
4,4'-DDT	3.3	7,900	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Aldrin	5	97	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
alpha-BHC	20	480	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
alpha-Chlordane	94	4,200	2.2	3.7	16.1	12.3	0.72 U	1.6	0.73 U
beta-BHC	36	360	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
delta-BHC	40	100,000	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Dieldrin	5	200	1.1	2.6	**40.5**	**16.3**	0.72 U	2.8	0.73 U
Endosulfan sulfate	2,400	24,000	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Endosulfan-I	2,400	24,000	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Endosulfan-II	2,400	24,000	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Endrin	14	11,000	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Endrin aldehyde	NS	NS	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Endrin ketone	NS	NS	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
gamma-BHC (Lindane)	100	1,300	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
gamma-Chlordane	NS	NS	2.7	5.5	30.6	31.2	0.72 U	2.6 a	0.73 U
Heptachlor	42	2,100	0.69 U	0.73 U	0.94	0.73 U	0.72 U	0.73 U	0.73 U
Heptachlor epoxide	NS	NS	0.69 U	0.73 U	0.68 U	0.73 U	0.72 U	0.73 U	0.73 U
Methoxychlor	NS	NS	1.4 U	1.5 U	1.4 U	1.5 U	1.4 U	1.5 U	1.5 U
Toxaphene	NS	NS	17 U	18 U	17 U	18 U	18 U	18 U	18 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 4
Elton Crossing/ Site C - Family
Bronx, NY

Soil Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID	**NYSDEC**	**NYSDEC**	**SS-1**	**FIELD BLANK**	**FIELD BLANK**	**FB20150226**
Lab Sample ID	**Part 375**	**Part 375**	**JB88569-2**	**JB60086-30**	**JB60086-31**	**JB88935-12**
Date Sampled	**Unrestricted**	**Restricted**	**2/19/2015**	**2/19/2014**	**2/19/2014**	**2/26/2015**
Dilution	**SCO**	**Residential**	**1**	**1**	**1**	**1**
		SCO				
Polychlorinated Biphenyls - µg/Kg	**µg/Kg**	**µg/Kg**				**µg/L**
Aroclor 1016	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1221	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1232	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1242	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1248	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1254	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1260	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Aroclor 1262	**NS**	**NS**	451 b	0.05 U	0.05 U	0.33 U
Aroclor 1268	**NS**	**NS**	38 U	0.05 U	0.05 U	0.33 U
Total PCBs	**100**	**1,000**	**451**	ND	ND	ND

Pesticides - µg/Kg

Dilution			**1/100/200 †**	**1**	**1**	**1**
4,4'-DDD	**3.3**	**13,000**	**144**	0.001 U	0.001 U	0.0067 U
4,4'-DDE	**3.3**	**8,900**	**1,250**	0.001 U	0.001 U	0.0067 U
4,4'-DDT	**3.3**	**7,900**	**1,190**	0.001 U	0.001 U	0.0067 U
Aldrin	**5**	**97**	**23.1** a	0.001 U	0.001 U	0.0067 U
alpha-BHC	**20**	**480**	0.75 U	0.001 U	0.001 U	0.0067 U
alpha-Chlordane	**94**	**4,200**	**2,340**	0.001 U	0.001 U	0.0067 U
beta-BHC	**36**	**360**	0.75 U	0.001 U	0.001 U	0.0067 U
delta-BHC	**40**	**100,000**	0.75 U	0.001 U	0.001 U	0.0067 U
Dieldrin	**5**	**200**	**7,220**	0.001 U	0.001 U	0.0067 U
Endosulfan sulfate	**2,400**	**24,000**	0.75 U	0.001 U	0.001 U	0.0067 U
Endosulfan-I	**2,400**	**24,000**	0.75 U	0.001 U	0.001 U	0.0067 U
Endosulfan-II	**2,400**	**24,000**	0.75 U	0.001 U	0.001 U	0.0067 U
Endrin	**14**	**11,000**	**168**	0.001 U	0.001 U	0.0067 U
Endrin aldehyde	**NS**	**NS**	0.75 U	0.001 U	0.001 U	0.0067 U
Endrin ketone	**NS**	**NS**	0.75 U	0.001 U	0.001 U	0.0067 U
gamma-BHC (Lindane)	**100**	**1,300**	0.75 U	0.001 U	0.001 U	0.0067 U
gamma-Chlordane	**NS**	**NS**	3,330	0.001 U	0.001 U	0.0067 U
Heptachlor	**42**	**2,100**	**1,520**	0.001 U	0.001 U	0.0067 U
Heptachlor epoxide	**NS**	**NS**	322 a	0.001 U	0.001 U	0.0067 U
Methoxychlor	**NS**	**NS**	1.5 U	0.002 U	0.002 U	0.013 U
Toxaphene	**NS**	**NS**	19 U	0.025 U	0.025 U	0.17 U

Notes: a = More than 40 % RPD for detected concentrations
between the two GC columns.

Table 5
Elton Crossing/ Site C - Family
Bronx, NY
Groundwater Analytical Results

Volatile Organic Compounds

Client ID **Lab Sample ID** **Date Sampled** **µg/L**	**NYSDEC Class GA Ambient Standard** **µg/L**	**MW-1** **JB89708-1** **3/11/2015**	**MW-2** **JB89708-2** **3/11/2015**	**MW-X** **JB89708-4** **3/11/2015**	**MW-3** **JB89708-3** **3/11/2015**	**TB20150311** **JB89708-5** **3/11/2015**	**FB20150311** **JB89708-6** **3/11/2015**
1,1,1-Trichloroethane	**5**	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	**5**	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	**1**	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	**5**	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	**5**	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	**5**	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	**0.04**	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	**0.0006**	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	**3**	1 U	1 U	1 U	1 7	1 U	1 U
1,2-Dichloroethane	**0.6**	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	**1**	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	**3**	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	**3**	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone (MEK)	**50**	10 R	10 R	10 R	10 R	10 R	10 R
2-Hexanone	**50**	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone(MIBK)	**NS**	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	**50**	7.6 J	16	16.7	32.5 J+	10 UJ	10 UJ
Benzene	**1**	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	**5**	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	**50**	1 U	1 U	1 U	1 U	1 U	0.48 J
Bromoform	**50**	4 U	4 U	4 U	4 U	4 U	4 U
Bromomethane	**5**	2 U	2 U	2 U	2 U	2 U	2 U
Carbon disulfide	**60**	2 U	2 U	2 U	2 U	2 U	2 U
Carbon tetrachloride	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	**7**	1 U	1 U	1 U	**9.5**	1 U	1.6
Chloromethane	**5**	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	**NS**	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane	**NS**	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	**50**	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	**5**	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Freon 113	**5**	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene	**5**	2 U	2 U	2 U	2 U	2 U	2 U
m,p-Xylene	**0.002**	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	**NS**	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tert Butyl Ether	**10**	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	**NS**	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	**5**	2 U	2 U	2 U	2 U	2 U	2 U
o-Xylene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	**5**	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	**5**	0.99 J	1 U	1 U	1 U	1 U	1 U
Toluene	**5**	1 U	0.48 J	0.43 J	0.56 J	1 U	1 U
trans-1,2-Dichloroethene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	**NS**	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	**5**	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	**5**	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl chloride	**2**	1 U	1 U	1 U	1 U	1 U	1 U
Xylene (total)	**NS**	1 U	1 U	1 U	1 U	1 U	1 U

Table 6
Elton Crossing/ Site C - Family
Bronx, NY

Groundwater Analytical Results

Semivolatile Organic Compounds

Client ID	**NYSDEC**	**MW-1**	**MW-2**	**MW-X**	**MW-3**	**FB20150311**
Lab Sample ID	**Class GA**	**JB89708-1**	**JB89708-2**	**JB89708-4**	**JB89708-3**	**JB89708-6**
Date Sampled	**Ambient**	**3/11/2015**	**3/11/2015**	**3/11/2015**	**3/11/2015**	**3/11/2015**
	Standard					
µg/L	**µg/L**					
1,1'-Biphenyl	**5**	1 U	1 U	1 U	1 U	1.1 U
1,2,4,5-Tetrachlorobenzene	**5**	2 U	2 U	2.1 U	2 U	2.1 U
1,4-Dioxane	**NS**	1 U	1 U	1 U	1 U	1.1 U
2,3,4,6-Tetrachlorophenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
2,4,5-Trichlorophenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
2,4,6-Trichlorophenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
2,4-Dichlorophenol	**5**	2 U	2 U	2.1 U	2 U	2.1 U
2,4-Dimethylphenol	**50**	5 U	5 U	5.2 U	5 U	5.3 U
2,4-Dinitrophenol	**10**	20 U	20 U	21 U	20 U	21 U
2,4-Dinitrotoluene	**5**	1 U	1 U	1 U	1 U	1.1 U
2,6-Dinitrotoluene	**5**	1 U	1 U	1 U	1 U	1.1 U
2-Chloronaphthalene	**10**	2 U	2 U	2.1 U	2 U	2.1 U
2-Chlorophenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
2-Methylnaphthalene	**NS**	1 U	1 U	1 U	1 U	1.1 U
2-Methylphenol	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
2-Nitroaniline	**5**	5 U	5 U	5.2 U	5 U	5.3 U
2-Nitrophenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
3&4-Methylphenol	**0.002**	2 U	2 U	2.1 U	2 U	2.1 U
3,3'-Dichlorobenzidine	**5**	2 U	2 U	2.1 U	2 R	2.1 U
3-Nitroaniline	**5**	5 U	5 U	5.2 U	5 U	5.3 U
4,6-Dinitro-o-cresol	**NS**	20 U	20 U	21 U	20 U	21 U
4-Bromophenyl phenyl ether	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
4-Chloro-3-methyl phenol	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
4-Chloroaniline	**5**	5 U	5 U	5.2 U	5 U	5.3 U
4-Chlorophenyl phenyl ether	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
4-Nitroaniline	**5**	5 U	5 U	5.2 U	5 U	5.3 U
4-Nitrophenol	**NS**	10 U	10 U	10 U	10 U	11 U
Acenaphthene	**20**	1 U	1 U	1 U	0.88 J	1.1 U
Acenaphthylene	**NS**	1 U	1 U	1 U	1 U	1.1 U
Acetophenone	**NS**	2 U	0.84 J	0.66 J	2 U	2.1 U
Anthracene	**50**	1 U	1 U	1 U	1 U	1.1 U
Atrazine	**7.5**	2 U	2 U	2.1 U	2 U	2.1 U
Benzaldehyde	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
Benzo(a)anthracene	**0.002**	1 U	1 U	1 U	1 U	1.1 U
Benzo(a)pyrene	**ND**	1 U	1 U	1 U	1 U	1.1 U
Benzo(b)fluoranthene	**0.002**	1 U	1 U	1 U	1 U	1.1 U
Benzo(g,h,i)perylene	**NS**	1 U	1 U	1 U	1 U	1.1 U
Benzo(k)fluoranthene	**0.002**	1 U	1 U	1 U	1 U	1.1 U
bis(2-Chloroethoxy)methane	**5**	2 U	2 U	2.1 U	2 U	2.1 U
bis(2-Chloroethyl)ether	**1**	2 U	2 U	2.1 U	2 U	2.1 U
bis(2-Chloroisopropyl)ether	**5**	2 U	2 U	2.1 U	2 U	2.1 U
bis(2-Ethylhexyl)phthalate	**5**	2 U	2 U	2.1 U	2 U	2.1 U
Butyl benzyl phthalate	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Caprolactam	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
Carbazole	**NS**	1 U	1 U	1 U	1 U	1.1 U
Chrysene	**0.002**	1 U	1 U	1 U	1 U	1.1 U
Dibenzo(a,h)anthracene	**NS**	1 U	1 U	1 U	1 U	1.1 U
Dibenzofuran	**NS**	5 U	5 U	5.2 U	5 U	5.3 U
Diethyl phthalate	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Dimethyl phthalate	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Di-n-butyl phthalate	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Di-n-octyl phthalate	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Fluoranthene	**50**	1 U	1 U	1 U	1 U	1.1 U
Fluorene	**50**	1 U	1 U	1 U	1 U	1.1 U
Hexachlorobenzene	**0.04**	1 U	1 U	1 U	1 U	1.1 U
Hexachlorobutadiene	**0.5**	1 U	1 U	1 U	1 U	1.1 U
Hexachlorocyclopentadiene	**5**	10 U	10 U	10 U	10 U	11 U
Hexachloroethane	**5**	2 U	2 U	2.1 U	2 U	2.1 U
Indeno(1,2,3-cd)pyrene	**0.002**	1 U	1 U	1 U	1 U	1.1 U
Isophorone	**50**	2 U	2 U	2.1 U	2 U	2.1 U
Naphthalene	**10**	1 U	1 U	1 U	1 U	1.1 U
Nitrobenzene	**0.4**	2 U	2 U	2.1 U	2 U	2.1 U
N-Nitroso-di-n-propylamine	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
N-Nitrosodiphenylamine	**50**	5 U	5 U	5.2 U	5 U	5.3 U
Pentachlorophenol	**NS**	10 U	10 U	10 U	10 U	11 U
Phenanthrene	**50**	1 U	1 U	1 U	1 U	1.1 U
Phenol	**NS**	2 U	2 U	2.1 U	2 U	2.1 U
Pyrene	**50**	1 U	1 U	1 U	1 U	1.1 U

Table 7
Elton Crossing Site C - Family
Bronx, NY

Groundwater Analytical Results

Metals

Client ID	NYSDEC	MW-1	MW-2	MW-X	MW-3	FB20150311
Lab Sample ID	Class GA	JB89708-1	JB89708-2	JB89708-4	JB89708-3	JB89708-6
Date Sampled	Ambient	3/11/2015	3/11/2015	3/11/2015	3/11/2015	3/11/2015
	Standard					
Total Metals - µg/L	µg/L					
Aluminum	NS	200 U	2,140	1,560	273	200 U
Antimony	3	6 U	6 U	6 U	6 U	6 U
Arsenic	25	7.1	3.2	3 U	3 U	3 U
Barium	1,000	200 U	200 U	200 U	200 U	200 U
Beryllium	3	1 U	2	1.7	1 U	1 U
Cadmium	5	3 U	3 U	3 U	3 U	3 U
Calcium	NS	71,500	78,400	72,700	56,600	5,000 U
Chromium	50	18.7	11.9	10 U	10 U	10 U
Cobalt	NS	50 U	50 U	50 U	50 U	50 U
Copper	200	10 U	11.9	10.2	10 U	10 U
Iron	300	100 U	**19,200**	**15,300**	**4,160**	100 U
Lead	25	3 U	23.2	20.3	3 U	3 U
Magnesium	35,000	**40,700**	24,500	22,000	15,000	5,000 U
Manganese	500	15 U	**524**	473	135	15 U
Mercury	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	20	16.6	10 U	10 U
Potassium	NS	22,200	39,800	38,000	53,700	10,000 U
Selenium	10	10 U	10 U	10 U	10 U	10 U
Silver	50	10 U	10 U	10 U	10 U	10 U
Sodium	20,000	**60,400**	**224,000**	**217,000**	**91,500**	10,000 U
Thallium	0.5	2 U	2 U	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U	50 U	50 U
Zinc	2,000	20 U	57.6	49.1	20 U	20 U

Filtered Metals - µg/L

Aluminum	NS	200 U	200 U	200 U	298	200 U
Antimony	3	6 U	6 U	6 U	6 U	6 U
Arsenic	25	7.3	3 U	3 U	3 U	3 U
Barium	1,000	200 U	200 U	200 U	200 U	200 U
Beryllium	3	1 U	1 U	1 U	1 U	1 U
Cadmium	5	3 U	3 U	3 U	3 U	3 U
Calcium	NS	70,800	29,200	30,000	56,200	5,000 U
Chromium	50	18.1	10 U	10 U	10 U	10 U
Cobalt	NS	50 U	50 U	50 U	50 U	50 U
Copper	200	10 U	10 U	10 U	10 U	10 U
Iron	300	100 U	100 U	100 U	**4,190**	100 U
Lead	25	3 U	3 U	3 U	3.1	3 U
Magnesium	35,000	**41,100**	5,280	5,440	15,400	5,000 U
Manganese	500	15 U	15 U	15 U	154	15 U
Mercury	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100	10 U	10 U	10 U	10 U	10 U
Potassium	NS	22,600	41,000	41,200	49,200	10,000 U
Selenium	10	10 U	10 U	10 U	10 U	10 U
Silver	50	10 U	10 U	10 U	10 U	10 U
Sodium	20,000	**60,900**	**239,000**	**239,000**	**84,900**	10,000 U
Thallium	0.5	2 U	2 U	2 U	2 U	2 U
Vanadium	NS	50 U	50 U	50 U	50 U	50 U
Zinc	2,000	20 U	20 U	20 U	20 U	20 U

Table 8
Elton Crossing/Site C - Family
Bronx, NY
Groundwater Analytical Results

Polychlorinated Biphenyls & Pesticides

Client ID **Lab Sample ID** **Date Sampled**	**NYSDEC Class GA Ambient Standard**	**MW-1** **JB89708-1** **3/11/2015**	**MW-2** **JB89708-2** **3/11/2015**	**MW-X** **JB89708-4** **3/11/2015**	**MW-3** **JB89708-3** **3/11/2015**	**FB20150311** **JB89708-6** **3/11/2015**
Polychlorinated Biphenyls - µg/L	**µg/L**					
Aroclor 1016	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1221	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1232	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1242	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1248	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1254	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aroclor 1260	**NS**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total PCBs	**0.09**	ND	ND	ND	ND	ND

Pesticides - µg/L

4,4'-DDD	**0.3**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
4,4'-DDE	**0.2**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
4,4'-DDT	**0.2**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Aldrin	**ND**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
alpha-BHC	**0.01**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
alpha-Chlordane	**NS**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
beta-BHC	**0.04**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
delta-BHC	**0.04**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Dieldrin	**0.004**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endosulfan sulfate	**NS**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endosulfan-I	**NS**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endosulfan-II	**NS**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endrin	**ND**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endrin aldehyde	**5**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Endrin ketone	**5**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
gamma-BHC (Lindane)	**0.05**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
gamma-Chlordane	**NS**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Heptachlor	**0.04**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Heptachlor epoxide	**0.03**	0.0067 U	0.0067 U	0.0067 U	0.0067 U	0.0067 U
Methoxychlor	**35**	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U
Toxaphene	**0.06**	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U

Table 9
Elton Crossing/Site C - Family
Bronx, NY

Soil Vapor and Ambient Air Analytical Results

Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Dilution μg/m3	NYSDOH 2003 Soil Vapor Intrusion Air Guideline Value μg/m^3	AA-1 JB60176-7 2/20/2014 1	SAA-1 JB88930-2 2/26/2015 1	SV-1 JB60176-1 2/20/2014 1	SV-2 JB60176-2 2/20/2014 1	SV-3 JB60176-3 2/20/2014 1	SV-4 JB60176-4 2/20/2014 1.55	SV-5 JB60176-5 2/20/2014 1	SV-6 JB60176-6 2/20/2014 1.52	SSV-1 JB88930-1 2/26/2015 57.2
1,1,1-Trichloroethane	**100**	<0.087 U	1.1 U	9.8	<0.36 U	<0.36 U	<0.36 U	8.2	<0.36 U	130 U
1,1,2,2-Tetrachloroethane	**NS**	<0.21 U	1.4 U	<0.82 U	<0.82 U	<0.82 U	<0.82 U	<0.82 U	<0.82 U	160 U
1,1,2-Trichloroethane	**NS**	<0.17 U	1.1 U	<0.65 U	<0.65 U	<0.65 U	<0.65 U	<0.65 U	<0.65 U	130 U
1,1-Dichloroethane	**NS**	<0.065 U	0.81 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	93 U
1,1-Dichloroethylene	**NS**	<0.083 U	0.79 U	<0.33 U	<0.33 U	<0.33 U	<0.33 U	<0.33 U	<0.33 U	91 U
1,2,4-Trichlorobenzene	**NS**	<0.59 UJ	1.5 U	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	170 U
1,2,4-Trimethylbenzene	**NS**	1.7	3.1	9.3	8.8	3.7 J	15	3 J	29	123,000 D
1,2-Dibromoethane	**NS**	<0.21 U	1.5 U	<0.85 U	<0.85 U	<0.85 U	<0.85 U	<0.85 U	<0.85 U	180 U
1,2-Dichloroethane	**NS**	<0.065 U	0.81 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	93 U
1,2-Dichloropropane	**NS**	1.3	0.92 U	<0.74 U	<0.74 U	<0.74 U	<0.74 U	<0.74 U	<0.74 U	110 U
1,3,5-Trimethylbenzene	**NS**	<0.074 U	0.98	2.6 J	2.5 J	2 J	4.8	<0.29 U	8.8	39,700 D
1,3-Butadiene	**NS**	<0.044 U	0.44 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	51 U
1,4-Dioxane	**NS**	<0.22 U	0.72 U	<0.86 U	<0.86 U	<0.86 U	<0.86 U	3.4	<0.86 U	83 U
2,2,4-Trimethylpentane	**NS**	0.7 J	0.65 J	5.1	2.2 J	<0.39 U	<0.39 U	<0.39 U	<0.39 U	958
2-Chlorotoluene	**NS**	<0.10 U	1 U	<0.41 U	<0.41 U	<0.41 U	<0.41 U	<0.41 U	<0.41 U	120 U
2-Hexanone	**NS**	0.61 J	0.82 U	<0.40 U	<0.40 U	<0.40 U	<0.40 U	<0.40 U	<0.40 U	94 U
3-Chloropropene	**NS**	<0.088 U	0.63 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	72 U
4-Ethyltoluene	**NS**	<0.074 U	0.88 J	5.9	6.9	2.9 J	6.4	<0.29 U	13	30,700 D
Acetone	**NS**	23	6.4	39.7	33.7	168	197	314	175	55 U
Benzene	**NS**	2	1.1	3.1	4.8	4.2	2.7	4.8	4.2	73 U
Benzyl Chloride	**NS**	<0.13 U	1 U	<0.51 U	<0.51 U	<0.51 U	<0.51 U	<0.51 U	<0.51 U	120 U
Bromodichloromethane	**NS**	<0.17 U	1.3 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	150 U
Bromoethene	**NS**	<0.061 U	0.87 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	100 U
Bromoform	**NS**	<0.23 U	2.1 U	<0.89 U	<0.89 U	<0.89 U	<0.89 U	<0.89 U	<0.89 U	240 U
Bromomethane	**NS**	<0.066 U	0.78 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	89 U
Carbon disulfide	**NS**	<0.053 U	0.62 U	<0.21 U	2.6	3	<0.21 U	1.5 J	7.8	72 U
Carbon tetrachloride	**5**	0.69 J	1.3 U	**8.2**	<0.28 U	<0.28 U	<0.28 U	<0.28 U	<0.28 U	140 U
Chlorobenzene	**NS**	<0.12 U	0.92 U	<0.46 U	<0.46 U	<0.46 U	<0.46 U	<0.46 U	<0.46 U	110 U
Chloroethane	**NS**	<0.053 U	0.53 U	<0.22 U	<0.22 U	<0.22 U	<0.22 U	<0.22 U	<0.22 U	61 U
Chloroform	**NS**	<0.093 U	0.98 U	60.1	48	<0.36 U	<0.36 U	<0.36 U	<0.36 U	110 U
Chloromethane	**NS**	0.99	1.2	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	<0.27 U	47 U
cis-1,2-Dichloroethylene	**NS**	<0.11 U	0.79 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	<0.44 U	91 U
cis-1,3-Dichloropropene	**NS**	<0.086 U	0.91 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	100 U
Cyclohexane	**NS**	0.45 J	0.69 U	<0.79 U	<0.79 U	<0.79 U	<0.79 U	<0.79 U	<0.79 U	79 U
Dibromochloromethane	**NS**	<0.25 U	1.7 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	200 U
Dichlorodifluoromethane	**NS**	3	2.7	7.9	7.9	5.4	3 J	2.9 J	3.1 J	110 U
Ethanol	**NS**	14	7	10	15	11	17	13	25.1	526
Ethyl Acetate	**NS**	2.6	0.72 U	<0.83 U	<0.83 U	<0.83 U	4.7	3.1	<0.83 U	83 U
Ethylbenzene	**NS**	0.78 J	0.61 J	13	17	14	16	12	22	7,860
Freon 113	**NS**	4.1	1.5 U	7.7	27	57	11	12	3.7 J	180 U
Freon 114	**NS**	<0.15 U	1.4 U	<0.59 U	13	11	<0.59 U	<0.59 U	<0.59 U	160 U
Heptane	**NS**	1	0.82 U	5.7	11	7.8	4.9	11	6.1	305
Hexachlorobutadiene	**NS**	<0.67 U	2.1 U	<2.7 U	<2.7 U	<2.7 U	<2.7 U	<2.7 U	<2.7 U	250 U
Hexane	**NS**	2.6	0.78	9.9	21	29	6.3	11	5.6	193
Isopropyl Alcohol	**NS**	3.2	0.88	<0.37 U	<0.37 U	<0.37 U	<0.37 U	<0.37 U	1.2 J	57 U
m,p-Xylene	**NS**	3.3	2.4	55.6	62.1	44.7	68.6	28	99.5	47,800 D
m-Dichlorobenzene	**NS**	<0.15 U	1.2 U	<0.60 U	<0.60 U	<0.60 U	<0.60 U	<0.60 U	<0.60 U	140 U
Methyl ethyl ketone	**NS**	6.8	0.53 J	3.5	3.2	3.5	1.8 J	2.5	4.4	68 U
Methyl Isobutyl Ketone	**NS**	<0.12 U	0.82 U	<0.49 U	<0.49 U	<0.49 U	<0.49 U	<0.49 U	<0.49 U	94 U
Methyl Tert Butyl Ether	**NS**	<0.061 U	0.72 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	83 U
Methylene chloride	**60**	5.9	0.69 U	11	31	**77.5**	13	14	5.9	80 U
Methylmethacrylate	**NS**	<0.16 U	0.82 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	<0.66 U	94 U
o-Dichlorobenzene	**NS**	<0.17 U	1.2 U	<0.72 U	<0.72 U	<0.72 U	<0.72 U	<0.72 U	<0.72 U	140 U
o-Xylene	**NS**	1.3	1.1	11	15	11	19	8.7	27	27,200 D
p-Dichlorobenzene	**NS**	<0.13 U	1.2 U	<0.52 U	<0.52 U	<0.52 U	<0.52 U	<0.52 U	<0.52 U	140 U
Propylene	**NS**	<0.053 U	1.5	<0.22 U	<0.22 U	<0.22 U	<0.22 U	<0.22 U	7.6	98 U
Styrene	**NS**	<0.085 U	0.85 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	<0.34 U	118
Tertiary Butyl Alcohol	**NS**	<0.13 U	0.61 U	<0.55 U	<0.55 U	<0.55 U	<0.55 U	3.3	<0.55 U	70 U
Tetrachloroethylene	**30**	0.81	0.27 U	2.8	1 J	3.1	4	1.6	3.7 U	**111**
Tetrahydrofuran	**NS**	0.77	0.59 U	<0.53 U	<0.53 U	<0.53 U	<0.53 U	<0.53 U	<0.53 U	68 U
Toluene	**NS**	4.5	1.9	45.6	54.6	54.3	44.8	67.8	47.9	871
trans-1,2-Dichloroethylene	**NS**	<0.059 U	0.79 U	<0.23 U	<0.23 U	<0.23 U	<0.23 U	<0.23 U	<0.23 U	91 U
trans-1,3-Dichloropropene	**NS**	<0.095 U	0.91 U	<0.38 U	<0.38 U	<0.38 U	<0.38 U	<0.38 U	<0.38 U	100 U
Trichloroethylene	**5**	<0.10 U	0.21 U	0.91	<0.42 U	<0.42 U	<0.42 U	<0.42 U	<0.42 U	25 U
Trichlorofluoromethane	**NS**	1.9	1.3	82	12	6.2	4.9	19	<0.31 U	130 U
Vinyl Acetate	**NS**	<0.20 U	0.7 U	<0.81 U	<0.81 U	<0.81 U	<0.81 U	<0.81 U	<0.81 U	81 U
Vinyl chloride	**NS**	<0.043 U	0.51 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	<0.17 U	59 U
Xylenes (total)	**NS**	4.3	3.5	66.9	76.9	56	87.3	36	127	75,100 D

Tables 1-9
Elton Crossing/Site C - Family
Bronx, NY
Remedial Investigation Analytical Results
Notes

GENERAL

NS : No cleanup objective listed.

ND : No Detections

U : The analyte was not detected at the indicated concentration.

J : The concentration given is an estimated value.

UJ : The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

UR : The sample results are rejected due to deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

D : Analyte concentration obtained from dilution.

FD : Field Duplicate

JD : The concentration given is an estimated value; in addition, the concentration has been obtained from a dilution.

JN : The analysis indicates the presence of an analyte that has been "tentatively identified," and the associated numerical value represents its approximate quantity.

J+ : The result is an estimated quantity, but the result may be biased high.

R : The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.

a : More than 40 % RPD for detected concentrations between the two GC columns.

b : Result is from Run# 2.

c : Elevated detection limit due to dilution required for high interfering element.

SSB-X : Blind Duplicate of SSB-2 (0-2)

MW-X : Blind Dupicate of MW-2

SB-8 (7-9) B : Field Duplicate of SB-8 (7-9)

SB-10 (0-2) B : Field Duplicate of SB-10 (0-2)

SOIL

Exceedences of Part 375 Unrestricted Soil Cleanup Objectives are highlighted in bold font.

Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives are highlighted in grey.

Part 375 Soil Cleanup Objectives : Soil Clean-up Objectives listed in NYSDEC (New York State Department of Environmental Conservation) "Part 375" Regulations (6 NYCRR Part 375).

µg/kg : micrograms per kilogram = parts per billion (ppb)

mg/kg : milligrams per kilogram = parts per million (ppm)

GROUNDWATER

NYSDEC Class GA Ambient Standard : New York State Department of Environmental Conservation Technical and Operational Guidance Series (1.1.1): Class GA Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

µg/L : micrograms per Liter = parts per billion (ppb)

SOIL VAPOR

NYSDOH Soil Vapor Intrusion Air Guidance Value : NYSDOH Air Guideline Values (AGVs) and Table 3.3 Matrix 1 and 2 Chemicals presented in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 (“NYSDOH Vapor Intrusion Guidance Document”), updated September 2013 for change of AGV for PCE.

µg/m^3 : micrograms per cubic meter of air

Table 10
Elton Crossing/Site C - Family
899 Elton Avenue
Bronx, NY

Track 4 Site-Specific Soil Cleanup Objectives (SSSCOs)

Compound	**SSSCO**	**Units**
VOCs	Restricted Residential SCOs	ppm
Total SVOCs	500	ppm
Lead	1,200	ppm
Mercury	3	ppm
Pesticides/PCBs	Commercial SCOs	ppm
Other metals	Commercial SCOs	ppm

Notes:
ppm = parts per million
VOC = volatile organic compound
SVOC = semi-volatile organic compound

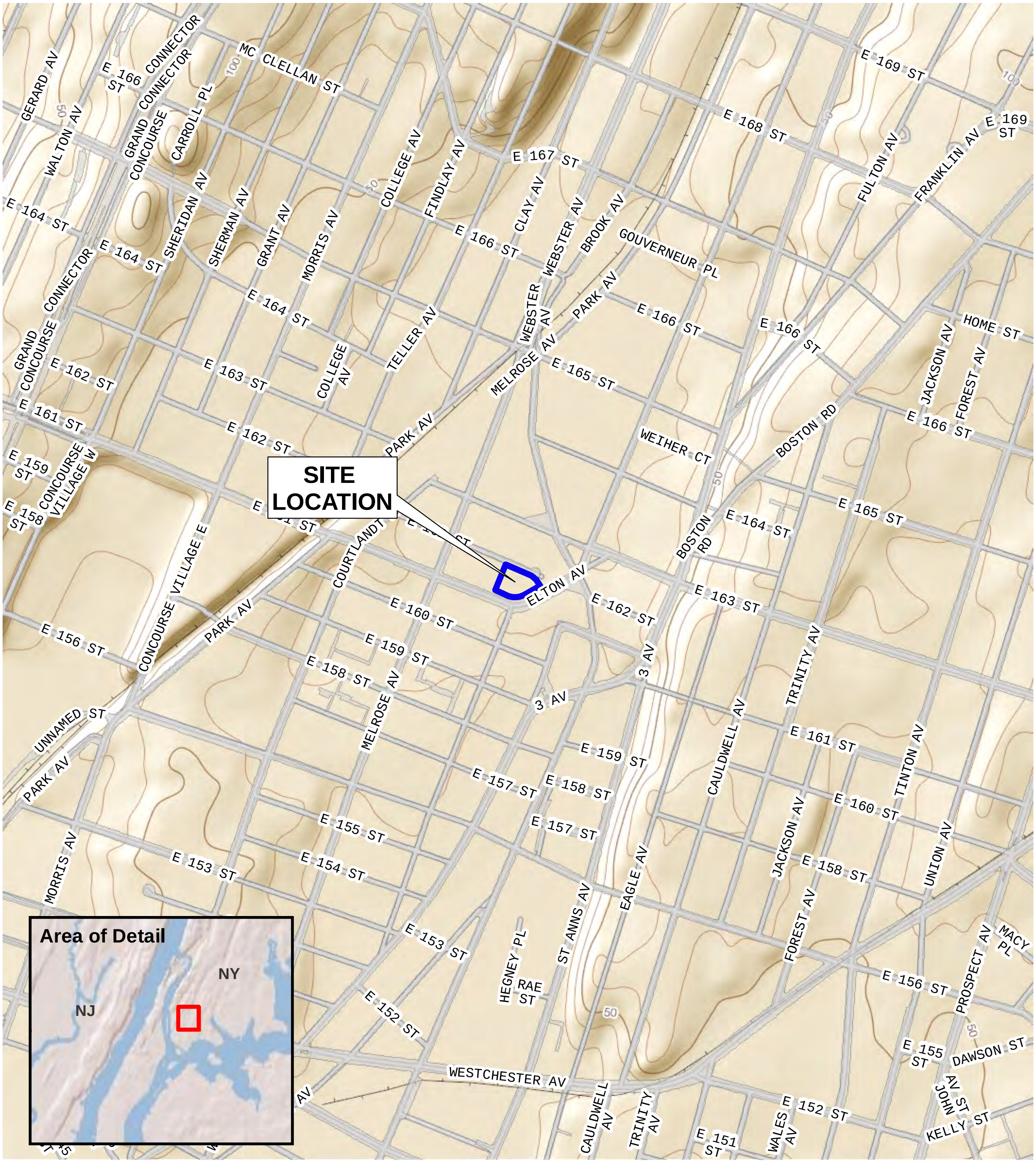
Table 11
Elton Crossing/Site C - Family
899 Elton Avenue
Bronx, NY

Anticipated Permits and Certifications Required For Redevelopment

Permit	Agency	Agency Phone Number
New Building Permit	NYCDOB	(718) 579-6906
Fencing/Sidewalk Closure Permit	NYCDOT	(212) 442-6770
Asbestos/Demolition Permit	NYCDOB	(718) 579-6906
Site Connections	NYCDEP	(718) 579-6988
DOT Signoff	NYCDOT	(212) 442-2772
FDNY Signoff	FDNY	(718) 999-1955
Certificate of Occupancy	NYCDOB	(718) 579-6923

Notes:
NYCDOT = New York City Department of Transportation
NYCDEP = New York City Department of Environmental Protection
FDNY = Fire Department of the City of New York
NYCDOB = New York City Department of Buildings

FIGURES



SOURCE
USGS 7.5 Minute Topographic Map
Central Park Quad 2011

Elton Crossing/Site C - Family
899 Elton Ave
Bronx, New York

SITE LOCATION

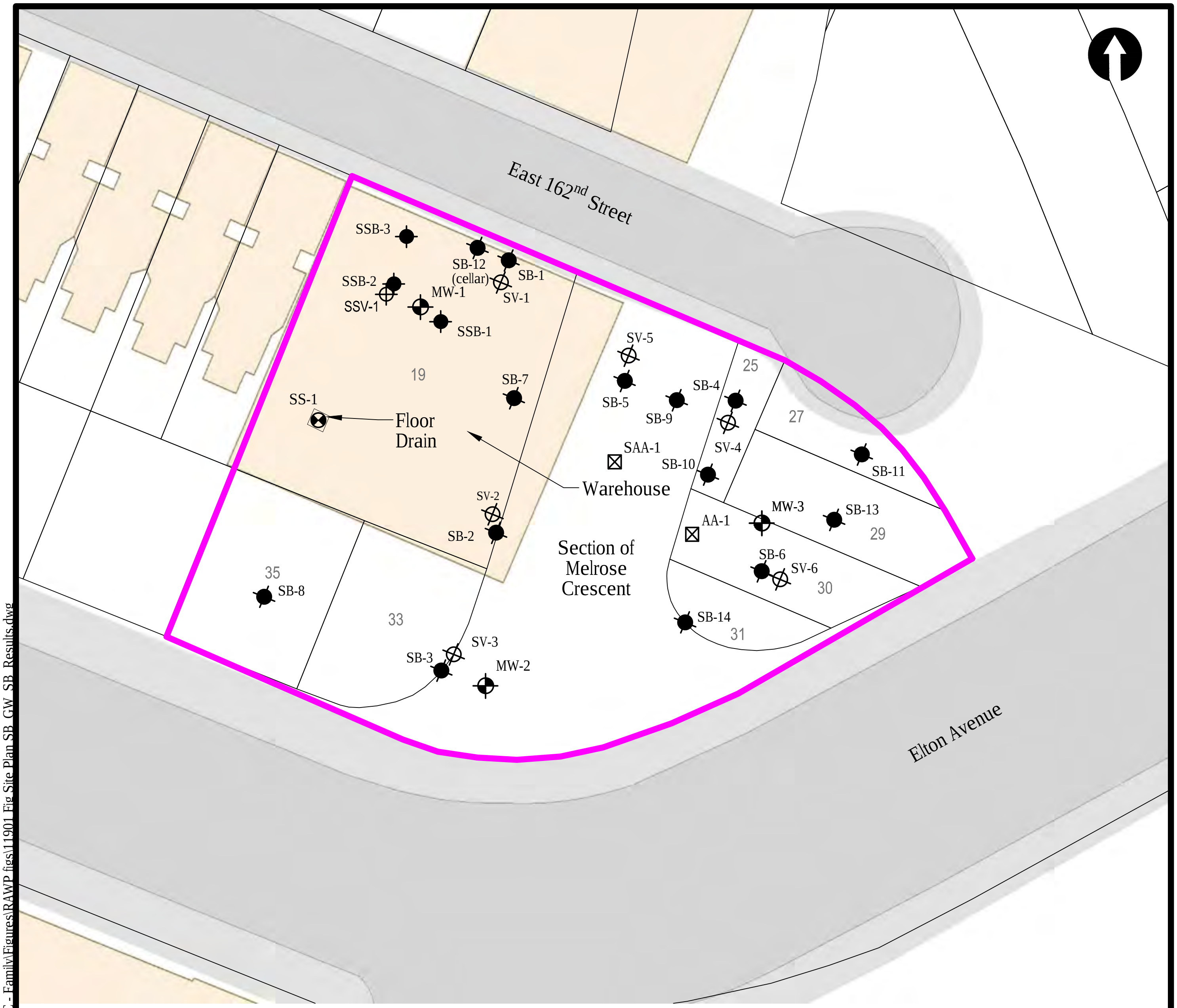
AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
4/8/2015

PROJECT No.
11901

FIGURE
1

© 2014 AKRF, Inc. Environmental Consultants O:\Projects\11901 - MELROSE COMMONS SITE C-FAMILY\11901 Fig 1 Site Location map.mxd



Map Source:
NYCDCP (NYC Dept. of City Planning 2014) GIS database

LEGEND:

33	LOT NUMBERS
──	LOT LINE
━━	PROJECT SITE BOUNDARY
⌖ SSV-1	SOIL VAPOR SAMPLE LOCATION
☒ SAA-1	AMBIENT AIR SAMPLE LOCATION
● SSB-2	SOIL BORING LOCATION
⌖ MW-2	MONITORING WELL LOCATION
⊗ SS-1	SOIL SAMPLE LOCATION

0' 25' 50' 100'

SCALE IN FEET

Elton Crossing/Site C - Family
899 Elton Avenue
Bronx, New York

SITE PLAN & SAMPLE LOCATIONS

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
5.21.2015

PROJECT No.
11901

SCALE
as shown

FIGURE
2

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Sample ID	NYSDEC	NYSDEC	SSB-1 (0-2)	SSB-1 (5-7)	SSB-1 (7-9)
Date Sampled	UUSCOs	RRSCOs	2/25/2015	2/25/2015	2/25/2015
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Dibenzo(a,h)anthracene	330	330	240 U	406 J	98.5 J
Indeno(1,2,3-cd)pyrene	500	500	420	1230 J	55.3 J
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Arsenic	13	16	16.1 c	14.5	4.6
Barium	350	400	792	492	139
Cadmium	2.5	4.3	11.9 c	17.7	4.3
Copper	50	270	198 c	270	95.3
Lead	63	400	935 c	1,940	373
Mercury	0.18	0.81	44	5.3	0.82
Nickel	30	310	34.7	43.1	30.6
Zinc	109	10,000	1,280	1,320	404
Polychlorinated Biphenyls	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Total PCBs	100	1,000	14,700	3,030	485
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	7320 D	7,280	2,150
4,4'-DDE	3.3	8,900	2710 D	1,030	530
alpha-Chlordane	94	4,200	19,400 JD	13,600 a	8,330 a
Dieldrin	5	200	8930 D	20,300	3,210
Endrin	14	11,000	817 D	834	330
gamma-BHC (Lindane)	100	1,300	253 D	958	0.84 U
Heptachlor	42	2,100	0.94 U	0.79 U	938

Sample ID	NYSDEC	NYSDEC	SB-1 (0-2)	SB-1 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/18/2014	2/18/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Copper	50	270	60.7	267
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDE	3.3	8,900	0.085 J	11.5 D

Sample ID	NYSDEC	NYSDEC	SB-9 (0-2)	SB-9 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/25/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Lead	63	400	245	9.1
Zinc	109	10,000	431	77.5
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	80.5 D	29.1 JD
4,4'-DDE	3.3	8,900	37.4 D	214 D
4,4'-DDT	3.3	7,900	110 D	1130 D
Dieldrin	5	200	5.3 Jna	33.9 D

Sample ID	NYSDEC	NYSDEC	SB-4 (0-2)	SB-4 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	592	923
Cadmium	2.5	4.3	1.9	6.8
Chromium	30	180	34.9	25.6
Copper	50	270	27.8	51.9
Lead	63	400	598	2,760
Mercury	0.18	0.81	0.14	0.95
Silver	2	180	1.1	17.1
Zinc	109	10,000	637	1,470
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	65.9	49.6
4,4'-DDE	3.3	8,900	41.9	32.8
4,4'-DDT	3.3	7,900	330	300
Dieldrin	5	200	6.2	5.6

Sample ID	NYSDEC	NYSDEC	SSB-3 (0-2)	SSB-3 (5-7)	SSB-3 (7.5-9.5)
Date Sampled	UUSCOs	RRSCOs	2/26/2015	2/26/2015	2/26/2015
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDE	3.3	8,900	2.6	20.2	0.73 U
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Nickel	30	310	16.8	38.6	28.3

Sample ID	NYSDEC	NYSDEC	SB-5 (0-2)	SB-5 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	1,160	34 U
Benzo(a)pyrene	1,000	1,000	1,240	34 U
Benzo(b)fluoranthene	1,000	1,000	1,460	34 U
Chrysene	1,000	3,900	1,230	34 U
Indeno(1,2,3-cd)pyrene	500	500	908	34 U
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	592	25
Chromium	30	180	40.4 b	10.6
Copper	50	270	71.5 b	16
Lead	63	400	678 b	9.4
Nickel	30	310	31.9	9.5
Zinc	109	10000	519 b	60
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	37.2	0.066 U
4,4'-DDE	3.3	8,900	33.6	0.066 U
4,4'-DDT	3.3	7,900	143	0.066 U
Dieldrin	5	200	20.8	0.066 U

Sample ID	NYSDEC	NYSDEC	SB-10 (0-2)	SB-10 (0-2) B	SB-10 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/25/2014	2/19/2014	2/19/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	1,810 J	4,800 J	12.9 J
Benzo(a)pyrene	1,000	1,000	1,890 J	4,990 J	13.1 J
Benzo(b)fluoranthene	1,000	1,000	2,070	5,690	15.3 J
Benzo(k)fluoranthene	800	3,900	614	1,890	32 U
Chrysene	1,000	3,900	2,040	5,340	32 U
Dibenzo(a,h)anthracene	330	330	453	822	32 U
Indeno(1,2,3-cd)pyrene	500	500	1,250 J	3,210 J	32 U
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Arsenic	13	16	6.7 J	18.4 J	3.5
Barium	350	400	999 J	716 J	35.1 J
Chromium	30	180	19.7 J	36.5 J	44.7 J
Copper	50	270	26.3 J	138 J	9.9
Lead	63	400	452 J	3,530 J	6
Mercury	0.18	0.81	0.2 J	1.8 J	0.034 U
Nickel	30	310	14.6 J	32.4 J	18.7 J
Selenium	3.9	180	2.3 U	5.2	2.2 U
Zinc	109	10,000	463 J	1,780 J	124
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	4.6 D	5.4 J	0.11 J
4,4'-DDE	3.3	8,900	13.9 JD	118 J	0.67 J
4,4'-DDT	3.3	7,900	77.8 JD	582 JD	3.8 J
Dieldrin	5	200	7.7 JD	36.8 JD	0.28 Ja

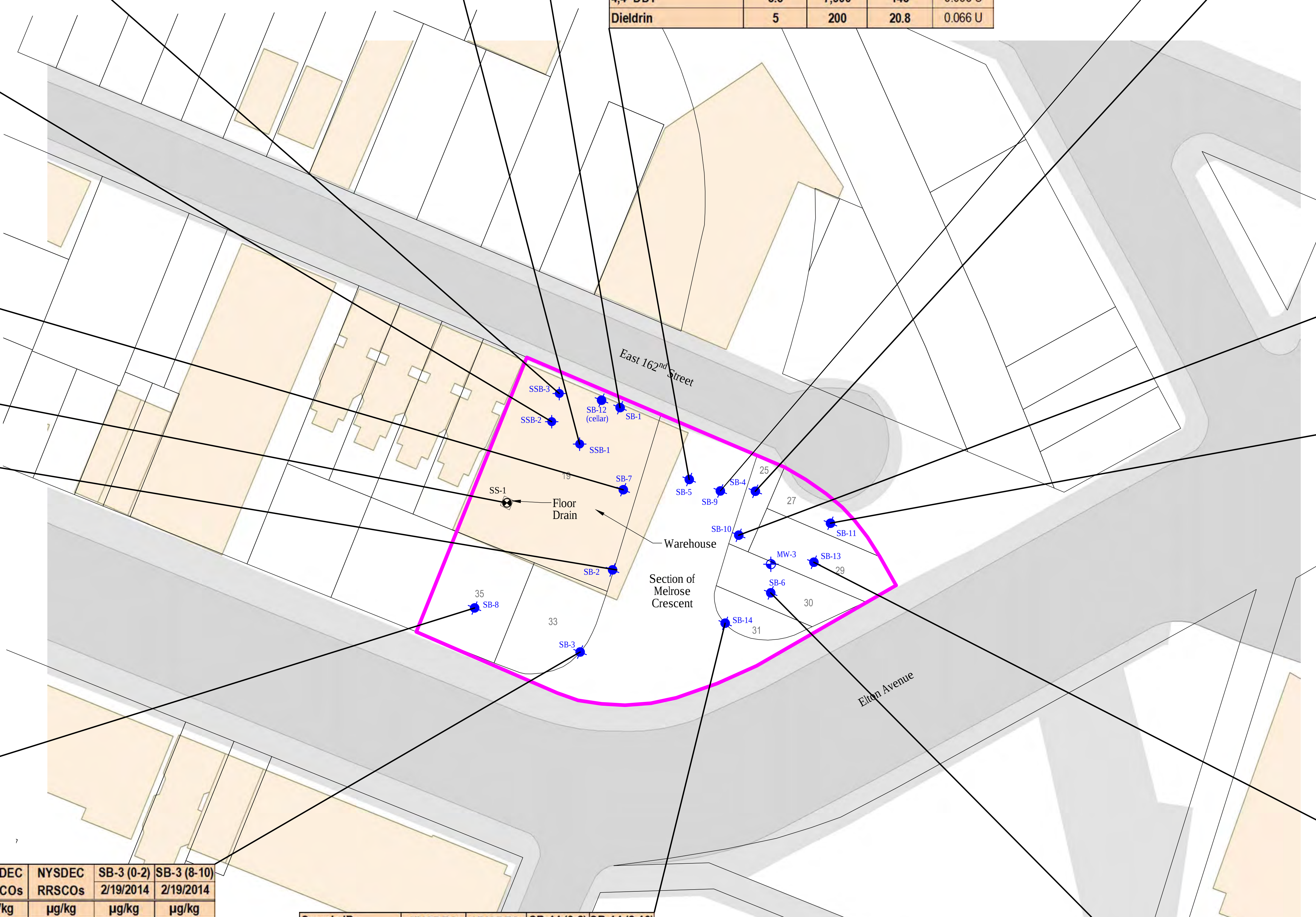
Sample ID	NYSDEC	NYSDEC	SS-1
Date Sampled	UUSCOs	RRSCOs	2/19/2015
Metals	mg/kg	mg/kg	mg/kg
Arsenic	13	16	13.3
Cadmium	2.5	4.3	7.1 c
Copper	50	270	130 c
Lead	63	400	354 c
Nickel	30	310	35.7
Zinc	109	10,000	833
Polychlorinated Biphenyls	µg/kg	µg/kg	µg/kg
Total PCBs	100	1,000	451
Pesticides	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	144
4,4'-DDE	3.3	8,900	1,250
4,4'-DDT	3.3	7,900	1,190
Aldrin	5	97	23.1 a
alpha-Chlordane	94	4,200	2,340
Dieldrin	5	200	7,220
Endrin	14	11,000	168
Heptachlor	42	2,100	1,520

Sample ID	NYSDEC	NYSDEC	SSB-2 (0-2)	SSB-X	SSB-2 (5-7)	SSB-2 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/25/2015	2/25/2015	2/25/2015	2/25/2015
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lead	63	400	17	27	100	450
Zinc	109	10,000	73	79	99	633
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	1.2	1.2	7.9	6.8
4,4'-DDE	3.3	8,900	1.9	2.3	61.2	59.3
Dieldrin	5	200	1.1	2.6	40.5	16.3

Sample ID	NYSDEC	NYSDEC	SB-7 (0-2)	SB-7 (5-7)
Date Sampled	UUSCOs	RRSCOs	2/18/2014	2/18/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Chromium	30	180	36.9	35.3
Nickel	30	310	26.6	30.5

Sample ID	NYSDEC	NYSDEC	SB-11 (0-2)	SB-11 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Lead	63	400	203	28.3
Zinc	109	10,000	153	42.2
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDT	3.3	7,900	14.7 D	0.079 U

Sample ID	NYSDEC	NYSDEC	SB-2 (0-2)	SB-2 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/18/2014	2/18/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	1,150	71 U
Benzo(a)pyrene	1,000	1,000	1,300	72 U
Benzo(b)fluoranthene	1,000	1,000	1,660	73 U
Chrysene	1,000	3,900	1,380	74 U
Indeno(1,2,3-cd)pyrene	500	500	918	75 U
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Chromium	30	180	19.4	33
Lead	63	400	201	11.7
Mercury	0.18	0.81	0.65	0.033 U
Zinc	109	10,000	197	70.2
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	5.8	0.073 U
4,4'-DDT	3.3	7,900	40 D	0.073 U
Dieldrin	5	200	14 D	0.073 U



Sample ID	NYSDEC	NYSDEC	SB-13 (0-2)	SB-13 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
VOCs	µg/kg	µg/kg	µg/kg	µg/kg
m,p-xylene	260	100,000	1.2 U	583
o-xylene	260	100,000	1.2 U	386
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	2,030	81.4
Benzo(a)pyrene	1,000	1,000	1,970	86.4
Benzo(b)fluoranthene	1,000	1,000	2,460	111
Benzo(k)fluoranthene	800	3,900	886	46.1
Chrysene	1,000	3,900	2,380	89
Dibenzo(a,h)anthracene	330	330	531	16.1 J
Indeno(1,2,3-cd)pyrene	500	500	1,240	50.9
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	383	668
Chromium	30	180	16.1	31.2
Copper	50	270	23.5	60.8
Lead	63	400	136	220
Mercury	0.18	0.81	0.39	34.8
Silver	2	180	55.1	1.9
Zinc	109	10,000	192	1,220
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	0.071 U	2180 D
4,4'-DDE	3.3	8,900	4.6 Ja	661 D
4,4'-DDT	3.3	7,900	37 D	10400 D
Dieldrin	5	200	6.2 Jna	3.6

Sample ID	NYSDEC	NYSDEC	SB-8 (0-2)	SB-8 (7-9)	SB-8 (7-9) B
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014	2/19/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	6,230	4,300	3,450
Benzo(a)pyrene	1,000	1,000	6,870	4,390	3,630
Benzo(b)fluoranthene	1,000	1,000	7,470	5,010	4,380
Benzo(k)fluoranthene	800	3,900	2,560 J	1,850	1,400
Chrysene	1,000	3,900	6,490 J	4,790	3,630
Dibenzo(a,h)anthracene	330	330	1,340 J	858	675
Indeno(1,2,3-cd)pyrene	500	500	4,120 J	3,270	2,610
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	379 J	1,580 J	554 J
Copper	50	270	54.6 J	16.1 J	30.3 J
Lead	63	400	667 J	465	565
Mercury	0.18	0.81	2.2 J	0.29	0.14
Zinc	109	10,000	1,220 J	669	569
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	4.4 J	58 J	20.7 J
4,4'-DDE	3.3	8,900	7.3 J	61.1	95.4
4,4'-DDT	3.3	7,900	150 J	96.7 J	561 J
Dieldrin	5	200	4.2 J	29.2 J	26.6
Endrin	14	11,000	0.075 U	29.4 J	0.079 U

Sample ID	NYSDEC	NYSDEC	SB-3 (0-2)	SB-3 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	36 U	2,720
Benzo(a)pyrene	1,000	1,000	36 U	2,770
Benzo(b)fluoranthene	1,000	1,000	36 U	3,010
Benzo(k)fluoranthene	800	3,900	36 U	1,120
Chrysene	1,000	3,900	36 U	2,910
Dibenzo(a,h)anthracene	330	330	36 U	462
Indeno(1,2,3-cd)pyrene	500	500	36 U	1,680
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	588	487
Lead	63	400	199	97.9
Zinc	109	10,000	274	273
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	5.3	6.8 J
4,4'-DDE	3.3	8,900	6.9	5.4 JD
4,4'-DDT	3.3	7,900	59 D	70.1 D
Dieldrin	5	200	5.5	5.2 J

Sample ID	NYSDEC	NYSDEC	SB-14 (0-2)	SB-14 (8-10)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	2,200	32.1
Cadmium	2.5	4.3	2.8	0.52 U
Lead	63	400	683	10.8
Zinc	109	10,000	921	34.6
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13,000	48.8 D	0.66
4,4'-DDE	3.3	8,900	214 D	1.8
4,4'-DDT	3.3	7,900	610 D	3.5
Dieldrin	5	200	74.5 D	0.8

Sample ID	NYSDEC	NYSDEC	SB-6 (0-2)	SB-6 (5-7)
Date Sampled	UUSCOs	RRSCOs	2/19/2014	2/19/2014
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Benzo(a)anthracene	1,000	1,000	35 U	2,240
Benzo(a)pyrene	1,000	1,000	35 U	2,150
Benzo(b)fluoranthene	1,000	1,000	35 U	2,490
Benzo(k)fluoranthene	800	3,900	35 U	895
Chrysene	1,000	3,900	35 U	2,500
Dibenzo(a,h)anthracene	330	330	35 U	631
Indeno(1,2,3-cd)pyrene	500	500	35 U	1,780
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Barium	350	400	48.2	2,900
Copper	50	270	329	24.6
Lead	63	400	24.2	156
Zinc	109	10000	103	895
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDD	3.3	13000	0.066 U	4.3 JN

0' 25' 50' 100'

SCALE IN FEET

SOIL

Part 375 Soil Cleanup Objectives:
Soil Cleanup Objectives listed in NYSDEC
(New York State Department of Environmental Conservation)
"Part 375" Regulations (6 NYCRR Part 375).

Exceedances of Part 375 Unrestricted Use SCOs (UUSCOS) are highlighted in bold font.
Exceedances of Part 375 Restricted Residential (RRSCOS) are highlighted in gray.

Õg/kg:micrograms per kilogram = parts per billion (ppb)
mg/kg:milligrams per kilogram = parts per million (ppm)

U:The analyte was not detected at the indicated concentration.
c: Elevated detection limit due to dilution required for interfering element.
a: More than 40% Relative Percent Difference (RPD) for detected concentrations between the two GC columns.
b: Result is from second run.
J: The concentration given is an estimated value
J-: The concentration given is an estimated value, the result may be biased low.
D: Analyte concentration obtained from dilution.
JN: The analysis indicates the presence of an analyte that has been "tentatively indentified", and the value represents an approx quanity.

LEGEND:

▬	PROJECT SITE BOUNDARY
—	LOT LINE
SSB-2 ⌖	SOIL BORING LOCATION
SS-1 ⊗	SOIL SAMPLE LOCATION
MW-3 ⌖	MONITORING WELL /SOIL SAMPLE LOCATION

SSB-X is a duplicate of SSB-2(0-2)

Sample ID	NYSDEC	NYSDEC	SSB-3 (0-2)	SSB-3 (5-7)	SSB-3 (7.5-9.5)
Date Sampled	UUSCOs	RRSCOs	2/26/2015	2/26/2015	2/26/2015
Pesticides	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDE	3.3	8,900	2.6	20.2	0.73 U

Analyte/Compound in Soil

Sample ID

Sample Date

Concentration in Soil

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Elton Crossing/Site C - Family
Bronx, New York

SOIL SAMPLE CONCENTRATIONS ABOVE NYSDEC SCOs

DATE
5.21.2015

SCALE
as shown

PROJECT No.
11901

FIGURE
3

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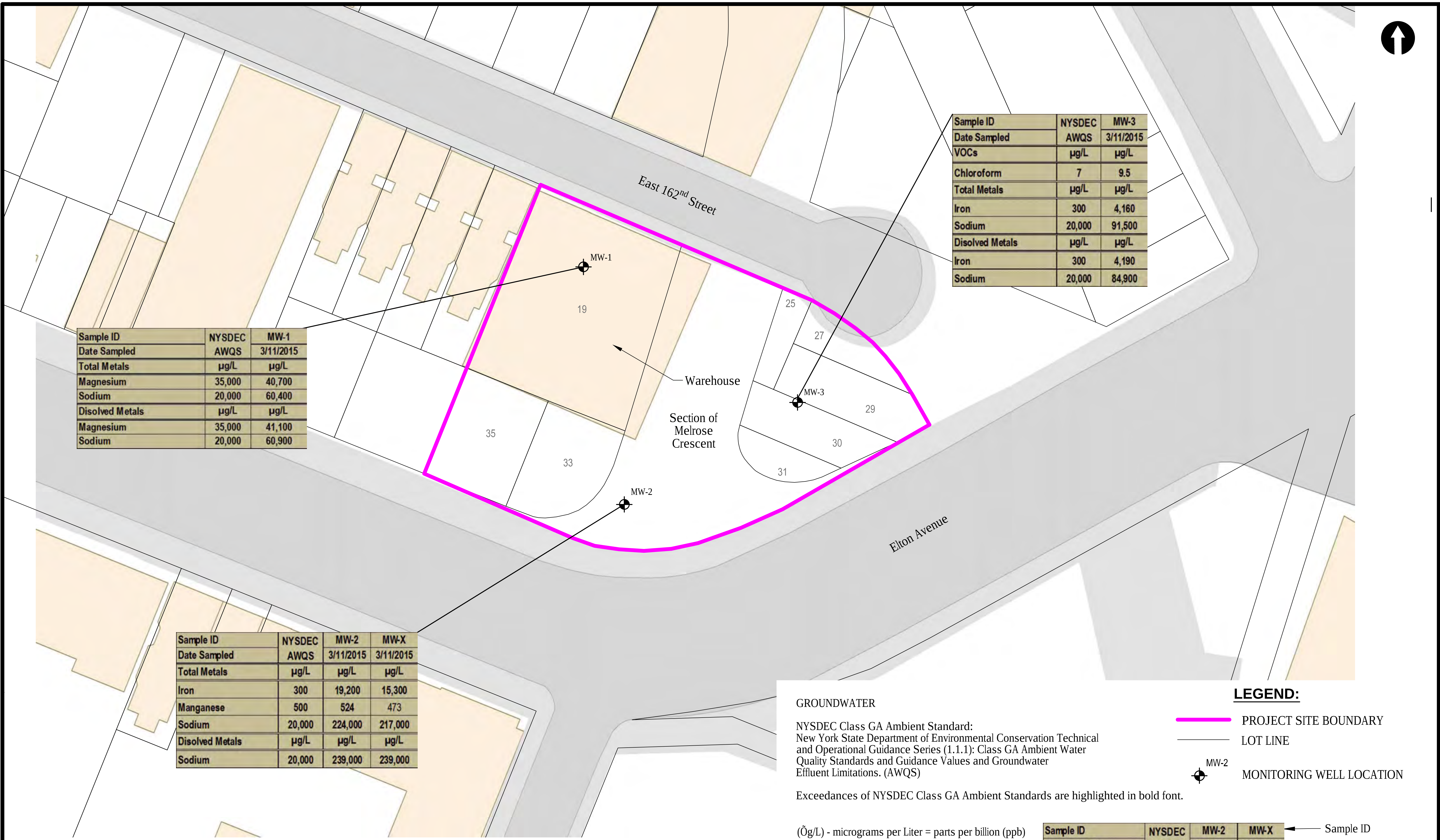


Sample ID	NYSDEC	MW-1
Date Sampled	AWQS	3/11/2015
Total Metals	**µg/L**	**µg/L**
Magnesium	35,000	40,700
Sodium	20,000	60,400
Disolved Metals	**µg/L**	**µg/L**
Magnesium	35,000	41,100
Sodium	20,000	60,900

Sample ID	NYSDEC	MW-3
Date Sampled	AWQS	3/11/2015
VOCs	µg/L	µg/L
Chloroform	7	9.5
Total Metals	µg/L	µg/L
Iron	300	4,160
Sodium	20,000	91,500
Disolved Metals	µg/L	µg/L
Iron	300	4,190
Sodium	20,000	84,900

Sample ID	NYSDEC	MW-2	MW-X
Date Sampled	AWQS	3/11/2015	3/11/2015
Total Metals	µg/L	µg/L	µg/L
Iron	300	19,200	15,300
Manganese	500	524	473
Sodium	20,000	224,000	217,000
Disolved Metals	µg/L	µg/L	µg/L
Sodium	20,000	239,000	239,000

GROUNDWATER

NYSDEC Class GA Ambient Standard:
New York State Department of Environmental Conservation Technical and Operational Guidance Series (1.1.1): Class GA Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. (AWQS)

Exceedances of NYSDEC Class GA Ambient Standards are highlighted in bold font.

(Õg/L) - micrograms per Liter = parts per billion (ppb)

Compound in Groundwater/Analyte

MW-X is a duplicate of MW-2

Sample ID	NYSDEC	MW-2	MW-X
Date Sampled	AWQS	3/11/2015	3/11/2015
Total Metals	µg/L	µg/L	µg/L
Iron	300	19,200	15,300
Manganese	500	524	473
Sodium	20,000	224,000	217,000
Disolved Metals	µg/L	µg/L	µg/L
Sodium	20,000	239,000	239,000

Sample ID

Sample Date

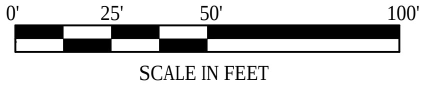
Concentration in water

LEGEND:

PROJECT SITE BOUNDARY

LOT LINE

MW-2 MONITORING WELL LOCATION



SCALE IN FEET

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Bronx, New York

GROUNDWATER SAMPLE CONCENTRATIONS ABOVE NYSDEC AWQS

DATE
5.1.2015

PROJECT NO.
11901

SCALE
as shown

FIGURE
4

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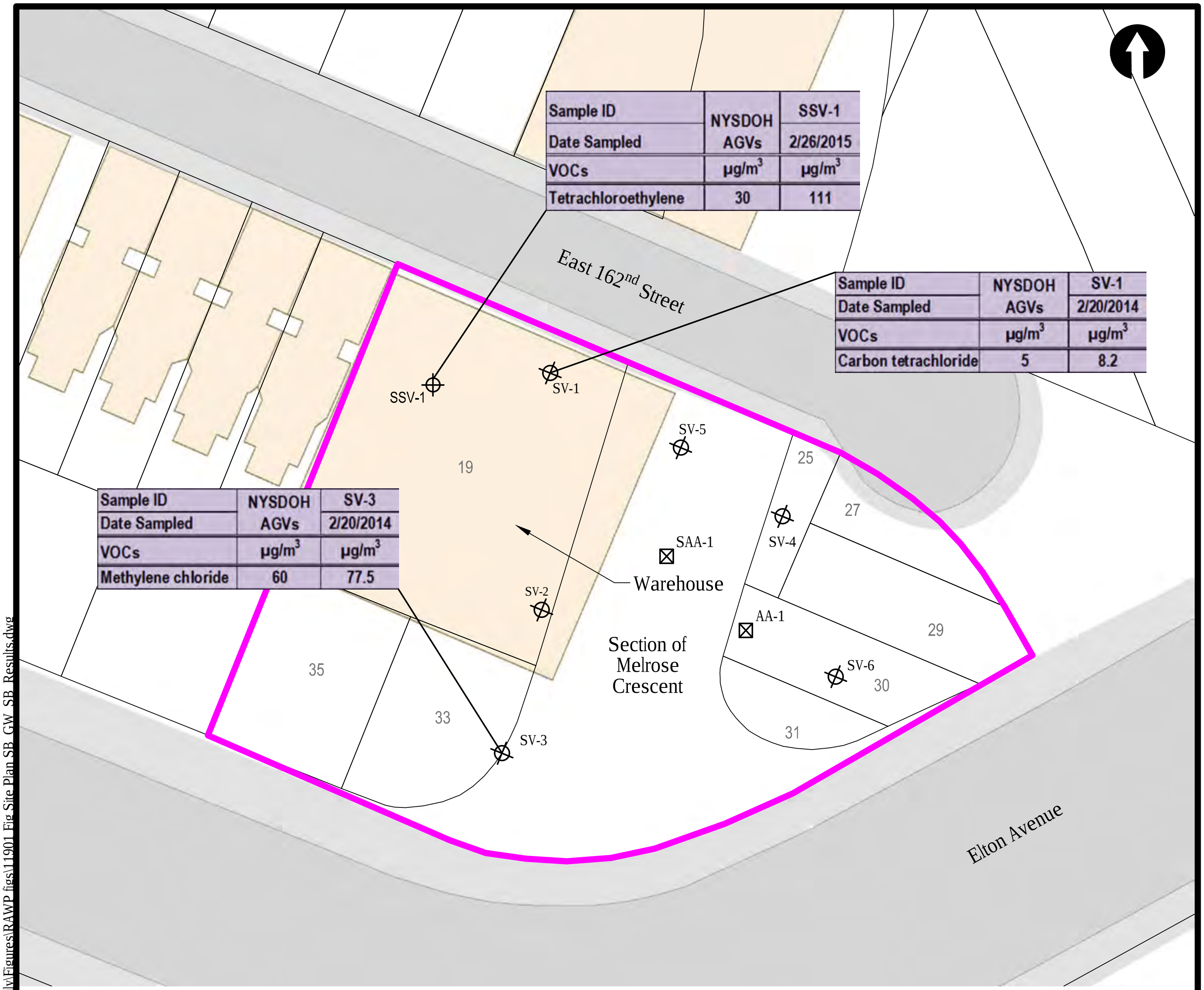

Sample ID Date Sampled	NYSDOH AGVs	SSV-1 2/26/2015
VOCs	µg/m^3	µg/m^3
Tetrachloroethylene	30	**111**

Sample ID Date Sampled	NYSDOH AGVs	SV-1 2/20/2014
VOCs	µg/m^3	µg/m^3
Carbon tetrachloride	5	**8.2**

Sample ID Date Sampled	NYSDOH AGVs	SV-3 2/20/2014
VOCs	µg/m^3	µg/m^3
Methylene chloride	60	**77.5**

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

SOIL VAPOR

NYSDOH Soil Vapor Intrusion Air Guidance Value:
NYSDOH Air Guideline Values (AGVs) and/or matrix value presented in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 (NYSDOH Vapor Intrusion Guidance Document).

Exceedances of NYSDOH Soil Vapor Intrusion Air Guidance Values are highlighted in bold font.

(Õg/mį): micrograms per cubic meter

0' 50' 100'
SCALE IN FEET

LEGEND:

- PROJECT SITE BOUNDARY
- LOT LINE
- ⌖ SSV-1 SOIL VAPOR SAMPLE LOCATION
- ☒ SAA-1 AMBIENT AIR SAMPLE LOCATION

Sample ID Date Sampled	NYSDOH AGVs	SV-3 2/20/2014
VOCs	µg/m^3	µg/m^3
Methylene chloride	60	77.5

Sample ID
Sample Date
Compound in Soil Vapor
Concentration in Soil Vapor

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Bronx, New York

SOIL VAPOR CONCENTRATIONS ABOVE AGVs

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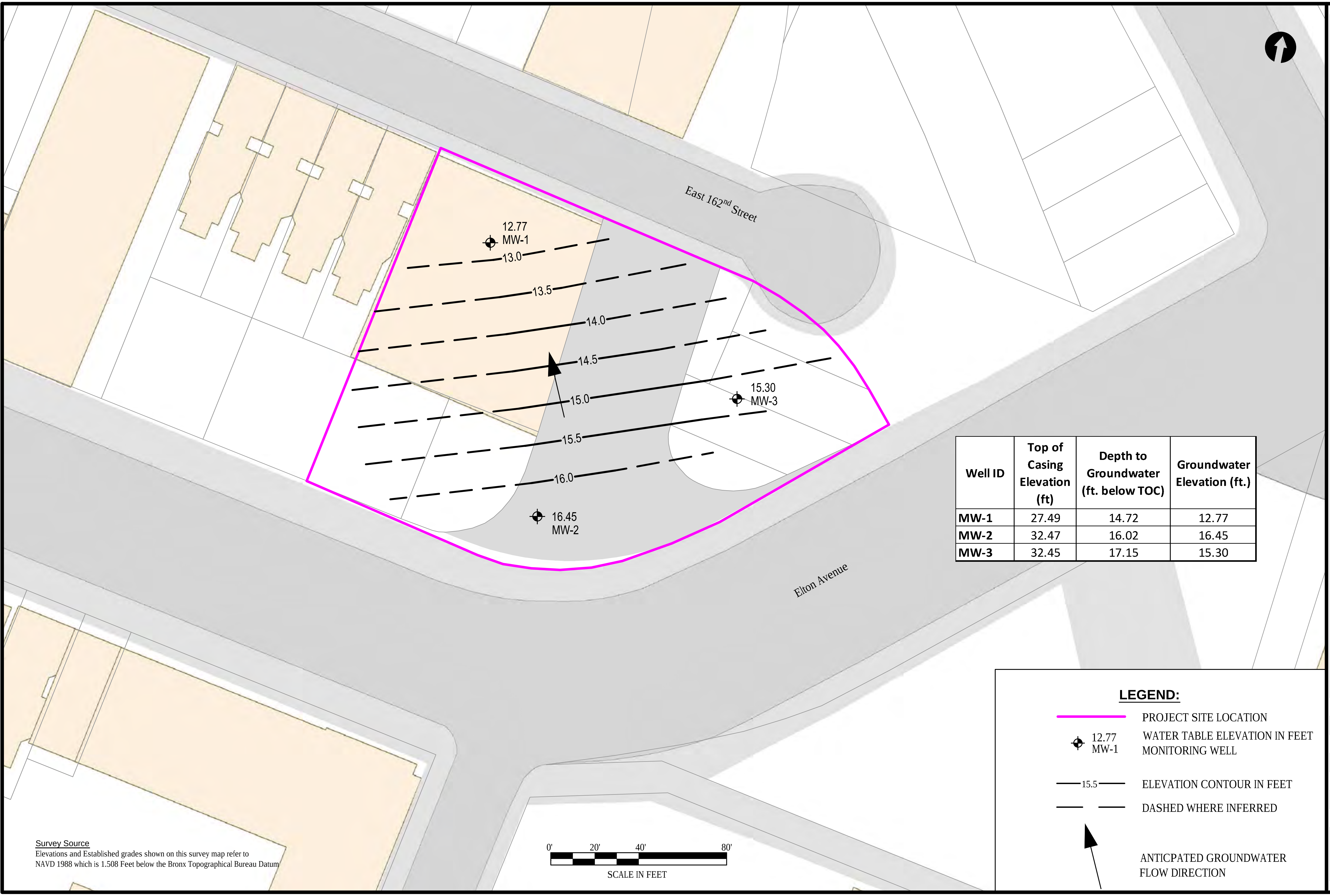
440 Park Avenue South, New York, N.Y. 10016

DATE 5.4.2015
PROJECT No. 11901
SCALE as shown
FIGURE 5



Well ID	Top of Casing Elevation (ft)	Depth to Groundwater (ft. below TOC)	Groundwater Elevation (ft.)
MW-1	27.49	14.72	12.77
MW-2	32.47	16.02	16.45
MW-3	32.45	17.15	15.30

LEGEND:

	PROJECT SITE LOCATION
⌖ 12.77 MW-1	WATER TABLE ELEVATION IN FEET MONITORING WELL
—15.5—	ELEVATION CONTOUR IN FEET
— —	DASHED WHERE INFERRED
↑	ANTICPATED GROUNDWATER FLOW DIRECTION

Survey Source
Elevations and Established grades shown on this survey map refer to NAVD 1988 which is 1.508 Feet below the Bronx Topographical Bureau Datum

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Bronx, New York

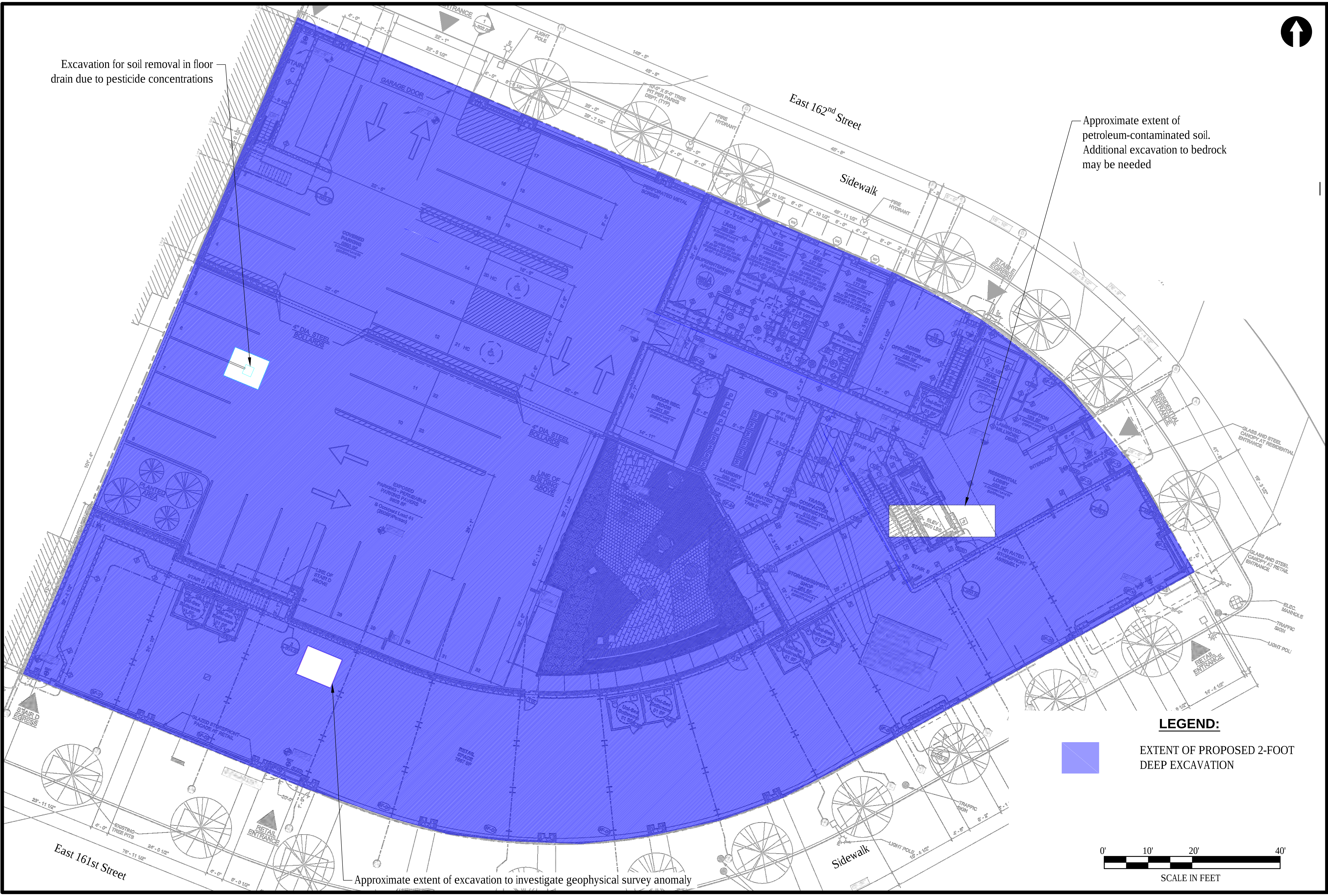
WATER TABLE ELEVATION CONTOURS 3/11/2015

DATE
5.4.2015

PROJECT NO.
11901

SCALE
as shown

FIGURE
6



Excavation for soil removal in floor drain due to pesticide concentrations

Approximate extent of petroleum-contaminated soil. Additional excavation to bedrock may be needed

Approximate extent of excavation to investigate geophysical survey anomaly

LEGEND:

▨ EXTENT OF PROPOSED 2-FOOT DEEP EXCAVATION

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PROPOSED REMEDIAL SITE EXCAVATION PLAN

DATE
6.26.2015

PROJECT NO.
11901

SCALE
as shown

FIGURE
7

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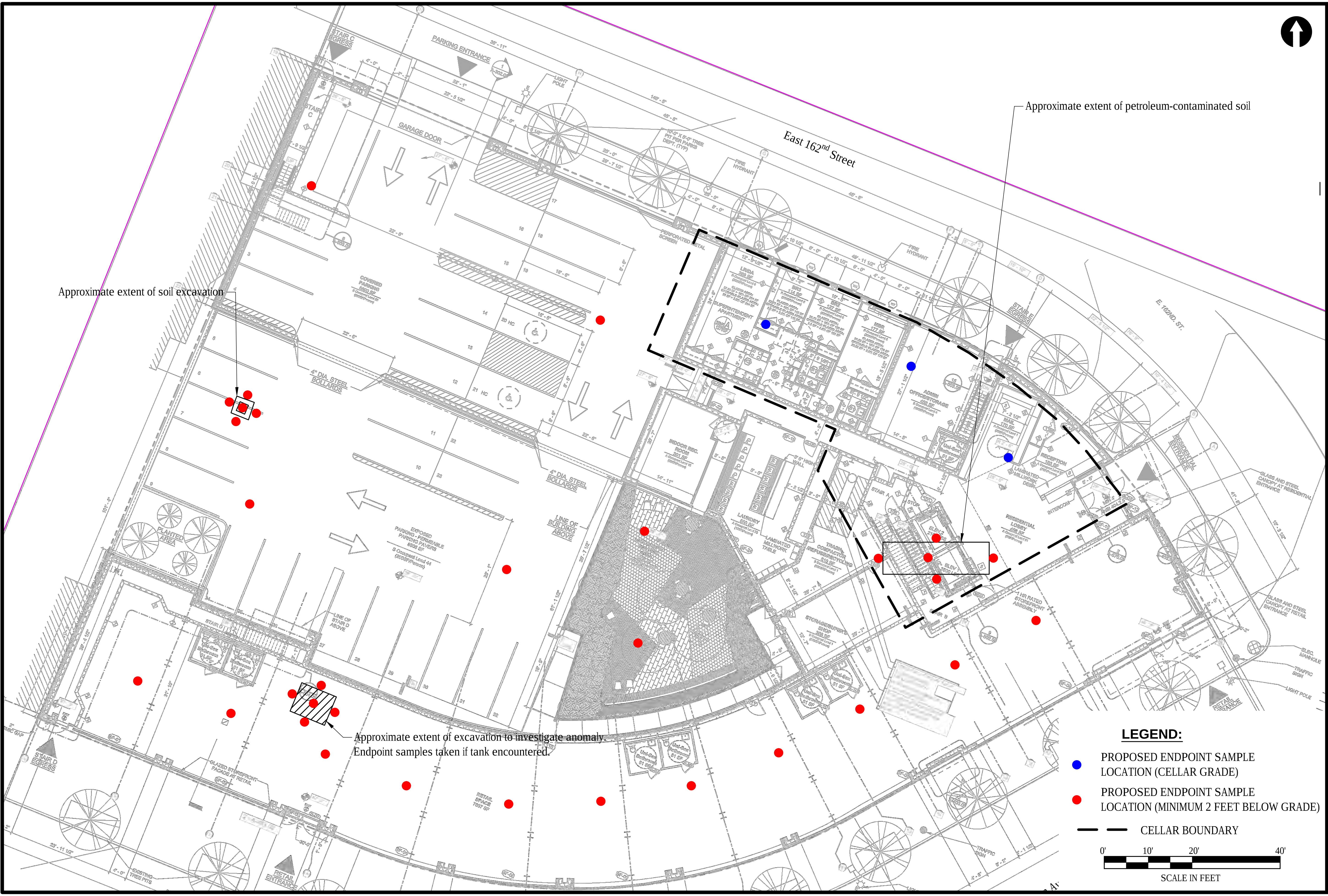
M:\AKRF Project Files\11901 Melrose Commons Site C - Family\Figures\RAWP figs\11901 Fig Site Cover and Excvation.dwg



Approximate extent of petroleum-contaminated soil

Approximate extent of soil excavation

Approximate extent of excavation to investigate anomaly. Endpoint samples taken if tank encountered.

LEGEND:

🔵 PROPOSED ENDPOINT SAMPLE LOCATION (CELLAR GRADE)

🔴 PROPOSED ENDPOINT SAMPLE LOCATION (MINIMUM 2 FEET BELOW GRADE)

— — CELLAR BOUNDARY

0' 10' 20' 40'
SCALE IN FEET

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Elton Crossing/Site C - Family
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Bronx, New York

PROPOSED ENDPOINT SAMPLE LOCATIONS

DATE
5.21.2015

PROJECT NO.
11901

SCALE
as shown

FIGURE
8

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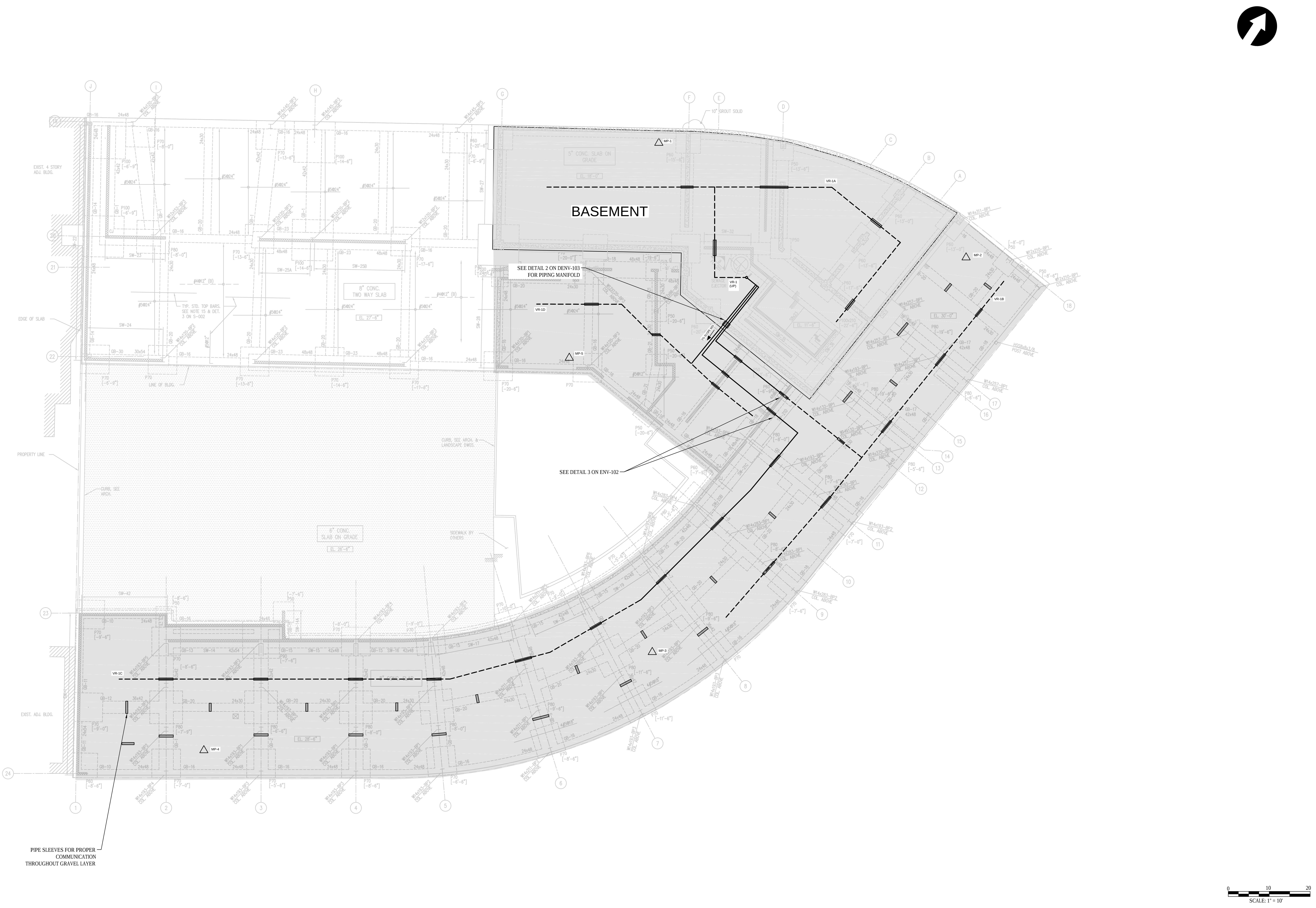
OWNER/APPLICANT

ELTON CROSSING ASSOCIATES, L.P.
902 BROADWAY, 13TH FLOOR
NEW YORK, NY 10010

ENVIRONMENTAL ENGINEER

AKRF

AKRF ENGINEERING, P.C.
440 PARK AVENUE SOUTH
NEW YORK, NY 10016
(212) 696-0670 (PHONE)
(212) 726-0942 (FAX)



NOT FOR CONSTRUCTION - FOR REMEDIAL PLAN APPROVAL ONLY

LEGEND

▨	LATERAL EXTENT OF GAS VAPOR BARRIER AND MINIMUM 6-INCH THICK GAS PERMEABLE AGGREGATE (SEE DETAILS 1, 2, AND 7 ON DRAWING ENV-102)
○ VR-1	VERTICAL RISER AND IDENTIFICATION NUMBER. EXTEND THROUGH ROOF TO EXHAUST STACK (SEE DETAIL 2 ON DRAWING ENV-102)
– – – –	4-INCH DIAMETER 0.02 SLOTTED PVC SSDS PIPE BENEATH FLOOR SLAB (SEE DETAIL 2 AND 7 0N DRAWING ENV-102)
━━━	4-INCH SCHEDULE 40 SOLID PVC SSDS PIPE BENEATH FLOOR SLAB
───	EXTENT OF BASEMENT
△ MP-X	MONITORING POINT (SEE DETAIL 4 ON DRAWING ENV-102)
▭	PIPE SLEEVE (SEE DETAIL 9 ON DRAWING ENV-102)
▨	COMMUNICATION SLEEVE

NOTES

1. THIS PLAN SHALL NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER REFERENCE PURPOSES EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM.

2. THE EXTENTS OF THE BUILDING CONSTRUCTION BENEATH THE FLOOR SLABS SHALL BE LINED WITH A VAPOR BARRIER. AS PART OF THE BUILDING CONSTRUCTION, THE GAS VAPOR BARRIER SHALL ALSO BE APPLIED TO BELOW GRADE WALLS, BOTTOM SLABS AND THE WALLS OF PITS AND SUMPS AS SHOWN AND SPECIFIED.

3. SLOPE SOLID HORIZONTAL 4-INCH SCHEDULE 40 PVC PIPE A MINIMUM OF 1% UNIFORMLY TOWARDS THE SUB-SLAB DEPRESSURIZATION SYSTEM SLOTTED PVC PIPING OR CONDENSATE DRAIN. CONTRACTOR TO SUBMIT SHOP DRAWING OF ALL CONDENSATE DRAIN LOCATIONS AND INVERTS.

4. COORDINATE ALL WORK FOR SSDS INSTALLATION WITH OTHER TRADES BEFORE INSTALLATION.

5. REFER TO DRAWINGS ENV-101 FOR SSDS RISER LOCATIONS ON EACH FLOOR AND ROOF.

6. REFER TO DRAWING ENV-102 FOR SSDS PIPE, RISER, GAS VAPOR BARRIER, AND GAS PERMEABLE AGGREGATE DETAILS AND SECTIONS.

7. BASE MAP TAKEN FROM DRAWING FO-100 AND S-101 DATED 03/18/2015 PREPARED.

8. SSDS DESIGN PIPING NETWORK AND EQUIPMENT ARE SUBJECT TO CHANGE BASED ON REVIEW BY NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

9. REFER TO DRAWING ENV-103 FOR SSDS FAN AND EQUIPMENT SCHEDULE,TYPICAL SSDS CROSS SECTION,GENERAL NOTES AND BLOWER NOTES

MICHELLE LAPIN , P.E.

REVISIONS

No.	DATE	DESCRIPTION
	05/04/2015	DEC SUBMISSION
	06/12/2015	DEC REVISIONS
	06/24/2015	DESIGN REVISIONS

PROJECT
ELTON CROSSING SITE C, BRONX, NEW YORK

DRAWN BY
KH

CHECKED BY
MG

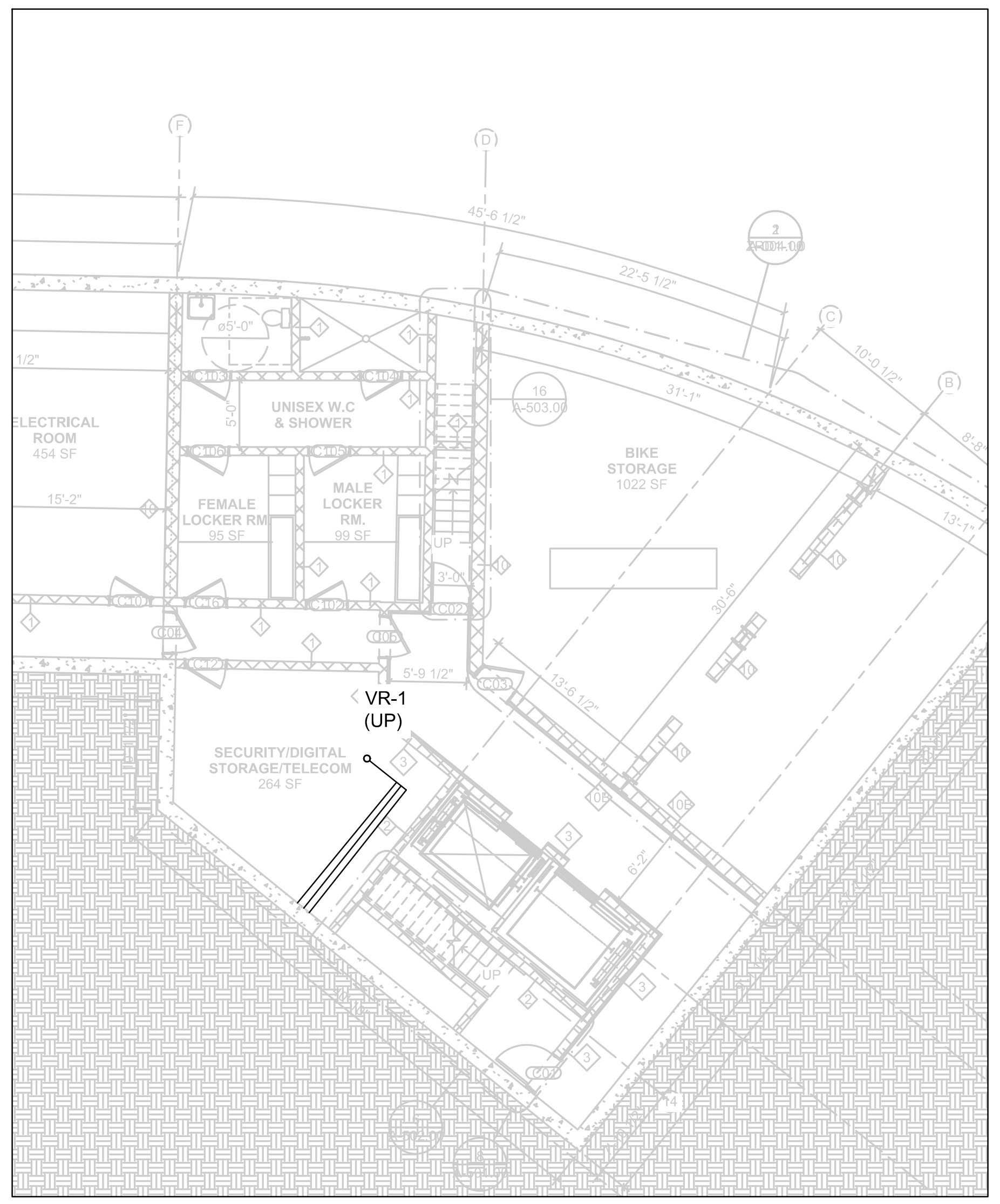
SCALE
AS NOTED

DATE
06/24/15

SHEET TITLE
SUB-SLAB DEPRESSURIZATION LAYOUT

SHEET NO.
FIGURE 9 - ENV-100

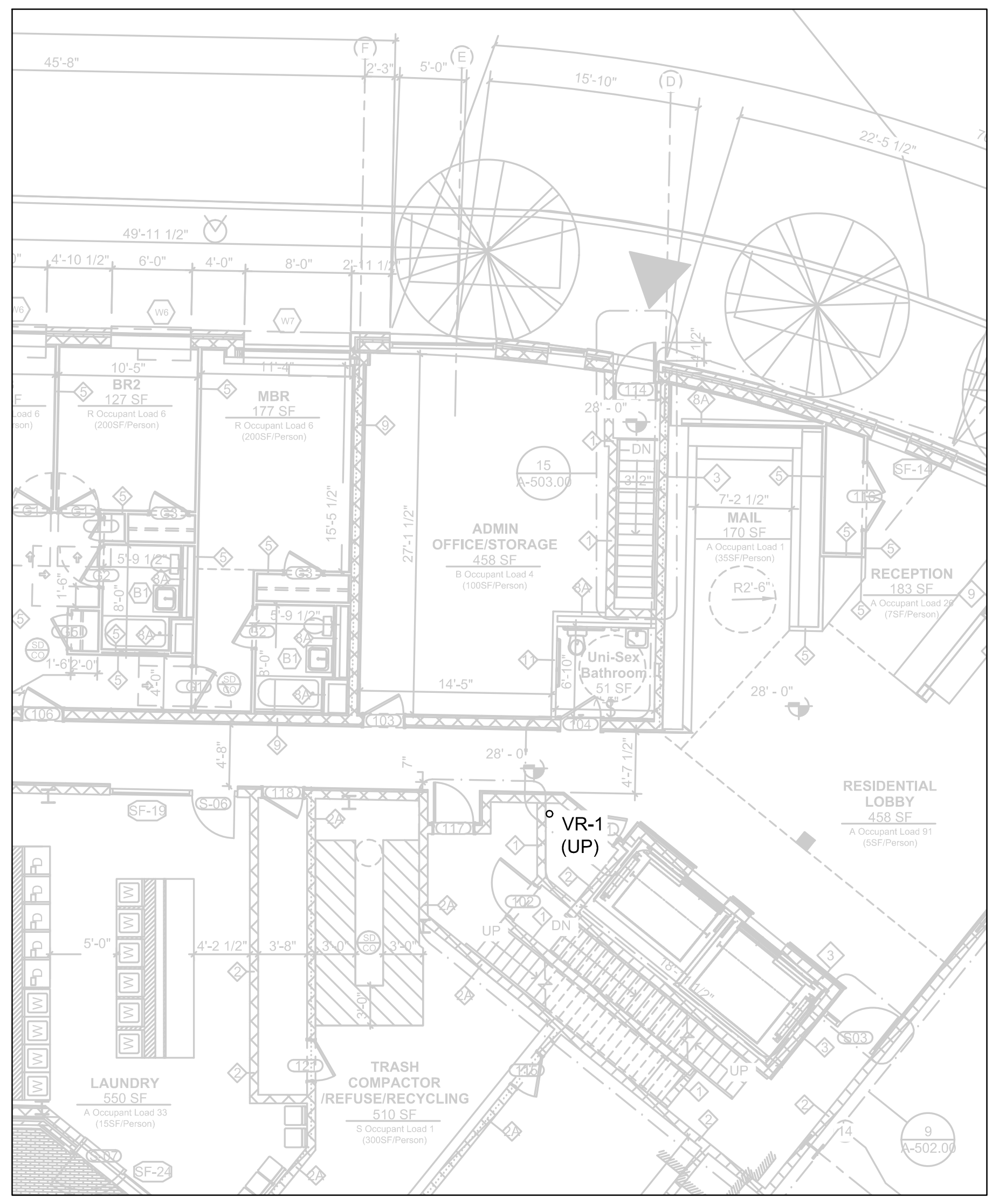
SHEET 1 OF 4



1. VR-1 CELLAR RISER LOCATION PLAN

A-100 USED AS BACKGROUND

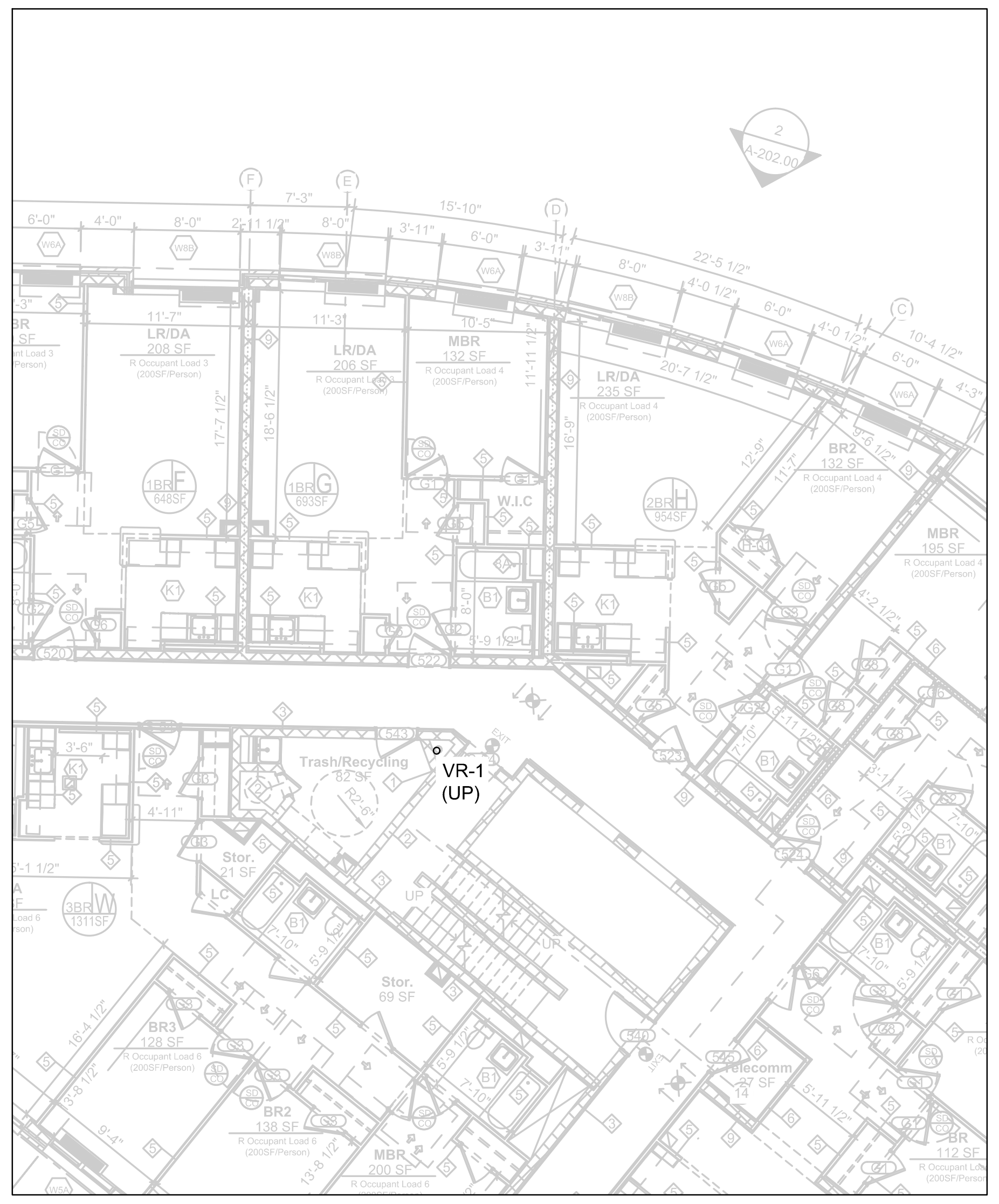
0 10' 20'



2. VR-1 FIRST FLOOR RISER LOCATION PLAN

A-100 USED AS BACKGROUND

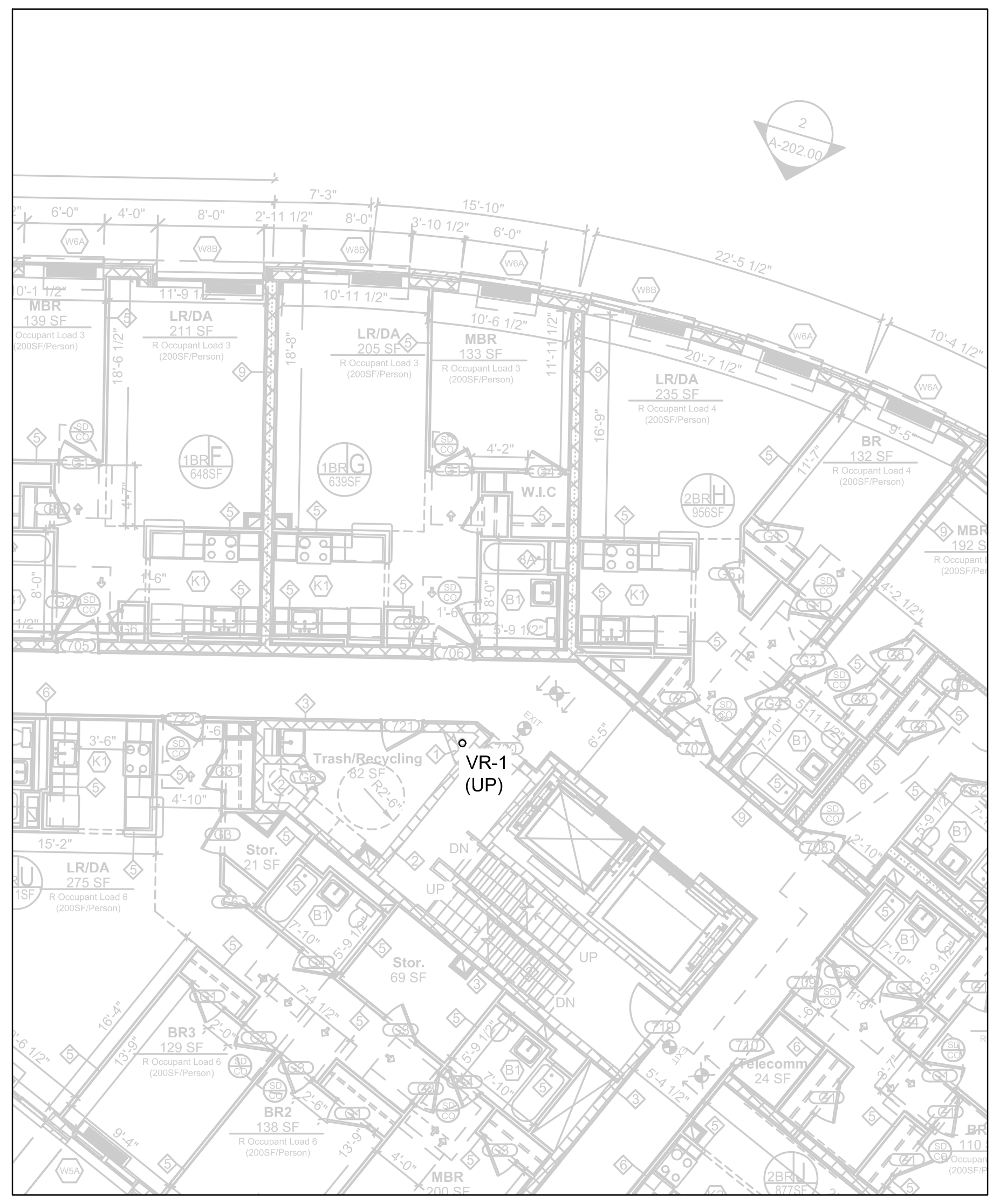
0 10' 20'



3. VR-1 SECOND TO SIXTH FLOOR RISER LOCATION PLAN

A-102 AS BACKGROUND

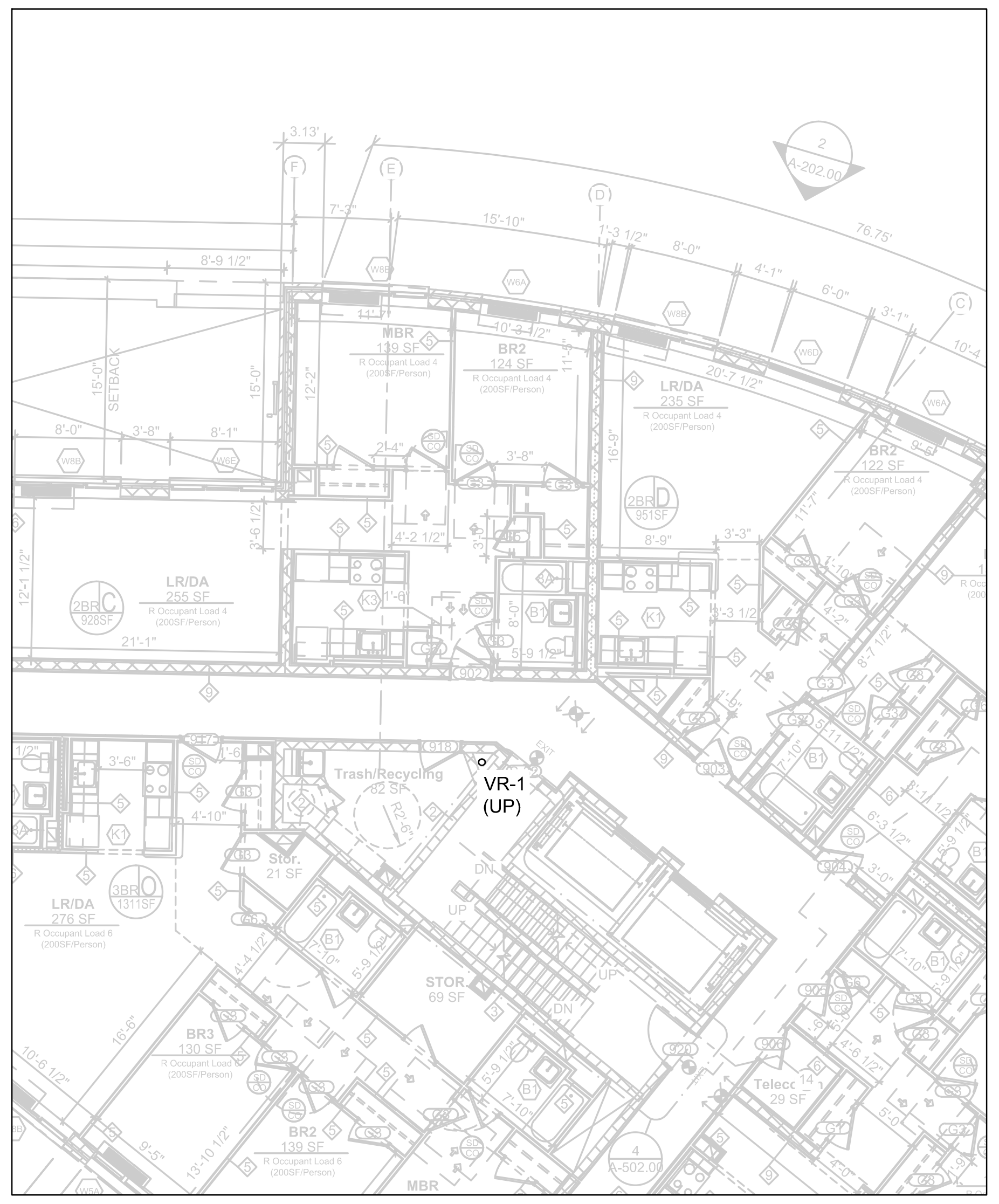
0 10' 20'



4. VR-1 SEVENTH TO EIGHTH FLOOR RISER LOCATION PLAN

A-103 USED AS BACKGROUND

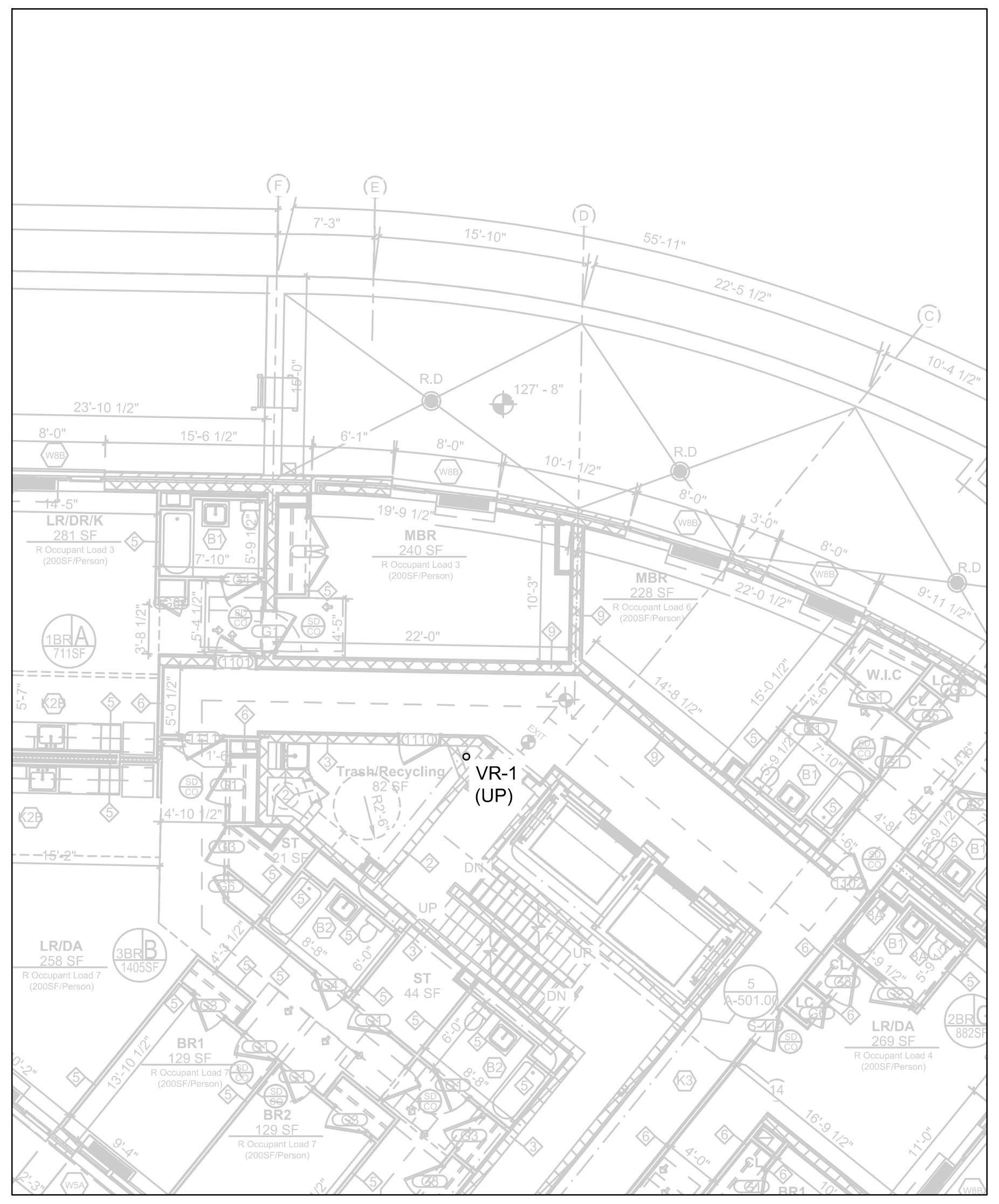
0 10' 20'



5. VR-1 NINTH TO TENTH FLOOR RISER LOCATION PLAN

A-104 USED AS BACKGROUND

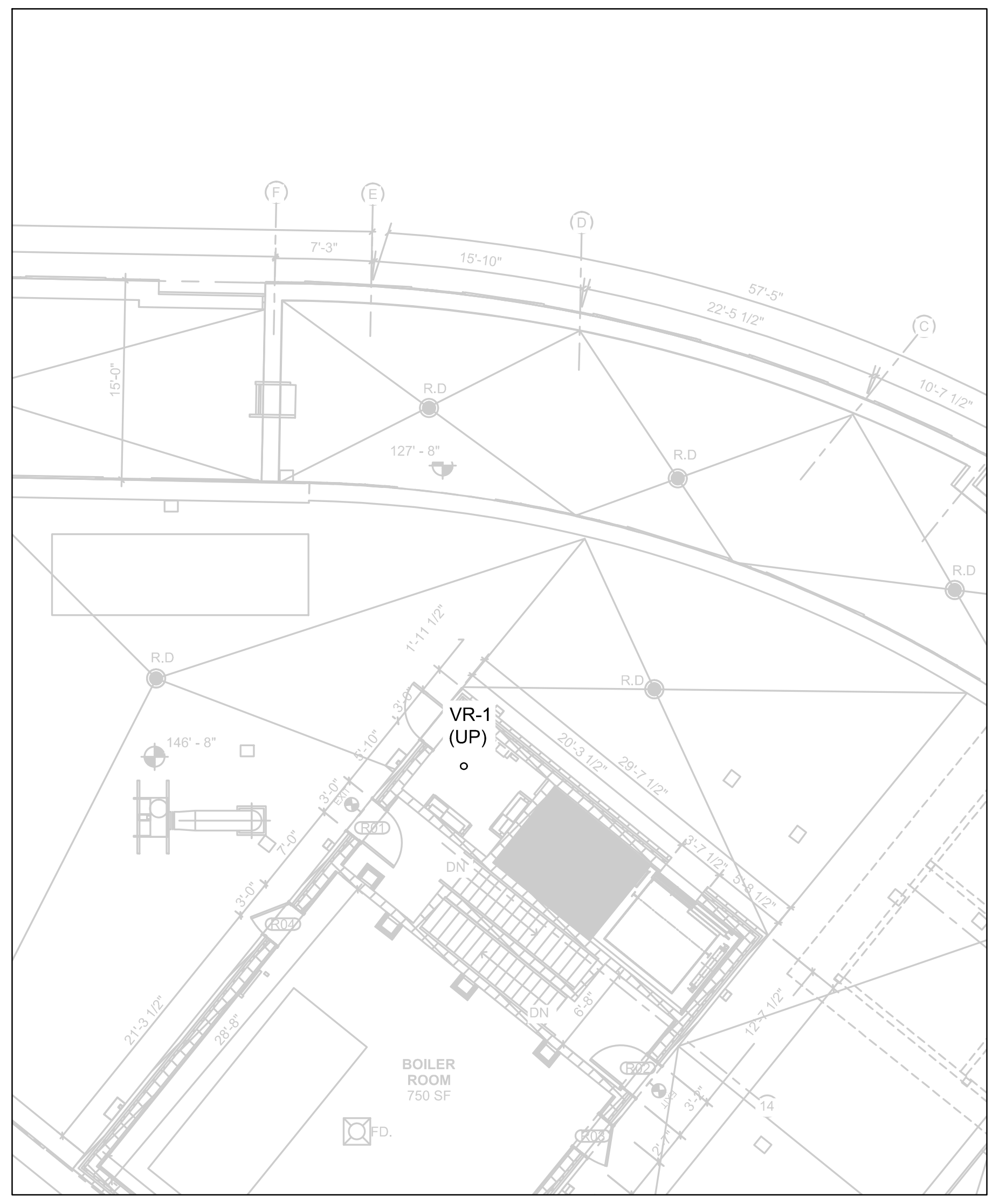
0 10' 20'



6. VR-1 ELEVENTH TO TWELFTH FLOOR RISER LOCATION PLAN

A-105 USED AS BACKGROUND

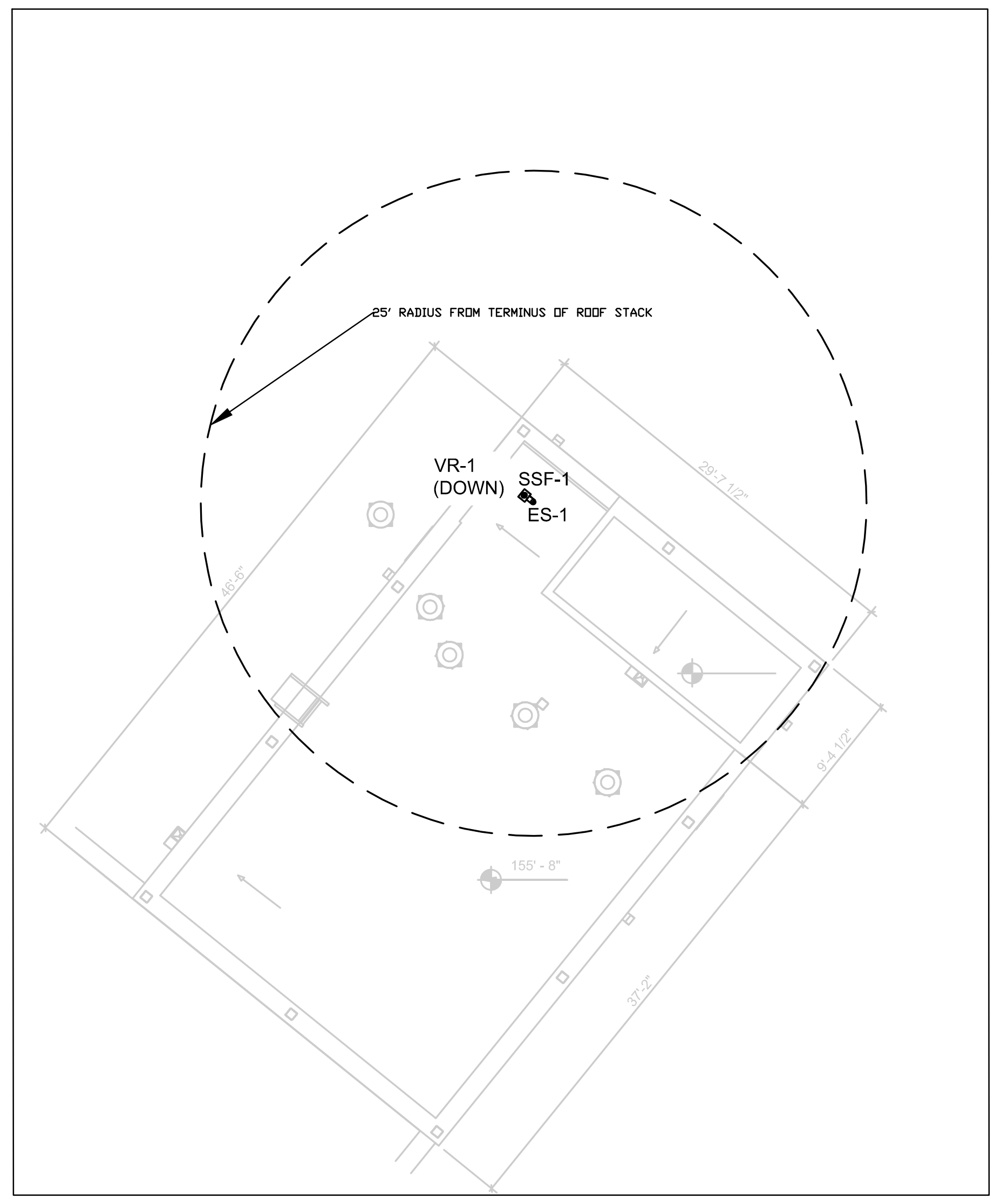
0 10' 20'



7. VR-1 ROOF RISER LOCATION PLAN

A-106 USED AS BACKGROUND

0 10' 20'



8. VR-1 HIGH ALBEDO ROOF OVER BULKHEAD/MECHANICAL ROOM LOCATION PLAN

A-106 USED AS BACKGROUND

0 10' 20'

LEGEND

○ VR-1	VERTICAL RISER AND IDENTIFICATION NUMBER. EXTEND THROUGH ROOF TO SUCTION FAN (REFER TO DETAIL 2 AND ON DRAWING ENV-102) (NOT TO SCALE)
□○ SSF-1	SUCTION FAN AND STACK (REFER TO DETAIL 1 ON DRAWING ENV-103) (NOT TO SCALE)
◉ ES-1	SUCTION FAN EXHAUST STACK (SEE DETAIL 3 ON ENV-103)

NOTES

1. THIS DRAWING IS FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM ONLY. THIS PLAN IS NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER PURPOSES.
2. COORDINATE ALL WORK FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM CONNECTIONS AND ROOF PENETRATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
3. REFER TO DRAWINGS ENV-101 AND ENV-103 FOR SYSTEM LAYOUT, VENT PIPE, RISER PIPE, SUCTION FAN, EXHAUST STACK DETAILS.
4. REFER TO DRAWING ENV-103 FOR FAN AND INSTRUMENT SCHEDULE, TYPICAL SSDS CROSS SECTION, GENERAL NOTES, AND BLOWER NOTES.
5. ALL SOLID PVC HORIZONTAL PIPE RUNS (ABOVE GROUND AND UNDERGROUND) MUST BE PITCHED A MINIMUM OF 1/8-INCH VERTICAL PER FOOT HORIZONTAL (1% SLOPE) TOWARDS EACH SUB-SLAB DEPRESSURIZATION PIT OR TO CONDENSATE DRAIN WITHIN THE SUB-SLAB WHEN UNDERGROUND PIPING CANNOT BE SLOPED TOWARDS PIT. THE SYSTEM SHALL BE INSTALLED SUCH THAT NO PORTION WILL ALLOW EXCESS ACCUMULATION OF CONDENSATION.
6. CONTRACTOR TO VERIFY THAT VENT STACKS EXHAUST LOCATIONS ARE A DISTANCE OF 25 FEET OR MORE FROM ANY AIR INLETS AND OPERABLE WINDOWS (INCLUDING NEIGHBORING PROPERTIES) AND THAT FINAL HEIGHT AND LOCATION OF VENT STACKS ARE IN ACCORDANCE WITH NYC BUILDING CODE.
7. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF EQUIPMENT, DUCTWORK, AND RAIL LOCATIONS AND/OR PROPOSED MOUNTING FOR APPROVAL BEFORE CONSTRUCTION.
8. INSTALL FIRE STOPPING AT PIPE PENETRATIONS IN ACCORDANCE WITH NYC BUILDING CODE.
9. SSDS RISERS SHALL NOT BE INSTALLED IN A SHAFT CONTAINING DUCTS CONVEYING ENVIRONMENTAL AIR.
10. BASE MAP TAKEN FROM DRAWINGS A-100 THROUGH A-106 DATED 03/18/2015 PREPARED BY MAGNUSSON ARCHITECTURE &PLANNING PC .

