Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151

NYC OER E-104: Block 264, p/o Lot 1, Queens CD 2
Long Island City, NY

REMEDIAL ACTION WORK PLAN

Block 264, Lot 1R & 17; Block 263, Lot 1 & 9

Prepared for

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Submitted to
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February 2016

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Professional Engineer's Certification

REMEDIAL WORK PLAN
Queens Plaza Residential Development – Site B
Long Island City, NY

BCP No. C241151

February 2016

I, Arnold F. Fleming, certify that I am currently an NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial 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.

2/2/16
Date

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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.

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EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

The Site, known as Queens Plaza Residential Development (QPRD) Brownfield Cleanup Program (BCP) Site B (hereafter referred to as "Site B"), has the BCP ID No. C241151. Site B is in Long Island City, New York in the Borough of Queens. Historically, Site B belonged to the West Chemical Company, a manufacturer of industrial cleaners, disinfectants, janitorial/lavatory supplies, and insecticides. Creosote was used in the manufacture of the disinfectant and was the material used in the largest quantities. During a fire in the 1950s, a large volume of creosote spilled from an aboveground storage tank on adjacent Site A (BCP Site ID No. C241105) and is the principal source of Site B contamination. The applicant, LIC Development Owner, LP, is a Volunteer. Figure 1 shows the Site in relation to the surrounding area. Figure 2 is a site plan including the locations of all former buildings.

Summary of the Remedial Investigation

A comprehensive Remedial Investigation (RI) completed in 2014 found that the principal compounds of concern were related to the 1950s creosote spill which flowed from Site B onto the adjacent Site A. More than 130 soil samples and approximately 30 groundwater samples were collected as part of the Site B RI. The RI found that the heaviest soil impacts centered on the former chemical storage and processing areas on the western and central portion of Site B. Soils were significantly impacted and contained elevated concentration of the principal compounds of concern (benzene, toluene, ethylbenzene, xylenes, naphthalene, and methylated phenols). Stained soils were also identified, but no free-phase creosote was observed. The heaviest creosote impacts were confined to the fine-grained soils, i.e., silts and clays. Creosote impacts reached to bedrock in a few locations, but no impacts in the bedrock were observed. Chlorinated volatile organic compounds and petroleum impacted soils as well but to a much lesser extent. Elsewhere on Site B, the impacts were substantially less and in many instances were below detection limits for many compounds. Groundwater impacts mirrored the soil impacts and the predominant impacts to groundwater were for the same compounds and in the same areas as soil impacts. Soil vapor impacts appeared largely confined to the upper soils, but were without a discernable connection to the principal soil and groundwater impacts. The RI work included the following scope:

- Installation and sampling of 31 soil borings
- Installation and/or sampling of 30 monitoring wells
- Installation and sampling of 15 soil vapor points
- Examination of 19 geotechnical rock cores from a concurrent geotechnical investigation
- Synoptic groundwater measurements
- Hydraulic conductivity testing

Depth to bedrock is highly variable across the site and ranges from approximately six feet below ground surface (bgs) to 50 feet bgs. A bedrock ridge lies on the western and central portion of Site B. Atop the bedrock are strata of sand, silty sands, and silty clay. A compact glacial till layer lies directly on top of the bedrock in places. Urban fill covers Site B from grade to depths of approximately six to 12 feet bgs.

Groundwater lies approximately 6 to 11 feet bgs. The direction of groundwater flow is influenced by the shallow bedrock ridge; a groundwater divide that coincides with the ridge. North of the ridge, groundwater flows to the north and northwest. South of the ridge, groundwater flows to the south and southeast.

Qualitative Human Health Exposure Assessment

The principal Human Health Exposure conclusions are that most pathways are incomplete and, therefore, pose no adverse risk to end users or the public. The groundwater ingestion pathway is incomplete because New York City code prohibits the use of groundwater for potable purposes and a BCP Site-specific groundwater prohibition within the Environmental Easement will prohibit groundwater use. The dermal contact pathway will be incomplete because contaminated soil will be removed and either a hardened cover system or a minimum of two feet of environmentally clean fill will be in place above any remaining contaminated soil left in place. The inhalation pathway is incomplete because the contaminated soil which acts as the source of the soil vapor concentrations will be excavated and a vapor barrier will be installed if needed to further eliminate this exposure pathway.

Potential exposure pathways during remediation include dermal contact and inhalation. Worker exposure will be controlled by a Health & Safety Plan that includes both protective measures and monitoring, including monitoring of dust and vapor levels. Full-time health & safety personnel will be present at Site B during remediation to monitor conditions.

A potential exposure route for off-site Residents/Building Occupants includes inhalation of vapors and particulates during remediation. This pathway will be controlled by means of community air monitoring, covered trucks, truck washing prior to leaving the site, excavation inside an enclosure in the areas with the heaviest contamination, and dust and odor control during remediation.

Summary of the Remedy

The remedy is excavation of contaminated soils so as to remove soil above the cleanup criteria. The remedy will have the following components:

1. Excavation of soil above the Site cleanup goals such that the Restricted Residential Soil Cleanup Objectives and the applicable Protection of Groundwater Soil Cleanup Objectives (for compounds in groundwater above TOGS) are achieved in soil to 15 feet bgs. For soil deeper than 15 feet bgs, the applicable Protection of Groundwater Soil Cleanup Objectives will be met to the extent feasible. Where excavation down to bedrock is achieved, Track 2 clean-up is proposed. Where practicable limitations prevent excavation to 15 feet bgs, Track 4 clean-up is

proposed. Excavation will occur over the entire Site to depths ranging from approximately 6 feet bgs to bedrock at approximately 22 feet bgs.

2. A cover system on Track 4 areas will prevent exposure to any remaining contaminated soils post-remediation. The soil cover will be a minimum of two feet thick and will consist of clean soil that meets 6NYCRR Part 375-6 Restricted Residential SCOs and the applicable Protection of Groundwater SCOs for the 4 areas, or approved commercial products including untested recycled concrete aggregate from NYSDEC registered facilities from uncontaminated concrete or material otherwise approved by the Department. Directly below the soil cover will be a demarcation barrier indicating the top of residual contaminated soil. The top six inches of the soil cover will be of sufficient quality to support vegetation in landscaped areas. Slabs and paving systems (buildings, roadways, parking lots, etc.) will be at least 4 inches thick.

3. A soil vapor intrusion evaluation will be conducted as part of the Site Management Plan (SMP)

4. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining on Site B requires periodic certification of the remedy, restriction on the use of groundwater as a source of potable or process water, allow appropriate land use, and require compliance with a Site Management Plan (SMP).

5. Publication of a SMP 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. Groundwater will be remedied by means of source removal, extensive construction dewatering, and if needed, following post remedial monitoring, by preventing any contaminated groundwater from leaving the Site (e.g., perimeter capture wells where groundwater is shown to be leaving Site B and secant walls to bedrock or low permeability soils along Jackson Avenue and the MTA sub-station).

1.0 INTRODUCTION

LIC Development Owner, L.P., the Volunteer, entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in May 2014, to investigate and remediate a 1.89-acre property located at 28-10 Jackson Avenue in Long Island City, Queens County, New York. The BCA Applicant is a Volunteer in the Brownfield Cleanup Program. Mixed-use Residential and Commercial use is proposed for the property. When the development is completed, Site B will contain two multi-story high rise buildings, a smaller general use building, parking, and open areas. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP):

1. Summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between September and December 2014 in accordance with an approved Remedial Investigation Work Plan and presented in the Remedial Investigation Report (RIR);

2. Provides an evaluation of a Track 2 and Track 4 cleanup and other applicable Remedial Action alternatives along with their associated costs, and;

3. Recommends a 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 including 6 NYCRR Part 375. 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 determined that Site B poses a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

The Volunteer intends to pursue a Track 2 Restricted Residential Remedy—meaning excavation meeting the Track 2 soil cleanup objectives to 15 feet below existing ground surface, or to bedrock, with Brownfield Cleanup Track 4 Restricted Residential as the fallback remedy if Track 2 cannot be attained. Where excavation down to bedrock is achieved Track 2 clean-up is proposed. Impacted bedrock has been identified during the installation of bedrock cores in specific Track 2 areas.

Therefore, post-remediation groundwater monitoring will be used to evaluate the effectiveness of the remedy in these areas. Where practicable limitations prevent excavation, Track 4 will be achieved. The groundwater cleanup goals are the Technical and Operational Guidance Series (TOGS) ambient water quality standards for Class GA groundwater.

Two Interim Remedial Measure Work Plans (IRMWP) were approved by the Department in order to allow work to begin before the formal RAWP was prepared and approved. The first IRMWP was approved by the Department in a letter dated July 3, 2014 and specified procedures for cleaning and removing the 46 process/storage kettles and vaults that contained feedstock and finished product. This work was completed in January-March 2015. A Construction Completion Report (CCR) was submitted to the Department documenting this work and was approved on May 15, 2015.

A second IRMWP approved by NYSDEC on January 22, 2015, detailed the excavation and removal of impacted Site B soils. As of the date of this report, work under this soil removal IRMWP is still ongoing. The soil removal IRM included excavation and disposal of all soils down to approximate depths of 6 to 20 feet bgs or bedrock. The anticipated depths to excavate were pre-determined by the results of the RI. Endpoint samples will document that the cleanup objectives have been achieved. Additional soil removal will occur where source area material is found based on the following: “a portion of a site or area of concern at a site where the investigation has identified a discrete area of soil, sediment, surface water or groundwater containing contaminants in sufficient concentrations to migrate in that medium, or to release significant levels of contaminants to another environmental medium, which could result in a threat to public health or the environment…” (Part 375 Section 1.2 (au)). The soil IRMWP specified that inaccessible materials be addressed by means of institutional and engineering controls. Remediation

may include additional hot spot removal where required, in the margins along Jackson Avenue, Queens Boulevard, and the New York City Transit (NYCT) Substation, and capping where necessary.

Soils will be excavated to the extent practicable to meet the 6 NYCRR Part 375, Table 375-6.8(b) Soil Cleanup Objectives (SCOs). Where excavation is 15 feet or less bgs, the soil cleanup goals are the RRSCOs or, for specific compounds identified in the RI above TOGS GA AWQSGVs, the soil cleanup goals will be the lower of the PGWSCOs or RRSCOs. Where excavation is deeper than 15 feet bgs, the PGWSCOs for the compounds identified in the RI above TOGS GA AWQSGVs will be the applicable cleanup goals. Groundwater will comply with Part 375, Section 6.5.

Much of the Site will be excavated to 15 or more feet bgs to meet the appropriate SCOs, or to bedrock, with the exceptions being along the margins of Jackson Avenue, Queens Boulevard, and the NYCT substation. A two- to three-foot-wide strip along the Long Island Railroad boundary, Queens Boulevard, Jackson Avenue, and the NYCT substation containing Support of Excavation (SOE) structures may not be excavated to the property line or to 15 feet bgs in some instances because of excavation safety limits imposed by these structures and/or NYCT restrictions on excavation and dewatering near their structures. In these areas, Track 4 RRSCOs, and the applicable PGWSCOs remediated to the extent feasible, will be covered with an environmentally clean soil cap placed as an engineering control. Track 4 areas will be surveyed for inclusion in the FER.

The soil removal IRMWP covered the soil portion of the remedy. The soil IRMWP was initiated in February 2015 and is ongoing as of the date of this RAWP. The purpose of this RAWP is to present the complete Site B remedy by addressing the remedial components omitted from the soil IRMWP.

1.1 Site Location and Description

Site B is located in the County of Queens, New York City, New York, and is identified as Block 264, Lot 1R & 17; Block 263, Lot 1 & 9 on the New York City Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site B location. Site B is an approximately 1.89-acre area bounded by Jackson Avenue to the north, The Long Island Railroad Sunnyside Yard (LIRR Yard A) to the south, Queens

Boulevard to the east, and Orchard Street to the west (Figure 2). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 1.89-acre property is fully described in Metes and Bounds (Appendix A). A global positioning system coordinate for the starting point is included.

1.2 Contemplated Redevelopment Plan

The Remedial Action to be performed under the RAWP is intended to make Site B 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.

1.3 Description of Surrounding Property

Site B is in an area designated as M1-6/R10 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a particular zoning provision to promote development and transformation of historical industrial/manufacturing areas into mixed-use commercial and residential spaces.

The nearest schools are St. Patrick's School and Public School No. 4, which are over 1,800 feet north of Site B. Two churches are approximately 1,000 feet west of Site B and the New York Foundling Hospital lies more than 2,000 feet southwest of the property. The New York City Subway elevated Line No. 7 passes by Site B along the eastern Site boundary, along Queens Boulevard. A subway tunnel transects the southwest corner of the intersection of Jackson Avenue and Orchard Street under adjacent Site A, approximately 200 feet from Site B, connecting to an active subway tunnel under Jackson Avenue. A subway tunnel borders Site B on the northern boundary, along Jackson Avenue. There are no streams or water bodies on, or in the area near, Site B; there are no known sensitive receptors on, or in the vicinity of Site B.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

Site B was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated August, 2014. The investigation was conducted between September and December 2014. The RI Work Plan was submitted to NYSDEC on August 11, 2014 and approved by NYSDEC on September 23, 2014.

2.1 Summary Remedial Investigation Performed

The eight previous investigations found that the majority of soil contamination originated from creosote spills and to a lesser extent from petroleum-based spills and chlorinated compounds. Creosote spills impacted both shallow soils in the form of a smear zone and the deeper soils on the western portion of Site B in the form of a residual Non-Aqueous Phase Liquid (NAPL)-impacted zone. Creosote migrated through soil and over the bedrock surface to where it has entered the basement of the former building 4, as understood from the earlier investigations.

A comprehensive RI was conducted by Fleming-Lee Shue, Inc. (FLS) and Roux Associates, Inc. (Roux) in September through December 2014 and the results were presented in a Remedial Investigation Report (RIR) dated March 2015 (Appendix B) and approved by the department in its letter dated June 26, 2015. The following sections summarize the results of the 2014 RI.

2.1.1. Borings and Wells

A total of 31 soil borings were advanced for the purpose of characterizing soil conditions and assessing the nature and extent of contamination of Site B. A total of 20 new monitoring wells were installed and a total of 30 new and existing monitoring wells sampled.

2.1.2 Samples Collected

Soil samples were collected to identify the extent and location of contamination. Generally, four samples were collected from each boring: One above the water table, one at the water table, one below the water table at depth, and one near the soil/bedrock contact. Groundwater samples were collected to characterize impacts to the groundwater in the different areas of Site B and to gauge for free-phase product. Soil vapor samples were

collected in soils within the upper six feet of soil to identify potential soil vapor impacts. Samples were collected for physical properties of the free-phase product found in a small area of the Site.

2.1.3 Chemical Analytical Work Performed

The following table enumerates the number of samples and analyses by matrix completed during the RI.

Number of RI Samples Collected

Matrix	Volatile Organic Compounds	Semi-Volatile Organic Compounds	Metals	Pesticides	Poly-chlorinated Biphenyls	Total Petroleum Hydro-carbons	Method TO-15
Soil	137	136	136	122	122	26	--
Groundwater	31	30	30	30	30	--	--
Soil Vapor	--	--	--	--	--	--	15

2.1.4 Documentation

Appendix B contains the complete RIR. All figures, tables and descriptions may be found in this section. Below is a summary of RI findings.

The 2014 RI found the bulk of the source material resulting in soil impacts originates from the large creosote release in the 1950s on adjacent Site A. Soils have also been impacted by chlorinated volatile organic compounds (VOCs) and petroleum, but to a far lesser extent. Creosote and chlorinated VOC soil impacts largely coincide. Soils have been impacted to a far lesser extent as a result of creosote and chlorinated VOC releases during storage, handling, and packaging on the northern and eastern portion of Site B. Figure 4 in Appendix B shows the 2014 RI sample locations.

The bulk of the creosote impacts (i.e., source material) coincide with the areas where chemicals were processed into products and stored on the western portion of the property. The principal creosote impacts are near the former central processing and storage area, near Building 2B/2C, Building 3A/3B, Building 6, Building 10, and Building 1 (Figure 2). Creosote from the 1950s release flowed beneath Building 1, through the site soils and potentially along the top of the shallow bedrock, and moved southward toward the southern

boundary on the southwestern side of Site B. The source material reached the top of bedrock in this area, which extends from approximately 12 feet bgs to 18 feet bgs, to 22 feet bgs along the southwest corner of the property. Elsewhere on Site B, impacts to soil are mainly within the upper 12 feet, with isolated deeper impacts in places. The deeper impacts extend to 16 feet bgs and to 21 feet bgs.

In addition to soil sampling, a concurrent geotechnical investigation produced 19 rock cores that penetrated approximately 10 feet into bedrock. All rock cores were examined and found entirely free of Dense Non-aqueous Phase Liquid (DNAPL) or Light Non-aqueous Phase Liquid (LNAPL). Ten of the rock cores were close to or within areas with visual staining from creosote in the overlying soil.

Groundwater has been impacted by the source material releases. Creosote compounds, benzene, toluene, ethylbenzene, xylenes, naphthalene, and phenol-related compounds (methylated phenol compounds) have impacted groundwater on Site B, but the heaviest impacts coincide with the source material found near the former chemical processing and storage areas. Chlorinated VOCs have impacted groundwater; their impacts also coincide mainly with the former chemical processing and storage areas. Petroleum associated with heating oil also impacts groundwater. Removal of source material as part of a Site-wide remediation is expected to greatly improve groundwater quality.

2.1.5 Significant Threat

The NYSDEC and NYSDOH have determined that Site B does pose a significant threat to human health and the environment. Notice of that determination has been provided for public review. A copy of the notice is included in Appendix C.

2.2 Site History

Prior to development, the real property containing Site B occupied an elevated area between two streams, an unnamed stream to the west and Dutch Kill to the south and east of Site B (Beers 1868 &1873), both discharging into Newtown Creek. Both streams were flanked by a marsh south of Site B that now contains the LIRR Yard A. Early industrial occupants of Site B include Romain & Co. Canned Goods. (1898 Sanborn map) and J.D. Johnson Co. (1915 Sanborn map). The West Chemical Company (West Chemical) occupied Site B from the early 1900s until 1977. During this time West Chemical

manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Prior to 1950, West Chemical manufactured a disinfectant that required storage of large quantities of creosote. Creosote use was discontinued by 1951 because of leaks and a fire that prompted the FDNY to empty the entire contents (several thousand gallons) of a creosote-filled above ground storage tank (on adjacent Site A) directly to the ground surface in order to prevent a conflagration during the fire.

Reportedly, West Chemical stored a variety of other materials on-site during its tenure including iodine, muriatic acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand creams, cleaning products (floor waxes and cleaners), and vending machine products. The storage tanks were principally located within Site B. Underground storage tanks (USTs) for heating purposes were in Building 10.

West Chemical divested Site B and transferred ownership to Outlet City, Inc. in 1978. On November 18, 2014, the Volunteer acquired Site B from Outlet City, Inc. and became the new property owner. All former West Chemical Company structures were razed by December 12, 2014.

2.2.1 Past Uses and Ownership

West Chemical functioned as a manufacturer of cleaners, disinfectants, waxes, and insecticides on Site B from its construction around 1910 until circa 1977. In the 1970s, the property was sold to Outlet City, Inc., where it functioned as a warehouse and office. It operated in this manner for many years, until about 2010, when all commercial uses ceased. The Site remained vacant until LIC Development Owner, LP acquired the property in 2014 and entered into a BCA.

2.2.2 Phase I and Phase II Reports

Seven previous environmental investigations and sampling events beginning in 1988 consisted of varying levels of soil and groundwater investigation, non-aqueous phase liquid (NAPL) product level studies, and collection of soil vapor. The previous investigations included the following:

1. Queens Plaza Site B Investigation, AKRF, 1988

2. Outlet City Soil and Groundwater Sampling Results, AKRF, 1990

3. Outlet City Property, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998

4. Soil and Groundwater Sampling and Analysis, ELM, 2001

5. Site Sampling Event, AKRF, 2002

6. Additional Remedial Investigation Report (Draft), Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)

7. SCS Engineers Sampling Event, April 2013

In addition, Mueser Rutledge Consulting Engineers (Mueser Rutledge) completed a geotechnical investigation of Site A and portions of Site B in April 2007. The report contains geotechnical test borings and cross-sections depicting soil strata and bedrock. The report is entitled Geotechnical Summary Report, Queens Plaza Project – Site A, Long Island City, Queens, New York, April 20, 2007. A more recent geotechnical investigation was completed by Mueser Rutledge in December 2014; this includes geotechnical information over the balance of Site B.

2.2.3 Sanborn Maps

All Sanborn Maps available for Site B were reviewed prior to preparation of the RAWP. Appendix D contains the Site B Sanborn maps.

2.3 Geological Conditions

A total of 31 soil borings were advanced for the purpose of characterizing soil conditions and assessing the nature and extent of contamination of Site B. A total of 20 new monitoring wells were installed and a total of 30 new and existing monitoring wells sampled. Soil vapor samples were collected from 15 locations throughout Site B in order to assess soil vapor conditions.

2.3.1 Lithology

The generalized subsurface profile consists of historic urban fill material (fill) overlying a layer of fine grained silty-sand, underlain by layers of silt and fine to coarse grained sand; depth to bedrock ranges from approximately 6 to 50 feet bgs. The subsurface fill identified during the RI consisted predominantly of brown, fine to coarse sand containing various

amounts of gravel, cobbles, brick, and construction and demolition debris. The extent of the fill layer ranged from approximately 4 to 13 feet bgs.

The fill was underlain by dark brown to dark grey fine to medium silty-sand, ranging in thickness from 5 feet to 15 feet, underlain by layers of silt and silty-clay ranging in thickness from 1 foot to 15 feet. The silt and silty-clay layers were underlain by either a layer of fine to coarse sand with varying amounts of silt and gravel or bedrock. The fine to coarse sand layer ranged in thickness from 1 foot to 15 feet. Additionally, a till layer is present over most, but not all, of Site B beginning at approximately 12 to 20 feet bgs (approximately (-0.4) ft. to (-9.4) ft. North American Vertical Datum 88 [NAVD88]) and extending to the top of bedrock at approximately 9 to 25 feet bgs (elevations of approximately (-2.4) ft. to (-12.4) ft. NAVD88) in the southwest portion of Site B). Based on soil boring data from previous investigations, the bedrock beneath Site B is gneiss.

Based on geotechnical soil boring data collected concurrently with the RI, bedrock is approximately 6 to 50 feet bgs. Bedrock was either overlain by the silt and silty-clay layers or by a layer of fine to coarse sand with varying amounts of silt and gravel. Bedrock beneath Site B rises beneath Building 10 at an approximate elevation of 4.6 ft. NAVD88. Bedrock plunges from the peak to the following elevations: (-30.9) ft. NAVD88 to the north (on Site A), (-14) ft. NAVD88 to the south, (-5) ft. NAVD88 to the west, and (-25.5) ft. NAVD88 to the east. The plunge is steepest to the north and relatively gentler in the other cardinal directions as shown on Figure 7 in Appendix B. A geologic section is shown in Figure 6 in Appendix B.

2.3.2 Hydrogeology

Groundwater occurs within the unconsolidated geologic materials at Site B. The groundwater table fluctuates seasonally in response to precipitation. Depth to the groundwater table ranges from 2 to 14 feet bgs but is typically 6 to 11 feet bgs over most of Site B. The groundwater table elevation ranges from approximately 7.6 ft. to 10.6 ft. NAVD88 over most of Site B. Groundwater flow typifies that found in an area of a groundwater divide. Groundwater flow direction varies depending on location within the Site. On an imaginary line running from the southwest corner of Site B to the northeast corner, groundwater flow south of the line is generally to the southeast and south. North

of the line groundwater flow is to the north and northwest. The groundwater divide coincides with the bedrock high beneath Buildings 10 and 3A/3B. (See Figure 2 for former building locations.) A groundwater contour and flow direction map is shown in Figure 3 in Appendix B.

There are no surface water bodies on Site B or on the surrounding properties. The closest surface water body is the Dutch Kill arising from Newtown Creek, located approximately 1,600 feet south of Site B, and the East River approximately 4,200 feet to the west.

2.4 Contaminant Conditions

2.4.1 Conceptual Model of Site Contamination

The Site Conceptual Model (SCM) holds that bulk creosote was shipped to Site B by freight train through the railroad siding on the rear of Building 1. These materials were stored in an above ground tank on Site A and processed at the central processing and storage areas on the west side of Site B (Building 1, Building 2B/2C, Building 3A/3B, Building 4, Building 6, and Building 10). A steam line from the boiler room in Building 5 traveled through a trench in Building 10, along the edge of Building 2B/2C and into Building 2B/2C. Steam heated the creosote that was mixed with the chemicals and soap in vessels as part of the manufacturing process. The sludge found in a number of the vaults was tested and exhibited high levels of naphthalene, a key indicator of creosote.

During the RI, a permeable gravel layer was discovered beneath the vaults that occupy the space between the bottom of the vaults and the shallow bedrock surface beneath the building footprint. Shallow bedrock is present beneath an appreciable portion of Building 2B/2C, so the gravel layer was most likely used as a foundation bed for the vaults that are bearing on bedrock. This gravel layer likely acted as a conduit for the creosote once it had seeped into the subsurface. The high permeability of the gravel layer allowed the creosote to spread horizontally beneath Building 2B/2C and under the adjacent buildings, Building 6A and Building 1.

Observations during the RI suggest that the creosote migrated laterally and downward and encountered increasing resistance near the capillary fringe due to water in the soil pores. The capillary resistance retarded migration of the creosote NAPL and caused it to smear

over soil in the unsaturated zone. Vertical migration was slowed by a layer of silty sand below the groundwater table that covers most of Site B.

Nonetheless, a portion of the creosote migrated along the top of the shallow bedrock beneath Building 2B/2C and flowed southward on top of the shallow bedrock beneath a portion of Building 1 and reached the south side of Building 1 and Building 4 where it migrated downward to approximately 22 feet bgs.

Creosote can be characterized by relatively elevated levels of naphthalene compared with benzene, toluene, ethylbenzene, and xylene concentrations. Analytical results obtained from this RI show that the bulk of the creosote contamination (i.e. highest relative naphthalene concentrations) lie within the top 10 feet of soil below the ground surface, primarily in the unsaturated zone.

The level of soil staining was compared to the strata from which the sample was collected. The most heavily stained material was observed in the finer-grained soils, while the lighter staining was observed in the coarser-grained soils. This indicates that the creosote mass likely traveled through both the finer-grained and coarser-grained soils, but was adsorbed more by the finer-grained soils, which contain the bulk of the contaminant mass.

Staining was also observed in the soil beneath Building 9 on the east side of Site B. The soil staining and analytical results from the soil borings SB-16 and SB-17 in Building 9 suggest that this release is independent from the 1950s creosote spill. The analytical results from the soil vapor samples in Building 9 show high levels of chlorinated compounds in this area as well. This release is probably related to the former use of Building 9 as a product handling, packaging, shipping, and warehousing facility, under West Chemical Company. Figure 5 in Appendix B depicts the extent of NAPL distribution and soil staining throughout Site B.

The groundwater analytical results show that concentrations of VOCs and semi-volatile organic compounds (SVOCs) in groundwater exceed NYSDEC Technical and Operational Guidance Series 1.1.1 (TOGS) Class GA Ambient Water Quality Standard and Guidance Values (AWQSGVs) primarily in the former central processing and storage area. The elevated levels of VOCs and SVOCs in groundwater from the monitoring wells located in the former central processing and storage area (6A-2, RMW-7, SCS-MW-2C, SCS-MW-

10-1, SCS-MW-10-2, RMW-1, RMW-2, RMW-3, RMW-4, and RMW-5) indicate that the creosote has impacted groundwater primarily in areas where soil staining was observed and soil contamination confirmed.

Creosote contamination in the subsurface is believed to have reached the bedrock in areas where shallow bedrock was encountered (Building 2B/2C, Building 10, and portions of Building 1); however, creosote was confined to the overburden soils and did not migrate into bedrock. Bedrock-creosote conditions were assessed in parallel with the RI during a separate geotechnical investigation conducted by Mueser Rutledge. Bedrock geotechnical cores were recovered and examined for evidence of creosote/NAPL impacts. The bedrock exposed during the geotechnical investigation did not exhibit any odors or staining. None of the 19 bedrock cores examined showed any creosote impacts, 10 of which were immediately adjacent to or within areas of visual staining by creosote of the overlying soils. No odor, staining or photoionization detector (PID) observations indicative of creosote or NAPL were observed in the bedrock cores.

The lack of creosote impacts to the bedrock indicate that the creosote contamination traveled downward from the shallow coarser-grained soils and was trapped in the finer-grained strata beneath, limiting the vertical extent of the contamination. As a result of this investigation, it was concluded that creosote contamination has not likely impacted bedrock.

2.4.2 Description of Areas of Concern

The principal area of concern centers around the former central processing and storage areas on the west side of Site B (Building 1, Building 2B/2C, Building 3A/3B, Building 4, Building 6, and Building 10). This area received the bulk of the creosote release and contained 46 sub-slab process and storage vaults. To a much lesser extent, soil is impacted on the east side of the Site B where storage and warehousing took place.

There are four fuel oil USTs that were closed in place on the western side of the Site in 1989. Petroleum impacted soil and some LNAPL was observed along the south side of Building 2A/2B. During the RI, an additional UST was discovered while drilling a soil boring in Area B. A spill was called in at the time and the Department issued Spill No. 1406541.

Contaminated media include soil, groundwater, and soil vapor. Soil is heavily impacted on the western part of Site B, near the former storage and processing area. Soil impacts decrease substantially with increasing distance from the storage and processing area. Groundwater impacts mirror those of the soil impacts and are also greatest near the former storage and processing areas. Soil vapor impacts appear largely confined to the upper six feet or so of soil. Soil vapor impacts occur near the former storage and processing areas and in and around former Building 9 where warehousing took place.

2.4.3 Identification of Standards, Criteria and Guidance

Site B is to be remediated to Track 2 Restricted Residential levels with Track 4 as a fallback. Where excavation down to bedrock is achieved, Track 2 clean-up is proposed. In addition, the following cleanup criteria apply:

- Where excavation is 15 feet or less bgs, the soil cleanup goals are the RRSCOs or, for specific compounds identified in the RI above TOGS GA AWQSGVs, the soil cleanup goals will be the lower of the PGWSCOs or RRSCOs.
- Where excavation is deeper than 15 feet bgs, the PGWSCOs for the compounds identified in the RI above TOGS GA AWQSGVs will be the applicable criteria. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet bgs.

Groundwater data is compared to the Ambient Water Quality Standards (AWQS) for class GA groundwater as listed in NYSDEC Technical Operation and Guidance Series (TOGS) 1.1.1 "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations."

Soil vapor data is compared to the guidance values as listed in the NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, revised 2013."

Additional standards, criteria, and guidance applicable to the project are listed below:

- NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation
- 6 NYCRR Part 360 – Solid Waste Management Facilities
- 6 NYCRR Part 364 – Waste Transporter Permits

- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- NYSDOH Generic Community Air Monitoring Plan

2.4.4 Soil/Fill Contamination

The following presents a summary of key compounds and their concentrations in soil across the Site as identified in the RI.

2.4.4.1 Soil/Fill Contamination

The matrices of key compounds show the number of detected and non-detected values along with the spread of detected values. The key constituents are the compounds of concern, main risk drivers, and compounds with groundwater results above TOGS. Summary statistics are for detected values only. Non-detects shown as portion of total number of samples.

Tables 4 through 8 in Appendix B show exceedances of Track 2 RRSCOs and GWPSCOs for all soil/fill at the Site. Figure 8 in Appendix B is a spider map that shows the location and summarizes exceedances of Track 2 RRSCOs and GWPSCOs.

Matrix of Key VOCs, µg/kg

Compound	Restricted Residential SCO	Protection of Groundwater SCO	NDs	Min	p25	p50	p75	Max
Benzene	4,800	60	90/131	0.2	0.96	151	735	11,900
Toluene	100,000	700	74/131	0.22	1.8	95	2,820	70,100
Ethylbenzene	41,000	1,000	70/131	0. 6	21	328	4,500	33,500
Xylene Total	100,000	1,600	57/131	0.35	5.6	423	7,400	147,000
$MeCL_2$	100,000	50	126/131	1.7	2.2	2.3	2.7	389
PCE	19,000	1,300	110/131	0.25	0.73	37	432	1,630
TCE	21,000	470	113/131	0.24	0.62	49	1,060	3,070
1,1-DCA	26,000	270	129/131	1	1	2	3	3
1,2-DCA	3,100	20	119/131	0.38	1.2	3	207	748
1,1-DCE	100,000	330	131/131	--	--	--	--	--
1,2-Dichlorobenzene	100,000	1,100	99/131	0.29	0.78	30	624	17,100
1,4-Dichlorobenzene	13,000	1,800	110/131	0.39	9.4	121	2,350	29,200
cis-1,2-DCE	100,000	250	112/131	0.35	0.78	13.5	243	2,620
1,1,1-TCA	100,000	680	128/131	1.4	1.4	1.4	3.8	3.8
Vinyl chloride	900	20	129/131	1.8	1.8	2.7	3.5	3.5
Total VOCs	100,000	--	19/131	0.2	13.5	52	2,937	282,070

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p25 (25 percent of results); p50 (median) (50 percent of results), p75 (75 percent of results), max (maximum). Statistics based on detected results only.

Matrix of Key SVOCs, µg/kg

Compound	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	Max
Naphthalene	100,000	12,000	47/130	14.9	106	754	129,000	2,150,000
2-Methylnaphthalene	--	--	60/130	23	162	2,880	187,000	2,080,000
Benzo(a)pyrene	1,000	22,000	59/130	14.7	63	243	632	7,490
Benz(a)anthracene	1,000	1,000	53/130	14.6	73	368	1,250	9,000
Acenaphthene	100,000	98,000	56/130	15	119	871	37,200	267,000
Dibenzofuran	59,000	210,000	65/130	15.8	140	2,530	31,100	260,000
Fluorene	100,000	386,000	58/130	13.5	98	1,235	22,100	166,000
2,4-Dimethylphenol	--	--	101/130	75	637	4,400	13,000	103,000
2-Methylphenol	100,000	--	114/130	43	362	1,375	3,300	36,500
3,4-Methylphenol	100,000	--	104/130	62	131	1,055	4,280	109,000
Phenol	100,000	330	123/130	599	634	2,120	26,900	50,700
4-Nitrophenol	--	--	130/130	--	--	--	--	--
1,1-Biphenyl	--	--	68/130	14	111	1,880	32,900	259,000
Bis(2-Ethylhex)phthalate	--	--	49/130	35	91	160	769	14,500
SVOC Total	100,000	--	10/130	44	244	3,942	114,959	5,120,914

Matrix of Key Metals, mg/kg

Compound	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	p90	Max
Arsenic	16	16	54/130	1.9	2.9	3.6	6.1	13	104
Barium	400	820	12/130	24	43	68	93	130	2,070
Cadmium	4.3	7.5	100/130	0.56	0.62	0.75	1	3.5	17
Chromium	180	--	0/130	4.8	14.9	18.9	27	37	74
Copper	270	1,720	0/130	4.7	13.4	20.6	30	73	1,780
Lead	400	450	2/130	2.3	4.8	8	79	252	3,890
Manganese	2,000	2.000	0/130	20.2	169	241	370	480	824
Mercury	0.81	0.73	80/130	0.04	0.14	0.22	0.5	1.1	3.6
Nickel	310	130	2/130	5.7	11	15.3	22	29	64
Selenium	180	4	128/130	2.1	2.1	3.4	5	5	5

Matrix of Key Pesticides, µg/kg

Compounds	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	Max
alpha-BHC	480	20	115/116	22.1	22.1	22.1	22.1	22.1
beta-BHC	360	90	115/116	1	1	1	1	1
Chlordane(alpha)	4,200	2,900	101/116	0.8	4	17	32	135
Chlordane (gamma)	--	--	101/116	1.4	4.8	15	37	133
4,4'-DDD	13,000	17	96/116	0.42	3.6	10	40	1,360
4,4'-DDE	8,900	14	90/116	1	1.8	3.4	14.3	457
4,4'-DDT	7,900	136	96/116	1.2	4.6	10.3	34	1,410
Dieldrin	200	100	99/116	0.84	2.2	5.6	11	768
Endosulfan-I	24,000	102	116/116	--	--	--	--	--
Endosulfan-II	24,000	102	116/116	--	--	--	--	--
Heptachlor	2,100	380	112/116	0.92	4.1	7.8	9	9.8

The contaminants closely follow the locations where Site operations took place. The concentrations decrease significantly with increasing distance from operational areas. An exception to this is where creosote flowed southward along low permeability strata toward the south side of Building 1.

No free-phase creosote was observed during the RI. Most of the contaminant mass lies within the fine-textured strata, silty sands and silty clay on the western portion of the site near the former storage and processing areas.

2.4.5 On-Site Groundwater Contamination

The matrices of key compounds show the number of detected and non-detected values along with the spread of detected values. The key constituents are the compounds of concern, main risk drivers, and compounds with groundwater results above TOGS GA criteria and guidance values. Summary statistics are for detected values only. Non-detects are shown as portion of total number of samples.

Matrix of Key VOCs, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Benzene	1	14/30	0.22	4.1	176	287	698
Toluene	5	15/30	1.5	54.7	468	887	1,200
Ethylbenzene	5	8/30	0.5	6.8	84	159	333
Xylene Total	5	7/30	1.7	5.7	329	937	10,000
$MeCL_2$	5	26/30	9.4	28.8	285	1,561	2,600
PCE	5	23/30	0.46	0.61	1.6	3.8	7.5
TCE	5	21/30	0.26	1	1.7	90	128
1,1-DCA	5	24/30	2	2.3	9.3	34.7	5,220
1,2-DCA	0.6	21/30	7	24.1	66	360	4,280
1,1-DCE	5	29/30	52	52	52	52	52
1,2-Dichlorobenzene	3	21/30	0.22	0.59	0.97	26.6	84
1,4-Dichlorobenzene	3	22/30	0.26	0.33	4.7	28.7	79
cis-1,2-DCE	5	20/30	1.1	2.5	8.7	161	1,050
1,1,1-TCA	5	29/30	483	483	483	483	483
Vinyl chloride	2	27/30	2.4	2.4	3.6	25.6	25.6

Matrix of Key SVOCs, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Naphthalene	10*	8/29	42	11	621	3,820	11,400
2-Methylnaphthalene	--	8/29	0.64	2.2	187	1,080	3,850
Benzo(a)pyrene	ND	26/29	0.85	0.85	1.5	1.9	1.9
Benz(a)anthracene	0.002	23/29	0.51	0.89	3.4	7.1	10.2
Acenaphthene	20*	7/29	0.44	0.84	22	146	661
Dibenzofuran	--	13/29	0.61	8.1	85	193	545
Fluorene	50	11/29	0.34	1.9	30	90	316
2,4-Dimethylphenol	1	16/29	4.3	38	1,440	5,540	14,600
2-Methylphenol	1	19/29	13.1	248	449	2,340	3,000
3,4-Methylphenol	1	18/29	2	93	450	3,510	7,570
Phenol	1	21/29	17.4	49	144	437	3,630
4-Nitrophenol	1	29/29	--	--	--	--	--
1,1-Biphenyl	5	13/29	0.61	12.4	97	189	567
Bis(2-Ethylhex)phthalate	5	13/29	1.1	1.4	3.4	4.8	45

*Guidance value

Matrix of Key Metals, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Arsenic	25	2/28	3.7	8.8	19.3	51.9	290
Barium	1,000	27/28	4,640	4,640	4,640	4,640	4,640
Cadmium	5	27/28	35	35	35	35	35
Chromium	50	25/28	12.3	12.3	14.2	1,150	1,150
Lead	25	13/28	3.2	6.5	14.4	23.9	5,140
Mercury	0.7	26/28	0.28	0.28	28	57	57
Nickel	100	12/28	10.9	13.4	18	28	784
Selenium	10	27/28	70	70	70	70	70
Silver	50	28/28	--	--	--	--	--
Zinc	--	28/28	--	--	--	--	--

Matrix of Pesticides, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Alpha-BHC	0.01	27/28	0.08	0.08	0.08	0.08	0.08
Beta-BHC	0.04	28/28	--	--	--	--	--
Gamma-BHC	0.05	27/28	0.09	0.09	0.09	0.09	0.09
Chlordane(alpha)	--	25/28	0.08	0.08	0.26	0.33	0.33
Chlordane (gamma)	--	25/28	0.05	0.05	0.32	0.56	0.56
4,4'-DDD	0.3	24/28	0.04	0.04	0.12	2.3	4.5
4,4'-DDE	0.2	24/28	0.38	0.05	0.08	0.32	0.53
4,4'-DDT	0.2	26/28	0.03	0.03	0.05	0.07	0.07
Dieldrin	0.004	24/28	0.01	0.06	0.11	1.1	2
Endosulfan-I	--	28/28	--	--	--	--	--
Endosulfan-II	--	28/28	--	--	--	--	--
Heptachlor	--	28/28	--	--	--	--	--

Groundwater concentrations mirror those of soil contaminants. The heaviest groundwater impacts are near the principal storage and processing areas and where soil impacts were greatest. A significant number of groundwater samples had non-detect measurements for many compounds.

Exceedances of TOGS GA AWQSGVs in monitoring well samples prior to remedy implementation are shown in Tables 10 through 13 in Appendix B. Figure 10 in Appendix B presents a spider map showing the location(s) of, and summaries of, TOGS GA AWQSGV exceedances prior to remedy implementation.

2.4.6 Off-Site Groundwater Contamination

An off-site investigation will be completed at a later time. During the RI, only one off-site, downgradient monitoring well was sampled along Jackson Avenue. Nearly all compounds of concern that were analyzed were below detection limits. The few detected

concentrations measured trace (<1 microgram per liter [µg/L]) or very low concentrations (<8 µg/L).

2.4.7 On-Site Soil Vapor Contamination

A total of 16 soil vapor samples (including duplicates) were collected throughout Site B. The matrix presents a summary of soil vapor results.

Matrix of Key Soil Vapor VOCs, microgram per cubic meter (µg/m^3)
(includes duplicate sample)

Compound	NDs	Min	p25	p50	p75	Max
Benzene	2/16	1.3	2.5	4.8	39	3,480
Toluene	2/16	5.3	18	30	368	3,540
Ethylbenzene	2/16	1.1	3.2	11.8	78	1,040
Xylene Total	2/16	2.8	16	32	90	1,550
$MeCL_2$	3/16	2.3	8.7	12	20	250
PCE	1/16	1.7	7.5	35	174	821
TCE	1/16	0.9	1.3	12	38	828
1,1-DCA	4/16	1	2.2	34	377	3,680
1,2-DCA	10/16	1.1	2.3	21	36	186
1,1-DCE	11/16	8.3	86	130	136	146
cis-1,2-DCE	8/16	2.4	4.6	18	469	3,060
1,1,1-TCA	6/16	1.7	6	71	164	29,700
Vinyl chloride	9/16	0.4	0.5	2	92	179
Total VOCs	0/16	247	400	986	6,934	33,990
Total cVOCs	0/16	18	94	185	2,606	33,990

Soil vapor results for non-chlorinated VOCs have few non-detect values, and most of these samples have low to moderate concentrations with one or two elevated concentrations. The chlorinated VOCs have a greater number of non-detect results.

Soil vapor levels appear related to small-scale incidental releases. There is no discernable relation between soil vapor and source contaminant or groundwater contaminant levels.

A table of soil vapor data collected prior to the remedy is shown in Table 15 in Appendix B. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in Figure 12 in Appendix B.

2.5 Environmental and Public Health Assessments

The predominant source of contamination was the creosote discharge in and around the central processing and storage area in the 1950s. To a lesser extent, creosote discharges occurred on the eastern side of Site B in the warehouse where it is likely that creosote-based

products were handled for packaging, storage, and shipping. Impacts by chlorinated compounds to soil and groundwater arose most likely from ancillary cleaning, storage, and small-scale manufacture of janitorial products. Additional sources included petroleum releases from storage tanks.

Much of the soil impacts occur in the soils within the upper six to 10 feet of soil, although deeper impacts occur at the southwest portion of the Site. The heaviest impacts center near the former storage and process areas. Groundwater impacts mirror soil impacts. Soil and groundwater impacts drop appreciably with distance from the main source area. Soil vapor impacts appear limited to the upper six feet of soil, but do not appear to follow any particular pattern or trend.

Contaminant Release and Transport Mechanisms

The principal contaminants at Site B exist almost exclusively as immobile residual-phase product in soils. The leaching of contaminants from soil serves as an ongoing source of contamination to groundwater beneath portions of Site B. In addition, VOCs are migrating through volatilization of compounds from soil into soil vapor, but this appears to be limited to a few small locations.

Receptor Population

The potential onsite receptors include occupational workers, construction workers, visitors, or trespassers. Future potential on-site receptors are expected to also include workers, residents and guests based on the potential future use of the property. The potential off-site receptors include off-site workers, visitors, residents, and trespassers.

Potential Points and Routes of Exposure

Contaminated soil is generally encountered within the central and southern areas of Site B and at depths below the immediate surface as indicated by subsurface and surficial soil samples collected as part of the RI. However, there is the potential for direct exposure to contaminated soil by anyone digging in the contaminated areas.

Site B and the surrounding community are supplied by public sources of drinking water, which meets all State and Federal standards for drinking water quality. As such, there is no

potential for exposure to Site B contaminants from the public sources of drinking water. Although it has not been conclusively verified, it is highly unlikely that there are any private wells located near Site B as use of groundwater as a potable source is prohibited in NYC.

It is unlikely that the existing soil vapor concentrations would result in unacceptable VOC levels in newly constructed buildings. If buildings are constructed in the area of Site B in the future, following source removal as part of a remediation plan, the potential for migration is negligible. With engineering controls installed during construction and source removal, there is neither source nor a pathway for migration. Prior to construction, site workers could be exposed to contaminants via air inhalation route of exposure.

2.6 Interim Remedial Action

Two Interim Remedial Measure Work Plans (IRMWP) were approved by the Department in order to allow work to begin before the formal RAWP was submitted. The first IRMWP was approved by the Department in a letter dated July 3, 2014 and specified procedures for cleaning and removing the 46 process kettles and vaults that contained feedstock and finished product. This work was completed between January-March 2015. Appendix E contains the Kettle and Vault IRM.

The Kettle and Vault IRM (KVIRM) required testing of the kettle and vault contents and removal and disposal of the kettle and vault contents. The KVIRM required vapor and air monitoring and cleaning of the units. When completed, more than 170,000 gallons of liquids, and approximately five tons of sludge and debris were removed and disposed. Nearly all of the contents were non-hazardous production chemicals and/or unused finished product. Only one vault contained corrosive hazardous materials, because of high pH.

A second IRMWP approved by NYSDEC on January 22, 2015, detailed the excavation and removal of impacted Site B soils (Appendix F). The soil removal IRM included excavation and disposal of all soils down to approximate depths of 6 to 20 feet bgs or bedrock. The anticipated depths to excavate were pre-determined by the results of the Remedial Investigation. The following SCOs are defined in the approved soil removal IRMWP:

- Where excavation is 15 feet or less bgs, the soil cleanup goals are the RRSCOs or,

for specific compounds identified in the RI above TOGS GA AWQSGVs, the soil cleanup goals will be the lower of the PGWSCOs or RRSCOs.

- Where excavation is deeper than 15 feet bgs, the PGWSCOs for the compounds identified in the RI above TOGS GA AWQSGVs will be the applicable cleanup goals. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet bgs.

Where source material is encountered, the soil will be excavated to where bottom endpoint results meet the soil cleanup criteria to the extent feasible. Where removal of soil exceeding the above-referenced SCOs is infeasible, Track 4 SCOs will apply. The IRMWP detailed the means, methods and protocols to be implemented for the soil removal portion of the remedy including site preparation, extent of excavation, containment structures, dewatering, trucking and disposal, air/odor monitoring, underground storage tanks, restoration, notification and reporting. Endpoint samples will be collected to document that soil exceeding the cleanup objectives has been removed. If endpoint samples fail to meet the SCOs, additional excavation to the extent feasible will be performed until the SCOs are met. The contents of the IRMWP for soil removal are identical to this RAWP except where deviations are noted. The IRMWP was prepared in order to begin work before this RAWP could be prepared.

The soil removal IRMWP covered the soil portion of the overall remedy. Work under the soil IRMWP which began in February 2015 is ongoing as of the date of this RAWP and scheduled to be completed by October 2015. The purpose of the RAWP is to present the complete Site B remedy and clarify any deviations from the IRMWP.

2.7 Remedial Action Objectives

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

2.7.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.

- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

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

2.7.2 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.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.7.2 Soil Vapor

RAOs for Environmental Protection

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

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

There are two remedial alternatives for Site B that are practicable considering the intended use, setting, the economic factors driving re-development, and the New York City regulations promoting re-vitalization. The matrix compares the Unrestricted Use Scenario with the proposed Track 2 remedy.

Remedial Alternatives Comparison

Evaluation Criteria	**Alternative 1 Unrestricted Use Track 1**	**Alternative 2 Excavation, Hot Spot Removal, Cap & Controls Track 2**
Overall Protectiveness of Public Health & Environment	Removes all soil contamination, DNAPL and LNAPL from grade to top of rock up to 25 ft. or more below grade, in addition to NAPL trapped in bedrock. Requires penetration of dense, compact till and removal of decomposed bedrock. Longer remedial duration. Requires massive volume removal and lengthy excavation. Remedy is protective of public health and environment and achieves the RAOs identified for the Site.	Removes all soil contamination, DNAPL and LNAPL to depths determined by the RI plus smear zone and removes virtually all contamination. Groundwater is treated by dewatering. Future exposure eliminated with engineering and institutional controls including the site cap, vapor barrier (if necessary), capture well system (if necessary) and Environmental Easement. Remedy is protective of human health and environment and achieves the RAOs by removing source material and applying engineering and institutional controls.
Standards, Criteria, & Guidance	Conform to standards and criteria via full removal of contaminated soil and attainment of a Track 1 cleanup. Removes requirement for engineering and institutional controls.	Will conform to cleanup standards and criteria via removal to depths determined by RI. Groundwater is remediated via dewatering and control of migration is achieved by groundwater interception (if necessary). In all cases, remaining compounds will be isolated and have no exposure pathway.
Long-Term Effectiveness & Performance	Completely effective, permanent remedy for mobile contaminants.	Completely effective, permanent remedy for mobile contaminants.
Reduction in Toxicity, Mobility, or Volume	Completely effective, permanent remedy. Removes mobile source mass and all contaminant mass.	Completely effective, permanent remedy. Removes mobile source mass and nearly all contaminant mass.
Short-Term Impacts and Effectiveness	Effective in short term, but may require excavation under tent, trucks for removal, community monitoring, increased traffic, odor controls and soil stockpiling. Increased duration of intrusive activities and community disruption through traffic, potential odors, and congestion.	Effective in short term, but will require excavation under tent, trucks for removal, community monitoring, increased traffic, odor controls and soil stockpiling.
Implementability	More difficult to implement because of excavation depth to bedrock, feasibility of excavation and equipment/construction limitations. Public infrastructure and safety prohibits excavation of all contaminant mass at Site boundaries.	Easily and readily implemented. Existing structures have been razed making excavation on Site B possible.

Remedial Alternatives Comparison

Evaluation Criteria	Alternative 1 Unrestricted Use Track 1	Alternative 2 Excavation, Hot Spot Removal, Cap & Controls Track 2
Cost-Effectiveness	Significantly more costly due to increased soil and bedrock disposal costs, extensive support of excavation required for deeper digs, increased dewatering requirements and extended duration of active remediation.	More cost effective because most of Site B must be excavated Track 2 dig depths for construction purposes. Excavation serves a dual purpose. Less costs associated with support of excavation, dewatering and duration of remediation.
Community Acceptance	Community acceptance is addressed via the Citizen Participation Plan. Community is largely commercial and most residences are at some distance from Site B. Not expected to cause concern as long as effective short-term controls are in place and followed. Will increase duration and disruption to community because of traffic.	Community acceptance is addressed via the Citizen Participation Plan. Community is largely commercial and most residences are at some distance from Site B. Not expected to cause concern as long as effective short-term controls are in place and followed. Shorter time of intrusive activities required that would potentially disrupt the community since excavation is less extensive
Land Use	Remedy is consistent with contemplated mixed residential and commercial use.	Remedy is consistent with contemplated mixed residential and commercial use.

The following regulations apply to Site cleanup.

- 6 NYCRR Part 375-6 Soil Cleanup Objectives – Specifies the remedial soil cleanup goals
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1 –Specifies the groundwater cleanup goals
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation – May 2010 –specifies technical guidance and procedures to follow
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan-specifies community air monitoring requirements
- NYS Waste Transporter Permits – 6 NYCRR Part 364- Applies to waste haulers
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364-applies to non-hazardous waste removal and disposal

3.1.1 Alternative 1: Removal of All Contaminants to Achieve Unrestricted Use

Alternative 1 consists of excavating down to bedrock over the entire area containing NAPL, excavation until Track 1 Unrestricted Use SCOs (UUSCOs) are met throughout the Site and backfilling to development grade with environmentally clean soil. Alternative 1 entails deep excavation through the very dense, tight till and scraping the decomposed bedrock surface as well as removing NAPL from within the bedrock, resulting in a long

remediation period. Off-site contamination would be blocked by a combination of sheeting, underpinning or existing building foundation walls to prevent re-contamination of Site B. Groundwater would be remediated by the construction de-watering/treatment system. No engineering or institutional controls would be necessary under Alternative 1, although it would not be possible to attain potable water standards for groundwater due to the urban nature of the area and an inadequate water supply available from the natural water-bearing formation.

Alternative 1 is completely protective of public health and the environment and would achieve the RAOs identified for the Site since all contaminated soil would be removed and impacted groundwater would be remediated with the dewatering treatment system. Alternative 1 would conform to applicable standards, criteria and guidance and will achieve Track 1 SCOs. It is completely effective in the long-term since all contaminants would be removed, and while it would also be effective in the short-term, there would be greater impacts to the community. The additional excavation associated with Alternative 1 would require longer duration of intrusive activities and community disruption due to traffic, potential odors, and congestion. Alternative 1 would be significantly more costly and difficult to implement due to the longer duration of active remediation, increased soil disposal quantities, extended support of excavation required for deeper digs, and increased dewatering requirements. Public infrastructure could limit fully implementing Alternative 1 due to restrictions on deep excavation near these structures. Alternative 1 is consistent with area land use. Community may be adversely impacted due to the longer cleanup duration.

3.1.2 Alternative 2: Soil, NAPL, and Hot Spot Removal with Engineering and Institutional Controls

Alternative 2 is excavation and off-site removal of the source contaminant and contaminated soil beneath Site B to the depths determined by the RI or to the extent feasible (Figure 3A). Hot spot removal will occur in the areas identified on Figure 3A. Alternative 2 includes excavation to Site B boundaries or perimeter SOE structures.[1] Excavation of

[1] Excavation will cover the entire area of Site B, but may be limited to the setback distance requirements from adjacent off-site structures as required by the NYC Building Department, NYCT and/or structural safety requirements. Protective cap means building foundation/slab, permanent pavement, and/or minimum of 2 feet of approved fill material.

contaminated soil is the principal means by which remediation in Alternative 2 will take place, and the goal is Track 2 Restricted Residential cleanup with Track 4 Restricted Residential cleanup as a fall back if Track 2 cannot be attained. It is anticipated that approximately 46,000 cubic yards of soil will be removed over 1.89 acres.

Groundwater will be remediated via the dewatering treatment system, which will pump water from the Site at such a flow rate and duration that it will remove all impacted groundwater. The dewatering system will not be stopped until all source material has been removed, therefore, minimizing potential for recontamination. As another mitigation measure, an engineering control consisting of a perimeter capture well system will be installed in order to eliminate any future offsite groundwater migration, if necessary, based on post remedial groundwater monitoring. Based on the results of a post-excavation soil vapor intrusion evaluation, a vapor barrier between the building(s) foundation and the surrounding soil maybe installed to isolate the interior from vapor intrusion.

Excavation of grossly contaminated portions of Site B will be performed under a containment structure with negative air pressure and/or by direct air flow to prevent odors or vapors from leaving Site B. Figure 4 shows the approximate location of the enclosures.

The building, paved areas and cover soil will serve as an engineered protective cover from remaining soils at depth containing residual contamination. If needed, a vapor barrier will further prevent the potential for vapor intrusion into the building(s) from any potential residual contamination.

The above engineering controls in addition to institutional controls will be incorporated to prevent future exposure potential. Groundwater use restriction will be instituted in the Environmental Easement. Post remedial groundwater sampling will be conducted to evaluate if further monitoring, controls or treatment is required to bring groundwater into compliance with NYSDEC standards.

Alternative 2 is protective of public health and the environment and would achieve the RAOs identified for the Site by removing source material and applying engineering and institutional controls to eliminate any potential for exposure to remaining contamination. Alternative 2 will conform to applicable standards, criteria and guidance via excavation of soils exceeding the SCOs, remediating impacted groundwater by dewatering and control

of migration through the perimeter capture well system if necessary. Engineering controls would mitigate impacts to public health resulting from potential soil vapor intrusion into the future buildings at the Site if necessary. The remedy is completely effective in the long term and would have less short-term impacts than Alternative 1 since the duration of intrusive excavation would be significantly shorter. Alternative 2 is more easily implemented and significantly more cost effective since the costs associated with soil disposal, support of excavation/construction, dewatering, and the duration of remediation would be much lower than Alternative 1. Alternative 2 is consistent with area land use and would be viewed more favorably by the community owing to its shorter duration.

3.2 Selection of the Preferred Remedy

The preferred remedial alternative is Alternative 2. Alternative 2 is selected because it is a completely effective permanent BCP site remedy that fulfills all of the BCP RAOs and leaves Site B in a condition that poses no adverse conditions adversely affecting public health or the environment. Source area material will be removed to the extent feasible and groundwater will be remediated through extensive dewatering.

Alternative 2 yields the optimum combination of remediation, environmental protection, and construction/cost feasibility. Hot spot removal ensures that grossly contaminated soil and elevated concentrations of compounds above regulatory standards will be removed. Engineering and institutional controls will ensure that there will be no exposure pathways and no future offsite migration of contaminants. Engineering controls will include an engineered composite cover in Track 4 areas, NAPL recovery, vapor barrier (if necessary) and perimeter groundwater capture well system (if necessary) (Section 8). Alternative 2 meets all the evaluation criteria listed in Section 3.1.

The following land use factor evaluation examines whether an alternative is acceptable based on the following criteria as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415. This evaluation applies directly to the preferred alternative.

3.2.1 Zoning

Site B is in an area designated as M1-6/R10 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special

Purpose District is a particular zoning provision to promote development and transformation of historical industrial/manufacturing areas into mixed-use commercial and residential spaces. Site redevelopment is consistent with zoning requirements.

3.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

Refer To Section 3.2.1.

3.2.3 Surrounding Property Uses

The nearest schools are St. Patrick's School and Public School No. 4, which are over 1,800 feet north of Site B. Two churches are approximately 1,000 feet west of Site B and the New York Foundling Hospital lies more than 2,000 feet southwest of the property. The New York City Subway elevated line No. 7 passes by Site B along the eastern boundary, along Queens Boulevard. A subway tunnel transects the southwest corner of the intersection of Jackson Avenue and Orchard Street, approximately 200 feet from Site B, connecting to an active subway tunnel under Jackson Avenue. Figures 5A and 5B show an aerial view and the location of sensitive land uses in the neighborhood. A subway tunnel borders Site B on the northern boundary, along Jackson Boulevard. Site redevelopment is consistent with surrounding land use.

3.2.4 Citizen Participation

A Citizen Participation Plan is included in Appendix G.

3.2.5 Environmental Justice Concerns

There are no known environmental justice concerns.

3.2.6 Land Use Designations

See Section 3.2.1.

3.2.7 Population Growth Patterns

This area of Long Island City has experienced a large degree of growth in recent years in response to the increase in housing costs in Manhattan over the past decade. The re-zoning of this area by the City to allow residential development was in response to the underutilization of manufacturing districts and the need for housing in the City. The re-zoning has promoted redevelopment of this portion of Long Island City and resulted in

population growth. This trend is expected to continue in the foreseeable future. Site redevelopment is consistent with expected population growth patterns.

3.2.8 Accessibility to Existing Infrastructure

Site B is in New York City and the existing infrastructure is well developed.

3.2.9 Proximity to Cultural Resources

The Site is located in a former industrial zone. There are no historic districts in the neighborhood nor identified landmarks. The Environmental Impact Statement produced as part of the Re-zoning identified one on-site cultural resource, the Van Alst Family Burial Ground. A Phase II archeological study of this resource, performed under a protocol developed with the New York City Landmarks Commission, found no evidence of any remains of the former Cemetery remaining on Site.

3.2.10 Proximity to Natural Resources

Site B is in a densely developed urban setting. There are no areas with recognized natural resource values in proximity to the site.

3.2.11 Off-Site Groundwater Impacts

Site B has potentially contributed to off-site contamination of groundwater. This off-site contamination from Site B will be investigated under a separate Order on Consent and Administrative Settlement (Index No. 02-20150406-218). The former manufacturing use of the neighborhood has resulted in area-wide groundwater impacts. Groundwater in the City of New York is not used for water supply and is prohibited from use as a potable water supply.

3.2.12 Proximity to Floodplains

Site B is not within a designated floodplain. The adjacent rail yards South of Site B are within the 100 year flood plain.

3.2.13 Geography and Geology of the Site

Geographically, Site B lies on the extreme western end of Long Island in the New England Geographic Province. The regional geology of Queens County is comprised of sequences of Wisconsin age Upper Pleistocene glacial moraine (northern part) and glacial outwash

(southern part) deposits (sand, gravel, cobbles, silt and clay); glacial-drift materials (lacustrine deposits, till, sand, gravel, and in some areas, fossil plant material disseminated in fine grained deposits); Upper Pleistocene deposits comprised of pre-Sangamon age Jameco gravel unit unconformably overlain by Gardiner's clay of Sangamon age and Cretaceous age deposits of continental origin consisting of the Raritan Formation, the Magothy Formation – Matawan Group Undifferentiated. Pre-Cambrian metamorphic bedrock underlying Queens is comprised of the folded and faulted Ravenswood Granodiorite, and in some areas, the Proterozoic Fordham Gneiss.

Prior to historical development, Site B and the surrounding area was at the edge of a large wetland area associated with the Dutch Kills, a stream discharging into Newtown Creek. As the area was developed from farms to urban development, the streams and wetlands were filled and mixed use development occurred. The development of the LIRR Yard A around 1910 resulted in the concentration of manufacturing use adjacent to the rail access.

3.2.14 Current Institutional Controls

There are no institutional controls in place at this time.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

The remedy consists of excavating soils to meet the cleanup levels and excavation is the principal means by which the remedy will be achieved, in that it will remove the source contaminant. The remedy will address groundwater impacts by means of source removal, dewatering, and hydraulic control (if needed). A soil vapor intrusion evaluation will be conducted as part of the Site Management Plan (SMP).

The Remedial Action contains the following components:

1. Excavation of soil/fill exceeding RRSCOs and PGWSCOs listed in Table 1 for the proposed Track 2 and Track 4 Restricted Residential areas to the extent practicable under the soil excavation IRMWP approved January 22, 2015. The locations of the proposed Track 2 and Track 4 areas are shown in Figure 3B;
2. Groundwater control perimeter capture well system consistent with Part 375, Section 6.5, if necessary, and further detailed in Section 8.0 of this report. Post remedial

groundwater performance monitoring will be conducted to determine if the groundwater control perimeter capture well system is necessary The capture wells will be operated under the Site Management Plan;

3. Construction and maintenance of a cover system over the Track 4 areas of the site.;
4. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at Site B;
5. A soil vapor intrusion evaluation will be conducted under the SMP

6. Publication and implementation of a (SMP) 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) certification and reporting;
7. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive site work in residual soils;
8. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 2 and Track 4 RRSCOs.;
9. Appropriate off-site disposal of all material removed from Site B in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
10. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Appendix H, Soil Management Plan, (2) all Federal, State and local rules and regulations for handling and transport of material;
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;
12. A Remedial Design (RD) will be submitted to the Department that will include an evaluation of NAPL in bedrock detailing the results of a bedrock investigation and means to capture mobile NAPL (if possible) and/or prevent it from migrating off site. Additional details of the groundwater capture well system (to be installed if required) will be included in a future RD as part of the SMP
13. Remedial activities will be performed at Site B 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

The following governing documents apply to this remedial program.

4.1.1 Site Specific Health & Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA).

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 Health and Safety Plan (HASP), submitted with the approved IRMWP, and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion (COC).

The Site Safety Coordinator will be Edward Ryan. A resume will be provided to NYSDEC.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses. The HASP is included in Appendix I.

4.1.2 Quality Assurance Project Plan (QAPP)

See Appendix J.

4.1.3 Soil/Materials Management Plan (SMMP)

A Soil Management Plan is included as Appendix H.

4.1.4 Storm-Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls were implemented under the approved IRMWP and will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control (Appendix L).

4.1.5 Site Dewatering Plan

The site will be dewatered to allow dry excavation of soils during the remediation phase of the project. The dewatering plan is presented in Appendix K and consists of well points inside the support of excavation structures. The dewatering will continue to operate until the buildings on Site B are sufficiently complete to allow discontinuance without structural damage to the buildings.

4.1.6 Community Air Monitoring Plan (CAMP)

A Community Air Monitoring Program included in the approved IRMWP is included in Appendix M.

4.1.7 Contractors Site Operations Plan (SOP)

The Remedial Engineer (see Section 4.2.2) 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 Remedial Engineer 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 certification of mailing will be sent by the Volunteer 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 approved Citizen Participation Plan for this project is attached in Appendix G.

Document repositories have been established at the following locations and contain all applicable project documents:

Queens Borough Public Library – Court Square Branch
Attn: Allison McKenna-Miller
25-01 Jackson Avenue
Long Island City, NY 11101
(718) 937-2790
M & Th: 11-7; Tu: 1-6; W & F: 10-6;
Sat & Sun: Closed
http://www.queenslibrary.org/branch/Court-Square

4.2 General Remedial Construction Information

4.2.1 Project Organization

An organization chart is included in Figure 6.

Resumes of key personnel involved in the Remedial Action are included in Appendix N.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Arnold F. Fleming, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Queens Plaza Residential Development Site B (NYSDEC BCA Index No. C241151-05-14, Site No. C241151). The Remedial Engineer will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in this RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

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

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the FER.

4.2.3 Remedial Action Schedule

Site B Remediation Schedule

Item	Duration/Date
Site B IRMWP Approval	1/22/15
Remedial Excavation Begins	2/16/15
Complete Remedial Excavation	2/25/16
Submit Final Engineering Report for Review	3/15/16
Submit Site Management Plan for Review	3/15/16

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteer of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

There is 24-hour security on site seven days per week.

4.2.6 Traffic Control

Traffic control is by permit by New York City Department of Transportation

4.2.7 Contingency Plan

Since the remedy is excavation only, a remedy contingency plan is unnecessary. A Spill Contingency to address chemical, petroleum, or stormwater spills is included in Section 4.2.11.

4.2.8 Worker Training and Monitoring

All site workers will have 40-hour HAZWOPER site safety training and medical monitoring along with up-to-date 8-hour OSHA refresher training.

4.2.9 Agency Approvals

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

The planned end use for Site B is in conformance with the current zoning for the property as determined by New York City Department of Planning.

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 2. 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 FER.

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 RAWP or its approval by NYSDEC should be construed as an approval for this purpose. No work is anticipated in regulated wetlands or adjacent areas.

4.2.10 Pre-Construction Meeting with NYSDEC

Several meetings took place at the Site with NYSDEC prior to the start of major remediation activities under the IRMWP.

4.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in Table 3. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.11 Remedial Action Costs

The total estimated cost of the Remedial Action is $48M. An itemized and detailed summary of estimated costs for all remedial activity is attached as Appendix P. This will be revised based on actual costs and submitted as an Appendix to the FER to the extent cost data are available at that time.

4.3 Site Preparation

4.3.1 Mobilization

Site mobilization was conducted under the approved IRMWP and consisted of bringing equipment onto Site B, preparing health and safety exclusions zones, establishing a truck wash, and dewatering

4.3.2 Erosion and Sedimentation Controls

Erosion and sedimentation controls were implemented under the IRMWP. The Storm Water Pollution Prevention Plan is presented in Appendix L.

4.3.3 Stabilized Construction Entrance(s)

The truck wash collection pit lies below the metal egress apparatus used to remove soil from trucks, which lies adjacent to the street in the northeast portion of Site B. As such, trucks are inspected and cleaned just before they reach the street. A temporary truck was installed near the Orchard Street side of the Site during the start of remediation. This was then moved to a permanent location on West Street (BCP Site C) when this area became available.

4.3.4 Utility Mark-out 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 Site B has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on Site B.

4.3.5 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.

4.3.6 Equipment and Material Staging

Equipment and material was staged in available on-site areas as required under the approved IRMWP.

4.3.7 Decontamination Area

Decontamination areas were set up at each egress under the approved IRMWP. These will move and additional decontamination areas will be set up depending on the specific work areas.

4.3.8 Site Fencing

The entire Site is encircled by a construction fence with access control.

4.3.9 Demobilization

Demobilization included decontamination of equipment used on Site B, removal of temporary structures used during remediation, restoration of disturbed areas such that they are ready for building, removal of truck wash areas, sediment and erosion control measures, and general trash cleanup.

4.4 Reporting

All weekly and monthly Reports will be included in the FER.

4.4.1 Weekly Reports

Weekly 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 week;
- Locations of work and quantities of material imported and exported from Site B;
- References to alpha-numeric map for Site B activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable site conditions.

Weekly 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 be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Weekly 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 any 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 2.

The NYSDEC assigned project number will appear on all reports.

4.4.2 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 Site B 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.

4.4.3 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 Site B 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 weekly reports as needed, and a comprehensive collection of photos will be included in the FER.

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.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions will be addressed by notifying the Department of the complaint and investigating the cause/source of the issue. Corrective measures will then be formulated and put into place to address the complaint as soon as possible.

4.4.5 Deviations from the Remedial Action Work Plan

Deviations from the RAWP will only be made if warranted by reasonable action or by uncontrolled or unavoidable conditions. The reasons for the deviation and its impact on

the overall remedy will be documented and sent to the Department. If deviations are known in advance, they will be discussed and approved by the Department before being executed.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

The principal remedial action consists of contaminated soil removal (source removal) being implemented under the excavation IRMWP approved January 22, 2015. As of the date of this RAWP, work under the IRMWP is ongoing and scheduled to be completed by March 2016. This RAWP is intended to propose any changes or deviations from the approved IRMWP and provide remedies for the other impacted media (groundwater and soil vapor). Excavation encompasses the entire Site B footprint except along the site edges where SOE structures are present and where set-backs from NYCT structures are required. Excavation generally occurs to depth of approximately six feet bgs to 20 feet bgs. The Volunteer has chosen to proceed directly from excavation to construction by installing the building(s)' slab prior to collecting soil vapor performance data.

If needed, any soil vapor sampling or additional engineering controls will be provided in the Remedial Design Report and documented in the FER.

This section provides additional detail. Several of the following subsections (5.1, 5.2.1, 5.2.2, 5.2.3, 5.2.4 and 5.4) are consistent with and currently being implemented under the approved soil removal IRMWP except where deviations are noted. A summary of the deviations and proposed changes from the IRMWP is provided in Section 5.7.

5.1 Soil Cleanup Objectives

The Soil Cleanup Objectives, as defined in the approved excavation IRMWP, are Track 2 with Track 4 cleanup if Track 2 cannot be attained. In areas where soil excavation extends to bedrock, a Track 2 cleanup will be sought. The cleanup standards are the RRSCOs and the PGWSCOs. The soil cleanup goals are as follows:

- Where excavation is 15 feet or less bgs, the soil cleanup goals are the RRSCOs or, for specific compounds identified in the RI above TOGS GA AWQSGVs, the soil cleanup goals will be the lower of the PGWSCOs or RRSCOs.

- Where excavation is deeper than 15 feet bgs, the PGWSCOs for the compounds identified in the RI above TOGS GA AWQSGVs will be the applicable cleanup

goals. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet bgs.

- Where excavation extends to bedrock, the soil cleanup goals are the RRSCOs. The Volunteer will demonstrate that Track 2 has been achieved by photo-documenting that these areas were excavated to bedrock.

The Soil Cleanup Objectives for this Site are listed in Table 1. In accordance with 6 NYCRR Part 375.6.5, the PGWSCOs may not be applicable where:

(1) The groundwater standard contravention is the result of an on-site source which is addressed by the remedial program:
The approved soil IRMWP for Site B contemplated removal of all soils to reach Track 2 SCOs wherever reachable. This work plan addresses the source material that is causing the exceedance of groundwater standards.

(2) An environmental easement will be put in place which provides for a groundwater use restriction on the site as set forth in paragraph 375-1.8(h)(2);
An environmental easement is required for any BCP Site not achieving Track 1 SCO. The environmental easement will include a prohibition on use of groundwater on the Site meeting this requirement.

(3) The Department determines that contaminated groundwater at the site:

(a) is not migrating, or likely to migrate, off-site; or

(b) is migrating, or is likely to migrate, off-site, however, the remedy includes controls or treatment to address off-site migration;

(4) The Department determines the groundwater quality will improve over time.
The removal of all source materials to PGWSCOs over nearly all of Site B is believed to satisfy this requirement. By approval of this RAWP, the Department would be making this finding.

Soil and materials management on-site and off-site will be conducted in accordance with the Soil Management Plan (SoMP) as approved in the excavation IRMWP and described in Section 5.4 below.

Tables 4 through 8 in Appendix B list all soil samples that exceed the SCOs proposed for this Remedial Action. A spider map that shows all soil samples that exceed the SCOs proposed for this Remedial Action is shown in Figure 8 in Appendix B.

UST closures will, at a minimum, conform to criteria defined in DER-10 or as approved by the Department.

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

Endpoint sampling will be done in accordance with DER-10.

5.2.1 End-Point Sampling Frequency

Bottom post-excavation confirmation samples will be collected to document endpoint conditions at a sampling rate of one endpoint sample/900 square feet (ft^2) (approximate 30-ft. center spacing). If endpoint sample results show that the soil cleanup objectives were not met, then additional excavation will be performed, to the extent feasible, and the endpoint sampling will be repeated for the parameter(s) that failed, in order to meet the SCOs as listed in 6 NYCRR Part 375, Table 375-6.8(b). If excavation is 15 feet or less bgs, then the soil cleanup goals will be the RRSCOs or, for the specific compounds that were detected in groundwater samples from Site B that are above the TOGS GA AWQSGVs as identified in the RI, the soil cleanup goals will be the lower of the PGWSCOs or RRSCOs. Where excavation is deeper than 15 feet bgs, the PGWSCOs for the compounds identified in the RI above TOGS GA standards will be the applicable SCOs. Post-excavation samples will not be collected where the excavation extends to bedrock.

Due to the rapid pace of excavation and the need to differentiate between environmental and development dig depths, an incremental endpoint sampling plan will be implemented, as needed, which is different from the endpoint sampling protocols described in the IRMWP. Areas consisting of multiple adjacent endpoint sampling grids will be excavated to the environmental depth and endpoint samples collected from each grid and photo documented. The excavation will then proceed over the entire area 4 feet deeper and

leveled off. Endpoint samples and photographs will again be taken at each grid point. The excavation will continue at 4-foot increments over the area until development depth is reached with endpoint samples and photographs taken at each 4-foot increment and at development depth.

If additional excavation for development becomes necessary after post-excavation sampling confirms clean conditions, then, assuming the soil is free of visible staining other signs of contamination, or elevated PID readings, the excavation will not require further testing.

Sidewall post-excavation samples will be collected around the perimeter of the Site B excavation at a minimum rate of one sample/30 linear feet, and will be collected in the approximate center of the contaminated interval. Additional side wall samples will be taken where differences in remedial depth occurs on-site. Additional sidewall samples may be collected if warranted by site conditions. Sidewall sample locations will be photo-documented. Sidewall samples will be collected on the Site B perimeter if feasible, but may be collected on either side of the Site B perimeter if support of excavation precludes sampling at the perimeter. Off-site sidewall samples will be collected for documentation purposes only. Where the sidewall is inaccessible, the samples may be taken with a direct push sampling device at 30-ft. intervals just outside the Site B boundary.

For the remaining perimeter, post-excavation samples will not be collected where there is no soil between the sheeting or foundation walls and the site boundary, nor will sidewall samples be collected at the Site B perimeter where there is a common perimeter with the bordering Site A or Site C.

Post-excavation samples will be collected for Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) metals, pesticides and PCBs.

5.2.2 Methodology

Endpoint samples will be collected in accordance with DER-10 procedures and the approved IRMWP.

5.2.3 Reporting of Results

Endpoint results will be reported in tables with the applicable SCOs for comparison as per the approved IRMWP. Endpoint sample results will be reported to the Department on an ongoing basis so as to closeout specific excavation areas as they are excavated and meet the soil cleanup goals.

5.2.4 Quality Assurance/Quality Control

As per the approved IRMWP, post-excavation samples will be collected for TCL VOCs, TCL SVOCs, TAL metals, pesticides and PCBs. The Quality Assurance/Quality Control (QA/QC) Plan in Appendix J presents the method numbers, and sample collection information.

5.2.5 Data Usability Summary Report

Data Usability Summary Reports (DUSRs) will be completed for all endpoint samples.

5.2.6 Reporting of End-Point Data in FER

The FER will contain tables of the endpoint results in tabular form along with a comparison to the SCOs. The tables will highlight endpoint results above the SCOs. A spider map showing all SCO exceedances will also be presented in the FER.

All chemical labs used for all end-point sample analyses and contingency sampling 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 as described in Section 5.2.1.

5.3 Estimated Material Removal Quantities

The material to be removed was determined by the results of the RI. Soil removal will occur over all of Site B and will extend from approximately six feet bgs to 20 feet bgs. Figure 3A shows the anticipated environmental cut depths and their locations across Site B.

The estimated quantity of soil/fill to be removed from the Site is 69,000 cubic yards. The estimated quantity of soil to be imported into the Site for backfill and cover soil is unknown at this time.

5.4 Soil Management Plan

This section describes the elements of the SoMP.

5.4.1 Soil Screening Methods

The following section is being implemented under the approved IRMWP. Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the direction of the Remedial Engineer 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, Remedial Investigation, 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 FER.

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.

5.4.2 Stockpile Methods

The following section is being implemented under the approved IRMWP. Stockpiling of excavated soil is not planned for Site B. Removal will be load-and-go. However, there is a possibility that some soil will need to be stockpiled. In the event that it is, any soil stockpiled outside a containment structure will be placed upon plastic sheeting and covered with plastic sheeting at the end of each day. At the conclusion of each work day, exposed

contaminated soil within the containment structure will be covered with plastic and/or long-duration foam and then the air handling system will be turned off.

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

All stockpiles kept outside of the containment structure 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 if warranted by site conditions. Hay bales will be used as needed near catch basins, and other discharge points.

A dedicated water supply will be available on-site for dust control; hydrants and hoses of sufficient size and length will be used to control dust.

5.4.3 Materials Excavation and Load Out

The following section is being implemented under the approved IRMWP. The Remedial Engineer or a qualified environmental professional under his 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 Site B has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on Site B.

The following procedures will be implemented for all excavated soil to be transported from Site B.

- All soils will be categorized as urban fill soil or petroleum and/or creosote-contaminated soil.
    - Urban fill soils will be loaded in trucks equipped with gasketed rear gates and impermeable roll tarps to prevent discharge during transit. No mesh

tarps will be used in transporting urban fill soil. If the soils are dry, they will be wetted prior to covering to prevent dust generation during transport.

- Creosote or petroleum contaminated soil will be loaded on trucks equipped with gasketed rear gates and a tight fitting impermeable tarp to prevent discharge during transit. No mesh tarps will be used in transporting creosote or petroleum contaminated soil.
- Soils without odors meeting the criteria outlined in the approved letter (April 7, 2015) may be transported without tight-fitting covers according to the approved procedures (Appendix H). This is a deviation from the approved IRMWP.

- All soils will be screened prior to leaving Site B for odor and moisture and the following procedures will be implemented.
  - All odorous soils will be loaded in trucks equipped with gasketed rear gates a tight fitting impermeable tarp to prevent discharge during transit.
  - If urban fill soils are lacking moisture and could potentially discharge dust during transit, the soil will be sprayed with water and loaded in trucks equipped with gasketed rear gates and impermeable roll tarps. This is an addition from the transportation procedures described in the IRMWP.

Loaded vehicles leaving Site B will be 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. A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and treated before disposal to the city sanitary sewer. The Remedial Engineer will be responsible for ensuring that all outbound trucks are washed at the truck wash before leaving the Site until the remedial construction is complete.

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

The Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from Site B will be clean of dirt and other materials derived from Site B 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 Remedial Engineer 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 FER.

5.4.4 Materials Transport Off-Site

The following section is being implemented under the approved IRMWP. 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.

All trucks loaded with site materials will exit the vicinity of Site B using only approved NYC truck routes (Appendix H).

The site is located at the intersection of two NYC truck routes, Jackson Avenue and Queens Boulevard. NYC truck routes 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 Site B.

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

Queuing of trucks will be performed on-site and in authorized street closure areas in order to minimize off-site disturbance. Off-site queuing beyond authorized lane closure areas will be prohibited.

Material transported by trucks exiting Site B will be secured according to the procedures outlined above in Section 5.4.3. No mesh tarps will be used in transporting any soil from Site B.

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

5.4.5 Materials Disposal Off-Site

The following section is being implemented under the approved IRMWP with additional disposal details. The contaminated soil disposal locations are Clean Earth of Carteret, Carteret, NJ; Bayshore Disposal, Keasbey, NJ; Conestoga Landfill, Morgantown, PA; and P-Park Facility, Prospect Park, NJ. Any disposal location established at a later date will be reported to the NYSDEC Project Manager.

The total quantity of material expected to be disposed off-site is approximately 69,000 cubic yards, all of it non-hazardous material.

All soil/fill/solid waste excavated and removed from Site B 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 Site B 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 Project Manager. Unregulated off-site management of materials from Site B 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 Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from Site B conforms with all applicable laws: (1) a letter from the Remedial Engineer 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 Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported 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 Site B are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

The FER will include an accounting of the destination of all material removed from Site B 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.

A waste manifest system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-site, if any, 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 Site B 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.

5.4.6 Materials Reuse On-Site

The following section is being implemented under the approved IRMWP. Reuse of soils on-site is not planned. Nonetheless, soil reuse may become advantageous and be considered. If soil reuse is desired, then the soil in question will be segregated in situ or stockpiled and sampled according to the imported backfill requirements listed in the SoMP in Appendix H. Soils will be required to meet the SCOs for Site B before being acceptable for reuse or otherwise be acceptable to the Department.

The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-site.

Concrete crushing or processing on-site is prohibited.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of Site B is 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.

All liquids to be removed from Site B, 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 Site B. Dewatering fluids will be managed off-site.

Treated dewatering fluids may be used for dust control.

5.4.7 Demarcation

The following section is being implemented under the approved IRMWP. 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 except under buildings. 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 SMP. 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 SMP. A map showing the survey results will be included in the FER and the SMP.

5.4.8 Backfill from Off-Site Sources

The following section is being implemented under the approved IRMWP. Backfill from off-site sources must meet the criteria and conditions listed in the SoMP presented in Appendix H.

All materials proposed for import onto Site B will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at Site B.

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

The FER will include the following certification by the Remedial Engineer: "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."

Solid waste will not be imported onto Site B.

Trucks entering Site B with imported soils will be securely covered with tight fitting covers.

5.4.9 Storm Water Pollution Prevention

The following section is being implemented under the approved IRMWP. The contractor shall prepare and maintain a Storm Water Pollution Prevention Plan (SWPPP) for the site in accordance with the evolving work areas, topography and drainage patterns.

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 Site B 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 SWPPP 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 or adjacent properties.

Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area as appropriate. See Appendix L.

The dewatering system will capture stormwater generated from the site and treat the stormwater to meet NYCDEP Sewer Discharge limits. No stormwater run-off is anticipated from the Site

5.4.10 Contingency Plan

The contractor's Spill Contingency Plan (SCP), Appendix Q, sets forth the procedures for addressing site conditions that have a potential to result in a spill of chemicals, petroleum or contaminated groundwater/stormwater from leaving the property. The dewatering system, once operational, will collect and treat any fluids that are present or spilled on site. The SCP will be maintained by the contractor and modified if site conditions change in a manner that would make provisions of this plan inoperative.

If 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 soils, 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 Spill Technology and Remediation Series (STARS) parameters 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.

To address the Department's concerns about soil conditions in the southeast portion of the Site beneath the former Building 9, a soil boring and monitoring well will be installed to bedrock (Grid cell 130) during remediation to investigate this potential issue. If soil sampling and field observations determine that that no further remediation is required, then the boring will be sealed and the well decommissioned. If the cleanup goals cannot be achieved by the remedy and additional remediation is necessary, then it will be implemented under a Remedial Design (see Section 5.6).

5.4.11 Community Air Monitoring Plan

The CAMP approved for the Soil IRMWP will be followed (Appendix M). Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Weekly Report. CAMP data collected while excavating within a containment structure or when excavating the Additional Odor Control Measures area will be provided to NYSDOH Project Manager on a daily basis.

5.4.12 Odor, Dust and Nuisance Control Plan

The FER 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."

5.4.12.1 Odor Control Plan

This odor control plan is different than and supersedes the protocols described in the IRMWP. 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 odor control foam and spray and covering soils. 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 Remedial Engineer, who is responsible for certifying the Final Engineering Report.

Portions of the Site have been designated as requiring excavation within a containment structure. Where infeasible to cover areas of potentially odoriferous soils with a containment structure, additional odor control methods will be proposed and used if approved by the Department.

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. A more detailed description of the odor control measures is available in the "Proposed Excavation Outside of Tented Areas – Additional Odor Control Measures" letter prepared by Fleming Lee Shue and dated June 26, 2015.

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, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.4.12.2 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 hydrants and hoses for road wetting. The hoses shall be of sufficient length to reach all portions of the site. Water will be available on-site at suitable supply and pressure for use in dust control.
- On-site roads will be limited in total area to minimize the area required for water spraying.

5.4.12.3 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.

5.5 Soil Vapor

To achieve the remedy objective, soil vapor will be addressed by means of contaminant source removal and installation of a vapor/waterproofing barrier around the building foundations. The groundwater table elevation ranges from 7.6 to 10.6 ft. NAVD88 across most of the Site. The proposed development at the site consists of two residential towers

and an amenity building, all of which are being designed to sit at, within or just above the groundwater table. The elevation of the vapor/waterproofing barrier for the tower located along Jackson Avenue will be 6.6 ft. NAVD88 while groundwater in this area ranges from 7.7 to 8 ft. NAVD88. The elevation of the vapor/waterproofing barrier for the tower located along Queens Boulevard will be 8.6 ft. NAVD88 while the static groundwater table in this area ranges from 7.4 to 10.2 ft. NAVD88. It should be noted that these groundwater elevations are based on measurements collected during December 2014 and that groundwater levels at the Site are known to fluctuate widely based on seasonal changes and rainfall events.

The design of the amenity building to be located in the southwest corner of the Site along Orchard Street has not yet been finalized. The slab is anticipated to be at or immediately above the groundwater interface and specific elevations will be provided in the Remedial Design Report. If the final design results in a significant space between the static groundwater table and the vapor/waterproofing barrier, soil vapor sampling or additional engineering controls may be required. If needed, any soil vapor sampling or additional engineering controls will be provided in the Remedial Design Report and documented in the FER.

As shown in Figure 3B, there are three anticipated Track 4 areas at the Site. The Track 4 area located in the eastern portion of the Site along Queens Boulevard and Jackson Avenue will not be covered with any buildings so there is no vapor intrusion risk. The narrow Track 4 area located in the northern portion of the Site along Jackson Avenue and the MTA substation building will not have a cellar and will be capped with a concrete secant wall preventing accumulation of vapor and intrusion.

The Track 4 area along the southern site boundary is unoccupied as the building is set back approximately 3 ft. to allow for the installation of support of excavation. None of the Track 4 areas will be occupied and therefore do not present a risk for soil vapor intrusion.

The vapor/waterproofing barrier will encapsulate the slab and foundation walls and extend to ground surface. In this manner the building will be completely sealed from soil vapors. The vapor/waterproofing barrier will be Grace Preprufe®, or equivalent. Grace Preprufe® is a 1.2 mm and 0.8 mm High Density Polyethylene (HDPE) sheeting specifically designed

for this purpose. The vapor/waterproofing barrier will be installed according to the manufacturer's specifications.

5.6 Groundwater

To achieve the remedy, groundwater impacts will be addressed by means of source removal and contaminant removal. Excavation will remove the contaminant source material to the extent feasible. Groundwater will be removed by dewatering operations during the months'-long excavation process, treated, and discharged to the city sewer. In this manner, contaminated groundwater will be removed from the Site.

Monitoring wells will be installed on Site for post remedial ground water performance monitoring. Post remedial ground water sampling frequency will be determined after remediation is complete and conducted under the Site Management Plan. Figure 7 shows the locations of the proposed monitoring wells.

The RIR demonstrates that Site B groundwater is migrating off-site along the south property line from approximately the east side of the former West Street (now Site C) west to Orchard Street, and along Orchard Street up to the boundary with Site A, a component also flows north. (See Figure 3, Groundwater Contour Map in the RI, Appendix B.) Along Jackson Avenue, a secant wall extending to a compact till layer blocks migration along this portion of Site B. The Mueser Rutledge 2015 Geotechnical Investigation Report states that the till "consists of medium compact to very compact, grey and grey brown fine to coarse sand, some to trace silt, gravel, trace boulders, cobbles, clay and rock fragments." Standard penetration tests of this material indicate that it is dense and in some instances impenetrable (refusal). Keying the bottom of secant wall into this material is expected to result in a highly water-resistant barrier. However, a deep monitoring well is proposed directly north of the secant wall along Jackson Avenue to monitor potential off-Site impacts (Figure 7). A deep on-Site monitoring well to bedrock is also planned in the northeast corner of the site (Grid cell 105) as part of the Remedial Design to determine if contaminated groundwater is moving off Site.

Perimeter capture wells to maintain hydraulic control may be necessary along the areas where groundwater from Site B is shown to migrate off-site. This determination will be

made by the Department following an evaluation of the post remedial groundwater conditions. If necessary, the capture well system will be installed and operated under the Site Management Plan.

Monitored Natural Attenuation

The onsite monitoring well network will be monitored to gauge contaminant levels. Groundwater monitoring activities to assess natural attenuation will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Groundwater monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities are outlined in the Monitoring Plan of the SMP.

5.7 Deviations from Soil Removal IRMWP

This section documents any proposed deviations from the approved IRMWP. A change in the soil load out and transportation requirements from those defined in the IRMWP was requested in the FLS letter dated April 7, 2015 and approved by the Department on April 8, 2015. The new trucking procedures and cover requirements described in the letter are included in Section 5.4.3 of this RAWP.

The incremental endpoint sampling procedures described in Section 5.2.1 differ from those proposed in the IRMWP. The new endpoint sampling protocols were detailed in the FLS letter dated July 13, 2015 and approved by the Department on July 14, 2015.

The enclosure details and odor control measures described in Section 5.4.13.1 are different from those included in the approved IRMWP. The odor control plan changes were detailed in the FLS letter dated June 26, 2015 and approved by the Department on July 9, 2015.

Since work under the IRMWP is ongoing, any other deviations from the soil removal IRMWP will be documented in the Final Engineering Report along with deviations from this RAWP.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

The remediation plan does not contemplate leaving residual contamination in place on Site B, although a very limited amount of residual contamination will remain in place in a few locations. There will be a 2- to 3-ft.-wide strip along the perimeter of Site B where SOE will be built and along a wider area along the northeast perimeter where SOE is set back from the site boundary. SOE structures cannot extend beyond the property line in these areas and are essential for excavation. Excavation cannot occur in these areas without jeopardizing safety and the integrity of the SOE. Consequently, some contamination may remain in place. Another area where contamination may remain is around RI monitoring point SB-7 where methylene chloride and 1,2-dichloroethane were above the PGWSCOs at 43-44 feet bgs. Overall, PGWSCOs will be met to the extent feasible, but some contamination may be left in place outside of the areas identified here. Additionally, in the southwest corner of Site B there may be remaining NAPL in bedrock post remedy. With some soil contamination remaining in place, there is a potential for soil vapor to adversely affect buildings and groundwater could remain impacted.

Since residually contaminated soil will exist beneath Site B 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 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 (Site B) will have three primary EC systems. These are (1) two feet of approved cover over the bottom of the excavation in Track 4 areas; (2) a NAPL recovery system; (3) a vapor barrier encapsulating the building foundations, if necessary; and (4) a perimeter groundwater capture well system that provides hydraulic control, if necessary.

The FER will report residual contamination on Site B in tabular and map form. This will include presentation of exceedances of both Track 2 and Track 4 areas of Site B. A survey of Track 2 and Track 4 areas of Site B will be provided in the FER. The elevation of all

end point samples in Track 2 and Track 4 areas will be presented on a map in the SMP showing where residually contaminated soils are located.

7.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEMS

Exposure to residual contaminated soils will be prevented by engineered, composite cover system that will be built on the Track 4 areas of Site B. The composite cover system will be comprised of 2 feet of approved environmentally clean soil over Track 4 areas of Site B.

Excavation of impacted areas is the remedial approach. Almost all of Site B will be covered with a protective cap in the form of hardened concrete slabs or asphalt-covered roads upon completion of the development. The small areas along the Site B perimeter outside of the SOE not covered by hardened surfaces cannot be excavated because of restrictions by the NYCT to protect subway related infrastructure. Additionally, the SOE is located along the property line and may contain some residual soils outside the foundation walls. In these areas, 2 feet of surface soils will be removed, a demarcation layer of construction fencing will be placed and covered by 2 feet of clean soil meeting Restricted Residential Soil Cleanup Objectives or a commercial product such as untested recycled concrete aggregate from uncontaminated concrete from a NYS registered facility approved by the Department. Paving or paving blocks may be placed within this 2 foot capping material as a finish under the SMP. The survey of the Track 2 and Track 4 will be included in the FER.

A SoMP 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.

Maintenance of this composite cover system will be described in the SMP and in the FER.

8.0 ENGINEERING **CONTROLS: TREATMENT SYSTEMS**

8.1 Bedrock NAPL Recovery

NAPL in bedrock was observed during the bedrock evaluation in August 2015 and in December 2015 during drilling for the installation of rock anchors in the western portion of the Site. In response, FLS proposed seven bedrock cores on the western side of BCP Site B on December 24, 2015. The Department approved the plan on December 28, 2015. The purpose of the rock cores was to investigate NAPL impacts in bedrock, assess potential free-phase NAPL, evaluate potential migration pathways, explore the potential fracture in the bedrock where NAPL was observed in bedrock to date, identify potential NAPL impacts to Orchard Street, identify potential zones of NAPL accumulation, and identify locations/intervals for NAPL recovery along Orchard Street and on BCP Site B. The Department approved the rock core locations with the understanding that the results would be analyzed and used to support recommendations for additional rock cores, if warranted.

A bedrock geophysical study was conducted following the rock cores to better understand the nature of the fractures and will aid in determining potential depths and locations for NAPL recovery wells. Geophysical logging of the boreholes included continuous caliper fluid temperature, fluid resistivity, and acoustical televiewer measurements. Optical televiewer (digital video image of the borehole oriented with respect to magnetic north) logs and heat pulse flowmeter logging was not feasible due to the opacity of the water, clogging nature of NAPL, and injected water from drilling rock cores and drilling piles while logging was ongoing.

The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy and will be documented in a Remedial Design Report. Free phase NAPL will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of NAPL over extended time periods, they can be converted to automated collection.

8.2 Contingent Remedial Element – Groundwater Capture Well System

Site B has as a goal of meeting Track 2 RRSCOs except for areas outside the SOE where limitations by the NYCT on excavation depths close to the infrastructure of the subway system including the NYCT sub-station along Jackson Avenue, the subway tunnel along Jackson Avenue, and the elevated subway line along Queens Boulevard where Track 4 SCOs will be met. Because protection of groundwater SCOs must also be met regardless of depth, Track 4 areas cannot meet these SCOs. It is possible that portions of the Track 2 area will also not be able to meet the PGWSCOs.

The RIR demonstrates that Site B groundwater is migrating off-site along the south property line from approximately the east side of the former West Street (now Site C) west to Orchard Street, and along Orchard Street up to the boundary with Site A. (See Figure 3, Groundwater Contour Map in the RI, Appendix B.) Along Jackson Avenue, a secant wall extending to a compact till layer blocks migration along this portion of the Site B. As stated in Section 5.6, The Mueser Rutledge 2015 Geotechnical Investigation Report states that the till "consists of medium compact to very compact, grey and grey brown fine to coarse sand, some to trace silt, gravel, trace boulders, cobbles, clay and rock fragments." Standard penetration tests of this material indicate that it is dense and in some instances impenetrable (refusal). Keying the bottom of secant wall into this material is expected to result in a highly water-resistant barrier. Additionally, a deep monitoring well is proposed directly north of the secant wall along Jackson Avenue.

The design of the capture well system, if needed, including the well design, well collection system and piping details, will be presented in a separate Remedial Design Report following post remedial performance monitoring to determine if the capture well system is necessary. The Remedial Design Report will provide all specific information, including the details necessary to install and operate the capture well system. It will include a figure showing the location of the capture wells, well screen lengths, present specifications for the size and number of capture wells, specify the pumping rates and drawdown level, and the type of groundwater pump. The Remedial Design will provide the results of a pumping test that was conducted to provide the capture well system design details.

The groundwater capture well system will be installed and operated under the SMP if post remedial performance monitoring deems it necessary. If required, further details of the capture well system will be determined during the remedial design and any O&M requirements will be incorporated into the SMP.

9.0 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS

9.1 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, as set forth in the Site Management Plan.

10.0 INSTITUTIONAL CONTROLS

After the remedy is complete, Site B 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 Queens 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 placed on Site B 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 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.

10.1 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 Queens County Office of the City Register. The Environmental Easement will be submitted as part of the FER.

The Environmental Easement renders Site B a Controlled Property. The Environmental Easement must be recorded with the Queens County Office of the City Register before the COC can be issued by NYSDEC. A series of ICs 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 Site B to restricted residential and commercial use(s) only. These ICs are requirements or restrictions placed on Site B that are listed in, and required by, the Environmental Easement. ICs can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls include the following:

- 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;
- A composite cover system consisting of 2 feet of clean soil cap, asphalt covered roads, concrete covered sidewalks, and concrete building slabs with a vapor barrier must be inspected, certified and maintained as required in 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;
- Groundwater and other environmental or public health monitoring must be performed as 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, groundwater monitor wells and capture wells, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for Site B is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Controlled Property (Site B) 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:

- 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 SMP;
- The Controlled Property may be used for restricted residential and commercial use only, provided the long-term Engineering and Institutional Controls included in the SMP 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;
- 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.

10.2 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 COC for the Remedial Action. The SMP 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 Site B 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 Periodic Review Reports, performance of inspections and certification of results, and demonstration of proper communication of Site B 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 Periodic Review 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 SMP 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.

The SMP in the FER will include a monitoring plan for groundwater at the down-gradient site perimeter to evaluate site-wide performance of the remedy. Appropriately placed groundwater and bedrock monitoring wells will also be installed immediately down-gradient of remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

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

11.0 FINAL ENGINEERING REPORT

A Final Engineering Report 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 Site B including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, calculation and manufacturer documentation for treatment systems, certifications, manifests, and bills of lading as well as the complete SMP. 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 SMP and Environmental Easement. This determination will be made by NYSDEC in the context of the FER review.

The FER 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 Site B after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 2 Restricted Residential SCOs in 6NYCRR Part 375-6. A table that shows exceedances from Track 2 RRSCOs for all soil/fill remaining at Site B after the Remedial Action and a map that shows the location and summarizes exceedances from Track 2 RRSCOs for all soil/fill remaining at Site B after the Remedial Action will be included in the FER. Any areas of Site B achieving Track 1 will also be presented.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for Site B 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 the Site B SCOs and a map that shows residual contamination in excess of the Site B 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 Site B.

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

11.1 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, Arnold F. Fleming, 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, Arnold F. Fleming, 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 Queens Plaza Residential Development Site B, Site (NYSDEC BCA Index No. C241151-05-14, Site No. C241151).

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 Site B and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations in a letter dated [month day year] and 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 Site B 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 Site B, 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 contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan with reported deviations, 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 soils 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.

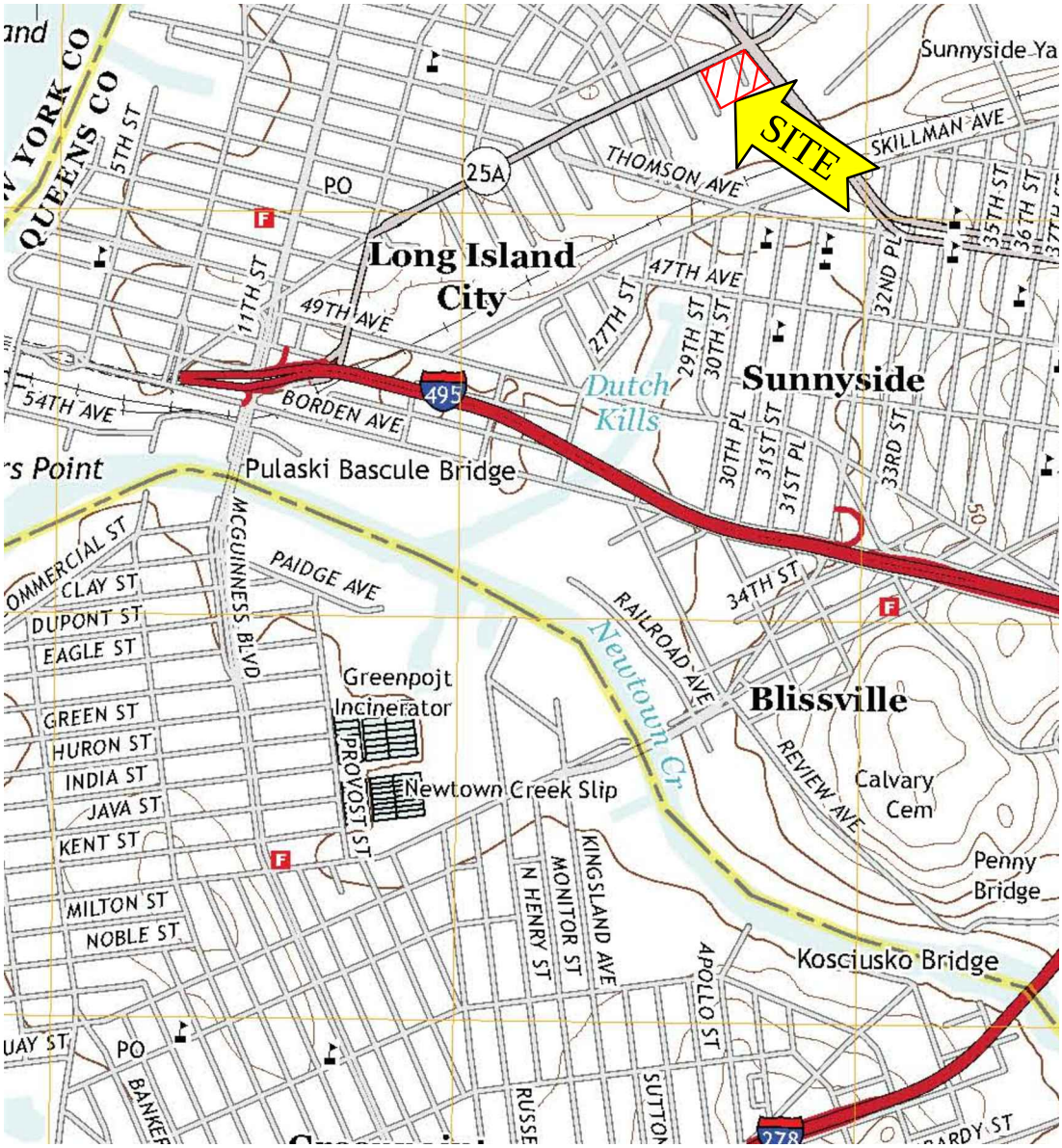
12.0 Schedule

A schedule of Remedial Actions is mandatory. It must subdivide work elements and provide estimated dates for performance of work and deliverables.

Brownfield Site B Remediation Schedule

Item	Duration/Date
Site B IRMWP Approval	1/22/15
Remedial Excavation Begins	2/16/15
Complete Excavation	2/25/16
Submit Draft Environmental Easement	2/12/16
Submit Final Engineering Report for Review	3/15/16
Submit Site Management Plan for Review	3/15/16

FIGURES



UTM GRID AND 2013 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
WL WK
Grid Zone Designation 18T

1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

QUADRANGLE LOCATION

Weehawken	Central Park	Flushing
Jersey City	Brooklyn	Jamaica
The Narrows	Coney Island	Far Rockaway

FIGURE 1: BROWNFIELD SITE LOCATION MAP

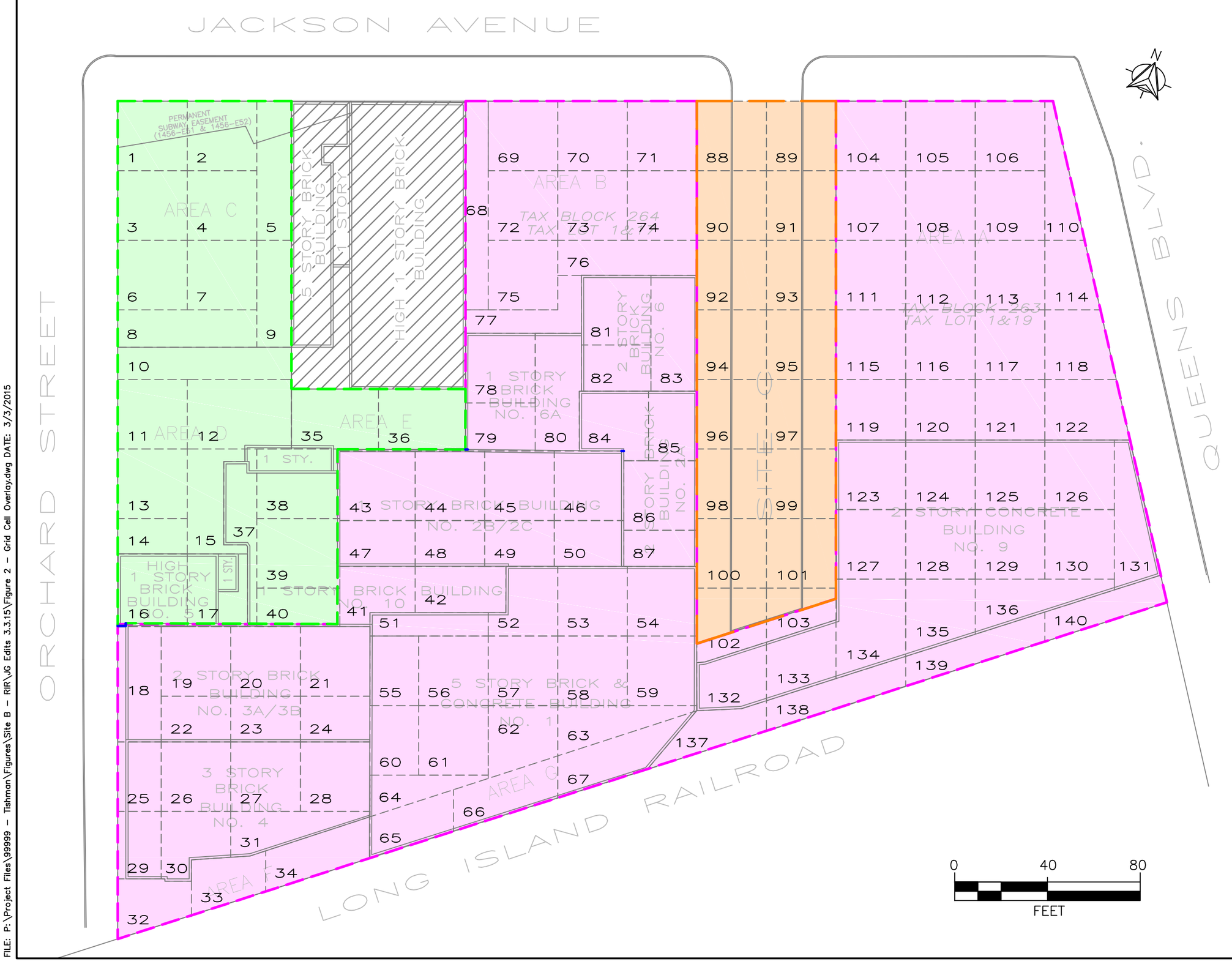
SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: LIC Development Owner, LP

BCP No. C241151

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

FILE: P:\Project Files\99999 – Tishman\Figures\Site B – RIR\JG Edits 3.3.15\FIG 1 – Site Location Map.dwg DATE: 3/4/2015



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\JG Edits 3.3.15\Figure 2 - Grid Cell Overlay.dwg DATE: 3/3/2015

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B
BCP No. C241151

FIGURE 2

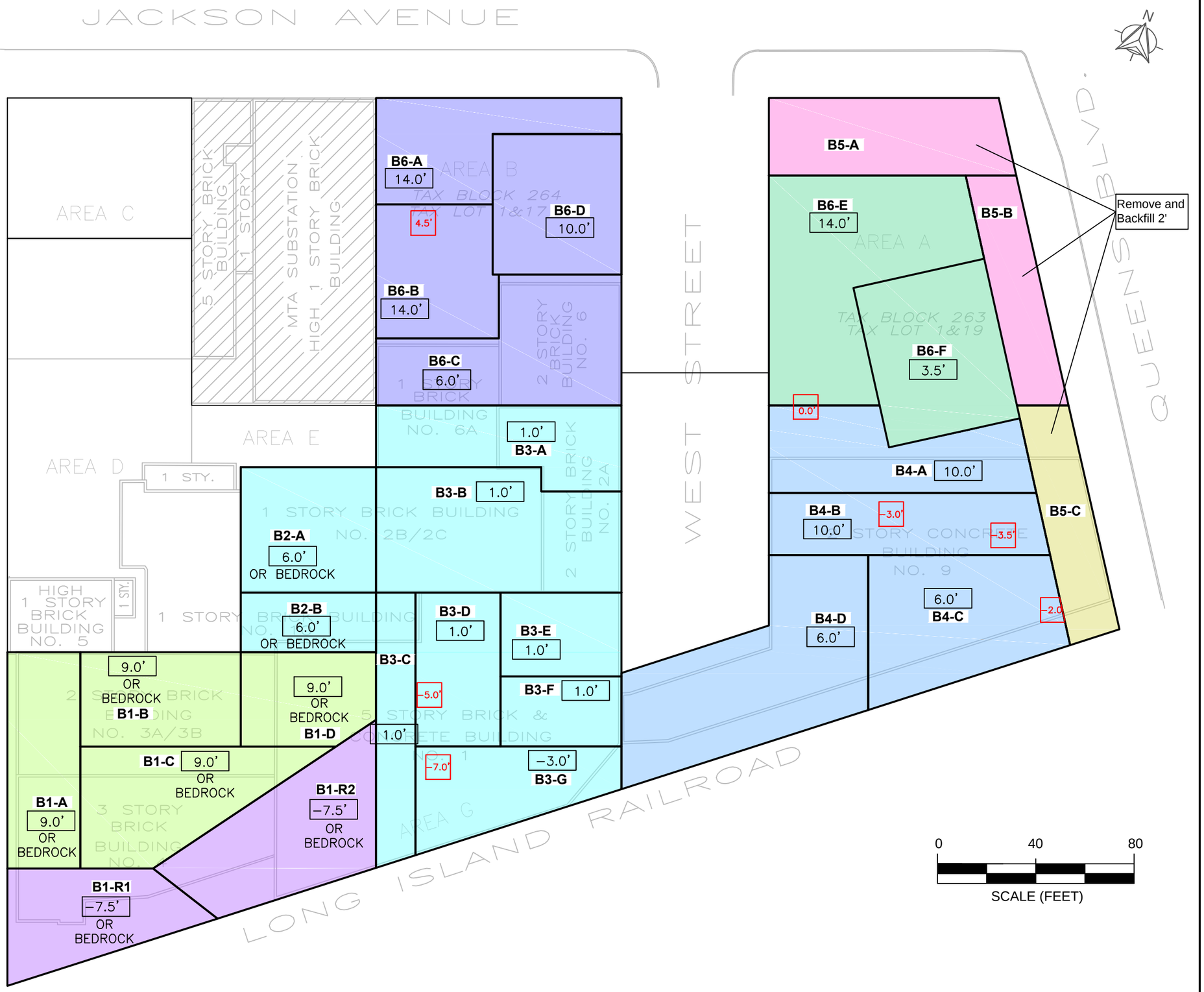
BROWNFIELD SITE PLAN

March 2015

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B
- BCP SITE C
- 117 GRID CELL NUMBER



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New York, NY 10001

Queens Plaza Development
Long Island City, NY

FIGURE 3A

ENVIRONMENTAL DIG DEPTH BASED ON RI ANALYTICAL DATA

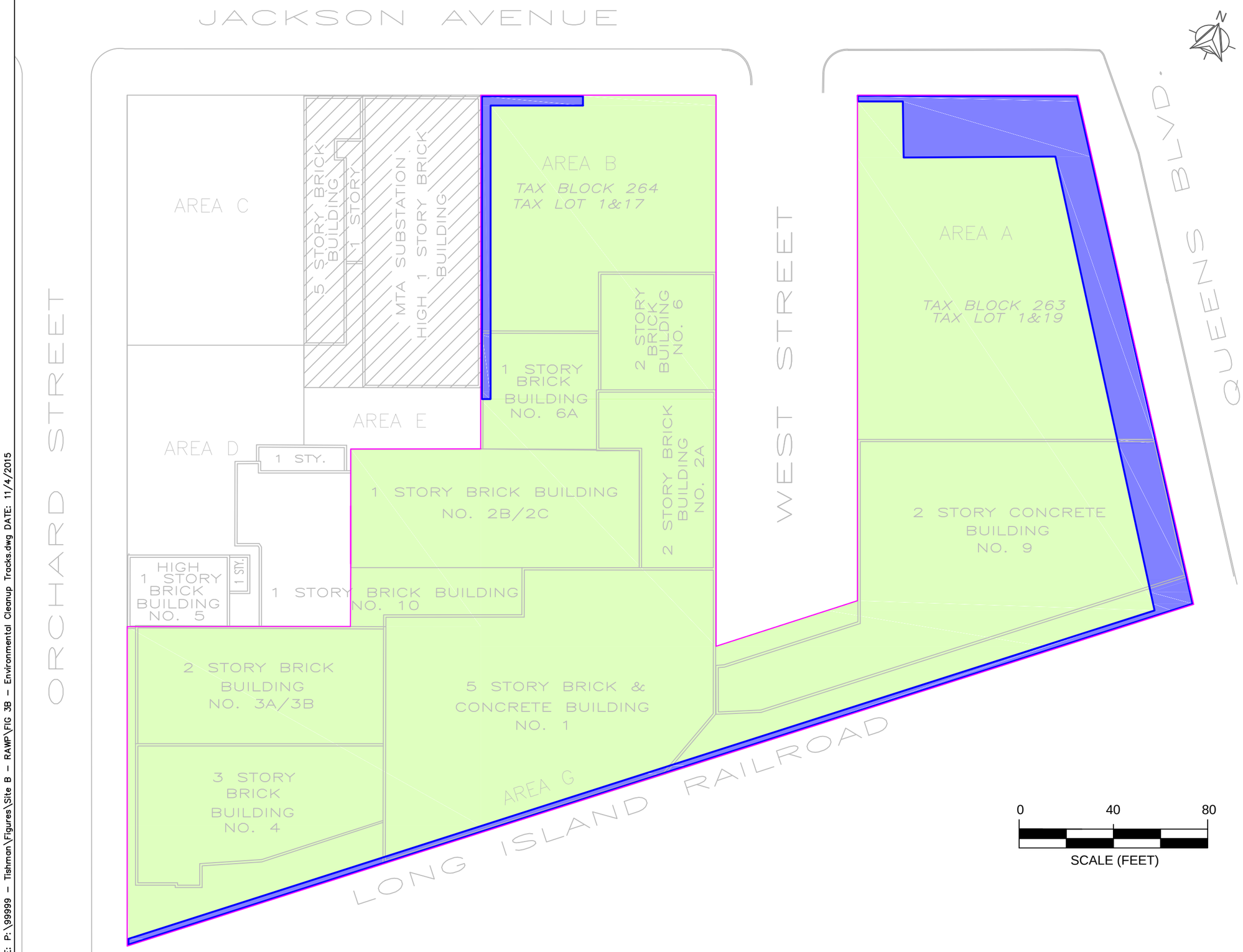
Date
June 2015

Project Number
10112-005

LEGEND

−2.5'	FINAL ELEVATION OF ENVIRONMENTAL EXCAVATION (ELEVATIONS IN NAVD88)
−5.0'	LOCALIZED EXCAVATION AREA (10' x 10') (ELEVATIONS IN NAVD88)

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAWP\FIG 3A - Environmental Dig Elevation.dwg DATE: 8/12/2015



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New York, NY 10001

Queens Plaza Development
Long Island City, NY

FIGURE 3B

ENVIRONMENTAL CLEANUP TRACKS

Date
October 2015

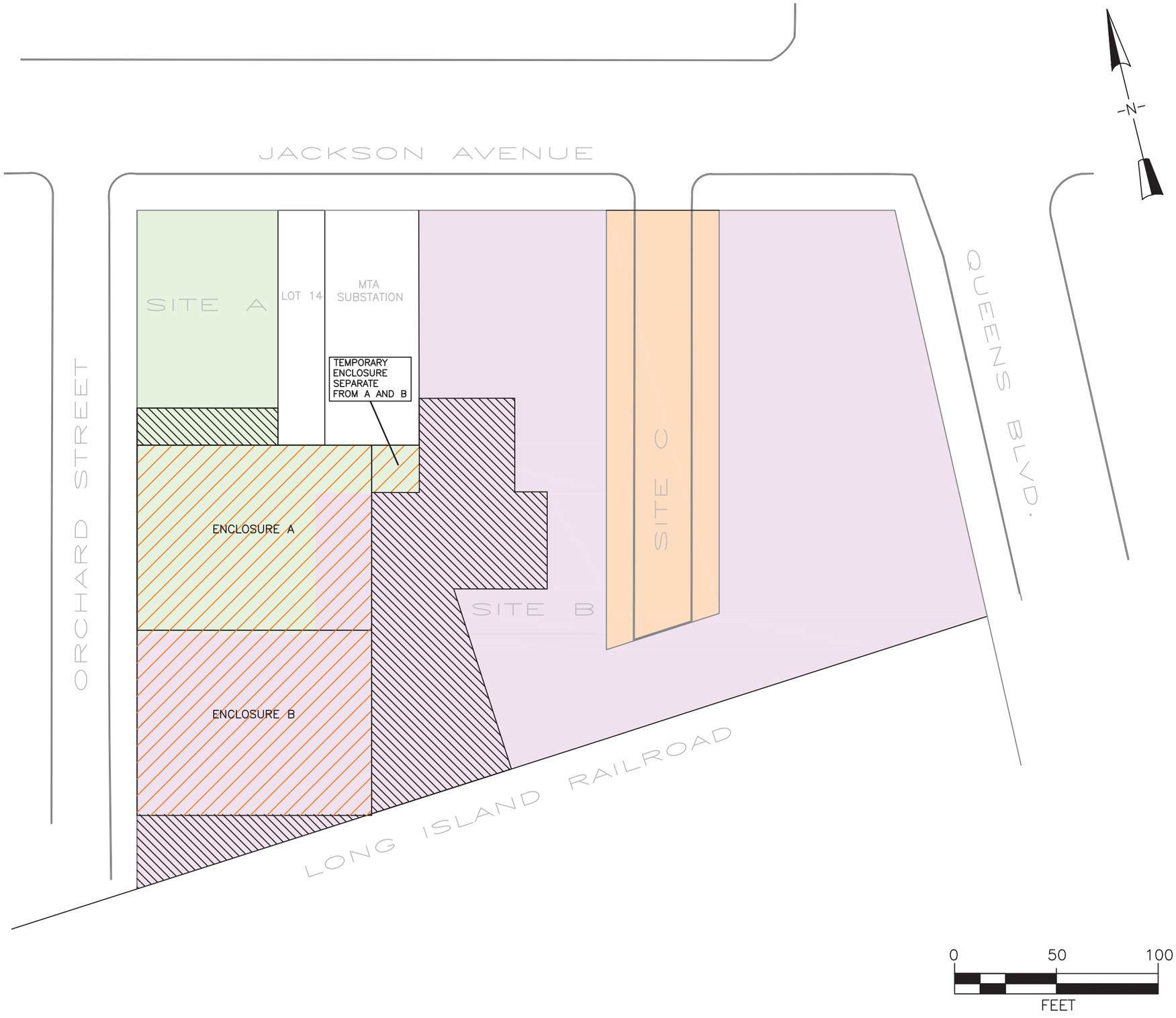
Project Number
10112-005

LEGEND

- BCP SITE B
- TRACK 2 AREA
- TRACK 4 AREAS

NOTE: AREAS EXCAVATED TO CLEAN BEDROCK MAY ACHIEVE TRACK 1 STATUS.

FILE: P:\99999 - Tishman\Figures\Site B - RAWP\FIG 3B - Environmental Cleanup Tracks.dwg DATE: 11/4/2015



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New York, NY 10001

Queens Plaza Development
Long Island City, NY
BCP No. C241151

FIGURE 4

EXCAVATION ENCLOSURE PLAN

June 2015

Project Number
10112-004

LEGEND

- BCP SITE A
- BCP SITE B
- BCP SITE C
- VENTILATED ENCLOSURE
- AREA EXCAVATED OUTSIDE OF ENCLOSURES WITH HEAVY ODOR CONTROL

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAWP\Figure 4 - Enclosure Map_6.30.15.dwg DATE: 6/30/2015

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\JG Edits 3.3.15\Figure 5A - Aerial view of Brownfield.dwg DATE: 3/4/2015

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158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential
Development - Site B
BCP No. C241151

FIGURE 5A

AERIAL VIEW OF BROWNFIELD SITE B AND NEARBY LAND USE

Date
March 2015

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B
- BCP SITE C
- OUTSIDE OF SITE

0 50 100
FEET

Final Dimension Realty
(1-story Industrial/
Manufacturing Building)

W B Werwaiss Realty LLC
(1-story Industrial/
Manufacturing Building)

JMS Hunter Street LLC
(2-story Residential Building)

Israel A. Cohen
(1-story Industrial/
Manufacturing Building)

42-61 Hunter Street LLC
(6-story Mixed Residential/
Commercial Building)

42-51 Hunter Street LLC
(7-story Residential
Building)

New York City Economic
Development Corporation
(Vacant Lot)

Zand Development LLC
(Vacant Lot; Previous Gas
Station)

CNY/MTA
(MTA Substation)

LIC Development Owner, LP
(Vacant Residential Bldg.)

Nzdckns LLC
(Warehouse)

Jackson Bounty LLC
(3-story Commercial
Building)

27-35 Jackson Ave. LLC
(4-story Commercial/
Office Building)

27-45 Jackson Ave. LLC
(3-story Warehouse/
Commercial Building)

LIC Place, LLC
(Vacant Land)

Mazza and Avena Co. Inc.
(1-story Transportaion/Utility)

Building Orchard LLC.
(Industrial/Warehouse)

Palmana Realty Corp.
(Vacant Commercial
Building; Previous Auto
Service Facility)

MTA/LIRR
(Sunnyside Rail Yards)

SITE A

SITE B

SITE C

Connector

Queens Plaza

Queens Plaza East

Bike Path

42 Road

Hunter Street

Jackson Avenue

Orchard Street

Queens Street

Dutch Kills Street

Ed Koch Br

Purves Stre

Block 420

Block 421

Block 432

Block 132

Block 263

Block 264

Block 265

Block 266

Block 267

7501

7502

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158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site C
BCP No. C241151

FIGURE 5B

ADJACENT PROPERTY LAND USES

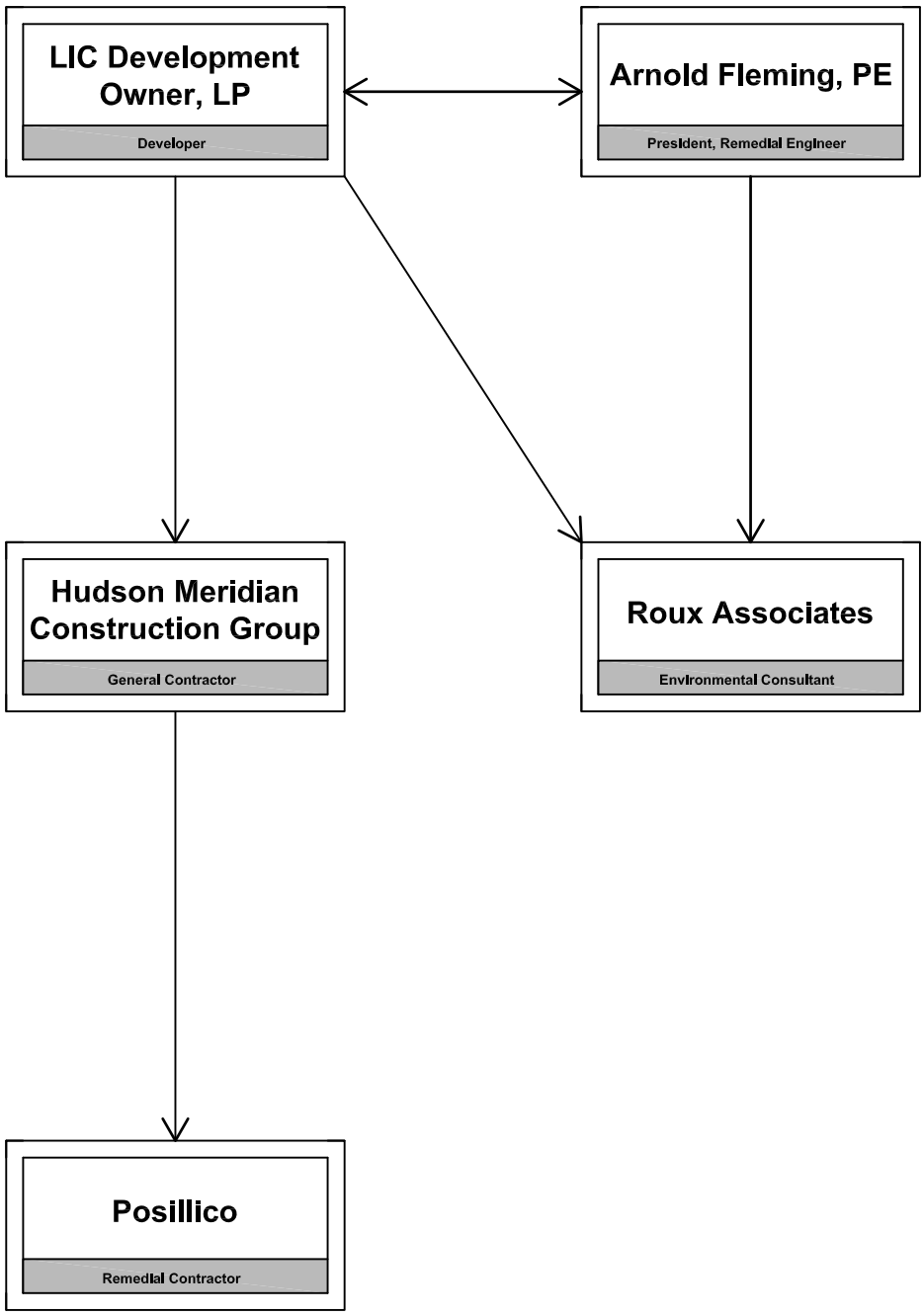
March 2015

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B
- BCP SITE C
- 2 LOT No.

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\JG Edits 3.3.15\Figure 5B - Land Use.dwg DATE: 3/4/2015



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAWP\FIG 9 - Project Organization Chart.dwg DATE: 3/3/2015

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158 West 29th Street, 9th Fl.
New York, NY 10001

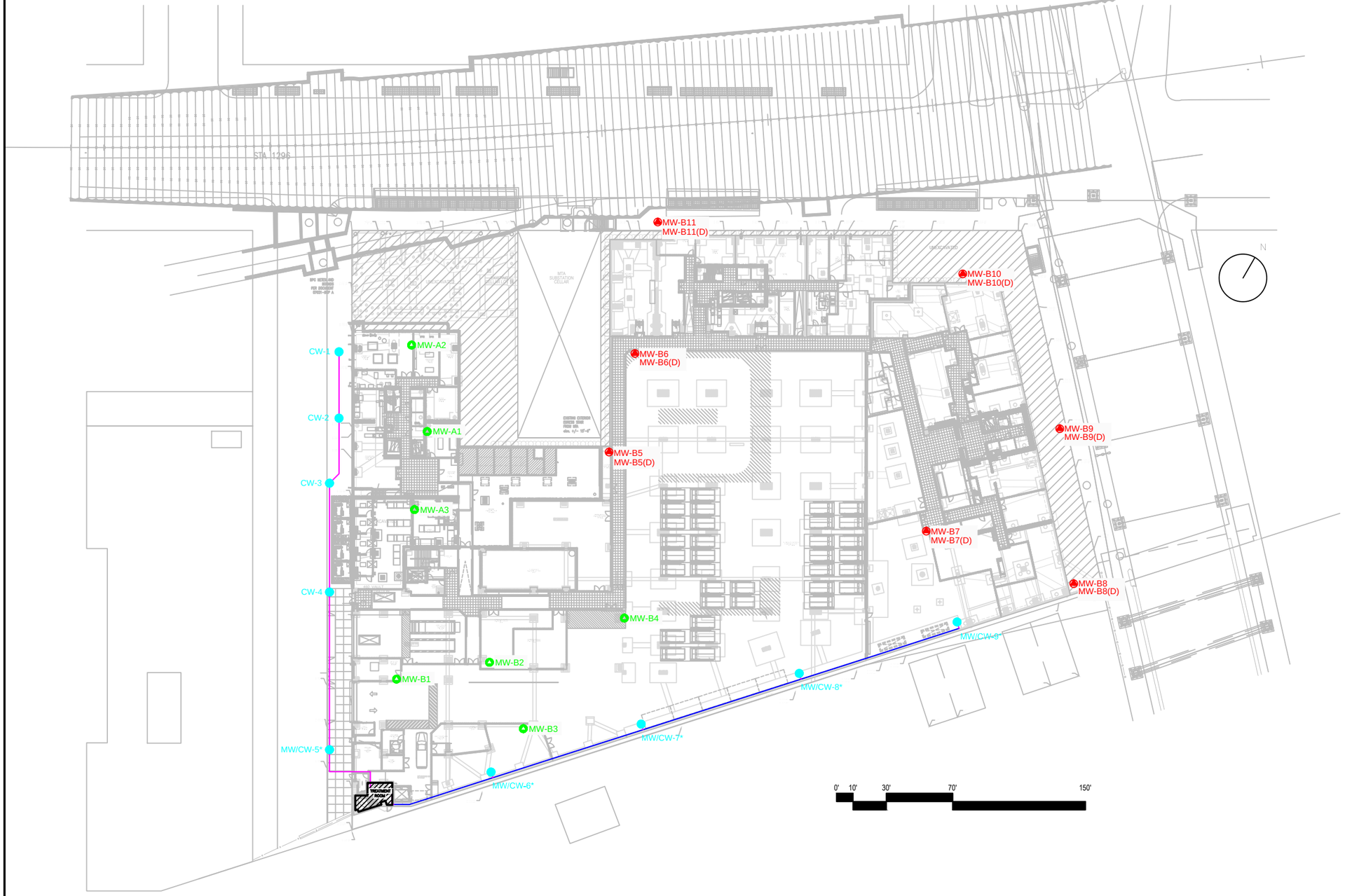
Date
February 2015

FIGURE 6

Project Number
10173-002

ORGANIZATIONAL CHART

Queens Plaza Residential Development
BCP No. C241151



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158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development

FIGURE 7

PROPOSED CAPTURE WELL AND MONITORING WELL LAYOUT

Date
January 2016

Project Number
10112-005

LEGEND

- MW — MONITORING WELL
- MW — NESTED DUAL MONITORING WELL
- MW/CW — MONITORING WELL/CAPTURE WELL
- ABOVE–GROUND MANIFOLD PIPE
- BELOW–GROUND MANIFOLD PIPE

* – MONITORING WELL CAN BE CONVERTED TO CAPTURE WELL BASED ON POST–REMEDIATION GROUNDWATER SAMPLING RESULTS (MW/CW–5 THROUGH 9)

FILE: P:\99999 – Tishman\Figures\Site B – RAWP\FIG 7 – Proposed CW and MW Layout (RAWP).dwg DATE: 1/26/2016

TABLES

Table 1A - 6 NYCRR Part 375-6 - Soil Cleanup Objectives
Queens Plaza Residential Site B, Long Island City, NY
BCP No. C241151

Contaminant	Restricted Residential Use	Protection of Groundwater	Unrestricted Use
Volatile organic compounds			
1,1,1-Trichloroethane	100	0.68	0.68
1,1-Dichloroethane	26	0.27	0.27
1,1-Dichloroethene	100	0.33	0.33
1,2-Dichlorobenzene	100	1.1	1.1
1,2-Dichloroethane	3.1	0.02	0.02
cis -1,2-Dichloroethene	100	0.25	0.25
trans-1,2-Dichloroethene	100	0.19	0.19
1,3-Dichlorobenzene	49	2.4	2.4
1,4-Dichlorobenzene	13	1.8	1.8
1,4-Dioxane	13	0.1	0.1
Acetone	100	0.05	0.05
Benzene	4.8	0.06	0.06
n-Butylbenzene	100	12	12
Carbon tetrachloride	2.4	0.76	0.76
Chlorobenzene	100	1.1	1.1
Chloroform	49	0.37	0.37
Ethylbenzene	41	1	1
Hexachlorobenzene	1.2	3.2	0.33
Methyl ethyl ketone	100	0.12	0.12
Methyl tert-butyl ether	100	0.93	0.93
Methylene chloride	100	0.05	0.05
n - Propylbenzene	100	3.9	3.9
sec-Butylbenzene	100	11	11
tert-Butylbenzene	100	5.9	5.9
Tetrachloroethene	19	1.3	1.3
Toluene	100	0.7	0.7
Trichloroethene	21	0.47	0.47
1,2,4-Trimethylbenzene	52	3.6	3.6
1,3,5-Trimethylbenzene	52	8.4	8.4
Vinyl chloride	0.9	0.02	0.02
Xylene (mixed)	100	1.6	0.26
Metals			
Arsenic	16	16	13
Barium	400	820	350
Beryllium	72	47	7.2
Cadmium	4.3	7.5	2.5
Chromium, hexavalent	110	19	1
Chromium, trivalent	180	-	30
Copper	270	1720	50
Total Cyanide	27	40	27
Lead	400	450	63
Manganese	2000	2000	1600
Total Mercury	0.81	0.73	0.18
Nickel	310	130	30
Selenium	180	4	3.9
Silver	180	8.3	2
Zinc	10000	2480	109

Contaminant	Restricted Residential Use	Protection of Groundwater	Unrestricted Use
Semivolatile organic compounds			
Acenaphthene	100	98	20
Acenapthylene	100	107	100
Anthracene	100	1000	100
Benz(a)anthracene	1	1	1
Benzo(a)pyrene	1	22	1
Benzo(b)fluoranthene	1	1.7	1
Benzo(g,h,i)perylene	100	1000	100
Benzo(k)fluoranthene	3.9	1.7	0.8
Chrysene	3.9	1	1
Dibenz(a,h)anthracene	0.33	1000	0.33
Fluoranthene	100	1000	100
Fluorene	100	386	30
Indeno(1,2,3-cd)pyrene	0.5	8.2	0.5
m-Cresol	100	0.33	0.33
Naphthalene	100	12	12
o-Cresol	100	0.33	0.33
p-Cresol	100	0.33	0.33
Pentachlorophenol	6.7	0.8	0.8
Phenanthrene	100	1000	100
Phenol	100	0.33	0.33
Pyrene	100	1000	100
PCBs/Pesticides			
2,4,5-TP Acid (Silvex)	100	3.8	3.8
4,4'-DDE	8.9	17	0.0033
4,4'-DDT	7.9	136	0.0033
4,4'-DDD	13	14	0.0033
Aldrin	0.097	0.19	0.005
alpha-BHC	0.48	0.02	0.02
beta-BHC	0.36	0.09	0.036
Chlordane (alpha)	4.2	2.9	0.094
delta-BHC	100	0.25	0.04
Dibenzofuran	59	210	7
Dieldrin	0.2	0.1	0.005
Endosulfan I	24	102	2.4
Endosulfan II	24	102	2.4
Endosulfan sulfate	24	1000	2.4
Endrin	11	0.06	0.014
Heptachlor	2.1	0.38	0.042
Lindane	1.3	0.1	0.1
Polychlorinated Biphenyls	1	3.2	0.1

Notes:
Concentrations in mg/kg.
Where excavation is 15 feet or less below ground surface , the soil cleanup goals will be the Restricted Residential SCOs or, where groundwater is above the TOGS GA standards, as identified in the Remedial Investigation, the soil cleanup goals will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS standards.
Where excavation is deeper than 15 feet below ground surface, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS GA standards will be the applicable SCOs.

Table 1B -Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values – Class GA
Queens Plaza Residential Site B, Long Island City, NY
BCP No. C241151

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Volatile organic compounds	
Acetone	-
Benzene	1
Bromodichloromethane	-
Bromoform	-
Bromomethane	5
2-Butanone (MEK)	-
Carbon disulfide	60
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	5
Chloroform	7
Chloromethane	5
Cyclohexane	-
1,2-Dibromo-3-	0.04
Dibromochloromethane	-
1,2-Dibromoethane	0.0006
1,2-Dichlorobenzene	3
1,3-Dichlorobenzene	3
1,4-Dichlorobenzene	3
Dichlorodifluoromethane	5
1,1-Dichloroethane	5
1,2-Dichloroethane	0.6
1,1-Dichloroethene	5
cis-1,2-Dichloroethene	5
trans-1,2-Dichloroethene	5
1,2-Dichloropropane	1
cis-1,3-Dichloropropene	-
trans-1,3-Dichloropropene	-
Ethylbenzene	5
Freon 113	5
2-Hexanone	-
Isopropylbenzene	5
Methyl Acetate	-
Methylcyclohexane	-
Methyl Tert Butyl Ether	10
4-Methyl-2-	-
Methylene chloride	5
Styrene	5
1,1,2,2-Tetrachloroethane	5
Tetrachloroethene	5
Toluene	5
1,2,4-Trichlorobenzene	5
1,1,1-Trichloroethane	5
1,1,2-Trichloroethane	1
Trichloroethene	5
Trichlorofluoromethane	5
Vinyl chloride	2
Xylene (total)	5

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Semivolatile organic compounds	
2-Chlorophenol	-
4-Chloro-3-methyl phenol	-
2,4-Dichlorophenol	1
2,4-Dimethylphenol	1
2,4-Dinitrophenol	1
4,6-Dinitro-o-cresol	-
2-Methylphenol	-
3&4-Methylphenol	-
2-Nitrophenol	-
4-Nitrophenol	-
Pentachlorophenol	1
Phenol	1
2,4,5-Trichlorophenol	-
2,4,6-Trichlorophenol	-
Acenaphthene	-
Acenaphthylene	-
Acetophenone	-
Anthracene	-
Atrazine	7.5
Benzaldehyde	-
Benzo(a)anthracene	-
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	-
Benzo(g,h,i)perylene	-
Benzo(k)fluoranthene	-
4-Bromophenyl phenyl	-
Butyl benzyl phthalate	-
1,1'-Biphenyl	5
2-Chloronaphthalene	-
4-Chloroaniline	5
Carbazole	-
Caprolactam	-
Chrysene	-
bis(2-	5
bis(2-Chloroethyl)ether	1
bis(2-Chloroisopropyl)ether	5
ether	-
2,4-Dinitrotoluene	5
2,6-Dinitrotoluene	5
3,3'-Dichlorobenzidine	5
Dibenzo(a,h)anthracene	-
Dibenzofuran	-
Di-n-butyl phthalate	50
Di-n-octyl phthalate	-
Diethyl phthalate	-
Dimethyl phthalate	-
bis(2-Ethylhexyl)phthalate	5
Fluoranthene	-
Fluorene	-
Hexachlorobenzene	0.04
Hexachlorobutadiene	0.5
Hexachlorocyclopentadien	5
Hexachloroethane	5
Indeno(1,2,3-cd)pyrene	-
Isophorone	-
2-Methylnaphthalene	-
2-Nitroaniline	5
3-Nitroaniline	5
4-Nitroaniline	5
Naphthalene	-
Nitrobenzene	0.4
N-Nitroso-di-n-propylamine	-
N-Nitrosodiphenylamine	-
Phenanthrene	-
Pyrene	-

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Metals	
Aluminum	-
Antimony	3
Arsenic	25
Barium	1000
Beryllium	-
Cadmium	5
Calcium	-
Chromium	50
Cobalt	-
Copper	200
Iron	300
Lead	25
Magnesium	-
Manganese	300
Mercury	0.7
Nickel	100
Potassium	-
Selenium	10
Silver	50
Sodium	20000
Thallium	-
Vanadium	-
Zinc	-
PCBs/Pesticides	
2,4,5-TP Acid (Silvex)	0.26
4,4'-DDE	0.2
4,4'-DDT	0.2
4,4'-DDD	0.3
Aldrin	ND
alpha-BHC	0.01
beta-BHC	0.04
Chlordane (alpha)	-
delta-BHC	0.04
Dibenzofuran	-
Dieldrin	0.004
Endosulfan I	-
Endosulfan II	-
Endosulfan sulfate	-
Endrin	ND
Heptachlor	0.04
Lindane	0.05
Polychlorinated Biphenyls	0.09

Notes:
Concentrations in µg/L.

Table 1C - New York State Department of Health Air Guidance Values
Queens Plaza Residential Site B, Long Island City, NY
BCP No. C241151

Contaminant	NYSDOH Soil Vapor/Indoor Air Guidance Values
Methylene chloride	60
Tetrachloroethylene	30
Trichloroethylene	5

Concentrations in µg/m^3.

Table 2 – Permits, Certificates, Approvals and Authorizations
Queens Plaza Residential Site, Long Island City, NY
BCP No. C241151

Law, Statue, Code	Originating Agency	Contact Name	Contact Phone
Landfill Permit (16 RCNY Chapter 3)	New York City Department of Sanitation (DPS)	Thomas Albano (Queens West Borough Chief)	(718) 334-9196
Sewer Connection Permit (15 RCNY Chapter 19)	Department of Environmental Protection (NYCDEP)	Gregory Cho (DEP Inspector General)	(212) 825-3335
New York State Pollution Discharge Elimination System (6 NYCRR 750)	Department of Environmental Conservation (NYSDEC)	Jack Nasca (Environmental Permits Division Director)	(518) 402-9167
Long Island Well Permit Regulation (Chapter V Part 602)	Department of Environmental Conservation (NYSDEC)	Jack Nasca (Environmental Permits Division Director)	(518) 402-9167
Air Facility Registration (6 NYCRR 201)	Department of Environmental Conservation (NYSDEC)	David Shaw (Air Resources Director)	(518) 402-8452
2014 Construction Codes (Building Codes Chapter 1)	New York City Buildings Department (NYCDOB)	Derek Lee, (Queens Borough Commissioner)	(718) 286-7670
Waiver for local permits (6 NYCRR 375.1.12)	Department of Environmental Conservation (NYSDEC)	Jane O'Connell (DEC Region 2 Environmental Remediation)	(718) 482-4599
Excavation Permit (34 RCNY Chapter 2 Section 2-02)	New York City Department of Transportation (NYCDOT)	Lori Ardito (First Deputy Commissioner)	(212) 839-6403

Table 3 – Emergency Contact List
Queens Plaza Residential Site B, Long Island City, NY

Emergency	
New York City Police Department	911
New York City Fire Department	911
Emergency Medical Service (ambulance)	911
NYSDEC Spill Hotline	(800) 457-7362
National Response Center	(800) 424-8802
New York University Medical Center 550 1st Avenue New York, NY	(212) 263-7300
Mount Sinai of Queens Hospital 25-10 30th Avenue Astoria, NY	(718) 932-1000
FLS Project Staff	
Steven Panter, FLS Project Manager	(212) 675-3225 ext. 310
Peter Helseth, FLS Project Engineer	(212) 675-3225 ext. 308
Arnold Fleming, Remedial Engineer	(212) 675-3225 ext. 301
Tom Eng, CIH	(201) 417-3079
Raphael Rosenbaum, Health and Safety Officer/ Field Supervisor	(646) 841-3100
Tishman Development Corporation	
Patrick Shiels, Client Representative	(212) 715-0361

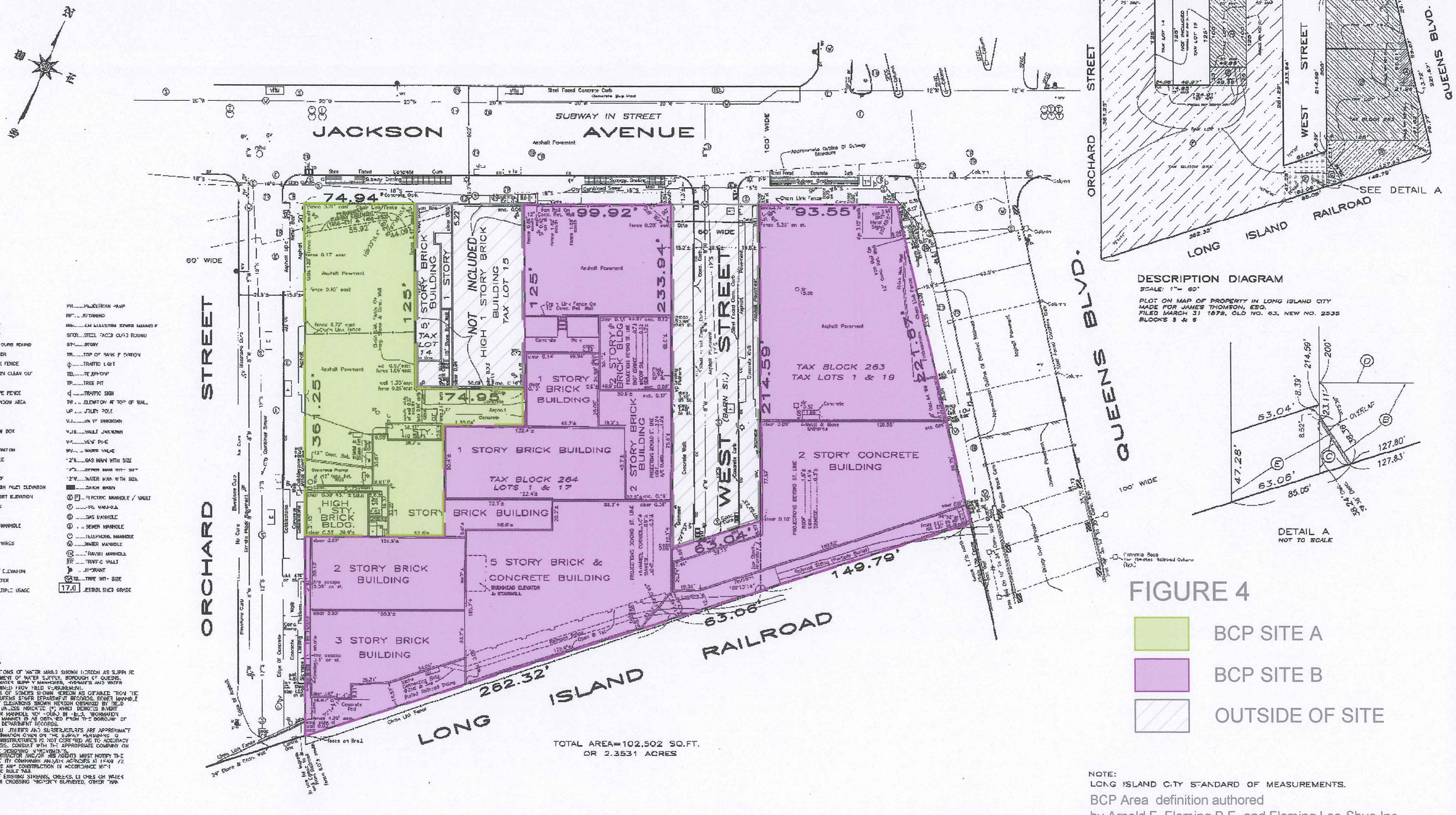
APPENDIX A

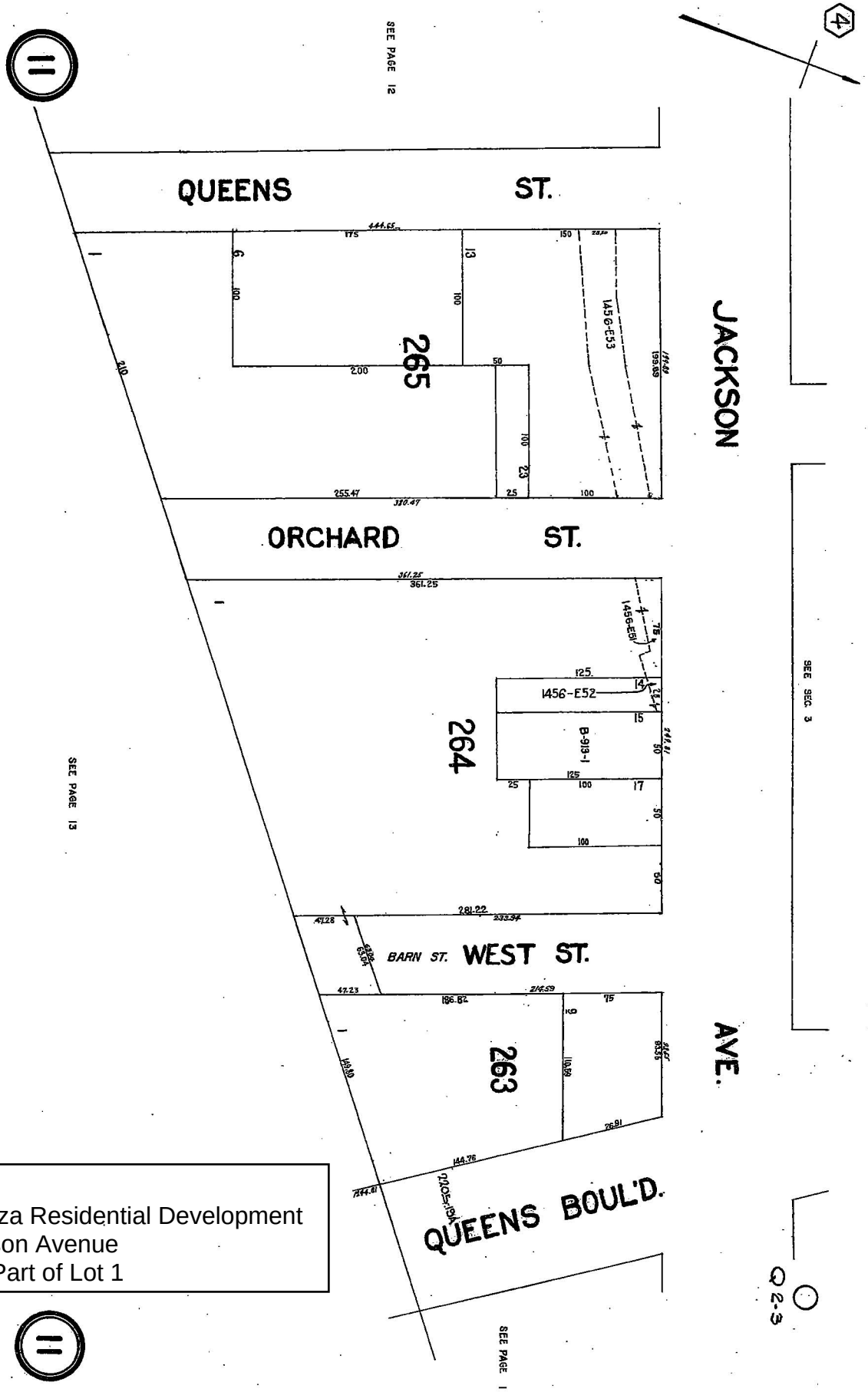
Brownfield Site Survey

TITLE NO. 08NYQ11112

SURVEY No. 40598—11

40598-11.DWG
40598-11.SRD


JACKSON AVENUE
SUBWAY IN STREET
Asphalt Pavement
100' WIDE
60' WIDE
STREET
ORCHARD STREET
WEST STREET
QUEENS BLVD.
74.94'
99.92'
93.55'
233.94'
125'
36.25'
74.95'
214.59'
221.67'
63.04'
149.79'
262.32'
LONG ISLAND RAILROAD
TAX BLOCK 263
TAX LOTS 1 & 19
TAX BLOCK 264
LOTS 1 & 17
TAX LOT 14
TAX LOT 15
NOT INCLUDED
HIGH 1 STORY BRICK BUILDING TAX LOT 15
1 STORY BRICK BUILDING
2 STORY BRICK BUILDING
3 STORY BRICK BUILDING
5 STORY BRICK & CONCRETE BUILDING
2 STORY CONCRETE BUILDING
HIGH 1 STY. BRICK BLDG.
11 STORY BRICK BUILDING
BULKHEAD ELEVATOR & STAIRWELL
Chain Link Fence
Concrete Pad
Asphalt
Concrete
Curb
Sidewalk
Edge of Concrete
Bluestone Curb
No Curb
Steel Faced Concrete Curb
Subway Grating
Subway Opening
Approximate Outline of Subway Structure
City Combined Sewer
Catch Basin
Manhole
Telephone Manhole
Water Manhole
Transit Manhole
Traffic Vault
Hydrant
Light Pole
Traffic Pole
Traffic Sign
Utility Pole
Gas Manhole
Gas Main with Size
Sewer Main with Size
Water Main with Size
Elevation at Top of Wall
Elevation
Fire Alarm Box
Vault Unknown
Vent Pipe
Water Valve
Guard Pole
Gas Valve
Iron Fence
Overhead Wires
Parking Meter
Pole, Multiple Usage
Jesbol Stick Grade
Pedestrian Ramp
Retaining
Steel Faced Curb Round
Story
Top of Bank Elevation
Telephone
Tree Pit
Chain Rope Fence
Area Window
Drain
Utility Pole
Unknown
Vault Unknown
Vent Pipe
Water Valve
Gas Main with Size
Sewer Main with Size
Water Main with Size
Catch Basin Inlet Elevation
Catch Basin
Electric Manhole / Vault
Fire Manhole
Gas Manhole
Sewer Manhole
Telephone Manhole
Water Manhole
Transit Manhole
Traffic Vault
Hydrant
Traffic Sign
Jesbol Stick Grade
Fence 0.17' east
Fence 0.40' east
Fence 6.29' east Chain Link Fence
Fence 0.28'
Fence 5.30' on st.
Fence 0.10' west
Fence 0.25' east
Fence 1.05' east
Wall 1.33' east
Fence 4.20' east
Fence 0.03' west
Fence 0.67' west
Fence 0.33' west
Fence 0.30' west
Fence 0.20' west
Fence 0.10' west
Fence 0.33' west
Fence 0.30



Tax Map
Queens Plaza Residential Development
28-10 Jackson Avenue
Block 264, Part of Lot 1

Note: Property boundaries do not correspond to Tax Map metes and bounds. See attached drawing for meets and bounds description.

SCHEDULE "A"

ALL THOSE CERTAIN PLOTS, PIECES OR PARCELS OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF QUEENS OF THE CITY OF NEW YORK, IN THE COUNTY OF QUEENS AND STATE OF NEW YORK, RESPECTIVELY BOUNDED AND DESCRIBED AS FOLLOWS:

PARCEL A (FOR INFORMATION ONLY: BLOCK 263 P/O LOTS 1 & 9)

BEGINNING AT A POINT ON THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD (FORMERLY KNOWN AS DIAGONAL STREET) DISTANT 29.11 FEET SOUTHEASTERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE

RUNNING THENCE SOUTHERLY PARALLEL WITH THE EASTERLY SIDE OF WEST STREET (FORMERLY KNOWN AS BARN STREET) 96.61 FEET;

THENCE EASTERLY AT RIGHT ANGLES TO THE EASTERLY SIDE OF BARN STREET 21.96 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD; AND

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, 99.07 FEET TO THE POINT OF PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

PARCEL B (FOR INFORMATION ONLY:BLOCK 263 P/O LOT 1)

BEGINNING AT A POINT ON THE EASTERLY SIDE OF BARN STREET DISTANT 200 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE AND;

RUNNING EASTERLY AT RIGHT ANGLES TO THE EASTERLY SIDE OF BARN STREET 125 FEET;

THENCE NORTHERLY PARALLEL WITH THE EASTERLY SIDE OF BARN STREET 61.62 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD 79.77 FEET TO THE NORTHERLY LINE OF LAND NOW OR FORMERLY OF LONG ISLAND RAILROAD COMPANY;

THENCE SOUTHWESTERLY ALONG SAID LINE OF SAID LAND OF SAID RAILROAD COMPANY 127.83 FEET TO A LINE DRAWN NORTHWESTERLY ON THE TAX MAP OF THE BOROUGH OF QUEENS;

THENCE NORTHWESTERLY ALONG SAID LAST MENTIONED LINE 38.36 FEET TO THE EASTERLY SIDE OF BARN STREET; AND

THENCE NORTHERLY ALONG THE EASTERLY SIDE OF BARN STREET 23.11 FEET TO THE POINT OF PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

PARCEL C (FOR INFORMATION ONLY: BLOCK 263 P/O LOT 1)

BEING A TRIANGULAR PLOT CONTIGUOUS TO SAID PARCEL B AND BEGINNING AT A POINT ON THE EASTERLY SIDE OF BARN STREET 223.11 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE;

CONTINUED...

RUNNING THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF BARN STREET OR ALONG A STRAIGHT LINE IN PROLONGATION THEREOF TO THE NORTHERLY LINE OF LAND OF THE LONG ISLAND RAILROAD COMPANY;

RUNNING NORTHEASTERLY ALONG SAID LINE OF SAID LAND OF SAID RAILROAD COMPANY TO A POINT THEREON 127.83 FEET
SOUTHWESTERLY FROM THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, AND BEING THE POINT WHERE THE SOUTHWESTERLY LINE OF SAID PARCEL B MEETS SAID NORTHERLY LINE OF SAID LAND OF SAID RAILROAD COMPANY;

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL B AND COINCIDING THEREWITH 38.36 FEET TO THE EASTERLY SIDE OF BARN STREET AT THE POINT OR PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

NOTE: PARCEL C IS ALSO ENCOMPASSED IN THE DESCRIPTION OF PARCEL E BELOW.

PARCEL D (FOR INFORMATION ONLY: BLOCK 263 P/O LOTS 1 & 9)

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF BARN STREET;

RUNNING THENCE EASTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 93 FEET 6-5/8 INCHES TO THE WESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF QUEENS BOULEVARD, 29 FEET 1-3/8 INCHES;

THENCE STILL SOUTHERLY AND ON A LINE FORMING AN EXTERIOR ANGLE OF 12° 48' AND 05" WITH QUEENS BOULEVARD, 96 FEET 7-3/8 INCHES;

THENCE EASTERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE 21 FEET 11 1/2 INCHES TO THE WESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF QUEENS BOULEVARD 13 FEET 8-5/8 INCHES;

THENCE STILL SOUTHERLY ON A LINE FORMING AN EXTERIOR ANGLE OF 12° 48' 05" WITH QUEENS BOULEVARD, 61 FEET 7 1/2 INCHES;

THENCE WESTERLY AT RIGHT ANGLES TO BARN STREET 125 FEET TO THE EASTERLY SIDE THEREOF;

THENCE NORTHERLY ALONG SAID EASTERLY SIDE OF BARN STREET, 200 FEET TO THE CORNER THE POINT OR PLACE OF BEGINNING.

PARCEL E (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT A POINT ON THE EASTERLY LINE OF WEST STREET AS THE SAID STREETS ARE LAID OUT ON THE CITY MAP ON APRIL 19, 1945. DISTANT 214.59 FEET SOUTHERLY FROM THE INTERSECTION OF THE SOUTHERLY LINE OF JACKSON AVENUE AS THE SAID STREETS ARE LAID OUT ON THE CITY MAP ON APRIL 19, 1945. AND THE EASTERLY LINE OF WEST STREET AS MEASURED ALONG THE SAID EASTERLY LINE OF WEST STREET;

CONTINUED...

THENCE SOUTHERLY ALONG THE EASTERLY LINE OF WEST STREET A DISTANCE OF 8.39 FEET;

THENCE SOUTHERLY DEFLECTING 33° 5' 30" TO THE LEFT ALONG THE SAID EASTERLY LINE OF WEST STREET A DISTANCE OF 38.36 FEET;

THENCE WESTERLY DEFLECTING 105° 13' 07" TO THE RIGHT A DISTANCE OF 85.05 FEET TO THE WESTERLY LINE OF WEST STREET;

THENCE NORTHERLY ALONG THE WESTERLY LINE OF WEST STREET A DISTANCE OF 47.28 FEET;

THENCE EASTERLY DEFLECTING 72° 07' 37" TO THE RIGHT A DISTANCE OF 63.04 FEET TO THE EASTERLY LINE OF WEST STREET AND THE POINT AND PLACE OF BEGINNING.

NOTE: DESCRIPTION OF PARCEL E INCLUDES THE LAND DESCRIBED AS PARCEL C ABOVE.

PARCEL F (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF ORCHARD STREET; AND

RUNNING THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF ORCHARD STREET 361.25 FEET TO ITS INTERSECTION WITH THE NORTHERLY LINE OF THE LAND OF LONG ISLAND RAILROAD; AND

THENCE EASTERLY ALONG THE NORTHERLY LINE OF THE LAND OF LONG ISLAND RAILROAD COMPANY 262.32 FEET TO ITS INTERSECTION WITH THE WESTERLY SIDE OF BARN STREET; AND

THENCE NORTHERLY ALONG THE WESTERLY SIDE OF BARN STREET 281.22 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF BARN STREET WITH THE SOUTHERLY SIDE OF JACKSON AVENUE; AND

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 50 FEET;

THENCE SOUTHERLY PARALLEL WITH BARN STREET 125 FEET;

THENCE WESTERLY PARALLEL WITH JACKSON AVENUE 125 FEET;

THENCE NORTHERLY AND PARALLEL WITH BARN STREET 125 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE; AND

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 75 FEET TO THE CORNER, THE POINT OF PLACE OF BEGINNING.

PARCEL G (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT A POINT IN A LINE DRAWN PARALLEL WITH THE WESTERLY SIDE OF BARN STREET AND DISTANT 50 FEET;

WESTERLY FROM THE WESTERLY SIDE OF BARN STREET MEASURED ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE; AND WHICH POINT OF BEGINNING IS DISTANT 100 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE;
CONTINUED...

RUNNING THENCE SOUTHERLY PARALLEL WITH BARN STREET, 25 FEET;

THENCE WESTERLY AND PARALLEL WITH JACKSON AVENUE, 50 FEET;

THENCE NORTHERLY, PARALLEL WITH BARN STREET, 25 FEET;

THENCE EASTERLY AND AGAIN PARALLEL WITH JACKSON AVENUE, 50 FEET TO THE POINT OR PLACE OF BEGINNING.

PARCEL H (FOR INFORMATION ONLY: BLOCK 264 LOT 17)

BEGINNING AT A POINT ON THE SOUTHERLY SIDE OF JACKSON AVENUE, DISTANT 50 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF BARN STREET WITH THE SOUTHERLY SIDE OF JACKSON AVENUE;

RUNNING THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 50 FEET;

THENCE SOUTHERLY, PARALLEL WITH BARN STREET 100 FEET;

THENCE EASTERLY, PARALLEL WITH JACKSON AVENUE 50 FEET;

THENCE NORTHERLY, PARALLEL WITH BARN STREET 100 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE, THE POINT OR PLACE OF BEGINNING, BE SAID DISTANCES OR DIMENSIONS MORE OF LESS.

PERIMETER DESCRIPTION AS SURVEYED

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE LYING AND BEING IN THE COUNTY OF QUEENS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE (100 FEET WIDE) WITH THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD (100 FEET WIDE);

RUNNING THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 93.55 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF WEST STREET (60 FEET WIDE);

THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF WEST STREET 214.59 FEET TO THE SOUTHERLY TERMINUS OF SAID STREET;

THENCE SOUTHWESTERLY ALONG THE SOUTHERLY TERMINUS OF SAID STREET AND ALONG A LINE FORMING AN ANGLE OF 72° 07' 37" ON THE NORTHEAST WITH THE WESTERLY SIDE OF WEST STREET, 63.04 FEET TO THE CORNER FORMED BY THE SOUTHERLY TERMINUS OF WEST STREET WITH THE WESTERLY SIDE OF WEST STREET;

THENCE NORTHERLY ALONG THE WESTERLY SIDE OF WEST STREET 233.94 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE WESTERLY SIDE OF WEST STREET;

CONTINUED...

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 99.92 FEET TO A POINT;

THENCE SOUTHERLY AT RIGHT ANGLES TO THE SOUTHERLY SIDE OF JACKSON AVENUE AND PARALLEL TO WEST STREET, 125 FEET;

THENCE WESTERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE AND PARALLEL TO JACKSON AVENUE, 74.95 FEET TO A POINT;

THENCE NORTHERLY AT RIGHT ANGLES TO LAST MENTIONED COURSE AND THE SOUTHERLY SIDE OF JACKSON AVENUE, AND PARALLEL TO WEST STREET, 125 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE;

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE, 74.94 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF ORCHARD STREET (60 FEET WIDE);

THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF ORCHARD STREET, 361.25 FEET TO THE LAND NOW OR FORMERLY OF THE LONG ISLAND RAILROAD;

THENCE NORTHEASTERLY ALONG THE LAND OF THE LONG ISLAND RAILROAD AND ALONG A LINE FORMING AN ANGLE OF 72° 14' 11" ON THE NORTHEAST WITH THE EASTERLY SIDE OF ORCHARD STREET, 262.32 FEET TO AN ANGLE POINT;

THENCE NORTHEASTERLY ALONG A LINE FORMING AN ANGLE OF 179° 50' 45" ON THE NORTHWEST WITH THE LAST MENTIONED COURSE, 63.06 FEET TO AN ANGLE POINT;

THENCE NORTHEASTERLY ALONG A LINE FORMING AN ANGLE OF 180° 10' 14" ON THE NORTHWEST WITH THE LAST MENTIONED COURSE, 149.79 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD;

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD 221.67 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, THE POINT OR PLACE OF BEGINNING.

THE policy to be issued under this report will insure the title to such buildings and improvements erected on the premises, which by law constitute real property.

FOR CONVEYANCING ONLY: TOGETHER with all the right, title and interest of the party of the first part, of in and to the land lying in the street in front of and adjoining said premises.

APPENDIX B

Remedial Investigation Report

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor, Albany, NY 12233-7016
P: (518) 402-9768 I F: (518) 402-9773
www.dec.ny.gov

June 26, 2015

Arnold Fleming, P.E.
Fleming-Lee, Shue, Inc.
158 West 29th Street, 9Fl.
New York, NY 10001

RE: Queens Plaza Residential Development – Site B
NYSDEC Site No. C241151

Dear Mr. Fleming:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the revised Remedial Investigation Report (RIR) submitted on June 12, 2015 for the above referenced site. Based on this review, the RIR is approved contingent upon the following:

- Based on my review of the RIR and the pump-test well boring logs, Fleming-Lee, Shue (FLS) has not fully determined the nature and extent of contamination. FLS must investigate the impact or potential impact to bedrock as part of the pre-design activities. The results must be included in the Remedial Design Report and Final Engineering Report. Based on the results of the investigation, a contingency for long term bedrock groundwater monitoring as well as hydraulic control to prevent off-site migration of contaminated groundwater must be included in the Remedial Action Work Plan (RAWP).

  As part of pre-design, please install a minimum of two bedrock borings and a minimum of one bedrock monitoring well in the areas of the greatest potential impact.

Please contact me with any questions at 518-402-9688.

Regards,

Michael Haggerty
Project Manager
Remedial Bureau B, Section C

ec: James Moras (Chief, Bureau B, Section C)
Benjamin Conlon (OGC)
Christopher Doroski (NYSDOH)
Bruce Phillips/ Patrick Shiels (Applicant)
Lawrence Schnapf (Applicant's Attorney)

Queens Plaza Residential Development Site B
Remedial Investigation Report
Site ID # BCP No. C241151

28-34 Jackson Avenue
Long Island City, New York

Prepared for

LIC Development Owner, LP & TST LIC Development, LLC
c/o
Tishman Speyer Properties
45 Rockefeller Plaza
New York, New York 10111

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Division 2

Prepared by

Arnold F. Fleming, P.E. &
Fleming-Lee Shue, Inc.
158 West 29th Street
New York, New York 10001

Environmental Management & Consulting

&
Roux Associates, Inc.
290 Shafter Street
Islandia, New York 11749

June 2015

Qualified Environmental Professional Certification

REMEDIAL INVESTIGATION REPORT (RIR)

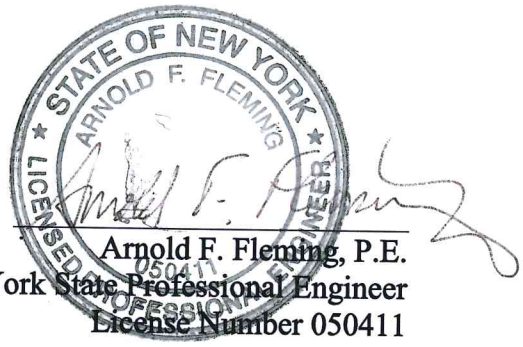
Queens Plaza Residential Development Site
Long Island City, New York

Brownfield Site B
Site No. C241151

June 2015

I, Arnold F. Fleming, P.E., certify that I am currently a Licensed Professional Engineer in New York State and Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Report 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

6/11/15
Date



Arnold F. Fleming, P.E.
New York State Professional Engineer
License Number 050411

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EXECUTIVE SUMMARY

The Volunteer (TST LIC Development, LLC and LIC Development Owner, LP) took ownership of the 1.9-acre Queens Plaza Residential Development (QPRD) property from Outlet City, Inc. on June 13, 2014. The Volunteer desires to redevelop the property for mixed commercial and residential use consistent with local zoning requirements. Figure 1 is a Site location map. Figure 2 is a Site Plan.

The property, known as Brownfield Cleanup Program (BCP) Site B (BCP Site B), was accepted into the Brownfield Cleanup Program on May 27, 2014 and has the BCP ID No. C241151. The property was the former site of West Chemical Company, a manufacturer of commercial cleaning and disinfectant products beginning in the early 1900s (before 1915). The Site experienced significant impacts from a creosote spill of several thousand gallons on adjacent BCP Site A in the 1950s (BCP Site ID No. C241105) that resulted in contamination of soils and groundwater on BCP Site B. Creosote is the predominant source of BCP Site B impacts, but releases of petroleum product have also been identified. Chlorinated compounds associated with Site operations also contributed to soil and groundwater contamination, but to a far lesser degree as well.

Given the Site history and contamination, the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) required a comprehensive environmental investigation to characterize the nature and extent of contamination and obtain information to support a remedial work plan to restore BCP Site B for its intended use. The Department approved the comprehensive Remedial Investigation Work Plan (RIWP) on September 23, 2014; the remedial investigation (RI) was completed in accordance with the approved RIWP and forms the basis of this report. The data were collected to support a BCP Track 2 Restricted Residential soil cleanup with Restricted Residential Track 4 as the fallback if Track 2 cleanup cannot be attained. The data collected during the RI are sufficient to develop an Interim Remedial Measure Work Plan and a Remedial Action Plan that will attain the desired BCP cleanup objectives.

The large creosote release in the 1950s impacted soils and groundwater and migrated beneath buildings on the western portion of the BCP Site. In particular, creosote migrated beneath Building 1, where a portion followed the shallow bedrock surface and flowed toward the southern property boundary. Creosote is responsible for the heaviest impacts to soil and groundwater and is the principal contributor to source material contamination. Petroleum releases have also impacted BCP Site B in some areas, but are much less extensive. Chlorinated solvents were used to a much lesser extent as cleaning/degreasing agents and to manufacture janitorial products, and these have impacted soil, groundwater, and soil vapor, but to a far lesser extent than creosote. The heaviest soil and groundwater impacts coincide with the main chemical processing and storage areas (described here as the central processing and storage area) on the western part of BCP Site B. This includes Building 2B/2C, Building 1, Building 10, Building 3A/3B, and Building 6. Contamination is much less pronounced to the north and east of the central processing and storage area. East of West Street the impacts are less pronounced.

Removal of source material to meet the Restricted Residential Soil Cleanup Objectives (RRSCOs) and applicable Protection of Groundwater (PGW) Soil Cleanup Objectives (PGWSCOs) is generally to the shallow bedrock, approximately 9 to 13 (ft-bgs) near the central processing and storage areas and deeper beneath Building 1 and the southwest corner of Site B. Contamination in this area will be excavated to approximately 13 to 22 feet below ground surface. East of West Street and north of Building 6, soil removal will occur approximately 8 ft-bgs, and deeper in localized areas.

In addition to soil impacts, source material removal will remedy groundwater and soil vapor impacts. Soil vapor impacts appear confined to soils within 6 feet of ground surface and are attributable to localized releases; soil vapor impacts appear unrelated to groundwater impacts.

Free-phase Dense Non-aqueous Phase Liquid (DNAPL) was not observed in any of the 31 soil borings or 30 monitoring wells sampled. Free-phase Light Non-aqueous Phase Liquid (LNAPL) was encountered in three wells near the central processing and storage area only. In addition to soil sampling, a concurrent geotechnical investigation produced 19 rock cores that penetrated approximately 10 feet into bedrock. All rock cores were entirely free of DNAPL or LNAPL.

Sampling conducted in BCP Site C has been omitted from the analysis in this report, but the locations and results of sampling have been included in the tables and figures for the sake of completeness and to promote a better understanding of BCP Site B conditions and the extent and limits of impacts.

1.0 INTRODUCTION

This Remedial Investigation Report (RIR) was prepared by Arnold F. Fleming, P.E. (AFF), Fleming Lee-Shue, Inc. (FLS), and Roux Associates, Inc. (Roux Associates) for TST LIC Development, LLC and LIC Development Owner, LP. (collectively, The Volunteer) to investigate the Queens Plaza Residential Development tract known as the Brownfield Cleanup Program (BCP) Site B (BCP No. C241151). Up to this point, numerous environmental investigations and sampling events were completed for portions of BCP Site B over time, but none were comprehensive, leaving a number of important data gaps. Figure 1 shows the Site location. Figure 2 is a Site Plan.

BCP Site B was accepted into the Brownfield Cleanup Program on May 27, 2014. One BCP requirement was that a comprehensive Site investigation be prepared to eliminate data gaps. The Department approved the BCP Site B Remedial Investigation Work Plan (BCP Site B RIWP) on September 23, 2014, and all Remedial Investigation (RI) work was completed in accordance with the approved work plan.

The RIWP objectives were to collect additional environmental data to assess potential impacts, enhance the exposure assessment, and augment the existing information dataset to assist in remediation of BCP Site B. The RI included the following scope of work:

- Collect soil, groundwater, and soil vapor data to increase the current coverage;
- Collect additional stratigraphic information and visual and instrument observations;
- Delineate areas with Light Non-aqueous Phase Liquid (LNAPL) and Dense Non-aqueous Phase Liquid (DNAPL);
- Collect environmental information to augment the exposure assessment;
- Evaluate the extent of potential impacts within BCP Site B;
- Support decision making for remediation of BCP Site B; and
- Collect information to support preparation of a Remedial Work Plan for Site cleanup based on the anticipated future use.

The data were collected to support a BCP Track 2 Restricted Residential soil cleanup with Restricted Residential Track 4 as a fallback if Track 2 cannot be attained. The RI data were evaluated employing the following BCP cleanup requirements:

- Where excavation is 15 feet or less below ground surface, the soil cleanup goals are the Restricted Residential Soil Cleanup Objectives (SCOs) or, for contaminants detected in groundwater above the Technical and Operational Guidance Series 1.1.1 (TOGS) Class GA Ambient Water Quality Standard and Guidance Values (AWQSGVs) as identified in this RI, the soil cleanup objectives will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS GA AWQSGVs.

- Where excavation is deeper than 15 ft-bgs, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS GA AWQSGVs will be the applicable SCOs. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 ft-bgs.
- Cleanup groundwater such that it meets the TOGS GA AWQSGVs or reaches asymptotic levels.

Understanding Site contamination is best viewed through the Site Conceptual Model (SCM). The SCM provides a logical framework derived from BCP Site B operations and materials processing that yield a meaningful basis from which to understand the nature and extent of contamination and its impacts.

The SCM holds that the primary raw material, creosote, was transported by overhead pipeline from the rail siding along the southern property boundary to an above ground storage tank near the central processing and storage area, in Building 2B/2C, on the western portion of Site B. This is where the bulk of the chemical processing and storage occurred. Creosote was processed in mixing vessels in Building 2B/2C where it was heated by steam with soap to mix the final product. The finished product (and other raw material) was stored in vaults beneath Building 2B/2C and in kettles in Building 3A/3B. The kettles and vaults were built atop shallow bedrock and the void between the bottom of the vaults and kettles backfilled with coarse bedding material. Finished product storage, packaging, and handling for shipping took place mainly in Building 9, removed from the main processing area.

The large creosote release on BCP Site A during a fire in the 1950s resulted in several thousand gallons of creosote flowing onto the ground surface. The creosote reached the coarse bedding material beneath the vaults and migrated beneath Building 2B/2C, Building 1, Building 10, and Building 6. A portion of the creosote migrated beneath Building 1 where it followed the shallow bedrock surface and flowed toward the southern property boundary. Creosote also flowed beneath Buildings 6, 6A, and 2, but stopped short of West Street. Creosote also migrated south toward Building 4. Chlorinated solvents were used to a much lesser extent, as cleaning/degreasing agents and to manufacture janitorial products. Petroleum product releases appear to be confined within the foundations of Building 10 and Building 2B/2C.

The principal findings are that soil is impacted most heavily on the western portion of Site B, mainly near the central processing and storage area and under Building 1, Building 10, and Building 6, and to a much lesser extent north and east of the central processing and storage area and Building 1. Creosote Non-aqueous Phase Liquid (NAPL) was also observed in the basement of Building 4. East of West Street, the impacts are much less severe because only storage, handling, packaging, and shipping occurred at this location.

Removal of soil to meet the RRSCOs and applicable PGWSCOs is generally to the shallow bedrock, approximately 9 to 13 ft-bgs near the central processing and storage area and deeper beneath Building 1 and the southwest corner of Site B. Contamination in this area will be excavated to approximately 12 to 22 ft-bgs. East of West Street and north of Building 6, soil removal is to extend approximately 6 ft-bgs, and deeper in localized areas.

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), chlorinated VOCs, metals, and a few pesticides have impacted groundwater. The impacts are greatest near the central processing and storage area. The impacts will be addressed by means of soil excavation, which will remove the source material contamination.

Source contaminant removal will also rectify soil vapor impacts. Soil vapor impacts appear confined to soils within 6 feet of ground surface and are attributable to localized releases

Free-phase DNAPL was not observed in any of the 31 soil borings or 30 monitoring wells sampled. The new wells added during the RI were installed to enable collection of DNAPL, if present. Of the 19 new wells installed, 15 were installed with screened intervals either atop rock, within low permeability strata or within approximately two to three feet of a low permeability stratum. All monitoring wells were screened for DNAPL and DNAPL was not identified in any of the wells. LNAPL was encountered in three wells near the central processing and storage area. In addition to soil sampling, a concurrent geotechnical investigation produced 19 rock cores that penetrated approximately 10 feet into bedrock. All rock cores were entirely free of DNAPL or LNAPL. Ten of the 19 rock cores were in or adjacent to areas with stained soils where there was a possibility of DNAPL reaching bedrock.

Sampling conducted in West Street has been omitted from the analysis in this report, but the locations and results of sampling have been included in the tables and figures for the sake of completeness and to promote a better understanding of Site conditions and the extent and limits of impacts.

All Site buildings were razed by December 2014. The former buildings and Site are referenced throughout this report as if they remain because they serve as reference points that facilitate describing and understanding the Site.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

BCP Site B is located in Long Island City, Queens County, New York. The Site occupies 1.9 acres (~82,230 square feet) and is bound by Jackson Avenue to the north, Orchard Street to the west, Queens Boulevard to the east, BCP Site A to the north, and the Long Island Railroad (LIRR) to the south. BCP Site B historically consisted of asphalt-covered open areas, several 1- to 3-story commercial buildings and one 5-story commercial building.

The Site is unoccupied, but historically, the principal activity was chemical manufacturing and storage. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes, insecticides and other household and industrial cleaners and janitorial products. Creosote was the principal component in the manufacture of disinfectants and creosote spills represent the most significant contamination of soil and groundwater. Chlorinated solvents and petroleum-based compounds appear in soils, groundwater, and soil vapor at some locations.

West Chemical Company occupied BCP Site B from the early 1900s until 1977 and manufactured and stored a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Among the materials stored, some were stored on adjacent BCP Site A in above ground tanks and some were stored in sub-slab vaults and kettles on BCP Site B. Creosote was among the main materials stored in these vessels. Creosote is a flammable material then used as the active ingredient in the manufacture of disinfectants, one of West Chemical's main product lines.

In the 1950s a fire began on the adjacent BCP Site A property. In an effort to prevent the fire from becoming a conflagration, the New York Fire Department (FDNY) reportedly cut down the creosote tank, which ruptured and the contents ran over the ground, infiltrating the underlying soils. This release is believed to be the principal cause of soil and groundwater impacts on BCP Site B.

BCP Site B is in an area designated as M1-6/R10 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a particular zoning provision to promote development and transformation of historical industrial/manufacturing areas into mixed-use commercial and residential spaces.

2.2 Site History

2.2.1 Historical Sanborn Maps

Information obtained from historical Sanborn fire insurance maps is summarized below. Copies of the Sanborn fire insurance maps are included in Appendix C. Historical Sanborn maps available for the Brownfield Site and surrounding areas are dated 1898, 1915, 1936, 1947, 1950, 1970, 1977, 1979, 1980, 1985, 1986, 1988, 1989, 1990, 1991, 1992, 1993,

1994, 1995, 1996, 1999, 2001, 2002, 2003, 2004, 2005 and 2006.

Year	Comments
1898	**Site:** The northeast corner of the Site (Block 263, Lot 9) is occupied by Romain & Co. Canned Goods. The remaining areas of the Site are occupied by residential dwellings and commercial stores. The Site is bounded by the Sunnyside Rail Yard to the south, Orchard Street to the west, Jackson Avenue to the north and vacant land to the east. Barn Street cuts through the center of the Site. **Surrounding Properties:** The surrounding properties consist of commercial and residential use only.
1915	**Site:** The northeast corner of the Site (Block 263, Lot 9) is occupied by J.D. Johnson Co. and used for a showroom, sales and metal works. The southeast corner of the Site (Block 263, Lot 1) is vacant. The southwest portion of the Site is shown as West Disinfectant Co., a manufacturer of disinfectants and disinfectant supplies. Several buildings and structures are associated with the West Disinfectant Co. facility including filling room, paint rooms, chemical storage, plating, shipping and laboratory. Several petroleum and chemical storage tanks are shown throughout the facility. The Site is bounded by the LIRR Sunnyside Rail Yard to the south, Orchard Street to the west, Jackson Avenue to the north and Queens Boulevard to the east. Barn Street cuts through the center of the Site. **Surrounding Properties:** The use of surrounding properties consist of residential, commercial and industrial. Rosenwasser Bros. Shoe Manufacturer is shown to the west of the Site across Orchard Street. A brass foundry, auto repair, stores and residential properties are shown to the north of the Site. To the east is Henry C Botjer Beer Bottling and stores. The LIRR Sunnyside Rail Yard is immediately south of the Site.
1936	**Site:** The northern portions of the Site along Jackson Avenue are shown as commercial stores and the southeast corner of the Site (Block 263, Lot 1) remains vacant. The southwest portion of the Site is still shown as West Disinfectant Co., including all structures and storage tanks. The Site street boundaries remain the same as the 1915 map. **Surrounding Properties:** The surrounding properties are predominantly commercial stores and industrial manufacturing. Rosenwasser Bros. Shoe Manufacturer and the Bristol Co. Furniture Manufactures are shown to the west of the Site across Orchard Street. The properties to the north and east of the Site are shown as stores and vacant land. A transit sub-station is shown adjacent to the north of the Site. The Sunnyside Rail Yard remains immediately south of the Site.

Year	Comments
1947	**Site:** The Site appears unchanged from the 1936 Sanborn Map except that West Disinfectant Co. now also occupies the previously vacant land in the southeast portion of the Site (Block 263, Lot 1). Additional details of the West Disinfectant Co. now show storage of steel drums and insecticide manufacturing. The Site street boundaries remain the same as the 1915 map; however, Barn Street has been named West Street. **Surrounding Properties:** The surrounding properties appear generally unchanged from the 1936 Sanborn Map. The vacant land to the north is now auto parking and the manufacturing facilities to the west are now shown as lofts.
1950	**Site:** The Site appears unchanged from the 1947 Sanborn Map. **Surrounding Properties:** The surrounding properties appear unchanged from the 1947 Sanborn Map.
1970	**Site:** The entire Site is now occupied by West Disinfectant Co. **Surrounding Properties:** The surrounding properties appear generally unchanged from the 1950 Sanborn Map. The property to the west is additionally shown as a parking lot.
1977 – 1986	**Site:** The Site appears unchanged from the 1970 Sanborn map. **Surrounding Properties:** The surrounding properties appear generally unchanged from the 1970 Sanborn map. The properties to the north of the Site are now all occupied by the Queens Bridge Plaza Parking Garage.
1988 – 2006	**Site:** The Site appears generally unchanged from the 1970 Sanborn Map. However, the northern portions of the Site along Jackson Avenue are shown as parking lots. **Surrounding Properties:** The surrounding properties appear generally unchanged from the 1977 Sanborn Map.

2.2.2 Historical Uses and Ownership

Prior to development, the real property containing BCP Site B occupied an elevated area between two streams, an unnamed stream to the west and Dutch Kill to the east of the BCP Site B (Beers 1868), both discharging into Newtown Creek. Both streams were flanked by a marsh south of the BCP Site B that now contains the LIRR Sunnyside Yard. Early industrial occupants of the Site include Romain & Co. Canned Goods. (1898 Sanborn map) and J.D. Johnson Co. (1915 Sanborn map). The West Chemical Company (West Chemical) occupied the BCP Site B from the early 1900s until 1977. During this time West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Prior to 1950, West Chemical manufactured a disinfectant that required storage of large quantities of creosote. Creosote use was discontinued after 1950 because of leaks and a fire that prompted the FDNY to empty the entire contents (several thousand gallons) of a creosote-filled above ground storage tank (on BCP Site A) directly to the ground surface in order to prevent its combustion during the fire.

Reportedly, West Chemical stored a variety of other materials on-Site during its tenure including iodine, muriatic acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand creams, cleaning products (floor waxes and cleaners), and vending machine products. Storage tanks were principally located within the BCP Site B. Underground storage tanks (USTs) for heating purposes are in Building 10. A UST for heating oil purposes was also identified north of Building 6.

West Chemical divested the BCP Site B and transferred ownership to Outlet City, Inc. in 1978. On June 13, 2014, the Volunteer acquired the property from Outlet City, Inc. and became the new property owner. All former West Chemical Company structures were razed by December 12, 2014.

2.2.3 Surrounding Historical Land Use

A New York City Transit (NYCT) substation and a vacant, former 5-story residential building occupy property on nearby lots immediately north and west of BCP Site B. The area along Jackson Avenue was historically lined by residential buildings with commercial/retail uses on the ground floor, similar to the 5-story residential building formerly abutting the northeast edge of the BCP Site A. These buildings were demolished over time and the areas they formerly occupied are now used principally for parking and storage.

The properties surrounding BCP Site B are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the LIRR Yard A. To the north and west lies the BCP Site A, which is vacant. To the north across Jackson Avenue is Two Gotham Center, a 700,000 ft^2 office building. West of BCP Site B are warehouse buildings and light manufacturing. East of the Brownfield Site, across Queens Boulevard (Route 25 and the elevated No. 7 Subway Line), is a former gasoline filling station and a vacant lot. The BCP Site B was historically zoned as "M1-6 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development on BCP Site B. West Street, a de-mapped City Street, outside of BCP Site B, extends south from Jackson Avenue into BCP Site B almost to the LIRR property. The Volunteer acquired West Street from the City of New York in December 2014.

2.3 Geology

2.3.1 Regional Geology

The regional geology of Queens County is comprised of sequences of Wisconsin age Upper Pleistocene glacial moraine (northern part) and glacial outwash (southern part) deposits (sand, gravel, cobbles, silt and clay); glacial-drift materials (lacustrine deposits, till, sand, gravel, and in some areas, fossil plant material disseminated in fine grained deposits); Upper Pleistocene deposits comprised of pre-Sangamon age Jameco gravel unit

uncomfortably overlain by Gardiner's clay of Sangamon age and Cretaceous age deposits of continental origin consisting of the Raritan Formation, the Magothy Formation – Matawan Group Undifferentiated (Soren 1978). Pre-Cambrian metamorphic bedrock underlying Queens is comprised of folded and faulted Ravenswood Granodiorite, and in some areas, Proterozoic Fordham Gneiss (Roberts – Dolgin 1989).

2.3.2 Local Geology

BCP Site B consists of two sections: Section 1 is referred to as Operable Unit 1 (OU-1) on the west side of the Site and Section 2, the balance of the property fronting Jackson Avenue, Queens Boulevard and the Long Island Railroad, as OU-2 (Figure 2). BCP Site B is on gently sloping land with a surface elevation of approximately 14.6 feet North American Vertical Datum 88 (NAVD88) for OU-1 and approximately 17.6 feet NAVD88 for OU-2. The generalized subsurface profile consists of fill overlying silty sand and glacial till, with bedrock below the till. A lens of clay is present above the bedrock in the area with the heaviest contamination near the center of the BCP Site B OU-1.

Upper soils consist of a fill layer approximately 5 to 13 feet in thickness. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varved silt and clay are present within this sand unit in some locations on BCP Site B. The sand layer varies in thickness from approximately 5 to 7 feet (ft). Additionally, a till layer is present over most, but not all, of the BCP Site B beginning at approximately 12 to 20 ft-bgs) (approximately (-0.4) ft. to (-9.4) ft. NAVD88 and extending to the top of bedrock at approximately 9 to 25 ft-bgs (elevations of approximately (-2.4) ft. to (-12.4) ft. NAVD88) in OU-1). Based on soil boring data from previous investigations, bedrock at the BCP Site B is gneiss.

2.4 Hydrogeology

Groundwater occurs within the unconsolidated geologic materials covering the BCP Site B. The upper surface of the groundwater table fluctuates seasonally in response to precipitation. Depth to the groundwater table ranges from 2 to 14 ft-bgs but is typically 6 to 11 ft-bgs over most of the Site. The groundwater table elevation ranges from approximately 7.6 ft. to 10.6 ft. NAVD88 over most of BCP Site B. Groundwater flow typifies that found in an area of a groundwater divide. Groundwater flow direction varies depending on location within the BCP Site B. On an imaginary line running from the southwest corner of BCP Site B to the northeast corner, groundwater flow south of the line is generally to the south and southwest. North of the line groundwater flow is to the northwest. Locally, there is a groundwater depression on the southwest corner of the Site. Groundwater flow in the northeast corner of the Site appears to flow onto BCP Site B from Jackson Avenue. Groundwater also appears to flow onto BCP Site B on the southeast corner of the Site due to the elevated, sloped embankment that borders the Site along Queens Boulevard. Figure 3 shows the direction of groundwater flow.

There are no surface water bodies on BCP Site B or on the surrounding properties. The closest surface water body is the Dutch Kill arising from Newtown Creek, located approximately 1,600 ft south of BCP Site B, and the East River approximately 4,200 ft to the west.

2.5 Previous Investigations

Seven previous environmental investigations and sampling events beginning in 1988 consisted of varying levels of soil and groundwater investigation, NAPL product level studies, and collection of soil vapor data on and outside BCP Site B. Previous investigations included the following:

1. Queens Plaza Site B Investigation, AKRF, 1988
2. Outlet City Soil and Groundwater Sampling Results, AKRF, 1990
3. Outlet City Property, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. Soil and Groundwater Sampling and Analysis, ELM, 2001
5. Site Sampling Event, AKRF, 2002
6. Additional Remedial Investigation Report (Draft), Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. SCS Engineers Sampling Event, April 2013

In addition, Mueser Rutledge Consulting Engineers (Mueser Rutledge or MRCE) completed a geotechnical investigation of BCP Site A and portions of BCP Site B in April 2007. The report contains geotechnical test borings and cross-sections depicting soil strata and bedrock. The report is entitled Geotechnical Summary Report, Queens Plaza Project – Site A, Long Island City, Queens, New York, April 20, 2007. A more recent geotechnical investigation was completed by Mueser Rutledge in January 8, 2015. This information has been incorporated into the RI. The geotechnical report is included in Appendix K.

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills and chlorinated compounds. Creosote spills impacted both shallow soils in the form of a smear zone and the deeper soils on the western portion of BCP Site B in the form of residual DNAPL-saturated zone. Creosote migrated through soil and over the bedrock surface to where it has entered the basement of adjacent Building 4—as understood from the earlier investigations. Creosote covers the floor and some portion of the basement walls of Building 4.

3.0 SAMPLING METHODOLOGY

This section details the sampling methodology employed by Roux Associates during RI activities conducted from August through December 2014. Figure 4 shows the location of samples collected during the RI. All RI activities were conducted in accordance with the August 2014 BCP Site B RIWP, approved by the Department in its letter dated September 23, 2014, and the Site's Health and Safety Plan (HASP) and included:

- The completion of 31 soil borings
- Installation, development, and sampling of 18 groundwater monitoring wells
- Development and sampling of 12 existing monitoring wells
- Installation and sampling of 15 temporary soil vapor monitoring points
- Surveying of all soil borings, monitoring wells, and soil vapor monitoring points
- Completion of seven monitoring well slug tests (rising-head tests)

The BCP Site B RIWP and HASP are provided in Appendix A. The aforementioned field activities completed during the RI are discussed in the following subsections.

3.1 Soil Sampling

Prior to completion, each boring was cleared by hand to a minimum depth of 5 ft-bgs using Vactron™ technology and hand tools (e.g., post-hole digger, shovel, hand-auger, etc.) to verify the absence of utilities. There were no utilities encountered during utility clearance activities.

A total of 31 soil borings (SB-1 through SB-31) was completed using the sonic and direct push drilling methods between August 13, 2014 and September 30, 2014. Soil borings SB-27 and SB-28 were completed using the sonic and direct push drilling methods on December 12, 2014. All drilling activities were conducted by Aquifer Drilling and Testing, Inc. of Mineola, New York.

In accordance with the BCP Site B RIWP, soil borings SB-1 through SB-8, SB-17, SB-21 and SB-29 through SB-35 were advanced to bedrock and soil borings SB-9 through SB-16, SB-18 through SB-20 and SB-22 through SB-26 were advanced to 20 ft-bg. Bedrock was encountered at soil borings SB-1 through SB-7, SB-20, SB-21, SB-29, and SB-31 through SB-35 at depths ranging from 6 ft-bgs to 44 ft-bgs. Refusals were encountered at SB-8 (23.5 ft-bgs) and at SB-30 (19.5 ft-bgs) before reaching bedrock. Shallow bedrock was encountered at SB-27 (6 ft-bgs), which was located within Building 3A/3B. The soil boring locations are shown on Figure 4. Soil boring logs are provided in Appendix F.

All soil samples were field screened for VOCs using a photoionization detector (PID) and were inspected for evidence of contamination (e.g., odors, staining, and visible free

product). The lithology of the soil was recorded according to the Unified Soils Classification System (USCS).

A geotechnical soil boring investigation was conducted by Mueser Rutledge independent of the work conducted in this RI. A total of 19 geotechnical soil borings (MR-1P through MR-21)[1] were completed throughout the Site, which included coring 10 feet into bedrock at each location. During the geotechnical investigation, bedrock was encountered at depths ranging from 6 to 50 ft-bgs. Roux Associates field personnel examined the bedrock cores from all of the geotechnical soil borings for evidence of contamination (e.g., odors, staining, and visible free product). There was no evidence of contamination in any of the bedrock cores completed during the geotechnical investigation. Ten of the 19 rock cores were in or adjacent to areas of soil staining where there was a possibility of NAPL (Figure 5). The lithology of the soil and bedrock cores that were in close proximity to RI soil borings were incorporated into those specific RI soil boring logs (See Appendix F). Photographic documentation of the bedrock cores is provided in Appendix E.

More than 150 soil samples, including Quality Assurance/Quality Control (QA/QC) samples, were collected and submitted for laboratory analysis. The following samples were collected from each soil boring for laboratory analysis, in accordance with the BCP Site B RIWP:

- One soil sample was collected from the five- to six-foot interval below ground surface;
- A second soil sample was collected from the one-foot interval directly at the observed groundwater interface; and
- A third soil sample was collected from the one foot depth interval exhibiting the highest PID reading and/or visual observations of contamination to document soil conditions; in locations where there were no PID readings and/or visual observations of contamination, the soil sample was collected at approximately 15-20 ft-bgs or just above bedrock.

Additional soil samples were collected from select soil borings to vertically delineate subsurface soil contamination and provide supplemental characterization data. All drilling equipment was decontaminated between each soil boring location using a non-phosphate detergent solution. A master sample tracking table is provided as Table 1. Observed NAPL staining in soil borings and a breakdown of frequency and percent of soil staining are presented in Tables 2A and 2B.

All soil samples were sent to Accutest Laboratories of Dayton, New Jersey, under chain of custody procedures and analyzed utilizing USEPA Method 8260B for Target Compound List (TCL) VOCs, USEPA Method 8270C for TCL Semi-Volatile Organic Compounds (SVOCs), USEPA Method 8081B for TCL Pesticides, USEPA Method 8082A for polychlorinated biphenyls (PCBs), and USEPA Method 6020A for Target Analyte List (TAL) Metals. In addition, select soil samples were analyzed for total

[1] Two additional geotechnical borings, MP-2 and MP-3, were scheduled, but later cancelled.

petroleum hydrocarbons diesel range organics (TPH DRO) and TPH gasoline range organics (GRO) using USEPA Method 8015C and bulk density, based on field screening observations. Accutest Laboratories is part of the Environmental Laboratory Approved Program (ELAP) certified by the New York State Department of Health (NYSDOH). As per the BCP Site B RIWP, all soil analytical data lab reports were submitted to Roux Associates' data validator in an effort to substantiate the reported values and verify that proper method-specific quality control was performed. The soil laboratory analytical reports and Data Usability Summary Reports (DUSRs) are provided in Appendix D.

Following screening and sampling activities, each borehole was backfilled with bentonite grout. Excess soil as well as decontamination water generated during soil boring activities were containerized in 55-gallon drums, labeled and stored in a temporary on-site drum storage area for future disposal to an approved waste disposal facility. The surface at each borehole was restored to the surrounding media (asphalt or concrete).

All soil boring locations were surveyed for horizontal and vertical coordinates by Mega Engineering and Land Surveying of Long Island City, New York (a New York State [NYS] licensed surveyor). Horizontal coordinates were referenced to the NYS Plane Coordinate System, Long Island Zone, North American Datum of 1983 (NAD83). Vertical coordinates (elevations) were measured for grade elevations referenced to the NAVD88.

3.2 Groundwater Sampling

A total of 18 monitoring wells (RMW-1 through RMW-17 and RMW-20) were installed between August 13, 2014 and September 30, 2014, in accordance with the BCP Site B RIWP. Monitoring wells RMW-1 through RMW-17 and RMW-20 were installed immediately following the completion of their respective soil borings (SB-5, SB-4, SB-21, SB-2, SB-29, SB-1, SB-6, SB-30, SB-9, SB-23, SB-15, SB-12, SB-13, SB-17, SB-18, SB-19, SB-16, and SB-3, respectively) (see Table 3). Proposed monitoring well RMW-18/SB-27 could not be completed due to bedrock at 6 ft-bgs. Proposed monitoring well, RMW-19/SB-28 was installed following the demolition of Building 4. The monitoring well locations are shown on Figure 4. All monitoring wells, except for RMW-5, were constructed with approximately 10 feet of 2-inch diameter, 0.01-inch slotted PVC screen, installed to bridge the water table with approximately seven (7) feet below and three (3) feet above the water table. RMW-5 was constructed with 10 feet of 1-inch diameter, 0.01-inch slotted PVC screen due to the present of a concrete slab encountered at approximately 4.5 ft-bgs. Monitoring well construction details are shown in Table 3. Monitoring well construction logs are provided in Appendix F.

Following well installation activities, each well was developed to ensure proper hydraulic connection with the aquifer and to reduce/eliminate turbidity of the water. All wells were developed using a submersible pump and a surge block, which was surged periodically until well yield was consistent and had reduced/eliminated turbidity, when possible.

All soil cuttings and purge water generated during well installation and development activities were containerized in 55-gallon drums and staged in a drum storage area at the

Site for future disposal to an approved waste disposal facility.

Monitoring wells RMW-1 through RMW-17 and RMW-20 were sampled between September 11, 2014 and September 30, 2014; approximately one week after each well's development. Groundwater samples were collected using the methods described in United States Environmental Protection Agency (USEPA) Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells dated January 19, 2010.

A full gauging round was conducted on October 16, 2014 at all newly installed monitoring wells, in an effort to determine groundwater level elevations within the Site. The monitoring wells were gauged using an electronic interface probe to detect free-phase product, if any. Measurable free-phase product was not detected in any of the newly installed monitoring wells during the gauging round.[2] Measurable free product (0.92 ft.) was observed in pre-existing monitoring well SCS-MW-2C on this date. A trace or sheen (0.09 ft.) was observed in monitoring well 6A-2. SCS-MW-10-1, while not exhibiting any free product on October 16, 2014, measured 2.05 feet of LNAPL on September 24, 2014.

During groundwater sampling, an in-line, water quality measurement device was used to monitor water quality indicator parameters such as pH, conductivity, dissolved oxygen (DO), oxygen reduction potential (ORP), temperature, and turbidity at all monitoring wells. The field parameters were recorded on well sampling data forms, which are included in Appendix F.

All groundwater samples were sent to Accutest Laboratories of Dayton, New Jersey, under chain of custody procedures and analyzed utilizing USEPA Method 8260B for TCL VOCs, USEPA Method 8270C for TCL SVOCs (total and dissolved), USEPA Method 8081B for TCL Pesticides, USEPA Method 8082A for PCBs, USEPA Method 6010/7000 for TAL metals (total and dissolved) and general groundwater parameters (nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate). As per the BCP Site B RIWP, all groundwater analytical data laboratory reports were submitted to Roux Associates' data validator in an effort to substantiate the reported values and verify that proper method-specific quality control was performed. The groundwater laboratory analytical reports are provided in Appendix D. The groundwater DUSRs are provided in Appendix D.

All newly installed monitoring wells were surveyed for horizontal and vertical coordinates by Mega Engineering and Land Surveying P.C., of Long Island City, New York (a NYS licensed surveyor). Horizontal coordinates were referenced to the New York State Plane Coordinate System, Long Island Zone NAD83. Vertical coordinates (elevations) were measured for top-of-casing (measuring point) and grade elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

[2] A trace product level of 0.09 feet was observed in RWM-2, but it is uncertain if this was measurable product or sheen because of the very small level. RWM-2 was probed for free product in September 2014 and no measurable free product was observed.

3.2.1 Existing Monitoring Well Development and Sample Collection

A total of 12 existing monitoring wells (6A-2, 9-1, 10-4, A-4, F-1, F-3, MW-4, SCS-MW-2C, SCS-10-1, SCS-MW-10-2, WS-4, and WS-5D) were developed to ensure proper hydraulic connection with the aquifer and to reduce/eliminate turbidity of the water. All wells were developed using a submersible pump and a surge block, which was surged periodically until well yield was consistent and had reduced/eliminated turbidity.

Existing monitoring wells 6A-2, 9-1, 10-4, A-4, F-1, F-3, MW-4, SCS-MW-2C, SCS-10-1, SCS-MW-10-2, WS-4, and WS-5D were sampled between September 9, 2014 and September 26, 2014; approximately one week after each well's development. Groundwater samples were collected using the USEPA methods described above.

A full gauging round was conducted on October 16, 2014. Each monitoring well, except WS-5D, sampled during the RI, was gauged in an effort to determine groundwater level elevations within the Site. WS-5D was covered by demolition debris and could not be accessed during the gauging round. The monitoring wells were gauged using an electronic interface probe to detect the presence of free-phase product, if any. Free-phase product was detected in monitoring wells 6A-2, SCS-MW-2C and SCS-MW-10-1 during the gauging round. Free-phase product samples were collected from SCS-MW-2C and SCS-MW-10-1 on October 1, 2014. An additional gauging round was conducted on December 22, 2014.

During groundwater sampling, an in-line, water quality measurement device was used to monitor water quality indicator parameters such as pH, conductivity, dissolved oxygen (DO), oxygen reduction potential (ORP), temperature, and turbidity at all monitoring wells. The field parameters were recorded on well sampling data forms, which are included in Appendix F.

All groundwater samples were sent to Accutest Laboratories of Dayton, New Jersey, under chain of custody procedures and analyzed utilizing USEPA Method 8260B for TCL VOCs, USEPA Method 8270C for TCL SVOCs (total and dissolved), USEPA Method 8081B for TCL Pesticides, USEPA Method 8082A for PCBs, USEPA Method 6010/7000 for TAL metals (total and dissolved), and general groundwater parameters (nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate). As per the BCP Site B RIWP, all groundwater analytical data were submitted to Roux Associates' data validator in an effort to substantiate the reported values and verify that proper method-specific quality control was performed. The free-phase product samples were sent to Torkelson Geochemisry, Inc., of Tulsa, Oklahoma, under chain of custody procedures and analyzed for physical properties (density, viscosity, interfacial tension and surface tension) and hydrocarbon fingerprint (gas chromatogram characterization). The groundwater and free-phase product laboratory analytical reports are provided in Appendix D. The groundwater DUSRs are provided in Appendix D.

3.3 Sub-Slab Soil Vapor and Ambient Air Sampling

Fifteen (15) temporary soil vapor monitoring points (SV-1 through SV-11, and SV-13 through SV-16) were installed between August 11, 2014 and December 16, 2014. Soil vapor points SV-13 and SV-14 were located in or immediately adjacent to the vault/kettle buildings and were installed and sampled in December 2014. Soil vapor point SV-12 could not be installed due to the shallow water table, less than one foot below grade, at that location. SV-16 was installed in place of the SV-12 location. The locations of the soil vapor monitoring points are shown on Figure 4. Following removal of the concrete or asphalt at SV-1 through SV-4, SV-6, and SV-7, the soils were excavated using hand tools to 8 ft-bgs (7-8 ft-bgs sample interval). Due to the presence of shallow groundwater, the soils at SV-5, SV-15 and SV-16 were excavated to 3 ft-bgs (2-3 ft-bgs sample interval); soil at SV-8 was excavated to 1.5 ft-bgs (0.5-1.5 ft-bgs sample interval); and soils at SV-10 and SV-11 were excavated to 5 ft-bgs (4-5 ft-bgs sample interval).

Upon reaching the target depth at each location, a 6-inch-long stainless steel screen attached to inert sampling tubing was inserted into the borehole. The end of the sampling tubing near land surface was sealed with flexible tubing to avoid water and/or sediment from enter and potentially clogging the sample tubing. The borehole was backfilled with coarse sand to approximately 6 inches above the stainless steel screen (creating a one foot sample interval) and the remainder of the borehole was filled with granular bentonite, which was hydrated with potable water, to secure the sampling tubing in place and prevent infiltration of ambient air into the sampling interval.

Soil vapor samples were collected between August 2014 and December 2014 at each temporary soil vapor point (SV-1 through SV-11, and SV-13 through SV-16) in accordance with the BCP Site B RIWP and the October 2006 NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH Guidance). Soil vapor samples were collected utilizing the following procedural steps:

1. A clay seal was placed around the sampling tubing in an effort to further minimize the infiltration of the atmospheric air present at land surface directly above the sampling point (ambient air).
2. The sampling tubing was connected to a “T” connector three-way valve assembly, with one end of the “T” connector leading to a vacuum pump and the other end leading to a pre evacuated summa canister with a calibrated flow controller.
3. The soil vapor sample tubing and surrounding sand pack was purged of approximately three volumes of air using a vacuum pump set at a rate of approximately 0.2 liters per minute.
4. A tracer gas (e.g., helium) was used to enrich the atmosphere in the immediate vicinity of the sampling location where the sampling tubing intersected the ground surface in order to test the borehole seal and verify that ambient air was not inadvertently being drawn into the sample. A plastic container (i.e. bucket), with a soft seal, was placed over the monitoring point and the helium was injected into the bucket during purging of the monitoring point in an effort to enrich the interior of the bucket with the tracer gas. Note that the 3-way valve used to connect the

sample tubing to the equipment was also placed under the shroud (i.e., the bucket enclosure) and included in the tracer gas verification. This was done in an effort to ensure that the valve did not provide a means by which ambient air would enter the canister and possibly dilute the sample. Both the purge volume from the sample tubing (i.e., also the air that passed through the 3-way valve), and the helium enriched area within the bucket were screened for the tracer gas. The gas was measured with a MGD-2002 helium detector (by Dielectric), which measured the rate of helium leakage at the surface. If the screening results showed that the rate of helium detected from the sampling tubing was greater than 10% of the helium detected in the enriched area (i.e., within the bucket), the seals around the sampling equipment were reset and the sampling tubing was purged again until the tracer gas was no longer detected at levels greater than 10% of the enriched area.

5. Following the purging and tracer gas verification steps, the valve leading to the pump was closed, the pump turned off, and the soil vapor directed to a 1-liter summa canister for sample collection. A laboratory-supplied, calibrated flow controller set for a ½-hour sample period was used at each location, to restrict the sample collection rate to 0.2 liters per minute or less.

All soil vapor samples were submitted to Accutest Laboratories in Dayton, New Jersey and analyzed for VOCs and naphthalene using USEPA Method TO-15. As per the BCP Site B RIWP, all soil vapor analytical data were submitted to Roux Associates' data validator in an effort to substantiate the reported values and verify that proper method-specific quality control was performed. Soil vapor sampling logs are provided in Appendix F. The soil vapor laboratory analytical reports are provided in Appendix D. The soil vapor DUSRs are provided in Appendix D.

3.4 Slug Tests

Slug tests, (i.e., raising-head tests) were conducted at seven monitoring wells, RMW-4, RMW-7, RMW-8, RMW-13, F-3, OS-5 and OS-7, between October 7, 2014 and October 13, 2014, in an effort to obtain estimates of hydraulic conductivity of the aquifer beneath the Site. The raising-head test method involved measuring the response of each well to the withdrawal of water over one-minute intervals.

During testing, water-level changes with time (data) were measured and recorded. A water level meter was used to collect slug test data needed for analysis. The following procedure was followed while performing each slug test.

- Static water level measurements (the depth to water below the top of casing at each well) were measured prior to the start of the slug tests. Following static water level measurements, the depth to bottom of each well was measured.
- At the start of the slug test, water from each well was removed using a 1½-inch diameter bailer, over a one-minute period, and the volume of water removed was recorded.

- Immediately following the one-minute water removal activity, water level measurements were collected over one-minute intervals until water levels returned to static or near-static conditions (i.e., normalized head reading was ≤ 0.05 feet).

The slug test procedure described above was performed three times at each of the following monitoring wells RMW-7, RMW-8, RMW-13, F-3, OS-5, and OS-7 and twice at RMW-4 to demonstrate reproducibility of results. Slug test data is provided in Appendix G.

4.0 SITE CONCEPTUAL MODEL

This Site Conceptual Model (SCM) integrates the effect of Site B history, release history, stratigraphy, hydrogeology, and soil physical properties with the distribution of contaminants. It combines these factors in a manner that provides a logical framework for understanding contaminant location, behavior, and distribution.

Historically, chemical manufacturing and storage were the principal activities on BCP Site B. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. The Site was developed for the West Chemical Company from the early 1900s (Building 4) to approximately 1947 (Buildings 10, 6 and 6A). Building locations are shown on Figure 2. Creosote was used in the manufacture of disinfectants and cleaners and creosote spills are the principal source of soil and groundwater contamination. Petroleum and chlorinated solvents have also been found in soils, groundwater, and soil vapor as a result of what are believed to be ancillary uses for cleaning, manufacture of janitorial supplies, and heating.

The SCM holds that bulk creosote was shipped to the Site by freight train through the railroad siding on the rear of Building 1. These materials were processed at the central processing and storage areas on the west side of BCP Site B (Building 1, Building 2B/2C, Building 3A/3B, Building 4, Building 6, and Building 10). A steam line from the boiler room in Building 5 traveled through a trench in Building 10, along the edge of Building 2B/2C and into Building 2B/2C. Steam heated the creosote that was mixed with the chemicals and soap in vessels as part of the manufacturing process. A blueprint showing a steam line used in the chemical processing is included in Appendix J. The sludge found in a number of the vaults was tested and exhibited high levels of naphthalene, a key indicator of creosote.

In the 1950s, a fire prompted the FDNY to empty the entire contents of a creosote-filled above ground storage tank (on BCP Site A) directly to the ground surface in order to prevent a conflagration. Due to the nature of the spill, the creosote spread along the surface of BCP Site A (primarily Area E) and entered the subsurface where it then migrated to other areas of BCP Site B. Much of the creosote reached the coarse bedding atop the shallow bedrock that served as support for the vaults beneath Building 2B/2C where finished bulk product and raw material were stored. Subsequent to the fire, West Chemical Company ceased using creosote as the active disinfectant switching to Bromine.

Building 2B/2C abuts the 1950s creosote spill. During the RI, a permeable gravel layer was discovered beneath the vaults that occupy the space between the bottom of the vaults and the shallow bedrock surface beneath the building footprint. Shallow bedrock is present beneath an appreciable portion of Building 2B/2C, so the gravel layer was most likely used as a foundation bed for the vaults that are bearing on bedrock. This gravel layer likely acted as a conduit for the creosote once it had seeped into the subsurface. The high permeability of the gravel layer allowed the creosote to spread horizontally beneath Building 2B/2C and under the adjacent buildings, Building 6A and Building 1.

Observations during the RI suggest that the creosote migrated laterally and downward and encountered increasing resistance near the capillary fringe due to water in the soil pores. The capillary resistance retarded migration of the creosote DNAPL and caused it to smear over soil in the unsaturated zone. Vertical migration was slowed by a layer of silty sand below the groundwater table that covers most of the Site.

Since the density of creosote (approximately 1.08 grams per milliliter [g/ml]), a light DNAPL, is comparable to that of water (1.00 g/ml), a higher hydrostatic pressure is required to displace water in the soil pores once the creosote reaches the groundwater table interface. Because of the limited mobility of creosote in the saturated zone due to capillary resistance, the principal mass of creosote moved through the unsaturated zone. It is believed that much of the creosote is within the coarse bedding material beneath Building 2B/2C. Nonetheless, a portion of the creosote migrated atop the shallow bedrock at Building 2B/2C and flowed southward over the shallow bedrock beneath a portion of Building 1 and reached the south side of Building 1 and Building 4 where it migrated to approximately 22 ft-bgs.

Creosote can be characterized by relatively elevated levels of naphthalene compared with benzene, toluene, ethylbenzene, and xylene concentrations. Analytical results obtained from this RI show that the bulk of the creosote contamination (i.e. highest relative naphthalene concentrations) lie within the top 10 feet of soil below ground surface, primarily in the unsaturated zone.

Soil analytical results from the RI show the highest concentrations of total SVOCs were observed in the three soil borings adjacent to Building 2B/2C (SB-1, SB-5 and SB-6). The concentration of total SVOCs in the samples from each of those three soil borings was at least twice the concentration of total SVOCs encountered in any of the samples from the other soil borings.

In addition to the analytical results, visual and olfactory field observations from all of the soil samples collected were recorded and categorized. The level of soil staining was then compared to the strata from which the sample was collected. The most heavily stained material was observed in the finer-grained soils, while the lighter staining was observed in the coarser-grained soils. This indicates that the creosote mass likely traveled through both the finer-grained and coarser-grained soils, but was absorbed into the finer-grained soils, which contain the bulk of the contaminant mass.

Although some migration of the creosote occurred in the subsurface, the bulk of the creosote spill most likely spread on the ground surface. Building 6A is lower in elevation than the area where the spill occurred. As a result, creosote mass migrated into Building 6A, which is the northern most extent of observed creosote staining.

Staining was also observed in the soil beneath Building 9. The soil staining and analytical results from the soil borings SB-16 and SB-17 in Building 9 suggest that this release is independent from the 1950s creosote spill. The analytical results from the soil vapor samples in Building 9 show high levels of chlorinated compounds in this area as well. This release is probably related to the former use of Building 9 as a product handling, packaging, shipping, and warehousing facility, under West Chemical Company. Table 2A summarizes

the NAPL and soil staining in the test borings. Figure 5 depicts the extent of NAPL distribution and soil staining throughout the Site.

The groundwater analytical results show that concentrations of VOCs and SVOCs in groundwater exceed NYSDEC TOGS GA AWQSGVs primarily in the former central processing and storage area. One of the groundwater samples from beneath Building 9, RMW-17, also shows elevated levels of VOCs and SVOCs. Naphthalene was found above its respective guidance value in approximately 75 percent of the samples collected. The elevated levels of VOCs and SVOCs in groundwater from the monitoring wells located in the former central processing and storage area (6A-2, RMW-7, SCS-MW-2C, SCS-MW-10-1, SCS-MW-10-2, RMW-1, RMW-2, RMW-3, RMW-4, and RMW-5) indicate that the creosote has impacted groundwater primarily in areas where soil staining was observed and soil contamination confirmed.

Creosote contamination in the subsurface is believed to have reached the bedrock in areas where shallow bedrock was encountered (Building 2B/2C, Building 10, and portions of Building 1); however, creosote was confined to the overburden soils and did not migrate into bedrock. Bedrock-creosote conditions were assessed in parallel with the RI during a separate geotechnical investigation conducted by Mueser Rutledge. Bedrock geotechnical cores were recovered and examined for evidence of creosote/NAPL impacts. The bedrock exposed during the geotechnical investigation did not exhibit any odors or staining. None of the 19 bedrock cores examined showed any creosote impacts. No odor, staining or PID observations indicative of creosote or NAPL were observed in the bedrock cores. Ten of the rock cores were in or adjacent to area with soil staining and where there was a possibility of NAPL reaching bedrock (Figure 5). An experienced senior field geologist examined all rock cores in detail.[3]

The lack of creosote impacts to the bedrock indicate that the creosote contamination traveled downward from the shallow coarser-grained soils and was trapped in the finer-grained strata beneath, limiting the vertical extent of the contamination. As a result of this investigation, it is concluded that creosote contamination has not impacted bedrock.

[3] Two additional soil borings were planned (MR-2 and MR-3), but as of March 2015 these borings are no longer required and are not scheduled for installation. Where bedrock is exposed during remediation, it will be visually inspected for evidence of NAPL on bedrock.

5.0 FINDINGS

5.1 Stratigraphy

The generalized subsurface profile consists of historic urban fill material (fill) overlying silty-sand, with intermittent layers of silt and clay; depth to bedrock ranges from 6 to 50 ft-bgs. Geologic cross-sections are included in Figure 6. Descriptions of each soil stratum are given below.

The subsurface fill identified during the RI consisted predominantly of brown, fine to coarse sand containing various amounts of gravel, cobbles, brick, and construction and demolition debris. The extent of the fill layer ranged from approximately 4 to 13 ft-bgs.

The fill was underlain by dark brown to dark grey fine to medium silty-sand, ranging in thickness from 5 feet to 15 feet, with intermittent layers of silt and silty-clay. The silt and silty-clay layers ranged in thickness from 1 foot to 5 feet. The silt and silty-clay layers were underlain by either a layer of fine to coarse sand with varying amounts of silt and gravel or bedrock. The fine to coarse sand layer ranged in thickness from 1 foot to 15 feet.

Based on geotechnical soil boring data collected concurrently with the RI (discussed in Section 2.5 and provided in Appendix K), bedrock, consisting of hard, un-weathered to moderately weathered grey gneiss, is located approximately 6 to 50 ft-bgs. An experienced, senior field geologist examined all 19 geotechnical rock cores in detail for evidence of DNAPL penetration and none was found. In the 25 RI borings that reached bedrock, staining was observed at the soil-bedrock contact in only three instances: SB-4 (19-20), SB-1 (8-9), and SB-28 (21-22). Based on these observations, it is FLS's opinion that there is an extremely low likelihood that DNAPL could penetrate and migrate through bedrock.

As indicated above, bedrock was either overlain by the silt and silty-clay layers or by a layer of fine to coarse sand with varying amounts of silt and gravel. Bedrock beneath the Site rises beneath Building 10 to an approximate elevation of 4.6 ft. NAVD88 and shallower below Building 3A/3B, where the bedrock elevation is at elevation 7.2 ft. NAVD88 (Figure 6 and Figure 7). Bedrock plunges from the peak to the following elevations: (-30.9) ft NAVD88 to the north, (-14) ft. NAVD88 to the south, (-5) ft. NAVD88 to the west, and (-25.5) ft. NAVD88 to the east. The plunge is steepest to the north and relatively gentler in the other cardinal directions. A bedrock elevation contour map is depicted in Figure 7.

The sampling analytical results are presented in the following sections. It must be noted that a disproportionately low number of samples were collected inside the most contaminated areas such as on the western portion of the Site where chemical storage and processing took place. Buildings 2 and 4 had no samples collected directly beneath them due to the physical restraints (i.e., product-filled vaults, and structural integrity concerns). Only one boring was advanced in Building 3A/3B due to access limitations imposed by liquid-filled kettles in this building.

5.2 Soil Analytical Results

Up to 137 soil samples were collected during this remedial investigation from 31 soil borings (excluding BCP Site C). The soil analytical results, along with the physical observations show that the bulk of the contamination is from the creosote spill is centered near the former central processing area and areas immediately adjacent. Tables 4 - 9 provide the analytical results from soil samples collected during the RI with a comparison to the SCOs. Figure 8 is a spider diagram for compounds detected above the SCO. Figure 9 shows the isopleth contours for concentrations of compounds of concern in soil.

The matrices of key compounds show the number of detected and non-detected values along with the spread of detected values. The key constituents are the compounds of concern, main risk drivers, and compounds with groundwater results above TOGS.

VOCs

The Matrix of Key VOC compounds identifies the number of results where contaminants were below detection limits [non-detects (ND)] and the number of sample results with measurable concentrations.[4] For those contaminants with measurable concentrations, the matrix illustrates the range of concentrations along with distribution of values. For example, in the samples where benzene was detected (137 - 94 = 43 samples), the minimum concentration measured 0.2 ug/kg and the maximum concentration measured 11,900 ug/kg. The median (p50) measured 138 ug/kg and 75 percent of the detected results measure 735 ug/kg or less.

With respect to the cleanup levels, in samples where benzene was detected, it exceeded the RRSCOs in seven percent of the sample results and exceeded the PGWSCOs in nearly 60 percent of the sample results. Toluene and ethylbenzene both exceeded the PGWSCOs in 35 percent of the soil samples where these compounds were detected. Xylenes exceeded the RRSCOs in approximately five percent of the sample results and were above the PGWSCOs in over 40 percent of the sample results. The results that exceed the SCOs are primarily found in and around the former central processing area and to a lesser extent in areas removed from that location.

[4] Key compounds are those chemical constituents typically found in creosote and/or petroleum (benzene, toluene, ethylbenzene, xylenes, naphthalene, phenolic compounds) and/or whose frequency, concentration, or toxicity otherwise strongly influence site characterization and remediation.

Matrix of Key VOCs, µg/kg

Compound	Restricted Residential SCO	Protection of Groundwater SCO	NDs	Min	p25	p50	p75	Max
Acetone	100,000	50	77/137	2.6	9.2	16.2	29	2,990
Benzene	4,800	60	94/137	0.2	0.96	138	735	11,900
Toluene	100,000	700	77/137	0.22	1.5	95	2,315	70,100
Ethylbenzene	41,000	1,000	74/137	0. 6	21	328	4,500	33,500
Xylene Total	100,000	1,600	61/137	0.35	5.6	423	7,045	147,000
$MeCL_2$	100,000	50	132/137	1.7	2.2	2.3	2.7	389
PCE	19,000	1,300	115/137	0.25	0.73	34	432	1,630
TCE	21,000	470	119/137	0.24	0.62	49	1,060	3,070
1,1-DCA	26,000	270	134/137	1	1	3	9.6	9.6
1,2-DCA	3,100	20	123/137	0.38	1.2	10.4	182	748
1,1-DCE	100,000	330	136/137	0.92	0.92	0.92	0.92	0.92
1,2-Dichlorobenzene	100,000	1,100	105/137	0.29	0.78	29.6	624	17,100
1,4-Dichlorobenzene	13,000	1,800	115/137	0.39	9.4	108	2,350	29,200
cis-1,2-DCE	100,000	250	118/137	0.35	0.78	13.5	243	2,620
1,1,1-TCA	100,000	680	133/137	1.4	1.4	2.6	17.7	31.5
Vinyl chloride	900	20	135/137	1.8	1.8	2.7	3.5	3.5
Total VOCs	100,000	--	20/137	0.2	15.3	51	2,924	282,070

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p25 (25 percent of results); p50 (median) (50 percent of results), p75 (75 percent of results), max (maximum). Statistics based on detected results only.

Of the key VOCs identified in groundwater above TOGS GA AWQSGVs, 1,1-DCA, 1,1-DCE; 1,1,1-TCA; and vinyl chloride were below both the RRSCOs and PGWSCOs in all soil samples at varying depths. Methylene chloride was below the RRSCOs and PGWSCOs in all soil samples except one, collected in sample SB-7 (43-44). All soil sample results were below both sets of criteria for cis-1,2-DCE and 1,2-DCA below 11 ft-bgs with the exception of 1,2-DCA in SB-7 (43-44), but in soils overall, 1,2-DCA exceeded the PGWSCOs in 35 percent of the sample results where it was detected. Trichloroethene (TCE) exceeded the PGWSCOs in a third of the samples where it was detected.

Deeper than 15 ft-bgs, the analytical results identified benzene, toluene, ethylbenzene, and xylenes above the PGW SCOs in six soil borings: SB-2, SB-3, SB-5, SB-12, SB-17, and SB-28 at depths ranging from 18 to 22 ft-bgs. Ethylbenzene were above the RRSCOs in two borings: SB-5 and SB-17. Xylenes were above the RRSCOs in four borings: SB-5, SB-12, SB-17, and SB-28.

SVOCs

The matrix of key SVOCs lists the compounds that exceed TOGS GA AWQSGVs (along with related compounds that have no TOGS GA AWQSGVs). The distribution of these compounds in soil exhibits a pattern similar to VOCs. For example, naphthalene, a key creosote compound and among the compounds with the highest concentrations, has 40 percent of the detected soil results above the Unrestricted Use Soil Cleanup Objective and PGWSCOs. Where naphthalene concentrations are highest, they are in borings near and

south of the former central processing and storage area near Building 6A, Building 2B/2C, Building 1, and Building 10 (Figure 8). Nine of the 10 soil borings with the most elevated naphthalene concentrations are in this area.

Matrix of Key SVOCs, µg/kg

Compound	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	Max
Naphthalene	100,000	12,000	50/136	14.9	106	776	105,000	2,150,000
2-Methylnaphthalene	--	36,400	63/136	23	162	2,170	170,000	2,080,000
Benzo(a)pyrene	1,000	22,000	62/136	14.7	63	241	632	7,490
Benz(a)anthracene	1,000	1,000	56/136	14.6	83	365	1,215	9,000
Acenaphthene	100,000	98,000	58/136	15	118	534	30,300	267,000
Dibenzofuran	59,000	210,000	68/136	15.8	133	2,360	30,050	260,000
Fluorene	100,000	386,000	60/136	13.5	98	943	20,700	166,000
2,4-Dimethylphenol	--	--	104/136	75	600	2,765	10,875	103,000
2-Methylphenol	100,000	330	117/136	43	222	816	3,290	36,500
3,4-Methylphenol	100,000	330	107/136	62	141	1,010	3,970	109,000
Phenol	100,000	330	128/136	599	675	1,435	24,800	50,700
4-Nitrophenol	--	100	136/136	--	--	--	--	--
1,1-Biphenyl	--	--	72/136	14	113	1,880	32,150	259,000
Bis(2-Ethylhex)phthalate	--	--	55/136	35	91	160	769	14,500
SVOC Total	100,000	--	10/136	24	241	3,942	97,480	5,120,914

Naphthalene within 15 ft-bgs was below the PGWSCO in all samples in Areas A, B, F, Building 3A/3B, and Building 9. Within 15 ft-bgs, naphthalene was above the PGW SCO in Area G, Building 5, Building 6, and Building 10, areas closest to the chemical processing and storage areas.

Below 15 ft-bgs, naphthalene was above the PGWSCOs at depths reaching 18 to 22 ft-bgs, in six borings: SB-2, SB-3, SB-4, SB-5, SB-17, and SB-28. Several results extend to the top of rock, and all but those from SB-17 were from the former central processing and storage area.

For the phenolic compounds with a listed RRSCO and PGWSCO, (phenol, 2-methylphenol, and 3,4-methylphenol; RRSCO of 100,000 µg/kg and PGWSCO of 330 µg/kg for each compound, respectively), the sample results were above the RRSCO in soils within 15 ft-bgs in one sample, 3,4-methylphenol (SB-1 (5-6) A; 109,000 µg/kg), in Building 10. In soils deeper than 15 ft-bgs, all three compounds were below the RRSCO.

With regard to the PGW SCO for the phenolic compounds within 15 ft-bgs, the results were above the PGWSCOs in seven borings (SB-1, Building 10; SB-2, SB-5, SB-20, Building 1; SB-6, Building 6; SB-27, Building 3A/3B, and SB-21, Area G). These are all on the western portion of the Site in and around the central chemical storage and processing area. Deeper than 15 ft-bgs, these compounds were above the PGWSCOs in borings SB-2, SB-5, SB-3, and SB-28.

Another naphthalene-based compound, 2-methylnaphthalene, is very highly correlated with naphthalene (0.99 correlation at the 95 percent confidence limit), meaning that it occurs with naphthalene and at concentrations approximately the same as naphthalene (approximately four percent lower).[5] The compound 2-methylnaphthalene was above the PGW SCO in soil within 15 ft-bgs in borings SB-1, SB-3, SB-4, SB-5, SB-6, SB-20, SB-21, and SB-29. Below 15 ft-bgs, 2-methylnaphthalene was above the PGWSCO in borings SB-2, SB-3, SB-5, and SB-28 at depths of 18 to 22 ft-bgs. These borings are all on the western portion of Site B near the central chemical storage and processing area and in the southwest corner of the Site.

For the key non-phenolic SVOCs in groundwater with concentrations above TOGS GA AWQSGVs (benzo(a)pyrene, benzo(a)anthracene, acenaphthene, dibenzofuran, and fluorene), the compounds exceed the RRSCOs or PGWSCOs primarily in soils within 15 ft-bgs. Within 15 ft-bgs, these compounds are above the RRSCOs or PGWSCOs in 17 borings throughout the Site and are not limited to locations near the chemical storage and processing area, the implication being they are also associated with urban fill. Below 15 ft-bgs, benzo(a)anthracene, acenaphthene, and/or dibenzofuran were above the RRSCOs or PGWSCOs in borings, SB-9 and SB-5 at depths of 16 to 18 ft-bgs, respectively.

All SVOCs above the RRSCOs were encountered in samples obtained from the top 12 feet of soil below ground surface except for samples from SB-3, SB-5, and SB-6; SVOCs were detected in these borings above the RRSCOs at depths up to 18 ft-bgs.

Metals

Most toxic key metals in soils had an appreciable number of detected concentrations (except selenium).

Matrix of Key Metals, mg/kg

Metal	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	Max
Arsenic	16	16	56/136	1.9	2.9	3.7	6.1	104
Barium	400	820	12/136	24	41	67	93	2,070
Cadmium	4.3	7.5	104/136	0.56	0.63	0.75	1	17
Chromium	180	--	0/136	4.8	14.9	18.9	27	74
Copper	270	1,720	0/136	4.7	13.4	20.6	31	1,780
Lead	400	450	2/136	2.3	4.8	8.6	90	3,890
Mercury	0.81	0.73	85/136	0.04	0.14	0.21	0.5	3.6
Nickel	310	130	2/136	5.7	11.2	15	21	64
Selenium	180	4	134/136	2.1	2.1	3.6	5	5

Selenium exceeded the PGWSCO in one sample. Arsenic was above the RRSCO and PGWSCO in seven samples, all of which were in the upper six feet of soil. Arsenic in this interval ranged from 17.6 mg/kg to 104 mg/kg. Lead was above the RRSCO in 10 samples

[5] The association between variables is measured by a correlation coefficient, which measures the strength of the correlation between the variables (correlation coefficients range from 0, no correlation, to 1, perfect correlation).

and eight of these samples were within the top 6 feet of soil. Lead in the remaining two borings, SB-9 and SB-23, was above the RRSCO at depths of 16 and 10 ft-bgs, respectively. Lead within 16 ft-bgs ranged from 435 mg/kg to 3,890 mg/kg. Mercury was above the RRSCO in six samples, all of which were within the upper 10 feet of soil. Mercury in this interval ranged from 0.9 mg/kg to 3.6 mg/kg.

Pesticides and PCBs

Polychlorinated Byphenyls (PCBs) were detected in two samples out of 116 samples. Both soil sample results were below the RRSCOs and PGWSCOs.

All pesticides except for one were below the RRSCOs. Dieldrin was above the PGWSCO in SB-4 (5-6), SB-5 (4-5), and SB-5 (5-6). Of the four pesticides detected in groundwater above TOGS (Alpha-BHC, Dieldrin, 4,4-DDD, and 4,4-DDE), Alpha-BHC is below the PGWSCO in all but one sample, SB-4 (5-6). Dieldrin is below the PGWSCO within 6 feet of ground surface. The pesticide 4,4-DDD is below the PGWSCO within 12 ft-bgs except in two instances, SB-4 (19-20) and SB-9 (15-16). The pesticide 4,4-DDE was below the PGWSCO within 7 ft-bgs except in one instance, SB-9 (15-16).

Matrix of Key Pesticides, µg/kg

Compounds	Restricted Residential SCOs	Protection of Groundwater SCOs	NDs	Min	p25	p50	p75	Max
alpha-BHC	480	20	115/116	22.1	22.1	22.1	22.1	22.1
beta-BHC	360	90	115/116	1	1	1	1	1
Chlordane(alpha)	4,200	2,900	101/116	0.8	4	17	32	135
Chlordane (gamma)	--	--	101/116	1.4	4.8	15	37	133
4,4'-DDD	13,000	17	96/116	0.42	3.6	10	40	1,360
4,4'-DDE	8,900	14	90/116	1	1.8	3.4	14.3	457
4,4'-DDT	7,900	136	96/116	1.2	4.6	10.3	34	1,410
Dieldrin	200	100	99/116	0.84	2.2	5.6	11	768
Endosulfan-I	24,000	102	116/116	--	--	--	--	--
Endosulfan-II	24,000	102	116/116	--	--	--	--	--
Heptachlor	2,100	380	112/116	0.92	4.1	7.8	9	9.8

5.3 Groundwater Analytical Results

Up to 31 groundwater samples (including two duplicate samples) were collected and analyzed during the RI. Tables 10 - 14 provided the groundwater analytical results and a comparison to TOGS GA AWQSGVs. Figure 10 is a spider diagram for compounds detected above TOGS GA AWQSGVs. Figure 11 shows the isopleth contours for concentrations of compounds of concern in groundwater.

Both chlorinated and non-chlorinated VOCs were identified above TOGS GA AWQSGVs in groundwater, but the most notable compounds were benzene, toluene, ethylbenzene, and xylenes (collectively BTEX), which were detected at concentrations at least one order of magnitude greater than all other VOCs. These compounds are strongly associated with creosote.

VOCs and SVOCs have the most material impacts to groundwater, and groundwater was most heavily impacted near the central processing and storage area near Building 2B/2C, Building 10, and Building 1. Lesser groundwater impacts occurred in Building 9.

VOCs

The matrix of key VOCs shows a distinction between chlorinated and non-chlorinated VOCs. Non-chlorinated VOCs were detected approximately four times more frequently than chlorinated VOCs. The bulk of the chlorinated VOCs occur near the central processing and storage area (Figures 10 and 11, Table 10), and to a much lesser extent at Building 9. Among the detected chlorinated VOCs, 1,1-DCA ranged from 2 to 5,220 micrograms per Liter (µg/L), PCE from 0.46 to 7.5 µg/L, TCE from 0.26 to 128 µg/L, cis-1,2-DCE from 1.1 to 1,050 µg/L, and vinyl chloride from 2.4 to 25.6 µg/L. The chlorinated compounds 1,2-DCA, 1,1-DCE, cis-1,2-DCE, methylene chloride, 1,1,1-TCA, and vinyl chloride were above TOGS GA criteria in 50 percent or more of the wells where these compounds were detected.

Matrix of Key VOCs, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Acetone	50	17/30	12.7	60.1	116	196	758
Benzene	1	13/30	0.22	5.8	179	288	698
Toluene	5	14/30	1.5	98	459	786	1,200
Ethylbenzene	5	8/30	0.5	6.8	84	177	333
Xylene Total	5	7/30	1.7	5.7	329	573	1,460
$MeCL_2$	5	25/30	9.4	48	56	522	2,600
PCE	5	23/30	0.46	0.61	1.6	3.8	7.5
TCE	5	21/30	0.26	1	1.7	90	128
1,1-DCA	5	23/30	2	2.3	4.6	34.7	5,220
1,2-DCA	0.6	20/30	7	24.1	65	360	4,280
1,1-DCE	5	29/30	52	52	52	52	52
1,2-Dichlorobenzene	3	21/30	0.22	0.59	0.97	26.6	84
1,4-Dichlorobenzene	3	22/30	0.26	0.33	4.7	28.7	79
cis-1,2-DCE	5	20/30	1.1	2.5	8.7	161	1,050
1,1,1-TCA	5	29/30	483	483	483	483	483
Vinyl chloride	2	26/30	2.4	3	3.7	14.7	25.6

The non-chlorinated VOCs, those associated with creosote, are the predominant VOCs affecting groundwater. These compounds were detected in most samples and the highest concentrations near the central processing and storage area near Building 2B/2C and Building 1. Where detected, benzene ranged from 0.22 µg/L to 698 µg/L, toluene from 1.5 µg/L to 1,200 µg/L, ethylbenzene 0.5 µg/L to 333 µg/L, and xylenes from 1.7 µg/L to 1,460 µg/L.[6] The highest BTEX values centered near the central processing and storage area; the highest xylene value was near an underground storage tank discovered near the north side

[6] A UST was discovered during installation of soil boring SB-31. The area was opened to examine the tank and a sample of the tank contents entering the excavation was collected for waste characterization purposes. The total xylene concentration in this sample measured 10,000 µg/L. The impacted soils were excavated and placed in drums for disposal. The UST will be addressed during remediation.

of Building 6. BTEX compounds were above TOGS GA criteria in 80 percent or more of the wells where BTEX concentrations were detected.

SVOCs

The matrix of key SVOCs shows the principal impacts to groundwater are from creosote-related compounds. These include naphthalene, methylnaphthalene, and phenol-related compounds. These are predominant near the central processing and storage area (specifically Building 2C/2B, Building 10, Building 1, and Building 6) and toward the southern property line on the western side of BCP Site B.

Where detected, naphthalene ranged from 0.42 µg/L to 11,400 µg/L, methylnaphthalene from 0.64 µg/L to 3,840 µg/L, and 2,4-dimethylphenol from 4.3 µg/L to 14,600 µg/L. The phenol-related compounds were above TOGS GA AWQSGVs in all samples where detected. Naphthalene and methylnaphthalene were elevated in approximately 50 percent of the samples with measurable concentrations, signifying impacts. Naphthalene has a TOGS GA guidance value of 10 µg/L; naphthalene results exceeded the guideline in approximately 75 percent of the groundwater samples where detected.

The heavier polycyclic aromatic hydrocarbons (PAHs): benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, and acenaphthylene, were below detection limits in most groundwater samples. Benzo(a)pyrene, a PAH with ND as the TOGS standard, was above TOGS in three samples: RMW-2, 1.9 µg/L; RMW-4, 1.5 µg/L; and RMW-12, 0.85 µg/L.

Matrix of Key SVOCs, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Naphthalene	10*	7/29	0.42	11	1,606	3,820	11,400
2-Methylnaphthalene	--	7/29	0.64	2.2	204	1,080	3,850
Benzo(a)pyrene	ND	26/29	0.85	0.85	1.5	1.9	1.9
Benz(a)anthracene	0.002	23/29	0.51	0.89	3.4	7.1	10.2
Acenaphthene	20*	6/29	0.44	0.84	23	146	661
Dibenzofuran	--	12/29	0.61	12.1	84	153	545
Fluorene	50	10/29	0.34	1.9	32	90	316
2,4-Dimethylphenol	1	16/29	4.3	169	1,640	5,540	14,600
2-Methylphenol	1	18/29	13.1	247	325	2,340	3,000
3,4-Methylphenol	1	17/29	2	200	469	2,255	7,570
Phenol	1	20/29	17.4	49	125	357	3,630
4-Nitrophenol	1	29/29	--	--	--	--	--
1,1-Biphenyl	5	12/29	0.61	12.4	97	189	567
Bis(2-Ethylhex)phthalate	5	13/29	1.1	1.4	3.4	4.8	45

*Guidance value

Metals

The matrix of key toxic metals shows that many metals in groundwater were below detection limits. Where measurable concentrations were encountered, lead ranged from 3.2 µg/L to 5,140 µg/L, nickel from 10.9 µg/L to 784 µg/L, and arsenic from 3.7 µg/L to 290 µg/L. Lead was above TOGS GA AWQSGVs in RMW-4, RMW-7, and SCS-MW-2C-1, all near the central processing and storage area. Arsenic was above TOGS GA AWQSGVs in 12 samples, all of which were near the central processing and storage area and along the border with LIRR. Nickel, cadmium, chromium, and mercury were above their respective TOGS GA criteria in monitoring well RMW-4.

A number of common metals associated to the local geology and urban setting were frequently above TOGS GA AWQSGVs. These include iron, magnesium, and sodium.

Matrix of Key Metals, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Arsenic	25	2/28	3.7	8.8	19.3	51.9	290
Barium	1,000	27/28	4,640	4,640	4,640	4,640	4,640
Cadmium	5	27/28	35	35	35	35	35
Chromium	50	25/28	12.3	12.3	14.2	1,150	1,150
Lead	25	13/28	3.2	6.5	14.4	23.9	5,140
Mercury	0.7	26/28	0.28	0.28	28	57	57
Nickel	100	12/28	10.9	13.4	18	28	784
Selenium	10	27/28	70	70	70	70	70
Silver	50	28/28	--	--	--	--	--
Zinc	--	28/28	--	--	--	--	--

Pesticides and PCBs

Pesticides were detected in eight samples and were above the TOGS GA criteria in seven wells. Pesticide concentrations were above TOGS GA AWQSGVs in one sample for Alpha-BHC (RMW-3); one sample for 4,4'-DDD and 4-4'-DDE (RMW-2), four samples for Dieldrin (RMW-2, RMW-4, RMW-9, and RMW-12), and two samples for Aldrin (MW-1 and RMW-6). Gamma-BHC was above TOGS GA AWQSGVs in RMW-1. Five of the seven samples detected above TOGS GA AWQSGVs were from Building 1. PCBs were below detection levels in all groundwater samples.

Matrix of Pesticides, µg/L

Compound	TOGS GA AWQSGVs	NDs	Min	p25	p50	p75	Max
Aldrin	ND	27/29	0.07	0.07	0.21	0.34	0.34
Alpha-BHC	0.01	28/29	0.08	0.08	0.08	0.08	0.08
Beta-BHC	0.04	29/29	--	--	--	--	--
Gamma-BHC	0.05	28/29	0.09	0.09	0.09	0.09	0.09
Chlordane(alpha)	--	26/29	0.08	0.08	0.26	0.33	0.33
Chlordane (gamma)	--	26/29	0.05	0.05	0.32	0.56	0.56
4,4'-DDD	0.3	25/29	0.04	0.04	0.12	2.3	4.5
4,4'-DDE	0.2	25/29	0.38	0.05	0.08	0.32	0.53
4,4'-DDT	0.2	27/29	0.03	0.03	0.05	0.07	0.07
Dieldrin	0.004	25/29	0.01	0.06	0.11	1.1	2
Endosulfan-I	--	29/29	--	--	--	--	--
Endosulfan-II	--	29/29	--	--	--	--	--
Heptachlor	--	29/29	--	--	--	--	--

5.4 Soil Vapor Analytical Results

A total of 17 soil vapor samples (including duplicates) were collected throughout the Site. The matrix of key soil vapor VOCs summarizes the results and shows the range and distribution of concentrations for the key compounds. Soil vapor results had low to moderate concentrations with one or two elevated concentrations. Table 15 summarizes the analytical results for soil vapor samples collected during the RI. Figure 12 is a spider diagram for compounds detected in soil vapor.

Benzene concentrations ranged from non-detect to 3,480 micrograms per cubic meter (µg/m^3) in SV-11. Most benzene soil vapor results were much lower, with approximately 70 percent measuring 7 µg/m^3 or less and more than 90 percent measuring 355 µg/m^3 or less. PCE ranged from non-detect to 821 µg/m^3, and approximately 63 percent of the sample results measured 30 µg/m^3 or more. TCE ranged from non-detect to 828 µg/m^3, and approximately 63 percent of sample results measured 1.5 µg/m^3 or more. Methylene chloride ($MeCl_2$) ranged from non-detect to 250 µg/m^3, and two samples were above 60 µg/m^3. The highest concentrations of chlorinated VOCs were in 1,1-DCA (3,680 µg/m^3); cis-1,2-DCE (3,060 µg/m^3); and 1,1,1-TCA (29,700 µg/m^3).

Matrix of Key Soil Vapor VOCs, µg/m^3

Compound	NDs	Min	p25	p50	p75	Max
Benzene	2/16	1.3	2.5	4.8	39	3,480
Toluene	2/16	5.3	18	30	368	3,540
Ethylbenzene	2/16	1.1	3.2	11.8	78	1,040
Xylene Total	2/16	2.8	16	32	90	1,550
$MeCL_2$	3/16	2.3	8.7	12	20	250
PCE	1/16	1.7	7.5	35	174	821
TCE	1/16	0.9	1.3	12	38	828
1,1-DCA	4/16	1	2.2	34	377	3,680
1,2-DCA	10/16	1.1	2.3	21	36	186
1,1-DCE	11/16	8.3	86	130	136	146
cis-1,2-DCE	8/16	2.4	4.6	18	469	3,060
1,1,1-TCA	6/16	1.7	6	71	164	29,700
Vinyl chloride	9/16	0.4	0.5	2	92	179
Total VOCs	0/16	247	400	986	6,934	33,990
Total cVOCs	0/16	18	94	185	2,606	33,990

The greatest soil vapor concentrations were detected in the samples from beneath Building 3A/3B (SV-14) and Building 1 (SV-11). The soil vapor concentrations point to two unique releases: a creosote-related release in Building 1, and a solvent-related release in Building 9.

Both of the soil vapor samples collected from under Building 9 (SV-3 and SV-4) had analytical results for tetrachloroethylene and trichloroethylene (PCE and TCE, respectively) that were over an order of magnitude higher than at any other location. This is believed to be an independent release (unrelated to the creosote spill). In Building 1, one of the soil vapor samples collected (SV-11) had concentrations of BTEX compounds over an order of magnitude greater than at any other location. The elevated concentration of BTEX compounds in Building 1 is related to the creosote release described in Section 4.0.

The elevated chlorinated and non-chlorinated soil vapor results do not correlate well with elevated concentrations of VOCs in groundwater. This suggests that soil vapor results are related to localized, small-scale surface spills affecting soils within 6 feet of ground surface and are unrelated to groundwater concentrations.

5.5 Free Product and NAPL-Stained Soils

NAPL-stained soils were observed and characterized during the RI. NAPL staining ranged from not observable to light, moderate, heavy, and very heavy staining. The level of soil staining at each soil boring and the vertical location of the staining is documented in the soil boring logs located in Appendix F. Free-phase NAPL was not observed in any of the 31 soil cores.

Figure 5 shows that the most heavily stained soils were encountered in the vicinity of Building 2B/2C and areas immediately adjacent to it (central processing and storage area). Moderate staining was observed in Building 1, followed by lighter staining in the south

portion of Building 1. As illustrated in Figure 5, soil staining does not extend beneath West Street and the light staining observed in and around Building 9 is believed to be from an independent release, unrelated to the creosote spill by the central processing and storage area.

A total of 131 soil samples (including duplicates and replicates) were collected as part of the RI and examined for NAPL staining. As shown in Table 2B, approximately 23 percent of samples exhibited light or moderate staining and approximately 11 percent exhibited heavy/very heavy staining: SB-1, Building 10; SB-5, Building 1; SB-6, Building 6; and SB-21, Area G. Soils with very heavy staining (four percent) were observed in two borings, SB-5 and SB-6. These borings are all on the western portion of BCP Site B and are adjacent to or south of the vault area. The proportion of samples collected from different soil types is as follows:

Soil Type	Percent of Samples
Medium – Coarse sand	20.5
Medium – Fine sand	10.6
Fine sand	6.6
Silty sand	41.1
Silt	18.5
Clayey silt	2.7
Total	100

Silt, silty sand, and clayey silt, examples of very fine textured soils, comprise 62 percent of the RI samples, yet they contain 82 percent of the samples with heavy/very heavy NAPL staining. In contrast, the samples collected in the coarser sandy media (M-C sand, M-F sand, and fine sand) comprise 38 percent of the samples, yet these samples contain 18 percent of the samples with heavy and very heavy NAPL staining. Therefore, the fine textured soils contain a disproportionate amount of NAPL staining compared with the coarse textured soils. The implication is that NAPL is contained in the fine textured soils as residual NAPL and free-phase NAPL is unlikely to occur.

The likelihood of free-phase NAPL was examined further using soil and NAPL physical characteristics. The bulk density and the total petroleum hydrocarbon content (sum of gasoline range organics and diesel range organics) were measured from eight soil samples (Table 16). The porosity of these samples was estimated using the specific gravity of the soils and the bulk density. Together, these parameters estimate the degree of NAPL saturation in the soil. NAPL density (1.03 g/mL) was obtained from previous samples of free-phase DNAPL collected near the central processing and storage area on Site A.

If the NAPL saturation is less than the maximum residual saturation level for a given soil type, the saturation level at which NAPL becomes continuous, NAPL resides at residual (discontinuous) levels and remains as individual droplets or ganglia that are immobile (T. Wiedemeier, H. Rifai, C. Newell, J. Wilson, 1999, *Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface,* p. 74 and A. Mayer and S. Hassanizadeh, 2005, *Soil and Groundwater Contamination: Nonaqueous Phase Liquids,* p.48). Of the eight samples measured, all NAPL content measurements were well below the residual saturation threshold, with the exception of sample SB-5 (1-2). In this sample, the residual

saturation value was at or slightly above the residual saturation threshold in the soils immediately below the slab in Building 1. Immediately below this depth, the NAPL saturation was appreciably below the threshold value, indicating that there is staining but no free-phase product[7].

The implication is that the potential for free-phase NAPL is limited to a shallow depth interval consistent with and in the vicinity of the bottom of the vaults (Building 2B/2C). These characteristics are consistent with actual observations of free-phase product in wells SCS-MW-2C (0.92 ft., Building. 2B/2C), MW-6A-2 (0.09 ft., Building 6), and RMW-2 (0.09 ft., Building 1) on 10/16/2014. Product was observed in SCS-MW-10-1 (near vault area) one time but never reappeared. Table 16 presents the product saturation results compared to the residual saturation threshold levels.

Two samples of LNAPL from wells SCS-MW-10-1 and SCS-MW-2C were analyzed for specific gravity, which measured 0.93. This density is similar to that of a heavy fuel oil using this value in lieu of the 1.03 g/mL has no material bearing whether the residual saturation threshold has been reached in the samples. It is likely that this free-phase product is the result of releases from the underground storage tanks (USTs) in former Building 10. Based on the chromatograms and density measurements of the two product samples (Appendix L), the LNAPL appears to be weathered fuel oil with creosote components. This is not surprising since the materials have similar chemical constituents that can both dissolve into groundwater (and NAPL) and the releases of creosote and fuel oil overlap in this area.

During the RI, drilling encountered an unknown UST at SB-31 (on the north side of Building 6. A spill was called in and the Department issued Spill No. 1406913. This sample had among the highest soil concentration of xylenes, but no free-product was observed. The impacted soil was removed and placed in drums. The spill will be closed and the UST removed and registered during Site-wide remediation.

5.6 Groundwater Plume Analysis

The most common compounds affecting groundwater were VOCs and SVOCs. The concentration contours on Figure 11 show that the greatest impacts by VOCs, SVOCs, and chlorinated VOCs are by the central processing and storage area. The groundwater concentrations reinforce the finding that the impacts coincide with the main processing area.

In addition to the compounds of concern, basic groundwater parameters were collected to characterize groundwater quality and to serve as a basis for monitoring groundwater quality over time.

[7] It should be noted that samples for NAPL saturation were not collected in Buildings 2, 3, and 4 due to access limitations. These areas have a high likelihood of contamination. Samples for NAPL saturation analysis in the most heavily contaminated portion on BCP Site A were all below residual saturation limits.

The groundwater pH was effectively neutral, ranging from 5.75 standard units (SU) to 8.28 SU with a median of 6.86. Oxidation-reduction potential (ORP) ranges from (-190) millivolts (mV) to 147 mV. Although there is a high of 147 mV, ORP on site has a mean of (-88) mV and only three wells contained a positive ORP. Lower ORP values in ground water suggest the occurrence of biodegradation, although ORP is not excessively low, pointing to a smaller degree of contaminant mass in the subsurface than anticipated given the concentrations. Dissolved oxygen (DO) levels range from 0.31 mg/L to 6.61 mg/L with a median of 0.93 mg/L. This finding also suggests that the contaminant mass is lower than anticipated given the concentrations. Conductivity ranges from 0.317 milliSiemens per centimeter (mS/cm) to 2.01 mS/cm with a median of 0.76 mS/cm.

Sulfate in groundwater ranged from ND to 501 mg/L and had a median value of approximately 19 mg/L. Sulfide ranged from ND to 3.6 mg/L and had a median value of ND. Chloride ranged from ND to 105 mg/L and had a median value of 105 mg/L. Alkalinity ranged from 73 mg/L to 617 mg/L and had a median value of 230 mg/L. Sodium ranged from ND to 202,000 µg/L and had a median value of 32,800 µg/L. Iron ranged from 304 µg/L to 753,000 µg/L and had a median value of 8,965 µg/L. Potassium ranged from ND to 207,000 µg/L and had a median value of 19,500 µg/L. Magnesium ranged from ND to 100,000 µg/L and had a median value of 8,470 µg/L. Calcium ranged from 21,000 µg/L to 261,000 µg/L and had a median value of 65,550 µg/L.

5.7 Groundwater Hydrology

The hydraulic conductivity is a coefficient of proportionality describing the rate at which water can move through a permeable medium (Fetter 1980). The coefficient of hydraulic conductivity (K) was determined for the water-bearing regime (i.e., Upper Glacial Aquifer) beneath the Site by a series of slug tests. As described in Section 3.4, slug tests were completed on seven monitoring wells (RMW-4, RMW-7, RMW-8, RMW-13, F-3, OS-5 and OS-7), between October 7, 2014 and October 13, 2014 to characterize hydraulic conductivity and groundwater flow rate. Analysis of the slug tests estimates the hydraulic conductivity in saturated soils on Site. Slug test data and curve matching printouts are provided in Appendix G.

The hydraulic conductivities ranged from 0.35 feet per day (ft/d) (1.2×10^{-4} centimeters per second [cm/sec]) to 0.81 ft/d (2.9×10^{-4} cm/sec). This range was calculated by taking the average K values of the slug tests from each monitoring well. The average hydraulic conductivity from all the slug tests was 0.49 ft/d (1.7×10^{-4} cm/sec).

Slug tests were performed three times at each monitoring well, with the exception of RMW-4 and RMW-8, to demonstrate reproducibility of results. Slug tests were performed twice at RMW-4 and RMW-8. The water level did not recover to its original value for tests 2 and 3 at monitoring well OS-7; the data from these two tests was not included in calculating the average K value for this well.

The relatively low hydraulic conductivity values are indicative of fine-grained material observed throughout the Site. The monitoring wells were installed to bridge the water table

and were screened within mostly fine sand materials, with varying amounts of silt and coarser grained materials.

Groundwater flow rates were calculated using water-level measurement data and slug test data, and the following equation:

$$V = KI/n$$

Where:

v = average linear ground-water flow rate (ft/d)

K = hydraulic conductivity (ft/d) obtained from slug tests

I = hydraulic gradient (ft/ft) obtained from water-level measurements

n = porosity of aquifer sediments

The average hydraulic gradient (I) across the Site is 0.030 foot per foot (ft/ft) as measured from monitoring wells RMW-13 and RMW-15. The porosity (n) of the aquifer is approximately 40%, which is based on the porosity of silty sand (Freeze and Cherry 1979). With these values and the range in hydraulic conductivity values from the slug tests, the calculated ground-water flow rate is approximately 0.012 ft/d (4.2×10^{-6} cm/sec) beneath the Site.

5.8 Remedial Excavation

The remediation goals are Track 2 Restricted Residential cleanup with Track 4 Restricted Residential cleanup as a fall back if Track 2 cannot be attained. The soil cleanup goals are as follows:

- Where excavation is 15 feet or less below ground surface, the soil cleanup goals are the RRSCOs or, for contaminants detected in groundwater above the TOGS GA AWQSGVs as identified in this RI, the soil cleanup goals will be the lower of the PGW SCOs or RRSCOs for the compounds above the TOGS standards.

- Where excavation is deeper than 15 ft-bgs, the PWSCOs for the compounds identified in the Remedial Investigation above TOGS GA AWQSGVs will be the applicable SCOs. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet below ground surface.

Given these operating criteria, it is necessary to evaluate the soil and groundwater information to identify remediation cut depths that achieve the desired cleanup goals. Figure 13 specifies the soil excavation depths below ground surface that need to be removed in order to reach the cleanup goals. Excavating soil to these depths will achieve the Track 2 RRSCOs and PGW SCOs for those compounds above TOGS deeper than 15 ft-bgs.

The sample collected at SB-7 at 43 – 44 ft-bgs has methylene chloride and 1,2-DCA above the PGW SCOs. This location is close to the MTA substation and Support of Excavation

(SOE) structures. The depth and location make it technically infeasible to remove soil at this depth.

5.9 Data Validation

All RI data were checked for quality assurance/quality control requirements and DUSRs completed (Appendix D). The data were found acceptable for the intended purpose with the understanding that some values were qualified "J." Recoveries of several SVOCs in soil samples SB-5 (1-2), SB-14 (5-6), and SB-29 (7-8) were zero percent and therefore non-detect results were rejected. These compounds include 2,4-dinitrophenol, 4-chloroailine, 4,6-dinitro-o-cresol, pentachlorophenol, and hexachlorocyclopentadiene. Recoveries of several SVOCs in the groundwater sample from RMW-6/SB-1 were zero and therefore non-detect results were rejected. These compounds include 2.4-dichlorophenol, 2,4-dinitrophenol, 3,3-dichlorobenzidine, and hexachlorocyclopentadiene.

6.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The objective of the qualitative exposure assessment is to describe how human and environmental receptors may be exposed to site contaminants based upon the site-specific conditions and to assess whether there are any complete or potentially complete exposure pathways.

As discussed above, the contaminants of concern (COCs) at the Site include petroleum related VOCs (i.e., BTEX) and SVOCs, creosote, chlorinated solvents (i.e., PCE and TCE), and several metals (i.e., copper and mercury). These COCs were detected in soil and groundwater at concentrations exceeding their respective NYSDEC standards. The NYSDEC TOGS Class GA Groundwater Quality Standards were developed to be protective of public health based upon consideration of groundwater as a potential source of drinking water. This exposure scenario is not applicable to the Site given the current land use and the reasonably anticipated land use at the Site. As specified in ECL 27-1415(2) and DER-10, the exposure assessment should consider the current conditions, as well as the reasonably anticipated future land use of the Site and the affected offsite areas, and the reasonably anticipated future groundwater use.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a receptor population; (4) a point of exposure; and (5) a route of exposure. The following paragraphs provide an overview discussion of exposure pathways that may potentially exist associated with the Site.

6.1 Contaminant Sources

The predominant source of contamination was the creosote discharge in and around the central processing and storage area in the 1950s. Creosote discharges also occurred on the eastern side of BCP Site B in the warehouse where it is likely that creosote-based products were handled for packaging, storage, and shipping. Impacts by chlorinated compounds to soil and groundwater arose most likely from ancillary cleaning, storage, and small-scale manufacture of janitorial products. Additional sources may have included petroleum releases from storage tanks.

6.2 Contaminant Release and Transport Mechanisms

The contaminants at the Site exist in the form of free-phase product (in some monitoring wells) and residual material adsorbed to soil particles in the saturated and unsaturated zones and compounds dissolved in groundwater. The leaching of contaminants from soil serves as an ongoing source of contamination to groundwater beneath portions of BCP Site B. In addition, VOCs are migrating through volatilization of compounds from soil and groundwater into soil vapor.

6.3 Receptor Population

The potential onsite receptors include occupational workers, construction workers, visitors, or trespassers. Future onsite receptors are expected to also include workers, residents and guests based on the potential future use of the property. The potential offsite receptors include offsite workers, visitors, residents, and trespassers.

6.4 Potential Points and Routes of Exposure

Contaminated soil is generally encountered within the central and southern areas of BCP Site B and at depths below the immediate surface as indicated by subsurface and surficial soil samples collected as part of the RI. However, there is the potential for direct exposure to contaminated soil by anyone digging in the contaminated areas.

BCP Site B and the surrounding community are supplied by public sources of drinking water, which meets all State and Federal standards for drinking water quality. As such, there is no potential for exposure to BCP Site B contaminants from the public sources of drinking water. The use of groundwater as a drinking water source is prohibited by the City of New York.

VOCs have been documented by soil vapor measurements beneath Buildings 1, 2B/2C, 3A/3B, 4, 6A and 10. There is a potential for vapor intrusion into newly constructed buildings with the concentrations of soil vapors measured. The development plan calls for basements over all areas of the Site down to the saturated zone, which would prevent vapors from collecting under the buildings. All floor slabs and basement walls will be protected with a waterproofing/vapor barrier preventing vapor intrusion.

Source removal as part of a remediation plan and installation of engineering controls during construction will ensure there will be neither a source nor pathways for migration. During construction, site workers could be exposed to contaminants via the air inhalation route of exposure, which is addressed in a Site Health & Safety Plan.

The following matrix summarizes the media, human health exposure pathways, controls, and status of exposure pathways during the pre- and post-development phases.

Summary of Human Health Exposure Pathways by Media and Site Operation

Medium	Exposure Pathway	Construction	Post Development
Soil	Dermal Contact	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by concrete slab or two feet of clean material.
	Inhalation	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by concrete slab or two feet of clean material.
	Ingestion	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: All soils covered by concrete slab or clean material.
Soil Vapor	Dermal Contact	Not Applicable	Not Applicable
	Inhalation	Pathway complete but controlled by air monitoring.	Pathway incomplete: Contaminated soil removed and vapor barrier in place around and under foundation.
	Ingestion	Not Applicable	Not Applicable
Groundwater	Dermal Contact	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Groundwater contact prevented by concrete slab and waterproofing around and under foundation and prohibition on use of groundwater as an institutional control.
	Inhalation	Pathway complete but controlled by air monitoring.	Pathway incomplete: Vapor barrier in place around foundation.
	Ingestion	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Groundwater use prohibited by local ordinances. Public water supply serves community.

In conclusion, complete exposure pathways will exist during the remediation and construction phases. These pathways will be controlled by air monitoring and implementing the procedures in the Health & Safety Plan and Community Air Monitoring Plan. Following construction and development, all exposure pathways will be incomplete or eliminated. Source removal will remove the majority of the contaminant mass. Engineering controls in the form of the concrete slab, clean material cap, and vapor barrier will add an additional level of protection in that they ensure there are no complete human health exposure pathways. A Site-specific prohibition on groundwater use will eliminate this potential exposure pathway. Following remediation and development, there will be no complete human health exposure pathways.

7.0 SUMMARY AND CONCLUSIONS

The following conclusions and recommendations are based on a review of all historic documentation, field observations collected by FLS and Roux Associates during the RI and a review of the laboratory analytical results.

7.1 Soil

The bulk of the source material resulting in soil impacts originates from the large creosote release in the 1950s. Soils have also been impacted by chlorinated VOCs, but to a far smaller extent. Creosote and non-chlorinated VOC soil impacts correlate well. Soils have also been impacted as a result of creosote and chlorinated VOC releases during storage, handling, and packaging on the northern and eastern portion of BCP Site B. Petroleum impacts appear to be limited to Building 10 and Building 2B/2C.

The bulk of the creosote impacts (i.e., source material) coincide with the areas where chemicals were processed into products and stored on the western portion of the property. The principal creosote impacts are near the former central processing and storage area, near Building 2B/2C, Building 6, Building 10, and Building 1. Creosote from the 1950s release on BCP Site A flowed beneath Building 1, along the top of the shallow bedrock, and moved southward toward the southern boundary on the southwestern side of BCP Site B, where creosote has been observed seeping through the basement walls in Building 4. The source material reaches the top of bedrock in this area, which extends from approximately 12 ft-bgs to 18 ft-bgs to 22 ft-bgs along the southwest corner of the property.

Elsewhere on BCP Site B, Area A, Area B, and most of Building 9, impacts to soil lay mainly within the upper 12 feet, with isolated deeper impacts in places. The deeper impacts extend to 16 ft-bgs and to 22 ft-bgs.

Some compounds do not have cleanup standards or guidance values but are isomers or variants of compounds that do. As a result, they are unregulated but still of interest. An important compound in this category is 2,4-dimethylphenol, a phenolic compound. Interest in this compound stems from its elevated concentrations on BCP Site B. Approximately 80 percent of the 156 soil sample results are below detection limits, but detected concentrations range from approximately 75 µg/kg to 103,000 µg/kg. The highest concentrations center around the former central processing area in Buildings 1, 6, and 10 (all but three detected results are on the western portion of Site B). This suggests that 2,4-dimethylphenol is associated with creosote and also with the regulated phenolic compounds (cresols) typical of creosote.

Among the regulated compounds in creosote are the cresol compounds 3,4-methylphenol and 2-methylphenol. These compounds will be removed during remediation to the selected cleanup levels. If there is an association between 3,4-methylphenol; 2-methylphenol; and 2,4-dimethylphenol; then removal of the regulated compounds means that unregulated 2,4-

dimethylphenol will be removed as well.

A correlation test of 136 paired sample results at the 99 percent significance level between 2,4-dimethylphenol and 3,4-methylphenol and 2,4-dimethylphenol and 2-methylphenol, found correlation coefficients of 0.85 and 0.83, respectively. This is both a very high level of agreement and a very high level of association; it indicates with a high level of certainty that when 3,4-methylphenol and 2-methylphenol are removed, 2,4-dimethylphenol will also be removed.

Excavation of soils to the recommended depths below ground surface will eliminate the source material. This will remove soil contamination and have a highly beneficial effect on groundwater quality.

In addition to soil sampling, a concurrent geotechnical investigation produced 19 rock cores that penetrated approximately 10 feet into bedrock. All rock cores were entirely free of DNAPL or LNAPL. Ten of the rock cores were in areas in or adjacent to locations with soil staining with a probability of DNAPL reaching bedrock.

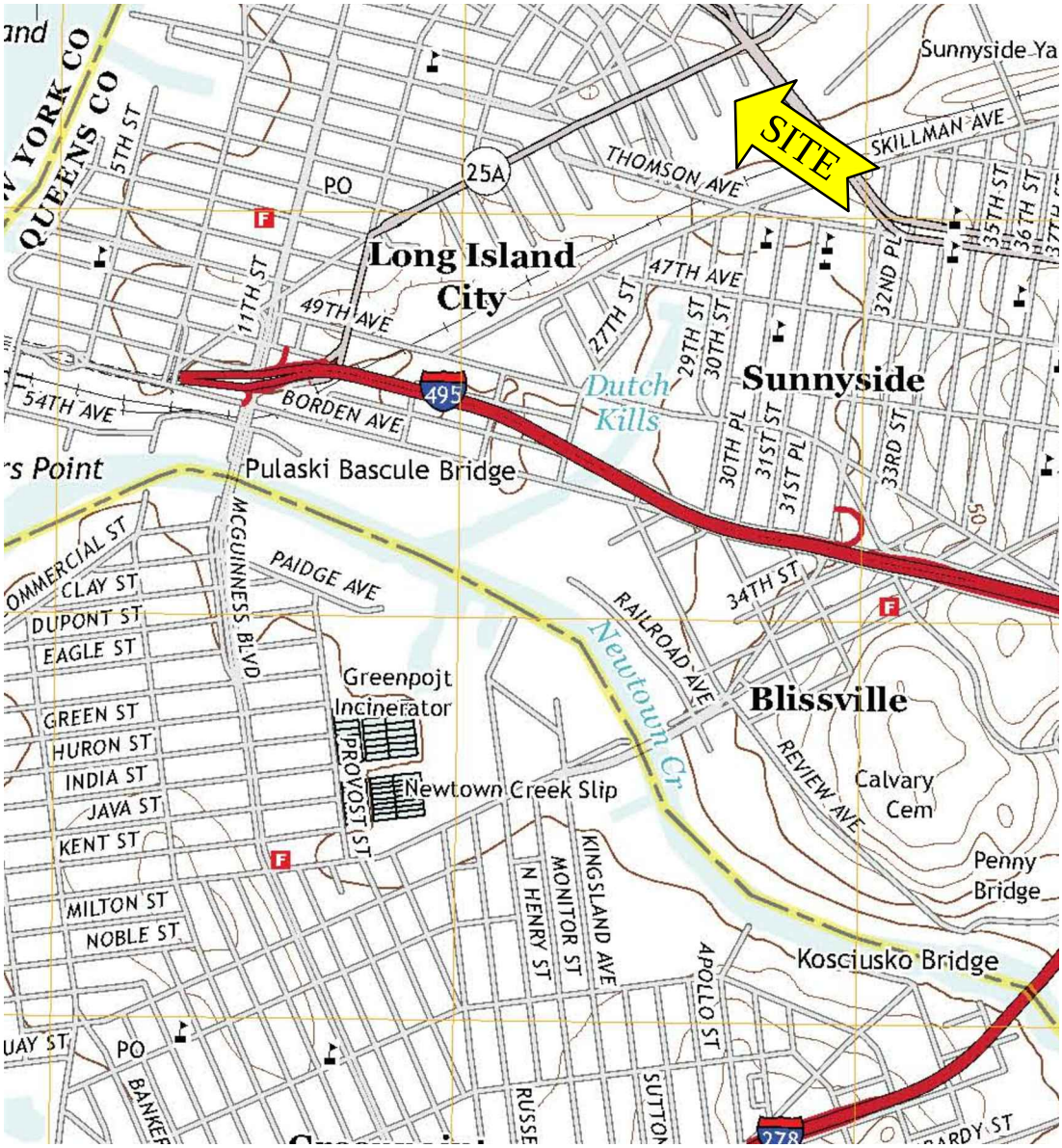
7.2 Groundwater

Groundwater has been impacted by the source material releases. Creosote compounds, benzene, toluene, ethylbenzene, xylenes, naphthalene, and phenol-related compounds have impacted groundwater on BCP Site B, but the heaviest impacts coincide with the source material found near the former chemical processing and storage areas. Chlorinated VOCs have impacted groundwater. Chlorinated VOC impacts also coincide mainly with the former chemical processing and storage areas. Removal of source material as part of a Site-wide remediation is expected to greatly improve groundwater quality.

7.3 Soil Vapor

Soil vapor impacts appear limited to within 6 feet of ground surface. Soil vapor impacts appear related to smaller, localized releases that are unrelated to groundwater impacts. Removal of soil as part of a Site-wide remediation is expected to remove all source material contributing to soil vapor impacts.

FIGURES



UTM GRID AND 2013 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
WL WK
Grid Zone Designation 18T

1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

QUADRANGLE LOCATION

Weehawken	Central Park	Flushing
Jersey City	Brooklyn	Jamaica
The Narrows	Coney Island	Far Rockaway

FIGURE 1: SITE LOCATION MAP

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: LIC Development, Owner LP

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New York, NY 10001

ROUX
ROUX ASSOCIATES, INC.
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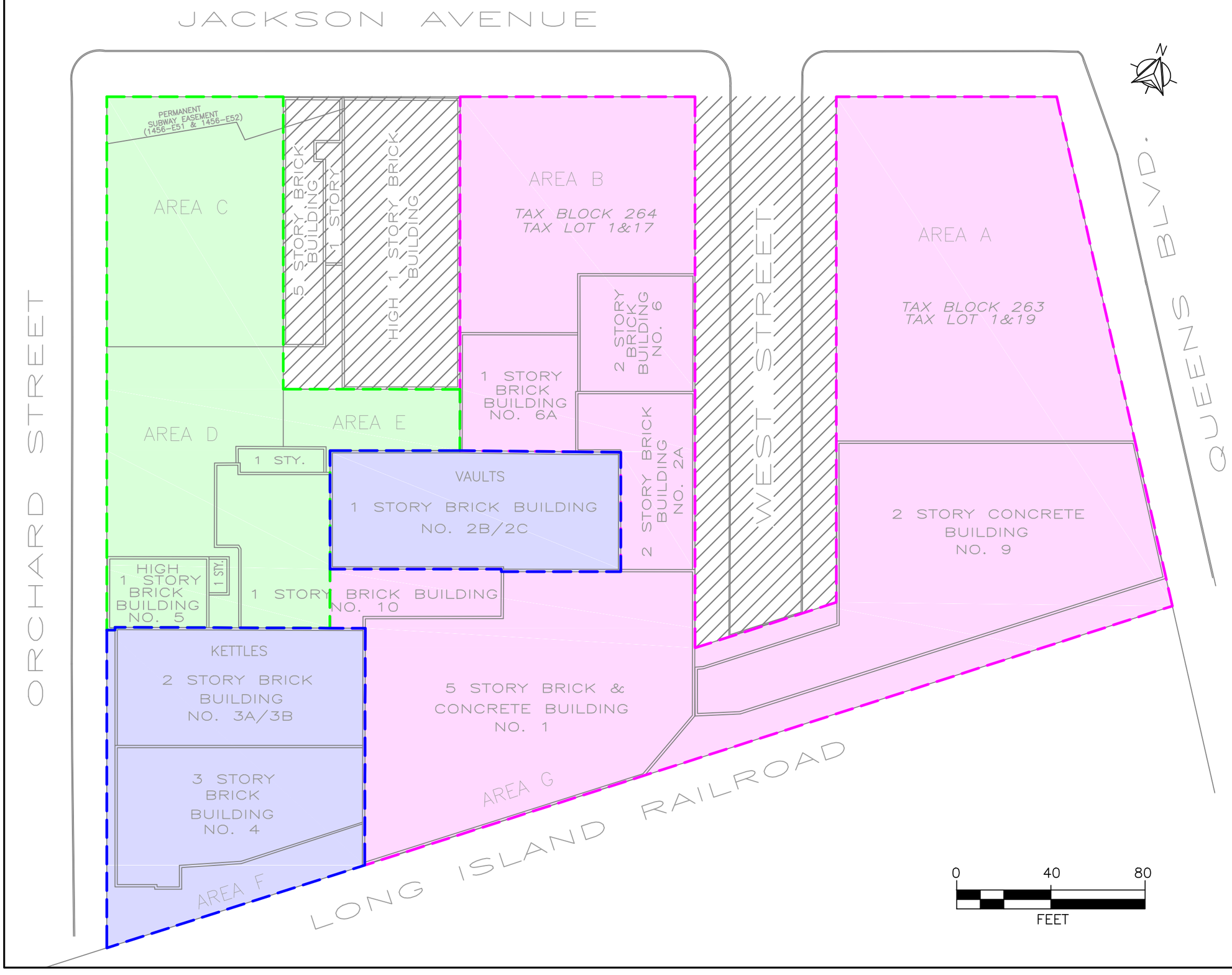
FILE: P:\Project Files\99999 – Tishman\Figures\Site B – RIR\FIG 1 – Site Location Map.dwg DATE: 1/5/2015



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\FIG 2 - Site Plan.dwg DATE: 1/5/2015

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BCP No. C241151

FIGURE 2

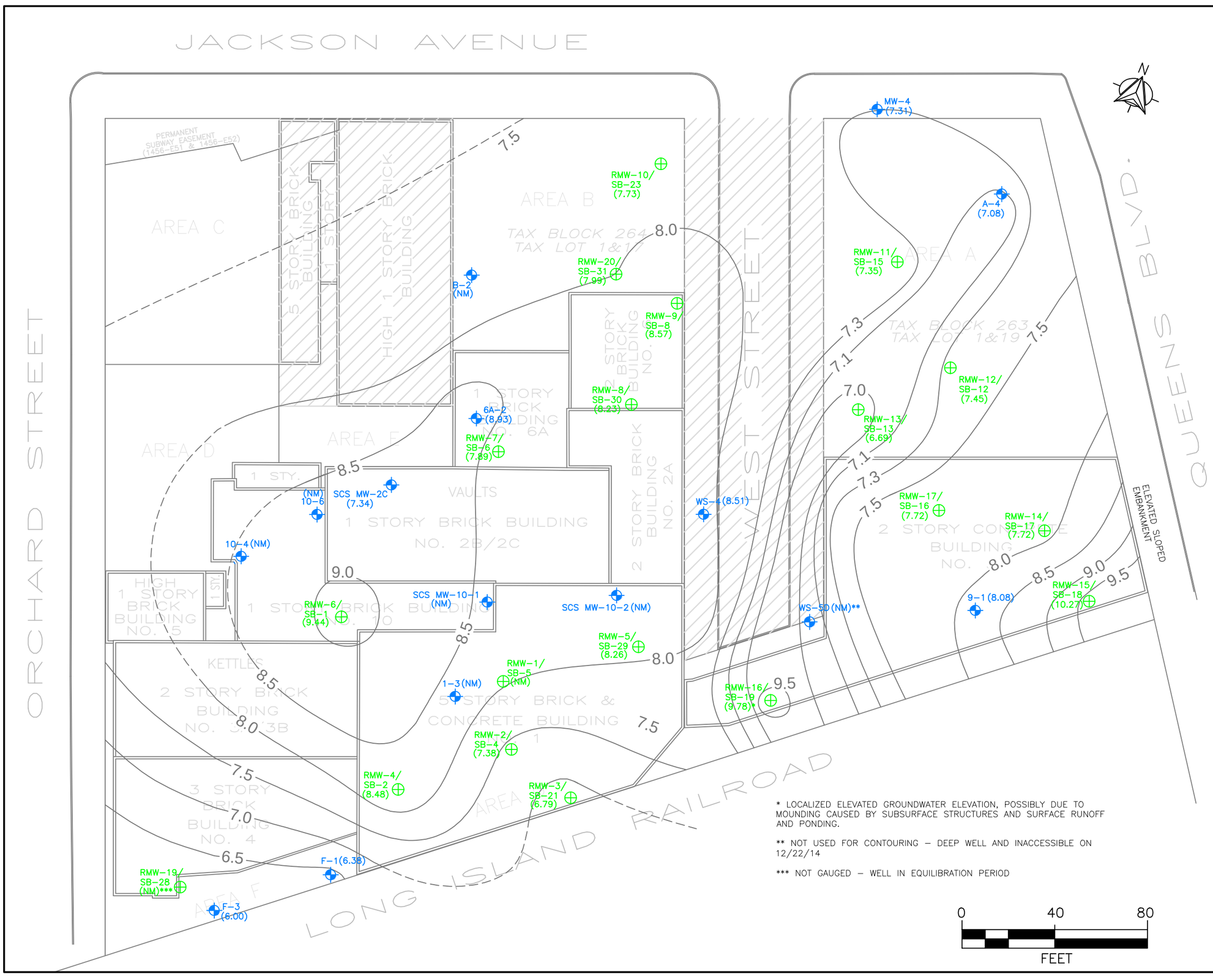
SITE PLAN

Date
December 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- NOT PART OF SITE



* LOCALIZED ELEVATED GROUNDWATER ELEVATION, POSSIBLY DUE TO MOUNDING CAUSED BY SUBSURFACE STRUCTURES AND SURFACE RUNOFF AND PONDING.