CODE COMPLIANCE NOTES:

1. THE SUB-SLAB DEPRESSURIZATION SYSTEM COMPLIES WITH THE REQUIREMENTS OF THE 2008 NYC MECHANICAL CODE SECTION 512, “SUBSLAB SOIL EXHAUST SYSTEMS.”
2. THE SUB-SLAB DEPRESSURIZATON SYSTEM IS NOT A “HAZARDOUS EXHAUST SYSTEM” AS DEFINED IN THE 2008 NYC MECHANICAL CODE SECTION 510.
3. 2008 NYC MECHANICAL CODE CHAPTER 6, “DUCT SYSTEMS”, PARAGRAPH 601.3, “CONTAMINATION PREVENTION” DOES NOT APPLY TO THE SUB-SLAB DEPRESSURIZATION RISERS, WHICH ARE NOT UNDER PRESSURE.
4. 2008 NYC MECHANICAL CODE CHAPTER 6, “DUCT SYSTEMS”, PARAGRAPH 607.5.5.2, “LIMITATIONS” DOES NOT APPLY TO THE SUB-SLAB DEPRESSURIZATION SYSTEM RISERS; HOWEVER, THE DESIGN DOES NOT ALLOW FOR INSTALLATION OF SSDS RISERS IN SHAFTS THAT CONTAIN DUCTWORK CONVEYING ENVIRONMENTAL AIR .

NOT FOR CONSTRUCTION - FOR REMEDIAL PLAN APPROVAL ONLY

OWNER/APPLICANT

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MICHELLE LAPIN , P.E.

REVISIONS

No.	DATE	DESCRIPTION
	05/04/2015	DEC SUBMISSION
	06/12/2015	DEC REVISIONS
	06/24/2015	DESIGN REVISIONS

PROJECT

ELTON CROSSING SITE C, BRONX, NEW YORK

DRAWN BY KH	CHECKED BY MG
SCALE AS NOTED	DATE 06/24/15

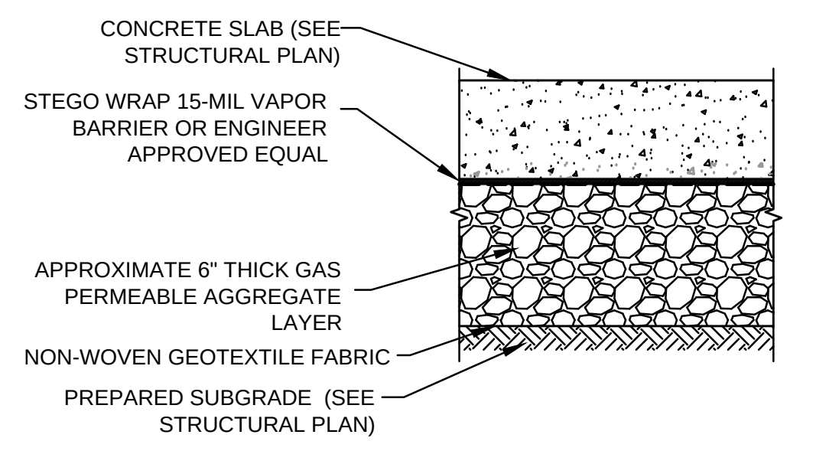
SHEET TITLE

SSDS PLAN
RISER PLAN 1

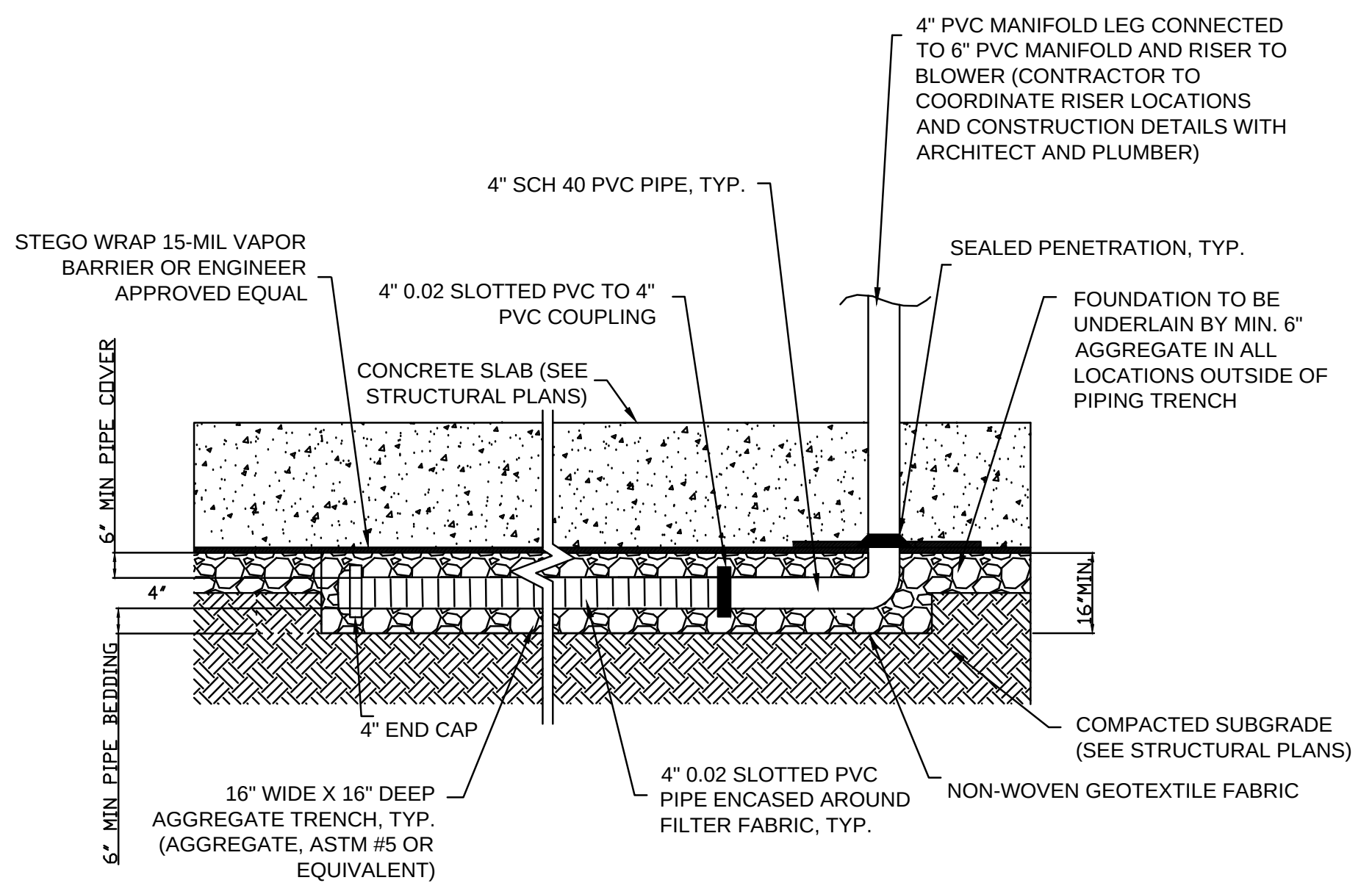
SHEET NO.

ENV-101

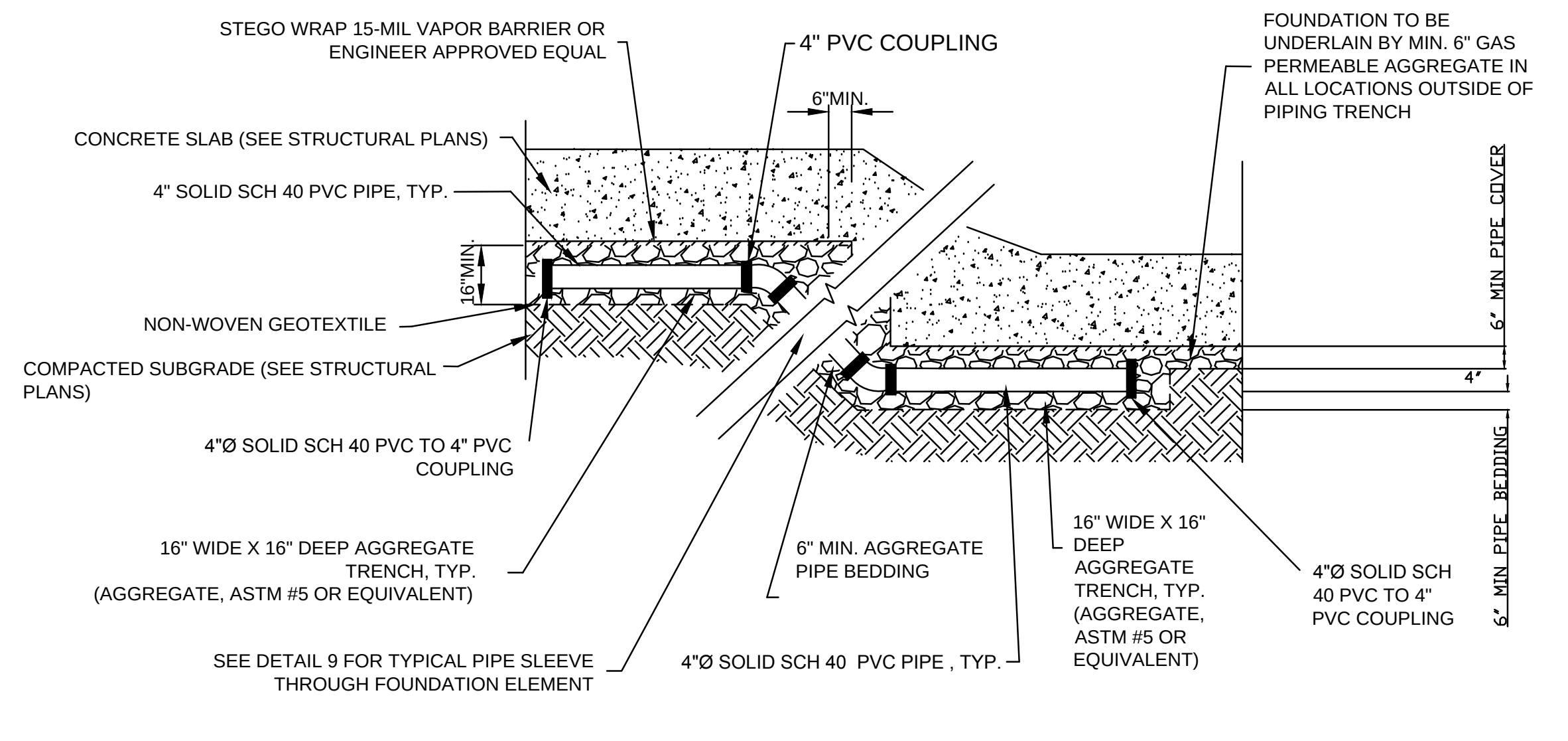
SHEET 2 OF 4



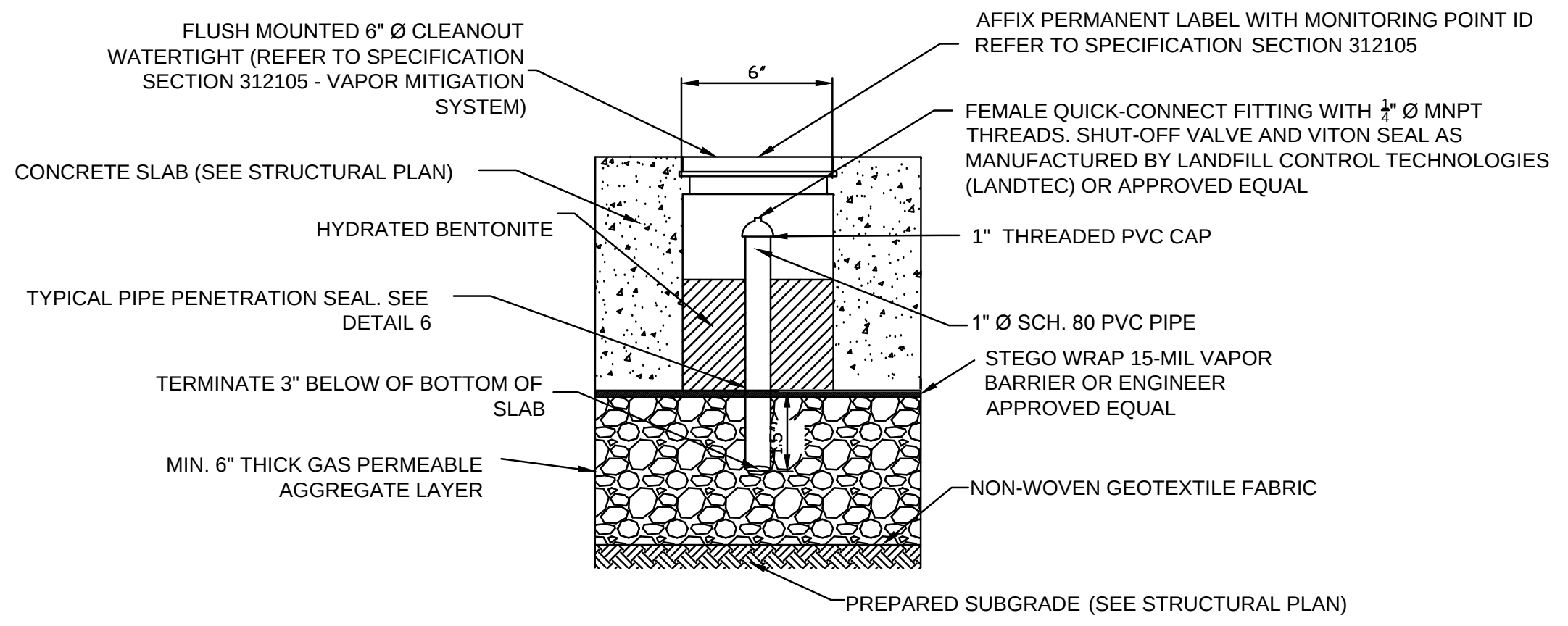
TYPICAL SECTION THROUGH SUB-SLAB OUTSIDE SSDS PIPE TRENCH ①
N.T.S.



TYPICAL SSDS PIPING PROFILE ②
N.T.S



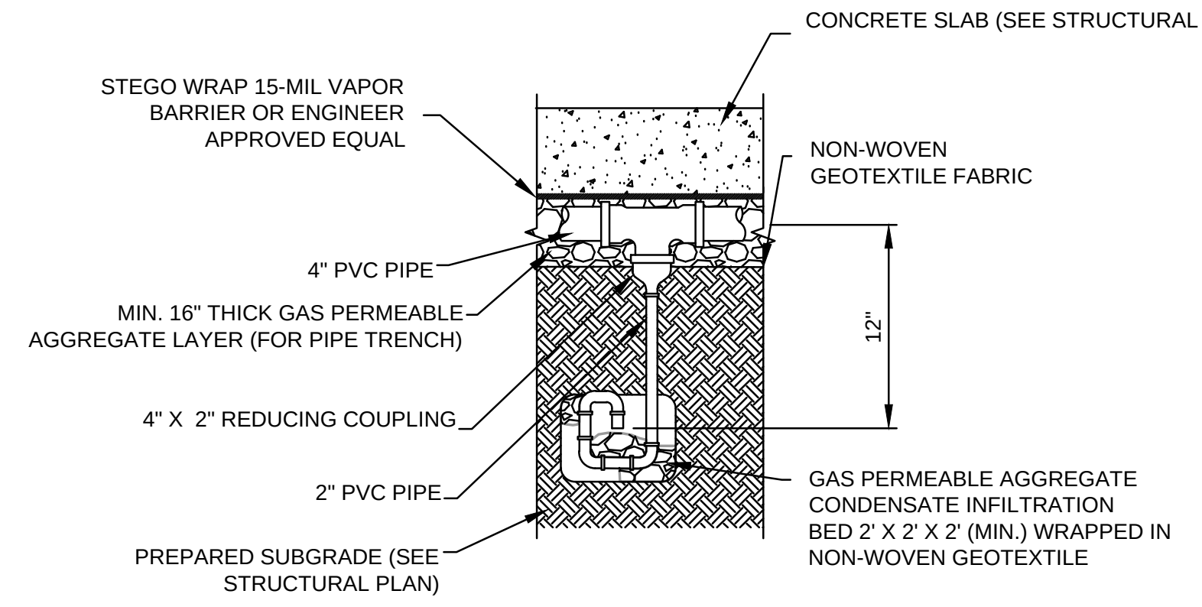
TYPICAL PROFILE AT ELEVATION CHANGE ③
N.T.S.



NOTES:

1. ANY DEVIATION FROM THIS INSTALLATION MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

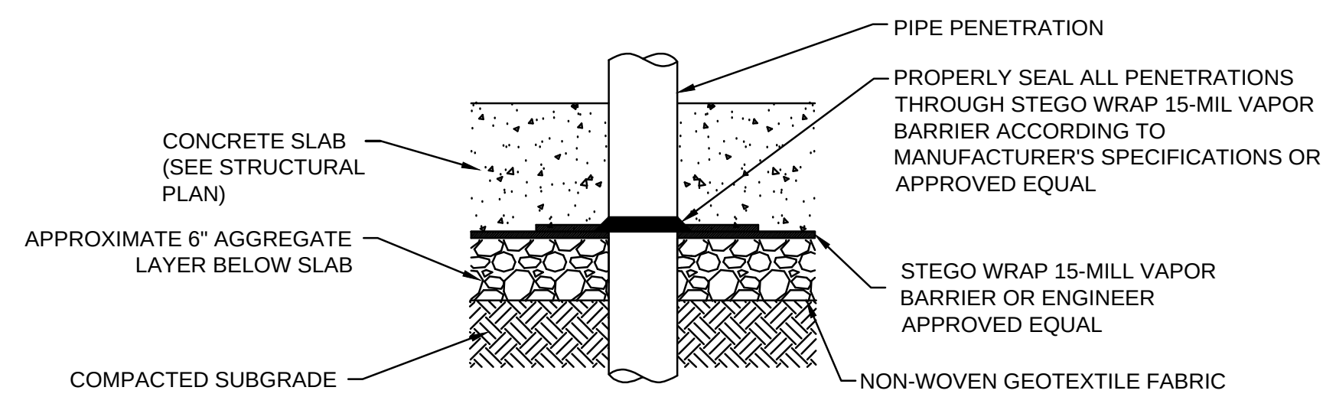
TYPICAL MONITORING POINT DETAIL ④
N.T.S.



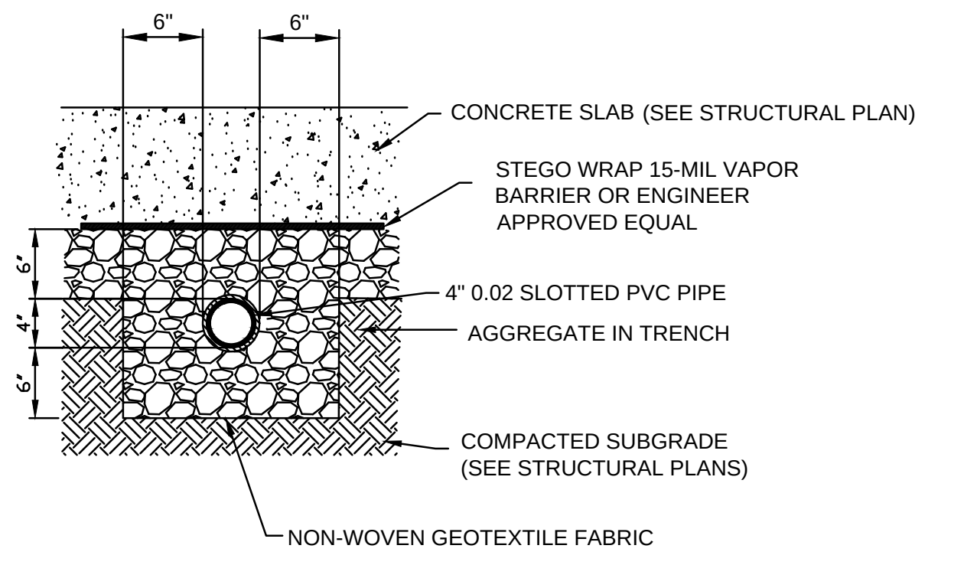
NOTES:

1. INSTALL, IF NECESSARY, AT ALL LOW POINTS IN SUB-SLAB DEPRESSURIZATION SYSTEM PIPING WHEN PIPING CANNOT BE SLOPED TO SLOTTED PIPE.
2. REINFORCE NEW CONCRETE SLAB AS PER ARCHITECTURAL DETAILS AND SPECIFICATIONS.
3. CONDENSATE DRAIN TO BE INSTALLED ALONG SOLID RUN OF UNDERGROUND PIPING, WHERE NECESSARY.

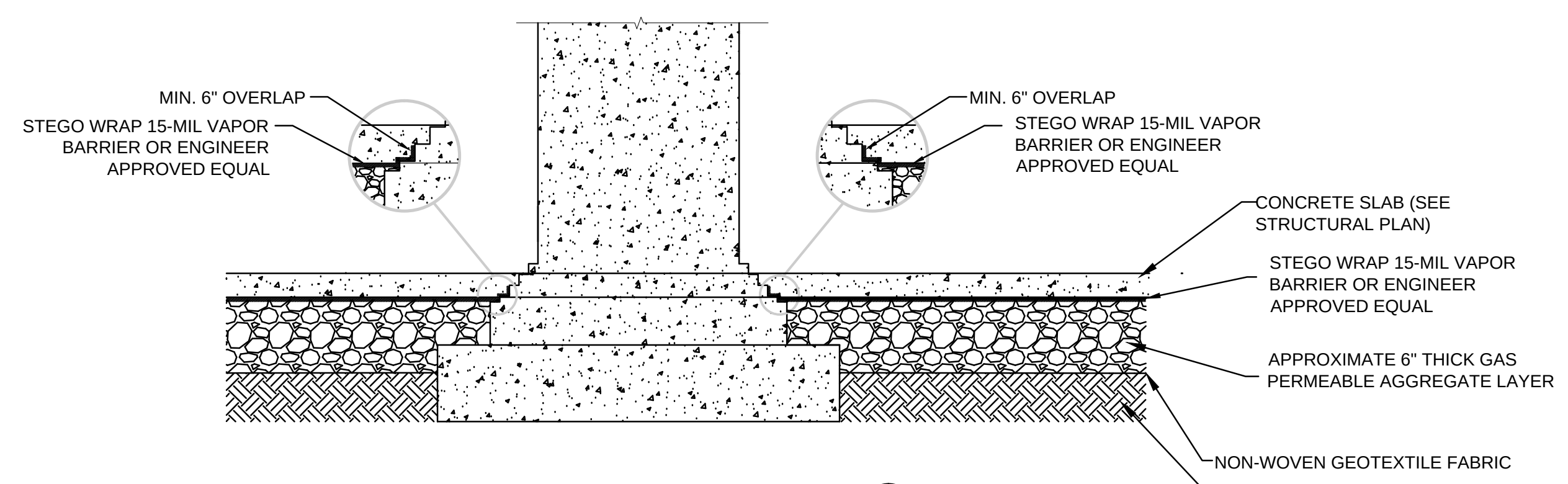
TYPICAL LOW POINT CONDENSATE DRAIN DETAIL ⑤
N.T.S.



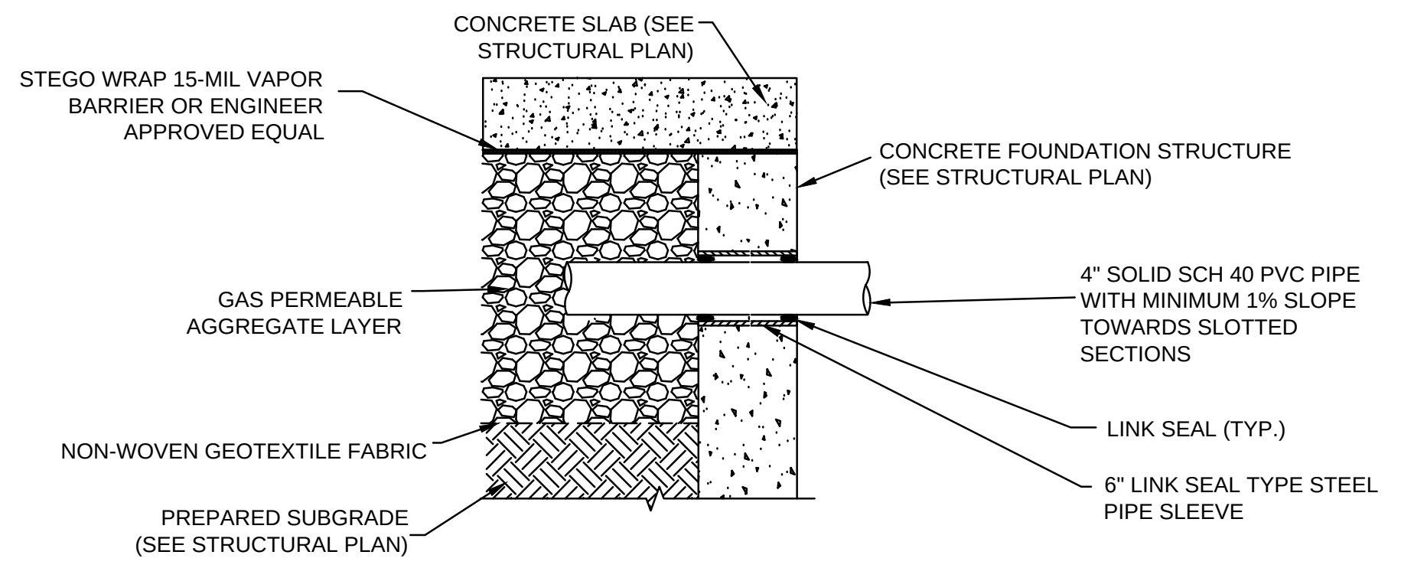
VAPOR BARRIER PENETRATION ⑥
N.T.S.



TYPICAL SLOTTED PIPE DETAIL ⑦
N.T.S.



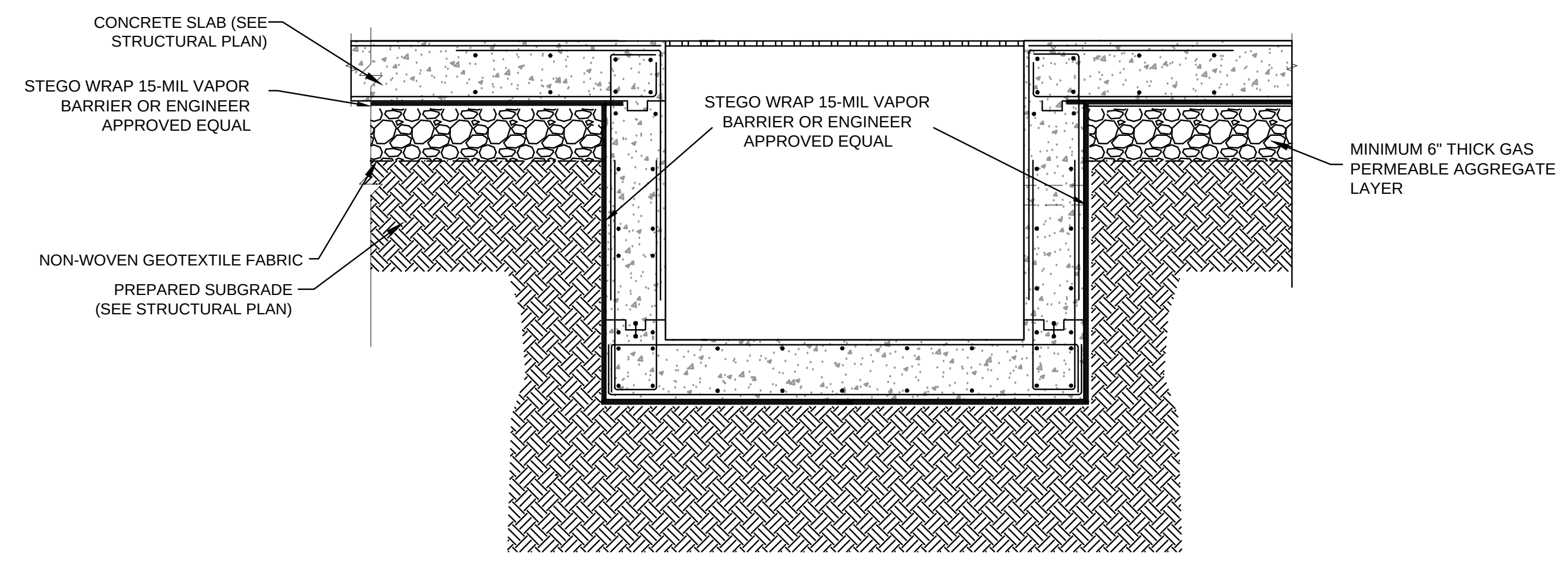
VAPOR BARRIER DETAIL FOR TYPICAL INTERIOR FOOTER WITH COLUMN ⑧
N.T.S.



NOTES:

1. CONTRACTOR TO COORDINATE PENETRATIONS THROUGH GRADE BEAMS WITH DETAIL 5 ON FO-002 TO AVOID STRUCTURAL REBAR.

TYPICAL PIPE SLEEVE THROUGH FOUNDATION ELEMENT ⑨
N.T.S.



NOTES:

1. SEAL ANY PIPE PENETRATIONS IN PIT WALL IN ACCORDANCE WITH DETAIL 6 OF THIS DRAWING.

VAPOR BARRIER DETAIL AT TYPICAL ELEVATOR / SUMP PIT / UTILITY PIT, ETC. ⑩
N.T.S.

GENERAL NOTES:

1. DRAWING SHALL NOT BE USED FOR STRUCTURAL, ARCHITECTURAL, UTILITY, OR OTHER REFERENCE EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM.

2. DESIGN DETAILS AND DRAWINGS ARE ADAPTED FROM EPA DOCUMENT EPA/625/R-92/016.

3. VENT AND RISER PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY PLUMBING CODE, INCLUDING, BUT NOT LIMITED TO, THOSE REQUIREMENTS PERTAINING TO:
- PROTECTION OF SYSTEM COMPONENTS
- TRENCHING, EXCAVATION, AND BACKFILL
- STRUCTURAL SAFETY
- PIPING SUPPORT
- JOINTS

5. UNLESS OTHERWISE SPECIFIED, ALL UNDERGROUND PIPING SHALL BE CONSTRUCTED OF 4-INCH SCHEDULE 40 PVC AND ALL ABOVEGROUND RISER PIPING SHALL BE CONSTRUCTED OF 6-INCH GALVANIZED STEEL.

6. REFER TO VAPOR MITIGATION SPECIFICATION SYSTEM FOR REQUIREMENTS RELATING TO SSDS ACCESSORIES.

7. ALL SOLID HORIZONTAL PIPE RUNS MUST BE PITCHED A MINIMUM OF 1/8-INCH VERTICAL PER FOOT HORIZONTAL (1% SLOPE) TOWARDS EACH SECTION OF SLOTTED VENTING PIPE. THE SYSTEM SHALL BE INSTALLED SUCH THAT NO PORTION WILL ALLOW EXCESS ACCUMULATION OF CONDENSATION. SOLID UNDERGROUND PIPING MAY BE PITCHED TO CONDENSATE DRAIN, SHOULD THEY BE NECESSARY (SEE DETAIL 5).

8. ALL CONNECTIONS AT PIPE FITTINGS AND JOINTS SHALL BE LEAK FREE. THIS SHALL BE DEMONSTRATED BY THE PERFORMANCE OF A POSITIVE 5 POUNDS PER SQUARE INCH (PSI) (MIN.) PRESSURE TEST IN ACCORDANCE WITH SSDS SPECIFICATION.

9. RISER PIPE SHALL BE PERMANENTLY IDENTIFIED WITHIN EACH FLOOR LEVEL. BACKGROUND SHALL BE SAFETY BLUE WITH WHITE LETTERING. LETTERING SHALL READ:

"CAUTION: DO NOT ALTER.
SUBSURFACE VAPOR VENT PIPE."

10. ALL EXTERNAL PIPES OR PIPES EXPOSED TO MOISTURE AND METAL SYSTEM COMPONENTS SHALL BE PAINTED WITH A CORROSION RESISTANT COATING.

11. INSTALLATION OF THE SUB-SLAB COMPONENTS AND VENT AND RISER PIPING, AND ROOF PENETRATIONS MUST BE COORDINATED WITH OTHER TRADES FOR THE INSTALLATION OF OTHER UTILITIES AND STRUCTURAL COMPONENTS.

12. RISER PIPE FROM SUB-SLAB TO ROOF SHALL BE COORDINATED WITH ARCHITECT AND MECHANICAL ENGINEER. RISER PIPE SHALL BE EXTENDED TO THE ROOF WITH MINIMAL CHANGES IN DIRECTION.

13. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT, DUCT WORK, MONITORING POINT LOCATIONS FOR APPROVAL.

14. SYSTEM INSTALLATION SHALL ADHERE TO: OCTOBER 2006 FINAL GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK PREPARED BY NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH), ALL APPLICABLE PORTIONS OF THE BUILDING CODE OF THE CITY OF NEW YORK, INCLUDING BUT NOT LIMITED TO 2012 NEW YORK CITY MECHANICAL CODE, CHAPTER 5, SECTION MC 512-SUBSLAB EXHAUST SYSTEMS. AS SUCH, POINT OF EXHAUST SHALL BE:
- AT LEAST 10 FEET ABOVE ROOF.
- AT LEAST 25 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS, OPERABLE WINDOWS, HVAC INTAKES, SUPPLY REGISTERS, OR ANY OTHER AIR INLETS.

15. STEGO WRAP 15-MIL VAPOR BARRIER OR APPROVED EQUAL, SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION (AND ALL OTHER APPLICABLE SPECIFICATION SECTIONS), AND RELATED DRAWINGS

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MICHELLE LAPIN , P.E.

REVISIONS

No.	DATE	DESCRIPTION
	05/04/2015	DEC SUBMISSION
	06/12/2015	DEC REVISIONS
	06/24/2015	DESIGN REVISIONS

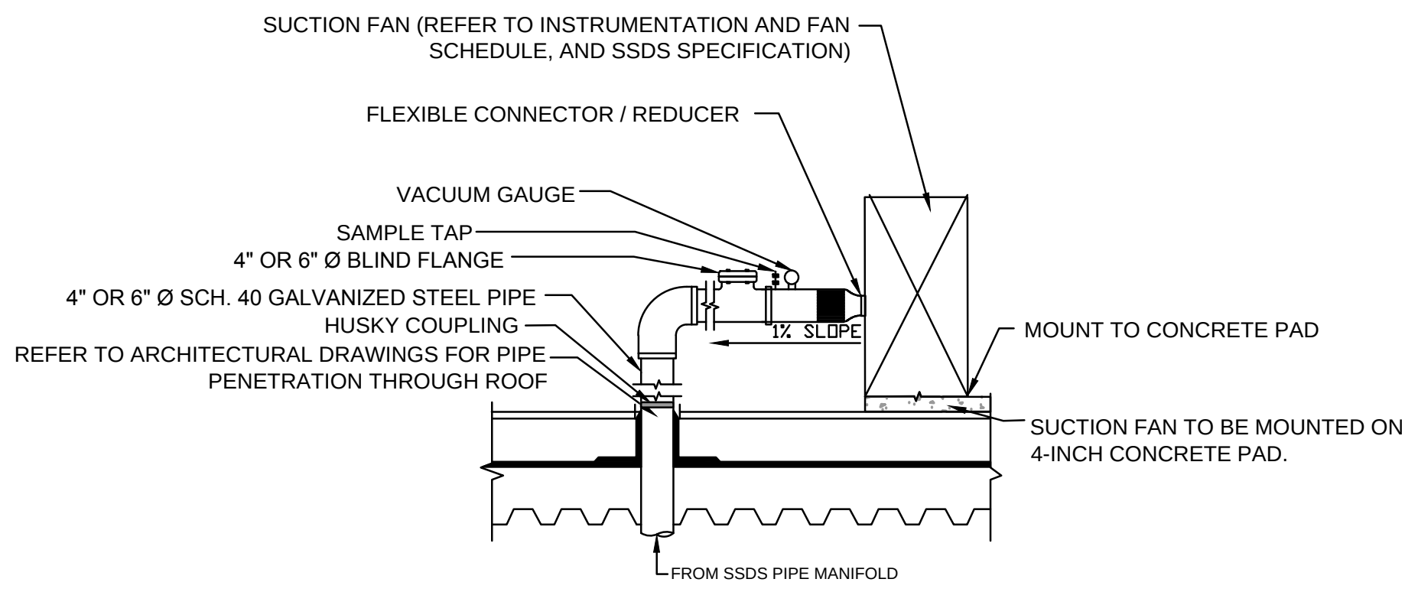
PROJECT
ELTON CROSSING SITE C, BRONX, NEW YORK

DRAWN BY: KH
CHECKED BY: MG
SCALE: AS NOTED
DATE: 06/24/15

SHEET TITLE
SUB-SLAB DEPRESSURIZATION DETAILS

SHEET NO.
ENV-102

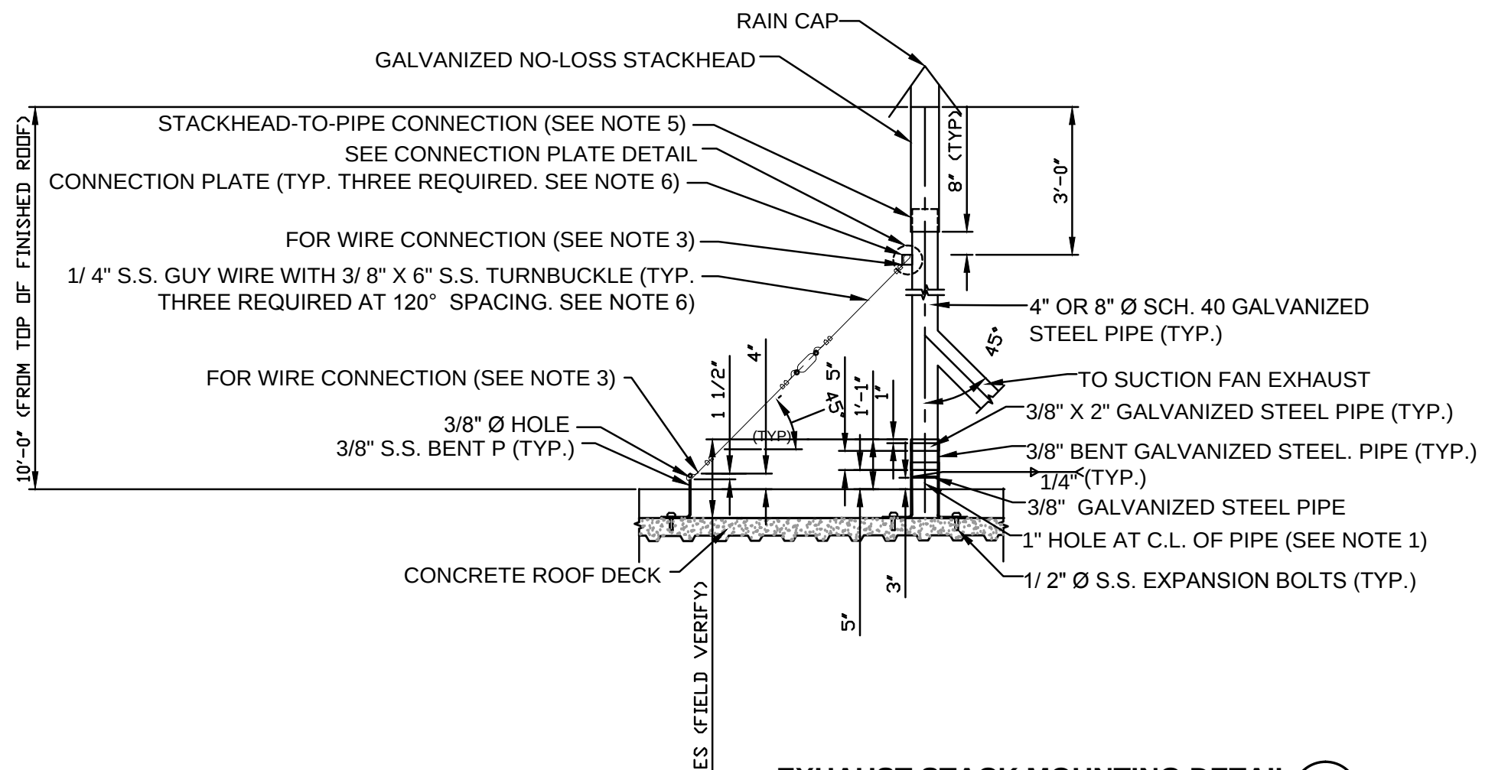
SHEET 3 OF 4



TYPICAL SUCTION FAN CONNECTION DETAIL ①
N.T.S.

NOTES:

1. ELECTRICAL WIRING AND EQUIPMENT NOT SHOWN. REFER TO ELECTRICAL SPECIFICATIONS FOR REQUIREMENTS.
2. NOT ALL REQUIRED ACCESSORIES ARE SHOWN. REFER TO SPECIFICATIONS FOR COMPLETE REQUIREMENTS.
3. PIPE AND EQUIPMENT ARRANGEMENT SHOWN FOR SCHEMATIC PURPOSES ONLY. SUBMIT TO-SCALE SHOP DRAWING SHOWING PROPOSED ARRANGEMENT. CONTRACTOR IS REQUIRED TO OBTAIN APPROVAL OF ARRANGEMENT.
4. COORDINATE ALL ROOF PENETRATIONS WITH ALL OTHER TRADES TO ENSURE PENETRATIONS ARE SEALED IN ACCORDANCE WITH SPECIFICATIONS.
5. PROVIDE SHOP DRAWINGS FOR BLOWER AND ACCESSORY LAYOUT.



EXHAUST STACK MOUNTING DETAIL ③
N.T.S.

NOTES:

1. PROVIDE PITCH POCKET IN PLATE FOR DRAINAGE.
2. ADJUST DIMENSIONS TO PROVIDE A TIGHT FIT BETWEEN THE PIPE AND THE BEND.
3. 1/4" S.S. GUY WIRE SHALL BE LOOPED THROUGH THE 3/8" Ø HOLES AT THE TOP AND BOTTOM CONNECTION PLATES AND THROUGH THE EYE AT EACH END OF THE TURNBUCKLE. EACH CONNECTION SHALL BE SECURED BY TWO 1/ 4" S.S. WIRE ROPE CLAMPS.
4. ALL PLATES, GUY WIRES, TURNBUCKLES, AND CLIPS SHALL BE ASTM G304 STAINLESS STEEL.
5. RISER PIPE IS GALVANIZED STEEL. REFER TO SPECIFICATION 0 28 00, VAPOR MITIGATION SYSTEM.
6. PROVIDE CONNECTION PER MANUFACTURER'S RECOMMENDATION OR USE (6) 1/4" ASTM G304 STAINLESS STEEL MACHINE SCREWS, DRILL AND TAP AS REQUIRED.
7. THREE GUY WIRE/CONNECTION PLATES ARE TO BE USED SPACED EVENLY AROUND THE CIRCUMFERENCE OF THE PIPE (120° SPACING).
8. PROVIDE LIGHTNING ROD AND GROUNDING WIRE AS PER ELECTRICAL REQUIREMENTS.
9. COORDINATE ALL ROOF PENETRATIONS FOR FAN SUPPORT WITH OTHER TRADES.

INSTRUMENT SCHEDULE

ITEM	DESCRIPTION	SERVICE	LOCATION	REQUIREMENTS	RANGE	REMARKS	MANUFACTURER/MODEL
MAGNEHELIC GAUGE	PRESSURE DIFFERENTIAL	SSD SYSTEM	RISER MANIFOLD	N/A	0-10 WC	FOR EACH MANIFOLD LEG AND RISER	DWYER INSTRUMENTS INC. SERIES 2000
VI	VACUUM INDICATOR	SSD SYSTEM	SUCTION FAN AND BLOWER	N/A	0-10 WC	FOR EACH BLOWER ASSEMBLY	DWYER INSTRUMENTS INC. SERIES 2000
DPS	DIFFERENTIAL PRESSURE SWITCH	AIS	SUCTION FAN	N/A	0.4 - 1.6" WC	CONNECT TO BMS FOR EACH BLOWER ASSEMBLY	DWYER INSTRUMENTS INC. SERIES 1900,MODEL 1910-10
CONTROL PANEL	SUCTION FAN	SSD SYSTEM	SUCTION FAN	1 PHASE, 60 HZ, 115 VOLTS	N/A	FOR BLOWER	IPF CHVS 125
FLOW METER AND DISPLAY	FLOW	SSD SYSTEM	RISER @ FIRST FLOOR	1 PHASE, 60 HZ, 115 VOLTS	N/A	FOR EACH MANIFOLD LEG	VORTEK VT-2100 AIRFLOW MEASUREMENT PROBE, TRANSMITTER AND OPTIONAL DISPLAY

FAN SCHEDULE

UNIT NO.	AREAS SERVED	SERVICE	LOCATION	MOTOR SIZE	MIN. CFM	MIN. RATE (INCHES WC)	MOTOR REQUIREMENTS			MANUFACTURER/MODEL
SF-1	ENTIRE SITE	SSD SYSTEM	BULKHEAD	1 hp	350	8	60 Hz	3 Phase	230 or 460 Volts	IPF CHVS 125

GENERAL NOTES:

1. DRAWING SHALL NOT BE USED FOR STRUCTURAL, ARCHITECTURAL, UTILITY, OR OTHER REFERENCE EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM.

2. DESIGN DETAILS AND DRAWINGS ARE ADAPTED FROM EPA DOCUMENT EPA/625/R-92/016.

3. SYSTEM INSTALLATION SHALL ADHERE TO: OCTOBER 2006 FINAL GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK PREPARED BY NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH), ALL APPLICABLE PORTIONS OF THE BUILDING CODE OF THE CITY OF NEW YORK, INCLUDING BUT NOT LIMITED TO 2008 NEW YORK CITY MECHANICAL CODE, CHAPTER 5, SECTION MC 512-SUBSLAB EXHAUST SYSTEMS. AS SUCH, POINT OF EXHAUST SHALL BE:
- AT LEAST 10 FEET ABOVE ROOF.
- AT LEAST 25 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS, OPERABLE WINDOWS, HVAC INTAKES, SUPPLY REGISTERS, OR ANY OTHER AIR INLETS.

4. EXHAUST STACKS SHALL BE SECURELY ANCHORED WITH ADEQUATE STRUCTURAL SUPPORTS AS SHOWN ON DETAILS.

5. VENT AND RISER PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY PLUMBING CODE, INCLUDING, BUT NOT LIMITED TO, THOSE REQUIREMENTS PERTAINING TO:
- PROTECTION OF SYSTEM COMPONENTS
- TRENCHING, EXCAVATION, AND BACKFILL
- STRUCTURAL SAFETY
- PIPING SUPPORT
- JOINTS

6. REFER TO DRAWINGS ENV-100 AND ENV-101 FOR SSDS PIPING LAYOUT, RISER, GAS VAPOR BARRIER, GAS PERMEABLE AGGREGATE, AND FAN & EXHAUST STACK DETAILS AND SECTIONS.

BLOWER NOTES:

1. THE SUCTION FAN SCHEMATICS ARE SHOWN TO ILLUSTRATE THE REQUIRED COMPONENTS AND THE GENERAL LOCATIONS IN THE PIPING RUN AND SHALL NOT BE CONSIDERED TO BE ACCURATE. THE ACTUAL CONFIGURATION AND DIMENSIONS OF THE SUCTION FAN ASSEMBLY WILL VARY BASED ON MANUFACTURING METHODS AND FIELD CONDITIONS. FINAL DESIGN AND SUCTION FAN SYSTEM SELECTED ARE SUBJECT TO APPROVAL BY THE ENVIRONMENTAL ENGINEER. CONTRACTOR SHALL PROVIDE ALL SUCTION FAN SPECIFICATIONS AND CUT SHEETS FOR THE ENVIRONMENTAL ENGINEER APPROVAL PRIOR TO INSTALLATION.

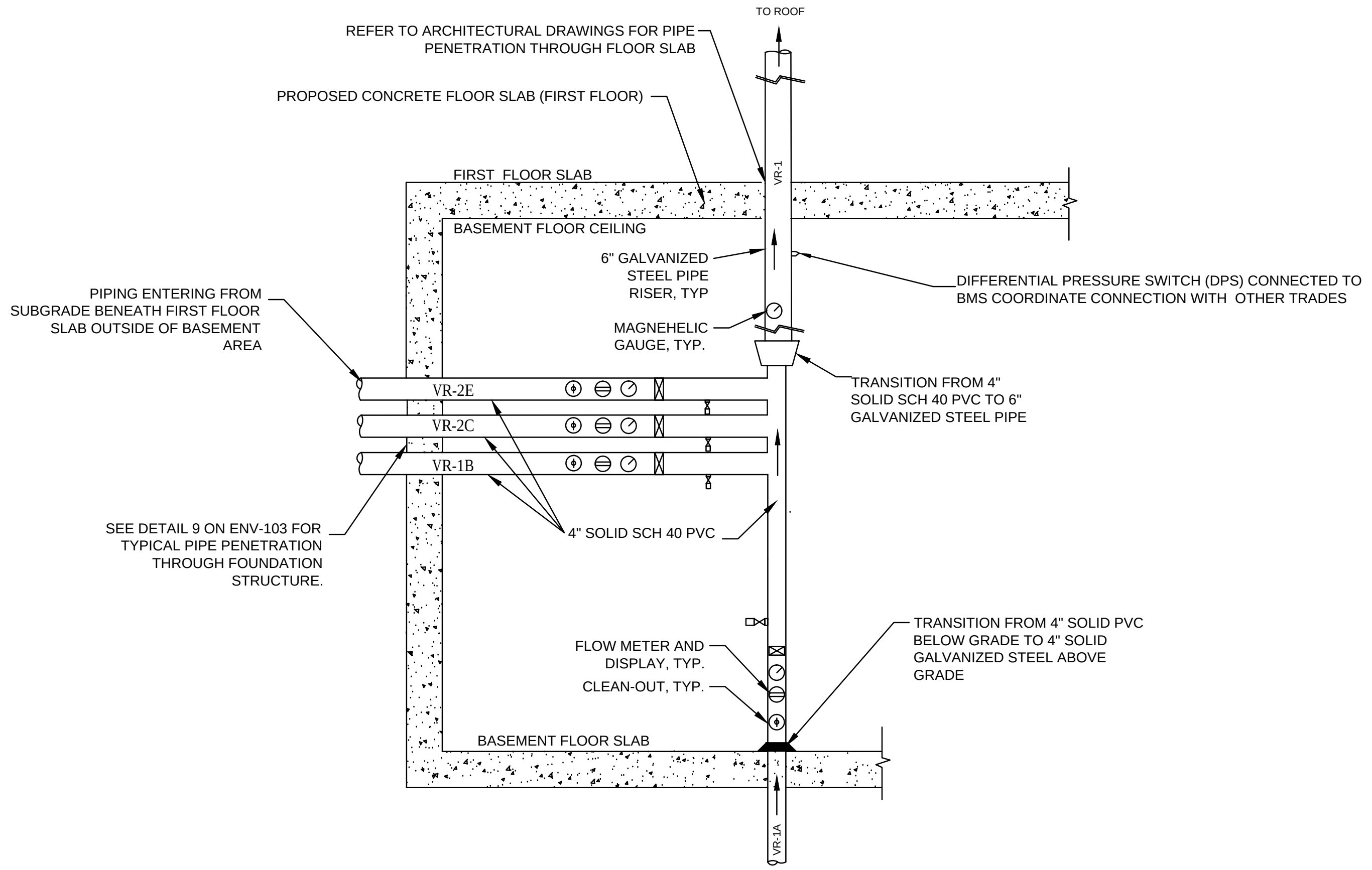
2. A DIFFERENTIAL PRESSURE SWITCH SHALL BE INSTALLED ON THE RISER PIPE AT BASEMENT LEVEL BEFORE THE SUCTION FAN. THE DIFFERENTIAL PRESSURE SWITCH SHALL BE CONNECTED TO THE BUILDING MANAGEMENT SYSTEM (BMS) IN ACCORDANCE WITH SPECIFICATION SECTIONS 02 80 00.

3. SUCTION FAN MOTORS WILL REQUIRE A 3-PHASE, 60HZ, 230 OR 460 VOLT POWER SUPPLY. THE CONTROL PANEL FOR THE SUCTION FAN WILL REQUIRE A ONE PHASE, 60 HZ, 115 VOLT POWER SUPPLY. THE REMOTE VISUAL ALARM WILL REQUIRE A ONE PHASE, 115 VOLT POWER SUPPLY FROM THE BUILDING'S ELECTRICAL SYSTEM. EACH FLOW METER WILL REQUIRE A ONE PHASE 60 HZ, 115 VOLT POWER SUPPLY. THE ELECTRICAL SERVICE TO THE BLOWER MOTOR IS SHOWN ON THE ELECTRICAL DRAWINGS. COORDINATE POWER SUPPLIES WITH BUILDING POWER FLOOR PLAN. COORDINATE POWER SUPPLY FOR FLOW METERS AT RISERS THROUGH FLOOR SLAB.

4. CONTRACTOR TO PROVIDE CONNECTION TO GROUNDING FOR ROOF TOP FANS.

5. REFER TO SSDS ACCESSORIES SPECIFICATION SECTION FOR REQUIREMENTS RELATING TO SUB-SLAB DEPRESSURIZATION SYSTEM ACCESSORIES.

6. CONTRACTOR TO PROVIDE SOUND ENCLOSURES IF REQUIRED TO MEET NEW YORK CITY NOISE CODE AND/OR FURTHER ATTENUATE NOISE FOR NEARBY RESIDENTIAL UNITS.

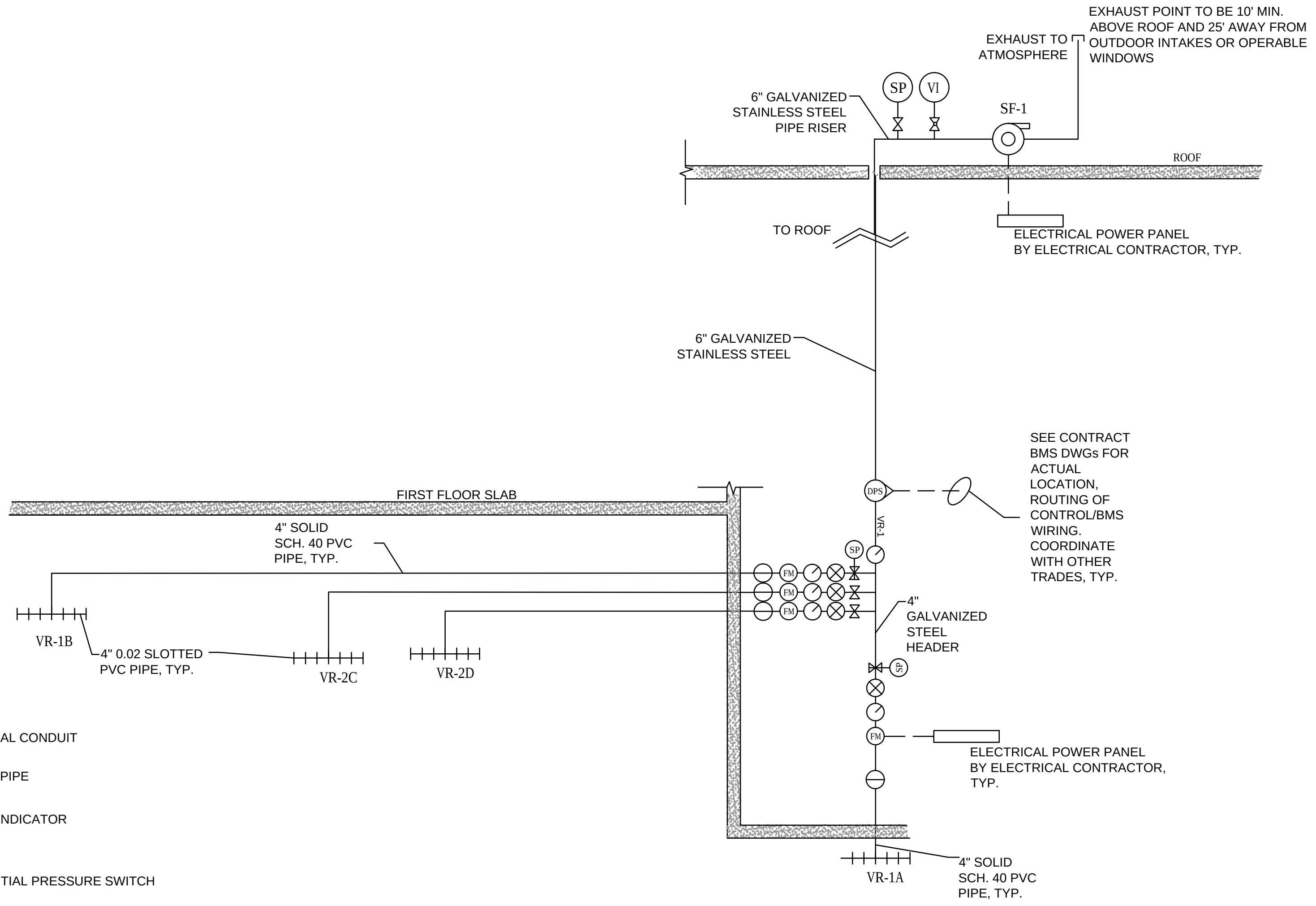


NOTES:

1. NOT ALL FITTINGS SHOWN. CONTRACTOR SHALL SUBMIT TO SCALE SKETCH SHOWING PROPOSED PIPE JOINT LOCATIONS. ENGINEER'S APPROVAL OF PIPE JOINT LOCATIONS SHALL BE REQUIRED PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO PROVIDE SHOP DRAWINGS SHOWING PIPE MANIFOLD LOCATION AND HEIGHT FROM BASEMENT FLOOR SLAB.
3. FURNISH ESCUTCHEONS AS SPECIFIED.
4. DIFFERENTIAL PRESSURE SWITCH CONNECTED TO AIS.
5. FURNISH PIPE HANGERS AND WALL MOUNTS AS SPECIFIED IN PLUMBING AND HVAC SPECIFICATIONS AND DRAWINGS.
6. ALL HORIZONTAL PIPE RUNS (ABOVE GROUND AND UNDERGROUND) MUST BE PITCHED A MINIMUM OF 1/8-INCH VERTICAL PER FOOT HORIZONTAL (1% SLOPE) TOWARDS EACH SLOTTED VENTING PIPE OR TO CONDENSATE SUMP WITHIN THE SUB-SLAB WHEN UNDERGROUND PIPING CANNOT BE SLOPED TOWARDS THE SLOTTED PIPES. THE SYSTEM SHALL BE INSTALLED SUCH THAT NO PORTION WILL ALLOW EXCESS ACCUMULATION OF CONDENSATION.

PIPING MANIFOLD DIAGRAM ②
N.T.S.

NOT FOR CONSTRUCTION - FOR REMEDIAL PLAN APPROVAL ONLY



NOTE:
SEE CONTRACT ELECTRICAL DRAWINGS FOR ACTUAL LOCATION, ROUTING OF CONDUIT AND CONDUCTORS , TYP.

PROCESS FLOW DIAGRAM ④
N.T.S.

LEGEND:

—	PIPE
– – –	ELECTRICAL CONDUIT
┼┼┼┼┼	SLOTTED PIPE
(VI)	VACUUM INDICATOR
◎	FAN
(DPS)	DIFFERENTIAL PRESSURE SWITCH
▬	REDUCER
⋈	BALL VALVE (NORMALLY CLOSED)
(FM)	FLOW METER
⌐	RAIN CAP
⊗	BUTTERFLY VALVE
⊖	CLEANOUT
⊘	MAGNEHELIC GAUGE
(SP)	SAMPLE PORT

OWNER/APPLICANT

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MICHELLE LAPIN , P.E.

REVISIONS

No.	DATE	DESCRIPTION
	05/04/2015	DEC SUBMISSION
	06/12/2015	DEC REVISIONS
	06/24/2015	DESIGN REVISIONS

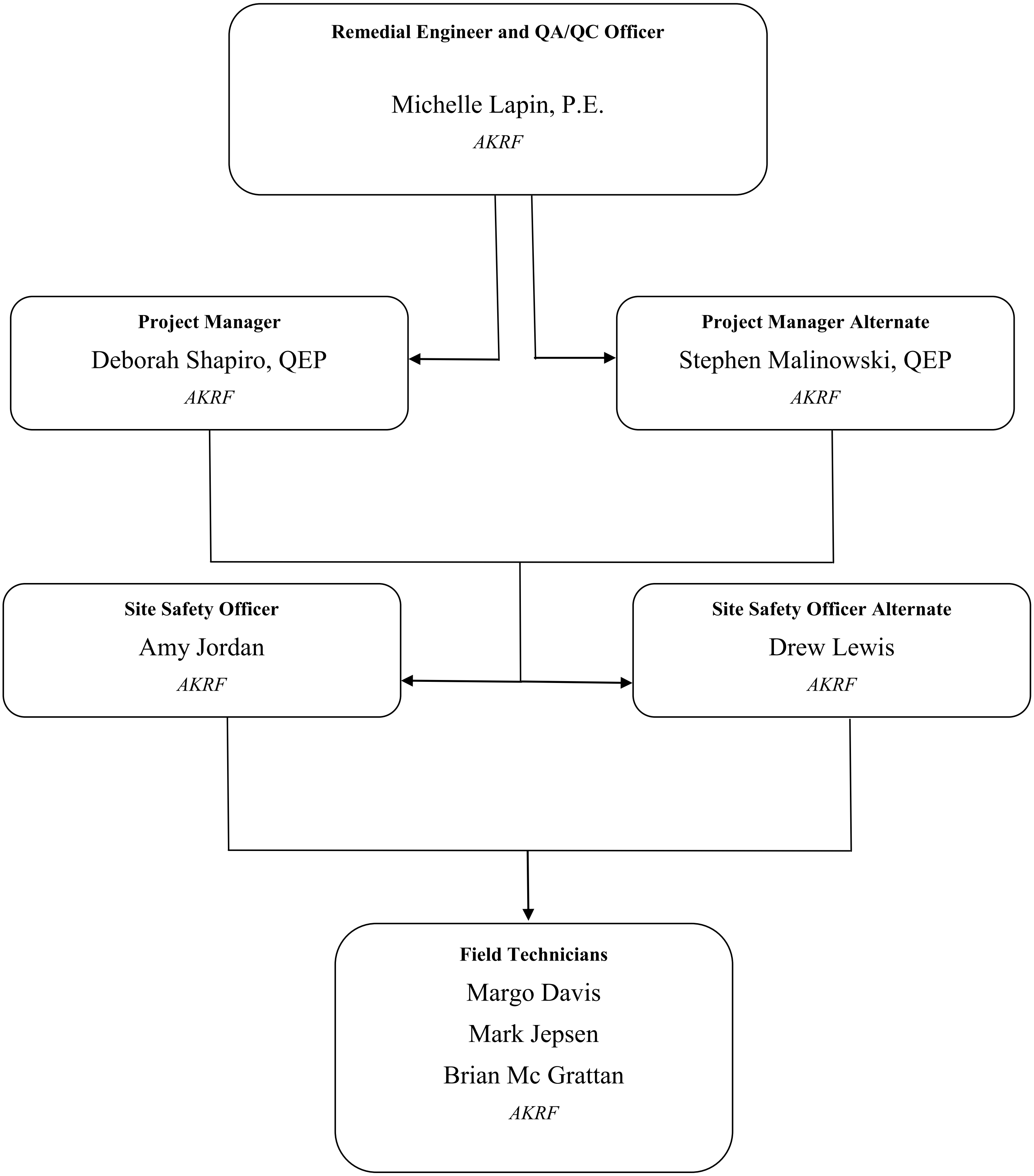
PROJECT
ELTON CROSSING SITE C, BRONX, NEW YORK

DRAWN BY KH	CHECKED BY MG
SCALE AS NOTED	DATE 06/24/15

SHEET TITLE
SSDS EQUIPMENT SCHEDULE AND DETAILS

SHEET NO.
ENV-103

SHEET 4 OF 4



899 Elton Avenue
BRONX, NEW YORK

ORGANIZATION CHART

AKRF

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	05.04.14
PROJECT No.	11901
SCALE	nts
FIGURE	10

M: A RF Project Files 11654 - Farley Building Phase I ESA Update Sanborns 11654 Sanborn maps .pub

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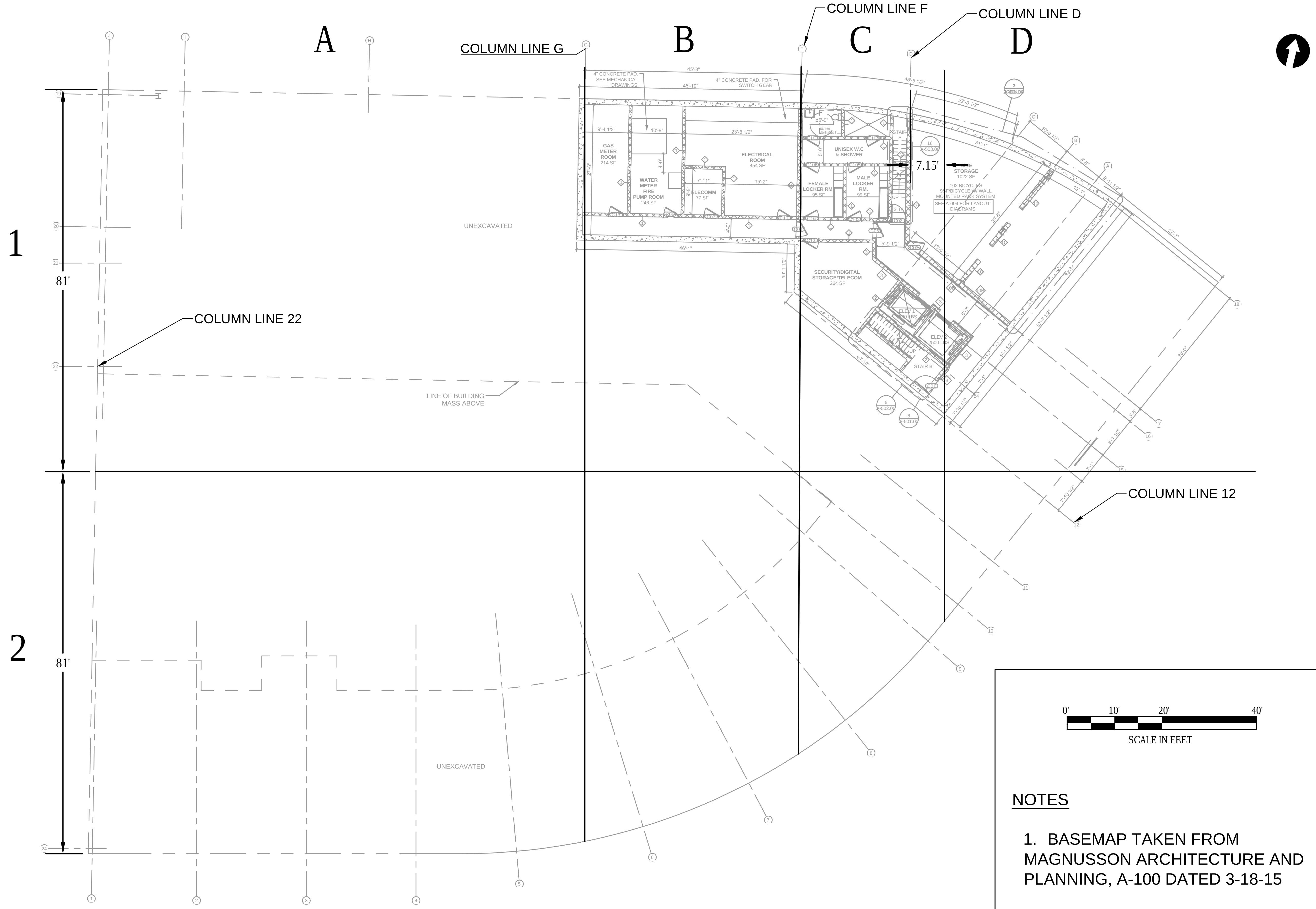

0' 10' 20' 40'

SCALE IN FEET

NOTES

1. BASEMAP TAKEN FROM MAGNUSSON ARCHITECTURE AND PLANNING, A-100 DATED 3-18-15

AKRF

Environmental Consultants

440 Park Avenue South, New York, NY 10016

Elton Crossing/Site C - Family

899 Elton Avenue

New York, New York

ALPHANUMERIC GRID

DATE

5.4.2015

PROJECT NO.

11901

SCALE

as shown

FIGURE

11

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Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Legend

🟨 Project Boundary

▶ Entrance Truck Route from I-87

◀ Exit Truck Route to I-87

Feet
0 500 1,000

Elton Crossing/Site C - Family
899 Elton Ave
Bronx, New York

TRUCK TRANSPORT ROUTE

AKRF
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440 Park Avenue South, New York, N.Y. 10016

DATE
5/4/2015

PROJECT No.
11901

FIGURE
12

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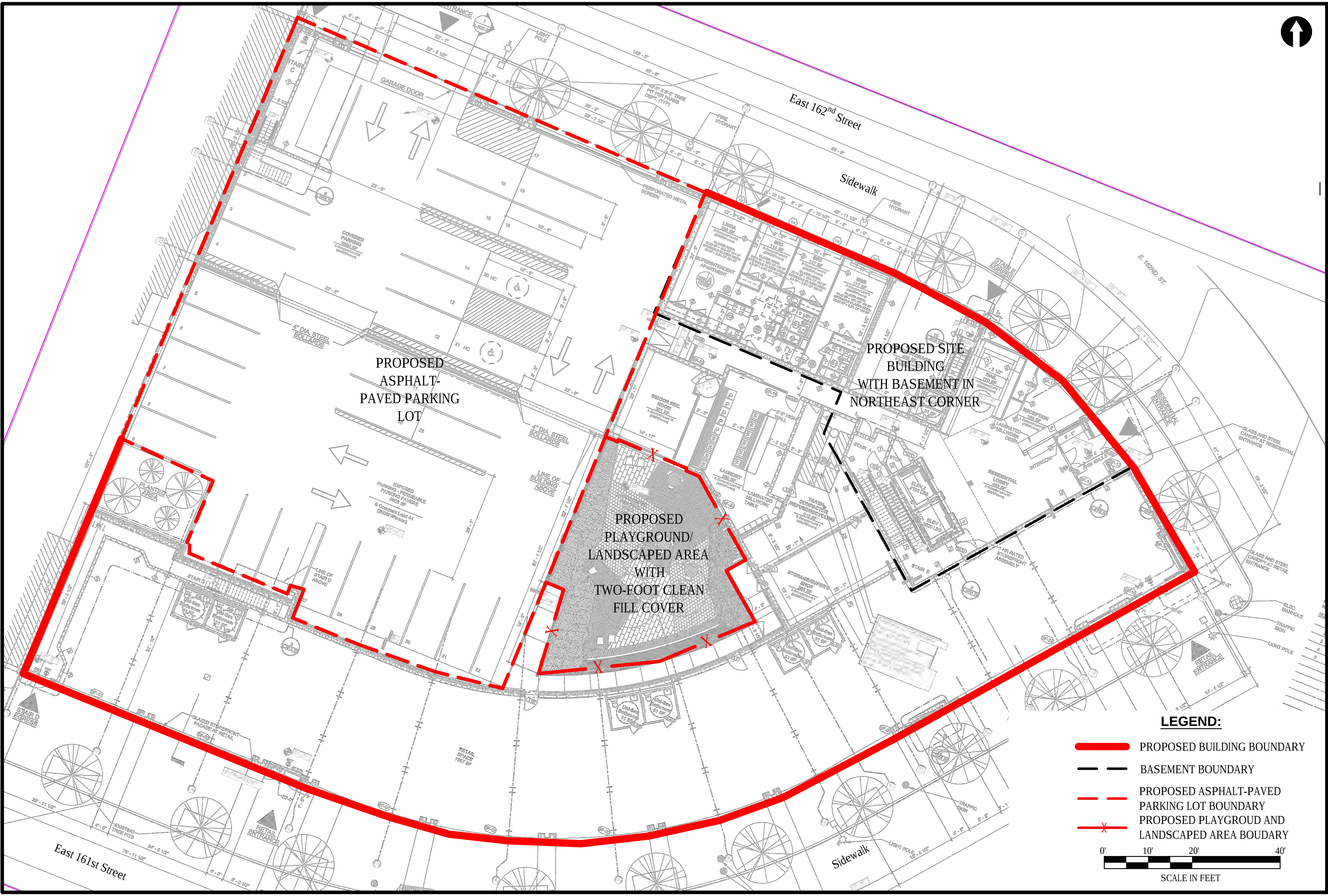
O:\Projects\11901 - MELROSE COMMONS SITE C-FAMILY\11901 Truck Route Map.mxd



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Elton Crossing/Site C - Family
899 Elton Avenue
Bronx, New York

SITE PLAN WITH COMPOSITE SITE COVER SYSTEM

DATE
5.1.2015

PROJECT NO.
11901

SCALE
as shown

FIGURE
13

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APPENDIX A

METES AND BOUNDS

note or obligation bearing even date herewith, the mortgagor hereby mortgages

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough and County of Bronx, City and State of New York, bounded and described as follows:

BEGINNING at a point on the Southerly side of East 162nd Street,
distant 165.37 feet Westerly from the corner formed by the inter-
section of the Southerly side of East 162nd Street with the Westerly
side of Elton Avenue; running thence WESTERLY along the Southerly
side of East 162nd Street, 99 feet; thence SOUTHERLY at right
angles to the Southerly side of East 162nd Street, 100 feet; thence
EASTERLY parallel with the Southerly side of East 162nd Street, 99
feet; and thence NORTHERLY at right angles to the Southerly side of
East 162nd Street, 100 feet to the Southerly side of East 162nd
Street, at the point or place of BEGINNING.

TOGETHER with all right, title and interest of the party of the first part in and to any and all strips and gores of land lying adjacent or contiguous to the above described premises.

Said premises being known as and by street numbers 432 and 440 East 162nd Street, Bronx, New York.

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough and Country of Bronx, City and State of New York being part of lot known and designated as Lot No. 49, on a certain map entitled "Map of North Melrose" in the Manor of Morrisania in the County of Westchester, New York, made by Andrew Findlay, Surveyor, dated West Farms, April 22,,1850. and filed in the office of the register of the County of Westchester May 18,1850 as Map No.242 said part of said lot being bounded and described as follows:

Beginning at the intersection of the southerly side of 162nd Street (formerly Union Street) as legally opened and the northwesterly side of Elton Avenue (formerly Washington Avenue) as legally opened; and running thence southwesterly along the northwesterly side of Elton Avenue, Thirty-One and 67/100 (31.67) feet; thence westerly parallel w4th 162nd street, Ninety and 05/100 (90.05) feet, thence northerly at right anles to 162nd Street,Twenty-five (25) feet to the southerly side of 162nd Street, and thence easterly along the southerly side of 162nd Street, One hundred and nine and 50/100 (109.50) feet to the point or place of beginning.

Said Premises being known as and by the street numbers 448-450 East 162nd Street.

WITNESSETH, that the party of the first part, in consideration of Ten Dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough and County of Bronx, City and State of New York, bounded and described as follows:

BEGINNING a a point on the Northwesterly side of Elton Avenue distant 31.67 feet southwesterly from the corner formed by the intersection of the Southerly side of 162nd Street and the Northwesterly side of Elton Avenue; and

THENCE Westerly parallel with 162nd Street 90.05 feet to a line drawn at right angles with the Southerly side of 162nd Street from a point thereon distant 109.50 feet Westerly from the Southerly corner of 162nd Street and Elton Avenue;

THENCE Southerly at right angles with the Southerly side of 162nd Street 25 feet to a division line between Lots 49 and 50 on a certain map entitled "Map of North Melrose" made by Andrew Findley Surveyor dated April 23, 1350 and filed in the Westchester County Register's Office on May 5,1850 as Map No. 242;

THENCE Easterly along a division line between Lots 49 and 80,70.60 feet to the Northwesterly side of Elton Avenue;

THENCE Northeasterly along the Northwesterly side of Elton Avenue 31.67 feet to the point or place of BEGINNING.

Said premises being known as and by Street number 901 Elton Avenue.

WITNESSETH, that the party of the first part, in consideration of ten dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough and County of the Bronx, City and State of New York, more particularly bounded and described as follows:-

BEGINNING at a point on the westerly side of EltonAvenue as legally opened, distant 63.69 feet southerly from the corner formed by the intersection of the westerly side of Elton Avenue with the southerly side of East 162nd Street as legally opened; running thence southerly along the westerly side of Elton Avenue, 31.67 feet; thence westerly parallel with the southerly side of East 162nd Street, 105.23 feet; thence northerly on a line at right angles to the southerly side of East 162nd Street, 25 feet; and thence easterly parallel with the southerly side of East 162nd Street , 124.67 feet to the westerly side of Elton Avenue at the point or place of beginning.

SAID PREMISES being known as 899 Elton Avenue.

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of the Bronx, County of Bronx, City and State of New York, more particularly bounded and described as follows:-

BEGINNING at a point on the westerly side of Elton Avenue, distant 95.12 x ~~[illegible]~~ feet southerly from the corner formed by the intersection of the westerly side of Elton Avenue with the southerly side of East 162nd Street; running thence westerly parallel with the southerly side of East 162nd Street, a distance of 105.29 feet; running thence southerly on a line making an interior angle of 90 degrees 17 minutes 40 seconds with the last mentioned course, a distance of 40.22 feet; running thence easterly on a line making an interior angle of 89 degrees 42 minutes 20 seconds with the last mentioned course, a distance of 74.22 feet to the westerly side of Elton Avenue; running thence northerly along the westerly side of Elton Avenue 50.95 feet to the point or place of beginning.

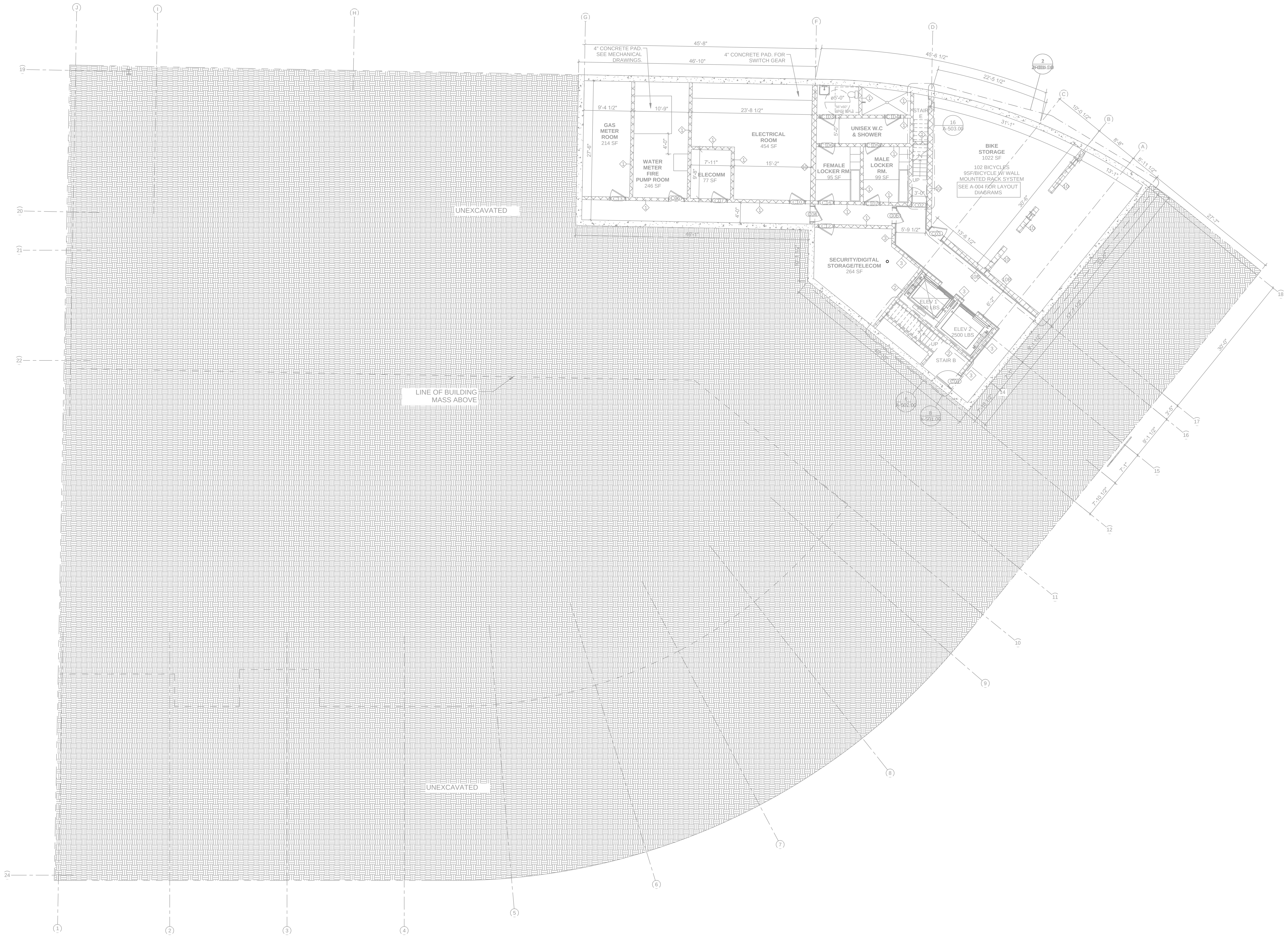
BEING the same premises known as and by the No. 897 Elton Avenue, Bronx, New York.

BEGINNING at a point on the northerly side of 161st Street as legally opened distant 98.54 feet westerly from the corner formed by the intersection of the northerly side of 161st Street with the westerly side of Elton Avenue measured along the northerly side of 161st Street as the same bends; thence northerly on a line forming an angle on the westerly side with the northerly side of 161st Street of 91 degrees and 05 minutes which said line is also the boundary line between said lot 84 and lots 85 and 86 on said map 60.07 feet to the southerly side of lot number 52 on said map; thence westerly along the southerly side of lot 52, 50 feet to the westerly side of lot number 83; thence southerly along the easterly side of said lot number 83 and partly through a party wall 61.01 feet to the northerly side of 161st Street; thence easterly along the northerly side of 161st Street 50.01 feet to the point or place of BEGINNING.

Premises known as Number 435 East 161st Street.

APPENDIX B

PROPOSED DEVELOPMENT PLAN


4" CONCRETE PAD. SEE MECHANICAL DRAWINGS.
4" CONCRETE PAD. FOR SWITCH GEAR
45'-8"
46'-10"
45'-6 1/2"
22'-5 1/2"
31'-1"
10'-0 1/2"
8'-8"
5'-11 1/2"
13'-1"
27'-7"
30'-0"
9'-4 1/2"
10'-9"
23'-8 1/2"
7'-11"
15'-2"
27'-6"
4'-0"
9'-8"
5'-0"
3'-0"
5'-9 1/2"
13'-6 1/2"
30'-6"
6'-2"
3'-5"
9'-1 1/2"
7'-1"
7'-10 1/2"
46'-1"
GAS METER ROOM 214 SF
WATER METER FIRE PUMP ROOM 246 SF
ELECOMM 77 SF
ELECTRICAL ROOM 454 SF
UNISEX W.C & SHOWER
ø5'-0"
56"x60" ANSI 604.3
FEMALE LOCKER RM. 95 SF
MALE LOCKER RM. 99 SF
STAIR E
UP
BIKE STORAGE 1022 SF
102 BICYCLES 9SF/BICYCLE W/ WALL MOUNTED RACK SYSTEM
SEE A-004 FOR LAYOUT DIAGRAMS
16 A-503.00
2 A-004.10
SECURITY/DIGITAL STORAGE/TELECOM 264 SF
ELEV 1 2500 LBS
ELEV 2 2500 LBS
STAIR B
5 A-502.00
8 A-501.00
C01
C02
C03
C04
C05
C06
C07
C10
C12
C13
C16
C102
C103
C104
C105
C106
10B
UNEXCAVATED
LINE OF BUILDING MASS ABOVE
UNEXCAVATED
J
I
H
G
F
D
C
B
A
19
20
21
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24
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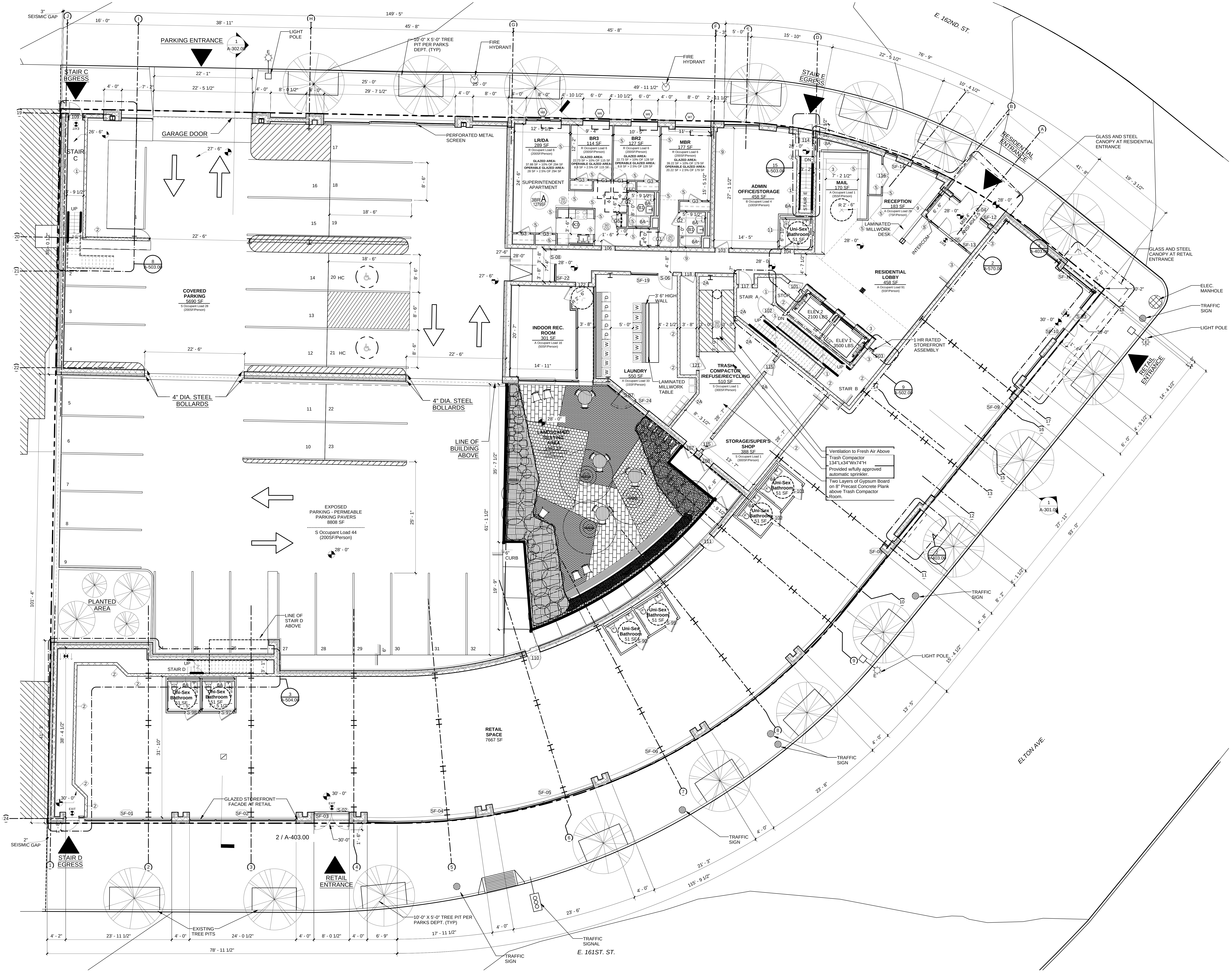


1 Level 1
1/8" = 1'-0"

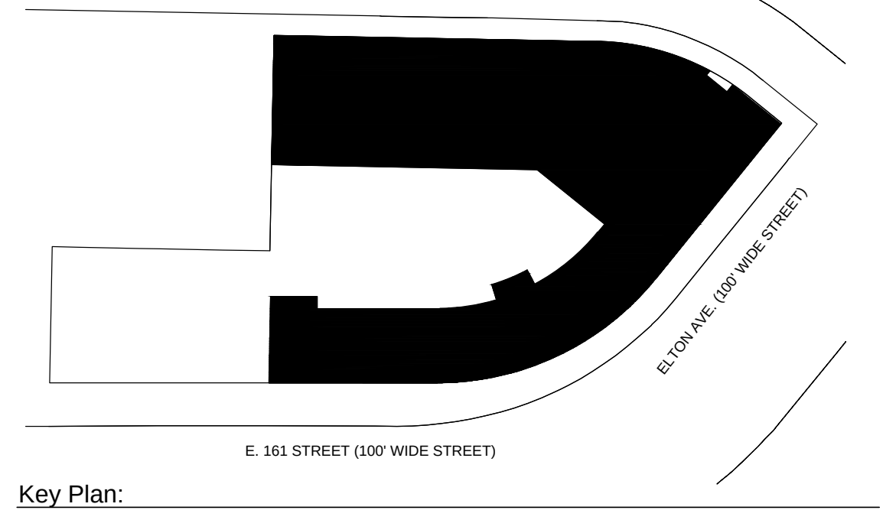
Melrose Commons Site C - Family

Bronx, NY

Owner:
Elton Crossing Associates, L.P.
445 E. 68th St.
New York, NY 10065

BLOCK: 2383 LOT: 19

NYC DOB # : 220403882



Key Plan:

Issued:

NUMBER	DATE	DESCRIPTION
1	09.30.13	BLDS INITIAL REVIEW
2	2.26.14	RESPONSE TO BLDS COMMENTS
3	8.15.14	50% PRICING SET
4	8.27.14	DOB FILING
5	3.18.15	90% CD SET

Revisions:

Architect:

MAP

Magnusson Architecture & Planning PC
42 West 39th Street, 15th Floor
New York, NY 10018
Tel (212) 253 7820 Fax (212) 253 1276

Structural Engineer:

GACE Consulting Engineers, PC
31 West 27th Street, 6th Floor
New York, NY 10001

MEP Engineer:

SIDERIS KEFALAS Engineers, PC
217-22 Northern Boulvard
Bayside, New York 11361
Tel (718) 224 9091 Fax (718) 224 9143

Landscape Architect:

Terrain NYC
200 Park Avenue South Suite 1401
New York, NY 10003
Tel (212) 537 6080 Fax (212) 537 6079

Civil Engineer:

Galli Engineering, P.C
734 Walt Whitman Road, Suite 402A
Melvile, New York 11747
Tel (631) 271-9292

Filing Representative:
DESIGN 2147, LTD
52 Diamond St, Brooklyn, NY 11222
Tel (718) 383-9340

Do Not Scale Plans
Contractor to promptly notify Architect of any material variations between field conditions and existing conditions as indicated in Contract documents

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1st Floor Plan

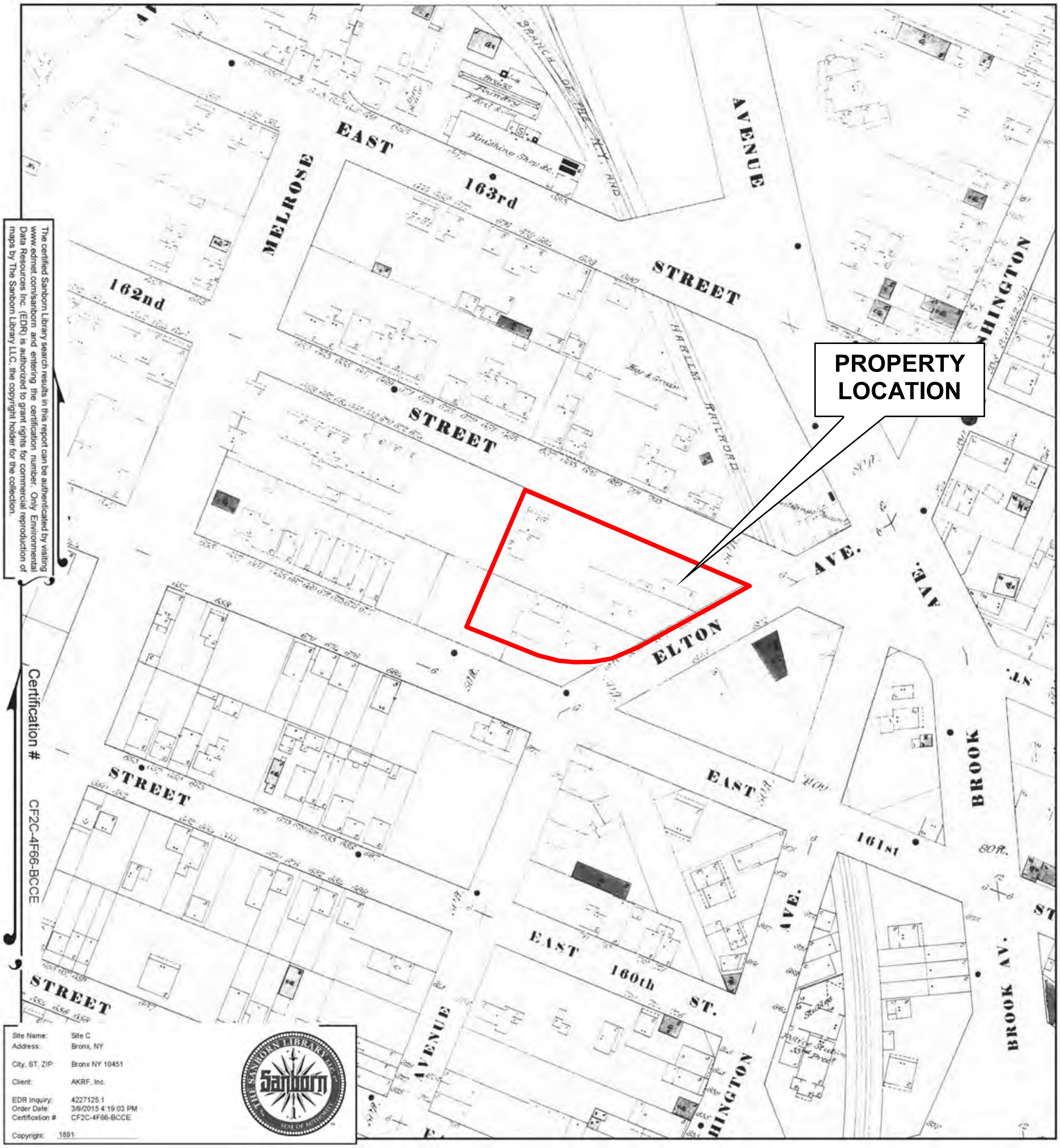
SEAL & SIGNATURE:

PROJECT No: 10008
DRAWING BY: Author
CHK BY: Checker
DWG No:
A-101.00
SCALE:
1/8" = 1'-0"

APPENDIX C

SANBORN MAPS

1891 Certified Sanborn Map



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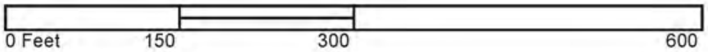
Certification # CF2C-4F66-BCCE

Site Name:	Site C
Address:	Bronx, NY
City, ST, ZIP:	Bronx NY 10451
Client:	AKRF, Inc.
EDR Inquiry:	4227125.1
Order Date:	3/9/2015 4:19:03 PM
Certification #:	CF2C-4F66-BCCE
Copyright:	1891



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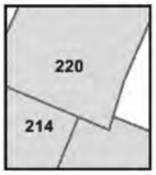
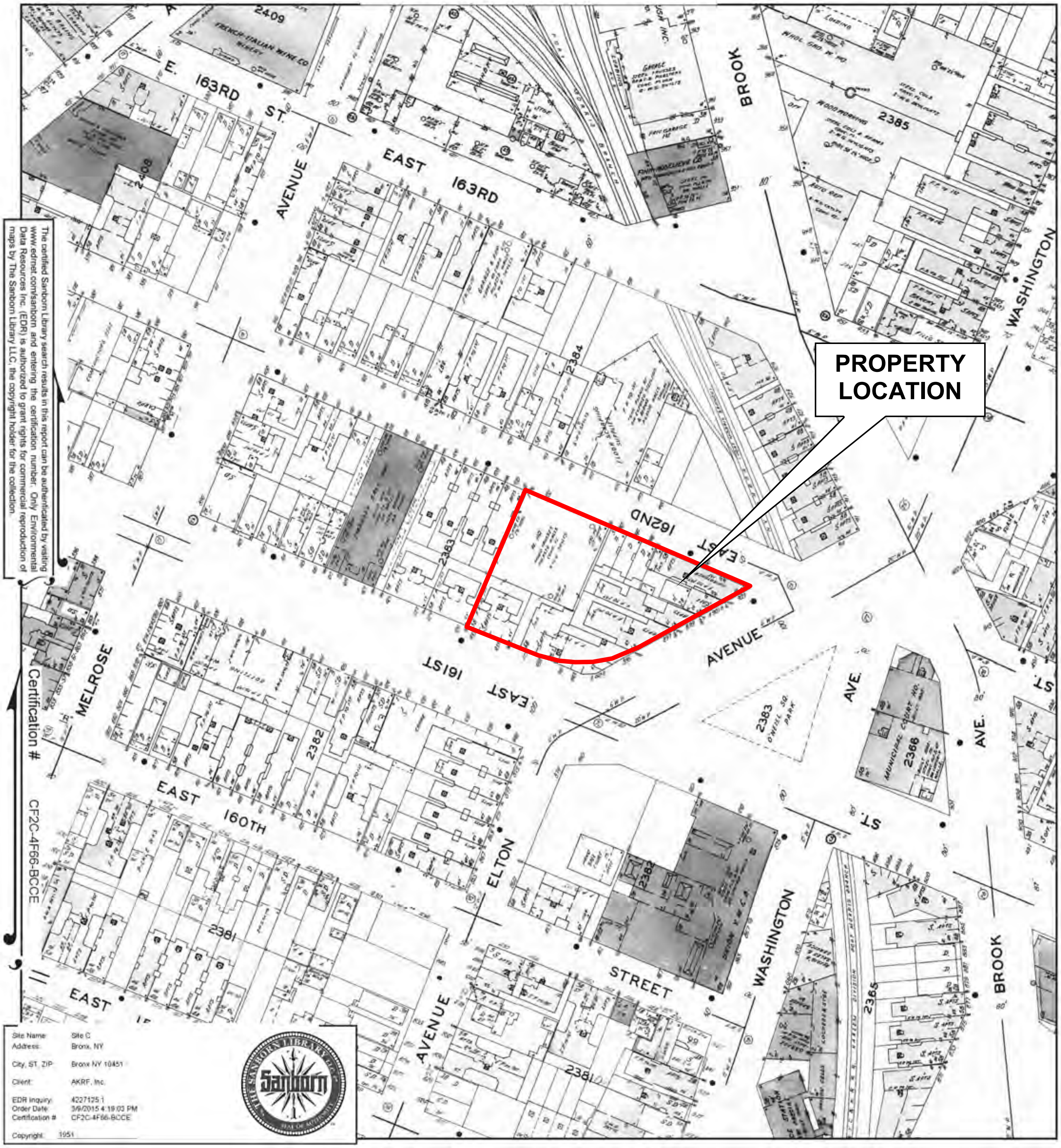


Volume 10, Sheet 214
Volume 10, Sheet 214
Volume 10, Sheet 220

1951 Certified Sanborn Map



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Order Date:	3/9/2015 4:19:03 PM
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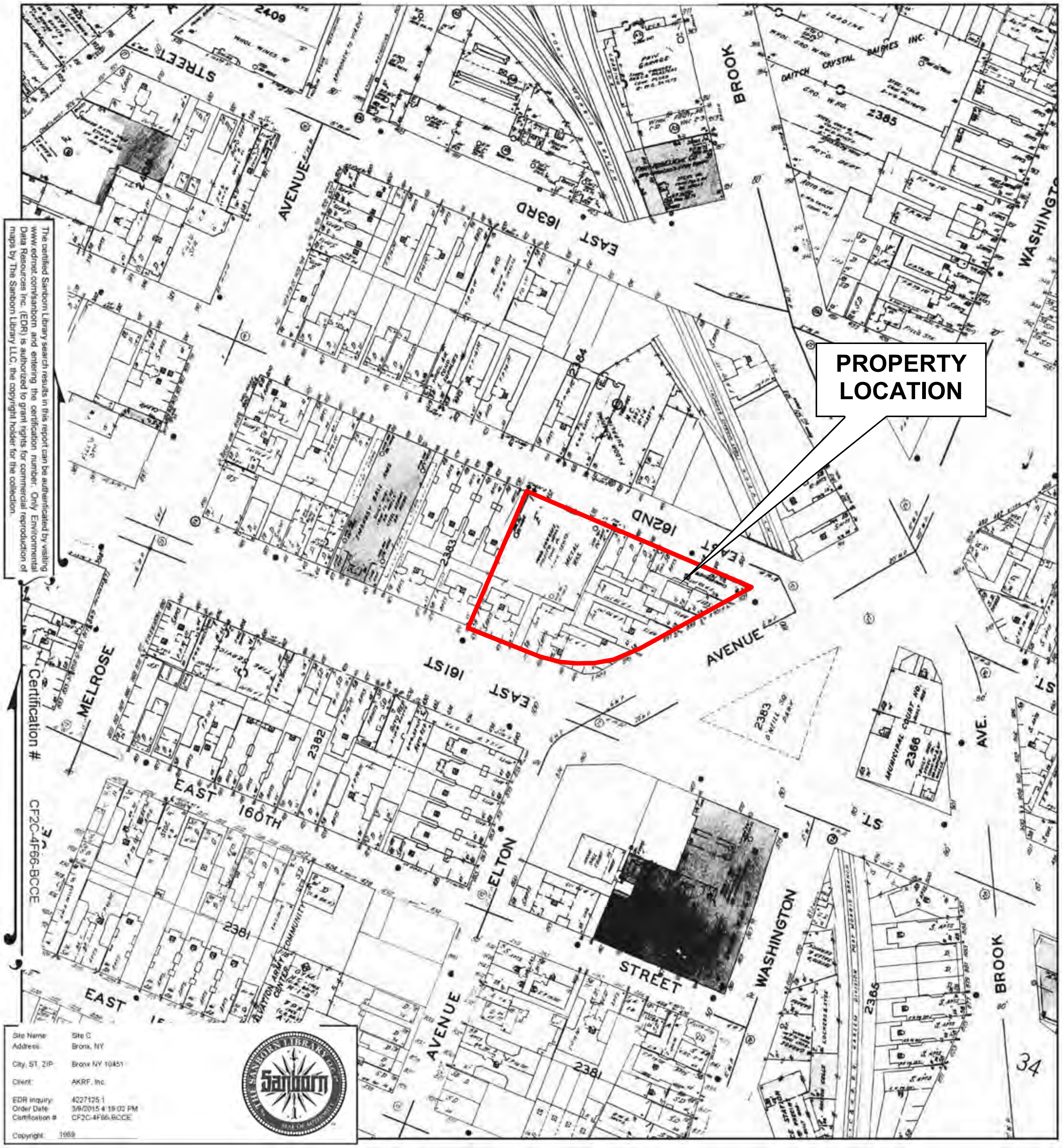
Volume 10S, Sheet 33
Volume 10S, Sheet 34
Volume 10S, Sheet 11

1969 Certified Sanborn Map



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Site Name: Site C
Address: Bronx, NY
City, ST, ZIP: Bronx NY 10451
Client: AKRF, Inc.
EDR Inquiry: 4227125.1
Order Date: 3/9/2015 4:19:03 PM
Certification # CF2C-4F66-BCCE
Copyright: 1969

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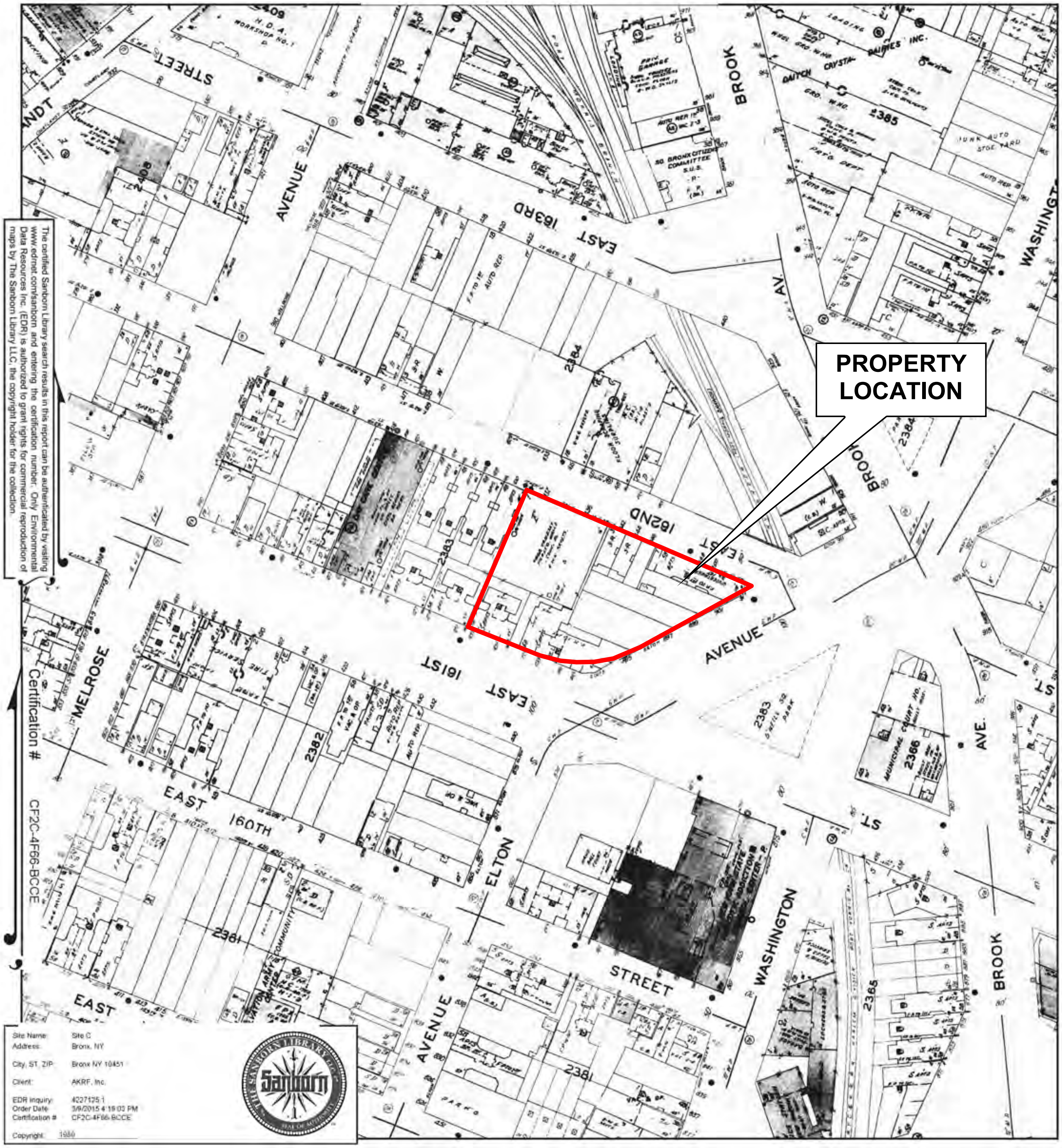
Volume 10S, Sheet 11
Volume 10S, Sheet 31
Volume 10S, Sheet 33
Volume 10S, Sheet 34

1980 Certified Sanborn Map



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Site Name: Site C
Address: Bronx, NY
City, ST, ZIP: Bronx NY 10451
Client: AKRF, Inc.
EDR Inquiry: 4227125.1
Order Date: 3/9/2015 4:19:03 PM
Certification #: CF2C-4F66-BCCE
Copyright: 1980

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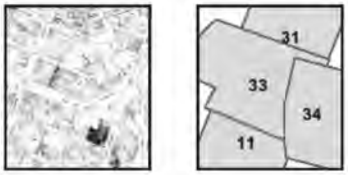
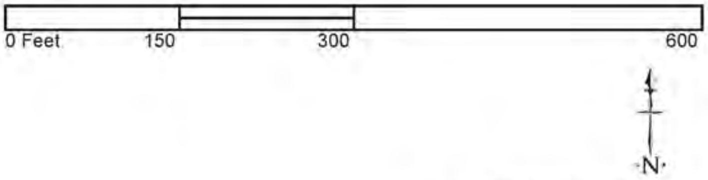
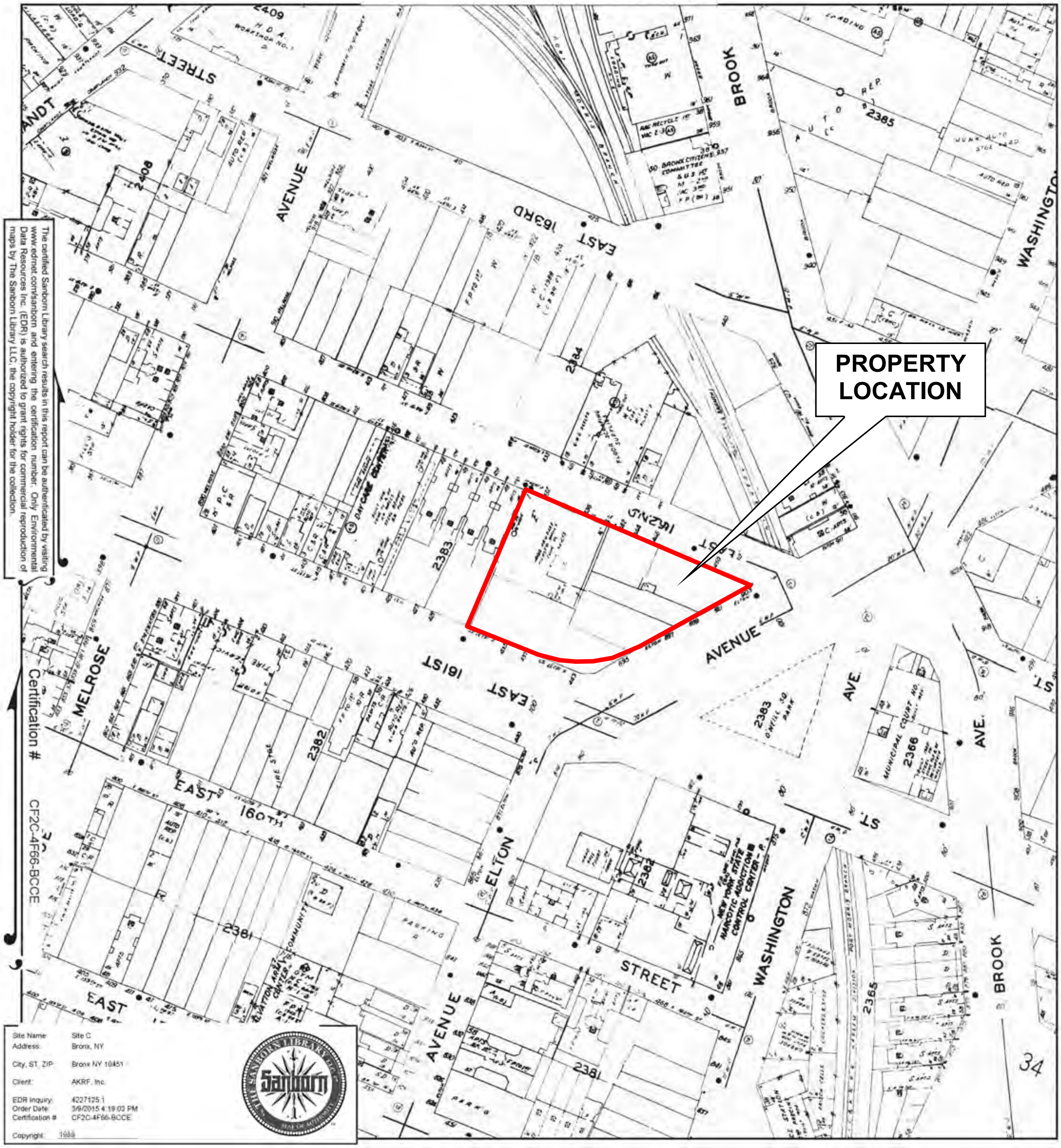


Volume 10S, Sheet 11
Volume 10S, Sheet 31
Volume 10S, Sheet 33
Volume 10S, Sheet 34



1989 Certified Sanborn Map



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Site Name: Site C
Address: Bronx, NY
City, ST, ZIP: Bronx NY 10451
Client: AKRF, Inc.
EDR Inquiry: 4227125.1
Order Date: 3/9/2015 4:19:03 PM
Certification #: CF2C-4F66-BCCE
Copyright: 1989

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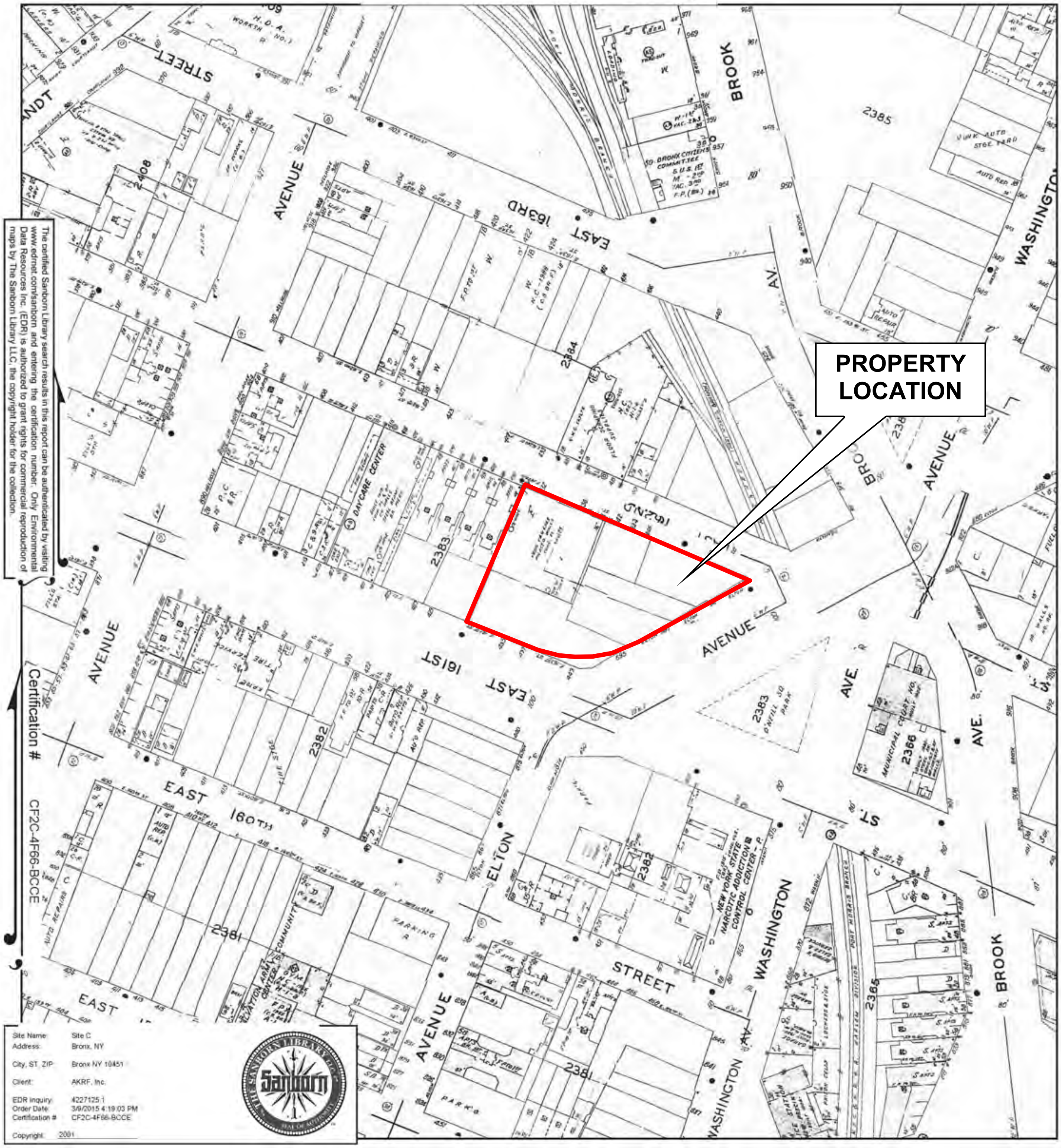
Volume 10S, Sheet 31
Volume 10S, Sheet 33
Volume 10S, Sheet 34
Volume 10S, Sheet 11

N

2001 Certified Sanborn Map



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Certification # CF2C-4F66-BCCE

Site Name:	Site C
Address:	Bronx, NY
City, ST, ZIP:	Bronx NY 10451
Client:	AKRF, Inc.
EDR Inquiry:	4227125.1
Order Date:	3/9/2015 4:19:03 PM
Certification #	CF2C-4F66-BCCE
Copyright:	2001

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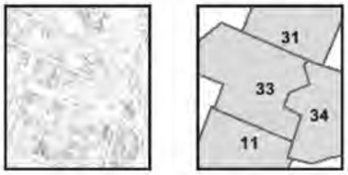

Volume 10S, Sheet 11
Volume 10S, Sheet 31
Volume 10S, Sheet 33
Volume 10S, Sheet 34

0 Feet 150 300 600

N

APPENDIX D

GEOTECHNICAL REPORT

GEOTECHNICAL EVALUATION
PROPOSED SIX TO TWELVE-STORY BUILDINGS
EAST 161ST STREET AND ELTON AVENUE
BRONX, NEW YORK

PREPARED FOR:

L. RISO & SONS CO., INC.
36-35 BELL BOULEVARD
BAYSIDE, NY 11361

PREPARED BY:

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.
70 PLEASANT HILL ROAD
MOUNTAINVILLE, NEW YORK 10953
(P) 845.534.5959
(F) 845.534.5655

FEBRUARY 7, 2014

MARK ANDREW STIER
076154

MARK A. STIER, P.E. NO. 076154

TECTONIC

Practical Solutions, Exceptional Service

W.O. 6926.01

GEOTECHNICAL EVALUATION
PROPOSED MULTI-STORY BUILDINGS
EAST 161ST STREET AND ELTON AVENUE
BRONX, NEW YORK

TABLE OF CONTENTS

1.0 INTRODUCTION

Tectonic Engineering & Surveying Consultants, P.C. has completed a site reconnaissance and geotechnical engineering evaluation for the proposed six to twelve story buildings located at East 161st Street and Elton Avenue in Bronx, New York. The purpose of this investigation was to evaluate the subsurface conditions and develop geotechnical recommendations for the design and construction of the foundations for the proposed buildings. This report presents our findings and recommendations.

2.0 SCOPE OF SERVICES

The following scope of services was provided for L. Riso & Sons Co., Inc., herein referred to as Client:

- Observation and logging of the excavation of four (4) test pits to depths ranging from 7 to 11.5 feet below existing ground surface.
- Drilling, sampling, and logging of thirty-two (32) test borings at the site to depths ranging from 8 to 35 feet below the existing ground surface.
- Drilling and logging of fourteen (14) rock probes at the site to depths ranging from 6 to 30 feet below the existing ground surface.
- Rock cores were performed in nine (9) borings to determine the integrity of the bedrock in the area.
- Two (2) groundwater observation wells were installed; one in boring B-20 and one in boring B-35.
- Field inspection and supervision by a geotechnical engineer to locate the borings, rock probes and test pits and log subsurface conditions.
- Laboratory testing of select soil samples to assist in the evaluation of the engineering characteristics of the soils and help in the field classification of the soils. Testing included gradation analyses.
- Geotechnical engineering analyses of the subsurface conditions as they relate to the design and construction of the proposed building foundations and associated site improvements.
- Preparation of this report presenting the results of our subsurface investigation, laboratory testing, engineering analyses, as well as our geotechnical recommendations for the design and construction of the proposed building foundations and associated site improvements.

3.0 PROJECT AND SITE DESCRIPTION

The project site is located on Elton Avenue between East 161st and 162nd Streets in Bronx, New York. The property is bound by a one story brick commercial building to the west; Elton Avenue to the east; several four-story apartment buildings for approximately 100 feet along 162nd Street at the northwest corner and frontage on 162nd Street for the remainder to the north; and 161st Street to the south.

The property consists of a vacant lot and an existing warehouse building that will be demolished. The existing building is located in the northwest section of the site and is roughly 8,500 square feet (sf). The reminder of the lot is about 25,000 sf of vacant land. The property is fenced off and access is limited to one gate on 161st Street and one gate on 162nd Street.

The proposed site consists of two multiple story buildings. The first building is the Melrose Commons Family House Building (Family Building). This building is the larger of the two buildings and is between six and twelve stories. The Family Building is a commercial and residential housing mixed use building. The building includes retail stores, a parking structure, and apartments. The structure also includes a one story basement located in the eastern portion of the building. The remaining sections of the building are proposed at approximately existing grade. The second building is a nine-story building referred to as Melrose Commons Veterans Supportive Housing Building (Veteran's Building). This building is a located at the southwest portion of the site and consists of residential units and a lobby. This building includes a one-story below grade basement.

4.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of drilling a total of forty-six (46) test borings and probes, designated as B-1 through B-46 and the excavation of four (4) test pits, designated as TP-1 through TP-4. The borings, rock probes and test pits were located on-site by measuring from existing features and were performed between October 17 and October 29, 2013, by Craig Test Boring, using a Mobile B-53 ATV mounted drill rig and a CME 750x rubber tire truck with an auto hammer. The test pits were performed on November 5, 2013, by Craig Test Boring using a KUBOTA KX 057-4 mini excavator. Standard Penetration Testing (SPT) was performed in the borings, using a standard 2-inch diameter split-spoon sampler, continuously to a depth of at least 12 feet, and at maximum 5-foot intervals thereafter. SPT sampling was performed in accordance with the requirements of ASTM Standard D1586 *"Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".* SPT N-values were recorded for each sample taken. Samples of the soils obtained by the split-spoon sampler were collected and retained in glass jars.

Two (2) ground observation wells were installed. The well in boring B-20 was installed on October 18, 2013 and the well in boring B-35 on October 24, 2013. The groundwater levels were measured and recorded several times and the wells were relocked for future use.

The subsurface investigation was performed under the full-time observation of a geotechnical engineer representing Tectonic. The boring, rock probe and test pit locations were marked out by Tectonic using existing site features. The engineer classified soil samples as they were recovered, collected representative samples of the soil for analysis, and prepared logs of the soil and groundwater conditions encountered. The locations of the borings, rock probes and test pits are shown on the attached Boring, Rock Probe and Test Pit Location Plan, Figure 1. Logs of the borings, rock probes and test pit, are included in Appendix I.

5.0 LABORATORY TESTING

Laboratory testing was conducted on selected soil samples to assist in the evaluation of the engineering characteristics and aid in the field classification of the soils encountered within the borings. Laboratory testing included five (5) soil gradation (particle-size analysis) tests. The gradation testing was performed in accordance with ASTM Standard D422 "Standard Test Method for Particle Size Analysis of Soils" to evaluate the grain size distribution of subsurface soils. The results of the laboratory testing are attached in Appendix II.

6.0 SUBSURFACE CONDITIONS

The subsurface conditions at the boring, rock probe and test pit locations typically consist of a variably thick layer of topsoil overlying fill material, native soils, and bedrock. Generalized descriptions of the conditions encountered are provided below. Detailed descriptions are provided on the attached boring, rock probe and test pit logs in Appendix I.

6.1 Fill Soils

The fill soils typically consisted of brown sand with variable amounts of silt and gravel. The borings and test pits generally contained large amounts of brick and debris, which most likely was the result of demolition of previous buildings on-site. Several areas contained larger amounts of refuse, such as boring B-15 where tires were found, and boring B-22 where an apparent abandoned tank was encountered. The fill material extended to bedrock in several locations. SPT N-values ranged from 3 to 50+ blows per foot (bpf); however, the higher values were most likely the result of brick and debris encountered throughout the stratum. Generally, the fill is characterized as loose with a New York City Building Code (Code) classification of Class 7. A summary of the encountered fill depths is provided in Table 2 below.

6.2 Native Soils

The native soils were typically comprised of brown sand with varying amounts of silt and gravel, transitioning to gravel with varying amounts of sand and silt at deeper elevations. Cobbles and boulders were encountered across the site. This layer was typically encountered at depths of between 4 and 13 feet below grade; however, there were locations on the site where no native soils were encountered. Where present, the stratum thickness varied from between 2 and 10 feet. The SPT N-values ranged from 6 to 50+ bpf, but were generally between 20 and 50+ bpf, indicating a medium to very dense soil condition. In the area of the existing warehouse, the SPT N-values ranged from 3 to 50+ bpf, but were generally in a looser condition near the surface than the native soils encountered in other locations. The Code classification of the stratum is Class 2a, 2b, 3a, 3b, and 6.

6.3 Groundwater

Groundwater observation wells were installed at borings B-20 and B-35. The depth of the water was recorded and is presented below.

Table 1- Summary of Groundwater Conditions		
Observation Well Number / Location	**Depth To Water Below Existing Grade (feet)**	**Date**
B-20	20.5	10/18/13
B-20	20.6	10/21/13
B-20	20.4	10/22/13
B-20	20.5	10/29/13
B-35	Not encountered (bottom of well on rock at 14 feet)	10/28/13
B-35	Not encountered (bottom of well on rock at 14 feet)	10/29/13

Groundwater could not be accurately measured in the completed borings due to the introduction of drilling fluids during mud rotary drilling. However, based on moisture condition of the soil observed during boring inspection, the groundwater table could possibly reach as high as 15 feet below existing grade. It is noted that groundwater levels fluctuate seasonally and with changing weather conditions, so groundwater should be anticipated to be encountered at depths other than those observed in the wells at other times.

6.4 Bedrock

Bedrock was observed in all boring and rock probe locations at depths of between 7.5 and 23 feet below existing ground surface. The bedrock was classified as a grey and white, slightly weathered, slightly fractured, fine grained, hard marble, with orientations up to 45 degrees from the horizontal. The rock quality designation (RQD) varied from 0 to 85. Generally the RQD was between 65 and 90; however, at borings B-12, B-19 and B-20, the RQD was 18, 53 and 0, respectively, for the upper 5 feet. The Code classification of bedrock is Class 1a, 1b and 1d. A summary of the depths at which rock was encountered is present in Table 2.

Table 2- Summary of Subsurface Conditions				
Location	**Depth To Rock Below Existing Grade (feet)**	**Elevation of Rock (feet)**	**Depth of Fill Below Existing Grade (feet)**	**RQD (%)**
B-1	18.5	7	7	NA
B-2	15	10.7	8	NA
B-3	15.5	10.3	13.5	NA
B-4	11.5	14.7	10	NA
B-5	20	6.3	10	NA
B-6	20	6.9	10	NA
B-7	23	3.8	12	86
B-8	14	13.4	11	NA
B-9	9	19.2	9	77
B-10	13.5	13.5	7	NA
B-11	21.2	6.7	10	NA
B-12	13.5	14.4	13	18
B-13	20.6	7.7	13.5	71
B-14	8	20.7	NA*	NA
B-15	10	18.6	9.5	NA
B-16	9	19.5	NA*	NA
B-17	15	13.4	7.5	NA
B-18	7.5	21	NA*	NA
B-19	9.4	19.2	8	53
B-20	22	4.5	8	0
B-21	19	8.7	NA*	NA
B-22	Boring terminated when tank encountered			NA
B-23	12	17.3	8.5	85
B-24	11	18.8	NA*	NA
B-25	8.1	18.5	4	NA
B-26	12	16.5	NA*	NA
B-27	8.8	19.8	9	NA
B-28	20.5	6.2	2	NA
B-29	19	8.5	NA*	NA
B-30	18	10.1	NA*	NA
B-31	10	18.2	10	NA
B-32	8	20.4	NA*	NA

B-33	8	20.8	4	NA
B-34	11	17.8	NA*	NA
B-35	14	14.8	14	NA
B-36	10	18.8	NA*	NA
B-37	30	-3.4	NA*	92
B-38	13.5	13.2	NA*	NA
B-39	8	19.4	7.5	NA
B-40	12	13.2	2	NA
B-41	19	6.2	2	83
B-42	19	6.2	2	67
B-43	11	14.2	2	NA
B-44	20	5.2	2	NA
B-45	15.1	10.1	2	NA
B-46	16.9	8.3	2	NA

* Rock probe, no soil information logged or sampled

7.0 SEISMIC SITE COEFFICIENTS AND LIQUEFACTION POTENTIAL

As part of our investigation, we have evaluated the subsurface conditions so as to provide an appropriate site coefficient for use in seismic design. Based on the results of our subsurface investigation and the criteria outlined in the 2008 New York City Construction Code (Code), the subsurface conditions underlying the proposed site should be considered Site Class C with maximum spectral response accelerations at short periods (S_{mS}) equal to 0.438g and at 1-second periods (S_{m1}) equal to 0.121g. The design spectral response accelerations (S_{DS} and S_{D1}) should be determined based on these maximum values and the procedures outlined in the Code.

Liquefaction of soils can be caused by a strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, granular soils saturated by a shallow groundwater table are most susceptible to liquefaction. Liquefaction occurs when an earthquake and associated ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid increase in pore water pressure, causing the soil to behave as a fluid for short periods. Based on the results of the borings and SPT sampling, the subsurface conditions at the site should be considered as having a low to moderate potential for liquefaction. The liquefaction analysis indicates that the factor of safety in the upper loose fills is acceptable, however only marginally so. There may be pockets of loose fill that liquefy locally. If the upper fills are over excavated, this will eliminate any liquefaction potential identified above.

8.0 DISCUSSION AND CONCLUSIONS

The proposed construction will consist of two new six to twelve-story buildings with below-grade basement levels in portions of the footprint. The site can be categorized as having an uncontrolled fill layer overlying native soils in areas with bedrock at relatively shallow depths, and a relatively deep groundwater table. The following summarizes the major geotechnical issues regarding the proposed construction and the conclusions of our analyses:

- Based on assumed loading conditions, the feasibility of both shallow foundations and driven piles was explored initially. Due to the presence of large thicknesses of uncontrolled fill and relatively high loading, the use of shallow foundations is impractical for all areas of the buildings not founded on competent rock. The disadvantage of driven piles is that they will be relatively short, and the Code places restrictions on the minimum lengths of piles. Short piles are defined as piles with lengths less than 10 feet from the tip to the cut-off elevation. The Code limits the number of short piles to 50 percent or less. Another disadvantage of driven piles is that the vibrations that result from driving can induce settlement in the looser soils surrounding the site, and consequently, induce settlement of the neighboring structures. As a result, the feasibility of mat foundations and drilled caisson piles were explored. The advantages of mat foundations are that they can be designed to reduce differential settlements and can handle the high loading of multi-story buildings. The disadvantage of a mat foundation is that in areas where the bearing elevation is in uncontrolled fill, all of the unsuitable fill should be replaced with controlled fill. The advantage of drilled caisson piles, which would consist of a steel shell through the overburden soil, concrete and a steel core socketed into bedrock, is that they can be sized such that a single caisson can support the design column load. They also result in the generation of lower vibrations than pile driving and typically do not require load testing per the Code. If the drilled caisson pile foundation alternative is selected, a conventional spread foundation could also be used in areas of shallow bedrock.

- Based on the results of our analyses, the proposed Veteran’s Building can be supported on a mat foundation. The basement level results in the bearing elevation of the mat subgrade varying from a thin layer of medium dense to dense soils to weathered bedrock. The thickness of the soil progressively decreases to the east. At the west end of the proposed building, the mat will bear on an estimated 8 to 12 feet thick layer of soil overlying the weathered bedrock. Mat foundation settlements have been evaluated to range from less than ¼ inch beneath the building where bedrock is shallowest to approximately 1 inch in the western section of the building. Although this results in a slight rotation of the mat, the settlement can be assumed to be approximately instantaneous with load application, and the differential settlement of approximately ¾ inch can be compensated for as the building is erected. If the identified rotation of the mat foundation is undesirable, the building can be supported on a combination of shallow and deep foundations, both bearing within bedrock. Where bedrock is shallow, spread footings and continuous wall foundations can be utilized. Where bedrock is deeper, the building can be supported on drilled caisson piles.

- Based on the results of our analyses, the proposed Family Building can be supported on a mat foundation, drilled caisson piles or where bedrock is shallow, spread footings and continuous wall foundations. There are two distinct areas within the footprint of the building: 1) the area within a one-level basement along the eastern section of the building, and 2) the areas without a basement along the southern and northern building sections. In areas where there is no basement level, the building can be supported on either a mat foundation constructed after removal and replacement of all existing fill, or on drilled caisson piles. In areas with a basement level, a mat foundation or a combination of drilled caisson piles and shallow spread footings on rock can be used to support the building. In the areas with a basement level, the bearing elevation if a mat foundation is utilized will be partially on rock, partially on controlled fill placed after remedial removals of the existing fill, and partially on native soils. Settlements have been evaluated to range from less than ¼ inch on rock to approximately 1 inch on native soil and controlled fill. If the rotation of the mat, as outlined above is undesirable, the building can be supported on a combination of shallow and deep foundations, both bearing on or within bedrock. Where bedrock is shallow, spread footings and continuous wall foundations can be utilized. Where bedrock is deeper, the building can be supported on drilled caisson piles.

- As the proposed buildings will span the majority of the building lot and will require excavation to a minimum depth of approximately 10 feet below sidewalk elevation, or approximately elevation +14, building construction will require the stabilization of the sidewalls of the excavation to minimize disturbance to the neighboring buildings and the adjoining sidewalk, road and underlying utilities. Traditional underpinning may be used and should consist of a continuous concrete wall cast in alternating pits whose dimensions and spacing are selected to maintain stability of the existing foundations and minimize the disturbance soils adjacent to each underpinning pit. Due to the granular nature of the soils, the pits will need to be hand excavated and tightly shored. The use of grouting may also be required to prevent soil raveling.

  Other approaches to stabilizing the sidewalls of the excavation include the utilization of soldier pile and lagging walls or steel sheet piles. With the case of soldier pile and lagging walls, a potential for damage to adjoining properties may exist resulting from the loss of lateral confinement of the soil and the loss of soil itself, either by raveling prior to installing the lagging or by loss through the relatively pervious lagging with groundwater seepage. With the case of sheet piling, the primary source of potential damage is the installation process. This is due to the vibrations that result, which can densify the loose sand soils and induce building settlement or induce damage directly from the vibration waves themselves. The most probable result of both of these methods will be differential settlement, and associated distress to the neighboring building. Vibration or settlement sensitive equipment within the adjacent buildings may also be impacted. For the Veterans Building, both of these approaches, when properly implemented, should have negligible impact on the adjacent buildings to the west and north due to the setback of 15 feet and 22 feet, respectively. For the Family Building, the adjacent building to the west is essentially on the lot line, which may result in an impact to the adjacent building if one of these methods is selected.

- An active monitoring system will need to be implemented to verify that the construction does not adversely impact the existing structures around the site. Monitoring should include surveying to identify both horizontal and vertical movement of the adjacent buildings. Monitoring should also include vibration monitoring to verify that vibration levels are within acceptable limits. Preconstruction surveys of adjacent structures should also be performed to aid in the defense of damage claims.

The following are other general conclusions that can be made regarding the proposed construction:

- Groundwater will likely not be encountered during construction when excavating the site. However, water perched over the bedrock and possibly in isolated fill pockets may be encountered.

- The majority of on-site soils are unsuitable for use as backfill materials due to the debris and relatively high silt contents observed.

- The majority of the existing fill will likely be removed during construction of the basement levels; however, deeper pockets of existing fill may be present at some locations.

- The results of our liquefaction analysis indicate that liquefaction potential of the subsurface soils is low to moderate, however removal of the fill will eliminate liquefaction potential.

- Excavations should be feasible with conventional heavy-duty construction equipment; however, cobbles, boulders and building construction debris will likely be encountered.

9.0 RECOMMENDATIONS

The following sections provide our geotechnical recommendations for design of the proposed building foundations. The recommendations are based on our understanding of the proposed construction as described in Section 3, the results of the subsurface investigation, and our experience in the general vicinity of the project site.

9.1 Building Foundations

As discussed in Section 8, the building structure can be supported on either a mat foundation spanning the weathered bedrock, native soils and controlled fill placed after remedial removals of the existing fill, or alternatively, on spread and continuous wall foundations bearing in rock, where rock is shallow, and on drilled caisson pile foundations bearing within rock where rock is at greater depths. The advantages and disadvantages of these foundation alternatives were also discussed in Section 8. The following subsections provide design criteria for the different foundation alternatives.

9.1.1 Mat Foundation

A single or stepped mat foundation can be used to support the structures. The mat foundation should bear on the bedrock, native soil or controlled fill. Preparation of the subgrade and controlled fill placement recommendations are provided in Section 10 of this report.

The mat should be designed using the values provided in Table 3. A mat foundation constructed to the approximate dimensions of the proposed buildings, and utilizing the design parameters below, is anticipated to settle up to approximately 1 inch or less.

Table 3 – Mat Foundation Design Parameters		
Parameter	**On Native Soil Below El. +16 Or Rock**	**On Native Soils Above El. +16 or On Controlled Fill**
Allowable Bearing Capacity (tsf)	5	2
Winkler Spring Coefficient (pci)	70	30
Base Sliding Coefficient	0.42	0.50

If a mat foundation is selected, the design should include measures for handling differential settlements, which may result from the mat bearing on rock and native soils or controlled fill in close proximity. Differential settlements of up to 1 inch are possible.

A maximum seasonal high groundwater level of 15 feet below existing grade should be used for the purpose of design. All recommendations included in this report are based on this groundwater elevation.

9.1.2 Drilled Caisson Pile

If used, caisson piles should be designed in accordance with the requirements of the Code. Specifically, they should be designed to derive their entire support from a socket constructed within Class 1c or better bedrock. The diameter, reinforcing and socket length will vary with the required load capacity, which will vary with location within the building. The rock socket should be designed utilizing an allowable bond stress between the concrete and the sides of the rock socket of 200 pounds per square inch. The allowable end bearing capacity of the socket will depend upon the Code classification of the bedrock, which was typically identified to be Class 1c or better during the subsurface investigation. Per the Code, Class 1c rock has a basic allowable bearing pressure of 20 tons per square foot. This can be increased per the Code by 10 percent for each foot of embedment below the bedrock surface (the socket depth) to a maximum of two times the basic allowable bearing pressure.

The drilled shaft should be designed to resist lateral loading using the following criteria:

Table 5 – Lateral Design Parameters for Drilled Caisson piles

Elevation (feet)	γ (pcf)	ϕ (degrees)	C (psf)	K_l (pci)	ε_{50}	K_p
Above +16	NA	NA	NA	NA	NA	NA
Rock to +16	110/58$^{(1)}$	34	NA	90/60$^{(1)}$	NA	3.54
Rock	73	NA	8000	2000	0.004	NA

For the above tables:
(1) Use first value above water table, second below

γ = design unit weight of soil (pounds per cubic foot)
ϕ = angle of internal friction (degrees)
C = cohesion (pounds per square foot)
K_l = coefficient of lateral subgrade reaction (pounds per cubic inch) required for p-y curve methods of analysis
ε_{50}= axial strain at 50% of the maximum principal stress difference
K_p = coefficient of passive earth pressure.

Individual boring logs should be consulted to determine the depth to bedrock when evaluating lateral stability and deflection of the caissons.

9.1.3 Spread and Continuous Wall Footings

If utilized, spread footings and continuous wall foundations should be designed to bear on bedrock. Based on the boring data, the foundations can either be designed to bear on Class 1b (intermediate) bedrock with a net allowable bearing pressure of 40 tons per square foot, or on Class 1d (soft) bedrock with a net allowable bearing pressure of 8 tons per square foot. Based on the boring data, the soft rock may have to be over-excavated distances ranging up to and possibly in excess of 5 feet to reach the intermediate rock. This has been identified in two locations (borings B-12 and

B-20) during the subsurface investigation, but may also be encountered at other areas of the site. Continuous wall foundations should have a minimum width of 2 feet and spread footing foundations should have a minimum width of 3 feet.

9.2 Design for Lateral Loading

Basement walls, underpinning and temporary shoring should be designed in accordance with the following criteria:

Table 4 – Lateral Design Parameters for Below Grade Walls

Soil Parameter	**Existing Fill**	**Native Sand/Controlled Fill**
Angle of Internal Friction	30º	34º
Active Earth Pressure Coefficient (Ka) [1]	0.33	0.28
Passive Earth Pressure Coefficient (Kp) [2]	3.00	3.54
At-Rest Earth Pressure Coefficient (Ko) [3]	0.50	0.44
Unit Weight of Soil (pounds per cubic foot)	115	125

1) Use for free standing walls where movement of up to 0.0015 X height of wall is both possible and tolerable. Otherwise, use at-rest coefficient.
2) Assume passive pressure below a depth of 4 feet below exterior grade only.
3) Use for walls restrained against outward lateral movement.

Additional loading due to temporary and permanent surcharges should be added to the lateral loading exerted by the retained soil. Loads due to supported structures should be applied in appropriate combinations with the lateral loads.

Dampproofing should be provided for all basement walls, as well as a perimeter drainage system. The latter should consist of a 12-inch wide drainage layer of crushed stone or clean gravel behind the wall with a collector pipe drained to a positive outlet. The gradation specification for the drainage material is provided in

Section 10. The stone or gravel should be separated from the natural soils or controlled fill by a permeable geotextile having an equivalent opening size of 70 to 100.

Walls should be backfilled in accordance with Section 10.6 of this report. Placement and compaction of backfill should be observed and tested by a geotechnical engineer to monitor that proper compaction is being achieved.

9.3 Floor Slabs

If a mat foundation is not utilized to support the proposed buildings, the floors should be designed as structural slabs in areas of drilled caisson piles or as slab-on-grade floors in the areas of conventional spread footings. If a slab-on-grade floor is utilized, it should be supported on a 6-inch thick crushed stone base placed over a proofrolled and approved subgrade consisting of native sand or weathered rock. A subgrade modulus of 200 pounds per cubic inch (pci) is recommended for the design of the slab-on-grade. The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for the purpose of calculating total or differential settlements.

10.0 EARTHWORK CONSTRUCTION CRITERIA

The following sections outline our recommendations regarding earthwork, fill placement and subgrade preparations for the proposed project site.

10.1 General Site Preparation

Initially, the site should be cleared of all existing structures, vegetation, pavements, roots, debris, and subsurface obstructions. Debris and vegetation from the clearing operations should be removed from the site and disposed of at a legal dump site. If the mat foundation, or slab-on-grade floor alternatives are selected, any existing fill, soft or unsuitable native materials, and subsurface obstructions should be removed from the building footprints and the zone of influence of the footings. The zone of influence is defined as a 1:1 (horizontal to vertical) line sloping downward and outward from the bottom edge of the footing.

The portion of the existing building which has not been completely demolished should be removed in its entirety from the proposed building footprint. Existing floor slabs, foundation walls, and column footings should be excavated and completely removed.

10.2 Rock Excavations

Bedrock is present at relatively shallow depths at the western and eastern portions of the project site. Excavation of rock should be performed in a manner that will minimize damage to underlying bedrock and adjacent structures. Where feasible, rock excavation should be performed by ripping techniques. Rock excavation by means of blasting is not recommended due to the urban setting of the project site. Other non-blasting methods, such as hydraulic hoe-ramming, rock trenching, or expansive chemical grout, should be considered as potential means for the rock excavation. The feasibility and methodology for rock removal should be developed by an experienced qualified contractor or a specialist and it should be performed in a manner that will minimize damage to underlying bedrock that will serve as foundation subgrades. Rock removal should also be conducted in a manner that will minimize ground vibrations at adjacent structures and also limit the amount of air overblast pressure. A monitoring program should be implemented through limitations on peak particle velocity and air overblast pressure (sound level) at adjacent structures. Final and temporary cuts in bedrock should be thoroughly scaled to remove any loose rock blocks.

Pre-construction and post-construction building condition surveys of adjacent structures should be performed to document existing conditions which may be aggravated by the proposed rock removal and other construction operations, and to aid in the defense of spurious damage claims.

10.3 Subgrade Preparation

All mat foundation and slab-on-grade subgrades and surfaces to receive fill should be inspected by the geotechnical engineer prior to placement of controlled fill or concrete. Mat foundation and slab-on-grade subgrades should consist of medium dense to dense native soils, as described in this report, compacted controlled fill, or bedrock. Subgrades should be prepared by excavating to the subgrade elevation, removing any remaining existing fill, and allowing a geotechnical engineer to inspect the subgrade conditions. Existing fill placed as part of previous construction or site grading activities should be removed from beneath all foundations and slabs-on-grade. .

The soil subgrades should be proofrolled in the presence of the geotechnical engineer by making a minimum of 4 passes in 2 perpendicular directions with a vibratory roller having a static weight of at least 10 tons. Proofrolling should not be performed in saturated areas or areas having freestanding surface water, until they are dewatered and allowed to dry. Soils found to be soft during proofrolling should be removed from the zone of influence of the slab or foundation and replaced with compacted controlled fill as directed by the geotechnical engineer. The zone of influence is defined in Section 10.1.

10.4 Rock Subgrade Preparation

Rock subgrades should be prepared approximately level and they should be cleaned of all soil materials. If lean concrete is used to provide a level subgrade, the geotechnical engineer should evaluate the degree and direction of the slope of the rock surface and their variation over the area of the leveling pad to determine the stability of the leveling pad relative to sliding failure along the concrete-bedrock interface. If it is determined that the leveling pad is unstable due to shear forces resulting from a sloping rock surface, the bedrock surface should be stepped or dowels should be installed to resist the sliding forces.

10.5 Protection of Subgrades/Dewatering

The site soils are susceptible to disturbance. Subgrades should be protected from the effects of frost, construction traffic, groundwater, and surface water. The necessary protection should be provided immediately after stripping and excavation, and be maintained until fill or concrete is placed. Soils that become disturbed due to wet conditions should be removed and replaced with compacted controlled fill.

Temporary surface drainage measures are recommended to divert runoff away from the proposed construction limits. Well defined temporary construction access roadways using crushed stone and possibly a stabilization fabric should be considered to avoid surface soil disturbance and the need for costly corrective measures.

Perched groundwater seepage may be encountered overlying the bedrock during excavation. If water is encountered, dewatering should be performed to maintain the water level at least 2 feet below the deepest excavation. Dewatering should be performed in a manner that will prevent loosening or migration of the subgrade soils. Dewatering by the use of sumps may is feasible. However, the sumps should not be installed directly in the footing excavations.

10.6 Fill Placement

Controlled fill should be as defined in the Code: *"well-graded sand, gravel, crushed rock, recycled concrete aggregate, or a mixture of these, or equivalent materials with a maximum of 10 percent passing the #200 sieve, as determined from the percent passing the #4 sieve."* In addition, controlled fill should be free of trash, debris, roots, vegetation or other deleterious materials.

The on-site fill is not suitable for re-use as controlled fill. The on-site native soils may be used as general fill outside the building area, or as fill beneath pavements or in landscape areas, provided these materials have a maximum particle size of 4 inches and they are free of trash, debris, roots, vegetation, peat or other deleterious materials. As previously noted, however, these soils are moisture sensitive due to their high silt content and their use may result in construction delays if they become wet.

Free draining crushed stone below floor slabs and as drainage materials behind foundation walls or around underdrains, should be as follows:

Sieve Size	**Percent Finer by Weight**
1 inch	100
½ inch	30-100
¼ inch	0 - 30
No. 4	0 - 10
No. 8	0 – 5

All fill should be compacted to at least 95 percent of the maximum dry density at near optimum moisture contents as determined by ASTM D1557, *"Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))".* The lift thickness for the fill soils will vary depending on the type of compaction equipment used. Fills should generally be placed in uniform horizontal lifts not exceeding 8 inches in loose thickness in open areas. In confined areas, the loose lift thickness should be reduced to 4 inches or less and each lift should be compacted with sufficient passes of hand operated vibratory or impact compaction equipment. Compaction within 5 feet of foundation walls should only be performed with hand-operated equipment.

A geotechnical engineer with appropriate field and laboratory support should inspect all footing subgrades, approve materials for use as fill, and test backfill materials for compliance with the recommended compaction. Each lift of fill placed at the site should be tested for compaction.

10.7 Excavations

All excavations should be sequenced in a manner that will not compromise the stability of the adjacent structures. Any vertical cut greater than 4 feet in height should be inclined for safety unless sheeting or shoring is used. The on-site soils meet the description for OSHA Class C soils; therefore, we anticipate that the on-site sands are not capable of holding a slope steeper than approximately 1.5:1 (horizontal to vertical). All sheeting and shoring should be designed by a professional engineer. OSHA and Code requirements pertaining to protection of property and worker safety should be met during excavation and backfilling activities.

Excavations should be feasible utilizing standard construction equipment (i.e. hydraulic excavator); however, construction debris and large boulders may be present.

Underpinning, if required, should consist of a continuous concrete wall cast in alternating pits whose dimensions and spacing are selected to maintain stability of the existing foundations and minimize the disturbance of soils adjacent to each underpinning pit. Additionally, construction monitoring and control point surveying should be performed during construction to monitor any displacement experienced by the existing building.

10.8 Drilled Caisson Pile Construction Considerations

Drilled caisson piles should be constructed in accordance with the most recent standards of the International Association of Foundation Drilling (ADSC) and ACI 336. Plans and specifications should clearly indicate that variable soil conditions are present, and that layers of gravel and possible cobbles and boulders could be encountered. This will allow the contractor to employ the appropriate equipment and construction methodologies. The foundations should also be constructed under the full-time observation of the geotechnical engineer or qualified in-house inspector provided by Client. If the drilled caisson piles extend into the underlying bedrock, the depth of the rock embedment and condition of the rock should be evaluated by a geotechnical engineer to confirm that it is in accordance with the design criteria.

Due to the granular nature of some of the subsurface soils, a temporary steel casing may be needed to prevent collapse of the soils into the excavations, and drilling slurry may be required to maintain the side wall stability below the groundwater level. The temporary casing could be extended to the full depth of the caisson pile in lieu of the drilling slurry, provided that the casing is removed while concrete is placed. Removal of the casing should be performed so that the level of the concrete within the casing is at least 1-foot above the bottom of the casing at all times.

Concrete placement associated with the drilled caisson piles should be performed utilizing a concrete pump or by the use of tremie methods to prevent segregation of the concrete. If casing is used, concrete placement should be done in a manner to prevent "necking" of the drilled caisson pile.

11.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field testing support should be engaged by the Client to observe that all earthworks is performed in accordance with the specifications and the design criteria outlined in this report.

The following work should be performed under the supervision of a geotechnical engineer:

- Subgrade preparation
- Drilled caisson piles, if necessary
- Underpinning of existing foundations, if necessary
- Proofrolling
- Fill placement and compaction
- Dewatering
- Vibration and deformation monitoring of adjacent buildings and structures

All materials proposed for use as soil fill should be tested and approved prior to delivery to the site. Additionally, all fill materials should be tested as they are being placed to verify that the required compaction is achieved. We further recommend that the project plans and specifications be reviewed by the geotechnical consultant prior to final completion of the bid documents. It should be noted that upon review of those documents, some recommendations presented herein may be revised or modified.

12.0 LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The recommendations contained in this report are intended for design purposes only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of L. Riso & Sons Co., Inc., for the specific application to the proposed construction of a mixed use residential and commercial buildings located at Melrose Commons on East 161st Street and Elton Avenue, Bronx, New York. We recommend that prior to construction, Tectonic review the project plans and specifications. It should be noted that upon review of those documents, some recommendations presented herein might be revised or modified. In the event that any changes in the design or location of the proposed structures are planned, Tectonic shall not consider the conclusions and recommendations contained in this report valid unless reviewed and verified in writing. It is further recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

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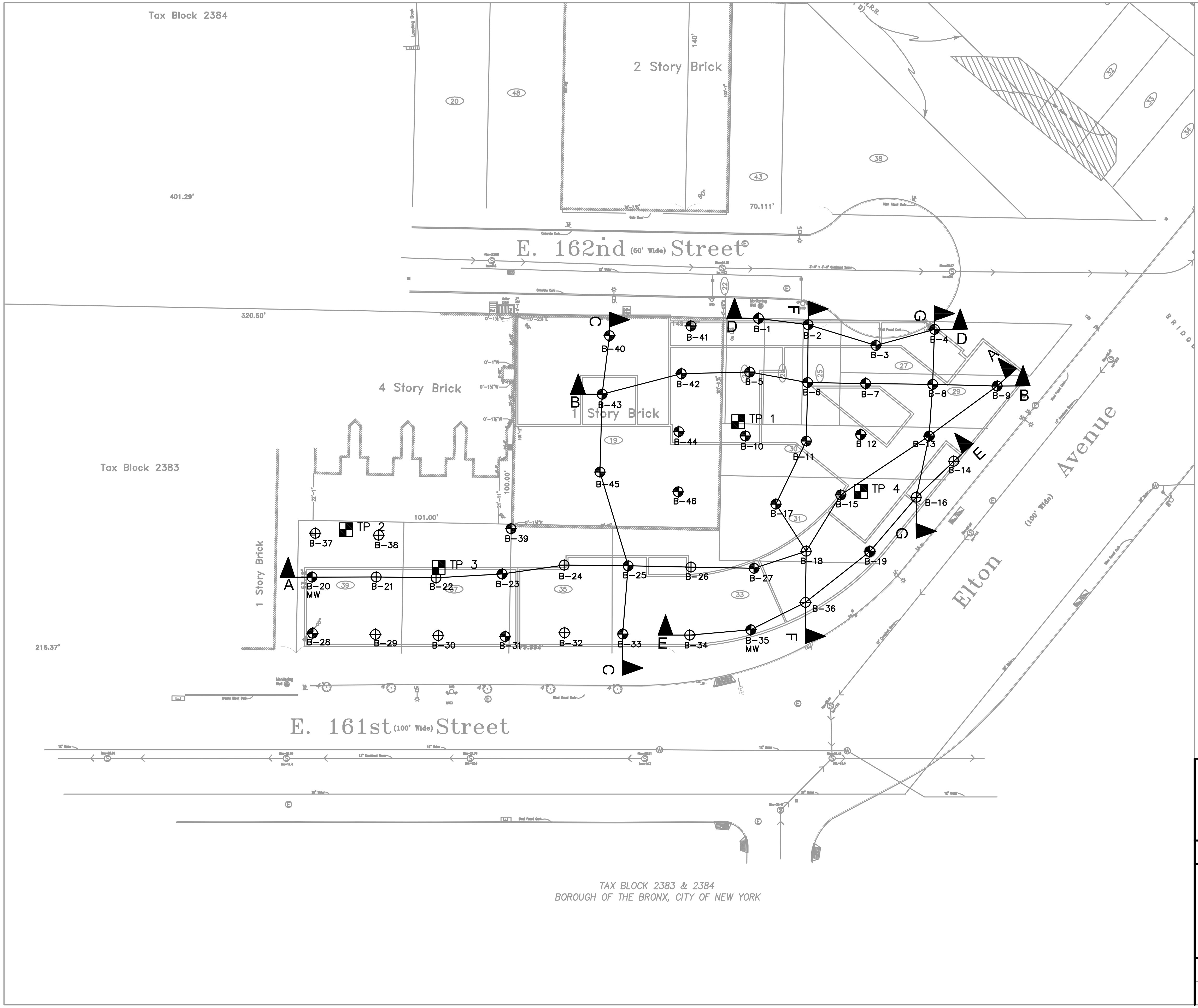
FIGURES

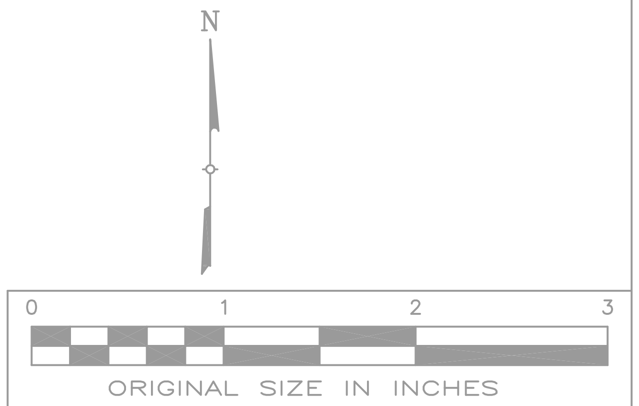


LEGEND

⊕ B-1	APPROXIMATE BORING LOCATION
⊕ B-1	APPROXIMATE ROCK PROBE LOCATION
▨ TP-1	APPROXIMATE TEST PIT LOCATION
⊕ B-1 MW	APPROXIMATE GROUNDWATER OBSERVATION WELL LOCATION
▲ ▲ A A	ROCK PROFILE

NOTES

1. PLAN BASED ON DRAWING ENTITLED "121016 SURVEY", DATED 9-23-2013 BY ERLANDSEN-CROWELL SHAW.
2. BORINGS, PROBES AND TEST PITS WERE FIELD LOCATED BY TECTONIC AND SHOULD BE CONSIDERED APPROXIMATE.



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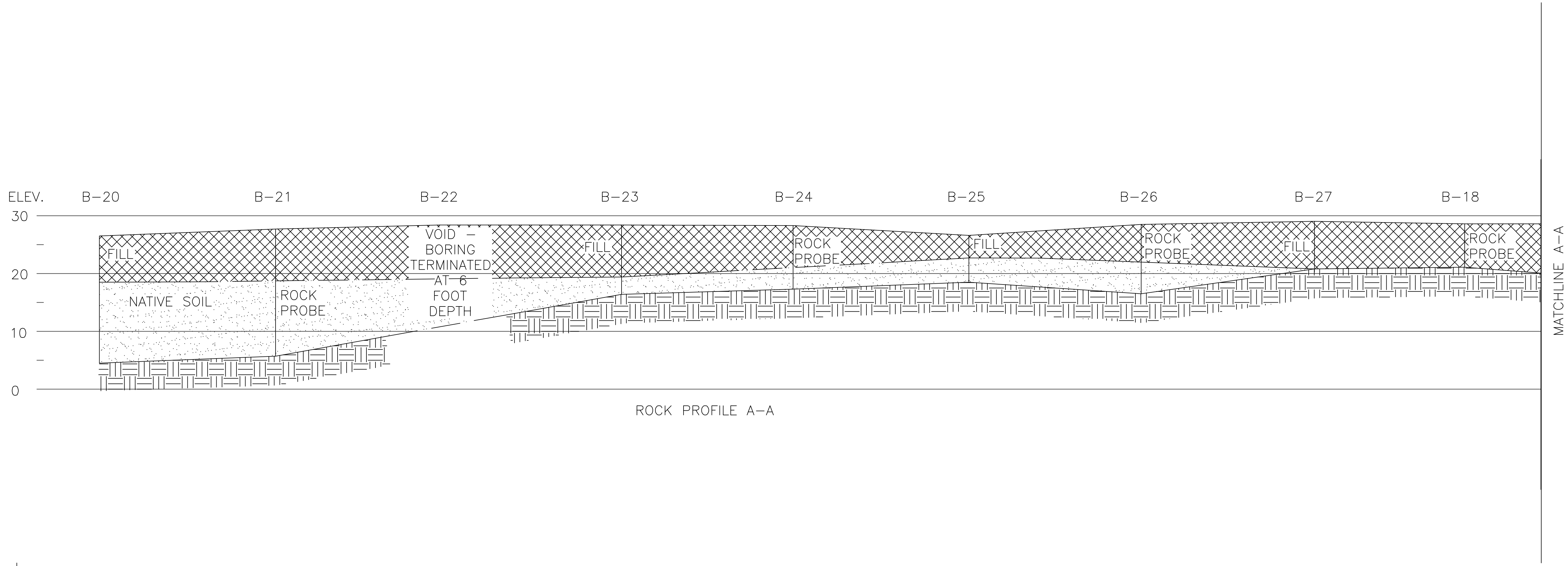
TECTONIC Engineering & Surveying Consultants P.C.
P.O. Box 37, 70 Pleasant Hill Road
Mountainville, NY 10953
Phone: (845) 534-5959
Fax: (845) 534-5999
www.tectonicengineering.com

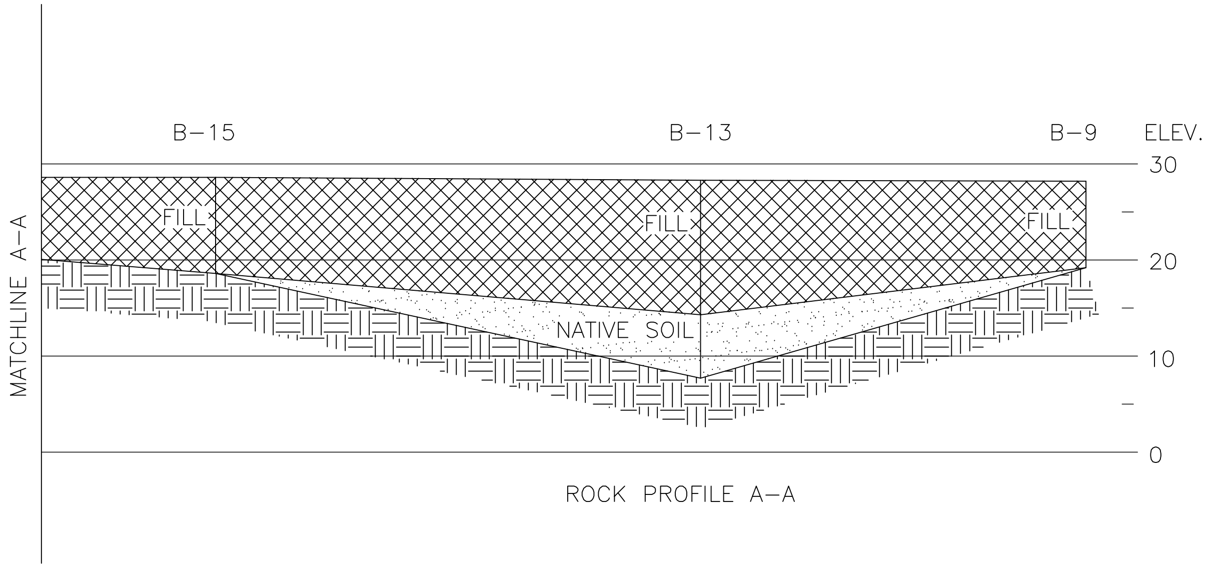
BORING, ROCK PROBE & TEST PIT LOCATION PLAN

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/2013	6926.01	1	
Scale 1"=40'			



ROCK PROFILE A–A



ROCK PROFILE A–A

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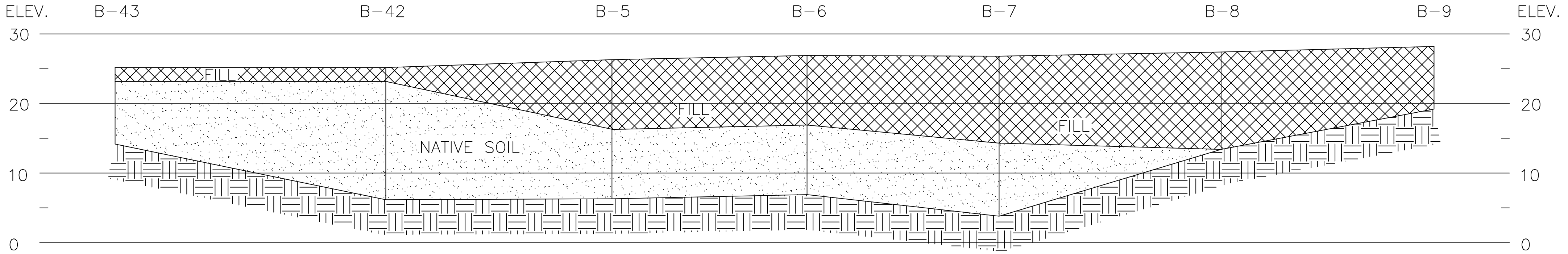
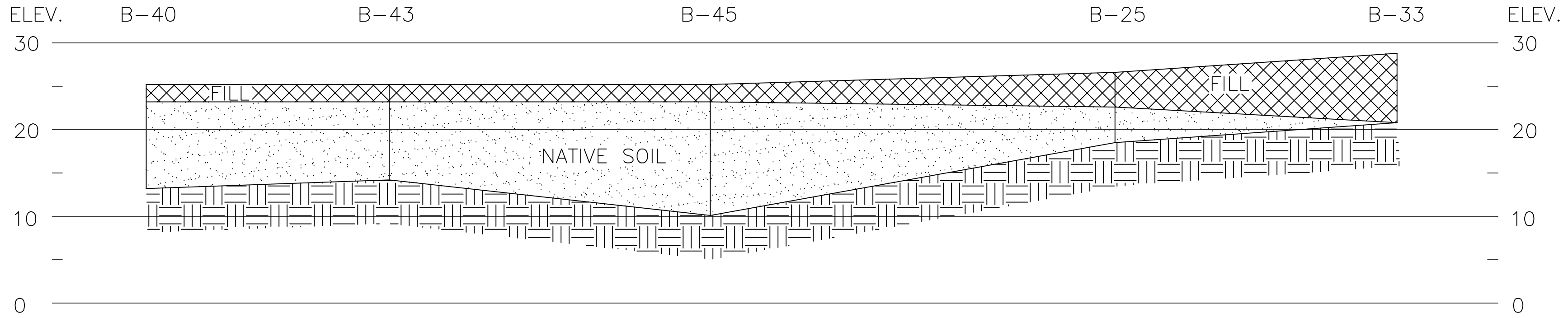
ROCK PROFILE A–A

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	2	
Scale 1"=20'			



ROCK PROFILE B-B



ROCK PROFILE C-C

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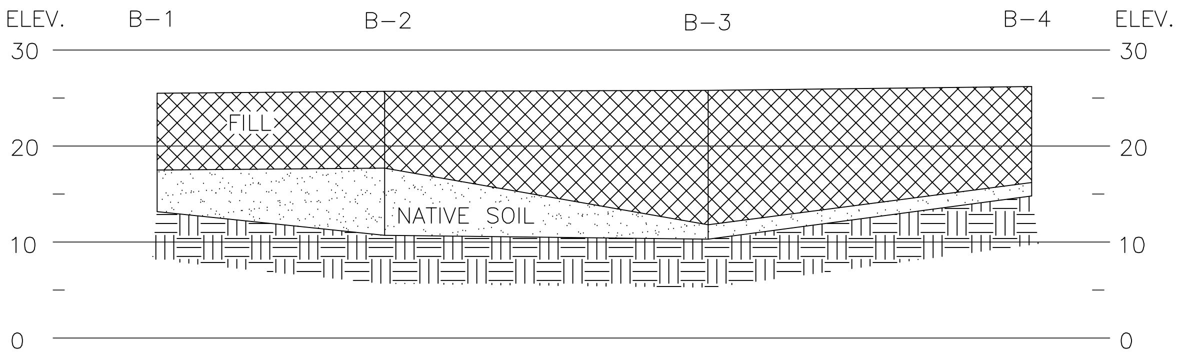
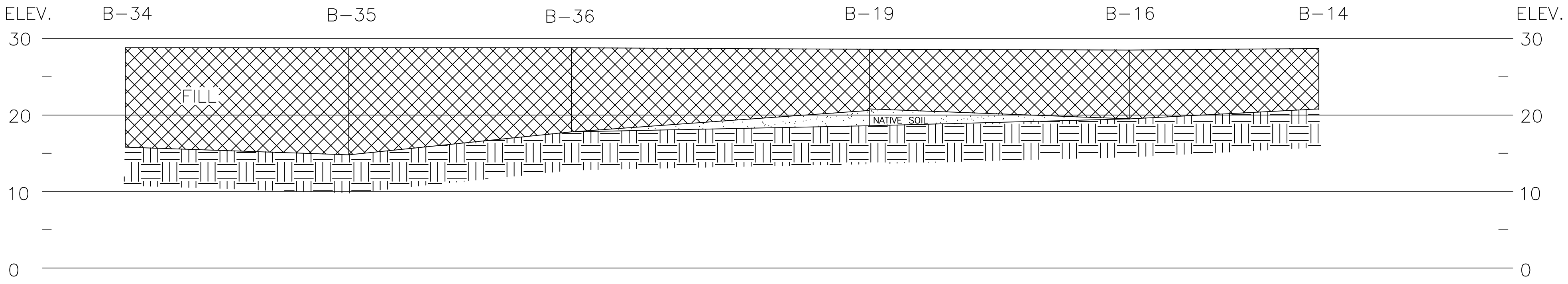
SOIL PROFILE B-B AND C-C

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	3	
Scale 1"=10'			



ROCK PROFILE D-D



ROCK PROFILE E-E

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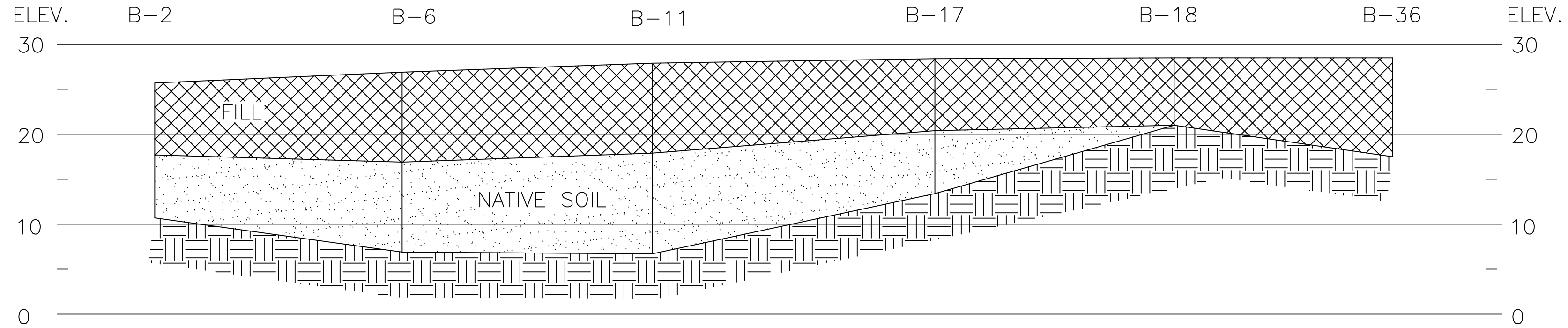
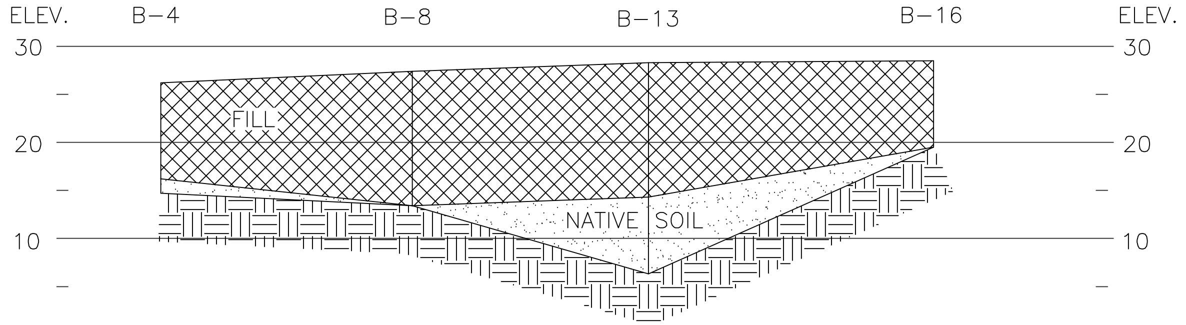
SOIL PROFILE D-D AND E-E

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	4	
Scale 1"=10'			



ROCK PROFILE F-F



ROCK PROFILE G-G

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SOIL PROFILE F-F AND G-G

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	5	
Scale 1"=10'			

APPENDIX I

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

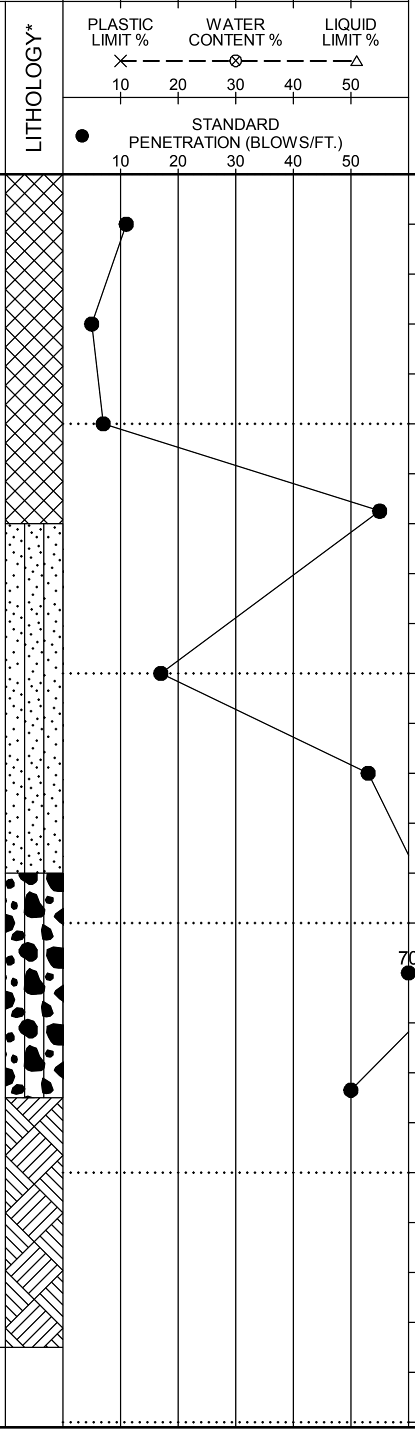
BORING No. B-1

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			
ROT. DRILL:	**3 7/8"**	**0** TO **18.5'**	SCREEN DEPTH: **---** TO **---**			
CASING:	**4"**	**0** TO **18.5'**	WEATHER: **Overcast** TEMP: **65° F**			
DIAMOND CORE:	**2"**	**18.5** TO **23.5'**	DEPTH TO ROCK: **18.5'**			
RIG: CME55 LC Rubber Track Mount Auto Hammer			*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.5**
DATUM: **See Remarks**
DATE START: **10/17/13**
DATE FINISH: **10/17/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	11	6 6 5 3	S-1	14		M		Bwn c-f SAND, and Silt, some f Gravel (brick fragments) (FILL) (Class 7)	
3 4	5	3 3 2 3	S-2	12		M		Same, with cinders (FILL) (Class 7)	
5 6	7	4 3 4 4	S-3	16		M		Same (FILL) (Class 7)	20.5
7	55+	5 5 50/6	S-4	14		M		Same to 7.0' (FILL) (Class 7) c Gravel fragments	
8 9								Advanced through boulder to 9'	
10 11	17	9 9 8 11	S-5	4		M	SM	Lgt bwn c-f SAND, and f Gravel, little Silt with horizontal staining (Class 3b)	15.5
12 13	53	18 30 23 20	S-6	12		W	SM	Lgt bwn c-f SAND, and f Gravel, little Silt (Class 3a)	
14 15									10.5
16 17	70	70 36 34 39	S-7	7		W	GM	Bwn-gy f GRAVEL, and c-f Sand, little Silt (Class 2a)	
18	50+	50/0	S-8	0				No recovery Drilling refusal @ 18.5'	
19 20 21 22 23	2 2 2 2 1		C-1	60	90			Wh-lgt gy, fresh, moderately fractured, fine grained, hard, MARBLE with Pyrite with fractures oriented 0 to 45 degrees from horizontal (Class 1a)	5.5
24 25								End of Boring at 23.5'	0.5



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-2

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

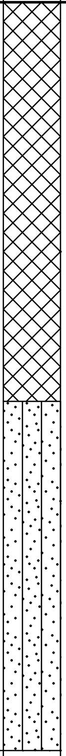
GROUND WATER	DATE	TIME	DEPTH

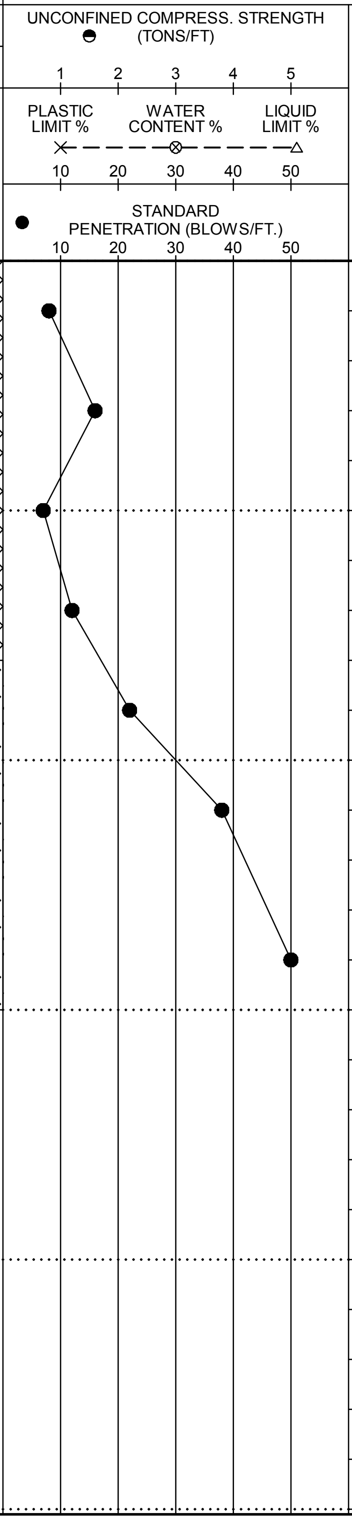
MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **15'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Anthony Laroche**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **25.7**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	8	2 3 5 5	S-1	8		M		Bwn c-f SAND, some c-f Gravel, little Silt (FILL) (Class 7)	
2									
3	16	5 12 4 3	S-2	12		M		Bwn c-f SAND, little c-f Gravel, little Silt (FILL) (Class 7)	
4									
5	7	8 3 4 8	S-3	8		M		Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL) (Class 7)	20.7
6									
7	12	9 5 7 20	S-4	10		M		Bwn c-f SAND, little Silt, some c-f Gravel (Partial FILL) (Class 7)	
8									
9	22	48 14 8 21	S-5	10		M	SM	Lgt bwn-bwn c-f SAND, little c-f Gravel, little Silt (Class 3b)	
10									15.7
11	38	29 22 16 12	S-6	6		M	SM	Bwn-gy c-f SAND, and c-f Gravel, little Silt (decomposed bedrock) (Class 2a)	
12									
13									
14	50+	50/0	S-7	0				No Recovery Spoon refusal @ 15'	
15									10.7
16								End of Boring at 15'	
17									
18									
19									
20									5.7
21									
22									
23									
24									
25									0.7

LITHOLOGY*





REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

BORING LOG 6926-01.GPJ TECTONIC ENG.GDT 11/21/13

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-3

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

INSPECTOR: **Anthony Laroche**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **25.8**

DATUM: **See Remarks**

DATE START: **10/29/13**

DATE FINISH: **10/29/13**

GROUND WATER	DATE	TIME	DEPTH

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15.5'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: --- TO ---

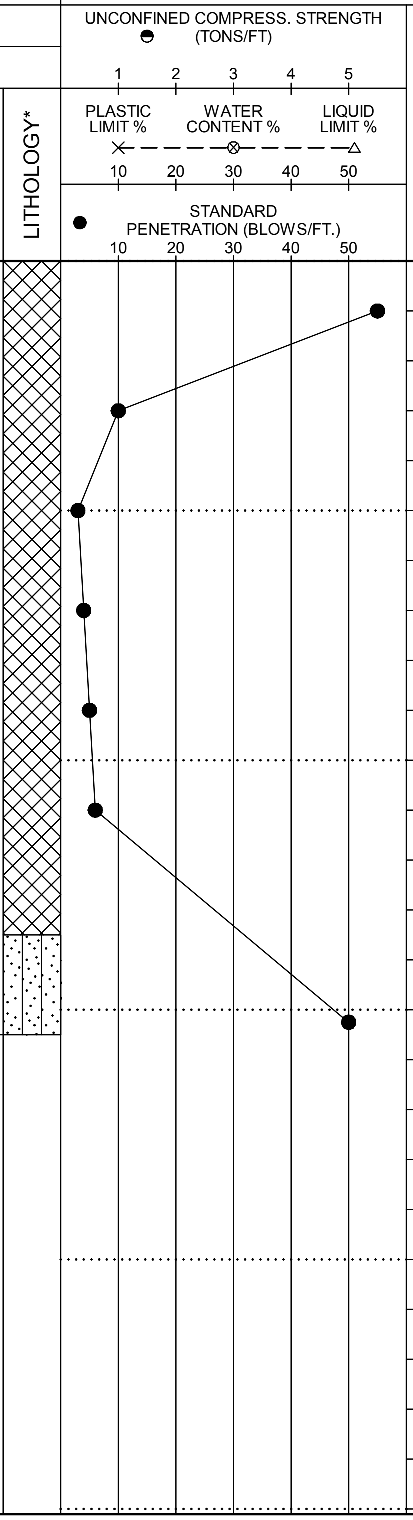
WEATHER: **Clear** TEMP: **50° F**

DEPTH TO ROCK: **15.5'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	55	11 24 31 9	S-1	12		M		Gy f GRAVEL, c-f Sand, little Silt (FILL) (Class 7)	
2									
3	10	3 5 5 3	S-2	4		M		Bwn c-f SAND, and f Gravel, some Silt (FILL) (Class 7)	
4									
5	3	2 1 2 3	S-3	8		M		Bwn c-f SAND, some Silt, some f Gravel, with brick fragments (FILL) (Class 7)	20.8
6									
7	4	2 2 2 2	S-4	5		M			
8									
9	5	2 2 3 2	S-5	5		M		Bwn f GRAVEL, some c-f Sand, little Silt with brick fragments, with fibrous wood material (FILL) (Class 7)	
10									15.8
11	6	3 3 3 3	S-6	3		M		Bwn f GRAVEL, and c-f Sand, little Silt, brick fragments (FILL) (Class 7)	
12									
13									
14								Rotary advanced to 15'	
15	50+	50/2	S-7	2		M	SM	Bwn-wh c-f SAND, some Silt, little Clay, little f Gravel, residual to decomposed basement rock (Class 3a)	10.8
16									
17								End of Boring at 15.5'	
18									
19									
20									5.8
21									
22									
23									
24									
25									0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

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PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-4

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

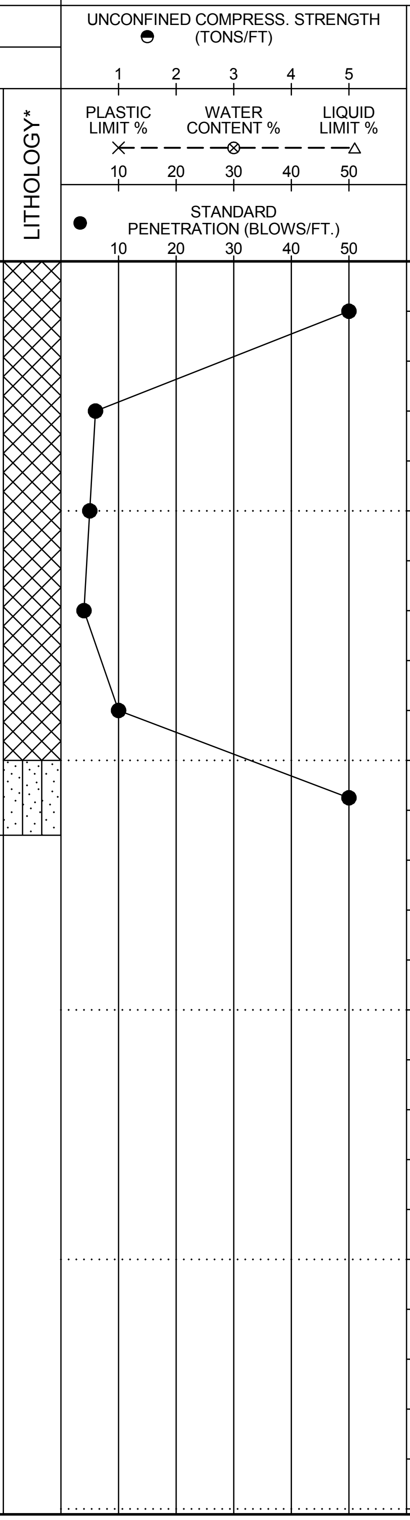
GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.2**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:		TO
CASING:		TO
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **11.5'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	50	12 26 24 6	S-1	14		M		Bwn c-f SAND, some f Gravel, little Silt with brick fragment (FILL) (Class 7)	
3 4	6	2 3 3 3	S-2	5		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments, with wood fibrous material (FILL) (Class 7)	
5 6	5	3 2 3 2	S-3	4		M		Bwn c-f GRAVEL, some c-f Sand, trace Silt/Clay, brick fragments (FILL) (Class 7)	21.2
7 8	4	3 2 2 2	S-4	0				No Recovery	
9 10	10	5 5 5 4	S-5	6		M		Brick fragments with woody fibrous material, with Bwn c-f SAND, little Silt, little f Gravel, petroleum odor (FILL) (Class 7)	16.2
11	50+	5 50/2	S-6	6		M	SM	Bwn-wh-gy c-f SAND, little f Gravel, little Silt, little Clay with brick fibrous, some residual to decomposed bedrock, strong petroleum odor (Class 3a) Drilling refusal @ 11.5'	
12 13 14								End of Boring at 11.5'	
15									11.2
16 17 18 19									
20									6.2
21 22 23 24									
25									1.2



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TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

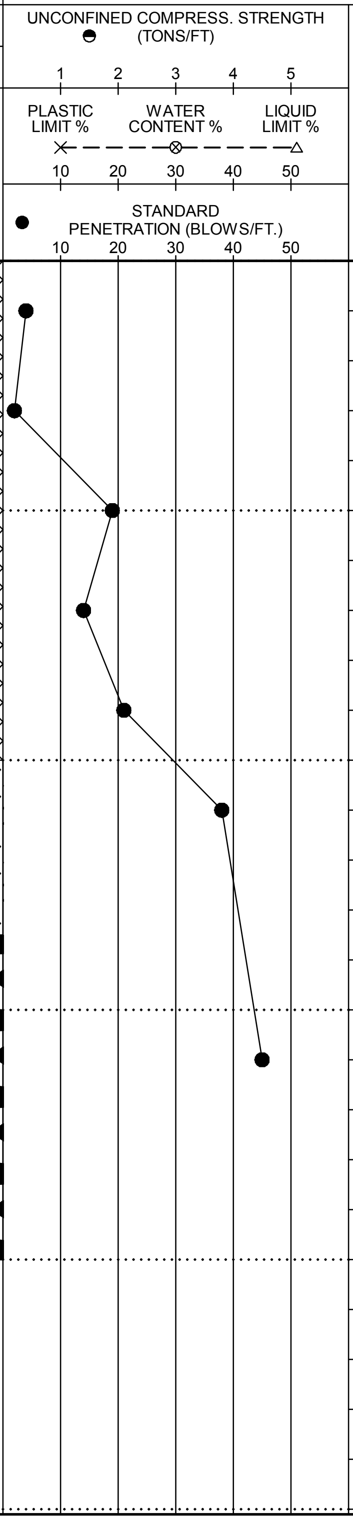
PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-5

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Z. Arno**	
CONTRACTOR: **Craig Test Boring Co., Inc.**								DRILLER: **Paul Mullins**	
METHOD OF ADVANCING BORING	DIA.	DEPTH						SURFACE ELEVATION: **26.3**	
POWER AUGER:		TO		MON. WELL	☐ YES	☒ NO		DATUM: **See Remarks**	
ROT. DRILL:	**3 7/8"**	**0** TO **20'**		SCREEN DEPTH:	**---**	TO	**---**	DATE START: **10/28/13**	
CASING:	**4"**	**0** TO **15'**		WEATHER: **Clear**		TEMP:	**60° F**	DATE FINISH: **10/28/13**	
DIAMOND CORE:		TO		DEPTH TO ROCK: **20'**					
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount				*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1 2	4	1 2 2 2	S-1	8		M		Bwn c-f SAND, and f Gravel, some Silt, with brick & glass fragments (FILL) (Class 7)	▨	
3 4	2	2 1 1 2	S-2	4		M		Brick fragments with c-f SAND, and Silt, some f Gravel (FILL) (Class 7)	▨	
5 6	19	9 11 8 6	S-3	7		M		Dk bwn c-f SAND, and Silt, some f Gravel with synthetic fibrous material and plastic particles (FILL) (Class 7)	▨	21.3
7 8	14	9 8 6 3	S-4	14		M		Bwn c-f SAND, some f Gravel, some Silt (FILL) (Class 7)	▨	
9 10	21	8 10 11 9	S-5	4		M		Bwn c-f SAND, and f Gravel, with coarse Gravel fragments, some Silt (brick fragments) (FILL) (Class 7)	▨	16.3
11 12	38	26 16 22 16	S-6	20		M	SM	Lgt bwn c-f SAND, and f Gravel, little Silt, residual to decomposed bedrock (Class 3a)	░	
13 14 15								Rotary advanced to 15'	░ ●	11.3
16 17	45	18 13 32 20	S-7	14		M	GM	Dk gy-bwn f GRAVEL, with c Gravel fragments, and c-f Sand, some Silt, trace Clay (Class 3a)	●	
18 19 20								Rotary advance to 20' Weathered bedrock Drilling refusal @ 20'	●	6.3
21 22 23 24 25								End of Boring at 20'		1.3



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TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-6

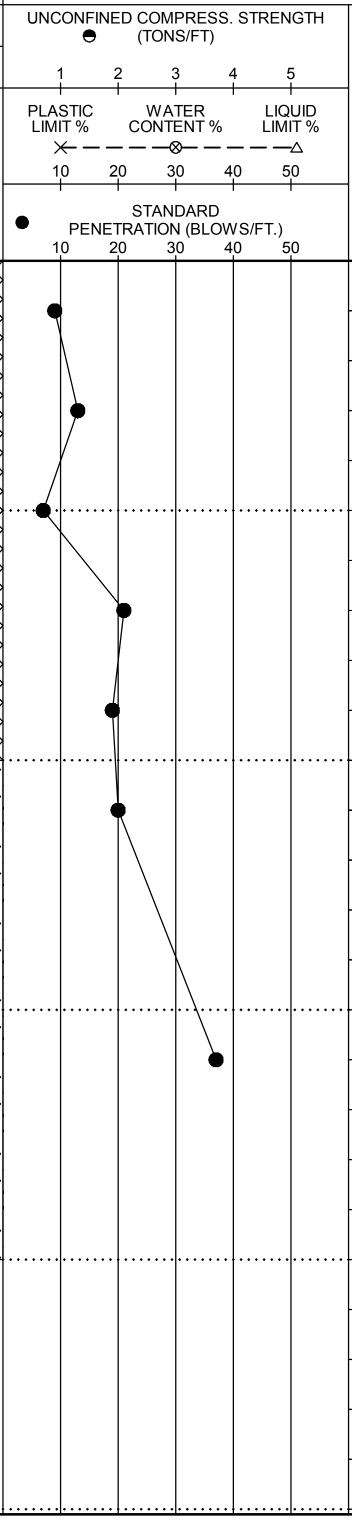
SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Z. Arno**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **26.9**
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO				DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **20'**	SCREEN DEPTH: **---** TO **---**				DATE START: **10/28/13**
CASING:	**4"**	**0** TO **15'**	WEATHER: **Clear** TEMP: **60° F**				DATE FINISH: **10/28/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **20'**				

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0-2	9	8 6 3 1	S-1	12		M		Bwn c-f SAND, some f GRAVEL, little Silt with organic fibers & brick fragments (FILL) (Class 7)	
2-4	13	6 7 6 5	S-2	12		M		Bwn-rd c-f SAND, some Gravel, little Silt, brick & tile fragments (FILL) (Class 7)	
4-6	7	4 4 3 2	S-3	3		M		Bwn c-f SAND, some f Gravel, little Silt with tile & brick fragments with organic fibers (FILL) (Class 7)	21.9
6-8	21	3 8 13 5	S-4	14		M		Wh-gy c-f SAND & f Gravel (FILL) (Class 7)	
8-10	19	22 11 8 5	S-5	12		M		Lgt bwn c-f SAND, some f Gravel, little Silt with brick fragments (FILL) (Class 7)	16.9
10-12	20	6 11 9 6	S-6	14		M	SM	Bwn c-f SAND, some Silt, little Gravel, decomposed residual bedrock (Class 3b)	
12-15								Rotary advanced to 15'	11.9
15-17	37	42 20 17 16	S-7	5		M	GM	Residual to decomposed bedrock Tn f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt (Class 3a)	
17-20								Significant resistance to drilling @ 18.5' Weathered bedrock	6.9
20-25								End of Boring at 20'	1.9



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

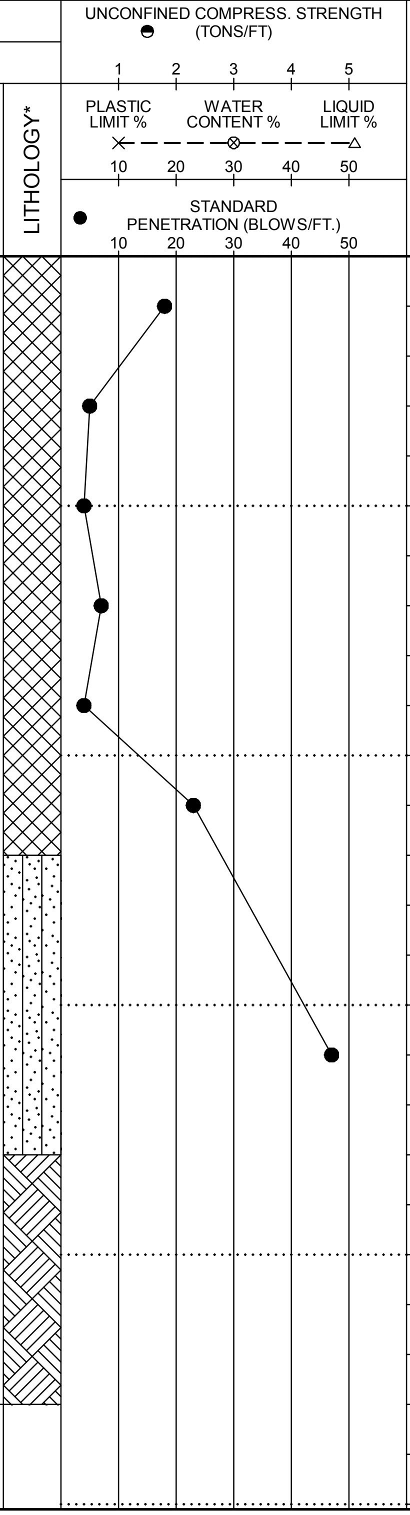
BORING No. B-7

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			
ROT. DRILL:	**3 7/8"**	**0** TO **18'**	SCREEN DEPTH: **---** TO **---**			
CASING:	**4"**	**0** TO **18'**	WEATHER: **Clear** TEMP: **60° F**			
DIAMOND CORE:	**2"**	**18** TO **23'**	DEPTH TO ROCK: **23'**			
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.8**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	18	9 9 9 4	S-1	18		M		Lgt bwn c-f SAND, some f Gravel, little Silt (brick fragments) (FILL) (Class 7)	
3 4	5	5 3 2 2	S-2	7		M		Rd c-f SAND, some f Gravel, little Silt, brick & concrete fragments with glass fragments (FILL) (Class 7)	
5 6	4	4 2 2 2	S-3	14		M		Bwn-gy c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	21.8
7 8	7	8 4 3 2	S-4	2		M		Rd-bwn c-f SAND, little Silt, brick fragments (FILL) (Class 7)	
9 10	4	4 2 2 2	S-5	20		M		Tn-bwn c-f SAND, some f Gravel, trace Silt, with brick fragments (FILL) (Class 7)	16.8
11 12	23	14 10 13 11	S-6	20		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments (FILL) (Class 7)	
13 14 15								Rotary advanced to 15.0'	11.8
16 17	47	19 16 31 50/1	S-7	10		M	SM	Tn-bwn c-f SAND, and f Gravel, little Silt, residual to decomposed bedrock (Class 3a)	
18								Weathered bedrock Drill refusal @ 18.0'	
19 20 21 22 23	4 3 4 4 3		C-1	51	86			Wh-lgt gy, fresh, moderately to slightly fractured, fine grained, hard, MARBLE, fractures oriented 2 to 5 degrees from horizontal, minor staining along few fractures (Class 1a)	6.8
24 25								End of Boring at 23'	1.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-8

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**				
CONTRACTOR: **Craig Test Boring Co., Inc.**				
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**14'**
CASING:	**4"**	**0**	TO	**10'**
DIAMOND CORE:			TO	

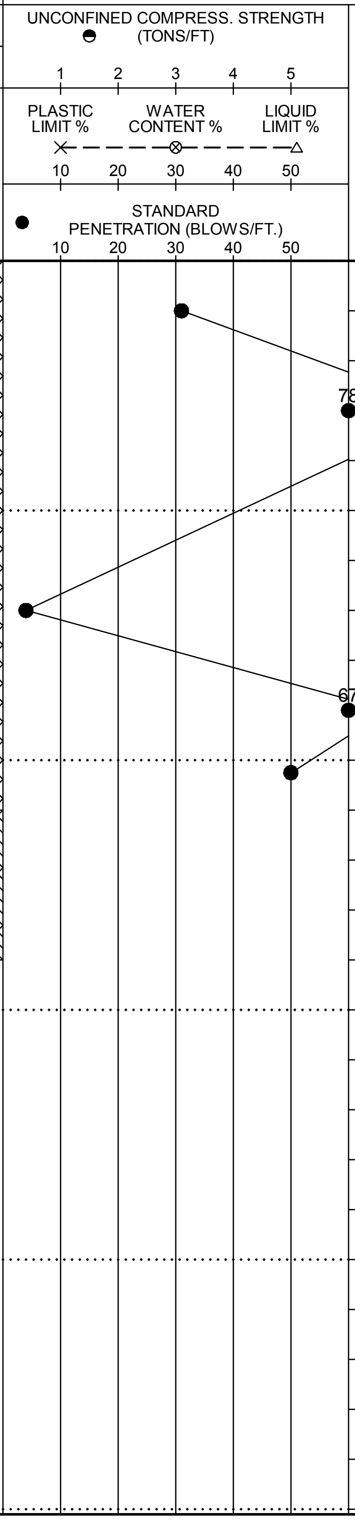
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **14'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.4**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	31	5 11 20 15	S-1	12		M		Lgt bwn c-f SAND, some Silt, little f Gravel with brick fragments (FILL) (Class 7)		
2										
3	78+	3 3 75/5	S-2	4		M		Bwn f GRAVEL with coarse Gravel fragments, and c-f Sand, some Silt with brick fragments (FILL) (Class 7)		
4										
5			S-3	0				No Recovery, Large void		22.4
6										
7	4	3 2 2 1	S-4	3		M		Dk bwn c-f SAND, some f Gravel, some Silt with brick fragments (FILL) (Class 7)		
8										
9	67+	8 17 50/4	S-5	4		M		Bwn c-f SAND, little Silt, little f Gravel with brick fragments		
10	50+	50/5	S-6			M		Tn-bwn c-f SAND, some f Gravel, little Silt, residual to weathered bedrock, some brick fragments (FILL) (Class 7)		17.4
11										
12										
13								Decomposed bedrock Auger refusal @ 14'		
14										
15								End of Boring at 14'		12.4
16										
17										
18										
19										
20										7.4
21										
22										
23										
24										
25										2.4



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

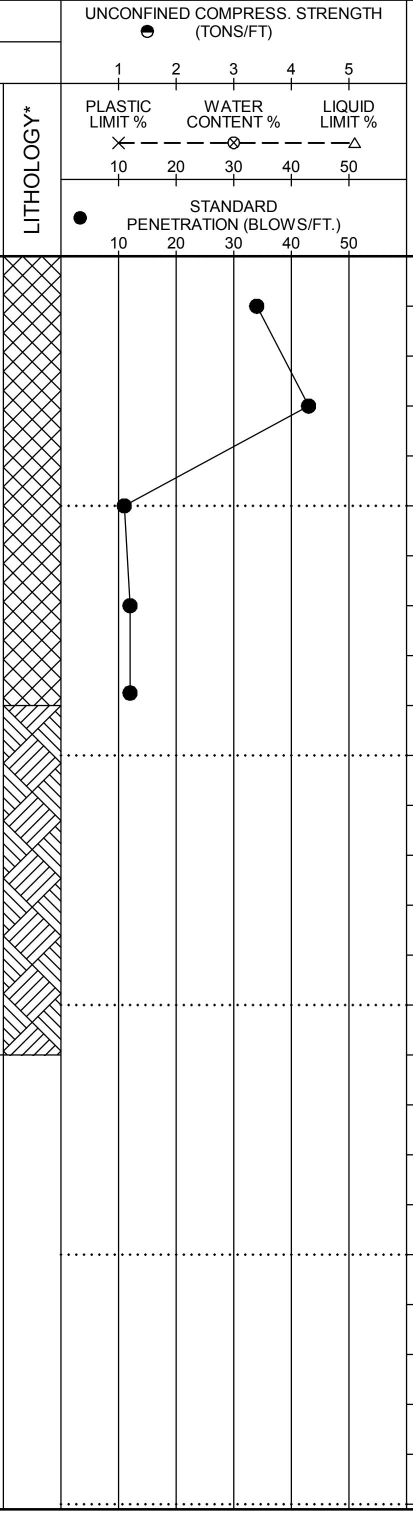
BORING No. B-9

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			
ROT. DRILL:	3 7/8"	0 TO 11'	SCREEN DEPTH: --- TO ---			
CASING:	4"	0 TO 11'	WEATHER: **Clear** TEMP: **50° F**			
DIAMOND CORE:	2"	11 TO 16'	DEPTH TO ROCK: **9.0'**			
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.2**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	34	8 15 19 13	S-1	17		M		Lgt bwn f GRAVEL (concrete fragments) and c-f Sand, little Silt, with root fibers (FILL) (Class 7)	
3 4	43	21 22 21 11	S-2	12		M		Bwn-gy f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt with concrete fragments (FILL) (Class 7)	
5 6	11	8 6 5 7	S-3	14		M		Bwn-gy f GRAVEL, with c Gravel fragments, and c-f Sand, little Silt (FILL) (Class 7)	23.2
7 8	12	7 7 5 3	S-4	0				No Recovery	
9	12	3 5 7	S-5	18		M		Asphalt fragments with Bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	
10 11		50/3						Bwn-lgt bwn f GRAVEL (bedrock fragments) and c-f Sand, little Silt (Class 3a)	18.2
12 13 14 15 16	2 2 4 3 2		C-1	58	77			Wh-lgt gy, slightly weathered to fresh, moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees from horizontal, with near verticle fracture at top 6" with orange staining with Sand along fractures to 13.5' (Class 1b)	13.2
17 18 19 20								End of Boring at 16'	8.2
21 22 23 24 25									3.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-10