** NOT USED FOR CONTOURING – DEEP WELL AND INACCESSIBLE ON 12/22/14

*** NOT GAUGED – WELL IN EQUILIBRATION PERIOD

FILE: P:\Project Files\99999 – Tishman\Figures\Site B – RIR\FIG 3 – Groundwater Contour.dwg DATE: 8/5/2014

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FIGURE 3

GROUNDWATER CONTOUR MAP

Date
March 2015

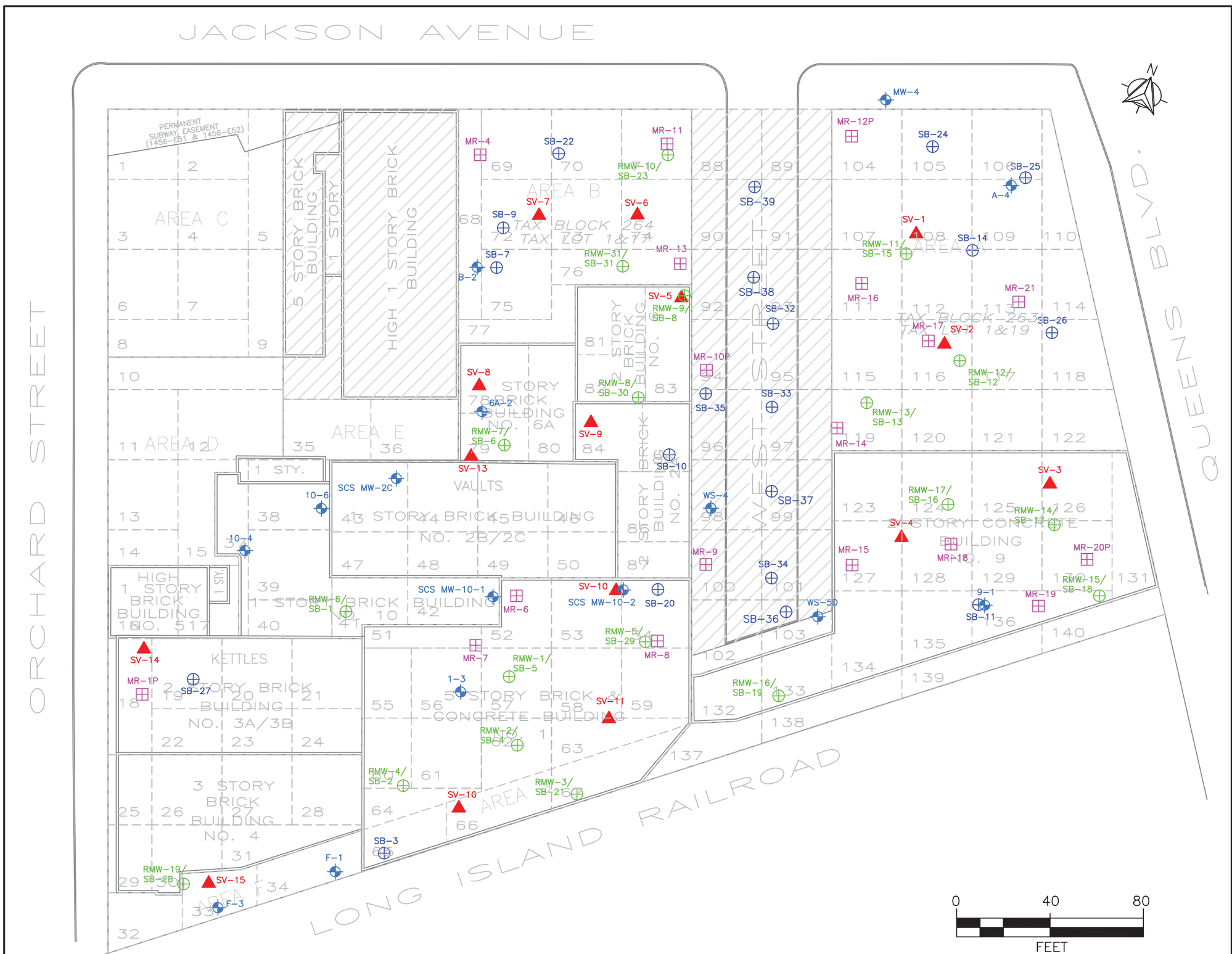
Project Number
10112-005

LEGEND

- RMW-10/ SB-5 — SOIL BORING/MONITORING WELL
- F-1 — EXISTING MONITORING WELL
- 7.5 — GROUNDWATER ELEVATION (NAVD88)

NOTE: GROUNDWATER ELEVATIONS WERE MEASURED ON 12/22/14

NM – NOT MEASURED



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\FIG 4 - Sample Locations.dwg DATE: 8/5/2014

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FIGURE 4

SAMPLE LOCATIONS

Date
March 2015

Project Number
10112-005

LEGEND

- SB-8 ENVIRONMENTAL SOIL BORING
- RMW-1/SB-5 SOIL BORING/MONITORING WELL
- SV-5 SOIL VAPOR SAMPLE
- MR-13 GEOTECHNICAL SOIL BORING
- F-1 EXISTING MONITORING WELL

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\FIG 5 - NAPL Soil Staining.dwg DATE: 8/5/2014

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FIGURE 5

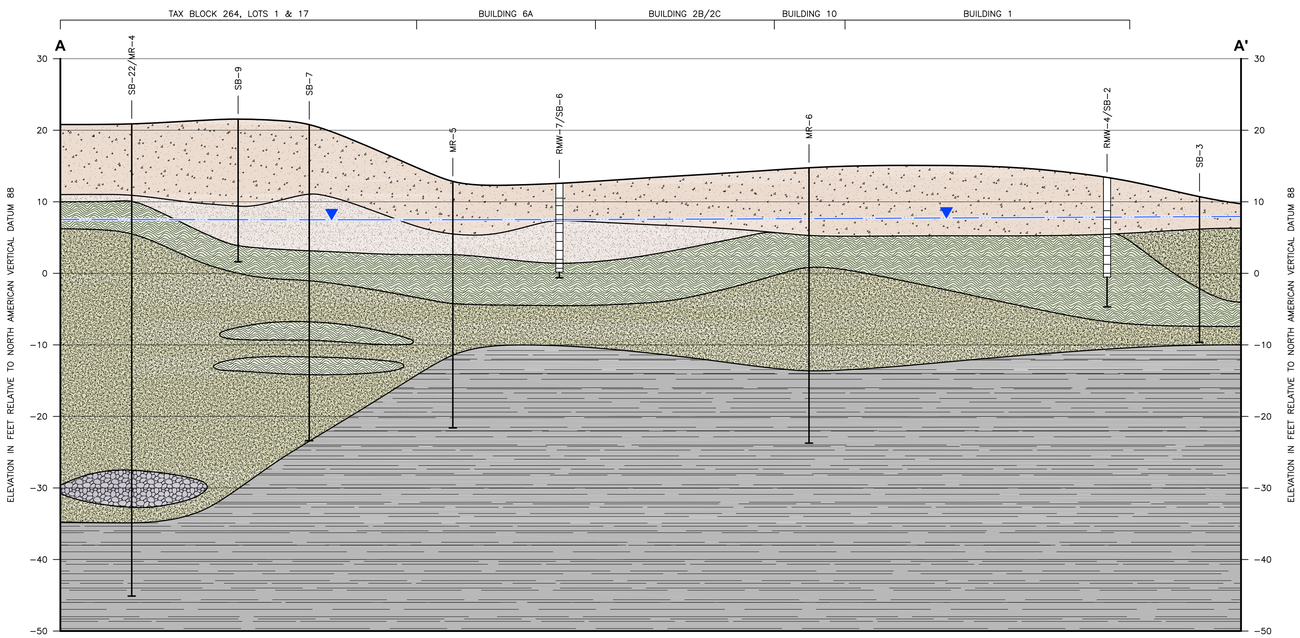
NAPL SOIL STAINING

Date
March 2015

Project Number
10112-005

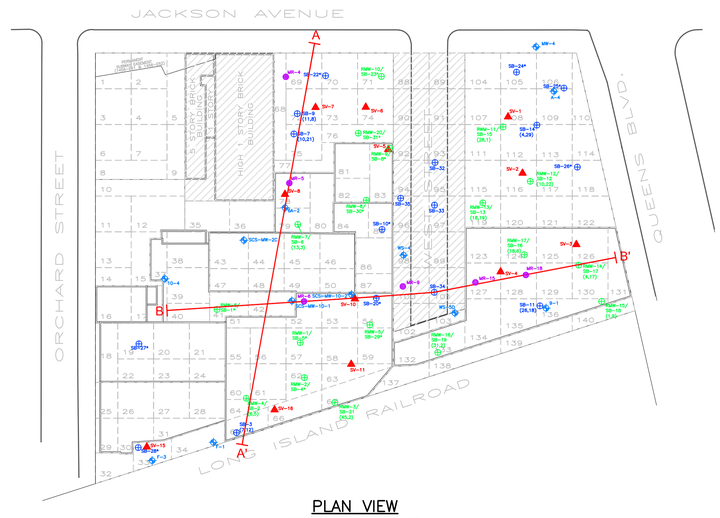
LEGEND

- SB-8 ENVIRONMENTAL SOIL BORING
- MR-13 GEOTECHNICAL SOIL BORING
- NO STAINING
- LIGHT STAINING
- MODERATE STAINING
- HEAVY/VERY HEAVY STAINING
- GEOTECHNICAL BORING IN OR ADJACENT TO AREA WITH NAPL STAINING AND POTENTIAL FOR NAPL OVER BEDROCK



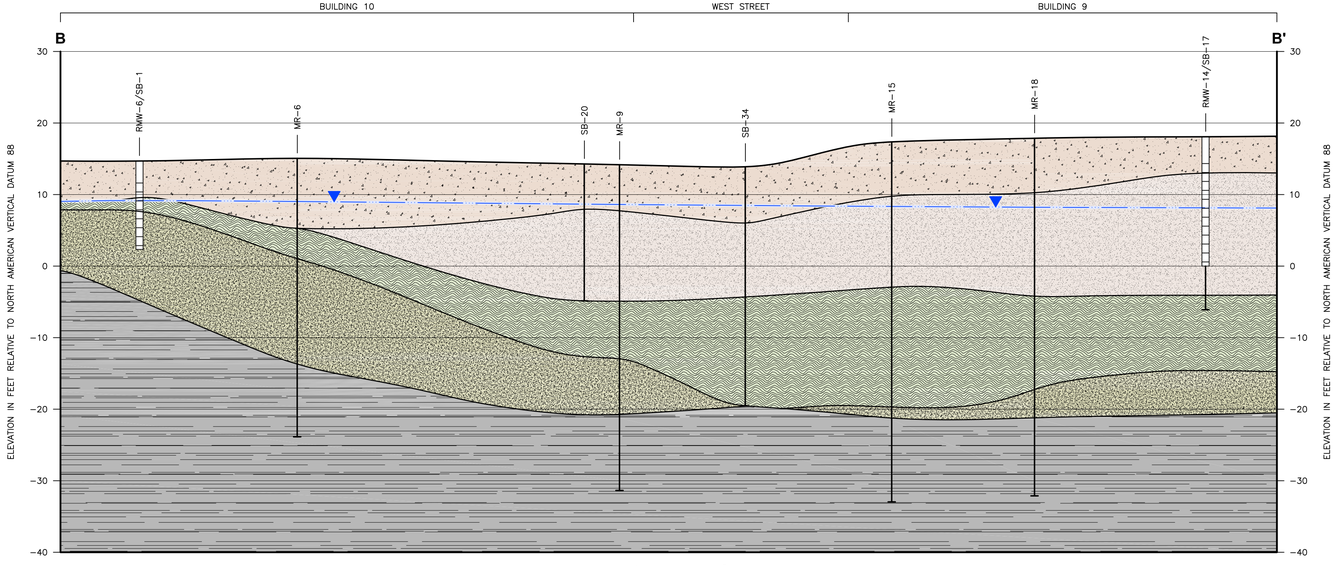
SECTION A–A'

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'



PLAN VIEW

HORIZONTAL SCALE: 1" = 60'

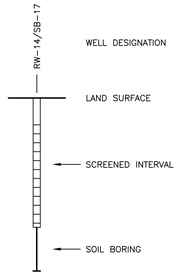


SECTION B–B'

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

LEGEND

- FILL MATERIAL
- PRIMARILY FINE SAND WITH VARYING AMOUNTS OF SILT AND GRAVEL
- PRIMARILY SILT WITH VARYING AMOUNTS OF SAND, CLAY AND GRAVEL
- PRIMARILY FINE TO COARSE SAND WITH VARYING AMOUNTS OF SILT AND GRAVEL
- BOULDERS
- BEDROCK
- INFERRED GROUNDWATER ELEVATION FROM OCTOBER 2014 IN FEET ABOVE NORTH AMERICAN VERTICAL DATUM 88



Title:

GENERALIZED HYDROGEOLOGIC CROSS SECTIONS A-A' AND B-B'

BCP NO. C241151
QUEENS PLAZA RESIDENTIAL DEVELOPMENT
LONG ISLAND CITY, NEW YORK

Prepared For:

TISHMAN SPEYER

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: J.W.	Date: 26NOV14	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	6
Project Mgr: J.L.	Project: 2409.0001Y000	
File: 2409.0001Y114.02.DWG		

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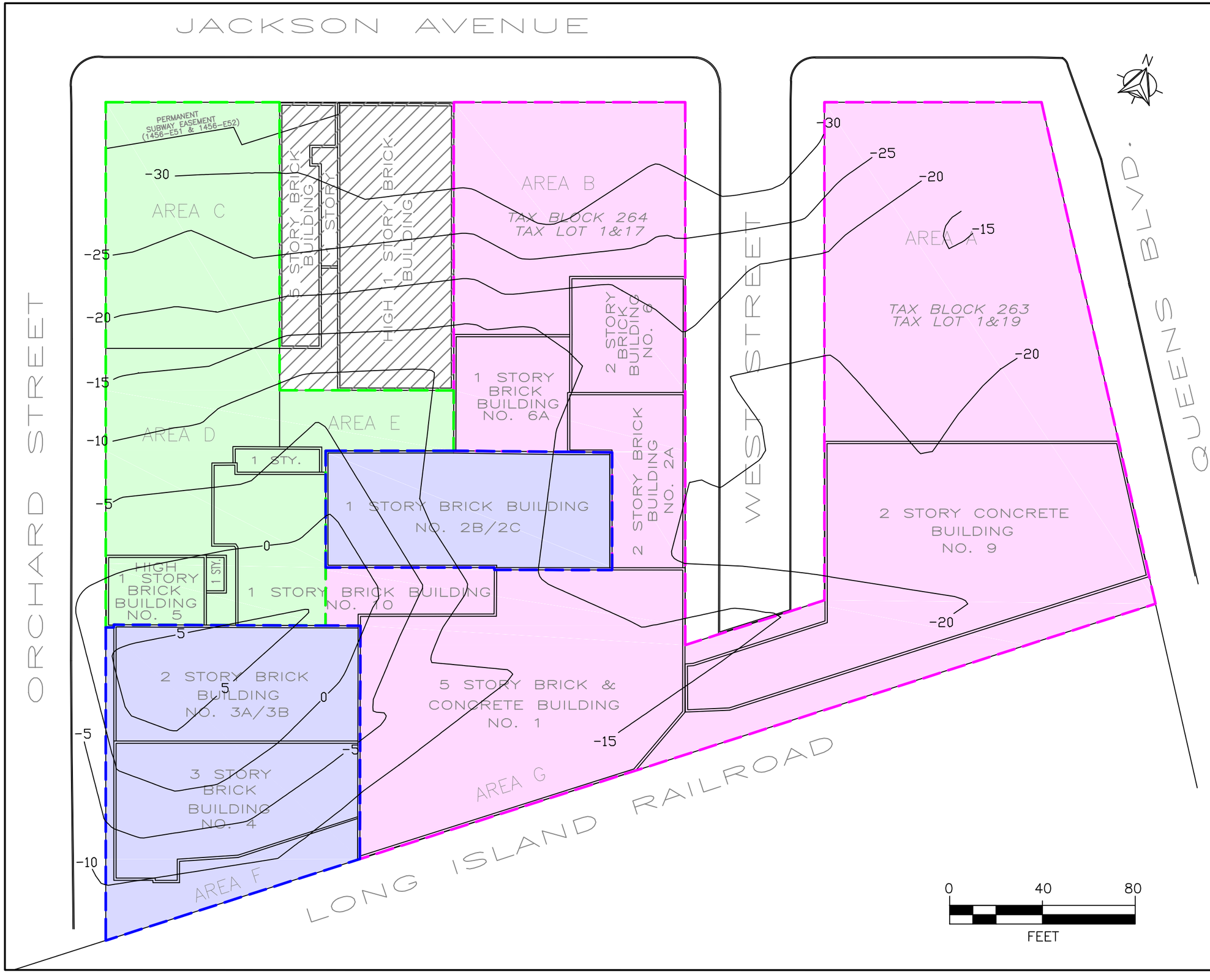

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\FIG 7 - Bedrock Contour Map.dwg DATE: 1/5/2015

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BCP No. C241151

FIGURE 7

BEDROCK ELEVATION CONTOUR MAP

Date
December 2014

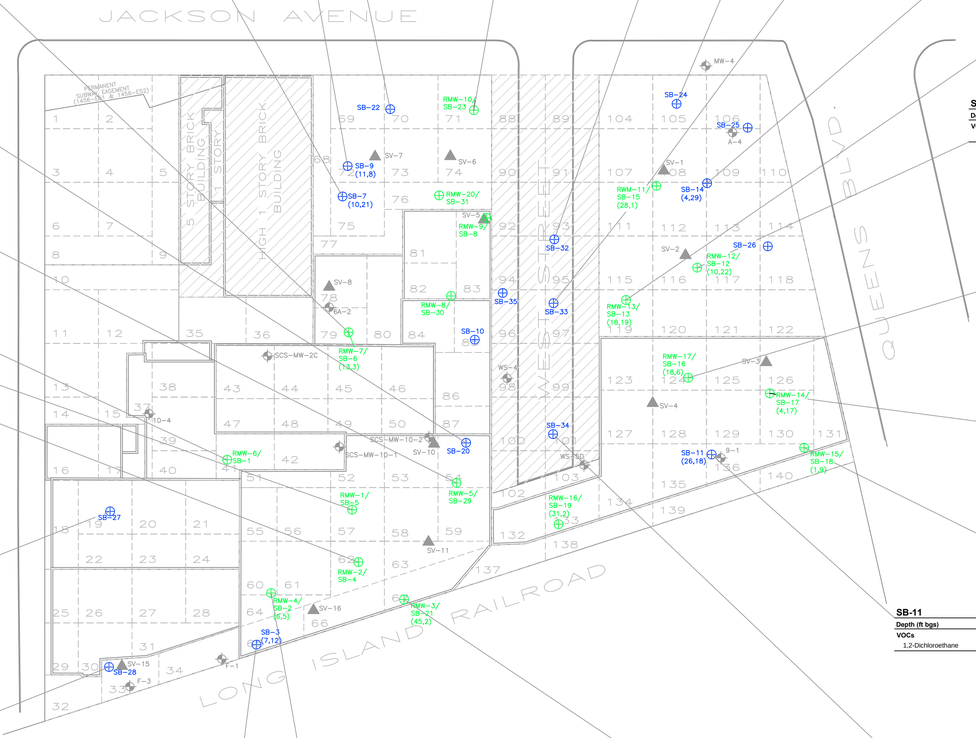
Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- 0 CONTOUR OF ELEVATION OF TOP OF ROCK

ELEVATION IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

SOURCE: PRELIMINARY SUPPORT OF EXCAVATION GENERAL PLAN (9-24-14) BY MUESER RUTLEDGE (UPDATED 10/24/14)



SB-20

Depth (ft bgs)	8/15/14 5 - 6	8/15/14 8 - 9
SVOCs		
2-Methylnaphthalene	**187000**	**196000**
2-Methylphenol	**406 J**	ND
3 & 4-Methylphenol	**938**	NE
Benzo[a]anthracene	**1300**	NE
Benzo[a]pyrene	1940	NE
Benzo[b]fluoranthene	**2380**	NE
Chrysene	**1590**	**1200**
Dibenzo[a,h]anthracene	341	NE
Indeno[1,2,3-cd]pyrene	1350	NE
Naphthalene	**73300**	**105000 D**
Metals		
Arsenic	**17.7 D**	NE
Mercury	**2.2**	NE

SB-6

Depth (ft bgs)	9/9/14 5 - 6	9/9/14 6 - 7	9/9/14 10 - 11	9/16/14 12 - 13
VOCs				
1,2-Dichloroethane	ND	ND	**231**	ND
Benzene	**1230 J**	**1590 J**	**559**	**417 J**
cis-1,2-Dichloroethene	**1240 J**	**2620 J**	**449**	NE
Ethylbenzene	**27900**	**31500**	**7910**	**6150**
Isopropylbenzene	**6370 J**	**7070 J**	NE	NE
Toluene	**25200**	**30200**	**7300**	**5350**
Trichloroethene	**764 J**	**1310 J**	NE	ND
Xylenes (total)	**136000**	**147000**	**35300**	**27100**
SVOCs				
2-Methylnaphthalene	**604000**	**1020000**	**261000**	**286000**
2-Methylphenol	NE	NE	ND	NE
3 & 4-Methylphenol	NE	NE	**1010**	NE
Benzo[a]anthracene	**1400**	**1250**	NE	NE
Chrysene	**1440**	**1240**	NE	NE
Dibenzofuran	60600 D	72800 D	NE	NE
Naphthalene	**721000 D**	**1150000 D**	**230000 D**	**298000 D**

SB-7

Depth (ft bgs)	9/8/14 5 - 6	9/8/14 43 - 44
VOCs		
1,2-Dichloroethane	ND	**182**
Methylene chloride	ND	**389**
SVOCs		
Benzo[a]anthracene	**2850**	ND
Benzo[a]pyrene	2960	ND
Benzo[b]fluoranthene	**3450**	ND
Chrysene	**2950**	ND
Dibenzo[a,h]anthracene	449	ND
Indeno[1,2,3-cd]pyrene	1980	ND

SB-22

Depth (ft bgs)	9/9/14 5 - 6
SVOCs	
Benzo[a]anthracene	**1580**
Benzo[a]pyrene	1440
Benzo[b]fluoranthene	1630
Chrysene	**1630**
Indeno[1,2,3-cd]pyrene	892

SB-9

Depth (ft bgs)	9/9/14 15 - 16
SVOCs	
Benzo[a]anthracene	**1390**
Chrysene	**1450**
Metals	
Lead	**839**

SB-23

Depth (ft bgs)	9/9/14 9 - 10
Metals	
Lead	**509**
Mercury	**1.3**

SB-24

Depth (ft bgs)	9/9/14 5 - 6
SVOCs	
Indeno[1,2,3-cd]pyrene	557

SB-32

Depth (ft bgs)	9/25/14 5 - 6
SVOCs	
Benzo[a]anthracene	**1250**
Benzo[a]pyrene	1160
Benzo[b]fluoranthene	1400
Chrysene	**1320**
Indeno[1,2,3-cd]pyrene	797
Metals	
Mercury	**0.78**

SB-33

Depth (ft bgs)	9/25/14 5 - 6
SVOCs	
Benzo[b]fluoranthene	1090
Chrysene	**1140**
Indeno[1,2,3-cd]pyrene	558
Metals	
Mercury	**0.84**
Selenium	**7.6**

SB-14

Depth (ft bgs)	9/12/14 5 - 6
Metals	
Lead	**511**
Mercury	**0.74**

SB-1

Depth (ft bgs)	9/15/14 5 - 6	9/15/14 5 - 6 SB-1A	9/15/14 5 - 6 SB-1B	9/15/14 8 - 9
VOCs				
1,2-Dichloroethane	**682 J**	**748 J**	ND	ND
1,4-Dichlorobenzene	**1970 J**	**2650 J**	**2350 J**	NE
Benzene	**735 J**	**1020 J**	**910 J**	**181 J**
cis-1,2-Dichloroethene	**411 J**	ND	ND	ND
Ethylbenzene	**7710**	**11100**	**9530**	**4500**
Isopropylbenzene	**4250 J**	**5850 J**	**5120 J**	**3290**
Tetrachloroethene	**1470 J**	**1630 J**	**1430 J**	NE
Toluene	**8020**	**11800**	**10200**	**2820**
Trichloroethene	**2750 J**	**3070 J**	**2730 J**	**1060 J**
Xylenes (total)	**38800**	**55700**	**48600**	**19600**
SVOCs				
2-Methylnaphthalene	**525000**	**972000**	**693000**	**329000**
2-Methylphenol	**24100 D**	**36500 D**	**22400 D**	**3290**
3 & 4-Methylphenol	**67400 D**	**109000 D**	**63700 D**	**10100 D**
Acenaphthene	**127000 D**	**172000 D**	**153000 D**	NE
Benzo[a]anthracene	**1050**	**1290**	**1180**	NE
Chrysene	**1220**	**1530**	**1400**	NE
Dibenzofuran	132000 D	170000 D	154000 D	NE
Naphthalene	**465000 D**	**769000 D**	**581000 D**	**264000 D**
Phenol	**26900 D**	**50700 D**	**22700 D**	**2120**

SB-29

Depth (ft bgs)	9/18/14 7 - 8	9/18/14 9 - 10	9/18/14 10 - 11
VOCs			
Ethylbenzene	**3640**	**1600**	NE
Toluene	**796**	NE	NE
Xylenes (total)	**7400**	**3680**	NE
SVOCs			
2-Methylnaphthalene	**170000**	**67000**	**43900**
Benzo[a]anthracene	**1290**	NE	NE
Chrysene	**1120**	NE	NE
Naphthalene	**171000 D**	**82000 D**	**41000 D**
Metals			
Silver	ND	**90.8**	ND

SB-5

Depth (ft bgs)	8/13/14 1 - 2	8/13/14 4 - 5	8/13/14 4 - 5 SB-5A	8/13/14 4 - 5 SB-5B	9/25/14 11 - 12	9/25/14 15 - 16	8/13/14 17 - 18	8/13/14 17 - 18 DUP
VOCs								
1,2-Dichlorobenzene	**17100**	**3810**	**13800**	**8090**	ND	ND	ND	ND
1,4-Dichlorobenzene	**29000**	**8060**	**29200**	**17200**	NE	ND	ND	ND
Benzene	**6010**	**3190**	**11900**	**5800**	**138 J**	**98.4 J**	ND	**953 J**
Ethylbenzene	**21800**	**8680**	**33500**	**17600**	**5950**	NE	**1290**	**14000**
Isopropylbenzene	**14300**	**5430**	**20400**	**11200**	ND	NE	NE	**4680**
Toluene	**41500**	**18400**	**70100**	**36000**	**1810**	NE	ND	**11700**
Xylenes (total)	**96200**	**35600**	**137000**	**73200**	**19200**	**2750**	**5360**	**60400**
SVOCs								
2-Methylnaphthalene	**508000**	**151000**	**797000**	**439000**	**76600**	NE	**2080000**	**539000**
2-Methylphenol	**3310**	ND	ND	ND	ND	NE	ND	NE
3 & 4-Methylphenol	**7830**	**1710**	ND	**2280**	ND	ND	**5220**	ND
Acenaphthene	NE	NE	**149000 D**	NE	NE	NE	**267000**	NE
Benzo[a]anthracene	**1830**	NE	**1990**	NE	NE	ND	**1640**	NE
Chrysene	**2130**	NE	**2130**	NE	NE	ND	**1530**	ND
Dibenzofuran	86900 D	NE	136000 D	72000 D	NE	NE	**260000**	NE
Naphthalene	**442000 D**	**138000 D**	**718000 D**	**424000 D**	**189000 D**	NE	**2150000**	NE
Metals								
Arsenic	**72.7**	NE	**33.2**	NE	NE	NE	NE	NE
Lead	NE	NE	**1010**	NE	NE	NE	NE	NE
Pesticides								
Dieldrin	**768 D**	**135 D**	NA	NA	ND	ND	ND	ND

SB-4

Depth (ft bgs)	8/14/14 5 - 6	8/14/14 11 - 12	8/14/14 19 - 20
VOCs			
Benzene	NE	**1170**	ND
Ethylbenzene	NE	**5490**	NE
Toluene	NE	**3850**	NE
Xylenes (total)	NE	**16100**	NE
SVOCs			
2-Methylnaphthalene	**329000**	NE	NE
Benzo[a]anthracene	**2160**	NE	NE
Benzo[b]fluoranthene	1070	NE	NE
Chrysene	**2310**	NE	NE
Naphthalene	**281000 D**	**129000 D**	**28700**
Metals			
Arsenic	**82.5**	NE	NE
Lead	**727**	NE	NE
Selenium	**5**	ND	ND
Pesticides			
alpha-BHC	**22.1**	ND	ND
Dieldrin	**640 D**	ND	ND

SB-27

Depth (ft bgs)	12/12/14 4 - 5
SVOCs	
2-Methylphenol	**816**
3 & 4-Methylphenol	**3610**
Benzo[a]anthracene	**1050**
Benzo[b]fluoranthene	**1960**
Chrysene	**1530**
Indeno[1,2,3-cd]pyrene	762
Phenol	**749**

SB-28

Depth (ft bgs)	9/5/14 0 - 0.5	12/12/14 21 - 22
VOCs		
Benzene	ND	**101**
Xylenes (total)	ND	**2220**
SVOCs		
2-Methylnaphthalene	NE	**48900**
3 & 4-Methylphenol	NE	**388**
Benzo[a]anthracene	**1910**	NE
Benzo[a]pyrene	2010	NE
Benzo[b]fluoranthene	**2780**	NE
Chrysene	**2200**	NE
Dibenzo[a,h]anthracene	390	ND
Indeno[1,2,3-cd]pyrene	1250	NE
Naphthalene	NE	**33300**
Metals		
Arsenic	**18.8**	NE
Cadmium	5.1	NE
Copper	**1780**	NE
Lead	**566**	NE
Mercury	**2.9**	ND

SB-3

Depth (ft bgs)	9/5/14 0 - 0.5	8/25/14 5 - 6	9/19/14 11 - 12	9/19/14 17 - 18	9/19/14 19 - 20
VOCs					
1,2-Dichlorobenzene	ND	NE	**1840**	ND	NE
Acetone	ND	ND	ND	ND	**653**
Benzene	ND	**151**	**407**	**101**	NE
Ethylbenzene	ND	NE	**7170**	NE	NE
Toluene	ND	NE	**5580**	NE	NE
Xylenes (total)	ND	NE	**25700**	NE	NE
SVOCs					
2-Methylnaphthalene	NE	**38500**	**572000**	**112000**	NE
2-Methylphenol	NE	NE	NE	**544**	NE
3 & 4-Methylphenol	NE	NE	NE	**578**	**640**
Benzo[a]anthracene	**1300**	NE	**1030**	NE	NE
Benzo[a]pyrene	1100	NE	NE	NE	NE
Benzo[b]fluoranthene	**2240**	NE	NE	NE	NE
Chrysene	**1670**	NE	**1030**	NE	NE
Dibenzofuran	NE	NE	87000 D	NE	NE
Indeno[1,2,3-cd]pyrene	844	NE	NE	NE	NE
Naphthalene	NE	**72600 D**	**620000 D**	**104000**	NE
Metals					
Arsenic	**17.6**	NE	NE	ND	NE
Barium	440	NE	NE	NE	NE
Cadmium	5.1	NE	ND	ND	NE
Copper	332	NE	NE	NE	NE
Lead	**825**	NE	NE	NE	NE
Mercury	NE	**1.3**	ND	ND	NE

SB-2

Depth (ft bgs)	8/25/14 6 - 7	8/25/14 17 - 18	8/25/14 17 - 18 SB-2A	8/25/14 17 - 18 SB-2B
Acetone	NE	**2720**	**2990**	**2720**
Benzene	NE	**268**	**313**	**285**
Toluene	NE	NE	**1000**	**714**
SVOCs				
2-Methylnaphthalene	NE	**68700**	NE	NE
2-Methylphenol	NE	**1570 J**	**1520 J**	**1840 J**
3 & 4-Methylphenol	**522**	**3970**	**3830**	**4280 D**
Benzo[a]anthracene	**1090**	NE	NE	NE
Benzo[b]fluoranthene	1090	NE	NE	ND
Chrysene	**1270**	NE	NE	NE
Indeno[1,2,3-cd]pyrene	599	NE	ND	ND
Naphthalene	NE	**76700 D**	**15200 D**	**15300 D**
Phenol	ND	**599**	**634**	**716**
Metals				
Mercury	**0.9**	ND	ND	ND

SB-21

Depth (ft bgs)	9/5/14 0 - 0.5	8/25/14 5 - 6	9/19/14 11 - 12
VOCs			
Benzene	ND	**286 J**	**453**
Ethylbenzene	ND	**4110**	**3000**
Toluene	ND	**1450**	**1050**
Xylenes (total)	ND	**12400**	**8910**
SVOCs			
2-Methylnaphthalene	ND	**94500**	**703000**
2-Methylphenol	ND	**589 J**	ND
3 & 4-Methylphenol	ND	**1100**	ND
Acenaphthene	NE	NE	**153000 D**
Benzo[a]anthracene	**1630**	NE	**3310**
Benzo[a]pyrene	1500	NE	NE
Benzo[b]fluoranthene	**2400**	NE	1250
Chrysene	**1890**	NE	**3230**
Dibenzo[a,h]anthracene	364	NE	NE
Dibenzofuran	NE	NE	127000 D
Fluorene	NE	NE	105000 D
Indeno[1,2,3-cd]pyrene	1160	NE	NE
Naphthalene	NE	**140000 D**	**1010000 D**
Phenanthrene	NE	NE	131000 D
Metals			
Arsenic	**104**	NE	NE
Barium	**2070**	NE	NE
Cadmium	**16.6**	ND	ND
Copper	340	NE	NE
Lead	**3890**	NE	NE
Mercury	**3.6**	NE	ND
Zinc	**3060**	NE	NE

SB-34

Depth (ft bgs)	9/25/14 7 - 8
VOCs	
Acetone	**53.3**

SB-11

Depth (ft bgs)	9/10/14 7 - 8
VOCs	
1,2-Dichloroethane	**46.6 J**

SB-12

Depth (ft bgs)	9/11/14 15 - 16
VOCs	
Xylenes (total)	**2950 J**

SB-13

Depth (ft bgs)	9/12/14 5 - 6	9/12/14 16 - 17
VOCs		
Acetone	NE	**63.6**
SVOCs		
Benzo[a]anthracene	**5530 D**	ND
Benzo[a]pyrene	5130 D	ND
Benzo[b]fluoranthene	**5330 D**	ND
Benzo[k]fluoranthene	**2700**	ND
Chrysene	**5580 D**	ND
Dibenzo[a,h]anthracene	950	ND
Indeno[1,2,3-cd]pyrene	3170 D	ND
Metals		
Lead	435	NE

SB-16

Depth (ft bgs)	9/11/14 5 - 6	9/11/14 19 - 20
VOCs		
Acetone	NE	**52.9**
SVOCs		
Benzo[a]anthracene	**9000 D**	ND
Benzo[a]pyrene	7490 D	ND
Benzo[b]fluoranthene	**9070 D**	ND
Benzo[k]fluoranthene	**1760**	ND
Chrysene	**8350 D**	ND
Dibenzo[a,h]anthracene	1200	ND
Indeno[1,2,3-cd]pyrene	3630	ND

SB-17

Depth (bgs)	9/11/14 5 - 6	9/11/14 11 - 12	9/11/14 19 - 20	9/11/14 20 - 21
VOCs				
Ethylbenzene	NE	NE	NE	**1220**
Xylenes (total)	NE	NE	**2850**	**6690**
SVOCs				
Benzo[a]anthracene	NE	**1540**	NE	NE
Benzo[a]pyrene	NE	1380	NE	NE
Benzo[b]fluoranthene	NE	**1710**	NE	NE
Butyl benzyl phthalate	**161000**	NE	NE	NE
Chrysene	NE	**1530**	NE	NE
Indeno[1,2,3-cd]pyrene	NE	849	NE	NE
Naphthalene	NE	NE	**13900**	**23100**

SB-18

Depth (ft bgs)	9/10/14 5 - 6	9/12/14 14 - 15
VOCs		
Acetone	**58**	**137**
SVOCs		
Benzo[a]anthracene	**4050 D**	NE
Benzo[a]pyrene	3890 D	NE
Benzo[b]fluoranthene	**4100 D**	NE
Chrysene	**4070 D**	NE
Dibenzo[a,h]anthracene	584	ND
Indeno[1,2,3-cd]pyrene	2470	ND

SOIL CLEANUP OBJECTIVES

Parameter	SCOs*	SCOs**
VOCs (Concentrations in µg/kg)	(µg/kg)	(µg/kg)
1,2-Dichlorobenzene	100000	**1100**
1,2-Dichloroethane	3100	**20**
1,4-Dichlorobenzene	13000	**1800**
Acetone	100000	**50**
Benzene	4800	**60**
cis-1,2-Dichloroethene	100000	**250**
Ethylbenzene	41000	**1000**
Methylene chloride	100000	**50**
Tetrachloroethene	19000	**1300**
Toluene	100000	**700**
Trichloroethene	21000	**470**
Xylenes (total)	100000	**1600**
SVOCs (Concentrations in µg/kg)	(µg/kg)	(µg/kg)
2-Methylnaphthalene		**36400**
2-Methylphenol	100000	**330**
3 & 4-Methylphenol	100000	**330**
Acenaphthene	100000	**98000**
Benzo[a]anthracene	1000	**1000**
Benzo[a]pyrene	1000	**22000**
Benzo[b]fluoranthene	1000	**1700**
Benzo[k]fluoranthene	3900	**1700**
Chrysene	3900	**1000**
Dibenzo[a,h]anthracene	330	**1000000**
Dibenzofuran	59000	**210000**
Fluorene	100000	**386000**
Indeno[1,2,3-cd]pyrene	500	**8200**
Naphthalene	100000	**12000**
Phenanthrene	100000	**1000000**
Phenol	100000	**330**
Metals (Concentrations in mg/kg)	(mg/kg)	(mg/kg)
Arsenic	16	**16**
Barium	400	**820**
Cadmium	4.3	**8**
Copper	270	**1720**
Lead	400	**450**
Mercury	0.81	**0.73**
Nickel	310	**130**
Selenium	180	**4**
Silver	180	**8**
Zinc	10000	**2480**
PCBs (Concentrations in µg/kg)	(µg/kg)	(µg/kg)
Total PCBs	1000	**3200**
Pesticides (Concentrations in µg/kg)	(µg/kg)	(µg/kg)
4,4'-DDD	1300	**14000**
4,4'-DDE	8900	**17000**
4,4'-DDT	7900	**136000**
alpha-BHC	480	**20**
alpha-Chlordane	4200	**2900**
Dieldrin	2000	**100**

DATA BOX LEGEND

- µg/kg – MICROGRAMS PER KILOGRAM
- mg/kg – MILLIGRAMS PER KILOGRAM
- * – NYSDEC PART 375 RESTRICTED RESIDENTIAL SCOs
- ** – NYSDEC PART 375 PROTECTION OF GROUNDWATER STANDARDS
- NYSDEC – NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- – – NO NYSDEC PART 375 STANDARDS AVAILABLE
- D – DILUTION
- J – ESTIMATED VALUE
- DUP – DUPLICATE SAMPLE
- SCOs – SOIL CLEANUP OBJECTIVES
- VOCs – VOLATILE ORGANIC COMPOUNDS
- SVOCs – SEMIVOLATILE ORGANIC COMPOUNDS
- PCBs – POLYCHLORINATED BIPHENYLS
- NA – NOT ANALYZED FOR BY LABORATORY
- NE – NO EXCEEDANCES
- ND – NO DETECTION
- FT BGS – FEET BELOW GROUND SURFACE

BOLD DATA INDICATES THAT PARAMETER WAS DETECTED ABOVE THE NYSDEC PART 375 PROTECTION OF GROUNDWATER SCOs (IF FOUND ABOVE TOGS GA AWQSGVs)

RED DATA INDICATES THAT PARAMETER WAS DETECTED ABOVE THE NYSDEC PART 375 RESTRICTED RESIDENTIAL SCOs IN THE TOP 15 FT BGS

RED/ BOLD DATA INDICATES THAT PARAMETER WAS DETECTED ABOVE THE NYSDEC PART 375 RESTRICTED RESIDENTIAL SCOs AND PROTECTION OF GROUNDWATER SCOs IN THE TOP 15 FT BGS (IF FOUND ABOVE TOGS GA AWQSGVs)

NOTES

1. FOR SOILS ≤15 FT BGS THE LOWER OF THE RESTRICTED RESIDENTIAL OR PROTECTION OF GROUNDWATER SCOs APPLY.
2. FOR SOILS >15 FT BGS THE PROTECTION OF GROUNDWATER SCOs APPLY WHERE GROUNDWATER IS ABOVE THE TOGS GA AWQSGVs.

Fleming Lee Shue

Environmental Management & Consulting

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New York, NY 10001

ROUX

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Queens Plaza Residential Development
BCP NO. C241151

FIGURE 8

RESULTS ABOVE SOIL CLEANUP OBJECTIVES

Date
January 2015

Project Number
10112-005

LEGEND

- OUTSIDE OF SITE
- GRID CELL AND NUMBER
- SB-11 (26,18) SOIL BORING LOCATION (RANDOM X AND Y COORDINATES FOR LOCATION, FT.)
- RWW-11/ SB-15 (28,1) GROUNDWATER MONITORING WELL/ SOIL BORING LOCATION
- SV-10 SOIL VAPOR SAMPLE LOCATION
- F-1 EXISTING MONITORING WELL

NOTES:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 80 FT. BY 80 FT. (900 SQ. FT.).

2) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE.

3) SCOs – SOIL CLEANUP OBJECTIVES.

0 40 80
FEET

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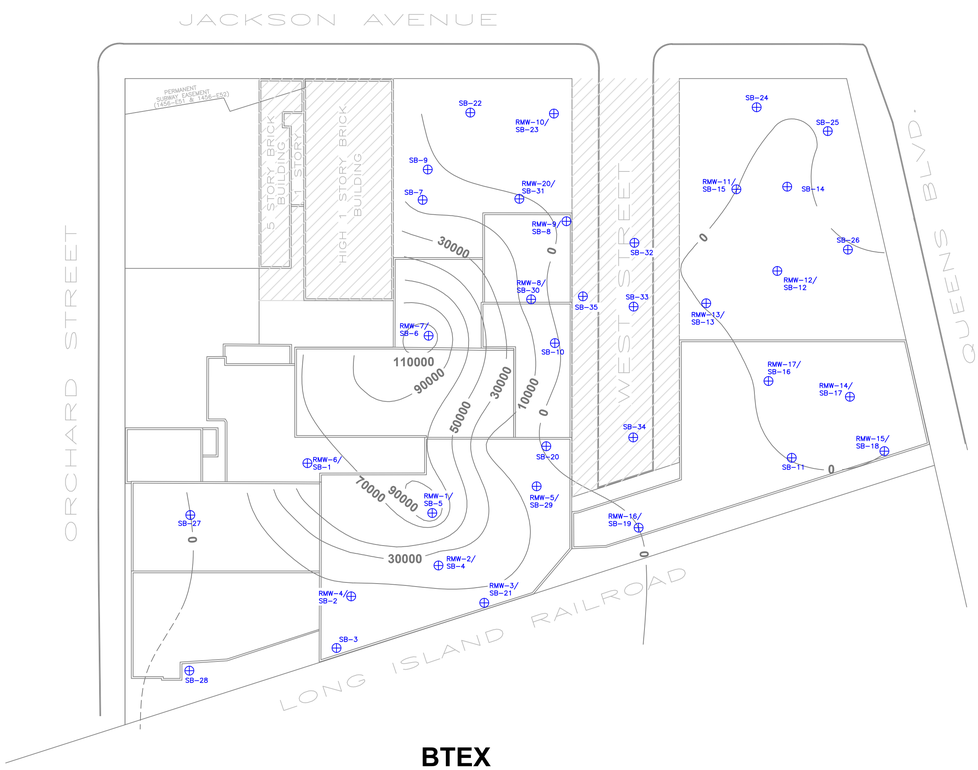
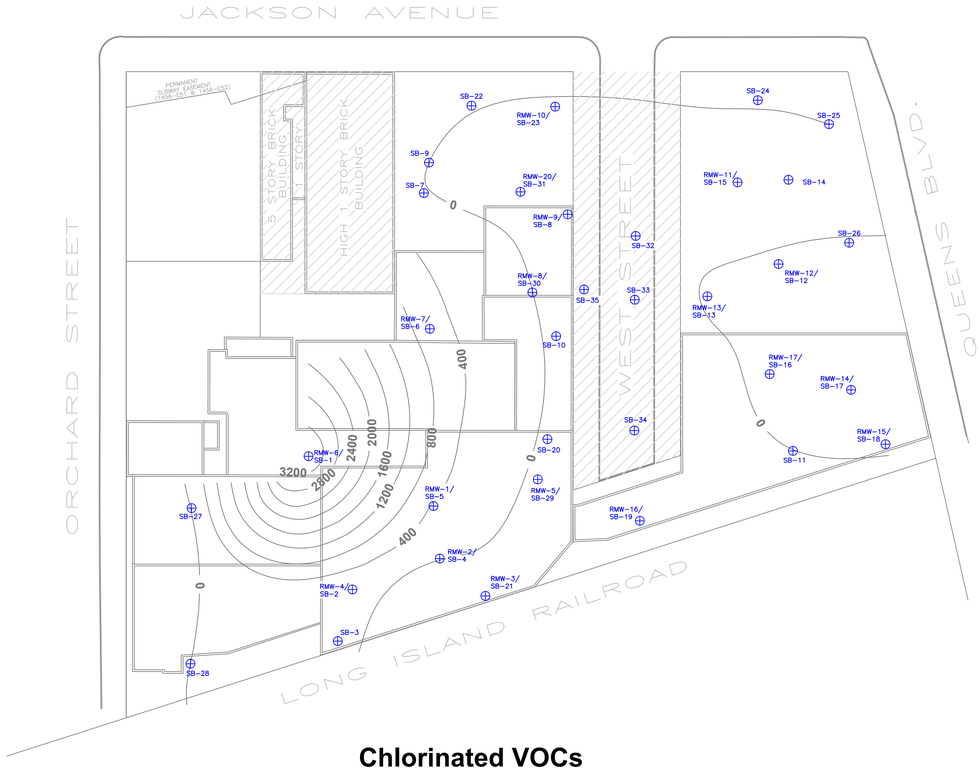
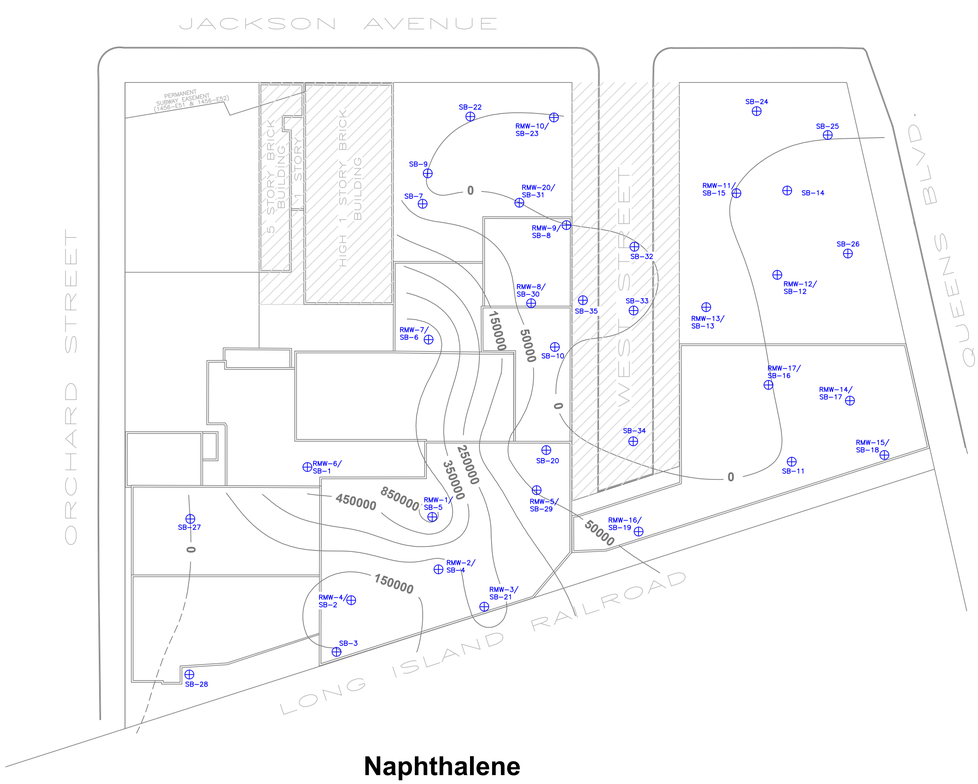


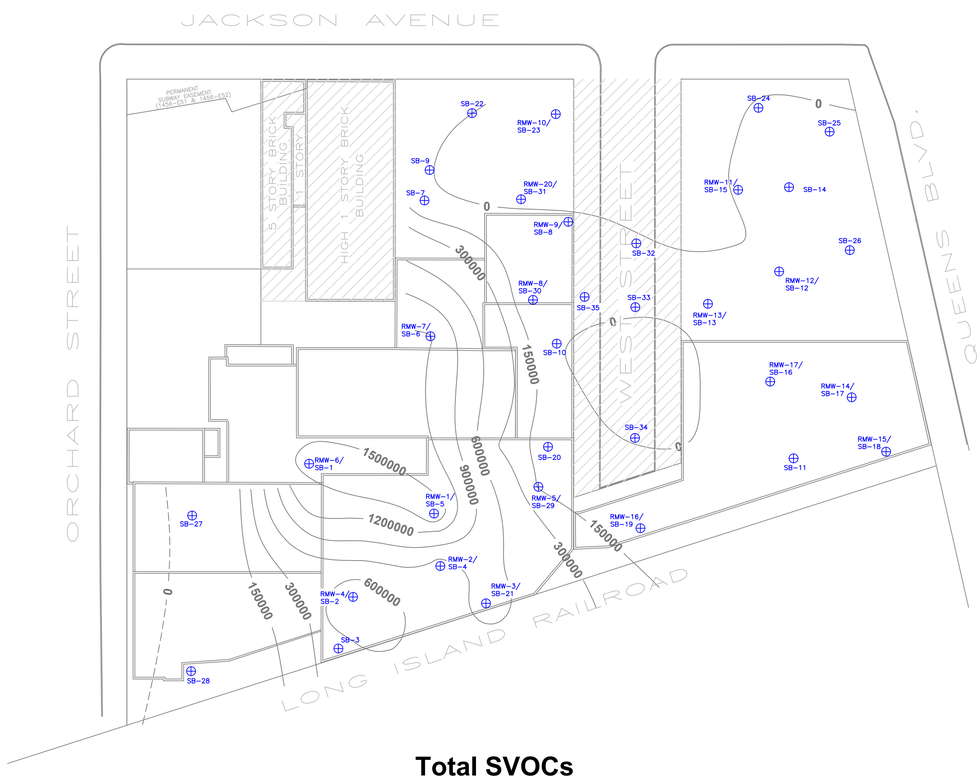
BTEX



Chlorinated VOCs



Naphthalene



Total SVOCs

0 40 80
FEET

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Environmental Consulting & Management

Queens Plaza Residential Development
BCP No. C241151

FIGURE 9

SOIL ISOPLETH MAP

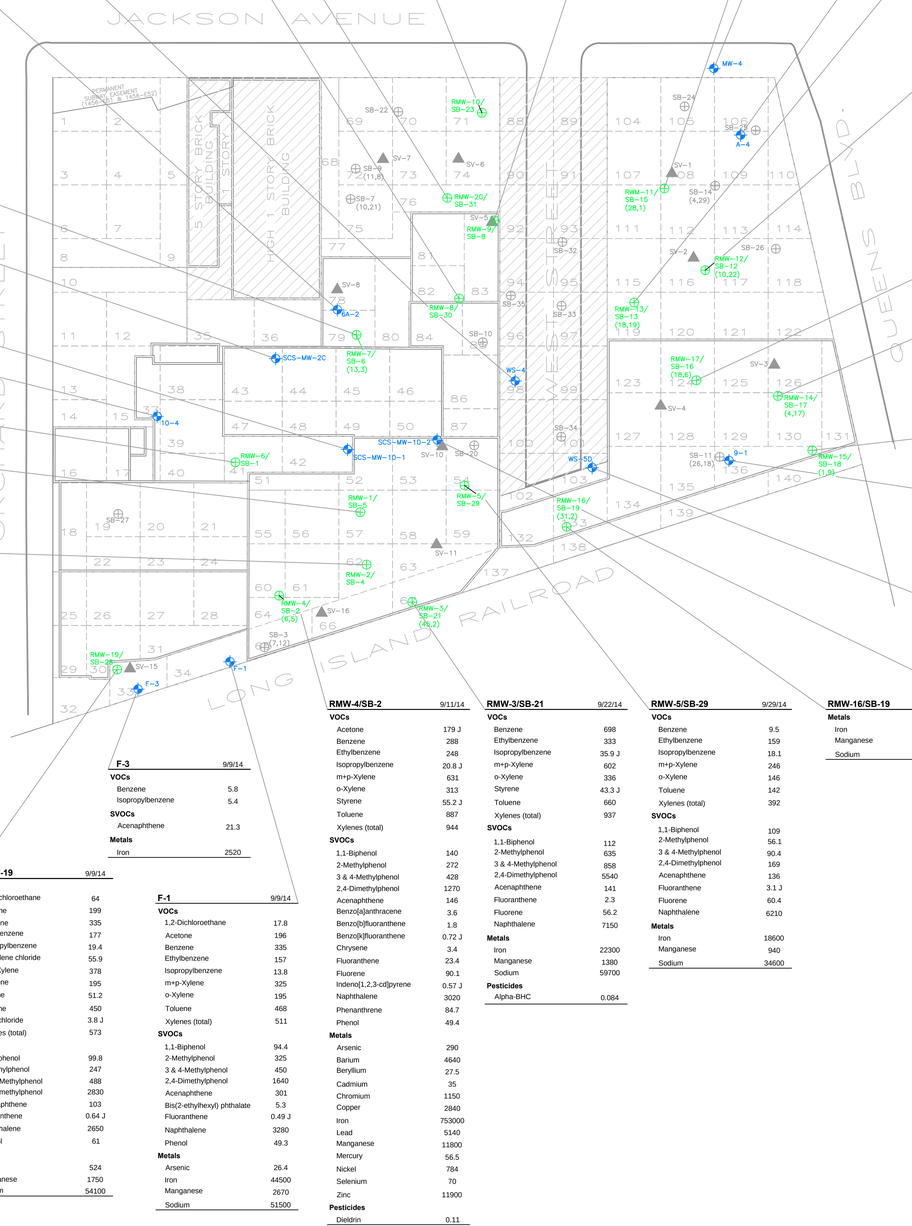
Date
December 2014

Project Number
10112-005

LEGEND

- SB-8 ⊕ — ENVIRONMENTAL SOIL BORING
- RMW-1/SB-5 ⊕ — SOIL BORING/MONITORING WELL
- 6000 — SOIL ISOPLETH IN ug/kg
- — — — DASHED WHERE INFERRED
- *NOTE: CONTOURS CREATED BY AVERAGING SELECT COMPOUNDS IN SAMPLES TAKEN FROM DIFFERENT DEPTHS FROM EACH SOIL BORING

FILE: P:\Project Files\V9999 - Tahmoor\Figures\Site B - RIR\Fig 9 - Soil Isopleth Map.dwg DATE: 8/5/2014



SCS-MW-2C 9/24/14

VOCs	
1,1,1-Trichloroethane	483
1,1-Dichloroethane	5220
1,1-Dichloroethene	52.3
1,2-Dichloroethane	4280
1,4-Dichlorobenzene	5.8 J
Acetone	191
Benzene	220
cis-1,2-Dichloroethene	161
Chloroethane	14.2
Ethylbenzene	114
Isopropylbenzene	9.6 J
m+p-Xylene	365
Methylene chloride	2600
o-Xylene	201
Styrene	85.8
Toluene	684
Trichloroethene	128
Vinyl chloride	25.6
Xylenes (total)	566
SVOCs	
1,1-Biphenol	237
Acenaphthene	253
Fluoranthene	5.3
Fluorene	107
Naphthalene	5200
Phenol	357
Metals	
Arsenic	102
Iron	3400
Lead	152
Sodium	113000

RMW-7/SB-6 9/26/14

VOCs	
1,2-Dichloroethane	361
2-Butanone (MEK)	196 J
Benzene	254
cis-1,2-Dichloroethene	1050
Ethylbenzene	326
Isopropylbenzene	22.2 J
m+p-Xylene	956
o-Xylene	508
Styrene	226 J
Toluene	1030
Trichloroethene	89.8
Xylenes (total)	1460
SVOCs	
1,1-Biphenol	333
2-Methylphenol	573
3 & 4-Methylphenol	1000
2,4-Dimethylphenol	3160
Acenaphthene	343
Benzo[a]anthracene	3.2 J
Bis(2-ethylhexyl) phthalate	7 J
Chrysene	3.4 J
Diethyl phthalate	70.1
Fluoranthene	20.3
Fluorene	149
Naphthalene	8620
Phenanthrene	127
Phenol	125
Metals	
Arsenic	30.7
Iron	12100
Lead	26.6
Manganese	373
Sodium	36000

6A-2 9/24/14

VOCs	
1,2-Dichloroethane	24.1
1,4-Dichlorobenzene	3.6 J
Acetone	95.7
Benzene	503
Ethylbenzene	259
Isopropylbenzene	16.6
m+p-Xylene	900
o-Xylene	417
Styrene	268
Toluene	1200
Vinyl chloride	2.4 J
Xylenes (total)	1320

WS-4 9/24/14

Metals	
Iron	4970
Manganese	2720
Sodium	61700

RMW-8/SB-30 9/23/14 9/23/14 DUP

VOCs		
Ethylbenzene	6.8	7
Xylenes (total)	5.7	5.6
SVOCs		
Naphthalene	11	11.6
Metals		
Arsenic	155	144
Iron	5660	5790
Manganese	1040	970
Sodium	25900	25100

RMW-20/SB-31 10/9/14

VOCs	
Isopropylbenzene	6.7
Metals	
Iron	1470
Manganese	2510

RMW-10/SB-23 9/22/14

Metals	
Iron	304
Manganese	3210
Sodium	41600

RMW-9/SB-8 9/24/14

SVOCs	
Bis(2-ethylhexyl) phthalate	45.4
Metals	
Iron	566
Manganese	1420
Pesticides	
Dieldrin	0.11

RMW-11/SB-15 9/23/14

Metals	
Iron	3370
Manganese	4460
Sodium	36900

MW-4 9/26/14

Metals	
Iron	846
Manganese	5190
Sodium	36800

A-4 9/26/14

Metals	
Iron	12800
Manganese	594
Sodium	35300

RMW-13/SB-13 9/23/14

Metals	
Iron	16100
Manganese	3300

RMW-12/SB-12 9/23/14

VOCs	
m+p-Xylene	8.2
Xylenes (total)	11.2
SVOCs	
Benzo[a]anthracene	0.89 J
Benzo[b]fluoranthene	1.1
Chrysene	0.94 J
Fluoranthene	1.7
Indeno[1,2,3-cd]pyrene	1.5
Metals	
Iron	7030
Manganese	3750
Sodium	42100
Pesticides	
Dieldrin	0.014

RMW-17/SB-16 9/25/14

VOCs	
1,2-Dichlorobenzene	31.9 J
cis-1,2-Dichloroethene	281
Ethylbenzene	58.7
m+p-Xylene	162
o-Xylene	51.5
Toluene	11.6 J
Xylenes (total)	214
SVOCs	
2-Methylphenol	13.1
3 & 4-Methylphenol	93
Benzo[a]anthracene	0.51 J
Chrysene	0.45 J
Diethyl phthalate	338
Fluoranthene	1.7
Naphthalene	99.9
Phenol	17.4
Metals	
Iron	68600
Manganese	468

RMW-14/SB-17 9/25/14

VOCs	
m+p-Xylene	8.2 J
Xylenes (total)	8.2 J
SVOCs	NE
Benzo[a]anthracene	0.73 J
Benzo[b]fluoranthene	0.69 J
Bis(2-ethylhexyl) phthalate	6.3
Chrysene	0.71 J
Fluoranthene	1.4
Phenol	2.1
Metals	
Antimony	30.9
Iron	5360

RMW-15/SB-18 9/29/14

SVOCs	
Fluoranthene	0.68 J
Naphthalene	14.2 B
Metals	
Iron	18600
Manganese	615
Sodium	20500

9-1 9/25/14

VOCs	
1,2-Dichloroethane	7
cis-1,2-Dichloroethene	6.8
Metals	
Antimony	7.1
Iron	8000
Manganese	1440

SCS-MW-10-1 9/16/14

VOCs	
1,2-Dichloroethane	92.2
1,4-Dichlorobenzene	14.6 J
Acetone	550
Benzene	285
Ethylbenzene	240
Isopropylbenzene	19.3 J
m+p-Xylene	638
Methylene chloride	48.2 J
o-Xylene	340
Styrene	99.6 J
Toluene	1150
Xylenes (total)	978
SVOCs	
1,1-Biphenol	567
2-Methylphenol	2760
3 & 4-Methylphenol	7570
2,4-Dimethylphenol	11700
Acenaphthene	661
Anthracene	61.1
Benzo[a]anthracene	10.2 J
Fluoranthene	50.7
Fluorene	316
Naphthalene	11400
Phenanthrene	221
Phenol	517
Metals	
Arsenic	36.1
Iron	27100
Manganese	886
Sodium	45900

10-4 9/9/14

Metals	
Iron	1620

RMW-6/SB-1 9/30/14

VOCs	
1,2-Dichloroethane	360
Acetone	758
Benzene	74.1
cis-1,2-Dichloroethene	90.8
Ethylbenzene	67.2
m+p-Xylene	211
Methylene chloride	522
o-Xylene	118
Toluene	209
Trichloroethene	102
Xylenes (total)	329
SVOCs	
1,1-Biphenol	99.6
2-Methylphenol	3000
3 & 4-Methylphenol	4860
2,4-Dimethylphenol	14600
Acenaphthene	108
Naphthalene	2820
Phenol	3630
Metals	
Arsenic	67.4
Iron	3900
Sodium	202000

RMW-1/SB-5 9/10/14

VOCs	
1,1-Dichloroethane	16.2
1,2-Dichlorobenzene	26.6
1,2-Dichloroethane	66.4
1,4-Dichlorobenzene	42.7
Acetone	116
Benzene	400
cis-1,2-Dichloroethene	6.1 J
Ethylbenzene	135
Isopropylbenzene	12.7 J
m+p-Xylene	368
o-Xylene	180
Styrene	36.5 J
Toluene	654
Xylenes (total)	548
SVOCs	
1,1-Biphenol	65.1
2-Methylphenol	2340
3 & 4-Methylphenol	3510
2,4-Dimethylphenol	10900
Acenaphthene	64.9
Naphthalene	2590
Phenol	162
Metals	
Arsenic	164
Iron	9930
Manganese	301
Sodium	41400
Pesticides	
Gamma-BHC	0.093

RMW-2/SB-4 9/11/14

VOCs	
1,1-Dichloroethane	34.7
1,2-Dichlorobenzene	84.1
1,2-Dichloroethane	26.2
1,4-Dichlorobenzene	79
Acetone	105
Benzene	173
Chlorobenzene	5.5
cis-1,2-Dichloroethene	10.5
Ethylbenzene	101
Isopropylbenzene	9.3 J
m+p-Xylene	290
o-Xylene	158
Tetrachloroethene	7.5
Toluene	432
Trichloroethene	22.9
Vinyl chloride	3.6 J
Xylenes (total)	448
SVOCs	
1,1-Biphenol	327
2-Methylphenol	248
3 & 4-Methylphenol	307
2,4-Dimethylphenol	1440
Acenaphthene	446
Anthracene	65.3
Benzo[a]anthracene	7.1
Benzo[b]fluoranthene	2.8
Benzo[k]fluoranthene	0.87 J
Bis(2-ethylhexyl) phthalate	5.5 B
Chrysene	6.4
Fluoranthene	74.8
Fluorene	236
Indeno[1,2,3-cd]pyrene	0.69 J
Naphthalene	3820
Phenanthrene	282
Metals	
Arsenic	51.9
Iron	23600
Magnesium	100000
Manganese	557
Sodium	36900
Pesticides	
4,4'-DDD	4.5
4,4'-DDE	0.53
Dieldrin	2

F-3 9/9/14

VOCs	
Benzene	5.8
Isopropylbenzene	5.4
SVOCs	
Acenaphthene	21.3
Metals	
Iron	2520

RMW-19 9/9/14

VOCs	
1,2-Dichloroethane	64
Acetone	199
Benzene	335
Ethylbenzene	177
Isopropylbenzene	19.4
Methylene chloride	55.9
m+p-Xylene	378
o-Xylene	195
Styrene	51.2
Toluene	450
Vinyl chloride	3.8 J
Xylenes (total)	573
SVOCs	
1,1-Biphenol	99.8
2-Methylphenol	247
3 & 4-Methylphenol	488
2,4-Dimethylphenol	2830
Acenaphthene	103
Fluoranthene	0.64 J
Naphthalene	2650
Phenol	61
Metals	
Iron	524
Manganese	1750
Sodium	54100

F-1 9/9/14

VOCs	
1,2-Dichloroethane	17.8
Acetone	196
Benzene	335
Ethylbenzene	157
Isopropylbenzene	13.8
m+p-Xylene	325
o-Xylene	195
Toluene	468
Xylenes (total)	511
SVOCs	
1,1-Biphenol	94.4
2-Methylphenol	325
3 & 4-Methylphenol	450
2,4-Dimethylphenol	1640
Acenaphthene	301
Bis(2-ethylhexyl) phthalate	5.3
Fluoranthene	0.49 J
Naphthalene	3280
Phenol	49.3
Metals	
Arsenic	26.4
Iron	44500
Manganese	2670
Sodium	51500

RMW-4/SB-2 9/11/14

VOCs	
Acetone	179 J
Benzene	288
Ethylbenzene	248
Isopropylbenzene	20.8 J
m+p-Xylene	631
o-Xylene	313
Styrene	55.2 J
Toluene	887
Xylenes (total)	944
SVOCs	
1,1-Biphenol	140
2-Methylphenol	272
3 & 4-Methylphenol	428
2,4-Dimethylphenol	1270
Acenaphthene	146
Benzo[a]anthracene	3.6
Benzo[b]fluoranthene	1.8
Benzo[k]fluoranthene	0.72 J
Chrysene	3.4
Fluoranthene	23.4
Fluorene	90.1
Indeno[1,2,3-cd]pyrene	0.57 J
Naphthalene	3020
Phenanthrene	84.7
Phenol	49.4
Metals	
Arsenic	290
Barium	4640
Beryllium	27.5
Cadmium	35
Chromium	1150
Copper	2840
Iron	753000
Lead	5140
Manganese	11800
Mercury	56.5
Nickel	784
Selenium	70
Zinc	11900
Pesticides	
Dieldrin	0.11

RMW-3/SB-21 9/22/14

VOCs	
Benzene	698
Ethylbenzene	333
Isopropylbenzene	35.9 J
m+p-Xylene	602
o-Xylene	336
Styrene	313
Toluene	660
Xylenes (total)	937
SVOCs	
1,1-Biphenol	112
2-Methylphenol	635
3 & 4-Methylphenol	858
2,4-Dimethylphenol	5540
Acenaphthene	141
Fluoranthene	2.3
Fluorene	56.2
Naphthalene	7150
Metals	
Iron	22300
Manganese	1380
Sodium	59700
Pesticides	
Alpha-BHC	0.084

RMW-5/SB-29 9/29/14

VOCs	
Benzene	9.5
Ethylbenzene	159
Isopropylbenzene	18.1
m+p-Xylene	246
o-Xylene	146
Toluene	142
Xylenes (total)	392
SVOCs	
1,1-Biphenol	109
2-Methylphenol	56.1
3 & 4-Methylphenol	90.4
2,4-Dimethylphenol	169
Acenaphthene	136
Fluoranthene	3.1 J
Fluorene	60.4
Naphthalene	6210
Metals	
Iron	18600
Manganese	940
Sodium	34600

RMW-16/SB-19 9/25/14

Metals	
Iron	4780
Manganese	663
Sodium	35300

SCS-MW-10-2 9/10/14 9/10/14 DUP

VOCs		
Acetone	60.1	57.5
Benzene	2.3 J	2.2 J
Ethylbenzene	60.2	58.3
Isopropylbenzene	23.1	22.5
m+p-Xylene	145	146
o-Xylene	101	100
Toluene	54.7	51.7
Xylenes (total)	246	246
SVOCs		
1,1-Biphenol	22.3	
Acenaphthene	20.7	22.5
Diethyl phthalate	NE	51.1
Naphthalene	390	621
Pentachlorophenol	2.1 J	2.4 J
Metals		
Arsenic	28.9	26.9
Iron	11600	11800
Manganese	NE	312
Sodium	31000	30100

WS-5D 9/24/14

VOCs	
1,2-Dichlorobenzene	5.1
1,2-Dichloroethane	40.3
1,4-Dichlorobenzene	4.2
Acetone	500
Benzene	367
Ethylbenzene	185
Isopropylbenzene	22.3
m+p-Xylene	318
o-Xylene	175
Toluene	328
Xylenes (total)	493
SVOCs	
1,1-Biphenol	43.9
2-Methylphenol	398
2,4-Dimethylphenol	9070
Acenaphthene	88.9
Naphthalene	3310
Phenol	331
Metals	
Iron	14100
Magnesium	42900
Manganese	672
Nickel	170
Sodium	114000

TOGS GA AWQSGVs

Parameter	Standards* (µg/L)
VOCs	
1,1,1-Trichloroethane	5
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,4-Dichlorobenzene	3
2-Butanone (MEK)	50 GV
Acetone	50 GV
Benzene	1
Chlorobenzene	5
cis-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
m+p-Xylene	5
Methylene chloride	5
o-Xylene	5
Styrene	5
Tetrachloroethene	5
Toluene	5
Trichloroethene	5
Vinyl chloride	2
Xylenes (total)	5
SVOCs, Total	
1,1-Biphenol	5
2-Methylphenol	1
3 & 4-Methylphenol	1
2,4-Dimethylphenol	50
Acenaphthene	20 GV
Anthracene	50 GV
Benzo[a]anthracene	0.002
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	0.002 GV
Benzo[k]fluoranthene	0.002 GV
Bis(2-ethylhexyl) phthalate	5
Chrysene	0.002 GV
Diethyl phthalate	50 GV
Fluoranthene	0.002 GV
Fluorene	50 GV
Indeno[1,2,3-cd]pyrene	0.002 GV
Naphthalene	10 GV
Pentachlorophenol	1
Phenanthrene	50 GV
Phenol	1

Parameter	Standards* (µg/L)
Metals, Total	
Antimony	3
Arsenic	25
Barium	1000
Beryllium	3 GV
Cadmium	5
Chromium	50
Copper	200
Iron	300
Lead	25
Magnesium	35000 GV
Manganese	300
Mercury	0.7
Nickel	100
Selenium	10
Sodium	20000
Zinc	2000 GV
PCBs	--
Pesticides	
4,4'-DDD	0.3
4,4'-DDE	0.2
4,4'-DDT	0.2
Dieldrin	0.004

CONCENTRATIONS IN µg/L

DATA BOX LEGEND

µg/L – MICROGRAMS PER LITER
* – NYSDEC TOGS GA AWQSGVs
NYSDEC – NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AWQSGVs – AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES
GV – GUIDANCE VALUE
-- – NO TOGS GA AWQSGVs
B – FOUND IN LABORATORY BLANK
E – EXCEEDS CALIBRATION LIMIT
D – DILUTION
J – ESTIMATED VALUE
DUP – DUPLICATE SAMPLE
VOCs – VOLATILE ORGANIC COMPOUNDS
SVOCs – SEMIVOLATILE ORGANIC COMPOUNDS
PCBs – POLYCHLORINATED BIPHENYLS
NE – NO EXCEEDANCES
ND – NO DETECTION
NA – NOT ANALYZED

0 40 80
FEET

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ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Queens Plaza Residential Development
BCP NO. C241151

FIGURE 10

GROUNDWATER RESULTS ABOVE TOG GA AWQSGVs

Date
January 2015

Project Number
10112-005

LEGEND

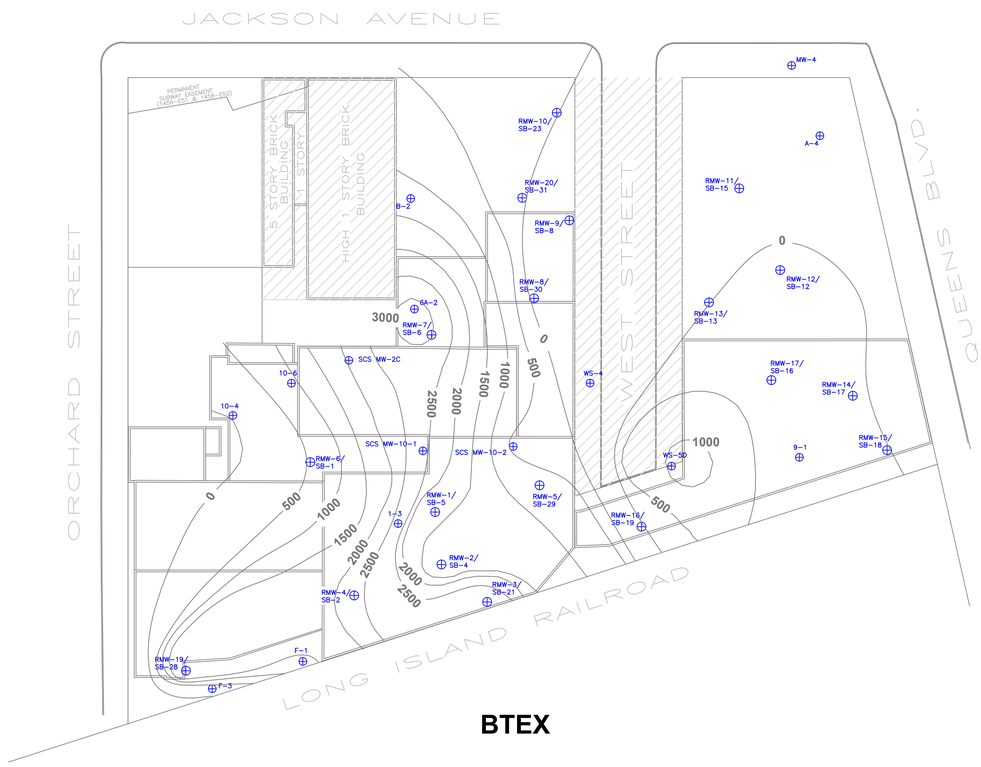
- OUTSIDE OF SITE
- GRID CELL AND NUMBER
- SB-11 (26,18) SOIL BORING LOCATION (RANDOM X AND Y COORDINATES FOR LOCATION, FT.)
- RMW-1/ SB-5 GROUNDWATER MONITORING WELL/ SOIL BORING LOCATION
- SV-10 SOIL VAPOR SAMPLE LOCATION
- F-1 EXISTING MONITORING WELL

NOTE:

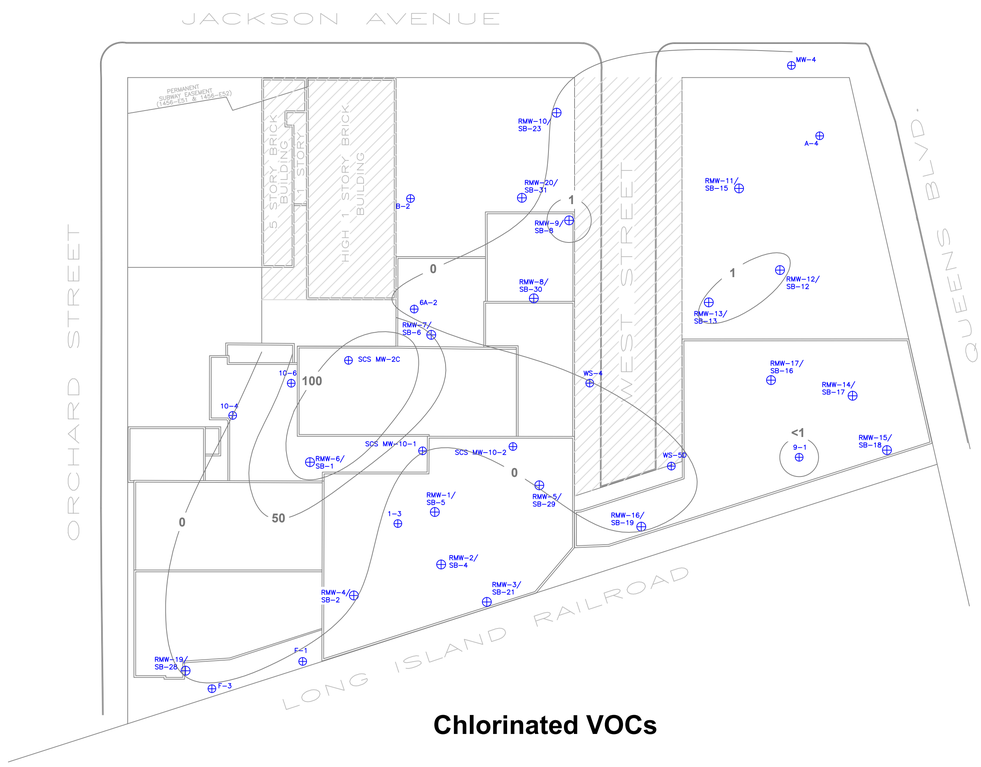
1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.).

2) TOGs – TECHNICAL AND OPERATIONAL GUIDANCE SERIES.

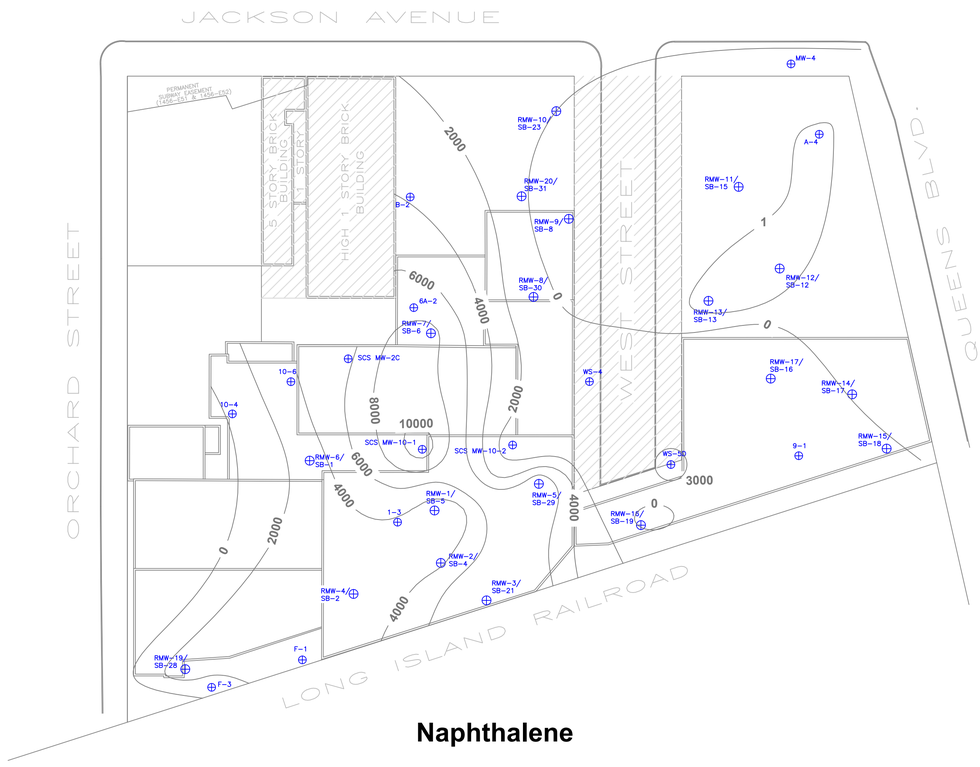
V:\CAD\PROJECTS\2409\Y2001\Y114\2409.0001Y114.02.DWG



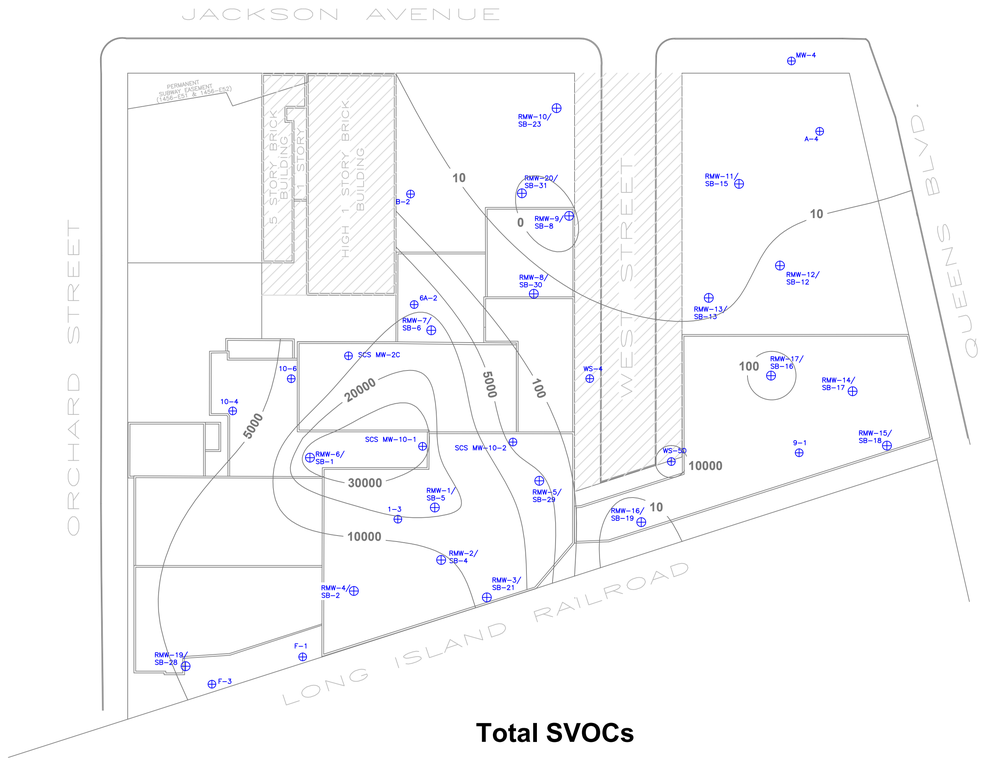
BTEX



Chlorinated VOCs



Naphthalene



Total SVOCs

0 40 80
FEET

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Environmental Consulting & Management

Queens Plaza Residential Development
BCP No. C241151

FIGURE 11

GROUNDWATER ISOPLETH MAP

Date
December 2014

Project Number
10112-005

LEGEND

- RMW-1/ SB-5 — MONITORING WELL
- 6000 — GROUNDWATER ISOPLETH IN ug/L
- DASHED WHERE INFERRED

FILE: P:\Project Files\99999 - Thomson\Figures\Site B - RIR\Fig 11 - Groundwater Isopleth Map.dwg DATE: 8/5/2014

SV-8 8/21/14

VOCs	
1,1-Dichloroethane	2.2
1,2,4-Trimethylbenzene	1.3 J
1,2-Dibromoethane	1.8 J
1,2-Dichloroethane	1.1 J
2-Butanone (MEK)	31.3
2-Hexanone	1.9
Acetone	306 D
Benzene	5.4
Carbon disulfide	24
Chloromethane	0.78
cis-1,2-Dichloroethene	6.3
Cyclohexane	7.2
Dichlorodifluoromethane	2.6
Ethanol	62
Ethyl Acetate	50.4
Ethylbenzene	1.1 J
Heptane	7.8
Hexane	12
Isooctane	13
Isopropanol	18
m+p-Xylene	2.8
Methylene chloride	11
Naphthalene	0.68 J
Propene	34.2
t-Butyl Alcohol	60.9
Tetrachloroethene	2.2
Tetrahydrofuran	1.7
Toluene	12
Trichloroethene	1.3
Trichlorofluoromethane	2
Vinyl chloride	0.59 J
Xylenes (total)	2.8

SV-9 12/16/14

VOCs	
1,1-Dichloroethane	2.2
1,2,4-Trimethylbenzene	11
1,3,5-Trimethylbenzene	3.8
2-Hexanone	1.9
Acetone	177
Benzene	2.5
Carbon disulfide	6.2
Carbon tetrachloride	0.82
Chloroform	11
cis-1,2-Dichloroethene	2.4
Cyclohexane	4.8
Dichlorodifluoromethane	2.4
Ethanol	5.8
Ethylbenzene	20
Ethyl Acetate	1.5
Heptane	2.8
Hexane	3.5
Methylene chloride	2.3
Methyl ethyl ketone	2.6
Methyl isobutyl ketone	3.2
Propylene	125
Tertiary Butyl Alcohol	3.6
Tetrachloroethene	7.5
Tetrahydrofuran	0.50 J
Toluene	18
Trichloroethylene	1
Trichlorofluoromethane	47
Vinyl chloride	0.46
m+p-Xylene	20
o-Xylene	14
Xylenes (total)	34

SV-7 8/19/14

VOCs	
1,1,1-Trichloroethane	10
1,2,4-Trimethylbenzene	4.9
1,3,5-Trimethylbenzene	1.3
2-Butanone (MEK)	14
Acetone	199
Benzene	2
Carbon disulfide	5
Carbon tetrachloride	1.6 J
Chloroform	16
Cyclohexane	5.5
Ethanol	18
Ethyl Acetate	9.4
Ethylbenzene	3.1
Heptane	3.5
Hexane	6.3
Isopropanol	6.6
m+p-Xylene	13
Methylene chloride	13
Naphthalene	1.3 J
o-Xylene	9.1
Styrene	4.7
t-Butyl Alcohol	75.2
Tetrachloroethene	39
Toluene	8.3
Trichloroethene	1.2
Trichlorofluoromethane	116
Xylenes (total)	22

SV-6 8/19/14

VOCs	
1,2,4-Trimethylbenzene	3.9
1,3,5-Trimethylbenzene	1.3
2-Butanone (MEK)	32.7
2-Hexanone	4.5
4-Ethyltoluene	0.74 J
4-Methyl-2-pentanone (MIBK)	1.1
Acetone	209 D
Benzene	1.3
Carbon disulfide	3.7
Chloroform	14
Cyclohexane	0.76 J
Dichlorodifluoromethane	5.9
Ethanol	29
Ethyl Acetate	32
Ethylbenzene	1.4
Heptane	1.9
Hexane	8.1
Isopropanol	8.4
m+p-Xylene	5.2
Methylene chloride	20
Naphthalene	1.8
o-Xylene	3.2
Propene	5.3
Styrene	0.89 J
t-Butyl Alcohol	61.2
Tetrachloroethene	35
Tetrahydrofuran	6.5
Toluene	5.3
Trichloroethene	1.4
Trichlorofluoromethane	29
Xylenes (total)	8.7

SV-5 8/22/14 DUP

VOCs		
1,1,1-Trichloroethane	ND	0.98 J
1,2,4-Trimethylbenzene	4.9	2.8
2-Butanone (MEK)	ND	1.8
Acetone	26.4	20
Benzene	2.1 J	1.1 J
Carbon disulfide	16	18
Carbon tetrachloride	ND	1.1 J
Chloroform	38	44
cis-1,2-Dichloroethene	29	35
Cyclohexane	4.8	3.3
Dichlorodifluoromethane	3.5 J	3.4
Ethanol	ND	5.3
Ethyl Acetate	11	5.4
Ethylbenzene	5.6	5.2
Heptane	2.6 J	1.1 J
Hexane	4.6	4.2
Isooctane	2.1 J	1.6 J
m+p-Xylene	21	23
Methylene chloride	8.3	9
o-Xylene	7.4	8.7
Styrene	ND	0.94 J
t-Butyl Alcohol	31.5	22
Tetrachloroethene	35	41
Tetrahydrofuran	ND	0.56 J
Toluene	26	24
trans-1,2-Dichloroethene	ND	0.67 J
Trichloroethene	12	18
Trichlorofluoromethane	9	9.6
Vinyl chloride	1.9 J	1.6
Xylenes (total)	29	31

SV-1 8/19/14

VOCs	
1,1-Dichloroethane	0.97 J
1,2,4-Trimethylbenzene	3.4
1,3,5-Trimethylbenzene	0.93 J
2-Butanone (MEK)	42.8
2-Hexanone	3.4
4-Ethyltoluene	0.64 J
4-Methyl-2-pentanone (MIBK)	1.8
Acetone	599 D
Benzene	7
Carbon disulfide	11
Chloroform	7.3
Chloromethane	0.62
Cyclohexane	1.7
Dichlorodifluoromethane	3.2
Ethanol	48.8
Ethyl Acetate	6.1
Ethylbenzene	3.7
Heptane	1.7
Hexane	4.9
Isopropanol	17
m+p-Xylene	11
Methylene chloride	7.6
Naphthalene	1.5
o-Xylene	5.2
Propene	5.5
Styrene	1.5
t-Butyl Alcohol	49.7
Tetrachloroethene	7.5
Tetrahydrofuran	1.6
Toluene	21
Trichloroethene	0.86
Trichlorofluoromethane	82.6
Vinyl chloride	0.38 J
Xylenes (total)	16

SV-13 12/16/14

VOCs	
1,1,1-Trichloroethane	4.4
1,1-Dichloroethane	28
1,1-Dichloroethylene	8.3
1,2,4-Trimethylbenzene	268
1,2-Dichloroethane	34
1,3,5-Trimethylbenzene	166
2,2,4-Trimethylpentane	71
4-Ethyltoluene	72.3
Acetone	126
Benzene	30
Carbon disulfide	47.3
Chloroform	19
cis-1,2-Dichloroethene	3060
Cyclohexane	102
Dichlorodifluoromethane	5.4 J
Ethanol	6.8 J
Ethylbenzene	275
Heptane	73.4
Hexane	25
m+p-Xylene	864
Methylene chloride	135
o-Xylene	363
Propylene	152
Styrene	20
Tetrachloroethene	37
Toluene	460
trans-1,2-Dichloroethene	34
Trichloroethylene	192
Vinyl chloride	91.8
Xylenes (total)	1220

SV-2 8/19/14

VOCs	
1,1,1-Trichloroethane	6
1,1-Dichloroethane	1.3
1,2,4-Trimethylbenzene	4.9
1,3,5-Trimethylbenzene	1.3 J
2-Butanone (MEK)	63.4
2-Hexanone	13
4-Ethyltoluene	0.88 J
Acetone	820 D
Benzene	3.2
Carbon disulfide	5
Chloroform	10
Cyclohexane	3.1
Ethanol	47.1
Ethyl Acetate	6.8
Ethylbenzene	3.2
Heptane	4.9
Hexane	7
Isooctane	12
Isopropanol	24
m+p-Xylene	12
Methylene chloride	10
Naphthalene	2.6
o-Xylene	7.4
Styrene	3.4
t-Butyl Alcohol	134
Tetrachloroethene	124
Toluene	21
Trichloroethene	33
Trichlorofluoromethane	12
Xylenes (total)	19

SV-14 12/16/14

VOCs	
1,1,1-Trichloroethane	25000
1,1-Dichloroethane	3380
1,1-Dichloroethylene	136
1,3-Butadiene	15 J
1,2-Dichloroethane	34
1,3,5-Trimethylbenzene	166
Chloroethane	25
Chloroform	140
Ethanol	23.0 J
Freon 113	39
Heptane	73.4
Propylene	114
Tetrachloroethene	174
Trichloroethylene	38

SV-15 8/21/14

VOCs	
1,1-Dichloroethane	3.7
1,1-Dichloroethene	130
1,2,4-Trimethylbenzene	7.4
1,2-Dichloroethane	7.3
2-Butanone (MEK)	122
2-Hexanone	11
Acetone	594
Benzene	355
Carbon disulfide	216
Chloroform	64.9
cis-1,2-Dichloroethene	6.3
Cyclohexane	89.5
Dichlorodifluoromethane	2.9 J
Ethanol	54.1
Ethyl Acetate	11
Ethylbenzene	77.7
Heptane	291
Hexane	197
Isooctane	174
Isopropanol	9.6
m+p-Xylene	46
Methylene chloride	12
o-Xylene	23
Propene	464
Styrene	2.1 J
t-Butyl Alcohol	434
Tetrachloroethene	6.4
Toluene	494
trans-1,2-Dichloroethene	3.8
Trichloroethene	12
Trichlorofluoromethane	4.6
Vinyl chloride	179
Xylenes (total)	69.1

SV-16 9/22/14

VOCs	
1,1,1-Trichloroethane	0.31
1,3,5-Trimethylbenzene	0.21 J
Acetone	20.5
Benzene	12.3
Chloroform	1.8
Cyclohexane	10.2
Dichlorodifluoromethane	0.58
Ethanol	5.4
Ethyl Acetate	20.2
Ethylbenzene	0.81
Heptane	24.1
Hexane	21.2
Isooctane	3
Isopropanol	1
m+p-Xylene	1.6
Methylene chloride	5.9
Naphthalene	0.18 J
o-Xylene	1.3
t-Butyl Alcohol	3.8
Tetrachloroethene	0.25
Toluene	20.1
Trichlorofluoromethane	0.55
Xylenes (total)	2.9

SV-10 8/19/14

VOCs	
1,1,1-Trichloroethane	109
1,1-Dichloroethane	85.8
1,2-Dichloroethane	2.3 J
1,3,5-Trimethylbenzene	5.4
4-Ethyltoluene	55.6
Acetone	62
Benzene	4.2
Carbon disulfide	14
Chloroform	84
cis-1,2-Dichloroethene	2.9 J
Cyclohexane	40.3
Dichlorodifluoromethane	3.8 J
Ethanol	21.3
Ethyl Acetate	8.6
Ethylbenzene	43.9
Heptane	105
Hexane	28
Isooctane	158
Isopropanol	4.9
m+p-Xylene	10
Methylene chloride	8.7
o-Xylene	30
Propene	177
Tetrachloroethene	33
Tetrahydrofuran	3.2
Toluene	34
Trichloroethene	11
Trichlorofluoromethane	17
Xylenes (total)	40

SV-11 8/15/14

VOCs	
1,1,1-Trichloroethane	32 J
1,1-Dichloroethane	39 J
1,4-Dioxane	123
Acetone	116
Benzene	3480
Carbon disulfide	106
Chloroform	45 J
Cyclohexane	372
Ethanol	50.5
Ethylbenzene	1040
Heptane	2140
Hexane	659
m+p-Xylene	1130
o-Xylene	419
Propene	541
Toluene	3540
Trichloroethene	26
Xylenes (total)	1550

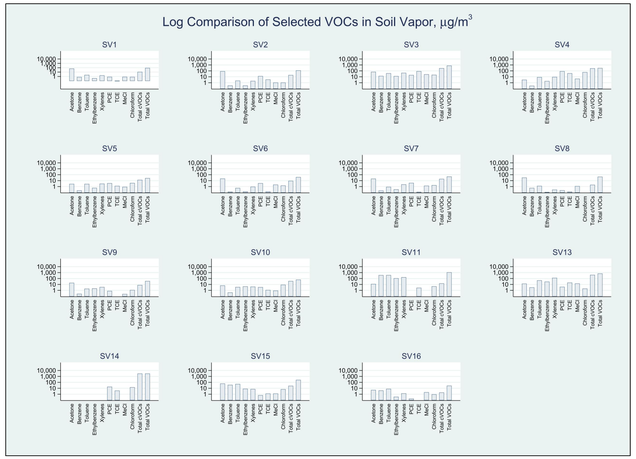
SV-4 8/21/14

VOCs	
1,1,1-Trichloroethane	115
1,1-Dichloroethane	344
1,2,4-Trimethylbenzene	3.4 J
1,2-Dichloroethane	36
Acetone	30.4
Benzene	2.9
Carbon disulfide	14
Chloroform	571
cis-1,2-Dichloroethene	216
Ethylbenzene	18
Heptane	3.4
Hexane	8.5
m+p-Xylene	73
Methylene chloride	44.1
o-Xylene	16
Tetrachloroethene	821
Toluene	82.2
trans-1,2-Dichloroethene	65
Trichloroethene	369
Trichlorofluoromethane	8.4
Xylenes (total)	89.5

SV-3 8/21/14

VOCs	
1,1,1-Trichloroethane	164
1,1-Dichloroethane	409
1,1-Dichloroethene	85.6
1,2,4-Trimethylbenzene	8.8
1,2-Dichloroethane	34
2-Butanone (MEK)	36.6
Acetone	651
Benzene	132
Carbon disulfide	2390 D
Carbon tetrachloride	5.9 J
Chloroform	204
Chloromethane	12
cis-1,2-Dichloroethene	722
Cyclohexane	244
Ethylbenzene	123
Heptane	1140 D
Hexane	99.4
Isooctane	64.5
Isopropanol	25.3
m+p-Xylene	331
Methylene chloride	250
o-Xylene	104
Propene	340
t-Butyl Alcohol	70.3
Tetrachloroethene	188
Toluene	368
trans-1,2-Dichloroethene	15
Trichloroethene	828
Vinyl chloride	27.4
Xylenes (total)	434

Log Comparison of Selected VOCs in Soil Vapor, µg/m^3



DATA BOX LEGEND

CONCENTRATIONS IN µg/m^3

µg/m^3 – MICROGRAMS PER CUBIC METER
VOCs – VOLATILE ORGANIC COMPOUNDS
DUP – DUPLICATE SAMPLE
J – ESTIMATED VALUE
D – A SECONDARY ANALYSIS AFTER DILUTION DUE TO EXCEEDANCE OF THE CALIBRATION RANGE IN THE ORIGINAL SAMPLE
ND – NOT DETECTED

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ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Queens Plaza Residential Development
BCP NO. C241151

FIGURE 12

VOC CONCENTRATIONS DETECTED IN SOIL VAPOR

Date
December 2014

Project Number
10112-005

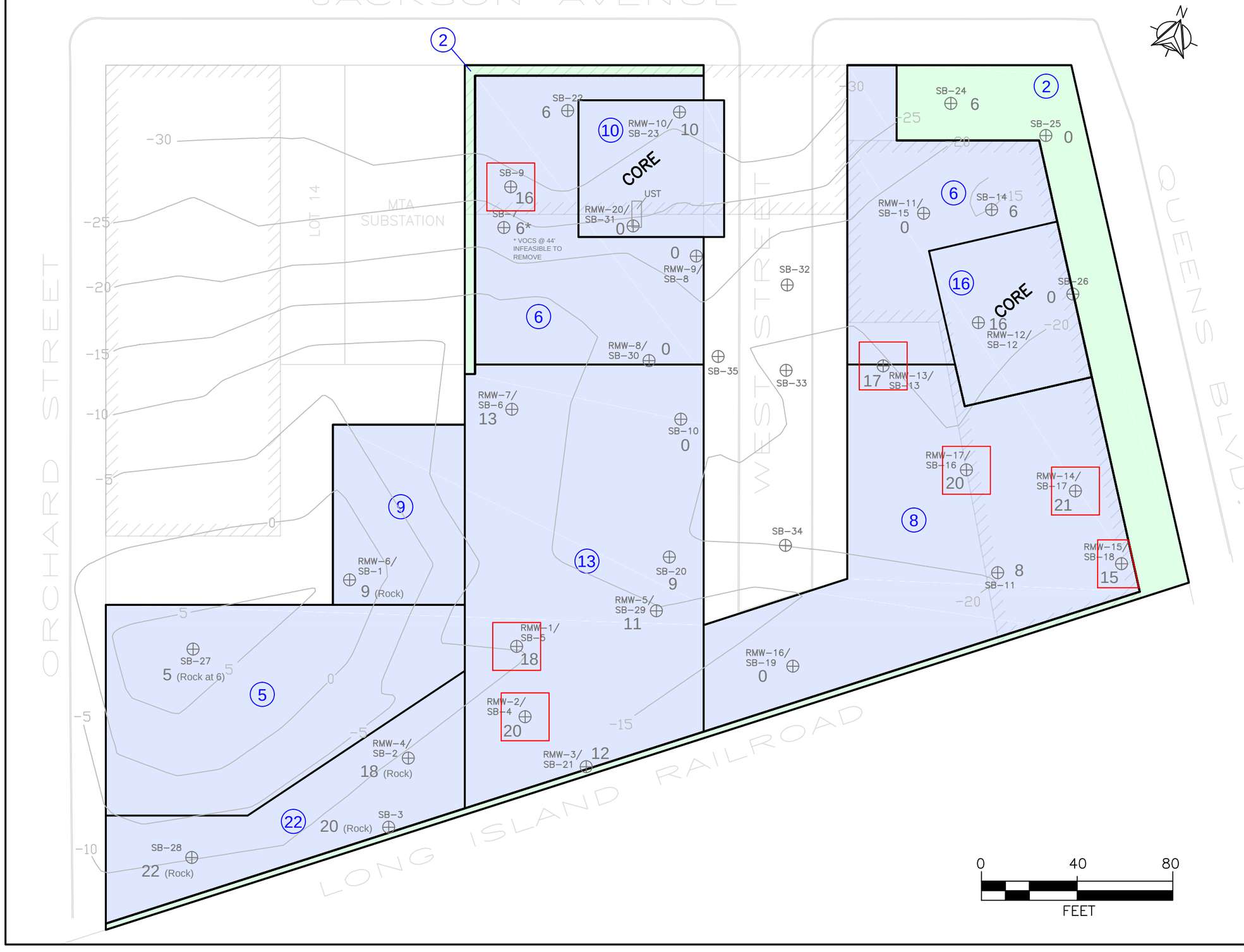
LEGEND

- OUTSIDE OF SITE
- [7,6] GRID CELL AND NUMBER
- SB-11 (34,18) SOIL BORING LOCATION (RANDOM X AND Y COORDINATES FOR LOCATION, FT.)
- RMW-1/SB-5 GROUNDWATER MONITORING WELL/ SOIL BORING LOCATION
- SV-15 SOIL VAPOR SAMPLE LOCATION
- F-1 EXISTING MONITORING WELL

NOTE:
1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.).

0 40 80
FEET

V:\CAD\PROJECTS\2409\Y\0001\Y114\2409.0001Y114.02.DWG



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RIR\FIG 3 - Environmental Dig Depth.dwg DATE: 1/15/2015

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B
BCP No. C241151

FIGURE 13

ENVIRONMENTAL DIG DEPTH BASED ON REMEDIAL INVESTIGATION ANALYTICAL DATA

March 2015

Project Number
10112-005

LEGEND

- TRACK 2 AREA
- TRACK 4 AREA
- 12 — LOCALIZED ENVIRONMENTAL DIG – MAXIMUM DEPTH (FT.) BELOW GROUND SURFACE AT WHICH A COMPOUND WAS FOUND ABOVE RRSCOs OR PROTECTION OF GROUNDWATER SCOs (DATA OBTAINED DURING THE REMEDIAL INVESTIGATION)
- (16) — PROPOSED ENVIRONMENTAL DIG – MAXIMUM ENVIRONMENTAL DEPTH (FT.) BELOW GROUND SURFACE REQUIRED FOR SPECIFIED AREA (EXCLUDING LOCALIZED HOT SPOTS DESCRIBED BELOW)
- LOCALIZED HOT SPOTS – LOCATIONS WHERE THE ENVIRONMENTAL DIG IS GREATER THAN THE PROPOSED DEVELOPMENT DIG; A 20 FT. X 20 FT. EXCAVATION WILL BE EXTENDED BEYOND THE PROPOSED ENVIRONMENTAL DIG TO THE MAXIMUM DEPTH AT WHICH A COMPOUND WAS FOUND ABOVE RRSCOs OR PROTECTION OF GROUNDWATER SCOs
- CONTOUR OF ELEVATION OF TOP OF ROCK (NAVD88)
- SB-10 — LOCATION OF ENVIRONMENTAL SOIL BORING

NOTE: EXACT NUMBER OF END POINT SAMPLES TO BE COLLECTED PER THE SITE B IRM WORK PLAN

TABLES

Table 1
Master Sample Tracking Table

Depth	(WELL) SB1	Soil/Product Coding	(WELL) SB2	Soil/Product Coding	SB3	Soil/Product Coding	(WELL) SB4	Soil/Product Coding	(WELL) SB5	Soil/Product Coding	(WELL) SB6	Soil/Product Coding	SB7	Soil/Product Coding	(WELL) SB8	Soil/Product Coding	SB9	Soil/Product Coding	SB10	Soil/Product Coding	SB11	Soil/Product Coding	(WELL) SB12	Soil/Product Coding	(WELL) SB13	Soil/Product Coding	SB14	Soil/Product Coding	(WELL) SB15	Soil/Product Coding	(WELL) SB16	Soil/Product Coding	(WELL) SB17	Soil/Product Coding
1					(0-0.5)	1/1			v																									
2									(1-2)	1/3																								
3																																		
4																																		
5	v				v				(4-5)	4/4	v				v		v		v															
6	(5-6)	4/3	(5-6)	1/0	(5-6)	4/1	v				(5-6)	4/4	(5-6)	4/0	(5-6)	4/0	(5-6)	2/0	(5-6)	2/1	(5-6)	4/0	(5-6)	4/0	(5-6)	1/0	(5-6)	1/0	(5-6)	1/0	(5-6)	2/0	(5-6)	3/2
7			(6-7)	1/1			(5-6)	1/2			(6-7)	5/4									v													
8																			(7-8)	4/2	(7-8)	4/0			(7-8)	3/0	(7-8)	1/0						
9	(8-9)	4/3																																
10																							v		v				v		v			
11							(10-11)	2/2			(10-11)	4/4	(10-11)	4/0									(10-11)	4/0	(10-11)	1/0			(10-11)	4/0	(10-11)	3/1	v	
12					(11-12)	3/2			(11-12)	4/3									(11-12)	4/1											(11-12)	3/1	(11-12)	4/1
13											(12-13)	5/3			(12-13)	4/0																		
14													v														v							
15													(14-15)	4/0			v								(14-15)	1/0	(14-15)	3/0						
16									(15-16)	5/3							(15-16)	4/0					(15-16)	4/0	(15-16)	4/1								
17																									(16-17)	4/1								
18			(17-18)	5/1	(17-18)	5/0			(17-18)	1/3									(17.5-18.5)	5/0														
19																											(18-19)	4/0						
20					(19-20)	1/0	(19-20)	1/2									(19-20)	5/0			(19-20)	6/0	(19-20)	4/0	(19-20)	4/0	(19-20)	4/0	(19-20)	4/0	(19-20)	5/0	(19-20)	3/1
21																													(20-21)	5/0			(20-21)	3/1
22																																		
23															22.5-23.5	5/0																		
24																																	(23-24)	5/0
25																																		
26																																		
27																																		
28																																		
29																																		
30																																		
31																																		
32																																		
33																																		
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35																																		
36																																		
37																																		
38																																		
39																																		
40																																		
41																																		
42																																		
43																																		
44													(43-44)	1/0																				

soilbl:
- 1 M-C sand
- 2 M-F sand
- 3 Fine sand
- 4 Silty sand
- 5 Silt
- 6 Clayey silt
- 7 Sandy clay
- 8 Till

productlbl:
- 0 none
- 1 light stain
- 2 moderate stain
- 3 heavy stain
- 4 free product

Table 1
Master Sample Tracking Table

Depth	(WELL) SB18	Soil/Product Coding	(WELL) SB19	Soil/Product Coding	SB20	Soil/Product Coding	(WELL) SB21	Soil/Product Coding	SB22	Soil/Product Coding	(WELL) SB23	Soil/Product Coding	SB24	Soil/Product Coding	SB25	Soil/Product Coding	SB26	Soil/Product Coding	SB27	Soil/Product Coding	(WELL) SB28	Soil/Product Coding	(WELL) SB29	Soil/Product Coding	(WELL) SB30	Soil/Product Coding	(WELL) SB31	Soil/Product Coding	West St SB32	Soil/Product Coding	West St SB33	Soil/Product Coding	West St SB34	Soil/Product Coding	West St SB35	Soil/Product Coding
1							(0-0.5)	1 / 0													(0-0.5)	1/0														
2																																				
3																																				
4																																				
5	v		v		v		v												(4-5)	4/0					v											
6	(5-6)	4/0	(5-6)	2/0	(5-6)	1/2	(5-6)	6 / 3	(5-6)	4/0	(5-6)	1/0	(5-6)	1/0	(5-6)	6/0	(5-6)	1/0	(5-6)	4/0	(5-6)	4/0			(5-6)	2/1			(5-6)	1 / 0	(5-6)	1 /0				
7																							v													
8																							(7-8)	4/1	(7-8)	4/1			(7-8)	2 / 0			(7-8)	2/0		
9	(8-9)	4/0	(8-9)	4/0	(8-9)	4/2					v																						v			
10											(9-10)	1/0	v										(9-10)	4/2									(9-10)	2/0		
11									v				(10-11)	5/0			v						(10-11)	4/2												
12	(11-12)	4/0					(11-12)	4 / 1	(11-12)	5/0					v		(11-12)	3/0									v		v		v					
13															(12-13)	4/0							(12-13)	1/0			(12-13)	4/0	(12-13)	3 / 0	(12-13)	2/0			v	
14																																			(13-14)	4/0
15	(14-15)	5/0									(14-15)	5/0	(14-15)	4/0									(14-15)	2/0			(14-15)	4/1								
16																	(15-16)	4/0													(15-16)	2/0				
17																																				
18																																			(17-18)	2/0
19	(18.5-19.5)	5/0			(18-19)	5/0															(18-19)	2/1			(18.5-19.5)	5/0			(18-19)	4/0				
20			(19-20)	6/0					(19-20)	5/0	(19-20)	4/0	(19-20)	4/0	(19-20)	1/0	(19-20)	4/0									(19-20)	5/0								
21							(20-21)	4/ 1																					(20-21)	4/0	(20-21)	4/0				
22																					(21-22)	2/1														
23																							(25-26)	1/1											(22-23)	5/0
24																																				
25																																				
26																																				
27																																				
28																																				
29																																				
30																													(29-30)	5/0						
31																																				
32																																	(32-33)	5/0		
33																																				
34																																				
35																																			(35-36)	2/0
36																																				
37																															(36-37)	5/0				
38																																				
39																																				
40																													(39-40)	4/0						
41																																				
42																																				
43																																				
44																											(43-44)	2/0								

soilbl:
1 M-C sand
2 M-F sand
3 Fine sand
4 Silty sand
5 Silt
6 Clayey silt
7 Sandy clay
8 Till

productlbl:
0 none
1 light stain
2 moderate stain
3 heavy stain
4 free product

Table 2A
Observed NAPL in Soil Borings

Sample	Sample Bottom (below grade surface)	Soil Type	NAPL Staining
SB1 (5-6)	6	Silty sand	heavy stain
SB1 (8-9)	9	Silty sand	heavy stain
SB2 (5-6)	6	M-C sand	none
SB2 (6-7)	7	M-C sand	light stain
SB2 (17-18)	18	Silt	light stain
SB3 (0-.5)	0.5	M-C sand	light stain
SB3 (5-6)	6	Silty sand	light stain
SB3 (11-12)	12	Fine sand	moderate stain
SB3 (17-18)	18	Silt	none
SB3 (19-20)	20	M-C sand	none
SB4 (5-6)	6	M-C sand	moderate stain
SB4 (11-12)	12	M-F sand	moderate stain
SB4 (19-20)	20	M-C sand	moderate stain
SB5 (1-2)	2	M-C sand	heavy stain
SB5 (4-5)	5	Silty sand	very heavy staining
SB5 (11-12)	12	Silty sand	heavy stain
SB5 (15-16)	16	Silt	heavy stain
SB5 (17-18)	18	M-C sand	heavy stain
SB6 (5-6)	6	Silty sand	very heavy staining
SB6 (6-7)	7	Silt	very heavy staining
SB6 (6-11)	11	Silt	very heavy staining
SB6 (12-13)	13	Silt	heavy stain
SB7 (5-6)	6	Silty sand	none
SB7 (10-11)	11	Silty sand	none
SB7 (14-15)	15	Silty sand	none
SB7 (43-44)	44	M-C sand	none
SB8 (5-6)	6	Silty sand	none
SB8 (12-13)	13	Silty sand	none
SB8 (22.5-23.5)	23.5	Silt	none
SB9 (5-6)	6	M-F sand	none
SB9 (15-16)	16	Silty sand	none
SB9 (19-20)	20	Silt	none
SB10 (5-6)	6	M-F sand	light stain
SB10 (7-8)	8	Silty sand	moderate stain
SB10 (11-12)	12	Silty sand	light stain
SB10 (17.5-18.5)	18.5	Silt	none
SB11 (5-6)	6	Silty sand	none
SB11 (7-8)	8	Silty sand	none
SB11 (19-20)	20	Clayey silt	none
SB12 (5-6)	6	Silty sand	none
SB12 (10-11)	11	Silty sand	none
SB12 (15-16)	16	Silty sand	none
SB12 (19-20)	20	Silty sand	none
SB13 (5-6)	6	M-C sand	none
SB13 (7-8)	8	Fine sand	none
SB13 (10-11)	11	M-C sand	none
SB13 (14-15)	15	M-C sand	none
SB13 (15-16)	16	Silty sand	light stain
SB13 (16-17)	17	Silty sand	light stain
SB13 (19-20)	20	Silty sand	none
SB14 (5-6)	6	M-C sand	none
SB14 (7-8)	8	M-C sand	none
SB14 (14-15)	15	Fine sand	none
SB14 (18-19)	19	Silty sand	none
SB14 (19-20)	20	Silty sand	none
SB15 (5-6)	6	M-C sand	none
SB15 (10-11)	11	Silty sand	none
SB15 (19-20)	20	Silty sand	none
SB15 (20-21)	21	Silt	none
SB16 (5-6)	6	M-F sand	none
SB16 (10-11)	11	Fine sand	light stain
SB16 (11-12)	12	Fine sand	light stain
SB16 (19-20)	20	Silt	none
SB17 (5-6)	6	Fine sand	moderate stain
SB17 (11-12)	12	Silty sand	light stain
SB17 (19-20)	20	Fine sand	light stain
SB17 (20-21)	21	Fine sand	light stain
SB17 (23-24)	24	Silt	none
SB18 (5-6)	6	Silty sand	none
SB18 (8-9)	9	Silty sand	none
SB18 (11-12)	12	Silty sand	none

F= fine
M= medium
C= coarse

Table 2A
Observed NAPL in Soil Borings

Sample	Sample Bottom (below grade surface)	Soil Type	NAPL Staining
SB18 (14-15)	15	Silt	none
SB18 (18.5-19.5)	19.5	Silt	none
SB19 (5-6)	6	M-F sand	none
SB19 (8-9)	9	Silty sand	none
SB19 (19-20)	20	Clayey silt	none
SB20 (5-6)	6	M-C sand	moderate stain
SB20 (8-9)	9	Silty sand	moderate stain
SB20 (18-19)	19	Silt	none
SB21 (0-.5)	0.5	M-C sand	none
SB21 (5-6)	6	Clayey silt	heavy stain
SB21 (11-12)	12	Silty sand	light stain
SB21 (20-21)	21	Silty sand	light stain
SB22 (5-6)	6	Silty sand	none
SB22 (11-12)	12	Silt	none
SB22 (19-20)	20	Silt	none
SB23 (5-6)	6	M-C sand	none
SB23 (9-10)	10	M-C sand	none
SB23 (14-15)	15	Silt	none
SB23 (19-20)	20	Silty sand	none
SB24 (5-6)	6	M-C sand	none
SB24 (10-11)	11	Silt	none
SB24 (14-15)	15	Silty sand	none
SB24 (19-20)	20	Silty sand	none
SB25 (5-6)	6	Clayey silt	none
SB25 (12-13)	13	Silty sand	none
SB25 (19-20)	20	M-C sand	none
SB26 (5-6)	6	M-C sand	none
SB26 (11-12)	12	Fine sand	none
SB26 (15-16)	16	Silty sand	none
SB26 (19-20)	20	Silty sand	none
SB27 (4-5)	5	Silty sand	none
SB-27(5-6)	6	Silty sand	none
SB28 (0-.5)	0.5	M-C sand	none
SB28 (5-6)	6	Silty sand	none
SB28 (18-19)	19	M-F sand	light stain
SB28 (21-22)	22	M-F sand	light stain
SB29 (7-8)	8	Silty sand	light stain
SB29 (9-10)	10	Silty sand	moderate stain
SB29 (10-11)	11	Silty sand	moderate stain
SB29 (12-13)	13	M-C sand	none
SB29 (14-15)	15	M-F sand	none
SB29 (25-26)	26	M-C sand	light stain
SB30 (5-6)	6	M-F sand	light stain
SB30 (7-8)	8	Silty sand	light stain
SB30 (18.5-19.5)	19.5	Silt	none
SB31 (12-13)	13	Silty sand	none
SB31 (14-15)	15	Silty sand	light stain
SB31 (19-20)	20	Silt	none
SB31 (43-44)	44	M-F sand	none
SB32 (5-6)	6	M-C sand	none
SB32 (7-8)	8	M-F sand	none
SB32 (12-13)	13	Fine sand	none
SB32 (18-19)	19	Silty sand	none
SB32 (20-21)	21	Silty sand	none
SB32 (29-30)	30	Silt	none
SB32 (39-40)	40	Silty sand	none
SB33 (5-6)	6	M-C sand	none
SB33 (12-13)	13	M-F sand	none
SB33 (15-16)	16	M-F sand	none
SB33 (20-21)	21	Silty sand	none
SB33 (36-37)	37	Silt	none
SB34 (7-8)	8	M-F sand	none
SB34 (9-10)	10	M-F sand	none
SB34 (32-33)	33	Silt	none
SB35 (13-14)	14	Silty sand	none
SB35 (17-18)	18	M-F sand	none
SB35 (22-23)	23	Silt	none
SB35 (35-36)	36	M-F sand	none

F= fine
M= medium
C= coarse

Table 2B
Frequency and Percent of NAPL Staining in Soil

Soil		No Stain	Light Stain	Moderate Stain	Heavy Stain	Very Heavy Stain	Total
Medium - Coarse sand		22	3	3	3	0	31
	Row %	71	9.7	9.7	9.7	0	100
	Column %	22	13	27.3	27.3	0	20.5
Medium - Fine sand		13	2	1	0	0	16
		81.3	12.5	6.2	0	0	100
		13	8.7	9.1	0	0	10.6
Fine sand		4	4	2	0	0	10
		40	40	20	0	0	100
		4	17.4	18.2	0	0	6.6
Silty sand		37	11	5	5	4	62
		59.7	17.7	8.1	8.1	6.5	100
		37	47.8	45.5	45.5	66.7	41.1
Silt		21	3	0	2	2	28
		75	10.7	0	7.1	7.1	100
		21	13	0	18.2	33.3	18.5
Clayey silt		3	0	0	1	0	4
		75	0	0	25	0	100
		3	0	0	9.1	0	2.7
Total	*Frequency*	100	23	11	11	6	151
	Row %	66.2	15.2	7.3	7.3	4	100
	Column %	100	100	100	100	100	100

Includes duplicate and replicate samples

Table 3
Well Construction Details

Well	Installation Date	Development Date	Total Depth (ft-bg)	Screen Interval (ft-bg)	Solid Riser Interval (ft-bg)	Bentonite Seal Interval (ft-bg)	Sand Pack Interval (ft-bg)	Grout Interval (ft-bg)	Ground Surface Elevation	Top of Casing Elevation	Top of Well Screen Elevation	Bottom of Well Screen Elevation	Well Screen Material
RMW-1	8/8/2014	8/13/2014	11.0	0.5 - 10.0	NA	NA	0.5 - 11.0	NA	9.61	9.07	9.10	-1.40	PVC
RMW-2	8/12/2014	8/14/2014	15.0	3.0 - 15.0	0.0 - 2.5	0.5 - 2.0	2.0 - 15.0	NA	13.77	13.54	10.80	-1.20	PVC
RMW-3	8/19/2014	9/19/2014	12.0	2.0 - 12.0	0.0 - 2.0	0.5 - 1.0	1.0 - 12.0	NA	10.36	9.61	8.40	-1.60	PVC
RMW-4	8/8/2014	8/27/2014	14.0	4.0 - 14.0	0.0 - 3.5	0.5 - 3.0	3.0 - 14.0	NA	13.65	13.20	9.70	-0.40	PVC
RMW-5	8/7/2014	8/25/2014	14.0	4.0 - 10.0	0.0 - 3.5	1.0 - 3.0	3.0 - 14.0	NA	13.78	13.17	9.80	-0.20	PVC
RMW-6	8/8/2014	9/18/2014	10.0	3.0 - 10.0	0.0 - 2.5	0.0 - 2.0	2.0 - 10.0	NA	14.42	14.15	11.40	4.40	PVC
RMW-7	8/13/2014	9/18/2014	13.0	3.0 - 13.0	0.0 - 2.5	0.5 - 1.0	1.0 - 13.0	NA	12.50	12.32	10.50	0.50	PVC
RMW-8	8/12/2014	9/9/2014	15.0	3.0 - 15.0	0.0 - 2.5	0.5 - 2.0	2.0 - 15.0	NA	12.06	11.93	9.10	-2.90	PVC
RMW-9	8/12/2014	9/8/2014	13.0	3.0 - 13.0	0.0 - 2.5	0.5 - 2.0	2.0 - 13.0	NA	12.02	11.69	9.00	-1.00	PVC
RMW-10	8/12/2014	9/9/2014	16.0	6.0 - 16.0	1.0 - 5.5	0.5 - 5.0	5.0 - 16.0	NA	20.12	19.20	14.10	4.10	PVC
RMW-11	8/4/2014	9/11/2014	17.0	7.0 - 17.0	0.0 - 5.5	1.0 - 6.0	6.0 - 17.0	NA	19.92	19.73	12.90	2.90	PVC
RMW-12	8/5/2014	8/25/2014	17.0	7.0 - 17.0	1.0 - 6.5	1.0 - 6.0	6.0 - 17.0	NA	18.77	18.33	11.80	1.80	PVC
RMW-13	8/5/2014	9/12/2014	17.0	7.0 - 17.0	1.0 - 6.5	1.0 - 6.0	6.0 - 17.0	NA	17.90	17.18	10.90	0.90	PVC
RMW-14	8/6/2014	9/11/2014	18.0	3.0 - 18.0	0.0 - 2.5	0.5 - 2.0	2.0 - 18.0	NA	18.06	17.68	15.10	0.10	PVC
RMW-15	8/6/2014	9/12/2014	10.0	3.0 - 10.0	0.0 - 2.5	1.0 - 2.0	2.0 - 10.0	NA	13.83	13.72	10.80	3.80	PVC
RMW-16	8/7/2014	9/10/2014	16.0	4.0 - 16.0	0.0 - 3.5	0.5 - 3.0	3.0 - 16.0	NA	13.64	13.39	9.60	-2.40	PVC
RMW-17	8/6/2014	9/11/2014	19.0	4.0 - 19.0	0.0 - 3.5	1.0 - 3.0	3.0 - 19.0	NA	17.78	17.58	13.80	-1.20	PVC
RMW-19	12/12/2014	12/12/2014	22.0	4.0 - 22.0	3.0* - 4.0	1.0-3.0	3.0 - 22.0	NA	14.66**	14.31	10.70	-7.30	PVC
RMW-20	8/15/2014	8/15/2014	20.0	10.0 - 20.0	0.0 - 10.0	7.0 - 9.0	9.0 - 20.0	1.0 - 7.0	19.96	19.43	10.00	0.00	PVC

Notes:
Survey Completed by MEGA Engineering & Land Surveying PC on October 6th and 7th, 2014
All wells are 2-inch diameter
ft-bg: feet below ground surface
PVC: Schedule (SCH) 40 Polyvinyl Chloride
Elevations in North American Verticle Datum of 1988
NA: not applicable
*: feet above ground surface
**: Elevation measured from top of outer protective stickup pipe

Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1 (5-6)	SB-1 (5-6) A	SB-1 (5-6) B	SB-1 (8-9)	SB-2 (5-6)	SB-2 (6-7)	SB-2 (17-18)	SB-2 (17-18)A	SB-2 (17-18)B	SB-3 (0-.5)	SB-3 (5-6)	SB-3 (11-12)	SB-3 (17-18)	SB-3 (19-20)	SB-4 (5-6)	SB-4 (11-12)	SB-4 (19-20)	SB-5 (1-2)	SB-5 (4-5)
Lab Sample ID:				JB76612-1	JB76612-4	JB76612-5	JB76612-6	JB74081-2	JB74932-5	JB74932-6	JB74932-7	JB74932-8	JB74932-18	JB74932-13	JB77153-5	JB77153-6	JB74932-14	JB74081-3	JB74081-6	JB74081-5	JB73951-1	JB73951-2
Date Sampled:				9/15/2014	9/15/2014	9/15/2014	9/15/2014	8/14/2014	8/25/2014	8/25/2014	8/25/2014	8/25/2014	9/5/2014	8/25/2014	9/19/2014	9/19/2014	8/25/2014	8/14/2014	8/14/2014	8/14/2014	8/13/2014	8/13/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	ND	ND	ND	ND	5.0 J	10.6 J	**2720**	**2990**	**2720**	ND	ND	ND	ND	**653**	41.9	ND	ND	ND	ND
Benzene	ug/kg	4800	60	**735 J**	**1020 J**	**910 J**	**181 J**	0.40 J	0.41 J	**268**	**313**	**285**	ND	**151**	**407**	**101**	17.9 J	3.7	**1170**	ND	**6010**	**3190**
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.1 J	ND	ND	ND	ND
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9 J	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	0.52 J	0.42 J	ND	ND	ND	0.73 J	51.1 J	ND	ND	ND	0.70 J	ND	ND	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	65.4 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	720 J	919 J	782 J	ND	ND	ND	ND	ND	ND	ND	50.2 J	**1840**	ND	ND	34.1	ND	ND	**17100**	**3810**
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	909 J	204 J
1,4-Dichlorobenzene	ug/kg	13000	1800	**1970 J**	**2650 J**	**2350 J**	812 J	ND	ND	ND	ND	ND	ND	87.0 J	1330	ND	ND	38.1	ND	ND	**29000**	**8060**
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	3.0 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0 J	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	**682 J**	**748 J**	ND	ND	ND	3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	**411 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	**7710**	**11100**	**9530**	**4500**	ND	ND	148	356	157	ND	369	**7170**	202	26.7 J	7.2	**5490**	222	**21800**	**8680**
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	**4250 J**	**5850 J**	**5120 J**	**3290**	ND	ND	16.4 J	58.6 J	16.5 J	ND	111 J	1740	59.1 J	ND	3.6 J	1600 J	251 J	**14300**	**5430**
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	742	ND	ND	ND	ND	924 J	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	1260 J	1590 J	1340 J	836 J	ND	ND	ND	ND	ND	ND	274 J	80.9 J	ND	ND	1.0 J	ND	ND	1510 J	532 J
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	1130 J	ND	ND	ND	ND	ND	ND	23.9 J	ND	ND	ND	ND	ND	ND	4490 J	2140 J
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	**1470 J**	**1630 J**	**1430 J**	384 J	ND	ND	ND	ND	ND	ND	37.3 J	31.2 J	ND	ND	0.96 J	ND	ND	1160 J	214 J
Toluene	ug/kg	100000	700	**8020**	**11800**	**10200**	**2820**	0.37 J	0.91 J	664	**1000**	**714**	ND	207	**5580**	179	66.4	6.5	**3850**	81.9 J	**41500**	**18400**
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	509 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	3.8 J	1.4 J	ND	ND	ND	ND	ND	ND	ND	ND	1.4 J	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	**2750 J**	**3070 J**	**2730 J**	**1060 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	**26400**	**38000**	**33400**	**13400**	0.41 J	0.72 J	386	911	408	ND	562	**17600**	469	61.7 J	22.1	**10200**	467	**68900**	**25600**
o-Xylene	ug/kg	100000	1600	**12300**	**17700**	**15200**	**6210**	ND	ND	186	444	201	ND	214	**8110**	250	32.3 J	14.7	**5910**	279	**27200**	**10000**
Xylene (total)	ug/kg	100000	1600	**38800**	**55700**	**48600**	**19600**	0.41 J	0.72 J	573	1350	609	ND	776	**25700**	719	93.9	36.8	**16100**	746	**96200**	**35600**

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-5 (4-5)A	SB-5 (4-5)B	SB-5 (11-12)	SB-5 (15-16)	SB-5 (17-18)	SB-6 (5-6)	SB-6 (6-7)	SB-6 (6-11)	SB-6 (12-13)	SB-7 (5-6)	SB-7 (10-11)	SB-7 (10-11)A	SB-7 (10-11)B	SB-7 (14-15)	SB-7 (43-44)	SB-8 (5-6)	SB-8 (12-13)	SB-8 (22.5-23.5)	SB-9 (5-6)
Lab Sample ID:				JB73951-3	JB73951-4	JB77153-7	JB77153-8	JB73951-7	JB74932-59	JB74932-60	JB74932-61	JB76612-7	JB74932-20	JB74932-21	JB74932-22	JB74932-23	JB74932-24	JB74932-25	JB74932-26	JB74932-27	JB74932-28	JB74932-39
Date Sampled:				8/13/2014	8/13/2014	9/25/2014	9/25/2014	8/13/2014	9/9/2014	9/9/2014	9/9/2014	9/16/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9 J	ND	16.8	ND	ND	ND	9.4 J	7.2 J
Benzene	ug/kg	4800	60	**11900**	**5800**	**138 J**	**98.4 J**	ND	**1230 J**	**1590 J**	**559**	**417 J**	ND	ND	ND	0.20 J	ND	52.9	ND	ND	ND	0.22 J
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46 J	ND	ND	ND	0.51 J	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	**13800**	**8090**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	49000	2400	688 J	416 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	**29200**	**17200**	75.2 J	ND	ND	ND	ND	94.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	ND	ND	ND	ND	ND	**231**	ND	ND	ND	ND	ND	ND	**182**	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	ND	ND	ND	ND	ND	**1240 J**	**2620 J**	**449**	243 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	**33500**	**17600**	**5950**	830	**1290**	**27900**	**31500**	**7910**	**6150**	ND	ND	ND	ND	ND	21.0 J	ND	ND	ND	ND
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	**20400**	**11200**	ND	257 J	484 J	**6370 J**	**7070 J**	1960	1340 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	1750 J	972 J	ND	ND	ND	ND	ND	37.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**389**	ND	ND	ND	ND
Styrene	ug/kg	-	-	8490	4290 J	ND	ND	233 J	13900 J	16000 J	3540	2710 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	680 J	432 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	100000	700	**70100**	**36000**	**1810**	423	ND	**25200**	**30200**	**7300**	**5350**	ND	ND	ND	ND	ND	73.2	0.23 J	ND	ND	ND
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	ND	ND	**764 J**	**1310 J**	261 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5 J	ND
m,p-Xylene	ug/kg	100000	1600	**97600**	**52300**	**12600**	**1690**	**3530**	**95900**	**104000**	**24800**	**19000**	ND	ND	ND	ND	ND	47.9 J	ND	ND	ND	ND
o-Xylene	ug/kg	100000	1600	**39300**	**20900**	**6610**	1060	**1830**	**40100**	**42900**	**9820**	**8160**	ND	ND	ND	ND	ND	25.7 J	ND	ND	ND	ND
Xylene (total)	ug/kg	100000	1600	**137000**	**73200**	**19200**	**2750**	**5360**	**136000**	**147000**	**35300**	**27100**	ND	ND	ND	ND	ND	73.5	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-9 (15-16)	SB-9 (19-20)	SB-10 (5-6)	SB-10 (7-8)	SB-10 (11-12)	SB-10 (17.5-18.5)	SB-11 (5-6)	SB-11 (7-8)	SB-11 (19-20)	SB-12 (5-6)	SB-12 (10-11)	SB-12 (15-16)	SB-12 (19-20)	SB-13 (5-6)	SB-13 (7-8)	SB-13 (10-11)	SB-13 (10-11)A	SB-13 (10-11)B	SB-13 (14-15)
Lab Sample ID:				JB74932-42	JB74932-43	JB74932-51	JB74932-52	JB74932-53	JB74932-54	JB74932-71	JB74932-72	JB74932-73	JB74932-96	JB74932-97	JB74932-98	JB74932-99	JB76479-8	JB76479-9	JB76479-10	JB76479-11	JB76479-12	JB76479-18
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	15.2	ND	ND	ND	ND	28	ND	ND	ND	ND	ND	ND	13.8 J	22.2	ND	ND	6.6 J	ND	29.8
Benzene	ug/kg	4800	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23 J	ND	ND	ND	ND	ND
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.0 J
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	ND	ND	0.50 J	ND	ND	ND	ND	ND	ND	0.54 J	0.41 J	ND	ND	ND	ND	1.4 J
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	0.40 J	ND	13.0 J	ND	ND	ND	ND	3.4 J	ND	ND	ND	ND	ND	0.70 J
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47 J	ND	ND	ND	ND	ND	0.79 J
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	ND	ND	ND	ND	1.1	**46.6 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	ND	ND	ND	ND	ND	0.66 J	ND	35.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	ND	ND	ND	384	ND	ND	ND	43.9 J	ND	ND	ND	ND	1.3 J	ND	ND	ND	ND	ND	ND
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	ND	ND	83.5 J	ND	ND	0.73 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	56.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.87 J
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	157 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	ND	ND	ND	ND	ND	ND	0.73 J	ND	ND	ND	ND	ND	ND	8.1	ND	0.33 J	ND	0.41 J	0.50 J
Toluene	ug/kg	100000	700	ND	ND	ND	51.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	ND	ND	0.77 J	0.24 J	ND	ND	ND	ND	ND	ND	1.1 J	ND	ND	ND	ND	0.55 J
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	ND	ND	ND	75.3	ND	0.35 J	ND	106	53.9 J	ND	ND	**2950 J**	3.6	ND	ND	ND	ND	ND	0.43 J
o-Xylene	ug/kg	100000	1600	ND	ND	ND	39.2 J	ND	ND	ND	28.5 J	ND	ND	ND	ND	1.4 J	ND	ND	ND	ND	ND	0.44 J
Xylene (total)	ug/kg	100000	1600	ND	ND	ND	114	ND	0.35 J	ND	135	53.9 J	ND	ND	**2950 J**	5.1	ND	ND	ND	ND	ND	0.87 J

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

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Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-13 (15-16)	SB-13 (16-17)	SB-13 (19-20)	SB-14 (5-6)	SB-14 (7-8)	SB-14 (7-8)A	SB-14 (14-15)	SB-14 (18-19)	SB-14 (19-20)	SB-15 (5-6)	SB-15 (10-11)	SB-15 (19-20)	SB-15 (20-21)	SB-16 (5-6)	SB-16 (10-11)	SB-16 (11-12)	SB-16 (19-20)	SB-17 (5-6)	SB-17 (11-12)
Lab Sample ID:				JB76479-15	JB76479-16	JB76479-17	JB76479-1	JB76479-2	JB77153-3	JB76479-3	JB76479-4	JB76479-5	JB74932-87	JB74932-88	JB74932-89	JB74932-90	JB74932-95	JB74932-101	JB74932-102	JB74932-103	JB74932-84	JB74932-91
Date Sampled:				9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/19/2014	9/12/2014	9/12/2014	9/12/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	34	**63.6**	24	22.5	7.3 J	ND	6.2 J	33	29.3	ND	3.5 J	27.5	ND	6.8 J	ND	28.1	**52.9**	ND	ND
Benzene	ug/kg	4800	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27 J	ND	ND	ND	0.34 J	ND	ND
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	7.8 J	10.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.1 J	ND	ND
Carbon disulfide	ug/kg	-	2700	1.2 J	0.75 J	ND	0.80 J	ND	ND	ND	0.91 J	1.9 J	ND	ND	1.7 J	ND	0.79 J	ND	2.8 J	0.72 J	40.9 J	42.1 J
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6 J	ND	ND	ND	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	9.4	1.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	59	19.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.4 J	0.37 J	ND	528 J	8.1	0.67 J	ND	25.1 J
1,3-Dichlorobenzene	ug/kg	49000	2400	0.32 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	9.4	2.7 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.39 J	ND	ND	ND	1.1 J	ND	ND	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0 J	ND	ND	1.3	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	1.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.5	0.78 J	ND	ND	5.1 J	ND	78.4 J
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	101	16.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	137 J	25.2	3.2	70.9	187
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	10.6	2.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.61 J	0.35 J	ND	ND	2.8 J	ND	ND	16.9 J
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	2.1 J	0.46 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.1	ND	ND	ND	54.8 J	96.8 J
Toluene	ug/kg	100000	700	0.51 J	0.43 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.84 J	1.8	21.8 J	73.8
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	0.61 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	0.62 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9 J	ND	0.25 J	ND	94.5 J	182 J
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	315	54	ND	4	0.46 J	ND	ND	0.70 J	1.2 J	ND	ND	4	ND	0.70 J	432 J	85.9	11.4	423	962
o-Xylene	ug/kg	100000	1600	76.4	15.1	ND	0.93 J	ND	ND	ND	ND	0.36 J	ND	ND	1.3	ND	0.42 J	145 J	22.1	3.3	80.6	224
Xylene (total)	ug/kg	100000	1600	392	69.1	ND	4.9	0.46 J	ND	ND	0.70 J	1.5	ND	ND	5.3	ND	1.1 J	577 J	108	14.7	504	1190

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-17 (19-20)	SB-17 (20-21)	SB-17 (23-24)	SB-18 (5-6)	SB-18 (8-9)	SB-18 (11-12)	SB-18 (14-15)	SB-18 (18.5-19.5)	SB-19 (5-6)	SB-19 (8-9)	SB-20 (18-19)	SB-19 (19-20)	SB-20 (5-6)	SB-20 (8-9)	SB-21 (0-.5)	SB-21 (5-6)	SB-21 (11-12)	SB-21 (20-21)	SB-22 (5-6)
Lab Sample ID:				JB74932-92	JB74932-93	JB74932-94	JB74932-74	JB74932-75	JB74932-76	JB76479-13	JB76479-14	JB74932-68	JB74932-69	JB74081-9	JB74932-70	JB74081-7	JB74081-8	JB74932-15	JB74932-1	JB77153-4	JB74932-9	JB74932-45
Date Sampled:				9/11/2014	9/11/2014	9/11/2014	9/10/2014	9/10/2014	9/10/2014	9/12/2014	9/12/2014	9/10/2014	9/10/2014	8/15/2014	9/10/2014	8/15/2014	8/15/2014	9/5/2014	8/25/2014	9/19/2014	8/25/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	ND	ND	9.2 J	**58**	44.9	ND	**137**	9.6 J	ND	17	9.5 J	12.6	ND	ND	ND	ND	ND	11.1	16
Benzene	ug/kg	4800	60	ND	ND	ND	ND	ND	ND	5.4	6.3	ND	ND	ND	ND	ND	ND	ND	**286 J**	**453**	0.42 J	0.96 J
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	14.4	10.2	ND	6.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	0.88 J	0.99 J	87.2 J	ND	0.49 J	ND	0.35 J	ND	0.53 J	ND	ND	ND	ND	ND	0.75 J	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	ND	29.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	44.5 J	44.4 J	ND	ND	ND	ND	0.29 J	0.38 J	ND	ND	0.84 J	ND	ND	ND	ND	ND	48.0 J	ND	ND
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1290 J	121 J	ND	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	0.38 J	ND	ND	ND	ND	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	18.9 J	88.6 J	0.42 J	ND	ND	ND	0.35 J	8.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	522	**1220**	ND	ND	ND	34.4 J	4.2	2.9	0.60 J	0.79 J	ND	ND	568	578	ND	**4110**	**3000**	1.6	ND
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	38.6 J	69.9 J	ND	ND	ND	ND	2.0 J	2.8 J	0.28 J	0.20 J	ND	ND	713 J	658	ND	ND	ND	ND	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	134 J	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	149 J	45.1 J	ND	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7 J	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	100000	700	94.9	358	ND	ND	ND	47.3 J	12.9	5.3	0.29 J	0.65 J	ND	ND	123 J	59.6	ND	**1450**	**1050**	0.22 J	1.2
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	ND	ND	ND	ND	0.38 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	**2350**	**5570**	ND	ND	ND	86.1 J	10.6	6.5	1.3	2.4	ND	ND	890	210	ND	**8350**	**6170**	2.3	0.48 J
o-Xylene	ug/kg	100000	1600	494	1120	ND	ND	ND	32.5 J	5.7	6	1	1.1	ND	ND	632	244	ND	**4050**	**2740**	1.6	0.42 J
Xylene (total)	ug/kg	100000	1600	**2850**	**6690**	ND	ND	ND	119 J	16.3	12.6	2.3	3.5	ND	ND	1520	454	ND	**12400**	**8910**	3.8	0.90 J

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

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Table 4
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Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-22 (11-12)	SB-22 (19-20)	SB-23 (5-6)	SB-23 (9-10)	SB-23 (14-15)	SB-23 (19-20)	SB-24 (5-6)	SB-24 (10-11)	SB-24 (14-15)	SB-24 (19-20)	SB-25 (5-6)	SB-25 (12-13)	SB-25 (19-20)	SB-26 (5-6)	SB-26 (11-12)	SB-26 (15-16)	SB-26 (19-20)	SB-27 (4-5)	SB-27 (5-6)
Lab Sample ID:				JB74932-46	JB74932-47	JB74932-48	JB74932-49	JB74932-55	JB74932-50	JB74932-56	JB74932-57	JB74932-62	JB74932-58	JB74932-63	JB74932-66	JB74932-67	JB74932-104	JB74932-105	JB74932-106	JB74932-107	JB84100-4	JB84100-5
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	12/12/2014	12/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																						
Acetone	ug/kg	100000	50	ND	10.1 J	5.0 J	ND	ND	ND	4.8 J	ND	ND	15.6	16.3	ND	9.1 J	ND	ND	38.3	22.2	ND	ND
Benzene	ug/kg	4800	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1 J	ND	ND	7.2	2.1 J	ND	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	0.54 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.69 J	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.41 J	ND	ND	ND	1.4 J	ND	ND
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.6	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92 J	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.40 J	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9	0.72 J	ND	ND
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77 J	ND	ND	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	1.7 J	2.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	ND	ND	0.25 J	0.57 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4 J	ND
Toluene	ug/kg	100000	700	ND	ND	ND	ND	ND	ND	0.70 J	ND	ND	ND	ND	ND	ND	ND	ND	0.61 J	ND	0.50 J	ND
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31.5	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92 J	ND	ND	6.5	4.4	ND	ND
o-Xylene	ug/kg	100000	1600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.4	1.5	ND	ND
Xylene (total)	ug/kg	100000	1600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92 J	ND	ND	15.9	5.9	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-28 (0-.5)	SB-28 (5-6)	SB-28 (18-19)	SB-28 (21-22)	SB-29 (7-8)	SB-29 (9-10)	SB-29 (10-11)	SB-29 (12-13)	SB-29 (14-15)	SB-29 (25-26)	SB-30 (5-6)	SB-30 (7-8)	SB-30 (18.5-19.5)	SB-31 (12-13)	SB-31 (14-15)	SB-31 (19-20)	SB-31 (43-44)	SB-32 (5-6)
Lab Sample ID:				JB74932-19	JB84100-1	JB84100-2	JB84100-3	JB76612-10	JB76612-13	JB76612-14	JB76612-16	JB76612-17	JB76612-18	JB74932-29	JB74932-30	JB74932-31	JB77825-13	JB77825-14	JB77825-15	JB77873-10	JB77153-9
Date Sampled:				9/5/2014	12/12/2014	12/12/2014	12/12/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/8/2014	9/8/2014	9/8/2014	9/29/2014	9/29/2014	9/29/2014	10/1/2014	9/25/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																					
Acetone	ug/kg	100000	50	ND	18.1	ND	ND	ND	ND	ND	23.5	23	14.8	ND	ND	8.6 J	7.0 J	27.8	11	7.8 J	7.2 J
Benzene	ug/kg	4800	60	ND	ND	52.9	**101**	ND	ND	ND	ND	ND	1.4	ND	ND	0.54 J	ND	ND	ND	ND	ND
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/kg	-	2700	ND	ND	ND	ND	ND	ND	ND	0.28 J	ND	0.87 J	ND	ND	ND	ND	0.35 J	ND	0.85 J	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77 J	ND	ND	0.57 J	ND	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND	ND	0.95 J
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	58.3 J	ND	0.72 J	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	ND	ND	ND	31.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	17.0 J	19.6 J	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	ND	ND	61.7	576	**3640**	**1600**	444	ND	ND	0.74 J	89	328	0.78 J	ND	ND	ND	ND	ND
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	ND	ND	23.4 J	295	1760	951 J	210 J	ND	ND	ND	143 J	ND	0.67 J	ND	14	0.26 J	ND	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	ND	ND	ND	ND	96.5 J	ND	ND	ND	ND	ND	25.6 J	ND	ND	ND	0.60 J	ND	ND	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2 J	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	22.9 J	162 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J
Toluene	ug/kg	100000	700	ND	ND	77.7	418	**796**	532	95.1	ND	ND	0.78 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4 J	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	ND	ND	145	1520	**4840**	**2480**	617	ND	ND	1.1	71	118	ND	ND	0.36 J	ND	ND	ND
o-Xylene	ug/kg	100000	1600	ND	ND	69.4	702	**2560**	1200	334	ND	ND	0.68 J	72	61.4 J	ND	ND	0.69 J	ND	ND	ND
Xylene (total)	ug/kg	100000	1600	ND	ND	214	**2220**	**7400**	**3680**	951	ND	ND	1.8	143	180	ND	ND	1.0 J	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

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Table 4
Volatile Organic Compounds in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-32 (7-8)	SB-32 (12-13)	SB-32 (18-19)	SB-32 (20-21)	SB-32 (29-30)	SB-32 (39-40)	SB-33 (5-6)	SB-33 (12-13)	SB-33 (15-16)	SB-33 (20-21)	SB-33 (36-37)	SB-34 (7-8)	SB-34 (9-10)	SB-34 (32-33)	SB-35 (13-14)	SB-35 (17-18)	SB-35 (22-23)	SB-35 (35-36)
Lab Sample ID:				JB77153-10	JB77825-1	JB77825-2	JB77825-3	JB77825-4	JB77825-5	JB77153-11	JB77825-6	JB77825-7	JB77825-8	JB77825-9	JB77153-12	JB77825-10	JB77825-16	JB77825-17	JB77825-18	JB77825-19	JB77825-20
Date Sampled:				9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)																					
Acetone	ug/kg	100000	50	ND	8.7 J	14.6	16.6	6.5 J	4.8 J	ND	ND	17.3	16.6	6.4 J	**53.3**	37.4	12.7	ND	33.2	21.4	ND
Benzene	ug/kg	4800	60	ND	ND	ND	ND	0.24 J	0.83 J	ND	ND	ND	ND	0.77 J	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/kg	100000	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.3	7.5 J	ND	ND	ND	5.5 J	ND
Carbon disulfide	ug/kg	-	2700	ND	0.42 J	1.0 J	1.5 J	ND	0.32 J	ND	ND	1.8 J	0.43 J	0.28 J	0.33 J	ND	ND	ND	ND	0.85 J	ND
Carbon tetrachloride	ug/kg	2400	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23 J	0.71 J	ND
Chloroethane	ug/kg	-	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	49000	370	0.43 J	0.99 J	1.2 J	ND	1.0 J	1.2 J	0.87 J	1.5 J	1.3 J	ND	ND	ND	ND	ND	1.5 J	1.0 J	ND	ND
Chloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	100000	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26 J	2.1 J	ND	ND	0.81 J	1.9 J	ND
1,3-Dichlorobenzene	ug/kg	49000	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	13000	1800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25 J	ND	ND	0.27 J	0.52 J	ND
Dichlorodifluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	26000	270	ND	ND	ND	ND	6.4	ND	ND	ND	ND	ND	ND	ND	ND	1.4 J	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	3100	20	ND	ND	ND	ND	11.4	ND	ND	ND	ND	ND	ND	ND	ND	0.41 J	ND	ND	ND	ND
1,1-Dichloroethene	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/kg	100000	250	ND	ND	ND	ND	10.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ug/kg	100000	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	41000	1000	ND	ND	ND	ND	ND	3.3	ND	ND	2.5	0.26 J	ND	ND	ND	ND	ND	0.34 J	0.88 J	53.3
Freon 113	ug/kg	-	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/kg	-	2300	ND	ND	ND	ND	ND	0.80 J	ND	ND	3.0 J	ND	0.28 J	ND	0.38 J	ND	ND	1.9 J	4.5 J	ND
Methyl Acetate	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	0.22 J	ND	ND	ND	ND	ND	ND	0.71 J	0.67 J	ND
Methyl Tert Butyl Ether	ug/kg	100000	930	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/kg	-	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	100000	50	ND	1.8 J	2.1 J	ND	ND	ND	ND	ND	2.9 J	2.3 J	ND	2.9 J	2.1 J	ND	ND	ND	ND	ND
Styrene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	-	600	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/kg	19000	1300	0.60 J	0.45 J	ND	0.28 J	ND	ND	1.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	100000	700	ND	ND	ND	ND	ND	0.35 J	ND	ND	ND	0.24 J	ND	ND	ND	ND	ND	0.25 J	0.45 J	36.1 J
1,2,3-Trichlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	-	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	100000	680	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/kg	21000	470	ND	ND	ND	0.25 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	900	20	ND	ND	ND	ND	0.94 J	ND	ND	ND	ND	ND	ND	ND	ND	6.5	ND	ND	ND	ND
m,p-Xylene	ug/kg	100000	1600	ND	ND	ND	ND	ND	4.8	ND	ND	1.0 J	ND	0.44 J	ND	0.65 J	ND	ND	0.73 J	2	78.6
o-Xylene	ug/kg	100000	1600	ND	ND	ND	ND	ND	4	ND	ND	0.52 J	ND	0.37 J	ND	0.94 J	ND	ND	1.0 J	3.1	43.9 J
Xylene (total)	ug/kg	100000	1600	ND	ND	ND	ND	ND	8.8	ND	ND	1.5	ND	0.82 J	ND	1.6	ND	ND	1.8	5.1	122

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1 (5-6)	SB-1 (5-6) A	SB-1 (5-6) B	SB-1 (8-9)	SB-2 (5-6)	SB-2 (6-7)	SB-2 (17-18)	SB-2 (17-18)A	SB-2 (17-18)B	SB-3 (0-.5)	SB-3 (5-6)	SB-3 (11-12)	SB-3 (17-18)	SB-3 (19-20)	SB-4 (5-6)	SB-4 (11-12)	SB-4 (19-20)	SB-5 (1-2)	SB-5 (4-5)	SB-5 (4-5)A	SB-5 (4-5)B	SB-5 (11-12)	SB-5 (15-16)	SB-5 (17-18)	SB-6 (5-6)
Lab Sample ID:				JB76612-1	JB76612-4	JB76612-5	JB76612-6	JB74081-2	JB74932-5	JB74932-6	JB74932-7	JB74932-8	JB74932-18	JB74932-13	JB77153-5	JB77153-6	JB74932-14	JB74081-3	JB74081-6	JB74081-5	JB73951-1	JB73951-2	JB73951-3	JB73951-4	JB77153-7	JB77153-8	JB73951-7	JB74932-59
Date Sampled:				9/15/2014	9/15/2014	9/15/2014	9/15/2014	8/14/2014	8/25/2014	8/25/2014	8/25/2014	8/25/2014	9/5/2014	8/25/2014	9/19/2014	9/19/2014	8/25/2014	8/14/2014	8/14/2014	8/14/2014	8/13/2014	8/13/2014	8/13/2014	8/13/2014	9/25/2014	9/25/2014	8/13/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																												
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	13800	103000	75800	31900	ND	291	6570	3440	5720	ND	ND	ND	1700	1080	ND	4400	376	15100	8200	32900	7560	637	547	38200	1620
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	**24100**	**36500**	**22400**	**3290**	ND	153	**1570**	**1520**	**1840**	ND	ND	ND	**544**	318	ND	ND	43.3 J	**3310**	ND	ND	ND	ND	222	ND	ND
3&4-Methylphenol	ug/kg	100000	330	**67400**	**109000**	**63700**	**10100**	ND	**522**	**3970**	**3830**	**4280**	ND	ND	ND	**578**	**640**	ND	ND	ND	**7830**	**1710**	ND	**2280**	ND	103	**5220**	ND
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	**26900**	**50700**	**22700**	**2120**	ND	ND	**599**	**634**	**716**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	**127000**	**172000**	**153000**	43600	131	296	11600	2780	1830	83.2 J	5750	92900	18000	165	81800	6710	6880	96000	30300	**149000**	73600	23800	260	**267000**	68600
Acenaphthylene	ug/kg	100000	107000	ND	ND	ND	ND	35.6 J	109	ND	ND	ND	684	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3290
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	100000	1000000	10800	10900	9290	3550	330	1360	2670	722	447	1020	831	11400	2520	46.1	19800	1080	3400	15600	8550	26300	9930	8730	89	27000	16500
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	**1050**	**1290**	**1180**	476	506	**1090**	296	64.8	39.6 J	**1300**	378	**1030**	196	190	**2160**	136	300	**1830**	800	**1990**	939	590	ND	**1640**	**1400**
Benzo(a)pyrene	ug/kg	1000	22000	487	632	571	235	423	951	82.7	20.3 J	ND	1100	321	332	63	209	645	49.3 J	83.2	530	237 J	623	290	157	ND	516	621
Benzo(b)fluoranthene	ug/kg	1000	1700	589	722	696	245	510	1090	98.1	23.6 J	ND	**2240**	486	396	75.3	101	1070	71.5	111	824	334 J	809	359	193	ND	572	677
Benzo(g,h,i)perylene	ug/kg	100000	1000000	349	539	461	184	247	572	26.0 J	ND	ND	941	220	129	26.0 J	109	403	27.4 J	27.6 J	278	ND	234	105 J	47.9	ND	170 J	251
Benzo(k)fluoranthene	ug/kg	3900	1700	219	273	223	98.1	175	285	37.1 J	ND	ND	680	153	142	28.6 J	26.8 J	386	26.3 J	40.2	286	ND	330	130 J	79.1	ND	210	176
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	ND	ND	ND	ND	ND	96.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ug/kg	-	-	114000	149000	133000	36200	38.1 J	132	12600	3020	1900	111 J	4060	82900	16100	110	32900	2630	5040	71700	26200	127000	71000	14200	216	259000	68300
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	2890	3450	3430	898	54.8 J	117	491	218	200	249 J	257	1780	422	31.6 J	2380	245	450	3650	1650	3360	2190	1140	58.0 J	3960	2180
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	**1220**	**1530**	**1400**	536	532	**1270**	261	55.1	32.5 J	**1670**	486	**1030**	183	190	**2310**	144	288	**2130**	831	**2130**	957	559	ND	**1530**	**1440**
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	71.8 J	87.6	85.2	34.7 J	70.1	160	ND	ND	ND	303	61.9	36.7 J	ND	77.9	100	ND	ND	ND	ND	87.5 J	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	59000	210000	132000	170000	154000	39800	126	345	14900	3660	2570	281 J	3800	87000	16900	141	2530	3000	7110	86900	28100	136000	72000	18500	324	**260000**	60600
Di-n-butyl phthalate	ug/kg	-	8100	317	429	ND	194	73.4 J	124	ND	ND	50.5 J	357 JB	237	222 B	200 B	127	ND	277	73.5	643	ND	ND	ND	102	117	ND	ND
Di-n-octyl phthalate	ug/kg	-	120000	ND	ND	ND	ND	ND	89.7	ND	ND	ND	ND	ND	ND	ND	123	ND	ND	287	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	-	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	-	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	ND	ND	ND	894	86.5	1070	57.0 J	159	97.9	923	210	ND	39.9 J	3590	ND	119	1770	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	100000	1000000	7160	8560	7140	2880	1170	616	2340	465	302	2250	1200	7850	1650	44.8	22700	1010	2440	12900	7100	15000	7840	5700	71.5	13600	9560
Fluorene	ug/kg	100000	386000	67800	93000	85100	23700	97.4	218	7350	1970	1260	113 J	2840	55800	10900	127	56400	2300	6490	58000	29500	95400	45500	19000	194	166000	45300
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	268	339	308	117	285	599	32.1 J	ND	ND	844	221	130	25.8 J	68.2	388	28.2 J	29.8 J	222	ND	254	117 J	51.8	ND	186	236
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	**525000**	**972000**	**693000**	**329000**	267	592	**68700**	12100	9590	419	**38500**	**572000**	**112000**	481	**329000**	20300	28500	**508000**	**151000**	**797000**	**439000**	**76600**	1240	**2080000**	**604000**
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	**465000**	**769000**	**581000**	**264000**	249	798	**76700**	**15200**	**15300**	323	**72600**	**620000**	**104000**	556	**281000**	**129000**	**28700**	**442000**	**138000**	**718000**	**424000**	**189000**	6660	**2150000**	**721000**
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	38900	39700	33300	15700	1030	2050	11100	2850	1880	1380	2930	39600	7050	203	66800	4070	8360	57200	29900	95300	37800	29100	408	95500	45800
Pyrene	ug/kg	100000	1000000	5780	8730	6830	2660	1080	2430	1790	400	262	2570	957	5760	1180	130	20300	704	1720	10200	4520	10900	5180	3560	54.6	9610	7480
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-6 (6-7)	SB-6 (10-11)	SB-6 (12-13)	SB-7 (5-6)	SB-7 (10-11)	SB-7 (10-11)A	SB-7 (10-11)B	SB-7 (14-15)	SB-7 (43-44)	SB-8 (5-6)	SB-8 (12-13)	SB-8 (22.5-23.5)	SB-9 (5-6)	SB-9 (15-16)	SB-9 (19-20)	SB-10 (5-6)	SB-10 (7-8)	SB-10 (11-12)	SB-10 (17.5-18.5)	SB-11 (5-6)	SB-11 (7-8)	SB-11 (19-20)	SB-12 (5-6)	SB-12 (10-11)	SB-12 (15-16)
Lab Sample ID:				JB74932-60	JB74932-61	JB76612-7	JB74932-20	JB74932-21	JB74932-22	JB74932-23	JB74932-24	JB74932-25	JB74932-26	JB74932-27	JB74932-28	JB74932-39	JB74932-42	JB74932-43	JB74932-51	JB74932-52	JB74932-53	JB74932-54	JB74932-71	JB74932-72	JB74932-73	JB74932-96	JB74932-97	JB74932-98
Date Sampled:				9/9/2014	9/9/2014	9/16/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																												
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	2090	13000	1400	ND	ND	ND	ND	ND	149 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	ug/kg	100000	330	ND	**1010**	ND	ND	ND	ND	ND	ND	77.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	148 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	82400	37200	40300	748	ND	ND	ND	ND	ND	ND	ND	ND	ND	177	ND	19.2 J	130	ND	ND	ND	53.6	ND	ND	ND	ND
Acenaphthylene	ug/kg	100000	107000	3600	ND	ND	253	ND	ND	ND	ND	ND	ND	ND	ND	ND	77	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	100000	1000000	16300	3310	6850	1690	ND	ND	ND	ND	ND	19.1 J	ND	ND	146 J	451	ND	ND	40.1	ND	ND	17.6 J	18.6 J	ND	ND	ND	ND
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	**1250**	277	615	**2850**	ND	23.6 J	ND	ND	ND	48.4	ND	ND	494	**1390**	15.3 J	14.6 J	26.5 J	ND	ND	42	64.7	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	1000	22000	510	108	292	2960	ND	15.3 J	ND	ND	ND	41.5	ND	ND	527	1430	ND	ND	14.7 J	ND	ND	44.6	105	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	1000	1700	508	124	294	**3450**	ND	18.1 J	ND	16.2 J	ND	49.2	ND	ND	583	1620	14.8 J	ND	20.1 J	ND	ND	60.7	82.5	ND	ND	ND	ND
Benzo(g,h,i)perylene	ug/kg	100000	1000000	188 J	40.3	118	1920	ND	ND	ND	ND	ND	24.2 J	ND	ND	363	1060	ND	ND	ND	ND	ND	44.6	119	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	3900	1700	185 J	37.6	111	1220	ND	ND	ND	ND	ND	20.8 J	ND	ND	261	607	ND	ND	ND	ND	ND	19.0 J	38.3 J	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	129	ND	ND	ND	ND
1,1'-Biphenyl	ug/kg	-	-	89400	34600	36000	80.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	14.0 J	ND	19.8 J	123	ND	ND	ND	25.7 J	ND	ND	ND	ND
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84.5 J	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	2590	1120	1270	861	ND	ND	ND	ND	37.3 J	ND	ND	ND	ND	202	ND	ND	22.0 J	ND	ND	ND	ND	ND	ND	ND	ND
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	**1240**	263	589	**2950**	ND	22.0 J	ND	ND	ND	47.6	ND	ND	514	**1450**	ND	ND	23.1 J	ND	ND	43.9	71.3	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	ND	ND	34.1 J	449	ND	ND	ND	ND	ND	ND	ND	ND	105 J	264	ND	ND	ND	ND	ND	ND	30.2 J	ND	ND	ND	ND
Dibenzofuran	ug/kg	59000	210000	72800	29100	34100	544	ND	ND	ND	ND	22.9 J	ND	ND	ND	ND	111	ND	17.0 J	116	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	-	8100	ND	136	203	58.3 JB	ND	69.5 JB	ND	43.5 BJ	ND	ND	49.2 BJ	43.9 BJ	ND	60.6 J	47.6 J	64.2 J	50.7 J	50.1 J	53.8 J	92.1	286	120	35.2 J	ND	ND
Di-n-octyl phthalate	ug/kg	-	120000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	32.6 J	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	-	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40.2 J	ND	65.4 J	60.1 JB	60.1 JB	69.5 JB	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	-	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	ND	112	344	105	ND	44.7 J	44.0 J	121	ND	35.5 J	ND	ND	1400	74.8	65.7 J	63.7 J	154	123	72.3 J	815	769	1460	89.9	97.5	ND
Fluoranthene	ug/kg	100000	1000000	9000	1700	3830	7040	ND	37.3	ND	24.8 J	ND	110	ND	ND	1000	2940	17.0 J	29.8 J	78.4	ND	ND	60.9	134	ND	ND	ND	ND
Fluorene	ug/kg	100000	386000	55000	21300	22900	675	ND	ND	ND	ND	54.3	ND	ND	ND	ND	169	ND	21.7 J	96.2	ND	ND	ND	45.8	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	179 J	36.7 J	125	1980	ND	ND	ND	ND	ND	24.4 J	ND	ND	345	1050	ND	ND	ND	ND	ND	41.5	99.3	ND	ND	ND	ND
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	**1020000**	**261000**	**286000**	235	ND	ND	ND	ND	34.5 J	ND	ND	ND	ND	51.7 J	ND	162	965	45.4 J	ND	ND	65.7 J	27.8 J	ND	ND	26.0 J
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	**1150000**	**230000**	**298000**	383	ND	ND	ND	ND	87.2	ND	ND	ND	ND	106	ND	89.2	374	22.8 J	ND	28.4 J	121	178	ND	ND	70.8
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	54900	18100	21900	7090	ND	29.4 J	ND	ND	ND	94.8	ND	ND	630	2200	ND	57.4	168	ND	ND	38.5	121	ND	ND	ND	ND
Pyrene	ug/kg	100000	1000000	6920	1830	3040	6180	ND	37	ND	23.9 J	ND	87.7	ND	ND	859	2370	16.4 J	34.3 J	76	ND	ND	61.3	101	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-12 (19-20)	SB-13 (5-6)	SB-13 (7-8)	SB-13 (10-11)	SB-13 (10-11)A	SB-13 (10-11)B	SB-13 (14-15)	SB-13 (15-16)	SB-13 (16-17)	SB-13 (19-20)	SB-14 (5-6)	SB-14 (7-8)A	SB-14 (14-15)	SB-14 (18-19)	SB-14 (19-20)	SB-15 (5-6)	SB-15 (10-11)	SB-15 (19-20)	SB-15 (20-21)	SB-16 (5-6)	SB-16 (10-11)	SB-16 (11-12)	SB-16 (19-20)	SB-17 (5-6)	SB-17 (11-12)
Lab Sample ID:				JB74932-99	JB76479-8	JB76479-9	JB76479-10	JB76479-11	JB76479-12	JB76479-18	JB76479-15	JB76479-16	JB76479-17	JB76479-1	JB77153-3	JB76479-3	JB76479-4	JB76479-5	JB74932-87	JB74932-88	JB74932-89	JB74932-90	JB74932-95	JB74932-101	JB74932-102	JB74932-103	JB74932-84	JB74932-91
Date Sampled:				9/11/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/19/2014	9/12/2014	9/12/2014	9/12/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																												
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	131	ND	97.2	141
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	ND	1560	ND	ND	ND	ND	119	118	ND	ND	78.3 J	ND	22.8 J	ND	ND	ND	ND	ND	ND	993	32.2 J	50.3	ND	102	225
Acenaphthylene	ug/kg	100000	107000	ND	401	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40.2	ND	ND	ND	ND	ND	ND	1620	ND	ND	ND	77.3	239
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	41.2 J	ND
Anthracene	ug/kg	100000	1000000	ND	3280	ND	ND	ND	ND	ND	24.7 J	ND	ND	174	ND	ND	ND	ND	ND	ND	ND	ND	6200	25.5 J	57.7	ND	163	786
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	ND	**5530**	ND	ND	ND	ND	ND	26.7 J	ND	ND	596	ND	ND	ND	ND	17.8 J	18.4 J	ND	ND	**9000**	52.8	91.7	ND	319	**1540**
Benzo(a)pyrene	ug/kg	1000	22000	ND	5130	ND	ND	ND	ND	ND	ND	ND	ND	650	ND	ND	ND	ND	17.2 J	15.8 J	ND	ND	7490	33.7 J	59.8	ND	239	1380
Benzo(b)fluoranthene	ug/kg	1000	1700	ND	**5330**	ND	ND	ND	ND	ND	ND	ND	ND	773	ND	ND	ND	ND	21.2 J	19.5 J	ND	ND	**9070**	71.2	103	ND	337	**1710**
Benzo(g,h,i)perylene	ug/kg	100000	1000000	ND	3280	ND	ND	ND	ND	ND	ND	ND	ND	474	ND	ND	ND	ND	13.6 J	ND	ND	ND	3090	18.7 J	32.8 J	ND	169	751
Benzo(k)fluoranthene	ug/kg	3900	1700	ND	**2700**	ND	ND	ND	ND	ND	ND	ND	ND	319	ND	ND	ND	ND	ND	ND	ND	ND	**1760**	29.9 J	37.0 J	ND	138	576
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	ND	147	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	947	126	193	ND	**161000**	1050
1,1'-Biphenyl	ug/kg	-	-	ND	163	ND	ND	ND	ND	136	169	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	201	116	151	ND	35.8 J	59.4 J
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	ND	1390	ND	ND	ND	ND	ND	ND	ND	ND	83.4 J	ND	ND	ND	ND	ND	ND	ND	ND	1300	ND	49.4 J	ND	131	222
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	ND	**5580**	ND	ND	ND	ND	ND	25.4 J	ND	ND	685	ND	ND	ND	ND	17.6 J	18.6 J	ND	ND	**8350**	49	107	ND	323	**1530**
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	ND	950	ND	ND	ND	ND	ND	ND	ND	ND	114 J	ND	ND	ND	ND	ND	ND	ND	ND	1200	ND	ND	ND	52.6	194
Dibenzofuran	ug/kg	59000	210000	ND	1110	ND	ND	ND	ND	95	90.0 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2640	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	-	8100	96.8	44.9 J	ND	ND	82.1	56.9 J	ND	582	61.2 J	53.9 J	ND	196 B	ND	ND	ND	ND	46.7 J	75.2 BJ	ND	76.5 J	857	1390	72.5 J	3470	ND
Di-n-octyl phthalate	ug/kg	-	120000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	48.0 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4110	67.4 J
Diethyl phthalate	ug/kg	-	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	442	894	50.9 J	129	ND
Dimethyl phthalate	ug/kg	-	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	ND	224	ND	123	121	225	373	299	67.0 J	ND	422	410	ND	ND	69.2 J	ND	ND	ND	ND	3570	231	315	109	6380	1020
Fluoranthene	ug/kg	100000	1000000	ND	12800	ND	ND	ND	ND	38.5 J	45.9	ND	ND	1440	ND	ND	ND	ND	34	33.9 J	ND	ND	20800	167	325	ND	763	3610
Fluorene	ug/kg	100000	386000	ND	1210	ND	ND	ND	ND	81	97.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6770	55.5	81.6	ND	97.7	529
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	ND	3170	ND	ND	ND	ND	ND	ND	ND	ND	455	ND	ND	ND	ND	ND	ND	ND	ND	3630	32.1 J	42.7	ND	189	849
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	ND	488	ND	ND	ND	ND	ND	1210	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3830	858	1210	22.5 J	62.4 J	355
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	59.1	813	ND	ND	ND	ND	ND	1500	71.4	89.6	ND	ND	16.2 J	ND	ND	ND	ND	34.9 J	ND	3420	754	1100	188	190	405
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	ND	12100	ND	ND	ND	ND	127	178	ND	ND	861	ND	ND	ND	ND	22.2 J	21.6 J	ND	ND	24900	178	349	ND	641	3130
Pyrene	ug/kg	100000	1000000	ND	10300	ND	ND	ND	ND	35.9 J	53.6	ND	ND	1080	15.6 J	ND	ND	ND	29.4 J	26.3 J	ND	ND	18300	109	215	ND	615	3140
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-17 (19-20)	SB-17 (20-21)	SB-17 (23-24)	SB-18 (5-6)	SB-18 (8-9)	SB-18 (11-12)	SB-18 (14-15)	SB-18 (18.5-19.5)	SB-19 (5-6)	SB-19 (8-9)	SB-19 (19-20)	SB-20 (5-6)	SB-20 (8-9)	SB-20 (18-19)	SB-21 (0-.5)	SB-21 (5-6)	SB-21 (11-12)	SB-21 (20-21)	SB-22 (5-6)	SB-22 (11-12)	SB-22 (19-20)	SB-23 (5-6)	SB-23 (9-10)	SB-23 (14-15)	SB-23 (19-20)
Lab Sample ID:				JB74932-92	JB74932-93	JB74932-94	JB74932-74	JB74932-75	JB74932-76	JB76479-13	JB76479-14	JB74932-68	JB74932-69	JB74932-70	JB74081-7	JB74081-8	JB74081-9	JB74932-15	JB74932-1	JB77153-4	JB74932-9	JB74932-45	JB74932-46	JB74932-47	JB74932-48	JB74932-49	JB74932-55	JB74932-50
Date Sampled:				9/11/2014	9/11/2014	9/11/2014	9/10/2014	9/10/2014	9/10/2014	9/12/2014	9/12/2014	9/10/2014	9/10/2014	9/10/2014	8/15/2014	8/15/2014	8/15/2014	9/5/2014	8/25/2014	9/19/2014	8/25/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																												
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	117 J	185 J	ND	ND	ND	ND	ND	ND	ND	75.2 J	ND	ND	ND	ND	ND	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**406 J**	ND	ND	ND	**589**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	ug/kg	100000	330	ND	98.5	ND	61.5 J	ND	ND	ND	ND	ND	104	ND	**938**	ND	ND	ND	**1100**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	3230	5580	ND	2110	ND	124 J	174	120	68.1	189	ND	67100	41500	ND	250	25400	**153000**	24.5 J	320	ND	ND	ND	16.4 J	ND	ND
Acenaphthylene	ug/kg	100000	107000	75.2	54.2	ND	118	ND	ND	22.0 J	15.9 J	27.5 J	32.0 J	ND	3260	ND	ND	526	ND	ND	ND	91	ND	ND	ND	ND	ND	ND
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	100000	1000000	593	699	ND	3590	77	113 J	63	30.0 J	128	138	ND	9330	3480	ND	1170	5980	40200	25.9 J	647	ND	ND	ND	55.5	ND	ND
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	362	342	ND	**4050**	222	256	73.3	ND	318	289	ND	**1300**	956	ND	**1630**	432	**3310**	ND	**1580**	16.0 J	ND	37.8 J	179	ND	ND
Benzo(a)pyrene	ug/kg	1000	22000	147	97.8	ND	3890	197	243	30.7 J	ND	311	248	ND	1940	680	ND	1500	156	985	ND	1440	ND	ND	39.6	173	ND	ND
Benzo(b)fluoranthene	ug/kg	1000	1700	178	97.7	ND	**4100**	219	258	23.2 J	ND	375	300	ND	**2380**	724	ND	**2400**	205	1250	ND	1630	ND	ND	43.3	195	ND	ND
Benzo(g,h,i)perylene	ug/kg	100000	1000000	96	43.6	ND	2390	153	158 J	ND	ND	223	158	ND	1530	384	ND	1330	69.8	352	ND	848	ND	ND	28.0 J	111	ND	ND
Benzo(k)fluoranthene	ug/kg	3900	1700	102	35.2 J	ND	1530	89.7	121 J	ND	ND	163	119	ND	519	285	ND	827	67	425	ND	515	ND	ND	18.8 J	72.9	ND	ND
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	277	380	ND	ND	415	ND	ND	ND	ND	ND	ND	ND	ND	ND	250 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ug/kg	-	-	788	959	ND	205	ND	ND	23.6 J	29.1 J	32.1 J	34.0 J	ND	24600	14900	ND	98.5 J	17700	110000	ND	38.9 J	ND	ND	ND	ND	ND	ND
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	926	1060	102	1530	ND	ND	60.3 J	ND	36.8 J	54.1 J	ND	1360	823	ND	397	2290	4950	ND	268	ND	ND	ND	24.0 J	ND	ND
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	300	300	ND	**4070**	199	241	56.1	ND	300	314	ND	**1590**	**1200**	ND	**1890**	406	**3230**	ND	**1630**	16.7 J	ND	39.3	173	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	56.3	ND	ND	584	ND	ND	ND	ND	59.3	46.4	ND	341	115	ND	384	19.2 J	106	ND	229	ND	ND	ND	33.8 J	ND	ND
Dibenzofuran	ug/kg	59000	210000	2190	ND	140	1350	ND	224 J	159	55.9 J	51.2 J	82.2	ND	52600	33900	ND	257 J	23200	127000	31.7 J	198	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	-	8100	ND	ND	59.7 J	96.4	72.8 JB	512	48.7 J	56.3 J	64.9 J	112	86.1	ND	ND	ND	372	ND	ND	153	34.8 J	75.1 J	60.7 J	58.8 J	59.3 J	69.0 J	54.2 J
Di-n-octyl phthalate	ug/kg	-	120000	74.7 J	160	ND	ND	ND	ND	ND	ND	ND	235	ND	ND	ND	ND	ND	ND	ND	ND	ND	99.7	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	-	7100	617	240	ND	ND	ND	ND	68.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34.0 JB	47.3 JB	ND	ND	54.4 JB	40.8 J	61.4 JB
Dimethyl phthalate	ug/kg	-	27000	47.9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	754	1330	168	192	868	464	90.6	139	143	1030	160	ND	ND	ND	1830	57.8 J	ND	229	118	63.9 J	55.6 J	55.2 J	125	ND	55.2 J
Fluoranthene	ug/kg	100000	1000000	2480	1560	ND	10600	ND	668	445	ND	491	881	ND	6820	4180	ND	3080	3720	30000	21.2 J	3380	21.4 J	ND	51.5	351	ND	ND
Fluorene	ug/kg	100000	386000	2540	2680	ND	1760	ND	98.6 J	125	83.3	46.1	108	ND	34400	20100	ND	233	19200	105000	36.5 J	274	ND	ND	ND	13.5 J	ND	ND
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	92	21.6 J	ND	2470	109	178 J	ND	ND	173	167	ND	1350	386	ND	1160	70.7	382	ND	892	ND	ND	27.1 J	118	ND	ND
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	3610	3590	ND	505	ND	ND	82.9 J	66.3 J	218	152	ND	**187000**	**196000**	ND	293 J	**94500**	**703000**	31.5 J	138	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	**13900**	**23100**	ND	1190	36.7 J	280	494	556	189	168	ND	**73300**	**105000**	ND	366	**140000**	**1010000**	40.4	211	ND	ND	ND	ND	14.9 J	ND
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	4160	6950	26.4 J	13000	305	437	812	171	404	404	ND	20400	15300	ND	2200	20800	131000	84.6	3270	21.6 J	ND	20.6 J	244	ND	ND
Pyrene	ug/kg	100000	1000000	1070	1060	ND	10200	371	400	304	ND	571	643	ND	7330	3450	ND	3130	2830	19900	26.3 J	3250	19.4 J	ND	53.7	310	18.0 J	ND
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-24 (5-6)	SB-24 (10-11)	SB-24 (14-15)	SB-24 (19-20)	SB-25 (5-6)	SB-25 (12-13)	SB-25 (19-20)	SB-26 (5-6)	SB-26 (11-12)	SB-26 (15-16)	SB-26 (19-20)	SB-27 (4-5)	SB-27 (5-6)	SB-28 (0-.5)	SB-28 (5-6)	SB-28 (18-19)	SB-28 (21-22)	SB-29 (7-8)	SB-29 (9-10)	SB-29 (10-11)	SB-29 (12-13)	SB-29 (14-15)	SB-29 (25-26)	SB-30 (5-6)	SB-30 (7-8)
Lab Sample ID:				JB74932-56	JB74932-57	JB74932-62	JB74932-58	JB74932-63	JB74932-66	JB74932-67	JB74932-104	JB74932-105	JB74932-106	JB74932-107	JB84100-4	JB84100-5	JB74932-19	JB84100-1	JB84100-2	JB84100-3	JB76612-10	JB76612-13	JB76612-14	JB76612-16	JB76612-17	JB76612-18	JB74932-29	JB74932-30
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	12/12/2014	12/12/2014	9/5/2014	12/12/2014	12/12/2014	12/12/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/8/2014	9/8/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																												
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1430	ND	ND	ND	563	1340	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**816**	ND	ND	ND	107	178	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**3610**	ND	ND	ND	252	**388**	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**749**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	129	ND	ND	ND	ND	ND	ND	ND	30.1 J	ND	73.1	ND	276	41	227	9200	38000	16300	13100	15.1 J	27.5 J	16.1 J	201	296	
Acenaphthylene	ug/kg	100000	107000	53.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1070	21.4 J	363	ND	ND	301	ND	ND	ND	ND	18.3 J	ND	ND	ND
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	425	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	100000	1000000	314	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1620	ND	853	91.8	152	1840	13800	4620	5440	38.7	119	ND	ND	92.8
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	860	29.3 J	ND	ND	55.5	ND	ND	ND	ND	ND	ND	**1050**	ND	**1910**	169	ND	170	**1290**	720	435	ND	ND	ND	105	62.3
Benzo(a)pyrene	ug/kg	1000	22000	822	26.3 J	ND	ND	42.4	ND	ND	ND	ND	ND	ND	791	ND	2010	149	ND	53.7	572	412	175	ND	ND	ND	53.3	43.7
Benzo(b)fluoranthene	ug/kg	1000	1700	911	27.1 J	ND	ND	45.8	ND	ND	ND	ND	ND	ND	**1960**	21.3 J	**2780**	174	ND	72.7	632	438	190	ND	ND	ND	68.1	55.9
Benzo(g,h,i)perylene	ug/kg	100000	1000000	528	17.0 J	ND	ND	29.4 J	ND	ND	ND	ND	ND	ND	688	ND	1610	113	ND	19.1 J	247	282	74.1	ND	ND	ND	30.9 J	28.5 J
Benzo(k)fluoranthene	ug/kg	3900	1700	351	ND	ND	ND	26.0 J	ND	ND	ND	ND	ND	ND	566	ND	904	112	ND	21.7 J	195	181	59.6	ND	ND	ND	19.8 J	18.4 J
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	73.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	992	ND	ND	ND	ND	19400	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	379	8190	31400	13500	10000	ND	ND	ND	115	285
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	153	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1070	ND	386 J	36.8 J	342	493	860	721	336	ND	ND	ND	ND	50.8 J
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	807	26.4 J	ND	ND	45.9	ND	ND	ND	ND	ND	ND	**1530**	ND	**2200**	200	ND	135	**1120**	736	373	ND	ND	ND	413	67.7
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	191	ND	390	18.5 J	ND	ND	58.6	67.2	15.9 J	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	59000	210000	59.6 J	ND	ND	ND	ND	ND	ND	ND	20.0 J	ND	ND	ND	ND	208 J	31.6 J	539	8200	31000	13600	10500	15.8 J	18.1 J	ND	276	269
Di-n-butyl phthalate	ug/kg	-	8100	ND	62.4 J	ND	ND	102	110	93.7	62.0 J	64.1 J	ND	54.0 J	ND	ND	1250 B	ND	ND	ND	ND	443 B	173 B	83.9 B	74.3 B	69.4 B	ND	76.4 BJ
Di-n-octyl phthalate	ug/kg	-	120000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	350	106	91.8	72.9	ND	ND	ND
Diethyl phthalate	ug/kg	-	7100	56.4 J	53.8 J	ND	62.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	-	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	ND	ND	ND	ND	ND	ND	4110	ND	35.0 J	187	99.1	ND	ND	14500	ND	ND	ND	129	9250	384	312	141	ND	ND	ND
Fluoranthene	ug/kg	100000	1000000	1980	61.2	ND	ND	86.5	ND	ND	ND	ND	ND	ND	2410	20.6 J	3610	344	39.8	1170	9430	3520	2870	38.3	187	ND	ND	232
Fluorene	ug/kg	100000	386000	110	ND	ND	ND	ND	ND	ND	ND	ND	23.6 J	ND	107	ND	303	34.8 J	641	5790	32900	12300	11900	18.6 J	62.5	15.8 J	ND	198
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	557	18.4 J	ND	ND	22.8 J	ND	ND	ND	ND	ND	ND	762	ND	1250	115	ND	20.9 J	305	235	89.9	ND	ND	ND	29.8 J	22.1 J
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	24.7 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	208 J	26.6 J	1140	**48900**	**170000**	**67000**	**43900**	22.9 J	ND	23.3 J	ND	2170
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	35.1 J	ND	ND	ND	ND	ND	ND	ND	ND	52.5	20.2 J	ND	ND	178 J	42.7	1200	**33300**	**171000**	**82000**	**41000**	28.6 J	16.7 J	27.3 J	284	615
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	1450	44.2	ND	ND	40.1	ND	ND	ND	ND	54.5	ND	70.1	ND	2590	339	203	4860	40500	14000	15600	58	113	26.0 J	3250	402
Pyrene	ug/kg	100000	1000000	1700	49	ND	ND	102	ND	ND	ND	ND	17.7 J	ND	2690	22.3 J	4440	431	36.4	945	7090	3040	1940	39.1	138	ND	ND	194
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 5
Semi-Volatile Organic Compound in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-30 (18.5-19.5)	SB-31 (12-13)	SB-31 (14-15)	SB-31 (19-20)	SB-31 (43-44)	SB-32 (5-6)	SB-32 (7-8)	SB-32 (12-13)	SB-32 (18-19)	SB-32 (20-21)	SB-32 (29-30)	SB-32 (39-40)	SB-33 (5-6)	SB-33 (12-13)	SB-33 (15-16)	SB-33 (20-21)	SB-33 (36-37)	SB-34 (7-8)	SB-34 (9-10)	SB-34 (32-33)	SB-35 (13-14)	SB-35 (17-18)	SB-35 (22-23)	SB-35 (35-36)
Lab Sample ID:				JB74932-31	JB77825-13	JB77825-14	JB77825-15	JB77873-10	JB77153-9	JB77153-10	JB77825-1	JB77825-2	JB77825-3	JB77825-4	JB77825-5	JB77153-11	JB77825-6	JB77825-7	JB77825-8	JB77825-9	JB77153-12	JB77825-10	JB77825-16	JB77825-17	JB77825-18	JB77825-19	JB77825-20
Date Sampled:				9/8/2014	9/29/2014	9/29/2014	9/29/2014	10/1/2014	9/25/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Semi-volatiles (SW846 8270D)																											
2-Chlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	-	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	6700	800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	100000	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/kg	100000	98000	ND	ND	36.5	ND	ND	226	51.1	ND	ND	ND	ND	ND	312	ND	16.7 J	ND	29.8 J	51.4	ND	ND	ND	ND	ND	37.3
Acenaphthylene	ug/kg	100000	107000	ND	ND	ND	ND	ND	71.3	52.2	ND	ND	ND	ND	ND	78.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	100000	1000000	ND	48.8	ND	ND	ND	416	104	ND	ND	ND	ND	ND	389	ND	ND	ND	ND	93.1	ND	ND	ND	ND	ND	ND
Atrazine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	1000	1000	ND	121	41.9	ND	ND	**1250**	313	ND	ND	27.9 J	ND	ND	985	ND	ND	ND	ND	194	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	1000	22000	ND	112	29.1 J	ND	ND	1160	324	ND	ND	24.1 J	ND	ND	926	ND	ND	ND	ND	176	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	1000	1700	ND	134	36.1	ND	ND	1400	360	ND	ND	28.5 J	ND	ND	1090	ND	ND	ND	ND	203	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ug/kg	100000	1000000	ND	96.6	15.8 J	ND	ND	765	225	ND	ND	24.3 J	ND	ND	554	ND	ND	ND	ND	106	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	3900	1700	ND	45.6	14.0 J	ND	ND	514	133	ND	ND	ND	ND	ND	407	ND	ND	ND	ND	75.9	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	122000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27.2 J
Benzaldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg		220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/kg	-	-	ND	33.2 J	ND	ND	ND	187	27.7 J	ND	ND	ND	ND	ND	181	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Caprolactam	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	3900	1000	ND	142	76	ND	ND	**1320**	353	ND	ND	28.1 J	ND	ND	**1140**	ND	ND	ND	ND	212	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg		1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/kg	13000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	330	1000000	ND	31.8 J	ND	ND	ND	199	43.7	ND	ND	ND	ND	ND	141	ND	ND	ND	ND	28.1 J	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	59000	210000	ND	ND	ND	ND	ND	78.9	19.5 J	ND	ND	ND	ND	ND	180	ND	ND	ND	ND	24.4 J	ND	ND	ND	ND	ND	36.0 J
Di-n-butyl phthalate	ug/kg	-	8100	ND	122	ND	65.5 J	ND	84.4	67.8 J	ND	64.4 J	114	172	73.8	73.2	90.9	147	114	84.7	81	135	65.3 J	255	83.7	175	60.3 J
Di-n-octyl phthalate	ug/kg	-	120000	ND	ND	ND	ND	ND	50.1 J	50.5 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	-	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	-	27000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	435000	ND	953	ND	ND	ND	74.4	88.2	339	ND	56.3 J	616	ND	58.8 J	ND	ND	ND	ND	53.1 J	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	100000	1000000	ND	227	112	ND	ND	2780	728	25.5 J	ND	47.9	ND	ND	2420	ND	ND	ND	ND	507	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	100000	386000	ND	ND	216	ND	ND	123	35.9	ND	ND	ND	ND	ND	154	ND	ND	ND	15.0 J	46.7	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	1200	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/kg	500	8200	ND	84.3	17.6 J	ND	ND	797	218	ND	ND	22.1 J	ND	ND	558	ND	ND	ND	ND	108	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	-	4400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	36400	ND	ND	ND	ND	ND	27.9 J	ND	ND	ND	ND	ND	ND	82.1	ND	ND	ND	48.4 J	ND	ND	ND	ND	ND	ND	85.3
2-Nitroaniline	ug/kg	-	400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	100000	12000	ND	ND	ND	ND	ND	47.9	26.4 J	ND	ND	ND	ND	146	138	ND	35.1 J	ND	147	22.9 J	ND	ND	ND	ND	ND	160
Nitrobenzene	ug/kg	15000	170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	100000	1000000	ND	160	270	ND	ND	2120	553	ND	ND	22.6 J	ND	ND	2480	ND	ND	ND	ND	318	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	100000	1000000	ND	231	173	ND	ND	1990	750	24.4 J	ND	52.7	ND	ND	2250	ND	ND	ND	ND	389	ND	ND	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text indicates compound above RRSCOs in the top 15 feet below ground surface
Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)
Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)
ND = Not detected (below detection limit)
- = No standard
J = Estimated value
B = Detected in blank
R = Rejected value

Table 6
Total Petroleum Hydrocarbons in Soil Samples

Client Sample ID:		NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO - Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-4 (19-20)	SB-4 (5-6)	SB-5 (1-2)	SB-5 (11-12)	SB-5 (15-16)	SB-5 (17-18)	SB-5 (4-5)A	SB-6 (6-11)	SB-6 (6-7)	SB-10 (7-8)	SB-27(4-5)	SB-27(5-6)	SB-28(21-22)
Lab Sample ID:				**JB74081-5R**	**JB74081-3R**	**JB73951-1R**	**JB77153-7**	**JB77153-8**	**JB73951-7T**	**JB73951-3R**	**JB74932-61**	**JB74932-60**	**JB74932-52R**	**JB84100-4**	**JB84100-5**	**JB84100-3**
Date Sampled:				**8/14/2014**	**8/14/2014**	**8/13/2014**	**9/25/2014**	**9/25/2014**	**8/13/2014**	**8/13/2014**	**9/9/2014**	**9/9/2014**	**9/9/2014**	**12/12/2014**	**12/12/2014**	**12/12/2014**
Matrix:				**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
GC Volatiles (SW846 8015C)																
TPH-GRO (C6-C10)	ug/kg	-	-	38000	716000	1030000	138000	25900	297000	953000	180000	805000	341000	ND	ND	107000
GC Semi-volatiles (SW846 8015C)																
TPH-DRO (C10-C28)	ug/kg	-	-	505000	11700000	35200000	1490000	57100	5330000	21400000	2320000	5820000	1200000	31400	-	-

Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1 (5-6)	SB-1 (8-9)	SB-2 (5-6)	SB-2 (6-7)	SB-2 (17-18)	SB-3 (0-.5)	SB-3 (11-12)	SB-3 (17-18)	SB-4 (5-6)	SB-4 (11-12)	SB-4 (19-20)	SB-5 (1-2)	SB-5 (4-5)	SB-5 (11-12)	SB-5 (15-16)	SB-5 (17-18)	SB-6 (5-6)	SB-6 (6-7)	SB-6 (6-11)	SB-6 (12-13)
Lab Sample ID:				JB76612-1	JB76612-6	JB74081-2	JB74932-5	JB74932-6	JB74932-18	JB77153-5	JB77153-6	JB74081-3	JB74081-6	JB74081-5	JB73951-1	JB73951-2	JB77153-7	JB77153-8	JB73951-7	JB74932-59	JB74932-60	JB74932-61	JB76612-7
Date Sampled:				9/15/2014	9/15/2014	8/14/2014	8/25/2014	8/25/2014	9/5/2014	9/19/2014	9/19/2014	8/14/2014	8/14/2014	8/14/2014	8/13/2014	8/13/2014	9/25/2014	9/25/2014	8/13/2014	9/9/2014	9/9/2014	9/9/2014	9/16/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																							
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	**22.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	9	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	6.3	ND	ND	ND	ND	ND	ND	42.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	35.3	17	ND	10.3	ND	ND	129	ND	ND	135	6.4	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	38.7	15.3	ND	11.3	ND	ND	45.2	ND	ND	133	11.3	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	200	100	ND	ND	4.9	ND	ND	17.1	5.3	ND	**540**	ND	6.6	**768**	**135**	ND	ND	ND	ND	5.6	0.9	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	ND	ND	ND	ND	34.5	ND	1360	5.5	17.2	812	463	ND	ND	ND	ND	9.8	3.5	ND
4,4'-DDE	ug/kg	8900	17000	ND	1.4	ND	66.8	ND	9.3	1.8	ND	119	ND	5.3	457	388	ND	0.99	ND	ND	1.7	3.2	ND
4,4'-DDT	ug/kg	7900	136000	ND	ND	ND	ND	ND	65.2	11.1	4.8	ND	ND	ND	9.4	ND	1.2	ND	ND	ND	11.6	ND	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.9	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	21.5	ND	ND	ND	ND	ND	12.5	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	8.2	ND	ND	9.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	32.3	ND	ND	ND	ND	ND	ND	ND	30.4	ND	ND	ND	ND	ND	11.2	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	2	ND	ND	9.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																							
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	106
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-7 (5-6)	SB-7 (10-11)	SB-7 (14-15)	SB-7 (43-44)	SB-8 (5-6)	SB-8 (12-13)	SB-8 (22.5-23.5)	SB-9 (5-6)	SB-9 (15-16)	SB-9 (19-20)	SB-10 (5-6)	SB-10 (7-8)	SB-10 (11-12)	SB-10 (17.5-18.5)	SB-11 (5-6)	SB-11 (7-8)	SB-11 (19-20)	SB-12 (5-6)	SB-12 (10-11)	SB-12 (15-16)
Lab Sample ID:				JB74932-20	JB74932-21	JB74932-24	JB74932-25	JB74932-26	JB74932-27	JB74932-28	JB74932-39	JB74932-42	JB74932-43	JB74932-51	JB74932-52	JB74932-53	JB74932-54	JB74932-71	JB74932-72	JB74932-73	JB74932-96	JB74932-97	JB74932-98
Date Sampled:				9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																							
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.4	ND	ND	ND	ND
alpha-Chlordane	ug/kg	4200	2900	28.6	ND	ND	ND	30.8	ND	ND	4	ND	ND	ND	ND	ND	ND	1.8	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	14000	29.8	ND	ND	ND	38.5	ND	ND	4.8	ND	ND	ND	ND	ND	ND	1.4	ND	ND	ND	ND	ND
Dieldrin	ug/kg	200	100	1.2	ND	ND	ND	11.6	ND	ND	4.9	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	ND	ND	ND	ND	ND	3.7	44.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	8900	17000	ND	ND	ND	ND	8.3	ND	ND	ND	206	ND	ND	3.3	ND	ND	4	5.1	ND	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	ND	ND	ND	ND	ND	ND	ND	3.2	1410	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																							
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

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Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-12 (19-20)	SB-13 (5-6)	SB-13 (7-8)	SB-13 (10-11)	SB-13 (14-15)	SB-13 (15-16)	SB-13 (16-17)	SB-13 (19-20)	SB-14 (5-6)	SB-14 (7-8)A	SB-14 (14-15)	SB-14 (18-19)	SB-14 (19-20)	SB-15 (5-6)	SB-15 (10-11)	SB-15 (19-20)	SB-15 (20-21)	SB-16 (5-6)	SB-16 (10-11)	SB-16 (11-12)
Lab Sample ID:				JB74932-99	JB76479-8	JB76479-9	JB76479-10	JB76479-18	JB76479-15	JB76479-16	JB76479-17	JB76479-1	JB77153-3	JB76479-3	JB76479-4	JB76479-5	JB74932-87	JB74932-88	JB74932-89	JB74932-90	JB74932-95	JB74932-101	JB74932-102
Date Sampled:				9/11/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/19/2014	9/12/2014	9/12/2014	9/12/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																							
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	200	100	ND	ND	ND	ND	ND	ND	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	ND	ND	ND	ND	ND	ND	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	8900	17000	ND	1.4	ND	ND	ND	ND	ND	ND	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	ND	12.5	ND	ND	ND	ND	ND	ND	40.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	11000	60	ND	4.2	ND	ND	ND	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																							
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

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Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-16 (19-20)	SB-17 (5-6)	SB-17 (11-12)	SB-17 (19-20)	SB-17 (20-21)	SB-17 (23-24)	SB-18 (5-6)	SB-18 (8-9)	SB-18 (11-12)	SB-18 (14-15)	SB-18 (18.5-19.5)	SB-19 (5-6)	SB-19 (8-9)	SB-19 (19-20)	SB-20 (5-6)	SB-20 (8-9)	SB-20 (18-19)	SB-21 (0-.5)	SB-21 (5-6)
Lab Sample ID:				JB74932-103	JB74932-84	JB74932-91	JB74932-92	JB74932-93	JB74932-94	JB74932-74	JB74932-75	JB74932-76	JB76479-13	JB76479-14	JB74932-68	JB74932-69	JB74932-70	JB74081-7	JB74081-8	JB74081-9	JB74932-15	JB74932-1
Date Sampled:				9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/10/2014	9/10/2014	9/10/2014	9/12/2014	9/12/2014	9/10/2014	9/10/2014	9/10/2014	8/15/2014	8/15/2014	8/15/2014	9/5/2014	8/25/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																						
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.93	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	ND	ND	ND	ND	ND	6.7	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31.7	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24.8	ND
Dieldrin	ug/kg	200	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.7	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	68.7	25	ND	10.1	0.97
4,4'-DDE	ug/kg	8900	17000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.2	1.8	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	59.6	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.92	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.7	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																						
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	260	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

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Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-21 (11-12)	SB-22 (5-6)	SB-22 (11-12)	SB-22 (19-20)	SB-23 (5-6)	SB-23 (9-10)	SB-23 (14-15)	SB-23 (19-20)	SB-24 (5-6)	SB-24 (10-11)	SB-24 (14-15)	SB-24 (19-20)	SB-25 (5-6)	SB-25 (12-13)	SB-25 (19-20)	SB-26 (5-6)	SB-26 (11-12)	SB-26 (15-16)	SB-26 (19-20)
Lab Sample ID:				JB77153-4	JB74932-45	JB74932-46	JB74932-47	JB74932-48	JB74932-49	JB74932-55	JB74932-50	JB74932-56	JB74932-57	JB74932-62	JB74932-58	JB74932-63	JB74932-66	JB74932-67	JB74932-104	JB74932-105	JB74932-106	JB74932-107
Date Sampled:				9/19/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																						
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	200	100	ND	ND	ND	ND	ND	0.84	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	13000	14000	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	8900	17000	ND	6.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.8	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	12.4	27.4	ND	ND	ND	ND	ND	ND	4.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.3	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																						
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-27 (4-5)	SB-27 (5-6)	SB-28 (0-.5)	SB-28 (5-6)	SB-28 (18-19)	SB-28 (21-22)	SB-29 (7-8)	SB-29 (9-10)	SB-29 (10-11)	SB-29 (12-13)	SB-29 (14-15)	SB-29 (25-26)	SB-30 (5-6)	SB-30 (7-8)	SB-30 (18.5-19.5)	SB-31 (12-13)	SB-31 (14-15)	SB-31 (19-20)	SB-31 (43-44)
Lab Sample ID:				JB84100-4	JB84100-5	JB74932-19	JB84100-1	JB84100-2	JB84100-3	JB76612-10	JB76612-13	JB76612-14	JB76612-16	JB76612-17	JB76612-18	JB74932-29	JB74932-30	JB74932-31	JB77825-13	JB77825-14	JB77825-15	JB77873-10
Date Sampled:				12/12/2014	12/12/2014	9/5/2014	12/12/2014	12/12/2014	12/12/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/8/2014	9/8/2014	9/8/2014	9/29/2014	9/29/2014	9/29/2014	10/1/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																						
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	20.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.6	ND	ND	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	23.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.6	ND	ND	ND
Dieldrin	ug/kg	200	100	ND	ND	10.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	21.9	19.5	ND	ND	ND	ND	ND	ND	ND	ND	0.43	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	8900	17000	ND	ND	14.3	2.3	ND	ND	ND	1.9	ND	ND	ND	ND	1	1.3	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	10.4	ND	81.8	4.5	ND	ND	7.4	5.1	ND	ND	ND	ND	ND	ND	ND	4.4	ND	ND	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																						
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 7
Pesticide and Polychlorinated Biphenyls in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-32 (5-6)	SB-32 (7-8)	SB-32 (12-13)	SB-32 (18-19)	SB-32 (20-21)	SB-32 (29-30)	SB-32 (39-40)	SB-33 (5-6)	SB-33 (12-13)	SB-33 (15-16)	SB-33 (20-21)	SB-33 (36-37)	SB-34 (7-8)	SB-34 (9-10)	SB-34 (32-33)	SB-35 (13-14)	SB-35 (17-18)	SB-35 (22-23)	SB-35 (35-36)
Lab Sample ID:				JB77153-9	JB77153-10	JB77825-1	JB77825-2	JB77825-3	JB77825-4	JB77825-5	JB77153-11	JB77825-6	JB77825-7	JB77825-8	JB77825-9	JB77153-12	JB77825-10	JB77825-16	JB77825-17	JB77825-18	JB77825-19	JB77825-20
Date Sampled:				9/25/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC Semi-volatiles (SW846 8081B)																						
Aldrin	ug/kg	97	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/kg	480	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/kg	360	90	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/kg	100000	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/kg	1300	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	4200	2900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5	ND	ND
gamma-Chlordane	ug/kg	-	14000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	200	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	13000	14000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	8900	17000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	7900	136000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	11000	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	24000	1000000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/kg	24000	102000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	2100	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	900000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																						
Aroclor 1016	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/kg	1000	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

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J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1 (5-6)	SB-1 (5-6) A	SB-1 (5-6) B	SB-1 (8-9)	SB-2 (5-6)	SB-2 (6-7)	SB-2 (17-18)	SB-2 (17-18)A	SB-2 (17-18)B	SB-3 (0-.5)	SB-3 (5-6)	SB-3 (11-12)	SB-3 (17-18)	SB-3 (19-20)	SB-4 (5-6)	SB-4 (11-12)	SB-4 (19-20)	SB-5 (1-2)	SB-5 (4-5)
Lab Sample ID:				JB76612-1	JB76612-4	JB76612-5	JB76612-6	JB74081-2	JB74932-5	JB74932-6	JB74932-7	JB74932-8	JB74932-18	JB74932-13	JB77153-5	JB77153-6	JB74932-14	JB74081-3	JB74081-6	JB74081-5	JB73951-1	JB73951-2
Date Sampled:				9/15/2014	9/15/2014	9/15/2014	9/15/2014	8/14/2014	8/25/2014	8/25/2014	8/25/2014	8/25/2014	9/5/2014	8/25/2014	9/19/2014	9/19/2014	8/25/2014	8/14/2014	8/14/2014	8/14/2014	8/13/2014	8/13/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																						
Aluminum	mg/kg	-	-	9120	10400	10800	7470	3800	5130	19800	16400	16100	4600	13300	10200	11400	6280	5090	16200	9840	6800	8040
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	9.7	7.9	9.7	2.9	6.5	9.7	3.3	2.9	2.1	**17.6**	12.5	2.1	ND	ND	**82.5**	4.1	2.5	**72.7**	9.6
Barium	mg/kg	400	820	79.7	89.7	74.7	43.3	130	141	127	107	103	440	112	31.4	69.6	47.1	180	71	171	71.1	26
Beryllium	mg/kg	72	47	0.38	0.45	0.45	0.41	0.27	0.59	1.9	1.7	1.5	ND	0.9	0.43	0.52	0.86	0.81	1	ND	0.32	0.37
Cadmium	mg/kg	4.3	7.5	0.78	1	1.2	ND	0.9	0.91	0.77	0.67	0.64	5.1	1.1	ND	ND	ND	1.2	ND	ND	ND	ND
Calcium	mg/kg	-	-	44100	15300	6680	4400	3070	12700	3220	2840	2610	4170	2240	752	5580	2690	2010	2430	5010	23300	764
Chromium	mg/kg	180	-	16.5	20.1	21.3	17	9.7	21.7	54.4	44.7	39.6	55.3	24.9	16.3	27.1	18.9	20	22.5	41.7	26.8	15.5
Cobalt	mg/kg	-	-	ND	ND	ND	ND	ND	5.8	12.7	12.2	16	6.3	7.5	5.6	8.1	ND	9.8	6.7	7.8	ND	ND
Copper	mg/kg	270	1720	75.5	114	193	17.4	167	116	26.3	24.6	25	332	75.4	10.1	18.9	16.1	177	14.9	15	29	9.6
Iron	mg/kg	-	-	14400	17400	18600	13300	9930	18800	30300	25200	23300	27900	20500	13300	16900	14000	31400	14700	20400	9100	11000
Lead	mg/kg	400	450	108	136	219	27.9	262	218	10.7	8.6	9.3	**825**	283	5.2	6	4.4	**727**	39.6	7.1	94.2	16.5
Magnesium	mg/kg	-	-	2410	2840	2460	2280	814	3280	8300	7130	6600	1070	2620	2280	6320	2780	1120	2700	7600	5700	2480
Manganese	mg/kg	2000	2000	578	223	251	192	105	157	419	369	379	325	364	127	321	370	96.2	184	197	110	128
Mercury	mg/kg	0.81	0.73	0.24	0.56	0.34	ND	0.58	**0.9**	ND	ND	ND	0.42	**1.3**	ND	ND	ND	0.44	0.16	ND	0.58	0.15
Nickel	mg/kg	310	130	12.3	15.3	16.8	12.2	10.1	22.9	34	29.3	31.9	43	17.8	11.2	19.3	10.9	24.8	15.7	14.2	9.1	11.2
Potassium	mg/kg	-	-	1590	1480	1240	1270	ND	ND	4430	3770	3450	ND	1160	1200	2570	1490	ND	ND	2930	ND	ND
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	ND	ND	ND	**5**	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	ND	ND	ND	1.7	0.87	ND	ND	ND	2.1	ND	ND	ND	0.66	4.2	0.62	2	ND	ND
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	17.6	19	20.1	20.9	11.6	19.1	49.7	46	40	152	30.2	23.7	30	25	25.4	26.1	53.3	13.6	18.1
Zinc	mg/kg	10000	2480	169	229	354	49.6	429	358	81.2	68.5	67.6	782	296	29.9	47.9	32	305	53.9	57.9	519	43.4

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

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Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-5 (4-5)A	SB-5 (4-5)B	SB-5 (11-12)	SB-5 (15-16)	SB-5 (17-18)	SB-6 (5-6)	SB-6 (6-7)	SB-6 (6-11)	SB-6 (12-13)	SB-7 (5-6)	SB-7 (10-11)	SB-7 (10-11)A	SB-7 (10-11)B	SB-7 (14-15)	SB-7 (43-44)	SB-8 (5-6)	SB-8 (12-13)	SB-8 (22.5-23.5)	SB-9 (5-6)
Lab Sample ID:				JB73951-3	JB73951-4	JB77153-7	JB77153-8	JB73951-7	JB74932-59	JB74932-60	JB74932-61	JB76612-7	JB74932-20	JB74932-21	JB74932-22	JB74932-23	JB74932-24	JB74932-25	JB74932-26	JB74932-27	JB74932-28	JB74932-39
Date Sampled:				8/13/2014	8/13/2014	9/25/2014	9/25/2014	8/13/2014	9/9/2014	9/9/2014	9/9/2014	9/16/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																						
Aluminum	mg/kg	-	-	10900	8080	9640	17500	5260	5470	11500	12000	9330	8320	8720	10200	9370	11700	8990	6020	10200	13300	8570
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	**33.2**	8.8	2.5	2.8	2.8	ND	2.9	5.1	3.9	4.1	3.6	3.2	3.6	2.9	ND	ND	ND	ND	3.3
Barium	mg/kg	400	820	73.4	ND	66.8	137	36.6	24.7	57.6	86.1	71.1	108	31.1	34.2	40.3	61.4	76.4	40.8	67.1	106	92.5
Beryllium	mg/kg	72	47	0.53	0.37	0.5	0.95	0.37	0.25	0.5	0.49	0.44	0.49	ND	0.39	0.35	0.57	ND	ND	0.29	0.41	ND
Cadmium	mg/kg	4.3	7.5	ND	ND	ND	ND	ND	ND	ND	ND	0.61	0.72	ND	ND	ND	0.59	ND	ND	0.62	0.61	0.71
Calcium	mg/kg	-	-	1450	782	2000	4030	2500	ND	ND	1690	9510	10300	914	1370	1190	1400	5800	941	2220	21300	9480
Chromium	mg/kg	180	-	24.4	15.7	28.2	39.6	11	25.7	25.4	22.9	23.9	17.5	16	17.8	17.6	27.9	19.1	11.2	24.5	28.8	17.3
Cobalt	mg/kg	-	-	6.3	ND	7.9	15.3	ND	ND	6.5	8.9	7.5	6.5	5.7	ND	ND	10.5	7.8	ND	9	10	6.8
Copper	mg/kg	270	1720	50.9	8.2	17.2	32	14	11.5	20.5	17.1	19.4	41.5	16.3	13.4	14.6	20.8	17.4	10.9	19.7	23.5	51.2
Iron	mg/kg	-	-	14500	12400	17300	29900	11700	10600	17600	25600	19400	14700	14000	12800	12900	18400	16000	9550	17100	18500	14400
Lead	mg/kg	400	450	**1010**	9.2	5.7	11.6	3.2	4.6	14.2	8.8	27.6	241	37.6	21.4	68.3	16.5	7.6	11.4	5.2	7	117
Magnesium	mg/kg	-	-	2840	2540	3720	9470	2010	1770	3110	4740	6720	6140	1820	2290	1910	2940	4600	1860	4860	13600	4610
Manganese	mg/kg	2000	2000	219	126	224	540	138	161	212	349	463	229	217	174	232	379	297	205	412	375	240
Mercury	mg/kg	0.81	0.73	0.076	ND	ND	ND	ND	ND	0.056	0.094	ND	0.39	0.078	0.053	0.14	ND	ND	0.13	ND	ND	0.14
Nickel	mg/kg	310	130	15.5	10.9	18	36.1	13.1	6.6	13.7	22.3	16.9	14.4	10.1	10.8	10.8	18.2	14.6	10	22.2	25.6	14.4
Potassium	mg/kg	-	-	1390	ND	2340	4970	1320	1380	2510	4550	3090	ND	ND	ND	ND	1720	3330	ND	2400	4270	1230
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	ND	ND	ND	ND	0.8	ND	1.2	ND	ND	0.95	ND	ND	ND	ND	ND	1	0.86	1
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	24.1	18.8	32.8	48.7	21.6	34.8	33.3	35.6	29.7	30.9	20.4	24.1	21.1	35.4	26.6	16.2	34.1	36.3	35.1
Zinc	mg/kg	10000	2480	170	38.8	47.4	87.9	25.9	39	32.9	41	52.2	182	69.1	51.4	131	54.7	42.8	49.7	54.4	56.5	121

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-9 (15-16)	SB-9 (19-20)	SB-10 (5-6)	SB-10 (7-8)	SB-10 (11-12)	SB-10 (17.5-18.5)	SB-11 (5-6)	SB-11 (7-8)	SB-11 (19-20)	SB-12 (5-6)	SB-12 (10-11)	SB-12 (15-16)	SB-12 (19-20)	SB-13 (5-6)	SB-13 (7-8)	SB-13 (10-11)	SB-13 (10-11)A	SB-13 (10-11)B	SB-13 (14-15)
Lab Sample ID:				JB74932-42	JB74932-43	JB74932-51	JB74932-52	JB74932-53	JB74932-54	JB74932-71	JB74932-72	JB74932-73	JB74932-96	JB74932-97	JB74932-98	JB74932-99	JB76479-8	JB76479-9	JB76479-10	JB76479-11	JB76479-12	JB76479-18
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																						
Aluminum	mg/kg	-	-	7660	10700	5050	9080	15000	22200	7190	6110	13300	6560	5960	11100	11000	4880	7840	5800	5960	3040	6980
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	6	2.6	2.8	5.1	3.8	4.2	2.3	ND	3.1	ND	ND	ND	ND	2.9	ND	ND	ND	3	ND
Barium	mg/kg	400	820	684	87.1	ND	51	89.6	256	36.3	ND	139	28.4	ND	56.9	86.8	80	23.9	ND	24.5	ND	26
Beryllium	mg/kg	72	47	ND	0.38	0.24	0.38	0.65	0.84	0.35	0.26	0.56	0.22	ND	0.36	ND	0.28	0.36	0.27	0.29	ND	0.33
Cadmium	mg/kg	4.3	7.5	0.93	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	mg/kg	-	-	11400	2350	ND	1230	2160	18300	1350	1140	17300	746	877	1480	8870	12000	788	778	683	2650	641
Chromium	mg/kg	180	-	19	26.1	8.4	21.6	21.7	43.4	16.1	16.4	34.6	14	13.5	35.4	27.8	13.7	16.1	10.6	11.6	7.6	14.9
Cobalt	mg/kg	-	-	5.7	10	ND	8.8	11.9	18.4	ND	ND	10.6	5.4	ND	9.8	9	ND	ND	ND	ND	ND	5.3
Copper	mg/kg	270	1720	43.6	24.2	9.2	73.4	34	28.4	39.1	12.1	23.3	10.1	10.4	20.6	18.6	49.5	9.3	9.7	10.5	7	12
Iron	mg/kg	-	-	12900	19400	8860	12700	23200	32800	12100	9410	25200	12300	11200	22400	20000	10700	11300	10600	10200	7630	11200
Lead	mg/kg	400	450	**839**	7.7	3.1	4.5	8.7	9.1	91.8	24.6	7.6	4	3.6	7.1	4.8	435	4.2	3.9	3.8	ND	4
Magnesium	mg/kg	-	-	2650	4080	1850	3230	5830	18100	2260	1900	14400	2450	2340	5050	11700	6060	2310	2120	2190	1650	2690
Manganese	mg/kg	2000	2000	289	484	101	273	449	483	156	107	796	279	223	241	239	154	275	211	192	135	225
Mercury	mg/kg	0.81	0.73	0.46	ND	ND	ND	ND	ND	0.18	0.061	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND
Nickel	mg/kg	310	130	12.9	23	11.3	63.7	37.6	43.8	11	8.8	24.7	11.1	10.8	19.5	19.5	10.7	11	9.8	9.1	5.8	11.7
Potassium	mg/kg	-	-	1400	2880	ND	1820	2910	8000	ND	ND	4430	ND	ND	2760	3160	ND	ND	ND	ND	ND	ND
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	23.6	33.9	12.7	26	28.3	48.6	19.5	17	43.6	18.7	17	32.6	32.8	15.1	17.6	13.9	16.3	9.3	19.6
Zinc	mg/kg	10000	2480	385	49.9	36.7	46.4	46.3	78.3	76.7	33.9	62.3	26.4	28.4	50.5	68.4	180	25.6	26.9	26.3	14.5	29.5

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

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Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-13 (15-16)	SB-13 (16-17)	SB-13 (19-20)	SB-14 (5-6)	SB-14 (7-8)A	SB-14 (14-15)	SB-14 (18-19)	SB-14 (19-20)	SB-15 (5-6)	SB-15 (10-11)	SB-15 (19-20)	SB-15 (20-21)	SB-16 (5-6)	SB-16 (10-11)	SB-16 (11-12)	SB-16 (19-20)	SB-17 (5-6)	SB-17 (11-12)	SB-17 (19-20)
Lab Sample ID:				JB76479-15	JB76479-16	JB76479-17	JB76479-1	JB77153-3	JB76479-3	JB76479-4	JB76479-5	JB74932-87	JB74932-88	JB74932-89	JB74932-90	JB74932-95	JB74932-101	JB74932-102	JB74932-103	JB74932-84	JB74932-91	JB74932-92
Date Sampled:				9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/19/2014	9/12/2014	9/12/2014	9/12/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																						
Aluminum	mg/kg	-	-	9900	17100	9360	5510	6180	6200	7260	11600	5840	6040	9740	9770	6450	3960	7670	9670	7930	6430	6750
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	ND	3	ND	6.6	4.3	ND	ND	1.9	2.9	ND	ND	ND	6.1	ND	ND	ND	ND	2.8	ND
Barium	mg/kg	400	820	50.5	88.7	63.7	116	52.6	30.2	39.5	63.5	43.2	28.6	48.3	70.4	107	ND	ND	61.7	44.2	43.9	31
Beryllium	mg/kg	72	47	0.37	0.69	0.41	0.43	0.27	0.3	0.33	0.52	0.3	0.29	0.43	0.44	0.31	ND	0.33	0.28	0.34	0.26	0.29
Cadmium	mg/kg	4.3	7.5	ND	ND	ND	1.8	0.64	ND	ND	ND	0.59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	mg/kg	-	-	693	656	2320	52400	2030	926	1490	1500	1180	1120	1120	22200	19700	ND	ND	11500	4550	5480	950
Chromium	mg/kg	180	-	31	56.9	22.7	14.9	12.4	16.8	21.5	33	12.8	13.9	32.3	23.9	17.8	11.9	16.3	25.7	18.8	18.2	18.3
Cobalt	mg/kg	-	-	9.6	11.8	7.9	ND	ND	ND	7.7	10.4	ND	ND	9.7	7.8	ND	ND	ND	8.4	6.9	ND	ND
Copper	mg/kg	270	1720	18.7	26.4	16.6	87.2	28.1	11.8	15.3	21.2	23.1	11	16.9	20.1	70	6.4	13.6	20.9	25.1	65.8	12.3
Iron	mg/kg	-	-	14300	29400	16300	12500	10800	10900	15000	19700	12100	11300	16600	16800	11100	5610	5500	18200	14700	12700	12600
Lead	mg/kg	400	450	4.8	8.6	3.6	**511**	22.6	2.9	3.8	6.7	11.6	9.5	4.8	5.7	252	21.3	6.8	5.3	50.3	176	4.9
Magnesium	mg/kg	-	-	3930	6420	6210	26000	2060	3440	3520	5460	2300	2210	4660	14700	3180	609	1290	10200	2570	1860	2890
Manganese	mg/kg	2000	2000	203	381	192	200	99.8	135	327	446	621	313	194	348	181	28.1	36.7	588	337	169	191
Mercury	mg/kg	0.81	0.73	ND	ND	ND	**0.74**	ND	ND	ND	ND	0.037	ND	ND	ND	0.72	0.22	0.2	ND	0.21	0.2	ND
Nickel	mg/kg	310	130	17.9	27.2	18.4	23.8	12	12.9	15.5	21.8	12	10.4	17.1	18.6	10.6	ND	5.7	18.3	8.3	8.2	12.3
Potassium	mg/kg	-	-	1770	3440	2340	1120	ND	1980	1990	2990	ND	ND	2350	2730	ND	ND	ND	2410	ND	ND	ND
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.65	0.65	ND	ND	ND	ND	ND
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	28.2	41.5	28.7	46.9	26.5	18.8	24.9	33.7	20	20.1	32.6	31.9	16.4	12.9	16.4	31.1	24.6	18.2	25.3
Zinc	mg/kg	10000	2480	40.4	58.1	53.6	342	434	51.5	36.8	52.3	250	65.1	45.2	60.3	179	12.7	60.3	54.4	66	98.1	32

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

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J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-17 (20-21)	SB-17 (23-24)	SB-18 (5-6)	SB-18 (8-9)	SB-18 (11-12)	SB-18 (14-15)	SB-18 (18.5-19.5)	SB-19 (5-6)	SB-19 (8-9)	SB-19 (19-20)	SB-20 (5-6)	SB-20 (8-9)	SB-20 (18-19)	SB-21 (0-.5)	SB-21 (5-6)	SB-21 (11-12)	SB-21 (20-21)	SB-22 (5-6)	SB-22 (11-12)
Lab Sample ID:				JB74932-93	JB74932-94	JB74932-74	JB74932-75	JB74932-76	JB76479-13	JB76479-14	JB74932-68	JB74932-69	JB74932-70	JB74081-7	JB74081-8	JB74081-9	JB74932-15	JB74932-1	JB77153-4	JB74932-9	JB74932-45	JB74932-46
Date Sampled:				9/11/2014	9/11/2014	9/10/2014	9/10/2014	9/10/2014	9/12/2014	9/12/2014	9/10/2014	9/10/2014	9/10/2014	8/15/2014	8/15/2014	8/15/2014	9/5/2014	8/25/2014	9/19/2014	8/25/2014	9/9/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																						
Aluminum	mg/kg	-	-	11700	13100	8090	6700	1310	14600	7910	7800	6610	11400	5100	7120	11800	7000	6320	10300	5260	7760	15000
Antimony	mg/kg	-	-	ND	ND	ND	ND	3.1	ND	ND	ND	ND	ND	ND	ND	ND	4.7	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	ND	ND	3.3	2.9	ND	4.5	2	4.9	3.4	ND	**17.7**	3.3	ND	**104**	3.7	2.4	ND	2.5	3.3
Barium	mg/kg	400	820	52.5	109	71.9	50.4	ND	106	76.8	80.7	45.7	100	105	37.7	76.6	**2070**	33.8	33.2	51	84.7	82.6
Beryllium	mg/kg	72	47	0.51	0.39	0.38	0.29	ND	0.69	0.37	0.42	ND	0.46	0.55	0.38	0.7	0.32	0.5	0.43	0.68	0.23	0.64
Cadmium	mg/kg	4.3	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**16.6**	ND	ND	ND	0.56	ND
Calcium	mg/kg	-	-	900	36100	3070	6810	ND	2700	21100	4390	32600	23800	2210	1020	25600	9370	1190	929	2160	21300	1250
Chromium	mg/kg	180	-	38.6	31.4	16.7	16.3	4.8	38.8	18.1	20	15.7	32.3	16.6	14.7	28.4	67.4	11.9	18.7	12.9	19.8	39.8
Cobalt	mg/kg	-	-	9.1	9.4	6.3	6.7	ND	12.8	7	6	ND	10.5	10.3	ND	9.6	10.3	ND	6.7	ND	6.7	13.4
Copper	mg/kg	270	1720	18.9	23.9	46.2	48.6	18.4	25	15.2	40.5	35.8	23.9	121	25.8	21	340	28.6	11.4	13	36.1	23.9
Iron	mg/kg	-	-	20800	22300	14300	13700	3500	22300	13800	18200	12600	20100	82100	12300	19900	37100	10000	16100	12000	13100	23400
Lead	mg/kg	400	450	6.2	6.9	149	152	113	11.1	4.4	165	106	7.2	302	68.1	9.1	**3890**	89.7	4.3	3.5	111	7.7
Magnesium	mg/kg	-	-	5080	22700	2340	3970	ND	7030	12700	2870	20400	16100	1010	2380	14400	3910	1670	2530	2370	8990	6030
Manganese	mg/kg	2000	2000	323	407	265	236	20.2	319	242	253	202	400	81.2	168	367	355	85.5	154	265	226	410
Mercury	mg/kg	0.81	0.73	ND	ND	0.31	0.33	0.16	ND	ND	0.37	0.25	ND	**2.2**	0.19	ND	**3.6**	0.17	ND	ND	0.19	ND
Nickel	mg/kg	310	130	19.2	25	14.4	12.5	ND	28.6	15.9	13.5	12.1	22.6	38.5	11.5	22.8	42	8.4	10.9	12.7	11.6	23.4
Potassium	mg/kg	-	-	2430	3960	ND	ND	ND	2760	2620	ND	ND	3780	ND	ND	2810	1230	ND	1340	1370	1140	2570
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.86	ND	2.4	0.57	ND	0.73	0.72	1.3
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	37.9	40.4	21.3	20.8	ND	41.9	25.4	33.4	21.2	41.3	19	18.5	33.9	114	14.5	23.2	20	38.5	43.5
Zinc	mg/kg	10000	2480	47.2	64.5	103	108	17.2	59.4	39.7	220	98.9	59.5	384	64	57.7	**3060**	130	27	29	88.6	44.3

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-22 (19-20)	SB-23 (5-6)	SB-23 (9-10)	SB-23 (14-15)	SB-23 (19-20)	SB-24 (5-6)	SB-24 (10-11)	SB-24 (14-15)	SB-24 (19-20)	SB-25 (5-6)	SB-25 (12-13)	SB-25 (19-20)	SB-26 (5-6)	SB-26 (11-12)	SB-26 (15-16)	SB-26 (19-20)	SB-27 (4-5)	SB-27 (5-6)
Lab Sample ID:				JB74932-47	JB74932-48	JB74932-49	JB74932-55	JB74932-50	JB74932-56	JB74932-57	JB74932-62	JB74932-58	JB74932-63	JB74932-66	JB74932-67	JB74932-104	JB74932-105	JB74932-106	JB74932-107	JB84100-4	JB84100-5
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	12/12/2014	12/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																					
Aluminum	mg/kg	-	-	12800	10800	5480	17400	7820	11400	9990	7790	7650	12700	9510	4530	6610	4750	8100	11100	12100	17500
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	2.9	4.7	8.5	4.1	ND	5	ND	ND	ND	3.9	ND	ND	ND	ND	ND	ND	3.7	4.4
Barium	mg/kg	400	820	102	111	136	84.9	57	124	43.7	57.3	45.1	92.5	51.2	24.2	29.1	23.6	52.6	79	38.2	110
Beryllium	mg/kg	72	47	0.53	0.53	0.34	0.69	0.31	0.56	0.39	0.34	0.31	0.49	0.44	0.26	0.24	ND	0.23	0.37	0.47	0.76
Cadmium	mg/kg	4.3	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.79	0.81	ND	ND	0.65	ND
Calcium	mg/kg	-	-	11100	3610	6620	1440	2230	17500	2480	1780	1690	6430	1620	1140	699	835	7030	24800	ND	2980
Chromium	mg/kg	180	-	28.9	27.9	10.9	32	26.1	19.3	15.1	17.7	16.3	19.7	24.7	12	13.3	13.8	20.7	25.5	22.7	44.3
Cobalt	mg/kg	-	-	10.7	11	7.9	14.3	8	10.9	7.6	7	6.5	7.1	9.6	ND	ND	ND	8.6	9.5	9.1	12.3
Copper	mg/kg	270	1720	24.4	36.2	61.2	20.9	21.8	30.4	17.1	13.4	12.8	16.9	19	10.1	9.3	9.6	16.9	21.2	15.8	29.9
Iron	mg/kg	-	-	21900	26000	15500	25300	15600	25200	16900	15500	14700	18100	18300	8290	11600	9630	17600	21200	18300	27400
Lead	mg/kg	400	450	7.1	115	**509**	8.1	3.8	128	7.3	3.7	3.5	66.5	6.7	3.2	3.7	2.7	4.3	6.2	20.8	9.6
Magnesium	mg/kg	-	-	11400	3400	1800	5980	4070	4830	4660	4130	3530	3470	3940	2470	2440	1940	7970	18000	2710	6240
Manganese	mg/kg	2000	2000	711	471	166	585	476	334	824	224	307	259	519	84.1	309	163	568	467	470	432
Mercury	mg/kg	0.81	0.73	ND	0.44	**1.3**	ND	ND	0.52	ND	ND	ND	0.18	ND	ND	ND	ND	ND	ND	0.17	ND
Nickel	mg/kg	310	130	25.1	19.8	17.4	29.8	16.7	22	17.9	17.5	15.3	14.1	18	10.4	11.5	9.9	17.8	19.3	14.2	28.2
Potassium	mg/kg	-	-	3670	2230	ND	3530	1480	4160	1860	2200	1790	ND	2000	1180	ND	ND	2830	3100	ND	2780
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	1.1	1.3	0.81	0.71	0.65	0.94	ND	ND	0.56	ND	ND	ND	ND	ND	ND	ND	ND	0.84
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	35.3	36.5	14.1	37.5	28.9	22.4	20	23.5	23.9	27.4	27.4	15.7	18.7	16.6	28.2	36	28.7	45.6
Zinc	mg/kg	10000	2480	56.4	104	178	48	51.9	95	35.7	38	33.7	77.2	39.6	28.3	138	401	47.7	59.7	90.3	66.2

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-28 (0-.5)	SB-28 (5-6)	SB-28 (18-19)	SB-28 (21-22)	SB-29 (7-8)	SB-29 (9-10)	SB-29 (10-11)	SB-29 (12-13)	SB-29 (14-15)	SB-29 (25-26)	SB-30 (5-6)	SB-30 (7-8)	SB-30 (18.5-19.5)	SB-31 (12-13)	SB-31 (14-15)	SB-31 (19-20)	SB-31 (43-44)	SB-32 (5-6)
Lab Sample ID:				JB74932-19	JB84100-1	JB84100-2	JB84100-3	JB76612-10	JB76612-13	JB76612-14	JB76612-16	JB76612-17	JB76612-18	JB74932-29	JB74932-30	JB74932-31	JB77825-13	JB77825-14	JB77825-15	JB77873-10	JB77153-9
Date Sampled:				9/5/2014	12/12/2014	12/12/2014	12/12/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/8/2014	9/8/2014	9/8/2014	9/29/2014	9/29/2014	9/29/2014	10/1/2014	9/25/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																					
Aluminum	mg/kg	-	-	9940	5080	4160	10600	8300	6800	7490	9240	8420	4290	6570	6330	14300	10500	10500	11000	2760	6300
Antimony	mg/kg	-	-	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	**18.8**	ND	ND	6.5	2.5	4.2	ND	ND	ND	ND	6.3	3.2	ND	4.6	2.3	ND	ND	5.5
Barium	mg/kg	400	820	285	33.1	27.8	77.6	25.5	65	26.9	75.1	54.9	29.3	ND	ND	116	79.4	38	81.4	ND	71.5
Beryllium	mg/kg	72	47	ND	0.3	0.23	0.43	0.33	0.33	0.31	0.24	0.42	0.23	0.32	ND	0.73	0.4	0.48	0.52	0.26	0.39
Cadmium	mg/kg	4.3	7.5	5.1	ND	ND	0.83	ND	ND	ND	0.58	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND
Calcium	mg/kg	-	-	17000	1910	774	2400	731	11900	774	1360	1210	1860	921	814	22400	2380	1090	2720	13600	3980
Chromium	mg/kg	180	-	73.8	17.3	13.2	26.6	14.9	16.6	14.2	12.9	21.3	10.3	11.8	10.8	31.4	18	18.5	27.6	6.2	14.5
Cobalt	mg/kg	-	-	12.7	ND	ND	ND	ND	ND	ND	6.4	7.6	ND	ND	6.9	12	7.7	8.5	9.5	6.2	7.4
Copper	mg/kg	270	1720	**1780**	15.1	12.6	147	12.2	44.6	10.5	4.7	10.7	14.7	28.7	8.4	24.2	72	14.2	23.8	9.8	80.9
Iron	mg/kg	-	-	31600	15800	10200	16700	14100	13200	13000	18700	14100	9940	9800	7560	20300	17200	14900	20000	12200	16000
Lead	mg/kg	400	450	**586**	4.9	3.8	175	5.3	60.2	4.7	ND	4.2	3	6.9	4.4	7.9	127	5.2	5.8	2.3	359
Magnesium	mg/kg	-	-	8530	1930	1420	2100	2570	4680	2550	4130	3310	2020	1990	1750	14100	2770	2990	5290	4500	2200
Manganese	mg/kg	2000	2000	405	896	290	93.3	188	187	145	215	128	153	120	100	461	383	176	413	288	249
Mercury	mg/kg	0.81	0.73	**2.9**	ND	ND	ND	ND	0.12	ND	ND	ND	ND	0.061	ND	ND	0.17	ND	ND	ND	**0.78**
Nickel	mg/kg	310	130	59.3	12.1	11.9	12.8	11.4	16.6	11.2	8.5	19.7	9.5	18.6	10.2	27.5	13.5	16.2	21.2	9.9	18.7
Potassium	mg/kg	-	-	1410	ND	ND	ND	ND	ND	ND	5100	1590	ND	ND	ND	4350	ND	ND	2850	ND	ND
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	1.5	0.6	ND	0.78	ND	**90.8**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.53	ND
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	56.9	25.8	15.4	23.7	19.8	19.8	19.1	35.5	30.3	17.8	16.8	14.9	39.3	25.1	26.8	36.7	18.2	20.3
Zinc	mg/kg	10000	2480	1200	29.6	25.3	211	31.2	102	30	48.4	34.4	20.1	51.3	47.6	63	168	174	56.7	17.4	231

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

ND = Not detected (below detection limit)

- = No standard

J = Estimated value

Table 8
Metals in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-32 (7-8)	SB-32 (12-13)	SB-32 (18-19)	SB-32 (20-21)	SB-32 (29-30)	SB-32 (39-40)	SB-33 (5-6)	SB-33 (12-13)	SB-33 (15-16)	SB-33 (20-21)	SB-33 (36-37)	SB-34 (7-8)	SB-34 (9-10)	SB-34 (32-33)	SB-35 (13-14)	SB-35 (17-18)	SB-35 (22-23)	SB-35 (35-36)
Lab Sample ID:				JB77153-10	JB77825-1	JB77825-2	JB77825-3	JB77825-4	JB77825-5	JB77153-11	JB77825-6	JB77825-7	JB77825-8	JB77825-9	JB77153-12	JB77825-10	JB77825-16	JB77825-17	JB77825-18	JB77825-19	JB77825-20
Date Sampled:				9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/26/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis																					
Aluminum	mg/kg	-	-	4810	6680	7520	5920	14800	6280	6360	6120	6620	8590	8570	7160	9830	17400	6550	6060	9740	7080
Antimony	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	mg/kg	16	16	ND	ND	ND	ND	2.7	ND	12.1	ND	ND	ND	3.5	3.5	2.4	3.1	ND	ND	ND	ND
Barium	mg/kg	400	820	41.6	26.7	30.6	27.9	126	45.3	53.2	ND	33.3	78.3	74.2	35.3	42.1	187	ND	28.8	58.6	65.4
Beryllium	mg/kg	72	47	0.35	0.3	0.28	0.28	0.75	0.36	0.39	0.29	0.35	0.38	0.39	0.35	0.4	0.79	0.28	0.35	0.4	0.41
Cadmium	mg/kg	4.3	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	mg/kg	-	-	7720	821	1150	1510	29400	10700	4900	1120	865	29400	18400	923	889	26700	815	1160	2100	14600
Chromium	mg/kg	180	-	10.1	12.5	15.3	12.8	31.2	15	16.5	11.5	14.8	20.7	19.6	15.8	17.3	39.6	12.5	13.4	24.9	16.5
Cobalt	mg/kg	-	-	ND	ND	ND	ND	12.3	5.8	5.9	ND	5.3	7.5	15.7	ND	6.2	14.5	ND	ND	9.2	7.5
Copper	mg/kg	270	1720	27.7	12.8	33.4	34.6	29.3	13.1	123	12.1	10.4	20.8	21.1	46.9	26.7	32.8	10.2	219	69.2	15.7
Iron	mg/kg	-	-	7900	11400	11000	10400	24400	18500	13500	11300	11200	15500	17300	13800	13000	29000	11300	9640	18800	16900
Lead	mg/kg	400	450	125	5.1	3.6	8.1	8.6	4.1	293	5.4	4.1	4.8	6.3	189	71.7	8.8	4	3.3	4.2	5
Magnesium	mg/kg	-	-	1850	2220	2730	2160	18600	7090	2540	2790	2280	17200	9750	2440	2110	19500	2180	2050	5310	8580
Manganese	mg/kg	2000	2000	141	139	140	118	507	702	205	119	168	317	394	155	129	521	124	143	431	322
Mercury	mg/kg	0.81	0.73	ND	0.053	ND	0.052	ND	ND	**0.84**	ND	ND	ND	ND	0.22 f	0.16	ND	ND	0.61	0.043	ND
Nickel	mg/kg	310	130	8.8	10.3	12.5	10.5	27.8	13.7	14.9	10.3	11	16.7	18.9	12.7	11.9	32.7	13.7	15.3	21.3	15.9
Potassium	mg/kg	-	-	ND	ND	ND	ND	4680	1960	ND	ND	ND	2680	2530	ND	ND	6430	ND	1050	3520	2380
Selenium	mg/kg	180	4	ND	ND	ND	ND	ND	ND	**7.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	mg/kg	180	8.3	ND	ND	ND	ND	0.57	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND	0.51	ND
Sodium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	mg/kg	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/kg	-	-	14	16.7	18.8	15.4	39.3	24.6	20	16.5	19.6	26.3	26.7	19.7	18	50.2	15.5	17.3	34.4	23.6
Zinc	mg/kg	10000	2480	70.7	50.9	45.3	50.3	69.4	28.5	97.9	33.6	33.3	50.4	42.1	107	47.3	83.1	33.9	26.4	55.9	40.1

Legend:

Red text indicates compound above RRSCOs in the top 15 feet below ground surface

Bold text indicates compound above PGW SCOs (if found above TOGS GA AWQSGVs)

Bold and red text indicates compound above RRSCOs and PGW SCOs in the top 15 feet below ground surface (if found above TOGS GA AWQSGVs)

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- = No standard

J = Estimated value

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-1 (5-6)	SB-1 (5-6) A	SB-1 (5-6) B	SB-1 (8-9)	SB-2 (17-18)	SB-2 (17-18)A	SB-2 (17-18)B	SB-2 (5-6)	SB-2 (6-7)	SB-3 (0-.5)	SB-3 (11-12)	SB-3 (17-18)	SB-3 (19-20)	SB-3 (5-6)	SB-4 (11-12)	SB-4 (19-20)	SB-4 (19-20)	SB-4 (5-6)	SB-4 (5-6)	SB-5 (1-2)	SB-5 (1-2)	SB-5 (11-12)	SB-5 (15-16)
Lab Sample ID:				JB76612-1	JB76612-4	JB76612-5	JB76612-6	JB74932-6	JB74932-7	JB74932-8	JB74081-2	JB74932-5	JB74932-18	JB77153-5	JB77153-6	JB74932-14	JB74932-13	JB74081-6	JB74081-5	JB74081-5R	JB74081-3	JB74081-3R	JB73951-1	JB73951-1R	JB77153-7	JB77153-8
Date Sampled:				9/15/2014	9/15/2014	9/15/2014	9/15/2014	8/25/2014	8/25/2014	8/25/2014	8/14/2014	8/25/2014	9/5/2014	9/19/2014	9/19/2014	8/25/2014	8/25/2014	8/14/2014	8/14/2014	8/14/2014	8/14/2014	8/14/2014	8/13/2014	8/13/2014	9/25/2014	9/25/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	0.63	-	0.97	1.8	1.4
Solids, Percent	%	-	-	89.9	84.5	83.5	90.8	75.3	76	74.8	79	90.3	85.8	75.3	80.2	81.6	75.1	54.9	89.1	-	73.1	-	82.7	-	83.4	72

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-5 (17-18)	SB-5 (17-18)	SB-5 (4-5)	SB-5 (4-5)A	SB-5 (4-5)A	SB-5 (4-5)B	SB-6 (12-13)	SB-6 (5-6)	SB-6 (6-11)	SB-6 (6-7)	SB-7 (10-11)	SB-7 (10-11)A	SB-7 (10-11)B	SB-7 (14-15)	SB-7 (14-15)	SB-7 (43-44)	SB-7 (43-44)	SB-7 (5-6)	SB-8 (12-13)	SB-8 (22.5-23.5)	SB-8 (5-6)	SB-9 (15-16)	SB-9 (19-20)
Lab Sample ID:				JB73951-7	JB73951-7T	JB73951-2	JB73951-3	JB73951-3R	JB73951-4	JB76612-7	JB74932-59	JB74932-61	JB74932-60	JB74932-21	JB74932-22	JB74932-23	JB74932-24	JB74932-24R	JB74932-25	JB74932-25R	JB74932-20	JB74932-27	JB74932-28	JB74932-26	JB74932-42	JB74932-43
Date Sampled:				8/13/2014	8/13/2014	8/13/2014	8/13/2014	8/13/2014	8/13/2014	9/16/2014	9/9/2014	9/9/2014	9/9/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/8/2014	9/9/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	1.3	-	-	1.2	-	-	-	1.9	1.8	-	-	-	-	1.3	-	1.1	-	-	-	-	-	-
Solids, Percent	%	-	-	88.1	-	85.4	80.4	-	84.7	77.8	85	85.3	84.7	86	84.7	85.5	87.6	-	90.8	-	87.8	77.1	79.7	86.6	87.1	89.4

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-9 (5-6)	SB-10 (11-12)	SB-10 (17.5-18.5)	SB-10 (5-6)	SB-10 (5-6)	SB-10 (7-8)	SB-10 (7-8)	SB-11 (19-20)	SB-11 (5-6)	SB-11 (7-8)	SB-12 (10-11)	SB-12 (15-16)	SB-12 (15-16)	SB-12 (19-20)	SB-12 (19-20)	SB-12 (5-6)	SB-13 (10-11)	SB-13 (10-11)A	SB-13 (10-11)B	SB-13 (14-15)	SB-13 (15-16)	SB-13 (16-17)	SB-13 (19-20)
Lab Sample ID:				JB74932-39	JB74932-53	JB74932-54	JB74932-51	JB74932-51R	JB74932-52	JB74932-52R	JB74932-73	JB74932-71	JB74932-72	JB74932-97	JB74932-98	JB74932-98R	JB74932-99	JB74932-99R	JB74932-96	JB76479-10	JB76479-11	JB76479-12	JB76479-18	JB76479-15	JB76479-16	JB76479-17
Date Sampled:				9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	1.5	-	1.5	-	-	-	-	-	0.93	-	0.97	-	-	-	-	-	-	-	-
Solids, Percent	%	-	-	91.1	80.1	74.6	84.8	-	83.9	-	77.2	88.8	82	82.3	67.9	-	70.6	-	94	83.2	83.7	83.9	76.5	73.1	71.2	71.3

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-13 (5-6)	SB-13 (7-8)	SB-14 (14-15)	SB-14 (18-19)	SB-14 (19-20)	SB-14 (5-6)	SB-14 (7-8)A	SB-15 (10-11)	SB-15 (19-20)	SB-15 (20-21)	SB-15 (5-6)	SB-16 (10-11)	SB-16 (11-12)	SB-16 (19-20)	SB-16 (5-6)	SB-17 (11-12)	SB-17 (19-20)	SB-17 (20-21)	SB-17 (23-24)	SB-17 (23-24)	SB-17 (5-6)	SB-18 (11-12)	SB-18 (14-15)
Lab Sample ID:				JB76479-8	JB76479-9	JB76479-3	JB76479-4	JB76479-5	JB76479-1	JB77153-3	JB74932-88	JB74932-89	JB74932-90	JB74932-87	JB74932-101	JB74932-102	JB74932-103	JB74932-95	JB74932-91	JB74932-92	JB74932-93	JB74932-94	JB74932-94R	JB74932-84	JB74932-76	JB76479-13
Date Sampled:				9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/12/2014	9/19/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	9/10/2014	9/12/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-
Solids, Percent	%	-	-	89.1	93.2	82.1	73.1	70.6	90.3	93.8	88.9	78.6	71.9	93.4	88.3	79.2	80.7	85.9	87.3	80.6	74	75.4	-	87.1	80.4	75

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-18 (18.5-19.5)	SB-18 (5-6)	SB-18 (8-9)	SB-19 (19-20)	SB-19 (5-6)	SB-19 (8-9)	SB-20 (18-19)	SB-20 (5-6)	SB-20 (8-9)	SB-21 (0-.5)	SB-21 (11-12)	SB-21 (20-21)	SB-21 (5-6)	SB-22 (11-12)	SB-22 (19-20)	SB-22 (5-6)	SB-23 (14-15)	SB-23 (19-20)	SB-23 (5-6)	SB-23 (9-10)	SB-24 (10-11)	SB-24 (14-15)	SB-24 (19-20)
Lab Sample ID:				JB76479-14	JB74932-74	JB74932-75	JB74932-70	JB74932-68	JB74932-69	JB74081-9	JB74081-7	JB74081-8	JB74932-15	JB77153-4	JB74932-9	JB74932-1	JB74932-46	JB74932-47	JB74932-45	JB74932-55	JB74932-50	JB74932-48	JB74932-49	JB74932-57	JB74932-62	JB74932-58
Date Sampled:				9/12/2014	9/10/2014	9/10/2014	9/10/2014	9/10/2014	9/10/2014	8/15/2014	8/15/2014	8/15/2014	9/5/2014	9/19/2014	8/25/2014	8/25/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014	9/9/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solids, Percent	%	-	-	78.1	84.1	85.7	83.2	88	86.1	79.6	77.4	84.7	90.4	80.9	81.1	78.1	83.1	79.8	92.7	85.5	77.4	87.1	85.1	80.8	81.7	74.4

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-24 (5-6)	SB-25 (12-13)	SB-25 (19-20)	SB-25 (5-6)	SB-26 (11-12)	SB-26 (15-16)	SB-26 (19-20)	SB-26 (5-6)	SB-27 (4-5)	SB-27 (5-6)	SB-28 (0-.5)	SB-28 (5-6)	SB-28 (18-19)	SB-28 (21-22)	SB-29 (10-11)	SB-29 (12-13)	SB-29 (14-15)	SB-29 (25-26)	SB-29 (7-8)	SB-29 (9-10)	SB-30 (18.5-19.5)	SB-30 (5-6)	SB-30 (7-8)
Lab Sample ID:				JB74932-56	JB74932-66	JB74932-67	JB74932-63	JB74932-105	JB74932-106	JB74932-107	JB74932-104	JB84100-4	JB84100-5	JB74932-19	JB84100-1	JB84100-2	JB84100-3	JB76612-14	JB76612-16	JB76612-17	JB76612-18	JB76612-10	JB76612-13	JB74932-31	JB74932-29	JB74932-30
Date Sampled:				9/9/2014	9/10/2014	9/10/2014	9/10/2014	9/11/2014	9/11/2014	9/11/2014	9/11/2014	12/12/2014	12/12/2014	9/5/2014	12/12/2014	12/12/2014	12/12/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/18/2014	9/8/2014	9/8/2014	9/8/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-	1.6	-	-	-	-	-
Solids, Percent	%	-	-	85.5	79.2	78.8	83.1	93.6	78	81.3	92.9	88.3	87	76.2	81.3	89	89.6	84.3	92.8	86.6	88.8	80	86.5	75.4	83.9	81.1

Table 9
General Chemistry in Soil

Client Sample ID:		NY SCO -Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-612/06)	NY SCO -Protection of Groundwater w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	SB-31 (12-13)	SB-31 (14-15)	SB-31 (19-20)	SB-31 (43-44)	SB-32 (12-13)	SB-32 (18-19)	SB-32 (20-21)	SB-32 (29-30)	SB-32 (39-40)	SB-32 (5-6)	SB-32 (7-8)	SB-33 (12-13)	SB-33 (15-16)	SB-33 (20-21)	SB-33 (36-37)	SB-33 (5-6)	SB-34 (32-33)	SB-34 (7-8)	SB-34 (9-10)	SB-35 (13-14)	SB-35 (17-18)	SB-35 (22-23)	SB-35 (35-36)
Lab Sample ID:				JB77825-13	JB77825-14	JB77825-15	JB77873-10	JB77825-1	JB77825-2	JB77825-3	JB77825-4	JB77825-5	JB77153-9	JB77153-10	JB77825-6	JB77825-7	JB77825-8	JB77825-9	JB77153-11	JB77825-16	JB77153-12	JB77825-10	JB77825-17	JB77825-18	JB77825-19	JB77825-20
Date Sampled:				9/29/2014	9/29/2014	9/29/2014	10/1/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/25/2014	9/26/2014	9/26/2014	9/26/2014	9/26/2014	9/25/2014	9/29/2014	9/25/2014	9/26/2014	9/29/2014	9/29/2014	9/29/2014	9/29/2014
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
General Chemistry																										
Bulk Density (Dry Basis)	g/ml	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solids, Percent	%	-	-	80.7	86	80.6	78.5	85.3	84.5	82.4	78	90.5	89.9	92.5	83.8	78.3	81.5	85.9	89.7	81.2	89.3	78.5	82.9	79.9	73.5	86.5

Table 10
Volatile Organic Compounds in Groundwater

Client Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	RMW-1/SB-5	RMW-2/SB-4	RMW-3/ SB-21	RMW-4/SB-2	RMW-5/SB-29	RMW-6/SB-1	RMW-7/SB-6	RMW-8/ SB-30	RMW-9/SB-8	RMW-10/ SB-23	RMW-11/ SB-15	RMW-12/ SB-12	RMW-13/ SB-13	RMW-14/SB-17	RMW-15/SB-18	RMW-16/SB-19
Lab Sample ID:			JB74932-81	JB74932-79	JB76715-5	JB74932-80	JB77661-14	JB77661-16	JB77661-7	JB76715-14	JB76715-16	JB76715-8	JB76715-9	JB76715-12	JB76715-13	JB77661-2	JB77661-13	JB77661-5
Date Sampled:			9/10/2014	9/11/2014	9/22/2014	9/11/2014	9/29/2014	9/30/2014	9/26/2014	9/23/2014	9/24/2014	9/22/2014	9/23/2014	9/23/2014	9/23/2014	9/25/2014	9/29/2014	9/25/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
GC/MS Volatiles (SW846 8260C)																		
Acetone	ug/l	50 GV	116	105	ND	179 J	48.9	758	ND	ND	ND	ND	ND	ND	ND	ND	12.7	ND
Benzene	ug/l	1	400	173	698	288	9.5	74.1	254	ND	ND	ND	ND	ND	0.22 J	ND	ND	ND
Bromochloromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/l	50 GV	ND	ND	ND	ND	6.6 J	ND	196 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/l	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND
Carbon tetrachloride	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/l	5	ND	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/l	7	ND	1.7 J	ND	ND	ND	ND	ND	ND	0.96 J	ND	ND	ND	ND	ND	0.26 J	ND
Chloromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/l	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	3	26.6	84.1	ND	ND	ND	ND	ND	ND	ND	ND	0.40 J	1.4	0.59 J	ND	ND	ND
1,3-Dichlorobenzene	ug/l	3	ND	2.9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	3	42.7	79	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34 J	ND	ND	ND
Dichlorodifluoromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/l	5	16.2	34.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/l	0.6	66.4	26.2	ND	ND	ND	360	361	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/l	5	6.1 J	10.5	ND	ND	ND	90.8	1050	ND	ND	ND	ND	ND	1.1	ND	ND	ND
trans-1,2-Dichloroethene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/l	5	135	101	333	248	159	67.2	326	6.8	ND	ND	ND	3.7	0.50 J	ND	0.72 J	ND
Freon 113	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ug/l	5	12.7 J	9.3 J	35.9 J	20.8 J	18.1	ND	22.2 J	1.3 J	ND	ND	ND	0.48 J	ND	ND	0.32 J	ND
Methyl Acetate	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/l	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	ug/l	-	14.5 J	ND	ND	ND	1.4 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/l	5	ND	ND	ND	ND	ND	522	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/l	5	36.5 J	ND	43.3 J	55.2 J	ND	ND	226 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/l	5	ND	7.5	ND	ND	ND	ND	ND	ND	2.2	ND	0.46 J	1.6	1.1	ND	ND	ND
Toluene	ug/l	5	654	432	660	887	142	209	1030	ND	ND	ND	ND	ND	ND	ND	1.5	ND
1,2,3-Trichlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/l	5	ND	22.9	ND	ND	ND	102	89.8	ND	ND	ND	ND	ND	1	ND	ND	ND
Trichlorofluoromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	2	ND	3.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/l	5	368	290	602	631	246	211	956	3	ND	ND	ND	8.2	1.2	8.2 J	1.7	ND
o-Xylene	ug/l	5	180	158	336	313	146	118	508	2.7	ND	ND	ND	3	0.47 J	ND	0.98 J	ND
Xylenes (total)	ug/l	5	548	448	937	944	392	329	1460	5.7	ND	ND	ND	11.2	1.7	8.2 J	2.7	ND

Legend:
Red text compound above TOGS GA AWQSGVs
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value

Table 10
Volatile Organic Compounds in Groundwater

Client Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	RMW-17/SB-16	RMW-19/SB-28	RMW-31/SB-31	10-4	6A-2	9-1	A-4	F-1	F-3	MW-4	SCS-MW-10-1	SCS-MW-10-2	SCS-MW-2C	WS-4	WS-5D
Lab Sample ID:			JB77661-3	JB84863-1	JB78820-1	JB74932-36	JB76715-19	JB77661-4	JB77661-10	JB74932-34	JB74932-35	JB77661-11	JB76715-1	JB74932-77	JB76715-20	JB76715-17	JB76715-21
Date Sampled:			9/25/2014	12/22/2014	10/9/2014	9/9/2014	9/24/2014	9/25/2014	9/26/2014	9/9/2014	9/9/2014	9/26/2014	9/16/2014	9/10/2014	9/24/2014	9/24/2014	9/24/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
GC/MS Volatiles (SW846 8260C)																	
Acetone	ug/l	50 GV	ND	199	ND	ND	95.7	ND	ND	196	ND	ND	550	60.1	191	ND	500
Benzene	ug/l	1	ND	335	ND	ND	503	0.95 J	ND	179	5.8	ND	285	2.3 J	220	ND	367
Bromochloromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	45.0 J	ND	44.9
Carbon disulfide	ug/l	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/l	5	ND	ND	0.71 J	ND	ND	ND	ND	ND	ND	0.58 J	ND	ND	ND	ND	ND
Chloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14.2	ND	ND
Chloroform	ug/l	7	ND	3.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.8 J	ND	ND
Chloromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ug/l	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	3	31.9 J	ND	ND	ND	ND	ND	0.78 J	ND	0.22 J	0.23 J	ND	ND	ND	1	5.1
1,3-Dichlorobenzene	ug/l	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	3	ND	ND	ND	ND	3.6 J	ND	0.26 J	ND	0.32 J	0.31 J	14.6 J	ND	5.8 J	ND	4.2
Dichlorodifluoromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/l	5	ND	4.6 J	ND	ND	2.0 J	ND	ND	ND	ND	ND	ND	2.4 J	5220	ND	4.1
1,2-Dichloroethane	ug/l	0.6	ND	64	ND	ND	24.1	7	ND	17.8	ND	ND	92.2	ND	4280	ND	40.3
1,1-Dichloroethene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	52.3	ND	ND
cis-1,2-Dichloroethene	ug/l	5	281	ND	ND	ND	2.4 J	6.8	2.5	ND	ND	ND	ND	ND	161	ND	4.5
trans-1,2-Dichloroethene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/l	5	58.7	177	ND	ND	259	1.1	ND	157	3.8	ND	240	60.2	114	ND	185
Freon 113	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1 J
Isopropylbenzene	ug/l	5	ND	19.4	6.7	ND	16.6	ND	ND	13.8	5.4	ND	19.3 J	23.1	9.6 J	ND	22.3
Methyl Acetate	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/l	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.73 J
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	51.5 J	ND	14.1 J	ND	20.5
Methylene chloride	ug/l	5	ND	55.9	ND	ND	9.4 J	ND	ND	ND	ND	ND	48.2 J	ND	2600	ND	3.1
Styrene	ug/l	5	ND	51.2	ND	ND	268	ND	ND	ND	ND	ND	99.6 J	ND	85.8	ND	ND
1,1,2,2-Tetrachloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ug/l	5	ND	ND	ND	ND	ND	0.61 J	ND	ND	ND	ND	ND	ND	3.8 J	ND	ND
Toluene	ug/l	5	11.6 J	450	ND	ND	1200	ND	ND	468	ND	ND	1150	54.7	684	ND	328
1,2,3-Trichlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	483	ND	ND
1,1,2-Trichloroethane	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ug/l	5	ND	ND	ND	ND	ND	0.26 J	0.37 J	ND	ND	ND	ND	1.6 J	128	ND	ND
Trichlorofluoromethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	2	ND	3.8 J	ND	ND	2.4 J	ND	ND	ND	ND	ND	ND	ND	25.6	ND	1.5
m,p-Xylene	ug/l	5	162	378	ND	ND	900	2.1	ND	325	1	ND	638	145	365	ND	318
o-Xylene	ug/l	5	51.5	195	ND	ND	417	1.8	ND	186	1.2	ND	340	101	201	ND	175
Xylenes (total)	ug/l	5	214	573	ND	ND	1320	3.9	ND	511	2.3	ND	978	246	566	ND	493

Legend:
Red text compound above TOGS GA AWQSGVs
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value

Table 11
Semi-Volatile Organic Compounds in Groundwater

Client Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	RMW-1/SB-5	RMW-2/SB-4	RMW-3/ SB-21	RMW-4/SB-2	RMW-5/SB-29	RMW-6/SB-1	RMW-7/SB-6	RMW-8/ SB-30	RMW-9/SB-8	RMW-10/ SB-23	RMW-11/ SB-15	RMW-12/ SB-12	RMW-13/ SB-13	RMW-14/SB-17	RMW-15/SB-18	RMW-16/SB-19	RMW-17/SB-16	RMW-19/SB-28	RMW-31/SB-31	SCS-MW-10-1
Lab Sample ID:			JB74932-81	JB74932-79	JB76715-5	JB74932-80	JB77661-14	JB77661-16	JB77661-7	JB76715-14	JB76715-16	JB76715-8	JB76715-9	JB76715-12	JB76715-13	JB77661-2	JB77661-13	JB77661-5	JB77661-3	JB84863-1	JB78820-1	JB76715-1
Date Sampled:			9/10/2014	9/11/2014	9/22/2014	9/11/2014	9/29/2014	9/30/2014	9/26/2014	9/23/2014	9/24/2014	9/22/2014	9/23/2014	9/23/2014	9/23/2014	9/25/2014	9/29/2014	9/25/2014	9/25/2014	12/22/2014	10/9/2014	9/16/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
GC/MS Semi-volatiles (SW846 8270D)																						
2-Chlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	1	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	1	10900	1440	5540	1270	169	14600	3160	ND	ND	ND	ND	ND	4.3 J	ND	4.7 J	ND	22.3	2830	ND	11700
2,4-Dinitrophenol	ug/l	1	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	1	2340	248	635	272	56.1	3000	573	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.1	247	ND	2760
3&4-Methylphenol	ug/l	1	3510	307	858	428	90.4	4860	1000	ND	ND	ND	ND	ND	ND	ND	2.0 J	ND	93	488	ND	7570
2-Nitrophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/l	1	162	ND	ND	49.4	ND	3630	125	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.4	61	ND	517
2,3,4,6-Tetrachlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/l	20 GV	64.9	446	141	146	136	108	343	0.44 J	ND	ND	ND	0.52 J	0.84 J	1.2	1.5	0.79 J	1.6	103	ND	661
Acenaphthylene	ug/l	-	ND	ND	ND	6.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8	ND	ND
Acetophenone	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	50 GV	ND	65.3	9.4	26.4	8.2	ND	37.7	ND	ND	ND	ND	ND	ND	ND	0.47 J	ND	0.67 J	2.8	ND	61.1
Atrazine	ug/l	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	0.002 GV	ND	7.1	ND	3.6	ND	ND	3.2 J	ND	ND	ND	ND	0.89 J	ND	ND	ND	ND	0.51 J	ND	ND	10.2 J
Benzo(a)pyrene	ug/l	ND	ND	1.9	ND	1.5	ND	ND	ND	ND	ND	ND	ND	0.85 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	0.002 GV	ND	2.8	ND	1.8	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ug/l	-	ND	0.77 J	ND	0.56 J	ND	ND	ND	ND	ND	ND	ND	0.53 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	0.002 GV	ND	0.87 J	ND	0.72 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND
1,1'-Biphenyl	ug/l	5	65.1	327	112	140	109	99.6	333	ND	ND	ND	ND	ND	1.3	0.71 J	0.61 J	ND	2.5	99.8	ND	567
2-Chloronaphthalene	ug/l	10 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/l	-	8.2	31.7	21.5	12.6	28.7	13.1 J	36.5	0.71 J	ND	ND	ND	ND	ND	ND	ND	ND	1.0 J	9.4	ND	74.8
Caprolactam	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	0.002 GV	ND	6.4	ND	3.4	ND	ND	3.4 J	ND	ND	ND	ND	0.94 J	ND	ND	ND	ND	0.45 J	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	5	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.5	ND	ND
Dibenzo(a,h)anthracene	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	-	50	339	84.2	129	100	85.4 J	274	0.61 J	ND	ND	ND	ND	0.62 J	ND	ND	ND	ND	76.9	ND	545
Di-n-butyl phthalate	ug/l	50	4.1	33.9 B	ND	26.2 B	5.6 JB	ND	15.6	3.2 B	7.6 B	9.0 B	3.3 B	7.6 B	7.3 B	13.7	8.8 B	5.5	21.4	ND	1.8 BJ	ND
Di-n-octyl phthalate	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	50 GV	4.6	ND	ND	14.4	ND	ND	70.1	ND	ND	ND	ND	ND	ND	1.2 J	4	ND	338	ND	ND	31.7 J
Dimethyl phthalate	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	5	ND	5.5 B	ND	3.9	ND	ND	7.0 J	ND	45.4	1.1 J	1.2 JB	3.3 B	1.2 JB	ND	3.5 B	ND	ND	ND	ND	ND
Fluoranthene	ug/l	0.002 GV	ND	74.8	2.3	23.4	3.1 J	ND	20.3	ND	ND	ND	ND	1.5	ND	1.4	0.68 J	ND	1.7	0.64 J	ND	50.7
Fluorene	ug/l	50 GV	32.1	236	56.2	90.1	60.4	41.1	149	1.0 J	ND	ND	ND	0.34 J	0.61 J	ND	ND	ND	2.3	33.2	ND	316
Hexachlorobenzene	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	5	ND	ND	ND	ND	ND	ND R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.002 GV	ND	0.69 J	ND	0.57 J	ND	ND	ND	ND	ND	ND	ND	0.56 J	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	-	934	2200	1080	1070	1120	1060	2520	3	ND	ND	ND	ND	0.64 J	ND	2.2	0.90 J	17.5	961	ND	3850
2-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/l	10 GV	2590	3820	7150	3020	6210	2820	8620	11	ND	ND	0.42 J	2.9	1.5	ND	14.2 B	ND	99.9	2650	ND	11400
Nitrobenzene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	50 GV	5.1	282	29.3	84.7	30	15.9 J	127	2.6	ND	ND	ND	0.66 J	ND	0.56 J	1.1	ND	3.6	10.4	ND	221
Pyrene	ug/l	50 GV	ND	40.5	2.2	17.2	ND	ND	15.5	ND	ND	ND	ND	1.6	ND	0.94 J	0.56 J	ND	1.6	0.55 J	ND	34.9
1,2,4,5-Tetrachlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text compound above TOGS GA AWQSGVs
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value
B = Detected in blank
R = Rejected value

Table 11
Semi-Volatile Organic Compounds in Groundwater

Client Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	SCS-MW-10-2	SCS-MW-2C	10-4	9-1	A-4	F-1	F-3	MW-4	WS-4	WS-5D
Lab Sample ID:			JB74932-77	JB76715-20	JB74932-36	JB77661-4	JB77661-10	JB74932-34	JB74932-35	JB77661-11	JB76715-17	JB76715-21
Date Sampled:			9/10/2014	9/24/2014	9/9/2014	9/25/2014	9/26/2014	9/9/2014	9/9/2014	9/26/2014	9/24/2014	9/24/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
GC/MS Semi-volatiles (SW846 8270D)												
2-Chlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	1	ND	ND	ND	ND	ND	1640	ND	ND	ND	9070
2,4-Dinitrophenol	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	1	ND	ND	ND	ND	ND	325	ND	ND	ND	398
3&4-Methylphenol	ug/l	1	ND	ND	ND	ND	ND	450	ND	ND	ND	ND
2-Nitrophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	1	2.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/l	1	ND	357	ND	ND	ND	49.3	ND	ND	ND	331
2,3,4,6-Tetrachlorophenol	ug/l	-	5.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/l	-	22.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ug/l	20 GV	20.7	253	ND	0.69 J	ND	301	21.3	ND	ND	88.9
Acenaphthylene	ug/l	-	ND	ND	ND	ND	ND	8	ND	ND	ND	ND
Acetophenone	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	50 GV	ND	10.9	ND	ND	ND	1.8	ND	ND	ND	0.77 J
Atrazine	ug/l	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	0.002 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	0.002 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	0.002 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	50 GV	ND	ND	ND	1.5 J	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ug/l	5	22.3	237	ND	ND	ND	94.4	ND	ND	ND	43.9
2-Chloronaphthalene	ug/l	10 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ug/l	-	ND	9.3	ND	ND	ND	7.8	ND	ND	ND	2.7
Caprolactam	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	0.002 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	ug/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/l	-	ND	ND	ND	ND	ND	2.3	ND	ND	ND	4.4
Dibenzo(a,h)anthracene	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	-	13.4	232	ND	ND	ND	153	4.1 J	ND	ND	34.2
Di-n-butyl phthalate	ug/l	50	16.4	9.7 JB	ND	5.1	5.4	5.1 B	3.2	7.5	2.7 B	9.1 B
Di-n-octyl phthalate	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	50 GV	49.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	5	2.3	ND	1.2 BJ	4.2	1.5 J	5.3	1.5 J	1.3 J	ND	3.8
Fluoranthene	ug/l	0.002 GV	ND	5.3	ND	ND	ND	0.49 J	ND	ND	ND	ND
Fluorene	ug/l	50 GV	6.5	107	ND	ND	ND	27.1	1.9	ND	ND	11.5
Hexachlorobenzene	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/l	0.002 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	-	148	1720	ND	1.8	0.78 J	187	1.8	ND	ND	452
2-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/l	10 GV	390	5200	ND	ND	1.4	3280	8.5	ND	ND	3310
Nitrobenzene	ug/l	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	50 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	50 GV	1.2	37.2	ND	0.55 J	ND	16.6	ND	ND	ND	1.3
Pyrene	ug/l	50 GV	ND	4.4 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text compound above TOGS GA AWQSGVs
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value
B = Detected in blank
R = Rejected value

Table 12

Pesticides and Polychlorinated Biphenyls in Groundwater

Client Sample ID:			RMW-1/SB-5	RMW-2/SB-4	RMW-3/ SB-21	RMW-4/SB-2	RMW-5/SB-29	RMW-6/SB-1	RMW-7/SB-6	RMW-8/ SB-30	RMW-9/SB-8	RMW-10/ SB-23	RMW-11/ SB-15	RMW-12/ SB-12	RMW-13/ SB-13	RMW-14/SB-17	RMW-15/SB-18	RMW-16/SB-19
Lab Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	JB74932-81	JB74932-79	JB76715-5	JB74932-80	JB77661-14	JB77661-16	JB77661-7	JB76715-14	JB76715-16	JB76715-8	JB76715-9	JB76715-12	JB76715-13	JB77661-2	JB77661-13	JB77661-5
Date Sampled:			9/10/2014	9/11/2014	9/22/2014	9/11/2014	9/29/2014	9/30/2014	9/26/2014	9/23/2014	9/24/2014	9/22/2014	9/23/2014	9/23/2014	9/23/2014	9/25/2014	9/29/2014	9/25/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
GC Semi-volatiles (SW846 8081B)																		
Aldrin	ug/l	ND	0.07	ND	ND	ND	ND	0.34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/l	0.01	ND	ND	0.084	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/l	0.05	0.093	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/l	-	ND	0.33	ND	0.26	ND	ND	ND	ND	0.082	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/l	-	ND	0.56	ND	0.32	ND	ND	ND	ND	0.05	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/l	0.004	ND	2	ND	0.11	ND	ND	ND	ND	0.11	ND	ND	0.014	ND	ND	ND	ND
4,4'-DDD	ug/l	0.3	0.037	4.5	ND	0.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/l	0.2	0.038	0.53	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/l	0.2	0.025	ND	ND	0.069	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/l	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/l	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/l	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																		
Aroclor 1016	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text compound above TOGS GA AWQSGVs

ND = Not detected (below detection limit)

- = No standard or guidance value

J = Estimated value

Table 12

Pesticides and Polychlorinated Biphenyls in Groundwater

Client Sample ID:			RMW-17/SB-16	RMW-19/SB-28	RMW-31/SB-31	10-4	9-1	A-4	F-1	F-3	MW-4	SCS-MW-10-1	SCS-MW-10-2	SCS-MW-2C	WS-4	WS-5D
Lab Sample ID:		**NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1**	**JB77661-3**	**JB84863-1**	**JB78820-1**	**JB74932-36**	**JB77661-4**	**JB77661-10**	**JB74932-34**	**JB74932-35**	**JB77661-11**	**JB76715-1**	**JB74932-77**	**JB76715-20**	**JB76715-17**	**JB76715-21**
Date Sampled:			**9/25/2014**	**12/22/2014**	**10/9/2014**	**9/9/2014**	**9/25/2014**	**9/26/2014**	**9/9/2014**	**9/9/2014**	**9/26/2014**	**9/16/2014**	**9/10/2014**	**9/24/2014**	**9/24/2014**	**9/24/2014**
Matrix:			**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**	**Ground Water**
GC Semi-volatiles (SW846 8081B)																
Aldrin	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ug/l	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ug/l	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/l	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/l	0.3	ND	ND	ND	ND	0.043	ND	ND	ND	ND	ND	ND	ND	ND	0.04
4,4'-DDE	ug/l	0.2	ND	ND	ND	ND	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/l	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/l	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/l	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/l	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/l	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC Semi-volatiles (SW846 8082A)																
Aroclor 1016	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1268	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1262	ug/l	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:

Red text compound above TOGS GA AWQSGVs

ND = Not detected (below detection limit)

- = No standard or guidance value

J = Estimated value

Table 13
Metals in Groundwater

Client Sample ID:			RMW-1/SB-5	RMW-2/SB-4	RMW-3/ SB-21	RMW-4/SB-2	RMW-5/SB-29	RMW-6/SB-1	RMW-7/SB-6	RMW-8/ SB-30	RMW-9/SB-8	RMW-10/ SB-23	RMW-11/ SB-15	RMW-12/ SB-12	RMW-13/ SB-13	RMW-14/SB-17	RMW-15/SB-18
Lab Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	JB74932-81	JB74932-79	JB76715-5	JB74932-80	JB77661-14	JB77661-16	JB77661-7	JB76715-14	JB76715-16	JB76715-8	JB76715-9	JB76715-12	JB76715-13	JB77661-2	JB77661-13
Date Sampled:			9/10/2014	9/11/2014	9/22/2014	9/11/2014	9/29/2014	9/30/2014	9/26/2014	9/23/2014	9/24/2014	9/22/2014	9/23/2014	9/23/2014	9/23/2014	9/25/2014	9/29/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Metals Analysis																	
Aluminum	ug/l	-	540	783	557	422000	538	1880	6180	429	ND	ND	ND	961	211	481	404
Antimony	ug/l	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30.9	ND
Arsenic	ug/l	25	164	51.9	22.1	290	16.4	67.4	30.7	155	3.7	8.8	3.7	9	12.4	7.8	7.8
Barium	ug/l	1000	ND	ND	ND	4640	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/l	3 GV	ND	ND	ND	27.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/l	5	ND	ND	ND	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	ug/l	-	94300	77500	83600	261000	60700	64100	21000	62500	87900	190000	51200	40500	28700	40900	89600
Chromium	ug/l	50	ND	ND	ND	1150	ND	ND	14.2	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	ug/l	-	ND	ND	ND	320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ug/l	200	ND	ND	ND	2840	ND	ND	11.1	ND	ND	ND	ND	ND	ND	ND	ND
Iron	ug/l	300	9930	23600	22300	753000	18600	3900	12100	5660	566	304	3370	7030	16100	5360	18600
Lead	ug/l	25	ND	13.1	14.4	5140	8.1	6.5	26.6	ND	4.3	ND	ND	3.2	ND	9.9	20.7
Magnesium	ug/l	35000 GV	8090	7750	12400	100000	10200	11500	10300	7230	8260	31900	12800	5870	6830	ND	13500
Manganese	ug/l	300	301	557	1380	11800	940	157	373	1040	1420	3210	4460	3750	3300	174	615
Mercury	ug/l	0.7	ND	ND	ND	56.5	0.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ug/l	100	ND	11.9	18.8	784	21.9	23.2	33.3	10.9	ND	ND	ND	ND	ND	11.2	ND
Potassium	ug/l	-	54600	31600	41500	126000	53100	126000	207000	45100	ND	13400	ND	ND	ND	ND	23400
Selenium	ug/l	10	ND	ND	ND	70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ug/l	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	ug/l	20000	41400	36900	59700	ND	34600	202000	36000	25900	15200	41600	36900	42100	17800	11600	20500
Thallium	ug/l	0.5 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/l	-	ND	ND	ND	1170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	ug/l	2000 GV	ND	25.6	40.9	11900	ND	28.2	39.7	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text compound above TOGS GA AWQSGVs
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value

Table 13
Metals in Groundwater

Client Sample ID:			RMW-16/SB-19	RMW-17/SB-16	RMW-19/SB-28	RMW-31/SB-31	10-4	9-1	A-4	F-1	F-3	MW-4	SCS-MW-10-1	SCS-MW-10-2	SCS-MW-2C	WS-4	WS-5D
Lab Sample ID:		NY TOGS Class GA GW AWQSGVs (NYSDEC 6/2004)1	JB77661-5	JB77661-3	JB84863-1	JB78820-1	JB74932-36	JB77661-4	JB77661-10	JB74932-34	JB74932-35	JB77661-11	JB76715-1	JB74932-77	JB76715-20	JB76715-17	JB76715-21
Date Sampled:			9/25/2014	9/25/2014	12/22/2014	10/9/2014	9/9/2014	9/25/2014	9/26/2014	9/9/2014	9/9/2014	9/26/2014	9/16/2014	9/10/2014	9/24/2014	9/24/2014	9/24/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Metals Analysis																	
Aluminum	ug/l	-	837	287	ND	ND	1160	807	ND	ND	ND	386	ND	ND	480	ND	2060
Antimony	ug/l	3	ND	ND	ND	ND	ND	7.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	ug/l	25	8.5	13.4	4.4	ND	ND	9.1	11.3	26.4	8.3	3.2	36.1	28.9	102	ND	10.9
Barium	ug/l	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	483
Beryllium	ug/l	3 GV	ND	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ug/l	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	ug/l	-	99700	35600	102000	91700	67000	74500	26100	86600	30900	47000	63700	77400	42200	106000	95300
Chromium	ug/l	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.3	ND	ND
Cobalt	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ug/l	200	ND	ND	ND	ND	ND	23	ND	ND	ND	ND	ND	ND	26	ND	ND
Iron	ug/l	300	4780	68600	524	1470	1620	8000	12800	44500	2520	846	27100	11600	3400	4970	14100
Lead	ug/l	25	20.5	15.4	8.5	ND	ND	23.9	ND	ND	ND	3.4	ND	ND	152	15.3	5.6
Magnesium	ug/l	35000 GV	9380	13900	19200	13700	ND	5010	6680	13300	7040	9300	8460	8540	ND	8790	42900
Manganese	ug/l	300	663	468	1750	2510	88	1440	594	2670	204	5190	886	293	132	2720	672
Mercury	ug/l	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ug/l	100	ND	ND	61	ND	ND	11.6	30.4	56.1	ND	ND	17.6	15.7	26.3	28.7	170
Potassium	ug/l	-	10200	12200	ND	ND	ND	ND	ND	15600	ND	ND	76300	29100	143000	11600	ND
Selenium	ug/l	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ug/l	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	ug/l	20000	35300	10600	54100	11400	14000	10800	35300	51500	19200	36800	45900	31000	113000	61700	114000
Thallium	ug/l	0.5 GV	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/l	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	56.8	ND	ND
Zinc	ug/l	2000 GV	ND	ND	40.6	ND	ND	183	ND	21.2	50.3	ND	ND	ND	131	35.5	ND

Legend:
Red text compound above TOGS GA AWQSGV
GV = Guidance Value
ND = Not detected (below detection limit)
- = No standard or guidance value
J = Estimated value

Table 14
General Chemistry in Groundwater

Client Sample ID:		NY TOGS Class GA GW Standards (NYSDEC 6/2004)1	RMW-1/SB-5	RMW-2/SB-4	RMW-3/ SB-21	RMW-4/SB-2	RMW-5/SB-29	RMW-6/SB-1	RMW-7/SB-6	RMW-8/ SB-30	RMW-9/SB-8	RMW-10/ SB-23	RMW-11/ SB-15	RMW-12/ SB-12	RMW-13/ SB-13	RMW-14/SB-17	RMW-15/SB-18
Lab Sample ID:			JB74932-81	JB74932-79	JB76715-5	JB74932-80	JB77661-14	JB77661-16	JB77661-7	JB76715-14	JB76715-16	JB76715-8	JB76715-9	JB76715-12	JB76715-13	JB77661-2	JB77661-13
Date Sampled:			9/10/2014	9/11/2014	9/22/2014	9/11/2014	9/29/2014	9/30/2014	9/26/2014	9/23/2014	9/24/2014	9/22/2014	9/23/2014	9/23/2014	9/23/2014	9/25/2014	9/29/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
General Chemistry																	
Alkalinity, Bicarbonate	ug/l	-	362000	617000	392000	374000	225000	613000	550000	226000	102000	246000	224000	174000	108000	119000	203000
Alkalinity, Total as CaCO3	ug/l	-	363000	618000	392000	374000	225000	615000	551000	227000	103000	246000	224000	174000	108000	119000	203000
Chloride	ug/l	250000	21200	25600	21100	19600	30000	105000	20600	24200	15900	8000	7800	4700	ND	10700	9100
Nitrogen, Nitrate	ug/l	10000	ND	ND	ND	ND	140 [e]	ND	ND	ND	1300 [e]	990 [e]	700 [e]	ND	ND	ND	ND
Nitrogen, Nitrate + Nitrite	ug/l	10000	ND	ND	ND	ND	140	ND	ND	ND	1300	1000	700	ND	ND	ND	ND
Nitrogen, Nitrite	ug/l	1000	ND	ND	ND	ND	ND	37	11	ND	ND	ND	ND	ND	ND	34	ND
Sulfate	ug/l	250000	18400	ND	74000	24800	68400	187000	11500	ND	163000	501000	35600	38600	14400	22900	19300
Sulfide	ug/l	-	2100	ND	ND	ND	ND	2400	ND	ND	ND	ND	ND	ND	ND	ND	ND

Legend:
Red text compound above TOGS GA Standard
ND = Not detected (below detection limit)
- = No standard
J = Estimated value

Table 14
General Chemistry in Groundwater

Client Sample ID:		NY TOGS Class GA GW Standards (NYSDEC 6/2004)1	RMW-16/SB-19	RMW-17/SB-16	RMW-19/SB-28	RMW-31/SB-31	10-4	9-1	A-4	F-1	F-3	MW-4	SCS-MW-10-1	SCS-MW-10-2	SCS-MW-2C	WS-4	WS-5D
Lab Sample ID:			JB77661-5	JB77661-3	JB84863-1	JB78820-1	JB74932-36	JB77661-4	JB77661-10	JB74932-34	JB74932-35	JB77661-11	JB76715-1	JB74932-77	JB76715-20	JB76715-17	JB76715-21
Date Sampled:			9/25/2014	9/25/2014	12/22/2014	10/9/2014	9/9/2014	9/25/2014	9/26/2014	9/9/2014	9/9/2014	9/26/2014	9/16/2014	9/10/2014	9/24/2014	9/24/2014	9/24/2014
Matrix:			Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
General Chemistry																	
Alkalinity, Bicarbonate	ug/l	-	192000	73000	268000	291000	106000	150000	149000	314000	96300	147000	406000	235000	461000	192000	537000
Alkalinity, Total as CaCO3	ug/l	-	192000	73000	268000	291000	107000	150000	149000	314000	96400	147000	406000	236000	461000	192000	538000
Chloride	ug/l	250000	22700	8200	97300	15100	4800	9300	17500	39200	19400	81100	19100	29000	18900	31300	87200
Nitrogen, Nitrate	ug/l	10000	ND	ND	ND [a]	ND [a]	1000 [e]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrogen, Nitrate + Nitrite	ug/l	10000	ND	ND	ND	ND	1000	130	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrogen, Nitrite	ug/l	1000	ND	ND	ND	14	ND	69	ND	ND	ND	ND	ND	ND	22	ND	ND
Sulfate	ug/l	250000	185000	ND	52000	14100	111000	132000	33400	17400	12300	70300	ND	ND	ND	169000	ND
Sulfide	ug/l	-	ND	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	3600	ND	ND

Legend:
Red text compound above TOGS GA Standard
ND = Not detected (below detection limit)
- = No standard
J = Estimated value

Table 15
Volatile Organic Compounds in Soil Vapor

Client Sample ID:		NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	SV-7	SV-8	SV-9	SV-10	SV-11	SV-13	SV-14	SV-15	SV-16
Lab Sample ID:			JB74685-1	JB74685-2	JB74685-3	JB74685-4	JB74685-11	JB74685-5	JB74685-6	JB74685-7	JB84341-3	JB74685-8	JB74217-1	JB84341-2	JB84341-1	JB74685-9	JB77274-1
Date Sampled:			8/19/2014	8/19/2014	8/21/2014	8/21/2014	8/22/2014	8/19/2014	8/19/2014	8/21/2014	12/16/2014	8/19/2014	8/15/2014	12/16/2014	12/16/2014	8/21/2014	9/22/2014
Matrix:			Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor	Soil Vapor
GC/MS Volatiles (TO-15)																	
Acetone	ug/m3	-	252	345	274	12.8	11.1	87.8	83.7	129	177	26.1	49	126	ND	250	20.5
1,3-Butadiene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15 J	ND	ND
Benzene	ug/m3	-	2.2	0.99	41.2	0.91	0.66 J	0.42	0.64	1.7	2.5	1.3	1090	30	ND	111	12.3
Bromodichloromethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoethene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Chloride	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ug/m3	-	3.4	1.6	768	4.6	5.1	1.2	1.6	7.8	6.2	4.4	34.1	47.3	ND	69.4	ND
Chlorobenzene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25	ND	ND
Chloroform	ug/m3	-	1.5	2.1	41.7	117	7.7	2.8	3.3	ND	11	17.2	9.3 J	19	140	13.3	1.8
Chloromethane	ug/m3	-	0.3	ND	5.8	ND	ND	ND	ND	0.38	ND	ND	ND	ND	ND	ND	ND
3-Chloropropene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/m3	-	ND	ND	0.94 J	ND	ND	ND	0.25 J	ND	0.82	ND	ND	ND	ND	ND	ND
Cyclohexane	ug/m3	-	0.49	0.9	71	ND	1.4	0.22 J	1.6	2.1	4.8	11.7	108	102	ND	26	10.2
1,1-Dichloroethane	ug/m3	-	0.24 J	0.31	101	85	ND	ND	ND	0.55	2.2	21.2	9.7 J	28	3380	0.91	ND
1,1-Dichloroethylene	ug/m3	-	ND	ND	21.6	ND	ND	ND	ND	ND	ND	ND	ND	8.3	136	32.7	ND
1,2-Dibromoethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	0.24 J	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/m3	-	ND	ND	8.5	8.8	ND	ND	ND	0.26 J	ND	0.57 J	ND	186	ND	1.8	ND
1,2-Dichloropropane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34	ND	ND	ND	ND
Dichlorodifluoromethane	ug/m3	-	0.65	ND	ND	ND	0.71 J	1.2	ND	0.53	2.4	0.77 J	ND	5.4 J	ND	0.59 J	0.58
Dibromochloromethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ug/m3	-	ND	ND	3.8	16.4	ND	ND	ND	ND	ND	ND	ND	34	ND	0.96	ND
cis-1,2-Dichloroethylene	ug/m3	-	ND	ND	182	54.6	7.4	ND	ND	1.6	2.4	0.73 J	ND	3060	ND	1.6	ND
cis-1,3-Dichloropropene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Dichlorobenzene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Dichlorobenzene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Dichlorobenzene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethanol	ug/m3	-	25.9	25	ND	ND	ND	15.4	9.8	32.9	5.8	11.3	26.8	6.8 J	23.0 J	28.7	5.4
Ethylbenzene	ug/m3	-	0.85	0.73	28.4	4.1	1.3	0.32	0.72	0.26 J	20	10.1	240	275	ND	17.9	0.81
Ethyl Acetate	ug/m3	-	1.7	1.9	ND	ND	3	8.8	2.6	14	1.5	2.4	ND	ND	ND	3	20.2
4-Ethyltoluene	ug/m3	-	0.13 J	0.18 J	ND	ND	ND	0.15 J	ND	ND	ND	11.3	ND	72.3	ND	ND	ND
Freon 113	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	39	ND	ND
Freon 114	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptane	ug/m3	-	0.42	1.2	279	0.82	0.63 J	0.46	0.85	1.9	2.8	25.7	522	73.4	ND	71	24.1
Hexachlorobutadiene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	ug/m3	-	1.4	2	28.2	2.4	1.3	2.3	1.8	3.3	3.5	7.9	187	25	ND	55.8	21.2
2-Hexanone	ug/m3	-	0.84	3.1	ND	ND	ND	1.1	ND	0.47	1.9	ND	ND	ND	ND	2.6	ND
Isopropyl Alcohol	ug/m3	-	7.1	9.8	10.3	ND	ND	3.4	2.7	7.2	ND	2	ND	ND	ND	3.9	1
Methylene chloride	ug/m3	60	2.2	2.9	72	12.7	2.4	5.9	3.7	3.3	2.3	2.5	ND	135	ND	3.4	5.9
Methyl ethyl ketone	ug/m3	-	14.5	21.5	12.4	ND	ND	11.1	4.7	10.6	2.6	ND	ND	24	ND	41.5	ND
Methyl Isobutyl Ketone	ug/m3	-	0.45	ND	ND	ND	ND	0.28	ND	ND	3.2	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylmethacrylate	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/m3	-	0.29	0.5	ND	ND	ND	0.34	0.24 J	0.13 J	-	ND	ND	-	-	ND	0.18 J
Propylene	ug/m3	-	3.2	ND	198	ND	ND	3.1	ND	19.9	125	103	315	152	114	270	ND
Styrene	ug/m3	-	0.35	0.8	ND	ND	ND	0.21 J	1.1	ND	ND	ND	ND	20	ND	0.49 J	ND
1,1,1-Trichloroethane	ug/m3	-	ND	1.1	30.1	21	ND	ND	1.9	ND	ND	19.9	5.9 J	4.4	25000	ND	0.31
1,1,2,2-Tetrachloroethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ug/m3	-	0.69	1	1.8	0.70 J	0.99	0.79	1	0.26 J	11	ND	ND	268	ND	1.5	ND
1,3,5-Trimethylbenzene	ug/m3	-	0.19 J	0.26 J	ND	ND	ND	0.27	0.21 J	ND	3.8	1.1	ND	166	ND	ND	0.21 J
2,2,4-Trimethylpentane	ug/m3	-	ND	2.5	13.8	ND	0.45 J	ND	ND	2.7	ND	33.9	ND	71	ND	37.3	3
Tertiary Butyl Alcohol	ug/m3	-	16.4	44.2	23.2	ND	10.4	20.2	24.8	20.1	3.6	ND	ND	ND	ND	143	3.8
Tetrachloroethylene	ug/m3	30	1.1	18.3	27.7	121	5.2	5.1	5.7	0.33	7.5	4.9	ND	37	174	0.94	0.25
Tetrahydrofuran	ug/m3	-	0.53	ND	ND	ND	ND	2.2	ND	0.57	0.50 J	1.1	ND	ND	ND	ND	ND
Toluene	ug/m3	-	5.7	5.5	97.6	21.8	6.9	1.4	2.2	3.2	18	8.9	940	460	ND	131	20.1
Trichloroethylene	ug/m3	5	0.16	6.1	154	68.7	2.2	0.26	0.22	0.24	1	2	4.9	192	38	2.2	ND
Trichlorofluoromethane	ug/m3	-	14.7	2.1	ND	1.5	1.6	5.2	20.6	0.36	47	3	ND	280	ND	0.81	0.55
Vinyl chloride	ug/m3	-	0.15 J	ND	10.7	ND	0.73 J	ND	ND	0.23 J	0.46	ND	ND	91.8	ND	70	ND
Vinyl Acetate	ug/m3	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ug/m3	-	2.5	2.7	76.3	16.8	4.9	1.2	3	0.65	20	2.4	261	864	ND	10.6	1.6
o-Xylene	ug/m3	-	1.2	1.7	23.9	3.7	1.7	0.74	2.1	ND	14	6.9	96.5	363	ND	5.4	1.3
Xylenes (total)	ug/m3	-	3.6	4.3	100	20.6	6.6	2	5.1	0.65	34	9.3	357	1220	ND	15.9	2.9

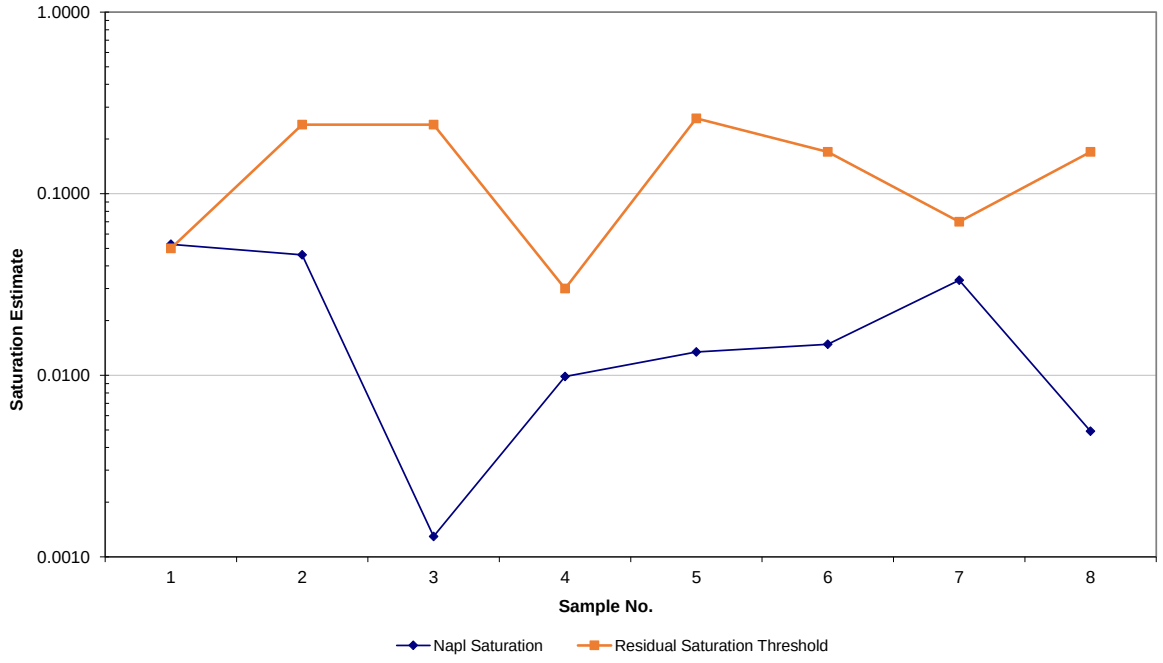
Legend:
Red text compound above NYSDOH guidance value
ND = Not detected (below detection limit)
- = No standard
J = Estimated value

Table 16
Residual Saturation Estimate

Sample	USCS Class.	Sample Depth	Soil Desc.	Soil Type	Estimated Residual Saturation	TPH mg/kg	Bulk Density ρ_b, g/cm^3	Specific Gravity	Porosity n	NAPL Density ρ_n, g/cm^3	Soil Meas. NAPL Sat. S_{napl}
SB5 (1-2)		2	Fill: Dark grey to black fine to coarse SAND, some concrete & asphalt, little silt, very moist.		0.05	36,230	0.97	2.7575	0.65	1.03	0.0526
SB5 (4-5) A		5	Fill: Dark grey to black fine to coarse SAND, some gravel, wet.		0.24	22,353	1.2	2.7575	0.56	1.03	0.0461
SB4 (19-20)		20	Dark grey to black medium to coarse SAND, little silt, wet.		0.24	543	1.3	2.7575	0.53	1.03	0.0013
SB4 (5-6)		6	Fill: Dark brown to black medium to coarse SAND, some gravel, moist.		0.03	12,416	0.63	2.7575	0.77	1.03	0.0098
SB5 (17-18)		18	Dark grey to black medium to coarse SAND, wet.		0.26	5,627	1.3	2.7575	0.53	1.03	0.0134
SB6 (6-11)		11	Dark brown fine SAND and silt, wet.		0.17	2,500	1.9	2.7575	0.31	1.03	0.0148
SB6 (6-7)		7	Fill: Dark brown fine SAND and SILT,little medium sand, v. moist.		0.07	6,625	1.8	2.7575	0.35	1.03	0.0333
SB10 (7-8)		8	Dark brown fine SAND and silt, wet.		0.17	1,541	1.5	2.7575	0.46	1.03	0.0049

* - Estimated
Specific gravity obtained from the average of 16 values from Site A

Saturated zone



APPENDIX A

Remedial Investigation Work Plan

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B, 12th Floor
625 Broadway, Albany, New York 12233-7016
Phone: (518) 402-9768 • **Fax:** (518) 402-9773
Website: www.dec.ny.gov

Joe Martens
Commissioner

September 23, 2014

Steven E. Panter, CGWP
Sr. Consultant
Fleming-Lee Shue, Inc.
158 West 29th Street
New York, NY 10001

RE: Queens Plaza Residential Development
Site B
NYSDEC Site No. C241151

Dear Mr. Panter:

The New York State Department of Environmental Conservation (NYSDEC) is approving the Remedial Investigation Work Plan (RIWP) submitted on August 11, 2014 for the above referenced site. The comment period for the RIWP has ended.

Regards,

Michael Haggerty
Project Manager
Remedial Bureau B, Section C

ec: James Moras (Chief, Section C)
Benjamin Conlon (OGC)
Christopher Doroski (DOH)
Patrick Shiels (Volunteer)
Larry Schnapf (Volunteer's attorney)
Arnold Fleming (FLS)

QUEENS PLAZA RESIDENTIAL DEVELOPMENT – SITE B
BROWNFIELD CLEANUP PROGRAM SITE No. C241151
Block 263, Lots 1 and 9 and Block 264, Lots 1R and 17
Long Island City, New York

Draft BCP SITE B REMEDIAL INVESTIGATION WORK PLAN

Prepared for

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York, 12233-7016

by

ARNOLD F. FLEMING P.E.

&

Fleming Lee Shue

Environmental Management and Consulting
158 West 29th Street
New York, New York, 10001

AUGUST 2014

Professional Engineer's Certification

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program
Site No. C241151
Block 263, Lots 1 and 9 and Block 264, Lots 1R and 17
Long Island City, New York

I Arnold F. Fleming certify that I am currently a New York State registered professional engineer or Qualified Environmental Professional (QEP) as defined by 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with DER Technical Guidance for Site investigation and remediation (DER-10).

I, Arnold F. Fleming, P.E. certify that this Remedial Investigation Work Plan was prepared by me or persons working under my direct supervision.

8/5/14
Date

STATE OF NEW YORK
ARNOLD F. FLEMING
LICENSED PROFESSIONAL ENGINEER

Arnold F. Fleming, P.E.
NYS Professional Engineer
License Number 070411

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1.0 INTRODUCTION AND OBJECTIVE

1.1. INTRODUCTION

This Remedial Investigation Work Plan (SRIWP) was prepared by Arnold F. Fleming, P.E. (AFF) and Fleming Lee-Shue, Inc. (FLS) for LIC Development Owner, LP. (The Volunteer) to investigate the Queens Plaza Residential Development tract known as the Brownfield Cleanup Program (BCP) Site B (BCP No. C241151).

BCP Site B ("Site" or "BCP Site B") is in Long Island City, Queens County, New York. The Site is bound by Jackson Avenue to the north, Orchard Street to the west, Queens Boulevard to the east, BCP Site A to the north, and the Long Island Railroad to the south. BCP Site B consists of asphalt-covered open areas, several 1- to 3-story commercial buildings and one 5-story commercial building. Figure 1 shows the Site location. Figure 2 is a site plan.

The Site is unoccupied, but historically, the principal activity was chemical manufacturing and storage. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes, and other household and industrial cleaners and products. Creosote was the principal component in the manufacture of disinfectants and creosote spills represent the most significant contamination of Site soil and groundwater. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layers at depth. Chlorinated solvents appear in soils and groundwater at some locations.

This SRIWP describes the sample locations, sampling matrices, and chemical analyses that would be useful in obtaining more information on BCP Site B.

1.2 OBJECTIVES

Several investigations and sampling events have been conducted since 1988, but most subsurface soils, groundwater, and soil vapor samples were collected in and near adjacent BCP Site A (C241105), where creosote impacts are most prevalent. Additional environmental data are needed in BCP Site B to assess potential impacts, enhance the exposure assessment, and augment the existing information dataset that will assist in remediation of BCP Site B.

The objectives of this SRIWP are to characterize conditions within BCP Site B and include the following scope:

- Collect soil, groundwater, and soil vapor data to increase the current coverage
- Collect additional stratigraphic information and visual and instrument observations
- Delineate areas with Light Non-aqueous Phase Liquid (LNAPL) and Dense Non-aqueous Phase Liquid (DNAPL)
- Collect environmental information so as to augment the exposure assessment
- Evaluate the extent of potential impacts within BCP Site B

- Support decision making for remediation of BCP Site

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

BCP Site B is a vacant property that occupies a portion of the New York City Tax Block 263, Lots 1 and 9 and Block 264, Lots 1R and 17 in Long Island City, Queens County, New York. The site is an irregularly-shaped parcel that occupies 1.89 acres. To the west and north lies BCP Site A encompassing approximately 0.5 acres. Figure 1 shows the Site in relation to the general area. Figure 2 is a site plan.

2.2 SITE DESCRIPTION

West Chemical Company occupied BCP Site B from early 1900s until 1977 and manufactured and stored a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Among the materials stored in above-ground tanks was creosote, a flammable material then used as the active ingredient in the manufacture of disinfectants, one of West Chemical's main product lines.

In the 1950s a fire began on the adjacent BCP Site A property. In an effort to contain the blaze, the Fire Department of New York (FDNY) reportedly cut down the creosote tank. The tank ruptured and the contents ran over the ground and infiltrated the underlying soils. This release is believed to be the principal cause of soil and groundwater impacts on BCP Site B.

BCP Site B is in an area designated as M1-6/R10 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a particular zoning provision to promote development and transformation of historical industrial/manufacturing areas into mixed use commercial and residential spaces.

2.3 VICINITY CHARACTERISTICS AND NEARBY PUBLIC AREAS OF CONCERN

The properties surrounding BCP Site B are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use, and transportation. To the south lies the Long Island Railroad. Jackson Avenue is north of BCP Site B. Across Jackson Avenue, to the north, is a commercial redevelopment project, Two Gotham Center. West of the Site are warehouse buildings with light manufacturing. Further east lie Queens Boulevard and the No. 7 subway line. On the east side of BCP Site B is Queens Boulevard. Across Queens Boulevard is a vacant lot and a commercial property, currently (and formerly) used as a gasoline station. Orchard Street fronts the Site on the west.

A New York City Transit (NYCT) substation and an unoccupied, 5-story residential building occupy the property north of BCP Site B. The area along Jackson Avenue was historically residential buildings with commercial/retail uses on the ground floor. These buildings were demolished and now the lot remains vacant.

The nearest schools are St. Patrick's School, Newcomer's High School, and the Academy of American Studies, which are over 1,800 feet northwest of BCP Site B. Two churches are

approximately 1,000 feet west of Site B and the New York Foundling Hospital lies more than 2,000 feet southwest of the property. The New York City Subway Line No. 7 passes by the Site along the east over Queens Boulevard. An abandoned subway tunnel transects the southwest corner of the intersection of Jackson Avenue and Orchard Street, through the northwest corner of BCP Site A; this structure connects to the active subway tunnel under Jackson Avenue.

2.4 DESCRIPTION OF CONTEMPLATED USE

The Volunteer proposes to build a multi-tenant, high-rise, mixed-use commercial residential building on BCP Site B. Retail space would occupy the ground floor. BCP Site B encompasses 1.89 acres.

2.5 SITE GEOLOGY, HYDROGEOLOGY, AND SUBSURFACE CHARACTERISTICS

BCP Site B consists of two sections: Section 1 is referred to as Operable Unit 1 (OU-1) on the west side of the Site and section 2, the balance of the property fronting Jackson Avenue, Queens Boulevard and the Long Island Railroad, as OU-2 (Figure 2). BCP Site B is on gently sloping land with a surface elevation of approximately 13 feet Queens Borough Datum (QBD) (14.6 feet North American Vertical Datum 88 (NAVD88))[1] for OU-1 and approximately 16 feet QBD (17.6 feet NAVD88) for OU-2. The generalized subsurface profile consists of fill overlying silty sand and glacial till, with bedrock below the till. A lens of clay above the bedrock near the center of the BCP Site B OU-1 occurs in the area with the heaviest contamination.

Surface soils consist of a fill layer approximately 5 to 9 feet in thickness. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varved silt and clay are present within this sand unit in some locations on BCP Site B. The sand layer varies in thickness from approximately 5 to 7 feet. Additionally, a till layer is present over most, but not all, of the BCP Site B OU-1 beginning at approximately 12 to 20 feet below grade (ft-bg) (approximately -2 ft. to -11 ft. QBD (-0.4 ft. to -9.4 ft. NAVD88) and extending to the top of bedrock at approximately 9 to 25 ft-bg (elevations of approximately -4 to -14 ft. QBD (-2.37 ft. to -12.4 ft. NAVD88) in OU-1). Based on soil boring data from previous investigations, bedrock at the BCP Site B is gneiss.

Groundwater occurs within the unconsolidated geologic materials covering the BCP Site B. The upper surface of the groundwater reservoir is marked by the groundwater table, which fluctuates seasonally in response to precipitation. Depth to the groundwater table ranges from 2 to 14 ft-bg but is typically 6 to 11 ft-bg over most of the site. The groundwater table elevation ranges from approximately 6 ft. to 9 ft. QBD (7.6 ft. to 10.6 ft. NAVD88) over most of BCP Site B. Groundwater flow direction is predominantly to the south-southwest. Figure 6 shows the direction of groundwater flow on the BCP Site B.

[1] To convert from QBD to NAVD88 = QBD + 1.625 ft.

There are no surface water bodies on BCP Site A or on the surrounding properties. The closest surface water body is the Dutch Kill arising from Newtown Creek, located approximately 1,600 feet south of the Brownfield Site, and the East River approximately 4,200 feet to the west

2.6 NATURE & EXTENT OF CONTAMINATION

2.6.1 Previous Investigations

Seven previous environmental investigations and sampling events beginning in 1988 consisted of varying levels of soil and groundwater investigation, non-aqueous phase liquid (NAPL) product level studies, and collection of soil gas data on and outside BCP Site B. These reports are provided in Appendix D. Previous investigations included the following:

1. *Queens Plaza Site B Investigation*, AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property*, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Sampling Event*, AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. *SCS Engineers Sampling Event, April 2013*

In addition, Mueser Rutledge completed a geotechnical investigation of BCP Site A and portions of BCP Site B in April 2007. The report contains geotechnical test borings and cross-sections depicting soil strata and bedrock. The report is entitled *Geotechnical Summary Report, Queens Plaza Project – Site A, Long Island City, Queens, New York,* April 20, 2007.

2.6.2 Soil Contamination

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills. The sources of these spills are primarily on BCP Site A. Creosote spills impacted both shallow soils in the form of a smear zone and the deeper soils on the western portion of BCP Site B in the form of residual DNAPL-saturated zone. Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of adjacent Building 4. Creosote covers the floor and some portion of the basement walls of Building 4.

Additionally, LNAPL is present in the soils on the northern portion of BCP Site B and southern portion of BCP Site A. Product level measurements collected on July 10, 2014 in monitoring wells SCS-MW-2C-1 in Building 2B/2C, and in SCS-MW-10-1 and SCS-MW-10-2 south of building 2B/2C. Product thickness measured 1 foot in SCS-MW-2C-1 and 2 feet in SCS-MW-10-1. No product was detected in SCS-MW-10-2.

Comparatively fewer soil borings and samples have been completed in BCP Site B, and for this reason the understanding of contaminants within BCP Site B is limited. The concentrations of key compounds[2] beyond BCP Site B—on Orchard Street, Jackson Avenue, and Queens Boulevard ("Off-Site") are summarized in the following sections.

The summaries describe soils and groundwater conditions in the off-Site area subject to further investigation. They include Orchard Street, Jackson Avenue, and Queens Boulevard. No information is available for the area along Queens Boulevard. Only VOCs and SVOCs were samples in these locations.

Volatile Organic Compounds

The primary soil contaminants are the creosote-based and petroleum-based volatile organic compounds (VOCs), benzene, toluene, ethylbenzene, and xylene (collectively BTEX) on the western portion of BCP Site B adjacent to BCP Site A. The elevated concentrations of these compounds correspond to observations of soil staining or NAPL on the Site.