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.0**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

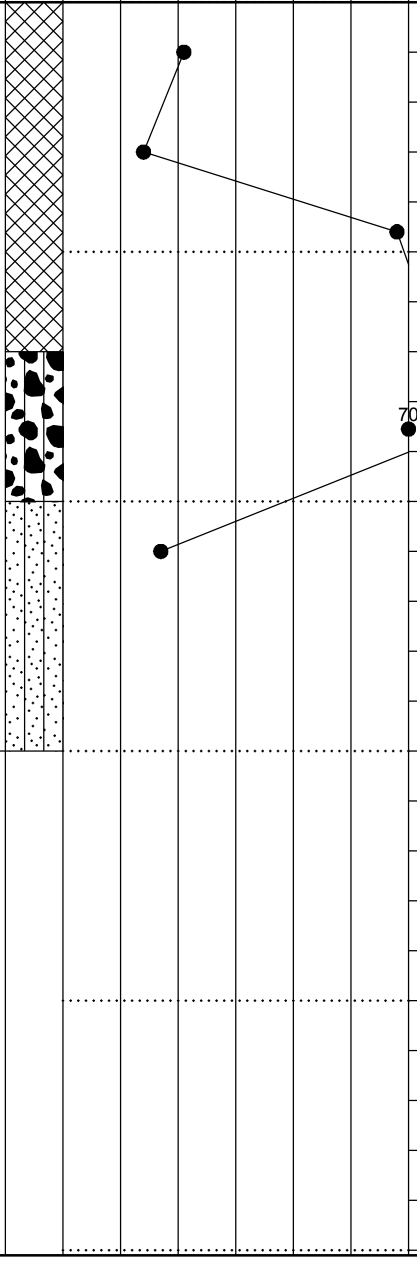
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15'
CASING:	4"	0	TO	6.5'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **13.5'**
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	21	6 11 10 7	S-1	14		M		Bwn f GRAVEL, some c-f Sand, trace Silt, brick & asphalt fragments (FILL) (Class 7)	
3	14	8 9 5 2	S-2	12		M		Rd-bwn f GRAVEL, and c-f Sand, little Silt, brick fragments (FILL) (Class 7)	
5	58+	11 8 50/2	S-3	12		M		Lgt bwn c-f SAND, and f Gravel, little Silt with brick fragments (FILL) (Class 7)	22.0
7								Resistant drilling 5.2' to 8' Rotary advanced to 8.0'	
9	70+	24 20 50/1	S-4	6		M	GM	Gy-bwn f GRAVEL, with c Gravel, little c-f Sand, little Silt, bedrock residual to weathered bedrock (Class 3a)	
10									17.0
11	17	10 9 8 8	S-5	17		M	SM	Bwn c-f SAND, and f Gravel, little Silt (Class 3b)	
14								Rotary advanced to 13.5' Weathered bedrock Drilling refusal @ 15.0'	
15									12.0
16								End of Boring at 15'	
20									7.0
25									2.0

LITHOLOGY*

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-11

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

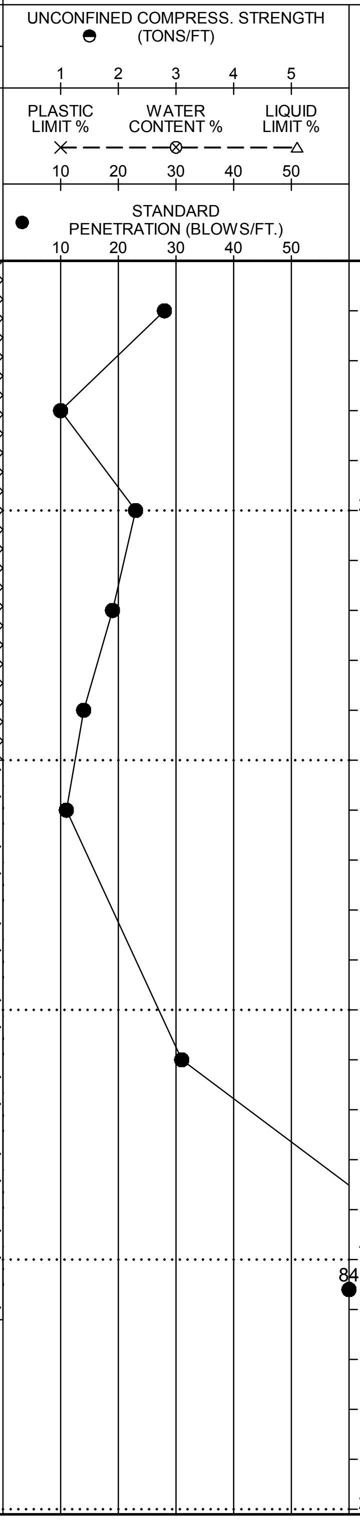
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	20'
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **21.2'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.9**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1 2	28	10 12 16 14	S-1	14		M		Bwn f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt, with wood fibers and brick fragments (FILL) (Class 7)	▨	
3 4	10	10 6 4 8	S-2	10		M		Bwn-rd c-f SAND, little f Gravel, little Silt (FILL) (Class 7)	▨	
5 6	23	11 10 13 19	S-3	8		M		Bwn c-f SAND, some f Gravel, little Silt, w black rubber & plastic material (FILL) (Class 7)	▨	22.9
7 8	19	8 9 10 14	S-4	14		M		Bwn c-f SAND, some f Gravel, trace Silt, with brick & concrete fragments (FILL) (Class 7)	▨	
9 10	14	13 8 6 9	S-5	4		M		Bwn-gy c-f SAND, some f Gravel with c Gravel fragments, trace Silt with rubber particles (FILL) (Class 7)	▨	17.9
11 12	11	7 5 6 15	S-6	11		M	SM	Bwn c-f SAND, some Silt, little Gravel, residual to decomposed bedrock (Class 3b)	░	
13 14 15								Rotary advanced to 15'	░	12.9
16 17	31	18 15 16 15	S-7	16		M	SM	Bwn c-f SAND, some Gravel, little Silt, residual to decomposed bedrock (Class 3a)	░	
18 19 20									░	7.9
21	84+	18 34 50/2	S-8	12		M	SM	Bwn-wh c-f SAND, and f Gravel, with c Gravel fragments, residual to decomposed bedrock (Class 3a) Spoon refusal @ 21.2'	░	
22 23 24 25								End of Boring at 21.2'		2.9



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TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

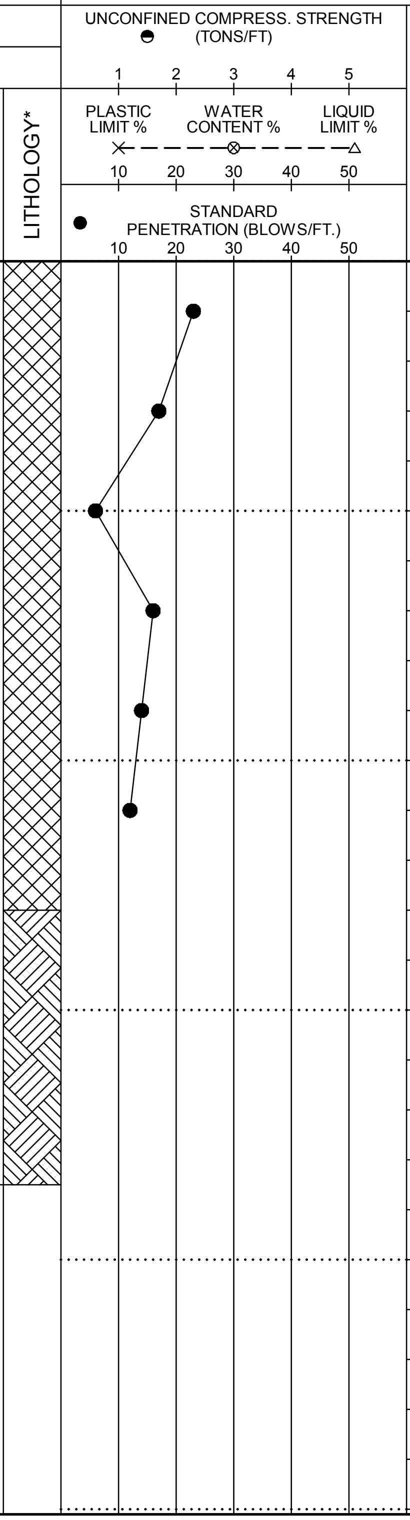
PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-12

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			
ROT. DRILL:	**3 7/8"**	**0** TO **13.5'**	SCREEN DEPTH: **---** TO **---**			
CASING:	**4"**	**0** TO **10'**	WEATHER: **Clear** TEMP: **50° F**			
DIAMOND CORE:		TO	DEPTH TO ROCK: **13.5'**			
			*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.9**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**



DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	23	5 5 18 22	S-1	12		M		Lgt bwn c-f SAND, little Silt, little f Gravel, with brick fragments (FILL) (Class 7)	
2									
3	17	16 12 5 3	S-2	8		M		Bwn-rd c-f SAND, and f Gravel, with c Gravel fragments, little Silt (FILL) (Class 7)	
4									
5	6	3 3 3 11	S-3	6		M		bwn-rd c-f SAND, some f Gravel, little Silt with brick fragments (FILL) (Class 7)	22.9
6									
7	16	12 8 8 4	S-4	16		M		Rd-bwn c-f SAND, and Gravel, trace Silt with brick fragments (FILL) (Class 7)	
8									
9	14	16 7 7 7	S-5	10		M		c-f GRAVEL fragments and c-f Sand, little Silt with brick fragments (FILL) (Class 7)	
10									17.9
11	12	9 6 6 8	S-6	14		M		Bwn c-f SAND, some f Gravel, little Silt with brick fragments on top (FILL) (Class 7)	
12									
13								Drill refusal @ 13.5'	
14	1								
15	2								12.9
16	3		C-1	4	18			Lgt gy-wh, slightly weathered, moderately fractured, fine grained, hard, MARBLE, fractures horizontal (Class 1d)	
17	3								
18	3								
19								End of Boring at 18.5'	
20									7.9
21									
22									
23									
24									
25									2.9

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-13

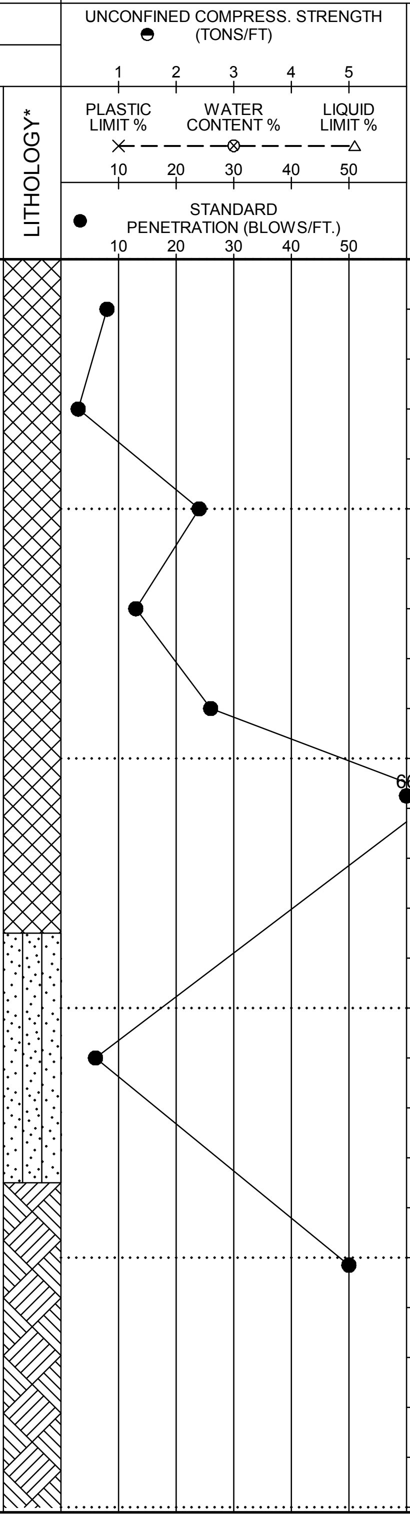
SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Z. Arno**
CONTRACTOR: **Craig Test Boring Co., Inc.**								DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH						SURFACE ELEVATION: **28.3**
POWER AUGER:		TO		MON. WELL ☐ YES ☒ NO				DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **22'**		SCREEN DEPTH: **---** TO **---**				DATE START: **10/29/13**
CASING:	**4"**	**0** TO **21'**		WEATHER: **Clear** TEMP: **50° F**				DATE FINISH: **10/29/13**
DIAMOND CORE:	**2"**	**22** TO **27'**		DEPTH TO ROCK: **20.6'**				

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	8	3 4 4 3	S-1	12		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments, organic veg material (FILL) (Class 7)	
2									
3	3	1 1 2 1	S-2	10		M		Bwn c-f SAND, some f Gravel, some Silt with brick fragments, with fibrous plant material (FILL) (Class 7)	
4									
5	24	3 12 12 8	S-3	18		M		Bwn c-f SAND, some f Gravel, little Silt with glass & tile fragments (FILL) (Class 7)	23.3
6									
7	13	8 7 6 6	S-4	16		M		Rd-bwn c-f SAND, little Gravel, trace Silt, brick & tar fragments (FILL) (Class 7)	
8									
9	26	8 18 8 4	S-5	14		M		Bwn c-f SAND, little f Gravel, trace Silt, weathered brick fragment, wood & concrete, tar fragments (FILL) (Class 7)	
10									18.3
11	66+	10 16 50/5	S-6	24		M		Rd-bwn-tn c-f SAND, little f Gravel, trace Silt, some weathered to residual bedrock with glass fragments and brick debris (FILL) (Class 7)	
12									
13									
14								Rotary advanced to 15'	
15									13.3
16	6	3 3 3 3	S-7	10		W	SM	Dk gy c-f SAND, some f Gravel, little Silt, weathered bedrock residual (petroleum odor) (Class 6)	
17									
18									
19								Rotary advanced to 20'	
20	50+	50/3	S-8	2			GM	Tn f GRAVEL, with c Gravel fragments, little c-f Sand, little Silt (Class 3a) Spoon refusal @ 20.2'	8.3
21									
22								Auger refusal @ 22'	
23	1								
24	1								
25	2		C-1	43	71			Gy-wh, slightly weathered, slightly fractured, fine grained, hard, MARBLE, fractures oriented 45	3.3



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-13

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
	2							degrees from horizontal (Class 1b)	▨		
26	2								▨		
27											
28								End of Boring at 27'			
29											
30											-1.7
31											
32											
33											
34											
35											-6.7
36											
37											
38											
39											
40											-11.7
41											
42											
43											
44											
45											-16.7
46											
47											
48											
49											
50											-21.7
51											
52											
53											
54											
55											-26.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-14

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.7**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**8'**
CASING:	**4"**	**0**	TO	**5'**
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **8'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV.: LENGTH (IN.)	SAMPLES: RECOV.: RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 / PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 / ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3								Resistance to drilling @ 6'			
4											
5											23.7
6											
7								Weathered bedrock Drilling resistance @ 8.0'			
8											
9								End of Boring at 8'			
10											18.7
11											
12											
13											
14											
15											13.7
16											
17											
18											
19											
20											8.7
21											
22											
23											
24											
25											3.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

PROJECT No. **6926.01**

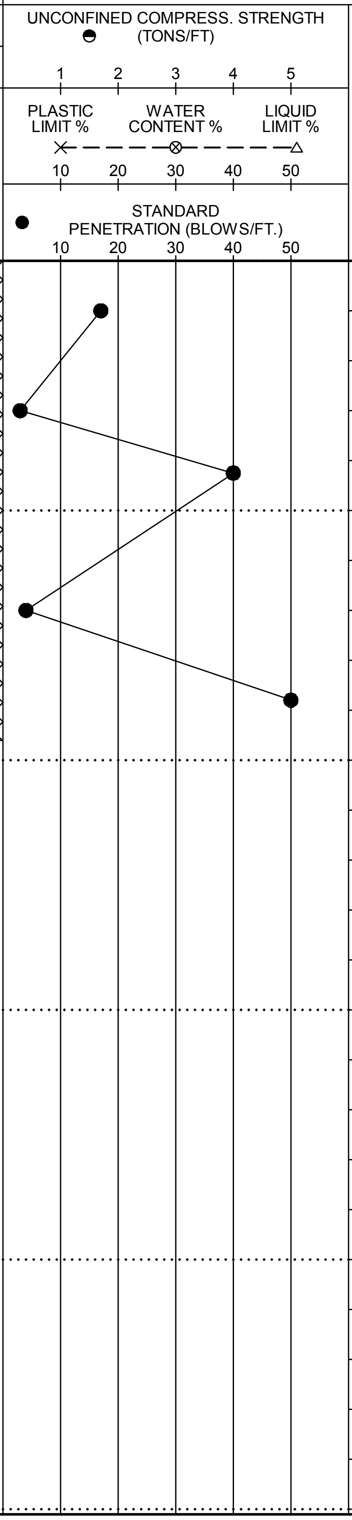
PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-15

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Z. Arno**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **28.6**
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO				DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **10'**	SCREEN DEPTH: **---** TO **---**				DATE START: **10/29/13**
CASING:	**4"**	TO	WEATHER: **Clear** TEMP: **50° F**				DATE FINISH: **10/29/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **10'**				
			*CHANGES IN STRATA ARE INFERRED				



DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1 2	17	10 9 8 7	S-1	12		M		Bwn c-f SAND, some f Gravel, with c Gravel fragments, little Silt (brick fragments) (FILL) (Class 7)		
3 4	3	4 2 1 2	S-2	8		M		Bwn c-f SAND, some f Gravel, little Silt, with brick fragments & wood fibers (FILL) (Class 7)		
	40+	40/2	S-3	3		M		Bwn c-f SAND, some f Gravel, little Silt, with brick fragments, with wood fibers (FILL) (Class 7)		
5 6										23.6
7 8	4	0 0 4 3	S-4	2		M		Bwn c-f SAND, and f Gravel, little Silt with brick fragments & rubber tire fragments (FILL) (Class 7)		
9	50+	2 50/5	S-5	3		M		Bwn c-f SAND, and f Gravel, some Silt with wood debris & brick fragments (FILL) (Class 7) Spoon refusal @ 9.6		
10								End of Boring at 9.6'		18.6
11										
12										
13										
14										
15										13.6
16										
17										
18										
19										
20										8.6
21										
22										
23										
24										
25										3.6

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-16

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**9'**
CASING:			TO	
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **9'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.5**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE				
				LENGTH (IN.)	RQD (%)					
1										
2										
3										
4										
5								Rotary advanced to 7.5'		23.5
6										
7										
8										
9										
10								End of Boring at 9'		18.5
11										
12										
13										
14										
15										13.5
16										
17										
18										
19										
20										8.5
21										
22										
23										
24										
25										3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-17

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**
INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

GROUND WATER	DATE	TIME	DEPTH

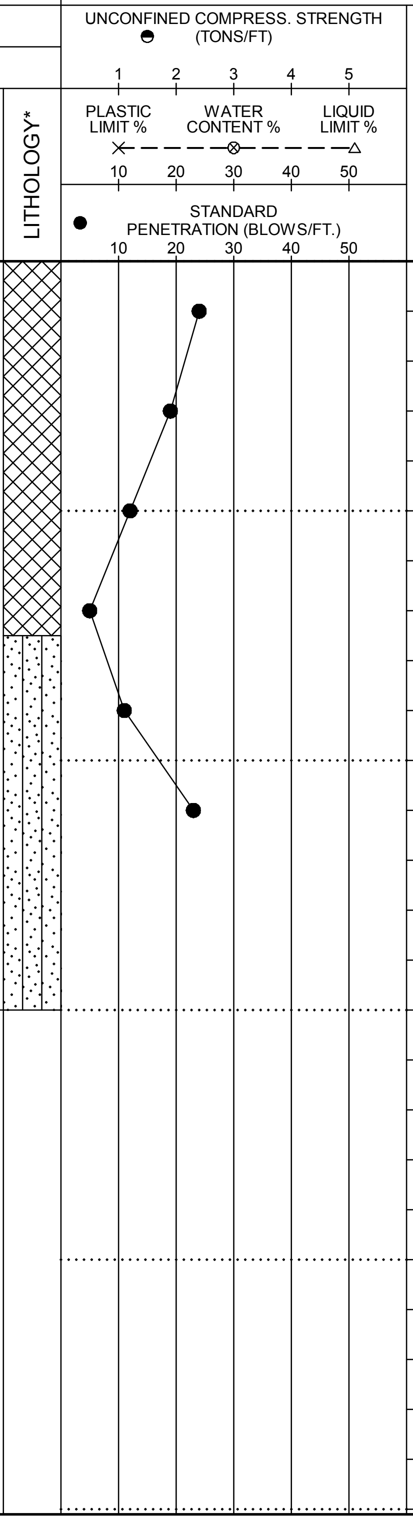
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**15'**
CASING:	**4"**	**0**	TO	**10'**
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **15'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0–2	24	12 10 14 4	S-1	14		M		Bwn f GRAVEL, and c-f Sand, little Silt, with asphalt fragments, brick fragments (FILL) (Class 7)	
2–4	19	9 11 8 8	S-2	14		M		Bwn-rd f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt, brick fragments (FILL) (Class 7)	
4–6	12	5 5 7 5	S-3	12		M		Lgt bwn-rd f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt, with brick fragments (FILL) (Class 7)	23.4 (5')
6–8	5	3 3 2 9	S-4	18		M	SM	Lgt bwn f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt with possible asphalt fragments, brick fragments to 7.5' (FILL) (Class 7) Bedrock residual	
8–10	11	7 4 7 7	S-5	16		M	SM	Lgt bwn c-f SAND, some f Gravel, little Silt with Clayey Silt pockets (Class 3b)	18.4 (10')
10–12	23	11 11 12 11	S-6	18		M	SM	Same	
12–15								Rotary advanced to 13.5' Weathered bedrock Drilling refusal @ 15'	13.4 (15')
15								End of Boring at 15'	
20									8.4
25									3.4



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-18

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.5**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**7.5'**
CASING:	**4"**	**0**	TO	**5'**
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **7.5'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 / PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % 10 20 30 40 50 / STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3								Advanced to 5.5'			
4											
5											23.5
6									▨		
7								Weathered bedrock Auger refusal @ 7.5'	▨		
8								End of Boring at 7.5'			
9											
10											18.5
11											
12											
13											
14											
15											13.5
16											
17											
18											
19											
20											8.5
21											
22											
23											
24											
25											3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-19

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

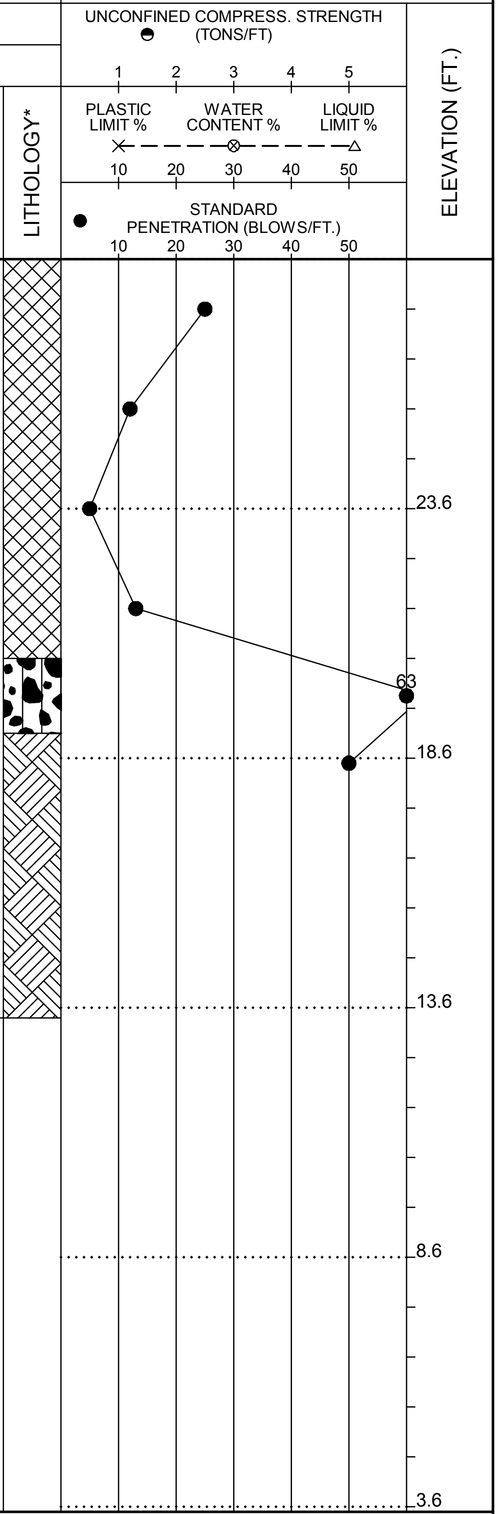
INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.6**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	TO
CASING:	4"	TO
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **9.4'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	25	5 12 13 11	S-1	13		M		Brick fragments with Lgt bwn f GRAVEL, and c-f Sand, little Silt (FILL) (Class 7)
3 4	12	7 8 4 4	S-2	5		M		Same (brick fragments) (FILL) (Class 7)
5 6	5	3 2 3 2	S-3	8		M		Brick & asphalt/slag fragments with Bwn f GRAVEL, and c-f Sand, little Silt with metal (FILL) (Class 7)
7 8	13	2 8 5 5	S-4	10		M		Brick & asphalt fragments with Bwn-gy f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)
9	63+	11 13 50/4	S-5	12		M	GM	Wh-lgt bwn c-f GRAVEL, and c-f Sand, little Silt (bedrock fragments) (Class 2a) Weathered bedrock @ 9.4'
10	50+	50/2	S-6	0				No Recovery
11 12 13 14 15	2 3 3 2 3		C-1	55	53			Wh-lgt gy slightly weathered, moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 30 degrees from horizontal with decomposed zone (Class 1a)
16 17 18 19 20 21 22 23 24 25								End of Boring at 15.2'



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-20

SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH
	10/18/13	**2:30 pm**	**20.5'**
	10/21/13	**2:10 pm**	**20.6'**

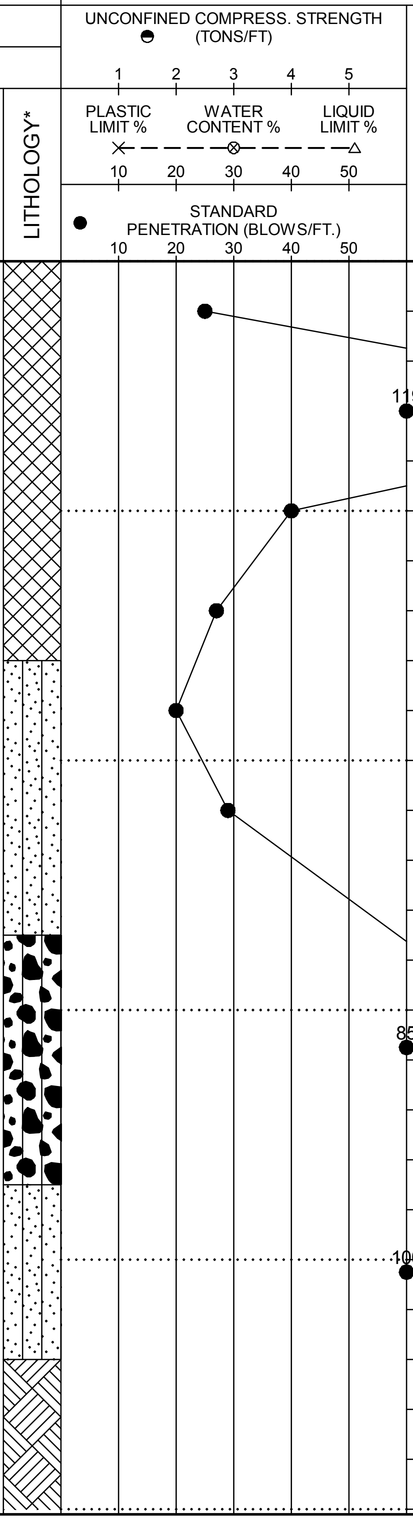
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **26.5**
DATUM: **See Remarks**
DATE START: **10/17/13**
DATE FINISH: **10/18/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**22'**
CASING:	**4"**	**0**	TO	**22'**
DIAMOND CORE:	**2"**	**22**	TO	**27'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☒ YES ☐ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **22'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	25	6 12 13 21	S-1	18		M		Lgt bwn f GRAVEL, (brick, concrete fragments) and c-f Sand, little Silt (FILL) (Class 7)	
2									
3	119	28 52 67 50	S-2	18		M		Bwn c-f SAND, some Silt, little f Gravel, with brick particles, with wood fibers (FILL) (Class 7)	
4									
5	40	23 20 20 10	S-3	16		M		Brick fragments, with f Gravel (FILL) (Class 7)	21.5
6									
7	27	8 12 15 50/3	S-4	18		M		Brick & concrete fragments with Bwn-gy c-f SAND, some Silt, little f Gravel (FILL) (Class 7)	
8									
9	20	11 9 11 9	S-5	10		M	SM	Gy-bwn c-f SAND, (micaceous) some Silt, little f Gravel (Class 3b)	
10									16.5
11	29	14 15 14 17	S-6	12		M	SM	Gy-bwn c-f SAND, some f Gravel, little Silt (Class 3b)	
12									
13									
14									
15									11.5
16	85+	25 35 50/4	S-7	12		M	GM	Bwn-gy f GRAVEL, with c Gravel fragments, and c-f Sand, little Silt (Class 2a)	
17									
18									
19									
20	100+	100/5	S-8	5		W	SM	Lgt bwn c-f SAND, little Silt, trace f Gravel (Class 3a) ▼	6.5
21									
22								Drilling refusal @ 22'	
23	2								
24	1								
25	2		C-1	15	0			Wh-lgt bwn, moderately weathered, highly to moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees	1.5



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-20

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ×, WATER CONTENT % ⊗, LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE					
				LENGTH (IN.)	RQD (%)						
26	1							from horizontal with bwn staining and sand filled fractures (Class 1d)	▨		
27	2								▨		
28								End of Boring at 27'			
29											
30											-3.5
31											
32											
33											
34											
35											-8.5
36											
37											
38											
39											
40											-13.5
41											
42											
43											
44											
45											-18.5
46											
47											
48											
49											
50											-23.5
51											
52											
53											
54											
55											-28.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-21

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **27.7**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	19'
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % × WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5										22.7
6										
7										
8								Rotary advanced to 19'		
9										
10										17.7
11										
12										
13										
14										
15										12.7
16								Increase in resistance @ 16'		
17								Weathered bedrock 16' - 19'		
18										
19										
20								Bedrock (Marble)		7.7
21								End of Boring at 20'		
22										
23										
24										
25										2.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-22

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	3'
CASING:	4"	0	TO	3'
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Overcast** TEMP: **45° F**
DEPTH TO ROCK: **Not Encountered'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 / PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 / ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE					
1											
2											
3											
4											
5								Void to 6.0' (Former cellar or vault) Void 3' to 6' Boring ended due to void (Test Pit found oil tank)			23.4
6											
7								End of Boring at 6'			
8											
9											
10											18.4
11											
12											
13											
14											
15											13.4
16											
17											
18											
19											
20											8.4
21											
22											
23											
24											
25											3.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-23

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

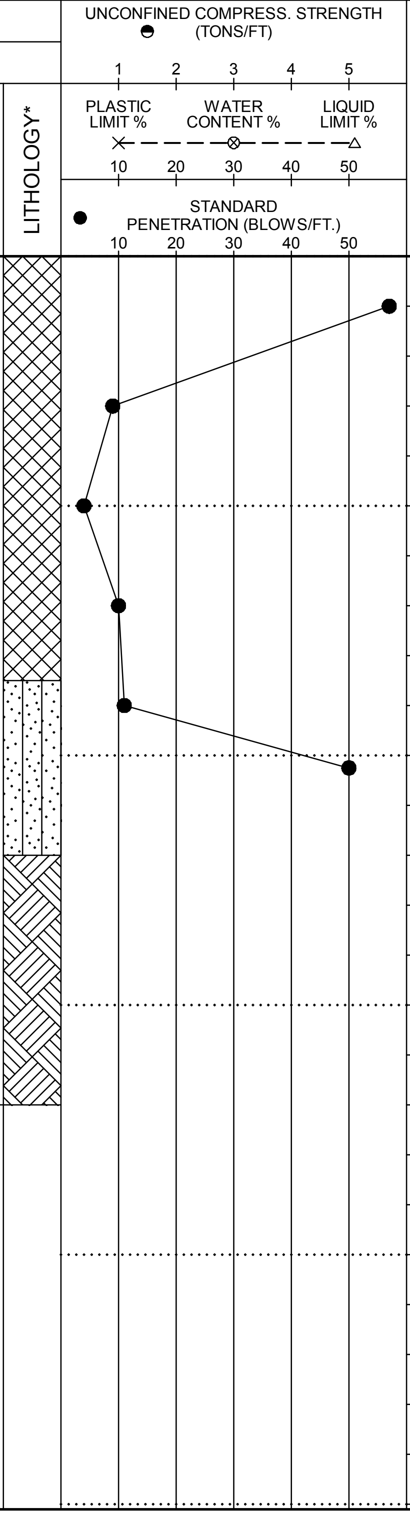
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**12'**
CASING:	**4"**	**0**	TO	**12'**
DIAMOND CORE:	**2"**	**12**	TO	**17'**

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **45° F**
DEPTH TO ROCK: **12'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	57	19 30 27 24	S-1	18		M		Bwn-wh f GRAVEL, with c Gravel fragments and c-f Sand, little Silt, with brick & concrete fragments (FILL) (Class 7)	
3 4	9	9 5 4 6	S-2	12		M		Lgt bwn c-f SAND, some Silt, little f Gravel (brick fragments) with glass & brick particles (FILL) (Class 7)	
5 6	4	1 2 2 2	S-3	12		M		Bwn-rd f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)	23.4
7 8	10	6 7 3 4	S-4	14		M		Concrete fragments with Bwn c-f SAND, and f Gravel, little Silt with brick, asphalt fragments (FILL) (Class 7)	
9 10	11	4 5 6 8	S-5	16		M	SM	Same to 8.5' Lgt bwn-wh c-f SAND, little Silt, little f Gravel (Class 3b)	18.4
	50+	15 50/1	S-6	5		M	SM	Wh c-f SAND (bedrock residual) some f Gravel, little Silt (Class 3a) Rotary advanced to 12'	
11 12									
13 14 15 16 17	2 2 2 1 2		C-1	58	85			Wh-lgt gy, fresh, moderately to slighty fractured, fine grained, hard, MARBLE, fractures oriented 0 to 10 degrees from horizontal, slight staining along fractures (Class 1a)	13.4
18 19 20 21 22 23 24 25								End of Boring at 17'	8.4 3.4



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-24

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.3**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**11'**
CASING:	**4"**	**0**	TO	**11'**
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **11'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 / PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % 10 20 30 40 50 / ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5								Rotary advanced to 9.5'			23.3
6											
7											
8											
9											
10								Weathered bedrock @ 9.5' Drilling refusal @ 11'	▨		18.3
11											
12								End of Boring at 11'			
13											
14											
15											13.3
16											
17											
18											
19											
20											8.3
21											
22											
23											
24											
25											3.3

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

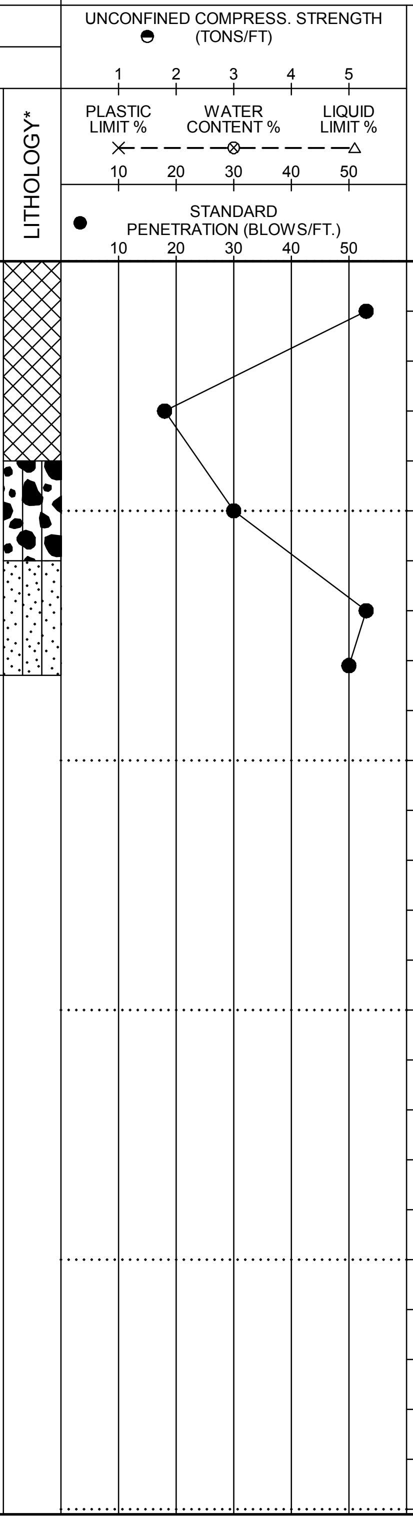
BORING No. B-25

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			
ROT. DRILL:	**3 7/8"**	**0** TO **8'**	SCREEN DEPTH: **---** TO **---**			
CASING:	**4"**	**0** TO **8'**	WEATHER: **Clear** TEMP: **60° F**			
DIAMOND CORE:		TO	DEPTH TO ROCK: **8.0'**			
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED			

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.6**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES					DESCRIPTION OF MATERIAL	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE	UNIFIED SOIL CLASS.		
				LENGTH (IN.)	RQD (%)				
1	53	7 28 25 13	S-1	4		M		Concrete fragments with Bwn c-f GRAVEL, some c-f Sand, little Silt with root fibers (FILL) (Class 7)	
2									
3	18	8 10 8 7	S-2	16		M		Brick fragments with Bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	
4									
5	30	14 17 13 12	S-3	18		M	GM	Lgt bwn c-f GRAVEL, and c-f Sand, little (bedrock residual) (Class 2a)	21.6
6									
7	53	10 20 33 56	S-4	16		M	SM	Lgt bwn c-f SAND (bedrock residual) little f Gravel, little Silt (Class 3a)	
8								No Recovery	
	50+	50/1	S-5	0				weathered bedrock (competent) @ 8.0'	
9									
10								End of Boring at 8.1'	16.6
11									
12									
13									
14									
15									11.6
16									
17									
18									
19									
20									6.6
21									
22									
23									
24									
25									1.6



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-26

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **28.5**

DATUM: **See Remarks**

DATE START: **10/24/13**

DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	12'
CASING:	4"	0	TO	8'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: --- TO ---

WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **12.0'**

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % × WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5											23.5
6								Lost drilling water @ 7' (Possible void in FILL)			
7											
8											
9											
10											18.5
11								Drilling refusal @ 12'			
12											
13								End of Boring at 12'			
14											
15											13.5
16											
17											
18											
19											
20											8.5
21											
22											
23											
24											
25											3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-27

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **28.6**

DATUM: **See Remarks**

DATE START: **10/24/13**

DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**8'**
CASING:	**4"**	**0**	TO	**8'**
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO

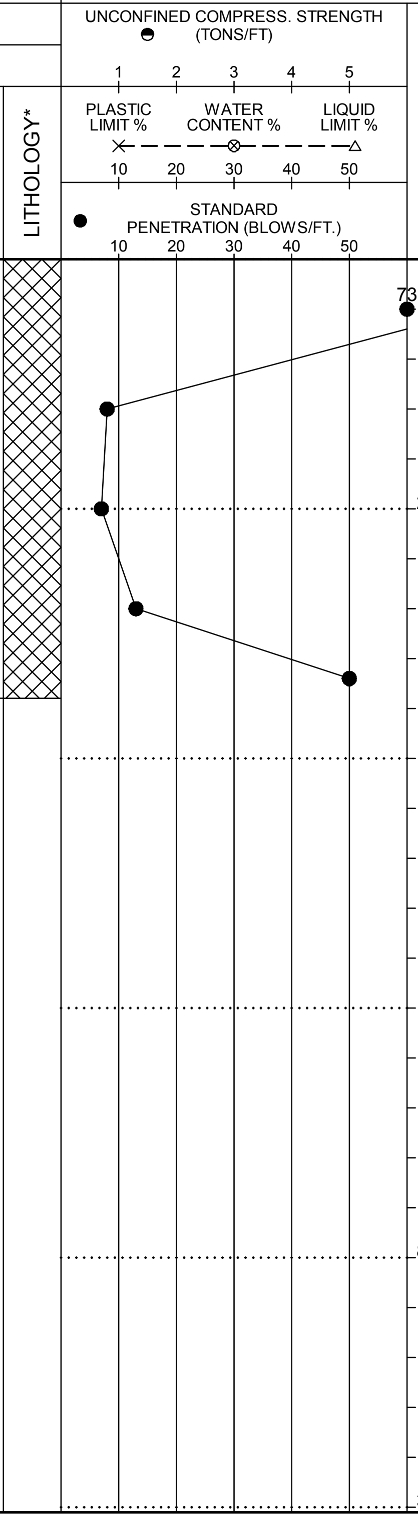
SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **8.8'**

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	73	6 40 33 16	S-1	18		M		Bwn c-f GRAVEL, some c-f Sand, little Silt with concrete fragments (FILL) (Class 7)	
2									
3	8	6 4 4 4	S-2	6		M		Brick fragments with Gy-bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	
4									
5	7	6 4 3 3	S-3	16		M		Lgt bwn-gy c-f SAND, and f Gravel, little Silt with brick fragments & particles (FILL) (Class 7)	23.6
6									
7	13	2 5 8 3	S-4	14		M		Lgt gy-bwn c-f SAND, and f Gravel, little Silt with concrete particles & wood fibers (FILL) (Class 7)	
8	50+	5 50/4	S-5	10		M		Concrete fragments with bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7) with Asphalt & brick particles	
9									
10								End of Boring at 8.8'	18.6
11									
12									
13									
14									
15									13.6
16									
17									
18									
19									
20									8.6
21									
22									
23									
24									
25									3.6



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-28

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Anthony Laroche**

DRILLER: **Rob Dollar**

SURFACE ELEVATION: **26.7**

DATUM: **See Remarks**

DATE START: **10/22/13**

DATE FINISH: **10/22/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO

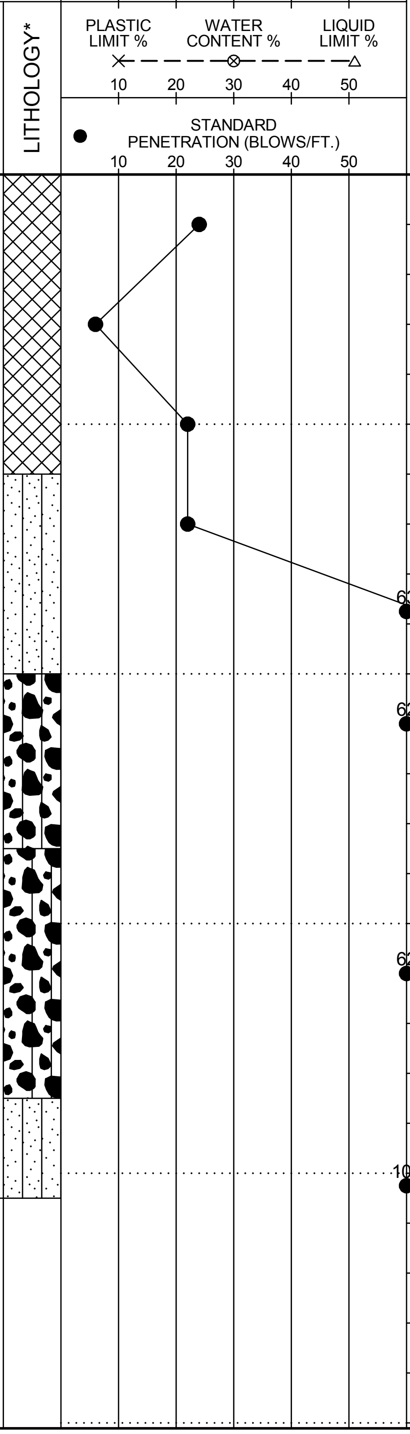
SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **20.5'**

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	24	9 12 12 12	S-1	18		M	SM	Topsoil, brick (FILL) (Class 7)	
2									
3	6	12 3 3 2	S-2	6		M	SM	Bwn-rd c-f SAND, and c-f Gravel, some Silt (brick) (FILL) (Class 7)	
4									
5	22	7 7 15 16	S-3	4		M	SM	Bwn c-f SAND, little Silt, little c-f Gravel (brick) (FILL) (Class 7)	21.7
6									
7	22	14 13 9 13	S-4	12		M	SM	Lgt bwn c-f SAND, some c-f Gravel, little Silt (Class 3b)	
8									
9	63+	15 13 50/3	S-5	18		M	SM	Lgt wh- bwn c-f SAND, some f Gravel, little Silt/Clay (Class 3b)	
10									16.7
11	62	29 13 49 40	S-6	6		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2a)	
12									
13									
14									
15									11.7
16	62	17 31 31 41	S-7	14		M	GP-GM	Bwn c-f SAND, some c-f Gravel, little Silt/Clay (Class 2a)	
17									
18									
19									
20	100+	100/5	S-8	5		M	SM	(Decomposed bedrock) Bwn c-f SAND, little Gravel, little Silt Spoon refusal @ 20.5' (Class 2a)	6.7
21									
22								End of Boring at 20.5'	
23									
24									
25									1.7



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-29

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Rob Dollar**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **27.5**
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO				DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **20'**	SCREEN DEPTH: **---** TO **---**				DATE START: **10/23/13**
CASING:	**4"**	**0** TO **19'**	WEATHER: **Overcast** TEMP: **45° F**				DATE FINISH: **10/23/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **19'**				
RIG: CME55 LC Rubber Track Mount Auto Hammer			*CHANGES IN STRATA ARE INFERRED				

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*		ELEVATION (FT.)
1											
2											
3											
4											
5											22.5
6											
7											
8											
9											
10								Rotary advanced to refusal @ 19'			17.5
11											
12											
13											
14											
15											12.5
16											
17											
18								Refusal @ 19' weathered bedrock (Marble)			
19											
20								Rotary advanced to 20 to confirm bedrock	▨		7.5
21								End of Boring at 20'			
22											
23											
24											
25											2.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No.	**6926.01**
PROJECT:	**Melrose Commons Site C**
LOCATION:	**Bronx, NY**

BORING No. B-30

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**					
CONTRACTOR: **Craig Test Boring Co., Inc.**					
METHOD OF ADVANCING BORING	DIA.	DEPTH			
POWER AUGER:			TO		
ROT. DRILL:	**3 7/8"**	**0**	TO	**20'**	
CASING:	**4"**	**0**	TO	**18'**	
DIAMOND CORE:			TO		
RIG: CME55 LC Rubber Track Mount Auto Hammer					

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

WEATHER: **Overcast** TEMP: **50° F**

DEPTH TO ROCK: **18'**

*CHANGES IN STRATA ARE INFERRED

INSPECTOR:	**Barry Ouimet**
DRILLER:	**Rob Dollar**
SURFACE ELEVATION:	**28.1**
DATUM:	**See Remarks**
DATE START:	**10/23/13**
DATE FINISH:	**10/23/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	SAMPLES RECOV. LENGTH (IN.)	SAMPLES RECOV. RQD (%)	SAMPLES MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % × WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5											23.1
6											
7											
8											
9											
10								Rotary advanced to refusal @ 18'			18.1
11											
12											
13											
14											
15											13.1
16											
17											
18								Refusal @ 18' weathered bedrock (Marble)			
19								Rotary advanced to 20' to confirm bedrock	▨		
20											8.1
21								End of Boring at 20'			
22											
23											
24											
25											3.1

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-31

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

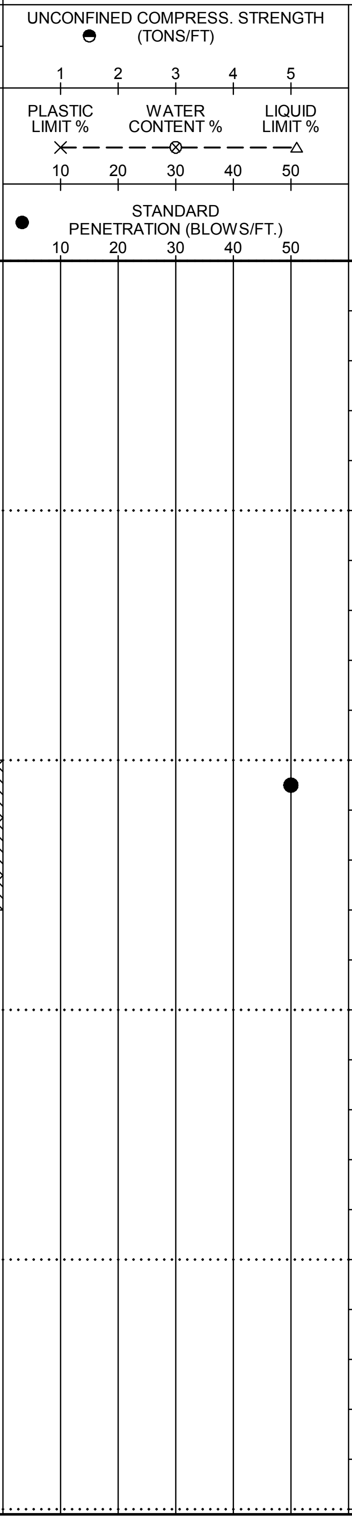
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.2**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	**3 7/8"**	**0** TO **13'**
CASING:	**4"**	**0** TO **10'**
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **10'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

*CHANGES IN STRATA ARE INFERRED



DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3								Advanced through Fill to 10'		
4										
5										23.2
6										
7										
8								Significant resistance to drilling 6.5' to 10' Possible weathered bedrock 6.5' to 10'		
9										
10	50+	50/1	S-1	1		M	GM	Wh f GRAVEL, little c-f SAND (Marble fragments) rotary advanced to 13' to confirm bedrock	▨	18.2
11									▨	
12									▨	
13										
14								End of Boring at 13'		
15										13.2
16										
17										
18										
19										
20										8.2
21										
22										
23										
24										
25										3.2

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-32

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**9'**
CASING:	**4"**	**0**	TO	**8'**
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **8'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4								Rotary advanced to 8.0'			
5											23.4
6											
7											
8								Resistance @ 8.0' Weathered bedrock Rotary advanced to refusal @ 9.0'	▨		
9											
10								End of Boring at 9'			18.4
11											
12											
13											
14											
15											13.4
16											
17											
18											
19											
20											8.4
21											
22											
23											
24											
25											3.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-33

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	8'
CASING:	4"	0	TO	8'
DIAMOND CORE:			TO	

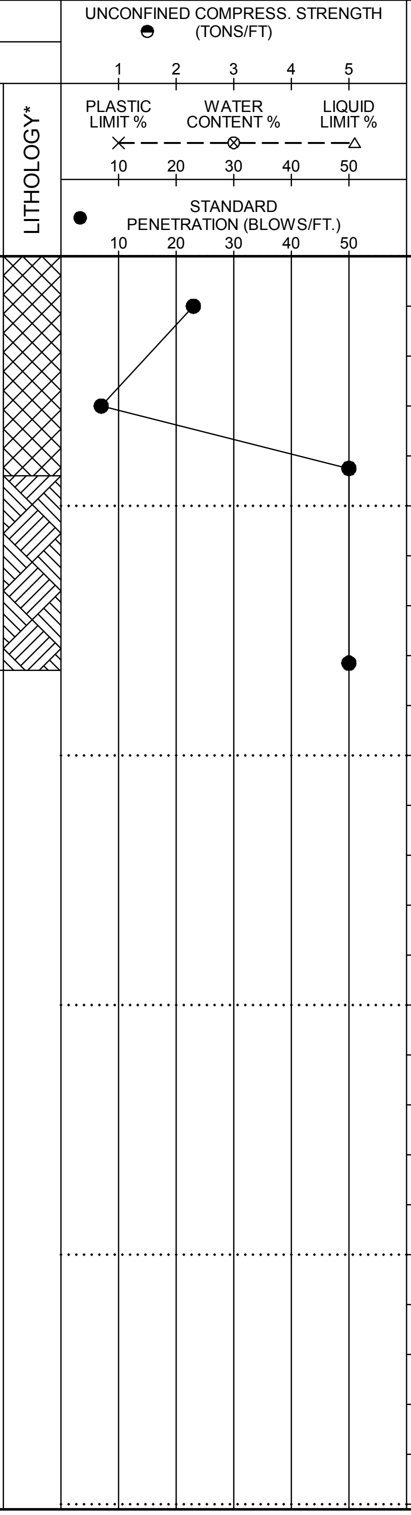
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **45° F**
DEPTH TO ROCK: **8'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	23	7 11 12 7	S-1	12		M		Lgt bwn f GRAVEL, some c-f Sand, little Silt with brick & concrete fragments (FILL) (Class 7)	
2									
3	7	2 1 6 5	S-2	10		M		Brick fragments Lgt bwn c-f SAND, some f Gravel, little Silt (FILL) (Class 7)	
4	50+	50/4	S-3	4		M		Lgt bwn c-f SAND, some Silt, little f Gravel, with brick & asphalt particles (FILL) (Class 7) Significant resistance to drilling from 4.4' to 8.0' Rotary advanced to 8.0' Possible decomposed to weathered bedrock Weathered bedrock to 8.0'	
5									23.8
6									
7									
8	50+	50/0	S-4	0				No Recovery	
9								End of Boring at 8'	
10									18.8
11									
12									
13									
14									
15									13.8
16									
17									
18									
19									
20									8.8
21									
22									
23									
24									
25									3.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-34

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **28.8**
POWER AUGER:		TO	MON. WELL	☐ YES		☒ NO	DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **13'**	SCREEN DEPTH:	**---**	TO	**---**	DATE START: **10/25/13**
CASING:	**4"**	**0** TO **11'**	WEATHER:	**Clear**	TEMP:	**40° F**	DATE FINISH: **10/25/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **11'**				UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2								Possible void 2' to 4'			
3											
4											
5											23.8
6								Low resistance to drilling 4' to 7'			
7											
8											
9											
10											18.8
11									▨		
12								Decomposed bedrock drilling refusal @ 13.0'	▨		
13											
14								End of Boring at 13'			
15											13.8
16											
17											
18											
19											
20											8.8
21											
22											
23											
24											
25											3.8

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-35

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**				**10/28/13**	**2:30 pm**	**14'**
METHOD OF ADVANCING BORING	DIA.	DEPTH		**10/29/13**	**2:30 pm**	**14'**

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

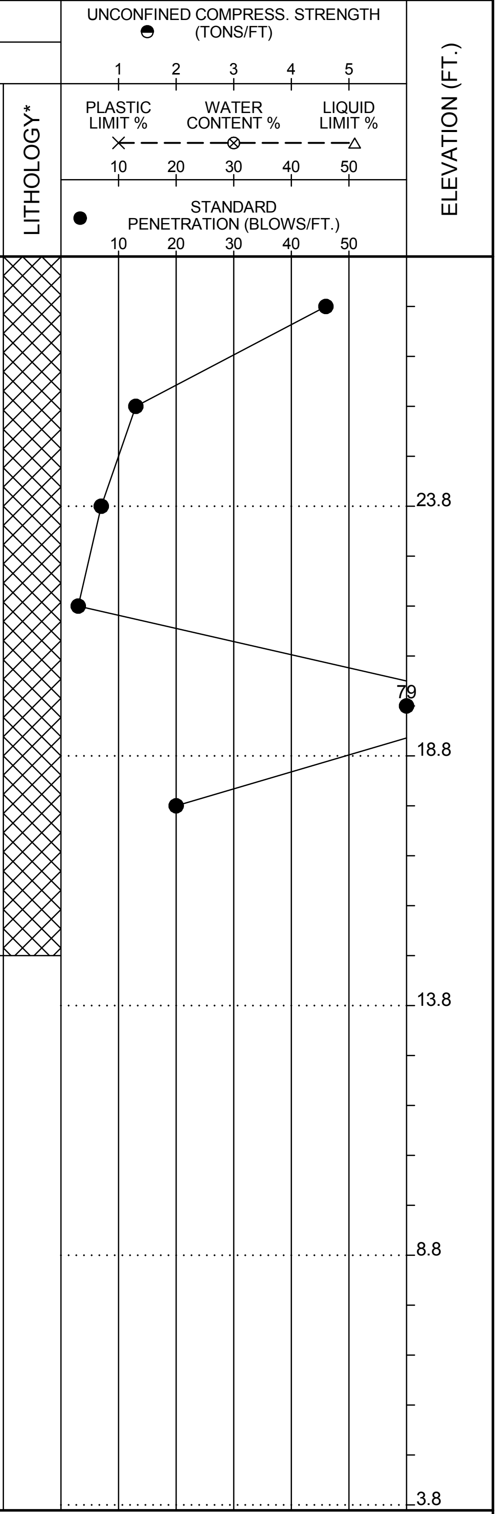
METHOD	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**14'**
CASING:	**4"**	**0**	TO	**14'**
DIAMOND CORE:			TO	

MON. WELL ☒ YES ☐ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **14'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1–2	46	7 22 24 14	S-1	4		M		Concrete fragments with Bwn f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)
3–4	13	4 6 7 8	S-2	4		M		Bwn c-f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt with concrete, with wood in spoon tip (FILL) (Class 7)
5–6	7	3 4 3 3	S-3	4		M		Brick with Bwn c-f GRAVEL, and c-f Sand, trace Silt/Clay (FILL) (Class 7)
7–8	3	2 1 2 3	S-4	12		M		Brick (FILL) (Class 7)
9–10	79	3 30 49 40	S-5	10		M		bwn c-f SAND, little f Gravel, little Silt with Asphalt fragments and brick particles (FILL) (Class 7)
11–12	20	10 9 11 11	S-6	16		M		Lgt bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)
13								
14								Drilling refusal @ 14.0 ▼
15								End of Boring at 14'
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-36

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **28.8**
POWER AUGER:		TO	MON. WELL	☐ YES		☒ NO	DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **11'**	SCREEN DEPTH:	**---**	TO	**---**	DATE START: **10/25/13**
CASING:	**4"**	**0** TO **10'**	WEATHER:	**Clear**	TEMP:	**50° F**	DATE FINISH: **10/25/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **10'**				
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % 10 20 30 40 50 STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE					
				LENGTH (IN.)	RQD (%)						
1											
2											
3											
4											
5											23.8
6											
7											
8											
9											
10								Resistant Drilling @ 10' Weathered bedrock	▨		18.8
11											
12								End of Boring at 11'			
13											
14											
15											13.8
16											
17											
18											
19											
20											8.8
21											
22											
23											
24											
25											3.8

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-37

SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**30'**
CASING:	**4"**	**0**	TO	**30'**
DIAMOND CORE:	**2"**	**30.1**	TO	**35'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **45° F**
DEPTH TO ROCK: **30'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.6**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5								Rapidly lost water at 5.0'			21.6
6								6' to 7.5' significant resistance possible concrete			
7											
8											
9											
10											16.6
11											
12											
13								Increased resistance at 17' Bedrock residual/weathered bedrock @ 17.0'			
14											
15											11.6
16											
17									▨		
18								Rotary advanced weathered rock to 25', with c-f Sand	▨		
19									▨		
20									▨		6.6
21									▨		
22									▨		
23									▨		
24									▨		
25									▨		1.6

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-37

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
	50+	50/1	S-1	1		M	SM	Tn-wh c-f SAND (bedrock residual), little f Gravel, little Silt (Class 3a)	
26									
27									
28								Bedrock residual At 29.6' soft based on significant loss to resistance during drilling Rotary advanced to 30'	
29									
30	50+	50/1	S-2	1		M	SM	Bedrock residual to highly weathered bedrock Wh-lgt bwn-tn c-f SAND, and Clayey Silt, trace f Gravel	-3.4
	3								
31									
	3								
32									
	4		C-1	55	92			Wh-lgt gy Fresh, massive, fine grained, hard, MARBLE	
33									
	3								
34									
	3								
35									-8.4
36								End of Boring at 35.1'	
37									
38									
39									
40									-13.4
41									
42									
43									
44									
45									-18.4
46									
47									
48									
49									
50									-23.4
51									
52									
53									
54									
55									-28.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-38

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.7**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	**3 7/8"**	**0** TO **13.5'**
CASING:	**4"**	**0** TO **13.5'**
DIAMOND CORE:		TO

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **13.5'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % × WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5											21.7
6											
7								Rotary advanced to 13.5'			
8											
9											
10											16.7
11											
12											
13								Significant resistance @ 13.5' Weathered bedrock			
14											
15								End of Boring at 13.5'			11.7
16											
17											
18											
19											
20											6.7
21											
22											
23											
24											
25											1.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-39

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.4**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

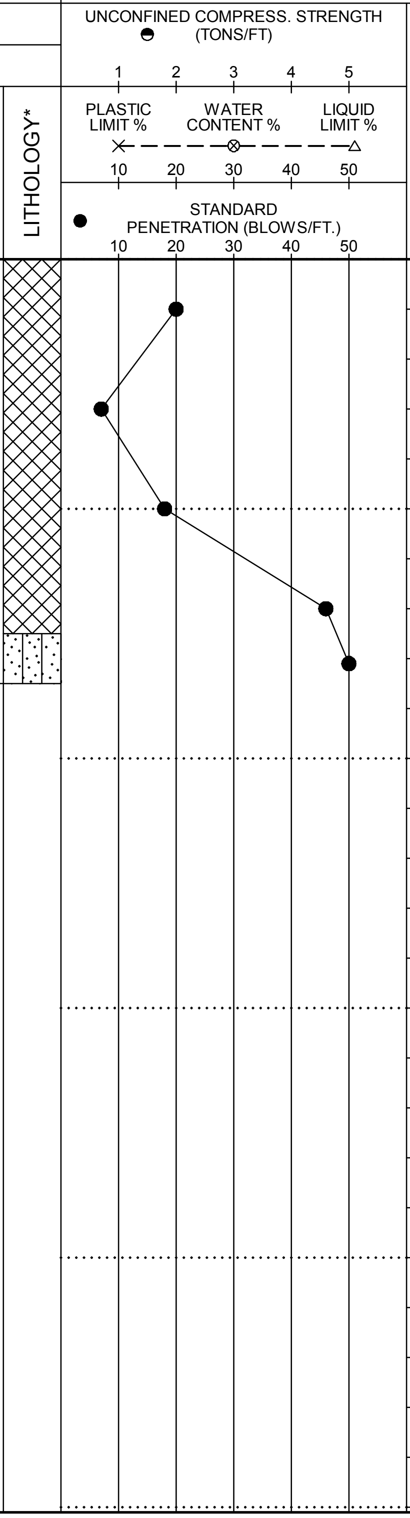
METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	**3 7/8"**	**0** TO **8'**
CASING:	**4"**	**0** TO **8'**
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **8'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	20	5 10 10 6	S-1	16		M		Bwn-gy f GRAVEL, and c-f Sand, some Silt, with brick & asphalt particles (FILL) (Class 7)	
2									
3	7	8 5 2 1	S-2			M		Concrete & brick fragments with Bwn c-f SAND, some f Gravel, little Silt (FILL) (Class 7)	
4									
5	18	3 4 14 16	S-3	16		M		Concrete fragments with Bwn c-f SAND, and f Gravel, little Silt with brick fragments (FILL) (Class 7)	22.4
6									
7	46	18 22 24 50/3	S-4	14		M		Bwn c-f GRAVEL, some c-f Sand, little Silt, with brick & concrete fragments (FILL) (Class 7)	
8	50+	50/1	S-5	0			SM	Bwn-lgt bwn c-f SAND (Possible bedrock residual) little f Gravel, little Silt (Class 3a) Weathered bedrock	
9									
10								End of Boring at 8.1'	17.4
11									
12									
13									
14									
15									12.4
16									
17									
18									
19									
20									7.4
21									
22									
23									
24									
25									2.4



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-40

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	12'
CASING:	4"	0	TO	10'
DIAMOND CORE:	2"		TO	

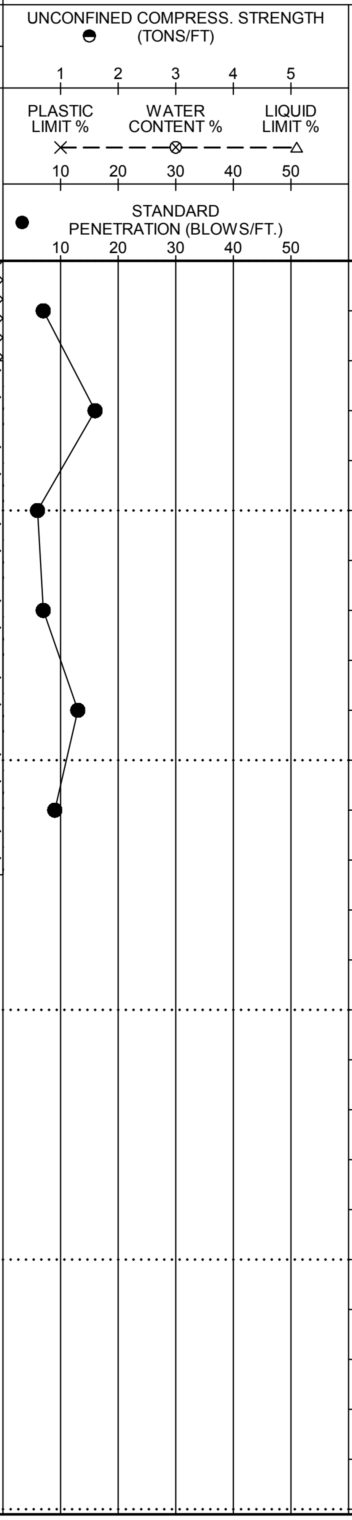
RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **12'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Anthony Laroche**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.8**
DATUM: **See Remarks**
DATE START: **10/22/13**
DATE FINISH: **10/22/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	7	11 4 3 3	S-1	12				Bwn c-f SAND, little Silt, some f Gravel (FILL) (Class 7)	
3	16	5 12 4 3	S-2	12		M	SM	Bwn c-f SAND, little c-f Gravel, little Silt (Class 3b)	
5	6	4 4 2 3	S-3	18		M	SM	Lgt bwn c-f SAND, little Silt, little c-f Gravel (Class 6)	20.8
7	7	9 4 3 4	S-4	12		M	SM	Lgt bwn c-f SAND, little Silt, little c-f Gravel (Class 6)	
9	13	5 6 7 6	S-5	14		M	SM	Lgt bwn c-f SAND, little Silt, some c-f Gravel (Class 3b)	
10									15.8
11	9	9 5 4 23	S-6	4		M	SM	Lgt bwn c-f SAND, trace Silt, trace c-f Gravel (Class 6)	
12		50	S-7	2				Bwn-wh decomposed bedrock, c-f SAND, little c-f Rock	
13								End of Boring at 12.2'	
15									10.8
20									5.8
25									0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-41

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

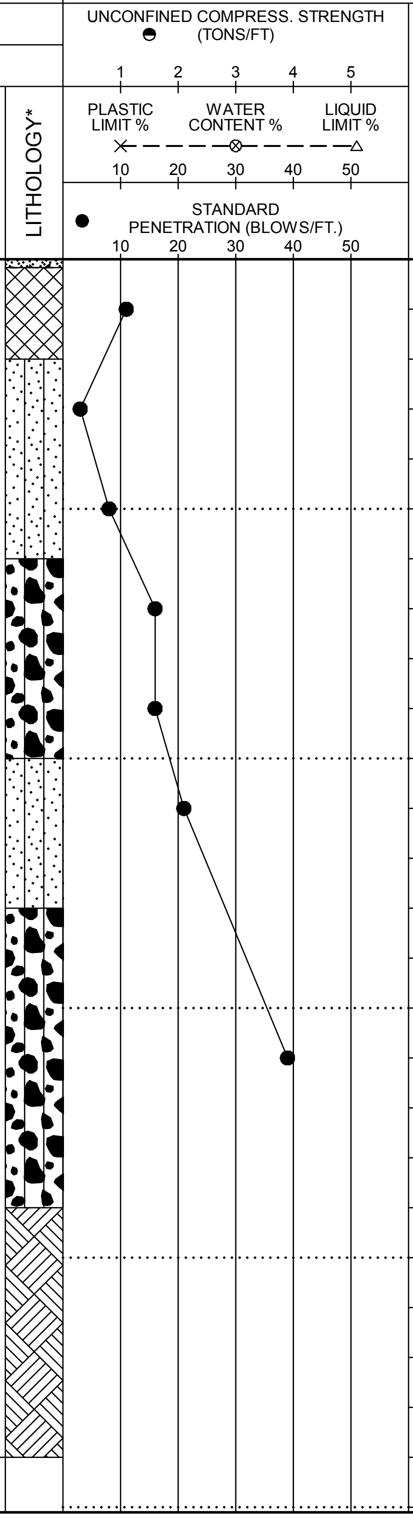
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.8**
DATUM: **See Remarks**
DATE START: **10/18/13**
DATE FINISH: **10/18/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**19'**
CASING:	**4"**	**0**	TO	**19'**
DIAMOND CORE:	**2"**	**19**	TO	**24'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **65° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	11	5 6 5 4	S-1	18		M		2" Concrete Slab Bwn c-f SAND, little Silt, trace f Gravel with Slag (FILL) (Class 7)	
3 4	3	2 2 1 2	S-2	16		M	SM	Lgt bwn c-f SAND, some Silt (Class 6)	
5 6	8	3 4 4 3	S-3	2		M	SM	Lgt bwn c-f SAND, some Silt, trace f Gravel (Class 6)	20.8
7 8	16	4 9 7 7	S-4	4		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 2b)	
9 10	16	8 8 8 11	S-5	6		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2b)	15.8
11 12	21	13 10 11 12	S-6	18		M	SM	Lgt bwn c-f SAND, some f Gravel, little Silt (Class 3b)	
13 14 15								Rotary advanced to 15'	10.8
16 17	39	12 16 23 45	S-7	12		W	GM	Gy c-f GRAVEL, and c-f Sand with very f Sand, little Silt (Class 2a)	
18 19								Drilling refusal @ 19.0'	
20 21 22 23 24	2 2 1 2 1		C-1	51	83			Wh-lgt gy, fresh, slightly fractured, fine grained, hard, MARBLE with SCHIST band, fractures oriented 0 to 5 degrees from horizontal (Class 1b)	5.8
25								End of Boring at 24'	0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-42

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	19'
CASING:	4"	0	TO	19'
DIAMOND CORE:	2"	19	TO	24'

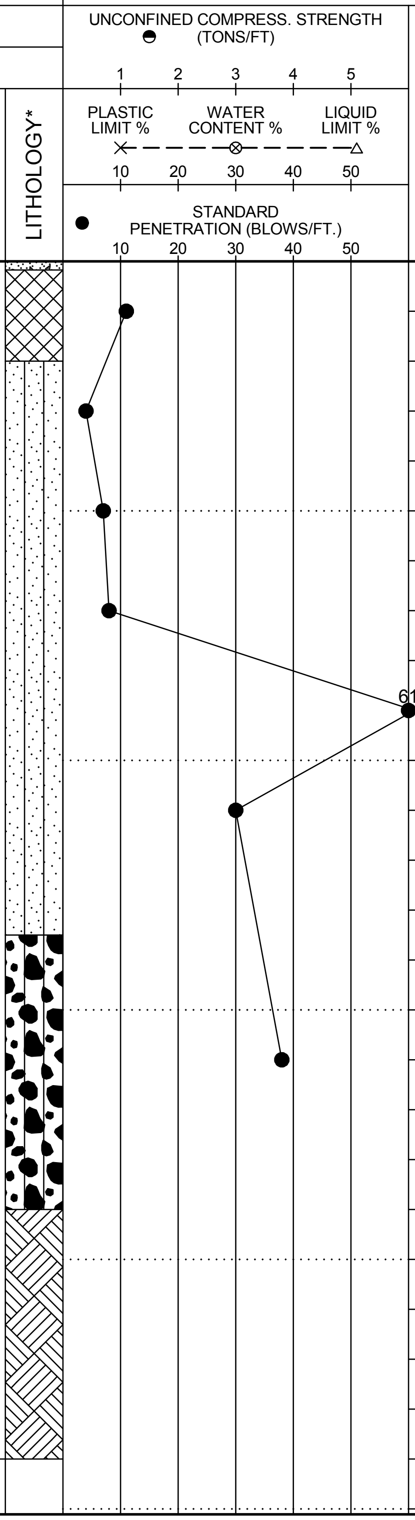
RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **65° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/18/13**
DATE FINISH: **10/21/13**

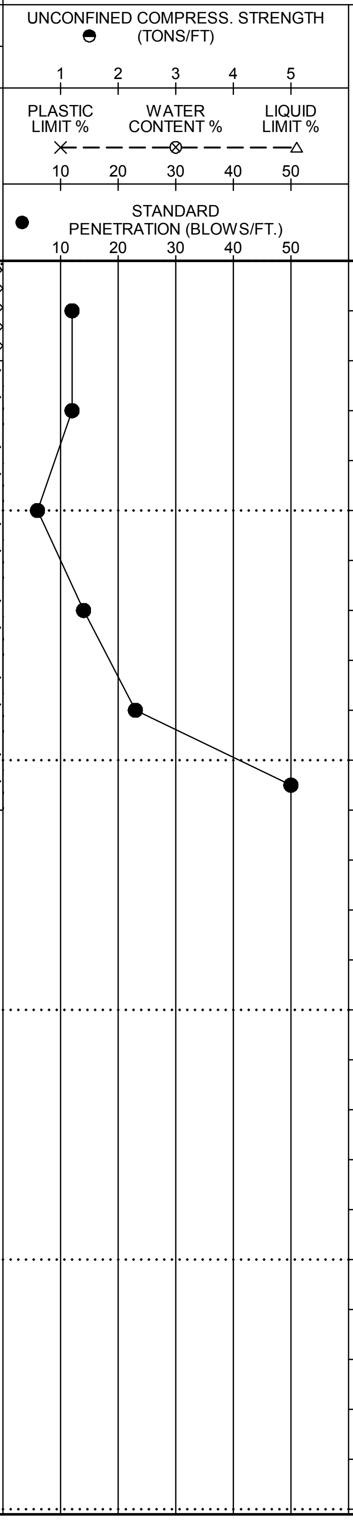
DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0-2	11	6 7 4 4	S-1	16		M		2" Concrete slab Bwn c-f SAND, some Silt, trace f Gravel (FILL) (Class 7)	
2-4	4	2 2 2 3	S-2	16		M	SM	Bwn c-f SAND, some Silt, trace f Gravel (Class 6)	
4-6	7	3 3 4 5	S-3	12		M	SM	Same (Class 6)	20.2
6-8	8	4 4 4 5	S-4	10		M	SM	Lgt bwn c-f SAND, some Silt, little f Gravel (Class 6)	
8-10	61	11 27 34 17	S-5	16		M	SM	Lgt bwn c-f SAND, little Silt/Clay, little f Gravel (Class 3a)	15.2
10-12	30	13 14 16 17	S-6	18		M	SM	Lgt bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2a)	
12-15									10.2
15-17	38	8 18 20 17	S-7	18		W	GM	Lgt bwn f GRAVEL, and c-f Sand, little Silt (Class 2a)	
17-19									
19-24	3 3 2 4 4		C-1	53	67			Wh-lgt gy, fresh, moderately to slightly fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees from horizontal with Sand along some fractures	5.2
25								End of Boring at 24'	0.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*	PROJECT No.	**6926.01**	**BORING No. B-43**
	PROJECT:	**Melrose Commons Site C**	
	LOCATION:	**Bronx, NY**	SHEET No. 1 of 1

				GROUND WATER				
CLIENT: **L. Riso & Sons Co., Inc.**				DATE	TIME	DEPTH	INSPECTOR:	**Anthony Laroche**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER:	**Rob Dollar**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION:	**25.2**
POWER AUGER:		TO		MON. WELL	☐ YES	☒ NO	DATUM:	**See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **12'**		SCREEN DEPTH:	**---** TO **---**		DATE START:	**10/22/13**
CASING:	**4"**	**0** TO **10'**		WEATHER: **Overcast**	TEMP: **60° F**		DATE FINISH:	**10/22/13**
DIAMOND CORE:	**2"**	TO		DEPTH TO ROCK: **11'**				
RIG: CME55 LC Rubber Track Mount Auto Hammer				*CHANGES IN STRATA ARE INFERRED				



DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	12	11 7 5 6	S-1	18		M		2" Concrete Bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)		
2										
3	12	6 6 6 8	S-2	10		M	SM	Bwn c-f SAND, little Silt, little f Gravel (Class 6)		
4										
5	6	5 4 2 3	S-3	12		M	SM	Bwn c-f SAND, some c-f Gravel, little Silt (Class 6)		20.2
6										
7	14	5 11 3 6	S-4	18		M	SM	Gy-bwn c-f SAND, some c-f Gravel, little Silt (Class 3b)		
8										
9	23	8 7 16 37	S-5	0				No Recovery		
10	50+	18 50/5	S-6	4		M	SM	Bwn c-f SAND, little c-f Gravel, little Silt (Class 3a) decomposed bedrock/marble		15.2
11										
12								End of Boring at 11'		
13										
14										
15										10.2
16										
17										
18										
19										
20										5.2
21										
22										
23										
24										
25										0.2

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-44

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

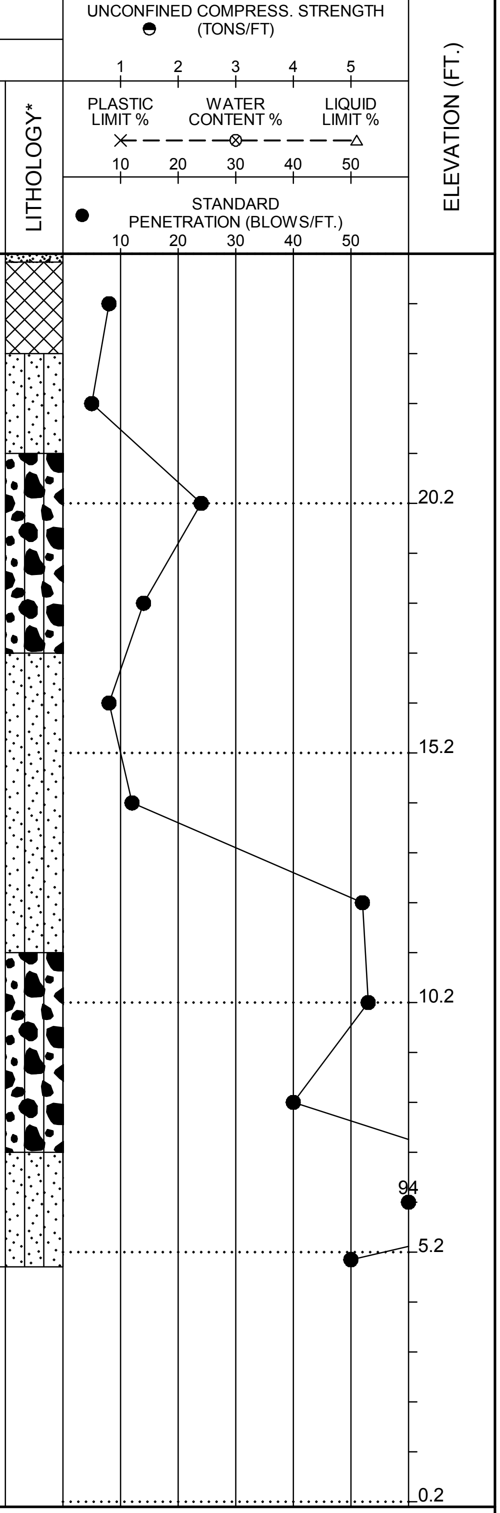
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/21/13**
DATE FINISH: **10/21/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **20'**
RIG: CME55 LC Rubber Track Mount Auto Hammer
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0-2	8	4 4 4 2	S-1			M		2" Concrete Slab Lgt bwn c-f SAND, some Silt, little f Gravel, with concrete fragments, cinder (FILL) (Class 7)	
2-4	5	2 3 2 2	S-2	10		M	SM	Lgt bwn c-f SAND, some Silt, trace f Gravel (Class 6)	
4-6	24	2 6 18 28	S-3	12		M	GM	Bwn-wh c-f GRAVEL, some c-f Sand, little Silt (Class 2b)	20.2
6-8	14	13 9 5 4	S-4	16		M	GM	Wh-bwn f GRAVEL, and c-f Sand, little Silt (Class 2b)	
8-10	8	4 4 4 4	S-5	12		M	SM	Lgt bwn c-f SAND, little Silt, trace f Gravel (Class 6)	15.2
10-12	12	4 7 5 12	S-6	18		M	SM	Same (Class 6)	
12-14	52	56 30 22 40	S-7	12		M	SM	Bwn c-f SAND, little Silt, trace f Gravel, with mica (Class 3a)	
14-16	53	20 25 28 36	S-8	20		M	GM	Lgt bwn-wh f GRAVEL, and c-f Sand, little Silt (Class 2a)	10.2
16-18	40	29 20 20 23	S-9	22		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 2a)	
18-20	94	13 52 42 42	S-10	22		M	SM	Lgt bwn-wh c-f SAND, and f Gravel, little Silt (bedrock fragments) (Class 2a)	5.2
20	50+	50/0	S-11	0				No Recovery spoon refusal @ 20'	
25									0.2

End of Boring at 20'



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TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-45

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

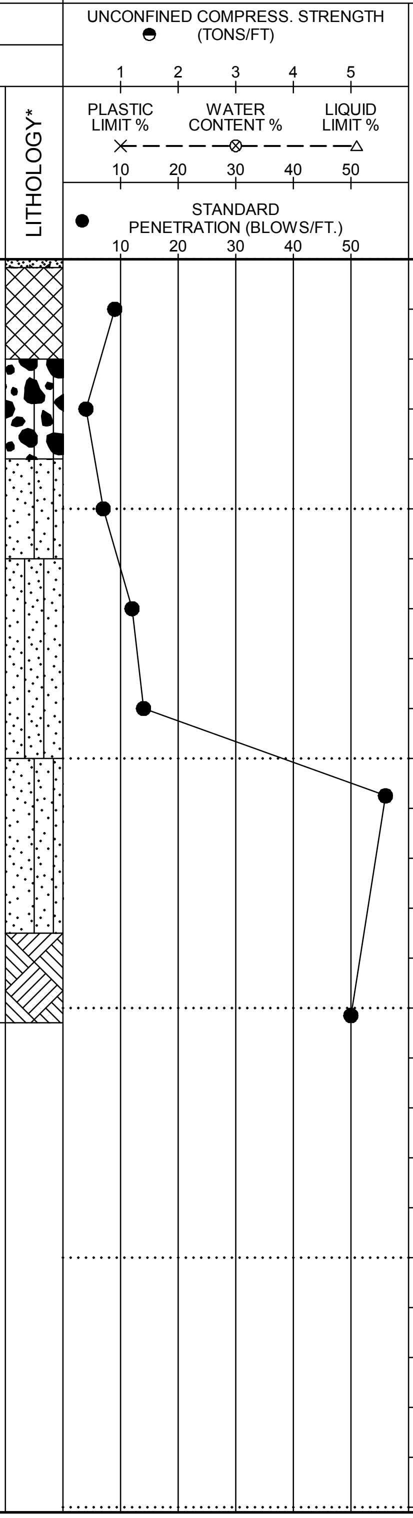
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/21/13**
DATE FINISH: **10/21/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 15'
CASING:	4"	0 TO 15'
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **65° F**
DEPTH TO ROCK: **15.1'**
*CHANGES IN STRATA ARE INFERRED

RIG: CME55 LC Rubber Track Mount Auto Hammer

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	9	7 5 4 4	S-1	12		M		2" Concrete Slab Top 2" under slab cinders, Asphalt fragments Bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)	
3	4	2 2 2 1	S-2	6		M	GP-GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 6)	
5	7	5 3 4 3	S-3	14		M	SP-SM	Bwn c-f SAND, little f Gravel, little Silt (Class 6)	20.2
7	12	7 5 7 8	S-4	18		M	SM	Bwn c-f SAND, some Silt, trace f Gravel (Class 3b)	
9	14	8 8 6 4	S-5	18		M	SM	Same (Class 3b)	
10									15.2
11	56+	3 6 50/2	S-6	18		M	SP-SM	Bwn c-f SAND, little f Gravel, little Silt (Class 3a)	
15	50+	50/1	S-7	0		M		Bedrock (marble) Fragments Spoon refusal @ 15.1'	10.2
								End of Boring at 15.1'	
20									5.2
25									0.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-46

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/21/13**
DATE FINISH: **10/21/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

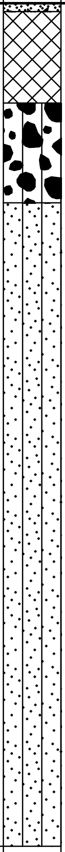
MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **16.9'**

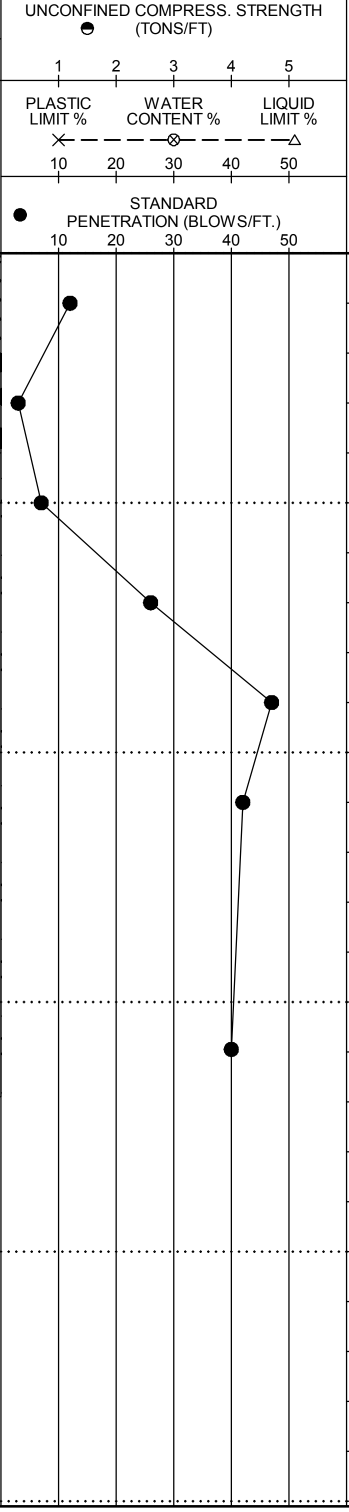
RIG: CME55 LC Rubber Track Mount Auto Hammer

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	12	2 7 5 5	S-1	18		M		2" Concrete slab Bwn c-f SAND, little f Gravel, little Silt with concrete/cinders and asphalt fragments (FILL) (Class 7)	
3 4	3	3 2 1 1	S-2	2		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 6)	
5 6	7	1 2 5 5	S-3	8		M	SM	Bwn c-f SAND, little Silt, trace f Gravel (Class 6)	20.2
7 8	26	9 13 13 17	S-4	1		M	SM	Same (Class 6)	
9 10	47	14 21 26 24	S-5	2		M	SM	Same (Class 6)	15.2
11 12	42	23 20 22 30	S-6	18		M	SM	Bwn-wh c-f SAND, some Silt, little f Gravel (Class 2a)	
13 14 15									10.2
16 17	40	27 19 21 65/5	S-7	16		M	SM	Lgt bwn c-f SAND, some Silt, little f Gravel (Class 3a) Bottom 2" Bedrock fragments-Marble	
18 19 20 21 22 23 24 25								End of Boring at 16.9'	5.2 0.2

LITHOLOGY*





REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

LEGEND FOR SOIL DESCRIPTION

COARSE GRAINED SOIL: (Coarser than No. 200 sieve)

DESCRIPTIVE TERM & GRAIN SIZE

TERM	SAND	GRAVEL
coarse - c	No. 4 Sieve to No. 10 Sieve	3" to 3/4"
medium - m	No. 10 Sieve to No. 40 Sieve	
fine - f	No. 40 Sieve to No. 200 Sieve	3/4" to 3/16"

COBBLES 3" to 10" **BOULDERS** 10" +

GRADATION DESIGNATIONS	PROPORTIONS OF COMPONENT
fine, f	Less than 10% coarse to medium
medium to fine, m-f	Less than 10% coarse
medium, m	Less than 10% coarse and fine
coarse to medium, c-m	less than 10% fine
coarse, c	Less than 10% medium and fine
coarse to fine, c-f	All greater than 10%

FINE GRAINED SOIL: (Finer than No. 200 Sieve)

DESCRIPTION	PLASTICITY INDEX	PLASTICITY
Silt	0 - 1	none
Clayey Silt	2 - 5	slight
Silt & Clay	6 - 10	low
Clay & Silt	11 - 20	medium
Silty Clay	21 - 40	high
Clay	greater than 40	very high

PROPORTION:

DESCRIPTIVE TERM	PERCENT OF SAMPLE WEIGHT
trace	1 - 10
little	10 - 20
some	20 - 35
and	35 - 50

The primary component is fully capitalized

COLOR:

Blue - blue
Blk - black
Bwn - brown
Gn - green

Gy - gray
Or - orange
Rd - red
Tn - tan

Wh - white
Yl - yellow
Lgt - light
Dk - dark

SAMPLE NOTATION:

S - Split Spoon Soil Sample
U - Undisturbed Tube Sample
C - Core Sample
B - Bulk Soil Sample
NR - No Recovery of Sample

WOC - Weight of Casing
WOR - Weight of Rods
WOH - Weight of Hammer
PPR - Compressive Strength based on Pocket Pentrometer
TV - Shear Strength (tsf) based on Torvane

ADDITIONAL CLASSIFICATIONS:

New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See Sections 1804.2 of the 2008 Building Code for further details.

TECTONIC	W.O. No. 6926.01	Date: 11/5/2013	**TEST PIT** **TP-1**	
	Project: Melrose Commons – Site C			
	Location: Bronx, NY			
(800) 829-6531				
Client: L. Riso & Sons Co., Inc.		Depth to Seepage: NE	Inspector: Anthony Laroche	
Contractor: Craig Test Borings		Depth to Groundwater: NE	Surface Elevation: 27	
Equipment: Kubota KX057-4		Depth to Bedrock: NE	Datum:	

SAMPLES					
Sample No.	**Moisture**	**Unified Soil Classification**	**DESCRIPTION OF MATERIAL**	**Strata Change (ft.)**	**REMARKS**
			Bwn c-f SAND, some c-f Gravel, little Silt, few Cobbles & sparse Boulders (FILL) (Class 7)	7'	
			Bwn c-f SAND, some c-f Gravel, little Silt, some Cobbles, trace Boulders (Class 3b)	11'	
			End of Test Pit @ 11'		

PARTICLE SIZE		**PROPORTION (exclusive of boulders & cobbles)**	**PROPORTION (boulders & cobbles)**		**MOISTURE**
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC	W.O. No. 6926.01	Date: 11/5/2013	**TEST PIT** **TP-2**	
	Project: Melrose Commons – Site C			
	Location: Bronx, NY			
(800) 829-6531				

Client: L. Riso & Sons Co., Inc.	Depth to Seepage: NE	Inspector: Anthony Laroche
Contractor: Craig Test Borings	Depth to Groundwater: NE	Surface Elevation: 27
Equipment: Kubota KX057-4	Depth to Bedrock: NE	Datum:

SAMPLES		**Unified Soil Classification**	**DESCRIPTION OF MATERIAL**	**Strata Change (ft.)**	**REMARKS**
Sample No.	**Moisture**				
			Fill (kitchen sink, metal, etc.) in SAND	5'	
			Floor slab from old building	5.5'	
			Bwn c-f SAND, some c-f Gravel, trace Silt, few cobbles, sparse boulders (Class 3b)	11.5'	
			End of Test Pit @ 11.5'		

PARTICLE SIZE		**PROPORTION (exclusive of boulders & cobbles)**	**PROPORTION (boulders & cobbles)**		**MOISTURE**
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC	W.O. No.	6926.01	Date: 11/5/2013	**TEST PIT**
	Project:	Melrose Commons – Site C		**TP-3**
	Location:	Bronx, NY		
(800) 829-6531				

Client: L. Riso & Sons Co., Inc.	Depth to Seepage: NE	Inspector: Anthony Laroche
Contractor: Craig Test Borings	Depth to Groundwater: NE	Surface Elevation: 28
Equipment: Kubota KX057-4	Depth to Bedrock: NE	Datum:

SAMPLES		**Unified Soil Classification**	**DESCRIPTION OF MATERIAL**	**Strata Change (ft.)**	**REMARKS**
Sample No.	**Moisture**				
			FILL (Class 7)		
			A 3'-4' diameter x 12' long oil tank inside foundation walls		
			Boring with void located outside oil tank	7'	
			End of Test Pit @ 7'		

PARTICLE SIZE		**PROPORTION (exclusive of boulders & cobbles)**	**PROPORTION (boulders & cobbles)**		**MOISTURE**
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC

(800) 829-6531

W.O. No. 6926.01
Date: 11/5/2013
Project: Melrose Commons – Site C
Location: Bronx, NY

TEST PIT
TP-4

Client: L. Riso & Sons Co., Inc.
Depth to Seepage: NE
Inspector: Anthony Laroche
Contractor: Craig Test Borings
Depth to Groundwater: NE
Surface Elevation: 28.5
Equipment: Kubota KX057-4
Depth to Bedrock: NE
Datum:

SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS
Sample No.	Moisture				
			Bwn c-f SAND, some c-f Gravel, little Silt, sparse Cobbles	4'	
			Bwn c-f SAND, some c-f Gravel, little Silt (inside the foundation found tires, metal, brick & wood) (Class 7)	10'	
			End of Test Pit @ 10'		

PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC

MONITORING WELL INSTALLATION REPORT

Project No.: 6926.01 Date: 10/18/2013
Project: Melrose Commons - Site C
Location: Bronx, NY

Client: L. Riso & Sons Co. Inc.
Driller: Rob Dollar
Monitoring Well No: MW/B-20
Owner:
Inspector: Barry Ouimet
Surface Elevation: 26.5
Contractor: Craig Test Borings, Inc.
Installed in Boring: B-20
Datum:

WELL CONSTRUCTION

EQUIPMENT AND DIMENSIONS

Type of Rig: CME 55LC Rubber Tire Track Mount
Drilling Method: Rotary
Drilling Fluid:
Borehole Diameter 4" (casing)
Total Depth Drilled: 27.0' (cored 22 - 27')

SURFACE FINISH

Flush Mounted ☒ or Above Grade ☐
If Above Grade, Height Above Grade:
Steel Protective Casing: Yes ☐ No ☐
Locked Cap: Yes ☐ No ☒

COMPONENTS AND MATERIALS

COMPONENT	Depth Below Ground Surface To Top (ft.)	To Bottom (ft.)	Diameter (inches)	Type and Material
Inner casing				
Outer Casing (Not Protective Casing)				
Screen (Not Slot Size) .020	17.0'	27.0'	2"	PVC
Riser Pipe	0'	17.0'	2"	PVC
Sand/Gravel Pack	15.0'	27.0'		
Annular Seals/Grout Bentnite Chips	0'	15.0'		

Method of Grouting Bentonite chips poured for seal

WELL DATA

Static Water Level After Drilling (ft.)
Method Used to Measure:
Well was Developed for hours at gpm
Method of Development:

Remarks:

GROUNDWATER MEASUREMENTS

Date	Time	Depth Below Ground Surface	Groundwater Elevation
10/18/13	2:30 PM	20.5	6.00
10/21/13	2:10 PM	20.6	5.90
10/22/13	9:30 AM	20.4	6.1
10/29/13	2:30 PM	20.5	6.0

TECTONIC

MONITORING WELL INSTALLATION REPORT

Project No.: 6926.01 Date: 10/24/2013
Project: Melrose Commons - Site C
Location: Bronx, NY

Client: L. Riso & Sons Co. Inc.	Driller: Rob Dollar	Monitoring Well No: MW/B-35
Owner:	Inspector: Barry Ouimet	Surface Elevation: 28.8
Contractor: Craig Test Borings, Inc.	Installed in Boring: B-35	Datum:

WELL CONSTRUCTION

EQUIPMENT AND DIMENSIONS

Type of Rig: CME 750X with Auto Hammer
Drilling Method: Mud Rotary
Drilling Fluid:
Borehole Diameter 4" (casing)
Total Depth Drilled: 14.0'

SURFACE FINISH

Flush Mounted ☒ or Above Grade ☐
If Above Grade, Height Above Grade:
Steel Protective Casing: Yes ☐ No ☐
Locked Cap: Yes ☐ No ☐

COMPONENTS AND MATERIALS

COMPONENT	Depth Below Ground Surface To Top (ft.)	To Bottom (ft.)	Diameter (inches)	Type and Material
Inner casing				
Outer Casing (Not Protective Casing)				
Screen (Not Slot Size) .020	9.0'	14.0'	2"	PVC .020 slot
Riser Pipe	0'	9.0'	2"	PVC
Sand/Gravel Pack	6.0'	14.0'		#2 Sand
Annular Seals/Grout Bentnite Chips	0.0	6.0'		
Method of Grouting				

WELL DATA

Static Water Level After Drilling (ft.) NE
Method Used to Measure:
Well was Developed for hours at gpm
Method of Development:

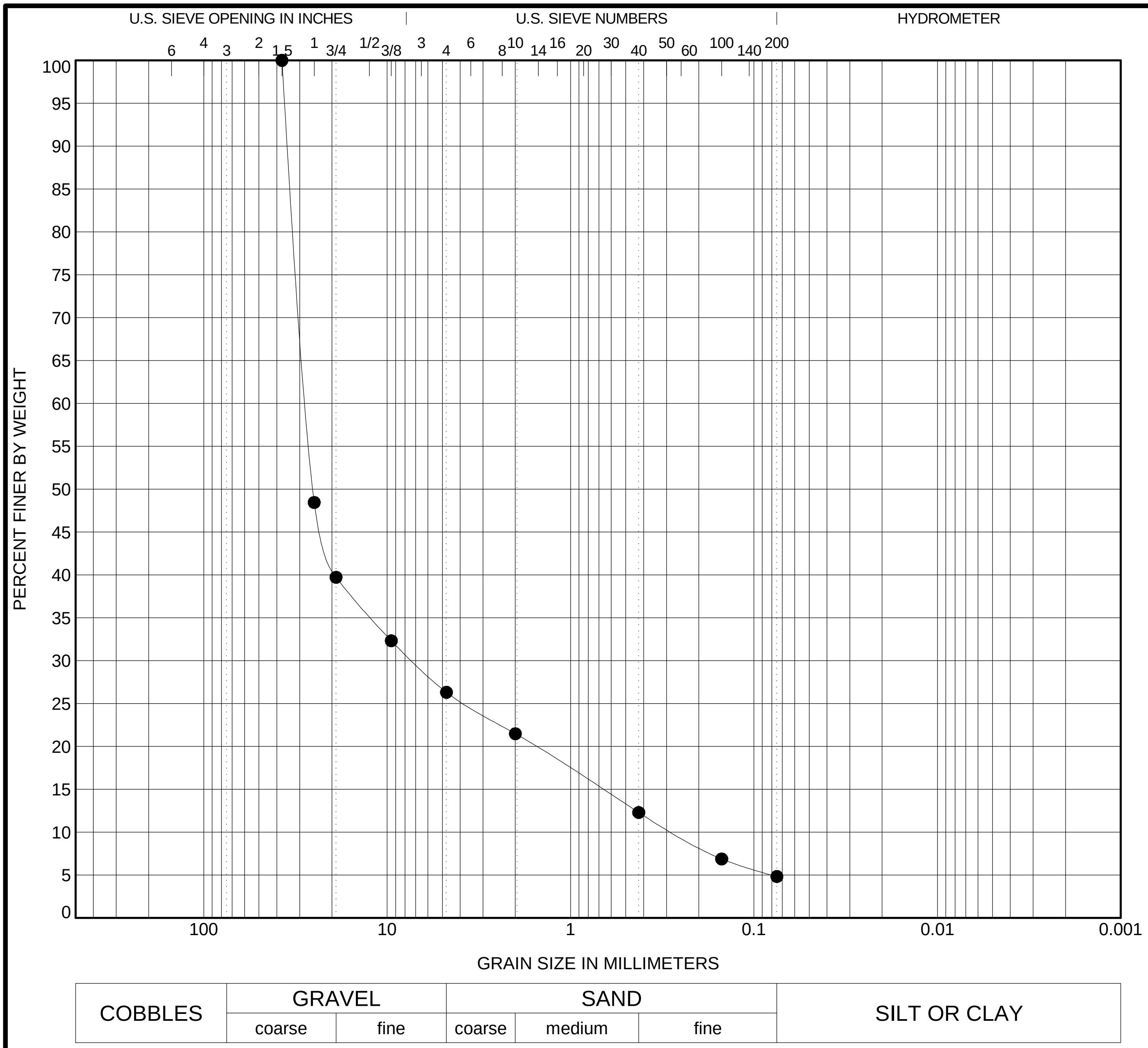
GROUNDWATER MEASUREMENTS

Date	Time	Depth Below Ground Surface	Groundwater Elevation
10/28/13	2:30 PM	NE	-
10/29/13	2:30 PM	NE	-

Remarks:

Well was dry to depth of well (on rock). No water encountered.

APPENDIX II



	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-4**	**4.0**	**S-3**	**Bwn c-f GRAVEL, some c-f Sand, trace Silt/Clay**	**11.8**				**7.06**	**100.10**

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-4**	**4.0**	**S-3**	**37.5**	**27.378**	**7.271**	**0.274**	**73.7**	**21.5**	**4.8**		**Boring**

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

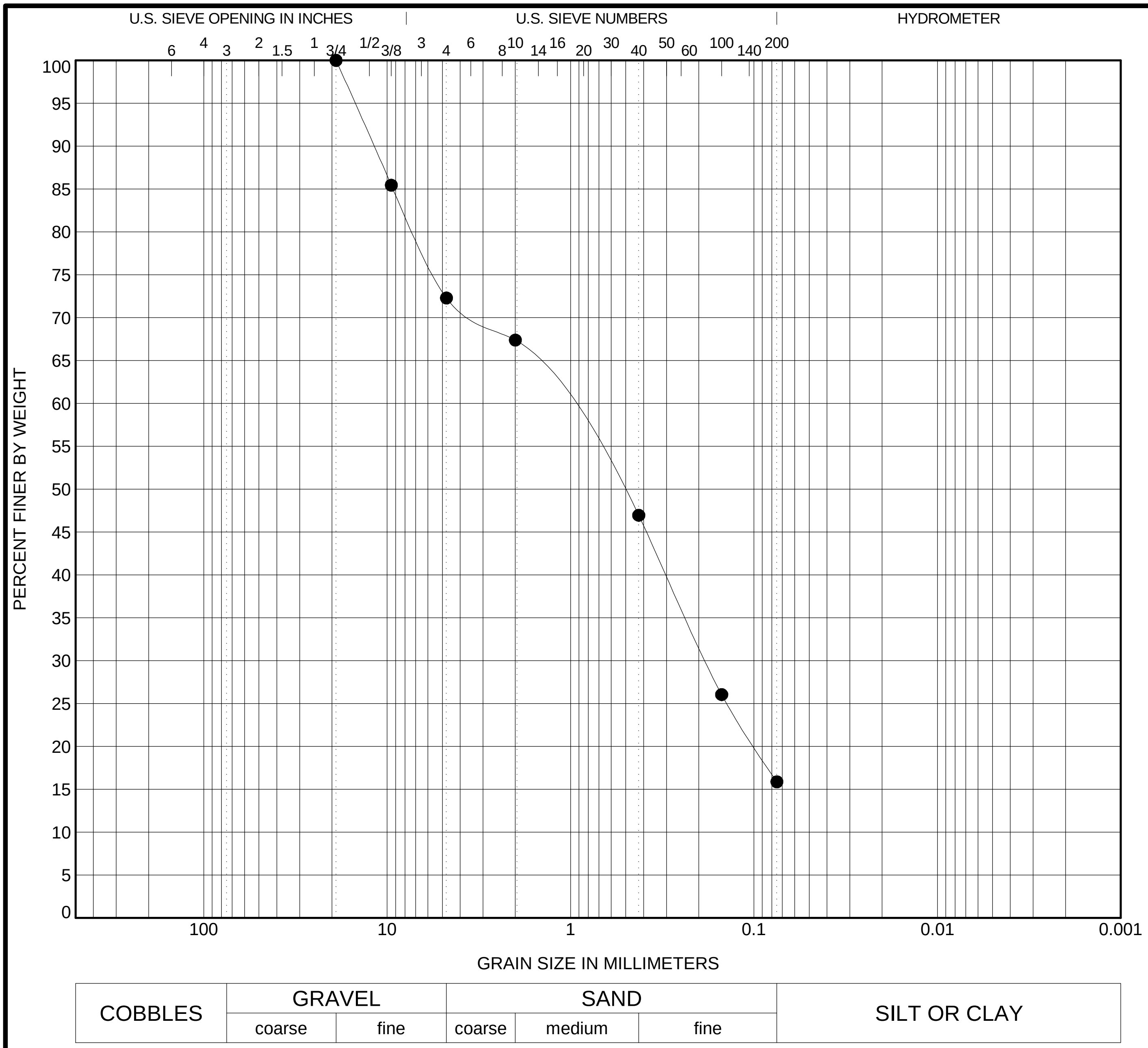
280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-28**	**8.0**	**S-5**	**Lgt Wh-Bwn c-f SAND, some f Gravel, little Silt/Clay**	**7.9**					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-28**	**8.0**	**S-5**	**19**	**1.143**	**0.183**		**27.7**	**56.4**	**15.9**		**Boring**

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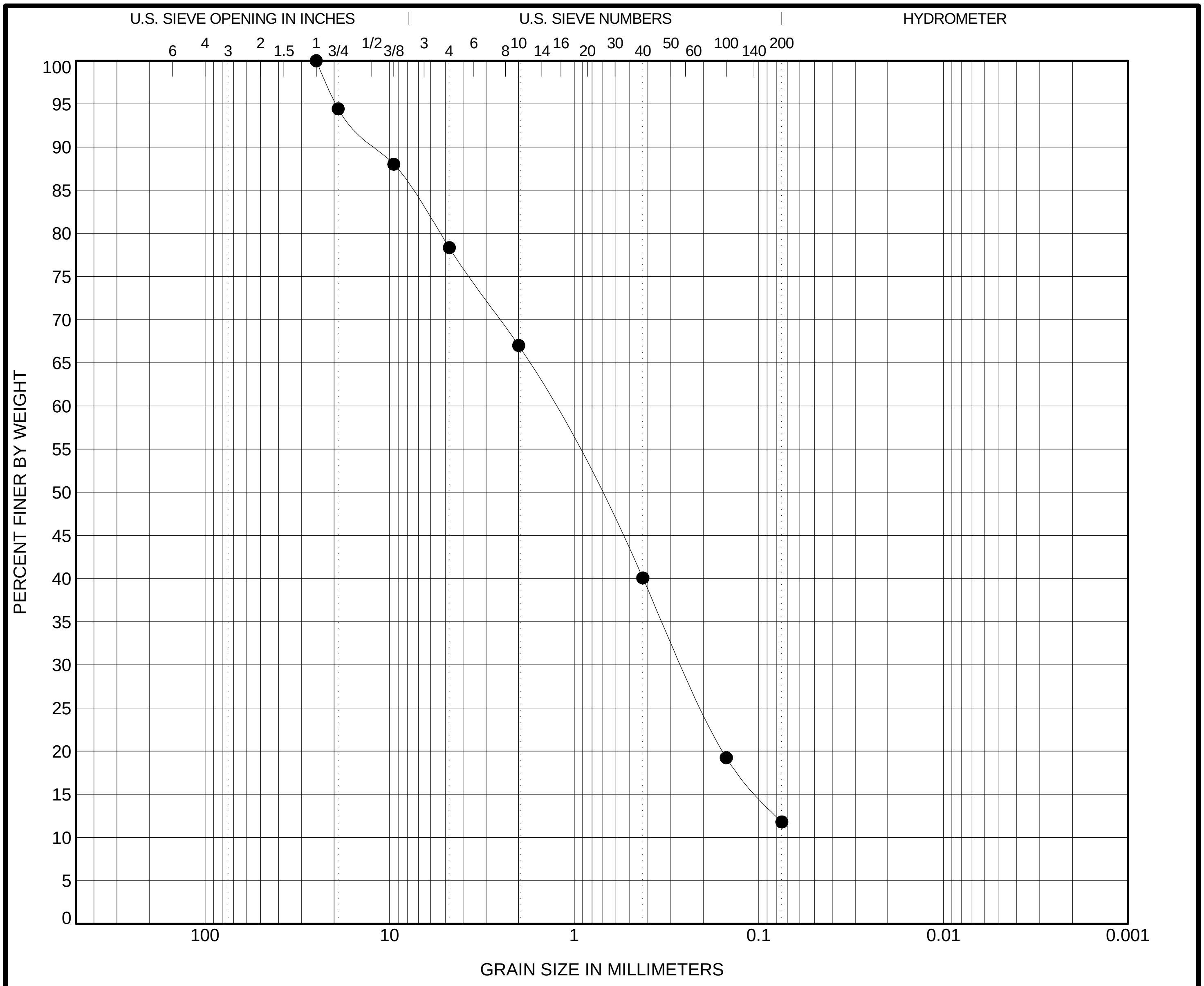
Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample Identification	Classification	WC%	LL	PL	PI	Cc	Cu
● **B-28 15.0 S-7**	**Bwn c-f SAND, some c-f Gravel, little Silt/Clay**	**3.9**				**0.78**	**21.07**

Sample Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
● **B-28 15.0 S-7**	**25**	**1.337**	**0.257**		**21.7**	**66.5**	**11.8**		**Boring**

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Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

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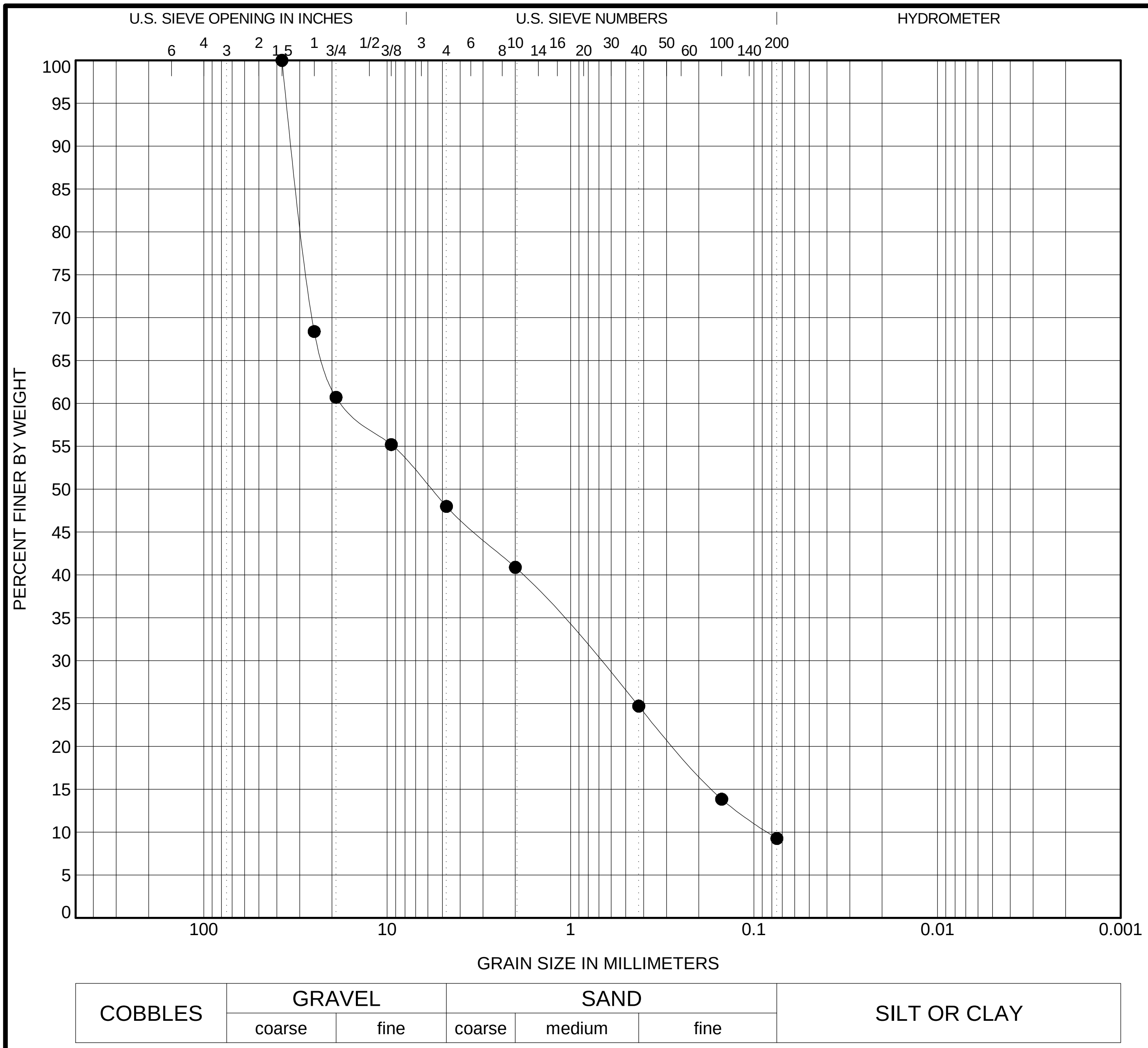

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-35**	**4.0**	**S-3**	**Bwn c-f GRAVEL and c-f Sand, trace Silt/Clay**	**14.3**				**0.34**	**207.20**

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-35**	**4.0**	**S-3**	**37.5**	**17.377**	**0.706**	**0.084**	**52.0**	**38.7**	**9.3**		**Boring**

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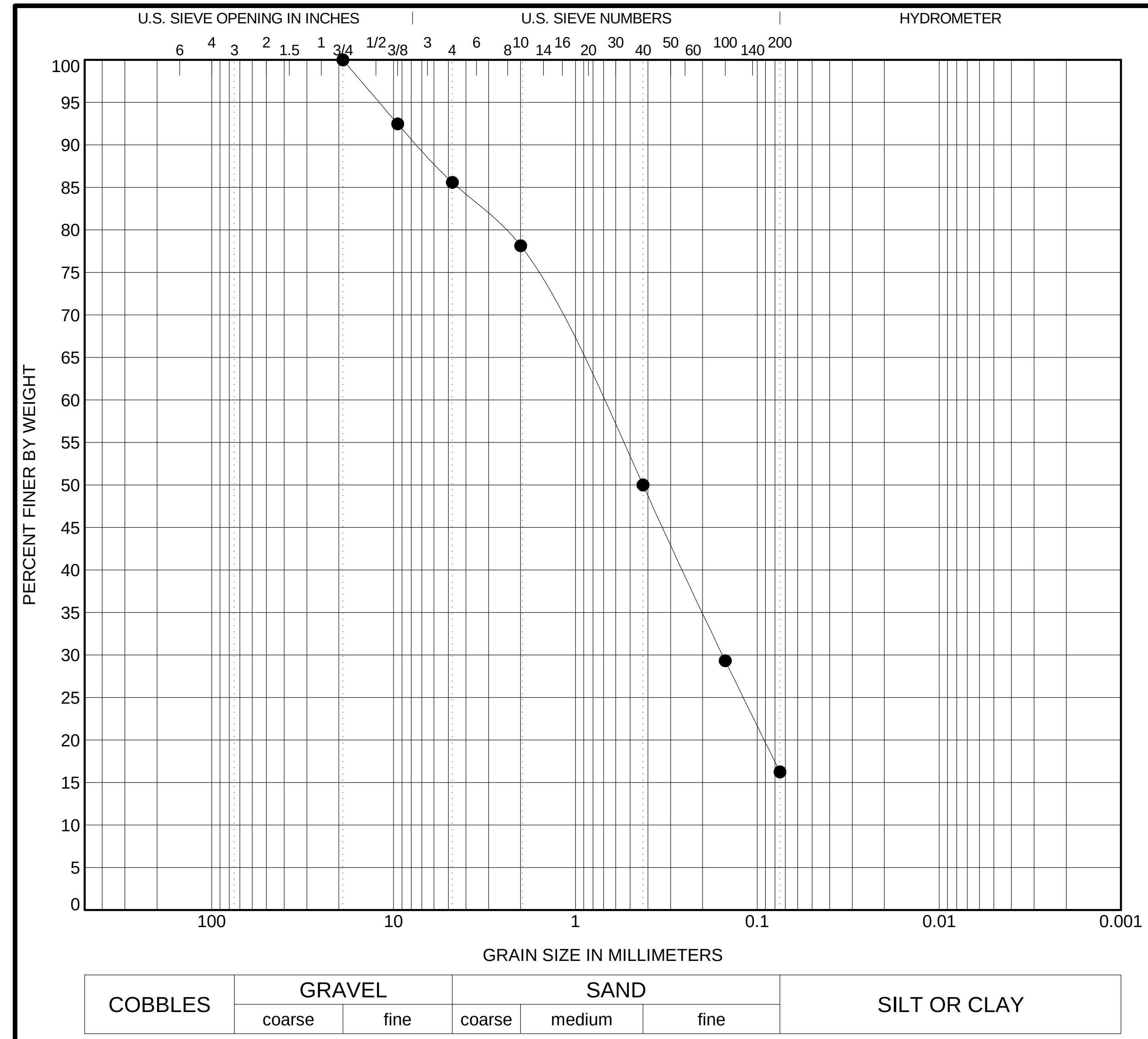
GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-42**	**8.0**	**S-5**	**Lgt Bwn c-f SAND, little Silt/Clay, little f Gravel**	**5.5**					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-42**	**8.0**	**S-5**	**19**	**0.737**	**0.155**		**14.4**	**69.3**	**16.2**		**Boring**

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GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**

GEOTECHNICAL EVALUATION
PROPOSED SIX TO TWELVE-STORY BUILDINGS
EAST 161ST STREET AND ELTON AVENUE
BRONX, NEW YORK

PREPARED FOR:

L. RISO & SONS CO., INC.
36-35 BELL BOULEVARD
BAYSIDE, NY 11361

PREPARED BY:

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.
70 PLEASANT HILL ROAD
MOUNTAINVILLE, NEW YORK 10953
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FEBRUARY 7, 2014

MARK ANDREW STIER
076154

MARK A. STIER, P.E. NO. 076154

TECTONIC

Practical Solutions, Exceptional Service

W.O. 6926.01

GEOTECHNICAL EVALUATION
PROPOSED MULTI-STORY BUILDINGS
EAST 161ST STREET AND ELTON AVENUE
BRONX, NEW YORK

TABLE OF CONTENTS

1.0 INTRODUCTION

Tectonic Engineering & Surveying Consultants, P.C. has completed a site reconnaissance and geotechnical engineering evaluation for the proposed six to twelve story buildings located at East 161st Street and Elton Avenue in Bronx, New York. The purpose of this investigation was to evaluate the subsurface conditions and develop geotechnical recommendations for the design and construction of the foundations for the proposed buildings. This report presents our findings and recommendations.

2.0 SCOPE OF SERVICES

The following scope of services was provided for L. Riso & Sons Co., Inc., herein referred to as Client:

- Observation and logging of the excavation of four (4) test pits to depths ranging from 7 to 11.5 feet below existing ground surface.

- Drilling, sampling, and logging of thirty-two (32) test borings at the site to depths ranging from 8 to 35 feet below the existing ground surface.

- Drilling and logging of fourteen (14) rock probes at the site to depths ranging from 6 to 30 feet below the existing ground surface.

- Rock cores were performed in nine (9) borings to determine the integrity of the bedrock in the area.

- Two (2) groundwater observation wells were installed; one in boring B-20 and one in boring B-35.

- Field inspection and supervision by a geotechnical engineer to locate the borings, rock probes and test pits and log subsurface conditions.

- Laboratory testing of select soil samples to assist in the evaluation of the engineering characteristics of the soils and help in the field classification of the soils. Testing included gradation analyses.

- Geotechnical engineering analyses of the subsurface conditions as they relate to the design and construction of the proposed building foundations and associated site improvements.

- Preparation of this report presenting the results of our subsurface investigation, laboratory testing, engineering analyses, as well as our geotechnical recommendations for the design and construction of the proposed building foundations and associated site improvements.

3.0 PROJECT AND SITE DESCRIPTION

The project site is located on Elton Avenue between East 161st and 162nd Streets in Bronx, New York. The property is bound by a one story brick commercial building to the west; Elton Avenue to the east; several four-story apartment buildings for approximately 100 feet along 162nd Street at the northwest corner and frontage on 162nd Street for the remainder to the north; and 161st Street to the south.

The property consists of a vacant lot and an existing warehouse building that will be demolished. The existing building is located in the northwest section of the site and is roughly 8,500 square feet (sf). The reminder of the lot is about 25,000 sf of vacant land. The property is fenced off and access is limited to one gate on 161st Street and one gate on 162nd Street.

The proposed site consists of two multiple story buildings. The first building is the Melrose Commons Family House Building (Family Building). This building is the larger of the two buildings and is between six and twelve stories. The Family Building is a commercial and residential housing mixed use building. The building includes retail stores, a parking structure, and apartments. The structure also includes a one story basement located in the eastern portion of the building. The remaining sections of the building are proposed at approximately existing grade. The second building is a nine-story building referred to as Melrose Commons Veterans Supportive Housing Building (Veteran’s Building). This building is a located at the southwest portion of the site and consists of residential units and a lobby. This building includes a one-story below grade basement.

4.0 SUBSURFACE INVESTIGATION

The subsurface investigation consisted of drilling a total of forty-six (46) test borings and probes, designated as B-1 through B-46 and the excavation of four (4) test pits, designated as TP-1 through TP-4. The borings, rock probes and test pits were located on-site by measuring from existing features and were performed between October 17 and October 29, 2013, by Craig Test Boring, using a Mobile B-53 ATV mounted drill rig and a CME 750x rubber tire truck with an auto hammer. The test pits were performed on November 5, 2013, by Craig Test Boring using a KUBOTA KX 057-4 mini excavator. Standard Penetration Testing (SPT) was performed in the borings, using a standard 2-inch diameter split-spoon sampler, continuously to a depth of at least 12 feet, and at maximum 5-foot intervals thereafter. SPT sampling was performed in accordance with the requirements of ASTM Standard D1586 *"Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".* SPT N-values were recorded for each sample taken. Samples of the soils obtained by the split-spoon sampler were collected and retained in glass jars.

Two (2) ground observation wells were installed. The well in boring B-20 was installed on October 18, 2013 and the well in boring B-35 on October 24, 2013. The groundwater levels were measured and recorded several times and the wells were relocked for future use.

The subsurface investigation was performed under the full-time observation of a geotechnical engineer representing Tectonic. The boring, rock probe and test pit locations were marked out by Tectonic using existing site features. The engineer classified soil samples as they were recovered, collected representative samples of the soil for analysis, and prepared logs of the soil and groundwater conditions encountered. The locations of the borings, rock probes and test pits are shown on the attached Boring, Rock Probe and Test Pit Location Plan, Figure 1. Logs of the borings, rock probes and test pit, are included in Appendix I.

5.0 LABORATORY TESTING

Laboratory testing was conducted on selected soil samples to assist in the evaluation of the engineering characteristics and aid in the field classification of the soils encountered within the borings. Laboratory testing included five (5) soil gradation (particle-size analysis) tests. The gradation testing was performed in accordance with ASTM Standard D422 "Standard Test Method for Particle Size Analysis of Soils" to evaluate the grain size distribution of subsurface soils. The results of the laboratory testing are attached in Appendix II.

6.0 SUBSURFACE CONDITIONS

The subsurface conditions at the boring, rock probe and test pit locations typically consist of a variably thick layer of topsoil overlying fill material, native soils, and bedrock. Generalized descriptions of the conditions encountered are provided below. Detailed descriptions are provided on the attached boring, rock probe and test pit logs in Appendix I.

6.1 Fill Soils

The fill soils typically consisted of brown sand with variable amounts of silt and gravel. The borings and test pits generally contained large amounts of brick and debris, which most likely was the result of demolition of previous buildings on-site. Several areas contained larger amounts of refuse, such as boring B-15 where tires were found, and boring B-22 where an apparent abandoned tank was encountered. The fill material extended to bedrock in several locations. SPT N-values ranged from 3 to 50+ blows per foot (bpf); however, the higher values were most likely the result of brick and debris encountered throughout the stratum. Generally, the fill is characterized as loose with a New York City Building Code (Code) classification of Class 7. A summary of the encountered fill depths is provided in Table 2 below.

6.2 Native Soils

The native soils were typically comprised of brown sand with varying amounts of silt and gravel, transitioning to gravel with varying amounts of sand and silt at deeper elevations. Cobbles and boulders were encountered across the site. This layer was typically encountered at depths of between 4 and 13 feet below grade; however, there were locations on the site where no native soils were encountered. Where present, the stratum thickness varied from between 2 and 10 feet. The SPT N-values ranged from 6 to 50+ bpf, but were generally between 20 and 50+ bpf, indicating a medium to very dense soil condition. In the area of the existing warehouse, the SPT N-values ranged from 3 to 50+ bpf, but were generally in a looser condition near the surface than the native soils encountered in other locations. The Code classification of the stratum is Class 2a, 2b, 3a, 3b, and 6.

6.3 Groundwater

Groundwater observation wells were installed at borings B-20 and B-35. The depth of the water was recorded and is presented below.

Table 1- Summary of Groundwater Conditions		
Observation Well Number / Location	**Depth To Water Below Existing Grade (feet)**	**Date**
B-20	20.5	10/18/13
B-20	20.6	10/21/13
B-20	20.4	10/22/13
B-20	20.5	10/29/13
B-35	Not encountered (bottom of well on rock at 14 feet)	10/28/13
B-35	Not encountered (bottom of well on rock at 14 feet)	10/29/13

Groundwater could not be accurately measured in the completed borings due to the introduction of drilling fluids during mud rotary drilling. However, based on moisture condition of the soil observed during boring inspection, the groundwater table could possibly reach as high as 15 feet below existing grade. It is noted that groundwater levels fluctuate seasonally and with changing weather conditions, so groundwater should be anticipated to be encountered at depths other than those observed in the wells at other times.

6.4 Bedrock

Bedrock was observed in all boring and rock probe locations at depths of between 7.5 and 23 feet below existing ground surface. The bedrock was classified as a grey and white, slightly weathered, slightly fractured, fine grained, hard marble, with orientations up to 45 degrees from the horizontal. The rock quality designation (RQD) varied from 0 to 85. Generally the RQD was between 65 and 90; however, at borings B-12, B-19 and B-20, the RQD was 18, 53 and 0, respectively, for the upper 5 feet. The Code classification of bedrock is Class 1a, 1b and 1d. A summary of the depths at which rock was encountered is present in Table 2.

Table 2- Summary of Subsurface Conditions

Location	Depth To Rock Below Existing Grade (feet)	Elevation of Rock (feet)	Depth of Fill Below Existing Grade (feet)	RQD (%)
B-1	18.5	7	7	NA
B-2	15	10.7	8	NA
B-3	15.5	10.3	13.5	NA
B-4	11.5	14.7	10	NA
B-5	20	6.3	10	NA
B-6	20	6.9	10	NA
B-7	23	3.8	12	86
B-8	14	13.4	11	NA
B-9	9	19.2	9	77
B-10	13.5	13.5	7	NA
B-11	21.2	6.7	10	NA
B-12	13.5	14.4	13	18
B-13	20.6	7.7	13.5	71
B-14	8	20.7	NA*	NA
B-15	10	18.6	9.5	NA
B-16	9	19.5	NA*	NA
B-17	15	13.4	7.5	NA
B-18	7.5	21	NA*	NA
B-19	9.4	19.2	8	53
B-20	22	4.5	8	0
B-21	19	8.7	NA*	NA
B-22	Boring terminated when tank encountered			NA
B-23	12	17.3	8.5	85
B-24	11	18.8	NA*	NA
B-25	8.1	18.5	4	NA
B-26	12	16.5	NA*	NA
B-27	8.8	19.8	9	NA
B-28	20.5	6.2	2	NA
B-29	19	8.5	NA*	NA
B-30	18	10.1	NA*	NA
B-31	10	18.2	10	NA
B-32	8	20.4	NA*	NA

B-33	8	20.8	4	NA
B-34	11	17.8	NA*	NA
B-35	14	14.8	14	NA
B-36	10	18.8	NA*	NA
B-37	30	-3.4	NA*	92
B-38	13.5	13.2	NA*	NA
B-39	8	19.4	7.5	NA
B-40	12	13.2	2	NA
B-41	19	6.2	2	83
B-42	19	6.2	2	67
B-43	11	14.2	2	NA
B-44	20	5.2	2	NA
B-45	15.1	10.1	2	NA
B-46	16.9	8.3	2	NA

* Rock probe, no soil information logged or sampled

7.0 SEISMIC SITE COEFFICIENTS AND LIQUEFACTION POTENTIAL

As part of our investigation, we have evaluated the subsurface conditions so as to provide an appropriate site coefficient for use in seismic design. Based on the results of our subsurface investigation and the criteria outlined in the 2008 New York City Construction Code (Code), the subsurface conditions underlying the proposed site should be considered Site Class C with maximum spectral response accelerations at short periods (S_{mS}) equal to 0.438g and at 1-second periods (S_{m1}) equal to 0.121g. The design spectral response accelerations (S_{DS} and S_{D1}) should be determined based on these maximum values and the procedures outlined in the Code.

Liquefaction of soils can be caused by a strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, granular soils saturated by a shallow groundwater table are most susceptible to liquefaction. Liquefaction occurs when an earthquake and associated ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid increase in pore water pressure, causing the soil to behave as a fluid for short periods. Based on the results of the borings and SPT sampling, the subsurface conditions at the site should be considered as having a low to moderate potential for liquefaction. The liquefaction analysis indicates that the factor of safety in the upper loose fills is acceptable, however only marginally so. There may be pockets of loose fill that liquefy locally. If the upper fills are over excavated, this will eliminate any liquefaction potential identified above.

8.0 DISCUSSION AND CONCLUSIONS

The proposed construction will consist of two new six to twelve-story buildings with below-grade basement levels in portions of the footprint. The site can be categorized as having an uncontrolled fill layer overlying native soils in areas with bedrock at relatively shallow depths, and a relatively deep groundwater table. The following summarizes the major geotechnical issues regarding the proposed construction and the conclusions of our analyses:

- Based on assumed loading conditions, the feasibility of both shallow foundations and driven piles was explored initially. Due to the presence of large thicknesses of uncontrolled fill and relatively high loading, the use of shallow foundations is impractical for all areas of the buildings not founded on competent rock. The disadvantage of driven piles is that they will be relatively short, and the Code places restrictions on the minimum lengths of piles. Short piles are defined as piles with lengths less than 10 feet from the tip to the cut-off elevation. The Code limits the number of short piles to 50 percent or less. Another disadvantage of driven piles is that the vibrations that result from driving can induce settlement in the looser soils surrounding the site, and consequently, induce settlement of the neighboring structures. As a result, the feasibility of mat foundations and drilled caisson piles were explored. The advantages of mat foundations are that they can be designed to reduce differential settlements and can handle the high loading of multi-story buildings. The disadvantage of a mat foundation is that in areas where the bearing elevation is in uncontrolled fill, all of the unsuitable fill should be replaced with controlled fill. The advantage of drilled caisson piles, which would consist of a steel shell through the overburden soil, concrete and a steel core socketed into bedrock, is that they can be sized such that a single caisson can support the design column load. They also result in the generation of lower vibrations than pile driving and typically do not require load testing per the Code. If the drilled caisson pile foundation alternative is selected, a conventional spread foundation could also be used in areas of shallow bedrock.

- Based on the results of our analyses, the proposed Veteran’s Building can be supported on a mat foundation. The basement level results in the bearing elevation of the mat subgrade varying from a thin layer of medium dense to dense soils to weathered bedrock. The thickness of the soil progressively decreases to the east. At the west end of the proposed building, the mat will bear on an estimated 8 to 12 feet thick layer of soil overlying the weathered bedrock. Mat foundation settlements have been evaluated to range from less than ¼ inch beneath the building where bedrock is shallowest to approximately 1 inch in the western section of the building. Although this results in a slight rotation of the mat, the settlement can be assumed to be approximately instantaneous with load application, and the differential settlement of approximately ¾ inch can be compensated for as the building is erected. If the identified rotation of the mat foundation is undesirable, the building can be supported on a combination of shallow and deep foundations, both bearing within bedrock. Where bedrock is shallow, spread footings and continuous wall foundations can be utilized. Where bedrock is deeper, the building can be supported on drilled caisson piles.

- Based on the results of our analyses, the proposed Family Building can be supported on a mat foundation, drilled caisson piles or where bedrock is shallow, spread footings and continuous wall foundations. There are two distinct areas within the footprint of the building: 1) the area within a one-level basement along the eastern section of the building, and 2) the areas without a basement along the southern and northern building sections. In areas where there is no basement level, the building can be supported on either a mat foundation constructed after removal and replacement of all existing fill, or on drilled caisson piles. In areas with a basement level, a mat foundation or a combination of drilled caisson piles and shallow spread footings on rock can be used to support the building. In the areas with a basement level, the bearing elevation if a mat foundation is utilized will be partially on rock, partially on controlled fill placed after remedial removals of the existing fill, and partially on native soils. Settlements have been evaluated to range from less than ¼ inch on rock to approximately 1 inch on native soil and controlled fill. If the rotation of the mat, as outlined above is undesirable, the building can be supported on a combination of shallow and deep foundations, both bearing on or within bedrock. Where bedrock is shallow, spread footings and continuous wall foundations can be utilized. Where bedrock is deeper, the building can be supported on drilled caisson piles.

- As the proposed buildings will span the majority of the building lot and will require excavation to a minimum depth of approximately 10 feet below sidewalk elevation, or approximately elevation +14, building construction will require the stabilization of the sidewalls of the excavation to minimize disturbance to the neighboring buildings and the adjoining sidewalk, road and underlying utilities. Traditional underpinning may be used and should consist of a continuous concrete wall cast in alternating pits whose dimensions and spacing are selected to maintain stability of the existing foundations and minimize the disturbance soils adjacent to each underpinning pit. Due to the granular nature of the soils, the pits will need to be hand excavated and tightly shored. The use of grouting may also be required to prevent soil raveling.

  Other approaches to stabilizing the sidewalls of the excavation include the utilization of soldier pile and lagging walls or steel sheet piles. With the case of soldier pile and lagging walls, a potential for damage to adjoining properties may exist resulting from the loss of lateral confinement of the soil and the loss of soil itself, either by raveling prior to installing the lagging or by loss through the relatively pervious lagging with groundwater seepage. With the case of sheet piling, the primary source of potential damage is the installation process. This is due to the vibrations that result, which can densify the loose sand soils and induce building settlement or induce damage directly from the vibration waves themselves. The most probable result of both of these methods will be differential settlement, and associated distress to the neighboring building. Vibration or settlement sensitive equipment within the adjacent buildings may also be impacted. For the Veterans Building, both of these approaches, when properly implemented, should have negligible impact on the adjacent buildings to the west and north due to the setback of 15 feet and 22 feet, respectively. For the Family Building, the adjacent building to the west is essentially on the lot line, which may result in an impact to the adjacent building if one of these methods is selected.

- An active monitoring system will need to be implemented to verify that the construction does not adversely impact the existing structures around the site. Monitoring should include surveying to identify both horizontal and vertical movement of the adjacent buildings. Monitoring should also include vibration monitoring to verify that vibration levels are within acceptable limits. Preconstruction surveys of adjacent structures should also be performed to aid in the defense of damage claims.

The following are other general conclusions that can be made regarding the proposed construction:

- Groundwater will likely not be encountered during construction when excavating the site. However, water perched over the bedrock and possibly in isolated fill pockets may be encountered.

- The majority of on-site soils are unsuitable for use as backfill materials due to the debris and relatively high silt contents observed.

- The majority of the existing fill will likely be removed during construction of the basement levels; however, deeper pockets of existing fill may be present at some locations.

- The results of our liquefaction analysis indicate that liquefaction potential of the subsurface soils is low to moderate, however removal of the fill will eliminate liquefaction potential.

- Excavations should be feasible with conventional heavy-duty construction equipment; however, cobbles, boulders and building construction debris will likely be encountered.

9.0 RECOMMENDATIONS

The following sections provide our geotechnical recommendations for design of the proposed building foundations. The recommendations are based on our understanding of the proposed construction as described in Section 3, the results of the subsurface investigation, and our experience in the general vicinity of the project site.

9.1 Building Foundations

As discussed in Section 8, the building structure can be supported on either a mat foundation spanning the weathered bedrock, native soils and controlled fill placed after remedial removals of the existing fill, or alternatively, on spread and continuous wall foundations bearing in rock, where rock is shallow, and on drilled caisson pile foundations bearing within rock where rock is at greater depths. The advantages and disadvantages of these foundation alternatives were also discussed in Section 8. The following subsections provide design criteria for the different foundation alternatives.

9.1.1 Mat Foundation

A single or stepped mat foundation can be used to support the structures. The mat foundation should bear on the bedrock, native soil or controlled fill. Preparation of the subgrade and controlled fill placement recommendations are provided in Section 10 of this report.

The mat should be designed using the values provided in Table 3. A mat foundation constructed to the approximate dimensions of the proposed buildings, and utilizing the design parameters below, is anticipated to settle up to approximately 1 inch or less.

Table 3 – Mat Foundation Design Parameters		
Parameter	**On Native Soil Below El. +16 Or Rock**	**On Native Soils Above El. +16 or On Controlled Fill**
Allowable Bearing Capacity (tsf)	5	2
Winkler Spring Coefficient (pci)	70	30
Base Sliding Coefficient	0.42	0.50

If a mat foundation is selected, the design should include measures for handling differential settlements, which may result from the mat bearing on rock and native soils or controlled fill in close proximity. Differential settlements of up to 1 inch are possible.

A maximum seasonal high groundwater level of 15 feet below existing grade should be used for the purpose of design. All recommendations included in this report are based on this groundwater elevation.

9.1.2 Drilled Caisson Pile

If used, caisson piles should be designed in accordance with the requirements of the Code. Specifically, they should be designed to derive their entire support from a socket constructed within Class 1c or better bedrock. The diameter, reinforcing and socket length will vary with the required load capacity, which will vary with location within the building. The rock socket should be designed utilizing an allowable bond stress between the concrete and the sides of the rock socket of 200 pounds per square inch. The allowable end bearing capacity of the socket will depend upon the Code classification of the bedrock, which was typically identified to be Class 1c or better during the subsurface investigation. Per the Code, Class 1c rock has a basic allowable bearing pressure of 20 tons per square foot. This can be increased per the Code by 10 percent for each foot of embedment below the bedrock surface (the socket depth) to a maximum of two times the basic allowable bearing pressure.

The drilled shaft should be designed to resist lateral loading using the following criteria:

Table 5 – Lateral Design Parameters for Drilled Caisson piles

Elevation (feet)	γ (pcf)	ϕ (degrees)	C (psf)	K_l (pci)	ε_{50}	K_p
Above +16	NA	NA	NA	NA	NA	NA
Rock to +16	110/58(1)	34	NA	90/60(1)	NA	3.54
Rock	73	NA	8000	2000	0.004	NA

For the above tables:
(1) Use first value above water table, second below

γ = design unit weight of soil (pounds per cubic foot)
ϕ = angle of internal friction (degrees)
C = cohesion (pounds per square foot)
K_l = coefficient of lateral subgrade reaction (pounds per cubic inch) required for p-y curve methods of analysis
ε_{50}= axial strain at 50% of the maximum principal stress difference
K_p = coefficient of passive earth pressure.

Individual boring logs should be consulted to determine the depth to bedrock when evaluating lateral stability and deflection of the caissons.

9.1.3 Spread and Continuous Wall Footings

If utilized, spread footings and continuous wall foundations should be designed to bear on bedrock. Based on the boring data, the foundations can either be designed to bear on Class 1b (intermediate) bedrock with a net allowable bearing pressure of 40 tons per square foot, or on Class 1d (soft) bedrock with a net allowable bearing pressure of 8 tons per square foot. Based on the boring data, the soft rock may have to be over-excavated distances ranging up to and possibly in excess of 5 feet to reach the intermediate rock. This has been identified in two locations (borings B-12 and

B-20) during the subsurface investigation, but may also be encountered at other areas of the site. Continuous wall foundations should have a minimum width of 2 feet and spread footing foundations should have a minimum width of 3 feet.

9.2 Design for Lateral Loading

Basement walls, underpinning and temporary shoring should be designed in accordance with the following criteria:

Table 4 – Lateral Design Parameters for Below Grade Walls

Soil Parameter	**Existing Fill**	**Native Sand/Controlled Fill**
Angle of Internal Friction	30º	34º
Active Earth Pressure Coefficient (Ka) [1]	0.33	0.28
Passive Earth Pressure Coefficient (Kp) [2]	3.00	3.54
At-Rest Earth Pressure Coefficient (Ko) [3]	0.50	0.44
Unit Weight of Soil (pounds per cubic foot)	115	125

1) Use for free standing walls where movement of up to 0.0015 X height of wall is both possible and tolerable. Otherwise, use at-rest coefficient.
2) Assume passive pressure below a depth of 4 feet below exterior grade only.
3) Use for walls restrained against outward lateral movement.

Additional loading due to temporary and permanent surcharges should be added to the lateral loading exerted by the retained soil. Loads due to supported structures should be applied in appropriate combinations with the lateral loads.

Damproofing should be provided for all basement walls, as well as a perimeter drainage system. The latter should consist of a 12-inch wide drainage layer of crushed stone or clean gravel behind the wall with a collector pipe drained to a positive outlet. The gradation specification for the drainage material is provided in

Section 10. The stone or gravel should be separated from the natural soils or controlled fill by a permeable geotextile having an equivalent opening size of 70 to 100.

Walls should be backfilled in accordance with Section 10.6 of this report. Placement and compaction of backfill should be observed and tested by a geotechnical engineer to monitor that proper compaction is being achieved.

9.3 Floor Slabs

If a mat foundation is not utilized to support the proposed buildings, the floors should be designed as structural slabs in areas of drilled caisson piles or as slab-on-grade floors in the areas of conventional spread footings. If a slab-on-grade floor is utilized, it should be supported on a 6-inch thick crushed stone base placed over a proofrolled and approved subgrade consisting of native sand or weathered rock. A subgrade modulus of 200 pounds per cubic inch (pci) is recommended for the design of the slab-on-grade. The subgrade modulus is suitable for estimating distributions of bearing pressure beneath the slab and for estimating bending moments and shears within the slab. It is not intended for the purpose of calculating total or differential settlements.

10.0 EARTHWORK CONSTRUCTION CRITERIA

The following sections outline our recommendations regarding earthwork, fill placement and subgrade preparations for the proposed project site.

10.1 General Site Preparation

Initially, the site should be cleared of all existing structures, vegetation, pavements, roots, debris, and subsurface obstructions. Debris and vegetation from the clearing operations should be removed from the site and disposed of at a legal dump site. If the mat foundation, or slab-on-grade floor alternatives are selected, any existing fill, soft or unsuitable native materials, and subsurface obstructions should be removed from the building footprints and the zone of influence of the footings. The zone of influence is defined as a 1:1 (horizontal to vertical) line sloping downward and outward from the bottom edge of the footing.

The portion of the existing building which has not been completely demolished should be removed in its entirety from the proposed building footprint. Existing floor slabs, foundation walls, and column footings should be excavated and completely removed.

10.2 Rock Excavations

Bedrock is present at relatively shallow depths at the western and eastern portions of the project site. Excavation of rock should be performed in a manner that will minimize damage to underlying bedrock and adjacent structures. Where feasible, rock excavation should be performed by ripping techniques. Rock excavation by means of blasting is not recommended due to the urban setting of the project site. Other non-blasting methods, such as hydraulic hoe-ramming, rock trenching, or expansive chemical grout, should be considered as potential means for the rock excavation. The feasibility and methodology for rock removal should be developed by an experienced qualified contractor or a specialist and it should be performed in a manner that will minimize damage to underlying bedrock that will serve as foundation subgrades. Rock removal should also be conducted in a manner that will minimize ground vibrations at adjacent structures and also limit the amount of air overblast pressure. A monitoring program should be implemented through limitations on peak particle velocity and air overblast pressure (sound level) at adjacent structures. Final and temporary cuts in bedrock should be thoroughly scaled to remove any loose rock blocks.

Pre-construction and post-construction building condition surveys of adjacent structures should be performed to document existing conditions which may be aggravated by the proposed rock removal and other construction operations, and to aid in the defense of spurious damage claims.

10.3 Subgrade Preparation

All mat foundation and slab-on-grade subgrades and surfaces to receive fill should be inspected by the geotechnical engineer prior to placement of controlled fill or concrete. Mat foundation and slab-on-grade subgrades should consist of medium dense to dense native soils, as described in this report, compacted controlled fill, or bedrock. Subgrades should be prepared by excavating to the subgrade elevation, removing any remaining existing fill, and allowing a geotechnical engineer to inspect the subgrade conditions. Existing fill placed as part of previous construction or site grading activities should be removed from beneath all foundations and slabs-on-grade. .

The soil subgrades should be proofrolled in the presence of the geotechnical engineer by making a minimum of 4 passes in 2 perpendicular directions with a vibratory roller having a static weight of at least 10 tons. Proofrolling should not be performed in saturated areas or areas having freestanding surface water, until they are dewatered and allowed to dry. Soils found to be soft during proofrolling should be removed from the zone of influence of the slab or foundation and replaced with compacted controlled fill as directed by the geotechnical engineer. The zone of influence is defined in Section 10.1.

10.4 Rock Subgrade Preparation

Rock subgrades should be prepared approximately level and they should be cleaned of all soil materials. If lean concrete is used to provide a level subgrade, the geotechnical engineer should evaluate the degree and direction of the slope of the rock surface and their variation over the area of the leveling pad to determine the stability of the leveling pad relative to sliding failure along the concrete-bedrock interface. If it is determined that the leveling pad is unstable due to shear forces resulting from a sloping rock surface, the bedrock surface should be stepped or dowels should be installed to resist the sliding forces.

10.5 Protection of Subgrades/Dewatering

The site soils are susceptible to disturbance. Subgrades should be protected from the effects of frost, construction traffic, groundwater, and surface water. The necessary protection should be provided immediately after stripping and excavation, and be maintained until fill or concrete is placed. Soils that become disturbed due to wet conditions should be removed and replaced with compacted controlled fill.

Temporary surface drainage measures are recommended to divert runoff away from the proposed construction limits. Well defined temporary construction access roadways using crushed stone and possibly a stabilization fabric should be considered to avoid surface soil disturbance and the need for costly corrective measures.

Perched groundwater seepage may be encountered overlying the bedrock during excavation. If water is encountered, dewatering should be performed to maintain the water level at least 2 feet below the deepest excavation. Dewatering should be performed in a manner that will prevent loosening or migration of the subgrade soils. Dewatering by the use of sumps may is feasible. However, the sumps should not be installed directly in the footing excavations.

10.6 Fill Placement

Controlled fill should be as defined in the Code: *"well-graded sand, gravel, crushed rock, recycled concrete aggregate, or a mixture of these, or equivalent materials with a maximum of 10 percent passing the #200 sieve, as determined from the percent passing the #4 sieve."* In addition, controlled fill should be free of trash, debris, roots, vegetation or other deleterious materials.

The on-site fill is not suitable for re-use as controlled fill. The on-site native soils may be used as general fill outside the building area, or as fill beneath pavements or in landscape areas, provided these materials have a maximum particle size of 4 inches and they are free of trash, debris, roots, vegetation, peat or other deleterious materials. As previously noted, however, these soils are moisture sensitive due to their high silt content and their use may result in construction delays if they become wet.

Free draining crushed stone below floor slabs and as drainage materials behind foundation walls or around underdrains, should be as follows:

Sieve Size	**Percent Finer by Weight**
1 inch	100
½ inch	30-100
¼ inch	0 - 30
No. 4	0 - 10
No. 8	0 – 5

All fill should be compacted to at least 95 percent of the maximum dry density at near optimum moisture contents as determined by ASTM D1557, *“Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))”.* The lift thickness for the fill soils will vary depending on the type of compaction equipment used. Fills should generally be placed in uniform horizontal lifts not exceeding 8 inches in loose thickness in open areas. In confined areas, the loose lift thickness should be reduced to 4 inches or less and each lift should be compacted with sufficient passes of hand operated vibratory or impact compaction equipment. Compaction within 5 feet of foundation walls should only be performed with hand-operated equipment.

A geotechnical engineer with appropriate field and laboratory support should inspect all footing subgrades, approve materials for use as fill, and test backfill materials for compliance with the recommended compaction. Each lift of fill placed at the site should be tested for compaction.

10.7 Excavations

All excavations should be sequenced in a manner that will not compromise the stability of the adjacent structures. Any vertical cut greater than 4 feet in height should be inclined for safety unless sheeting or shoring is used. The on-site soils meet the description for OSHA Class C soils; therefore, we anticipate that the on-site sands are not capable of holding a slope steeper than approximately 1.5:1 (horizontal to vertical). All sheeting and shoring should be designed by a professional engineer. OSHA and Code requirements pertaining to protection of property and worker safety should be met during excavation and backfilling activities.

Excavations should be feasible utilizing standard construction equipment (i.e. hydraulic excavator); however, construction debris and large boulders may be present.

Underpinning, if required, should consist of a continuous concrete wall cast in alternating pits whose dimensions and spacing are selected to maintain stability of the existing foundations and minimize the disturbance of soils adjacent to each underpinning pit. Additionally, construction monitoring and control point surveying should be performed during construction to monitor any displacement experienced by the existing building.

10.8 Drilled Caisson Pile Construction Considerations

Drilled caisson piles should be constructed in accordance with the most recent standards of the International Association of Foundation Drilling (ADSC) and ACI 336. Plans and specifications should clearly indicate that variable soil conditions are present, and that layers of gravel and possible cobbles and boulders could be encountered. This will allow the contractor to employ the appropriate equipment and construction methodologies. The foundations should also be constructed under the full-time observation of the geotechnical engineer or qualified in-house inspector provided by Client. If the drilled caisson piles extend into the underlying bedrock, the depth of the rock embedment and condition of the rock should be evaluated by a geotechnical engineer to confirm that it is in accordance with the design criteria.

Due to the granular nature of some of the subsurface soils, a temporary steel casing may be needed to prevent collapse of the soils into the excavations, and drilling slurry may be required to maintain the side wall stability below the groundwater level. The temporary casing could be extended to the full depth of the caisson pile in lieu of the drilling slurry, provided that the casing is removed while concrete is placed. Removal of the casing should be performed so that the level of the concrete within the casing is at least 1-foot above the bottom of the casing at all times.

Concrete placement associated with the drilled caisson piles should be performed utilizing a concrete pump or by the use of tremie methods to prevent segregation of the concrete. If casing is used, concrete placement should be done in a manner to prevent “necking” of the drilled caisson pile.

11.0 CONSTRUCTION MONITORING

A geotechnical engineer familiar with the existing subsurface conditions and having the appropriate laboratory and field testing support should be engaged by the Client to observe that all earthworks is performed in accordance with the specifications and the design criteria outlined in this report.

The following work should be performed under the supervision of a geotechnical engineer:

- Subgrade preparation
- Drilled caisson piles, if necessary
- Underpinning of existing foundations, if necessary
- Proofrolling
- Fill placement and compaction
- Dewatering
- Vibration and deformation monitoring of adjacent buildings and structures

All materials proposed for use as soil fill should be tested and approved prior to delivery to the site. Additionally, all fill materials should be tested as they are being placed to verify that the required compaction is achieved. We further recommend that the project plans and specifications be reviewed by the geotechnical consultant prior to final completion of the bid documents. It should be noted that upon review of those documents, some recommendations presented herein may be revised or modified.

12.0 LIMITATIONS

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers and geologists practicing in this or similar situations. The interpretation of the field data is based on good judgment and experience. However, no matter how qualified the geotechnical engineer or detailed the investigation, subsurface conditions cannot always be predicted beyond the points of actual sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The recommendations contained in this report are intended for design purposes only. Contractors and others involved in the construction of this project are advised to make an independent assessment of the soil and groundwater conditions for the purpose of establishing quantities, schedules and construction techniques.

This report has been prepared for the exclusive use of L. Riso & Sons Co., Inc., for the specific application to the proposed construction of a mixed use residential and commercial buildings located at Melrose Commons on East 161st Street and Elton Avenue, Bronx, New York. We recommend that prior to construction, Tectonic review the project plans and specifications. It should be noted that upon review of those documents, some recommendations presented herein might be revised or modified. In the event that any changes in the design or location of the proposed structures are planned, Tectonic shall not consider the conclusions and recommendations contained in this report valid unless reviewed and verified in writing. It is further recommended that Tectonic be retained to provide construction monitoring and inspection services to ensure proper implementation of the recommendations contained herein, which would otherwise limit our professional liability.

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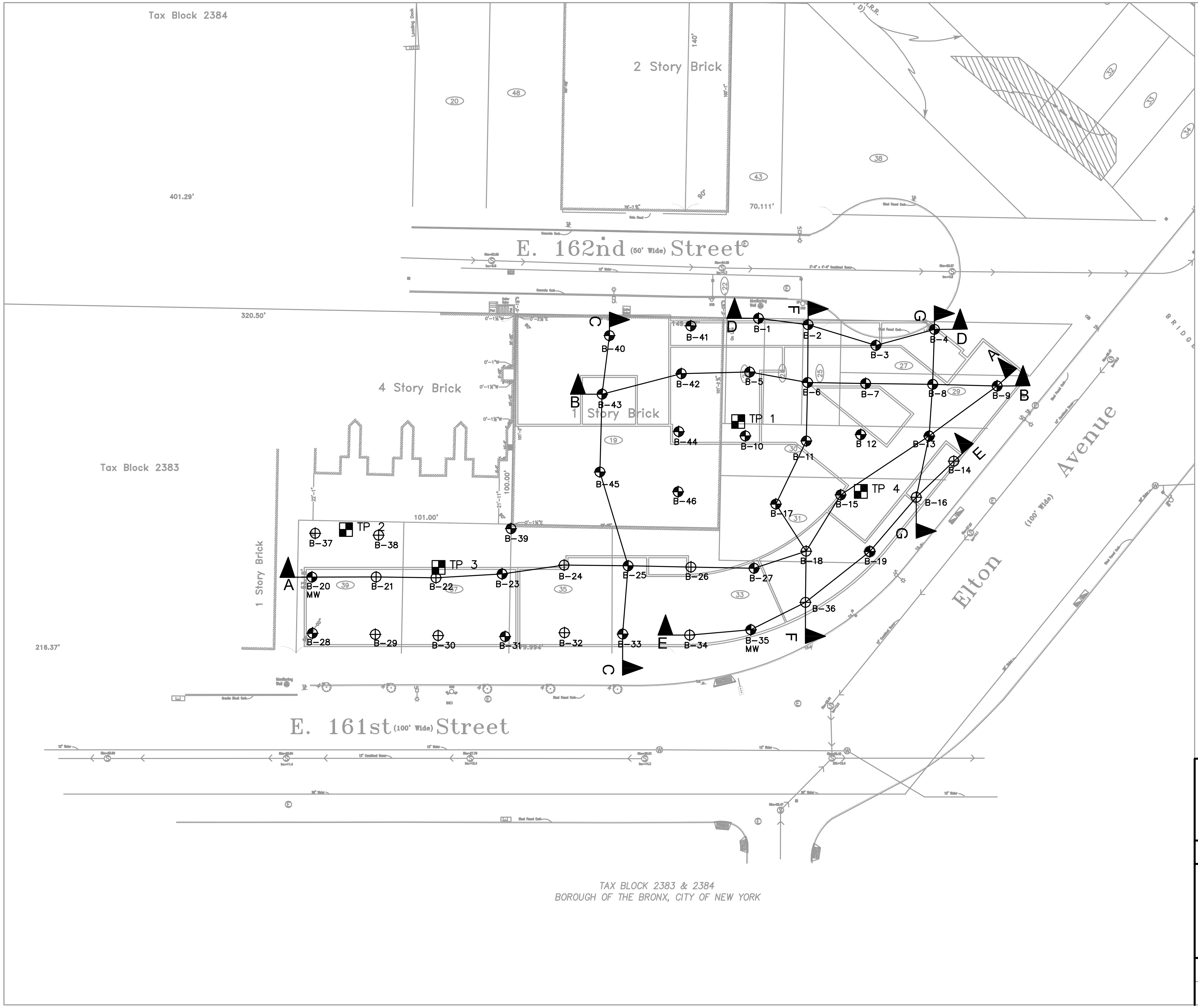
FIGURES



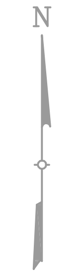
TAX BLOCK 2383 & 2384
BOROUGH OF THE BRONX, CITY OF NEW YORK

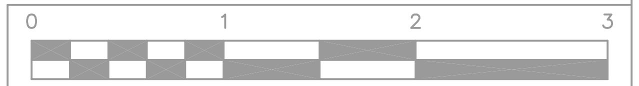
LEGEND

⊕ B-1	APPROXIMATE BORING LOCATION
⊕ B-1	APPROXIMATE ROCK PROBE LOCATION
▚ TP-1	APPROXIMATE TEST PIT LOCATION
⊕ B-1 MW	APPROXIMATE GROUNDWATER OBSERVATION WELL LOCATION
▲ ▲ A A	ROCK PROFILE

NOTES

1. PLAN BASED ON DRAWING ENTITLED "121016 SURVEY", DATED 9-23-2013 BY ERLANDSEN-CROWELL SHAW.
2. BORINGS, PROBES AND TEST PITS WERE FIELD LOCATED BY TECTONIC AND SHOULD BE CONSIDERED APPROXIMATE.





ORIGINAL SIZE IN INCHES

TECTONIC
- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

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BORING, ROCK PROBE & TEST PIT LOCATION PLAN

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
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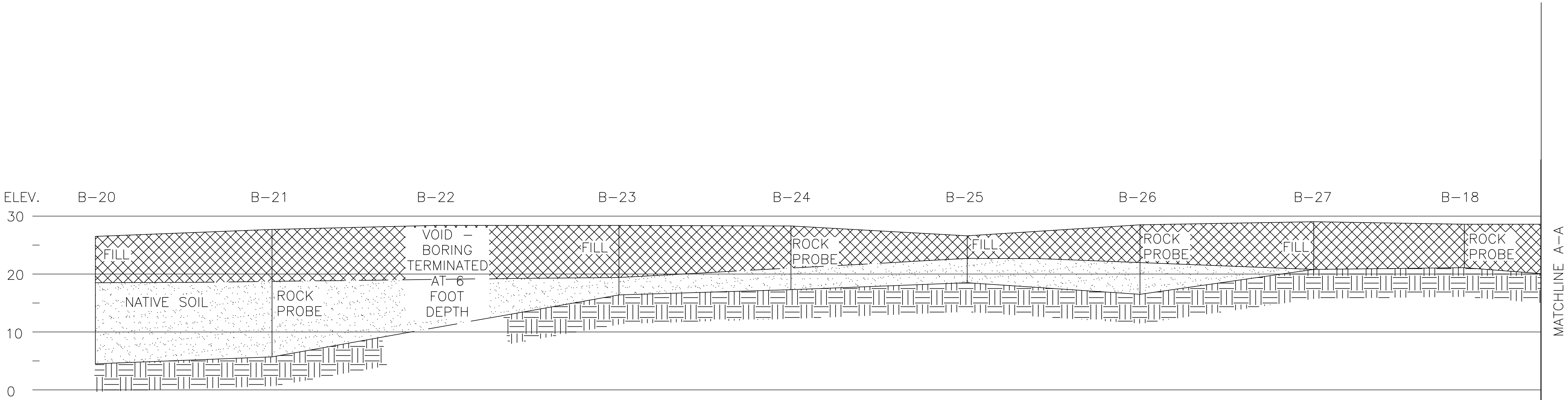
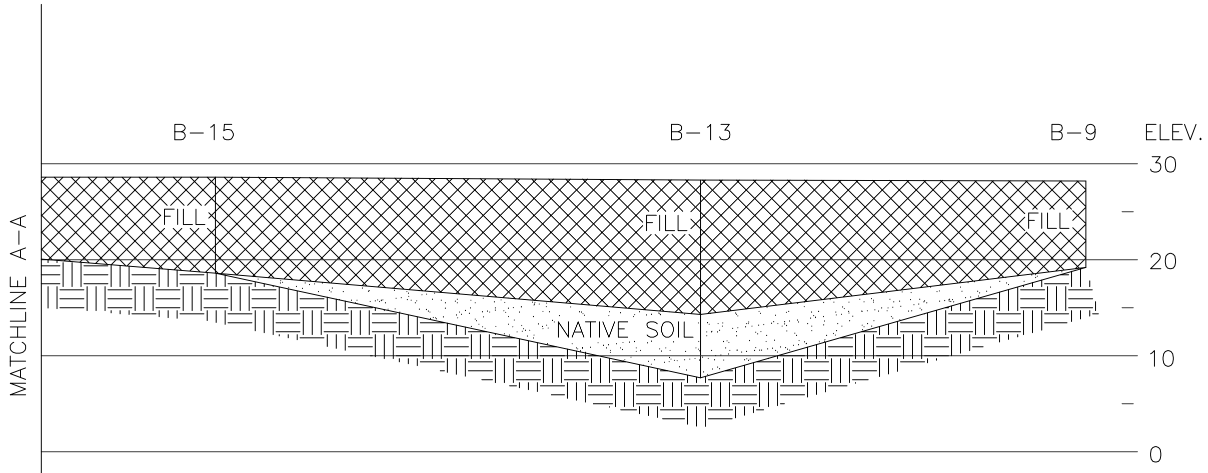


ROCK PROFILE A-A



ROCK PROFILE A-A

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ROCK PROFILE A-A

MELROSE COMMONS
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NEW YORK

Date	Work Order	Drawing No.	Rev
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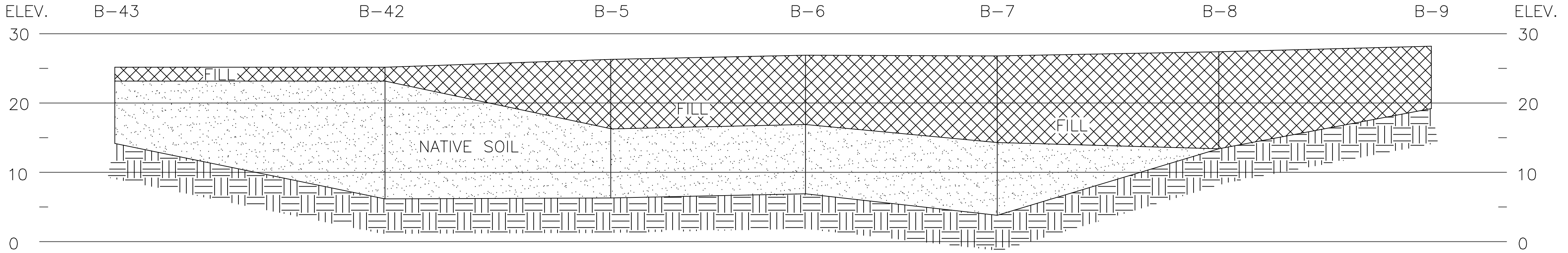
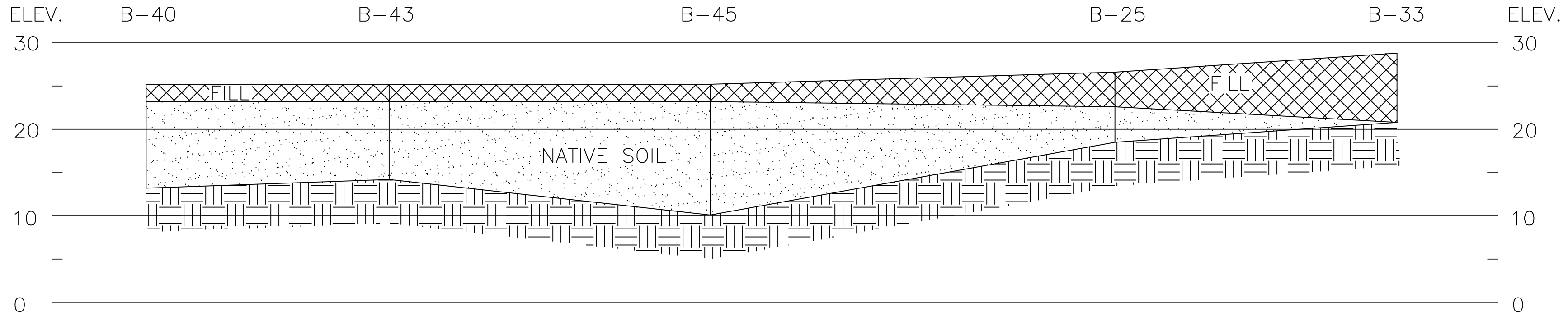


ROCK PROFILE B-B



ROCK PROFILE C-C

TECTONIC

- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

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SOIL PROFILE B-B AND C-C

MELROSE COMMONS
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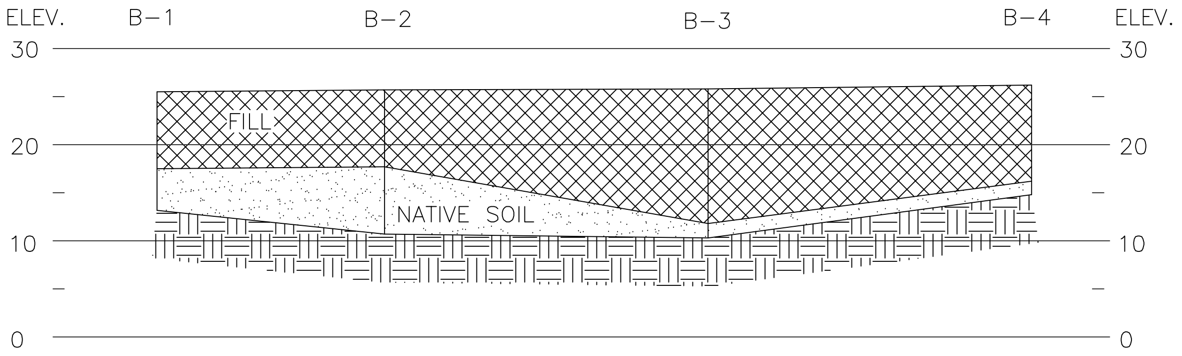
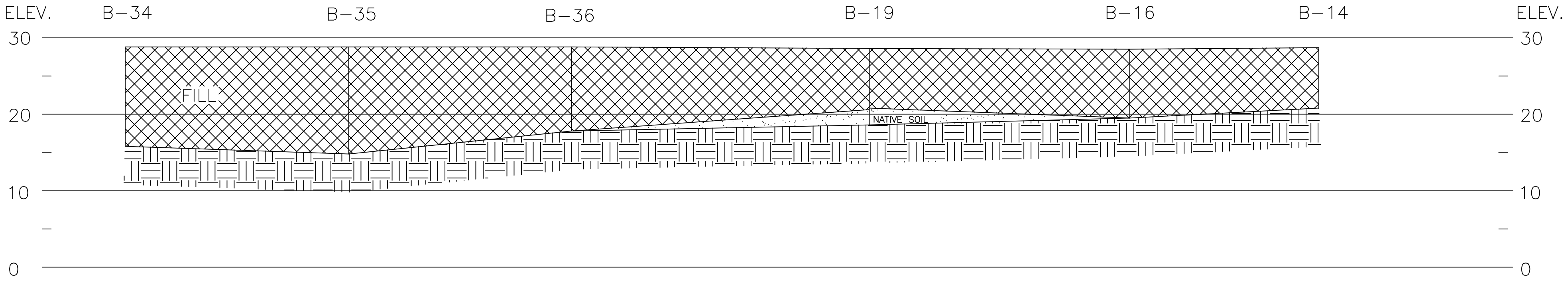
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	3	
Scale 1"=10'			



ROCK PROFILE D-D



ROCK PROFILE E-E

TECTONIC

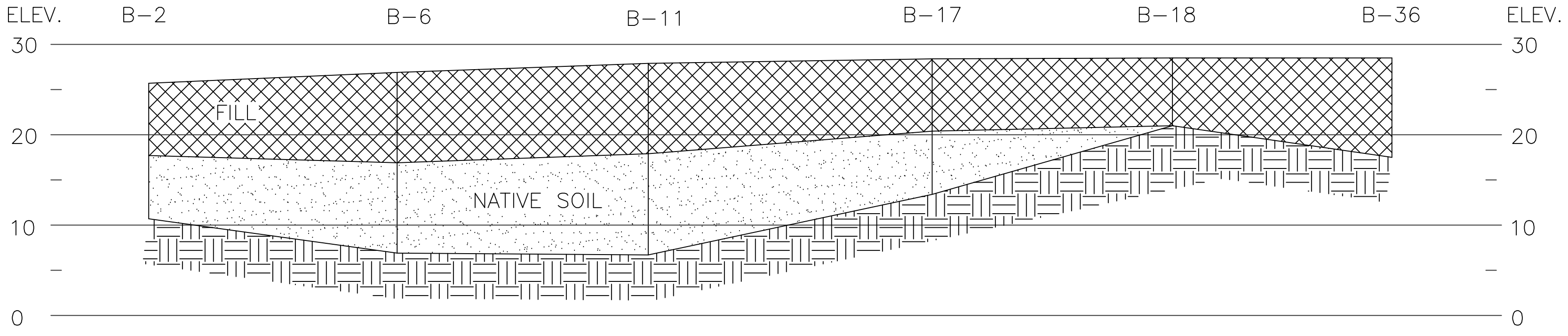
- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
P.O. Box 37, 70 Pleasant Hill Road
Mountainville, NY 10953
Phone: (845) 534-5959
Fax: (845) 534-5999
www.tectonicengineering.com

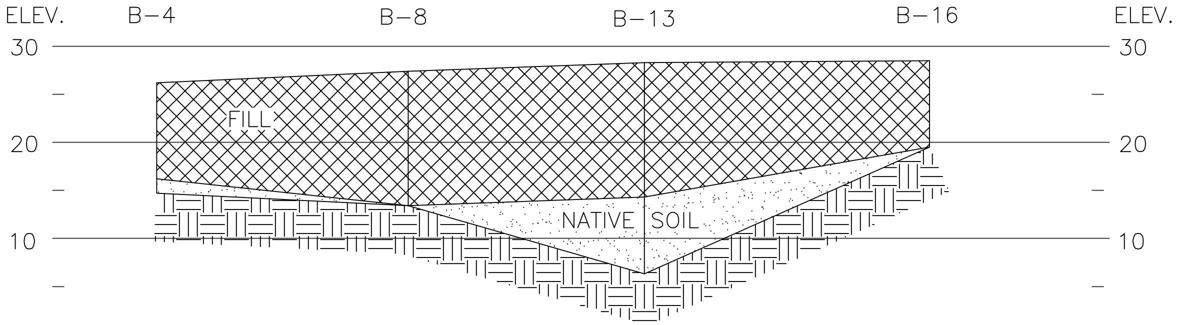
SOIL PROFILE D-D AND E-E

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date	Work Order	Drawing No.	Rev
11/27/13	6926.01	4	
Scale 1"=10'			



ROCK PROFILE F-F



ROCK PROFILE G-G

TECTONIC
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P.O. Box 37, 70 Pleasant Hill Road
Mountainville, NY 10953
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SOIL PROFILE F-F AND G-G

MELROSE COMMONS
161ST STREET AND ELTON AVENUE
BRONX
NEW YORK

Date 11/27/13	Work Order 6926.01	Drawing No. 5	Rev
Scale 1"=10'			

APPENDIX I

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-1

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	18.5'
CASING:	4"	0	TO	18.5'
DIAMOND CORE:	2"	18.5	TO	23.5'

RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: --- TO ---

WEATHER: **Overcast** TEMP: **65° F**

DEPTH TO ROCK: **18.5'**

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**

DRILLER: **Rob Dollar**

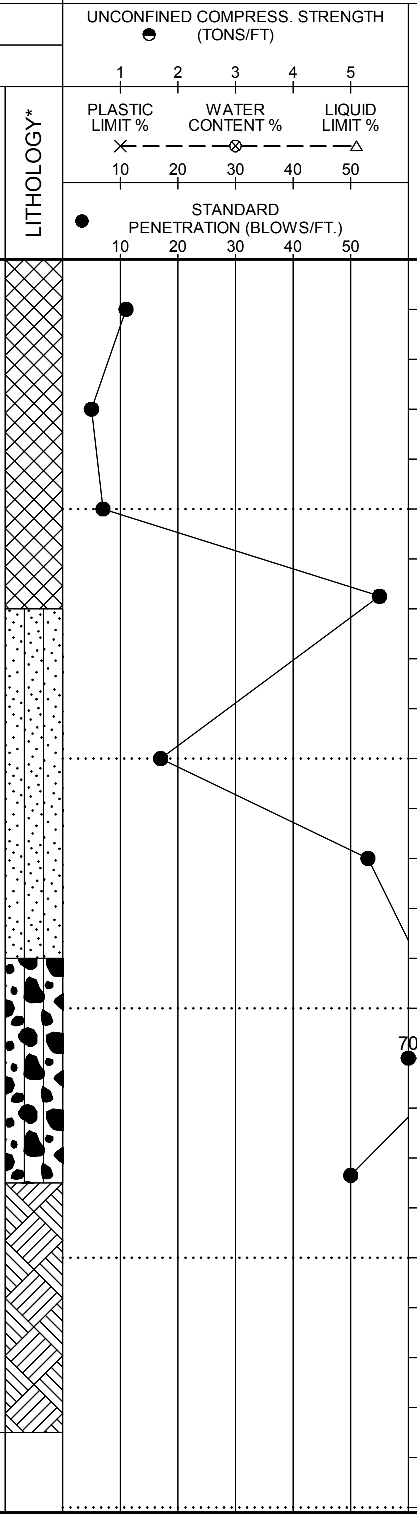
SURFACE ELEVATION: **25.5**

DATUM: **See Remarks**

DATE START: **10/17/13**

DATE FINISH: **10/17/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	11	6 6 5 3	S-1	14		M		Bwn c-f SAND, and Silt, some f Gravel (brick fragments) (FILL) (Class 7)	
3	5	3 3 2 3	S-2	12		M		Same, with cinders (FILL) (Class 7)	
5	7	4 3 4 4	S-3	16		M		Same (FILL) (Class 7)	20.5
7	55+	5 5 50/6	S-4	14		M		Same to 7.0' (FILL) (Class 7) c Gravel fragments	
8								Advanced through boulder to 9'	
10	17	9 9 8 11	S-5	4		M	SM	Lgt bwn c-f SAND, and f Gravel, little Silt with horizontal staining (Class 3b)	15.5
12	53	18 30 23 20	S-6	12		W	SM	Lgt bwn c-f SAND, and f Gravel, little Silt (Class 3a)	
15									10.5
16	70	70 36 34 39	S-7	7		W	GM	Bwn-gy f GRAVEL, and c-f Sand, little Silt (Class 2a)	
18	50+	50/0	S-8	0				No recovery Drilling refusal @ 18.5'	
19	2								
20	2								5.5
21	2		C-1	60	90			Wh-lgt gy, fresh, moderately fractured, fine grained, hard, MARBLE with Pyrite with fractures oriented 0 to 45 degrees from horizontal (Class 1a)	
22	2								
23	1								
24								End of Boring at 23.5'	
25									0.5



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

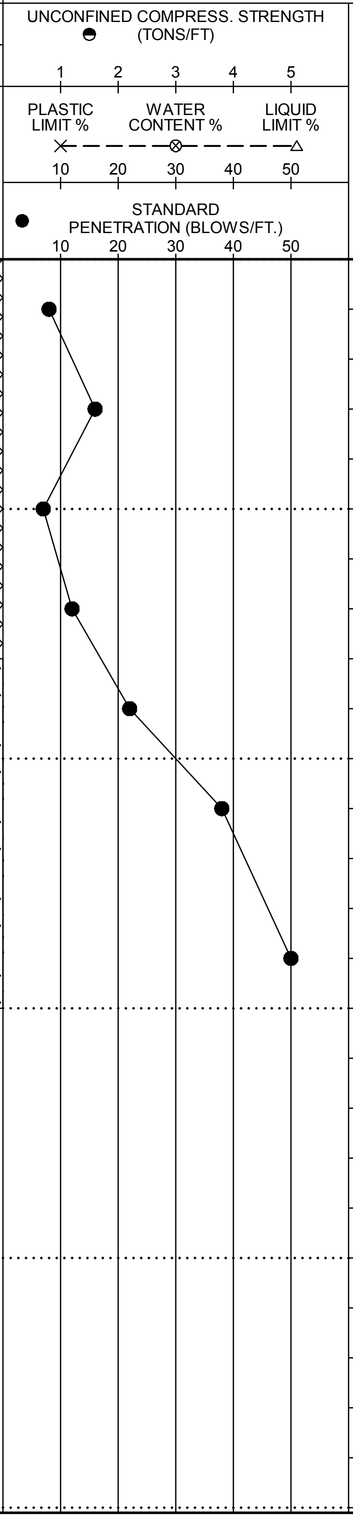
PROJECT No.	**6926.01**
PROJECT:	**Melrose Commons Site C**
LOCATION:	**Bronx, NY**

BORING No. B-2

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR:	**Anthony Laroche**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER:	**Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION:	**25.7**
POWER AUGER:		TO	MON. WELL	☐ YES		☒ NO	DATUM:	**See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **15'**	SCREEN DEPTH:	**---**	TO	**---**	DATE START:	**10/29/13**
CASING:	**4"**	**0** TO **15'**	WEATHER:	**Clear**	TEMP:	**50° F**	DATE FINISH:	**10/29/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **15'**					
			*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	8	2 3 5 5	S-1	8		M		Bwn c-f SAND, some c-f Gravel, little Silt (FILL) (Class 7)	
3 4	16	5 12 4 3	S-2	12		M		Bwn c-f SAND, little c-f Gravel, little Silt (FILL) (Class 7)	
5 6	7	8 3 4 8	S-3	8		M		Bwn-gy c-f SAND, some c-f Gravel, little Silt (FILL) (Class 7)	20.7
7 8	12	9 5 7 20	S-4	10		M		Bwn c-f SAND, little Silt, some c-f Gravel (Partial FILL) (Class 7)	
9 10	22	48 14 8 21	S-5	10		M	SM	Lgt bwn-bwn c-f SAND, little c-f Gravel, little Silt (Class 3b)	15.7
11 12	38	29 22 16 12	S-6	6		M	SM	Bwn-gy c-f SAND, and c-f Gravel, little Silt (decomposed bedrock) (Class 2a)	
13									
14 15	50+	50/0	S-7	0				No Recovery Spoon refusal @ 15'	10.7
16								End of Boring at 15'	
17									
18									
19									
20									5.7
21									
22									
23									
24									
25									0.7



LITHOLOGY*

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-3

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15.5'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

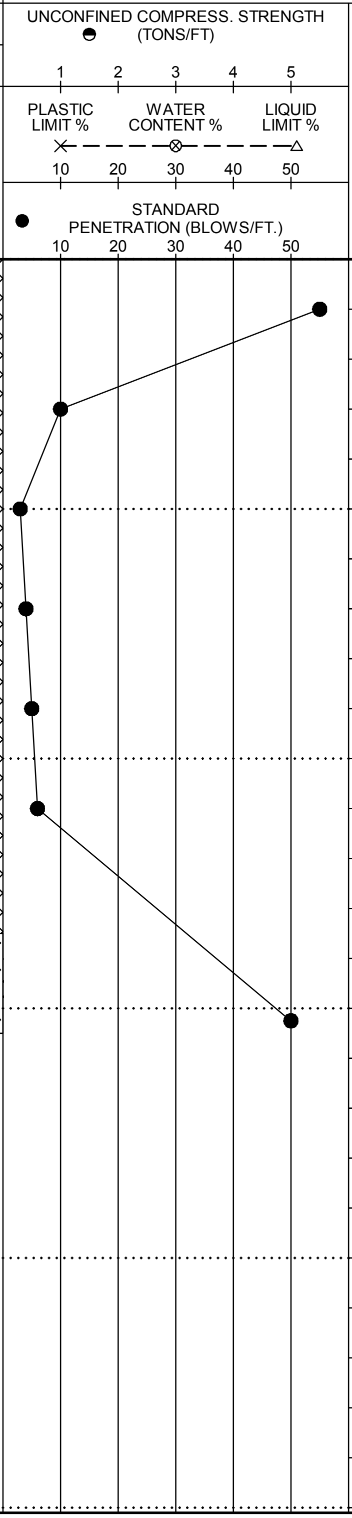
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **15.5'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Anthony Laroche**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **25.8**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	55	11 24 31 9	S-1	12		M		Gy f GRAVEL, c-f Sand, little Silt (FILL) (Class 7)	▨	
2										
3	10	3 5 5 3	S-2	4		M		Bwn c-f SAND, and f Gravel, some Silt (FILL) (Class 7)	▨	
4										
5	3	2 1 2 3	S-3	8		M		Bwn c-f SAND, some Silt, some f Gravel, with brick fragments (FILL) (Class 7)	▨	20.8
6										
7	4	2 2 2 2	S-4	5		M			▨	
8										
9	5	2 2 3 2	S-5	5		M		Bwn f GRAVEL, some c-f Sand, little Silt with brick fragments, with fibrous wood material (FILL) (Class 7)	▨	
10										15.8
11	6	3 3 3 3	S-6	3		M		Bwn f GRAVEL, and c-f Sand, little Silt, brick fragments (FILL) (Class 7)	▨	
12										
13									▨	
14								Rotary advanced to 15'		
15	50+	50/2	S-7	2		M	SM	Bwn-wh c-f SAND, some Silt, little Clay, little f Gravel, residual to decomposed basement rock (Class 3a)		10.8
16								End of Boring at 15.5'		
17										
18										
19										
20										5.8
21										
22										
23										
24										
25										0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

BORING LOG 6926-01.GPJ TECTONIC ENG.GDT 11/21/13

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-4

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

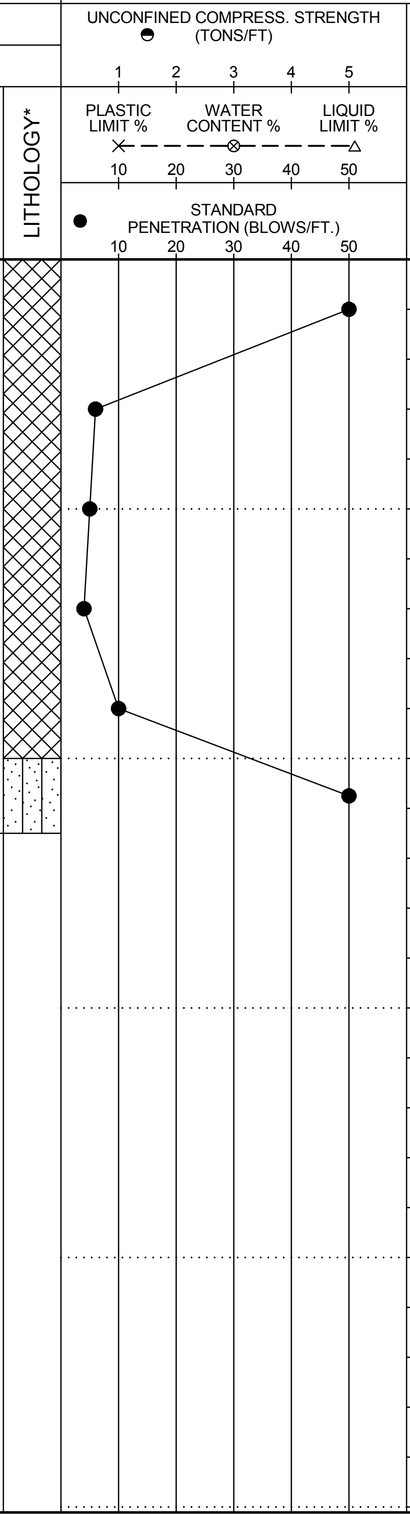
METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:		TO
CASING:		TO
DIAMOND CORE:		TO

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **11.5'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.2**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	SAMPLES RECOV. LENGTH (IN.)	SAMPLES RECOV. RQD (%)	SAMPLES MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	50	12 26 24 6	S-1	14		M		Bwn c-f SAND, some f Gravel, little Silt with brick fragment (FILL) (Class 7)	
2									
3	6	2 3 3 3	S-2	5		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments, with wood fibrous material (FILL) (Class 7)	
4									
5	5	3 2 3 2	S-3	4		M		Bwn c-f GRAVEL, some c-f Sand, trace Silt/Clay, brick fragments (FILL) (Class 7)	21.2
6									
7	4	3 2 2 2	S-4	0				No Recovery	
8									
9	10	5 5 5 4	S-5	6		M		Brick fragments with woody fibrous material, with Bwn c-f SAND, little Silt, little f Gravel, petroleum odor (FILL) (Class 7)	
10									16.2
11	50+	5 50/2	S-6	6		M	SM	Bwn-wh-gy c-f SAND, little f Gravel, little Silt, little Clay with brick fibrous, some residual to decomposed bedrock, strong petroleum odor (Class 3a)	
12								Drilling refusal @ 11.5'	
13								End of Boring at 11.5'	
14									
15									11.2
16									
17									
18									
19									
20									6.2
21									
22									
23									
24									
25									1.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-5

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

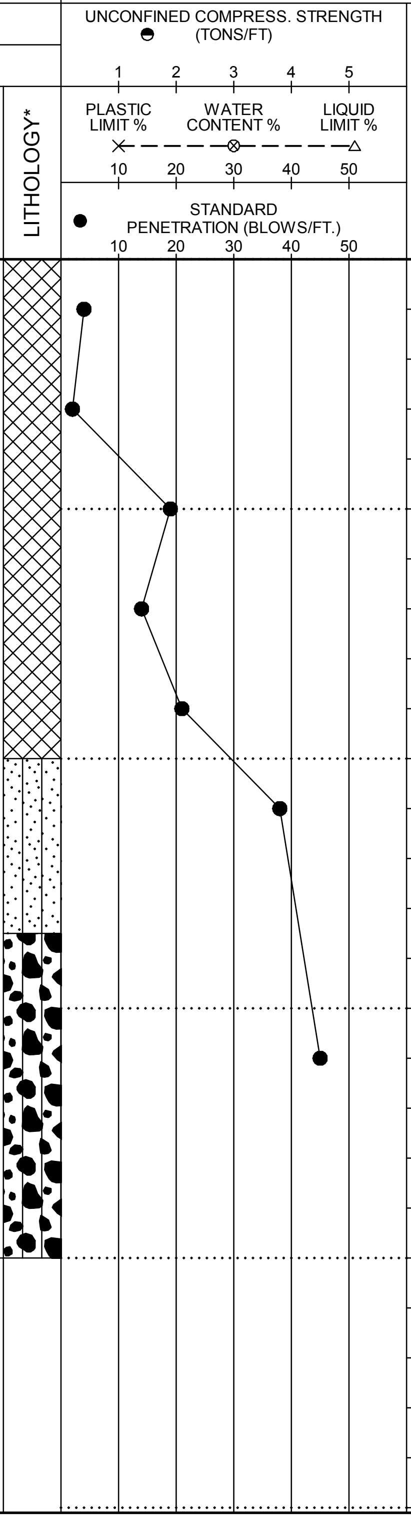
INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.3**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **20'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES					DESCRIPTION OF MATERIAL	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE	UNIFIED SOIL CLASS.		
				LENGTH (IN.)	RQD (%)				
1	4	1 2 2 2	S-1	8		M		Bwn c-f SAND, and f Gravel, some Silt, with brick & glass fragments (FILL) (Class 7)	
2									
3	2	2 1 1 2	S-2	4		M		Brick fragments with c-f SAND, and Silt, some f Gravel (FILL) (Class 7)	
4									
5	19	9 11 8 6	S-3	7		M		Dk bwn c-f SAND, and Silt, some f Gravel with synthetic fibrous material and plastic particles (FILL) (Class 7)	21.3
6									
7	14	9 8 6 3	S-4	14		M		Bwn c-f SAND, some f Gravel, some Silt (FILL) (Class 7)	
8									
9	21	8 10 11 9	S-5	4		M		Bwn c-f SAND, and f Gravel, with coarse Gravel fragments, some Silt (brick fragments) (FILL) (Class 7)	
10									16.3
11	38	26 16 22 16	S-6	20		M	SM	Lgt bwn c-f SAND, and f Gravel, little Silt, residual to decomposed bedrock (Class 3a)	
12									
13									
14								Rotary advanced to 15'	
15									11.3
16	45	18 13 32 20	S-7	14		M	GM	Dk gy-bwn f GRAVEL, with c Gravel fragments, and c-f Sand, some Silt, trace Clay (Class 3a)	
17									
18									
19								Rotary advance to 20'	
20								Weathered bedrock Drilling refusal @ 20'	6.3
21								End of Boring at 20'	
22									
23									
24									
25									1.3



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-6

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Z. Arno**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **26.9**

DATUM: **See Remarks**

DATE START: **10/28/13**

DATE FINISH: **10/28/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	15'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: --- TO ---

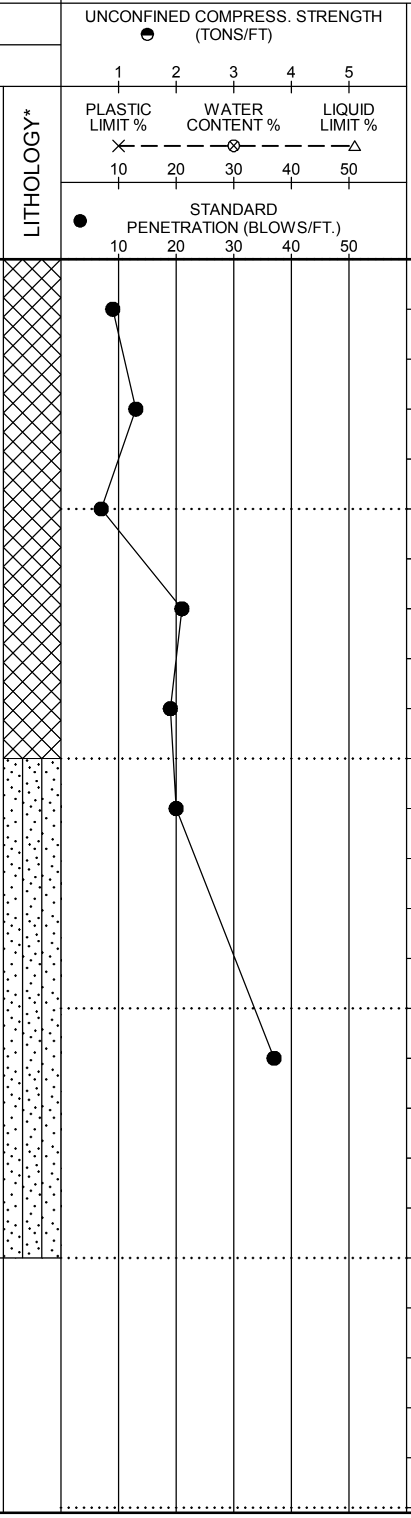
WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **20'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	9	8 6 3 1	S-1	12		M		Bwn c-f SAND, some f GRAVEL, little Silt with organic fibers & brick fragments (FILL) (Class 7)	
2									
3	13	6 7 6 5	S-2	12		M		Bwn-rd c-f SAND, some Gravel, little Silt, brick & tile fragments (FILL) (Class 7)	
4									
5	7	4 4 3 2	S-3	3		M		Bwn c-f SAND, some f Gravel, little Silt with tile & brick fragments with organic fibers (FILL) (Class 7)	21.9
6									
7	21	3 8 13 5	S-4	14		M		Wh-gy c-f SAND & f Gravel (FILL) (Class 7)	
8									
9	19	22 11 8 5	S-5	12		M		Lgt bwn c-f SAND, some f Gravel, little Silt with brick fragments (FILL) (Class 7)	
10									16.9
11	20	6 11 9 6	S-6	14		M	SM	Bwn c-f SAND, some Silt, little Gravel, decomposed residual bedrock (Class 3b)	
12									
13								Rotary advanced to 15'	
14									
15									11.9
16	37	42 20 17 16	S-7	5		M	GM	Residual to decomposed bedrock Tn f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt (Class 3a)	
17									
18								Significant resistance to drilling @ 18.5'	
19								Weathered bedrock	
20									6.9
21								End of Boring at 20'	
22									
23									
24									
25									1.9



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-7

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.8**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

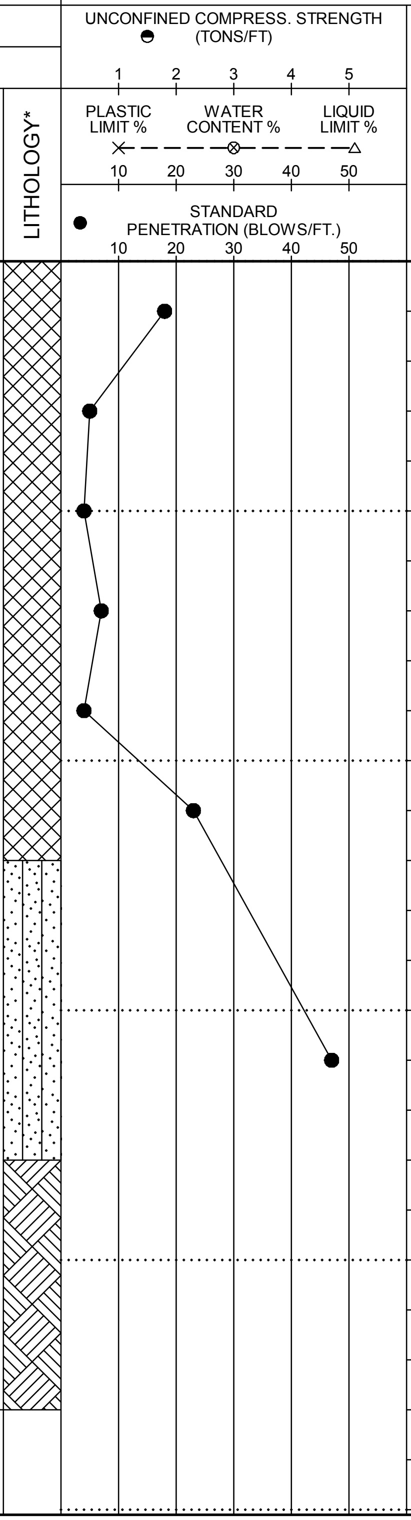
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**18'**
CASING:	**4"**	**0**	TO	**18'**
DIAMOND CORE:	**2"**	**18**	TO	**23'**

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **23'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	18	9 9 9 4	S-1	18		M		Lgt bwn c-f SAND, some f Gravel, little Silt (brick fragments) (FILL) (Class 7)	
3 4	5	5 3 2 2	S-2	7		M		Rd c-f SAND, some f Gravel, little Silt, brick & concrete fragments with glass fragments (FILL) (Class 7)	
5 6	4	4 2 2 2	S-3	14		M		Bwn-gy c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	21.8
7 8	7	8 4 3 2	S-4	2		M		Rd-bwn c-f SAND, little Silt, brick fragments (FILL) (Class 7)	
9 10	4	4 2 2 2	S-5	20		M		Tn-bwn c-f SAND, some f Gravel, trace Silt, with brick fragments (FILL) (Class 7)	16.8
11 12	23	14 10 13 11	S-6	20		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments (FILL) (Class 7)	
13 14 15								Rotary advanced to 15.0'	11.8
16 17	47	19 16 31 50/1	S-7	10		M	SM	Tn-bwn c-f SAND, and f Gravel, little Silt, residual to decomposed bedrock (Class 3a)	
18								Weathered bedrock Drill refusal @ 18.0'	
19 20 21 22 23	4 3 4 4 3		C-1	51	86			Wh-lgt gy, fresh, moderately to slightly fractured, fine grained, hard, MARBLE, fractures oriented 2 to 5 degrees from horizontal, minor staining along few fractures (Class 1a)	6.8
24 25								End of Boring at 23'	1.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-8

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.4**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	14'
CASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

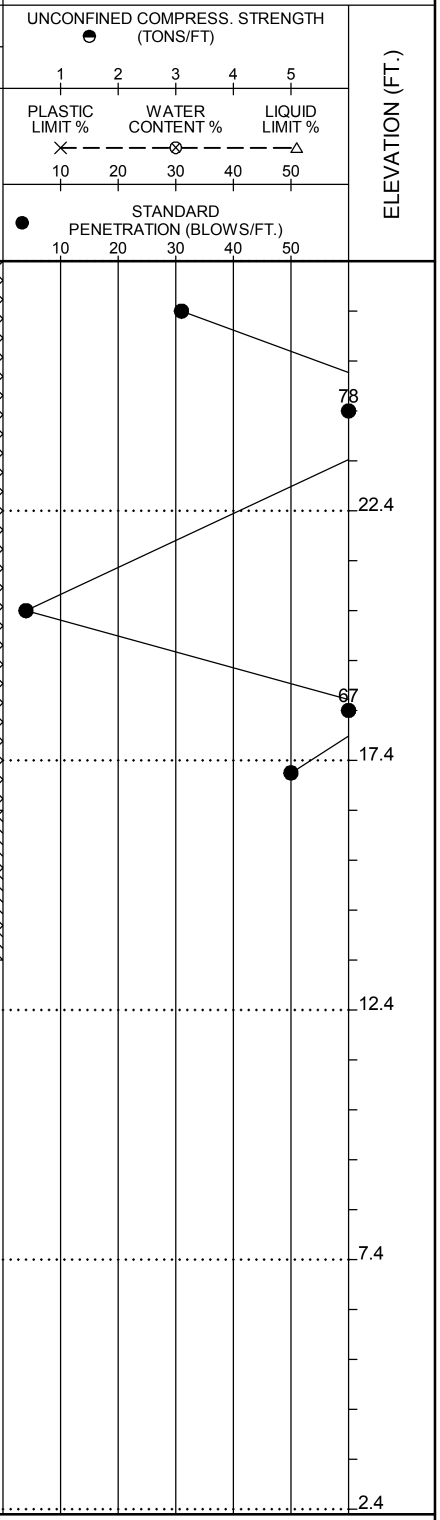
MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **14'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
0-2	31	5 11 20 15	S-1	12		M		Lgt bwn c-f SAND, some Silt, little f Gravel with brick fragments (FILL) (Class 7)
2-4	78+	3 3 75/5	S-2	4		M		Bwn f GRAVEL with coarse Gravel fragments, and c-f Sand, some Silt with brick fragments (FILL) (Class 7)
4-6			S-3	0				No Recovery, Large void
6-8	4	3 2 2 1	S-4	3		M		Dk bwn c-f SAND, some f Gravel, some Silt with brick fragments (FILL) (Class 7)
8-10	67+	8 17 50/4	S-5	4		M		Bwn c-f SAND, little Silt, little f Gravel with brick fragments
10	50+	50/5	S-6			M		Tn-bwn c-f SAND, some f Gravel, little Silt, residual to weathered bedrock, some brick fragments (FILL) (Class 7)
11-14								Decomposed bedrock Auger refusal @ 14'

End of Boring at 14'



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-9

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

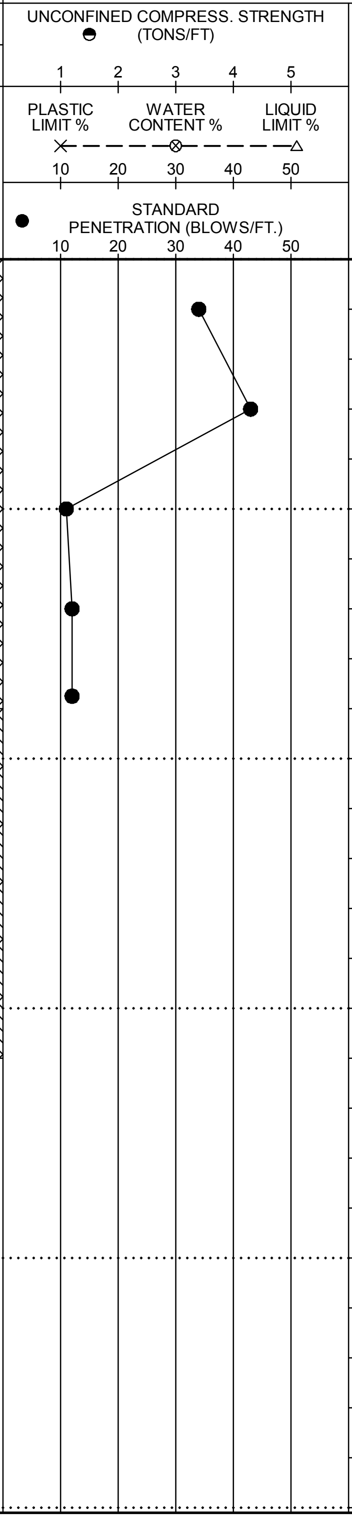
INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.2**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**11'**
CASING:	**4"**	**0**	TO	**11'**
DIAMOND CORE:	**2"**	**11**	TO	**16'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **9.0'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	34	8 15 19 13	S-1	17		M		Lgt bwn f GRAVEL (concrete fragments) and c-f Sand, little Silt, with root fibers (FILL) (Class 7)	
3 4	43	21 22 21 11	S-2	12		M		Bwn-gy f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt with concrete fragments (FILL) (Class 7)	
5 6	11	8 6 5 7	S-3	14		M		Bwn-gy f GRAVEL, with c Gravel fragments, and c-f Sand, little Silt (FILL) (Class 7)	23.2
7 8	12	7 7 5 3	S-4	0				No Recovery	
9 10	12	3 5 7 50/3	S-5	18		M		Asphalt fragments with Bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7) Bwn-lgt bwn f GRAVEL (bedrock fragments) and c-f Sand, little Silt (Class 3a)	18.2
11									
12 13 14 15 16	2 2 4 3 2		C-1	58	77			Wh-lgt gy, slightly weathered to fresh, moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees from horizontal, with near verticle fracture at top 6" with orange staining with Sand along fractures to 13.5' (Class 1b)	13.2
17 18 19 20 21 22 23 24 25								End of Boring at 16'	8.2 3.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-10

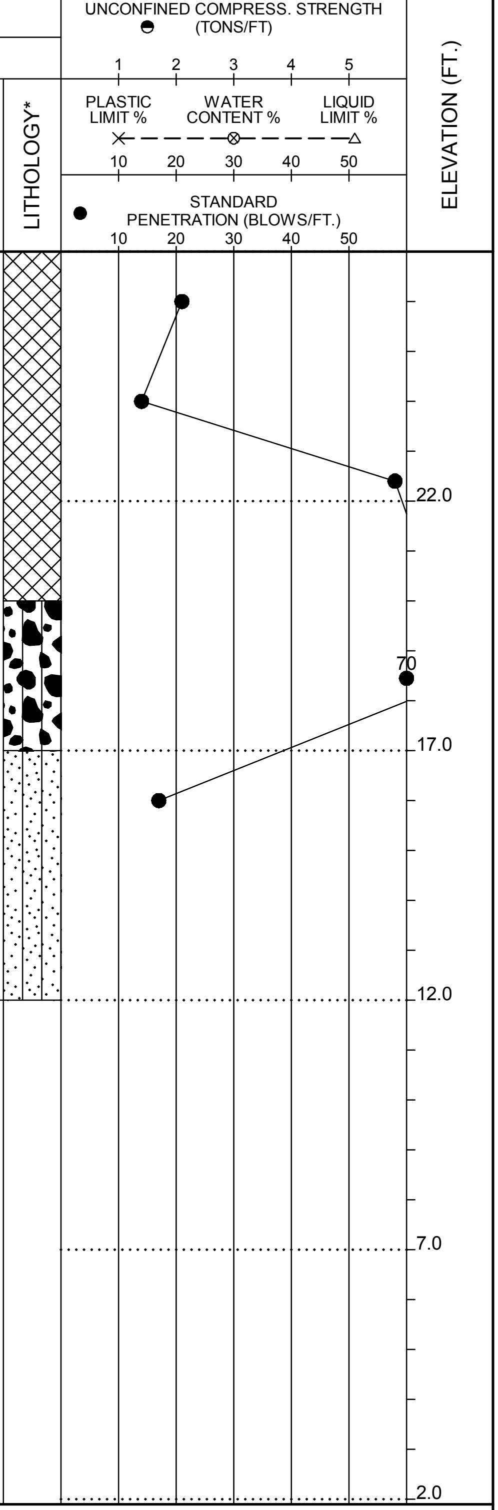
SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **27.0**
POWER AUGER:		TO	MON. WELL	☐ YES		☒ NO	DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **15'**	SCREEN DEPTH: **---**	TO **---**			DATE START: **10/28/13**
CASING:	**4"**	**0** TO **6.5'**	WEATHER: **Clear**	TEMP: **55° F**			DATE FINISH: **10/28/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **13.5'**				

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0-2	21	6 11 10 7	S-1	14		M		Bwn f GRAVEL, some c-f Sand, trace Silt, brick & asphalt fragments (FILL) (Class 7)	
2-4	14	8 9 5 2	S-2	12		M		Rd-bwn f GRAVEL, and c-f Sand, little Silt, brick fragments (FILL) (Class 7)	
4-5.2	58+	11 8 50/2	S-3	12		M		Lgt bwn c-f SAND, and f Gravel, little Silt with brick fragments (FILL) (Class 7)	22.0
5.2-8								Resistant drilling 5.2' to 8' Rotary advanced to 8.0'	
8-9.1	70+	24 20 50/1	S-4	6		M	GM	Gy-bwn f GRAVEL, with c Gravel, little c-f Sand, little Silt, bedrock residual to weathered bedrock (Class 3a)	17.0
10-12	17	10 9 8 8	S-5	17		M	SM	Bwn c-f SAND, and f Gravel, little Silt (Class 3b)	
12-15								Rotary advanced to 13.5' Weathered bedrock Drilling refusal @ 15.0'	12.0
15								End of Boring at 15'	



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-11

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

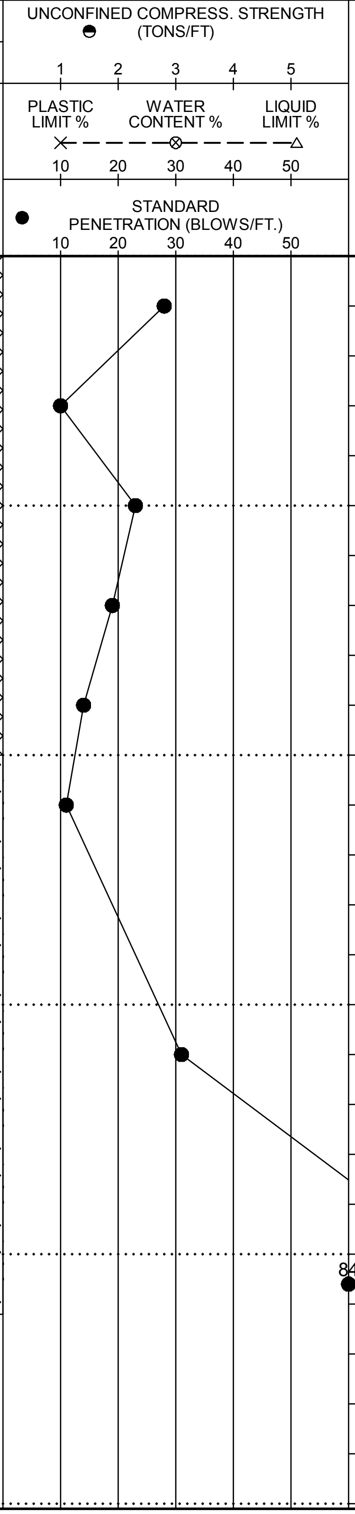
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	20'
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **21.2'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.9**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1 2	28	10 12 16 14	S-1	14		M		Bwn f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt, with wood fibers and brick fragments (FILL) (Class 7)	▨	
3 4	10	10 6 4 8	S-2	10		M		Bwn-rd c-f SAND, little f Gravel, little Silt (FILL) (Class 7)	▨	
5 6	23	11 10 13 19	S-3	8		M		Bwn c-f SAND, some f Gravel, little Silt, w black rubber & plastic material (FILL) (Class 7)	▨	22.9
7 8	19	8 9 10 14	S-4	14		M		Bwn c-f SAND, some f Gravel, trace Silt, with brick & concrete fragments (FILL) (Class 7)	▨	
9 10	14	13 8 6 9	S-5	4		M		Bwn-gy c-f SAND, some f Gravel with c Gravel fragments, trace Silt with rubber particles (FILL) (Class 7)	▨	17.9
11 12	11	7 5 6 15	S-6	11		M	SM	Bwn c-f SAND, some Silt, little Gravel, residual to decomposed bedrock (Class 3b)	░	
13 14 15								Rotary advanced to 15'	░	12.9
16 17	31	18 15 16 15	S-7	16		M	SM	Bwn c-f SAND, some Gravel, little Silt, residual to decomposed bedrock (Class 3a)	░	
18 19 20									░	7.9
21	84+	18 34 50/2	S-8	12		M	SM	Bwn-wh c-f SAND, and f Gravel, with c Gravel fragments, residual to decomposed bedrock (Class 3a) Spoon refusal @ 21.2'	░	
22 23 24 25								End of Boring at 21.2'		2.9



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-12

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

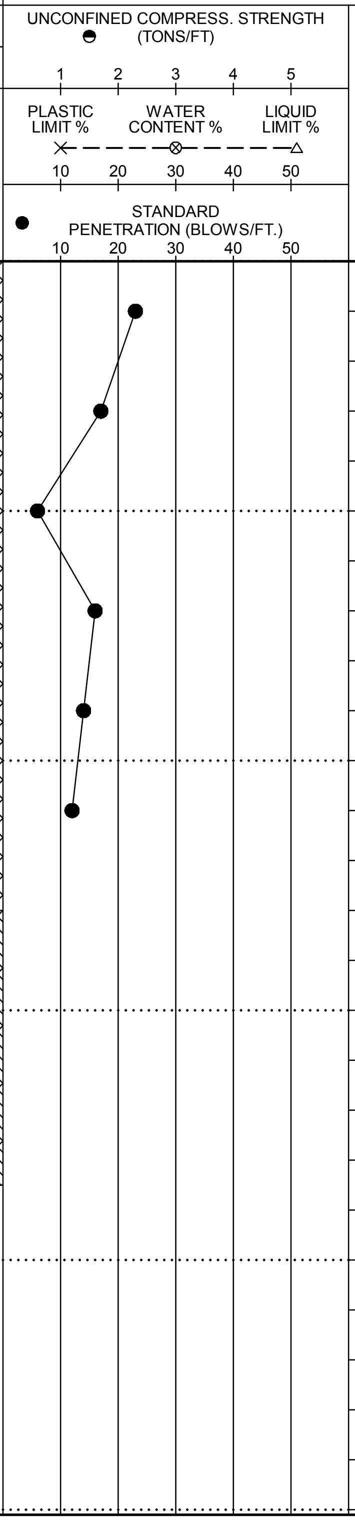
GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.9**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 13.5'
CASING:	4"	0 TO 10'
DIAMOND CORE:		TO

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **13.5'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1 2	23	5 5 18 22	S-1	12		M		Lgt bwn c-f SAND, little Silt, little f Gravel, with brick fragments (FILL) (Class 7)		
3 4	17	16 12 5 3	S-2	8		M		Bwn-rd c-f SAND, and f Gravel, with c Gravel fragments, little Silt (FILL) (Class 7)		
5 6	6	3 3 3 11	S-3	6		M		bwn-rd c-f SAND, some f Gravel, little Silt with brick fragments (FILL) (Class 7)		22.9
7 8	16	12 8 8 4	S-4	16		M		Rd-bwn c-f SAND, and Gravel, trace Silt with brick fragments (FILL) (Class 7)		
9 10	14	16 7 7 7	S-5	10		M		c-f GRAVEL fragments and c-f Sand, little Silt with brick fragments (FILL) (Class 7)		17.9
11 12	12	9 6 6 8	S-6	14		M		Bwn c-f SAND, some f Gravel, little Silt with brick fragments on top (FILL) (Class 7)		
13								Drill refusal @ 13.5'		
14 15 16 17 18	1 2 3 3 3		C-1	4	18			Lgt gy-wh, slightly weathered, moderately fractured, fine grained, hard, MARBLE, fractures horizontal (Class 1d)		12.9
19 20 21 22 23 24 25								End of Boring at 18.5'		7.9 2.9



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

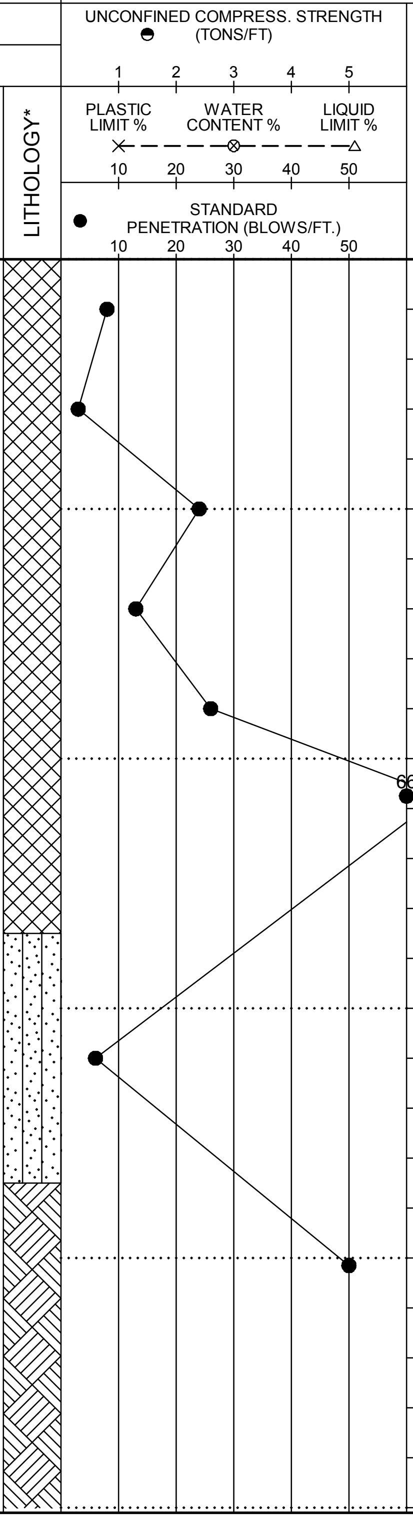
TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-13

SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER: DATE	TIME	DEPTH	INSPECTOR: **Z. Arno**
CONTRACTOR: **Craig Test Boring Co., Inc.**						DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH				SURFACE ELEVATION: **28.3**
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO			DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **22'**	SCREEN DEPTH: **---** TO **---**			DATE START: **10/29/13**
CASING:	**4"**	**0** TO **21'**	WEATHER: **Clear**	TEMP: **50° F**		DATE FINISH: **10/29/13**
DIAMOND CORE:	**2"**	**22** TO **27'**	DEPTH TO ROCK: **20.6'**			
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED			



DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	8	3 4 4 3	S-1	12		M		Bwn c-f SAND, little f Gravel, little Silt with brick fragments, organic veg material (FILL) (Class 7)	
3 4	3	1 1 2 1	S-2	10		M		Bwn c-f SAND, some f Gravel, some Silt with brick fragments, with fibrous plant material (FILL) (Class 7)	
5 6	24	3 12 12 8	S-3	18		M		Bwn c-f SAND, some f Gravel, little Silt with glass & tile fragments (FILL) (Class 7)	23.3
7 8	13	8 7 6 6	S-4	16		M		Rd-bwn c-f SAND, little Gravel, trace Silt, brick & tar fragments (FILL) (Class 7)	
9 10	26	8 18 8 4	S-5	14		M		Bwn c-f SAND, little f Gravel, trace Silt, weathered brick fragment, wood & concrete, tar fragments (FILL) (Class 7)	18.3
11	66+	10 16 50/5	S-6	24		M		Rd-bwn-tn c-f SAND, little f Gravel, trace Silt, some weathered to residual bedrock with glass fragments and brick debris (FILL) (Class 7)	
12 13 14 15								Rotary advanced to 15'	13.3
16 17	6	3 3 3 3	S-7	10		W	SM	Dk gy c-f SAND, some f Gravel, little Silt, weathered bedrock residual (petroleum odor) (Class 6)	
18 19								Rotary advanced to 20'	
20 21	50+	50/3	S-8	2			GM	Tn f GRAVEL, with c Gravel fragments, little c-f Sand, little Silt (Class 3a) Spoon refusal @ 20.2'	8.3
22								Auger refusal @ 22'	
23 24 25	1 1 2		C-1	43	71			Gy-wh, slightly weathered, slightly fractured, fine grained, hard, MARBLE, fractures oriented 45	3.3

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-13

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)						
	2							degrees from horizontal (Class 1b)	▨		
26	2								▨		
27											
28								End of Boring at 27'			
29											
30											-1.7
31											
32											
33											
34											
35											-6.7
36											
37											
38											
39											
40											-11.7
41											
42											
43											
44											
45											-16.7
46											
47											
48											
49											
50											-21.7
51											
52											
53											
54											
55											-26.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-14

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.7**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	8'
CASING:	4"	0	TO	5'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **8'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3								Resistance to drilling @ 6'			
4											
5											23.7
6											
7								Weathered bedrock Drilling resistance @ 8.0'			
8											
9								End of Boring at 8'			
10											18.7
11											
12											
13											
14											
15											13.7
16											
17											
18											
19											
20											8.7
21											
22											
23											
24											
25											3.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-15