Other VOCs in soils include methylene chloride, tetrachloroethylene, and trichloroethylene. Among the key VOCs, the majority of sample results for the 70+ samples are below detection limits; and approximately 90 percent or more of the samples with measurable results are below the Restricted Residential Soil Cleanup Objectives (RRSCOs). Table 1 summarizes the range of key VOC concentrations on BCP Site B.

Semi-Volatile Organic Compounds

The location of elevated semi-volatile organic compounds SVOCs mirrors that of elevated VOCs. The concentrations of SVOCs with the highest concentrations include naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, flourene, and total SVOCs. Among the key SVOCs, the majority of sample results for the 70+ samples are below detection limits. For measurable SVOCs, approximately 25 percent of the sample results are above the Restricted Residential Soil Cleanup Objectives (RRSCOs). As with the VOCs, the greatest concentration of SVOCs occurs on the Site corresponding to the creosote DNAPL. Table 2 summarizes the range of key SVOCs throughout BCP Site B.

Metals

The concentrations of metals in the Site soil were typical of urban areas. Among the key metals, many sample results for the 65+ samples are below detection limits. For metals with measurable levels, approximately 90 percent or more of the sample results are below the Restricted Residential Soil Cleanup Objectives (RRSCOs). Cadmium, lead, and mercury had approximately 10 percent of the results above the RRSCOs. Table 3 summarizes the range of key metals throughout BCP Site B.

[2] Key compounds are those with the highest concentrations, compounds typical of the principal contaminants, and/or most frequently found.

Pesticides

The concentrations of key pesticides were mostly below detection limits in the 64 soil samples collected on BCP Site B.[3] For measurable levels of pesticides, nearly all key pesticides were below the RRSCOs. Two exceptions are alpha-BHC and Dieldrin, where the results were above the RRSCOs in one and two samples, respectively. Table 4 summarizes the range of key pesticides throughout BCP Site B.

Polychlorinated Biphenyls (PCBs)

Only one sample for PCBs was collected on BCP Site B.

2.6.3 Groundwater

Volatile and Semi-volatile Organic Compounds

Few aqueous samples are available for BCP Site B. One groundwater sample was collected for VOCs and SVOCs at the extreme southern part of BCP Site B along the border with LIRR in Area F. Another sample was collected from the sump in Building 4 (JA24522, July 2009). Both samples contained elevated concentrations of benzene, toluene, ethylbenzene, and toluene. Low concentrations of chlorinated VOCs were also observed. Naphthalene, methylnaphthalene, and other SVOCs associated with creosote were detected. Tables 5 and 6 present a summary of key VOCs and SVOCs in BCP Site B groundwater.

Metals

Groundwater from the Resource Conservation Recovery Act (RCRA) metals sample collected at the sump in Building 4 contained copper, lead, nickel, and zinc. All concentrations were below TOGS GA AWQS. Table 7 presents a summary of key metals in BCP Site B groundwater.

2.6.4 Other Environmental Conditions

Underground Process Kettles/Vaults and Storage Tanks

There are 45 former subsurface process kettles and vaults on BCP Site B. These will be investigated to determine their contents, volume, toxicity, health risks, and demolition implications prior to the start of remediation. The vaults and kettles will be tested, emptied, power washed, and stabilized, if necessary, as an Interim Remedial Measure (IRM) before remediation begins. Unknown underground storage tanks (USTs) may be encountered as BCP Site B is excavated for remediation and development; USTs will be managed in the same manner as the vaults.

[3] 44 samples collected for Gamma chlordane.

Sub-Slab Vapor and Indoor Air Findings

VOCs were detected in air and sub-slab soil vapor on the BCP Site A and in the adjacent buildings and sub-slab areas on BCP Site B. The compounds included acetone, benzene, 2-butanone, carbon tetrachloride, chloromethane, dichlorodifluoromethane, ethylbenzene, toluene, xylenes, vinyl chloride, tetrachloroethylene, trichloroethene, and trichlorofluoromethane. All indoor air VOCs were at concentrations within the ranges published in the New York State Department of Health (NYSDOH) study of air in homes (1997-2003) and the USEPA study of air in offices (1994 -1998).

Comparison of the indoor air values to the more recent USEPA study entitled *Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences (1990 – 2005): A Compilation of Statistics for Assessing Vapor Intrusion,* Table ES-1, June 2011, found that out of 12 indoor air samples approximately 90 percent of the results (11 samples) for the compounds of concern were lower than half the indoor air concentrations in the study.

2.6.5 Soils Compared with Contemplated Restricted Residential Cleanup Objectives

The Volunteer contemplates development using the Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs). Figure 3A (on a grid cell-by-grid cell basis) charts the pre-development/remediation soils above the RRSCOs on BCP Site B, along with the depth (feet below grade) of the deepest sample with results above the RRSCOs. (In some instances, it is only one polycyclic aromatic hydrocarbon (PAH) compound that is above the RRSCO.)

Remediation on BCP Site B OU-1 contemplates removal of soils to 15 feet below grade or to bedrock, whichever is shallower. On BCP OU-2, preparing the area for development will require removal of the top four feet or so of soil for development purposes (development depth) prior to any soil remediation. Figure 3B charts the soil areas that would remain as Hot Spots to be removed in OU-2 after the initial four feet of soil is removed. All Hot Spots would be eliminated in OU-1. Figures 3A and 3B contribute to the remedial investigation described in Section 3.

3.0 REMEDIAL INVESTIGATION TASKS

This section summarizes the remedial investigation tasks proposed to fulfill the stated objectives. The tasks are separated in three sections: 1) Project Planning and Preparation, 2) Health and Safety Plan preparation, and 3) Site Investigation and Characterization. Standard Operating Procedures for soil sampling, well installation, and groundwater sampling appear in Appendix A.

3.1 PROJECT PLANNING AND PREPARATION

3.1.1 Site Inspection, Geophysical Survey, Utility Clearance and Permitting

Prior to initiating the field work, LIC Development Owner, LP and/or designee will inspect the work area to assess current conditions, evaluate equipment access, and check the viability of existing monitoring wells. FLS will prepare an inventory of any drums or other conditions that warrant removal or other appropriate action. The reconnaissance will check for USTs or aboveground storage tanks (ASTs) and collect indoor air instrument measurements.

A geophysical survey will be conducted to mark out any subsurface structures and pre-clear the sample locations. If any USTs/ASTs are discovered, the contents will be sampled and analyzed for profiling and proper disposal.

LIC Development Owner, LP and its subcontractors will coordinate with the various agencies to obtain the necessary permits and notifications prior to conducting any subsurface intrusive work.

3.2 HEALTH AND SAFETY PLAN

A Site-Specific Health and Safety Plan (HASP) has been prepared for FLS employees. All work is expected to be performed in Level D personal protective equipment (PPE) with field personnel monitoring the work space. PPE upgrades will be implemented as necessary. The HASP is included as Appendix B.

3.3 SITE INVESTIGATION AND CHARACTERIZATION

3.3.1 Kettle Investigation – Buildings 2B, 2C, 3A, 3B, & 10

Forty-five kettles/subsurface mixing vaults with unconfirmed amounts of liquid were found inside Buildings 2B, 2C, and Building 3 on BCP Site B. Previous investigations identified traces of disinfectant and lye in the kettles, which can be attributed to the historic use as a soap manufacturing facility. Subsequent sampling by SCS Engineers in 2013 identified liquids with VOCs, SVOCs, and metals, but all results proved non-hazardous except for one kettle (K-9), which had mercury above the Toxicity Leachate Control procedure (TCLP) threshold. The pH of the kettles' contents was approximately neutral. Subsequent sampling by Roux Associates in July found all the contents non-hazardous except for one vault where the pH measured 13 to 14 standard units.

Further investigation was needed to determine the contents and liquid volume in each unit. The investigation was conducted starting with the collection of samples from each vault, analyzing and profiling the liquid samples to determine the appropriate disposal facility, and implementing the necessary action to minimize the potential exposure risk to all workers.

The kettles and vaults were explored by opening the covers or bung and inserting an explosimeter (LEL meter) and screening for lower explosive limits (LEL), hydrogen sulfide, oxygen, and carbon monoxide. A Jerome mercury analyzer was also be used. If conditions proved non-hazardous, then a photoionization detector (PID) screened for organic vapors. Next, aqueous samples were collected for analysis using a bailer and/or peristaltic pump. The units were probed for their approximate dimensions, condition, free product, and settled solids.

The remaining kettles/vaults were opened, inspected for condition and an estimate made of the liquid volume. Each unit was sampled for the following parameters:

- NYSDEC ASP 2005 Target compound list (TCL) volatile organic compounds (VOCs), EPA Method 8260
- NYSDEC ASP 2005 TCL semivolatile organic compounds (SVOCs), EPA Method 8270
- NYSDEC ASP 2005 Target Analyte List (TAL) metals, EPA Method 6010/7000
- TCLP analysis as warranted by analytical results

3.3.2 Soil, Groundwater and Soil Vapor Sampling and Analysis Plan

Soil Investigation

Soil Boring Installation

Thirty-three soil borings (including West Street) are proposed throughout BCP Site B. Since the general subsurface geology consists of fill, silty sand, and glacial till overlying bedrock, a sonic drill rig will be used to advance the soil borings and collect soil samples. A direct-push drill rig and/or mobile probe unit/hand unit may also be used for sampling purposes if warranted by access limitations, but the sonic rig will be the primary drill rig. The soil borings will be surveyed to QBD and NAVD88 by a New York State Licensed Surveyor.

The proposed soil boring locations are presented in Figure 4. The locations were selected to fulfil the objectives listed in Section 1.2. Within each grid cell, the boring position is based on random coordinates, although some locations are non-random for specific purposes (Figure 4). This yields good coverage while introducing a random component that provides better site characterization. The rationale for each boring is presented in Table 8.

Soil Screening

Soils will be field screened using a photoionization detector (PID) and described using the Unified Soil Classification system along the vertical soil column of each boring. PID readings will be recorded on the boring logs along with visual, olfactory, and lithology observations.

Soil Sampling and Analysis

It is contemplated that remediation of BCP Site B will remove, at a minimum, the top 4 feet of soil (to the proposed development grade of 12 ft. QDB [13.6 ft. NAVD88] over OU-2) to prepare BCP Site B for development; and, as this soil will be removed, there are no plans to sample it. (This soil will be sampled separately for disposal purposes.) In some instances up to 8 feet of soil will be removed from existing grade to reach development grade, but in most cases approximately 4 to 5 feet of soil will be removed from existing grade. Near the southern Site boundary, where the elevation is lower, removal of the upper 4 to 5 feet of soil will extend below 12 ft. QBD (13.6 ft. NAVD88).

Soil samples will be obtained primarily using the sonic drill rig with 3-inch-diameter, 5-foot-long core barrels. All in-ground sampling equipment will thoroughly steam-cleaned and/or pressure-washed before and between sample collection. Alternatively, as a concomitant means, soil samples may be collected using a direct-push rig using a nominal 2-inch-diameter, 5-foot-long macro-core sample with dedicated acetate liners and/or mobile probe unit/hand unit. Table 8 lists the proposed boring depths.

In general, three soil samples per boring will be collected. The samples will be collected from a 1-foot intervals at the following locations:

- One sample will be collected from the interval beginning at approximately 4 feet below grade (12 ft. QBD, 13.6 ft. NAVD88), to document conditions at the depth/elevation where soils may remain when developing BCP Site B, and where a demarcation barrier may be placed
- A second sample will be collected from a 1-foot interval at the water table
- A third sample may be collected from the 1-foot interval at depth to document conditions at approximately 15 – 20 feet below grade and/or near bedrock. This sample will be collected from the depth interval exhibiting the highest PID reading, visual observations of contamination (i.e. stained soils, unusual odors, free product, etc.), and the field geologist's judgment and discretion.

In the event that the sample is collected using a direct push rig, the sample will be collected from the entire 5-foot-long core length to obtain a sample volume similar to that collected using the sonic rig. Two or more co-located direct-push samples of shorter length may be used to obtain a similar volume in lieu of a 5-foot-long core.

- VOC samples will be collected by taking three EnCore™ samples and solids sample from the 1-foot section of core that is most representative of soil conditions based on PID readings, visual observations of contamination (i.e. stained soils, unusual odors, free product, etc.), and the field geologist's judgment and discretion.

Each non-VOC soil sample will be managed in the following manner:

- The samples will be placed in a pre-cleaned, stainless steel container and homogenized in the field before being placed in the sample containers. The mixing containers and implements will be cleaned per the decontamination procedures listed in Section 4.0

(Appendix A). Alternatively, clean, dedicated mixing apparatus that will not adversely affect the sample may be used in lieu of decontaminated equipment.

- At selected borings, two replicate samples will be collected along with the primary sample by taking the homogenized sample and placing it into two separate sets of sample containers. The replicate samples will be labeled identically as the original sample except that they will have an "A" and "B" added to the label. This step is to measure variability in the sample so as not to bias decisions because a result is too high or too low. The replicate samples will be analyzed for SVOCs and metals only, as the remaining non-VOC compounds occur at primarily non-detect levels. The borings and sample intervals where replicates are to be collected are listed in Table 8.
- VOC replicate samples are to be collected by taking the EnCore™ samples from three separate areas before the sample is homogenized using the sample collection criteria for VOCs samples. No VOC samples are to be homogenized.

Each sample will be labeled (e.g., name of boring and sample interval; B-1 (12.5'-13.5'), sealed, and placed in a chilled cooler for shipment to the laboratory. Soil samples will be analyzed for the following parameters:

- NYSDEC ASP 2005 TCL volatile organic compounds (VOCs) by EPA Method 8260. Samples for TCL VOCs will be collected using an EnCore™ sampler, a volumetric storage chamber that can be filled completely with zero headspace to minimize loss of VOCs. Soil samples for VOC analysis will be collected by obtaining 3, 5-gram aliquots of soil per 6-inch sample interval using the EnCore™ samplers. One 60-mL volume of soil will also be collected for each VOC sample for percent solids analysis.
- NYSDEC ASP 2005 TCL semi-volatile organic compounds (SVOCs) by EPA Method 8270
- NYSDEC ASP 2005 Pesticides/Polychlorinated Biphenyls (PCBs) by EPA Methods 8081/8082
- NYSDEC ASP 2005 Target Analyte List (TAL) metals by EPA Methods 6010/7000

One surface soil sample (0-6 inches) will be collected from each of the five boring locations along the boundary with LIRR. They will be collected for the same analyses as the soil samples.

Groundwater Investigation

Monitoring Well Installation

Sixteen of the borings will be converted into monitoring wells (Figure 5) to investigate groundwater throughout the BCP Site and obtain detailed information in areas where groundwater is impacted and to investigate/delineate areas where free product and elevated VOCs are known or suspected. A machine-slotted, 2-inch-diameter PVC well screen will be installed approximately 7 to 8 feet into the saturated zone. If a soil boring encounters staining, DNAPL or other evidence of contamination at depth, then a well screened at a deeper interval may be installed. If a boring encounters staining or other evidence of groundwater impacts, then additional monitoring wells may be installed at that location to evaluate potential impacts. This decision will be made on an *ad hoc* basis in consultation with the Department.

A No. 1 Morie Sand or equivalent sand pack will be placed into the annular space 1 to 2 feet above the top of the well screen. A minimum 1-foot-thick bentonite seal will be installed above the sand pack. The bentonite seal is to be wetted with potable water and allowed to expand for a minimum of one-half hour before filling the overlying annular space. The remaining annular space will be tremied to grade with a Portland cement mix.

The well surface will be completed as either a flush-mounted, watertight manhole or stick-up protective casing depending on development status and field conditions. This will be a field decision. The monitoring wells will be developed by pumping with a submersible pump until the discharge is silt-free or demonstrates no further improvement in turbidity. Diagrams of construction of the newly installed wells along with the existing ones will be provided in the final report. The wells will be allowed to equilibrate for a minimum of one week prior to sampling. The existing monitoring wells on BCP Site B will also be redeveloped. Any existing wells found to be unusable will be re-installed/renovated, substituted, or otherwise addressed in consultation with the Department for satisfactory coverage.

The wells will be surveyed by a New York State Licensed Surveyor. Both the position and top of casing elevations will be surveyed into QBD and NAVD88. A round of synoptic water level measurements from all viable BCP Site B wells will be completed and a groundwater contour map prepared.

Groundwater Sampling and Analysis

One groundwater sample will be collected from each of the 30 monitoring wells on BCP Site B (16 new and 14 existing) using low-flow sampling methods. The groundwater samples will be analyzed for the following parameters:

- TCL VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- TCL Pesticides/Polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- TAL metals by EPA Method 6010/7000

- Basic groundwater parameters: nitrate, sulfate, sulfide, chloride, alkalinity, bicarbonate

A filtered sample will also be collected to minimize colloidal size particles and sediments for metals and SVOCs.

Free Phase Product Investigation

Several wells have been added to investigate the extent of LNAPL and DNAPL (Figure 5). The proposed wells in grid cells 19 and 33 will be installed to investigate groundwater conditions as well as investigate the extent of DNAPL in/near Building 4. The wells at these two locations will be screened atop bedrock to measure potential DNAPL thickness (bedrock is a maximum of 25 feet or less at these locations).

Product level measurements were made in the following monitoring wells on July 10, 2014:

Well	Product Thickness, ft.	Grid cell
SCS-MW-2C-1	1	43
SCS-MW-10-1	2	52
SCS-MW-10-2	0	53

The proposed wells in grid cells 41, 52, 55, 69, 61, 62, 66, 79, 82, and 92 will be installed to investigate groundwater conditions as well as investigate the extent of LNAPL. The wells at these two locations will be screened to straddle the water table so as to gauge potential LNAPL thickness and/or define it limit. Actual boring and well locations may vary somewhat depending on access limitations.

Soil Vapor Investigation

Sub-slab soil vapor samples will be collected at 14 locations throughout BCP Site B and to assess potential subsurface vapor conditions beneath proposed building areas. The soil vapor sampling points are presented in Figure 6. The sub-slab soil vapor samples will analyzed for using EPA Method TO-15 plus naphthalene.

Vapor Probe Installation

Soil vapor samples will be collected from temporary soil vapor sample points installed 8 feet below grade and 1 foot above the groundwater table per New York State Department of Health's (NYSDOH) requirements (*Soil Vapor Intrusion Guidance*, October 2006. If this depth cannot be reached, the probe will be advanced and the soil vapor sample collected such that the bottom of the probe is 1 foot above the water table. At each sample location, a 0.5-inch-diameter, retractable, decontaminated, stainless steel sampling probe will be driven to the sampling interval. The sampling probe will be retracted approximately 4 inches exposing the sampling screen. The borehole above the sampling probe will be sealed with modeling clay or equivalent material to prevent ambient air from mixing with soil vapor.

Vapor Probe Sampling

Vapor samples will be collected in accordance with the NYSDOH *Soil Vapor Intrusion Guidance*. Vapor samples will be collected after the installation of the probes using laboratory certified 1-liter SUMMA canisters. Prior to collecting a sample, a closed circuit sampling train will be created by attaching the sampling canister via a steam-cleaned, stainless steel manifold. A "shut-in" test will be performed prior to connecting the sampling equipment to the vapor probe tubing. This test will be performed by sealing all openings to ambient air, opening the SUMMA canister to establish a vacuum inside the sampling train and waiting to ensure the vacuum remained stable over time. The shut-in test reduces the potential for ambient air to dilute the soil vapor samples. Once the sampling train passes the "shut-in" test, it will be connected to the probe tubing (0.25-inch polyethylene tubing). Using the same flow rate as will be used during sampling, approximately three purge volumes will be purged from the sample tubing before sampling begins. While sampling, the vacuum of the sample SUMMA canister will be used to draw the soil vapor through the flow controller at 0.2 mL/minute or less until a negative pressure of approximately 5 inches of mercury is observed on the vacuum gauge. A leak test will be performed during sampling using laboratory grade helium. The vapor probe inlet, probe tubing, and entire sampling train will be enclosed in a shroud. The helium concentration in the shroud will be maintained above 10 percent and quantified using a helium meter. After sampling, the SUMMA canisters will be packaged and sent to a state approved laboratory under chain-of-custody for analysis.

3.3.3 Investigation Derived Waste Management

All investigation derived waste (IDW) generated during investigation will be stored in covered 55-gallon, Department of Transportation (DOT) approved, steel drums which will be sealed at the end of each work day Each drum will be labeled with the date, well/boring number, waste type (soil, purge water), and a point of contact. The drums will be stored in a secure area of the Site until the drums can be properly removed. An appropriate waste designation will be assigned based on the remedial investigation results and the IDW will be properly disposed of according to local, state, and federal regulations.

3.3.4 Community Air Monitoring Program (CAMP)

CAMP procedures are outlined in Appendix C.

4.0 QUALITY ASSURANCE PROJECT PLAN

The following procedures will be used to ensure that samples are collected and handled in accordance with NYCDEC protocols.

Laboratory Testing

A New York State Environmental Laboratory Accreditation Program (ELAP)-certified laboratory will be used for all laboratory analysis. The laboratory will operate a Quality Assurance/Quality Control (QA/QC) program that will consist of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State. The laboratory will be Accutest Laboratories of Dayton, New Jersey. Accutest is an ELAP-certified laboratory.

Laboratory Methods and Holding Times

Table 9 summarizes the laboratory methods, sample preservatives, minimum volume required and holding time that will be used to analyze the soil, groundwater and soil vapor samples.

Field Quality Assurance/Quality Control

Field duplicate samples will be collected for soil, groundwater, and soil vapor samples at a rate of one duplicate sample per 20 field samples.

Field blank samples will be collected for soil and groundwater samples at a rate of one field blank sample per 20 field samples.

Trip blank samples will be collected at a rate of one trip blank per cooler with groundwater samples for VOCs.

Field blanks, duplicates, and trip blanks are not required for samples collected from the kettles or vaults.

Field Decontamination Procedures

Refer to Appendix A.

Chain of Custody

To ensure the integrity of samples collected, a strict chain of custody record must be maintained on each sample. This begins after sampling with the entry in the sampler's field log book of the sampling details:

- Date and time of sampling
- Sample location (as specific as possible)
- The unique sample number, size, and containers used
- Sample description

- Weather conditions (if applicable)
- Any additional comments

In addition, a record must be kept of the sample's progress from the sample site to the laboratory where it will be analyzed. This is the chain-of-custody form. The form must include:

- The sample number
- The sampler's name
- Date and time of sampling
- Location at which the sample was taken, including the address, if possible
- A description of the sample, as best known
- Signatures of people involved in the chain of possession
- Inclusive dates of possession of each person in the chain

The chain-of-custody form must accompany the sample throughout its trip to the laboratory. If the samples must be shipped to a laboratory, most shipping agents will refuse to sign or separately carry the chain-of-custody form. In this one case, it is permissible to put the chain-of-custody form into the cooler with the sample and then seal the box. The recipient of the cooler, the laboratory's sample custodian, can then attest to the cooler's arrival still sealed and unopened. Accompanying the chain-of-custody record, or included in it, must be a request to the laboratory for sample analysis. Information required includes:

- Name of person receiving the sample.
- Laboratory sample number.
- Date of sample receipt.
- Sample allocation.
- Analysis to be performed.

Finally, on arrival at the laboratory, the sample custodian must enter the sample in the laboratory's sample log book. The chain-of-custody should be kept on file at the laboratory.

Data Usability Summary Report

All soil, groundwater, and soil vapor analytical results will undergo a third party review and will be validated in accordance with NYSDEC Division of Environmental Remediation DER-10, Technical Guidance for Site Investigation and Remediation Appendix 2B – *Guidance for Data Deliverables and Development of Data Usability Summary Reports* (DUSR). The analytical results will be evaluated to determine whether the data meet NYSDEC data quality requirements. New Environment Horizons (NEH) of Skillman, New Jersey will be the third party validating the data.

5.0 REMEDIAL INVESTIGATION REPORT

A Remedial Investigation Report (SRIR) will be prepared upon completion of all fieldwork and review of analytical results. The SRIR will include the following components:

- Description of field activities
- Summaries of field measurements and analytical data
- Conclusions and recommendation section
- Soil boring and monitoring well logs
- Laboratory and field level monitoring summary tables
    - Tables summarizing sample results, applicable standards for all sampled media
    - Table summarizing the construction details of new and existing monitoring wells (screen elevations, date of construction, geologic interval screened, and current status, i.e., destroyed, intact, etc.)

- Maps/Drawings, including:

    - A site map showing the final sample locations
    - Spider diagrams of analytical results
    - Groundwater contour map
    - Site map(s) showing layout and sampling locations

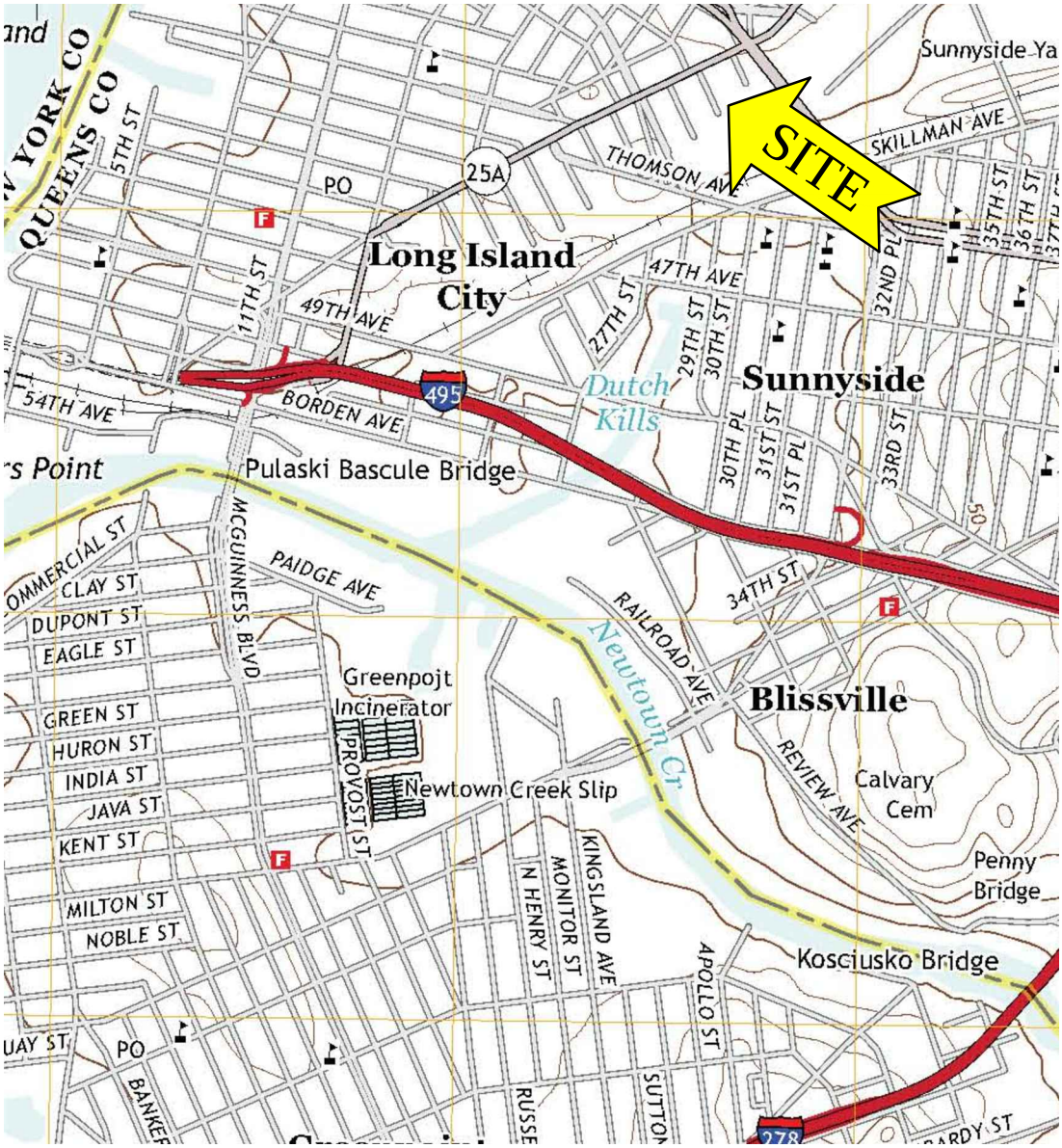
- Data validation results (DUSRs)

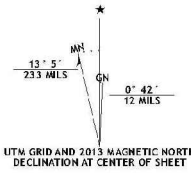
6.0 SCHEDULE

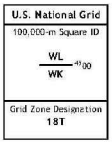
Brownfield Site B Investigation Schedule

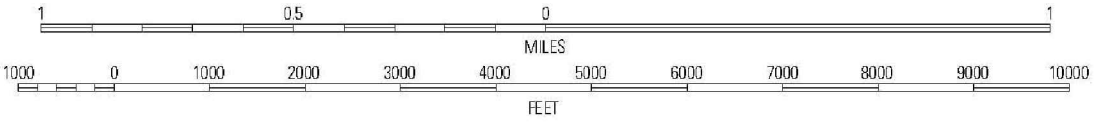
Item	Duration/Date
Submit Proposed RIWP	7/28/14
NYSDEC Reviews/Approves RIWP	7/30/14
Public Comment Period	30 Days
Comment Period Ends	8/29/14
NYSDEC Issues Notice to Proceed at Risk	1 Day, 7/31/14
Begin Remedial Investigation	8/4 – 8/11/14
Complete Remedial Investigation Field Work	30 Days
Submit Remedial Investigation Report	10/3/14

Figures









CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

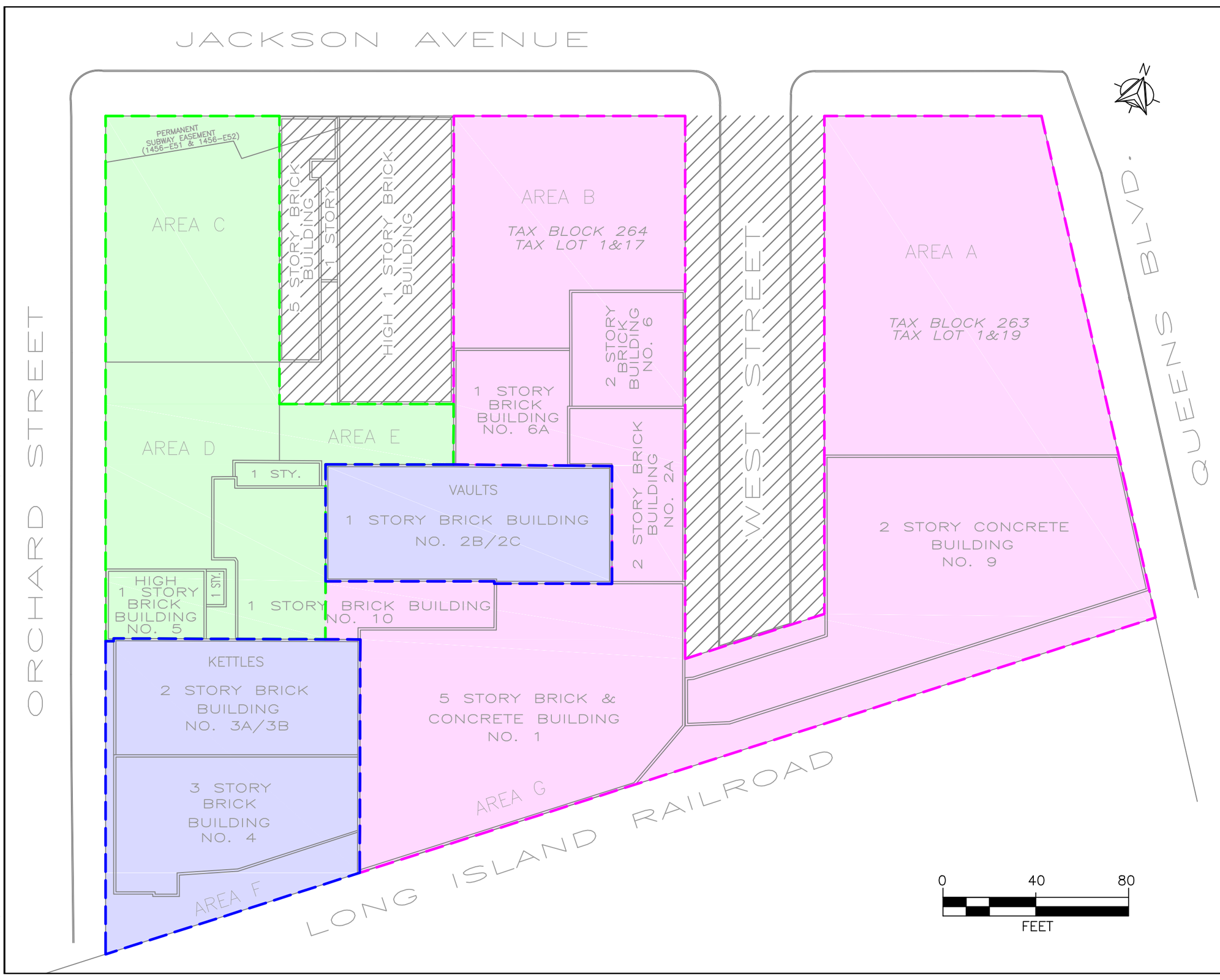
FIGURE 1: BROWNFIELD SITE LOCATION MAP

Fleming Lee Shue

SITE: Queens Plaza Residential Development
Long Island City, NY

CLIENT: TST LIC Development LLC

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Figures\Site B RAWP March 2014\CAD\Figure 1.dwg DATE: 3/6/2014



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RIWP\FIG 2 - Site Plan.dwg DATE: 7/17/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 2

SITE PLAN

Date
July 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- NOT PART OF SITE

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RIWP\FIG 3A - Hot-Spot Soil Areas.dwg DATE: 7/15/2014

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New York, NY 10001

Queens Plaza Residential Development

FIGURE 3A

HOT-SPOT SOIL AREAS

Date
July 2014

Project Number
10112-005-1

LEGEND

- VOCs EXCEEDING RRSCOs
- SVOCs EXCEEDING RRSCOs
- METALS EXCEEDING RRSCOs
- PESTICIDES EXCEEDING RRSCOs
- OUTSIDE OF SITE
- 76 GRID CELL AND NUMBER
- (8') MAXIMUM DEPTH OF SOILS EXCEEDING RRSCOs (FT. BELOW GRADE)

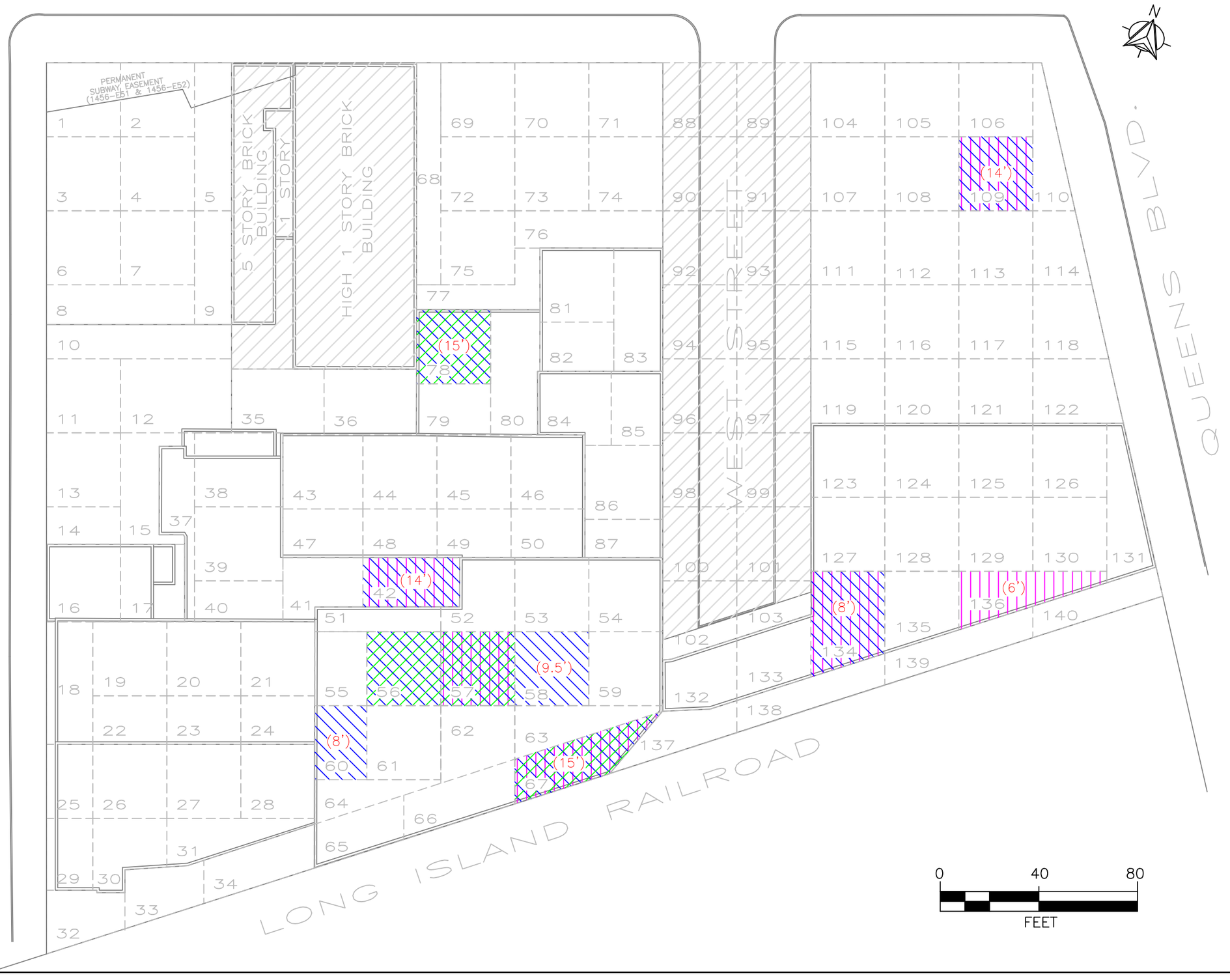
NOTE:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.)

2) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE

3) DEVELOPMENT DEPTH FOR OU–1 IS –2.7 FT. QBD (APPROX. 15 FT. BELOW GRADE); DEVELOPMENT DEPTH FOR OU–2 IS 12 FT. QBD (APPROX. 4 FT. BELOW GRADE)

QBD – QUEENS BOROUGH DATUM; TO CONVERT TO NAVD88 = QBD + 1.625 FT.



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RIWP\FIG 3B - Hot-Spot Soil Areas Below Development Depth.dwg DATE: 7/17/2014

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New York, NY 10001

Queens Plaza Residential Development

FIGURE 3B

HOT-SPOT SOIL AREAS BELOW DEVELOPMENT DEPTH

Date
July 2014

Project Number
10112-005-1

LEGEND

- VOCs EXCEEDING RRSCOs
- SVOCs EXCEEDING RRSCOs
- METALS EXCEEDING RRSCOs
- OUTSIDE OF SITE
- 76 GRID CELL AND NUMBER
- (8') MAXIMUM DEPTH OF SOILS EXCEEDING RRSCOs (FT. BELOW GRADE)

NOTE:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.)

2) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE

3) DEVELOPMENT DEPTH FOR OU-1 IS -2.7 FT. QBD (APPROX. 15 FT. BELOW GRADE); DEVELOPMENT DEPTH FOR OU-2 IS 12 FT. QBD (APPROX. 4 FT. BELOW GRADE)

QBD – QUEENS BOROUGH DATUM; TO CONVERT TO NAVD88 = QBD + 1.625 FT.

JACKSON AVENUE

ORCHARD STREET

QUEENS BLVD.

LONG ISLAND RAILROAD

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

5 STORY BRICK BUILDING

1 STORY

HIGH 1 STORY BRICK BUILDING

SB-1* SB-2 (6,5) SB-3 (7,12) SB-4* SB-5* SB-6 (13,3) SB-7 (10,21) SB-8* SB-9 (11,8) SB-10* SB-11 (26,18) SB-12 (10,22) SB-13 (18,19) SB-14 (4,29) SB-15 (28,1) SB-16 (18,6) SB-17 (4,17) SB-18 (1,9) SB-19 (31,2) SB-20* SB-21 (45,2) SB-22* SB-23* SB-24* SB-25* SB-26* SB-27* SB-28* SB-29* SB-30* WS-1* WS-2*

SOIL BORING LOCATIONS MAY VARY BASED ON ACCESS AND SITE CONDITIONS

0 40 80

FEET

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RIWP\FIG 4 - Proposed Soil Boring Locations.dwg DATE: 8/5/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development

FIGURE 4

PROPOSED SOIL BORING LOCATIONS

Date
August 2014

Project Number
10112-005-1

LEGEND

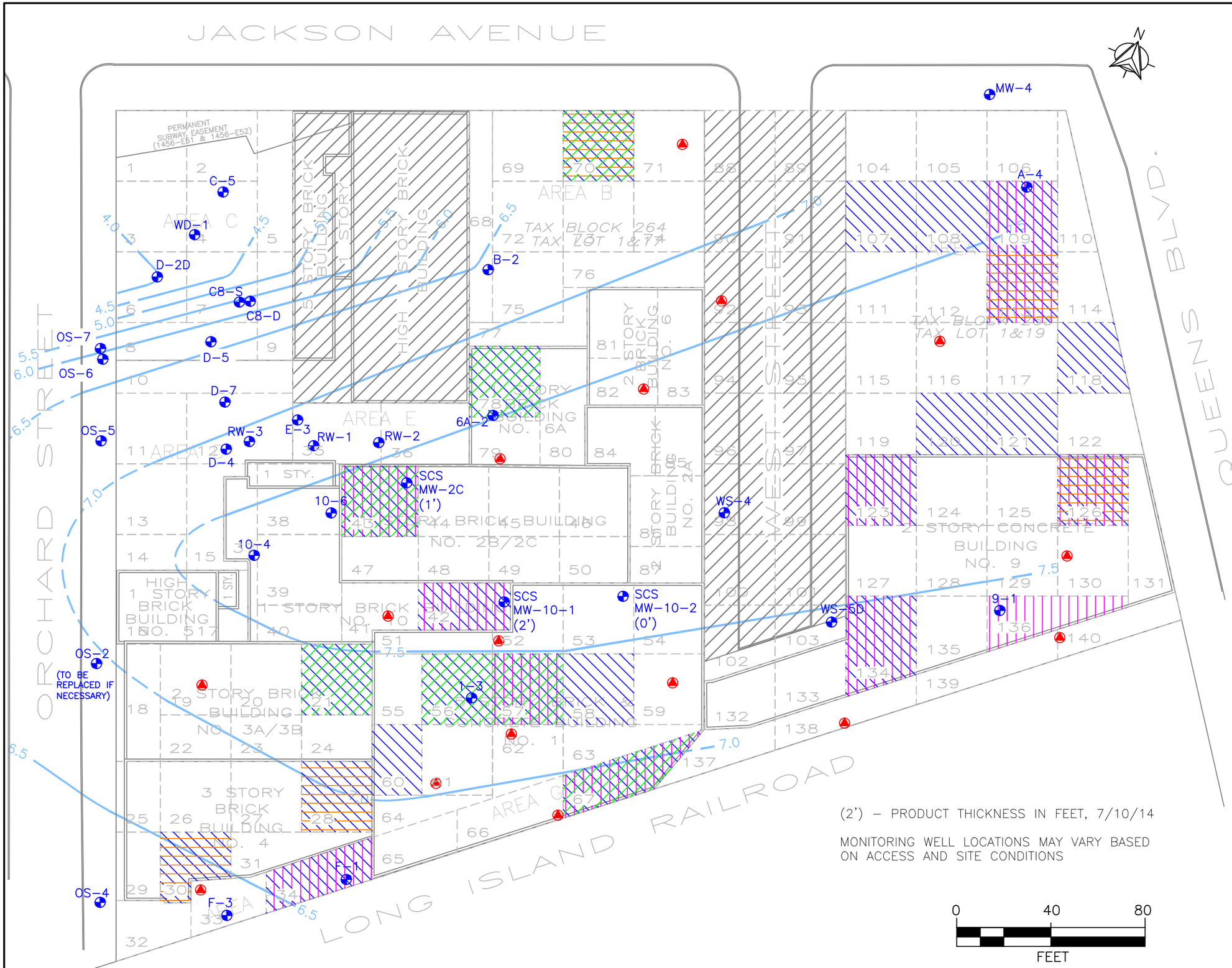
- VOCs EXCEEDING RRSCOs
- SVOCs EXCEEDING RRSCOs
- METALS EXCEEDING RRSCOs
- PESTICIDES EXCEEDING RRSCOs
- OUTSIDE OF SITE
- GRID CELL AND NUMBER
- SB-13 (18,19) SOIL BORING LOCATION (RANDOM X AND Y COORDINATES FOR LOCATION, FT.)

NOTE:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.)

2) RANDOM COORDINATES FROM THE SOUTHWEST CORNER OF GRID CELL (* DENOTES NON-RANDOM LOCATION)

3) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE



FILE: P:\Project Files\10112 – Tishman Consulting\001-10 – Site B\Figures\Site B RIWP\FIG 5 – Proposed Groundwater Sample Locations with Grids.dwg DATE: 8/5/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development

FIGURE 5

PROPOSED GROUNDWATER SAMPLE LOCATIONS

Date
August 2014

Project Number
10112-005-1

LEGEND

- VOCs EXCEEDING RRSCOs
- SVOCs EXCEEDING RRSCOs
- METALS EXCEEDING RRSCOs
- PESTICIDES EXCEEDING RRSCOs
- OUTSIDE OF SITE
- 76 GRID CELL AND NUMBER
- EXISTING MONITORING WELL
- PROPOSED MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (QBD) – DASHED WHERE INFERRED, 6/25/09

NOTE:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.)

2) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE

3) PROPOSED GROUNDWATER SAMPLES FROM BCP SITE B WELLS ONLY

QBD – QUEENS BOROUGH DATUM

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RIWP\FIG 6 - Proposed Soil Vapor Sample Locations with Grids.dwg DATE: 7/15/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development

FIGURE 6

PROPOSED SOIL VAPOR SAMPLE LOCATIONS

Date
August 2014

Project Number
10112-005-1

LEGEND

- VOCs EXCEEDING RRSCOs
- SVOCs EXCEEDING RRSCOs
- METALS EXCEEDING RRSCOs
- PESTICIDES EXCEEDING RRSCOs
- OUTSIDE OF SITE
- 76 GRID CELL AND NUMBER
- SOIL VAPOR SAMPLE LOCATION

NOTE:

1) EACH GRID CELL HAS THE APPROXIMATE DIMENSIONS OF 30 FT. BY 30 FT. (900 SQ. FT.)

2) RRSCO – RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVE

QBD – QUEENS BOROUGH DATUM

Tables

Table 1 - Summary of Key VOCs in Soils

Results in µg/kg

Queens Plaza Residential Development, BCP Site B

Compound	Unrestricted SCO	Restricted Residential SCO	NDs	Min	p50	p90	Max
Benzene	60	4,800	58/72	0.9	405	5,400	13,000
Toluene	700	100,000	51/72	2	4,200	36,000	55,000
Ethylbenzene	1,000	41,000	46/72	1	4,200	27,000	53,000
Xylene Total	260	100,000	32/70	2	9,450	99,000	213,000
BTEX	--	--	32/70	2	10,700	149,300	326,400
Methylene Chloride	50	100,000	49/71	1	6.5	12,000	15,000
Tetrachloroethylene	1,300	19,000	66/72	2	630	1,800	1,800
Trichloroethylene	470	19,000	68/71	5	800	930	930
Total VOCs	100,000	100,000	4/72	10	453	110,000	364,800

BTEX – benzene, toluene, ethylbenzene and xylene (total)

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p50 (median) (50 percent of results), p90 (90 percent of results), max (maximum). Statistics based on detected results only.

Table 2 - Summary of Key SVOCs in Soils

Results in µg/kg

Queens Plaza Residential Development, BCP Site B

Compound	Unrestricted SCO	Restricted Residential SCOs	NDs	Min	p50	p90	Max
Naphthalene	12,000	100,000	24/74	45	2,886	729,580	7,100,000
Methylnaphthalene	--	--	33/73	18	18,950	887,750	6,500,000
Benzo(a)pyrene	1,000	1,000	38/75	42	980	13,000	38,000
Benz(a)anthracene	1,000	1,000	32/75	46	1,829	13,000	46,000
Acenaphthene	20,000	100,000	33/75	45	11,332	131,741	2,500,000
Dibenzofuran	7,000	59,000	34/75	58	4,800	76,000	280,000
Fluorene	30,000	100,000	29/75	41	8,800	89,000	2,400,000
2,4-Dimethylphenol	--	--	56/79	68	5,700	230,000	620,000
2-Methylphenol	330	100,000	59/78	58	2,235	45,000	48,000
3,4-Methylphenol	330	100,000	1/6	12,000	21,000	560,000	560,000
4-Methylphenol	330	100,000	57/78	65	1,300	19,000	24,000
Phenol	330	100,000	68/77	170	1,700	11,000	11,000
4-Nitrophenol	--	--	75/79	580	2,100	3,000	3,000
SVOC Total	--	--	6/76	55	22,536	1,193,050	22,210,000

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p50 (median), p90 (90 percent of results), max (maximum). Statistics based on detected results only.

Table 3- Summary of Key Metals in Soils

Results in mg/kg

Queens Plaza Residential Development, BCP Site B

Compound	Unrestricted SCOs	Restricted Residential SCOs	NDs	Min	p50	p90	Max
Arsenic	13	16	20/66	0.45	3.6	16	34
Barium	350	400	0/60	11	60	178	881
Cadmium	2.5	4.3	47/66	0.44	0.85	5.2	14
Chromium	--	--	0/66	5.2	17	28.3	96
Lead	63	400	4/66	2.2	50	924	3,380
Mercury	0.18	0.81	30/66	0.03	0.31	1.3	2.7
Nickel	30	310	0/66	4.5	12.7	21.7	33
Selenium	3.9	180	57/66	0.83	2.3	5.9	6
Silver	2	180	60/66	0.90	1.5	3.7	4
Zinc	109	10,000	0/65	12.5	69	408	1,390

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p50 (median) (50 percent of results), p90 (90 percent of results), max (maximum). Statistics based on detected results only.

Table 4 - Summary of Key Pesticides in Soils

Results in µg/kg

Queens Plaza Residential Development, BCP Site B

Compounds	Unrestricted SCOs	Restricted Residential SCOs	NDs	Min	p50	p90	Max
alpha-BHC	20	480	60/64	1.9	24	593	593
beta-BHC	36	360	63/64	1.8	1.8	1.8	1.8
Chlordane(alpha)	94	4,200	63/64	354	354	354	354
Chlordane (gamma)	--	--	31/44	4	140	410	940
4,4'- DDD	3.3	13,000	57/64	3	49	10,800	10,800
4,4'-DDE	3.3	8,900	57/64	4.	43	2,660	2,660
4,4'-DDT	3.3	7,900	58/64	4.9	15	130	130
Dieldrin	5	200	59/64	13	120	2,480	2,480
Endosulfan-I	2,400	24,000	63/64	131	131	131	131
Endosulfan-II	2,400	24,000	58/64	21	60	620	620
Heptachlor	42	2,100	55/64	38	210	890	890

SCOs – 6 NYCRR Part 375 Environmental Remediation Program Soil Cleanup Objectives for Unrestricted Use (Table 375-6.8 [a]) and Restricted Residential Use (Table 375-6.8 [b]).

NDs – Number of non-detects among samples (non-detects / no. of samples), min (minimum), p50 (median) (50 percent of results), p90 (90 percent of results), max (maximum). Statistics based on detected results only.

Table 5 - Summary of Key VOCs in Groundwater

Results in µg/L

Queens Plaza Residential Development, BCP Site B

Compound	NYSDEC TOGS 1.1.1 Groundwater Standards	NDs	Min	p50	p90	Max
Benzene	1	1/6	1.5	91	1,100	1,100
Toluene	5	0/6	0.17	56	1,900	1,900
Ethylbenzene	5	0/6	0.12	52	350	350
Xylene total	5	0/6	0.65	170	1,440	1,440
BTEX	--	0/6	0.94	322	4,790	4,790
Methylene chloride	5	2/5	0.84	79	8,400	8,400
VOC Total	--	0/6	1.97	368	24,711	24,711
Tetrachloroethene	5	4/6	1.4	2.5	3.6	3.6
Trichloroethene	5	2/5	1.3	1.8	38	38

NYSDEC TOGS 1.1.1– New York State Department of Environmental Conservation- Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values , Groundwater Effluent Limitations

NDs – Number of non-detects among samples (non-detects / no. of samples), min - (minimum), p50 - (median) (50 percent of results), p90 - (90 percent of results), max - (maximum). Statistics based on detected results only.

Table 6 - Summary of Key SVOCs in Groundwater

Results in µg/L

Queens Plaza Residential Development, BCP Site B

Compound	NYSDEC TOGS 1.1.1 Groundwater Standards	NDs	Min	p50	p90	Max
Naphthalene	10	0/6	20	291	7,600	7,600
2-Methylnaphthalene	--	1/5	15	106	1,600	1,600
Benzo(a)pyrene	ND	4/5	14	14	14	14
Benzo(a)anthracene	--	4/5	18	18	18	18
Acenaphthene	20	1/5	11	64	160	160
Dibenzofuran	--	2/5	10	15	150	150
Fluorene	50	2/5	5.4	17	170	170
2,4-Dimethylphenol	50	2/5	120	411	18,000	18,000
4-Methylphenol	--	2/4	100	4,600	9,100	9,100
Phenol	--	2/5	14.5	60	990	990
4-Nitrophenol	--	4/5	200	200	200	200
SVOC Total	--	4/11	55	741	40,350	40,350

ND – not detected

NYSDEC TOGS 1.1.1– New York State Department of Environmental Conservation- Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values , Groundwater Effluent Limitations

NDs – Number of non-detects among samples (non-detects / no. of samples), min - (minimum), p50 - (median) (50 percent of results), p90 - (90 percent of results), max - (maximum). Statistics based on detected results only.

Table 7 - Summary of Key Metals in Groundwater

Results in µg/L

Queens Plaza Residential Development, BCP Site B

Compounds	NYSDEC TOGS 1.1.1 Groundwater Standards	NDs	Min	p50	p90	Max
Arsenic	25	0/2	4.1	10	16	16
Barium	1,000	0/2	9.6	197	384	384
Lead	25	2/3	5.8	5.8	5.8	5.8
Nickel	100	1/3	12	45	78	78
Mercury	0.7	3/3	ND	ND	ND	ND
Zinc	--	1/3	14	81	148	148

NYSDEC TOGS 1.1.1– New York State Department of Environmental Conservation- Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values, Groundwater Effluent Limitations

NDs – Number of non-detects among samples (non-detects / no. of samples), min - (minimum), p50 - (median) (50 percent of results), p90 - (90 percent of results), max - (maximum). Statistics based on detected results only.

Table 8 - Soil Boring & Monitoring Well Locations & Rationale

Sample Location	Area	Grid Cell	Sample	Boring Depth	Sample Interval	Convert to Well	Replicate Sample	Rationale
1	Bldg. 1	41	Soil	bedrock	4 ft to rock	X	water table	Assess extent of creosote from Bldg. 3. Verify Hot spot area. Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1. Delineate NAPL.
2	Bldg. 1	61	Soil	bedrock	4 ft to rock	X	--	Assess extent of creosote from Bldg. 3. Verify Hot spot area. Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1. Collect groundwater data near area with NAPL contamination.
3	Bldg. 1	65	soil	bedrock	4 ft to rock	--	--	Assess extent of creosote from Bldg. 3. Verify Hot spot area. Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1.
4	Bldg. 1	62	soil	bedrock	4 ft to rock	X	~ 4 ft-bg	Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1. Verify hot spot area limit. Delineate NAPL from Bldg. 2.
5	Bldg. 1	52	soil	bedrock	4 ft to rock	X	~ 4 ft-bg	Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1 & Bldg 10. Verify hot spot area limits. Delineate NAPL from Bldg. 2.
6	Bldg. 6A	79	soil	bedrock	4 ft to rock	X	--	Collect data to define extent of creosote, evaluate hot spot. Delineate NAPL.
7	Area B	75	soil	bedrock	4 ft to rock	--	water table	Collect data to define extent of creosote, obtain PAH data in Area B
8	Bldg. 6/ West St.	92	soil	20	4 ft to rock	X	--	Collect data to define Bldg. 6. Expand groundwater information in this area.
9	Area B	72	soil	20	4 to 20 ft	--	--	Collect data to define extent of creosote, obtain PAH data in Bldg. 6
10	Bldg. 2A/ West St.	96	soil	20	4 to 20 ft	--	--	Collect data to define extent of creosote, obtain PAH data in Bldg. 6
11	Bldg. 9	135	soil	20	4 to 20 ft	--	--	Collect data to define Bldg. 9
12	Area A	116	soil g.water	20	4 to 20 ft	X	--	Assess soil and groundwater conditions in Area A and near dry well
13	Area A	119	soil	20	4 to 20 ft	--	water table	Assess soil conditions in Area A
14	Area A	113	soil	20	4 to 20 ft	--	~ 4 ft-bg	Assess soil conditions in Area A, assess hot spot
15	Area A	107	soil	20	4 to 20 ft	--	--	Assess soil conditions in Area A
16	Bldg. 9	124	soil	20	4 to 20 ft	--	--	Collect data to define Bldg. 9
17	Bldg. 9	130	soil	20	4 ft to rock	X	--	Collect data to define Bldg. 9. Collect groundwater information in this area.
18	Bldg. 9/G	140	soil g.water	20	4 to 20 ft	X	--	Collect soil and groundwater data at edge of Bldg 9/Area G
19	Bldg. 9/G	138	soil g.water	20	4 to 20 ft	X	--	Collect soil and groundwater data at edge of Bldg 9/Area G
20	Bldg. 2A	54	soil	20	4 to 20 ft	--	--	Collect soil date to define hot spot and asses limits of creosote
21	Bldg. 1/G	66	soil g.water	bedrock	4 ft to rock	X	--	Assess extent of creosote from Bldg. 3. Verify Hot spot area. Collect additional OU-2 data. Assess elevated PAHs in Bldg. 1/Area G. Assess potential for off-site groundwater impacts.
22	Area B	70			4 to 20 ft	--	--	Collect soil data in Area B near Site boundary.
23	Area B	71	soil g.water	20	4 to 20 ft	X	--	Collect soil and groundwater data in Area B near Site boundary.
24	Area A	105	soil	20	4 to 20 ft	--	--	Collect soil data in Area A near Site boundary.
25	Area A	106	soil	20	4 to 20 ft	--	--	Collect soil data in Area A near Site boundary.
26	Area A	118	soil	20	4 to 20 ft	--	--	Collect soil data in Area A near Site boundary.
27	Bldg. 3	19	soil g.water	bedrock	4 ft to rock	X	--	Collect soil and groundwater data in Bldg. 3. Assess DNAPL.
28	Bldg. 4	33	soil g.water	bedrock	4 ft to rock	X	--	Collect soil and groundwater data in Bldg. 4. Assess DNAPL.
29	Bldg. 1	59	soil g.water	bedrock	4 ft to rock	X	--	Collect soil and groundwater data. Assess DNAPL.
30	Bldg. 6	82	soil g.water	bedrock	4 ft to rock	X	--	Collect soil and groundwater data in Bldg. 6.
31	Area B	76	soil	bedrock	4 ft to rock	--	--	Collect soil data in Area B near Site boundary.
WS-1	West St.	91	soil	bedrock	4 to 20 ft	--	--	Assess soil conditions in West Street
WS-2	West St.	101	soil	bedrock	4 to 20 ft	--	--	Assess soil conditions in West Street

ft-bg, feet below grade

Table 9 - Laboratory Analytical Methods and Holding Times for Samples

Matrix	Quantity (approx.)	Analysis	Method or Technique	Preservative	Jar Volume	Holding Time
SOIL	67	TCL VOCs	EPA 8260	None	3 x Encore	48 Hours for preservation by Method 5035A; 14 Days for Analysis
		TCL SVOCs	EPA 8270	None	1 x 300 mL	14 Days Extraction 40 Days Analysis
		TAL Metals	EPA 6010 / 7000	None	1 x 300 mL	14 Days Extraction 40 Days Analysis
		TCL PCBs/Pesticides	EPA 8081/8082	None	1 x 300 mL	14 Days Extraction 40 Days Analysis
WATER	16	TCL VOCs	EPA 8260	HCl	3 x 40ml.	14 Days
		TCL SVOCs	EPA 8270	None	2 x1000 mL	7 Days Extraction 40 Days Analysis
		Ammonia	Prep: SM4500-NH3 B-2011 Analytical: SM4500NH3 H-2011	sulfuric acid to a pH of <2 and cooled to 4 deg C.	1 x glass 60mL	28 days
		TAL Metals-total	EPA 6010 / 7000	HNO_3	500 mL	6 Months
		TAL Metals-dissolved	EPA 6010 / 7000	None	500 ml.	6 Months
		TCL PCBs/Pesticides	EPA 8081/8082	None	2 x 1000 mL	14 Days Extraction 40 Days Analysis
SOIL VAPOR	13	VOCs, plus naphthalene	TO+15	None	1 X L SUMMA Canister	14 Days
Kettles/ Vaults (Aqueous)	20	TCL VOCs	EPA 8260	HCl	3 x 40mL.	14 Days
		TCL SVOCs	EPA 8270	None	2 x1000 mL	7 Days Extraction 40 Days Analysis
		TAL Metals	EPA 6010 / 7000	HNO_3	500 mL	6 Months
		PCBs/Pesticides	EPA 8081/8082	None	2 X 1000 mL	14 Days Extraction 40 Days Analysis

Appendix A

FLS Standard Operating Procedures

Standard Operating Procedures

The standard operating procedures (SOPs) for monitoring well installation and development, labeling, and sampling equipment decontamination are described in the following sections. Follow the SOPs as applicable. Site-specific procedures as outlined in this SCWP supersede the SOPs.

1.0 Soil Borings

Where soil borings will be installed by means of hollow stem augers, soil samples will be collected on a continuous basis by means of a two-foot long, 2-inch-diameter, stainless steel split spoon samplers. The augers will be advanced to the top of the desired sampling interval depth and the split spoon and connected rods will be lowered through the auger and driven into the soil another two-feet using a 140-pound weight dropped through a 30-inch interval. The split spoon and rods will be withdrawn to obtain the soil sample.

Where subsurface materials consist mostly of sand mixed with fill material smaller than cobble-size, Samples may be obtained using a smaller direct push Geoprobe® sampling rig. In this case, a macrocore sampler with plastic liners will collect undisturbed soil cores down to the required depth. The four or five-foot long macrocore is pushed into the soil using the hydraulic pressure generated by the Geoprobe® rig. If resistance is encountered the Geoprobe® unit has a vibrating unit that either breaks up the resisting object or vibrates it aside. Plastic acetate liners are placed within the core barrel of the macro core to store the soil/sediment sample, and to prevent any cross-contamination between soil borings. To further reduce the chance of cross-contamination during sampling, the macrocores and equipment will be decontaminated between uses with a non-phosphate detergent wash followed by a clean water rinse, followed by a final rinse with deionized water. Once the macrocore is retrieved from its desired depth, the cutting end of the core barrel is removed, and the plastic core liner is removed. The acetate liner is then cut length-wise with a special knife. PID readings are taken from the soil while still in the core and undisturbed.

The following procedures will be used to complete all soil sampling:

- Identify that the marked-out sampling location is consistent with the location designated on the soil boring location plan, and in a safe location relative to overhead and underground utilities.
- Cleaning/decontamination of the split spoon samplers/macrocores (refer to Section 6)
- The driller will drive the sampler through the desired sampling interval.
- Recover the sampler and open to retrieve soil core. Split/cut the sample lengthwise for inspection.

- Observe the soil core for visual evidence of contamination (i.e., staining, sheens, odor and/or oil-like/ creosote-like material).
- Using a sampling utensil (i.e., sampling spoon), burrow small holes in the core at one-foot intervals, placing the PID probe in the holes along the way to retrieve measurements of organic vapor concentrations. Refer to Section 4.0 for project-specific procedures.
- Using the modified Burmister soil classification system to describe visual observations of the soil sample.
- Retrieve an aliquot from each one-foot interval soil samples and seal in a plastic bag in an ice-filled cooler until sample selection for laboratory analysis.
- Choose which samples will be analyzed at the laboratory and label and fill the laboratory-supplied sample jars with the selected soil aliquots from their respective depth intervals. Seal the sample jars and store in a cooler at 4º Celsius. Labeling and sealing procedures have been included as Section 7.
- Decontaminate soil sampling equipment between sample locations (refer to Section 6).
- Record field observations in the field log book and/or boring log data sheet, including: boring number, sample depth and sample observations (PID readings, evidence of contamination, and soil classification).

2.0 Monitoring Well Installation

Borings will be advanced to the desired depths by means of hollow stem augers and a truck-mounted or skid-mounted drill rig for the installation of monitoring wells. The monitoring wells will be constructed of two-inch diameter PVC (1 ¼-inch PVC and/or stainless steel in this work plan) in accordance with the following procedures:

- Using an oil/water interface probe, measure and record the depth to water in the open hole.
- Lower a PVC riser with a 10-foot to 15-foot length of PVC slotted screen to the bottom of the borehole. Approximately seven feet of the screen will be placed below the water table.
- If dense non-aqueous phase liquids (DNAPL) (such as PCE) are suspected, a two-foot sump of PVC casing will be attached to the bottom of the screen.
- The PVC screen slot size will be selected based on the sediment grain size observed in the soil. A slot opening of 0.020 inches will be chosen when medium to coarse sand is the dominant grain size. If silty sands or fine sand is dominant, then a 0.010-inch slot size will be chosen.

- In the annular space around the well screen, install the sand filter pack (about one to two feet above the top of the screen).

- For the one to two feet above the filter pack, a bentonite seal will be installed in the annular space.

- The remaining annular space will be filled with a bentonite-cement grout.

- Install a locking cap, flush-with-grade, curb box that has been set in cement. Set up a cement apron around the curb box to direct run-off away from the well.

- Decontaminate the hollow stem augers prior to and following each well installation (refer to Section 6).

- Record data regarding the well installation in the field logbook and/or field data sheets (i.e., location, depth, construction details, water level measurements).

3.0 Temporary Well Point Installation

In specific instances where a permanent or semi-permanent monitoring well is not planned or called for, but the field geologist or project manager makes a field decision to collect a groundwater sample; or the location of the boring does not allow the use of a larger hollow-stem auger drill rig, a temporary well point will need to be installed using a Geoprobe® drill rig to collect a groundwater sample. The temporary well point consists of a five to ten-foot length of approximately 1 ¼-inch-diameter PVC well screen placed into a borehole already produced by the Geoprobe® macrocore. A gravel pack consisting of pre-sized sand will be placed in the annular space between the screen and the borehole wall. A groundwater sample will then be collected following the procedures outlined in Section 5.3.5. When the groundwater sample has been collected the PVC well screen and riser pipe will be retrieved and placed in plastic garbage bags for later disposal. The borehole is then backfilled with Bentonite hole plug, and the surface repaired with concrete or asphalt patch.

4.0 Monitoring Well Development

The following procedure illustrates the development of all new and existing wells:

- Measure, using a water level meter or an oil/water interface probe, the depth to the water and, using a weighted tape, the total depth of the well. From these measurements, calculate the length of the water column (total depth minus depth to water). The volume of water in the well is calculated using the following conversion factors:

Well Diameter (Inches)	Volume per Foot of Water Column (gallons)
1	0.041
1 ¼	0.064
2	0.163
4	0.653
6	1.469

- Discharge the water to 5-gallon buckets using a submersible pump. Transfer water from the buckets to 55-gallon drums designated for well development water.

- When the turbidity is less than 50 nephelometric turbidity units (NTUs) (three successive readings), the well is close to being developed. If after one hour of steady pumping, the turbidity remains high, additional methods of surging and jetting may need to be considered.

- In the field logbook or on field data sheets, record the volume of water removal and any other observations made.

- The equipment must be decontaminated before and after development for each well location (refer to Section 5.3.6).

5.0 Groundwater Sampling

Groundwater will be sampled according to the USEPA protocol for low-flow purging and sampling (http://epa.gov/region1/lab/qa/pdfs/EQASOP-GW001.pdf). Groundwater samples will be collected from the monitoring wells/well points applying the following procedures no sooner than 14 days following development:

- As the well plug is removed, measure the vapor concentrations in the well using a PID.
- Ensure that any pressure in the well dissipates and that water levels have stabilized before measuring fluid levels.
- Measure depth to water and check for LNAPL or DNAPL utilizing an oil/water interface probe, if applicable. If the NAPL is measurable, groundwater samples will not be collected from such a well.
- During the well development, calculate the mid-point of the water column length within the screen, using the water level and the total well depth measured. [For example, if the total depth is 40 feet, the screened interval is 30 to 40 feet, and the depth to water is 15 feet, the mid-point of the water column within the screened interval would be 35 feet.].

- Connect dedicated polyethylene or Teflon tubing to either a submersible or peristaltic pump and lower such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. The intake should be a minimum of 1 foot above the bottom of the well screen. Record the depth of the intake in the field notes. Connect the discharge end of the tubing to the flow-through cell of a multi-parameter (or equivalent) meter, such as a Hydrolab Quanta or a Horiba U-10 or U-22. Connect tubing to the output of the cell and place the discharge end of the tubing in a 5-gallon bucket.
- At its lowest flow rate setting, activate the pump (but no more than 0.5 L/min.).
- Measure the depth to water within the well. Increase the pump flow rate such that the water level a measurement does not deviate more than 0.3 feet compared to the initial static reading.
- Transfer discharged water from the 5-gallon buckets to 55-gallons drums designated for well-purge water.
- During purging, collect periodic samples (every five minutes) and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, oxidation-reduction potential and specific conductivity).
- Continue purging the well until water quality indicators have stabilized (three successive readings) for the following parameters and criteria:

Parameter	Stabilization Criteria
pH	+/- 0.1 pH units
Temperature	+/- 3% degrees Celsius
Specific Conductance	+/- 3% S /cm
ORP/Eh	+/- 10 mV
Turbidity	+/- 10% NTUs (< 50 NTUs,): if 3 turbidity values are less than 5 NTU, consider the values as stabilized.
Dissolved Oxygen	10% for values greater than 0.5 mg/L, if 3 DO values are less than 0.5 mg/L, consider stabilized

Strive to reduce turbidity to the lowest practical limit. Record all efforts to stabilize the water quality for the well in the field book and then collect samples as described below. Discontinue purging after three well volumes have been removed and water quality parameters do not stabilize.

- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing (first VOCs then SVOCs) and place into the required sample containers. Containers are to be labeled as described in Section 5.3.7 and put in an ice-filled cooler.

- All sample bottles shall be filled to the top to minimize aeration and immediately placed on ice and in the dark to minimize temperature or photo-induced changes to the groundwater samples.
- Collect one final field sample and analyze for water quality parameters (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) and record the final readings in the field notes.
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of any sample filters in a 55-gallon drum designated for disposable sampling materials and PPE.
- Decontaminate the pump, oil/water interface probe and flow-through cell as described in Section 5.3.6.
- In the project logbook and field data sheet, record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations.

6.0 Decontamination Procedures

Decontamination will be performed on plastic sheeting or in another containment area that is deemed to prevent runoff to the ground. Prior to use on-site and between sampling locations, the macrocore sampler, probe rods, pump, oil/water interface probe, and other non-disposable sampling equipment will be decontaminated using the following protocol:

1. Scrub using tap water / non-phosphate detergent mixture and bristle brush
2. Rinse with tap water
3. Repeat step 1 and 2
4. Final rinse with distilled water.
5. Air-dry the equipment.

All invasive drilling equipment (augurs rods, etc.) will be decontaminated with a steam cleaner or pressure washer using potable water to remove any loose soil and/or contaminants.

7.0 Sampling Handling

Sample Identification

All samples will be identified using a format that provides the essential information on the use, tracking, location, and media sampled (groundwater, soil, sediment, soil gas, surface water, waste, etc.), date, time, location, and depth interval.

Examples are as follows:

Soil: B-10 (5.5-6.0), indicates that the soil sample was collected from the 5.5 - 6.0-foot intervals in boring B-10.

Groundwater: MW-1 indicates that the sample is a groundwater sample collected in monitoring well 1.

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

Blanks should be spelled out and identify the associated matrix, e.g., Field (Rinsate) Blank (FB)-Soil; Field Blank-Groundwater. Trip Blanks should be labeled with the prefix TB.

Sample Labeling and Shipping

All sample containers must contain the following information—written in waterproof indelible ink (Sharpie)—on the label:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Samplers initials
- Media Sampled

Collected and labeled samples will be placed in ice-filled coolers away from direct sunlight to await shipment/delivery to the laboratory.

To prepare the samples for shipment place each sample in a resealable plastic bag, then wrap each container in bubble wrap, only if being shipped, to prevent breakage. Finally, add fresh ice in two sealable plastic bags, or "blue ice" blocks, and the chain-of-custody form. Samples may be shipped overnight (e.g., via 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. C*oolers must be heavily iced to bring the entire sample contents to* 4^0 *C.*

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured area until arrival at the laboratory or laboratory pick up. Sample possession record from the time of obtainment in the field to the time of delivery to the laboratory or shipping 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; media sampled; date and time of collection and matrix; signatures of individuals involved

in sample transfer; and the dates and times of transfers. Laboratory personnel will examine the custody seal's condition at sample check-in.

8.0 Field Instrumentation

Equipment will be calibrated at the start of each day of field work in accordance with the manufacturer's specifications. In the instance that an instrument fails calibration, the Project Manager or QA/QC Officer must be contacted immediately so as to arrange repairs or obtain a replacement instrument. A calibration log will be maintained in the field log book in order to record specific details regarding instrument calibration, including: dates, problems, and corrective actions. The PID will be calibrated each day using a standard of 100 parts per million (ppm) isobutylene, zeroed as per manufacturer specifications.

Field personnel will be trained in the proper operation of all field instruments at the start of the field program; however, instruction manuals for all equipment will be stored on-site as a reference of the proper procedures for operation, maintenance and calibration.

Appendix B

Health and Safety Plan

Queens Development
Brownfield Cleanup Program Nos. C241105 & C241151
Long Island City, NY

HEALTH & SAFETY PLAN

TST LIC Development LLC
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Submitted to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

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&

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June 2014

I, Tom Eng, CIH certify that the Queens Plaza Residential Development Brownfield Cleanup Program Health & Safety Plan was prepared under my direction. Changes to this document may be made only with approval by T. Eng, Certified Industrial Hygienist (CIH).

4/8/14
Date

Tom C. Eng, CIH
Certified Industrial Hygienist

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1.0 INTRODUCTION

1.1 Purpose

The firms Fleming-Lee Shue, Inc. (FLS), Arnold F. Fleming P.E. (AFF), and Tom Eng of Active EHS LLC, third party Certified Industrial Hygienist (CIH) prepared this site-specific Health and Safety Plan (HASP) to address the health and safety practices and guidelines that will be employed during the environmental investigation and remediation of the Queens Plaza Development Brownfield Site (hereafter referred to as the "Brownfield Site") located in Long Island City, New York. The Brownfield Site is under the Brownfield Cleanup Program (BCP) as Site Nos. C241105 and C241151 administered by the New York State Department of Environmental Conservation (NYSDEC).

This HASP has been developed in accordance with the requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. The HASP establishes the known chemical and physical hazards associated with the work activities and provides a description of the air monitoring requirements, personal protective equipment requirements and safe operating guidelines for use by FLS/AFF and our subcontractors. This HASP applies to the FLS and AFF scope of work: remedial investigation, remedial action, interim remedial measures, and off-site investigation work. All subcontractors working with FLS/AFF will be provided with a copy of this HASP for review. Based on their means and methods of executing the work activities, the subcontractors will either accept the safety procedures outline in this HASP and FLS/AFF Health and Safety Officer's supervision or the subcontractor can provide a HASP addendum, for FLS/AFF review and acceptance, stating any additional procedures that they wish to be incorporated. Other parties (Contractors, subcontractors, and their employees) performing their own scope of work not covered by this HASP can review this HASP but must prepare their own HASP that meets Occupational Safety and Health Administration (OSHA) requirements. Contractors providing their own HASP must indicate that their HASP was prepared under the direction of a CIH. This HASP will be kept onsite during field activities and shall be accessible at all times. This HASP will be reviewed as necessary and amended or revised as conditions change and additional activities arise. All FLS/AFF site personnel and subcontractors will receive site specific HASP training and will be required to sign the Acknowledgement Form (Attachment I). All visitors, who visit the site for the purposes of

observing our work activities will also receive a health and safety briefing, sign the Acknowledgement Form, and be escorted at all times.

1.2. References

The general provisions of this HASP were developed in accordance with the provisions of OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 or 29 CFR 1926.65.

The Occupational Safety and Health Act (1970) requires the following:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.
- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Occupational Safety and Health Act, that are applicable to company business and operations.
- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.
- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

In addition, all work will comply with the Owner Required Safety Performance Standards in the appendix.

2.0 PROJECT INFORMATION

2.1 Site Description

The Brownfield Site is in Long Island City, Queens County, New York and encompasses a trapezoid-shaped parcel (Figure 1). The Site is bound by Jackson Avenue on the north. On the west, the Brownfield Site abuts Orchard Street. The eastern side of the Brownfield Site abuts Queens Boulevard and the southern boundary fronts the Long Island Railroad (LIRR) Sunnyside Yard property. West Street, a 5-story Apartment building and a New York City transit (NYCT) Substation are outside the Brownfield Site.

The Brownfield Site contains paved areas and a number of 1-, 2-, 3-story brick buildings. One 5-story building is also on Site. The Site plan is presented in Figure 2.

The Brownfield Site topography slopes gently to the south. The surface elevation ranges from approximately 12 ft. Queens Borough Datum (QBD) to 16 ft. QBD. The surface soils consist of a fill layer approximately 5 to 9 ft. thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The depth to bedrock is variable beneath the Site; it is shallow near the middle of the western side of the property and deepens to the north, south, and east. All Site soil is capped by buildings, concrete or asphalt.

The Site is in an area designated as M1-5/R9 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a special zoning provision to promote the development and transformation of historical industrial/ manufacturing areas into mixed use commercial and residential spaces

2.2 Site Background and Previous Investigation Findings

2.2.1 Site Background

The Site was occupied by the West Chemical Company (West Chemical) from the early 1900s until 1977. West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. West Chemical stored a variety of other materials on-Site during its tenancy, including muriatic (hydrochloric) acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand

creams, cleaning products (floor waxes and cleaners), and vending machine products. The manufacture of a disinfectant "Coronoleum" (CN+) prior to 1950 resulted in the storage of large quantities of creosote on the western side of the property.

2.2.2 Previous Investigation Findings

Previous Site investigations identified the following three historic instances of creosote contamination:

- Leaks in the bottoms of several aboveground storage tanks (ASTs). These are believed to all be removed.
- In 1950, the New York City Fire Department (FDNY) deliberately released the contents of a 5,000-gallon AST of creosote to the ground during a fire as an explosion prevention measure.
- Former West Chemical personnel identified that creosote was historically delivered to the plant by means of a rail siding and the creosote was pumped into a fill line and delivered to storage tanks.

The following summarizes the history of petroleum bulk storage on the subject property:

- Two, 500-gallon, gasoline underground storage tanks (USTs) were identified and were removed in 2003. They were located near the parking area that lies along Orchard Street.
- Four heating oil USTs were installed between 1947 and 1948. These USTs were originally used to store No. 6 fuel oil and later converted to No. 4 fuel oil. In 1990, the USTs were closed-in-place and a natural gas-fired heating system was installed. These are located in the western part of Building 10.
- Twenty-two aboveground storage tanks (ASTs) were identified on the Site in the 1940s and 1950s. The ASTs ranged in capacity from 3,000 to 24,000 gallons, with a total tank volume of 260,575 gallons. These have been removed.
- Forty-five process/storage vaults and kettles filled with unknown liquid were encountered in Buildings 2B, 3A, and Buildings 3A and 3B, and 10. The composition of the liquid and quantity, if any, is unknown for all of the units, but water mixed with soap and/or lye is suspected in at least one unit.

Seven previous environmental investigations, beginning in 1988, consisted of varying levels of soil and groundwater investigation, Non-Aqueous Phase Liquid (NAPL) product-level

studies, and collection of soil gas data across the Site. Previous investigations included the following studies:

1. *Queens Plaza Site B Investigation,* AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property*, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Investigation*, AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. *Site Characterization Investigation Data Summary,* SCS Engineers, July 12, 2013.

Underground Process Kettles/Vaults and Storage Tanks

According to the 2013 investigation completed by SCS Engineers, there are 17 kettles in Buildings 3A and 3B and 23 vaults in Building 2B. All kettles had some liquid in them and at least one vault contained liquid.

SCS did not identify any hazardous concentrations of gases or the risk of explosion while investigating these units. The measurements were made by a personal multi-gas meter. The SCS July 12, 2013 report provided no information on vapor conditions inside any of the kettles or vaults.

Water samples from nine kettles were collected and analyzed SCS Engineers for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pH. All VOC and SVOC results were below Toxicity Characteristic Leaching Procedures (TCLP) threshold values. One sample exceeded the TCLP threshold for mercury in one kettle (K-9). The pH was between 6.8 and 8.2 standard units.

Soil Contamination

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills on the Site. Much of this contamination is on the western part of the Site.

Creosote spills impacted soils in the form of a smear zone and deeper soils in the form of residual Dense Non-Aqueous Phase Liquid (DNAPL). Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of Building 4; creosote covers the floor and some portion of the basement walls in Building 4.

Comparatively fewer soil borings have been completed on the eastern part of the Site. The primary soil contaminants are the creosote-based and petroleum-based VOCs, benzene, toluene, ethylbenzene, and xylenes, (collectively BTEX) and SVOCs corresponding to the creosote DNAPL. The elevated concentrations of these compounds correspond to observations of soil staining or NAPL on the western part of the property. The soil analytical results are summarized in Attachment II.

Groundwater Contamination

A limited amount of groundwater data are available for the Site. The few samples that were collected during earlier investigations found elevated concentrations of BTEX and low concentrations of chlorinated VOCs. Naphthalene, methylnaphthalene, and other SVOCs associated with creosote were also detected.

Sub-Slab Vapor and Indoor Air Contamination

The previous investigations detected VOCs in the indoor air and sub-slab soil vapor on the Site. The compounds included acetone, benzene, 2-butanone, carbon tetrachloride, chloromethane, dichlorodifluoromethane, ethylbenzene, toluene, xylenes, tetrachloroethylene, trichloroethene, and trichlorofluoromethane.

3.0 SCOPE OF WORK

This HASP addresses the general activities associated with the planned environmental investigation and remediation of the Site. These activities include, but are not limited to, the following:

- Mobilization/demobilization
  - Mobilization and demobilization of equipment and supplies
  - Establishment of Site access procedures, site security and work zones
- Pre-Investigation Activities
  - Site Inspection, Geophysical Survey
  - Utility Clearance (clearing drilling and sampling locations by identifying utilities) and Permitting
- Investigation Activities
  - Inspection of vaults, kettles and other recognized environmental conditions
  - Soil boring installation and soil sample collection
  - Monitoring well installation and groundwater sample collection
  - Test pit installation (when deemed necessary)
  - Soil vapor and indoor air sampling
  - Investigation derived waste handling and storage activities
- Remedial Activities
  - Site enclosure installation
  - Soil excavation
  - Soil and materials management and disposal
  - Collection of samples for remediation (i.e. waste classification, contamination delineation etc.)
  - Sampling, investigation, and remediation of the kettles and vaults

The planned environmental investigation and remediation activities are detailed in the succeeding sections.

3.1 Site Investigation

3.1.1 Kettle Investigation – Buildings 2B, 2C, 3A, 3B & 10

Forty kettles/subsurface mixing vaults with unconfirmed amounts of liquid were found inside Buildings 2B, 2C, 3A, 3B, and 10. Previous investigations revealed traces of disinfectant and lye in the kettles which can be attributed to the historic use of the Site as a soap manufacturing facility. SCS identified VOC, SVOCs, and metals in liquids in some of the units. Mercury only was above the TCLP threshold in one unit (K-9).

A thorough investigation is needed to determine the contents and the exact amount of liquid in each of the kettles. The investigation will be conducted starting with the collection of samples from each vault, analyzing and profiling the liquid samples to determine the appropriate disposal facility, and implementing the necessary action to minimize the potential exposure risk to all workers.

3.1.2 Soil, Groundwater and Soil Vapor Sampling

Soil Investigation

Soil Boring Installation

Soil borings will be installed throughout the Site. A number of soil borings will be converted into monitoring wells. Because the general subsurface geology of the Site consists of fill, silty sand, with glacial till overlying bedrock, a sonic drill rig will be used to advance the soil borings. A Geoprobe direct-push drill rig may be used to advance borings where conditions warrant, such as where borings are shallow and/or inside buildings where access for larger drill rigs is limited.

After the soil borings have been completed, FLS will have a New York State Licensed Surveyor survey the locations.

Soil Screening

Soils will be field-screened using a photoionization detector (PID) and described along the vertical depth of each boring at each sampling location. The PID readings will be documented as well as visual and olfactory observations.

Soil Sampling and Analysis

Soil samples will be obtained by a dedicated plastic liner. The Sonic drill rig sampler will be advanced to collect soil samples down to the proposed development depth or until bedrock is encountered.

The soil samples will be containerized in accordance with EPA analytical protocols. Each sample will be labeled, sealed, and placed in a chilled cooler for shipment to the laboratory and will be analyzed for the following parameters:

- Target compound list (TCL) VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- Target analyte list (TAL) metals by EPA Method 6010/7000

Groundwater Investigation

Monitoring Well Installation

A machine-slotted PVC well screen will be installed into the saturated zone. A No. 1 Morie Sand/equivalent gravel pack will be tremied into the annular space outside the well screen to a minimum of 2 feet above the top of the well screen. A minimum 2-foot bentonite seal will be installed above the gravel pack. Any remaining annular space will be sealed with a Portland cement mix. A surface completion consisting of a flush-mounted, watertight manhole will be cemented into the pavement above the well. The monitoring wells will be developed by pumping with a submersible pump until the discharge is silt-free. Other existing monitoring wells on the Site will also be developed. Diagrams of the construction of the newly installed wells along with the existing ones will be provided in the final report. The wells will be allowed to equilibrate for a minimum of 1 week prior to sampling.

Monitoring Well Gauging

A synoptic round of water-level measurements from the newly installed wells will be collected along with the existing monitoring wells. FLS will also retain a New York State Licensed surveyor to survey the well locations and the top of casing elevations.

Groundwater Sampling and Analysis

Groundwater samples will be collected from each of the monitoring wells using low-flow sampling methods. One trip blank will also be analyzed for quality control. The groundwater samples will be analyzed for the following parameters:

- TCL VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- TAL metals by EPA Method 6010/7000

Soil Vapor Investigation

Sub-slab soil vapor samples will be collected at 12 locations throughout the Site. Soil vapor samples will be collected from temporary soil vapor sample points installed to two feet below the floor slab. At each sample location, a 0.5-inch diameter and 3.5-inch long decontaminated stainless steel sampling probe will be driven approximately 2 feet into the underlying soil under the basement floor slab. The sampling probe will be retracted approximately 4-inches to expose a sampling screen. The borehole above the sampling probe will be sealed with clay to prevent ambient above-ground air from mixing with the soil vapor. To ensure a satisfactory seal above the sampling probe, helium will be utilized to enrich the atmosphere above the sealed borehole. Soil vapor will be purged through a 0.25-inch polyethylene (PE) tubing and screened for the presence of helium, utilizing a calibrated MGD2002 helium leak detector. Once it was confirmed that helium is not being detected in the soil vapor and an appropriate seal was constructed, the soil vapor point will be purged at a flow rate of approximately 0.2

liters per minute (Lpm). Following the purging procedure, an individually-certified clean 6-liter SUMMA canister with a 2-hour regulatory control valve will be connected to the PE tubing to collect a representative soil vapor sample.

Investigation Derived Waste Management

All investigation derived waste (IDW) generated during the Site investigation will be stored in covered 55-gallon, Department of Transportation (DOT) approved, steel drums which will be sealed at the end of each work day Each drum will be labeled with the date, well/boring number, waste type (soil, purge water), and a point of contact. The drums will be stored in a secure area of the Site until the drums can be properly removed. An appropriate waste designation will be assigned based on the remedial investigation results and the IDW will be properly disposed of according to local, state, and federal regulations.

3.2 Description of Brownfield Site Remedy

The proposed remedy on the western quarter of the Site contemplates excavation and disposal of all soils down to an approximate development depth of 15 ft. below grade (ft-bg) (approximately -2.7 QBD) or to bedrock, whichever is shallower, as anticipated in the building. Additional soil removal would occur where accessible grossly contaminated soils are found, but contamination will not be chased beneath the Substation. Inaccessible materials would be addressed by institutional and engineering controls.

The proposed remedy for the eastern three-quarters of the property contemplates a combination of measures depending on the characteristic associated with individual development tracts. The proposed remediation includes removal of the upper 4 ft. of soil/fill to a development grade of 12 ft. QBD accompanied by hot spot removal, limited excavation, and capping.

Soil with LNAPL, DNAPL, creosote, or petroleum staining may be expected. Some of the soil will be extremely odorous. To control odors and dust, excavation may occur within an enclosure over the most contaminated former source and processing area, Area E and adjacent Area D, (see Additional Remedial Investigation Report (Draft), Fleming-Lee Shue, Inc., February 2010).

The enclosure will be large enough to accommodate excavation equipment and soil loading. The structure will have ventilation, air control, and a filter system to manage odors and VOCs. Foam may also be used to control odors.

It is estimated that approximately 30,000 tons of soil will be excavated as part of the remediation on the western quarter of the Site and approximately 20,000 tons of soil on the eastern three-quarters. Large pieces of debris such as wood and concrete will be segregated from the soils and set aside as construction and debris (C & D) for disposal. Stained soils will also be segregated for disposal. Additionally, there will be removal of several USTs, testing and removal of water from derelict processing kettles, and possible concrete demolition. Pre-characterization of soils before remediation begins will also occur. Unknown subsurface utilities may be on Site.

Air Monitoring will be required both on the Site, at the site perimeter, and within the excavation enclosure(s). Air monitoring includes dust monitoring, PID measurements, combustible gas measurements (Oxygen [O_2], Lower Explosive Limit [LEL], Carbon Monoxide [CO], Hydrogen Sulfide [H_2S]), and colorimetric tubes.

There is a NYCT substation and tunnel adjacent to the Site where extensive excavation will occur. There is a very high possibility that ultra-high voltage lines may transect the Site. The Health and Safety Officer (HSO) will work with the NYCT to have these lines clearly marked, de-energized if possible, and/or protected as required by NYCT prior to any excavation work. Work will comply with all utility clearance distances.

3.3 Description of Brownfield Site Kettle & Vault Interim Remedial Measure Plan

Investigation

Further investigation is needed to determine the nature of the contents and liquid volume in each unit before IRM measures can be employed. The investigation will start with opening each unit, collecting vapor measurements and probing for liquid volume and collecting samples from each unit for chemical analysis. The analysis will characterize the contents and profile the liquid for disposal.

Each unit will be explored first by opening the bung with non-sparking tools and inserting an explosimeter and screening for LEL, H_2S, and O_2. If conditions prove non-flammable, then a PID will be inserted to screen for organic vapors as will a Jerome mercury analyzer to monitor mercury vapor levels. Next, a sample of the contents will be collected for analysis using a bailer and/or peristaltic pump, or drum thief or similar apparatus. The units will be probed for their approximate dimensions, condition, and for free product.

Each unit with adequate liquid volume will be sampled and the samples analyzed for the following parameters:

- NYSDEC ASP 2005 TCL VOCs, EPA Method 8260
- NYSDEC ASP 2005 TCL SVOCs, EPA Method 8270
- NYSDEC ASP 2005 TAL metals, EPA Method 6010/7000
- Total Petroleum Hydrocarbons (TPH), Diesel & Gasoline range organics
- TCLP analysis as warranted by analytical results
- Field parameters: pH, conductivity, temperature, oxidation reduction potential, and dissolved oxygen measurement

The first phase will be sampling and evaluation of the results. The second phase will be removal, disposal, and stabilizing of the units.

Remedy

Remediation depends on the chemical and physical conditions of the contents of each unit. In general, the IRM will include the following parts:

1. Render the unit(s) inert to eliminate the potential for flammable and/or toxic vapors. This will be accomplished by either venting the interior with fresh air and/or introducing nitrogen or carbon dioxide to displace any vapors. Rendering the unit(s) inert will not be undertaken if unwarranted by the conditions. The decision on the means and methods for rendering the unit(s) inert will be based on the analytical data and field conditions.

2. Remove the liquid in each unit. Liquids in each unit will be removed by means of a vacuum truck. After removal, the interior may be power washed to remove residue and the rinse volume again removed by vacuum truck. The decision will be field based. The vacuum truck or tanker may remain on Site until all units are emptied, tested, and accepted at an approved disposal facility.

3. The units will be stabilized, after cleaning, if warranted by field conditions. Stabilization may include filling the interior with nitrogen, carbon dioxide, foam, or other inert material to displace the vapors. Alternatively, the top of the units may be removed to allow fresh air to vent the unit in lieu of adding inert materials. This decision will be based on the contents and condition of each unit.

4. The units will be bonded and/or grounded as necessary to reduce sparking from static electricity.

5. All work will be done with bay doors open to promote ventilation, such that there is air flow through the work area. Fans will be available to increase air flow if necessary. Air monitoring will follow the requirements in Table 2.

4.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The Health and Safety meeting will include all personnel and members of the Site Project Team. All Site workers must review and comprehend this HASP before entering the Site. The HSO or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask health and safety questions during attendance at a pre-field safety meeting. Field personnel will sign the acknowledgment form (Attachment I) maintained on-Site by the HSO. The Site Project team organization and roles are described below.

Health and Safety Officer

- Administers all aspects of the occupational health and safety program to FLS and AFF personnel
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites
- Assists management and supervisors in the health and safety training of employees
- Conducts inspections to identify unhealthy or unsafe conditions or work practices. Takes immediate corrective action.
- Investigates all accidents and takes action to eliminate accident causes
- Monitors to determine the degree of hazard
- Determines the protection levels and equipment required to ensure the safety of personnel
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels
- Monitors performance of all personnel to ensure compliance with the required safety procedures
- Ensures that all personnel have been trained in proper site-safety procedures including the use of Personal Protective Equipment (PPE), and have read and signed the Acknowledgment Form (Attachment I)
- Conducts daily health and safety briefings as necessary
- Halts work if necessary

- Ensures strict adherence to the Brownfield Site HASP
- Reviews personnel medical monitoring participation to ensure compliance
- Records safety infractions and corrective actions in field log
- Notifies subcontractors of unsafe conditions
- Ensure overall project objectives are being met
- Ensures that safety equipment is available
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations

Project Manager

- Ensure overall project objectives are being met
- Supports HSO

All FLS and AFF Employees

The minimum personal qualifications for each individual participating in field activities are as follows:

- Has had all OSHA-specific medical examinations including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators
- Participation in the FLS Occupational Health Monitoring Program
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4])
- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper personal protective safety equipment
- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries
- Be alert on Site and communicate unsafe conditions and safety infractions immediately.

Visitors

- Must be escorted upon entering the work location if they meet the health and safety requirements stated above. All non-qualified visitors will be limited to the support zone(s) for observation purposes.

- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper PPE
- Be alert on site and communicate unsafe conditions and safety infractions immediately.

5.0 POTENTIAL CHEMICAL, PHYSICAL AND BIOLOGICAL HAZARDS AND CONTROLS

This section discusses the potential chemical, physical, and biological hazards and controls associated with the investigation tasks above. A summary of potential Brownfield Site tasks, safety hazards, and safety requirements is presented in Table 1.

5.1 Site–Specific Potential Chemical Hazards/Controls

Based on data collected during previous investigations, the potential chemical hazards are creosote, petroleum hydrocarbons, and creosote-based SVOCs. The following are chemicals of concern:

- Creosote
- VOCs
    - Benzene
    - Toluene
    - Ethylbenzene
    - Xylene
- SVOCs
    - Polycyclic Aromatic Hydrocarbons
- Metals
    - Arsenic
    - Cadmium
    - lead
    - Mercury

Attachment III lists the recognized and suspected health hazards, exposure limits, physical and chemical properties, recommended protection levels and symptoms of exposure for the chemicals known or suspected. Any chemical hazards will be minimized by limiting exposure of personnel to soil and groundwater and by engineering control and PPE.

5.2 Physical Hazards/Controls

Physical hazards potentially present at the Site include, but are not limited to, the following:

Hazard	Control
Slip, trip and fall (uneven terrain and slippery surfaces)	Avoid uneven terrain, walk slowly, wear sturdy/supportive shoes
Environmental (heat/cold) stress	A discussion of heat stress and cold stress and related illnesses and controls is provided in Attachment IV.
Dust/Particulate Inhalation Hazard	Dust suppression and monitoring will be employed during this effort. A discussion of the dust suppression plan is presented in Section 7.11. The air monitoring requirements are presented in Section 8.0.
Vehicular Traffic	Avoid working in high traffic areas. If necessary, use cones, reflective vests, and consider use of a flagman/additional protection.
Fire	Ensure class ABC fire extinguisher is nearby to work area when using equipment that can provide an ignition source (heavy machinery, generators, power tools)
Noise hazards	Use ear plugs and/or ear muffs during demolition and excavation activities.
Use of heavy equipment	Stay clear of heavy equipment during operation. Maintain eye contact with operator when approaching equipment.
Flying/Falling Debris	Safety glasses and hard hats will be used during all demolition and excavation activities. Be vigilant.

Anticipated Site operations do not include the need for specific operations such as lockout/tag-out, scaffolds or confined spaces; therefore these items are not addressed in this HASP. If Site activities require these operations, the HASP will be amended and personnel properly trained, experienced and competent personnel shall be utilized.

5.3 Changing Conditions

Physical conditions change on Site and it is important to recognize this situation. One type of changing condition is the temporary enclosure. The structure is vulnerable to movement by wind or equipment and may become unstable with shifting ground and vibration. A growing excavation and building demolition may alter stability. It is important to be mindful of this potential and to periodically look for unsecured or damaged components supporting the structure. If these conditions occur, they should immediately be brought to the attention of the HSO and construction manager.

Other potentially changing conditions include gases and depth of excavation. As the excavation deepens below the breathing zone, it is possible for gases/vapors denser than air to accumulate. These gases must be monitored before entering the excavation or enclosure. This is especially true at the beginning of each work day after gases have had all night to accumulate. If air monitoring results identify concentrations above their established action levels, localized ventilation may be used to reduce the concentrations to below the action levels prior to the start of work.

5.4 Biological Hazards

General biological hazards present at the Brownfield Site include, but not limited to, the following:

- Bites or stings from insects (particularly ticks) resulting in skin inflammation, disease, or allergic reaction
- Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma
- Rodent and/or bird droppings inside vacant buildings

6.0 HEALTH AND SAFETY PROTOCOL

6.1 Site Work Hazard Evaluation

Upon review of contaminant levels and physical hazards, exposure routes and the nature of the remediation/excavation/construction tasks, it has been determined that Level D protection will be used to start all FLS/AFF field activities with a contingency to upgrade to Level C protection if warranted. Air monitoring and action levels for the appropriate level of PPE appear in Table 2.

6.2 Training

Knowledge of the safety rules, supplemented by compliance, is essential to safety. New employees will be provided orientation training by qualified personnel having at a minimum the 40-hour OSHA HAZWOPPER training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site. Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety-training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program. If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics
- Confined space entry (Not anticipated)
- Respirator care/use
- Hazard communication (hazardous chemicals)
- Slip, trip and fall hazards and fall protection
- Lockout/tagout procedures (Not anticipated)
- Scaffold use, and erection/dismantling (Not anticipated)
- Blood-borne Pathogens (Non-Medical)

Specialized training will be documented in the employees' personnel records and/or in a master training record.

6.3 Personal Hygiene

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol at the work site is prohibited. Field personnel taking prescription or non-prescription medication that could impair function or cause drowsiness should alert the HSO before work begins. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater or soil should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

6.4 Levels of Personal Protection

All PPE must be worn as required for each job in all operations where there is an exposure to hazardous conditions. A general description and discussion of the levels of protection that will be used for the Brownfield Site are presented in the succeeding sections.

6.4.1 Level D

Level D applies to work in areas where the possibility of contact with potentially contaminated media exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls
- Safety boots, with steel toe
- Safety glasses or face shield
- Hard hat
- Reflective vest
- Disposable nitrile gloves
- Hearing protection as needed

6.4.2 Level C

Level C is required when the action levels are exceeded per Table 2. Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D
- Full-face air purifying respirator (APR) with the combination cartridges for organic vapors, acid mist, and particulates cartridges. Coated disposable coveralls with hoods, as necessary
- Boot covers

6.5 General Workplace Safety Rules

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager—immediately.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions—Be alert!
- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.

6.6 Construction Equipment Safety Rules

A discussion of health and safety issues related to FLS and AFF employees performing work in the vicinity of common construction elements, such as electrical; compressed gas cylinders; ladders; aerial lifts; cranes; welding and brazing; tools; safety railings and other fall protection; scaffolds; excavations and trenches; motor vehicles and mechanized equipment, is provided in Attachment V.

6.7 Spill Containment Program

The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel. Spill kits, consisting of absorbents and protective equipment should be available to clean up minor spills. A minor chemical spill is one that the FLS and AFF staff is capable of handling safely without the assistance of emergency personnel. All other chemical spills are considered major. For a major spill, contact the HSO.

Procedure for Responding to a Minor Chemical Spill

- Contact HSO to obtain guidance
- Alert people in immediate area of spill
- Wear PPE, minimum level D—**First assess the spill to determine whether you have sufficient protection to continue**
- Upgrade to level C to avoid breathing vapors from spill
- Confine spill to small area using absorbent, debris, soil etc.
- Absorb spill with vermiculite, dry sand, or oil-sorbent pads
- Collect residues, place in DOT-approved containers (labeled) and dispose as chemical waste
- Clean spill area

7.0 INDIVIDUAL SAFETY AND HEALTH PROGRAMS LISTING

The OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

7.1 Hazard Communication Program

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Important elements of the written program are required to include a master listing of chemicals, maintaining material safety data sheets on each chemical, and training of employees on the program, the chemicals exposed to, and safety data sheets.

7.2 Confined Space Entry Program

If employees enter a confined space that contains or has the potential to contain an atmospheric or physical hazard, this program is required. Either the ANSI Z117.1-1989 Safety Requirements or Permit-Required Confined Space Program per OSHA (29 CFR 1910.146) must be used as guidance to develop the company's program. Primary elements of the program are identification of applicable confined spaces, testing/monitoring, control or elimination of hazards, protective equipment, entry authorization, attendants, training, and rescue.

No FLS or AFF employee is authorized to enter a confined space without the specified training AND notifying the HSO and project manager.

7.3 Respiratory Protection Program

If employees are exposed to hazardous chemical, dusts, or aerosols above the OSHA Permissible Exposure Limits or ACGIH Threshold Limit Values, and/or employees wear respirators, this program is required. Program elements are written for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use.

7.4 Occupational Noise Exposure/Hearing Conservation Program

If employees are exposed to noise levels above 85 decibels on the A scale (85 dBA), protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as written program, noise monitoring, hearing evaluations and follow-on testing, personal protective equipment (hearing protection), and maintenance of medical records.

7.5 Lockout/Tagout Program

If employees deactivate or de-energize electrical controls, equipment, or circuits and are thus exposed to electrical energy, this program is required. Program elements include lockout when possible, tagout when lockout not possible, and the employer providing and controlling lockouts.

7.6 Assured Equipment Grounding Conductor Program

If the employer uses assured equipment grounding verses ground fault circuit interrupters to provide employee electrical grounding protection, this program is required. Program elements include the inclusion of all cord sets, receptacles and cord/plug connected equipment and tools; a written program; quarterly testing; recording of each test by logging, color coding, or other equally effective means; and designation of a competent person to run the program.

7.7 Emergency Response Plan

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented to handle anticipated emergencies. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

7.8 Dust Suppression Plan

The following techniques have been shown to be effective for the controlling of the generation and mitigation of dust during construction activities:

- Applying water on haul roads
- Wetting equipment and excavation faces
- Spraying water on buckets during excavation and dumping
- Hauling material in properly sealed or watertight containers

- Restricting vehicle speeds to 10 miles per hour (mph)
- Covering excavated areas and material after excavation activity ceases
- Reducing the excavation size and/or number of excavations
- Applying dust suppressants such as calcium chloride, water, or gravel in high vehicle traffic areas
- To evaluate the effectiveness of the dust suppression measures, air-monitoring utilizing real-time dust-monitoring equipment will be performed. The requirements for air monitoring during soil disturbance activities are presented in Section 7.

7.9 Building Access

FLS and AFF employees are prohibited from entering buildings or other structures deemed unsafe and/or structurally unsound. Building 4 has been determined to pose a Class-1 Immediately Hazardous condition for structural reasons by the New York City Department of Buildings (NYC DOB).

The NYC DOB ECB Violation Number 34993699N (2/08/13) reads:

"FAILURE TO MAINTAIN BLDG WALLS OR APPURTENANCES; NOTED: AT EXPOSURE #1 (ORCHARD STREET SIDE) OBSERVED VERTICAL CRACK FROM 1ST FL TO PARAPIT WALL AT ROOF LINE, WALL BULGING, SEPARATION AT CRACK APPROX. 2", BROKEN"

7.10 Site-Specific Health and Safety Guidelines

Site-Specific Health and Safety guidelines are included in Attachment VI.

8.0 AIR QUALITY MONITORING AND ACTION LEVELS

Air quality monitoring equipment will be used during all work to monitor total organic vapors, dust, O2, LEL, H_2S, CO, and mercury. A PID (to monitor total volatile organic concentrations), a particulate monitor, a combustible gas indicator , an oxygen meter, colorimetric tubes, a CO meter, and a Jerome meter will be used during on-Site activities. Air monitoring requirements by field activity is specified in Table 1. The instruments will be calibrated daily or as necessary due to field conditions and the results noted in the project field book. A background level will be established, at a minimum, on a daily basis, and recorded in the field book. The action levels and required responses are listed in the Table 2.

9.0 SITE/WORK AREA MANAGEMENT

Per the HAZWOPER regulation, site control measures shall be implemented to protect the workers and public. A typical Site work area will consist of an exclusion zone where the actual field activity will take place, a contaminant reduction zone, and a support zone located outside the contaminant reduction and exclusion zones. The HSO will implement these zones based on the work activities that will be performed in each area. The size of the zones will be based on work activities, equipment usage, and air monitoring results. Only 40-hour HAZWOPPER-trained personnel will be allowed beyond the support zone.

Levels of personal protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

Fences, guardrails, and access control devices shall be provided and maintained by the construction contractor throughout the project activities in accordance with 29 CFR 1926. In addition, barricades, warning signs and devices, temporary lighting and other safety measures shall be provided by the construction contractor, as required, to protect site personnel.

9.1 Work Zones

Entry into the work zones begins once a person comes on Site. This approach reflects the dynamic nature of the operations and the need for everyone to be aware of the conditions while on-site. Using the concept of three zones for the Site, the following areas are identified:

Exclusion Zone

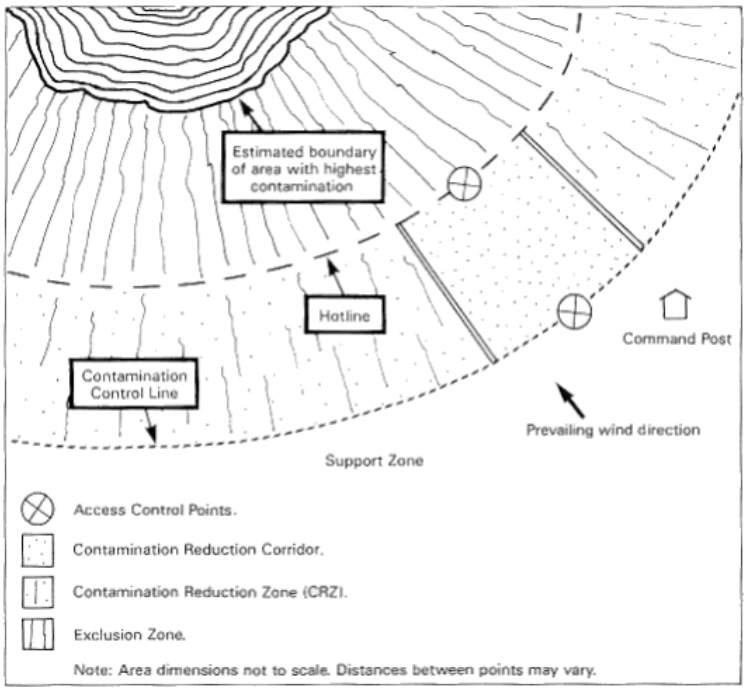
The Exclusion Zone (EZ) will be within a designated area to be determined based on where field activities will take place. No worker shall enter the Exclusion Zone without the required training and PPE. In the event that a worker in the EZ requires a replacement or his/her protective suit or respirator filters, the worker shall exit the EZ and utilize proper decontamination procedures in the CRZ, replace or repair the defective PPE, then re-enter the EZ.

Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) will be within a designated area to be determined based on where field activities will take place. Workers shall be aware of and follow all Site control procedures with respect to entering and exiting the CRZ, to ensure that they are not exposed to contaminants and to minimize the potential for contamination of workers and the spread of contamination outside the EZ. These measures include having workers follow the proper procedures for donning and doffing PPE and washing in the CRZ. The measures also address the decontamination procedures for use when moving equipment between zones. The CRZ shall consist of an area to drop off equipment, plastic bags to dispose of protective clothing, adequate soap and water for workers and equipment decontamination and a means of capturing wash water generated during decontamination.

Support Zone

This area starts at the project/property fence line and extends to the entry to where field work will be conducted. In this area all personnel shall wear Level D PPE. An example of the exclusion zone layout appears below. (Source: https://www.osha.gov/Publications/complinks/OSHG-HazWaste/9-10.pdf.



9.2 Personnel Decontamination

Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps:

Within the CRZ, the following stations will be established for the decontamination of equipment and personnel wearing Level D and Level C protection:

- Station 1: Equipment Drop – equipment used in the exclusion zone is left for use when returning to work after breaks or stored in a designated area at the end of each work day.

- Station 2: Equipment and Personal Protective Equipment Decontamination – If the equipment will be removed from the site, the equipment will be washed or wiped with a mild soap solution (e.g. Alconox or equivalent) and rinsed with clean water and wiped dry. Wash and rinse buckets with brushes should be set up in this station along with containers for trash and water containment for disposal purposes. Plastic sheeting can be used to collect material for containerization and proper disposal.

- Station 3: Respirator Cartridge Change Out – expired respirator cartridges are exchanged for new cartridges and the worker returns to the exclusion zone.

- Station 4: Change Out – removal of boots, gloves, and disposable coveralls. All PPE will be collected and containerized for proper disposal.

- Station 5: Respirator Removal – worker can remove respirator upon arrival at this station. The respirator will receive final cleaning, dried, and properly stored for future use. Workers can then clean their hands with soap and water and proceed to the clean zone.

Level D decontamination stations can be set up in a similar manner as described above with the elimination of Station 3 and Station 5.

9.3 Vehicle Decontamination

For large equipment such as excavators, backhoes, and haul vehicles, a bermed decontamination pad lined with plastic sheeting should be set up to wash the equipment and contain the rinse water prior to leaving the site. A power washer should be used to remove soil and other materials from the entire vehicle before it leaves the containment area. The rinse water should be collected and containerized for disposal.

10.0 EMERGENCY AND CONTINGENCY PLAN

Emergency communications will be maintained during all on-site field activities. The emergency route to the hospital is depicted on Figure 3 and emergency contacts and their phone numbers are presented in Table 3.

A first aid kit will be available on-site at all times for any minor on-site injuries. Emergency medical assistance or ambulance can be reached by calling 911 for more severe injuries.

All OSHA recordable injuries and illnesses will be reported using OSHA Form 301 (Attachment VII).

General Emergency Response Procedures:

Any employee discovering a fire, explosion, or release of hazardous materials, which could potentially harm human health, or the environment, must immediately notify 911 to activate appropriate emergency procedures.

The following steps will be taken to expeditiously secure the appropriate assistance:

- Ascertain pertinent information (location, type of emergency condition, presence of possible victims which may be hurt or trapped nearby to the condition) and immediately contact and provide this information to 911 emergency personnel.

- Identify yourself and give the exact location first, then the type of emergency, and the presence of possible victims which may be hurt or trapped nearby to the condition. Then await the arrival of emergency response police officers, staying a safe distance from the emergency condition if warranted.

- Contact the FLS HSO and Project Manager and notify them of situation while waiting for emergency personnel.

- If possible, have a responsible person nearby to help flag down responding emergency services personnel as they respond.

- Emergency response personnel will assess the reported emergency and advise what appropriate action needs to be taken (i.e., evacuate an area).

Unless specifically trained to handle an emergency of the type you may be reporting, please do not attempt to render assistance in handling the emergency unless ordered to do so by competent authority or emergency services personnel.

Emergency Medical Services

In the event of an injury or illness that requires medical treatment, the HSO will contact emergency services by dialing 911 (ambulance) for the transportation of the individual. In the event ambulance service is not available or the response time is not suitable, the following are driving directions to the hospital:

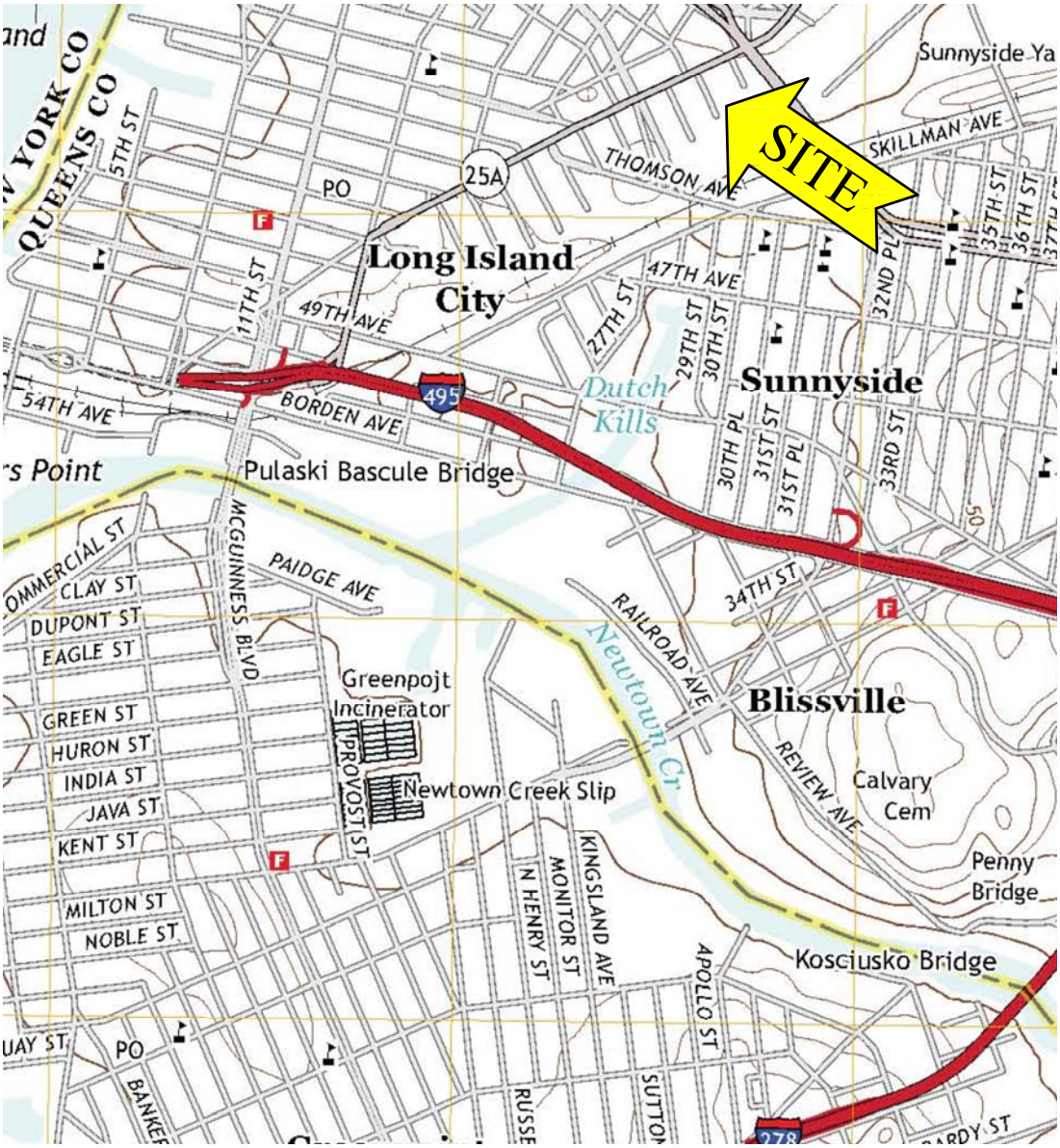
HOSPITAL

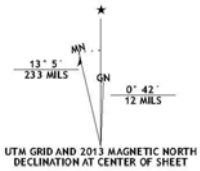
Mt Sinai Hospital of Queens: (718) 932-1000 (main line)
2510 30th Ave, Astoria,
On 30th Avenue
Between Crescent Avenue and 29th Street
NY 11102, US

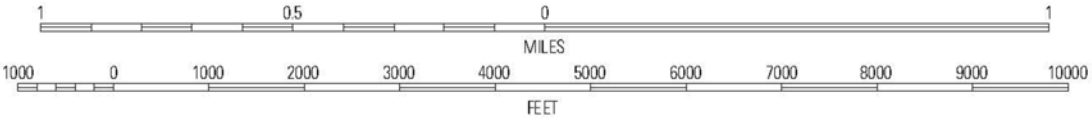
- Proceed northeast on Northern Boulevard
- Continue on 31st Street
- Turn left on 30th Street, arrive at destination

Figure 3 provides a map and route to the hospital.

Figures







CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

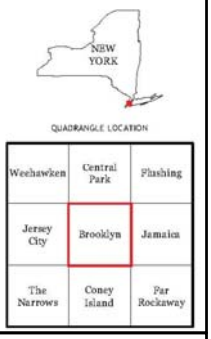


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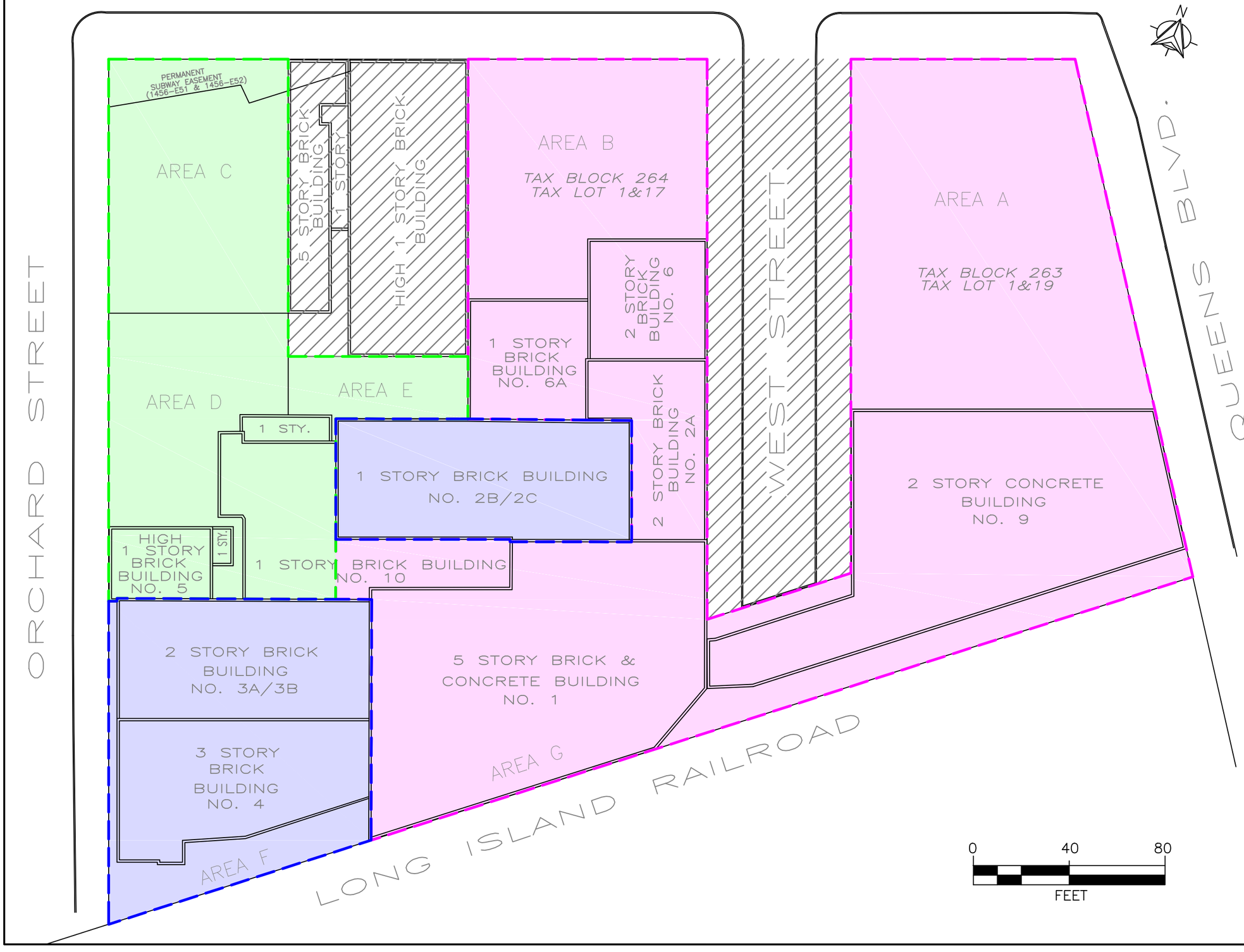
FIGURE 1: BROWNFIELD SITE LOCATION MAP

SITE: Queens Plaza Development
Long Island City, NY
CLIENT: TST LIC Development LLC

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Reports\Health & Safety Plan\Health & Safety Plan, T. Eng, CIH\Figures\Figure 1 – Site Location Map.dwg DATE: 5/15/2014



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Reports\Health & Safety Plan\Health & Safety Plan, T. Eng, CIH\Figures\Figure 2 - Site Plan.dwg DATE: 5/15/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Development

FIGURE 2

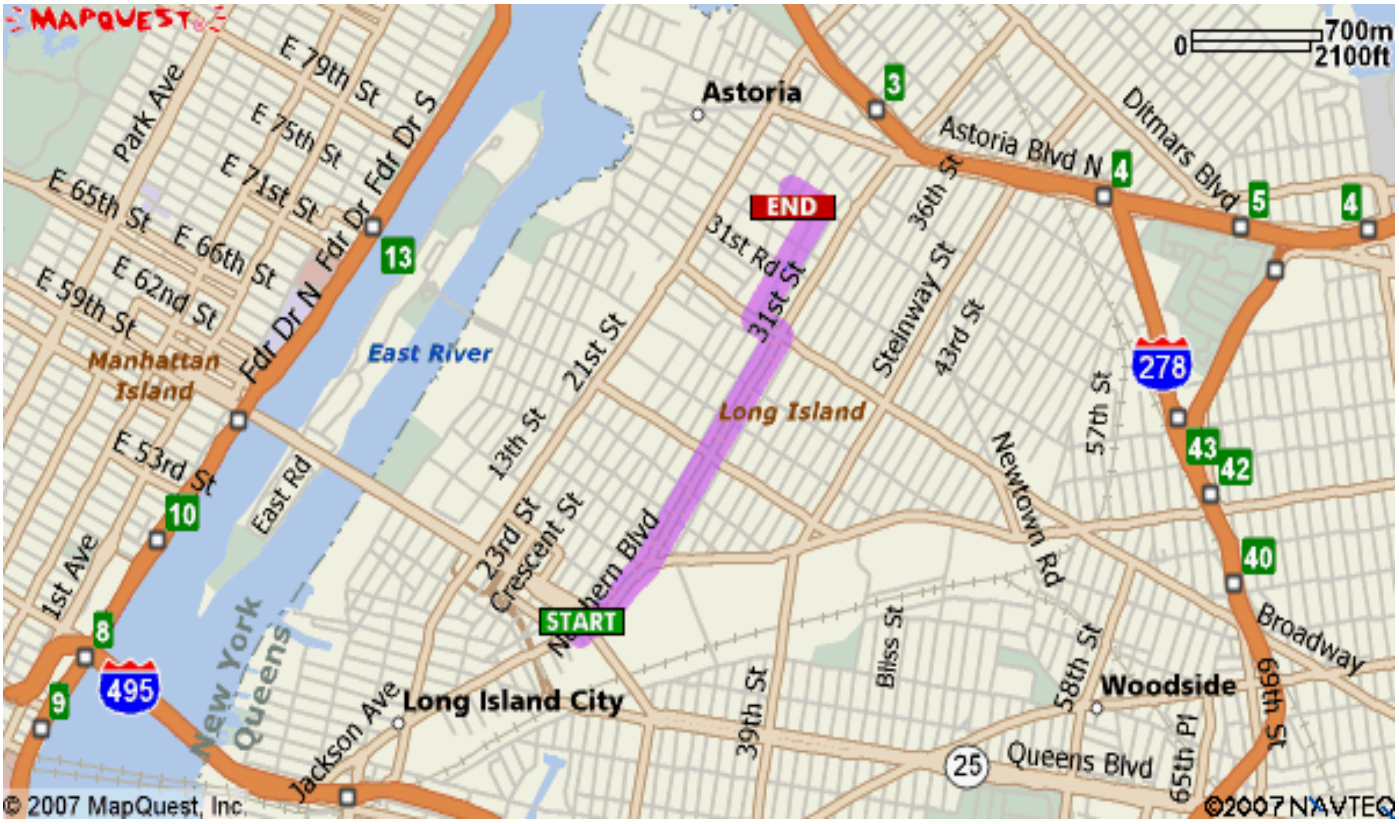
SITE PLAN

Date
May 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE



Mt Sinai Hospital of Queens:
2510 30th Ave, Astoria, NY 11102, US

Directions Distance **Total Est. Time:** 6 minutes **Total Est. Distance:** 1.76 miles

START 1: Start out going NORTHWEST on WEST ST toward JACKSON AVE / NY-25A. <0.1 miles

2: Turn RIGHT onto JACKSON AVE / NY-25A. Continue to follow NY-25A. 0.2 miles

3: Turn SLIGHT LEFT onto 31ST ST. 0.8 miles

4: Turn LEFT onto BROADWAY. <0.1 miles

5: Turn RIGHT onto 29TH ST. 0.3 miles

6: Turn LEFT onto 30TH AVE. 0.1 miles

END 7: End at **Mt Sinai Hospital of Queens:** 2510 30th Ave, Astoria, NY 11102, US

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FIGURE 3: ROUTE TO THE MOUNT SINAI HOSPITAL OF QUEENS

SITE: Queens Plaza Residential Development
42-14 West Street, Long Island City, Queens, NY
CLIENT: TST LIC Development LLC

Tables

Table 1 – Tasks, Safety Hazards & Safety Requirements

Task/Activity	Hazards	Preventative Measures	Air Monitoring Requirements
Pre-characterization Soil Sampling with Test Pits or Soil Borings	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals.	Clear utilities beforehand, use normal sampling procedures, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, and Jerome measurements for Mercury (test pits only)
Excavation - Outside	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Excavation – Inside Enclosure	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, CO, CO_2, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors each morning and after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and CO, CO_2, LEL measurements.
UST Removal	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Kettle Investigation and Cleaning	Vehicle hazards, trips, falls, materials handling, VOCs, lye, and unknowns	PPE as required with the addition of a face shield to protect against splashing.	PID measurements for VOCs, colorimetric tubes for benzene, and Jerome measurements for Mercury.

LEL - Lower Explosive Limit
PID - Photoionization detector
VOCs - Volatile organic compounds
SVOCs - Semi-volatile organic compounds
LNAPL - Light non-aqueous phase liquid
DNAPL - Dense non-aqueous phase liquid

Table 2 Air Monitoring, Action Levels, PPE

Instrument	Action Level	Response Action
Gas/Vapor		
PID	<0.5 ppm total VOCs in the workers' breathing zone (WBZ)	Continue work in Level D
PID	>0.5 ppm for a sustained period of 5 minutes in the WBZ	Use detector tube to measure benzene concentration
Colorimetric detector tube	> 0.5 ppm for benzene in the WBZ	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the benzene concentration is still greater than 0.5 ppm, upgrade to Level C, notify HSO
PID	1 to 10 ppm in the WBZ (no benzene)	Continue work in Level D
	> 10 ppm for a sustained period of 5 minutes in the WBZ (confirmed absence of benzene)	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the PID reading is still greater than 10 ppm, upgrade to Level C, notify HSO
	> 100 ppm for a sustained period of 5 minutes in the WBZ	Stop work. Resume work when readings are less than 100 ppm
Combustible Gas Indicator	Less than 20% LEL	Continue work
	Greater than 20% LEL	Stop work. Resume work when less than 20% LEL
Oxygen Monitor	Above 19.5% and less than 23.5%	Continue work
	Outside of this range	Stop work. Resume work when concentration is back in this acceptable range
Carbon Monoxide Monitor	Less than 25 ppm	Continue work
	Above 25 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 25 ppm.
Carbon Dioxide Monitor	<1000 ppm	Continue work
	>1000 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 1000 ppm.
Particulates		
Particulate Monitor	<100 µg/m^3 above background (upwind location)	Continue work, Level D
	> 100 µg/m3 above background for a period of 5 minutes in the WBZ	Stop work. Apply dust suppression measures. Resume work using Level D only if <100 µg/m^3 above background.
	>150 µg/m^3 above background for a sustained period of 5 minutes.	Stop work. Re-evaluate work. Collect air samples for As, Pb, Cd, and PAHs.
Mercury		
Jerome Monitor	<0.025 mg/m^3	Continue work, Level D
	> 0.025 mg/m3 for a period of 5 minutes in the WBZ	Stop work. Allow the work area to vent. Use mechanical ventilation as necessary. Resume work using Level D only if <0.025 mg/$m^{3.}$
	** Should Level C be necessary, contact the CIH as special coveralls and respirator cartridges are required.	

Table 3 – Key Personnel Emergency Phone Numbers

New York City Police Department	911
New York City Fire Department	911
New York University Medical Center 550 1st Avenue New York, NY	(212) 263-7300
Mount Sinai of Queens Hospital 25-10 30th Avenue Astoria, NY	(718) 932-1000
Emergency Medical Service (ambulance)	911
Patrick Shiels, Tishman Speyer	(212) 715-0361
Arnold F. Fleming, P. E., Project Director	(212) 675-3225
Steven Panter, FLS Project Manager	(212) 675-3225
TBD, Site Health and Safety Officer	(212) 675-3225
Tom Eng, CIH	(201) 417-3079
National Response Center	(800) 424-8802
NYSDEC Spill Hotline	(800) 457-7362

Attachment I

HASP ACKNOWLEDGMENT FORM

The following personnel have read the site-specific HASP and are familiar with its provisions.

Print Name	*Signature*	*Company*	*Function*	*Date*

Attachment II

Note: The Site is broken into two sections, BCP Site A and BCP Site B. BCP Site B is broken down further into Operable Units 1 & 2. The summary information is presented in this manner.
Refer to Figure 2, Site Plan

Table 7 – Summary of VOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Benzene	94/151	1.1	665	6,440	35,800
Toluene	45/151	0.62	2,250	42,200	195,000
Ethylbenzene	37/151	0.83	3,050	31,200	67,000
Total Xylene	28/151	0.96	11,950	119,500	312,000
BTEX	25/148	0.99	14,4727	192,960	567,300
Methylene chloride	122/151	2	116	4,200	13,000
Total VOCs	110/151	9	13,030	195,154	759,966
Tetrachloroethylene	132/151	2	392	3,300	230,000
Trichloroethylene	13/153	8	368	1,400	2,600

NDs – Number of non-detects among samples (non-detects/no. samples). Min., median, 90th %, and max. for detected results.

Table 8 – Summary of SVOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Naphthalene	17/119	67	111,000	1,500,000	3,320,000
2- Methylnaphthalene	12/83	17	181,000	1,550,000	3,330,000
Benzo(a)pyrene	56/119	16.9	522	2,360	12,000
Benzoaanthracene	43/119	21.5	709	3,420	13,000
Acenaphthene	17/119	21.3	32,200	320,000	707,000
Dibenzofuran	17/119	47	68,900	312,000	780,000
Fluorene	20/119	17.1	19,300	149,000	411,000
Total SVOCs	9/126	11	164,190	2,850,301	8,576,290

Table 9 – Summary of Metals on BCP Site A, mg/kg

Compound	NDs	Min	Median	90th %	Max
Arsenic	20/74	0.48	4	14.8	47
Barium	0/74	10.3	86	290	930
Cadmium	46/74	0.44	0.79	2.5	15.2
Chromium	0/74	3.95	22	41	64
Lead	2/74	2.76	29.8	511	2,190
Mercury	38/74	0.04	0.29	1.6	4.9
Nickel	0/74	2.97	16.7	24	42.7
Selenium	65/74	1.3	2	2.7	2.7
Silver	70/74	0.98	1.0	1.1	1.1
Zinc	0/73	6.36	77	372	6,100

Table 10 – Summary of Pesticides on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Alpha BHC	71/76	10.9	58.2	930	930
Beta BHC	75/76	2.4	2.4	2.4	2.4
Alpha chlordane	36/39	200	580	660	660
Gamma chlordane	21/29	16	178	730	730
44-DDD	43/76	2.3	120	1,300	19,500
44-DDE	60/76	3.1	12.95	350	500
44-DDT	55/76	3.1	52	1,000	1,800
Dieldrin	64/76	5.8	17.5	155	230
Endosulfan II	72/76	2.3	74.5	220	220
Heptachlor epoxide	71/76	43	76	380	380

PCBs: 42 out of 44 samples collected for PBCs were non-detect. The remaining two results measured 99.6 µg/kg and 410 µg/kg.

Attachment III

Attachment III - Health Hazards for Contaminants of Concern

Contaminant	Recognized and Suspected Health Hazards
Creosote	**Recognized** carcinogen
	Suspected respiratory toxicant and skin or sense organ toxicant
Volatile Organic Compounds (VOCs) Including BTEX Benzene, Toulene, Ethylbenzene and Xylene	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Semi- Volatile Organic Compounds (SVOCs) Including Poly Aromatic Hydrocarbons (PAHs)	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Arsenic	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Beryllium	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Copper	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant
Chromium	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Cyanide	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Iron	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant

Contaminant	Recognized and Suspected Health Hazards
Lead	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Mercury	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Nickel	**Recognized** skin or sense organ toxicant and respiratory toxicant
Pesticides	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Polychlorinated Biphenyls	**Recognized** carcinogen, developmental toxicant
	Suspected endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Tetrachloroethylene	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; developmental toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Zinc	**Suspected** cardiovascular or blood toxicant; developmental toxicant; immunotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant

International Chemical Safety Cards

BENZENE

ICSC: 0015

Cyclohexatriene
Benzol
C_6H_6
Molecular mass: 78.1

ICSC # 0015
CAS # 71-43-2
RTECS # CY1400000
UN # 1114
EC # 601-020-00-8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion: see chemical dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin (further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES		face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Sore throat. Vomiting (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Fireproof. Separated from food and feedstuffs, oxidants and halogens.	Do not transport with food and feedstuffs. F symbol T symbol R: 45-11-48/23/24/25 S: 53-45 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0015

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZENE

ICSC: 0015

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
Reacts violently with oxidants and halogens causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm; 32 mg/m^3 (as TWA) A2 (ACGIH 1991-1992).
OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm See Appendix F
NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A
NIOSH IDLH: Potential occupational carcinogen 500 ppm

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and through the skin.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersion, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure far above the occupational exposure limit may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the blood forming organs, liver and immune system. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES	Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 25°C: 0.18 Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: (c.c.) -11°C Auto-ignition temperature: about 500°C Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow: 2.13
ENVIRONMENTAL DATA		

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-7
NFPA Code: H2; F3; R0;

ADDITIONAL INFORMATION

ICSC: 0015 **BENZENE**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE: Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

Material Safety Data Sheet

Beryllium, powder, -325 mesh, 99+%

ACC# 99072

Section 1 - Chemical Product and Company Identification

MSDS Name: Beryllium, powder, -325 mesh, 99+%
Catalog Numbers: AC317870000, AC317870050
Synonyms: None.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-41-7	Beryllium	>99	231-150-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: gray-white flakes.
Warning! Cancer hazard. Can be explosive when exposed to heat or flames. Causes eye, skin, and respiratory tract irritation. Inhalation of fumes may cause metal-fume fever.
Target Organs: Lungs.

Potential Health Effects

Eye: Causes eye irritation. May cause conjunctivitis and corneal inflammation.
Skin: Causes skin irritation. May cause contact dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. If heated, dust or fume may cause respiratory tract irritation.
Chronic: Chronic beryllium disease, an immunologically mediated response occurring after a latent period ranging from a few weeks to many years, causes difficult breathing on exertion, weight loss, nonproductive cough, fatigue, chest pain, anorexia, and weakness.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid.
Extinguishing Media: Do NOT use carbon dioxide. Do NOT use halogenated agents. Use approved class D extinguishing agents or smother with dry sand, clay, or sodium bicarbonate. DO NOT USE WATER!
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not breathe dust. Keep away from heat, sparks and flame. Use only with adequate ventilation or respiratory protection.
Storage: Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Beryllium	0.002 mg/m3 TWA; 0.01 mg/m3 STEL	4 mg/m3 IDLH	2 ug/m3 TWA; 5 æg/m3 Ceiling

OSHA Vacated PELs: Beryllium: 2 ug/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Flakes
Appearance: gray-white
Odor: odorless
pH: Not available.
Vapor Pressure: 1.85 mm Hg
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 2970 deg C
Freezing/Melting Point:1287 deg C
Decomposition Temperature: Not available.
Solubility: Not available.
Specific Gravity/Density:1.85 @ 20C
Molecular Formula: Be
Molecular Weight:9.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Ignition sources, dust generation, excess heat, exposure to flame.
Incompatibilities with Other Materials: Oxidizing agents, phosphorus, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), carbontetrachloride, chlorinated hydrocarbons, Contact with acids causes evolution of flammable hydrogen gas..
Hazardous Decomposition Products: Hydrogen gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-41-7: DS1750000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7440-41-7:

- **ACGIH:**
  A1 - Confirmed Human Carcinogen
- **California:**
  carcinogen, initial date 10/1/87
- **NTP:**
  Known carcinogen
- **IARC:**
  Group 1 carcinogen

Epidemiology: Epidemiologic studies have demonstrated a statistically significant increase in lung cancer mortality in beryllium-exposed workers.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: CAS# 7440-41-7: waste number P015.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	BERYLLIUM POWDER
Hazard Class:		6.1
UN Number:		UN1567
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7440-41-7 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-41-7: 10 lb final RQ (no reporting of releases of this hazardous substance is required

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7440-41-7: immediate, delayed, fire.

Section 313

This material contains Beryllium (CAS# 7440-41-7, >99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7440-41-7 (listed as Beryllium compounds, n.o.s.) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-41-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-41-7 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-41-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Beryllium, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 7440-41-7: 0.1 æg/day NSRL

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+

Risk Phrases:

R 25 Toxic if swallowed.
R 26 Very toxic by inhalation.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 43 May cause sensitization by skin contact.
R 49 May cause cancer by inhalation.
R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 7440-41-7: No information available.

Canada - DSL/NDSL

CAS# 7440-41-7 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B4, D2A, D1A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7440-41-7 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 1/21/1998
Revision #5 Date: 8/23/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet
Chloroform

ACC# 04770

Section 1 - Chemical Product and Company Identification

MSDS Name: Chloroform
Catalog Numbers: AC95232184, S79960, S79960-1, S79960HPLC-2, S79960SPEC-1, S79960SPEC-2, C2974LC, C297POP19, C297POP200, C297POP50, C297RS115, C297RS200, C297RS28, C297RS50, C297SS115, C297SS19, C297SS200, C297SS28, C297SS50, C29820LC, C298FB115, C298FB19, C298FB200, C298FB50, C298J1, C298POP19, C298POP200, C298POP50, C298POPB19, C298POPB200, C298POPB50, C298RB115, C298RB19, C298RB200, C298RB50, C298RB500, C298RS115, C298RS19, C298RS200, C298RS28, C298RS50, C298SS-11, C298SS19, C298SS28, C605-1, C605-4, C606POP19, C606POP200, C606POP50, C606RS115, C606RS200, C606RS28, C606RS50, C606SS115, C606SS19, C606SS200, C606SS28, C606SS50
Synonyms: Formyl Trichloride; Methane Trichloride; Methenyl Trichloride; Methyl Trichloride; Trichlormethan; Trichloroform; Trichloromethane.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-66-3	Chloroform	100	200-663-8
25377-72-4	Amylene	<1.0	246-916-6

Hazard Symbols: XN
Risk Phrases: 22 38 40 48/20/22

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. May cause central nervous system depression. May cause cardiac disturbances. May cause cancer based on animal studies. This substance has caused adverse reproductive and fetal effects in animals. May be harmful if swallowed. **Caution!** Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Light sensitive.
Target Organs: Blood, kidneys, heart, central nervous system, liver, cardiovascular system, excretory system, reproductive system.

Potential Health Effects

Eye: Causes moderate eye irritation. Contact with liquid causes immediate burning pain, tearing, and

reddening of the conjunctiva.
Skin: Causes mild skin irritation. Prolonged or repeated contact may dry/defat the skin and cause irritation. Absorption of liquid through intact skin is possible and may cause sys temic poisoning if contact with liquid is prolonged.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver damage. May cause cardiac disturbances. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Possible aspiration hazard. May cause hallucinations and distorted perceptions.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause cardiac sensitization and possible failure. Inhalation of large amounts may cause respiratory stimulation, followed by respiratory depression, convulsions and possible death due to respiratory paralysis. May be absorbed through the lungs. Causes irritation of the mucous membrane and upper respiratory tract.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects. Toxicity may be increased by exposure to alcohol, steroids, and ketones. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Causes cardiac sensitization to endogenous catelcholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine. Persons with liver, kidney, or central nervous system diseases may be at increased risk from exposure to this product. Alcoholic beverage consumption may enhance the toxic effects of this substance. Effects may be delayed.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Substance is nonflammable. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire. Do NOT get water inside containers. Do NOT use straight streams of water. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use water spray, fog or regular foam. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Do not breathe dust, vapor, mist, or gas. Do not ingest or inhale. Store protected from light.
Storage: Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store near alkaline substances. Separate from strong mineral acids.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chloroform	10 ppm TWA	500 ppm IDLH	50 ppm Ceiling; 240 mg/m3 Ceiling
Amylene	none listed	none listed	none listed

OSHA Vacated PELs: Chloroform: 2 ppm TWA; 9.78 mg/m3 TWA Amylene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweet, fruity odor - ethereal odor
pH: Not available.
Vapor Pressure: 160 mm Hg @ 20 deg C
Vapor Density: 4.12 (Air=1)
Evaporation Rate:11.6 (Butyl acetate=1)

Viscosity: 0.58 cps @ 20 deg C
Boiling Point: 60.5-61.5 deg C
Freezing/Melting Point:-63 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble.
Specific Gravity/Density:1.492 (Water=1)
Molecular Formula:CHCl3
Molecular Weight:119.366

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Light sensitive.
Conditions to Avoid: High temperatures, incompatible materials, light.
Incompatibilities with Other Materials: Strong oxidizing agents, aluminum, fluorine, magnesium, sodium potassium, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), dinitrogen tetraoxide, sodium + methanol, potassium-tert-butoxide, chemically active metals, Attacks some forms of plastics, rubbers, and coatings., nitrogen tetroxide, acetone + alkali, disilane, perchloric acid + phosphorus pentoxide, sodium methylate, triisopropylphosphine, sodium methoxide + methanol.
Hazardous Decomposition Products: Hydrogen chloride, carbon monoxide, carbon dioxide, chlorine, phosgene gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 67-66-3: FS9100000
CAS# 25377-72-4 unlisted.
LD50/LC50:
CAS# 67-66-3:
Draize test, rabbit, eye: 148 mg;
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 47702 mg/m3/4H;
Oral, mouse: LD50 = 36 mg/kg;
Oral, rat: LD50 = 695 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;

CAS# 25377-72-4:

Carcinogenicity:
CAS# 67-66-3:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 10/1/87
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen CAS# 25377-72-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Oral, rat: TDLo = 13832 mg/kg/2Y-C (Tumorigenic - Carcinogen ic by RTECS criteria - Blood - leukemia).; Oral, mouse: TDLo = 127 gm/kg/92W-I (Tumorigenic - Carcinogenic by RTECS criteria - Liver - tumors).; Oral, rat: TD = 98 gm/kg/78W-I (Tumorigenic - neoplastic by RTECS

criteria - Kidney, Ureter, Bladder - Kidney tumors and Endocrine - thyroid tumors).; Oral, mouse: TD = 18 gm/kg/17W-I (Tumorigenic - neoplastic by RTECS criteria - Liver - tumor s).;
Teratogenicity: Oral, rat: TDL0 = 1260 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Specific Developmental Abnormalities - musculoskeletal system.; Inhalation, rat: TCLo = 100 ppm/7H (female 6-15 day(s) after conception) Specific Developmental Abnormalities - gastrointestinal system and homeostasis.; Inhalation, mouse: TCLo = 100 ppm/7H (female 8-15 day(s) after conception) Specific Developmental Abnormalities - craniofacial (including nose and tongue).
Reproductive Effects: Inhalation, rat: TCLo = 30 ppm/7H (female 6-15 day(s) after conception) Fertility - other measures of fertility.; Inhalation, rat: TCLo = 300 ppm/7H (female 6-15 day(s) after conception) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated) and post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Neurotoxicity: No information available.
Mutagenicity: DNA Inhibition: Human, HeLa cell = 19 mmol/L.; Sister Chromatid Exchange: Human, Lymphocyte = 10 mmol/L.; Micronucleus Test: Oral, rat = 4 mmol/kg.; Unscheduled DNA Synthesis: Oral, rat = 1 gm/kg.; Sister Chromatid Exchange: Hamster, Embryo = 100 umol/L.
Other Studies: Open irritation test: Administration onto the skin (rabbit) 10 mg/24H (Mild). Standard Draize Test: Administratio n onto the skin (rabbit) = 500 mg/24H (Mild). Standard D raize Test: Administration into the eye (rabbit) = 20 mg /24H (Moderate).

Section 12 - Ecological Information

Ecotoxicity: Fish: Channel catfish: LC50 = 75 ppm; 96 Hr; Unspecified Rainbow trout: LC50 = 43.8 mg/L; 96 Hr; Static bioassay Fathead Minnow: LC50 = 129.0 mg/L; 96 Hr; Static bioassay (pH = 7.6-8.3) Bluegill/Sunfish: LC50 = 100.0 mg/L; 96 Hr; Static bioassay flea Daphnia: EC50 = 28.9 mg/L; 48 Hr; Static bioassay The majority of the environmental releases from industrial uses are to the atmosphere; releases to water and land will be primarily lost by evaporation and will end up in the atmosphere. Release to the atmosphere may be transported long distances and will photodegrade with a half-life of a few months. Spills and other releases on land will also leach into the groundwater where it will reside for long periods of time.
Environmental: Chloroform will not be expected to bioconcentrate into the food chain but contamination of food is likely due to its use as an extractant and its presence in drinking water.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 67-66-3: waste number U044.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	CHLOROFORM				CHLOROFORM
Hazard Class:	6.1				6.1(9.2)
UN Number:	UN1888				UN1888

Packing Group:	III				II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 67-66-3 is listed on the TSCA inventory.
CAS# 25377-72-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 67-66-3: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 67-66-3: 10 lb final RQ; 4.54 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 67-66-3: 10,000 lb TPQ
SARA Codes
CAS # 67-66-3: acute, chronic. CAS # 25377-72-4: acute, flammable.
Section 313
This material contains Chloroform (CAS# 67-66-3, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 67-66-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 67-66-3 is listed as a Hazardous Substance under the CWA. CAS# 67-66-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 67-66-3 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 67-66-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 25377-72-4 can be found on the following state right to know lists: New Jersey.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Chloroform, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 67-66-3: 20 ug/day NSRL (oral); 40 ug/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 22 Harmful if swallowed.
R 38 Irritating to skin.
R 40 Limited evidence of a carcinogenic effect.

R 48/20/22 Harmful : danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)
CAS# 67-66-3: 3
CAS# 25377-72-4: No information available.
Canada - DSL/NDSL
CAS# 67-66-3 is listed on Canada's DSL List.
CAS# 25377-72-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A, D1B.
Canadian Ingredient Disclosure List
CAS# 67-66-3 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 67-66-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3) OEL-AUSTRALIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-AUSTRIA:TWA 10 ppm (50 mg/m3) OEL-BELGIUM:TWA 10 ppm (49 mg/m3);Carcinogen JAN9 OEL-CZECHO SLOVAKIA:TWA 10 mg/m3;STEL 20 mg/m3 OEL-DENMARK:TWA 2 ppm (10 mg/m3); Carcinogen OEL-FINLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm;Skin;CAR OE L-FRANCE:TWA 5 ppm (25 mg/m3);STEL 50 ppm (250 mg/m3);CAR OEL-GERMANY :TWA 10 ppm (50 mg/m3);Carcinogen JAN9 OEL-HUNGARY:STEL 10 mg/m3 OEL -INDIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-JAPAN:TWA 50 ppm (240 mg/ m3);Carcinogen OEL-THE NETHERLANDS:TWA 10 ppm (50 mg/m3) OEL-THE PHI LIPPINES:TWA 50 ppm (240 mg/m3) OEL-POLAND:TWA 50 mg/m3 OEL-RUSSIA:T WA 50 ppm OEL-SWEDEN:TWA 2 ppm (10 mg/m3);STEL 5 ppm (25 mg/m3);CAR OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm (100 mg/m3) OEL-THA ILAND:TWA 50 ppm (240 mg/m3) OEL-TURKEY:TWA 50 ppm (240 mg/m3) OEL-U NITED KINGDOM:TWA 2 ppm (9.9 mg/m3);Skin OEL IN BULGARIA, COLOMBIA, J ORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM c heck ACGIH TLV

Section 16 - Additional Information

MSDS Creation Date: 6/09/1999
Revision #7 Date: 9/11/2002

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

Chrome
Cr (metal)
Atomic mass: 52.0

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible if in very fine powder. Gives off irritating or toxic fumes (or gases) in a fire.	No open flames if in powder form.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful	Fireproof. Separated from strong oxidants.	R: S:

particles).

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I M P O R T A N T

PHYSICAL STATE; APPEARANCE:
STEEL GREY LUTROUS METAL.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts violently with strong oxidants such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: ppm; 0.5 mg/m^3 (as TWA) (ACGIH 1994-1995).
OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts.
NIOSH REL: TWA 0.5 mg/m^3 See Appendix C
NIOSH IDLH: 250 mg/m^3 (as Cr)

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C	Relative density (water = 1): 7.14 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Explosive limits are unknown in literature. Depending on the degree of exposure, periodic medical examination is indicated.

ADDITIONAL INFORMATION

ICSC: 0029	**CHROMIUM**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

ALDRICH CHEMICAL CO -- DIELDRIN, TECH., CA. 90%, 29121-8 -- 6810-00N037359

========== Product Identification ==========

Product ID:DIELDRIN, TECH., CA. 90%, 29121-8
MSDS Date:01/07/1992
FSC:6810
NIIN:00N037359
MSDS Number: BQRWJ
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

========== Composition/Information on Ingredients ==========

Ingred Name:1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6,
7-EPOXY- 1,4,4A,5,6,7,8,8A-OCTAHYDRO, ENDO, EXO-; (ING 2)
CAS:60-57-1
RTECS #:IO1750000
Fraction by Wt: 90%
OSHA PEL:0.25 MG/M3, S
ACGIH TLV:0.25 MG/M3, S
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:ING 1: (DIELDRIN) (SARA III)
RTECS #:9999999ZZ

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 (ORAL,RAT): 38300 UG/KG.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE:MAY BE FATAL IF INHALED,
SWALLOWED, OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION. CHRONIC:
CARCINOGEN. MAY ALTER GENETIC MATERIAL. OVEREXPOSURE MAY CAUSE
REPRODUCTIVE DISORDER(S) BASED ON TEST S WITH LABORATORY ANIMALS.
TARGET ORGANS: CENTRAL NERVOUS SYSTEM, LIVER, BLOOD. OVEREXPOSURE
CAN CAUSE (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: MALAISE, HEADACHE, NAUSEA, VOMITING,
DIZZINESS, TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY
FAILURE.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT
LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF

WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SH OES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION: WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYS.

========== Fire Fighting Measures ==========

Extinguishing Media:WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MAT ERIAL PICKUP IS COMPLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.
Other Precautions:HIGHLY TOX.CARCIN. MUTAGEN. REPROD HAZ.MAY CAUSE CANCER.MAY CAUSE INHERITABLE GENETIC DMG. READILY ABSORB THRU SKIN. AVOID PRLNGD/RPTD EXPOS. DO NOT BRTH DUST. DO NOT GET IN EYES,ON SKIN,ON CLTHG.VERY TOX BY INHAL,IN CONT W/SKIN & (SUPDAT)

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:CHEM WORK GOG W/FULL LNGTH FCSHLD
Other Protective Equipment:OTHER PROTECTIVE CLOTHING. SAFETY SHOWER AND EYE BATH.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
OTHER PRECAUTIONS: IF SWALLOWED. IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:>289F,>143C
Vapor Density:13.2
Appearance and Odor:ORANGE-TAN POWDER.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES OF CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE GAS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISSOLVE OR MIX MATERIAL WITH COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCURBBER. DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS (FP N).

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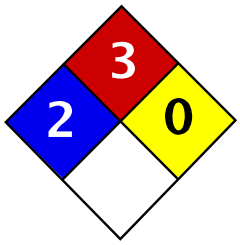

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001)
CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001)
CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States]
TWA: 435 STEL: 545 from OSHA (PEL) [United States]
TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States]
TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)]
TWA: 100 STEL: 125 (ppm) [Belgium]
TWA: 100 STEL: 125 (ppm) [Finland]
TWA: 50 (ppm) [Norway]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether.
Very slightly soluble in cold water or practically insoluble in water.
Soluble in all proportions in Ethyl alcohol.
Soluble in Carbon tetrachloride, Benzene.
Insoluble in Ammonia.
Slightly soluble in Chloroform.
Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials.
Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill:
LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg
Lowest Published Lethal Dose/Conc:
LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data.
May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate.
May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Can cause mild skin irritation. It can be absorbed through intact skin.
Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS)
Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987).
Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene
Illinois toxic substances disclosure to employee act: Ethylbenzene
Illinois chemical safety act: Ethylbenzene
New York release reporting list: Ethylbenzene
Rhode Island RTK hazardous substances: Ethylbenzene
Pennsylvania RTK: Ethylbenzene
Minnesota: Ethylbenzene
Massachusetts RTK: Ethylbenzene
Massachusetts spill list: Ethylbenzene
New Jersey: Ethylbenzene
New Jersey spill list: Ethylbenzene
Louisiana spill reporting: Ethylbenzene
California Director's List of Hazardous Substances: Ethylbenzene
TSCA 8(b) inventory: Ethylbenzene
TSCA 4(a) proposed test rules: Ethylbenzene
TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97
SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R20- Harmful by inhalation.
S16- Keep away from sources of ignition - No smoking.
S24/25- Avoid contact with skin and eyes.
S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet.
-Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA)
-Registry of Toxic Effects of Chemical Substances (RTECS)
-Chemical Hazard Response Information System (CHRIS)
-Hazardous Substance Data Bank (HSDB)
-New Jersey Hazardous Substance Fact Sheet
-Ariel Global View
-Reprotext System

Other Special Considerations: Not available.

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Material Safety Data Sheet

CREOSOTE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	CREOSOTE
OTHER/GENERIC NAMES:	Coal Tar Creosote, KMG-B Coal Tar Creosote Creosote Oil
PRODUCT USE:	Wood preservative
COMPANY:	KMG-Bernuth, Inc. 10611 Harwin, Suite 402 Houston, Texas 77036 Telephone: 713-988-9252
U. S. EPA Registration Nos.	61470-1 61483-7, 61483-8 61483-9, 61483-10

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)

CHEMTREC: 1 800 424 9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Creosote *	8001-58-9	100

* Mixture of 2, 3, & 4-ringed polynuclear aromatic hydrocarbons, including some substituted compounds

Trace impurities and additional material names not fisted above may also appear in Section 15. These materials may be listed for local “Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Creosote is a brown to black oily liquid with a penetrating smoky odor. Vapor causes moderate to severe irritation of eyes, nose, throat and respiratory tract. Liquid can cause burning and itching with reddening of the skin, which is accentuated by sunlight.

POTENTIAL-HEALTH HAZARDS

SKIN: Contact with skin can result in irritation, which when not washed off or when accentuated by sunlight, can result in minor burns.

EYES: Overexposure to product vapors can result in irritation. Eye contact with product will result in irritation, which in the absence of recommended first aid can result in effects ranging from minor burns to severe corneal injury, including keratitis, conjunctivitis and corneal abrasion.

INHALATION: Overexposure to vapor may result in irritation to respiratory tract. Prolonged exposure in significant excess of permissible air concentrations can result in acute toxic effects, such as dizziness, respiratory difficulty, convulsions and possible cardiovascular collapse.

INGESTION: Irritation of the gastrointestinal tract followed by nausea and vomiting, abdominal discomfort. rapid pulse etc. Cardiovascular collapse may occur.

DELAYED EFFECTS: Prolonged and repeated skin exposure over many years in the absence of recommended hygiene practices may lead to changes in skin pigmentation, benign skin growths and may, in some cases, result in skin cancer. Additionally, inhalation may present a lung cancer hazard.

Ingredients found on one of the OSHA designated carcinogen lists me listed below.

INGREDIENT NAME	NTB STATUS	JARC STATUS	OSHA LIST
Creosote	Carcinogen	2A - Probable	–

4. FIRST AID MEASURES

SKIN: Wash thoroughly with waterless hand cleaners, olive oil or soap and water. Avoid solvents.

EYES: Flush eyes immediately with large amounts of water or olive oil for at least 15 minutes. Call a physician

INHALATION: Remove to fresh air. If not breathing, give artificial respiration; preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

INGESTION: If conscious. first induce vomiting, then take 2 tablespoons of activated charcoal (USP-drug grade) in water. Get immediate medical attention. Do not induce vomiting, or give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN: No additional instructions.

5. FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINTS:	> 93º C (> 200º F) / > 93º C (> 200º F)
FLASH POINT METHOD:	Closed Cup / Open Cup
AUTOIGNITION TEMPERATURE:	336º C (637º F)
UPPER FLAME LIMIT (volume 0/6 in air):	Not Determined
LOWER FLAME LIMIT (volume % In air):	Not Determined
FLAME PROPAGATION RATE (solids):	Not Applicable
OSHA FLAMMABILITY CLASS:	Not Determined

EXTINGUISHING MEDIA: Water/fog, carbon dioxide, foam, dry chemicals, sand or steam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Water/fog is recommended for the control of unconfined oil fires, but water may cause frothing or eruption in closed tank.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS: Self-contained breathing apparatus (SCBA) and full protective clothing should be worn when fumes and/or smoke are present.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment)

Avoid breathing vapors and contact with skin and eyes. Avoid sources of ignition (sparks or open flame). Contain the spill or leak with solids, such as sand, earth, etc. Contaminated materials must be handled and managed as RCRA Hazardous Waste and treated before disposal in approved facilities. Do not allow to enter into sewers or waterways.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment)

Wear clothing closed at the neck, long sleeves and non-porous type gloves, eg. neoprene, butyl rubber, nitrile, poly-vinyl alcohol (PVA), polyvinyl chloride (PVC).

STORAGE RECOMMENDATIONS: Recommended temperature for storage is about 140º F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use in areas with adequate natural or local exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:	Avoid skin contact whenever possible by using non-porous type gloves. For outdoor work use a waterproof sunscreen (SPF 25 or greater); reapply every 90 minutes while in direct sun. For exposed skin, use protective creams (for example: MSA's Fend AE-2, Kerodex 51, Jergens SBS-46).
EYE PROTECTION:	Safety glasses, goggles and/or face shield.
RESPIRATORY PROTECTION:	Not required for properly ventilated areas. Use a NIOSH approved respirator with suitable organic vapor cartridge as necessary to control exposures above the TLV of PEL.
ADDITIONAL RECOMMENDATIONS:	Do not take contaminated work clothing home. It is recommended that a complete soap and water shower and/or steam bath be taken at the end of each working day.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Creosote (measured as Coal Tar Pitch Volatiles, CTPV	0.2 mg/m^3	0.2 mg/ m^3	–

HAZARDOUS INGREDIENTS	CAS NUMBER	% BY WT.	EXPOSURE LIMIT	(PPM; MG/M3)
Coal Tar Distillate	65996-92-1		OSHA-TWA -	*
Indene	95-13-6	<10	ACGIH-TWA 10	48
			OSHA-TWA 10	45
Naphthalene	91-20-3	<15	ACGIH-TWA 10	52
			ACGIH-STEL 15	79
			OSHA-TWA 10	50
			OSHA-STEL 15	75
			NIOSH-TWA 10	50
			NIOSH-STEL 15	75
Biphenyl	92-52-4	<5	ACGIH-TWA 0.2	1.3
			OSHA-TWA 0.2	1
Benzene	71-43-2	<1	ACGIH-TWA 10	32**, #
			OSHA-TWA 1	***
			OSHA-STEL 5	-
			NIOSH-TWA 0.1	-
			NIOSH-STEL 1	-
Alkylnaphthalene		<10	none	
Phenanthrene	85-01-8	9-13	NONE	
Benz (a) anthracene	56-55-3	1.6	NONE	
Benzo (a) phenanthrene	218-01-9	1.7	NONE	
Benzo (b) fluoranthene+	205-99-2		NONE	
Benzo (k) fluoranthene+	207-08-9		NONE	
Benzo (j) fluoranthene+	205-82-3		NONE	
7, 12-Dimethylbenz (a) anthracene	57-97-6	2.43	NONE	
Indeno (1,2,3-cd) pyrene	193-39-5	0.25	NONE	
Benzo (a) pyrene	50-32-8	0.92	NONE	
Dibenzo (a,h) anthracene	53-70-3	0.09	NONE	
Benzo (g,h,i) perylene+	191-24-2		NONE	
7-H Dibenzo (c,g) carbazole	194-59-2	0.18	NONE	
Dibenzo (a,l) pyrene	191-30-0	0.02	NONE	
1-Nitropyrene	5522-43-0	0.24	NONE	
Dibenz (a,j) acridine	224-42-0	0.06	NONE	
Dibenz (a,h) acridine	226-36-8	0.04	NONE	

------SARA TITLE III SECTION 313 CHEMICALS------
(SEE SECTION V11 FOR CAS NUMBERS AND PERCENTAGES)

Naphthalene
Biphenyl
Benzene
Phenanthrene / Benz (a) anthracene
Benzo (a) phenanthrene
Benzo (b) fluoranthrene / Benzo (k) fluoranthrene
Benzo (j) fluoranthrene
Benzo (a) pyrene
Dibenzo (a,h) anthracene
Indeno)1,2,3-cd) pyrene
1-Nitropyrene
7,12-Dimethylbenz (a) anthracene
7-H Dibenzo (c,g) carbazole / Benzo (g,h,i) perylene
Dibenzo (a,l) pyrene
Dibenz (a,j) acridine
Dibenz (a,h) acridine

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: None

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark brown to black oily liquid
PHYSICAL STATE:	Liquid
MOLECULAR WEIGHT:	130-210
CHEMICAL FORMULA:	Mixture of organic compounds
ODOR:	Penetrating smoky odor
SPECIFIC GRAVITY (water=1.0):	1.03-1.18 (Avg.: 9.1 lbs/ gal)
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	Not Determined
BOILING POINT:	194 - 400º C
MELTING POINT:	Not Determined
VAPOR PRESSURE (in mm Hg):	at 100º C - 80 mm; at 125º C - 225 mm; at 150º C - 370 mm
VAPOR DENSITY (air = 1.0):	< 1
EVAPORATION RATE:	< 1 COMPARED TO: Butyl Acetate –1
% VOLATILES:	Not Determined
FLASH POINT:	Closed cup: > 93º C (>200º F)
	Open cup: > 93º C (>200º F)

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

STABILITY (CONDITIONS TO AVOID): Product stable under normal conditions.
Due to its low vapor pressure and extremely low evaporation rate, the volatility rate at 20º C is almost zero. Upon heating, at extremely high temperatures, hydrocarbons will be emitted and some degradation will take place. Avoid loading or unloading near open flame.

INCOMPATIBILITIES: Mixing chlorosulfonic acid and creosote oil in a closed container can cause an increase in temperature and pressure (NFPA 491M, 1991)

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose under normal conditions of use. When heated to extreme temperatures creosote emits acrid smoke.

HAZARDOUS POLYMERIZATION: Will not occur

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: Oral LD_{50}; 725 mg/kg (rat); 433 mg/kg (mouse)

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS: Several studies in mice have shown the formation of both local (i.e. skin) and distant (i.e. lung) tumor formation after dermal exposure to creosote. [Poel & Kammer. 1957; Roe et al, 1958]

OTHER DATA: Has caused mutations in *S. typhimurium* strains TA98. TA100, TA1537, TA1538 and mouse lymphoma cell L5178y. [Fed Reg., 1978; Bos et al, 1983] Death from large doses of creosote appears due primarily to cardiovascular collapse. Fatalities have occurred 14-36 hours after the ingestion of creosote (about 7g for adults; about 1 or 2g for children). [Clayton & Clayton, 3rd ed., 1981]

12. ECOLOCICAL INFORMATION

TL_{50}, *Carassius auratus* (goldfish); 3.51 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Lepomis macrochirus* (bluegill); 4.42 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Salnio gairdner* (rainbow trout); 3.72 ppm/24 hours [60:40 mixture of creosote & coal tar]
LD_{50}, *Colinus virginianus* (bobwhite quail); 1260 ppm/8 days [60:40 mixture of creosote & coal tar]
LD_{50}, *Anas platyrhynchos* (mallard duck); 10,388 ppm/8 days [60:40 mixture of creosote & coal tar]

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? YES
If yes, the RCRA ID number is: U051

OTHER DISPOSAL CONSIDERATIONS:

Other waste code designations for creosote containing wastes appear in the December 6, 1990 *Federal Register* as F034; Wastewater's, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachloraphenol. Please consult with the appropriate state regulatory authorities to determine when the F034 designation is effective in the given state.

Creosote-containing waste may also be characteristic hazardous wastes, even if not meeting the U051, K001, or F034 waste code designation.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote). 9
US DOT ID NUMBER: UN 3082
US DOT SHIPPING NAME: RQ, Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote), 9, UN3082, III

For additional information on shipping regulations affecting this material, contact the number found in Section 1.

I5. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on EPA's TSCA Inventory
OTHER TSCA ISSUES: Substance of unknown or variable composition

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	WEIGHT %	SARA/CERCLA RQ (LB)	SARA EHS TPQ (LB)
Creosote	100 %	1	None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802], State Emergency Response Commission and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate, Delayed, Fire

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents an found in Section 2.

INGREDIENT NAME	WEIGHT	COMMENT
Creosote	100%	de minimus concentration is 0.1%

STATE-RIGHT-TO-KNOW

In addition to the ingredients found In Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT	COMMENT
None		

ADDITIONAL REGULATORY INFORMATION: For some applications, Creosote is also regulated as a "Restricted Use" pesticide under the Federal Insecticide, Fungicide. and Rodenticide Act (FIFRA).

WHMIS CLASSIFICATION (CANADA): Class D, Division 2, Subdivision A, very toxic material

FOREIGN INVENTORY STATUS: Listed on the EINECS Inventory - ID# 2322875
Listed on Canadian Inventory Domestic Substance List (DSL)

16. OTHER INFORMATION

CURRENT ISSUE DATE: March 2003
PREVIOUS ISSUE DATE: January 2002

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Updated DOT transportation information
Updated to include 16-section ANSI format for Material Safety Data Sheets

OTHER INFORMATION: NFPA Hazard Ratings:
Health (Blue): 2
Flammability (Red): 2
Reactivity (Yellow): 0

REFERENCES:

1. ACGIH (1995): *"1995-1996 Threshold Limit Values...."*
2. USDOL/OSHA General Industry 29 CFR 1910.1000 Coal Tar Pitch Volatile (CTPV) Permissible Exposure Limit
3. USEPA 40 CFR Parts 112; 261; 268; 300
4. USDOT 49 CFR Part 172
5. USEPA(1986) *"Evaluation of the Potential Carcinogenicity of Creosote (8001-58-9)"*, Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response, Washington, DC
6. National Fire Prevention Association (1991): *"Fire Protection Guide on Hazardous Materials"*, 10th ed. NFPA:Quincy, MA, pg 325M-29, 491M.
7 USEPA (1980) *"Health and Environmental Effects of Creosote"*, EPA # 53, pg 53-12
8. Clayton & Clayton, eds (1981): *"Patty's Industrial Hygiene & Toxicology, Volume 2A, 2B, 2C Toxicology"*, 3rd ed. John Wiley & Sons, New York, NY
9. NIOSH (1977): *"Criteria for a recommended standard...Occupational Exposure to Coal Tar Products"*, USDHEW/NIOSH Publication # 78-107
10. Poel, W.E. and Kammer, A.G. (1957): *"Experimental carcinogenicity of coal-tar fractions: The carcinogenicity of creosote oils"* J NATL CANCER INST 18(1):41-55
11. Roe, F.J.C., Bosch, D., Boutwell, R.K. (1958): *The carcinogenicity of creosote oil: The induction of lung tumors in mice"* CANCER RES 18:1176-1178
12. Bos, R.P., Hulshof, C.T.J., Theuws, J.L.G., Hendershon, P.Th. (1983): *"Mutagenicity of creosote in the Salmonella/microsome assay"* MUT RES 119:21-25
13. FEDERAL REGISTER (1978), Vol 43 #200; October 18th, page 48199
14. IARC (1987): *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man"*, World Health Organization (WHO): Geneva p S7 177
15. NTP (1994): *"National Toxicology Program's 7th Annual Report on Carcinogens 1994 - Summary"*

METAL

MATERIAL SAFETY DATA SHEET

ALDON CORPORATION
221 Rochester Street
Avon, New York 14414-9409
(585) 226-6177

MSDS No.: LL0070 LL0079 LL0080 LL0081 LL0082 LL0085 LL0086
Effective Date: March 29, 2005

SECTION I NAME

Product	Lead Metal
Chemical Synonyms	N/A
Formula	Pb
Unit Size	up to 2.5 Kg.
C.A.S. No.	7439-92-1

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA / HMIS *

Health	3
Fire	0
Reactivity	0

HAZARD RATING
MINIMAL 0 SLIGHT 1 MODERATE 2 SERIOUS 3 SEVERE 4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Lead metal, shot, granular, sheet, foil	99+%	See Section V.
CAUTION! MAY BE HARMFUL OR FATAL IF SWALLOWED		
OR INHALED AS FUMES OR DUST.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Approx. 327.4°C (621°F)	Specific Gravity (H_2O = 1)	11.34 (20/4°C)
Boiling Point (°F)	1753°C (3187°F)	Percent Volatile by Volume (%)	0% at ambient temp.
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	Non-volatile (N/A).
Vapor Density (Air=1)	N/A		
Solubility in Water	Insoluble.		
Appearance & Odor	Bluish, silvery, gray soft metal, granular, shot, sheet, foil; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

			Lower	Upper
Flash Point (Method Used)	Non-flammable (N/A).	Flammable Limits in Air % by Volume N/A	--------	--------
Extinguisher Media	Dry chemical or carbon dioxide should be used on surrounding fire. Do not use water on fires where molten metal is present.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated emits toxic fumes of lead which can react vigorously with oxidizing materials.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA LL0070

Threshold Limited Value
Lead as inorganic compounds, as Pb:
TWA 0.05 mg/m^3 (ACGIH 2001).

Effects of Overexposure
SKIN: Not absorbed through skin. EYES: No specific hazard known. Contact may cause transient irritation. INGESTION: May produce anorexia, vomiting, malaise, convulsions due to increased intracranial pressure. INHALATION: Of dust or fumes can cause lead poisoning. Target organs: Lungs, kidneys.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. EYES: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. SKIN: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		High temperatures to produce fumes.
	Stable	X	

Incompatibility (Materials to Avoid) Strong oxidizing materials.

Hazardous Decomposition Products When heated, emits toxic fumes of lead.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Carefully sweep up without producing dust and recycle for use or place in a suitable container for disposal.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.
Dispose of in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory use at room temperature. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation				
	Local Exhaust	None needed.	Special	No.
	Mechanical (General)	None needed.	Other	No.

Protective Gloves	Recommended - leather.	Eye Protection	Chemical safety glasses.

Other Protective Equipment Smock, apron, eye wash station, lab coat, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.
Store in a cool, dry place away from fire hazards. Wash thoroughly after handling. Remove and wash contaminated clothing.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Lead can react violently with oxidizing materials. Water may become trapped within surface cracks which may cause an explosion when the metal is molten.

Revision No. 9	Date 03/29/05	Approved Michael Raszeja	Chemical Safety Coordinator MR

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. * Hazardous Materials Industrial Standards. Printed on recycled paper.

METAL

10 M

Material Safety Data Sheet
Mercury

ACC# 14020

Section 1 - Chemical Product and Company Identification

MSDS Name: Mercury
Catalog Numbers: S40672B, S41542, S41599, S41599B, S41599E, S41599G, S41599J, S41599K, S41599M, S41600P, S41600S, S41600W, S41630A, S41630B, S41630C, S41631, S41631A, S41631B, S41631C, S41645, S45245, S46981, S50443, S71966, S71967, S71968, S78777, 13501, M139-1LB, M139-5LB, M140-14LB, M140-1LB, M140-5LB, M141-1LB, M141-6LB, NC9534278
Synonyms: Colloidal mercury; Hydrargyrum; Metallic mercury; Quick silver; Liquid silver.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7439-97-6	Mercury	100	231-106-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver liquid.
Danger! Corrosive. Harmful if inhaled. May be absorbed through intact skin. Causes eye and skin irritation and possible burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May cause central nervous system effects. Inhalation of fumes may cause metal-fume fever. May cause liver and kidney damage. Possible sensitizer. This substance has caused adverse reproductive and fetal effects in animals.
Target Organs: Blood, kidneys, central nervous system, liver, brain.

Potential Health Effects
Eye: Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision. Causes eye irritation and possible burns. Contact with mercury or mercury compounds can cause ulceration of the conjunctiva and cornea.
Skin: May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
Ingestion: May cause severe and permanent damage to the digestive tract. May cause perforation

of the digestive tract. May cause effects similar to those for inhalation exposure. May cause systemic effects.
Inhalation: Causes chemical burns to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause respiratory sensitization.
Chronic: May cause liver and kidney damage. May cause reproductive and fetal effects. Effects may be delayed. Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, personality changes. Chronic ingestion may cause accumulation of mercury in body tissues. Prolonged or repeated exposure may cause inflammation of the mouth and gums, excessive salivation, and loosening of the teeth.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Wash mouth out with water.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Treat symptomatically and supportively. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.
Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel. The use of Dimercaprol or BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not breathe vapor.
Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store protected from azides.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Mercury	0.025 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.05 mg/m3 TWA (vapor) 10 mg/m3 IDLH	0.1 mg/m3 Ceiling (vapor)

OSHA Vacated PELs: Mercury: 0.05 mg/m3 TWA (vapor)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: silver
Odor: odorless
pH: Not available.

Vapor Pressure: 0.002 mm Hg @ 25C
Vapor Density: 7.0
Evaporation Rate: Not available.
Viscosity: 15.5 mP @ 25 deg C
Boiling Point: 356.72 deg C
Freezing/Melting Point:-38.87 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:13.59 (water=1)
Molecular Formula: Hg
Molecular Weight:200.59

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, incompatible materials.
Incompatibilities with Other Materials: Oxygen, sulfur, acetylene, ammonia, chlorine dioxide, azides, chlorates, nitrates, sulfuric acid, halogens, rubidium, calcium, 3-bromopropyne, ethylene oxide, lithium, methylsilane + oxygen, peroxyformic acid, tetracarbonylnickel + oxygen, copper, copper alloys, boron diiodophosphide, metals, nitromethane, sodium carbide, aluminum, lead, iron, metal oxides.
Hazardous Decomposition Products: Mercury/mercury oxides.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7439-97-6: OV4550000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7439-97-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Intraperitoneal, rat: TDLo = 400 mg/kg/14D-I (Tumorigenic - equivocal tumorigenic agent by RTECS criteria - tumors at site of application).
Teratogenicity: Inhalation, rat: TCLo = 1 mg/m3/24H (female 1-20 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive Effects: Inhalation, rat: TCLo = 890 ng/m3/24H (male 16 week(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).; Inhalation, rat: TCLo = 7440 ng/m3/24H (male 16 week(s) pre-mating) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Mutagenicity: Cytogenetic Analysis: Unreported, man = 150 ug/m3.
Neurotoxicity: The brain is the critical organ in humans for chronic vapor exposure; in severe cases, spontaneous degeneration of the brain cortex can occur as a late sequela to past exposure.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Channel catfish: LC50 = 0.35 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 = 0.01 mg/L; 48 Hr; Unspecified In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury bound to dust particles in the atmosphere or bed sediment particles in rivers and lakes is generally less substantial. The conversion, in aquatic environments, of inorganic mercury cmpd to methyl mercury implies that recycling of mercury from sediment to water to air and back could be a rapid process.
Environmental: Mercury bioaccumulates and concentrates in food chain (concentration may be as much as 10,000 times that of water). Bioconcentration factors of 63,000 for freshwater fish and 10,000 for salt water fish have been found. Much of the mercury deposited on land, appears to revaporize within a day or two, at least in areas substantially heated by sunlight.
Physical: All forms of mercury (Hg) (metal, vapor, inorganic, or organic) are converted to methyl mercury. Inorganic forms are converted by microbial action in the atmosphere to methyl mercury.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 7439-97-6: waste number U151.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	MERCURY	MERCURY
Hazard Class:	8	8
UN Number:	UN2809	UN2809
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7439-97-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs

CAS# 7439-97-6: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7439-97-6: acute, chronic.

Section 313

This material contains Mercury (CAS# 7439-97-6, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7439-97-6 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7439-97-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7439-97-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7439-97-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

WARNING: This product contains Mercury, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 23 Toxic by inhalation.

R 33 Danger of cumulative effects.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 1/2 Keep locked up and out of reach of children.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 7439-97-6: 3

Canada - DSL/NDSL

CAS# 7439-97-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, E.

Canadian Ingredient Disclosure List

CAS# 7439-97-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/15/1999
Revision #7 Date: 1/20/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

NICKEL

ICSC: 0062

NICKEL
(powder)
Ni
Molecular mass: 58.7

CAS # 7440-02-0
RTECS # QR5950000
ICSC # 0062
EC # 028-002-00-7

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Water in large amounts, foam, dry sand, NO carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest.
• **SKIN**		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Separated from strong acids.	Xn symbol R: 40-43 S: (2-)22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

NICKEL

ICSC: 0062

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** ODOURLESS SILVERY METALLIC SOLID IN VARIOUS FORMS. **PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: ppm; 1 mg/m^3 (as TWA) (ACGIH 1993-1994).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of the dust and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of the fumes may cause pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. The substance may have effects on the nasal sinuses , resulting in inflammation and ulceration.
PHYSICAL PROPERTIES	Boiling point: 2730°C Melting point: 1455°C	Relative density (water = 1): 8.9 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062 **NICKEL**

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Material Safety Data Sheet

PAH Contaminated Soil

ACC# 17974

Section 1 - Chemical Product and Company Identification

MSDS Name: PAH Contaminated Soil
Catalog Numbers: SRS103100
Synonyms: API separator sludge
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Soil	78-99	unlisted
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: not available solid.
Warning! May cause allergic skin reaction. Causes eye and skin irritation. May cause cancer based on animal studies.
Target Organs: Eyes, skin.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and
Inhalation: Causes respiratory tract irritation. May cause effects similar to those described for ingestion.
Chronic: May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Soil	none listed	none listed	none listed
Anthracene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

Benzo(a)pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.5 mg/m3 TWA 2.5 mg/m3 IDLH	0.5 mg/m3 TWA
Naphthalene	10 ppm TWA; 15 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m3 TWA
2-methylnaphthalene	none listed	none listed	none listed

OSHA Vacated PELs: Soil: No OSHA Vacated PELs are listed for this chemical. Anthracene: No OSHA Vacated PELs are listed for this chemical. Pyrene: No OSHA Vacated PELs are listed for this chemical. Dibenzofuran: No OSHA Vacated PELs are listed for this chemical. Benzo(b)fluoranthene: No OSHA Vacated PELs are listed for this chemical. Fluoranthene: No OSHA Vacated PELs are listed for this chemical. Acenaphthylene: No OSHA Vacated PELs are listed for this chemical. 1,2-benzphenanthrene: No OSHA Vacated PELs are listed for this chemical. Benzo(a)pyrene: No OSHA Vacated PELs are listed for this chemical. 1,2-Benzanthracene: No OSHA Vacated PELs are listed for this chemical. Acenaphthene: No OSHA Vacated PELs are listed for this chemical. Phenanthrene: No OSHA Vacated PELs are listed for this chemical. Fluorene: No OSHA Vacated PELs are listed for this chemical. Pentachlorophenol: 0.5 mg/m3 TWA Naphthalene: 10 ppm TWA; 50 mg/m3 TWA 2-methylnaphthalene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: not available
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.
Molecular Formula: Mixture
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures.
Incompatibilities with Other Materials: None reported.
Hazardous Decomposition Products: No data available.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 120-12-7: CA9350000
CAS# 129-00-0: UR2450000; UR2450100
CAS# 132-64-9: HP4430000
CAS# 205-99-2: CU1400000
CAS# 206-44-0: LL4025000
CAS# 208-96-8: AB1254000; AB1254200
CAS# 218-01-9: GC0700000
CAS# 50-32-8: DJ3675000
CAS# 56-55-3: CV9275000
CAS# 83-32-9: AB1000000
CAS# 85-01-8: SF7175000
CAS# 86-73-7: LL5670000
CAS# 87-86-5: SM6300000; SM6314000; SM6321000
CAS# 91-20-3: QJ0525000
CAS# 91-57-6: QJ9635000
LD50/LC50:
CAS# 120-12-7:

Oral, mouse: LD50 = 4900 mg/kg;

CAS# 129-00-0:
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 170 mg/m3;
Inhalation, rat: LC50 = 170 mg/m3;
Oral, mouse: LD50 = 800 mg/kg;
Oral, rat: LD50 = 2700 mg/kg;

CAS# 132-64-9:

CAS# 205-99-2:

CAS# 206-44-0:
Oral, rat: LD50 = 2 gm/kg;
Skin, rabbit: LD50 = 3180 mg/kg;

CAS# 208-96-8:
Oral, mouse: LD50 = 1760 mg/kg;

CAS# 218-01-9:

CAS# 50-32-8:

CAS# 56-55-3:

CAS# 83-32-9:

CAS# 85-01-8:
Oral, mouse: LD50 = 700 mg/kg;
Oral, rat: LD50 = 1.8 gm/kg;

CAS# 86-73-7:

CAS# 87-86-5:
Draize test, rabbit, eye: 100 uL/24H Mild;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, rat: LC50 = 355 mg/m3;
Inhalation, rat: LC50 = 200 mg/m3;
Inhalation, rat: LC50 = 335 mg/m3;
Oral, mouse: LD50 = 36 mg/kg;
Oral, mouse: LD50 = 117 mg/kg;
Oral, mouse: LD50 = 30 mg/kg;
Oral, rabbit: LD50 = 200 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 50 mg/kg;
Skin, rat: LD50 = 96

CAS# 91-20-3:
Draize test, rabbit, eye: 100 mg Mild;
Inhalation, rat: LC50 = >340 mg/m3/1H;
Oral, mouse: LD50 = 316 mg/kg;
Oral, rat: LD50 = 490 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rat: LD50 = >2500 mg/kg;

CAS# 91-57-6:
Oral, rat: LD50 = 1630 mg/kg;

Carcinogenicity:
CAS# 120-12-7:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 205-99-2:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 208-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 56-55-3:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').

- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 86-73-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 87-86-5:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Not listed.
- **IARC:** Not listed.

CAS# 91-20-3:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/19/02
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 91-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 206-44-0: waste number U120.
CAS# 218-01-9: waste number U050.
CAS# 50-32-8: waste number U022.
CAS# 56-55-3: waste number U018.
CAS# 91-20-3: waste

Section 14 - Transport Information

US DOT	Canada TDG

Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Soil is not listed on the TSCA inventory. It is for research and development use only.
CAS# 120-12-7 is listed on the TSCA inventory.
CAS# 129-00-0 is listed on the TSCA inventory.
CAS# 132-64-9 is listed on the TSCA inventory.
CAS# 205-99-2 is not listed on the TSCA inventory. It is for research and development use only.
CAS# 206-44-0 is listed on the TSCA inventory.
CAS# 208-96-8 is listed on the TSCA inventory.
CAS# 218-01-9 is listed on the TSCA inventory.
CAS# 50-32-8 is listed on the TSCA inventory.
CAS# 56-55-3 is listed on the TSCA inventory.
CAS# 83-32-9 is listed on the TSCA inventory.
CAS# 85-01-8 is listed on the TSCA inventory.
CAS# 86-73-7 is listed on the TSCA inventory.
CAS# 87-86-5 is listed on the TSCA inventory.
CAS# 91-20-3 is listed on the TSCA inventory.
CAS# 91-57-6 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97 CAS# 91-20-3: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

CAS# 91-20-3: Testing required by manufacturers, processors

Section 12b

CAS# 91-20-3: Section 4

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 120-12-7: 5000 lb final RQ; 2270 kg final RQ CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ CAS# 205-99-2: 1 lb final RQ; 0.454 kg final RQ CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ CAS# 208-96-8: 5000 lb final RQ; 2270 kg final RQ CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ CAS# 56-55-3: 10 lb final RQ; 4.54 kg final RQ CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ CAS# 86-73-7: 5000 lb final RQ; 2270 kg final RQ CAS# 87-86-5: 10 lb final RQ; 4.54 kg final RQ CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper thre shold)

SARA Codes

CAS # 120-12-7: acute.
CAS # 129-00-0: acute, chronic.
CAS # 206-44-0: acute.

CAS # 50-32-8: acute, chronic.
CAS # 56-55-3: chronic.
CAS # 83-32-9: acute.
CAS # 85-01-8: acute.
CAS # 91-20-3: acute, chronic, flammable.
CAS # 91-57-6: acute.

Section 313

This material contains Anthracene (CAS# 120-12-7, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Dibenzofuran (CAS# 132-64-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Fluoranthene (CAS# 206-44-0, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains 1,2-benzphenanthrene (CAS# 218-01-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Phenanthrene (CAS# 85-01-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Pentachlorophenol (CAS# 87-86-5, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Naphthalene (CAS# 91-20-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed

as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 120-12-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 205-99-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 208-96-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 56-55-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 86-73-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 87-86-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-57-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer. WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer. WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 205-99-2: 0.096 æg/day NSRL (oral) CAS# 218-01-9: 0.35 æg/day NSRL (oral) CAS# 50-32-8: 0.06 æg/day NSRL CAS# 56-55-3: 0.033 æg/day NSRL (oral) CAS# 87-86-5: 40 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 120-12-7: 2
CAS# 129-00-0: No information available.
CAS# 132-64-9: No information available.
CAS# 205-99-2: No information available.
CAS# 206-44-0: No information available.
CAS# 208-96-8: No information available.
CAS# 218-01-9: No information available.
CAS# 50-32-8: No information available.
CAS# 56-55-3: No information available.
CAS# 83-32-9: No information available.
CAS# 85-01-8: No information available.
CAS# 86-73-7: No information available.
CAS# 87-86-5: 3
CAS# 91-20-3: 2
CAS# 91-57-6: No information available.

Canada - DSL/NDSL

CAS# 120-12-7 is listed on Canada's DSL List.
CAS# 129-00-0 is listed on Canada's DSL List.
CAS# 132-64-9 is listed on Canada's DSL List.
CAS# 218-01-9 is listed on Canada's DSL List.
CAS# 50-32-8 is listed on Canada's DSL List.
CAS# 83-32-9 is listed on Canada's DSL List.
CAS# 85-01-8 is listed on Canada's DSL List.
CAS# 86-73-7 is listed on Canada's DSL List.
CAS# 87-86-5 is listed on Canada's DSL List.
CAS# 91-20-3 is listed on Canada's DSL List.
CAS# 91-57-6 is listed on Canada's DSL List.
CAS# 206-44-0 is listed on Canada's NDSL List.
CAS# 208-96-8 is listed on Canada's NDSL List.
CAS# 56-55-3 is listed on Canada's NDSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

Canadian Ingredient Disclosure List

CAS# 120-12-7 is listed on the Canadian Ingredient Disclosure List.
CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 205-99-2 is listed on the Canadian Ingredient Disclosure List.
CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 208-96-8 is not listed on the Canadian Ingredient Disclosure List.
CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 56-55-3 is listed on the Canadian Ingredient Disclosure List.
CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 86-73-7 is not listed on the Canadian Ingredient Disclosure List.
CAS# 87-86-5 is not listed on the Canadian Ingredient Disclosure List.
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

3 PCB

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

Chlorobiphenyl (54% chlorine)
Chlorodiphenyl (54% chlorine)
PCB
Molecular mass: 327 (average)

ICSC # 0939
CAS # 11097-69-1
RTECS # TQ1360000
UN # 2315
EC # 602-039-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		Powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION		Ventilation.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Headache. Numbness.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Consult an expert! Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Severe marine pollutant. Note: C Xn symbol R: 33-50/53 S: 2-35-60-61 UN Hazard Class: 9 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0939

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 2000. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** LIGHT YELLOW VISCOUS LIQUID. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes in a fire producing irritating and toxic gases. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: ppm; 0.5 mg/m^3 A3 (skin) (ACGIH 1999). OSHA PEL: TWA 0.5 mg/m^3 skin NIOSH REL: Ca TWA 0.001 mg/m^3 See Appendix A *Note: The REL also applies to other PCBs. NIOSH IDLH: Potential occupational carcinogen 5 mg/m^3	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
PHYSICAL PROPERTIES	Relative density (water = 1): 1.5 Solubility in water: none	Vapour pressure, Pa at 25°C: 0.01 Octanol/water partition coefficient as log

	Pow: 6.30 (estimated)
ENVIRONMENTAL DATA	In the food chain important to humans, bioaccumulation takes place, specifically in water organisms. It is strongly advised not to let the chemical enter into the environment.

N O T E S

Changes into a resinous state (pour point) at 10°C. Distillation range: 365°-390°C.

Transport Emergency Card: TEC (R)-914

ADDITIONAL INFORMATION

ICSC: 0939 **POLYCHLORINATED BIPHENYL (AROCLOR 1254)**

(C) IPCS, CEC, 2000

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

21 VOC

Material Safety Data Sheet
Tetrachloroethylene

ACC# 22900

Section 1 - Chemical Product and Company Identification

MSDS Name: Tetrachloroethylene
Catalog Numbers: C182 20, C182 4, C182-20, C182-4, C18220, C1824, O4586 4, O4586-4, O45864
Synonyms: Ethylene tetrachloride; Tetrachlorethylene; Perchloroethylene; Perchlorethylene
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
127-18-4	Tetrachloroethylene	99.0+	204-825-9

Hazard Symbols: XN N
Risk Phrases: 40 51/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Irritant. May cause severe eye and skin irritation with possible burns. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May cause cancer based on animal studies. **Caution!** May cause respiratory tract irritation.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects
Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: May cause severe irritation and possible burns.
Ingestion: May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Inhalation of vapor may cause respiratory tract irritation. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause respiratory tract cancer. May cause

adverse nervous system effects including muscle tremors and incoordination. May cause liver and kidney damage. May cause reproductive and fetal effects.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Flush down the spill with a large amount of water. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not reuse this container. Avoid breathing vapors from heated material. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from flames

and other sources of high temperatures that may cause material to form vapors or mists.
Storage: Keep away from heat and flame. Store in a cool, dry place. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetrachloroethylene	25 ppm TWA; 100 ppm STEL	150 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

OSHA Vacated PELs: Tetrachloroethylene: 25 ppm TWA; 170 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweetish odor
pH: Not available.
Vapor Pressure: 15.8 mm Hg
Vapor Density: 5.2
Evaporation Rate:9 (ether=100)
Viscosity: 0.89 mPa s 20 deg C
Boiling Point: 121 deg C
Freezing/Melting Point:-22.3 deg C
Decomposition Temperature:150 deg C
Solubility: Nearly insoluble in water.
Specific Gravity/Density:1.623
Molecular Formula:C2Cl4
Molecular Weight:165.812

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong bases, metals, liquid oxygen, dinitrogen tetroxide.

Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 127-18-4: KX3850000
LD50/LC50:
CAS# 127-18-4:
Draize test, rabbit, eye: 162 mg Mild;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 810 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 5200 ppm/4H;
Inhalation, rat: LC50 = 34200 mg/m3/8H;
Oral, mouse: LD50 = 8100 mg/kg;
Oral, rat: LD50 = 2629 mg/kg;
Carcinogenicity:
CAS# 127-18-4:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen
Epidemiology: Epidemiologic studies have given inconsistent results. Studi es have shown that tetrachloroethylene has not caused canc er in exposed workers. The studies have serious weakne sses such as mixed exposures. In tests with rats and mice, i t appeared that tissue destruction or peroxisome prolifera tion rather than genetic mechanisms were the cause of the observed increases in normally occurring cancers. The oral mouse TDLo that was tumorigenic was 195 gm/kg/50W-I.
Teratogenicity: Has caused musculoskeletal abnormalities. Has caused morphological transformation at a dose of 97mol/L in a study using rat embryos.
Reproductive Effects: Has caused behavioral, biochemical, and metabolic effects on newborn rats when the mother was exposed to the TCLo of 900 ppm/7H at 7-13 days after conception. A dose of 300 ppm/7H 6-15 days after conception caused post-implantation mortality.
Neurotoxicity: No information available.
Mutagenicity: Not mutagenic in Escherichia coli. No mutagenic effects were seen in rat liver after exposure at 200 ppm for 10 weeks. No chromosome changes were seen in the bone marrow cells of exposed mice.
Other Studies: A case of 'obstructive jaundice' in a 6-week old infant has been attributed to tetrachloroethylene in breast milk.

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 5.28 mg/L; 96 Hr.; Static Condition, 12 degrees C Fathead Minnow: LC50 = 18.4 mg/L; 96 Hr.; Flow-through condition Bluegill/Sunfish: LC50 = 12.9 mg/L; 96 Hr.; Static Condition ria: Phytobacterium phosphoreum: EC50 = 120.0 mg/L; 30 minutes; Microtox test No data available.

Environmental: In soil, substance will rapidly evaporate. In water, it will evaporate. In air, it can be expected to exist in the vapor phase.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 127-18-4: waste number U210.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TETRACHLOROETHYLENE				TETRACHLOROETHYLENE
Hazard Class:	6.1				6.1
UN Number:	UN1897				UN1897
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 127-18-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 127-18-4: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 127-18-4: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 127-18-4: acute.
Section 313
This material contains Tetrachloroethylene (CAS# 127-18-4, 99 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:
CAS# 127-18-4 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 127-18-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 127-18-4 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 127-18-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Tetrachloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 127-18-4: 14 ug/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 40 Limited evidence of a carcinogenic effect.
R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 23 Do not inhale gas/fumes/vapour/spray.
S 36/37 Wear suitable protective clothing and gloves.
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 127-18-4: 3
Canada - DSL/NDSL
CAS# 127-18-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D1B, D2A.
Canadian Ingredient Disclosure List
CAS# 127-18-4 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 127-18-4: OEL-ARAB Republic of Egypt:TWA 5 ppm (35 mg/m3);Skin OEL-AUSTRALIA:TWA 50 ppm (335 mg/m3);STEL 150 ppm;CAR OEL-BELGIUM:TWA 50 ppm (339 mg/m3);STEL 200 ppm (1368 mg/m3) OEL-CZECHOSLOVAKIA:TWA 250 mg/m3;STEL 1250 mg/m3 OEL-DENMARK:TWA 30 ppm (200 mg/m3);Skin OEL-FINLAND:TWA 50 ppm (335 mg/m3);STEL 75 ppm (520 mg/m3);Skin OEL-FRANCE:TWA 50 ppm (335 mg/m3) OEL-GERMANY:TWA 50 ppm (345 mg/m3);Carcinogen OEL-HUNGARY:STEL 50 mg/m3;Skin;Carcinogen OEL-JAPAN:TWA 50 ppm (340 mg/m3) OEL-THE NETHERLANDS:TWA 35 ppm (240 mg/m3);Skin OEL-THE PHILIPPINES:TWA 100 ppm (670 mg/m3) OEL-POLAND:TWA 60 mg/m3 OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m3 OEL-SWEDEN:TWA 10 ppm (70 mg/m3);STEL 25 ppm (170 mg/m3) OEL-SWITZERLAND:TWA 50 ppm (345 mg/m3);STEL 100 ppm;Skin OEL-THAILAND:TWA 100 ppm;STEL 200 ppm OEL-UNITED KINGDOM:TWA 50 ppm (335 mg/m3);STEL 15 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA

check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 6/17/1999
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Number: **T3913** * * * * * *Effective Date:* ***10/05/06*** * * * * * *Supercedes:* ***08/03/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TOLUENE

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes:
J.T. Baker: 5375, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

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4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.
Skin Contact:
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 1.1; uel: 7.1
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full

facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic benzene-like.
Solubility:
0.05 gm/100gm water @ 20C (68F).
Specific Gravity:
0.86 @ 20C / 4 C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
111C (232F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.14
Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Toluene (108-88-3)	No	No	3

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12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction

with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Toluene (108-88-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Toluene (108-88-3)	1000	U220	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 5.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **X2000** * * * * * *Effective Date:* ***02/16/06*** * * * * * *Supercedes:* ***04/01/03***

MSDS Material Safety Data Sheet

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes:
J.T. Baker: 5377, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	Yes
o-Xylene	95-47-6	15 - 20%	Yes
p-Xylene	106-42-3	< 20%	Yes
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.
Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.
Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:

lel: 1.0; uel: 7.0
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen.
ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.
Odor:
Characteristic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.86 @ 20C/4C
pH:
Not applicable.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
137 - 140C (279 - 284F)
Melting Point:
-25C (-13F)
Vapor Density (Air=1):
3.7
Vapor Pressure (mm Hg):
8 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.7

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.
Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**

Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.
Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.
Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **Z0858** * * * * * *Effective Date: 05/07/03* * * * * * *Supercedes: 11/02/01*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ZINC METAL POWDER

1. Product Identification

Synonyms: Powdered zinc; blue powder; CI77945; CI Pigment Black 16
CAS No.: 7440-66-6
Molecular Weight: 65.37
Chemical Formula: Zn
Product Codes:
J.T. Baker: 4282
Mallinckrodt: 8681

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Zinc	7440-66-6	96 - 97%	Yes
Zinc Oxide	1314-13-2	0 - 3%	Yes
Lead	7439-92-1	0 - 0.3%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR. WATER REACTIVE. MAY AFFECT THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM (lead component).

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 2 - Moderate

Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; CLASS D EXTINGUISHER
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
No adverse effects expected but dust may cause mechanical irritation. The effects may be expected to resemble those of inhaling an inert dust; possible difficulty in breathing, sneezing, coughing. When heated, the fumes are highly toxic and may cause fume fever.
Ingestion:
Extremely large oral dosages may produce gastrointestinal disturbances, due both to mechanical effects and the possibility of reaction with gastric juice to produce zinc chloride. Pain, stomach cramps and nausea could occur in aggravated cases.
Skin Contact:
May cause irritation.
Eye Contact:
May cause irritation.
Chronic Exposure:
No adverse health effects expected.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

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5. Fire Fighting Measures

Fire:
Autoignition temperature: ca. 460C (ca. 860F)
The listed autoignition temperature is for Zinc powder (layer); dust cloud is ca. 680C (1255F). Zinc powder is not pyrophoric but will burn in air at elevated temperatures. Bulk dust in damp state may heat spontaneously and ignite on exposure to air. Releases flammable hydrogen gas upon contact with acids or alkali hydroxides. Contact with strong oxidizers may cause fire.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Smother with a suitable dry powder (sodium chloride, magnesium oxide, Met-L-X).
Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition and provide mild ventilation in area of spill. Substance may be pyrophoric and self-ignite. Clean-up personnel require protective clothing, goggles and dust/mist respirators. Sweep or vacuum up the spill in a manner that does not disperse zinc powder in the air and place the zinc in a closed container for recovery or disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None for Zinc metal.
-OSHA Permissible Exposure Limit (PEL):
10 mg/m3 (TWA), for zinc oxide fume
-ACGIH Threshold Limit Value (TLV):
10 mg/m3 (TWA), Inhalable fraction, A4 Not classifiable as a human carcinogen for zinc oxide.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Gray or bluish-gray powder.
Odor:
Odorless.

Solubility:
Insoluble in water.
Density:
7.14
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
907C (1665F)
Melting Point:
419C (786F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1 @ 487C (909F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Moist zinc dust can react exothermically and ignite spontaneously in air.
Hazardous Decomposition Products:
Hydrogen in moist air, zinc oxide with oxygen at high temperature. Zinc metal, when melted, produces zinc vapor which oxidizes and condenses in air to form zinc fume.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Zinc powder can react violently with water, sulfur and halogens. Dangerous or potentially dangerous with strong oxidizing agents, lower molecular weight chlorinated hydrocarbons, strong acids and alkalis.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Zinc: Irritation skin, human: 300 ug/3D-I mild; investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Zinc (7440-66-6)	No	No	None
Zinc Oxide (1314-13-2)	No	No	None
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	Yes	Yes
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	No	Yes
Lead (7439-92-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\-----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Zinc (7440-66-6)	No	No	Yes	No
Zinc Oxide (1314-13-2)	No	No	No	Zinc compoun
Lead (7439-92-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\-----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Zinc (7440-66-6)	1000	No	No
Zinc Oxide (1314-13-2)	No	No	No
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
Reactivity: Yes (Mixture / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 4Y
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **1** Other: **Water reactive**

Attachment IV

Attachment IV – Heat Stress / Cold Stress

1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

1.1 Heat Rash

Heat rash also know as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth, such as the variety of sports drinks on the market.

CAUTION SHOULD BE EXERCISED BY PEOPLE WITH HEART PROBLEMS OR THOSE ON LOW SODIUM DIETS WHO WORK IN HOT ENVIRONMENTS. THESE PEOPLE SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting

- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.
AS WITH HEAT CRAMPS, CERTAIN PERSONS SHOULD CONSULT WITH THEIR PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105oF or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

1.6 Protecting Against Heat Stress

There are several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

2.0 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)
- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

Attachment V

Attachment V - Construction Equipment Safety Rules

1.0 ELECTRICAL

1. Live electrical parts shall be guarded against accidental contact by cabinets, enclosure, location, or guarding. Cabinet covers will be replaced.

2. Working and clear space around electric equipment and distribution boxes will be kept clear and assessable.

3. Circuit breakers, switch boxes, etc. will be legibly marked to indicate their purpose.

4. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. If the prime contractor has not provided this protection with GFCI receptacles at the temporary service drop, employees will ensure portable GFCI protection is provided. (Employers may wish to use assured equipment grounding conductor program in lieu of this GFCI protection.) This requirement is in addition to any other electrical equipment grounding requirement or double insulated protection.

5. All extension cords will be three-wire (grounded) type and designed for hard or extra hard usage (Type S, ST, SO, STO, or SJ, SJO, SJT, SJTO).

6. Ground prongs will not be removed.

7. Cords and strain relief devices/clamps will be in good condition.

8. All lamps for general illumination will have the bulbs protected against breakage.

9. Electrical cords will not suspend temporary lights unless cords and lights are designed for such suspension. Flexible cords used for temporary and portable lights will be designed for hard or extra hard usage.

10. Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.

11. Equipment or circuits that are de-energized will be locked out and tagged out. The tags will plainly identify the equipment or circuits being worked on.

2.0 COMPRESSED GAS CYLINDERS

1. All gas cylinders will have their contents clearly marked on the outside of each cylinder.

2. Cylinders must be transported, stored, and secured in an upright position. They will never be left laying on the ground or floor, nor used as rollers or supports.

3. Cylinder valves must be protected with caps and closed when not in use.

4. All leaking or defective cylinders must be removed from service promptly, tagged as inoperable and placed in an open space removed from the work area.

5. Oxygen cylinders and fittings will be kept away from oil or grease.

6. When cylinders are hoisted, they will be secured in a cradle, sling-board, or pallet. Valve protection caps will not be used for lifting cylinders from one vertical level to another.

3.0 LADDERS

1. A competent person to identify any unsafe conditions will periodically inspect ladders.

2. Those ladders with structural defects will be removed from service, and repaired or replaced.

3. Straight ladders used on other than stable, level, and dry surfaces must be tied off, held, or secured for stability.

4. Portable ladder side rails will extend at least three feet above the upper landing to which the ladder is used to gain access.

5. The top or top step of a stepladder will not be used as a step.

4.0 AERIAL LIFTS

1. Aerial lifts include cherry pickers, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and any combinations of the above.

2. Only authorized and trained persons will operate aerial lifts.

3. Lift controls will be tested each day before use.

4. Safety harness will be worn when elevated in the aerial lift.

5. Lanyards will be attached to the boom or basket.

6. Employees will not belt off to adjacent poles, structures, or equipment while working from an aerial lift.

7. Employees will always stand firmly on the floor of the basket, and will not sit or climb on the edge of the basket.

8. Planks, ladders, or other devices will not be used for work position or additional working height.

9. Brakes will be set and outriggers will be used.

10. The aerial lift truck will not be moved with the boom elevated and employees in the `basket, unless the equipment is specifically designed for such.

5.0 CRANES

1. A competent person prior to each use/during use to make sure it is in safe operating condition will inspect all cranes. Also, a certification record of monthly inspections to include date, inspector signature, and crane identifier will be maintained.

2. A thorough annual inspection of hoisting machinery will be made by a competent person, or by a government or private agency, and records maintained.

3. Loads will never be swung over the heads of workers in the area.

4. Employees will never ride hooks, concrete buckets, or other material loads being suspended or moved by cranes.

5. Hand signals to crane operators will be those prescribed by the applicable ANSI standard to the type of crane in use.

6. Tag lines must be used to control loads and keep workers away.

7. Loads, booms, and rigging will be kept at least 10 feet from energized electrical lines rated 50 KV or lower unless the lines are de-energized. For lines rated greater that 50 KV follow OSHA Rules and Regulations, 1926.550(a)(15).

8. Cranes will always be operated on firm, level surfaces, or use mats/pads, particularly for near-capacity lifts.

9. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, will be barricaded in such a manner as to prevent employees from being struck or crushed by the crane.

10. If suspended personnel platforms are to be lifted with a crane, reference 1926.550(g) for general and specific requirements.

11. Rigging equipment (chains, slings, wire rope, hooks, other attachments, etc.) will be inspected prior to use on each shift to ensure it is safe. Defective rigging and equipment will be removed from service.

12. Job or shop hooks or other makeshift fasteners using bolts, wire, etc. will not be used.

13. Wire rope shall be taken out of service when one of the following conditions exist:

- In running ropes, 6 random distributed broken wires in one lay or 3 broken wires in one strand or one lay.
- Wear of one-third the original diameter of outside individual wires.
- Kinking, crushing, bird caging, heat damage, or any other damage resulting in distortion of the rope structure.
- In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.

6.0 WELDING and BRAZING

1. Combustible material will be cleared from the area around cutting or welding operations.

2. Welding helmets and goggles will be worn for eye protection and to prevent flash burns.

3. Eye protection to guard against slag while chipping, grinding and dressing of welds will be worn.

4. Only electrode holders specifically designed for arc welding will be used.

5. All parts subject to electrical current will be fully insulated against the maximum voltage encountered to ground.

6. A ground return cable shall have a safe current carrying capacity equal to, or exceeding, the specified maximum output capacity of the arc-welding unit that it services.

7. Cables, leads, hoses, and connections will be placed so that there are no fire or tripping hazards.

7.0 TOOLS

1. Take special precautions when using power tools.

2. Defective tools will be removed form service.

3. Electric power tools will be the grounded-type or double insulated.

4. Power tools will be turned off and motion stopped before setting tool down.

5. Tools will be disconnected from power source before changing drills, blades or bits, or attempting repair or adjustment. Never leave a running tool unattended.

6. Power saws, table saws, and radial arm saws will have operational blade guards installed and used.

7. Unsafe/defective hand tools will not be used. These include sprung jaws on wrenches, mushroomed head of chisels/punches, and cracked/broken handles of any tool.

8. Portable abrasive grinders will have guards installed covering the upper and back portions of the abrasive wheel. Wheel speed ratings will never be less than the grinder RPM speed.

9. Compressed air will not be used for cleaning purposes except when pressure is reduced to less than 30 psi by regulating or use of a safety nozzle, and then only with effective chip guarding and proper personal protective equipment.

10. Abrasive blasting nozzles will have a valve that must be held open manually.

11. Only trained employees will operate powder-actuated tools.

12. Any employee furnished tools of any nature must meet all OSHA and ANSI requirements.

8.0 SAFETY RAILINGS AND OTHER FALL PROTECTION

1. All open sided floors and platforms six feet or more above adjacent floor/ground level will be guarded by a standard railing (top and mid rail, toeboard if required).

2. A stairway or ladder will be provided at any point of access where there is a break in elevation of 19 inches or more.

3. All stairways of four or more risers or greater than 30 inches high will be guarded by a handrail or stair rails

4. When a floor hole or opening (greater than two inches in its least dimension) is created during a work activity, through which a worker can fall, step into, or material can fall through, a cover or a safety guardrail must be installed immediately.

5. Safety nets will be provided when workplaces are more than 25 feet above the ground, water, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts, is impractical.

6. Safety harnesses, lanyards, lines, and lifelines may be used in lieu of other fall protection systems to provide the required fall protection.

7. Adjustment of lanyards must provide for not more than a six-foot fall, and all tie off points must be at least waist high.

8.1 Scaffolds

1. Scaffolds will be erected, moved, dismantled, or altered only under the supervision of a competent person qualified in scaffold erection, moving, dismantling, or alteration.

2. Standard guardrails (consisting of top-rail and mid-rail) will be installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet above the ground, floor, or lower level.

3. Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches will have standard railings installed on all open sides/ends.

4. Platforms at all working levels will be fully planked. Planking will be laid tight with no more than one inch space between them, overlap at least 12 inches, and extend over end supports 6 - 12 inches.

5. The front edge of all platforms will be no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.

6. Mobile scaffolds will be erected no more than a maximum height of four times their minimum base dimension.

7. Scaffolds will not be overloaded beyond their design loadings.

8. Scaffold components should not be used as tie-off/anchor points for fall protection devices.

9. Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure will be used for access when platforms are more than two feet above or below a point of access.

10. Cross braces will not be used as a mean of access to scaffolds.

11. Scaffolds will not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than the following:

- Three feet from insulated lines of less than 300 volts;
- Ten feet plus for any other insulated or un-insulated lines.

8.2 Excavations and Trenches

1. Any excavation or trench five feet or more in depth will be provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes.

2. Trenches less than five feet in depth and showing potential of cave-in will also be provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.

3. A competent person will inspect each excavation/trench daily prior to start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.

4. Means of egress will be provided in trenches four feet or more in depth so as to require no more than 25 feet of lateral travel for each employee in the trench.

5. Spoil piles and other equipment will be kept at least two feet from the edge of the trench or excavation.

9.0 MOTOR VEHICLES AND MECHANIZED EQUIPMENT

1. All vehicles and equipment will be checked at the beginning of each shift, and during use, to make sure it is in safe operating condition.

2. All equipment left unattended at night adjacent to highways in normal use shall have lights or reflectors, or barricades with lights or reflectors, to identify the location of the equipment.

3. When equipment is stopped or parked, parking brakes shall be set. Equipment on inclines shall have wheels chocked as well as having parking brakes set.

4. Operators shall not use earth-moving or compaction equipment having an obstructed rear view unless vehicle has an audible reverse signal alarm, or is backed only when observer says it is safe to do so.

5. All vehicles shall have in operable condition:

- Horn (bi-directional equipment)
- Seats, firmly secured, for the number of persons carried. Passengers must ride in seats.
- Seat belts properly installed.
- Service, parking and emergency brake system.
- All vehicles with cabs will be equipped with windshields with safety glass.
- All material handling equipment will equipped with rollover protective structures.

10.0 MISCELLANEOUS

1. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the impalement hazard.

2. Enclosed chutes will be used when material, trash, and debris are dropped more than 20 feet outside the exterior walls of a building. A substantial gate will be provided near the discharge end of the chute, and guardrails at the chute openings into which workers drop material.

3. Only trained employees will service large truck wheels. A cage or other restraining device plus an airline assembly consisting of a clip-on chuck, gauge, and length of hose will be used to inflate any large truck tires.

4. Only trained employees will operate forklifts and other industrial trucks.

Attachment VI

EXHIBIT 4

OWNER REQUIRED SAFETY PERFORMANCE STANDARDS

Safety Addendum to Contract Specifications

This document is intended to highlight various safety requirements applicable to the Project, and shall not be construed to waive, or release the construction manager, general contractor and subcontractors (all tiers) from responsibility for compliance with, any and all safety requirements and conditions of federal (including but not limited to OSHA CFR 1926 and 1910), state and local laws, codes, ordinances, regulations and government orders applicable to the Project. Specifically, this Attachment does not purport or attempt to cover all of the safety requirements of local codes, ordinances, regulations and government orders, and construction manager, contractor and subcontractors shall have the specific responsibility to review, understand and incorporate such requirements into the performance of work at the Project.

All safety requirements of any federal, state or local agency with jurisdiction concerning the Project shall be deemed to be included in the Contract Sum of General Contractor ("GC") and/or Construction Manager ("CM") and any subcontractor of any tier, and change orders for the cost of complying with safety requirements stated herein, or required by applicable federal, state or local law, shall not be valid and shall not be considered.

The safety and health requirements attached hereto (the "Requirements") shall be part of the Contract, and shall be followed by all contractors while performing work on site. The Requirements shall be treated as contract requirements, and any material breach of the Requirements shall be grounds for termination under applicable provisions of the Contract Documents. The Requirements specifically include required elements of a site specific safety and health plan which must be developed and implemented by the construction manager, general contractor and the subcontractors.

It will be a condition of the Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract, that the Owner and its affiliated entities or agents are assuming no liability relating to their receipt and review of the GC/CM safety plans or activities. Safety remains the responsibility of the GC/CM and their subcontractors (all tiers), as Owner shall retain no control over the Project work areas. As to the Owner, the GC/CM shall be fully responsible for compliance with all safety requirements applicable to the Project, and for any liability arising out of any failure to comply with such safety requirements.

These Requirements include "best practices" that are standards or requirements that may exceed applicable federal, state or local safety requirements or provide consistency in their application. These Requirements only identify minimum requirements, and do not replace any existing local, state, federal or governing agency requirements. The most stringent requirement, whether found in these Requirements or in applicable federal, state or local law will always apply if a conflict in safety requirements exists. In addition, the Construction Manager and general contractor, and all subcontractors of any tier, shall comply with the safety or Project requirements of any insurance carrier supplying insurance for the Project, as part of the Contract Sum.

The GC/CM shall represent the Owner on all matters of project safety management as it relates to the superintendence of the work on the Project, but under no circumstances shall be considered an agent of the Owner for purposes of complying with or implementing safety requirements.

By the terms of this Contract, the GC/CM agree to impose upon themselves and their subcontractors (all tiers) the following minimum mandatory safety requirements:

1. GC/CM must provide a full time **[part time – Modify as appropriate]** designated on-site safety manager, unless otherwise required by the law, with no other duties other than superintendence of the safety program, with full authority to stop work and remove any person for violation of the project safety program. The safety manager will allocate 100% of his time toward implementing and enforcing the project safety program. The resume of the on-site safety manager shall be submitted for review and reasonable approval of the Owner. GC/CM shall staff additional safety personnel, as necessary, to maintain the effectiveness and integrity of the safety program.

2. Prior to the mobilization, GC/CM shall submit for review a Site Specific Safety Program that includes all of the safety provisions set forth in these Requirements, or otherwise noted in the Contract Documents. The written safety program shall be used as a guideline and direction for the Contractor's and subcontractors' activities. The program and all sections must be project and site specific. This program must meet these Requirements, all applicable federal, state and local legal requirements and include the following minimal provisions: (a) worksite safety policy and mission statement; (b) assigned responsibilities among management supervisors and employees; (c) a system for daily and weekly documented self inspections, including inspections of job sites, materials, work performance and equipment; (d) a thorough accident and injury reporting and investigation process to identify root cause and prevent incident re-occurrence; (e) a safety employee orientation program; (f) a subcontractor orientation program; (f) a safety training program including weekly tool box talks, job hazard analysis, and additional formal training, as required, including but not limited to, fall protection, confined spaces, scaffolding, ladders, excavation safety, lockout/tag out, personnel protective equipment, at a minimum; (g) an employee disciplinary policy; (h) a subcontractor disciplinary

policy including monetary fine system and/or charge back system; (i) include all relevant OSHA subparts; (j) a fire prevention and control program; (k) a task and site specific fall protection program when exposures of 6 feet or greater exist; (l) a hazard communication program; (m) a site specific respiratory protection program; (n) an emergency action plan with contacts, emergency evacuation plan, and notification plan; (o) a property and public protection plan; (p) a site security plan addressing employees, public, venders, suppliers subcontractors, visitors, and control of delivery of equipment and materials to and from the job site. GC/CM must require all subcontractors to submit site specific health and safety programs for review, as well as acknowledgement of compliance with the GC/CM project specific program. GC/CM shall monitor the effectiveness of all subcontractor safety programs by requiring submission of all relevant documentation for review, frequent un-announced attendance at subcontractor safety meetings and site inspections.

3. Require each GC/CM supervisor who works more than 1 hour on the project to possess a federal OSHA 30 Hour Card issued not more than 3 years previously.

4. Require at least one subcontractor supervisor who works more than 1 hour on the project to possess a federal OSHA 10 Hour Card issued not more than 3 years previously.

5. GC/CM shall verbally inform the Owner's Representative at first knowledge of any accident involving property damage or personal injury occurring on the Project and shall provide a written investigation report within 24 hours of having knowledge of such incidents. GC/CM shall establish criteria to ensure that all subcontractors report all incidents immediately to the GC/CM for review and follow-up.

6. GC/CM shall request submission of names of OSHA defined "competent persons" from all subcontractors for all applicable OSHA subparts. Persons shall have the ability to identify hazards and have the authority to stop applicable work.

7. GC/CM and all tier subcontractors shall conduct weekly documented safety meetings for their employees on the job site. Attendees and minutes of the meetings shall be documented. Topics shall include site specific information. Representation of all subcontractor tiers is required at the GC/CM meeting. Subcontractors shall also be required to conduct their own meetings with their own employees. Contractors shall submit meeting schedules to the GC/CM to allow un-announced attendance to their meetings. The GC/CM shall submit subcontractor meeting schedules to the Owner's Representative to allow un-announced attendance at their meetings.

8. GC/CM shall also confirm in writing follow-up and status of any third party, insurance carrier or owner representative safety report identifying site safety recommendations.

9. GC/CM shall implement and enforce a mandatory hard-hat policy for all phases of the Project. Hard hats shall meet ANSI Standard 2.89.1-1969.

10. GC/CM shall ensure that approved safety glasses are available and provided to all employees of all subcontractors on the job-site. GC/CM shall ensure that individual persons have, on person, safety glasses at all times. Safety glasses will be utilized and worn as per OSHA requirements, at a minimum. GC/CM shall ensure that all other protective apparel necessary for the work of any personnel be available at appropriate times, including noise protection, hand protection and protection as to particle or air contaminants, or hazardous chemicals, as may be required by CFR 1926.101 and related provisions.

11. GC/CM shall ensure that the use of horizontal debris netting is installed and maintained not more than two stories below the stripping floor on concrete structures or the utmost finished concrete floor on steel frame structures. Netting shall project outward horizontally a minimum of 10 feet.

12. GC/CM shall ensure that vertical perimeter debris netting is established and maintained at all elevated levels where there is exposure to the public or adjacent property. Vertical safety netting shall have a height not less then 60 inches. The top edge and intermediate height of nets shall be mounted securely to a non-corrosive wire cable capable of withstanding a load of at least 200 pounds applied to any direction except upward. Netting shall be brought to deck level and securely fastened and have openings not over one inch in greatest dimension. This shall be accomplished by utilizing a zero cable or equivalent means.

13. GC/CM shall ensure that sidewalk sheds are provided and adequately designed for the protection of pedestrians, adjacent property and/or site workers adjacent to and/or entering/leaving the building. A sidewalk shed shall be erected when a structure higher than forty feet is to be constructed and the horizontal distance from the structure being built to the inside edge of the permanent or temporary walkway is equal to one half or less of the height of the structure. A sidewalk shed shall be erected regardless of the height of the structure or the horizontal distance between the structure and the sidewalk when material or debris is to be moved by a hoist, crane, derrick or chute or the building or structure is to be demolished.

14. GC/CM shall ensure that procedures are in place to prevent storage of materials at the edge of unprotected floors, roof, etc. so as to minimize materials from blowing or falling off of the building or other structures. GC/CM shall ensure that storage of materials within 10 feet of a perimeter edge is prohibited unless secondary means of securing such materials, and permission from the GC/CM, is obtained. GC/CM shall ensure that procedures are in place to secure all materials stored on the roof at the end of each work

day to minimize materials from blowing or falling off of the building or other structures during non-working hours.

15. GC/CM shall implement and enforce a scaffolding tagging system to identify scaffolds that have been inspected, are deficient or areas where additional means of fall protection should be provided. Inspections shall be made by "competent persons", as defined by OSHA, before each work shift.

16. GC/CM shall ensure that operations rendering signs, signals, and barricades insufficient for the necessary protection on or adjacent to a highway or street, will utilize trained flagmen or other appropriate traffic control.

17. Hot work permits must be issued, submitted by contractors and reviewed by the GC/CM for all welding, cutting and/or brazing operations involving renovations to existing structures.

18. GC/CM shall ensure a fire watch is conducted during the initial hot work and one hour after for final inspection.

19. GC/CM shall develop and implement a project specific safety orientation for all new persons performing work on the Project. No person shall perform any work on this Project until completing such orientation. Contractor orientation shall be presented to the Owner's Representative for review and shall include the following, at a minimum: (a) first aid; (b) emergency facilities; (c) fire protection and prevention; (d) housekeeping; (e) illumination; (f) sanitation; (g) personal protective equipment requirements; (h) fall protection; (i) ladder safety; (j) confined space awareness; (k) lockout/tag out; (l) disciplinary policy; (m) drug/alcohol policy; (n) accident reporting; (o) include site tour; and (p) material handling. GC/CM shall develop a means of tracking individuals who have completed the new employee orientation and shall develop a means of readily identifying such individuals (i.e. hard hat tags) on the Project. GC/CM is responsible for the implementation and presentation of the orientation program to all employees, subcontractors and subcontractor employees.

20. GC/CM shall conduct and document a subcontractor safety orientation prior to engaging in work activity on the Project premises. The orientation program shall meet or exceed project safety plan and Owner requirements. GC/CM must ensure that the orientation is delivered, tracked and maintained. The orientation should be provided to the senior supervisor and/or project manager responsible for the project specific staff.

21. GC/CM shall require all subcontractors to submit a written job hazard analysis ("JHA") for new work and all work of a critical nature. Contractor shall not allow work to proceed until such JHA has been reviewed and approved by the GC/CM safety manager

or designated representative. Subcontractors should communicate the final approved JHA to the entire crew and update such analysis as conditions or scope changes.

22. GC/CM shall ensure mandatory substance abuse testing for all contractors, subcontractor and any sub-tier subcontractor employees in a post-accident situation. GC/CM shall perform substance abuse testing for all contractor, subcontractor and any sub-tier subcontractor employees where reasonable suspicion exists. GC/CM shall prohibit any person failing to pass such substance abuse test from performing work on the Project. Such substance abuse testing shall be conducted within the parameters of accepted industry standards and recognized best practices. Service vendors and material delivery personnel are exempted from this provision. A written substance abuse program shall be developed and submitted.

23. GC/CM and their subcontractors (all tiers) shall implement and enforce a 6 ft. 100% fall protection program for all crafts, trades and activities except steel erection activities that fall under OSHA Subpart R standards and crane operations falling under Subpart N. GC/CM shall be required to ensure the following requirements are initiated:
    a. In addition to OSHA steel erection fall protection requirements covered under subpart R, the following shall apply to all steel erection activities including connecting, work other than connecting, and decking:
        i. All steel workers including deckers and connectors must be required to wear a full body harness and lanyard when a fall exposure of 6 feet or greater exists. Workers shall be provided with documented fall protection training.
        ii. Where existing OSHA Subpart R requirements do not require mandatory fall protection, a positive fall protection system shall still be immediately available and provided as an option for use to all employees exposed to a fall exposure of 6 feet or greater.

    When such requirement is more stringent than that required by the local safety authority, such costs shall be considered by contractors and subcontractors of all tiers at time of bid.

24. GC/CM shall prohibit the use of controlled access zones, warning line systems, controlled decking zones or safety monitoring systems as a means of personal fall protection unless a positive means of fall protection is also provided. Comply also with OSHA 1926.550 and 1926.760 for workers involved in crane operations and steel erection operations respectively.

25. Prior to mobilization, GC/CM shall submit for review a task and Site Specific Fall Protection Program that addresses task and/or activity specific exposures to include, but may not be limited to, unloading areas, stairways, leading edges, elevator shafts, perimeter fall protection, floor openings, etc.

26. GC/CM shall ensure that a third party annual crane inspection shall have been conducted and documented within the last 30 days prior to commencement of operations.

27. GC/CM shall require that all persons operating any crane greater then 15,000 pounds capacity and or equipped with a boom of 25 feet or more shall hold and possess at all times while operating any such crane a current operator's certification as recognized by the National Commission for the Certification of Crane Operators (NCCCO) or its equivalent as approved by the recognized safety authority or state agency having jurisdiction over the Project.

28. GC/CM shall ensure that a "Written Critical Lift Plan" is reviewed and approved prior to any "Critical Lift" including any lift exceeding 75% rated capacity, multiple lifts, lifts involving the hoisting of personnel, lifts within general proximity of power lines, lifts posing risks to property or people, lifts where the operator does not have direct visual contact with the load, static tower crane erection and dismantling, and lifts involving specialized or unique rigging configurations.

29. GC/CM shall ensure that routine crane inspections are documented on a daily and weekly basis.

30. GC/CM shall ensure that any person performing rigging, signaling or supervisor duties for crane operations to carry on his or her person documentation and/or licensing of rigging and signaling safety training prior to assuming such duties. In the absence of such documentation, such individual shall not rig, signal or direct the operation of any crane at any time.

31. GC/CM shall be responsible to ensure that all cranes on the jobsite are free of loads at the end of each day. The act of leaving a load on an unmanned crane shall be prohibited.

32. GC/CM shall implement and enforce a mandatory Ground Fault Circuit Interrupters (GFCI) program. The use of an assured grounding program alone shall be prohibited. Consider installation of GFCI within the main or sub panels on the Project.

33. GC/CM shall ensure that site inspections are conducted daily and weekly, and that written records are maintained of such inspections. GC/CM shall require similar site inspections and records be maintained by subcontractors.

34. GC/CM shall ensure that the use of mobile phones, radios or similar devices by any person when operating vehicles, heavy equipment and other mobile mechanized equipment while on the Project site is expressly prohibited. (Unless specifically utilized for spotting and/or two way communication with a hands-free kit in place per CM approval).

35. GC/CM shall ensure that a "No Smoking" policy is enforced on the Project site. Smoking should only be allowed in exterior designated areas.

36. GC/CM shall permanently remove from the Project any person who, in the opinion of the general contractor, engages in any unsafe work activity, or who in any manner jeopardizes the safety of other workers or any member of the public.

37. All visitors, defined as non-Owner representatives, contractors, subcontractors and service providers, shall sign release forms before entering the Project site. GC/CM shall ensure that all visitors are accompanied at all times.

38. GC/CM shall submit for review a subcontractor pre-qualification and review program that shall be implemented during the pre-qualification of all subcontractors allowed on the Project site. At a minimum, the GC/CM shall obtain and confirm the EMR of each subcontractor seeking pre-qualification. At the Owner's option, any subcontractor with an EMR greater than 1.0 will not be allowed to bid work.

39. GC/CM shall develop and submit for review a public protection program pursuant to the requirements of ANSI standards A10.34 "Public Protection In Construction Zones" and any other applicable regulations.

40. GC/CM shall ensure that lifting loads over persons, occupied or temporary structures is prohibited. GC/CM shall also ensure that for all lifts where loads may expose any employee or member of the public to the hazards of dropped loads, effective and adequate means shall be implemented prior to the lift to eliminate such exposures. The responsible person for taking such action shall be the competent person in charge of the lifting activity and shall be identified in writing by name in any pre-lift written plans and/or job hazard analysis.

TISHMAN SPEYER
SAFETY ATTACHMENT ADDENDA
(NEW YORK)

In addition to the requirements set forth in the Safety Attachment, the following requirements also apply for projects in the City of New York, New York, and the additional requirements are numbered below so as to relate back to the same numbered items in the Safety Attachment, for ease of reference.

1. A competent watchman shall be on duty at the Project site during all hours when operations are not in progress (at least one additional watchman required for each additional 40,000 square feet of construction, or fraction thereof over 5,000). Watchmen shall be familiar with fire alarm boxes and the location and use of fire fighting equipment required to be on the Project site.

11. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

12. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

13. For all buildings 100 feet or more in height, the deck and protective guards of the sidewalk shed shall be extended parallel with the curb at least 20 feet beyond the ends of all faces of the structure, regardless of whether such extensions are in front of the property being developed or in front of adjacent property. The GC/CM shall also comply with all codes applicable to the erection and maintenance of sidewalk sheds.

14. When exterior walls are not in place, material piles shall be kept at least ten feet back from the perimeter of the building; material may be stored within two feet of the edge of a building provided however that such material is stored not more than two stories below the stripping operation on concrete structures or the uppermost concrete floor on steel frame structures (such material shall be secured against accidental movement).

15. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240.

23. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240. GC/CM shall also comply with N.Y. Labor Law § 241 with regard to construction safety.

26. All power-operated cranes must have a certificate of approval, a certificate of operation, and a certificate of on-site inspection (as defined in New York City building code).

27. Riggers and hoisting machine operators shall be licensed as required under Chapter One of Title 26 of the New York City Administrative Code. The operator shall be responsible for making the machine inoperative before leaving the machine.

Attachment VII

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary,* these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____--_____ **Date** ____/ ____/ ____

Information about the employee

1) **Full name** _____

2) **Street** _____

City _____ **State** _____ **ZIP** _____

3) **Date of birth** _____ / _____ / _____

4) **Date hired** _____ / _____ / _____

5) ❒ **Male**
❒ **Female**

Information about the physician or other health care professional

6) **Name of physician or other health care professional** _____

_____

7) **If treatment was given away from the worksite, where was it given?**

Facility _____

Street _____

City _____ **State** _____ **ZIP** _____

8) **Was employee treated in an emergency room?**
❒ **Yes**
❒ **No**

9) **Was employee hospitalized overnight as an in-patient?**
❒ **Yes**
❒ **No**

Information about the case

10) **Case number from the *Log*** _____ *(Transfer the case number from the Log after you record the case.)*

11) **Date of injury or illness** _____ / _____ / _____

12) **Time employee began work** _____ **AM / PM**

13) **Time of event** _____ **AM / PM** ☐ **Check if time cannot be determined**

14) ***What was the employee doing just before the incident occurred?*** **Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific.** ***Examples:*** **"climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."**

15) ***What happened?*** **Tell us how the injury occurred.** ***Examples:*** **"When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."**

16) ***What was the injury or illness?*** **Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore."** ***Examples:*** **"strained back"; "chemical burn, hand"; "carpal tunnel syndrome."**

17) ***What object or substance directly harmed the employee?*** ***Examples:*** **"concrete floor"; "chlorine"; "radial arm saw."** ***If this question does not apply to the incident, leave it blank.***

18) ***If the employee died, when did death occur?*** **Date of death** _____ / _____ / _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Appendix C

Community Air Monitoring Program

Appendix C
Queens Plaza Residential Development

BCP # C241151
Long Island City, New York

COMMUNITY AIR MONITORING PLAN

Prepared for

TST LIC Development LLC
45 Rockefeller Center
New York, New York

Submitted to:

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

Arnold F. Fleming, P.E.

&

Fleming Lee Shue

Environmental Management & Consulting
158 West 29th Street, 9th Floor
New York, New York 10001
http://www.flemingleeshue.com

June 2014

Community Air Monitoring Plan (CAMP)

Purpose

The purpose of the CAMP is to protect downwind receptors (e.g., residences, businesses, schools, nearby workers, and the public) from potential airborne contaminants released as a direct result of the SRIWP. The CAMP helps to confirm that the RI does not spread airborne contamination off-site by providing real-time monitoring protocols for VOCs and particulates (i.e., dust) at the downwind Site perimeter while the RI is in progress. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown.

The CAMP does not establish action levels for worker respiratory protection, which are given in the Health and Safety Plan included in Appendix B and developed in accordance with 40 CFR 1910 and 1920.

Contaminant Source

The main contaminants of concern in Site soils are the petroleum and/or coal-tar-related VOCs, benzene, ethylbenzene, toluene, xylene (BTEX); the semi-volatile compound naphthalene; and the poly aromatic hydrocarbons (PAHs). Metals represent a secondary and minor concern.

Investigation Activities

The soil gas survey should not expose any soils in a manner that will affect air quality or release particulates. Similarly, groundwater is approximately 6 to 11 feet below grade and will not be exposed during site investigation activities except for small quantities generated during well development and sampling and is not expected to have any impact on air quality.

The tasks with potential to disperse any contaminated soil into the air are soil boring and well installation. However, this type of invasive work generates very little dust or airborne contamination. Typical drilling of the type proposed does not adversely affect air quality. Regardless, the CAMP will be implemented to ensure that potential impacts are monitored.

Receptor Population

Potentially exposed receptors during remediation include workers on nearby construction sites, passersby and, to a lesser degree, individuals living, working, and shopping in the vicinity of the project.

Monitoring Plan

While drilling or installing monitoring wells the proposed CAMP, entailing upwind and downwind perimeter monitoring will be implemented as described in the following sections. Due care will be taken to monitor and control fugitive odors and dust emissions from the Site, minimizing the risk of exposure to the surrounding receptor population during the SRIWP.

Continuous Monitoring

Continuous monitoring will be conducted while advancing soil borings and installing monitoring wells.

Periodic Monitoring

Periodic VOC monitoring will occur during non-intrusive activities such as collection of groundwater samples from monitoring wells. Periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location.

VOC Monitoring, Response Levels, and Actions

VOCs will be continually monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) using a photoionization detector (PID). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The PID will be calibrated at least daily, or more often if needed. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, work must cease. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

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

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will cease and a re-evaluation of activities initiated. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration. All readings must be recorded and be available for State (DEC and DOH) personnel to review.

Appendix D

Historical Environmental Investigations

AKRF, Inc.

ENVIRONMENTAL CONSULTANTS
117 East 29th Street • New York, NY 10016-8022

212/696-0670
FAX 212/447-5546

October 1, 1998

Mr. Richard A. Gardineer
Division of Environmental Remediation
New York State Department of Environmental Conservation
47-40 21st Street
Long Island City, NY 11101

Re: Supplemental Site Assessment/Remedial Investigation
Outlet City Site - Long Island City, New York

Dear Mr. Gardineer:

Please find attached a Supplemental Site Assessment/Remedial Investigation Report. These activities were performed in accordance with the Revised Supplemental Site Assessment/Remedial Investigation Work Plan dated September 1996 and Mr. Brevdo's letters of October 7, 1996 (additional sampling locations) and November 4, 1996 (groundwater sampling and water table measurements).

Sincerely,
AKRF, Inc.

Marcus Simons
Technical Director

MS\C:\Files\Outletcity\supsite2.doc

cc: Richard A. Gardineer - NYSDEC (4 copies, 1 unbound)
G. Anders Carlson - NYSDOH (2 copies)
Lou Oliva - NYSDEC
Joseph Conley - Outlet City Inc.
John Scagnelli - Whitman Breed Abbott & Morgan

OUTLET CITY PROPERTY

Long Island City, New York

SUPPLEMENTAL SITE ASSESSMENT/REMEDIAL INVESTIGATION

Prepared for submission to:

New York State Department
of Environmental Conservation

Prepared by:

AKRF, Inc.
117 East 29th Street
New York, NY 10016
(212) 696-0670

OCTOBER 1998

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Appendix

A. Well Logs for Locations F-1 and W-D2

1. INTRODUCTION

A Voluntary Cleanup Site Assessment Report was prepared and submitted by AKRF, Inc. to the New York State Department of Environmental Conservation (NYSDEC) in June 1996 for the Outlet City property located in Long Island City, New York. The report contained a description of the site, its past history, and a summary of previous investigations that had been conducted on the site.

NYSDEC requested this additional limited investigation be performed to obtain more information on site conditions, to help in selecting the final remedial plan for the site. An approved Revised Supplemental Site Assessment/Remedial Investigation (SA/RI) Work Plan was prepared and submitted to NYSDEC in September 1996. Sampling beyond that outlined in the Workplan was performed in accordance with NYSDEC's (Mr. Brevdo's) letters of October 7, 1996 (additional soil sampling locations) and November 4, 1996 (groundwater sampling and water table measurements) An additional well was installed at location F-1.

2. SAMPLING LOCATIONS AND PARAMETERS

To obtain additional information, soil samples were collected at the following eleven locations (all sampling locations are shown on Figure 1):

- under Building # 1 (locations B-1, B-2 and B-3) and Building # 4 (locations B-4 and B-5). These samples were analyzed for volatile organics, semi-volatile organics, and pesticides on the EPA's Target Compound List; and for priority pollutant metals and cyanide. One soil sample from under each building (locations B-3 and B-4) was analyzed for TCLP metals and TCLP pesticides/herbicides.

- at the previous locations and depths E-1D (0-4 feet), C-2 (0-2 feet), and C-3D (0-2 feet) from the 1990 sampling program which had exhibited high total metal concentrations. These samples were analyzed for TCLP lead, cadmium, and arsenic. Please note that these three samples are also referred to as B-6, B-7 and B-8 respectively.

- At locations B-9 and B-10, adjacent to the substation, samples were analyzed for PCBs.

- At location F-1, where high levels of total lead were previously found, a sample from 0 to 2 feet was analyzed for TCLP metals.

The monitoring well locations are shown on Figure 1. Well F-1 was a new well, installed and developed on July 17, 1998. Well W-D2 was reinstalled on the same day (at its approximate former location), as the previous well location had been covered with concrete. Logs for both wells are contained in Appendix A. Of these 13 wells, three (D-2D, E-2 and 10-1) had a floating layer of creosote. Based on discussions with and memoranda to (June 12 and June 30, 1998) Vadim Brevdo

LEGEND

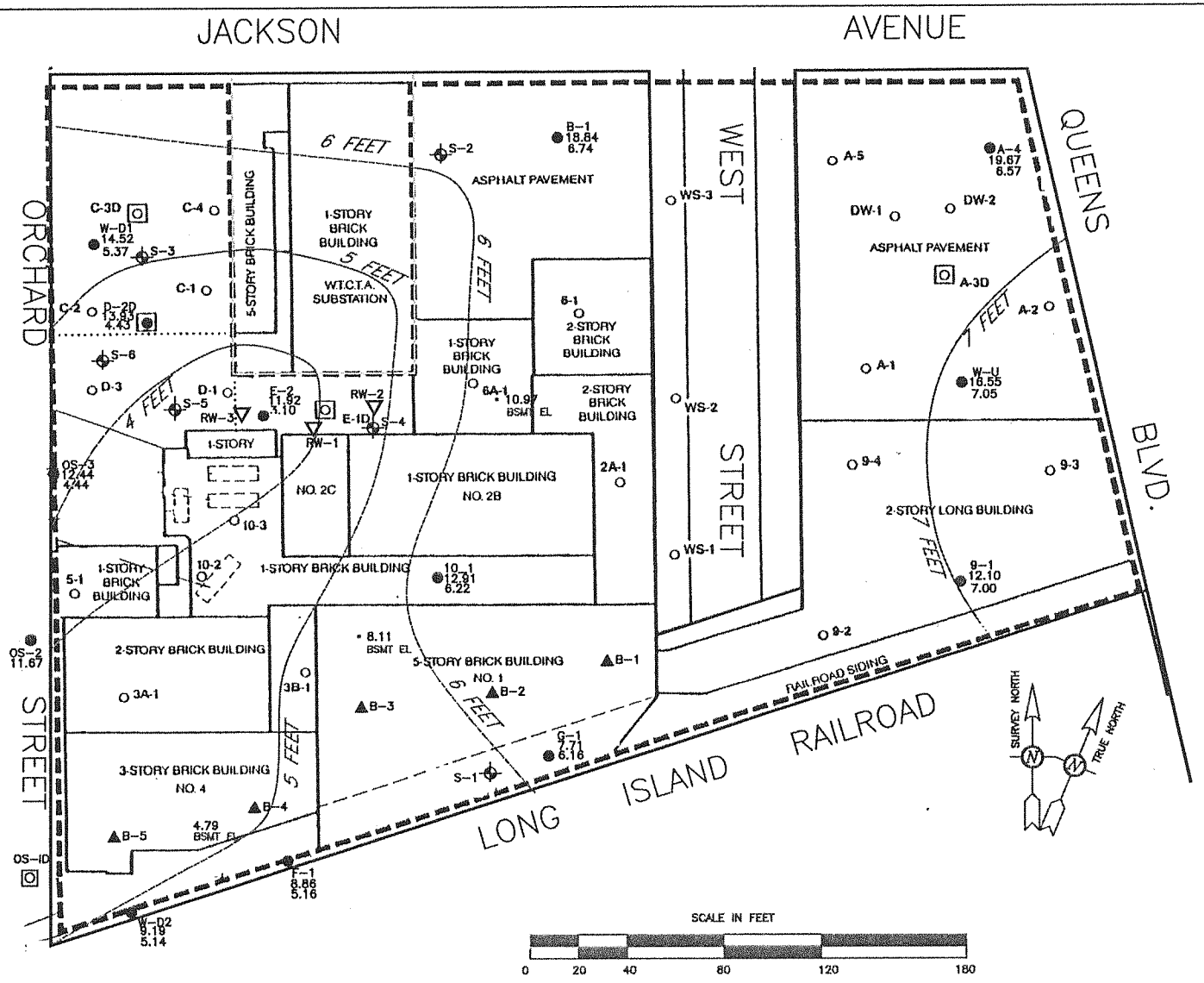
Surveyed Monitoring Well Locations
August 1998

DESC
SURFACE ELEVATION
WATER TABLE ELEVATION

- 1997 Soil Sampling Locations
- 1990 Soil Sampling Locations
- 1988 Soil Sampling Locations
- Bedrock Borings
- Recovery Wells

Note: Contour lines show elevation of water table

DESC	NORTH	EAST
W-D1	429.457	517.686
D-2D	401.859	540.410
OS-3	333.879	500.909
OS-2	265.196	491.909
E-2	357.689	587.585
W-D2	152.447	533.331
F-1	173.443	597.745
G-1	216.301	705.683
BSMT EL	192.768	573.925
10_1	290.359	659.704
BSMT EL	266.066	627.210
BSMT EL	364.091	683.944
9-1	287.871	875.327
B-1	473.427	707.465
W-U	370.249	875.651
A-1	467.650	887.546



of NYSDEC, no sampling was performed of these three wells, however, the depth to the top of the product and the thickness of the product was measured. At 9 of the other 10 wells, after redevelopment and measuring the depth to water, samples were collected and analyzed for TCL volatile and semi-volatile organic compounds as well as TAL metals (both filtered and unfiltered samples). Well OS-2 was almost dry, preventing collection of enough water for any laboratory analysis

3. SOIL SAMPLING METHODOLOGIES

3.1 Sampling Within Buildings

Within the buildings, a tripod arrangement was used to obtain the soil samples. At each boring location, soil samples were obtained by a steel, 24-inch long, 3-inch diameter split-spoon sampler. Soil samples were collected from discrete two foot intervals: 0-2 feet, 2-4 feet, etc. until the groundwater table was reached. The approximately 2-foot soil samples obtained from each depth were screened for total organic vapors using an Organic Vapor Meter (OVM), and the sample with the highest organic vapor content was collected for laboratory analysis.

Each sample container was properly sealed, labeled, and placed in a refrigeration unit at a temperature of approximately 4 °C for transport to the laboratory. A record of each sample, including notation of any odors, color, or sample matrix, was kept in the sampler's field log book. A chain of custody was maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis.

3.2 Sampling in Open Areas

Soil sampling was performed using a truck mounted rotary drill rig in the open areas. At each boring location, soil samples were obtained by a steel, 24-inch long, 3-inch diameter split-spoon sampler. For TCLP metals, the soil sample from each location will be collected from the depth specified above. For PCBs, soil samples in the absence of visual indication of stains, the sample closest to the water table was selected. At location F-1, the soil sample was collected at the time of the well installation.

4. GROUNDWATER SAMPLING METHODOLOGIES

Groundwater sampling, at the wells where no product was encountered, was conducted in accordance with NYSDEC guidance using dedicated disposable bailers.

5. QUALITY ASSURANCE / QUALITY CONTROL

5.1 Field Decontamination Procedures

To avoid contamination and cross-contamination of samples, all sampling equipment was cleaned before collection of each sample. The procedure used was adapted from the New York State Department of Environmental Conservation's *Sampling Guidelines and Protocols*, September 1992.

Step 1: Steam clean or pressure wash equipment.
Step 2: Scrub equipment with a bristle brush using a non-phosphate detergent solution
Step 3: Rinse with distilled water.
Step 4: Rinse with 0.1N nitric acid (HNO3). Stainless steel equipment, will be rinsed with 0.1N hydrochloric acid (HCL).
Step 5: Rinse twice with distilled water.
Step 6: Rinse with spectrographic grade methanol.
Step 7: Air dry.
Step 8: Double rinse with distilled water.
Step 9: Air dry the equipment.
Step 10: Package in clean aluminum foil.

5.2 Trip And Field Blanks

A trip blank and field blank were included in the sampling program. Trip blanks were analyzed for volatile organics to check for any contamination during transportation, and field blanks were analyzed for all sampling parameters to check for any contamination due to the sampling equipment used.

5.3 Laboratory Testing

Accredited Laboratories, Inc. (Carteret, New Jersey), a laboratory certified to perform NYSDEC Analytical Services Protocol (ASP) performed the laboratory analyses.

6. SOIL SAMPLING RESULTS

In all cases, except the two PCB borings (B-9 and B-10), groundwater was intercepted within 3 feet from the start of the boring. The depths of the samples are shown in Tables 1 through 5.

6.1 Volatile Organic Compounds

All five borings analyzed for VOCs (B-1 through B-5) showed elevated levels of VOCs. BTEX (benzene, toluene, ethylbenzene and xylene) were the major constituents with total BTEX levels

At three of the other 4 wells (W-D2, G-1 and F-1), methylphenols and dimethylphenols were detected. Naphthalene and methyl-naphthalene were detected at these three wells (but at less than 10 ppb at G-1) as well as OS-3. [These 4 wells contained the highest levels of BTEX, see 7.1 above]. Other SVOCs detected at levels above 100 ppb were acenaphthene and dibenzofuran at W-D2 and F-1, and fluorene and phenanthrene at F-1 only.

7.3 Total Metals and Dissolved Metals

Levels of metals are shown in Table 9. In terms of total levels detected i.e., prior to filtration, all wells exceeded GA drinking water standards for iron, manganese and sodium (except well 9-1). Six wells exceeded the GA standard for magnesium. None of these metals are likely to be associated with site contamination. Other compounds where GA standards were exceeded at one or more wells were antimony, arsenic, beryllium, cadmium, copper, lead, mercury, nickel, silver and zinc. Only lead and silver were found at levels more than 10 times their GA standards.

Since levels of total metals may be more indicative of contaminants contained in suspended particles in the well and hence the groundwater sample, the samples were filtered and re-analyzed. Since these filtered samples are more indicative of what is dissolved in the groundwater, they give a better representation of the levels of metals which can be expected to flow with the groundwater. Iron, manganese, magnesium and sodium still showed general exceedances of the GA standard. Antimony, lead, mercury and nickel were the only other metals for which there were exceedances of GA standards. Only the level of antimony (9.4 ppb at G-1, compared to a standard of 3 ppb) was more than twice its GA standard.

7.4 Pesticides and PCBs

As shown in Table 10, no pesticides or PCBs were detected, with the exception of 0.23 ppb of heptachlor epoxide at F-1, which is above the GA standard of 0.03 ppb.

8. GROUNDWATER ELEVATIONS AND MODELING

8.1 Groundwater Elevations

The top-of-casing elevations were surveyed for all wells by Montrose Surveying Company, Inc. On July 24, 1998, depths from the top of the casing to the surface of the water were measured by AKRF in all 13 wells. In the three wells with floating creosote, the thickness of the creosote was also measured. The equivalent water table elevations (EWTE) for the three wells with product were calculated as if there had been no creosote, i.e., EWTE = actual water elevation + 0.9 x thickness of creosote (0.9 is the estimated specific gravity of the creosote).

Well No.	Elevation to top of PVC [feet]	Depth to water [feet]	Creosote thickness [feet]	Equivalent Water Table Elevation [feet]
OS-3	12.44	8.0		4.44
OS-2	11.67	7.85		3.82
G 1	7.71	1.55		6.16
F 1	8.86	3.7		5.16
9-1	12.1	5.1		7.00
W-D2	9.19	4.05		5.14
B-1	18.84	12.1		6.74
W-U	16.55	9.5		7.05
A-4	19.67	13.1		6.57
W-D1	14.52	9.15		5.37
D-D2	13.93	9.5	0.60	4.97
10-1	12.91	6.9	0.23	6.22
E-2	11.92	9.05	0.25	3.10

Figure 1 shows the EWTE for all wells at the site and estimated contours of equal elevation. Although the general flow, consistent with the regional flow is towards the west (to the East River), the water table is considerably lower in the central-western portion of the site. This was the general area where the thickest layer of creosote accumulates. It is also where the bedrock is shallower.

8.2 Groundwater Modeling

In their letter of December 2, 1996, NYSDEC required that an evaluation be performed to determine if the contaminated groundwater from the site could have an impact on the East River or the Jamaica Water Company (now NYC DEP) supply area. Based on the flow directions discussed in Section 8.1, there is no potential for adverse impacts to the Jamaica Water Company (now NYC DEP) supply area, since the supply area is located to the east of the site.

In terms of potential impact to the East River, which is approximately 2,000 feet west of the site, the applicable standards are New York State Ambient Water Quality Standards and Guidance Values for Class I Waters. Since modeling of the advection/dispersion and absorption of contaminants over this distance is problematic, the following extremely conservative assumptions were made.

- Flow from the site was assumed to be directly to the west (true north is shown on the survey) i.e., along a 360 foot length parallel to the river, with no sorption or biodegradation occurring.
- The hydraulic gradient was estimated to be 0.007 (using wells D-2D and 9-1)
- The hydraulic conductivity was estimated to be 0.001 cm/s (typical for fill and sandy silt)
- The effective porosity was assumed to be 0.25

Well No.	Elevation to top of PVC [feet]	Depth to water [feet]	Creosote thickness [feet]	Equivalent Water Table Elevation [feet]
OS-3	12.44	8.0		4.44
OS-2	11.67	7.85		3.82
G 1	7.71	1.55		6.16
F 1	8.86	3.7		5.16
9-1	12.1	5.1		7.00
W-D2	9.19	4.05		5.14
B-1	18.84	12.1		6.74
W-U	16.55	9.5		7.05
A-4	19.67	13.1		6.57
W-D1	14.52	9.15		5.37
D-D2	13.93	9.5	0.60	4.97
10-1	12.91	6.9	0.23	6.22
E-2	11.92	9.05	0.25	3.10

Figure 1 shows the EWTE for all wells at the site and estimated contours of equal elevation. Although the general flow, consistent with the regional flow is towards the west (to the East River), the water table is considerably lower in the central-western portion of the site. This was the general area where the thickest layer of creosote accumulates. It is also where the bedrock is shallower.

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- The hydraulic conductivity was estimated to be 0.001 cm/s (typical for fill and sandy silt)
- The effective porosity was assumed to be 0.25

- The average thickness of the aquifer (from water table to bedrock) was estimated at 25 feet

When combined, these assumptions imply that the groundwater moves with an average velocity of 0.00028 cm/s [0.007 x 0.001/0.25] or 0.0000028 m/s towards the East River. The cross-sectional area of flow is 9,000 square feet [360 x 25] or 836 square meters. Therefore the total flow leaving the site (and assumed to enter the East River) is 0.00023 cubic meters or 0.2 liters per second. It then follows that the contaminants in this flow are diluted by mixing with the flow along the East River. This flow was calculated from the following assumptions:

- Average speed of flow is 0.26 m/s or 0.5 knots (from tide tables, maximum speeds exceed 1 knot)
- Average depth of river is 10 meters (NOAA Chart 12335)
- Distance from bulkhead over which mixing occurs is 100 meters (conservative assumption, mixing probably occurs over entire distance to Roosevelt Island, 300 meters)

Using these assumptions, the per second average flow mixing with the 0.00023 cubic meters of contaminated groundwater from the Outlet City Site is 260 cubic meters [0.26 x 10 x 100], i.e., the groundwater would be diluted by a factor of 1,130,000 [260/0.00023]. Table 11 shows the resulting loading to the East River, assuming that all groundwater leaving the site has a concentration equal to the highest level detected in any well. The incremental loading is well below 1% of any Class I Standard. As such, even using all the above conservative assumptions, no violations of water quality standards would result from the flow of groundwater at the site.

TABLE 1
VOLATILE ORGANICS IN SOIL SAMPLES

Sample #	B-1	B-2	B-3	B-4	B-5	FB	TB	FB	TB	VBLKD85
Laboratory #	9714081	9714080	9714079	9714377	9714378	9714085	9714086	9714381	9714382	--
Depth*	0.5'-2.5'	0.5'-3.0'	0.5'-3.5'	1'-3'	1'-3'	N/A	N/A	N/A	N/A	N/A
Dilution Factor	200	200	1,000	500	500	1	1	1	1	1
Volatile Organics (ppb)										
Acrolein	U	U	U	U	U	U	U	U	U	U
Acrylontrile	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	3,200 B	3,800 B	15,000 B	13,000 B	12,000 B	9 B	7 B	19 BW	20 BW	U
Acetone	2,100 B	U	22,000 B	U	U	8 B	7 B	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U
Chloroform	310 J	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U
Benzene	13,000	4,300	5,400 J	1,900 J	2,200 J	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropane	U	U	U	U	U	U	U	U	U	U
2-Chloroethylvinylether	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	1,400 JB	U	U	U	U	U	U	2 J
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U
Toluene	47,000	27,000	55,000	17,000	16,000	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	40,000	19,000	53,000	12,000	12,000	U	U	U	U	U
Styrene	U	U	U	4,700	4,700	U	U	U	U	U
m,p-Xylene	120,000 D	61,000	140,000	33,000	31,000	U	U	U	U	U
o-Xylene	45,000	38,000	73,000	16,000	15,000	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U

U = Undetected

B = Indicated that compound found in the associated blank

D = Indicates result is based on additional dilution

J = Concentration found less than MDL

* Depth below existing grade

TABLE 2

SEMIVOLATILE ORGANICS IN SOIL SAMPLES

Sample #	B-1		B-2		B-3		B-4		B-5		FB
Laboratory #	9714081		9714080		9714079		9714377		9714378		9714381
Depth*	0.5-2.5'		0.5-3.0'		0.5-3.5'		1'-3'		1'-3'		N/A
Dilution Factor	1000		1000		1000		165		165		1
Base Neutral Organics (ppb)											
Acenaphthene	1,900,000	D	2,400,000	D	2,500,000	D	34,410		36,865		U
Acenaphthylene		U	5,300		15,000		837		1,185		U
Anthrancene	49,000		1,000,000	D	600,000	D	10,232		10,673		U
Benzidine		U		U		U		U		U	U
Benzo (a) Anthracene	4,800		7,200		5,800		809		1,118		U
Benzo (a) Pyrene	1,100	J	1,700	J	2,000	J		U		U	U
Benzo (b)flouranthene	820		1,600	J	1,700	J	232	J	248	J	U
Benzo (g,h,I) Perylene		U		U	840	J		U		U	U
Benzo (k) Fluoranthene	1,300	J	1,400	J	1,500	J		U		U	U
Bis (2-Chloroethoxy) methane		U		U		U		U		U	U
Bis (2-Chloroethyl) ether		U		U	3,500	J		U		U	U
Bis (2-Chloroisporopyl) ether		U	5,100			U		U		U	U
Bis (2-Ethylhexyl) Phthalate	5,300		15,000		6,600		121	J	157	J	U
4-Bromophenyl phenyl ether		U		U		U		U		U	U
Butyl benzyl phthalate		U		U		U		U		U	U
2-Chloronaphthalane		U		U		U		U		U	U
4-Chlororphenyl phenyl ether		U		U		U		U		U	U
Chrysene	5,100		7,900		6,000		757		992		U
Dibenzo (a,h) Anthracene		U		U		U		U		U	U
Dibenzofuran		U		U		U		U		U	
1,2-Dichlorobenzene	930	J	1,500	J	5,500			U		U	U
1,3-Dichlorobenzene		U	U			U		U		U	U
1,4-Dichlorobenzene	8,900		3,300	J	4,000			U		U	U
3,3-Dichlorobenzidine		U		U		U		U		U	U
Diethyl phthalate		U		U		U		U		U	U
Dimethyl pthalate		U		U		U		U		U	U
Di-n-butyl phthalate	1,300	J	4,400			U	334	J	292	J	U
2,4-Dinitrotoluene		U		U		U		U		U	U
2,6-Dinitrotoluene		U		U		U		U		U	U
Di-n-octyl-phthalate		U		U		U		U		U	U
1,2-Diphenylhydrazine		U		U		U		U		U	U
Fluoranthene	35,000		62,000		50,000		6,125		7,387		U
Fluorene	1,500,000	D	2,400,000	D	2,200,000	D	25,036		75,408		U
Hexachlorobenzene	U			U		U		U		U	U
Hexachloroabutiene	U			U		U		U		U	U

U = Undetected

J = Concentration found less than MDL

D = Indicates result is based on a additional dilution

* Depth below existing grade

TABLE 2 (continued)

SEMIVOLATILE ORGANICS IN SOIL SAMPLES

Sample #	B-1		B-2		B-3		B-4		B-5		FB
Laboratory #							9714377		9714378		9714381
Depth*	0.5-2.5'		0.5-3.0'		0.5-3.5'		1'-3'		1'-3'		N/A
Dilution Factor							165		165		1
Base Neutral Organics (ppb)											
Hexachlorocyclopentadience		U		U		U	U		U		U
Hexachloroethane		U		U		U	U		U		U
Indeno (1,2,3-cd) Pyrene		U		U	700	J	U		U		U
Isophorone		U		U		U	U		U		U
Naphthalene	4,900,000	D	6,100,000	D	7,100,000	ED	U		563,159		U
Nitorbenzene		U		U		U	U		U		U
N-Nitrosodimethylamine		U		U		U	U		U		U
N-Nitrododi-n-propylamine		U		U		U	U		U		U
N-Nitrosodiphnylamine		U		U		U	U		U		U
Phenanthrene	1,600,000	D	3,000,000		1,900,000	D	20,211		23,668		U
Pyrene	21,000		34,000		25,000		4,516		5,624		U
1,2,4-Trichlorobenzene		U		U		U	U		U		U
Acid Extractable Organics (ppb)											
3&4-Methylphenol	12,000		21,000		560,000	D	16,285		31,663		U
2-Methylphenol		U	9,100		30,000		7,867		12,787		U
4-Chloroaniline		U		U		U	U		U		U
2-Methynapthalene	5,000,000	D	4,700,000	D	6,500,000	D	U		U		U
2,4,5-Trichlorophenol		U		U		U	U		U		U
2-Nitroaniline		U		U		U	U		U		U
3-Nitroaniline		U		U		U	U		U		U
4-Nitroaniline		U		U		U	U		U		U
Benzoil Acid		U		U		U	U		U		U
Benzyl Alcohol		U		U		U	U		U		U
2-Chlorophenol		U		U		U	U		U		U
2-Nitrophenol		U		U		U	U		U		U
Phenol	1,700	J	2,900	J	11,000		U		U		U
2,4-Dimethylphenol	230,000	JD	430,000	D	620,000	D	U		U		U
2,4-Dichlorophenol		U		U		U	U		U		U
2,4,6-Trichlorophenol		U		U		U	U		U		U
Pentachlorophenol		U		U		U	U		U		U
2,4-Dinitrophenol	6,800			U		U	U		U		U
4-Nitrophenol		U		U		U	U		U		U
4-Chloro-3-methyl phenol		U		U		U	U		U		U

U = Undetected

J = Concentration found less than MDL

D = Indicates result is based on a additional dilution

* Depth below existing grade

TABLE 3
METALS IN SOIL SAMPLES

Sample #	B-1	B-2	B-3	B-4	B-5
Laboratory #	9714081	9714080	9714079	9714377	9714378
Depth*	0.5'-2.5'	0.5'-3.0'	0.5'-3.5'	1-3'	1-3'
Dilution Factor	100	1	1	1	1
Total Metals (ppm)					
Antimony	ND	ND	ND	ND	ND
Arsenic	15	30.3	15.5	3.2	1.95
Beryllium	ND	0.706	ND	ND	ND
Cadmium	ND	1.75	ND	ND	ND
Chromium	20.5	18.8	15	13.5	17.2
Copper	29.2	187	66.7	14.8	22.1
Lead	68.9	1,270	168	ND	ND
Mercury	ND	0.303	ND	ND	ND
Nickel	9.94	27.9	10.8	10	11.8
Selenium	1.2	5.56	0.832	ND	ND
Silver	ND	2.92	0.897	0.924	1.2
Thallium	ND	ND	ND	ND	ND
Zinc	215	467	186	27.6	62.7
Cyanide, total	ND	ND	ND	ND	ND

Sample #	B-3	B-4	B-6	B-7	B-8
Laboratory #	9714079	9714377	9714082	9714082	9714084
Depth*	0.5'-3.5'	1-3'	0.5'-2.5'	0.5'-2.5'	0.5'-2.5'
Dilution Factor	1	1	1	1	1
TCLP Metals (ppm)					
Arsenic	ND	ND	ND	ND	ND
Barium	0.318	0.136	NR	NR	NR
cadmium	ND	ND	ND	0.143	ND
Chromium	ND	ND	NR	NR	NR
Lead	ND	ND	0.8	2.47	1.43
Mercury	ND	ND	NR	NR	NR
Selenium	ND	ND	NR	NR	NR
Silver	ND	ND	NR	NR	NR

ND = Not detected
NR = Not Required
* Depth below existing grade

Table 4 - TCLP Metals at Location F-1

	RCRA Level	F-1
Aluminum		1,450
Antimony		6.5 B
Arsenic	5,000	8.7 BN
Barium	100,000	1,020
Beryllium		0.99 B
Cadmium	1,000	27
Calcium		63,400
Chromium	5,000	8.4 B
Cobalt		27.8 B
Copper		2,060
Iron		211
Lead	5,000	**19,800**
Magnesium		13,800
Manganese		1,080
Mercury	200	0.5 U
Nickel		110
Potassium		2,290 B
Selenium	1,000	3.7 U
Silver	5,000	1.4 U
Sodium		265,000
Thallium		1.7
Vanadium		1 U
Zinc		9,190 B

all values in micrograms per liter

U Not Detected

B Estimated Value

N Spiked sample recovery outside control limits

TABLE 5
PESTICIDES IN SOIL SAMPLES

Sample #	B-1	B-2	B-3	B-4	B-5	FB
Laboratory #	9714081	9714080	9714079DL	9714377	9714378	9714085
Depth	0.5'-2.5'	0.5'-3.0'	0.5'-3.5'	1-3'	1-3'	N/A
Dilution Factor	100	1	1			1
Pesticides (ppb)						
A-BHC	593	U	U	1.88	2.98	U
B-BHC	U	U	U	U	U	U
C-BHC (Lindene)	U	U	U	U	U	U
D-BHC	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	U
Endosulfan I	U	U	131 D	U	U	U
A-Chlorodane	354	U	U	U	U	U
G-Chlorodane	312	U	U	U	3.99	U
Dieldrin	2,480	U	U	U	U	U
4,4-DDE	2,660	208 D	30.5 D	4.09	U	U
Endrin	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U
4,4-DDD	10,800 D	538 D	39.5	U	3.01	U
Endrin Aldehyde	U	U	U	U	U	U
Endosulfan Sulfide	U	U	U	U	U	U
4,4-DDT	U	U	U	U	U	U
Endrin Keton	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U
Toxaphene	U	U	U	U	U	U

Sample #	B-3	B-4
Laboratory #	9714079	9714377
Depth	0.5'-3.5'	1-3'
Dilution Factor	1	50
TCLP Pesticides (ppm)		
G-BHC (Lindnae)	U	U
Heptachlor	U	U
Heptachlor Epoxide	U	U
Endrine	U	U
Methoxychlor	U	U
A-Chlordane	U	U
G-Chlordane	U	U
Toxaphene	U	U
TCLP Herbicide (ppm)		
2,4-D	U	U
Silvex	U	U

U = Undetected
D = Indicates result is based on a additional dilution
J = Concentration found less than MDL
* Depth below existing grade

TABLE 6
PCBs IN SOIL SAMPLES

Sample #	B-9	B-10	FB
Laboratory #	9714380	9714379	9714381
Depth*	11-12'	4-5'	N/A
Dilution Factor	100	1	1
PCBs (ppm)			
Aroclor-1016	U	U	U
Aroclor-1221	U	U	U
Aroclor-1232	U	U	U
Aroclor-1242	U	U	U
Aroclor-1248	U	U	U
Aroclor-1254	U	U	U
Aroclor-1260	U	U	U

U = Undetected
* Depth below existing grade

Table 7 - VOCs in Groundwater Samples

	W-D1	A-4	W-U	B-1	OS-3	W-D2	9-1	G-1	F-1	DUP	FB	TB
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	2 J	U	U	U	U	U	U	U	2 J	U	U
Chloroethane	U	U	U	U	U	U	3 J	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	3 JB	U	U	U
Acetone	9	12 B	140 B	7 JB	8 JB	28	14	120	1100 D	6 J	13	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	1 J	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	2 J	U	U	U	U	U
total-1,2-Dichloroethene	U	9 J	240	U	U	U	35	U	U	9 J	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	3 J	3 J	U	U	U	33	U	U	3 J	U	U
2-Butanone	U	U	U	U	U	3 J	U	10	41	U	2 J	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	1 J	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	2 J	U	U	70	2 J	190	570 D	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	2 J	U	U	2 J	U	3 J	11	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	5 JB	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	6 J	U	30	40	5 J	86	1700 D	U	1 J	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	U	5 J	U	140	180	46	20	450 D	U	U	U
Styrene	U	U	U	U	U	U	U	3 J	210 D	U	U	U
Xylenes, total	U	U	15	U	330	340	170	50	1600 D	U	U	U

all values in micrograms per liter

U Not Detected
J Estimated Value
D Diluted Sample
B Also Detected in Associated Blank Sample

Table 8 - SVOCs in Groundwater Samples

	W-D1	A-4	W-U	W-UDL	B-1	OS-3	W-D2	9-1	G-1	F-1	DUP	FB
bis(2-Chloroethyl)ether	U	U	U	U	U	U	U	U	U	U	U	U
Phenol	U	2 JB	U	U	U	U	40	U	46	400	U	1 J
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	4 J	U	U	U	U	U	U
1,2-Dichlorobenzene	U	4 J	U	U	U	U	U	2 J	U	U	U	U
2,2'-oxybis(1-Chloropropane)	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	15	17 DJ	U	U	98 DJ	U	170 D	1100 DJ	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	U	U	U	U	U	U	U	U	U	U	U	U
4-Methylphenol	U	U	U	U	U	U	130 DJ	U	220 D	1400 DJ	U	U
Nitrobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Isophorone	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	U	U	26	36 DJ	U	U	1100 D	4 J	640 D	3100 D	U	1 J
bis(2-Chloroethoxy)methane	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Naphthalene	U	U	4 J	6 DJ	7 J	3000 D	2900 D	56	11 J	9700 D	4 J	11
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylnaphthalene	U	U	U	U	2 J	170 DJ	1400 D	8 J	12	2600 D	U	2 J
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Acenaphthylene	U	U	U	U	U	5 J	6 J	U	U	10 J	U	U
Dimethylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
Acenaphthene	U	U	U	U	U	170 DJ	280 DJ	3 J	19	320	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	U	U	U	U	U	130 DJ	210 DJ	U	16	250	U	U
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
Fluorene	U	U	U	U	U	52	120 DJ	2 J	15	160	U	U
4-Chlorophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	3 J	150 E	220 D	U	U	U	2 J	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
n-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	U	U	1 J	U	U	16	57	1 J	9 J	120	U	U
Anthracene	U	U	U	U	U	8 J	16	U	4 J	30 J	U	U
Carbazole	U	U	U	U	U	17	8 J	U	8 J	35 J	U	U
Di-n-butylphthalate	U	U	U	U	U	U	610 DB	8 J	1 JB	U	U	130 DJB
Fluoranthene	U	U	U	U	U	2 J	11	U	2 J	21 J	U	U
Pyrene	U	U	U	U	U	2 J	10 J	U	2 J	16 J	U	1 J
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(a)anthracene	U	U	U	U	U	U	1 J	U	U	U	U	U
Chrysene	U	U	U	U	U	U	2 J	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	2 JB	3 JB	11 B	12 DJB	U	560 DB	2600 DB	7 JB	5 JB	5 JB	51 B	1900 DB
Di-n-Octylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(a)pyrene	U	U	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	U	U	U	U	U	U	U	U	U	U	U	U
Dibenz(a,h)anthracene	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	U	U	U	U	U	U	1 J	U	U	U	U	2 J

all values in micrograms per liter

U Not Detected
J Estimated Value
D Diluted Sample
B Also Detected in Associated Blank Sample

Table 9 - Metals in Groundwater Samples

TOTAL

	GA Std.	W-D1	A-4	W-U	B-1	OS-3	W-D2	9-1	G-1	F-1	DUP	FB
Aluminum		2620	136 B	503	54.7 B	8810	62300	32.3 B	5800	45100	6940	92.6 B
Antimony	3	1.8 U	1.8 U	2.9 B	1.8 U	1.8 U	1.8 B	2.9 B	24.1 B	1.8 U	1.8 U	1.8 U
Arsenic	25	7.1 B	13.8	32.3	1.7 U	23.8	19.8	32.3	73.6	22	31	1.7 U
Barium	1000	73.8 B	178 B	25.1 B	69.3 B	193 B	646	118 B	311	866	275	1.8 B
Beryllium	3	0.22 U	0.22 U	0.22 U	0.22 U	0.22 B	5.3	0.57 B	0.41 B	4.1 B	0.22 U	0.22 U
Cadmium	5	0.75 B	0.49 B	0.34 B	0.6 B	1.7 B	6.6	1.6 B	41.2	1.7 B	2 B	0.33 U
Calcium		424000	87100	79700	149000	82200	28600	48700	109000	81200	99100	9080
Chromium	50	6.9 B	1.9 B	3.3 B	1.4 B	18.7	171	26.7	20.9	120	16.3	2.1 B
Cobalt		8.9 B	5.3 B	13.5 B	2.5 B	14.5 B	65	19.9 B	21.5	83.1	14 B	0.69 B
Copper	200	26.2	7.3 B	470	7.8 B	39	375	42.3	1980	158	28.6	2 B
Cyanide	200	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Iron	300	6610	43700	50300	779	72500	95300	61600	18300	97000	66400	108
Lead	25	19.3	7.3	112	9.5	21.1	842	762	382	120	17.1	1.8 U
Magnesium	35000	48200	40400	42300	64300	22500	20100	14200	12200	38000	46200	247 B
Manganese	300	4170	1530	10700	6340	6500	2650	1150	506	5070	1870	7.7 B
Mercury	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.36	1.7	0.2 U	0.2 U
Nickel	100	76	26 B	65.5	5.8 B	23.7 B	90.6	29.5 B	37.9 B	184	37.3 B	4.1 B
Potassium		16200	28100	24400	9100	3920 B	11000	17000	21000	65600	29200	155 B
Selenium	10	18.3 U	3.7 U	3.5 BW	5.2 B	4.4 B	3.7 U	3.9 BW	4.9 B	3.7 UW	3.7 U	2.8
Silver	50	2.5	1.4 U	1.4 U	1.4 U	1.4 U	11.9	6310	1.4 U	12.4	1.4 U	1.4 U
Sodium	20000	258000	151000	42100	60000	254000	31600	10700	51200	68000	150000	960 B
Thallium	0.5	6.7 U	3.7 U	16.7 U	16.7 U	16.7 U	6.7 U	3.3 U	1.7 U	8.3 U	1.7 U	1.7 U
Vanadium		8.8 B	0.9 B	7.9 B	1.1 B	20.7 B	196	28.3 B	34.8 B	191	15.5 B	0.44 U
Zinc	2000	100	72.8	111	38	85.3	1630	78	7020	331	216	196

DISSOLVED

	GA STD.	W-D1	A-4	W-U	B-1	OS-3	W-D2	9-1	G-1	F-1	DUP
Aluminum		38.9 B	46.4 B	38.9 B	9.5 U	13.7 B	9.5 U	416	9.5 U	17.5 B	9.5 U
Antimony	3	1.8 U	1.8 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	9.4 B	1.6 U	1.6 U
Arsenic	25	3.3 B	1.7 U	20.8	2 B	2.6 B	3.5 B	14.1	4.9 B	7.9 B	1.8 B
Barium	1000	46.5 B	134 B	1.4 B	60.3 B	74	60 B	30.6 B	177 B	186 B	138 B
Beryllium	3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	5	0.31 B	0.3 U	0.3 U	0.57 B	0.3 U	0.3 U	0.3 U	0.3 U	0.34 B	0.3 U
Calcium		448000	94700	79600	154000	79100	21400	49100	101000	78200	94400
Chromium	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.67 B	1.6 B	0.5 U	0.5 U	0.5 U
Cobalt		5.6 B	3.3 B	10 B	1.9 B	0.69 B	6.4 B	5.7 B	5.1 B	17.2 B	3.7 B
Copper	200	7.7 B	2.8 B	4.2 B	5.5 B	1.7 B	1 B	2.6 B	7 B	4 B	2.1 B
Iron	300	171	492	16100	152	814	16700	22300	99.2 B	2360	3790
Lead	25	7.3 B	2.9 B	10.1	3.6	2.2 B	2.6 B	39	3.1	8.4	3
Magnesium	35000	48400	42600	41800	64100	19300	6090	12700	9860	23000	43700
Manganese	300	4180	1490	9180	6370	5690	1910	882	369	2950	1550
Mercury	0.7	1.1	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100	66.2	20.8 B	52	2.1 B	2.2 B	16.9 B	16.7 B	12.3 B	124	21.1 B
Potassium		18500	34000	28800	10800	2290 B	5160 B	19600	23100	57500	34000
Selenium	10	16.5 UNW	3.3 UNW	3.6 BN	3.3 UNW	3.3 UN	3.3 UN	3.3 UN	3.3 UN	3.3 UN	3.3 UNW
Silver	50	3.3 B	1.3 U	1.3 U	2.7 B	1.3 U	1.3 U	2.3 B	1.4 B	1.3 U	1.3 U
Sodium	20000	275000	158000	41600	61300	262000	36200	10000	45700	73000	159000
Thallium	0.5	7.5 UN	3 UN	15 UN	15 UN	15 UN	4.5 UN	1.5 UN	1.5 UN	7.5 UN	3 UN
Vanadium		0.4 U	0.55 B	2.7 B	0.92 B	0.4 U	5.9 B	2.6 B	0.62 B	3 B	0.64 B
Zinc	2000	15.4 B	20.2	29.1	6.5 B	21	37.8	5.5 B	298	35.8	3.6 U

all values in micrograms per liter

U Not Detected
B Estimated Value
N Spiked sample recovery outside control limits
W Post digestion spike outside control limits

Table 10 - Pesticides and PCBs in Groundwater Samples

	W-D1	A-4	W-U	B-1	OS-3	W-D2	9-1	G-1	F-1	DUP	FB
alpha-BHC	U	U	U	U	U	U	U	U	U	U	U
beta-BHC	U	U	U	U	U	U	U	U	U	U	U
delta-BHC	U	U	U	U	U	U	U	U	U	U	U
gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U
Heptachlor epoxide	U	U	U	U	U	U	U	U	0.23	U	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDE	U	U	U	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDD	U	U	U	U	U	U	U	U	U	U	U
Endosulfan sulfate	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U
Endrin ketone	U	U	U	U	U	U	U	U	U	U	U
Endrin aldehyde	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U	U	U
gamma-Chlordane	U	U	U	U	U	U	U	U	U	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1016	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1221	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1232	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1242	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1248	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1254	U	U	U	U	U	U	U	U	U	U	U
Aroclor - 1260	U	U	U	U	U	U	U	U	U	U	U

all values in micrograms per liter **U** Not Detected

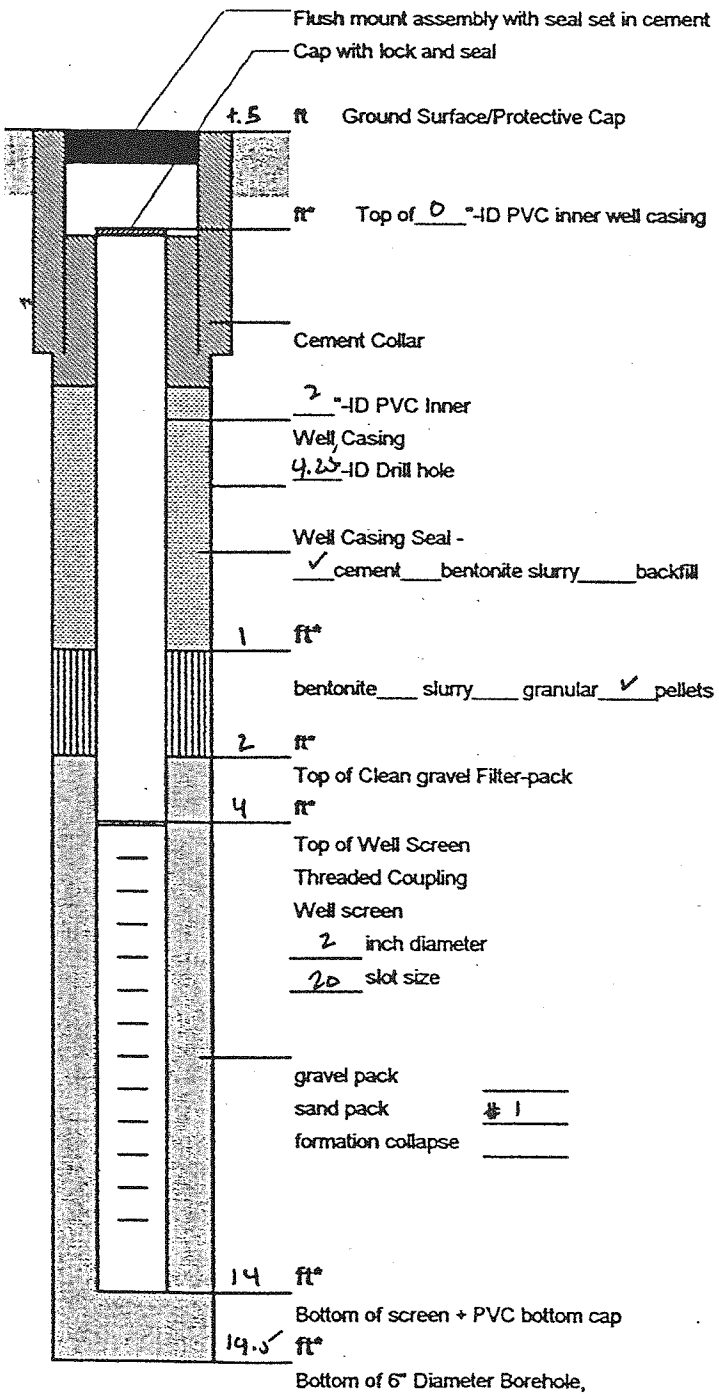
Table 11 - Groundwater Impact on East River

	Maximum Site Groundwater Concentration (ppb)	Incremental Loading (ppb)	Class I Standard (ppb)	Increment as Percentage of Standard
Vinyl Chloride	2	1.8E-06	NS	
Chloroethane	3	2.7E-06	NS	
Methylene Chloride	3	2.7E-06	200	0.00%
Acetone	1100	9.7E-04	NS	
1,1-Dichloroethene	1	8.8E-07	NS	
1,1-Dichloroethane	2	1.8E-06	NS	
total-1,2-Dichloroethene	240	2.1E-04	NS	
1,2-Dichloroethane	33	2.9E-05	NS	
2-Butanone	41	3.6E-05	NS	
Trichloroethene	1	8.8E-07	5	0.00%
Benzene	570	5.0E-04	10	0.01%
4-Methyl-2-Pentanone	11	9.7E-06	NS	
2-Hexanone	5	4.4E-06	50	0.00%
Toluene	1700	1.5E-03	92	0.00%
Ethylbenzene	450	4.0E-04	4.5	0.01%
Styrene	210	1.9E-04	NS	
Xylenes, total	1600	1.4E-03	19	0.01%
Phenol	400	3.5E-04	NS	
1,4-Dichlorobenzene	4	3.5E-06	5	0.00%
1,2-Dichlorobenzene	4	3.5E-06	NS	
2-Methylphenol	1100	9.7E-04	NS	
4-Methylphenol	1400	1.2E-03	NS	
2,4-Dimethylphenol	3100	2.7E-03	1000	0.00%
Naphthalene	9700	8.6E-03	16	0.05%
2-Methylnaphthalene	2600	2.3E-03	4.2	0.05%
Acenaphthylene	10	8.8E-06	NS	
Acenaphthene	320	2.8E-04	6.6	0.00%
Dibenzofuran	250	2.2E-04	NS	
Fluorene	160	1.4E-04	2.5	0.01%
Diethylphthalate	220	1.9E-04	NS	
Phenanthrene	120	1.1E-04	1.5	0.01%
Anthracene	30	2.7E-05	NS	
Carbazole	35	3.1E-05	NS	
Di-n-butylphthalate	610	5.4E-04	NS	
Fluoranthene	21	1.9E-05	NS	
Pyrene	16	1.4E-05	NS	
Benzo(a)anthracene	1	8.8E-07	NS	
Chrysene	2	1.8E-06	NS	
bis(2-Ethylhexyl)phthalate	2,600	2.3E-03	NS	
Benzo(g,h,i)perylene	1	8.8E-07	NS	
Aluminum	416	3.7E-04	NS	
Antimony	9.4	8.3E-06	NS	
Arsenic *	20.8	1.8E-05	36	0.00%
Barium	186	1.6E-04	NS	
Beryllium	0.2	1.8E-07	NS	
Cadmium *	0.57	5.0E-07	2.7	0.00%
Calcium	448000	4.0E-01	NS	
Chromium	1.6	1.4E-06	NS	
Cobalt	17.2	1.5E-05	NS	
Copper *	7.7	6.8E-06	5.6	0.00%
Iron	22300	2.0E-02	NS	
Lead *	39	3.5E-05	8	0.00%
Magnesium	64100	5.7E-02	NS	
Manganese	9180	8.1E-03	NS	
Mercury *	1.1	9.7E-07	0.0007	0.14%
Nickel *	124	1.1E-04	8.2	0.00%
Potassium	57500	5.1E-02	NS	
Selenium	16.5	1.5E-05	NS	
Silver	3.3	2.9E-06	NS	
Sodium	275000	2.4E-01	NS	
Thallium	15	1.3E-05	NS	
Vanadium	5.9	5.2E-06	NS	
Zinc	298	2.6E-04	66	0.00%
Heptachlor epoxide	0.23	2.0E-07	0.0003	0.07%

NS - no standard

APPENDIX A
Well Logs for Wells F-1 and W-D2

FLUSHMOUNT
WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



Field Staff M. Ahmed / J. Weingartner
Project Manager M. Simons
Project #
Weather Hot, humid, hazy 80°

Project Outlet City Well F-1
Town

County Queens State NY
Permit No. N/A

Installation Date(s) 7/16/98

Drilling method hollow stem auger
Drilling Contractor General Borings
Drilling Fluid

Development Technique and dates submers. 7/16/98

Fluid loss during drilling 0 gallons
Water removed during development ~10 gallons
Static depth to water 1.2 ft below TOC

Pumping depth to water N/A ft below TOC
Pumping duration 7 mins Hours 0

Well purpose monitoring well -

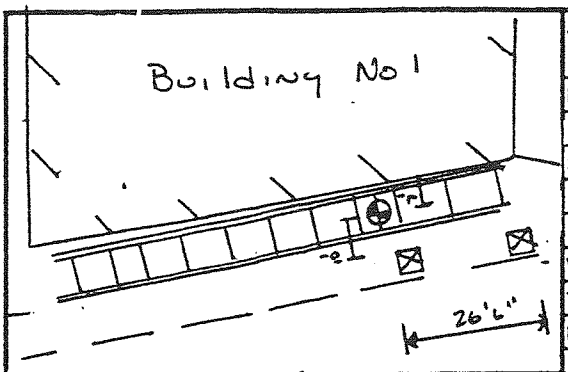
Remarks very dry, cuttings had odor

MEASURE POINT IS THE TOP OF THE WELL CASING UNLESS OTHERWISE NOTED
* DEPTH BELOW LAND SURFACE

q:\exldata\projects\gnv\standard\mwlo

NOT TO SCALE

AKRF SOIL BORING LOG



Job No.	Client	Location
	outlet City	south
Drilling Method hollow stem auger on a track machine		Boring No. F-1
Sampling Method - no samples		Sheet 1 of 2
		Drilling
		Start / Finish
Water Level 1.2		Time 11:35 / Date 7/16/98
Time 11:45		Time 13:20 / Date 7/16/98
Date 7/16/98		

Surface Condition: trash and exposed earth

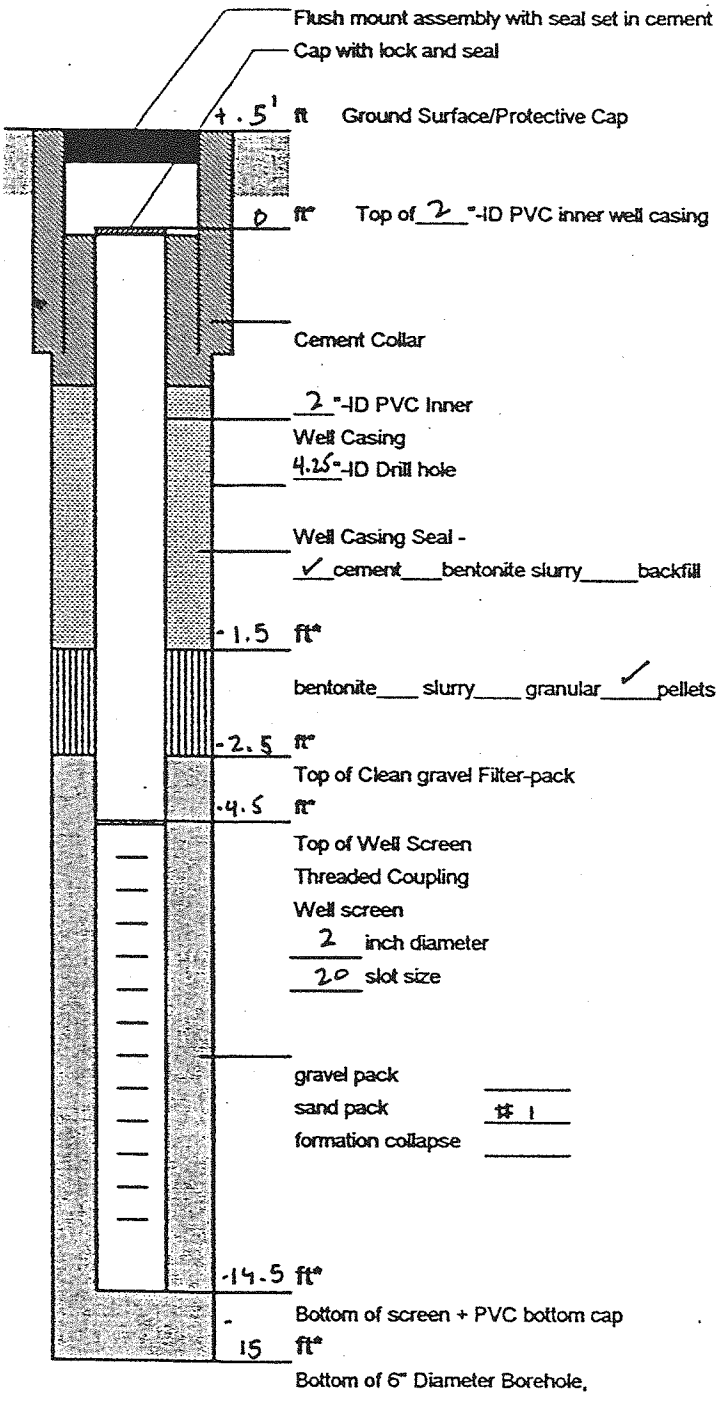
Sample Type	IN. DRV. / IN. RECVD		Sample No / Depth	PID/FID READING	Depth Feet		
N/A							0-6" topsoil
					1		6"-5' gray/green silty sand moist grading to wet @ 3'
					2		
					3		
					4		
					5		
							5'-10 gray (dark) silt sand, staining and odor, wet
					6		
					7		
					8		
					9		
					10		

AKRF SOIL BORING LOG

Job No.	Client	Location
	Outlet City	South
Drilling Method	hollow stem auger	Boring No.
ON G		F-1
Sampling Method		Sheet 2 of 2
		Drilling
		Start / Finish
Water Level	1, 2	Time / Date: 11:35 / 7/16/98
Time	11:45	
Date	7/16/98	Time / Date: 13:20 / 7/16/98

Sample Type	IN. DRV. / IN. RECVD		Sample No. / Depth	PID/FID READING	Depth Feet	Surface Condition:
						10'-13' Brown Silty sand, wet
					11	
					12	
					13	
					14	Boring F-1 completed @ 13' on 7/16/98 - NO samples - a well was installed see well construction log
					15	
					16	
					17	
					18	
					19	
					20	

FLUSHMOUNT
WELL CONSTRUCTION LOG
(UNCONSOLIDATED)



Field Staff J. Weingartner, M. Ahmed
Project Manager M. Simons
Project #
Weather Hot, humid, hazy 85°

Project Outlet City Well W-D2
Town

County Queen State NY
Permit No. N/A

Installation Date(s) 7/16/98

Drilling method hollow stem auger
Drilling Contractor General Borings
Drilling Fluid None

Development Technique and dates submers. 7/16/98

Fluid loss during drilling 0 gallons
Water removed during development ~13 gallons
Static depth to water N/A ft below TOC

Pumping depth to water ft below TOC
Pumping duration 9 Hours 0

Well purpose monitoring well / off-site

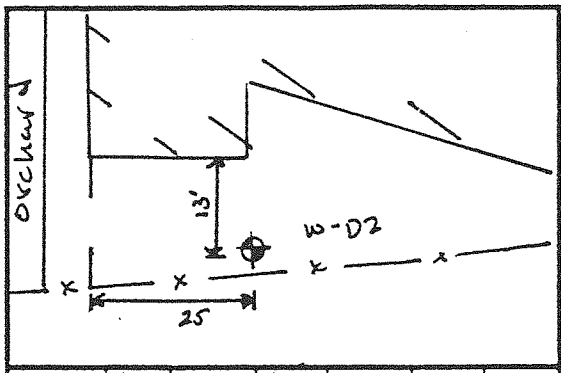
Remarks ran dry

MEASURE POINT IS THE TOP OF THE WELL CASING UNLESS OTHERWISE NOTED
* DEPTH BELOW LAND SURFACE

q:\exldata\projects\gnv\standard\mwlo

NOT TO SCALE

AKRF SOIL BORING LOG



Job No.	Client	Location
	Outlet City	Southeast
Drilling Method 4.25" hollow stem auger		Boring No. W-D2
Sampling Method No samples		Sheet 1 of 2
		Drilling
		Start / Finish
Water Level		Time 9:00 / Date 7/16/98
Time		
Date		Time 10:05 / Date 7/16/98

Surface Condition: debris and trash

Sample Type	IN. DRV. / IN. RECVD		Sample No. / Depth	PID/FID READING	Depth Feet
N/A					
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10

0-6" topsoil

6" - 3' dark brown silt and sand, moist

3-10' gray/green silty sand, moist grading to wet @ 4'

AKRF SOIL BORING LOG

Job No.	Client: Outlet City		Location: Southwest
Drilling Method			Boring No.: W-D2
Sampling Method			Sheet: 2 of 2
			Drilling
			Start / Finish
Water Level			Time: 9:00 / Date: 7/16/90
Time			
Date			Time: 10:05 / Date: 7/16/90

Sample Type	IN. DRV. / IN. RECVD		Sample No. / Depth	PID/FID READING	Depth Feet
					11
					12
					13
					14
					15
					6
					7
					8
					9
					0

Surface Condition:

10-15' Same as above

Boring W-D2 completed @ 15' on 7/16/90
- No samples
- See well log for details

OUTLET CITY

Soil and groundwater sampling results

August 1990

AKRF, Inc.
117 East 29th Street
New York, N.Y. 10016

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ATTACHMENT NO. 2

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1	Volatile organics in soil samples	2
2	PAHs in soil samples	10
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4	Acid Extractables in soil samples	26
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10	PAHs in water samples	55
11	Base Neutrals (other than PAHs) in water samples	56
12	Acid Extractables in water samples	57
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NOTES

PAHs are Polycyclic Aromatic Hydrocarbons that are a subset of the Base Neutral fraction.