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

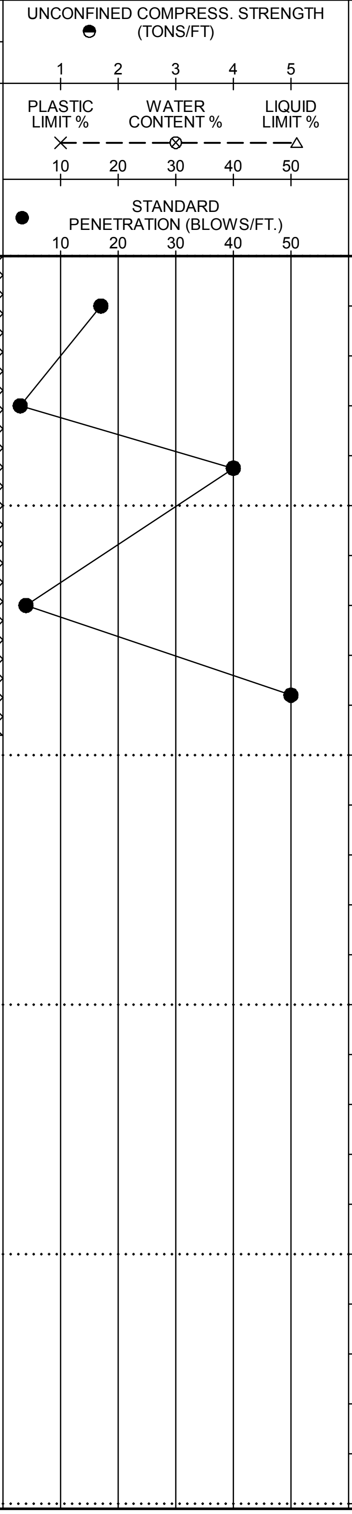
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	10'
CASING:	4"		TO	
DIAMOND CORE:			TO	

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **10'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Z. Arno**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.6**
DATUM: **See Remarks**
DATE START: **10/29/13**
DATE FINISH: **10/29/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1	17	10 9 8 7	S-1	12		M		Bwn c-f SAND, some f Gravel, with c Gravel fragments, little Silt (brick fragments) (FILL) (Class 7)	▨	
2									▨	
3	3	4 2 1 2	S-2	8		M		Bwn c-f SAND, some f Gravel, little Silt, with brick fragments & wood fibers (FILL) (Class 7)	▨	
4	40+	40/2	S-3	3		M		Bwn c-f SAND, some f Gravel, little Silt, with brick fragments, with wood fibers (FILL) (Class 7)	▨	
5									▨	23.6
6									▨	
7	4	0 0 4 3	S-4	2		M		Bwn c-f SAND, and f Gravel, little Silt with brick fragments & rubber tire fragments (FILL) (Class 7)	▨	
8									▨	
9	50+	2 50/5	S-5	3		M		Bwn c-f SAND, and f Gravel, some Silt with wood debris & brick fragments (FILL) (Class 7) Spoon refusal @ 9.6	▨	
10								End of Boring at 9.6'		18.6
11										
12										
13										
14										
15										13.6
16										
17										
18										
19										
20										8.6
21										
22										
23										
24										
25										3.6



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

BORING LOG 6926-01.GPJ TECTONIC ENG.GDT 11/21/13

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-16

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **28.5**

DATUM: **See Remarks**

DATE START: **10/25/13**

DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**9'**
CASING:			TO	
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **50° F**

DEPTH TO ROCK: **9'**

*CHANGES IN STRATA ARE INFERRED

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5

PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △ 10 20 30 40 50

● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5								Rotary advanced to 7.5'		23.5
6										
7										
8										
9										
10								End of Boring at 9'		18.5
11										
12										
13										
14										
15										13.5
16										
17										
18										
19										
20										8.5
21										
22										
23										
24										
25										3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-17

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	15'
CASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

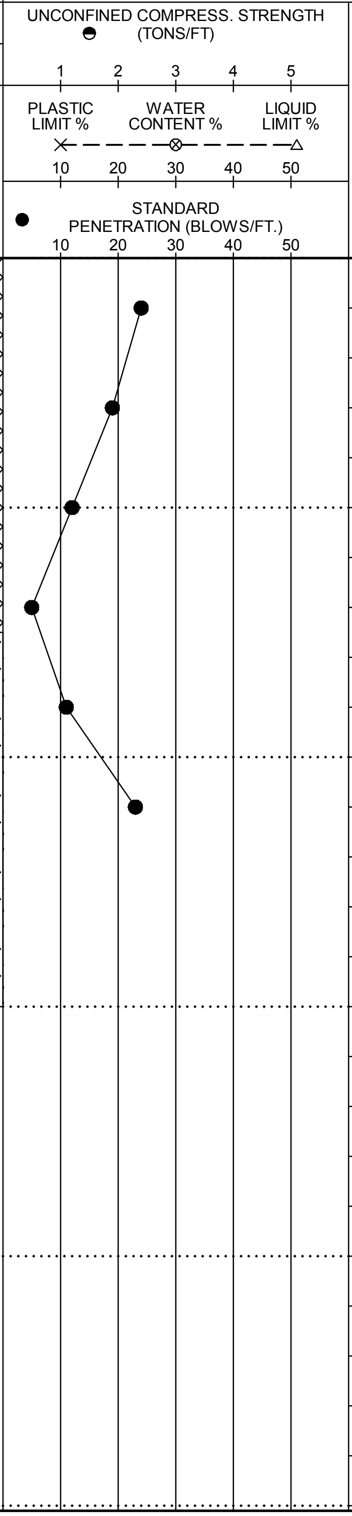
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **15'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	24	12 10 14 4	S-1	14		M		Bwn f GRAVEL, and c-f Sand, little Silt, with asphalt fragments, brick fragments (FILL) (Class 7)	
3	19	9 11 8 8	S-2	14		M		Bwn-rd f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt, brick fragments (FILL) (Class 7)	
5	12	5 5 7 5	S-3	12		M		Lgt bwn-rd f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt, with brick fragments (FILL) (Class 7)	23.4
7	5	3 3 2 9	S-4	18		M	SM	Lgt bwn f GRAVEL, with c Gravel fragments, some c-f Sand, trace Silt with possible asphalt fragments, brick fragments to 7.5' (FILL) (Class 7) Bedrock residual	
9	11	7 4 7 7	S-5	16		M	SM	Lgt bwn c-f SAND, some f Gravel, little Silt with Clayey Silt pockets (Class 3b)	18.4
11	23	11 11 12 11	S-6	18		M	SM	Same	
14								Rotary advanced to 13.5' Weathered bedrock Drilling refusal @ 15'	
15									13.4
16								End of Boring at 15'	
20									8.4
25									3.4



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-18

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	7.5'
CASING:	4"	0	TO	5'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **7.5'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.5**
DATUM: **See Remarks**
DATE START: **10/28/13**
DATE FINISH: **10/28/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	SAMPLES RECOV. LENGTH (IN.)	SAMPLES RECOV. RQD (%)	SAMPLES MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3								Advanced to 5.5'			
4											
5											23.5
6									▨		
7								Weathered bedrock Auger refusal @ 7.5'	▨		
8								End of Boring at 7.5'			
9											
10											18.5
11											
12											
13											
14											
15											13.5
16											
17											
18											
19											
20											8.5
21											
22											
23											
24											
25											3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-19

SHEET No. 1 of 1

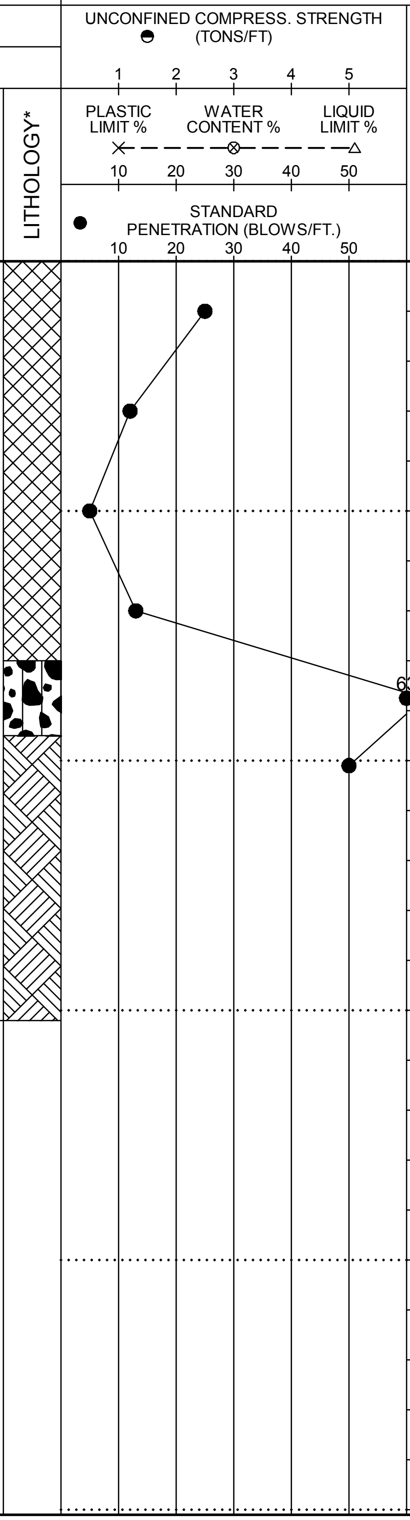
CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**						
METHOD OF ADVANCING BORING	DIA.	DEPTH				
POWER AUGER:		TO				
ROT. DRILL:	**3 7/8"**	TO				
CASING:	**4"**	TO				
DIAMOND CORE:		TO				

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.6**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **9.4'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	25	5 12 13 11	S-1	13		M		Brick fragments with Lgt bwn f GRAVEL, and c-f Sand, little Silt (FILL) (Class 7)	
3 4	12	7 8 4 4	S-2	5		M		Same (brick fragments) (FILL) (Class 7)	
5 6	5	3 2 3 2	S-3	8		M		Brick & asphalt/slag fragments with Bwn f GRAVEL, and c-f Sand, little Silt with metal (FILL) (Class 7)	23.6
7 8	13	2 8 5 5	S-4	10		M		Brick & asphalt fragments with Bwn-gy f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)	
9	63+	11 13 50/4	S-5	12		M	GM	Wh-lgt bwn c-f GRAVEL, and c-f Sand, little Silt (bedrock fragments) (Class 2a) Weathered bedrock @ 9.4'	
10	50+	50/2	S-6	0				No Recovery	18.6
11 12 13 14 15	2 3 3 2 3		C-1	55	53			Wh-lgt gy slightly weathered, moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 30 degrees from horizontal with decomposed zone (Class 1a)	13.6
16 17 18 19 20 21 22 23 24 25								End of Boring at 15.2'	8.6 3.6



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-20

SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **26.5**
DATUM: **See Remarks**
DATE START: **10/17/13**
DATE FINISH: **10/18/13**

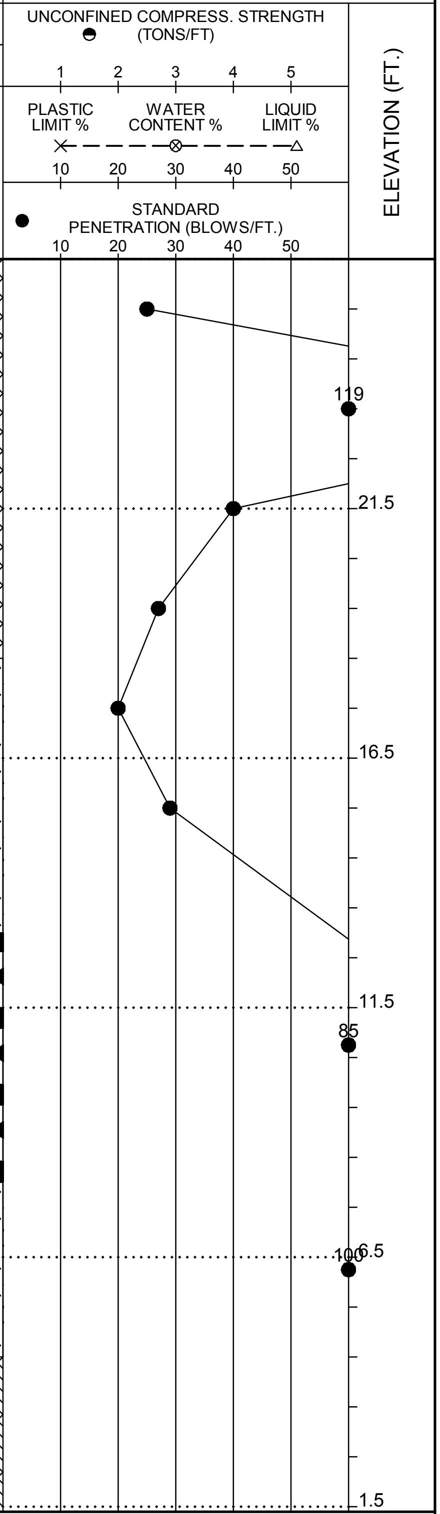
GROUND WATER	DATE	TIME	DEPTH
	10/18/13	**2:30 pm**	**20.5'**
	10/21/13	**2:10 pm**	**20.6'**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**22'**
CASING:	**4"**	**0**	TO	**22'**
DIAMOND CORE:	**2"**	**22**	TO	**27'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☒ YES ☐ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **75° F**
DEPTH TO ROCK: **22'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
0-2	25	6 12 13 21	S-1	18		M		Lgt bwn f GRAVEL, (brick, concrete fragments) and c-f Sand, little Silt (FILL) (Class 7)		
2-4	119	28 52 67 50	S-2	18		M		Bwn c-f SAND, some Silt, little f Gravel, with brick particles, with wood fibers (FILL) (Class 7)		
4-6	40	23 20 20 10	S-3	16		M		Brick fragments, with f Gravel (FILL) (Class 7)		21.5
6-8	27	8 12 15 50/3	S-4	18		M		Brick & concrete fragments with Bwn-gy c-f SAND, some Silt, little f Gravel (FILL) (Class 7)		
8-10	20	11 9 11 9	S-5	10		M	SM	Gy-bwn c-f SAND, (micaceous) some Silt, little f Gravel (Class 3b)		16.5
10-12	29	14 15 14 17	S-6	12		M	SM	Gy-bwn c-f SAND, some f Gravel, little Silt (Class 3b)		
12-15										11.5
15-16.5	85+	25 35 50/4	S-7	12		M	GM	Bwn-gy f GRAVEL, with c Gravel fragments, and c-f Sand, little Silt (Class 2a)		
16.5-20										6.5
20-21	100+	100/5	S-8	5		W	SM	Lgt bwn c-f SAND, little Silt, trace f Gravel (Class 3a) ▼		
21-22								Drilling refusal @ 22'		
22-25	2 1 2		C-1	15	0			Wh-lgt bwn, moderately weathered, highly to moderately fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees		1.5



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TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-20

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES			MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % × WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.							
				LENGTH (IN.)	RQD (%)						
	1							from horizontal with bwn staining and sand filled fractures (Class 1d)	▨		
26	2								▨		
27											
28								End of Boring at 27'			
29											
30											-3.5
31											
32											
33											
34											
35											-8.5
36											
37											
38											
39											
40											-13.5
41											
42											
43											
44											
45											-18.5
46											
47											
48											
49											
50											-23.5
51											
52											
53											
54											
55											-28.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-21

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	19'
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

WEATHER: **Overcast** TEMP: **50° F**

DEPTH TO ROCK: **19'**

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**

DRILLER: **Rob Dollar**

SURFACE ELEVATION: **27.7**

DATUM: **See Remarks**

DATE START: **10/23/13**

DATE FINISH: **10/23/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE					
1											
2											
3											
4											
5											22.7
6											
7											
8								Rotary advanced to 19'			
9											
10											17.7
11											
12											
13											
14											
15											12.7
16								Increase in resistance @ 16'			
17								Weathered bedrock 16' - 19'			
18											
19											
20								Bedrock (Marble)			7.7
21								End of Boring at 20'			
22											
23											
24											
25											2.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-22

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Rob Dollar**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **28.4**
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO				DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **3'**	SCREEN DEPTH: **---** TO **---**				DATE START: **10/23/13**
CASING:	**4"**	**0** TO **3'**	WEATHER: **Overcast** TEMP: **45° F**				DATE FINISH: **10/23/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **Not Encountered'**				
RIG: CME55 LC Rubber Track Mount Auto Hammer			*CHANGES IN STRATA ARE INFERRED				

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV.		MOISTURE					
				LENGTH (IN.)	RQD (%)						
1											
2											
3											
4											
5								Void to 6.0' (Former cellar or vault) Void 3' to 6' Boring ended due to void (Test Pit found oil tank)			23.4
6											
7								End of Boring at 6'			
8											
9											
10											18.4
11											
12											
13											
14											
15											13.4
16											
17											
18											
19											
20											8.4
21											
22											
23											
24											
25											3.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-23

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	12'
CASING:	4"	0	TO	12'
DIAMOND CORE:	2"	12	TO	17'

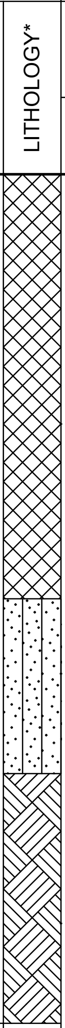
RIG: CME55 LC Rubber Track Mount Auto Hammer

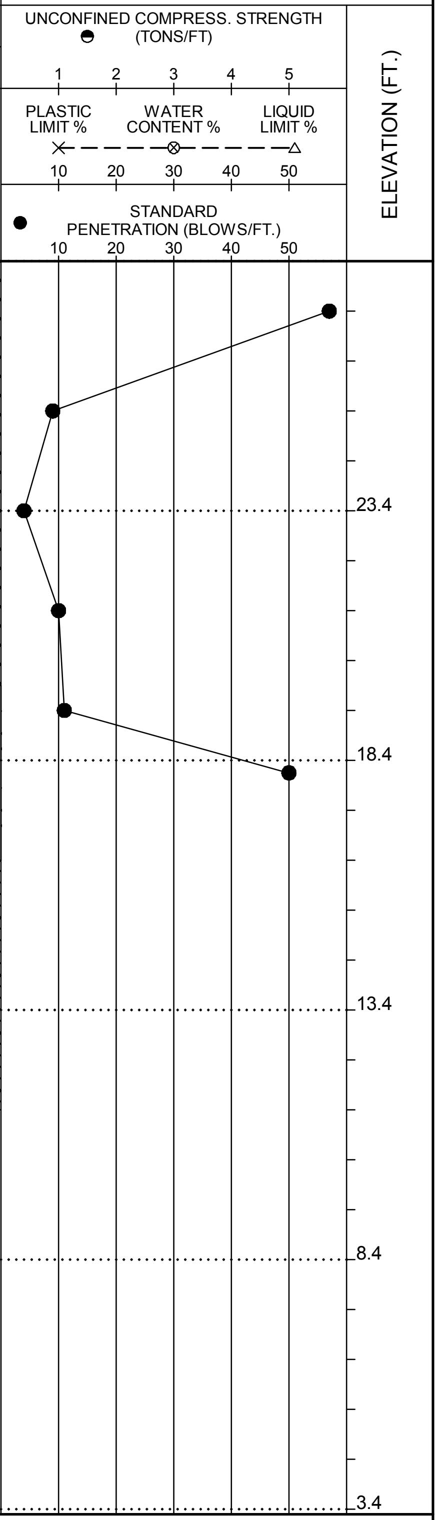
GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Overcast** TEMP: **45° F**
DEPTH TO ROCK: **12'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.4**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	57	19 30 27 24	S-1	18		M		Bwn-wh f GRAVEL, with c Gravel fragments and c-f Sand, little Silt, with brick & concrete fragments (FILL) (Class 7)
3 4	9	9 5 4 6	S-2	12		M		Lgt bwn c-f SAND, some Silt, little f Gravel (brick fragments) with glass & brick particles (FILL) (Class 7)
5 6	4	1 2 2 2	S-3	12		M		Bwn-rd f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)
7 8	10	6 7 3 4	S-4	14		M		Concrete fragments with Bwn c-f SAND, and f Gravel, little Silt with brick, asphalt fragments (FILL) (Class 7)
9 10	11	4 5 6 8	S-5	16		M	SM	Same to 8.5' Lgt bwn-wh c-f SAND, little Silt, little f Gravel (Class 3b)
11 12	50+	15 50/1	S-6	5		M	SM	Wh c-f SAND (bedrock residual) some f Gravel, little Silt (Class 3a) Rotary advanced to 12'
13 14 15 16 17	2 2 2 1 2		C-1	58	85			Wh-lgt gy, fresh, moderately to slighty fractured, fine grained, hard, MARBLE, fractures oriented 0 to 10 degrees from horizontal, slight staining along fractures (Class 1a)
18 19 20 21 22 23 24 25								End of Boring at 17'





REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-24

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	11'
CASING:	4"	0	TO	11'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **11'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.3**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
1											
2											
3											
4											
5								Rotary advanced to 9.5'			23.3
6											
7											
8											
9											
10								Weathered bedrock @ 9.5' Drilling refusal @ 11'	▨		18.3
11											
12								End of Boring at 11'			
13											
14											
15											13.3
16											
17											
18											
19											
20											8.3
21											
22											
23											
24											
25											3.3

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-25

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**			DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH	SURFACE ELEVATION: **26.6**
POWER AUGER:		TO	DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **8'**	DATE START: **10/24/13**
CASING:	**4"**	**0** TO **8'**	DATE FINISH: **10/24/13**
DIAMOND CORE:		TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

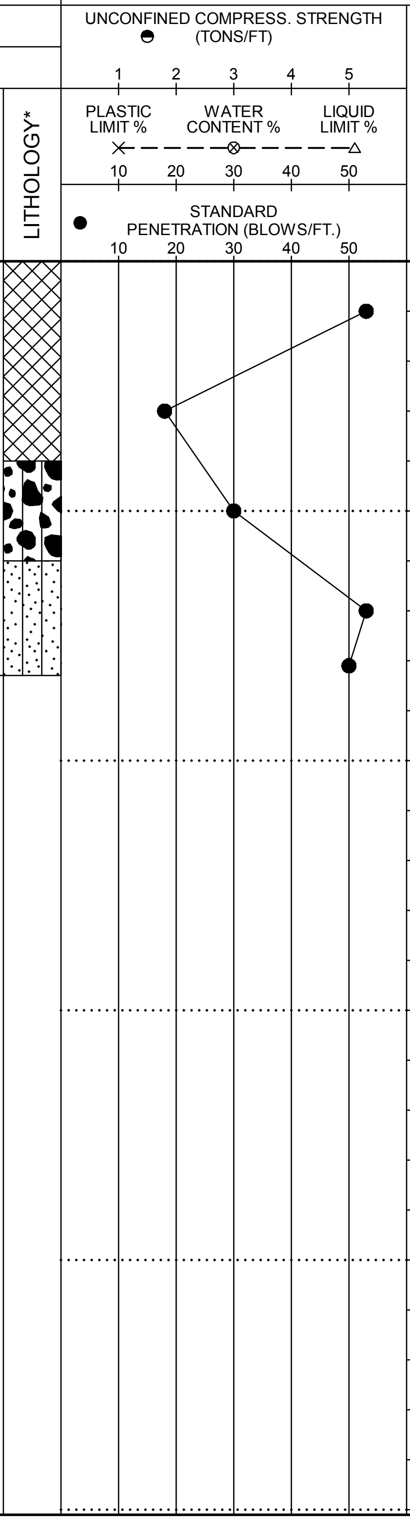
SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **8.0'**

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	53	7 28 25 13	S-1	4		M		Concrete fragments with Bwn c-f GRAVEL, some c-f Sand, little Silt with root fibers (FILL) (Class 7)	
3 4	18	8 10 8 7	S-2	16		M		Brick fragments with Bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	
5 6	30	14 17 13 12	S-3	18		M	GM	Lgt bwn c-f GRAVEL, and c-f Sand, little (bedrock residual) (Class 2a)	21.6
7 8	53	10 20 33 56	S-4	16		M	SM	Lgt bwn c-f SAND (bedrock residual) little f Gravel, little Silt (Class 3a) No Recovery	
	50+	50/1	S-5	0				weathered bedrock (competent) @ 8.0'	
9									
10								End of Boring at 8.1'	16.6
11									
12									
13									
14									
15									11.6
16									
17									
18									
19									
20									6.6
21									
22									
23									
24									
25									1.6



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No.	**6926.01**
PROJECT:	**Melrose Commons Site C**
LOCATION:	**Bronx, NY**

BORING No. B-26

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**12'**
CASING:	**4"**	**0**	TO	**8'**
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **60° F**

DEPTH TO ROCK: **12.0'**

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **28.5**

DATUM: **See Remarks**

DATE START: **10/24/13**

DATE FINISH: **10/24/13**

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5										23.5
6								Lost drilling water @ 7' (Possible void in FILL)		
7										
8										
9										
10										18.5
11								Drilling refusal @ 12'		
12										
13								End of Boring at 12'		
14										
15										13.5
16										
17										
18										
19										
20										8.5
21										
22										
23										
24										
25										3.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-27

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	8'
CASING:	4"	0	TO	8'
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

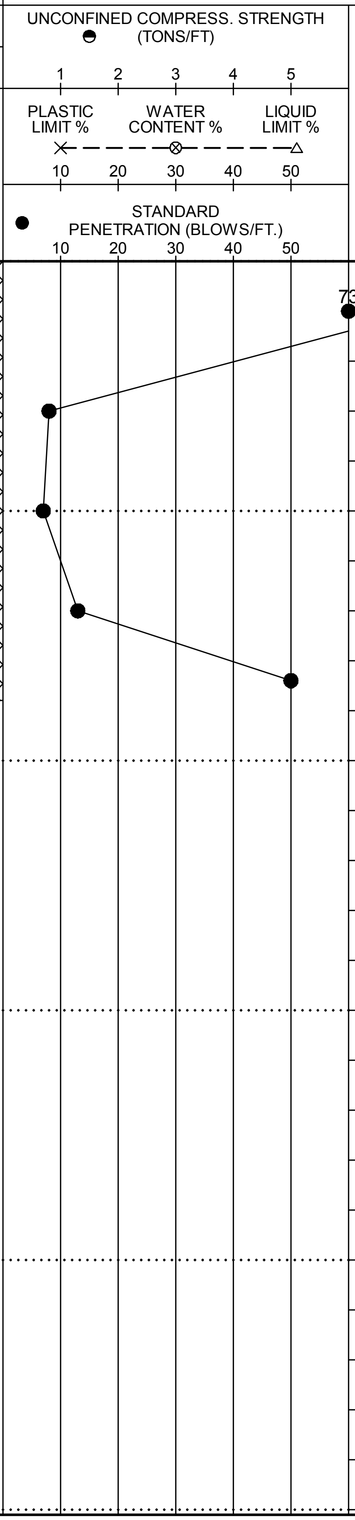
GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **8.8'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.6**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*
1–2	73	6 40 33 16	S-1	18		M		Bwn c-f GRAVEL, some c-f Sand, little Silt with concrete fragments (FILL) (Class 7)	☒
3–4	8	6 4 4 4	S-2	6		M		Brick fragments with Gy-bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7)	☒
5–6	7	6 4 3 3	S-3	16		M		Lgt bwn-gy c-f SAND, and f Gravel, little Silt with brick fragments & particles (FILL) (Class 7)	☒
7–8	13	2 5 8 3	S-4	14		M		Lgt gy-bwn c-f SAND, and f Gravel, little Silt with concrete particles & wood fibers (FILL) (Class 7)	☒
8–8.8	50+	5 50/4	S-5	10		M		Concrete fragments with bwn c-f SAND, and f Gravel, little Silt (FILL) (Class 7) with Asphalt & brick particles	☒

End of Boring at 8.8'



DEPTH (FT.)	ELEVATION (FT.)
5	23.6
10	18.6
15	13.6
20	8.6
25	3.6

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-28

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**					INSPECTOR: **Anthony Laroche**
CONTRACTOR: **Craig Test Boring Co., Inc.**					DRILLER: **Rob Dollar**
METHOD OF ADVANCING BORING	DIA.	DEPTH			SURFACE ELEVATION: **26.7**
POWER AUGER:		TO			DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **20'**			DATE START: **10/22/13**
CASING:	**4"**	**0** TO **15'**			DATE FINISH: **10/22/13**
DIAMOND CORE:		TO			
RIG: CME55 LC Rubber Track Mount Auto Hammer					

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

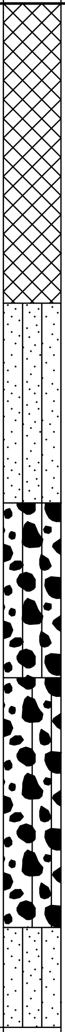
WEATHER: **Clear** TEMP: **60° F**

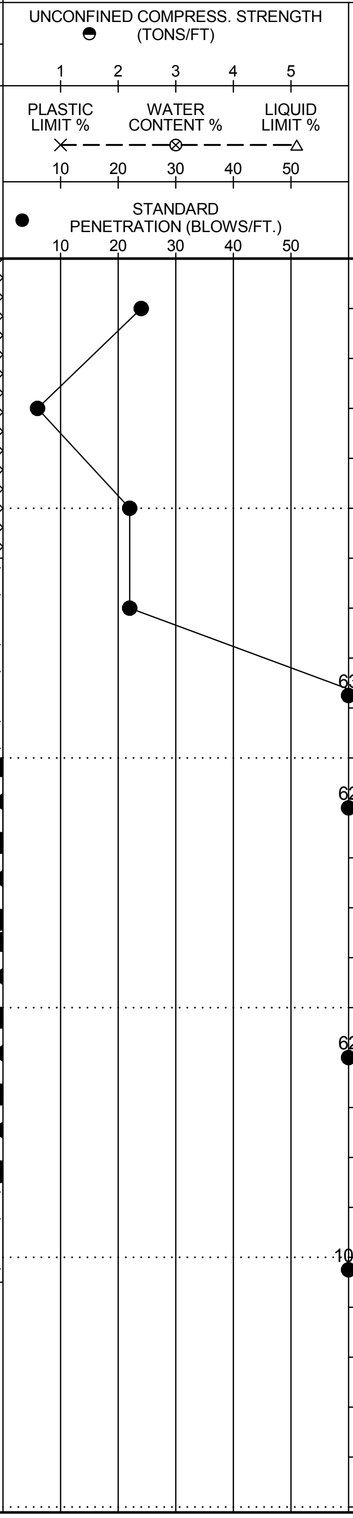
DEPTH TO ROCK: **20.5'**

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	24	9 12 12 12	S-1	18		M	SM	Topsoil, brick (FILL) (Class 7)	
2									
3	6	12 3 3 2	S-2	6		M	SM	Bwn-rd c-f SAND, and c-f Gravel, some Silt (brick) (FILL) (Class 7)	
4									
5	22	7 7 15 16	S-3	4		M	SM	Bwn c-f SAND, little Silt, little c-f Gravel (brick) (FILL) (Class 7)	21.7
6									
7	22	14 13 9 13	S-4	12		M	SM	Lgt bwn c-f SAND, some c-f Gravel, little Silt (Class 3b)	
8									
9	63+	15 13 50/3	S-5	18		M	SM	Lgt wh- bwn c-f SAND, some f Gravel, little Silt/Clay (Class 3b)	
10									16.7
11	62	29 13 49 40	S-6	6		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2a)	
12									
13									
14									
15									11.7
16	62	17 31 31 41	S-7	14		M	GP-GM	Bwn c-f SAND, some c-f Gravel, little Silt/Clay (Class 2a)	
17									
18									
19									
20	100+	100/5	S-8	5		M	SM	(Decomposed bedrock) Bwn c-f SAND, little Gravel, little Silt Spoon refusal @ 20.5' (Class 2a)	6.7
21									
22								End of Boring at 20.5'	
23									
24									
25									1.7

LITHOLOGY*





REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-29

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **27.5**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	20'
CASING:	4"	0	TO	19'
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **45° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES				UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ×, WATER CONTENT % ⊗, LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE					
1											
2											
3											
4											
5											22.5
6											
7											
8											
9											
10								Rotary advanced to refusal @ 19'			17.5
11											
12											
13											
14											
15											12.5
16											
17											
18								Refusal @ 19' weathered bedrock (Marble)			
19											
20								Rotary advanced to 20 to confirm bedrock	▨		7.5
21								End of Boring at 20'			
22											
23											
24											
25											2.5

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-30

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.1**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**20'**
CASING:	**4"**	**0**	TO	**18'**
DIAMOND CORE:			TO	

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **18'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES	RECOV.			UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
			SAMPLE NUMBER	LENGTH (IN.)	RQD (%)	MOISTURE					
1											
2											
3											
4											
5											23.1
6											
7											
8											
9											
10								Rotary advanced to refusal @ 18'			18.1
11											
12											
13											
14											
15											13.1
16											
17											
18								Refusal @ 18' weathered bedrock (Marble)			
19								Rotary advanced to 20' to confirm bedrock	▨		
20									▨		8.1
21								End of Boring at 20'			
22											
23											
24											
25											3.1

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-31

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **28.2**
DATUM: **See Remarks**
DATE START: **10/23/13**
DATE FINISH: **10/23/13**

GROUND WATER	DATE	TIME	DEPTH

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	13'
CASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Overcast** TEMP: **50° F**
DEPTH TO ROCK: **10'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

*CHANGES IN STRATA ARE INFERRED

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	STANDARD PENETRATION (BLOWS/FT.)	ELEVATION (FT.)
0–6.5								Advanced through Fill to 10'			
5											23.2
6.5–10								Significant resistance to drilling 6.5' to 10' Possible weathered bedrock 6.5' to 10'			
10											18.2
10–11	50+	50/1	S-1	1		M	GM	Wh f GRAVEL, little c-f SAND (Marble fragments) rotary advanced to 13' to confirm bedrock	▨	● 50	
11–13									▨		
13								End of Boring at 13'			
15											13.2
20											8.2
25											3.2

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-32

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER	DATE	TIME	DEPTH	INSPECTOR: **Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**							DRILLER: **Paul Mullins**
METHOD OF ADVANCING BORING	DIA.	DEPTH					SURFACE ELEVATION: **28.4**
POWER AUGER:		TO	MON. WELL	☐ YES		☒ NO	DATUM: **See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **9'**	SCREEN DEPTH:	**---**	TO	**---**	DATE START: **10/25/13**
CASING:	**4"**	**0** TO **8'**	WEATHER:	**Clear**	TEMP:	**50° F**	DATE FINISH: **10/25/13**
DIAMOND CORE:		TO	DEPTH TO ROCK: **8'**				
RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount			*CHANGES IN STRATA ARE INFERRED				

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ — WATER CONTENT % ⊗ — LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4								Rotary advanced to 8.0'		
5										23.4
6										
7										
8								Resistance @ 8.0' Weathered bedrock Rotary advanced to refusal @ 9.0'	▨	
9										
10								End of Boring at 9'		18.4
11										
12										
13										
14										
15										13.4
16										
17										
18										
19										
20										8.4
21										
22										
23										
24										
25										3.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-33

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

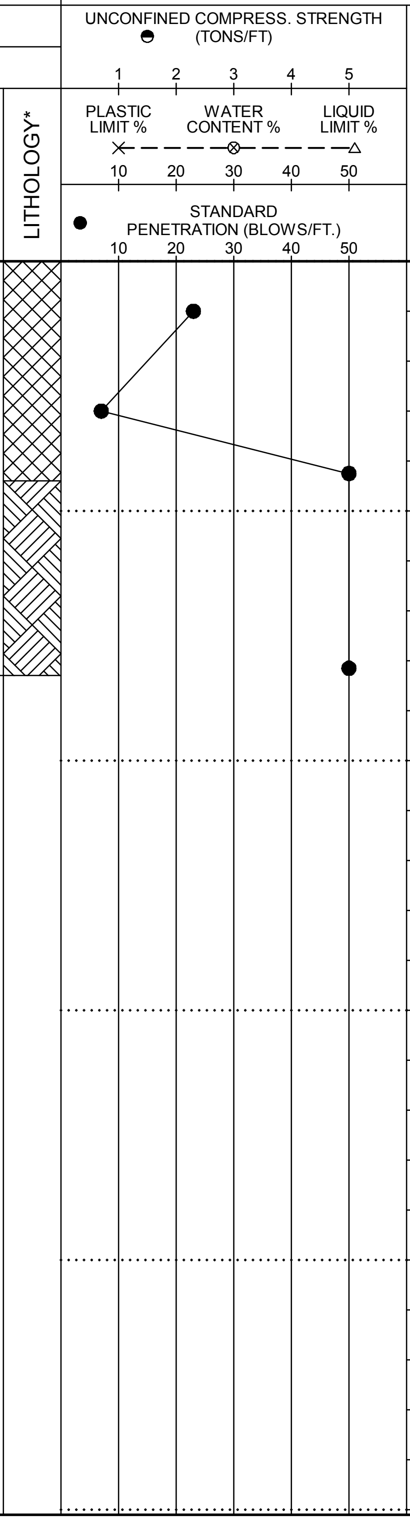
INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 8'
CASING:	4"	0 TO 8'
DIAMOND CORE:		TO

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **45° F**
DEPTH TO ROCK: **8'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	23	7 11 12 7	S-1	12		M		Lgt bwn f GRAVEL, some c-f Sand, little Silt with brick & concrete fragments (FILL) (Class 7)	
2									
3	7	2 1 6 5	S-2	10		M		Brick fragments Lgt bwn c-f SAND, some f Gravel, little Silt (FILL) (Class 7)	
4	50+	50/4	S-3	4		M		Lgt bwn c-f SAND, some Silt, little f Gravel, with brick & asphalt particles (FILL) (Class 7) Significant resistance to drilling from 4.4' to 8.0' Rotary advanced to 8.0' Possible decomposed to weathered bedrock Weathered bedrock to 8.0'	
5									23.8
6									
7									
8	50+	50/0	S-4	0				No Recovery	
9								End of Boring at 8'	
10									18.8
11									
12									
13									
14									
15									13.8
16									
17									
18									
19									
20									8.8
21									
22									
23									
24									
25									3.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

BORING LOG 6926-01.GPJ TECTONIC ENG.GDT 11/21/13

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-34

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**13'**
CASING:	**4"**	**0**	TO	**11'**
DIAMOND CORE:			TO	

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **40° F**
DEPTH TO ROCK: **11'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2								Possible void 2' to 4'		
3										
4										
5										23.8
6								Low resistance to drilling 4' to 7'		
7										
8										
9										
10										18.8
11										
12								Decomposed bedrock drilling refusal @ 13.0'	▨	
13										
14								End of Boring at 13'		
15										13.8
16										
17										
18										
19										
20										8.8
21										
22										
23										
24										
25										3.8

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-35

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH
	10/28/13	**2:30 pm**	**14'**
	10/29/13	**2:30 pm**	**14'**

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

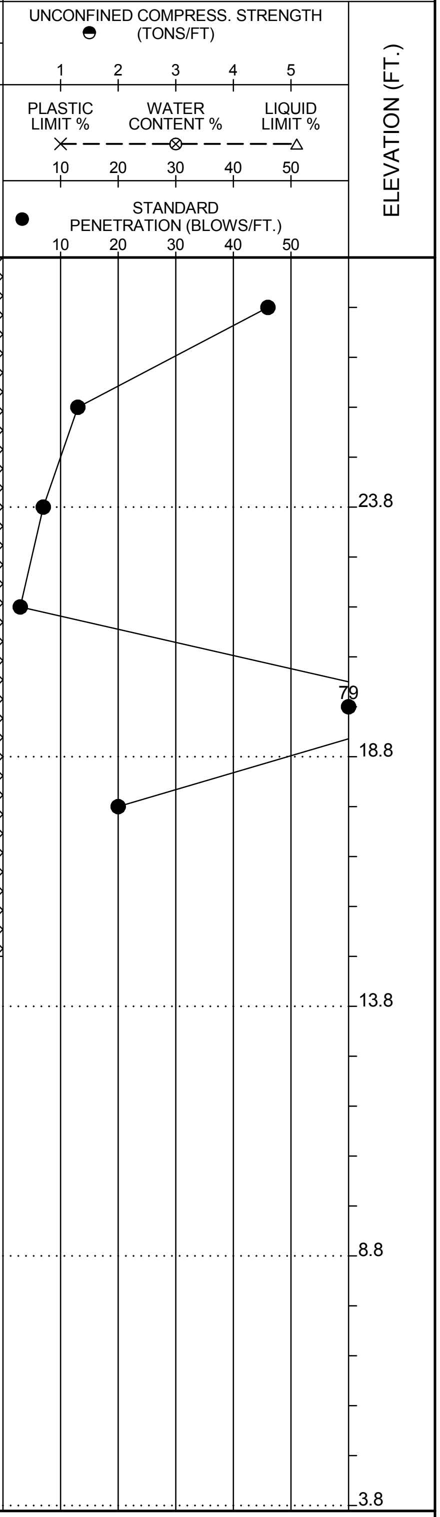
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**14'**
CASING:	**4"**	**0**	TO	**14'**
DIAMOND CORE:			TO	

MON. WELL ☒ YES ☐ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **14'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	46	7 22 24 14	S-1	4		M		Concrete fragments with Bwn f GRAVEL, some c-f Sand, little Silt (FILL) (Class 7)
3 4	13	4 6 7 8	S-2	4		M		Bwn c-f GRAVEL, with c Gravel fragments, some c-f Sand, little Silt with concrete, with wood in spoon tip (FILL) (Class 7)
5 6	7	3 4 3 3	S-3	4		M		Brick with Bwn c-f GRAVEL, and c-f Sand, trace Silt/Clay (FILL) (Class 7)
7 8	3	2 1 2 3	S-4	12		M		Brick (FILL) (Class 7)
9 10	79	3 30 49 40	S-5	10		M		bwn c-f SAND, little f Gravel, little Silt with Asphalt fragments and brick particles (FILL) (Class 7)
11 12	20	10 9 11 11	S-6	16		M		Lgt bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)
13 14								Drilling refusal @ 14.0 ▼
15 16 17 18 19 20 21 22 23 24 25								End of Boring at 14'



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-36

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **28.8**
DATUM: **See Remarks**
DATE START: **10/25/13**
DATE FINISH: **10/25/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	11'
CASING:	4"	0	TO	10'
DIAMOND CORE:			TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **50° F**
DEPTH TO ROCK: **10'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5										23.8
6										
7										
8										
9										
10								Resistant Drilling @ 10' Weathered bedrock	▨	18.8
11										
12								End of Boring at 11'		
13										
14										
15										13.8
16										
17										
18										
19										
20										8.8
21										
22										
23										
24										
25										3.8

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-37

SHEET No. 1 of 2

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**30'**
CASING:	**4"**	**0**	TO	**30'**
DIAMOND CORE:	**2"**	**30.1**	TO	**35'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO

SCREEN DEPTH: **---** TO **---**

WEATHER: **Clear** TEMP: **45° F**

DEPTH TO ROCK: **30'**

*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**

DRILLER: **Paul Mullins**

SURFACE ELEVATION: **26.6**

DATUM: **See Remarks**

DATE START: **10/24/13**

DATE FINISH: **10/24/13**

UNCONFINED COMPRESS. STRENGTH (TONS/FT) 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5								Rapidly lost water at 5.0'		21.6
6								6' to 7.5' significant resistance possible concrete		
7										
8										
9										
10										16.6
11										
12										
13								Increased resistance at 17' Bedrock residual/weathered bedrock @ 17.0'		
14										
15										11.6
16										
17									▨	
18								Rotary advanced weathered rock to 25', with c-f Sand	▨	
19									▨	
20									▨	6.6
21									▨	
22									▨	
23									▨	
24									▨	
25									▨	1.6

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**

PROJECT: **Melrose Commons Site C**

LOCATION: **Bronx, NY**

BORING No. B-37

SHEET No. 2 of 2

CLIENT: **L. Riso & Sons Co., Inc.**

CONTRACTOR: **Craig Test Boring Co., Inc.**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	SAMPLES: RECOV. LENGTH (IN.)	SAMPLES: RECOV. RQD (%)	SAMPLES: MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5 / PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50 / ● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50	ELEVATION (FT.)
	50+	50/1	S-1	1		M	SM	Tn-wh c-f SAND (bedrock residual), little f Gravel, little Silt (Class 3a)		● 50	
26											
27											
28								Bedrock residual At 29.6' soft based on significant loss to resistance during drilling Rotary advanced to 30'			
29											
30	50+	50/1	S-2	1		M	SM	Bedrock residual to highly weathered bedrock Wh-lgt bwn-tn c-f SAND, and Clayey Silt, trace f Gravel		● 50	-3.4
31	3										
32	3										
33	4		C-1	55	92			Wh-lgt gy Fresh, massive, fine grained, hard, MARBLE			
34	3										
35	3										-8.4
36								End of Boring at 35.1'			
37											
38											
39											
40											-13.4
41											
42											
43											
44											
45											-18.4
46											
47											
48											
49											
50											-23.4
51											
52											
53											
54											
55											-28.4

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-38

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **26.7**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 13.5'
CASING:	4"	0 TO 13.5'
DIAMOND CORE:		TO

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **13.5'**
*CHANGES IN STRATA ARE INFERRED

UNCONFINED COMPRESS. STRENGTH ◓ (TONS/FT) 1 2 3 4 5
PLASTIC LIMIT % ✕ WATER CONTENT % ⊗ LIQUID LIMIT % △ 10 20 30 40 50
● STANDARD PENETRATION (BLOWS/FT.) 10 20 30 40 50

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	LITHOLOGY*	ELEVATION (FT.)
1										
2										
3										
4										
5										21.7
6										
7								Rotary advanced to 13.5'		
8										
9										
10										16.7
11										
12										
13								Significant resistance @ 13.5' Weathered bedrock		
14										
15								End of Boring at 13.5'		11.7
16										
17										
18										
19										
20										6.7
21										
22										
23										
24										
25										1.7

REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-39

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Barry Ouimet**
DRILLER: **Paul Mullins**
SURFACE ELEVATION: **27.4**
DATUM: **See Remarks**
DATE START: **10/24/13**
DATE FINISH: **10/24/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	**3 7/8"**	**0** TO **8'**
CASING:	**4"**	**0** TO **8'**
DIAMOND CORE:		TO

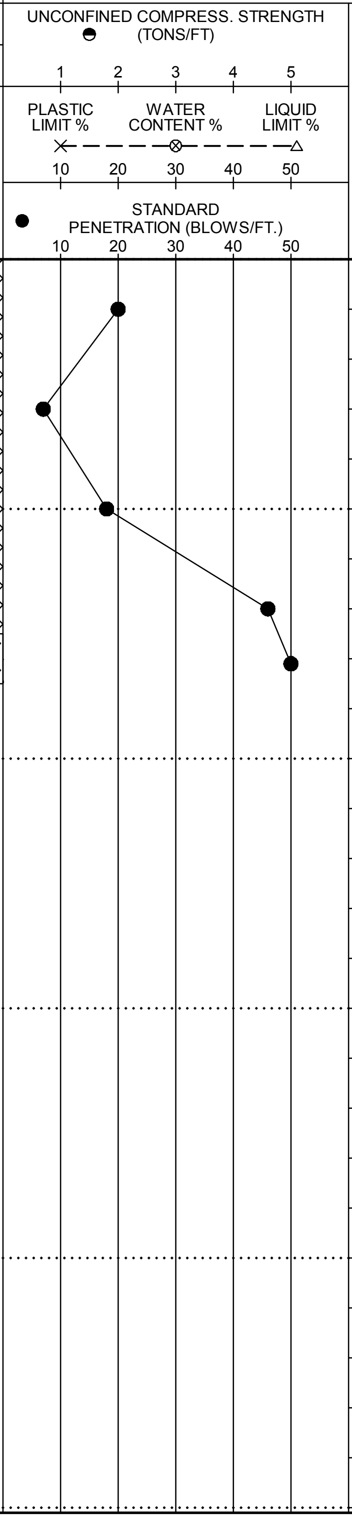
MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **55° F**
DEPTH TO ROCK: **8'**

RIG: CME 750x Rubber Tire Mount with Auto Hammer Rubber Tire Mount

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RECOV.: RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	20	5 10 10 6	S-1	16		M		Bwn-gy f GRAVEL, and c-f Sand, some Silt, with brick & asphalt particles (FILL) (Class 7)	
3 4	7	8 5 2 1	S-2			M		Concrete & brick fragments with Bwn c-f SAND, some f Gravel, little Silt (FILL) (Class 7)	
5 6	18	3 4 14 16	S-3	16		M		Concrete fragments with Bwn c-f SAND, and f Gravel, little Silt with brick fragments (FILL) (Class 7)	22.4
7 8	46	18 22 24 50/3	S-4	14		M	SM	Bwn c-f GRAVEL, some c-f Sand, little Silt, with brick & concrete fragments (FILL) (Class 7) Bwn-lgt bwn c-f SAND (Possible bedrock residual) little f Gravel, little Silt (Class 3a)	
	50+	50/1	S-5	0				Weathered bedrock	
9									
10								End of Boring at 8.1'	17.4
15									12.4
20									7.4
25									2.4

LITHOLOGY*



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-40

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

INSPECTOR: **Anthony Laroche**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.8**
DATUM: **See Remarks**
DATE START: **10/22/13**
DATE FINISH: **10/22/13**

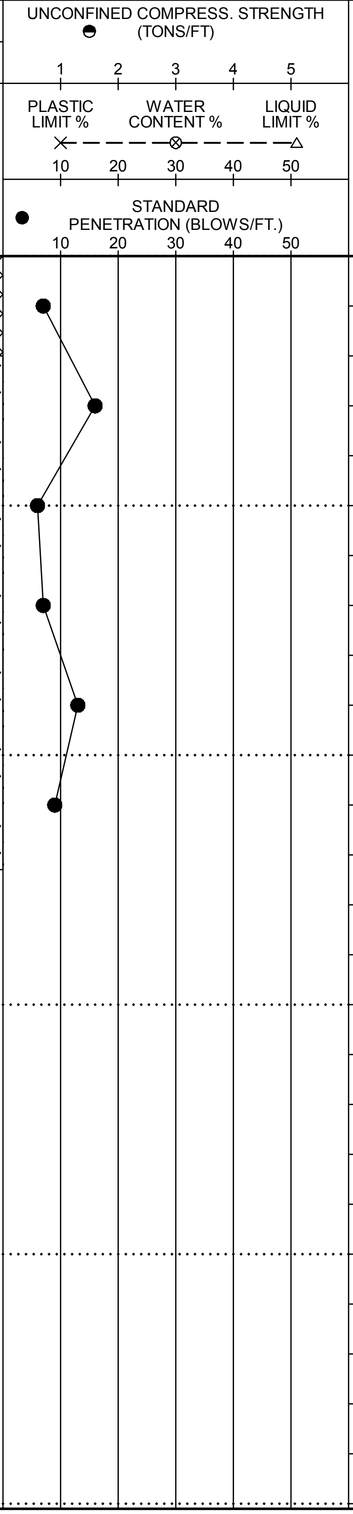
METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	12'
CASING:	4"	0	TO	10'
DIAMOND CORE:	2"		TO	

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **12'**

RIG: CME55 LC Rubber Track Mount Auto Hammer

*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
0–2	7	11 4 3 3	S-1	12				Bwn c-f SAND, little Silt, some f Gravel (FILL) (Class 7)	
2–4	16	5 12 4 3	S-2	12		M	SM	Bwn c-f SAND, little c-f Gravel, little Silt (Class 3b)	
4–6	6	4 4 2 3	S-3	18		M	SM	Lgt bwn c-f SAND, little Silt, little c-f Gravel (Class 6)	20.8
6–8	7	9 4 3 4	S-4	12		M	SM	Lgt bwn c-f SAND, little Silt, little c-f Gravel (Class 6)	
8–10	13	5 6 7 6	S-5	14		M	SM	Lgt bwn c-f SAND, little Silt, some c-f Gravel (Class 3b)	15.8
10–12	9	9 5 4 23	S-6	4		M	SM	Lgt bwn c-f SAND, trace Silt, trace c-f Gravel (Class 6)	
12–12.2		50	S-7	2				Bwn-wh decomposed bedrock, c-f SAND, little c-f Rock	
								End of Boring at 12.2'	
15									10.8
20									5.8
25									0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-41

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	**3 7/8"**	**0** TO **19'**
CASING:	**4"**	**0** TO **19'**
DIAMOND CORE:	**2"**	**19** TO **24'**

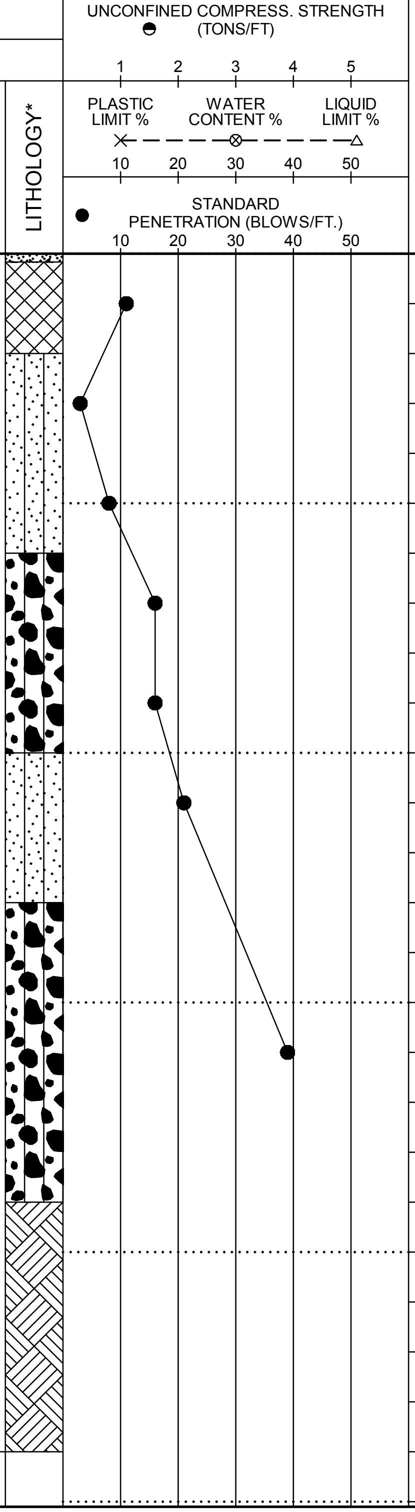
RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **65° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.8**
DATUM: **See Remarks**
DATE START: **10/18/13**
DATE FINISH: **10/18/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	11	5 6 5 4	S-1	18		M		2" Concrete Slab Bwn c-f SAND, little Silt, trace f Gravel with Slag (FILL) (Class 7)	
3 4	3	2 2 1 2	S-2	16		M	SM	Lgt bwn c-f SAND, some Silt (Class 6)	
5 6	8	3 4 4 3	S-3	2		M	SM	Lgt bwn c-f SAND, some Silt, trace f Gravel (Class 6)	20.8
7 8	16	4 9 7 7	S-4	4		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 2b)	
9 10	16	8 8 8 11	S-5	6		M	GM	Bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2b)	15.8
11 12	21	13 10 11 12	S-6	18		M	SM	Lgt bwn c-f SAND, some f Gravel, little Silt (Class 3b)	
13 14 15								Rotary advanced to 15'	10.8
16 17	39	12 16 23 45	S-7	12		W	GM	Gy c-f GRAVEL, and c-f Sand with very f Sand, little Silt (Class 2a)	
18 19								Drilling refusal @ 19.0'	
20 21 22 23 24	2 2 1 2 1		C-1	51	83			Wh-lgt gy, fresh, slightly fractured, fine grained, hard, MARBLE with SCHIST band, fractures oriented 0 to 5 degrees from horizontal (Class 1b)	5.8
25								End of Boring at 24'	0.8



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-42

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

GROUND WATER	DATE	TIME	DEPTH

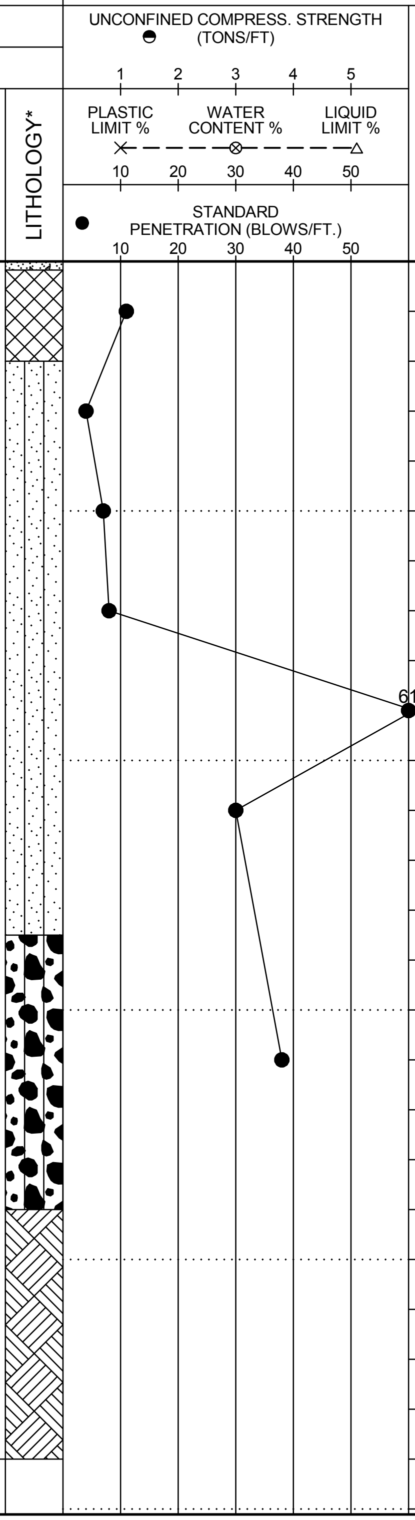
INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/18/13**
DATE FINISH: **10/21/13**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	3 7/8"	0	TO	19'
CASING:	4"	0	TO	19'
DIAMOND CORE:	2"	19	TO	24'

RIG: CME55 LC Rubber Track Mount Auto Hammer

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Clear** TEMP: **65° F**
DEPTH TO ROCK: **19'**
*CHANGES IN STRATA ARE INFERRED

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	11	6 7 4 4	S-1	16		M		2" Concrete slab Bwn c-f SAND, some Silt, trace f Gravel (FILL) (Class 7)	
3 4	4	2 2 2 3	S-2	16		M	SM	Bwn c-f SAND, some Silt, trace f Gravel (Class 6)	
5 6	7	3 3 4 5	S-3	12		M	SM	Same (Class 6)	20.2
7 8	8	4 4 4 5	S-4	10		M	SM	Lgt bwn c-f SAND, some Silt, little f Gravel (Class 6)	
9 10	61	11 27 34 17	S-5	16		M	SM	Lgt bwn c-f SAND, little Silt/Clay, little f Gravel (Class 3a)	15.2
11 12	30	13 14 16 17	S-6	18		M	SM	Lgt bwn c-f GRAVEL, some c-f Sand, little Silt (Class 2a)	
13 14 15									10.2
16 17	38	8 18 20 17	S-7	18		W	GM	Lgt bwn f GRAVEL, and c-f Sand, little Silt (Class 2a)	
18 19									
20 21 22 23 24	3 3 2 4 4		C-1	53	67			Wh-lgt gy, fresh, moderately to slightly fractured, fine grained, hard, MARBLE, fractures oriented 0 to 20 degrees from horizontal with Sand along some fractures	5.2
25								End of Boring at 24'	0.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-43

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH		
POWER AUGER:			TO	
ROT. DRILL:	**3 7/8"**	**0**	TO	**12'**
CASING:	**4"**	**0**	TO	**10'**
DIAMOND CORE:	**2"**		TO	

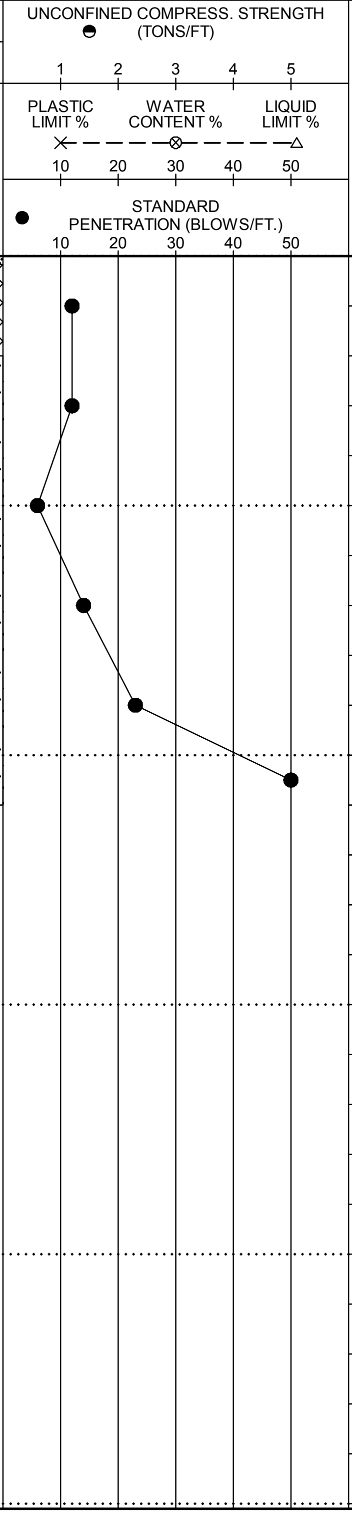
RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: **---** TO **---**
WEATHER: **Overcast** TEMP: **60° F**
DEPTH TO ROCK: **11'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Anthony Laroche**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/22/13**
DATE FINISH: **10/22/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1 2	12	11 7 5 6	S-1	18		M		2" Concrete Bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)	
3 4	12	6 6 6 8	S-2	10		M	SM	Bwn c-f SAND, little Silt, little f Gravel (Class 6)	
5 6	6	5 4 2 3	S-3	12		M	SM	Bwn c-f SAND, some c-f Gravel, little Silt (Class 6)	20.2
7 8	14	5 11 3 6	S-4	18		M	SM	Gy-bwn c-f SAND, some c-f Gravel, little Silt (Class 3b)	
9 10	23	8 7 16 37	S-5	0				No Recovery	15.2
11	50+	18 50/5	S-6	4		M	SM	Bwn c-f SAND, little c-f Gravel, little Silt (Class 3a) decomposed bedrock/marble	
12 13 14 15								End of Boring at 11'	10.2
16 17 18 19 20									5.2
21 22 23 24 25									0.2

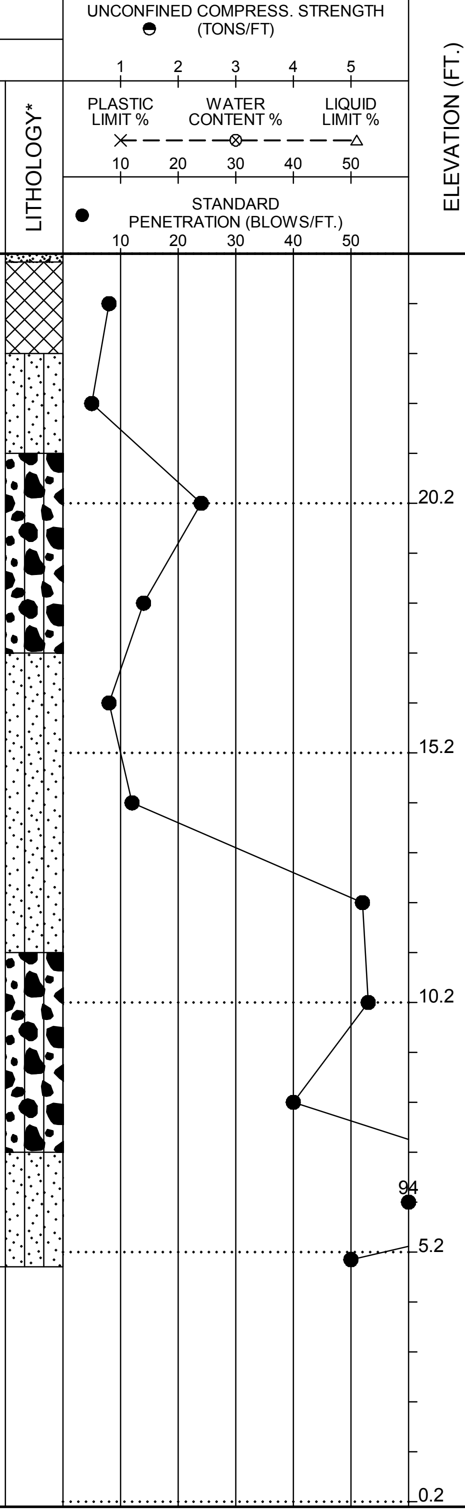


REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*	PROJECT No. **6926.01** PROJECT: **Melrose Commons Site C** LOCATION: **Bronx, NY**	**BORING No. B-44** SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**				GROUND WATER	DATE	TIME	DEPTH	INSPECTOR:	**Barry Ouimet**
CONTRACTOR: **Craig Test Boring Co., Inc.**								DRILLER:	**Rob Dollar**
METHOD OF ADVANCING BORING	DIA.	DEPTH						SURFACE ELEVATION:	**25.2**
POWER AUGER:		TO		MON. WELL	☐ YES	☒ NO		DATUM:	**See Remarks**
ROT. DRILL:	**3 7/8"**	**0** TO **20'**		SCREEN DEPTH:	**---**	TO	**---**	DATE START:	**10/21/13**
CASING:	**4"**	**0** TO **15'**		WEATHER:	**Clear**	TEMP:	**50° F**	DATE FINISH:	**10/21/13**
DIAMOND CORE:		TO		DEPTH TO ROCK:	**20'**				
RIG: CME55 LC Rubber Track Mount Auto Hammer				*CHANGES IN STRATA ARE INFERRED					

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL
1 2	8	4 4 4 2	S-1			M		2" Concrete Slab Lgt bwn c-f SAND, some Silt, little f Gravel, with concrete fragments, cinder (FILL) (Class 7)
3 4	5	2 3 2 2	S-2	10		M	SM	Lgt bwn c-f SAND, some Silt, trace f Gravel (Class 6)
5 6	24	2 6 18 28	S-3	12		M	GM	Bwn-wh c-f GRAVEL, some c-f Sand, little Silt (Class 2b)
7 8	14	13 9 5 4	S-4	16		M	GM	Wh-bwn f GRAVEL, and c-f Sand, little Silt (Class 2b)
9 10	8	4 4 4 4	S-5	12		M	SM	Lgt bwn c-f SAND, little Silt, trace f Gravel (Class 6)
11 12	12	4 7 5 12	S-6	18		M	SM	Same (Class 6)
13 14	52	56 30 22 40	S-7	12		M	SM	Bwn c-f SAND, little Silt, trace f Gravel, with mica (Class 3a)
15 16	53	20 25 28 36	S-8	20		M	GM	Lgt bwn-wh f GRAVEL, and c-f Sand, little Silt (Class 2a)
17 18	40	29 20 20 23	S-9	22		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 2a)
19 20	94	13 52 42 42	S-10	22		M	SM	Lgt bwn-wh c-f SAND, and f Gravel, little Silt (bedrock fragments) (Class 2a)
	50+	50/0	S-11	0				No Recovery spoon refusal @ 20'
21 22 23 24 25								End of Boring at 20'



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

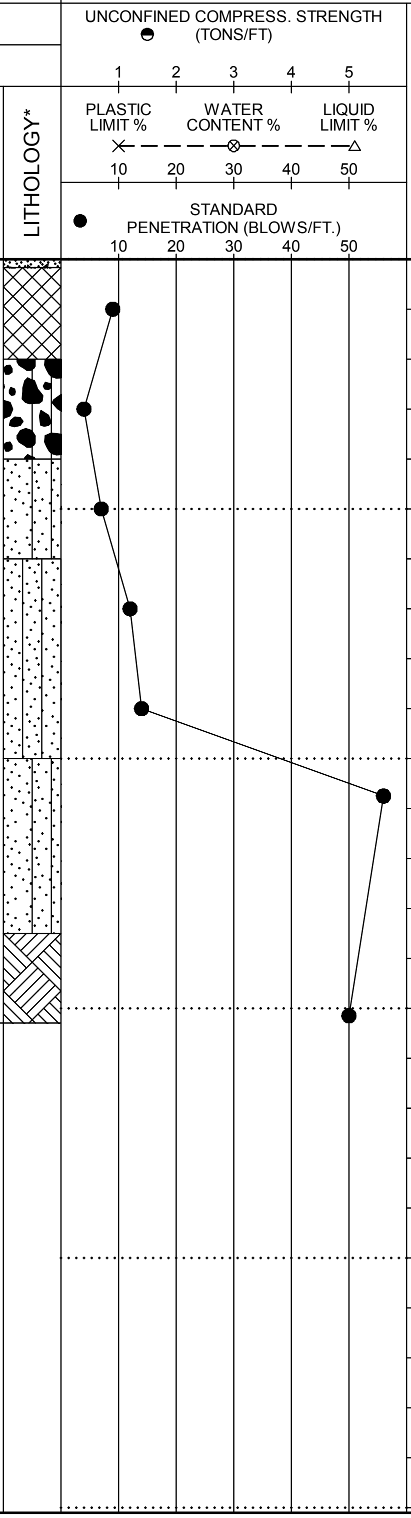
BORING No. B-45

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**			GROUND WATER: DATE	TIME	DEPTH
CONTRACTOR: **Craig Test Boring Co., Inc.**					
METHOD OF ADVANCING BORING	DIA.	DEPTH			
POWER AUGER:		TO	MON. WELL ☐ YES ☒ NO		
ROT. DRILL:	**3 7/8"**	**0** TO **15'**	SCREEN DEPTH: **---** TO **---**		
CASING:	**4"**	**0** TO **15'**	WEATHER: **Clear**	TEMP: **65° F**	
DIAMOND CORE:		TO	DEPTH TO ROCK: **15.1'**		
RIG: CME55 LC Rubber Track Mount Auto Hammer			*CHANGES IN STRATA ARE INFERRED		

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/21/13**
DATE FINISH: **10/21/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES: SAMPLE NUMBER	RECOV.: LENGTH (IN.)	RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	9	7 5 4 4	S-1	12		M		2" Concrete Slab Top 2" under slab cinders, Asphalt fragments Bwn c-f SAND, little Silt, little f Gravel (FILL) (Class 7)	
2									
3	4	2 2 2 1	S-2	6		M	GP-GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 6)	
4									
5	7	5 3 4 3	S-3	14		M	SP-SM	Bwn c-f SAND, little f Gravel, little Silt (Class 6)	20.2
6									
7	12	7 5 7 8	S-4	18		M	SM	Bwn c-f SAND, some Silt, trace f Gravel (Class 3b)	
8									
9	14	8 8 6 4	S-5	18		M	SM	Same (Class 3b)	
10									15.2
11	56+	3 6 50/2	S-6	18		M	SP-SM	Bwn c-f SAND, little f Gravel, little Silt (Class 3a)	
12									
13									
14									
15	50+	50/1	S-7	0		M		Bedrock (marble) Fragments Spoon refusal @ 15.1'	10.2
16								End of Boring at 15.1'	
17									
18									
19									
20									5.2
21									
22									
23									
24									
25									0.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

TECTONIC *ENGINEERING & SURVEYING CONSULTANTS P.C.*

PROJECT No. **6926.01**
PROJECT: **Melrose Commons Site C**
LOCATION: **Bronx, NY**

BORING No. B-46

SHEET No. 1 of 1

CLIENT: **L. Riso & Sons Co., Inc.**
CONTRACTOR: **Craig Test Boring Co., Inc.**

METHOD OF ADVANCING BORING	DIA.	DEPTH
POWER AUGER:		TO
ROT. DRILL:	3 7/8"	0 TO 15'
CASING:	4"	0 TO 15'
DIAMOND CORE:		TO

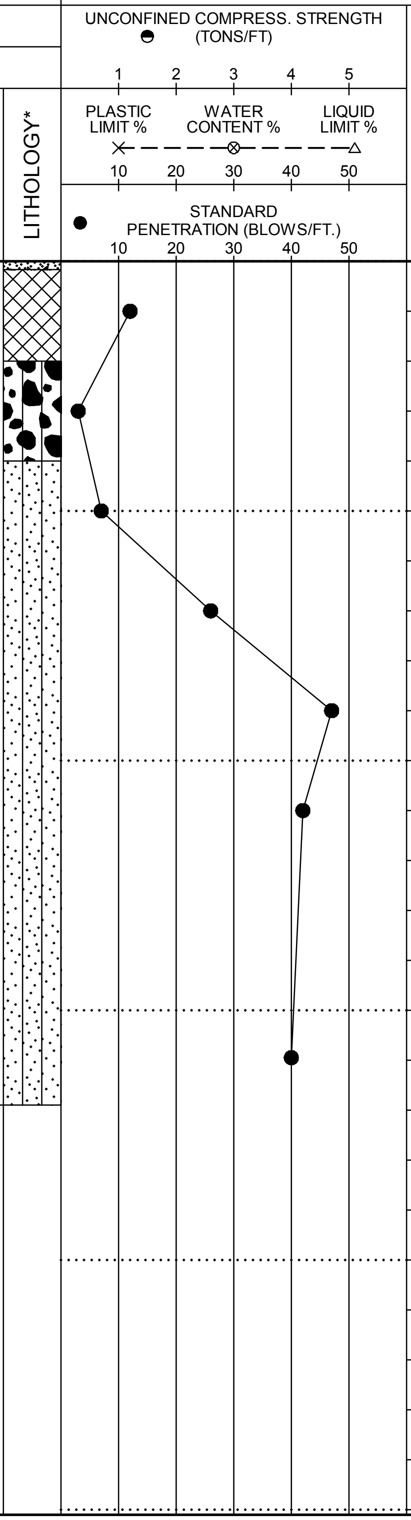
RIG: CME55 LC Rubber Track Mount Auto Hammer

GROUND WATER	DATE	TIME	DEPTH

MON. WELL ☐ YES ☒ NO
SCREEN DEPTH: --- TO ---
WEATHER: **Clear** TEMP: **60° F**
DEPTH TO ROCK: **16.9'**
*CHANGES IN STRATA ARE INFERRED

INSPECTOR: **Barry Ouimet**
DRILLER: **Rob Dollar**
SURFACE ELEVATION: **25.2**
DATUM: **See Remarks**
DATE START: **10/21/13**
DATE FINISH: **10/21/13**

DEPTH (FT.)	N OR MIN./FT.	PENETRATION RESISTANCE (BL/6 IN.)	SAMPLES SAMPLE NUMBER	RECOV. LENGTH (IN.)	RECOV. RQD (%)	MOISTURE	UNIFIED SOIL CLASS.	DESCRIPTION OF MATERIAL	ELEVATION (FT.)
1	12	2 7 5 5	S-1	18		M		2" Concrete slab Bwn c-f SAND, little f Gravel, little Silt with concrete/cinders and asphalt fragments (FILL) (Class 7)	
2									
3	3	3 2 1 1	S-2	2		M	GM	Bwn f GRAVEL, and c-f Sand, little Silt (Class 6)	
4									
5	7	1 2 5 5	S-3	8		M	SM	Bwn c-f SAND, little Silt, trace f Gravel (Class 6)	20.2
6									
7	26	9 13 13 17	S-4	1		M	SM	Same (Class 6)	
8									
9	47	14 21 26 24	S-5	2		M	SM	Same (Class 6)	
10									15.2
11	42	23 20 22 30	S-6	18		M	SM	Bwn-wh c-f SAND, some Silt, little f Gravel (Class 2a)	
12									
13									
14									
15									10.2
16	40	27 19 21 65/5	S-7	16		M	SM	Lgt bwn c-f SAND, some Silt, little f Gravel (Class 3a) Bottom 2" Bedrock fragments-Marble	
17									
18								End of Boring at 16.9'	
19									
20									5.2
21									
22									
23									
24									
25									0.2



REMARKS: Surface elevation estimated based on drawing entitled "121016 Survey" dated 9/23/13 by Erlanden-Crowell Shaw, provided by Client.

LEGEND FOR SOIL DESCRIPTION

COARSE GRAINED SOIL: (Coarser than No. 200 sieve)

DESCRIPTIVE TERM & GRAIN SIZE

TERM	SAND	GRAVEL
coarse - c	No. 4 Sieve to No. 10 Sieve	3" to 3/4"
medium - m	No. 10 Sieve to No. 40 Sieve	
fine - f	No. 40 Sieve to No. 200 Sieve	3/4" to 3/16"

COBBLES 3" to 10" **BOULDERS** 10" +

GRADATION DESIGNATIONS	PROPORTIONS OF COMPONENT
fine, f	Less than 10% coarse to medium
medium to fine, m-f	Less than 10% coarse
medium, m	Less than 10% coarse and fine
coarse to medium, c-m	less than 10% fine
coarse, c	Less than 10% medium and fine
coarse to fine, c-f	All greater than 10%

FINE GRAINED SOIL: (Finer than No. 200 Sieve)

DESCRIPTION	PLASTICITY INDEX	PLASTICITY
Silt	0 - 1	none
Clayey Silt	2 - 5	slight
Silt & Clay	6 - 10	low
Clay & Silt	11 - 20	medium
Silty Clay	21 - 40	high
Clay	greater than 40	very high

PROPORTION:

DESCRIPTIVE TERM	PERCENT OF SAMPLE WEIGHT
trace	1 - 10
little	10 - 20
some	20 - 35
and	35 - 50

The primary component is fully capitalized

COLOR:

Blue - blue
Blk - black
Bwn - brown
Gn - green

Gy - gray
Or - orange
Rd - red
Tn - tan

Wh - white
Yl - yellow
Lgt - light
Dk - dark

SAMPLE NOTATION:

S - Split Spoon Soil Sample
U - Undisturbed Tube Sample
C - Core Sample
B - Bulk Soil Sample
NR - No Recovery of Sample

WOC - Weight of Casing
WOR - Weight of Rods
WOH - Weight of Hammer
PPR - Compressive Strength based on Pocket Pentrometer
TV - Shear Strength (tsf) based on Torvane

ADDITIONAL CLASSIFICATIONS:

New York City Building Code soil classifications are given in parentheses at the end of each description of material, if applicable. See Sections 1804.2 of the 2008 Building Code for further details.

TECTONIC

(800) 829-6531

W.O. No. 6926.01
Date: 11/5/2013
Project: Melrose Commons – Site C
Location: Bronx, NY

TEST PIT

TP-1

Client: L. Riso & Sons Co., Inc.	Depth to Seepage: NE	Inspector: Anthony Laroche
Contractor: Craig Test Borings	Depth to Groundwater: NE	Surface Elevation: 27
Equipment: Kubota KX057-4	Depth to Bedrock: NE	Datum:

SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS
Sample No.	Moisture				
			Bwn c-f SAND, some c-f Gravel, little Silt, few Cobbles & sparse Boulders (FILL) (Class 7)	7'	
			Bwn c-f SAND, some c-f Gravel, little Silt, some Cobbles, trace Boulders (Class 3b)	11'	
			End of Test Pit @ 11'		

PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC

(800) 829-6531

W.O. No. 6926.01 Date: 11/5/2013

Project: Melrose Commons – Site C

Location: Bronx, NY

TEST PIT

TP-2

Client: L. Riso & Sons Co., Inc.

Depth to Seepage: NE

Inspector: Anthony Laroche

Contractor: Craig Test Borings

Depth to Groundwater: NE

Surface Elevation: 27

Equipment: Kubota KX057-4

Depth to Bedrock: NE

Datum:

SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS
Sample No.	Moisture				
			Fill (kitchen sink, metal, etc.) in SAND	5'	
			Floor slab from old building	5.5'	
			Bwn c-f SAND, some c-f Gravel, trace Silt, few cobbles, sparse boulders (Class 3b)	11.5'	
			End of Test Pit @ 11.5'		

PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC	W.O. No.	6926.01	Date:	11/5/2013	**TEST PIT**
	Project:	Melrose Commons – Site C			**TP-3**
	Location:	Bronx, NY			
(800) 829-6531					

Client: L. Riso & Sons Co., Inc.	Depth to Seepage: NE	Inspector: Anthony Laroche
Contractor: Craig Test Borings	Depth to Groundwater: NE	Surface Elevation: 28
Equipment: Kubota KX057-4	Depth to Bedrock: NE	Datum:

SAMPLES		**Unified Soil Classification**	**DESCRIPTION OF MATERIAL**	**Strata Change (ft.)**	**REMARKS**
Sample No.	**Moisture**				
			FILL (Class 7) A 3'-4' diameter x 12' long oil tank inside foundation walls Boring with void located outside oil tank	7'	
			End of Test Pit @ 7'		

PARTICLE SIZE		**PROPORTION (exclusive of boulders & cobbles)**	**PROPORTION (boulders & cobbles)**		**MOISTURE**
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC

(800) 829-6531

W.O. No. 6926.01
Date: 11/5/2013
Project: Melrose Commons – Site C
Location: Bronx, NY

TEST PIT

TP-4

Client: L. Riso & Sons Co., Inc.
Contractor: Craig Test Borings
Equipment: Kubota KX057-4
Depth to Seepage: NE
Depth to Groundwater: NE
Depth to Bedrock: NE
Inspector: Anthony Laroche
Surface Elevation: 28.5
Datum:

SAMPLES		Unified Soil Classification	DESCRIPTION OF MATERIAL	Strata Change (ft.)	REMARKS
Sample No.	Moisture				
			Bwn c-f SAND, some c-f Gravel, little Silt, sparse Cobbles	4'	
			Bwn c-f SAND, some c-f Gravel, little Silt (inside the foundation found tires, metal, brick & wood) (Class 7)	10'	
			End of Test Pit @ 10'		

PARTICLE SIZE		PROPORTION (exclusive of boulders & cobbles)	PROPORTION (boulders & cobbles)		MOISTURE
Boulder: 10"(+)	Sand: No.200 Sieve-3/16"	trace: 0-10%	sparse:	0-10%	D: dry
Cobble: 3-10"	Silt/Clay: No.200 Sieve (-)	little: 10-20%	few:	10-35%	M: moist
Gravel: 3/16"-3"		some: 20-35%	many:	35-65%	W: wet
		and: 35-50%			

TECTONIC

MONITORING WELL INSTALLATION REPORT

Project No.: 6926.01
Date: 10/18/2013
Project: Melrose Commons - Site C
Location: Bronx, NY

Client: L. Riso & Sons Co. Inc.	Driller: Rob Dollar	Monitoring Well No: MW/B-20
Owner:	Inspector: Barry Ouimet	Surface Elevation: 26.5
Contractor: Craig Test Borings, Inc.	Installed in Boring: B-20	Datum:

WELL CONSTRUCTION

EQUIPMENT AND DIMENSIONS

Type of Rig: CME 55LC Rubber Tire Track Mount
Drilling Method: Rotary
Drilling Fluid:
Borehole Diameter 4" (casing)
Total Depth Drilled: 27.0' (cored 22 - 27')

SURFACE FINISH

Flush Mounted ☒ or Above Grade ☐
If Above Grade, Height Above Grade:
Steel Protective Casing: Yes ☐ No ☐
Locked Cap: Yes ☐ No ☒

COMPONENTS AND MATERIALS

COMPONENT	Depth Below Ground Surface To Top (ft.)	To Bottom (ft.)	Diameter (inches)	Type and Material
Inner casing				
Outer Casing (Not Protective Casing)				
Screen (Not Slot Size) .020	17.0'	27.0'	2"	PVC
Riser Pipe	0'	17.0'	2"	PVC
Sand/Gravel Pack	15.0'	27.0'		
Annular Seals/Grout Bentnite Chips	0'	15.0'		
Method of Grouting	Bentonite chips poured for seal			

WELL DATA

Static Water Level After Drilling (ft.)
Method Used to Measure:
Well was Developed for hours at gpm
Method of Development:

Remarks:

GROUNDWATER MEASUREMENTS

Date	Time	Depth Below Ground Surface	Groundwater Elevation
10/18/13	2:30 PM	20.5	6.00
10/21/13	2:10 PM	20.6	5.90
10/22/13	9:30 AM	20.4	6.1
10/29/13	2:30 PM	20.5	6.0

TECTONIC

MONITORING WELL INSTALLATION REPORT

Project No.: 6926.01
Date: 10/24/2013
Project: Melrose Commons - Site C
Location: Bronx, NY

Client: L. Riso & Sons Co. Inc.	Driller: Rob Dollar	Monitoring Well No: MW/B-35
Owner:	Inspector: Barry Ouimet	Surface Elevation: 28.8
Contractor: Craig Test Borings, Inc.	Installed in Boring: B-35	Datum:

WELL CONSTRUCTION

EQUIPMENT AND DIMENSIONS

Type of Rig: CME 750X with Auto Hammer
Drilling Method: Mud Rotary
Drilling Fluid:
Borehole Diameter 4" (casing)
Total Depth Drilled: 14.0'

SURFACE FINISH

Flush Mounted ☒ or Above Grade ☐
If Above Grade, Height Above Grade:
Steel Protective Casing: Yes ☐ No ☐
Locked Cap: Yes ☐ No ☐

COMPONENTS AND MATERIALS

COMPONENT	Depth Below Ground Surface To Top (ft.)	To Bottom (ft.)	Diameter (inches)	Type and Material
Inner casing				
Outer Casing (Not Protective Casing)				
Screen (Not Slot Size) .020	9.0'	14.0'	2"	PVC .020 slot
Riser Pipe	0'	9.0'	2"	PVC
Sand/Gravel Pack	6.0'	14.0'		#2 Sand
Annular Seals/Grout Bentnite Chips	0.0	6.0'		
Method of Grouting				

WELL DATA

Static Water Level After Drilling (ft.) NE
Method Used to Measure:
Well was Developed for hours at gpm
Method of Development:

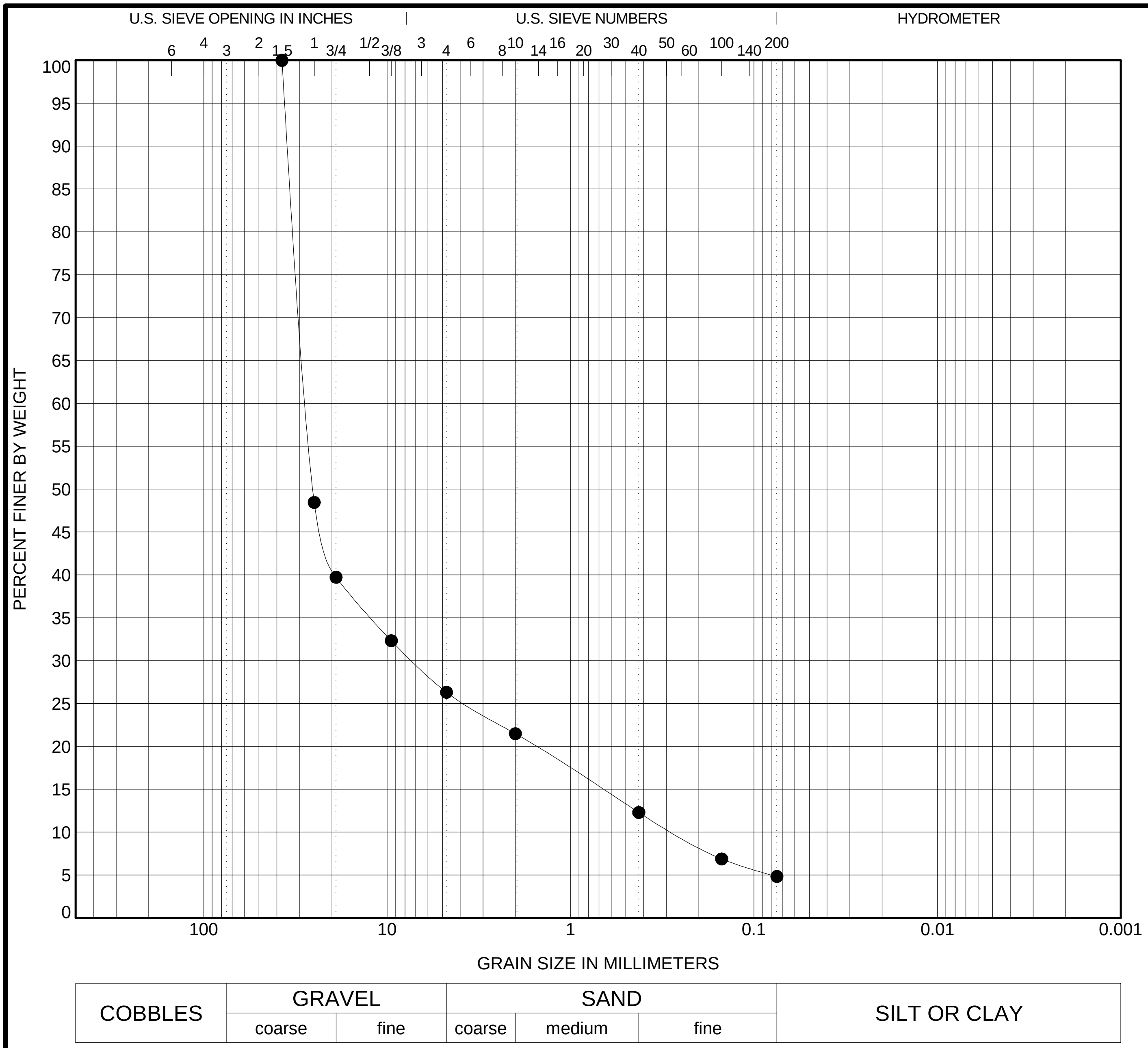
Remarks:

Well was dry to depth of well (on rock). No water encountered.

GROUNDWATER MEASUREMENTS

Date	Time	Depth Below Ground Surface	Groundwater Elevation
10/28/13	2:30 PM	NE	-
10/29/13	2:30 PM	NE	-

APPENDIX II



	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-4**	**4.0**	**S-3**	**Bwn c-f GRAVEL, some c-f Sand, trace Silt/Clay**	**11.8**				**7.06**	**100.10**

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-4**	**4.0**	**S-3**	**37.5**	**27.378**	**7.271**	**0.274**	**73.7**	**21.5**	**4.8**		**Boring**

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

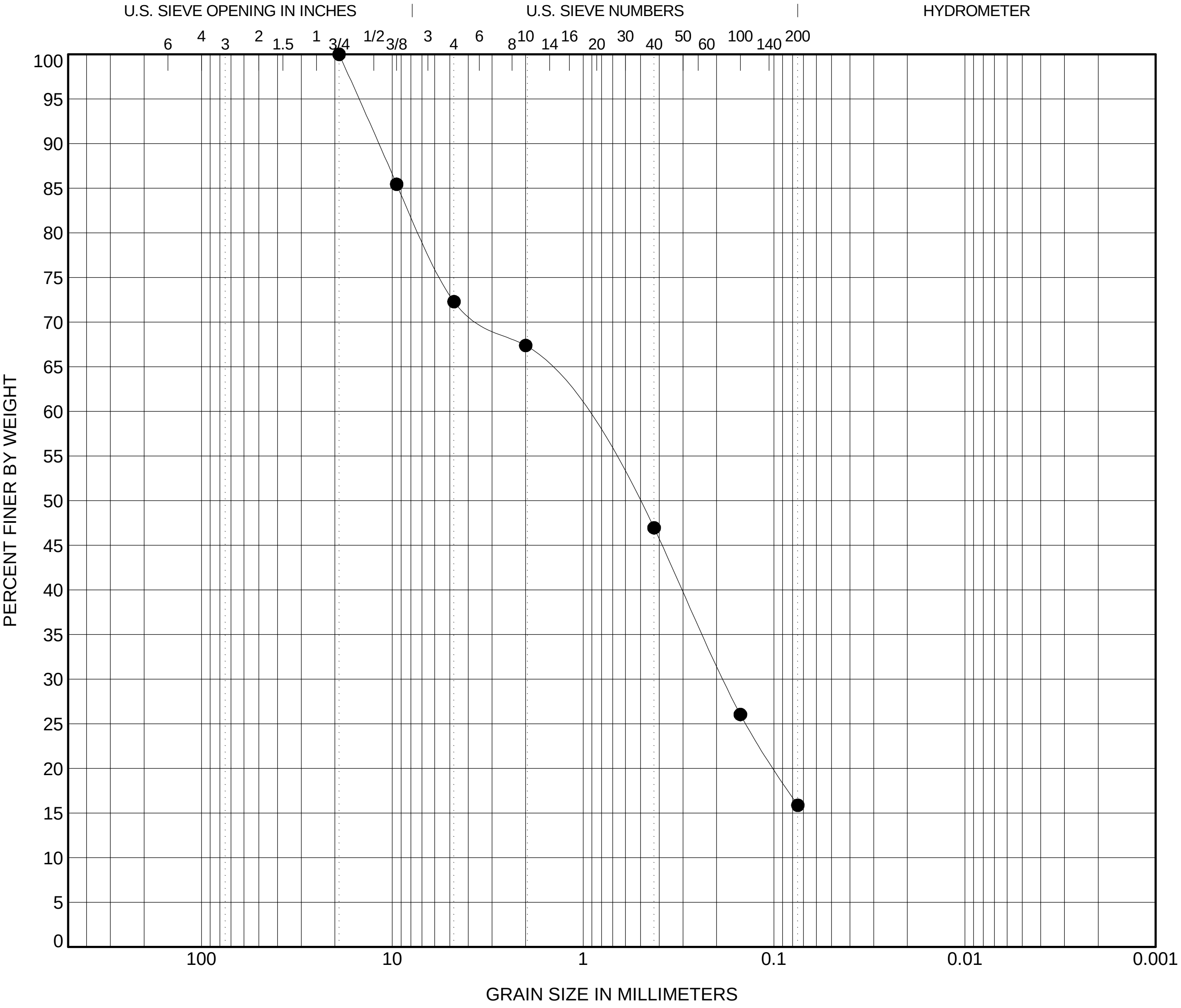
280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-28**	**8.0**	**S-5**	**Lgt Wh-Bwn c-f SAND, some f Gravel, little Silt/Clay**	**7.9**					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-28**	**8.0**	**S-5**	**19**	**1.143**	**0.183**		**27.7**	**56.4**	**15.9**		**Boring**

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ENGINEERING & SURVEYING
CONSULTANTS P.C.

280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

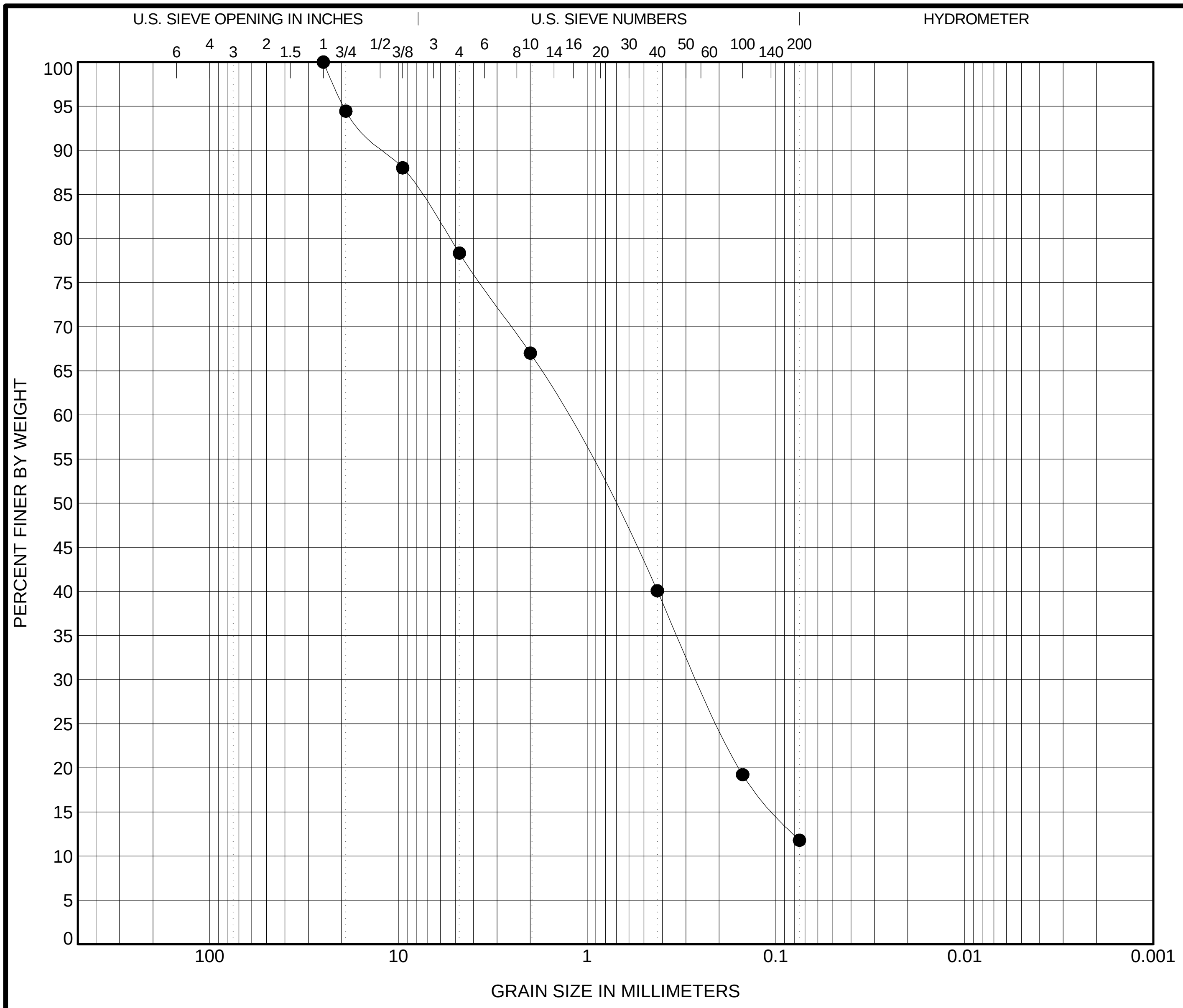
GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**

GRAIN SIZE DISTRIBUTION 6926.GPJ TECTONIC ENG.GDT 11/21/13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-28**	**15.0**	**S-7**	**Bwn c-f SAND, some c-f Gravel, little Silt/Clay**	**3.9**				**0.78**	**21.07**

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-28**	**15.0**	**S-7**	**25**	**1.337**	**0.257**		**21.7**	**66.5**	**11.8**		**Boring**

TECTONIC ***ENGINEERING & SURVEYING CONSULTANTS P.C.***

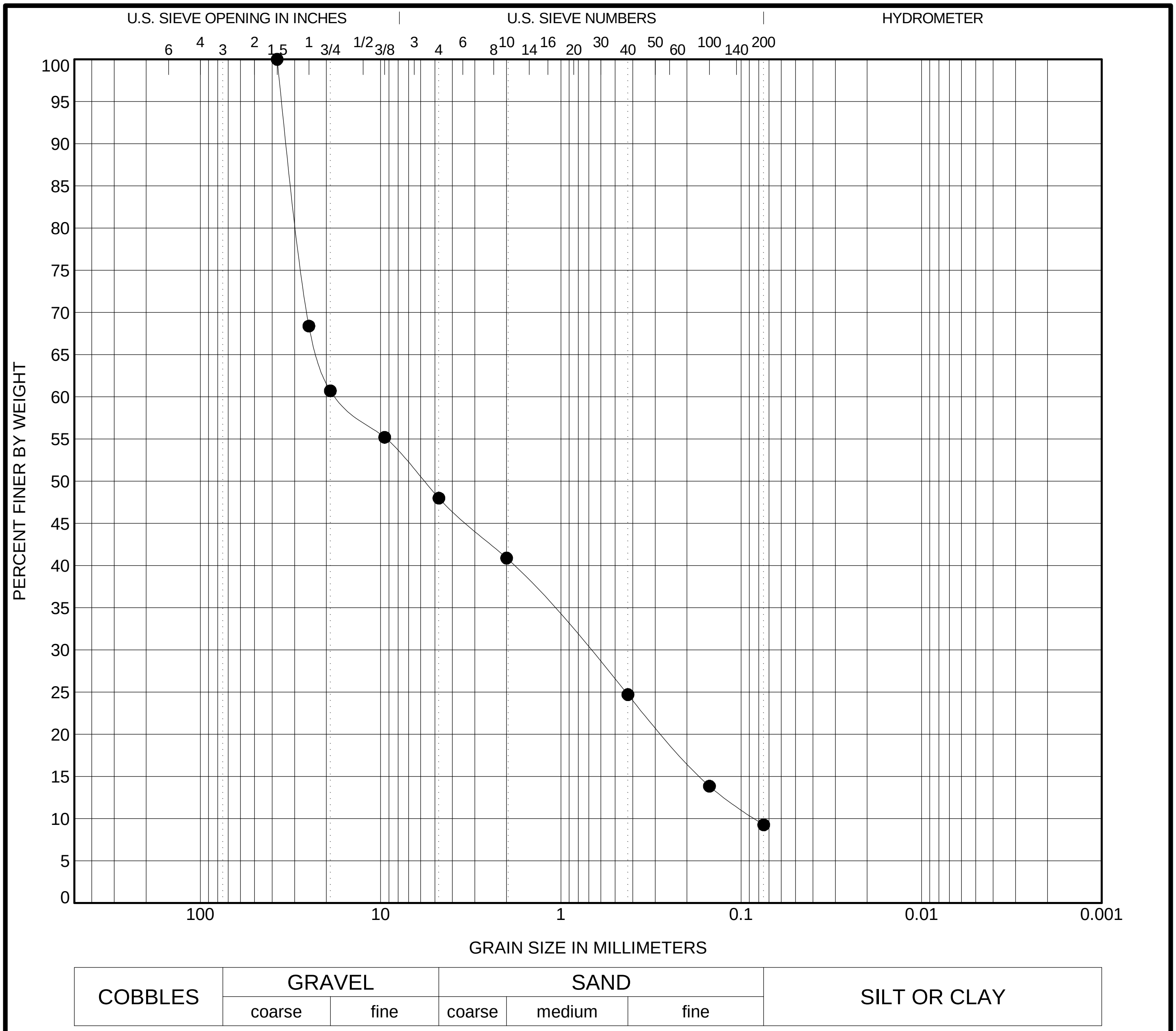
280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-35**	**4.0**	**S-3**	**Bwn c-f GRAVEL and c-f Sand, trace Silt/Clay**	**14.3**				**0.34**	**207.20**

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-35**	**4.0**	**S-3**	**37.5**	**17.377**	**0.706**	**0.084**	**52.0**	**38.7**	**9.3**		**Boring**

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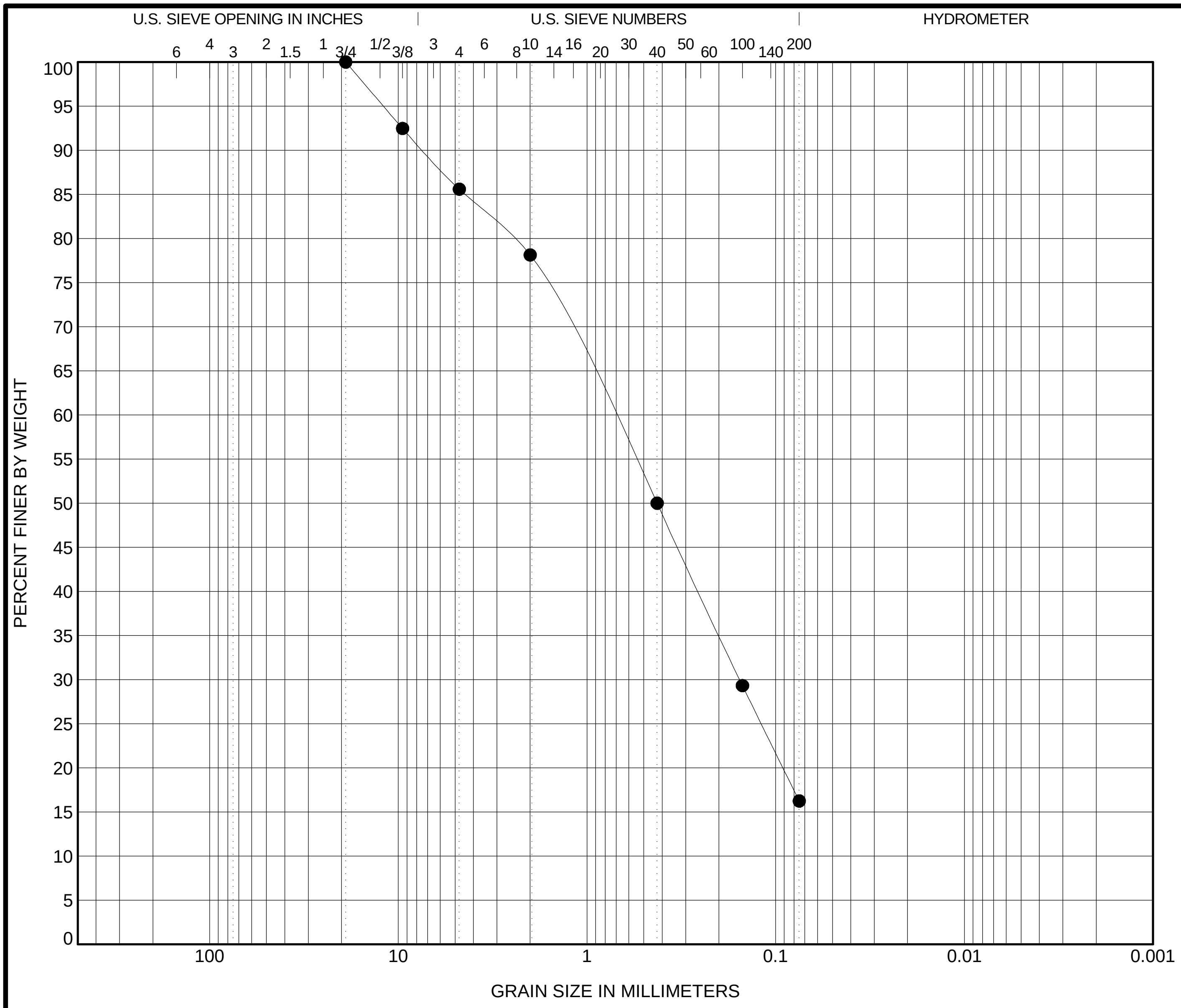
280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Identification			Classification	WC%	LL	PL	PI	Cc	Cu
●	**B-42**	**8.0**	**S-5**	**Lgt Bwn c-f SAND, little Silt/Clay, little f Gravel**	**5.5**					

	Sample Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	Source of Material
●	**B-42**	**8.0**	**S-5**	**19**	**0.737**	**0.155**		**14.4**	**69.3**	**16.2**		**Boring**

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280 Little Britain Road
Newburgh, NY 12550
Telephone: (845) 563-9081 Fax: (845) 563-9085

GRAIN SIZE DISTRIBUTION

Project No: **6926.01** Date: **11/21/13**

Project: **Melrose Commons**

Location: **Bronx, NY**

APPENDIX E

VAPOR BARRIER SPECIFICATIONS

STEGO® WRAP VAPOR BARRIER

ASTM E 1745 Class A-B-C Compliant

STEGO® WRAP VAPOR BARRIER

is made with our proven trade secret blend of prime virgin resins and additives. Stego Wrap Vapor Barrier is an ASTM E 1745 Class A Vapor Barrier (Below 0.01 perms). We focus on producing a product that will maintain its extremely low permeance for the life of a building. The protection of Stego Wrap Vapor Barrier provides the flexibility to change flooring types and overall building use without worrying about below-slab moisture vapor.

FEATURES & BENEFITS

Unsurpassed Permeance Characteristics

Life of the Building Protection

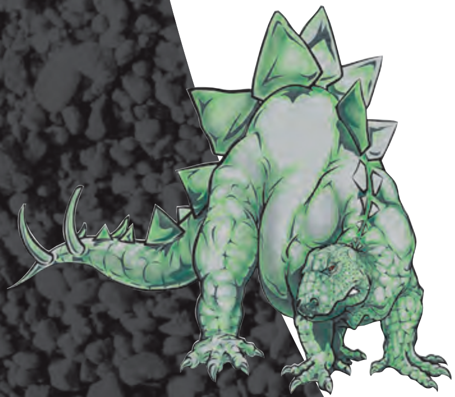
Exceptional Tear and Puncture Resistance

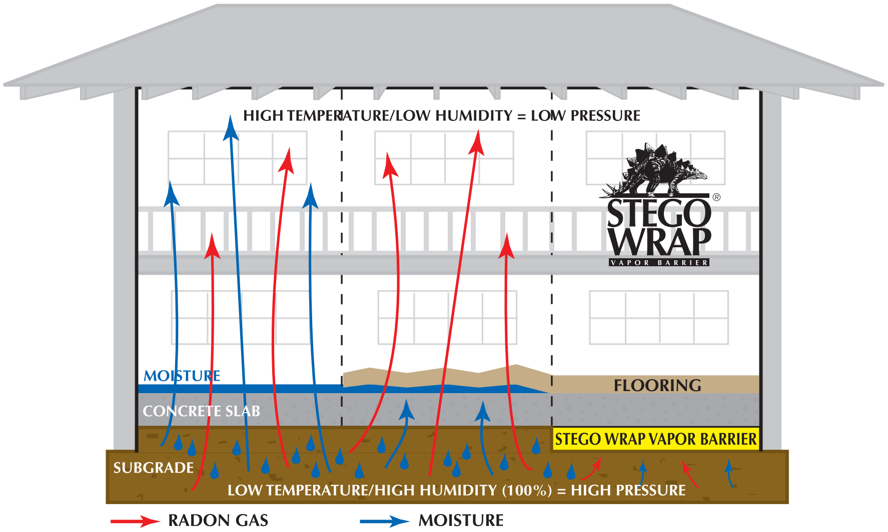
Easy, Reliable Installation

Competitively Priced

Available Nationwide

Local Support





Regardless of the location of the water table, humidity below concrete slabs approximates 100%. Typical below slab vapor pressure is more than twice that of building interiors at room temperature, creating vapor drive from the substrate, up through the slab, and into the building.