All the soil and water samples were tested for PCBs (Polychlorinated Biphenyls). No PCBs were detected in any of the samples; hence tables for PCBs are not presented.

The metal analyses of the water samples was performed in two ways: one on the sample, as is; and one on the sample after it had been filtered. The results are displayed in Tables 14 and 15 respectively. The latter represents the metal concentration in the aqueous phase, while the former has a higher value due to the metal content of the fine suspended particles that break through the filter pack of the well screen and are found in the water sample.

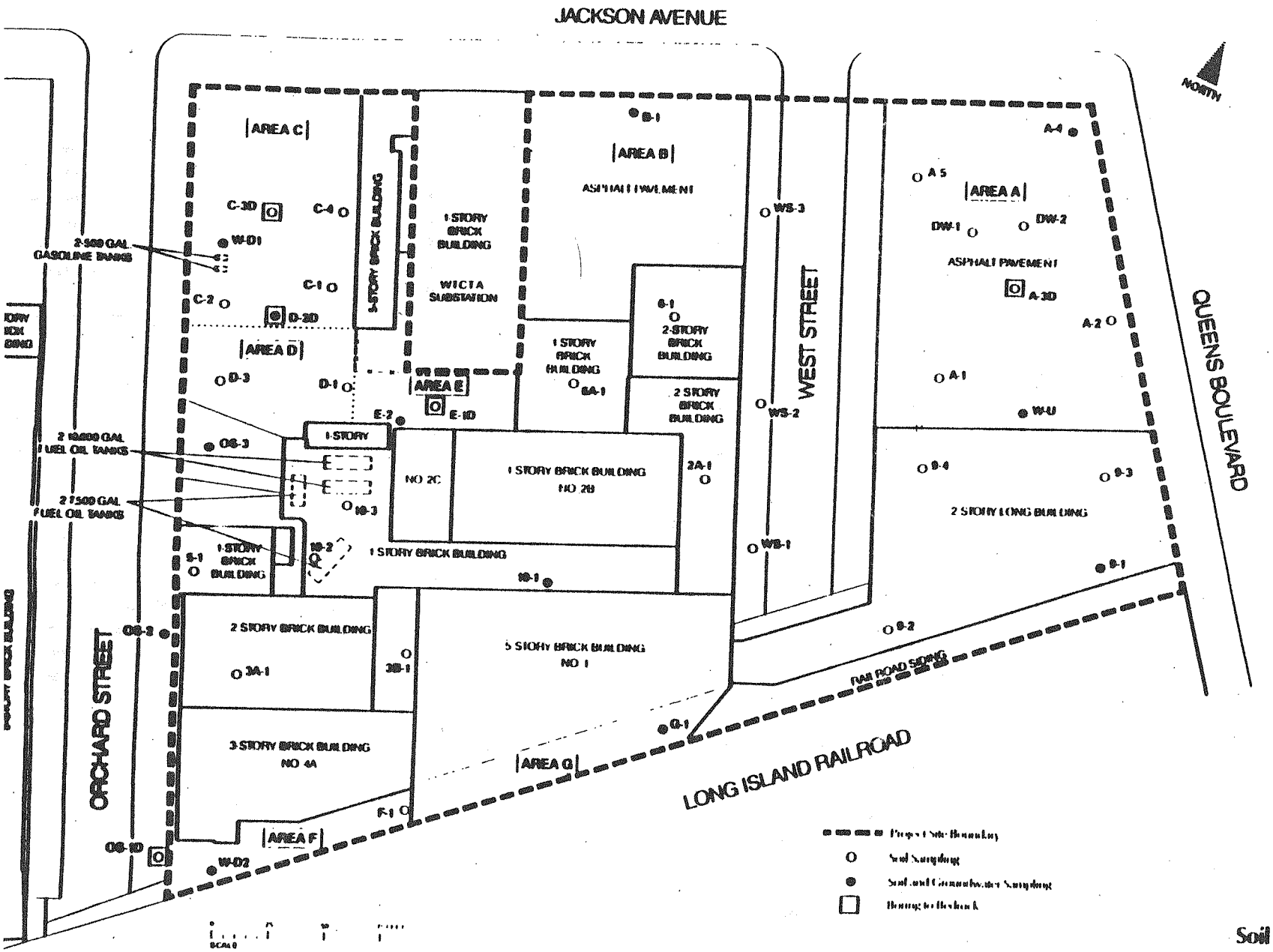
The following is an explanation of the laboratory qualifiers used in the attached tables.

U Analyte was analyzed for but not detected

B The analyte was found in both the sample and its associated laboratory blank and indicates possible/probable blank contamination

J Value is estimated because it is less than the instrument detection limit but greater than zero

X Co-eluting compounds whose concentrations have been summed e.g. the isomers of xylene



Soil and Groundwater Sampling Locations

Table 1

VOLATILE ORGANICS IN SOIL SAMPLES

Parts per billion (ppb)

	A-3D 0-2	A-3D 10-12	A-3D 34-36	A-4 4-6	A-4 14-16	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12
Chloromethane	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2 J	U	U	U	2 JB	2 JB	2 JB	2 JB	U	7	4 J
Acetone	17 B	24 B	16 B	36 B	21 B	11 JB	18 B	18 B	10 J	20 B	27 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U
Total Xylenes	U	U	U	U	U	U	U	U	U	U	U
Total Volatile Organics	19	24	16	36	23	13	20	20	10	27	31

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Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8	C-30 0-2	C-30 4-6	C-30 12-14	C-30 34-36	C-4 0-2	C-4 10-14	D-1 0-4	D-1 6-8
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	2 J	U	U	U	U	U	13 BJ
Acetone	37 B	31 B	U	54 B	10 J	23	U	32 B	U	U	5,700 B	140 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	9 J
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U	26 J
Chloroform	U	U	U	U	U	U	U	U	U	U	U	10 J
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	83
2-Butanone	U	2 J	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	8 J
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	8 J
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	10 J
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	8 J
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	330 J	42
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	2 J	U	U	U	U	2 J	U	U	U	U	3,300	24 J
1,1,2,2-Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	3 J	U	1,200 J	U	1 J	2 J	U	U	2 J	U	11,000	430
Chlorobenzene	U	U	U	U	U	U	U	U	11	U	U	U
Ethylbenzene	6	U	3,000	U	U	1 J	U	10	U	U	7,400	200
Styrene	U	U	U	U	U	U	U	U	U	U	U	200
Total Xylenes	61	U	21,000	U	U	8 X	U	63 X	17 X	U	41,000	1,000
Total Volatile Organics	109	33	25,200	54	11	38	0	105	30	0	68,730	2,211

C-1 C-2 C-3

Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	D-2D 0-5	D-2D 7-9	D-2D 20-22	D-2D 30-32	D-3 0-4	D-3 4-6	D-3 8-10	E-1D 0-4	E-1D 6-10	E-1D 14-16
Chloromethane	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2 BJ	U	U	U	3 JB	1 JB	2 JB	4,900 J	U	1,900 J
Acetone	55 B	21,000 B	19 B	18,000 B	34 B	18	19 B	29,000 B	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	1,800 J	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	7	4 J	3 J	26,000	2,400	19,000
Ethylbenzene	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	1,800 J	8	7	10	21,000	1,700	18,000
Total Xylenes	U	U	U	1,600 J	U	U	U	U	U	U
Total Volatile Organics	57	4,200 J 25,200	U 19	12,000 33,400	30 82	35! 65	45 X 79	64,000 146,700	9,000 13,100	116,000 154,900

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Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6
Chloromethane	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	1,300 J	U	13,000	U	U	U	U	U	U	U	5 J
Acetone	3,000 JB	5,500	16,000 B	18	19,000 BX	17,000 B	22	20,000 B	18,000 B	22 B	56 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	1,700 J	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	2,300 J	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	1,800 J	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	8,500	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	1,400 J	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U
Toluene	840 J	4,800	100,000	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	1,300 J	13,000	63,000	U	U	8,200	U	6,000 J	1,200 J	U	U
Styrene	U	8,100	U	U	U	U	U	U	U	U	U
Total Xylenes	9,100	74,000 X	220,000	U	3,000 J	30,000	U	19,100	5,000 J	U	U
Total Volatile Organics	15,540	106,800	424,500	18	22,000	55,200	22	46,900	24,200	22	61

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Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8
Chloromethane	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2 J	2 J	U	U	1 J	2 J	2 J	2 BJ	1 BJ	U	U
Acetone	22 B	46 B	U	U	23 B	22 B	32 B	16 B	11 B	20 B	15 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	5 J	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	5 J	U	U	U	1 J
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	U	U	U	U	U	3 J	U	U	U	6
Styrene	U	U	U	U	U	U	U	U	U	U	U
Total Xylenes	U	U	U	U	U	U	U	U	U	U	23
Total Volatile Organics	24	53	0	0	24	24	42	18	12	20	45

Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	1 J	U	U	U	U	U	U	U	U	U	U	U
Acetone	93 B	19 B	22 B	19 B	12 B	52 B	U	150 B	39 B	37 B	28	160 B
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	15	U	U	U	U	U	U	14	U	U	4 J	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	2 J	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	54
Ethylbenzene	U	U	U	1 J	U	U	U	2 J	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U
Total Xylenes	U	U	U	3 J	2 J	34	U	7	U	U	2 J	55
Total Volatile Organics	109	19	22	23	14	88	0	173	39	37	34	269

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Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10
Chloromethane	U	U	U	U	U	U	U	U	U	U	2 J
Bromomethane	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U
Acetone	63,000 B	55,000 B	U	5,500	4,600	U	U	U	U	7 JB	9 JB
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	930 J	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	8,400	1,400 J	U	U	1,500 J	970 J	U	2 J
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	U	13,000 J	U	8,600	1,100 J	540 J	1,300	7,900	3,100	U	U
Styrene	U	U	U	2,300	U	U	U	U	U	U	U
Total Xylenes	13,100 J	42,000	15,000 JBX	45,000 X	5,800 X	1,100 J	1,500	25,000	13,000	U	U
Total Volatile Organics	76,100	110,000	15,000	69,800	12,900	1,640	3,730	34,400	17,070	7	13

POLICY

Table 1 (cont'd)
VOLATILE ORGANICS IN SOIL SAMPLES
Parts per billion (ppb)

	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
Chloromethane	U	U	U	U
Bromomethane	U	U	U	U
Vinyl Chloride	U	U	U	U
Chloroethane	U	U	U	U
Methylene Chloride	1 J	3 BJ	U	U
Acetone	11 BJ	22 B	82,000 B	52,000 B
Carbon Disulfide	U	U	U	U
1,1-Dichloroethene	U	U	U	U
1,1-Dichloroethane	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U
Chloroform	U	U	U	U
1,2-Dichloroethane	U	U	U	U
2-Butanone	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U
Carbon Tetrachloride	U	U	U	U
Vinyl Acetate	U	U	U	U
Bromodichloromethane	U	U	U	U
1,2-Dichloropropane	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U
Trichloroethene	U	U	U	U
Dibromochloromethane	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U
Benzene	U	U	4,000 J	U
1,3-Dichloropropene-cis	U	U	U	U
Bromoform	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U
2-Hexanone	U	U	U	U
Tetrachloroethene	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U
Toluene	U	U	36,000	11,000 J
Chlorobenzene	U	U	U	U
Ethylbenzene	U	U	27,000	6,900 J
Styrene	U	U	7,700 J	U
Total Xylenes	U	U	128,000	36,000
Total Volatile Organics	12	25	284,700	105,900

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Table 2
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	A-1 0-2	A-1 10-12	A-2 0-2	A-2 14-16	A-3D 0-2	A-3D 10-12	A-3D 34-36	A-4 4-6	A-4 14-16	A-5 0-2	A-5 10-12
Naphthalene	U	U	64 J	U	670 J	U	U	U	U	120 J	U
2-Methylnaphthalene	U	U	62 J	U	420 J	U	U	U	U	140 J	U
Acenaphthylene	U	U	54 J	U	460 J	U	U	U	U	330 J	U
Acenaphthene	9,800 J	U	230 J	U	1,400 J	U	U	77 J	U	630 J	U
Fluorene	6,500 J	U	190 J	U	1,100 J	U	U	U	U	870	U
Phenanthrene	70,000	U	2,100	46 J	11,000	U	U	320 J	U	6,200	U
Anthracene	21,000 J	U	430	U	3,600	U	U	94 J	U	2,200	U
Fluoranthene	86,000	U	2,200	U	18,000	U	U	500	U	7,500	U
Pyrene	82,000	U	3,500	U	30,000	U	U	740	U	12,000	U
Benzo(a)anthracene *	46,000	U	1,400	U	19,000	U	U	270 J	U	6,100	U
Chrysene	56,000	U	2,200	U	23,000	U	U	360 J	U	8,100	U
Benzo(b)fluoranthene *	26,000 J	U	1,500	U	11,000	U	U	210 J	U	4,700	U
Benzo(k)fluoranthene	40,000	U	1,400	U	12,000	U	U	260 J	U	4,600	U
Benzo(a)pyrene *	38,000	U	1,500	U	13,000	U	U	230 J	U	5,200	U
Indeno(1,2,3-cd)pyrene *	19,000 J	U	1,000	U	6,600	U	U	140 J	U	3,100	U
Dibenzo(a,h)anthracene *	U	U	500	U	2,700	U	U	U	U	1,400	U
Benzo(g,h,i)perylene	21,000 J	U	1,100	U	7,600	U	U	150 J	U	3,200	U
TOTAL PAHs	521,300	0	19,430	46	161,550	0	0	3,351	0	66,390	0
TOTAL CARCINOGENIC PAHs	129,000	0	5,900	0	52,300	0	0	850	0	20,500	0

U = Undetected
J = Estimated Value
* Carcinogenic

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8
Naphthalene	88 J	U	160 J	U	110 J	U	9,500	U	U	U
2-Methylnaphthalene	89 J	U	110 J	U	100 J	U	16,000	U	1,200 J	U
Acenaphthylene	79 J	U	380	U	U	U	U	U	U	U
Acenaphthene	130 J	U	320 J	U	110 J	U	2,400 J	U	2,400 J	U
Fluorene	120 J	U	220 J	U	80 J	260 J	1,700 J	U	U	U
Phenanthrene	1,700	U	2,300	U	900	U	6,200	U	1,200 J	U
Anthracene	390 J	U	440	U	130 J	U	1,300 J	U	U	U
Fluoranthene	2,500	U	2,500	51 J	970	U	5,800	U	2,200 J	U
Pyrene	3,200	U	3,200	U	920	U	6,500	U	2,400 J	U
Benzo(a)anthracene *	1,900	U	1,300	U	290 J	U	2,200 J	U	U	U
Chrysene	2,700	U	1,800	U	440	U	3,000 J	U	1,100 J	U
Benzo(b)fluoranthene *	1,900	U	1,200	U	280 J	U	1,100 J	U	U	U
Benzo(k)fluoranthene	1,900	U	1,300	U	250 J	U	900 J	U	U	U
Benzo(a)pyrene *	1,800	U	1,300	U	310 J	U	1,200 J	U	U	U
Indeno(1,2,3-cd)pyrene *	1,300	U	690	U	170 J	U	700 J	U	U	U
Dibenzo(a,h)anthracene *	630	U	U	U	72 J	U	U	U	U	U
Benzo(g,h,i)perylene	1,500	U	700	U	190 J	U	800 J	U	U	U
TOTAL PAHs	21,926	0	17,920	51	5,322	260	59,300	0	10,500	0
TOTAL CARCINOGENIC PAHs	7,530	0	4,490	0	1,122	0	5,200	0	0	0

U = Undetected
J = Estimated Value
* Carcinogenic

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	C-30 0-2	C-30 4-6	C-30 12-14	C-30 34-36	C-4 0-2	C-4 10-14	D-1 0-4	D-1 6-8	D-20 0-5	D-20 7-9	D-20 20-22	D-20 30-32
Naphthalene	340 J	430 J	U	5,900	5,300	U	610,000	51,000	180 J	12,000	U	20,000
2-Methylnaphthalene	480 J	530 J	U	11,000	8,000	U	820,000	63,000	48 J	17,000	U	36,000
Acenaphthylene	U	U	U	170 J	550 J	U	U	U	U	200 J	U	330 J
Acenaphthene	320 J	320 J	U	3,100	5,700	U	300,000	23,000	U	7,900	U	12,000
Fluorene	220 J	U	U	4,200	7,900	U	140,000	9,800	U	5,500	U	8,200
Phenanthrene	2,300	1,700 J	U	1,900	31,000	44 J	52,000 J	4,000 J	U	1,800	U	3,500
Anthracene	560 J	440 J	U	660	13,000	U	13,000 J	1,200 J	U	470 J	U	930 J
Fluoranthene	2,400	1,700 J	U	290 J	31,000	54 J	14,000 J	U	U	450 J	U	500 J
Pyrene	2,500	1,400 J	U	230 J	17,000	54 J	11,000 J	U	U	320 J	U	420 J
Benzo(a)anthracene *	1,200 J	660 J	U	37 J	13,000	U	U	U	U	U	U	U
Chrysene	1,500 J	1,000 J	U	42 J	15,000	U	U	U	U	U	U	U
Benzo(b)fluoranthene *	1,200 J	730 J	U	U	11,000	U	U	U	U	U	U	U
Benzo(k)fluoranthene	1,400 J	660 J	U	U	10,000	U	U	U	U	U	U	U
Benzo(a)pyrene *	1,200 J	670 J	U	U	12,000	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene *	910 J	560 J	U	U	6,300	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene *	U	U	U	U	1,400 J	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	940 J	630 J	U	U	7,000	U	U	U	U	U	U	U
TOTAL PAHs	17,390	11,430	0	27,529	195,150	152	1,960,000	152,000	228	45,640	0	81,880
TOTAL CARCINOGENIC PAHs	4,510	2,620	0	37	43,700	0	0	0	0	0	0	0

U = Undetected
J = Estimated Value
* Carcinogenic

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	D-3 0-4	D-3 4-6	D-3 8-10	E-1D 0-4	E-1D 6-10	E-1D 14-16	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8
Naphthalene	32,000	1,400	4,500	160,000	200,000	86,000	380,000	630,000	1,700,000	3,500 J	73,000	34,000
2-Methylnaphthalene	43,000	2,900	4,100	150,000	210,000	280,000	350,000	690,000	1,800,000	9,900	99,000	36,000
Acenaphthylene	470 J	U	180 J	2,300 J	3,400 J	4,000 J	U	U	U	1,700 J	U	1,100 J
Acenaphthene	28,000	2,200	4,500	94,000	110,000	130,000	130,000	230,000	460,000	11,000	51,000	25,000
Fluorene	7,300	610	1,800	77,000	75,000	93,000	67,000	130,000	260,000	4,100	31,000	18,000
Phenanthrene	11,000	1,000	3,100	18,000	16,000 J	29,000	67,000	60,000	130,000 J	29,000	37,000	33,000
Anthracene	3,900	280 J	1,300	3,900 J	4,000 J	8,100 J	17,000 J	15,000 J	33,000 J	6,800	15,000 J	14,000
Fluoranthene	4,500	440	1,600	4,800 J	2,700 J	4,100 J	28,000 J	14,000 J	22,000 J	23,000	11,000 J	29,000
Pyrene	3,900	360 J	560	3,200 J	2,500 J	3,700 J	23,000 J	12,000 J	U	30,000	8,700 J	21,000
Benzo(a)anthracene *	1,100 J	100 J	200 J	U	U	U	8,800 J	U	U	12,000	2,400 J	13,000
Chrysene	1,700 J	160 J	260 J	1,800 J	U	U	13,000 J	U	U	15,000	3,500 J	17,000
Benzo(b)fluoranthene *	550 J	U	63 J	U	U	U	5,500 J	U	U	8,400	U	11,000
Benzo(k)fluoranthene	580 J	U	85 J	U	U	U	5,800 J	U	U	11,000	U	9,900
Benzo(a)pyrene *	U	U	90 J	U	U	U	6,800 J	U	U	9,200	U	14,000
Indeno(1,2,3-cd)pyrene *	U	U	U	U	U	U	U	U	U	5,400	U	7,000
Dibenzo(a,h)anthracene *	U	U	U	U	U	U	U	U	U	1,600 J	U	3,400 J
Benzo(g,h,i)perylene	U	U	U	U	U	U	U	U	U	5,500	U	7,000
TOTAL PAHs	138,000	9,450	22,338	515,000	623,600	637,900	1,101,900	1,781,000	4,405,000	187,100	331,600	293,400
TOTAL CARCINOGENIC PAHs	1,650	100	353	0	0	0	21,100	0	0	36,600	2,400	48,400

U = Undetected
J = Estimated Value
* Carcinogenic

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19
Naphthalene	1,000 J	210,000	21,000	68 J	U	39 J	U	74 J	U	20,000	400 J	370 J
2-Methylnaphthalene	500 J	210,000	28,000	U	U	U	44 J	U	U	12,000 J	1,600	81 J
Acenaphthylene	U	2,400 J	330 J	U	U	U	U	U	U	U	U	U
Acenaphthene	170 J	69,000	9,600	80 J	42 J	75 J	U	100 J	U	25,000	6,900	86 J
Fluorene	U	65,000	8,400	77 J	U	65 J	U	74 J	U	29,000	5,800	93 J
Phenanthrene	990 J	76,000	10,000	770	320 J	670	100 J	950	U	160,000	8,500	520
Anthracene	370 J	29,000	3,600	150 J	65 J	110 J	U	94 J	U	52,000	3,200	150 J
Fluoranthene	980 J	26,000	3,000	860	370 J	590	76 J	970	U	140,000	2,700	570
Pyrene	1,000 J	30,000	2,900	810	330 J	530	66 J	960	U	180,000	2,100	570
Benzo(a)anthracene *	650 J	3,500 J	330 J	370 J	160 J	220 J	U	300 J	U	81,000	340 J	180 J
Chrysene	1,100 J	4,200 J	360 J	550	210 J	310 J	42 J	470	U	97,000	390 J	230 J
Benzo(b)fluoranthene *	1,000 J	U	U	390 J	130 J	170 J	U	360 J	U	51,000	U	130 J
Benzo(k)fluoranthene	820 J	U	U	340 J	130 J	210 J	U	380 J	U	59,000	U	130 J
Benzo(a)pyrene *	760 J	U	U	450	140 J	200 J	U	390 J	U	69,000	U	150 J
Indeno(1,2,3-cd)pyrene *	640 J	U	U	270 J	78 J	110 J	U	230 J	U	39,000	U	81 J
Dibenzo(a,h)anthracene *	280 J	U	U	120 J	U	U	U	95 J	U	17,000	U	U
Benzo(g,h,i)perylene	740 J	U	U	300 J	89 J	120 J	U	250 J	U	45,000	U	90 J
TOTAL PAHs	11,000	725,100	87,520	5,605	2,064	3,419	328	5,697	0	1,076,000	31,930	3,431
TOTAL CARCINOGENIC PAHs	3,330	3,500	330	1,600	508	700	0	1,375	0	257,000	340	541

U = Undetected
J = Estimated Value
* Carcinogenic

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12
Naphthalene	U	U	U	27,000	67 J	U	200 J	810	2,400 J	210 J	2,100	110 J
2-Methylnaphthalene	U	U	U	46,000	U	U	130 J	450	1,900 J	160 J	1,500 J	210 J
Acenaphthylene	U	U	U	400 J	U	U	36 J	130 J	2,500 J	U	520 J	U
Acenaphthene	U	U	U	10,000	U	U	140 J	310 J	2,200 J	49 J	2,800	45 J
Fluorene	U	U	U	7,200	U	U	130 J	490	7,300	64 J	3,100	41 J
Phenanthrene	45 J	U	52 J	6,100	250 J	U	980	1,900	23,000	310 J	12,000	180 J
Anthracene	U	U	U	1,800 J	51 J	U	280 J	620	9,300	54 J	5,200	U
Fluoranthene	64 J	U	64 J	960 J	440	U	1,200	2,100	25,000	240 J	14,000	110 J
Pyrene	66 J	U	79 J	1,000 J	450	U	1,200	2,000	29,000	460	25,000	140 J
Benzo(a)anthracene *	U	U	U	U	260 J	U	580	980	17,000	170 J	14,000	U
Chrysene	44 J	U	45 J	U	320 J	U	690	1,200	20,000	130 J	18,000	56 J
Benzo(b)fluoranthene *	U	U	U	U	230 J	U	430	810	12,000	64 J	9,500	U
Benzo(k)fluoranthene	U	U	41 J	U	240 J	U	470	890	16,000	74 J	9,900	U
Benzo(a)pyrene *	U	U	U	U	260 J	73 J	580	970	16,000	77 J	12,000	U
Indeno(1,2,3-cd)pyrene *	U	U	U	U	150 J	U	330 J	550	7,500	38 J	200 J	U
Dibenzo(a,h)anthracene *	U	U	U	U	66 J	U	110 J	170 J	2,800 J	U	3,500	U
Benzo(g,h,i)perylene	U	U	49 J	U	170 J	U	360	640	8,700	48 J	7,700	U
TOTAL PAHs	219	0	330	100,460	2,954	73	7,846	15,020	202,600	2,148	141,020	892
TOTAL CARCINOGENIC PAHs	0	0	0	0	966	73	2,030	3,480	55,300	349	39,200	0

= Undetected
= Estimated Value
Carcinogenic

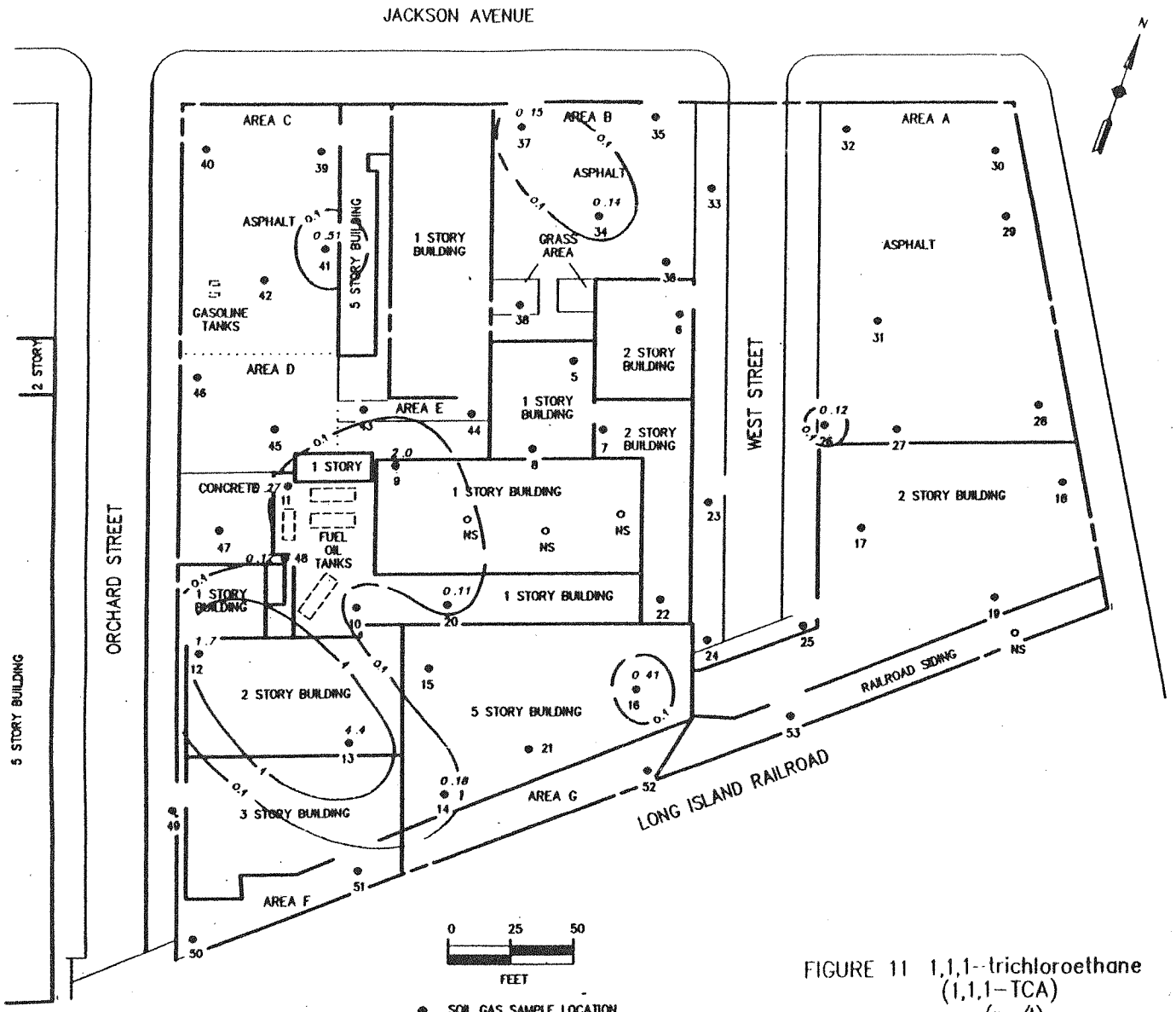

FIGURE 11 1,1,1--trichloroethane (1,1,1-TCA) (µg/l)

ENVIRONMENTAL SERVICES, INC.

OUTLET CITY
LONG ISLAND CITY, NEW YORK

This map is integral to a written report and should be viewed in that context.

Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6
Naphthalene	U	U	45 J	U	96,000	260,000	54,000	170,000	150,000	6,000 J	49,000
2-Methylnaphthalene	U	U	U	U	140,000	350,000	80,000	210,000	180,000	17,000	110,000
Acenaphthylene	U	U	U	U	U	4,100 J	U	U	U	890 J	U
Acenaphthene	U	U	U	U	35,000	82,000	65,000	64,000	54,000	17,000	45,000
Fluorene	U	U	U	U	18,000	56,000	51,000	45,000	39,000	12,000	39,000
Phenanthrene	150 J	180 J	130 J	U	15,000 J	79,000	69,000	43,000	41,000	19,000	65,000
Anthracene	U	U	U	U	3,400 J	21,000	23,000	10,000 J	9,700 J	5,900 J	19,000
Fluoranthene	210 J	270 J	170 J	U	2,900 J	10,000 J	29,000	12,000 J	12,000 J	6,200 J	23,000
Pyrene	170 J	210 J	140 J	U	2,300 J	11,000 J	19,000	13,000 J	12,000 J	6,700 J	18,000
Benzo(a)anthracene *	61 J	65 J	48 J	U	U	2,200 J	4,400 J	2,400 J	2,100 J	1,700 J	5,100 J
Chrysene	92 J	100 J	76 J	U	U	2,600 J	6,600 J	3,500 J	3,400 J	3,100 J	9,900 J
Benzo(b)fluoranthene *	60 J	61 J	41 J	U	U	U	1,800 J	U	U	1,200 J	3,600 J
Benzo(k)fluoranthene	60 J	U	U	U	U	U	2,600 J	U	U	U	1,700 J
Benzo(a)pyrene *	60 J	69 J	42 J	U	U	U	2,000 J	U	U	1,400 J	3,800 J
Indeno(1,2,3-cd)pyrene *	U	42 J	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene *	U	U	U	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	U	47 J	U	U	U	U	U	U	U	1,500 J	3,200 J
TOTAL PAHs	863	1,044	692	0	310,600	877,900	407,400	572,900	503,200	99,590	395,300
TOTAL CARCINOGENIC PAHs	181	237	131	0	0	2,200	8,200	2,400	2,100	4,300	12,500

U = Undetected
J = Estimated Value
* Carcinogenic

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Table 2 (cont'd)
PAHs IN SOIL SAMPLES
Parts per billion (ppb)

	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
Naphthalene	50,000	87,000	85 J	U	U	U	390,000	210,000
2-Methylnaphthalene	40,000	44,000	100 J	U	U	U	490,000	230,000
Acenaphthylene	U	U	U	U	U	U	4,100 J	1,400 J
Acenaphthene	11,000	20,000	U	U	U	U	130,000	44,000
Fluorene	8,600	16,000	U	U	U	U	89,000	29,000
Phenanthrene	13,000	23,000	110 J	U	330 J	U	70,000	22,000
Anthracene	4,500	8,000 J	U	U	45 J	U	21,000	6,700 J
Fluoranthene	3,100 J	6,000 J	100 J	U	400	U	14,000 J	4,400 J
Pyrene	2,300 J	4,000 J	100 J	U	260 J	U	15,000 J	4,600 J
Benzo(a)anthracene *	U	U	61 J	U	130 J	U	2,000 J	U
Chrysene	U	U	110 J	U	170 J	U	2,500 J	840 J
Benzo(b)fluoranthene *	U	U	68 J	U	110 J	U	U	U
Benzo(k)fluoranthene	U	U	76 J	U	140 J	U	U	U
Benzo(a)pyrene *	U	U	63 J	U	94 J	U	U	U
Indano(1,2,3-cd)pyrene *	U	U	U	U	67 J	U	U	U
Dibenzo(a,h)anthracene *	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	U	U	U	U	78 J	U	U	U
TOTAL PAHs	132,500	228,000	873	0	1,824	0	1,227,600	552,940
TOTAL CARCINOGENIC PAHs	0	0	192	0	401	0	2,000	0

- = Undetected
- = Estimated Value
Carcinogenic

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Table 3

BASE NEUTRALS (OTHER THAN PAHs) IN SOIL SAMPLES (ppb)

	A-1 0-2	A-1 10-12	A-2 0-2	A-2 14-16	A-3D 0-2	A-3D 10-12	A-3D 34-36	A-4 4-6	A-4 14-16	A-5 0-2	A-5 10-12
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	790 J	U	U	U	U	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	2,400	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	49 J	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	U	U	U	U	U	U	U
Isophorone	U	U	U	U	U	U	U	U	U	U	U
Benzoic acid	U	44 J	U	60 J	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U
2-Chloronapthalene	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	3,800 J	U	88 J	U	890 J	U	U	58 J	U	580 J	U
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
4-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	84 J	U	350 J	U	U	U	U	U	U	U
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	290 J	U
3,3-Dichlorobenzidene	U	U	U	U	260 J	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	U	84 J	180 J	440	480 J	U	130 J	390	68 J	1,000	120 J
Di-n-octylphthalate	U	U	U	U	U	U	U	310 J	U	340 J	110 J
TOTAL	3,800	212	268	899	4,820	0	130	758	68	2,210	230
TOTAL PAHs (from Table 2)	521,300	0	19,430	46	161,550	0	0	3,351	0	66,390	0
TOTAL BASE NEUTRALS	525,100	212	19,698	945	166,370	0	130	4,109	68	68,600	230

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PANs) IN SOIL SAMPLES (ppb)

	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	U	U	U	U	2,300 J	U
Isophorone	U	U	U	U	U	U	U	U	U	U
Benzoic acid	45 J	U	52 J	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	78 J	U	210 J	U	82 J	U	2,500 J	U	1,200 J	U
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	U	U	44 J	U	U	U	U	U	U
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	2,000	U	2,600	U	U	U	U	U	U	U
Butylbenzylphthalate	460	U	100 J	U	U	U	U	U	U	U
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	460	U	210 J	860	41 J	550 J	U	U	110 J	
Di-n-octylphthalate	1,700	U	U	U	U	U	U	U	U	U
TOTAL	4,743	0	3,172	904	123	550	2,500	0	3,500	110
TOTAL PANs (from Table 2)	21,926	0	17,920	51	5,322	260	59,300	0	10,500	0
TOTAL BASE NEUTRALS	26,669	0	21,092	955	5,445	810	61,800	0	14,000	110

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PAHs) IN SOIL SAMPLES (ppb)

	C-3D 0-2	C-3D 4-6	C-3D 12-14	C-3D 34-36	C-4 0-4	C-4 10-14	D-1 0-4	D-1 6-8	D-2D 0-5	D-2D 7-9	D-2D 20-22	D-2D 30-32
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	520 J	U	10,000 J	U	U	180 J	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Isophorone	U	U	U	U	U	U	U	U	U	U	U	91 J
Benzoic acid	U	U	U	U	U	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronapthalene	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	U	U	51,000 J	3,200 J	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	370 J	340 J	U	5,400	5,400	U	300,000	23,000	U	11,000	U	15,000
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	100 J	U	U
Diethylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	U	U	U	U	U	U	U	U	U	U	48 J
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	470 J	U	U	U	U	U	U	U	42 J	52 J	U	40 J
Di-n-octylphthalate	U	480 BJ	2,600 B	740 B	U	U	U	U	U	U	U	U
TOTAL	840	820	2,600	6,140	5,920	0	361,000	26,200	42	11,332	0	15,179
TOTAL PAHs (from Table 2)	17,390	11,430	0	27,529	195,150	152	1,960,000	152,000	228	45,640	0	81,880
TOTAL BASE NEUTRALS	18,230	12,250	2,600	33,669	201,070	152	2,321,000	178,200	270	56,972	0	97,059

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PAHs) IN SOIL SAMPLES (ppb)

	D-3 0-4	D-3 4-6	D-3 8-10	E-1D 0-4	E-1D 6-10	E-1D 14-16	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	2,100	U	U	U	6,600 J	63,000	90,000 J	U	U	390 J
Isophorone	U	U	U	U	U	U	U	U	U	U	U	U
Benzoic acid	U	U	U	U	U	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronapthalene	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	2,100	U	U	U	U	U	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	18,000	1,300	3,400	110,000	120,000	140,000	110,000	240,000	440,000	17,000	46,000	19,000
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	U	2,100	U	U	U	U	U	U	U	U	U
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)	U	U	2,100	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	U	U	U	U	U	U	U	U	U	690 J	U	U
Di-n-octylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	18,000	1,300	11,800	110,000	120,000	140,000	116,600	303,000	530,000	17,690	46,000	19,390
TOTAL PAHs (from Table 2)	138,000	9,450	22,338	515,000	623,600	637,900	1,101,900	1,781,000	4,405,000	187,100	331,600	293,400
TOTAL BASE NEUTRALS	156,000	10,750	34,138	625,000	743,600	777,900	1,218,500	2,084,000	4,935,000	204,790	377,600	312,790

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PANs) IN SOIL SAMPLES (ppb)

	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19
s(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
nzyl Alcohol	U	U	U	U	U	U	U	U	U	U	U	U
2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
s(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U	U
xachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
robenzene	U	U	U	U	U	U	U	U	U	U	U	U
phorone	U	U	U	U	U	U	U	U	U	U	U	U
zoic acid	U	U	U	U	U	U	U	U	U	U	U	U
s(2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U	U
,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
phthalene	U	U	U	U	U	U	U	U	U	U	U	U
xachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
xachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
phoronaphthalene	U	U	U	U	U	U	U	U	U	U	U	U
Itroaniline	U	U	U	U	U	U	U	U	U	U	U	U
thyl Phthalate	U	U	U	U	U	U	U	U	U	U	U	U
-Dinitrotoluene	U	10,000 J	1,800 J	U	U	U	U	U	U	1,800 J	U	U
Itroaniline	U	U	U	U	U	U	U	U	U	U	U	U
nzofuran	240 J	60,000	9,700	75 J	U	57 J	U	78 J	U	23,000	6,100	88 J
-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
tyiphthalate	U	U	U	U	U	U	U	U	U	U	U	U
lorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U	U
troaniline	U	U	U	U	U	U	U	U	U	U	U	U
trosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U	U
mophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
-butylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
benzylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U	U
2-Ethylhexyl)phthalate	190 J	U	U	U	U	U	U	U	U	U	U	66 J
-octylphthalate	U	U	U	U	U	770 B	200 BJ	500	340 BJ	U	U	U
al	430	70,000	11,500	75	0	827	200	578	340	24,800	6,100	154
al PANs (from Table 2)	11,000	725,100	87,520	5,605	2,064	3,419	328	5,697	0	1,076,000	31,930	3,431
al BASE NEUTRALS	11,430	795,100	99,020	5,680	2,064	4,246	528	6,275	340	1,100,800	38,030	3,585

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PAHs) IN SOIL SAMPLES (ppb)

	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	280 J	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Isophorone	U	U	U	U	U	U	U	U	U	U	U	U
Benzoic acid	U	U	U	U	44 J	U	U	43 J	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	2,000 J	U	U	U	U	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	U	U	U	11,000	U	U	110 J	340 J	4,800	63 J	1,600	U
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	U	U	U	U	U	U	U	U	470	U	250 J
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	U	U	U	U	U	41 J	64 J	1,100 J	51 J	1,400 J	330 J
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	160 J	17,000	86 J
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	160 J	100 J	230 J	U	80 J	U	68 J	150 J	360 J	520	U	200 J
Di-n-octylphthalate	U	U	U	U	U	U	U	U	U	U	490 J	U
TOTAL	160	100	230	13,000	124	0	219	877	6,260	1,264	20,490	866
TOTAL PAHs (from Table 2)	219	0	330	100,460	2,954	73	7,846	15,020	202,600	2,148	141,020	892
TOTAL BASE NEUTRALS	379	100	560	113,460	3,078	73	8,065	15,897	208,860	3,412	161,510	1,758

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PANs) IN SOIL SAMPLES (ppb)

	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	1,400 J	2,700 J
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	U	U	2,600 J	U	U	U	U
Isophorone	U	U	U	U	U	U	U	U	U	U	U
Benzoic acid	U	U	U	U	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	7,100 J	U	U	U	U	U	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
Acenaphthene	U	U	U	U	34,000	76,000	42,000	66,000	55,000	1,200 J	15,000 J
2,4-Dinitrotoluene	U	U	U	U	U	1,800 J	U	U	U	U	U
Diethylphthalate	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U
4-Nitrosodiphenylamine (1)	U	U	U	U	7,700 J	U	U	U	U	U	6,700 J
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	U	U	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	U	U	U	U	U	U	U	U	U	U	U
TOTAL	0	0	0	0	48,800	77,800	44,600	66,000	55,000	2,600	24,400
TOTAL PANs (from Table 2)	863	1,044	692	0	310,600	877,900	407,400	572,900	503,200	99,590	395,300
TOTAL BASE NEUTRALS	863	1,044	692	0	359,400	955,700	452,000	638,900	558,200	102,190	419,700

Table 3 (cont'd)

BASE NEUTRALS (OTHER THAN PANs) IN SOIL SAMPLES (ppb)

	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
is(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U
,3-Dichlorobenzene	U	U	U	U	U	U	U	U
,4-Dichlorobenzene	U	U	U	U	U	U	3,300 J	U
nzyl Alcohol	U	U	U	U	U	U	U	U
,2-Dichlorobenzene	U	U	U	U	U	U	3,200 J	U
is(2-chloroisopropyl)Ether	U	U	U	U	U	U	U	U
-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U
xachloroethane	U	U	U	U	U	U	U	U
trobenzene	U	U	U	U	U	U	U	U
ophorone	U	U	U	U	U	U	U	U
nzoic acid	U	U	U	U	U	U	U	U
s(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U
2,4-Trichlorobenzene	U	U	U	U	U	U	U	U
Chloroaniline	U	U	U	U	U	U	U	U
xachlorobutadiene	U	U	U	U	U	U	U	U
xachlorocyclopentadiene	U	U	U	U	U	U	U	U
Chloronapthalene	U	U	U	U	U	U	U	U
Nitroaniline	U	U	U	U	U	U	U	U
methyl Phthalate	U	U	U	U	U	U	U	U
-Dinitrotoluene	1,600 J	2,700 J	U	U	U	U	U	10,000
Nitroaniline	U	U	U	U	U	U	U	U
nzofuran	11,000	20,000	47 J	U	U	U	150,000	45,000
-Dinitrotoluene	U	U	U	U	U	U	U	U
thylphthalate	U	U	U	U	U	U	U	U
hlorophenyl-phenylether	U	U	U	U	U	U	U	U
Nitroaniline	U	U	U	U	U	U	U	U
Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U
romophenyl-phenylether	U	U	U	U	U	U	U	U
xachlorobenzene	U	U	U	U	U	U	U	U
n-butylphthalate	U	U	U	U	U	U	U	2,800 J
ylbenzylphthalate	U	U	U	U	U	U	U	U
-Dichlorobenzidene	U	U	U	U	U	U	U	U
(2-Ethylhexyl)phthalate	U	U	U	U	58 J	480 J	1,600 J	1,100 J
n-octylphthalate	U	U	U	U	U	U	U	U
AL	12,600	22,700	47	0	58	480	158,100	58,900
AL PANs (from Table 2)	132,500	228,000	873	0	1,824	0	1,227,600	552,940
AL BASE NEUTRALS	145,100	250,700	920	0	1,882	480	1,385,700	611,840

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Table 4
ACID EXTRACTABLES IN SOIL SAMPLES
Parts per billion (ppb)

	A-1 0-2	A-1 10-12	A-2 0-2	A-2 14-16	A-3D 0-2	A-3D 10-12	A-3D 34-36	A-4 4-6	A-4 14-16	A-5 0-2	A-5 10-12
Phenol	U	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U
4-Methylphenol	U	U	U	160 J	U	U	U	U	U	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	U	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U
TOTAL	0	0	0	160	0	0	0	0	0	0	0

U = Undetected
J = Estimated Value

Table 4 (cont'd)
ACID EXTRACTABLES IN SOIL SAMPLES
Parts per billion (ppb)

	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8
Phenol	U	U	U	U	U	U	440 J	U	U	U
2-Chlorophenol	U	U	U	U	U	U	370 J	U	U	U
2-Methylphenol	U	U	U	U	U	U	U	U	U	U
4-Methylphenol	U	U	U	U	U	U	1,700 J	U	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	U	U	U	U	U	U	670 J	U	U	U
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	U	17,000	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U
TOTAL	0	0	0	0	0	0	20,180	0	0	0

U = Undetected
J = Estimated Value

Table 4 (cont'd)
ACID EXTRACTABLES IN SOIL SAMPLES
Parts per billion (ppb)

	C-3D 0-2	C-3D 4-6	C-3D 12-14	C-3D 34-36	C-4 0-2	C-4 10-14	D-1 0-4	D-1 6-8	D-2D 0-5	D-2D 7-9	D-2D 20-22	D-2D 30-32
Phenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	U	U	U	U	U	1,300 J	U	U	U	U
4-Methylphenol	730 J	690 J	U	U	490 J	U	U	2,900 U	U	U	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	610 J	780 J	U	U	U	U	23,000 J	5,100 J	U	U	U	1,900
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	U	U	U	49 J	110 J	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	1,340	1,470	0	0	490	0	23,000	9,300	49	110	0	1,900

U = Undetected
J = Estimated Value

Table 4 (cont'd)

ACID EXTRACTABLES IN SOIL SAMPLES

Parts per billion (ppb)

	D-3 0-4	D-3 4-6	D-3 8-10	E-10 0-4	E-10 6-10	E-10 14-16	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8
Phenol	890 J	U	U	5,600 J	U	U	7,000 J	29,000 J	47,000 J	1,300 J	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	2,400 J	150 J	U	U	6,500 J	36,000	16,000 J	69,000	U	460 J	U	U
4-Methylphenol	2,200 J	480	2,100	57,000	19,000	110,000	41,000 J	180,000	160,000 J	2,000 J	2,400 J	780 J
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	2,700 J	950	250 J	96,000	36,000	110,000	86,000	220,000	280,000	640 J	U	540 J
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	7,900 J	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	750 J	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	2,600 J	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	8,190	1,580	2,350	166,500	61,500	256,000	150,000	498,000	487,000	5,150	5,000	1,320

U = Undetected

J = Estimated Value

Table 4 (cont'd)
ACID EXTRACTABLES IN SOIL SAMPLES
Parts per billion (ppb)

	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19
Phenol	440 J	U	U	U	U	U	U	U	U	U	U	
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U	
2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	
4-Methylphenol	900 J	U	U	100 J	U	U	U	U	U	U	U	
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	
2,4-Dimethylphenol	U	U	U	U	U	U	U	U	U	U	U	
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U	
4-Chloro-3-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	
2,4-Dinitrophenol	U	U	250 J	U	U	U	U	U	U	U	140 J	
4-Nitrophenol	U	3,000 J	580 J	U	U	U	U	U	U	U	320 J	
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	
TOTAL	1,340	3,000	830	100	0	0	0	0	0	0	460	0

U = Undetected
J = Estimated Value

Table 4 (cont'd)

ACID EXTRACTABLES IN SOIL SAMPLES

Parts per billion (ppb)

	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12
Phenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Methylphenol	U	U	U	U	U	U	130 J	79 J	U	U	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	U	U	U	U	U	U	68 J	U	U	U	U	U
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	0	0	0	0	0	0	198	79	0	0	0	0

U = Undetected

J = Estimated Value

Table 4 (cont'd)

ACID EXTRACTABLES IN SOIL SAMPLES

Parts per billion (ppb)

	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6
Phenol	U	U	U	U	U	U	U	6,300 J	U	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	U	U	U	U	U	11,000 J	12,000 J	U	U
4-Methylphenol	U	U	U	U	2000 J	U	3,300 J	24,000	19,000	U	U
2-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	U	U	U	U	5100 J	5700 J	9,800 J	13,000 J	15,000 J	U	U
2,4-Dichlorophenol	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	2000 J	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	3100 J	U	U	U	U	U
4-Nitrophenol	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U
TOTAL	0	0	0	0	7,100	10,800	13,100	54,300	46,000	0	0

U = Undetected

J = Estimated Value

Table 4 (cont'd)
ACID EXTRACTABLES IN SOIL SAMPLES
Parts per billion (ppb)

	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
Phenol	U	U	U	U	U	U	U	U
2-Chlorophenol	U	U	U	U	U	U	U	U
2-Methylphenol	U	U	U	U	U	U	2,200 J	U
4-Methylphenol	380 J	U	U	U	U	U	2,100 J	3,300 J
2-Nitrophenol	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	600 J	U	U	U	U	U	29,000	15,000
2,4-Dichlorophenol	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	U	U	2,400 J	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	U	U	U	1,200 J
4-Nitrophenol	U	U	U	U	U	U	U	1,600 J
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U
TOTAL	980	0	0	0	0	0	35,700	21,100

U = Undetected
J = Estimated Value

02323

Table 5

PESTICIDES IN SOIL SAMPLES

Parts per billion (ppb)

	A-2 0-2	A-2 14-16	A-3D 0-2	A-3D 10-12	A-3D 34-36	A-4 4-6	A-4 14-16	A-5 0-2	A-5 10-12
Alpha-BHC	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	1.8 J
Delta-BHC	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	79 J	U	U	U	U	38 J	U
Endosulfan I	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	330 J	U	U	U	U	U	U
4,4'-DDE	U	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	U	U	U
4,4'-DDD	U	U	U	U	U	9.7 J	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	6.6 J	U	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U
gamma-Chlordane	41 J	U	280 J	U	U	U	U	110 J	U
Toxaphene	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	41	6.6	689	0	0	9.7	0	148	1.8

U = Undetected

J = Estimated Value

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8
Alpha-BHC	U	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	6.2 J	U	U	U	U	U	U	U	84	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U
Dieldrin	12 J	U	U	U	U	U	U	U	U	U
4,4'-DDE	U	U	U	U	U	U	U	U	350 J	U
Endrin	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	220	U	U	U
4,4'-DDD	U	U	U	U	U	U	U	U	1500	U
Endosulfan Sulfate	U	U	U	U	U	U	150 J	U	U	U
4,4'-DDT	260	18 J	U	4.9 J	U	U	420	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U	U
gamma-Chlordane	U	U	25 J	U	U	U	U	U	44 J	U
Toxaphene	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	278.2	18	25	4.9	0	0 0	790	0	1978	0

U = Undetected
J = Estimated Value

02203

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	C-3D 0-2	C-3D 4-6	C-3D 12-14	C-3D 34-36	C-4 0-2	C-4 10-14	D-1 0-4	D-1 6-8	D-2D 0-5	D-2D 7-9	D-2D 20-22	D-2D 30-32
Alpha-BHC	U	U	U	U	U	U	U	14 J	930 J	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	170 J	1.3 J	U	87	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	26 J	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	U	U	U	U	U	U	43 J
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDE	U	13 J	U	U	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	2.3 J	U	U	U	U	U	U	U	U
4,4'-DDD	U	31 J	U	U	U	U	1200	400	U	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	U	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	53 J	U	U	U	U
gamma-Chlordane	U	U	U	U	730 J	U	200 J	54 J	U	U	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	0	44	0	2.3	900	1.3	1400	634	930	0	0	43

U = Undetected
J = Estimated Value

9320

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	D-3 0-4	D-3 4-6	D-3 8-10	E-1D 0-4	E-1D 6-10	E-1D 14-16	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8
Alpha-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	150	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	76 J	U	380	U	890 J	U	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	12 J	U	U	U	U	U	U	U	U	U
4,4'-DDE	U	U	U	U	U	U	U	U	500 J	U	U	U
Endrin	U	U	U	U	U	U	U	330	U	U	U	U
Endosulfan II	U	U	U	50 J	U	U	39 J	U	U	620 J	U	65 J
4,4'-DDD	330 J	30 J	150	U	360 J	U	120 J	890	1300 J	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	1000	73 J	U	1700	1800 J	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	660 J	U	U	U	U
gamma-Chlordane	U	U	66 J	U	U	45 J	U	550 J	620 J	U	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	330	30	228	50	1360	344	159	4510	4220	1510	0	65

U = Undetected
J = Estimated Value

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19
Alpha-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	32 J	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	U	U	U	U	110	U	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	13 J	U	U	U	U	U	U	U	U	U
4,4'-DDE	17 J	U	U	U	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDD	49 J	U	U	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	U	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U	U	U	U
gamma-Chlordane	85 J	U	U	U	U	U	U	U	U	U	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	151	0	13	0	0	0	32	0	0	110	0	0

U = Undetected
J = Estimated Value

02220

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12
Alpha-BHC	U	U	U	U	U	U	U	U	45 J	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	U	U	U	U	U	U	U
Endosulfan I	U	U	U	U	U	U	U	U	860 J	U	U	U
Dieldrin	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDE	U	U	U	U	U	U	U	U	U	U	120 J	U
Endrin	U	U	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	6.3 J	U	U	U	U	U	U	U	U
4,4'-DDD	U	U	U	U	U	U	U	U	44 J	U	140 J	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	U	U	U	U	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	130 J	12 J
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U	U	U	U
gamma-Chlordane	U	U	U	U	U	U	U	U	U	U	U	U
Toxaphene	U	U	U	U	U	U	13 J	U	940 J	U	140 J	U
							U	U	U	U	U	U
TOTAL PESTICIDES	0	0	0	6.3	0	0	13	0	1889	0	530	12

U = Undetected
J = Estimated Value

02203

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6
Alpha-BHC	U	U	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	59 J	U	59 J	370 J	210 J	210 J	U	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	U	U	U	U	U	U	U	U	230
4,4'-DDE	U	U	U	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	2	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	U	U	U	U	110 J
4,4'-DDD	U	U	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	U	U	U	U	U	180 J
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U	U	U	U
gamma-Chlordane	U	U	U	120 J	U	120 J	410 J	200 J	180 J	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	0	0	0	179	0	179	780	410	390	0	520

U = Undetected
J = Estimated Value

A02303

Table 5 (cont'd)
PESTICIDES IN SOIL SAMPLES
Parts per billion (ppb)

	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
Alpha-BHC	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U
Heptachlor Epoxide	55	U	U	U	U	U	U	U
Endosulfan I	U	U	U	U	U	U	U	U
Dieldrin	U	U	U	U	U	U	22 J	U
4,4'-DDE	U	U	U	U	U	U	U	U
Endrin	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	54 J	21 J
4,4'-DDD	U	U	U	U	U	U	U	U
Endosulfan Sulfate	U	U	9.9 J	U	U	U	U	U
4,4'-DDT	U	U	16 J	U	U	U	U	74 J
Methoxychlor	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	U	U	U	U
gamma-Chlordane	U	71 J	U	U	U	U	U	U
Toxaphene	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	55	71	25.9	0	0	0	76	95

U = Undetected
J = Estimated Value

230B

U41

Table 6

METALS AND CYANIDE IN SOIL SAMPLES

Parts per million (ppm)

	A-30 0-2	A-30 10-12	A-30 34-36	A-4 4-6	A-4 14-16	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12
Aluminum	5,170	6,080	6,120	14,700	2,170	7,200	8,150	6,210	6,320	2,560	8,140
Antimony	U	U	U	U	U	U	U	7.1	U	U	U
Arsenic	16.0	1.2	0.53	3.8	U	23.0	0.73	4.0	0.74	1.8	0.7
Barium	339	29.4	59.0	98.7	11.1	294	37.9	106	36.6	60.3	42.2
Beryllium	U	U	U	U	U	U	U	U	U	U	U
Cadmium	2.1	U	U	0.54	U	4.8	U	14.1	0.48	U	U
Calcium	50,300	975	12,700	5,270	493	13,700	1,400	7,760	2,150	17,300	967
Chromium	17.4	14.3	12.8	21.4	5.2	35.6	20.6	19.9	18.5	6.6	15.8
Cobalt	5.8	6.2	6.0	9.5	3.4	9.6	10.3	14.4	6.4	2.7	5.0
Copper	324	13.7	15.1	20.8	5.0	139	14.0	35.5	14.4	8.3	4.4
Iron	21,700	11,600	12,000	21,000	4,220	31,600	15,500	115,000	16,000	6,080	10,700
Lead	718	167	109	84.3	26.6	1060	5.2	225	15.1	51.6	9.1
Magnesium	8,640	2,610	6,920	3,760	1,300	4,900	3,510	2,920	2,890	10,200	2,870
Manganese	245	220	287	278	51.6	349	423	1600	183	121	112
Mercury	0.87	U	U	0.13	U	0.61	U	0.22	0.16	U	U
Nickel	18.8	13.5	17.6	15.7	4.5	34.2	14.9	28.7	13.0	5.0	10.9
Potassium	714	1,060	1,750	1,320	472	1,260	1,950	1,320	1,490	507	1,070
Selenium	1.8	U	U	U	U	2.0	U	U	U	U	U
Silver	U	U	U	U	U	U	U	U	U	U	U
Sodium	468	108	232	242	75.1	429	158	199	129	43.9	88.5
Thallium	U	U	U	U	U	U	U	U	U	U	U
Vanadium	32.6	18.6	19.7	30.0	7.0	38.8	27.8	42.2	24.4	10.1	19.0
Zinc	524	66.4	44.8	110	33.1	858	58.1	143	176	60.4	48.1
Cyanide	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

00230C

Table 6 (cont'd)
METALS AMD CYANIDE IN SOIL SAMPLES
Parts per million (ppm)

	C-1 0-2	C-1 8-10	C-2 0-2	C-2 6-8	C-30 0-2	C-30 4-6	C-30 12-14	C-30 34-36	C-4 0-2	C-4 10-14	D-1 0-4	D-1 6-8
Aluminum	5,190	12,000	13,800	16,400	6,700	15,900	10,700	2,710	5,560	6,050	14,000	19,400
Antimony	U	U	22.5	U	U	U	U	U	U	U	U	U
Arsenic	10.6	3.1	5.4	1.1	47.3	23.5	2.0	1.7	20.8	1.4	3.6	1.2
Barium	306	117	134	93.2	434	132	101	18.7	930	43.0	64.0	117
Beryllium	U	U	U	U	U	U	U	U	U	U	U	U
Cadmium	1.0	U	15.2	0.73	1.7	1.1	0.53	U	2.5	0.44	0.76	0.83
Calcium	39,500	1,890	5,080	4,770	28,600	18,100	1,910	12,700	16,700	1,330	6,090	4,100
Chromium	22.2	31.7	15.3	41.4	31.6	42.6	54.7	11.7	38.7	17.3	29.2	42.7
Cobalt	8.2	10.3	6.0	11.7	7.0	15.2	17.5	5.3	9.6	7.4	8.0	14.1
Copper	78.4	19.4	3330	27.6	162	44.3	40.2	11.4	153	33.9	22.7	28.1
Iron	17,300	22,400	25,900	25,300	22,300	29,400	20,700	10,400	40,800	15,700	24,000	30,600
Lead	206	20.6	528	14.8	696	66.9	15.9	10.3	511	23.9	57.1	17.2
Magnesium	14,300	5,290	1,660	7,330	8,550	13,700	7,220	6,590	7,540	2,720	4,450	8,340
Manganese	173	383	220	446	337	563	409	301	258	232	467	461
Mercury	0.38	U	0.47	U	1.1	U	U	U	0.89	U	U	U
Nickel	20.4	22.2	17.8	24.3	18.5	21.6	42.7	9.8	24.5	12.0	12.9	30.0
Potassium	1,160	4,540	650	3,040	822	2,030	3,550	731	996	1,880	1,130	5,960
Selenium	U	U	U	U	2.0	1.8	U	U	2.2	U	U	U
Silver	U	U	U	U	U	U	U	U	0.99	U	U	U
Sodium	378	268	301	562	259	151	175	120	218	114	147	521
Thallium	U	U	U	U	U	U	U	U	U	U	U	0.63
Vanadium	18.7	33.1	17.7	43.8	36.7	54.5	52.4	15.9	46.9	21.3	33.8	55.8
Zinc	332	56.6	6100	64.3	706	172	61.9	21.5	918	46.8	84.0	77.1
Cyanide	U	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

00230

Table 6 (cont'd)

METALS AND CYANIDE IN SOIL SAMPLES

Parts per million (ppm)

	D-2D 0-5	D-2D 7-9	D-2D 20-22	D-2D 30-32	D-3 0-4	D-3 4-6	D-3 8-10	E-1D 0-4	E-1D 6-10	E-1D 14-16
Aluminum	11,600	17,700	4,980	3,140	12,500	12,800	21,100	8,440	16,500	2,910
Antimony	U	U	U	U	U	U	U	U	U	U
Arsenic	4.5	3.9	0.49	0.48	3.7	1.7	1.7	20.3	5.7	0.83
Barium	80.0	114	32.0	16.4	77.9	40.0	165	817	155	22.2
Beryllium	U	U	U	U	U	U	U	U	U	U
Cadmium	1.2	1.0	U	U	U	U	0.80	4.2	0.88	U
Calcium	21,800	4,310	10,300	8,290	2,370	1,570	3,370	9,610	3,620	8,950
Chromium	24.5	44.8	9.0	8.7	23.6	30.3	50.5	28.6	63.7	8.1
Cobalt	8.9	16.4	4.9	3.2	8.5	7.6	16.6	9.3	13.1	3.3
Copper	42.7	30.1	9.7	5.3	33.6	9.7	26.7	124	11.8	6.7
Iron	16,300	31,700	10,400	6,870	19,700	22,400	34,100	41,700	30,000	8,840
Lead	49.9	14.9	7.5	6.3	171	19.0	32.9	2190	76.9	3.4
Magnesium	8,610	8,310	5,280	4,130	2,920	2,620	9,850	5,800	6,960	4,290
Manganese	1160	922	233	150	593	308	489	397	404	184
Mercury	0.14	U	U	U	0.78	U	U	0.98	U	U
Nickel	12.6	32.1	9.1	5.3	15.4	12.3	36.9	17.7	30.5	7.5
Potassium	1,450	5,740	1,080	713	1,270	1,330	6,970	2,290	4,940	714
Selenium	2.3	U	U	U	0.84	U	1.3	2.7	U	U
Silver	U	U	U	U	U	U	U	U	U	U
Sodium	2790	492	278	216	245	145	375	268	243	380
Thallium	U	U	U	U	U	U	0.64	U	U	U
Vanadium	30.2	54.1	16.4	10.7	29.9	34.3	57.7	24.3	56.0	12.8
Zinc	155	70.1	22.3	13.5	82.2	29.7	91.9	2140	177	33.8
Cyanide	U	U	U	U	U	U	U	U	3.0	2.8

U = Not Detected

00230E

Table 6 (cont'd)

METALS AND CYANIDE IN SOIL SAMPLES

Parts per million (ppm)

	E-2 2-4	E-2 8-10	E-2 12-14	F-1 0-2	F-1 4-6	F-1 6-8	G-1 0-2	G-1 2-4	G-1 8-10	WS-1 0-4	WS-1 4-6
Aluminum	9,710	14,600	3,230	7,030	6,600	10,400	6,340	7,340	6,720	10,200	8,170
Antimony	U	U	U	U	U	U	U	U	U	U	U
Arsenic	14.8	2.2	3.8	32.3	5.2	3.7	U	33.9	1.3	3.8	2.1
Barium	310	96.2	55.3	881	112	65.0	330	193	17.9	101	61.1
Beryllium	U	U	U	0.53	U	U	U	U	U	U	U
Cadmium	1.1	0.58	U	5.2	0.88	0.49	4.3	0.85	U	0.70	U
Calcium	4,280	2,500	9,600	4,120	8,220	1,630	2,780	2,460	761	9,150	1,800
Chromium	29.3	46.0	9.3	95.9	17.2	19.9	47.5	18.0	15.5	26.0	16.5
Cobalt	8.6	13.6	3.6	7.0	7.2	7.8	6.2	6.6	5.2	7.7	6.1
Copper	83.9	24.0	8.2	244	86.8	37.0	210	178	8.4	38.8	37
Iron	31,600	27,700	8,480	25,400	32,800	19,900	24,300	17,900	11,800	20,000	14,400
Lead	1460	23.0	4.5	1580	132	2090	924	234	7.6	512	141
Magnesium	2,380	7,090	4,420	2,450	1,780	2,650	2,010	1,330	2,590	3,480	2,350
Manganese	481	547	438	215	464	321	234	86.9	115	268	236
Mercury	1.7	U	U	2.7	0.35	0.41	1.9	1.4	U	0.46	3.6
Nickel	17.0	26.4	8.4	25.1	15.4	14.6	19.6	15.5	10.1	16.3	12.1
Potassium	2,520	5,400	1,150	672	565	756	1,040	713	706	1,070	650
Selenium	1.8	U	U	U	U	U	U	5.9	U	U	U
Silver	U	U	U	U	U	U	U	U	U	U	U
Sodium	321	1170	800	161	83.8	87.1	166	165	139	305	281
Thallium	0.69	U	U	U	U	U	U	U	U	U	U
Vanadium	26.8	50.8	12.3	80.4	20.0	24.5	52.7	27.8	16.2	27.0	22.3
Zinc	304	64.6	23.5	1390	273	153	1310	393	34.8	125	72.6
Cyanide	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

00230 F

Table 6 (cont'd)

METALS AND CYANIDE IN SOIL SAMPLES

Parts per million (ppm)

	WS-2 0-2	WS-2 8-10	WS-3 0-2	WS-3 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19	OS-2 0-2	OS-2 5-7	OS-3 0-2	OS-3 6-8
Aluminum	10,900	7,840	6,530	6,470	5,880	10,300	6,770	13,400	8,180	15,400	9,120
Antimony	U	U	U	U	U	U	U	U	U	U	U
Arsenic	1.7	2.4	1.5	0.47	11.2	3.0	0.68	8.4	U	2.8	0.98
Barium	49.1	27.0	42.3	20.9	72.4	33.6	36.8	55.4	42.7	56.1	53.9
Beryllium	U	U	U	U	U	U	U	U	U	U	U
Cadmium	U	U	U	U	0.66	0.66	0.75	0.48	U	0.52	U
Calcium	1,560	901	1,530	846	11,000	1,190	2,050	1,930	1,260	1,790	1,920
Chromium	20.4	50.2	13.6	14.4	15.9	17.7	22.2	25.6	14.6	23.3	18.5
Cobalt	7.1	5.2	5.1	5.1	5.9	9.3	5.6	9.4	6.0	7.3	7.2
Copper	17.6	30.9	21.8	9.6	101	12.4	45.4	41.1	12.9	18.4	14.8
Iron	15,900	11,700	11,000	11,700	12,600	21,600	16,100	18,900	12,200	17,700	14,900
Lead	85.7	4.3	132	27.7	157	32.4	37.1	50.8	8.0	40.3	13.9
Magnesium	2,680	2,150	2,040	2,280	3,780	2,470	2,540	4,590	1,940	2,890	2,760
Manganese	360	195	226	206	187	408	455	415	294	341	290
Mercury	0.11	U	0.14	U	0.66	U	U	2.5	U	U	U
Nickel	12.8	16.5	11.1	9.4	12.9	11.0	13.6	21.5	10.7	13.7	13.8
Potassium	613	532	544	544	801	523	1,360	1,560	1,040	1,260	1,530
Selenium	U	U	U	U	2.2	U	U	U	U	U	U
Silver	U	U	U	U	U	U	U	U	U	U	U
Sodium	283	155	209	132	156	171	170	187	185	549	251
Thallium	U	U	U	U	U	U	U	U	U	U	U
Vanadium	25.2	18.1	18.4	17.6	15.9	24.3	23.3	31.3	21.6	27.7	27.1
Zinc	50.0	46.7	62.1	29.3	158	38.9	77.6	51.1	20.8	55.1	28.9
Cyanide	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

022306

Table 6 (cont'd)
METALS AND CYANIDE IN SOIL SAMPLES
Parts per million (ppm)

	9-1 2-6	9-1 6-8	9-2 0-4	9-2 6-8	9-3 0-2	9-3 6-10	9-4 1-4	9-4 8-12	2A-1 0-4	2A-1 4-6	6-1 0-4	6-1 4-6
Aluminum	6,230	7,660	5,940	5,880	8,220	5,760	4,260	6,050	6,600	5,240	9,580	6,370
Antimony	U	U	U	U	U	U	U	U	U	U	U	U
Arsenic	U	U	1.1	3.9	11.3	0.45	4.6	U	3.5	3.4	2.2	1.7
Barium	34.1	54.2	38.9	56.0	116	24.8	87.2	17.8	60.2	51	32.5	18.7
Beryllium	U	U	U	U	U	U	U	U	U	U	U	U
Cadmium	U	U	0.67	0.84	1.9	U	0.90	U	U	U	U	U
Calcium	1,180	1,160	1,670	1,980	10,600	556	6,150	734	19,700	7,070	1,540	802
Chromium	11.9	14.7	16.3	20.5	20.9	13.0	12.1	12.0	12.5	11.9	23.5	11.7
Cobalt	4.6	6.1	46.4	93.5	37.0	5.3	228	5.5	49.8	24.9	18.8	6.4
Copper	37.5	75.3	28.2	40.8	181	11.8	258	17.1	18.4	16.8	15.7	7.6
Iron	9,370	11,200	12,800	12,700	25,000	10,500	18,100	11,500	10,400	9,520	15,800	11,500
Lead	975	3380	237	503	623	65	789	24.7	132	126	29.1	19.9
Magnesium	2,020	2,090	2,690	2,530	2,800	2,240	1,990	2,630	2,590	2,230	2,720	2,300
Manganese	200	126	230	253	293	322	184	166	180	167	210	131
Mercury	U	0.15	0.39	0.38	0.42	U	0.96	U	0.5	0.4	0.21	U
Nickel	9.5	9.7	11.9	12.5	12.0	10.2	13.0	8.0	9.1	9.8	18.3	9.9
Potassium	578	589	1,080	893	960	651	0	680	738	678	686	561
Selenium	U	U	U	U	2.3	U	2.0	U	U	U	U	U
Silver	U	U	U	U	U	U	1.7	U	U	U	U	U
Sodium	106	128	100	135	249	98.1	252	127	138	95.3	151	104
Thallium	U	U	U	U	U	U	U	U	U	U	U	U
Vanadium	13.4	15.6	17.2	16.7	21.8	17.0	17.9	13.8	15.6	14.3	22.1	17.3
Zinc	74.8	120	181	240	570	50.2	340	87.6	82.8	65.8	89.3	68.7
Cyanide	U	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

00230

Table 6 (cont'd)
METALS AND CYANIDE IN SOIL SAMPLES
Parts per million (ppm)

	6A-1 0-4	6A-1 4-6	10-1 3-6	10-1 6-8	10-1 8-14	10-2 0-4	10-2 4-6	10-3 0-2	10-3 4-8	5-1 0-2	5-1 8-10
Aluminum	14,000	10,180	4,980	12,600	13,000	10,500	8,220	14,000	16,800	10,800	5,270
Antimony	U	U	U	U	U	U	U	U	U	U	U
Arsenic	6.4	2.6	10.8	4.3	4.6	3.7	11.1	9.6	3.1	6.3	0.96
Barium	46.1	39.2	74.0	43.3	80.7	185	83.1	57.6	91.3	319	31.6
Beryllium	U	U	U	U	U	U	U	U	U	U	U
Cadmium	U	U	0.82	0.49	U	0.79	0.69	U	0.68	0.60	U
Calcium	856	675	14,600	1,540	2,420	4,310	3,440	1,080	1,640	15,600	1,060
Chromium	20.7	18.4	14.4	20.4	23.5	23.1	21.6	21.3	39.9	20.9	15.8
Cobalt	15.1	12.2	423	12.4	25.1	13.3	7.1	25.8	38.3	39.0	4.8
Copper	16.1	13.6	51.0	21.2	37.2	63.6	29.7	16.0	20.4	48.1	8.8
Iron	20,000	1,980	30,200	19,400	18,600	19,200	15,300	18,400	25,200	17,800	9,960
Lead	66.7	73.9	156	101	170	203	79.4	43.7	16.8	388	3.8
Magnesium	2,650	2,270	2,450	2,740	3,120	3,050	2,460	2,840	6,090	3,090	1,880
Manganese	192	151	252	236	281	361	312	139	266	326	168
Mercury	0.22	0.4	0.32	0.22	0.67	U	U	U	U	0.59	U
Nickel	14.0	10.4	15.6	13.0	15.0	21.8	20.3	13.4	22.7	22.2	9.9
Potassium	1,620	1,380	1,300	1,660	1,960	1,780	1,540	1,240	4,630	1,060	800
Selenium	U	U	U	U	U	U	U	U	U	U	U
Silver	U	U	3.7	U	U	U	U	U	0.98	1.1	U
Sodium	259	201	569	378	538	252	221	169	227	453	252
Thallium	U	U	U	U	U	U	U	U	U	U	U
Vanadium	29.1	25.5	28.4	24.9	27.2	52.1	80.2	30.7	43.4	128	16.8
Zinc	82.7	83.3	176	87.0	126	314	127	72.7	98.2	209	17.4
Cyanide	U	U	U	U	U	U	U	U	U	U	U

U = Not Detected

00230 I

Table 6 (cont'd)
METALS AND CYANIDE IN SOIL SAMPLES
Parts per million (ppm)

	3A-1 0-4	3A-1 4-7	3B-1 4-6	3B-1 8-10
Aluminum	17,600	8,990	10,400	5,970
Antimony	U	U	U	U
Arsenic	2.7	1.2	3.0	3.3
Barium	44.8	56.8	45.3	163
Beryllium	U	U	U	U
Cadmium	0.47	U	U	U
Calcium	846	1,180	571	1,280
Chromium	24.8	18.8	16.3	13.9
Cobalt	9.3	10.7	5.5	4.7
Copper	14.4	13.3	11.3	33.9
Iron	21,300	14,000	11,000	10,700
Lead	23.9	10.2	20.8	47.9
Magnesium	3,630	2,010	2,840	1,750
Manganese	397	519	133	99.1
Mercury	U	U	0.55	0.22
Nickel	16.4	14.4	10.2	9.2
Potassium	1,460	1,020	1,380	875
Selenium	U	U	U	U
Silver	U	U	U	U
Sodium	282	249	161	155
Thallium	0.56	U	U	U
Vanadium	35.7	29.2	18.7	15.1
Zinc	64.3	29.1	85.6	257
Cyanide	U	U	U	U

U = Not Detected

00230

049

Table 7

TOTAL PETROLEUM HYDROCARBONS

Parts per million (ppm)

Sample I.D.	Concentration
A-1:0-2	3,368
A-1:10-12	84
A-2:0-2	240
A-2:14-16	1,070
A-30:0-2	1,980
A-30:10-12	130
A-30:34-36	110
A-4:4-6	210
A-4:14-16	130
A-5:0-2	760
A-5:10-12	100
DW-1:4-6	882
DW-1:10-12	60
DW-2:6-8	284
DW-2:12-16	80
B-1:0-2	110
B-1:10-12	3,900
C-1:0-2	18,300
C-1:8-10	255
C-2:0-2	43,600
C-2:6-8	18
C-30:0-2	6,380
C-30:4-6	374
C-30:12-14	358
C-30:34-36	2,350
C-4:0-2	13,000
C-4:10-14	356
D-1:0-4	6,910
D-1:6-8	3,430
D-20:0-5	6,900
D-20:7-9	708
D-20:20-22	796
D-20:30-32	2,960
D-3:0-4	1,890
D-3:4-6	2,320
D-3:8-10	3,140
E-10:0-4	2,040
E-10:6-10	1,690
E-10:14-16	8,260
E-2:2-4	3,190
E-2:8-10	6,093
E-2:12-14	16,051
F-1:0-2	790
F-1:4-6	8,200
F-1:6-8	7,300
G-1:0-2	2,000
G-1:2-4	8,000
G-1:8-10	2,100
WS-1:0-4	2,720
WS-1:4-6	355
WS-2:0-2	421
WS-2:8-10	494
WS-3:0-2	643
WS-3:8-10	336
OS-10:0-2	320
OS-10:4-6	1,420
OS-10:14-19	120
OS-2:0-2	20
OS-2:5-7	U
OS-3:0-2	34
OS-3:6-8	272
9-1:2-6	137
9-1:6-8	136
9-2:0-4	143
9-2:6-8	163
9-3:0-2	373
9-3:6-10	506
9-4:1-4	430
9-4:8-12	990
2A-1:0-4	90
2A-1:4-6	170
6-1:0-4	110
6-1:4-6	3,840
6A-1:0-4	7,200
6A-1:4-6	18,000
10-1:3-6	29,500
10-1:6-8	16,600
10-1:8-14	12,200
10-2:0-4	10,300
10-2:4-6	201,000
10-3:0-2	2,010
10-3:4-8	2,360
5-1:0-2	592
5-1:8-10	118
3A-1:0-4	160
3A-1:4-7	280
30-1:4-6	9,400
30-1:8-10	3,700

00230 K

Table 8
EP TOXICITY RESULTS
(parts per million)

	RCRA limit	A-3D 0-2	A-3D 34-36	DW-1 4-6	DW-1 10-12	DW-2 6-8	DW-2 12-16	B-1 0-2	B-1 10-12	C-3D 0-2	C-3D 4-6	C-3D 12-14	C-3D 34-36
Arsenic	5.0	U	U	U	U	U	U	U	U	U	U	U	U
Barium	100.0	0.262	0.72	1.28	0.213	0.524	0.232	0.21	0.244	0.99	0.37	0.38	0.26
Cadmium	1.0	U	U	0.063	U	U	U	U	U	U	U	U	U
Chromium	5.0	U	U	U	U	U	U	U	U	U	U	U	U
Lead	5.0	U	U	6.31 *	U	0.329	U	U	U	1.2	U	U	U
Mercury	0.2	U	U	U	U	U	U	U	U	U	0.002	U	U
Selenium	1.0	U	U	U	U	U	U	U	U	U	U	U	U
Silver	5.0	U	U	U	U	U	U	U	U	U	U	U	U
Endrin	0.02	U	U	U	U	U	U	U	U	U	U	U	U
Lindane	0.4	U	U	U	U	U	U	U	U	U	U	U	U
Methoxychlor	10.0	U	U	U	U	U	U	U	U	U	U	U	U
Toxaphene	0.5	U	U	U	U	U	U	U	U	U	U	U	U
2,4-D	10.0	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-TP	1.0	U	U	U	U	U	U	U	U	U	U	U	U

* Value exceeds threshold limit

U = Undetected

00230

Table 8 (cont'd)
EP TOXICITY RESULTS
(parts per million)

	RCRA limit	D-2D 0-5	B-2D 7-9	D-2D 20-22	D-2D 30-32	E-1D 0-4	E-1D 6-10	E-1D 14-16	G-1 0-2	G-1 2-4	G-1 8-10	OS-1D 0-2	OS-1D 4-6	OS-1D 14-19
Arsenic	5.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Barium	100.0	0.326	0.4	0.236	0.122	0.486	1.09	U	0.452	0.196	0.192	0.526	0.338	0.268
Cadmium	1.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Chromium	5.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Lead	5.0	U	U	U	U	1.62	U	U	U	U	U	0.16	U	U
Mercury	0.2	U	U	U	U	U	U	U	U	U	U	U	U	U
Selenium	1.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Silver	5.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Endrin	0.02	U	U	U	U	U	U	U	U	U	U	U	U	U
Lindane	0.4	U	U	U	U	U	U	U	U	U	U	U	U	U
Methoxych	10.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Toxaphene	0.5	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4-D	10.0	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-TP	1.0	U	U	U	U	U	U	U	U	U	U	U	U	U

U = Undetected

00230 N

Table 8 (cont'd)
EP TOXICITY RESULTS
(parts per million)

	RCRA limit	9-1 2-6	9-1 6-8	6A-1 0-4	6A-1 4-6	10-1 8-14
Arsenic	5.0	U	U	U	U	U
Barium	100.0	0.34	0.72	0.376	0.322	0.393
Cadmium	1.0	U	U	U	U	U
Chromium	5.0	U	U	U	U	U
Lead	5.0	13.4 *	15.3 *	U	U	U
Mercury	0.2	U	U	U	U	U
Selenium	1.0	U	U	U	U	U
Silver	5.0	U	U	U	U	U
Endrin	0.02	U	U	U	U	U
Lindane	0.4	U	U	U	U	U
Methoxychlor	10.0	U	U	U	U	U
Toxaphene	0.5	U	U	U	U	U
2,4-D	10.0	U	U	U	U	U
2,4,5-TP	1.0	U	U	U	U	U

* Value exceeds threshold limit

U = Undetected

Table 9

VOLATILE ORGANICS IN WATER SAMPLES

Parts per billion (ppb)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W	W-D2:W	OS-3:W	OS-2:W
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	3 J	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	10,000 J	220,000	U	U	U
Acetone	U	880 B	150 B	U	13,000 B	100	4 J	60,000 B	37,000 J	3 J	520 B	7 BJ
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	2 J	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	620 X	220	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	11,000 J	U	U	2 J
1,2-Dichloroethane	20	38	57	U	U	2 J	U	U	16,000 J	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	14,000 J	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	4 J	U	7 J	U	U	39	U	U	52,000	U	U	U
1,3-Dichloropropene-cis	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	8 J	U	U	3 J	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	17,000 J	U	U	1 J
Toluene	U	19 J	44	U	780 J	49	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	500,000	U	140 J	U
Ethylbenzene	U	6 J	50	U	U	56	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	240,000	U	160 J	U
Total Xylenes	12	38 X	290	U	U	180	U	U	120,000	U	U	U
						I		U	1,170,000			
Total Volatile Organics	41	1,601	826	0	13,780	429	4	70,000	2,397,000	3	820	10

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Table 10
PAHs IN WATER SAMPLES
Parts per billion (ppb)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W (ppm)	W-D2:W	OS-3:W	OS-2:W
Naphthalene	U	11	41	U	720	710	U	44,000	16,000	U	1,300	U
2-Methylnaphthalene	U	U	10	U	2,200	430	U	53,000	20,000	U	1,100	U
Acenaphthylene	U	U	U	U	U	U	U	U	U	U	8 J	U
Acenaphthene	U	2 J	U	U	290 J	72	U	10,000	5,000	U	140	U
Fluorene	U	U	U	U	140 J	44	U	6,500	2,600	U	78	U
Phenanthrene	U	8 J	U	U	82	38	U	4,000	1,000 J	U	52	U
Anthracene	U	U	U	U	20 J	10	U	1,200 J	U	U	15	U
Fluoranthene	U	3 J	U	U	18 J	6 J	U	690 J	U	U	8 J	U
Pyrene	U	4 J	U	U	13 J	8 J	U	610 J	U	U	7 J	U
Benzo(a)anthracene *	U	U	U	U	U	U	U	U	U	U	U	U
Chrysene	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene *	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(a)pyrene *	U	U	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene *	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene *	U	U	U	U	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL PAHs	0	28	51	0	3,483	1,318	0	120,000	44,600	0	2,708	0
TOTAL CARCINOGENIC PAHs	0	0	0	0	0	0	0	0	0	0	0	0

U = Undetected
J = Estimated Value
* Carcinogenic

Note: E-2 values are in parts per million (ppm)

0030

Table 11

BASE NEUTRALS (OTHER THAN PAHs) IN WATER SAMPLES

Parts per billion (ppb) (ppm)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W	W-D2:W	OS-3:W	OS-2:W
bis(2-Chloroethyl)Ether	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	11	U
Benzyl Alcohol	U	U	U	U	U	U	U	U	U	U	4 J	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)Ether	2 J	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-Di-n-Propylamine	U	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	U	U	U	U	250	35	U	890 J	1,029 J	U	U	U
Isophorone	U	U	U	U	45 J	U	U	U	U	U	U	U
Benzoic acid	U	U	U	U	U	U	U	U	U	U	U	U
bis(-2-Chloroethoxy)Methane	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Chloroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloronapthalene	U	U	U	U	U	U	U	U	U	U	U	U
2-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dimethyl Phthalate	U	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	U	U	U	U	43 J	8 J	U	1,900 J	U	U	21	U
3-Nitroaniline	U	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	U	2 J	U	U	310	61	U	11,000	5,500	U	150	U
2,4-Dinitrotoluene	U	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	U	80	46	U	U	U	U	U	U	U	U	U
4-Chlorophenyl-phenyether	U	U	U	U	U	U	U	U	U	U	U	U
4-Nitroaniline	U	U	U	U	13 J	U	U	U	U	U	U	U
N-Nitrosodiphenylamine (1)	U	U	U	U	U	U	U	U	U	U	U	U
4-Bromophenyl-phenylether	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidene	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	U	4 J	5 BJ	U	U	3 BJ	5 BJ	U	U	U	U	3 BJ
Di-n-octylphthalate	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	2	86	51	0	661	107	5	13,790	6,529	0	186	3
TOTAL PAHs (from Table 10)	0	28	51	0	3,443	1,338	0	120,000	44,600	0	2,708	0
TOTAL BASE NEUTRALS	2	114	102	0	4,104	1,445	5	133,790	51,129	0	2,894	3

Table 12

ACID EXTRACTABLES IN WATER SAMPLES

Parts per billion (ppb)

	A-4:W	W-W:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W (ppm)	W-D2:W	OS-3:W	OS-2:W
Phenol	U	U	U	U	2,900	28	U	5,000	U	U	U	U
2-Chlorophenol	U	2 J	U	U	U	U	U	U	U	U	U	U
2-Methylphenol	U	6 J	17	U	3,700	60	U	6,500	U	U	U	U
4-Methylphenol	U	29	6 J	U	U	120	U	18,000	1,900 J	U	3 J	U
2-Nitrophenol	U	U	U	U	210	U	U	U	U	U	3 J	U
2,4-Dimethylphenol	U	6 J	21	U	3,800	220	U	26,500	5,000	U	U	U
2,4-Dichlorophenol	U	2 J	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-Methylphenol	U	U	U	U	320 J	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	U	U	U	U	120 J	9 J	U	460 J	U	U	6 J	U
4-Nitrophenol	U	U	U	U	140 J	U	U	U	U	U	6 J	U
4,6-Dinitro-2-Methylphenol	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL	0	45	44	0	11,190	437	0	56,460	6,900	0	18	0

U = Undetected

J = Estimated Value

Note: E-2 values are in parts per million (ppm)

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Table 13

PESTICIDES IN WATER SAMPLES

Parts per billion (ppb)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W	W-D2:W	OS-3:W	OS-2:W
Alpha-BHC	U	0.14 J	U	U	U	U	U	U	U	U	U	U
Beta-BHC	U	U	U	U	U	U	U	U	U	U	U	U
Delta-BHC	U	U	U	U	U	U	U	U	1,800	U	U	U
Gamma-BHC (Lindane)	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor	U	U	U	U	U	U	U	U	U	U	U	U
Aldrin	U	U	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	U	U	U	U	U	U	U	21	1,700 J	U	U	U
Endosulfan I	U	U	U	U	U	U	U	U	U	U	U	U
Dieldrin	U	U	U	U	U	0.19	U	U	U	U	U	0.083 J
4,4'-DDE	U	U	U	U	U	U	U	U	2,700 J	U	U	U
Endrin	U	U	U	U	U	U	U	U	U	U	U	U
Endosulfan II	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDD	U	U	U	U	U	U	U	3.9 J	19,000	U	U	U
Endosulfan Sulfate	U	U	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	U	U	U	U	U	0.10	U	U	11,000	U	U	U
Methoxychlor	U	U	U	U	U	U	U	U	U	U	U	U
Endrin Ketone	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlordane	U	U	U	U	3.2 J	U	U	U	U	U	U	U
gamma-Chlordane	U	U	U	U	U	U	U	U	2,400 J	U	U	U
Toxaphene	U	U	U	U	U	U	U	U	U	U	U	U
TOTAL PESTICIDES	0	0.14	0	0	3.2 0	0.29 0	0 0	24.9	38,600	0	0	0.083

U = Undetected

J = Estimated Value

Table 14
Total Metals and Cyanide
Parts per billion (ppb)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-01:W	D-2D:W	E-2:W	W-02:W	OS-3:W	OB-2:W
Aluminum	40,100	14,500	61,200	16,200	5,300	34,500	35,100	3,460	10,300	21,000	35,000	19,000
Antimony	U	U	U	U	U	U	U	U	U	U	U	U
Arsenic	23.2	93.9	84.5	6.0	69.0	50.0	23.3	382	400	34.8	16.5	3.3
Barium	414	144	246	291	125	634	340	346	336	125	342	123
Beryllium	U	U	U	U	U	U	U	U	U	U	U	U
Cadmium	2.7	U	3.6	U	U	4.2	3.1	U	U	U	U	U
Calcium	63,900	82,800	50,200	170,000	37,300	114,000	403,000	68,400	124,000	64,400	114,000	26,500
Chromium	87.9	37.6	152	37.3	15.1	82.6	75.9	26.8	1570	244	61.2	33.7
Cobalt	42.0	19.2	52.1	16.9	64.4	24.2	39.2	106	642	8.2	22.5	13.5
Copper	133	117	63.0	28.8	36.1	352	128	30.7	1040	100	92.3	33.3
Iron	79,100	41,500	151,000	28,100	11,400	77,800	53,500	11,500	82,200	26,300	48,900	26,400
Lead	103	436	385	12.9	70.9	600	90.6	226	510	178	52.0	31.0
Magnesium	43,500	39,300	22,600	77,900	10,500	16,000	64,600	29,100	17,700	13,100	36,300	6,880
Manganese	2,390	1,420	1,420	10,900	1,040	1,500	6,840	7,580	34,600	204	4,460	694
Mercury	U	U	U	U	U	1.1	U	U	U	0.45	U	U
Nickel	89.5	171	111	31.5	62.6	69.5	335	497	1260	26.7	58.6	27.8
Potassium	36,100	23,000	26,400	9,040	241,000	31,700	16,900	767,000	888,000	10,500	44,300	11,500
Selenium	U	U	U	U	U	U	U	U	U	U	U	U
Silver	U	U	U	U	16.3	U	U	U	U	U	U	U
Sodium	145,000	70,400	23,900	44,200	235,000	75,400	178,000	508,000	2,410,000	26,700	146,000	58,800
Thallium	U	U	U	U	U	U	U	U	U	U	U	U
Vanadium	119	74.5	167	41.1	21.2	92.5	84.0	209	2080	55.8	79.6	42.6
Zinc	184	232	168	70.5	186	1,060	250	832	1440	135	124	76.3
Cyanide	U	U	U	U	U	U	U	U	1130	209	U	U

U = Not Detected

00230

Table 15
Dissolved metals
Parts per billion (ppb)

	A-4:W	W-U:W	9-1:W	B-1:W	10-1:W	G-1:W	W-D1:W	D-2D:W	E-2:W	W-D2:W	OS-3:W	OB-2:W
Aluminum	6,290	2,070	2,950	65.7	328	5,720	1,340	98.4	1,590	3140	4,890	1,610
Antimony	U	U	U	U	U	U	U	U	U	U	U	U
Arsenic	3.3	U	60.5	U	62.8	58.3	U	296	1,930	6.2	U	U
Barium	264	99.8	168	176	96.2	532	45.1	299	1,580	125	239	69.3
Beryllium	U	U	U	U	U	U	U	U	6.2	U	U	U
Cadmium	U	U	3.2	U	U	2.5	U	U	19.0	U	U	U
Calcium	68,200	84,900	51,600	173,000	37,200	122,000	404,000	76,000	253,000	66,600	118,000	27,300
Chromium	16.5	7.0	10.2	3.0	4.4	12.8	3.9	16.3	1,350	99.8	8.2	4.3
Cobalt	27.3	14.7	43.8	5.1	56.9	14.7	24.8	109	759	U	8.3	5.9
Copper	109	73.2	16.3	U	15.4	25.4	86.7	19.6	1,300	145	32.5	7.4
Iron	34,100	30,100	110,000	231	4,410	55,200	3,800	5,650	57,400	7,350	9,080	1,910
Lead	35.0	276	255	U	35.4	336	87.3	220	3,010	576	16.8	8.8
Magnesium	33,700	37,400	15,800	73,000	9,750	11,300	54,400	29,400	17,500	10,700	29,100	3,160
Manganese	2,460	1,410	1,310	10,700	1,020	1,580	6,620	8,080	47,400	163	4,440	530
Mercury	U	U	U	U	U	U	U	U	U	U	0.39	U
Nickel	45.0	159	54.6	U	57.2	36.8	302	528	1,560	8.7	23.9	U
Potassium	28,700	21,900	23,000	3,520	228,000	29,200	8,580	744,000	1,150,000	8,470	39,300	7,740
Selenium	U	U	U	U	U	U	U	2.2	96	U	U	U
Silver	U	U	U	U	U	U	U	U	U	U	U	U
Sodium	148,000	71,000	23,500	42,400	234,000	78,100	170,000	518,000	3,220,000	26,700	150,000	59,200
Thallium	U	U	U	U	U	U	U	U	U	U	U	U
Vanadium	47.6	61.5	75.5	U	11.9	47.8	6.2	200	2,450	31.4	18.0	5.2
Zinc	100	171	79.2	19.3	104	1,020	134	850	2,660	109	38.2	27.8

U = Not Detected

0023C

QUEENS PLAZA

SITE INVESTIGATION

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August 1988

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QUEENS PLAZA
SITE INVESTIGATION

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QUEENS PLAZA
SITE INVESTIGATION

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I. INTRODUCTION

The project site is located in Long Island City, Queens, at the intersection of Queens Boulevard and Jackson Avenue. The 120,000-square-foot site has a history of manufacturing use over the last 50 years, and is currently being used as a flea market. The site is proposed for development for 1,750,000 square feet of commercial space (there may be a small retail component). A soil and groundwater sampling program was performed to detect the presence, if any, of hazardous materials on the site and assess the potential for a remediation program being necessary to allow for development of the site as proposed. The design of the sampling program was based on interviews with the plant engineer, a site reconnaissance, and a land use history for the site and adjacent areas.

II. PAST ACTIVITIES ON THE SITE

West Chemical Company occupied a major portion of the site from the turn of the century to their closure in 1977 and subsequent transfer to the Modell Company. West Chemical manufactured commercial and household products, such as disinfectants, insecticides, soaps, floor wax, and paper product dispensing machines. West Chemical also ran a gasoline filling operation on their site for their delivery vehicles. There are two 500-gallon gasoline tanks on the site that have been empty for the last 20-25 years.

In addition to the West Chemical facility on the site, there is a New York Transit Authority Substation in the middle of the site and a tenement building adjacent to the substation. The transformers in the electrical substations may have contained PCBs (Polychlorinated Biphenyls).

INTERVIEWS OF PLANT PERSONNEL

Discussions with Mr. Murphy, the West Chemical Company engineer who had worked as the plant engineer on the site for about 50 years, yielded detailed information on the history of manufacturing practices by West Chemical and on the specific activities that occurred at each location on the company property. The main product of the company was a disinfectant marketed under the trade name of "CN^{+}" which stood for coronoleum. Before 1960, CN+ was manufactured using creosols (methylphenols). After 1960, the formulation for CN+ was changed to an iodine-based product. The other chemicals and raw materials used on the site included muriatic acid (hydrochloric acid), alcohol, rosin, fats,

and oils. These were used to manufacture hand creams, vending machine products, and such miscellaneous cleaning products as floor waxes and cleaners.

Figure 1 is a site map of the project area, and a summary of the uses of the buildings that exist on the site has been listed in Table 1.

There are two 10,000-gallon and two 7,500-gallon fuel oil tanks in Building No. 10. Prior to World War II and after the war until 1968, No. 6 fuel oil was utilized for heat and steam generation, with coal being used during the World War II period. The tanks were cleaned out in 1968, and from then on No. 4 fuel oil was used.

The alleyway between the substation and Building No. 2B/2C (Area E) was used for storage of products in elevated tanks above a concrete pad. There were 10 tanks altogether, used for storing products, including insecticides in unheated tanks.

The parking lot at the intersection of Orchard Street and Jackson Avenue (Area C) was used for storage of raw materials and products. The portion of Area C adjacent to Jackson Avenue and close to the five-story brick building was used for storage of soaps and waxes in two 3,000-gallon unheated metal tanks. The portion of Area C along the five-story building was used for storing raw powdered iodine used for the disinfectant product. The area adjacent to Orchard Street and opposite the two-story brick building (Area D) was used for the storage of creosol.

Muriatic acid was originally stored in rubber-lined tanks between Building No. 4A and the Long Island Rail Road tracks (Area F). It was later stored in the parking lot at the intersection of Jackson Avenue and Queens Boulevard, along Queens Boulevard (Area A).

Building No. 9 had special glass-lined kettles for manufacturing the newer iodine-based disinfectant, and the finished product was stored in drums in the same building. There were limestone scrubbers underground to neutralize acid

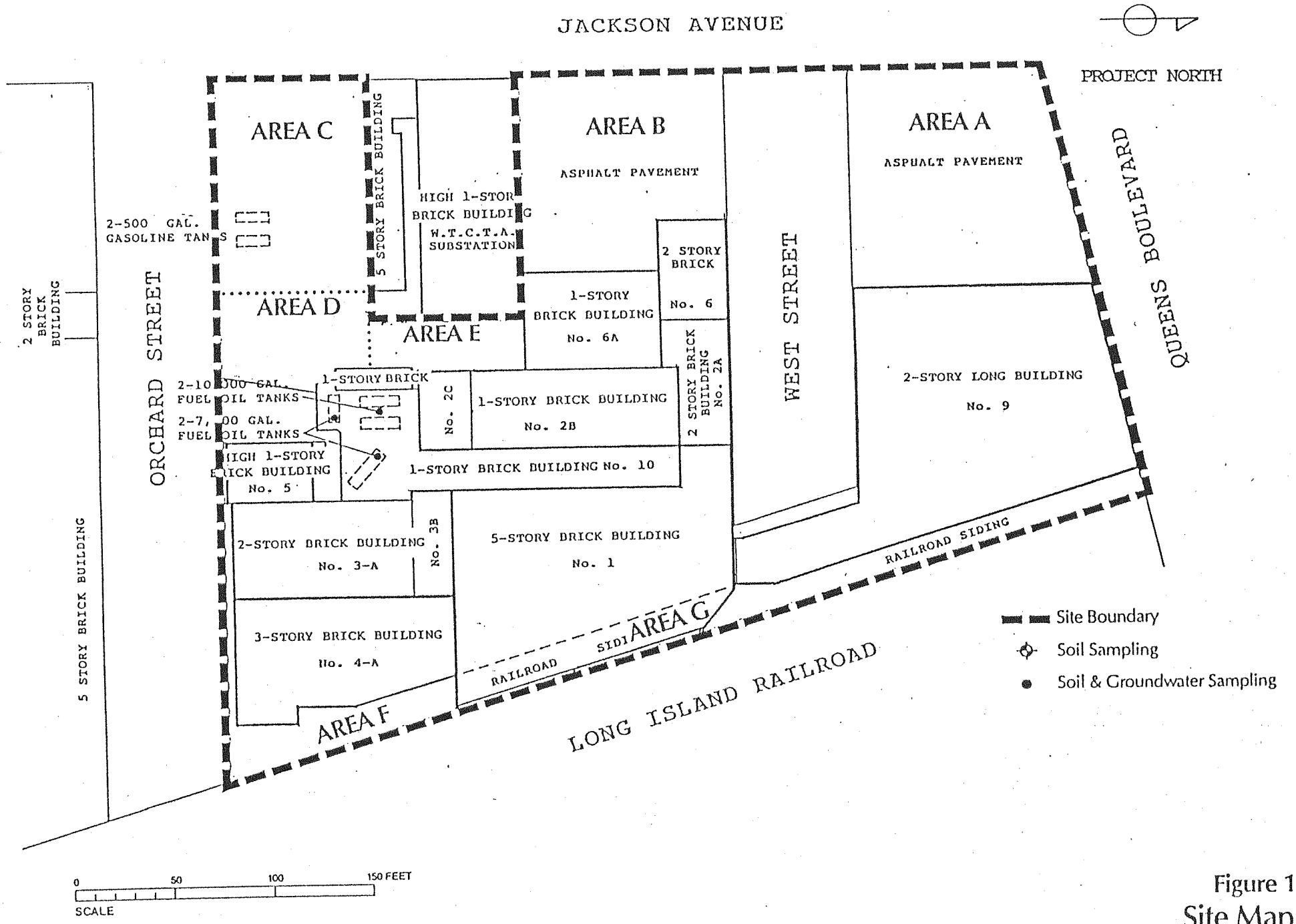


Figure 1
Site Map

Table 1

USES OF SITE BUILDINGS

Building No. and Floor	Use
1 - Basement	Gravity filling of tanks and packages
First Floor	Shipping dept - storage of products
Second Floor	Mechanical dept - plating operations
Top Three Floors	Offices
2-A Basement	File storage (paper storage)
First Floor	Chemical laboratory and office, product filling operations
2-B & 2-C	Manufacturing kettles - soaps
3-A	Underground steel storage tanks -- soaps & waxes
3-B	Built in 1925 -- covers a vacant space between buildings -- No manufacturing or storage at this location.
4-A - First Floor	Shipping department
Second Floor	Packing
Third Floor	Storage of bottled goods
5	Boiler room
6 - First Floor	Manufacture of hand creams for the navy (flash creams)
Second Floor	Light manufacturing - vending machines Paint Spray Shop
6 - A	Manufacturing kettles - wax Drained into tank downstairs and filled into drums
9 - First Floor	Warehouse - Built in 1945 Manufacture of newer iodine based disinfectant
Second Floor	Chemical labs - built in 1957
10	Built in 1948 drum storage Four underground fuel oil tanks

spills. There was an accident in 1950 in this building when there was an explosion because these drums were closed while the product inside was still hot.

The parking lot at the intersection of Jackson Avenue and West Street (Area B) was used for management parking. Before its use as a parking lot, the land was leased and was occupied by ground floor retail and tenements. Two buildings in Area B were torn down by the Modell Company after 1977.

A file search of the New York City Fire Department's Buried Tank Unit revealed no records of the gasoline tanks in Area C of the site (Attachment I). The plant engineer recalled these tanks being taken out of service over 20 years ago in the mid-1960's when West Chemical ceased performing its own shipping.

SITE RECONNAISANCE

The site reconnaissance was performed on April 13, 1988 to visually inspect the site to determine the potential areas for chemical spills, visual signs of potential hazardous materials on-site and to interview personnel present at the site concerning any knowledge of the past activities. The visual inspection indicated that most of the site is covered by buildings that were present on the site for the last 40 to 50 years. The buildings vary in their construction from wood post and beam construction to reinforced concrete frame structures. All buildings had concrete floors at the lowest floor level with concrete drain trenches leading to the City combined sewer system. These trenches are now largely filled in providing flat floor areas for the retail use the buildings are now in.

The buildings were supplied with raw materials stored primarily in an alley between the MTA substation and buildings 2B, 2C, and 10 (Area E). The

storage extended to Orchard Street and Jackson Avenue (Areas C and D). Some acid storage occurred in Areas A and ~~C~~ F. All of the yard areas except the rail siding at the east side of the site are either concrete slabs or asphalt paved. The only visual signs of contamination were oil stains on the paving and in the drain in the alley (Area E) and cinders along the rail siding in the rear of the site (Area H).

Because the site is occupied and the buildings all have had concrete floors during their occupancy, sampling was limited to the raw material and product storage areas where chemical spills were most likely.

At the time of the site inspection, the premises were occupied by a flea market with stalls of various vendors throughout the buildings.

LAND USE HISTORY FOR THE SITE AND ADJOINING AREA

A land use history for the project site and the adjacent block (between Orchard and Queens Streets and between Jackson Avenue and the Long Island Rail Road) was compiled based on information obtained from the New York City Department of Buildings, Queens. The search was conducted as follows:

A. Index search -- a computer search by block and lot which resulted in a listing of all recorded permits and applications.

B. Old record search -- a manual search through borough records between 1898 and 1960 arranged by block and lot.

A record room search (a manual research of borough records between 1961 and 1986 arranged by block and lot) and a docket book search (a manual search through borough docket books that contain records of permits issued between 1986 and the present) could not be conducted because the above information has

not yet been compiled for the area under consideration.

The document search revealed that the block adjacent to the project site has been mainly used as a factory and manufacturing facility. Specific information regarding the products manufactured and the chemicals used at the factory were not available in the Building Department records. The project site records indicated uses that were consistent with the detailed description provided above.

The specific results of the site history are presented in Attachment II.

III. DESIGN OF SAMPLING PROTOCOL

SAMPLING LOCATIONS

Soil and groundwater sampling locations are shown in Figure 2. Soil sampling locations were picked based on the reasons tabulated in Table 2.

United States Geological Survey County wide mapping of groundwater elevations (Figure 3) were utilized to predict the direction of groundwater flow (Reconnaisance of the Ground Water Resources of Kings & Queens Counties, New York, U.S. Geological Survey, Open File Report 81-1186). The direction of flow was shown to be to the south towards the East River. This preliminary grounwater direction was then used to locate three groundwater monitoring wells: one upgradient (W-U) and two downgradient (W-D1 and W-D2). The upgradient well was placed near the center of the northern portion of the site adjacent to Queens Boulevard. The downgradient wells were located near the center of the southern portion of the site and on the southeast corner of the site.

ANALYTICAL PARAMETERS

The soil and groundwater samples were analyzed for the following chemical characteristics:

Soil Samples

All the soil samples were tested for the following:

- Volatile organics on EPA Target Compound List -- Solvents are widely used in the manufacture of chemical products, and the site also had gasoline tanks.

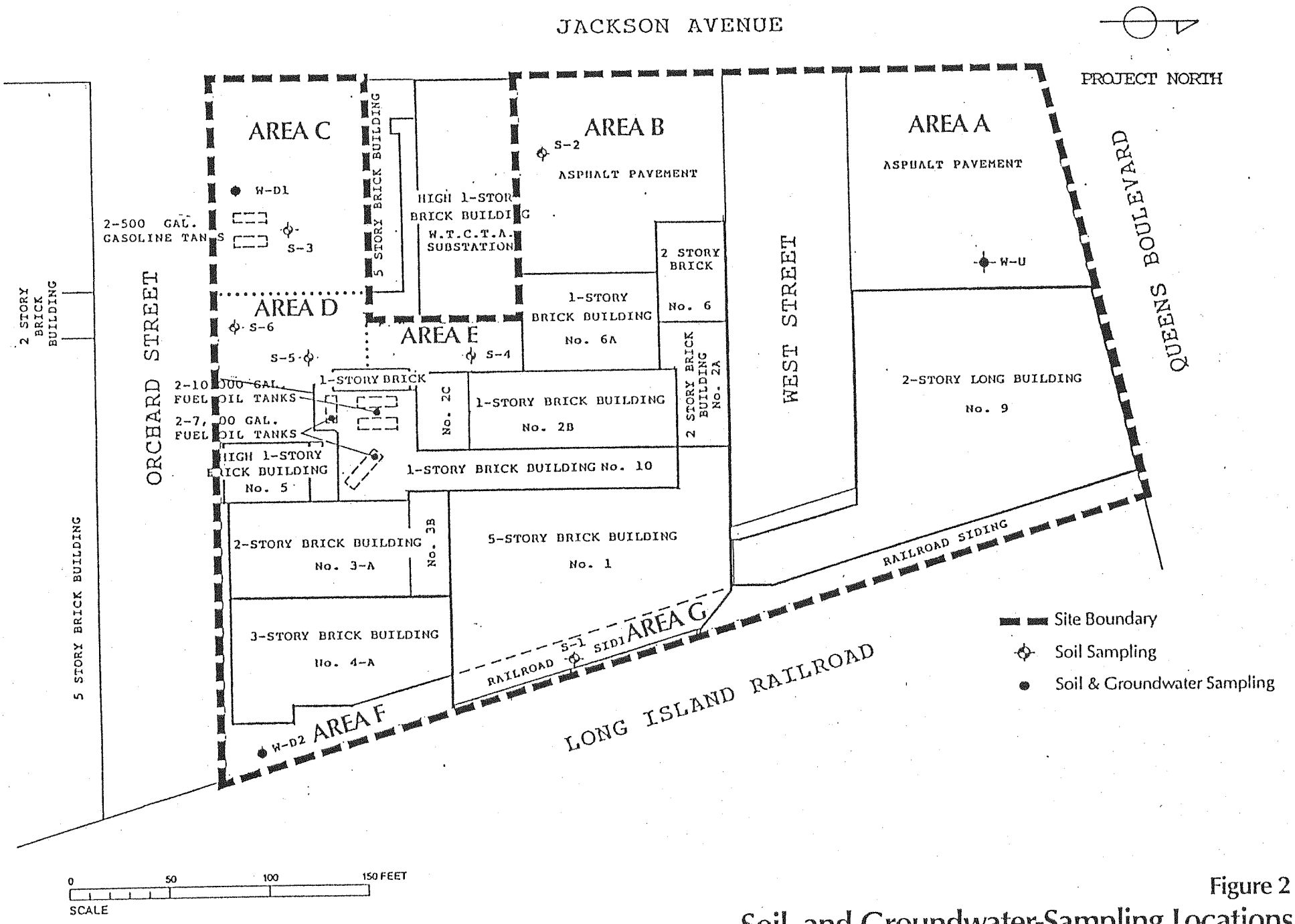
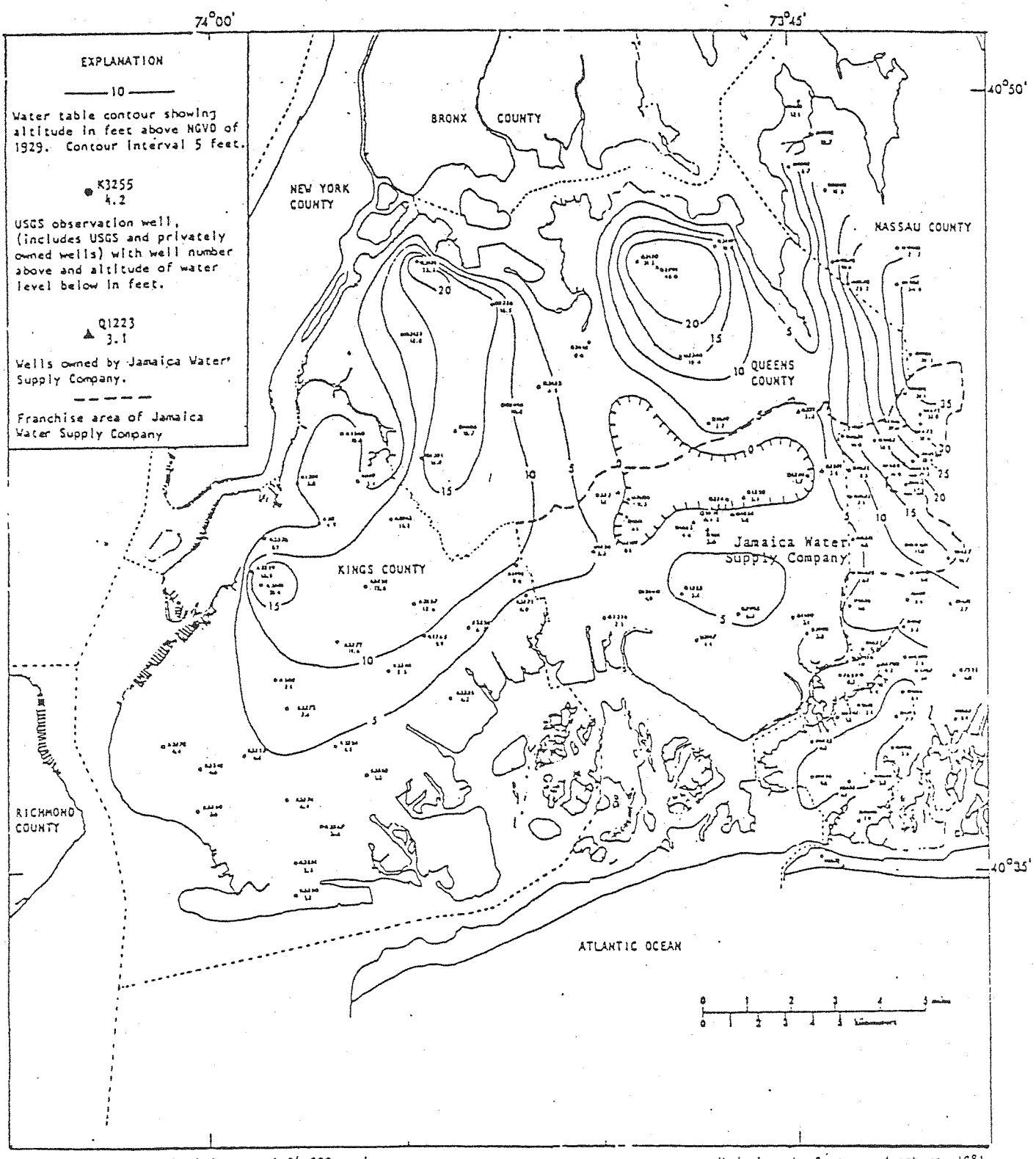


Figure 2

Soil- and Groundwater-Sampling Locations



Base from U.S. Geological Survey, 1:24,000 series: Jamaica, 1957; Brooklyn, Central Park, Mount Vernon, Yonkers, 1956: Coney Island, Flushing, Jersey City, The Narrows, Hackensack, 1955: and Far Rockaway, Weehawken, 1954.

Hydrology by Buxton and others, 1981

Figure 3. Water-table configuration in 1981. Water-level measurements were taken from February to June.

Table 2

Selection of soil sampling locations

Location	Reason
W-U	Building No. 9 was used as a warehouse for the storage of products. Preliminary hydrogeological information indicated a north to south groundwater gradient, therefore, this area was the upgradient area of the site.
S-1	Building No. 1 was used for the storage of products and used for plating operations.
S-2	Adjacent to substation -- potential PCBs in transformers of substation
S-3	Adjacent to former gasoline tanks
S-4	Alleyway was used for the storage of raw materials and products. Close to fuel oil tanks
S-5	Alleyway was used for the storage of raw materials and products. Close to fuel oil tanks
S-6	Adjacent to gasoline tanks Area used for storing creosol
W-D1	Adjacent to gasoline tanks -- upgradient side
W-D2	Downgradient of site, storage of muriatic acid in this area

- Semi-volatile organics on EPA Target Compound List (except for S-2) -- This list encompasses Base/Neutral organic compounds (contains PAHs) and Acid Organic compounds (phenol and its derivatives). The older disinfectant was based on creosols (methlyphenols). Creosols are derived from creosote (a wood or coal tar that also contains PAHs). There were also fuel oil tanks on the site (a potential source of PAHs)

- Priority pollutant metals -- Metal plating operations were conducted on the site.

- EP toxicity test -- Test for which there are RCRA stipulated guidelines for determining if the material is hazardous for purposes of disposal.

The following analyses were conducted at selected locations:

- Pesticides - S-1, S-3, S-4, and W-U -- This test was added after laboratory results of soil samples from S-3 and S-4 showed contamination with some pesticides during their analysis for PCBs.

- PCBs - S-2, S-3, S-4 -- Locations around the substation.

- Cyanide - S-1, W-D2 -- Likely to have been effected by chrome plating operations in adjacent buildings.

- Ignitability - S-3, S-6, W-D1 -- Locations around gasoline tanks. Also has RCRA stipulated guidelines for determining if the material is hazardous for purposes of disposal.

Groundwater Samples

Because groundwater may have been affected by any of the materials in the soils on the site, all of the groundwater sample were tested for the entire EPA Target Compound List: volatile organics, semi-volatile organics, pesticides/ PCBs, 23 metals and cyanide. This would detect any contamination if due to past industrial activities reaching the groundwater, both documented and undocumented, both on-site and off-site.

SAMPLING PROCEDURES

The sampling procedures used were those used in performing sampling for CEQR reviewed projects. The latest protocols approved by the New York City Department of Environmental Protection, Division of Hazardous Materials were followed. The following briefly outlines the procedures utilized for obtaining soil and groundwater samples. A detailed description of the protocols is contained in Attachment III.

Soil Sampling

Soil samples were obtained with a truck-mounted drilling rig, using split-spoon samplers and hollow stemmed augers. Samples were taken from the surface and at the soil-groundwater interface. At the locations around the gasoline tanks, continuous sampling was performed in two-foot increments until the groundwater was reached. The surface sample and one subsurface sample was sent for laboratory analysis. The subsurface sample chosen was the one that had the highest non-methane organic vapor content as measured by an organic vapor analyzer, an OVA 108GC (OVA profiles are tabulated on page 28). Sampling

techniques, containerization of samples, and Organic Vapor Analysis (OVA) procedures are included in Attachment III.

Groundwater Sampling

Wells were installed with a truck-mounted drilling rig, using 6-1/4 inch I.D. hollow-stemmed augers and two-inch I.D. PVC screens and risers.

Well installation procedures, well development methods, and sample containerization are outlined in Attachment III.

Field decontamination

To avoid contamination and cross-contamination of samples, all sampling equipment were cleaned prior to collection of each sample. The split-spoon and hollow-stem auger were first steam-cleaned. The sampling equipment was then further cleaned using the procedure described in Attachment III.

York Laboratories, Monroe, CT, a New York State Department of Environmental Conservation CLP certified laboratory was used for all laboratory analyses.

IV. RESULTS OF LABORATORY ANALYSIS

SOIL SAMPLES

The following discussion and tables provide a summary of the findings at various locations. Detailed results, with concentrations reported for each individual constituent can be found in Attachment IV. Sample concentration values have been tabulated under two different categories: detectables (above the specified minimum detection limit) and non-detectables (below the specified minimum detection limit). The non-detectables when added together may exceed action limits for the class of compound testing even though no one individual chemical was above the minimum accurate detection limit. The reported concentrations for non-detectable compounds are estimates of the concentration only. Compounds that were found in the blanks (field blanks, trip blanks, and method blanks) were not taken into account in arriving at the figures presented in the tables below. New Jersey Department of Environmental Protection ECRA action levels are provided as a guideline for assessing the magnitude of remedial actions that may be required on the site. These limits used in the State of New Jersey to determine if remedical action is necesary at a site have no legal authority in New York State, but are generally used as guidance as to whether a soil is contaminated. Certain action limits, i.e., petroleum hydrocarbons and their component parts, are regulated in New Jersey as hazardous materials but not in New York. In these instances, ECRA action levels may be lower than have been used in cleanup actions in New York State.

A. Volatile organics

Results of volatile organic testing of soils on the site are presented in Table 3. The highest concentrations were found in the surface samples at S-5 and S-6 (48.2 and 41.0 mg/kg respectively), followed by the subsurface sample at S-5 (depth of 5'-7'; 17.7 mg/kg). The compounds detected were tetrachloroethene, 2-butanone, and ethylbenzene at S-5, and xylenes, ethylbenzene and trichloroethene at S-6. Values exceeding the ECRA action level are circled.

B. Semi-volatile organics: Base/Neutral organics

Results of the base/neutral component of the semi-volatile organic testing of soils on the site are presented in Table 4. Significant contamination in thousands of ppm (parts per million) was discovered at locations S-4 and S-5, and all the compounds detected were PAHs (Polycyclic aromatic hydrocarbons). They were mainly napthalene and methylnapthalene, with some amounts of phenanthrene, anthracene, floranthene, and pyrene. Values exceeding the ECRA action level are circled.

C. Semi-volatile organics: Acid organic compounds

The results of the acid extractable component of the semi-volatile organic testing of soils at the site are presented in Table 5. This groups includes phenol and its derivatives. At locations S-4 and S-5 the non-detectables were found in relatively high amounts, of the order of 200 ppm, exceeding the NJ ECRA action limits. These organics were mainly phenol and methylphenol, components of the materials once stored at this location. Values exceeding the ECRA action levels are circled.

Table 3

TOTAL VOLATILE ORGANIC COMPOUNDS

(ECRA Action level 1 mg/kg)

Sample I.D.	Concentration (mg/kg)	
	Detectables	Non-detectables
S-1: 0'-2'	0.007	0.002
S-2: 0'-2'	0.132	0.040
S-2: 15'-17'	0.000	0.000
S-3: 0'-2'	0.000	0.048
S-3: 8'-10'	0.000	0.000
S-4: 0'-2'	4.400	1.230
S-4: 5'-7'	4.700	0.440
S-5: 0'-2'	48.200	0.840
S-5: 5'-7'	17.700	1.200
S-6: 0'-2'	41.000	0.000
S-6: 8'-10'	0.000	0.024
W-U: 0'-2'	0.006	0.012
W-U: 13'-15'	0.057	0.017
W-D1: 0'-2'	0.039	0.000
W-D1: 4'-8'	0.000	0.007
W-D1: 8'-10'	0.000	0.000
W-D2: 0'-2'	2.000	0.520

Table 4

TOTAL BASE/NEUTRAL ORGANIC COMPOUNDS

(ECRA Action level 10 mg/kg)

Sample I.D.	Concentration (mg/kg)	
	Detectables	Non-detectables
S-1: 0'-2'	0.000	0.000
S-2: 0'-2'	Not tested	Not tested
S-2: 15'-17'	Not tested	Not tested
S-3: 0'-2'	0.000	32.100
S-3: 8'-10'	0.000	1.100
S-4: 0'-2'	1,140.000	216.500
S-4: 5'-7'	706.000	23.900
S-5: 0'-2'	3,080.000	113.900
S-5: 5'-7'	4,150.000	309.000
S-6: 0'-2'	0.000	40.600
S-6: 8'-10'	0.000	26.700
W-U: 0'-2'	0.000	59.400
W-U: 13'-15'	0.000	0.670
W-D1: 0'-2'	0.000	100.300
W-D1: 4'-8'	0.000	0.203
W-D1: 8'-10'	0.440	0.046
W-D2: 0'-2'	0.000	0.097

Table 5

TOTAL ACID ORGANICS

(ECRA Action level 10 mg/kg)

Sample I.D.	Concentration (mg/kg)	
	Detectables	Non-detectables
S-1: 0'-2'	0	0
S-2: 0'-2'	NT	NT
S-2: 15'-17'	NT	NT
S-3: 0'-2'	0	0
S-3: 8'-10'	0	0
S-4: 0'-2'	0	237
S-4: 5'-7'	0	0
S-5: 0'-2'	0	37.6
S-5: 5'-7'	0	258
S-6: 0'-2'	0	0
S-6: 8'-10'	0	0
W-U: 0'-2'	0	0
W-U: 13'-15'	0	0
W-D1: 0'-2'	0	0
W-D1: 4'-8'	0	0
W-D1: 8'-10'	0	0
W-D2: 0'-2'	0	0

NT - NOT TESTED

D. Pesticides

As presented in Table 6, pesticides such as 4,4' DDD, 4,4 DDT, and Chlordane were found at S-6 and S-4, with the maximum concentration being 2.8 mg/kg in the surface sample at S-6. No specific action limit for pesticides exists.

E. PCBs

Except for traces of PCBs in the S-2 sample (less than the ECRA action level of 1 mg/kg), all soils tested were free of detectable PCB.

F. Priority pollutant metals

Table 7 presents the results of metals testing of the soils on the site. The samples exhibiting metal concentrations in excess of the ECRA action limits (page 20) have been circled.

G. Total cyanide

All soil sample concentrations were below the ECRA action level.

H. Ignitability

None of the soil samples adjacent to the gasoline tanks exhibited the characteristic of ignitability.

I. EP Toxicity

For all the soil samples, the concentrations of the eight metals, four pesticides, and two herbicides, in the extract were below the RCRA threshold concentrations, above which the soil sample would be considered a hazardous waste for purposes of disposal.

Table 7

PRIORITY POLLUTANT METALS

All Values are mg/Kg

Parameter	S-2:0-2	S-2:L	S-4:0-2	S-4:L	ECRA Action limit
Antimony	<12	<12	<12	<12	NA
Arsenic	2.7	<2.0	<2.0	3.1	20
Beryllium	<1.0	<1.0	<1.0	<1.0	NA
Cadmium	<2	<2	<2	<2	3
Chromium	12	18	14	16	100
Copper	30	27	25	22	170
Lead	58	34	61	119	100
Mercury	<0.1	<0.1	0.4	1.4	1
Nickel	14	14	<8	9	100
Selenium	<1.0	<1.0	<1.0	<1.0	4
Silver	<2	<2	<2	<2	5
Thallium	<2.0	<2.0	<2.0	<2.0	NA
Zinc	65	65	79	152	350

NA = Not available

Table 6

TOTAL PESTICIDES

(ECRA Action level -none specified)

Sample I.D.	Concentration (mg/kg)	
	Detectables	Non-detectables
S-1: 0'-2'	0	0.12
S-2: 0'-2'	NT	NT
S-2: 15'-17'	NT	NT
S-3: 0'-2'	0	0
S-3: 8'-10'	0	0
S-4: 0'-2'	1.06	0
S-4: 5'-7'	1.181	0.016
S-5: 0'-2'	NT	NT
S-5: 5'-7'	NT	NT
S-6: 0'-2'	2.8	0
S-6: 8'-10'	0.87	0
W-U: 0'-2'	0	0
W-U: 13'-15'	0	0
W-D1: 0'-2'	NT	NT
W-D1: 4'-8'	NT	NT
W-D1: 8'-10'	NT	NT
W-D2: 0'-2'	NT	NT

Table 7 (cont'd)

PRIORITY POLLUTANT METALS

All Values are mg/Kg

Parameter	S-5:0-2	S-5:L	S-WD2:0-2	S-WD1:0-2
Antimony	<12	<12	<12	<12
Arsenic	4.4	<2.0	4.3	9.3
Beryllium	<1.0	<1.0	<1.0	<1.0
Cadmium	<2	<2	<2	<2
Chromium	36	14	66	20
Copper	31	13	37	194
Lead	115	3.7	586	390
Mercury	0.5	<0.1	0.3	0.8
Nickel	<8	13	10	14
Selenium	<1.0	<1.0	<1.0	<1.0
Silver	<2	<2	<2	<2
Thallium	<2.0	<2.0	<2.0	<2.0
Zinc	172	32	62	494

Table 7 (cont'd)

PRIORITY POLLUTANT METALS

All Values are mg/Kg

Parameter	S-WD1:4-8	S-WD:8-10	S-3:0-2	S-3:8-10
Antimony	<12	<12	<12	<12
Arsenic	2.0	<2.0	33	<2.0
Beryllium	<1.0	<1.0	<1.0	<1.0
Cadmium	<2	<2	8	<2
Chromium	30	21	22	29
Copper	40	27	1,710	38
Lead	55	15	1,530	11
Mercury	<0.1	<0.1	0.8	<0.1
Nickel	18	15	31	27
Selenium	<1.0	<1.0	1.2	<1.0
Silver	<2	<2	<2	<2
Thallium	<2.0	<2.0	<2.0	<2.0
Zinc	93	60	3,270	53

Table 7 (cont'd)

PRIORITY POLLUTANT METALS

All Values are mg/Kg.

Parameter	S-6:0-2	S-6:8-10	S-WU:L	S-WU:0-2	S-1:0-2
Antimony	<12	<12	<12	<12	<12
Arsenic	3.3	<2.0	<2.0	2.9	71
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<2	<2	<2	<2	5
Chromium	10	13	14	11	24
Copper	153	84	14	61	164
Lead	243	50	2.5	394	851
Mercury	4.9	0.2	<0.1	0.2	0.7
Nickel	9	10	9	10	20
Selenium	<1.0	<1.0	<1.0	<1.0	1.1
Silver	<2	<2	<2	<2	<2
Thallium	<2.0	<2.0	<2.0	<2.0	<2.0
Zinc	458	391	13	244	1,020

Table 7 (cont'd)

PRIORITY POLLUTANT METALS

All Values are ug/L

Parameter	Field Blank 4/18/88	Field Blank 4/19/88	Field Blank 4/20/88
Antimony	<60	<60	<60
Arsenic	<10	<10	<10
Beryllium	<5.0	<5.0	<5.0
Cadmium	<10	<10	<10
Chromium	<10	<10	<10
Copper	<25	<25	<25
Lead	<5.0	<5.0	<5.0
Mercury	<0.2	<0.2	<0.2
Nickel	<40	<40	<40
Selenium	<5.0	<5.0	<5.0
Silver	<10	<10	<10
Thallium	<10	<10	<10
Zinc	<20	<20	<20

Table 7 (cont'd)

PRIORITY POLLUTANT METALS

All Values are ug/L

Parameter	Field Blank 4/21/88	Field Blank 4/22/88	Field Blank 4/25/88
Antimony	<60	<60	<60
Arsenic	<10	<10	<10
Beryllium	<5.0	<5.0	<5.0
Cadmium	<10	<10	<10
Chromium	<10	<10	<10
Copper	<25	<25	<25
Lead	<5.0	<5.0	<5.0
Mercury	<0.2	<0.2	<0.2
Nickel	<40	<40	<40
Selenium	<5.0	<5.0	<5.0
Silver	<10	<10	<10
Thallium	<10	<10	<10
Zinc	<20	<20	<20

GROUNDWATER SAMPLES

The results of the groundwater sampling are presented in Table 8. The results are for both filtered and unfiltered samples. The filtered samples would represent the dissolved fraction of the metals while the unfiltered would include insoluble metal or compounds as well as metals adhering to soil particles in the groundwater samples. Table 6 also presents the New York State Groundwater Standards for Class GA waters and NYS DEC guideline values where no standards exist.

A. Volatile organics

None of the standards were violated.

B. Semi-volatile organics

There were no compounds present above the specified minimum detection limit.

C. Pesticides

No pesticides were detected in any of the samples.

D. PCBs

No PCBs were detected in any of the samples.

E. Metals

The concentrations of the metals has been tabulated and those values exceeding the standards have been circled.

F. Cyanide

Cyanide concentrations were below the minimum detection limit.

Table 8

GROUNDWATER METAL CONCENTRATIONS

(All Concentrations in ug/l)

Parameter	Well Designation W-U Filtered	W-U Unfiltered	W-D1 Filtered	W-D1 Unfiltered	W-D2 Filtered	W-D2 Unfiltered	Groundwater Standard	Guidance Value
Aluminum	239	132,000	<200	146,000	490	105,000	--	--
Antimony	<60	<60	<60	<60	<60	<60	--	3
Arsenic	20.8	34	<10	19	<10	21.7	25	--
Barium	<200	1,330	<200	2,350	<200	798	1,000	--
Beryllium	<5	<5	<5	<5	<5	<5	--	3
Cadmium	<10	<10	<10	<10	<10	<10	10	--
Calcium	61,100	121,000	224,000	339,000	21,200	40,300	--	--
Chromium	<10	366	<10	387	<10	1,060	--	--
Cobalt	<50	167	<50	232	<50	63.8	--	--
Copper	<25	1,040	69	1,210	74	1,320	1,000	--
Iron	166	187,000	320	248,000	2,050	169,000	300	--
Lead	<5	2,220	19	1,500	8.2	2,450	25	--
Magnesium	15,100	55,900	31,800	99,900	6,900	33,100	--	35,000
Manganese	598	6,730	5,150	14,300	954	2,180	300	--
Mercury	<0.2	0.47	<0.2	1.91	<0.2	3.74	2	--
Nickel	48	306	163	514	183	144	--	--
Potassium	9,060	27,900	10,700	32,800	5,110	10,700	--	--
Selenium	<5	<5	<5	<5	<5	<5	20	--
Silver	<10	<10	<10	<10	<10	<10	50	--
Sodium	20,900	24,00	85,600	94,000	29,400	28,000	--	--
Thallium	<10	<10	<10	<10	<10	<10	--	4
Vanadium	<50	506	<50	453	<50	397	--	--
Zinc	24	1,590	75	2,560	142	1,220	5,000	--

Table 9

OVA Profiles

Depth (ft)	Total organic vapors (ppm)	Methane levels (ppm)	Non-methane levels (ppm)
S-WD1			
0 - 2	5	2	3
2 - 4	4	1	3
4 - 8	28	1	27
8 - 10	6	1	5
S - 3			
0 - 4	30	1	29
4 - 6	6	1	5
6 - 8	10	1	9
8 - 10	10	1	9
S - 6			
0 - 4	210	2	208
4 - 6	6	0	6
6 - 8	5	1	4
8 - 10	70	1	69

ATTACHMENT I

BURIED TANK SEARCH

AKRF, Inc.

Environmental and Planning Consultants
117 East 29th Street • New York, NY 10016 • 212/696-0670

TO: Arnold F. Fleming FROM: Allison B. Berkowitz

RE: Queens Plaza Tank Search DATE: July 20, 1988

Attached please find the record search request forms for the above referenced site. A District Office official searched the Fire Department computer for an account at the site, no account files were found. Since no account files were found for the site, it is likely that they have been voided.

RF-71 (1/84) 13-133-1601

FIRE DEPARTMENT • CITY OF NEW YORK
BUREAU OF FIRE PREVENTION
250 Livingston Street
Brooklyn, N.Y. 11201-5884

No. 07460

Date 7-18-8

Rec'd. From Allec King Rosen Fleming

Address 117 E 24 ST 10016

Cash ✓

Check ____ } In the sum of $ 40 for a search request.

Vio. ✓ Fire Records ✓ Other ____

Premises 2824 ORCHARD ST
7233 ORCHARD ST
2818 SACKSON HTS
2820 ORCHARD ST

SIGNED

FIRE DEPARTMENT • THE CITY OF NEW YORK
BUREAU OF FIRE PREVENTION
ROOM 439, 250 LIVINGSTON STREET
BROOKLYN, N.Y. 11201-5884

A-95 (9/84) 13-130-1056

RECORD SEARCH REQUEST

MAIL TO:

ALLEE KING ROSEN FLEMING
117 EAST 29th STREET
NEW YORK, NY 10016

Search No. _____

The undersigned requests the following information re: Premises

2813 Jackson Ave (ADDRESS) Queens (BOROUGH)

☐ 1. Record of existing Fire Department Violations _____ FEE: $10.00

☐ 2. Record of Permit for _____ FEE: $10.00

☒ 3. Other All information regarding the location and leak history of all on site oil and gasoline storage tanks FEE: $10.00

TOTAL FEE: $ 10.00

State applicants interest in or relation to premises:

Agent representing owner

(THE CITY OF NEW YORK IS NOT BEING SUED, NOR IS THERE ANY INTENTION TO SUE THE CITY OF NEW YORK)

Signed Allison B. Berkow

Date JUL 18 1988

DO NOT WRITE BELOW THIS LINE

Gentlemen:

In reply to your request concerning the premises mentioned above, please be advised that as of 9 A.M., _____ our records show the following:

SEARCHED BY: _____
Chief of Fire Prevention

FIRE DEPARTMENT • THE CITY OF NEW YORK A-95 (9/84) 13-130-1058
BUREAU OF FIRE PREVENTION
ROOM 439, 250 LIVINGSTON STREET
BROOKLYN, N.Y. 11201-5884

RECORD SEARCH REQUEST

MAIL TO:

ALLEE KING ROSEN FLEMING
117 EAST 29th STREET
NEW YORK, NY 10016

Search No. _____

The undersigned requests the following information re: Premises

4233 Orchard St (ADDRESS) Queens (BOROUGH)

☐ 1. Record of existing Fire Department Violations _____ FEE: $10.00

☐ 2. Record of Permit for _____ FEE: $10.00

☒ 3. Other All information regarding location and leak history of on site oil and gasoline storage tank. Date of installation and closing FEE: $10.00

TOTAL FEE: $ 10.00

State applicants interest in or relation to premises:

Agent representing owner

(THE CITY OF NEW YORK IS NOT BEING SUED, NOR IS THERE ANY INTENTION TO SUE THE CITY OF NEW YORK)

Signed Allison B Berkowitz

Date [redacted] JUL 18 1988

DO NOT WRITE BELOW THIS LINE

Gentlemen:

In reply to your request concerning the premises mentioned above, please be advised that as of 9 A.M., _____ our records show the following:

SEARCHED BY: _____
Chief of Fire Prevention

FIRE DEPARTMENT • THE CITY OF NEW YORK A-95 (9/84) 13-130-1056
BUREAU OF FIRE PREVENTION
ROOM 439, 250 LIVINGSTON STREET
BROOKLYN, N.Y. 11201-5884

RECORD SEARCH REQUEST

MAIL TO:

ALLEE KING ROSEN FLEMING
117 EAST 29th STREET
NEW YORK, N Y 10016

Search No. _____

The undersigned requests the following information re: Premises

2624 Orchard St (ADDRESS) Queens (BOROUGH)

☐ 1. Record of existing Fire Department Violations _____ FEE: $10.00

☐ 2. Record of Permit for _____ FEE: $10.00

☐ 3. Other All information regarding leak history and location of on site oil tank/gasoline tanks. Date installation and closing FEE: $10.00

TOTAL FEE: $ 10.00

State applicants interest in or relation to premises:

Agent representing owner

(THE CITY OF NEW YORK IS NOT BEING SUED, NOR IS THERE ANY INTENTION TO SUE THE CITY OF NEW YORK)

Signed Allison A. Berkerity

Date [redacted] JUL 18 1988

DO NOT WRITE BELOW THIS LINE

Gentlemen:

In reply to your request concerning the premises mentioned above, please be advised that as of 9 A.M., _____ our records show the following:

SEARCHED BY: _____
Chief of Fire Prevention

FIRE DEPARTMENT • THE CITY OF NEW YORK A-95 (9/84) 13-130-1056
BUREAU OF FIRE PREVENTION
ROOM 439, 250 LIVINGSTON STREET
BROCKLYN, N.Y. 11201-5884

RECORD SEARCH REQUEST

MAIL TO:

ALLEE KING ROSEN FLEMING
117 EAST 29th STREET
NEW YORK, NY 10016

Search No. _____

The undersigned requests the following information re: Premises

2620 Orchard St. (ADDRESS) Queens (BOROUGH)

☐ 1. Record of existing Fire Department Violations _____ FEE: $10.00

☐ 2. Record of Permit for _____ FEE: $10.00

☒ 3. Other All information regarding last history and location of oil and gasoline storage tanks on the site. Date of installation and closing _____ FEE: $10.00

TOTAL FEE: $ 10.00

State applicants interest in or relation to premises: Agent representing owner

(THE CITY OF NEW YORK IS NOT BEING SUED, NOR IS THERE ANY INTENTION TO SUE THE CITY OF NEW YORK)

Signed Allison B. Berkowitz

Date JUL 18 1988

DO NOT WRITE BELOW THIS LINE

Gentlemen:

In reply to your request concerning the premises mentioned above, please be advised that as of 9 A.M., _____ our records show the following:

SEARCHED BY: _____
Chief of Fire Prevention

ATTACHMENT II

LAND USE HISTORY

Allee
King
Rosen &
Fleming, Inc.

Environmental and Planning Consultants
117 East 29th Street • New York, NY 10016 • 212/696-0670

M E M O R A N D U M

TO: Phil C. Sears

FROM: Allison B. Berkowitz

RE: Hartz Mountain

DATE: April 29, 1988

This memo documents the land use history for the above-referenced site based on information obtained from the New York City Department of Buildings: Queens.

The search was conducted as follows:

A. Index search -- a computer search by block and lot which resulted in a listing of all recorded permits and applications;

B. Old record search -- a manual search through borough records between 1898 and 1960 arranged by block and lot;

C. Record room search -- a manual research of borough records between 1961 and 1986 arranged by block and lot; and

D. Docket book search -- a manual search through borough docket books that contain records of permits issued between 1986 and the present.

Please note that the information is listed chronologically according to street address and summarized for each address.

File memo:

two 1,500-gallon tanks of alcohol located at the corner of Jackson Avenue and Orchard Street

below-ground tanks at 42-16 West Street

44-16 West Street -- four 100-gallon fuel oil tanks and one 7,500-gallon tank

Block: 264
Lot: 20
Address: 42-14 West Street
Dem 2351/42
Occupied Use: Factory

Block: 264
Lot: 20
Address: 42-14 West Street
Alt 192/42
Occupied Use: Storage and factory

Block: 264
Lot: 20
Address: 42-14 West Street
Alt 5798/42
Occupied Use: Factory

Block: 264
Lot: 20
Address: 42-14 West Street
Alt 1331/43
Occupied Use: Factory

Summary: Factory and storage facility

* Key: BN: Building Notice
Dem: Demolition Permit
Elev: Elevator Installation Permit
Misc: Miscellaneous Permit
PB: Plumbing Permit
Alt: Alteration Permit
NB: New Building Permit
C of O: Certificate of Occupancy
C of A: Certificate of Approval

Block: 264
Lot: 1
Address: 42-16 West Street
BN 1445/42
Occupied Use: Office, manufacturing, and storage

Block: 264
Lot: 1
Address: 42-16 West Street
Alt 2389/56
Occupied Use: Research lab and warehouse for West Disinfecting
Permit: For the installation of a mixing compartment for inflammable products (first floor) and muriatic acid storage tank

Summary: Owned by West Disinfecting used for research, manufacturing, storage, and office space

Block: 264
Lot: 1
Address: 42-17 West Street
Alt 502/44
Occupied Use: Maintenance shop
Permit: To install aqueous soap tanks

Summary: Maintenance shop

Block: 264
Lot: 1
Address: 42-18 West Street
Alt 501/44
Occupied Use: Factory (two stories) and storage

Summary: Factory and storage facility

Block: 265
Lot: 6
Address: 31 Queens Boulevard (corner of Jackson Avenue)
NB 1851/15
Occupied Use: Carpentry Shop

Summary: Carpentry shop

Block: 265
Lot: 1
Address: 41 Queens Boulevard
Alt 1148/14
Occupied Use: Residential dwelling

Summary: Residential dwelling

Block: 265
Lot: 6 and 11
Address: 43-15 Queens Boulevard
PB 5835/39
Occupied Use: Factory

Block: 265
Lot: 6
Address: 43-15 Queens Boulevard
Alt 37/43
Occupied Use: Shoe Factory

Block: 265
Lot: 13
Address: 43-15 Queens Boulevard
Alt 4406/58
Occupied Use: Factory

Block: 265
Lot: 13
Address: 43-15 Queens Boulevard
BN 241/61
Occupied Use: Factory and office

Block: 265
Lot: 6 and 11
Address: 43-15 Queens Boulevard
C of O 912/64
Occupied Use: Factory

Summary: Shoe factory and office facility

Block: 265
Lot: 6 and 11
Address: 43-17 Queens Boulevard
NB 1119/18
Occupied Use: Factory

Block: 265
Lot: 6 and 11
Address: 43-17 Queens Boulevard
Alt 5906/43
Occupied Use: Factory

Block: 265
Lot: 6 and 11
Address: 43-17 Queens Boulevard
Misc 1679/43
Occupied Use: Factory

Summary: Factory

Block: 265
Lot: 1
Address: 42-24 Queens Boulevard
Alt 2290/56
Occupied Use: Factory

Block: 265
Lot: 11
Address: 42-24 Queens Boulevard
Misc permit for installation of one 10,000-gallon #6 fuel oil tank

Summary: Factory

Block: 263
Lot: 1
Address: 43-27 Queens Boulevard
BN 1074/51
Occupied Use: Manufacturing

Summary: Manufacturing facility

Block: 265
Lot: 1
Address: 43-43 Queens Boulevard
Alt 922/51
Occupied Use: Commercial warehouse with offices

Summary: Commercial warehouse with office space

Block: 191
Lot: 1, 2, 3, 4, and 10
Address: Corner of Queens Boulevard and Jackson Avenue
NB 1569/17
Occupied Use: Light manufacturing

Block: 191
Lot: 1, 2, 3, 4, and 10
Address: Corner of Queens Boulevard and Jackson Avenue
Alt 666/25
Occupied Use: Light manufacturing

Block: 191
Lot: 1, 2, 3, 4, and 10
Address: Corner of Queens Boulevard and Jackson Avenue
Alt 8809/43
Occupied Use: Factory

Summary: Manufacturing facility

Block: 265
Lot: 13
Address: Southeast corner of Queens Boulevard and Jackson Avenue
Alt 246/27
Occupied Use: Light manufacturing

Summary: Manufacturing facility

Block: 265
Lot: 1
Address: East side of Queens Boulevard south of Jackson Avenue
Alt 2667/27
Occupied Use: Factory

Summary: Factory

Block: 265
Lot: 1
Address: North side of Queens Boulevard (east of Jackson Avenue)
Alt 1917/13
Occupied Use: Stable

Block: 265
Lot: 13
Address: Northeast corner of Queens Boulevard and Jackson Avenue
Alt 1569/17
Occupied Use: Factory

Block: 265
Lot: 13
Address: Northeast corner of Queens Boulevard and Jackson Avenue
Alt 1146/17
Occupied Use: Factory

Block: 265
Lot: 1
Address: North side of Queens Boulevard (east of Jackson Avenue)
Alt 1081/29
Occupied Use: Factory

Summary: Prior to 1917 the lot was used as a horse stable, and from 1917 on the site was used as a factory

Block: 264
Lot: 1
Address: Orchard Street
Alt 2085/40
Occupied Use: Residential

Summary: Residential dwelling

Block: 265
Lot: 1
Address: 24-62 Orchard Street
BN 34/52
Occupied Use: Office

Summary: Office facility

Block: 265
Lot: 23
Address: 42-22 Orchard Street
Alt 987/55
Occupied Use: Testing facility

Block: 265
Lot: 23
Address: 42-22 Orchard Street
C of B 1467/62
Occupied Use: Testing laboratory with offices and draft room

Block: 265
Lot: 23
Address: 42-22 Orchard Street
BN 287/26
Occupied Use: Factory

Summary: Prior to 1967 the facility was used for testing purposes; from 1967 to present the site has been used as a factory

Block: 264
Lot: 1
Address: 42-23 Orchard
BN 65/48
Occupied Use: West Disinfecting Factory

Block: 264
Lot: 1
Address: 42-23, 42-25 Orchard Street
Alt 1001/47
Occupied Use: Factory, cellar, and office

Summary: Factory and office facility owned by the West Disinfecting Co.

Block: 264 Lot: 11
Address: 42-24 Orchard Street
NB 3778/25
Occupied Use: Boiler House

Block: 265 Lot: 1
Address: 42-24 Orchard Street
PB 725/45
Occupied Use: TDM Clothing Corp.

Block: 265 Lot: 1
Address: 42-24 Orchard Street
Misc. 3014/46
Occupied Use: Factory and use

Block: 264 Lot: 1
Address: 42-24 Orchard Street
PB 696/48
Occupied Use: Textile factory

Block: 265 Lot: 23
Address: 42-24 Orchard Street
BN 890/56
Occupied Use: Factory

Block: 265 Lot: 1
Address: 42-24 Orchard Street
Misc 886/56
Permit: To install 10,000-gallon fuel oil tank

Block: 265 Lot: 1
Address: 42-24 Orchard Street
Misc 1194/56
Occupied Use: Factory

Block: 265 Lot: 1
Address: 42-24 and 42-34 Orchard Street
Elev 65/57
Occupied Use: Five-story building

Block: 265 Lot: 1
Address: 42-24 Orchard Street
Alt BN 1097/60
Occupied Use: Factory with spray booths

Block: 265 Lot: 1
Address: 42-24 Orchard Street
Alt BN 1924/65
Occupied Use: Factory with spray booths, ovens, and vents

Summary: Textile factory

Block: 264
Lot: 1
Address: 42-27, 29, 31 Orchard Street
Alt 738/46
Occupied Use: Office facility for West Disinfecting Co.

Summary: Office facility for West Disinfecting Co.

Block: 264
Lot: 11
Address: 42-33 Orchard Street
BN 107/50
Occupied Use: Five-story factory owned by West Disinfecting Co.

Summary: Factory owned by West Disinfecting Co.

Block: 265
Lot: 1
Address: 42-34 Orchard Street
BN 1074/51
Occupied Use: Manufacturing

Summary: Manufacturing facility

Block: 264
Lot: 11
Address: 42-35 Orchard Street
Alt 879/49
Occupied Use: Maintenance and storage area for West Disinfecting Co.

Block: 264
Lot: 11
Address: 42-35 Orchard Street
Alt Misc. 793/49
Permit amendment to install acid tanks inside building

Summary: Maintenance and storage area

Block: 265
Lot: 1
Address: Southwest corner of Orchard Street
Alt 991/27
Occupied Use: Shoe factory

Summary: Shoe factory

Block: 264
Lot: 1
Address: South side Orchard Street and Jackson Avenue
Alt 891/08
Occupied Use: Factory

Summary: Factory

Block: 264
Lot: 11
Address: 42-16 Barn Street
PB 9028/40
Occupied Use: Factory owned and operated by West Disinfecting Co.

Summary: Factory

Block: 264
Lot: 1
Address: West side Barn Street and Jackson Avenue
NB 2171/09
Occupied Use: Factory

Summary: Factory

Block: 264
Lot: 14
Address: 28-18 Jackson Avenue
Alt 641/53
Occupied Use: Store and residential dwelling

Block: 264
Lot: 14
Address: 28-18 Jackson Avenue
Alt 2685/54
Occupied Use: Store and residential dwelling

Block: 264
Lot: 14
Address: 28-18 Jackson Avenue
Alt 387/64
Occupied Use: Doctor's office, store and residential dwelling

Block: 264
Lot: 14
Address: 28-18 Jackson Avenue
Alt 2436/67
Occupied Use: Store, office, and residential development

Summary: Residential dwelling with retail and office usage

Block: 265
Lot: 13
Address: 27-34 Jackson Avenue
Dem 4795/42
Occupied Use: Residential with first floor retail

Summary: Residential dwelling with first floor retail

Block: 265
Lot: 13
Address: 27-48 Jackson Avenue
Misc 58/34
Occupied Use: Factory

Block: 265
Lot: 13
Address: 27-48 Jackson Avenue
Alt 522/50
Occupied Use: Factory

Summary: Factory

Block: 265
Lot: 13
Address: 27-50 Jackson Avenue
NB 69/15
Occupied Use: Garage

Block: 265
Lot: 13 and 22
Address: 27-50 Jackson Avenue
Alt 477/54
Occupied Use: Office and parking lot

Summary: Office building with parking garage

Block: 265
Lot: 13
Address: 27-54 Jackson Avenue
Alt 8809/38
Occupied Use: Factory

Summary: Factory

Block: 264
Lot: 17
Address: 28-28 Jackson Avenue
Alt 1416/35
Occupied Use: Retail stores

Block: 264
Lot: 17
Address: 28-26 and 28-28 Jackson Avenue
DEM 119/55
Occupied Use: Residential dwelling

Summary: Residential dwelling with first floor retail until 1955 when it was demolished

Block: 264
Lot: 19
Address: 28-30 Jackson Avenue
Alt 644/33
Occupied Use: Store

Summary: Retail

Block: 191
Lot: 1, 2, 3, 4, and 10
Address: 344 Jackson Avenue
Alt 386/10
Occupied Use: Business with one-family residential dwelling

Summary: Residential dwelling with first floor retail

Block: 264
Lot: 11
Address: 348 Jackson Avenue
Alt 2237/14
Occupied Use: Store with residential dwelling

Summary: Residential dwelling with first floor retail

Block: 264
Lot: 11
Address: 352 Jackson Avenue
Alt 1293/14
Occupied Use: Machine shop

Summary: Machine shop

Block: 264
Lot: 14
Address: 360 Jackson Avenue
Alt 203/27
Occupied Use: Paint Store

Summary: Paint Store

Block: 264
Lot: 17
Address: 368 Jackson Avenue
Alt 1815/24
Occupied Use: Delicatessen (SIG-NABEH)

Block: 264
Lot: 17
Address: 368 Jackson Avenue
Alt 1187/24
Occupied Use: Store with residential dwelling

Summary: Residential dwelling with a deli on the first floor

Block: 264
Lot: 17
Address: 370 Jackson Avenue
Alt 1623/13
Occupied Use: Retail stores and six-family residential dwelling

Summary: Residential dwelling with first floor retail

Block: 264
Lot: 19
Address: 372 Jackson Avenue
Alt 594/99
Occupied Use: Store with residential dwelling

Summary: Residential dwelling with first floor retail

Block: 264
Lot: 20
Address: 374 Jackson Avenue
Alt 2211/16
Occupied Use: Store and residential dwelling

Block: 264
Lot: 20
Address: 374 Jackson Avenue
Alt 2600/23
Occupied Use: Store

Summary: Residential dwelling with first floor retail

Block: 264
Lot: 20
Address: 386 Jackson Avenue
Alt 6543/26
Occupied Use: Business and residential dwelling

Summary: Residential dwelling with first floor retail

ATTACHMENT III

SAMPLING PROTOCOL

SAMPLING PROCEDURES

Soil sampling

A total of 17 soil samples were obtained from the 9 locations shown in Figure 2. At four of these locations (W-U, S-2, S-4, and S-5) two samples were obtained from each boring: a surface sample and a subsurface sample. The surface sample consisted of a composite of the top two feet of soil, while the subsurface sample was obtained from the soil-groundwater interface. At W-D2 the groundwater table was just four feet below grade. The surface sample did not yield sufficient soil and the remaining required sample amount was obtained from a 2'-4' layer. Hence, only one sample was obtained at this location. At S-1 which was inaccesible to a drilling rig, a surface sample was obtained with a soil recovery auger. At the three locations around the gasoline tanks, (W-D1, S-3, and S-6) continuous soil sampling was performed at two feet intervals to the groundwater table. Two samples were selected for laboratory analysis from each boring: a surface sample and a subsurface sample with the highest non-methane organic vapor content, as measured by an organic vapor analyzer, an OVA 108GC. At S-3 and S-6 the latter sample coincided with the sample taken from the groundwater interface. At W-D1 an additional sample from the soil-groundwater interface was included for laboratory analysis.

At each sampling location, soil samples were obtained by a steel, 24-inch, split-spoon sampler which was driven through the subsurface levels ahead of a hollow-stem (6-1/4 inch) auger which bore into the soil to the desired sampling depth. At each sampling level, a composite of the split-spoon sample was placed in the proper sample container: glass jars with teflon lined caps for samples receiving tests for semivolatile organics, pesticides/PCBs, priority pollutant metals, cyanide, ignitability, and EP toxicity; and 40 ml glass vials with teflon lined septum caps for the volatile organics test samples. A minimum amount of head space was provided in the vials to prevent volatilization of chemicals by packing soil firmly to entirely fill the vials.

A composite was obtained by placing the core sample into a stainless steel mixing bowl, breaking it apart and mixing it with a stainless steel scoop, dividing it into quarters, and placing a sample of each quarter into the proper container with a stainless steel trowel. To reduce volatilization, the samples to be tested for volatile organics was not composited in this manner, but instead comprised roughly equal portions of the middle and two end sections of the two-foot core, placed directly into the vial by a small stainless steel trowel.

To obtain samples from the three locations around the gasoline tanks, "continuous soil sampling" was performed at each sampling location. The split-spoon sampler was driven through the top two feet of soil to obtain the surface sample, which was composited (except the samples for volatile organics and OVA analysis), containerized, and stored in the manner described above. The auger then bore down to a depth of two feet, a split-spoon sampler was inserted in the hollow stem and driven to a depth of four feet to obtain the first intermediate sample. Next, the auger bore down to four feet and the split-spoon sampler was driven to six feet, to obtain the second intermediate sample. This procedure was repeated until the groundwater table was reached. Each of the above samples was composited (except the samples for volatile organics and OVA analysis), containerized, and stored as described above.

Each container was then properly labeled, sealed, and placed in a refrigeration unit at a temperature of approximately 4°C for transport to the laboratory. A record of each sample, including notation of any odors, color, or sample matrix, was kept in the sampler's field log book. A chain of custody was maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis.

OVA analysis

Organic Vapor Analysis (OVA) was performed on the soil samples from S-3, S-6, and W-D1, using a Century Model 108-GC Organic Vapor Analyzer. The soil

sample volume was collected in a fashion similar to that used for obtaining sample volumes for volatile organics analysis. It was divided in half, and each portion placed in a 500 gm jar, sealed with an air-tight membrane, and shaken in order to allow any trapped vapor within the pore space to occupy the head space in the jar. After at least 4 hours, a clean probe of the readout assembly was inserted through the membrane of one of the jars and the headspace organic vapor reading was noted. A granular activated charcoal filter adapter was then attached to the probe, and a reading obtained for the other jar. The difference between the two readings was recorded as the non-methane organic vapor content of that particular sample. The results of the organic vapor analysis were tabulated to form an organic vapor level profile for each boring.

GROUNDWATER SAMPLING

The monitoring wells were drilled using a 6-1/4 inch hollow-stemmed auger and consisted of two-inch I.D. PVC screens and risers. The PVC screen extended five feet below the groundwater table at all wells. The length of the screens above the groundwater table varied depending on the depth to the water table (W-U:5', W-D1:3', W-D2:6") since, sufficient depth had to be allowed for placing the sand pack, bentonite pellets, cement-bentonite mixture, and the concrete apron, as described below. A filter pack of sand was placed in the annular space around the screens and extended one-two feet above the screen. Next, the annular area around the well casing was sealed with bentonite pellets for an interval of two feet (This step had to be skipped at W-D2). A grout, consisting of a cement and bentonite mixture then extended from the bentonite pellet seal to a level two feet below ground. The remaining annular space was sealed with a concrete cap and well apron (expanding cement). A locking well cap was installed upon completion of the well.

Wells were developed using dedicated 1-5/8 inch O.D. PVC bailers, five

feet in length. Prior to sampling, water levels were measured. Samples were not taken until pH, temperature and conductivity measurements had stabilized, and not before at least three well volumes were purged. The sample were taken after recovery was complete. Well evacuation and sample collection was accomplished using the bailers described above.

The groundwater samples for metals testing were placed in one-liter plastic containers. The samples for volatile organics testing were placed in 40 mL septum vials filled to the top to prevent gas bubbles from forming. Samples for semi-volatile organics, and pesticides/PCBs analysis were placed in glass jars with teflon-lined caps. Each sample was labeled, sealed, and refrigerated at approximately 4°C for shipment to the laboratory.

FIELD DECONTAMINATION

To avoid contamination and cross-contamination of samples, all sampling equipment were cleaned prior to collection of each sample. The split-spoon and hollow-stem auger were first steam-cleaned. The following procedure* was then followed for further decontamination of sampling equipment:

Step 1: The equipment was washed and scrubbed with distilled water using a pressurized, stainless steel fruit tree sprayer.

Step 2: It was then checked for adhered soils or gross contamination with a clean laboratory tissue.

Step 3: If soil particles were present, the equipment was rinsed with the waste solvents from below. The contaminated solvent was discarded by pouring into a waste container. Waste containers met DOT regulations and were properly labelled. Waste solvents will be properly disposed off in accordance with all applicable regulations.

Step 4: The equipment was rechecked for adhered soils. If soils were present Step 3 was repeated.

Step 5: The equipment was then air dried.

Step 6: It was double rinsed with de-ionized, distilled water.

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*Source:"Preparation of Soil Sampling Protocol: Techniques and Strategies," U.S. Environmental Protection Agency. May 1983.

Step 7: It was then rinsed with spectrographic grade acetone, with the used solvent being saved for use in Step 3, above.

Step 8: Next, it was rinsed twice in spectrographic grade hexane, with the used solvent being saved for use in Step 3, above.

Step 9: It was given a final double rinse with deionized, distilled water.

Step 10: The equipment was then air dried.

Step 11: It was packaged in aluminum foil.

QA/QC PROGRAM

The lab operated a Quality Assurance/Quality Control (QA/QC) program that consisted of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State.

A trip blank and field blank was included in each batch of samples. Trip blanks were tested for volatile organics and field blanks were tested for all parameters that the samples collected on that day were going to be tested for, to check for contamination during transportation or due to sampling equipment, respectively.

Sample containerization, preservation and holding times are presented in Table 1 for soil samples and aqueous samples.

The analytical methods followed and their detection limits are listed in Table 2.

Table 1

SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

SOIL SAMPLES

Parameter	Container	Preservation	Maximum Holding Time
Volatile Organics	40 mL glass vials, teflon-lined septum caps	Cool, 4°C	10 days for extraction*
Semivolatile Organics	Amber glass, teflon-lined cap	Cool, 4°C	10 days*
Pesticides/PCBs	Amber glass, teflon-lined cap	Cool, 4°C	10 days*
Priority pollutant metals	Amber glass, teflon-lined cap	Cool, 4°C	6 months 26 days-mercury
Cyanide	Amber glass, teflon-lined cap	Cool, 4°C	14 days
EP Toxicity	Amber glass, teflon-lined cap	Cool, 4°C	6 months
Ignitability	Amber glass, teflon-lined cap	Cool, 4°C	N/A

AQUEOUS SAMPLES

Parameter	Container	Preservation	Maximum Holding Time
Volatile Organics	40 mL glass vials, Teflon-lined septum caps	Cool, 4°C	7 days*
Semi-volatile organics	Amber glass, teflon-lined cap	Cool, 4°C,	5 days to extraction*
Pesticides/ PCBs	Amber glass, teflon-lined cap	Cool, 4°C	5 days*
Metals	One liter, plastic	HNO_3 to pH < 2	6 months (Mercury -- 26 days)
Cyanide	One liter, plastic	NaOH to pH> 12 Cool, 4°C	14 days

* 40 day holding time on extract

ATTACHMENT IV

DETAILED LABORATORY RESULTS

ANALYSES OF SOIL SAMPLES

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification		
Dilution Factor	1.0	1.0	
Method Blank I.D.	>B1292	>B1292	
Compound	Method Blank	Field Blank 4/19/88	Lower Limits of Detection with no Dilution
chloromethane	U	U	10
bromomethane	U	U	10
vinyl chloride	U	U	10
chloroethane	U	U	10
methylene chloride	U	U	5
acetone	6J	5JB	10
carbon disulfide	U	U	5
1,1-dichloroethene	U	U	5
1,1-dichloroethane	U	U	5
1,2-dichloroethene (total)	U	U	5
chloroform	U	U	5
1,2-dichloroethane	U	U	5
2-butanone	U	U	10
1,1,1-trichloroethane	U	U	5
carbon tetrachloride	U	U	5
vinyl acetate	U	U	10
bromodichloromethane	U	U	5
1,2-dichloropropane	U	U	5
cis-1,3-dichloropropene	U	U	5
trichloroethene	U	U	5
dibromochloromethane	U	U	5
1,1,2-trichloroethane	U	U	5
benzene	U	U	5
trans-1,3-dichloropropene	U	U	5
bromoform	U	U	5
4-methyl-2-pentanone	U	U	10
2-hexanone	U	U	10
tetrachloroethene	U	U	5
1,1,2,2-tetrachloroethane	U	U	5
toluene	U	U	5
chlorobenzene	U	U	5
ethylbenzene	U	U	5
styrene	U	U	5
xylene (total)	U	U	5

U, J, B - See Appendix for definition.

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification					
Dilution Factor	1.0	1.0	1.0	1.0	20	
Method Blank I.D.	>B1307 Method Blank	>B1307 Trip Blank 4/19/88	>B1307 Field Blank 4/20/88	>B1307 Trip Blank 4/18/88	>B1307 Field Blank 4/18/88	Lower Limits of Detection with no Dilution
Compound						
chloromethane	U	U	U	U	U	10
bromomethane	U	U	U	U	U	10
vinyl chloride	U	U	U	U	U	10
chloroethane	U	U	U	U	U	10
methylene chloride	4J	2JB	U	3JB	U	5
acetone	10	4JB	4JB	U	4,300B	10
carbon disulfide	U	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	U	5
1,2-dichloroethene (total)	U	U	U	U	U	5
chloroform	U	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	U	5
2-butanone	U	U	U	U	U	10
1,1,1-trichloroethane	U	U	U	U	U	5
carbon tetrachloride	U	U	U	U	U	5
vinyl acetate	U	U	U	U	U	10
bromodichloromethane	U	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	U	5
trichloroethene	U	U	U	U	U	5
dibromochloromethane	U	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	U	5
benzene	U	U	U	U	U	5
trans-1,3-dichloropropene	U	U	U	U	U	5
bromoform	U	U	U	U	U	5
4-methyl-2-pentanone	U	U	U	U	U	10
2-hexanone	U	U	U	U	U	10
tetrachloroethene	U	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	U	5
toluene	1J	1JB	2JB	U	U	5
chlorobenzene	U	U	3J	U	U	5
ethylbenzene	U	U	U	U	U	5
styrene	U	U	U	U	U	5
xylene (total)	1J	U	U	U	U	5

U, J, B - See Appendix for definition.

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification			
Dilution Factor	1.0	5.35	1.12	
Method Blank I.D.	>B1378	>B1378	>B1378	
Compound	Method Blank	S-2: 0-2	S-2:L	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	10
bromomethane	U	U	U	10
vinyl chloride	U	U	U	10
chloroethane	U	U	U	10
methylene chloride	3J	23JB	4JB	5
acetone	11	1,200B	46B	10
carbon disulfide	U	U	U	5
1,1-dichloroethene	U	U	U	5
1,1-dichloroethane	U	U	U	5
1,2-dichloroethene (total)	U	U	U	5
chloroform	U	U	U	5
1,2-dichloroethane	U	U	U	5
2-butanone	6J	89B	U	10
1,1,1-trichloroethane	U	U	U	5
carbon tetrachloride	U	U	U	5
vinyl acetate	U	U	U	10
bromodichloromethane	U	U	U	5
1,2-dichloropropane	U	U	U	5
cis-1,3-dichloropropene	U	U	U	5
trichloroethene	U	20J	U	5
dibromochloromethane	U	U	U	5
1,1,2-trichloroethane	U	20J	U	5
benzene	U	U	U	5
trans-1,3-dichloropropene	U	U	U	5
bromoform	U	U	U	5
4-methyl-2-pentanone	U	45	U	10
2-hexanone	U	53	U	10
tetrachloroethene	U	U	U	5
1,1,2,2-tetrachloroethane	U	34	U	5
toluene	2J	11JB	2JB	5
chlorobenzene	U	U	U	5
ethylbenzene	U	U	U	5
styrene	U	U	U	5
xylene (total)	3J	11JB	U	5

U, J, B - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.20	1.17	MEDIUM LEVEL
Method Blank I.D.	>B1423	>B1423	>B1423	
Compound	Method Blank	S-4: 0-2	S-4:L	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	1,200
bromomethane	U	U	U	1,200
vinyl chloride	U	U	U	1,200
chloroethane	U	U	U	1,200
methylene chloride	U	920	570J	620
acetone	U	1,800	1,600	1,200
carbon disulfide	U	U	U	620
1,1-dichloroethene	U	U	U	620
1,1-dichloroethane	U	U	U	620
1,2-dichloroethene (total)	U	U	U	620
chloroform	U	U	U	620
1,2-dichloroethane	U	730J	220J	620
2-butanone	U	2,400	2,500	1,200
1,1,1-trichloroethane	300J	U	U	620
carbon tetrachloride	U	U	U	620
vinyl acetate	U	U	U	1,200
bromodichloromethane	U	U	U	620
1,1,2,2-tetrachloroethane	U	U	U	620
1,2-dichloropropane	U	U	U	620
cis-1,3-dichloropropene	U	U	U	620
trichloroethene	U	500J	220J	620
dibromochloromethane	U	U	U	620
1,1,2-trichloroethane	U	U	U	620
benzene	U	U	U	620
trans-1,3-dichloropropene	U	U	U	620
bromoform	U	U	U	620
4-methyl-2-pentanone	U	U	U	1,200
2-hexanone	U	U	U	1,200
tetrachloroethene	U	U	U	620
toluene	330J	2,100B	1,900B	620
chlorobenzene	U	U	U	620
ethylbenzene	U	2,000	2,200	620
styrene	150J	1,100B	1,300B	620
xylene (total)	340J	11,000B	9,900B	620

U, J, B - See Appendix for definition.

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification			
Dilution Factor	1.00	11.2	2.32	MEDIUM LEVEL
Method Blank I.D.	>B1423	>B1423	>B1423	
Compound	Method Blank	S-5: 0-2	S-5:L	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	1,200
bromomethane	U	U	U	1,200
vinyl chloride	U	U	U	1,200
chloroethane	U	U	U	1,200
methylene chloride	U	4,200J	890J	620
acetone	U	U	U	1,200
carbon disulfide	U	U	U	620
1,1-dichloroethene	U	U	U	620
1,1-dichloroethane	U	U	U	620
1,2-dichloroethene (total)	U	U	U	620
chloroform	U	U	U	620
1,2-dichloroethane	U	U	U	620
2-butanone	U	13,000	4,200	1,200
1,1,1-trichloroethane	300J	U	U	620
carbon tetrachloride	U	U	U	620
vinyl acetate	U	U	U	1,200
bromodichloromethane	U	U	U	620
1,1,2,2-tetrachloroethane	U	U	U	620
1,2-dichloropropane	U	U	U	620
cis-1,3-dichloropropene	U	U	U	620
trichloroethene	U	U	U	620
dibromochloromethane	U	U	U	620
1,1,2-trichloroethane	U	U	U	620
benzene	U	840J	1,200J	620
trans-1,3-dichloropropene	U	U	U	620
bromoform	U	U	U	620
4-methyl-2-pentanone	U	U	U	1,200
2-hexanone	U	U	U	1,200
tetrachloroethene	U	27,000	1,500	620
toluene	330J	7,300B	18,000B	620
chlorobenzene	U	U	U	620
ethylbenzene	U	8,200	12,000	620
styrene	150J	4,300JB	13,000B	620
xylene (total)	340J	50,000B	62,000B	620

U, J, B - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.25	MEDIUM LEVEL
Method Blank I.D.	>B1423	>B1423	
Compound	Method Blank	S-WD2: 0-2	Lower Limits of Detection with no Dilution
chloromethane	U	U	1,200
bromomethane	U	U	1,200
vinyl chloride	U	U	1,200
chloroethane	U	U	1,200
methylene chloride	U	520J	620
acetone	U	U	1,200
carbon disulfide	U	U	620
1,1-dichloroethene	U	U	620
1,1-dichloroethane	U	U	620
1,2-dichloroethene (total)	U	U	620
chloroform	U	U	620
1,2-dichloroethane	U	U	620
2-butanone	U	2,000	1,200
1,1,1-trichloroethane	300J	U	620
carbon tetrachloride	U	U	620
vinyl acetate	U	U	1,200
bromodichloromethane	U	U	620
1,1,2,2-tetrachloroethane	U	U	620
1,2-dichloropropane	U	U	620
cis-1,3-dichloropropene	U	U	620
trichloroethene	U	U	620
dibromochloromethane	U	U	620
1,1,2-trichloroethane	U	U	620
benzene	U	U	620
trans-1,3-dichloropropene	U	U	620
bromoform	U	U	620
4-methyl-2-pentanone	U	U	1,200
2-hexanone	U	U	1,200
tetrachloroethene	U	U	620
toluene	330J	310JB	620
chlorobenzene	U	U	620
ethylbenzene	U	U	620
styrene	150J	U	620
xylene (total)	340J	970B	620

U, J, B - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.14	1.22	1.16	
Method Blank I.D.	>B1461	>B1461	>B1461	>B1461	
Compound	Method Blank	S-WD1: 4-8	S-WD1: 8-10	S-WD1: 0-2	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	U	U	10
methylene chloride	2J	2JB	2JB	U	5
acetone	10	8JB	27B	140B	10
carbon disulfide	U	U	U	9	5
1,1-dichloroethene	U	4J	U	U	5
1,1-dichloroethane	U	U	U	U	5
1,2-dichloroethene (total)	U	U	U	U	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	5
2-butanone	9J	U	U	69B	10
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
trichloroethene	U	U	U	U	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	3J	U	30	5
trans-1,3-dichloropropene	U	U	U	U	5
bromoform	U	U	U	U	5
4-methyl-2-pentanone	U	U	U	U	10
2-hexanone	6J	U	U	U	10
tetrachloroethene	U	U	U	U	5
toluene	2J	3JB	2JB	120B	5
chlorobenzene	U	U	U	U	5
ethylbenzene	U	U	U	45B	5
styrene	U	U	U	U	5
xylene (total)	3J	U	U	190B	5

U, J, B - See Appendix for definition.

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.18	5.90	1.16	
Method Blank I.D.	>B1461	>B1461	>B1461	>B1461	
Compound	Method Blank	S-3: 8-10	S-3: 0-2	S-WD1: 0-2RE	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	35J	U	10
methylene chloride	2J	2JB	23JB	4JB	5
acetone	10	150B	5,300B	57B	10
carbon disulfide	U	U	U	6	5
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
1,2-dichloroethene (total)	U	U	U	U	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	5
2-butanone	9J	18B	87B	41B	10
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
trichloroethene	U	U	U	U	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	U	13J	12	5
trans-1,3-dichloropropene	U	U	U	U	5
bromoform	U	U	U	U	5
4-methyl-2-pentanone	U	U	U	U	10
2-hexanone	6J	U	U	U	10
tetrachloroethene	U	U	U	U	5
toluene	2J	2JB	33B	53B	5
chlorobenzene	U	U	U	U	5
ethylbenzene	U	U	U	23	5
styrene	U	U	U	U	5
xylene (total)	3J	U	66B	85B	5

U, J, B - See Appendix for definition.

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.15	5.80	5.70	
Method Blank I.D.	>B1477	>B1477	>B1477	>B1477	
Compound	Method Blank	S-WV: 0-2	S-WV:L	S-6: 8-10	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	U	U	10
methylene chloride	4J	6B	11JB	13JB	5
acetone	36	24B	311B	240B	10
carbon disulfide	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
1,2-dichloroethene (total)	U	6	17J	U	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	1J	U	U	5
2-butanone	20	8JB	U	22JB	10
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
trichloroethene	U	5J	U	U	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	0.9J	U	U	5
trans-1,3-dichloropropene	U	U	U	U	5
bromoform	U	U	U	U	5
4-methyl-2-pentanone	5J	U	U	U	10
2-hexanone	10	U	U	U	10
tetrachloroethene	U	5J	U	U	5
toluene	2J	4JB	25JB	6JB	5
chlorobenzene	2J	2JB	3JB	U	5
ethylbenzene	U	U	57	24J	5
styrene	U	U	U	U	5
xylene (total)	2J	2JB	290B	130B	5

U, J, B - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.26	MEDIUM LEVEL
Method Blank I.D.	>B1493	>B1493	
Compound	Method Blank	S-6: 0-2	Lower Limits of Detection with no Dilution
chloromethane	U	U	1,200
bromomethane	U	U	1,200
vinyl chloride	U	U	1,200
chloroethane	U	U	1,200
methylene chloride	U	430J	620
acetone	1,700	U	1,200
carbon disulfide	U	U	620
1,1-dichloroethene	U	U	620
1,1-dichloroethane	U	U	620
1,2-dichloroethene (total)	U	U	620
chloroform	U	U	620
1,2-dichloroethane	U	U	620
2-butanone	U	U	1,200
1,1,1-trichloroethane	380J	U	620
carbon tetrachloride	U	U	620
vinyl acetate	U	U	1,200
bromodichloromethane	U	U	620
1,1,2,2-tetrachloroethane	U	U	620
1,2-dichloropropane	U	U	620
cis-1,3-dichloropropene	U	U	620
trichloroethene	U	1,400	620
dibromochloromethane	U	U	620
1,1,2-trichloroethane	U	U	620
benzene	U	U	620
trans-1,3-dichloropropene	U	U	620
bromoform	U	U	620
4-methyl-2-pentanone	U	U	1,200
2-hexanone	U	U	1,200
tetrachloroethene	U	U	620
toluene	310J	U	620
chlorobenzene	U	U	620
ethylbenzene	U	4,600	620
styrene	U	U	620
xylene (total)	U	35,000	620

U, J - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.17	
Method Blank I.D.	>B1513	>B1513	
Compound	Method Blank	S-1: 0-2	Lower Limits of Detection with no Dilution
chloromethane	U	U	10
bromomethane	U	U	10
vinyl chloride	U	U	10
chloroethane	U	U	10
methylene chloride	U	U	5
acetone	12	U	10
carbon disulfide	U	U	5
1,1-dichloroethene	U	U	5
1,1-dichloroethane	U	U	5
1,2-dichloroethene (total)	U	U	5
chloroform	U	U	5
1,2-dichloroethane	U	U	5
2-butanone	8J	6JB	10
1,1,1-trichloroethane	U	U	5
carbon tetrachloride	U	U	5
vinyl acetate	U	U	10
bromodichloromethane	U	U	5
1,1,2,2-tetrachloroethane	2J	U	5
1,2-dichloropropane	U	U	5
cis-1,3-dichloropropene	U	U	5
trichloroethene	U	U	5
dibromochloromethane	U	U	5
1,1,2-trichloroethane	U	U	5
benzene	U	2J	5
trans-1,3-dichloropropene	U	U	5
bromoform	2J	U	5
4-methyl-2-pentanone	2J	U	10
2-hexanone	5J	U	10
tetrachloroethene	1J	U	5
toluene	U	7	5
chlorobenzene	U	U	5
ethylbenzene	U	U	5
styrene	2J	U	5
xylene (total)	2J	4JB	5

U, J, B - See Appendix for definition.

Soil

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.17	
Method Blank I.D.	>B1530	>B1530	
Compound	Method Blank	S-1: 0-2RE	Lower Limits of Detection with no Dilution
chloromethane	U	U	10
bromomethane	U	U	10
vinyl chloride	U	U	10
chloroethane	U	U	10
methylene chloride	3J	2JB	5
acetone	46	53B	10
carbon disulfide	U	U	5
1,1-dichloroethene	U	U	5
1,1-dichloroethane	U	U	5
1,2-dichloroethene (total)	U	U	5
chloroform	U	U	5
1,2-dichloroethane	U	U	5
2-butanone	13	U	10
1,1,1-trichloroethane	U	U	5
carbon tetrachloride	U	U	5
vinyl acetate	U	U	10
bromodichloromethane	U	U	5
1,1,2,2-tetrachloroethane	U	U	5
1,2-dichloropropane	U	U	5
cis-1,3-dichloropropene	U	U	5
trichloroethene	U	U	5
dibromochloromethane	U	U	5
1,1,2-trichloroethane	U	U	5
benzene	U	U	5
trans-1,3-dichloropropene	U	U	5
bromoform	U	U	5
4-methyl-2-pentanone	U	U	10
2-hexanone	U	U	10
tetrachloroethene	U	U	5
toluene	U	3J	5
chlorobenzene	U	U	5
ethylbenzene	U	U	5
styrene	U	U	5
xylene (total)	U	U	5

U, J, B - See Appendix for definition.

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification		
Dilution Factor	1.0	1.0	
Method Blank I.D.	›G3519	›G3519	
Compound	Method Blank	Trip Blank 4/20/88	Lower Limits of Detection with no Dilution
chloromethane	U	U	10
bromomethane	U	U	10
vinyl chloride	U	U	10
chloroethane	U	U	10
methylene chloride	U	U	5
acetone	U	U	10
carbon disulfide	U	U	5
1,1-dichloroethene	U	U	5
1,1-dichloroethane	U	U	5
1,2-dichloroethene (total)	U	U	5
chloroform	U	U	5
1,2-dichloroethane	U	U	5
2-butanone	U	U	10
1,1,1-trichloroethane	U	U	5
carbon tetrachloride	U	U	5
vinyl acetate	U	U	10
bromodichloromethane	U	U	5
1,2-dichloropropane	U	U	5
cis-1,3-dichloropropene	U	U	5
trichloroethene	U	U	5
dibromochloromethane	U	U	5
1,1,2-trichloroethane	U	U	5
benzene	U	U	5
trans-1,3-dichloropropene	U	U	5
bromoform	U	U	5
4-methyl-2-pentanone	U	U	10
2-hexanone	U	U	10
tetrachloroethene	U	U	5
1,1,2,2-tetrachloroethane	U	U	5
toluene	U	U	5
chlorobenzene	U	U	5
ethylbenzene	U	U	5
styrene	U	U	5
xylene (total)	U	U	5

U - See Appendix for definition.

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification					
Dilution Factor	1.0	1.0	1.0	1.0	1.0	
Method Blank I.D.	›G3611 Method Blank	›G3611 Field Blank 4/21/88	›G3611 Field Blank 4/22/88	›G3611 Trip Blank 4/21/88	›G3611 Trip Blank 4/22/88	Lower Limits of Detection with no Dilution
Compound						
chloromethane	U	U	U	U	U	10
bromomethane	U	U	U	U	U	10
vinyl chloride	U	U	U	U	U	10
chloroethane	U	U	U	U	U	10
methylene chloride	2J	U	2JB	U	U	5
acetone	10	U	10B	U	U	10
carbon disulfide	U	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	U	5
1,2-dichloroethene (total)	U	U	U	U	U	5
chloroform	U	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	U	5
2-butanone	U	U	U	U	U	10
1,1,1-trichloroethane	U	U	U	U	U	5
carbon tetrachloride	U	U	U	U	U	5
vinyl acetate	U	U	U	U	U	10
bromodichloromethane	U	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	U	5
trichloroethene	U	U	U	U	U	5
dibromochloromethane	U	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	U	5
benzene	U	U	U	U	U	5
trans-1,3-dichloropropene	U	U	U	U	U	5
bromoform	U	U	U	U	U	5
4-methyl-2-pentanone	U	U	U	U	U	10
2-hexanone	U	U	U	U	U	10
tetrachloroethene	U	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	U	5
toluene	U	U	U	U	U	5
chlorobenzene	U	U	U	U	U	5
ethylbenzene	U	U	U	U	U	5
styrene	U	U	U	U	U	5
xylene (total)	U	U	U	U	U	5

U, J, B - See Appendix for definition.

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification			
Dilution Factor	1.0	1.0	1.0	
Method Blank I.D.	›G3629	›G3629	›G3629	
Compound	Method Blank	Trip Blank 4/25/88	Field Blank 4/25/88	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	10
bromomethane	U	U	U	10
vinyl chloride	U	U	U	10
chloroethane	U	U	U	10
methylene chloride	U	U	U	5
acetone	15	U	25B	10
carbon disulfide	U	U	U	5
1,1-dichloroethene	U	U	U	5
1,1-dichloroethane	U	U	U	5
1,2-dichloroethene (total)	U	U	U	5
chloroform	U	U	5	5
1,2-dichloroethane	U	U	U	5
2-butanone	U	U	U	10
1,1,1-trichloroethane	U	U	U	5
carbon tetrachloride	U	U	U	5
vinyl acetate	U	U	U	10
bromodichloromethane	U	U	U	5
1,2-dichloropropane	U	U	U	5
cis-1,3-dichloropropene	U	U	U	5
trichloroethene	U	U	U	5
dibromochloromethane	U	U	U	5
1,1,2-trichloroethane	U	U	U	5
benzene	U	U	U	5
trans-1,3-dichloropropene	U	U	U	5
bromoform	U	U	U	5
4-methyl-2-pentanone	U	U	U	10
2-hexanone	U	U	U	10
tetrachloroethene	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	5
toluene	U	U	U	5
chlorobenzene	U	U	U	5
ethylbenzene	U	U	U	5
styrene	U	U	U	5
xylene (total)	U	U	U	5

U, J, B - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.21	1.30	6.15	
Method Blank I.D.	›C0083	›C0083	›C0083	›C0083	
Compound	Method Blank 4/26/88	S-6: 0-2	S-6: 8-10	S-4: 0-2	Lower Limits of Detection with no Dilution
Phenol	U	U	U	23,000J	20,000
bis(2-Chloroethyl)Ether	U	U	U	U	20,000
2-Chlorophenol	U	U	U	U	20,000
1,3-Dichlorobenzene	U	U	U	U	20,000
1,4-Dichlorobenzene	U	U	U	U	20,000
Benzyl Alcohol	U	U	U	U	20,000
1,2-Dichlorobenzene	U	U	U	U	20,000
2-Methylphenol	U	U	U	59,000J	20,000
bis(2-chloroisopropyl)ether	U	U	U	U	20,000
4-Methylphenol	U	U	U	81,000J	20,000
N-Nitroso-Di-n-propylamine	U	U	U	U	20,000
Hexachloroethane	U	U	U	U	20,000
Nitrobenzene	U	U	U	U	20,000
Isophorone	U	U	U	U	20,000
2-Nitrophenol	U	U	U	U	20,000
2,4-Dimethylphenol	U	U	U	74,000J	20,000
Benzoic Acid	U	U	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	U	U	20,000
2,4-Dichlorophenol	U	U	U	U	20,000
1,2,4-Trichlorobenzene	U	U	U	U	20,000
Naphthalene	U	2,600J	3,200J	450,000	20,000
4-Chloroaniline	U	U	U	U	20,000
Hexachlorobutadiene	U	U	U	U	20,000
4-Chloro-3-methylphenol	U	U	U	U	20,000
2-Methylnaphthalene	U	5,900J	13,000J	520,000	20,000
Hexachlorocyclopentadiene	U	U	U	U	20,000
2,4,6-Trichlorophenol	U	U	U	U	20,000
2,4,5-Trichlorophenol	U	U	U	U	96,000
2-Chloronaphthalene	U	U	U	U	20,000
2-Nitroaniline	U	U	U	U	96,000
Dimethyl Phthalate	U	U	U	U	20,000
Acenaphthylene	U	U	U	U	20,000
3-Nitroaniline	U	U	U	U	96,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.09	1.18	
Method Blank I.D.	>C0083	>C0083	>C0083	
Compound	Method Blank 4/26/88	S-3: 8-10	S-WD1: 0-2	Lower Limits of Detection with no Dilution
Phenol	U	U	U	20,000
bis(2-Chloroethyl)Ether	U	U	U	20,000
2-Chlorophenol	U	U	U	20,000
1,3-Dichlorobenzene	U	U	U	20,000
1,4-Dichlorobenzene	U	U	U	20,000
Benzyl Alcohol	U	U	U	20,000
1,2-Dichlorobenzene	U	U	U	20,000
2-Methylphenol	U	U	U	20,000
bis(2-chloroisopropyl)ether	U	U	U	20,000
4-Methylphenol	U	U	U	20,000
N-Nitroso-Di-n-propylamine	U	U	U	20,000
Hexachloroethane	U	U	U	20,000
Nitrobenzene	U	U	U	20,000
Isophorone	U	U	U	20,000
2-Nitrophenol	U	U	U	20,000
2,4-Dimethylphenol	U	U	U	20,000
Benzoic Acid	U	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	U	20,000
2,4-Dichlorophenol	U	U	U	20,000
1,2,4-Trichlorobenzene	U	U	U	20,000
Naphthalene	U	U	U	20,000
4-Chloroaniline	U	U	U	20,000
Hexachlorobutadiene	U	U	U	20,000
4-Chloro-3-methylphenol	U	U	U	20,000
2-Methylnaphthalene	U	U	U	20,000
Hexachlorocyclopentadiene	U	U	U	20,000
2,4,6-Trichlorophenol	U	U	U	20,000
2,4,5-Trichlorophenol	U	U	U	96,000
2-Chloronaphthalene	U	U	U	20,000
2-Nitroaniline	U	U	U	96,000
Dimethyl Phthalate	U	U	U	20,000
Acenaphthylene	U	U	U	20,000
3-Nitroaniline	U	U	U	96,000

J, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.09	1.18	MEDIUM LEVEL
Method Blank I.D.	>C0083	>C0083	>C0083	
Compound	Method Blank 4/26/88	S-3: 8-10	SWD-1: 0-2	Lower Limits of Detection with no Dilution
Acenaphthene	U	U	1,200J	20,000
2,4-Dinitrophenol	U	U	U	96,000
4-Nitrophenol	U	U	U	20,000
Dibenzofuran	U	U	U	20,000
2,4-Dinitrotoluene	U	U	U	20,000
2,6-Dinitrotoluene	U	U	U	20,000
Diethylphthalate	U	U	U	20,000
4-Chlorophenyl-phenylether	U	U	U	20,000
Fluorene	U	U	U	20,000
4-Nitroaniline	U	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	U	96,000
N-Nitrosodiphenylamine	U	U	U	20,000
4-Bromophenyl-phenylether	U	U	U	20,000
Hexachlorobenzene	U	U	U	20,000
Pentachlorophenol	U	U	U	96,000
Phenanthrene	U	U	15,000J	20,000
Anthracene	U	U	2,900J	20,000
Di-n-Butylphthalate	U	1,100J	1,600J	20,000
Fluoranthene	U	U	18,000J	20,000
Pyrene	U	U	17,000J	20,000
Butylbenzylphthalate	U	U	U	40,000
3,3'-Dichlorobenzidine	U	U	U	20,000
Benzo(a)Anthracene	U	U	10,000J	20,000
bis(2-Ethylhexyl)Phthalate	U	U	U	20,000
Chrysene	U	U	12,000J	20,000
Di-n-Octyl Phthalate	U	U	U	20,000
Benzo(b)fluoranthene	U	U	5,000J	20,000
Benzo(k)fluoranthene	U	U	U	20,000
Benzo(a)pyrene	U	U	8,800J	20,000
Indeno(1,2,3-cd)pyrene	U	U	4,300J	20,000
Dibenzo(a,h)anthracene	U	U	U	20,000
Benzo(g,h,i)perylene	U	U	4,500J	20,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	5.54	1.12	
Method Blank I.D.	>C0083	>C0083	>C0083	
Compound	Method Blank 4/26/88	S-5:0-2	S-3:0-2	Lower Limits of Detection with no Dilution
Phenol	U	4,700J	U	20,000
bis(2-Chloroethyl)Ether	U	U	U	20,000
2-Chlorophenol	U	U	U	20,000
1,3-Dichlorobenzene	U	U	U	20,000
1,4-Dichlorobenzene	U	U	U	20,000
Benzyl Alcohol	U	U	U	20,000
1,2-Dichlorobenzene	U	U	U	20,000
2-Methylphenol	U	U	U	20,000
bis(2-chloroisopropyl)ether	U	U	U	20,000
4-Methylphenol	U	5,900J	U	20,000
N-Nitroso-Di-n-propylamine	U	U	U	20,000
Hexachloroethane	U	U	U	20,000
Nitrobenzene	U	U	U	20,000
Isophorone	U	U	U	20,000
2-Nitrophenol	U	U	U	20,000
2,4-Dimethylphenol	U	27,000J	U	20,000
Benzoic Acid	U	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	U	20,000
2,4-Dichlorophenol	U	U	U	20,000
1,2,4-Trichlorobenzene	U	U	U	20,000
Naphthalene	U	1,000,000	1,700J	20,000
4-Chloroaniline	U	U	U	20,000
Hexachlorobutadiene	U	U	U	20,000
4-Chloro-3-methylphenol	U	U	U	20,000
2-Methylnaphthalene	U	1,300,000	4,100J	20,000
Hexachlorocyclopentadiene	U	U	U	20,000
2,4,6-Trichlorophenol	U	U	U	20,000
2,4,5-Trichlorophenol	U	U	U	96,000
2-Chloronaphthalene	U	5,400J	U	20,000
2-Nitroaniline	U	U	U	96,000
Dimethyl Phthalate	U	U	U	20,000
Acenaphthylene	U	U	U	20,000
3-Nitroaniline	U	U	U	96,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	5.54	1.12	MEDIUM LEVEL
Method Blank I.D.	>C0083 Method Blank 4/26/88	>C0083	>C0083	Lower Limits of Detection with no Dilution
Compound		S-5:0-2	S-3:0-2	
Acenaphthene	U	390,000	8,000J	20,000
2,4-Dinitrophenol	U	U	U	96,000
4-Nitrophenol	U	U	U	20,000
Dibenzofuran	U	260,000	3,400J	20,000
2,4-Dinitrotoluene	U	U	U	20,000
2,6-Dinitrotoluene	U	U	U	20,000
Diethylphthalate	U	U	U	20,000
4-Chlorophenyl-phenylether	U	U	U	20,000
Fluorene	U	130,000	U	20,000
4-Nitroaniline	U	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	U	96,000
N-Nitrosodiphenylamine	U	U	U	20,000
4-Bromophenyl-phenylether	U	U	U	20,000
Hexachlorobenzene	U	U	U	20,000
Pentachlorophenol	U	U	U	96,000
Phenanthrene	U	55,000J	5,500J	20,000
Anthracene	U	13,000J	U	20,000
Di-n-Butylphthalate	U	U	1,400J	20,000
Fluoranthene	U	15,000J	4,600J	20,000
Pyrene	U	14,000J	3,400J	20,000
Butylbenzylphthalate	U	U	U	40,000
3,3'-Dichlorobenzidine	U	U	U	20,000
Benzo(a)Anthracene	U	5,200J	U	20,000
bis(2-Ethylhexyl)Phthalate	U	U	U	20,000
Chrysene	U	6,300J	U	20,000
Di-n-Octyl Phthalate	U	U	U	20,000
Benzo(b)fluoranthene	U	U	U	20,000
Benzo(k)fluoranthene	U	U	U	20,000
Benzo(a)pyrene	U	U	U	20,000
Indeno(1,2,3-cd)pyrene	U	U	U	20,000
Dibenzo(a,h)anthracene	U	U	U	20,000
Benzo(g,h,i)perylene	U	U	U	20,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.18	11.4	MEDIUM LEVEL
Method Blank I.D.	›C0083	›C0083	›C0083	
Compound	Method Blank 4/26/88	S-4:L	S-5:L	Lower Limits of Detection with no Dilution
Phenol	U	U	U	20,000
bis(2-Chloroethyl)Ether	U	U	U	20,000
2-Chlorophenol	U	U	U	20,000
1,3-Dichlorobenzene	U	U	U	20,000
1,4-Dichlorobenzene	U	U	18,000J	20,000
Benzyl Alcohol	U	U	U	20,000
1,2-Dichlorobenzene	U	U	U	20,000
2-Methylphenol	U	U	21,000J	20,000
bis(2-chloroisopropyl)ether	U	U	U	20,000
4-Methylphenol	U	U	67,000J	20,000
N-Nitroso-Di-n-propylamine	U	U	U	20,000
Hexachloroethane	U	U	U	20,000
Nitrobenzene	U	U	U	20,000
Isophorone	U	U	U	20,000
2-Nitrophenol	U	U	U	20,000
2,4-Dimethylphenol	U	U	170,000J	20,000
Benzoic Acid	U	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	U	20,000
2,4-Dichlorophenol	U	U	U	20,000
1,2,4-Trichlorobenzene	U	U	U	20,000
Naphthalene	U	240,000	2,200,000	20,000
4-Chloroaniline	U	U	U	20,000
Hexachlorobutadiene	U	U	U	20,000
4-Chloro-3-methylphenol	U	U	U	20,000
2-Methylnaphthalene	U	200,000	1,200,000	20,000
Hexachlorocyclopentadiene	U	U	U	20,000
2,4,6-Trichlorophenol	U	U	U	20,000
2,4,5-Trichlorophenol	U	U	U	96,000
2-Chloronaphthalene	U	U	U	20,000
2-Nitroaniline	U	U	U	96,000
Dimethyl Phthalate	U	U	U	20,000
Acenaphthylene	U	U	U	20,000
3-Nitroaniline	U	U	U	96,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.18	11.4	MEDIUM LEVEL
Method Blank I.D.	›C0083 Method Blank 4/26/88	›C0083	›C0083	
Compound		S-4:L	~~S-6~~: S-5:L	Lower Limits of Detection with no Dilution
Acenaphthene	U	130,000	440,000	20,000
2,4-Dinitrophenol	U	U	U	96,000
4-Nitrophenol	U	U	U	20,000
Dibenzofuran	U	99,000	310,000	20,000
2,4-Dinitrotoluene	U	U	U	20,000
2,6-Dinitrotoluene	U	U	U	20,000
Diethylphthalate	U	U	U	20,000
4-Chlorophenyl-phenylether	U	U	U	20,000
Fluorene	U	37,000	180,000J	20,000
4-Nitroaniline	U	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	U	96,000
N-Nitrosodiphenylamine	U	U	U	20,000
4-Bromophenyl-phenylether	U	U	U	20,000
Hexachlorobenzene	U	U	U	20,000
Pentachlorophenol	U	U	U	96,000
Phenanthrene	U	15,000J	60,000J	20,000
Anthracene	U	2,500J	16,000J	20,000
Di-n-Butylphthalate	U	U	U	20,000
Fluoranthene	U	4,100J	15,000J	20,000
Pyrene	U	2,300J	10,000J	20,000
Butylbenzylphthalate	U	U	U	40,000
3,3'-Dichlorobenzidine	U	U	U	20,000
Benzo(a)Anthracene	U	U	U	20,000
bis(2-Ethylhexyl)Phthalate	U	U	10,000J	20,000
Chrysene	U	U	U	20,000
Di-n-Octyl Phthalate	U	U	U	20,000
Benzo(b)fluoranthene	U	U	U	20,000
Benzo(k)fluoranthene	U	U	U	20,000
Benzo(a)pyrene	U	U	U	20,000
Indeno(1,2,3-cd)pyrene	U	U	U	20,000
Dibenzo(a,h)anthracene	U	U	U	20,000
Benzo(g,h,i)perylene	U	U	U	20,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.22	1.02	MEDIUM LEVEL
Method Blank I.D.	›C0113 Method Blank 5/4/88	›C0113 S-WV:L	›C0113 S-WV: 0-2	Lower Limits of Detection with no Dilution
Compound				
Phenol	U	U	U	20,000
bis(2-Chloroethyl)Ether	U	U	U	20,000
2-Chlorophenol	U	U	U	20,000
1,3-Dichlorobenzene	U	U	U	20,000
1,4-Dichlorobenzene	U	U	U	20,000
Benzyl Alcohol	U	U	U	20,000
1,2-Dichlorobenzene	U	U	U	20,000
2-Methylphenol	U	U	U	20,000
bis(2-chloroisopropyl)ether	U	U	U	20,000
4-Methylphenol	U	U	U	20,000
N-Nitroso-Di-n-propylamine	U	U	U	20,000
Hexachloroethane	U	U	U	20,000
Nitrobenzene	U	U	U	20,000
Isophorone	U	U	U	20,000
2-Nitrophenol	U	U	U	20,000
2,4-Dimethylphenol	U	U	U	20,000
Benzoic Acid	U	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	U	20,000
2,4-Dichlorophenol	U	U	U	20,000
1,2,4-Trichlorobenzene	U	U	U	20,000
Naphthalene	U	670J	U	20,000
4-Chloroaniline	U	U	U	20,000
Hexachlorobutadiene	U	U	U	20,000
4-Chloro-3-methylphenol	U	U	U	20,000
2-Methylnaphthalene	U	U	U	20,000
Hexachlorocyclopentadiene	U	U	U	20,000
2,4,6-Trichlorophenol	U	U	U	20,000
2,4,5-Trichlorophenol	U	U	U	96,000
2-Chloronaphthalene	U	U	U	20,000
2-Nitroaniline	U	U	U	96,000
Dimethyl Phthalate	U	U	U	20,000
Acenaphthylene	U	U	U	20,000
3-Nitroaniline	U	U	U	96,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.22	1.02	MEDIUM LEVEL
Method Blank I.D.	›C0113 Method Blank 05/04/88	›C0113 S-WV:L	›C0113 S-WV: 0-2	Lower Limits of Detection with no Dilution
Compound				
Acenaphthene	U	U	U	20,000
2,4-Dinitrophenol	U	U	U	96,000
4-Nitrophenol	U	U	U	20,000
Dibenzofuran	U	U	U	20,000
2,4-Dinitrotoluene	U	U	U	20,000
2,6-Dinitrotoluene	U	U	U	20,000
Diethylphthalate	U	U	U	20,000
4-Chlorophenyl-phenylether	U	U	U	20,000
Fluorene	U	U	U	20,000
4-Nitroaniline	U	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	U	96,000
N-Nitrosodiphenylamine	U	U	U	20,000
4-Bromophenyl-phenylether	U	U	U	20,000
Hexachlorobenzene	U	U	U	20,000
Pentachlorophenol	U	U	U	96,000
Phenanthrene	U	U	9,500J	20,000
Anthracene	U	U	1,600J	20,000
Di-n-Butylphthalate	U	3,500J	U	20,000
Fluoranthene	U	U	9,000J	20,000
Pyrene	U	U	11,000J	20,000
Butylbenzylphthalate	U	U	U	40,000
3,3'-Dichlorobenzidine	U	U	U	20,000
Benzo(a)Anthracene	U	U	5,500J	20,000
bis(2-Ethylhexyl)Phthalate	U	2,000J	U	20,000
Chrysene	U	U	6,300J	20,000
Di-n-Octyl Phthalate	U	U	U	20,000
Benzo(b)fluoranthene	U	U	7,000J	20,000
Benzo(k)fluoranthene	U	U	U	20,000
Benzo(a)pyrene	U	U	6,000J	20,000
Indeno(1,2,3-cd)pyrene	U	U	3,500J	20,000
Dibenzo(a,h)anthracene	U	U	U	20,000
Benzo(g,h,i)perylene	U	U	U	20,000

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.21	1.30	6.15	MEDIUM LEVEL
Method Blank I.D.	>C0083	>C0083	>C0083	>C0083	
Compound	Method Blank 4/26/88	S-6: 0-2	S-6: 8-10	S-4: 0-2	Lower Limits of Detection with no Dilution
Acenaphthene	U	U	U	170,000	20,000
2,4-Dinitrophenol	U	U	U	U	96,000
4-Nitrophenol	U	U	U	U	20,000
Dibenzofuran	U	U	U	96,000J	20,000
2,4-Dinitrotoluene	U	U	U	U	20,000
2,6-Dinitrotoluene	U	U	U	U	20,000
Diethylphthalate	U	U	U	U	20,000
4-Chlorophenyl-phenylether	U	U	U	U	20,000
Fluorene	U	2,400J	U	53,000J	20,000
4-Nitroaniline	U	U	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	U	U	96,000
N-Nitrosodiphenylamine	U	U	U	U	20,000
4-Bromophenyl-phenylether	U	U	U	U	20,000
Hexachlorobenzene	U	U	U	U	20,000
Pentachlorophenol	U	U	U	U	96,000
Phenanthrene	U	9,600J	4,300J	33,000J	20,000
Anthracene	U	U	U	7,500J	20,000
Di-n-Butylphthalate	U	2,000J	2,200J	U	20,000
Fluoranthene	U	9,400J	2,600J	14,000J	20,000
Pyrene	U	5,400J	1,400J	13,000J	20,000
Butylbenzylphthalate	U	U	U	U	40,000
3,3'-Dichlorobenzidine	U	U	U	U	20,000
Benzo(a)Anthracene	U	U	U	U	20,000
bis(2-Ethylhexyl)Phthalate	U	U	U	U	20,000
Chrysene	U	3,300J	U	U	20,000
Di-n-Octyl Phthalate	U	U	U	U	20,000
Benzo(b)fluoranthene	U	U	U	U	20,000
Benzo(k)fluoranthene	U	U	U	U	20,000
Benzo(a)pyrene	U	U	U	U	20,000
Indeno(1,2,3-cd)pyrene	U	U	U	U	20,000
Dibenzo(a,h)anthracene	U	U	U	U	20,000
Benzo(g,h,i)perylene	U	U	U	U	20,000

U, J, B - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification		
Dilution Factor	1.0	1.2	
Method Blank I.D.	›C0305 Method Blank 05/02/88	›C0305 Field Blank 4/25/88	Lower Limits of Detection with no Dilution
Compound			
Phenol	U	U	10
bis(2-Chloroethyl)Ether	U	U	10
2-Chlorophenol	U	U	10
1,3-Dichlorobenzene	U	U	10
1,4-Dichlorobenzene	U	U	10
Benzyl Alcohol	U	U	10
1,2-Dichlorobenzene	U	U	10
2-Methylphenol	U	U	10
bis(2-chloroisopropyl)ether	U	U	10
4-Methylphenol	U	U	10
N-Nitroso-Di-n-propylamine	U	U	10
Hexachloroethane	U	U	10
Nitrobenzene	U	U	10
Isophorone	U	U	10
2-Nitrophenol	U	U	10
2,4-Dimethylphenol	U	U	10
Benzoic Acid	U	U	50
bis(-2-Chloroethoxy)Methane	U	U	10
2,4-Dichlorophenol	U	U	10
1,2,4-Trichlorobenzene	U	U	10
Naphthalene	U	U	10
4-Chloroaniline	U	U	10
Hexachlorobutadiene	U	U	10
4-Chloro-3-methylphenol	U	U	10
2-Methylnaphthalene	U	U	10
Hexachlorocyclopentadiene	U	U	10
2,4,6-Trichlorophenol	U	U	10
2,4,5-Trichlorophenol	U	U	50
2-Chloronaphthalene	U	U	10
2-Nitroaniline	U	U	50
Dimethyl Phthalate	U	U	10
Acenaphthylene	U	U	10
3-Nitroaniline	U	U	50

U - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification		
Dilution Factor	1.0	1.2	
Method Blank I.D.	>C0305 Method Blank 05/02/88	>C0305 Field Blank 4/25/88	Lower Limits of Detection with no Dilution
Compound			
Acenaphthene	U	U	10
2,4-Dinitrophenol	U	U	50
4-Nitrophenol	U	U	50
Dibenzofuran	U	U	10
2,4-Dinitrotoluene	U	U	10
2,6-Dinitrotoluene	U	U	10
Diethylphthalate	U	U	10
4-Chlorophenyl-phenylether	U	U	10
Fluorene	U	U	10
4-Nitroaniline	U	U	50
4,6-Dinitro-2-methylphenol	U	U	50
N-Nitrosodiphenylamine	U	U	10
4-Bromophenyl-phenylether	U	U	10
Hexachlorobenzene	U	U	10
Pentachlorophenol	U	U	50
Phenanthrene	U	U	10
Anthracene	U	U	10
Di-n-Butylphthalate	U	2J	10
Fluoranthene	2J	U	10
Pyrene	2J	U	10
Butylbenzylphthalate	U	U	10
3,3'-Dichlorobenzidine	U	U	20
Benzo(a)Anthracene	U	U	10
bis(2-Ethylhexyl)Phthalate	3J	9JB	10
Chrysene	U	U	10
Di-n-Octyl Phthalate	U	U	10
Benzo(b)fluoranthene	U	U	10
Benzo(k)fluoranthene	U	U	10
Benzo(a)pyrene	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	10
Dibenzo(a,h)anthracene	U	U	10
Benzo(g,h,i)perylene	U	U	10

U, J, B - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification			
Dilution Factor	1.0	1.1	1.1	
Method Blank I.D.	>C0109 Method Blank 4/27/88	>C0109 Field Blank 4/21/88	>C0109 Field Blank 4/22/88	Lower Limits of Detection with no Dilution
Compound				
Phenol	U	U	U	10
bis(2-Chloroethyl)Ether	U	U	U	10
2-Chlorophenol	U	U	U	10
1,3-Dichlorobenzene	U	U	U	10
1,4-Dichlorobenzene	U	U	U	10
Benzyl Alcohol	U	U	U	10
1,2-Dichlorobenzene	U	U	U	10
2-Methylphenol	U	U	U	10
bis(2-chloroisopropyl)ether	U	U	U	10
4-Methylphenol	U	U	U	10
N-Nitroso-Di-n-propylamine	U	U	U	10
Hexachloroethane	U	U	U	10
Nitrobenzene	U	U	U	10
Isophorone	U	U	U	10
2-Nitrophenol	U	U	U	10
2,4-Dimethylphenol	U	U	U	10
Benzoic Acid	U	U	U	50
bis(-2-Chloroethoxy)Methane	U	U	U	10
2,4-Dichlorophenol	U	U	U	10
1,2,4-Trichlorobenzene	U	U	U	10
Naphthalene	U	U	U	10
4-Chloroaniline	U	U	U	10
Hexachlorobutadiene	U	U	U	10
4-Chloro-3-methylphenol	U	U	U	10
2-Methylnaphthalene	U	U	U	10
Hexachlorocyclopentadiene	U	U	U	10
2,4,6-Trichlorophenol	U	U	U	10
2,4,5-Trichlorophenol	U	U	U	50
2-Chloronaphthalene	U	U	U	10
2-Nitroaniline	U	U	U	50
Dimethyl Phthalate	U	U	U	10
Acenaphthylene	U	U	U	10
3-Nitroaniline	U	U	U	50

U - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification			
Dilution Factor	1.0	1.1	1.1	
Method Blank I.D.	>C0109 Method Blank 4/27/88	>C0109 Field Blank 4/21/88	>C0109 Field Blank 4/22/88	Lower Limits of Detection with no Dilution
Compound				
Acenaphthene	U	U	U	10
2,4-Dinitrophenol	U	U	U	50
4-Nitrophenol	U	U	U	50
Dibenzofuran	U	U	U	10
2,4-Dinitrotoluene	U	U	U	10
2,6-Dinitrotoluene	U	U	U	10
Diethylphthalate	U	U	U	10
4-Chlorophenyl-phenylether	U	U	U	10
Fluorene	U	U	U	10
4-Nitroaniline	U	U	U	50
4,6-Dinitro-2-methylphenol	U	U	U	50
N-Nitrosodiphenylamine	U	U	U	10
4-Bromophenyl-phenylether	U	U	U	10
Hexachlorobenzene	U	U	U	10
Pentachlorophenol	U	U	U	50
Phenanthrene	U	U	U	10
Anthracene	U	U	U	10
Di-n-Butylphthalate	U	U	U	10
Fluoranthene	U	U	U	10
Pyrene	U	U	U	10
Butylbenzylphthalate	U	U	U	10
3,3'-Dichlorobenzidine	U	U	U	20
Benzo(a)Anthracene	U	U	U	10
bis(2-Ethylhexyl)Phthalate	U	U	4J	10
Chrysene	U	U	U	10
Di-n-Octyl Phthalate	U	U	U	10
Benzo(b)fluoranthene	U	U	U	10
Benzo(k)fluoranthene	U	U	U	10
Benzo(a)pyrene	U	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	U	10
Dibenzo(a,h)anthracene	U	U	U	10
Benzo(g,h,i)perylene	U	U	U	10

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification			
Dilution Factor	1.0	1.1	1.1	
Method Blank I.D.	›C0306 Method Blank	›C0306 Field Blank	›C0306 Field Blank	Lower Limits of Detection with
Compound	4/24/88	4/19/88	4/20/88	no Dilution
Phenol	U	U	U	10
bis(2-Chloroethyl)Ether	U	U	U	10
2-Chlorophenol	U	U	U	10
1,3-Dichlorobenzene	U	U	U	10
1,4-Dichlorobenzene	U	U	U	10
Benzyl Alcohol	U	U	U	10
1,2-Dichlorobenzene	U	U	U	10
2-Methylphenol	U	U	U	10
bis(2-chloroisopropyl)ether	U	U	U	10
4-Methylphenol	U	U	U	10
N-Nitroso-Di-n-propylamine	U	U	U	10
Hexachloroethane	U	U	U	10
Nitrobenzene	U	U	U	10
Isophorone	U	U	U	10
2-Nitrophenol	U	U	U	10
2,4-Dimethylphenol	U	U	U	10
Benzoic Acid	U	U	U	50
bis(-2-Chloroethoxy)Methane	U	U	U	10
2,4-Dichlorophenol	U	U	U	10
1,2,4-Trichlorobenzene	U	U	U	10
Naphthalene	U	U	U	10
4-Chloroaniline	U	U	U	10
Hexachlorobutadiene	U	U	U	10
4-Chloro-3-methylphenol	U	U	U	10
2-Methylnaphthalene	U	U	U	10
Hexachlorocyclopentadiene	U	U	U	10
2,4,6-Trichlorophenol	U	U	U	10
2,4,5-Trichlorophenol	U	U	U	50
2-Chloronaphthalene	U	U	U	10
2-Nitroaniline	U	U	U	50
Dimethyl Phthalate	U	U	U	10
Acenaphthylene	U	U	U	10
3-Nitroaniline	U	U	U	50

U - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification			
Dilution Factor	1.0	1.1	1.1	
Method Blank I.D.	›C0306 Method Blank 4/24/88	›C0306 Field Blank 4/19/88	›C0306 Field Blank 4/20/88	Lower Limits of Detection with no Dilution
Compound				
Acenaphthene	U	U	U	10
2,4-Dinitrophenol	U	U	U	50
4-Nitrophenol	U	U	U	50
Dibenzofuran	U	U	U	10
2,4-Dinitrotoluene	U	U	U	10
2,6-Dinitrotoluene	U	U	U	10
Diethylphthalate	U	U	U	10
4-Chlorophenyl-phenylether	U	U	U	10
Fluorene	U	U	U	10
4-Nitroaniline	U	U	U	50
4,6-Dinitro-2-methylphenol	U	U	U	50
N-Nitrosodiphenylamine	U	U	U	10
4-Bromophenyl-phenylether	U	U	U	10
Hexachlorobenzene	U	U	U	10
Pentachlorophenol	U	U	U	50
Phenanthrene	U	U	U	10
Anthracene	U	U	U	10
Di-n-Butylphthalate	U	U	2J	10
Fluoranthene	U	U	U	10
Pyrene	U	U	U	10
Butylbenzylphthalate	U	U	U	10
3,3'-Dichlorobenzidine	U	U	U	20
Benzo(a)Anthracene	U	U	U	10
bis(2-Ethylhexyl)Phthalate	U	U	U	10
Chrysene	U	U	U	10
Di-n-Octyl Phthalate	U	2J	6J	10
Benzo(b)fluoranthene	U	U	U	10
Benzo(k)fluoranthene	U	U	U	10
Benzo(a)pyrene	U	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	U	10
Dibenzo(a,h)anthracene	U	U	U	10
Benzo(g,h,i)perylene	U	U	U	10

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.18	MEDIUM LEVEL
Method Blank I.D.	›C0296 Method Blank 5/10/88	›C0296	Lower Limits of Detection with no Dilution
Compound		S-1:0-2	
Phenol	U	U	20,000
bis(2-Chloroethyl)Ether	U	U	20,000
2-Chlorophenol	U	U	20,000
1,3-Dichlorobenzene	U	U	20,000
1,4-Dichlorobenzene	U	U	20,000
Benzyl Alcohol	U	U	20,000
1,2-Dichlorobenzene	U	U	20,000
2-Methylphenol	U	U	20,000
bis(2-chloroisopropyl)ether	U	U	20,000
4-Methylphenol	U	U	20,000
N-Nitroso-Di-n-propylamine	U	U	20,000
Hexachloroethane	U	U	20,000
Nitrobenzene	U	U	20,000
Isophorone	U	U	20,000
2-Nitrophenol	U	U	20,000
2,4-Dimethylphenol	U	U	20,000
Benzoic Acid	U	U	96,000
bis(-2-Chloroethoxy)Methane	U	U	20,000
2,4-Dichlorophenol	U	U	20,000
1,2,4-Trichlorobenzene	U	U	20,000
Naphthalene	U	U	20,000
4-Chloroaniline	U	U	20,000
Hexachlorobutadiene	U	U	20,000
4-Chloro-3-methylphenol	U	U	20,000
2-Methylnaphthalene	U	U	20,000
Hexachlorocyclopentadiene	U	U	20,000
2,4,6-Trichlorophenol	U	U	20,000
2,4,5-Trichlorophenol	U	U	96,000
2-Chloronaphthalene	U	U	20,000
2-Nitroaniline	U	U	96,000
Dimethyl Phthalate	U	U	20,000
Acenaphthylene	U	U	20,000
3-Nitroaniline	U	U	96,000

U - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.18	MEDIUM LEVEL
Method Blank I.D.	›C0296 Method Blank 5/10/88	›C0296 S-1: 0-2	Lower Limits of Detection with no Dilution
Compound			
Acenaphthene	U	U	20,000
2,4-Dinitrophenol	U	U	96,000
4-Nitrophenol	U	U	20,000
Dibenzofuran	U	U	20,000
2,4-Dinitrotoluene	U	U	20,000
2,6-Dinitrotoluene	U	U	20,000
Diethylphthalate	U	U	20,000
4-Chlorophenyl-phenylether	U	U	20,000
Fluorene	U	U	20,000
4-Nitroaniline	U	U	96,000
4,6-Dinitro-2-methylphenol	U	U	96,000
N-Nitrosodiphenylamine	U	U	20,000
4-Bromophenyl-phenylether	U	U	20,000
Hexachlorobenzene	U	U	20,000
Pentachlorophenol	U	U	96,000
Phenanthrene	U	U	20,000
Anthracene	U	U	20,000
Di-n-Butylphthalate	U	U	20,000
Fluoranthene	U	U	20,000
Pyrene	U	U	20,000
Butylbenzylphthalate	U	U	40,000
3,3'-Dichlorobenzidine	U	U	20,000
Benzo(a)Anthracene	U	U	20,000
bis(2-Ethylhexyl)Phthalate	U	U	20,000
Chrysene	U	U	20,000
Di-n-Octyl Phthalate	U	U	20,000
Benzo(b)fluoranthene	U	U	20,000
Benzo(k)fluoranthene	U	U	20,000
Benzo(a)pyrene	U	U	20,000
Indeno(1,2,3-cd)pyrene	U	U	20,000
Dibenzo(a,h)anthracene	U	U	20,000
Benzo(g,h,i)perylene	U	U	20,000

U - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.25	1.09	1.14	
Method Blank I.D.	>C0097 Method Blank 4/26/88	>C0097 SWD-2: 0-2	>C0097 SWD-1: 4-8	>C0097 SWD-1: 8-10	Lower Limits of Detection with no Dilution
Compound					
Phenol	U	U	U	U	330
bis(2-Chloroethyl)Ether	U	U	U	U	330
2-Chlorophenol	U	U	U	U	330
1,3-Dichlorobenzene	U	U	U	U	330
1,4-Dichlorobenzene	U	U	U	U	330
Benzyl Alcohol	U	U	U	U	330
1,2-Dichlorobenzene	U	U	U	U	330
2-Methylphenol	U	U	U	U	330
bis(2-chloroisopropyl)ether	U	U	U	U	330
4-Methylphenol	U	U	U	U	330
N-Nitroso-Di-n-propylamine	U	U	U	U	330
Hexachloroethane	U	U	U	U	330
Nitrobenzene	U	U	U	U	330
Isophorone	U	U	U	U	330
2-Nitrophenol	U	U	U	U	330
2,4-Dimethylphenol	U	U	U	U	330
Benzoic Acid	U	U	U	U	1,600
bis(-2-Chloroethoxy)Methane	U	U	U	U	330
2,4-Dichlorophenol	U	U	U	U	330
1,2,4-Trichlorobenzene	U	U	U	U	330
Naphthalene	U	47J	U	U	330
4-Chloroaniline	U	U	U	U	330
Hexachlorobutadiene	U	U	U	U	330
4-Chloro-3-methylphenol	U	U	U	U	330
2-Methylnaphthalene	U	18J	U	17J	330
Hexachlorocyclopentadiene	U	U	U	U	330
2,4,6-Trichlorophenol	U	U	U	U	330
2,4,5-Trichlorophenol	U	U	U	U	1,600
2-Chloronaphthalene	U	U	U	U	330
2-Nitroaniline	U	U	U	U	1,600
Dimethyl Phthalate	U	U	U	U	330
Acenaphthylene	U	U	U	U	330
3-Nitroaniline	U	U	U	U	1,600

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/Kg.

	Sample Identification				
Dilution Factor	1.00	1.25	1.09	1.14	
Method Blank I.D.	›C0097 Method Blank 4/26/88	›C0097 S-WD2: 0-2	›C0097 S-WD1: 4-8	›C0097 S-WD1: 8-10	Lower Limits of Detection with no Dilution
Compound					
Acenaphthene	U	U	U	U	330
2,4-Dinitrophenol	U	U	U	U	1,600
4-Nitrophenol	U	U	U	U	1,600
Dibenzofuran	U	U	U	U	330
2,4-Dinitrotoluene	U	U	U	U	330
2,6-Dinitrotoluene	U	U	U	U	330
Diethylphthalate	U	U	U	U	330
4-Chlorophenyl-phenylether	U	U	U	U	330
Fluorene	U	U	U	U	330
4-Nitroaniline	U	U	U	U	1,600
4,6-Dinitro-2-methylphenol	U	U	U	U	1,600
N-Nitrosodiphenylamine	U	U	U	U	330
4-Bromophenyl-phenylether	U	U	U	U	330
Hexachlorobenzene	U	U	U	U	330
Pentachlorophenol	U	U	U	U	1,600
Phenanthrene	U	U	U	12J	330
Anthracene	U	U	6J	U	330
Di-n-Butylphthalate	U	47J	170J	440	330
Fluoranthene	U	U	U	U	330
Pyrene	U	20J	U	17J	330
Butylbenzylphthalate	U	12J	20J	U	330
3,3'-Dichlorobenzidine	U	U	U	U	660
Benzo(a)Anthracene	U	U	U	U	330
bis(2-Ethylhexyl)Phthalate	100J	270JB	1,100B	2,000B	330
Chrysene	U	U	U	U	330
Di-n-Octyl Phthalate	U	7J	7J	U	330
Benzo(b)fluoranthene	U	U	U	U	330
Benzo(k)fluoranthene	U	U	U	U	330
Benzo(a)pyrene	U	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	U	U	U	330
Dibenzo(a,h)anthracene	U	U	U	U	330
Benzo(g,h,i)perylene	U	U	U	U	330

U, J - See Appendix for definition.

Soil

EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.23	MEDIUM LEVEL
Method Blank I.D.	5/16/88	5/16/88	
Compound	Method Blank	S-4:0-2	Lower Limits of Detection with no Dilution
alpha BHC	U	U	120
beta BHC	U	U	120
gamma BHC	U	U	120
delta BHC	U	U	120
Heptachlor	U	U	120
Aldrin	U	U	120
4,4' DDE	U	U	120
Dieldrin	U	U	240
4,4' DDD	U	480	240
Methoxychlor	U	U	1,200
Endrin Ketone	U	U	240
4,4' DDT	U	U	240
alpha Chlordane	U	580	1,200
Gamma Chlordane	U	U	1,200
Endosulfan I	U	U	120
Endosulfan II	U	U	120
Endosulfan Sulfate	U	U	120
Endrin	U	U	120
Heptachlor Epoxide	U	U	120
Toxaphene	U	U	2,400
PCB - 1016	U	U	1,200
PCB - 1221	U	U	1,200
PCB - 1232	U	U	1,200
PCB - 1242	U	U	1,200
PCB - 1248	U	U	1,200
PCB - 1254	U	U	2,400
PCB - 1260	U	U	2,400

U - See Appendix for definition.

EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

	Sample Identification			
Dilution Factor	1.00	1.22	1.13	
Method Blank I.D.	5/12/88	5/12/88	5/12/88	
Compound	Method Blank	S-WV:L	S-WV: O-2	Lower Limits of Detection with no Dilution
Alpha BHC	U	U	U	8.0
Beta BHC	U	U	U	8.0
gamma BHC	U	U	U	8.0
delta BHC	U	U	U	8.0
Heptachlor	U	U	U	8.0
Aldrin	U	U	U	8.0
4,4' DDE	U	U	U	8.0
Dieldrin	U	U	U	16
4,4' DDD	U	U	U	16
Methoxychlor	U	U	U	80
Endrin Ketone	U	U	U	16
4,4' DDT	U	U	U	16
alpha Chlordane	U	U	U	80
gamma Chlordane	U	U	U	80
Endosulfan I	U	U	U	16
Endosulfan II	U	U	U	16
Endosulfan Sulfate	U	U	U	16
Endrin	U	U	U	16
Heptachlor Epoxide	U	U	U	16
Toxaphene	U	U	U	160
PCB - 1016	U	U	U	80
PCB - 1221	U	U	U	80
PCB - 1232	U	U	U	80
PCB - 1242	U	U	U	80
PCB - 1248	U	U	U	80
PCB - 1254	U	U	U	160
PCB - 1260	U	U	U	160

U - See Appendix for definition.

Soil

EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

	Sample Identification		
Dilution Factor	1.00	1.17	MEDIUM LEVEL
Method Blank I.D.	5/24/88	5/24/88	
Compound	Method Blank	S-1:0-2	Lower Limits of Detection with no Dilution
lpha BHC	U	U	120
eta BHC	U	U	120
gamma BHC	U	U	120
elta BHC	U	U	120
eptachlor	U	U	120
Aldrin	U	U	120
4,4' DDE	U	U	120
ieldrin	U	U	240
,4' DDD	U	U	240
Methoxychlor	U	U	1,200
ndrin Ketone	U	U	240
,4' DDT	U	U	240
alpha Chlordane	U	U	1,200
amma Chlordane	U	120J	1,200
ndosulfan I	U	U	120
ndosulfan II	U	U	120
Endosulfan Sulfate	U	U	120
ndrin	U	U	120
eptachlor Epoxide	U	U	120
Toxaphene	U	U	2,400
CB - 1016	U	U	1,200
CB - 1221	U	U	1,200
PCB - 1232	U	U	1,200
CB - 1242	U	U	1,200
CB - 1248	U	U	1,200
CB - 1254	U	U	2,400
PCB - 1260	U	U	2,400

, J - See Appendix for definition.

Aqueous

PCB's ANALYSIS

All results reported as ug/L.

	Sample Identification		
Dilution Factor	1.0	1.0	
Method Blank I.D.	4/25/88	4/25/88	
Compound	Blank	Field Blank 4/18/88	Lower Limits of Detection with no Dilution
PCB - 1016	U	U	0.50
PCB - 1221	U	U	0.50
PCB - 1232	U	U	0.50
PCB - 1242	U	U	0.50
PCB - 1248	U	U	0.50
PCB - 1254	U	U	0.50
PCB - 1260	U	U	0.50

U - See Appendix for definition.

Soil

PCB's ANALYSIS

All results reported as mg/Kg.

Sample Identification

Dilution Factor	1.0	1.1	1.3	
Method Blank I.D.	4/26/88	4/26/88	4/26/88	
Compound	Blank	S-2:O-2	S-2:L	Lower Limits of Detection with no Dilution
PCB - 1016	U	U	U	0.20
PCB - 1221	U	U	U	0.20
PCB - 1232	U	U	U	0.20
PCB - 1242	U	U	U	0.20
PCB - 1248	U	U	U	0.20
PCB - 1254	U	U	U	0.20
PCB - 1260	U	0.40	0.09J	0.20

U, J - See Appendix for definition.

Aqueous

PCB's ANALYSIS

All results reported as ug/L.

	Sample Identification		
Dilution Factor	1.0	1.0	
Method Blank I.D.	5/03/88	5/03/88	
Compound	Blank	Field Blank 4/25/88	Lower Limits of Detection with no Dilution
PCB - 1016	U	U	0.50
PCB - 1221	U	U	0.50
PCB - 1232	U	U	0.50
PCB - 1242	U	U	0.50
PCB - 1248	U	U	0.50
PCB - 1254	U	U	0.50
PCB - 1260	U	U	0.50

U - See Appendix for definition.

Soil

PCB's ANALYSIS

All results reported as mg/Kg.

	Sample Identification			
Dilution Factor	1.00	1.12	1.20	
Method Blank I.D.	6/10/88	6/10/88	6/10/88	
Compound	Blank	S-3:0-2	S-3: 8-10	Lower Limits of Detection with no Dilution
PCB - 1016	U	U	U	0.20
PCB - 1221	U	U	U	0.20
PCB - 1232	U	U	U	0.20
PCB - 1242	U	U	U	0.20
PCB - 1248	U	U	U	0.20
PCB - 1254	U	U	U	0.20
PCB - 1260	U	U	U	0.20

U - See Appendix for definition.

E.P. TOXICITY PESTICIDE RESULTS

All values are mg/L.

Compound	Method Blank	S-2:O-2	S-2:L	S-4:O-2	S-4:L
Lindane	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	<0.5	<0.5	<0.5	<0.5	<0.5
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordane	NR	NR	NR	<0.05	<0.05
4,4'-DDT	NR	NR	NR	<0.01	<0.01

Compound	S-5:O-2	S-5:L	S-WD2:O-2	S-WD1:O-2
Lindane	<0.01	<0.01	<0.01	<0.01
Endrin	<0.001	<0.001	<0.001	<0.001
Methoxychlor	<0.5	<0.5	<0.5	<0.5
Toxaphene	<0.1	<0.1	<0.1	<0.1
Chlordane	NR	NR	NR	NR
4,4'-DDT	NR	NR	NR	NR

NR - Not Requested

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E.P. TOXICITY PESTICIDE RESULTS

All values are mg/L.

Compound	Method Blank	S-WD1:4-8	S-WD1:8-10	S-3:0-2
Lindane	<0.01	<0.01	<0.01	<0.01
Endrin	<0.001	<0.001	<0.001	<0.001
Methoxychlor	<0.5	<0.5	<0.5	<0.5
Toxaphene	<0.1	<0.1	<0.1	<0.1
Chlordane	NR	NR	NR	NR
4,4'-DDT	NR	NR	NR	NR

Compound	S-3:8-10	S-6:0-2	S-6:8-10	S-WV:L	S-WV:0-2
Lindane	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	<0.5	<0.5	<0.5	<0.5	<0.5
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.1
Chlordane	NR	<0.05	<0.05	NR	NR
4,4'-DDT	NR	<0.01	<0.01	NR	NR

NR - Not Requested

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E.P. TOXICITY PESTICIDE RESULTS

All values are mg/L.

Compound	Method Blank 06/01/88	S-1:0-2
Lindane	<0.01	<0.01
Endrin	<0.001	<0.001
Methoxychlor	<0.5	<0.5
Toxaphene	<0.1	<0.1

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E.P. TOXICITY HERBICIDE RESULTS

All values are mg/L.

Dilution Factor	1.0	1.0	1.0	1.0	1.0
Compound	Method Blank 5/19/88	S-2:O-2	S-2:L	S-4:O-2	S-4:L
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1
Silvex	<0.01	<0.01	<0.01	<0.01	<0.01

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E.P. TOXICITY HERBICIDE RESULTS

All values are mg/L.

Dilution Factor	1.0	1.0	1.0	1.0	1.0
Compound	Method Blank 5/19/88	S-5:O-2	S-5:L	S-WD2: O-2	S-WD1: O-2
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1
Silvex	<0.01	<0.01	<0.01	<0.01	<0.01

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EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification		
Dilution Factor	1.0	1.1	
Method Blank I.D.	>C0304	>C0304	
Compound	Method Blank* 5/10/88	W-V	Lower Limits of Detection with no Dilution
Phenol	U	U	10
bis(2-Chloroethyl)Ether	U	U	10
2-Chlorophenol	U	U	10
1,3-Dichlorobenzene	U	U	10
1,4-Dichlorobenzene	U	U	10
Benzyl Alcohol	U	U	10
1,2-Dichlorobenzene	U	U	10
2-Methylphenol	U	U	10
bis(2-chloroisopropyl)ether	U	U	10
4-Methylphenol	U	U	10
N-Nitroso-Di-n-propylamine	U	U	10
Hexachloroethane	U	U	10
Nitrobenzene	U	U	10
Isophorone	U	U	10
2-Nitrophenol	U	U	10
2,4-Dimethylphenol	U	U	10
Benzoic Acid	U	U	50
bis(-2-Chloroethoxy)Methane	U	U	10
2,4-Dichlorophenol	U	U	10
1,2,4-Trichlorobenzene	U	U	10
Naphthalene	U	U	10
4-Chloroaniline	U	U	10
Hexachlorobutadiene	U	U	10
4-Chloro-3-methylphenol	U	U	10
2-Methylnaphthalene	U	U	10
Hexachlorocyclopentadiene	U	U	10
2,4,6-Trichlorophenol	U	U	10
2,4,5-Trichlorophenol	U	U	50
2-Chloronaphthalene	U	U	10
2-Nitroaniline	U	U	50
Dimethyl Phthalate	U	U	10
Acenaphthylene	U	U	10
3-Nitroaniline	U	U	50

U - See Appendix for definition.

*Liquid-Liquid

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification		
Dilution Factor	1.0	1.1	
Method Blank I.D.	>C0304 Method Blank* 5/10/88	>C0304	
Compound		W-V	Lower Limits of Detection with no Dilution
Acenaphthene	U	U	10
2,4-Dinitrophenol	U	U	50
4-Nitrophenol	U	U	50
Dibenzofuran	U	U	10
2,4-Dinitrotoluene	U	U	10
2,6-Dinitrotoluene	U	U	10
Diethylphthalate	U	18	10
4-Chlorophenyl-phenylether	U	U	10
Fluorene	U	U	10
4-Nitroaniline	U	U	50
4,6-Dinitro-2-methylphenol	U	U	50
N-Nitrosodiphenylamine	U	U	10
4-Bromophenyl-phenylether	U	U	10
Hexachlorobenzene	U	U	10
Pentachlorophenol	U	U	50
Phenanthrene	U	U	10
Anthracene	U	U	10
Di-n-Butylphthalate	U	U	10
Fluoranthene	2J	U	10
Pyrene	U	U	10
Butylbenzylphthalate	U	U	10
3,3'-Dichlorobenzidine	U	U	20
Benzo(a)Anthracene	U	U	10
bis(2-Ethylhexyl)Phthalate	6J	U	10
Chrysene	U	U	10
Di-n-Octyl Phthalate	2J	U	10
Benzo(b)fluoranthene	U	U	10
Benzo(k)fluoranthene	U	U	10
Benzo(a)pyrene	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	10
Dibenzo(a,h)anthracene	U	U	10
Benzo(g,h,i)perylene	U	U	10

U, J - See Appendix for definition.

*Liquid-Liquid

E.P. TOXICITY HERBICIDE RESULTS

All values are mg/L.

Dilution Factor	1.0	1.0	1.0	1.0	1.0
Compound	Method Blank 5/19/88	S-WD1: 4-8	S-WD1: 8-10	S-3: 0-2	S-3: 8-10
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1
Silvex	<0.01	<0.01	<0.01	<0.01	<0.01

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

E.P. TOXICITY HERBICIDE RESULTS

All values are mg/L.

Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0
Compound	Method Blank 5/19/88	S-6: 0-2	S-6: 8-10	S-WV:L	S-WV: 0-2	S-1: 0-2
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silvex	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

E.P. TOXICITY DATA (PRIORITY POLLUTANT METALS LIST)

All values are ug/L.

Parameter	S-6:0-2	S-6:8-10	S-WV:L	S-WV:0-2
Antimony	<60	<60	<60	<60
Arsenic	<1,000	<1,000	<1,000	<1,000
Beryllium	<5.0	<5.0	<5.0	<5.0
Cadmium	<10	<10	<10	<10
Chromium	<10	<10	<10	<10
Copper	<25	<25	<25	<25
Lead	<200	<200	<200	<200
Mercury	<2.0	<2.0	<2.0	<2.0
Nickel	<40	<40	<40	<40
Selenium	<500	<500	<500	<500
Silver	<10	<10	<10	<10
Thallium	<50	<50	<50	<50
Zinc	246	228	156	204

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

E.P. TOXICITY DATA (PRIORITY POLLUTANT METALS LIST)

All values are ug/L.

Parameter	S-2:O-2	S-2:L	S-4:O-2	S-4:L
Antimony	<60	<60	<60	<60
Arsenic	<1,000	<1,000	<1,000	<1,000
Beryllium	<5.0	<5.0	<5.0	<5.0
Cadmium	<10	<10	46	<10
Chromium	<10	<10	<10	<10
Copper	<25	<25	<25	<25
Lead	<200	<200	<200	<200
Mercury	<2.0	<2.0	<2.0	<2.0
Nickel	<40	<40	<40	<40
Selenium	<500	<500	<500	<500
Silver	<10	<10	<10	<10
Thallium	<50	<50	<50	<50
Zinc	92	72	484	231

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

E.P. TOXICITY DATA (PRIORITY POLLUTANT METALS LIST)

All values are ug/L.

Parameter	S-5:0-2	S-5:L	S-WD2:0-2	S-WD1:0-2
Antimony	<60	<60	<60	<60
Arsenic	<1,000	<1,000	<1,000	<1,000
Beryllium	<5.0	<5.0	<5.0	<5.0
Cadmium	<10	<10	<10	<10
Chromium	<10	<10	<10	<10
Copper	<25	<25	<25	29
Lead	<200	<200	<200	<200
Mercury	<2.0	<2.0	<2.0	<2.0
Nickel	<40	<40	<40	<40
Selenium	<500	<500	<500	<500
Silver	<10	<10	<10	<10
Thallium	<50	<50	<50	<50
Zinc	640	110	251	895

E.P. TOXICITY DATA (PRIORITY POLLUTANT METALS LIST)

All values are ug/L.

Parameter	S-WD1:4-8	S-WD1:8-10	S-3:0-2	S-3:8-10
Antimony	<60	<60	<60	<60
Arsenic	<1,000	<1,000	<1,000	<1,000
Beryllium	<5.0	<5.0	<5.0	<5.0
Cadmium	<10	<10	24	<10
Chromium	<10	<10	<10	<10
Copper	<25	<25	459	84
Lead	<200	<200	250	<200
Mercury	<2.0	<2.0	<2.0	<2.0
Nickel	<40	<40	82	<40
Selenium	<500	<500	<500	<500
Silver	<10	<10	<10	<10
Thallium	<50	<50	<50	<50
Zinc	158	133	8,610	178

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

E.P. TOXICITY DATA (PRIORITY POLLUTANT METALS LIST)

All values are ug/L.

Parameter	S-1:O-2
Antimony	<60
Arsenic	<1,000
Beryllium	<5.0
Cadmium	<10
Chromium	<10
Copper	<25
Lead	<200
Mercury	<2.0
Nickel	<40
Selenium	<500
Silver	<10
Thallium	<50
Zinc	1,260

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261-4458

ANALYSES OF GROUNDWATER SAMPLES

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	>G3725	>G3725	>G3725	>G3725	
Compound	Method Blank	W-D2	W-D1	Field Blank 5/1/88	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	U	U	10
methylene chloride	U	U	U	U	5
acetone	U	10	96	26	10
carbon disulfide	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
1,2-dichloroethene (total)	U	U	U	U	5
chloroform	U	U	7	U	5
1,2-dichloroethane	U	U	U	U	5
2-butanone	U	U	U	U	10
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
trichloroethene	U	U	U	U	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	3J	U	U	5
trans-1,3-dichloropropene	U	U	U	U	5
bromoform	U	U	U	U	5
4-methyl-2-pentanone	U	U	U	U	10
2-hexanone	U	U	U	U	10
tetrachloroethene	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
toluene	U	U	U	U	5
chlorobenzene	3J	U	U	U	5
ethylbenzene	U	U	U	U	5
styrene	U	U	U	U	5
xylene (total)	U	U	U	U	5

U, J, B - See Appendix for definition.

Aqueous

EPA TCL VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification			
Dilution Factor	1.0	1.0	1.0	
Method Blank I.D.	>G3725	>G3725	>G3725	
Compound	Method Blank	W-V	Trip Blank 5/1/88	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	10
bromomethane	U	U	U	10
vinyl chloride	U	U	U	10
chloroethane	U	U	U	10
methylene chloride	U	3J	U	5
acetone	U	270	U	10
carbon disulfide	U	U	U	5
1,1-dichloroethene	U	U	U	5
1,1-dichloroethane	U	U	U	5
1,2-dichloroethene (total)	U	32	U	5
chloroform	U	10	U	5
1,2-dichloroethane	U	U	U	5
2-butanone	U	U	U	10
1,1,1-trichloroethane	U	U	U	5
carbon tetrachloride	U	U	U	5
vinyl acetate	U	U	U	10
bromodichloromethane	U	U	U	5
1,2-dichloropropane	U	U	U	5
cis-1,3-dichloropropene	U	U	U	5
trichloroethene	U	U	U	5
dibromochloromethane	U	U	U	5
1,1,2-trichloroethane	U	U	U	5
benzene	U	U	U	5
trans-1,3-dichloropropene	U	U	U	5
bromoform	U	U	U	5
4-methyl-2-pentanone	U	U	U	10
2-hexanone	U	U	U	10
tetrachloroethene	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	5
toluene	U	2J	U	5
chlorobenzene	3J	U	U	5
ethylbenzene	U	U	U	5
styrene	U	U	U	5
xylene (total)	U	8	U	5

U, J, B - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	>C0223 Method Blank 5/10/88	>C0223 W-D1	>C0223 W-D2	>C0223 Field Blank 5/1/88	Lower Limits of Detection with no Dilution
Compound					
Phenol	U	U	U	U	10
bis(2-Chloroethyl)Ether	U	U	U	U	10
2-Chlorophenol	U	U	U	U	10
1,3-Dichlorobenzene	U	U	U	U	10
1,4-Dichlorobenzene	U	U	U	U	10
Benzyl Alcohol	U	U	U	U	10
1,2-Dichlorobenzene	U	U	U	U	10
2-Methylphenol	U	U	U	U	10
bis(2-chloroisopropyl)ether	U	U	U	U	10
4-Methylphenol	U	U	U	U	10
N-Nitroso-Di-n-propylamine	U	U	U	U	10
Hexachloroethane	U	U	U	U	10
Nitrobenzene	U	U	U	U	10
Isophorone	U	U	U	U	10
2-Nitrophenol	U	U	U	U	10
2,4-Dimethylphenol	U	U	4J	U	10
Benzoic Acid	U	U	U	U	50
bis(-2-Chloroethoxy)Methane	U	U	U	U	10
2,4-Dichlorophenol	U	U	U	U	10
1,2,4-Trichlorcbenzene	U	U	U	U	10
Naphthalene	U	U	U	U	10
4-Chloroaniline	U	U	U	U	10
Hexachlorobutadiene	U	U	U	U	10
4-Chloro-3-methylphenol	U	U	U	U	10
2-Methylnaphthalene	U	U	U	U	10
Hexachlorocyclopentadiene	U	U	U	U	10
2,4,6-Trichlorophenol	U	U	U	U	10
2,4,5-Trichlorophenol	U	U	U	U	50
2-Chloronaphthalene	U	U	U	U	10
2-Nitroaniline	U	U	U	U	50
Dimethyl Phthalate	U	U	U	U	10
Acenaphthylene	U	U	U	U	10
3-Nitroaniline	U	U	U	U	50

U, J - See Appendix for definition.

EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	>C0223 Method Blank 5/10/88	>C0223 W-D1	>C0223 W-D2	>C0223 Field Blank 5/1/88	Lower Limits of Detection with no Dilution
Compound					
Acenaphthene	U	U	U	U	10
2,4-Dinitrophenol	U	U	U	U	50
4-Nitrophenol	U	U	U	U	50
Dibenzofuran	U	U	U	U	10
2,4-Dinitrotoluene	U	U	U	U	10
2,6-Dinitrotoluene	U	U	U	U	10
Diethylphthalate	U	U	2J	U	10
4-Chlorophenyl-phenylether	U	U	U	U	10
Fluorene	U	U	U	U	10
4-Nitroaniline	U	U	U	U	50
4,6-Dinitro-2-methylphenol	U	U	U	U	50
N-Nitrosodiphenylamine	U	U	U	U	10
4-Bromophenyl-phenylether	U	U	U	U	10
Hexachlorobenzene	U	U	U	U	10
Pentachlorophenol	U	U	U	U	50
Phenanthrene	U	U	U	U	10
Anthracene	U	U	U	U	10
Di-n-Butylphthalate	U	5J	4J	U	10
Fluoranthene	U	U	U	U	10
Pyrene	U	U	U	U	10
Butylbenzylphthalate	U	U	U	U	10
3,3'-Dichlorobenzidine	U	U	U	U	20
Benzo(a)Anthracene	U	U	U	U	10
bis(2-Ethylhexyl)Phthalate	2J	4JB	2JB	3JB	10
Chrysene	U	U	U	U	10
Di-n-Octyl Phthalate	U	U	U	U	10
Benzo(b)fluoranthene	U	U	U	U	10
Benzo(k)fluoranthene	U	U	U	U	10
Benzo(a)pyrene	U	U	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	U	U	10
Dibenzo(a,h)anthracene	U	U	U	U	10
Benzo(g,h,i)perylene	U	U	U	U	10

U, J, B - See Appendix for definition.

Aqueous

EPA TCL PESTICIDES/PCB's

All results reported as ug/L.

Sample Identification

Dilution Factor	1.0	10	10	1.0	1.0	
Method Blank I.D.	5/11/88	5/11/88	5/11/88	5/11/88	5/11/88	
Compound	Method Blank	W-V	W-D1	W-D2	Field Blank 5/1/88	Lower Limits of Detection with no Dilution
lpha BHC	U	U	U	U	U	0.05
eta BHC	U	U	U	U	U	0.05
gamma BHC	U	U	U	U	U	0.05
elta BHC	U	U	U	U	U	0.05
eptachlor	U	U	U	U	U	0.05
Aldrin	U	U	U	U	U	0.05
4,4' DDE	U	U	U	U	U	0.05
ieldrin	U	U	U	U	U	0.10
,4' DDD	U	U	U	U	U	0.10
Methoxychlor	U	U	U	U	U	0.50
ndrin Ketone	U	U	U	U	U	0.10
,4' DDT	U	U	U	U	U	0.10
alpha Chlordane	U	U	U	U	U	0.50
amma Chlordane	U	U	U	U	U	0.50
ndosulfan I	U	U	U	U	U	0.10
Endosulfan II	U	U	U	U	U	0.10
Endosulfan Sulfate	U	U	U	U	U	0.10
ndrin	U	U	U	U	U	0.10
eptachlor Epoxide	U	U	U	U	U	0.10
Toxaphene	U	U	U	U	U	1.0
CB - 1016	U	U	U	U	U	0.5
CB - 1221	U	U	U	U	U	0.5
PCB - 1232	U	U	U	U	U	0.5
CB - 1242	U	U	U	U	U	0.5
CB - 1248	U	U	U	U	U	0.5
CB - 1254	U	U	U	U	U	1.0
PCB - 1260	U	U	U	U	U	1.0

- See Appendix for definition.

MISCELLANEOUS INORGANICS

All values are mg/Kg unless noted.

Sample Identification	Petroleum Hydrocarbons	Total Cyanide	Ignitability
Field Blank (4/18/88)	Note 1	NR	NR
S-2:0-2	473	NR	NR
S-2:L	47.7	NR	NR
S-4:0-2	56,500	NR	NR
S-4:L	943	NR	NR
S-5:0-2	18,500	NR	NR
S-5:L	839	NR	NR
S-WD2:0-2	18.7	0.39	NR
Field Blank (4/20/88)	NR	0.008*	NR
S-WD1:0-2	767	NR	Non-Ignitable
S-WD1:4-8	204	NR	Non-Ignitable
S-WD1:8-10	91.5	NR	Non-Ignitable
S-3:0-2	848	NR	Non-Ignitable
S-3:8-10	180	NR	Non-Ignitable
S-6:0-2	975	NR	Non-Ignitable
S-6:8-10	605	NR	Non-Ignitable
Field Blank (4/22/88)	32.0*	NR	NR
S-WV:L	30.8	NR	NR
S-WV:0-2	519	NR	NR
Field Blank (4/25/88)	1.2*	NR	NR
S-1:0-2	959	1.08	NR
W-V	NR	<0.005*	NR
W-D1	NR	<0.005*	NR
W-D2	NR	<0.005*	NR
Field Blank (5/1/88)	NR	<0.005*	NR

Note 1 - No sample was submitted for petroleum hydrocarbon analysis, therefore no results are reported.

NR - Not Requested

*values are mg/L

APPENDIX

U - Indicates that the compound was analyzed for but not detected.

J - Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.

B - This flag is used when the analyte is found in the blanks as well as the sample. It indicates possible sample contamination and warns the data user to use caution when applying the results of this analyte.

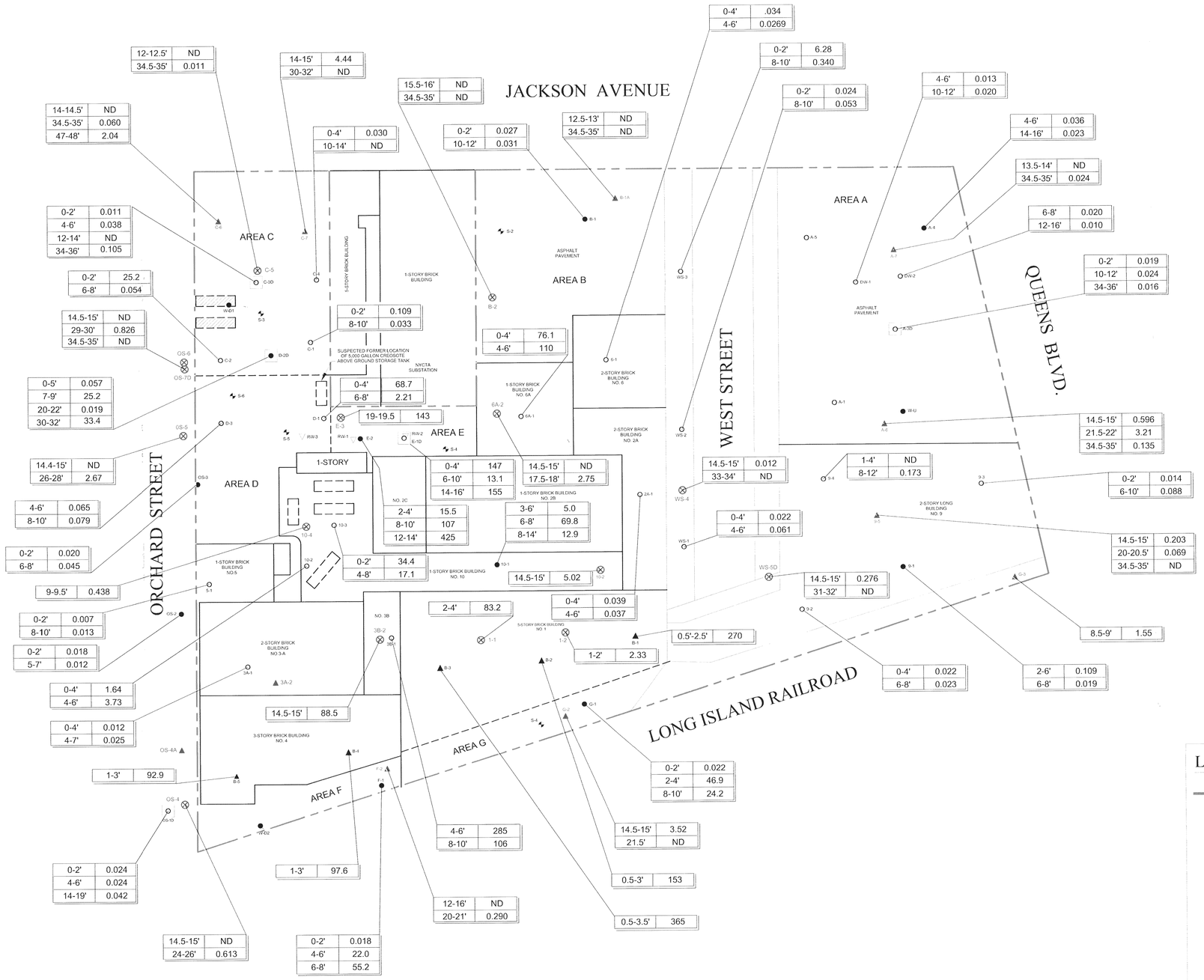
N - Indicates that the compound was analyzed for but not requested as an analyte. Value will not be listed on tabular result sheet.

M - Matrix spike compound.

OUTLET CITY

SITE INVESTIGATION – DECEMBER 2002

BY AKRF, INC.



Legend:

- PROPERTY BOUNDARY
- GASOLINE UNDERGROUND STORAGE TANKS
- FUEL OIL UNDERGROUND STORAGE TANKS
- AKRF/ELM SOIL BORING/MONITORING WELL-SHALLOW (2001)
- AKRF/ELM SOIL BORING/MONITORING WELL-DEEP (2001)
- ELM SOIL BORING (2001)
- BEDROCK BORINGS
- 1990 SOIL SAMPLING LOCATION
- 1988 SOIL SAMPLING LOCATION
- 1997 SOIL SAMPLING LOCATION
- RECOVERY WELL
- MONITORING WELL
- SAMPLE DEPTH
- TOTAL VOC CONCENTRATION IN PARTS PER MILLION (ppm)

2-6'	0.109
6-8'	0.019

AKRF, Inc.
Environmental Consultants
116 East 27th Street, New York, N.Y. 10016

OUTLET CITY
Brooklyn, New York

TOTAL VOCs IN SOIL

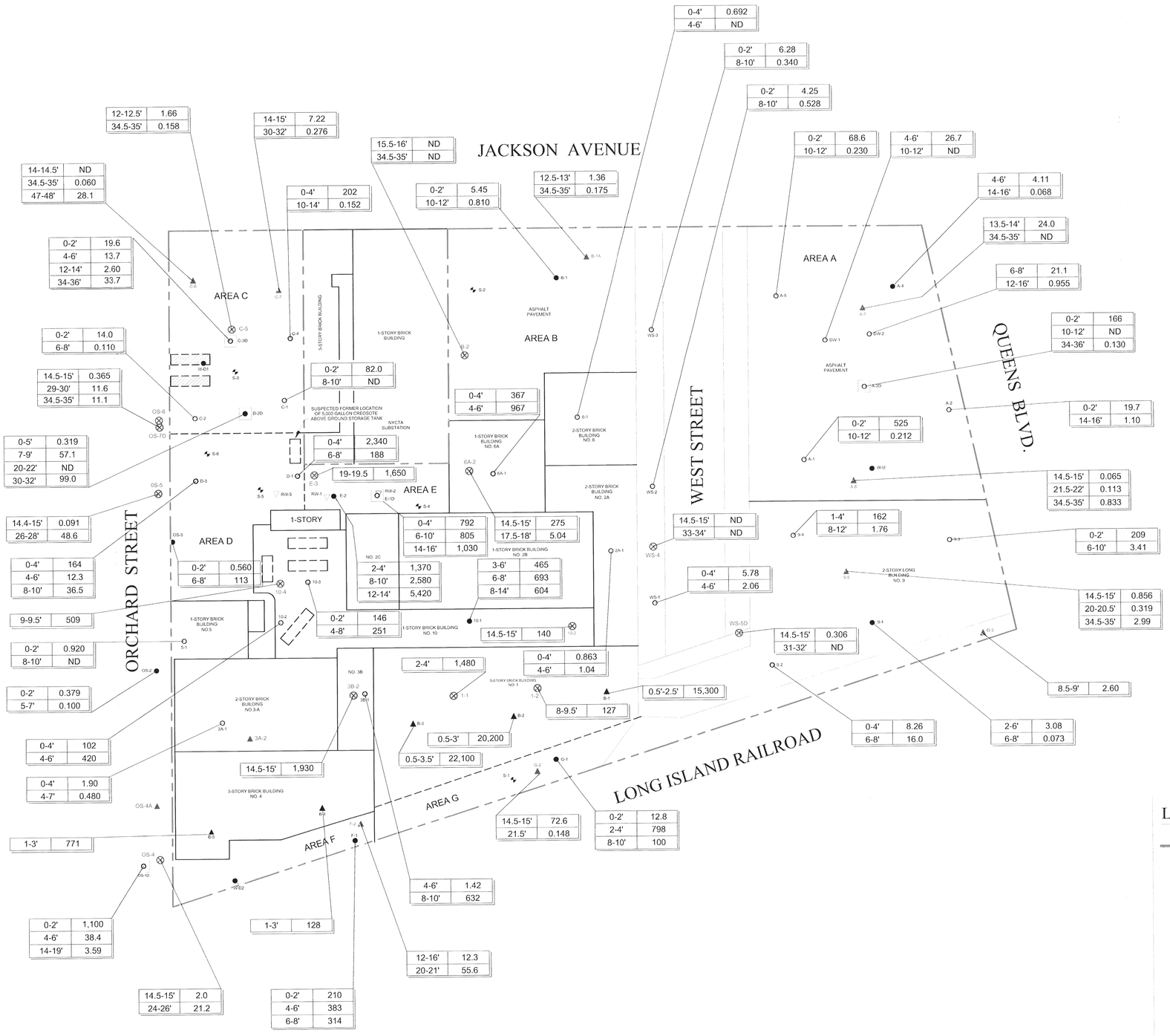
DATE
12.30.02

SCALE
AS NOTED

PROJECT No.
08008

FIGURE No.
4

2002 AKRF, Inc. Environmental Consultants G:\AKRF\data\OUTLET CITY (08008-0008\F4_Total VOCs in Soil



Legend:

- PROPERTY BOUNDARY
- GASOLINE UNDERGROUND STORAGE TANKS
- FUEL OIL UNDERGROUND STORAGE TANKS
- ELM SOIL BORING/MONITORING WELL-SHALLOW (2001)
- ELM SOIL BORING/MONITORING WELL-DEEP (2001)
- ELM SOIL BORING (2001)
- BEDROCK BORINGS
- 1990 SOIL SAMPLING LOCATION
- 1988 SOIL SAMPLING LOCATION
- 1998 SOIL SAMPLING LOCATION
- RECOVERY WELL
- MONITORING WELL
- SAMPLE DEPTH
- TOTAL SVOC CONCENTRATION IN PARTS PER MILLION (ppm)

2-6'	3.08
6-8'	0.073

AKRF, Inc.
Environmental Consultants
116 East 27th Street, New York, N.Y. 10016

OUTLET CITY
Brooklyn, New York

TOTAL SVOCs IN SOIL

DATE
12.30.02

SCALE
AS NOTED

PROJECT No.
08008

FIGURE No.
5

2002 AKRF, Inc. Environmental Consultants Q:\AKRFData\OUTLET CITY 08008-0008\FS_Total SVOCs in Soil

AKRF Engineering, P.C.

ENVIRONMENTAL AND ENGINEERING CONSULTANTS
117 East 29th Street • New York, NY 10016-8022

TEL: 212/696-0670
FAX: 212/447-5546

October 23, 2001

Mr. Dennis Wolterding, Chief
Region 2 Hazardous Waste Remediation Program
NYS DEC Region 2
47-40 21st Street
Long Island City, NY 11101

Re: Outlet City Site – Transmittal of Sampling Data

Dear Mr. Wolterding:

Please find attached results of laboratory analyses, boring logs and a figure showing sampling locations from sampling conducted at the Outlet City Site. These data were generated by Environmental Liability Management Inc. (ELM) of Princeton, New Jersey. The sampling was conducted by ELM on behalf of a potential purchaser of the site.

Please note that AKRF was not present during this sampling and has no additional information concerning the performance or results of this sampling. You will note, however, that the sampling locations, depths, parameters, etc. are similar to those proposed by AKRF in our August 2001 "Additional Environmental Investigation Work Plan", on which we are still awaiting your comments.

As such, we request you consider these data as a partial fulfillment of the work proposed under AKRF's August 2001 Work Plan.

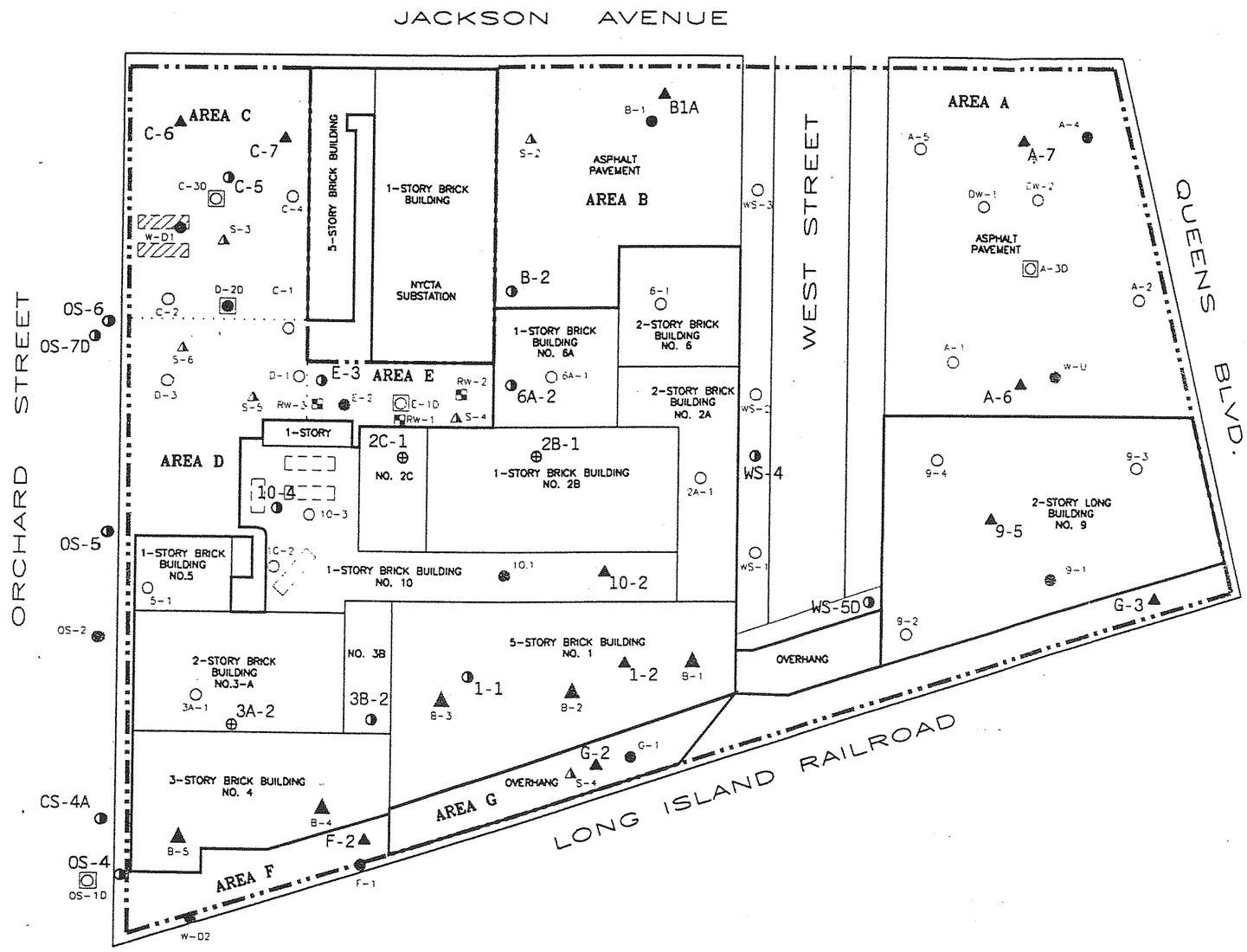
If you have any questions, please call me at (212) 340-9790.

Sincerely,
AKRF Engineering, P.C.

Marcus Simons
Vice President

C:\MARCUS FILES\OUTLETCITY\ELM DATA TRANSMITTAL.DOC

cc: Vadim Brevdo - NYSDEC
~~Gary Litwin/Geoff Laccetti/Krista Anders~~ - NYSDOH
~~Rosalie Rusinko~~ – NYSDEC (w/o attachments)
~~Joseph Conley~~ – Outlet City Inc. (w/o attachments)
~~John Scagnelli~~ - Scarinci & Hollenbeck (w/o attachments)
~~David Freeman~~ - Paul, Hastings, Janofsky & Walker LLP (w/o attachments)
~~Mark Chertok~~ - Sive, Paget & Riesel, P.C. (w/o attachments)
~~Pete Zimmerman~~ – ELM Inc. (w/o attachments)



LEGEND

C-5	SOIL/GROUND WATER BORING LOCATION AND ID (SUBMITTED TO NYSDEC)
A-7	SOIL/GROUND WATER BORING LOCATION AND ID (PHASE II SAMPLING EVENT)
3A-2	SOIL/GROUND WATER GEOPROBE BORING REFUSAL LOCATION AND ID
	BEDROCK BORING LOCATION
S-1	1988 SOIL SAMPLING LOCATION AND ID
A-3D	1990 SOIL SAMPLING LOCATION AND ID
A-4	1990 SOIL SAMPLING/SURVEYED GROUND WATER MONITORING WELL LOCATION AND ID
B-1	1997 SOIL SAMPLING LOCATION AND ID
RW-3	RECOVERY WELL LOCATION AND ID
	FUEL OIL UNDERGROUND STORAGE TANK
	GASOLINE UNDERGROUND STORAGE TANK

NOTES:

DRAFT

SOURCE:
AKRF, INC., PROJECT No. 08008, FIGURE No. 2, 3/20/01.

0 50 100

SCALE: 1" = 50'

TITLE:

FIGURE 1

GENERAL SITE MAP

LOCATION:
OUTLET CITY
LONG ISLAND CITY,
QUEENS, NEW YORK

DATE: 5/9/01

PROJECT NO.: 201119

FILENAME: 201119_SITEMAP_rev2

ENVIRONMENTAL LIABILITY MANAGEMENT, INC.
218 Wall Street, Research Park, Princeton, NJ 08540
4920 York Road, Ste. 2CC2, P.O. Box 306, Holicong, PA 18928
1259 Route 46 East, Building 1, First Floor, Parsippany, NJ 07054

AKRF 00962

FIELD SOIL BORING INFORMATION SHEET

B-10

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/15/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		0.5-2'		3"	7-3-2	Asphalt-0-2"; Subbase-2"4 Stone-~~2~~ 2"-6" 0.5-2' → Dk Brown, f(+)-~~c~~SAND, trace(+) Silt, trace f Gravel); moist, 0, freq. brick frags., fill.
SS-1		2-4' 4-6'		16" 15"	2-1-1-2 4-2-3-5	Lt Brown, f-m SAND, trace Silt; dry, 0, fill ~~X~~ — Blk cinders noted Brown, f(+)-mSAND), little Silt; moist, 0, freq. brick frags, occ. cinders (blk), wood frags, fill
		6-8'		16"	4-3-3-4	Lt. brown, f(+)-m SAND), trace Silt; moist, 0, occ. brick frags, fill.
		8-10'		17"	4-4-4-4	Brown, f(+) m(+)-C SAND, trace(+) Silt, trace(-) f Gravel; wet, 0
		10-12'		15"	4-5-6-6	Lt brown, f(+)-C SAND), trace Silt, trace f Gravel; wet, 2, lower 6" Gray, odor, apparent staining
		12-14'		16"	2-3-4-4	Gray, vf-f SAND, trace Silt; wet, 3.5, odor
		14-16'		10"	3-3-3-3	Gray, vf-f SAND, some Silt; wet, 2.5, staining, varving noted (~~Varves~~ Varves Gray SILT-moist)
SS-2						Analytical sample - ~~S-1A~~ - 14.5-15' A-6-1
		16-18'		9"	4-3-3-3	Gray, vf-f SAND, some Silt; wet, 2.5, staining, odor, varving noted - varves - Gray SILT, moist, freq. mica.
		18-20'		20"	2-5-6-10	As above; wet, 4, varves less freq., staining, odor
		20-22'		18"	3-4-5-6	Gray, vf SAND, some(+) Silt; wet, 4.5, odor, staining, varving noted but less freq. than above. ANAL. SAMPLE A-6-2 - 21.5-22'
		22-24'		14"	3-4-4-6	Top 6"- As above; wet, 0
		~~24-26~~			~~2-4-4-6~~	Bottom 8"- Gray, vf SAND, some(+) Silt; wet, 0, freq. varves noted, varves ~~Gray~~ Brown CLAY.

AKRF 00963

A-6

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3	—	24-26'	—	17"	2-3-4-2	As above; wet, 1.5, varying less frag. - lenses - Brown CLAY, Gray SILT - APPEARING
		26-28'		11"	3-4-4-6	Gray, vf(sl)-f SAND, some silt; wet, 1, varying notes - alt. lenses Brown Clay, Gray silty CLAY
		28-30'		13"	3-3-4-4	As above; wet, 0.
		30-32'		12"	6-7-10-7	Top 8": Gray, vf-f SAND, some (+) silt; wet, 0, varying notes - alt. layer Brown CLAY, Gray SILT Bottom 4": Gray, f(+)-c SAND, some silt, trace(+) f-m Gravel; wet, 1.5, frag 1/4"-ϕ pebbles, Sandy till.
SS-4		32-34' (Drive 18")		6"	18-28-5/6"	As above; wet, 0.5, Sandy till.
		34-35'	—	5"	59-29 (59-28)	As above; ~~wet~~, 0.8, Sandy till, freq. gneissic frags, with. ANALYTICAL SAMPLE A-6-3 ~~34.5~~ 34.5'-35'.
						A-6-GWS - Sc. 0-15' - ~~SS~~ Sheen noted.
						A-6-GWD - Sc. 30-35' -

AKRF 00964

A-7

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3½inch diameter.

Date: 4/29/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	SS-1	~~0-~~2'		5"	3-3	Asphalt- 0-2" ; 2"-6"- 2"4 Stone subbase 1-2'- Brown - DK brown, f-c SAND, little Silt, trace f Gravel; moist, 0, abundant brick frags., fill. DK brown, f-c SAND, little Silt, trace f Gravel; moist, 0, frag. brick frags, blk. cinders, fill.
	SS-2	2-4'		11"	4-3-2-2	Brown, f(+)-c SAND, little(+) Silt, trace(+) f(+)-m Gravel; moist, 0, frag. brick frags., fill.
	SS-3	4-6'		0"	2-3-21	No recovery.
	SS-4	6-8'		0"	5-1-2-1	No recovery.
	SS-5	8-10'		8"	10-11-11-8	~~Top 2"- Brown, f-c SAND, little(+) Silt, little(+) f-m Gravel; wet, 0, occ. ¼" ø pebbles.~~ Bottom 6"- Black WOOD and CINDERS; moist, stained, odor, 8, metal frags., fill.
		10-12'		20"	7-5-4-5	Top 5"- Brown, f(+)-m SAND, little(+) Silt, trace f Gravel; moist, 1, frag. brick frags & cinders, fill Middle 4"- Black CINDERS; moist, 6.5, fill
SS-		12-14'		17"	3-4-4-4	Bottom 11"- Brown, clayey SILT, trace (+) vf Sand; dry, 1. ~~Brown, vf-f SAND, little Silt, frag mica, wet, 0, ~~ Seams of 1"th. Brown clayey SILT varves; moist, 0. ANALYTICAL ~~EIS~~ SAMPLE- 135-14'-A-7-1
		14-16'		0"	3-3-3-3	No Recovery.
		16-18'		0"	4-3-3-3	No Recovery.
		18-20'		13"	3-2-2-2	Brown Gray, vf-f SAND, little(+) Silt, ~~with~~ also seams of 0.25"- th. gray clayey SILT varves; moist, 0.
		20-22'		11"	5-1-1-4	Top 10"- As above; wet, 0, clayey SILT varves @ ⅛"-¼" th. Bottom 1"- Brown, vf SAND, some Silt; ~~f~~ wet, 0, frag. micaceous, ~~some~~ occ. clayey SILT varve -½" th.
		22-24'		15"	4-5-6-11	As above; wet, 0, occ. clayey SILT varve, ½" th.

AKRF 00965

FIELD SOIL BORING INFORMATION SHEET

A-7

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		24-26'		14"	3-5-7-9	Brown, vf Gr-f SAND, some Silt; wet, 0, occ. 1/8"-th. varves of brown silty CLAY. mica noted abund.
		26-28'		10"	2-2-4-5	As above; wet, 0, varves more freq.; abund. mica noted
		28-30'		17"	2-2-4-4	Gray, vf-f SAND, some Gr Silt; wet, 0.8, freq. 1/8"-th. gray clayey SILT varves, occ. 1/16"-th. brown CLAY varves.
		30-32'		13"	3-4-7-8	Gray, SILT, some and Gr, vf Sand; wet, 0.5, freq. brown CLAY varves, -1/16" thick.
		32-34'		19"	5-5-5-7	Top 3" - Gray-f-c SAND, little Silt, trace Gr-f Gravel; wet, 0, occ. 1/4"-Pebble. Bottom 16" - Gray SILT and vf Sand; wet, 0, freq. 1/16-1/8"-th. clayey SILT varves.
SS-		34-35'		5"	3-4	As above; wet, 0. ANALYTICAL SAMPLE 34.5-35' A-7 2
						GW Emple- A-7 GWD

AKRF 00966

FIELD SOIL BORING INFORMATION SHEET

B-1A

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: Area B

Description: A Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/18/01 Time Started: Time Completed:

0-10% Trace 35-50 mod
10-20% - little
20-35% - some

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
B-1A						
~~SS-1~~		~~(0.5-2)~~ 0.5-2.5		13"	4-5-3-4	~~Brown~~ Top 8" - Brown, f-m SAND, some Silt, ~~trace~~ f trace m Gravel; dry, PID=0, apparent fill. middle 2" - Lt. brown, c-f SAND, trace(+) Silt, trace Gravel; dry, PID=1, apparent fill. Bottom 3" - Brown, SILT, f(+)-m Sand, moist, PID=1, cinders (blk) & wood, brick frag. - fill
SS-2		2.5-4.5'		3"	3-5-2-6	Dk. Brown, clayey SILT, little f-m Sand, trace(-) fn Gravel; moist PID=0 fill.
SS-3 ~~SS-2~~		4.5-6'		2"	1-2-1-4	Dk brown-Brown, fn-md-c SAND and(=) Silt, trace(+) fn-md Gravel; moist PID=
SS-4		6-8'		8"	5-14-2-2	Red BRICK; Wet, PID=0 large Concrete Frag observed, fill

Color, Density, Dom Sediment type (SAND, silt gravel or Silt Sand Gravel); moisture, odor, PID, comments

AKRF 00967

FIELD SOIL BORING INFORMATION SHEET

SB-1A

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3						
		8-10'		15"	4-6-6-4	Top 6" Black-Brown F-M SAND, some (+) Silt, trace f-m gravel; moist PID=Ø Occasional Brick Flags, concrete flags, pieces of rubber, Fill Bottom 9" Brown F-M SAND, trace (+) Silt; ~~moist~~ wet; Ø
		10-12'		20"	4-5-6-5	Top 7" Brown-dk brown F-M SAND, little (+) Silt, trace fn gravel; wet; Ø Middle 8" Brown - SILT, and (+), fn-md Sand, trace (-) md Gravel; wet Ø Mottled Bottom 5" Brown-dk brown - see top 7"
SS-4						
		12-14'		21"	8-6-5-6	Top 8" - ~~Brown F-m SAND, little (+) Silt~~; wet, 1, apparent gray staining, lower 4" of interval (Analytical Sample B-1A1 -- 12.5-13') Bottom 13" = Brown-Gray, Silty Clay, trace Sand; moist, 0, mottled.
		14-16'		Ø	6-8-5-6	No recovery ~ Stone in SS nosepiece.

AKRF 00968

FIELD SOIL BORING INFORMATION SHEET

SB-1A

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-						
		16-18'		12"	5-7-11-13	Brown-Lt. brown, clayey SILT; moist, O, occ. silty clay seams.
						Lt. Gray - clayey SILT; moist, O, occ. seams of silty CLAY ($\frac{1}{8}$"-$\frac{1}{25}$" th-typ)
		18-20'		8"	3-5-7-7	
SS-						Lt. Gray - SILT; wet, O, occ. seams of clayey silt (⅛"-th. typ) - mica noted.
		20-22'		14"	5-5-7-8	~~As above; moist, O, 1"ø pebble noted~~
		22-24'		14"	4-5-6-9	Brown-Grey - clayey SILT, trace (-) vf to f Sd; wet, varving Ø's

AKRF 00969

Hit hardpan

SB-1A

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-						
		24-26'		Ø"	100/4"	Split spoon refusal, resumed HSA drilling broke thru obstruction @ 25'+/- HSA to 26'
		26-28'		11"	10-9-12-11	Top 3"-Gry/Dark Gray fn-C SAND, some Silt, trace(+) fn Md Gravel Bottom 8" = Gray f-C+ SAND, trace(-) silt, trace(+) fn-md Gravel; wet, Ø, occasional 1/2-3/4" diameter pebbles
SS-						
		28-30"		8"	9-9/3	As above (Bottom 8"); Wet Ø frequent 1/2-3/4" diameter pebbles
		30-32"		9"	20-23-14-15	Gray As Above; wet Ø, occ. 1/2-3/4" Ø pebbles; bottle ~~x~~ noted. freq.

AKRF 00970

FIELD SOIL BORING INFORMATION SHEET

BB-1A

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY: **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		32'-34'	0.7	9"	27-14-15-8	Top 5" As above; wet, ∅ Bottom 4" Gray Silty CLAY, Trace(s) fn Sd; moist ∅
		34-35'	∅	9"	7-8	Gray Clayey SILT; moist, ∅ Analytical Sample BB-1A2 34.5-35'
						BB-1A GW (Dup)
SS-						

AKRF 00971

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: B-2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/18/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-1		0"-2'		3"	4-3-3	Brown f-m SAND, trace fn Gravel; dry, PID ∅
		2-4'		5"	55-1-1	Top 2" Brown m-f SAND, trace(+) silt. Apparent fill Bottom 3" Brown f SAND, Little Silty ~~trace of clay~~ clay; dry ∅ Apparent fill
SS-2		4-6'		9"	1-2-3-3	Top 5" Brown m-f SAND, trace silty clay; trace(+) Gravel; dry, ∅ Large 1.5" Stone noted at top Bottom 4" Brown, SILT, some fn Md Sand, trace gravel; dry, ∅ w/ occasional clay lays noted
		6-8'		13"	3-2-2-2	Light Brown - Brown - SILT, some vfn-fn Sand; (Mottled) moist, ∅, Frequent Brick frag occasional pieces of glass

AKRF 00972

FIELD SOIL BORING INFORMATION SHEET

B-2

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3						
		8-10'		0"	1-2-1-3	No recovery
		10-12'		22"	33-44	Lt Brown-Orange, f(+), m(+)-c SAND, trace(+) Silt; wet, 0.
SS-4						
		12-14'		16"	7-7-10-10	Top 9" - Brown-Wht, f(+)-m SAND, little Silt; wet, 0, mottled. Bottom 7" - Brown, f(+) m(+) - c SAND, little(+) Silt; wet, 0, mottled.
						Top 6" - Brown, f-m SAND, trace(+) Silt; wet, 0.5, middle 6" - Gray, f-m SAND, some(-) silt, trace f Gravel; wet, 0, Bottom 10" = Brown-Gray, f(+)-m SAND, some Silt; moist, 1, mottled.
		14-16'		22"	69-9-15	

Analytical Sample - B-2-1 15-16'

AKRF 00973

B-2

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		16-18'		22"	3-4-5-5	Top 4" - Brown fn-md SAND, trace fn gravel
						~~Bottom 18"~~ middle 6" - Gray SILT, some(+) fn-md Sand; moist
						(at -17' 6.5ppm IP10)) occ. quartz frag, clay frag? possible fill - 3.5 PID
						~~(16-17')~~ Bottom 12" Brown Silty CLAY, trace(+) fn Sand, trace fine gravel; moist; 6.5
SS-		18-20'		16"	4-5-5-7	Top 6" Gray Brown Clayey SILT, ~~trace~~ little(+) vfn-fn Sand; wet, 1ppm
						Bottom 10" - Brown Silty CLAY, trace gravel trace(+) fn Sand, trace(+) fn Gravel; ~~moist~~ wet, 1ppm, occ. ½" diam pebble
		20-22'		16"	5-4-4-7	Top 3" - Brown fn-md SAND, Little(+) Silt, trace + fn Gravel; wet; 0
						Middle 7" - Brown md SAND, ~~trace~~ Silt, trace fn-md Gravel; wet 0
						Bottom 6" - Brown vfn SAND and Clayey ~~Silt~~ Silt, trace fn-md Gravel; wet 0

AKRF 00974

FIELD SOIL BORING INFORMATION SHEET

B-2

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		22-24"		~~5~~ 4"	100/4	Brown, clayey SILT, little(+) vf-f Sand, trace(+) f Gravel; moist, occ. ½-3/4" pebble; till.
SS-1						
		24-26"		20"	7-13-15-10	Top 7" - Brown fn-md SAND, trace(+) Silt, trace(+) fn-md gravel; wet, Ø (Ø) occ ½-3/4" d. pebbles
						middle 6" - Brown little(+) SILT, ~~little~~ fn Sand, trace fn gravel; wet, Ø (Ø)
						Bottom 7" - Brown md-C SAND, trace(+) Silt, trace(+) fn-md gravel 1" d. pebbles noted; wet, 3ppm (3ppm)
SS-2		26-28"		20"	6-7-10-10	Top 6" - Brown SILT, little fn Sand, trace fn gravel; wet, Ø
						Top Middle - 7.0" Brown md-C SAND trace silt, little(+) fn-md gravel, wet, Ø 2.3ppm
						Bottom Middle 4.0" Brown vfn SAND and Silt; wet, Ø
				0		Bottom 6" - Gray CLAY, Gray SILT, little vfn Sand; moist, Ø alternating layers of Varves

AKRF 00975

FIELD SOIL BORING INFORMATION SHEET

B-2

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3		28-30'	Ø	14"	6-7-10-12	Top 1" Brown SILT some (+) fn-md Sand; wet; Ø
						Bottom 13" Alternating layers of Gray CLAY, ~~and~~ Gray SILT, little vfn Sand; dry, Ø
		30-32	Ø	8"	16-20-22-27	Brown fn+-md SAND, little(+) Silt, trace fn gravel; wet, Ø
						Freq. 1"+ d. pebbles
SS-4		32-34	Ø	10"	27-16-16-22	Top 2" As above; ~~wet~~ mast Ø
						Bottom 8" vf-fn SAND, (mdst+); ~~wet~~ wet, Ø
						occ. 1" d. pebble little silt, trace fn Gravel
		34-35			10-16	Brown, f-m SAND, trace (+) Silt, trace (+) f Gravel; wet, Ø, occ. 1/4" pebble.
						S.A. Analytical 34.5-35

AKRF 00976

FIELD SOIL BORING INFORMATION SHEET

C-5

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/20/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
	0720	0.5-2.0	0	50	10-6-5	Dark Brown fine to medium sand with some fine gravel Dry. Trace asphalt
SS-1	0725	2.0-4.0	0	75	2-3-3-3	Brown Same as above to 3.5 feet. 3.5 to 4.0 feet Brown fine sand with fine silt and small gravel throughout. Damp
	0730	4.0-6.0	0	85	2-4-4-7	Same as above Very slight petro odor
	0735	6.0-8.0	0	90	4-6-7-9	VF silty sand 6.5 to 6.5 to 7.5 feet with trace of fine gravel Damp 7.5 ft to 8.0 clayey silt with VF sand and fine gravel throughout. Damp/moist. Very slight petro odor
SS-2	0740	8.0-10	0	95	11-21-17-30	Same as above to 9.0 feet with reddish brown silt/clay fragment at 9.5 feet. moist 9.5 to 10 feet. Lite brown poorly sorted sand and fine to medium gravel throughout. Some fine silt. moist
	0745	10-12	0	85	15-7-7-10	Dark brown to black silty sand with small to med gravel with coal, brick fragment to 11.0 feet 11 to 12 feet Fine to med brown silty sand with fine to medium gravel throughout [illegible] very moist at 12 feet

AKRF 00977

C-5

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 4/20/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3	0750	12-14	0	95	8-8-8-7	Same as above wet at 12.5 feet
	0755	14-16	0	90	12-12-11-16	~~Analytical @ 12'-12.5~~ Same as above to 15 feet. 15 to 16 feet VF brown silt with Trace VF sand. Setting temp well. Gray/brown
						Collect groundwater sample 0820 @ 13.5 & 15 feet GW very turbid brown
SS-4	0835	16-18'	0.1	75	14-15-11-7	Same as above to 17 feet. 16.5 to 17 feet dark brown silty sand with small to medium gravel throughout 17 to 17.5 Brown fine to medium silty sand with medium grain gravel. 17.5 to 18 feet poorly sated brown to gray sand with some gravel throughout. Some silt wet. Very ~~Hvy~~ slight odor @ 16.5 to 17.5 feet
		~~18-20~~			17-18-11-9	

AKRF 00978

C-5

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	0845	18-20	0	40	17-15-11-9	Same as above. Some smaller quartz gravel at 20 feet wet.
	0847	20-22	0	30	5-3-4-5	same as above 21 to 22 feet gray/brown fine clayey silt with trace VF sand at 22 feet. wet
	0850	22-24	0	60	4-3-3-5	same as above to 23 feet with some VF sand. 23.5 to 24 feet Fine to medium grey/brown silty sand with quartz gravel fragments. (reddish brown)
SS-						
	0855	24-26	0	80	7-9-11-22	Fine to medium brown sand with small gravel throughout and fine q silt to 25.5 feet. 26 Fine gray to greybrown silty sand with some small gravel. wet.
	0900	26-28	~~4.5~~ 0	40	17-13-14-13	same as above with small to medium gravel

AKRF 00979

C-5

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	0910	28-30	0	45	22-17-15-23	Fine to medium grey brown silty sand with ~~fine~~ sand gravel throughout. Trace of quartz fragment at 30 feet. wet.
	0915	30-32	0	20	10-21-30-16	same as above with large fractured dark grey quartz gravel at bottom of spoon wet.
				~~20~~		
SS-	0930	32-34		20	13-14-15-12	Dark grey at 34
						analytical sample @ 34.5 to 35
	0935	34-35	1.0	—	9-7	Dark grey poorly sorted sand with fine to medium gravel and quartz fragments throughout. End of Boring
						Petroleum type odor throughout
						collect groundwater sample 1005 @ 30 to 34 feet
						strong odor and sheen on water coming off auger flights. Some black product globules too.

AKRF 00980

* = Labeling drums = date, Boring, sample consolidated drums Area B. Area E Spoons not smaller Soil 15', only 4 bags * Dup sample * ⇒ Sample 35' ⇒ Sample * ⇒ Bottom of Hole. C-6 & C-7

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project # 516-6358-8261

Site Specific Work Location: C-6

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/7/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		5-7	Ø	~~8"~~ 3"	3-2-2-3	3" Dark Brown Md SAND, Some Silt, little fn-Md gravel, trace gray clay; moist, small pieces of coal, brick, 1/4" pebble noted.
		10-12	Ø	25"	2-3-5-7	15" Brown & gray CLAY - no Hcl; dry 15-17" Brown Md SAND; wet 17-20" same as 0-15"; dry 20-25" Dark Brown fn-Md SAND, Some Silt, trace fn gravel; dry Ø
SS-		14-16	Ø	11"	46-10-15	0-7" - Gray & Brown-Pink varved CLAY, trace v fn SAND; dry Ø 7"-11" Brown fn-Md SAND; moist wet, cobble noted at 11'; Ø Sample 14.5-15' C-6-S

AKRF 00981

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: C-16

Description: Sampling Devise: 24-inch Split spoon/3"-inch diameter.

Date: 5/17/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		20-22	Ø	7"	11-11-15-16	Brown 0-7" - fn-Md SAND, some gray clay; 1/4" pebbles throughout 2" pebble noted at bottom; moist
		25-27	Ø	12"	25-16-12-15	0-7" Gray fn±-Md SAND; wet, gravel-sized Quartz & 1/4" pebbles noted at 7"
						7-12" Brown fn±-Md SAND; wet, 1/4 & 1/2 inch pebbles noted
SS-		30-32	Ø	9"	10-12-15-20	0-9" Dark Gray fn±, Md SAND, trace(s) fn gravel; wet, 1" pebble noted at 7" - 8" little piece of wood noted, 1/4" & 1" (flw) pebbles noted 1-3"
		32-34	Ø	18"	27-36-50/5	0-18" Dark Gray fn±-Md SAND, little fn gravel; 1/4 in. pebble

AKRF 00982

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: C-6

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 6/7/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		34-36	0-14"-Ø 15"-1.2	15"	9-17-20-23	34.5-35 ~~Set 5 35~~ C-6-D1 0-7"- same above; wet 7"-15"- Brown & Gray Md+SAND, Little gravel; wet, ¼" pebbles, Fill, Schist at 15"; Slight odor
		36-37	4" 4.0 7" 10.2	7"	22-50/3	0-7"- Brown & Gray, Md+SAND, Little gravel; wet, ¼" pebbles Noted, ODOR (Slight) (Washed) ~~Sample~~ ~~36.5-37 C-6-5D~~ (Sandbag)
SS-		37.5			50/0	auger
					50/0	auger Set well 37', 3' screen C-6-GWD This well covered, moved 5' towards Jackson Ave → C-6A One more spoon - 4" auger → get opposite field. - 3' Screen & set Sample. pad cut

AKRF 00983

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: C-6

Description: Sampling Devise: 24-inch Split spoon/3'inch diameter.

Date: 4/7/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		38-40'	3"-229 8"-86	10"	10-12-15-24	0-10" - Brown fn-Md SAND; wet, odor
						layered Gneiss at 10" (Water test - no globules no sheen
		40-42'	3"-149 10"-49 17"-22	17"	22-50-47-43	0-3" (Mixed SANDS-) Brn-Gray Md SAND, trace fn gravel; wet, odor 3"-17" Brn fn-Md SANDS, trace fn gravel; 1-2" pebbles noted & ¼" pebbles, wet, odor
SS-		42-44'	3"-35 8"-11	9"	13-17-13-14	0-9" weathered Bedrock; (Gray schist) dry Solvent odor
		44-46	3"-5.1 8"-6.4	7"	9-11-18-20	0-7" Weathered Bedrock; Odor (solvent), dry
		46-48	3"-52 8"-11.6	10"	17-25-50/4"	0-10" Same as above (Sample C-6-EB @ 47-48')

at 48' 50/0 (set well 48'-3' Screen) kmp.

AKRF 00984

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: C-7

Description: Sampling Devise: 24-inch Split spoon/3"-inch diameter.

Date: 5/8/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		5-7'	4'-19 5'-0	11"	4-4-6-8	0-10" Brown Silt, trace fn Sand; moist, no odor 10-11" Brown fn SAND, trace fn gravel, moist, no odor
		10-12		Ø	5-8-10-9	fill.
		14-16				Refusal 13' ft. marl/shale
						Refusal @ 15' (SO13) marl/shale
SS-		14-16	3'-14.6 7"-2 13"-0	15"	11-13-12-10	0-7" Brown & gray fn-md(f) SAND, some fn gravel; wet, no odor 7-10" Rust & white cobble 10-15" - Brown & gray Mottled CLAY; 1" pebble rated; moist, no odor Sample 14-15' C-7-5
		20-22	Ø	7"	22-32	Brown SAND, some fn-md gravel; wt, no odor

AKRF 00985

Tom-516-6078-8261.

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: C-7

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 5/8/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		25-26	3"-0.2	5"	12-16-50/6	Brn fn ± Md SAND, Some fn gravel; occassional 1/4" pebbles noted, wet, no odor
						Refusal @ 26' noted
		30-32	3"-1.2 8"-0	10"	18-10-17-20	0-3"-Brown-Org-Clayey Silt; moist 3"-10"-Gray fn ± Md SAND, Some fn gravel; wet; no odor, 1/2" pebble at 10" noted, occ fn organ & Black sand noted.
SS-		32		3"	50/4	Same as above, Cobbles at end - Grab GW Hto
						Soil Sample 31-32' C-7-D C-7-GWD. cloudy, no sheen, no odor
						Set temp well @ ± 33'

AKRF 00986

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: E-3

Description:

Sampling Device: 24-inch Split spoon/3-inch diameter. Auger

Date: 4/30/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	0-1' Asphalt & Concrete	0-2'	3"-54 9"-292	11"	7-8	0-4" white f-m SAND; dry 4"-11" Black md-C SAND, some md Gravel; moist, strong odor
		2-4'	3"-30 8"-50	19"	8-8-35	0-2" Same as above; moist, odor 2"-6" dark Brown fn-md SAND & Silt; moist
			10"-11.3			6"-19" Black SILT, some(-) fn Sand & little fn-md Gravel; cinders & slag noted, moist
		4-6'	3"-23 9"-11	18"	3-3-4-6	0-8" Dark Brown Clayey SILT, some(-) fn Sand; moist, odor 8"-15" Grey Brown fn-md SAND, some clayey Silt; moist, odor
SS-			15"-118			15"-18" Grey Brown fn-md SAND, some clayey Silt, trace md Gravel; moist, odor
		6-8'	3"-20 8"-173	17"	4-5-6/10	0-2" - Same; moist, odor 2-5" - White fn-md SAND; brick & 1/2" dia. pebbles noted
			15"-172			5"-17" Gr-Brown fn SAND; strong odor trace(-) clayey Silt

AKRF 00987

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location:

Description: E-3 **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 1/30/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		8-10'	3"-150 9"-284	15"	2-3-3-4	0-5" - Black fn-Mdt-Crse SAND, some fn-Md Gravel; ½-1" Slag noted at 4-5", dry, odor
			13"-500			5"-15" Light Brown fn SAND & SILT; Strong odor (solvent), dry
		10-12'	3"-404 9"-460	15"	11-11-14-12	0-15" Light Brown fn-Md SAND; Product, wet, odor
			15" 820			
SS-						
		12-14'	4"-407 11"-299	21"	34-26-21-19	0-13", same as above, more significant product⇒Saturated
			18"-120			14-15" 1/2 & 1" pebble - Moist
						15 Brown fn-Md SAND, little fn Gravel (dark grey); moist, Strong odor, product noted, little quartz Pebbles noted at 21"

AKRF 00988

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: E-3

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/30/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		14-16'	3"-309 9"-91	18"	4-4-13-15	0-6" Light Brn SILT, little f Sand; wet, Stmy Odor 6"-18" Lt Brn f-md SAND; wet, Stmy odor
			16"-81			
		16-18'	3"-50 10"-80	18"	10-12-25-23	0-18" - Same as above; wet, odor
SS-		18-19.5'	4"-346	19"	13-50/2	0-11" Same; moist, odor. 11"-15" - Brn f SAND, little Silt; 1/2" pebble, wet. Product, 1/2-1" pebbles 16-19" noted
			10"-438 15"-231			
						auger Refusal 19.5' (Analysis @ 19-19.5')
						- Set well. - chokeSand - 19.5' Nol Sand choker pack 1' above No 2 S 15-N'

19.5-16.5 Screen

15 → sand
16.5 → 3' Screen
19.5

AKRF 00989

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: F-2
Description: Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sleeve direct Push
Date: 4/25/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	- -	1-4'	5"- 0.5 12"- 71	31"		0-6" Black - SILT, trace(+) fn-md gravel; ¼" pebble, dry 6"-10" Brown-Black, fn-c-md SAND, some Silt, & little fn-md pebbles; dry, odor 10-14" Brown-Black, fn-Md+-C SAND, little Silty Clay; moist, odor 14-24" Brn, orange, Black fn SAND, some Silty clay, Sheen, odor, 1"d. Pebble noted
			18"- 148 24"- 164			
			30"- 220			
SS-						24"-28" Black fn-Md+-C SAND, little Silty Clay, little fn-md gravel; wet, sheen, odor
		4-8'	4"- 74.1 11"- 185	33"		0-10" - Black fn-Md+-C SAND, little Silty Clay; little fn-md gravel moist, odor, sheen, pieces of wood 10-19" Black fn-MSAND, trace Silty Clay, trace fn gravel; wet, sheen, odor ¼" pebbles 19-33" Brown l'fn-fn SAND, trace Silty Clayey
			16"- 433 22"- 95			
			29"- 91			

AKRF 00990

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: F-2

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 4/25/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		8-12	4"-171 11"-73	46"		0-7" Black fn-md SAND, little(+) clayey Silt, trace fn gravel; wet, sheen, odor
SS-1			18"-117 25"-84			7-16" Brown fn SAND, some silty clay; wet, sheen, odor
			32"-54 39"-63			16-31" Grey-green fn+-md SAND, trace Silt, ~~clay~~ moist; odor, sheen
			45"-41			31-46" Gray-Brown clayey SILT, trace→fn Sand; moist, odor
		12-16	6"-37	11"		0-6" Same above; wet, odor 6"-11" Orange & gray Mottled CLAY, little(+) fn Sand, trace Silt; dry, odor (wood)
						(Sample 12-16') F-2-1
SS-2						0-6" - Same above; dry, odor
		16-20	5"-20 12"-24	45"		6"-17" Gray clayey SILT, trace fn Sand; dry, odor
			19"-25 26"-15			17-23 Grey-gray, Brown clayey ~~SILT~~, trace→Vfn Sand; dry, slight odor
			32"-13 46"-12			23-27 Brown vfn SAND, some silt; wet, odor 27-32 - Brown-dark gray SILT, little fn Sand; trace clay
			45"-27			

Brown ... SAND ... wet, odor ... moist

AKRF 00991

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location: F-2

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / 25 /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3		20-21'	3.32	6"		0-6"-Brown-Orange Med-C. SAND, Some(t) fn-Md Gravel, Wet, odor - 1"d. pebbles at 6" noted (Analysis at 20-21') F-2-2 F-2 GW1 - hydropunch - Screen 17-21' Sampled 21'
SS-4						F-2 GW5 - @ 15' All Sc

AKRF 00992

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: G-2
Description:
Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sleeve Direct Push
Date: 4/25/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		1-4'	5"-3 12"-2	28"		0-12" Brown-orange fn-md SAND, some Silt, some md gravel, apparent fill, pieces of wood
SS-1			17"-5 24"-230			12-17" Md-C SAND, trace Silt, some md gravel; wet Pieces of wood, apparent fill 17-19" Gray/Black md pebbles 19-23" Brown-Black Md-C SAND, trace md gravel; wet, odor, pieces of wood fill? 23-28"- Brown fn SAND, some Silt
SS-2		4-8	4"-6150 10"-129	20"		0-12" Brown Vfn SAND; wet, odor 12-16" Black md+-C+ SAND; some f-md+ gravel; wet, odor 16-20" Brown-Black Vfn-Fn SAND; moist, odor
			17"-280			

AKRF 00993

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: G-2

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter. 4' Sleeve Direct Push

Date: 7/25/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3		8-12	3"-88 8"-52 14"-74 21"-47 28"-27 34"-72 41"-187	43"		0-3" - Same as above; wet odor 3"-28" - Brown-Green fn-Md SAND; wet, odor 28"-33" Brown-Green fn SAND, Silt; wet 33"-43" Brown fn-Md+ SAND trace silt; dry, odor
SS-4	6"-12"	12-16	3"-32 9"-212 16"-44 21"-49	28"		0-8"- Brown fn SAND; moist, 1/4" d. pebbles 8-10" Brn fn SAND and SILT, some Gray Clay; moist, odor 10-13" Gray CLAY, mottled coarse, moist, odor 13-16" Gray-Brown CLAY, SILT trace fn sand; moist odor 16-28" Gray-Brown Clay/SILT trace fn Sand; moist, odor
	1115	16-20				

AKRF 00994

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: G-2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		16-20'	2"-65 8"-65	30"		0-3" Brown Clayey SILT, trace(+) fn Sand; wet, odor 3"-18" Brown V. Clayey SILT, trace(+) fn Sand; moist, odor 18-30" Black md+-C SAND, trace mdgravel; wet, sheen, odor, 1" d. pebble.
			15"-27 21"-46			
			27"-32			
		20-22'	6"-22'	12"		0-12" Same as above, wet, sheen 8-12" Same; 1/2", 1/4" pebbles
SS-						Refusal at 22' - Schist noted (Hydropunch for discrete Sample (21.5-22') Sample at 22') Screen @ 18-22'
						G-2 GWD
						G-2 GWS - 15'± - All Sc.

AKRF 00995

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-4A

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/2/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-						3' Concrete & Brick (0-4') 1' Sandy fill
		4-6	3'-2.1 10"-1.2	17"	7-13-22-20	0-12" Brn fn ± Md SAND, some Silt, trace fn gravel; dry, no odor
						12-17" Black & Brn Md SAND; Brick & Cobble 2"ø.
SS-		6-8'	3"-80	6"	21-33-30-14	0-6" Brn fn-Md SAND, Little silt, little fn gravel; 1/4" pebbles noted
		8-10'			7-28-50/2	7" - Blk & Brown fn-Md Sand, some Silt, wood fragments, 3" Cobble 1/4" pebbles
						8-11.5 feet. → Set well at @ 12 ft (could not auger (Split spoon) past 12')

Page 3 of 4

AKRF 00996

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS 4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/3/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		8-10'	4"-4 11"-2.9	21"	4-5-9-6	0-13" - Brown fn + Md SAND; moist, wet at 11-13" 13-18" = Dark Brown fn. Md SAND, little (+) clay, silt; dry 18-21" - Grey & Brown (mottled) CLAY; dry slight odor (5.3ppm) trace fn SAND
			19"-1.8			
						0-6" Brown fn SAND & Gray & Brown CLAY, trace(+) fn gravel; moist Slight odor
		10-12'	4"-2.1 11"-0.7	15"	7-5-5-5	6-11" - Brown-Md+ SAND, trace(+) fn gravel; wet
SS-			15"-0.7			11-15 - Same as 0-6", moist-dry
		12-14	3"-1.8	5"	5-10-16-19	0-1" - Cobble 1"-5" - Brown fn-Md+ SAND, Little Silty Clay, trace fn gravel; solvent odor

AKRF 00997

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 05-4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		14-16	2"-1	11"	3-5-4-5	0-4" Brown CLAY, trace fn SAND, Moist, odor 1" pebbles noted, ~~Soft~~
			7"21			4"-12" Brn fn-Md SAND, some fn-md grad; 1/2-1" Pebbles odor; moist (Sample 14.5-15) (well 2" 10' screen -15')
		16-18	3"-5.6 8"-7.5	9"	10-5-4-4	Same as above; wet, odor
SS-						
		18-20	3"-9 10"-33	12"	1-1-1-1	0-9" Brn fn SAND, some clayey Silt; wet odor & little Md Gravel
						9-12" - Brn Md+SAND; wet, som odor

AKRF 00998

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		20-22	4"-21	8"	3-4-4-5	0-7" Brown fn-Md SAND, some Silt, some clay, little fn gravel; wet, odor
						7-8"- Brown md SAND & fn-md GRAVEL; wet, odor
		22-24		Ø	5-4-11	
SS-						
		24-26	7ppm	2"	14-23-R-20	Brown CLAY, trace fn Sand, trace vfn gravel; odor, wet
						(Sample - 24-26') Deep Grdwtr - Temp OS-4-GWD
						~~26'-STEam~~

AKRF 00999

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: G-3

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sheer Direct Push

Date: 4/25/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-	0820	0-4	3"=0 9"=0 15"=11.2 21"=11.6 28"=8.9	32"	N/A	0-21" - Brown fn-C*-Md* SAND, Little (→) Silt, Little fn Gravel; dry, 21-32" Black fn SAND, Little Silt, trace fn Gravel; moist, odor
	0835	4-8	3"=2.6 9"=5.6 14"=5.0 24"=10.1	46"	N/A	0-7" - Black fn SAND, Little Silt; wet, odor 7-17" Gray fn SAND, trace (→) Silt; wet.
SS-			30" 3.2 37"=9.0 43"=19.0			17-24" Brown Md SAND, some md Gravel; dry, ½" d, pebbles 24-46" Brown-Gray fn-Md SAND; wet, black stain at 45-46", odor
		8-9'	6"-4			DK Brown fn-Md+C SAND; wet Refusal at 9' (Sample 8.5-9')

AKRF 01000

FIELD SOIL BORING INFORMATION SHEET

1st hole. Refusal 9'
2nd hole. Refusal 9'
3rd hole Refusal 9'
4th hole Refusal 6'

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: G-3

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 4/25/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-						Set Well at 9', 5' Screen 4' Riser (at 1st hole) - G-3 GWS - No deep GW sample.
SS-						

AKRF 01001

(MK '17

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-5

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/1/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-4'	Ø	NA		Due to utility concerns posthole down to 4' (6"- concrete) Brown & Black fn-Md SAND, some silt, trace clay; no odor
		4-6	Ø	18"	5-5-6-6	0-18" Brn fn-Md SAND, little silt; moist, no odor
SS-		6-8	Ø	24"	4-4-4-5	0-10" Same as above; moist, no odor
						10"-24" Brown & Gray mottled CLAY, trace silt, trace fn Sand
		8-10	Ø	20"	4-4-5-5	0-6"- Same; moist; no odor
						6-11" - Brown Vfn SAND, little silt; wet, no odor
						11-16" - Same; moist; no odor
						16"-20" - Brown Silty CLAY; moist, no odor

AKRF 01002

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-5

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/1 /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		10-12	Ø	10"	4-5-8-9	0-5" - Same as above; @ 1½" pebble at 5", moist, no odor 5-10" - Brown fn-Md SAND, little fn gravel; moist, no odor
		12-14	Ø	20"	11-14-12-13	0-7" - Red-Brown Silty Clay, moist; trace fn Sand 7"-20" Brown fn-Md SAND, little Silt, little fn-Md gravel; moist, no odor
SS-		14-16	Ø	14"	16-12-14-11	0-14" Same as above's wet, no odor (Sample #4.5-15) -Set temp shallow well Sample, pull out, continue split spoon-

AKRF 01003

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-5

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 5/2/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		16-18	3"-0 6"-20	15"	9-10-15-20	0-15" Brown fn-Mdt SAND; Moist, odor (Slight)
			11"-19			
		18-20	2"-25 7"-31	9"	27-27-35-31	Brown fn-Md SAND, trace Silt; Moist, brick 1/4-1" pieces noted at 7-8", odor
SS-		20-22	3"-93 8"-336	11"	23-27-15-16	0-4"- Brn fn-Mdd SAND; odor (strong) wet 4-10"- Black Md SAND; wet, Sheen, odor 1/4-1" pebbles noted throughout 10-11"- Brn fn-Mdd SAND; wet, odor little f-m gravel
		22-24	2"-479 7"-479	9"	10-23-34-50/3	0-9"- Brn f-Mdt SAND, trace Silt; odor, some f-md gravel 1/4" pebbles noted throughout

AKRF 01004

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-5
Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.
Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		24-26	3'-78	14"	17-12-13-16	0-5" cr-Brn md SAND, trace silt & some fn-md Gravel; dry, odor
			12"-42			5-14" - weathered Bedrock; slt brn to dark (Gray & white) Gneiss
		26-28	5"-39	7"	15-25-27-29	Same as above - moist, odor (Sample 26-28') OS-5-D
						Auger Refusal 28'
SS-						Temp well 23-28 - screen (5')
						- Bailed @ 20 gal. prior to sampling
						- H2O extremely turbid
						Set perm. well @ 15'

AKRF 01005

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-7D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 9 / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-4	325			Due to utility Concerns - post hole dig down to 4.5'
		4-6	4"-37 10"-4	24"	2-2-14	0-4" Brown & Black f-Md SAND, some Silt; moist (no odor)
			17"-3.4 23"-3.2			0-7" Brown - f-Md SAND, little f gravel; Moist 7"-19" Dark Brown clayey SILT; moist
		6-8	5"-1.5 11"-1.8	19"	5-8-6-10	19"-24" - Gray f SAND; some Clayey Silt; moist 0-19" - Brn f SAND, little Silt; moist
SS-			17"-1.8			
		8-10'	4"-2.6 12"-2.3	16"	6-6-4-5	0-3" - Same as above; wet 3-10" - Brown & Black - Md SAND, little Silty Clay, little f-Md Gravel; wet, 1/4" pebbles noted, Slight odor
						10-14" - Gray Brown - Md SAND; dry
						14-16" = Gray & Brown varved silty CLAY; dry

AKRF 01006

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-7D

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 7 t /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		10-12'	4"-0.7 8"-0.7	10"	2-2-4-7	0-4" Same; Moist 4"-10" - Light Brown SILT, trace fn Sand; dry
		12-14	3"-1 8"-1	11"	6-8-8-11	0-7" Same; Slight odor 7"-11" Brt Gray clayey SILT, trace fn Sand; no odor; moist
			13"-1			
SS-		14-16	4"-0 9"-0.4	18"	4-12-15-17	0-9" Same as above; trace Brick, moist 9-11" 1" pebbles 11"-18" Brown-Gray fn-Md SAND; some fn-Md gravel; moist, no odor (Analysis 14.5-15')
			15"-0.4			
					16-20-12-15	

AKRF 01007

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-7D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/1/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		16-18	Ø	9"	10-11-23-11	Brown fn-Mdt SAND; at 9" 1"d. cobble, wet, no odor
		18-20	Ø	5"	10-25-25-26	Brn f-Mdt SAND, some fn gravel; wet ½"-1" d. pebbles noted
		20-22	4"-0 12"-0.7	24"	21-26-27 29	Same; layer cobble at bottom of spoon
			18"-0.7 23"-1.2			
SS-		22-24	4"-39 11"-16.8	18"	10-12-15-19	0-9" Same as 18-20' 9-11" Black Md SAND; 1"-2" d. pebbles; wet, sheen, odor 11-15" Brn fn-Md SAND trace fn gravel; wet, odor sheen 15"-18" Brown C+ SAND; some(+) md gravel; wet, strong odor, sheen
			18"-40			
		24-26'	3"-37 7"-34	11"	19-31-16-18	0-6" Brn fn-Mdt C SAND; wet. stng odor 6-11" Brn Md-C SAND, some fn-Mdt gravel ½, 1-2" d pebble odor, wet

AKRF 01008

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OS-7D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		26-28	3"-68 7"-62	17"	25-12-12-17	0-5" Brn fn-Md SAND; wet, odor 5"-12" Brn Md SAND, Some clayey Silt; dry, odor 12-17" White gray VF Sandy SILT (27')
			15"-50			
		28-30	3"-45 9"-[illegible]	13"	7-11-18-23	0-13" weathered gneiss, moist, (Coarse schistose structured) (Bottled 28-30') (Not Analyzed)
SS-		30-32	2"-11 7"-16	8"	7-9-17-22	0-11" Same as above; odor (Creosote & /or Solvent)
		32-34	2"-41 7"-56	8"	7-10-13-15	0-8" Same as above; odor
		34-35'	3"-6.2	6"	11-25	0-6" Same as above; odor (Sample 34-35') OS-70-D Bedrock @ 36'

5' Screen at 30-35'
No 1 Sand to 29'
Pressure Grout - Cement

AKRF 01009

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-4

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 5/3/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-4				Due to utility conflicts- Posthole down to @ 4' (6" concrete) Brown Black cinder at 1' - SAND & Gravel to 2.5', Brown Md SAND, some Silt, slight to
		4-6	3"-2.1 11"-1.2	24"	3-3-5-6	0-14"- Brn fn SAND, trace Silt; dry, no odor
			19"-0.7			14"- Gray fn SAND; dry, no odor
		6-8	Ø	18"	5-5-4-3	0-9" Brown-Black fn-Md SAND, trace Silt, trace+ fn Gravel, Moist
SS-					PID	9"-18" - Brown v fn SAND; moist
		8-10	weight of hammer	12"	Ø Ø/m	0-12" Brn v fn SAND, some Clayey Silt; Mo's
		10-12	weight of hammer	12"	Ø	0-12" Same as above; wet, very slight odor
		12-14	Ø	18"	3-5-5-4	0-18'. Brown fn-Md SAND; slight odor

AKRF 01010

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		14-16	Ø	20"	2-4-6-5	0-20" Brown fn-Md SAND, trace-Silt; wet
						14.5-15' Analysis WS-4-S & WS-4-GWS
		16-18'	Ø	14"	2-2-2-3	0-10" Same as above; wet 3-6" Rest moist
						10-14 Dark Brown Gray SILT; moist trace fn Sand
SS-		18-20'	Ø	10"	3-4-4-8	0-10" Same as above; Moist
		20-22	Ø	15"	5-5-9-10	0-9" Dark Brown-Gray Clayey SILT, trace fn Sand; Moist
						9-15" Dark Brn-Gray SILT, trace fn Sand; Moist-wet
		22-24	Ø	11"	4-5-10-21	0-8" Gray SILT Same as above; Slight odor, moist
						8"-11" Gray Sandy CLAY; trace clay Slight odor, moist

AKRF 01011

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		24-26	Ø	13"	4-45-6	0-5" Gray SILT, trace vfn Sand; moist, slight odor 5"-13" Gray Clayey SILT, trace vfn Sand; moist, slight odor (Cs stone)
		26-28	Ø	9"	5-6-78	0-2" Same as above; slight odor 2-8" Grey silty CLAY, trace vfn Sand; slight odor, moist 8-9" Brown-Gray vfn-fn SAND; moist, slight odor
SS-		28-~~30~~ 29'	Ø	6"	6,50/3	0-6" Gray CLAYey SILT; wet, no odor trace vfn Sand
		~~29-31~~ 30-32'	3"-1 8"-0.2	10"	25-27-21-19	0-10" Gray fn-Mdt SAND, some fn-Md Gravel; wet, 1" pebble notes, sandy fill.

AKRF 01012

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-4

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		32-34	0	6"	9-11-18-19	0.6" Same as above; ~~wet~~ moist, 0, no odor, Sandy fill (Sample 33-34' WS-4-1) WS-4-GWD
		34-35		5"		outwash sand Gray - fn + Mdt SAND (Lose the spoon shell)
						Set perm well at 14'
SS-						

AKRF 01013

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-5D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 5/9/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-4				Due to Utility Concerns- 0-4' post hole - Brown fn-C SAND w/ little Silt, trace fn gravel
		4-6	3"-2.1 4"-1	10"	Weight of hammer	0-4"- Black fn SAND, some(+) Silt, trace md gravel, moist 4"-10"- Light Brown fn SAND, some(+) Silt, moist, odor
		6-8	3"-1 10"-0	11"	3-3-3-2	0-4"- Black fn(+) SAND, some Silt, moist 4-8"- Brown fn(+) SAND, some Silt, moist, slight odor
SS-						8-11"- Brown fn-Md-Crse SAND, some(+) fn gravel; wet
		8-10	0	24"	1-2-2-1	0-6"- same as above; wet 6"-24"- Brown fn(+) SAND; wet trace Silt
		10-12	3"-0 7"-0.7 11"-1.0	12"	3-4-4-3	0-12"- same as above; wet, slight odor

AKRF 01014

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-5D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		12-14	3"-0.7 9"-0.7	11"	3-4-5-4	0-11" - Same as above; wet; odor
		14-16	3"-0.7 8"-1.0	23"	3-4-55	0-7" - Brown & Black fn-Med ± C- SAND, some Clayey Silt, little fn gravel; wet, Slight odor
			15"-1.0 21"-2.1			9" - 23" - Light Brn fn SAND; wet
						(Sample 14.5-15' - WS-5D-S) Grab WS-5D-S @ 14'-15'
SS-		16-18"	4"-1	8"	4-4-4-5	0-8" Light Brn SILT, trace vfn Sand; moist
		18-20'	Ø	11"	3-4-4-3	0-9" Light Brn Clayey SILT, trace vfn Sand; wet, no odor 9-11" Light Gray Silty CLAY; moist, no odor trace vfn Sand

AKRF 01015

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WSSD

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		20-22'	Ø	16"	2-4-4-5	0-16" Same as above; moist, no odor, staining noted
		22-24	Ø	9"	2-4-5-5	0-9" - Litho Gray Clayey SILT & Sandy CLAY, trace Fine Sand, moist, no odor
SS-		24-26	Ø	17"	3-4-5-7	0-6" 17" - Same as above; moist, no odor
		26-28	Ø	5"	4-4-5-6	0-5" - Same; moist, no odor, staining noted

AKRF 01016

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: WS-5D

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: _/ /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		28-30	Ø	14"	7-8-11-10	0-5" - Same as above; 5"-14" - Gray fn-Md ± C SAND, trace Silt, little fn-Md gravel; moist, no odor
		30-32	Ø	12"	26-13-35-48	0-2" Gray fn-Md SAND; wet, no odor 2-12" Gray fn-Md SAND, some md gravel; 1/4-1" pebbles noted Sample 30-32'-WS-5D-D Grab GW WS-5D-Grab
SS-		32-34		1"	50/1	Weathered gneissic bedrock

Bottom of well 31.5'
3' of Screen
No 1 Morie Sand → 27.5'
No 00 28.5'
(v. fn sand)

AKRF 01017

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #,

Site Specific Work Location: 1-1

Description:

Date: 5/2/01

Sampling Devise: ~~24-inch Split spoon/3-inch diameter.~~ Slide Sam hammer (manual Labor)

Time Started:

Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-2'	3"-278 10"-290	12"		6" Concrete 0-12" Brown-Black & Black md+-C SAND, little Silt, some fn gravel; Strong odor, moist, wet at 10-12 (saturated)
		2-4'	3"-164 9"-120	12"		0-4" Black md+-C SAND; Saturated w/product-Creosote, some fn gravel 4-12" Green fine SAND; clayey Silt; moist, odor (Sample 2-4')
SS-		4-6		Ø		-6'8" Refusal - metal? Set well 5' Screen

Page 3 of 4

AKRF 01018

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 1-2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter. 2' Macrocore - Manual Sample

Date: 5/2 /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		1-2'	400	4"	1	6" Concrete Brown-Black fn-Md+-(+SAND, some(+) md gravel; Saturated (product), significant odor
		2-4'	8"-219 11-435	9"		0-3" Black Md+-C SAND, some(-) md gravel; Saturated, odor 3"-9" Br-Green fn SAND, some(-) Silt, Moist, odor
		4-6		Ø		
SS-		6-8		Ø		→ Significant ODOR (very)
		8-9.5	5" 85ppm 9" 175ppm	8"		0-8" Same as Bottom 2-4'; Very Strong odor Sample 8.0-9.5' 9' 8" Refusal 1-2" OWS Set well - 8½ Screen all

AKRF 01019

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 3A-2

Description:

Sampling Devise: 24-inch Split spoon/3-inch diameter. Geoprobe -4' Sleeves

Date: / /01 4/23/01 Time Started:

Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		0-4' (below 6" conc.)		26"		0-4" Dark Brown Sand, some Md Gravel; moist, PID Ø, Fine subbase 4"-26" Brown SILT, little fn Sand; dry PID-1
SS-1		4-8'	0-25"-Ø 25-28"-59	28"		0-25" Brown fn-Md SAND, little Silt; dry PID Ø 25-28" Black fn-Md SAND, little Silt; moist, PID 59, Creosote Odor - Refusal
		8-12'				(Could not Complete this hole)
SS-2						

AKRF 01020

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 3B-2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sleeve (Geoprobe Direct Push)

Date: 4/24/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
						8" Concrete Floor
SS3		0-4'		14"		0-7" Dark Brown-Black Md+C SAND, Little Silt, Little f Md Gravel; dry, 1.2 7-11" Brown Md+C SAND, Little Silt, Little Md Gravel; dry, 1, 1/2" d pebble 11-14" Brown C+SAND, Md+ Gravel; moist, Ø
SS4		4-8'		30"		0-8" Dark Brown-Black Md+C SAND, Little Silt Some Md Gravel; wet, 79ppm 8-30" Dark Brown-Black fn SAND, trace Silt; wet, 242 creosote odor 20-30" Brown fn SAND, Little Silt; wet, 335
			14"-242 21"-476			
			27"-335			

AKRF 01021

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 3B-2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: / /01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		8-12'		32"		0-32" Brown f SAND; Wet Approximate 11.5' Stroke test(+)
			4"-312 12"-463			
			19"-228 25"-325			
SS-		12-16'	4"-301 11"-263			0-16" Brown f-Md SAND, trace Silt; Wet 16-21" Rock fragments 1"d 21-31" Brown f-Md-C SAND, & little f-Md gravel; Wet (Analytical Sample 14.5-15')
			22"-324 26"-411			
		16-17'	289	6"		0-6" Same as above; wet, 289, gneiss fragment (refusal) at 17'

3B-2GWS- Sc. 1'-16' - Nt deep GW Sample.
Product noted

AKRF 01022

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: GA-2

Description: Sampling Devise: ~~24-inch Split spoon/3-inch diameter.~~ 4' Sleeve Direct push

Date: 4/26/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3		0-4'	5"-159 10"-133	33"		0-5" Black Md SAND, some black Silt, dry, ½-1" pebbles - Red Brick 5-12" Black SILT, little fn Sand, little fn-md gravel; moist 12-33" Dark Brown-Brown fn-md SAND, wet, odor
			17"-102 24"-169			
			31"-136			
		4-8	5"-106	46"		0-12" Same as above; wet, odor 12"-21" fn SAND, some clay; Gas odor at 20", moist, sheen 21-Gay Brn fn SAND, little Silt; wet, odor, sheen (Note 20" Gasoline Odor)
			11"-171 18-19'-243 20'			
SS-4			24-141 31-62 36-54			
			45-105			
		8-12	3"-38	19"		0-14" - Same; wet, odor, sheen (Gas) odor 14-19' - fill (Landing clay); 1" pebbles
			8"-49 13'-192			
		12-15	6"-54	6"		Brown - clayey-sandy fill Sample: 12-15'

AKRF 01023

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: OA-2

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 4 / 25/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		16-18'	5"-220 11"-86 20"-73	0-22"		0-7" - Brown fn-Md+-C SAND; Wood-debris, 1" pebble noted at 7" 7"-22" - Brown Vfn SAND, wet, odor (Set well screened 2-12' ~~3-13'~~) — Hole Collapse Gneiss evident at 22" OR 18" OA-GWS-
SS-						

AKRF 01024

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 9-5

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sleeve Direct Push

Date: 1/26/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		1-4'	3"-0 5"-0	17"		0-11" Brown fn-md SAND, little Silt, little fn Gravel; dry 11-17" Brown vfn-fn SAND, little Silt; dry 1/4" pebbles noted
			15"-0			
		4-8'	3"-0 10"-52	18"		0-14" Black (little with ite) fn-md+C SAND, trace Silt, Some fn-md gravel; dry, 1/4"-1/2" d. Pebbles noted
7.5-9'			15"-40.			14-18" Dark brown fn+-md SAND; trace Silt, trace(-) fn gravel; dry, odor
SS-		8-12'	3"-25 7"-11	34"		0-4"- Same as above; dry Slight odor 4"-24' Brown vfn+-fn SAND; wet 16-21", odor Rest moist
			12"-9.4 18"-7.8			24-34" Brown fn-md SAND; wet
			24"-8.6 29"-10			VO, BN

AKRF 01025

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 9-5

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: 4/26/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		12-16	5"-14 10"-8	46"		0-5" Blck fn-md SAND, little Silt+, little fn gravel; dry 5-46" Light Brown-Gray fn-md SAND; wet (Analysis 14.5-15') (Shallow Groth 015')
			17"-6.7 23"-5.6			
			30"-5.3 37-5.1 42-7.8			
		16-20'	4"-10	33"		0-16" Brown fn-md SAND; moist, odor 16-33" Brn Vdn SAND, ~~some~~ little Silty Clay; wet, slight odor
SS-			12"-15 19"-14			
			26"-4 32"-3.4			
		20-24'	3"-1.5 10"-3.2	37"		0-37" Same as above; wet, odor (Sample at 20-20.5')
			17"-2.1 24"-0.7			
			31"-1.5			

AKRF 01026

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location: 9-5

Description: **Sampling Devise:** 24-inch Split spoon/3-inch diameter.

Date: / /01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
---		24-28	Ø @ 37" @ 38"-1.5	40"		0-40" Gray Silty CLAY; wet, odor at 40"
SS-1		28-32'	4"-0 12"-0 24"-2.1	39"		0-39" Same as above; wet, odor throughout
			31-1.8 36-3.7			
		32-35'	4"-11.8 10-7.2	28"		0-4" Same as above; wet, odor 4-28" Grey fn-Mdt-C SAND; wet, strong odor, 1"d pebbly noted Some fn-md gravel (analysis 34.5-35')
			17"-4.2 24"-2.9			
SS-2			---			Oldydropunch @ 32-35')

AKRF 01027

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 10.2

Description: Sampling Devise: 24-inch Split spoon/3-inch diameter.

Date: 9/24/01 Time Started: Time Completed:

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-3		12-16'	4"-326 10"-127	47"		0-8" - Black f-Md+C SAND, little Silty clay, trace fn brng mnts) 0-15" wet, odor
			16"-158 23"-175			8"-15" Brown fn-Md SAND; wet, odor 15-40
			30"-147 36"-100			40-47" fn-Md+ SAND; trace fn gravel, wet, odor
			43"-134			(Sample 14.5-15')
SS-4		16-18'	2"-59 7"-98	18"		0-8" Brn fn SAND, Some Silty Clay; wet, odor 8"-15" Brn SILT, trace fn Sand; wet, odor 15"-18" Brn fn-Md SAND, little Silt; wet, odor
			12"-70 17"-140	0		Refusal

Well: 15' Screen, Sed set 17', Refusal @ 18'

10.2 GWS - 18' deep GW sample

AKRF 01028

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. ELM Project #

Site Specific Work Location: 10.2

Description:

Sampling Devise: 24-inch Split spoon/3-inch diameter. 4' Sleeve

Date: 4/24/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
		0-4'	0"=0	19"		0-9" brown-gray Md+-C+ SAND, fn-md gravel; dry, 1"d pebbles
SS-1			9"-14.1			9-19" dark Brown Md SAND, little Silt, fn-md fragments; dry, apparent wood pieces, creosote odor, appears fill
			14"-264			
			18"-291			
4@4'		4-8'	3"-219	28"		0-3" Brown Md-C SAND, some md fragments; dry
SS-2			9"-186 15"-488			3-18" Brown-Black fn-Md+-C+ SAND, little Silt, some md fragments; wet, odor, appears wood pieces, product
			20"-244 26"-406			18-28" Brown fn-fn Sand, little Clayey Silt; moist, odor
		8-12'	2"-239 7"-306	15"		0-3" Brown-Black-Md-C+ SAND, some md fragments; moist, odor
			10"-199 14"-244			3"-9" Dark Brown-fn-Md+-C SAND, trace(+) Silt, trace md fragments; moist, odor
						9-15" SILT, Brown Clay, trace fn Sand; moist, odor

AKRF 01029

10-4

FIELD SOIL BORING INFORMATION SHEET

Project Name & Number: Outlet City Soil Boring/Monitoring Well Installation Program. Queens, NY. **ELM Project #**

Site Specific Work Location:

Description: [illegible] **Sampling Devise:** 24-inch Split spoon/3-inch diameter. 4' Sleeve Geoprobe Direct Push

Date: 4/24/01 **Time Started:** **Time Completed:**

Sample Type/ ID Number	Sample Collection Time	Sample Depth (feet bgs)	PID Reading (ppm)	Total % Recovery	Blow Count	Soil Litho/Other Relevant Comments
SS-		0-4'	4"-4.9 9"-3.4	12"		5" Concrete Floor (Base) 0-10" - Brown Md-C SAND, Little Silt, Little (-) md Gravel; dry apparent cinder at 8-10" 10-12" Brown vf-fn SAND, Little Silt; dry moist
		4-8'	3"-1 9"-0.7 14"-2.1 18"-13	31"		0-14" vfn-fn Brown SAND, Little Silt, Little (+) fn-Md gravel; dry 14-24' Gray vf SAND, Little Silty Clay, & trace (-) fn gravel; dry 24-31" dark gray-Black md SAND, trace fn gravel; moist,
SS-			23"-13.5 29"-77			odor apparent product
		8-9.5	3"-12.5 10"-120.7 15"-122			0-6" - Gray vfn-fn SAND, Little Silty Clay; dry, 1/4"d pebbles 6-18" Black f-md-C SAND, trace (-) Silty clay, Little fn gravel; wet, creosote odor, apparent product (Analysis @ 9-9.5)

Refusal 9.5'

10-4-GWS- Sampled 10'5".
- sl. product?
- No deep GW sample

AKRF 01030

Invoice #: 223401
Date: 4/24/01
PO #: Verbal-DK
Lab ID #: 0113312-0113319

Bill To:

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Outlet City, Queens, Sample Date April 19, 2001

Item	Qty.	Description	Unit	Extended
1.	8	EPA 8260	$120.00	$960.00
2.	8	EPA 8270	$140.00	$1,120.00
3.	8	EPA 8081	$120.00	$960.00
4.	8	Total (23) Metals	$110.00	$880.00
		10% Surcharge for 3-day TAT		$392.00

This Amount Due Upon Receipt: $4,312.00
To Long Island Analytical Laboratories, Inc.

Terms and conditions: All accounts are payable in full within 30 days, outstanding balances will accrue service charges of 1.5% per month.

April 24, 2001

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Outlet City, Queens, Sample Date April 19, 2001

Dear Ms. Krieger:

Enclosed please find the Laboratory Analysis Report(s) for sample(s) received on April 19, 2001. Long Island Analytical Laboratories analyzed the samples on April 24, 2001 for the following:

CLIENT ID	ANALYSIS
B-2GWS	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
B-2GWD	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-6GWS	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-6GWD	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-6-1	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-6-2	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-6-3	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
B-2-2	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals

If you have any questions or require further information, please call at your convenience. Long Island Analytical Laboratories would like to thank you for the opportunity to be of service to you.

Best Regards,

Long Island Analytical Laboratories, Inc.

Scan 3

Invoice #: 222401
Date: 4/23/01
PO #: Verbal-DK
Lab ID #: 0113299-0113302

Bill To:

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Long Island City, Queens, Sample Date April 18, 2001

Item	Qty.	Description	Unit	Extended
1.	4	EPA 8260	$120.00	$480.00
2.	4	EPA 8270	$140.00	$560.00
3.	4	EPA 8081	$120.00	$480.00
4.	4	Total (23) Metals	$110.00	$440.00
		10% Surcharge for 3-day TAT		$196.00

This Amount Due Upon Receipt: $2,156.00
To Long Island Analytical Laboratories, Inc.

Terms and conditions: All accounts are payable in full within 30 days, outstanding balances will accrue service charges of 1.5% per month.

April 23, 2001

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Long Island City, Queens, Sample Date April 18, 2001

Dear Ms. Krieger:

Enclosed please find the Laboratory Analysis Report(s) for sample(s) received on April 18, 2001. Long Island Analytical Laboratories analyzed the samples on April 21, 2001 for the following:

CLIENT ID	ANALYSIS
B-1A1 {12.5-13"}	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
B-1A2 {34.5-35'}	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
B-1AGW	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
B-2-1 {15.5-16'}	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals

If you have any questions or require further information, please call at your convenience. Long Island Analytical Laboratories would like to thank you for the opportunity to be of service to you.

Best Regards,

Long Island Analytical Laboratories, Inc.

Invoice #: 225901
Date: 4/25/01
PO #: Verbal-DK
Lab ID #: 0113329-0113335

Bill To:

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Outlet City, LI City, Sample Date April 20, 20

Item	Qty.	Description		
1.	7	EPA 8260		
2.	7	EPA 8270	$140.00	$980.00
3.	7	EPA 8081	$120.00	$840.00
4.	7	Total (23) Metals	$110.00	$770.00
		10% Surcharge for 3-day TAT		$343.00

This Amount Due Upon Receipt: $3,773.00
To Long Island Analytical Laboratories, Inc.

Terms and conditions: All accounts are payable in full within 30 days, outstanding balances will accrue service charges of 1.5% per month.

April 25, 2001

Tara Krieger
Environmental Liability Management
Research Park, 218 Wall Street
Princeton, New Jersey 08540

Re: Outlet City, LI City, Sample Date April 20, 2001

Dear Ms. Krieger:

Enclosed please find the Laboratory Analysis Report(s) for sample(s) received on April 20, 2001. Long Island Analytical Laboratories analyzed the samples on April 25, 2001 for the following:

CLIENT ID	ANALYSIS
A-7-1	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-7-2	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
A-7-GWD	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
C-5-1 {12-12.5'}	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
C-5-GWS	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
C-5-2 {34.5-35'}	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals
C-5-GWD	EPA 8260, EPA 8270, EPA 8081, Total (23) Metals

If you have any questions or require further information, please call at your convenience. Long Island Analytical Laboratories would like to thank you for the opportunity to be of service to you.

Best Regards,

Long Island Analytical Laboratories, Inc.

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	11
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	25
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	24
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	12
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	18
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	13
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	17
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	70
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	77
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	286
n-PROPYLBENZENE	103-65-1	6
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	10
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	15
1,2,4-TRIMETHYLBENZENE	95-63-6	49
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	249
o-XYLENE	1330-20-7	60

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	8
1,2-DICHLOROETHANE	107-06-2	23
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	78
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	25
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	3,080
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	20
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	10
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	54
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	125
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/kg
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	1.98
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	0.72
MAGNESIUM, Mg	0.05 mg/L	78.7
NICKEL, Ni	0.05 mg/L	0.20
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	2.43
ALUMINUM, Al	0.05 mg/L	195
BERYLLIUM, Be	0.05 mg/L	<0.05
COBALT, Co	0.05 mg/L	0.10
IRON, Fe	0.05 mg/L	223
MANGANESE, Mn	0.05 mg/L	5.96
LEAD, Pb	0.05 mg/L	3.41
THALIUM, Tl	0.05 mg/L	<0.05
MERCURY, Hg	0.002 mg/L	0.006
ARSENIC, As	0.05 mg/L	<0.05
CALCIUM, Ca	0.05 mg/L	196
CHROMIUM, Cr	0.05 mg/L	0.29
POTASSIUM, K	0.05 mg/L	28.8
SODIUM, Na	0.05 mg/L	104
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	0.47

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	<1.00
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	<0.05
MAGNESIUM, Mg	0.05 mg/L	19.4
NICKEL, Ni	0.05 mg/L	<0.05
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	<0.05
ALUMINUM, Al	0.05 mg/L	11.8
BERYLLIUM, Be	0.05 mg/L	<0.05
COBALT, Co	0.05 mg/L	<0.05
IRON, Fe	0.05 mg/L	10.8
MANGANESE, Mn	0.05 mg/L	5.35
LEAD, Pb	0.05 mg/L	<0.05
THALIUM, Tl	0.05 mg/L	<0.05
MERCURY, Hg	0.002 mg/L	<0.002
ARSENIC, As	0.05 mg/L	<0.05
CALCIUM, Ca	0.05 mg/L	148
CHROMIUM, Cr	0.05 mg/L	<0.05
POTASSIUM, K	0.05 mg/L	16.0
SODIUM, Na	0.05 mg/L	53.7
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	<0.05

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	12.9
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	13.7
MAGNESIUM, Mg	0.05 mg/L	757
NICKEL, Ni	0.05 mg/L	2.16
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	<0.05
ALUMINUM, Al	0.05 mg/L	1,802
BERYLLIUM, Be	0.05 mg/L	0.07
COBALT, Co	0.05 mg/L	1.05
IRON, Fe	0.05 mg/L	3,144
MANGANESE, Mn	0.05 mg/L	57.3
LEAD, Pb	0.05 mg/L	30.6
THALIUM, Tl	0.05 mg/L	0.45
MERCURY, Hg	0.002 mg/L	0.002
ARSENIC, As	0.05 mg/L	1.02
CALCIUM, Ca	0.05 mg/L	1,842
CHROMIUM, Cr	0.05 mg/L	3.44
POTASSIUM, K	0.05 mg/L	249
SODIUM, Na	0.05 mg/L	51.7
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	4.32

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	<1.00
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	8.40
MAGNESIUM, Mg	0.05 mg/L	3,675
NICKEL, Ni	0.05 mg/L	3.49
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	9.22
ALUMINUM, Al	0.05 mg/L	3,517
BERYLLIUM, Be	0.05 mg/L	0.09
COBALT, Co	0.05 mg/L	1.69
IRON, Fe	0.05 mg/L	6,615
MANGANESE, Mn	0.05 mg/L	<0.05
LEAD, Pb	0.05 mg/L	4.33
THALIUM, Tl	0.05 mg/L	0.59
MERCURY, Hg	0.002 mg/L	<0.002
ARSENIC, As	0.05 mg/L	1.36
CALCIUM, Ca	0.05 mg/L	5,460
CHROMIUM, Cr	0.05 mg/L	4.61
POTASSIUM, K	0.05 mg/L	1,216
SODIUM, Na	0.05 mg/L	123
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	<0.05

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	62.7
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	28.4
MAGNESIUM, Mg	1.65 mg/kg	6,259
NICKEL, Ni	1.65 mg/kg	20.1
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	50.1
ALUMINUM, Al	1.65 mg/kg	10,947
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	9.50
IRON, Fe	1.65 mg/kg	21,240
MANGANESE, Mn	1.65 mg/kg	243
LEAD, Pb	1.65 mg/kg	9.87
THALIUM, Tl	1.65 mg/kg	4.25
MERCURY, Hg	0.020 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	4,938
CHROMIUM, Cr	1.65 mg/kg	33.5
POTASSIUM, K	1.65 mg/kg	2,605
SODIUM, Na	1.65 mg/kg	391
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	34.9

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	62.2
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	18.1
MAGNESIUM, Mg	1.65 mg/kg	17,572
NICKEL, Ni	1.65 mg/kg	11.6
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	33.4
ALUMINUM, Al	1.65 mg/kg	5,605
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	5.42
IRON, Fe	1.65 mg/kg	9,870
MANGANESE, Mn	1.65 mg/kg	295
LEAD, Pb	1.65 mg/kg	<1.65
THALIUM, Tl	1.65 mg/kg	<1.65
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	40,125
CHROMIUM, Cr	1.65 mg/kg	14.0
POTASSIUM, K	1.65 mg/kg	1,168
SODIUM, Na	1.65 mg/kg	361
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	47.6

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	237
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	34.0
MAGNESIUM, Mg	1.65 mg/kg	13,181
NICKEL, Ni	1.65 mg/kg	33.4
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	68.1
ALUMINUM, Al	1.65 mg/kg	14,960
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	14.8
IRON, Fe	1.65 mg/kg	27,800
MANGANESE, Mn	1.65 mg/kg	461
LEAD, Pb	1.65 mg/kg	6.96
THALIUM, Tl	1.65 mg/kg	3.07
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	8.08
CALCIUM, Ca	1.65 mg/kg	27,683
CHROMIUM, Cr	1.65 mg/kg	40.3
POTASSIUM, K	1.65 mg/kg	5,289
SODIUM, Na	1.65 mg/kg	460
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	58.4

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	105
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	21.5
MAGNESIUM, Mg	1.65 mg/kg	8,626
NICKEL, Ni	1.65 mg/kg	16.4
SELENIUM, Se	1.65 mg/kg	5.11
ZINC, Zn	1.65 mg/kg	33.1
ALUMINUM, Al	1.65 mg/kg	6,484
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	7.52
IRON, Fe	1.65 mg/kg	13,521
MANGANESE, Mn	1.65 mg/kg	438
LEAD, Pb	1.65 mg/kg	3.71
THALIUM, Tl	1.65 mg/kg	2.28
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	24,741
CHROMIUM, Cr	1.65 mg/kg	18.4
POTASSIUM, K	1.65 mg/kg	1,181
SODIUM, Na	1.65 mg/kg	273
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	36.8

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	44.5
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	10.8
MAGNESIUM, Mg	1.65 mg/kg	3,052
NICKEL, Ni	1.65 mg/kg	9.80
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	28.0
ALUMINUM, Al	1.65 mg/kg	9,208
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	5.50
IRON, Fe	1.65 mg/kg	15,764
MANGANESE, Mn	1.65 mg/kg	512
LEAD, Pb	1.65 mg/kg	20.9
THALIUM, Tl	1.65 mg/kg	4.65
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	1,706
CHROMIUM, Cr	1.65 mg/kg	18.9
POTASSIUM, K	1.65 mg/kg	337
SODIUM, Na	1.65 mg/kg	132
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	16.5

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	60.8
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	11.1
MAGNESIUM, Mg	1.65 mg/kg	7,447
NICKEL, Ni	1.65 mg/kg	10.2
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	22.0
ALUMINUM, Al	1.65 mg/kg	7,726
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	4.87
IRON, Fe	1.65 mg/kg	16,118
MANGANESE, Mn	1.65 mg/kg	240
LEAD, Pb	1.65 mg/kg	3.53
THALIUM, Tl	1.65 mg/kg	2.84
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	10,942
CHROMIUM, Cr	1.65 mg/kg	12.0
POTASSIUM, K	1.65 mg/kg	1,856
SODIUM, Na	1.65 mg/kg	176
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	21.7

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/19/01	Matrix: Liquid
Date analyzed: 4/19/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	22.3
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	6.07
MAGNESIUM, Mg	0.05 mg/L	220
NICKEL, Ni	0.05 mg/L	4.01
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	10.1
ALUMINUM, Al	0.05 mg/L	2,596
BERYLLIUM, Be	0.05 mg/L	0.10
COBALT, Co	0.05 mg/L	1.89
IRON, Fe	0.05 mg/L	6,321
MANGANESE, Mn	0.05 mg/L	119
LEAD, Pb	0.05 mg/L	3.02
THALIUM, Tl	0.05 mg/L	0.32
MERCURY, Hg	0.002 mg/L	0.008
ARSENIC, As	0.05 mg/L	<0.05
CALCIUM, Ca	0.05 mg/L	233,609
CHROMIUM, Cr	0.05 mg/L	4.93
POTASSIUM, K	0.05 mg/L	818
SODIUM, Na	0.05 mg/L	104
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	9.30

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	65.6
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	16.5
MAGNESIUM, Mg	1.65 mg/kg	4,128
NICKEL, Ni	1.65 mg/kg	13.5
SELENIUM, Se	1.65 mg/kg	4.01
ZINC, Zn	1.65 mg/kg	35.4
ALUMINUM, Al	1.65 mg/kg	13,182
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	8.05
IRON, Fe	1.65 mg/kg	24,915
MANGANESE, Mn	1.65 mg/kg	216
LEAD, Pb	1.65 mg/kg	11.5
THALIUM, Tl	1.65 mg/kg	3.19
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	890
CHROMIUM, Cr	1.65 mg/kg	21.0
POTASSIUM, K	1.65 mg/kg	3,212
SODIUM, Na	1.65 mg/kg	125
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	24.4

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	26.9
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	8.63
MAGNESIUM, Mg	1.65 mg/kg	3,308
NICKEL, Ni	1.65 mg/kg	9.42
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	25.1
ALUMINUM, Al	1.65 mg/kg	4,830
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	4.28
IRON, Fe	1.65 mg/kg	7,436
MANGANESE, Mn	1.65 mg/kg	118
LEAD, Pb	1.65 mg/kg	2.56
THALIUM, Tl	1.65 mg/kg	<1.65
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	2,509
CHROMIUM, Cr	1.65 mg/kg	12.1
POTASSIUM, K	1.65 mg/kg	1,151
SODIUM, Na	1.65 mg/kg	133
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	14.3

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	97.0
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	25.8
MAGNESIUM, Mg	1.65 mg/kg	315
NICKEL, Ni	1.65 mg/kg	17.2
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	60.7
ALUMINUM, Al	1.65 mg/kg	<1.65
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	9.23
IRON, Fe	1.65 mg/kg	16,290
MANGANESE, Mn	1.65 mg/kg	363
LEAD, Pb	1.65 mg/kg	13.4
THALIUM, Tl	1.65 mg/kg	3.71
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	15,514
CHROMIUM, Cr	1.65 mg/kg	23.0
POTASSIUM, K	1.65 mg/kg	3,941
SODIUM, Na	1.65 mg/kg	243
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	41.0

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	16.3
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	4.63
MAGNESIUM, Mg	0.05 mg/L	1,538
NICKEL, Ni	0.05 mg/L	2.78
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	8.52
ALUMINUM, Al	0.05 mg/L	1,927
BERYLLIUM, Be	0.05 mg/L	0.07
COBALT, Co	0.05 mg/L	1.35
IRON, Fe	0.05 mg/L	2,658
MANGANESE, Mn	0.05 mg/L	57.3
LEAD, Pb	0.05 mg/L	3.50
THALIUM, Tl	0.05 mg/L	0.33
MERCURY, Hg	0.002 mg/L	<0.002
ARSENIC, As	0.05 mg/L	0.80
CALCIUM, Ca	0.05 mg/L	1,395
CHROMIUM, Cr	0.05 mg/L	3.20
POTASSIUM, K	0.05 mg/L	704
SODIUM, Na	0.05 mg/L	146
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	8.02

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	48.5
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	24.6
MAGNESIUM, Mg	1.65 mg/kg	2,516
NICKEL, Ni	1.65 mg/kg	14.8
SELENIUM, Se	1.65 mg/kg	2.31
ZINC, Zn	1.65 mg/kg	45.9
ALUMINUM, Al	1.65 mg/kg	5,359
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	6.87
IRON, Fe	1.65 mg/kg	11,953
MANGANESE, Mn	1.65 mg/kg	167
LEAD, Pb	1.65 mg/kg	34.8
THALIUM, Tl	1.65 mg/kg	<1.65
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	2,060
CHROMIUM, Cr	1.65 mg/kg	14.8
POTASSIUM, K	1.65 mg/kg	708
SODIUM, Na	1.65 mg/kg	206
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	16.0

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	5.61
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	2.64
MAGNESIUM, Mg	0.05 mg/L	407
NICKEL, Ni	0.05 mg/L	1.57
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	4.33
ALUMINUM, Al	0.05 mg/L	769
BERYLLIUM, Be	0.05 mg/L	<0.05
COBALT, Co	0.05 mg/L	0.65
IRON, Fe	0.05 mg/L	1,253
MANGANESE, Mn	0.05 mg/L	58.3
LEAD, Pb	0.05 mg/L	1.80
THALIUM, Tl	0.05 mg/L	0.07
MERCURY, Hg	0.002 mg/L	<0.002
ARSENIC, As	0.05 mg/L	0.36
CALCIUM, Ca	0.05 mg/L	385
CHROMIUM, Cr	0.05 mg/L	1.36
POTASSIUM, K	0.05 mg/L	238
SODIUM, Na	0.05 mg/L	95.0
ANTIMONY, Sb	0.05 mg/L	<0.05
VANADIUM, V	0.05 mg/L	1.95

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

Priority Pollutant Metals

PARAMETER	MDL	RESULTS mg/kg
SILVER, Ag	1.65 mg/kg	<1.65
BARIUM, Ba	3.33 mg/kg	10.3
CADMIUM, Cd	1.65 mg/kg	<1.65
COPPER, Cu	1.65 mg/kg	5.75
MAGNESIUM, Mg	1.65 mg/kg	2,442
NICKEL, Ni	1.65 mg/kg	3.17
SELENIUM, Se	1.65 mg/kg	<1.65
ZINC, Zn	1.65 mg/kg	9.23
ALUMINUM, Al	1.65 mg/kg	1,590
BERYLLIUM, Be	1.65 mg/kg	<1.65
COBALT, Co	1.65 mg/kg	1.66
IRON, Fe	1.65 mg/kg	3,705
MANGANESE, Mn	1.65 mg/kg	91.2
LEAD, Pb	1.65 mg/kg	10.6
THALIUM, Tl	1.65 mg/kg	<1.65
MERCURY, Hg	0.02 mg/kg	<0.020
ARSENIC, As	6.60 mg/kg	<6.60
CALCIUM, Ca	1.65 mg/kg	4,757
CHROMIUM, Cr	1.65 mg/kg	3.95
POTASSIUM, K	1.65 mg/kg	414
SODIUM, Na	1.65 mg/kg	231
ANTIMONY, Sb	1.65 mg/kg	<1.65
VANADIUM, V	1.65 mg/kg	7.77

Preformed by SW-846 Method 6010

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

Target Compound List-Metals

PARAMETER	MDL	RESULTS mg/L
SILVER,Ag	0.05 mg/L	<0.05
BARIUM, Ba	1.00 mg/L	9.63
CADMIUM, Cd	0.05 mg/L	<0.05
COPPER, Cu	0.05 mg/L	3.39
MAGNESIUM, Mg	0.05 mg/L	841
NICKEL, Ni	0.05 mg/L	2.02
SELENIUM, Se	0.05 mg/L	<0.05
ZINC, Zn	0.05 mg/L	5.84
ALUMINUM, Al	0.05 mg/L	1,012
BERYLLIUM, Be	0.05 mg/L	<0.05
COBALT, Co	0.05 mg/L	0.87
IRON, Fe	0.05 mg/L	1,750
MANGANESE, Mn	0.05 mg/L	46.9
LEAD, Pb	0.05 mg/L	4.61
THALIUM, Tl	0.05 mg/L	0.07
MERCURY, Hg	0.002 mg/L	<0.002
ARSENIC, As	0.05 mg/L	0.60
CALCIUM, Ca	0.05 mg/L	867
CHROMIUM, Cr	0.05 mg/L	2.62
POTASSIUM, K	0.05 mg/L	312
SODIUM, Na	0.05 mg/L	92.3
ANTIMONY, Sb	0.05 mg/L	0.08
VANADIUM, V	0.05 mg/L	3.26

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	65
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	65
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	48
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	122
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	88
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	89
PYRENE	129-00-0	73
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	46
CHRYSENE	218-01-9	51
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	254
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	50
BENZO-a-PYRENE	50-32-8	60
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<200
PHENOL	108-95-1	<200
2-CHLOROPHENOL	95-57-8	<200
1,3-DICHLOROBENZENE	541-73-1	<200
1,4-DICHLOROBENZENE	106-46-7	<200
1,2-DICHLOROBENZENE	95-50-1	<200
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<200
2-METHYLPHENOL	95-48-7	<200
HEXACHLOROETHANE	67-72-1	<200
N-NITROSODI-n-PROPYL AMINE	621-64-7	<200
4-METHYLPHENOL	106-44-5	<200
NITROBENZENE	98-95-3	<200
ISOPHORONE	78-59-1	<200
2-NITROPHENOL	88-75-5	<200
2,4-DIMETHYLPHENOL	105-67-9	<200
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<200
2,4-DICHLOROPHENOL	102-83-2	<200
1,2,4-TRICHLOROBENZENE	120-82-1	<200
NAPHTHALENE	91-20-3	<200
4-CHLOROANILINE	106-47-8	<200
HEXACHLOROBUTADIENE	87-68-3	<200
4-CHLORO-3-METHYLPHENOL	59-50-7	<200
2-METHYLNAPHTHALENE	91-57-6	<200
HEXACHLOROCYCLOPENTADIENE	77-47-4	<200
2,4,6-TRICHLOROPHENOL	88-06-2	<200
2,4,5-TRICHLOROPHENOL	95-95-4	<200
2-CHLORONAPHTHALENE	91-58-7	<200
2-NITROANILINE	88-74-4	<200
ACENAPHTHYLENE	208-96-8	<200
DIMETHYLPHTHALATE	131-11-3	<200
2,6-DINITROTOLUENE	606-20-2	<200
ACENAPHTHENE	83-32-9	<200

Note: MDL's are raised due to high levels of target compounds.

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<200
2,4-DINITROPHENOL	51-28-5	<200
DIBENZOFURAN	132-64-9	<200
2,4-DINTROTOLUENE	121-14-2	<200
4-NITROPHENOL	100-02-7	<200
FLUORENE	86-73-7	<200
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<200
DIETHYLPHTHALATE	84-66-2	<200
4-NITROANILINE	100-01-6	<200
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<200
N-NITROSODIPHENYLAMINE	86-30-6	<200
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<200
HEXACHLOROBENZENE	118-74-1	<200
PENTACHLORPHENOL	87-86-5	<200
PHENANTHRENE	85-01-8	3,354
ANTHRACENE	120-12-7	511
Di-n-BUTYLPHTHALATE	84-74-2	<200
FLUORANTHENE	206-44-0	5,073
PYRENE	129-00-0	4,702
BUTYLBENZYLPHTHALATE	85-68-7	<200
3,3-DICHLOROBENZIDINE	91-94-1	<200
BENZO-a-ANTHRACENE	56-55-3	2,407
CHRYSENE	218-01-9	1,702
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<200
DI-n-OCTYLPHTHALATE	117-84-0	<200
BENZO-b-FLUOROANTHENE	205-99-2	1,273
BENZO-k- FLUOROANTHENE	207-08-9	1,801
BENZO-a-PYRENE	50-32-8	1,681
INDENO(1,2,3-c,d)PYRENE	193-39-5	787
DIBENZO-a,h-ANTHRACENE	53-70-3	<200
BENZO-g,h,i-PERYLENE	191-24-2	689

Note: MDL's are raised due to high levels of target compounds.

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	43
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	120
PYRENE	129-00-0	116
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	61
CHRYSENE	218-01-9	68
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	638
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	56
BENZO-k- FLUOROANTHENE	207-08-9	78
BENZO-a-PYRENE	50-32-8	87
INDENO(1,2,3-c,d)PYRENE	193-39-5	43
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	48

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	175
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/19/01	Matrix: Soil
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/20/01	Matrix: Soil
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	<40
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	134
ANTHRACENE	120-12-7	51
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	204
PYRENE	129-00-0	198
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	133
CHRYSENE	218-01-9	122
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	322
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	117
BENZO-k- FLUOROANTHENE	207-08-9	103
BENZO-a-PYRENE	50-32-8	132
INDENO(1,2,3-c,d)PYRENE	193-39-5	72
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	68

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
Bis(2-CHLOROETHYL)ETHER	111-44-4	<40
PHENOL	108-95-1	<40
2-CHLOROPHENOL	95-57-8	<40
1,3-DICHLOROBENZENE	541-73-1	<40
1,4-DICHLOROBENZENE	106-46-7	<40
1,2-DICHLOROBENZENE	95-50-1	<40
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<40
2-METHYLPHENOL	95-48-7	<40
HEXACHLOROETHANE	67-72-1	<40
N-NITROSODI-n-PROPYL AMINE	621-64-7	<40
4-METHYLPHENOL	106-44-5	<40
NITROBENZENE	98-95-3	<40
ISOPHORONE	78-59-1	<40
2-NITROPHENOL	88-75-5	<40
2,4-DIMETHYLPHENOL	105-67-9	158
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<40
2,4-DICHLOROPHENOL	102-83-2	<40
1,2,4-TRICHLOROBENZENE	120-82-1	<40
NAPHTHALENE	91-20-3	<40
4-CHLOROANILINE	106-47-8	<40
HEXACHLOROBUTADIENE	87-68-3	<40
4-CHLORO-3-METHYLPHENOL	59-50-7	<40
2-METHYLNAPHTHALENE	91-57-6	<40
HEXACHLOROCYCLOPENTADIENE	77-47-4	<40
2,4,6-TRICHLOROPHENOL	88-06-2	<40
2,4,5-TRICHLOROPHENOL	95-95-4	<40
2-CHLORONAPHTHALENE	91-58-7	<40
2-NITROANILINE	88-74-4	<40
ACENAPHTHYLENE	208-96-8	<40
DIMETHYLPHTHALATE	131-11-3	<40
2,6-DINITROTOLUENE	606-20-2	<40
ACENAPHTHENE	83-32-9	<40

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/23/01	Matrix: Soil
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/kg
3-NITROANILINE	99-09-2	<40
2,4-DINITROPHENOL	51-28-5	<40
DIBENZOFURAN	132-64-9	<40
2,4-DINTROTOLUENE	121-14-2	<40
4-NITROPHENOL	100-02-7	<40
FLUORENE	86-73-7	<40
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<40
DIETHYLPHTHALATE	84-66-2	<40
4-NITROANILINE	100-01-6	<40
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<40
N-NITROSODIPHENYLAMINE	86-30-6	<40
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<40
HEXACHLOROBENZENE	118-74-1	<40
PENTACHLORPHENOL	87-86-5	<40
PHENANTHRENE	85-01-8	<40
ANTHRACENE	120-12-7	<40
Di-n-BUTYLPHTHALATE	84-74-2	<40
FLUORANTHENE	206-44-0	<40
PYRENE	129-00-0	<40
BUTYLBENZYLPHTHALATE	85-68-7	<40
3,3-DICHLOROBENZIDINE	91-94-1	<40
BENZO-a-ANTHRACENE	56-55-3	<40
CHRYSENE	218-01-9	<40
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<40
DI-n-OCTYLPHTHALATE	117-84-0	<40
BENZO-b-FLUOROANTHENE	205-99-2	<40
BENZO-k- FLUOROANTHENE	207-08-9	<40
BENZO-a-PYRENE	50-32-8	<40
INDENO(1,2,3-c,d)PYRENE	193-39-5	<40
DIBENZO-a,h-ANTHRACENE	53-70-3	<40
BENZO-g,h,i-PERYLENE	191-24-2	<40

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	1,954
BROMOBENZENE	108-86-1	<250
BROMOCHLOROMETHANE	74-97-5	<250
BROMODICHLOROMETHANE	75-27-4	<250
BROMOFORM	75-25-2	<250
BROMOMETHANE	74-83-9	<250
n-BUTYLBENZENE	104-51-8	<250
sec-BUTYLBENZENE	135-98-8	<250
tert-BUTYLBENZENE	98-06-6	<250
CARBON TETRACHLORIDE	56-23-5	<250
CHLOROBENZENE	108-90-7	<250
CHLORODIBROMOMETHANE	124-48-1	<250
CHLOROETHANE	75-00-3	<250
CHLOROFORM	67-66-3	<250
CHLOROMETHANE	74-87-3	<250
2-CHLOROTOLUENE	95-49-8	<250
4-CHLOROTOLUENE	106-43-4	<250
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<250
1,2-DIBROMOETHANE	106-93-4	<250
DIBROMOMETHANE	74-95-3	<250
1,2-DICHLOROBENZENE	95-50-1	<250
1,3-DICHLOROBENZENE	541-73-1	<250
1,4-DICHLOROBENZENE	106-46-7	<250
DICHLORODIFLUOROMETHANE	75-71-8	<250
1,1-DICHLOROETHANE	75-34-3	<250
1,2-DICHLOROETHANE	107-06-2	635
1,1-DICHLOROETHENE	75-35-4	<250
cis-1,2-DICHLOROETHENE	156-59-2	<250
trans-1,2-DICHLOROETHENE	156-60-5	<250

Note: MDL's are raised due to high levels of target compounds.

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<250
1,3-DICHLOROPROPANE	142-28-9	<250
2,2-DICHLOROPROPANE	594-20-7	<250
1,1-DICHLOROPROPENE	563-58-6	<250
ETHYLBENZENE	100-41-4	1,266
HEXACHLOROBUTADIENE	87-68-3	<250
ISOPROPYLBENZENE	98-82-8	1,037
p-ISOPROPYLTOLUENE	99-87-6	5,791
METHYLENE CHLORIDE	75-09-2	1,808
NAPHTHALENE	91-20-3	286,000
n-PROPYLBENZENE	103-65-1	784
STYRENE	100-42-5	<250
1,1,1,2-TETRACHLOROETHANE	630-20-6	<250
1,1,2,2-TETRACHLOROETHANE	79-34-5	<250
TETRACHLOROETHENE	127-18-4	<250
TOLUENE	108-88-3	861
1,2,3-TRICHLOROBENZENE	87-61-6	<250
1,2,4-TRICHLOROBENZENE	120-82-1	<250
1,1,1-TRICHLOROETHANE	71-55-6	<250
1,1,2-TRICHLOROETHANE	79-00-5	<250
TRICHLOROETHENE	79-01-6	<250
TRICHLOROFLUOROMETHANE	75-69-4	<250
1,2,3-TRICHLOROPROPANE	96-18-4	<250
1,3,5-TRIMETHYLBENZENE	108-67-8	6,196
1,2,4-TRIMETHYLBENZENE	95-63-6	14,171
VINYL CHLORIDE	75-01-4	<250
ACETONE	62-64-1	<2500
CARBON DISULFIDE	75-15-0	<250
2-BUTANONE (MEK)	78-93-3	<250
VINYL ACETATE	108-05-4	<250
2-HEXANONE	591-78-6	<250
p & m-XYLENE	1330-20-7	2,983
o-XYLENE	1330-20-7	1,122

Note: MDL's are raised due to high levels of target compounds.

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/19/01	Matrix: Liquid
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	<0.7
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/19/01	Matrix: Liquid
Date analyzed: 4/19/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	11
1,2-DICHLOROETHANE	107-06-2	73
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	22
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	17
NAPHTHALENE	91-20-3	<5
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	17
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	<5
VINYL CHLORIDE	75-01-4	21
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	10
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	6
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	9
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	53
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	22
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	160
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	7
1,2,4-TRIMETHYLBENZENE	95-63-6	24
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	191
o-XYLENE	1330-20-7	41

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	6
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	<5
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	8
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	7
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	28
1,2-DICHLOROETHANE	107-06-2	61
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	634

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	39
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	25
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	351
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	18
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	6
1,2,4-TRIMETHYLBENZENE	95-63-6	21
VINYL CHLORIDE	75-01-4	5
ACETONE	62-64-1	898
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	140
o-XYLENE	1330-20-7	46

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	<5
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	12
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	<5
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	<5
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	<5
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	8
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	<5
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	<5
1,2,4-TRIMETHYLBENZENE	95-63-6	10
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	<5
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	<10
o-XYLENE	1330-20-7	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
BENZENE	71-43-2	14
BROMOBENZENE	108-86-1	<5
BROMOCHLOROMETHANE	74-97-5	<5
BROMODICHLOROMETHANE	75-27-4	<5
BROMOFORM	75-25-2	<5
BROMOMETHANE	74-83-9	<5
n-BUTYLBENZENE	104-51-8	13
sec-BUTYLBENZENE	135-98-8	<5
tert-BUTYLBENZENE	98-06-6	<5
CARBON TETRACHLORIDE	56-23-5	<5
CHLOROBENZENE	108-90-7	<5
CHLORODIBROMOMETHANE	124-48-1	<5
CHLOROETHANE	75-00-3	<5
CHLOROFORM	67-66-3	<5
CHLOROMETHANE	74-87-3	<5
2-CHLOROTOLUENE	95-49-8	<5
4-CHLOROTOLUENE	106-43-4	<5
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	<5
1,2-DIBROMOETHANE	106-93-4	<5
DIBROMOMETHANE	74-95-3	<5
1,2-DICHLOROBENZENE	95-50-1	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
DICHLORODIFLUOROMETHANE	75-71-8	<5
1,1-DICHLOROETHANE	75-34-3	<5
1,2-DICHLOROETHANE	107-06-2	12
1,1-DICHLOROETHENE	75-35-4	<5
cis-1,2-DICHLOROETHENE	156-59-2	<5
trans-1,2-DICHLOROETHENE	156-60-5	<5

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8260

Parameter	CAS No.	Results ug/L
1,2-DICHLOROPROPANE	78-87-5	<5
1,3-DICHLOROPROPANE	142-28-9	<5
2,2-DICHLOROPROPANE	594-20-7	<5
1,1-DICHLOROPROPENE	563-58-6	<5
ETHYLBENZENE	100-41-4	16
HEXACHLOROBUTADIENE	87-68-3	<5
ISOPROPYLBENZENE	98-82-8	<5
p-ISOPROPYLTOLUENE	99-87-6	6
METHYLENE CHLORIDE	75-09-2	<5
NAPHTHALENE	91-20-3	412
n-PROPYLBENZENE	103-65-1	<5
STYRENE	100-42-5	<5
1,1,1,2-TETRACHLOROETHANE	630-20-6	<5
1,1,2,2-TETRACHLOROETHANE	79-34-5	<5
TETRACHLOROETHENE	127-18-4	<5
TOLUENE	108-88-3	24
1,2,3-TRICHLOROBENZENE	87-61-6	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
1,1,1-TRICHLOROETHANE	71-55-6	<5
1,1,2-TRICHLOROETHANE	79-00-5	<5
TRICHLOROETHENE	79-01-6	<5
TRICHLOROFLUOROMETHANE	75-69-4	<5
1,2,3-TRICHLOROPROPANE	96-18-4	<5
1,3,5-TRIMETHYLBENZENE	108-67-8	8
1,2,4-TRIMETHYLBENZENE	95-63-6	48
VINYL CHLORIDE	75-01-4	<5
ACETONE	62-64-1	<50
CARBON DISULFIDE	75-15-0	<5
2-BUTANONE (MEK)	78-93-3	19
VINYL ACETATE	108-05-4	<5
2-HEXANONE	591-78-6	<5
p & m-XYLENE	1330-20-7	23
o-XYLENE	1330-20-7	16

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	<5
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	75
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	<5
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	7
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	9
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	16
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	82
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	39
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	143
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	67
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	<5
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	<5
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/23/01	Matrix: Liquid
Date analyzed: 4/23/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	6
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	<5
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	<5
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	<5
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	<5
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	6
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	<5
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	14
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	302
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	26
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	6

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/20/01	Matrix: Liquid
Date analyzed: 4/20/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	<5
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/21/01	Matrix: Liquid
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<60
PHENOL	108-95-1	320
2-CHLOROPHENOL	95-57-8	<60
1,3-DICHLOROBENZENE	541-73-1	<60
1,4-DICHLOROBENZENE	106-46-7	<60
1,2-DICHLOROBENZENE	95-50-1	<60
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<60
2-METHYLPHENOL	95-48-7	2,466
HEXACHLOROETHANE	67-72-1	<60
N-NITROSODI-n-PROPYL AMINE	621-64-7	<60
4-METHYLPHENOL	106-44-5	6,408
NITROBENZENE	98-95-3	<60
ISOPHORONE	78-59-1	<60
2-NITROPHENOL	88-75-5	<60
2,4-DIMETHYLPHENOL	105-67-9	25,856
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<60
2,4-DICHLOROPHENOL	102-83-2	<60
1,2,4-TRICHLOROBENZENE	120-82-1	<60
NAPHTHALENE	91-20-3	80,140
4-CHLOROANILINE	106-47-8	<60
HEXACHLOROBUTADIENE	87-68-3	<60
4-CHLORO-3-METHYLPHENOL	59-50-7	<60
2-METHYLNAPHTHALENE	91-57-6	85,372
HEXACHLOROCYCLOPENTADIENE	77-47-4	<60
2,4,6-TRICHLOROPHENOL	88-06-2	<60
2,4,5-TRICHLOROPHENOL	95-95-4	<60
2-CHLORONAPHTHALENE	91-58-7	<60
2-NITROANILINE	88-74-4	<60
ACENAPHTHYLENE	208-96-8	<60
DIMETHYLPHTHALATE	131-11-3	<60
2,6-DINITROTOLUENE	606-20-2	<60
ACENAPHTHENE	83-32-9	16,628

Note: MDL's are raised due to high levels of target compounds.

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/21/01	Matrix: Liquid
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<60
2,4-DINITROPHENOL	51-28-5	440
DIBENZOFURAN	132-64-9	14,830
2,4-DINTROTOLUENE	121-14-2	<60
4-NITROPHENOL	100-02-7	<60
FLUORENE	86-73-7	7,793
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<60
DIETHYLPHTHALATE	84-66-2	<60
4-NITROANILINE	100-01-6	<60
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<60
N-NITROSODIPHENYLAMINE	86-30-6	<60
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<60
HEXACHLOROBENZENE	118-74-1	<60
PENTACHLORPHENOL	87-86-5	<60
PHENANTHRENE	85-01-8	3,238
ANTHRACENE	120-12-7	813
Di-n-BUTYLPHTHALATE	84-74-2	<60
FLUORANTHENE	206-44-0	486
PYRENE	129-00-0	390
BUTYLBENZYLPHTHALATE	85-68-7	<60
3,3-DICHLOROBENZIDINE	91-94-1	<60
BENZO-a-ANTHRACENE	56-55-3	83
CHRYSENE	218-01-9	<60
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<60
DI-n-OCTYLPHTHALATE	117-84-0	<60
BENZO-b-FLUOROANTHENE	205-99-2	<60
BENZO-k- FLUOROANTHENE	207-08-9	<60
BENZO-a-PYRENE	50-32-8	<60
INDENO(1,2,3-c,d)PYRENE	193-39-5	<60
DIBENZO-a,h-ANTHRACENE	53-70-3	<60
BENZO-g,h,i-PERYLENE	191-24-2	<60

Note: MDL's are raised due to high levels of target compounds.

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/21/01	Matrix: Liquid
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
Bis(2-CHLOROETHYL)ETHER	111-44-4	<5
PHENOL	108-95-1	<5
2-CHLOROPHENOL	95-57-8	<5
1,3-DICHLOROBENZENE	541-73-1	<5
1,4-DICHLOROBENZENE	106-46-7	<5
1,2-DICHLOROBENZENE	95-50-1	<5
Bis(2-CHLOROISOPROPYL)ETHER	108-60-1	<5
2-METHYLPHENOL	95-48-7	<5
HEXACHLOROETHANE	67-72-1	<5
N-NITROSODI-n-PROPYL AMINE	621-64-7	<5
4-METHYLPHENOL	106-44-5	<5
NITROBENZENE	98-95-3	<5
ISOPHORONE	78-59-1	<5
2-NITROPHENOL	88-75-5	<5
2,4-DIMETHYLPHENOL	105-67-9	<5
Bis(2-CHLOROETHOXY)METHANE	111-91-1	<5
2,4-DICHLOROPHENOL	102-83-2	<5
1,2,4-TRICHLOROBENZENE	120-82-1	<5
NAPHTHALENE	91-20-3	<5
4-CHLOROANILINE	106-47-8	<5
HEXACHLOROBUTADIENE	87-68-3	<5
4-CHLORO-3-METHYLPHENOL	59-50-7	<5
2-METHYLNAPHTHALENE	91-57-6	<5
HEXACHLOROCYCLOPENTADIENE	77-47-4	<5
2,4,6-TRICHLOROPHENOL	88-06-2	<5
2,4,5-TRICHLOROPHENOL	95-95-4	<5
2-CHLORONAPHTHALENE	91-58-7	<5
2-NITROANILINE	88-74-4	<5
ACENAPHTHYLENE	208-96-8	<5
DIMETHYLPHTHALATE	131-11-3	<5
2,6-DINITROTOLUENE	606-20-2	<5
ACENAPHTHENE	83-32-9	<5

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/21/01	Matrix: Liquid
Date analyzed: 4/21/01	ELAP #: 11693

EPA METHOD 8270

Parameter	CAS No.	Results ug/L
3-NITROANILINE	99-09-2	<5
2,4-DINITROPHENOL	51-28-5	<5
DIBENZOFURAN	132-64-9	<5
2,4-DINTROTOLUENE	121-14-2	<5
4-NITROPHENOL	100-02-7	<5
FLUORENE	86-73-7	<5
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	<5
DIETHYLPHTHALATE	84-66-2	<5
4-NITROANILINE	100-01-6	<5
4,6-DINITRO-2-METHYLPHENOL	534-52-1	<5
N-NITROSODIPHENYLAMINE	86-30-6	<5
4-BROMOPHENYL-PHENYL ETHER	101-55-3	<5
HEXACHLOROBENZENE	118-74-1	<5
PENTACHLORPHENOL	87-86-5	<5
PHENANTHRENE	85-01-8	<5
ANTHRACENE	120-12-7	<5
Di-n-BUTYLPHTHALATE	84-74-2	<5
FLUORANTHENE	206-44-0	<5
PYRENE	129-00-0	<5
BUTYLBENZYLPHTHALATE	85-68-7	<5
3,3-DICHLOROBENZIDINE	91-94-1	<5
BENZO-a-ANTHRACENE	56-55-3	<5
CHRYSENE	218-01-9	<5
Bis(2-ETHYLEXYL)PHTALATE	117-81-7	<5
DI-n-OCTYLPHTHALATE	117-84-0	<5
BENZO-b-FLUOROANTHENE	205-99-2	<5
BENZO-k- FLUOROANTHENE	207-08-9	<5
BENZO-a-PYRENE	50-32-8	<5
INDENO(1,2,3-c,d)PYRENE	193-39-5	<5
DIBENZO-a,h-ANTHRACENE	53-70-3	<5
BENZO-g,h,i-PERYLENE	191-24-2	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWS)
Date received: 4/19/01	Laboratory ID: 0113312
Date extracted: 4/24/01	Matrix: Liquid
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2GWD)
Date received: 4/19/01	Laboratory ID: 0113313
Date extracted: 4/24/01	Matrix: Liquid
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWS)
Date received: 4/19/01	Laboratory ID: 0113314
Date extracted: 4/24/01	Matrix: Liquid
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6GWD)
Date received: 4/19/01	Laboratory ID: 0113315
Date extracted: 4/24/01	Matrix: Liquid
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-1)
Date received: 4/19/01	Laboratory ID: 0113316
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-2)
Date received: 4/19/01	Laboratory ID: 0113317
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (A-6-3)
Date received: 4/19/01	Laboratory ID: 0113318
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, Queens (B-2-2)
Date received: 4/19/01	Laboratory ID: 0113319
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A1 {12.5-13'})
Date received: 4/18/01	Laboratory ID: 0113299
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1A2 {34.5-35'})
Date received: 4/18/01	Laboratory ID: 0113300
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-1AGW)
Date received: 4/18/01	Laboratory ID: 0113301
Date extracted: 4/21/01	Matrix: Liquid
Date analyzed: 4/21/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Long Island City, Queens (B-2-1 {15.5-16'})
Date received: 4/18/01	Laboratory ID: 0113302
Date extracted: 4/21/01	Matrix: Soil
Date analyzed: 4/21/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-1 {13.5-14'})
Date received: 4/20/01	Laboratory ID: 0113329
Date extracted: 4/24/01	Matrix: Soil
Date analyzed: 4/24/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113330
Date extracted: 4/25/01	Matrix: Soil
Date analyzed: 4/25/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (A-7GWD)
Date received: 4/20/01	Laboratory ID: 0113331
Date extracted: 4/25/01	Matrix: Liquid
Date analyzed: 4/25/01	ELAP #: 11693

EPA METHOD 608

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-1 {12-12.5'})
Date received: 4/20/01	Laboratory ID: 0113332
Date extracted: 4/25/01	Matrix: Soil
Date analyzed: 4/25/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWS)
Date received: 4/20/01	Laboratory ID: 0113333
Date extracted: 4/25/01	Matrix: Liquid
Date analyzed: 4/25/01	ELAP #: 11693

EPA METHOD 608

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5-2 {34.5-35'})
Date received: 4/20/01	Laboratory ID: 0113334
Date extracted: 4/25/01	Matrix: Soil
Date analyzed: 4/25/01	ELAP #: 11693

PESTICIDES EPA METHOD 8080

COMPOUND	CAS No.	RESULTS ug/kg
Aldrin	309-00-2	<5
α - BHC	319-84-6	<5
β - BHC	319-85-7	<5
δ - BHC	319-86-8	<5
γ - BHC (Lindane)	58-89-9	<5
Chlordane	12789-03-6	<5
4,4'- DDD	72-54-8	<5
4,4'-DDE	72-55-9	<5
4,4'-DDT	50-29-3	<5
Dieldrin	60-57-1	<5
Endosulfan I	959-98-8	<5
Endosulfan II	33212-65-9	<5
Endosulfan sulfate	1031-07-8	<5
Endrin	72-20-8	<5
Endrin aldehyde	7421-93-4	<5
Heptachlor	76-44-8	<5
Heptachlor epoxide	1024-57-3	<5
4,4'-Methoxychlor	72-43-5	<5
Toxaphene	8001-35-2	<500
Endrin ketone	53494-70-5	<5

Laboratory Director

Client: ELM	Client ID: Outlet City, LI City (C-5GWD)
Date received: 4/20/01	Laboratory ID: 0113335
Date extracted: 4/25/01	Matrix: Liquid
Date analyzed: 4/25/01	ELAP #: 11693

EPA METHOD 608

PARAMETER	CAS No.	RESULTS ug/L
ALDRIN	309-00-2	<0.01
α - BHC	319-84-6	<0.01
β - BHC	319-85-7	<0.01
δ - BHC	319-86-8	<0.01
γ - BHC (Lindane)	58-89-9	<0.02
CHLORDANE	12789-03-6	<0.02
4,4'-DDD	72-54-8	<0.01
4,4'-DDE	72-55-9	<0.01
4,4'-DDT	50-29-3	<0.05
DIELDRIN	60-57-1	<0.01
ENDOSULFAN I	959-98-8	<0.01
ENDOSULFAN II	33212-65-9	<0.01
ENDOSULFAN SULFATE	1031-07-8	<0.02
ENDRIN	72-20-8	<0.01
ENDRIN ALDEHYDE	7421-93-4	<0.01
ENDRIN KETONE	53494-70-5	<0.02
HEPTACHLOR	76-44-8	<0.01
HEPTACHLOR EPOXIDE	1024-57-3	<0.01
4,4'-METHOXYCHLOR	72-43-5	<0.01
TOXAPHENE	8001-35-2	<20

Laboratory Director

APPENDIX B

Regulatory Agreements and Documents

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B, 12th Floor
625 Broadway, Albany, New York 12233-7016
Phone: (518) 402-9768 • **Fax:** (518) 402-9773
Website: www.dec.ny.gov

Joe Martens
Commissioner

September 23, 2014

Steven E. Panter, CGWP
Sr. Consultant
Fleming-Lee Shue, Inc.
158 West 29th Street
New York, NY 10001

RE: Queens Plaza Residential Development
Site B
NYSDEC Site No. C241151

Dear Mr. Panter:

The New York State Department of Environmental Conservation (NYSDEC) is approving the Remedial Investigation Work Plan (RIWP) submitted on August 11, 2014 for the above referenced site. The comment period for the RIWP has ended.

Regards,

Michael Haggerty
Project Manager
Remedial Bureau B, Section C

ec: James Moras (Chief, Section C)
Benjamin Conlon (OGC)
Christopher Doroski (DOH)
Patrick Shiels (Volunteer)
Larry Schnapf (Volunteer's attorney)
Arnold Fleming (FLS)

APPENDIX C

Sanborn Maps

Queens Plaza Residential Development Site B
28-10 Jackson Avenue
Long Island City, NY 11101

Inquiry Number: 3887794.1
March 21, 2014

Certified Sanborn® Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

3/21/14

Site Name:
Queens Plaza Residential
28-10 Jackson Avenue
Long Island City, NY 11101

Client Name:
Fleming-Lee Shue, Inc.
158 West 29th St
New York, NY 10001

EDR Inquiry # 3887794.1

Contact: Steve Panther

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Fleming-Lee Shue, Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Queens Plaza Residential Development Site B
Address: 28-10 Jackson Avenue
City, State, Zip: Long Island City, NY 11101
Cross Street:
P.O. # 10112-004-1
Project: Queens Plaza Residential Dvpmt
Certification # 6DE4-4141-888C

Maps Provided:

2006	1999	1991	1980	1936
2005	1996	1990	1979	1915
2004	1995	1989	1977	1898
2003	1994	1988	1970	
2002	1993	1986	1950	
2001	1992	1985	1947	

Sanborn® Library search results
Certification # 6DE4-4141-888C

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

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Sanborn Sheet Thumbnails

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

2006 Source Sheets

Volume 1, Sheet 23

Volume 1, Sheet 24

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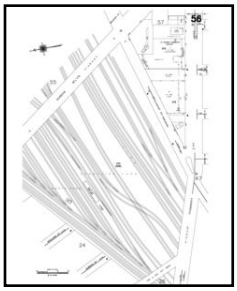

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2005 Source Sheets

Volume 1, Sheet 23

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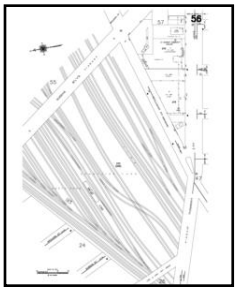
Volume 1, Sheet 55



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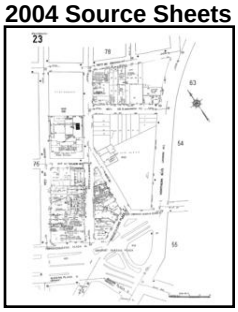

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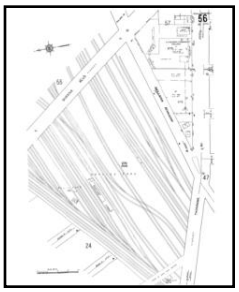

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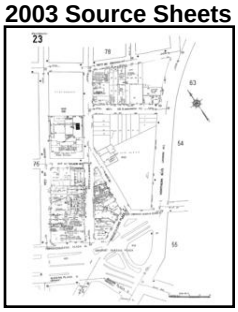

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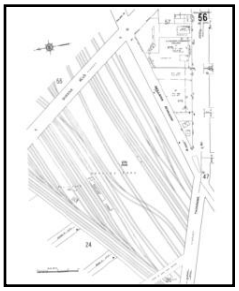

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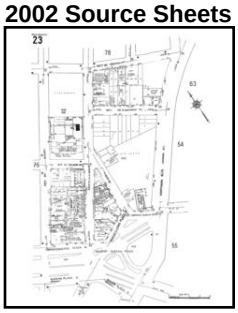

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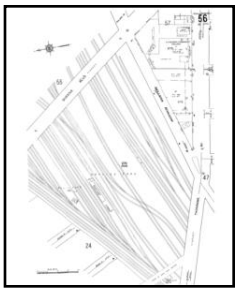

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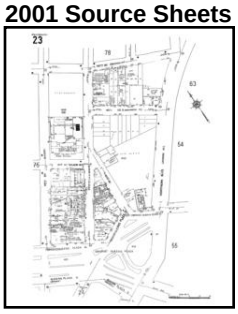

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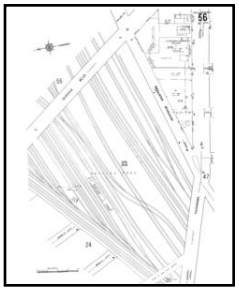

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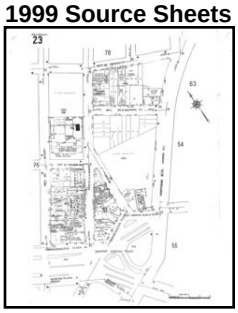

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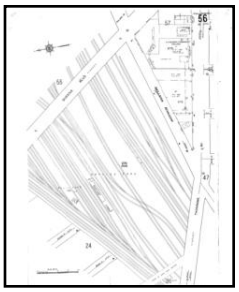

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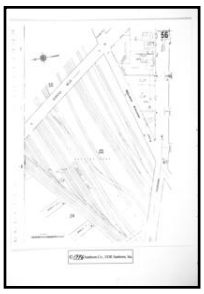

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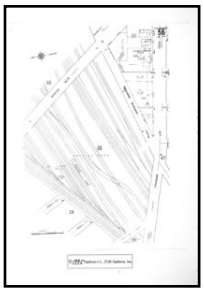

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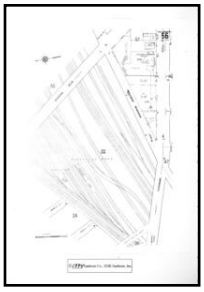

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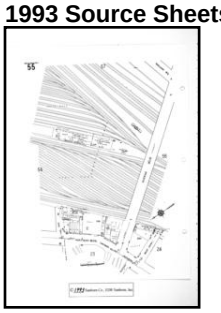

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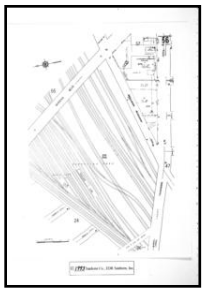

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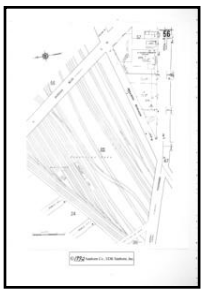

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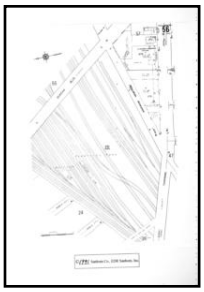

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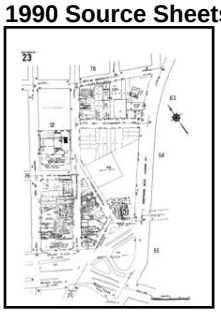

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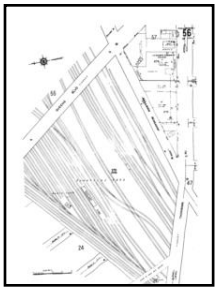

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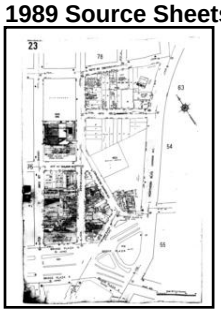

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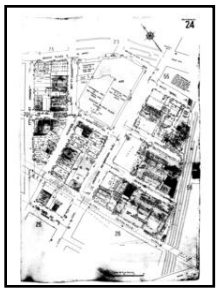

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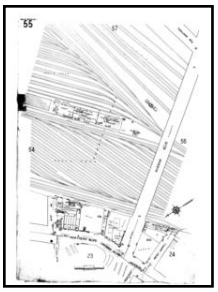

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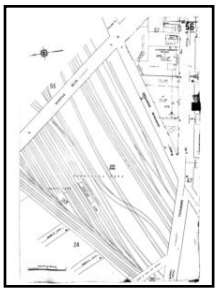

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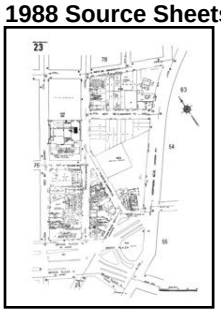

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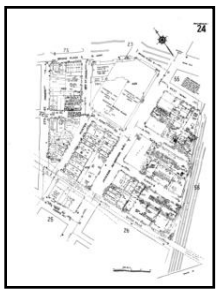

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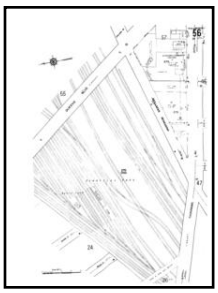

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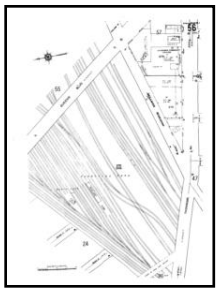

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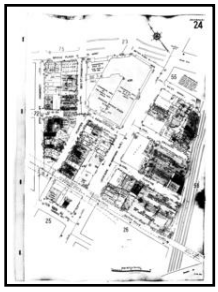

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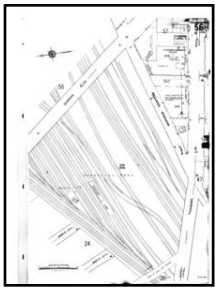

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Volume 1, Sheet 24

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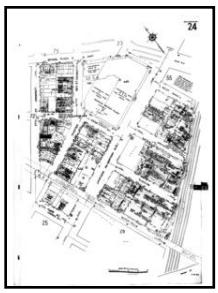

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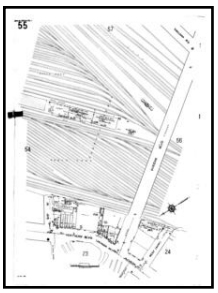

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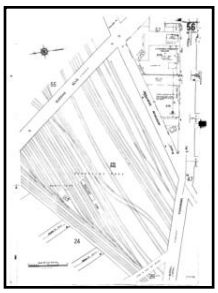

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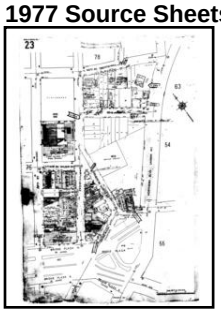

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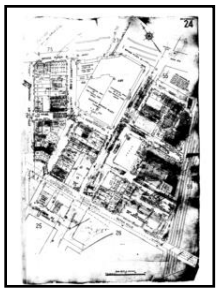

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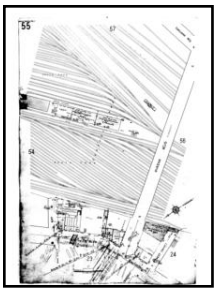

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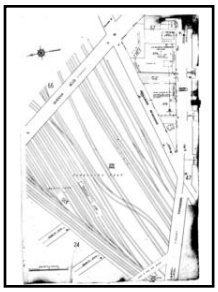

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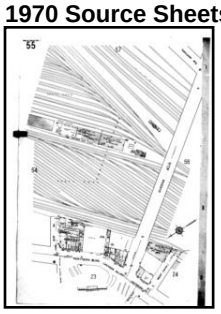

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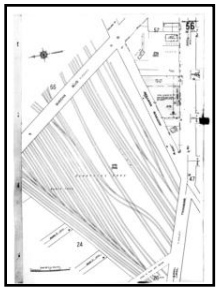

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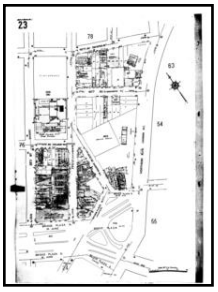

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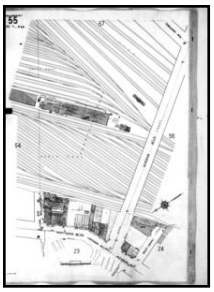
Volume 1, Sheet 24

1950 Source Sheets

Volume 1, Sheet 23

Volume 1, Sheet 24



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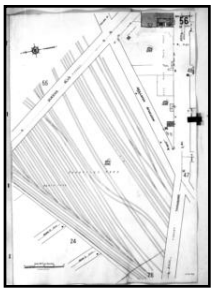

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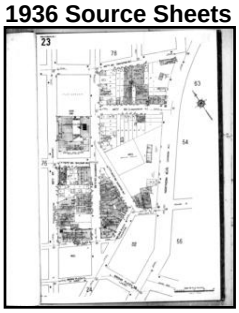

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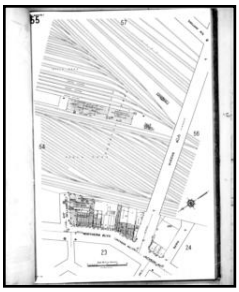

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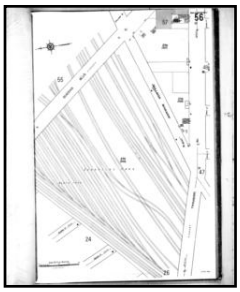

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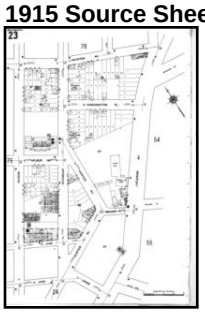

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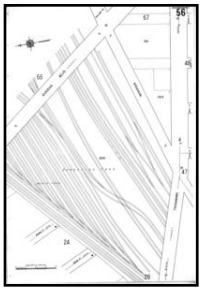

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1898 Source Sheets

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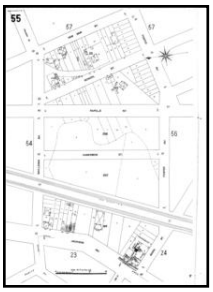

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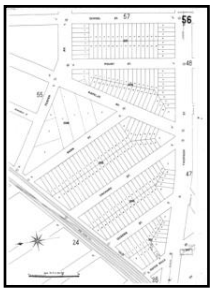

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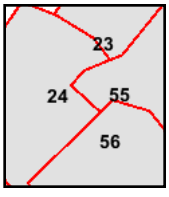

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0 Feet 150 300 600

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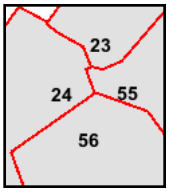

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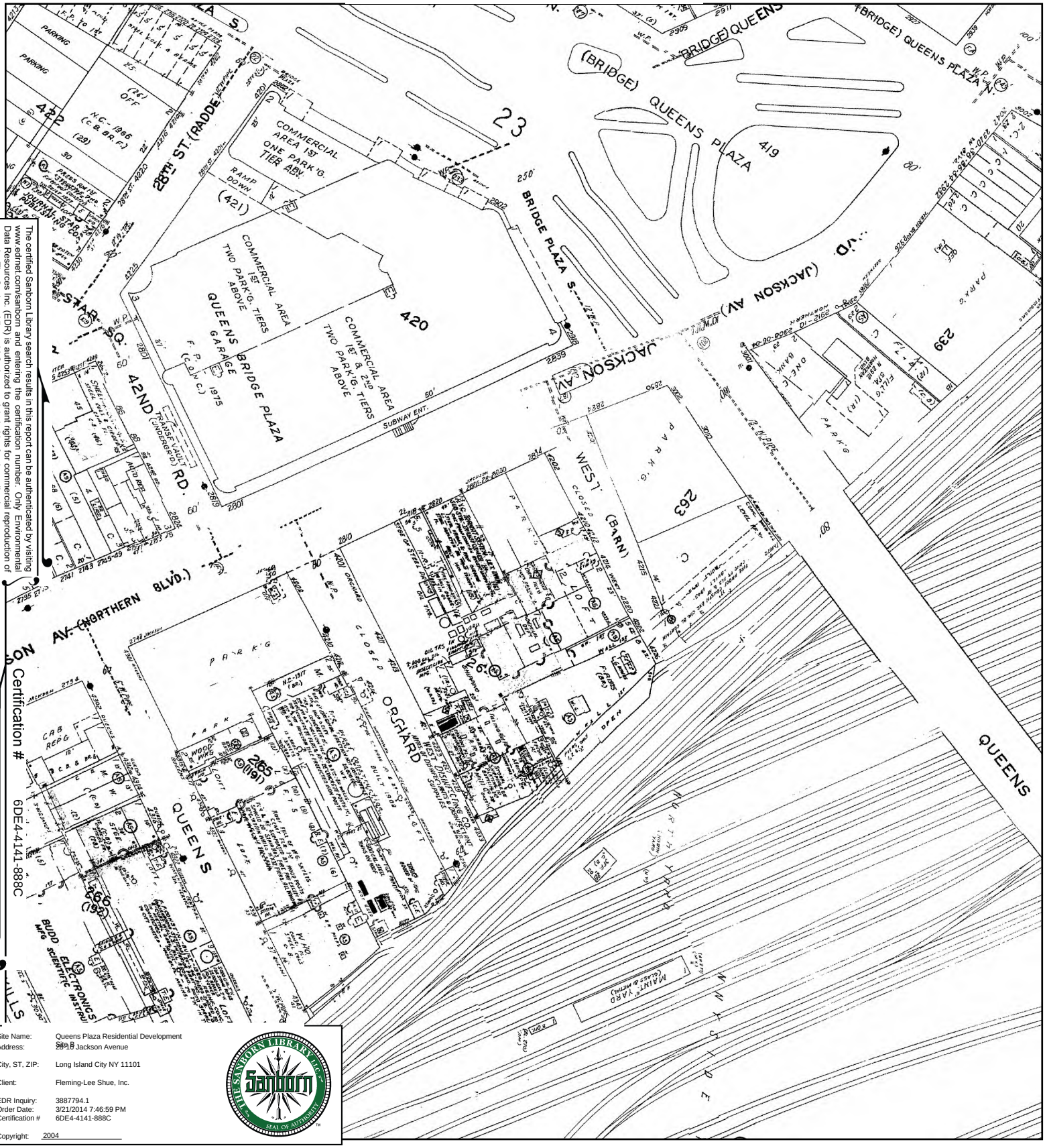

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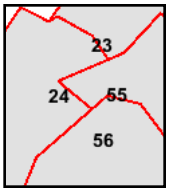

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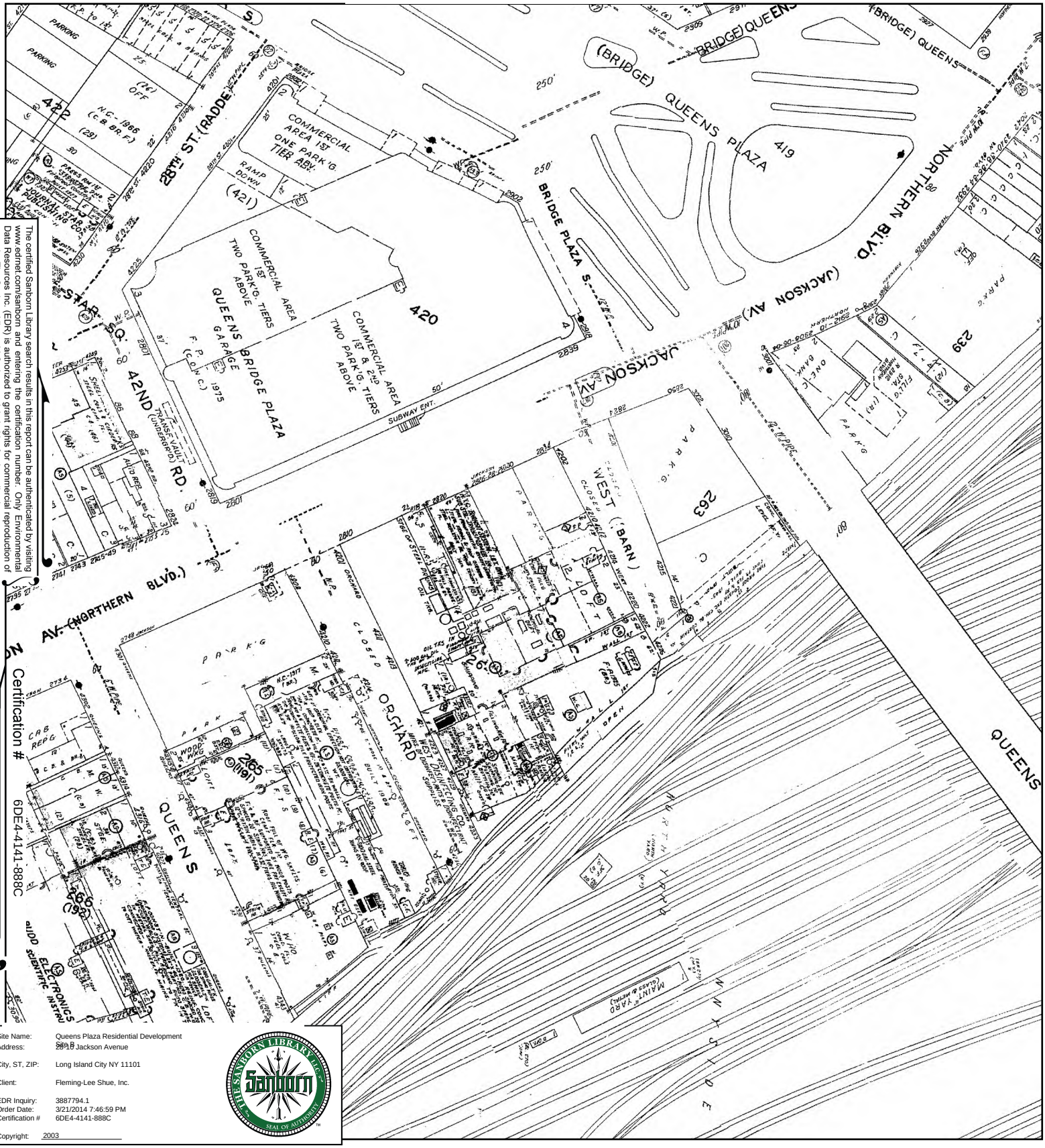

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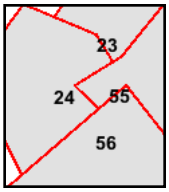

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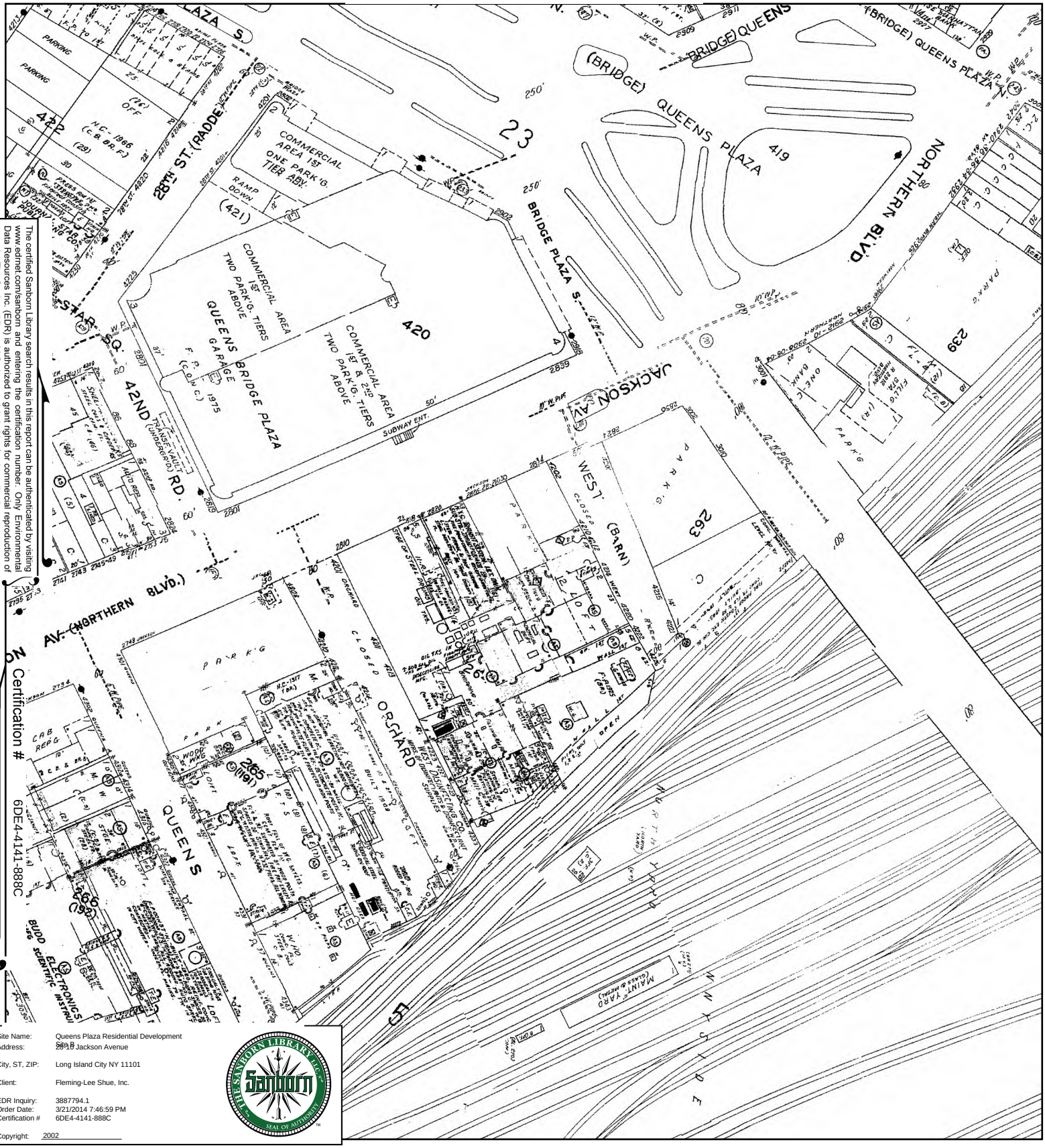

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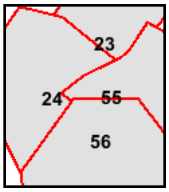

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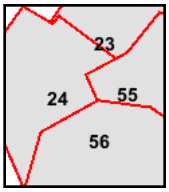

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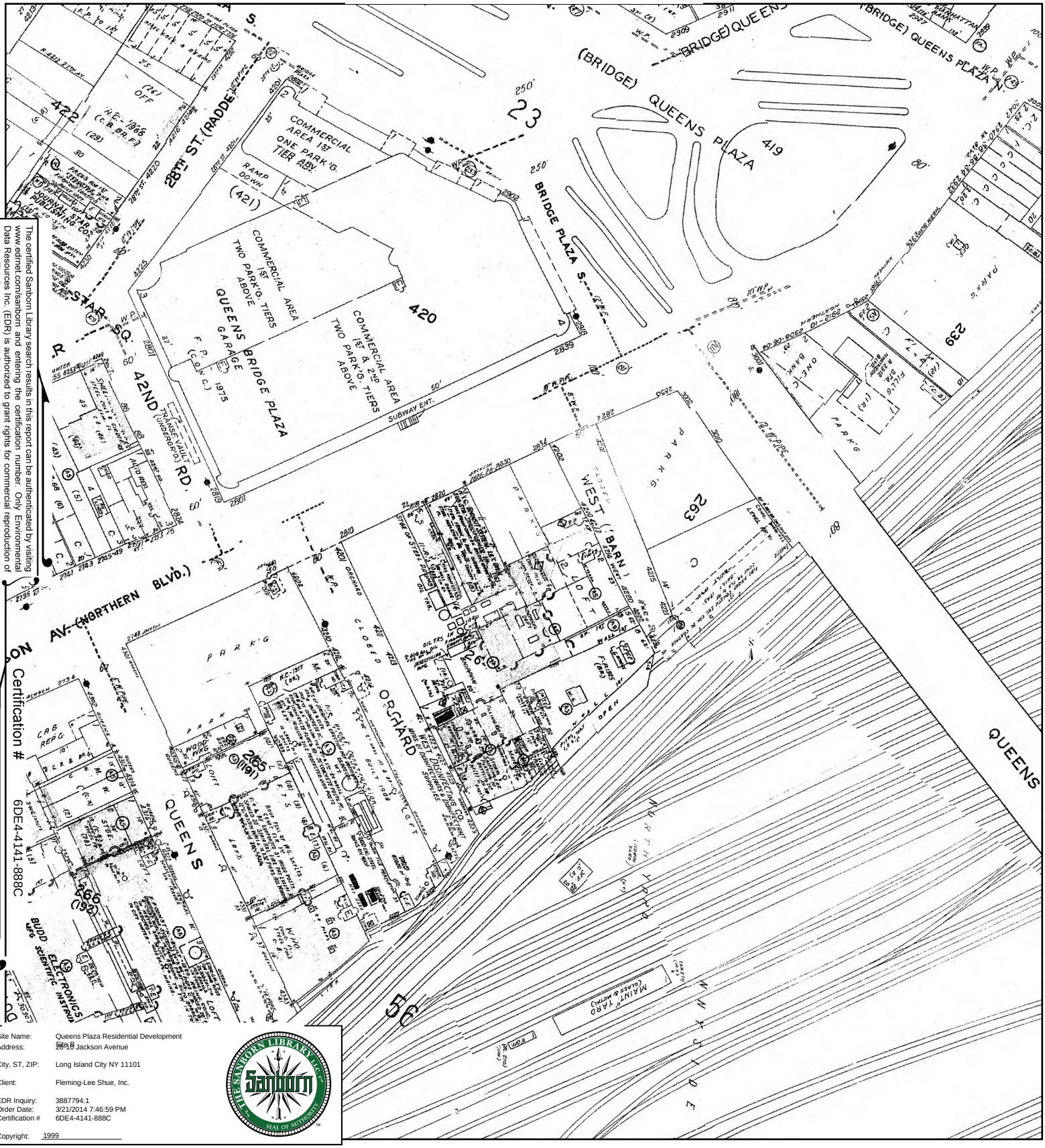

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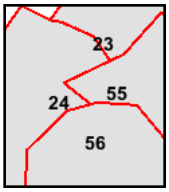

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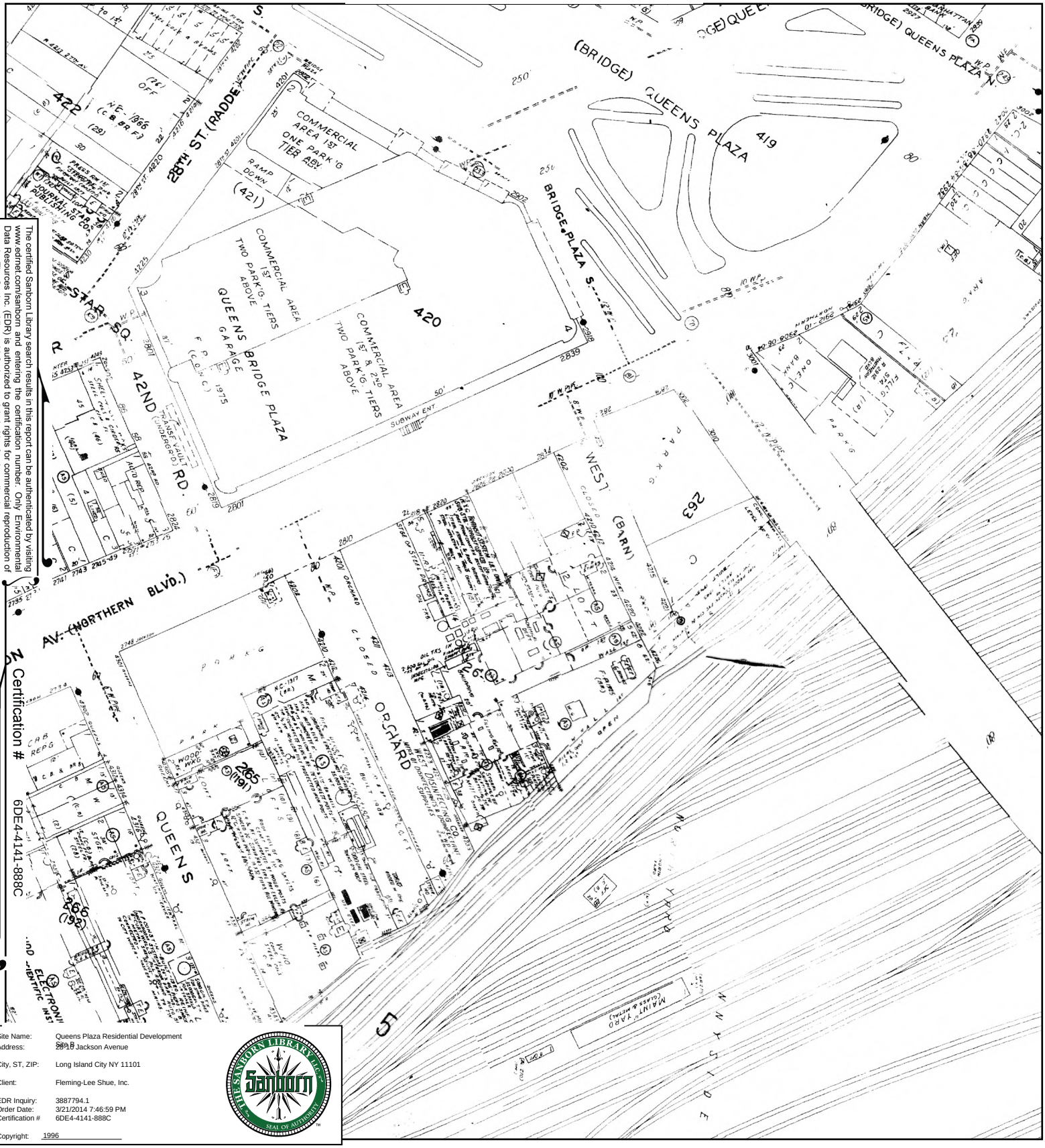

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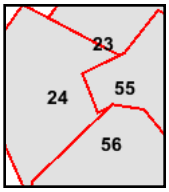

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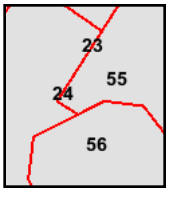

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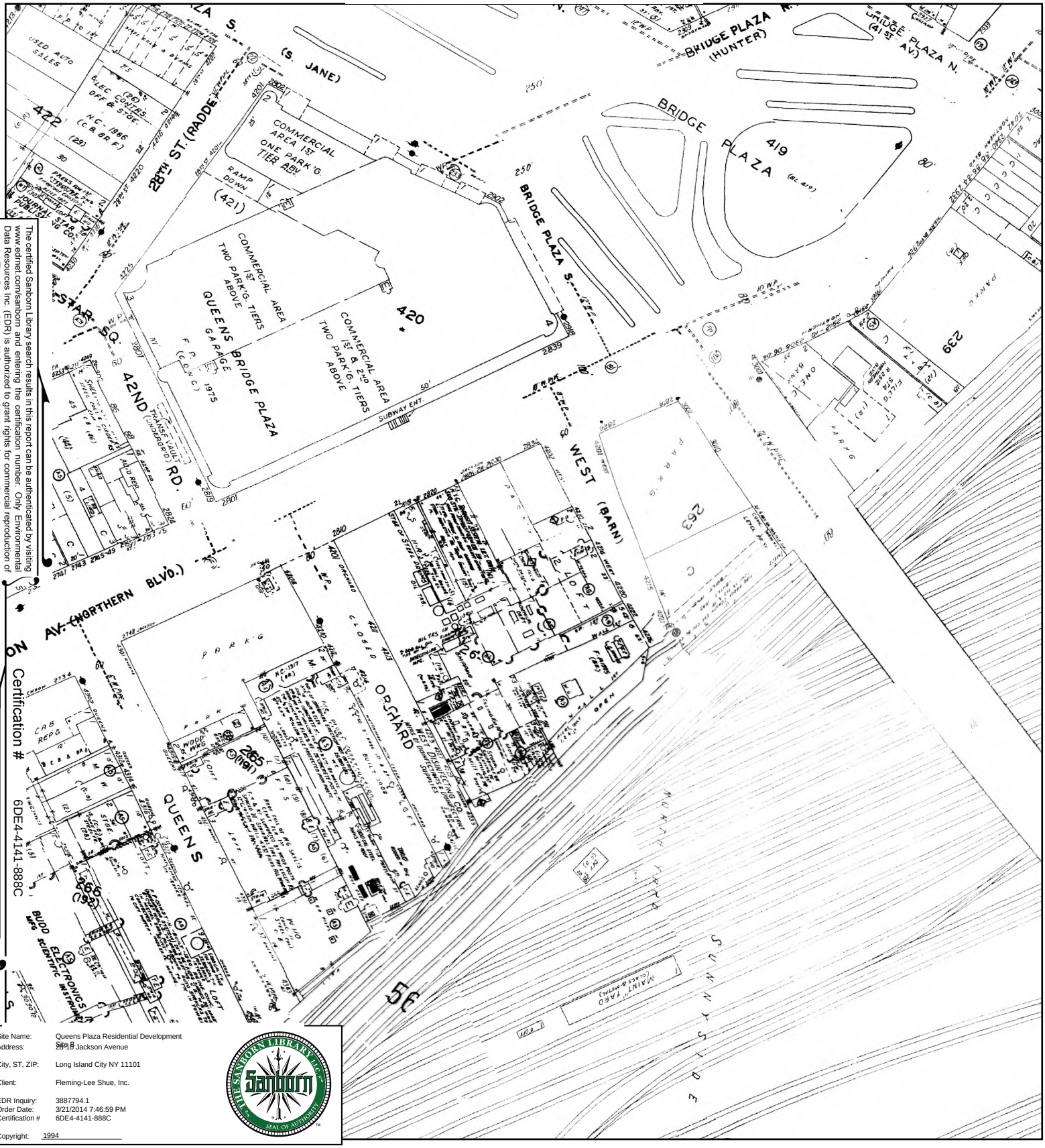

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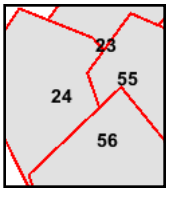

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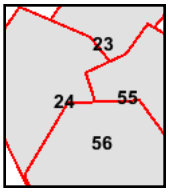

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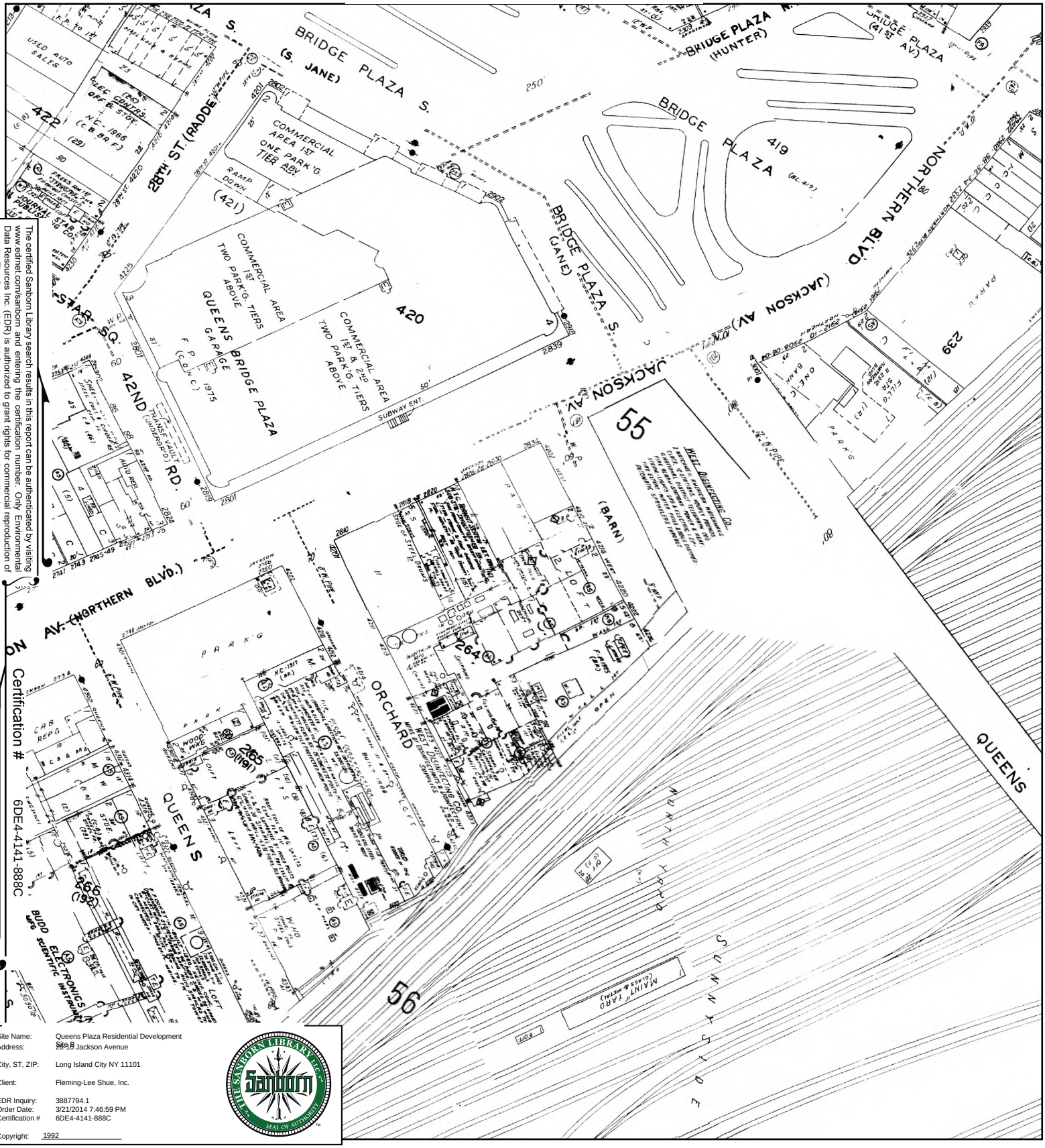

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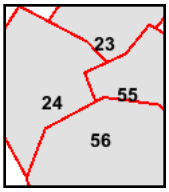

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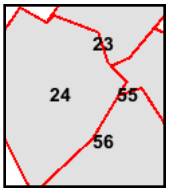

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Volume 1, Sheet 55
Volume 1, Sheet 56

0 Feet 150 300 600

N

1990 Certified Sanborn Map

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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development
Address: Site B 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1990

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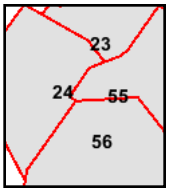

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Certification # 6DE4-4141-888C

Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
Order Date:	3/21/2014 7:46:59 PM
Certification #	6DE4-4141-888C
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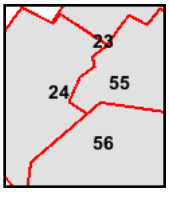

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Volume 1, Sheet 56

0 Feet 150 300 600

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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development
Address: Site B 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification #: 6DE4-4141-888C
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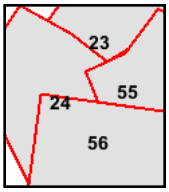

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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development Site B
Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
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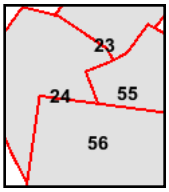

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0 Feet 150 300 600

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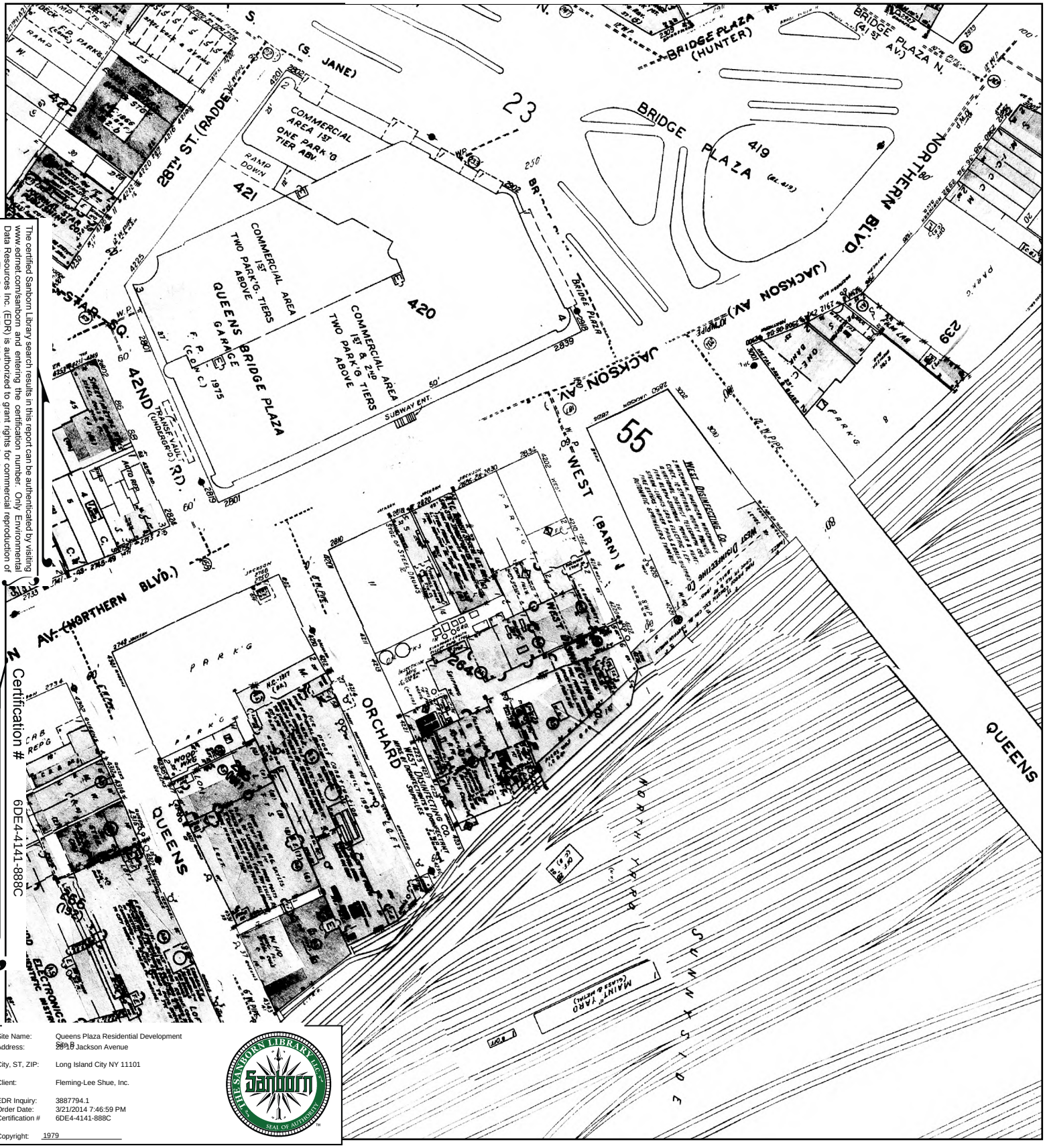
1979 Certified Sanborn Map



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Certification # 6DE4-4141-888C

Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
Order Date:	3/21/2014 7:46:59 PM
Certification #	6DE4-4141-888C
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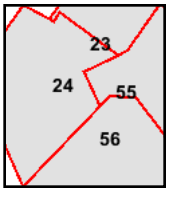

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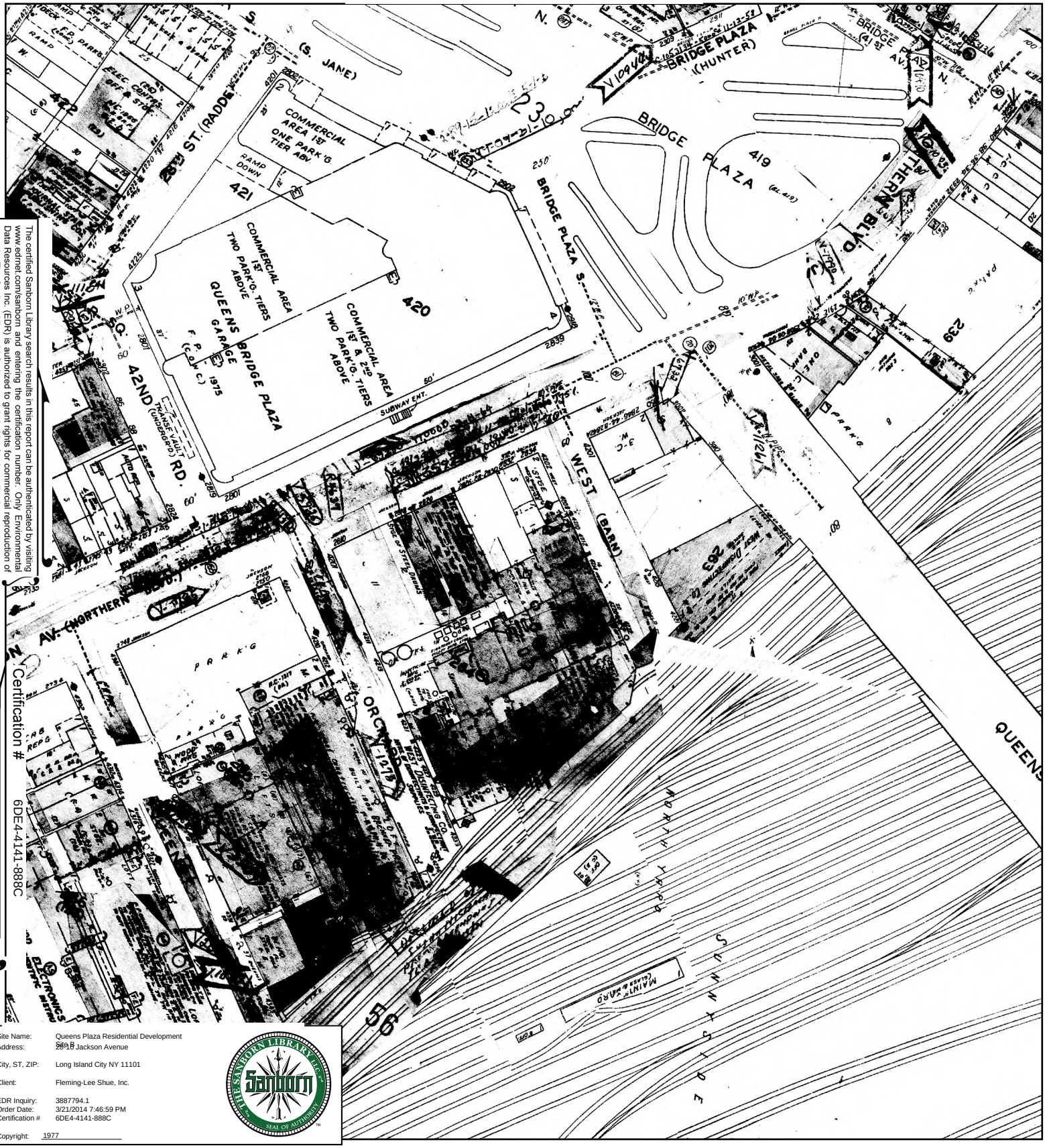
1977 Certified Sanborn Map



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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development Site B
Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1977

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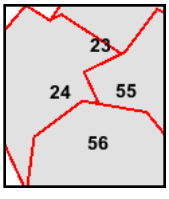

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1970 Certified Sanborn Map

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Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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Certification # 6DE4-4141-888C
Copyright: 1970

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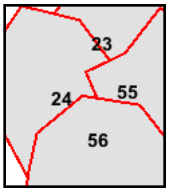

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Volume 1, Sheet 24

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1950 Certified Sanborn Map

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Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
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Copyright:	1950

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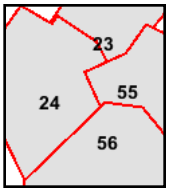

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Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
Order Date:	3/21/2014 7:46:59 PM
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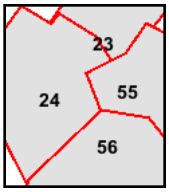

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Site Name: Queens Plaza Residential Development Site B
Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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Certification # 6DE4-4141-888C
Copyright: 1936

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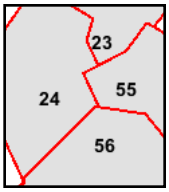

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0 Feet 150 300 600

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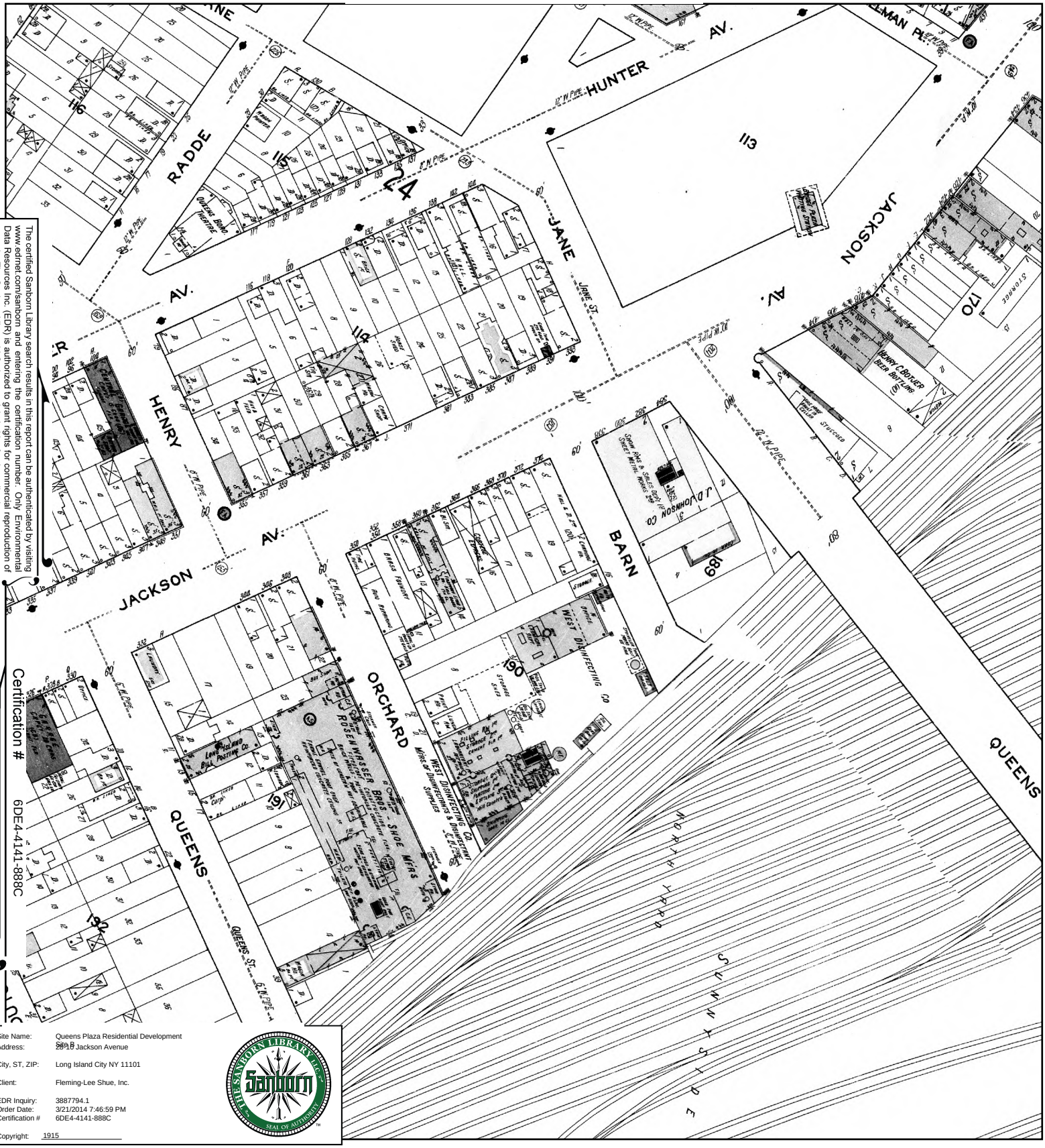
1915 Certified Sanborn Map



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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development
Address: Site B 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1915

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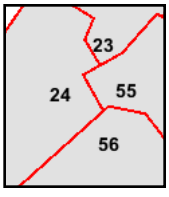

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1898 Certified Sanborn Map

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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development
Address: Site B 28-15 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1898

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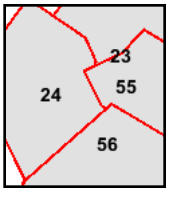

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0 Feet 150 300 600

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APPENDIX D

Laboratory Analytical Data & DUSRs

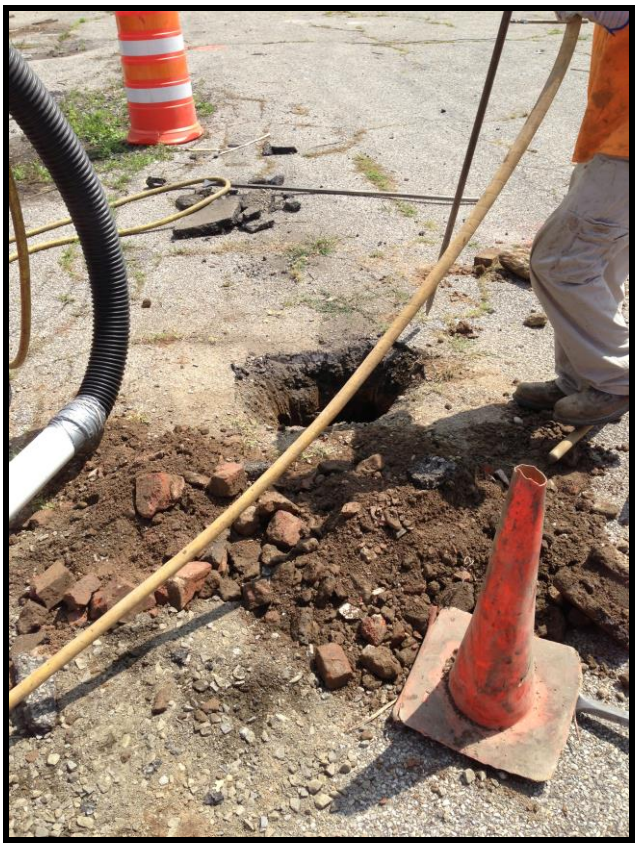
(included in previous submissions, can be provided upon request)

APPENDIX E

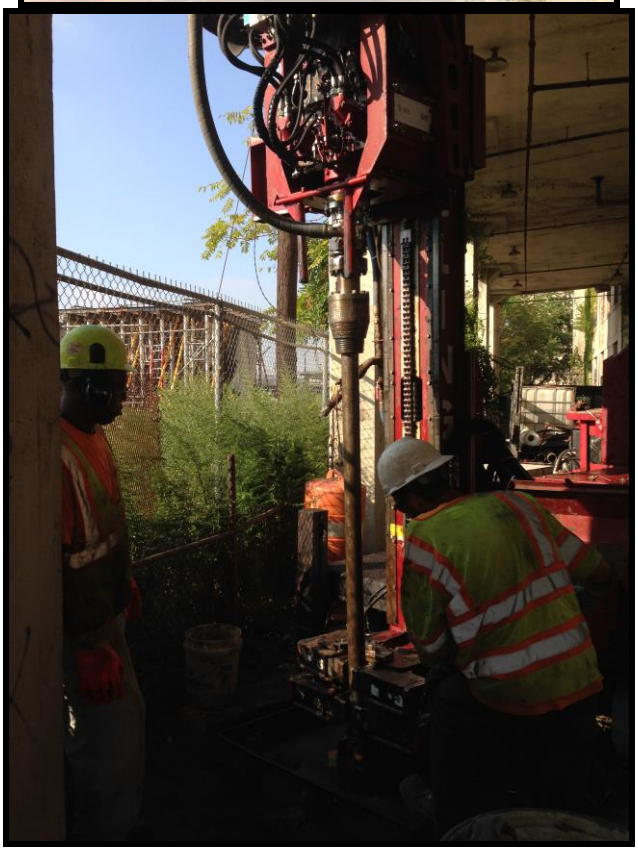
Photograph Log

<u>Queens Plaza:</u> CAMP Setup during Remedial Investigation activities (above)
Utility clearance during Remedial Investigation activities (below)

<u>Queens Plaza</u>: Remedial Investigation Utility Clearances (above/below)



<u>Queens Plaza</u>: Sonic Drilling at SB-14 (above) and SB-7 (below)

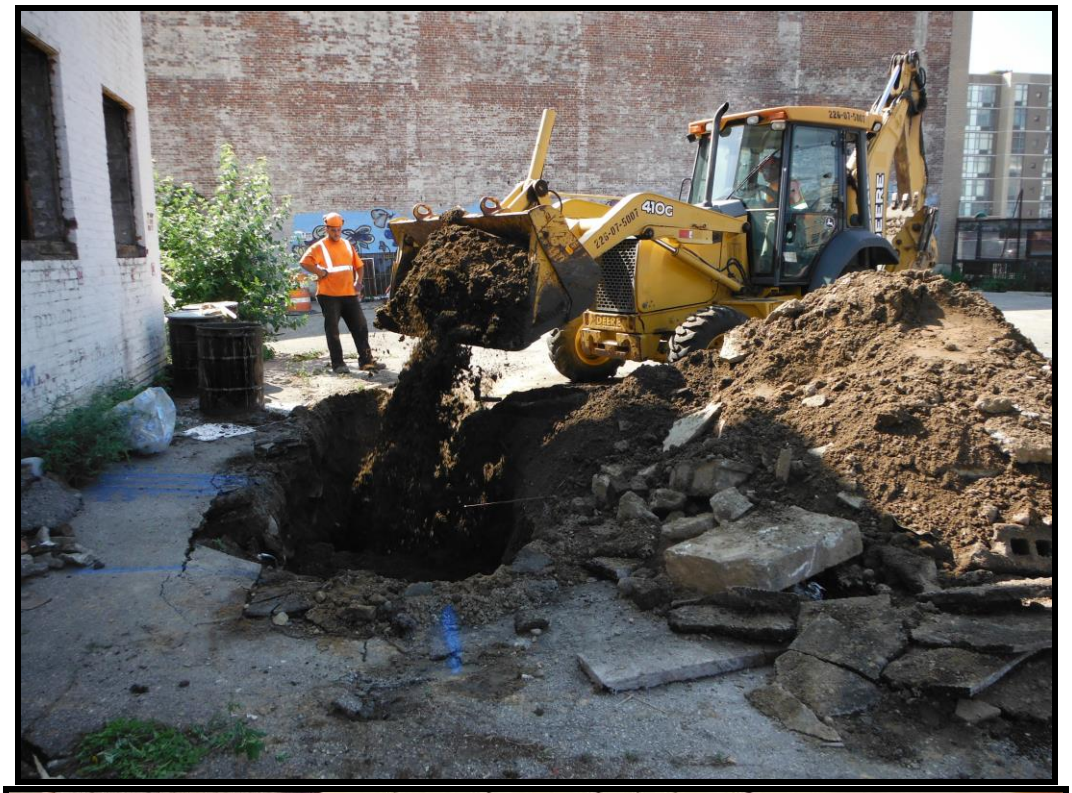


<u>Queens Plaza</u>: Sonic Drilling/Soil Sampling at SB-21 (above/below)

<u>Queens Plaza:</u> Geoprobe 420 Mobile rig drilling at SB-5 (above)
Impacted soil observed while drilling at SB-6 (below)

**<u>Queens Plaza:</u> UST Encountered While drilling SB-31 (above).
Vacing of UST contents (below).**

<u>Queens Plaza:</u> Post UST vacing (above).
Backfilling of UST excavation (below)

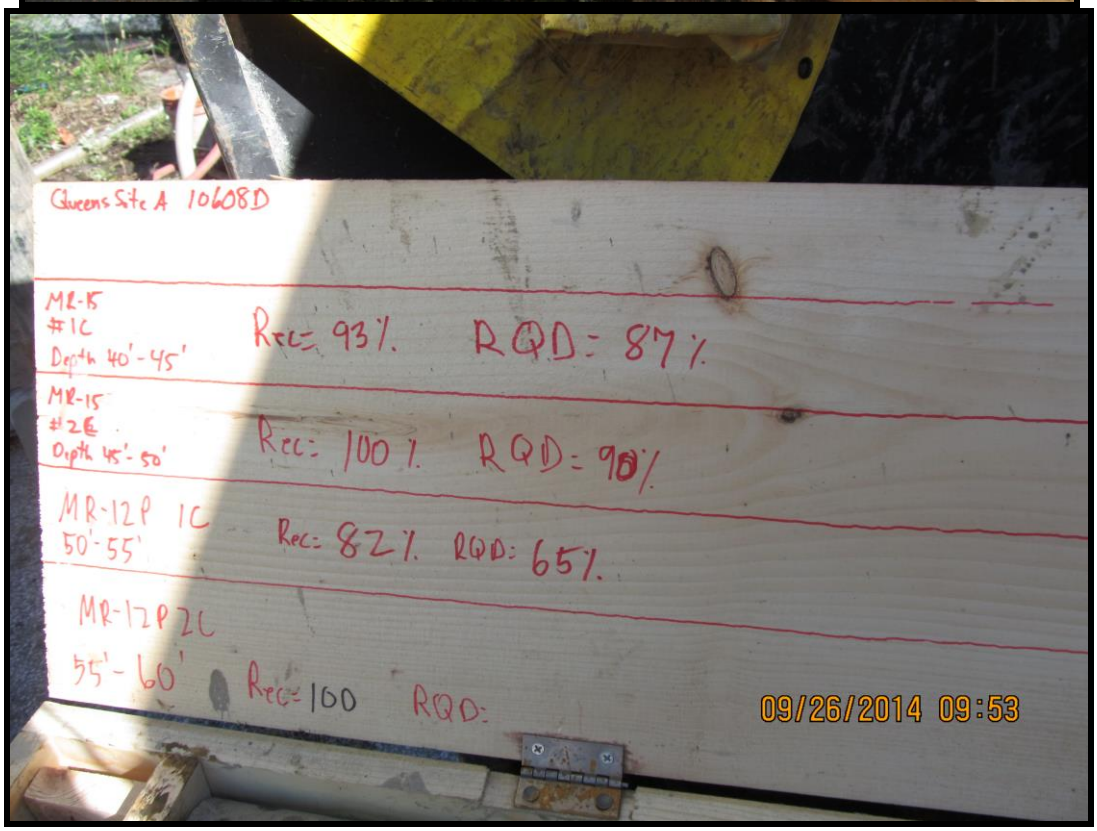


<u>Queens Plaza</u>: MR-4 Bedrock Core (above)
MR-5 Bedrock Core (below)

<u>Queens Plaza</u>: MR-6 bedrock core (above)
MR-7 bedrock core (below)

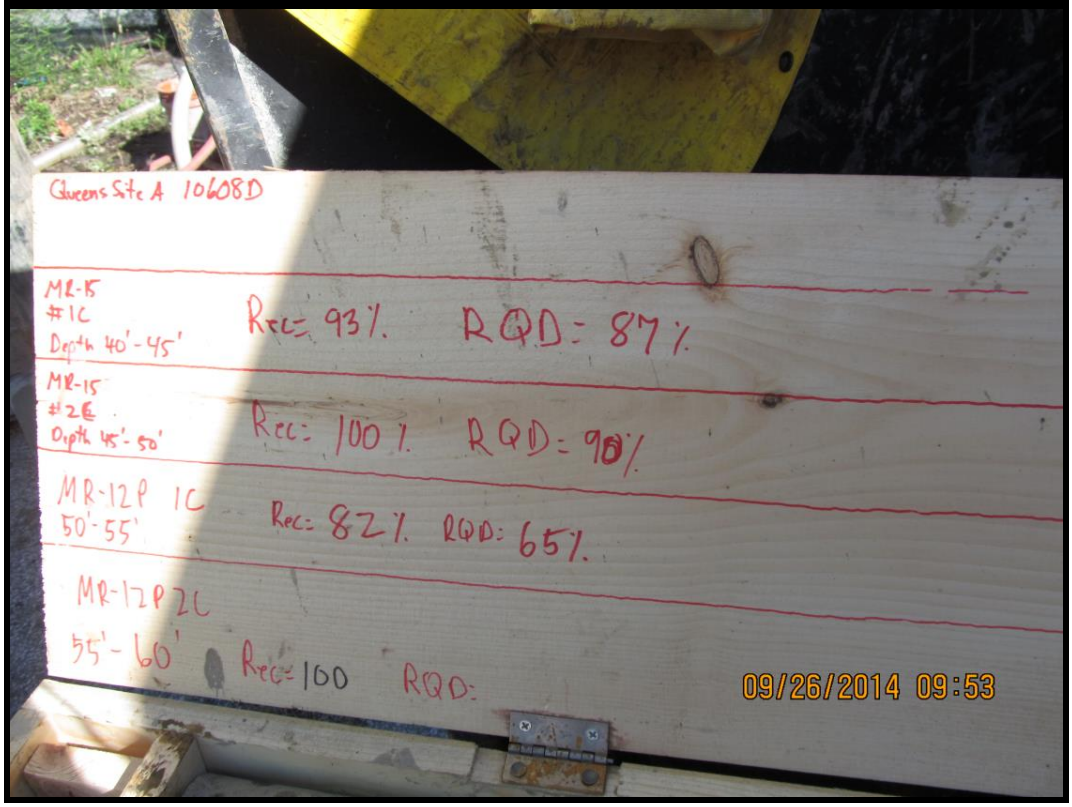
<u>Queens Plaza</u>: MR-8 bedrock core (above)
MR-9 bedrock core (below)

<u>Queens Plaza</u>: MR-10P bedrock core (above)
MR-11 bedrock core (below)



<u>Queens Plaza</u>: MR-12P bedrock core (above/below)

<u>Queens Plaza</u>: MR-13 bedrock core (above)
MR-14 bedrock core (below)



<u>Queens Plaza</u>: MR-15 bedrock core (above/below)

<u>Queens Plaza</u>: MR-16 bedrock core (above)
MR-17 bedrock core (below)

<u>Queens Plaza</u>: MR-18 bedrock core (above)
MR-19 bedrock core (below)

<u>Queens Plaza</u>: MR-20 bedrock core (above/below)

APPENDIX F

Soil Boring and Well Construction Logs, and Groundwater Sampling Logs

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: A-4 Weather: 75 F, Sunny & clear

Date: 9/26/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: KR Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 21.10 Water Column (ft): 7.02

Depth to Water(ft): 14.08 Volume of Water in Well (gal) 1.15

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 11:05 Purge Rate: 100 mL/min

End Purging: 11:33 Volume of Water Removed (gal): 1.25

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 11:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
11:10	14.10	100	-141	0.485	3.9	6.99	19.78	0.69
11:15	14.10	100	-148	0.471	2.7	6.99	19.91	0.54
11:20	14.10	100	-153	0.462	0.0	7.01	20.11	0.45
11:25	14.10	100	-155	0.457	0.0	7.02	20.23	0.41
11:30	14.10	100	-157	0.451	0.0	7.02	20.38	0.38
11:33	14.10	100	-158	0.449	0.0	7.02	20.42	0.37

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: F-1 Weather: 65 F, Mostly cloudy

Date: 9/9/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 14.22 Water Column (ft): 9.96

Depth to Water(ft): 4.26 Volume of Water in Well (gal) 1.63

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 10:30 Purge Rate: 200 mL/min

End Purging: 11:10 Volume of Water Removed (gal): 2.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Light-brown color, odor, sheen and trace floating debris

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 11:15 Laboratory : Accutest

Final Field Measurements:

Time	DTW ft	Flow Rate ml/min	ORP mV (+/- 10 mV)	Conductivity mS/m (w/in 3%)	Turbidity NTU (w/in %10)	pH SU (+/- 0.1)	Temperature C^o (w/in 3%)	Dissolved O_2 mg/L (w/in 10%)
10:35	4.85	225	-141	0.908	39.7	6.86	18.01	1.59
10:40	5.22	200	-160	0.908	23.3	7.00	17.98	0.71
10:45	5.45	200	-165	0.912	27.9	7.03	17.94	0.63
10:50	5.61	200	-168	0.915	27.3	7.04	17.82	0.52
10:54	5.75	200	-169	0.916	25.6	7.05	17.72	0.47
10:57	5.81	200	-169	0.916	25.1	7.05	17.68	0.45
11:00	5.85	200	-169	0.915	23.9	7.05	17.64	0.42
11:03	5.89	200	-169	0.915	22.2	7.06	17.58	0.42
11:06	5.92	200	-169	0.914	21.1	7.06	17.56	0.42
11:09	5.96	200	-169	0.915	20.3	7.05	17.55	0.43

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: F-3 Weather: 65 F, Mostly cloudy

Date: 9/9/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 14.32 Water Column (ft): 9.43

Depth to Water(ft): 4.89 Volume of Water in Well (gal) 1.54

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:30 Purge Rate: 200 mL/min

End Purging: 9:00 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 9:05 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:31	5.01	225	-84	0.349	27.1	6.92	17.77	2.56
8:36	5.25	200	-29	0.319	24.4	6.24	17.83	1.77
8:41	5.29	200	-11	0.320	18.2	6.07	17.93	1.42
8:46	5.33	200	-23	0.318	14.7	6.26	17.83	1.22
8:49	5.34	200	-24	0.318	11.7	6.25	17.79	1.18
8:52	5.35	200	-24	0.319	10.4	6.26	17.77	1.16
8:55	5.35	200	-23	0.319	9.2	6.27	17.73	1.12

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: MW-4 Weather: 75 F, Sunny & clear

Date: 9/26/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 23.51 Water Column (ft): 10.26

Depth to Water(ft): 13.25 Volume of Water in Well (gal) 1.67

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 13:05 Purge Rate: 150 mL/min

End Purging: 13:37 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 13:35 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
13:10	13.53	150	1	0.502	209.0	6.83	22.65	1.77
13:15	13.53	150	1	0.507	185.0	6.80	22.24	0.99
13:20	13.53	150	-1	0.521	179.0	6.80	22.04	0.79
13:25	13.53	150	-2	0.543	185.0	6.79	21.92	0.68
13:30	13.53	150	-4	0.558	175.0	6.80	21.83	0.65
13:33	13.53	150	-4	0.564	172.0	6.79	21.79	0.58
13:36	13.53	150	-4	0.569	168.0	6.79	21.74	0.52

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: SCS MW-2C Weather: 65 F, Rain

Date: 9/24/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 11.30 Water Column (ft): 3.02

Depth to Water(ft): 8.28 Volume of Water in Well (gal) 0.49

Depth to Product (ft): 7.33 Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 12:05 Purge Rate: 100 mL/min

End Purging: 12:20 Volume of Water Removed (gal): 0.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Free-product: dark brown color; Water: yellow brown color

No parameters collected due to free-product in the well.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 12:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** **mS/m** - S/m **(w/in 3%)**	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** **C°** - *F°* **(w/in 3%)**	**Dissolved O_2** mg/L (w/in 10%)

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: SCS MW-10-1 Weather: 65 F, Mostly cloudy

Date: 9/16/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 20.00 Water Column (ft): 9.90

Depth to Water(ft): 10.10 Volume of Water in Well (gal) 1.62

Depth to Product (ft): 8.05 Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:10 Purge Rate: 100 mL/min

End Purging: 8:45 Volume of Water Removed (gal): 0.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Free-product: dark brown color; Water: yellow brown color.

No parameters collected due to free-product in well.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 8:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** **mS/m** - S/m **(w/in 3%)**	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** **C°** - *F°* **(w/in 3%)**	**Dissolved O_2** mg/L (w/in 10%)

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: SCS-MW-10-2 Weather: 65 F, Mostly cloudy

Date: 9/10/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 20.35 Water Column (ft): 13.57

Depth to Water(ft): 6.78 Volume of Water in Well (gal) 2.21

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 10:22 Purge Rate: ~200 mL/min

End Purging: 10:50 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: trace suspended solids, odor

Duplicate sample DUP-091014 (GW) collected.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 10:50 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
10:25	7.06	200	-114	0.643	3.2	6.41	16.60	0.59
10:30	7.17	200	-123	0.642	3.7	6.40	16.60	0.47
10:35	7.24	200	-131	0.644	5.3	6.40	16.48	0.37
10:38	7.26	200	-132	0.645	5.3	6.40	16.46	0.38
10:41	7.28	200	-135	0.647	5.8	6.41	16.49	0.36
10:44	7.30	200	-139	0.649	5.9	6.41	16.48	0.31

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: WS-4 Weather: 75 F, Partly cloudy

Date: 9/24/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 11.46 Water Column (ft): 3.53

Depth to Water(ft): 7.93 Volume of Water in Well (gal) 0.58

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 9:40 Purge Rate: 100 mL/min

End Purging: 10:15 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 10:35 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
9:45	8.69	120	-34	0.981	98.3	6.69	19.39	1.42
9:50	8.73	100	-33	0.985	111.0	6.68	19.38	0.99
9:55	8.75	100	-31	0.983	99.1	6.68	19.37	0.75
10:00	8.77	100	-31	0.977	94.6	6.68	19.39	0.67
10:05	8.87	100	-33	0.964	80.1	6.68	19.48	0.59
10:08	8.87	100	-37	0.959	52.9	6.68	19.47	0.56
10:11	8.80	100	-40	0.952	36.9	6.68	19.48	0.54
10:14	8.79	100	-46	0.942	24.1	6.68	19.50	0.51

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: WS-5D Weather: 70 F, Mostly cloudy

Date: 9/25/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: RC Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 31.08 Water Column (ft): 24.21

Depth to Water(ft): 6.87 Volume of Water in Well (gal) 3.95

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 14:04 Purge Rate: 150 mL/min

End Purging: 14:39 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy, odor

White foam collecting on water surface in bucket with slight sheen

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 14:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
14:09	7.72	150	-176	1.300	82.6	7.38	17.58	1.33
14:14	7.75	150	-178	1.300	97.3	7.40	17.68	1.03
14:19	7.72	150	-175	1.290	116.0	7.39	17.75	0.88
14:26	7.77	150	-174	1.280	150.0	7.39	17.86	0.70
14:30	7.80	150	-175	1.270	152.0	7.38	17.87	0.65
14:35	7.77	150	-173	1.260	135.0	7.38	18.15	0.59
14:38	7.77	150	-173	1.260	129.0	7.39	18.22	0.57

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: 6A-2 Weather: 75 F, Partly cloudy

Date: 9/24/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 1-inch / PVC

Depth of Well (ft): 11.91 Water Column (ft): 7.50

Depth to Water(ft): 4.41 Volume of Water in Well (gal) 1.22

Depth to Product (ft): 4.33 Volume of Water to Remove (gal): -

well diameter:	**1 in**	2 in	4 in	6 in	8 in
gallons per foot:	**0.041**	0.163	0.653	1.469	2.611

Start Purging: 11:15 Purge Rate: 100 mL/min

End Purging: 11:20 Volume of Water Removed (gal): 1/4

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: No parameters colected due to free-product in well. Unable to stabilize water level on lowest setting, very slow recharge. Unable to complete sample set.

Samples Collected: (analyses / no. bottles) Only sampled VOCs; 3-40mL voas with HCL

Time: 11:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: 9-1 Weather: 60 F, Rain

Date: 9/25/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 12.86 Water Column (ft): 6.88

Depth to Water(ft): 5.98 Volume of Water in Well (gal) 1.12

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 11:37 Purge Rate: 175 mL/min

End Purging: 12:05 Volume of Water Removed (gal): 1

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 12:15 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
11:42	6.29	175	-48	0.582	11.9	6.37	17.62	1.55
11:47	6.32	175	-57	0.589	6.6	6.44	17.40	0.94
11:52	6.32	175	-63	0.587	6.3	6.46	17.34	0.86
11:57	6.33	175	-66	0.584	6.2	6.48	17.32	0.81
12:02	6.33	175	-68	0.579	5.5	6.49	17.36	0.76

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: 10-4 Weather: 65 F, Mostly cloudy

Date: 9/9/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 1-inch / PVC

Depth of Well (ft): 8.06 Water Column (ft): 3.68

Depth to Water(ft): 4.38 Volume of Water in Well (gal) 0.15

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	**1 in**	2 in	4 in	6 in	8 in
gallons per foot:	**0.041**	0.163	0.653	1.469	2.611

Start Purging: 13:10 Purge Rate: 100 mL/min

End Purging: 13:21 Volume of Water Removed (gal): 0.25

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Unable to stabilize water table; let well recharge before sampling.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 13:40 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
13:15	5.34	100	53	0.499	316.0	7.54	21.14	2.69
13:18	6.35	100	76	0.503	350.0	7.22	20.80	1.60
13:21	7.21	100	80	0.500	214.0	7.21	20.71	1.47

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-1/SB-5 Weather: 65 F, Overcast

Date: 9/10/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 10.70 Water Column (ft): 9.15

Depth to Water(ft): 1.55 Volume of Water in Well (gal) 1.49

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 14:25 Purge Rate: 200 mL/min

End Purging: 15:20 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Cloudy with odor.

* Observed bubbles in flow through cell but not in sample tubing.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 15:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
14:33	2.34	200	-162	0.871	21.8	7.04	18.95	0.52
14:38	3.10	200	-173	0.873	134.0	7.08	18.89	0.42
14:43	3.65	200	-176	0.872	127.0	7.10	18.51	0.41
14:48	3.95	200	-172	0.871	81.0	7.12	17.99	0.44
14:53	4.13	200	-165	0.868	55.0	7.13	17.56	0.54
14:58	4.29	200	-156	0.868	112.0	7.14	17.13	0.71
15:03	4.34	200	-151	0.852	135.0	7.15	17.03	4.45*
15:06	4.36	200	-146	0.871	121.0	7.15	16.90	3.65*
15:09	4.36	200	-142	0.863	106.0	7.15	16.85	6.61*

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-2/SB-4 Weather: 65 F, Overcast

Date: 9/11/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 13.35 Water Column (ft): 7.04

Depth to Water(ft): 6.31 Volume of Water in Well (gal) 1.15

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:05 Purge Rate: 100 mL/min

End Purging: 8:23 Volume of Water Removed (gal): 0.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Brown color with sheen and odor

Unable to stabilize water table on lowest setting. Let recharge and sampled.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 8:50 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:10	6.97	200	-109	0.800	11.9	6.97	20.47	0.60
8:15	7.45	100	-141	0.743	12.3	7.45	19.90	0.50
8:20	8.28	100	-147	0.743	14.5	8.28	19.46	0.49

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-3/SB-21 Weather: 70 F, Rain

Date: 9/22/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: RC Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 12.13 Water Column (ft): 8.35

Depth to Water(ft): 3.78 Volume of Water in Well (gal) 1.36

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 10:40 Purge Rate: 200 mL/min

End Purging: 11:10 Volume of Water Removed (gal): ~2.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy with odor

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 11:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
10:40	3.78	200	-122	1.180	139.0	7.01	18.14	1.88
10:45	4.16	200	-126	1.160	126.0	7.01	17.58	1.52
10:50	4.25	200	-128	1.150	103.0	7.01	17.68	1.36
10:55	4.22	200	-129	1.150	88.8	6.99	18.85	1.25
11:00	4.22	200	-129	1.140	64.9	7.08	17.57	1.22
11:05	4.27	200	-130	1.140	60.0	7.03	17.46	1.23
11:10	4.31	200	-130	1.130	46.9	7.02	17.47	1.13

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-4/SB-2 Weather: 70 F, Overcast

Date: 9/11/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: AS Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 11.25 Water Column (ft): 5.71

Depth to Water(ft): 5.54 Volume of Water in Well (gal) 0.93

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 11:35 Purge Rate: 150 mL/min

End Purging: 12:10 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear with odor

Light brown color with floating fines. Very turbid water. Let well recharge then sampled.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 13:25 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
11:40	6.39	200	-167	0.949	293.0	6.81	18.44	0.78
11:45	7.29	150	-189	0.912	345.0	6.88	18.11	0.72
11:50	8.18	150	-194	0.927	749.0	6.92	17.63	0.73
11:55	8.40	150	-201	0.943	>800	6.95	17.25	0.70
11:08	8.43	150	-201	0.943	>800	6.96	17.18	0.67
12:01	8.45	150	-206	0.961	>800	7.03	17.25	0.65
12:04	8.47	150	-217	0.903	>800	7.05	17.05	0.63
12:07	8.47	150	-218	0.892	>800	7.05	16.97	0.61
12:10	8.47	150	-210	0.879	>800	7.04	16.88	0.60

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-5/SB-29 Weather: 73 F, Overcast

Date: 9/29/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 1-inch / PVC

Depth of Well (ft): 13.82 Water Column (ft): 7.60

Depth to Water(ft): 6.22 Volume of Water in Well (gal) 1.24

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	**1 in**	2 in	4 in	6 in	8 in
gallons per foot:	**0.041**	0.163	0.653	1.469	2.611

Start Purging: 11:15 Purge Rate: 200 mL/min

End Purging: 11:45 Volume of Water Removed (gal): ~2.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy, odor, sheen

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 11:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
11:20	6.31	200	-123	0.680	65.7	6.69	19.67	1.60
11:25	6.34	200	-127	0.723	57.2	6.97	19.06	0.95
11:30	6.39	200	-126	0.736	55.8	6.92	18.67	0.72
11:35	6.42	200	-128	0.736	53.4	6.92	18.54	0.63
11:40	6.45	200	-131	0.735	50.1	6.92	18.44	0.56
11:43	6.45	200	-131	0.736	46.9	6.93	18.40	0.55
11:45	6.45	200	-132	0.737	45.8	6.93	18.41	0.53

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-6/SB-1 Weather: 70 F, Overcast

Date: 9/29/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 10.81 Water Column (ft): 3.85

Depth to Water(ft): 6.96 Volume of Water in Well (gal) 0.63

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 13:11 Purge Rate: 100 mL/min

End Purging: 13:35 Volume of Water Removed (gal): 0.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear with odor

Unable to stabilize water level on lowest setting, well dry. Allowed to recharge overnight

Sampled on 9/30/14 @ 8:15am

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 8:15 (9/30/14) Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
13:16	8.19	100	-117	2.070	30.4	7.49	19.73	0.63
13:22	8.52	100	-134	2.050	26.8	7.49	19.58	0.51
13:26	9.15	100	-139	2.040	50.2	7.49	19.27	0.52
13:30	8.45	100	-139	2.010	46.9	7.48	18.85	0.69

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-7/SB-6 Weather: 70 F, Clear & sunny

Date: 9/26/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: KR, LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 12.69 Water Column (ft): 7.91

Depth to Water(ft): 4.78 Volume of Water in Well (gal) 1.29

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 9:43 Purge Rate: 125 mL/min

End Purging: 10:13 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Cloudy, odor, slight sheen

Unable to stabilize water level on lowest setting. Let recharge and sampled.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 10:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
9:48	5.57	150	-89	1.300	253.0	6.67	17.73	0.99
9:53	6.50	125	-103	1.280	275.0	6.71	17.83	0.79
9:58	7.12	125	-113	1.270	274.0	6.71	17.96	0.71
10:03	7.96	125	-118	1.270	266.0	6.71	17.91	0.65
10:08	8.63	125	-120	1.270	256.0	6.71	17.79	0.61
10:11	8.91	125	-121	1.270	243.0	6.71	17.76	0.60

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-8/SB-30 Weather: 70 F, Sunny

Date: 9/23/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: RC Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 14.45 Water Column (ft): 9.99

Depth to Water(ft): 4.46 Volume of Water in Well (gal) 1.63

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 13:18 Purge Rate: 150 mL/min

End Purging: 14:34 Volume of Water Removed (gal): 3

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy with odor

Duplicate sample DUP-092314 (GW) collected.

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 13:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
13:23	4.64	150	-136	0.607	0.0	7.19	17.47	1.48
13:28	4.67	150	-142	0.611	0.0	7.20	17.09	1.03
13:33	4.67	150	-147	0.609	972.0	7.20	17.15	0.77
13:38	4.69	150	-150	0.603	191.0	7.21	17.25	0.68
13:43	4.67	150	-151	0.603	104.0	7.21	17.31	0.63
13:48	4.69	150	-151	0.605	110.0	7.21	17.38	0.56
13:53	4.69	150	-151	0.606	101.0	7.21	17.38	0.53
13:58	4.70	150	-151	0.610	222.0	7.20	17.37	0.51
14:08	4.71	150	-122	0.659	365.0	7.49	17.34	1.15
14:13	4.71	150	-138	0.645	338.0	7.19	17.19	0.64
14:18	4.70	150	-142	0.630	333.0	7.18	17.18	0.56

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-9/SB-8 Weather: 70 F, Sunny

Date: 9/24/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 15.19 Water Column (ft): 11.03

Depth to Water(ft): 4.16 Volume of Water in Well (gal) 1.80

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:13 Purge Rate: 200 mL/min

End Purging: 8:45 Volume of Water Removed (gal): ~2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear with trace floating debris

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 8:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:18	4.29	200	-47	0.642	60.3	6.77	17.46	0.98
8:23	4.32	200	-60	0.636	26.8	6.88	17.48	0.85
8:28	4.31	200	-66	0.624	14.3	6.94	17.57	0.78
8:33	4.32	200	-69	0.621	13.7	6.97	17.64	0.72
8:38	4.32	200	-70	0.618	17.9	6.98	17.69	0.67
8:43	4.32	200	-70	0.617	24.9	6.99	17.73	0.63

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-10/SB-23 Weather: 70 F, Rain

Date: 9/22/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 15.45 Water Column (ft): 3.83

Depth to Water(ft): 11.62 Volume of Water in Well (gal) 0.63

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 12:48 Purge Rate: 200 mL/min

End Purging: 13:25 Volume of Water Removed (gal): 2.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear, trace floating debris

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 13:20 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
12:50	11.95	200	202	1.570	54.0	7.11	21.20	1.72
12:55	11.91	200	194	1.570	37.3	6.91	21.08	1.40
13:00	11.91	200	182	1.550	21.4	6.89	21.07	1.30
13:05	11.90	200	177	1.550	16.2	6.89	21.08	1.27
13:10	11.91	200	171	1.530	8.0	6.89	21.05	1.24
13:15	11.91	200	162	1.510	4.1	6.90	21.00	1.20
13:20	11.91	200	153	1.490	3.6	6.90	20.99	1.18
13:23	11.91	200	147	1.480	2.4	6.91	21.00	1.17

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-11/SB-15 Weather: 70 F, Sunny

Date: 9/23/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 16.62 Water Column (ft): 4.50

Depth to Water(ft): 12.12 Volume of Water in Well (gal) 0.73

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:00 Purge Rate: 125 mL/min

End Purging: 8:40 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 8:40 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:05	12.18	200	-3	0.607	450.0	6.78	19.19	2.37
8:10	12.17	150	-28	0.573	264.0	6.89	19.19	1.52
8:15	12.18	125	-42	0.561	105.0	6.91	19.27	1.27
8:20	12.18	125	-54	0.552	55.2	6.92	19.50	1.14
8:25	12.18	125	-59	0.551	32.7	6.92	19.49	1.08
8:30	12.18	125	-62	0.551	17.6	6.93	19.68	1.05
8:35	12.18	125	-65	0.552	10.5	6.94	19.78	1.01
8:40	12.18	125	-70	0.550	11.2	6.93	19.89	1.02

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-12/SB-12 Weather:

Date: 9/23/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: RC Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 16.62 Water Column (ft): 5.65

Depth to Water(ft): 10.97 Volume of Water in Well (gal) 0.92

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 9:30 Purge Rate: 200 mL/min

End Purging: 10:26 Volume of Water Removed (gal): 4

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 10:30 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
9:35	11.39	200	-45	0.590	0.0	6.78	20.62	1.33
9:40	11.46	200	-49	0.575	0.0	6.74	20.71	0.90
9:45	11.49	150	-53	0.569	0.0	6.73	20.75	0.75
9:50	11.51	150	-63	0.559	0.0	6.73	20.73	0.66
9:55	11.55	150	-69	0.554	793.0	6.72	20.76	0.63
10:00	11.56	150	-74	0.540	378.0	6.71	20.71	0.62
10:05	11.57	150	-77	0.534	287.0	6.72	20.69	0.59
10:10	11.57	150	-84	0.529	176.0	6.71	20.71	0.57
10:15	11.58	150	-85	0.527	161.0	6.71	20.74	0.57
10:20	11.58	150	-87	0.523	114.0	6.71	20.75	0.57
10:25	11.58	150	-90	0.519	59.0	6.71	20.75	0.54

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-13/SB-13 Weather: 70 F, Sunny

Date: 9/23/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: RC Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 16.61 Water Column (ft): 6.85

Depth to Water(ft): 9.76 Volume of Water in Well (gal) 1.12

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 11:10 Purge Rate: 150 mL/min

End Purging: 11:50 Volume of Water Removed (gal): 2.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 11:55 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
11:10	9.76	150	-75	0.373	481.0	6.98	19.95	3.73
11:15	9.75	150	-75	0.321	272.0	6.46	20.44	1.65
11:20	9.77	150	-73	0.295	299.0	6.41	20.87	0.96
11:25	9.77	150	-73	0.287	483.0	6.40	21.08	0.75
11:30	9.78	150	-79	0.296	350.0	6.41	21.07	0.61
11:35	9.78	150	-80	0.302	242.0	6.41	21.07	0.55
11:40	9.78	150	-81	0.305	189.0	6.41	21.19	0.52
11:45	9.79	150	-83	0.312	43.1	6.40	21.23	0.48
11:50	9.80	150	-85	0.317	26.9	6.39	21.25	0.46

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-14/SB-17 Weather: 60 F, Rain

Date: 9/25/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: KR, LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 17.39 Water Column (ft): 7.15

Depth to Water(ft): 10.24 Volume of Water in Well (gal) 1.17

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:22 Purge Rate: ~125 mL/min

End Purging: 9:05 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear, no odor

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 9:00 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:30	10.26	150	-142	0.398	53.3	6.53	17.88	0.89
8:35	10.30	150	-136	0.390	44.8	6.53	17.86	0.76
8:40	9.97	150	-127	0.395	44.5	6.49	17.83	0.73
0:00	9.98	125	-113	0.394	35.6	6.44	18.17	0.67
8:50	9.93	125	-107	0.389	32.8	6.41	18.20	0.63
8:55	9.94	125	-106	0.388	31.3	6.42	18.21	0.66
9:00	9.96	125	-106	0.387	30.1	6.42	18.20	0.69
9:03	9.98	125	-106	0.387	28.5	6.42	18.20	0.73

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-15/SB-18 Weather: 70 F, Overcast

Date: 9/29/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: LT Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 9.92 Water Column (ft): 4.14

Depth to Water(ft): 5.78 Volume of Water in Well (gal) 0.68

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:30 Purge Rate: ~200 mL/min

End Purging: 9:00 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Slightly cloudy, odor

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 9:00 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:35	6.28	150	-76	0.564	90.9	6.27	20.37	0.77
8:40	6.37	150	-117	0.534	85.5	6.45	20.14	0.61
8:45	6.52	150	-130	0.532	76.2	6.52	20.02	0.58
8:50	6.87	150	-133	0.519	48.1	6.52	19.95	0.59
8:55	7.07	150	-134	0.516	47.9	6.49	19.92	0.60
9:00	7.17	150	-135	0.517	50.2	6.48	19.89	0.57

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-16/SB-19 Weather: 63 F, Rain

Date: 9/25/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: KR Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 15.40 Water Column (ft): 9.08

Depth to Water(ft): 6.32 Volume of Water in Well (gal) 1.48

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 13:25 Purge Rate: 100 mL/min

End Purging: 14:03 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 14:15 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
13:30	6.64	100	-139	0.952	39.1	7.24	17.30	2.52
13:35	6.73	100	-163	0.943	34.0	7.43	17.44	1.69
13:40	6.75	100	-176	0.931	40.7	7.52	17.59	1.12
0:00	6.79	100	-183	0.913	22.3	7.54	17.67	0.93
13:50	6.80	100	-186	0.900	15.3	7.55	17.70	0.82
13:55	6.81	100	-189	0.873	12.9	7.56	17.72	0.73
13:59	6.81	100	-190	0.859	14.2	7.56	17.74	0.69
14:02	6.81	100	-190	0.847	13.1	7.55	17.76	0.67

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-17/SB-16 Weather: 63 F, Light rain

Date: 9/25/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: KR Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 19.01 Water Column (ft): 9.04

Depth to Water(ft): 9.97 Volume of Water in Well (gal) 1.48

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 10:11 Purge Rate: 150 mL/min

End Purging: 10:38 Volume of Water Removed (gal): 1.5

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear, slight sheen, foam accumulating on top of water in bucket

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 10:45 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
10:16	10.12	150	-105	0.493	29.3	5.76	17.17	11.14
10:21	10.11	150	-110	0.492	26.1	5.77	17.14	1.01
10:26	10.12	150	-111	0.492	24.3	5.77	17.10	1.02
10:31	10.13	150	-113	0.492	22.8	5.76	17.07	1.04
10:36	10.12	150	-113	0.492	21.4	5.75	17.08	0.92

Well Sampling Data Form

Client: Tishman Speyer **Project Number:** 2409.0001Y000

Site Location: Queens Plaza: 28-10 Jackson Ave, Long Island City, NY 11101

Well No: RMW-31/SB-31 Weather: 65 F, Sunny

Date: 10/9/2014 Purge Water Disposal: 55 Gallon Drum

Sampled By: DK Well Diameter / Type: 2-inch / PVC

Depth of Well (ft): 19.77 Water Column (ft): 7.97

Depth to Water(ft): 11.80 Volume of Water in Well (gal) 1.30

Depth to Product (ft): - Volume of Water to Remove (gal): -

well diameter:	1 in	**2 in**	4 in	6 in	8 in
gallons per foot:	0.041	**0.163**	0.653	1.469	2.611

Start Purging: 8:43 Purge Rate: 200 mL/min

End Purging: 9:33 Volume of Water Removed (gal): 2

Method of Purge: peristaltic pump Method of Sampling: low flow

Physical Appearance/ Comments: Clear with slight odor

Samples Collected: (analyses / no. bottles) VOCs; 3-40mL voas with HCL, total and dissolved SVOCs; 4-1L ambers; total and dissolved Metals; 2-500mLplastic with HNO3, Pesticides and PCBs; 2-500mL ambers; nitrate, sulfate, sulfide, chloride, alkalinity and bicarbonate

Time: 9:40 Laboratory : Accutest

Final Field Measurements:

Time	**DTW** ft	**Flow Rate** ml/min	**ORP** mV (+/- 10 mV)	**Conductivity** mS/m (w/in 3%)	**Turbidity** NTU (w/in %10)	**pH** SU (+/- 0.1)	**Temperature** C^o (w/in 3%)	**Dissolved O_2** mg/L (w/in 10%)
8:48	12.19	200	47	0.452	69.0	6.70	17.46	7.84
8:53	12.12	200	31	0.483	50.6	6.11	17.02	3.19
8:58	12.14	200	18	0.503	46.4	6.09	16.87	2.15
9:03	12.17	200	8	0.513	44.1	6.10	16.75	1.74
9:08	12.18	200	-1	0.520	43.2	6.13	16.69	1.53
9:13	12.17	200	-5	0.524	42.8	6.13	16.61	1.39
9:18	12.16	200	-7	0.526	42.4	6.14	16.58	1.28
9:23	12.15	200	-8	0.528	39.4	6.14	16.57	1.19
9:28	12.16	200	-10	0.529	37.8	6.14	16.57	1.14
9:33	12.17	200	-11	0.530	36.7	6.15	16.53	1.11

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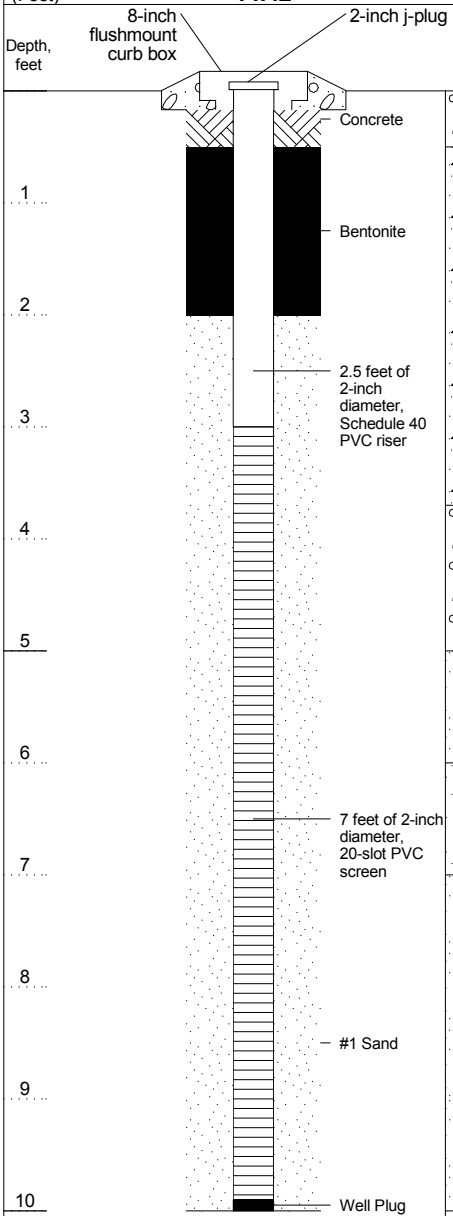
WELL CONSTRUCTION LOG

WELL NO. **SB-1/RMW-6**	NORTHING **211749.86**	EASTING **1001406.43**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 41**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **6620DT / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/8/14-9/18/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC**	TOTAL LENGTH **7.0** ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **14.42**	TOP OF WELL CASING **14.15**	TOP & BOTTOM SCREEN **11.4 / 4.4**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
0		Reinforced CONCRETE			Hand cleared to 5 ft-bg. Odor and staining observed.
1		FILL (Dark grey to black, medium to coarse SAND, some Gravel and Concrete fragments, little Brick and Lumber; moist)		395.2	
2		FILL (Dark grey to black, medium to coarse SAND, some Gravel and Concrete fragments, little Brick and Lumber; wet)	G	476	
3					
4		CONCRETE			Concrete observed at 3.7 ft-bg.
5		Dark grey, fine SAND, some Silt, trace coarse sand and gravel; wet		1049	Sample SB-1 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at ~6 ft-bg. Odor and staining observed.
6		Dark brown, SILT, little fine Sand, trace gravel; wet		462	
7		Dark brown, fine SAND, little Silt, trace coarse sand and gravel; wet		1272	
8				870	Sample SB-1 (8-9) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor and staining observed.
9		Dark brown, fine SAND, little medium Sand, trace coarse sand and gravel; wet			
10		REFUSAL			Encountered Refusal/Bedrock at 10 ft/bg. Drilled 2 feet into refusal with an air hammer.
11					
12					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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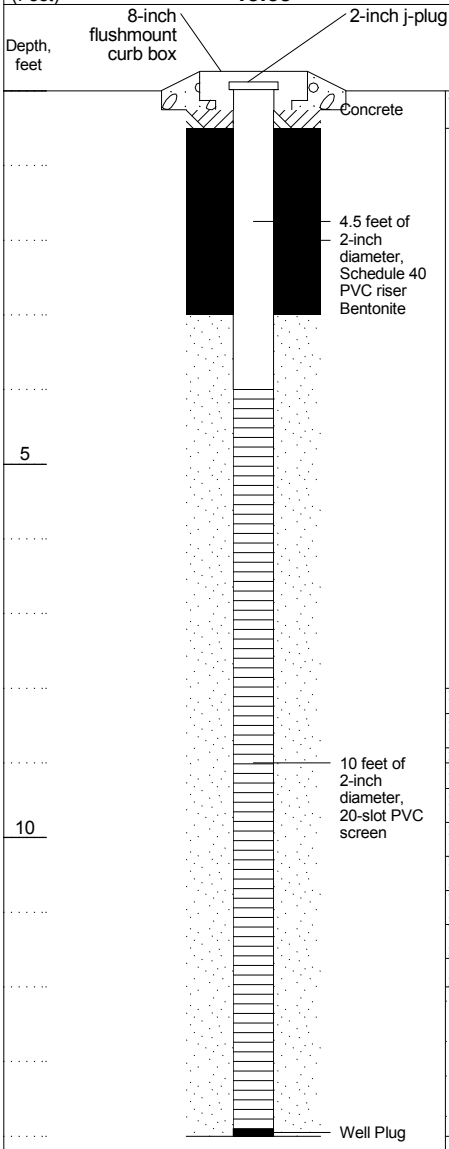
WELL CONSTRUCTION LOG

WELL NO. **SB-2/RMW-4**	NORTHING **211693.07**	EASTING **1001460.5**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 61**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/8/14-8/27/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **13.65**	TOP OF WELL CASING **13.20**	TOP & BOTTOM SCREEN **9.7 / -0.4**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark grey to black, fine to coarse SAND, some Concrete, Brick and Gravel, little Silt, trace cobble; moist)		1.7	
				3.8	
				2.9	
5		FILL (Dark brown, coarse SAND, some Brick, Gravel and Concrete; moist)		4.0	Sample SB-2 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, TAL Metals and PCBs.
		FILL (Dark grey, fine to coarse SAND, some Gravel, little Silt, trace cobble; wet)		194	Sample SB-2 (6-7) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, TAL Metals and PCBs. Odor observed.
		FILL (Dark grey, GRAVEL, little medium to coarse Sand, trace lumber; wet)		209	Water table observed at ~6 ft-bg. Staining and odor observed.
		Dark brown to dark grey, SILT, little Clay and fine Sand, trace organic matter; very moist		53	Odor observed.
		Dark brown, SILT, little Clay, trace fine sand; wet		49	Odor observed.
10				94	
				72	
		Dark brown to dark grey, SILT, some fine Sand, trace clay; wet		99	Odor observed.
		Brown to dark brown, SILT, trace fine sand; very moist		36	Odor oberved.
15		Brown to grey, SILT, trace fine sand and clay; very moist		48	Sample SB-2 (17-18) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, TAL Metals and PCBs. Odor observed.
					Refusal/Bedrock at 18 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-3	**211663.48**	**1001465.47**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 65**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/19/14-9/19/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
10.10(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		FILL (Dark brown, medium to fine SAND, some coarse Sand, Gravel, Brick and Lumber, little Silt; moist)		3.6	Hand cleared at 5 ft-bg.
		FILL (Brown to dark brown, medium tocoarse SAND, little Silt and fine Sand, trace lumber and gravel; moist)	G	2.4	
		Grey to dark grey, fine SAND and SILT, little medium Sand; wet		65	Water table observed at ~4 ft-bg.
5		Dark brown, fine SAND, some Silt and medium Sand, little Gravel; wet		69.6	Sample SB-3 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
		Brown to dark brown, fine SAND, some Silt; wet		146	
		Brown to dark brown, fine SAND, some medium Sand, little Silt; wet		432.3	
10		Grey, fine SAND, little Silt, trace medium sand; wet		127.7	Sample SB-3 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor Observed.
		Brown, SILT, some Clay; wet		79.2	
15		Brown, SILT, little Clay; wet		45.2	
		Brown, SILT, some fine Sand, little Clay, trace coarse sand; wet		35.1	Sample SB-3 (17-18) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Sample SB-3 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at 20 ft-bg.
		Dark brown, coarse SAND, little Silt, trace gravel; wet		46.5	
20					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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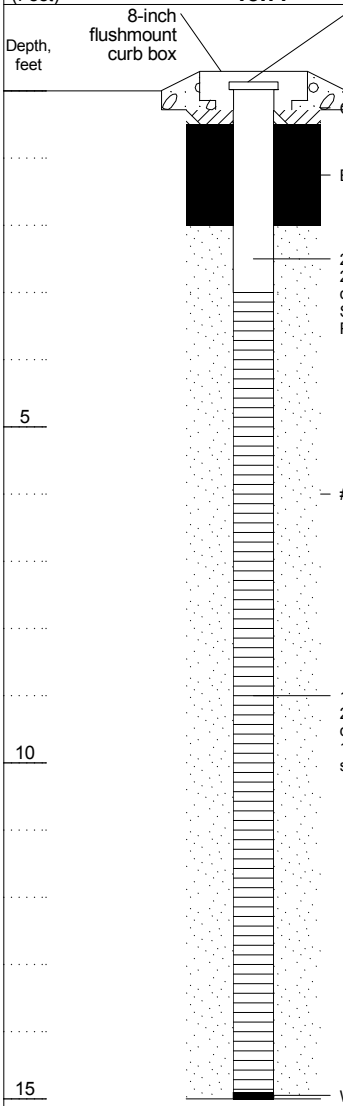
WELL CONSTRUCTION LOG

WELL NO. **SB-4/RMW-2**	NORTHING **211729.61**	EASTING **1001497.19**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 62**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/12/14-8/14/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **12.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **13.77**	TOP OF WELL CASING **13.54**	TOP & BOTTOM SCREEN **10.8 / -1.2**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark grey to black, fine to coarse SAND, some Concrete, Brick and Gravel, little Silt, trace cobble; moist)		3.4	
			G	3.0	
				7.2	
5		FILL (Dark brown to black, medium to coarse SAND, some Gravel; moist)		242.4	Sample SB-4 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH-DRO/GRO and Bulk Density. Water table observed at ~5.5 ft-bg. Staining and odor observed.
		FILL (Dark grey to black, fine to coarse SAND, trace Gravel; wet)		227	
		Dark grey, fine to medium SAND, some Silt; wet		393.6	
10		Dark grey, fine to medium SAND, little Silt; wet		481.7	
		Dark grey, fine SAND, some Silt; wet		127	Sample SB-4 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
		Dark grey to black, fine SAND, little Silt, trace gravel and medium sand; wet		53.7	
		Grey, fine SAND, little Silt, trace medium sand; wet		74.3	
15		Grey to dark grey, fine SAND and SILT, some coarse Sand, trace medium sand; wet		461.8	
		Grey, CLAY, little Silt; moist		285.3	
				74.1	Sample SB-4 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH-DRO/GRO and Bulk Density. Staining and odor observed. Refusal/Bedrock encountered at 20 ft-bg.
20		Dark grey to black, medium to coarse SAND, little Silt, trace gravel; wet		151.2	

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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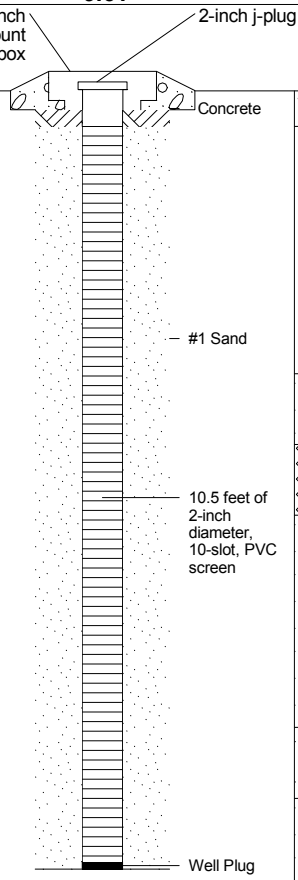
WELL CONSTRUCTION LOG

WELL NO. **SB-5/RMW-1**	NORTHING **211754.62**	EASTING **1001481.43**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Jeff Wills**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 52**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/8/14-8/13/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.5**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **9.61**	TOP OF WELL CASING **9.07**	TOP & BOTTOM SCREEN **9.1 / -1.4**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark grey to black, fine to coarse SAND, some Concrete and Asphalt, little Silt; very moist)		34.1	
		FILL (Black, fine to coarse SAND, some Gravel, Concrete and Asphalt, little Silt; wet)		334.3	Sample SB-5 (1-2) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH-DRO/GRO and Bulk Density. Water table encountered at ~1 ft-bg. Staining and odor observed.
		FILL (Dark grey to black, fine to coarse SAND, some Gravel; wet)		392.3	
		FILL (Dark grey, fine to medium SAND, some Silt and Gravel; wet)		365.7	
		Grey, fine to medium SAND, some Silt; wet		577.4	Sample SB-5 (4-5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
5		Grey, fine to coarse SAND, some Silt; wet		454.6	5
		Dark grey to black, fine to medium SAND, some Silt and Gravel; wet		116.9	
		Dark grey, SILT, some fine Sand; wet		413	
10		Grey, fine SAND, some Silt; wet		342.1	10
				307.8	Sample SB-5 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
		Light brown, fine SAND and SILT, trace clay; wet		170.9	
		Grey, SILT, some fine Sand and Clay; wet		58.2	
15		Grey to dark grey, SILT, some Clay, trace gravel; very moist		26.3	15 Sample SB-5 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Product and odor observed.
		Dark grey to black, medium to coarse SAND; wet		446	Sample SB-5 (17-18) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals TPH-DRO/GRO and Bulk Density. Staining and odor observed.
		NO RECOVERY			Bottom of boring at 19 ft-bg

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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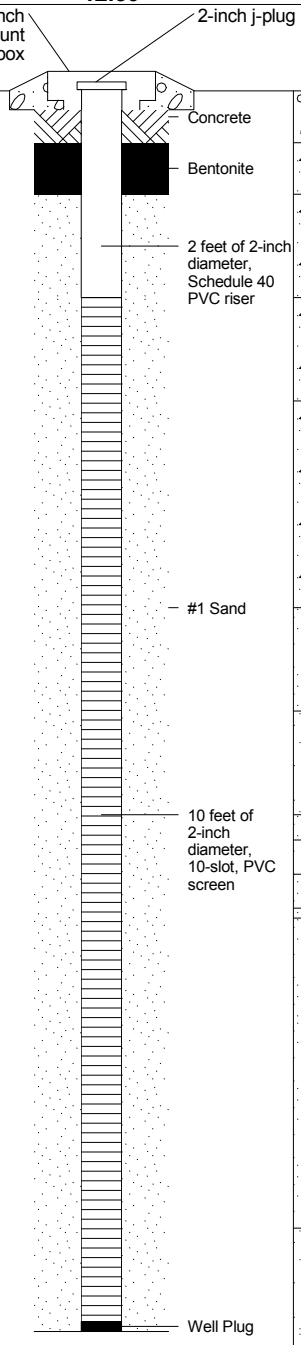
WELL CONSTRUCTION LOG

WELL NO. **SB-6/RMW-7**	NORTHING **211843.27**	EASTING **1001437.14**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 79**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **6620DT / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/13/14-9/18/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **12.50**	TOP OF WELL CASING **12.32**	TOP & BOTTOM SCREEN **10.5 / 0.5**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
0		CONCRETE			Hand cleared to 5 ft-bg.
1		Fill (Dark brown to dark grey, fine SAND, some Silt, little medium to coarse Sand, Concrete, and Brick fragments, trace tile fragments; moist)		126	
				301	Free product and strong odors observed on soil from 1 to 12 ft-bg.
2		Fill (Dark grey fine Sand and Silt, little medium Sand, trace coarse sand; very moist)			
		Fill (Dark brown fine SAND and SILT, little medium Sand, trace coarse sand; very moist)		359	
3			G		
		Fill (Dark brown fine SAND and SILT, little medium Sand, trace gravel; very moist)		278	
4					
5					
		Dark grey to dark brown, fine SAND, some Silt, trace medium sand; wet		359	Sample SB-6 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~5 ft-bg.
6		Dark brown, SILT, little fine Sand, trace coarse sand and gravel; wet		300	Sample SB-6 (6-7) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH GRO/DRO and Bulk Density.
7		Dark brown, fine SAND and SILT, trace coarse sand and gravel; wet		296	
8		Dark brown, fine SAND, some Silt, trace coarse sand and gravel; wet		275	
9		Dark brown, fine SAND, little Silt, trace medium sand and gravel; wet		329	
10					Sample SB-6 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH GRO/DRO and Bulk Density.
11		Dark brown, SILT, little fine Sand, trace coarse sand and gravel; wet		357	
12		Brown, SILT, little fine Sand, trace gravel; wet		397	Sample SB-6 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Refusal at 13 ft-bg.
13					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-7	**211910.45**	**1001401.58**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 75**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/18/14-9/8/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
20.88(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		2.8	Hand cleared to 5 ft-bg.
		FILL (Brown to dark brown, fine to medium SAND, some Gravel and Asphalt, little Silt and coarse Sand; moist)			
		FILL (Brown, fine to medium SAND, some Gravel, little Silt and coarse Sand; moist)	G	3.0	
		ASPHALT		3.6	
5		FILL (Brown, fine to medium SAND, some Gravel, little Silt and coarse Sand; moist)		1.6	5
		FILL (Dark brown to brown, fine to medium SAND, some Gravel, little Silt and coarse Sand, Concrete and Cobble; moist)		2.4	Sample SB-7 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		FILL (Brown, to dark brown, fine SAND, little Silt, trace gravel; moist)			
10		Brown, fine SAND, little Silt; wet		2.2	10
		Brown, fine SAND, some Silt, trace clay; wet		117.8	Sample SB-7 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at 10 ft-bg.
15		Greyish brown, fine SAND, little Silt, trace gravel; wet		6.3	Sample SB-7 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density. 15
		Grey, fine SAND and SILT, trace clay, coarse sand and gravel; wet		5.7	
		Dark grey, SILT, some fine Sand, trace clay; wet		5.3	
20		Greyish brown, SILT, trace clay, fine sand and gravel; wet		2.1	20
		Brown, fine SAND, some coarse to medium Sand, little Silt and Gravel; wet		2.6	
		Brown, fine SAND, some medium Sand. little coarse Sand and Silt; wet		0.1	
25		Grey to dark grey, medium to coarse SAND, some Gravel, little fine Sand, Silt and Clay; wet		1.1	25
		Grey to dark grey, SILT, trace clay and fine sand; moist		1.2	
30		Grey, medium to coarse SAND, some Gravel; wet		1.4	30
		Grey, SILT, some Clay and fine Sand; wet		1.2	
35		Dark grey, fine SAND, some Gravel, little Silt; wet		0.1	35
		Grey, fine SAND, some Silt, trace gravel; wet		0.9	
40		Grey, fine to coarse SAND, little Silt and Gravel; wet		7.3	Sample SB-7 (43-44) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density. 40
		Grey, fine to coase SAND, some Silt, trace gravel; wet		75.2	Bedrock encountered at 44 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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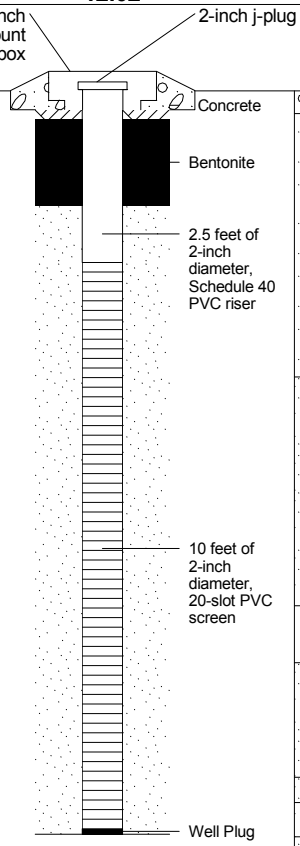
WELL CONSTRUCTION LOG

WELL NO. **SB-8/RMW-9**	NORTHING **211934.11**	EASTING **1001479.34**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 83**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/12/14-9/8/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **12.02**	TOP OF WELL CASING **11.69**	TOP & BOTTOM SCREEN **9.0 / -1.0**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Brown, fine to coarse SAND, some Silt, little Gravel and Brick, trace cobble; moist)			
		FILL (Dark brown, fine to medium SAND, little Silt, coarse Sand and Gravel, trace cobble; wet	G		
5					5
		Dark brown, fine SAND, some medium Sand, little Silt, trace gravel; wet		8.8	Sample SB-8 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~5 ft-bg.
				7.3	
		Dark grey, fine SAND, little medium Sand and Silt, trace gravel; wet		8.5	
		Brown, fine SAND, little Silt and medium Sand, trace coarse sand; wet		6.8	
		NO RECOVERY			
10					10
		Brown, fine SAND, little medium Sand and Silt; wet		13.8	
				11.7	
		Brown, fine SAND, some SILT, trace medium sand; wet		14.9	Sample SB-8 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				6.9	
		Dark grey to brown, fine SAND, some Silt, little medium Sand; wet		7.6	
15					15
		Grey, SILT, trace fine sand; wet		13.1	
		Dark brown, fine SAND, some Silt; wet		6.6	
				9.7	
		Dark brown, SILT, little fine Sand, trace clay; very moist		13.7	
				3.3	
20					20
				6.1	
		Grey to brown, SILT, some Clay; very moist		2.3	Sample SB-8 (21-23.5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
					Refusal encountered at 23.5 ft-bg.

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING
SB-9	**211927.02**	**1001396.89**

PROJECT NO./NAME	LOCATION
2409.0001Y000 / Queens Plaza	**28-10 Jackson Avenue**
APPROVED BY: **Jeff Wills** / LOGGED BY: **Dave Klein**	**Long Island City, New York**
DRILLING CONTRACTOR/DRILLER: **Aquifer Drilling and Testing / Tom Sheerin**	GEOGRAPHIC AREA: **Grid Cell 72**

DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/4/14-9/9/14**

LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL
21.20(FT.)	**Not Measured**	**Bentonite**

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to medium SAND, some coarse Sand, little Gravel, Brick and Silt, trace cobble; moist)		2.1	
		ASPHALT		1.1	
		FILL (Dark brown, fine to medium SAND, some coarse Sand, little Gravel, Brick and Silt, trace cobble; moist)			
		FILL (Dark brown, fine to medium SAND, some coarse Sand, little Gravel and Silt, trace cobble and brick; moist)		1.7	
5		FILL (Dark brown, fine SAND, some medium Sand, little coarse Sand and Silt, trace gravel; moist)		0.9	Sample SB-9 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		FILL (Dark brown, fine to coarse SAND, little Silt, trace gravel; moist)		0.6	
10				1.9	
		Brown, fine SAND, some Silt; moist		0.6	
15		Dark brown, fine SAND and SILT, trace gravel; wet		2.7	Sample SB-9 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at ~15 ft-bg.
		Brown, fine SAND and SILT, trace gravel; wet		1.6	
		Brown, SILT, some fine Sand, trace gravel and clay; wet		1.3	Sample SB-9 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.
20					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING
SB-10	**211869.81**	**1001502.68**

PROJECT NO./NAME	LOCATION
2409.0001Y000 / Queens Plaza	**28-10 Jackson Avenue**
APPROVED BY: **Jeff Wills** / LOGGED BY: **Rich Crockett**	**Long Island City, New York**
DRILLING CONTRACTOR/DRILLER: **Aquifer Drilling and Testing / Chris Migliori**	GEOGRAPHIC AREA: **Grid Cell 85**

DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
2-in. / Drive Sampler	**2-inches**	**Mobile 420 / Geoprobe**	**2" Macro-Core**	**8/12/14-9/9/14**

LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL
10.84(FT.)	**Not Measured**	**Bentonite**

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to medium SAND, some coarse Sand, Brick, Concrete and Cobble, little Silt; moist)		16.4	
				21.2	
		FILL (Dark brown to grey, fine SAND and SILT, some medium Sand, Cobble and Brick; wet)	G	50.3	Odor observed.
		Dark brown to grey, SILT; trace gravel; wet		80.3	
5		Dark grey, fine SAND, little medium Sand, trace silt; wet		22.1	Sample SB-10 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density. Odor observed. Water table observed at 5 ft-bg.
		Dark grey, fine SAND, trace medium sand and silt; wet		85.3	
		Dark brown, fine SAND, little Silt; wet		15000	Sample SB-10 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals TPH-DRO/GRO and Bulk Density. Odor observed.
		Dark brown, fine SAND, trace medium sand and silt; wet		153.2	
		Dark brown, fine SAND, some Silt, trace gravel; wet		102.6	
10				223.2	
		Dark brown, fine SAND, some Silt; wet		250	Sample SB-10 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
		Dark grey to dark brown, SILT, little fine Sand; very moist		16.5	
				4.1	
		Brown, SILT, trace fine sand; very moist		7.4	
15				1.0	
				2.4	
		Brown, SILT, trace clay and fine sand; very moist		3.5	Sample SB-10 (17.5-18.5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Refusal encountered at 18.5 ft-bg.
				2.7	

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-11	**211868.59**	**1001649.79**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Chris Migliori		**Grid Cell 135**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**2-inches**	**Compact C-17 / Rotosonic**	**2" Macro-Core**	**8/6/14-9/10/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
13.64(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Brown, fine to medium SAND, little Silt, Gravel and Concrete fragments; moist)		3.8	
		FILL (Light brown, fine to medium SAND, little Silt, trace metal; moist)		3.2	
		FILL (Reddish brown, fine to coarse SAND, little Silt, trace gravel; moist)		2.9	
5		Dark brown to brown, fine SAND, little Silt, trace medium to coarse sand and gravel; moist		10.2	Sample SB-11 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				8.3	Sample SB-11 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 7 ft-bg.
10		NO RECOVERY			
15		Grey to dark brown, CLAY and SILT; very moist		9.2	
20					Sample SB-11 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed. Bottom of boring at 20 ft-bg

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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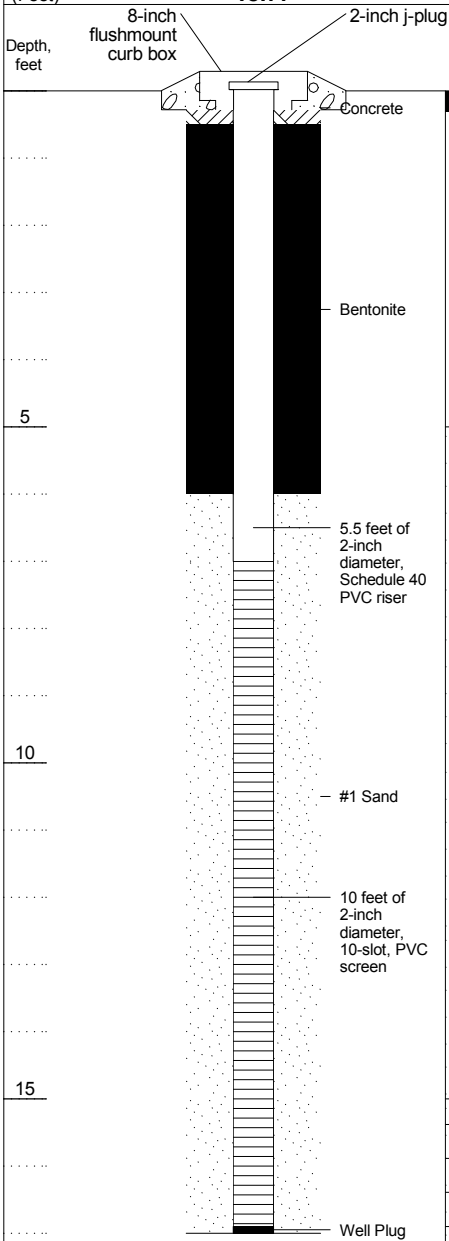
WELL CONSTRUCTION LOG

WELL NO. **SB-12/RMW12**	NORTHING **211959.5**	EASTING **1001597.74**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 116**		
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/5/14-8/25/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC**	TOTAL LENGTH **10.0**ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **18.77**	TOP OF WELL CASING **18.33**	TOP & BOTTOM SCREEN **11.8 / 1.8**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Gravel, Brick, Concrete and Asphalt fragments, little Silt; moist)		5.0	
		FILL (Dark brown, fine to coarse SAND, some Silt, little Brick and Concrete fragments, trace metal; moist)	G	5.4	
		FILL (Brown, fine to medium SAND, some Silt, little Cobble and Brick, trace gravel; moist)		4.6	
5		Brown, fine SAND, little Silt; moist		4.7	Sample SB-12 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
10		Brown, fine SAND, little Silt; wet		6.2	Sample SB-12 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 10 ft-bg.
		Grey, fine SAND, little Silt; wet		6.2	
15		Grey, fine SAND and Silt; wet		2.1	Sample SB-12 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density.
		Grey, fine SAND, little Silt; wet		4.1	Sample SB-12 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density. Bottom of boring at 20 ft-bg.
20					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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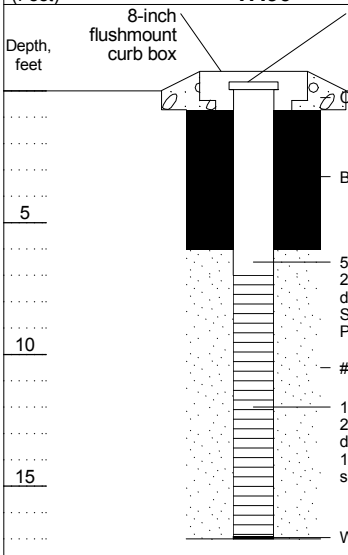
WELL CONSTRUCTION LOG

WELL NO. **SB-13/RMW-13**	NORTHING **211926.13**	EASTING **1001569.54**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 119**		
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/5/14-9/12/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **17.90**	TOP OF WELL CASING **17.18**	TOP & BOTTOM SCREEN **10.9 / 0.9**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		3.4	Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Silt and Gravel, little Asphalt, Concrete and Brick fragments; moist)		G 2.1	
		FILL (Light Brown, fine to medium SAND, little Silt; moist)		5.8	
5		FILL (Dark grey, fine to coarse SAND, some Asphalt, little Silt, Brick and Gravel; moist)		8.8	Sample SB-13 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
		Brown, fine SAND, trace silt; moist		5.4	Sample SB-13 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
10		Greyish brown, fine to coarse SAND, trace silt; wet		10.0	Sample SB-13 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals. Water table encountered at 10 ft-bg.
		Grey, fine to coarse SAND, trace silt; wet		105.5	
15		Grey, fine SAND, little Silt; wet		124.3	Sample SB-13 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
				13.0	
				10.9	
				3.2	Sample SB-13 (16-17) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
20				9.3	Sample SB-13 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.
25					
30					
35					
40					
45					
50					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-14	**212004.28**	**1001582.51**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 114**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/4/14-9/19/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
20.35(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		2.0	Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Gravel, little Silt and Brick, trace cobble; moist)			
		FILL (Dark grey to black, fine to medium SAND, little Silt and Gravel, trace lumber; moist)	G	3.2	
		FILL (Dark grey to black, fine to coarse SAND, some Gravel, little Silt, trace brick and cobbles; moist)		1.8	
5		FILL (Dark grey, fine to coarse SAND and GRAVEL, some Silt, little Brick, Tile and Metal debris; moist)		5.0	Sample SB-14 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
				9.4	
				12.1	Sample SB-14 (7-8)A collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
		Brown, fine SAND, tace silt; moist		12.6	
10				10.0	
				10.6	
		Brown, fine SAND, tace silt; wet		13.4	Sample SB-14 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.Water table encountered at 14 ft-bg.
15				6.6	
		Dark grey, fine SAND, little Silt, trace medium sand; wet		5.6	
				13.8	Sample SB-14 (18-19) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals.
				9.8	Sample SB-14 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticids, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.
20					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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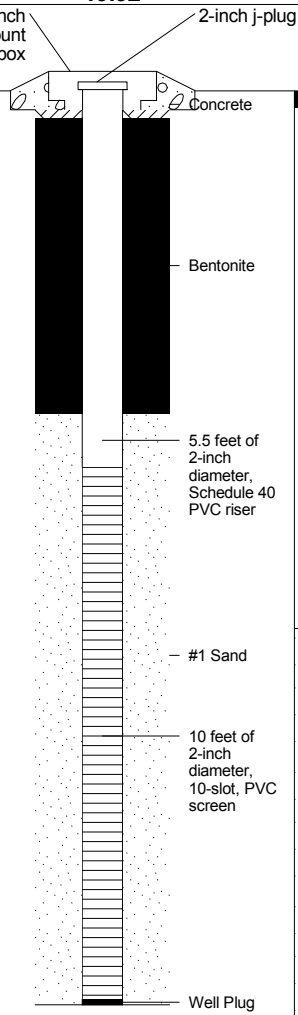
WELL CONSTRUCTION LOG

WELL NO. **SB-15/RMW-11**	NORTHING **211990.95**	EASTING **1001557.48**			
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**			
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**				
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 107**			
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/4/14-9/11/14**	
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted**	MAT. **PVC**	TOTAL LENGTH **10.0**ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **19.92**	TOP OF WELL CASING **19.43**	TOP & BOTTOM SCREEN **12.9 / 2.9**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			
		FILL (Dark brown, fine to coarse SAND, some Gravel, little Silt, Brick and Concrete, trace tile and metal; moist)		1.2	Hand cleared to 5 ft-bg.
			G	1.0	
				1.0	
5		FILL (Brown, fine to coarse SAND, little Silt, trace gravel; moist)		3.4	Sample SB-15 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
10		Reddish brown, fine SAND, little Silt; wet		2.9	Sample SB-15 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 10 ft-bg.
		Brown, fine SAND, little Silt, trace gravel; wet		2.4	
15		Grey, fine SAND, little Silt, trace gravel; wet		4.5	
					Staining on soil observed from 18-20 ft-bg.
20		Brown, SILT, some fine Sand, trace clay; wet		5.9	Sample SB-15 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Sample SB-15 (20-21) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Brown, fine SAND, little Silt; wet		5.8	
				5.2	
25					Bottom of boring at 25 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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WELL CONSTRUCTION LOG

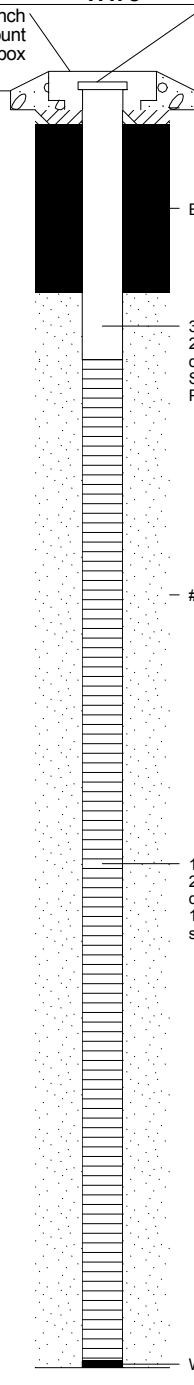
WELL NO.	NORTHING	EASTING
SB-16/RMW-17	**211901.78**	**1001619.61**

PROJECT NO./NAME	LOCATION
2409.0001Y000 / Queens Plaza	**28-10 Jackson Avenue**
APPROVED BY: **Jeff Wills** / LOGGED BY: **Dave Klein**	**Long Island City, New York**
DRILLING CONTRACTOR/DRILLER: **Aquifer Drilling and Testing / Chris Migliori**	GEOGRAPHIC AREA: **Grid Cell 124**

DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
3-in. / Drive Sampler	**3-inches**	**Mobile 420 / Geoprobe**	**2" Macro-Core**	**8/6/14-9/11/14**

CASING MAT./DIA.: **PVC / 2-inch**
SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **15.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**

ELEVATION OF: (Feet)	GROUND SURFACE	TOP OF WELL CASING	TOP & BOTTOM SCREEN	GRAVEL PACK SIZES
	17.78	**17.58**	**13.8 / -1.2**	**#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark grey to black, fine to coarse SAND, some Silt, little Concrete, Asphalt and Brick fragment; most)		3.8	
		FILL (Dark grey to black, fine to coarse SAND, some Silt, little Concrete fragments and Gravel; moist)	G	13.9	
		FILL (Dark grey to black, medium to coarse SAND, some fine Sand and Silt, little Concrete fragments; moist)		2.9	
5		FILL (Dark brown, fine SAND, some medium Sand, little coarse Sand, trace gravel and brick fragments; moist)		4.7	Sample SB-16 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors observed throughout borehole.
		Dark grey, fine SAND, little Silt, trace gravel; moist		83.7	
		Grey to dark grey, fine SAND, little Silt, trace coarse sand and gravel; moist		14.4	
		Dark grey, fine SAND, trace silt; moist		57.1	
		Dark grey, fine SAND, trace silt, coarse sand and gravel; moist		45	
10				162.6	Sample SB-16 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 10 ft-bg.
		Dark grey, fine SAND, trace medium sand and gravel; wet		182	
		Grey, fine SAND, little medium Sand; wet		130.2	Sample SB-16 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Dark grey, fine SAND, trace medium sand; wet		109	
		Dark grey, fine SAND, little medium Sand; wet		109.5	
15		Dark grey, fine SAND, trace silt; wet		120	
				143.1	
		Greyish brown, SILT, trace fine sand; very moist		21.6	Sample SB-16 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.
20					

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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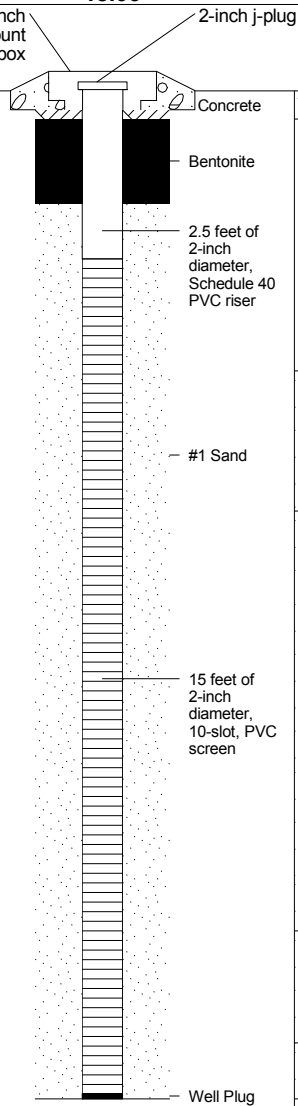
WELL CONSTRUCTION LOG

WELL NO. **SB-17/RMW-14**	NORTHING **211913.37**	EASTING **1001664.51**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 130**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/6/14-9/11/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC**	TOTAL LENGTH **15.0**ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **18.06**	TOP OF WELL CASING **17.68**	TOP & BOTTOM SCREEN **15.1 / 0.1**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Silt, little Concrete and Brick fragments, trace gravel; moist)		5.2	
		FILL (Dark brown, fine to medium SAND, some Concrete fragments, trace gravel; moist)	G	5.1	
		FILL (Dark brown, fine to medium SAND, some Cobble and Concrete fragments; moist)		2.4	
5		Dark grey to dark brown, fine SAND, trace silt, coarse sand and gravel; wet		230	Sample SB-17 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
		Dark brown, fine SAND, little Silt, trace coarse sand and gravel; wet		15.8	
		Dark brown, fine SAND, little Silt, trace gravel; wet		28.5	
10					Sample SB-17 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed to 14 feet bls. Water table encountered at 11 ft-bg.
		Dark brown, fine SAND, little Silt, trace medium to coarse sand; wet		39.7	
		Dark brown, fine SAND, little Silt, trace medium to coarse sand and gravel; wet		23.6	
15		Dark grey, fine SAND, trace silt and gravel; wet		15.6	
		Dark grey to dark brown, fine SAND, some Silt; wet		61.7	
		Dark grey, fine SAND, trace silt and medium to coarse sand; wet		36.6	Sample SB-17 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
		Dark grey, fine SAND, trace silt and gravel; wet		70.1	
20		Greyish brown, fine SAND and SILT; wet		34.6	Sample SB-17 (20-21) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
		Grey to brown, fine SAND and SILT; very moist		4.1	
		Grey to brown, SILT, little fine Sand; very moist		3.7	Sample SB-17 (23-24) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals and Bulk Density. Refusal encountered at 24 ft-bg.
		Greyish brown, SILT. trace fine sand; very moist		3.1	

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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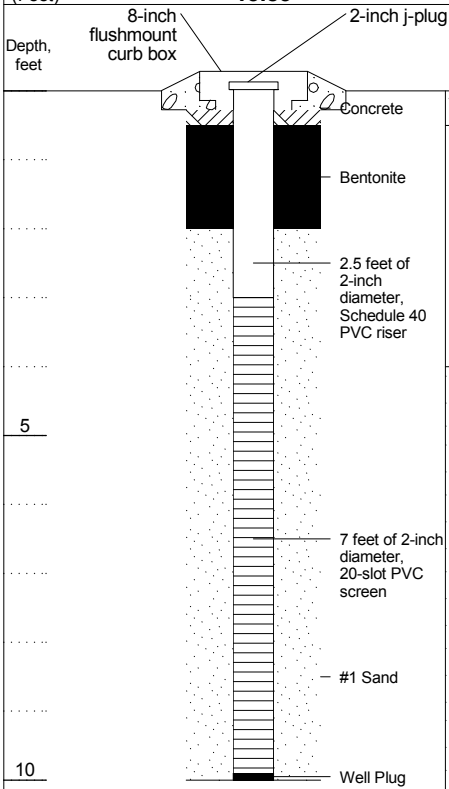
WELL CONSTRUCTION LOG

WELL NO. **SB-18/RMW-15**	NORTHING **211894.16**	EASTING **1001694.93**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 136**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/6/14-9/12/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC**	TOTAL LENGTH **7.0** ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **13.83**	TOP OF WELL CASING **13.72**	TOP & BOTTOM SCREEN **10.8 / 3.8**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Brown, fine to coarse SAND, some Silt, little Concrete fragments; moist)		3.5	
			G	3.6	
		Brown, fine to medium SAND, little Silt; wet		3.6	
5		Brown, fine SAND, little Silt, trace gravel; wet		19.7	Sample SB-18 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at 5 ft-bg.
				21.2	
					Sample SB-18 (8-9) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Dark grey, fine SAND, some Silt, trace gravel; wet		27	
10					Encountered refusal at 10 ft-bg while attempting to install well material.
					Sample SB-18 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Dark grey to grey, fine SAND and SILT, trace coarse sand and gravel; wet		16.3	
		Greyish brown, SILT, trace fine sand; very moist		7.9	Sample SB-18 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
15		Dark grey, SAND and SILT, trace gravel; wet		10	
		Greyish brown, SILT, trace fine sand; very moist			
				11.2	Sample SB-18 (18.5-19.5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Refusal encountered at 19.5 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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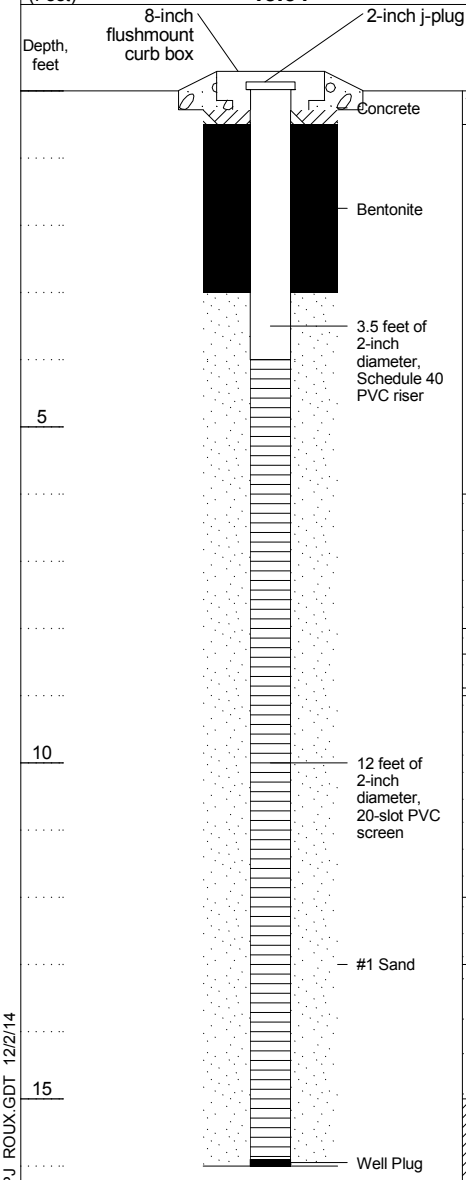
WELL CONSTRUCTION LOG

WELL NO. **SB-19/RMW-16**	NORTHING **211796.64**	EASTING **1001589.19**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Jeff Wills**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 134**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/7/14-9/10/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **12.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **13.64**	TOP OF WELL CASING **13.39**	TOP & BOTTOM SCREEN **9.6 / -2.4**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Silt, little Gravel, Concrete and Brick fragments; moist)		0.6	
			G	1.7	
				3.0	
5		FILL (Dark brown to brown, fine SAND, little medium Sand, trace silt, coarse sand and gravel; moist to wet)		21.7	Sample SB-19 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 5 ft-bg.
		Light brown, fine SAND; wet			
		Dark brown, fine SAND and SILT, trace coarse sand and gravel; wet		24.4	Sample SB-19 (8-9) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Dark grey to dark brown, fine SAND, trace coarse sand and gravel; wet		31.7	
10		Dark grey to dark brown, fine SAND, trace silt, gravel and coarse sand; wet		11.2	
				18.6	
		Dark brown to brown, fine SAND and SILT, trace gravel and organic matter; wet		15	
		Dark grey to dark brown, SILT, little fine Sand, trace organic matter; very moist		11.2	
				10.2	
15		Dark grey, CLAY, little Silt; very moist		7.5	
				10.1	
				15	
				13.7	Sample SB-19 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
20					Bottom of boring at 20 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-20	**211815.66**	**1001523.02**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Jeff Wills**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Chris Migliori		**Grid Cell 54**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
2-in. / Drive Sampler	**2-inches**	**Mobile 420 / Geoprobe**	**2" Macro-Core**	**8/11/14-8/25/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
14.07(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		ASPHALT		1.2	
		FILL (Light brown, medium to coarse SAND, some Asphalt and Concrete; very moist)			
		Reinforced CONCRETE		3.2	
		FILL (Brown, fine to coarse SAND, some Concrete and Cobble, little Silt; moist)		3.0	
		FILL (Dark brown, fine to coarse SAND, some Cobble, Brick and Gravel, little Silt; moist)	G		
				3.2	
5					5
		FILL (Brown, fine to coarse SAND, some Gravel, trace silt and brick; moist)		0.4	Sample SB-20 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~5.5 ft-bg. Staining and odor observed.
		FILL (Dark grey, fine to coarse SAND, some Gravel, trace silt and brick; wet)		389	
		Dark brown to grey, fine SAND, little medium Sand and Silt, trace coarse sand and gravel; wet		580	
					Sample SB-20 (8-9) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
		NO RECOVERY			No recovery, very soft zone.
10					10
		Grey, fine SAND, little Silt, trace medium to coarse sand; wet		11.1	
15					15
		Grey, fine SAND and SILT, wet		3.4	
					Sample SB-20 (18-19) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Greyish brown, SILT, trace fine sand; moist			
		Greyish brown, SILT, some Clay, trace fine sand; moist		2.1	Refusal at 19 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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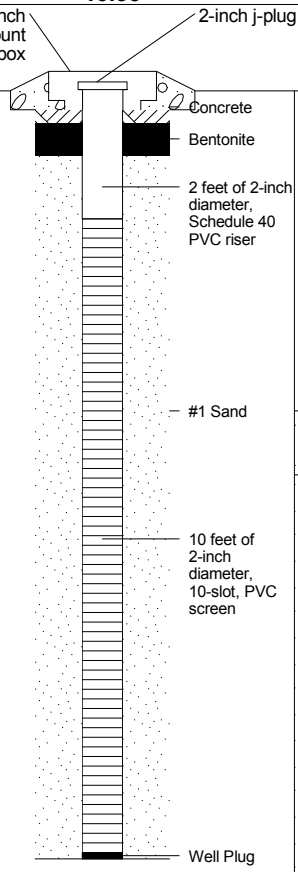
WELL CONSTRUCTION LOG

WELL NO. **SB-21/RMW-3**	NORTHING **211721.68**	EASTING **1001529.22**			
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**			
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**				
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 66**			
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/19/14-9/19/14**	
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**				
ELEVATION OF: (Feet)	GROUND SURFACE **10.36**	TOP OF WELL CASING **9.61**	TOP & BOTTOM SCREEN **8.4 / -1.6**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		FILL (Dark brown, medium to coarse SAND, some fine Sand, Brick and Gravel, little Silt and Lumber; moist)		1.1	Hand cleared to 5 ft-bg.
		FILL (Dark brown, medium to coarse SAND, some Brick and Lumber, little Silt and fine Sand, trace gravel; moist)	G	2.7	
		FILL (Dark grey to black, medium to coarse SAND, some Gravel, little Silt; moist)		52.6	
		FILL (Dark grey to black, medium to coarse SAND, some Gravel and Lumber, little Silt and fine Sand; wet)		389.9	
5		Dark brown to black, SILT, some fine Sand and Clay; wet		220.6	Water table encountered at ~4.5 ft-bg. Sample SB-21 (5-6) collected for TCL VOCs, TLC SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odor observed.
		Dark brown to black, fine SAND, some Silt; wet		217.6	
10		Grey, fine SAND, little Silt, trace medium sand; wet		45.3	SB-21 (11-12) collected for TCL VOCs, TLC SVOCs, TCL Pesticides, PCBs and TAL Metals. Slight odor observed.
		Grey, SILT, little fine Sand; moist		117	
15		Grey, SILT, some Clay, little fine Sand; wet		40.2	
		Grey, fine SAND, little Silt, trace medium sand and gravel; wet		31.5	SB-21 (19-20) collected for TCL VOCs, TLC SVOCs, TCL Pesticides, PCBs and TAL Metals. Slight odor observed.
		Grey, fine SAND and SILT, trace gravel and medium sand; wet		63	
20		Grey to dark grey, fine SAND, some coarse Sand, little Silt, trace gravel; wet		11	SB-21 (20-21) collected for TCL VOCs, TLC SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at 21 ft-bg.

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-22	**211965.97**	**1001404.73**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 70**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/13/14-9/9/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
20.81(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		0.0	Hand cleared to 5 ft-bg.
		Fill (Dark brown fine Sand, some medium to coarse Sand, trace silt, gravel, and brick; moist)			
		Fill (Light brown, fine to medium SAND, trace coarse sand and gravel; moist)		0.0	
		ASPHALT			
		Fill (Dark brown to brown, fine SAND and SILT, some medium Sand, trace gravel and cobble; moist)		0.8	
				1.2	
5		FILL (Dark grey, fine to coarse SAND, little Silt and Gravel; moist)		3.4	Sample SB-22 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				4.2	
		Dark grey, fine to medium SAND, little Silt, trace gravel and cobble; moist			
10		Brown, SILT and fine SAND, trace cobble; moist		5.5	
		Brown, SILT, some fine Sand; wet		5.7	Sample SB-22 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at ~11 feet bls.
		Greyish brown, SILT, little fine Sand, trace clay; wet		6.4	
15		Dark brown, fine SAND, little Silt, trace gravel; wet		6.8	
		Brown, SILT, some Clay; wet			
20					Sample SB-22 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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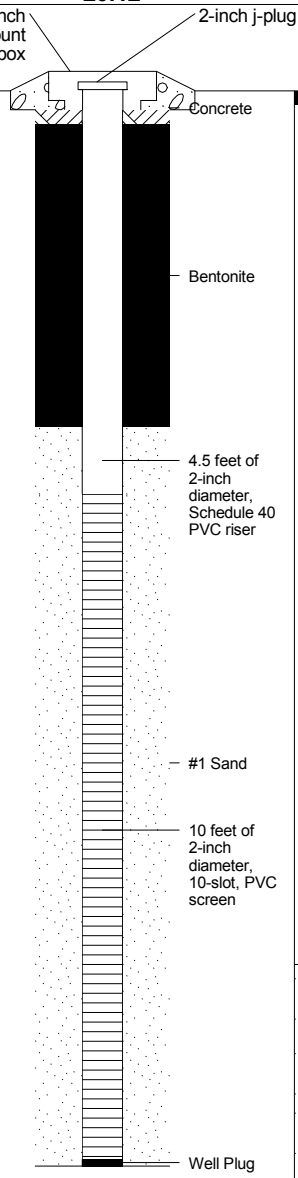
WELL CONSTRUCTION LOG

WELL NO. **SB-23/RMW-10**	NORTHING **211985.49**	EASTING **1001447.21**			
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**			
APPROVED BY **Jeff Wills**	LOGGED BY **Jeff Wills**				
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 71**			
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/12/14-9/9/14**	
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted**	MAT. **PVC**	TOTAL LENGTH **10.0**ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **20.12**	TOP OF WELL CASING **19.20**	TOP & BOTTOM SCREEN **14.1 / 4.1**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		FILL (Brown, fine to coarse SAND, some Gravel, little Silt, Brick and Cobble, trace metal; moist)		1.3	
				2.4	
5		FILL (Brown, fine to coarse SAND, little Silt and Gravel; moist)		5.5	Sample SB-23 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		FILL (Brown, fine to coarse SAND, little Silt, trace gravel and cobble; moist)		6.6	
		FILL (Dark brown to black, fine to coarse SAND, little Silt, trace gravel; wet)		5.4	Sample SB-23 (9-10) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~9.5 feet bls.
10				4.7	
		Brown, SILT, little fine Sand and Clay; wet		6.1	
15		Brown to grey, SILT, little fine Sand; wet		4.5	
		Brown, fine SAND, little Silt; wet		2.1	
					Sample SB-23 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
20					Bottom of boring at 20 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-24	**212037.28**	**1001548.05**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Rich Crockett**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 105**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/14/14-9/9/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
20.37(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		0.0	Hand cleared to 5 ft-bg.
		FILL (Dark brown fine SAND and SILT, some medium Sand, little Gravel, Cobble, and Brick; moist)		0.8	
		FILL (Dark to reddish brown fine SAND, some medium Sand, little Gravel, Cobble and Brick; moist		1.8	
				2.0	
5		FILL (Dark brown, fine to coarse SAND, little Silt, trace gravel and lumber; moist)		2.9	Sample SB-24 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Brown, fine SAND, some Silt, trace gravel; moist		5.3	
10		Brown, SILT, some fine Sand, trace gravel; wet		4.1	Sample SB-24 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~10 ft-bg.
		Brown, fine SAND, little Silt; wet		4.3	
15		Grey, fine SAND, little Silt; wet		2.8	Sample SB-24 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Grey, fine SAND, little Silt, trace clay; wet		2.0	
20					Sample SB-24 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bottom of boring at 20 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-25	**212042.26**	**1001589.7**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Rich Crockett**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 106**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/14/14-9/10/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
21.73(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			
		Fill (Grey fine SAND and SILT, some medium Sand, trace gravel; dry)		1.9	Hand cleared to 5 ft-bg.
		Fill (Brown fine SAND, some medium Sand, little Silt and Gravel, trace cobble and brick; moist			
				0.7	
				2.0	
5		FILL (Olive grey CLAY, some Silt, little fine to medium Sand, trace gravel and brick; moist)		3.1	Sample SB-25 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		FILL (Grey, fine to coarse SAND, some Silt and Clay, trace gravel; very moist)		8.0	
		COBBLE; very moist		8.4	Drilled through cobble/boulder zone from 9 to 10 ft-bg.
10		Grey, SILT, some Clay, little fine Sand, trace gravel; very moist		8.2	
		Brown, fine SAND, some Silt; wet		7.2	
		Brown, fine SAND, little Silt; wet		5.5	Sample SB-25 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~12 feet bls.
15		Brown, fine to coarse SAND. little Silt; wet		0.6	
		Brown to grey, fine to coarse SAND, little Silt; wet		1.3	Sample SB-25 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
20					Bottom of boring at 20 ft-bg.

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-26	**211987.2**	**1001628.28**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 118**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**8/15/14-9/11/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
20.05(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine SAND, some medium Sand, and Gravel; moist)		0.0	
		FILL (Dark to light brown, fine SAND, some Silt, trace gravel; moist)		0.0	
		FILL (Light brown, fine SAND and SILT; moist)		0.0	
5		FILL (Brown, fine to coarse SAND, trace gravel; moist)		3.4	Sample SB-26 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		FILL (Brown, fine to coarse SAND, little Silt and Cobble; moist)		4.7	
10		FILL (Greyish brown, fine to coarse SAND, some Silt, little Gravel; moist)		3.3	
		Brown, fine to medium SAND, little Silt, trace gravel; wet		3.8	Sample SB-26 (11-12) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~11 ft bg.
		Grey, fine to medium SAND, little Silt; wet		6.6	
15		Grey, fine to medium SAND, some Silt; wet		6.0	Sample SB-26 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Grey, fine SAND, some Silt; wet		2.8	
		Grey, fine SAND and SILT; wet		4.0	Sample SB-26 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
20					Bottom of boring at 20 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-27	**211698.28**	**1001335.15**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 19**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
5-in. / Sonic	**5-inches**	**Compact C-17 / Rotosonic**	**Sonic**	**12/12/14-12/12/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
13.75(FT.)	**Not Measured**	**#1 Sand/Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Brown, fine SAND, some Silt, trace medium to coarse sand; moist)		1.7	
1					1
2				1.9	2
3			G		3
4					4 Sample SB-27 (4-5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
5					5
				2.2	Sample SB-27 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
6					Bedrock encountered at 6 ft-bg. 6

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 1/16/15

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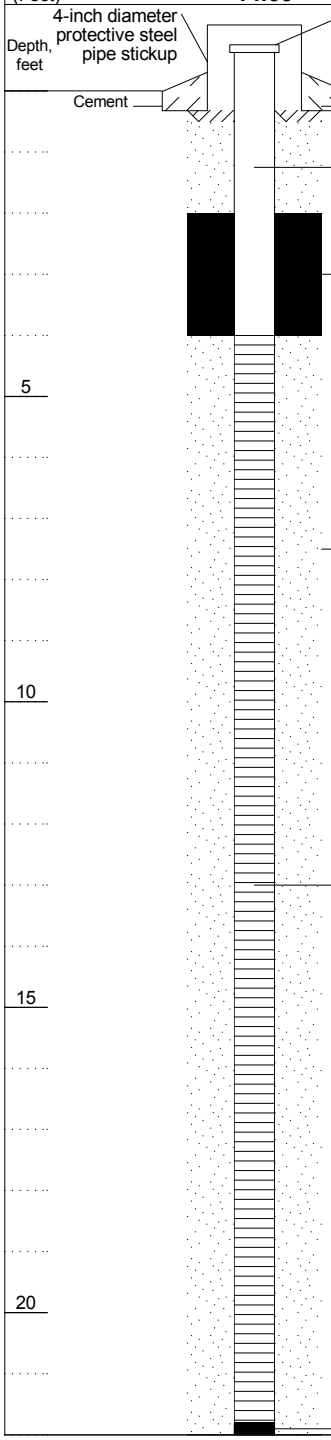
WELL CONSTRUCTION LOG

WELL NO. **SB-28/RMW-19**	NORTHING **211614.73**	EASTING **1001393.59**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Tom Sheerin**		GEOGRAPHIC AREA **Grid Cell 33**		
DRILL BIT DIAMETER/TYPE **5-in. / Sonic**	BOREHOLE DIAMETER **5-inches**	DRILLING EQUIPMENT/METHOD **Compact C-17 / Rotosonic**	SAMPLING METHOD **Sonic**	START-FINISH DATE **8/12/14-12/12/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC**	TOTAL LENGTH **18.0**ft	DIA. **2-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **14.66**	TOP OF WELL CASING **14.31**	TOP & BOTTOM SCREEN **10.7 / -7.3**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		FILL (Dark brown to brown, medium to coarse SAND, some Brick, Cobble, Asphalt and Gravel, little Silt and fine Sand; moist)			
		FILL (Brown to dark brown, fine to medium SAND, some coarse Sand, Brick and Cobble, little Silt; moist)	G	2.9	
		Brown to dark brown, SILT and CLAY; very moist-wet			
5		Greyish brown, fine SAND and SILT, little medium Sand, trace coarse sand; wet		1.7	Sample SB-28 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors observed. Water table observed at approximately 5 ft-bg.
10		Dark grey to dark brown, fine to medium SAND, some Silt, trace coarse sand; wet		4.6	
		Brown, SILT, trace fine sand; very moist		2.1	
15				2.1	
		Dark greyish brown, fine to medium SAND, little Silt, trace coarse sand and gravel; wet		105.7	Sample SB-28 (18-19) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Staining and odors observed. Sample SB-28 (21-22) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs, TAL Metals, TPH GRO/DRO and Bulk Density. Staining and odors observed. Bedrock encountered at 22 ft-bg.
20		Dark grey, fine to medium SAND, some coarse Sand, little Silt, trace gravel; wet		532.7	

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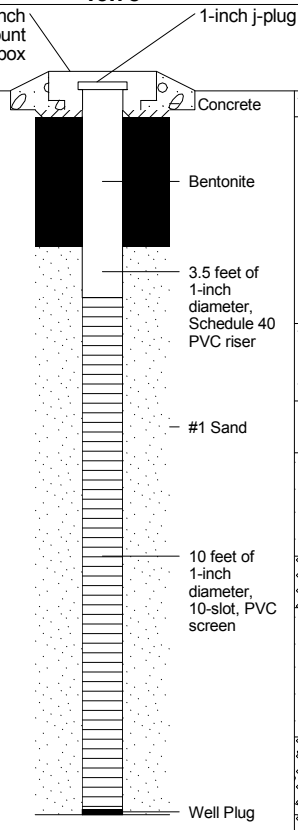
WELL CONSTRUCTION LOG

WELL NO. **SB-29/RMW-5**	NORTHING **211793.09**	EASTING **1001527.76**			
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**			
APPROVED BY **Jeff Wills**	LOGGED BY **Dave Klein**				
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 59**			
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/7/14-8/25/14**	
CASING MAT./DIA. **PVC / 1-inch**	SCREEN: TYPE **Slotted**	MAT. **PVC**	TOTAL LENGTH **10.0**ft	DIA. **1-inch**	SLOT SIZE **10-Slot**
ELEVATION OF: (Feet)	GROUND SURFACE **13.78**	TOP OF WELL CASING **13.17**	TOP & BOTTOM SCREEN **9.8 / -0.2**	GRAVEL PACK SIZES **#1**	



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		Reinforced CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark brown, fine to coarse SAND, some Silt, little Cobble, Gravel, Concrete and Brick fragments; moist)		3.2	
			G	3.3	
				4.3	
5		CONCRETE			Drilled through concrete from 4.5 to 6 ft-bg. 5
		NO RECOVERY	C		
		Brown, fine SAND, little Silt; wet		282	Sample SB-29 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors observed. Water table observed at ~6.5 ft-bg.
		Dark grey to black, fine to coarse SAND, little Silt, trace gravel; wet		94.3	
10		Grey, fine SAND, little Silt; wet		149	Sample SB-29 (9-10) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors observed. 10
		Brown, coarse SAND, little Gravel; wet		8.1	Sample SB-29 (10-11) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors observed.
		Dark brown, fine SAND, little medium to coarse Sand and Silt; wet		6.8	Sample SB-29 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odors Observed.
15		Grey, fine to coarse SAND, little Silt; wet		11.8	15
		Greyish brown, SILT, little fine Sand; wet		8.9	Sample SB-29 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Grey, SILT, trace fine sand; wet		6.1	
20		Dark brown, fine to coarse SAND, some Silt, little Clay; wet		6.8	20
		Grey, SILT, little fine Sand and Clay, trace gravel; wet		3.1	
		Dark grey to black, coarse SAND; wet		7.0	Sample SB-29 (25-26) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Refusal encountered at 26 ft-bg.
25		Dark grey to black, coarse SAND, trace gravel; wet		14.4	25

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

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Environmental Consulting & Management

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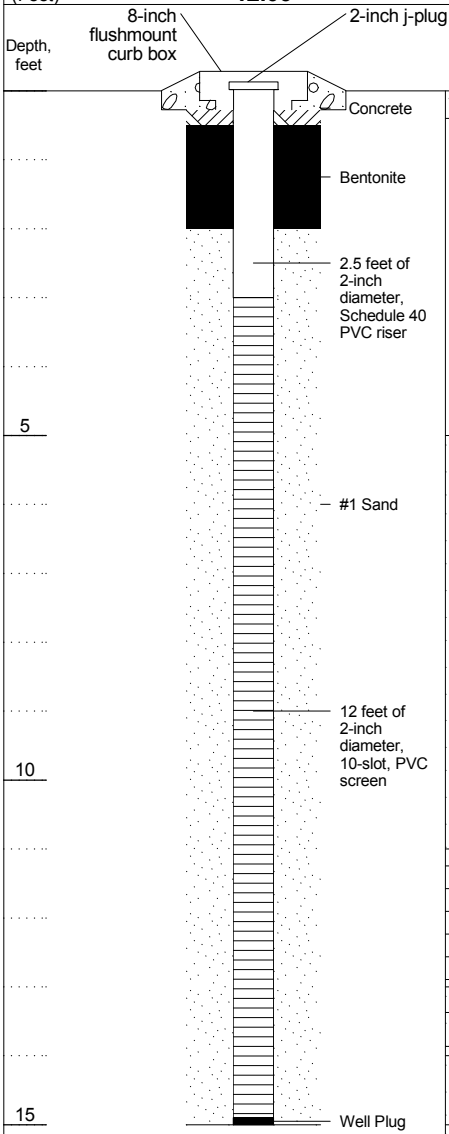
WELL CONSTRUCTION LOG

WELL NO. **SB-30/RMW-8**	NORTHING **211886.22**	EASTING **1001480.2**		
PROJECT NO./NAME **2409.0001Y000 / Queens Plaza**		LOCATION **28-10 Jackson Avenue** **Long Island City, New York**		
APPROVED BY **Jeff Wills**	LOGGED BY **Rich Crockett**			
DRILLING CONTRACTOR/DRILLER **Aquifer Drilling and Testing / Chris Migliori**		GEOGRAPHIC AREA **Grid Cell 82**		
DRILL BIT DIAMETER/TYPE **3-in. / Drive Sampler**	BOREHOLE DIAMETER **3-inches**	DRILLING EQUIPMENT/METHOD **Mobile 420 / Geoprobe**	SAMPLING METHOD **2" Macro-Core**	START-FINISH DATE **8/12/14-9/9/14**
CASING MAT./DIA. **PVC / 2-inch**	SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **12.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**			
ELEVATION OF: (Feet)	GROUND SURFACE **12.06**	TOP OF WELL CASING **11.93**	TOP & BOTTOM SCREEN **9.1 / -2.9**	GRAVEL PACK SIZES **#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		CONCRETE			Hand cleared to 5 ft-bg.
		FILL (Dark brown to brown, fine to coarse SAND, some Gravel, Concrete and Brick, little Silt; moist)		2.7	
		FILL (Dark brown to black, fine SAND and SILT, little medium to coarse Sand and Gravel, trace cobble; wet	G	15	Staining and odors observed.
		FILL (Dark brown to black, fine SAND and SILT, little medium to coarse Sand, trace gravel; wet		25.1	
5		Dark grey, fine to medium SAND, little Silt, trace coarse sand; wet		98.6	Sample SB-30 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed. Water table observed at ~4.5 feet bls.
		Dark grey, fine SAND, little Silt, trace medium to coarse sand; wet		215	
				378	Sample SB-30 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
				282	
		Grey, fine to medium SAND, little Silt, trace gravel; wet		239	Odor observed.
10		Brown, SILT, trace fine sand; wet		37	
				10.2	
		Brown, fine SAND and SILT; wet		8.5	
		Grey to brown, fine SAND, some Silt, little medium Sand; wet		30.1	
15		Brown, fine SAND and SILT; wet		16.1	
		Brown, SILT; very moist		13	
				18.1	
		Grey to brown, SILT, little fine Sand; wet		10.2	Sample SB-30 (18.5-19.5) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Refusal encountered at 19.5 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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WELL CONSTRUCTION LOG

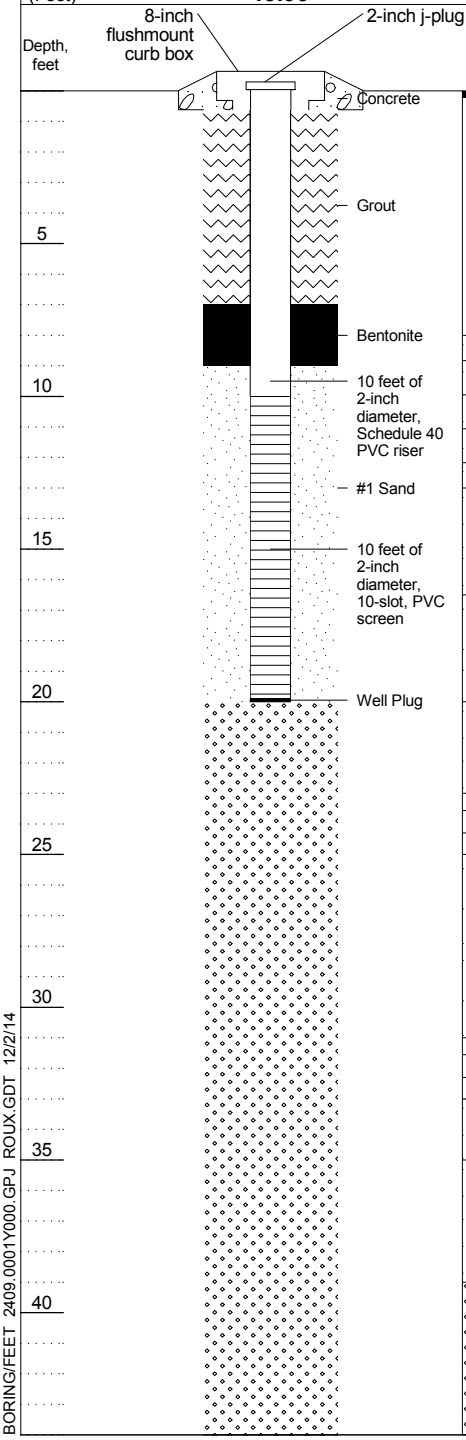
WELL NO.	NORTHING	EASTING
SB-31/RMW-20	**211934.17**	**1001450.11**

PROJECT NO./NAME	LOCATION
2409.0001Y000 / Queens Plaza	**28-10 Jackson Avenue**
APPROVED BY: **Jeff Wills** / LOGGED BY: **Rich Crockett**	**Long Island City, New York**
DRILLING CONTRACTOR/DRILLER: **Aquifer Drilling and Testing / Tom Sheerin**	GEOGRAPHIC AREA: **Grid Cell 76**

DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
2-in. / Drive Sampler	**5-inches**	**6620DT / Geoprobe**	**Sonic**	**8/15/14-8/15/14**

CASING MAT./DIA.: **PVC / 2-inch** | SCREEN: TYPE **Slotted** MAT. **PVC** TOTAL LENGTH **10.0**ft DIA. **2-inch** SLOT SIZE **10-Slot**

ELEVATION OF: (Feet)	GROUND SURFACE	TOP OF WELL CASING	TOP & BOTTOM SCREEN	GRAVEL PACK SIZES
	19.96	**19.43**	**10.0 / 0.0**	**#1**



Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		0.0	Hand cleared to 8 ft-bg.
		FILL (Grey fine to coarse SAND and SILT, some Brick and Concrete; moist)		0.0	
		FILL (Light brown fine SAND, some Gravel; moist)		0.0	
		FILL (Brown fine SAND, some Brick and Gravel; moist.	G	0.0	
5		FILL (Light brown to dark brown fine SAND, some Silt; moist.			5
		Brown, fine SAND and SILT, trace medium sand; wet		0.1	
10				7.2	10
		Dark grey to grey, fine SAND, some Silt, trace medium sand; wet		713	Sample SB-31 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~12 ft-bg.
15		Dark grey, fine SAND, little Silt; wet		115.5	15
		Grey to dark brown, SILT, little fine Sand; very moist		106.7	Sample SB-31 (14-15) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
		Brown, SILT, little fine Sand; very moist		1.6	Odor observed.
20		Brown, fine SAND, some Silt, trace medium sand; wet			Odor observed. 20
		Dark brown, SILT, trace fine sand; very moist		0.6	Sample SB-31 (19-20) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Odor observed.
25		Brown, SILT, little fine Sand; very moist		0.9	25
		Grey, SILT, some fine Sand, trace medium sand; wet		0.2	
30				0.2	30
		Grey, SILT, trace fine sand; very moist		0.1	
		Greyish brown, fine SAND, some medium Sand, little Silt; wet		0.7	
35		Dark brown, fine SAND, some medium Sand, trace coarse sand and silt; wet		0.2	35
		Dark grey to grey, medium SAND, some fine Sand, little coarse Sand, trace silt and gravel; wet		2.4	
40				1.4	40
					Bedrock encountered at 44 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-32	**211939.5**	**1001518.82**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Rich Crockett**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 93**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
3-in. / Drive Sampler	**2-inches**	**6620DT / Geoprobe**	**2" Macro-Core**	**9/25/14-9/26/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
19.43(FT.)	**Not Measured**	**#1 Sand/Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		CONCRETE		6.0	
		FILL (Dark brown, fine to coarse SAND and GRAVEL, little Silt and Brick, trace cobble and metal; moist)		5.0	
5		FILL (Brown, fine to coarse SAND, little Gravel and SIlt, trace brick; moist)	G	5.9	
		FILL (Dark brown, fine to medium SAND, little coarse Sand and Gravel, trace cobble; moist)		4.0	Sample SB-32 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				2.3	
		Brown, fine SAND, some medium Sand, trace silt; moist		8.8	Sample SB-32 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
10		Brown, fine SAND, some medium Sand, trace silt, gravel and coarse sand; moist		4.7	
		Greyish brown, fine SAND, little medium Sand, trace silt; moist		24.7	
		Greyish brown, fine SAND, little medium Sand, trace silt; wet		13.2	Sample SB-32 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at 12 feet bls.
				19.2	
15		Brown, fine SAND, little medium Sand and Silt; wet		10.4	
		Brown, fine SAND, little medium Sand and Silt, trace coarse sand and gravel; wet		17.2	
		Greyish brown, fine SAND, some Silt, trace medium sand; wet		28.6	Sample SB-32 (18-19) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
20		Grey, fine SAND, little Silt; wet		25.7	
				10.3	Sample SB-32 (20-21) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				6.4	
				13.4	
				17.8	
25				22.2	
		Grey, fine SAND, some Silt; wet		20.5	
				15.7	
		Greyish brown, SILT, trace fine sand; wet		19.9	
30					Sample SB-32 (29-30) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		NO RECOVERY			
35					
		Greyish brown, SILT, trace fine sand; wet		10.1	
				9.5	Sample SB-32 (39-40) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at ~40 ft-bg.
		Dark greyish brown, fine SAND and SILT; wet		6.5	
40				9.0	

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-33	**211907.08**	**1001533.67**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Rich Crockett**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 97**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
3-in. / Drive Sampler	**2-inches**	**6620DT / Geoprobe**	**2" Macro-Core**	**9/25/14-9/29/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
18.46(FT.)	**Not Measured**	**#1 Sand/Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 5 ft-bg.
		CONCRETE			
		FILL (Dark brown, fine to coarse SAND, some Gravel, little Silt, Brick and Concrete; moist)		3.8	
5		FILL (Brown to dark brown, fine to medium SAND, little Silt and Gravel, trace cobble; moist)	G	4.0	5
				1.8	Sample SB-33 (5-6) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Brown, fine SAND, little medium Sand and Silt; moist		6.0	
10		Brown, fine to medium SAND, trace silt, coarse sand and gravel; wet		0.8	10
					Sample SB-33 (12-13) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table encountered at 12 feet bls.
15		Grey, fine to medium SAND, little Silt; wet		6.5	15
		Dark grey, fine to medium SAND, little Silt; wet		27.5	Sample SB-33 (15-16) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				20	
		Dark grey, fine SAND, little Silt; wet		18.5	
20					20
				10.1	Sample SB-33 (20-21) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
				5.6	
				1.0	
25		Dark greyish brown, fine SAND and SILT; wet		1.0	25
		Dark greyish brown, SILT, trace fine sand; wet		2.5	
30				2.5	30
				1.0	
				6.5	Sample SB-33 (36-37) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at 37 ft-bg.
35		Grey, SILT, little fine Sand, trace gravel; wet		4.3	35

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-34	**211840.9**	**1001564.83**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Dave Klein**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Tom Sheerin		**Grid Cell 101**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
3-in. / Drive Sampler	**2-inches**	**6620DT / Geoprobe**	**2" Macro-Core**	**9/25/14-9/29/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
13.91(FT.)	**Not Measured**	**#1 Sand/Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT			Hand cleared to 8 ft-bg.
		CONCRETE		3.9	
		FILL (Dark brown, fine to coarse SAND, some Gravel, little Silt and Brick, trace metal; moist)		4.2	
5		Brown to dark brown, fine to medium Sand, little Silt and Gravel; moist	G	6.9	
				14	
					Sample SB-34 (7-8) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Brown, fine SAND, little medium Sand, trace silt; moist		15.5	
		Dark brown, fine SAND, trace medium sand and silt; wet		1.5	Sample SB-34 (9-10) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at ~9 feet bls.
10		Greyish brown, fine SAND, little medium Sand, trace silt; wet		2.5	
15		Greyish brown, fine SAND, little medium Sand, trace silt; wet		0.8	
		Grey SILT, little fine Sand; very moist		1.3	
20		Greyish brown, fine SAND and SILT; wet		0.4	
		Greyish brown, SILT, trace fine sand; very moist		0.5	
25		Greyish brown, SILT, some fine Sand; wet		0.1	
		Grey, SILT, trace fine sand; very moist		0.3	
30				0.4	Sample SB-34 (32-33) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at 33 ft-bg.

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 12/2/14

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SOIL BORING LOG

WELL NO.	NORTHING	EASTING		
SB-35	**211900.13**	**1001505.6**		
PROJECT NO./NAME		LOCATION		
2409.0001Y000 / Queens Plaza		**28-10 Jackson Avenue**		
APPROVED BY	LOGGED BY	**Long Island City, New York**		
Jeff Wills	**Rich Crockett**			
DRILLING CONTRACTOR/DRILLER		GEOGRAPHIC AREA		
Aquifer Drilling and Testing / Chris Iodice		**Grid Cell 96**		
DRILL BIT DIAMETER/TYPE	BOREHOLE DIAMETER	DRILLING EQUIPMENT/METHOD	SAMPLING METHOD	START-FINISH DATE
2-in. / Drive Sampler	**2-inches**	**6620DT / Geoprobe**	**2" Macro-Core**	**9/25/14-9/29/14**
LAND SURFACE ELEVATION	DEPTH TO WATER	BACKFILL		
18.70(FT.)	**Not Measured**	**Bentonite**		

Depth, feet	Graphic Log	Visual Description	Blow Counts per 6"	PID Values (ppm)	REMARKS
		ASPHALT		0.3	Hand cleared to 5 ft-bg.
		FILL (Brown, fine to coarse SAND, little Gravel, Silt and Brick; moist)			
		FILL (Brown, fine to medium SAND, little Gravel and Silt, trace cobble and brick; moist)		0.8	
			G		
5				0.6	5
		Brown, fine SAND, little medium Sand, Silt and Gravel; moist		0.4	
		Brown, fine SAND, some Silt, little medium Sand, trace coarse sand; moist		0.3	
10				0.5	10
		Brown, fine SAND, some Silt, little medium Sand, trace coarse sand; wet			Sample SB-35 (13-14) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Water table observed at 13 ft-bg.
		Grey, fine SAND, little medium Sand, trace silt; wet		13.9	
15		Grey, fine SAND, some medium Sand, little Silt; wet		5.7	15
				14.8	Sample SB-35 (17-18) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
		Dark brown, SILT, little fine Sand; very moist		14.1	
20				6.5	20
		Brown, SILT, little fine Sand, trace medium sand; very moist		0.7	Sample SB-35 (22-23) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals.
25				0.7	25
		Grey, SILT, trace fine sand; very moist		0.1	
30				0.2	30
		Dark brown, SILT, some fine Sand, little medium Sand, trace coarse sand and gravel; wet		8.3	Sample SB-35 (35-36) collected for TCL VOCs, TCL SVOCs, TCL Pesticides, PCBs and TAL Metals. Bedrock encountered at 36 ft-bg.
35		Dark brown, fine to medium SAND, little Silt and coarse Sand, trace gravel; wet		16	35

BORING/FEET 2409.0001Y000.GPJ ROUX.GDT 6/18/15

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/19/2014 **Time:** 11:50
Weather : Clear

Temperature:	78˚F	Humidity:	64%
Wind Magnitude:	4mph	Wind Direction:	ENE
Barometric Pressure:	28.98	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-1 (Grid 108)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Parking lot (Area A)

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1796 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 20,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 11:58
Ending Time: 12:20
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A1231
Flow Regulator ID # FC426
Sample ID # SV-1
Time 12:20

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/19/2014 **Time:** 12:00
Weather : Clear

Temperature:	78˚F	Humidity:	64%
Wind Magnitude:	4mph	Wind Direction:	ENE
Barometric Pressure:	28.98	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-2 (Grid 116)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Parking lot (Area A)

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1796 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 15,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30.00 in. of Hg
Starting Time: 12:11
Ending Time: 12:45
Ending Pressure: -5 in. of Hg

Summa Canister Identification #: A1222
Flow Regulator ID # FC483
Sample ID # SV-2
Time 12:45

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/21/2014 **Time:** 12:52
Weather : Clear
Temperature: 82˚F Humidity: 49%
Wind Magnitude: 8 mph Wind Direction: S
Barometric Pressure: 30.07 Precipitation: --

Sampling Team: J.Freijomil
Sampling Location: SV-3 (Grid 126)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Building #9

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1775 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 17,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -29 in. of Hg
Starting Time: 12:52
Ending Time: 13:29
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A428
Flow Regulator ID # FC332
Sample ID # SV-3
Time 13:29

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/21/2014 **Time:** 12:49
Weather : Clear

Temperature:	82˚F	Humidity:	49%
Wind Magnitude:	8 mph	Wind Direction:	S
Barometric Pressure:	30.07	Precipitation:	--

Sampling Team: J.Freijomil
Sampling Location: SV-4 (Grid 127)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Building #9

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1775 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 20,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 12:49
Ending Time: 13:27
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A562
Flow Regulator ID # FC252
Sample ID # SV-4
Time 12:49

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/22/2014 **Time:** 10:05
Weather : Cloudy
Temperature: 72˚F Humidity: 75%
Wind Magnitude: 9 mph Wind Direction: ENE
Barometric Pressure: 30.05 Precipitation: --

Sampling Team: David Klein
Sampling Location: SV-5 (Grid 83)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Bottom of stairwell; Basement of Building #6

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 2-3 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1985 Must be less than 0.2 L/min
Purge Time: 60 sec
Helium Rate at enclosure: 10,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 09:35
Ending Time: 10:10
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A496
Flow Regulator ID # FC268
Sample ID # SV-5
Time 10:10

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/22/2014 **Time:** 10:05
Weather : Cloudy
Temperature: 72˚F Humidity: 75%
Wind Magnitude: 9 mph Wind Direction: ENE
Barometric Pressure: 30.05 Precipitation: --

Sampling Team: David Klein
Sampling Location: SV-5 (Grid 83) Duplicate Sample
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Bottom of stairwell; Basement of Building #6

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 2-3 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1985 Must be less than 0.2 L/min
Purge Time: 60 sec
Helium Rate at enclosure: 10,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 10:22
Ending Time: 11:00
Ending Pressure: -3 in. of Hg

Summa Canister Identification #: A435
Flow Regulator ID # FC365
Sample ID # DUP-082214
Time 11:00

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/19/2014 **Time:** 13:50
Weather : Clear

Temperature:	80˚F	Humidity:	64%
Wind Magnitude:	4mph	Wind Direction:	ENE
Barometric Pressure:	28.98	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-6 (Grid 74)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Parking Lot (Area B)

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1796 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 20,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 13:57
Ending Time: 14:35
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A620
Flow Regulator ID # FC261
Sample ID # SV-6
Time 14:35

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/19/2014 **Time:** 14:00
Weather : Clear

Temperature:	80˚F	Humidity:	64%
Wind Magnitude:	4mph	Wind Direction:	ENE
Barometric Pressure:	28.98	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-7 (Grid 72)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Parking Lot (Area B)

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1796 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 20,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -27 in. of Hg
Starting Time: 14:11
Ending Time: 14:42
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A526
Flow Regulator ID # FC442
Sample ID # SV-7
Time 14:42

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/21/2014 **Time:** 13:18
Weather : Clear
Temperature: 83˚F Humidity: 48%
Wind Magnitude: 8 mph Wind Direction: S
Barometric Pressure: 30.01 Precipitation: --

Sampling Team: J.Freijomil
Sampling Location: SV-8 (Grid Cell 78)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Building 6A

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 1 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: .1775 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 18,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -28 in. of Hg
Starting Time: 13:18
Ending Time: 13:51
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A606
Flow Regulator ID # FC361
Sample ID # SV-8
Time 13:18

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 12/16/2014 **Time:** 10:15
Weather : Overcast
Temperature: 44˚F Humidity: 76%
Wind Magnitude: 1 mph Wind Direction: ENE
Barometric Pressure: 30.10 Precipitation: 0.2"

Sampling Team: R.Crockett
Sampling Location: SV-9 (Grid 84)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 2-3 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1884 Must be less than 0.2 L/min
Purge Time: 60 sec
Helium Rate at enclosure: 6,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -29.50 in. of Hg
Starting Time: 10:22
Ending Time: 11:01
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A1026
Flow Regulator ID # FC701
Sample ID # SV-9
Time 11:01

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/19/2014 **Time:** 08:50
Weather : Clear

Temperature:	68˚F	Humidity:	64%
Wind Magnitude:	4mph	Wind Direction:	ENE
Barometric Pressure:	29.91	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-10 (Grid 53)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Building 10

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 4-5 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1796 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 15,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -29.50 in. of Hg
Starting Time: 09:01
Ending Time: 09:35
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A1224
Flow Regulator ID # FC159
Sample ID # SV-10
Time 09:35

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/15/2014 **Time:** 13:00
Weather : Clear

Temperature:	71˚F	Humidity:	53%
Wind Magnitude:	5mph	Wind Direction:	WNW
Barometric Pressure:	29.94	Precipitation:	--

Sampling Team: J.Wills
Sampling Location: SV-11 (Grid 63)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Building 1

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 7-8 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1765 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 10,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -28 in. of Hg
Starting Time: 13:07
Ending Time: 13:39
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A1238
Flow Regulator ID # FC282
Sample ID # SV-11
Time 13:39

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 12/16/2014 **Time:** 09:30
Weather : Overcast
Temperature: 41˚F Humidity: 76%
Wind Magnitude: 1 mph Wind Direction: ENE
Barometric Pressure: 30.10 Precipitation: 0.2"

Sampling Team: R.Crockett
Sampling Location: SV-13 (Grid 79)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Adjacent to (north side) former Building 2B/2C

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 2-3 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1884 Must be less than 0.2 L/min
Purge Time: 60 sec
Helium Rate at enclosure: 10,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -29.00 in. of Hg
Starting Time: 09:47
Ending Time: 10:35
Ending Pressure: -3 in. of Hg

Summa Canister Identification #: A1034
Flow Regulator ID # FC551
Sample ID # SV-13
Time 10:35

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 12/16/2014 **Time:** 09:30
Weather : Overcast
Temperature: 41˚F Humidity: 76%
Wind Magnitude: 1 mph Wind Direction: ENE
Barometric Pressure: 30.10 Precipitation: 0.2"

Sampling Team: R.Crockett
Sampling Location: SV-14 (Grid 18)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Within former Building 3A/3B

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 4-5 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1884 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 8,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30.00 in. of Hg
Starting Time: 09:41
Ending Time: 10:19
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A859
Flow Regulator ID # FC508
Sample ID # SV-14
Time 10:19

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 8/21/2014 **Time:** 13:23
Weather : Clear

Temperature:	83˚F	Humidity:	48%
Wind Magnitude:	8 mph	Wind Direction:	S
Barometric Pressure:	30.01	Precipitation:	--

Sampling Team: J.Freijomil
Sampling Location: SV-15 (Grid 33)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Behind Building 4

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 3-4 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: .1775 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 18,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

Starting Pressure: -30 in. of Hg
Starting Time: 13:23
Ending Time: 13:59
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A1131
Flow Regulator ID # FC388
Sample ID # SV-15
Time 13:23

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

Soil Vapor Sampling Form
28-10 Jackson Avenue
Long Island City, NY

Date: 9/22/2014 **Time:** 08:30
Weather : Overcast
Temperature: 65˚F Humidity: 55%
Wind Magnitude: 6mph Wind Direction: west
Barometric Pressure: 29.85 Precipitation: --

Sampling Team: D.Klien
Sampling Location: SV-16 (Grid 66)
Site Condition (i.e. any adjacent questionable facilities, vent pipes, tanks, etc. and what type of basements are present)
Behind Building 1

Prior to commencing the sampling activity, remove the brass cap from the end of the sample tubing and fit a new brass hose barb fitting onto the sample tubing.

Calibrate the Helium detection meter

Utility Clearance Completed: Yes

Sampling Depth: 2-3 feet below land surface (If ambient air sample, elevate can to approx. 3 ft - 5 ft above land surface)
Sealed with bentonite: Yes
Apparent Moisture Content: N/A
Purge Rate: 0.1890 Must be less than 0.2 L/min
Purge Time: 120 sec
Helium Rate at enclosure: 10,000 ppm
Helium Rate from sample tubing: 0 ppm Is this rate <10% of the rate at the enclosure **Yes /** No

If the Helium readings have a greater ratio than 10% the seals should be rechecked and the tracer gas should be reapplied.

Once the tracer gas screening procedures are completed and no short-circuiting is determined to be present at the location the soil vapor sample can be collected in a lab certified clean summa canister at a rate less than 0.2 L/min.