THE STEGO® ADVANTAGES

SUPERIOR DEFENSE Against Floor Failures:

Experts say "the need for a vapor barrier (as opposed to a vapor retarder) is becoming increasingly clear." Concrete Construction Magazine, August 2003, p.18.

Infiltration of moisture through concrete slabs is a major building defect liability. Stego Wrap Vapor Barrier has an extremely low permeance preventing water vapor, soil gases (i.e. Radon), alkaline salts and soil sulfates from compromising the integrity of the building envelope and leading to serious problems with the concrete slab, floor coverings and indoor air quality. Stego Wrap Vapor Barrier is the best protection against these costly failures.

MOLD PREVENTION:

Mold needs three things to survive: moisture, sustained temperature (between 50° and 122° F), and a food source (dust, drywall, etc.). In any given building environment, contractors can only control one of these variables: moisture. Mold spores are present in 100% of building interiors. If moisture is allowed into your building environment, mold can and will grow. Toxic molds like Stachybotyrus can be fatal for nearly 5% of people (Institute of Medicine 1993), and cause a variety of serious health problems in others. Several recent well-publicized cases involving toxic mold have resulted in multimillion-dollar insurance settlements. Many of the nation's leading Insurance companies have severely limited or removed coverage for mold claims fearing that these claims will bankrupt their companies. Now more than ever, it is critically important that extra attention be paid to preventing the intrusion of moisture vapor from your below-slab environment. Stego Wrap Vapor Barrier offers the level of protection that many architects are now seeking and is considered to be inexpensive insurance against these costly failures.

LONGEVITY AND STRENGTH:

Stego Wrap Vapor Barrier is NOT made with recycled materials and will not degrade. Prime, virgin resins are the key. Molecules within Stego Wrap "interlock" to provide strength, durability and unprecedented resistance to moisture vapor and radon gas. Stego Wrap's puncture resistance is excellent. Stego Wrap will not tear, crack, flake, snag or puncture, even when 18,000 lb. laser-screed machines are driving directly across the barrier (see the reverse side for Stego Wrap Vapor Barrier's specifications).

Stego Industries, LLC · San Clemente, CA
Tel: 949-257-4100 · Toll Free: 877-464-7834 · Fax: 949-257-4113
www.stegoindustries.com

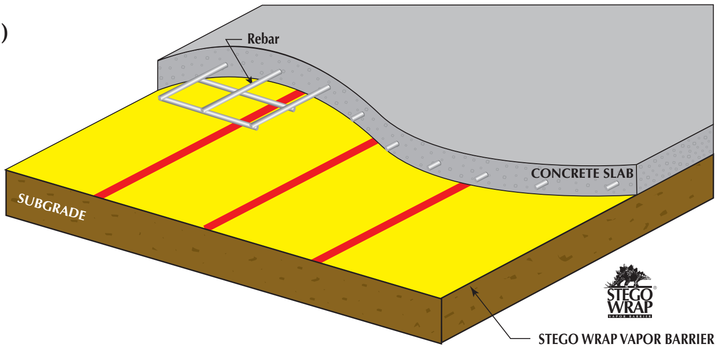
STEGO® WRAP VAPOR BARRIER SPECIFICATIONS

PROPERTIES	TEST METHOD	ASTM E 1745 Class A Requirements	TEST RESULT	EXPLANATION
Permeance	ASTM F 1249	0.1 perms	0.0086 perms * 0.0036 WVTR	Very impermeable to water vapor
Puncture Resistance	ASTM D 1709	2200 grams	Method B 2266 grams	Resistant to puncturing from construction abuse
Tensile Strength	ASTM D 882	45.0 lbf./in.	70.6 lbf./in.	Will not tear easily
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 section 8	0.1 perms	0.0098 perms	Permeance after wetting, drying, and soaking
	ASTM E 154 section 11	0.1 perms	0.0091 perms	Permeance after heat conditioning
	ASTM E 154 section 12	0.1 perms	0.0097 perms	Permeance after low temperature conditioning
	ASTM E 154 section 13	0.1 perms	0.0095 perms	Permeance after soil organism exposure
Methane Transmission Rate	ASTM D 1434		**GTR = 192.8 mL(STP)/m^2*day	Greatly impedes the transmission of methane gas
Radon Diffusion Coefficient			5.5 x 10^{-14}m^2/second	Greatly impedes the transmission of radon gas
Thickness			15 mils	Stronger, tougher and less permeable than much thicker membranes
Roll Dimensions			14 ft. X 140 ft.	1,960 ft^2/roll - allows for a minimum of seams
Roll Weight			140 lbs.	Easy to unroll and install

Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = water vapor transmission rate **GTR = Gas Transmission Rate

INSTALLATION INSTRUCTIONS: (Based on ASTM E 1643)

Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. Overlap seams 6 inches and tape using Stego Tape. All penetrations and blockouts should be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic. If the Stego Wrap is damaged, cut a piece from the Stego Wrap roll, place over the damaged area, and tape around all edges. Concrete may be placed directly on Stego Wrap. For additional information, please refer to Stego's complete installation instructions.



STEGO® TAPE:

STEGO WRAP RED POLYETHYLENE TAPE (3.75″ x 180′/roll) is specially designed to seal seams and penetrations on Stego Wrap installations. The acrylic, pressure-sensitive adhesive provides permanent bonding and quick-stick properties. The area to be bonded should be free of dust, dirt and moisture.

WARRANTY:

STEGO INDUSTRIES, LLC believes, to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions and installations are not within our control, STEGO INDUSTRIES, LLC does not guarantee results from use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY EXPRESS OR IMPLIED IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO.

Note: Test results above are for Stego Wrap products made as of March 15, 2013. If you have product made prior to March 15, 2013, please refer to Stego literature dated 10/12 for representative test results or call your local Stego Representative with questions.

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

Stego Industries, LLC · San Clemente, CA
Tel: 949-257-4100 · Toll Free: 877-464-7834 · Fax: 949-257-4113 · www.stegoindustries.com

04/2013

STEGO® DATA

Stego® Wrap Vapor Barrier

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Wrap Vapor Barrier

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Wrap Vapor Barrier is used as a below-slab vapor barrier.
COMPOSITION: Stego Wrap Vapor Barrier is a multi-layer plastic extrusion manufactured with only high grade prime, virgin, polyolefin resins.
ENVIRONMENTAL FACTORS:
Stego Wrap Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

5. Installation

UNDER SLAB: Unroll Stego Wrap Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of six inches and tape using Stego Tape or Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego accessories.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Wrap Vapor Barrier is available nationally via building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' sales department.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website.

10. Filing Systems

- Stego Industries' website
- Buildsite
- 4Specs

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO WRAP VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E 1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F 1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0086 perms *0.0036 WVTR
Puncture Resistance	ASTM D 1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method	2266 grams
Tensile Strength	ASTM D 882 – Test Method for Tensile Properties of Thin Plastic Sheeting	70.6 lbf/in.
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 Section 8, F 1249 – Permeance after wetting, drying, and soaking ASTM E 154 Section 11, F 1249 – Permeance after heat conditioning ASTM E 154 Section 12, F 1249 – Permeance after low temperature conditioning ASTM E 154 Section 13, F 1249 – Permeance after soil organism exposure	0.0098 perms 0.0091 perms 0.0097 perms 0.0095 perms
Methane Transmission Rate	ASTM D 1434 – Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	**192.8 GTR mL(STP)/m^2*day
Radon Diffusion Coefficient		5.5 x $10^{-14}$$m^2$/second
Thickness	ACI 302.1R-04 – Minimum Thickness (10 mils)	15 mils
Roll Dimensions		14 ft. wide x 140 ft. long or 1,960 ft^2
Roll Weight		140 lbs.

Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = Water Vapor Transmission Rate ** GTR = Gas Transmission Rate

Note: Test results above are for Stego Wrap products made as of March 15, 2013. If you have product made prior to March 15, 2013 please refer to Stego literature dated 10/12 for representative test results or call your local Stego Representative with questions.

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

Stego® Mastic

STEGO INDUSTRIES, LLC

Vapor Retarders

07 26 00, 03 30 00

1. Product Name

Stego Mastic

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Mastic is designed to be used as a waterproofing and vapor retardant membrane for use in conjunction with Stego Wrap 10-mil and 15-mil Vapor Retarder/Barrier. Stego Mastic can be used as an alternate to boots for pipe penetrations in Stego Wrap Vapor Barrier.

COMPOSITION: Stego Mastic is a medium-viscosity, water-based, polymer-modified anionic bitumin-ous/asphalt emulsion, which exhibits bonding, elongation and water-proofing characteristics.

SIZE: Stego Mastic comes in five-gallon buckets.

4. Technical Data

APPLICABLE STANDARDS:

American Society for Testing and Materials (ASTM)

- ASTM D 412 Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover
- ASTM G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000)
- ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
- ASTM D 751 Standard Test Methods for Coated Fabrics
- ASTM D 1434 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
- ASTM C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Water-proofing Membrane for Use with Separate Wearing Course.
- ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.

5. Installation

PREPARATION:

- A test application simulating the project environment should always be done prior to final usage of Stego Mastic.
- All Surfaces should be dry and free of loose materials, oils and other contaminants. The surfaces should be cleaned in the same fashion as the test surface in order to ensure proper results.
- Store above 40°F

PENETRATIONS:

For small pipe and rebar penetrations in Stego Wrap Vapor Barrier cut Stego Wrap just big enough for the penetration. Liberally apply Stego Mastic around the penetration to keep the integrity of the membrane intact. Stego Mastic can be applied by brush, roller, or sprayer.

NOTES: 1) For larger penetrations or wide cut-outs of Stego Wrap, use Stego Wrap and Stego Tape to repair and seal. 2) Solvent-based products should not be applied over this product. 3)Clean all tools with kerosene and/or oil-based cleaners.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Mastic is available nationally via building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' sales department.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchan-tability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or by visiting the website.

10. Filing Systems

- Stego Industries' website
- Buildsite

TABLE 1: PHYSICAL PROPERTIES OF STEGO MASTIC

Property and Test	Stego Mastic
Tensile/Elongation, ASTM D 412	32 psi / 3860%
Resistance to Decay, ASTM E 154	9% perm loss
Accelerated Aging, ASTM G 23	No Effect
Permeance, ASTM E 96	0.17 Perms
Hydrostatic Water Pressure, ASTM D 751	28 psi
Methane Transmission Rate, ASTM D 1434	0
Adhesion to Concrete & Masonry, ASTM C 836	7 lbf./in.
Hardness, ASTM C 836	85
Crack Bridging, ASTM C 836	No Cracking
Low Temp Flexibility, ASTM C 836	No Cracking at -20°C
Resistance to Acids:	
Acetic	30%
Sulfuric and Hydrochloric	15%
Temperature Effect:	
Stable	248°F
Flexible	13°F

Note: perm unit = grains/(ft^2 *hr* in.Hg)

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

04/2013

Stego® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name
Stego Tape

2. Manufacturer
Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description
USES: Stego Tape is a low permeance tape designed for protective sealing, hanging, seaming, splicing, and patching applications where a highly conformable material is required. It has been engineered to bond specifically to Stego Wrap, making it ideal for sealing Stego Wrap seams and penetrations.

COMPOSITION: Stego Tape is composed of polyethylene film and an acrylic, pressure-sensitive adhesive.

SIZE: Stego Tape is 3.75" wide and 180' long. Stego Tape ships 12 rolls in a case.

4. Technical Data
APPLICABLE STANDARDS:

Pressure Sensitive Tape Council (PSTC)

- PSTC 101 – International Standard for Peel Adhesion of Pressure Sensitive Tape

American Society for Testing & Materials (ASTM)

- ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs

5. Installation
SEAMS:

Overlap Stego Wrap six inches and seal with Stego Tape. Make sure the area of adhesion is free from dust, dirt, moisture and frost to allow maximum adhesion of the pressure sensitive tape.

PIPE PENETRATION SEALING

1) Install Stego Wrap around pipe by slitting/cutting material
2) If void space around pipe is minimal, seal around base of pipe with Stego Tape (Stego Mastic can be used for additional coverage)

DETAIL PATCH FOR PIPE PENETRATION SEALING

1) Cut a piece of Stego Wrap that creates a six inch overlap around all edges of the void space
2) Cut an "X" in the center of the detail patch
3) Slide detail patch over pipe, secure tightly
4) Tape down all sides of detail patch with Stego Tape
5) Seal around base of pipe with Stego Tape (Stego Mastic can be used for additional coverage)

Stego Tape should be installed above 40°F. In temperatures below 40°F, take extra care to remove moisture or frost from the area of adhesion.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost
Stego Tape is available nationally via building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' sales department.

7. Warranty
Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance
None required.

9. Technical Services
Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or by visiting the website.

10. Filing Systems
- Stego Industries' website
- Buildsite

TABLE 1: PHYSICAL PROPERTIES OF STEGO TAPE

PROPERTY	RESULTS
Total Thickness	6 mils
Permeance	0.03 perms
Tensile Strength	17 lbs./in. width
Elongation (at break) MD	1060%
Adhesion (20 min dwell ss, PSTC 101)	95-oz./in. width
Ultraviolet Resistance	Excellent

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

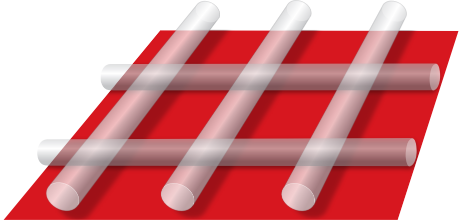
STEGO CRETE CLAW® TAPE

Stego Crete Claw® Tape provides an innovative and economical way to secure plastic film to concrete while the concrete is still wet.

Crete Claw is a multi-layered tape/detail strip that will mechanically lock Stego Wrap Vapor Barrier to concrete. The patent-pending design allows wet concrete to cast into the textured surface of Crete Claw. Just stick Crete Claw to Stego Wrap prior to concrete placement, then place the concrete directly over the system.

Stego Crete Claw can be used in place of Stego Tape to seal joints in Stego Wrap Vapor Barrier providing a dual purpose and helping to offset costs.

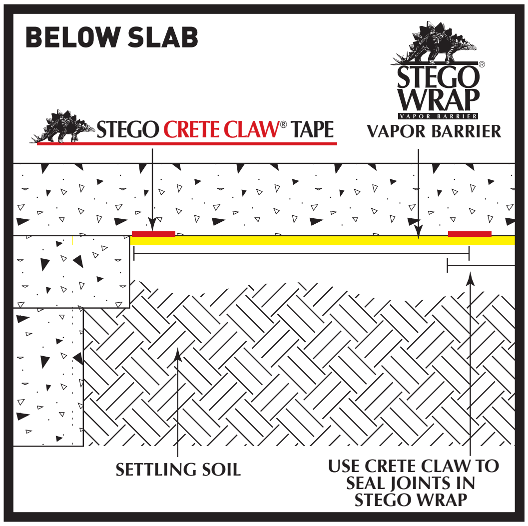
The patent-pending design allows wet concrete to cast into the textured surface of Crete Claw

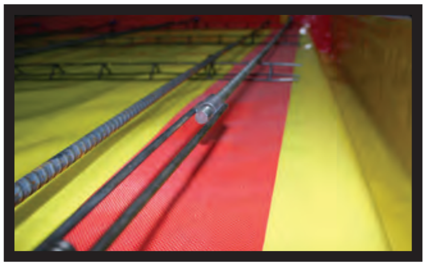


ANGLED TOP VIEW

MOST COMMON APPLICATIONS FOR CRETE CLAW®		6” Wide	3” Wide
ASTM E 1643 - Forming seal to the slab at perimeter		✓	✓
Securing Stego Wrap to bottom of slab for expansive/settling soils and carton/void form applications	Perimeter	✓	
	Seams	✓	

- Quick and easy to install
- Saves time and money
- Innovative Solution to help meet ASTM E 1643





Other more expensive products rely on chemical reaction or geotextile to bond with concrete making it all but impossible to properly install the vapor barrier. Often in pursuit of the all-in-one product, the performance characteristics of the vapor barrier are compromised. Because Crete Claw Tape is applied as a separate accessory to the vapor barrier, it does not interfere with the ability to detail around penetrations or repair damaged areas.

TABLE 1: CRETE CLAW TAPE TEST RESULTS

PROPERTY	TEST	RESULTS
Total Thickness		26 mils
Permeance	ASTM F 1249	0.03 perms
180° Adhesion Peel Strength	ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength	1 in.^{2} shear test using an Instron 3345 Machine	>49 lbf/in.^{2}*
Roll Sizes		6” x 180’ and 3” x 180’ **

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.
** 3” wide is for perimeter seal application only.

Contact us to learn more about this innovative product.

STEGO INDUSTRIES, LLC | San Clemente, CA | 949-257-4100 | Toll Free 877-464-7834 | Fax 949-257-4113 | www.stegoindustries.com

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04/2013

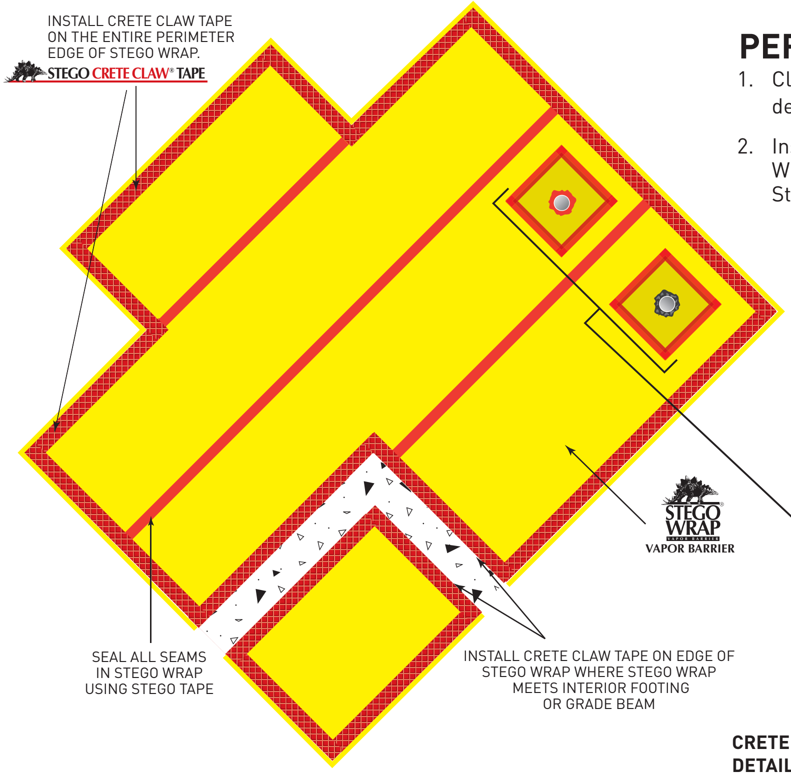
STEGO CRETE CLAW® TAPE

INSTALLATION INSTRUCTIONS

TOP-DOWN VIEWS OF A BUILDING FOOTPRINT

PERIMETER SEAL TO SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of Crete Claw Tape.
2. Install 3” or 6” Crete Claw Tape on the entire perimeter of the Stego Wrap Installation. Crete Claw Tape should be completely on Stego Wrap.


INSTALL CRETE CLAW TAPE ON THE ENTIRE PERIMETER EDGE OF STEGO WRAP.

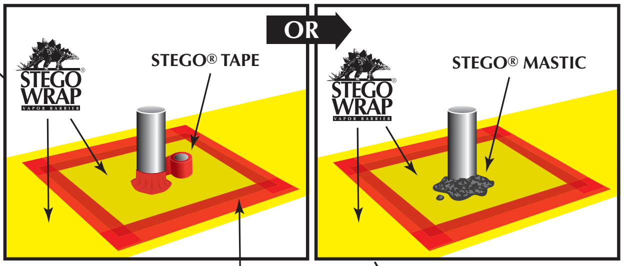
STEGO CRETE CLAW® TAPE

STEGO WRAP VAPOR BARRIER

SEAL ALL SEAMS IN STEGO WRAP USING STEGO TAPE

INSTALL CRETE CLAW TAPE ON EDGE OF STEGO WRAP WHERE STEGO WRAP MEETS INTERIOR FOOTING OR GRADE BEAM

SEAL ALL PENETRATIONS WITH STEGO TAPE AND/OR STEGO MASTIC. CRETE CLAW TAPE IS NOT MEANT FOR REPAIRING PENETRATIONS.



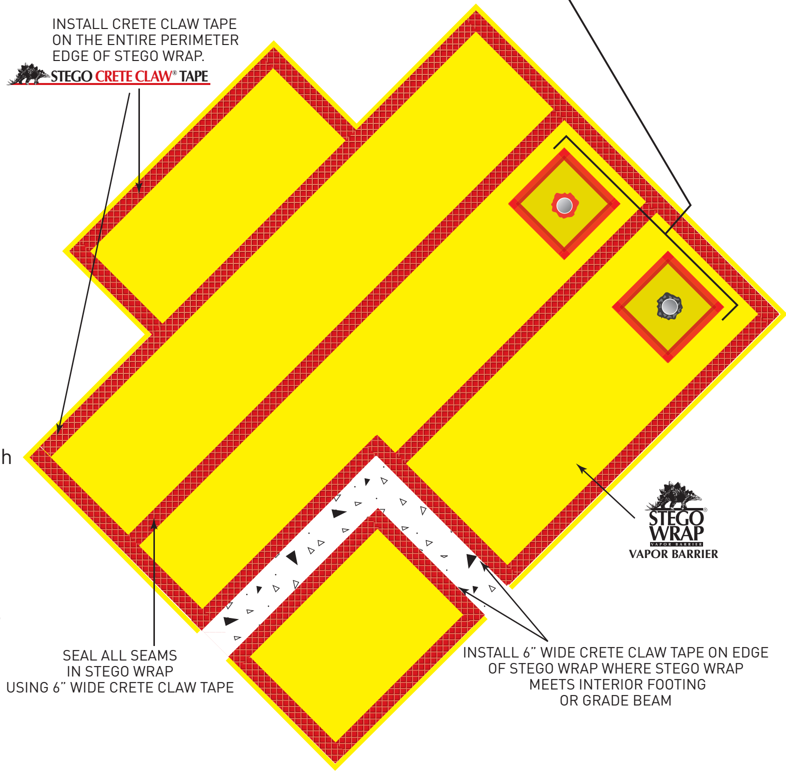
CRETE CLAW CAN BE USED TO SEAL SEAM AROUND DETAIL PATCH FOR ADDED PROTECTION.

SECURING STEGO WRAP TO THE BOTTOM OF THE SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of 6” wide Crete Claw Tape.
2. Overlap seams a minimum of 6 inches. Seal all seams in Stego Wrap using Crete Claw Tape.
3. Install 6” wide Crete Claw Tape on the entire perimeter of the Stego Wrap Installation. Crete Claw Tape should be completely on Stego Wrap.
4. Install additional Crete Claw Tape if required. Lab and simulated field tests have shown that if 6” wide Crete Claw is installed on all seams and around the perimeter, then it is more than strong enough to support Stego Wrap. If determined by the architect or engineer, additional Crete Claw may be specified.
5. Prior to the placement of concrete, ensure that Crete Claw is free of dirt or debris to ensure maximum bond to the concrete.

These are general instructions. Installation requirements may change on a project-by-project basis

IMPORTANT - For the application of securing Stego Wrap to the bottom of the slab, always use 6” wide Crete Claw Tape.


INSTALL CRETE CLAW TAPE ON THE ENTIRE PERIMETER EDGE OF STEGO WRAP.

STEGO CRETE CLAW® TAPE

STEGO WRAP VAPOR BARRIER

SEAL ALL SEAMS IN STEGO WRAP USING 6” WIDE CRETE CLAW TAPE

INSTALL 6” WIDE CRETE CLAW TAPE ON EDGE OF STEGO WRAP WHERE STEGO WRAP MEETS INTERIOR FOOTING OR GRADE BEAM

NOTE: Stego Industries, LLC’s (“Stego”) installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*. These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner’s representative before proceeding. If you have any questions regarding the above mentioned installation instructions, Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

949-257-4100 • 877-464-7834 • www.stegoindustries.com

Stego® Crete Claw® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00

1. Product Name

Stego® Crete Claw® Tape

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Crete Claw Tape is a multi-layered tape that is used to seal Stego Wrap to concrete while the concrete is still wet. Crete Claw allows wet concrete to cast into the textured top surface to form a mechanical bond/seal.
COMPOSITION: Stego Crete Claw is composed of polyethylene film, aperture film, and an acrylic, pressure sensitive adhesive.
SIZE: Stego Crete Claw is 6" wide by 180' long. Stego Crete Claw ships 8 rolls in a case.

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW

PROPERTY	RESULTS
Dimensions	6" x 180'
Total Thickness	26 mils
Permeance: ASTM F 1249	0.03 perms
180° Adhesion Peel Strength: ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.

5. Installation

SECURING STEGO WRAP TO SLAB: Clean the surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw. When ready to apply Crete Claw, peel back the release liner and apply to Stego Wrap. Stego Crete Claw should be completely on Stego Wrap.

Install Crete Claw Tape on all seams and around the entire perimeter of the Stego Wrap installation.

To detail, cut Stego Crete Claw with a box knife or scissors. Crete Claw should be installed above 40°F for maximum adhesion. For additional information, please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Crete Claw. This technique will allow the release liner to pull off easily and keep it out of the way.

6. Availability & Cost

Stego Crete Claw is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

Store Stego Crete Claw in a dry and temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical department or via our website.

10. Filing Systems

www.stegoindustries.com
Buildsite

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

STEGO® DATA

Stego® Crete Claw® (3" Wide)

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00

1. Product Name

Stego® Crete Claw® (3" Wide)

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Crete Claw is a multi-layered tape that is used to seal Stego Wrap to the perimeter of the slab while the concrete is placed. Crete Claw allows wet concrete to cast into the textured top surface to form a mechanical bond/seal.
COMPOSITION: Stego Crete Claw is composed of polyethylene film, aperture film, and an acrylic, pressure sensitive adhesive.
SIZE: Stego Crete Claw (3" Wide) is 3" wide and 180' long. Stego Crete Claw (3" Wide) ships 16 rolls in a case.

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW (3" Wide)

PROPERTY	RESULTS
Dimensions	3" x 180'
Total Thickness	26 mils
Permeance: ASTM F 1249	0.03 perms
180° Adhesion Peel Strength: ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.

5. Installation

UNDER SLAB: Clean surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw. When ready to apply Crete Claw, peel back the release liner and apply to Stego Wrap. Stego Crete Claw should be completely on Stego Wrap.

To detail, cut Stego Crete Claw with a box knife or scissors. Crete Claw should be installed above 40°F for maximum adhesion. For additional information please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Crete Claw. This technique will allow the release liner to pull off easily and keep it out of the way.

6. Availability & Cost

Stego Crete Claw (3" Wide) is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

Store Stego Crete Claw in a dry and temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical department or via our website.

10. Filing Systems

www.stegoindustries.com
Buildsite

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

StegoTack® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders

07 26 00, 03 30 00

1. Product Name

StegoTack® Tape

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: StegoTack Tape is a double-sided adhesive strip used to bond and seal Stego Wrap to concrete, masonry, wood, metal, and other surfaces. StegoTack is a flexible and moldable material to allow for a variety of applications and installations.
COMPOSITION: StegoTack Tape is made from a blend of synthetic rubber and resins. SIZE: StegoTack Tape is 2 inches wide and 50 feet long. StegoTack Tape ships 12 rolls in a case.

5. Installation

TO WALLS: Make sure the area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion. Remove release liner on one side and stick to desired surface. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

TO FOOTINGS: Make sure the area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion. Remove release liner on one side and stick to desired surface. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

Cut StegoTack Tape using a utility knife or scissors. Cut StegoTack Tape before removing the release liner for easier cutting. Install StegoTack Tape between 40°F and 110°F. For additional information please refer to Stego's complete installation instructions.

6. Availability & Cost

StegoTack Tape is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

For longer adhesive life, store in dry, temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

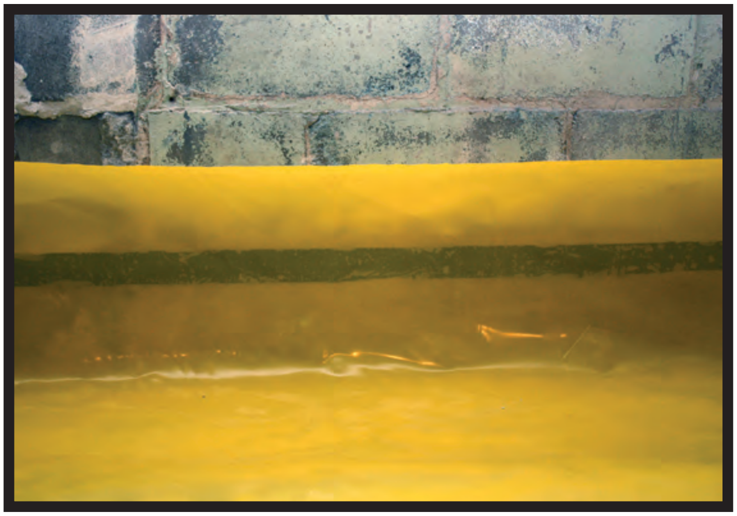
10. Filing Systems

www.stegoindustries.com
Buildsite

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGOTACK TAPE

PROPERTY	RESULTS
Dimensions	50 feet long, 2 inches wide
Total Thickness	30 Mils
Permeance	0.03 perms (30 mils)
Color	Grey
Material	Synthetic rubber blend
Adhesion to Steel	10.3 lbs./in. width ASTM C 1000
Installation Temperature	40°F/110°F (4°C/43°C)
In Service Temperature Range	-20°F/+140°F (-29°C/60°C)
VOC Content	No VOC's, 100% solids



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Stego® Term Bar

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Term Bar

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Term Bar is a semi-flexible plastic termination bar used for mechanically securing Stego Wrap or other materials to concrete, masonry, or wood.
COMPOSITION: Stego Term Bar is made from post-industrial recycled PVC.

5. Installation

UNDER SLAB: Nail through Stego Term Bar and Stego Wrap to secure material as needed. If the beveled edge is facing the wall, a pocket/lip is created for mastic/sealant to be used if required. Pre-drilled nail holes are provided every 6 inches for ease of installation.

To cut Stego Term Bar, score with a utility knife or wire snips. Stego Term Bar can be bent back and forth and then broken at desired locations as well. Stego Term Bar is flexible enough to bend around corners and contours in the wall for easy installation.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Term Bar is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

Store above 60°F. Term Bar will become less flexible at lower temperatures.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

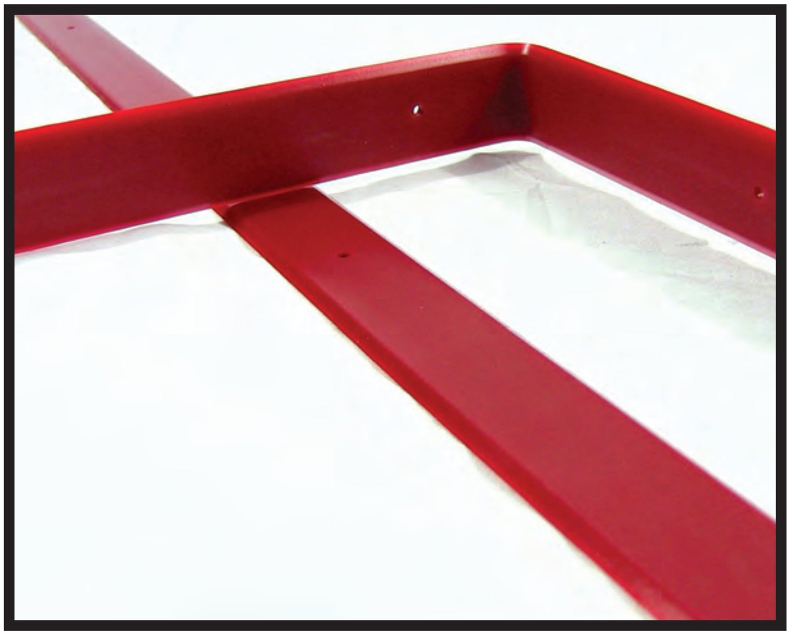
10. Filing Systems

www.stegoindustries.com

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO TERM BAR

PROPERTY	RESULTS
Dimensions	4 feet long, 1 1/8 inches wide
Color	Red
Material	Recycled PVC
Weight	4.7 oz. (132 grams)



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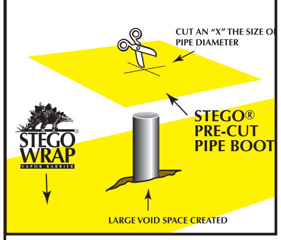


Stego® Pre-Cut Pipe Boots

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Pre-Cut Pipe Boots

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Pre-Cut Pipe Boots are used to seal around permanent penetrations in Stego Wrap.
COMPOSITION: Stego Pre-Cut Pipe Boots are made from Stego Wrap Vapor Barrier (15-mil), and therefore are manufactured from only high grade prime, virgin, polyolefin resins.
SIZE: Stego Pre-Cut Pipe Boots are 18” by 18” and 15 mils thick. Stego Pre-Cut Pipe Boots ship 10 packs of 25 in a case (250 boots per case).

5. Installation

UNDER SLAB: Cut an “X” the size of the pipe diameter in the center of the Pre-Cut Pipe Boot and slide tightly over pipe. Tape all sides of the pipe boot with Stego Tape. Seal around the base of the pipe using Stego tape and/or Stego Mastic.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Pre-Cut Pipe Boots are available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO PRE-CUT PIPE BOOTS

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E 1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F 1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0086 perms *0.0036 WVTR
Puncture Resistance	ASTM D 1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method	2266 grams
Tensile Strength	ASTM D 882 – Test Method for Tensile Properties of Thin Plastic Sheeting	70.60 lbf/in.
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 Section 8, F 1249 – Permeance after wetting, drying, and soaking ASTM E 154 Section 11, F 1249 – Permeance after heat conditioning ASTM E 154 Section 12, F 1249 – Permeance after low temperature conditioning ASTM E 154 Section 13, F 1249 – Permeance after soil organism exposure	0.0098 perms 0.0091 perms 0.0097 perms 0.0095 perms
Thickness	ACI 302.1R-04 – Minimum Thickness (10 mils)	15 mils
Pipe Boot Dimensions		18" x 18"

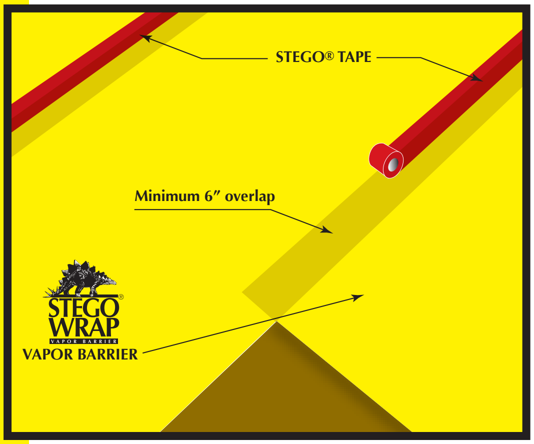
Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = Water Vapor Transmission Rate

PART 1

STEGO WRAP VAPOR BARRIER/RETARDER
INSTALLATION INSTRUCTIONS

IMPORTANT: Please read these installation instructions completely, prior to beginning any Stego Wrap installation. The following installation instructions are based on ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. If project specifications call for compliance with ASTM E 1643, then be sure to review the specific installation sections outlined in the standard along with the techniques referenced in these instructions.

FIGURE 1: UNDER-SLAB INSTALLATION



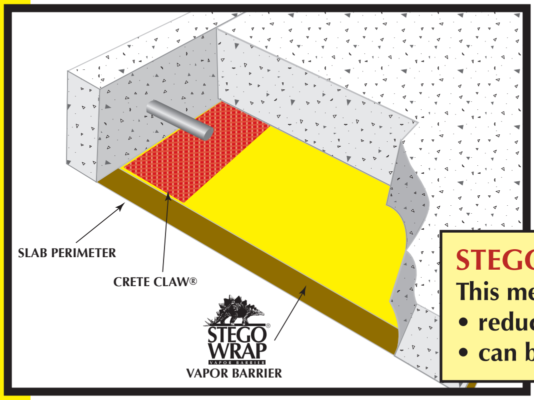
UNDER-SLAB INSTRUCTIONS:

1. Stego Wrap can be installed over an aggregate, sand, or tamped earth base. It is not necessary to have a cushion layer or sand base, as Stego Wrap is tough enough to withstand rugged construction environments.
2. Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. All joints/seams both lateral and butt should be overlapped a minimum of six inches and taped using Stego Tape.

NOTE: The area of adhesion should be free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive tape.

3. ASTM E 1643 requires sealing the perimeter of the slab. *Extend vapor retarder over footings and seal to foundation wall, grade beam, or slab at an elevation consistent with the top of the slab or terminate at impediments such as waterstops or dowels.* Consult the structural engineer of record before proceeding.

FIGURE 2a: SEAL TO SLAB AT PERIMETER



SEAL TO SLAB AT PERIMETER:*

NOTE: Clean the surface of Stego Wrap to ensure that the area of adhesion is free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive adhesive.

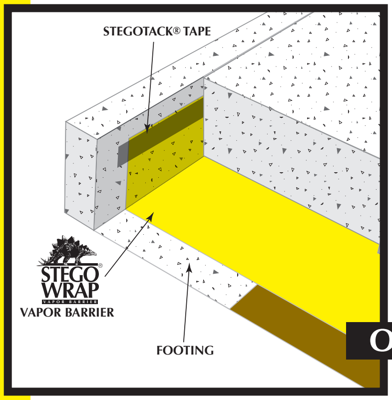
a. Install Crete Claw® on the entire perimeter edge of Stego Wrap.
b. Prior to the placement of concrete, ensure that the top of Crete Claw is free of dirt, debris, or mud to maximize the bond to the concrete.

STEGO LABOR SAVER!

This method not only complies with ASTM E 1643, but it also:

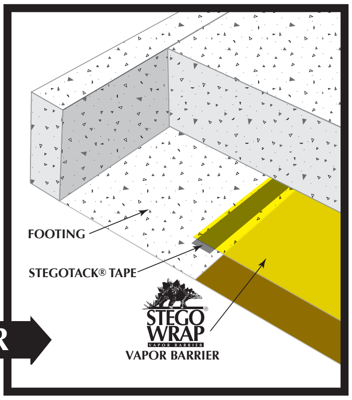
- **reduces labor compared to other perimeter sealing techniques.**
- **can be used even without an existing wall or footing, unlike alternatives.**

FIGURE 2b: SEAL TO PERIMETER WALL



OR

FIGURE 2c: SEAL TO FOOTING



OR SEAL TO PERIMETER WALL OR FOOTING WITH STEGOTACK® TAPE:*

a. Make sure area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion.
b. Remove release liner on one side and stick to desired surface.
c. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

* If ASTM E 1643 is specified, consult with project architect and structural engineer to determine which perimeter seal technique should be employed for the project.

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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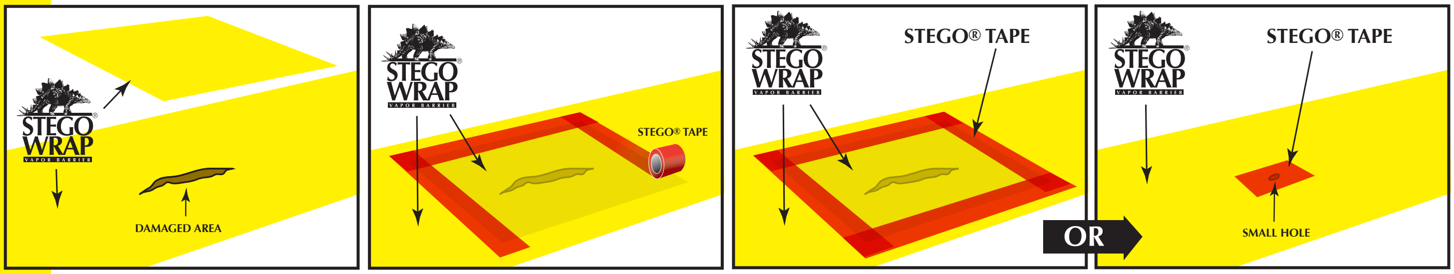
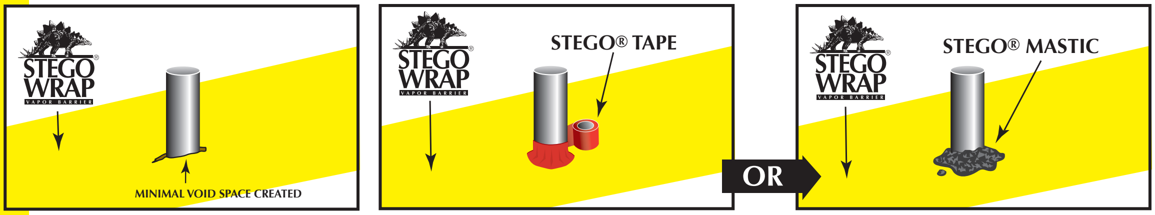
4. In the event that Stego Wrap is damaged during or after installation, repairs must be made. Stego Tape can be used to repair small holes in the material. For larger holes, cut a piece of Stego Wrap to a size and shape that covers any damage by a minimum overlap of six inches in all directions. Clean all adhesion areas of dust, dirt, moisture, and frost. Tape down all edges using Stego Tape (see figure 3, Sealing Damaged Areas).

FIGURE 3: SEALING DAMAGED AREAS



5. **IMPORTANT: ALL PENETRATIONS MUST BE SEALED.** All pipe, ducting, rebar, wire penetrations and block outs should be sealed using Stego Wrap, Stego Tape and/or Stego Mastic (see figure 4a, Pipe Penetration Sealing).

FIGURE 4a: PIPE PENETRATION SEALING



STEGO WRAP PIPE PENETRATION REPAIR DETAIL:

1: Install Stego Wrap around pipe penetrations by slitting/cutting material as needed. Try to minimize the void space created.

2: If Stego Wrap is close to pipe and void space is minimized then seal around pipe penetration with Stego Tape and/or Stego Mastic.

(See Figure 4a)

3: If detail patch is needed to minimize void space around penetration, then cut a detail patch to a size and shape that creates a six inch overlap on all edges around the void space at the base of the pipe. Stego Pre-Cut Pipe Boots are also available to speed up the installation.
4: Cut an "X" the size of the pipe diameter in the center of the pipe boot and slide tightly over pipe.
5: Tape down all sides of the pipe boot with Stego Tape.
6: Seal around the base of the pipe using Stego Tape and/or Stego Mastic.
(See Figure 4b)

FIGURE 4b: DETAIL PATCH FOR PIPE PENETRATION SEALING

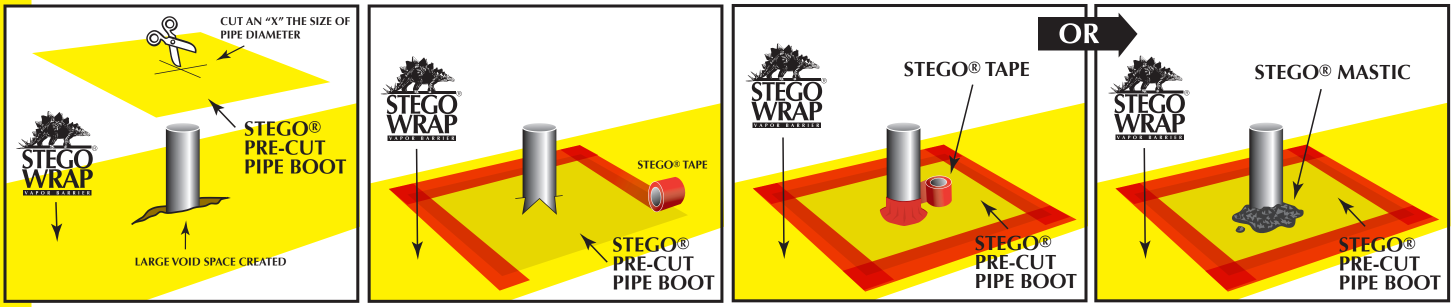
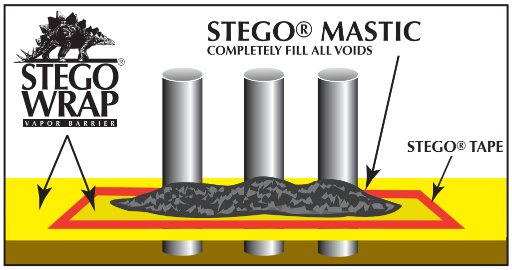


FIGURE 5: MULTIPLE PIPE PENETRATION SEALING



MULTIPLE PIPE PENETRATION SEALING:

Multiple pipe penetrations in close proximity and very small pipes may be sealed using Stego Wrap and Stego Mastic for ease of installation (see figure 5, Multiple Pipe Penetration Sealing).

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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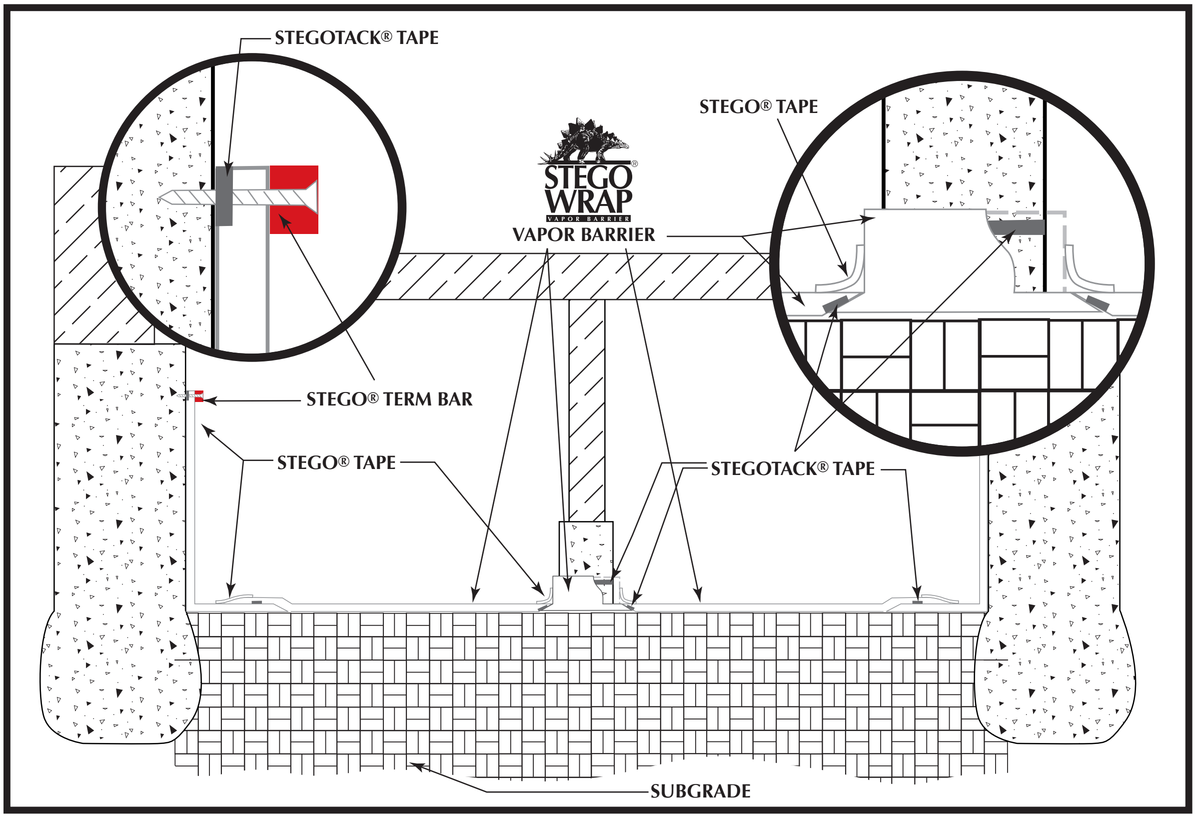
PART 2

STEGO WRAP VAPOR BARRIER/RETARDER
INSTALLATION INSTRUCTIONS

CRAWL SPACE INSTALLATION INSTRUCTIONS:

1. Turn Stego Wrap up the foundation wall to a minimum height of six inches above the outside/exterior grade or in compliance with local building codes and terminate with Stego Term Bar. To form a complete seal, apply StegoTack Tape or a layer of Stego Mastic to the foundation wall prior to installing Stego Term Bar. Allow one hour for Stego Mastic to cure prior to installing Stego Term Bar.
2. Seal Stego Wrap around all penetrations and columns using Stego Tape, StegoTack Tape, and/or Stego Mastic.
3. Place Stego Wrap directly over the crawl space floor. If rigid insulation is to be used, install Stego Wrap prior to insulation (under insulation and between the foundation wall and insulation).
4. Overlap seams a minimum of six inches and seal with Stego Tape. Some codes require a minimum of a twelve inch overlap. Check appropriate codes prior to installation.

FIGURE 6: CRAWL SPACE INSTALLATION



NOTE: Stego Wrap Vapor Barrier and Stego Tape are both available in white (as shown in illustration above).

INSTALLATION TIP:

1. For a cleaner look and to prevent against tenting of Stego Wrap at the foundation wall/foundation floor intersection, consider mechanically fastening Stego Wrap to base of foundation wall in addition to the above mentioned wall termination.

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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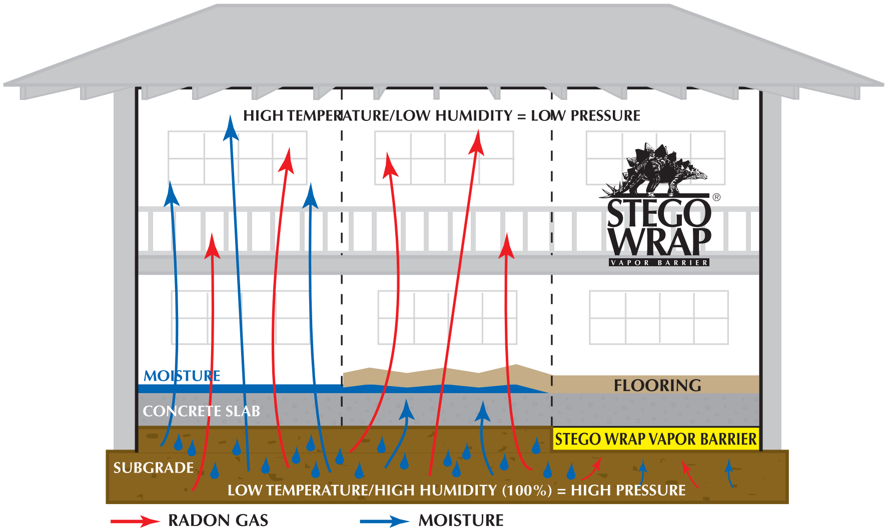
STEGO® INDUSTRIES, LLC

STEGO® WRAP VAPOR BARRIER

ASTM E 1745 Class A-B-C Compliant



Regardless of the location of the water table, humidity below concrete slabs approximates 100%. Typical below slab vapor pressure is more than twice that of building interiors at room temperature, creating vapor drive from the substrate, up through the slab, and into the building.

STEGO® WRAP VAPOR BARRIER

is made with our proven trade secret blend of prime virgin resins and additives. Stego Wrap Vapor Barrier is an ASTM E 1745 Class A Vapor Barrier (Below 0.01 perms). We focus on producing a product that will maintain its extremely low permeance for the life of a building. The protection of Stego Wrap Vapor Barrier provides the flexibility to change flooring types and overall building use without worrying about below-slab moisture vapor.

FEATURES & BENEFITS

Unsurpassed Permeance Characteristics

Life of the Building Protection

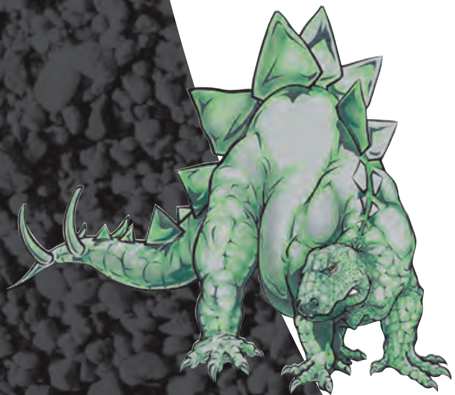
Exceptional Tear and Puncture Resistance

Easy, Reliable Installation

Competitively Priced

Available Nationwide

Local Support



THE STEGO® ADVANTAGES

SUPERIOR DEFENSE Against Floor Failures:

Experts say "the need for a vapor barrier (as opposed to a vapor retarder) is becoming increasingly clear." Concrete Construction Magazine, August 2003, p.18.

Infiltration of moisture through concrete slabs is a major building defect liability. Stego Wrap Vapor Barrier has an extremely low permeance preventing water vapor, soil gases (i.e. Radon), alkaline salts and soil sulfates from compromising the integrity of the building envelope and leading to serious problems with the concrete slab, floor coverings and indoor air quality. Stego Wrap Vapor Barrier is the best protection against these costly failures.

MOLD PREVENTION:

Mold needs three things to survive: moisture, sustained temperature (between 50° and 122° F), and a food source (dust, drywall, etc.). In any given building environment, contractors can only control one of these variables: moisture. Mold spores are present in 100% of building interiors. If moisture is allowed into your building environment, mold can and will grow. Toxic molds like Stachybotyrus can be fatal for nearly 5% of people (Institute of Medicine 1993), and cause a variety of serious health problems in others. Several recent well-publicized cases involving toxic mold have resulted in multimillion-dollar insurance settlements. Many of the nation's leading Insurance companies have severely limited or removed coverage for mold claims fearing that these claims will bankrupt their companies. Now more than ever, it is critically important that extra attention be paid to preventing the intrusion of moisture vapor from your below-slab environment. Stego Wrap Vapor Barrier offers the level of protection that many architects are now seeking and is considered to be inexpensive insurance against these costly failures.

LONGEVITY AND STRENGTH:

Stego Wrap Vapor Barrier is NOT made with recycled materials and will not degrade. Prime, virgin resins are the key. Molecules within Stego Wrap "interlock" to provide strength, durability and unprecedented resistance to moisture vapor and radon gas. Stego Wrap's puncture resistance is excellent. Stego Wrap will not tear, crack, flake, snag or puncture, even when 18,000 lb. laser-screed machines are driving directly across the barrier (see the reverse side for Stego Wrap Vapor Barrier's specifications).

Stego Industries, LLC · San Clemente, CA
Tel: 949-257-4100 · Toll Free: 877-464-7834 · Fax: 949-257-4113
www.stegoindustries.com

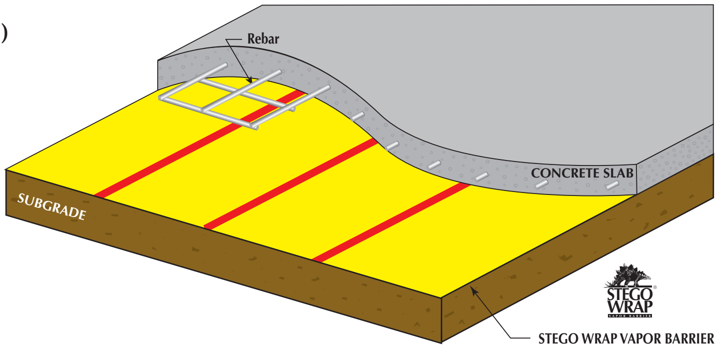
STEGO® WRAP VAPOR BARRIER SPECIFICATIONS

PROPERTIES	TEST METHOD	ASTM E 1745 Class A Requirements	TEST RESULT	EXPLANATION
Permeance	ASTM F 1249	0.1 perms	0.0086 perms * 0.0036 WVTR	Very impermeable to water vapor
Puncture Resistance	ASTM D 1709	2200 grams	Method B 2266 grams	Resistant to puncturing from construction abuse
Tensile Strength	ASTM D 882	45.0 lbf./in.	70.6 lbf./in.	Will not tear easily
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 section 8	0.1 perms	0.0098 perms	Permeance after wetting, drying, and soaking
	ASTM E 154 section 11	0.1 perms	0.0091 perms	Permeance after heat conditioning
	ASTM E 154 section 12	0.1 perms	0.0097 perms	Permeance after low temperature conditioning
	ASTM E 154 section 13	0.1 perms	0.0095 perms	Permeance after soil organism exposure
Methane Transmission Rate	ASTM D 1434		**GTR = 192.8 mL(STP)/m^2*day	Greatly impedes the transmission of methane gas
Radon Diffusion Coefficient			$5.5 \times 10^{-14} m^2$/second	Greatly impedes the transmission of radon gas
Thickness			15 mils	Stronger, tougher and less permeable than much thicker membranes
Roll Dimensions			14 ft. X 140 ft.	1,960 ft^2/roll - allows for a minimum of seams
Roll Weight			140 lbs.	Easy to unroll and install

Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = water vapor transmission rate **GTR = Gas Transmission Rate

INSTALLATION INSTRUCTIONS: (Based on ASTM E 1643)

Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. Overlap seams 6 inches and tape using Stego Tape. All penetrations and blockouts should be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic. If the Stego Wrap is damaged, cut a piece from the Stego Wrap roll, place over the damaged area, and tape around all edges. Concrete may be placed directly on Stego Wrap. For additional information, please refer to Stego's complete installation instructions.



STEGO® TAPE:

STEGO WRAP RED POLYETHYLENE TAPE (3.75″ x 180′/roll) is specially designed to seal seams and penetrations on Stego Wrap installations. The acrylic, pressure-sensitive adhesive provides permanent bonding and quick-stick properties. The area to be bonded should be free of dust, dirt and moisture.

WARRANTY:

STEGO INDUSTRIES, LLC believes, to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions and installations are not within our control, STEGO INDUSTRIES, LLC does not guarantee results from use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY EXPRESS OR IMPLIED IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO.

Note: Test results above are for Stego Wrap products made as of March 15, 2013. If you have product made prior to March 15, 2013, please refer to Stego literature dated 10/12 for representative test results or call your local Stego Representative with questions.

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Tel: 949-257-4100 · Toll Free: 877-464-7834 · Fax: 949-257-4113 · www.stegoindustries.com

04/2013

STEGO® DATA

Stego® Wrap Vapor Barrier

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Wrap Vapor Barrier

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Wrap Vapor Barrier is used as a below-slab vapor barrier.
COMPOSITION: Stego Wrap Vapor Barrier is a multi-layer plastic extrusion manufactured with only high grade prime, virgin, polyolefin resins.
ENVIRONMENTAL FACTORS:
Stego Wrap Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

5. Installation

UNDER SLAB: Unroll Stego Wrap Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of six inches and tape using Stego Tape or Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego accessories.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Wrap Vapor Barrier is available nationally via building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' sales department.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website.

10. Filing Systems

- Stego Industries' website
- Buildsite
- 4Specs

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO WRAP VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E 1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F 1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0086 perms *0.0036 WVTR
Puncture Resistance	ASTM D 1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method	2266 grams
Tensile Strength	ASTM D 882 – Test Method for Tensile Properties of Thin Plastic Sheeting	70.6 lbf/in.
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 Section 8, F 1249 – Permeance after wetting, drying, and soaking ASTM E 154 Section 11, F 1249 – Permeance after heat conditioning ASTM E 154 Section 12, F 1249 – Permeance after low temperature conditioning ASTM E 154 Section 13, F 1249 – Permeance after soil organism exposure	0.0098 perms 0.0091 perms 0.0097 perms 0.0095 perms
Methane Transmission Rate	ASTM D 1434 – Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	**192.8 GTR mL(STP)/m^2*day
Radon Diffusion Coefficient		5.5 x $10^{-14}m^2$/second
Thickness	ACI 302.1R-04 – Minimum Thickness (10 mils)	15 mils
Roll Dimensions		14 ft. wide x 140 ft. long or 1,960 ft^2
Roll Weight		140 lbs.

Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = Water Vapor Transmission Rate ** GTR = Gas Transmission Rate

Note: Test results above are for Stego Wrap products made as of March 15, 2013. If you have product made prior to March 15, 2013 please refer to Stego literature dated 10/12 for representative test results or call your local Stego Representative with questions.

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Stego® Mastic

STEGO INDUSTRIES, LLC

Vapor Retarders

07 26 00, 03 30 00

1. Product Name

Stego Mastic

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Mastic is designed to be used as a waterproofing and vapor retardant membrane for use in conjunction with Stego Wrap 10-mil and 15-mil Vapor Retarder/Barrier. Stego Mastic can be used as an alternate to boots for pipe penetrations in Stego Wrap Vapor Barrier.

COMPOSITION: Stego Mastic is a medium-viscosity, water-based, polymer-modified anionic bitumin-ous/asphalt emulsion, which exhibits bonding, elongation and water-proofing characteristics.

SIZE: Stego Mastic comes in five-gallon buckets.

4. Technical Data

APPLICABLE STANDARDS:

American Society for Testing and Materials (ASTM)

- ASTM D 412 Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover
- ASTM G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000)
- ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials
- ASTM D 751 Standard Test Methods for Coated Fabrics
- ASTM D 1434 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting
- ASTM C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Water-proofing Membrane for Use with Separate Wearing Course.
- ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.

5. Installation

PREPARATION:

- A test application simulating the project environment should always be done prior to final usage of Stego Mastic.
- All Surfaces should be dry and free of loose materials, oils and other contaminants. The surfaces should be cleaned in the same fashion as the test surface in order to ensure proper results.
- Store above 40°F

PENETRATIONS:

For small pipe and rebar penetrations in Stego Wrap Vapor Barrier cut Stego Wrap just big enough for the penetration. Liberally apply Stego Mastic around the penetration to keep the integrity of the membrane intact. Stego Mastic can be applied by brush, roller, or sprayer.

NOTES: 1) For larger penetrations or wide cut-outs of Stego Wrap, use Stego Wrap and Stego Tape to repair and seal. 2) Solvent-based products should not be applied over this product. 3)Clean all tools with kerosene and/or oil-based cleaners.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Mastic is available nationally via building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' sales department.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchan-tability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or by visiting the website.

10. Filing Systems

- Stego Industries' website
- Buildsite

TABLE 1: PHYSICAL PROPERTIES OF STEGO MASTIC

Property and Test	Stego Mastic
Tensile/Elongation, ASTM D 412	32 psi / 3860%
Resistance to Decay, ASTM E 154	9% perm loss
Accelerated Aging, ASTM G 23	No Effect
Permeance, ASTM E 96	0.17 Perms
Hydrostatic Water Pressure, ASTM D 751	28 psi
Methane Transmission Rate, ASTM D 1434	0
Adhesion to Concrete & Masonry, ASTM C 836	7 lbf./in.
Hardness, ASTM C 836	85
Crack Bridging, ASTM C 836	No Cracking
Low Temp Flexibility, ASTM C 836	No Cracking at -20°C
Resistance to Acids:	
Acetic	30%
Sulfuric and Hydrochloric	15%
Temperature Effect:	
Stable	248°F
Flexible	13°F

Note: perm unit = grains/(ft^2 *hr* in.Hg)

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Stego® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Tape

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Tape is a low permeance tape designed for protective sealing, hanging, seaming, splicing, and patching applications where a highly conformable material is required. It has been engineered to bond specifically to Stego Wrap, making it ideal for sealing Stego Wrap seams and penetrations.

COMPOSITION: Stego Tape is composed of polyethylene film and an acrylic, pressure-sensitive adhesive.

SIZE: Stego Tape is 3.75" wide and 180' long. Stego Tape ships 12 rolls in a case.

4. Technical Data

APPLICABLE STANDARDS:

Pressure Sensitive Tape Council (PSTC)

- PSTC 101 – International Standard for Peel Adhesion of Pressure Sensitive Tape

American Society for Testing & Materials (ASTM)

- ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs

5. Installation

SEAMS:

Overlap Stego Wrap six inches and seal with Stego Tape. Make sure the area of adhesion is free from dust, dirt, moisture and frost to allow maximum adhesion of the pressure sensitive tape.

PIPE PENETRATION SEALING

1) Install Stego Wrap around pipe by slitting/cutting material
2) If void space around pipe is minimal, seal around base of pipe with Stego Tape (Stego Mastic can be used for additional coverage)

DETAIL PATCH FOR PIPE PENETRATION SEALING

1) Cut a piece of Stego Wrap that creates a six inch overlap around all edges of the void space
2) Cut an "X" in the center of the detail patch
3) Slide detail patch over pipe, secure tightly
4) Tape down all sides of detail patch with Stego Tape
5) Seal around base of pipe with Stego Tape (Stego Mastic can be used for additional coverage)

Stego Tape should be installed above 40°F. In temperatures below 40°F, take extra care to remove moisture or frost from the area of adhesion.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Tape is available nationally via building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' sales department.

7. Warranty

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8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or by visiting the website.

10. Filing Systems

- Stego Industries' website
- Buildsite

TABLE 1: PHYSICAL PROPERTIES OF STEGO TAPE

PROPERTY	RESULTS
Total Thickness	6 mils
Permeance	0.03 perms
Tensile Strength	17 lbs./in. width
Elongation (at break) MD	1060%
Adhesion (20 min dwell ss, PSTC 101)	95-oz./in. width
Ultraviolet Resistance	Excellent

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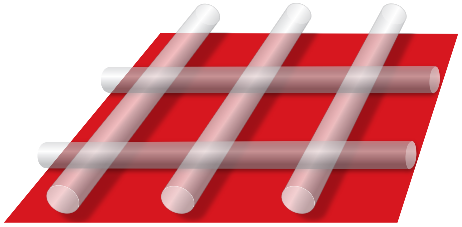
STEGO CRETE CLAW® TAPE

Stego Crete Claw® Tape provides an innovative and economical way to secure plastic film to concrete while the concrete is still wet.

Crete Claw is a multi-layered tape/detail strip that will mechanically lock Stego Wrap Vapor Barrier to concrete. The patent-pending design allows wet concrete to cast into the textured surface of Crete Claw. Just stick Crete Claw to Stego Wrap prior to concrete placement, then place the concrete directly over the system.

Stego Crete Claw can be used in place of Stego Tape to seal joints in Stego Wrap Vapor Barrier providing a dual purpose and helping to offset costs.

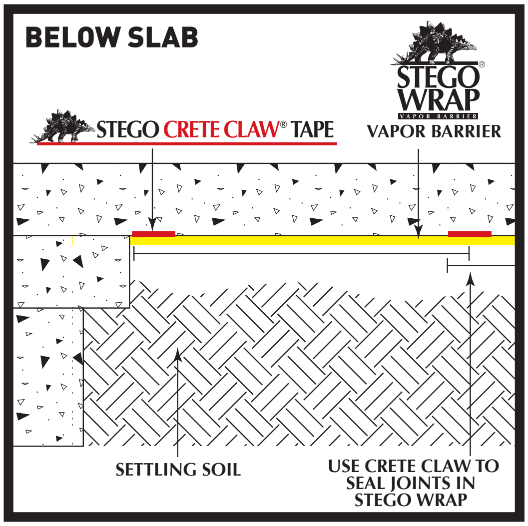
The patent-pending design allows wet concrete to cast into the textured surface of Crete Claw

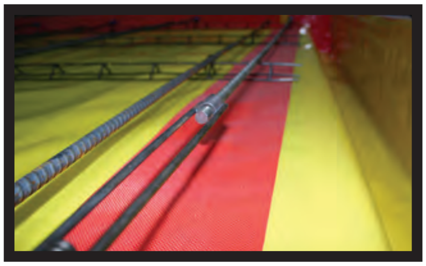


ANGLED TOP VIEW

MOST COMMON APPLICATIONS FOR CRETE CLAW®		6" Wide	3" Wide
ASTM E 1643 - Forming seal to the slab at perimeter		✓	✓
Securing Stego Wrap to bottom of slab for expansive/settling soils and carton/void form applications	Perimeter	✓	
	Seams	✓	

- Quick and easy to install
- Saves time and money
- Innovative Solution to help meet ASTM E 1643





Other more expensive products rely on chemical reaction or geotextile to bond with concrete making it all but impossible to properly install the vapor barrier. Often in pursuit of the all-in-one product, the performance characteristics of the vapor barrier are compromised. Because Crete Claw Tape is applied as a separate accessory to the vapor barrier, it does not interfere with the ability to detail around penetrations or repair damaged areas.

TABLE 1: CRETE CLAW TAPE TEST RESULTS

PROPERTY	TEST	RESULTS
Total Thickness		26 mils
Permeance	ASTM F 1249	0.03 perms
180° Adhesion Peel Strength	ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength	1 in.^{2} shear test using an Instron 3345 Machine	>49 lbf/in.^{2}*
Roll Sizes		6" x 180' and 3" x 180' **

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.
** 3" wide is for perimeter seal application only.

Contact us to learn more about this innovative product.

STEGO INDUSTRIES, LLC | San Clemente, CA | 949-257-4100 | Toll Free 877-464-7834 | Fax 949-257-4113 | www.stegoindustries.com

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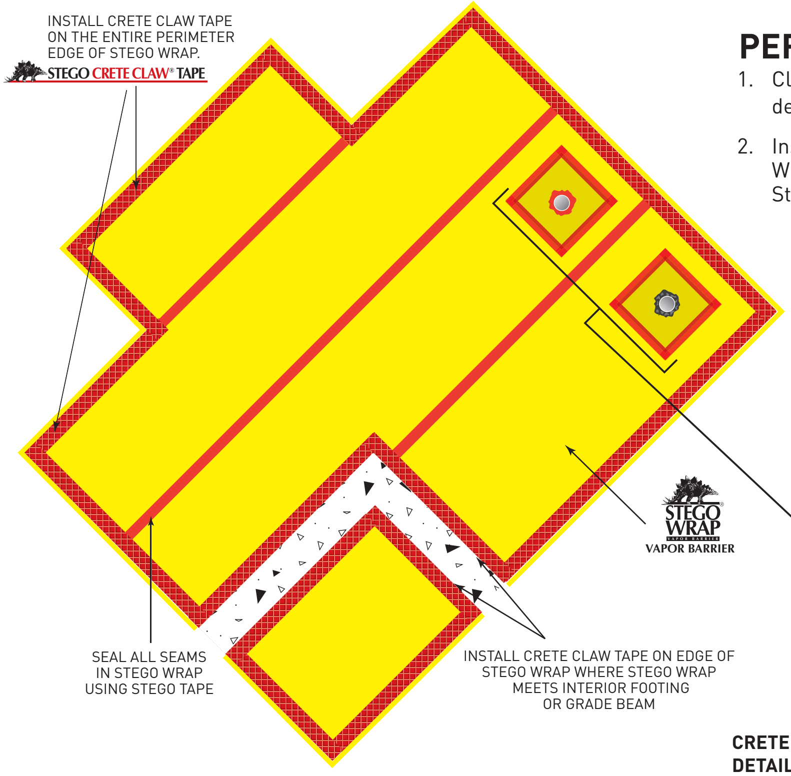
04/2013

STEGO CRETE CLAW® TAPE

INSTALLATION INSTRUCTIONS

TOP-DOWN VIEWS OF A BUILDING FOOTPRINT


INSTALL CRETE CLAW TAPE ON THE ENTIRE PERIMETER EDGE OF STEGO WRAP.
STEGO CRETE CLAW® TAPE

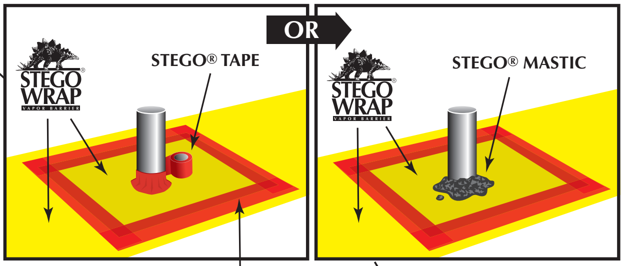
SEAL ALL SEAMS IN STEGO WRAP USING STEGO TAPE

INSTALL CRETE CLAW TAPE ON EDGE OF STEGO WRAP WHERE STEGO WRAP MEETS INTERIOR FOOTING OR GRADE BEAM

PERIMETER SEAL TO SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of Crete Claw Tape.
2. Install 3" or 6" Crete Claw Tape on the entire perimeter of the Stego Wrap Installation. Crete Claw Tape should be completely on Stego Wrap.

SEAL ALL PENETRATIONS WITH STEGO TAPE AND/OR STEGO MASTIC. CRETE CLAW TAPE IS NOT MEANT FOR REPAIRING PENETRATIONS.



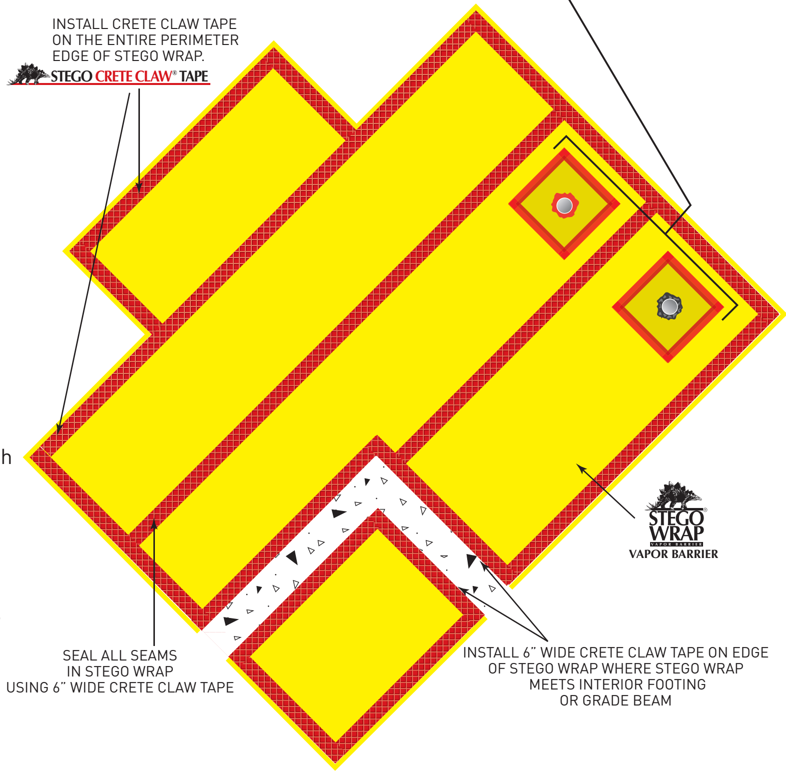
CRETE CLAW CAN BE USED TO SEAL SEAM AROUND DETAIL PATCH FOR ADDED PROTECTION.

SECURING STEGO WRAP TO THE BOTTOM OF THE SLAB

1. Clean surface of Stego Wrap to ensure that it is free of moisture and debris prior to the installation of 6" wide Crete Claw Tape.
2. Overlap seams a minimum of 6 inches. Seal all seams in Stego Wrap using Crete Claw Tape.
3. Install 6" wide Crete Claw Tape on the entire perimeter of the Stego Wrap Installation. Crete Claw Tape should be completely on Stego Wrap.
4. Install additional Crete Claw Tape if required. Lab and simulated field tests have shown that if 6" wide Crete Claw is installed on all seams and around the perimeter, then it is more than strong enough to support Stego Wrap. If determined by the architect or engineer, additional Crete Claw may be specified.
5. Prior to the placement of concrete, ensure that Crete Claw is free of dirt or debris to ensure maximum bond to the concrete.

These are general instructions. Installation requirements may change on a project-by-project basis

IMPORTANT - For the application of securing Stego Wrap to the bottom of the slab, always use 6" wide Crete Claw Tape.


INSTALL CRETE CLAW TAPE ON THE ENTIRE PERIMETER EDGE OF STEGO WRAP.
STEGO CRETE CLAW® TAPE

SEAL ALL SEAMS IN STEGO WRAP USING 6" WIDE CRETE CLAW TAPE

INSTALL 6" WIDE CRETE CLAW TAPE ON EDGE OF STEGO WRAP WHERE STEGO WRAP MEETS INTERIOR FOOTING OR GRADE BEAM

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*. These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions, Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

Stego® Crete Claw® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00

1. Product Name

Stego® Crete Claw® Tape

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Crete Claw Tape is a multi-layered tape that is used to seal Stego Wrap to concrete while the concrete is still wet. Crete Claw allows wet concrete to cast into the textured top surface to form a mechanical bond/seal.
COMPOSITION: Stego Crete Claw is composed of polyethylene film, aperture film, and an acrylic, pressure sensitive adhesive.
SIZE: Stego Crete Claw is 6" wide by 180' long. Stego Crete Claw ships 8 rolls in a case.

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW

PROPERTY	RESULTS
Dimensions	6" x 180'
Total Thickness	26 mils
Permeance: ASTM F 1249	0.03 perms
180° Adhesion Peel Strength: ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.

5. Installation

SECURING STEGO WRAP TO SLAB: Clean the surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw. When ready to apply Crete Claw, peel back the release liner and apply to Stego Wrap. Stego Crete Claw should be completely on Stego Wrap.

Install Crete Claw Tape on all seams and around the entire perimeter of the Stego Wrap installation.

To detail, cut Stego Crete Claw with a box knife or scissors. Crete Claw should be installed above 40°F for maximum adhesion. For additional information, please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Crete Claw. This technique will allow the release liner to pull off easily and keep it out of the way.

6. Availability & Cost

Stego Crete Claw is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

Store Stego Crete Claw in a dry and temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical department or via our website.

10. Filing Systems

www.stegoindustries.com
Buildsite

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC.

Stego® Crete Claw® (3" Wide)

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00

1. Product Name

Stego® Crete Claw® (3" Wide)

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Crete Claw is a multi-layered tape that is used to seal Stego Wrap to the perimeter of the slab while the concrete is placed. Crete Claw allows wet concrete to cast into the textured top surface to form a mechanical bond/seal. COMPOSITION: Stego Crete Claw is composed of polyethylene film, aperture film, and an acrylic, pressure sensitive adhesive. SIZE: Stego Crete Claw (3″ Wide) is 3″ wide and 180′ long. Stego Crete Claw (3″ Wide) ships 16 rolls in a case.

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO CRETE CLAW (3" Wide)

PROPERTY	RESULTS
Dimensions	3" x 180'
Total Thickness	26 mils
Permeance: ASTM F 1249	0.03 perms
180° Adhesion Peel Strength: ASTM D 903	17.6 lbf/in.
Sheer Adhesion Strength: 1 in^2 shear test using an Instron 3345 Machine	>49 lbf/in^2*

* Specimens failed by stretching vapor barrier to failure before pulling Crete Claw from concrete.

5. Installation

UNDER SLAB: Clean surface of Stego Wrap to ensure that it is free of moisture, frost, dirt, and debris prior to the installation of Stego Crete Claw. When ready to apply Crete Claw, peel back the release liner and apply to Stego Wrap. Stego Crete Claw should be completely on Stego Wrap.

To detail, cut Stego Crete Claw with a box knife or scissors. Crete Claw should be installed above 40°F for maximum adhesion. For additional information please refer to Stego's complete installation instructions.

TIP: Wrap the release liner back over the entire roll while unrolling Crete Claw. This technique will allow the release liner to pull off easily and keep it out of the way.

6. Availability & Cost

Stego Crete Claw (3″ Wide) is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

Store Stego Crete Claw in a dry and temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical department or via our website.

10. Filing Systems

www.stegoindustries.com
Buildsite

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StegoTack® Tape

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

StegoTack® Tape

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: StegoTack Tape is a double-sided adhesive strip used to bond and seal Stego Wrap to concrete, masonry, wood, metal, and other surfaces. StegoTack is a flexible and moldable material to allow for a variety of applications and installations.
COMPOSITION: StegoTack Tape is made from a blend of synthetic rubber and resins. SIZE: StegoTack Tape is 2 inches wide and 50 feet long. StegoTack Tape ships 12 rolls in a case.

5. Installation

TO WALLS: Make sure the area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion. Remove release liner on one side and stick to desired surface. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

TO FOOTINGS: Make sure the area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion. Remove release liner on one side and stick to desired surface. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

Cut StegoTack Tape using a utility knife or scissors. Cut StegoTack Tape before removing the release liner for easier cutting. Install StegoTack Tape between 40°F and 110°F. For additional information please refer to Stego's complete installation instructions.

6. Availability & Cost

StegoTack Tape is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

For longer adhesive life, store in dry, temperate area.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

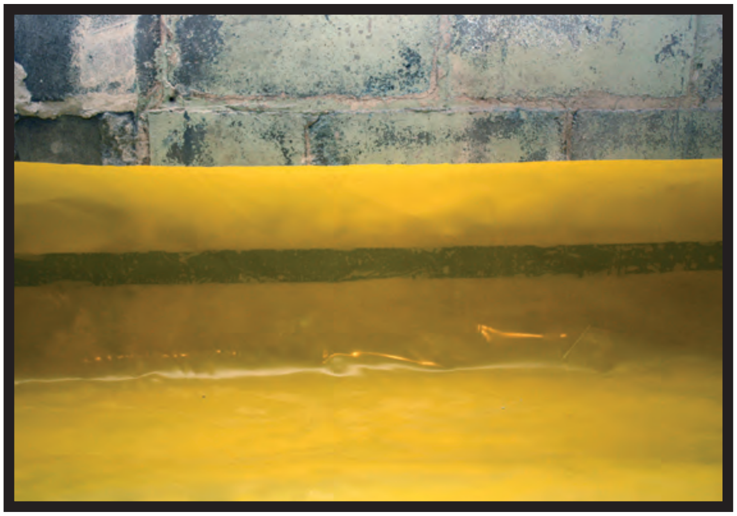
10. Filing Systems

www.stegoindustries.com
Buildsite

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGOTACK TAPE

PROPERTY	RESULTS
Dimensions	50 feet long, 2 inches wide
Total Thickness	30 Mils
Permeance	0.03 perms (30 mils)
Color	Grey
Material	Synthetic rubber blend
Adhesion to Steel	10.3 lbs./in. width ASTM C 1000
Installation Temperature	40°F/110°F (4°C/43°C)
In Service Temperature Range	-20°F/+140°F (-29°C/60°C)
VOC Content	No VOC's, 100% solids



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04/2013

Stego® Term Bar

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name
Stego Term Bar

2. Manufacturer
Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description
USES: Stego Term Bar is a semi-flexible plastic termination bar used for mechanically securing Stego Wrap or other materials to concrete, masonry, or wood.
COMPOSITION: Stego Term Bar is made from post-industrial recycled PVC.

5. Installation
UNDER SLAB: Nail through Stego Term Bar and Stego Wrap to secure material as needed. If the beveled edge is facing the wall, a pocket/lip is created for mastic/sealant to be used if required. Pre-drilled nail holes are provided every 6 inches for ease of installation.

To cut Stego Term Bar, score with a utility knife or wire snips. Stego Term Bar can be bent back and forth and then broken at desired locations as well. Stego Term Bar is flexible enough to bend around corners and contours in the wall for easy installation.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost
Stego Term Bar is available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty
Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance
Store above 60°F. Term Bar will become less flexible at lower temperatures.

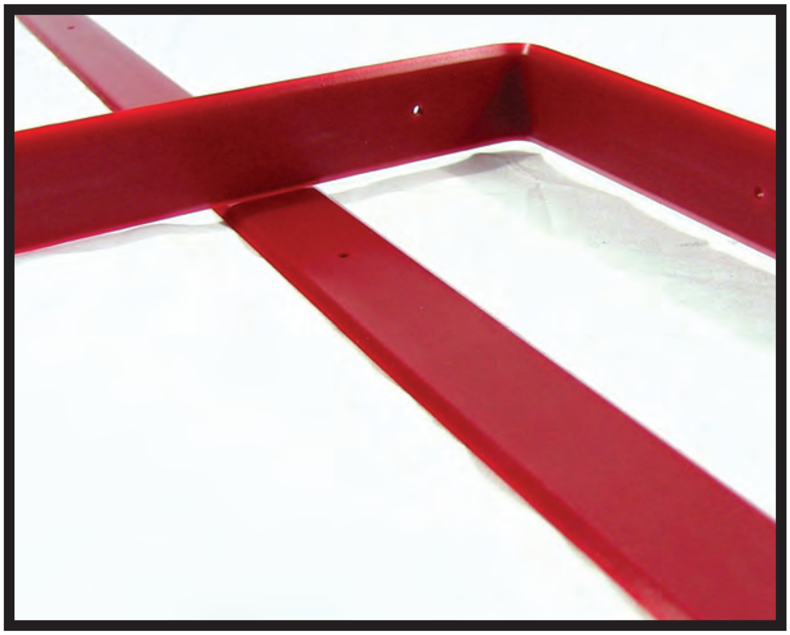
9. Technical Services
Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

10. Filing Systems
www.stegoindustries.com

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO TERM BAR

PROPERTY	RESULTS
Dimensions	4 feet long, 1 1/8 inches wide
Color	Red
Material	Recycled PVC
Weight	4.7 oz. (132 grams)



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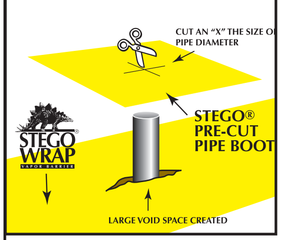

Stego® Pre-Cut Pipe Boots

STEGO INDUSTRIES, LLC

Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Pre-Cut Pipe Boots

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Pre-Cut Pipe Boots are used to seal around permanent penetrations in Stego Wrap.
COMPOSITION: Stego Pre-Cut Pipe Boots are made from Stego Wrap Vapor Barrier (15-mil), and therefore are manufactured from only high grade prime, virgin, polyolefin resins.
SIZE: Stego Pre-Cut Pipe Boots are 18" by 18" and 15 mils thick. Stego Pre-Cut Pipe Boots ship 10 packs of 25 in a case (250 boots per case).

5. Installation

UNDER SLAB: Cut an "X" the size of the pipe diameter in the center of the Pre-Cut Pipe Boot and slide tightly over pipe. Tape all sides of the pipe boot with Stego Tape. Seal around the base of the pipe using Stego tape and/or Stego Mastic.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Pre-Cut Pipe Boots are available nationally through our network of building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' Sales Representative.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website. **www.stegoindustries.com**

4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO PRE-CUT PIPE BOOTS

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E 1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F 1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0086 perms *0.0036 WVTR
Puncture Resistance	ASTM D 1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method	2266 grams
Tensile Strength	ASTM D 882 – Test Method for Tensile Properties of Thin Plastic Sheeting	70.60 lbf/in.
Permeance After Conditioning (ASTM E 1745 Sections 7.1.2 - 7.1.5)	ASTM E 154 Section 8, F 1249 – Permeance after wetting, drying, and soaking ASTM E 154 Section 11, F 1249 – Permeance after heat conditioning ASTM E 154 Section 12, F 1249 – Permeance after low temperature conditioning ASTM E 154 Section 13, F 1249 – Permeance after soil organism exposure	0.0098 perms 0.0091 perms 0.0097 perms 0.0095 perms
Thickness	ACI 302.1R-04 – Minimum Thickness (10 mils)	15 mils
Pipe Boot Dimensions		18" x 18"

Note: perm unit = grains/(ft^2 *hr* in.Hg) * WVTR = Water Vapor Transmission Rate

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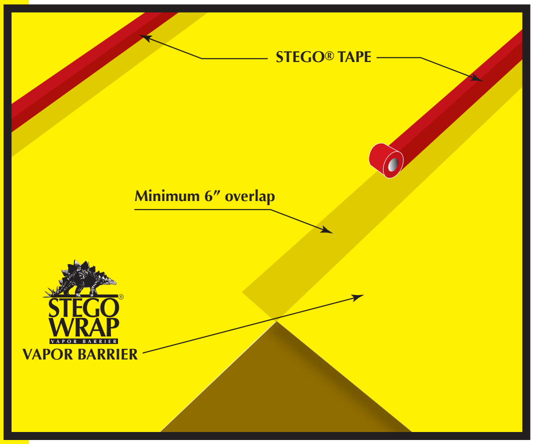
PART 1

STEGO WRAP VAPOR BARRIER/RETARDER
INSTALLATION INSTRUCTIONS

STEGO® INDUSTRIES, LLC

IMPORTANT: Please read these installation instructions completely, prior to beginning any Stego Wrap installation. The following installation instructions are based on ASTM E 1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. If project specifications call for compliance with ASTM E 1643, then be sure to review the specific installation sections outlined in the standard along with the techniques referenced in these instructions.

FIGURE 1: UNDER-SLAB INSTALLATION



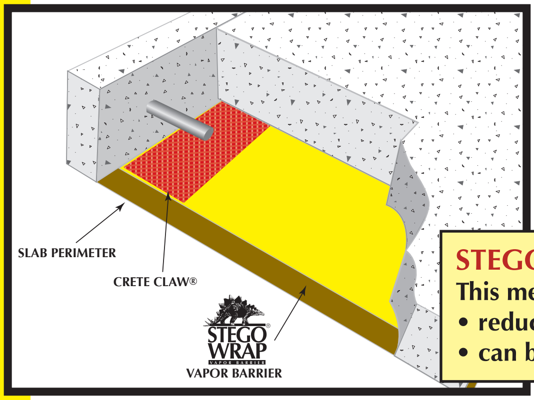
UNDER-SLAB INSTRUCTIONS:

1. Stego Wrap can be installed over an aggregate, sand, or tamped earth base. It is not necessary to have a cushion layer or sand base, as Stego Wrap is tough enough to withstand rugged construction environments.
2. Unroll Stego Wrap over the area where the slab is to be placed. Stego Wrap should completely cover the concrete placement area. All joints/seams both lateral and butt should be overlapped a minimum of six inches and taped using Stego Tape.

NOTE: The area of adhesion should be free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive tape.

3. ASTM E 1643 requires sealing the perimeter of the slab. *Extend vapor retarder over footings and seal to foundation wall, grade beam, or slab at an elevation consistent with the top of the slab or terminate at impediments such as waterstops or dowels.* Consult the structural engineer of record before proceeding.

FIGURE 2a: SEAL TO SLAB AT PERIMETER



SEAL TO SLAB AT PERIMETER:*

NOTE: Clean the surface of Stego Wrap to ensure that the area of adhesion is free from dust, dirt, moisture, and frost to allow maximum adhesion of the pressure-sensitive adhesive.

a. Install Crete Claw® on the entire perimeter edge of Stego Wrap.

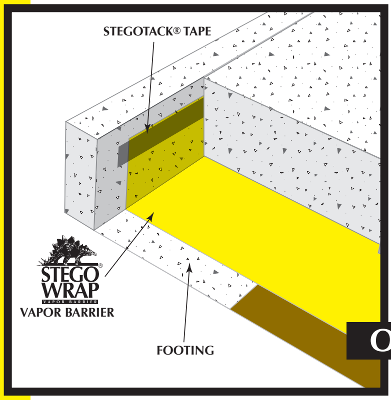
b. Prior to the placement of concrete, ensure that the top of Crete Claw is free of dirt, debris, or mud to maximize the bond to the concrete.

STEGO LABOR SAVER!

This method not only complies with ASTM E 1643, but it also:

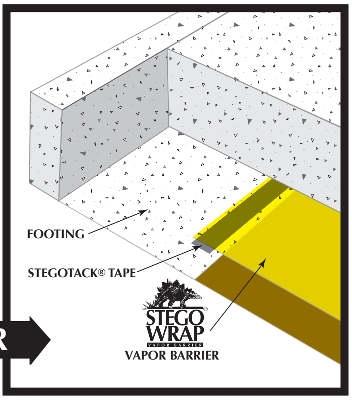
- **reduces labor compared to other perimeter sealing techniques.**
- **can be used even without an existing wall or footing, unlike alternatives.**

FIGURE 2b: SEAL TO PERIMETER WALL



OR

FIGURE 2c: SEAL TO FOOTING



OR SEAL TO PERIMETER WALL OR FOOTING WITH STEGOTACK® TAPE:*

a. Make sure area of adhesion is free of dust, dirt, debris, moisture, and frost to allow maximum adhesion.

b. Remove release liner on one side and stick to desired surface.

c. When ready to apply Stego Wrap, remove the exposed release liner and press Stego Wrap firmly against StegoTack Tape to secure.

* If ASTM E 1643 is specified, consult with project architect and structural engineer to determine which perimeter seal technique should be employed for the project.

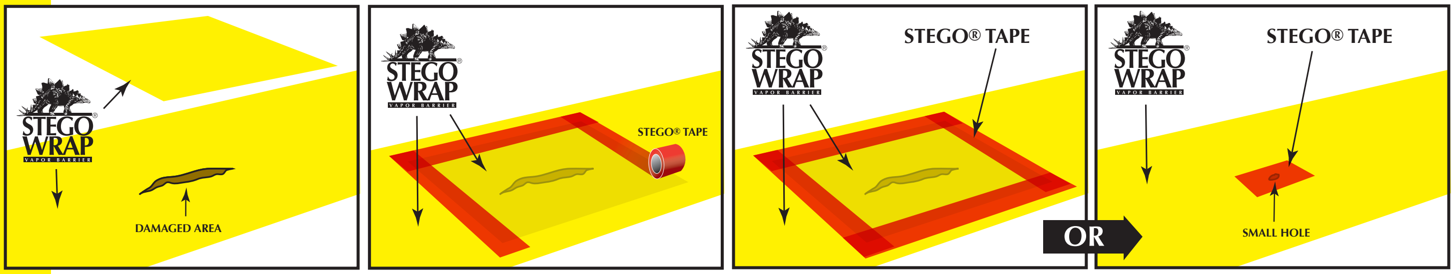
NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC. 04/2013

949-257-4100 • 877-464-7834 • www.stegoindustries.com

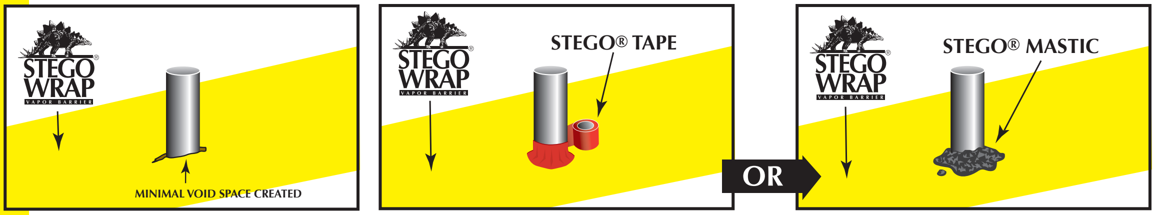
4. In the event that Stego Wrap is damaged during or after installation, repairs must be made. Stego Tape can be used to repair small holes in the material. For larger holes, cut a piece of Stego Wrap to a size and shape that covers any damage by a minimum overlap of six inches in all directions. Clean all adhesion areas of dust, dirt, moisture, and frost. Tape down all edges using Stego Tape (see figure 3, Sealing Damaged Areas).

FIGURE 3: SEALING DAMAGED AREAS



5. **IMPORTANT: ALL PENETRATIONS MUST BE SEALED.** All pipe, ducting, rebar, wire penetrations and block outs should be sealed using Stego Wrap, Stego Tape and/or Stego Mastic (see figure 4a, Pipe Penetration Sealing).

FIGURE 4a: PIPE PENETRATION SEALING



STEGO WRAP PIPE PENETRATION REPAIR DETAIL:

1: Install Stego Wrap around pipe penetrations by slitting/cutting material as needed. Try to minimize the void space created.

2: If Stego Wrap is close to pipe and void space is minimized then seal around pipe penetration with Stego Tape and/or Stego Mastic.

(See Figure 4a)

3: If detail patch is needed to minimize void space around penetration, then cut a detail patch to a size and shape that creates a six inch overlap on all edges around the void space at the base of the pipe. Stego Pre-Cut Pipe Boots are also available to speed up the installation.
4: Cut an "X" the size of the pipe diameter in the center of the pipe boot and slide tightly over pipe.
5: Tape down all sides of the pipe boot with Stego Tape.
6: Seal around the base of the pipe using Stego Tape and/or Stego Mastic.
(See Figure 4b)

FIGURE 4b: DETAIL PATCH FOR PIPE PENETRATION SEALING

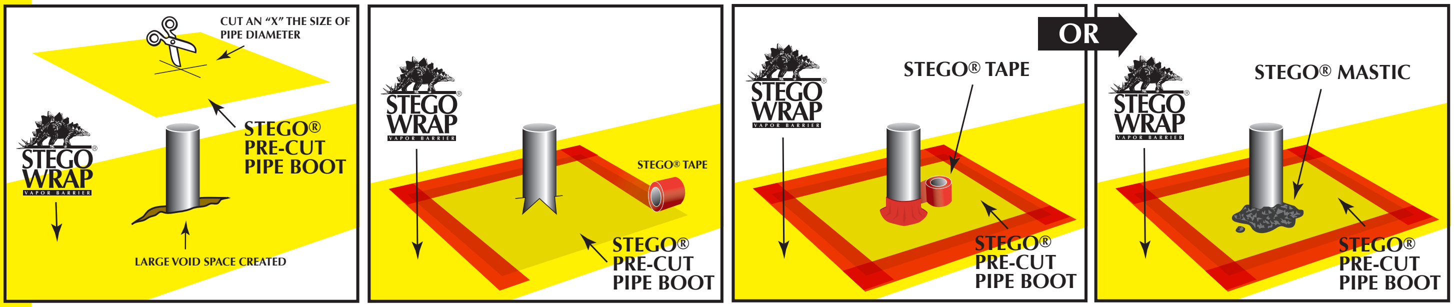
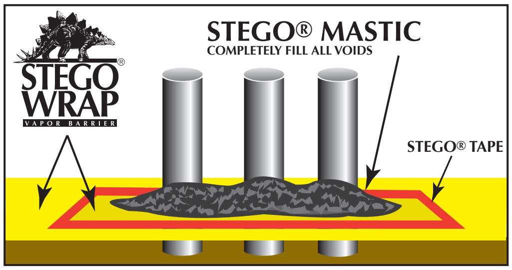


FIGURE 5: MULTIPLE PIPE PENETRATION SEALING



MULTIPLE PIPE PENETRATION SEALING:

Multiple pipe penetrations in close proximity and very small pipes may be sealed using Stego Wrap and Stego Mastic for ease of installation (see figure 5, Multiple Pipe Penetration Sealing).

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

Stego, the stegosaurus logo, Crete Claw, and StegoTack are all deemed to be registered and protectable trademarks of Stego Industries, LLC. 04/2013

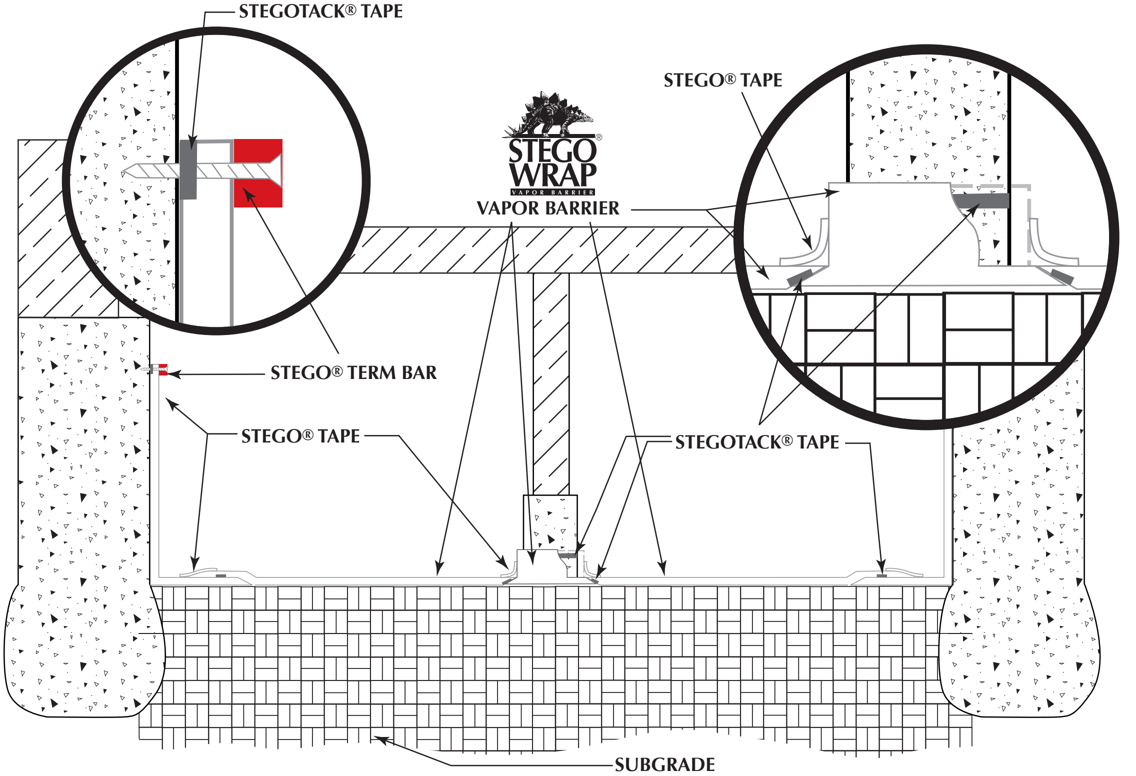
PART 2

STEGO WRAP VAPOR BARRIER/RETARDER
INSTALLATION INSTRUCTIONS

CRAWL SPACE INSTALLATION INSTRUCTIONS:

1. Turn Stego Wrap up the foundation wall to a minimum height of six inches above the outside/exterior grade or in compliance with local building codes and terminate with Stego Term Bar. To form a complete seal, apply StegoTack Tape or a layer of Stego Mastic to the foundation wall prior to installing Stego Term Bar. Allow one hour for Stego Mastic to cure prior to installing Stego Term Bar.
2. Seal Stego Wrap around all penetrations and columns using Stego Tape, StegoTack Tape, and/or Stego Mastic.
3. Place Stego Wrap directly over the crawl space floor. If rigid insulation is to be used, install Stego Wrap prior to insulation (under insulation and between the foundation wall and insulation).
4. Overlap seams a minimum of six inches and seal with Stego Tape. Some codes require a minimum of a twelve inch overlap. Check appropriate codes prior to installation.

FIGURE 6: CRAWL SPACE INSTALLATION



NOTE: Stego Wrap Vapor Barrier and Stego Tape are both available in white (as shown in illustration above).

INSTALLATION TIP:

1. For a cleaner look and to prevent against tenting of Stego Wrap at the foundation wall/foundation floor intersection, consider mechanically fastening Stego Wrap to base of foundation wall in addition to the above mentioned wall termination.

NOTE: Stego Industries, LLC's ("Stego") installation instructions are based on ASTM E 1643 - *Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.* These instructions are meant to be used as a guide, and do not take into account specific job site situations. Consult local building codes and regulations along with the building owner or owner's representative before proceeding. If you have any questions regarding the above mentioned installation instructions or Stego products, please call us at 877-464-7834 for technical assistance. While Stego employees and representatives may provide technical assistance regarding the utility of a specific installation practice or Stego product, they are not authorized to make final design decisions.

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APPENDIX F

HEALTH AND SAFETY PLAN

Elton Crossing/ Site C - Family

899 ELTON AVENUE

BRONX, NEW YORK

Health and Safety Plan and
Community Air Monitoring Plan

BCP Site #: C203073
AKRF Project Number: 11901

Prepared for:

Elton Crossings Associates, L.P.
902 Broadway, 13th Floor
New York, NY 10010

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

MAY 2015

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FIGURE

APPENDICES

1.0 INTRODUCTION

This Health and Safety Plan and Community Air Monitoring Plan were prepared by AKRF Engineering, P.C. (AKRF) on behalf of Elton Crossing Associates, P.C., (the Volunteer) for the Site located at 899 Elton Avenue in the Bronx, New York. The legal definition of the Site is Tax Block 2383, Lots 19, 25, 27, 29, 30, 31, 33, 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street in the Bronx, New York.

Lot 19 is developed with an approximately 9,200-square foot vacant, one-story building with a partial cellar, which is anticipated to be demolished in late Spring/early Summer 2015. The remaining lots are vacant. The Site is abutted by East 162nd Street to the north, beyond which are vacant lots and buildings; East 161st Street to the south, beyond which are residential buildings with first floor commercial space; Elton Avenue followed by Boricua College to the east; and residential buildings to the west, followed by Melrose Avenue. The Site is located in a predominantly developed area consisting of residential, educational, commercial, and industrial buildings.

Lot 19 was developed historically with: an automobile garage from 1927 to 1940; a factory in 1945; freezer and oven mobile units in 1961; a metal works from at least 1969 to 1978; and Blasco Supply company from 2000 to 2005. Lot 25 was developed historically with an automobile garage in 1921 and a funeral home from at least 1927 to 1984. Lot 27 was developed historically with an undertaker and a multi-story residential building from at least 1969 to 1979. Lot 29 was developed historically with a beauty shop, a lawyers' office, a dentist, and a multi-story residential building from 1927 to 1971. Lot 35 was developed historically with the Elton Glass Works, Soenning Plumbing and Heating, and a butcher and glazer in 1927, and stores and a multi-story residential building in 1965. The other lots were developed historically as multi-story residences with cellars that likely contained petroleum storage tanks.

Previous investigations conducted at the Site identified elevated levels of SVOCs, metals, PCBs, and pesticides in the sediment and soil, and the elevated levels of VOCs in the soil vapor. AKRF prepared a Remedial Action Work Plan (RAWP) to address sediment, soil, and soil vapor contamination during remediation at the Site. This Health and Safety Plan (HASP) has been designed to provide workplace safety while completing the field requirements of the RAWP.

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

Check all that apply		
(**X**) Organic Chemicals	(**X**) Inorganic Chemicals	( ) Radiological
( ) Biological	( ) Explosive/Flammable	( ) Oxygen Deficient Atm.
(**X**) Heat Stress	(**X**) Cold Stress	( ) Carbon Monoxide
Comments: No personnel are permitted to enter permit confined spaces.		

2.1.2 Physical Characteristics

Check all that apply		
( ) Liquid	(**X**) Solid	( ) Sludge
(**X**) Vapors	( ) Unknown	( ) Other
Comments:		

2.1.3 Hazardous Materials

Check all that apply					
Chemicals	**Solids**	**Sludges**	**Solvents**	**Oils**	**Other**
( ) Acids	( ) Ash	( ) Paints	( ) Halogens	( ) Transformer	( ) Lab
( ) Caustics	() Asbestos	( ) Metals	(**X**) Petroleum	( ) Other DF	( ) Pharm
(**X**) Pesticides	( ) Tailings	( ) POTW	(**X**) Other Chlorinated Organic Solvents	( ) Motor or Hydraulic Oil	( ) Hospital
(**X**)Petroleum	(**X**) Other	( ) Other		(**X**) Gasoline	( ) Rad
( ) Inks	Fill material			(**X**) Fuel Oil	( ) MGP
(X) PCBs				(**X**) Waste Oil	( ) Mold
(**X**) Metals					( ) Cyanide
(**X**)Other: SVOCs					

2.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
alpha-Chlordane	REL =0. 5 mg/m^3 PEL =0. 5 mg/m^3	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria; in animals: lung, liver, kidney damage; [potential occupational carcinogen].
Arsenic	REL = 0.002 mg/m^3 PEL = 0.01 mg/m^3	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin; potential occupational carcinogen.
Barium	PEL = 0.5 mg/m^3 REL = 0.5 mg/m^3	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia.
Benzo(a)pyrene	PEL = 0.1 mg/m^3 REL = 0.2 mg/m^3	Dermatitis, bronchitis, potential occupational carcinogen.
Cadmium	PEL = 0.005 mg/m^3	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen].
DDE, DDD, DDT (pesticide)	REL = 0.5 mg/m^3 PEL = 1 mg/m^3 [skin]	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; potential carcinogen.
Dieldrin	REL = 0.25 mg/m^3 PEL = 0.25 mg/m^3	Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage.
Lead	REL = 0.05 mg/m^3 PEL = 0.05 mg/m^3	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Mercury	REL = 0.1 mg/m^3 PEL = 0.05 mg/m^3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
PCBs	PCB-1242: REL = 1 mg/m^3 PEL = 0.001 mg/m^3 PCB-1254: REL = 0.5 mg/m^3 PEL = 0.001 mg/m^3	Rash; anemia, liver, stomach, thyroid damage; reduced ability to fight disease; impaired reproduction.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m^3	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; [potential occupational carcinogen]
Comments: REL = National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of the HASP. The SSO will have a 4-year college degree in occupational safety or a related science/engineering field, and experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel is outlined in Section 2.3 of this HASP.

2.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety; make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before he/she goes onto the Site. A Site safety meeting will be conducted at the start of the project. Additional meetings shall be conducted, as necessary, for new personnel working at the Site.