Finishing pressure should be within 0.5 - 4 " of Hg

Is the Summa Canister Certified Clean and within the proper holding time ? **Yes**

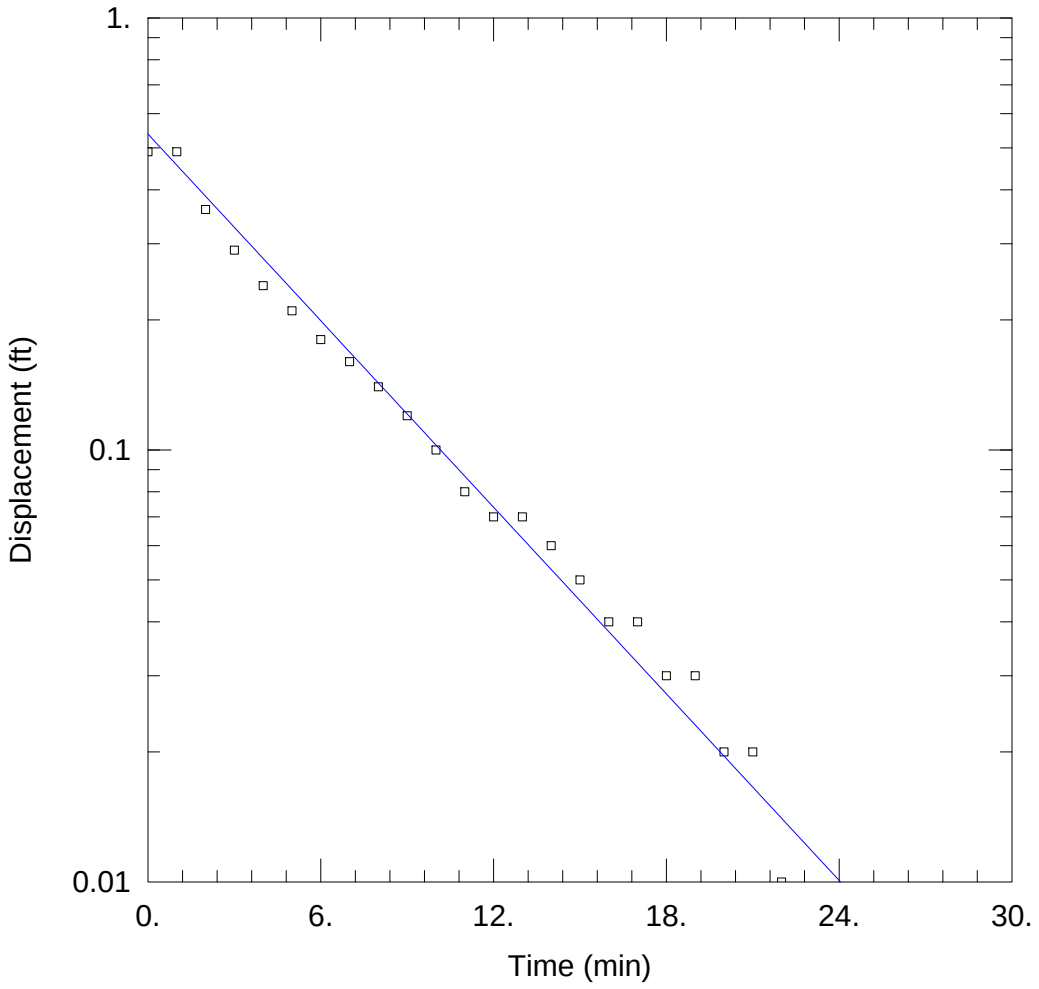
Starting Pressure: -29 in. of Hg
Starting Time: 08:38
Ending Time: 09:14
Ending Pressure: -4 in. of Hg

Summa Canister Identification #: A559
Flow Regulator ID # FC331
Sample ID # SV-16
Time 09:14

Analysis VOCs + naphthalene(TO-15)
Laboratory Accutest Laboratories

APPENDIX G

Slug Test Data



F-3

PROJECT INFORMATION

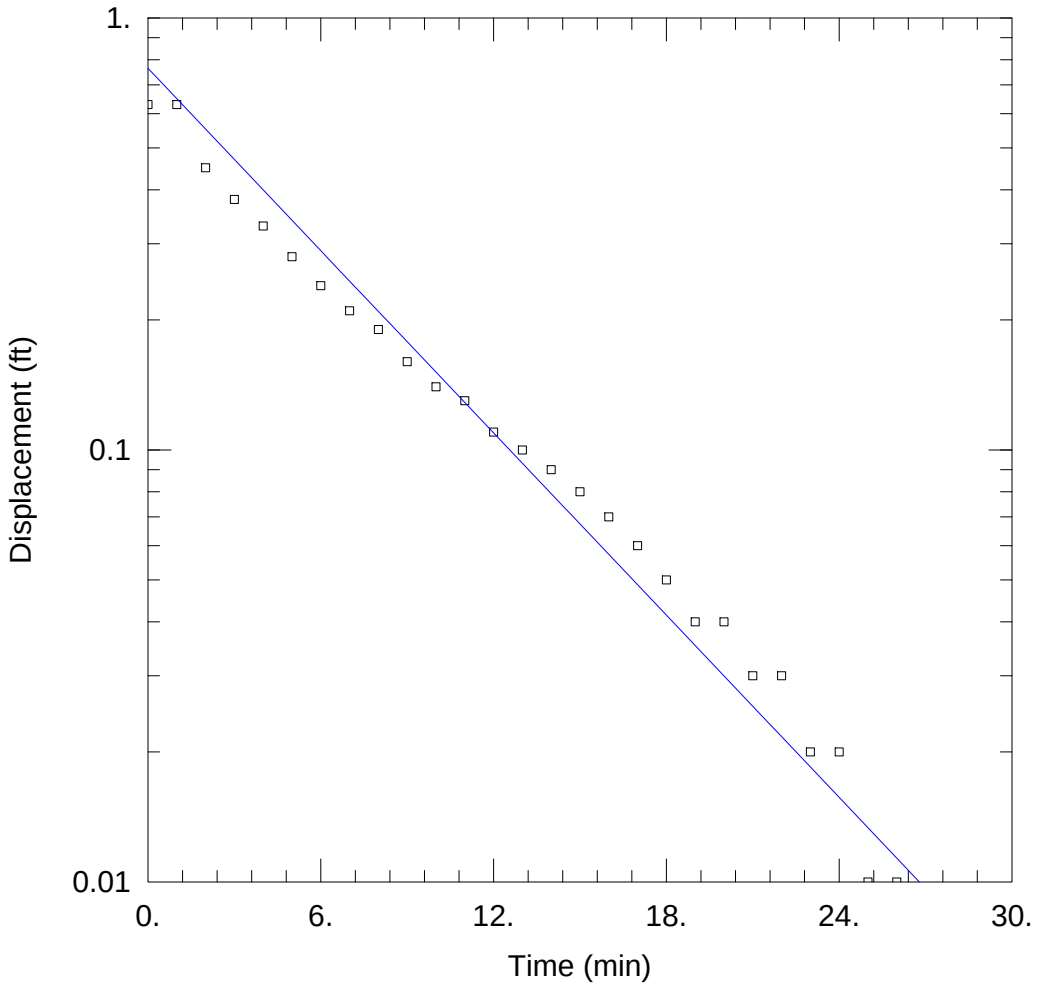
Company: Roux Associates
Client: Queens Plaza
Test Well: F-3 Test 1
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 19.18 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.391 ft/day
y0 = 0.5384 ft



F-3

PROJECT INFORMATION

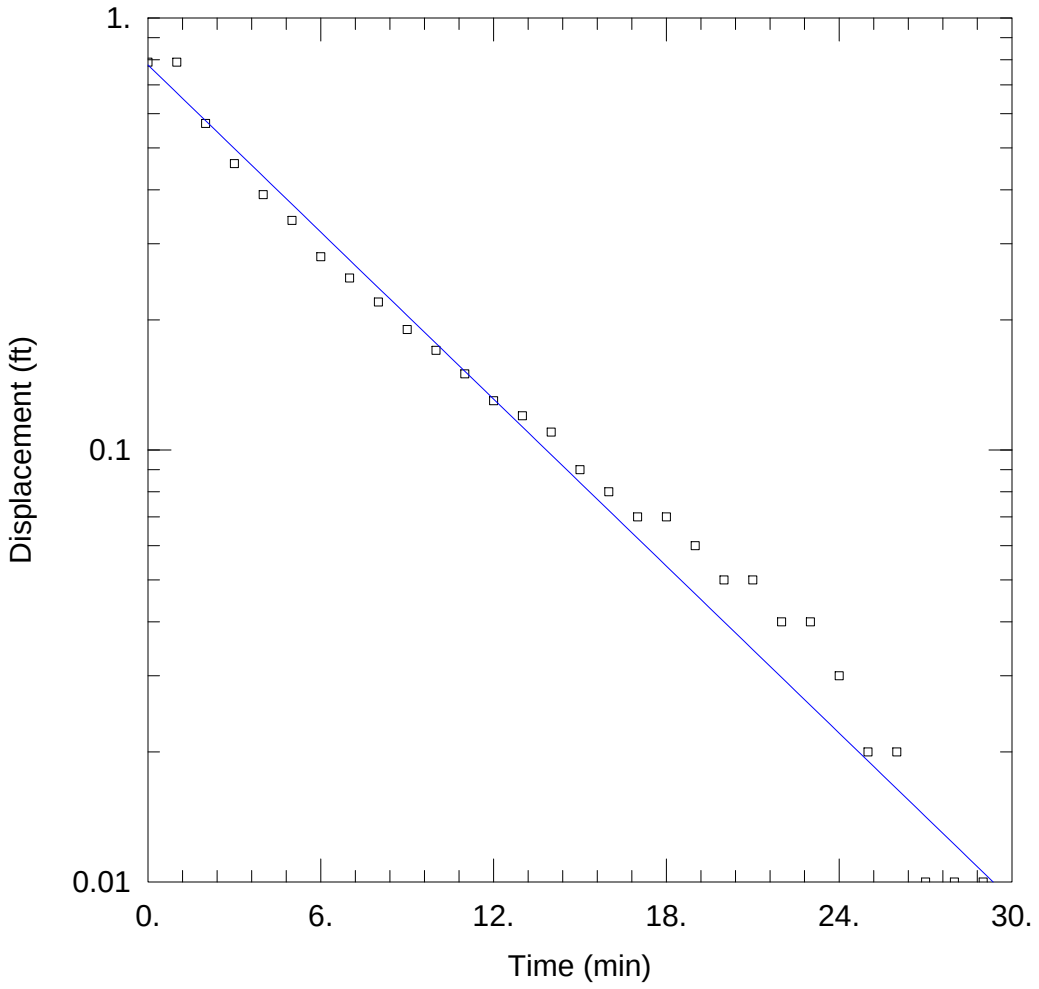
Company: Roux Associates
Client: Queens Plaza
Test Well: F-3 Test 2
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 19.18 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3819 ft/day
y0 = 0.7644 ft



F-3

PROJECT INFORMATION

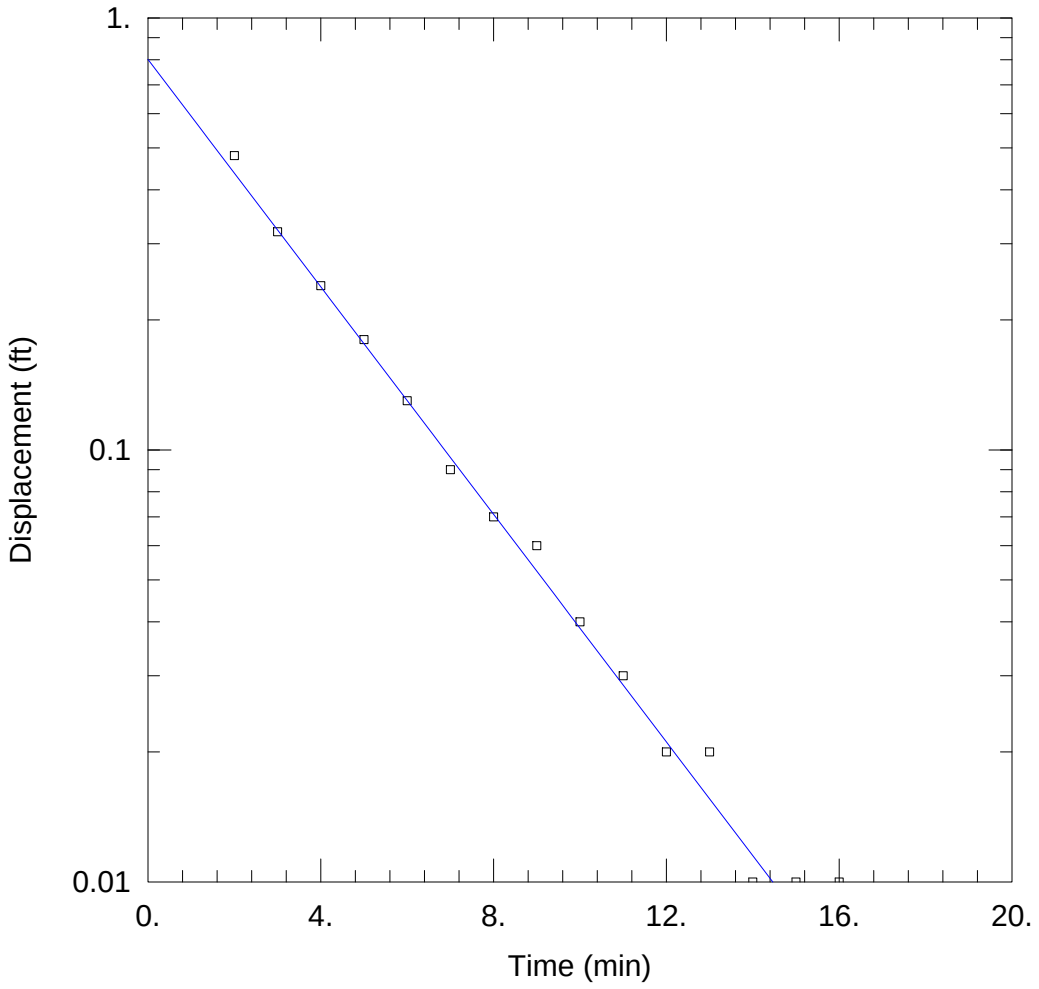
Company: Roux Associates
Client: Queens Plaza
Test Well: F-3 Test 3
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 19.18 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.35 ft/day
y0 = 0.7781 ft



OS-5

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-5 Test 2
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 13.77 ft

Anisotropy Ratio (Kz/Kr): 0.1

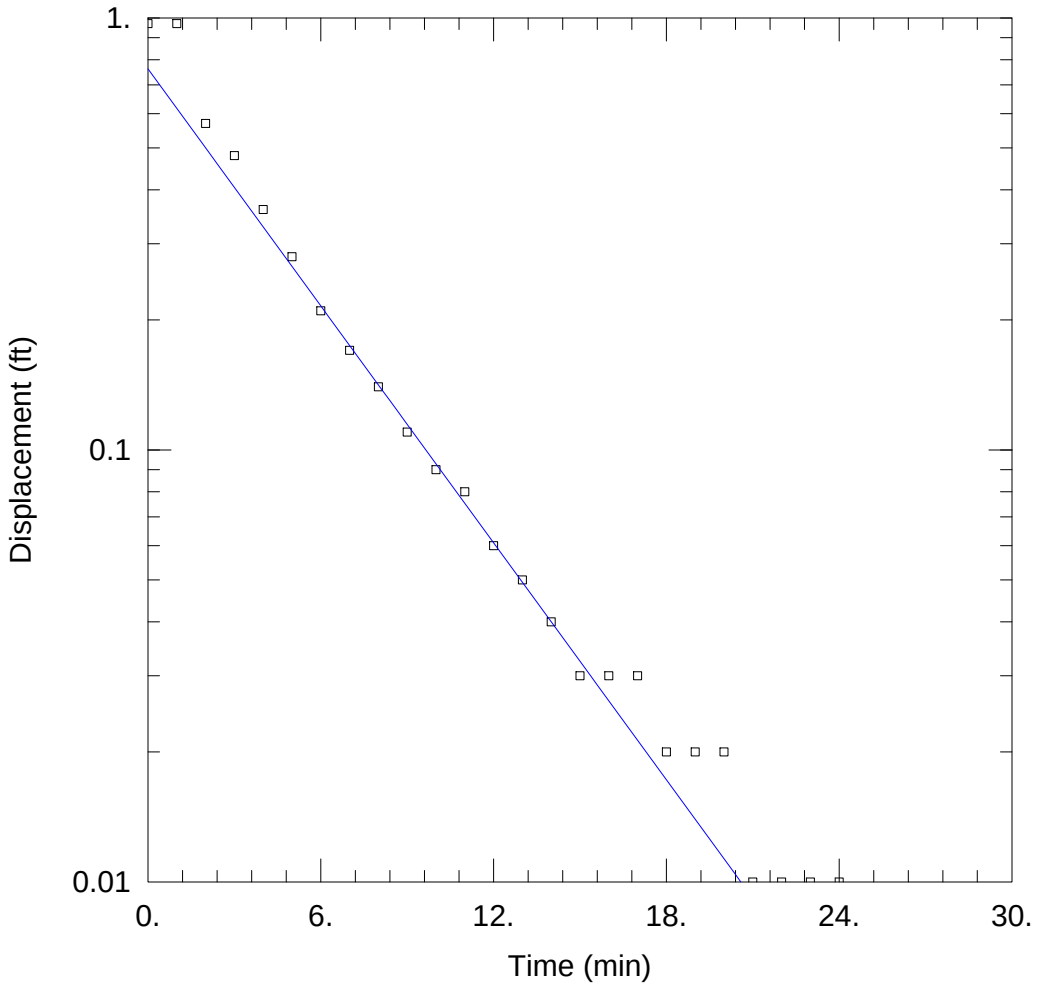
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.6629 ft/day

y0 = 0.8015 ft



OS-5

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-5 Test 3
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 13.77 ft

Anisotropy Ratio (Kz/Kr): 0.1

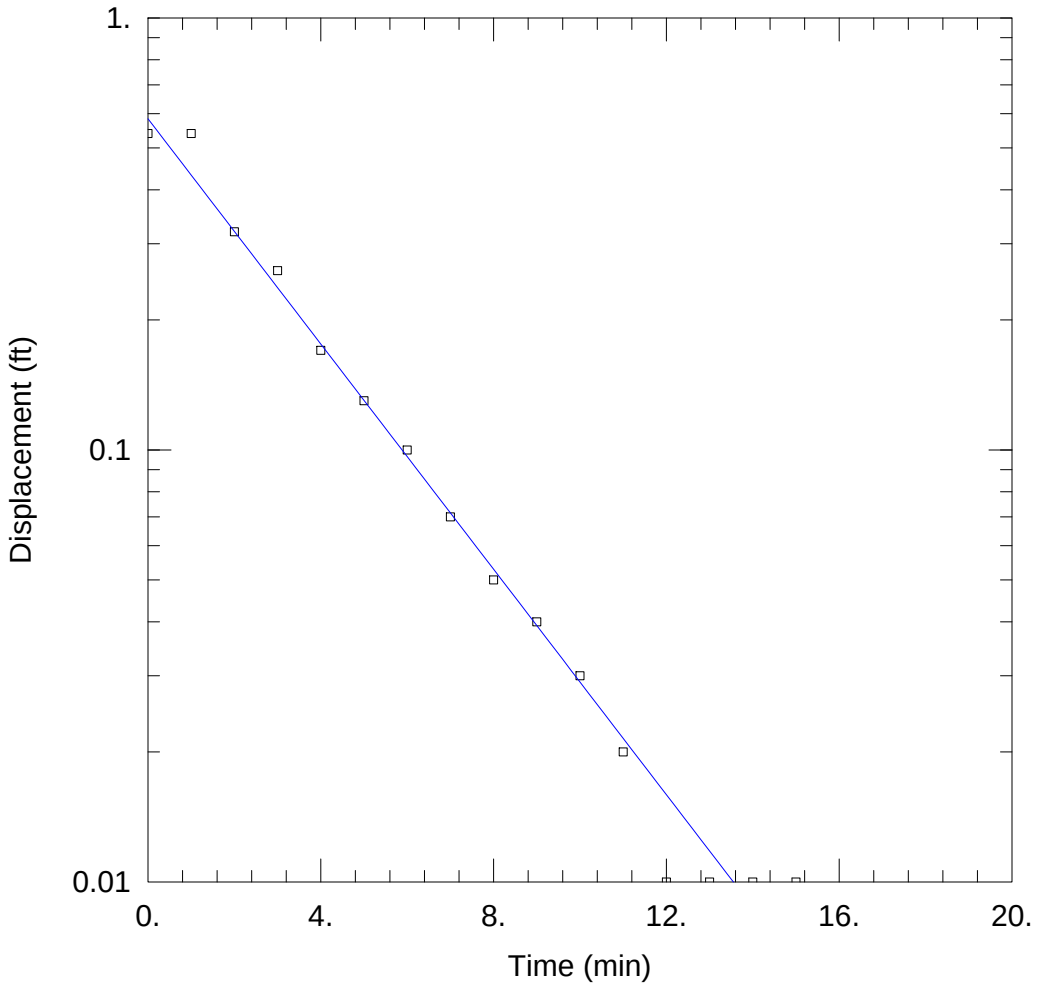
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.4604 ft/day

y0 = 0.762 ft



OS-5

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-5 Test 1
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 13.77 ft

Anisotropy Ratio (Kz/Kr): 0.1

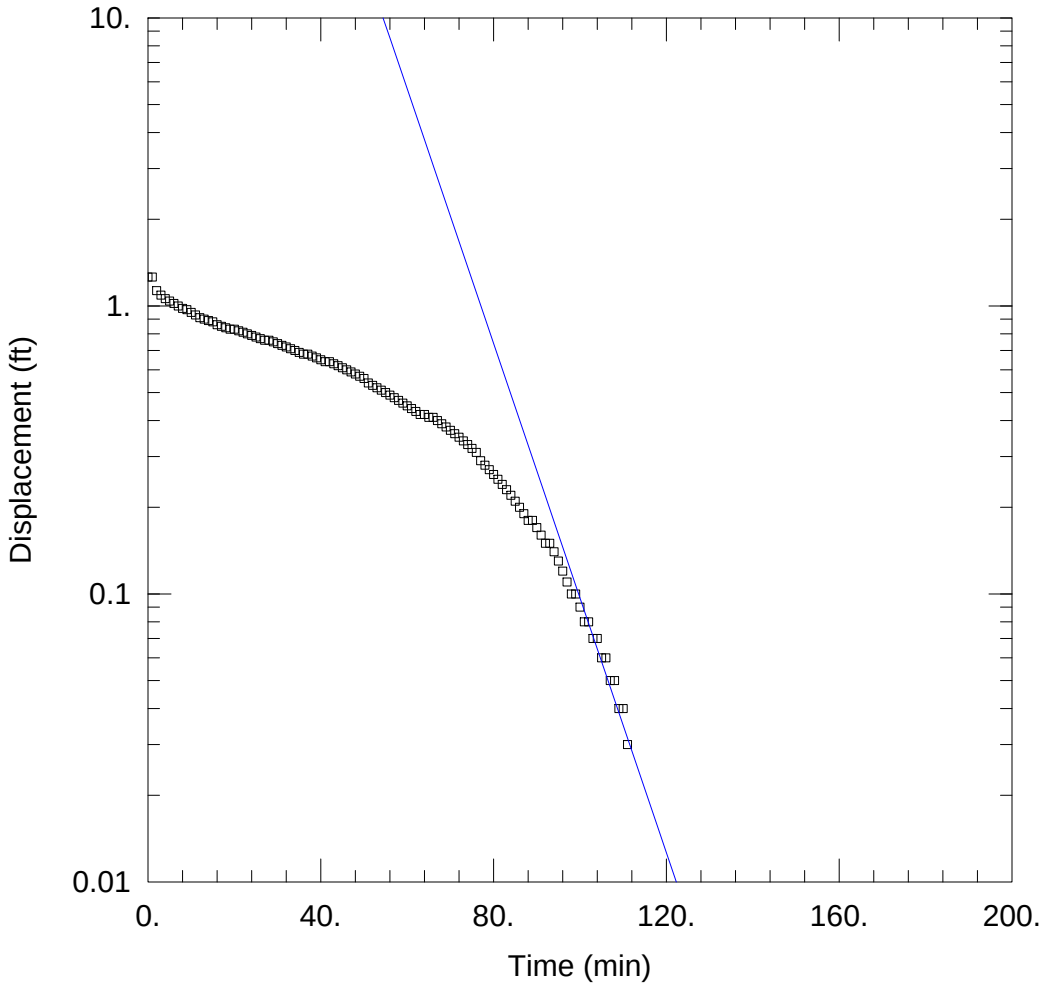
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.6564 ft/day

y0 = 0.5842 ft



OS-7

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-7 Test 2
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 25.83 ft

Anisotropy Ratio (Kz/Kr): 0.1

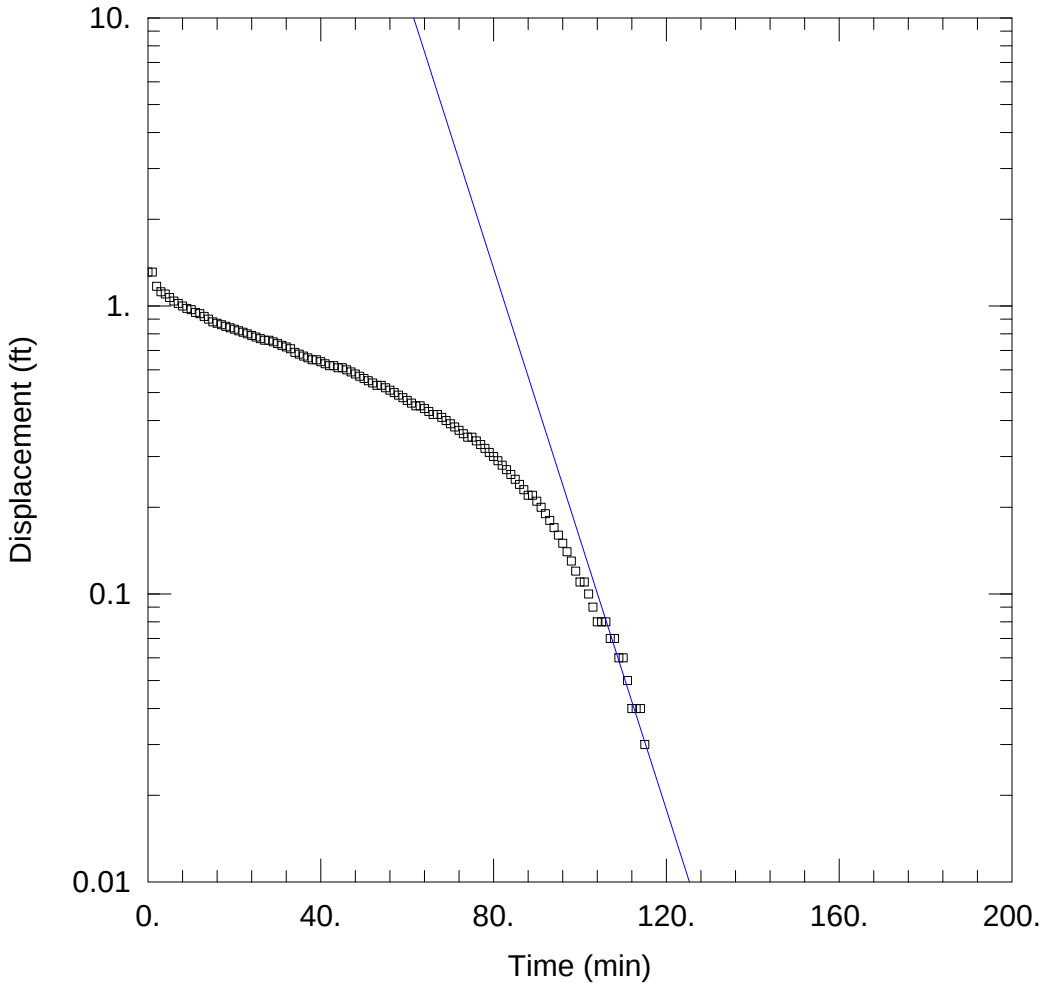
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.2753 ft/day

y0 = 2550.4 ft



OS-7

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-7 Test 3
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 25.83 ft

Anisotropy Ratio (Kz/Kr): 0.1

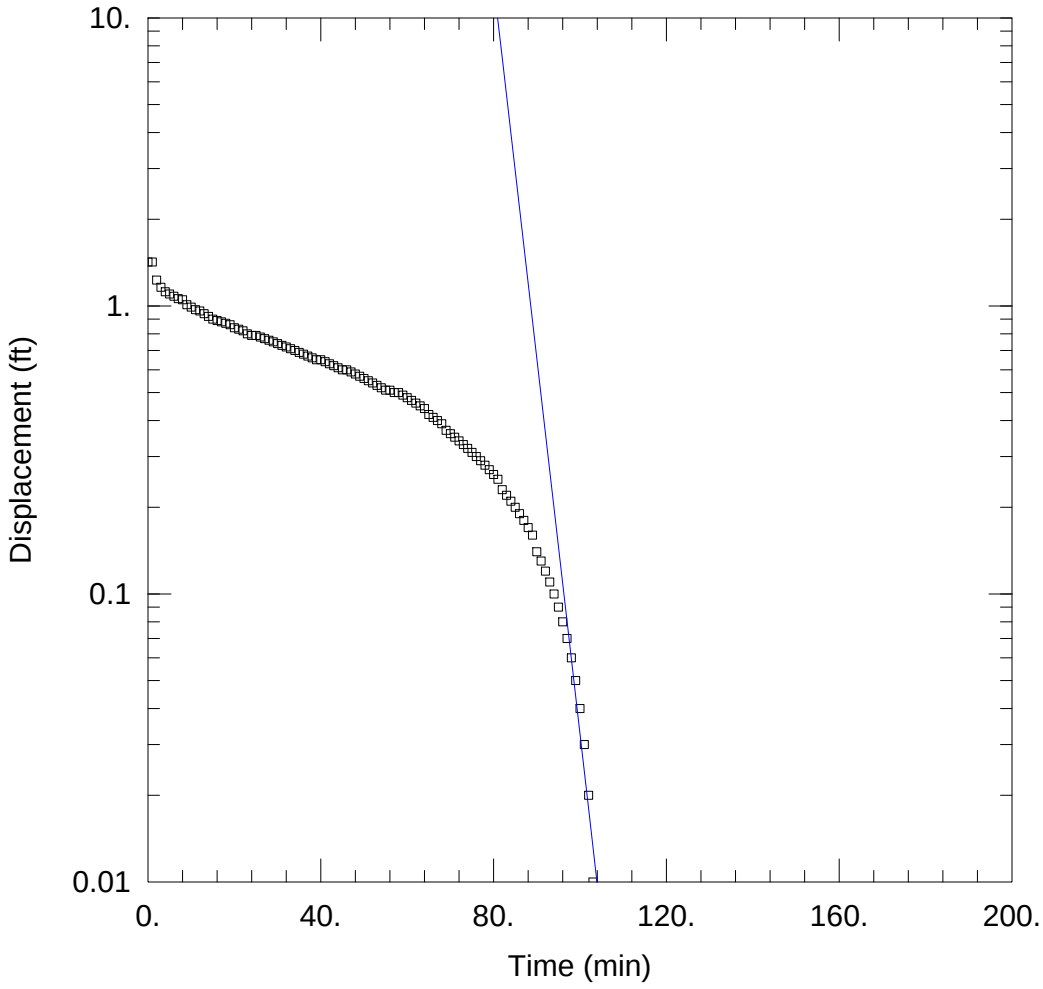
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.2926 ft/day

y0 = 7760.6 ft



OS-7

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: OS-7 Test 1
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 25.83 ft

Anisotropy Ratio (Kz/Kr): 0.1

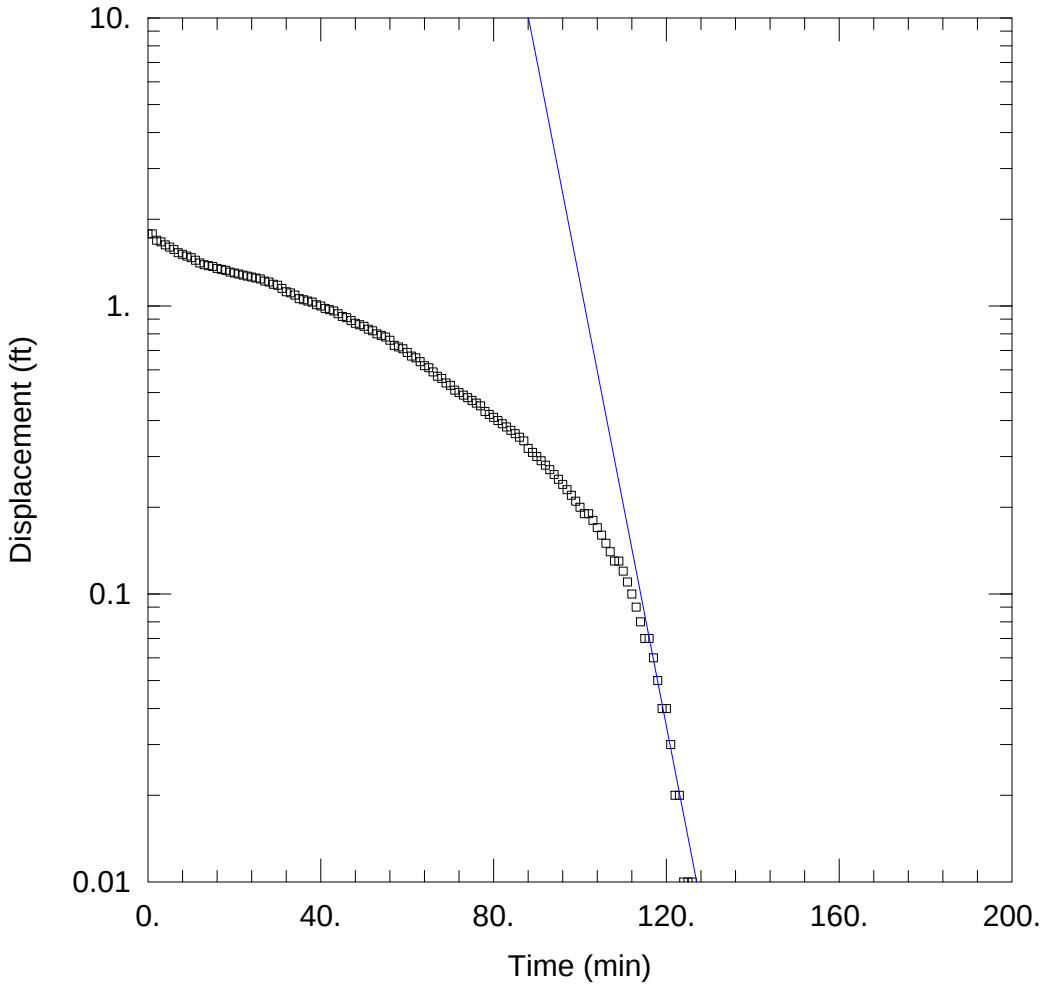
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.812 ft/day

y0 = 3.591E+11 ft



RMW-4/SB-2

PROJECT INFORMATION

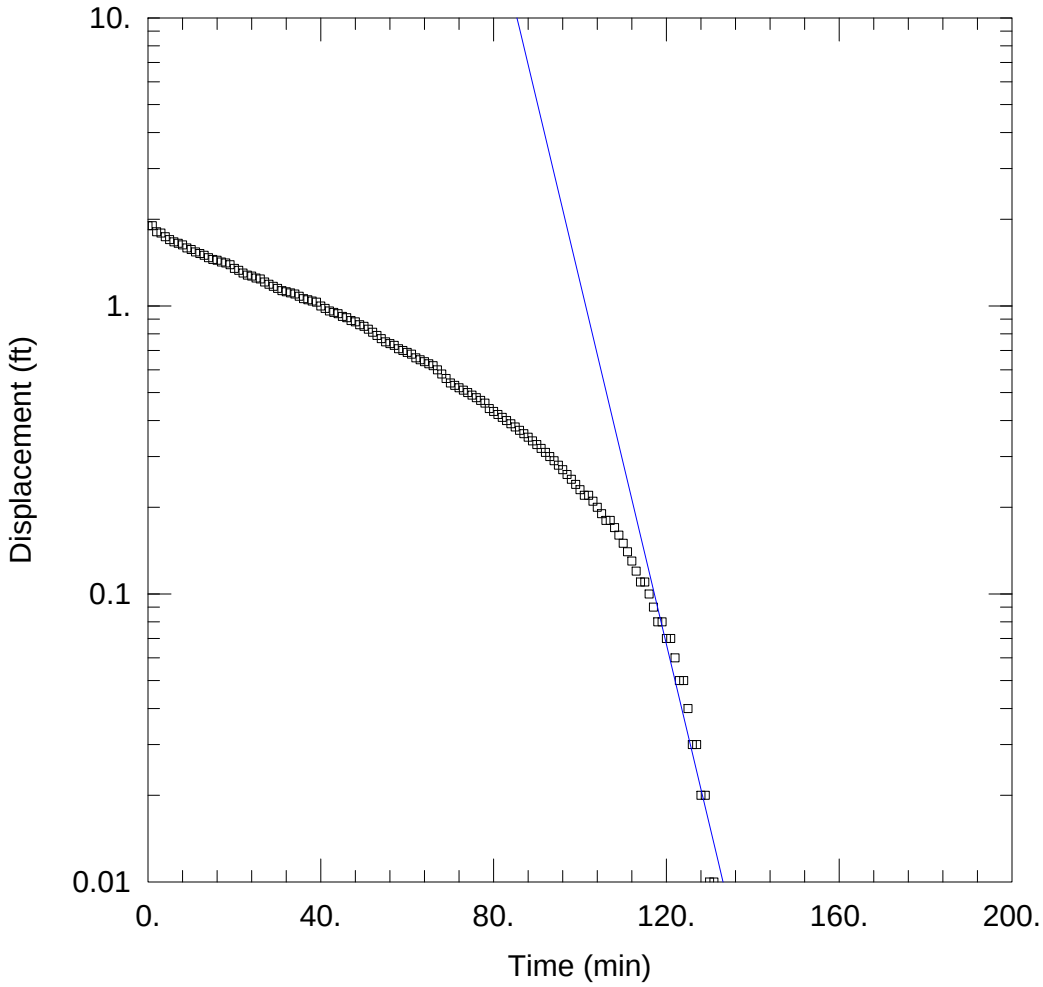
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-4/SB-2 Test 2
Test Date: 10/13/2014

AQUIFER DATA

Saturated Thickness: 12.49 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3887 ft/day
y0 = 6.161E+7 ft



RMW-4/SB-2

PROJECT INFORMATION

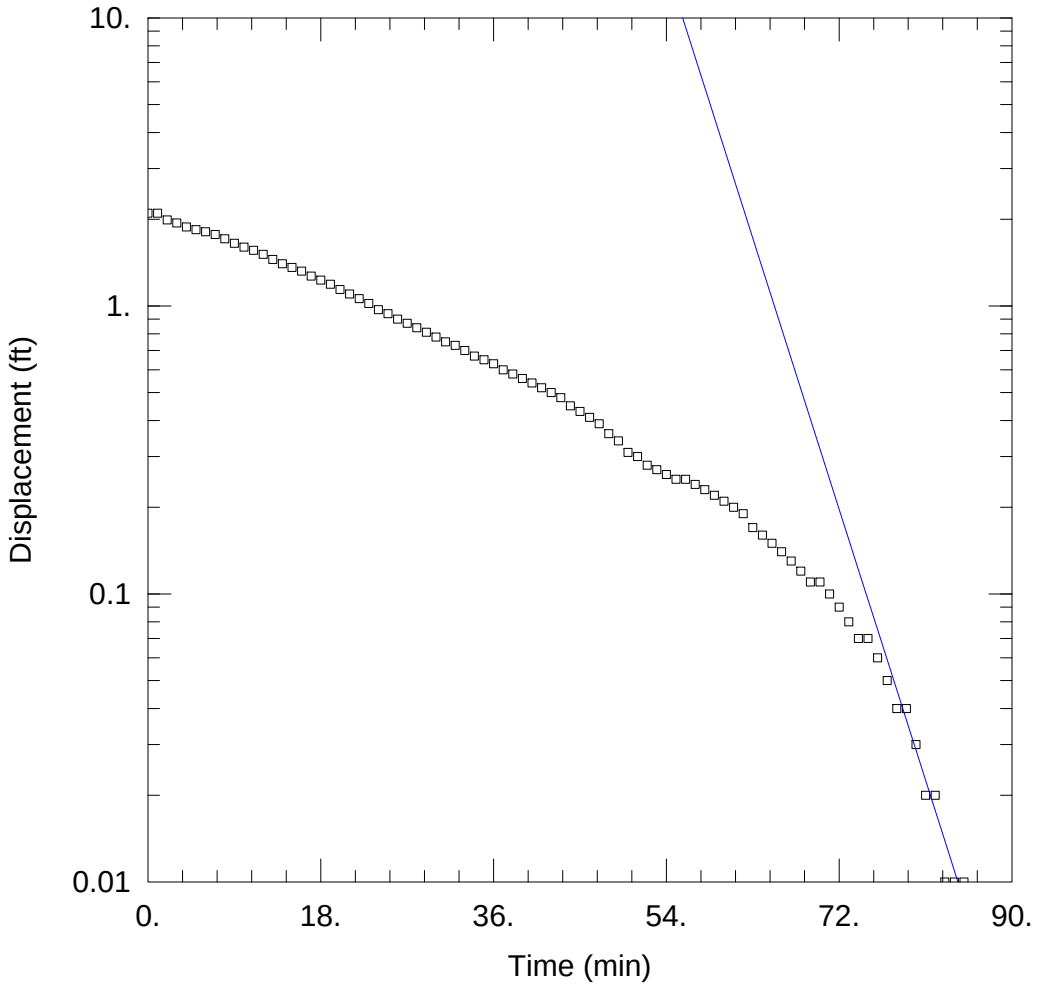
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-4/SB-2 Test 1
Test Date: 10/13/2014

AQUIFER DATA

Saturated Thickness: 12.49 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.3172 ft/day
y0 = 2.354E+6 ft



RMW-7/SB-4

PROJECT INFORMATION

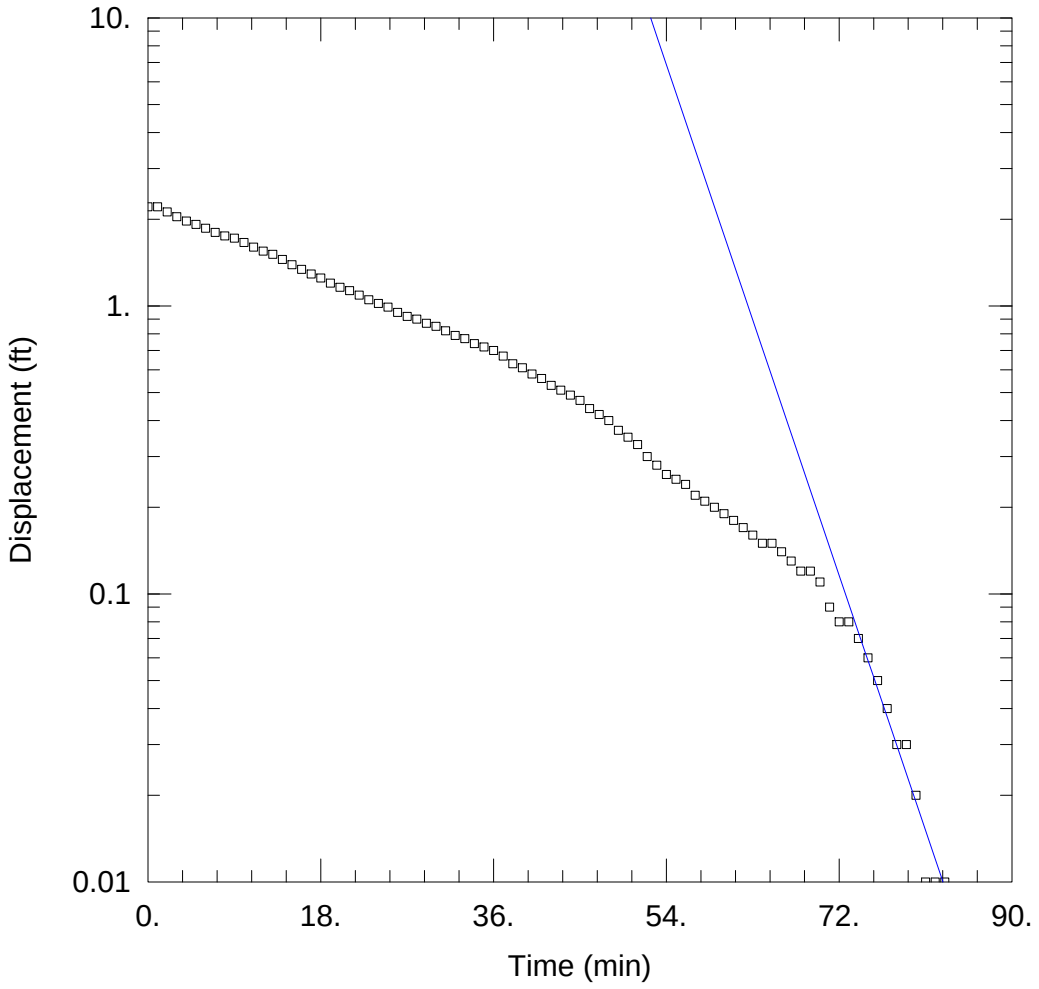
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-7/SB-4 Test 2
Test Date: 10/08/2014

AQUIFER DATA

Saturated Thickness: 18.77 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5144 ft/day
y0 = 6.769E+6 ft



RMW-7/SB-4

PROJECT INFORMATION

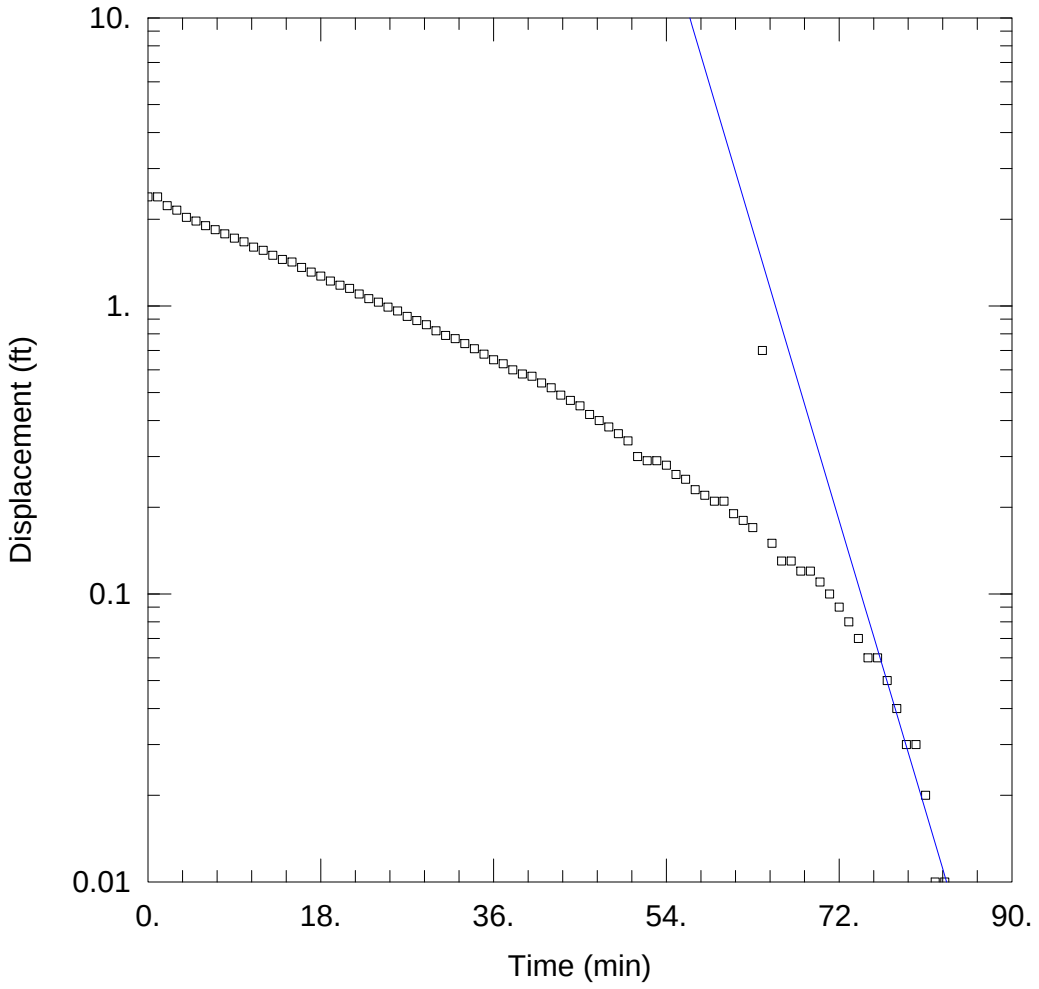
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-7/SB-4 Test 3
Test Date: 10/08/2014

AQUIFER DATA

Saturated Thickness: 18.77 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4843 ft/day
y0 = 1.448E+6 ft



RMW-7/SB-4

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-7/SB-4 Test 1
Test Date: 10/08/2014

AQUIFER DATA

Saturated Thickness: 18.77 ft

Anisotropy Ratio (Kz/Kr): 0.1

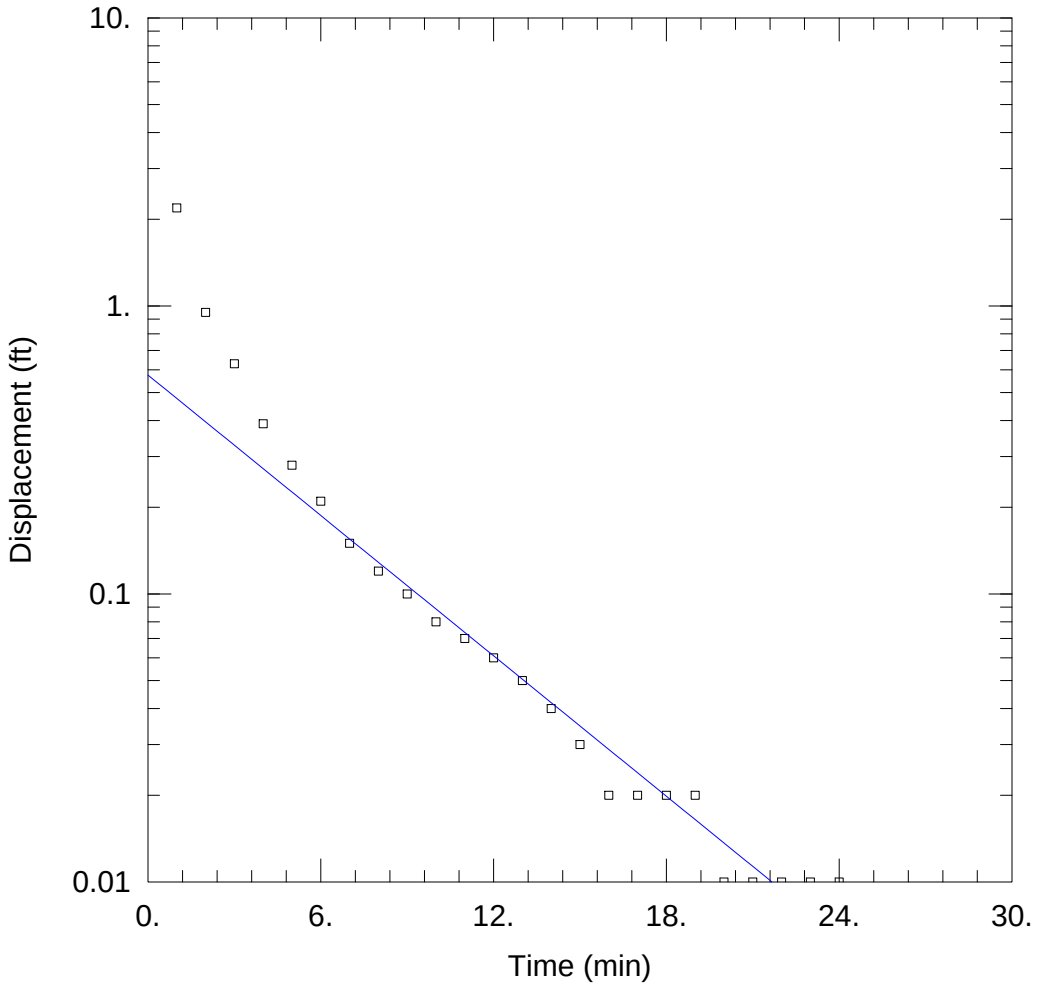
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.5513 ft/day

y0 = 2.151E+7 ft



RMW-8/SB-30

PROJECT INFORMATION

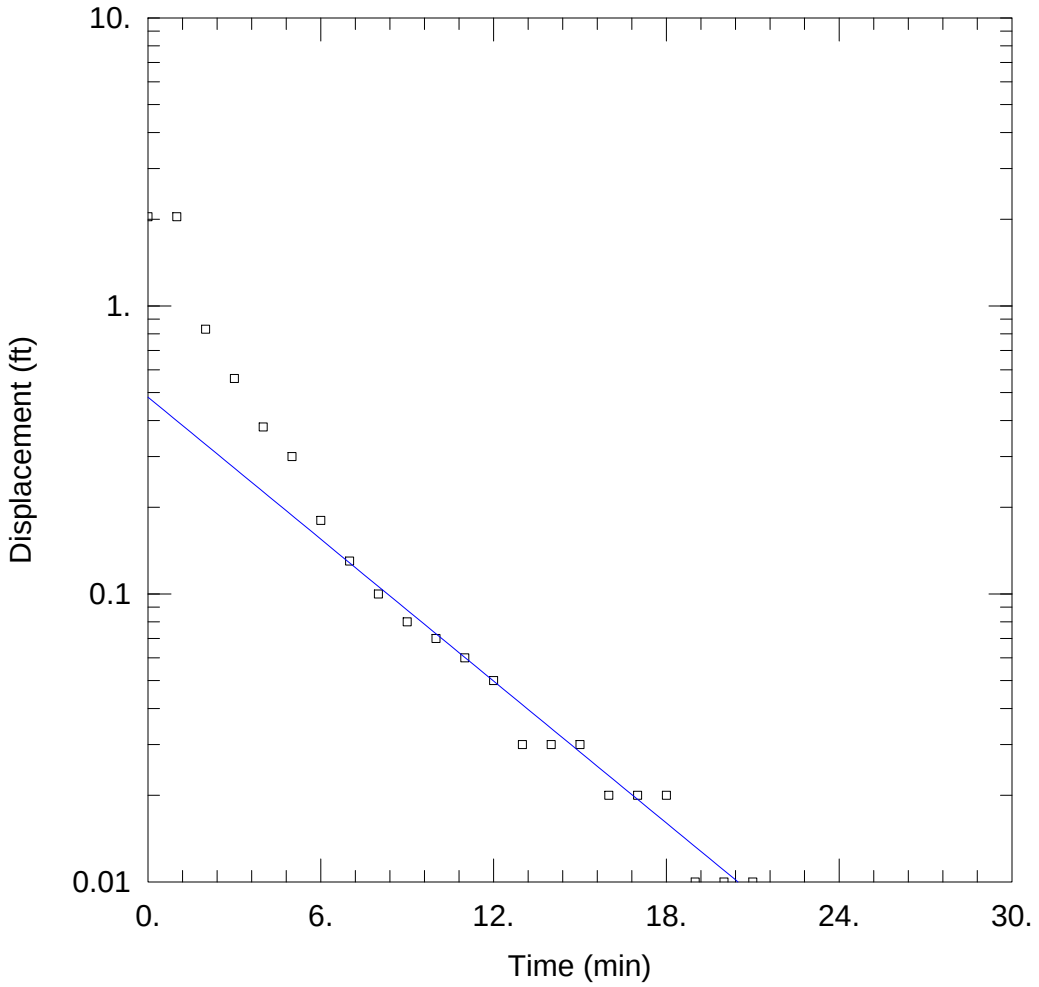
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-8/SB-30 Test 2
Test Date: 10/07/2014

AQUIFER DATA

Saturated Thickness: 15.31 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4748 ft/day
y0 = 0.5753 ft



RMW-8/SB-30

PROJECT INFORMATION

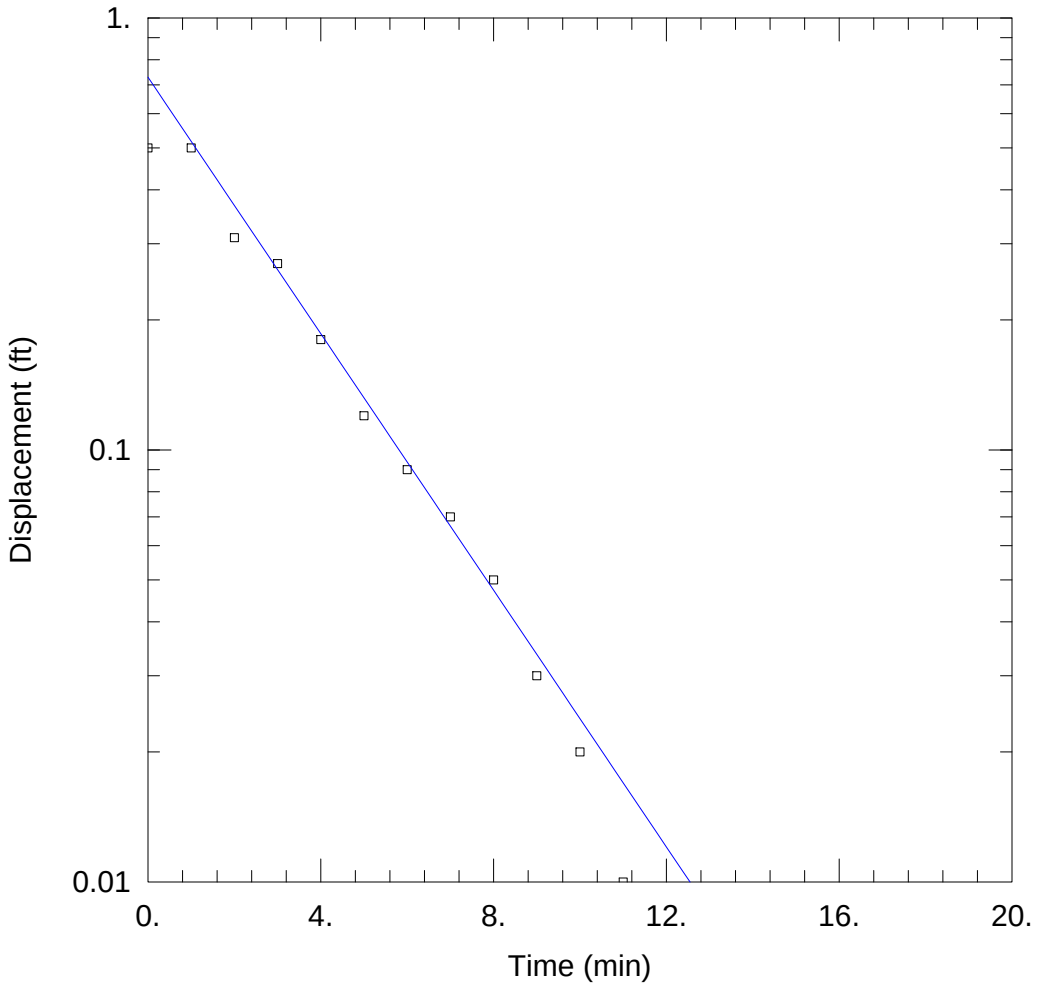
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-8/SB-30 Test 1
Test Date: 10/07/2014

AQUIFER DATA

Saturated Thickness: 15.31 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4801 ft/day
y0 = 0.4823 ft



RMW-13/SB-13

PROJECT INFORMATION

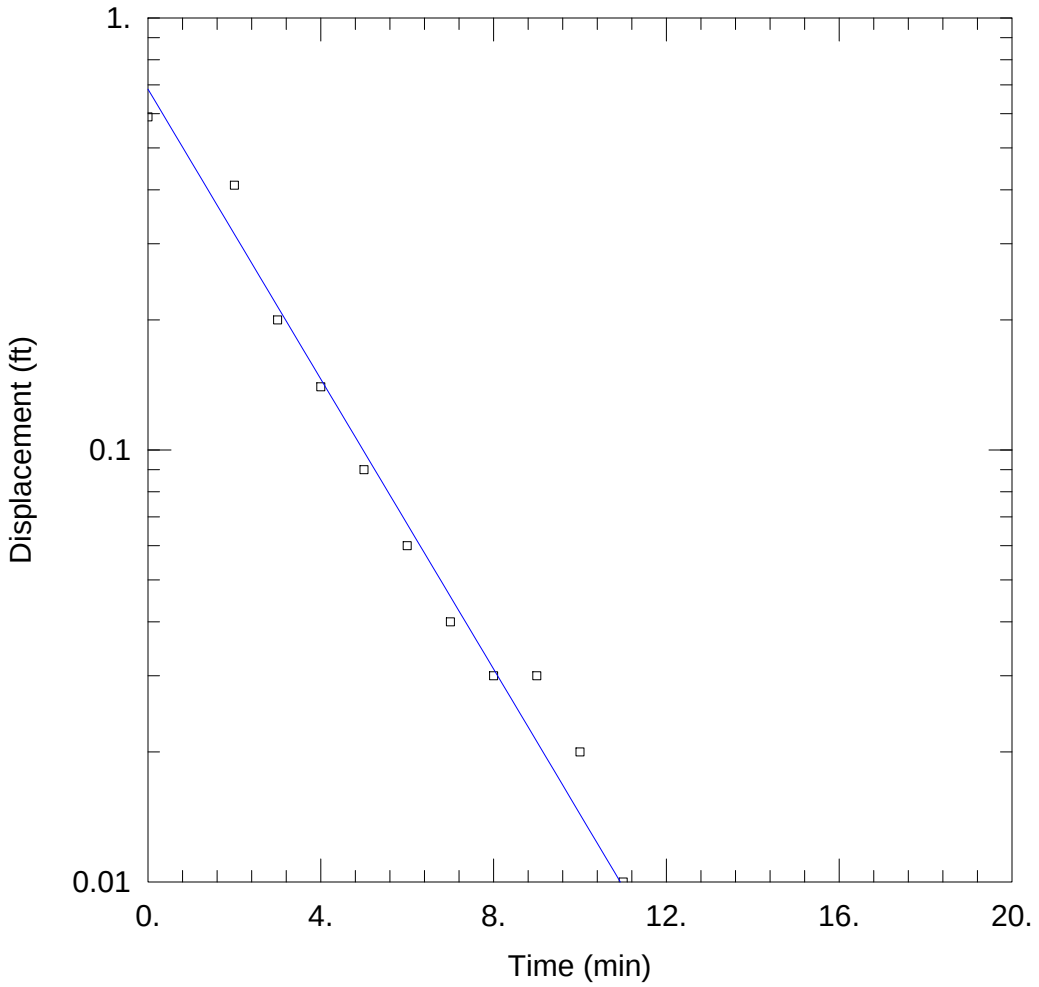
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-13/SB-13 Test 1
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 30.48 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7268 ft/day
y0 = 0.729 ft



RMW-13/SB-13

PROJECT INFORMATION

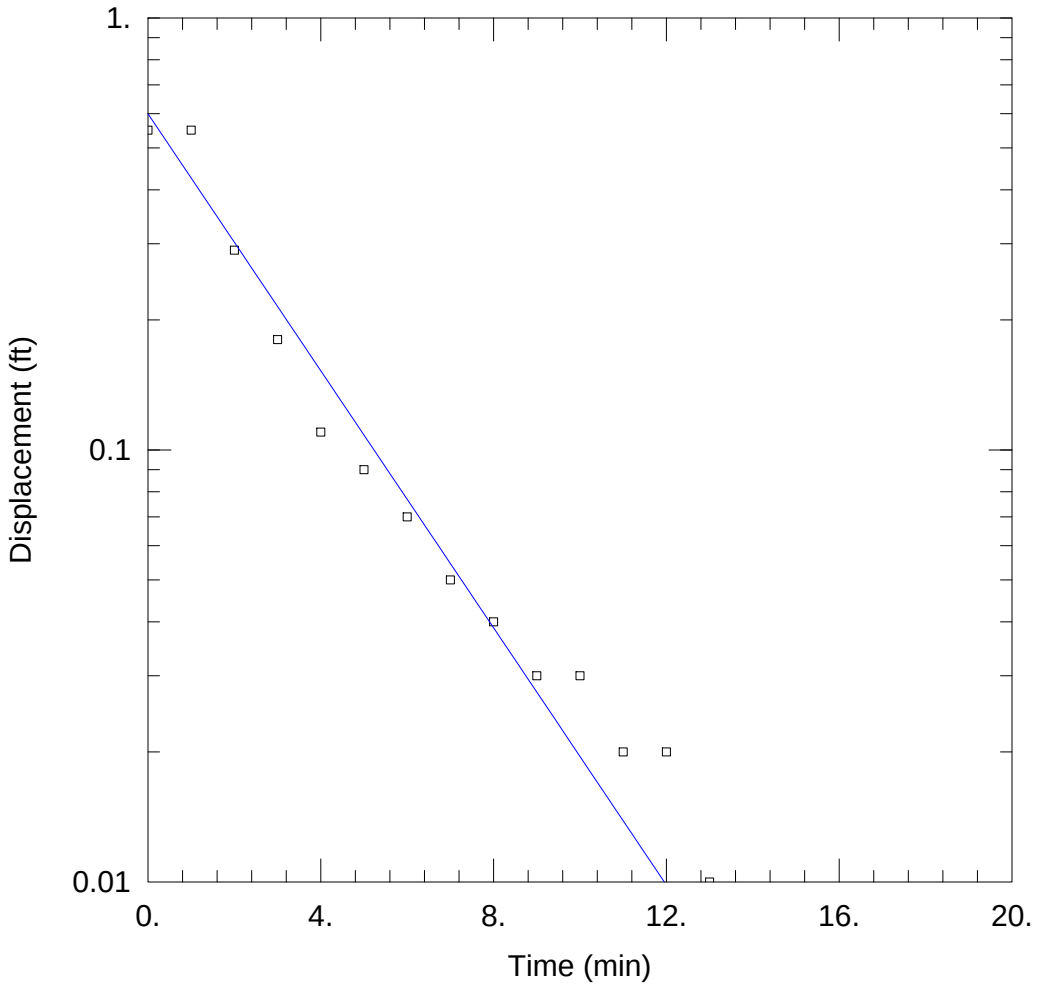
Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-13/SB-13 Test 2
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 30.58 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.8215 ft/day
y0 = 0.684 ft



RMW-13/SB-13

PROJECT INFORMATION

Company: Roux Associates
Client: Queens Plaza
Test Well: RMW-13/SB-13 Test 3
Test Date: 10/06/2014

AQUIFER DATA

Saturated Thickness: 30.58 ft
Anisotropy Ratio (Kz/Kr): 0.1

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7333 ft/day
y0 = 0.5998 ft

APPENDIX H

CAMP Data

Community Air Monitoring
Particulate Sampling Data
8/25/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
8:44:00 AM	0.097	N/A	0	**-0.097**
8:59:00 AM	0.04	N/A	0	**-0.040**
9:14:00 AM	0.04	N/A	0	**-0.040**
9:29:00 AM	0.08	9:28:46 AM	0.030	**-0.050**
9:44:00 AM	0.03	9:43:46 AM	0.028	**-0.002**
9:59:00 AM	0.018	9:58:46 AM	0.028	**0.010**
10:14:00 AM	0.02	10:13:46 AM	0.025	**0.005**
10:29:00 AM	0.02	10:28:46 AM	0.025	**0.005**
10:44:00 AM	0.026	10:43:46 AM	0.025	**-0.001**
10:59:00 AM	0.037	10:58:46 AM	0.025	**-0.012**
11:14:00 AM	0.027	11:13:46 AM	0.023	**-0.004**
11:29:00 AM	0.047	11:28:46 AM	0.023	**-0.024**
11:44:00 AM	0.036	11:43:46 AM	0.023	**-0.013**
11:59:00 AM	0.085	11:58:46 AM	0.024	**-0.061**
12:14:00 PM	0.05	12:29:49 PM	0.029	**-0.021**
12:36:40 PM	0.027	12:44:49 PM	0.038	**0.011**
12:51:40 PM	0.041	12:59:49 PM	0.045	**0.004**
1:06:40 PM	0.042	1:14:49 PM	0.036	**-0.006**
1:21:40 PM	0.039	1:29:49 PM	0.023	**-0.016**
1:36:40 PM	0.025	1:44:49 PM	0.027	**0.002**

Community Air Monitoring
Particulate Sampling Data
8/26/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
8:48:34 AM	0.097	8:41:17 AM	0.061	**-0.036**
9:03:34 AM	0.099	8:56:17 AM	0.068	**-0.031**
9:18:34 AM	0.102	9:11:17 AM	0.052	**-0.050**
9:33:34 AM	0.09	9:26:17 AM	0.044	**-0.046**
9:48:34 AM	0.076	9:41:17 AM	0.039	**-0.037**
10:03:34 AM	0.083	9:56:17 AM	0.036	**-0.047**
10:18:34 AM	0.071	10:11:17 AM	0.03	**-0.041**
10:33:34 AM	0.067	10:26:17 AM	0.037	**-0.030**
10:48:34 AM	0.061	10:41:17 AM	0.029	**-0.032**
11:03:34 AM	0.067	10:56:17 AM	0.042	**-0.025**
11:18:34 AM	0.095	11:11:17 AM	0.032	**-0.063**
11:33:34 AM	0.064	11:26:17 AM	0.029	**-0.035**
11:48:34 AM	0.093	11:41:17 AM	0.028	**-0.065**
12:03:34 PM	0.055	11:56:17 AM	0.036	**-0.019**
12:18:34 PM	0.058	12:11:17 PM	0.044	**-0.014**
12:33:34 PM	0.056	12:26:17 PM	0.029	**-0.027**
12:48:34 PM	0.048	12:41:17 PM	0.022	**-0.026**
1:03:34 PM	0.067	12:56:17 PM	0.024	**-0.043**
1:18:34 PM	0.068	1:11:17 PM	0.034	**-0.034**
1:33:34 PM	0.057	1:26:17 PM	0.031	**-0.026**
1:48:34 PM	0.06	1:41:17 PM	0.029	**-0.031**
2:03:34 PM	0.056	1:56:17 PM	0.029	**-0.027**

Community Air Monitoring
Particulate Sampling Data
9/8/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
8:27:33 AM	0.022	8:27:53 AM	0.011	**-0.011**
8:42:33 AM	0.014	8:42:53 AM	0.008	**-0.006**
8:57:33 AM	0.014	8:57:53 AM	0.009	**-0.005**
9:12:33 AM	0.016	9:12:53 AM	0.01	**-0.006**
9:27:33 AM	0.017	9:27:53 AM	0.009	**-0.008**
9:42:33 AM	0.011	9:42:53 AM	0.008	**-0.003**
9:57:33 AM	0.01	9:57:53 AM	0.008	**-0.002**
10:12:33 AM	0.013	10:12:53 AM	0.014	**0.001**
10:27:33 AM	0.014	10:27:53 AM	0.01	**-0.004**
10:42:33 AM	0.013	10:42:53 AM	0.008	**-0.005**
10:57:33 AM	0.014	10:57:53 AM	0.014	**0.000**
11:12:33 AM	0.014	11:12:53 AM	0.014	**0.000**
11:27:33 AM	0.014	11:27:53 AM	0.015	**0.001**
11:42:33 AM	0.011	11:42:53 AM	0.011	**0.000**
11:57:33 AM	0.009	11:57:53 AM	0.008	**-0.001**
12:12:33 PM	0.006	12:12:53 PM	0.009	**0.003**
12:27:33 PM	0.011	12:27:53 PM	0.012	**0.001**
12:42:33 PM	0.008	12:42:53 PM	0.009	**0.001**
12:57:33 PM	0.009	12:57:53 PM	0.009	**0.000**
1:12:33 PM	0.014	1:12:53 PM	0.01	**-0.004**
1:27:33 PM	0.02	1:27:53 PM	0.011	**-0.009**
1:42:33 PM	0.02	1:42:53 PM	0.01	**-0.010**
1:57:33 PM	0.02	1:57:53 PM	0.01	**-0.010**
2:12:33 PM	0.019	2:12:53 PM	0.008	**-0.011**
2:27:33 PM	0.013	2:27:53 PM	0.007	**-0.006**
2:42:33 PM	0.011	2:42:53 PM	0.006	**-0.005**

Community Air Monitoring
Particulate Sampling Data
9/9/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
N/A	0	8:29:42 AM	0.013	**0.013**
N/A	0	8:44:42 AM	0.012	**0.012**
N/A	0	8:59:42 AM	0.011	**0.011**
N/A	0	9:14:42 AM	0.012	**0.012**
9:32:14 AM	0.004	9:29:42 AM	0.014	**0.010**
9:47:14 AM	0.002	9:44:42 AM	0.016	**0.014**
10:02:14 AM	0.001	9:59:42 AM	0.016	**0.015**
10:17:14 AM	0.001	10:14:42 AM	0.013	**0.012**
10:32:14 AM	0	10:29:42 AM	0.013	**0.013**
10:47:14 AM	0.006	10:44:42 AM	0.014	**0.008**
11:02:14 AM	0	10:59:42 AM	0.018	**0.018**
11:17:14 AM	0.001	11:14:42 AM	0.015	**0.014**
11:32:14 AM	0.001	11:29:42 AM	0.019	**0.018**
11:47:14 AM	0	11:44:42 AM	0.016	**0.016**
12:02:14 PM	0	11:59:42 AM	0.013	**0.013**
12:17:14 PM	0.001	12:14:42 PM	0.012	**0.011**
12:32:14 PM	0	12:29:42 PM	0.012	**0.012**
12:47:14 PM	0.001	12:44:42 PM	0.012	**0.011**
1:02:14 PM	0	12:59:42 PM	0.013	**0.013**
1:17:14 PM	0	1:14:42 PM	0.016	**0.016**
1:32:14 PM	0	1:29:42 PM	0.016	**0.016**
1:47:14 PM	0	1:44:42 PM	0.015	**0.015**
N/A	0	1:59:42 PM	0.018	**0.018**
N/A	0	2:14:42 PM	0.014	**0.014**
N/A	0	2:29:42 PM	0.01	**0.010**

Community Air Monitoring
Particulate Sampling Data
9/10/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
7:42:04 AM	0.001	7:32:01 AM	0.013	**0.012**
7:57:04 AM	0.011	7:47:01 AM	0.012	**0.001**
8:12:04 AM	0.001	8:02:01 AM	0.011	**0.010**
8:27:04 AM	0.002	8:17:01 AM	0.011	**0.009**
8:42:04 AM	0.012	8:32:01 AM	0.011	**-0.001**
8:57:04 AM	0.012	8:47:01 AM	0.014	**0.002**
9:12:04 AM	0.014	9:02:01 AM	0.013	**-0.001**
9:27:04 AM	0.011	9:17:01 AM	0.011	**0.000**
9:42:04 AM	0.002	9:32:01 AM	0.011	**0.009**
9:57:04 AM	0	9:47:01 AM	0.011	**0.011**
10:12:04 AM	0.006	10:02:01 AM	0.009	**0.003**
10:27:04 AM	0	10:17:01 AM	0.006	**0.006**
10:42:04 AM	0.001	10:32:01 AM	0.004	**0.003**
10:57:04 AM	0	10:47:01 AM	0.006	**0.006**
11:12:04 AM	0	11:02:01 AM	0.005	**0.005**
11:27:04 AM	0	11:17:01 AM	0.005	**0.005**
11:42:04 AM	0	11:32:01 AM	0.005	**0.005**
11:57:04 AM	0	11:47:01 AM	0.003	**0.003**
12:12:04 PM	0	12:02:01 PM	0.002	**0.002**
12:27:04 PM	0	12:17:01 PM	0.002	**0.002**

Community Air Monitoring
Particulate Sampling Data
9/11/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
7:57:00 AM	0.025	N/A	0	**-0.025**
8:12:00 AM	0.017	8:11:28 AM	0.021	**0.004**
8:27:00 AM	0.015	8:26:28 AM	0.019	**0.004**
8:42:00 AM	0.009	8:41:28 AM	0.018	**0.009**
8:57:00 AM	0.009	8:56:28 AM	0.015	**0.006**
9:12:00 AM	0.008	9:11:28 AM	0.016	**0.008**
9:27:00 AM	0.005	9:26:28 AM	0.013	**0.008**
9:42:00 AM	0.003	9:41:28 AM	0.012	**0.009**
9:57:00 AM	0.002	9:56:28 AM	0.013	**0.011**
10:12:00 AM	0.003	10:11:28 AM	0.012	**0.009**
10:27:00 AM	0.006	10:26:28 AM	0.014	**0.008**
10:42:00 AM	0.006	10:41:28 AM	0.017	**0.011**
10:57:00 AM	0.008	10:56:28 AM	0.016	**0.008**
11:12:00 AM	0.018	11:11:28 AM	0.019	**0.001**
11:27:00 AM	0.005	11:26:28 AM	0.017	**0.012**
11:42:00 AM	0.01	11:41:28 AM	0.019	**0.009**
11:57:00 AM	0.006	11:56:28 AM	0.018	**0.012**
12:12:00 PM	0.018	12:11:28 PM	0.018	**0.000**
12:27:00 PM	0.002	12:26:28 PM	0.017	**0.015**
12:42:00 PM	0.003	12:41:28 PM	0.017	**0.014**
12:57:00 PM	0.001	12:56:28 PM	0.012	**0.011**
1:12:00 PM	0.002	1:11:28 PM	0.015	**0.013**
1:27:00 PM	0.006	1:26:28 PM	0.016	**0.010**
1:42:00 PM	0.009	1:41:28 PM	0.021	**0.012**
1:57:00 PM	0.015	1:56:28 PM	0.021	**0.006**
2:12:00 PM	0.015	2:11:28 PM	0.022	**0.007**
2:27:00 PM	0.011	2:26:28 PM	0.024	**0.013**
2:42:00 PM	0.009	2:41:28 PM	0.021	**0.012**
2:57:00 PM	0.01	2:56:28 PM	0.022	**0.012**
3:12:00 PM	0.007	3:11:28 PM	0.022	**0.015**

Community Air Monitoring
Particulate Sampling Data
9/12/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (mg/m^3)	Time	15-min Avg. (mg/m^3)	
7:47:05 AM	0.047	7:41:12 AM	0.011	**-0.036**
8:02:05 AM	0.025	7:56:12 AM	0.014	**-0.011**
8:17:05 AM	0.029	8:11:12 AM	0.016	**-0.013**
8:32:05 AM	0.028	8:26:12 AM	0.014	**-0.014**
8:47:05 AM	0.027	8:41:12 AM	0.011	**-0.016**
N/A	0	8:56:12 AM	0.01	**0.010**
9:07:21 AM	0.021	9:11:12 AM	0.012	**-0.009**
9:22:21 AM	0.03	9:26:12 AM	0.012	**-0.018**
9:37:21 AM	0.02	9:41:12 AM	0.013	**-0.007**
9:52:21 AM	0.034	9:56:12 AM	0.014	**-0.020**
10:07:21 AM	0.019	10:11:12 AM	0.02	**0.001**
10:22:21 AM	0.018	10:26:12 AM	0.019	**0.001**
10:37:21 AM	0.018	10:41:12 AM	0.011	**-0.007**
10:52:21 AM	0.017	10:56:12 AM	0.006	**-0.011**
11:07:21 AM	0.014	11:11:12 AM	0.031	**0.017**
11:22:21 AM	0.009	11:26:12 AM	0.034	**0.025**
11:37:21 AM	0.01	11:41:12 AM	0.032	**0.022**
11:52:21 AM	0.005	11:56:12 AM	0.031	**0.026**
12:07:21 PM	0.002	12:11:12 PM	0.03	**0.028**
12:22:21 PM	0.001	12:26:12 PM	0.03	**0.029**
12:37:21 PM	0	12:41:12 PM	0.03	**0.030**
12:52:21 PM	0.002	12:56:12 PM	0.031	**0.029**
1:07:21 PM	0	1:11:12 PM	0.031	**0.031**
1:22:21 PM	0.001	1:26:12 PM	0.032	**0.031**
1:37:21 PM	0.001	1:41:12 PM	0.038	**0.037**
1:52:21 PM	0	1:56:12 PM	0.032	**0.032**
2:07:21 PM	0	2:11:12 PM	0.031	**0.031**
2:22:21 PM	0	2:26:12 PM	0.03	**0.030**
N/A	0	2:41:12 PM	0.031	**0.031**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/17/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:41:49 AM	0.098	8:48:07 AM	0	**-0.10**
8:56:49 AM	0.136	9:03:07 AM	0	**-0.14**
9:11:49 AM	0.151	9:18:07 AM	0	**-0.15**
9:26:49 AM	0.563	9:33:07 AM	0	**-0.56**
9:41:49 AM	0.109	9:48:07 AM	0	**-0.11**
9:56:49 AM	0.04	10:03:07 AM	0	**-0.04**
10:11:49 AM	0.016	10:18:07 AM	0	**-0.02**
10:26:49 AM	0.079	10:33:07 AM	0	**-0.08**
10:41:49 AM	0.386	10:48:07 AM	0	**-0.39**
10:56:49 AM	0.627	11:03:07 AM	0	**-0.63**
11:11:49 AM	0.635	11:18:07 AM	0	**-0.64**
11:26:49 AM	0.33	11:33:07 AM	0	**-0.33**
11:41:49 AM	1.795	11:48:07 AM	0	**-1.80**
11:56:49 AM	8.236	12:03:07 PM	0	**-8.24**
12:11:49 PM	0.158	12:18:07 PM	0	**-0.16**
12:26:49 PM	0.001	12:33:07 PM	0	**0.00**
12:41:49 PM	0.016	12:48:07 PM	0	**-0.02**
12:56:49 PM	0	1:03:07 PM	0	**0.00**
1:11:49 PM	2.429	1:18:07 PM	0	**-2.43**
1:26:49 PM	12.626	1:33:07 PM	0	**-12.63**
1:41:49 PM	0.086	1:48:07 PM	0	**-0.09**
1:56:49 PM	0.179	2:03:07 PM	0	**-0.18**
2:11:49 PM	0.005	2:18:07 PM	0	**-0.01**
2:26:49 PM	0	2:33:07 PM	0	**0.00**
2:41:49 PM	0.022	2:48:07 PM	0	**-0.02**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/18/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:48:42 AM	0	8:53:34 AM	0	**0.00**
9:03:42 AM	0	9:08:34 AM	0	**0.00**
9:18:42 AM	0	9:23:34 AM	0	**0.00**
9:33:42 AM	0	9:38:34 AM	0	**0.00**
9:48:42 AM	0	9:53:34 AM	0	**0.00**
10:03:42 AM	0	10:08:34 AM	0	**0.00**
10:18:42 AM	0	10:23:34 AM	0	**0.00**
10:33:42 AM	0	10:38:34 AM	0	**0.00**
10:48:42 AM	0	10:53:34 AM	0	**0.00**
11:03:42 AM	0	11:08:34 AM	0	**0.00**
11:18:42 AM	0	11:23:34 AM	0	**0.00**
11:33:42 AM	0	11:38:34 AM	0	**0.00**
11:48:42 AM	0	11:53:34 AM	0	**0.00**
12:03:42 PM	0	12:08:34 PM	0	**0.00**
12:18:42 PM	0	12:23:34 PM	0	**0.00**
12:33:42 PM	0	12:38:34 PM	0	**0.00**
12:48:42 PM	0	12:53:34 PM	0	**0.00**
1:03:42 PM	0	1:08:34 PM	0	**0.00**
1:18:42 PM	0	1:23:34 PM	0	**0.00**
1:33:42 PM	0	1:38:34 PM	0	**0.00**
1:48:42 PM	0	1:53:34 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/19/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:08:39 AM	0	8:12:21 AM	0	**0.00**
8:23:39 AM	0	8:27:21 AM	0	**0.00**
8:38:39 AM	0	8:42:21 AM	0	**0.00**
8:53:39 AM	0	8:57:21 AM	0	**0.00**
9:08:39 AM	0	9:12:21 AM	0	**0.00**
9:23:39 AM	0	9:27:21 AM	0	**0.00**
9:38:39 AM	0	9:42:21 AM	0	**0.00**
9:53:39 AM	0	9:57:21 AM	0	**0.00**
10:08:39 AM	0	10:12:21 AM	0	**0.00**
10:23:39 AM	0	10:27:21 AM	0	**0.00**
10:38:39 AM	0	10:42:21 AM	0	**0.00**
10:53:39 AM	0	10:57:21 AM	0	**0.00**
11:08:39 AM	0	11:12:21 AM	0	**0.00**
11:23:39 AM	0	11:27:21 AM	0	**0.00**
11:38:39 AM	0	11:42:21 AM	0	**0.00**
11:53:39 AM	0	11:57:21 AM	0	**0.00**
12:08:39 PM	0	12:12:21 PM	0	**0.00**
12:23:39 PM	0	12:27:21 PM	0	**0.00**
12:38:39 PM	0	12:42:21 PM	0	**0.00**
12:53:39 PM	0	12:57:21 PM	0	**0.00**
1:08:39 PM	0	1:12:21 PM	0	**0.00**
1:23:39 PM	0	1:27:21 PM	0	**0.00**
1:38:39 PM	0	1:42:21 PM	0	**0.00**
1:53:39 PM	0	1:57:21 PM	0	**0.00**
2:08:39 PM	0	2:12:21 PM	0	**0.00**
2:23:39 PM	0	2:27:21 PM	0	**0.00**
2:38:39 PM	0	2:42:21 PM	0	**0.00**
2:53:39 PM	0	2:57:21 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/22/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:15:51 AM	0	8:17:49 AM	0.06	**0.06**
8:30:51 AM	0	8:32:49 AM	0.113	**0.11**
8:45:51 AM	0	8:47:49 AM	0.139	**0.14**
9:00:51 AM	0	9:02:49 AM	0.158	**0.16**
9:15:51 AM	0	9:17:49 AM	0.145	**0.15**
9:30:51 AM	0	9:32:49 AM	0.14	**0.14**
9:45:51 AM	0	9:47:49 AM	0.125	**0.13**
10:00:51 AM	0	10:02:49 AM	0.104	**0.10**
10:15:51 AM	0	10:17:49 AM	0.079	**0.08**
10:30:51 AM	0	10:32:49 AM	0.053	**0.05**
10:45:51 AM	0	10:47:49 AM	0.026	**0.03**
11:00:51 AM	0	11:02:49 AM	0.007	**0.01**
11:15:51 AM	0	11:17:49 AM	0.001	**0.00**
11:30:51 AM	0	11:32:49 AM	0	**0.00**
11:45:51 AM	0	11:47:49 AM	0	**0.00**
12:00:51 PM	0	12:02:49 PM	0	**0.00**
12:15:51 PM	0	12:17:49 PM	0	**0.00**
12:30:51 PM	0	12:32:49 PM	0	**0.00**
12:45:51 PM	0	12:47:49 PM	0	**0.00**
1:00:51 PM	0	1:02:49 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/23/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:24:32 AM	0	8:20:42 AM	0	**0.00**
8:39:32 AM	0	8:35:42 AM	0	**0.00**
8:54:32 AM	0	8:50:42 AM	0	**0.00**
9:09:32 AM	0	9:05:42 AM	0.001	**0.00**
9:24:32 AM	0	9:20:42 AM	0	**0.00**
9:39:32 AM	0	9:35:42 AM	0	**0.00**
9:54:32 AM	0	9:50:42 AM	0	**0.00**
10:09:32 AM	0	10:05:42 AM	0	**0.00**
10:24:32 AM	0	10:20:42 AM	0	**0.00**
10:39:32 AM	0	10:35:42 AM	0	**0.00**
10:54:32 AM	0	10:50:42 AM	0	**0.00**
11:09:32 AM	0	11:05:42 AM	0	**0.00**
11:24:32 AM	0	11:20:42 AM	0	**0.00**
11:39:32 AM	0	11:35:42 AM	0	**0.00**
11:54:32 AM	0	11:50:42 AM	0	**0.00**
12:09:32 PM	0	12:05:42 PM	0	**0.00**
12:24:32 PM	0	12:20:42 PM	0	**0.00**
12:39:32 PM	0	12:35:42 PM	0	**0.00**
12:54:32 PM	0	12:50:42 PM	0	**0.00**
1:09:32 PM	0	1:05:42 PM	0	**0.00**
1:24:32 PM	0	1:20:42 PM	0	**0.00**
1:39:32 PM	0	1:35:42 PM	0	**0.00**
1:54:32 PM	0	1:50:42 PM	0	**0.00**
2:09:32 PM	0	2:05:42 PM	0	**0.00**
2:24:32 PM	0	2:20:42 PM	0	**0.00**
2:39:32 PM	0	2:35:42 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/24/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:01:34 AM	0	8:03:47 AM	0.017	**0.02**
8:16:34 AM	0	8:18:47 AM	0.064	**0.06**
8:31:34 AM	0	8:33:47 AM	0	**0.00**
8:46:34 AM	0	8:48:47 AM	0	**0.00**
9:01:34 AM	0	9:03:47 AM	0	**0.00**
9:16:34 AM	0	9:18:47 AM	0	**0.00**
9:31:34 AM	0	9:33:47 AM	0	**0.00**
9:46:34 AM	0	9:48:47 AM	0	**0.00**
10:01:34 AM	0	10:03:47 AM	0	**0.00**
10:16:34 AM	0	10:18:47 AM	0	**0.00**
10:31:34 AM	0	10:33:47 AM	0	**0.00**
10:46:34 AM	0	10:48:47 AM	0	**0.00**
11:01:34 AM	0	11:03:47 AM	0	**0.00**
11:16:34 AM	0	11:18:47 AM	0	**0.00**
11:31:34 AM	0	11:33:47 AM	0	**0.00**
11:46:34 AM	0	11:48:47 AM	0	**0.00**
12:01:34 PM	0	12:03:47 PM	0	**0.00**
12:16:34 PM	0	12:18:47 PM	0	**0.00**
12:31:34 PM	0	12:33:47 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/26/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:54:10 AM	0	8:52:05 AM	0	**0.00**
9:09:10 AM	0	9:07:05 AM	0	**0.00**
9:24:10 AM	0	9:22:05 AM	0	**0.00**
9:39:10 AM	0	9:37:05 AM	0	**0.00**
9:54:10 AM	0	9:52:05 AM	0	**0.00**
10:09:10 AM	0	10:07:05 AM	0	**0.00**
10:24:10 AM	0	10:22:05 AM	0	**0.00**
10:39:10 AM	0	10:37:05 AM	0	**0.00**
10:54:10 AM	0	10:52:05 AM	0	**0.00**
11:09:10 AM	0	11:07:05 AM	0	**0.00**
11:24:10 AM	0	11:22:05 AM	0	**0.00**
11:39:10 AM	0	11:37:05 AM	0	**0.00**
11:54:10 AM	0	11:52:05 AM	0	**0.00**
12:09:10 PM	0	12:07:05 PM	0	**0.00**
12:24:10 PM	0	12:22:05 PM	0	**0.00**
12:39:10 PM	0	12:37:05 PM	0	**0.00**
12:54:10 PM	0	12:52:05 PM	0.012	**0.01**
1:09:10 PM	0	1:07:05 PM	0	**0.00**
1:24:10 PM	0	1:22:05 PM	0	**0.00**
1:39:10 PM	0	1:37:05 PM	0.2	**0.20**
1:54:10 PM	0	1:52:05 PM	0	**0.00**
2:09:10 PM	0	2:07:05 PM	0	**0.00**
2:24:10 PM	0	2:22:05 PM	0	**0.00**
2:39:10 PM	0	2:37:05 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/27/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
10:40:02 AM	0	10:42:17 AM	0	**0.00**
10:55:02 AM	0	10:57:17 AM	0	**0.00**
11:10:02 AM	0	11:12:17 AM	0	**0.00**
11:25:02 AM	0	11:27:17 AM	0	**0.00**
11:40:02 AM	0	11:42:17 AM	0	**0.00**
11:55:02 AM	0	11:57:17 AM	0	**0.00**
12:10:02 PM	0	12:12:17 PM	0	**0.00**
12:25:02 PM	0	12:27:17 PM	0	**0.00**
12:40:02 PM	0	12:42:17 PM	0	**0.00**
12:55:02 PM	0	12:57:17 PM	0	**0.00**
1:10:02 PM	0	1:12:17 PM	0	**0.00**
1:25:02 PM	0	1:27:17 PM	0	**0.00**
1:40:02 PM	0	1:42:17 PM	0	**0.00**
1:55:02 PM	0	1:57:17 PM	0	**0.00**
2:10:02 PM	0	2:12:17 PM	0	**0.00**
2:25:02 PM	0	2:27:17 PM	0	**0.00**
2:40:02 PM	0	2:42:17 PM	0	**0.00**
2:55:02 PM	0	2:57:17 PM	0	**0.00**
3:10:02 PM	0	3:12:17 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/29/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:25:37 AM	0	8:28:41 AM	0	**0.00**
8:40:37 AM	0	8:43:41 AM	0	**0.00**
8:55:37 AM	0	8:58:41 AM	0	**0.00**
9:10:37 AM	0	9:13:41 AM	0	**0.00**
9:25:37 AM	0	9:28:41 AM	0	**0.00**
9:40:37 AM	0	9:43:41 AM	0	**0.00**
9:55:37 AM	0	9:58:41 AM	0	**0.00**
10:10:37 AM	0	10:13:41 AM	0	**0.00**
10:25:37 AM	0	10:28:41 AM	0	**0.00**
10:40:37 AM	0	10:43:41 AM	0	**0.00**
10:55:37 AM	0	10:58:41 AM	0	**0.00**
11:10:37 AM	0	11:13:41 AM	0	**0.00**
11:25:37 AM	0	11:28:41 AM	0	**0.00**
11:40:37 AM	0	11:43:41 AM	0	**0.00**
11:55:37 AM	0	11:58:41 AM	0	**0.00**
12:10:37 PM	0	12:13:41 PM	0	**0.00**
12:25:37 PM	0	12:28:41 PM	0	**0.00**
12:40:37 PM	0	12:43:41 PM	0	**0.00**
12:55:37 PM	0	12:58:41 PM	0	**0.00**
1:10:37 PM	0	1:13:41 PM	0	**0.00**
1:25:37 PM	0	1:28:41 PM	0	**0.00**
1:40:37 PM	0	1:43:41 PM	0	**0.00**
1:55:37 PM	0	1:58:41 PM	0	**0.00**
2:10:37 PM	0	2:13:41 PM	0	**0.00**
2:25:37 PM	0	2:28:41 PM	0	**0.00**
2:40:37 PM	0	2:43:41 PM	0	**0.00**
2:55:37 PM	0	2:58:41 PM	0	**0.00**
3:10:37 PM	0	3:13:41 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
9/30/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
9:04:13 AM	0	9:01:07 AM	0	**0.00**
9:19:13 AM	0	9:16:07 AM	0	**0.00**
9:34:13 AM	0	9:31:07 AM	0	**0.00**
9:49:13 AM	0	9:46:07 AM	0	**0.00**
10:04:13 AM	0	10:01:07 AM	0	**0.00**
10:19:13 AM	0	10:16:07 AM	0	**0.00**
10:34:13 AM	0	10:31:07 AM	0	**0.00**
10:49:13 AM	0	10:46:07 AM	0	**0.00**
11:04:13 AM	0	11:01:07 AM	0	**0.00**
11:19:13 AM	0	11:16:07 AM	0	**0.00**
11:34:13 AM	0	11:31:07 AM	0	**0.00**
11:49:13 AM	0	11:46:07 AM	0	**0.00**
12:04:13 PM	0	12:01:07 PM	0	**0.00**
12:19:13 PM	0	12:16:07 PM	0	**0.00**
12:34:13 PM	0	12:31:07 PM	0	**0.00**
12:49:13 PM	0	12:46:07 PM	0	**0.00**
1:04:13 PM	0	1:01:07 PM	0	**0.00**
1:19:13 PM	0	1:16:07 PM	0	**0.00**
1:34:13 PM	0	1:31:07 PM	0	**0.00**
1:49:13 PM	0	1:46:07 PM	0	**0.00**
2:04:13 PM	0	2:01:07 PM	0	**0.00**
2:19:13 PM	0	2:16:07 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
10/2/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:18:27 AM	0	8:20:16 AM	0	**0.00**
8:33:27 AM	0	8:35:16 AM	0.122	**0.12**
8:48:27 AM	0	8:50:16 AM	0	**0.00**
9:03:27 AM	0	9:05:16 AM	0	**0.00**
9:18:27 AM	0	9:20:16 AM	0	**0.00**
9:33:27 AM	0	9:35:16 AM	0	**0.00**
9:48:27 AM	0	9:50:16 AM	0	**0.00**
10:03:27 AM	0	10:05:16 AM	0	**0.00**
10:18:27 AM	0	10:20:16 AM	0	**0.00**
10:33:27 AM	0	10:35:16 AM	0.001	**0.00**
10:48:27 AM	0	10:50:16 AM	0	**0.00**
11:03:27 AM	0	11:05:16 AM	0	**0.00**
11:18:27 AM	0	11:20:16 AM	0	**0.00**
11:33:27 AM	0	11:35:16 AM	0	**0.00**
11:48:27 AM	0	11:50:16 AM	0	**0.00**
12:03:27 PM	0	12:05:16 PM	0	**0.00**
12:18:27 PM	0	12:20:16 PM	0	**0.00**
12:33:27 PM	0	12:35:16 PM	0	**0.00**
12:48:27 PM	0	12:50:16 PM	0	**0.00**
1:03:27 PM	0	1:05:16 PM	0	**0.00**
1:18:27 PM	0	1:20:16 PM	0	**0.00**
1:33:27 PM	0	1:35:16 PM	0	**0.00**
1:48:27 PM	0	1:50:16 PM	0	**0.00**
2:03:27 PM	0	2:05:16 PM	0	**0.00**
2:18:27 PM	0	2:20:16 PM	0	**0.00**
2:33:27 PM	0	2:35:16 PM	0	**0.00**
2:48:27 PM	0	2:50:16 PM	0	**0.00**
3:03:27 PM	0	3:05:16 PM	0	**0.00**
3:18:27 PM	0	3:20:16 PM	0	**0.00**

Community Air Monitoring
Volatile Organic Compound Sampling Data
10/3/2014
Queens Plaza
Long Island City, NY

Upwind Station		Downwind Station		15-min Average (Corrected for Background)
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:36:11 AM	0	8:31:48 AM	0.007	**0.01**
8:51:11 AM	0	8:46:48 AM	0.039	**0.04**
9:06:11 AM	0	9:01:48 AM	0.034	**0.03**
9:21:11 AM	0	9:16:48 AM	0.035	**0.04**
9:36:11 AM	0	9:31:48 AM	0.034	**0.03**
9:51:11 AM	0	9:46:48 AM	0.057	**0.06**
10:06:11 AM	0	10:01:48 AM	0.082	**0.08**
10:21:11 AM	0	10:16:48 AM	0.105	**0.11**
10:36:11 AM	0	10:31:48 AM	0.117	**0.12**
10:51:11 AM	0	10:46:48 AM	0.112	**0.11**
11:06:11 AM	0	11:01:48 AM	0.107	**0.11**
11:21:11 AM	0	11:16:48 AM	0.097	**0.10**
11:36:11 AM	0	11:31:48 AM	0.098	**0.10**
11:51:11 AM	0	11:46:48 AM	0.094	**0.09**
12:06:11 PM	0	12:01:48 PM	0.038	**0.04**
12:21:11 PM	0	12:16:48 PM	0	**0.00**
12:36:11 PM	0	12:31:48 PM	0	**0.00**
12:51:11 PM	0	12:46:48 PM	0	**0.00**
1:06:11 PM	0	1:01:48 PM	0	**0.00**
1:21:11 PM	0	1:16:48 PM	0	**0.00**
1:36:11 PM	0	1:31:48 PM	0	**0.00**
1:51:11 PM	0	1:46:48 PM	0	**0.00**
2:06:11 PM	0	2:01:48 PM	0	**0.00**
2:21:11 PM	0	2:16:48 PM	0	**0.00**
2:36:11 PM	0	2:31:48 PM	0	**0.00**

APPENDIX I

Site Survey

SURVEY No. 40598–15

40598–15.DWG
40598–4.CRD

LEGEND

ASPH.....ASPHALT
BK.....BRICK
BSMT.....BASEMENT
CC.....CURB CUT
CCR.....CONCRETE CURB ROUND
CD.....CELLAR DOOR
CLF.....CHAIN LINK FENCE
CO.....CATCH BASIN CLEAN OUT
CONC.....CONCRETE
CRF.....CHAIN ROPE FENCE
CWA.....CELLAR WINDOW AREA
DR.....DRAIN
EL.....ELEVATION
FAB.....FIRE ALARM BOX
FC.....FILL CAP
FL EL....FLOOR ELEVATION
GP.....GUARD POLE
GV.....GAS VALVE
IF.....IRON FENCE
INL.....CATCH BASIN INLET ELEVATION
INV.....SEWER INVERT ELEVATION
☼.....*LIGHT POLE*
MB.....MAIL BOX
MHU.....UNKNOWN MANHOLE
OF.....OIL FILL
OHW.....OVERHEAD WIRES
P.....POLE
PAVT.....PAVEMENT
PAR.EL.....PARAPET ELEVATION
PM.....PARKING METER
PMULT.....POLE, MULTIPLE USAGE

PR.....PEDESTRIAN RAMP
RET.....RETAINING
RIM.....RIM ELEVATION SEWER MANHOLE
SFCR....STEEL FACED CURB ROUND
STY.....STORY
TB.....TOP OF BANK ELEVATION
ϕ.....TRAFFIC LIGHT
TEL.....TELEPHONE
TP.....TREE PIT
ϕ.....TRAFFIC SIGN
TW.....ELEVATION AT TOP OF WALL
UP.....UTILITY POLE
VU.....VALVE UNKNOWN
VLTU.....VAULT UNKNOWN
VP.....VENT PIPE
WV.....WATER VALVE
12"G.....GAS MAIN WITH SIZE
12"S.....SEWER MAIN WITH SIZE
12"W.....WATER MAIN WITH SIZE
■.....CATCH BASIN
Ⓔ Ⓔ.....ELECTRIC MANHOLE / VAULT
Ⓕ.....*FIRE MANHOLE*
Ⓖ.....GAS MANHOLE
Ⓢ.....SEWER MANHOLE
Ⓣ.....TELEPHONE MANHOLE
Ⓦ.....WATER MANHOLE
TR.....TRANSIT MANHOLE
TR.....TRAFFIC VAULT
.....HYDRANT
TB....TREE WITH SIZE
17.0.....ESTABLISHED GRADE
(rim 6.08) *(inv. 2.7)*.....ELEVATIONS IN BOROUGH DATUM

GENERAL NOTES

1. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO NAVD 1988 WHICH IS 1.625 FEET BELOW THE QUEENS TOPOGRAPHICAL BUREAU DATUM.
2. ESTABLISHED GRADES SHOWN HEREON REFER TO TOP OF CURB. IF ESTABLISHED GRADES VARY SUBSTANTIALLY WITH EXISTING ELEVATIONS CONSULT WITH THE HIGHWAY DEPARTMENT BEFORE DESIGNING IMPROVEMENTS.
3. SIZES AND LOCATIONS OF WATER MAINS SHOWN HEREON AS SUPPLIED BY THE DEPARTMENT OF WATER SUPPLY, BOROUGH OF QUEENS. LOCATIONS OF WATER SUPPLY MANHOLES, HYDRANTS AND WATER VALVES AS OBTAINED FROM FIELD MEASUREMENT.
4. SIZES AND TYPES OF SEWERS SHOWN HEREON AS OBTAINED FROM THE BOROUGH OF QUEENS SEWER DEPARTMENT RECORDS. SEWER MANHOLE RIM AND INVERT ELEVATIONS SHOWN HEREON OBTAINED BY FIELD MEASUREMENTS UNLESS INDICATED (•) WHICH DENOTES INVERT INACCESSIBLE OR MANHOLE NOT FOUND IN FIELD. INFORMATION SHOWN IN THIS MANNER IS AS OBTAINED FROM THE BOROUGH OF QUEENS SEWER DEPARTMENT RECORDS.
5. ELECTRIC AND GAS INFORMATION SHOWN HEREON AS SUPPLIED BY THE CONSOLIDATED EDISON COMPANY OF NEW YORK.
6. TELEPHONE INFORMATION SHOWN HEREON AS SUPPLIED BY THE NEW YORK TELEPHONE COMPANY.
7. FIRE ALARM INFORMATION SHOWN HEREON AS SUPPLIED BY THE NEW YORK CITY FIRE DEPARTMENT.
8. CABLE TELEVISION INFORMATION SHOWN HEREON AS SUPPLIED BY THE CABLE VISION COMPANY OF NEW YORK.
9. LOCATIONS OF ALL UTILITIES AND SUBSTRUCTURES ARE APPROXIMATE ONLY. THE INFORMATION GIVEN ON THE SURVEY PERTAINING TO UTILITIES AND SUBSTRUCTURES IS NOT CERTIFIED AS TO ACCURACY OR COMPLETENESS. CONSULT WITH THE APPROPRIATE COMPANY OR AGENCY BEFORE DESIGNING IMPROVEMENTS.
10. THE OWNER, CONTRACTOR AND/OR HIS AGENTS MUST NOTIFY THE APPROPRIATE UTILITY COMPANIES AND/OR AGENCIES AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION IN ACCORDANCE WITH INDUSTRIAL CODE RULE 753.
11. NO EVIDENCE OF EXISTING STREAMS, CREEKS, DITCHES OR WATER COURSES ON/OR CROSSING PROPERTY SURVEYED, OTHER THAN THOSE SHOWN.
12. NOT ALL SUBSURFACE INFORMATION PLOTTED.
13. THIS SURVEY IS A COPY OF SURVEY PERFORMED BY MONTROSE SURVEYING CO. LLP ON 05–30–2007 WITH ELEVATIONS CONVERTED TO NAVD 1988 DATUM. NO FIELD INSPECTION WERE PERFOMED SINCE 05–30–2007.

FLOOD HAZARD NOTE

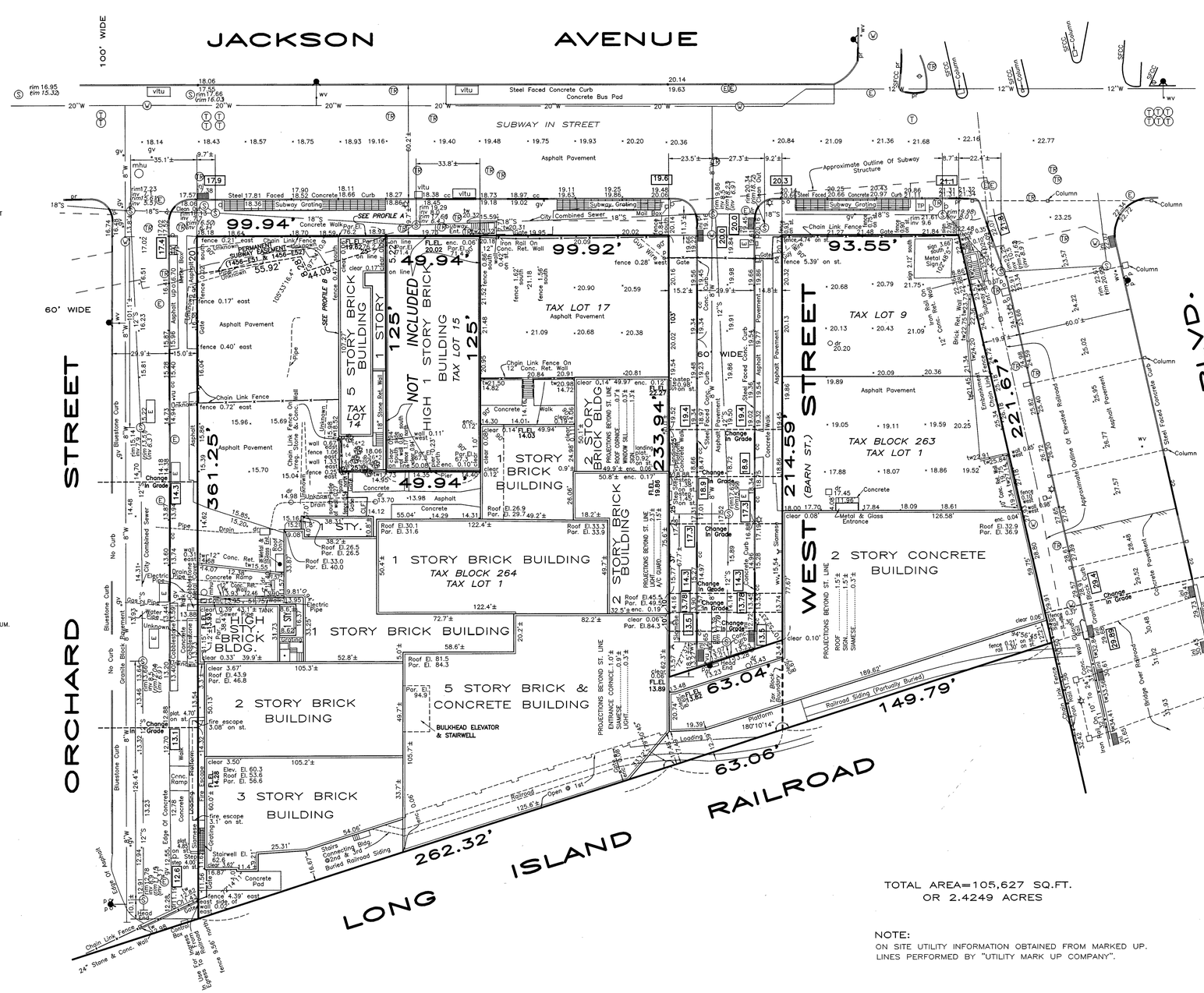
THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS ZONE X (LESS THAN 0.2% CHANCE OF FLOODING)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 360497 0202 F
EFFECTIVE DATE SEPTEMBER 5, 2007

PRELIMINARY FLOOD HAZARD NOTE

THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS ZONE X (LESS THAN 0.2% CHANCE OF FLOODING)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 360497 0202 G
PRELIMINARY DECEMBER 5, 2013

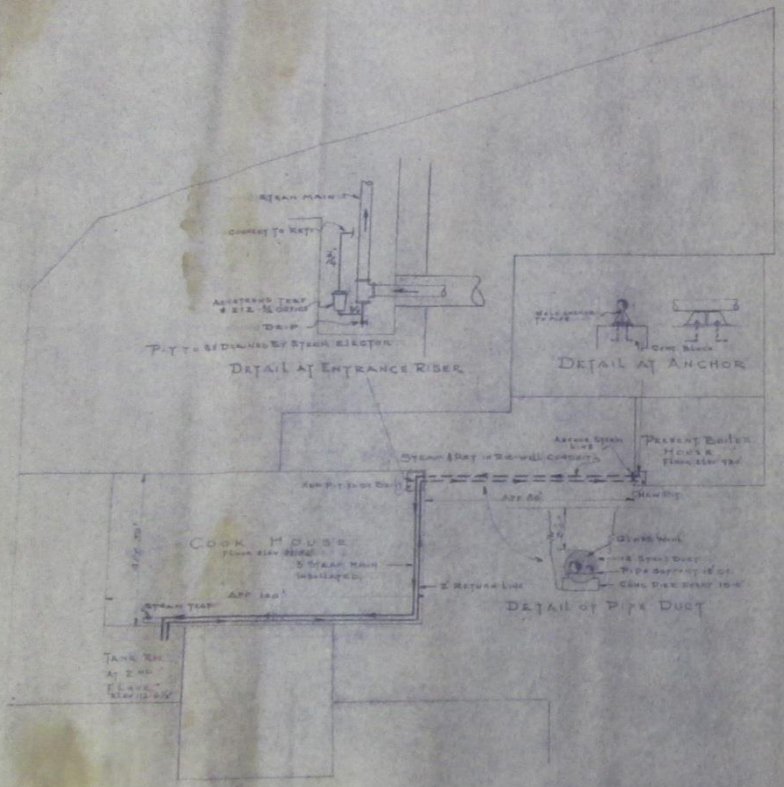
QUEENS TOPOGRAPHICAL BUREAU DATUM
MEAN SEA LEVEL 0.00 (NAVD 1988) — 1.625
MEAN SEA LEVEL 0.00 (NGVD1929) — 2.725

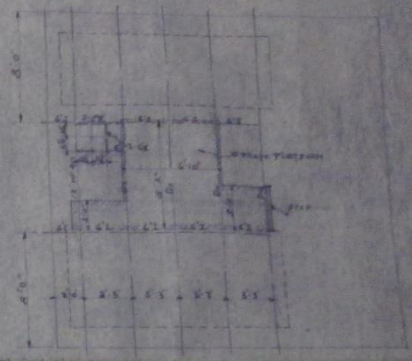
NAVD 1988 DATUM IS 1.625 FEET BELOW THE QUEENS HIGHWAY DATUM


JACKSON AVENUE
100' WIDE
SUBWAY IN STREET
Steel Faced Concrete Curb
Concrete Bus Pad
Asphalt Pavement
Approximate Outline Of Subway Structure
Subway Grating
City Combined Sewer
Mail Box
Chain Link Fence On 12" Conc. Ret. Wall
Gate
Column
99.94'
99.92'
93.55'
49.94'
INCLUDED
125'
TAX LOT 14
TAX LOT 15
TAX LOT 17
TAX LOT 9
TAX BLOCK 263
TAX LOT 1
5 STORY BRICK BUILDING
1 STORY BRICK BUILDING
2 STORY BRICK BUILDING
3 STORY BRICK BUILDING
2 STORY CONCRETE BUILDING
1 STORY BRICK BUILDING
TAX BLOCK 264
TAX LOT 1
5 STORY BRICK & CONCRETE BUILDING
BULKHEAD ELEVATOR & STAIRWELL
PROJECTIONS BEYOND ST. LINE
ENTRANCE CORNICE..1.0'±
SIAMESE.....0.3'±
ROOF SIGNS.....1.5'±
SIAMESE.....0.3'±
WINDOW SILL.....0.1'±
Metal & Glass Entrance
Concrete Pad
Concrete Ramp
Stairwell El. 62.6
Stairs Connecting Bldg. 2nd & 3rd Buried Railroad Siding
Railroad Siding (Partially Buried)
Platform
Loading Dock
Railroad
Open @ 1st
Bridge Over Railroad
Concrete Base For Elevated Railroad Column (typ.)
Approximate Outline Of Elevated Railroad
Concrete Pavement
Steel Faced Concrete Curb
Chain Link Fence
Stone & Conc. Wall
Brick Ret. Wall
Fence 0.17' east
Fence 0.40' east
Fence 0.72' east
Fence 0.21' east
Fence 0.28' west
Fence 5.39' on st.
Fence 4.39' east
Fence 0.31' on st.
Fence 1.30' on st.
Fence 1.62' south
Fence 1.56' south
Fence 0.74' on st.
Fence 0.08' on st.
Fence 0.1' on st.
Fence 3.50'
Fence 3.67'
Fence 0.33'
Fence 0.39'
Fence 0.37'
Fence 0.41'
Fence 0.34'
Fence 0.43'
Fence 0.45'
Fence 0.47'
Fence 0.49'
Fence 0.51'
Fence 0.53'
Fence 0.55'
Fence 0.57'
Fence 0.59'
Fence 0.61'
Fence 0.63'
Fence 0.65'
Fence 0.67'
Fence 0.69'
Fence 0.71'
Fence 0.73'
Fence 0.75'
Fence 0.77'
Fence 0.79'
Fence 0.81'
Fence

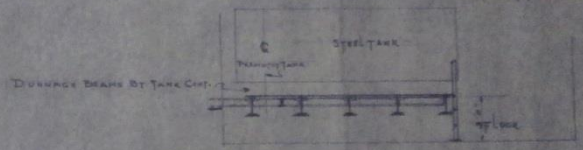
APPENDIX J

Historic Site Blueprints





Steel Construction To Do All Cutting & Patching for Steel Erection

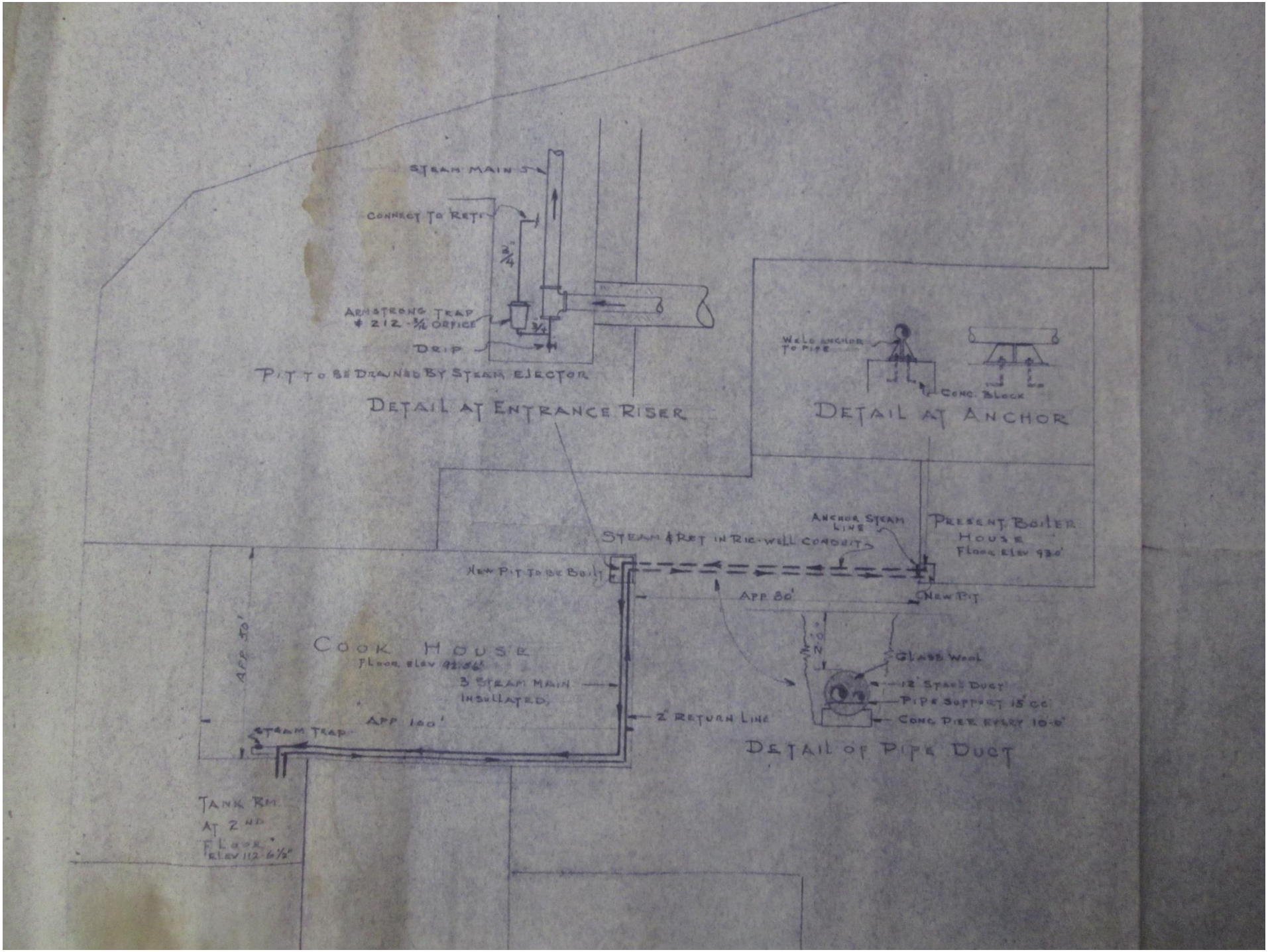


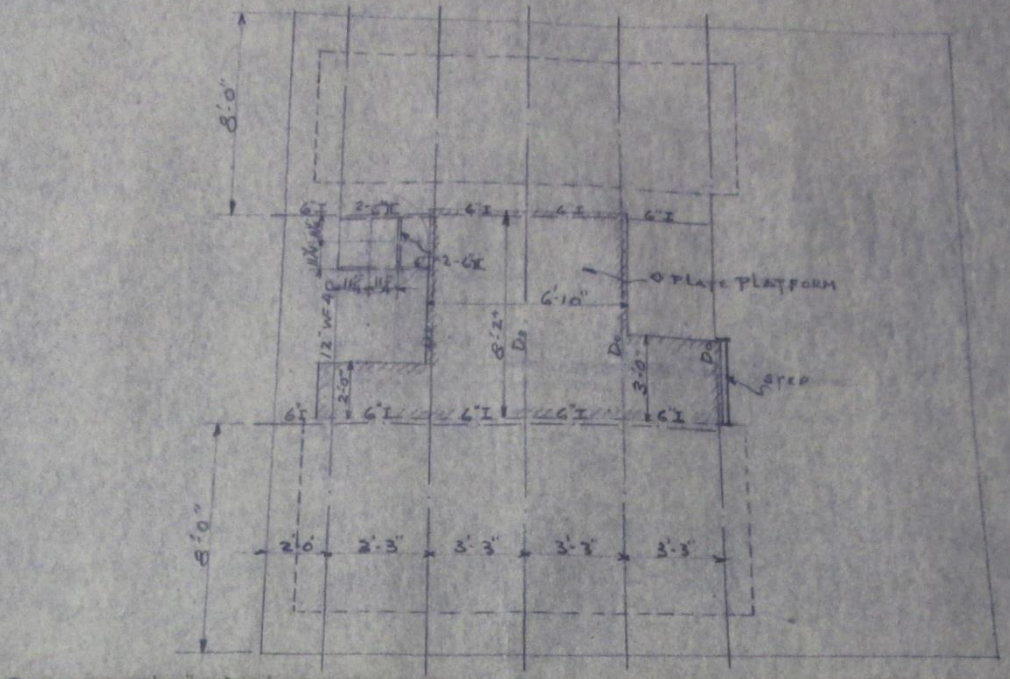
Steel Layout for Tank Supports

West Disinfecting Co.
42nd St. West of
Long Island City, New York

Proposed Steam Lines For Water System	Date 3-21-20	Dwg. No. W2

Walter Monroe Cory
Architect-Engineer Lic. No.

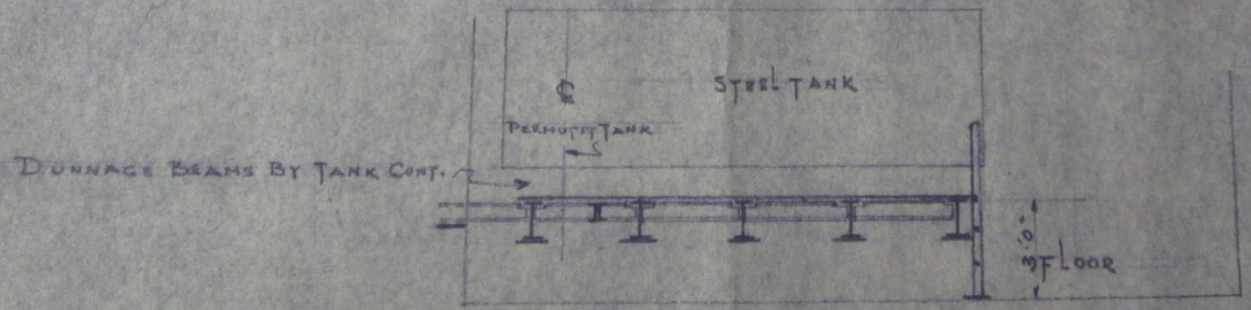

STEAM MAIN
CONNECT TO RET.
3/4"
ARMSTRONG TRAP
212 - 3/16 ORFICE
3/4
DRIP
PIT TO BE DRAINED BY STEAM EJECTOR
DETAIL AT ENTRANCE RISER
WELD ANCHOR TO PIPE
CONC. BLOCK
DETAIL AT ANCHOR
ANCHOR STEAM LINE
PRESENT BOILER HOUSE
Floor Elev 93.0'
STEAM & RET IN RIC-WELL CONDUITS
NEW PIT TO BE BUILT
APP 80'
NEW PIT
APP 50'
COOK HOUSE
Floor Elev 92.64'
3" STEAM MAIN INSULATED
APP 100'
STEAM TRAP
2" RETURN LINE
GLASS WOOL
12" STEEL DUCT
PIPE SUPPORT 15' CC
CONC PIER EVERY 10'-0"
DETAIL OF PIPE DUCT
TANK RM
AT 2ND
FLOOR
ELEV 112' 6 1/2"



BEARING PL 8"x12"x⅜" AT EACH BEAM

PLAN

STEEL CONTRACTOR TO DO ALL CUTTING & PATCHING FOR STEEL ERECTION



SECTION

STEEL LAYOUT FOR TANK SUPPORTS

WEST DISINFECTING CO
42-16 WEST ST.
LONG ISLAND CITY NEW YORK

PROPOSED STEAM
LINES FOR WATER SYSTEM

DATE
2-21-46

1" = 20'

DWG No.
W 2

WALTER MONROE CORY
ARCHITECT-ENGINEER
29-28-41ST AVE L.I.C. N.Y.

APPENDIX K

Geotechnical Report

GEOTECHNICAL INVESTIGATION
QUEENS PLAZA RESIDENTAIL DEVELOPMENT
LONG ISLAND CITY, QUEENS, NEW YORK

Tisham Speyer
45 Rockefeller Plaza
New York, NY 10111

Mueser Rutledge Consulting Engineers
14 Penn Plaza, 225 West 34th Street
New York, NY 10122

January 8, 2015

Mueser Rutledge
Consulting Engineers
14 Penn Plaza · 225 West 34th Street · New York, NY 10122
Tel: (917) 339-9300 · Fax: (917) 339-9400
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James M. Tantalla
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Andrew Pontecorvo
Renzo D. Verastegui
Alex Krutovskiy
Srinivas Yenamandra
Associates

Joseph N. Courtade
Director of Finance and Administration

Martha J. Huguet
Director of Marketing

January 8, 2015

Tishman Speyer
45 Rockefeller Plaza
New York, NY 10111

Attention: Patrick Shiels

Re: Geotechnical Subsurface Investigation
Queens Plaza Residential Development
Long Island City, Queens, New York
MRCE File No. 10608D

Dear Mr. Shiels:

In accordance with our Proposal dated June 6, 2014, Mueser Rutledge Consulting Engineers (MRCE) has completed a subsurface investigation for the referenced project. This report summarizes the investigation, our interpretations of subsurface conditions, and our recommendations regarding foundation design and construction, and other geotechnical issues.

EXHIBITS

Drawing No. B-1	Boring and Test Pit Location Plan
Figure No. 1	Proposed Site Plan
Drawing No. C-1	Rock Contour Plan
Drawing No. GS-1	Geologic Sections A-A and B-B
Drawing No. GS-2	Geologic Sections C-C and D-D
Drawing No. GS-3	Geologic Sections E-E and F-F
Drawing No. GS-4	Geologic Sections G-G and H-H
Drawing No. GS-R	Geotechnical Reference Standards
Drawing No. RC-1	Rock Core Classification Criteria
Table No. 1	Summary of Groundwater Levels
Table No. 2	Summary of Laboratory Test Data
Table No. 3	Soil and Rock Design Parameters
Plate No. 1	Gradation Curves – Borings MR-1P, MR-4 and MR-7
Plate No. 2	Gradation Curves – Borings MR-10P and MR-15
Plate No. 3	Gradation Curves – Borings MR-12P and MR-20P
Plate No. 4	Plasticity Chart

Figure No. S-1	Design Acceleration Response Spectrum for Building A
Figure No. S-2	Design Acceleration Response Spectrum for Basement Garage of Building B1
Figure No. S-2A	Design Acceleration Response Spectrum for Basement Garage of Building B1 Alternate
Figure No. S-3	Design Acceleration Response Spectrum for Tower B1
Figure No. S-4	Design Acceleration Response Spectrum for Building B2
Figure No. S-5	Site-Specific Liquefaction Assessment Diagram for Building B2
Figure No. S-6	Site-Specific Liquefaction Assessment Diagram for Tower B1
Appendix A	2014 MRCE Boring Logs
Appendix B	MRCE Test Pit Log
Appendix C	2007 Previous Boring Logs
Appendix D	1988 Previous Boring Logs

SITE AND PROJECT DESCRIPTION

The Queens Plaza Residential Development project is in Long Island City, Queens, New York in a quadrangle bounded by Jackson Avenue to the north, the Long Island Railroad (LIRR) Sunnyside Yards to the south, Queens Boulevard to the east, and Orchard Street to the west. The site also contains West Street extending southward from Jackson Avenue as a dead end, as shown on Drawing No. B-1.

Site topography is variable, generally ranging from about El. +12 in the south to El. +22 in the north. All elevations herein refer to the North American Vertical Datum of 1988 (NAVD88), which is 1.625 feet below Borough President of Queens Datum and 1.1 feet above Mean Sea Level at Sandy Hook, New Jersey in 1929, National Geodetic Vertical Datum (NGVD).

During the recently completed geotechnical investigation the site was occupied by multiple buildings and open parking areas. New York City Transit (NYCT) facilities exist along the north and east sides of the site. There is an elevated transit line to the east along Queens Boulevard and an underground subway tunnel runs beneath Jackson Avenue. The subway consists of four running tracks beneath Jackson Avenue, widening into a station about 120 feet east of Orchard Street. Another single-track tunnel intersects the main tunnel approaching from the southwest and running through a triangular easement in the northwest corner of the project site. The bottom of the subway structure is about 35 feet below street level. A NYCT sub-station occupies a building on Jackson Avenue approximately halfway between Orchard and West Streets.

The proposed development consists of three Tower structures, Tower A (44-story), Tower B1 (53-story) and Tower B2 (33-story), as well as one to five story buildings as shown on Figure No. 1. A one basement parking level will extend over most of the site footprint interconnecting all of the structures within the project site. At street level, the area between the Towers and low-rise structures of the site footprint is planned as open space.

Prior to construction environmental remediation is planned, including excavation and removal of contaminated soils and replacement with backfill for depths as great as 20 feet.

AVAILABLE INFORMATION

The following references were used in preparing this report:

1. "Geotechnical and Foundation Evaluation Queens Plaza Project" report by Mueser Rutledge Consulting Engineers, dated December 16, 1988.
2. "Geotechnical Summary Report Queens Plaza Project-Site A" by Mueser Rutledge Consulting Engineers, dated April 20, 2007.
3. A property survey plan by Montrose Surveying Co., LLP, dated September 26, 2014.
4. QPRD-Bldg A, Bldg B1 and Bldg B2 Foundation Plans by GHWA, MSMEA, WSP, Edwards and Zuck, D.P.C., and MRCE, dated 11/10/2014.
5. QRPD – Scheme 2 Zoning Lot, Drawing No. Z-001.00 by GHWA, MSMEA, WSP, Edwards and Zuck, D.P.C, and MRCE, dated 11/03/2014.

SUBSURFACE INVESTIGATION

Previous Investigations: In 1988, MRCE performed a subsurface investigation of nine widely-spaced borings, Nos. 1P through 9, on the overall project site for a previous planned development. That investigation was summarized in our report titled "Geotechnical and Foundation Evaluation Queens Plaza Project" dated December 16, 1988.

In 2007, thirteen borings, Nos. A-1 through A-13 were drilled within and south of the proposed Tower A footprint, under the continuous inspection of MRCE. That investigation was summarized in our report titled "Geotechnical Summary Report Queens Plaza Project – Site A" dated April 20, 2007. For both previous investigations, the boring locations are shown on Drawing No. B-1, and the logs for each boring are attached in Appendices C and D.

Present Investigation: We developed a subsurface investigation program consisting of twenty one (21) borings to investigate subsurface conditions and comply with NYC Building Code requirements, and one (1) test pit to determine the depth, size and condition of existing foundations of the NYCT sub-station. We prepared a plan and specifications, obtained unit prices, and you awarded the contract to Aquifer Drilling and Testing, Inc. (ADT) of Mineola, New York.

Since the project site is within 200 feet of NYCT subway structures, a submittal to NYCT was required for the approval of the subsurface investigation. We visited NYCT's archives and obtained as-built drawings of the adjacent elevated structure, underground subway tunnels and station, and sub-station building. We prepared a plan and sections showing the site and proposed borings and test pits with respect to the NYCT structures. We submitted drawings to NYCT for approval of the subsurface investigation, addressed NYCT comments, and received approval.

The site was classified by the project environmental engineer as requiring Level D Personal Protective Equipment (PPE). Due to the presence of creosote and other contaminants from past industrial activities there was a potential need to upgrade to Level C PPE. Air monitoring and

environmental screening were performed with a Photoionization Detector (PID) by Roux Associates, Inc. of Islandia, New York throughout the duration of the subsurface investigation. There was no need to upgrade to level C PPE.

Nineteen (19) of the twenty-one (21) proposed borings were made by ADT between September 11th and October 14th, 2014 under the continuous inspection of our Resident Engineers, Messrs. Mark Chancy and Michael McMaster. Our inspectors prepared a field log for each boring. The two (2) remaining borings, Nos. MR-2 and MR-3, were inaccessible and have been deleted from the program. As-drilled boring locations and ground surface elevations for borings were surveyed by Mega Engineering & Land Surveying, P.C of Queens Village, New York under contract to ADT. The boring locations are shown in Drawing No. B-1 and the boring logs are included in Appendix A.

Ten of the borings were made outdoors and the remaining nine borings were made inside the existing buildings. All of the outdoor borings were made with a truck-mounted drill rig equipped with a 140-lb automatic hammer. All indoor borings were made using an electric rubber track-mounted drill rig equipped with doughnut type hammers (140-lb and 300-lb).

Typically, all borings were hand-augered by others to a depth of 5 feet to clear utilities prior to drilling. The borings were advanced using rotary techniques with a tri-cone roller bit, and a combination of drilling mud and casing to stabilize the borehole. Boring MR-7 was drilled from the 1st floor slab and through the basement slab.

Following hand-augering, three split-spoon samples were typically obtained between depths of 5 and 12 feet. Below 12 feet, samples were typically taken at intervals not exceeding 5 feet. Representative soil samples were obtained by driving a 2-inch O.D. split spoon sampler with a 140-lb hammer, free falling 30 inches (ASTM D1586). The number of hammer blows required to advance the sampler through each of four six-inch intervals was recorded. The Standard Penetration Test (SPT) resistance, expressed in blows per foot (bpf), also termed N-Value, is an indication of the relative density of the material sampled and is calculated by summing the blows from the second and third six-inch intervals. In some instances, where the sampler was unable to penetrate the full 24 inches due to dense soils, large gravel, cobbles, boulders or other obstructions, the sampler was driven until 50 or 100 blows were administered and the actual penetration of the sampler was measured and recorded. Occasionally, the sampler penetrated 24 inches due to the stationary weight-of-hammer (WH).

All borings were terminated in bedrock after coring a minimum of 10 feet. Bedrock was penetrated and cored using a double tube, M-series, NX size core barrel with a diamond bit, recovering a nominal 2-inch diameter rock core, typically in five foot run lengths. Percent Recovery (REC) and Rock Quality Designation (RQD) was determined for each core run. Recovery is the total length of rock core obtained divided by the length of core run expressed as a percentage. RQD is defined as the sum of the lengths of recovered core pieces greater than 4 inches in length between natural breaks expressed as a percentage of the total core run. RQD is an indication of the relative frequency of jointing or natural fracturing of the bedrock. Sketches of the recovered cores were prepared in the field and are attached as part of the boring logs in Appendices A, C and D.

Observation wells, also termed piezometers, were installed in the completed boreholes in

Borings Nos. MR-1P, MR-10P, MR-12P and MR-20P to monitor the groundwater level. The observation wells consist of 2-inch I.D. PVC pipe extending to a depth of about 20 feet. The bottom 10 feet is slotted and surrounded by filter sand to allow free water movement without movement of soil particles. Steel-mount caps flush with the surrounding pavement were installed at each well for protection and to facilitate future readings. Proper operation of each well was verified by performing a variable head test consisting of filing up the well with water or bailing down the water level and measuring its drop or rise with time to a stable level. Water levels were measured during the exploration program and are recorded on the Piezometer Records in the boring logs in Appendix A.

All boreholes not receiving an observation well were backfilled with soil cuttings upon completion. Any excess waste materials generated from the drilling work was collected by ADT in DOT approved 55-gallon drums and stored at the site for testing and appropriate disposal.

Recovered soil samples were preserved in glass jars, and rock cores in wooden boxes for shipment and future examination. Upon completion of the subsurface investigation, all soil and rock samples were delivered to MRCE's laboratory.

Test Pit No. TP-1 was excavated and backfilled along the east side of the NYCT sub-station building on September 27th, 2014. Our Resident Engineer Kyriakos Barbagianis inspected the test pit continuously and prepared a sketch documenting exposed conditions. The test pit sketch and photographs are included in Appendix B. The test pit location was measured in the field by our Resident Engineer and is shown on Drawing No. B-1.

LABORATORY TESTING

Upon completion of the investigation, all soil samples and rock cores were delivered by ADT to MRCE's soil laboratory. Field descriptions were reviewed and revised as necessary for conformance with MRCE's Geotechnical Reference Standards and Rock Core Classification Criteria, described on Drawings Nos. GS-R and RC-1, respectively. Individual soil sample descriptions are based on the Unified Soil Classification System (USCS) and are provided in the boring logs in Appendix A.

Laboratory testing consisted of water content determination, mechanical analysis of grain size, minus 200 sieve particle size analysis, and Atterberg Limits. Natural water contents as a percent of dry weight were obtained on samples consisting of fine grained materials (silts and clays) and are reported on the boring logs. Gradation curves were obtained for several soil samples within the anticipated dewatering zone, and are shown on Plates Nos. 1 through 3. Minus 200 sieve particle size analysis, liquid limit and plasticity index were obtained on selected samples of loose granular and varved soils to assist in the site-specific liquefaction study. All test results are presented in Table No. 2, Summary of Laboratory Test Data. Liquid limit and plasticity index are also presented on Plate No. 4.

SUBSURFACE CONDITIONS

Our interpretations of subsurface conditions encountered in the borings are graphically illustrated on Geologic Sections A-A through H-H on Drawings Nos. GS-1, GS-2, GS-3 and GS-4. The geologic sections summarize the essential data from the borings including sample number and

position, SPT N-value in blows per foot (bpf), and the Unified Soil Classification System (USCS) soil group symbol for each soil sample. Core number and position, percent recovery, and RQD are shown for each rock core run. Soil and rock classification standards are defined on Drawing Nos. GS-R and RC-1. Individual soil and rock descriptions are provided on the boring logs in Appendix A.

General description of materials encountered at the site and their classification in accordance with the NYC Building Code are summarized below in order of their occurrence with depth:

Stratum F – Fill (NYC Class 7): The uppermost material encountered in each boring is a layer of fill ranging in thickness from 2 to 13.5 feet, with the exception of Boring No. 3 where fill is 27 feet thick. The fill consists of loose to very compact, brown, gray and black fine to coarse sand, silty to trace silt, gravelly to trace gravel, trace to some brick and concrete fragments, asphalt, clay, trace wood, cinders, glass, metal, vegetation and cobbles. N-values range from weight-of-hammer (indicating the weight of hammer, sampler and drill rods pushed the sampler 24 inches) to refusal (greater than 50 or 100 blows per 6 inches), with an average of 16 bpf.

Stratum S – Sand (NYC Class 3b): The fill is underlain by a natural sand stratum consisting of loose to very compact, brown and gray fine to medium sand, silty to trace silt, trace to some gravel, trace clayey silt pockets, layers and seams, fine sand seams and layers. Where encountered, the thickness of the Stratum S ranges from 2 to 19 feet. N-values range from weight-of-hammer to refusal, with an average of 16 bpf. Stratum S was not encountered in Boring Nos. A-6, A-10, A-11, MR-1P and MR-8.

Stratum V – Varved Silt, Sand and Clay (NYC Class 6): Stratum F and S are underlain by a varved glacial lake layer, except at Borings Nos. 1P, 3, 9, A-2, A-3P, A-8A, A-9, A-10, A-11, MR-1P, MR-4, MR-6 and MR-7. Stratum V consists of interlayered, soft to stiff, gray and brown silty clay, silt and silty fine sand, some to trace fine to coarse sand layers and seams, trace gravel. The thickness of Stratum V ranges from 2.5 to 15 feet. N-values range from 4 to 77 bpf, with an average of 17 bpf.

Stratum T – Glacial Till (NYC Class 3a): In all of the borings, except in Borings Nos. A-10, A-11, A-13 and MR-1P the above strata are underlain by a glacial till layer ranging in thickness from 1 to 35 feet. The till consists of medium compact to very compact, gray and gray brown fine to coarse sand, some to trace silt, gravel, trace boulders, cobbles, clay and rock fragments. N-values range from 12 bpf to refusal, with an average of 56 bpf.

Stratum DR – Decomposed Rock (NYC Class 3a): In four borings, Nos. 7, MR-4, MR-11 and MR-21, a thin layer of decomposed rock was encountered above intact bedrock. Stratum DR consists of compact to very compact, gray and white fine to coarse sand, some silt, gravel, clay, rock fragments, trace mica. The thickness of the decomposed rock ranges from 0.5 to 7 feet. N-values range from 48 to refusal and are typically greater than 100 blows per 6 inches.

Stratum R – Bedrock (NYC Class 1b, 1c): All borings were terminated after penetrating 10 to 13 feet into bedrock. The depth to bedrock ranges from 6 to 54 feet below ground surface, corresponding to a range of Elev. + 7.7 to Elev. -34.1. The bedrock consists of hard to intermediate, unweathered to moderately weathered, gray gneiss with white pegmatite and gray schistose gneiss zones, massive to broken, weathered and iron stained joints, trace mineral coated

joints. Recoveries range from 36 to 100 percent, averaging 92 percent. RQD ranges from 0 to 100, averaging 78 percent. The lower values occur in weathered zones. The elevation of top of bedrock at each boring location is reported and contoured on Drawing No. C-1.

Groundwater Levels. Groundwater levels were monitored during the investigation in Piezometers Nos. MR-1P, MR-10P, MR-12P and MR-20P. Water levels were also measured in seven observation wells installed under the inspection of Fleming Lee Shue during a previous environmental investigation. Between October 2 and 11, 2014, the measured groundwater levels varied from a depth of about 6 to 13 feet, corresponding to Elev. +8.0 to +3.7. Water level measurements are summarized on Table No. 1 for all of the wells, and on the piezometer installation records for Nos. MR-1P, MR-10P, MR-12P and MR-20P.

Groundwater levels were also measured in boreholes and observation wells in our 1988 and 2007 investigations. Observation wells were installed in Boring Nos. 1P and 6P, and A-3P and A-12P, in 1988 and 2007 respectively. The stabilized water levels measured in the 1988 and 2007 observation wells ranged from Elev. +9.4 to +4.8.

Water levels were also measured in some borings at the beginning of each day prior to start of work and are shown on the geologic sections and boring logs. Where the casing was installed to the top of bedrock, the casing sealed the borehole walls, and where drilling mud was used, the fluid level in the borehole may have been prevented from stabilizing. For these reasons, water or mud levels measured in boreholes may not be stabilized or indicative of the groundwater regime.

We note that pumping or drainage by NYCT in the nearby subway facilities may also influence groundwater levels at the project site.

Environmental Issues. We understand that the project environmental consultants will address environmental and contamination concerns. It is our understanding that the project consultants, Fleeming Lee Shue and Roux Associates have performed environmental investigations. Our inspectors noted contamination as petroleum and creosote odors in several of the borings as described in the remarks on the boring logs. The identification of the extent, location and nature of contaminants is outside our scope of services. We understand that the environmental consultants will be issuing reports on their recent investigations.

SOIL AND GROUNDWATER DESIGN PARAMETERS

Design Soil & Rock Parameters. Based on the data collected from the subsurface investigation, the general subsurface profile at the site consists of 5 to 13 feet of fill, overlying sand and/or varved silt, sand and clay, underlain by glacial till, decomposed rock and bedrock. Table No. 3 provides recommended soil and rock parameters for the design of foundations and structures at this site.

Design Groundwater. The observation wells indicate that the groundwater level during the recent subsurface investigation ranged between Elev. +8.0 and Elev. +3.7, or about 6 to 13 feet below ground surface. Prior investigations showed a water elevation of +9.4. Groundwater levels in Queens have been historically lowered by pumping from wells for water supply starting in early 1900's. Recently, pumping efforts have been reduced and groundwater levels have been gradually rising to pre-pumping levels.

The 2013 Flood Insurance Rate Maps (FIRM) published by the Federal Emergency Management Agency (FEMA) show that the site is primarily outside the flood zone. The southernmost portion of the site is within the 100 to 500-year flood zone. The 100-year flood level is west of the site and is noted as Elev. +10 referenced to the North American Vertical Datum of 1988 (NAVD 88). If a flood occurs, a temporary rise of groundwater may occur. For those reasons, and to account for seasonal variations, we recommend that a design groundwater level of Elev. +10 be used for the project.

SEISMIC DESIGN

The design of the proposed structures must comply with the seismic provisions of the 2008 NYC Building Code (the Code). The seismic parameters and considerations as per Code are presented in this section.

Seismic Site Classification and Liquefaction Potential.

The Code requires the site to be assigned a Site Class that determines seismic design parameters. In addition, for sites that contain soils that could be susceptible to liquefaction, the potential for liquefaction and its effects should be evaluated. We have assumed that the proposed development falls in Seismic Use Group (SUG) I, or Structural Occupancy Category II of the Code.

Based on the boring data from the 2007 and the recent 2014 investigations, soil conditions vary significantly in stiffness across the project site. Given the significant variation in soil conditions at the site we have assumed that the proposed structures will be structurally independent from each other, therefore, allowing separate Site Class to be assigned to different areas of the site.

Subgrade excavations vary throughout the site based on the required removal of soil contamination. Generally, the subgrade excavation is deeper than the proposed foundations, except at portions of the western end of the site where bedrock is shallower. New soil material will be used to backfill between the subgrade excavation and the new foundations. For the seismic evaluation, we have assumed that the new backfill will be compacted to a density equivalent to an SPT resistance N-value of 20 bpf or higher.

Site classification is defined based on the characteristics of soils and rock below the anticipated foundation level. The Code-prescribed N-value averaging method has been applied to determine the Site Class, presented below for each proposed building site.

<u>Building A</u>

Building A is classified as Class C as per Code with seismic design parameters:

S_{DS} = 0.292g and S_{D1} = 0.080g

Figure S-1 shows the Site Class C design acceleration response spectrum which leads to a Seismic Design Category (SDC) of B for Structural Occupancy Category (OC) II development.

Liquefaction susceptibility was assessed using the Code's Liquefaction Assessment Diagram (NYCBC Figure 1813.1), which compares the field measured SPT N-Values with specified

screening lines. The assessment showed that liquefaction of the soil within Building A is unlikely during the Code design level earthquake event.

Basement Garage of Building B1

The southwest and south central portion of the site will host 1 to 5-story Buildings and the Basement Garage of Building B1. This portion of the site is classified as Class D as per Code with seismic design parameters:

S_{DS} = 0.367g and S_{D1} = 0.114g

Figure S-2 shows the Site Class D design acceleration response spectrum which leads to a Seismic Design Category (SDC) of C for Structural Occupancy Category (OC) II development.

Liquefaction susceptibility was assessed using the Code's Liquefaction Assessment Diagram (NYCBC Figure 1813.1), which compares the field measured SPT N-Values with specified screening lines. The assessment showed that liquefaction of the soil in the Basement Garage of Building B1 is unlikely during the Code design level earthquake event.

If the southwest portion of the Basement Garage of Building B1 can be separated structurally from the remaining portion, as shown on the key plan on Figure S-2A, a different Site Class can be applied.

In the southwest portion of the site where rock is shallow, the one level basement garage and the related 1, 2 and 5-story buildings (south of Building A) will be supported on a combination of footings and piles. Where the bottom of the footings or pile caps in this portion of the site are within 10 feet of the top of bedrock, Site Class B can be used for seismic design provided that the buildings supported in these conditions are structurally independent (i.e., the base shear is transferred only to foundations whose bottom is within 10 feet of the bedrock) and no seismic loads are transferred from the north and eastern portion of the site. For Site Class B the seismic design parameters are:

S_{DS} = 0.243g and S_{D1} = 0.047g

Figure S-2A shows the Site Class B design acceleration response spectrum which leads to a Seismic Design Category (SDC) of B for Structural Occupancy Category (OC) II development.

Tower B1 and Building B2

The north central and eastern portion of the site will host Tower B1 and adjacent 5-story Building, and Building B2. The areas that will host Tower B1 with its adjacent 5-story building, and Building B2 have been screened as potentially liquefiable within 15 to 35 feet below the ground surface based on the screening diagram published in the Code. The Code classifies such sites with potentially liquefiable soils as Site Class F. The Code does not provide seismic design parameters for Site Class F, but rather requires a site-specific seismic study to be performed. This analysis is presented below.

Site Specific Seismic Study

A site-specific seismic study was performed for the Site Class F portion of the site (eastern part of the proposed Queens Plaza Residential Development - Tower B1 and Building B2). The study

was based on geologic, seismologic, and soil characteristics of the site and was performed using the one-dimensional equivalent linear program Shake. The input is the soil and rock shear wave velocity (V_s) and Code-compatible earthquake motions at the bedrock level. The V_s values for the soil and bedrock, presented in Table S-1, were estimated using correlations with the N-values and data from other studies from our files. To account for variability and uncertainty in predicting the V_s values, we performed parametric analyses. The input bedrock earthquake motions are three sets (two orthogonal motions) of acceleration time histories representative of the seismic hazard at the site for the Code's Maximum Considered Earthquake (MCE) which has a return period of 2,500 years.

Table S-1: Summary of V_s profile used in seismic study

Stratum	Depth (ft)	Vs (ft/s)
New Fill	0-15	584-678
Sand	15-22	670
Varved Sand, Silt & Clay	22-32	633
Glacial Till	32-40	925
Bedrock		6500

Tower B1 and Building B2 are planned to be supported on a combination of footings and pile foundations. The bottom of the footings and/or pile caps will be between elevations +4 to -1 for Tower B1 and between elevations +8 to -11 for Building B2 (as per Datum NAVD88). We developed site specific seismic design response spectra at these elevations, shown on Figures S-3 and S-4 for the bottom of foundation of Tower B1 and Building B2, respectively. The structural damping was assumed to be 5%. As per Code, our design recommendations correspond to 2/3 of the MCE and incorporate Code provisions in §1615.2.5 for site specific studies. The following design parameters are recommended as per Figures S-3 and S-4:

Tower B1

S_{DS} = 0.44g and S_{D1} = 0.091g

Building B2

S_{DS} = 0.47g and S_{D1} = 0.13g

Based on the above S_{DS} and S_{D1} assuming that both Tower B1 and Building B2 are classified as Structural Occupancy Category (OC) II (or Seismic Use Group I), the Seismic Design Category (SDC) is "C" for both structures.

The following limitations apply:

- If the elevations of the bottom of the foundations are modified from what is referenced in this section, MRCE shall review the changes and revise the design spectrum accordingly. Currently, MRCE's recommendations should be applied at the bottom of pile caps or footings between elevations +4 and -1 for Tower B1 and +8 and -11 for Building B2.
- The recommended design spectra must be considered in their entire spectrum of periods and supersede any generic site classification. The values of S_{DS} and S_{D1} provided in Figures S-3 and S-4 cannot be used to generate an alternative design response spectrum.

– No site class should be provided on the design drawings. Site class should indicate "As per a site-specific study."

Liquefaction Potential Evaluation

Liquefaction is a phenomenon primarily described as the loss of strength of loose saturated, cohesionless soils during an earthquake due to increased pore water pressure and reduced effective stress. Preliminary Code-based screening indicated a potential for liquefaction of the soils below the proposed Building B2 and portions of Tower B1.

In simple engineering terms, the potential for liquefaction can be expressed as an equivalent Factor of Safety (FS) which is the ratio of the seismic capacity of the soil, called Cyclic Resistance Ratio (CRR), and the seismic demand imposed by the earthquake, called Cyclic Stress Ratio (CSR). We have followed the consensus state-of-practice approach to evaluate the liquefaction hazard as described in the Youd et al. (2001) report summarizing the relevant 1996 and 1998 NCEER workshops. Based on stabilized piezometer readings from the piezometers previously installed at the site, we have taken the ground water table at Elevation +7, approximately 6.5 ft to 13 ft below the existing ground surface.

m m n R max vo max is the maximum earthquake-induced shear stress derived from the site- m n vo is the vertical effective overburden stress at any examined depth below grade.

The capacity of the soil to resist liquefaction or CRR is evaluated by available field test results and represents the maximum stress a soil can endure before liquefying during an earthquake. We have evaluated CRR based on SPT N-values which were corrected for several factors including the overburden, soil type (including fines content), and methods of drilling to produce the corrected $N_{1,60cs}$ values. In this evaluation the Fines Content (FC) of the granular soils was of particular importance. MRCE performed several sieve laboratory analyses to evaluate the FC values.

The results of the liquefaction assessment are presented in the form of site-specific screening diagrams shown on Figures S-5 and S-6 for Building B2 and Tower B1, respectively. We used nine borings for Building B2, and three borings for Tower B1. The FC tests showed values varying from 10 to 80%. We have incorporated FC as one of the variables in our analysis. Any $N_{1,60}$ values plotting to the right of the curves indicate that liquefaction for that soil layer is unlikely during the seismic code design event, while $N_{1,60}$ data plotting to the left of the curve indicate that liquefaction is likely during the Code design earthquake event. The results indicate that liquefaction is unlikely for Tower B1 and Building B2 during the Code design earthquake event since the vast majority of $N_{1,60}$ values fall on the right hand “safe” side of the liquefaction screening line.

In addition to the liquefaction hazard, we examined the potential for cyclic softening of the soils that can induce dynamic settlements in the 5-foot thick varved stratum at Building B2. We have evaluated the seismically induced settlements to range between 0.5 and 2 inches for 5 feet of the varved stratum. These settlements should be accounted in addition to the static settlements, considering though that they reflect behavior for an extreme and transient event (i.e., smaller factors of safety can be considered for the foundation in this case).

Piles should be structurally detailed to transfer seismic lateral forces and bending moments. Earthquake induced settlements due to strain softening and its effects on pile free length, axial/lateral capacity should be accounted for in the foundation design for Tower B2.

Conclusions & Recommendations

MRCE performed a site-specific seismic study for Queens Plaza Residential Development, for areas covering Tower B1 and Building B2. The main conclusions and findings of this site-specific study are as follows:

(i) Recommended seismic design parameters and acceleration response spectra are provided in Figures S-3 and S-4. The seismic design category (SDC) is "C" provided that the proposed structures are classified as Structural Occupancy Category (OC) II (or Seismic Group I).

(ii) Liquefaction hazard analysis indicates that liquefaction is unlikely under the 2008 New York City (NYC) Building Code seismic design event.

(iii) Deep foundations should be detailed structurally to transfer seismic lateral forces and bending moments. Potential earthquake-induced settlements for Building B2 due to strain softening and its effects on pile free length, axial/lateral capacity should be accounted for in the foundation design.

FOUNDATION DESIGN RECOMMENDATIONS

The recommendations below are intended to satisfy the requirements of the 2008 NYC Building Code, and to provide information for foundation design.

Foundation drawings indicate that subgrade excavations will vary throughout the site. In some areas where removal of soil contamination is required the subgrade excavation is typically deeper than the proposed foundations, except at portions of the western end of the site where bedrock is shallower. In these areas, new structural fill will be used to backfill between the proposed subgrade excavation and the new foundations.

Boring Coverage. For a project site encompassing an area of about 114,900 square feet, the Code requires coverage of at least one boring per 2,500 square feet for the first 20,000 square feet and at least one boring for each additional 5,000 square feet for structures supported on shallow foundations. The Code requires boring coverage increase by 30 percent for areas of the structures supported on piles. The subsurface investigation consisting of nineteen (19) recent borings and the twenty-two (22) previous borings satisfies the Code requirements for subsurface exploration.

Building Foundations. The fill layer, Stratum F is classified as NYC Building Code Class 7 and is unsatisfactory as a bearing material for building foundations. Natural soils of Strata S, V, T and DR in undisturbed condition are suitable bearing material for building foundations at allowable bearing pressures provided in Table No. 3. The underlying bedrock, ranging from hard to medium hard in quality, provides allowable bearing pressures of 40 tons per square foot (tsf). Where intermediate quality bedrock is encountered, in lieu of deepening the foundation grade, a second foundation wall and footing schedule can be established for 20 tsf rock, to be used in the event that local zones of lesser quality rock are encountered during construction.

The uppermost bearing soils will generally consist of new backfill material, Stratum S and/or Stratum V. Spread footings are a viable foundation option for the low-rise structures and the one-level basement garage. A combination of spread footings on rock and deep foundation

elements may be used for support of Tower A. For support of Towers B1 and B2 we recommend deep foundation elements.

Deep foundation options include driven and drilled piles bearing on or in till, decomposed rock or bedrock. Due to the presence of boulders in the till stratum, we recommend against using displacement piles such as concrete-filled pipe piles driven closed-ended. We recommend the use of driven non-displacement piles such steel H-piles with a hardened driving point. Driven H-piles should provide a design compression capacity of 100 tons, subject to verification by load testing in accordance with the 2008 NYC Building Code. Due to the possibility of corrosion of steel due to stray currents from the nearby subway and/or corrosive materials in the soil, the piles should be sized with an allowance of 1/8 inch for corrosion (1/16 inch on all exposed surfaces). Driven H-piles should be assumed to not provide uplift or lateral capacity. For drilled piles, discussed below, lateral capacity will be a function of pile size, spacing, and penetration and pile cap geometry, and should be evaluated on a case-by-case basis. Where piles are shorter than 10 feet, lateral capacity will not be provided and the Code requires that lateral bracing be provided using adjacent pile caps, anchors, or connection to other structural elements that provide lateral resistance. A minimum rock socket length of 12 feet will be required to develop compression capacity. However, where drilled piles are used for support of tension loads, longer rock sockets will be required and will need to be determined on the basis of a site-specific pull-out analysis taking into account depths to rock, pile spacing and pile-group action.

Due to NYCT regulations, driven piles may not be used within 25 feet of the subway structure, and no piles may be installed closer than 3 feet from the subway. In this zone, we recommend drilled piles socketed in bedrock. The piles can be sized using an allowable bond stress of concrete to bedrock of 200 pounds per square inch (psi) for compression capacity. Based on preliminary compression loads provided by the structural engineer, we recommend a drilled pile with a compressive capacity ranging from 425 to 450 tons consisting of a 13 3/8 inch outer diameter casing, 11 ½ inch diameter rock socket, 8,000 psi grout and four #20, 75 ksi threaded reinforcing bars extending the full length of the pile. Pile capacity must be demonstrated by load testing in conformance with the Code. In lieu of load testing for drilled piles, the rock quality of each pile can be verified by camera inspection. Drilled piles can also be used to support building shear walls. Drilled piles may also be economical in areas where driven piles will be short, namely at the southwest portion of the Tower A footprint where bedrock is shallow.

Building Settlement. At the recommended bearing pressures, settlement of footings bearing on natural soil should be less than one (1) inch, provided that the subgrade is undisturbed. Settlements will occur rapidly as load is added. Additional settlements can occur if a seismic event occurs, as described in the "SEISMIC DESIGN" section above. For footings bearing on intact bedrock, settlement will be negligible, provided subgrades are prepared and protected as described below in the paragraph "Excavation and Subgrade Preparation". Similarly, the settlement of pile-supported elements will be controlled by the elastic shortening of the piles.

Given the variability in character, depth and thickness of bearing strata across the proposed structures, differential settlement between building columns and foundation types (footings and piles) is a concern and may dictate foundation requirements at a given location or within an area of the buildings depending on column spacing and load differences between columns. A more detailed evaluation of potential differential movements and foundation support requirements across the proposed structures can be made once the column layout is defined and building loads

and tolerable movements are available from the structural engineer.

Uplift Forces. Tower columns may have net uplift forces due to wind loads that are greater than the gravity loading. Where drilled piles are not used, uplift forces can be resisted by installing pre-tensioned rock anchors. Double corrosion protection for permanent installation is required. The anchors must extend deep enough into the rock to engage sufficient rock mass to prevent pullout of a wedge of rock. Where wedges overlap, determined by anchor spacing, the mass can only be considered once. All anchors must undergo proof or performance testing.

Basement Slab Support and Uplift Protection. The top of basement slabs are at Elev. +9.7 or Elev. +7.8 and can be supported on natural soils or the new backfill material. Slab subgrade will require evaluation and treatment in accordance with the provisions of the paragraph "Excavation and Subgrade Preparation" herein.

The basement slabs are below the design groundwater table of Elev. +10. Groundwater will exert a hydrostatic uplift pressure that must be resisted by the dead load of the structures or other positive measures provided to relieve uplift pressure.

The basement is intended to serve as high quality space and is below the design groundwater level and near the measured groundwater level. Since NYCDEP does not allow permanent discharge of groundwater to the sewer system, the use of an underdrain system to collect infiltrating groundwater flow makes such a system impractical. We therefore recommend designing basement slabs as a pressure slab that can resist hydrostatic uplift, using either the slab weight or connection to the building structure.

We recommend using a safety factor of at least 1.2 in evaluating uplift resistance under the design water level. Uplift resistance should be calculated using only the dead weight of the structure in place. Live load within the structures should not be taken as a resisting force to counter uplift pressures. If the dead weight of the structure is not sufficient or the slab design cannot accommodate the full uplift pressure, tiedown anchors, tension piles or other positive measures must be provided to resist the uplift pressures.

Foundation Walls. The permanent foundation walls need to be designed to withstand long-term, at rest earth pressures, surcharge and water pressures, consistent with 2008 NYC Building Code requirements. At-rest soil and water pressures can be calculated using an equivalent fluid pressure of 60 pcf above the groundwater level and 90 pcf below the groundwater level. Foundation walls must also accommodate surcharge pressures in accordance with the 2008 NYC Building Code and temporary rise in water level as described in Table No. 3.

Waterproofing. A membrane waterproofing system with waterstops in all concrete joints is recommended to provide a dry basement. Membrane waterproofing is advised for full height of subsurface foundation walls to prevent infiltration of water including runoff seepage or leaking utilities into the basement. The waterproofing system must be carefully designed and detailed, and construction inspection is vital to provide proper quality control. It has been our experience that waterproofed basements may eventually develop leaks, in some cases due to slab cracking or gaps in the membrane despite good construction practice and inspection. Remedial grouting may be needed to stem minor leakage.

If any contaminated soils are to remain below or adjacent to the basement, the waterproofing system selected needs to be compatible with the contaminants. The system must also prevent vapors from entering the basement space. Your environmental consultant should be involved in the basement waterproofing design process.

CONSTRUCTION CONSIDERATIONS

Subgrade excavations and basement construction will require excavations to depths of about 21 feet below the normal water table.

Support of Excavation. Soil parameters recommended for use in the design of temporary excavation support structures are summarized in Table No. 3. Where NYCT structures are present, at-rest earth pressures must be used in design of a stiff support system, in accordance with NYCT guidelines. Appropriate surface surcharge pressures per NYC Building Code should be considered such as from adjacent roadways, sidewalks, and potential temporary construction loads.

The NYCT tunnel, sub-station and station entrances border the property line along Jackson Avenue and the NYCT elevated structure borders the property line along Queens Boulevard. The excavation bracing system and foundation design will, therefore, have to be reviewed and approved by NYCT. NYCT generally does not allow drilling and installation of permanent or temporary structural elements within three feet of their structures. The basement may have to be benched or offset to address NYCT concerns. Excavation support must be designed by licensed Professional Engineer.

Protection of Adjacent Structures. A NYCT subway tunnel runs through the northwest corner of the site and borders the property line along Jackson Avenue, and station entrances exist adjacent to the NYCT Sub-Station building and at the northeast corner of site along Queens Boulevard. NYCT typically requires that foundations of new adjacent structures bear below a 1V:1H influence line projected upward from the base of their structure. The Jackson Avenue NYCT tunnel and station subgrade elevation varies from Elev. -13 to -16, in the vicinity of the site. NYCT drawings show the tunnel and station along Jackson Avenue bearing on the glacial till. The elevated structure along Queens Boulevard is supported on piles likely bearing on till or bedrock. The new foundations must be located and constructed to avoid imposing load on the subway structures.

The NYCT sub-station building on Jackson Avenue has a one-level basement with shallow footings bearing on the natural sand stratum approximately 15 feet below grade, corresponding to about Elev. +6.5. If proposed excavation extends below the foundation bearing level, underpinning of the existing sub-station will be required or a stiff excavation support system such as secant piles can be used in lieu of underpinning to limit movements of the NYCT structure.

Groundwater Control. Construction below the groundwater level will require dewatering to provide and maintain dry, undisturbed subgrades for soil removal, backfill compaction, footing and pile cap construction. The dewatering system should be designed and operated with the intent of lowering and maintaining the groundwater level a minimum of two feet below subgrade excavations, and foundation or slab subgrades at all stages of the work. Improperly dewatered

subgrades are easily disturbed during construction, which will increase settlement and provide poor foundation performance. Stratum V in particular will be sensitive to disturbance in the presence of water. Gradation curves for several soil samples are shown on Plates Nos. 1 through 3. Variable head permeability test data performed in piezometers are attached to boring logs MR-1P, MR-10P, MR-12P and MR-20P in Appendix A in order to assist in design of an appropriate dewatering system.

Dewatering for subgrade excavation and construction of basement and foundations will depress the groundwater level about 21 feet, from Elev. +8 to Elev. -13. The effects of lowering the water table outside the excavation must be evaluated by the dewatering system designer. The effects of dewatering and extent of depressurization should be monitored with piezometers installed both within and around the excavation. The dewatering system, including monitoring, should be designed by a Professional Engineer experienced in this work. The NYC Department of Environmental Protection (NYCDEP) requires discharge permits for groundwater extracted from temporary, construction-related sources. Your environmental consultant will need to review the dewatering issue to determine whether there is a potential for drawing contaminants to the building excavation, and if treatment of discharge water is necessary.

Water levels in the area were previously depressed for construction of the NYCT subway tunnel running beneath Jackson Avenue. The bottom of the subway tunnel is at about Elev. -16, therefore previous dewatering efforts have created larger drawdowns and may have affected a larger area than the dewatering that is planned.

Excavation and Subgrade Preparation. Subgrade excavation and construction of basement and foundations requires excavation in fill and natural Strata S, V and T soils. These materials can be excavated using conventional earth moving equipment. Excavation in rock is not generally expected based on the borings and proposed basement elevations. However, some rock chipping may be needed to develop acceptable footing subgrades.

Care should be exercised to prevent disturbing or loosening the soil in the sides and bottom of excavations. Structures founded on footings require support on undisturbed subgrade. Final subgrade exposure in soils must be made using a smooth edged excavating tool, such as a backhoe bucket with the teeth shielded, and operating by reach of equipment working on mats or at least two feet above subgrade. Rock subgrades must be relatively horizontal and broom cleaned of all loose material. All subgrades must be free of water and inspected and approved for foundation construction by a qualified Geotechnical Engineer. Footing construction should either proceed immediately after subgrade approval or subgrade promptly covered with a lean concrete mud mat to protect subgrade materials from subsequent deterioration from weather, surface water infiltration and construction traffic in the interim period until footing construction.

Excavation or structure subgrades in granular soil should be proof-rolled with a heavy walk-behind compactor to verify its integrity. Hard points, such as building remnants and boulders, should be removed a minimum of one foot below subgrade. If soft, spongy, or otherwise unsatisfactory material is encountered, that material should be removed and replaced with compacted engineered fill. Subgrades in Stratum V (varved soils) should not be proof compacted to avoid disturbance.

Backfill Under and Around Structures. Construction documents must define classes of fill,

such as common fill and engineered fill (structural fill) based on purpose and desired engineering characteristics.

Engineered fill (structural fill) should consist of natural well-graded sand or sand gravel mixtures (SP, SP-SM, GP or GP-GM) free of rock or gravel larger than 3 inches (75 mm) in any dimension, and with a maximum of 10% passing the No. 200 sieve. The percentage passing the No. 200 sieve should be based on the fraction passing the No. 4 sieve.

Common fill should consist of granular soils (SW, SP, SP-SM, GW, GP, GP-GM, SM or GM) free of rock or gravel larger than 3 inches (75 mm) in any dimension, and with a maximum of 20% passing the No. 200 sieve. The percentage passing the No. 200 sieve should be based on the fraction passing the No. 4 sieve.

Engineered fill (structural fill) is recommended for use beneath structures, roadways, sidewalks and as backfill adjacent to foundation walls. It should be placed in loose lifts not exceeding 12 inches (six inches where hand operated equipment is used) and compacted to a minimum of 95% of the Modified Proctor maximum dry density (ASTM D1557).

Common fill may be used to raise grades beneath landscaped areas. It should be placed in loose lifts not exceeding 12 inches and compacted to a minimum of 90% of the Modified Proctor maximum dry density (ASTM D1557). Lift thicknesses in confined areas, such as utility trenches should be limited to six inches.

Soils with fines content greater than 10% or with fines exhibiting plasticity are more sensitive to moisture changes and may require extensive moisture conditioning and drying to achieve proper compaction, particularly if work is performed during wet or cold weather (i.e. winter and early spring). The contractor must factor the costs of such manipulation and impacts on productivity in selection of backfill sources and scheduling of backfill placement.

Surfaces to receive backfill should be cleared and grubbed prior to backfill placement. This should be followed by proofrolling of exposed subgrade with a heavy walk-behind static compactor to re-densify soils loosened during excavation, determine if any soft or weak soils exist below subgrade, and improve the density of existing soils prior to fill placement.

Backfilling is not permitted in freezing weather, with frozen materials, or upon frozen materials. Every effort must be made to prevent surface water runoff and flood waters from entering excavation and backfill areas using perimeter berms and dikes. Slopes, crowns, and ditches on backfill surfaces should be maintained to ensure proper surface drainage and prevent surface water from ponding or softening backfill surfaces and soil subgrades.

Pre-Construction Survey and Monitoring. We recommend a program of monitoring vibration, noise and settlement of adjacent and nearby structures during demolition and construction. The program should include control points on adjacent structures to measure both vertical and lateral movement. Control points should also be established on the excavation support system around the entire site perimeter for similar movement monitoring. During any construction operation below existing grade, the contractor should monitor the control points once per day. The surrounding streets and sidewalks should also be inspected daily for cracks, lateral movement, and settlement. If progressive movement is observed, corrective measures

must be taken immediately. Construction vibrations should be measured by seismographs. We also expect NYCT will require a pre-construction survey of their structures prior to construction, and monitoring of vibrations and displacement of their facilities.

CLOSURE

This report represents the results of our investigation and our recommendations for foundation design and construction. We would be pleased to meet with you to answer questions you may have concerning our report and assist further on the project as you may request.

Very truly yours,

MUESER RUTLEDGE CONSULTING ENGINEERS

By: _____
Sara Rocha

By: _____
Alfred H. Brand, P.E.

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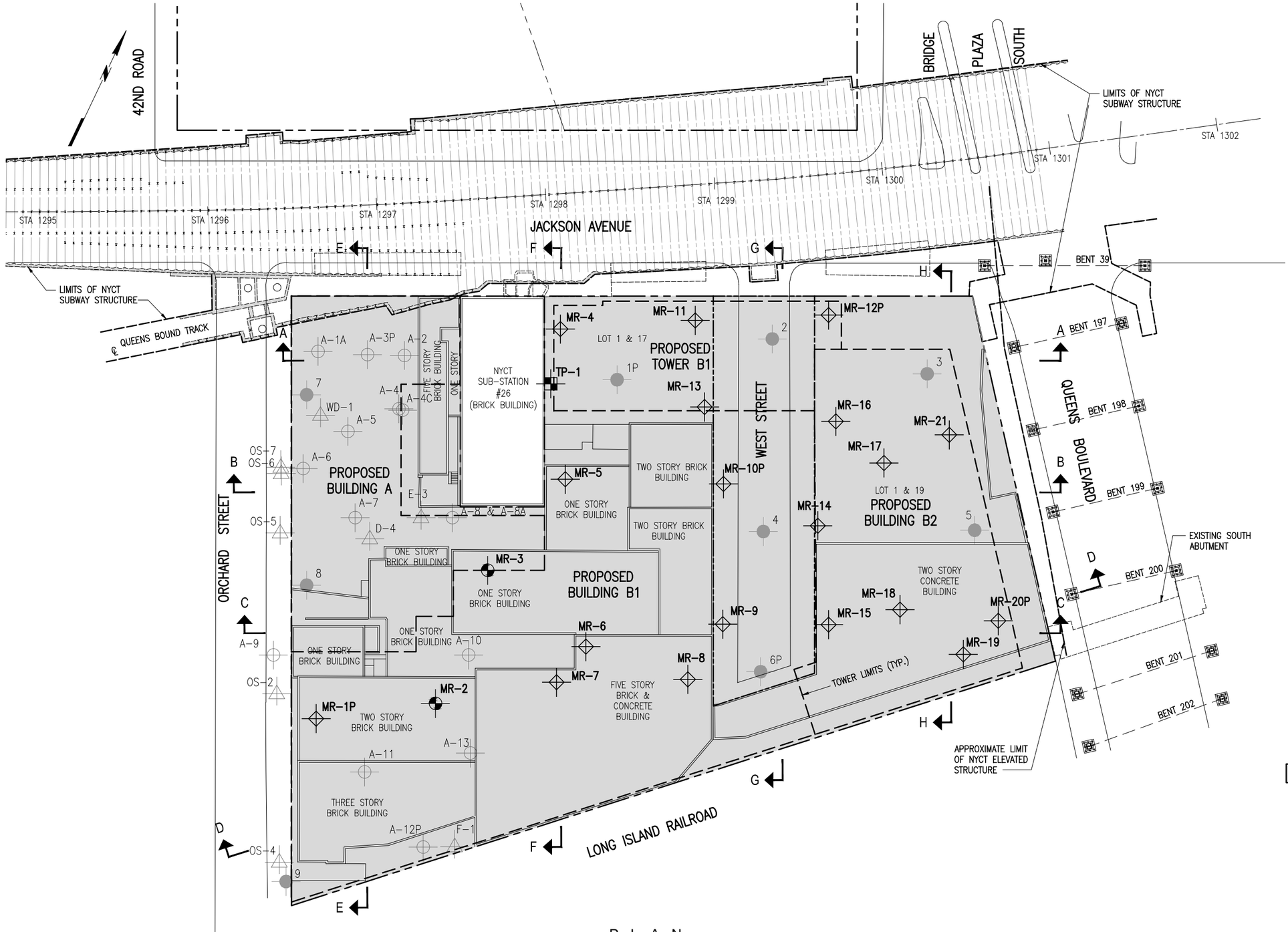
EXHIBITS



P L A N

GRAPHIC SCALE

30' 20' 10' 0 30' 60'

GENERAL NOTES:

1. PLAN BASED ON SURVEY BY MONTROSE SURVEYING CO., INC., DATED 5–30–07 AND REVISED ON 9–26–14.
2. SUBWAY LOCATIONS AND ELEVATIONS WERE OBTAINED FROM NYCT DRAWINGS FOR ROUTE NO. 108, SECTION NO. 1, SUBSECTIONS 1 AND 2, DRAWINGS NOS. 302, 334, 335, 336, 340, 375, 376 AND 426, DATED 1929.
3. LOCATIONS AND ELEVATIONS FOR QUEENS BOUND TRACK WERE OBTAINED FROM NYCT DRAWINGS FOR ROUTE NO. 125A, SECTION NO. 2, SUBSECTION NO. 7, DRAWING NO. 346, DATED 1951.
4. DETAILS OF ELEVATED TRANSIT STRUCTURE WERE OBTAINED FROM NYCT DRAWINGS FOR ROUTE NO. 36 AND 37, SECTION NO. 1, DRAWING NOS. 24A, 26A, 81, 85 DATED FEB. 16, 1915, DRAWINGS NOS. 127, 128 AND 130, DATED JUNE 1922, AND SURVEY BY MONTROSE SURVEYING CO., INC., DATED 3–23–07.
5. BORINGS NOS. MR–1P THROUGH MR–21 EXCEPT MR–2 AND MR–3, WERE MADE BY AQUIFER DRILLING AND TESTING, INC. BETWEEN SEPTEMBER 11 AND OCTOBER 13, 2014 UNDER CONTINUOUS INSPECTION BY MUESER RUTLEDGE CONSULTING ENGINEERS (MRCE).
6. AS–DRILLED LOCATIONS AND GROUND SURFACE ELEVATIONS FOR BORINGS NOS. MR–1P THROUGH MR–21 EXCEPT MR–2 AND MR–3 WERE SURVEYED BY MEGA ENGINEERING AND LAND SURVEYING, P.C., DATED OCTOBER 15, 2014.
7. BORINGS NOS. MR–2 AND MR–3 WERE NOT ACCESSIBLE AND WILL BE DONE AFTER BUILDING DEMOLITION.
8. TEST PIT LOCATION AND ELEVATION FOR TP–1 WAS MEASURED IN THE FIELD AND GROUND SURFACE ELEVATIONS WERE ESTIMATED BY MRCE.
9. FOR GEOLOGIC SECTIONS A–A THROUGH H–H, SEE DRAWING NOS. GS–1 THROUGH GS–4.

LEGEND:

A–6 – BORING MADE IN 2007.
"P" INDICATES PIEZOMETER INSTALLATION.
"A" INDICATES OFFSET FROM ORIGINAL LOCATION

7 – BORING MADE IN 1988.
"P" INDICATES PIEZOMETER INSTALLATION.

WD–1 – OBSERVATION WELL INSTALLED UNDER INSPECTION BY FLEMING LEE SHUE.

MR–1P – BORING MADE IN 2014.
"P" INDICATES PIEZOMETER INSTALLATION

MR–1 – PROPOSED BORINGS

TP–1 – TEST PIT MADE IN 2014

– INDICATES PROJECT SITE

REV.	DATE	BY	DESCRIPTION

QUEENS PLAZA
RESIDENTIAL DEVELOPMENT

QUEENS NEW YORK

TISHMAN SPEYER PROPERTIES

NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W. 34TH STREET, NY, NY 10122

SCALE	MADE BY: L.R.	DATE: 01–08–2015	FILE NUMBER
GRAPHIC	CH'KD BY: S.M.R.	DATE: 01–08–2015	10608D

BORING AND TEST PIT LOCATION PLAN

DRAWING NUMBER B–1

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1 SITE PLAN
1/32" = 1'-0"

SOURCE: QPRD – Scheme 2 – Zoning Lot, Drawing No. Z-001.00 by GHWA, MSMEA, WSP, Edwards and Zuck, D.P.C., and MRCE, dated 11/3/2014.

QUEENS PLAZA RESIDENTIAL DEVELOPMENT

QUEENS NEW YORK

TISHMAN SPEYER PROPERTIES

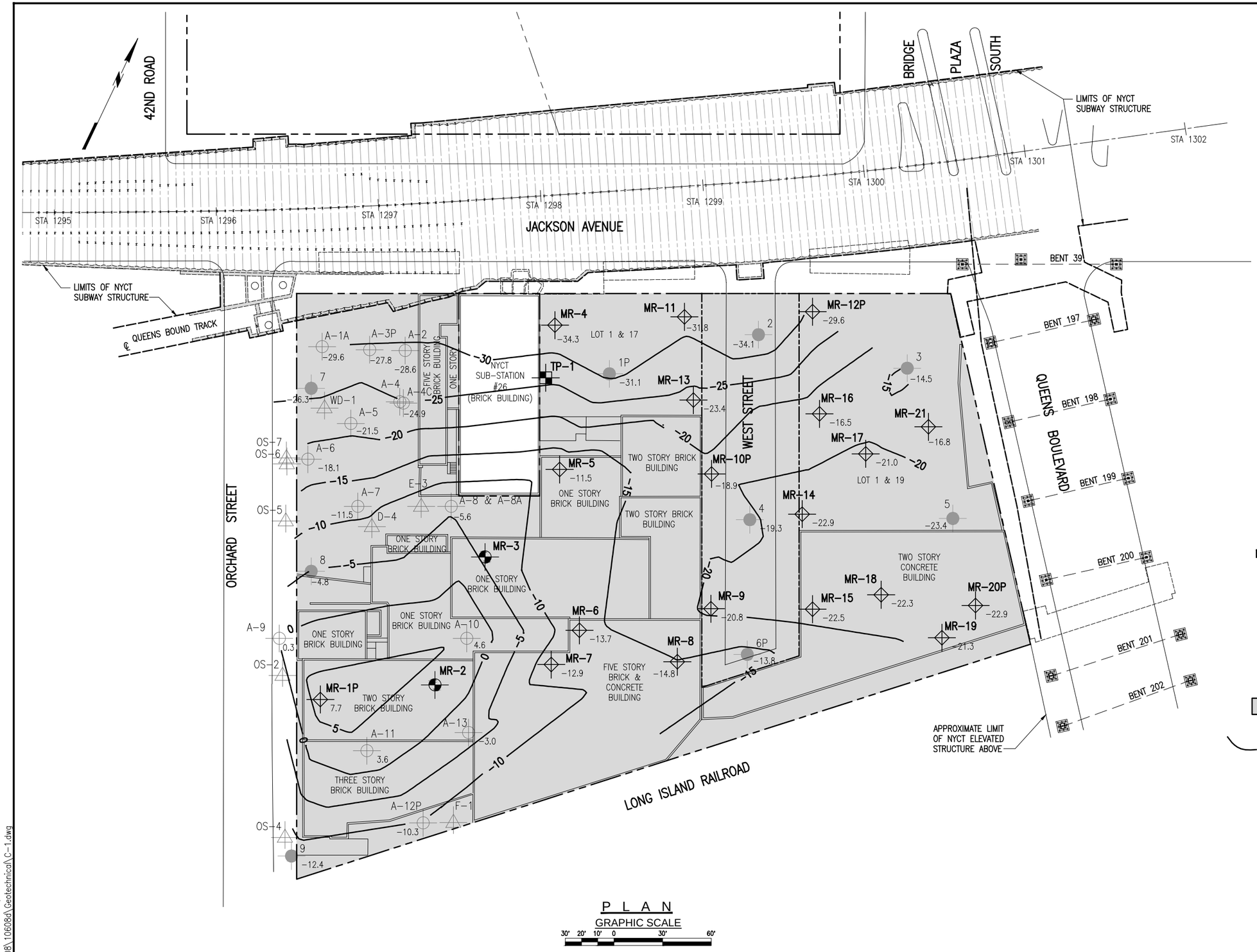
NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34TH STREET, NEW YORK, NY 10122

SCALE	MADE BY: SMR	DATE: 12-19-14	FILE NO.
-	CH'KD BY: CZ	DATE: 01-08-15	10608D

PROPOSED SITE PLAN FIGURE NO. 1



NOTES:

1. PLAN BASED ON SURVEY BY MONTROSE SURVEYING CO., INC., DATED 5–30–07 AND REVISED ON 9–26–14.
2. FOR PLAN NOTES, SEE DRAWING NO. B–1.
3. ELEVATIONS OF TOP OF ROCK SHOWN AT BORINGS WERE INTERPRETED FROM BORING LOGS.
4. CONTOURS ILLUSTRATE INTERPOLATIONS BETWEEN BORINGS OF THE TOP OF ROCK AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
5. ELEVATIONS ARE REFERENCED REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

LEGEND:

- A–6 / –11.5 – BORING MADE IN 2007. "P" INDICATES PIEZOMETER INSTALLATION. "A" INDICATES OFFSET FROM ORIGINAL LOCATION. TOP OF ROCK ELEVATION
- 7 / –10.5 – BORING MADE IN 1988. "P" INDICATES PIEZOMETER INSTALLATION. TOP OF ROCK ELEVATION
- WD–1 – OBSERVATION WELL INSTALLED UNDER INSPECTION BY FLEMING LEE SHUE
- MR–1P / –12.9 – AS–DRILLED BORING MADE IN 2014. "P" INDICATES PIEZOMETER INSTALLATION. TOP OF ROCK ELEVATION
- MR–1 – PROPOSED BORINGS
- TP–1 – TEST PIT MADE IN 2014
- INDICATES PROJECT SITE
- –20 – CONTOUR ELEVATION OF TOP OF ROCK OF CLASS 1C OR BETTER

PLAN

GRAPHIC SCALE

30' 20' 10' 0 30' 60'

REV.	DATE	BY	DESCRIPTION

QUEENS PLAZA
RESIDENTIAL DEVELOPMENT

QUEENS NEW YORK

TISHMAN SPEYER PROPERTIES

NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W. 34TH STREET, NY, NY 10122

SCALE	MADE BY: L.R.	DATE: 01–08–2015	FILE NUMBER
GRAPHIC	CH'KD BY: S.M.R.	DATE: 01–08–2015	10608D

ROCK CONTOUR PLAN

DRAWING NUMBER C–1

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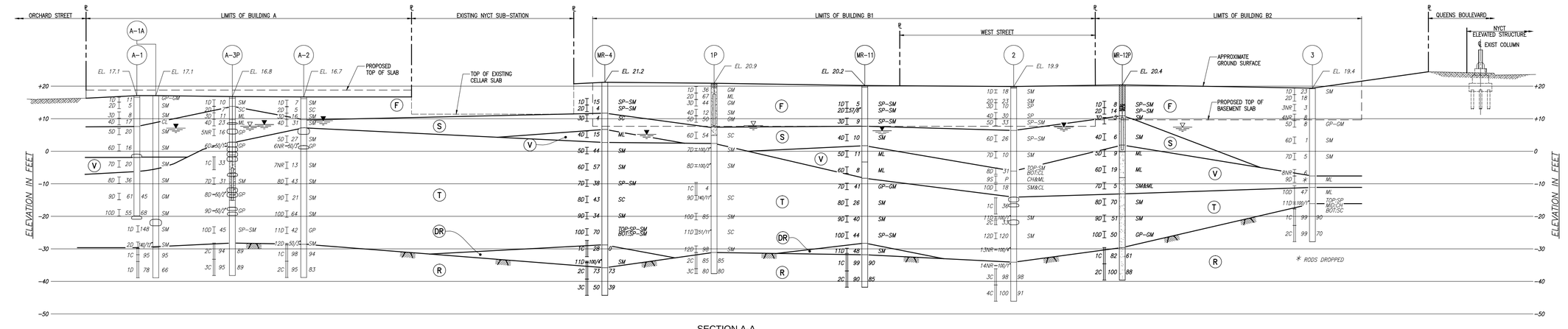
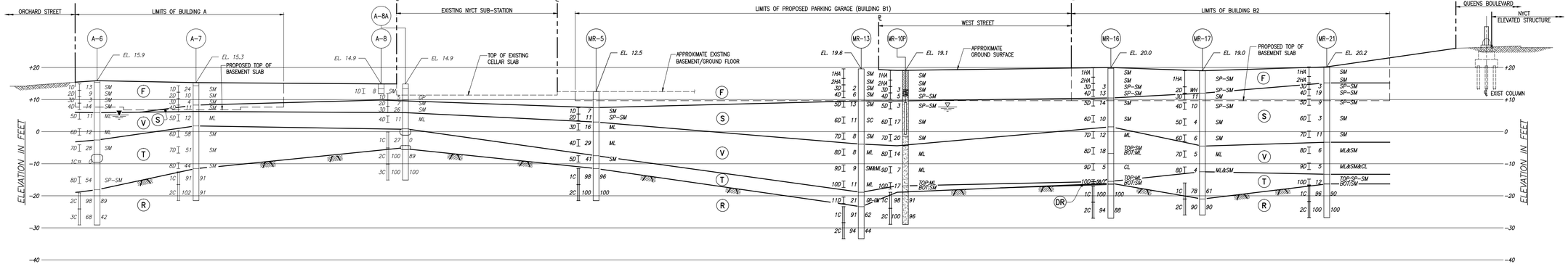


SECTION A-A



SECTION B-B

GRAPHIC SCALE
10' 5' 0 10' 20'

NOTES:

1. FOR GENERAL NOTES AND SECTION LOCATIONS SEE DRAWING NO. B-1.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. STRATIFICATIONS ON GEOLOGIC SECTIONS ARE NECESSARY INTERPOLATIONS BETWEEN BORINGS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
4. SAMPLE DESCRIPTIONS AND STRATIFICATIONS SHOWN ARE BY MRCE.
5. SEE DRAWING NO. GS-R FOR BORING LEGEND AND SUMMARY OF UNIFIED SOIL CLASSIFICATION CRITERIA.
6. SEE DRAWING NO. RC-1 FOR ROCK CLASSIFICATION CRITERIA.
7. COMPLETE SOIL AND ROCK SAMPLE DESCRIPTIONS ARE PROVIDED ON THE BORING LOGS IN APPENDICES A, C AND D.

GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT, BROWN, GRAY AND BLACK FINE TO COARSE SAND, SILTY TO TRACE SILT, GRAVELLY TO TRACE GRAVEL, TRACE TO SOME BRICK AND CONCRETE FRAGMENTS, ASPHALT, CLAY, TRACE WOOD, CINDERS, GLASS, METAL, VEGETATION AND COBBLES.

(S) **SAND** – LOOSE TO VERY COMPACT, BROWN AND GRAY FINE TO MEDIUM SAND, SILTY TO TRACE SILT, TRACE TO SOME GRAVEL, TRACE CLAYEY SILT POCKETS, LAYERS AND SEAMS, FINE SAND SEAMS AND LAYERS.

(V) **VARVED SILT AND CLAY** – INTERLAYERED, SOFT TO STIFF, GRAY AND BROWN SILTY CLAY, SILT AND SILTY FINE SAND, SOME TO TRACE FINE TO COARSE SAND LAYERS AND SEAMS, TRACE GRAVEL.

(T) **GLACIAL TILL** – MEDIUM COMPACT TO VERY COMPACT, GRAY AND GRAY BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, GRAVEL, TRACE BOULDERS, COBBLES, CLAY AND ROCK FRAGMENTS.

(DR) **DECOMPOSED ROCK** – COMPACT TO VERY COMPACT, GRAY AND WHITE FINE TO COARSE SAND, SOME SILT, GRAVEL, CLAY, ROCK FRAGMENTS, TRACE MICA.

(R) **ROCK** – HARD TO INTERMEDIATE, UNWEATHERED TO MODERATELY WEATHERED, GRAY GNEISS WITH WHITE PEGMATITE AND GRAY SCHISTOSE GNEISS ZONES, MASSIVE TO BROKEN, WEATHERED AND IRON STAINED JOINTS, TRACE MINERAL COATED JOINTS.

BIDDING: IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER ANY ITEM ON THESE PLANS IN ANY WAY. IF ALTERATIONS TO THESE PLANS ARE MADE, THE ALTERATIONS SHALL BE MADE IN ACCORDANCE WITH ARTICLE 145 – SECTION 7209.2 OF THE NEW YORK STATE EDUCATION LAW.

THIS DRAWING IS THE PROPERTY OF MUESER RUTLEDGE CONSULTING ENGINEERS (MRCE), AND THE INFORMATION HEREON IS NOT TO BE USED IN WHOLE OR IN PART. THE INFORMATION AND TECHNOLOGY EMBODIED HEREIN SHALL NOT BE DISCLOSED OR USED AND THE DRAWING SHALL NOT BE REPRODUCED OR COPIED IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY MRCE. ANY UNAUTHORIZED REUSE OF, OR MODIFICATION TO, THIS DRAWING WILL BE HELD STRICTLY LIABLE FOR ANY VIOLATION OF THIS NOTICE, WHETHER WILLFUL OR NEGLIGENT.

REV.	DATE	BY	DESCRIPTION

QUEENS PLAZA
RESIDENTIAL DEVELOPMENT
QUEENS NEW YORK

TISHMAN SPEYER PROPERTIES
NEW YORK NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS
14 PENN PLAZA – 225 W. 34TH STREET, NY, NY 10122

SCALE	MADE BY: L.R.	DATE: 01-08-2015	FILE NUMBER
GRAPHIC	CHKD BY: S.M.R.	DATE: 01-08-2015	10608D

GEOLOGIC SECTIONS
A-A AND B-B

DRAWING NUMBER
GS-1

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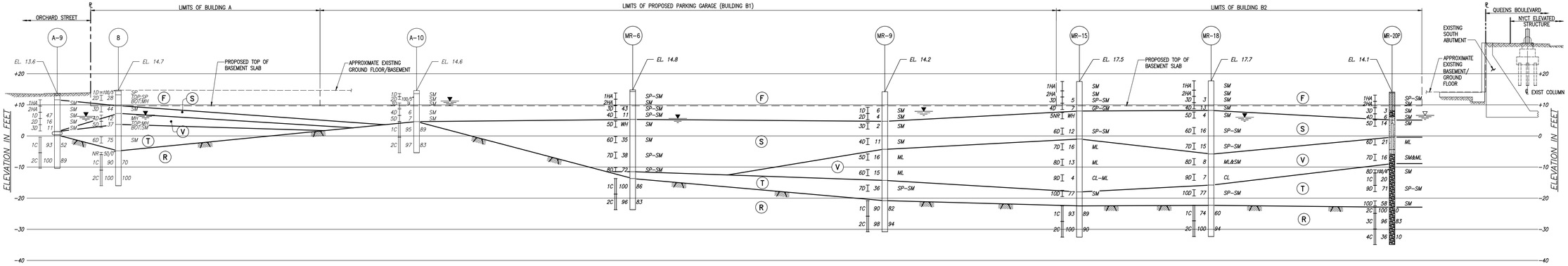
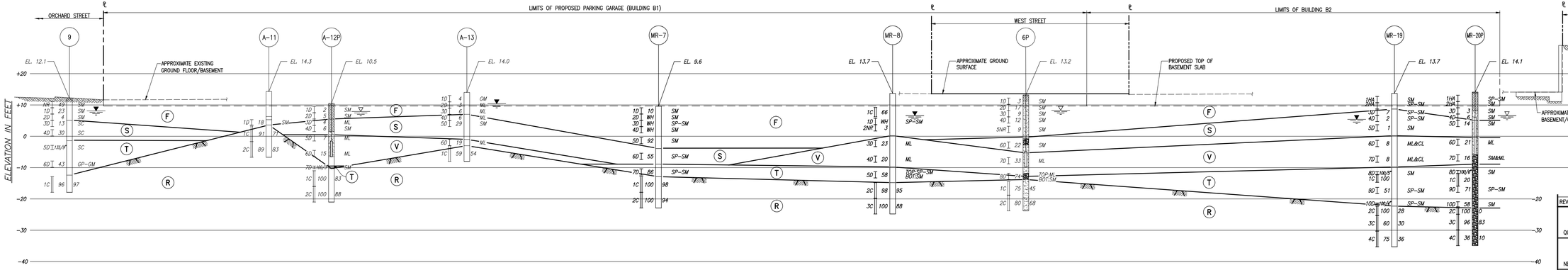


SECTION C-C



SECTION D-D

NOTES:

1. FOR GENERAL NOTES AND SECTION LOCATIONS, SEE DRAWING NO. B-1.
2. FOR GEOLOGIC SECTION NOTES, SEE DRAWING NO. GS-1.

GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT, BROWN, GRAY AND BLACK FINE TO COARSE SAND, SILTY TO TRACE SILT, GRAVELLY TO TRACE GRAVEL, TRACE TO SOME BRICK AND CONCRETE FRAGMENTS, ASPHALT, CLAY, TRACE WOOD, CINDERS, GLASS, METAL, VEGETATION AND COBBLES.

(S) **SAND** – LOOSE TO VERY COMPACT, BROWN AND GRAY FINE TO MEDIUM SAND, SILTY TO TRACE SILT, TRACE TO SOME GRAVEL, TRACE CLAYEY SILT POCKETS, LAYERS AND SEAMS, FINE SAND SEAMS AND LAYERS.

(V) **VARVED SILT AND CLAY** – INTERLAYERED, SOFT TO STIFF, GRAY AND BROWN SILTY CLAY, SILT AND SILTY FINE SAND, SOME TO TRACE FINE TO COARSE SAND LAYERS AND SEAMS, TRACE GRAVEL.

(T) **GLACIAL TILL** – MEDIUM COMPACT TO VERY COMPACT, GRAY AND GRAY BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, GRAVEL, TRACE BOULDERS, COBBLES, CLAY AND ROCK FRAGMENTS.

(DR) **DECOMPOSED ROCK** – COMPACT TO VERY COMPACT, GRAY AND WHITE FINE TO COARSE SAND, SOME SILT, GRAVEL, CLAY, ROCK FRAGMENTS, TRACE MICA.

(R) **ROCK** – HARD TO INTERMEDIATE, UNWEATHERED TO MODERATELY WEATHERED, GRAY GNEISS WITH WHITE PEGMATITE AND GRAY SCHISTOSE GNEISS ZONES, MASSIVE TO BROKEN, WEATHERED AND IRON STAINED JOINTS, TRACE MINERAL COATED JOINTS.

GRAPHIC SCALE
10' 5' 0 10' 20'

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GEOLOGIC SECTIONS
C-C AND D-D

DRAWING NUMBER
GS-2

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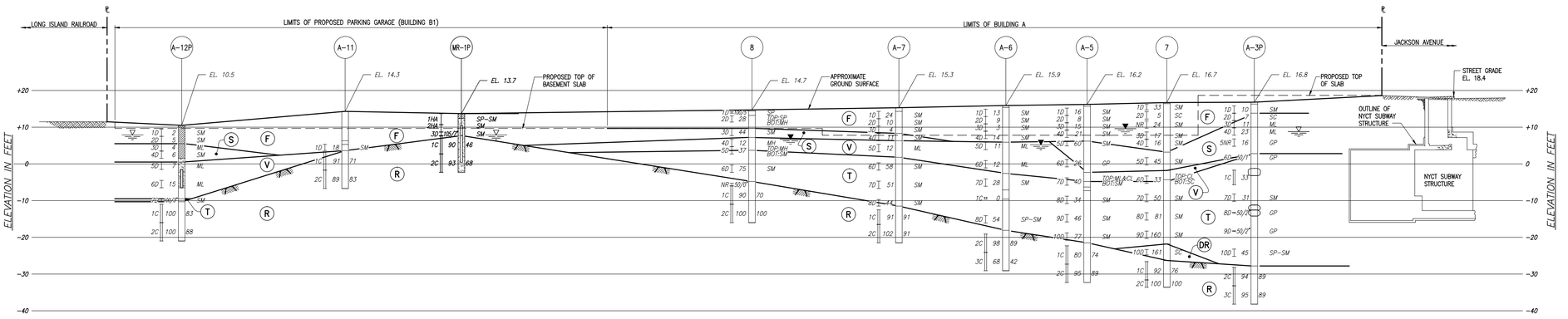
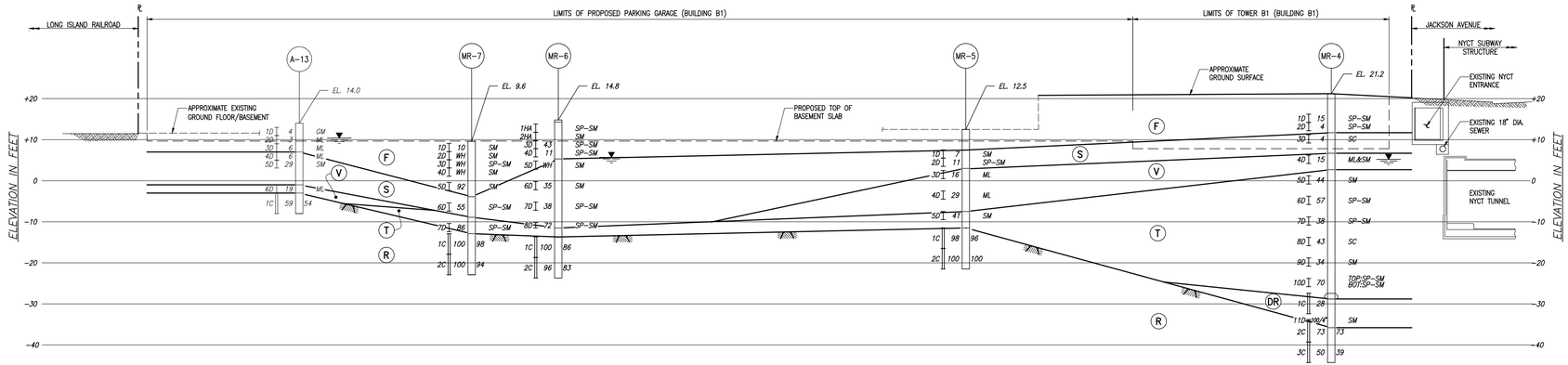


SECTION E-E



SECTION F-F

NOTES:

1. FOR GENERAL NOTES AND SECTION LOCATIONS, SEE DRAWING NO. B-1.
2. FOR GEOLOGIC SECTION NOTES, SEE DRAWING NO. GS-1.

GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT, BROWN, GRAY AND BLACK FINE TO COARSE SAND, SILTY TO TRACE SILT, GRAVELLY TO TRACE GRAVEL, TRACE TO SOME BRICK AND CONCRETE FRAGMENTS, ASPHALT, CLAY, TRACE WOOD, CINDERS, GLASS, METAL, VEGETATION AND COBBLES.

(S) **SAND** – LOOSE TO VERY COMPACT, BROWN AND GRAY FINE TO MEDIUM SAND, SILTY TO TRACE SILT, TRACE TO SOME GRAVEL, TRACE CLAYEY SILT POCKETS, LAYERS AND SEAMS, FINE SAND SEAMS AND LAYERS.

(V) **VARVED SILT AND CLAY** – INTERLAYERED, SOFT TO STIFF, GRAY AND BROWN SILTY CLAY, SILT AND SILTY FINE SAND, SOME TO TRACE FINE TO COARSE SAND LAYERS AND SEAMS, TRACE GRAVEL.

(T) **GLACIAL TILL** – MEDIUM COMPACT TO VERY COMPACT, GRAY AND GRAY BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, GRAVEL, TRACE BOULDERS, COBBLES, CLAY AND ROCK FRAGMENTS.

(DR) **DECOMPOSED ROCK** – COMPACT TO VERY COMPACT, GRAY AND WHITE FINE TO COARSE SAND, SOME SILT, GRAVEL, CLAY, ROCK FRAGMENTS, TRACE MICA.

(R) **ROCK** – HARD TO INTERMEDIATE, UNWEATHERED TO MODERATELY WEATHERED, GRAY GNEISS WITH WHITE PEGMATITE AND GRAY SCHISTOSE GNEISS ZONES, MASSIVE TO BROKEN, WEATHERED AND IRON STAINED JOINTS, TRACE MINERAL COATED JOINTS.

GRAPHIC SCALE
10' 5' 0 10' 20'

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GEOLOGIC SECTIONS
E-E AND F-F

DRAWING NUMBER
GS-3

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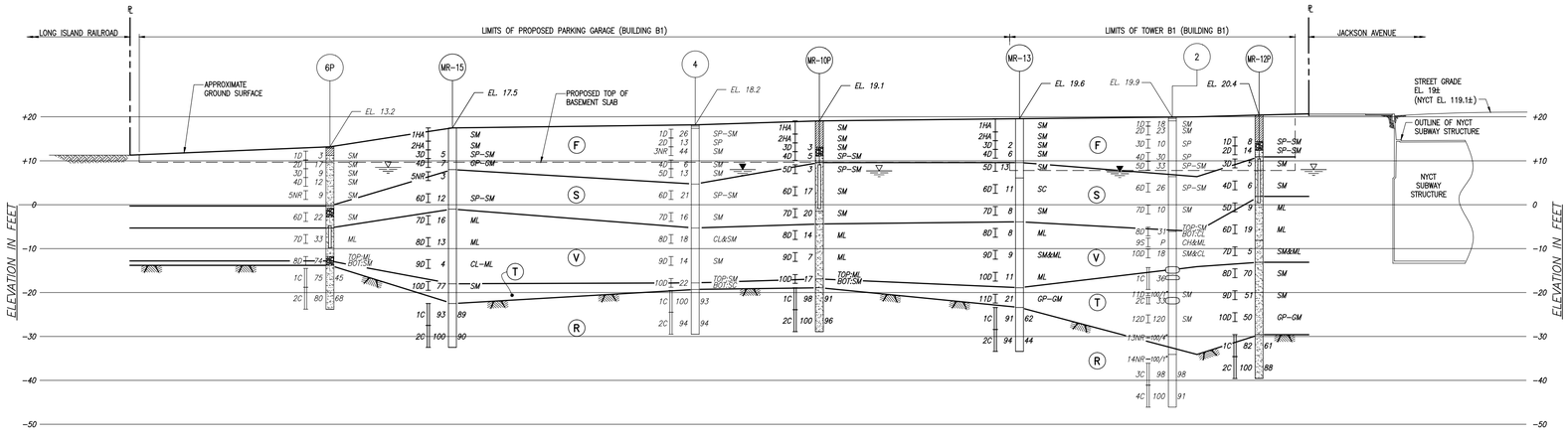
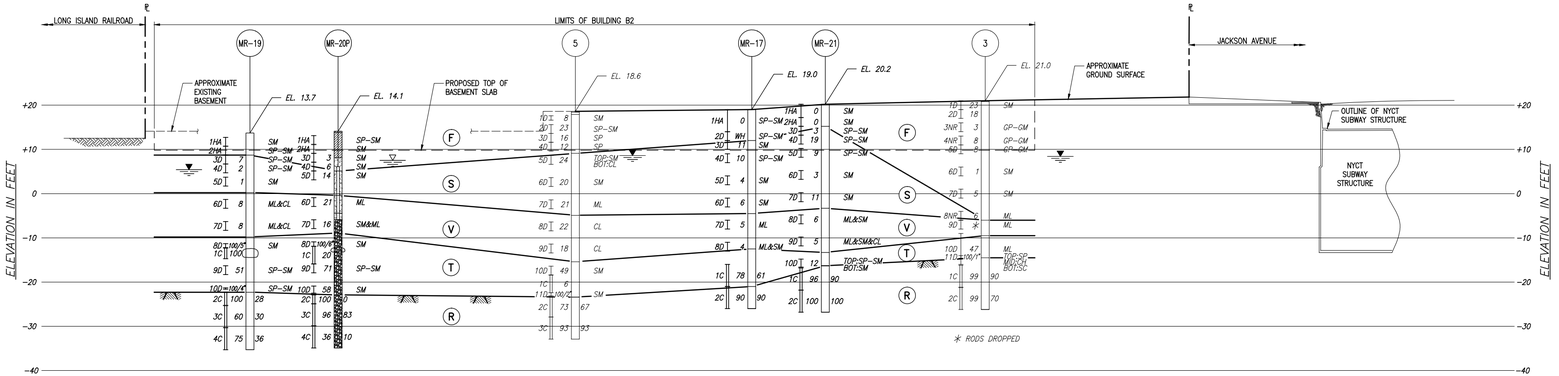


SECTION G-G



SECTION H-H

NOTES:

1. FOR GENERAL NOTES AND SECTION LOCATIONS, SEE DRAWING NO. B-1.
2. FOR GEOLOGIC SECTION NOTES, SEE DRAWING NO. GS-1.

GENERAL STRATA DESCRIPTIONS:

(F) **FILL** – LOOSE TO VERY COMPACT, BROWN, GRAY AND BLACK FINE TO COARSE SAND, SILTY TO TRACE SILT, GRAVELLY TO TRACE GRAVEL, TRACE TO SOME BRICK AND CONCRETE FRAGMENTS, ASPHALT, CLAY, TRACE WOOD, CINDERS, GLASS, METAL, VEGETATION AND COBBLES.

(S) **SAND** – LOOSE TO VERY COMPACT, BROWN AND GRAY FINE TO MEDIUM SAND, SILTY TO TRACE SILT, TRACE TO SOME GRAVEL, TRACE CLAYEY SILT POCKETS, LAYERS AND SEAMS, FINE SAND SEAMS AND LAYERS.

(V) **VARVED SILT AND CLAY** – INTERLAYERED, SOFT TO STIFF, GRAY AND BROWN SILTY CLAY, SILT AND SILTY FINE SAND, SOME TO TRACE FINE TO COARSE SAND LAYERS AND SEAMS, TRACE GRAVEL.

(T) **GLACIAL TILL** – MEDIUM COMPACT TO VERY COMPACT, GRAY AND GRAY BROWN FINE TO COARSE SAND, SOME TO TRACE SILT, GRAVEL, TRACE BOULDERS, COBBLES, CLAY AND ROCK FRAGMENTS.

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GRAPHIC SCALE
10' 5' 0 10' 20'

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GEOLOGIC SECTIONS
G-G AND H-H

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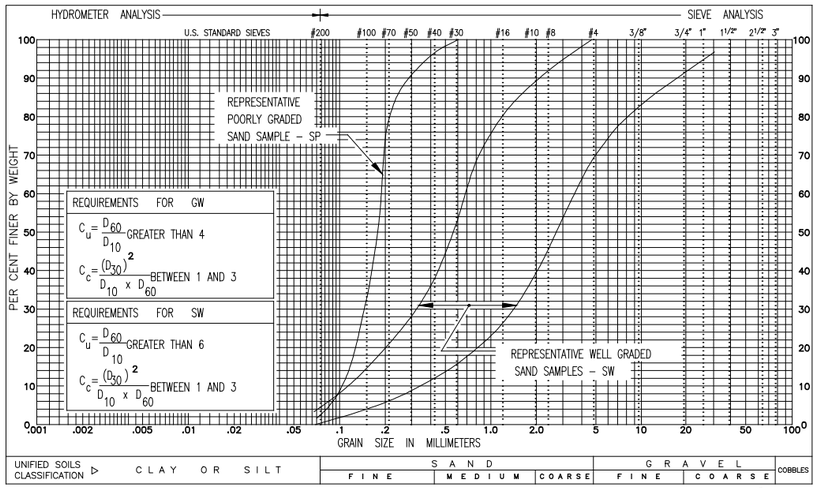
UNIFIED SOIL CLASSIFICATION (INCLUDING IDENTIFICATION AND DESCRIPTION)

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	FIELD IDENTIFICATION PROCEDURES (EXCLUDING PARTICLES LARGER THAN 3 IN. AND BASING FRACTIONS ON ESTIMATED WEIGHTS)
1	2		3	4	5
COARSE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE BUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE	GRAVELS: MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE. (FOR VISUAL CLASSIFICATION, THE 1/4 -IN. SIZE MAY BE USED AS EQUIVALENT TO THE NO. 4 SIEVE SIZE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES.
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	PREDOMINANTLY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING.
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT-MIXTURES.	NONPLASTIC FINES OR FINES WITH LOW PLASTICITY (FOR IDENTIFICATION PROCEDURES SEE ML BELOW)
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.	PLASTIC FINES (FOR IDENTIFICATION PROCEDURES SEE CL BELOW)
	SANDS: MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE.	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.	WIDE RANGE IN GRAIN SIZES AND SUBSTANTIAL AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES.
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.	PREDOMINANTLY ONE SIZE OR A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING.
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT-MIXTURES.	NONPLASTIC FINES OR FINES WITH LOW PLASTICITY (FOR IDENTIFICATION PROCEDURES SEE ML BELOW)
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES.	PLASTIC FINES (FOR IDENTIFICATION PROCEDURES SEE CL BELOW)
FINE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE BUT THE NO. 200 SIEVE SIZE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE					IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN NO. 40 SIEVE SIZE
					DRY STRENGTH (CRUSHING CHARACTERISTICS) / DILATANCY (REACTION TO SHAKING) / TOUGHNESS (CONSISTENCY NEAR PL)
	SILTS AND CLAYS: LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, SANDY SILTS, ROCK FLOUR, OR CLAYEY SILTS WITH SLIGHT PLASTICITY.	NONE TO SLIGHT / QUICK TO SLOW / NONE
			CL	INORGANIC CLAYS, OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.	MEDIUM TO HIGH / NONE TO VERY SLOW / MEDIUM
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.	SLIGHT TO MEDIUM / SLOW / SLIGHT
	SILTS AND CLAYS: LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.	SLIGHT TO MEDIUM / SLOW TO NONE / SLIGHT TO MEDIUM
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.	HIGH TO VERY HIGH / NONE / HIGH
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.	MEDIUM TO HIGH / NONE TO VERY SLOW / SLIGHT TO MEDIUM
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS.	READILY IDENTIFIED BY COLOR, ODOR, SPONGY FEEL AND FREQUENTLY BY FIBROUS TEXTURE.

BOUNDARY CLASSIFICATIONS: SOILS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE DESIGNATED BY COMBINATIONS OF GROUP SYMBOLS, I.E.: SP-SC POORLY GRADED SAND WITH CLAY BINDER.

LABORATORY CLASSIFICATION CRITERIA

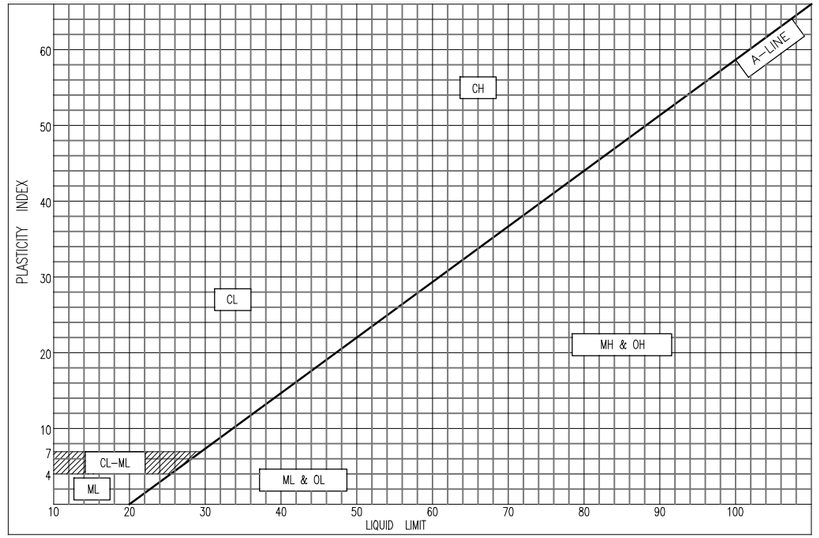


GRAIN SIZE PLOT

COBBLE 3-12"
BOULDER > 12"

DEPENDING ON PERCENTAGE OF FINES (FRACTION SMALLER THAN NO. 200 SIEVE SIZE) COARSE GRAINED SOILS ARE CLASSIFIED AS FOLLOWS:

LESS THAN 5%	GW, GP, SW, SP
MORE THAN 12%	GM, GC, SM, SC
5% TO 12%	BORDERLINE CASES REQUIRING USE OF DUAL SYMBOLS, I.E.: SP-SM, GP-GM.



PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS

TERMINOLOGY USED IN MRCE SOIL DESCRIPTIONS

DEGREE OF COMPACTION FOR NON-PLASTIC SOIL

DEGREE OF COMPACTION	BLOWS* PER FOOT
LOOSE	0 TO 10
MEDIUM COMPACT	11 TO 29
COMPACT	30 TO 50
VERY COMPACT	GREATER THAN 50

* STANDARD PENETRATION RESISTANCE USING 140 LB. HAMMER FREE FALLING 30 INCHES TO DRIVE A 2 INCH O.D. SPLIT-SPOON SAMPLER.

CONSISTENCY OF CLAY AND CLAYEY SILT+

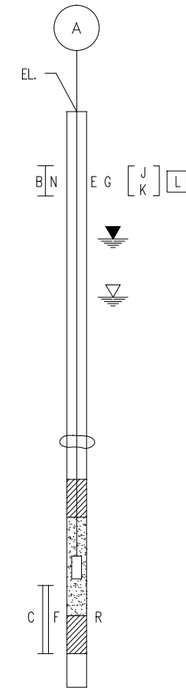
CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TSF)	IDENTIFICATION CHARACTERISTICS
SOFT	LESS THAN 0.5	EASILY REMOLDED WITH SLIGHT FINGER PRESSURE
MEDIUM	0.5 TO 1.0	REQUIRES SUBSTANTIAL PRESSURE FOR REMOLDING
STIFF	1.0 TO 4.0	DIFFICULT TO REMOLD WITH FINGERS
HARD	GREATER THAN 4.0	CANNOT BE REMOLDED WITH FINGERS

\+ NONPLASTIC SILTS ARE DESCRIBED USING DEGREE OF COMPACTION AS PRESENTED FOR NON-PLASTIC SOIL.

DESCRIPTION OF CONSTITUENT PERCENTAGES AS USED IN SOIL SAMPLE CLASSIFICATIONS

1% TO 12%	"TRACE"
13% TO 30%	"SOME"
31% TO 49%	ADJECTIVE FORM OF SOIL GROUP (EG. SANDY)
EQUAL AMOUNT	"AND" (EG. SAND AND GRAVEL)

BORING LEGEND



- A — NUMBER, TYPE AND LOCATION OF BORING
- EL. — GROUND SURFACE ELEVATION AT BORING
- B — NUMBER AND TYPE OF SAMPLE
  - HA – HAND AUGER SAMPLE
  - D – DRY SAMPLE TAKEN WITH 2 INCH O.D. SPLIT SPOON
  - U – UNDISTURBED SAMPLE TAKEN WITH 3 INCH O.D. FIXED PISTON TYPE SAMPLER
  - UD – UNDISTURBED SAMPLE EXTRUDED IN FIELD AND PLACED IN JAR DUE TO POOR RECOVERY OR DISTURBANCE
  - S – THIN TUBE SAMPLE TAKEN WITH SHELBY TUBE SAMPLER
  - N – THIN TUBE SAMPLE TAKEN WITH DENISON BARREL SAMPLER
  - P – THIN TUBE SAMPLE TAKEN WITH PITCHER BARREL SAMPLER
  - NR – NO RECOVERY
- N — STANDARD PENETRATION RESISTANCE. NUMBER OF BLOWS FROM 140 LB. HAMMER FREE FALLING 30 INCHES REQUIRED TO DRIVE 2 INCH O.D. SPLIT SPOON SAMPLER ONE FOOT AFTER INITIAL PENETRATION OF 6 INCHES, UNLESS A SPECIFIC PENETRATION IS INDICATED.
  - P – PRESSED OR PUSH SAMPLE
  - WH – SAMPLE TAKEN UNDER WEIGHT OF HAMMER AND RODS
  - WR – SAMPLE TAKEN UNDER WEIGHT OF RODS
- E — AVERAGE NATURAL WATER CONTENT OF SAMPLE, IN PERCENT OF DRY WEIGHT
- G — UNIFIED SOIL CLASSIFICATON GROUP SYMBOL OF SAMPLE
- [J / K] = ATTERBERG LIQUID LIMIT VALUE / ATTERBERG PLASTIC LIMIT VALUE
- [L] — COMPRESSIVE STRENGTH IN TSF DETERMINED FROM UNCONFINED COMPRESSION TEST
- (M) — COMPRESSIVE STRENGTH IN TSF DETERMINED FROM UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
- GROUNDWATER LEVEL OBSERVED IN BORING (*– MUD LEVEL)
- GROUNDWATER LEVEL OBSERVED IN PIEZOMETER
- C — ROCK CORE NUMBER
- LENGTH OF CORE RUN
- F — LENGTH OF CORE RECOVERED EXPRESSED AS A PERCENT OF THE LENGTH OF CORE RUN
- R — ROCK QUALITY DESIGNATION–THE SUM OF THE LENGTHS OF PIECES OF RECOVERED CORE WHICH ARE EQUAL TO OR GREATER THAN FOUR INCHES IN LENGTH, EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF CORE RUN. LENGTHS ARE MEASURED BETWEEN IN-SITU SEPARATIONS AND MECHANICAL BREAKS RESULTING FROM CORING ARE IGNORED.
- IMPERVIOUS SEAL
- SAND FILTER SURROUNDING PIEZOMETER INTAKE ELEMENT
- INTAKE ELEMENT
- COBBLE OR BOULDER

REVISED 10-25-2012

MUESER RUTLEDGE CONSULTING ENGINEERS
225 WEST 34th STREET – 14 PENN PLAZA
NEW YORK, NY 10122

GEOTECHNICAL REFERENCE STANDARDS

DRAWING NO. GS-R

TABLE R–1 ROCK CORE CLASSIFICATION CRITERIA

HARDNESS/SOUNDNESS CLASSIFICATION	TYPICAL GEOLOGIC CLASSIFICATION	IDENTIFICATION CHARACTERISTICS	GENERAL MINIMUM CORING CHARACTERISTICS				INTACT SPECIMEN TYPICAL MINIMUM COMPRESSIVE STRENGTH
			NX OR LARGER		BX OR SMALLER		
			REC	RQD	REC	RQD	PSI
HARD ROCK UNWEATHERED MAY BE JOINTED	–CRYSTALLINE IGNEOUS, OR METAMORPHIC ROCKS –HIGHLY SILICEOUS SEDIMENTARY ROCKS	– UNWEATHERED FABRIC – RINGS WHEN STRUCK WITH BAR – SHARP AND HARD FRACTURE SURFACE WHEN BROKEN MECHANICALLY – MAY BE JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS MAY BE IRON STAINED. – DOES NOT DISINTEGRATE UPON EXPOSURE – DOES NOT SLAKE IN WATER	95 OR MORE	85 OR MORE	85 OR MORE	75 OR MORE	3000
MEDIUM HARD ROCK SLIGHTLY WEATHERED MAY BE CLOSELY JOINTED	AS FOR HARD ROCKS AND: – MODERATELY SILICEOUS SEDIMENTARY ROCKS – CERTAIN CALCAREOUS ROCKS	AS FOR HARD ROCK, EXCEPT: – FABRIC MAY BE IRON STAINED – MAY BE CLOSELY JOINTED, BUT JOINTS ARE GENERALLY TIGHT. JOINTS HAVE SLIGHT WEATHERING OR MAY BE IRON STAINED.	70	50	50	40	1500
INTERMEDIATE ROCK MODERATELY WEATHERED MAY BE CLOSELY JOINTED	AS FOR MEDIUM HARD ROCKS AND: – MOST SEDIMENTARY ROCKS OTHER THAN COMPACTION SHALES – MOST CALCAREOUS ROCKS WHICH ARE NOT POROUS	AS FOR MEDIUM HARD ROCK, EXCEPT: – MODERATELY WEATHERED FABRIC – WEATHERED JOINTS – THUDS WHEN STRUCK BY BAR – CAN BE INDENTED WITH A STEEL NAIL – BREAKS READILY WITH HAMMER – PIECES OF WEATHERED SURFACE CAN BE BROKEN OFF BY HAND – DOES NOT DISINTEGRATE UPON EXPOSURE – UNWEATHERED PIECES DO NOT SLAKE	50	35	35	25	500
WEATHERED ROCK HIGHLY WEATHERED MAY BE BROKEN	AS FOR INTERMEDIATE ROCKS AND: – COMPACTION SEDIMENTARIES – CALCAREOUS ROCKS WITH SOIL–FILLED CAVITIES	AS FOR INTERMEDIATE ROCK, EXCEPT: – HIGHLY WEATHERED FABRIC – CAN BE BROKEN EASILY, CRUMBLES WITH DIFFICULTY BY HAND – CAN BE SCRAPED BY KNIFE – MAY SOFTEN UPON EXPOSURE – MAY SLAKE IN WATER – STANDARD PENETRATION RESISTANCE EXCEEDS 50 BLOWS/FOOT	LESS THAN 50	LESS THAN 35	LESS THAN 35	LESS THAN 25	150
		WHEN RECOVERED WITH SOIL SAMPLING TECHNIQUES, DESCRIBED AS FOR SOILS INCLUDING USC GROUP SYMBOLS. (WTHD ROCK) ADDED TO DESCRIPTION.					
DECOMPOSED ROCK (RESIDUAL SOILS)	ALL ROCK TYPES	– ROCK TEXTURE AND STRUCTURE OFTEN PRESERVED – GENERALLY SOIL–LIKE IN CONSISTENCY – CAN BE CRUMPLED BY SLIGHT HAND PRESSURE – CAN BE PEELED WITH A KNIFE – STANDARD PENETRATION RESISTANCE LESS THAN 50 BLOWS/FOOT	GENERALLY RECOVERED WITH SOIL SAMPLING TECHNIQUES AND DESCRIBED AS FOR SOILS INCLUDING USC GROUP SYMBOLS. (DEC ROCK) ADDED TO DESCRIPTION.				

NOTES:

1. ROCK CORE DESCRIPTIONS REPRESENT ONLY THE MATERIAL RECOVERED IN THE CORING OPERATIONS.
2. GENERAL MINIMUM CORING CHARACTERISTICS ASSUME ROCK CORING WITH A DOUBLE TUBE SERIES "M" OR EQUIVALENT CORE BARREL USING GOOD CORING TECHNIQUES AND EQUIPMENT.
3. REC – RECOVERY IS THE LENGTH OF CORE RECOVERED, EXPRESSED AS A PERCENTAGE OF THE LENGTH OF CORE RUN.
4. RQD – ROCK QUALITY DESIGNATION IS THE SUM OF THE LENGTHS OF CORE PIECES FOUR INCHES OR LONGER EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF CORE RUN. LENGTHS ARE MEASURED BETWEEN IN–SITU SEPARATIONS; MECHANICAL BREAKS RESULTING FROM CORING AND VERTICAL JOINTS ARE IGNORED.

TABLE R–2 WEATHERING AND JOINTING DEFINITIONS

DEGREE OF FABRIC WEATHERING

FABRIC WEATHERING		CHARACTERISTIC
Unweathered	UnW	No decomposition or discoloration rings when struck
Slightly Weathered	SlW	Iron Stained Rings when struck
Moderately Weathered	MdW	Deteriorated fabric Thuds when struck
Highly Weathered	HiW	Friable, easily broken by hand
Decomposed	Dec	Soil–like

DEGREE OF JOINT WEATHERING

JOINT WEATHERING		CHARACTERISTIC
Iron stained joints	FeJtS	Indicates movement of water along joints
Weathered joints	WJts	Joints are not tight and do not match. Joints have friable edges.

DEGREE OF JOINTING

JOINTING		JOINT FREQUENCY
Massive	Mssv	Less than 1 joint in 4 feet
Blocky	Blky	1 joint every 2 to 4 feet
Moderately Jointed	MdJtd	1 joint every foot to 2 feet
Jointed	Jtd	1 to 2 joints per foot
Closely Jointed	ClJtd	2 to 4 joints per foot
Broken	Bkn	More than 4 joints per foot

Vertical joints are ignored in RQD and joint frequency evaluations, but are noted in written descriptions and and on core sketches.

TABLE R–3 ABBREVIATIONS FOR ROCK CORE CLASSIFICATION

Blocky	Blky	Intermediate	Int
Broken	Bkn	Light	Lt
Brown	brn	Lignite	lign
Calcareous or Calcite	calc	Limestone	lms
Cavities	cvts	Jointed	Jtd
Chlorite	chl	Joints	Jts
Clay, Clayey	cl	Massive	Mssv
Closely Jointed	ClJtd	Medium Hard	MdHd
Coating on joint surface	coat	Mica, Micaceous	Mic
Crushed	crsh	Moderately Jointed	MdJtd
Dark	dk	Moderately Weathered	MdW
Decomposed	Dec	Pockets	pkts
Ditto	do	Quartz	qtz
Dolomite, Dolomitic	Dol	Recovery	Rec
Iron stained Joints	FeJts	Rock Quality Designation	RQD
Iron Stained	FeStn	Sand	sa
Feldspar	feld	Sandstone	ss
Foliation	Fol	Schist, Schistose	sch
Fractured	frct	Shale	sh
Fragments	fgmts	Shear zone	Sz
Gneiss, Gneissic	gns	Siliceous	sil
Gouge	gog	Silt	si
Granite, Granitic	gr	Slickensided	slks
Gray	gry	Slightly Weathered	SlW
Hard	Hd	Unweathered	UnW
Highly Weathered	HiW	Weathered	Wthd
Hornblende	Hbl	Weathered Joints	WJts
Injected	inj	Vein	Vn
Interbedded	Intrbd	Vertical Joints	VJts

TABLE R–4 ROCK CORE SKETCH KEY

SKETCH SYMBOLS

- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand

JOINT ORIENTATION AND CONDITION

			SURFACE – CONDITION			
Parallel	–	//	Curved	– C	Slick	– 1
Crossing	–	X	Irregular	– I	Smooth	– 2
Foliation	–	F	Straight	– S	Rough	– 3
Stratification	–	S				
Unfoliated or Unstratified	–	U				
Mechanical Break	–	MB				

MUESER RUTLEDGE CONSULTING ENGINEERS
225 WEST 34th STREET – 14 PENN PLAZA
NEW YORK, NY 10122

ROCK CORE CLASSIFICATION CRITERIA

DRAWING NO. RC–1

TABLE NO. 1 - SUMMARY OF GROUNDWATER LEVELS

Well No.		F-1	OS-4	OS-2	D-4	E-3	OS-5	OS-6	OS-7	WD-1	A-3P	A-12P	MR-1P	MR-10P	MR-12P	MR-20P
Surface Elevation (NAVD 88)		10.70	12.03	13.42	15.12	14.79	14.48	15.31	15.34	16.31	16.86	10.50	13.40	19.10	20.40	14.10
Well Depth		14.35	11.50	8.00	19.50	18.50	13.65	33.86	14.80	13.00	32.00	17.00	20.00	20.00	20.00	20.00
WATER ELEVATION	**DATE**															
	7/5/2006	-	-	-	5.61	-	6.28	-	4.87	6.65	-	-	-	-	-	-
	8/7/2006	7.52	7.99	5.61	5.98	7.15	5.80	7.67	5.42	6.44	-	-	-	-	-	-
	8/23/2006	7.47	7.75	5.53	5.84	6.36	5.83	5.63	5.54	6.49	-	-	-	-	-	-
	8/31/2006	8.15	8.33	5.87	6.22	6.34	6.08	7.76	5.69	6.61	-	-	-	-	-	-
	9/15/2006	7.85	8.44	5.76	6.37	6.60	6.14	8.06	5.81	6.90	-	-	-	-	-	-
	3/14/2007	7.66	8.23	5.79	6.12	5.94	6.09	5.64	8.48	6.77	-	-	-	-	-	-
	3/20/2007	8.39	9.35	6.84	6.52	6.30	6.31	5.72	9.27	7.64	-	-	-	-	-	-
	3/22/2007	-	-	-	-	-	-	-	-	-	7.66	-	-	-	-	-
	3/23/2007	8.20	8.71	7.04	7.05	6.64	7.00	6.11	9.44	8.05	-	-	-	-	-	-
	3/27/2007	-	-	-	-	-	-	-	-	-	7.56	7.80	-	-	-	-
	4/6/2007	-	-	-	-	-	-	-	-	-	-	8.05	-	-	-	-
	4/16/2007	Flooded	*	8.12	-	8.49	8.28	-	-	-	8.86	Flooded	-	-	-	-
	10/2/2014	-	-	-	-	6.09	-	-	-	6.01	-	-	-	-	-	-
	10/3/2014	-	-	-	-	-	-	-	-	-	-	-	6.10	-	7.70	7.40
	10/6/2014	-	5.93	3.72	-	5.59	5.98	5.71	6.24	6.11	-	-	5.20	-	8.00	7.50
	10/7/2014	-	5.93	5.52	-	5.69	5.58	5.51	5.84	6.01	-	-	6.95	-	7.25	7.50
	10/8/2014	-	5.73	5.62	-	5.59	5.48	5.41	6.84	6.11	-	-	5.05	7.80	7.30	7.60
	10/9/2014	-	5.83	5.62	-	5.19	5.28	5.21	6.64	5.71	-	-	4.75	7.70	7.25	7.40
	10/11/2014	-	5.73	5.62	-	5.09	5.08	4.91	6.34	5.51	-	-	4.75	7.50	7.10	7.50

Note: * Water flows into well

TABLE NO. 2

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					CLASSIFICATION PROPERTIES								PHYSICAL PROPERTIES												
										UNIFIED SOIL CLASSIFICATION SYSTEM			STRENGTH						CONSOLIDATION						
BORING NUMBER	SAMPLE NUMBER	ELEVATION , FT.	STRATUM DESIGNATION	SOIL TYPE	AVERAGE NATURAL WATER CONTENT, W_n , %	LIQUID LIMIT, W_L , %	PLASTICITY INDEX, I_P , %	NATURAL WATER CONTENT OF LIMIT SAMPLE, W_n , %	SPECIFIC GRAVITY OF SOILIDS, G_s	GROUP SYMBOL	% SAND (< #4 > #200 SIEVE)	% FINES (< #200 SIEVE)	TYPE OF TEST	COMPRESSIVE STRENGTH ($\sigma_1 - \sigma_3$) , TSF	CONFINING PRESSURE σ_3 , TSF	STRAIN AT FAILURE, %	NATURAL WATER CONTENT, W_n , %	WATER CONTENT AT END OF TEST, W_f , %	NATURAL WATER CONTENT, W_n , %	INITIAL VOID RATIO, e_o	EXISTING OVERBURDEN STRESS, P_o , TSF	ESTIMATED PRECONSOLIDATION STRESS, P_c , TSF	COMPRESSION INDEX, C_c	RECOMPRESSION INDEX, C_R	VOID RATIO AT START OF SWELL, e_r
MR-1P	2HA	9.7	F							SM	51.3	39.7													
	3D	8.2	F							SM	71.1	17.4													
MR-4	4D	5.2	V							ML&SM	27.6	63.4													
	5D	0.2	T							SM	59.6	22.7													
	6D	-4.8	T							SM	57.6	15.6													
MR-5	3D	1.5	V		21					ML															
	4D	-3.5	V		28					ML															
MR-7	4D	2.1	F							SM	62.0	36.1													
	5D	-1.4	F							SM	57.7	21.5													
	6D	-6.4	S							SP-SM	85.5	8.3													
MR-8	3D	-2.3	V		29					ML															
	4D	-7.3	V		21					ML															
MR-9	4D	-1.8	S							SM		25.8													
	5D	-6.8	V		25					ML															
	6D	-11.8	V		25					ML															
MR-10P	5D	8.1	S							SP-SM	90.8	9.2													
	6D	3.1	S							SM	67.2	32.8													
	7D	-1.9	S							SM	52.2	47.8													
	8D	-6.9	V		22					ML	6.8	93.2													
	9D	11.9	V		33					ML															
MR-11	5D	-0.8	V							ML		62.8													
	6D	-5.8	V		30					ML															
MR-12P	3D	9.4	S							SM	85.5	14.5													
	4D	4.4	S							SM	54.5	45.5													
	5D	-0.6	V							ML	38.7	61.3													
	6D	-5.6	V							ML	20.4	79.6													
MR-13	8D	-6.4	V		27					ML															
	9D	-11.4	V		26					SM&ML															
MR-14	7D	-2.9	V							ML		51.8													
	8D	-7.9	V		30	28	7	26.1		CL&SM															
	9D	-12.9	V			23	3	30.5		SM&ML															

STRATA DESIGNATIONS

F - Fill

S - Sand

V - Varved Silt, Sand and Clay

T - Glacial Till

NOTES

1. All tests summarized were performed in the laboratory of Mueser Rutledge Consulting Engineers.
2. The sample elevation is the average of the sampling interval.
3. Ground surface elevations at borings are:

BORING NO.	BORING ELEVATION	BORING NO.	BORING ELEVATION
MR-1P	+13.7	MR-13	+19.6
MR-4	+21.2	MR-14	+18.1
MR-5	+12.5	MR-15	+17.5
MR-7	+9.6	MR-16	+20.0
MR-8	+13.7	MR-17	+19.0
MR-9	+14.2	MR-18	+17.7
MR-10P	+19.1	MR-19	+13.7
MR-11	+20.2	MR-20P	+14.1
MR-12P	+20.4	MR-21	+20.2

4. "Average natural water content" is a weighted average of all material tested.

MRCE Form LT-1

MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34th STREET, NEW YORK, N.Y. 10122

QUEENS PLAZA RESIDENTIAL DEVELOPMENT

QUEENS **NEW YORK**

TABLE NO. 2

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION					CLASSIFICATION PROPERTIES								PHYSICAL PROPERTIES												
										UNIFIED SOIL CLASSIFICATION SYSTEM			STRENGTH						CONSOLIDATION						
BORING NUMBER	SAMPLE NUMBER	ELEVATION , FT.	STRATUM DESIGNATION	SOIL TYPE	AVERAGE NATURAL WATER CONTENT, W_n , %	LIQUID LIMIT, W_L , %	PLASTICITY INDEX, I_P , %	NATURAL WATER CONTENT OF LIMIT SAMPLE, W_n , %	SPECIFIC GRAVITY OF SOILIDS, G_s	GROUP SYMBOL	% SAND (< #4 > #200 SIEVE)	% FINES (< #200 SIEVE)	TYPE OF TEST	COMPRESSIVE STRENGTH ($\sigma_1 - \sigma_3$) , TSF	CONFINING PRESSURE σ_3 , TSF	STRAIN AT FAILURE, %	NATURAL WATER CONTENT, W_n , %	WATER CONTENT AT END OF TEST, W_f , %	NATURAL WATER CONTENT, W_n , %	INITIAL VOID RATIO, e_o	EXISTING OVERBURDEN STRESS, P_o , TSF	ESTIMATED PRECONSOLIDATION STRESS, P_c , TSF	COMPRESSION INDEX, C_c	RECOMPRESSION INDEX, C_R	VOID RATIO AT START OF SWELL, e_r
MR-15	4D	9.5	F							SM	62.7	16.5													
	6D	1.5	S							SP-SM	84.9	11.4													
	7D	-3.5	V							ML	25.6	74.4													
	8D	-8.5	V			27	6	34.0		CL-ML		87.3													
	9D	-13.5	V			30	8	30.6		ML		75.8													
MR-16	6D	4.0	S							SM		36.8													
	7D	-1.0	V							ML		79.6													
	9D	-11.0	V		35	32	9	30.0		CL															
MR-17	7D	-7.0	V							ML		88.3													
	8D	-12.0	V							ML&SM		65.9													
MR-18	8D	-8.3	V		27	24	4	27.7		ML&SM		78.6													
	9D	-13.3	V		35	35	12	33.7		CL		85.9													
MR-19	6D	-2.3	V		30	28	6	27.8		ML&CL															
	7D	-7.3	V		43	39	16	36.3		ML&CL															
MR-20P	4D	6.1	F							SM	79.0	18.4													
	5D	4.1	S							SM	82.5	17.1													
	6D	-1.9	V							ML	39.5	57.5													
MR-21	9D	-10.8	V		35					ML&SM &CL															

STRATA DESIGNATIONS

F - Fill

S - Sand

V - Varved Silt, Sand and Clay

T - Glacial Till

NOTES

1. All tests summarized were performed in the laboratory of Mueser Rutledge Consulting Engineers.
2. The sample elevation is the average of the sampling interval.
3. Ground surface elevations at borings are:

BORING NO.	BORING ELEVATION	BORING NO.	BORING ELEVATION
MR-1P	+13.7	MR-13	+19.6
MR-4	+21.2	MR-14	+18.1
MR-5	+12.5	MR-15	+17.5
MR-7	+9.6	MR-16	+20.0
MR-8	+13.7	MR-17	+19.0
MR-9	+14.2	MR-18	+17.7
MR-10P	+19.1	MR-19	+13.7
MR-11	+20.2	MR-20P	+14.1
MR-12P	+20.4	MR-21	+20.2

4. "Average natural water content" is a weighted average of all material tested.

MRCE Form LT-1

MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34th STREET, NEW YORK, N.Y. 10122

QUEENS PLAZA RESIDENTIAL DEVELOPMENT

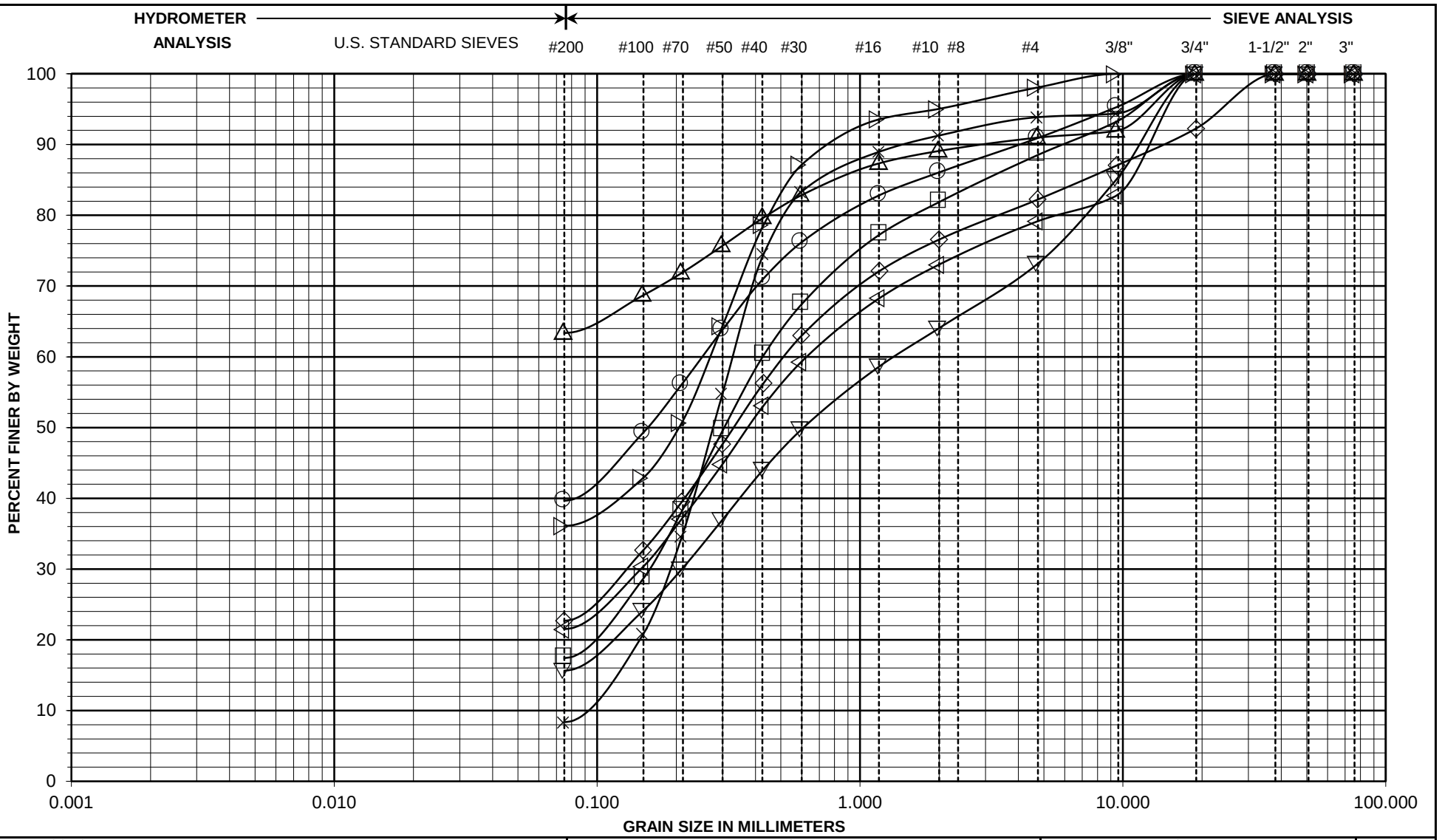
QUEENS **NEW YORK**

TABLE NO. 3: SOIL AND ROCK DESIGN PARAMETERS

Stratum	Total Unit Weight	Effective Friction Angle	Ultimate Friction Factor between Concrete & n	Allowable Net Bearing Capacity (2)	Active Earth Pressure Coeff., K_a (1)	At Rest Earth Pressure Coeff., K_o (1)
F	115 pcf	φ = 30	NA	NA	0.33	0.50
S	120 pcf	φ = 32	0.40	3 tsf	0.31	0.47
V	120 pcf	φ = 30	0.35	2 tsf	0.33	0.50
T	125 pcf	φ = 34	0.50	6 tsf	0.28	0.44
DR	135 pcf	φ = 34	0.50	6 tsf	0.28	0.44
R	170 pcf	N/A	0.70	40 tsf (3)	0.1 (4)	0.1 (4)

Notes:

1. K-values are lateral earth pressure coefficients for soil strata against the face of a vertical wall with a horizontal ground surface and do not account for pressures due to groundwater or surcharges. Variations from these conditions will result in changes of the K-values. Effective unit weights should be used below the groundwater table and water pressure should be added. Surcharge loads above the ground surface should be included in accordance with NYC Building Code.
2. Allowable net bearing pressures reported represent values in excess of pre-construction stabilized overburden pressure at the same location and are subject to adjustments based on actual foundation conditions in accordance with NYC Building Code, Table 1804.1.
3. Foundations bearing on bedrock are expected to bear on 40 tsf rock. Where bedrock is intermediate quality, in lieu of deepening the foundation grade, a second foundation wall and footing schedule can be established for 20 tsf rock, to be used in the event that local zones of lesser quality rock are encountered during construction.
4. Rock lateral pressure coefficients assume that single formed walls are used. If double formed walls are used and the backfill is up to maximum of four feet wide, use a lateral pressure coefficient for active and at rest case of 0.2.
5. Foundation walls should be waterproofed and have the ultimate capacity to resist water pressure up to street level that may occur due to temporary flood or utility failure conditions.
6. Foundations where the bearing stratum is underlain by the varved stratum, the allowable net bearing capacity for the varved stratum shall be applied.



UNIFIED SOILS CLASSIFICATION	CLAY OR SILT	SAND			GRAVEL		COBBLES
		FINE	MEDIUM	COARSE	FINE	COARSE	

SYMBOL	BORING	SAMPLE	DESCRIPTION OF SAMPLE
○	MR-1P	2HA	BROWN SILTY FINE TO COARSE SAND, TRACE GRAVEL, BRICKS (SM)
□	MR-1P	3D	BROWN FINE TO COARSE SAND, SOME SILT, TRACE GRAVEL , MICA (SM)
△	MR-4	4D	BROWN CLAYEY SILT VARVED WITH SOME FINE TO MEDIUM SAND, TRACE GRAVEL, COARSE SAND (ML)
◇	MR-4	5D	BROWN FINE TO COARSE SAND, SOME SILT, GRAVEL (SM)*
▽	MR-4	6D	GRAY BROWN FINE TO COARSE SAND, SOME GRAVEL, SILT (SM)
▷	MR-7	4D	BROWN SILTY FINE TO MEDIUM SAND, TRACE COARSE SAND, GRAVEL (SM)
◁	MR-7	5D	BROWN FINE TO COARSE SAND, SOME GRAVEL, SILT (SM)*
×	MR-7	6D	BROWN FINE TO MEDIUM SAND, TRACE SILT, GRAVEL , COARSE SAND (SP-SM)

NOTE: * 3/4" GRAVEL EXCLUDED FROM SAMPLE

QUEENS PLAZA RES. DEVELOPMENT

QUEENS NY

MUESER RUTLEDGE CONSULTING ENGINEERS

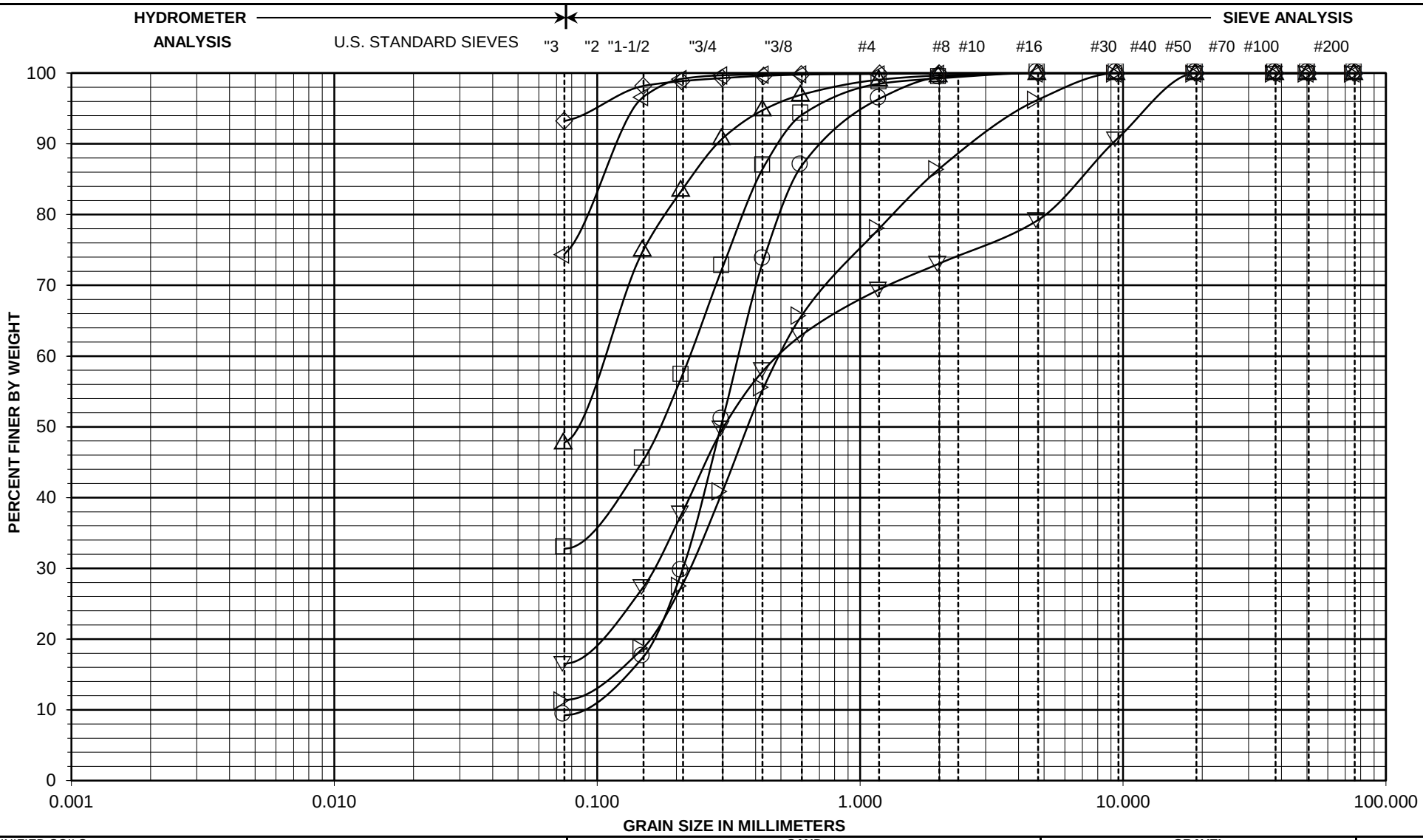
225 WEST 34TH STREET, NEW YORK, N.Y. 10122

NAME BY: YO DATE: 11-11-14 FILE NO. **10608D**

CH'KD BY: FW DATE: 11-12-14

GRADATION CURVES PLATE NO. 1

PLATE NO. 1



UNIFIED SOILS CLASSIFICATION	CLAY OR SILT	SAND			GRAVEL		COBBLES
		FINE	MEDIUM	COARSE	FINE	COARSE	

SYMBOL	BORING	SAMPLE	DESCRIPTION OF SAMPLE
○	MR-10P	5D	BROWN FINE TO MEDIUM SAND, TRACE SILT (SP-SM)
□	MR-10P	6D	BROWN SILTY FINE TO MEDIUM SAND (SM)
△	MR-10P	7D	GRAY BROWN SILTY FINE TO MEDIUM SAND VARVED WITH TRACE SILT (SM)
◇	MR-10P	8D	GRAY CLAYEY SILT VARVED WITH TRACE SILTY CLAY, FINE SAND, TRACE MICA (ML)
▽	MR-15	4D	BROWN FINE TO COARSE SAND, SOME GRAVEL, SILT, TRACE ASPHALT (SM)*
▷	MR-15	6D	BROWN FINE TO COARSE SAND, TRACE SILT, GRAVEL (SP-SM)
◁	MR-15	7D	GRAY SILT, SOME FINE SAND, MICA (ML)
			NOTE: * 3/4" GRAVEL EXCLUDED FROM SAMPLE

PLATE NO. 2

QUEENS PLAZA RES. DEVELOPMENT

QUEENS NY

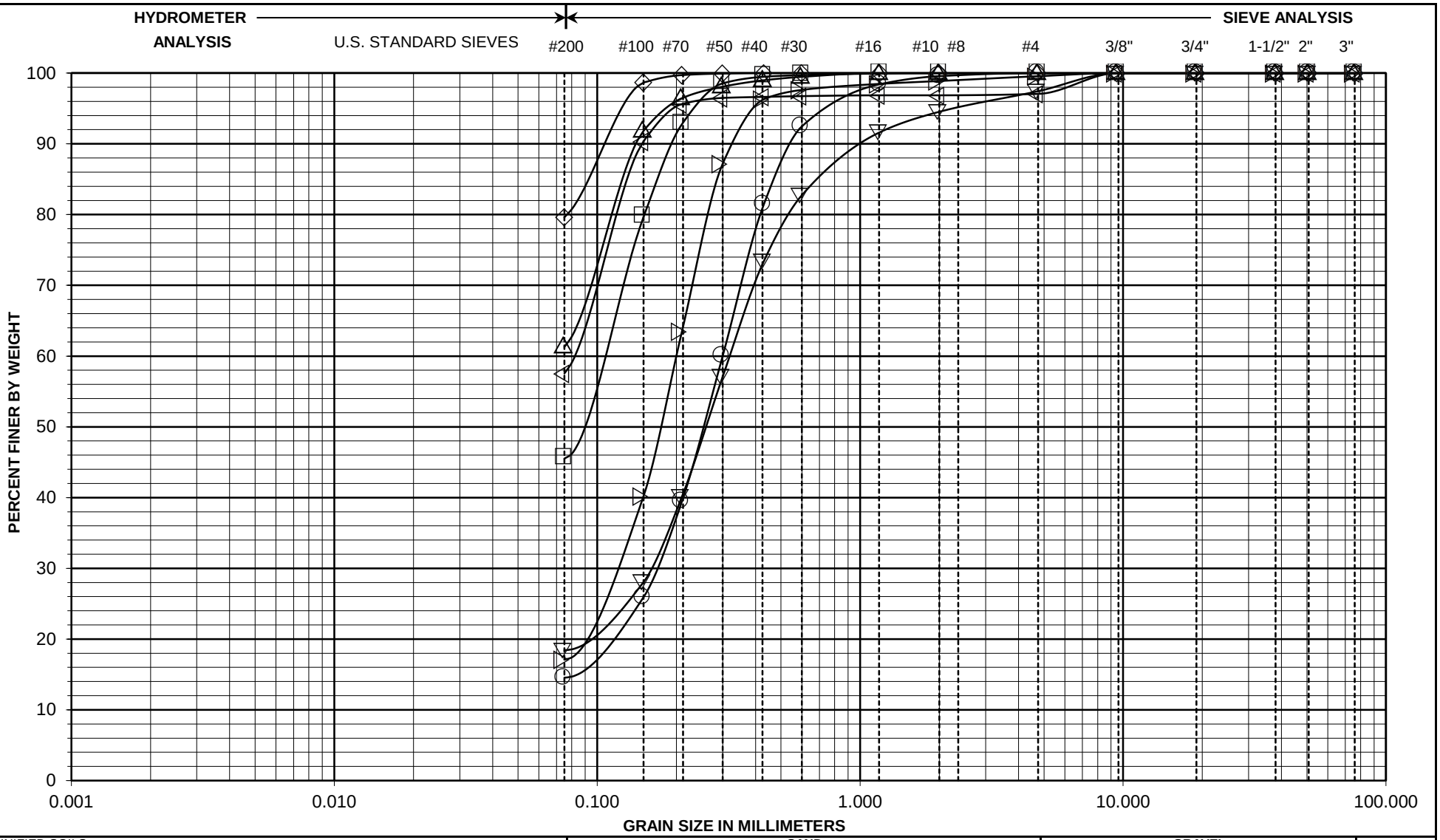
MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34TH STREET, NEW YORK, N.Y. 10122

MADE BY:YO DATE: 11-11-14 FILE NO.

CH'KD BY: FW DATE: 11-12-14 **10608D**

GRADATION CURVES PLATE NO. 2



UNIFIED SOILS CLASSIFICATION	CLAY OR SILT	SAND			GRAVEL		COBBLES
		FINE	MEDIUM	COARSE	FINE	COARSE	

SYMBOL	BORING	SAMPLE	DESCRIPTION OF SAMPLE
○	MR-12P	3D	BROWN FINE TO MEDIUM SAND, SOME SILT (SM)
□	MR-12P	4D	GRAY BROWN SILTY FINE SAND (SM)
△	MR-12P	5D	BROWN FINE SANDY SILT (ML)
◇	MR-12P	6D	BROWN SILT, SOME FINE SAND (ML)
▽	MR-20P	4D	GRAY BROWN FINE TO MEDIUM SAND, SOME SILT, TRACE COARSE SAND, GRAVEL (SM)
▷	MR-20P	5D	GRAY FINE SAND, SOME SILT, TRACE MEDIUM SAND (SM)
◁	MR-20P	6D	GRAY FINE SANDY SILT VARVED WITH TRACE SILTY CLAY, TRACE GRAVEL, MICA (ML)

PLATE NO. 3

QUEENS PLAZA RES. DEVELOPMENT

QUEENS NY

MUESER RUTLEDGE CONSULTING ENGINEERS

225 WEST 34TH STREET, NEW YORK, N.Y. 10122

MADE BY: YO DATE: 11-11-14

CH'KD BY: FW DATE: 11-12-14

FILE NO. **10608D**

GRADATION CURVES

PLATE NO. 3

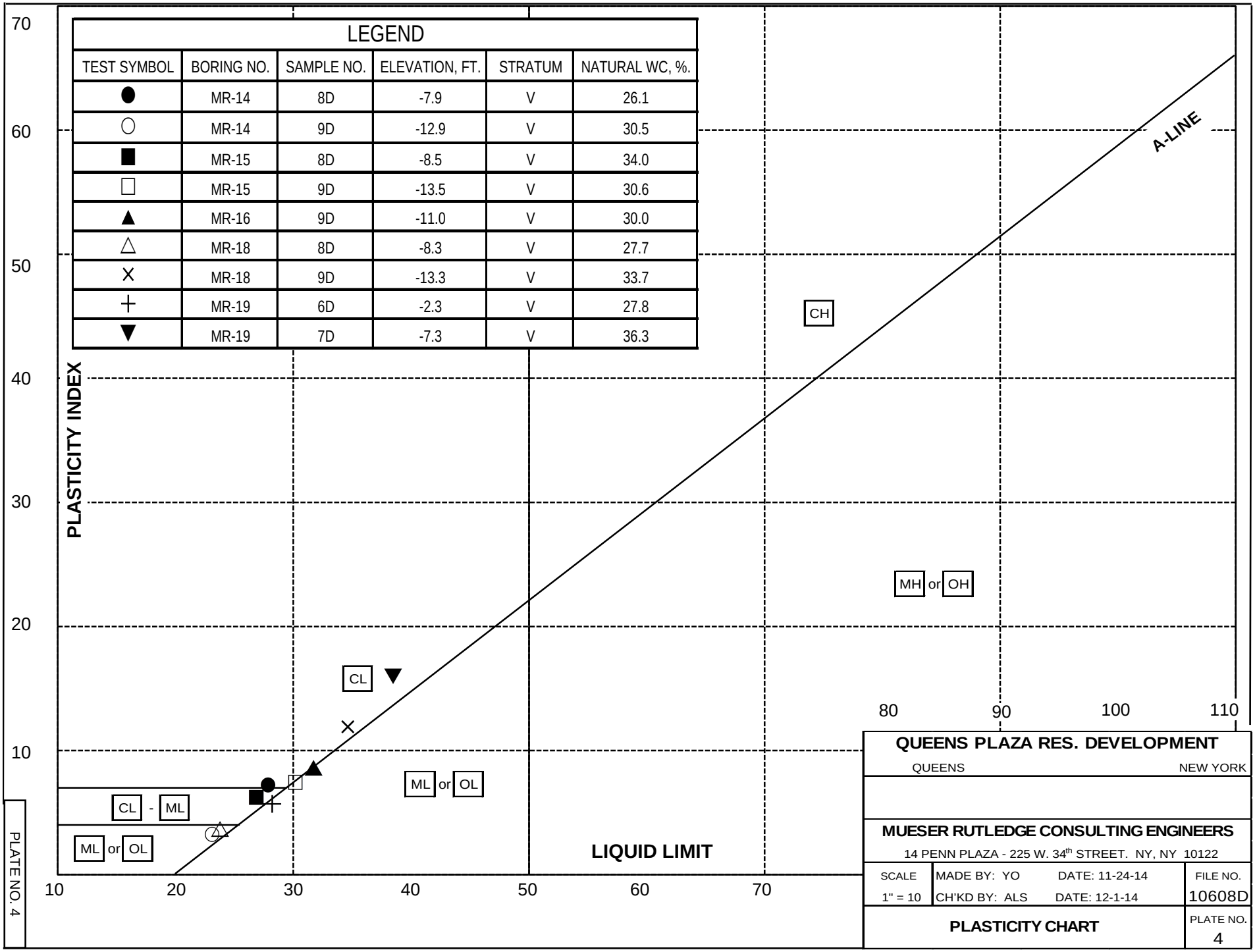


PLATE NO. 4

QUEENS PLAZA RES. DEVELOPMENT

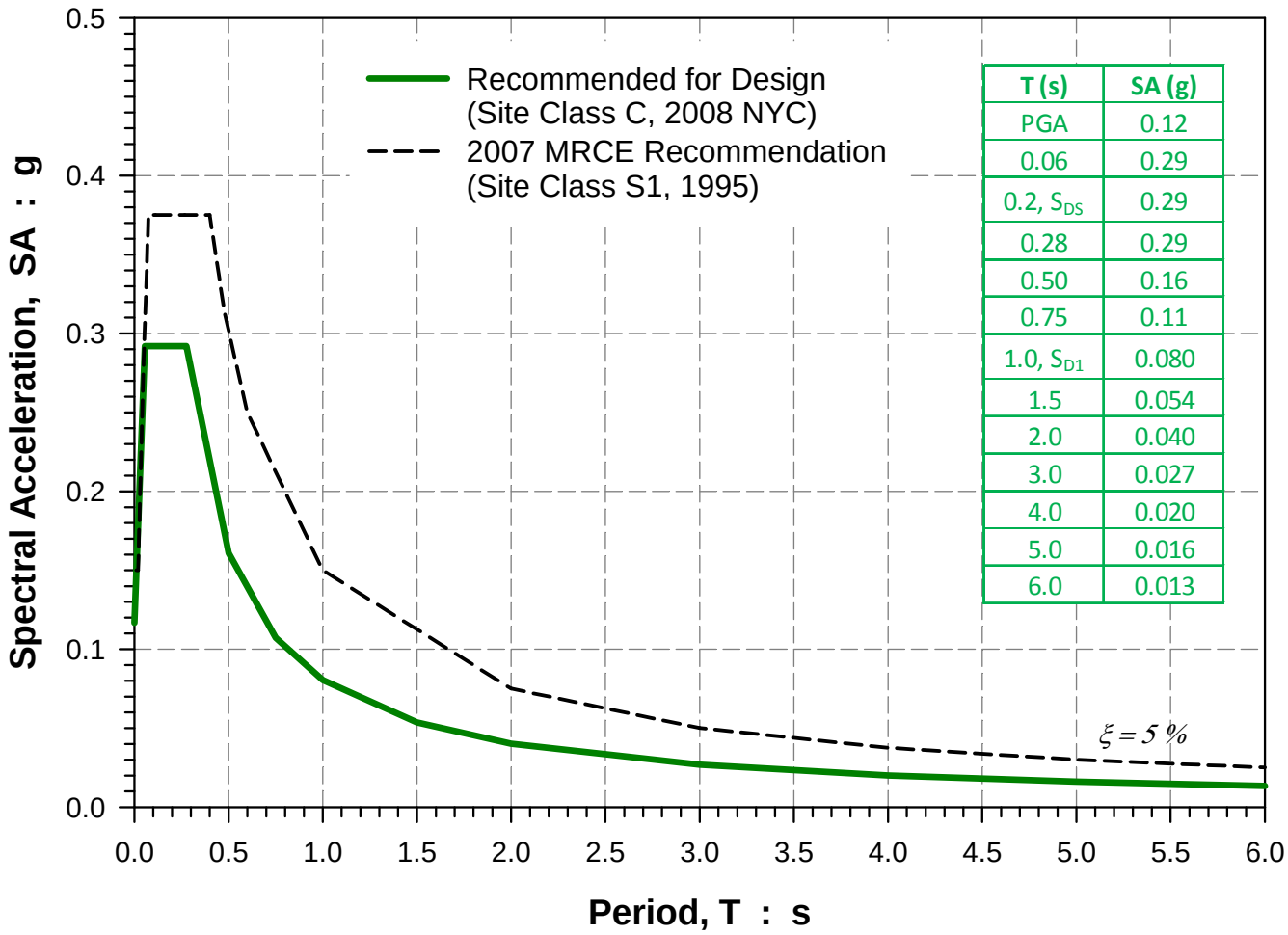
QUEENS NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA - 225 W. 34th STREET. NY, NY 10122

SCALE	MADE BY: YO	DATE: 11-24-14	FILE NO.
1" = 10	CH'KD BY: ALS	DATE: 12-1-14	10608D

PLASTICITY CHART PLATE NO. 4



T (s)	SA (g)
PGA	0.12
0.06	0.29
0.2, S_{DS}	0.29
0.28	0.29
0.50	0.16
0.75	0.11
1.0, S_{D1}	0.080
1.5	0.054
2.0	0.040
3.0	0.027
4.0	0.020
5.0	0.016
6.0	0.013

KEY PLAN

Notes:

1. The recommended design spectrum is as per the 2008 NYC Building Code seismic guidelines.
2. The recommended design spectrum is applicable for Building A (shown as the shaded area of the key plan) and should be applied at the bottom of the pile caps and footings, which ranges between El. +13 and -10 (NAVD88). Should any of the stated design elevations change, MRCE shall review the changes to determine if revisions to the design spectrum are required.
3. Structural damping, ξ, is 5%.

Queens Plaza Residential Development

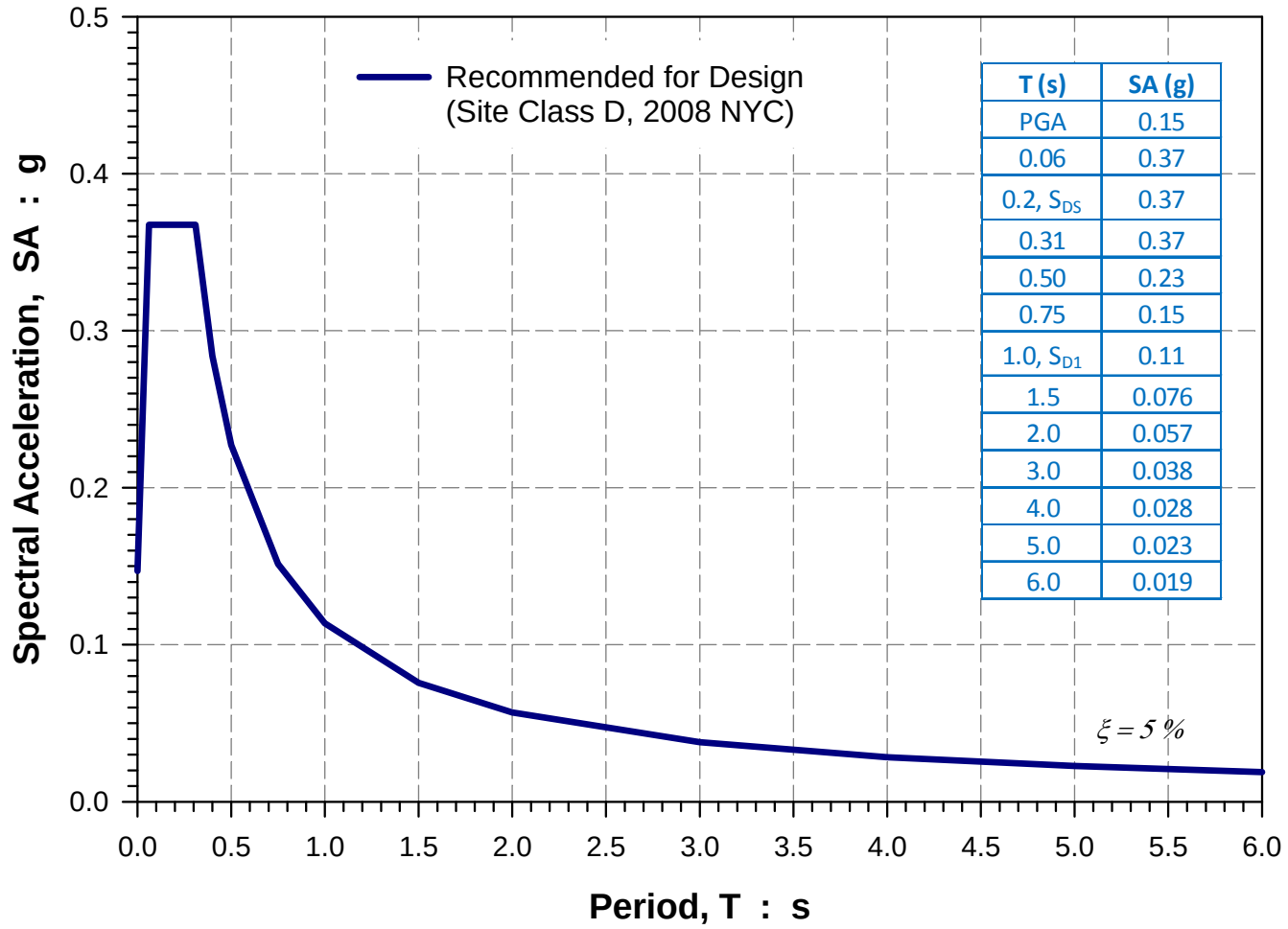
Queens — New York

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: CZ	DATE: 12-17-14	FILE No.
N/A	CH'KD BY: MMM	DATE: 12-17-14	10608D

DESIGN ACCELERATION RESPONSE SPECTRUM BUILDING A — FIGURE No. S-1



T (s)	SA (g)
PGA	0.15
0.06	0.37
0.2, S_{DS}	0.37
0.31	0.37
0.50	0.23
0.75	0.15
1.0, S_{D1}	0.11
1.5	0.076
2.0	0.057
3.0	0.038
4.0	0.028
5.0	0.023
6.0	0.019

KEY PLAN

Notes:

1. The recommended design spectrum is as per the 2008 NYC Building Code seismic guidelines.
2. The recommended design spectrum is applicable for the Basement Garage of Buildings B1(shown as the shaded area of the key plan) and should be applied at the bottom of the pile caps and footings, which range between El. +7 and -11 (NAVD88). Should any of the stated design elevations change, MRCE shall review the changes to determine if revisions to the design spectrum are required.
3. Structural damping, ξ, is 5%.

Queens Plaza Residential Development

Queens — New York

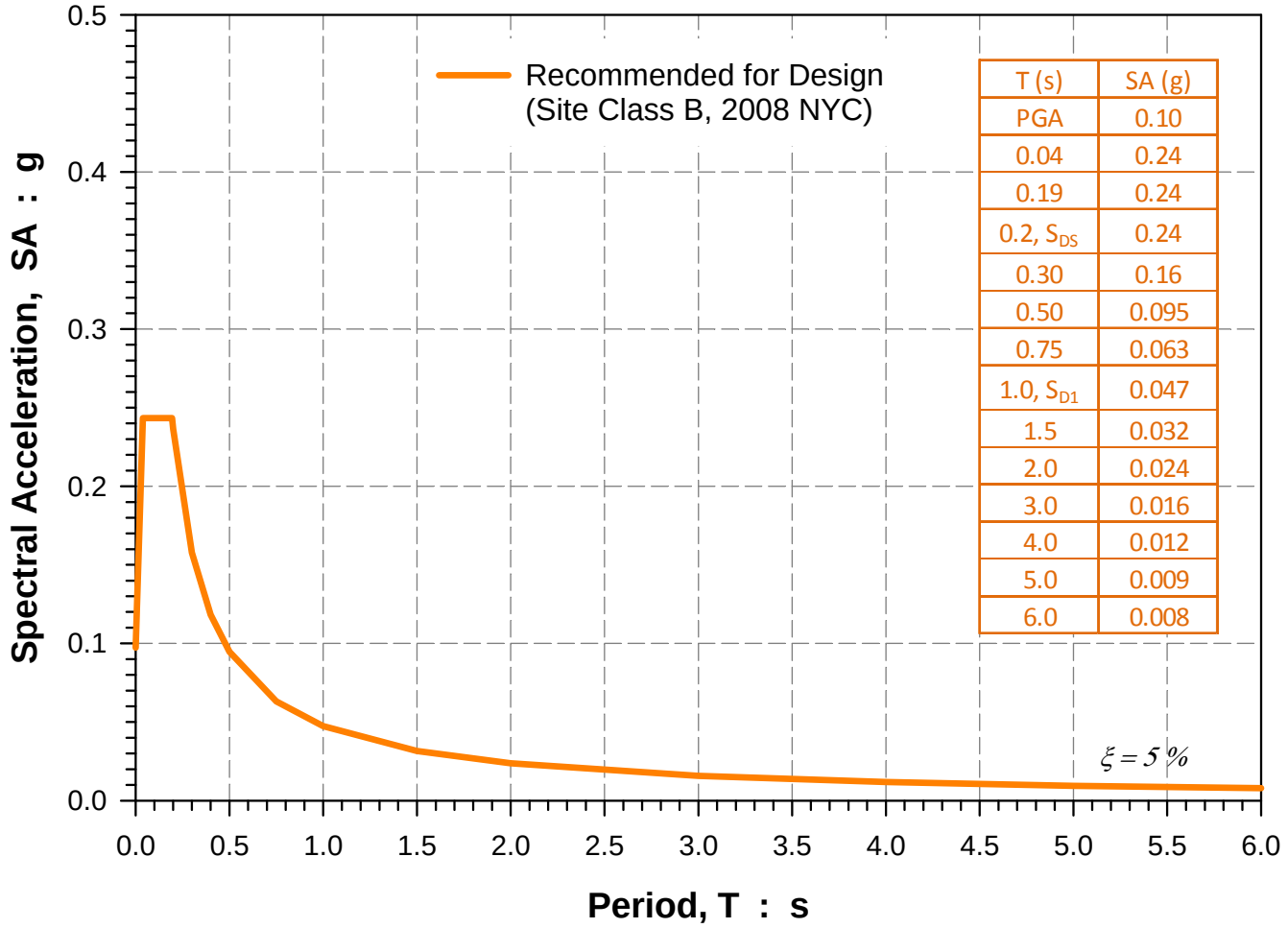
MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

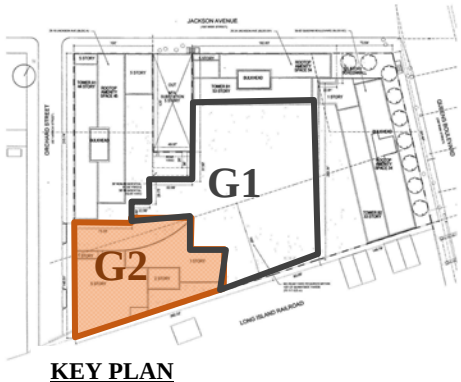
SCALE	MADE BY: CZ	DATE: 12-17-14	FILE No.
N/A	CH'KD BY: MMM	DATE: 12-17-14	10608D

DESIGN ACCELERATION RESPONSE SPECTRUM
BASEMENT GARAGE OF BUILDING B1

FIGURE No. S-2



T (s)	SA (g)
PGA	0.10
0.04	0.24
0.19	0.24
0.2, S_{DS}	0.24
0.30	0.16
0.50	0.095
0.75	0.063
1.0, S_{D1}	0.047
1.5	0.032
2.0	0.024
3.0	0.016
4.0	0.012
5.0	0.009
6.0	0.008



KEY PLAN

Notes:

1. The recommended design spectrum is as per the 2008 NYC Building Code seismic guidelines.
2. The recommended design spectrum is applicable for the Basement Garage G2 of Building B1 (shown as the shaded area of the key plan) and should be applied at the bottom of the pile caps and footings, which range between El. +7 and -11 (NAVD88), only if the two portions (G1 and G2) of the Basement Garage are structurally independent.
3. Should any of the stated design elevations change, MRCE shall review the changes to determine if revisions to the design spectrum are required.
4. Structural damping, ξ, is 5%.

Queens Plaza Residential Development

Queens — New York

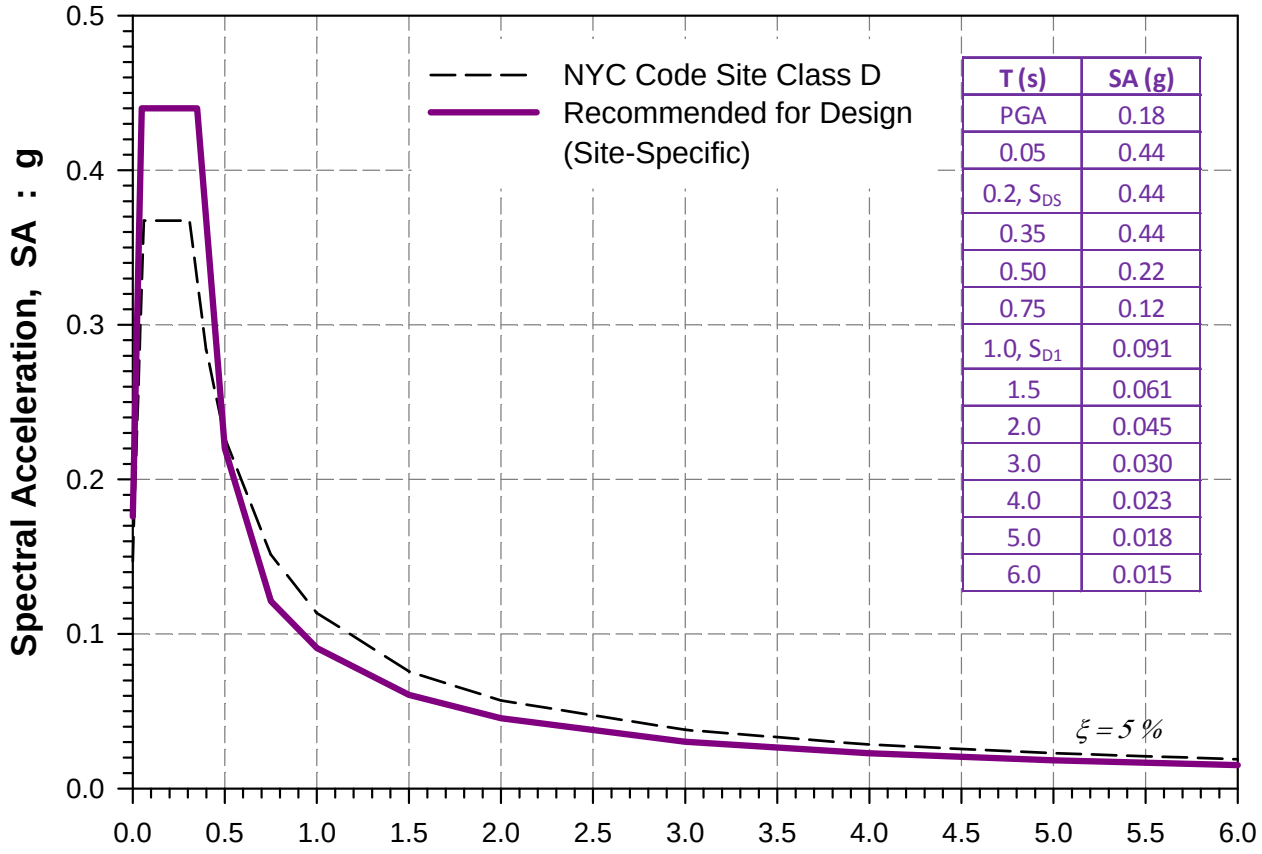
MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

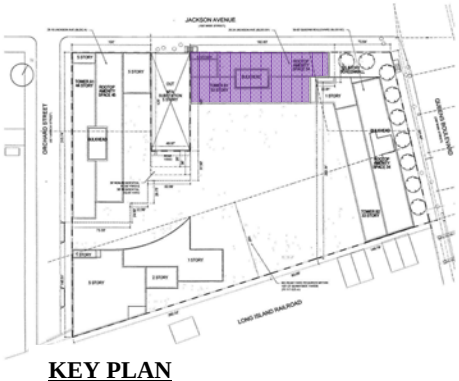
SCALE	MADE BY: CZ	DATE: 12-18-14	FILE No.
N/A	CH'KD BY: MP	DATE: 12-23-14	10608D

DESIGN ACCELERATION RESPONSE SPECTRUM
BASEMENT GARAGE G2 OF BUILDING B1

FIGURE No. S-2A



T (s)	SA (g)
PGA	0.18
0.05	0.44
0.2, S_{DS}	0.44
0.35	0.44
0.50	0.22
0.75	0.12
1.0, S_{D1}	0.091
1.5	0.061
2.0	0.045
3.0	0.030
4.0	0.023
5.0	0.018
6.0	0.015



KEY PLAN

Notes:

1. The recommended design spectrum is developed based on MRCE's site-specific study performed in accordance with the 2008 NYC Building Code for the Maximum Considered Earthquake (MCE), or an earthquake event with return period of 2,500 years. The recommended Spectral Acceleration (SA) values are adjusted to 2/3 of the MCE level as required for the design.
2. The recommended design spectrum is applicable for Tower B1 (shown as the shaded area in the key plan) at the bottom of the pile caps, which ranges between El. +4 and -1 (NAVD88). Should any of the stated design elevations change, MRCE shall review the changes to the design spectrum are required.
3. No site class should be provided on the design drawings. Site class should indicate "As per a site-specific study."
4. The recommended design spectrum must be considered in its entire spectrum of periods and supersede any generic site classification. The values of SA at 0.2 sec, S_{DS} (0.44g), and SA at 1 sec, S_{D1} (0.091g), cannot be used to generate an alternative design response spectrum.
5. Structural damping, ξ, is 5%.

Queens Plaza Residential Development

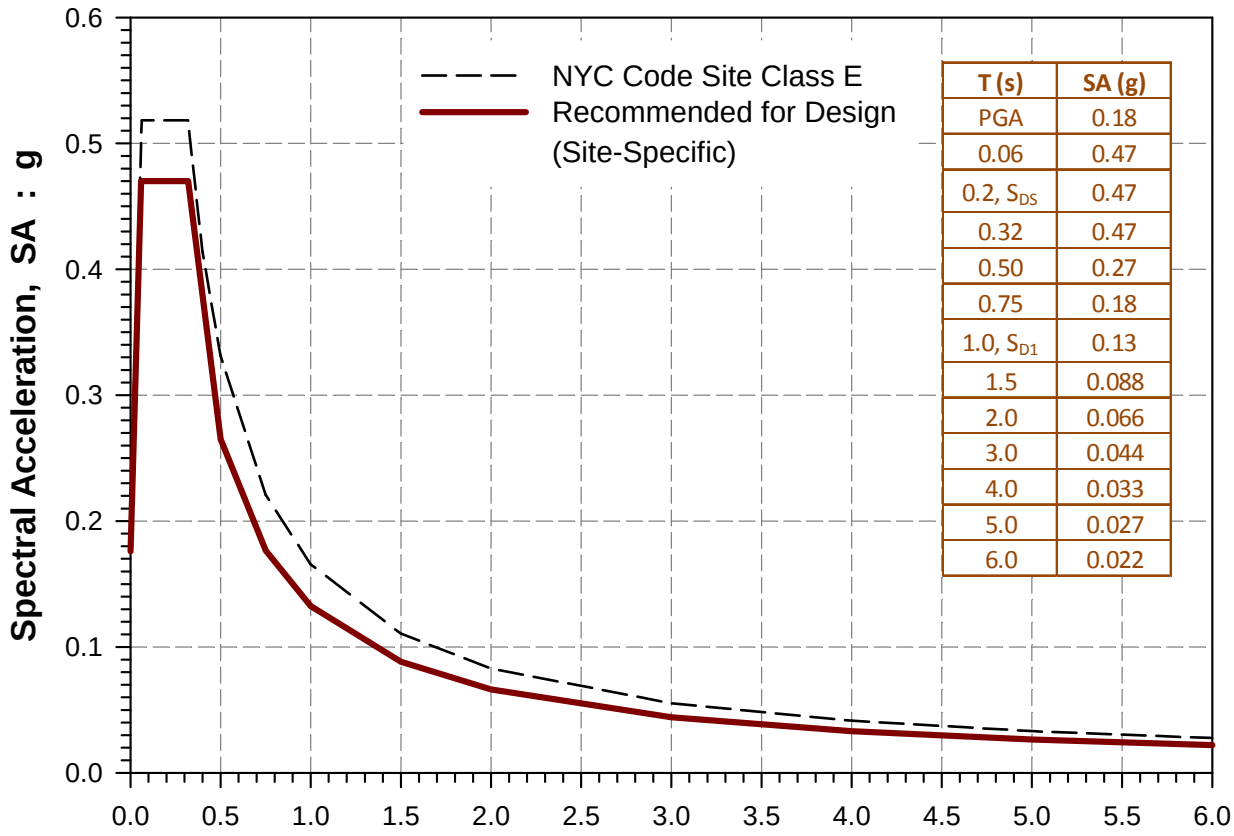
Queens — New York

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: CZ	DATE: 12-18-14	FILE No.
N/A	CH'KD BY: MP	DATE: 12-23-14	10608D

DESIGN ACCELERATION RESPONSE SPECTRUM TOWER B1 — FIGURE No. S-3



T (s)	SA (g)
PGA	0.18
0.06	0.47
0.2, S_{DS}	0.47
0.32	0.47
0.50	0.27
0.75	0.18
1.0, S_{D1}	0.13
1.5	0.088
2.0	0.066
3.0	0.044
4.0	0.033
5.0	0.027
6.0	0.022

KEY PLAN

Notes:

1. The recommended design spectrum is developed based on MRCE's site-specific study performed in accordance with the 2008 NYC Building Code for the Maximum Considered Earthquake (MCE), or an earthquake event with return period of 2,500 years. The recommended Spectral Acceleration (SA) values are adjusted to 2/3 of the MCE level as required for design.
2. The recommended design spectrum is applicable for Building B2 (shown as the shaded area of the key plan) at the bottom of the pile caps, which ranges between El. +8 and -11 (NAVD88). Should any of the stated design elevations change, MRCE shall review the changes to determine if revisions to the design spectrum are required.
3. No site class should be provided on the design drawings. Site class should indicate "As per a site-specific study."
4. The recommended design spectrum must be considered in its entire spectrum of periods and supersede any generic site classification. The values of Spectral Acceleration (SA) at 0.2 sec, S_{DS} (0.47g), and SA at 1 sec, S_{D1} (0.13g), cannot be used to generate an alternative design response spectrum.
5. Structural damping, ξ, is 5%.

Queens Plaza Residential Development

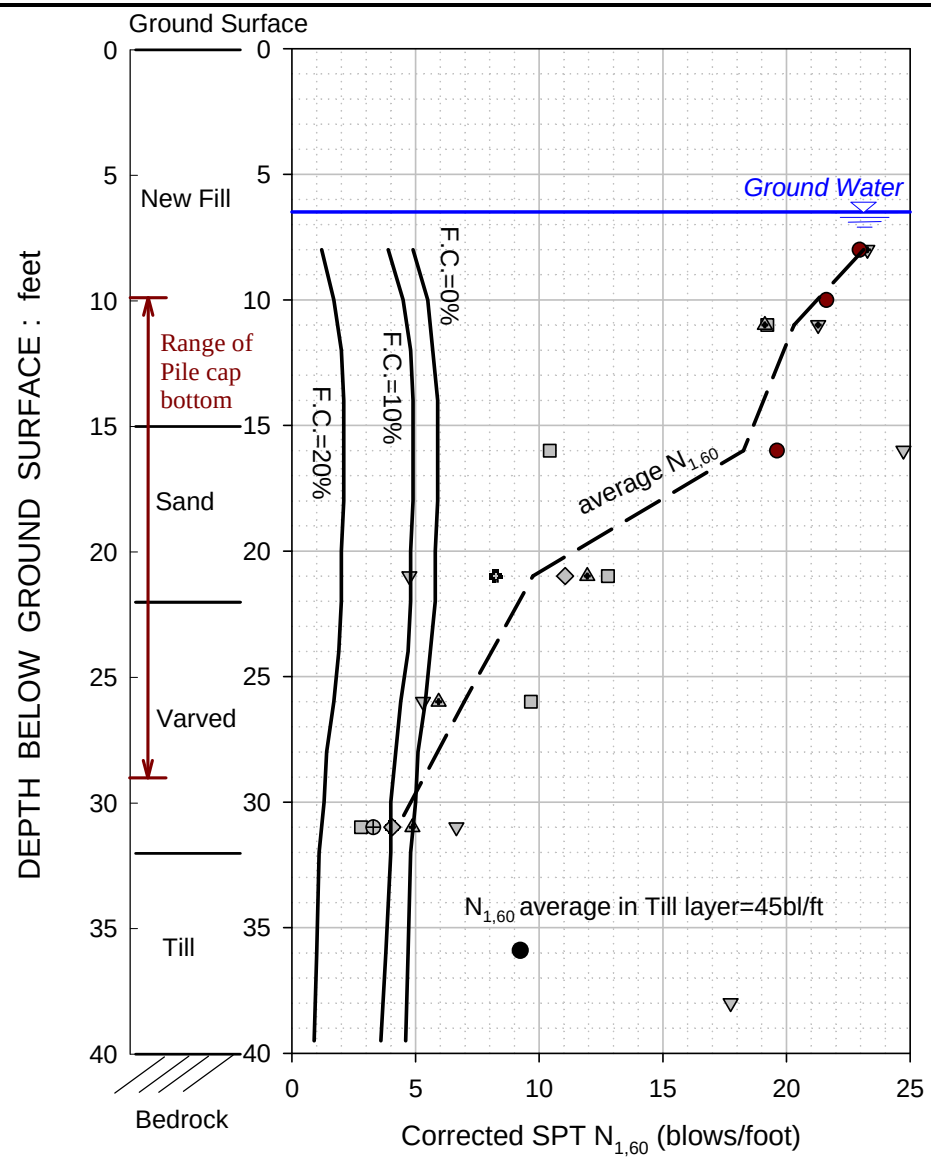
Queens — New York

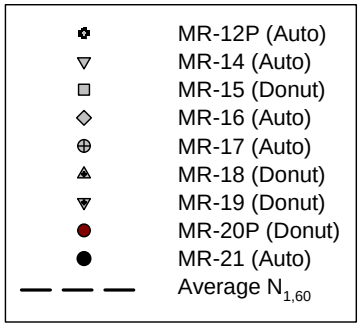
MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: CZ	DATE: 12-18-14	FILE No.
N/A	CH'KD BY: MP	DATE: 12-23-14	10608D

DESIGN ACCELERATION RESPONSE SPECTRUM BUILDING B2 — FIGURE No. S-4





Notes:

1. Liquefaction screening lines correspond to a Factor of Safety of 1.2 against liquefaction for different Fines Contents (FC).
2. Liquefaction screening lines are developed for Building B2 representative soil stratigraphy.
3. Corrected SPT $N_{1,60}$ values falling to the right of the screening lines indicate liquefaction is unlikely during the Code seismic design event.

Queens Plaza Residential Development

Queens — New York

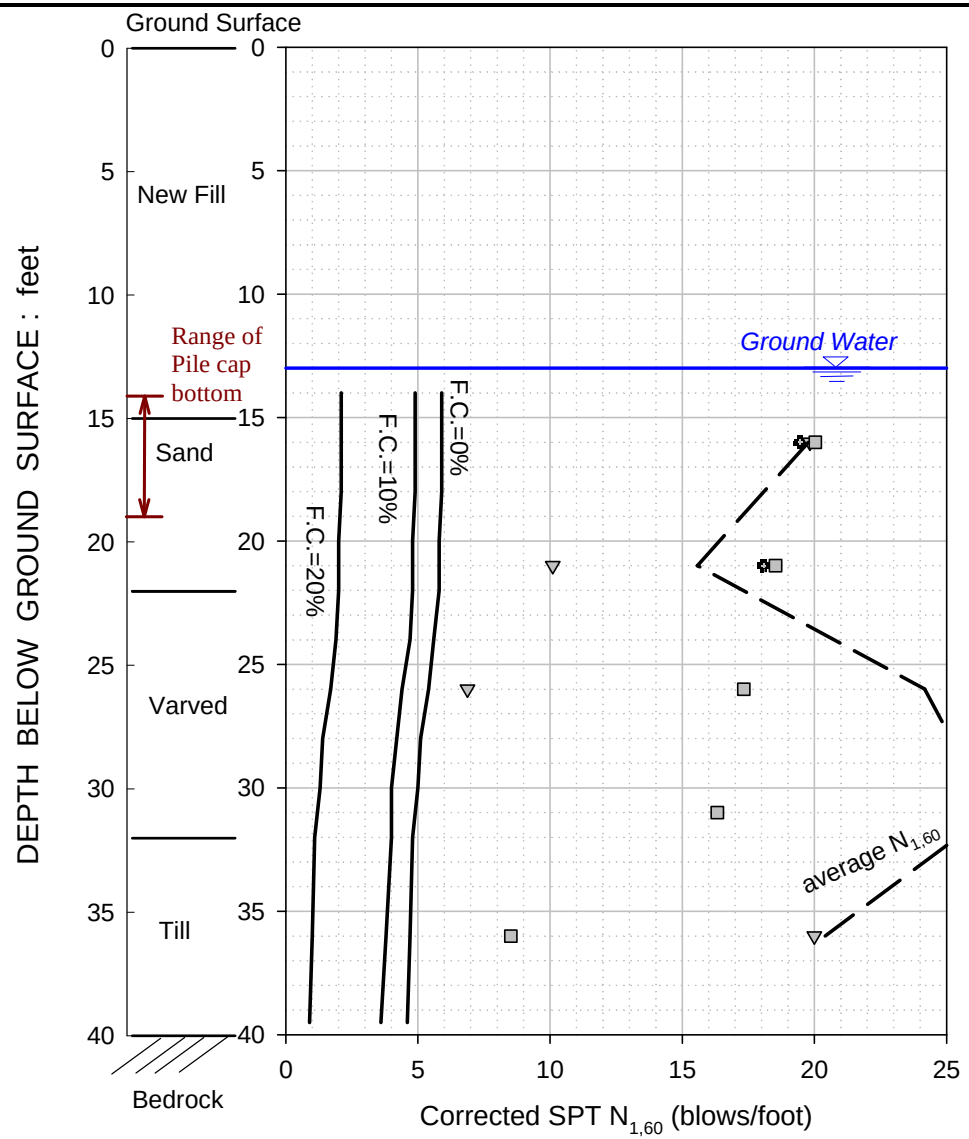
MUESER RUTLEDGE CONSULTING ENGINEERS

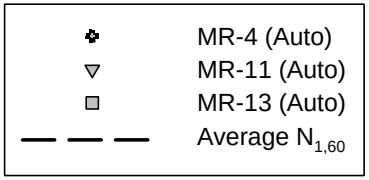
14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: CZ	DATE: 12-31-14	FILE No.
N/A	CH'KD BY: MP	DATE: 01-08-15	10608D

SITE-SPECIFIC LIQUEFACTION ASSESSMENT DIAGRAM FOR BUILDING B2

FIGURE No. S-5





Notes:

1. Liquefaction screening lines correspond to a Factor of Safety of 1.2 against liquefaction for different Fines Contents (FC).
2. Liquefaction screening lines are developed for Building B2 soil stratigraphy, which is representative of Tower B1 subsurface conditions.
3. Corrected SPT $N_{1,60}$ values falling to the right of the screening lines indicate liquefaction is unlikely during the Code seismic design event.

Queens Plaza Residential Development

Queens — New York

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA – 225 W 34TH STREET, NEW YORK NY 10122

SCALE	MADE BY: CZ	DATE: 12-31-14	FILE No.
N/A	CH'KD BY: MP	DATE: 01-08-15	10608D

SITE-SPECIFIC LIQUEFACTION ASSESSMENT DIAGRAM FOR TOWER B1

FIGURE No. S-6

APPENDIX A

2014 MRCE BORING LOGS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-1P
SHEET 1 OF 5

PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 13.7
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30	1HA	0.0	HAND	Brown fine to coarse sand, some gravel, trace			DRILLED	Boring Drilled indoors.
10-01-14		3.0	AUGER	silt (Fill) (SP-SM)			AHEAD	Hand Augered by others
Wednesday							4"	to 5 feet.
Slight Rain	2HA	3.0	HAND	Brown silty fine to coarse sand, trace gravel,	F			
60°F		5.0	AUGER	brick (Fill) (SM)		5		
	3D	5.0	6-55	Brown fine to coarse sand, some silt, trace		6		
		6.1	50/1"	gravel, mica (Fill) (SM)			3*	*Coring time in
	1C	6.0	REC=90%	Intermediate to medium hard slightly weathered			11*	minutes per foot.
		11.0	RQD=46%	gray gneiss, jointed to broken, weathered joints			11*	
				& iron stained joints		10	10*	
							13*	
	2C	11.0	REC=93%	Medium hard slightly weathered to unweathered	R		9*	
		16.0	RQD=68%	gray gneiss, jointed to closely jointed, weathered			10*	
				joints & iron stained joints			8*	
						15	6*	
15:00						16	12*	End of Boring at 16'.
						20		
						25		
						30		
						35		
						40		
						45		
						50		

Mueser Rutledge Consulting Engineers
14 Penn Plaza - 225 West 34th Street
New York, NY 10122
T: 917 339-9300 F: 917 339-9400
www.mrce.com

ROCK CORE SKETCH

BORING NO. MR-1P
SHEET 2 OF 5
FILE NO. 106080
SURFACE ELEV. 13.7
RES ENGR. Mark Chang

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
2C	93% / 68%

11 TOP

MB
20 XF S2
J20 S2 XF
J20I3 XF
20XF I3
20 XF I2
0XF I3
10\\ FI3
10XFI3
10XFI3
10XFI3

16 BOTTOM

Run No.	REC/RQD
1C	90% / 46%

6 TOP

J20IC XF w/fejts
J20IS XF
10XFI3
10XFI3
20XFS2
J20S2XF
20XFI3
10XFS2
20XFI3
30XFS2
J45I3XF
0XFS3

11 BOTTOM

Run No.	REC/RQD
MR-6 2C	

TOP

MR-6
2C

BOTTOM

Run No.	REC/RQD
MR-6 1C	

TOP

MR-6
1C

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

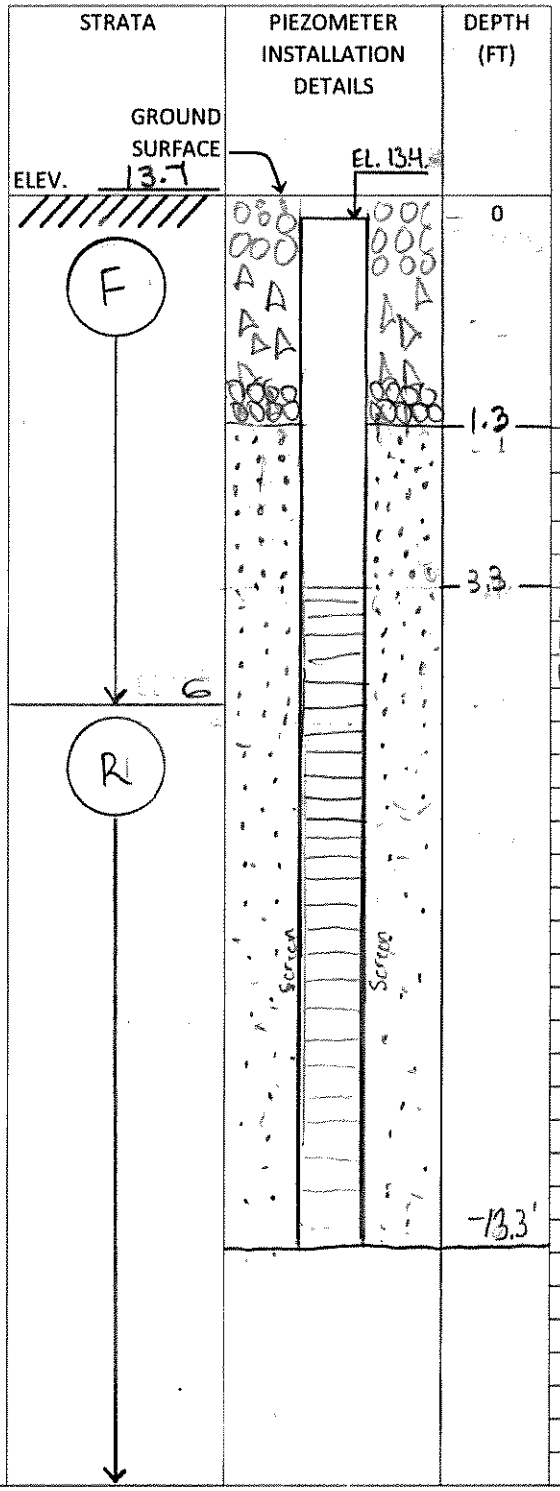
Mueser Rutledge Consulting Engineers
14 Penn Plaza - 225 West 34th Street
New York, NY 10122
T: 917 339-9300 F: 917 339-9400
www.mrce.com

PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-1P
SHEET 3 OF 5
FILE NO. 106080
INSTALLATION DATE 10/2/2014
RES ENGR. Mark Chang

PROJECT: Queens Plaza Residential Development
LOCATION: Queens, NY
PIEZOMETER LOCATION: See Boring Location Plan

☐ SEE SKETCH ON BACK



PIEZOMETER TYPE SLOTTED PVC

INTAKE POINT
depth to bottom, ft = 13.3
depth to top, ft = 1.3
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 13.4
diameter, in = 2 , ft = 0.167 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10/3/14	7:00	7.3	6.1	
10/6/14	7:00	8.2	5.2	
10/7/14	7:00	6.45	7.0	
10/8/14	7:00	8.35	5.1	
10/9/14	7:00	8.65	4.8	
10/11/14	7:00	8.65	4.8	

SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. 13.7

PIEZOMETER NO. MR-1P

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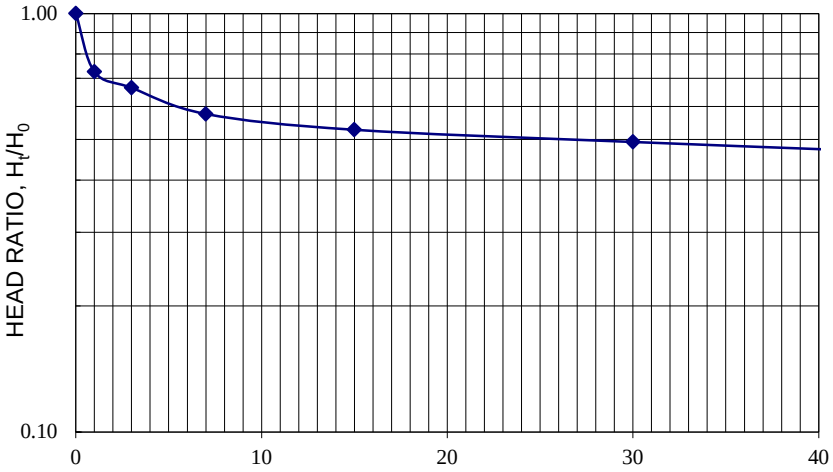
14 Penn Plaza - 225 West 34th Street
New York, NY 10122
T: 917 339-9300 F: 917 339-9400
www.mrce.com

VARIABLE HEAD PERMEABILITY TEST

☐ **BOREHOLE OR** ☑ **PIEZOMETER NO.** MR-1P

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, Queens, NY
PIEZOMETER LOCATION: See Boring Location Plan

SHEET 4 **OF** 5
FILE NO. 10608
TEST NO. 1
RES ENGR. MDC
CALC. BY JMB **DATE** 11/6/2014
CH'KD BY **DATE**



INTAKE POINT
depth to bottom, ft = 13.3
depth to top, ft = 1.3
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 13.4
diameter, in = 2 , ft = 0.167 = 2r

depth of casing, ft = -

depth to which stand-pipe was bailed, ft = - = Z

READING TIME			ORIGINAL TEST DEPTH, H_0 (ft.)	DEPTH AT TIME t, H_t (ft.)	UNBALANCED HEAD $DH_t = H_t - H_0$ (ft.)	HEAD RATIO DH_t/DH_0	REMARKS
DATE	CLOCK	Δt MIN.					
10/2/2014	10:00	0	7.3	0	7.3	1.00	FALLING HEAD TEST
10/2/2014	10:01	1		2	5.3	0.73	
10/2/2014	10:03	3		2.45	4.85	0.66	
10/2/2014	10:07	7		3.1	4.2	0.58	
10/2/2014	10:15	15		3.45	3.85	0.53	
10/2/2014	10:30	30		3.7	3.6	0.49	
10/2/2014	11:00	60		4.1	3.2	0.44	
10/2/2014	12:00	120		4.8	2.5	0.34	
10/2/2014	2:00	240		5.6	1.7	0.23	

PIEZOMETER NO. MR-1P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-1P
SHEET 5 **OF** 5

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 13.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED								
TYPE OF BORING RIG		DURING CORING		CASING USED		[X]	YES	[ ]	NO	
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	6	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER	TRACK DK-515									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON	DRILLING MUD USED	[X]	YES	[ ] NO
U-SAMPLER		DIAMETER OF ROTARY BIT, IN.		3-7/8	
S-SAMPLER		TYPE OF DRILLING MUD		BIOBORE	
CORE BARREL	NX	AUGER USED	[ ]	YES	[X] NO
CORE BIT	DIAMOND	TYPE AND DIAMETER, IN.			
DRILL RODS	NWJ				

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					FOR PIEZOMETER READINGS, SEE SHEET NO. 4.

PIEZOMETER INSTALLED [X] YES [ ] NO SKETCH SHOWN ON SEE SHEET NO. 4

STANDPIPE:	TYPE	PVC	ID, IN.	2	LENGTH, FT.	3.3	TOP ELEV.	13.4
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2-3/8	LENGTH, FT.	10	TIP ELEV.	0.4
FILTER:	MATERIAL	SAND	OD, IN.	3 & 4	LENGTH, FT.	12	BOT. ELEV.	-2.3

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	1	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGER BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS OBSERVATION WELL INSTALLED AFTER 10' ROCK CORE WAS COMPLETED.
RESIDENT ENGINEER MARK CHANCY DATE 10-25-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-4
SHEET 1 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 21.2
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:15							DRILLED	Boring drilled outdoors.
09-23-14							AHEAD	Hand augered by others
Wednesday							4"	to 5 feet. No samples
Mostly Sunny								obtained in first 5 feet.
65°F					F	5		
	1D	5.0	6-8	Brown fine to medium sand, some gravel, trace				
		7.0	7-6	silt, coarse sand (Fill) (SP-SM)				
	2D	7.0	5-2	Brown gravelly fine to coarse sand, trace brick,				REC=2"
		9.0	2-1	silt, wood (Fill) (SP-SM)				
						9.5		
	3D	10.0	2-3	Light brown clayey fine to medium sand, trace	S			
		12.0	1-3	gravel (SC)				
						14.5		
	4D	15.0	6-11	Brown clayey silt varved with some fine to	V			
		17.0	4-5	medium sand, trace gravel, coarse sand				
				(ML&SM)		18.5		
						20		
	5D	20.0	23-22	Brown fine to coarse sand, some gravel, silt	T			
		22.0	22-25	(SM)				
						25		
	6D	25.0	18-33	Gray brown fine to coarse sand, some gravel,				
		27.0	24-31	silt (SM)				
						30		
	7D	30.0	15-21	Brown black fine to coarse sand, some gravel,				
		32.0	17-15	trace silt (SP-SM)				
						35		
	8D	35.0	17-23	Gray gravelly fine to coarse sand, some clay				No recovery on 1st
		37.0	20-24	(SC)				attempt, 2nd attempt.
								REC=4"
								Split spoon possibly
						40		jammed.
	9D	40.0	16-16	Gray fine to coarse sand, some gravel, silt,				
		42.0	18-14	trace clay (SM)				
15:00						45		
07:15	10D	45.0	12-35	Top 9": Gray coarse to fine sand, some gravel,				
09-24-14		47.0	35-38	trace silt (SP-SM)				
Thursday				Bot 9": Brown f-m sand, trace silt (SP-SM)				
Mostly Sunny	1C	48.6	REC=28%	Gray boulder				
60°F		53.6	RQD=NA			50	4*	*Coring time in
					DR			minutes per foot.

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-4
SHEET 2 OF 4
FILE NO. 10608D
SURFACE ELEV. 21.2
RES. ENGR. MARK CHANCY

PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							DRILLED 1.5*	
09-24-14							AHEAD 1*	
Thursday							4" 1.5*	
Mostly Sunny					DR		2*	
60°F						55		
	11D	55.0	100/4"	Gray fine to medium sand, some silt, trace				REC=5"
		55.3		mica (Decomposed Rock) (SM)		57	2*	Rock core coated in
	2C	55.5	REC=73%	Medium hard slightly weathered to moderately			2.5*	soil, can be broken
		60.5	RQD=73%	weathered gray gneiss, jointed, weathered			2*	by hand.
				joints		60	2.5*	
	3C	60.5	REC=50%	Intermediate to weathered slightly weathered			3*	
		65.5	RQD=39%	to moderately weathered gray gneiss, jointed	R		3*	Rock core coated in
				to broken, weathered joints			3*	soil, can be broken
							3*	by hand.
						65	3*	
12:00						65.5	6*	End of Boring at 65.5'.
						70		
						75		
						80		
						85		
						90		
						95		
						100		

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ROCK CORE SKETCH

BORING NO. MR-4
SHEET 3 OF 4
FILE NO. 106080
SURFACE ELEV. 21.2
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
3C	50% / 39%

Run No.	REC/RQD

Run No.	REC/RQD
MR-16 2C	

Run No.	REC/RQD
MR-16 1C	

TOP

20XFS2
J60I3XF
20XFI3
MB

BOTTOM

TOP

Grey ☆ Boulder 1C
MB Rec=28%
Soil RQD=NA
MB
MB
☆ 2C
0XF Rec=73%
S2 RQD=73%
J20XF
J45S2XF

BOTTOM

TOP

MR-16
2C

BOTTOM

TOP

MR-16
1C

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-4
SHEET 4 **OF** 4

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 21.2
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED								
TYPE OF BORING RIG		DURING CORING		CASING USED		[X] YES	[ ] NO			
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	55	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-24-14	12:15	65.5	35	17	WATER LEVEL WAS TAKEN AFTER (3) 5' SECTION OF CASING
					WERE REMOVED.
09-25-14	07:00	65.5	35	15	OVERNIGHT MUD LEVEL, LIGHT RAIN.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	42	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	15	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED WITH SOIL CUTTINGS UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-25-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-5
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 12.5
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:15							DRILLED	Boring drilled outdoors.
10-10-14							AHEAD	Hand augered by others
Friday					F		4"	to 5 feet. No samples
Cloudy								obtained in first 5 feet.
66°F						**5**		
	1D	5.0	4-3	Gray fine to medium sand, some silt, trace				
		7.0	4-7	clay (SM)				
	2D	7.0	11-6	Gray fine to medium sand, trace silt (SP-SM)	S			
		9.0	5-9					
						9.5		
	3D	10.0	4-7	Gray brown silt, trace fine sand seams (ML)				WC=21
		12.0	9-14					
					V	**15**		
	4D	15.0	7-13	Gray silt varved with trace clayey silt, silty fine				WC=28
		17.0	16-19	sand (ML)				
						20		
	5D	20.0	10-16	Gray fine to coarse sand, some silt, gravel (SM)				
15:00		22.0	25-38		T			
09:15								
10-13-14						**24**	▼	
Monday	1C	24.0	REC=98%	Hard unweathered gray gneiss, blocky		**25**	16*	*Coring time in
Cloudy		29.0	RQD=96%				15*	minutes per foot.
55°F							16*	
							16*	
							15*	
	2C	29.0	REC=100%	Hard unweathered gray gneiss, blocky	R	**30**	15*	
		34.0	RQD=100%				20*	
							20*	
							15*	
						34	16*	End of Boring at 34'.
14:30						**35**		
								WC=Water Content
								in percent of dry
								weight.
						40		
						45		
						50		

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ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-5
SHEET 2 OF 3
FILE NO. 106080
SURFACE ELEV. 12.5
RES ENGR. Mark Chaney

Run No.	REC/RQD
MR-8 1C	

4.5 TOP — 7.5 BOTTOM

MR-8
1C

Run No.	REC/RQD

TOP — BOTTOM

Run No.	REC/RQD
2C	100% / 100%

29 TOP — 34 BOTTOM

0 XFI3
0 XFI3

Run No.	REC/RQD
1C	98% / 96%

24 TOP — 29 BOTTOM

SJ20I3
MB

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-5
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 12.5
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	24	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER	TRACK DK-515									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	19	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGER BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 10-13-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-6
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 14.8
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
12:30							DRILLED	**Asphalt from 3.5' to 4'.
09-26-14	1HA	1.0	HAND	Black coarse to fine sand, some gravel, trace	F		AHEAD	Boring drilled outdoors.
Friday		3.0	AUGER	silt (Fill) (SP-SM)			4"	Hand augered by others
Mostly Sunny	2HA	3.0	HAND	Black fine to coarse sand, some gravel, silt	**	3.5		to 5 feet.
60°F		5.0	AUGER	(Fill) (SM)		5		
	3D	5.0	6-12	Black coarse to fine sand, some gravel, trace				Strong odor of creosote
		7.0	31-19	silt, wood (Fill) (SP-SM)	F			from 5' to 9'.
	4D	7.0	14-5	Black coarse to fine sand, some gravel, trace				
		9.0	6-11	silt (Fill) (SP-SM)				
						9.5		Visible stains from
15:00	5D	10.0	WH/24"	Light brown silty fine to medium sand, trace				creosote.
07:45		12.0		clay (SM)				
09-29-14								
Monday								
Cloudy						15		Rig chatter.
69°F	6D	15.0	23-21	Brown fine to medium sand, some gravel,				Very strong odor of
		17.0	14-8	silt, trace coarse sand (SM)				creosote.
					S			
						20		
	7D	20.0	14-24	Brown gravelly fine to coarse sand, trace silt				
		22.0	14-13	(SP-SM)				
						25		
	8D	25.0	19-22	Brown coarse to fine sand, some gravel, trace				
		26.3	50/3"	silt (SP-SM)		26.3		Rig chatter.
					T		▼	
	1C	28.5	REC=100%	Hard unweathered gray gneiss, jointed,		28.5		
		33.5	RQD=86%	weathered joints		30	8*	*Coring time in
							10*	minutes per foot.
							8*	
							6*	
	2C	33.5	REC=96%	Hard unweathered gray gneiss, moderately	R		6*	
		38.5	RQD=83%	jointed to blocky, weathered joints		35	4*	
							5*	
							4*	
							5*	
15:00						38.5	5*	End of Boring at 38.5'.
						40		
						45		
						50		

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ROCK CORE SKETCH

BORING NO. MR-6
SHEET 2 OF 3
FILE NO. 10608D
SURFACE ELEV. 14.8
RES ENGR. Mark Chancy

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-1P 2C	

TOP

MR-1P
2C

BOTTOM

Run No.	REC/RQD
MR-1P 1C	

TOP

MR-1P
1C

BOTTOM

Run No.	REC/RQD
2C	96% / 83%

33.5 TOP

MB
J20C3XF
MB
MB
J20I3XF

36.5 BOTTOM

Run No.	REC/RQD
1C	100% / 86%

28.5' TOP

J20XFI2
MB
0XFS3
J20S2XF
10XFI3
J10S3XF
MB

33.5 BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-6
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 14.8
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO	
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	28
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER	TRACK DK-515								

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-30-14	07:15	38.5	27	9.1	OVERNIGHT READING.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	23.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-29-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-7
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 9.6
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
11:30	1D	0.5	WH-4	Brown fine to coarse some silt, gravel (Fill) (SM)	**	**0.5**	DRILLED	**Concrete from 0' to
10-03-14		2.5	6-4				AHEAD	0.5'.
Friday	2D	2.5	3-WH/18"	Brown fine to medium sand, some gravel, silt,			4"	Boring drilled indoors.
Sunny		4.5		trace coarse sand, clay (Fill) (SM)				Strong odor of creosote.
64°F	3D	4.5	WH/24"	Brown fine to coarse sand, some gravel, trace		**5**		1D: REC=5"
		6.5		silt (Fill) (SP-SM)				REC=0.5"
	4D	6.5	WH/18"	Brown silty fine to medium sand, trace coarse				Strong odor.
		8.5	1	sand, gravel (SM)	**F**			
						10		
	5D	10.0	23-73	Brown fine to coarse sand, some gravel, silt				Strong odor.
		12.0	19-8	(SM)				
						13.5		
						15		
	6D	15.0	20-29	Brown fine to medium sand, trace silt, gravel,	**S**			Strong odor.
		17.0	26-24	coarse sand (SP-SM)				
						18.5		
						20		
	7D	20.0	16-23	Brown fine to coarse sand, some gravel, trace	**T**			Strong odor.
		22.0	63-31	silt (SP-SM)				
	1C	22.5	REC=100%	Hard slightly weathered to unweathered gray		**22.5**	15*	*Coring time in
		27.5	RQD=98%	gneiss, jointed, weathered joints			10*	minutes per foot.
						25	10*	
							15*	
							11*	
	2C	27.5	REC=100%	Hard unweathered gray gneiss, blocky,	**R**		10*	
		32.5	RQD=94%	weathered joints			10*	
						30	10*	
							12*	
							11*	
15:00						**32.5**		End of Boring at 32.5'.
						35		
						40		
						45		
						50		

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ROCK CORE SKETCH

BORING NO. MR-7
SHEET 2 OF 3
FILE NO. 10608D
SURFACE ELEV. 9.6
RES ENGR. Mark Chaney

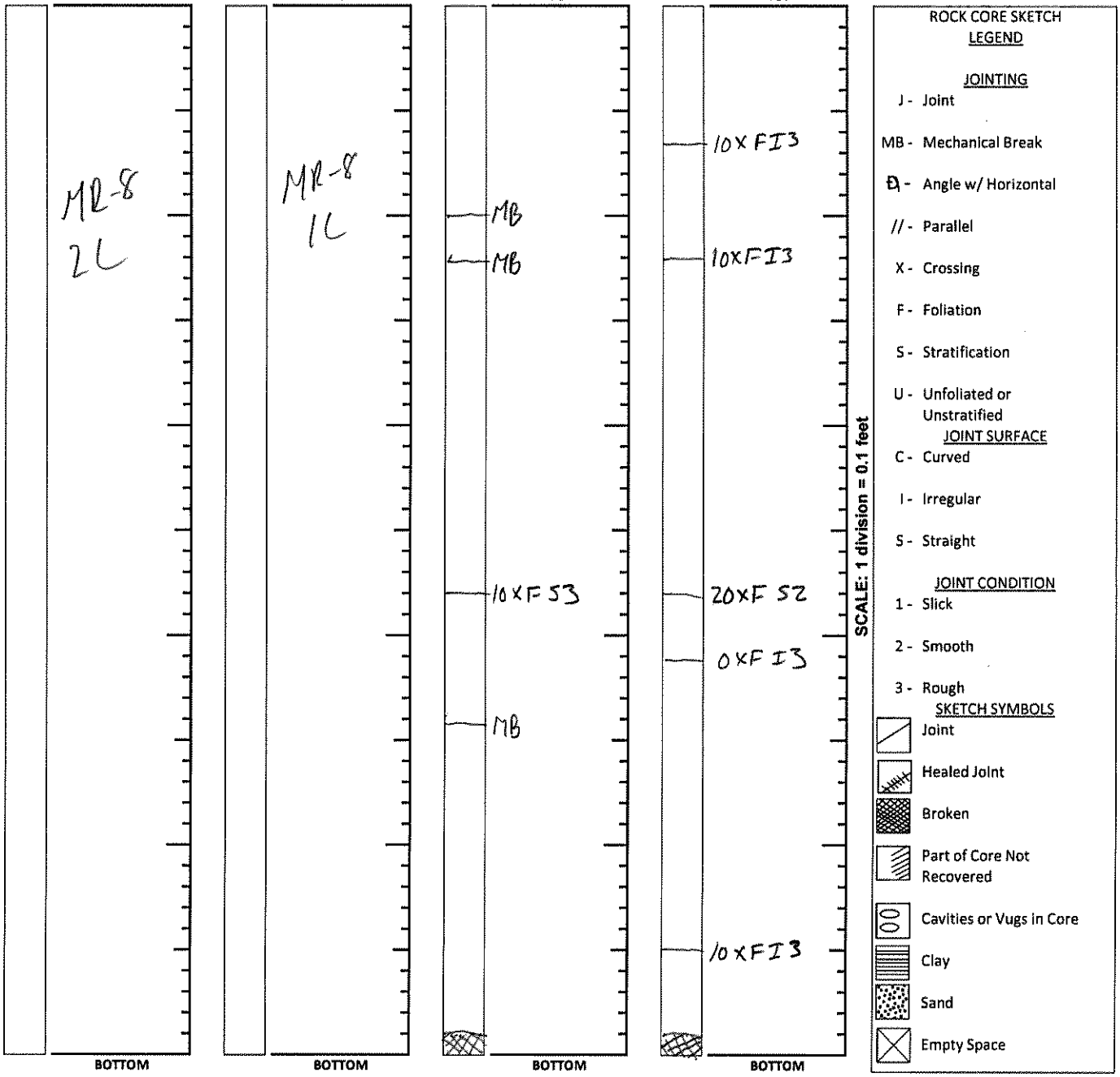
PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-8 2C	

Run No.	REC/RQD
MR-8 1C	

Run No.	REC/RQD
2C	100% / 94%

Run No.	REC/RQD
1C	100% / 98%



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- Θ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

JOINT SURFACE
- C - Curved
- I - Irregular
- S - Straight

JOINT CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-7
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 9.6
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO	
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	22
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER	TRACK DK-515								

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	22.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 10-03-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-8
SHEET 1 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 13.7
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30							DRILLED	Boring drilled indoors.
10-08-14							AHEAD	Hand augered by others
Wednesday							4"	to 4.5'. No samples
Partly Cloudy								obtained.
64°F	1C	4.5	REC=66%	Cobbles		5	9*	Strong odor of creosote,
		7.5	RQD=NA				10*	Cored through cobbles
					F		12*	at 4.5'.
								Strong odor of creosote,
	1D	8.0	4-WH/12"	Black fine to medium sand, some silt, trace				sample appears oily.
		10.0	1	gravel (SP-SM)		10		2nd Attempt with 3"
	2NR	10.0	3-1	No recovery				split spoon; still no
		12.0	2-3					recovery.
						13.5		
						15		
	3D	15.0	5-6	Gray soft to stiff clayey silt varved with trace silty				WC=29
		17.0	17-17	clay, silty fine sand (ML)				REC=6"
					V			
						20		
	4D	20.0	4-9	Gray soft to stiff silt varved with trace silty fine				WC=21
		22.0	11-23	sand (ML)				
						23.5		
						25		
	5D	25.0	16-22	Top 4": Brown fine to coarse sand, some	T			
		27.0	36-16	gravel, trace silt (SP-SM)				
15:00				Bot 4": Brown f-m sand, some gravel, silt (SM)			▼	
07:30	2C	28.5	REC=98%	Hard unweathered gray gneiss, blocky,		28.5		
10-09-14		33.5	RQD=95%	weathered joints		30	10*	*Coring time in
Thursday							10*	minutes per foot.
Rainy							7*	
55°F							10*	
	3C	33.5	REC=100%	Hard unweathered to slightly weathered gray	R		12*	
		38.5	RQD=88%	gneiss, jointed to moderately jointed, weathered		35	9*	
				joints			12*	
							10*	
							11*	
12:00						38.5	15*	End of Boring at 38.5'.
						40		
								WC=Water Content
								in percent of dry
								weight.
						45		
						50		

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ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-8
SHEET 2 OF 4
FILE NO. 10608D
SURFACE ELEV. 13.7
RES ENGR. Mark Chancy

Run No.	REC/RQD
3C	100% / 87.5%

33.5 TOP

MB
10 x FI3
10 x F I3
MB
MB
10 x FI3
20 x FI2
10 XF S2

38.5 BOTTOM

Run No.	REC/RQD
2C	98% / 95%

28.5 TOP

20 x FI3
10XF S3
J20S3 x F

33.5 BOTTOM

Run No.	REC/RQD
MR-7 2C	

TOP

MR-7 2C

BOTTOM

Run No.	REC/RQD
MR-7 1C	

TOP

MR-7 1C

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Ø - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Stralght

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

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ROCK CORE SKETCH

BORING NO. MR-8
SHEET 3 OF 4
FILE NO. 10606D
SURFACE ELEV. 13.7
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
1C	66% / NA

4.5 TOP

MB
MB
MB

Empty space

BOTTOM

Run No.	REC/RQD

TOP

BOTTOM

Run No.	REC/RQD

TOP

BOTTOM

Run No.	REC/RQD

TOP

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-8
SHEET 4 **OF** 4

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 13.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	28	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER	TRACK DK-515									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON	DRILLING MUD USED	X YES		NO
U-SAMPLER		DIAMETER OF ROTARY BIT, IN.	3-7/8		
S-SAMPLER		TYPE OF DRILLING MUD	QUIK GEL		
CORE BARREL	NX	AUGER USED		YES	X NO
CORE BIT	DIAMOND	TYPE AND DIAMETER, IN.			
DRILL RODS	NWJ				

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
10-09-14	07:00	28	28	7.1	OVERNIGHT READING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	24	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	13	OTHER: HAND AUGERED BY OTHERS	4.5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 10-09-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-9
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 14.2
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
13:30							DRILLED	Boring drilled outdoors.
10-03-14							AHEAD	Hand augered by
Friday							4"	others to 5'. No samples
Sunny								obtained.
70°F					F	**5**		
	1D	5.0	3-3	Brown fine to medium sand, some silt (Fill) (SM)				
		7.0	3-3					
	2D	7.0	3-2	Brown fine to medium sand, some silt, trace				Creosote staining.
		9.0	2-1	clay (Fill) (SM)				
						9.5		
	3D	10.0	1-1	Light brown fine to medium sand, some silt				
		12.0	1-2	(SM)				
15:00					S			
07:15						**15**		
10-06-14	4D	15.0	5-6	Gray brown fine to medium sand, some silt,				
Monday		17.0	5-6	trace coarse sand, gravel (SM)				
Sunny								
46°F						**18.5**		
						20		
	5D	20.0	4-8	Gray silt varved with trace silty clay (ML)				WC=25
		22.0	8-9					
					V			
						25		
	6D	25.0	4-7	Gray silt varved with trace silty clay (ML)				WC=25
		27.0	8-12					
						28.5		
						30		
	7D	30.0	12-17	Gray gravelly fine to coarse sand, trace silt				
		32.0	19-23	(SP-SM)	T			
						35	▼	
	1C	35.0	REC=90%	Hard unweathered gray gneiss, blocky			4*	*Coring time in
		40.0	RQD=82%				3*	minutes per foot.
							3*	
							4*	
					R	**40**	7*	
	2C	40.0	REC=98%	Hard unweathered gray gneiss, blocky			6*	
		45.0	RQD=94%				4*	
							4*	
							3*	
11:30						**45**	5*	End of Boring at 45'.
								WC=Water Content
								in percent of dry
								weight.
						50		

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ROCK CORE SKETCH

BORING NO. MR-9
SHEET 2 OF 3
FILE NO. 106080
SURFACE ELEV. 14.2
RES ENGR. Mark D. Chancy

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
2C	98% / 94%

40 TOP
20xF I3
10xF I3
J20S2xF
45 BOTTOM

Run No.	REC/RQD
1C	90% / 82%

35 TOP
MB
20xFI3
10xF S3
20xFS2
40 BOTTOM

Run No.	REC/RQD
MR-10P 2C	

TOP
MR-10P 2C
BOTTOM

Run No.	REC/RQD
MR-10P 1C	

TOP
MR-10P 1C
BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH LEGEND

JOINTING
J - Joint
MB - Mechanical Break
∠ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-9
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 14.2
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TYPE OF BORING RIG										
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	35	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
10-06-14	09:50	45	35	6.3	READING TAKEN AFTER ROCK CORE RUN 2C.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	30	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 10-06-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-10P
SHEET 1 OF 5
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 19.1
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:30	1HA	0.0	HAND	Brown fine to medium sand, some silt, trace			DRILLED	
10-02-14		3.0	AUGER	gravel (Fill) (SM)			AHEAD	
Thursday							4"	
Partly Cloudy	2HA	3.0	HAND	Brown fine to medium sand, some silt (Fill) (SM)				
60°F		5.0	AUGER		F	**5**		
	3D	5.0	2-1	Brown fine to medium sand, some silt, trace				
		7.0	2-3	gravel (Fill) (SM)				
	4D	7.0	2-2	Brown fine to coarse sand, some gravel, trace				REC=0.5"
		9.0	3-2	silt, concrete (Fill) (SP-SM)				
						9.5		
	5D	10.0	2-2	Brown fine to medium sand, trace silt, coarse				
		12.0	1-1	sand (SP-SM)				
						15		
	6D	15.0	5-8	Brown silty fine to medium sand (SM)				
		17.0	9-9		S			
						20		
	7D	20.0	5-10	Gray brown silty fine to medium sand varved				
		22.0	10-11	with trace silt (SM)				
						23.5		
						25		
	8D	25.0	7-7	Gray clayey silt varved with trace silty clay, silty				WC=22
		27.0	7-10	fine sand, trace mica (ML)				
					V	**30**		
	9D	30.0	4-4	Soft gray clayey silt varved with trace red brown				WC=33
		32.0	3-4	silty clay, silty fine sand (ML)				
15:00						**35**		
07:15	10D	35.0	3-6	Top 9": Gray clayey silt varved with trace silty		**36**		
10-03-14		37.0	11-16	fine sand, silty clay (ML)	T			
Friday				Bot 9": Gray f-c sand, sm gvl, silt (SM)		**38**		
Sunny	1C	38.0	REC=98%	Hard slightly weathered to unweathered gray			7*	*Coring time in
60°F		43.0	RQD=91%	gneiss, jointed, weathered joints		**40**	11*	minutes per foot.
							10*	
							7*	
							7*	
	2C	43.0	REC=100%	Hard unweathered to slightly weathered gray	R		10*	
		48.0	RQD=96%	gneiss, moderately jointed to jointed,		**45**	10*	
				weathered joints			10*	
							10*	
15:00						**48**	10*	End of Boring at 48'.
						50		WC=Water Content
								in percent of dry
								weight.

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ROCK CORE SKETCH

BORING NO. MR-10P
SHEET 2 OF 5
FILE NO. 10608D
SURFACE ELEV. 19.1
RES ENGR. Mark Chang

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-9 2C	

TOP

MR-9
2C

BOTTOM

Run No.	REC/RQD
MR-9 1C	

TOP

MR-9
1C

BOTTOM

Run No.	REC/RQD
2C	100% / 96%

43' TOP

J20XFS3
J20S3XF
J80S3XF
20XFS3

BOTTOM

Run No.	REC/RQD
1C	98% / 91%

38' TOP

90° FIZ
0XFI3
MB
10XF I3
10XF S3
J45I3 XF
J45S2 XF
60XF S2
20XF S3

43' BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

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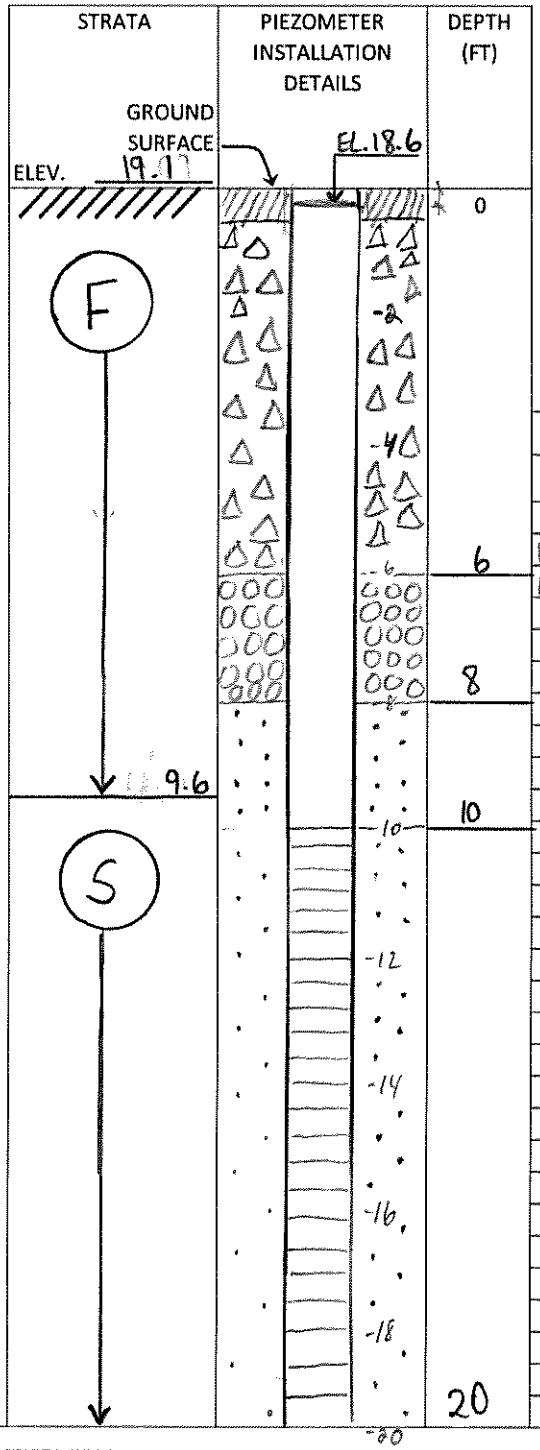
PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-10P
SHEET 3 OF 5
FILE NO. 106080
INSTALLATION DATE 10/3/14
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
PIEZOMETER LOCATION: See Boring Location Plan

☐ SEE SKETCH ON BACK



PIEZOMETER TYPE SLOTTED PVC

INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 18.6
diameter, in = 2 , ft = 0.167 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10/8/14	7:00	11.3	7.3	
10/9/14	7:00	11.4	7.2	
10/11/14	7:00	11.6	7.0	

SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. 19.1

PIEZOMETER NO. MR-10P

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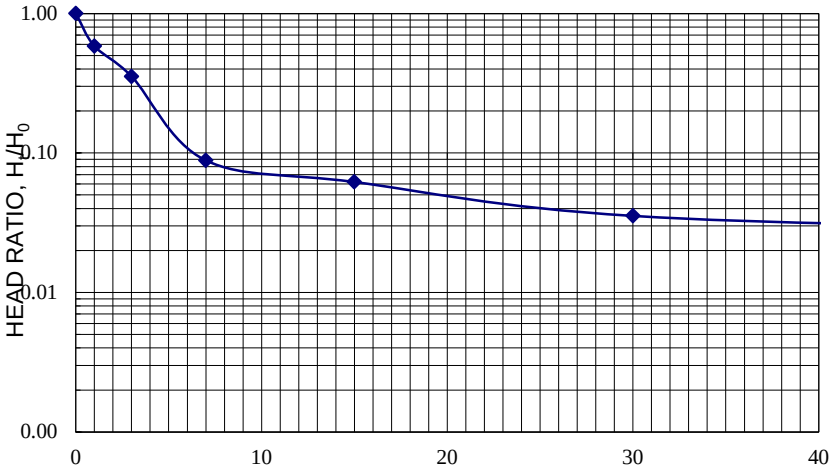
VARIABLE HEAD PERMEABILITY TEST

☐ **BOREHOLE OR** ☑ **PIEZOMETER NO.** MR-10P

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, Queens, NY
PIEZOMETER LOCATION: See Boring Location Plan

SHEET 4 **OF** 5
FILE NO. 10608
TEST NO. 1
RES ENGR. MDC
CALC. BY JMB **DATE** 11/6/2014
CH'KD BY **DATE**



INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 18.6
diameter, in = 2 , ft = 0.167 = 2r

depth of casing, ft = -

depth to which stand-pipe was bailed, ft = - = Z

READING TIME			ORIGINAL TEST DEPTH, H_0 (ft.)	DEPTH AT TIME t, H_t (ft.)	UNBALANCED HEAD $DH_t = H_t - H_0$ (ft.)	HEAD RATIO DH_t/DH_0	REMARKS
DATE	CLOCK	Δt MIN.					
10/6/2014	10:00	0	11.3	0	11.3	1.00	FALLING HEAD TEST
10/6/2014	10:01	1		4.7	6.6	0.58	
10/6/2014	10:03	3		7.3	4	0.35	
10/6/2014	10:07	7		10.3	1	0.09	
10/6/2014	10:15	15		10.6	0.7	0.06	
10/6/2014	10:30	30		10.9	0.4	0.04	
10/6/2014	11:00	60		11	0.3	0.03	
10/6/2014	12:00	120		11.15	0.15	0.01	
10/6/2014	2:00	240		11.25	0.05	0.00	

PIEZOMETER NO. MR-10P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-10P
SHEET 5 **OF** 5

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 19.1
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	38
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD BIOBORE

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					FOR PIEZOMETER READINGS, SEE SHEET NO. 4.

PIEZOMETER INSTALLED [X] YES [ ] NO SKETCH SHOWN ON SEE SHEET NO. 4

STANDPIPE:	TYPE	PVC	ID, IN.	2	LENGTH, FT.	10	TOP ELEV.	18.6
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2-3/8	LENGTH, FT.	10	TIP ELEV.	-0.9
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	12	BOT. ELEV.	-0.9

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	33	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS PIEZOMETER INSTALLED.
RESIDENT ENGINEER MARK CHANCY DATE 10-03-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-11
SHEET 1 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.2
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
							DRILLED	Hand augered by
							AHEAD	others, no samples
							4"	obtained.
					F	5		
08:00	1D	5.0	3-2	Brown fine to coarse sand, some gravel, trace				
09-30-14		7.0	3-4	silt (Fill) (SP-SM)				
Tuesday	2D	7.0	4-7	Brown fine to coarse sand & brick, trace				
Cloudy		8.2	50/2"	gravel, silt (Fill) (SP-SM)				
68°F						9.5		
	3D	10.0	3-5	Brown fine to medium sand, trace silt, gravel				
		12.0	4-5	(SP-SM)				
					S			
						15		
	4D	15.0	8-6	Brown fine to medium sand, some silt, trace				
		17.0	4-5	mica (SM)				
						18.5		
						20		
	5D	20.0	2-3	Brown silt, some fine to medium sand, trace				
		22.0	8-13	clay seams (ML)				
					V			
						25		
	6D	25.0	3-3	Gray silt varved with clayey silt, trace silty clay				WC=30
		27.0	5-12	(ML)				
						28.5		
						30		
	7D	30.0	7-20	Gray gravel, some fine to coarse sand, trace				
		32.0	21-12	silt (GP-GM)				
						35		
	8D	35.0	6-11	Brown fine to coarse sand, some silt, trace				
		37.0	15-16	gravel (SM)				
					T			
						40		
	9D	40.0	11-19	Gray brown fine to medium sand, some gravel,				
		42.0	21-22	silt, trace coarse sand (SM)				
						45		
	10D	45.0	13-20	Gray fine to medium sand, some gravel, trace				
		47.0	24-30	silt (SP-SM)				
						48.5		
						50		
	11D	50.0	12-18	White fine to coarse sand, some rock fragments,	DR			
		51.6	30-50/1"	clayey silt (Decomposed Rock) (SM)				

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-11
SHEET 2 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.2
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd					DR		DRILLED	
09-30-14						52	AHEAD	
Tuesday	1C	52.0	REC=99%	Hard unweathered to slightly weathered gray			4" 4*	*Coring time in
Cloudy		57.0	RQD=90%	gneiss, jointed, weathered joints			3*	minutes per foot.
68°F						55	3*	
							3*	
							3*	
	2C	57.0	REC=90%	Medium hard unweathered gray gneiss,	R		3*	
		62.0	RQD=85%	jointed, weathered joints			3*	
						60	4*	
							5*	
12:30						62	6*	End of Boring at 62'.
								WC=Water Content
						65		in percent of dry
								weight.
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MRCE Form BL-1

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ROCK CORE SKETCH

BORING NO. MR-11
SHEET 3 OF 4
FILE NO. 106080
SURFACE ELEV. 20.2
RES ENGR. Mark Cheung

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-13 2C	

TOP

MR-13
2C

BOTTOM

Run No.	REC/RQD
MR-13 1C	

TOP

MR-13
1C

BOTTOM

Run No.	REC/RQD
2C	90% / 85%

57 TOP

J10 S2 XF
10 XF S2
10XF S2
20XFI3
10 XFS3
10XFS2
0XFS2
J20I3XF
MB

62 BOTTOM

Run No.	REC/RQD
1C	99% / 90%

52 TOP

J20 I3 XF
20XFS2
60XFI3
80XFI3
10XF S3
0XFI3
20XFS2
MB
MB

57 BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-11
SHEET 4 **OF** 4

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 20.2
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG					X	YES		NO	
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	52
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED	X	YES	NO
DIAMETER OF ROTARY BIT, IN.	3-7/8		
TYPE OF DRILLING MUD	QUIK GEL		
AUGER USED		YES	X NO
TYPE AND DIAMETER, IN.			

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-30-14	02:10	62	50	16.5	TAKEN AFTER RUN 2C.
10-02-14	11:00	62		11.35	OVERNIGHT MUD LEVEL.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	47	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-30-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-12P
SHEET 1 OF 6
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.4
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:00							DRILLED	Hand augered by
09-25-14							AHEAD	others, no samples
Thursday							4"	obtained.
Light Rain								
65°F						5		
	1D	5.0	3-4	Brown fine to coarse sand & red brick fragments,	F			
		7.0	4-1	trace silt (Fill) (SP-SM)				
	2D	7.0	6-7	Brown fine to coarse sand, some gravel, trace				
		9.0	7-1	silt, red brick fragments (Fill) (SP-SM)				
						9.5		
	3D	10.0	2-2	Brown fine to medium sand, some silt (SM)				
		12.0	3-4					
					S			
						15		
	4D	15.0	2-3	Gray brown silty fine sand (SM)				
		17.0	3-2					
						18.5		
						20		
	5D	20.0	4-5	Brown fine sandy silt (ML)				REC=2"
		22.0	4-5					No recovery on 1st
								attempt, 2nd attempt
								by pushing spoon
						25		yielded 2" of recovery.
	6D	25.0	7-9	Brown silt, some fine sand (ML)				
		27.0	10-11		V			
						30		
	7D	30.0	2-3	Gray fine sand, some silt varved with some				
		32.0	2-6	clayey silt, trace silty clay (SM&ML)				
						33.5		
						35		
	8D	35.0	20-40	Gray brown fine to coarse sand, some silt,				
		37.0	30-27	gravel (SM)				
						40		
	9D	40.0	37-28	Gray brown fine to coarse sand, some silt,				
		42.0	23-24	gravel (SM)	T			
								Rig chatter.
						45		
	10D	45.0	30-25	Gray brown gravel, some coarse to fine sand,				Cobbly zone, REC=2",
12:45		47.0	25-16	trace silt (GP-GM)				very hard drilling.
08:30								
09-26-14								
Friday								
Mostly Sunny						50		
62°F	1C	50.0	REC=82%	Medium hard unweathered to slightly weathered	R			
		55.0	RQD=61%	gray gneiss, jointed to closely jointed, WJts				

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-12P
SHEET 2 OF 6
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.4
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							3*	*Coring time in
09-26-14							4*	minutes per foot.
Friday							6*	
Mostly Sunny							3*	
62°F						**55**	5*	
	2C	55.0	REC=100%	Medium hard unweathered to slightly weathered	**R**		4*	
		60.0	RQD=88%	gray gneiss, jointed, weathered joints			5*	
							5*	
							6*	
11:30						**60**	3*	End of Boring at 60'.
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

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ROCK CORE SKETCH

BORING NO. MR-12P
SHEET 3 OF 6
FILE NO. 106080
SURFACE ELEV. 20.4
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-12P 2C	100/88

55' TOP

MB
0XF S3
J20I3 //F
J20S2
J20S2 //F
J20S2
10 //FS2

60' BOTTOM

Run No.	REC/RQD
MR-12P 1C	82%/61%

50' TOP

0XF S3
20XF I3
30XFI2
0XFI3
10XF I3
60XFS3
10 //FI3
30 //FS2 wjt.

55' BOTTOM

Run No.	REC/RQD
MR-15 2C	

TOP

MR-15

BOTTOM

Run No.	REC/RQD
MR-15 1C	

TOP

MR-15

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

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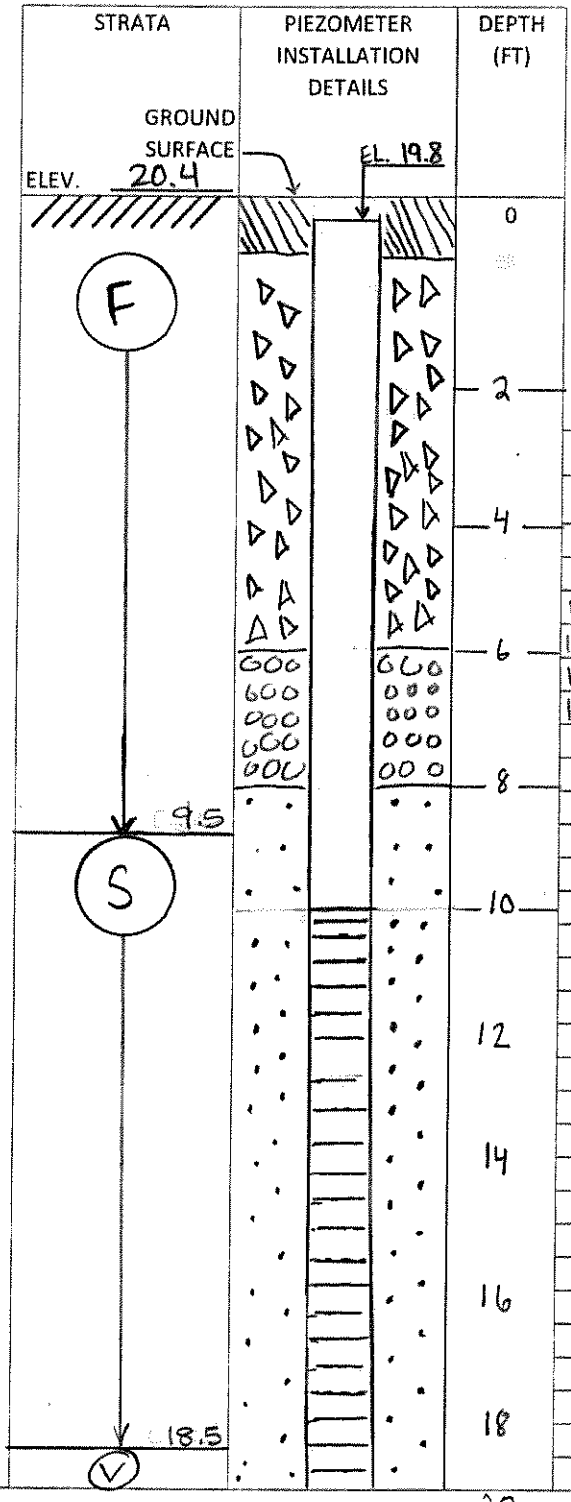
PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-12P
SHEET 4 OF 6
FILE NO. 10608D
INSTALLATION DATE 9/29/14
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
PIEZOMETER LOCATION: See Boring Location Plan

☐ SEE SKETCH ON BACK



PIEZOMETER TYPE SLOTTED PVC

INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 19.8
diameter, in = 2 , ft = 0.167 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10/3/14	7:00	12.7	7.1	
10/6/14	7:00	12.4	7.4	
10/7/14	7:00	13.15	6.7	
10/8/14	7:00	13.1	6.7	
10/9/14	7:00	13.15	6.7	
10/11/14	7:00	13.3	6.5	

SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. 20.4

PIEZOMETER NO. MR-12P

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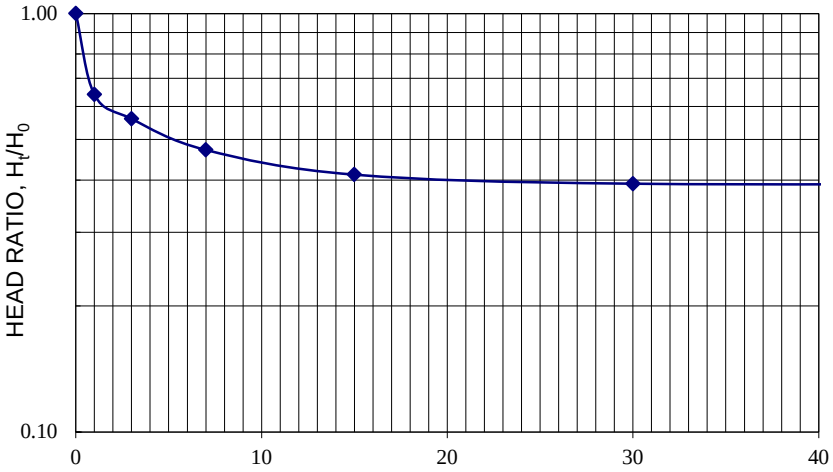
VARIABLE HEAD PERMEABILITY TEST

☐ **BOREHOLE OR** ☑ **PIEZOMETER NO.** MR-12P

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, Queens, NY
PIEZOMETER LOCATION: See Boring Location Plan

SHEET 5 **OF** 6
FILE NO. 10608
TEST NO. 1
RES ENGR. MDC
CALC. BY JMB **DATE** 11/6/2014
CH'KD BY **DATE**



INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 19.8
diameter, in = 2 , ft = 0.167 = 2r

depth of casing, ft = -

depth to which stand-pipe was bailed, ft = - = Z

READING TIME			ORIGINAL TEST DEPTH, H_0 (ft.)	DEPTH AT TIME t, H_t (ft.)	UNBALANCED HEAD $DH_t = H_t - H_0$ (ft.)	HEAD RATIO DH_t/DH_0	REMARKS
DATE	CLOCK	Δt MIN.					
10/7/2014	11:00	0	12.5	0	12.5	1.00	FALLING HEAD TEST
10/7/2014	11:01	1		4.5	8	0.64	
10/7/2014	11:03	3		5.5	7	0.56	
10/7/2014	11:07	7		6.6	5.9	0.47	
10/7/2014	11:15	15		7.35	5.15	0.41	
10/7/2014	11:30	30		7.6	4.9	0.39	
10/7/2014	12:00	60		7.6	4.9	0.39	
10/7/2014	13:00	120		7.6	4.9	0.39	
10/7/2014	15:00	240		7.6	4.9	0.39	

PIEZOMETER NO. MR-12P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-12P
SHEET 6 **OF** 6

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 20.4
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	50
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD BIOBORE

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-26-14	08:07	50	50	13	OVERNIGHT READING.
					FOR PIEZOMETER READINGS, SEE SHEET NO. 5.

PIEZOMETER INSTALLED [X] YES [ ] NO SKETCH SHOWN ON SEE SHEET NO. 5

STANDPIPE:	TYPE	PVC	ID, IN.	2	LENGTH, FT.	10	TOP ELEV.	19.8
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2-3/8	LENGTH, FT.	10	TIP ELEV.	0.4
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	12	BOT. ELEV.	0.4

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	45	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGER BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS PIEZOMETER INSTALLED.
RESIDENT ENGINEER MARK CHANCY DATE 09-26-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-13
SHEET 1 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 19.6
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30	1HA	0.0	HAND	Brown fine to coarse sand, some gravel, silt			DRILLED	
10-01-14		3.0	AUGER	(Fill) (SM)			AHEAD	
Wednesday							4"	
Light Rain	2HA	3.0	HAND	Do 1HA, trace brick (Fill) (SM)				
60°F		5.0	AUGER		F	5		
	3D	5.0	3-1	Brown fine to medium sand, some silt, trace				
		7.0	1-5	gravel, coarse sand (Fill) (SM)				
	4D	7.0	14-4	Black fine to coarse sand, some gravel, silt				
		9.0	2-2	(Fill) (SM)				
						9.5		
	5D	10.0	3-6	Light brown fine to medium sand, some				
		12.0	7-10	silt (SM)				
						15		
	6D	15.0	5-5	Light brown clayey fine to medium sand, trace				
		17.0	6-7	gravel, coarse sand (SC)	S			
						20		
	7D	20.0	3-4	Light brown silty fine sand, trace gravel (SM)				
		22.0	4-5					
						23.5		
						25		
	8D	25.0	4-3	Gray clayey silt varved with trace silty fine sand				WC=27
		27.0	5-6	(ML)				
						30		
	9D	30.0	4-4	Soft gray silty fine sand varved with some silt,	V			WC=26
		32.0	5-5	trace silty clay (SM&ML)				
						35		
	10D	35.0	5-5	Gray silt varved with trace silty fine sand (ML)				
		37.0	6-7					
						38.5		
						40		
	11D	40.0	11-9	Gray fine to coarse sandy gravel, trace silt	T			
		42.0	12-16	(GP-GM)				
						43		
	1C	43.0	REC=91%	Medium hard unweathered to slightly weathered			2*	*Coring time in
		48.0	RQD=62%	gray gneiss, jointed to broken, weathered		45	2*	minutes per foot.
				joints			2*	
							2*	
					R		2*	
	2C	48.0	REC=94%	Medium hard to intermediate unweathered to			9*	
		53.0	RQD=44%	slightly weathered gray gneiss, jointed to broken,		50	9*	
				weathered joints				

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-13
SHEET 2 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 19.6
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd								
10-01-14					R			
Wed.,Lt. Rain						53		End of Boring at 53'.
60°F, 14:00								
						55		WC=Water Content in percent of dry weight.
						60		
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MRCE Form BL-1

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ROCK CORE SKETCH

BORING NO. MR-13
SHEET 3 OF 4
FILE NO. 10608D
SURFACE ELEV. 19.6
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
2C	94% / 44%

48 TOP

10XFS2
10XFS2
70XFS2
J20I2
20XFI3
20XFS2
10XFS3
XFI3
10XFS3
10XFS2
MB

53 BOTTOM

Run No.	REC/RQD
1C	91% / 62%

43 TOP

20US2
20XFI3
20XFI3
70XFS2
70XFS3
10XFS3
0XFS2
10XFS3
J60I3//F
MB

BOTTOM

Run No.	REC/RQD
MR-11 2C	

TOP

MR-11
2C

BOTTOM

Run No.	REC/RQD
MR-11 1C	

2 TOP

MR-11
1C

6 BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-13
SHEET 4 **OF** 4

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 19.6
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	43
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 10-02-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-14
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 18.1
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:00	1HA	0.0	HAND	Dark brown fine to coarse sand, some gravel,			DRILLED	
09-17-14		3.0	AUGER	silt (Fill) (SM)			AHEAD	
Wednesday					F		4"	
Partly Sunny	2HA	3.0	HAND	Brown fine to coarse sand, some gravel, trace				
70°F		5.0	AUGER	silt (Fill) (SP-SM)		**5**		
	3D	5.0	2-1	Brown fine to medium sand, some silt, trace				
		7.0	1-1	gravel (SM)				
	4D	7.0	1-2	Brown fine to medium sand, trace silt, gravel				
		9.0	3-3	(SP-SM)				
						10		
	5D	10.0	2-2	Light brown fine to medium sand, trace silt				
		12.0	2-2	(SP-SM)	S			
						15		
	6D	15.0	4-4	Gray fine sand, some silt, trace mica (SM)				
		17.0	4-4					
						18.5		
						20		
	7D	20.0	2-3	Gray fine sandy silt, trace mica (ML)				
		22.0	2-6					
						25		
	8D	25.0	4-2	Soft gray brown silty clayey varved with some				WC=30
		27.0	4-6	silty fine sand, trace silty clay (CL&SM)	V			
						30		
	9D	30.0	2-3	Gray silty fine sand varved with some silt, trace				
		32.0	5-6	silty clay (SM&ML)				
						33.5		
						35		
	10D	35.0	32-24	Gray brown fine to medium sand, some gravel,				
		37.0	20-22	trace silt (SP-SM)				
	11D	37.0	12-12	Gray brown fine to medium sand, some gravel,	T			
		39.0	11-12	trace silt (SP-SM)				
						40		
	12D	40.0	23-50/3"	Gray brown gravelly fine to coarse sand, trace		**41**		
		40.8		silt (SP-SM)			3*	*Coring time in
	1C	41.0	REC=100%	Hard unweathered gray gneiss, moderately			3*	minutes per foot.
		46.0	RQD=95%	jointed, weathered joints			3*	
						45	3*	WC=Water Content
							4*	in percent of dry
	2C	46.0	REC=100%	Hard unweathered gray gneiss, moderately	R		2.5*	weight.
		51.0	RQD=98%	jointed, weathered joints			2.5*	
							2.5*	
						50	2.5*	
15:00						**51**	2.5	End of Boring at 51'.

MRCE Form BL-1

BORING NO. MR-14

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ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-14
SHEET 2 OF 3
FILE NO. 106080
SURFACE ELEV. 18.1
RES ENGR. Mark Chaney

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	100/98

Run No.	REC/RQD
1C	100/95

Part of run 1C recovered in 2C

TOP 5.0' | TOP | TOP 0 | TOP 4.6 | TOP 4.1'

MR-17 2C

MR-17 1C

MB

3.00 JOXFS3

3.05 10 XFS2

3.00 10 XFS2

3.15 70 XFS2

1C BOT

BOTTOM | BOTTOM | BOTTOM 13.11 5' | BOTTOM 4.28 4.6 | BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-14
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 18.1
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	40	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-18-14	07:15	51	40	13	OVERNIGHT MUD LEVEL.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	36	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-17-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-15
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 17.5
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
11:00	1HA	0.0	HAND	Brown fine to medium sand, some silt, trace			DRILLED	
09-11-14		3.0	AUGER	gravel (SM)			AHEAD	
Thursday							4"	
Cloudy	2HA	3.0	HAND	Orange brown fine to medium sand, some				
72°F		5.0	AUGER	silt (SM)	F	**5**		
	3D	5.0	2-3	Brown gravelly fine to medium sand, trace silt				REC=1"
		7.0	2-1	(SP-SM)				
	4D	7.0	4-4	Brown gravelly fine to coarse sand, some silt,				REC=3"
		9.0	3-1	trace asphalt (SM)				
14:45						**9.5**		
09:30	5NR	10.0	WH/18"	No recovery				
09-12-14		12.0	2					
Friday								
Cloudy					S			
64°F						**15**		
	6D	15.0	4-6	Brown fine to coarse sand, trace silt, gravel				REC=4"
		17.0	6-7	(SP-SM)				
						18.5		
						20		
	7D	20.0	7-8	Gray silt, some fine sand, mica (ML)				
		22.0	8-9					
						25		
	8D	25.0	3-6	Gray silt varved with silty clay, trace fine sand				
		27.0	7-8	(CL-ML)	V			
						30		
	9D	30.0	2-2	Gray silt varved with trace silty clay, fine sand				
		32.0	2-7	(ML)				
						35		
	10D	35.0	11-40	Gray fine to coarse sand, some gravel, silt		**35.5**		
		37.0	37-32	(SM)				
					T			
						40		
	1C	40.0	REC=93%	Hard unweathered gray gneiss, moderately			5.5*	*Coring time in
		45.0	RQD=89%	jointed, weathered joints			7.5*	minutes per foot.
							6.5*	
							4*	
14:45					R	**45**	5.5*	
07:15	2C	45.0	REC=100%	Hard unweathered gray gneiss, moderately			16*	
09-15-14		50.0	RQD=90%	jointed, weathered joints			5*	
Monday							7*	
Mostly Sunny							5*	
60°F, 09:00						**50**	8.5*	End of Boring at 50'.

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ROCK CORE SKETCH

BORING NO. MR-15
SHEET 2 OF 3
FILE NO. 10680
SURFACE ELEV. 17.5
RES ENGR. M Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Queens Boulevard & Jackson Avenue - Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD

TOP

Run No.	REC/RQD

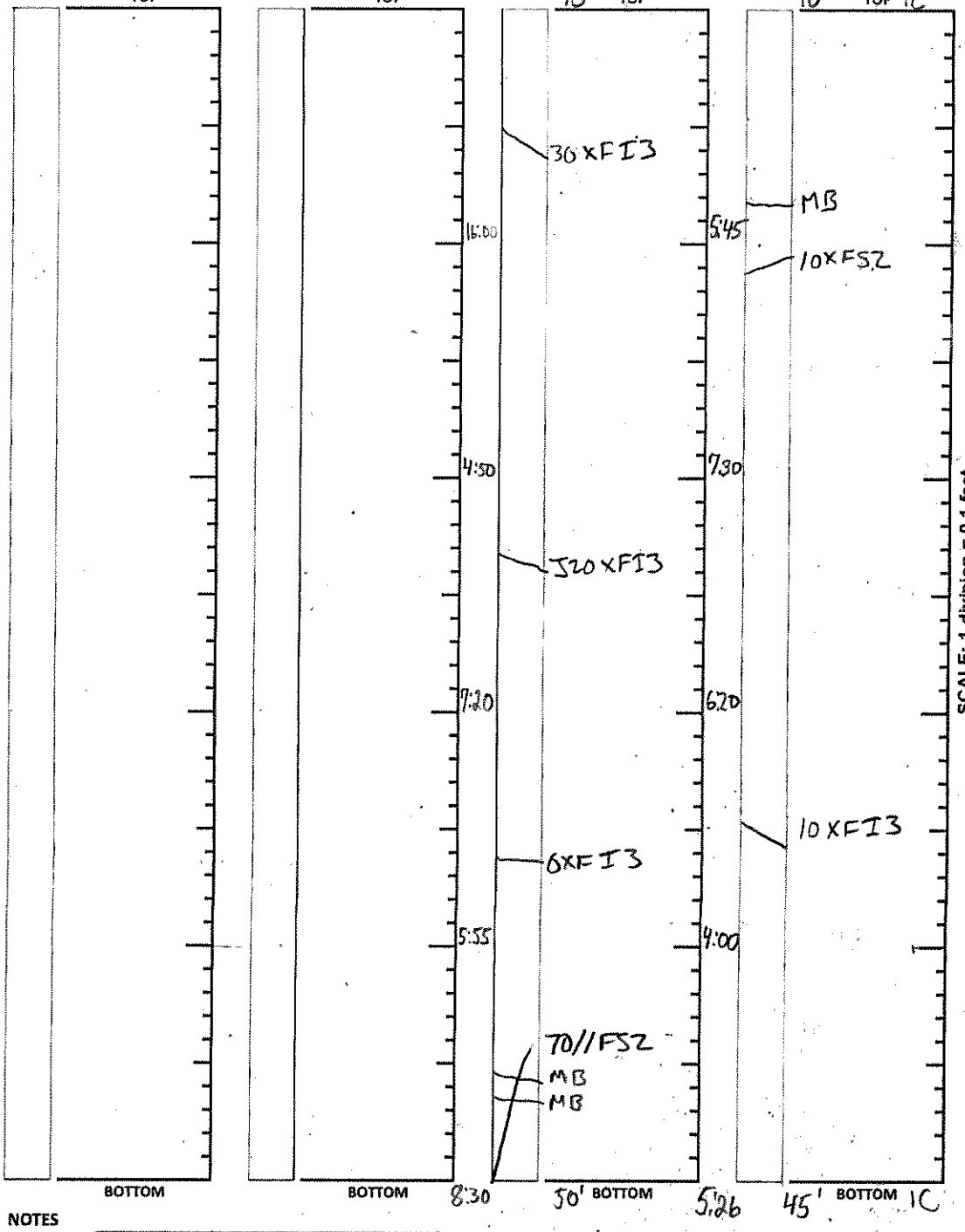
TOP

Run No.	REC/RQD
2C	100/90

45' TOP

Run No.	REC/RQD
1C	93/89

40' TOP 1C



ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-15
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 17.5
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	40	
SKID		HYDRAULIC		DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER	ELECTRIC	DIA., IN.		DEPTH, FT. FROM		TO		
OTHER	TRACK DK-515									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	35	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-15-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-16
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.0
RES. ENGR. MICHAEL MCMASTER

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:30					**	0.3	DRILLED	**Asphalt from 0' to 0.3'.
09-22-14	1HA	1.0	HAND	Dark gray fine to medium sand, some gravel,			AHEAD	
Monday		3.0	AUGER	silt, trace brick, concrete, glass (Fill) (SM)			4"	
Clear	2HA	3.0	HAND	Dark gray fine to coarse sand, some gravel,				
70°F		5.0	AUGER	silt, trace concrete (Fill) (SM)	F	5		
	3D	5.0	5-2	Brown & black fine to medium sand, some gravel,				
		7.0	1-1	trace silt, concrete, brick (Fill) (SP-SM)				
	4D	7.0	2-6	Brown fine to medium sand, some gravel, trace				REC=6"
		9.0	7-1	silt, concrete, brick (Fill) (SP-SM)				
						9.5		
	5D	10.0	5-6	Brown fine to medium sand, some silt (SM)				
		12.0	8-10					
					S			
						15		
	6D	15.0	4-5	Gray brown silty fine to medium sand (SM)				
		17.0	5-5					
						18.5		
						20		
	7D	20.0	3-6	Brown fine sandy silt varved with trace silt (ML)				
		22.0	6-7					
						25		
	8D	25.0	6-9	Top 15": Gray brown silty fine sand varved with				
		27.0	9-8	trace silt (SM)	V			
				Bot 1": Gray brown clayey silt varved with trace				
				silty clay (ML)				
						30		
	9D	30.0	3-2	Gray silty clay varved with trace silt, fine sand				WC=35
		32.0	3-3	lenses (CL)				
						35		
	10D	35.0	1-8	Top 10": Gray silt varved with trace silty clay (ML)		35.5		Till from 35.5' to 36.1'.
		36.1	50/1"	Bot 2": Gray brown gravelly fine to medium sand,	TILL DR	36.1		Decomposed rock
				some silt (SM)		36.5	6*	from 36.1' to 36.5'.
	1C	37.0	REC=100%	Hard slightly weathered to unweathered gray			4*	Hard drilling from 36.5'
		42.0	RQD=100%	gneiss, massive		40	5*	to 37'.
							5*	*Coring time in
							4*	minutes per foot.
	2C	42.0	REC=94%	Hard unweathered gray gneiss, massive to	R		5*	
		47.0	RQD=88%	closely jointed, iron stained joints			5*	
						45	7*	Lost circulation at 44.5'.
							6*	
13:35						47	7*	End of Boring at 47'.
								WC=Water Content
						50		in percent of dry
								weight.

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New York, NY 10122
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www.mrce.com

ROCK CORE SKETCH

BORING NO. MR-16
SHEET 2 OF 3
FILE NO. 106085
SURFACE ELEV. 20.0
RES ENGR. M. McMASTER

PROJECT: QUEENS PLAZA RESIDENTIAL DEVEL.
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-4 2C	

TOP

MR-4
2-C

BOTTOM

Run No.	REC/RQD
MR-4 1C	

TOP

MR-4
1C

BOTTOM

Run No.	REC/RQD
2C	94/88

42.0 TOP

J20XFS2
J0XFS2
J10XFS2
J10XFS2
J0XFS2
J0XFS2
J10XFS2

BOTTOM

Run No.	REC/RQD
1C	100/100

37.0 TOP

J0XFS2

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
∠ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-16
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 20.0
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	36
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	32	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED WITH SOIL CUTTINGS UPON COMPLETION.
RESIDENT ENGINEER MICHAEL MCMASTER DATE 09-22-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-17
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 19.0
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30	1HA	0.0	HAND	Gray fine to coarse sand, some brick fragments,			DRILLED	
09-18-14		5.0	AUGER	trace gravel, silt (Fill) (SP-SM)			AHEAD	
Thursday							4"	
Partly Sunny					F			
62°F						**5**		
	2D	5.0	WH/12"	Brown fine to coarse sand, some asphalt,				
		7.0	2/12"	brick fragments, trace silt (Fill) (SP-SM)		**7**		
	3D	7.0	23-6	Brown fine to medium sand, some silt (SM)				
		9.0	5-4					
						10		
	4D	10.0	3-5	Brown fine to medium sand, trace silt (SP-SM)				
		12.0	5-8					
						15		
	5D	15.0	1-1	Gray fine sand, some silt, trace mica (SM)	S			
		17.0	3-3					
						20		
	6D	20.0	2-3	Gray silty fine sand, trace mica (SM)				
		22.0	3-6					
						23.5		
						25		
	7D	25.0	1-2	Gray silt varved with trace silty fine sand (ML)				
		27.0	3-3					
					V			
						30		
	8D	30.0	1-2	Gray silt, some layer of fine to medium sand,				
		32.0	2-11	some gravel, silt (ML&SM)		**31.5**		
						35		
	1C	35.0	REC=78%	Gray boulder with some gravel & cobbles	T		3*	Possible ledge over
		40.0	RQD=NA				3*	till.
							3*	*Coring time in
							3*	minutes per foot.
						40	3*	
	2C	40.0	REC=90%	Hard unweathered to slightly weathered gray			2.5*	
		45.0	RQD=90%	gneiss, jointed to moderately jointed,			3*	
				weathered joints	R		2*	
							3*	
14:45						**45**	3*	End of Boring at 45'.
						50		

MRCE Form BL-1

BORING NO. MR-17

Mueser Rutledge Consulting Engineers
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ROCK CORE SKETCH

BORING NO. MR-17
SHEET 2 OF 3
FILE NO. 10608D
SURFACE ELEV. 19.0
RES ENGR. Mark Chang

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
2C	90/90

45 TOP

Asstd gvl.

0XFS3

0XFS2 wjt

10XFS3

50 BOTTOM

Run No.	REC/RQD
1C	78/61

35 TOP

Possible bldr or ledge

J20FS3 Asstd gvl

MB

Cobble

gvl pieces

BOTTOM

Run No.	REC/RQD

TOP

2C

MR-14

BOTTOM

Run No.	REC/RQD

TOP

1C

MR-14

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-17
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 19.0
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	35
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	30	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-18-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-18
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 17.7
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:30	1HA	0.0	HAND	Dark brown fine to medium sand, some gravel,			DRILLED	
09-15-14		3.0	AUGER	silt, trace coarse sand (Fill) (SM)			AHEAD	
Monday							4"	
Mostly Sunny	2HA	3.0	HAND	Dark brown fine to medium sand, some gravel,				
62°F		5.0	AUGER	silt (Fill) (SM)	F	5		
	3D	5.0	3-1	Black fine to coarse sand, some silt, trace				
		7.0	2-1	gravel, wood (Fill) (SM)				
	4D	7.0	7-6	Brown fine to medium sand, some silt, trace				
		9.0	7-8	gravel (Fill) (SM)				
						9.5		
	5D	10.0	3-3	Brown fine to medium sand, some silt (SM)				REC=4"
		12.0	1-2					
						15		
	6D	15.0	5-6	Gray fine to medium sand, trace silt (SP-SM)				
		17.0	10-9		S			
						20		
	7D	20.0	3-6	Brown fine to medium sand, trace silt (SP-SM)				
		22.0	9-13					
						23.5		
						25		
	8D	25.0	2-4	Gray silt varved with some silty fine sand				WC=27
		27.0	4-7	(ML&SM)				
					V			
						30		
	9D	30.0	3-3	Soft gray silty clay varved with trace clayey silt,				WC=35
		32.0	4-5	silty fine sand (CL)				
						33.5		
						35		
	10D	35.0	35-36	Gray fine to coarse sand, some gravel, trace				
14:30		37.0	41-37	silt (SP-SM)	T			
07:30								
09-16-14								
Monday						40		
Partly Cloudy	1C	40.0	REC=74%	Medium hard slightly weathered to unweathered			6.5*	*Coring time in
62°F		45.0	RQD=60%	gray gneiss, jointed to closely jointed, weathered			6*	minutes per foot.
				joints			10.5*	
							16*	WC=Water Content
						45	15*	in percent of dry
	2C	45.0	REC=100%	Hard unweathered gray gneiss, closely	R		3*	weight.
		50.0	RQD=94%	jointed to moderately jointed			2*	
							2.5*	
							2.5*	
11:00						50	3*	End of Boring at 50'.

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BORING NO. MR-18

Mueser Rutledge Consulting Engineers
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ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-18
SHEET 2 OF 3
FILE NO. 106080
SURFACE ELEV. 17.7
RES ENGR. MChaney

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	100/94

Run No.	REC/RQD
1C	74/60

TOP

MR-21
2C

BOTTOM

TOP

MR-21
1-C

BOTTOM

TOP 45

2.46
20 XFS2
10 XFS2
7.05
9.40
10XFI3
12.56

BOTTOM 50

TOP 40

6.26
70XFI3
10XFS2
20XFI3
8.15
20XFI3
10.29
20UI3
30UI3
15.00

BOTTOM 45

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-18
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 17.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	40
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER	TRACK DK-515								

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-16-14	07:00	50		11.75	OVER WEEKEND MUD LEVEL.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	35	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-16-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-19
SHEET 1 OF 4
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 13.7
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:00							DRILLED	
09-17-14	1HA	1.0	HAND	Brown fine to medium sand, some silt, trace			AHEAD	
Wednesday		3.0	AUGER	gravel, brick, coarse sand (Fill) (SM)	F		4"	
Partly Sunny	2HA	3.0	HAND	Brown fine to medium sand, some gravel, trace				
60°F		5.0	AUGER	silt, coarse sand (Fill) (SP-SM)		**5**		
	3D	5.0	6-5	Brown fine to medium sand, trace silt, gravel				
		7.0	2-1	(SP-SM)				
	4D	7.0	3-1	Brown fine to medium sand, trace silt, gravel				REC=4"
		9.0	1-1	(SP-SM)				
					S	**10**		
	5D	10.0	1/24"	Gray brown fine to medium sand, some silt				
		12.0		(SM)				
						13.5		
						15		
	6D	15.0	3-4	Soft gray brown fine sandy silt varved with some				WC=30
		17.0	4-5	clayey silt (ML&CL)				
					V			
						20		
	7D	20.0	2-4	Medium gray brown fine sandy silt varved with				WC=43
		22.0	4-9	silty clay (ML&CL)				
						23.5		
						25		
	8D	25.0	65-100/5"	Gray brown fine to coarse sand, some gravel,				
		25.9		silt (SM)				Drillers cored through
	1C	26.0	REC=100%	Gray boulders				large boulder, Run 1C.
		28.4	RQD=NA					
					T	**30**		
14:45	9D	30.0	29-25	Dark gray fine to coarse sand, some gravel,				
09:11		32.0	26-57	trace silt (SP-SM)				
09-18-14								Drilling from hard to
Thursday								soft.
Mostly Sunny						**35**		
70°F	10D	35.0	100/4"	Gray gravelly fine to coarse sand, trace silt		**36**		
		35.3		(SP-SM)			17*	*Coring time in
	2C	36.0	REC=100%	Intermediate slightly weathered to moderately			17*	minutes per foot.
		39.0	RQD=28%	weathered gray to blk gns, Jtd to Bkn, WJts			17*	Core barrel jammed,
	3C	39.0	REC=60%	Intermediate slightly weathered to moderately		**40**	24*	3' run.
		44.0	RQD=30%	weathered gray to black gneiss, jointed to			24*	
				broken, weathered joints			24*	
					R		24*	
							24*	
	4C	44.0	REC=75%	Intermediate slightly weathered gray schistose		**45**	21*	WC=Water Content
		49.0	RQD=36%	gneiss, closely jointed to jointed, weathered			15*	in percent of dry
				joints			13*	weight.
							13*	
10:00						**49**	13*	End of Boring at 49'.
						50		

Mueser Rutledge Consulting Engineers
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www.mrce.com

ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-19
SHEET 2 OF 4
FILE NO. 10608D
SURFACE ELEV. 13.7
RES ENGR. Mark Cheney

Run No.	REC/RQD

TOP

BOTTOM

Run No.	REC/RQD
3C	60%/30

39 TOP

10XFS2
10XFS3
45XFI3
0XFI3
60//FS2

44 BOTTOM

Run No.	REC/RQD
2C	100/1.4/3.0

36 TOP

MB
J60//FS2
MB

39 BOTTOM

Run No.	REC/RQD
1C	100/0.4/2.4 NA

26 TOP

MB
MB
MB
MB
MB
MB
MB
MB

S11
9.00
4.00
7
6

28 BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs In Core
Clay
Sand
Empty Space

NOTES

Mueser Rutledge Consulting Engineers
14 Penn Plaza - 225 West 34th Street
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ROCK CORE SKETCH

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

BORING NO. MR-19
SHEET 3 OF 4
FILE NO. 10608.D
SURFACE ELEV. 13.7
RES ENGR. Mark Cheney

Run No.	REC/RQD
4C	95%/36%

44 TOP

MB
MB
J60// FC3
J60 // FC3
J60// FC3
J60// FC3
J60// FC3
60 //FS2
MB

49 BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Ⓐ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-19
SHEET 4 **OF** 4

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 13.7
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	36	
SKID		HYDRAULIC		DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER	ELECTRIC	DIA., IN.		DEPTH, FT. FROM		TO		
OTHER	TRACK DK-515									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED X YES NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED YES X NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-18-14	08:00	32	32	8.3	OVERNIGHT MUD LEVEL.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.		
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.		
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.		

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	30.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	13	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-18-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-20P
SHEET 1 OF 5
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 14.1
RES. ENGR. MICHAEL MCMASTER

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
12:30					**	0.3	DRILLED	**Concrete from 0' to
09-22-14	1HA	1.0	HAND	Brown fine to medium sand, trace silt, gravel,			AHEAD	0.3'.
Monday		3.0	AUGER	coarse sand (Fill) (SP-SM)			4"	
Indoors	2HA	3.0	HAND	Brown fine to medium sand, some silt (Fill)				
		5.0	AUGER	(SM)	F	5		
	3D	5.0	4-2	Gray brown fine to coarse sand, some silt				REC=1"
		7.0	1/12"	(Fill) (SM)				
	4D	7.0	2-3	Gray brown fine to medium sand, some silt				
		9.0	3-2	trace coarse sand, gravel (Fill) (SM)		9		
	5D	9.0	5-5	Gray fine sand, some silt, trace medium sand		10		Petroleum odor.
		11.0	9-7	(SM)				REC=6"
					S			
						14.5		
	6D	15.0	5-8	Gray fine sandy silt varved with trace silty clay,				
		17.0	13-15	trace gravel, mica (ML)				
					V			
						20		
	7D	20.0	4-5	Gray silty fine sand varved with some clayey				
		22.0	11-12	silt (SM&ML)				
						23		Rig chatter from 23' to
								25'.
						25		Strong chemical odor.
15:00	8D	25.0	44-100/6"	Gray gravelly fine to coarse sand, some silt				
08:00		26.0		(SM)			34*	*Coring time in
09-23-14	1C	26.0	REC=20%	Gray boulder & cobbles				minutes per foot.
Tuesday		30.0	RQD=NA					
Partly Sunny						30		
74°F	9D	30.0	12-31	Gray gravelly fine to coarse sand, trace silt	T			
		32.0	40-83	(SP-SM)				
15:00						35		
07;30	10D	35.0	22-30	Gray gravelly fine to coarse sand, some silt				Strong chemical odor.
09-24-14		36.6	28-50/1"	(SM)		37		
Wednesday	2C	37.0	REC=100%	Weathered moderately weathered gray gneiss,			18*	Core barrel jammed
Sunny		39.0	RQD=0%	broken, weathered joints			24*	at 39'.
75°F	3C	39.0	REC=96%	Hard slightly weathered to unweathered gray		40	3*	
		44.0	RQD=83%	gneiss, jointed to closely jointed, weathered			3*	
				joints			3*	
							7*	
					R		8*	
	4C	44.0	REC=36%	Medium hard to intermediate slightly weathered		45	6*	
		49.0	RQD=10%	gray gneiss, jointed			5*	
							6*	
							4*	
15:00						49	8*	End of Boring at 49'.
						50		

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ROCK CORE SKETCH

BORING NO. MR-20P
SHEET 2 OF 5
FILE NO. 106080
SURFACE ELEV. 14.1
RES ENGR. Mark Cheney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
MR-19 4C	

TOP

MR-19
4-C

BOTTOM

Run No.	REC/RQD
MR-20P 4C	36/10

TOP

10XFI3
10XFI3
10XFI3
MB

BOTTOM

Run No.	REC/RQD
MR-20P 3C	96/83

TOP

J45UI2
0US3
J20C2U
10US2
10US2
10US2
10XFS3
10XFS3
MB

BOTTOM

Run No.	REC/RQD
MR-20P 1C	Rec=20% / NA

MR-20P. 1C 26-30'

TOP

MB
MB
Grey boulders + cobbles
MR-20P 2C 37-39'
Rec=100
RQD=0
MB
MB
MB
MB
Empty Space

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

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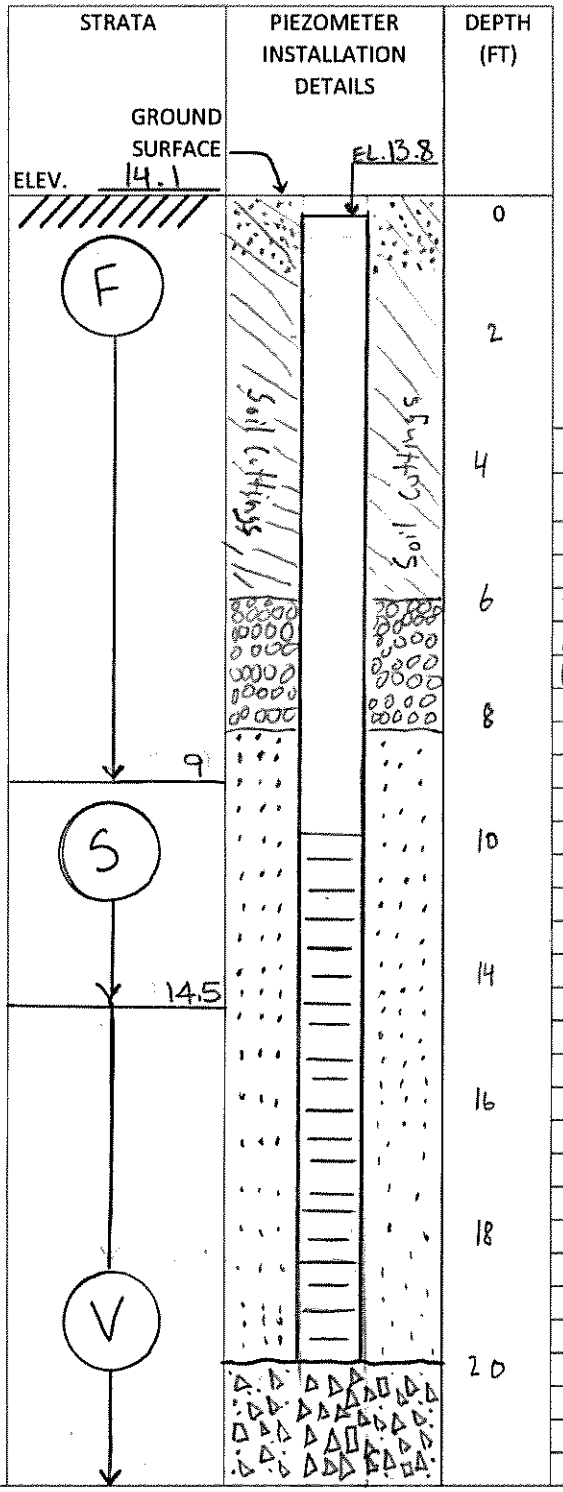
PIEZOMETER RECORD

PIEZOMETER OR BORING NO. MR-20P
SHEET 3 OF 5
FILE NO. 10608D
INSTALLATION DATE 9/25/14
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
PIEZOMETER LOCATION: See Boring Location Plan

☐ SEE SKETCH ON BACK



PIEZOMETER TYPE Slotted pvc

INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2", ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 13.8
diameter, in = 2, ft = 0.167 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10/3/14	7:00	6.7	7.1	
10/6/14	7:00	6.6	7.2	
10/7/14	7:00	6.6	7.2	
10/8/14	7:00	6.5	7.3	
10/9/14	7:00	6.7	7.1	
10/11/14	7:00	6.6	7.2	

SAND
GRAVEL
BENTONITE
GROUT

GROUND SURFACE ELEV. 14.1

PIEZOMETER NO. MR-20P

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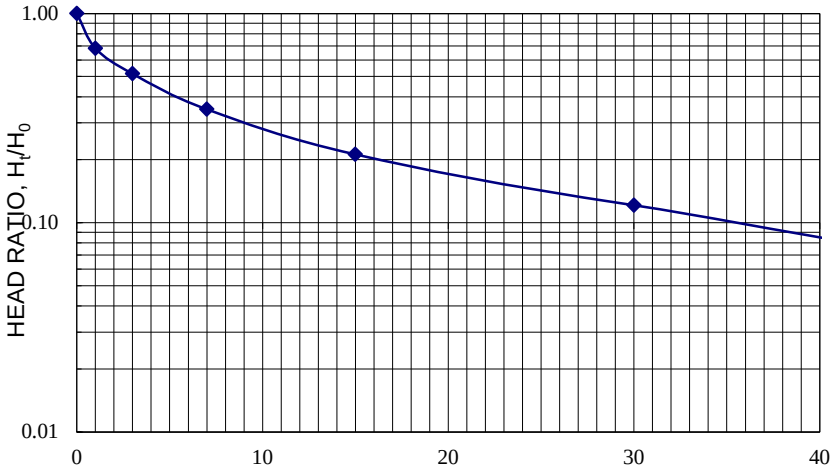
VARIABLE HEAD PERMEABILITY TEST

☐ **BOREHOLE OR** ☑ **PIEZOMETER NO.** MR-20P

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, Queens, NY
PIEZOMETER LOCATION: See Boring Location Plan

SHEET 4 **OF** 5
FILE NO. 10608
TEST NO. 1
RES ENGR. MDC
CALC. BY JMB **DATE** 11/6/2014
CH'KD BY **DATE**



INTAKE POINT
depth to bottom, ft = 20
depth to top, ft = 8
length, ft = 12 = L
diameter, in = 2 , ft = 0.167 = 2R

STANDPIPE/RISER
elevation of rim, ft = 13.8
diameter, in = 2 , ft = 0.167 = 2r

depth of casing, ft = -

depth to which stand-pipe was bailed, ft = - = Z

READING TIME			ORIGINAL TEST DEPTH, H_0 (ft.)	DEPTH AT TIME t, H_t (ft.)	UNBALANCED HEAD $DH_t = H_t - H_0$ (ft.)	HEAD RATIO DH_t/DH_0	REMARKS
DATE	CLOCK	Δt MIN.					
9/25/2014	12:25	0	6.6	0	6.6	1.00	FALLING HEAD TEST
9/25/2014	12:26	1		2.1	4.5	0.68	
9/25/2014	12:28	3		3.2	3.4	0.52	
9/25/2014	12:32	7		4.3	2.3	0.35	
9/25/2014	12:40	15		5.2	1.4	0.21	
9/25/2014	12:55	30		5.8	0.8	0.12	
9/25/2014	1:25	60		6.25	0.35	0.05	
9/25/2014	2:25	120		6.35	0.25	0.04	

PIEZOMETER NO. MR-20P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-20P
SHEET 5 **OF** 5

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 14.1
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	37
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER	TRACK DK-515								

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED DONUT HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
09-23-14	07:00	26	20	6.6	OVERNIGHT MUD LEVEL.
09-25-14	07:00	49	27	6.6	OVERNIGHT MUD LEVEL.
					FOR PIEZOMETER READINGS, SEE SHEET NO. 4.

PIEZOMETER INSTALLED [X] YES [ ] NO SKETCH SHOWN ON SE SHEET NO. 4

STANDPIPE:	TYPE	PVC	ID, IN.	2	LENGTH, FT.	10	TOP ELEV.	13.8
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	2-3/8	LENGTH, FT.	10	TIP ELEV.	-5.9
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	12	BOT. ELEV.	-5.9

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	31.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	12	OTHER: HAND AUGERED BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DAVID CARTER HELPERS HUGH MOORE
REMARKS PIEZOMETER INSTALLED.
RESIDENT ENGINEER MARK CHANCY DATE 09-25-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. MR-21
SHEET 1 OF 3
PROJECT: QUEENS PLAZA RESIDENTIAL DEVELOPMENT **FILE NO.** 10608D
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK **SURFACE ELEV.** 20.2
RES. ENGR. MARK CHANCY

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
07:45	1HA	0.0	HAND	Black fine to coarse sand, some gravel, silt			DRILLED	
09-19-14		3.0	AUGER	(Fill) (SM)			AHEAD	
Friday					F		4"	
Partly Cloudy	2HA	3.0	HAND	Brown fine to medium sand, some silt, trace				
65°F		5.0	AUGER	coarse sand, gravel (Fill) (SM)		5		
	3D	5.0	2-1	Brown fine to medium sand, trace silt (SP-SM)				
		7.0	2-4					
	4D	7.0	6-8	Do 3D (SP-SM)				
		9.0	11-9					
						10		
	5D	10.0	4-5	Do 3D, trace mica (SP-SM)				
		12.0	4-5					
					S	15		
	6D	15.0	1-2	Gray fine sand, some silt, trace mica (SM)				
		17.0	1-2					
						20		
	7D	20.0	3-4	Gray brown silty fine sand (SM)				
		22.0	7-7					
						23.5		
						25		
	8D	25.0	2-2	Gray silt varved with some silty fine sand,				
		27.0	4-6	trace silty clay (ML&SM)				
					V			
						30		
	9D	30.0	2-2	Soft gray silt varved with some silty fine sand,				WC=35
		32.0	3-5	silty clay (ML&SM&CL)				
						33.5		Rig chatter at 34'.
						35		
	10D	35.0	10-7	Top 12": Gray c-f sand, tr silt, gravel (SP-SM)	T			**Decomposed rock
		36.8	5-50/3"	Bot 2": Gray & white f-m sand, sm silt (DR) (SM)		36.5		from 36.5' to 37'.
	1C	37.0	REC=96%	Hard unweathered gray gneiss, jointed to	**	37	-*	*Coring time in
		42.0	RQD=90%	moderately jointed			3.5*	minutes per foot.
						40	4.5*	
							6*	
							8*	
	2C	42.0	REC=100%	Hard unweathered gray gneiss, blocky	R		5*	
		47.0	RQD=100%				3*	
						45	4*	
							4*	
12:30						47	2*	End of Boring at 47'.
								WC=Water Content
						50		in percent of dry
								weight.

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ROCK CORE SKETCH

BORING NO. MR-21
SHEET 2 OF 3
FILE NO. 106080
SURFACE ELEV. 20.2
RES ENGR. Mark Chaney

PROJECT: Queens Plaza Residential Development
LOCATION: Long Island City, NY
TEST/INSP. EQUIPMENT
REF. CODES/STANDARDS

Run No.	REC/RQD
2C	100/100

42' TOP

MB
MB
MB

BOTTOM

Run No.	REC/RQD
1C	96/90%

37 TOP

OXFS2 wjt
MB
OXFS2
OXFI3
OXFI3
MB
MB
MB

BOTTOM

Run No.	REC/RQD
MR-18 2C	

TOP

MR-18
2-C

BOTTOM

Run No.	REC/RQD
MR-18 1C	

TOP

MR-18
1-C

BOTTOM

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH
LEGEND

JOINTING
J - Joint
MB - Mechanical Break
Θ - Angle w/ Horizontal
// - Parallel
X - Crossing
F - Foliation
S - Stratification
U - Unfoliated or Unstratified

JOINT SURFACE
C - Curved
I - Irregular
S - Straight

JOINT CONDITION
1 - Slick
2 - Smooth
3 - Rough

SKETCH SYMBOLS
Joint
Healed Joint
Broken
Part of Core Not Recovered
Cavities or Vugs in Core
Clay
Sand
Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. MR-21
SHEET 3 **OF** 3

PROJECT QUEENS PLAZA RESIDENTIAL DEVELOPMENT
FILE NO. 10608D
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
SURFACE ELEV. 20.2
BORING LOCATION SEE BORING LOCATION PLAN
DATUM NAVD 88

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED					
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	37
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

CASING USED: [X] YES [ ] NO

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX
CORE BIT	DIAMOND
DRILL RODS	NWJ

DRILLING MUD USED: [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 3-7/8
TYPE OF DRILLING MUD QUIK GEL

AUGER USED: [ ] YES [X] NO
TYPE AND DIAMETER, IN.

*CASING HAMMER, LBS. 300 AVERAGE FALL, IN. 24
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	32	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGER BY OTHERS	5'

BORING CONTRACTOR AQUIFER DRILLING & TESTING CO., INC.
DRILLER DOUG WOOD HELPERS LEONID MALYUKOV
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER MARK CHANCY DATE 09-19-14
CLASSIFICATION CHECK: CHERYL J. MOSS TYPING CHECK: CHERYL J. MOSS

APPENDIX B

MRCE TEST PIT LOG

Mueser Rutledge Consulting Engineers
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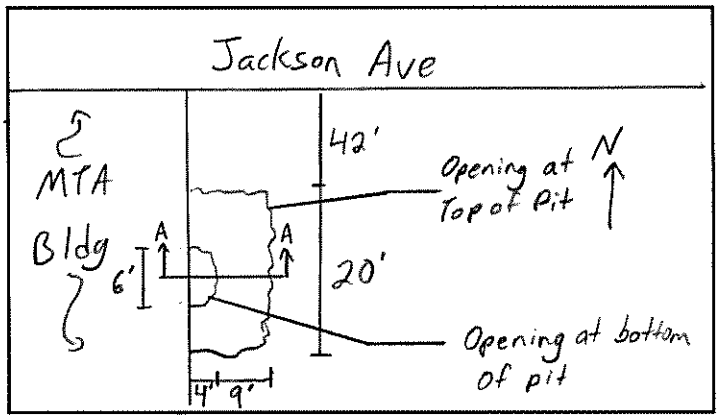
TEST PIT LOG

File No. 106080
Date 09/27/14
Test Pit No. TP-1
Res. Engr. KB

Project Queens Plaza Residential Development
Location Queens, NY



NOTES

Contractor: ADT- 1 Excavator, 2 workers

2' thick concrete slab resting on 6" to 12" stone observed at bottom of test pit.

Test pit backfilled upon completion.

Probe 10 in. into underside of footing Did not observe piles

Ground Surface Elevation 21.5 +/-

Sample Depth	Description	Depth
0	Asphalt	0
2	CMU	2
4		4
6	Fill	6
8	Brick	8
10		10
12	Conc. slab (chipped)	12
14	Stone	14
16		16
18	Brown silty f-m sand (Damp) Contaminated: 386 ppm VOCs	18

TEST PIT NO. TP-1

QUEENS PLAZA RESIDENTIAL DEVELOPMENT LONG ISLAND CITY, QUEENS, NEW YORK	MRCE 10608D
	TEST PIT 1 (TP-1)

APPENDIX C

2007 PREVIOUS BORING LOGS

"Boring Elevations are referenced to the Borough President of Queens"

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-1
SHEET 1 OF 2
FILE NO. 10608
SURFACE ELEV. 15.5
RES. ENGR. CAROL HAWK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:45	1D	0.5	8-6	Gray gravel, some coarse to fine sand, trace	**	0.5	DRILLED	**0.5' Asphalt at
02-21-07		2.0	5	silt (Fill) (GP-GM)			AHEAD	surface.
Wednesday	2D	2.0	3-2	Dark brown silty fine to coarse sand, some			4"	1D: Poor recovery,
Clear		4.0	3-1	gravel, trace wood, glass fragments (Fill) (SM)				gravel in tip of spoon.
40°F						5		
	3D	5.0	2-3	Brown silty fine to coarse sand, some clay	F			
		7.0	5-4	pockets, glass fgmts, tr metal, wood (Fill) (SM)				
	4D	7.0	5-7	Brown fine to medium sandy clay, trace glass				
		9.0	10-7	fragments, roots (Fill) (CL)				
						9.5		
	5D	10.0	5-9	Brown silty fine to coarse sand, trace gravel				
		12.0	11-10	(SM)				
					S			
						15		
	6D	15.0	7-8	Brown fine to coarse sand, some silt, trace				
		17.0	8-10	gravel (SM)				
						18		Hard drilling from 18'
					BLDR	19		to 19'; possible
						20		boulder.
	7D	20.0	6-11	Gray fine to coarse sand, some silt, clay layers,	V			Tip of spoon: Gray brn
		22.0	9-8	gravel, trace brown silty fine to coarse sand				silty clay varved with
				layers (SM)				sm silt & tr f-m sand
						23.5		(CL)
	8D	25.0	19-17	Gray brown gravelly fine to coarse sand, some		25		Occasional rig chatter
		27.0	19-17	silt (SM)				from 25' to 30'.
						30		Lost mud from 30' to
	9D	30.0	10-16	Gray brown gravel & fine to coarse sand, some	T			35'.
		32.0	45-37	silt (GM)				
						35		
	10D	35.0	31-33	Gray brown gravelly fine to coarse sand, some				Petroleum odor.
		37.0	22-29	silt (SM)		37		Hard drilling from 37'
					BLDR	38		to 38'; possible
14:00					T			boulder.
						40		Bottom 2' of rods &
								bit sheared off.
								Abandoned boring at
								40' & offset to A-1A.
						45		
						50		

MRCE Form BL-1

BORING NO. A-1

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-1
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	2 **OF** 2
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	15.5
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG				[X] YES	[ ] NO				
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	9
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED	[X] YES	[ ] NO	
DIAMETER OF ROTARY BIT, IN.	4-7/8, 3-15-16		
TYPE OF DRILLING MUD	BENTONITE		
AUGER USED	[ ] YES	[X] NO	
TYPE AND DIAMETER, IN.			
CASING HAMMER, LBS.	140	AVERAGE FALL, IN.	30
*SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	40	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.		OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	JERRY ZAMBARDI	HELPERS	BRENT ROUSEY
REMARKS	BOREHOLE TREMIE GROUTED UPON COMPLETION.		
RESIDENT ENGINEER	CAROL HAWK	DATE	02-22-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-1A
SHEET 1 OF 4
FILE NO. 10608
SURFACE ELEV. 15.5
RES. ENGR. CAROL HAWK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:45 02-22-07 Thursday Cloudy 40°F to 30°F					F		DRILLED AHEAD	Drilled from 0' to 40' without sampling. For sample descriptions above 40', see Boring No. A-1.
							4"	
						5		
						9.5		
					S	15		
						19		
					V	20		
						23.5		
					T	25		
						30		
						35		
						38		
					BLDR & CBLS	40		Strong petroleum odor from 40' to 46'.
	1D	40.0	70-72	Brown gray fine to coarse sand, some gravel, silt, trace pockets white fine to coarse sand (SM)	T			
		41.9	76-100/5"			45		
	2D	45.0	24-40	Gray fine to coarse sand, some silt, trace gravel (SM)				Strong petroleum odor.
		46.5	100/6"			46.7		
	1C	47.0	REC=95%	Hard unweathered gray schistose gneiss & white pegmatite, jointed, slightly weathered joints	R		4*	*Coring time in minutes per foot.
		51.0	RQD=95%				2*	
13:00						50	2*	
							2*	Lost circulation at 51'.
							3*	

MRCE Form BL-1

BORING NO. A-1A

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-1A
SHEET 2 OF 4
FILE NO. 10608
SURFACE ELEV. 15.5
RES. ENGR. CAROL HAWK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
							2*	
07:15	2C	51.0	REC=78%	Hard unweathered gray schistose gneiss, some			3*	
02-23-07		56.0	RQD=66%	light gray pegmatite, closely jointed to jointed			3*	
Fri., Cloudy				slightly weathered joints	R		4*	
Windy, 30°F						55	4*	
08:30						56	4*	End of Boring 56'.
						60		
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MRCE Form BL-1

BORING NO. A-1A

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-1A
SHEET 3 OF 4
FILE NO. 10608
SURFACE ELEV. 15.5
RES. ENGR. CL HAWK

PROJECT QUEENS PLAZA

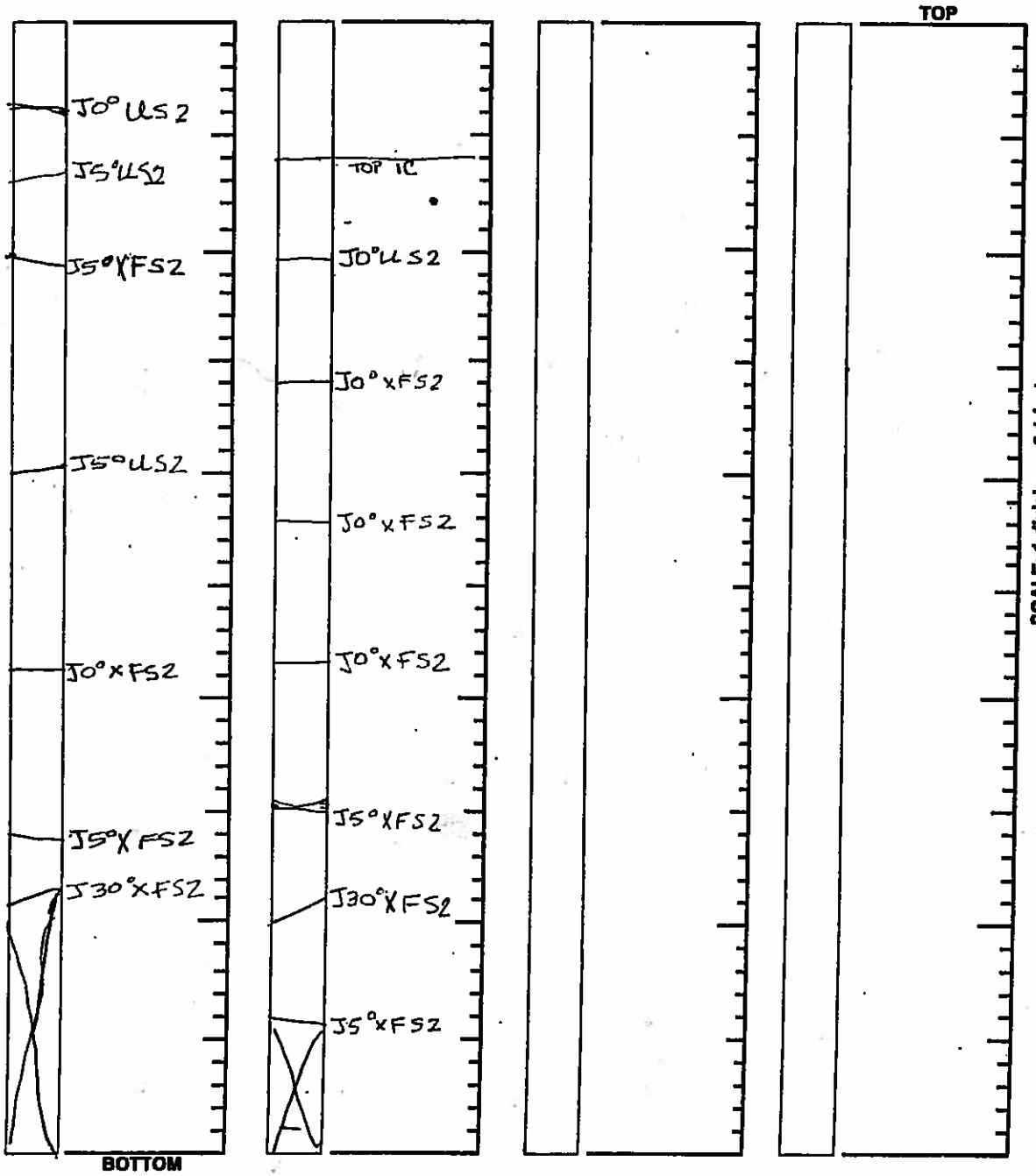
LOCATION LIC, QUEENS

Run No.	REC / RQD
2C	78/66

Run No.	REC / RQD
1C	95/95

Run No.	REC / RQD

Run No.	REC / RQD



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∢ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-1A
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	4 OF 4
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	15.5
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG				[X] YES	[ ] NO				
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	13
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-15/16

TYPE OF DRILLING MUD

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
02-23-07	08:30	56	13	10	AFTER CORING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	7	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.

DRILLER JERRY ZAMBARDI HELPERS BRENT ROUSEY

REMARKS BOREHOLE BACKFILLED WITH SPOILS & BENTONITE GROUT.

RESIDENT ENGINEER CAROL HAWK DATE 02-23-07

CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-2
SHEET 1 OF 4
FILE NO. 10608
SURFACE ELEV. 15.1
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:00					**	0.5	DRILLED	**0.5' Pavement at surface.
03-15-07	1D	1.0	3-3	Dark brown silty fine to coarse sand, some gravel, trace clay (SM)			AHEAD	
Thursday		3.0	4-5				4"	
Cloudy	2D	3.0	5-3	Dark brown to brown silty fine to coarse sand, some gravel (SM)	F			
50°F		5.0	2-2			5		
	3D	5.0	2-7	Brown fine to coarse sand, some gravel, silt, trace brick (SM)				
		7.0	9-11			7		
	4D	7.0	9-14	Brown fine to coarse sand, some gravel, silt (SM)	S			
		9.0	17-14			9.5		Hard drilling from 9.5' to 11.5'; possible boulder.
					BLDR			
	5D	12.0	15-14	Do 4D (SM)		11.5		
		14.0	13-14		T			
						15		Hard drilling from 15' to 16'; possible boulder.
	6NR	15.0	50/3"	No recovery	BLDR	16		
		15.3						
						20		
	7NR	20.0	5-6	No recovery				
		22.0	7-8					
						25		
	8D	25.0	21-20	Gray fine to coarse sand, some gravel, silt (SM)				
		27.0	23-20					
						30		
	9D	30.0	9-10	Do 8D (SM)	T			
		32.0	11-10					
						35		
	10D	35.0	14-28	Do 8D (SM)				
14:15		37.0	36-40					
08:00								
03-20-07								
Tuesday								
Sunny						40		
40°F	11D	40.0	22-19	Gray & red gravel, trace silt, fine to coarse sand (GP)				Light petroleum odor from 40'.
		42.0	23-21					
						45		
	12D	45.0	50/3"	Gray silty fine to coarse sand, some gravel (SM)		45.3		
		45.3					5*	*Coring time in minutes per foot.
	1C	45.5	REC=98%	Hard unweathered white pegmatite with gray gneiss, jointed, slightly weathered joints	R		6*	
		50.5	RQD=94%				6*	
						50	6*	
							5*	
							5*	

MRCE Form BL-1

BORING NO. A-2

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-2
SHEET 2 OF 4
FILE NO. 10608
SURFACE ELEV. 15.1
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd							5*	
03-20-07	2C	50.5	REC=95%	Hard unweathered white pegmatite with some			5*	
Tuesday		55.5	RQD=83%	gray gneiss, jointed, slightly weathered joints	R		5*	
Sunny, 40°F							5*	
12:40						55	6*	
						55.5	5*	End of Boring at 55.5'.
						60		
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MRCE Form BL-1

BORING NO. A-2

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-2
SHEET 3 OF 4
FILE NO. 10608
SURFACE ELEV. 15.1
RES. ENGR. H. Wei

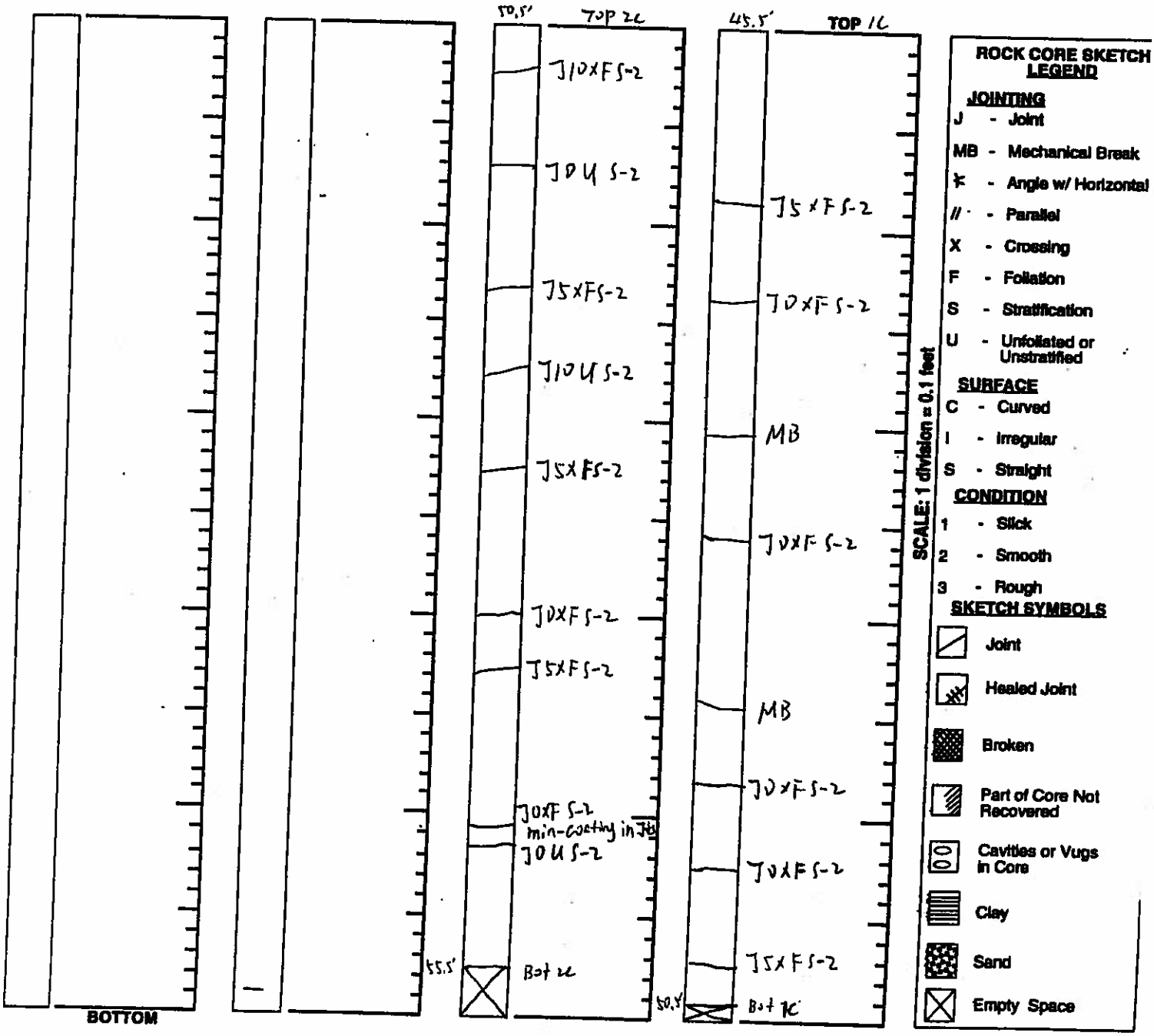
PROJECT Queens Plaza
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
2C	95% / 83%

Run No.	REC / RQD
1C	98% / 94%



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-2
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	4 **OF** 4
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	15.1
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[X] YES	[ ] NO		
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	45
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8, 4-7/8

TYPE OF DRILLING MUD Water

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-20-07	12:45	55.5	45	7.3	UPON COMPLETION OF BOREHOLE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	45.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.

DRILLER LUIS RAMOS HELPERS NELSON RAMOS

REMARKS BOREHOLE BACKFILLED UPON COMPLETION.

RESIDENT ENGINEER HAI WEI DATE 03-20-07

CLASSIFICATION CHECK: TYPING CHECK:

MRCE Form BS-1

BORING NO. A-2

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-3P
SHEET 1 OF 5
FILE NO. 10608
SURFACE ELEV. 15.2
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:00					**	0.5	DRILLED	**0.5' Pavement at surface.
03-09-07	1D	1.0	7-6	Dark brown silty fine to coarse sand, trace clay, brick, wood (SM)	F		AHEAD	
Friday		3.0	4-3			3	4"	
Sunny	2D	3.0	2-4	Brown clayey fine to medium sand, some silt,				
20°F		5.0	3-9	trace dark fine to coarse sand layers (SC)		5		
	3D	5.0	2-5	Brown clayey silt, trace fine to medium sand				
		7.0	6-6	(ML)				
	4D	7.0	8-11	Brown clayey silt, trace fine to medium sand				
		9.0	12-17	(ML)	S			Hard drilling from 8' to 8.5'; cobble.
						10		Hard drilling from 10' to 11.5'; cobble.
	5NR	10.0	6-7	No recovery				
		12.0	9-18					
						14		Hard drilling from 14' to 18.5'; possible boulders.
	6D	15.0	50/1"	Gray fine to coarse sandy gravel (GP)		15		6D: Boulder pieces.
		15.1			BLDR			
	1C	18.5	REC=33%	Boulder				
		22.5				20		
					T			
						25		Hard drilling from 23.5' to 24'; possible cobble.
	7D	25.0	13-16	Gray fine to coarse sand, some silt, trace				
		27.0	15-23	gravel (SM)		28		Hard drilling from 28' to 31'; possible cobbles & boulders.
					BLDR & CBL	30		
	8D	30.0	50/2"	Gray fine to coarse sandy gravel (GP)		31		8D: Possible wash sample.
		30.2						Hard drilling from 33.5' to 34'; cobble.
						35		Hard drilling from 35' to 36.5'; boulder.
	9D	35.0	50/2"	Do 8D (GP)				9D: Possible wash sample.
		35.2			T			Petroleum odor from 40'.
14:15						40		
07:30	10D	40.0	15-23	Gray fine to coarse sand, some gravel, trace				
03-12-07		42.0	22-34	silt (SP-SM)				
Monday								
Sunny								
40°F						44.6		
	2C	45.0	REC=94%	Hard unweathered gray gneiss with trace			4*	*Coring time in minutes per foot.
		50.0	RQD=89%	pegmatite, moderately jointed to blocky,			3*	
				slightly weathered joints to min coated joints			6*	
					R		4*	
						50	7*	
							5*	
							4*	

MRCE Form BL-1

BORING NO. A-3P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-3P
SHEET 2 OF 5
FILE NO. 10608
SURFACE ELEV. 15.2
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
Cont'd	3C	50.0	REC=95%	Hard unweathered gray gneiss with some			5*	
03-12-07		55.0	RQD=89%	pegmatite, jointed to moderately jointed,			4*	
Monday				slightly weathered joints to min coated joints	R		4*	
Sunny							7*	
40°F, 12:15						55	5*	End of Boring at 55'.
						60		
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MRCE Form BL-1

BORING NO. A-3P

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-3P
SHEET 3 OF 5
FILE NO. 10608
SURFACE ELEV. 15.2
RES. ENGR. H. Wei

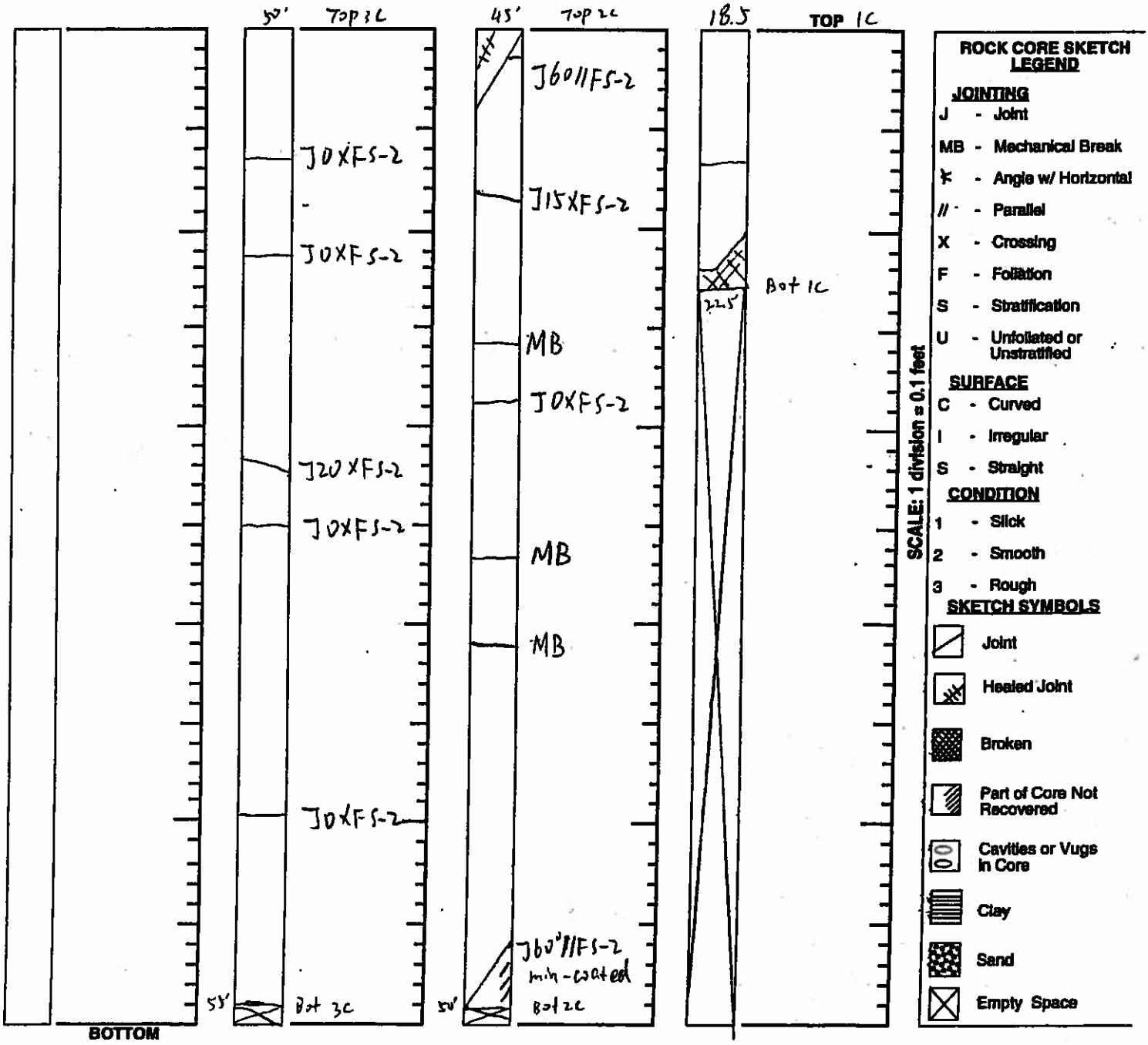
PROJECT Queens Plaza
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD
3C	95% / 89%

Run No.	REC / RQD
2C	94% / 89%

Run No.	REC / RQD
1C	33%



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ⌀ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

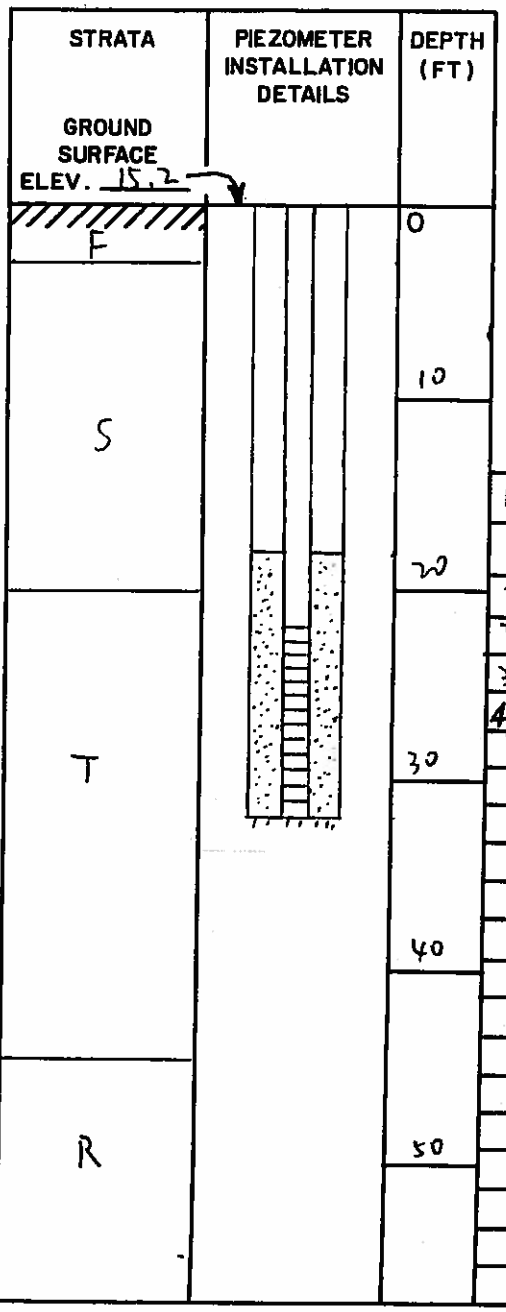
SHEET 4 OF 5
FILE NO. 12608
SUBCODE

MUESER RUTLEDGE CONSULTING ENGINEERS

PIEZOMETER RECORD

PROJECT Queens Plaza
LOCATION Queens, NY
PIEZOMETER LOCATION See Boring Plan
☐ SEE SKETCH ON BACK

PIEZOMETER NO. A-3P
DATE OF INSTALLATION 3/12/07
RES. ENG. H, Wa



PIEZOMETER TYPE Slot PVC

INTAKE POINT

depth to bottom, ft = 32
depth to top, ft = 22
length, ft = 10 = L
diameter, in = 1-1/4, ft = 0.104 = 2R

STANDPIPE/RISER

elevation of rim, ft = 15.2
diameter, in = 1-1/4, ft = 0.104 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
3/12/07	12:28	8.6	6.6	@ Borehole completion
3/22/07	11:25	9.2	6.0	
3/27/07	9:30	9.3	5.9	
4/16/07		8.0	7.2	AFTER HEAVY RAIN

Sand Bentonite
Gravel Grout

GROUND SURFACE ELEV. 15.2

PIEZOMETER NO. A-3P

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-3P
		SHEET	5 **OF** 5
PROJECT	QUEENS PLAZA - SITE A	**FILE NO.**	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SURFACE ELEV.**	15.2
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	44	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-15/16

TYPE OF DRILLING MUD WATER

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-12-07	12:28	55	44	8.6	UPON COMPLETION OF BORING.
					FOR OBSERVATIONS IN PIEZOMETER, SEE SHEET NO. 4.

PIEZOMETER INSTALLED X YES NO SKETCH SHOWN ON SHEET NO. 4

STANDPIPE:	TYPE	SOLID PVC	ID, IN.	1-1/4	LENGTH, FT.	22	TOP ELEV.	+15.2
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	1-1/2	LENGTH, FT.	10	TIP ELEV.	-16.8
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	14	BOT. ELEV.	-16.8

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	41	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	14	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	LUIS RAMOS	HELPERS	NELSON RAMOS
REMARKS	PIEZOMETER INSTALLED.		
RESIDENT ENGINEER	HAI WEI	DATE	03-12-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MRCE Form BS-1

BORING NO. A-3P

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-4
SHEET 1 OF 2
FILE NO. 10608
SURFACE ELEV. 14.7
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30					**	0.5		**0.5' Pavement at surface.
03-21-07	1D	1.0	13-21	Dark brown to brown fine to coarse sand, some silt, gravel, trace brick pieces (SM)				
Partly		3.0	23-34					
Cloudy	2D	3.0	28-12	Brown silty fine to coarse sand, some gravel, trace brick pieces (SM)				
30°F		5.0	5-5			5		Object at the side of the borehole; casing inclined. Offset to Boring No. A-4A.
	3D	5.0	1-2	Gray silty fine to medium sand, trace gravel, clay (SM)	F			
		7.0	5-7					
	4D	7.0	11-9	Gray silty fine to coarse sand, some gravel, trace clay, wood (SM)				
09:30		9.0	9-11			10		End of Boring at 10'.
						15		
						20		
						25		
						30		
						35		
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. A-4

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING NO. A-4
SHEET 2 **OF** 2
FILE NO. 10608
SURFACE ELEV. 14.7
DATUM BOROUGH OF QUEENS

PROJECT QUEENS PLAZA - SITE A
LOCATION LONG ISLAND CITY, QUEENS, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		YES		NO	
TRUCK	X	MECHANICAL		DIA., IN.		DEPTH, FT. FROM		TO	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED ☐ YES ☒ NO
DIAMETER OF ROTARY BIT, IN. 4-7/8
TYPE OF DRILLING MUD Water

AUGER USED ☐ YES ☒ NO
TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. AVERAGE FALL, IN.
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	10	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.		OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER LUIS RAMOS HELPERS NELSON RAMOS
REMARKS BOREHOLE BACKFILLED UPON COMPLETION.
RESIDENT ENGINEER HAI WEI DATE 03-21-07
CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-4A
SHEET 1 OF 2
FILE NO. 10608
SURFACE ELEV. 14.7
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:40 03-21-07 Wednesday Partly Cloudy 30°F, 10:00					**	0.5		**0.5' Pavement at surface. Object was at the side of borehole; casing inclined. Offset to Boring No. A-4B. End of Boring at 5'.
					F	5		
						10		
						15		
						20		
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-4A
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	2 OF 2
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	14.7
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG					[ ] YES	[X] NO			
TRUCK	X	MECHANICAL		DIA., IN.		DEPTH, FT. FROM		TO	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED	[ ] YES	[X] NO
DIAMETER OF ROTARY BIT, IN.	4-7/8	
TYPE OF DRILLING MUD	WATER	
AUGER USED	[ ] YES	[X] NO
TYPE AND DIAMETER, IN.		
CASING HAMMER, LBS.	AVERAGE FALL, IN.	
SAMPLER HAMMER, LBS.	AVERAGE FALL, IN.	

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.				
DRILLER	LUIS RAMOS	HELPERS	NELSON RAMOS		
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.				
RESIDENT ENGINEER	HAI WEI			DATE	03-21-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-4B
SHEET 1 OF 2
FILE NO. 10608
SURFACE ELEV. 14.7
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA **	DEPTH	CASING BLOWS	REMARKS
10:10 03-21-07 Wednesday Partly Cloudy 30°F, 10:20					F	0.5 5 10 15 20 25 30 35 40 45 50		**0.5' Pavement at surface. Object was at the side of the borehole; casing inclined. Offset to Boring No. A-4C. End of Boring at 5'.

MRCE Form BL-1

BORING NO. A-4B

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-4B
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	2 OF 2
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	14.7
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[ ] YES	[X] NO		
TRUCK	X	MECHANICAL		DIA., IN.		DEPTH, FT. FROM		TO	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED	[ ] YES	[X] NO	
DIAMETER OF ROTARY BIT, IN.	4-7/8		
TYPE OF DRILLING MUD	WATER		
AUGER USED	[ ] YES	[X] NO	
TYPE AND DIAMETER, IN.			
CASING HAMMER, LBS.		AVERAGE FALL, IN.	
SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.		NO. OF 3" SHELBY TUBE SAMPLES
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK	LIN. FT.		OTHER:

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	LUIS RAMOS	HELPERS	NELSON RAMOS
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.		
RESIDENT ENGINEER	HAI WEI	DATE	03-21-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-4C
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 14.8
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:30 03-021-07 Wednesday Partly Cloudy 30°F					F		DRILLED AHEAD 4"	Drilled without sampling to 10'. For sample descriptions above 10', see Boring No. A-4.
						5		
	1D	10.0	8-10	Gray fine to coarse sand, some gravel, silt, trace wood, brick (Fill) (SM)		10		
		12.0	9-10			12		
	2D	15.0	7-19	Gray silty fine to coarse sand, some clayey silt pockets, trace gravel, clay (SM)	S	15		
		17.0	25-18			18.5		
	3D	20.0	11-10	Gray clayey silt varved with trace silty clay (ML)	V	20		
		22.0	12-13			23.5		
	4D	25.0	14-19	Gray fine to coarse sand, some silt, trace gravel (SM)	T	25		
		27.0	20-25			30		
	5D	30.0	28-28	Do 4D (SM)				
14:00		32.0	35-36					
07:30 03-22-07 Thursday Cloudy 50°F						35		Petroleum odor from 35' to 37' sample.
	6D	35.0	56-52	Gray fine to coarse sand, some silt, trace gravel (SM)				
		37.0	33-38			40		
	7D	40.0	39-87	Gray silty fine to coarse sand, trace gravel (SM)				
		41.3	100/4"			41.3		
	1C	42.0	REC=98% RQD=86%	Hard unweathered to slightly weathered gray gneiss with trace pegmatite, jointed, slightly weathered joints	R		6*	*Coring time in minutes per foot.
		47.0					7*	
						45	6*	
							6*	
	2C	47.0	REC=94% RQD=90%	Hard unweathered to slightly weathered gray gneiss with trace pegmatite at top, jointed to blocky, slightly weathered joints			6*	
		52.0					7*	
							6*	
						50	6*	
11:50							5*	
						52	6*	End of Boring at 52'.

MRCE Form BL-1

BORING NO. A-4C

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-4C
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 14.8
RES. ENGR. H. Wei

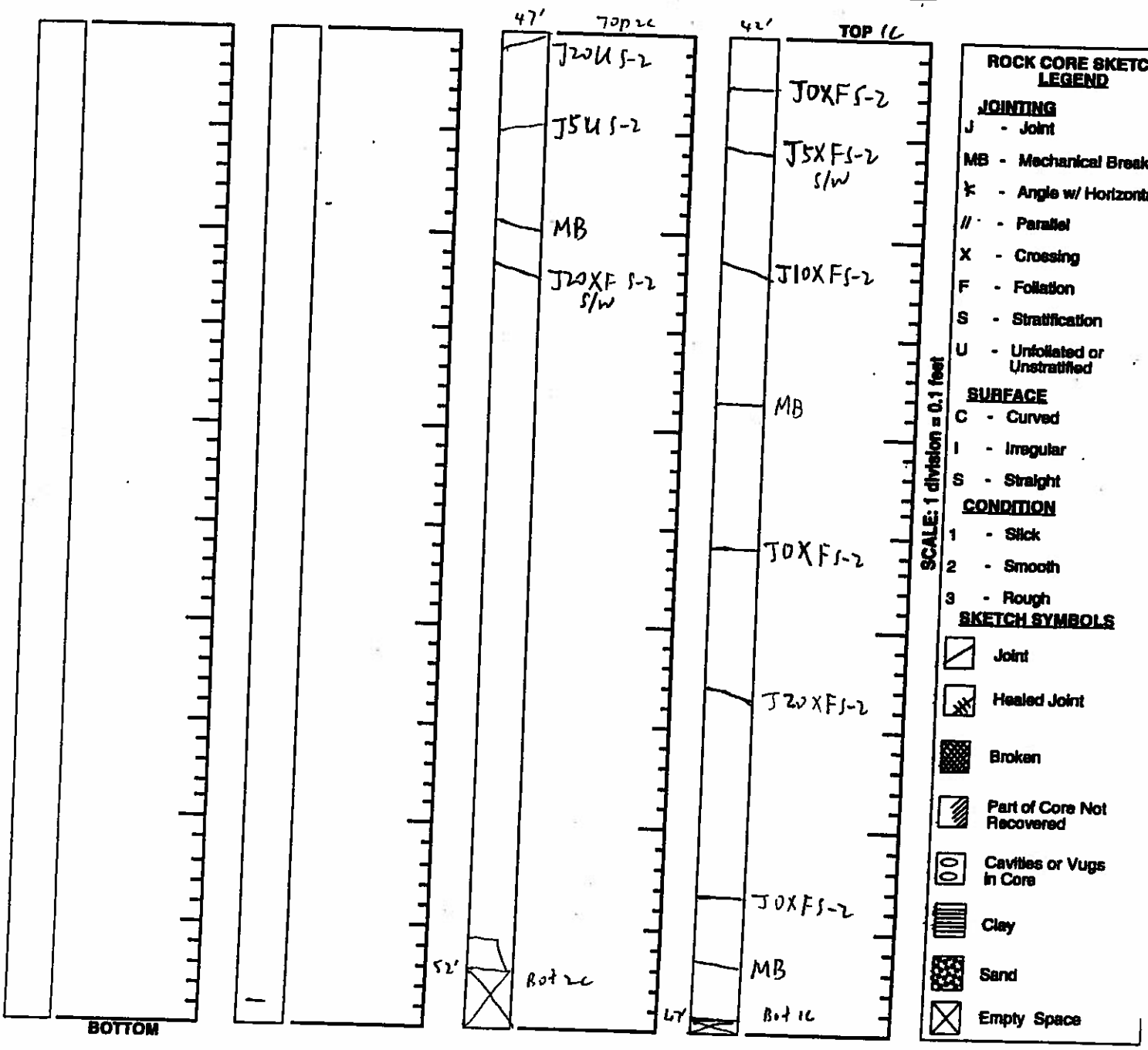
PROJECT Queens Plaza
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
2C	94% / 90%

Run No.	REC / RQD
1C	98% / 86%



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-4C
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	3 **OF** 3
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	14.8
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	41	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED: X YES ☐ NO

DIAMETER OF ROTARY BIT, IN.: 4-7/8, 3-7/8

TYPE OF DRILLING MUD: WATER

AUGER USED: ☐ YES X NO

TYPE AND DIAMETER, IN.:

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-22-07	12:00	52	41	2.3	UPON COMPLETION OF BORING.
03-23-07	07:10	17.3	--	4.7	OVERNIGHT.

PIEZOMETER INSTALLED ☐ YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	32	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR: JERSEY BORING & DRILLING CO., INC.

DRILLER: LUIS RAMOS HELPERS: NELSON RAMOS

REMARKS: BOREHOLE TREMIE GROUTED UPON COMPLETION.

RESIDENT ENGINEER: HAI WEI DATE: 03-22-07

CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MRCE Form BS-1

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-5
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 14.6
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
13:40					**	0.5	DRILLED	**0.5' Pavement at
03-05-07	1D	1.0	9-7	Black silty fine to coarse sand, trace gravel,			AHEAD	surface.
Monday		3.0	9-9	clay, wood (SM)			4"	
Cloudy,	2D	3.0	13-4	Do 1D (SM)				
Snow, Windy		5.0	4-4			5		
30°F	3D	5.0	8-8	Gray silty fine to medium sand, trace gravel,	F			
		7.0	7-10	clay, steel bar (SM)				
	4D	7.0	6-7	Gray silty fine to medium sand, trace gravel,				
14:20		9.0	14-22	clay (SM)				
08:00						10		
03-08-07	5D	10.0	8-10	Dark gray fine to coarse sand, some silt,				
Thursday		11.3	50/3"	trace gravel (SM)				
Sunny								
20°F					S	15		
	6D	15.0	13-14	Dark gray fine to coarse sandy gravel (GP)				
		17.0	12-12					
						18.5		
					V	20		
	7D	20.0	13-13	Top: Gray silt varved with some silty clay,		21		
		22.0	27-17	trace fine to coarse sand (ML&CL)	T			
				Bot: Gray fine to coarse sand, some gravel,	BLDR	22.5		Hard drilling from 22.5'
				silt (SM)		23.5		to 23.5'; boulder.
						25		
	8D	25.0	10-14	Gray fine to medium sand, some silt, trace				
		27.0	20-24	gravel, coarse sand (SM)				
						30		
	9D	30.0	18-24	Do 8D (SM)	T			Petroleum odor in
		32.0	22-21					Sample 9D & from 33'.
						35		
	10D	35.0	22-31	Gray silty fine to medium sand, trace gravel,				
		37.0	46-58	coarse sand (SM)				
						37.7		
	1C	38.5	REC=80%	Medium hard slightly weathered gray gneiss			4*	*Coring time in
		43.5	RQD=74%	with some pegmatite, jointed, slightly		40	3*	minutes per foot.
				weathered joints			3*	
							3*	
							4*	
	2C	43.5	REC=95%	Hard slightly weathered gray gneiss with some	R		3*	
		48.5	RQD=89%	pegmatite, moderately jointed to jointed,		45	4*	
				slightly weathered joints			4*	
							3*	
14:20							3*	
						48.5		End of Boring at 48.5'.
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-5
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 14.6
RES. ENGR. H. Wei

PROJECT Queens Plaza
LOCATION Queens NY

Run No.	REC / RQD
2C	95% / 89%

Run No.	REC / RQD
1C	80% / 74%

Run No.	REC / RQD

Run No.	REC / RQD

43.5' Top 2C
J5XFS-2
J15XFS-2
J0XFT-2 WJ+
J25XFS-2
J15XFS-2
J0XFS-2
J0XFS-2
43.5 Bot 2C
BOTTOM

38.5 Top 1C
J0XFS-2
J0XFS-2
J0XFS-2
J0XFS-2
J0XFS-2
J60IIFS-2
J45XFS-2
43.5 Bot 1C

TOP

SCALE: 1 division = 0.1 feet

ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-5
		SHEET	3 OF 3
PROJECT	QUEENS PLAZA - SITE A	FILE NO.	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	SURFACE ELEV.	14.6
BORING LOCATION	SEE BORING LOCATION PLAN	DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	37	
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-7/8

TYPE OF DRILLING MUD WATER

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-08-07	14:30	48.5	37	6.6	UPON COMPLETION OF BORING.

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	38.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.

DRILLER LUIS RAMOS HELPERS NELSON RAMOS

REMARKS BOREHOLE BACKFILLED UPON COMPLETION.

RESIDENT ENGINEER HAI WEI DATE 03-08-07

CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-6
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 14.3
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:00					**	0.5	DRILLED	**0.5' Pavement at
03-01-07	1D	1.0	8-5	Black organic silty fine to medium sand, trace			AHEAD	surface.
Thursday		3.0	8-6	gravel, clay (SM)			3" 4"	
Partly	2D	3.0	3-4	Do 1D (SM)				
Cloudy		5.0	5-11			5		
30°F	3D	5.0	1-1	Gray silty fine to medium sand, trace gravel,	F			
		7.0	2-3	clay (SM)				
	4D	7.0	3-5	Do 3D (SM)				
		9.0	9-10			10		
	5D	10.0	5-5	Brown clayey silt, trace fine sand (ML)				
		12.0	6-9					
					V	15		
	6D	15.0	5-6	Gray clayey silt, trace fine sand (ML)				
		17.0	6-6					
						18.5		
	7D	20.0	13-12	Gray fine to coarse sand, some silt, trace	T	20		
		22.0	16-16	gravel (SM)				
						23		Hard drilling from 23'
					BLDR			to 25.5'; boulder.
	1C	25.0	REC=0%	No recovery		25		
		25.5				25.5		
								Petroleum odor from
	8D	30.0	12-19	Brown fine to coarse sand, trace gravel, silt	T	30		30'.
		32.0	35-47	(SP-SM)				
13:00						34		Hard drilling at 34'.
07:10	2C	35.0	REC=98%	Hard slightly weathered gray gneiss, moderately		35		Core barrel was
03-05-07		40.0	RQD=89%	jointed to jointed, iron stained joints			3*	jammed several times.
Friday							4*	*Coring time in
Partly							4*	minutes per foot.
Cloudy							3*	
30°F	3C	40.0	REC=68%	Intermediate to medium hard slightly weathered	R	40	3*	
		45.0	RQD=42%	gray gneiss, jointed, iron stained joints to min			3*	
				coated joints			4*	
							3*	
12:30							3*	
						45	4*	End of Boring at 45'.
						50		

MRCE Form BL-1

BORING NO. A-6

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-6
SHEET 2 OF 3
FILE NO. 1060B
SURFACE ELEV. 14.3
RES. ENGR. H. Wei

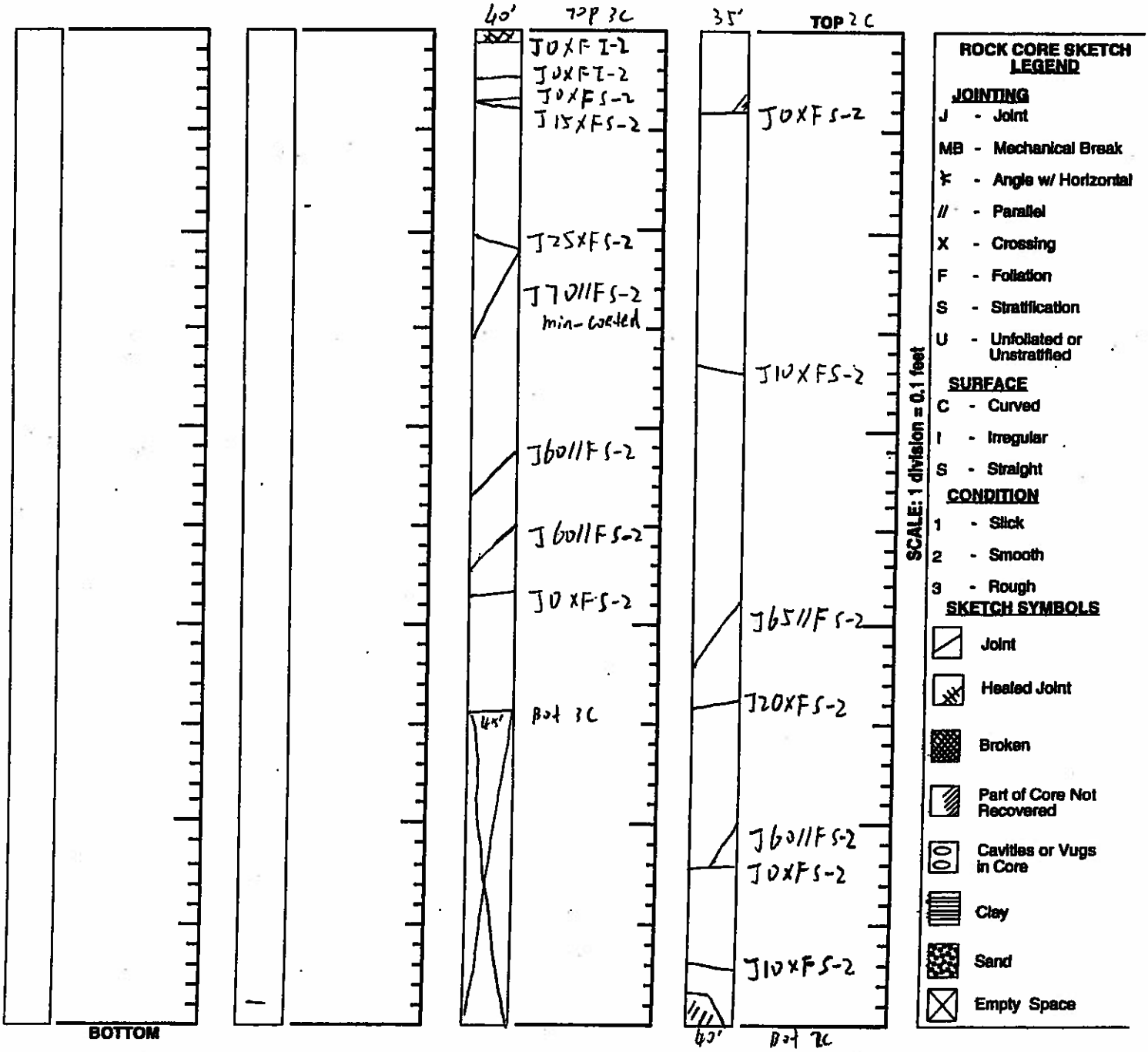
PROJECT Queens Plaza
LOCATION Queens NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
3C	68% / 42%

Run No.	REC / RQD
2C	98% / 89%



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-6
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	3 OF 3
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	14.3
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG				[X] YES	[ ] NO				
TRUCK	X	MECHANICAL		DIA., IN.	3	DEPTH, FT. FROM	0	TO	34
SKID		HYDRAULIC	X	DIA., IN.	4	DEPTH, FT. FROM	0	TO	23
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED	[X] YES	[ ] NO	
DIAMETER OF ROTARY BIT, IN.	4-7/8, 3-7/8, 2-7/8		
TYPE OF DRILLING MUD	QUIK GEL		
AUGER USED	[ ] YES	[X] NO	
TYPE AND DIAMETER, IN.			
CASING HAMMER, LBS.	140	AVERAGE FALL, IN.	30
SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-05-07	13:00	45	34	10.7	UPON COMPLETION OF BORING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	35	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	LUIS RAMOS	HELPERS	NELSON RAMOS
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.		
RESIDENT ENGINEER	HAI WEI	DATE	03-05-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MRCE Form BS-1

BORING NO. A-6

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-7
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 13.7
RES. ENGR. CAROL HAWK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
09:25					**	1	DRILLED	**1' Asphalt & concrete
02-20-07	1D	1.0	13-12	Gray & brown fine to coarse sand, some gravel,			AHEAD	at surface.
Tuesday		3.0	12-9	silt (Fill) (SM)			4"	1D: Strong petroleum
Clear,	2D	3.0	5-7	Gray fine to coarse sand, some concrete				odor.
Breezy		5.0	3-3	fragments, brick fragments, silt (Fill) (SM)	F	5		2D-7D: Petroleum
40°F	3D	5.0	2-1	Brown silty fine to medium sand, some brick				odor.
		7.0	3-3	fragments (Fill) (SM)		7		
	4D	7.0	3-4	Brown fine to medium sand, some silt, trace	S			
		9.0	7-6	coarse sand, gravel (SM)		9		Clay in wash from 9'
						10		to 10'. Some of sand
	5D	10.0	2-4	Gray brown silty varved with some fine sand &	V			varves were dark
		12.0	8-12	some clay (ML)				brown & oozed oil.
						13.5		
						15		
	6D	15.0	19-25	Gray brown & gray fine to coarse sand, some				Rig chatter at 15.5'.
		17.0	33-44	gravel, silt (SM)				
								Rig chatter from 19' to
	7D	20.0	16-24	Gray brown fine to coarse sand, some silt,	T	20		19.3'.
		22.0	27-26	trace gravel (SM)				
						25		Rig chatter at 25'.
	8D	25.0	14-18	Green gray fine to coarse sand, some rock				8D: Light petroleum
		26.8	26-100/4"	fragments, silt (SM)		26.8		odor.
							5*	*Coring time in
	1C	27.8	REC=91%	Hard unweathered gray & tan pegmatite,		30	3*	minutes per foot.
		31.8	RQD=91%	jointed, slightly weathered joints			4*	
					R		3*	
	2C	31.8	REC=102%	Hard unweathered gray & tan pegmatite,			4*	
		36.8	RQD=91%	jointed, slightly weathered joints			4*	
						35	4*	
							5*	
13:00							7*	
						36.8	8*	End of Boring at 36.8'.
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. A-7

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-7
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 13.7
RES. ENGR. CL HAWK

PROJECT QUEENS PLAZA

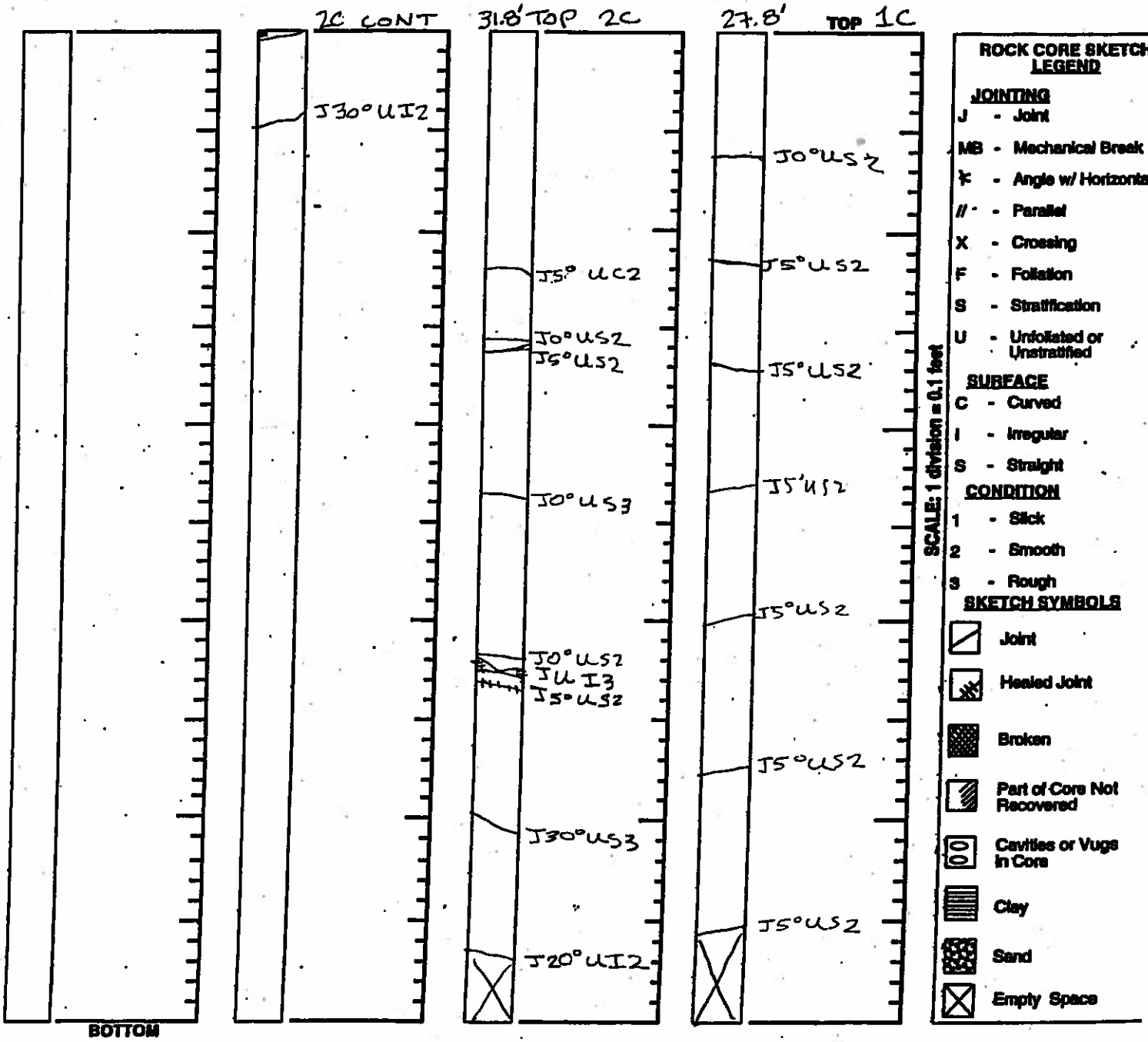
LOCATION LIC, QUEENS

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
2C	102/91

Run No.	REC / RQD
1C	91/91



NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-7
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	3 **OF** 3
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	13.7
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG				[X] YES	[ ] NO				
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	13
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED	[X] YES	[ ] NO	
DIAMETER OF ROTARY BIT, IN.	4-7/8, 3-15/16		
TYPE OF DRILLING MUD	REVERT		
AUGER USED	[ ] YES	[X] NO	
TYPE AND DIAMETER, IN.			
CASING HAMMER, LBS.	140	AVERAGE FALL, IN.	30
*SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	26.8	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	JERRY ZAMBARDI	HELPERS	BRENT ROUSEY
REMARKS	BOREHOLE TREMIE GROUTED UPON COMPLETION.		
RESIDENT ENGINEER	CAROL HAWK	DATE	02-21-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MRCE Form BS-1

BORING NO. A-7

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-8
SHEET 1 OF 2
FILE NO. 10608
SURFACE ELEV. 13.3
RES. ENGR. CAROL HAWK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:50					CONC		DRILLED	1.5' Concrete at surface.
02-21-07	1D	1.5	5-4	Gray silty fine to coarse sand, trace concrete fragments (Fill) (SM)		1.5	AHEAD	Ended borehole at 3' due to strong petroleum odor.
Wed., Partly		3.0	4		F	3	↓ 4"	Offset to Boring No. A-8A.
Cloudy, 40°F								End of Boring at 3'.
9:20						5		
						10		
						15		
						20		
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-8
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	2 OF 2
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	13.3
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	[X] YES	[ ] NO		
TRUCK	CME-75	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO 3
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO
OTHER								

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	
CORE BIT	
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-15/16
TYPE OF DRILLING MUD EASY SEAL

AUGER USED [ ] YES [X] NO
TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. AVERAGE FALL, IN.
*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30
*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	3	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.		OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER JERRY ZAMBARDI HELPERS BRENT ROUSEY
REMARKS BOREHOLE BACKFILLED WITH BENTONITE.
RESIDENT ENGINEER CAROL HAWK DATE 02-21-07
CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-8A
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 13.3
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
13:30					CONC		DRILLED	Offset from Boring
03-13-07						1.5	AHEAD	No. A-8.
Tuesday							4"	Petroleum odor below
Cloudy	1D	3.0	9-3	Dark fine to coarse sandy, gravel, some wood	F			concrete.
50°F		5.0	2-2	(Fill) (GP)		5		
	2D	5.0	2-1	Brown silty fine to coarse sand, trace gravel				
		7.0	6-11	(SM)				
	3D	7.0	9-13	Brown silty fine to medium sand (SM)				
14:15		9.0	13-10					
07:40					S	10		
03-14-07	4D	10.0	3-3	Brown clayey silt, some fine to medium sand				
Wednesday		12.0	8-10	(ML)				
Partly								
Cloudy						14		Hard drilling from 14'
60°F						15		to 16'; boulder.
	1C	15.0	REC=27%	Top: Boulder	BLDR	16		
		20.0	RQD=NA	Bot: Light gray gneiss & pegmatite boulder				
					T			
						20		
	2C	20.0	REC=100%	Top 0.5': Cobble		20.5	7*	*Coring time in
		25.0	RQD=89%	Bot: Hard unweathered light gray gneiss &			9*	minutes per foot.
				pegmatite, blocky			10*	
							10*	
						25	9*	
	3C	25.0	REC=100%	Hard unweathered light gray gneiss &	R		9*	
		30.0	RQD=100%	pegmatite, massive			9*	
							10*	
							9*	
13:40						30	9*	End of Boring at 30'.
						35		
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. A-8A

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-8A
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 13.3
RES. ENGR. H. Wei

PROJECT Queens Plaza

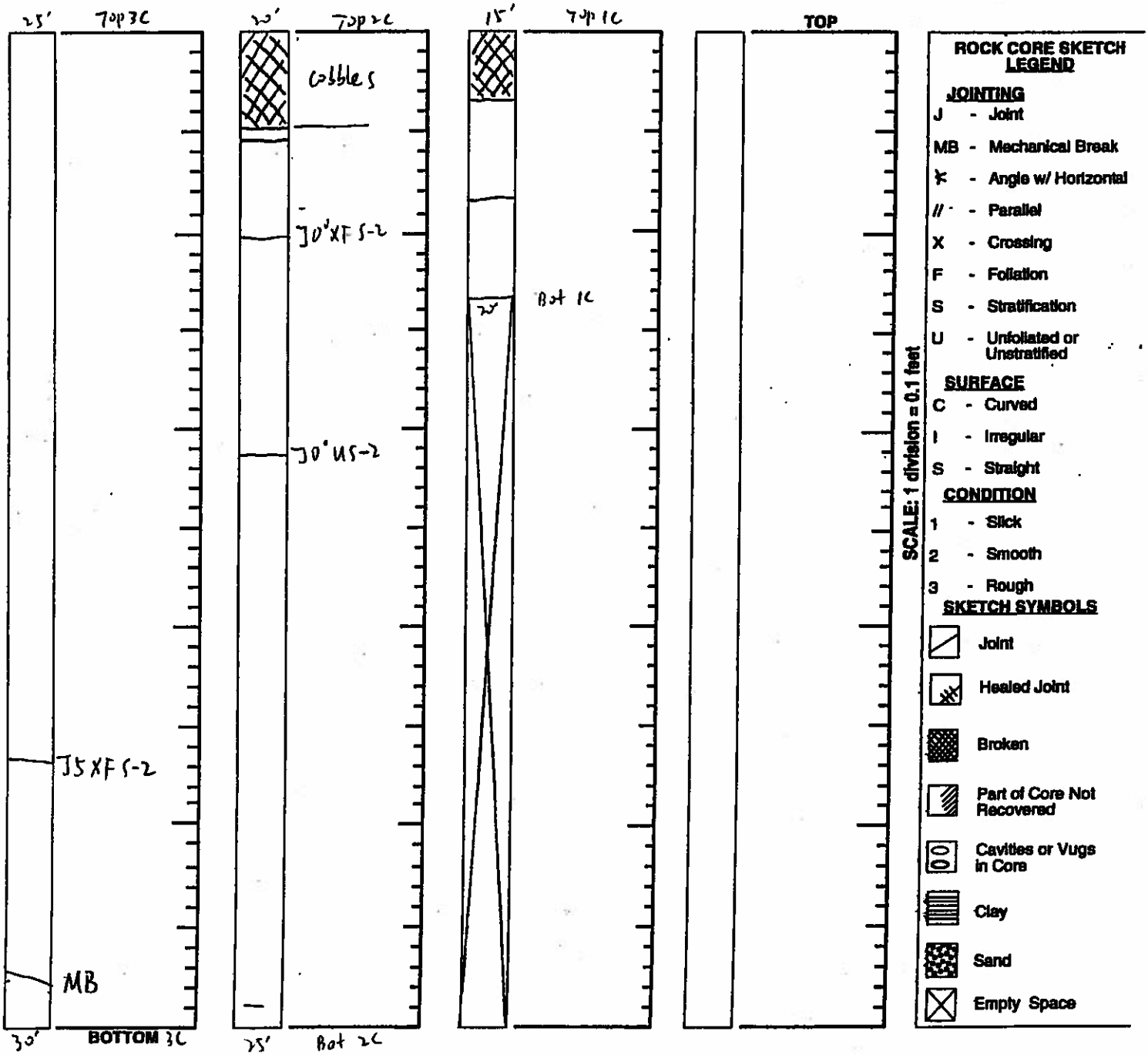
LOCATION Queens, NY

Run No.	REC / RQD
3C	100% / 100%

Run No.	REC / RQD
2C	100% / 89%

Run No.	REC / RQD
1C	27% / N/A

Run No.	REC / RQD



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ⊀ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-8A
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	3 **OF** 3
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	13.3
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED	X YES	NO		
TYPE OF BORING RIG								
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO 19
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO
OTHER								

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED X YES NO

DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-7/8

TYPE OF DRILLING MUD WATER

AUGER USED YES X NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-14-07	13:55	30	19	--	

PIEZOMETER INSTALLED YES X NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	15	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	15	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.

DRILLER LUIS RAMOS HELPERS NELSON RAMOS

REMARKS BOREHOLE BACKFILLED UPON COMPLETION.

RESIDENT ENGINEER HAI WEI DATE 03-14-07

CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-9
SHEET 1 OF 4
FILE NO. 10608
SURFACE ELEV. 12.0
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:00					**	0.5	DRILLED	**0.5' Pavement at
03-08-07					F	2	AHEAD	surface.
Thursday	1HA	2.0	HAND	Brown fine to coarse sand, some silt, trace			4"	
Sunny		4.0	AUGER	gravel (SM)				
20°F	2HA	4.0	HAND	Brown fine to coarse sand, some silt, trace		5		
09:30		6.0	AUGER	gravel (SM)				
09:00	1D	6.0	11-19	Brown silty fine to medium sand, trace gravel,	S			
03-13-07		8.0	28-41	clayey silt pockets (SM)				
Tuesday	2D	8.0	8-7	Brown fine to medium sand, some silt, trace				
Cloudy		10.0	9-16	gravel (SM)		10		
40°F	3D	10.0	6-5	Top: Brown fine to medium sand, some silt,				
		12.0	6-9	trace gravel (SM)		12.2		
				Bot 2": Dark brown fine to medium sand,	BLDR			Petroleum odor from
				some silt (SM)		13.3		13.3'.
	1C	14.0	REC=93%	Medium hard unweathered to slightly weathered	T	14	10*	*Coring time in
		19.0	RQD=52%	white pegmatite with some gray gneiss,			11*	minutes per foot.
				closely jointed to moderately jointed, iron			10*	
				stained joints			9*	
							10*	
	2C	19.0	REC=100%	Hard unweathered light gray gneiss, trace	R	20	10*	
		24.0	RQD=89%	pegmatite, moderately jointed to jointed			9*	
							9*	
							10*	
12:00						24	11*	End of Boring at 24'.
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-9
SHEET 2 OF 4
FILE NO. 10608
SURFACE ELEV. 12.0
RES. ENGR. H. Wei

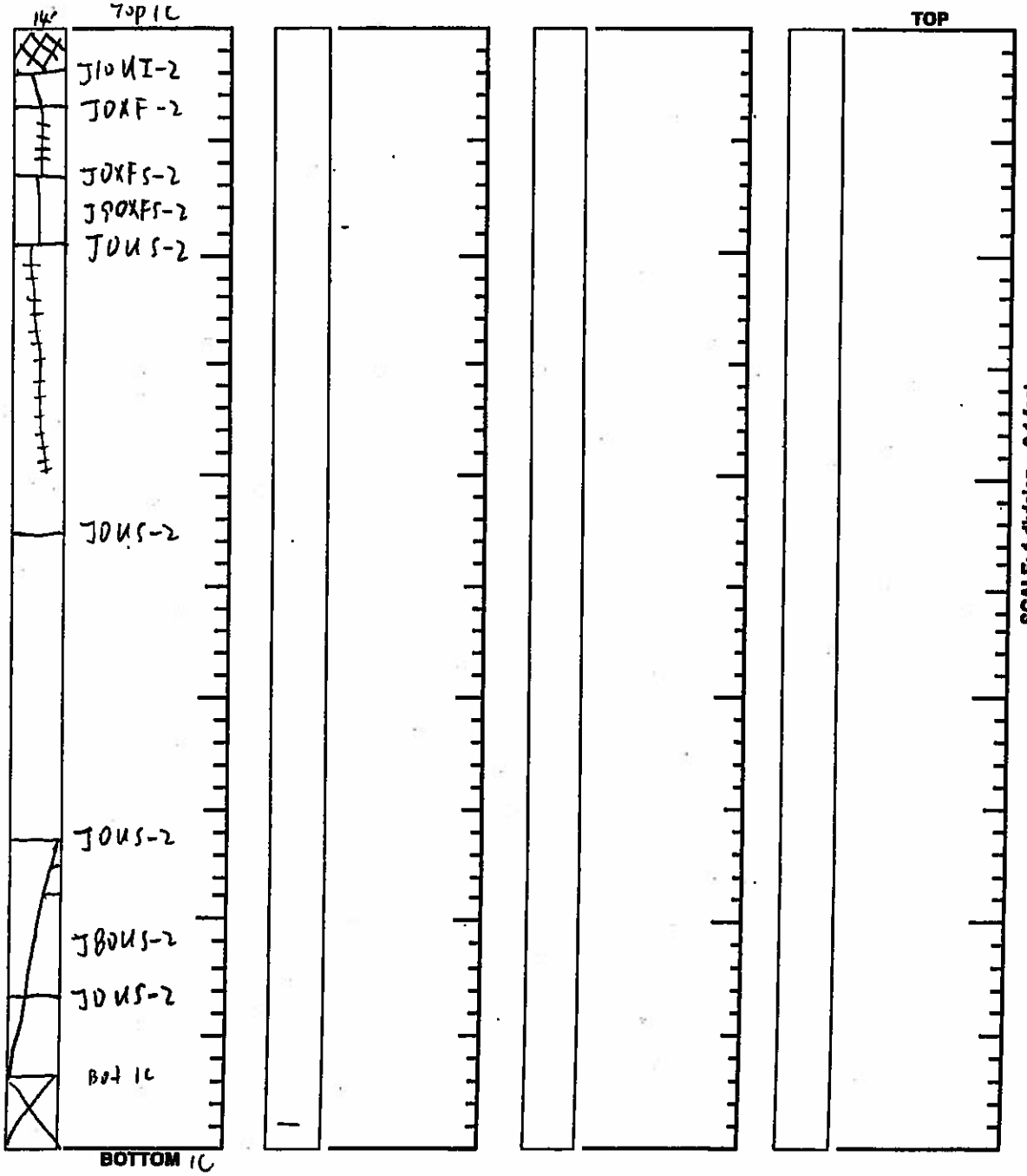
PROJECT Queens Plaza
LOCATION Queens NY

Run No.	REC / RQD
1C	93% / 52%

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-9
SHEET 3 OF 4
FILE NO. 10608
SURFACE ELEV. 12.0
RES. ENGR. H. Wei

PROJECT Queens Plaza

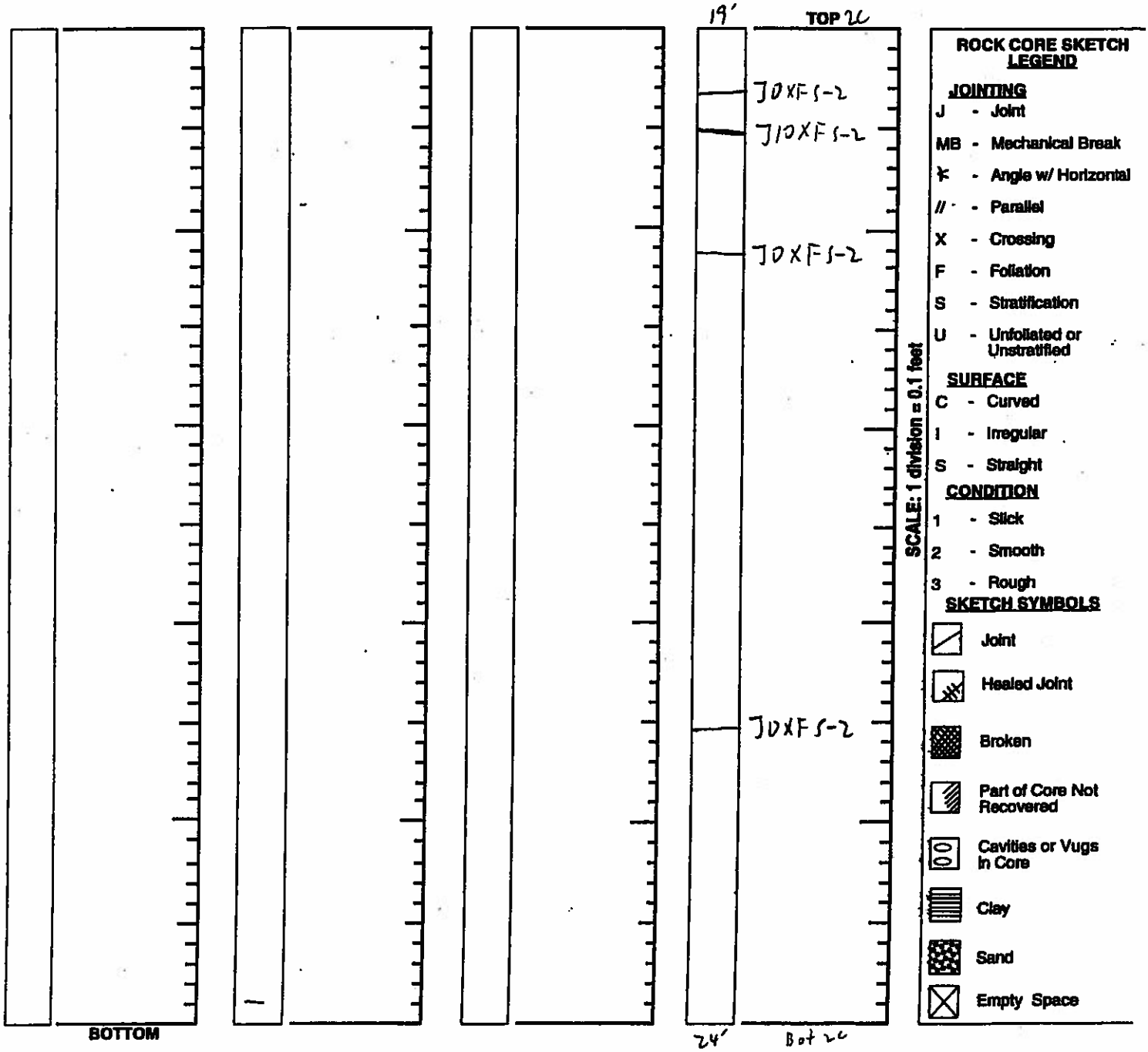
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
2C	100% / 89%



NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-9
		SHEET	4 **OF** 4
PROJECT	QUEENS PLAZA - SITE A	**FILE NO.**	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SURFACE ELEV.**	12.0
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		[X] YES	[ ] NO		
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	12
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED	[X] YES	[ ] NO	
DIAMETER OF ROTARY BIT, IN.	4-7/8, 3-7/8		
TYPE OF DRILLING MUD	WATER		
AUGER USED	[ ] YES	[X] NO	
TYPE AND DIAMETER, IN.			

CASING HAMMER, LBS.	140	AVERAGE FALL, IN.	30
*SAMPLER HAMMER, LBS.	140	AVERAGE FALL, IN.	30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-13-07	12:10	24	12	7.3	UPON COMPLETION OF BORING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	8	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER: HAND AUGER	6

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	LUIS RAMOS/CANDIDO CRUZ	HELPERS	NELSON RAMOS/JOSE SANTIAGO
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.		
RESIDENT ENGINEER	HAI WEI	DATE	03-13-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-10
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 13.0
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:30					CONC	1	DRILLED	1' Concrete at
03-12-07	1D	1.0		Dark brown silty fine to coarse sand, trace			AHEAD	surface.
Monday		2.0		gravel (SM)			4"	1D: Recovered from
Sunny	2D	2.0	10-100/5"	Dark brown wood with some silty fine to coarse				casing.
40°F		2.9		sand		5		Petroleum odor below
	3D	4.0	7-5	Dark brown silty fine to coarse sand, trace	F			floor.
		5.7	4-100/2"	clay (SM)				
	4D	6.0	3-2	Dark gray silty fine to coarse sand, trace				
		8.0	4-4	clay (SM)				
12:00	5D	8.0	5-4	Dark gray silty fine to coarse sand, trace		10		
08:00		10.0	3-2	organic clay (SM)	R		17*	*Coring time in
03-14-07	1C	10.0	REC=95%	Hard unweathered gray gneiss with some			15*	minutes per foot.
Wednesday		15.0	RQD=89%	pegmatite, moderately jointed to jointed			16*	
Partly							17*	
Cloudy						15	17*	
60°F	2C	15.0	REC=97%	Hard unweathered gray gneiss with trace			18*	
		20.0	RQD=83%	pegmatite, moderately jointed to closely			18*	
				jointed, iron stained joints			20*	
							17*	
14:00						20	18*	End of Boring at 20'.
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-10
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 13.0
RES. ENGR. H. Wu

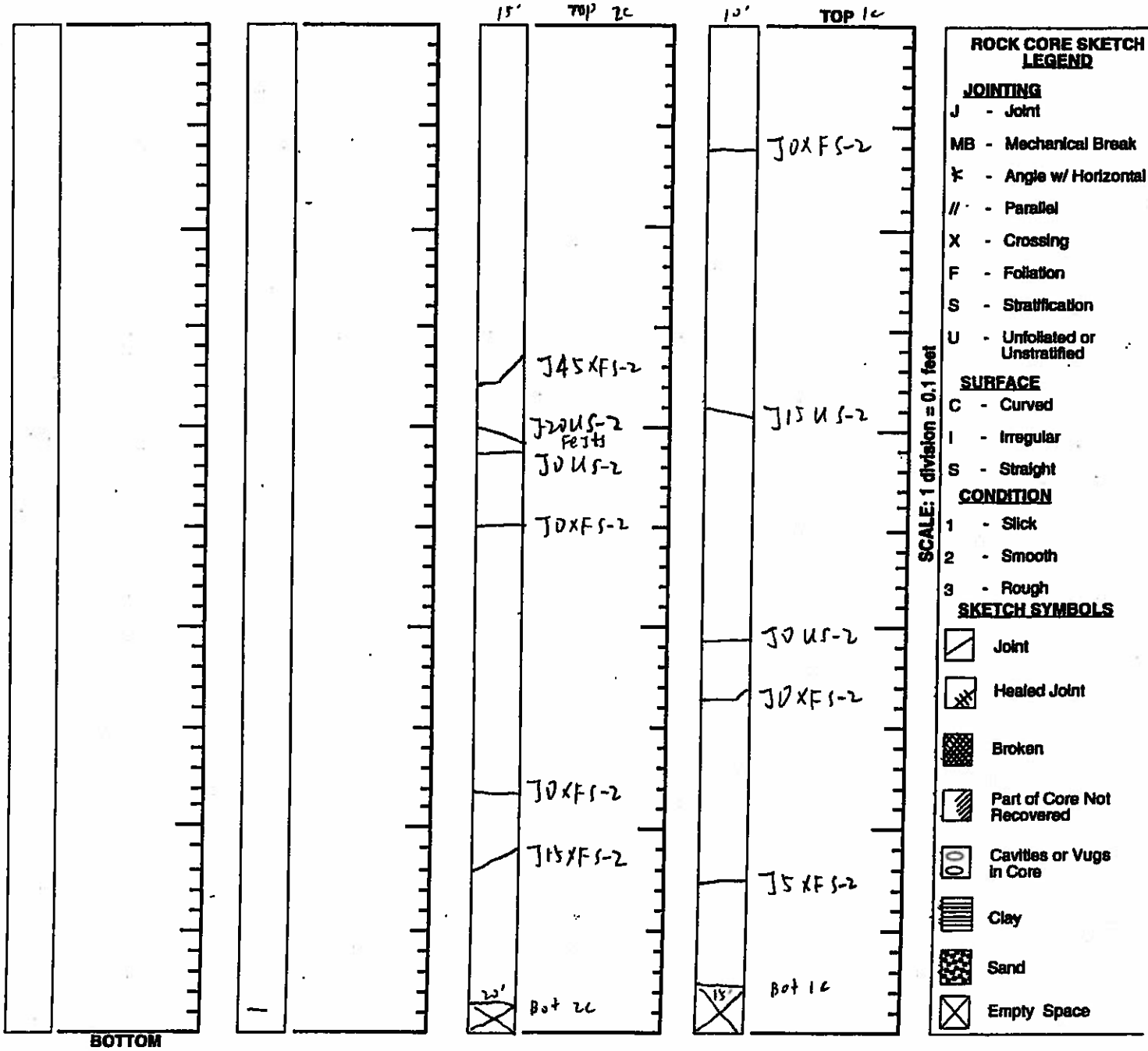
PROJECT Queens Plaza
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD

Run No.	REC / RQD
2C	97% / 83%

Run No.	REC / RQD
1C	95% / 89%



NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT	QUEENS PLAZA - SITE A	**BORING NO.**	A-10
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SHEET**	3 OF 3
BORING LOCATION	SEE BORING LOCATION PLAN	**FILE NO.**	10608
		SURFACE ELEV.	13.0
		DATUM	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED	[X] YES	[ ] NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO 10
SKID	X	HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO
OTHER								

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED [X] YES [ ] NO
DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-7/8
TYPE OF DRILLING MUD WATER

AUGER USED [ ] YES [X] NO
TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30
SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-14-07	14:10	20	10	3.4	UPON COMPLETION OF BORING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	10	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER CANDIDO CRUZ/JOSE SANTIAGO HELPERS ANGEL MEDRANZ
REMARKS BOREHOLE TOP SEALED WITH CONCRETE UPON COMPLETION.
RESIDENT ENGINEER HAI WEI DATE 03-14-07
CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

BORING NO. A-11
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 12.7
RES. ENGR. HAI WEI

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:45							DRILLED	Boring drilled from
03-21-07							AHEAD	ground floor, cased
Wednesday							4"	through basement.
Partly								
Cloudy					BSMT	5		
30°F								
						8		
					CONC	9		
	1D	9.0	22-7	Dark to brown fine to coarse sand, some silt,	F	10		Petroleum odor
		10.7	11-100/2"	gravel, trace brick, vegetation (SM)		10.7		from Sample 1D.
	1C	11.0	REC=91%	Medium hard slightly weathered gray gneiss			17*	
		16.0	RQD=71%	with white pegmatite, jointed, iron stained			16*	*Coring time in
				joints to mln coated joints			16*	minutes per foot.
						15	17*	
14:15							15*	
07:30	2C	16.0	REC=89%	Hard slightly weathered gray gneiss with some	R		16*	
03-22-07		21.0	RQD=83%	white pegmatite, moderately jointed, slightly			17*	
Thursday				weathered joints			17*	
Cloudy						20	18*	
50°F, 12:10						21	17*	End of Boring at 21'.
						25		
						30		
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-11
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 12.7
RES. ENGR. H. We.

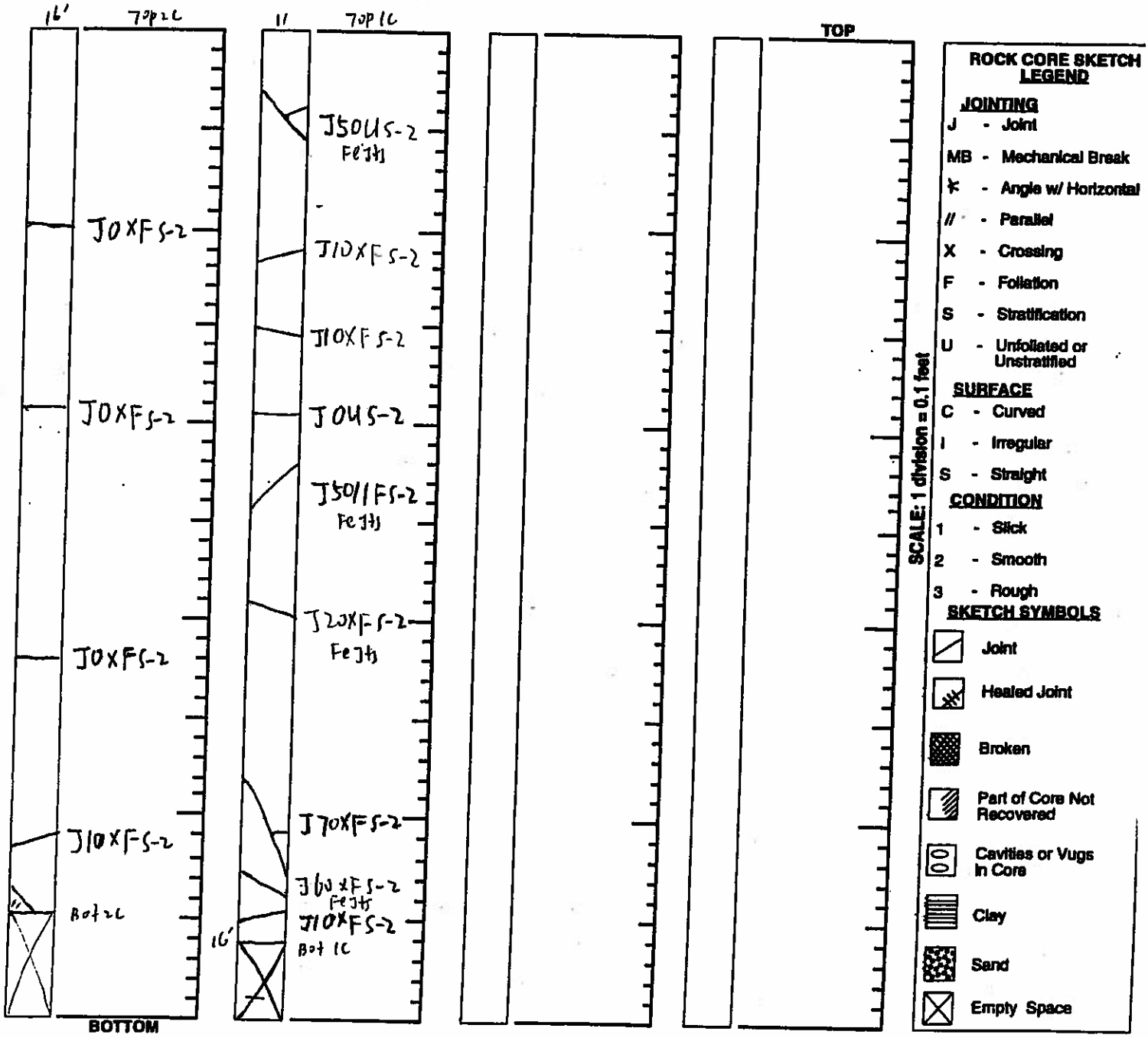
PROJECT Queens Plaza
LOCATION Queens NY

Run No.	REC / RQD
2C	89% / 83%

Run No.	REC / RQD
1C	91% / 71%

Run No.	REC / RQD

Run No.	REC / RQD



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-11
		SHEET	3 **OF** 3
PROJECT	QUEENS PLAZA - SITE A	**FILE NO.**	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SURFACE ELEV.**	12.7
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED						
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	10	
SKID	X	HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:		DRILLING MUD USED	X YES / NO
D-SAMPLER	2" O. D. SPLIT SPOON	DIAMETER OF ROTARY BIT, IN.	3-7/8
U-SAMPLER		TYPE OF DRILLING MUD	WATER
S-SAMPLER			
CORE BARREL	NX DOUBLE TUBE	AUGER USED	YES / X NO
CORE BIT	NX DIAMOND BIT	TYPE AND DIAMETER, IN.	
DRILL RODS	NWJ		
		CASING HAMMER, LBS. 140	AVERAGE FALL, IN. 30
		SAMPLER HAMMER, LBS. 140	AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
					NO WATER LEVEL OBSERVATIONS MADE.

PIEZOMETER INSTALLED ☐ YES ☒ NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.		TOP ELEV.
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.		TIP ELEV.
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.		BOT. ELEV.

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	2	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.		
DRILLER	JOSE SANTIAGO	HELPERS	ANGEL MEDRANZ
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.		
RESIDENT ENGINEER	HAI WEI	DATE	03-22-07
CLASSIFICATION CHECK:	CHERYL MOSS	TYPING CHECK:	HAI WEI

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-12P
SHEET 1 OF 4
FILE NO. 10608
SURFACE ELEV. 8.9
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
08:00							DRILLED	
03-23-07	1D	1.0	3-1	Dark brown silty fine to medium sand, trace			AHEAD	
Friday		3.0	1-2	clay, gravel (SM)	F		4"	
Cloudy,	2D	3.0	2-2	Do 1D (SM)				
Rain		5.0	3-4			5		
50°F	3D	5.0	1-2	Brown clayey silt, some fine sand (ML)				Petroleum odor
		7.0	2-1					from Sample 3D.
	4D	7.0	2-3	Brown silty fine to medium sand (SM)	S			
		9.0	3-8			10		
	5D	10.0	5-4	Brown clayey silt, trace fine to coarse sand				
		12.0	3-5	layers (ML)				
						15		
	6D	15.0	2-7	Brown silt varved with clayey silt, trace silty	V			
		17.0	8-11	clay (ML)				
						20		
	7D	20.0	6-100/3"	Dark brown to gray silty fine to coarse sand,		20.8		
		20.8		trace gravel (SM)	T			
	1C	21.5	REC=100%	Hard slightly weathered to unweathered			7*	
		26.5	RQD=83%	gray gnelss, jointed to moderately jointed,			6*	*Coring time in
				iron stained joints		25	6*	minutes per foot.
							6*	
	2C	26.5	REC=100%	Hard slightly weathered to unweathered gray	R		7*	
		31.5	RQD=88%	gneiss with some pegmatite, jointed to			5*	
				moderately jointed, iron stained joints			6*	
						30	6*	
							5*	
12:20						31.5	5*	End of Boring at 31.5'.
						35		
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. A-12P

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-12P
SHEET 2 OF 4
FILE NO. 10608
SURFACE ELEV. 8.9
RES. ENGR. H. Wei

PROJECT _____

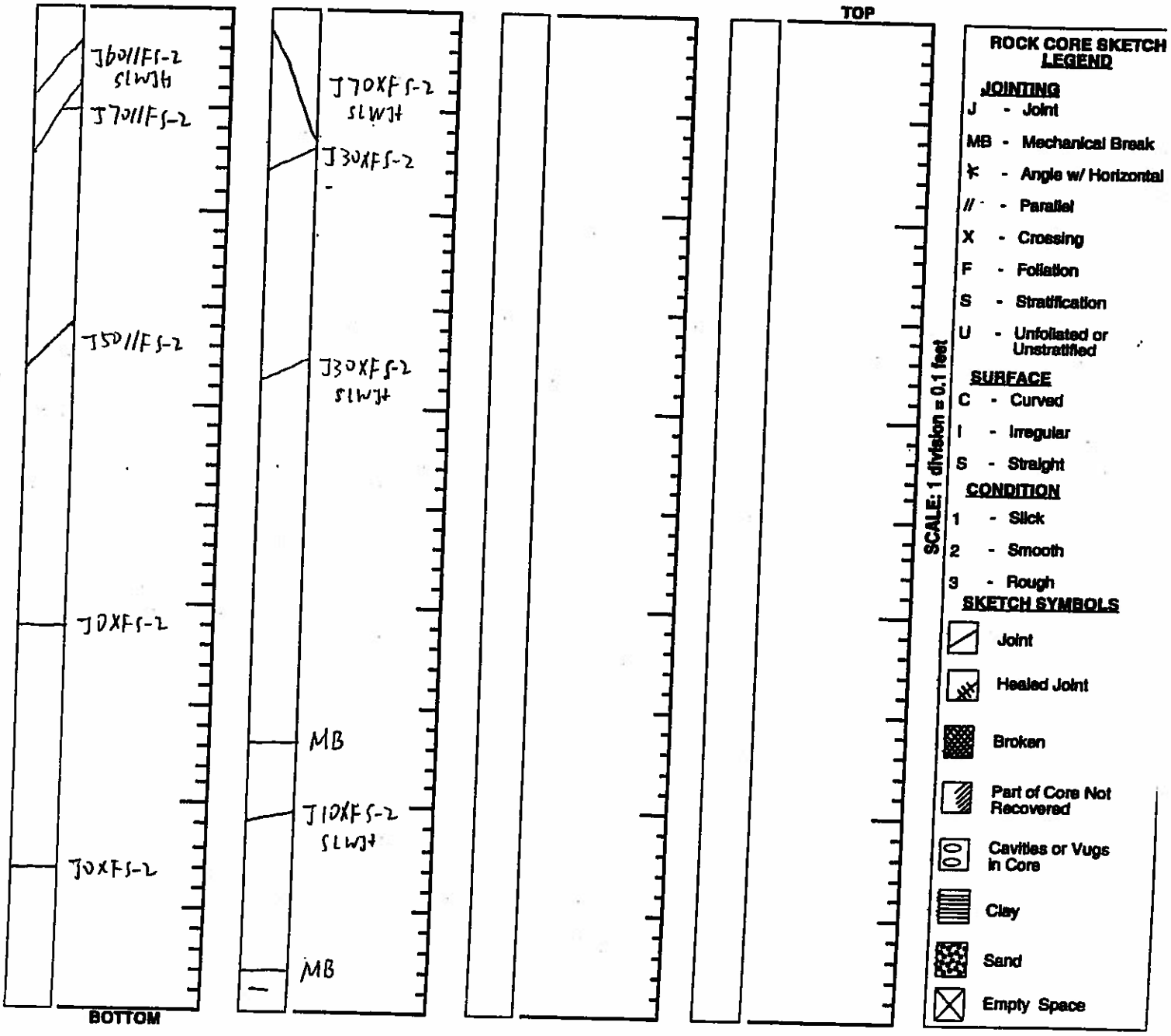
LOCATION _____

Run No.	REC / RQD
2C	100% / 88%

Run No.	REC / RQD
1C	100% / 83%

Run No.	REC / RQD

Run No.	REC / RQD



NOTES _____

SHEET 3 OF 7
FILE NO. 10608
SUBCODE

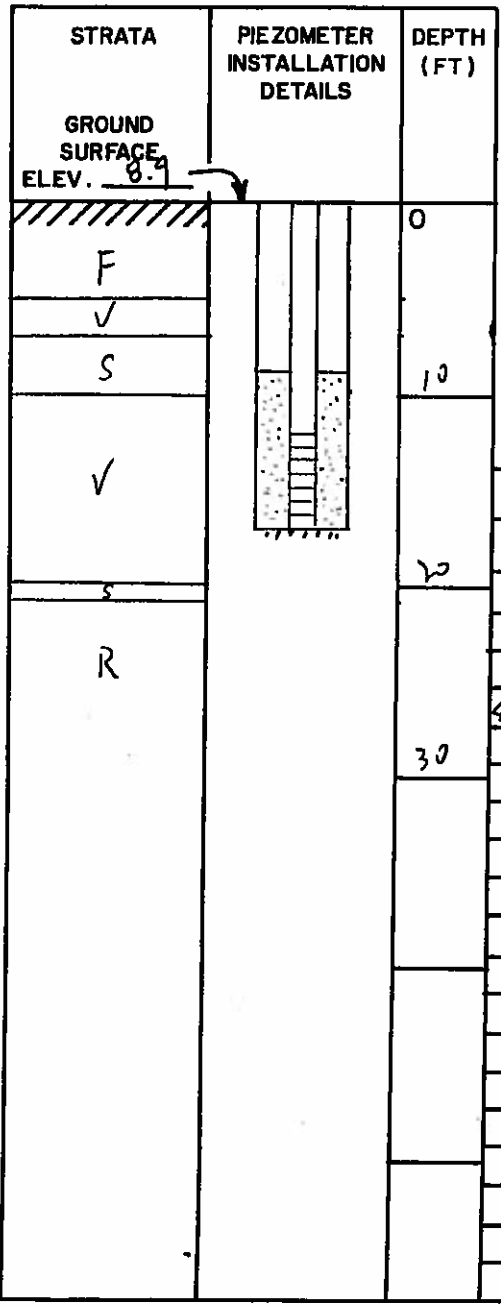
MUESER RUTLEDGE CONSULTING ENGINEERS

PIEZOMETER RECORD

PROJECT Queens Plaza
LOCATION Queens, NY
PIEZOMETER LOCATION See Boring Plan
☐ SEE SKETCH ON BACK

PIEZOMETER NO. A-12P
DATE OF INSTALLATION 3/23/07
RES. ENG. H. Wu

PIEZOMETER TYPE Slot PVC



INTAKE POINT

depth to bottom, ft = 17
depth to top, ft = 12
length, ft = 5 = L
diameter, in = 1-1/4, ft = 0.104 = 2R

STANDPIPE/RISER

elevation of rim, ft = 8.9
diameter, in = 1-1/4, ft = 0.104 = 2r

READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
3/23/07	12:30	5.1	3.8	@ Bore hole completion
3/27/07	9:35	2.7	6.2	
4/6/07	11:00	2.5	6.4	
4/16/07		FLOODED		AFTER HEAVY RAIN

Sand Bentonite
Gravel Grout

GROUND SURFACE ELEV. 8.9

PIEZOMETER NO. A-12P

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-12P
		SHEET	4 **OF** 4
PROJECT	QUEENS PLAZA - SITE A	**FILE NO.**	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SURFACE ELEV.**	8.9
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

		TYPE OF FEED DURING CORING		CASING USED					
TYPE OF BORING RIG				[X] YES	[ ] NO				
TRUCK	X	MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	20
SKID		HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO	
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO	
OTHER									

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 3-7/8

TYPE OF DRILLING MUD WATER

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

*USED AUTOMATIC HAMMER.

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-23-07	12:30	31.5	20	5.1	UPON COMPLETION OF BORING.
					FOR OBSERVATIONS IN PIEZOMETER, SEE SHEET NO. 3.

PIEZOMETER INSTALLED [X] YES [ ] NO SKETCH SHOWN ON SHEET NO. 3

STANDPIPE:	TYPE	SOLID PVC	ID, IN.	1-1/4	LENGTH, FT.	12	TOP ELEV.	+8.9
INTAKE ELEMENT:	TYPE	SLOTTED PVC	OD, IN.	1-1/4	LENGTH, FT.	5	TIP ELEV.	-8.1
FILTER:	MATERIAL	SAND	OD, IN.	4	LENGTH, FT.	8	BOT. ELEV.	-8.1

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	21.5	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.		NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	10	OTHER:	

BORING CONTRACTOR	JERSEY BORING & DRILLING CO., INC.				
DRILLER	LUIS RAMOS	HELPERS	NELSON RAMOS		
REMARKS	BOREHOLE BACKFILLED UPON COMPLETION.				
RESIDENT ENGINEER	HAI WEI			DATE	03-23-07
CLASSIFICATION CHECK.	CHERYL MOSS	TYPING CHECK:	HAI WEI		

MUESER RUTLEDGE CONSULTING ENGINEERS

BORING LOG

BORING NO. A-13
SHEET 1 OF 3
FILE NO. 10608
SURFACE ELEV. 12.4
RES. ENGR. HAI WEI

PROJECT: QUEENS PLAZA - SITE A
LOCATION: LONG ISLAND CITY, QUEENS, NEW YORK

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10:00							DRILLED	
03-15-07	1D	1.0	3-2	Dark gray fine to coarse sand, gravel, some			AHEAD	
Thursday		3.0	2-2	silt (GM)			4"	
Cloudy	2D	3.0	2-1	Gray clayey silt, some fine sand (ML)	F			
50°F		5.0	2-1			5		
	3D	5.0	3-4	Dark gray clayey silt, some fine to coarse				Petroleum odor from
		7.0	2-3	sand, trace gravel (ML)		7		5'.
	4D	7.0	4-4	Brown to gray fine sandy silt, some clay (ML)				
		9.0	2-1					
	5D	9.0	7-10	Gray silty fine to medium sand, trace clay (SM)		10		
		10.9	19-100/4"		S			
13:50								
08:30								
03-20-07						15		
Tuesday	6D	15.0	7-9	Gray clayey silt varved with some fine to medium	V			
Sunny		17.0	10-9	sand, trace silty clay, gravel (ML)		17		
40°F	1C	17.0	REC=59%	Hard slightly weathered gray gneiss with			17*	*Coring time in
		22.0	RQD=54%	pegmatite, jointed, iron stained joints			17*	minutes per foot.
					R	20	18*	
							17*	
12:00						22	18*	
								Borehole depth was 20'. 2' Rock was not recovered. Couldn't send core barrel down after Sample 1C. End of Boring at 22'.
						25		
						30		
						35		
						40		
						45		
						50		

MRCE Form BL-1

BORING NO. A-13

MUESER RUTLEDGE CONSULTING ENGINEERS
ROCK CORE SKETCH

BORING NO. A-13
SHEET 2 OF 3
FILE NO. 10608
SURFACE ELEV. 12.4
RES. ENGR. H. We:

PROJECT Queens Plaza

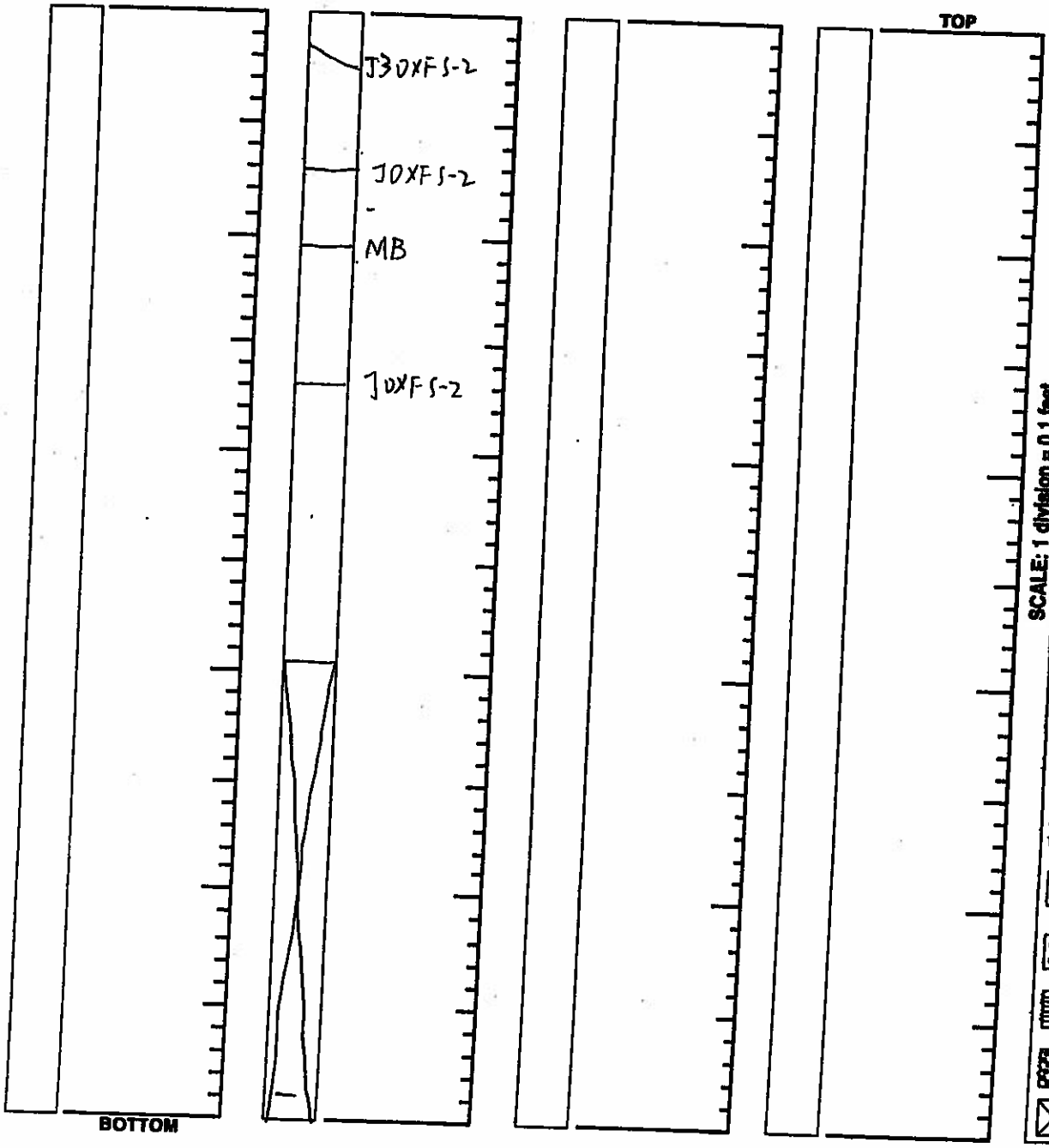
LOCATION Queens, NY

Run No.	REC / RQD

Run No.	REC / RQD
1C	59% / 54%

Run No.	REC / RQD

Run No.	REC / RQD



ROCK CORE SKETCH LEGEND

JOINTING
- J - Joint
- MB - Mechanical Break
- ∠ - Angle w/ Horizontal
- // - Parallel
- X - Crossing
- F - Foliation
- S - Stratification
- U - Unfoliated or Unstratified

SURFACE
- C - Curved
- I - Irregular
- S - Straight

CONDITION
- 1 - Slick
- 2 - Smooth
- 3 - Rough

SKETCH SYMBOLS
- Joint
- Healed Joint
- Broken
- Part of Core Not Recovered
- Cavities or Vugs in Core
- Clay
- Sand
- Empty Space

NOTES

MUESER RUTLEDGE CONSULTING ENGINEERS

		BORING NO.	A-13
		SHEET	3 **OF** 3
PROJECT	QUEENS PLAZA - SITE A	**FILE NO.**	10608
LOCATION	LONG ISLAND CITY, QUEENS, NEW YORK	**SURFACE ELEV.**	12.4
BORING LOCATION	SEE BORING LOCATION PLAN	**DATUM**	BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG		TYPE OF FEED DURING CORING		CASING USED		X YES		NO		
TRUCK		MECHANICAL		DIA., IN.	4	DEPTH, FT. FROM	0	TO	17	
SKID	X	HYDRAULIC	X	DIA., IN.		DEPTH, FT. FROM		TO		
BARGE		OTHER		DIA., IN.		DEPTH, FT. FROM		TO		
OTHER										

TYPE AND SIZE OF:

D-SAMPLER	2" O. D. SPLIT SPOON
U-SAMPLER	
S-SAMPLER	
CORE BARREL	NX DOUBLE TUBE
CORE BIT	NX DIAMOND BIT
DRILL RODS	NWJ

DRILLING MUD USED [ ] YES [X] NO

DIAMETER OF ROTARY BIT, IN. 4-7/8, 3-7/8

TYPE OF DRILLING MUD

AUGER USED [ ] YES [X] NO

TYPE AND DIAMETER, IN.

CASING HAMMER, LBS. 140 AVERAGE FALL, IN. 30

SAMPLER HAMMER, LBS. 140 AVERAGE FALL, IN. 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION
03-20-07	12:20	20	17	3.6	UPON COMPLETION OF BORING.

PIEZOMETER INSTALLED [ ] YES [X] NO SKETCH SHOWN ON

STANDPIPE:	TYPE		ID, IN.		LENGTH, FT.	TOP ELEV.	
INTAKE ELEMENT:	TYPE		OD, IN.		LENGTH, FT.	TIP ELEV.	
FILTER:	MATERIAL		OD, IN.		LENGTH, FT.	BOT. ELEV.	

PAY QUANTITIES

3.5" DIA. DRY SAMPLE BORING	LIN. FT.	NO. OF 3" SHELBY TUBE SAMPLES	
3.5" DIA. U-SAMPLE BORING	LIN. FT.	NO. OF 3" UNDISTURBED SAMPLES	
CORE DRILLING IN ROCK	LIN. FT.	OTHER:	

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.

DRILLER JOSE SANTIAGO HELPERS ANGEL MEDRANZ

REMARKS BOREHOLE SEALED WITH CONCRETE & BACKFILLED UPON COMPLETION.

RESIDENT ENGINEER HAI WEI DATE 03-20-07

CLASSIFICATION CHECK: CHERYL MOSS TYPING CHECK: HAI WEI

APPENDIX D

1988 PREVIOUS BORING LOGS

"Boring Elevations are referenced to the Borough President of Queens"

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 5
FILE NO. 6980
BORING NO. 1P
SURFACE ELEV. 19.3

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0745								4" asphalt.
	1D	1.0 3.0	17-17 19-28	Brown silty gravel, sm fine to coarse sand (GM)			26 31	
	2D	3.0 5.0	24-31 36-40	Brown fine to coarse sandy silt, sm gravel, tr cinders (ML)		5	40 46	
	3D	5.0 7.0	14-30 14-9	Brown gravel, sm silt, fine to coarse sand (GM)	F		53 17	Pungent odor 3D to 8D.
	4D	8.0 10.0	9-7 5-9	Brown fine to medium sand, sm silt, brick, tr gvl, conc (SM)		10	8 5 7	
	5D	10.0 12.0	23-20 30-45	Brown gravel, sm silt, fine sand, tr wood, brick (GM)			56 143 96	
						13.5	75	
	6D	15.0 17.0	18-23 31-19	Gry-brn & blk clayey fine sand, sm gravel, tr clay seams (SC)	S	15	35 50 67 73	
October 4, 1988						18.5 20	130 143	4" casing to 20'
	7D	20.0 20.8	85-100/3"	Gry-brn & blk fine to medium sand, sm silt, tr gravel (SM)				Drill 3" casing to 52'.
						25		
	8D	25.0 25.7	75-100/2"	Do 7D, decomposed rock fgmts, clayey fine sand layer (SM)				
						30		
	1C	30.0 34.5	Rec=2"	Gray cobble, sm gray silty clay (Till)				
	9D	30.5 35.9	21-40 100/5"	Gry-brn clayey fine sand, tr medium to coarse sand, gravel (SC)				
1430						35		
0800					T			
						40		
	10D	40.0 42.0	25-45 40-27	Gry-brn fine to coarse sand, sm gravel, silt (SM)				
October 5, 1988						45		
	11D	45.0 46.4	40-51 100/5"	Gry brn clayey fine to medium sand, sm gravel, tr coarse sand (SC)				
						50		
	12D	50.0 52.0	41-49 49-57	Gry-brn fine to medium sand, sm silt, tr gravel, clay pkts (SM)				

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 2 OF 5
FILE NO. 6980
BORING NO. 1P
SURFACE ELEV. 19.3

PROJECT QUEENS PLAZA

PROJECT LOCATION LONG ISLAND CITY, NEW YORK RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
October 5, 1988	2C	52.0 57.0	Rec=85% RQD=85%	Medium hard gray schistose gneiss, MdJtd	T	52		
					R	55		
1130	3C	57.0 58.5	Rec=80% RQD=80%	Do 2C		58.5		End of boring @ 58.5'.
						60		
						65		
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MOESER ROTLEDGE CONSULTING ENGINEERS

Sheet 1 of 1

File No. 3780

Boring No. 1P

ROCK CORE SKETCH

Project QUEENS PLAZA

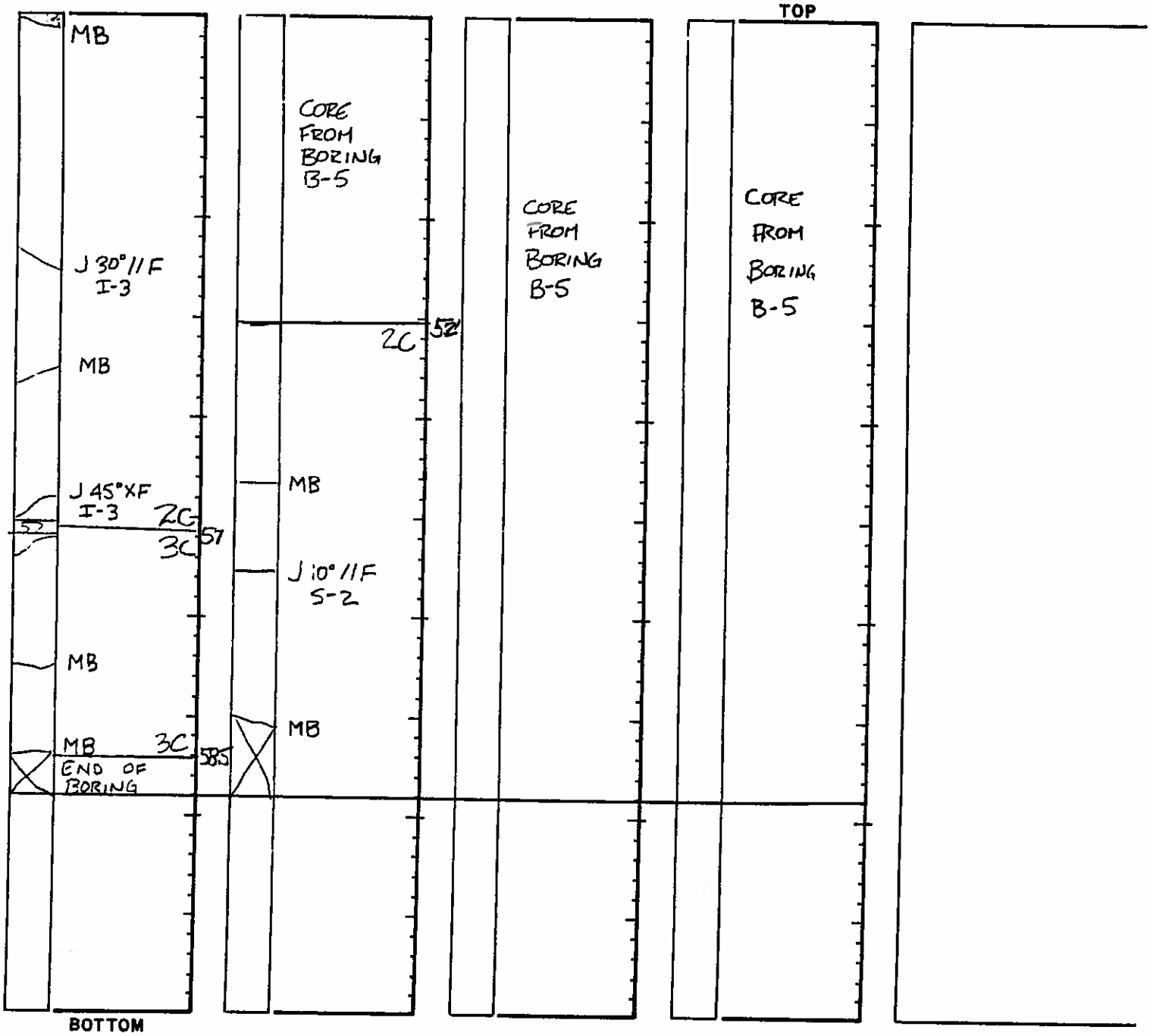
Location L.I.C., N.Y.

Run No.	REC/RQD
3C	80/80

Run No.	REC/RQD
2C	95/85

Run No.	REC/RQD

Run No.	REC/RQD



NOTES RUN 1C WAS TILL: SAMPLE PLACED IN JAR

Boring No. 1P

SHEET 4 OF 5
FILE NO. 6980
SUBCODE

MUESER RUTLEDGE CONSULTING ENGINEERS

PIEZOMETER RECORD

PROJECT [illegible]
PIEZOMETER NO. 1P
LOCATION L.I.C. N.Y.
PIEZOMETER LOCATION IN BORING NO. 1
DATE OF INSTALLATION 10/6/82
☐ SEE SKETCH ON BACK
RES. ENG. J. GALLAGHER

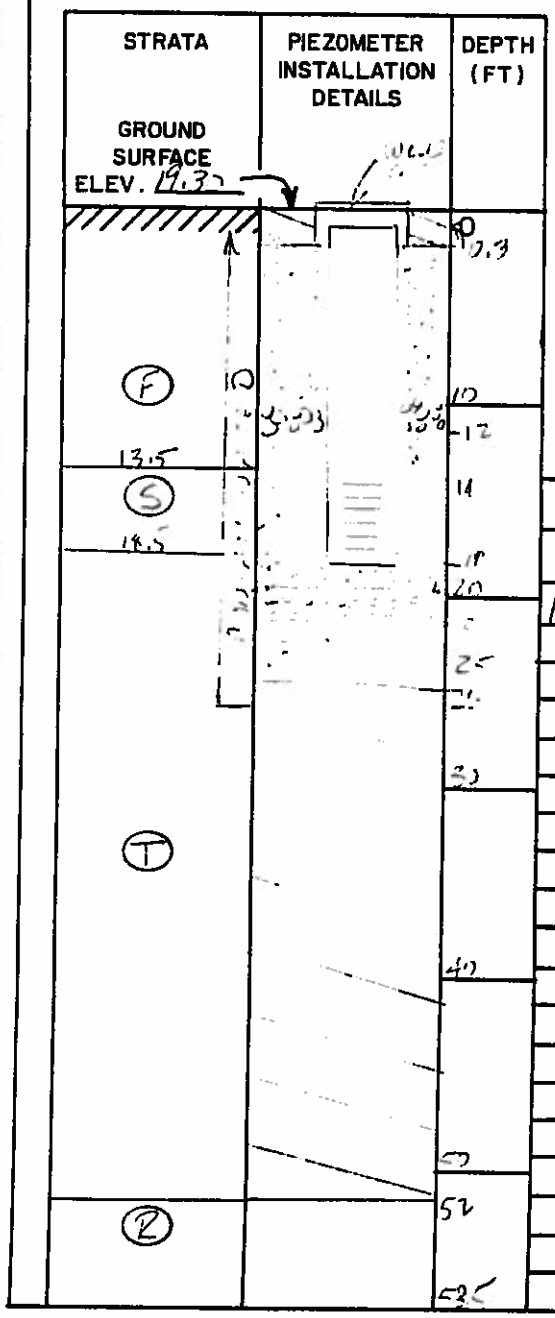
PIEZOMETER TYPE SLOTTED PIPE

INTAKE POINT

depth to bottom, ft = 20'
depth to top, ft = 12'
length, ft = 8' = L
diameter, in = 4, ft = 2.33 = 2R

STANDPIPE/RISER

elevation of rim, ft = 19.0
diameter, in = 1½, ft = 0.10 = 2r



READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
10/12/82	1100	12.7		RIM IS 0.3' BELOW GROUND SURFACE

Sand Bentonite
Gravel Grout

GROUND SURFACE ELEV. 19.3

PIEZOMETER NO. 1P

PROJECT QUEENS PLAZA BORING NO. 1P
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 19.3 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4, DEPTH FROM 0.0' TO 20.0'
DIAMETER, INCHES 3, DEPTH FROM 0.0' TO 52.0'
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300, AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140, AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-5-88	0700	35.0'	35.0'	13.8'	OVERNIGHT
		SEE	PIEZOMETER RECORD		

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☒ PIEZOMETER INSTALLED, SKETCH SHOWN ON SEE SHEET NO. 4
STANDPIPE: TYPE PVC, ID 1", LENGTH 13.7', TOP ELEV. 19.0
INTAKE POINT: TYPE SLOTTED PVC, OD 1-1/4", LENGTH 5.0', TIP ELEV. 0.0
FILTER: MATERIAL SAND, OD 4", LENGTH 8.0', BOT. ELEV. -1.0

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 52.0. NO. OF 2" SHELBY TUBE SAMPLES
___ DIA. U-SAMPLE BORING, LIN. FT. ___. NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 6.5. OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER JIM VELYKIS HELPERS BOB HARRISON
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10/5/88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 5
FILE NO. 6980
BORING NO. 2
SURFACE ELEV. 18.3

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
1330 October 4, 1988	1D	1.0 2.0	31-18	Brn & blk f-m sand, sm silt, tr gravel, cinders (SM)			10 18	4" asphalt, 5" concrete. Pungent odor 1D to 5D.
	2D	2.0 4.0	14-13 10-6	Brn fine to medium sand, sm silt, tr gravel (SM)		5	19 14 15	
	3D	5.0 7.0	3-5 5-7	Brn medium to fine sand, tr silt (SP)			15 18 23	
	4D	8.0 10.0	8-13 17-24	Brn medium to fine sand, tr silt (SP)	(F)	10	16 30	
	5D	10.0 12.0	14-16 17-19	Brn fine to medium sand, tr silt (SP-SM)			20 47 49	
						13.5	60	
1500	6D	15.0 17.0	7-12 14-22	Top: Gry medium to fine sand, tr silt, clay lyr (SP-SM)		15	53 32	
0700				Bot: Brn silty fine sand, tr clay seams (SM)			63 71 78	
	7D	20.0 22.0	4-5 5-7	Brown silty fine sand, tr clay seams (SM)	(S)	20	59 37 39	
				Top: Do 7D (SM)			44 46	
	8D	25.0 27.0	11-17 14-13	Bot: Stiff gry silty clay vvd w/f sand, silt seams (CL)		25 26	48	WC Bot=41%
	9SD	27.5 29.5	P=24" Rec=0	Interlayered stiff rd-brn & gry silty clay & gry fine sandy silt, tr fine sand seams (CH & ML)	(V)	30		WC=27%
	10D	30.0 32.0	2-7 11-12	Interlayered gry silty fine sand, and stiff gry silty clay (SM & CL)				
	1C	34.2 39.2	Rec=1.8'	Gray granite boulders		35	USED MUD	Boulders at 34' to 35.5' and 36' to 37'.
						40		
October 5, 1988	11D	40.0 40.6	65-100/1"	Gray fine to medium sand and gravel, sm silt (SM)				
	2C	41.0 42.5	Rec=33%	Gray gneiss boulder		45		
	12D	45.0 46.8	55-70 50-100/4"	Brn fine to medium sand, sm silt, tr gravel, c sand, clay pkts(SM)	(T)			WC=Water Content in percent of dry weight.
	NR	50.0 50.3	100/4"			50		

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 2 OF 5
FILE NO. 6980
BORING NO. 2
SURFACE ELEV. 18.3

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
10-5-88 1500					(T)			
0630						54		
	NR	55.0 55.1	100/1"			55		
	3C	56.0 61.0	Rec=98% RQD=98%	Hard gray gneiss, MdJtd	(R)	60		
October 6, 1988	4C	61.0 66.0	Rec=100% RQD= 91%	Do 3C, MdW schistose gneiss zone 65' to 66'.		65		
1530						66		End of boring @ 66.0'.
						70		
						75		
						80		
						85		
						90		
						95		
						100		

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 3 of 5

File No. 6980

Boring No. 2

ROCK CORE SKETCH

Project QUEENS PLAZA

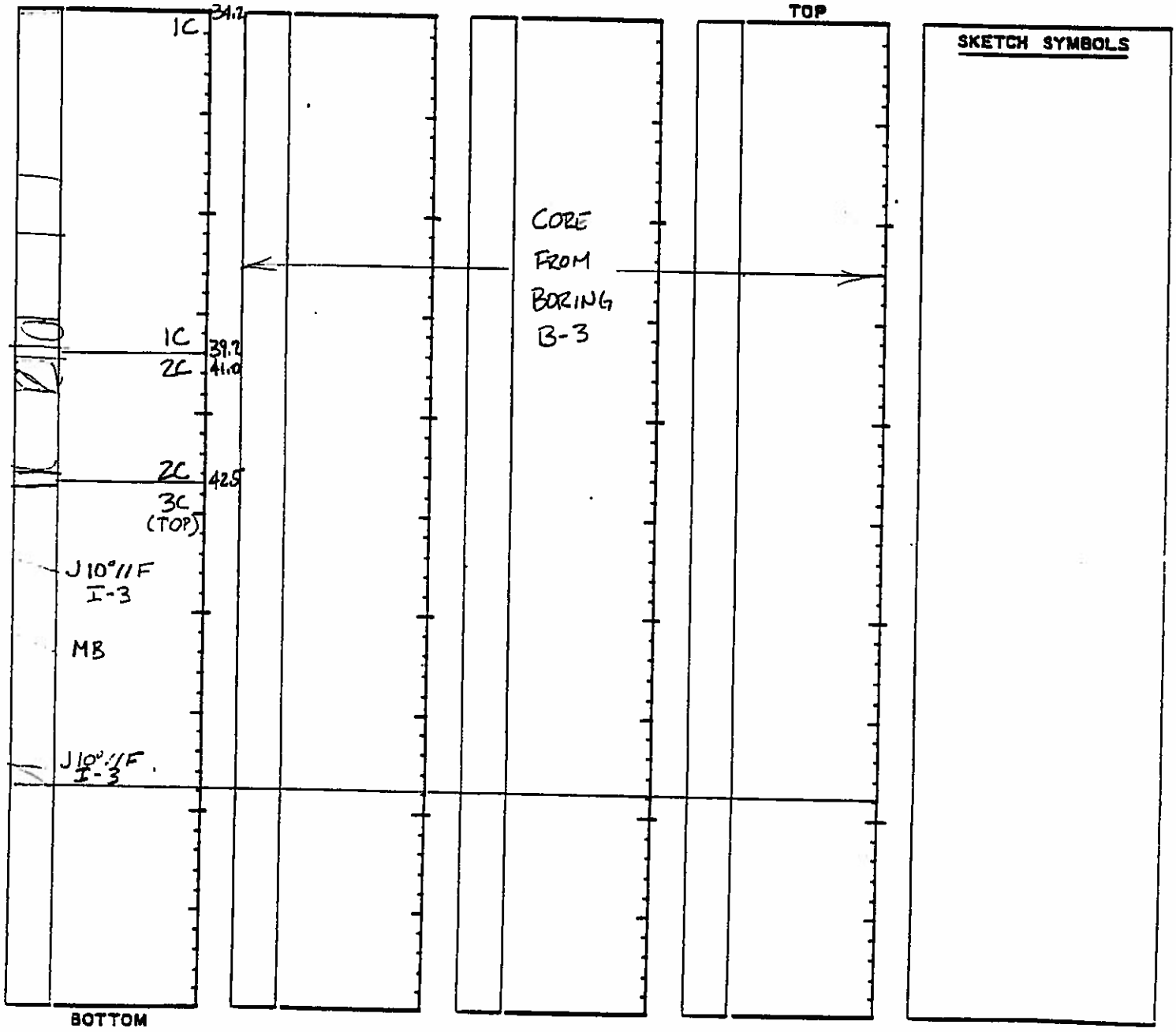
Location L.I.C., NY

Run No.	REC/RQD
1C	36/NA
2C	33/NA
3C (TOP)	98/98

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD



NOTES RUNS 1C + 2C ARE BOULDERS

Boring No. 2

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 4 of 5

File No. 2780

Boring No. 2

ROCK CORE SKETCH

Project QUEENS PUMP BOOST

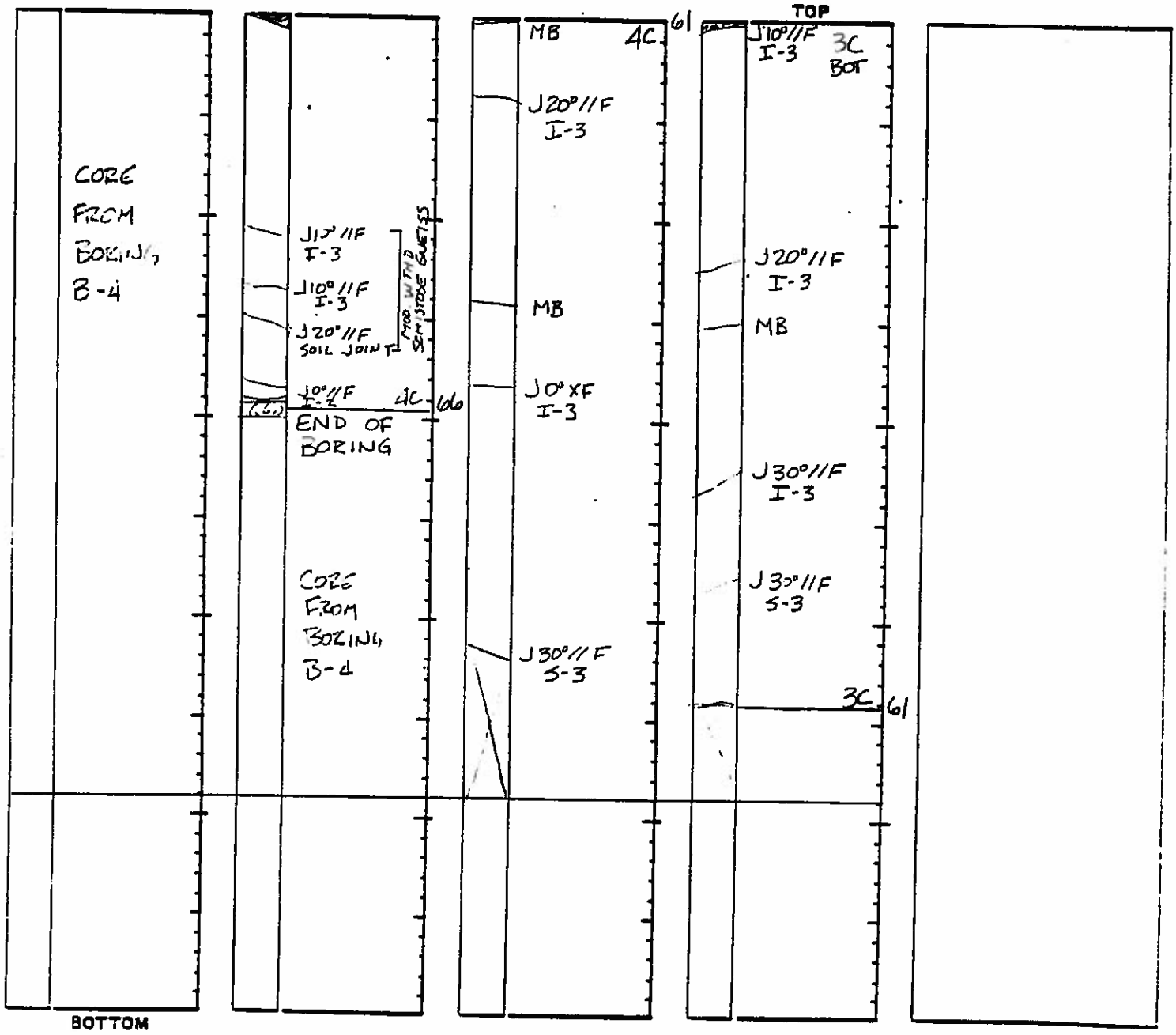
Location L.I.C., NY

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
4C	100/91

Run No.	REC/RQD
3C (BOT)	98/98



NOTES

Boring No. 2

PROJECT QUEENS PLAZA BORING NO. 2
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 18.3 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 25.0'
DIAMETER, INCHES , DEPTH FROM TO
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER SHELBY HEAD (PUSHED) . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-6-88	0630	55.0'	25.0'	12.4'	OVERNIGHT

* Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 56.0 . NO. OF 2" SHELBY TUBE SAMPLES
___ DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 10.0 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER ARMANDO FELICIANO HELPERS CARLOS TORADO
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-6-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3
FILE NO. 6980
BORING NO. 3
SURFACE ELEV. 19.4

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
1030	1D	0.0	27-12	Brown fine to medium sand, sm gvl,			23	2" asphalt.
		2.0	11-8	brick, silt, tr asphalt (SM)			18	
	2D	2.0	18-9	Brick concrete, asphalt , gravel			10	2D to 6D:
		4.0	9-9				21	2 attempts each
						5	16	sample, 2" to
	NR	5.0	3-2				21	4" recovery.
		7.0	1-1				7	
							8	
	NR	8.0	2-3				6	
		10.0	5-7			10	7	
	3D	10.0	6-5	Brown fine to coarse sandy gravel,			9	
		12.0	3-3	sm brick, tr silt, cinders			10	
				(GP-GM)			12	
							1	
						15	2	
	4D	15.0	1-1	Black silty fine to medium sand,	(F)		3	
		17.0	WH-WH	sm brick gravel, tr wood (SM)			4	
							5	
							8	
						20	7	Suds in wash
	5D	20.0	4-2	Do 4D			7	20' to 25'.
		22.0	3-3	(SM)			8	
							6	
							3	
						25	3	
	NR	25.0	3-4				5	
		27.0	2-1			27	5	**Rods dropped.
	6D	27.0	**	Gray fine sandy silt, tr clay,			6	
		29.0		gravel coarse sand (ML)	(S)		21	
						30	26	
	7D	30.0	11-18	Top: Gry fine sandy silt (ML)		30.5	16	Drilled ahead of
		37.0	29-35	Mid: Gry c sand, sm gvl, tr si(SP)			19	casing 30' to 35'
				Bot: Gry&rd-brn gravelly f-c sand,	(T)		11	
				sm silt (SM)			7	
1500						35	10	
	8D	35.0	25-100/1"	Top: Stiff gry-brn silty clay, tr		35.5	50/6'	Top WC=40%
		35.6		f sand, f sandy silt seams (CH)				
				Bot:Gry f-m sand,sm clay,tr gvl(SC)				
	1C	37.2	Rec= 99%	Hard gray quartzite gneiss,				1C: Partial loss
		42.2	RQD= 90%	jointed		40		of water.
					(R)			
	2C	42.2	Rec= 99%	Do 1C, Moderately jointed,				2C: Lose water
		47.2	RQD= 70%	broken zone				entire run.
						45		
1200								End of boring
						47.2		@ 47.2'.
								WC=Water Content
						50		in percentof
								dry weight.

September 29, 1988
October 3, 1988

MUESER RUTLEDGE CONSULTING ENGINEERS

ROCK CORE SKETCH

Sheet 4 of —
File No. 6980
Boring No. 3

Project QUEENS PLAZA

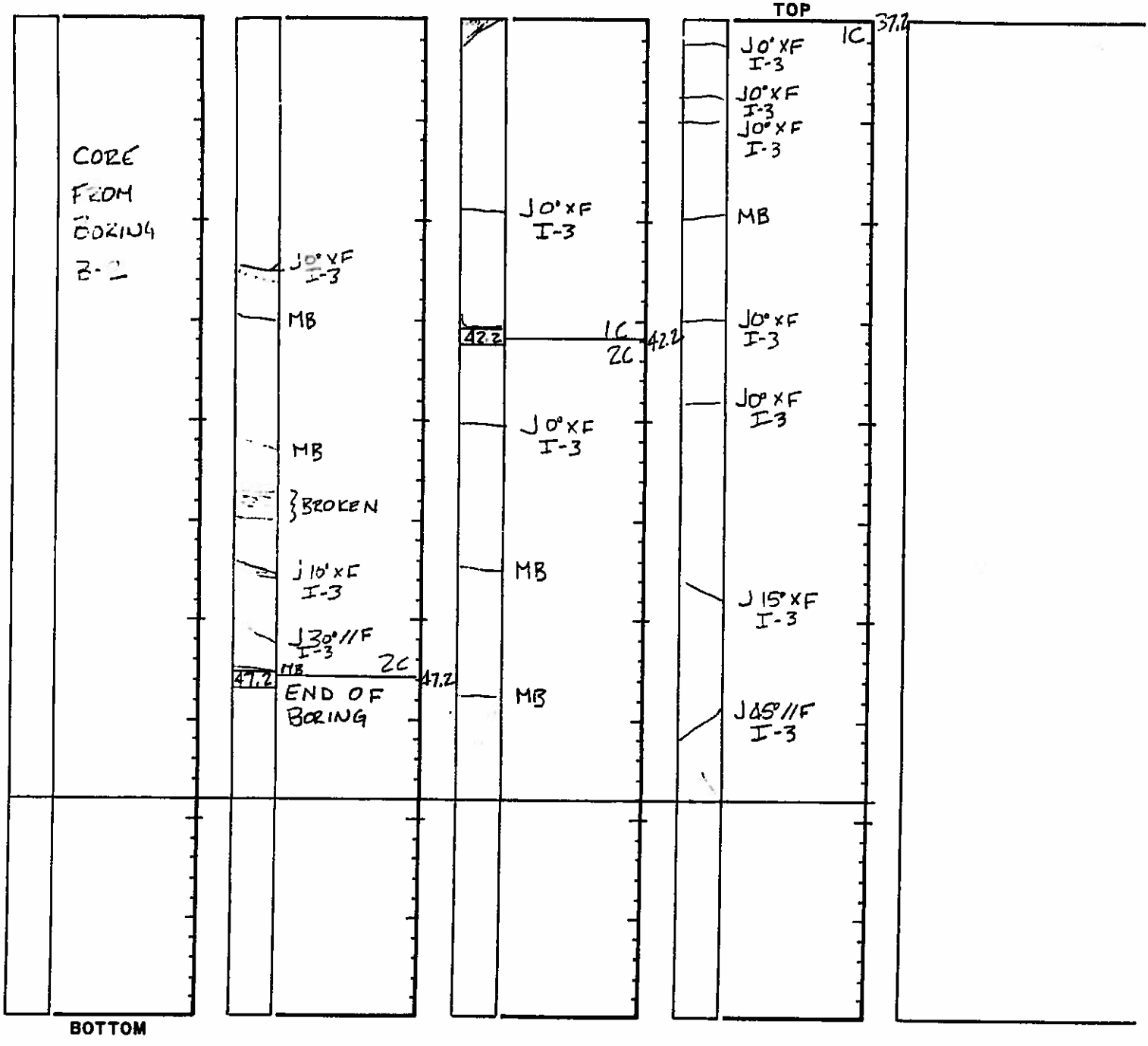
Location L.I.C. NY

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	99/90

Run No.	REC/RQD
1C	99/90



NOTES

Boring No. 3

PROJECT QUEENS PLAZA BORING NO. 3
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 19.4 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 35.5'
DIAMETER, INCHES , DEPTH FROM TO
☒ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES 3-3/4"
TYPE OF DRILLING MUD QUICK - GEL
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-3-88	0730	30.0'	30.0'	13.5'	OVER WEEKEND
10-3-88	1200	47.0'	35.5'	11.6'	AT COMPLETION OF BORING

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 37.2 . NO. OF 2" SHELBY TUBE SAMPLES
DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 10.0 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER ARMANDO FELICIANO HELPERS CARLOS TORADO
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-3-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 4
FILE NO. 6980
BORING NO. 4
SURFACE ELEV. 16.6

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0830								3" asphalt
	1D	1.0	13-13	Brown fine to medium sand, tr			16	7" concrete
		3.0	13-12	silt, cinders, brick (SP-SM)			30	
	2D	3.0	7-7	Brown fine to medium sand, sm			11	
		5.0	6-5	silt, tr coarse sand, cinders(SP)		5	15	
	NR	5.0	13-17				7	
		7.0	27-6				28	
							19	
	3D	8.0	11-4	Brown fine to medium sand, sm			14	
		10.0	2-2	silt, tr coarse sand (SM)	F	10	16	
	4D	10.0	17-7	Do 3D			18	
		12.0	6-5	(SM)			17	
							23	
						13.5	19	
						15	18	5D: Pungent odor
	5D	15.0	10-11	Gray-brown fine to medium sand,			24	
		17.0	10-9	tr silt, gravel, coarse sand			26	
				(SP-SM)	S		26	
							23	
						20	27	
	6D	20.0	6-9	Gray-brown silty fine sand, tr				
		22.0	7-10	clay seams (SM)				
						23.5		
						25		
	7D	25.0	10-9	Interlayered stiff gray-brown				WC=25%
		27.0	9-12	silty clay and silty fine sand				
				(CL & SM)	V			
						30		
	8D	30.0	5-5	Gray-brown silty fine sand, sm				
		32.0	9-9	clay lyrs, tr medium to fine				
				sand lyrs (SM)				
						35		
	9D	35.0	4-6	Top: Do 8D (SM)		36		
		37.0	16-24	Bot: Gry clayey fine to medium	T			
				sand, sm gravel (SC)		37.5		
	1C	37.7	Rec=100%	Hard gray gneiss, MdJtd, SlW				WC=Water Content
		42.7	RQD= 93%	zones, WJts		40		in percent of
								dry weight.
	2C	42.7	Rec= 94%	Hard gray quartzite gneiss,				
		47.7	RQD= 94%	massive	R			
						45		
1530								End of boring
						47.7		@ 47.7'.
						50		

October 7, 1988

USED MUD

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 6 of 6
File No. 5980
Boring No. 4

ROCK CORE SKETCH

Project QUEENS TUNNEL

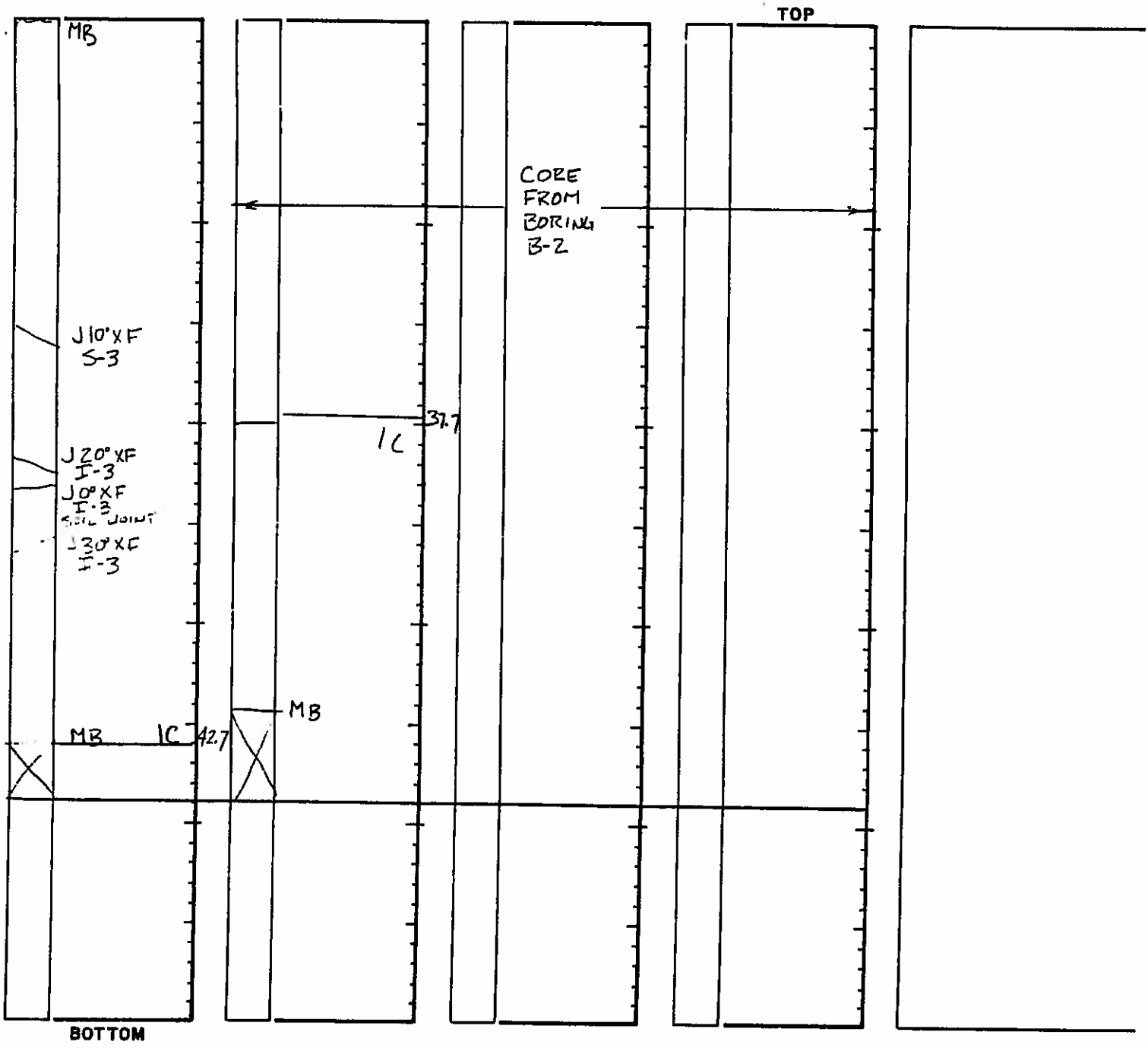
Location L.I.C. U/

Run No.	REC/RQD
1C	100/93

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD



NOTES

Boring No. 4

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 1 of 1

File No. 5780

Boring No. 4

ROCK CORE SKETCH

Project QUEENS PLAZA PROJECT

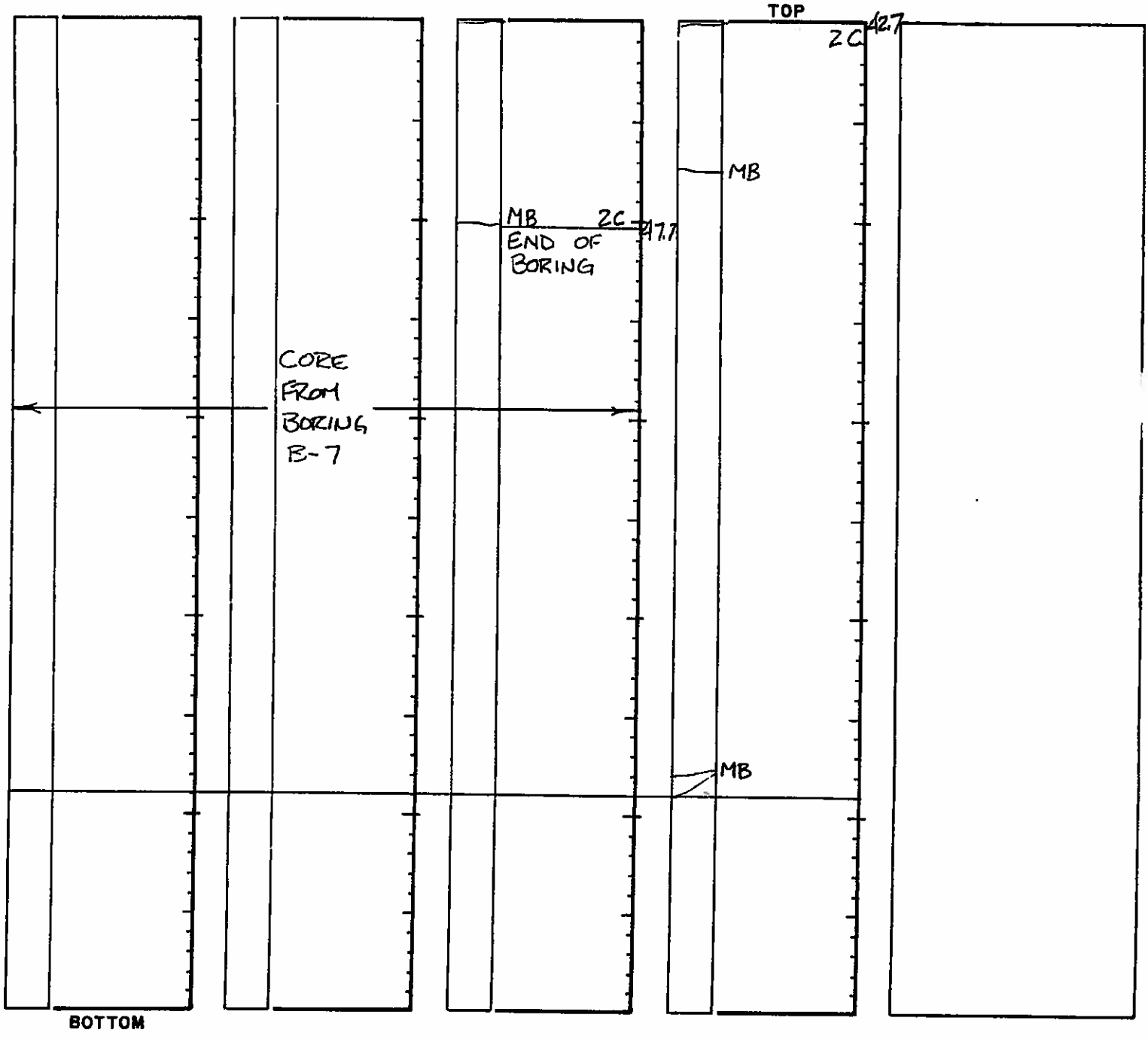
Location L.I.C., NY

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	94/94



NOTES

Boring No. 4

PROJECT QUEENS PLAZA BORING NO. 4
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 16.6 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 20.0'
DIAMETER, INCHES , DEPTH FROM TO
☒ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES 3-3/4"
TYPE OF DRILLING MUD QUICK GEL
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-10-88	0700	47.7'	20.0'	10.2'	OVER WEEKEND

* Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 37.7 . NO. OF 2" SHELBY TUBE SAMPLES
DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 10.0 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER ARMANDO FELICIANO HELPERS CARLOS TORADO
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-10-88

NOTES:

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2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3
FILE NO. 6980
BORING NO. 5
SURFACE ELEV. 17.0

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
1145 September 30, 1988	1D	1.0 2.0	5-4 4-9	Brown fine to medium sand, sm silt, tr cinders, glass (SM)				2" aspahlt 6" coarse gravel.
	2D	3.0 5.0	14-10 13-18	Brown fine to medium sand, tr silt, coarse sand (SP-SM)		5		
	3D	5.0 7.0	7-8 8-9	Brown fine to medium sand, trace silt (SP)	F		5 13	Pungent odor 4D to 6D.
	4D	7.0 9.0	11-7 5-4	Do 3D, trace coarse sand, gravel (SP)			13 15	
						9.5	27	
	5D	10.0 12.0	13-18 6-10	Top: Gry m-f sand, sm silt, tr gravel (SM) Bot: Stiff blk & gry silty clay, sm silty fine sand lyrs, tr coarse sand (CL)			28 38 57 56	
						15	32	
	6D	15.0 17.0	12-10 10-12	Black silty fine sand, trace clay (SM)			22 34 36 34	
					S	20	44	
	7D	20.0 22.0	10-11 10-15	Brown fine sandy silt, sm silty clay seams (ML)			37 47 69	
						23.5	70	
						25	77	
	8D	25.0 27.0	10-12 10-14	Stiff brown silty clay, vvd w/sm silty fine sand seams (CL)			60 51 53 27	WC=28%
					V	30	36	
1500	9D	30.0 32.0	6-8 10-10	Do 8D (CL)				WC=41% Suds in wash 30' to 35'. Drill ahead of casing to 39', and advance casing.
0730						34		
						35		
	10D	35.0 37.0	14-22 27-23	Gry medium to fine sand, sm silt, tr gravel (SM)				
	1C	37.0 41.0	Rec= 3"	Gray cobbles	T			
	11D	41.0 41.7	55-100/2"	Gray fine to medium sand, sm silt, gravel, tr coarse sand, clay pockets (SM)		40		
						42		
October 3, 1988	2C	42.0 46.5	Rec=73% RQD=67%	Medium hard gray gneiss, jointed, SlW joints				WC=Water Content in percent of dry weight.
						45		
	3C	46.5 51.5	Rec=93% RQD=93%	Hard gray gneiss, blocky	R			
						50		
1200						51.5		End of boring @ 51.5'.

MOESER ROTLEDGE CONSULTING ENGINEERS

Sheet 1 of 2

File No. 6980

Boring No. 5

ROCK CORE SKETCH

Project QUEENS PLAZA

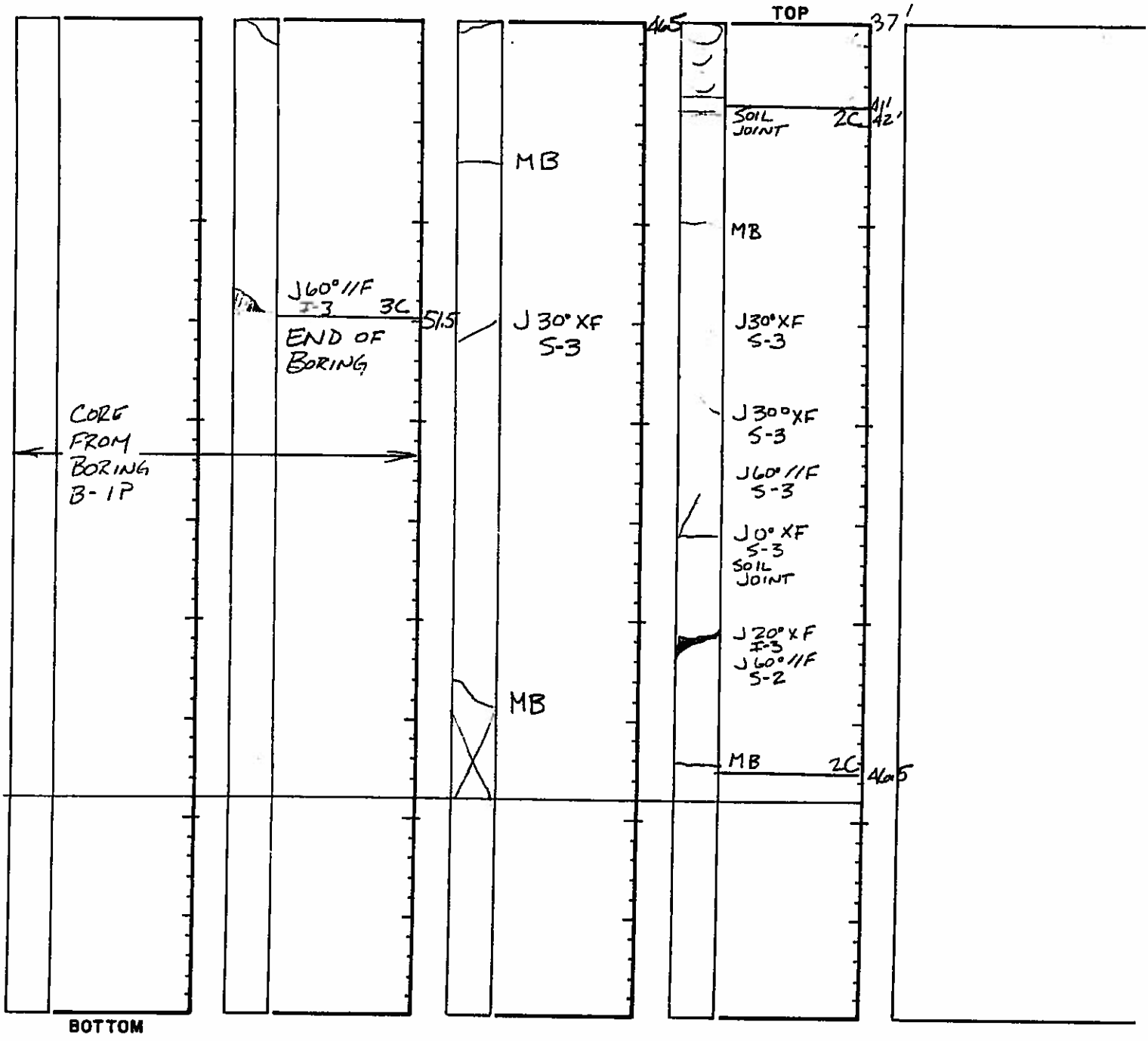
Location L.I. N.Y.

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
3C	93/93

Run No.	REC/RQD
1C	6/NA
2C	73/67



NOTES

Boring No. 5

PROJECT QUEENS PLAZA BORING NO. 5
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 17.0 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 39.0'
DIAMETER, INCHES , DEPTH FROM TO
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-3-88	0730	30.0'	25.0'	10.0'	OVER WEEKEND

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 38.0 . NO. OF 2" SHELBY TUBE SAMPLES
DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 13.5 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER JIM VELYKIS HELPERS BOB HARRISON
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-3-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 4
FILE NO. 6980
BORING NO. 6P
SURFACE ELEV. 11.6

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0800							4	4" asphalt
	1D	1.0	6-2	Brown & gray gravelly fine to			6	
		3.0	1-10	coarse sand, sm silt (SM)			8	
	2D	3.0	4-6	Gray-brown fine to medium sand,			6	
		5.0	11-11	sm silt, tr cinders, brick (SM)		5	14	
	3D	5.0	9-5	Gray-brown fine to medium sand,			10	
		7.0	4-2	sm silt, tr gravel, cinders (SM)	(F)		11	
	4D	7.0	3-5	Do 3D			13	
		9.0	7-12	(SM)			17	
						10	50	
	NR	10.0	10-6				17	
		12.0	3-3				13	
							12	
						13.5	55	
						15	79	
	5D	15.0	17-14	Gray-brown fine to medium sand,	(S)		35	
		17.0	8-8	sm silt, tr clayey silt lyrs(SM)			30	
							45	
						18.5	47	
						20	63	
October 10, 1988	6D	20.0	5-17	Gray-brown silt, sm fine sand,			59	WC=34%
		22.0	16-15	silty clay layers (ML)	(V)		61	
							67	
							81	
						25	100+	
	7D	25.0	6-14	Top: Do 6D (ML)		26	100+	Top WC=31%
		27.0	60-61	Bot: Gry-brn f-m sand, sm silt,	(T)	27		
				gravel (SM)				
	1C	27.7	Rec=75%	Medium hard gry gneiss, ClJtd to				
		32.0	RQD=45%	Bkn, WJts to iron stained Jts		30		
	2C	32.0	Rec=80%	Medium hard gray gneiss, ClJtd,				
		37.0	RQD=68%	WJts	(R)			
						35		
1200								End of boring @ 37.0'.
						37		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 2 of 4

File No. 6980

Boring No. 6P

ROCK CORE SKETCH

Project [illegible]

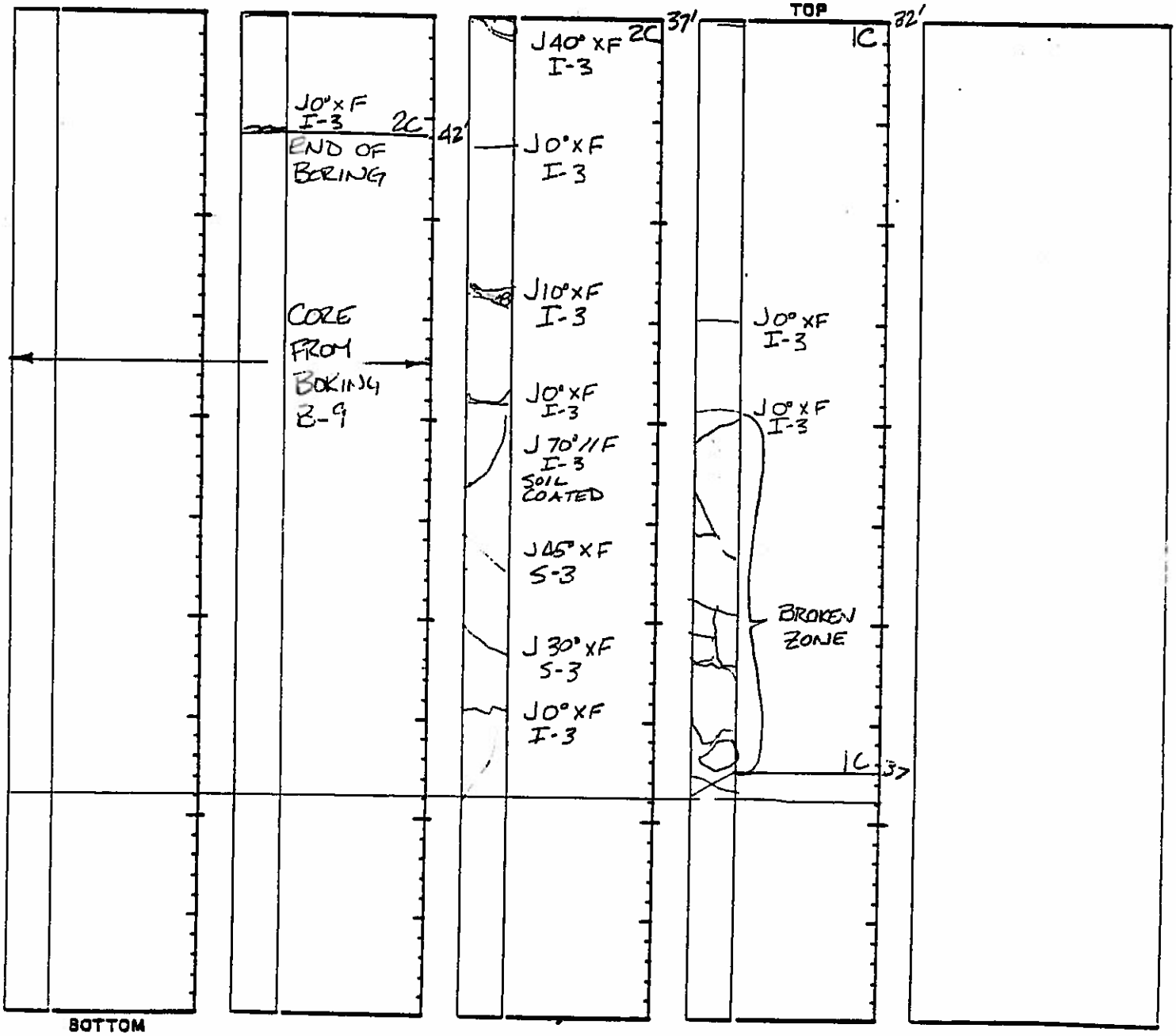
Location [illegible]

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	60/66

Run No.	REC/RQD
1C	75/45



NOTES

Boring No. 6P

SHEET 2 OF 4
FILE NO. 780
SUBCODE

MUESER RUTLEDGE CONSULTING ENGINEERS

PIEZOMETER RECORD

PROJECT QUEENS TUNNEL — PIEZOMETER NO. 6P
LOCATION L.I.C. 10
PIEZOMETER LOCATION IN BOREHOLE 6P — DATE OF INSTALLATION 10/12/68
☐ SEE SKETCH ON BACK — RES. ENG. J. MUESER

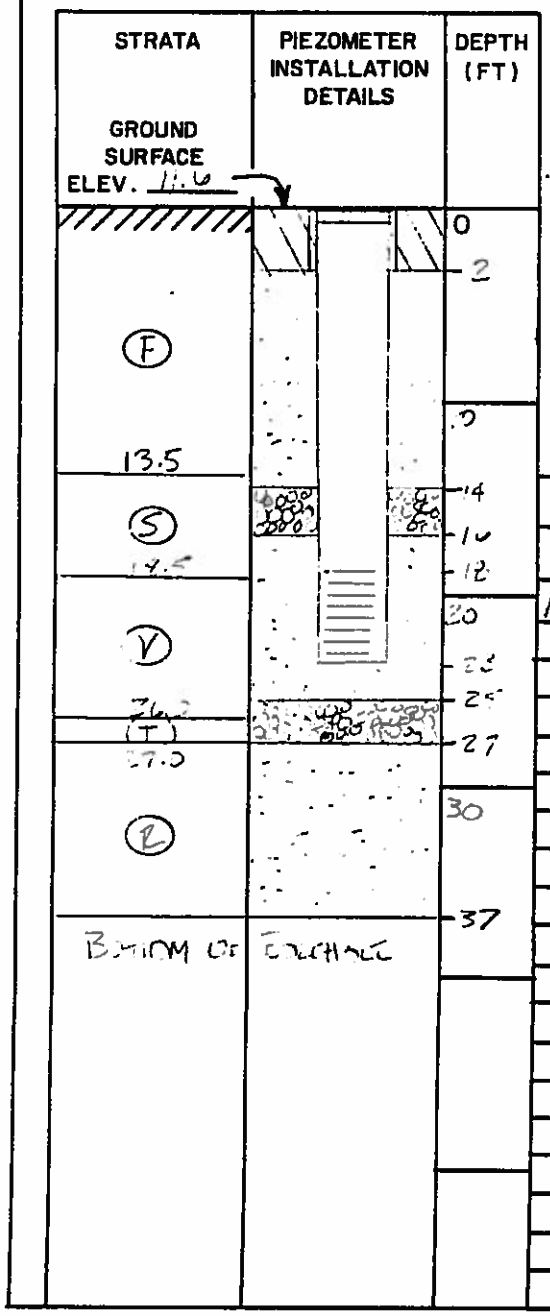
PIEZOMETER TYPE SLOTTED PVC

INTAKE POINT

depth to bottom, ft = 25
depth to top, ft = 16
length, ft = 9 = L
diameter, in = 4, ft = 0.33 = 2R

STANDPIPE/RISER

elevation of rim, ft = 11.4
diameter, in = 1½, ft = ____ = 2r



READING TIME		DEPTH – RIM TO WATER	ELEVATION OF WATER	REMARKS
DATE	CLOCK			
12/12	1300	4.7	+6.7	RIM IS 0.2' BELOW GROUND SURFACE

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT QUEENS PLAZA BORING NO. 6P
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 11.6 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 27.0'
DIAMETER, INCHES , DEPTH FROM TO
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
			SEE PIEZOMETER RECORD		

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☒ PIEZOMETER INSTALLED. SKETCH SHOWN ON SEE SHEET NO.3
STANDPIPE: TYPE PVC , ID 1" , LENGTH 18' , TOP ELEV. 11.4
INTAKE POINT: TYPE SLOTTED PVC , OD 1-1/4" , LENGTH 5' , TIP ELEV. -11.6
FILTER: MATERIAL SAND , OD 4" , LENGTH 9' , BOT. ELEV. -13.6

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 27.0 . NO. OF 2" SHELBY TUBE SAMPLES
DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 10.0 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER JIM VELYKIS HELPERS BOB HARRISON
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-10-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and incnes and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3
FILE NO. 6980
BORING NO. 7
SURFACE ELEV. 15.1

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0900	1D	0.5	8-15	Gry-brn fine to medium sand, sm			3	2" asphalt
		2.5	18-7	silt, tr gravel, silt pkts (SM)			18	4" concrete
	2D	2.5	13-3	Brn clayey fine to medium sand,			24	
		4.5	2-2	tr gravel, coarse sand (SC)			10	
						5	10	
	NR	5.0	17-13				19	
		7.0	11-10		F		25	
							38	
	3D	8.0	10-9	Brown gravelly fine to coarse			12	
		10.0	8-8	sand, sm silt (SM)		10	29	
	4D	10.0	8-10	Do 3D			20	
		12.0	6-9	(SM)			39	
							52	
						13.5	50	
						15	44	
	5D	15.0	13-24	Brn fine to medium sand, sm silt,	S			
		17.0	21-36	gravel, tr clay pkts, silty				
October 10, 1988				clay lyrs (SM)				
					V	18.5		
						20		
	6D	20.0	6-13	Top: Stiff gry-brn silty clay, sm		21		Top WC=28%
		22.0	20-25	silty fine sand lyrs (CL)				
				Bot: Brn fine to medium sand, sm				
				gravel, clay (SC)				
						25	MUD	WC=Water Content in percent of dry weight.
	7D	25.0	17-25	Gry-brn fine to medium sand, sm				
		27.0	25-31	gravel, silt (SM)			USED	
						30		Pungent odor 8D to 10D. Note oil in wash 8D to 10D and run 1C.
	8D	30.0	23-34	Do 7D	T			
		32.0	47-62	(SM)				
						35		
	9D	35.0	36-83	Do 7D				
1300		37.0	77-43	(SM)				
0630								
						38.5		
	10D	40.0	21-61	Gry & white clayey fine to coarse	D	40		
		41.5	100	sand, sm gravel (Decomposed rock)				
October 11, 1988				(SC)		43		
	1C	43.3	Rec=92%	Medium hard SlW gry gneiss, MdJtd				
		48.3	RQD=76%	to ClJtd, WJts		45		
					R			
	2C	48.3	Rec=100%	Hard gray gneiss, MdJtd,				
1100		50.3	RQD=100%	iron stained		50		End of boring @ 50.3'.
						50.3		

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 6 of 7

File No. 0780

Boring No. 7

ROCK CORE SKETCH

Project [illegible]

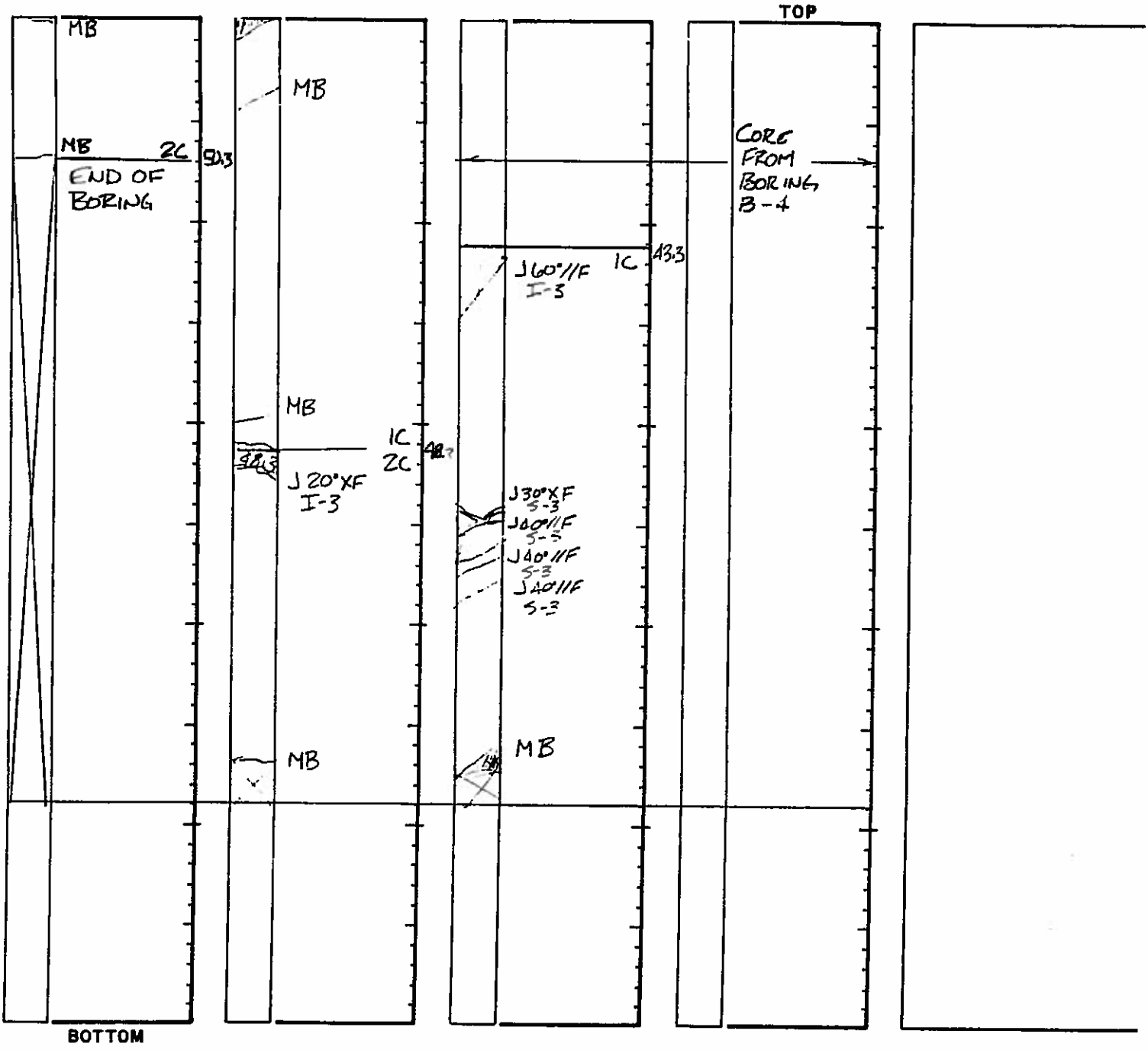
Location L.I.C. NY

Run No.	REC/RQD

Run No.	REC/RQD
2C	100/100

Run No.	REC/RQD
1C	92/7[illegible]

Run No.	REC/RQD



NOTES

Boring No. 7

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3
FILE NO. 6980
BORING NO. 8
SURFACE ELEV. 13.1

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0700 October 4, 1988	1D	0.5	100/5"	Lt brn m-f sand, sm gravel, tr silt, cement, coarse sand (SP)				4" concrete
		0.9					30	5" concrete
	2D	1.6	14-15	Top: Do 1D (SP)			33	slab @ 1.2' to
		3.3	13-100/2"	Bot: Gry-brn silt, sm f-c sand, gravel (MH)	F		89	1.6'.
						5	125	Boulder @ 3.3'
	3D	5.0	79-15	Gry-brn silty fine sand, tr clay	S		55	to 5'.
		7.0	29-38	lyrs, gravel, coarse sand (SM)			25	Pungent odor
						7.5	28	and oil in wash,
	4D	8.0	3-5	Stiff gry-brn clayey silt,	V		34	2D to 6D.
		10.0	7-7	tr fine sand, fine sand seams (MH)		10	35	
	5D	10.0	4-10	Top: Do 4D, tr f-m sand sms (MH)		11	53	Top WC=31%
		12.0	27-37	Bot: Gry-brn f-m sand, sm silt, tr coarse sand (SM)			99	
							55	Boulder @
							71	12' to 13'.
						15	70	
1200	6D	15.0	35-24	Gry-brn fine to medium sand, sm	T		27	
0630		17.0	51-59	silt, tr gravel (SM)			28	
							25	
							73	
						19.5	125/6"	
October 12, 1988	NR	20.0	50/0"					
	1C	20.7	Rec=90%	Medium hard gray gneiss, jointed,				
		25.7	RQD=70%	broken zones, weathered joints				
						25		*Run 2C: 1' of
	2C	25.7	Rec=100%*	Hard gray gneiss, moderately	R			core left in
		30.7	RQD=100%*	jointed				hole.
						30		End of boring
1230						30.7		@ 30.7'.
						35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

ROCK CORE SKETCH

Sheet 2 of 3
File No. 6980
Boring No. 8

Project QUEENS PLAZA

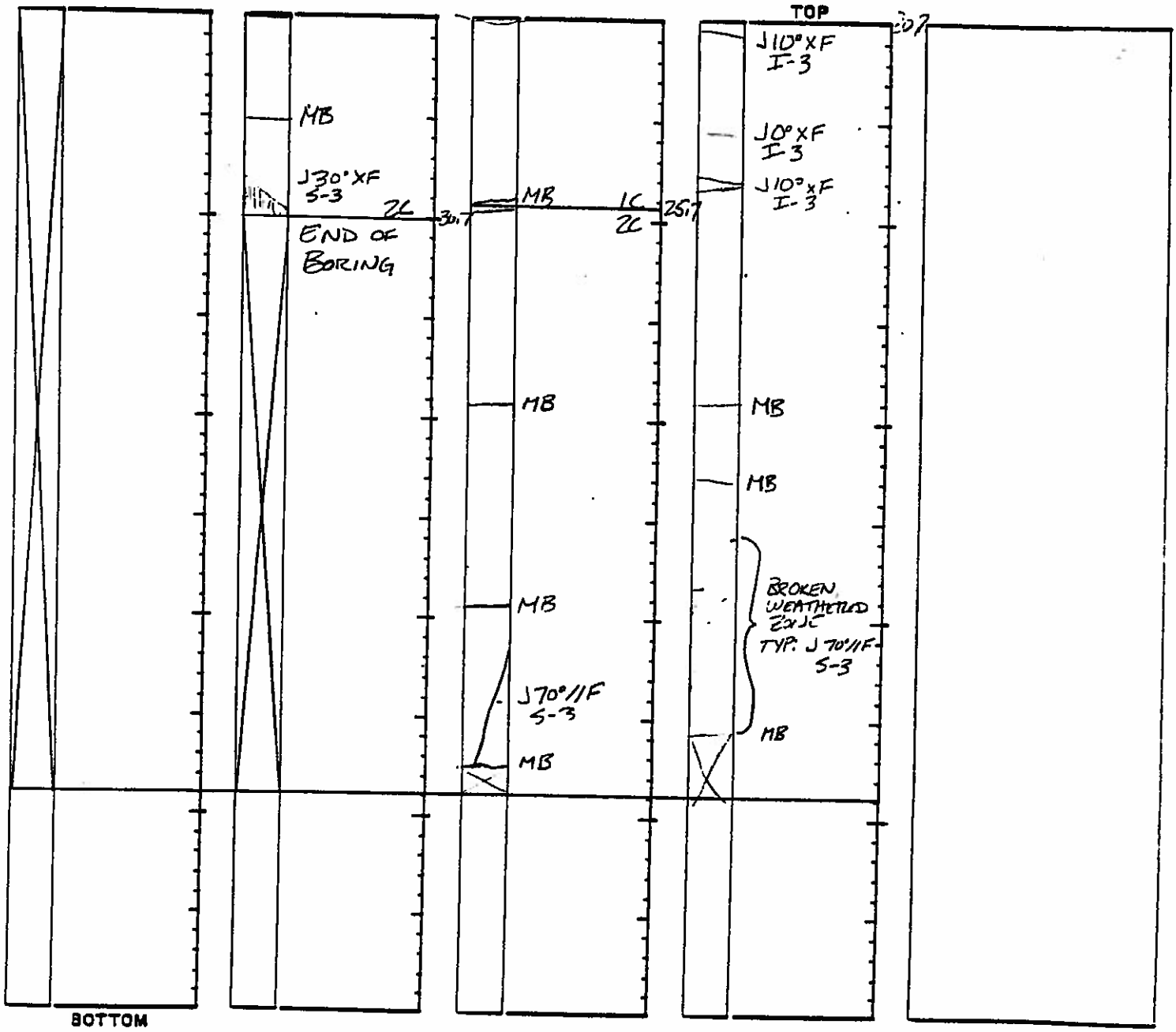
Location L.I.C., NY

Run No.	REC/RQD

Run No.	REC/RQD

Run No.	REC/RQD
2C	100/100

Run No.	REC/RQD
1C	90/70



NOTES RUN 2C: 1 FT OF CORE LEFT IN HOLE (MEASURED)

Boring No. 8

PROJECT QUEENS PLAZA BORING NO. 8
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 13.1 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4 , DEPTH FROM 0.0' TO 15.0'
DIAMETER, INCHES , DEPTH FROM TO
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300 , AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140 , AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-4-88	1400	13.0'	15.0'	8.0'	STABILIZED 7 DAYS

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 20.7 . NO. OF 2" SHELBY TUBE SAMPLES
DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 10.0 . OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER ARMANDO FELICIANO HELPERS CARLO TORADO
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-12-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

MUESER RUTLEDGE CONSULTING ENGINEERS

SHEET 1 OF 3
FILE NO. 6980
BORING NO. 9
SURFACE ELEV. 10.5

PROJECT QUEENS PLAZA
PROJECT LOCATION LONG ISLAND CITY, NEW YORK
RES. ENGR. J. GALLIONE

DAILY PROGRESS	SAMPLE NO.	SAMPLE DEPTH	SAMPLE BLOWS/6"	SAMPLE DESCRIPTION	STRATA	DEPTH	CASING BLOWS	REMARKS
0700	NR	1.0	57-32					6" concrete
		3.0	17-7					Drill ahead of casing 0' to 5'.
	1D	3.0	5-15	Brown fine to coarse sand, sm gravel, silt (SM)	F	5	10	
		5.0	8-5				9	
	2D	5.0	5-2	Brown gravelly fine to coarse sand, sm silt, tr brick. (SM)		7	17	
		7.0	2-2				32	
	3D	7.0	2-3	Gry-brn clayey fine to medium sand, tr clay pkts (SC)	S	10	46	
		9.0	10-15					
	4D	10.0	27-12	Mottled brn & gry clayey fine to medium sand, sm clay lyrs, tr fine sand lyrs (SC)		13.5		Advance 4" casin to 12'. Drill 3" casing to 24.5'.
		12.0	18-15			15		
October 11, 1988	5D	15.0	20-35	Brown gravelly fine to medium sand, sm clay (SC)	T	20		
		16.3	100/3"					
	6D	20.0	6-13	Brown gravel, sm coarse to fine sand, tr silt (GP-GM)		24.5		
		22.0	30-29					
	1C	25.0	Rec=96%	Hard gray gneiss, Moderately jointed, iron stained joints	R	30		End of boring @ 30.0'.
1230		30.0	RQD=97%			35		
						40		
						45		
						50		

MUESER RUTLEDGE CONSULTING ENGINEERS

Sheet 2 of 3

File No. 6980

Boring No. 9

ROCK CORE SKETCH

Project QUEBEC PLAZA

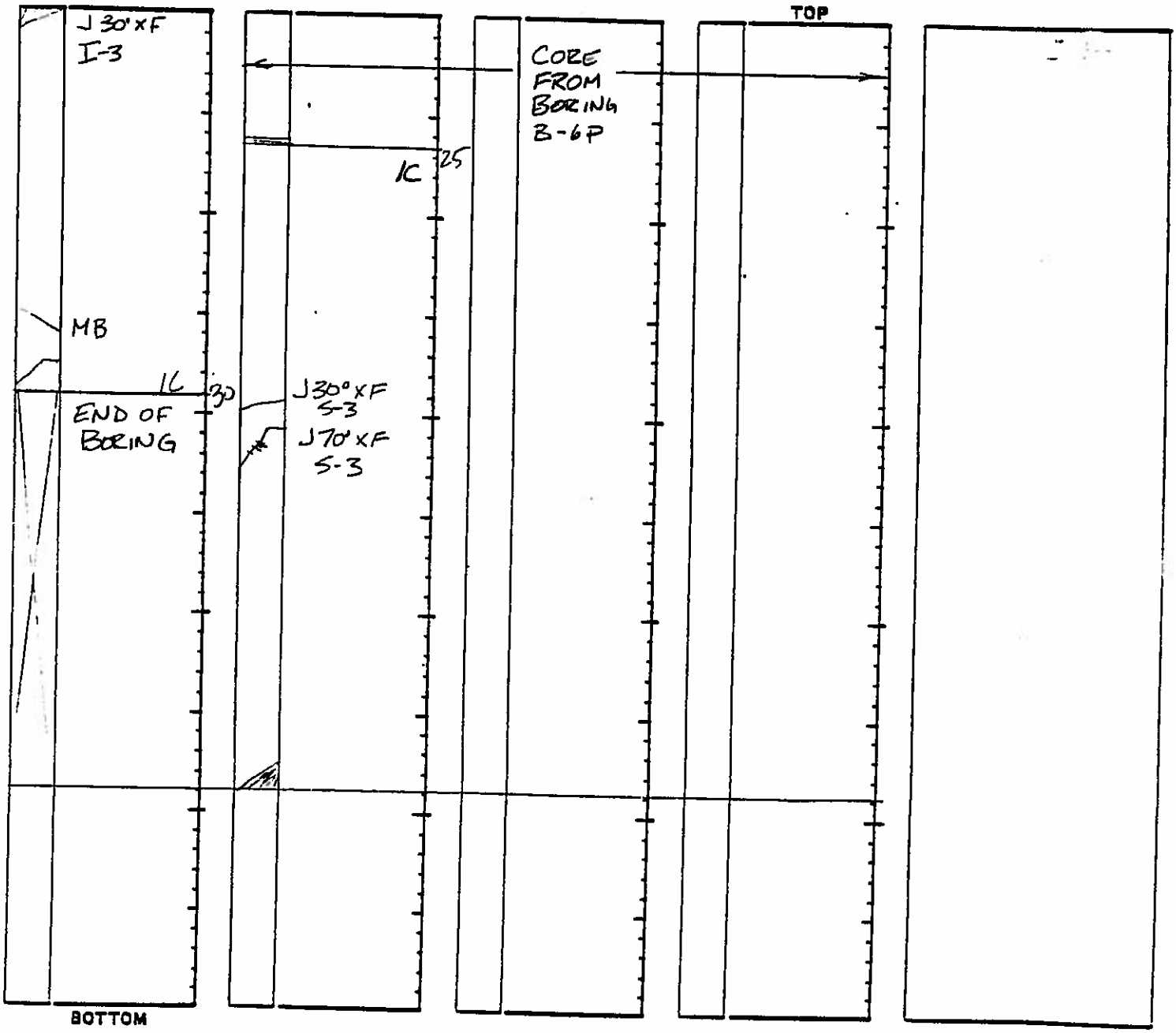
Location L.I.C.

Run No.	REC/RQD

Run No.	REC/RQD
1C	96/92

Run No.	REC/RQD

Run No.	REC/RQD



NOTES

Boring No. 9

MUESER RUTLEDGE CONSULTING ENGINEERS

PROJECT QUEENS PLAZA BORING NO. 9
LOCATION LONG ISLAND CITY, NEW YORK
BORING LOCATION SEE BORING LOCATION PLAN
SURFACE ELEVATION 10.5 DATUM BOROUGH OF QUEENS

BORING EQUIPMENT AND METHODS OF STABILIZING BOREHOLE

TYPE OF BORING RIG: ☒ TRUCK, ☐ SKID, ☐ TRIPOD, ☐ OTHER
TYPE OF FEED DURING CORING: ☐ MECHANICAL, ☒ HYDRAULIC ☐ OTHER
☒ CASING UTILIZED: DIAMETER, INCHES 4, DEPTH FROM 0.0' TO 12.0'
DIAMETER, INCHES 3, DEPTH FROM 0.0' TO 24.5'
☐ DRILLING MUD UTILIZED: DIAMETER OF ROTARY BIT, INCHES
TYPE OF DRILLING MUD
☐ AUGER UTILIZED: TYPE AND DIAMETER, INCHES
TYPE AND SIZE OF:
DRILL RODS N . D-SAMPLER 2" O.D. SPLIT SPOON
S-SAMPLER . U-SAMPLER
CORE BARREL CHRISTENSEN . CORE BIT NX DIAMOND
CASING HAMMER: WEIGHT, POUNDS 300, AVERAGE FALL, INCHES 24
SAMPLER HAMMER: WEIGHT, POUNDS 140, AVERAGE FALL, INCHES 30

WATER LEVEL OBSERVATIONS IN BOREHOLE

DATE	TIME	DEPTH OF HOLE	DEPTH OF CASING	DEPTH TO WATER	CONDITIONS OF OBSERVATION*
10-11-88	1230	30.0'	24.5'	4.0'	AT COMPLETION OF BORING

*Note reliability of observation, rainfall, elevation of nearby open water, tide gauge or other factors affecting water level recorded.

☐ PIEZOMETER INSTALLED. SKETCH SHOWN ON
STANDPIPE: TYPE , ID , LENGTH , TOP ELEV.
INTAKE POINT: TYPE , OD , LENGTH , TIP ELEV.
FILTER: MATERIAL , OD , LENGTH , BOT. ELEV.

PAY QUANTITIES

2½" DIA. DRY SAMPLE BORING, LIN. FT. 25.0. NO. OF 2" SHELBY TUBE SAMPLES
___ DIA. U-SAMPLE BORING, LIN. FT. . NO. OF 3" UNDISTURBED SAMPLES
CORE DRILLING IN ROCK, LIN. FT. 5.0. OTHER

BORING CONTRACTOR JERSEY BORING & DRILLING CO., INC.
DRILLER JIM VELYKIS HELPERS BOB HARRISON
REMARKS BORING HOLE GROUTED WITH VOLCLAY GROUT AFTER COMPLETION OF DRILLING.
RESIDENT ENGINEER JOY GALLIONE DATE 10-11-88

NOTES:

1. Make a separate log of each boring and each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelby tube samples S, fixed piston samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sampler per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata description.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock core in feet and inches and per cent of run, Rock Quality Designation (RQD) in per cent and any unusual occurrences.
8. Include sample description by Unified Soil Classification System.
9. Obtain water level at the beginning of each day and at all other times when stable water conditions exist.

APPENDIX L

LNAPL Test Results

Torkelson Geochemistry, Inc.

2528 S. Columbia Place
Tulsa, OK 74114-3233
Phone: 918-749-8441
Fax: 918-749-6005
e-mail: BTorkelson@torkelsongeochemistry.com

CHAIN-OF-CUSTODY RECORD

Project: Queens Plaza
Location: 28-10 Jackson Avenue
Long Island City, NY 11101

Proj. No.: 2409.0001Y000
P.O.:
Sampled By: J.Wills

Report/Bill To: Roux Associates
Address: 209 Shafter Street
Islandia, NY 11749

Phone: 631-232-2600
Fax: 631-232-9898
e-mail: jwills@rouxinc.com

Additional Instructions

Attn: Josh Levine

Complete Analyses at ambient ground temperature of 55° F

Requested Turn-Around Time: 7 Days

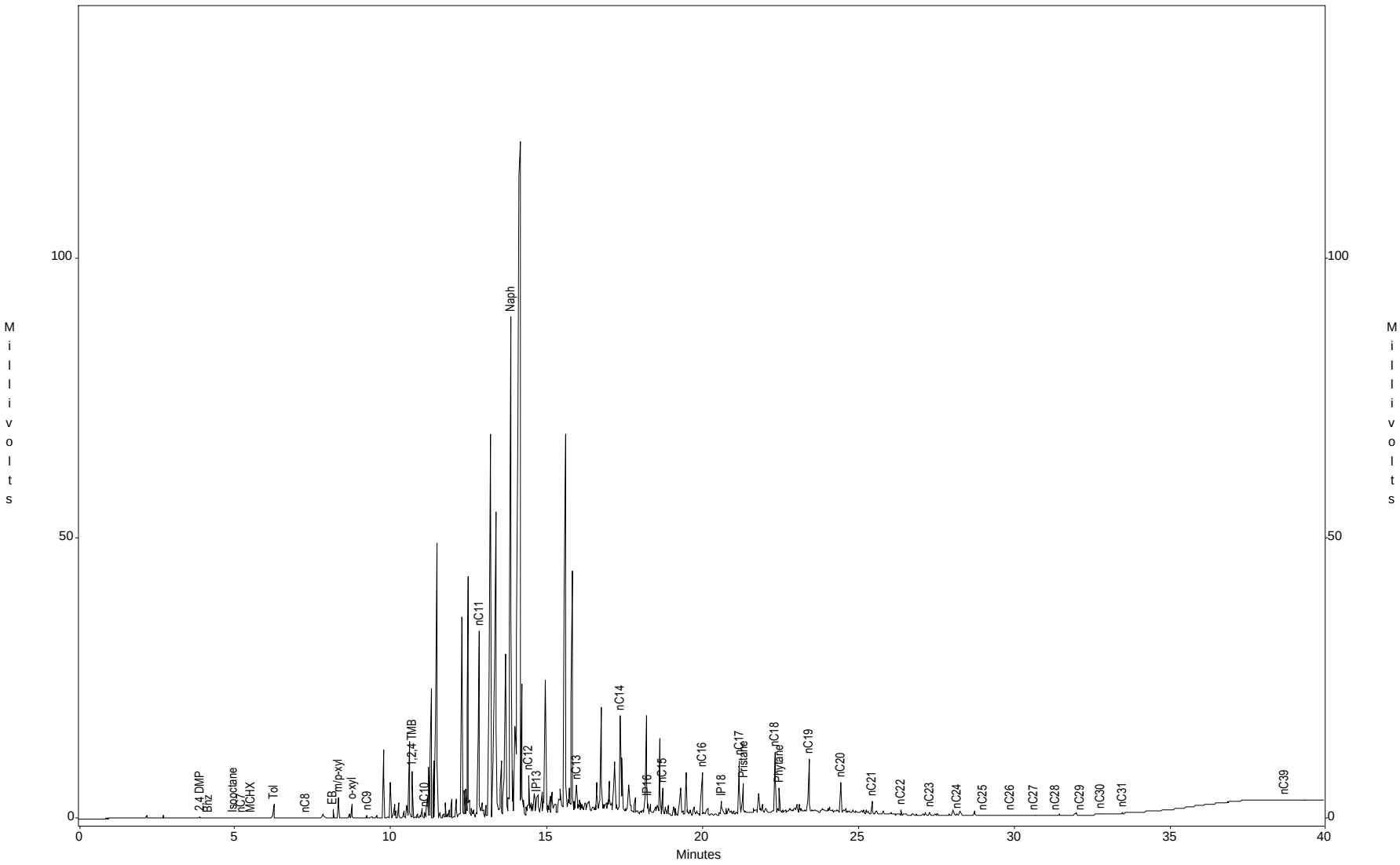
ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES					ANALYSES REQUESTED											REMARKS
						None	Ice				GC Characterization	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac. Tens.	Lead	Sulfur				
1	SCS-MW-10-1	10/1/2014	OIL/Water		5	3	2				x	x	x		x	x						
2	SCS-MW-2C	10/1/2014	OIL/Water		5	3	2				x	x	x		x	x						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
	10/2/14	1630		10-3-14	1220

Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : SCS-MW-2C
Acquired : Oct 07, 2014 09:57:54

c:\ezchrom\chrom\14160\mw-2c -- Channel A



Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : SCS-MW-10-1
Acquired : Oct 07, 2014 09:04:32

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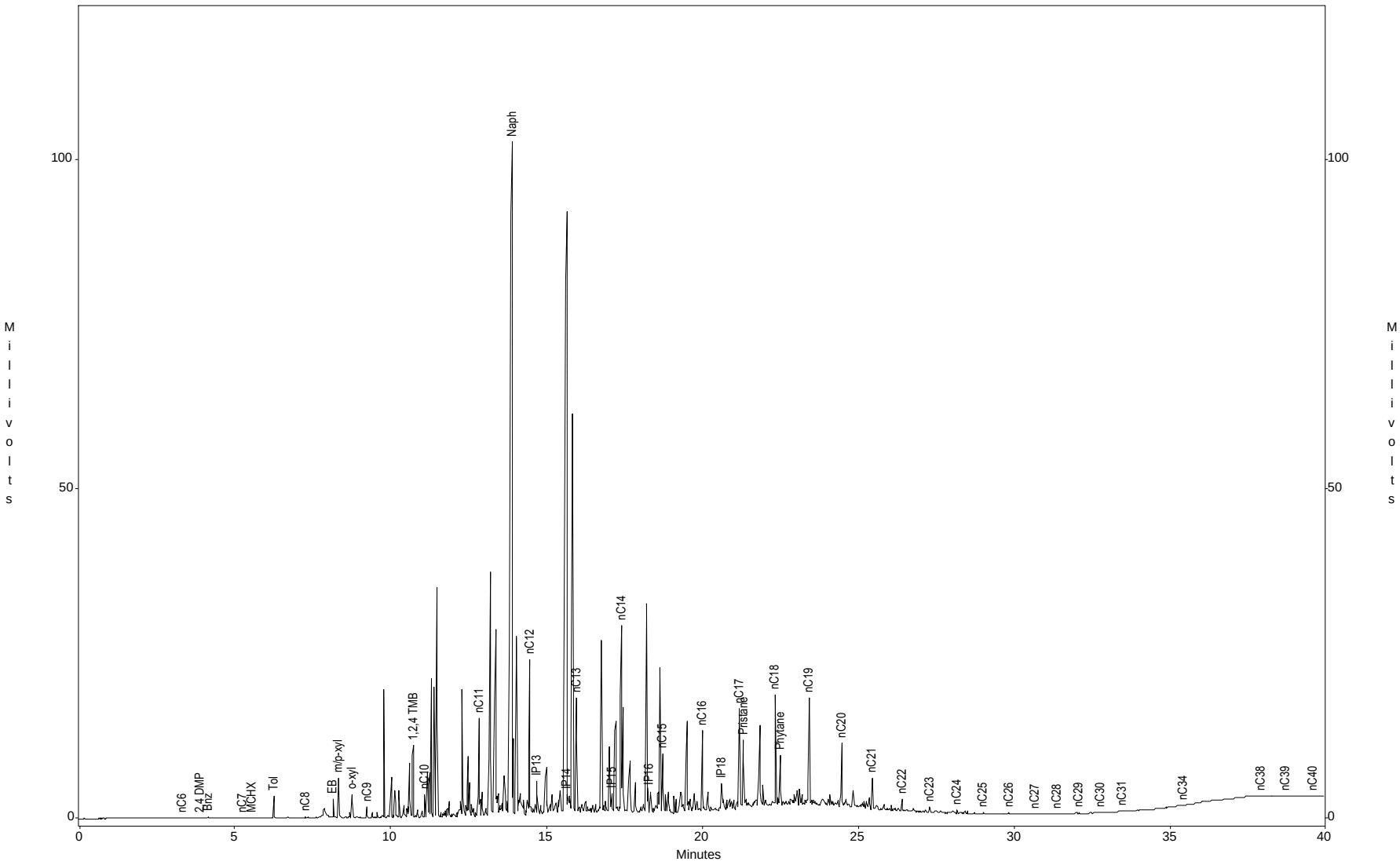

Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : Gas/Dies/Wax std
Acquired : Oct 07, 2014 12:05:53

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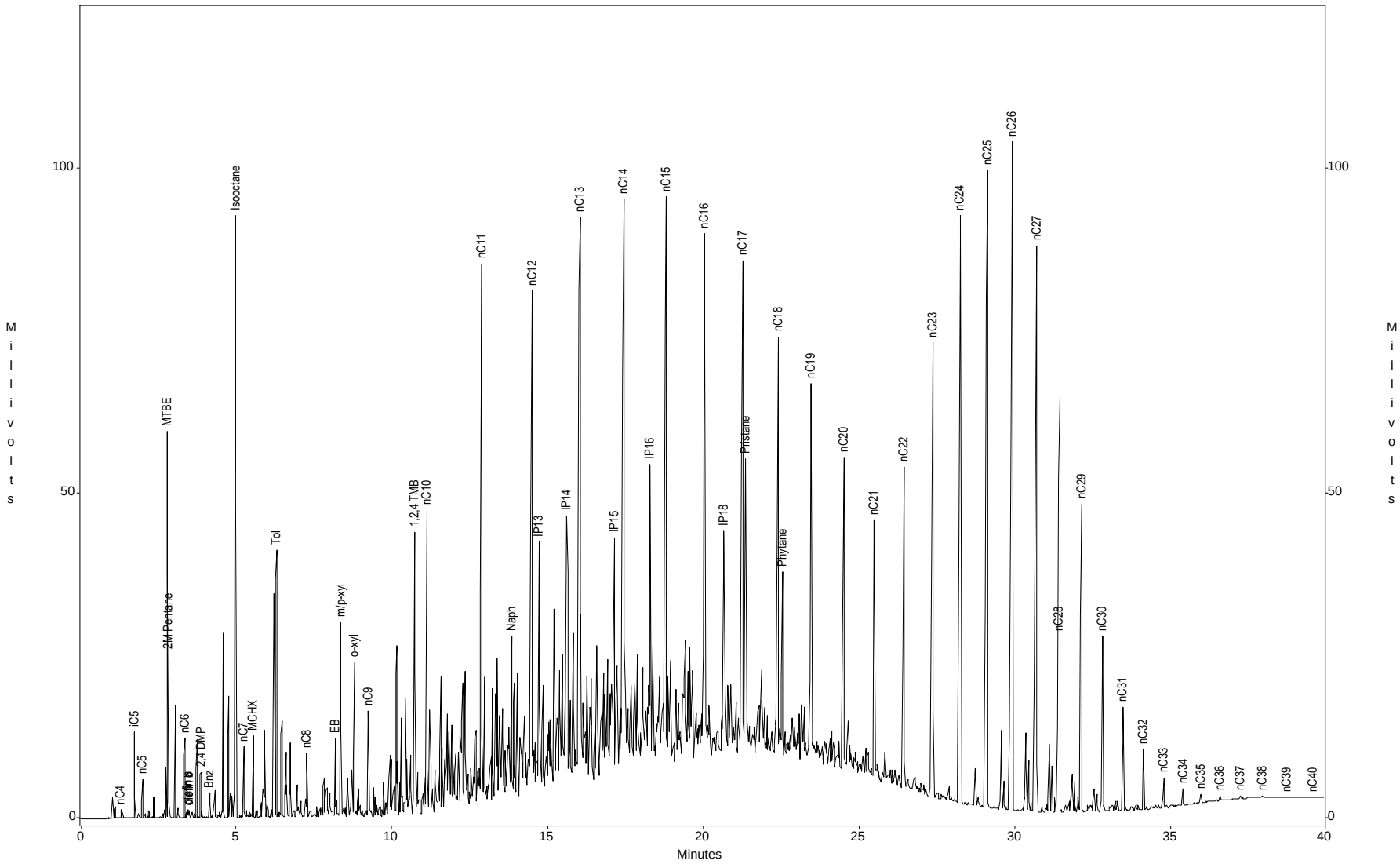

Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : SCS-MW-2C
Acquired : Oct 07, 2014 09:57:54

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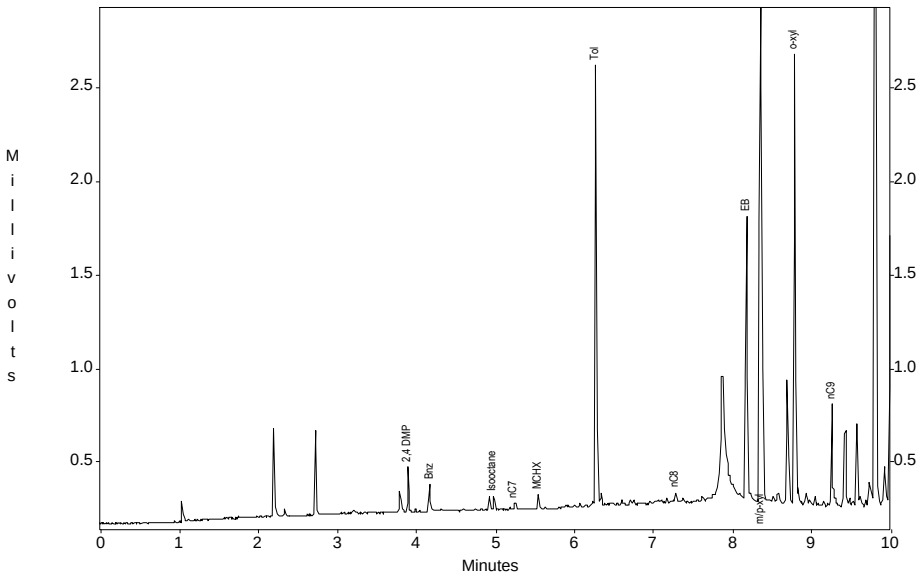

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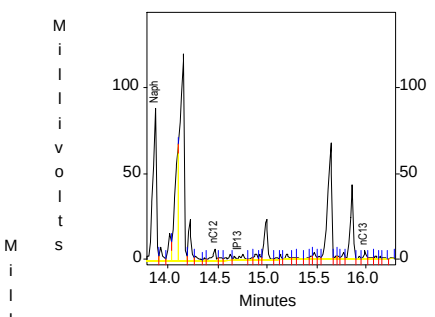

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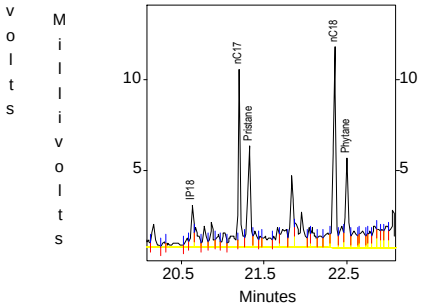

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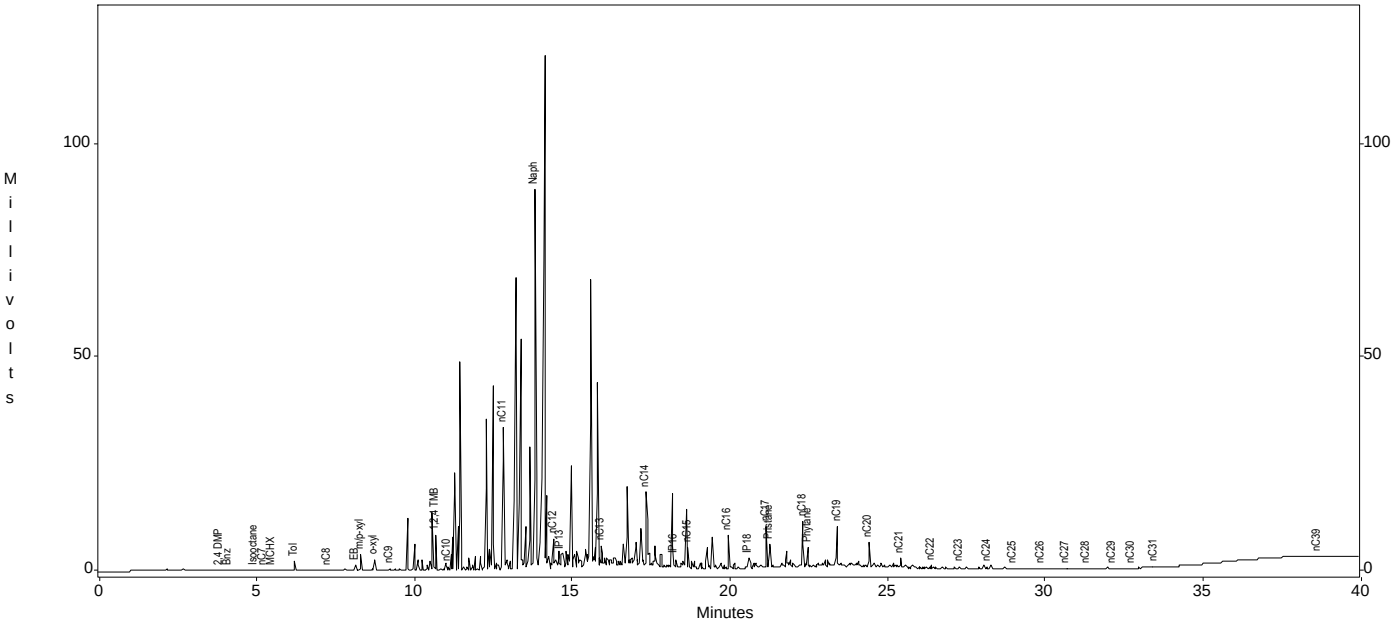


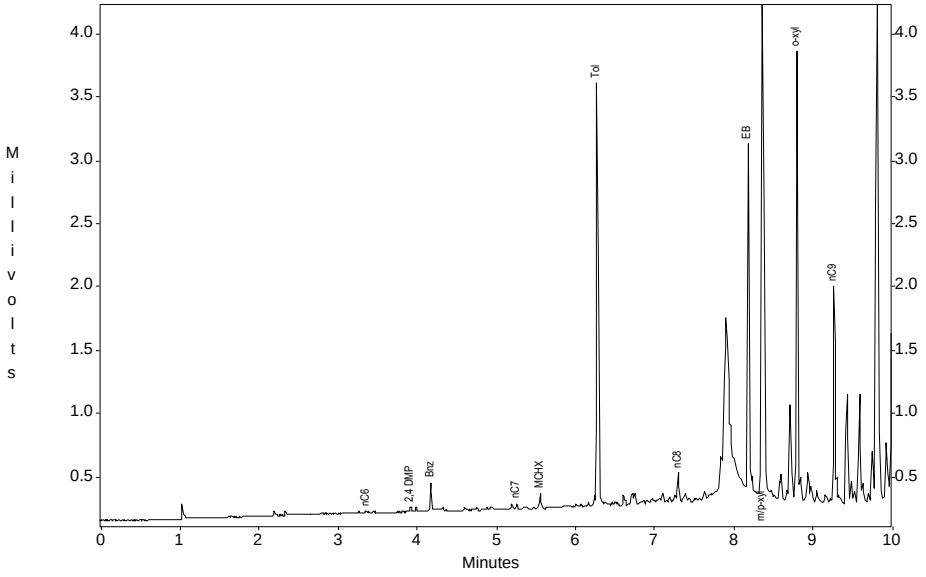
Channel A Results

Peak	Area	Height
nC4	0	0
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	0	0
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	272	235
Bnz	177	142
Isooctane	81	69
nC7	30	29
MCHX	94	77
Tol	2943	2350
nC8	88	58
EB	2099	1516
m/p-xyl	6546	3733
o-xyl	3087	2400
nC9	892	545
1,2,4 TMB	12042	8032
nC10	1442	1054
nC11	68536	33243
Naph	207983	88875
nC12	16064	6913
IP13	15442	2943
IP14	0	0
nC13	7737	4565
IP15	0	0
nC14	25123	15190
IP16	3652	2153
nC15	8393	4737
nC16	12576	7651
IP18	5130	2323
nC17	16868	9823
Pristane	12336	5620
nC18	20664	11139
Phytane	11003	4960
nC19	27004	9952
nC20	11777	6001
nC21	5396	2591
nC22	2155	1066
nC23	1141	520
nC24	777	320
nC25	313	168
nC26	124	48
nC27	449	169
nC28	72	35
nC29	79	49
nC30	46	24
nC31	169	69
nC32	0	0
nC33	0	0
nC34	0	0
nC35	0	0
nC36	0	0
nC37	0	0
nC38	0	0
nC39	134	18
nC40	0	0

Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : SCS-MW-10-1
Acquired : Oct 07, 2014 09:04:32

c:\ezchrom\chrom\14160\mw-10-1 -- Channel A



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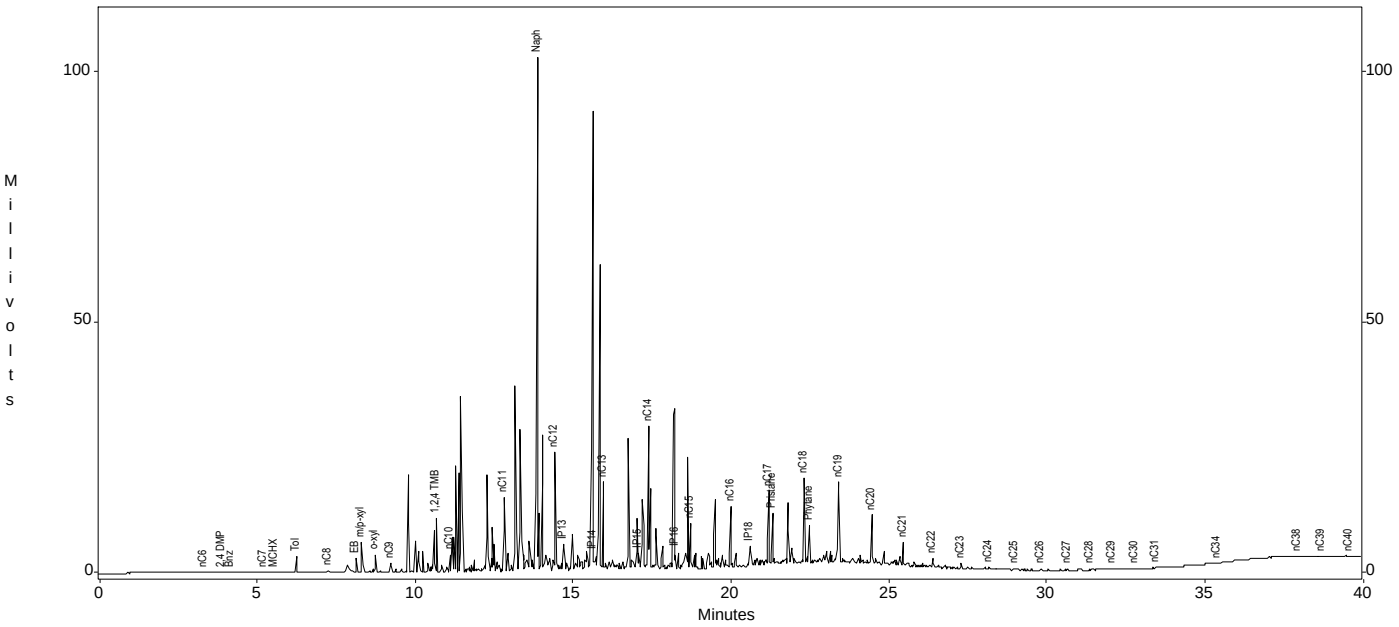
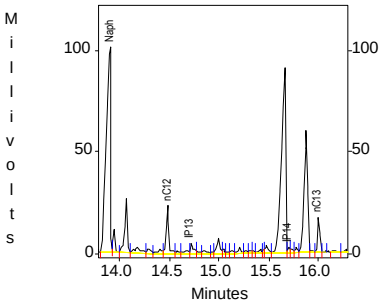


c:\ezchrom\chrom\14160\mw-10-1 -- Channel A



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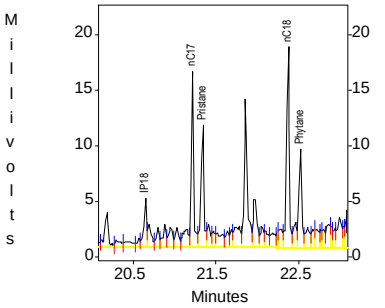


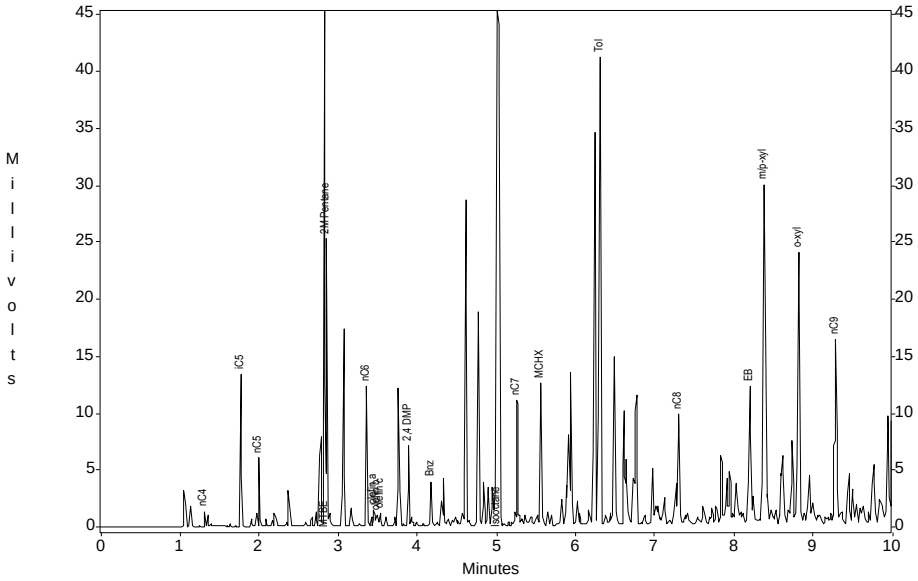
Channel A Results

Peak	Area	Height
nC4	0	0
iC5	0	0
nC5	0	0
MTBE	0	0
2M Pentane	0	0
nC6	12	11
olefin a	0	0
olefin b	0	0
olefin c	0	0
2,4 DMP	40	36
Bnz	272	218
Isooctane	0	0
nC7	50	45
MCHX	151	111
Tol	4095	3332
nC8	307	232
EB	3924	2827
m/p-xyl	10473	5886
o-xyl	4720	3559
nC9	2643	1713
1,2,4 TMB	16746	10900
nC10	4243	3381
nC11	27115	14835
Naph	279302	101887
nC12	37480	23494
IP13	10307	4998
IP14	4275	2629
nC13	26893	17294
IP15	5435	3015
nC14	59791	28537
IP16	1976	3297
nC15	16164	8874
nC16	23356	12543
IP18	10099	4329
nC17	30072	15747
Pristane	24011	10943
nC18	37152	17948
Phytane	20571	8764
nC19	50025	17409
nC20	20422	10695
nC21	11029	5370
nC22	4467	2212
nC23	1922	1034
nC24	759	505
nC25	647	361
nC26	510	232
nC27	328	170
nC28	203	107
nC29	87	58
nC30	98	52
nC31	202	79
nC32	0	0
nC33	0	0
nC34	117	31
nC35	0	0
nC36	0	0
nC37	0	0
nC38	67	24
nC39	49	16
nC40	36	27

Torkelson Geochemistry, Inc.