2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician’s medical release for work will be confirmed by the SSO before an employee can begin Site activities. The medical release shall consider the type of work to be performed and the required PPE. The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may changed by SSO, depending on that day’s activities. All field personnel will be informed of the location of these zones before work begins.

Appropriate barriers will be set up to secure the area and prevent any unauthorized personnel from approaching within 15 feet of the work area.

Site Work Zones			
Task	**Exclusion Zone**	**CRZ**	**Support Zone**
Sediment and Soil Excavation and Petroleum Storage Tank Removal Areas	15 feet from excavation border and excavation equipment or vehicles	15 feet from excavation border and excavation equipment or vehicles	As Needed

2.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the sediment, soil, and soil vapor. Results of the air monitoring will be used to determine the appropriate response action, if needed.

2.6.1 Work Zone Air Monitoring

Real time air monitoring will be performed with a photoionization detector (PID). Measurements will be taken prior to commencement of work and continuously during the work, as outlined in the following table. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The SSO shall set up the equipment and confirm that it is working properly. The PID will be calibrated with 100 parts per million (ppm) isobutylene standard in accordance with the manufacturer's instructions at the start of each work day. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table:

Work Zone Air Monitoring Action Levels		
Instrument	**Action Level**	**Response Action**
PID	Less than 10 ppm in breathing zone	Level D or D-Modified
	Between 10 ppm and 500 ppm	Level C
	More than 500 ppm	Stop work. Resume work when readings are less then 500 ppm.

2.6.2 Community Air Monitoring Plan

Community air monitoring will be conducted during all intrusive Site activities in compliance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). Real-time air monitoring for volatile compounds and dust at the perimeter of the exclusion zone will be performed as described below.

VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of excavation endpoint soil samples. Periodic monitoring may include obtaining measurements upon arrival at a location and upon leaving the location.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities, including excavation and tank removal (if any) activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with an 11.7 eV lamp capable of calculating 15-minute running average concentrations. The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

Dust Monitoring

Continuous monitoring for particulates will be conducted during all ground intrusive activities, which will involve the measurement of respirable dust. Community air monitoring for dust particulates will be conducted using a MIE 1000 Personal DataRam or equivalent to measure the concentration of airborne respirable particulates less than 10 micrometers in size (PM_{10}). The dust monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. An inspection of the monitoring stations will be conducted on at least an hourly basis. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on site for NYSDOH and/or NYSDEC review. If the downwind particulate concentrations are greater than 100 micrograms per cubic meter ($\mu g/m^3$) above background (upwind concentrations), and no other obvious source is apparent, then it will be assumed that the elevated particulate concentrations are a result of site activities. In such instances, dust suppression measures will be implemented and monitoring will be continued. Work will be allowed to continue with dust suppression if downwind particulate levels do not exceed 150 µg/m^3 above the background (upwind concentration) and provided that no visible dust is migrating from the work area. If particulate levels persist at 150 µg/m^3 above the background, work must be stopped until dust suppression measures bring particulate levels to below 150 µg/m^3 above background.

Major Vapor Emission Response Plan

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work Site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period.

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

2.6.3 Personal Protection Equipment

The personal protection equipment required for various kinds of Site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, “General Description and Discussion of the Levels of Protection and Protective Gear.”

AKRF field personnel and other Site personnel shall wear, at a minimum, Level D personal protective equipment. The protection will be based on the air monitoring described in this section.

Personal Protection Equipment Requirements

LEVEL OF PROTECTION & PPE		**All Tasks**
Level D (**X**) Steel Toe Shoes (**X**) Hard Hat (within 25 ft of excavator) (**X**) Work Gloves	(**X**) Safety Glasses ( ) Face Shield (**X**) Ear Plugs (within 25 ft of excavator) (**X**) Nitrile Gloves (**X**) Tyvek for tank contractor if NAPL present	Yes
Level C ***(in addition to Level D)*** (**X**) Half-Face Respirator (**X**) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (**X**) Dual Organic/ Particulate Cartridge	If PID > 10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected).		

2.7 General Work Practices

To protect their health and safety, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to the Lincoln Hospital in the Bronx by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

3.1 Hospital Directions

Hospital Name:	Lincoln Hospital
Phone Number:	718-579-5000
Address/Location:	234 E 149th Street, Bronx, NY 10451
Directions:	1. Head northwest on East 156th St/Thurman Munson Way toward 3rd Ave. 2. Turn left onto 3rd Ave. 3. Turn right onto East 149th St. 4. Destination will be on the left.

3.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
-AKRF	Michelle Lapin, P.E.	Remedial Engineer	646-388-9520 (office)
	Deborah Shapiro	Project Manager	646-388-9544 (office)
	Stephen Malinowski	Project Manager Alternate	631-574-3724 (office)
	Amy Jordan	Site Safety Officer (SSO)	610-405-2847 (cell)
	Drew Lewis	Site Safety Officer (SSO) Alternate	201-841-8479 (cell)
Elton Crossing Associates, L.P.	Michael Wadman	Client Representative	646-388-8216 (office)
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

APPROVAL

Signed: ______________________________ Date: ______________________________

AKRF Project Manager

Signed: ______________________________ Date: ______________________________

AKRF Health and Safety Officer

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the SSO.

AFFIDAVIT

I,_________________________(name), of_______________________________(company name), have read the Health and Safety Plan (HASP) for the Elton Crossing/Site C-Family Site. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the Site.

Signed: ______________________ Company: ____________________ Date: ________

Signed: ______________________ Company: ____________________ Date: ________

Signed: ______________________ Company: ____________________ Date: ________

Signed: ______________________ Company: ____________________ Date: ________

Signed: ______________________ Company: ____________________ Date: ________

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Signed: ______________________ Company: ____________________ Date: ________

FIGURES

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Legend

Route to hospital

🟨 Project_Site_Location

✚ Hospital Location

0 500 1,000 Feet

Lincoln Medical Center
234 Eugenio Maria De Hostos Blvd (East 149th Street)
Bronx, New York 10451
(Between Park and Morris Avenues)

Melrose Commons Site C - Family
Bronx, New York

HOSPITAL LOCATION MAP

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
2/18/2014

PROJECT No.
11901

FIGURE
1

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O:\Projects\11901 - MELROSE COMMONS SITE C-FAMILY\11901 Hospital Loc map.mxd

ATTACHMENT A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

BARIUM AND COMPOUNDS

CAS # 7440-39-3

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

❑ Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
❑ The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
❑ Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
❑ Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).
❑ Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

❑ Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
❑ Living in areas with unusually high natural levels of barium in the drinking water.
❑ Working in a job that involves barium production or use.
❑ Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 μg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m^3) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m^3 of total dust and 5 mg/m^3 for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m^3 for soluble barium compounds. The NIOSH has set RELs of 10 mg/m^3 (total dust) for barium sulfate and 5 mg/m^3 (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CADMIUM
CAS # 7440-43-9

Agency for Toxic Substances and Disease Registry ToxFAQs June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the lungs, can cause kidney disease, and may irritate the digestive tract. This substance has been found in at least 776 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is cadmium?

(Pronounced kăd′mē-əm)

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- ☐ Cadmium enters air from mining, industry, and burning coal and household wastes.
- ☐ Cadmium particles in air can travel long distances before falling to the ground or water.
- ☐ It enters water and soil from waste disposal and spills or leaks at hazardous waste sites.
- ☐ It binds strongly to soil particles.
- ☐ Some cadmium dissolves in water.
- ☐ It doesn't break down in the environment, but can change forms.
- ☐ Fish, plants, and animals take up cadmium from the environment.
- ☐ Cadmium stays in the body a very long time and can build up from many years of exposure to low levels.

How might I be exposed to cadmium?

- ☐ Breathing contaminated workplace air (battery manufacturing, metal soldering or welding).
- ☐ Eating foods containing it; low levels in all foods (highest in shellfish, liver, and kidney meats).
- ☐ Breathing cadmium in cigarette smoke (doubles the average daily intake).
- ☐ Drinking contaminated water.
- ☐ Breathing contaminated air near the burning of fossil fuels or municipal waste.

How can cadmium affect my health?

Breathing high levels of cadmium severely damages the lungs and can cause death. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea. Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease.

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Agency for Toxic Substances and Disease Registry

Other long-term effects are lung damage and fragile bones. Animals given cadmium in food or water had high blood pressure, iron-poor blood, liver disease, and nerve or brain damage.

We don't know if humans get any of these diseases from eating or drinking cadmium. Skin contact with cadmium is not known to cause health effects in humans or animals.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

How can cadmium affect children?

The health effects in children are expected to be similar to those in adults (kidney, lung and intestinal damage).

We don't know if cadmium causes birth defects in people. Cadmium does not readily go from a pregnant woman's body into the developing child, but some portion can cross the placenta. It can also be found in breast milk. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. Cadmium may also affect birth weight and the skeleton in developing animals.

Animal studies also indicate that more cadmium is absorbed into the body if the diet is low in calcium, protein, or iron, or is high in fat. A few studies show that younger animals absorb more cadmium and are more likely to lose bone and bone strength than adults.

How can families reduce the risk of exposure to cadmium?

In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children. If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.

A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to show whether I've been exposed to cadmium?

Tests are available in some medical laboratories that measure cadmium in blood, urine, hair, or nails. Blood levels show recent exposure to cadmium, and urine levels show both recent and earlier exposure. The reliability of tests for cadmium levels in hair or nails is unknown.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 5 parts of cadmium per billion parts of drinking water (5 ppb). EPA doesn't allow cadmium in pesticides.

The Food and Drug Administration (FDA) limits the amount of cadmium in food colors to 15 parts per million (15 ppm).

The Occupational Safety and Health Administration (OSHA) limits workplace air to 100 micrograms cadmium per cubic meter (100 $\mu g/m^3$) as cadmium fumes and 200 μg cadmium/m^3 as cadmium dust.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for cadmium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CHLORDANE
CAS # 57-74-9

Agency for Toxic Substances and Disease Registry ToxFAQs September 1995

This fact sheet answers the most frequently asked health questions (FAQs) about chlordane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to chlordane occurs mostly from eating contaminated foods, such as root crops, meats, fish, and shellfish, or from touching contaminated soil. High levels of chlordane can cause damage to the nervous system or liver. This chemical has been found in at least 171 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is chlordane?
(Pronounced klôr′dān′)

Chlordane is a manufactured chemical that was used as a pesticide in the United States from 1948 to 1988. Technical chlordane is not a single chemical, but is actually a mixture of pure chlordane mixed with many related chemicals. It doesn't occur naturally in the environment. It is a thick liquid whose color ranges from colorless to amber. Chlordane has a mild, irritating smell.

Some of its trade names are Octachlor and Velsicol 1068. Until 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens.

Because of concern about damage to the environment and harm to human health, the Environmental Protection Agency (EPA) banned all uses of chlordane in 1983 except to control termites. In 1988, EPA banned all uses.

What happens to chlordane when it enters the environment?

- ☐ Chlordane entered the environment when it was used as a pesticide on crops, on lawns and gardens, and to control termites.
- ☐ Chlordane sticks strongly to soil particles at the surface and is not likely to enter groundwater.
- ☐ It can stay in the soil for over 20 years.
- ☐ Most chlordane leaves soil by evaporation to the air.
- ☐ It breaks down very slowly.
- ☐ Chlordane doesn’t dissolve easily in water.
- ☐ It builds up in the tissues of fish, birds, and mammals.

How might I be exposed to chlordane?

- ☐ By eating crops grown in soil that contains chlordane.
- ☐ By eating fish or shellfish caught in water that is contaminated by chlordane.
- ☐ By breathing air or touching soil near homes treated for termites with chlordane.
- ☐ By breathing air or by touching soil near waste sites or landfills.

How can chlordane affect my health?

Chlordane affects the nervous system, the digestive system, and the liver in people and animals. Headaches, irritability, confusion, weakness, vision problems, vomiting, stomach cramps, diarrhea, and jaundice have occurred in people who breathed air containing high concentrations of chlordane or accidentally swallowed small amounts of chlordane. Large amounts of chlordane taken by mouth can cause convulsions and death in people.

A man who had long-term skin contact with soil containing high levels of chlordane had convulsions. Japanese workers who used chlordane over a long period of time had minor changes in liver function.

Animals given high levels of chlordane by mouth for short periods died or had convulsions. Long-term exposure caused harmful effects in the liver of test animals.

We do not know whether chlordane affects the ability of people to have children or whether it causes birth defects. Animals exposed before birth or while nursing developed behavioral effects later.

How likely is chlordane to cause cancer?

The International Agency for Research on Cancer has determined that chlordane is not classifiable as to its carcinogenicity to humans. Studies of workers who made or used chlordane do not show that exposure to chlordane is related to cancer, but the information is not sufficient to know for sure. Mice fed low levels of chlordane in food developed liver cancer.

Is there a medical test to show whether I've been exposed to chlordane?

Laboratory tests can measure chlordane and its breakdown products in blood, fat, urine, feces, and breast milk. The amount of breakdown products measured in body fat or breast milk does not tell how much or how long ago you were exposed to chlordane or if harmful effects will occur.

Has the federal government made recommendations to protect human health?

In 1988, the EPA banned all uses of chlordane. The EPA recommends that a child should not drink water with more than 60 parts of chlordane per billion parts of drinking water (60 ppb) for longer than 1 day. EPA has set a limit in drinking water of 2 ppb.

EPA requires spills or releases of chlordane into the environment of 1 pound or more to be reported to EPA.

The Food and Drug Administration (FDA) limits the amount of chlordane and its breakdown products in most fruits and vegetables to less than 300 ppb and in animal fat and fish to less than 100 ppb.

The Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Health and Safety (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH) set a maximum level of 0.5 milligrams of chlordane per cubic meter (mg/m^3) in workplace air for an 8-hour workday, 40-hour workweek. These agencies have advised that eye and skin contact should be avoided because this may be a significant route of exposure.

Glossary

Carcinogenicity: Ability to cause cancer.

Long-term: Lasting one year or longer.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

ppb: Parts per billion.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for chlordane (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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DDT, DDE, AND DDD

CAS # 50-29-3, 72-55-9, 72-54-8

Division of Toxicology ToxFAQs™ **September 2002**

This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

❑ DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
❑ DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
❑ DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
❑ They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.
❑ Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
❑ DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

❑ Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
❑ Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
❑ Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
❑ Infants fed on breast milk from mothers who have been exposed.
❑ Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months.

A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies.

In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer.

The Department of Health and Human Services (DHHS) determined that DDT may reasonable be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans. A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT,DDE, and DDE?

- ❑ Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- ❑ Cooking will reduce the amount of DDT in fish.
- ❑ Washing fruit and vegetables will remove most DDT from their surface.
- ❑ Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m^3) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

❑ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.

❑ When lead is released to the air, it may travel long distances before settling to the ground.

❑ Once lead falls onto soil, it usually sticks to soil particles.

❑ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

❑ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

❑ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

❑ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.

❑ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❏ Avoid exposure to sources of lead.

❏ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❏ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❏ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❏ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES
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MERCURY
CAS # 7439-97-6

Agency for Toxic Substances and Disease Registry ToxFAQs **April 1999**

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mū̃r′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

☐ Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.

☐ It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

☐ Methylmercury may be formed in water and soil by small organisms called bacteria.

☐ Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

☐ Eating fish or shellfish contaminated with methylmercury.

☐ Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.

☐ Release of mercury from dental work and medical treatments.

☐ Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).

☐ Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- ☐ PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- ☐ PAHs can occur in air attached to dust particles.
- ☐ Some PAH particles can readily evaporate into the air from soil or surface waters.
- ☐ PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- ☐ PAHs enter water through discharges from industrial and wastewater treatment plants.
- ☐ Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- ☐ Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- ☐ In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- ☐ PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- ☐ Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- ☐ Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- ☐ Coming in contact with air, water, or soil near hazardous waste sites.
- ☐ Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- ☐ Drinking contaminated water or cow's milk.

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☐ Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❑ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❑ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❑ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❑ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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ALDRIN and DIELDRIN

CAS # 309-00-2 and 60-57-1

Division of Toxicology ToxFAQs™ September 2002

This fact sheet answers the most frequently asked health questions (FAQs) about aldrin and dieldrin. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to aldrin and dieldrin happens mostly from eating contaminated foods, such as root crops, fish, or seafood. Aldrin and dieldrin build up in the body after years of exposure and can affect the nervous system. Aldrin has been found in at least 207 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA). Dieldrin has been found in at least 287 of the 1,613 sites.

What are aldrin and dieldrin?

Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this fact sheet because aldrin quickly breaks down to dieldrin in the body and in the environment. Pure aldrin and dieldrin are white powders with a mild chemical odor. The less pure commercial powders have a tan color. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

What happens to aldrin and dieldrin when they enter the environment?

❑ Sunlight and bacteria change aldrin to dieldrin so that we mostly find dieldrin in the environment.

❑ They bind tightly to soil and slowly evaporate to the air.

❑ Dieldrin in soil and water breaks down very slowly.

❑ Plants take in and store aldrin and dieldrin from the soil.

❑ Aldrin rapidly changes to dieldrin in plants and animals.

❑ Dieldrin is stored in the fat and leaves the body very slowly.

How might I be exposed to aldrin or dieldrin?

❑ Dieldrin is everywhere in the environment, but at very low levels.

❑ Eating food like fish or shellfish from lakes or streams contaminated with either chemical, or contaminated root crops, dairy products, or meats.

❑ Air, surface water, or soil near waste sites may contain higher levels.

❑ Living in homes that were once treated with aldrin or dieldrin to control termites.

How can aldrin and dieldrin affect my health?

People who have intentionally or accidentally ingested large amounts of aldrin or dieldrin have suffered convulsions and some died. Health effects may also occur after a longer period of exposure to smaller amounts because these chemicals build up in the body.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Animals exposed to high amounts of aldrin or dieldrin also had nervous system effects. In animals, oral exposure to lower levels for a long period also affected the liver and decreased their ability to fight infections. We do not know whether aldrin or dieldrin affect the ability of people to fight disease.

Studies in animals have given conflicting results about whether aldrin and dieldrin affect reproduction in male animals and whether these chemicals may damage the sperm.

We do not know whether aldrin or dieldrin affect reproduction in humans.

How likely are aldrin and dieldrin to cause cancer?

There is no conclusive evidence that aldrin or dieldrin cause cancer in humans. Aldrin and dieldrin have been shown to cause liver cancer in mice. The International Agency for Research on Cancer (IARC) has determined that aldrin and dieldrin are not classifiable as to human carcinogenicity. The EPA has determined that aldrin and dieldrin are probable human carcinogens.

How can aldrin and dieldrin affect children?

Children can be exposed to aldrin and dieldrin in the same way as adults. There are no known unique exposure pathways for children. Children who swallowed amounts of aldrin or dieldrin much larger than those found in the environment suffered convulsions and some died, as occurred in adults. However, we do not know whether children are more susceptible than adults to the effects of aldrin or dieldrin.

We do not know whether aldrin or dieldrin cause birth defects in humans. Pregnant animals that ingested aldrin or dieldrin had some babies with low birth weight and some with alterations in the skeleton. Dieldrin has been found in human breast milk, therefore, it can be passed to suckling infants.

How can families reduce the risk of exposure to aldrin and dieldrin?

❏ Since aldrin and dieldrin are no longer produced or used, exposure to these compounds will occur only from past usage.

❏ Because aldrin and dieldrin were applied to the basement of some homes for termite protection, before buying a home families should investigate what, if any, pesticides have been used within the home.

Is there a medical test to show whether I've been exposed to aldrin and dieldrin?

There are laboratory tests that can measure aldrin and dieldrin in your blood, urine, and body tissues. Because aldrin changes to dieldrin fairly quickly in the body, the test has to be done shortly after you are exposed to aldrin. Since dieldrin can stay in the body for months, measurements of dieldrin can be made much longer after exposure to either aldrin or dieldrin. The tests cannot tell you whether harmful health effects will occur. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The EPA limits the amount of aldrin and dieldrin that may be present in drinking water to 0.001 and 0.002 milligrams per liter (mg/L) of water, respectively, for protection against health effects other than cancer. The EPA has determined that a concentration of aldrin and dieldrin of 0.0002 mg/L in drinking water limits the lifetime risk of developing cancer from exposure to each compound to 1 in 10,000.

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 0.25 milligrams of aldrin and dieldrin per cubic meter of air (0.25 mg/m^3) in the workplace during an 8-hour shift, 40 hour week. The National Institute for Occupational Safety and Health (NIOSH) also recommends a limit of 0.25 mg/m^3 for both compounds for up to a 10-hour work day, 40-hour week.

The Food and Drug Administration (FDA) regulates the residues of aldrin and dieldrin in raw foods. The allowable range is from 0 to 0.1 ppm, depending on the type of food product.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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ARSENIC
CAS # 7440-38-2

Division of Toxicology ToxFAQs™ **December 2003**

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occurs mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found at 1,014 of the 1,598 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Organic arsenic compounds are used as pesticides, primarily on cotton plants.

What happens to arsenic when it enters the environment?

❑ Arsenic cannot be destroyed in the environment. It can only change its form.
❑ Arsenic in air will settle to the ground or is washed out of the air by rain.
❑ Many arsenic compounds can dissolve in water.
❑ Fish and shellfish can accumulate arsenic, but the arsenic in fish is mostly in a form that is not harmful.

How might I be exposed to arsenic?

❑ Eating food, drinking water, or breathing air containing arsenic.
❑ Breathing contaminated workplace air.
❑ Breathing sawdust or burning smoke from wood treated with arsenic.
❑ Living near uncontrolled hazardous waste sites containing arsenic.
❑ Living in areas with unusually high natural levels of arsenic in rock.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Organic arsenic compounds are less toxic than inorganic arsenic compounds. Exposure to high levels of some organic arsenic compounds may cause similar effects as inorganic arsenic.

How likely is arsenic to cause cancer?

Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

How can arsenic affect children?

We do not know if exposure to arsenic will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to inorganic arsenic.

It is likely that health effects seen in children exposed to high amounts of arsenic will be similar to the effects seen in adults.

How can families reduce the risk of exposure to arsenic?

☐ If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
☐ If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.

Is there a medical test to show whether I've been exposed to arsenic?

There are tests to measure the level of arsenic in blood, urine, hair, or fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels or arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict how the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or canceled many uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration has set limits of 10 μg arsenic per cubic meter of workplace air (10 μg/m^3) for 8 hour shifts and 40 hour work weeks.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATTACHMENT B

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

ATTACHMENT C

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: ________________ Project Name/Number: ________________

Report Date: ________________ Project Manager Name: ________________

Summary of any violations of procedures occurring that week:

Summary of any job related injuries, illnesses, or near misses that week:

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

Comments:

Name: ________________ Company: ________________

Signature: ________________ Title: ________________

INCIDENT REPORT FORM

Date of Report: ______________________________

Injured: ______________________________

Employer: ______________________________

Site: ______________ Site Location: ______________

Report Prepared By: ______________ ______________
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury
__ Property Damage
__ On-site Equipment
__ Mechanical
___ Illness
___ Fire
___ Motor Vehicle
___ Spill
___ Near Miss
___ Chemical Exposure
___ Electrical
___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of Accident/Incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

WITNESS TO ACCIDENT/INCIDENT:

Name: ______________ Company: ______________
Address: ______________ Address: ______________
Phone No.: ______________ Phone No.: ______________
Name: ______________ Company: ______________
Address: ______________ Address: ______________
Phone No.: ______________ Phone No.: ______________

INJURED - ILL:

Name: ____________________ SSN: ____________________

Address: ____________________ Age: ____________________

Length of Service: ____________________ Time on Present Job: ____________________

Time/Classification: ____________________

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: ____________________

NATURE OF INJURY OR ILLNESS: ____________________

____

____

____

CLASSIFICATION OF INJURY:

__ Abrasions
__ Bites
__ Blisters
__ Bruises
__ Chemical Burns
__ Cold Exposure
__ Concussion
__ Lacerations
_____ Dislocations
_____ Faint/Dizziness
_____ Fractures
_____ Frostbite
_____ Heat Burns
_____ Heat Exhaustion
_____ Heat Stroke
____ Punctures
____ Radiation Burns
____ Respiratory Allergy
____ Sprains
____ Toxic Resp. Exposure
____ Toxic Ingestion
____ Dermal Allergy

Part of Body Affected: ____________________

Degree of Disability: ____________________

Date Medical Care was Received: ____________________

Where Medical Care was Received: ____________________

Address (if off-site): ____________________

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: ______________________________

____

Cost of Damage: $ ______________________________

ACCIDENT/INCIDENT LOCATION: ______________________________

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

____

____

____

____

Was weather a factor?:______________________________

____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

____

____

____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

____

____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

____

____

Modifications:

____

Was injured using required equipment?:

____

____

If not, how did actual equipment use differ from plan?:

____

____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

ACCIDENT/INCIDENT REPORT REVIEWED BY:

SSO Name Printed

SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

Signature

Title

Signature

Title

Signature

Title

ACCIDENT/INCIDENT FOLLOW-UP: Date:

Outcome of accident/incident:

Physician's recommendations:

Date injured returned to work:

Follow-up performed by:

Signature

Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT D

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!

Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!

Hands on top of head

OKAY! – I'M ALL RIGHT!

- I UNDERSTAND!

Thumbs up

NO! - NEGATIVE!

Thumbs down

APPENDIX G

QAPP

Elton Crossing/Site C - Family

899 Elton Avenue

BRONX, NEW YORK

Quality Assurance Project Plan

NYSDEC BCP Number: C203073

AKRF Project Number: 11901

Prepared for:

Elton Crossing Associates, L.P.
902 Broadway, 13th Floor
New York, NY 10010

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South
New York, New York 10016
(212) 696-0670

MAY 2015

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TABLES

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Remedial Action Work Plan (RAWP) at the Elton Crossing/Site C – Family site (the "Site"), located at 899 Elton Avenue in the Bronx, New York. The legal definition of the Site is Tax Block 2383, Lots 19, 25, 27, 29, 30, 31, 33, 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street in the Bronx, New York. The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative, sampling and remedial activities conducted under the RAWP. Adherence to the QAPP will ensure that defensible data will be obtained during the investigation and remediation.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 PROJECT DIRECTOR

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team, the New York State Department of Environmental Conservation (NYSDEC), and to ensure a smooth flow of information between involved parties. Michelle Lapin, P.E. will serve as the project director for the RAWP. Ms. Lapin's resume is included in Attachment A.

2.2 PROJECT MANAGER

The project manager will be responsible for directing and coordinating all elements of the RAWP. The project manager will prepare reports and participate in meetings with the Volunteer and/or the NYSDEC. Deborah Shapiro will serve as the project manager for the RAWP. Ms. Shapiro's resume is included in Attachment A.

2.3 FIELD TEAM LEADER

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and HASP. She will report to the Project Manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified, responsible person, able to act professionally and promptly during soil disturbing activities. Amy Jordan will be the field team leader for the RAWP.

2.4 PROJECT QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. She will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic site visits to assess implementation of the procedures. The QA/QC officer will also be responsible for reviewing a Data Usability Summary Report (DUSR) for soil analytical results, as described in Section 5.0 of this QAPP. Michelle Lapin, P.E. will serve as the QA/QC officer for the RAWP.

2.5 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be Nick Straccione of Accutest Laboratory.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the remedial activities included in the RAWP. During these operations, safety monitoring will be performed as described in the project Health and Safety Plan (HASP) and all field personnel will wear appropriate personal protective equipment.

3.1 DECONTAMINATION OF SAMPLING EQUIPMENT

All sampling equipment (augers, drilling rods, split spoon samplers, probe rods and pumps, etc.) will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green® and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground.

3.2 MANAGEMENT OF INVESTIGATION DERIVED WASTE

All investigation-derived waste (IDW) exhibiting field evidence of contamination will be containerized in DOT-approved 55-gallon drums or disposed of via tri-axel trucks during excavation activities. The drums will be sealed at the end of each work day and labeled with the date, the well number(s) or excavation grid(s), the type of waste (i.e., drill cuttings) and the name of an AKRF point-of-contact. Soil samples collected from soil boring activities will be used for waste characterization of soils, since such data would be biased towards areas which are expected to be most contaminated. Notwithstanding, additional waste characterization soil samples will be collected, if warranted. All IDW exhibiting field evidence of contamination will be disposed of or treated according to applicable local, state and federal regulations.

4.0 SAMPLING AND LABORATORY PROCEDURES

4.1 ENDPOINT AND WATE CLASSIFICATION SOIL SAMPLING

Endpoint and waste classification soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.

- If field screening exhibits evidence of contamination (e.g., odors, staining, elevated PID measurements), collect an aliquot of soil from each sampling location and place in labeled sealable plastic bags. The bag should be labeled with the excavation grid and the depth the sample was collected. Place the plastic bags in a chilled cooler to await selection of samples for laboratory analysis.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.4 of this QAPP and place in an ice-filled cooler.
- Decontaminate any soil sampling equipment between sample locations as described in Section 3.1 of this QAPP.
- Record sample location, sample depth, and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

The jars will be sealed and labeled as described in Section 4.4 of this QAPP and place in an ice-filled cooler.

4.2 LABORATORY METHODS

Table 1 summarizes the laboratory methods that will be used to analyze field samples as well as the sample container type, preservation, and applicable holding times. Accutest Laboratories (Accutest), an ELAP Certified laboratory subcontracted to AKRF, will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), including Category B Deliverables.

Table 1
Laboratory Analytical Methods for Analysis Groups

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil	TCL VOCs	8260	Encore sampler (3) or Terracore Sampler (1)	4 °C 0°C within 24 hrs	48 hours to extract 14 days to analyze
	TCL SVOCs	8270	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze
	TAL Metals	6000/7000	Glass 8 oz. Jar	4 °C	6 months (28 days for Hg)
	Pesticides	8081	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze
	PCBs	8082	Glass 8 oz. Jar	4 °C	14 days to extract 40 days to analyze

4.3 QUALITY CONTROL SAMPLING

In addition to the laboratory analysis of the soil samples, additional analysis will be included for quality control measures, as required by the Category B sampling techniques. These samples will include field blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD), and blind duplicate samples at a frequency of one sample per 20 field samples collected. Table 2 provides a summary of the field samples and QA/QC samples to be analyzed by the laboratory.

Table 2
Field Sample and QC Sample Quantities

Sample Type	Parameters	EPA Method	Field Samples	QC Samples			
				Field Blank	Trip Blank	MS/MSD	Blind Duplicate
Soil	VOCs	EPA 8260	20	1	1	1	1
	TCL SVOCs	EPA 8270	20	1	--	1	1
	TAL Metals	EPA 6000/7000	20	1--	--	1	1
	Pesticides	EPA 8081	20	1--	--	1	1
	PCBs	EPA 8082	20	1--	--	1	1

Notes:
MS/MSD - matrix spike/matrix spike duplicate

4.4 SAMPLE HANDLING

4.4.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents, and laboratory reports using an alpha-numeric code. In-situ soil waste characterization samples and soil excavation endpoint samples will be identified by the excavation grid area and the cardinal direction of the sidewalls. Waste characterization samples collected from 55-gallon drums will be identified by the drum number (e.g., D-1 or D-2) followed by a sample type designation (LQ for liquid and SD for solid).

The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. Trip blanks and field blanks will be identified with “TB” and “FB”, respectively.

Table 3 provides examples of the sampling identification scheme.

Table 3
Examples of Sample Names

Sample Description	Sample Designation
Excavation Endpoint Soil sample EP-1 collected from 2 feet	EP-1 (2’)
MS/MSD sample from EP-1	EP-1-MS/MDS
Blind duplicate sample from 2 feet at EP-1	EP-X (2’)

4.4.2 Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification

- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody (COC) form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the coolers remain sealed during delivery.

4.4.3 Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on chain-of-custody (COC) forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.5 FIELD INSTRUMENTATION

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

ATTACHMENT A

RESUME OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, AND PROJECT MANAGER

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 29 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in investigation and remediation concerning hazardous waste cell closures, and landfills. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985
B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.
State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters
Member, American Society of Civil Engineers (ASCE), National and CT Chapters
Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)
Member, Environmental Professionals' Organization of Connecticut (EPOC)
Board Member, New York City Brownfield Partnership
Member, NAIOP, a Commercial Real Estate Development Association

Years of Experience

Year started in company: 1994
Year started in industry: 1986

RELEVANT EXPERIENCE

Gedney Way Landfill, White Plains, NY

Ms. Lapin was the Engineer of Record for this closure of a former ash landfill, which is also utilized as a leaf and yard waste compost facility by the City of White Plains. The landfill closure required investigations to document the landfill's disposal history and the extent of the solvent contamination and methane. The investigation and closure of the landfill were completed to satisfy the requirements of a New York State Department of Environmental Conservation's (NYSDEC) consent order, were completed in compliance with NYSDEC DER-10 and 6NYCRR Part 360, and included placement of landfill cap, methane recovery system, and sealing of storm sewers traversing the landfill.

Roosevelt Union Free School District – District-wide Improvement Program, Roosevelt, NY

Ms. Lapin managed the hazardous materials investigation for the Draft and Final Environmental Impact Statements (EIS) for the improvement program, which included the demolition of three existing elementary schools and portions of the junior-senior high school, and the reconstruction of three replacement elementary schools, a separate replacement middle school, and renovations to the high school. Following the EIS, additional hazardous materials investigations were completed, including comprehensive asbestos and lead surveys; Phase I and Phase II Environmental Site Assessments; the preparation of asbestos, lead, hazardous materials and demolition specifications; and obtaining site-specific variances from the New York State Department of Labor (NYSDOL). The middle school remediation was conducted through coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH), the New York State Education Department (NYSED) and the local school district. The project was approved, and construction/renovation for the new middle school completed such that the school opened for the Fall 2008 semester as planned.

Memorial Sloan Kettering Cancer Center-CUNY 74th Street EIS, New York, NY

AKRF was engaged by Memorial Sloan-Kettering Cancer Center (MSK) and CUNY-Hunter College (CUNY) to prepare an EIS for a proposed joint facility located on a New York City-owned parcel located between East 73rd Street and East 74th Street adjacent to the FDR Drive in Manhattan. The proposed facility was formerly occupied by the Department of Sanitation, and had included over 41 underground storage tanks, will include an ambulatory medical care center for MSK and educational and medical research facilities for CUNY.

Ms. Lapin is leading the hazardous materials work which includes the preparation of the Phase I and II environmental site assessments, remedial action work plans (RAWPs), and construction health and safety plans (CHASPs) for submission to the New York City Office of Environmental Remediation (OER) for the Voluntary Cleanup Program (VCP) and to the New York State Department of Environmental Conservation (NYSDEC) for remediation of a petroleum spill. The RAWPs and CHASPs included provisions for excavation of contaminated soil and rock, removal of tanks and environmental monitoring during the construction activities. AKRF also performed a pre-demolition asbestos survey of the remaining concrete foundation structures and prepared specifications for asbestos abatement, soil management and underground storage tank removal and disposal.

Brooklyn Bridge Park, Brooklyn, NY

AKRF prepared an Environmental Impact Statement (EIS) and is continuing to provide technical and planning support services for Brooklyn Bridge Park, which revitalizing the 1.3-mile stretch of the East River waterfront between Jay Street on the north and Atlantic Avenue on the south. The new park, allows public access to the water's edge, allowing people to enjoy the spectacular views of the Manhattan skyline and New York Harbor. It also provides an array of passive and active recreational opportunities, including lawns, pavilions, and a marina. As with many waterfront sites around New York City, the lands along the Brooklyn waterfront have a long history of industrial activities. Some of these industries used dangerous chemicals and generated toxic by-products that could have entered the soil and groundwater. In addition, landfilling activities along the shoreline also used ash and other waste materials from industrial processes. Based on site inspections, historical maps, government records, and other sources, AKRF has been investigating the potential for the presence for hazardous materials in the park. This information was compiled into a Phase 1 Environmental Site Assessment report. AKRF has also provided and continues to support to the design team related to designing the project to minimize costs related to remediating hazardous materials where possible. Ms. Lapin is serving as senior manager for the hazardous materials investigations.

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). The proposed complex was to occupy an underutilized portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street, immediately south of NYU's campus. As originally contemplated, Phase I was to include 618,000 square feet of development, including a clinical practice and research building, a biotech center, 220 housing units for post-doctorate staff, a child care center, and a conference center. This phase would include reuse of the former Bellevue Psychiatric Building, a historic structure on East 30th Street east of First Avenue. Phase II was to include a second biotech building with a library to serve NYU and Bellevue at the eastern end of the block between 29th and 30th Streets. Phase III was to include a third biotech building and parking. The project's EIS considered a full range of issues, including land use, socioeconomics, shadows, historic resources, open space, traffic and transportation, air quality, noise, and construction. The firm also prepared all of the traffic and transportation studies for the urban design and master planning efforts. Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues.

Events relating to September 11, 2001 put a hold on the project for a number of years. When the project resurfaced, it had a new developer and a decreased scope. Ms. Lapin updated the hazardous materials issues for the new developer and consulted with them regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of the former psychiatric hospital building, laundry building and parking areas associated with Bellevue Hospital. The new development includes a biotechnology center (Commercial Life Science Research and Office Park) comprising two buildings (combined 550,000 square feet), street level retail, and an elevated plaza.

New York City School Construction Authority (SCA), Environmental Consulting Hazardous Materials Services

The SCA was established by the New York State government to construct school facilities to reduce overcrowding and to provide new schools in growing neighborhoods. Focusing on the environmental consulting services, dating back to the 1980s and the days of the New York City Board of Education, the firm continues to provide broad support to SCA's effort, including environmental assessments in meeting the requirements of the State Environmental Quality Review Act (SEQRA), and site selection and property acquisition support for potential new sites. AKRF is currently serving under three individual on-call contracts for site acquisition and environmental consulting services, hazardous materials consulting services, and architectural and engineering services.

AKRF has undertaken various assignments under two consecutive hazardous materials on-call contract, including environmental assessment, remedial design, and plumbing disinfection consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments (ESAs) and multi-media subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems (SSDS) and contract specifications, and construction oversight. The work has also included conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours. Ms. Lapin is the QA/QC officer for all of the SCA hazardous materials assignments and the Professional Engineer (P.E.) of record for the various remediation systems, including sub-slab depressurization systems (SSDS).

Hudson River Park, New York, NY

Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF has overseen preparation and implementation of additional soil and groundwater investigations [working with both the New York State Department of Environmental Conservation (NYSDEC) and the New York City Department of Environmental Protection (NYCDEP)], all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the Environmental Impact Statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Davids Island Site Investigations, New Rochelle, NY

Ms. Lapin managed the hazardous materials investigation of Davids Island, the largest undeveloped island on the Long Island Sound in Westchester County. The 80-acre island features pre- and post-Civil War military buildings and parade grounds, and is viewed as a major heritage, tourism, and recreational amenity. The island, formerly known as Fort Slocum, was used by the U.S. military, beginning in the 19th century, as an Army base, hospital, and training center. The island was planned for county park purposes. The investigation included a Phase I Environmental Site Assessment, with historical research going back to the 17th century, a Phase II (Subsurface) Investigation, underground storage tank investigations, asbestos surveys, and conditions surveys of all remaining structures. Cost estimates were submitted to Westchester County for soil remediation, asbestos abatement, and building demolition.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I Environmental Site Assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

Storage Deluxe, Various Locations, NY

Ms. Lapin manages the firm's ongoing work with Storage Deluxe, which includes Phase I Environmental Site Assessments and Phase II Subsurface Investigations, underground storage tank removals and associated remediation, asbestos surveys and abatement oversight, and contaminated soil removal and remediation for sites in Connecticut, the Bronx, Brooklyn, Manhattan, Queens, Westchester County, and Long Island.

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY

Ms. Lapin served as Hazardous Materials Task Leader on this Environmental Impact Statement (EIS) for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm's Hazardous Materials group performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the Environmental Impact Statement (EIS). Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with a New York City Department of Environmental Protection (NYCDEP) approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study was used to estimate costs to remediate contaminated soil and groundwater, and underground storage tanks and hazardous building materials, including lead-based paint and asbestos-containing materials.

DPR Soundview Park Playgrounds and Open Space, Bronx, NY

AKRF is part of a team working on the reconstruction of this 212-acre NYCDPR public park located along the Bronx River in the Bronx, New York. The park was identified as an underutilized park and is being improved in accordance with the goals of PlaNYC. Ms. Lapin is overseeing AKRF's hazardous materials investigations including environmental and remediation-related work. AKRF prepared the Environmental Assessment Statement (EAS) and the project has moved into the design and construction phase. The remediation/construction of multiple phases of the development is currently underway.

Rego Park Home Depot, Queens, NY

Solvent contamination was encountered during retail development of a former industrial property in Rego Park, Queens, New York. The site work included an extensive investigation and a multi-phase remediation performed under the NYSDEC Voluntary Cleanup Program (BCP). Remediation included removal of aboveground and underground storage tanks (ASTs and USTs) and hotspot soil removal. An Air Sparging/Soil Vapor Extraction (AS/SVE) groundwater remediation system designed by AKRF was installed as part of the building construction. Continued remediation work included upgrading and expanding the AS/SVE system after the store was opened. AKRF prepared the Final Engineering Report and obtained closure with a Release and Covenant Not to Sue issued by NYSDEC in 2013. AKRF continues operations, maintenance, and monitoring under the NYSDEC-approved Site Management Plan. Ms. Lapin is the Professional Engineer (P.E.) of record for the remediation design and implementation in accordance with the NYSDEC Brownfield Cleanup Program (BCP).

DEBORAH SHAPIRO, QEP

TECHNICAL DIRECTOR

Deborah Shapiro is a Technical Director with more than 16 years of experience in the assessment and remediation of hazardous waste issues. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

Prior to joining AKRF, Ms. Shapiro was a Senior Project Manager at CA RICH Consultants, Inc. in Plainview, New York. She was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area. Ms. Shapiro was also a panelist at the Northeast Sustainable Communities Workshop that was held in May 2012.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001
B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120

OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

President, New York City Brownfield Partnership
Board Member, Residents for a More Beautiful Port Washington
Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013
Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012
Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013
Year started in industry: 1998

RELEVANT EXPERIENCE

Second Farms, Bronx, NY

AKRF was contracted by the New York City Office of Environmental Remediation (OER) to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program. The investigation included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

New York University Langone Medical Center – Kimmel Pavilion, New York, NY

Ms. Shapiro is currently managing implementation of the Remedial Action Plan for the NYU Langone Medical Center (NYULMC) Kimmel Pavilion development project in Manhattan, New York. Based on the results of the assessment and subsurface investigations, a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP) were prepared for submission to the Mayor's Office of Environmental Remediation (OER). The RAP/CHASP includes requirements pertaining to environmental monitoring during intrusive construction activities, as well as supplementary groundwater sampling, endpoint sampling, and installation of a vapor barrier. AKRF will also prepare the closure documentation required by OER to obtain Certificates of Occupancy from the New York City Department of Buildings (DOB).

Mariners Marsh Park, Staten Island, NY

AKRF was contracted by the New York City Office of Environmental Remediation (OER) to implement the Remedial Action Plan (RAP) and Construction Health & Safety Plan (CHASP) for a 0.4 acre parcel of land within the Mariners Marsh Park in Staten Island, NY. The remedial action was performed as a service to DPR using an United States Environmental Protection Agency (USEPA) Brownfield Cleanup Grant. The remediation included clearing and grubbing of existing vegetation, installation of soil and erosion sediment controls, sampling, analysis, and importation of clean fill/topsoil, grading, hydroseeding, monitoring, and reporting.

Courtlandt Crescent, Bronx, NY

Ms. Shapiro directed all Phases of this NYS Brownfield Cleanup Program project in the Melrose Commons section of the Bronx from the initial Phase I and II through the Certificate of Completion and is currently managing the implementation of the Site Management Plan. A New York State Brownfield Cleanup Program (BCP) Application was submitted simultaneously with the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP), which sped up the timetable so that the remediation could be implemented concurrently with the planned site redevelopment activities. The site comprised an entire city block whose historic usage included a gasoline filling station, auto repair shop, machine shop, auto junkyard, iron works, boiler repair shop, brass fabricator shop, universal machinery manufacturing, waste paper company, cosmetic company, and a saw works. The investigation included soil and soil vapor testing as well as the installation and sampling of groundwater monitoring wells. The remedial activities included the removal of underground storage tanks and hydraulic lifts, soil waste classification testing, the excavation and removal of approximately 23,000 tons of non-hazardous petroleum and metals contaminated soil as well as hazardous soil containing lead, in-situ chemical oxidation, and installation of a composite cover system. In addition, site dewatering activities allowed the elevator pits to be advanced into the groundwater table. A vapor barrier (and water-proofing for the elevator pits) was installed beneath the two new buildings' foundations and a sub-slab depressurization system (SSDS) was incorporated into the buildings' foundations to eliminate the potential exposure pathway for soil vapor into the new affordable housing residential buildings. Ms. Shapiro directed the remedial activities and monitoring under a construction health and safety plan, which included a community air monitoring program. Site management activities include post-remedial groundwater monitoring and sampling, SSDS start-up testing and operations and maintenance, and annual institutional control/engineering control inspections. The project was the recipient of the 2013 Big Apple Brownfield Award.

La Terrazza, Cornerstone Site B-1, Bronx, NY

Ms. Shapiro provided environmental consulting services to an affordable housing developer who purchased a property in the Melrose Commons section of the Bronx, New York. The Phase I ESA revealed that a portion of the Property was historically used as a drycleaner. The Phase II showed that tetrachloroethene (PCE) was present in the soil gas beneath the building, within perched groundwater and groundwater within the bedrock fractures at levels indicating possible DNAPL. Based on the results of the Phase II, a NYSDEC Brownfield Cleanup Program (BCP) Application was completed on behalf of the developer as a "Volunteer" to eliminate off-site liability. The redevelopment site consisted of three adjacent lots; however only two were accepted into the BCP and included in the BCP Agreement. A remedial action work plan (RAWP) was completed and approved by NYSDEC within a few months to enable redevelopment work for a new affordable housing complex with underground parking and retail on the first floor. The RAWP included the removal of aboveground storage tanks, excavation of soil to 15 feet below grade site wide, in-situ chemical oxidation injections, a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination in groundwater within the bedrock fractures, and installation of a composite cover system. Ms. Shapiro directed the remedial activities and monitoring for additional potential contamination during construction. The groundwater remediation system was installed during site development and began operation once development was complete. Although only two lots were accepted into the program, intuitional and engineering control measures were incorporated into the entire redevelopment site to protect future building occupants. The Certificate of Completion (COC) for this site was received within two years after conducting the Phase II. The COC enabled the developer to receive tax credits from NYS. In addition, this project was the recipient of the 2011 Big Apple Brownfield Award.

Federal Express at JFK Airport, Jamaica, NY

Ms. Shapiro served as a senior scientist during the investigation and remediation of a petroleum spill at the Federal Express Hanger located at JFK Airport. The investigation included the installation and sampling of a network of monitoring wells located within the hanger as well as on the tarmac. A remedial action work plan (RAWP) was completed and approved by the New York State Department of Environmental Conservation (NYSDEC). The RAWP included the removal of free-floating petroleum products and installation and operation of an air sparge/soil vapor extraction system.

ExxonMobil, Multiple Locations, NY

Ms. Shapiro has managed the investigation and remediation of numerous ExxonMobil retail service stations in the five boroughs and Long Island. The investigations have included Phase I, II, and III site assessments, regulatory compliance, emergency spill response, UST removals, and soil and groundwater remediation.

Bradhurst Cornerstone II Residences, Manhattan, NY

AKRF, Inc. prepared a Part 58 Environmental Assessment and a City Environmental Quality Review Environmental Assessment Statement for the Bradhurst Cornerstone II Apartments project. Issues of concern for the environmental review included the identification of project commitments for certain of the four sites related to historic resources, hazardous materials, air quality, and building attenuation. As part of the mitigation of hazardous materials, AKRF conducted a Phase II investigation, and prepared a Remedial Action Plan and Construction Health and Safety Plan.

Lambert Houses, Bronx, NY

AKRF performed a Phase I ESA of the Lambert Houses affordable housing complex located in the West Farms section of the Bronx, NY. Lambert Houses consisted of multi-story apartment buildings, parking garage, and a multi-tenant retail/commercial building alongside the elevated NYC subway. AKRF also conducted a vapor intrusion screen of the Property to satisfy HUD's vapor intrusion requirements. The Phase I and vapor intrusion screens were prepared in accordance with ASTM E1527-05, ASTM E2600, and EPA's All Appropriate Inquiry (AAI) rule.

Brook 156, Bronx, NY

AKRF performed a Phase I ESA of two lots located at the northeast intersection of Brook Avenue and East 156th Street in the Bronx, NY. One lot was a NYC-owned former gasoline service station and the other lot was a former railroad. In addition, AKRF conducted a vapor intrusion screen of the Property to satisfy HUD's vapor intrusion requirements. The Phase I and vapor intrusion screens were prepared in accordance with ASTM E1527-05, ASTM E2600, and EPA's All Appropriate Inquiry (AAI) rule.

Tenant Inspection Program, Multiple Locations, NY

Ms. Shapiro directed a Tenant Inspection Program for a landlord who owned 1.2 million square feet of multi-tenanted industrial and commercial properties located in Queens, Nassau, and Suffolk counties for nearly a decade. The Tenant Inspection Program was a compliance program established to address concerns that certain tenant's operations may have been negatively impacting the property. The program included an annual inspection of each tenant space to determine their processes, chemical usage, waste disposal habits, current permits, and fire safety procedures. In addition, each sanitary system was sampled for chemical constituents identified during the inspections and approximately 300 exterior storm drains were inspected for evidence of illegal discharges or dumping. Based on the results of the inspection and sampling, letter reports were sent to the tenants informing them of any issues and educating them on best practices. Each tenant was assisted with regulatory compliance, permitting, and health and safety. The landlord received a report for each building detailing the findings of the inspection and sampling, and any follow-up actions. The landlord became educated on environmental issues and was able to incorporate the cost for this program and environmental compliance requirements into their leases as common area maintenance (CAM) charges. This resulted in a direct improvement in tenant housekeeping practices and enabled the landlord to obtain a comprehensive environmental insurance policy covering the entire property portfolio.

APPENDIX H

CITIZEN PARTICIPATION PLAN

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

Elton Crossing (Melrose C Family)

899 Elton Avenue
Bronx County
Bronx, New York

December 2014

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Section **Page Number**

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: **Elton Crossing Associates, L.P. ("Applicant")**
Site Name: **Elton Crossing (Melrose C Family) ("site")**
Site Address: **899 Elton Avenue, Bronx, NY 10451**
Site County: **Bronx County**
Site Number: **C203073**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:

http://www.dec.ny.gov/chemical/brownfields.html

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interest in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom to public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The location of the reports and information related to the site's investigation and cleanup program are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;

- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility; and
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

For more information about TAGs, go online at:

http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repositories	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about proposed RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that summarizes the Final Engineering Report • Distribute fact sheet to site contact list announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets are combined if possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Current Issues

The site is part of Census Tract 141. According to the 2000 Census, 58.58% of the families in Census Tract 141 are living below the poverty line, compared to the national poverty rate of 14.9% and the New York State poverty rate of 14.9%. The unemployment rate for Census Tract 141 is 37.92%, which is more than four times the New York City unemployment rate of 7.9% (as of February 2014) and the national unemployment rate of 6.7% (as of March 2014). This Site is within an area designated as an Environmental Zone or En-Zone. Designation of Environmental Zones is limited to those census tracts with a poverty rate of at least 20% according to the 2000 Census, and an unemployment rate of at least 8.868%.

The entire site has been underutilized and/or vacant since 1989 with portions vacant or underutilized since the 1970s. The Melrose Commons section of the Bronx has suffered economically since the 1960s and 1970s when a wave of arson combined with suburban flight ravaged the community. Most of the original housing stock was structurally damaged by the arson and eventually demolished by the city. In addition, the City of New York dismantled the Third Avenue El train in 1973, leaving Melrose Commons and other portions of the southwestern Bronx underserved by public transportation. There is a direct correlation between the economic disparity of the neighborhoods adjacent to Third Avenue and the lack of viable subway access. In addition, the Melrose Commons neighborhood, like the rest of the South Bronx, is plagued by gang activity, drug use, prostitution, and homelessness. The economic conditions of the Site have contributed to its remaining underutilized and/or vacant. The site has also remained underutilized and/or vacant due to the perceived or real threat of contamination.

The site is located within the Melrose Commons Urban Renewal Area and directly addresses several of the housing and economic development needs outlined in the Melrose Commons Urban Renewal Plan (URP) originally adopted in 1994. The objectives of the URP are as follows:

- Eliminate blight and maximize appropriate land use.
- Removed substandard and insanitary structures.
- Remove impediments to land assemblage and orderly development.
- Strengthen the tax base of the City by encouraging development.
- Provide new and/or rehabilitated low, moderate, and/or middle income housing exhibiting good design in terms of privacy, light, air, and open space.
- Provide convenient community facilities, parks and recreational uses, local commercial activities, and parking.

- Redevelop the area in a comprehensive manner, removing blight and restoring the residential character of the area, with appropriate support facilities.
- Encourage the upgrading of housing quality in the immediate vicinity.
- Provide new low and/or moderate income housing exhibiting good design in terms of privacy, light, air, and open space.
- Redevelop the area in a comprehensive manner.

The site currently contains a vacant one-story industrial building with a partial cellar, which has been vacant for many years. There are no issues related to noise or odor at this time. The site is not affecting the use and enjoyment of any local amenities or nearby projects; however, the site is considered to be an unattractive blight on the community in its current condition.

The development plan will transform the vacant blighted lots into one new affordable residential building containing a total of 203 multi-family residential units with approximately 8,000 square feet of ground floor retail space. The proposed redevelopment will comply with the New York State Energy Research and Development Authority (NYSERDA) Multi-Family Performance Program and the Enterprise Green Communities Criteria and will include the following sustainable design features: solar panels, well-insulated building envelope with high performance windows, energy efficient boilers and heating system, energy efficient lighting, low-flow plumbing fixtures, use of recycled and low-VOC materials and gardening beds. The BCP Volunteer plans on working with the local community board to market the new housing units. In addition, community board preference will be given for 50% of the units. As part of the redevelopment, the existing building will be demolished prior to the start of remedial activities. Redevelopment of the site in accordance with the Project Plan will eliminate the current concerns in connection with the site's current blighted condition while providing affordable housing, community resources, and open space.

Potential Remediation/ Construction-Related Issues

Issues of concern during the on-site remediation phase will likely include those related to the on-site handling and off-site disposal of contaminated soil. Of particular concern to the surrounding community will likely be the possibility of the generation of vapors or dust from the site during remediation. On-site air quality and dust levels will be monitored during any soil excavation and removal activity in accordance with a site-specific Health and Safety Plan (HASP) that will be included as part of the Remedial Work Plan (RWP). Dust suppression techniques will be employed to prevent the generation of dust. All air and dust monitoring will be performed in accordance with NYSDOH's Community Air Monitoring Program.

An additional remediation/construction concern will likely be the potential presence of large trucks traveling through the community, and parking or idling at or near the project site during soil excavation and disposal. The RWP will include provisions for on-site soil handling techniques that minimize the number of trucks and duration of time within or near the site. In addition, provisions were included to restrict truck traffic (to the extent possible) to designated routes along main road while minimizing traffic within the community.

The concern over construction-related noise is a common one for communities in which redevelopment is occurring. Construction plans will minimize noise to the extent possible and the operation of heavy equipment will be restricted to normal working hours as will be set forth in the required NY City-issued permits.

Other Issues

As there is a presence of a limited English-proficient population in the area, all Fact Sheets related to the site will be distributed in both English and Spanish. The Citizen Participation process, as outlined in Section 2.0, will be used to communicate to the public any issues and milestones that may arise. If additional major issues of public concern are identified in the future, this Plan will be revised accordingly.

4. Site Information

Site Description

The site is located at 899 Elton Avenue in the Bronx, New York. Appendix C contains a map identifying the location of the site.

The site includes eight lots and a section of Melrose Crescent between East 161st Street and East 162nd Street, Bronx, New York, and is approximately 0.69 acre in size. The site is irregular in shape, and is bound to the north by East 162nd Street, to the east by Elton Avenue, to the south by East 161st Street, and to the west by vacant lots and residential/commercial buildings, followed by Melrose Avenue. The legal identifier is Block 2383, Lots 19, 25, p/o 27, p/o 29, 30, 31, 33 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street, Bronx, New York. It should be noted that the section of Melrose Crescent between East 162nd Street and East 161st Street, which comprises old Lots 22, 23, 24, a portion of 33 and a portion of Lots 25, 30, and 31, is not associated with an address. The site is located in a predominantly developed area consisting of residential, educational, commercial, and industrial buildings.

History of Site Use, Investigation, and Cleanup

Historic reports indicated that Lot 19 was developed historically with an automobile garage from 1927 to 1940; a factory in 1945; freezer and oven mobile units in 1961; a metal works from at least 1969 to 1978; and Blasco Supply company from 2000 to 2005. Lot 25 was developed historically with an automobile garage in 1921 and a funeral home between 1927 and 1984. Lot 27 was developed historically with an undertaker and a multi-story residential building between 1969 and 1979. Lot 29 was developed historically with a beauty shop, lawyer, dentist and multi-story residential building between 1927 and 1971. Lot 35 was developed historically with the Elton Glass Works, Soenning Plumbing and Heating, and a butcher and glazer in 1927, and stores and a multi-story residential building in 1965. The other lots were developed as multi-story residences with cellars that likely contained petroleum storage tanks. In addition, currently a gasoline station, auto repair facilities, and a paint store are located south of the site on East 161st Street; a dry cleaner is located west of the Site on East 161st Street; and a Brownfield Cleanup Program site is located south of the Site across East 161st Street.

AKRF conducted a Remedial Investigation (RI) at the site in February 2014, which included a geophysical survey and utility mark-outs, the installation of 14 soil borings and 6 soil vapor probes to evaluate areas of concern at the site. An anomaly consistent with that of an underground storage tank (UST), measuring approximately 7 feet by 8.5 feet, was detected and delineated at the rear of the site building on Lot 35.

Previous investigations have documented that the site is underlain by approximately 2 to 14 feet of historic fill. Analytical data from the RI indicated that contaminated soil and soil vapor were present at the site. Groundwater at the site was not encountered above bedrock. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals were detected in the soil. The VOCs seem to be associated with former fuel oil use at the site. The SVOCs and metals in the soil and the volatile organic compounds (VOCs) in the soil vapor seem to be attributed to the historic use at the site and subsequent demolition of the former structures. The elevated levels of pesticides indicate the prior usage of pesticides at the site and possible storage in the cellar of the former structures.

5. Investigation and Cleanup Process

Application

The Applicant has applied for, and been accepted into, New York’s Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a qualitative exposure assessment, a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted residential purposes. To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant completed a Remedial Investigation before it entered into the BCP. The Applicant will develop a supplemental remedial investigation work plan, which is subject to public comment as noted in Appendix D and a supplemental investigation. NYSDEC will determine if the investigation goals and requirements of the BCP have been met or if additional work is needed before a remedy can be selected. The goals of the supplemental investigation will be as follows:

1. Define the nature and extent of contamination in soil, groundwater, and any other impacted media;
2. Identify the source(s) of the contamination;
3. Assess the impact of the contamination on public health and/or the environment; and
4. Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

NYSDEC will determine whether the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a Certificate of Completion (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a Remedial Work Plan. The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the site.

When the Applicant submits a proposed Remedial Work Plan for approval, NYSDEC would announce the availability of the proposed plan for public review during a 45-day public comment period.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination will remain in place. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An institutional control is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that is pumping and treating groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's remedial program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Michael MacCabe
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
(518) 402-9774

Tom Panzone
Citizen Participation Specialist
NYSDEC Region 2
1 Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
(718) 482-4958

New York State Department of Health (NYSDOH):

Krista Anders
Bureau Director
New York State Department of Health
547 River Street
Troy, NY 12180-2216
(518) 402-7880

Appendix B
Site Contact List

Appendix B
Site Contact List

1. Local, State, and Federal Officials

Hon. Bill de Blasio
Mayor of New York City
City of New York
1 Centre Street
New York, New York 10007-1200

Hon. Ruben Diaz Jr.
Bronx Borough President
851 Grand Concourse
Bronx, New York 10451

Hon. Maria del Carmen Arroyo
New York City Council – District 17
384 E. 149th Street, Suite 300
Bronx, NY 10455

Department of City Planning
Bronx Borough Office
One Fordham Plaza, 5th Floor
Bronx, New York 10458-5891

Hon. Governor Andrew Cuomo
State of New York
NYS Capitol Building
Albany, New York 12224

Hon. Eliot Engel
U.S. House of Representatives
2227 Rayburn House Office Building
Washington, DC 20515

Hon. Scott M. Stringer
New York City Comptroller
Office of the Comptroller, City of NY
1 Centre Street
New York, NY 10007

Hon. Ruben Diaz
NY State Senator
900 Rogers Place
Bronx, NY 10459

Carl Weisbrod, Director
Department of City Planning
22 Reade Street
New York, New York 10007-1216

Daniel Walsh, Director
Mayor's Office of Environmental
Remediation
100 Gold Street, 2nd Floor
New York, New York, 10038

Hon. Charles Schumer
U.S. Senate
322 Hart Senate Office Building
Washington, DC 20510

Hon. Kirsten Gillibrand
U.S. Senate
478 Russell Senate Office Building
Washington, DC 20510

2. Current Owners and Occupants of the Subject Site and Adjacent Sites

The Site comprises Lots 19, 25, p/o 27, p/o 29, 30, 31, 33 35, and a section of Melrose Crescent between East 161st Street and East 162nd Street, Bronx, New York. The Site is currently owned by the New York City Department of Housing Preservation and Development, 100 Gold Street, New York, NY 10038 and is currently vacant.

Adjacent to the west:

Block 2383, Lot 18
430 East 162nd Street
Bronx, NY 10451
Kunba LLC (Owner/Operator)
℅ Evan Roberts
36 West 37th Street
New York, NY 10018

Block 2383, Lot 37
431 East 161st Street
Bronx, NY 10451
New York City Housing Preservation and Development (Owner/Operator)
100 Gold Street
New York, NY 10038

Adjacent to the east:

Block 2383, Lot 61
O'Neill Triangle
East 161st Street
Bronx, NY 10451
New York City Parks and Recreation (Owner/Operator)
100 Church Street
New York, NY 10007

Block 2382, Lot 14
422 East 161st Street
Bronx, NY 10451
One and One Holdings LLC (Owner/Operator)
460 Malbone Street, Suite 1
Brooklyn, NY 11225

Adjacent to the north:

Block 2384, Lot 20
439 East 162nd Street
Bronx, NY 10451
New York City Housing Preservation and Development (Owner/Operator)
100 Gold Street
New York, NY 10038

Block 2384, Lot 38
East 162nd Street
Bronx, NY 10451
New York City Housing Preservation and Development (Owner/Operator)
100 Gold Street
New York, NY 10038

Adjacent to the south:

Block 2382, Lot 48
470 East 161st Street
Bronx, NY 10451
New York State (Owner/Operator)

Block 2382, Lot 7501
871 Elton Avenue
Bronx, NY 10451
Parkview Commons Condo
(Owner/Operator)

Block 2382, Lot 15
424 East 161st Street
Bronx, NY 10451
Ernesto Robles (Owner/Operator)
424 East 161st Street
Bronx, NY 10451

Block 2384, Lot 48
433 East 162nd Street
Bronx, NY 10451
New York City Housing Preservation and Development (Owner/Operator)
100 Gold Street
New York, NY 10038

3. Local News Media

Inner City Press
PO Box 580188, Mount Carmel Station
Bronx, NY 10458

The New York Times
229 West 43rd Street
New York, NY 10036

WNBC News 4
30 Rockefeller Plaza
New York, NY 10012

New York 1 News
75 Ninth Avenue
New York, NY 10011
Email: ny1news@ny1.com

Bronx Times Reporter
900 East 132nd Street
Bronx, NY 10454
Email: bronxtimes@cnglobal.com

News 12 The Bronx
930 Soundview Avenue
Bronx, NY 10473
Email: news12bx@news12.com

WNYW Fox 5
205 East 67th Street
New York, NY 10021

1010 Wins – CBS Radio
888 7th Avenue, 10th Floor
New York, NY 10106

4. Public Water Supply

Public water is provided by The City of New York, Department of Environmental Protection (Consumer Service Center, 59-17 Junction Boulevard, 10th Floor, Flushing, NY 11373).

5. Additional Contacts: None

6. Schools and Day Care Centers

The following day care centers have been identified near the Site:

Five Star Day Care
3261 3rd Avenue
Bronx, New York 10456
Joselin Blanco
(718) 292-4774
Distance: 900 feet northeast of the Site

Salvation Army Bronx Day Care
425 East 159th Street
Bronx, New York 10451
Valerie Toon
(718) 742-2346
Distance: 835 feet south of the Site

First Century Christ Academy Day Care
3110 3rd Avenue
Bronx, New York 10451
William Britt
(718) 585-4800
Distance: 780 feet south of the Site

N A H Shawn Group Family Day Care
320 East 159th Street, # 3G
Bronx, New York 10451
Yolanda Fernandez
(347) 591-0917
Distance: 1,360 feet southwest of the Site

The following schools have been identified near the Site:

Boricua College
Bronx Campus at Melrose Commons
890 Washington Avenue
Bronx, New York 10451
Victor G. Alicea, Ph.D.
(347) 964-8600
Distance: 400 feet southeast of the Site

The Eagle School
P.S. X 140
916 Eagle Avenue
Bronx, New York 10456
Paul Cannon
(718) 585-1205
Distance: 1,160 feet east of the Site

Melrose Community School
758 Courtlandt Avenue
Bronx, New York 10451
(718) 292-3785
Meredith Gotlin
Distance: 0.4 miles southwest of the Site

Saint Peter and Paul School
838 Brook Avenue
Bronx, New York 10451
(718) 665-2056
Sister Michelle McKeon
Distance: 890 feet southeast of the Site

New York City Charter High School for Architecture, Engineering, and the Construction Industries
838 Brook Avenue
Bronx, New York 10451
Eugene Foley
(646) 400-5566
Distance: 890 feet southeast of the Site

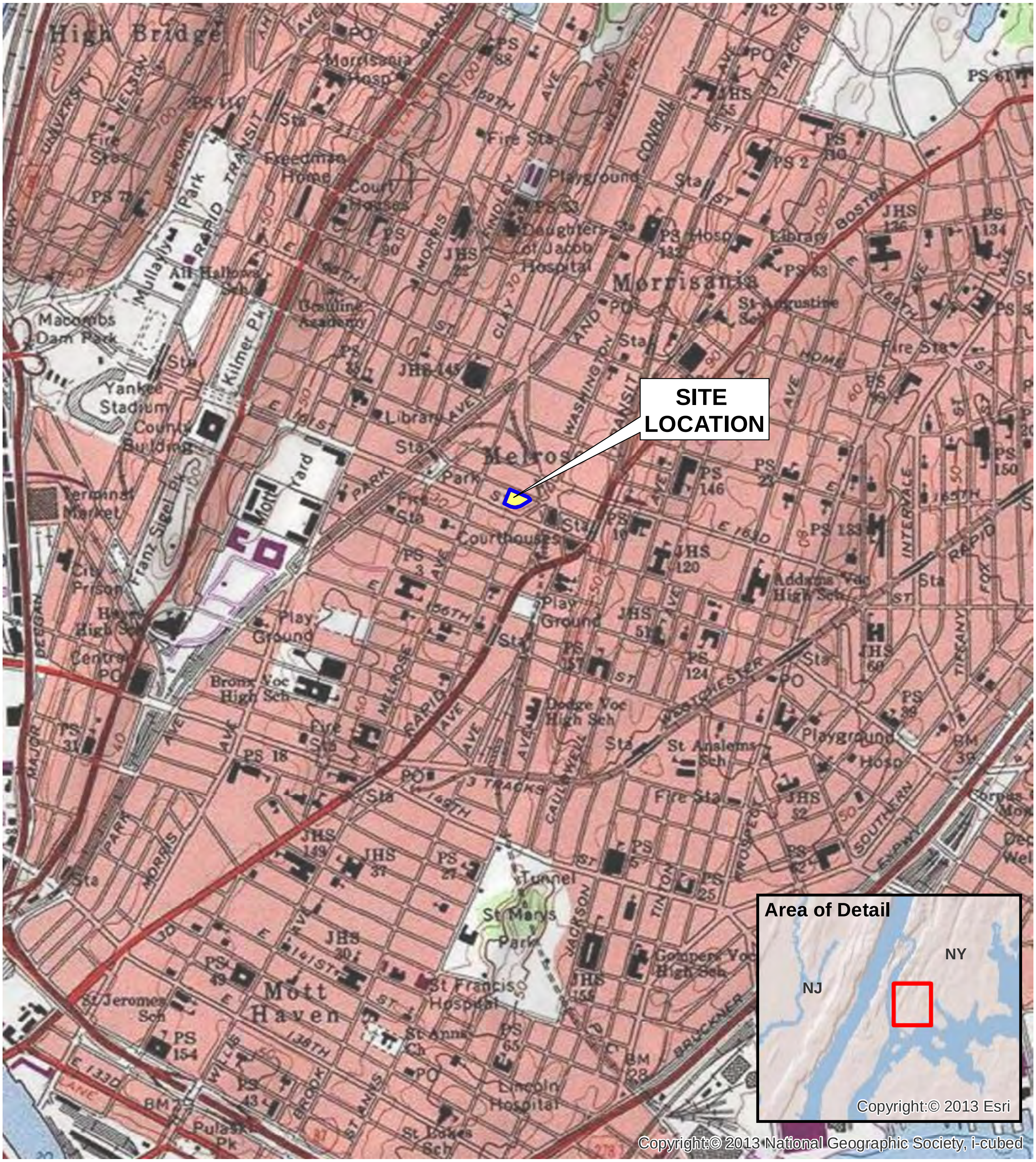
7. Local Community Board

Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
George Rodriguez
(718) 402-2270

8. Local Document Repository

Melrose Library
910 Morris Avenue (at E. 162nd St.)
Bronx, NY 10451
Tony Marx
(718) 588-0110

Appendix C
Site Location Map



SOURCE
USGS 7.5 Minute Topographic Map
CENTRAL PARK Quad 1995

0 1,000 2,000 3,000 Feet

Melrose Commons Site C - Family
Bronx, New York

SITE LOCATION

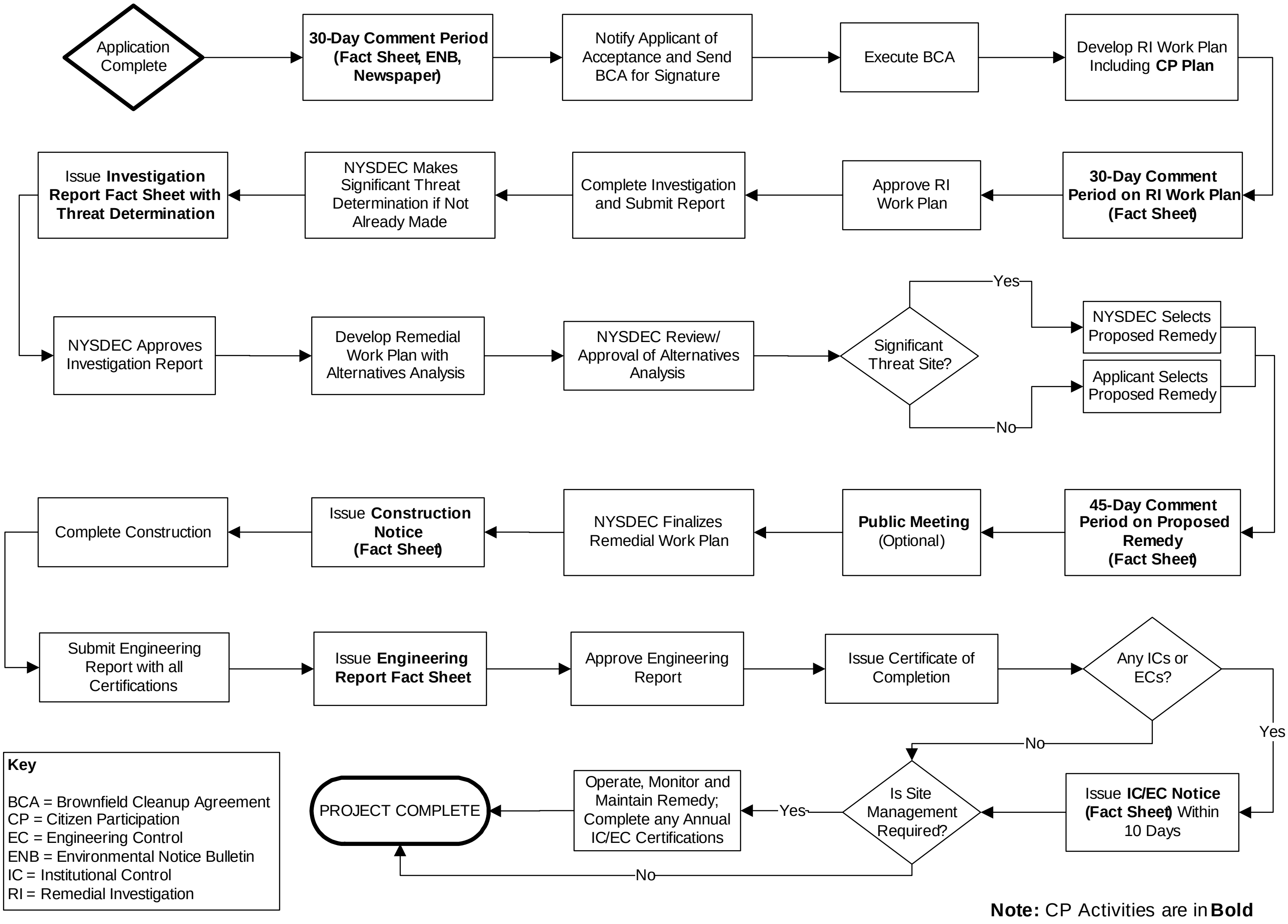
AKRF

Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE	2/18/2014
PROJECT No.	11901
FIGURE	1

© 2014 AKRF, Inc. Environmental Consultants O:\Projects\11901 - MELROSE COMMONS SITE C-FAMILY\11901 Fig 1 loc map.mxd

Appendix D– Brownfield Cleanup Program Process



APPENDIX I

RESUMES OF KEY PERSONNEL

AMELIA TAYLOR JORDAN

ENVIRONMENTAL SCIENTIST

Amy Jordan is an Environmental Scientist in AKRF's Hazardous Materials Department. She has experience in Phase I and Phase II site investigations, including water, air, and soil sampling. Ms. Jordan is a 2011 graduate of Franklin and Marshall College, where she studied Geosciences, Environmental Studies, and French. She has experience doing environmental fieldwork along the east and west coasts of the United States and the East African Rift System in Kenya.

BACKGROUND

Education

B.A. Geosciences, Franklin and Marshall College, Lancaster, PA, 2011

Licenses/Certifications

40 Hour OSHA HAZWOPER Certified, November 2011

Years of Experience

Year started in company: 2012
Year started in industry: 2011

RELEVANT EXPERIENCE

250 North 10th Street, Williamsburg, NY

Investigation and remediation of this former warehouse are being conducted under the New York City Office of Environmental Remediation (OER) E-designation program. AKRF completed a Phase I Environmental Site Assessment, Phase II Subsurface Investigation, and prepared a Remedial Action Plan (RAP) and Construction Health and Safety Plan to obtain a Notice to Proceed from OER to allow start of the proposed construction. AKRF is currently providing environmental oversight during implementation of the RAP. For this project, Ms. Jordan serves as the on-site environmental monitor to oversee soil management activities, conduct air quality monitoring, and prepare daily reports for submittal to the OER project manager.

New City Plaza, New City, NY

Investigation and remediation at this former dry cleaning facility site are being conducted under the NYSDEC Brownfield Cleanup Program. Tasks have included preparation and state approval of a Site Investigation Work Plan, Site Quality Assurance Project Plan, Health and Safety Plan, a Community Participation Plan, and completion of the investigation phase of the Brownfield's program. Interim Remedial activities included contamination source removal from soil and installation of a sub-slab depressurization system to address soil vapor. For this project, Ms. Jordan conducted quarterly groundwater and indoor air sampling.

Proposed Whitney Museum Expansion, Meat Packing District, Manhattan, NY

In 2007 and 2008, AKRF prepared an EAS for a proposed new 230,000-square-foot museum facility located in Gansevoort Market Historic District. This new building will provide exhibition galleries, an auditorium, education space, administrative offices, a café and bookstore, and ancillary storage for the Whitney. As part of the project AKRF completed a Phase I Environmental Site Assessment, Phase II Subsurface Investigation, and prepared a Remedial Action Plan (RAP) and Construction Health and Safety plan to obtain a Notice to Proceed from NYC Office of Environmental Remediation (OER) to allow start of the proposed construction. AKRF is currently providing environmental oversight during implementation of the RAP. For this project, Ms. Jordan has served as an on-site environmental monitor to oversee soil management activities, conduct air quality monitoring, and prepare daily reports for submittal to the OER project manager.

AvalonBay, West Chelsea, Manhattan, NY

Investigation and remediation of this former warehouse and auto-repair facility are being conducted under the New York City Office of Environmental Remediation (OER) E-designation program. AKRF is currently providing environmental oversight during implementation of the Remedial Action Plan (RAP) for the site. For this project, Ms. Jordan has served as the on-site environmental monitor to oversee soil management activities, conduct air quality monitoring, and prepare daily reports for submittal to the OER project manager.

25 Broad Street, Manhattan, NY

AKRF was retained by LCOR to design and implement a Community Air Monitoring program during demolition of a former residential building on a property in lower Manhattan that is to be redeveloped. The program includes real-time community monitoring for volatile organic compounds and particulate matter, personnel monitoring for particulate matter, and confirmatory sampling for silica. Ms. Jordan has served as the on-site monitor to calibrate and operate the real time monitoring equipment, download data, and prepare daily email status reports to be submitted to the Client.

Brownfield Science & Technology, Inc., Cochranville, PA

Before joining AKRF, Ms. Jordan worked as a field geoscientist for Brownfield Science and Technology doing soil, air, and groundwater sampling. She also did Phase I and Phase II site investigations and assessments, soil vapor intrusion assessments, and general maintenance and repairs of field equipment.

The Wetlands Institute, Stone Harbor, NJ

Before joining AKRF, Ms. Jordan established a research project, participated in laboratory and field projects previously established by the institute. She also contributed to conservation and public education efforts.

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a Senior Vice President with more than 29 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's Hazardous Materials group and offers extensive experience providing strategic planning and management for clients. Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, air and geotechnical problems. Her other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes groundwater investigations, formulation and administration of groundwater monitoring programs and remediation throughout the Northeast. Her experience with groundwater contamination includes Level B hazardous waste site investigations; leaking underground storage tank studies, including hazardous soil removal and disposal and associated soil and water issues; soil gas/vapor intrusion surveys; and wetlands issues. Ms. Lapin is experienced in investigation and remediation concerning hazardous waste cell closures, and landfills. She has directed hundreds of Phase I, Phase II, and Phase III investigations and remediations, many of them in conjunction with developers, law firms, lending institutions, and national retail chains. She is also experienced in the cleanup of contaminated properties under Brownfield Cleanup Program (BCP) regulations.

BACKGROUND

Education

M.S., Civil Engineering, Syracuse University, 1985
B.S., Civil Engineering, Clarkson University, 1983

Professional Licenses/Certifications

New York State P.E.
State of Connecticut P.E.

Professional Memberships

Member, National Society of Professional Engineers (NSPE), National and CT Chapters
Member, American Society of Civil Engineers (ASCE), National and CT Chapters
Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council (EPC)
Member, Environmental Professionals' Organization of Connecticut (EPOC)
Board Member, New York City Brownfield Partnership
Member, NAIOP, a Commercial Real Estate Development Association

Years of Experience

Year started in company: 1994
Year started in industry: 1986

RELEVANT EXPERIENCE

Gedney Way Landfill, White Plains, NY

Ms. Lapin was the Engineer of Record for this closure of a former ash landfill, which is also utilized as a leaf and yard waste compost facility by the City of White Plains. The landfill closure required investigations to document the landfill's disposal history and the extent of the solvent contamination and methane. The investigation and closure of the landfill were completed to satisfy the requirements of a New York State Department of Environmental Conservation's (NYSDEC) consent order, were completed in compliance with NYSDEC DER-10 and 6NYCRR Part 360, and included placement of landfill cap, methane recovery system, and sealing of storm sewers traversing the landfill.

Roosevelt Union Free School District – District-wide Improvement Program, Roosevelt, NY

Ms. Lapin managed the hazardous materials investigation for the Draft and Final Environmental Impact Statements (EIS) for the improvement program, which included the demolition of three existing elementary schools and portions of the junior-senior high school, and the reconstruction of three replacement elementary schools, a separate replacement middle school, and renovations to the high school. Following the EIS, additional hazardous materials investigations were completed, including comprehensive asbestos and lead surveys; Phase I and Phase II Environmental Site Assessments; the preparation of asbestos, lead, hazardous materials and demolition specifications; and obtaining site-specific variances from the New York State Department of Labor (NYSDOL). The middle school remediation was conducted through coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH), the New York State Education Department (NYSED) and the local school district. The project was approved, and construction/renovation for the new middle school completed such that the school opened for the Fall 2008 semester as planned.

Memorial Sloan Kettering Cancer Center-CUNY 74th Street EIS, New York, NY

AKRF was engaged by Memorial Sloan-Kettering Cancer Center (MSK) and CUNY-Hunter College (CUNY) to prepare an EIS for a proposed joint facility located on a New York City-owned parcel located between East 73rd Street and East 74th Street adjacent to the FDR Drive in Manhattan. The proposed facility was formerly occupied by the Department of Sanitation, and had included over 41 underground storage tanks, will include an ambulatory medical care center for MSK and educational and medical research facilities for CUNY.

Ms. Lapin is leading the hazardous materials work which includes the preparation of the Phase I and II environmental site assessments, remedial action work plans (RAWPs), and construction health and safety plans (CHASPs) for submission to the New York City Office of Environmental Remediation (OER) for the Voluntary Cleanup Program (VCP) and to the New York State Department of Environmental Conservation (NYSDEC) for remediation of a petroleum spill. The RAWPs and CHASPs included provisions for excavation of contaminated soil and rock, removal of tanks and environmental monitoring during the construction activities. AKRF also performed a pre-demolition asbestos survey of the remaining concrete foundation structures and prepared specifications for asbestos abatement, soil management and underground storage tank removal and disposal.

Brooklyn Bridge Park, Brooklyn, NY

AKRF prepared an Environmental Impact Statement (EIS) and is continuing to provide technical and planning support services for Brooklyn Bridge Park, which revitalizing the 1.3-mile stretch of the East River waterfront between Jay Street on the north and Atlantic Avenue on the south. The new park, allows public access to the water's edge, allowing people to enjoy the spectacular views of the Manhattan skyline and New York Harbor. It also provides an array of passive and active recreational opportunities, including lawns, pavilions, and a marina. As with many waterfront sites around New York City, the lands along the Brooklyn waterfront have a long history of industrial activities. Some of these industries used dangerous chemicals and generated toxic by-products that could have entered the soil and groundwater. In addition, landfilling activities along the shoreline also used ash and other waste materials from industrial processes. Based on site inspections, historical maps, government records, and other sources, AKRF has been investigating the potential for the presence for hazardous materials in the park. This information was compiled into a Phase 1 Environmental Site Assessment report. AKRF has also provided and continues to support to the design team related to designing the project to minimize costs related to remediating hazardous materials where possible. Ms. Lapin is serving as senior manager for the hazardous materials investigations.

East River Science Park, New York, NY

Originally, New York University School of Medicine (NYUSOM) retained the firm to prepare a full Environmental Impact Statement (EIS) for its proposed East River Science Park (ERSP). The proposed complex was to occupy an underutilized portion of the Bellevue Hospital campus between East 30th Street and approximately East 28th Street, immediately south of NYU's campus. As originally contemplated, Phase I was to include 618,000 square feet of development, including a clinical practice and research building, a biotech center, 220 housing units for post-doctorate staff, a child care center, and a conference center. This phase would include reuse of the former Bellevue Psychiatric Building, a historic structure on East 30th Street east of First Avenue. Phase II was to include a second biotech building with a library to serve NYU and Bellevue at the eastern end of the block between 29th and 30th Streets. Phase III was to include a third biotech building and parking. The project's EIS considered a full range of issues, including land use, socioeconomics, shadows, historic resources, open space, traffic and transportation, air quality, noise, and construction. The firm also prepared all of the traffic and transportation studies for the urban design and master planning efforts. Ms. Lapin managed the Phase I Environmental Site Assessment and other hazardous materials-related issues.

Events relating to September 11, 2001 put a hold on the project for a number of years. When the project resurfaced, it had a new developer and a decreased scope. Ms. Lapin updated the hazardous materials issues for the new developer and consulted with them regarding remediation strategies and involvement of regulatory agencies. For the actual remediation/development, the city requested oversight by AKRF to represent its interests (the city is retaining ownership of the land). Ms. Lapin completed directing the remediation oversight on behalf of the City of New York for the remediation of the former psychiatric hospital building, laundry building and parking areas associated with Bellevue Hospital. The new development includes a biotechnology center (Commercial Life Science Research and Office Park) comprising two buildings (combined 550,000 square feet), street level retail, and an elevated plaza.

New York City School Construction Authority (SCA), Environmental Consulting Hazardous Materials Services

The SCA was established by the New York State government to construct school facilities to reduce overcrowding and to provide new schools in growing neighborhoods. Focusing on the environmental consulting services, dating back to the 1980s and the days of the New York City Board of Education, the firm continues to provide broad support to SCA's effort, including environmental assessments in meeting the requirements of the State Environmental Quality Review Act (SEQRA), and site selection and property acquisition support for potential new sites. AKRF is currently serving under three individual on-call contracts for site acquisition and environmental consulting services, hazardous materials consulting services, and architectural and engineering services.

AKRF has undertaken various assignments under two consecutive hazardous materials on-call contract, including environmental assessment, remedial design, and plumbing disinfection consulting tasks. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments (ESAs) and multi-media subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plans, design of sub-slab depressurization systems (SSDS) and contract specifications, and construction oversight. The work has also included conducting Phase I ESAs and indoor air quality testing, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours. Ms. Lapin is the QA/QC officer for all of the SCA hazardous materials assignments and the Professional Engineer (P.E.) of record for the various remediation systems, including sub-slab depressurization systems (SSDS).

Hudson River Park, New York, NY

Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a five-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF has overseen preparation and implementation of additional soil and groundwater investigations [working with both the New York State Department of Environmental Conservation (NYSDEC) and the New York City Department of Environmental Protection (NYCDEP)], all health and safety activities, and removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the Environmental Impact Statement (EIS) process, including extensive database and historical research, and soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Davids Island Site Investigations, New Rochelle, NY

Ms. Lapin managed the hazardous materials investigation of Davids Island, the largest undeveloped island on the Long Island Sound in Westchester County. The 80-acre island features pre- and post-Civil War military buildings and parade grounds, and is viewed as a major heritage, tourism, and recreational amenity. The island, formerly known as Fort Slocum, was used by the U.S. military, beginning in the 19th century, as an Army base, hospital, and training center. The island was planned for county park purposes. The investigation included a Phase I Environmental Site Assessment, with historical research going back to the 17th century, a Phase II (Subsurface) Investigation, underground storage tank investigations, asbestos surveys, and conditions surveys of all remaining structures. Cost estimates were submitted to Westchester County for soil remediation, asbestos abatement, and building demolition.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I Environmental Site Assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, which enabled construction of mixed-use retail, residential development, and parking.

Storage Deluxe, Various Locations, NY

Ms. Lapin manages the firm's ongoing work with Storage Deluxe, which includes Phase I Environmental Site Assessments and Phase II Subsurface Investigations, underground storage tank removals and associated remediation, asbestos surveys and abatement oversight, and contaminated soil removal and remediation for sites in Connecticut, the Bronx, Brooklyn, Manhattan, Queens, Westchester County, and Long Island.

Columbia University Manhattanville Academic Mixed-Use Development, New York, NY

Ms. Lapin served as Hazardous Materials Task Leader on this Environmental Impact Statement (EIS) for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The work included Phase I Environmental Site Assessments for the properties within the site boundaries, and estimates for a Subsurface (Phase II) Investigation of the entire development area. The firm's Hazardous Materials group performed over 30 individual Phase I Environmental Site Assessments for properties within the development area. In addition, a Preliminary Environmental Site Assessment (PESA) was completed in conjunction with the Environmental Impact Statement (EIS). Based on the Phase I studies, AKRF conducted a subsurface (Phase II) investigation in accordance with a New York City Department of Environmental Protection (NYCDEP) approved investigative work plan and health and safety plan. Subsurface activities included the advancement of soil borings, groundwater monitor wells, and the collection of soil and groundwater samples for laboratory analysis. This study was used to estimate costs to remediate contaminated soil and groundwater, and underground storage tanks and hazardous building materials, including lead-based paint and asbestos-containing materials.

DPR Soundview Park Playgrounds and Open Space, Bronx, NY

AKRF is part of a team working on the reconstruction of this 212-acre NYCDPR public park located along the Bronx River in the Bronx, New York. The park was identified as an underutilized park and is being improved in accordance with the goals of PlaNYC. Ms. Lapin is overseeing AKRF's hazardous materials investigations including environmental and remediation-related work. AKRF prepared the Environmental Assessment Statement (EAS) and the project has moved into the design and construction phase. The remediation/construction of multiple phases of the development is currently underway.

Rego Park Home Depot, Queens, NY

Solvent contamination was encountered during retail development of a former industrial property in Rego Park, Queens, New York. The site work included an extensive investigation and a multi-phase remediation performed under the NYSDEC Voluntary Cleanup Program (BCP). Remediation included removal of aboveground and underground storage tanks (ASTs and USTs) and hotspot soil removal. An Air Sparging/Soil Vapor Extraction (AS/SVE) groundwater remediation system designed by AKRF was installed as part of the building construction. Continued remediation work included upgrading and expanding the AS/SVE system after the store was opened. AKRF prepared the Final Engineering Report and obtained closure with a Release and Covenant Not to Sue issued by NYSDEC in 2013. AKRF continues operations, maintenance, and monitoring under the NYSDEC-approved Site Management Plan. Ms. Lapin is the Professional Engineer (P.E.) of record for the remediation design and implementation in accordance with the NYSDEC Brownfield Cleanup Program (BCP).

STEPHEN T. MALINOWSKI, QEP

SENIOR TECHNICAL DIRECTOR

Stephen Malinowski is a Senior Technical Director in AKRF's Hazardous Materials Department. He has more than 20 years of professional experience in the assessment, investigation and remediation of hazardous waste issues as well as environmental laboratory testing. Mr. Malinowski has served as a project manager and team leader for many hazardous materials investigation initiatives, including working with developers, property owners and construction teams to navigate the regulatory processes associated with the New York State and New York City and 'E' designation programs administered by NYSDEC, NYCOER and NYCDEP. Mr. Malinowski has assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services. In addition, he has performed proactive environmental inspection and sampling services to reduce potential hazards and avoid violations from State and County regulators, thus limiting client liability.

Mr. Malinowski's experience includes groundwater investigations; formulation and administration of groundwater monitoring programs; Brownfield and hazardous waste site investigations; underground storage tank studies, including soil contamination delineation, classification, removal and disposal. He has designed and implemented indoor air and soil vapor intrusion surveys at numerous industrial, commercial and residential properties in accordance with NYSDOH protocols. He is proficient in coordinating and overseeing teams initiating redevelopment projects of contaminated properties under the oversight of New York State, New York City and both Nassau and Suffolk County regulatory programs and maintains a strong rapport with regulatory personnel. In addition, he has overseen and conducted hundreds of Phase I ESA's and Phase II investigations in a variety of environmental settings ranging from industrial sites to sites in challenging urban areas, many of them in conjunction with property transactions and site redevelopment activities.

Prior to joining AKRF, Mr. Malinowski was an Associate at CA RICH Consultants, Inc. in Plainview, New York. His was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area. His proficiency in the development of custom scopes of work and accurate cost estimates allowed him to turnkey all environmental aspects of cleanup and redevelopment projects. He guided fellow staff members through their implementation of projects to ensure client and regulatory agency satisfaction. His other duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies.

Education

B.A., Environmental Science, State University of New York at Plattsburgh1992

Certifications

Qualified Environmental Professional from the Institute of Professional Environmental Practice (IPEP)
NYSDEC Erosion and Sediment Control Inspector -SWT#47T-120313-07
Gold Certified Brownfield Professional by New York City Office of Environmental Remediation
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

Member, Long Island Association of Professional Geologists (LIAPG)
Member, Institute of Professional Environmental Practice (IPEP)
Member Hauppauge Industrial Association (HIA)

Awards

Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team

Years of Experience

Year started in company: 2013
Year started in industry: 1992

RELEVANT EXPERIENCE

Litigation Support Services, Greenpoint, Brooklyn, NY

AKRF was retained by a private land owner of a 17-acre site along the Newtown Creek waterfront located above the 55-acre, 20-million gallon underground petroleum plume (referred to as the “Greenpoint plume”). The property owner requested assistance understanding the impacts to their property from the plume, negotiating the investigation and cleanup with responsible parties and NYSDEC, and protecting their employees. Mr. Malinowski's initial role involved the review of work plans, investigation and remediation reports, overseeing remediation, and acting as a liaison between the client, the responsible parties, and the NYSDEC to ensure the cleanup strategies were coordinated to address concerns of additional petroleum migrating onto the property.

In addition to reviewing, overseeing and commenting on the investigation and cleanup activities, Mr. Malinowski has prepared Phase I Environmental Site Assessments and Spill Prevention Countermeasure Control Plans for the property, reviewed historic maps and documents on the refining history of Greenpoint, initiated indoor air monitoring programs, removed underground oil tanks, installed sub-slab depressurization systems, and responded to work inquiries by the two major oil companies on his client’s property. Mr. Malinowski continues to represent the client as testing and cleanup activities are ongoing.

13th and 14th Street Realty, NYS Brownfield Redevelopment, New York, NY

Mr. Malinowski directed all Phases of this NYS Brownfield project including the initial investigation, submittal of a BCP Application simultaneously with a Remedial Investigation Work Plan, Interim Remedial Measures Work Plan, which enabled the investigation and remediation to be implemented concurrently with planned site redevelopment activities. The site consisted of an approximately 20,000 square foot property in Manhattan comprised of 100 year old dilapidated buildings. The presence of perchloroethene (PCE) contamination associated with a former dry cleaner prevented the property owner from selling. Mr. Malinowski worked with the developer and applied to the New York State Brownfield Cleanup Program (BCP) as a "Volunteer" to eliminate off-site liability. Prior to the client securing its construction loan all plans were approved by NYSDEC and a detailed remedial estimate was approved for financing by the client’s lending institutions.

The investigation included soil and soil vapor testing as well as the installation and sampling of groundwater monitoring wells. The remediation activities included the removal of underground oil tanks, soil waste classification testing, and removal of approximately 15,000 tons of non-hazardous petroleum and lead contaminated soil as well as 200 tons of hazardous soil containing chlorinated solvents. In addition, site dewatering activities allowed the foundation excavation to be advanced into the groundwater table. A vapor barrier/water-proofing membrane was installed beneath the entire building to eliminate the exposure pathway for PCE into the new 8-story residential building. The investigation and remedial work was performed under a construction health and safety plan that included a community air monitoring program. The client received approximately $6,000,000 in tax credits from NYS for the Track 2 cleanup of this underutilized contaminated property.

Empire State Varnish Corporation - RCRA Closure, Greenpoint, Brooklyn, NY

Mr. Malinowski orchestrated the Closure of a varnish company with a host of RCRA problems situated over our Nation's largest underground oil spill ion by negotiating an investigation and cleanup with NYSDEC and the property purchaser ExxonMobil. The $750,000 remedial cost estimate was utilized to create an escrow account to finance the investigation and remediation. The remediation included the disposal of more than 1,000 drums of hazardous/flammable waste, 17 underground storage tanks, and a vast inventory of small containers of hazardous material, off-site disposal of approximately 700 tons of non-hazardous soil, abatement of asbestos containing material and construction health and safety monitoring. The work was performed under the oversight of NYSDEC's RCRA unit as well as Albany's Bureau of Environmental remediation overseeing the regional ExxonMobil Off-site Spill aka the Greenpoint Oil Spill.

His efforts on the Empire State Varnish projects resulted in a positive outcome for all the involved parties. The Empire State Varnish Corp. was able to cleanup and sell the property, which was destined to be listed on New York State's list of inactive hazardous waste sites. The purchaser, ExxonMobil, obtained a strategically located property to greatly increase their remediation efforts of the regional petroleum spill. The residents of Greenpoint benefited by having a potentially dangerous site cleaned quickly rather than remaining dormant for years as well as expediting the cleanup of the regional spill beneath their community. Finally, the State of New York benefited because the cleanup was funded by private parties rather than having to be paid for by tax payer dollars.

Environmental Consulting Services for NYCOER E-designated Sites, Various Locations, NY

Mr. Malinowski has provided environmental services required to satisfy hazardous materials-related E-designations on various locations in New York City, including Flushing Commons in Queens, NY for the Rockefeller Group Development Corp., 401 West 31st Street in Manhattan, NY for Brookfield Properties, 77 Commercial Street in Brooklyn, NY for Clipper Equities, and 260 West 26th Street in Manhattan, NY for Artimus Construction. These services included Phase I environmental site assessments, remedial investigations, preparation of Sampling Protocols, Remedial Action Plans and Health and Safety Plans based on identified hazardous materials issues, correspondence with the New York City Mayor's Office of Environmental Remediation (OER), remediation oversight as required by identified conditions, and preparation of Remedial Investigation and Remedial Closure Reports. He has also initiated pre-disposal soil classification programs and assisted with the disposal of large volumes of soil displaying characteristics from clean to hazardous containing to facilitate the installation of the new building foundations.

Environmental Consulting Services for NYCDEP Sites, Various Locations, NY

Mr. Malinowski has provided environmental services required to satisfy hazardous materials-related requirements on various locations in New York City, 235 West Broadway and 98 Franklin Street in Manhattan, NY for DDG Partners, 48-21 5thAvenue in Queens, NY for the Milestone Group, 1070 Washington Avenue in the Bronx, NY for Bronx Pro Real Estate Management, 1734 St. john Place in Brooklyn, NY for MDG Design and Construction, LLC, and 20 West 40th Street in Manhattan for HFZ Capital. These services included Phase I environmental site assessments, remedial investigations, preparation of Sampling Protocols, Remedial Action Plans and Health and Safety Plans based on identified hazardous materials issues, correspondence with the New York City Department of Environmental, remediation oversight as required by identified conditions, and preparation of Site Investigation and Closure Reports. He has also initiated pre-disposal soil classification programs and assisted with the disposal of large volumes of soil to facilitate the installation of the new building foundations. Many of the projects with NYCDEP also involved the New York City Housing and Preservation Department (NYCHPD).

875 Tenant Corp., Oil Spill Investigation and Remediation, New York, NY

Mr. Malinowski assisted one of the most prestigious real estate organizations in the northeast to investigate and remediate a petroleum spill in the basement of one of their high-rise residential properties along central park east in Manhattan. The source of the spill was a petroleum storage tank containing #6 fuel oil located in an exterior vault beneath the adjoining sidewalk. The contamination was located beneath the tank vault and adjacent to the foundation wall. The location of the oil and the viscous nature of the oil necessitated the need for innovative technology to remediate the spill with the least amount of disruption to this fully occupied and active residential building.

Mr. Malinowski performed a subsurface investigation to determine the extent of the impacts and assisted with the design and installation of a multi-phase extraction system in the building's sub-basement. The extraction system was fabricated on-site and consisted of eight extraction points to remove petroleum and groundwater pooled outside the foundation of the buildings' subbasement. The treatment system operated under a Stipulation Agreement with NYSDEC and required a NYCDEP sewer discharge permit. To mobilize the viscous oil steam was injected outside the foundation wall beneath the tank vault at nine locations. Formal spill closure was received by NYSDEC after a surfactant application was applied to the wells to eliminate the dissolved petroleum constituents and the subbasement walls were sealed with a chemical grout to prevent exposure to building occupants. Mr. Malinowski performed/supervised all field work, prepared all plans and reports and maintained communications with NYSDEC and the Tenant Board.

Air Testing Near Ground Zero Following 911, New York, NY

The dust cloud generated during the catastrophic collapse of the former World Trade Center and the buried fires that continued to smolder caused many local area businesses and residents to become increasingly concerned about air quality. Mr. Malinowski led a sampling team to evaluate the quality of indoor air and the adequacy of interior cleaning inside several privately-owned buildings in close proximity to Ground Zero. Mr. Malinowski worked with a Certified Industrial Hygienist to develop and determine an appropriate testing program to evaluate the indoor air quality at five mixed-use commercial properties that were in various stages of tenant reoccupation. The specifically-designed sampling protocols included testing for asbestos, volatile & semi-volatile classes of organics, dust, mercury, PCBs, lead, and carbon monoxide. The air sampling teams collected interior and exterior air samples, both at street level and on the building rooftops for background purposes.

The initial review and design of the recommended sampling protocols, as well as implementation of the air tests, laboratory analyses, quality control, and reporting to the Client were all expedited and completed within six weeks after 9/11. The results were compared to the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) indoor air quality levels, the OSHA permissible exposure limits (PELs) divided by a safety factor of 10 and EPA's Asbestos Hazard Emergency Response Act (AHERA). The results showed that the cleaning of the building interior and ventilation ducts eliminated any health concerns within the buildings and the client could allow occupants to safely reoccupy the buildings.

Tenant Environmental Inspection Program, Multiple Locations, NY

Mr. Malinowski directed a Tenant Inspection Program for a landlord who owned 1.2 million square feet of multi-tenanted industrial and commercial properties located in Queens, Nassau, and Suffolk counties for nearly a decade. The Tenant Inspection Program was a compliance program established to address concerns that certain tenant's operations may have been negatively impacting the property. The program included an annual inspection of each tenant space to determine their processes, chemical usage, waste disposal habits, current permits, and fire safety procedures. In addition, each sanitary system was sampled for chemical constituents identified during the inspections and approximately 300 exterior storm drains were inspected for evidence of illegal discharges or dumping. Based on the results of the inspection and sampling, letter reports were sent to the tenants informing them of any issues and educating them on best practices. Each tenant was assisted with regulatory compliance, permitting, and health and safety. The landlord received a report for each building detailing the findings of the inspection and sampling, and any follow-up actions. The landlord became educated on environmental issues and was able to incorporate the cost for this program and environmental compliance requirements into their leases as common area maintenance (CAM) charges. This resulted in a direct improvement in tenant housekeeping practices and enabled the landlord to obtain a comprehensive environmental insurance policy covering the entire property portfolio.

Drywell Remediation, ABCO Refrigeration Company, Hauppauge, NY

AKRF managed a drywell remediation for the ABCO Refrigeration Company. Contamination was identified in three on-site drywells prior to a property transaction. AKRF notified the Suffolk County Department of Health Services (SCDHS) and performed further investigation activities to test the sanitary system for contamination and utilized a remote camera to locate additional drywells buried beneath the asphalt pavement. The remediation was conducted using a high-powered vacuum truck under the oversight of SCDHS and included the disposal of 3,500 gallons of liquid and 40.43 tons of soil. Post-remedial sediment samples were collected from the base of the drainage structures to document the soil quality. Based on these results, the SCDHS issued a “no further action” letter and the property transaction proceeded on schedule.

Site Investigation, Albanese Organization, Wyandanch, NY

AKRF performed a Phase II subsurface investigation for the Albanese Organization to support the Wyandanch Rising project located on the Long Island Rail Road (LIRR) and Town of Babylon parking areas immediately located north of the Wyandanch train station. Prior to beginning the work, AKRF obtained a rail road protective liability insurance policy for the project and a Site Entry Permit from LIRR. The work consisted of the installation of soil and groundwater borings as well as the inspection and sampling of 13 stormwater drywells and five sanitary leaching structures under the oversight of the Suffolk County Department of Health Services (SCDHS). Based on these results, the SCDHS issued a “no further action” letter and the client was able to obtain financing for the project.

Gas Station Closure and Property Transfer, Hewlett, NY

On behalf of a private property owner, AKRF provided third party oversight for closure of a filling station by a major national gasoline retailer and assisted with environmental matters which complicated the sale of the property to a commercial developer. The remedial work conducted by the gasoline retailer included the removal of three active and five improperly abandoned underground storage tanks and pump islands and the three hydraulic lifts. AKRF maintained direct communication with the New York State Department of Environmental Conservation (NYSDEC) to ensure that the on-site soil was excavated to the furthest extent possible and that a post-remedial groundwater monitoring plan was promptly initiated so the property could be promptly redeveloped. Additional investigation activities conducted by the purchaser revealed the presence of chlorinated solvents in the groundwater above NYSDEC groundwater standards which further complicated the pending transaction. AKRF conducted research of the surrounding area and contacted the United States Environmental Protection Agency (EPA) regarding a well-documented nearby solvent plume. AKRF’s efforts expedited the closure of the fuel spill and our communications with NYSDEC and EPA provided a level of comfort to the Purchaser that allowed the property transaction to proceed. The former gas station is slated for redevelopment by a national commercial coffee retailer instead of being unsellable and vacant.

DEBORAH SHAPIRO, QEP

SENIOR TECHNICAL DIRECTOR

Deborah Shapiro is a Senior Technical Director with more than 15 years of experience in the assessment and remediation of hazardous waste issues. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

Prior to joining AKRF, Ms. Shapiro was a Senior Project Manager at CA RICH Consultants, Inc. in Plainview, New York. She was responsible for the design, implementation, and management of environmental assessment, investigation and remediation projects on Long Island and across the New York Metropolitan Area.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001
B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional
Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120
OSHA 10 Hour Occupational Construction Safety and Health

Professional Memberships

President, New York City Brownfield Partnership
Board Member, Residents for a More Beautiful Port Washington
Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013
Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012
Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013
Year started in industry: 1998

RELEVANT EXPERIENCE

New York University Langone Medical Center – Kimmel Pavilion, New York, NY

Ms. Shapiro is currently managing implementation of the Remedial Action Plan for the NYU Langone Medical Center (NYULMC) Kimmel Pavilion development project in Manhattan, New York. Based on the results of the assessment and subsurface investigations, a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP) were prepared for submission to the Mayor's Office of Environmental Remediation (OER). The RAP/CHASP includes requirements pertaining to environmental monitoring during intrusive construction activities, as well as supplementary groundwater sampling, endpoint sampling, and installation of a vapor barrier. AKRF will also prepare the closure documentation required by OER to obtain Certificates of Occupancy from the New York City Department of Buildings (DOB).

Mariners Marsh Park, Staten Island, NY

AKRF was contracted by the New York City Office of Environmental Remediation (OER) to implement the Remedial Action Plan (RAP) and Construction Health & Safety Plan (CHASP) for a 0.4 acre parcel of land within the Mariners Marsh Park in Staten Island, NY. The remedial action was performed as a service to DPR using an United States Environmental Protection Agency (USEPA) Brownfield Cleanup Grant. The remediation included clearing and grubbing of existing vegetation, installation of soil and erosion sediment controls, sampling, analysis, and importation of clean fill/topsoil, grading, hydroseeding, monitoring, and reporting.

Bradhurst Cornerstone II Residences, Manhattan, NY

AKRF prepared a Part 58 Environmental Assessment and a City Environmental Quality Review Environmental Assessment Statement for the Bradhurst Cornerstone II Apartments project. Issues of concern for the environmental review included the identification of project commitments for certain of the four sites related to historic resources, hazardous materials, air quality, and building attenuation. As part of the mitigation of hazardous materials, AKRF conducted a Phase II investigation, and prepared a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP). AKRF also prepared a Construction Protection Plan that was reviewed and approved by the New York City Landmarks Preservation Commission and the New York State Offce of Parks, Recreation and Historic Preservation. AKRF is currently implementing the RAP/CHASP including conducting the environmental monitoring, and overseeing the excavation, passive venting system and vapor barrier installations. Once complete, AKRF will prepare the closure documentation required by the New York City Department of Environmental Protection (NYCDEP).

Courtlandt Crescent, Bronx, NY

Ms. Shapiro directed all Phases of this NYS Brownfield Cleanup Program project in the Melrose Commons section of the Bronx from the initial Phase I and II through the Certificate of Completion and is currently managing the implementation of the Site Management Plan. A New York State Brownfield Cleanup Program (BCP) Application was submitted simultaneously with the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP), which sped up the timetable so that the remediation could be implemented concurrently with the planned site redevelopment activities. The remedial activities included the removal of underground storage tanks and hydraulic lifts, soil waste classification testing, the excavation and removal of approximately 23,000 tons of non-hazardous petroleum and metals contaminated soil as well as hazardous soil containing lead, in-situ chemical oxidation, and installation of a composite cover system including a vapor barrier and a sub-slab depressurization system (SSDS). Ms. Shapiro directed the remedial activities and monitoring under a construction health and safety plan, which included a community air monitoring program. Site management activities include post-remedial groundwater monitoring and sampling, SSDS start-up testing and operations and maintenance, and annual institutional control/engineering control inspections. The project was the recipient of the 2013 Big Apple Brownfield Award.