Queens Plaza, 28-10 Jackson Avenue, Long Island City, NY
Sample ID : Gas/Dies/Wax std
Acquired : Oct 07, 2014 12:05:53

c:\ezchrom\chrom\14160\gadiwax2.2 -- Channel A



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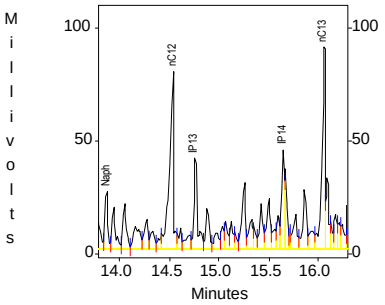

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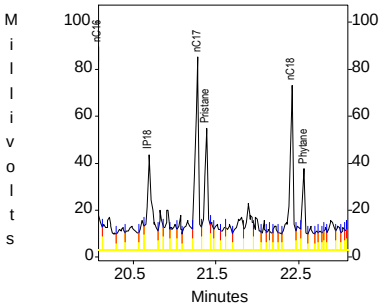

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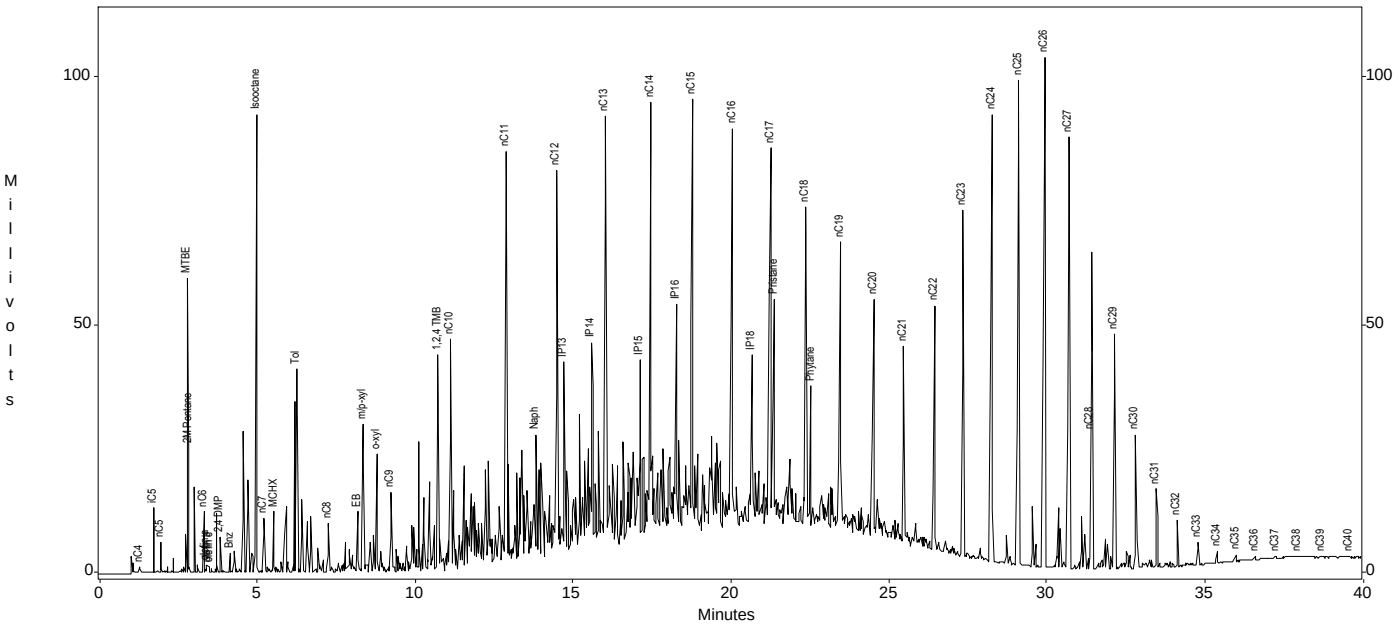

Channel A Results

Peak	Area	Height
nC4	860	1316
iC5	9053	13325
nC5	4449	5999
MTBE	54318	59379
2M Pentane	22568	25165
nC6	12071	12241
olefin a	1309	1370
olefin b	1170	997
olefin c	1536	1101
2,4 DMP	7340	6979
Bnz	4560	3835
Isooctane	131861	92493
nC7	13187	10912
MCHX	15688	12487
Tol	59556	41040
nC8	11936	9612
EB	16362	11824
m/p-xyl	56291	29508
o-xyl	34895	23831
nC9	23532	16005
1,2,4 TMB	73173	43309
nC10	73154	46456
nC11	168243	82459
Naph	41559	25226
nC12	225282	78300
IP13	87045	39669
IP14	83615	43534
nC13	220154	89522
IP15	106941	40143
nC14	353789	92249
IP16	144022	51508
nC15	268340	92699
nC16	271037	87047
IP18	177347	41356
nC17	226491	82854
Pristane	160445	52283
nC18	222398	71045
Phytane	94543	34996
nC19	160959	63980
nC20	148166	52533
nC21	107920	42991
nC22	115625	51094
nC23	181378	70227
nC24	283415	90328
nC25	353271	98048
nC26	377980	102843
nC27	299123	86946
nC28	27166	27008
nC29	107448	47225
nC30	49034	26028
nC31	28572	15941
nC32	15047	9229
nC33	8090	4629
nC34	4485	2500
nC35	2295	1369
nC36	1255	723
nC37	887	370
nC38	505	202
nC39	418	125
nC40	202	72

Torkelson Geochemistry, Inc.							
Physical Properties Measurements							
Sample	TGI Job Number	Density of NAPL (gm/ml)	Viscosity of NAPL (centipoise)	Surface Tension Air/Water (dynes/cm)	Interfacial Tension NAPL/Water (dynes/cm)	Surface Tension Air/NAPL (dynes/cm)	Temperature of Measurements
SCS-MW-2C	14160	0.9167	10.7	39.2	7.4	29.5	55F
SCS-MW-10-1	14160	0.9343	8.4	45.2	7.3	30.8	55F

APPENDIX C

Significant Threat Determination

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Environmental Site Remediation Database Search Details

Site Record

Administrative Information

Site Name: Queens Plaza Residential Development - SiteB
Site Code: C241151
Program: Brownfield Cleanup Program
Classification: A
EPA ID Number:

Location

DEC Region: 2
Address: 28-10 Jackson Avenue
City: Long Island City Zip: 11101
County:QUEENS
Latitude: 40.747611111
Longitude: -73.938194444
Site Type: STRUCTURE
Estimated Size: 1.89 Acres

Site Owner(s) and Operator(s)

Site Document Repository

Name: Queens Borough Public Library - Court Square Branch
Address: 25-01 Jackson Avenue
Long Island City,NY 11101

Site Description

Location: The Queens Plaza Residential Development - Site B site is located in an urban area at 28-10 Jackson Avenue in Long Island City. This site is a portion of the NYSDEC Voluntary Cleanup Program (#V00081) site known as the Outlet City. This site encompasses a trapezoidal-shaped parcel bounded on the north by the Queens Plaza Residential Development BCP site (C241105) and Jackson Avenue; to the west by Orchard Street; to the south by the Long Island Railroad (LIRR) Sunnyside Yard property and to the east by Queens Boulevard. Site Features: Site B consists of 9 buildings including a 2-story brick building (Bldg. No. 3), a 3-story brick building (Bldg. No. 4), a 2-story brick building (Bldg. No.6), a 1-story brick building (Bldg. No.6A), a 2-story brick building (Bldg. No. 2A), a 1-story brick building (Bldg. No. 10), a 5 story brick building (Bldg. No. 1), a 2-story concrete building (Bldg. No. 9), a 1-story brick building (Bldg. No. 2B and 2C), two narrow unpaved areas along the LIRR Sunnyside Yard known as Area F and Area G and two asphalt covered vacant lots (Area A and Area B). Current Zoning and Land Use: The site is currently unoccupied and is zoned M1-6/R10 (Manufacturing and Residential) under the special Long Island City Mixed Use District; the surrounding area is a longstanding mix of residential, commercial, industrial and cultural uses at varying densities. Past Use of the site: Bulk quantities of pine oil, mineral oil, hydrochloric acid, cresylic acid, tar acid, caustic potash, terpene solvent, Shell E-407 solvent, ortho nitro toluene, kerosene and creosote were stored and used on-site at the West Chemical Company from the early 1900s to their closure in 1977. The company manufactured commercial and household products such as disinfectants, insecticides, soaps, floor wax and Kotex dispensing machines. In 1977, the site was transferred to the Modell Company and used for commercial purposes under the company name Outlet City. Multiple previous environmental investigations were conducted on-site since the mid-1980's leading up to the property owner at the time, Outlet City, signing Voluntary Clean-up Agreements with the Department on February 10, 1997 and again on April 18, 2001. Site Geology/Hydrogeology: Site B is located on gently sloping land with the high point along Jackson Avenue sloping down approximately 7 feet to the border with the LIRR property to the south. Surface soils consist of a fill layer approximately 5 - 9 feet in thickness. This fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varved silt

and clay are present within this sand unit in some locations on site. The sand layer varies in thickness from approximately less than 5 to 7 feet. Additionally, a till layer is present over portions of the site beginning from approximately 12 feet below grade (fbg) and extending to the top of bedrock at elevations of approximately 37fbg at the deepest point. Bedrock varies from approximately 9fbg to 37fbg. Based on soil boring data from previous investigations, bedrock is gneiss. Groundwater occurs within the unconsolidated geologic materials covering the Site. The groundwater table ranges from approximately 3 to 12 fbg over the Site. Groundwater from the site flows south-southwest toward Newtown Creek and the East River.

Summary of Project Completion Dates

Projects associated with this site are listed in the Project Completion Dates table and are grouped by Operable Unit (OU). A site can be divided into a number of operable units depending on the complexity of the site and the number of issues associated with a site. Sites are often divided into operable units based on the media to be addressed (such as groundwater or contaminated soil), geographic area, or other factors.

Contaminants of Concern (Including Materials Disposed)

Type of Waste	Quantity of Waste
1,2-DICHLOROETHANE	UNKNOWN
BENZENE	UNKNOWN
NAPHTHALENE	UNKNOWN
PHENOL, 2,4-DIMETHYL-	UNKNOWN
ARSENIC	UNKNOWN
DIELDRIN	UNKNOWN
CREOSOTE	UNKNOWN
MERCURY	UNKNOWN
VINYL CHLORIDE	UNKNOWN

Site Environmental Assessment

Nature and Extent of Contamination: Primarily, the site is contaminated from creosote and petroleum releases

although pesticide and metals contamination is also present. Soil, soil vapor and groundwater are affected. Creosote (both LNAPL and DNAPL) and petroleum LNAPL are present; currently LNAPL on-site ranges from 0 - 2ft in thickness. There are 45 subsurface vaults containing various chemicals used when the site was operating as a chemical manufacturing plant (West Chemical). The vaults are located in Building 3A and 3B where the on-site laboratory was located and in Building 2B and 2C where the chemical cooking took place. Groundwater: Total on-site VOCs (Volatile Organic Compounds), including both chlorinated hydrocarbons and petroleum constituents, are present in groundwater from non-detect to over 25,000 parts per billion (ppb). Compounds detected exceeding Class GA groundwater standards include Acetone (up to 4,700ppb), Benzene (up to 1,100 ppb), Toluene (up to 1,900 ppb), Ethylbenzene (up to 350 ppb), Xylene (up to 1,440 ppb), Methylene Chloride (8,400 ppb), 1,1,1-Trichloroethane (up to 690 ppb), 1,1-Dichloroethane (up to 3,100 ppb), 1,2-Dichloroethane (up to 9,800 ppb), Trichloroethene (up to 38 ppb) and Vinyl Chloride (up to 98 ppb). Total on-site SVOCs (Semi-Volatile Organic Compounds) are present in groundwater from non-detect to over 50,000 ppb. Compounds detected exceeding Class GA groundwater standards include Naphthalene (up to 7,600 ppb), 2-methylnaphthalene (up to 3,600 ppb), phenol (up to 990 ppb), 2-Methylphenol (up to 2,900 ppb), 4-Methylphenol (up to 9,100 ppb), 2,4-Dimethylphenol (up to 18,000 ppb). Only 2 groundwater samples were analyzed for metals and they met Class GA groundwater standards. No groundwater samples were analyzed for pesticides or PCBs. Groundwater will be sampled for metals, PCB and pesticides during the upcoming remedial investigation. Based on an initial off-site investigation, completed in 2013, contamination (both VOCs and SVOCs) has migrated off-site to the west across Orchard Street and north across Jackson Avenue. Soil: Total VOCs in soil range from non-detect to 365 parts per million (ppm). Compounds detected over Part 375 Restricted Residential Soil Clean-up Objectives (SCO's) include Benzene, Toluene, Ethylbenzene and Xylenes. Total SVOCs in soil range from non-detect to 22,000 ppm. Compounds detected over Part 375 Restricted Residential SCO's include Naphthalene, Benzo(a)pyrene, Benzo(a)anthracene, Acenaphthene, Dibenzofuran, Flourene. 2-Methylnaphthalene was detected up to 6,500 ppm although the compound is not included in Part 375 SCOs. 2-Methylnaphthalene has a CP-51 Residential SCO of 0.41ppm. 2,4-Dimethylphenol and Diphenyl were also detected in significant concentrations but no SCOs are included in Part 375 or CP-51. The metals Arsenic, Barium, Cadmium, Lead and Mercury were detected above Restricted Residential SCOs. The pesticides Alpha-BHC and Dieldrin were detected above Restricted Residential SCOs. PCB contamination in soil has not been evaluated but PCB will be analyzed for in the upcoming remedial

investigation. Soil Vapor: Sub-slab concentrations include Benzene up to 35,000 micrograms per cubic meter (ug/m3), cis-1,2-Dichloroethene up to 2,400 ug/m3, Trichloroethene up to 2,400 ug/m3, and Vinyl Chloride up to 20,000 ug/m3. The site represents a significant threat to the environment due to the ongoing release of contaminants from source material in the soil and groundwater including creosote and petroleum product.

Site Health Assessment

Persons who dig below the ground surface will come into contact with contamination in subsurface soils. Access to the site is restricted. However, contact with contaminated groundwater is likely if people dig below the surface. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because the site is vacant, the inhalation of site-related contaminants due to soil vapor intrusion does not represent a current concern. An evaluation of the potential for soil vapor intrusion to occur will be completed as the site use changes. In addition, soil vapor intrusion may be a concern for off-site buildings.

For more Information: E-mail Us

Refine Current Search

APPENDIX D

Sanborn Maps

Queens Plaza Residential Development Site B
28-10 Jackson Avenue
Long Island City, NY 11101

Inquiry Number: 3887794.1
March 21, 2014

Certified Sanborn® Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

3/21/14

Site Name:
Queens Plaza Residential
28-10 Jackson Avenue
Long Island City, NY 11101

Client Name:
Fleming-Lee Shue, Inc.
158 West 29th St
New York, NY 10001

EDR Inquiry # 3887794.1

Contact: Steve Panther

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Fleming-Lee Shue, Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Queens Plaza Residential Development Site B
Address: 28-10 Jackson Avenue
City, State, Zip: Long Island City, NY 11101
Cross Street:
P.O. # 10112-004-1
Project: Queens Plaza Residential Dvpmt
Certification # 6DE4-4141-888C

Maps Provided:

2006	1999	1991	1980	1936
2005	1996	1990	1979	1915
2004	1995	1989	1977	1898
2003	1994	1988	1970	
2002	1993	1986	1950	
2001	1992	1985	1947	

Sanborn® Library search results
Certification # 6DE4-4141-888C

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

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Sanborn Sheet Thumbnails

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

2006 Source Sheets

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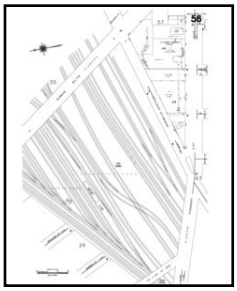

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2005 Source Sheets

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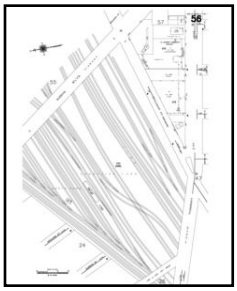

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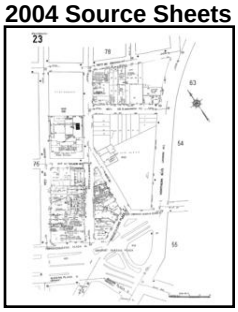

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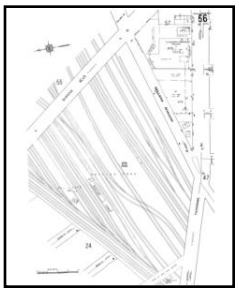

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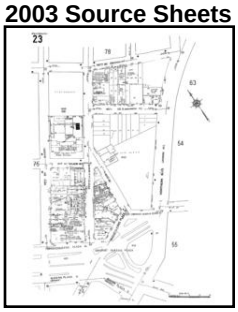

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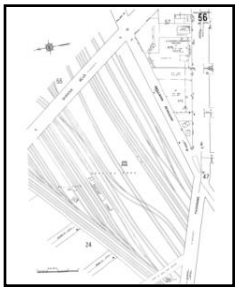

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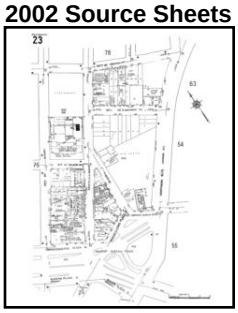

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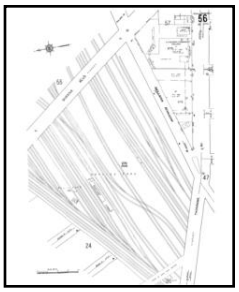

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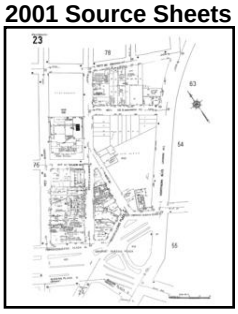

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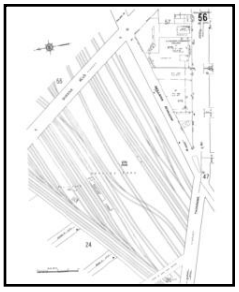

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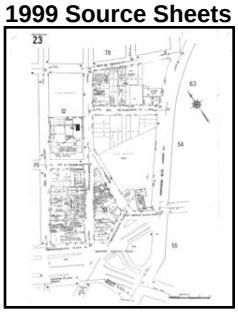

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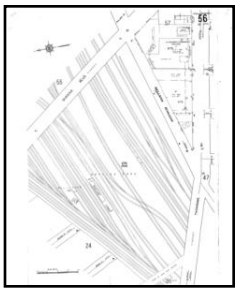

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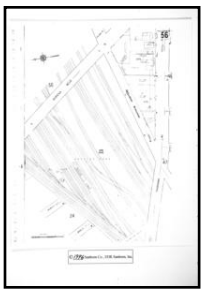

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1995 Source Sheets

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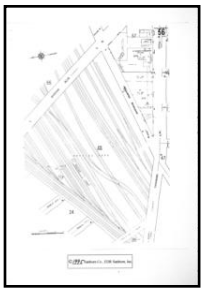

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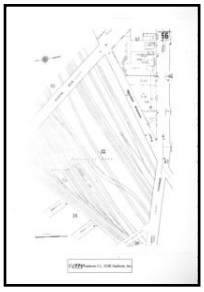

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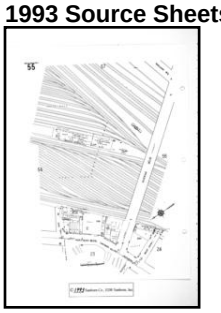

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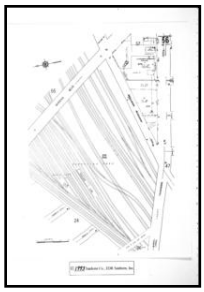

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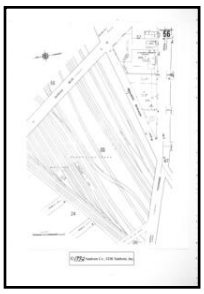

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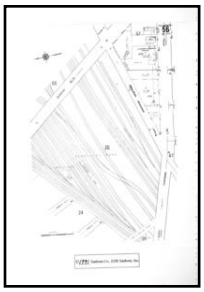

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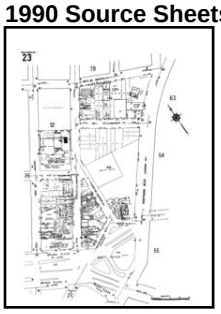

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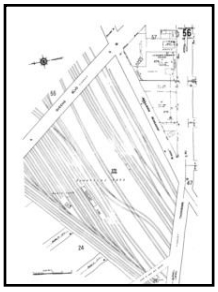

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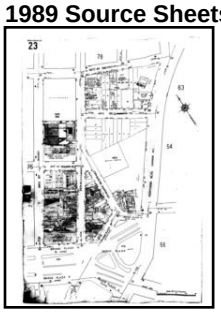

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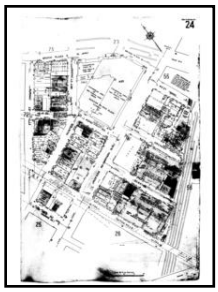

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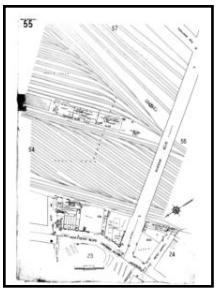

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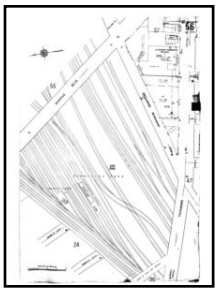

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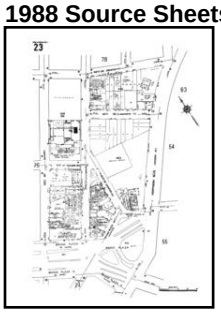

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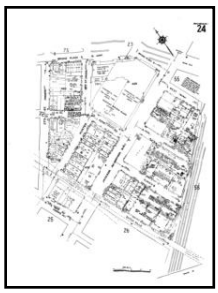

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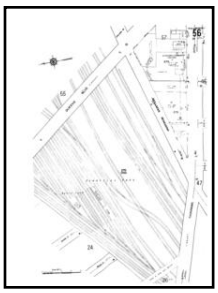

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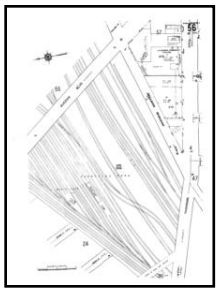

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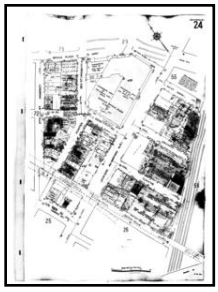

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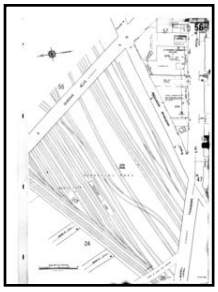

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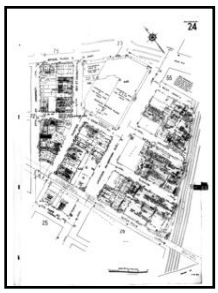

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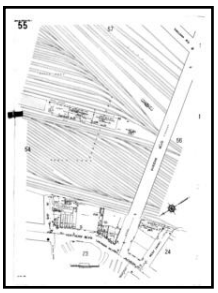

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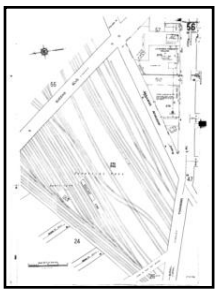

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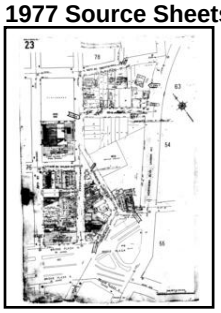

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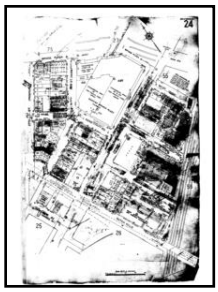

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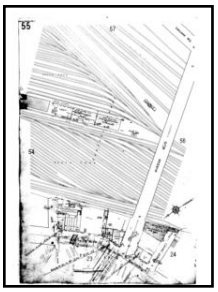

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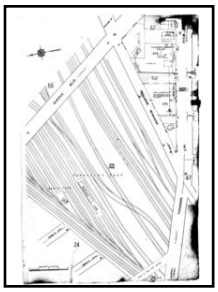

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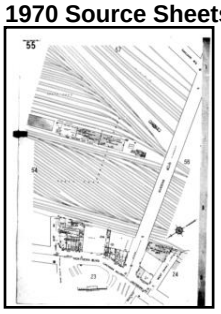

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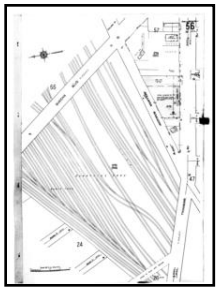

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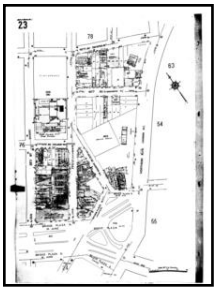

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1950 Source Sheets

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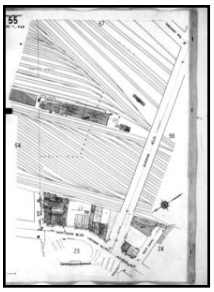

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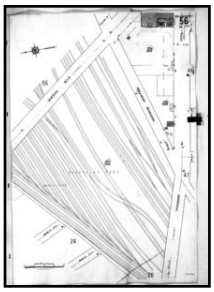

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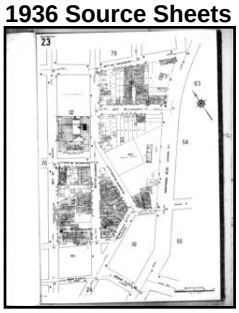
1936 Source Sheets



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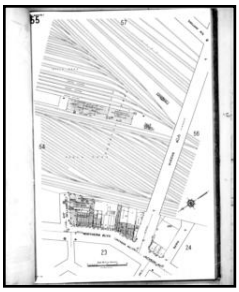

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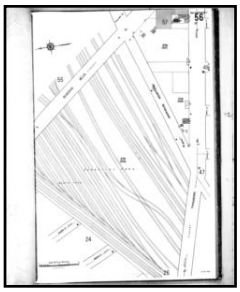

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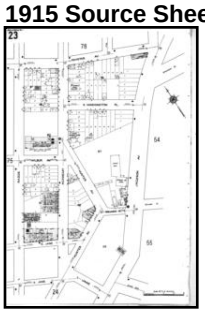

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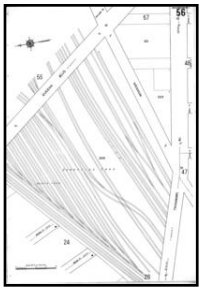

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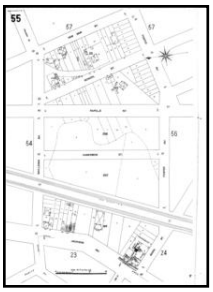

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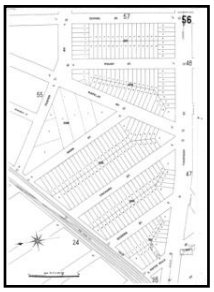

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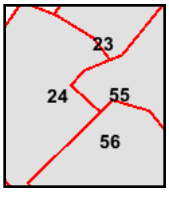

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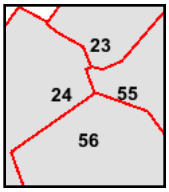

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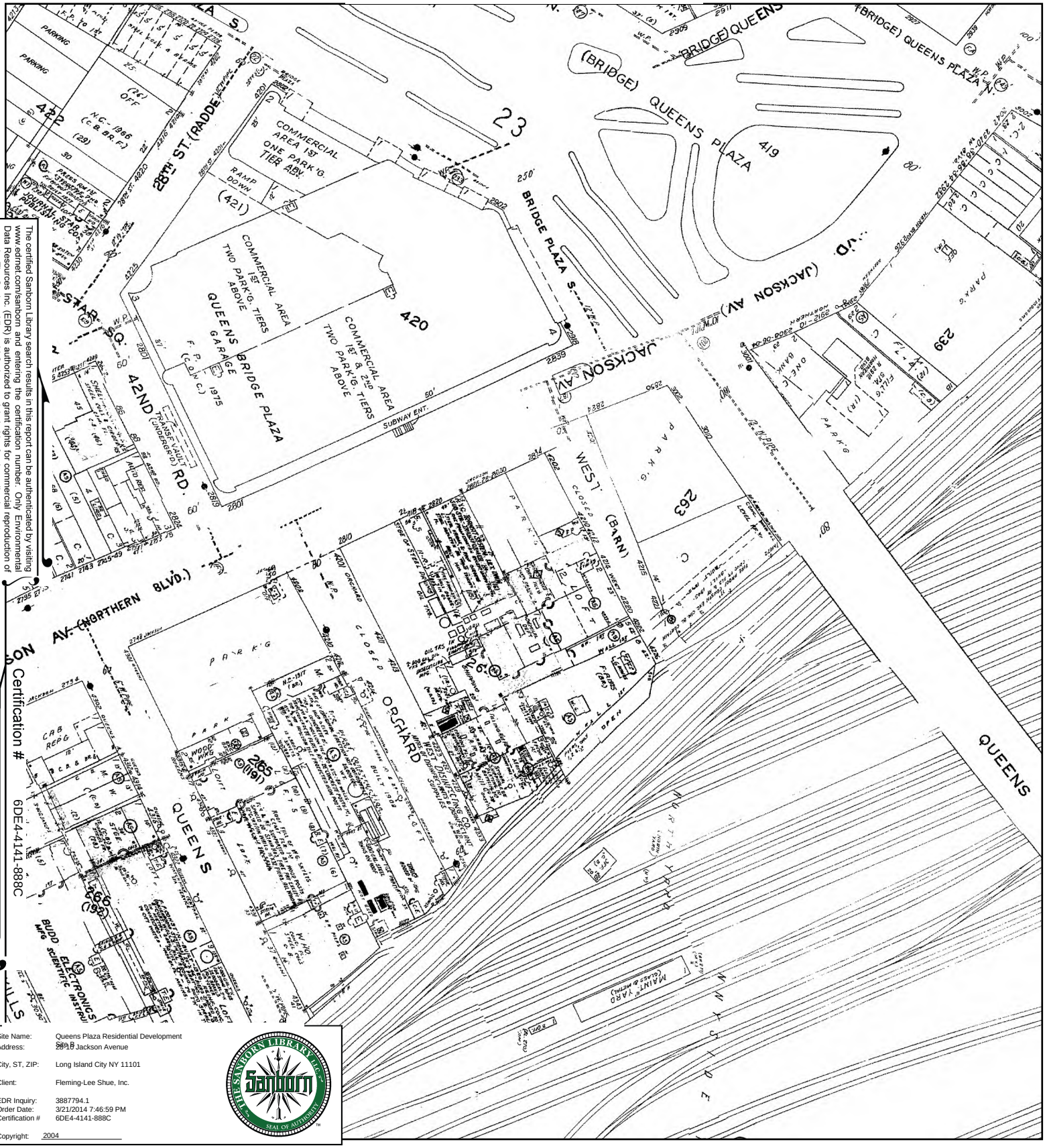

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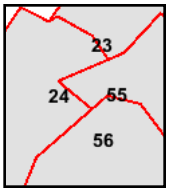

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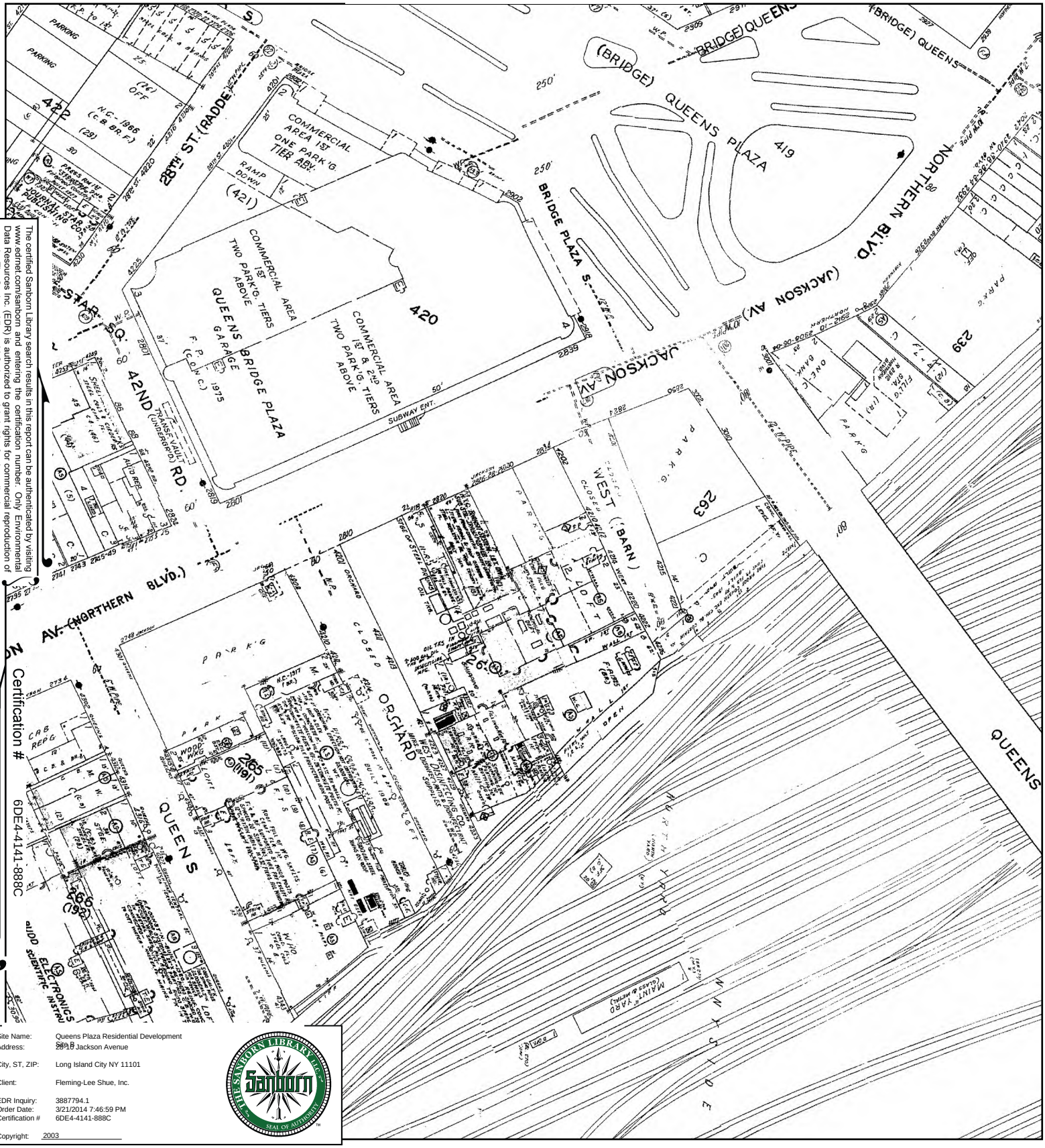

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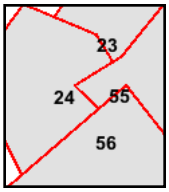

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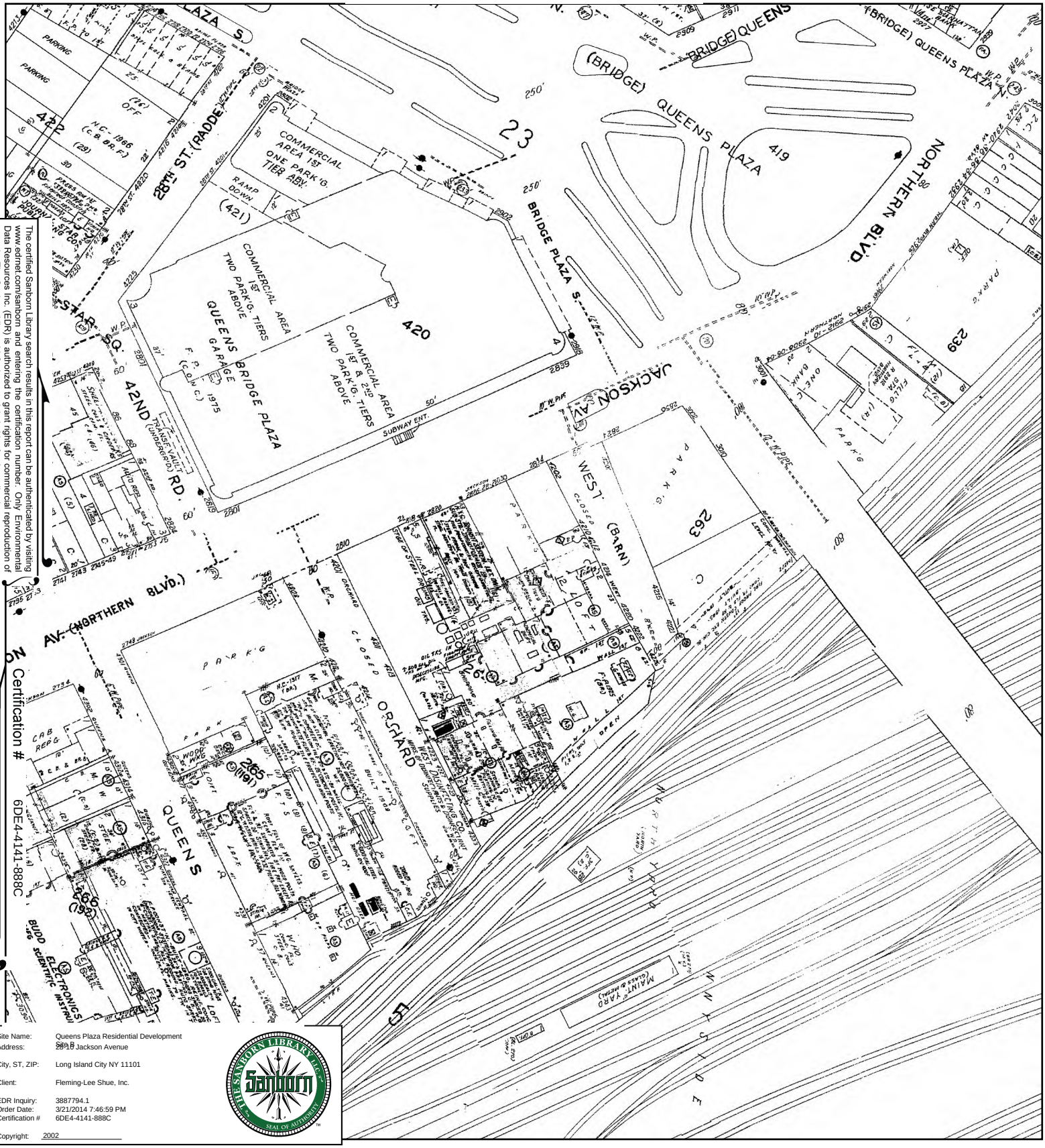

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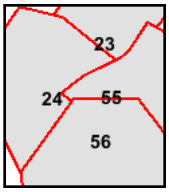

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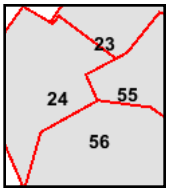

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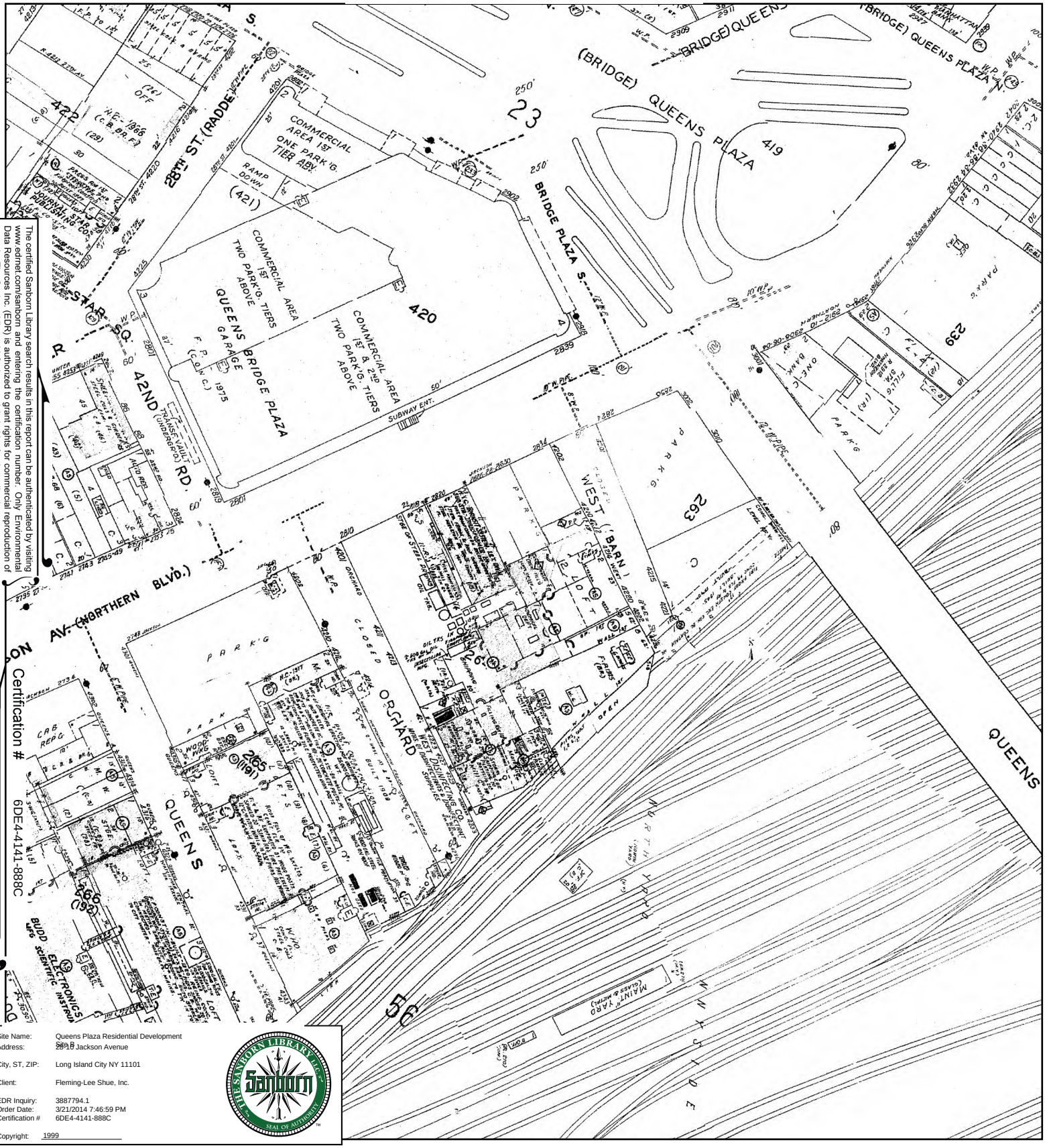

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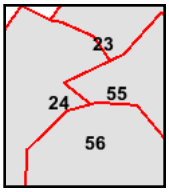

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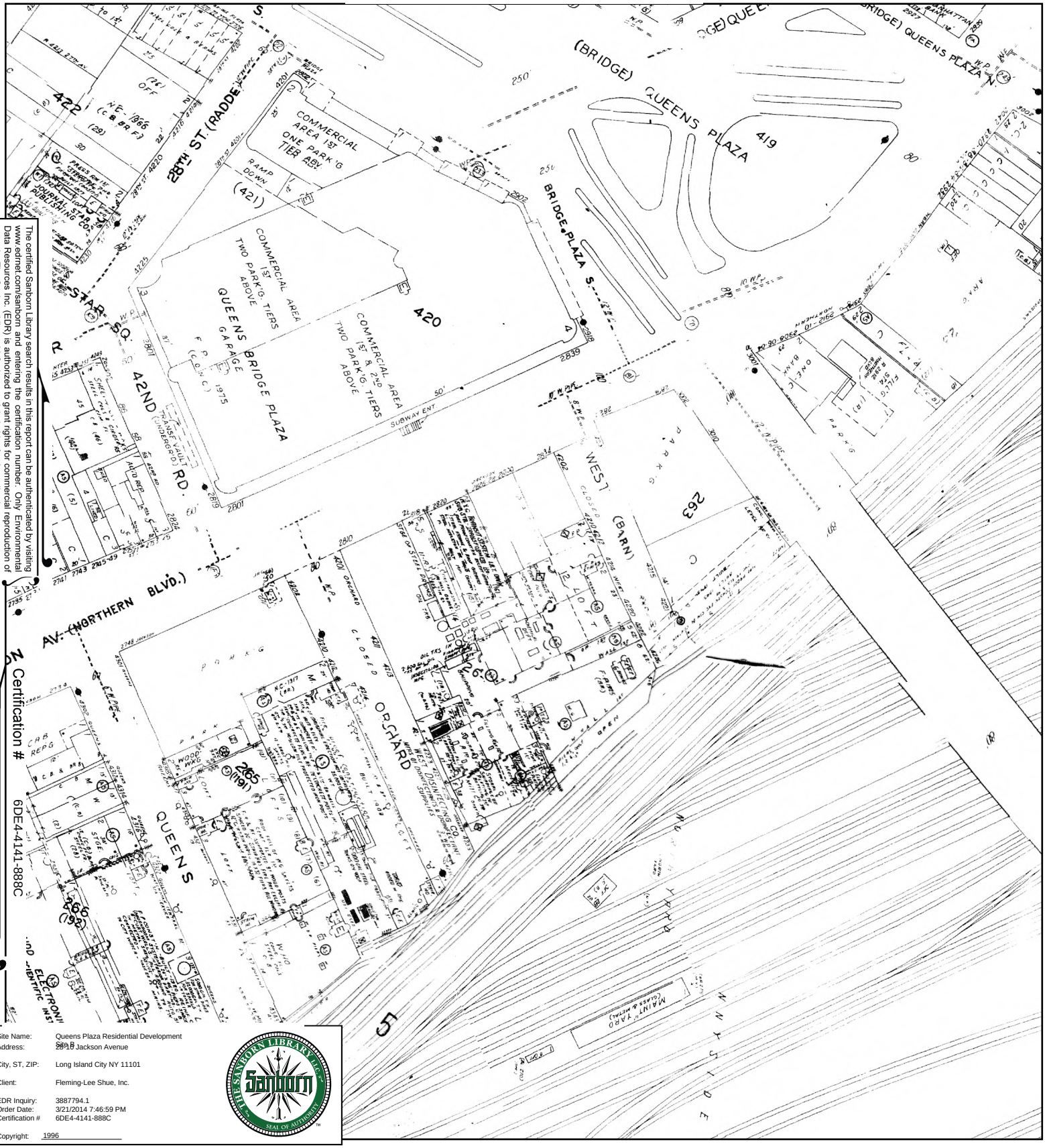

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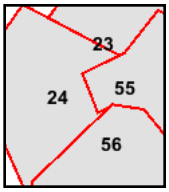

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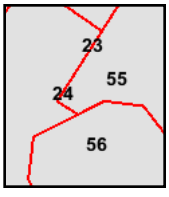

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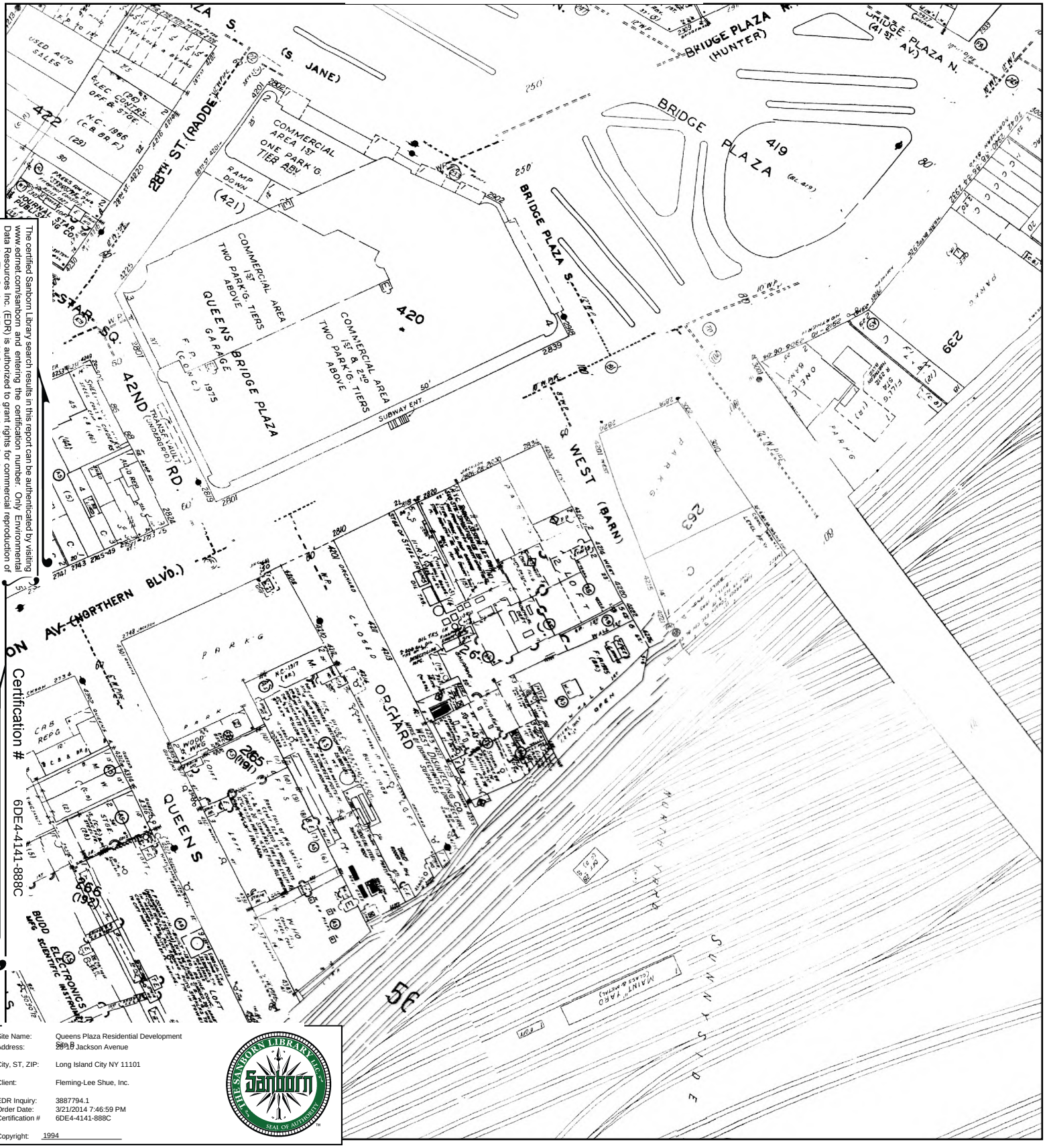

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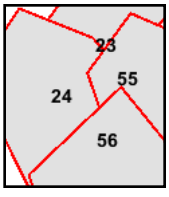

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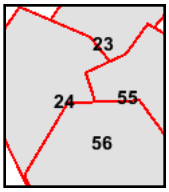

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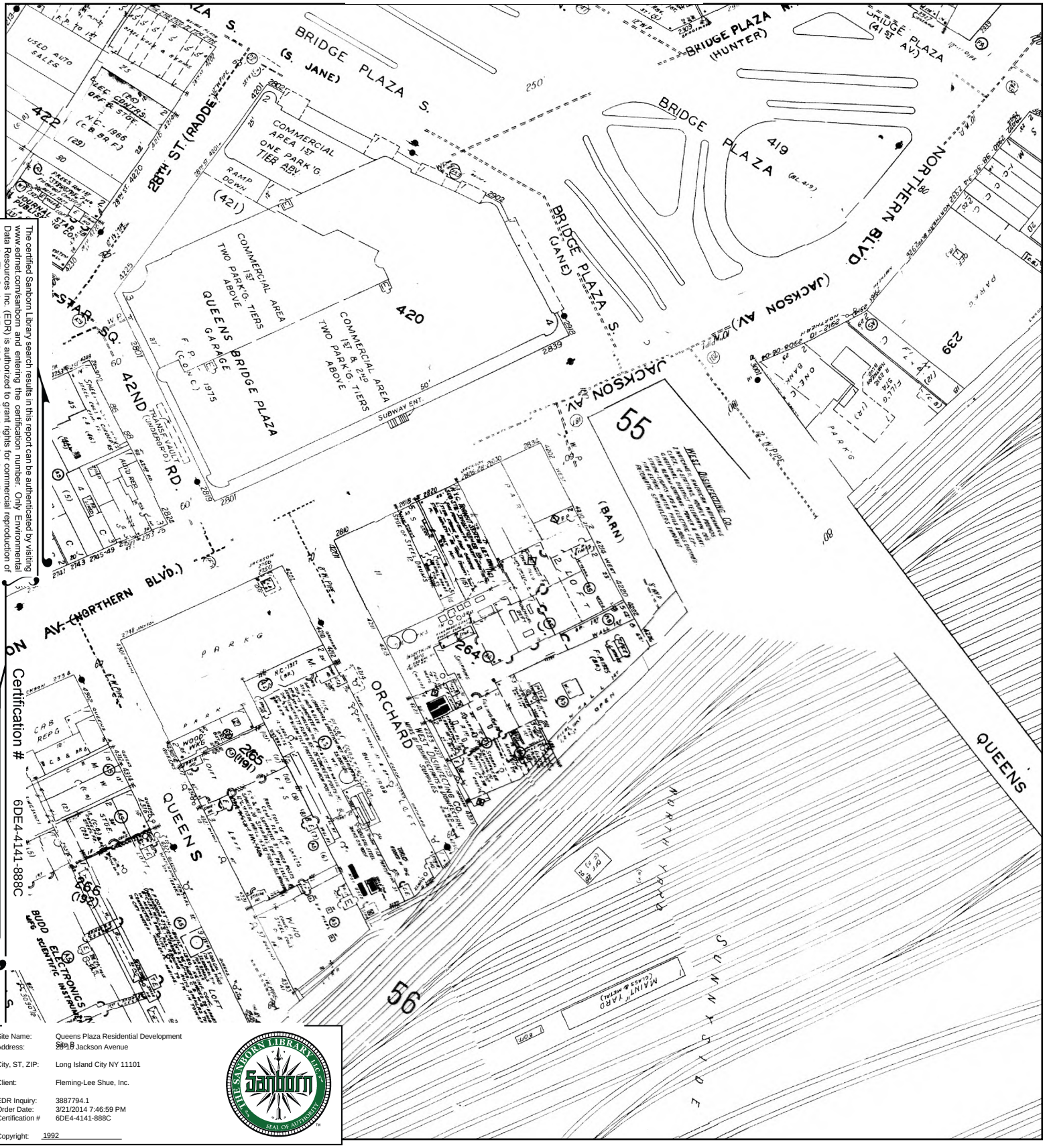

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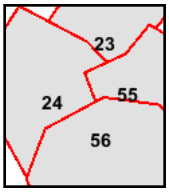

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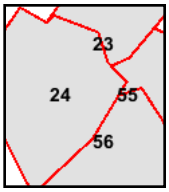

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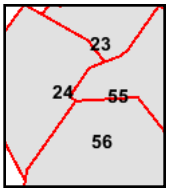

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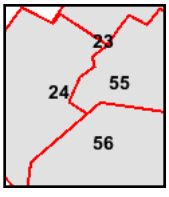

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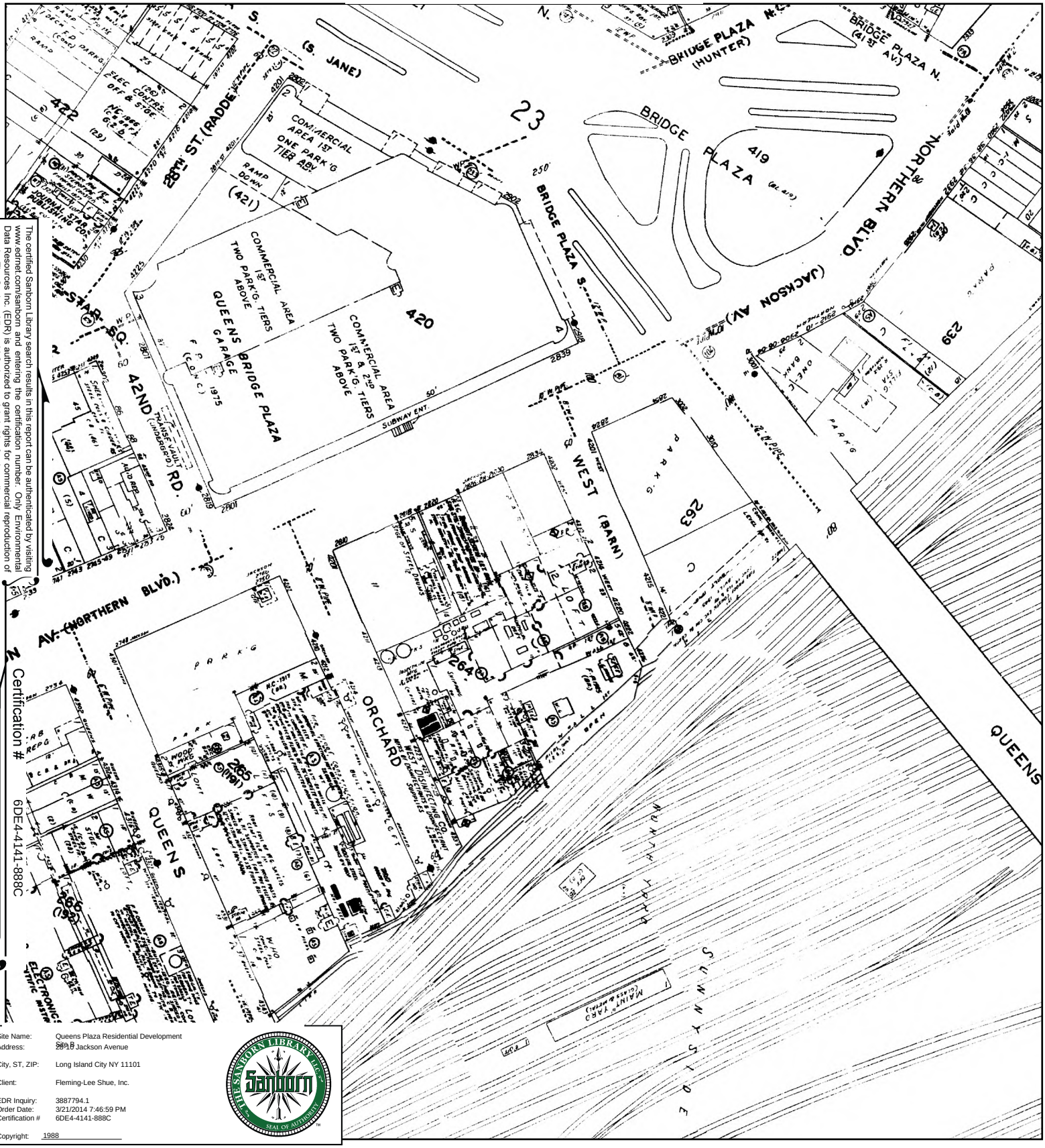

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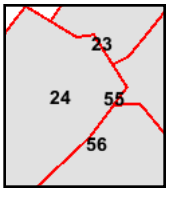

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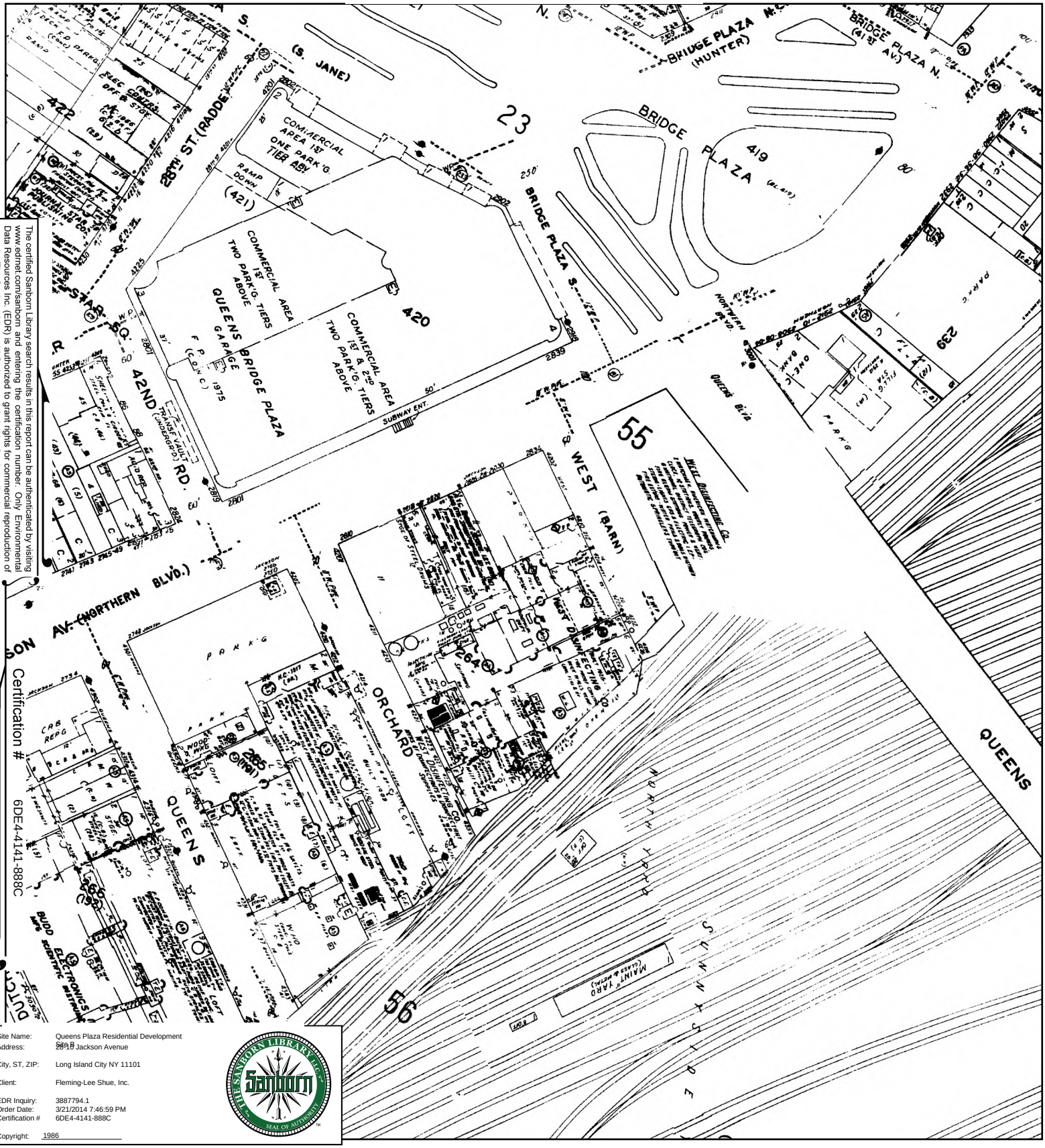

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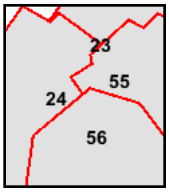

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Volume 1, Sheet 24

0 Feet 150 300 600

N

1985 Certified Sanborn Map

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Site Name: Queens Plaza Residential Development
Address: Site B 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
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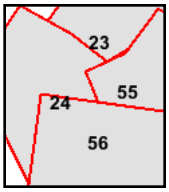

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1980 Certified Sanborn Map

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Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
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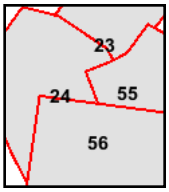

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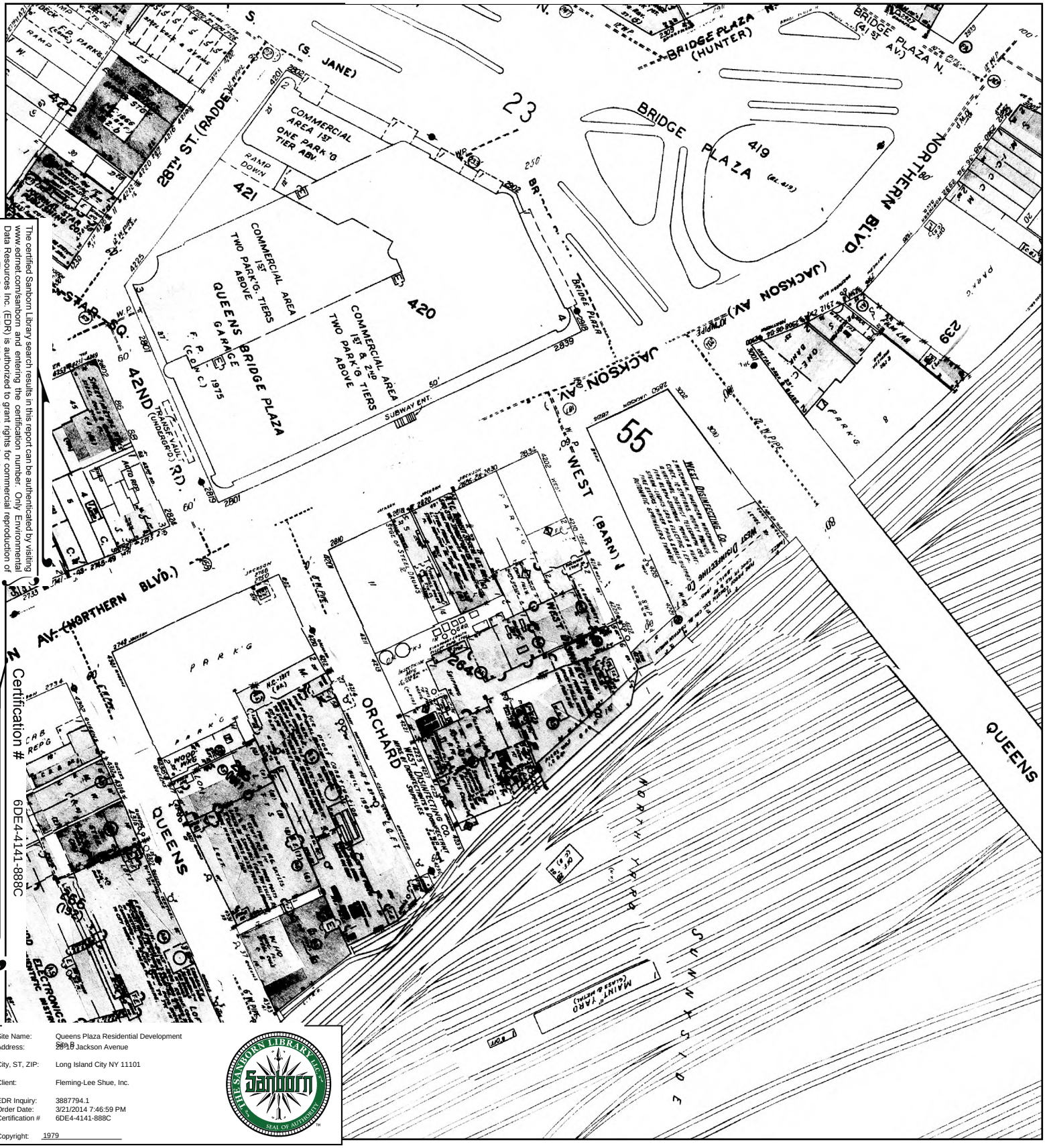
1979 Certified Sanborn Map



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Certification # 6DE4-4141-888C

Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
Order Date:	3/21/2014 7:46:59 PM
Certification #	6DE4-4141-888C
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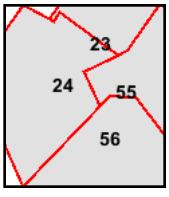

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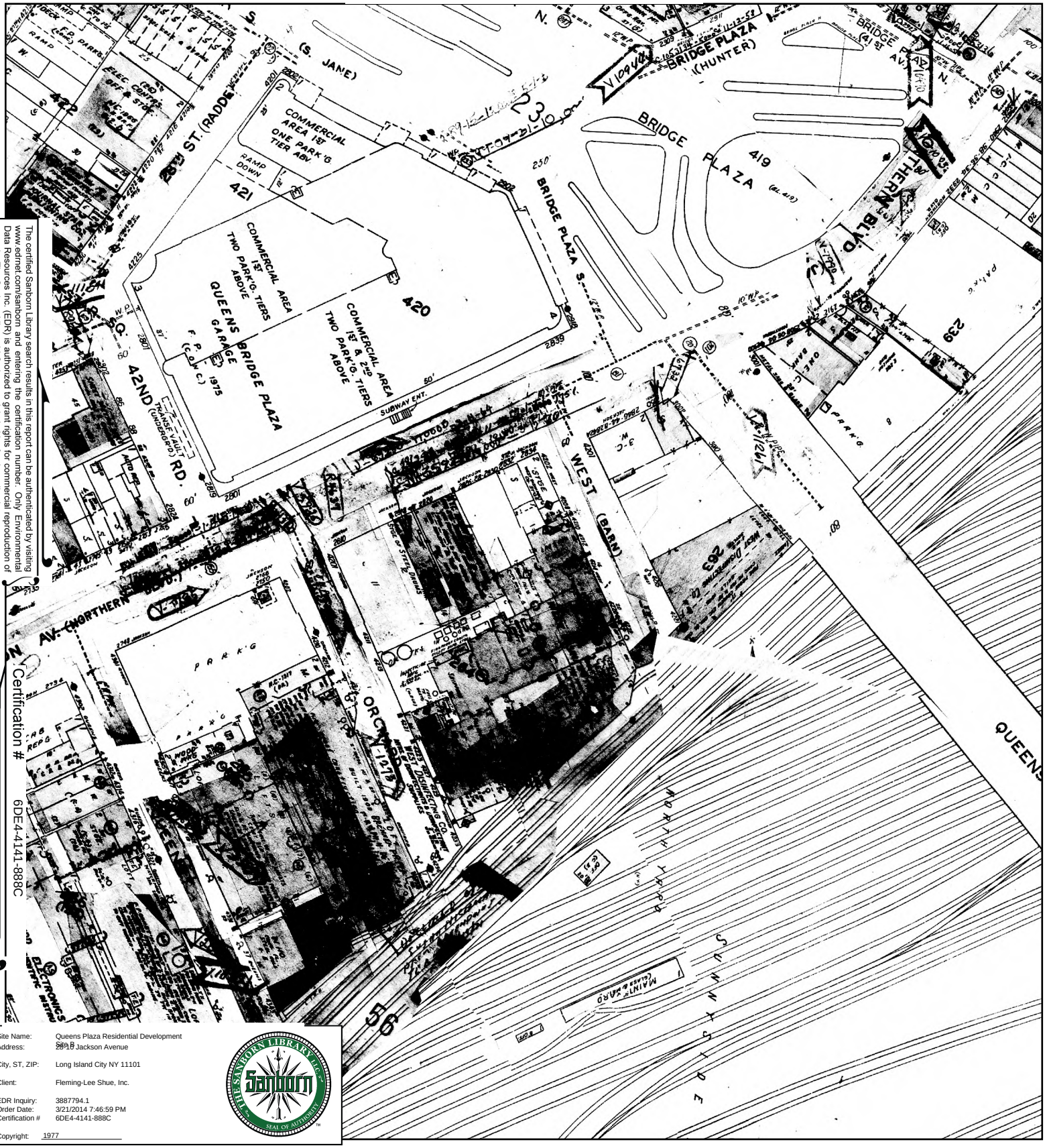
1977 Certified Sanborn Map



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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development Site B
Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
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Certification # 6DE4-4141-888C
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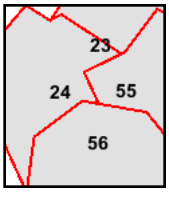

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1970 Certified Sanborn Map

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Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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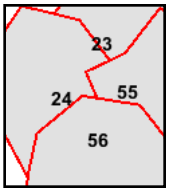

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1950 Certified Sanborn Map

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Certification # 6DE4-4141-888C

Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
EDR Inquiry:	3887794.1
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Certification #	6DE4-4141-888C
Copyright:	1950

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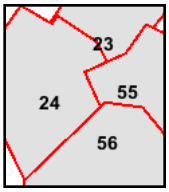

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Site Name:	Queens Plaza Residential Development Site B
Address:	28-18 Jackson Avenue
City, ST, ZIP:	Long Island City NY 11101
Client:	Fleming-Lee Shue, Inc.
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Order Date:	3/21/2014 7:46:59 PM
Certification #	6DE4-4141-888C
Copyright:	1947

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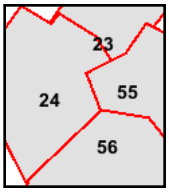

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Site Name: Queens Plaza Residential Development Site B
Address: 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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Copyright: 1936

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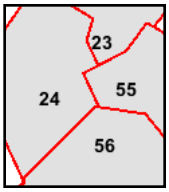

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0 Feet 150 300 600

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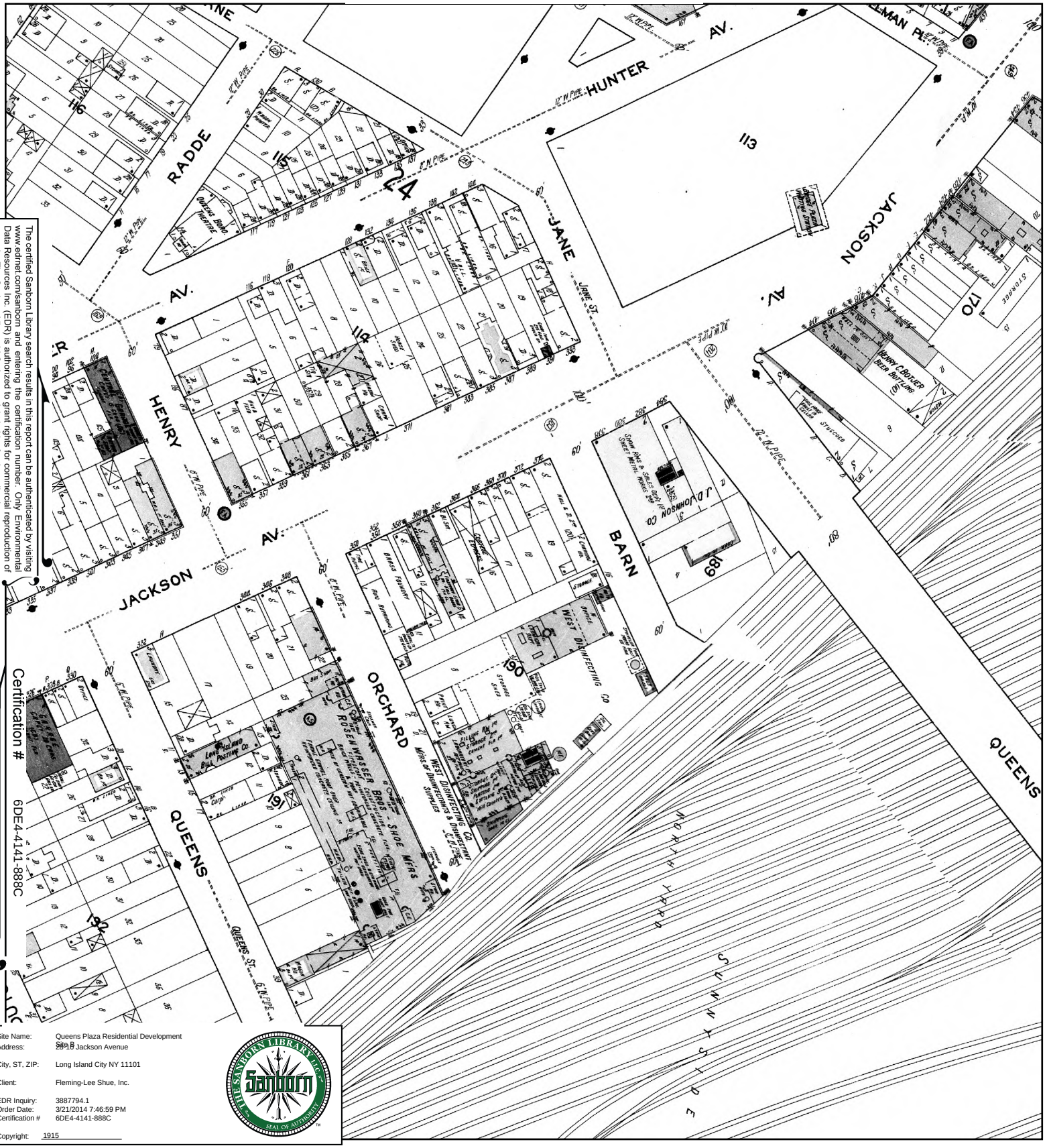
1915 Certified Sanborn Map



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Site Name: Queens Plaza Residential Development
Address: Site B 28-18 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1915

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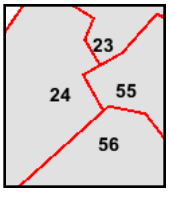

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1898 Certified Sanborn Map

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Certification # 6DE4-4141-888C

Site Name: Queens Plaza Residential Development
Address: Site B 28-15 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
Client: Fleming-Lee Shue, Inc.
EDR Inquiry: 3887794.1
Order Date: 3/21/2014 7:46:59 PM
Certification # 6DE4-4141-888C
Copyright: 1898

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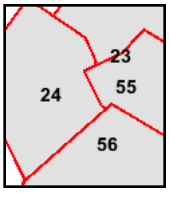

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0 Feet 150 300 600

N

Queens Plaza Residential Development Site B
28-10 Jackson Avenue
Long Island City, NY 11101

Inquiry Number: 3887794.1
March 21, 2014

Certified Sanborn® Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

3/21/14

Site Name:
Queens Plaza Residential
28-10 Jackson Avenue
Long Island City, NY 11101

Client Name:
Fleming-Lee Shue, Inc.
158 West 29th St
New York, NY 10001

EDR Inquiry # 3887794.1

Contact: Steve Panther

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The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Queens Plaza Residential Development Site B
Address: 28-10 Jackson Avenue
City, State, Zip: Long Island City, NY 11101
Cross Street:
P.O. # 10112-004-1
Project: Queens Plaza Residential Dvpmt
Certification # 6DE4-4141-888C

Maps Provided:

2006	1999	1991	1980	1936
2005	1996	1990	1979	1915
2004	1995	1989	1977	1898
2003	1994	1988	1970	
2002	1993	1986	1950	
2001	1992	1985	1947	

Sanborn® Library search results
Certification # 6DE4-4141-888C

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

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Sanborn Sheet Thumbnails

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2006 Source Sheets

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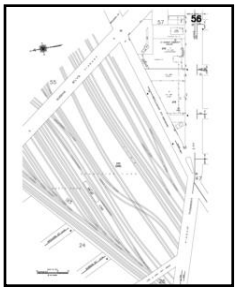

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2005 Source Sheets

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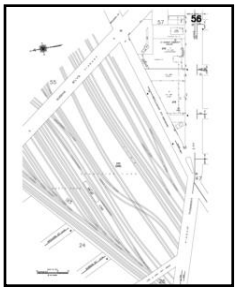

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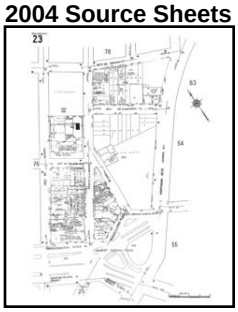
2004 Source Sheets



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Volume 1, Sheet 24

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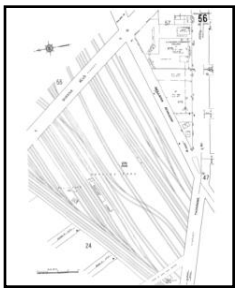

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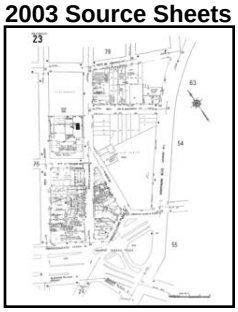

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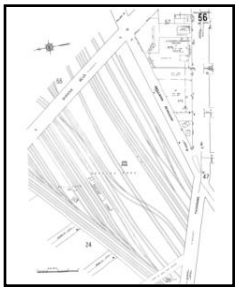

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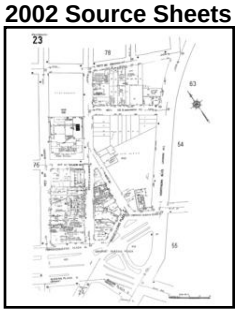
2002 Source Sheets



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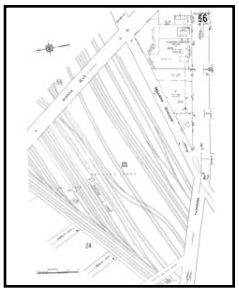

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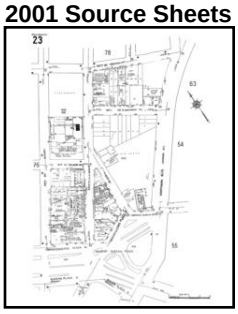
2001 Source Sheets



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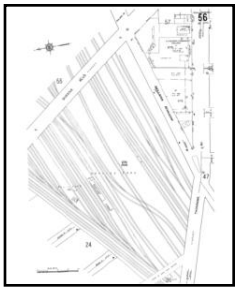

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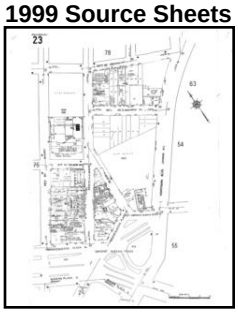

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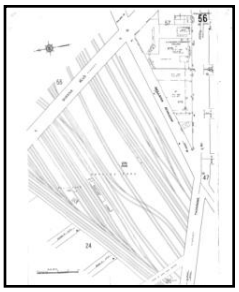

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1996 Source Sheets

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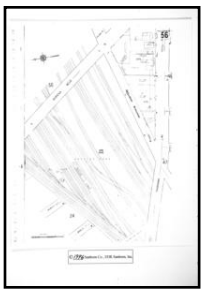

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1995 Source Sheets

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Volume 1, Sheet 24

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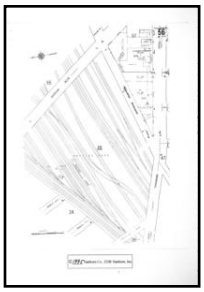

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1994 Source Sheets

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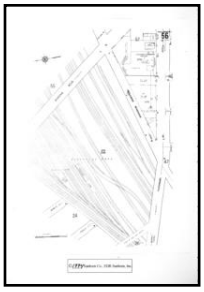

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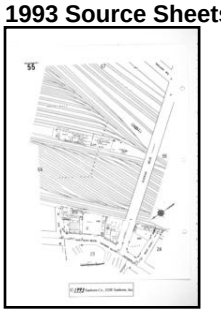
1993 Source Sheets



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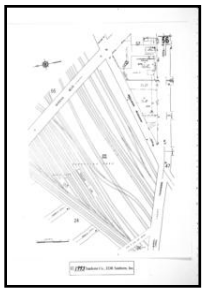

Volume 1, Sheet 56

Volume 1, Sheet 23

Volume 1, Sheet 24

1992 Source Sheets

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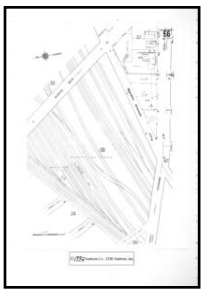
Volume 1, Sheet 55



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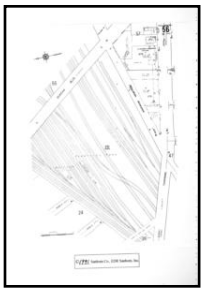

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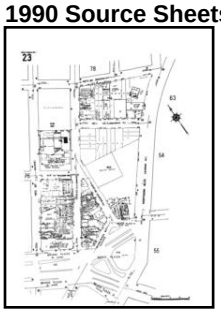

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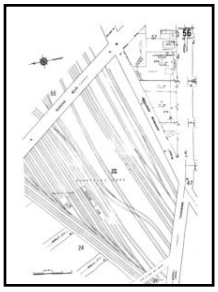
Volume 1, Sheet 55



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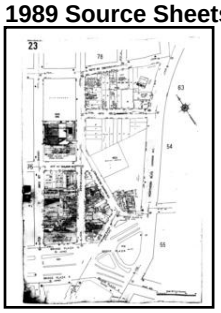

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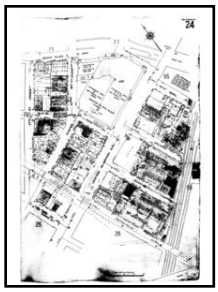

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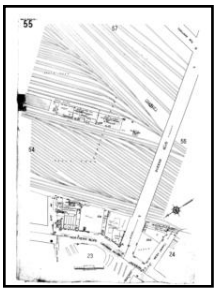

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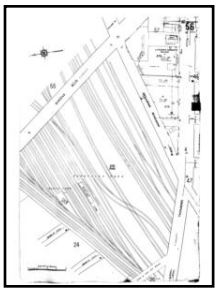

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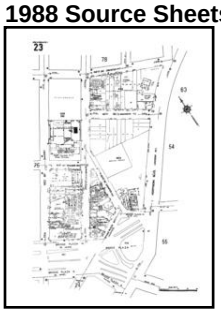

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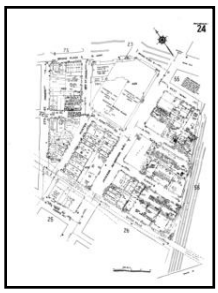

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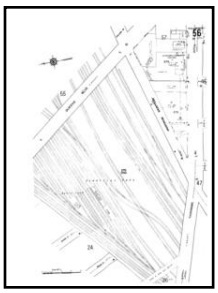

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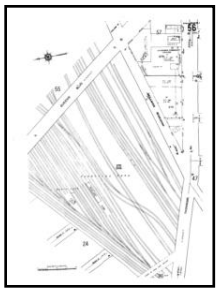

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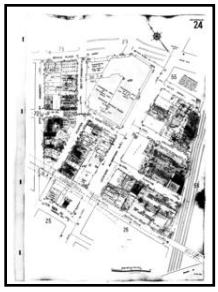

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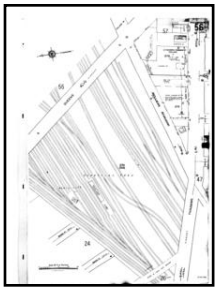

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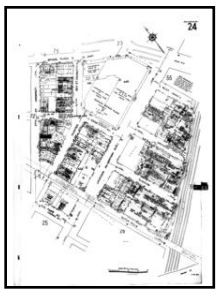

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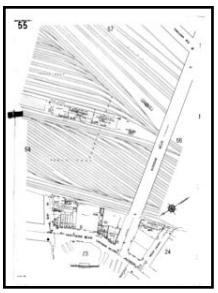

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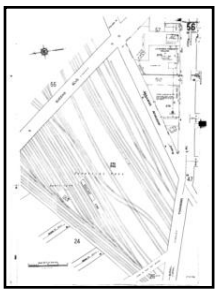

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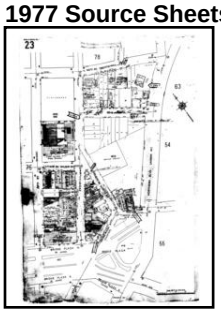

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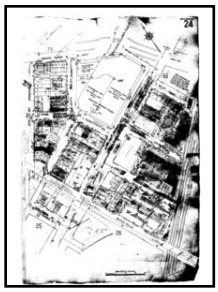

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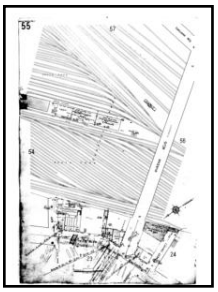

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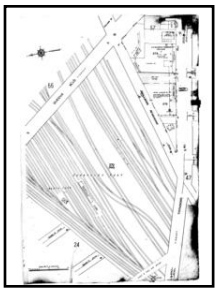

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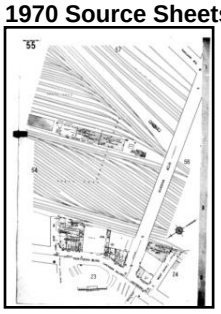

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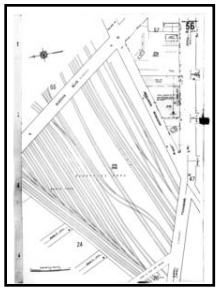

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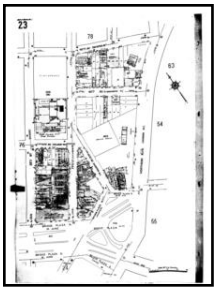

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1950 Source Sheets

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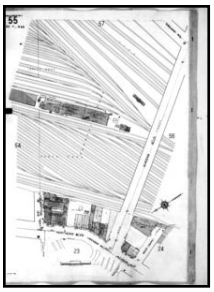

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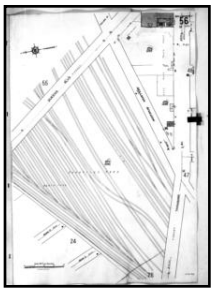

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1947 Source Sheets

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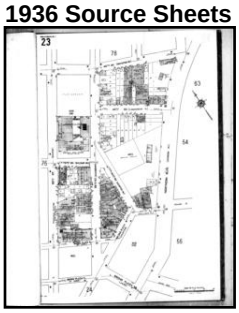
1936 Source Sheets



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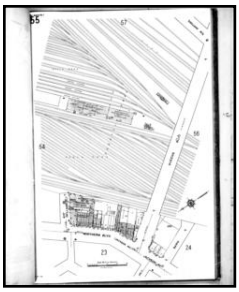

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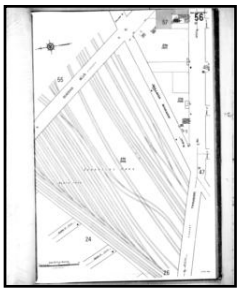

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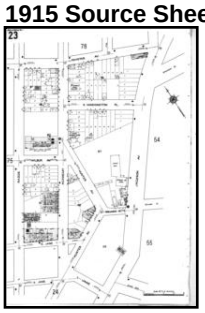
1915 Source Sheets



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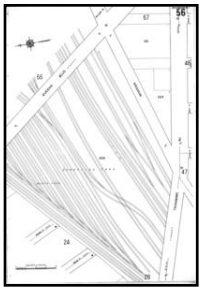

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1898 Source Sheets

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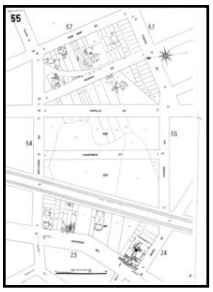

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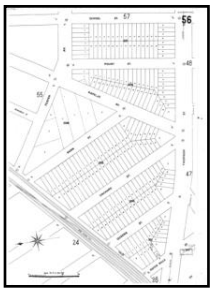

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Site Name: Queens Plaza Residential Development Site B
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City, ST, ZIP: Long Island City NY 11101
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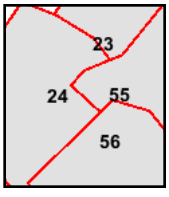

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0 Feet 150 300 600

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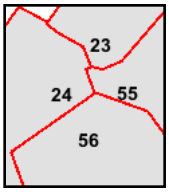

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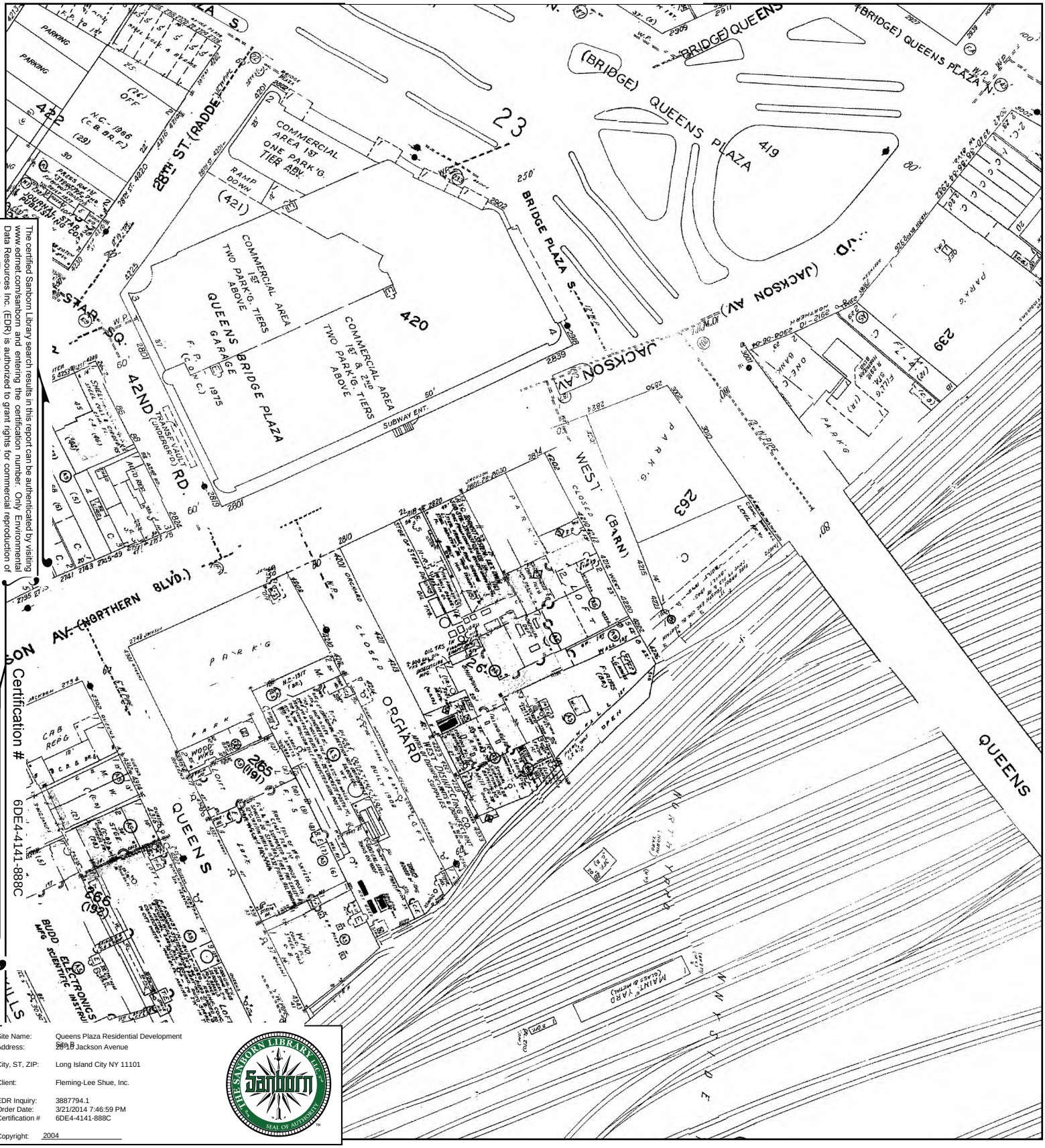

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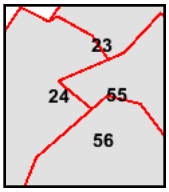

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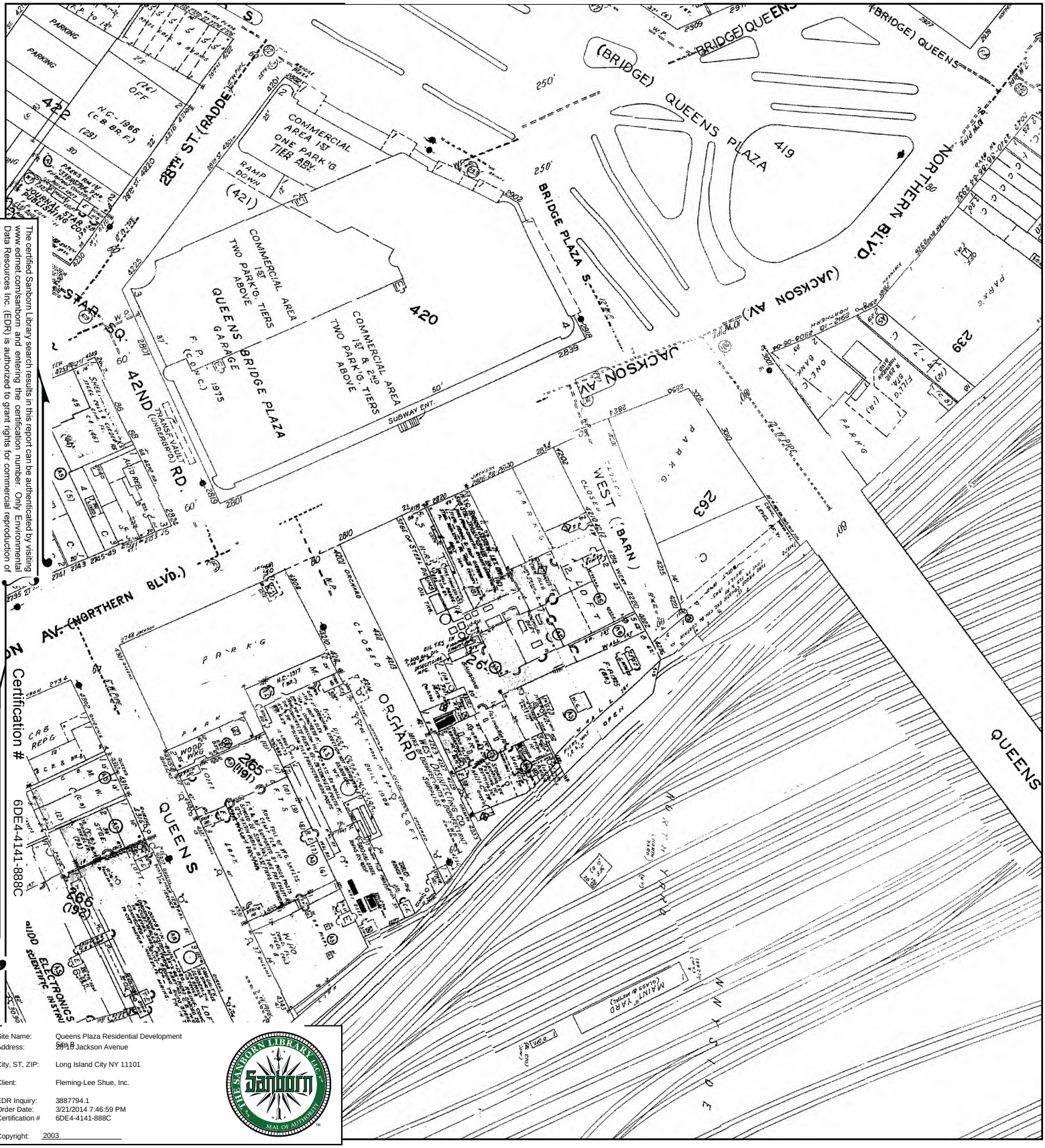

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City, ST, ZIP: Long Island City NY 11101
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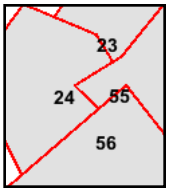

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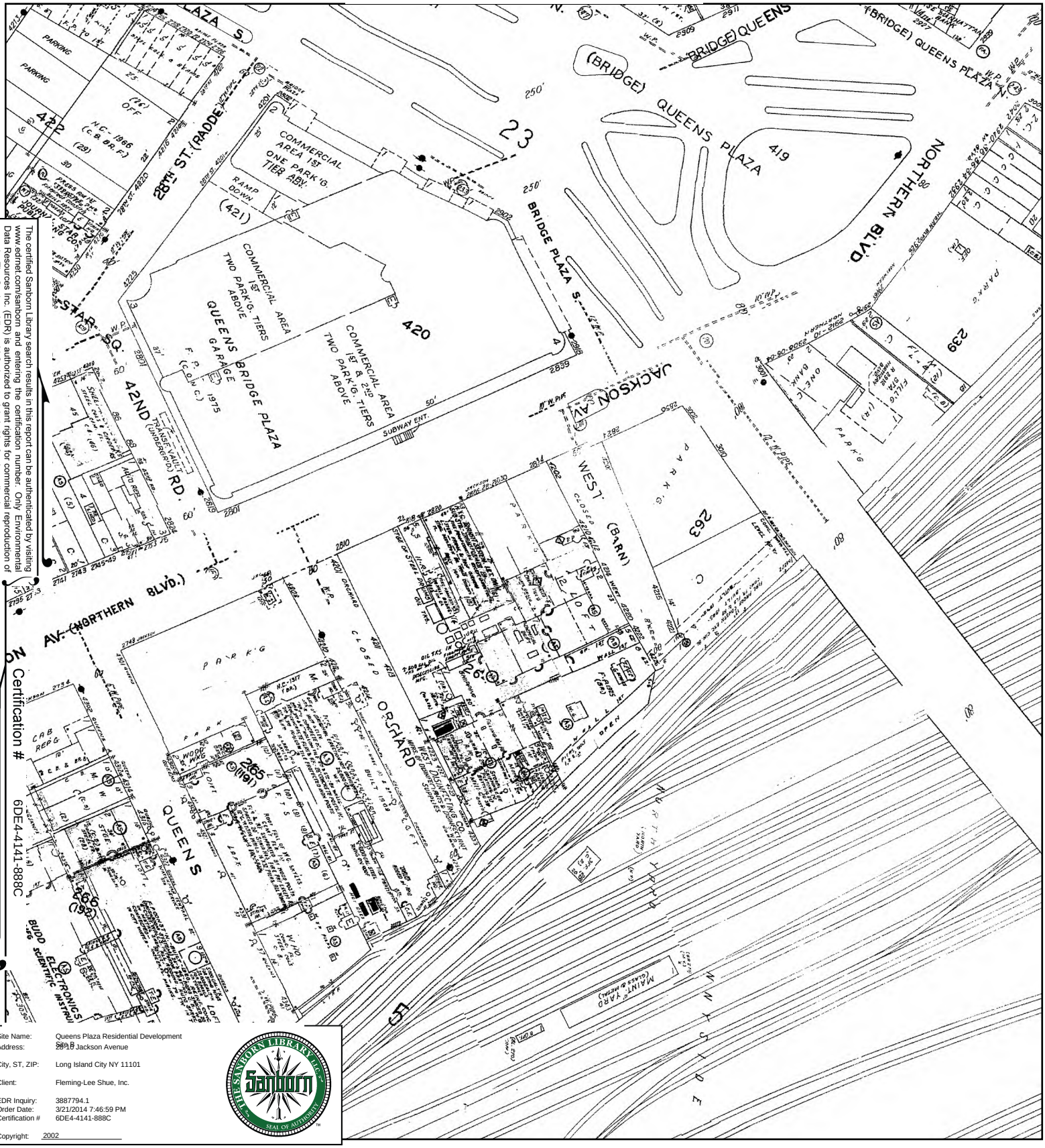

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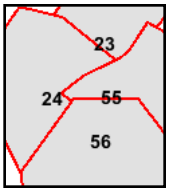

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City, ST, ZIP: Long Island City NY 11101
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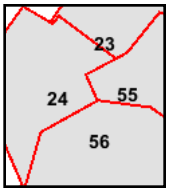

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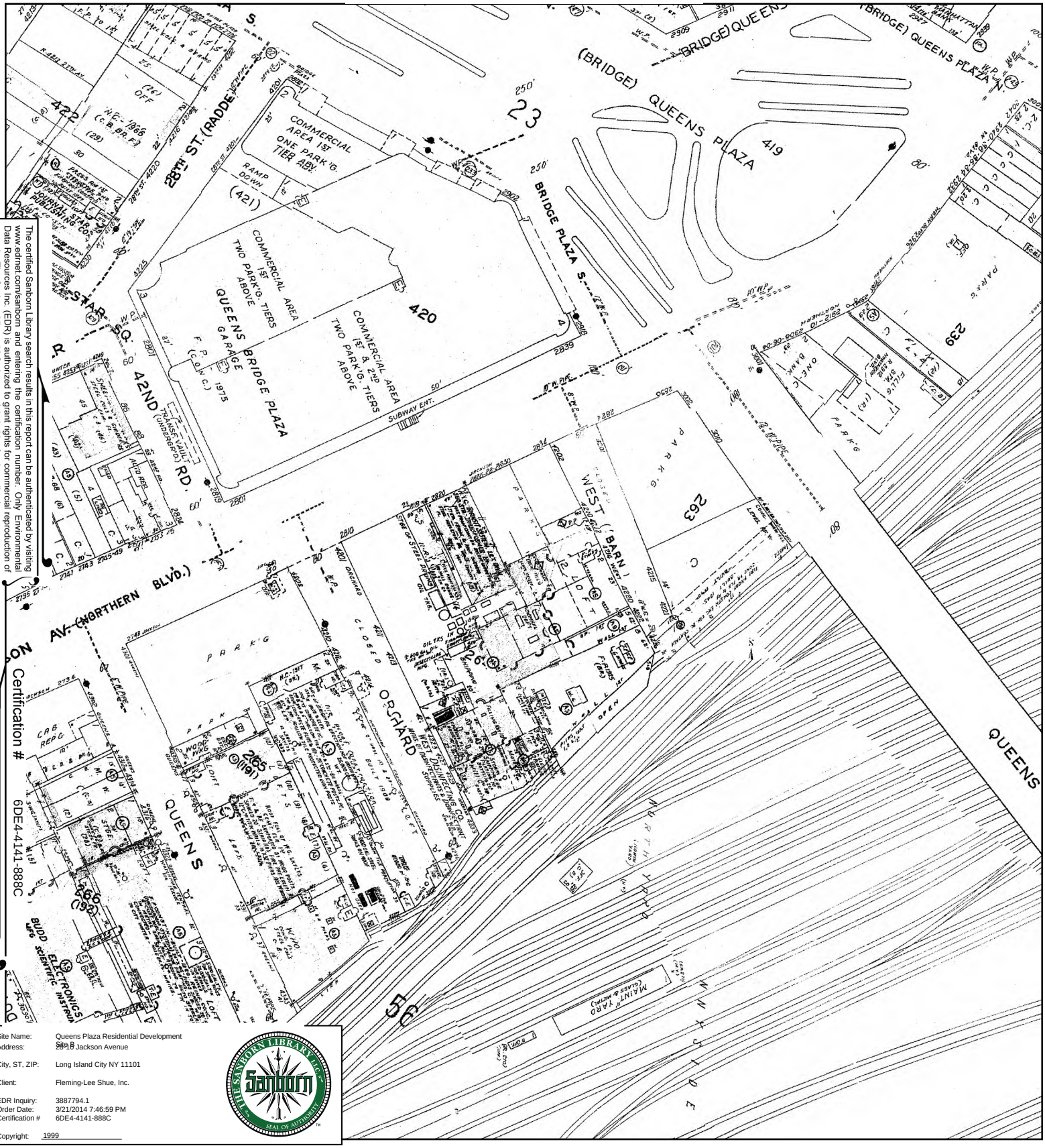
1999 Certified Sanborn Map



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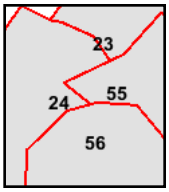

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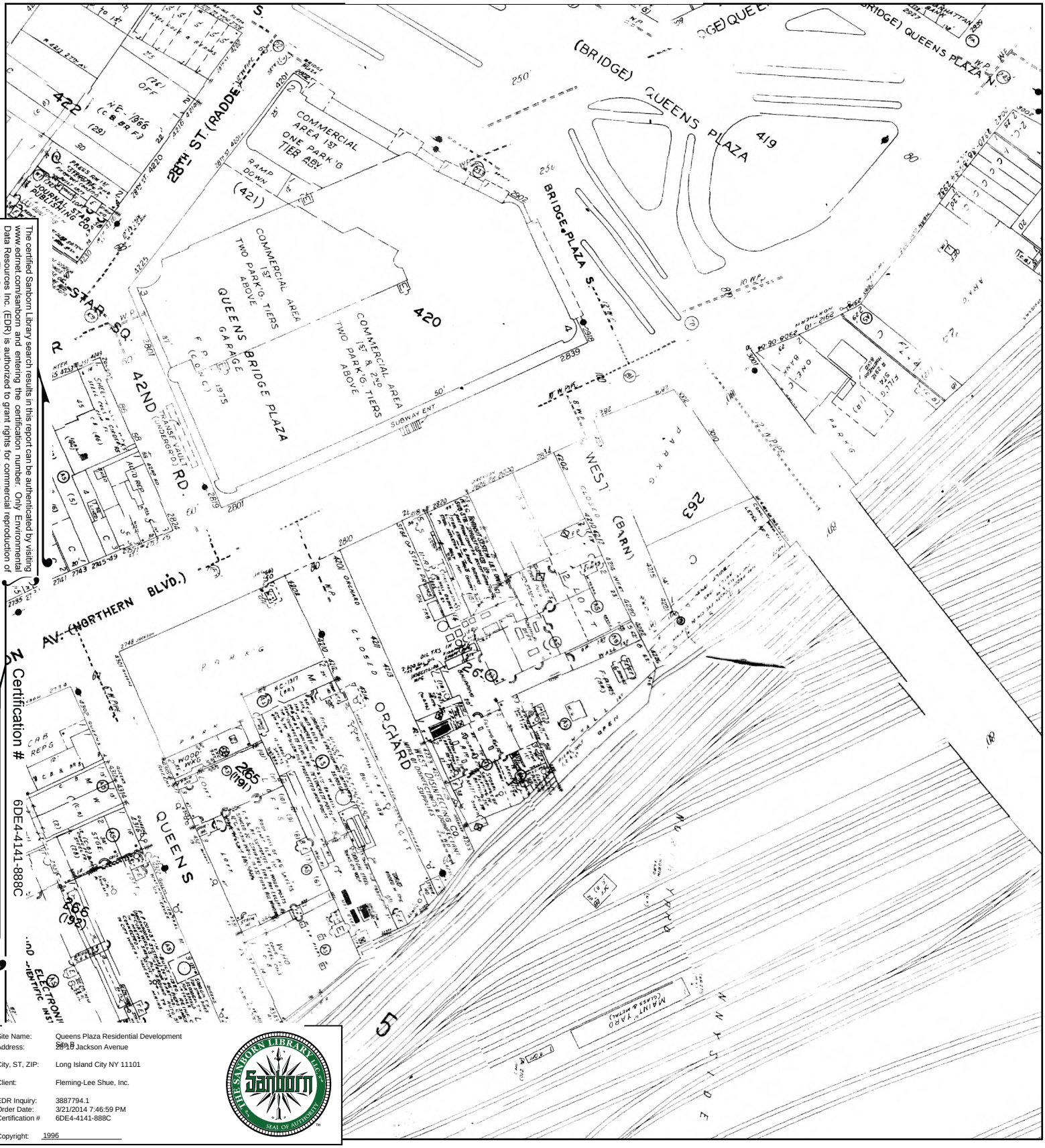

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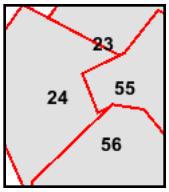

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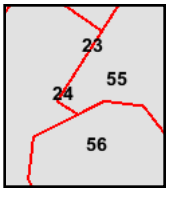

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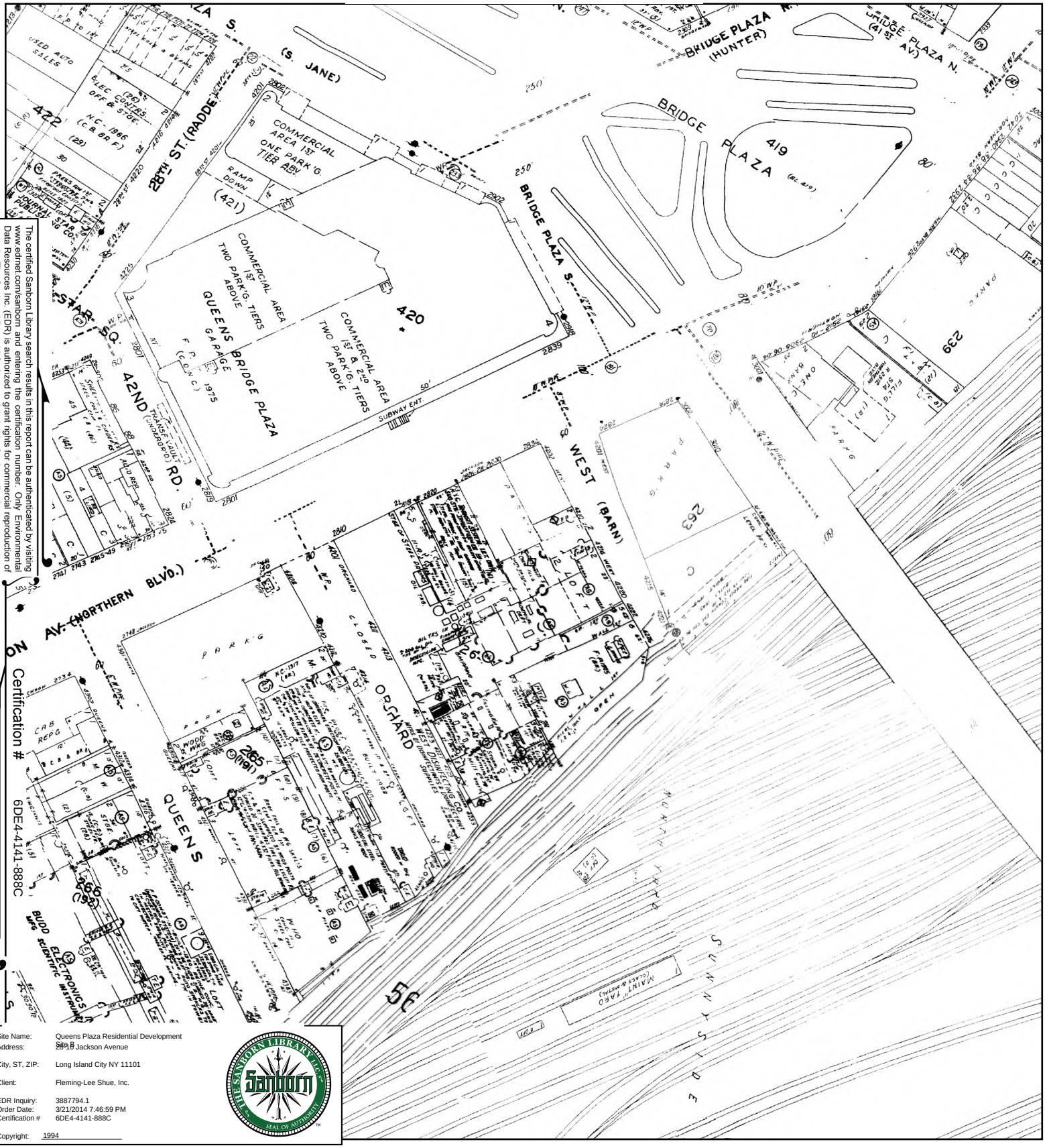

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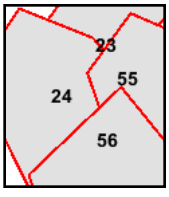

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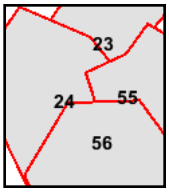

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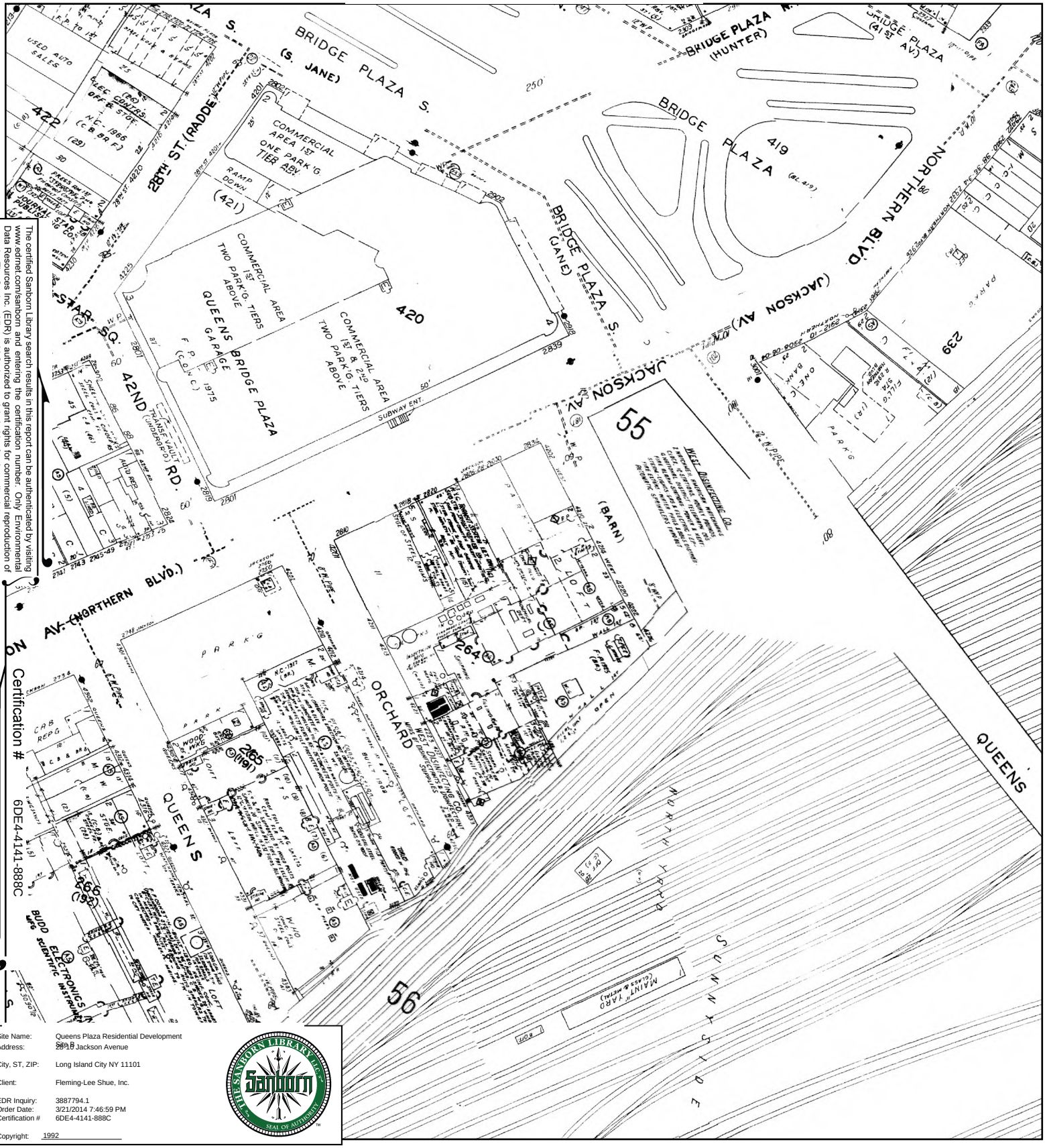

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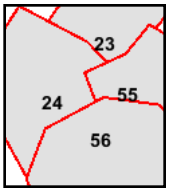

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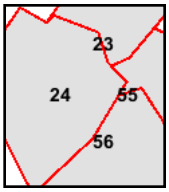

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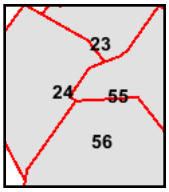

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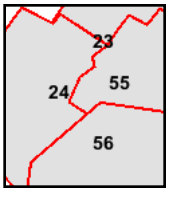

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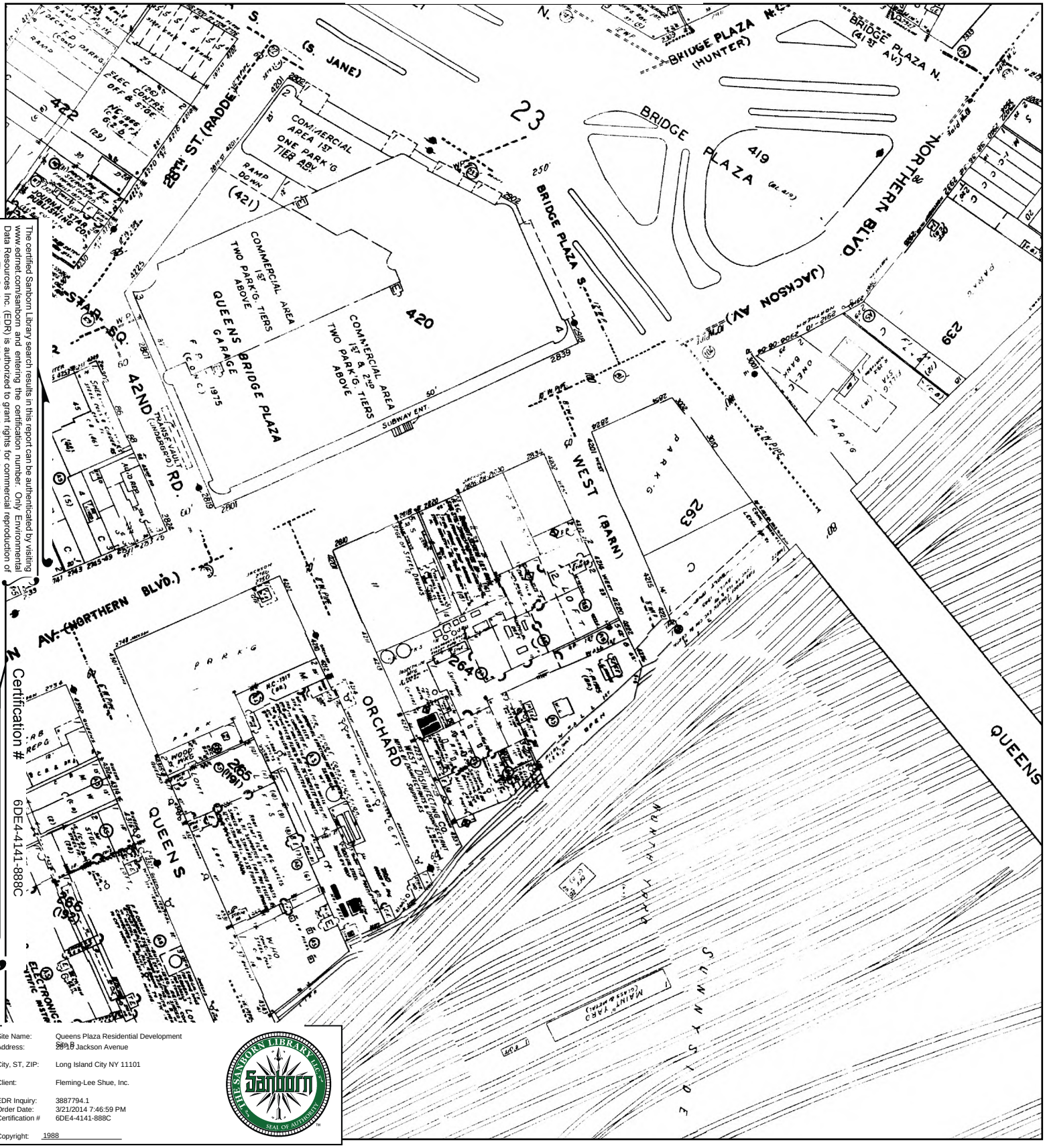

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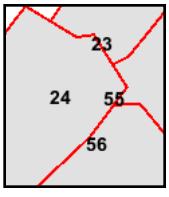

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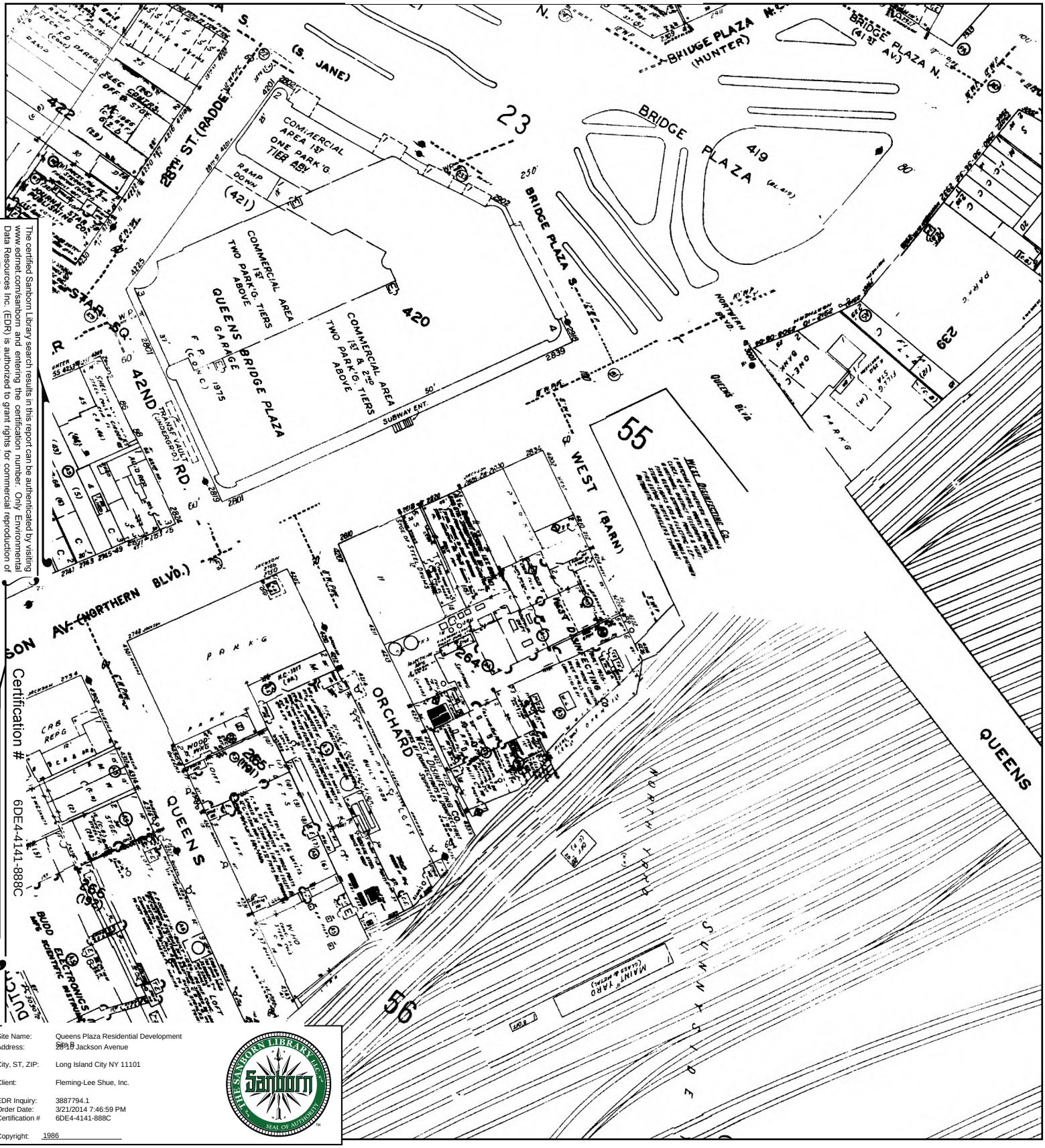

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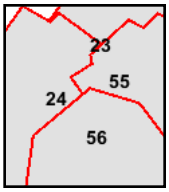

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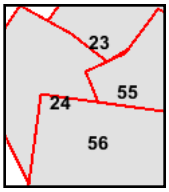

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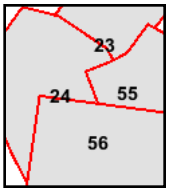

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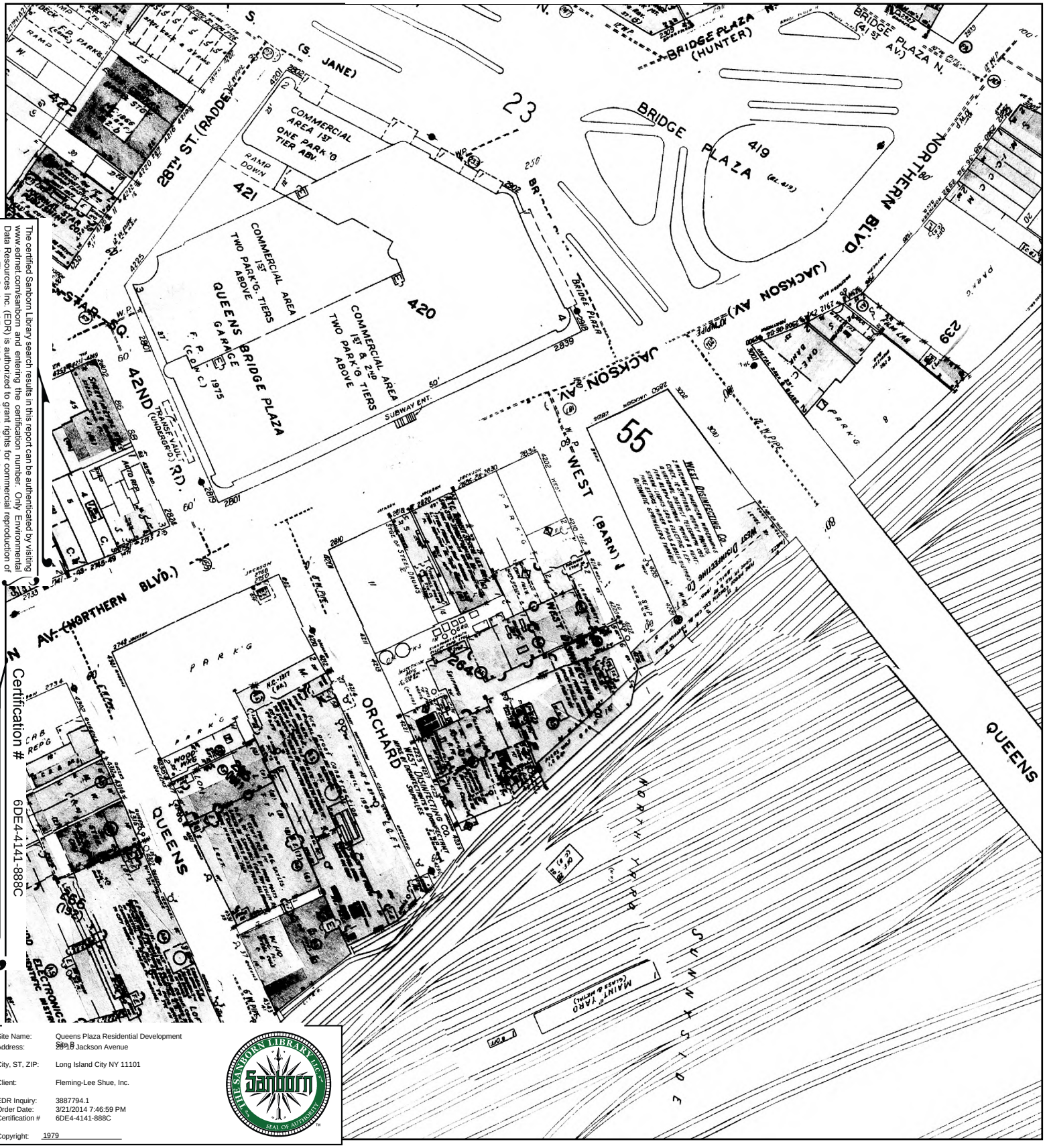

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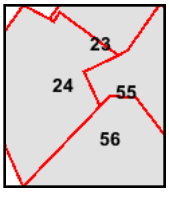

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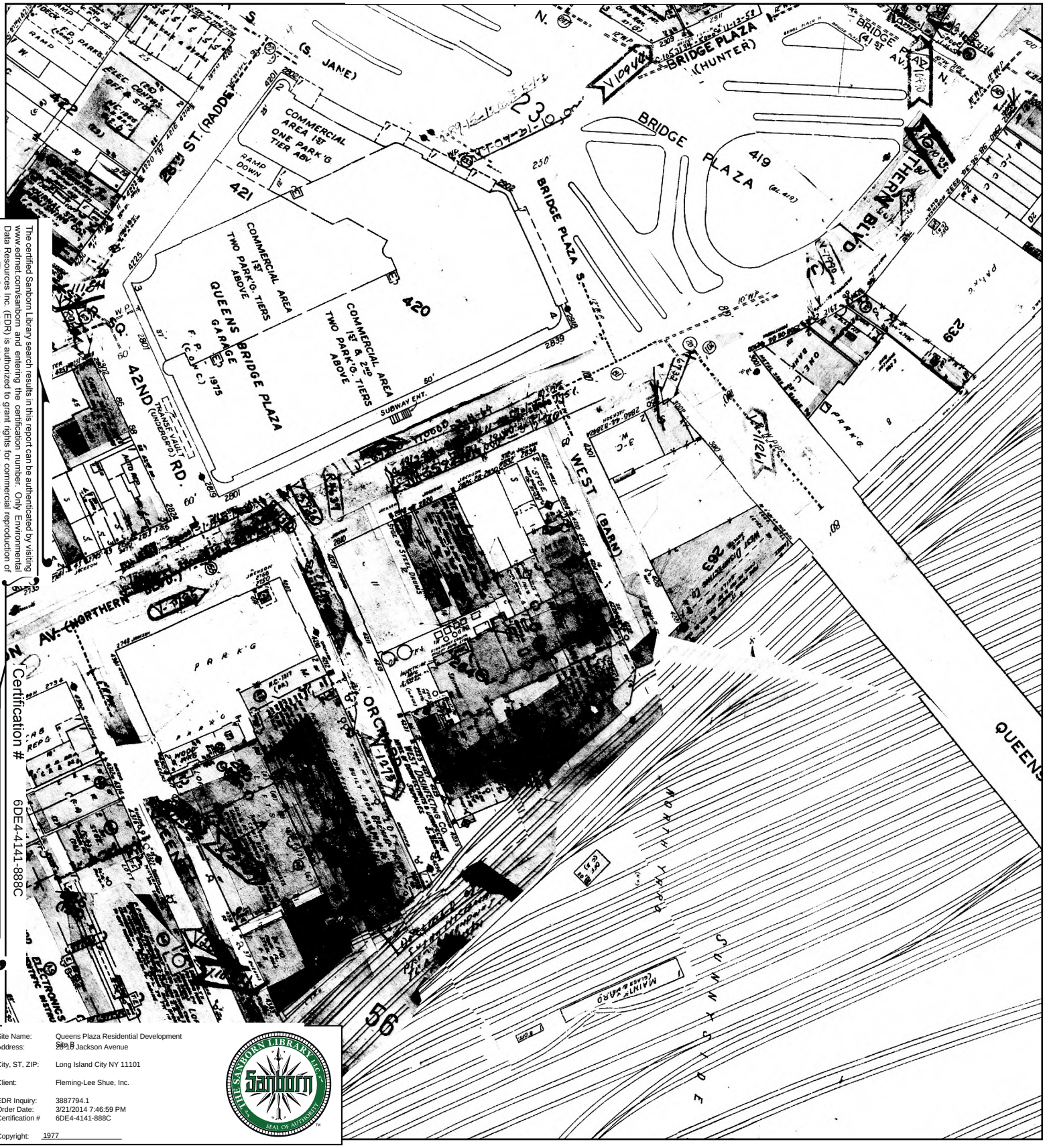

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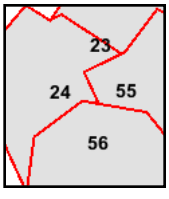

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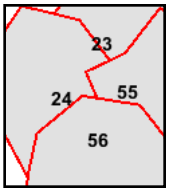

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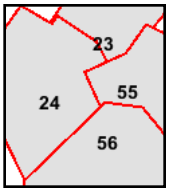

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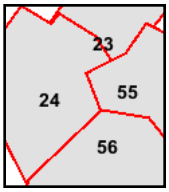

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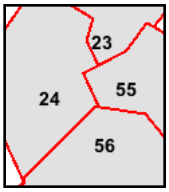

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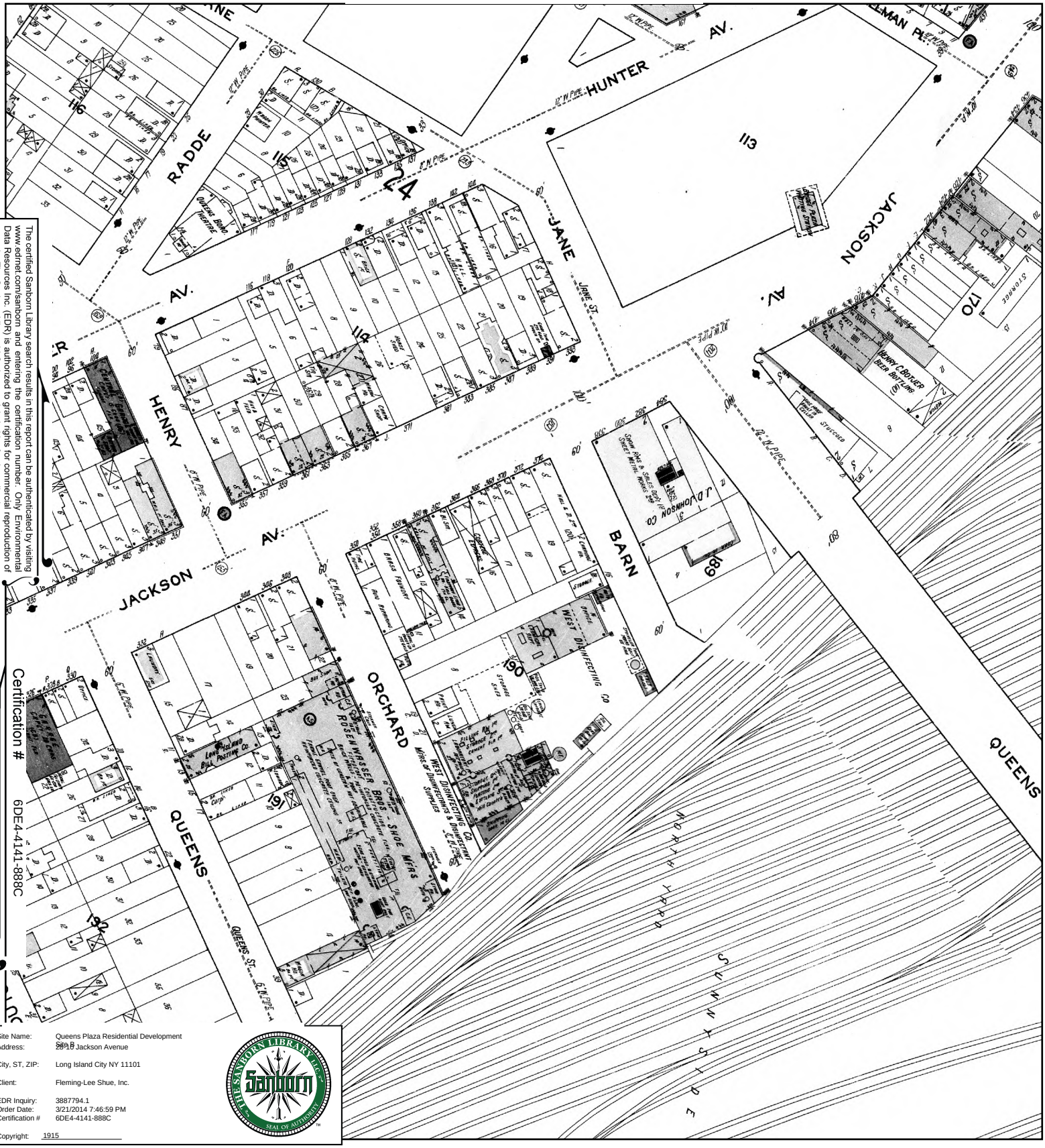

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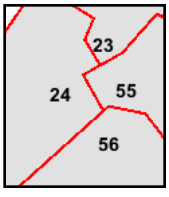

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Address: Site B 28-15 Jackson Avenue
City, ST, ZIP: Long Island City NY 11101
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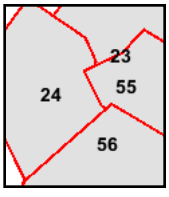

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Volume 1, Sheet 56

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APPENDIX E

Kettle and Vault Interim Remedial Measures Work Plan

Queens Plaza Residential Development
Brownfield Cleanup Program (BCP)
Site Nos. C241105 & C241151
Long Island City, NY

Kettle and Vault Interim Remedial Measures Plan

Prepared for

LIC Development Owner, LP.
c/o Tishman Speyer
Rockefeller Center
45 Rockefeller Plaza
New York, NY 10111

and

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

By

Arnold F. Fleming, P.E.

July 2014

Professional Engineer's Certification

INTERIM REMEDIAL MEASURES PLAN (IRM)

Queens Plaza Residential Development
Long Island City, NY

BCP Site No. C241151

July 2014

I Arnold F. Fleming, P.E. certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Interim Remedial Measures 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, Arnold Fleming, hereby certify that the information presented in the report was prepared under my direct supervision.

7/7/14
Date

Arnold F. Fleming, P.E.
NYS Professional Engineer
License Number 050411

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APPENDIX A – Kettle & Vault Inventory Form

1.0 INTRODUCTION

This Interim Remedial Measures Plan (IRM) was prepared by Arnold F. Fleming, P.E. (AFF) for LIC Development Owner, LP. (the Volunteer) to investigate and remediate the sub-slab former chemical processing kettles and vaults (units) on Brownfield Cleanup Program (BCP) Site B. The IRM is to be completed before full-scale remediation begins. BCP Site B is part of the Queens Plaza Residential Development (BCP Site No. C241105).

BCP Site B ("Site") is in Long Island City, Queens County, New York. The Site is bound by Jackson Avenue and BCP Site A to the north, Orchard Street to the west, the Long Island Railroad (LIRR) Sunnyside Yards to the south, and Queens Boulevard to the east. The Site contains asphalt-covered open areas and a number of 1- and 3-story former commercial buildings. One 5-story building is also on Site. Figure 1 shows the Site location. Figure 2 is a site plan.

The Site is vacant, but historically, the principal activity was chemical manufacturing and storage. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. It is believed that much of the product manufacture took place in the subsurface kettles and vaults (units).

There are 43 known kettles and vaults below the floor slab in Buildings 2B, 2C, 3A, 3B, and 10. Limited investigation of these units has been completed over the years, so the nature of their contents and condition is not well understood.

This IRM describes the investigation methods and chemical analyses used to obtain more information about the kettles and vaults and describes the work necessary to clean and stabilize the units before they are removed as part of Site remediation.

Objectives

The specific IRM objectives include the following:

1. Obtain physical and chemical information for each of the 43 kettles and vaults
2. Assess whether the contents of the units are hazardous and whether potential vapors in the units are hazardous (e.g., toxic or explosive)
3. Remove as much liquid volume in each of the units as possible
4. Clean each unit(s) to the degree warranted to render the units safe and/or inert until remediation begins

2.0 SUMMARY OF RELEVANT ENVIRONMENTAL CONDITIONS

Previous investigations identified traces of disinfectant and lye in the kettles, which can be attributed to the historic use as a soap manufacturing facility. A subsequent sampling event by SCS Engineers in April 2013 sampled nine kettles and identified liquids with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals. All results proved non-hazardous except for one kettle (K-9), which had mercury above the Toxicity Leachate Control Procedure (TCLP) hazardous waste threshold. The pH of the kettles' contents was approximately neutral. Liquid was identified liquid in each of the 17 units opened during their investigation. The kettles are reported as having a depth of 6 feet below grade and a width of 10 feet. No length dimension is available.

3.0 INVESTIGATION

Further investigation is needed to determine the nature of the contents and liquid volume in each unit before IRM measures can be employed. The investigation will start with opening each unit, collecting vapor measurements and probing for liquid volume and collecting samples from each unit for chemical analysis. The analysis will characterize the contents and profile the liquid for disposal (Figure 3).

Each unit will be explored first by drilling a hole in the opening or opening the bung and inserting an explosimeter and screening for lower explosive limits (LEL), hydrogen sulfide (H_2S), and oxygen (O_2). If conditions prove non-hazardous, then a photoionization detector (PID) will be inserted to screen for organic vapors as will a Jerome mercury analyzer to monitor mercury vapor levels. Next, an aqueous sample will be collected for analysis using a bailer and/or peristaltic pump, or drum thief or similar apparatus. The units will be probed for their approximate dimensions, condition, and for free product.

Each unit with adequate liquid volume will be sampled for the following parameters:

- NYSDEC ASP 2005 Target compound list (TCL) volatile organic compounds (VOCs), EPA Method 8260
- NYSDEC ASP 2005 TCL semi-volatile organic compounds (SVOCs), EPA Method 8270
- NYSDEC ASP 2005 Target Analyte List (TAL) metals, EPA Method 6010/7000
- Total Petroleum Hydrocarbons (TPH), Diesel & Gasoline range organics
- TCLP analysis as warranted by analytical results
- Field parameters: pH, conductivity, temperature, oxidation reduction potential, and dissolved oxygen measurement

The information will be compiled in an inventory for use in managing each unit. An example of the inventory form is included as Appendix A.

The first phase will be sampling and evaluation of the results. The second phase will be removal, disposal, and stabilizing of the units.

4.0 REMEDY DESCRIPTION

Remediation depends on the chemical and physical conditions identified in each unit. In general, the IRM includes the following parts:

1. Render the unit(s) inert to eliminate the potential for explosive and/or toxic vapors. This will be accomplished by either venting the interior with fresh air and/or introducing nitrogen or carbon dioxide to displace the vapors. Rendering the unit(s) inert will not be undertaken if unwarranted by the conditions. The decision on the means and methods for rendering the unit(s) inert will be field based.

2. Remove the liquid in each unit. Liquids in each unit will be removed by means of a vacuum truck. After removal, the interior may be power washed to remove residue and the rinse volume again removed by vacuum truck. The decision will be field based. The vacuum truck or tanker may remain on Site until all units are emptied, tested, and accepted at an approved disposal facility.

3. The units will be stabilized, after cleaning, if warranted by field conditions. Stabilization may include filling the interior with nitrogen, carbon dioxide, foam, or other inert material to displace the vapors. Alternatively, the top of the units may be removed to allow fresh air to vent the unit in lieu of adding inert materials. This decision will be based on the contents and condition of each unit.

4. The units will be bonded and/or grounded as necessary to reduce sparking from static electricity.

5. All work will be done with bay doors open to promote ventilation, such that there is air flow through the work area. Fans will be available to increase air flow.

5.0 MONITORING

Air Monitoring

Ambient air monitoring will take place inside the building(s) where investigation and remediation of the kettles and vaults takes place (See Health & Safety Plan, Appendix B in the Supplemental Remedial Investigation Work Plan).

Community Air Monitoring Program (CAMP)

Since particulates are not a concern, VOCs in ambient inside air only will be monitored during all work phases using New York State Department of Health (NYSDOH) CAMP procedures:

VOC Monitoring, Response Levels, and Actions

VOCs will be continually monitored at the bay doors, the point before VOCs potentially reach the outside air, using a PID. VOC concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The PID will be calibrated at least daily, or more often if needed. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work may resume, provided that the total organic vapor is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, work must cease. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also are recorded.

In addition, ambient air will be periodically monitored using gas tubes for benzene and tetrachloroethene (PCE). Work shall cease and the cause of elevated benzene or PCE levels examined. Ventilation shall increase so as to bring the concentrations of indoor air concentrations for benzene below 0.5 ppm and PCE below 25 ppm (2013 recommendations of the American Conference of Governmental and Industrial Hygienists, ACGIH).

6.0 WASTE MANAGEMENT

The liquid removed from the units will be vacuumed directly into a vacuum truck. In this manner, all wastes will be contained and segregated from the environment. Pre-characterization testing will allow removal of waste directly to licensed, permitted disposal facility. Pre-characterization results will be used to assess the compatibility of the kettle and vault contents for mixing. Only compatible materials will be mixed in either the Vacuum truck or drums.

If any waste is stored on Site, it will be stored in DOT-approved in 55-gallon steel drums. PPE will also be stored in 55-gallon steel drums. All drummed waste will be sealed at the end of each work day and labeled with the date, location number, waste type (water, free product), and the point of contact.

The kettle and vault liquids (and sludge, if applicable) will be sampled for waste characterization purposes to determine if it is hazardous and to ensure that it meets the disposal facility requirements. Until the potential disposal facilities are known, the exact analyses cannot be specified, but it is anticipated that the liquids will be sampled for VOCs, SVOCs, PCBs, total petroleum hydrocarbons, metals, TCLP analyses, and RCRA characteristics. Alternatively, generator knowledge or pre-characterization sampling may be used to characterize the waste in lieu of sampling. This will depend on the disposal facility requirements.

7.0 SCHEDULE

The following proposed schedule outlines the key steps and timeframes to investigate and remediate the kettles and vaults:

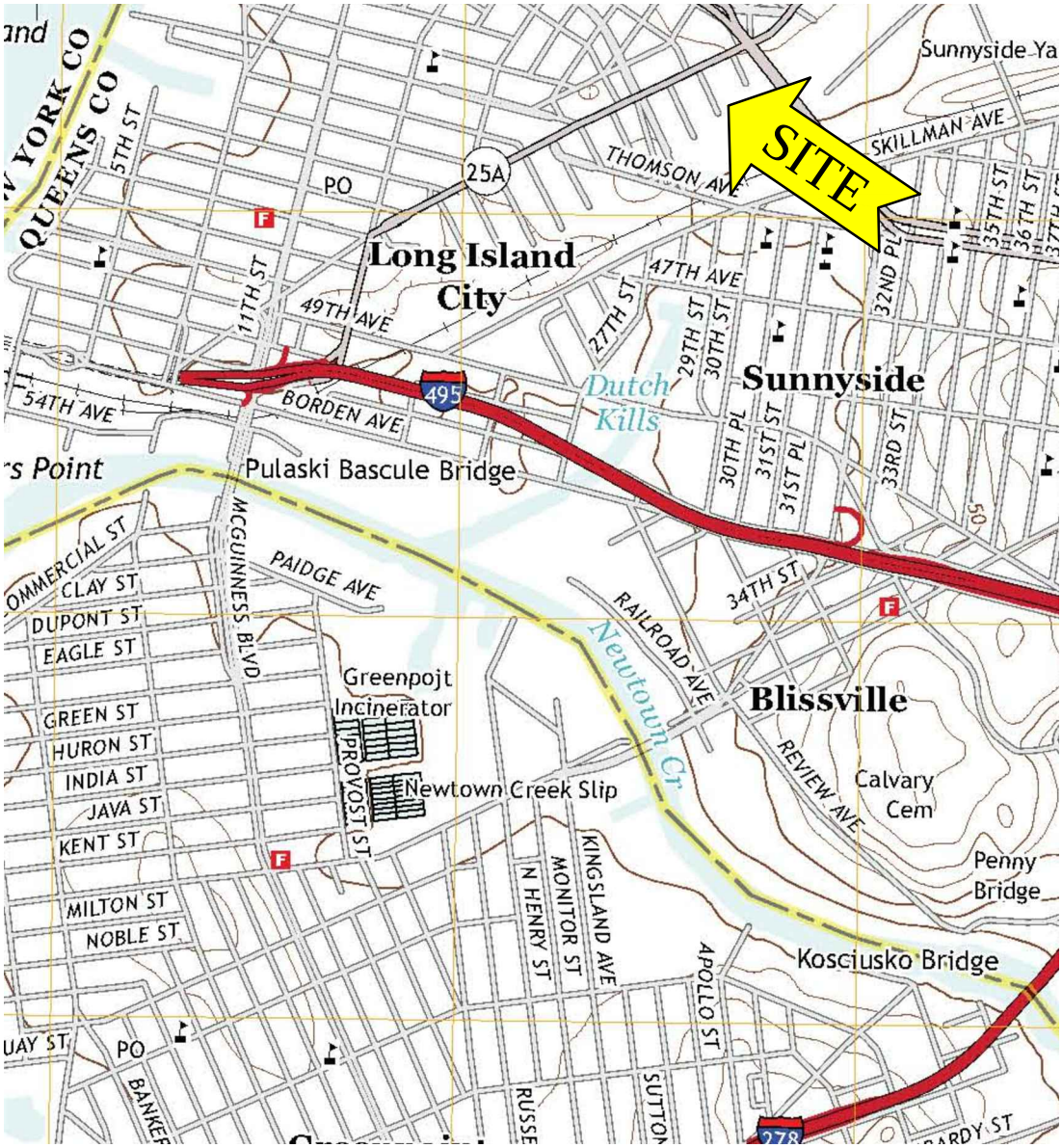
No.	Task	Time/Date
1	Kettle and vault investigation	7/8/14 – 7/11/14
2	Receive analytical results	7/25/14
3	Remediate kettles and vaults	8/1/14 – 8/15/14
4	IRM Remedial Action Report	9/16/14

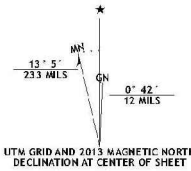
8.0 REFERENCES

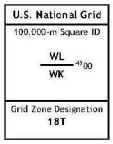
Muser Rutledge, *Geotechnical Summary Report, Queens Plaza Project —Site A, Long Island City, Queens, New York,* April 20, 2007.

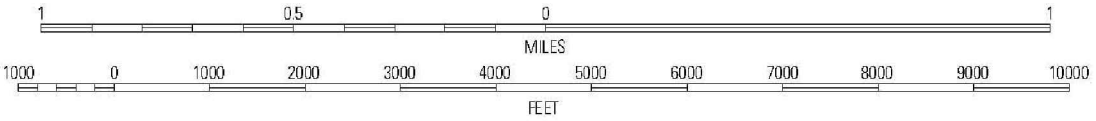
Fleming-Lee Shue, Inc., *Outlet City Voluntary Cleanup Program (VCP) No. V00081-2 Long Island City, NY. Remedial Investigation Report*, April 2007.

FIGURES









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NORTH AMERICAN VERTICAL DATUM OF 1988

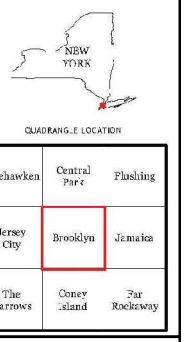


FIGURE 1: BROWNFIELD SITE LOCATION MAP

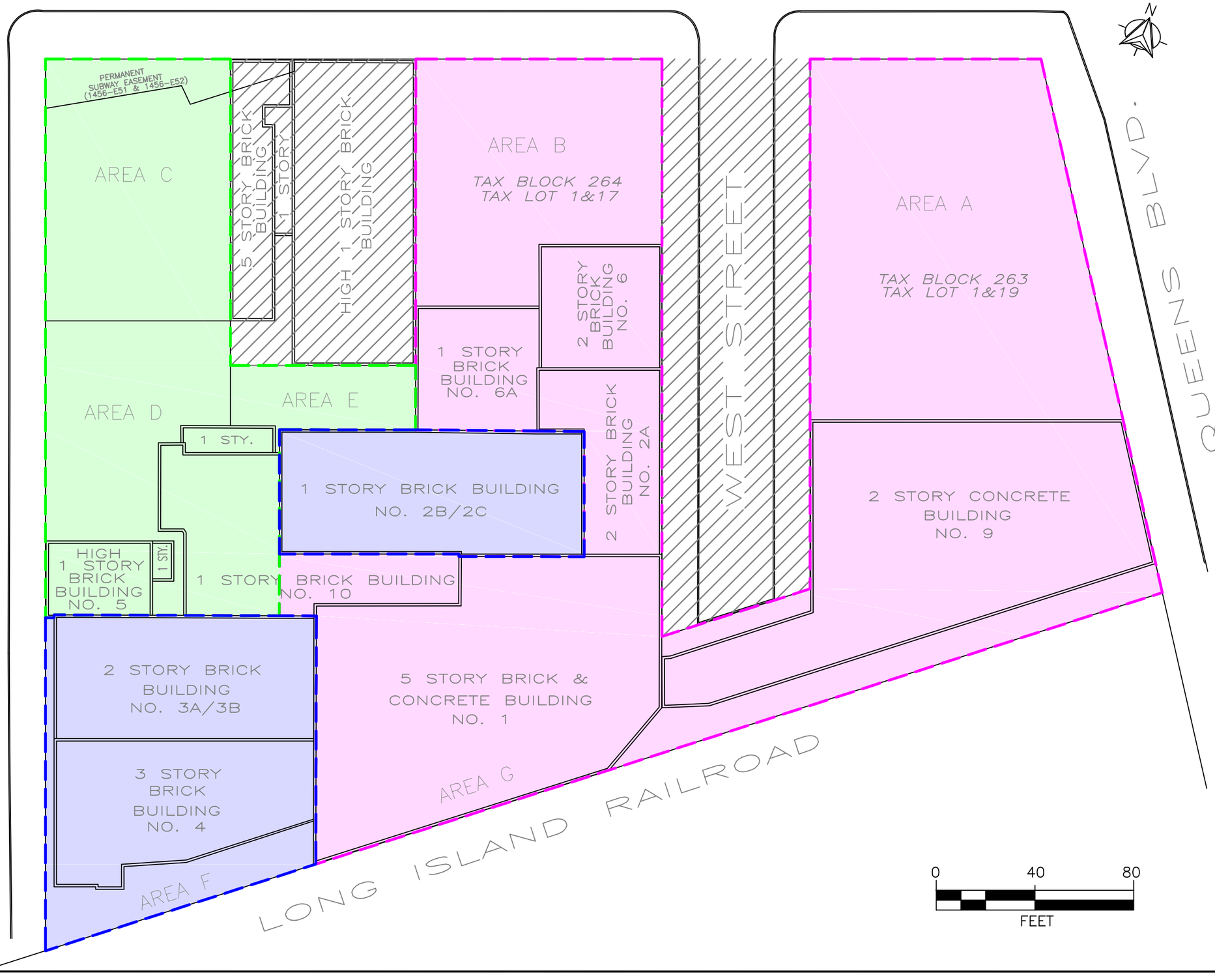
Arnold F. Fleming, P.E

158 West 29th Street, 9th Fl.
New York, NY 10001

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

FILE: P:\Project Files\10112 – Tishman Consulting\001-10 – Site B\Figures\Kettle Investigation\FIG 1 – Site Location.dwg DATE: 3/31/2014



Arnold F. Fleming, P.E

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B

FIGURE 2

BROWNFIELD SITE PLAN

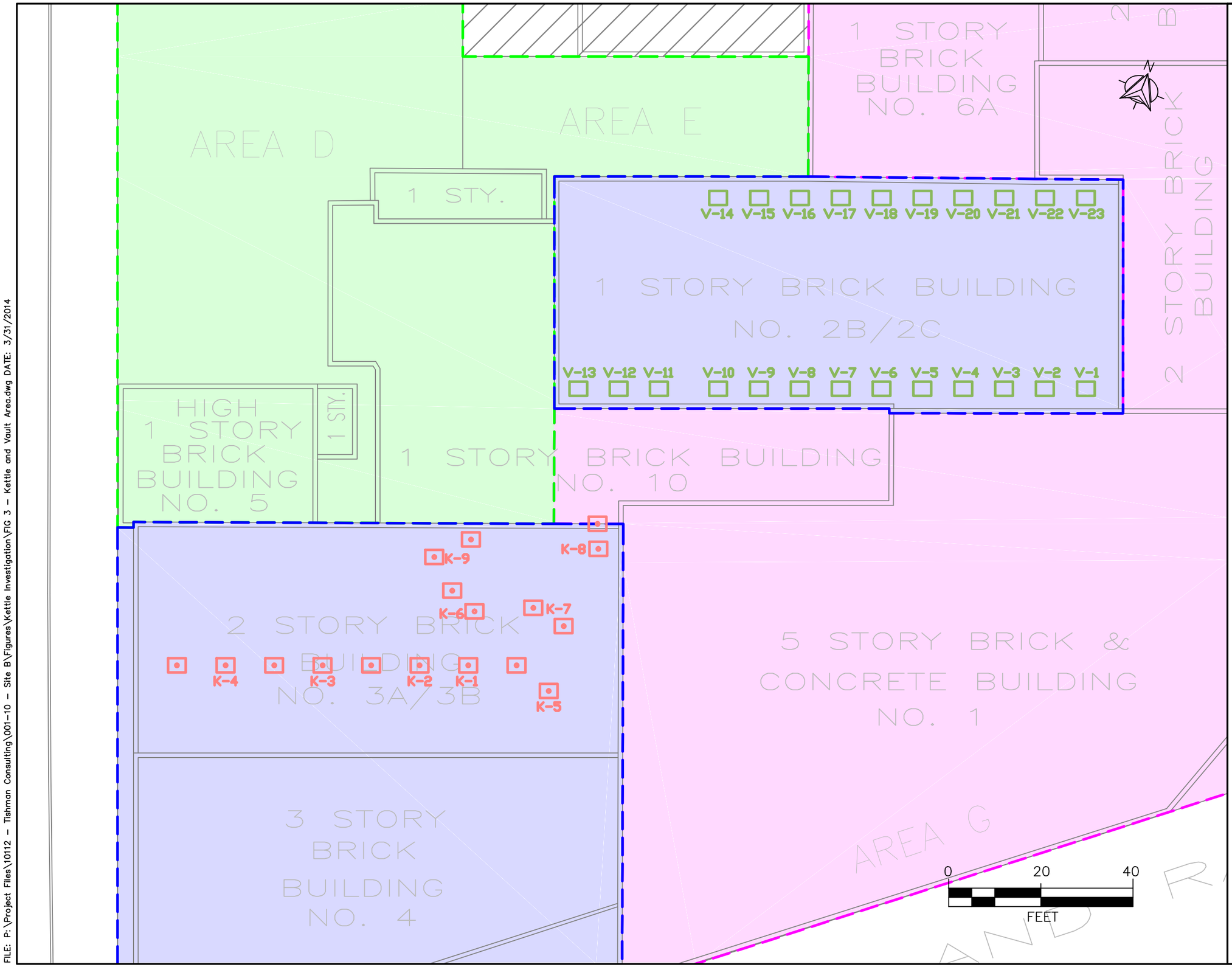
Date
March 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE

FILE: P:\Project Files\10112 – Tishman Consulting\001-10 – Site B\Figures\Kettle Investigation\FIG 2 – Site Plan.dwg DATE: 3/31/2014



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Kettle Investigation\FIG 3 - Kettle and Vault Area.dwg DATE: 3/31/2014

Arnold F. Fleming, P.E

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development

FIGURE 3

KETTLE AND VAULT AREA

Date
March 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE
- KETTLE
- VAULT

APPENDIX A

Kettle & Vault Inventory Form

Kettle & Vault Inventory

Unit ID	Approximate Dimensions (L x W x H)	Depth to Liquid (ft.)	Estimated Liquid Vol. (gals)	Cumulative Volume (gals)	LEL %	H_2S, PPM	O_2 %	Hg vapor ppm	PID ppm	TCLP Results[1]	Remarks
K-9	10 x10 x 6	5.5	375	375	<.5	< 1	20.5	<1	3	Haz. for Hg	VOCs, SVOCs, & all other metals below TCLP thresholds

EXAMPLE ONLY - DATA NOT VALID

[1] NH - non hazardous; analytical results did not warrant TCLP testing

APPENDIX F

Soil Excavation IRM Interim Remedial Measures Work Plan

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

SOIL EXCAVATION IRM INTERIM REMEDIAL MEASURES WORK PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

November 2014

By

Arnold F. Fleming, P.E.

Professional Engineer's Certification

INTERIM REMEDIAL MEASURE WORK PLAN
Queens Plaza Residential Development – Site B
Long Island City, NY

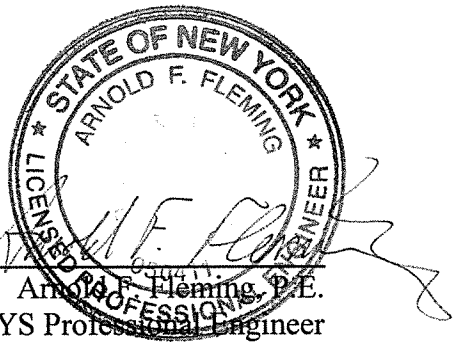
BCP No. C241151

November 2014

I Arnold F. Fleming certify that I am currently an NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Interim Remedial Measure 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, Arnold F. Fleming, hereby certify that the information presented in the report was prepared under my direct supervision.

11/14/14
Date



Arnold F. Fleming, P.E.
NYS Professional Engineer
License Number 050411

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1.0 INTRODUCTION & PURPOSE

The purpose of this Interim Remedial Measure Work Plan (IRMWP) for the Queens Plaza Residential Development Site B (C241151) is to present remedial measures that meet the requirements of the Brownfield Cleanup Program (BCP) while addressing the specific conditions on BCP Site B. LIC Development Owner, LP (the "BCP Volunteer") acquired BCP Site B on June 13, 2014.

The BCP Site B is in Long Island City, Queens County, New York and encompasses an irregularly-shaped parcel bounded on the north and west by the Queens Plaza Residential Brownfield Site A. (C241105) and Jackson Avenue. On the west, BCP Site B abuts Orchard Street, a mapped and dedicated city street. The southern boundary of BCP Site B is the Long Island Railroad (LIRR) Sunnyside Yard property. The eastern side of BCP Site B borders Queens Boulevard. Figure 1 presents a Brownfield Site Location Map and Figure 2A presents a Brownfield Site Plan. Figure 2B presents the BCP Site with a grid cell overlay. (The grid overlay provides a permanent reference system after the Site configuration changes following demolition. It also assists in remediation: each grid cell is approximately 30 ft. by 30 ft.).

BCP Site B was formerly enrolled in the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP), VCP No. V00081-2.

BCP Site B consists of two parts: Operable Unit 1 (OU-1) and Operable Unit 2 (OU-2) (Figure 2A). BCP Site B OU-1 consists of 2 and 3-story buildings: Buildings 3A, 3B, Building 4, Buildings 2B, 2C, and a small open area known as Area F. OU-2 includes the balance of the property, principally to the east of OU-1, but excludes West Street. OU-2 includes a number of 1- and 2-story brick buildings, and one 5-story building. The Site is also a New York City "E" designated site for air quality, noise, and hazardous waste. The BCP Site B is currently unoccupied.

The proposed remedy for OU-1 contemplates excavation and disposal of all soils down to approximate depths of 12 to 20 feet below ground surface (ft-bg) or bedrock. The exact depths to excavate will be pre-determined by the results of the Remedial Investigation. Endpoint samples will document that soil results above the soil cleanup objectives has been removed. A pre-excavation survey of ground surface and slabs will establish ground surface and slab elevations following demolition.

Additional soil removal will occur where source area material is found: "a portion of a site or area of concern at a site where the investigation has identified a discrete area of soil, sediment, surface water or groundwater containing contaminants in sufficient concentrations to migrate in that medium, or to release significant levels of contaminants to another environmental medium, which could result in a threat to public health or the environment" (Part 375 Section 1.2 (au). Inaccessible materials will be addressed by institutional and engineering controls.

The proposed remedy for OU-2 contemplates excavation and disposal of all soils down to approximate depths of 15 or more feet below ground surface (ft-bg) or bedrock; but the

exact depths to excavate will be pre-determined by the results of the Remedial Investigation. Endpoint samples will document that soil results above the soil cleanup objectives has been removed. A pre-excavation survey will establish ground surface and slab elevations following demolition. Remediation may include additional hot spot removal where required, in the margins along Jackson Avenue, Queens Boulevard, and the NYCT Substation, and capping where necessary.

The BCP B Site topography slopes gently to the south. The average surface elevation is approximately 13.6 ft. North American Vertical Datum 88 (NAVD88) on OU-1 and 17.6 ft. NAVD88 on OU-2. Upper soils consist of a fill layer approximately 5 to 9 feet thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The depth to bedrock is variable beneath BCP Site B. All BCP Site B soil has been historically capped with buildings, asphalt paving, or concrete.

Historically, chemical manufacturing/storage was the principal activity on the BCP Site B. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. Creosote was used in a disinfectant and creosote spills represent the most significant contamination of BCP Site B OU-1 soil and groundwater. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layers at depth. Chlorinated solvents have been detected in soils and groundwater.

The structures on BCP Site B are built of reinforced concrete frame and wood post-and-beam construction and have served commercial purposes for 50 or more years. Building 3 has a concrete floor at or slightly below the surrounding sidewalk elevations. Building 4 has a basement that lies several feet below sidewalk grade. The buildings on OU-2 are 2 and 3-story structures, and one 5-story structure of similar construction and age. The buildings will be demolished prior to and/or concurrently with remediation, but their foundations will remain and be removed as appropriate under the remediation of BCP Site B; ultimately this will be a field decision

The properties surrounding BCP Site B are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the Long Island Railroad (LIRR) Yard A. To the north and west lies the BCP Site A, which is currently vacant. To the north across Jackson Avenue is Two Gotham Center, a 700,000 ft^2 office building and vacant land between the office building and Jackson Avenue. West of BCP Site B are warehouse buildings and light manufacturing. East of the Brownfield Site, across Queens Boulevard (Route 25 and the elevated No. 7 Subway Line), is a former gasoline filling station and an empty lot. The BCP Site B was historically zoned as "M1-6 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development.

The entire BCP Site B OU-1 encompasses 19,076 ft^2 (0.438 acres). The BCP Volunteer intends to pursue Track 2 Restricted Residential Soil Cleanup Objectives (SCOs)—meaning excavation to 15 feet below existing ground surface or bedrock—for OU-1 with

Brownfield Cleanup Track 4 Restricted Residential as the fall-back soil cleanup goals if Track 2 cannot be attained.

OU-2 occupies 63,006 ft^2 (1.45 acres). The BCP Volunteer intends to pursue Track 2 Restricted Residential Soil Cleanup Objectives (SCOs)—meaning excavation to 15 feet below existing ground surface or bedrock—for OU-2 with Brownfield Cleanup Track 4 Restricted Residential as the fall- back soil cleanup goals if Track 2 cannot be attained.

Soils will be excavated to the extent feasible meet the 6 NYCRR Part 375, Table 375-6.8(b) Soil Cleanup Objectives (SCOs). Where excavation is 15 feet or less below ground surface, the soil cleanup goals will be the Restricted Residential SCOs or, where groundwater is above the TOGS GA standards as identified in the Remedial Investigation, the soil cleanup goals will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS standards. Where excavation is deeper than 15 feet below ground surface, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS will be the applicable SCOs. Groundwater will comply with Part 375, Section 6.5.

In essence, much of OU-2 will be excavated to 15 or more feet below ground surface with the exceptions being along the margins of Jackson Avenue, Queens Boulevard, and the New York City Transit (NYCT) substation. A 2- to 3-foot-wide strip along the Long Island Railroad, Queens Boulevard, Jackson Avenue, and the NYCT substation containing Support of Excavation (SOE) structures may not be excavated to the property line or to 15 feet below ground surface in some instances because of these structures and/or NYCT restrictions.

Groundwater contamination will be addressed while dewatering for construction. Dewatering will act as a pump-and-treat system removing contaminated groundwater and introducing oxygen that will enhance natural degradation.

Any contamination not addressed by this IRM will be addressed in an overall Site remedy.

2.0 BROWNFIELD SITE DESCRIPTION

2.1 Brownfield Site Location

The BCP Site B occupies the larger portion of a city block. BCP Site B occupies tax Block 264, Lots 1R and 17 and Block 263, Lots 1 and 9. Figure 1 presents a BCP Site Location Map and Figure 2A presents a BCP Site Plan. A BCP Site B survey is included in Appendix A.

2.2 Brownfield Site & Vicinity Characteristics

The BCP Site B is in Long Island City, long a manufacturing district but rezoned by the City to allow a mixed residential commercial neighborhood. The BCP Site B lies in an area containing a mixture of residential buildings, office buildings, and commercial enterprises consisting of warehouses, light manufacturing, retail, and shipping terminals. The LIRR Yard A to the south of the BCP Site B is a major transportation hub consisting of numerous tracks and train service equipment. Figure 3 presents an aerial view of the BCP Site B and surrounding areas.

2.3 Nearby Public Areas of Concern

The nearest schools are St. Patrick's School and Public School No. 4, which are over 1,800 feet north of the BCP Site B. Two churches are approximately 1,000 feet west of the BCP Site B and the New York Foundling Hospital lies more than 2,000 feet southwest of the property. The New York City Elevated Subway Line No. 7 passes by the BCP Site B along the eastern Site boundary, along Queens Boulevard. A subway tunnel transects the southeast corner of the intersection of Jackson Avenue and Orchard Street, approximately 200 feet from Site B. (Figure 2A), connecting to an active subway tunnel under Jackson Avenue. Figure 3 shows the location of sensitive land uses in the neighborhood. A subway tunnel borders the Site on the northern boundary, along Jackson Avenue.

2.4 Brownfield Site History

Prior to urban development of Queens, the real property containing BCP Site B occupied an elevated area between two streams, an unnamed stream to the west and Dutch Kill to the east of the BCP Site B (Beers, 1868), both discharging into Newtown Creek. Both streams were flanked by a marsh south of the BCP Site B that now contains the LIRR Sunnyside Yard. The West Chemical Company (West Chemical) occupied the BCP Site B from the early 1900s until 1977. During this time West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Prior to 1950, West Chemical manufactured a disinfectant that required storage of large quantities of creosote. Creosote use was discontinued after 1950 because of leaks and a fire that prompted the New York City Fire Department (FDNY) to empty the entire contents of a creosote-filled above ground storage tank (on Brownfield Site A) directly to the ground surface in order to prevent its combustion during the fire.

Reportedly, West Chemical stored a variety of other materials on-Site during its tenure including muriatic acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand creams, cleaning products (floor waxes and cleaners), and vending machine products.

West Chemical divested the BCP Site B and transferred ownership to Outlet City, Inc. in 1978. The BCP Site B is currently unoccupied.

2.5 Off-Site History

A New York City Transit (NYCT) substation and a vacant, 5-story residential building occupy property on nearby lots immediately north and west of BCP Site B. The area along Jackson Avenue was historically residential buildings with commercial/retail uses on the ground floor, similar to the one remaining structure of this type, the 5-story residential building. These buildings were demolished over time and the areas they formally occupied are now used principally for parking and storage.

The properties surrounding BCP Site B are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the Long Island Railroad (LIRR) Yard A. To the north and west lies the BCP Site A, which is vacant. To the north across Jackson Avenue is Two Gotham Center, a 700,000 ft^2 office building. West of BCP Site B are warehouse buildings and light manufacturing. East of the Brownfield Site, across Queens Boulevard (Route 25 and the elevated No. 7 Subway Line), is a former gasoline filling station and a vacant lot. The BCP Site B was historically zoned as "M1-6 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development.

West Street, a de-mapped City Street, outside of BCP Site B, extends south from Jackson Avenue into BCP Site B almost to the LIRR property.

2.6 Description of Contemplated Use

The BCP Volunteer intends mixed-use residential and commercial use on the BCP Site B.

2.7 Brownfield Site Geology, Hydrogeology, and Subsurface Characteristics

The BCP Site B is located on gently sloping land with a surface elevation of approximately 13.6 ft. NAVD88 for OU-1 and approximately 17.6 ft. NAVD88 for OU-2. The generalized subsurface profile consists of fill overlying silty sand and glacial till, with bedrock below the till. A lens of clay above the bedrock near the center of the BCP Site B OU-1 occurs in the area with the worst contamination. A bedrock elevation contour map for BCP Site B and a geologic cross-section for the Brownfield Site OU-1 are depicted in Figures 4 and 5.

Subsurface soils consist of a fill layer approximately 5 to 9 feet in thickness. This fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varied silt and clay are present within this sand unit in some locations on the BCP Site B. The sand layer varies in thickness from approximately 5 to 7 feet. Additionally, a till layer is present over most of the BCP Site B OU-1beginning from approximately -0.38 ft. to -9.38 ft. NAVD88 and extending to the top of bedrock at elevations of approximately -2.4 ft. to -12.4 ft. NAVD88 in OU-1. Based on soil boring data from previous investigations, bedrock at the BCP Site B is gneiss.

Groundwater occurs within the unconsolidated geologic materials covering the BCP Site B. The upper surface of the groundwater reservoir is marked by the groundwater table, which fluctuates seasonally in response to precipitation. The groundwater table elevation ranges from approximately 6 ft. to 8 ft. and averages 7.3 ft. NAVD88 over most of BCP Site B. Groundwater flow direction is predominantly to the south-southwest. Figure 6 shows the direction of groundwater flow.

No surface water bodies exist on the BCP Site B. The closest surface water body is the Dutch Kill coming from the Newtown Creek, located approximately 1,600 feet south of the BCP Site B, and the East River approximately 4,200 feet to the west.

2.8 Other Environmental Conditions

This section describes other environmental conditions that will be addressed during remediation.

2.8.1 Underground Process Kettles/Vaults and Storage Tanks

The underground units (kettles and vaults) will be remediated (emptied, power washed, and stabilized, as necessary) as part of an interim remedial measure (IRM) approved by NYSDEC.

3.0 INTERIM REMEDIAL MEASURE WORK PLAN

This IRMWP describes the details to remediate the BCP Site B. There are two different interim remedial measures, one for OU-1 and one for OU-2. Excavation of contaminated soil is the principal means by which remediation will take place, and the goal is Track 2 Restricted Residential cleanup with Track 4 Restricted Residential cleanup as a fall back if Track 2 cannot be attained. Soil cleanup goals: Where excavation is 15 feet or less below ground surface, the soil cleanup goals will be the Restricted Residential SCOs or, where groundwater is above the TOGS GA standards as identified in the Remedial Investigation, the soil cleanup goals will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS standards. Where excavation is deeper than 15 feet below ground surface, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS GA standards will be the applicable SCOs. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet below ground surface.

The results of the Remedial Investigation will be used to pre-determine the remedial excavation depths. Then endpoint sampling will be used to document that all soil above the standards has been removed. If endpoint confirmation samples identify compounds above the SCOs, then excavation will continue and additional endpoint samples will be collected for the compound(s) exceeding the SCOs. Excavation will be repeated until the SCOs are attained to the extent feasible. Any residual contamination not addressed by this IRM will be addressed in an overall Site remedy.

There may be instances where Track 2 cannot be attained. These conditions may arise along the site perimeter where the Support of Excavation (SOE) is 2 to 3 feet inside the property line and the structure prevents excavation. Other instances where Track 2 cannot be attained are where New York City Transit (NYCT) restrictions prohibit excavation within certain distances of their structures. A metes and bounds description of each Track 2 and Track 4 area will be prepared.

The building demolition contractor will remove the buildings so as to leave the building slabs in place. The remediation contractor will subsequently remove the building slabs during remedial soil excavation.

Where remedial excavation exposes bedrock, the bedrock will be examined to assess whether non-aqueous phase liquid (NAPL) is present in the bedrock. If NAPL is observed, then as much of it as feasible will be removed during excavation. An evaluation whether bedrock needs to be remediated will also be made in conjunction with information obtained during the Remedial Investigation and information obtained during a concurrent geotechnical investigation.

OU-1 Interim Remedial Measure

The IRMWP describes the details to excavate OU-1. The IRM plan contemplates excavating the entire OU-1 area to approximately 12 to 20 feet below existing ground surface or to bedrock; but the results of the Remedial Investigation will be used to pre-

determine the remedial excavation depths. Bottom endpoint samples will be collected at the depths pre-determined by the Remedial Investigation. Then endpoint sampling will be used to confirm that all soil above the SCOs has been removed. If endpoint confirmation samples identify compounds above the SCOs, then excavation will continue and additional endpoint samples will be collected for the compound(s) that were above the SCOs. Excavation will be repeated until the SCOs are attained to the extent feasible.

If source area material is encountered below 15 feet, then it will be removed until soil meeting the SCOs is encountered or to bedrock, whichever is shallower. Source material will be removed such that it meets the Protection of Groundwater SCOs for compounds identified in the Remedial Investigation that exceed TOGS GS standards. Soils will be excavated and sampled as described in Section 3.2.1

Sidewall samples will be collected along the Site perimeter to document conditions at the property line. Sidewall samples will be collected from the most contaminated interval using a Geoprobe or similar equipment to collect sidewall samples along the outer edge of the support of excavation if infeasible to collect samples from the interior face of the support of excavation. Sidewall sample locations will be photo-documented.

The buildings on OU-1 and buildings near OU-1 will be demolished to ground surface before remediation begins or take place concurrently with remediation, but their slabs will remain, although the disposition of foundations will be a field determination. The foundations will be removed during remediation because of potential contamination and/or used as barriers to contamination re-entering the BCP Site, pending discussion with the Department, depending on field conditions. Beyond excavation, another goal is to add hydraulic control to prevent contaminated groundwater from leaving the BCP Site, if warranted.

OU-2 Interim Remedial Measure

The IRMWP describes the details to excavate OU-2. The IRM plan contemplates excavating the entire OU-2 area to approximate depths of 15 to 20 feet below existing ground surface; but the results of the Remedial Investigation will be used to pre-determine the remedial excavation depths. Bottom endpoint samples will be collected at the depths pre-determined by the Remedial Investigation. Then endpoint sampling will be used to confirm that all soil above the SCOs has been removed. If endpoint confirmation samples identify compounds above the SCOs, then excavation will continue and additional endpoint samples will be collected for the compound(s) that were above the SCOs. Excavation will be repeated until the SCOs are attained to the extent feasible, the goal being to attain the SCOs and remove source contamination per Part 375.

If source area material is encountered below 15 feet, then it will be removed until soil meeting the SCOs is encountered or to bedrock, whichever is shallower. Source material will be removed such that it meets the Protection of Groundwater SCOs for compounds identified in the Remedial Investigation that exceed TOGS GS standards. Soils will be excavated and sampled as described in Section 3.2.1.

Excavation of hot spot areas will begin by removing soils and collecting endpoint samples. Any additional excavation will proceed by removing a 10- foot by 10-foot area centered on the sample where analytical results exceed the SCOs to a depth determined by the field geologist. This procedure will continue until the SCOs are attained to the extent feasible. Hot spot areas below 15 feet below ground surface will be treated as described in Section 3.2.1, if required.

Initial bottom endpoint samples will be collected in soils at the base of the excavation and at the bottom of hot spot excavations for the full parameter list. At locations 15 feet below ground surface or shallower, the endpoint results must meet the Restricted Residential SCOs or, where groundwater is above the TOGS GA standards as identified in the Remedial Investigation, the soil cleanup goals will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS standards. Where excavation is deeper than 15 feet below ground surface, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS GA standards will be the applicable SCOs. Subsequent bottom endpoint samples at hot spot locations, where initial endpoint samples identify a compound(s) failing the SCOs, will be collected for the parameter(s) that were above the SCOs, until the hot spot soils meet the SCOs, to the extent feasible. If bottom endpoint samples fail the Track 2 SCOs, then either Track 4 SCOs will apply by default or additional excavation and endpoint sampling may take place. If excavation below 15 below ground surface cannot meet the Protection of Groundwater SCOs for the contaminants above groundwater standards from the RI, then the four conditions from Part 375-6.5 must be met.

Sidewall samples will be collected from the most contaminated interval using a Geoprobe or similar equipment to collect sidewall samples along the outer edge of the support of excavation if infeasible to collect samples from the interior face of the support of excavation. Sidewall sample locations will be photo-documented.

The buildings on OU-2 and buildings near OU-2 will be demolished to ground surface before remediation begins or take place concurrently with remediation, but their foundations may remain, although the disposition of foundations will be a field determination. The foundations may be removed during remediation because of potential contamination and/or used as barriers to contamination re-entering the BCP Site B, depending on field conditions and discussion with the Department. Beyond excavation, another goal is to add hydraulic control to prevent contaminated groundwater from leaving the BCP Site, if warranted.

3.1 Brownfield Site Preparation

3.1.1 Sediment and Erosion Control Measures

Sediment and erosion control measures will be installed prior to any ground-intrusive work. They will be installed according to the requirements of the Storm water Pollution Prevention Plan (SPPP), Appendix B. SPPP measures will provide for control of environmental pollution arising from storm water during remediation and construction. The control measures will include a berm, or hay bales around the BCP Site B perimeter,

drainage inlet protection, stabilized construction pads at each construction entrance and routine maintenance and street cleaning. Appendix B describes the specific measures in detail.

3.1.2 Grading

Structural materials will be brought on BCP Site B and for remediation. BCP Site B is currently almost completely covered by unoccupied buildings that will be demolished to allow access to the soils beneath the structures. Demolition of the buildings will lower the BCP Site B to sidewalk grade or below before remediation begins.

Any imported backfill required for grading will either be certified virgin material or non-virgin material that has been tested and meets the stated reuse criteria as noted in the Soil Management Plan (SMP) in Appendix C, or is otherwise acceptable to the Department.

3.1.3 Support of Excavation

Areas adjacent and within the Site contain source contamination in the form of light non-aqueous phase liquid (LNAPL), dense non-aqueous phase liquid (DNAPL), or NAPL-stained soils. NAPL is believed to have accumulated along the northern foundation wall of Building 4 in OU-1. It is possible that the remedial excavation will encounter NAPL at these locations, and it is possible that the NAPL could migrate back onto the remediated area. A means of preventing re-contamination of the remediated areas may therefore be necessary. Additional samples may be collected to verify that clean areas have not been re-contaminated.

A number of methods of preventing re-contamination may be used depending on the structures and nature of the contamination near them. Sheeting may be used on OU-1 where there is sufficient space to drive the sheet piles and where the structures can sustain the vibration. Where these conditions cannot be met, the approach may be to use underpinning of structures to below the smear layer. If foundation walls extend to bedrock, then these may be left in place to control migration, if conditions warrant; this will be a field determination in consultation with the Department. Figure 7 shows the anticipated location of the excavation support system. At some locations field conditions will dictate what method is used; and this will only be known upon excavation.

Waste characterization and additional geotechnical soil sampling are planned for the BCP Site B in which numerous borings within the footprint(s) and along the Site perimeter will be advanced. The information obtained from these borings will influence the means to control NAPL in OU-1.

Permanent interlocking sheeting may be installed around other segments of the remedial excavation in OU-1 to isolate it from re-contamination; the exact location and extent of sheeting will be based on Site conditions. The sheeting will be driven into the low-permeability till layer, other low permeability stratum, or to bedrock as warranted by field conditions. Sheeting will include all necessary walling, bracing, and/or tiebacks. The sheet

piling will be new and unused, conforming to the requirements of ASTM A328-07, unless otherwise indicated.

The sheet piling must conform to all applicable codes and standards. The seams in the sheeting will be sealed with hydrocarbon-resistant Adeka gaskets, or equivalent, to prevent infiltration of contaminants back onto the BCP Site. Steam, vibratory, pneumatic or diesel-powered hammers will be used to drive all sheeting. Any material that obstructs the driving of sheeting may be removed by excavation.

3.1.4 Permits/Notifications

All necessary permits will be obtained prior to commencing the remediation work. The permits that may be required include:

- New York City Department of Sanitation (DPS) landfill permit (16 RCNY Chapter 3) for placement of clean fill – Not anticipated.
- A New York City Department of Environmental Protection (NYCDEP) sewer connection permit (15 RCNY Chapter 19) for the discharge of the groundwater from dewatering operations to the city sanitary sewer and remediated groundwater after dewatering ceases.
- A NYSDEC Long Island Well Permit or permit equivalency may be required for dewatering depending on the rate and duration of the dewatering system.
- Filing of a Notice of Intent (NOI) with the NYSDEC to obtain coverage under New York State Pollution Discharge Elimination System (SPDES) General Stormwater Permit for Construction Activity – Not anticipated because under the BCP the applicant need not obtain specific permits but must meet the practical requirements of the permit.
- A copy of the NYSDEC Air Facility Registration form and manufacturer cut sheets for the blowers and the granular activated carbon vessels associated with the air handling/vapor treatment system will be provided to NYSDEC
- Building permit for excavation enclosure
- Part 375.1.12 waiver for local permits. Not anticipated, but could be required.
- Excavation permits issued by the Transit Authority for ground intrusive activities within the off-set of Transit Authority structures.

3.2 Soil Removal

The following sections describe the remedial excavation methods and procedures.

3.2.1 Extent of Soil Removal

Soils will be excavated to meet the Track cleanup goals. Where soil is above the SCOs, the soil will be excavated to the extent feasible to meet the lower of the Restricted Residential SCOs or the Protection of Groundwater SCOs (6 NYCRR Part 375, Table 375-

6.8(b)). For soils greater than 15 feet below ground surface, the Protection of Groundwater SCOS will apply for those compounds observed above the TOGS GA groundwater standards as identified in the Remedial Investigation. The goal is to remove source material (as defined in Part 375), to the extent feasible, in soils deeper than 15 feet below ground surface. Groundwater will comply with Part 375, Section 6.5 and meet all four groundwater criteria (i, ii, iii, iv) of (a) (1).

The results of the Remedial Investigation will be used to pre-determine the remedial excavation depths. Then endpoint sampling will be used to confirm that all soil above the standards has been removed. If endpoint confirmation samples identify compounds above the SCOs, then excavation will continue and additional endpoint samples will be collected for the compound(s) that were above the SCOs. Excavation will be repeated until the SCOs are attained to the extent feasible.

OU-1

Excavation will extend to the boundary of OU-1. Soldier beams and lagging are anticipated to be constructed approximately 3 feet beyond the property line along Orchard Street. Within the BCP Site B, a combination of sheeting, shoring, and underpinning will stabilize the excavation sides where there are building foundations or walls. The BCP Site B will have been previously divided into grid cells for the purpose of pre-characterizing soil for disposal (refer to the Soil Management Plan in Appendix C).

Soil within OU-1 will be excavated to meet the Track cleanup goals. Where source material occurs, the soil will be excavated to where clean soil is encountered and confirmed by soil sampling or to bedrock whichever is shallower, to the extent feasible.[1] Any residual contamination will be addressed as part of an overall Site remedy.

OU-2

Shallow excavation will extend to the boundary of OU-2, although where soldier beams and lagging and/or secant type walls are in place for excavation, excavation may fall 2 to 3 feet short of the Site boundary. Where source material is encountered, the soil will be excavated to where bottom endpoint results meet the soil cleanup criteria to the extent feasible. If this is infeasible due to physical limitations, then residual contamination will be addresses as part of the overall Site remedy (Track 4 cleanup goals will be adopted). Any residual contamination will be addressed as part of an overall Site remedy.

OU-1 & OU-2

Post-excavation bottom confirmation samples will be collected at endpoints to document conditions at a sampling rate of one endpoint sample/900 ft^2 (DER-10, 5.4 (a) 2 ii). Post-excavation sidewall samples will be collected around the excavation perimeter at a rate of one sample/30 linear feet (DER-10, 5.4 (a) 2 ii). Since these samples will be at the

[1] Depth to bedrock occurs at 15 feet below ground surface over approximately 60 percent of OU-1. The deeper soils lie closer to the southern Site boundary and are expected to be significantly less contaminated.

perimeter of the BCP Site B, they are for documentation purposes. Where sheeting is left in place inside the outer perimeter, end point samples will be obtained by geo-probe samples just outside the sheeting. It is estimated that a total of up to approximately 65,000 to 75,000± tons of soil in OU-1 and OU-2. Large pieces of uncontaminated debris such as wood and concrete will be segregated from the soils and set aside as construction and debris (C & D) for disposal.

3.2.2 Excavation

The method is to excavate and load soil (and debris) directly into trucks for disposal at off-Site facilities without stockpiling; however, some temporary stockpiling within the excavation may be necessary based on the availability of transport vehicles. There is insufficient space to routinely stockpile and segregate large volumes of soil and direct loading is the most effective means to meet the remediation schedule and control potential odors. Soil will be removed using appropriate or otherwise suitable excavation equipment. The excavation of OU-1, where creosote or petroleum contamination is anticipated, will be performed within an engineered containment structure designed for constant negative air pressure to contain odors. The area covered by the containment structure may be expanded based on the Remedial Investigation data.

Soil will be excavated over the entire BCP Site area and loaded directly into trucks for off-site disposal whenever possible. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible, but may still require alternative odor control measures. This decision will be made in conjunction with the Department. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible. Any soil stockpiled outside a containment structure will be placed upon plastic sheeting and covered with plastic sheeting at the end of each day. Soils stockpiled within the containment structure will be placed on plastic sheeting but not covered. At the conclusion of each work day, exposed contaminated soil within the containment structure will be covered with plastic and/or long-duration foam and then the air handling system will be turned off.

DNAPL was not identified in the borings along Orchard Street and no migration of product back into the BCP Site B from this direction is anticipated.

Potential areas for DNAPL migration from off-Site occur along the north wall of Building 3A, Building 4, Buildings 2B and 2C, and the west and south walls of Building 2C. Building details are unknown at these locations and it is possible that the building walls extend to the top of bedrock. Their exact condition will only become known when the buildings are demolished and excavation begins. Depending on the uncovered conditions, several alternatives may be used to control DNAPL from migrating on or off Site. Measures may include underpinning of the building foundations or installing sheeting that will be keyed into the till or extend to bedrock.

3.2.3 Containment Structure—Petroleum and Creosote-Contaminated Areas of the BCP Site – OU-1 and Areas of OU-2

Creosote is thought to be responsible for nearly all of the environmental impacts in OU-1 and generates strong odors. Consequently, OU-1 soils must be excavated beneath an engineered containment structure so that odors and vapors can be controlled. The enclosure(s) will be an engineered structure that may consist of a sprung structure, scaffolding, or an enclosure formed by tarps or plastic coverings attached to adjacent buildings, or a hybrid, as approved by the Department. The enclosure will be sufficiently large to accommodate excavation equipment and accommodate truck loading. Negative air pressure will be maintained by a continuous ventilation system consisting of ventilation fans and activated charcoal filters. Other areas may require excavation within an enclosure if warranted by excessive odors or VOC levels or controlled with the use of odor suppressing foam and tarp covers. This decision will be made based on field conditions. Conversely, there may be soils along the southern and eastern boundaries of OU-1 that are relatively clean and do not pose an adverse odor threat. These soils may be excavated without an enclosure. This decision will be based on field conditions and discussion with NYSDEC and NYSDOH. Figure 8 shows the area of potential excavation inside an enclosure.

A containment structure will be installed, operated and maintained over the excavation areas to prevent off-Site migration of odors and vapors. The structure will be erected and maintained for as long as necessary during excavation. The structure will be designed and engineered to be self-supporting, constructed of a material that is compatible with the proposed environment, impermeable to the anticipated contaminant vapors, adequately lighted, large enough to encompass the excavation operations and able to be moved to encompass other areas, if necessary. The enclosure will comply with local building codes with regard to loading and structural considerations.

The containment structure will be fully enclosed and include an air handling/vapor treatment system. The enclosure will have a vapor management system capable of maintaining a negative air pressure and capturing and treating emissions from the excavation prior to discharge into the atmosphere and/or capable of controlling air emissions by means of direct air flow. Air changes will be sufficient to allow work within the structure at Level C or lower, the preferred level of protection being Level D, as defined in the Health & Safety Plan (HASP) (Appendix D).

The air handling system will consist of at least two blowers that will draw air out of the structure to maintain a negative air pressure and/or by direct air flow so that vapors and odors are contained. The blowers will be sized to include a minimum of six air exchanges/hour, inclusive of the open excavation volume. Selection of the vapor control measures is subject to acceptance by the Department. The levels should be as such to meet the community air monitoring requirements as given in the Community Air Monitoring Plan (Appendix E). Exhaust air will be treated by an air treatment system designed to assure compliance of the discharged air with relevant emissions standards in DAR-1. The vapor treatment system will likely consist of at least two vapor phase granular activated carbon (GAC) units to reduce VOC concentrations in the discharged air. Supplemental

emission control (e.g., synthetic foam, "Biosolve", and/or soil liners) will be available for localized contaminant areas discovered outside the containment structure.

During operation of the air handling system, discharge emissions will be tested, as required by the NYSDEC, to confirm that they meet NYSDEC discharge criteria. Testing will consist of field screening the treated discharge periodically throughout each day using a photo-ionization detector (PID). At a minimum, PID testing will be done each day at start-up, at mid-day, and before shutdown. Vapor samples will also be collected for laboratory analysis using SUMMA canisters for United States Environmental Protection Agency (USEPA) TO-15 analysis at system activation and once again during contaminated soil removal activities to calibrate the PID measurements to actual containment concentrations.

At the conclusion of each work day, exposed contaminated soil within the containment structure will be covered with plastic and long-duration vapor suppressing foam and then the air handling system will be turned off. Operation of the air handling system will resume the next morning approximately one hour prior to any entry or excavation or loading, to evacuate and treat any vapors in the structure. If the covering of the exposed contaminated soil proves to be inadequate to control vapor/odors, as a contingency measure, at least one blower will be operated during non-working hours to maintain negative pressure within the structure. Contaminated soil containers and roll-off containers, if any, will be covered at the end of each day by vapor suppressing foam and plastic to prevent vapor emissions and the migration of odors and to prevent the infiltration of rainwater.

3.3 Endpoint Sampling

The goal of endpoint sampling is to verify that soil left on BCP Site B meets the soil cleanup objectives and that any remaining soil does not pose an adverse risk to end users. Another goal is to document final conditions both on the BCP Site and along the adjacent sites and street.

Bottom post-excavation confirmation samples will be collected to document endpoint conditions at a sampling rate of one endpoint sample/900 ft^2 (approximate 30-ft. center spacing). If endpoint sampling indicates that the soil cleanup objectives were not met, then additional excavation will be performed, to the extent feasible, and the endpoint sampling will be repeated for the parameter(s) that failed in order to meet the SCOs as listed in 6 NYCRR Part 375, Table 375-6.8(b). If excavation is 15 feet or less below ground surface, then the soil cleanup goals will be the Restricted Residential SCOs or, where groundwater is above the TOGS GA standards as identified in the Remedial Investigation, the soil cleanup goals will be the lower of the Protection of Groundwater SCOs or Restricted Residential SCOs for the compounds above the TOGS GA standards. Where excavation is deeper than 15 feet below ground surface, the Protection of Groundwater SCOs for the compounds identified in the Remedial Investigation above TOGS GA standards will be the applicable SCOs. Post-excavation samples will not be collected where the excavation extends to bedrock.

If additional excavation becomes necessary after post-excavation sampling confirms clean conditions, then, assuming the soil is free of visible staining other signs of contamination, or elevated PID readings, the excavation will not require further testing.

Sidewall post-excavation samples will be collected around the perimeter of the BCP Site excavation at a minimum rate of one sample/30 linear feet, and will be collected in the approximate center of the contaminated interval. Additional sidewall samples may be collected if warranted by Site conditions. Sidewall sample locations will be photo-documented. Sidewall samples will be collected on the Site perimeter if feasible, but may be collected on either side of the Site perimeter if support of excavation precludes sampling at the perimeter. Sidewall samples will be collected for documentation purposes only. Where the sidewall is inaccessible, the samples may be taken with a direct push sampling device at 30-ft. intervals just outside the BCP Site boundary.

For the remaining perimeter, post-excavation samples will not be collected where there is sheeting or foundation walls only if there is no soil between the sheeting or foundation walls and the site boundary, nor will sidewall samples be collected at the BCP Site perimeter where there is a common perimeter with the bordering BCP Site A.

Post-excavation samples will be collected for Target Compound List (TCL) VOCs, TCL SVOCs, TAL metals, pesticides and PCBs. The Quality Assurance/Quality Control (QA/QC) Plan in Appendix F presents the approximate number of samples, method numbers, and sample collection information

3.4 Construction Dewatering

Dewatering will be used as necessary to complete the work and excavate to the desired depths per Part 375. Groundwater within the BCP Site will be lowered and removed from the excavation using wells placed so as to dewater for construction purposes and/or by local dewatering as necessary. The dewatering system will remove and treat the BCP Site groundwater as well as the surrounding area to well below development depth, to the bottom of the remediation zone and/or to the bedrock surface depending on field conditions.

The dewatering system will operate in OU-1 and OU-2 only throughout the remediation phase. The extracted groundwater will then be properly treated by being pumped through a treatment suite consisting of settling tanks to remove suspended solids, a separator to remove any free product, and granular activated charcoal (GAC) units to remove dissolved organic contaminants, as required. From there the water will be discharged to the New York City Combined Sewer system through a sewer connection to the existing sewer line on Orchard Street. Discharge will be performed under a NYCDEP groundwater discharge permit meeting the NYCDEP requirements for treatment. No dewatering liquids will be discharged back into the excavation. See Appendix B for the Storm water Pollution Prevention Plan. A dewatering plan will be forwarded to NYSDEC once it has been developed. The dewatering plan will describe the treatment design plan including covered frac tanks and possible sumps that may be required. Contaminated soil will be amended to be as dry as possible, if necessary, prior to loading.

3.5 Trucking and Disposal

All trucks used for disposal will be permitted as licensed waste transporters as required by NYCRR Part 364. Trucks will be covered with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). Petroleum or creosote-contaminated soils will be transported in trucks with gasketed rear gates to prevent any liquid discharge during transit.

A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and treated before disposal to the city sanitary sewer. Onsite truck roads will be covered with stone to minimize dust and mud entering public roads.

Details of truck movement and staging will not be complete until a contractor is selected. These will be presented to NYSDEC once they become known. Truck transport routes will be provided to the Department for approval.

3.6 Transportation Specifications

The following sections describes the furnishing of labor, materials and equipment, and performing all operations required for the proper management, off-Site transportation, and disposal of waste materials and waste liquids generated during implementation of the remedial action.

Disposal Facilities and Submittals

Disposal facilities will be identified for each anticipated waste stream. All required analytical data will be provided to the disposal facilities for approval. Primary and alternate disposal facilities will be designated and submitted for each anticipated waste stream. Primary facilities will be contracted, upon final approval from the Volunteer, prior to excavation. Copies of contracts from each facility or letters from each facility indicating acceptance of the total estimated volume of material from this project will be submitted to the Department. Additionally, copies of all waste manifests, bills of lading, and certified weight slips from a scale approved for the use of all disposed materials as well as the Part 364 Permits for all waste transporters will be submitted to the Department.

Vehicle Requirements and Odor Suppressant

All license plates on the trucks will be properly affixed and visible at all times; proper placards will be displayed and extraneous or incorrect placards will be covered and/or removed prior to the truck departing the Site. All required permits will be properly displayed or readily available for verification by the Department. Drivers will remain in the truck at all times unless they are wearing the correct personal protective equipment required for the Site. Standing on the back of the truck will be prohibited and ladders or scaffolding will be used when securing tarps and/or covers. Non-gasketed trucks will be lined with polyethylene material strong enough to withstand the placement of excavated

material into the container without tearing, chemically resistant to the contaminants within the material, and be of sufficient length and width to cover the interior bed of the haul truck with no seams while completely covering over the load with overlap. Vehicles and containers used to store and/or transport materials will provided with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). The Department has the right to reject vehicles that are not properly equipped and/or arrive to the Site in a dirty condition. Odor and dust suppressing foam will be available as needed to supplement covers, or if requested by the Department.

Execution

Pre-characterization sample results will allow direct load, transport, and disposal of all impacted material whenever possible. Traffic control at the Site entry will ensure a smooth flow of traffic and minimize congestion at the Site entrance. At a minimum, the traffic control will include the usage of flaggers and proper signage, where required. Trucks containing excavated material will be properly covered prior to exiting the Site to prevent vapor and fugitive dust emissions during transport. The covers will be supplemented with odor suppressant foam or solvent as needed. Gross vehicle truck weights shall conform to the most current DOT regulations for the Federal, State, and local level. All work in and around trucks will be performed in appropriate personal protective equipment in conformance with the Site Specific Constructions HASP.

Prior to leaving the Site, material transport vehicles and containers will be inspected for evidence of contamination (including inside of wheels and undercarriage). All trucks leaving the Site will proceed to a decontamination station for cleaning prior to exiting onto public roads. Trucks and equipment will be cleaned using a broom and/or brushes within the excavation area prior to moving to the decontamination pads to decrease the amount of particulates leaving the remediation area. If necessary, at the decontamination pad, all heavy equipment will be pressure washed before leaving the Site. All equipment leaving the Site will be decontaminated as per these guidelines. In addition, any equipment previously utilized to excavate impacted material will be decontaminated prior to use in backfilling (e.g. excavator bucket). Decontamination pads will be sized to ensure that the largest piece of contractor equipment can be adequately decontaminated and provisions will be made to control overspray at the decontamination pads. All waste water from decontamination will be collected and pumped into frac tanks. Wastewater will be transported from the Site by a properly licensed liquid waste hauler or will be discharged in the approved dewatering system. Soils collected from the decontamination pads will be bulked with the impacted material and sent to the properly licensed approved disposal facility, as necessary.

Trucks will proceed directly to the designated disposal facility after leaving the Site and will not be pre-loaded with material for overnight storage. Clean up of any material spilled or leaked in transit, or mud or dirt tracked off-Site will be performed in accordance with all applicable Federal, State, and local regulations. Material from the Site will not be combined with any other material.

Volunteer and/or Volunteer's agent will sign transport bills of lading or manifests. Volunteer will provide a hazardous waste generator number, if required. Maintain copies of all documents involving transportation of materials from the Site. Copies of these records shall be submitted to the Department at a frequency agreed to by Arnold F. Fleming, Remedial Engineer, and Volunteer. All records shall be turned over to the Volunteer at the completion of the Work. It will be ensured that all transport vehicles are properly secured, labeled, and placarded prior to exiting the Site.

3.7 Air/Odor Monitoring

Air monitoring on-Site and in the work zone is described in the BCP Site-specific HASP in Appendix D. Air monitoring around the BCP Site perimeter and within the community is described in the Community Air Monitoring Plan (CAMP) described in Appendix E. In addition to CAMP monitoring, daily monitoring of downwind odor levels will take place at the Site perimeter. The downwind perimeter will be checked for odors a minimum of once per day and more frequently, if required. Use of measures such as odor suppressant foam or spray, covering of soils will be used as necessary to mitigate odors, if required.

The Volunteer is responsible for compliance with odor control requirements. 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 all reasonable and necessary means as described in the following paragraph.

If nuisance odors are identified by Volunteer at the Site boundary, or if odor complaints are received, 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. The NYSDEC, NYSDOH, and Volunteer will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the Remedial Engineer, and any measures that are implemented will be discussed with NYSDEC. All reasonable and necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (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.

3.8 Underground Storage Tanks

Previously unknown underground storage tanks (USTs) and ancillary piping uncovered during excavation will be emptied of their contents, if applicable, and the tanks/piping removed for disposal (or scrap metal). The USTs will be registered under the Petroleum Bulk Storage requirements if eligible. The USTs will also be registered with FDNY as required by local regulations.

Endpoint samples will be collected per the guidance outlines in DER-10. Their location will be noted for inclusion in the final report.

3.9 Groundwater Remediation

3.9.1 OU-1

Groundwater in OU-1 will be remediated by means of source removal. Excavation will remove nearly all the contaminant mass and source material since much of the excavation will extend to bedrock and encompass all the impacted soils within OU-1. The principal compounds affecting groundwater are amenable to further degradation by microbial degradation. Post-remedial conditions are expected to yield geochemical conditions favorable to monitored natural attenuation (MNA). Dewatering during remedial excavation (Section 3.4) will also serve as pump-and-treat remediation. Dewatering will remove contaminated groundwater and also introduce oxygenated groundwater into contaminated areas of the Site, which in turn will promote *in situ* groundwater remediation.

3.9.2 OU-2

Excavation will remove nearly all the contaminant mass. The principal compounds affecting groundwater are amenable to further degradation by microbial degradation. Post-remedial conditions are expected to yield geochemical conditions favorable to MNA. Nonetheless, dewatering during remedial excavation (Section 3.4) will also serve as pump-and-treat remediation. Dewatering will remove contaminated groundwater and also introduce oxygenated groundwater into contaminated areas of the Site, which in turn will promote *in situ* groundwater remediation.

3.10 Restoration

3.10.1 Backfill Material

The BCP Site B will be an excavated area. Soils that meet the Restricted Residential SCOs, or are otherwise acceptable to the Department for reuse on Site, will be stockpiled on BCP Sites A or B and used for fill in the areas of the BCP Site B not occupied by the building basement in OU-1. Either reusable soils or imported soils meeting the requirements of Restricted Residential use will be used for backfilling.

No exposed soils are anticipated to remain on the BCP Site B after remediation. However, the master plan envisions green space on the Site. Where green space is planned, a minimum 2-foot-thick continuous cap of imported clean soil, as described below, will be placed in these areas.

Any potential backfill brought onto the BCP Site B must be either certified virgin soil or non-virgin material that fulfills the requirements specified in the Soil Management Plan (Appendix C). The backfill will be used to fill the soil excavations, if necessary. All soil stockpiling, handling, and characterization will be conducted according to the requirements of the SPPP and Soil Management Plan, included in Appendix B and C, respectively.

3.10.2 Backfilling

The excavations may be backfilled to within approximately 2 feet below street level with certified clean fill or reusable soils from the BCP Site. Backfill will be placed in loose lifts no thicker than 12 inches and compacted in accordance with the developer's requirements. Excavated and filled areas and adjacent transition areas shall be reasonably smooth, compacted, and free from irregular surface changes.

3.11 Engineering Controls

3.11.1 Water Proofing and Vapor Barrier

OU-1

A waterproofing/vapor barrier will be installed as needed and the Remedial Action Work Plan will document what is required as part of the remedy.

OU-2

A waterproofing/vapor barrier will be installed as needed and the Remedial Action Work Plan will document what is required as part of the remedy.

3.12 Nuisance Control

3.12.1 Rodent Control

The potential for rats and other rodents will be addressed by placing traps around the periphery of BCP Site B. No food will be stored on-Site for the duration of remedial activities, and all refuse generated by BCP Site B activities will be promptly containerized in covered dumpsters or roll-offs. These measures will reduce the possibility of attracting rodents. Rodent traps will be inspected and replaced at a minimum of once every month. Additional traps will be placed, if warranted.

3.12.2 Noise Control

Appropriate measures will be taken to ensure that noise levels conform to New York City and local regulations, and to the latest OSHA standards for worker protection. Noise control measures will ensure that on-Site work does not pose a nuisance to surrounding businesses. Equipment and vehicles used on-Site will be outfitted with appropriate noise control devices.

3.13 Citizen Participation

Citizen participation will be performed throughout the project in accordance with the approved Citizen Participation Plan. Project fact sheets will be distributed to the public throughout the project, and will include the following:

- BCP Site description
- Remedial objectives and selected remedial alternative
- Project schedule
- Sources of additional information

The NYSDEC-approved fact sheet will be provided to persons on the project mailing list (included in Appendix G) prior to the start of remedial activities.

3.14 Notification and Reporting

2.14.1 Notification

The following parties will be notified of significant events or developments during the course of the remedial program, and will be notified a minimum of one week in advance of the start of remediation. The listed individuals will receive copies of all reports, plans, and relevant specifications and correspondence.

Name	Agency	Address	Phone	Role
Michael Haggerty	NYSDEC	Div. of Environmental Remediation 625 Broadway Albany, New York 12233-7016	518/402-9688	Project Manager
Chris Doroski	NYSDOH	New York State Dept. of Health Corning Tower Empire State Plaza, Albany, NY 12237	518/402-7880	Health Dept. Liaison

3.14.2 Daily Reports

Daily reports will be provided to the NYSDEC project manager during excavation activities (via e-mail or facsimile). The daily reports will provide a summary of daily activities, a Brownfield Site map, results of air monitoring, a discussion of any odor or dust problems, and any corrective actions implemented to counter noise, odor, or dust. Any time-sensitive information will be communicated directly to the NYSDEC project manager ahead of the daily reports.

3.14.3 Record Keeping

A project logbook will be kept on-site during all remedial activities, and will be available for NYSDEC inspection. At a minimum, the following information will be recorded in the project logbook:

- Date, weather, and BCP Site conditions

- Names and affiliations of all on-Site personnel
- Calibration records for all monitoring equipment
- A record of trucks transporting excavated material from the BCP Site
- Daily summary of work, issues, decisions, delays, resolution of issues
- Safety incidents and their resolution
- Waste manifests for material removed from the BCP Site will be kept with the project file

3.14.4 Construction Completion Report

Upon completion of BCP Site B remediation, a Construction Completion Report (CCR) will be submitted to NYSDEC. The CCR will comply with the requirements of DER-10 and include as a minimum the following:

- Photographs of remedial activities
- As-built drawings for all constructed elements (e.g., vapor barrier, containment wall)
- Monitoring and post-excavation end-point sampling results
- Waste manifests and bills of lading for all material removed from the BCP Site
- A drawing depicting the source areas of contamination encountered during remedial activities
- Documentation of environmental quality for imported backfill

The CCR will be certified by the professional engineer of record.

3.15 Schedule

Remedial actions will be performed during regular construction work hours on weekdays. The current estimate for the duration of the remedial part of construction is 6 months starting in January-February 2015. An approximate schedule is as follows:

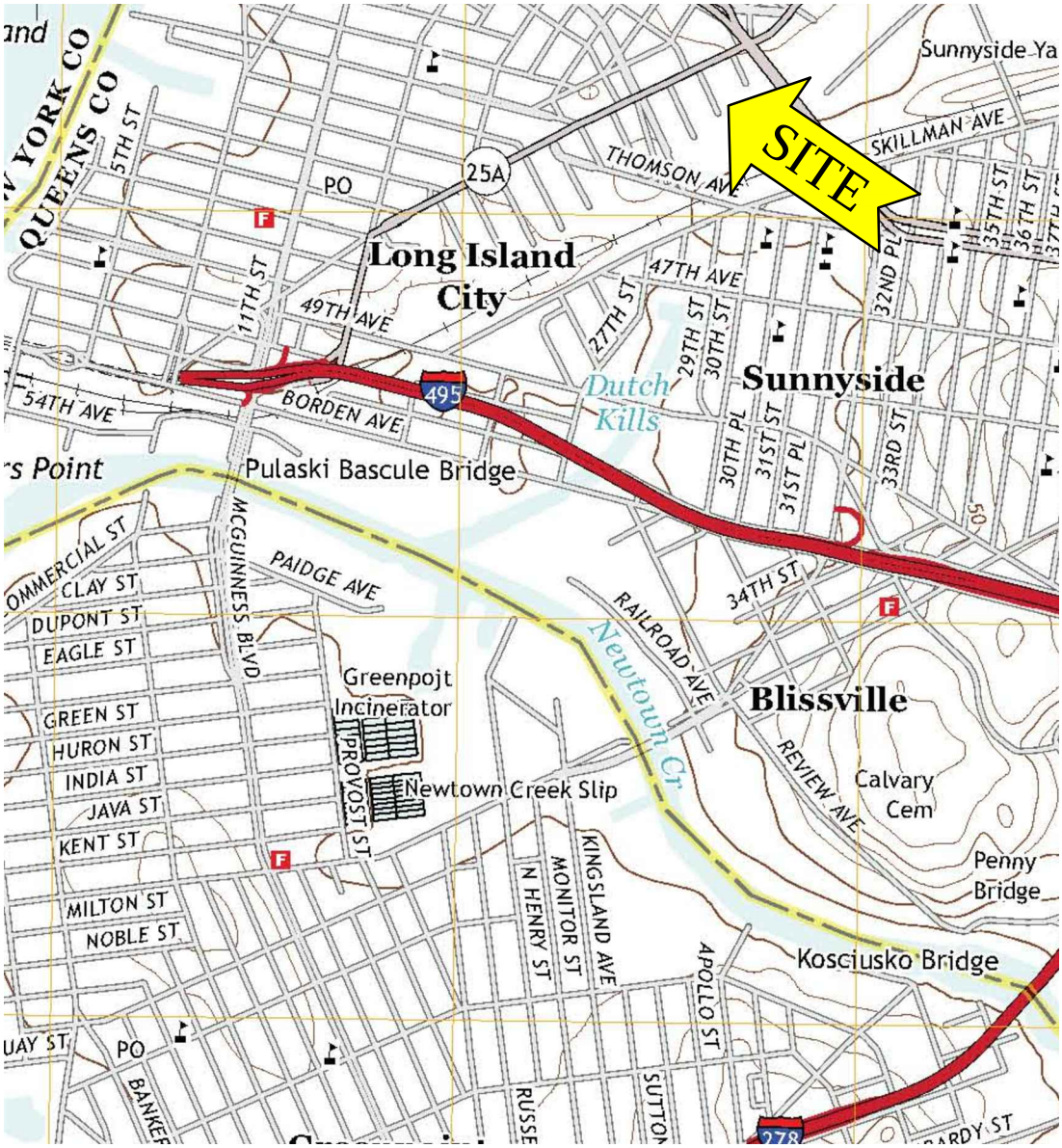
Brownfield Site Remediation Schedule

Item	**Duration/Date**
Submit Proposed IRMWP	11/4/14
NYSDEC/NYSDOH Reviews IRMWP	2 weeks, 11/18/14
Public Comment Period	45 Days
Comment Period Ends	1/5/15
NYSDEC Issues Notice to Proceed	1/9/15
Begin In-Ground Remediation/Construction	**January- February 2015**
Complete Remedial Excavation	6 months

4.0 REFERENCES

1. *Queens Plaza Site Investigation,* AKRF, 1988.
2. *Outlet City Soil and Groundwater Sampling Results,* AKRF, 1990.
3. *Outlet City Property*, Supplemental Site Assessment/Remedial Investigation, AKRF, 1998.
4. *Site Investigation*, AKRF, 2002.
5. *Soil and Groundwater Sampling and Analysis*, ELM, 2001.
6. *Remedial Investigation Report,* Fleming Lee-Shue, Inc., March 2007.
7. *Geotechnical Summary Report, Queens Plaza Project – Site A, Long Island City, Queens, New York, Mueser Rutledge, April 20, 2007*
8. *Geotechnical Summary Report, Gotham Center – Tower B-2 – Long Island City, Queens, New York, Mueser Rutledge,* February 15, 2008
9. Approved FLS *Queens Plaza Residential Development* [Site A], *Brownfield Cleanup Program (BCP) C241105, Long Island City,* August 2007
10. SCS Engineers sampling event April 2013.

FIGURES



UTM GRID AND 2013 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
WL WK
Grid Zone Designation 18T

1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

QUADRANGLE LOCATION

Weehawken	Central Park	Flushing
Jersey City	Brooklyn	Jamaica
The Narrows	Coney Island	Far Rockaway

FIGURE 1: BROWNFIELD SITE LOCATION MAP

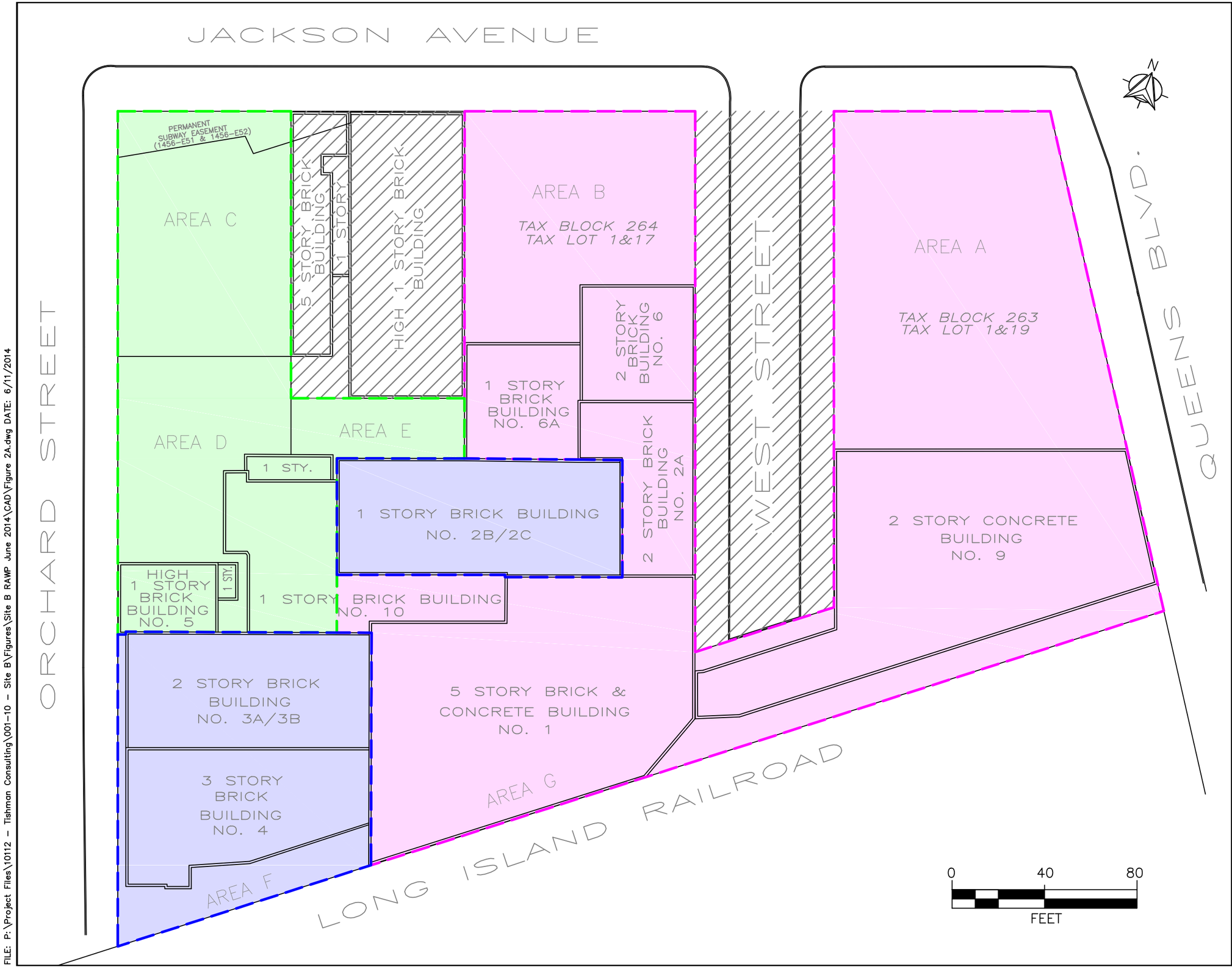
SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

Fleming Lee Shue

Environmental Management & Consulting, 158 West 29th Street, New York, NY 10001

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Figures\Site B RAWP March 2014\CAD\Figure 1.dwg DATE: 3/6/2014



Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 2A

BROWNFIELD SITE PLAN

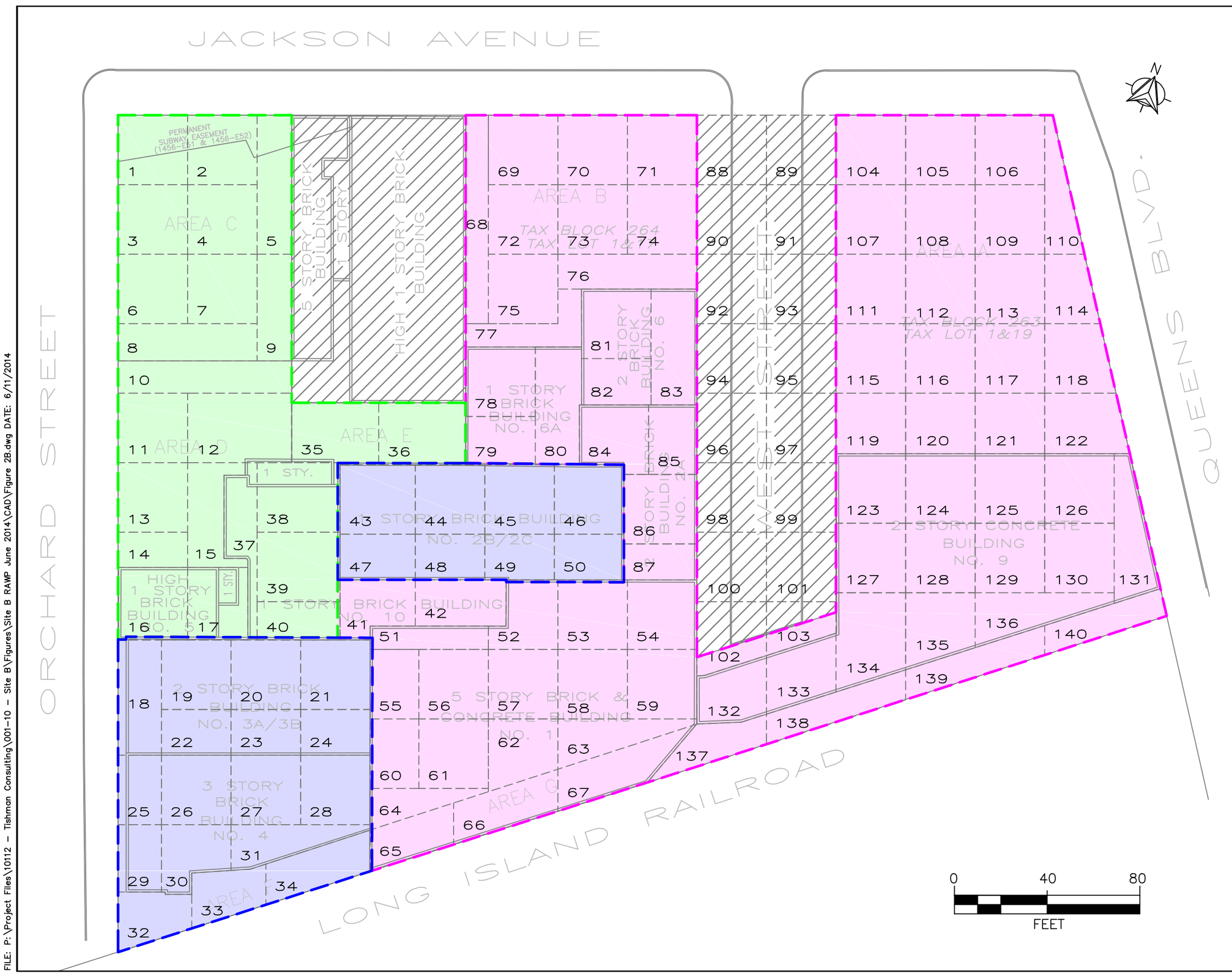
Date
June 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Figures\Site B RAWP June 2014\CAD\Figure 2A.dwg DATE: 6/11/2014



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAMP June 2014\CAD\Figure 2B.dwg DATE: 6/11/2014

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New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 2B

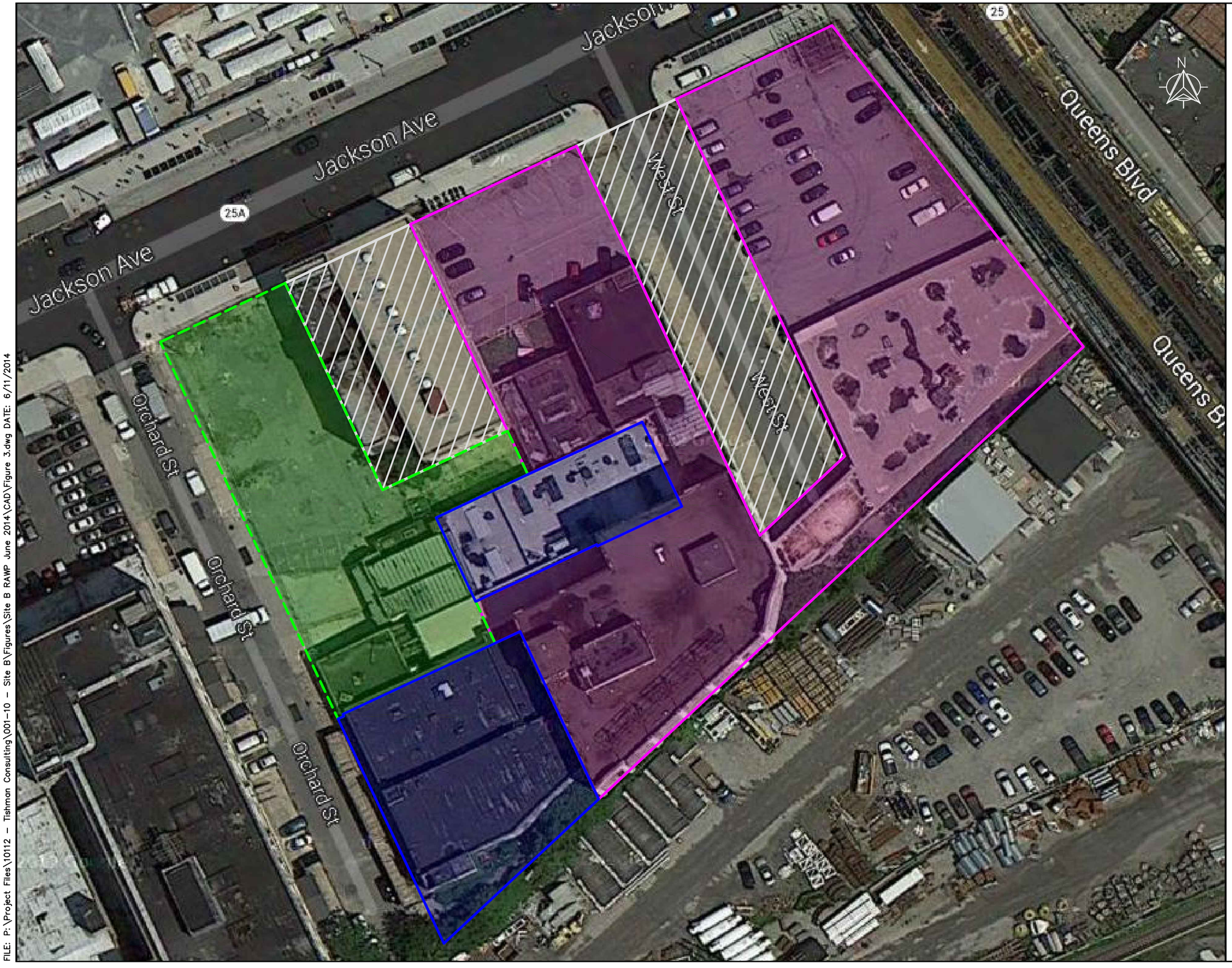
BROWNFIELD SITE PLAN WITH GRID CELL OVERLAY

Date
June 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- NOT PART OF SITE
- 117 GRID CELL NUMBER



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\CAD\Figure 3.dwg DATE: 6/11/2014

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Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 3

AERIAL VIEW OF BROWNFIELD SITE B AND NEARBY LAND USE

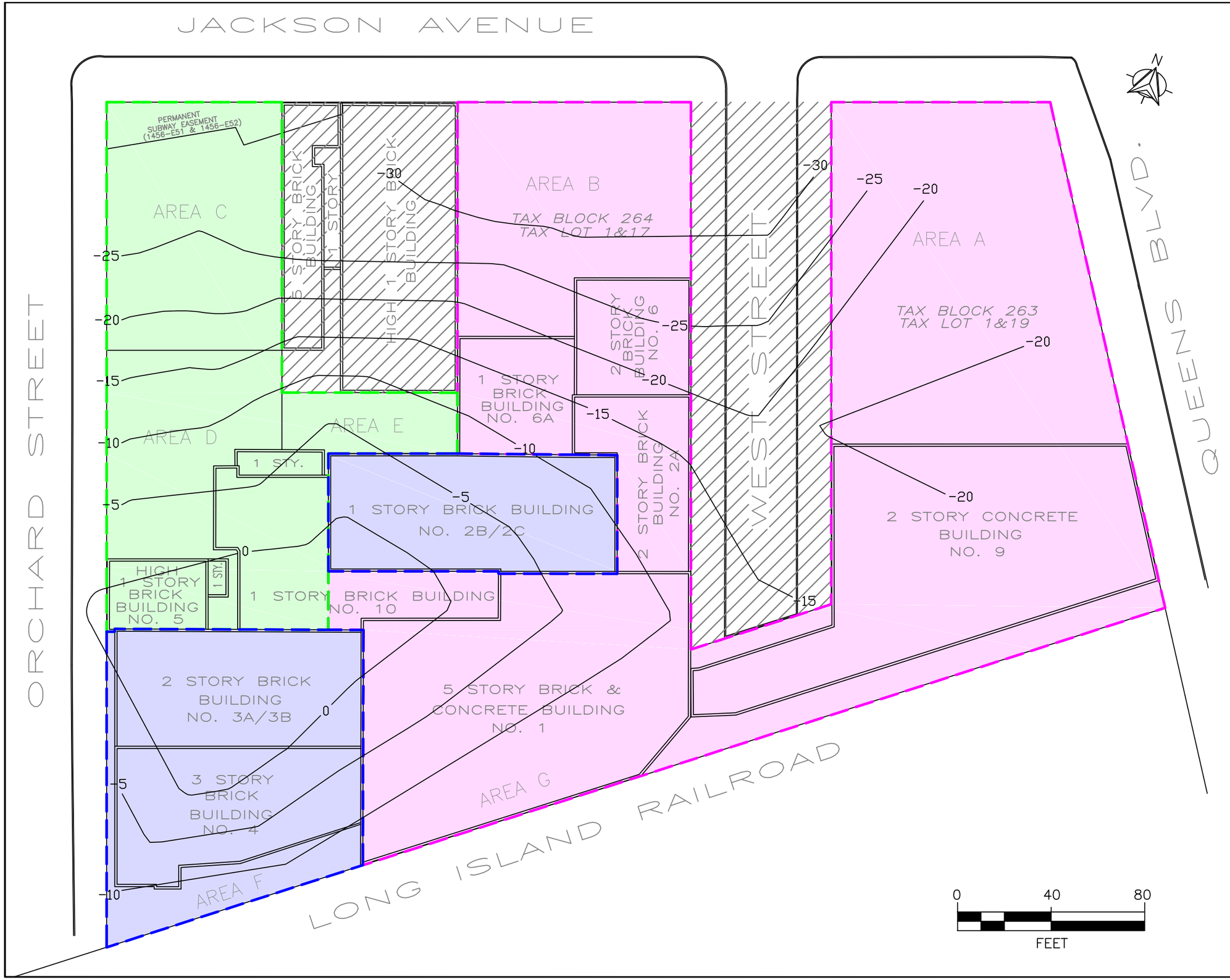
Date
June 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE

0 50 100
FEET



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAMP\Figure 4.dwg DATE: 10/7/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 4

PRELIMINARY BEDROCK ELEVATION CONTOUR MAP

Date
October 2014

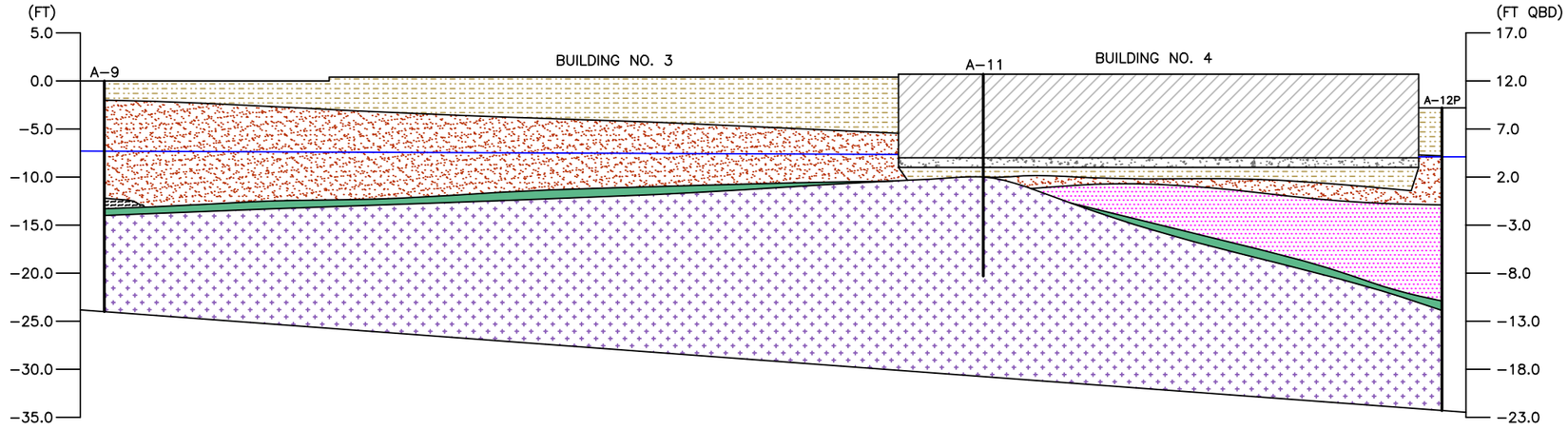
Project Number
10112-005-1

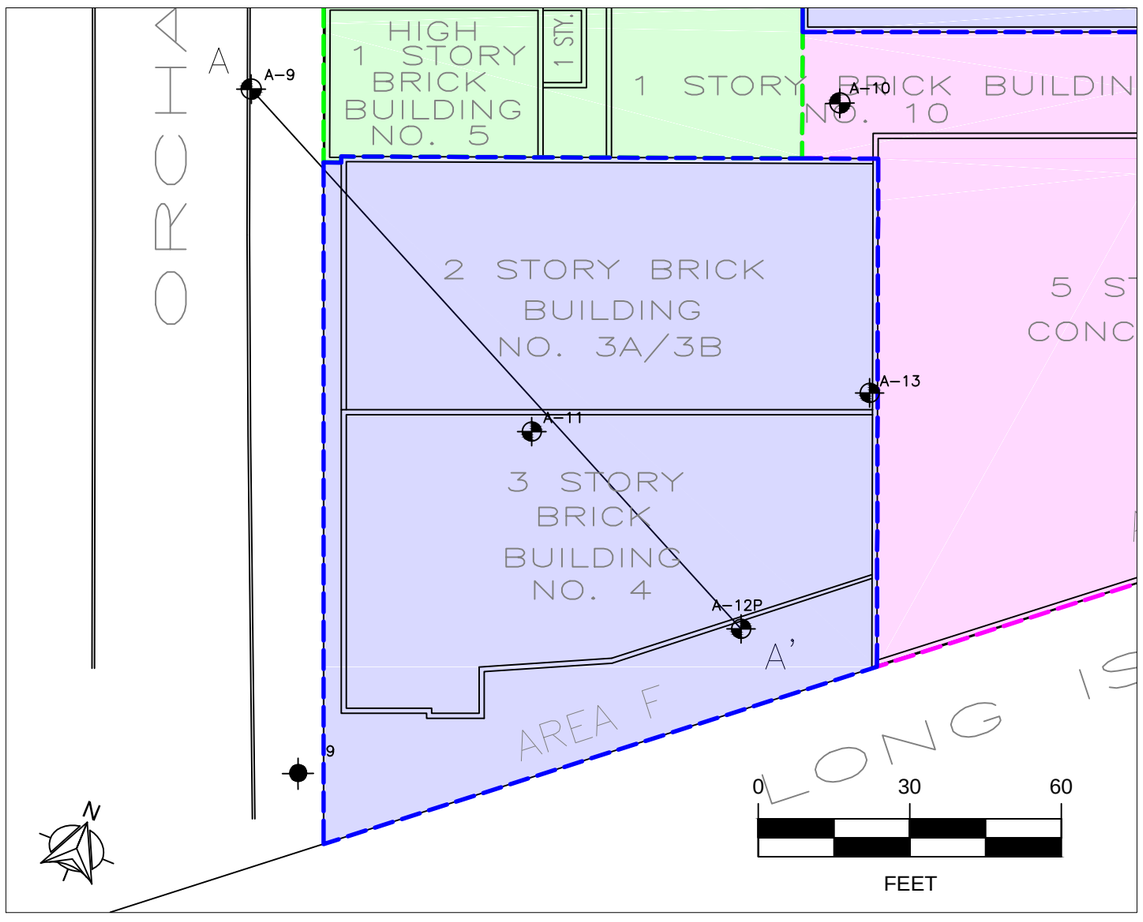
LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- 0 — CONTOUR OF ELEVATION OF TOP OF ROCK

ELEVATION IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

SOURCE: PRELIMINARY SUPPORT OF EXCAVATION GENERAL PLAN (9-24-14) BY MUESER RUTLEDGE





FT-QBG: Elevation in feet relative to Queens Borough Datum(QBD), 1929

Source: Geotechnical Summary Report, Mueser Rutledge Consulting Engineers, April 20, 2007

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 5

BEDROCK PROFILE CROSS-SECTION A-A'

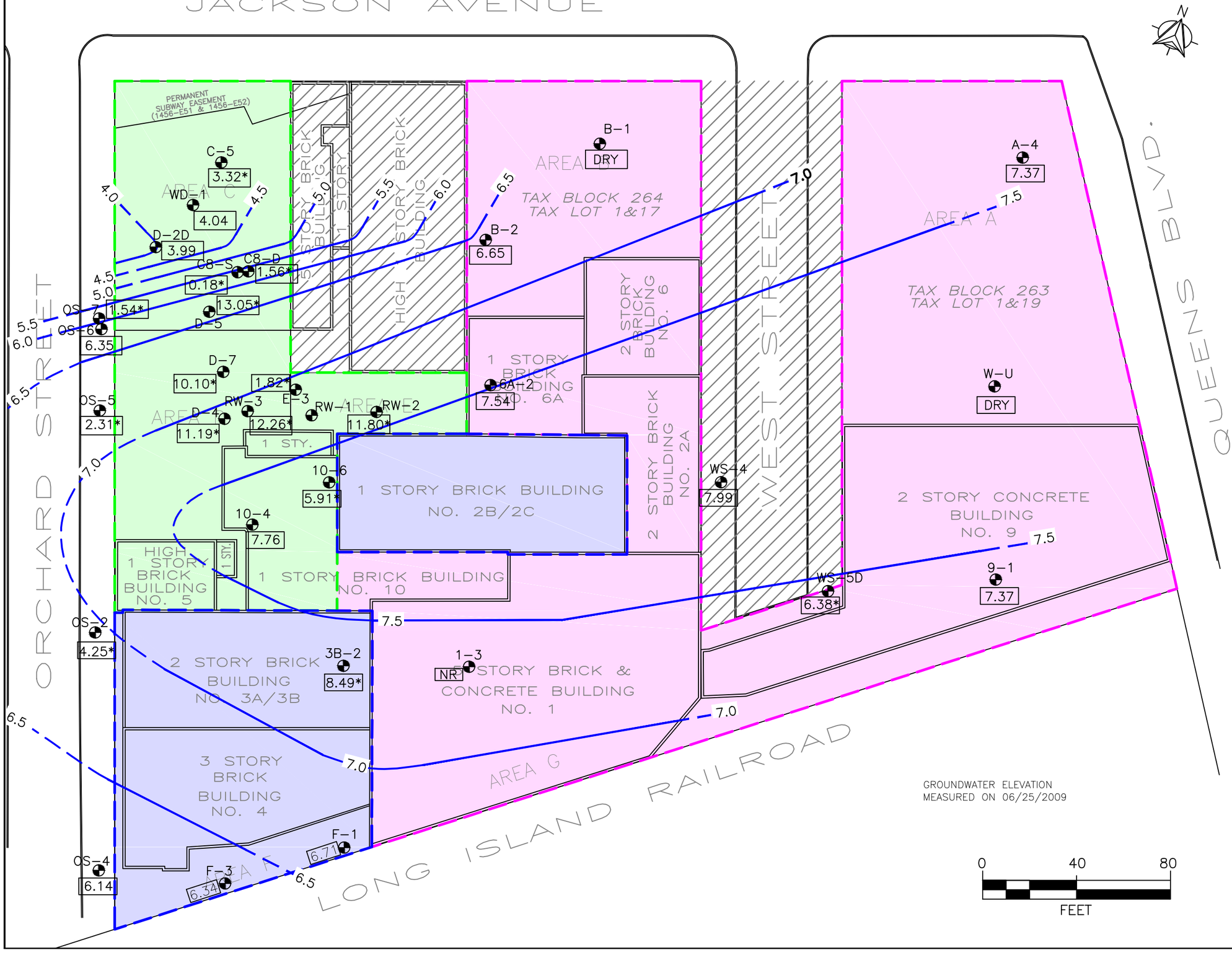
Date
June 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- MONITORING WELL
- VOID
- CONCRETE
- FILL
- SILT
- VARVED SILT AND CLAY
- BOULDER
- TILL
- BEDROCK

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\CAD\Figure 5.dwg DATE: 6/11/2014



FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\CAD\Figure 6.dwg DATE: 7/2/2014

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New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 6

GROUNDWATER ELEVATION CONTOUR MAP

Date
June 2014

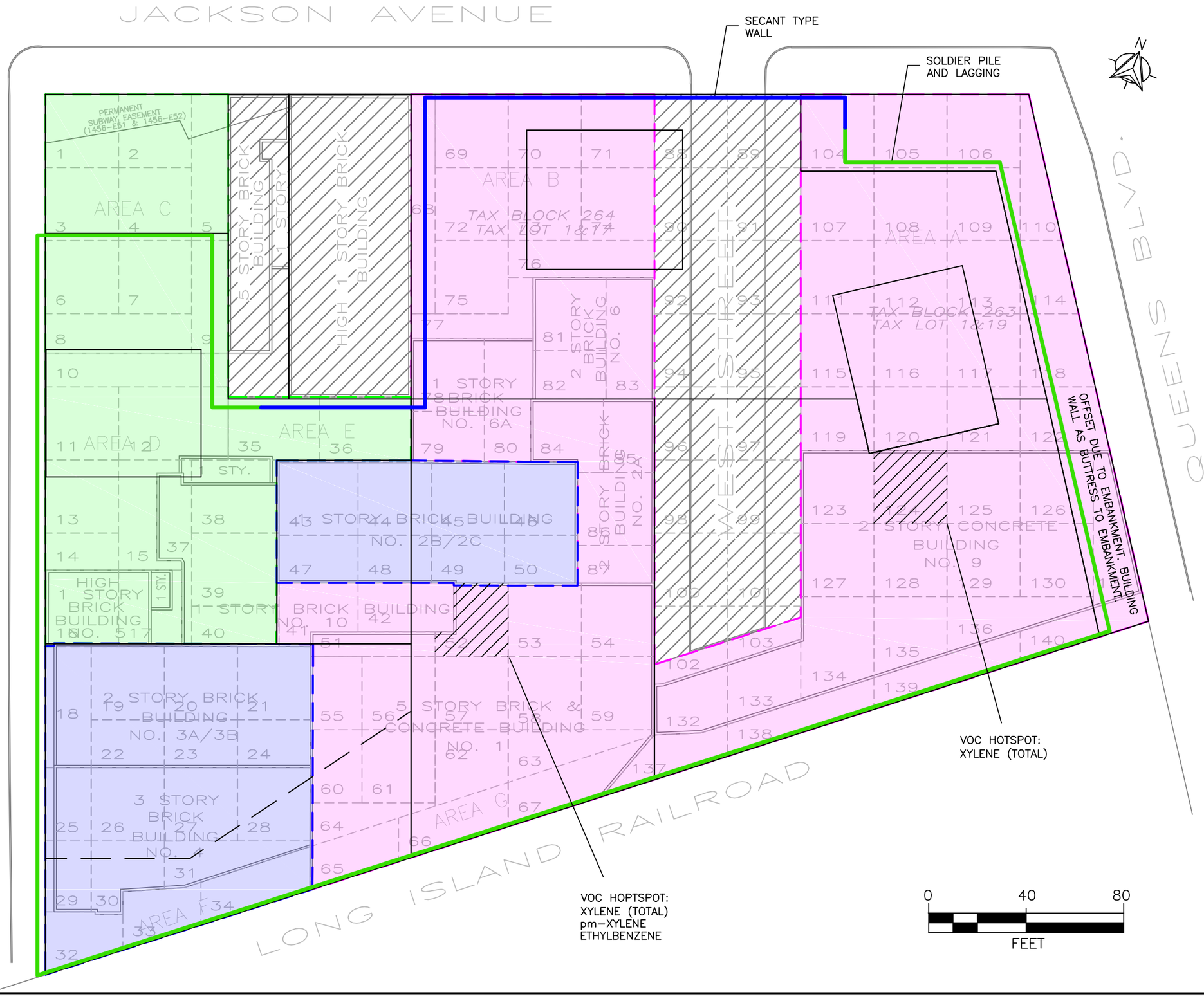
Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (QBD) – DASHED WHERE INFERRED
- 7.37 GROUNDWATER ELEVATION (QBD)
- * ELEVATION NOT USED DUE TO ANOMALOUS READINGS OF GROUNDWATER LEVEL
- NR NOT RECORDED

ELEVATION QUEENS BOROUGH DATUM (QBD) 1929

QBD IS 1.625 FT HIGHER THAN NORTH AMERICAN VERTICAL DATUM (NAVD88). TO CONVERT FROM QBD TO NAVD88 = QBD + 1.625 FT



FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAWP\Figure 7.dwg DATE: 11/18/2014

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New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 7

BCP SITE REMEDIATION AREA

Date
November 2014

Project Number
10112-005

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- VOCs EXCEEDING TOGS IN GROUNDWATER AND POGSCOs IN SOIL
- OUTSIDE OF SITE
- GRID CELL NUMBER

NOTE: ALL ELEVATIONS IN NORTH AMERICAN VERTICAL DATUM (NAVD88).

JACKSON AVENUE

ORCHARD STREET

LOT 14

MTA SUBSTATION

WEST STREET

QUEENS BLVD.

LONG ISLAND RAILROAD

0 40 80

FEET

FILE: P:\Project Files\99999 - Tishman\Figures\Site B - RAWP\Figure 8.dwg DATE: 11/18/2014

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158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Development
Long Island City, NY

FIGURE 8

PROPOSED ENCLOSURE PLAN

Date
November 2014

Project Number
10112-004

LEGEND

- TRACK 2 AREA
- TRACK 4 AREA
- VENTILATED ENCLOSURE
- FOAM

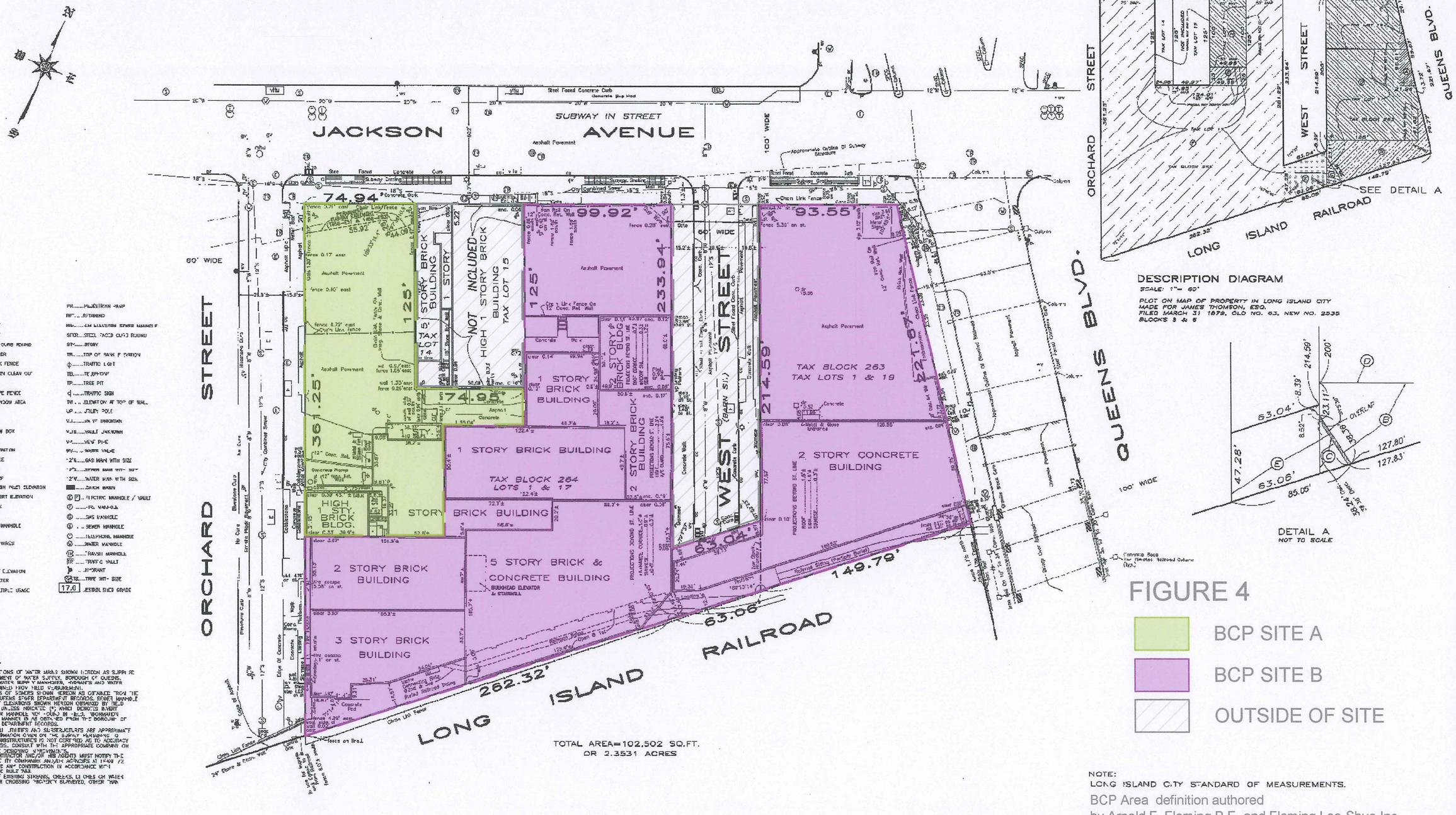
APPENDIX A

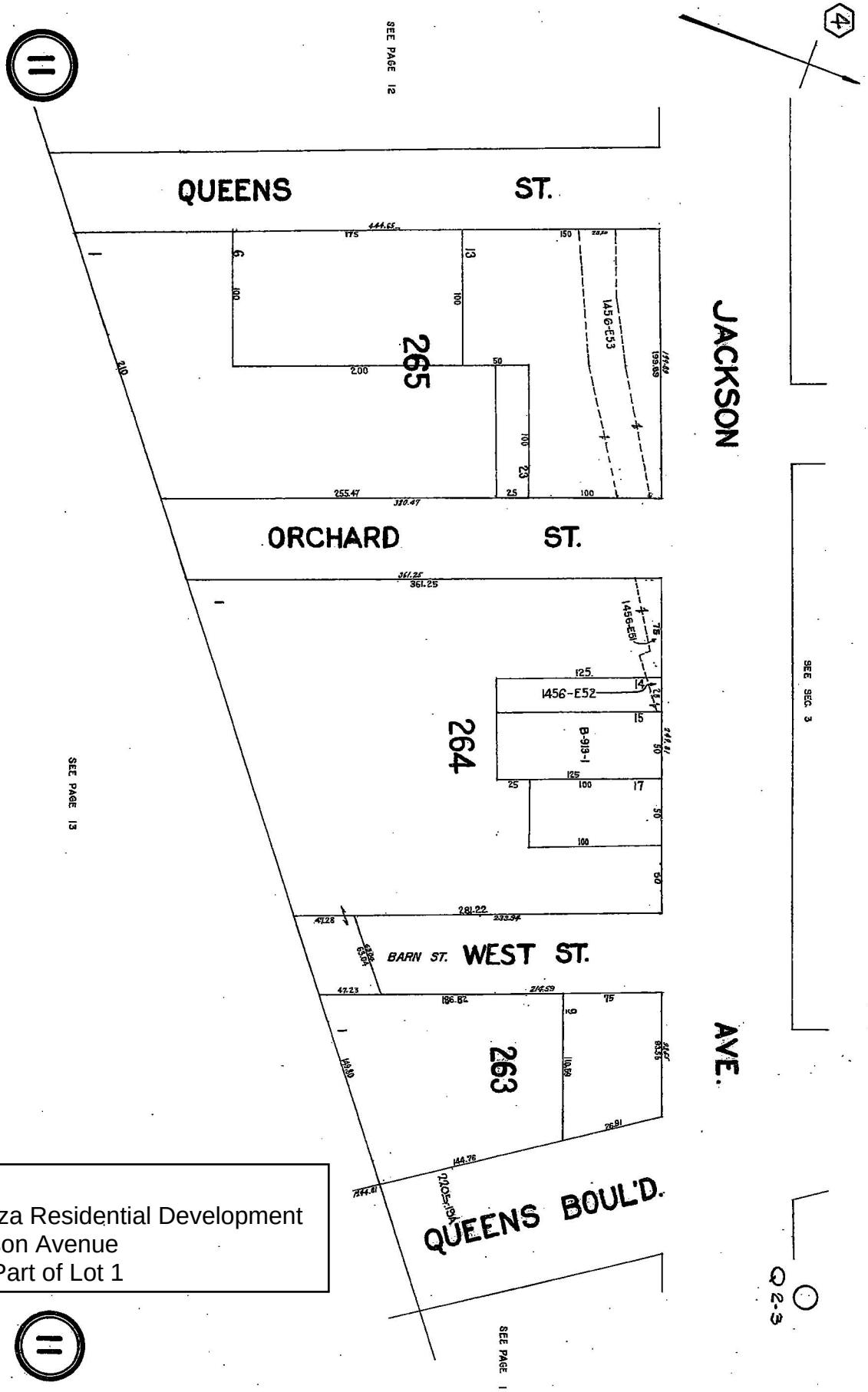
Brownfield Site Survey

TITLE NO. 08NYQ11112

SURVEY No. 40598—11

40598-11.DWG
40598-11.SRD


JACKSON AVENUE
SUBWAY IN STREET
Asphalt Pavement
100' WIDE
60' WIDE
STREET
ORCHARD STREET
WEST STREET
QUEENS BLVD.
74.94'
99.92'
93.55'
233.94'
125'
36.25'
74.95'
214.59'
221.67'
63.04'
149.79'
262.32'
LONG ISLAND RAILROAD
TAX BLOCK 263
TAX LOTS 1 & 19
TAX BLOCK 264
LOTS 1 & 17
TAX LOT 14
TAX LOT 15
NOT INCLUDED
HIGH 1 STORY BRICK BUILDING TAX LOT 15
1 STORY BRICK BUILDING
2 STORY BRICK BUILDING
3 STORY BRICK BUILDING
5 STORY BRICK & CONCRETE BUILDING
2 STORY CONCRETE BUILDING
HIGH 1 STY. BRICK BLDG.
11 STORY BRICK BUILDING
BULKHEAD ELEVATOR & STAIRWELL
Chain Link Fence
Concrete Pad
Asphalt
Concrete
Curb
Sidewalk
Edge of Concrete
Bluestone Curb
No Curb
Steel Faced Concrete Curb
Subway Grating
Subway Opening
Approximate Outline of Subway Structure
City Combined Sewer
Catch Basin
Manhole
Telephone Manhole
Water Manhole
Transit Manhole
Traffic Vault
Hydrant
Light Pole
Traffic Pole
Traffic Sign
Utility Pole
Gas Manhole
Gas Main with Size
Sewer Main with Size
Water Main with Size
Elevation at Top of Wall
Elevation
Fire Alarm Box
Vault Unknown
Vent Pipe
Water Valve
Guard Pole
Gas Valve
Iron Fence
Overhead Wires
Parking Meter
Pole, Multiple Usage
Jesbol Stick Grade
Pedestrian Ramp
Retaining
Steel Faced Curb Round
Story
Top of Bank Elevation
Telephone
Tree Pit
Chain Rope Fence
Area Window
Drain
Utility Pole
Unknown
Vault Unknown
Vent Pipe
Water Valve
Gas Main with Size
Sewer Main with Size
Water Main with Size
Catch Basin Inlet Elevation
Catch Basin
Electric Manhole / Vault
Fire Manhole
Gas Manhole
Sewer Manhole
Telephone Manhole
Water Manhole
Transit Manhole
Traffic Vault
Hydrant
Traffic Sign
Jesbol Stick Grade
Fence 0.17' east
Fence 0.40' east
Fence 6.29' east Chain Link Fence
Fence 0.28'
Fence 5.30' on st.
Fence 0.10' west
Fence 0.25' east
Fence 1.05' east
Wall 1.33' east
Fence 4.20' east
Fence 0.03' west
Fence 0.67' west
Fence 0.33' west
Fence 0.30' west
Fence 0.20' west
Fence 0.10' west
Fence 0.33' west
Fence 0.30



Tax Map
Queens Plaza Residential Development
28-10 Jackson Avenue
Block 264, Part of Lot 1

Note: Property boundaries do not correspond to Tax Map metes and bounds. See attached drawing for meets and bounds description.

SCHEDULE "A"

ALL THOSE CERTAIN PLOTS, PIECES OR PARCELS OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF QUEENS OF THE CITY OF NEW YORK, IN THE COUNTY OF QUEENS AND STATE OF NEW YORK, RESPECTIVELY BOUNDED AND DESCRIBED AS FOLLOWS:

PARCEL A (FOR INFORMATION ONLY: BLOCK 263 P/O LOTS 1 & 9)

BEGINNING AT A POINT ON THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD (FORMERLY KNOWN AS DIAGONAL STREET) DISTANT 29.11 FEET SOUTHEASTERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE

RUNNING THENCE SOUTHERLY PARALLEL WITH THE EASTERLY SIDE OF WEST STREET (FORMERLY KNOWN AS BARN STREET) 96.61 FEET;

THENCE EASTERLY AT RIGHT ANGLES TO THE EASTERLY SIDE OF BARN STREET 21.96 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD; AND

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, 99.07 FEET TO THE POINT OF PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

PARCEL B (FOR INFORMATION ONLY:BLOCK 263 P/O LOT 1)

BEGINNING AT A POINT ON THE EASTERLY SIDE OF BARN STREET DISTANT 200 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE AND;

RUNNING EASTERLY AT RIGHT ANGLES TO THE EASTERLY SIDE OF BARN STREET 125 FEET;

THENCE NORTHERLY PARALLEL WITH THE EASTERLY SIDE OF BARN STREET 61.62 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD 79.77 FEET TO THE NORTHERLY LINE OF LAND NOW OR FORMERLY OF LONG ISLAND RAILROAD COMPANY;

THENCE SOUTHWESTERLY ALONG SAID LINE OF SAID LAND OF SAID RAILROAD COMPANY 127.83 FEET TO A LINE DRAWN NORTHWESTERLY ON THE TAX MAP OF THE BOROUGH OF QUEENS;

THENCE NORTHWESTERLY ALONG SAID LAST MENTIONED LINE 38.36 FEET TO THE EASTERLY SIDE OF BARN STREET; AND

THENCE NORTHERLY ALONG THE EASTERLY SIDE OF BARN STREET 23.11 FEET TO THE POINT OF PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

PARCEL C (FOR INFORMATION ONLY: BLOCK 263 P/O LOT 1)

BEING A TRIANGULAR PLOT CONTIGUOUS TO SAID PARCEL B AND BEGINNING AT A POINT ON THE EASTERLY SIDE OF BARN STREET 223.11 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE;

CONTINUED...

RUNNING THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF BARN STREET OR ALONG A STRAIGHT LINE IN PROLONGATION THEREOF TO THE NORTHERLY LINE OF LAND OF THE LONG ISLAND RAILROAD COMPANY;

RUNNING NORTHEASTERLY ALONG SAID LINE OF SAID LAND OF SAID RAILROAD COMPANY TO A POINT THEREON 127.83 FEET
SOUTHWESTERLY FROM THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, AND BEING THE POINT WHERE THE SOUTHWESTERLY LINE OF SAID PARCEL B MEETS SAID NORTHERLY LINE OF SAID LAND OF SAID RAILROAD COMPANY;

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL B AND COINCIDING THEREWITH 38.36 FEET TO THE EASTERLY SIDE OF BARN STREET AT THE POINT OR PLACE OF BEGINNING, BE SAID SEVERAL DISTANCES AND DIMENSIONS MORE OR LESS.

NOTE: PARCEL C IS ALSO ENCOMPASSED IN THE DESCRIPTION OF PARCEL E BELOW.

PARCEL D (FOR INFORMATION ONLY: BLOCK 263 P/O LOTS 1 & 9)

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF BARN STREET;

RUNNING THENCE EASTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 93 FEET 6-5/8 INCHES TO THE WESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF QUEENS BOULEVARD, 29 FEET 1-3/8 INCHES;

THENCE STILL SOUTHERLY AND ON A LINE FORMING AN EXTERIOR ANGLE OF 12° 48' AND 05" WITH QUEENS BOULEVARD, 96 FEET 7-3/8 INCHES;

THENCE EASTERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE 21 FEET 11 1/2 INCHES TO THE WESTERLY SIDE OF QUEENS BOULEVARD;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF QUEENS BOULEVARD 13 FEET 8-5/8 INCHES;

THENCE STILL SOUTHERLY ON A LINE FORMING AN EXTERIOR ANGLE OF 12° 48' 05" WITH QUEENS BOULEVARD, 61 FEET 7 1/2 INCHES;

THENCE WESTERLY AT RIGHT ANGLES TO BARN STREET 125 FEET TO THE EASTERLY SIDE THEREOF;

THENCE NORTHERLY ALONG SAID EASTERLY SIDE OF BARN STREET, 200 FEET TO THE CORNER THE POINT OR PLACE OF BEGINNING.

PARCEL E (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT A POINT ON THE EASTERLY LINE OF WEST STREET AS THE SAID STREETS ARE LAID OUT ON THE CITY MAP ON APRIL 19, 1945. DISTANT 214.59 FEET SOUTHERLY FROM THE INTERSECTION OF THE SOUTHERLY LINE OF JACKSON AVENUE AS THE SAID STREETS ARE LAID OUT ON THE CITY MAP ON APRIL 19, 1945. AND THE EASTERLY LINE OF WEST STREET AS MEASURED ALONG THE SAID EASTERLY LINE OF WEST STREET;

CONTINUED...

THENCE SOUTHERLY ALONG THE EASTERLY LINE OF WEST STREET A DISTANCE OF 8.39 FEET;

THENCE SOUTHERLY DEFLECTING 33° 5' 30" TO THE LEFT ALONG THE SAID EASTERLY LINE OF WEST STREET A DISTANCE OF 38.36 FEET;

THENCE WESTERLY DEFLECTING 105° 13' 07" TO THE RIGHT A DISTANCE OF 85.05 FEET TO THE WESTERLY LINE OF WEST STREET;

THENCE NORTHERLY ALONG THE WESTERLY LINE OF WEST STREET A DISTANCE OF 47.28 FEET;

THENCE EASTERLY DEFLECTING 72° 07' 37" TO THE RIGHT A DISTANCE OF 63.04 FEET TO THE EASTERLY LINE OF WEST STREET AND THE POINT AND PLACE OF BEGINNING.

NOTE: DESCRIPTION OF PARCEL E INCLUDES THE LAND DESCRIBED AS PARCEL C ABOVE.

PARCEL F (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF ORCHARD STREET; AND

RUNNING THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF ORCHARD STREET 361.25 FEET TO ITS INTERSECTION WITH THE NORTHERLY LINE OF THE LAND OF LONG ISLAND RAILROAD; AND

THENCE EASTERLY ALONG THE NORTHERLY LINE OF THE LAND OF LONG ISLAND RAILROAD COMPANY 262.32 FEET TO ITS INTERSECTION WITH THE WESTERLY SIDE OF BARN STREET; AND

THENCE NORTHERLY ALONG THE WESTERLY SIDE OF BARN STREET 281.22 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF BARN STREET WITH THE SOUTHERLY SIDE OF JACKSON AVENUE; AND

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 50 FEET;

THENCE SOUTHERLY PARALLEL WITH BARN STREET 125 FEET;

THENCE WESTERLY PARALLEL WITH JACKSON AVENUE 125 FEET;

THENCE NORTHERLY AND PARALLEL WITH BARN STREET 125 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE; AND

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 75 FEET TO THE CORNER, THE POINT OF PLACE OF BEGINNING.

PARCEL G (FOR INFORMATION ONLY: BLOCK 264 P/O LOT 1)

BEGINNING AT A POINT IN A LINE DRAWN PARALLEL WITH THE WESTERLY SIDE OF BARN STREET AND DISTANT 50 FEET;

WESTERLY FROM THE WESTERLY SIDE OF BARN STREET MEASURED ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE; AND WHICH POINT OF BEGINNING IS DISTANT 100 FEET SOUTHERLY FROM THE SOUTHERLY SIDE OF JACKSON AVENUE;
CONTINUED...

RUNNING THENCE SOUTHERLY PARALLEL WITH BARN STREET, 25 FEET;

THENCE WESTERLY AND PARALLEL WITH JACKSON AVENUE, 50 FEET;

THENCE NORTHERLY, PARALLEL WITH BARN STREET, 25 FEET;

THENCE EASTERLY AND AGAIN PARALLEL WITH JACKSON AVENUE, 50 FEET TO THE POINT OR PLACE OF BEGINNING.

PARCEL H (FOR INFORMATION ONLY: BLOCK 264 LOT 17)

BEGINNING AT A POINT ON THE SOUTHERLY SIDE OF JACKSON AVENUE, DISTANT 50 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF BARN STREET WITH THE SOUTHERLY SIDE OF JACKSON AVENUE;

RUNNING THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 50 FEET;

THENCE SOUTHERLY, PARALLEL WITH BARN STREET 100 FEET;

THENCE EASTERLY, PARALLEL WITH JACKSON AVENUE 50 FEET;

THENCE NORTHERLY, PARALLEL WITH BARN STREET 100 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE, THE POINT OR PLACE OF BEGINNING, BE SAID DISTANCES OR DIMENSIONS MORE OF LESS.

PERIMETER DESCRIPTION AS SURVEYED

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE LYING AND BEING IN THE COUNTY OF QUEENS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE (100 FEET WIDE) WITH THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD (100 FEET WIDE);

RUNNING THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 93.55 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF WEST STREET (60 FEET WIDE);

THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF WEST STREET 214.59 FEET TO THE SOUTHERLY TERMINUS OF SAID STREET;

THENCE SOUTHWESTERLY ALONG THE SOUTHERLY TERMINUS OF SAID STREET AND ALONG A LINE FORMING AN ANGLE OF 72° 07' 37" ON THE NORTHEAST WITH THE WESTERLY SIDE OF WEST STREET, 63.04 FEET TO THE CORNER FORMED BY THE SOUTHERLY TERMINUS OF WEST STREET WITH THE WESTERLY SIDE OF WEST STREET;

THENCE NORTHERLY ALONG THE WESTERLY SIDE OF WEST STREET 233.94 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE WESTERLY SIDE OF WEST STREET;

CONTINUED...

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE 99.92 FEET TO A POINT;

THENCE SOUTHERLY AT RIGHT ANGLES TO THE SOUTHERLY SIDE OF JACKSON AVENUE AND PARALLEL TO WEST STREET, 125 FEET;

THENCE WESTERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE AND PARALLEL TO JACKSON AVENUE, 74.95 FEET TO A POINT;

THENCE NORTHERLY AT RIGHT ANGLES TO LAST MENTIONED COURSE AND THE SOUTHERLY SIDE OF JACKSON AVENUE, AND PARALLEL TO WEST STREET, 125 FEET TO THE SOUTHERLY SIDE OF JACKSON AVENUE;

THENCE WESTERLY ALONG THE SOUTHERLY SIDE OF JACKSON AVENUE, 74.94 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE EASTERLY SIDE OF ORCHARD STREET (60 FEET WIDE);

THENCE SOUTHERLY ALONG THE EASTERLY SIDE OF ORCHARD STREET, 361.25 FEET TO THE LAND NOW OR FORMERLY OF THE LONG ISLAND RAILROAD;

THENCE NORTHEASTERLY ALONG THE LAND OF THE LONG ISLAND RAILROAD AND ALONG A LINE FORMING AN ANGLE OF 72° 14' 11" ON THE NORTHEAST WITH THE EASTERLY SIDE OF ORCHARD STREET, 262.32 FEET TO AN ANGLE POINT;

THENCE NORTHEASTERLY ALONG A LINE FORMING AN ANGLE OF 179° 50' 45" ON THE NORTHWEST WITH THE LAST MENTIONED COURSE, 63.06 FEET TO AN ANGLE POINT;

THENCE NORTHEASTERLY ALONG A LINE FORMING AN ANGLE OF 180° 10' 14" ON THE NORTHWEST WITH THE LAST MENTIONED COURSE, 149.79 FEET TO THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD;

THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD 221.67 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE SOUTHERLY SIDE OF JACKSON AVENUE WITH THE SOUTHWESTERLY SIDE OF QUEENS BOULEVARD, THE POINT OR PLACE OF BEGINNING.

THE policy to be issued under this report will insure the title to such buildings and improvements erected on the premises, which by law constitute real property.

FOR CONVEYANCING ONLY: TOGETHER with all the right, title and interest of the party of the first part, of in and to the land lying in the street in front of and adjoining said premises.

APPENDIX B

Storm Water Pollution Prevention Plan

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

STORM WATER POLLUTION PREVENTION PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street
Long Island City, NY 11101-5407

Arnold F. Fleming, P.E.

November 2014

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FIGURES

Figure 1 Brownfield Site Location Map

Figure 2 Site Plan

Figure 3 Bedrock Elevation

Figure 4 Groundwater Elevation Contour Map

Figure 5 Soil Erosion and Sediment Control Measures

Figure 6 Soil Erosion and Sediment Control Details

1.0 INTRODUCTION

1.1 PURPOSE OF STORM WATER POLLUTION PREVENTION PLAN

This Storm water Pollution Prevention Plan (SWPPP) was prepared by Arnold F. Fleming, P.E. to address conditions as specified in the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001). The SWPPP was developed according to the current New York State Storm Water Management Design Manual and the New York Standards and Specifications for Erosion and Sediment Control. The SWPPP describes the measures for controlling runoff and pollutants during the implementation of the proposed soil remediation of the Queens Plaza Residential Development – Site B (the "Brownfield Site"). Note that the Site area is less than 1 acre and technically is outside the jurisdiction SWPPP requirements. This plan is prepared for the sake of completeness and to support best management practices.

The Brownfield Site is in the NYSDEC Brownfield Cleanup Program (C241151). LIC Development Owner, L.P. (the "Volunteer") is a contract vendee and the BCP Volunteer. The Brownfield Site remediation will be conducted in accordance with the approved Interim Remedial Measure Work Plan (IRMWP). The objectives of the SWPPP include the following:

- Reduction and minimization of erosion during and after remediation and sediment loading of storm water entering or exiting the Brownfield Site during remediation activities
- Control and reduction of storm water entering the Brownfield Site during excavation and remediation
- Control of the volume and peak rate of runoff during and after remediation
- Maintenance of storm water controls before, during and after remediation.

In order to comply with the SPDES General Permit for storm water Discharges from Construction Activity Permit, the SWPPP identifies potential pollution sources that could affect the quality of storm water discharges during remediation. The SWPPP also identifies controls and practices that will be used during and after remediation to minimize runoff, reduce pollutants in discharges, and establish compliance with terms and conditions of the SPDES permit.

The storm water pollution prevention devices and practices described in this document and in the remediation documents will provide effective attenuation and removal of sediments and pollutants in storm water runoff during remediation at the Brownfield Site.

The improvements are designed to control the rate, the volume, and the sediment/pollutant loading of storm water discharges during and after the proposed remediation. Proper implementation of this SWPPP will result in compliance with the provisions of the General Permit GP-0-10-001.

1.2 IMPLEMENTATION OF STORM WATER POLLUTION PREVENTION PLAN

The Contractor will be responsible for complying with all conditions and requirements of this SWPPP, in addition to the conditions of the General Permit GP-0-10-001. The Contractor shall keep all remediation activities under surveillance, management and control to avoid pollution of surface waters and groundwater. The Contractor will be required to submit a Method of Erosion Control and a final Site-specific Erosion and Sediment Control Plan. The Contractor will be required to initiate and maintain erosion controls before and during remediation to prevent siltation of any affected collection basins, manholes, channels, combined sewers, storm sewers, down gradient properties, or receiving waters, as well as any public right-of-ways. In the event that the temporary controls implemented by the Contractor prove to be ineffective or inadequate in controlling sediment and erosion at the Brownfield Site or otherwise unacceptable, the SWPPP will be modified accordingly and the Contractor will then be required to make the appropriate modifications or additions at the remediation site. Furthermore, if a new Contractor or Subcontractor assumes responsibility for implementing any portion of the SWPPP or if there is a significant change in design, remediation, operation or maintenance that was not considered or addressed in the SWPPP, the SWPPP shall be revised to include the relevant information and controls. If significant changes are made, the revised SWPPP will be certified and resubmitted to the NYSDEC for review and approval.

1.3 PROJECT DURATION

Remediation/demolition is anticipated to begin in August 2014 and terminate in December 2015.

2.0 PROJECT DESCRIPTION

2.1 PRE-REMEDIATION SITE CONDITIONS

The Brownfield Site is in the Brownfield Cleanup Program (BCP) and is listed as BCP Site No. C241151. LIC Development Owner, L.P. (the "BCP Volunteer") is a contract vendee and the BCP Applicant. The Brownfield Site B consists of two and three-story buildings, and one 5-story building: Buildings 3A, 3B, Building 4, and a small open area known as Area F. The Brownfield Site is also a New York City "E" Designated site. The Site is currently vacant.

The Brownfield Site is in Long Island City, Queens County, New York and encompasses a trapezoid-shaped parcel bounded on the north by the Queens Plaza Residential Brownfield Site A. (C241105) and Jackson Avenue. On the west, Brownfield Site B abuts Orchard Street, a mapped and dedicated city street. The southern boundary of Site B is the Long Island Rail Road (LIRR) Sunnyside Yard property. The eastern side of Brownfield Site B abuts Queens Boulevard. Figure 1 presents a Brownfield Site Location Map and Figure 2 presents a Brownfield Site Plan. This SWPPP applies to the Brownfield Site, which covers approximately 1.89 acres.

Historically, chemical manufacturing/storage was the principal activity on the Brownfield Site. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. Creosote was used in large quantities as a disinfectant and creosote spills represent the most significant contamination of the Brownfield Site's soil and groundwater. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layers at depth. Chlorinated solvents appear in soils and groundwater at lower levels.

The surrounding properties are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the LIRR Sunnyside Yard, which is a major train repair and service center. The Brownfield Site was historically zoned as "M1-6/R10 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development on the Brownfield Site.

2.1.1 Drainage

The Brownfield Site is currently served by the New York City combined sewer located in Orchard Street. Storm water inlets are located in various locations on the Brownfield Site. The Brownfield Site is paved with concrete/asphalt, and there is no storm water infiltration. No off-Site discharges have been noted during significant rainfall events.

2.1.2 Geology and Hydrogeology

The Brownfield Site is located on gently sloping land with a surface elevation of approximately 13.6 feet relative to the North American Vertical Datum 88 (NAVD88). The generalized subsurface profile consists of fill overlying silty sand and glacial till, with bedrock below the till. A bedrock elevation contour map is shown as Figure 3.

Surface soils consist of a fill layer approximately 5 to 9 feet in thickness. This fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varied silt and clay are present within this sand unit in some locations on the Brownfield Site. The sand layer varies in thickness from approximately 5 to 7 feet. Additionally, a till layer is present over most of the Brownfield Site beginning from approximately -0.4 to -9 feet NAVD88and extending to the top of bedrock at elevations of approximately -2 to -12 feet NAVD88. Based on soil boring data from previous investigations, bedrock at the Brownfield Site is gneiss.

Groundwater occurs within the unconsolidated geologic materials covering the Brownfield Site. The upper surface of the groundwater reservoir is marked by the groundwater table, which fluctuates seasonally in response to precipitation. The groundwater table elevation ranges from approximately 9 feet to 11 feet NAVD88 over most of the Brownfield Site. Groundwater flow direction is predominantly to the south-southwest. Figure 5 shows the direction of groundwater flow on the Brownfield Site.

No surface water bodies exist on the Brownfield Site. The closest surface water body is the Dutch Kill coming from the Newtown Creek, located approximately 1,600 feet south of the Brownfield Site, and the East River approximately 4,200 feet to the west.

2.1.3 Results of Previous Investigations

Previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills. The sources of these spills are greatest near where the material was stored and processed on Brownfield Site A, immediately north of Brownfield Site B.

Creosote spills impacted soils in the form of a smear zone and deeper soils in the form of residual DNAPL. Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of Building 4. Creosote covers the floor and some portion of the basement walls in Building 4. Comparatively fewer soil borings have been completed on Brownfield Site B because buildings cover most of the Site. For this reason, the understanding of contamination on Site B is limited.

2.2 INTERIM REMEDIAL MEASURE WORK PLAN

The elements of the proposed remediation (i.e. excavation, dewatering, sheeting and shoring etc.) for the Brownfield Site will be implemented during remediation. The remediation will be phased so as to minimize the exposure of soils underneath the current building slab and prevent sediment and pollutant runoff from occurring.

2.2.1 Remediation Phasing

The Interim Remedial Measure will consist of the following elements:

- Installation of site fencing
- Installation of stabilized remediation entrance

- Demolition of existing building
- Installation of a containment structure
- Installation of temporary sheeting and shoring
- Installation of berm along the Site perimeter
- Excavation
- Dewatering
- Remediation of building foundations
- Site Paving

2.2.2 Excavation

The method is to excavate and load soil (and debris) directly into trucks for disposal at off-Site facilities without stockpiling; however, some temporary stockpiling within the excavation may be necessary based on the availability of transport vehicles. There is insufficient space to routinely stockpile and segregate large volumes of soil and direct loading is the most effective means to meet the remediation schedule and control potential odors. Soil will be removed using appropriate or otherwise suitable excavation equipment. The excavation of OU-1, where creosote or petroleum contamination is anticipated, will be performed within an engineered containment structure designed for constant negative air pressure to contain odors. The area covered by the containment structure may be expanded based on the Remedial Investigation data.

Soil will be excavated over the entire BCP Site area and loaded directly into trucks for off-site disposal whenever possible. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible, but may still require alternative odor control measures. This decision will be made in conjunction with the Department. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible. Any soil stockpiled outside a containment structure will be placed upon plastic sheeting and covered with plastic sheeting at the end of each day. Soils stockpiled within the containment structure will be placed on plastic sheeting but not covered. At the conclusion of each work day, exposed contaminated soil within the containment structure will be covered with plastic and/or long-duration foam and then the air handling system will be turned off.

2.2.3 Temporary Sheeting, Shoring and Underpinning

Within the Brownfield Site, a combination of sheeting, shoring, and underpinning will stabilize the excavation. Shoulder beams and lagging will be constructed along the Brownfield Site perimeter accessible to the public (along Orchard Street and along the southern perimeter where there are no adjacent building foundations). Underpinning will be used to support the foundations of the buildings that abut the eastern, northern and southern boundaries of the Brownfield Site. Where excavation is shallow, slope stabilization, slope cuts (1:1 or 2:1, as necessary) or other acceptable means may be used where sheeting and shoring are unnecessary.

2.2.4 Permanent Sheeting

It is possible that NAPL could migrate back into the remediated OU-1 area from sources outside the Brownfield Site. A means of preventing re-contamination of the remediated areas is

therefore necessary. Three methods of preventing re-contamination will be used depending on the structures and nature of the contamination near them. Steel sheeting will be used where there is insufficient space to drive the sheet piles and where the structures can sustain the vibration and pounding. Where these conditions cannot be met, the approach will be to use underpinning of the structures. If foundation walls extend to bedrock, then these will be left in place to control migration, if conditions warrant.

2.2.5 Containment Structure

Creosote is responsible for most of the impacts and generates strong odors. Consequently, soils in the Brownfield Site must be excavated beneath an enclosure (OU-1) so that odors can be controlled. The enclosure(s) may be a sprung structure, scaffolding, or an enclosure formed by tarps or plastic coverings attached to adjacent buildings, or a hybrid. The enclosure will be sufficiently large to accommodate excavation equipment and accommodate truck loading and will have air exchange with filtering. Other areas may require excavation within an enclosure if warranted by excessive odors or VOC levels. This decision will be made based on field conditions.

2.2.6 Dewatering

Dewatering will be used as necessary in OU-1 to complete the work and excavate to the desired depths. Water will be pumped from the excavation to temporary well points placed on the perimeter of the Brownfield Site in the sheeting excavation. Groundwater will then be pumped to a treatment suite consisting of settling tanks to remove suspended solids, a separator to remove any free product, and granular activated charcoal (GAC) units to remove dissolved organic contaminants. From there the water will be discharged to the New York City combined sewer through a connection to the existing sewer line on Orchard Street. Discharge will comply with New York City Department of Environmental Protection (NYCDEP) permit requirements. No dewatering liquids will be discharged back into the excavation. No dewatering is anticipated in OU-2.

3.0 PROPOSED STORM DRAINAGE CONDITIONS

The proposed storm drainage system will be adapted to Site conditions as the Brownfield Site is developed.

Existing Conditions

The Brownfield Site is currently served by the New York City combined sewer located in Orchard Street. Storm water inlets are located on the Brownfield Site as shown on Figure 5.

Remediation

The anticipated storm water control and remediation sequencing at the Brownfield Site is described below. If changes are made to the remediation sequencing, the SWPPP will be adapted as necessary.

1. Prior to beginning excavation, install a security fence around the perimeter of the Brownfield Site open to public access. A temporary asphalt berm will be installed around the outer perimeter of the Brownfield Site along Orchard Street, preventing storm water from entering the Brownfield Site from off-Site sources.
2. Paving will be removed across the Brownfield Site, to bring the Site elevation below sidewalk elevation, preventing storm water from leaving the Brownfield Site. If necessary, during this process, storm water will be collected on-Site and pumped into a baker tank, and then pumped into the New York City combined.
3. The entire perimeter of the Brownfield Site along Orchard Street will be sheeted, outside the property line on the sidewalk. The area between the property line and the proposed sheeting will be excavated to facilitate sheeting installation. Temporary well points will be installed in this excavation at various points around the Brownfield Site to collect storm water and eventually groundwater. These well points will act as the dewatering system for the excavation, once underway.
4. Along the buildings on the eastern northern and northern sides of the Brownfield Site, underpinning will be installed to support the adjacent buildings' foundations. On sides where the boundary of the Brownfield Site does not abut a building, sheeting will be installed for stabilization.
5. Stabilized pads will be installed at each vehicle access point. These locations will be determined by the Contractor prior to beginning work on-Site.
6. Excavation will be at least to the depths below ground surface as identified in the Remedial Investigation. Excavation may be deeper in some places. Creosote-impacted soils will be characterized for waste characteristics, removed from the Brownfield Site, and disposed off-site at an approved facility. Once operational, the remediation dewatering system will collect the storm water and groundwater and pump it to the on-Site treatment system (see Section 4.0). After treatment, the storm water will discharge to the combined on Orchard Street.

7. Brownfield Site remediation activities will be completed, including excavation of contaminated soil, transportation of contaminated soil from the Brownfield Site, and backfilling of the disturbed area as necessary to support the proposed building foundation. The dewatering system will operate until the building superstructure is stabilized.

8. The SWPPP plan calls for minimizing the stockpiling of soil. But in the event temporary stockpiling becomes unavoidable, then either of two options will be used. Option 1, the preferred option, will be to stockpile soil within the excavation, where the lower elevation will prevent runoff. Exposed stockpiles will be covered by plastic sheeting, when inactive, until removal. The second option, available only at the very beginning of the project when on-Site unexcavated space is available, will be to temporarily stockpile soil on asphalt/concrete, cover it with plastic sheeting, and encircle it with hay bales, when inactive, until removal. The SWPPP controls will prevent additional protection against runoff from the Site.

4.0 EROSION AND SEDIMENT CONTROLS

Adequate erosion and sediment control methods will be provided prior to any grading, excavating, trenching or otherwise disturbing any areas. The following describes the temporary erosion and sediment controls that will be implemented at the Brownfield Site, as shown on Figure 6.

Stabilized Remediation Entrances

A stabilized pad will be installed consisting of gravel underlain by filter cloth. This temporary measure will be used to reduce the tracking of sediments outside the work area onto adjacent pavements and public streets. A pad of gravel will be placed at the point of entry for remediation traffic onto the Brownfield Site, which will be determined by the Contractor prior to beginning work on-Site. Tires will be washed before leaving the Project Site. The truck wash wastewater drain will connect to the New York City combined on Orchard Street through the dewatering system.

Storm Drain Inlet Protection

Silt barrier/geotextile material and hay bales will be placed around existing and newly constructed inlets to reduce or eliminate sediment entering the storm drainage system. Inlet protection will be critical in reducing sediment content of water entering the storm drain system (See Figures 7 and 8).

Temporary Berm

A temporary berm will be constructed to prevent storm water from entering or exiting the Brownfield Site. The hand-formed asphalt berm will be approximately 3 inches high. The berm will be constructed along Orchard Street as shown on Figures 7 and 8.

Spill Prevention Control and Countermeasure (SPCC) Plan

The Contractor will submit a Site-specific SPCC plan detailing its methods for preventing spills to the ground during all handling and operations. The SPCC plan shall include details of all containment and contingencies for quickly and effectively cleaning up any spilled material. Specifications and locations of materials (absorbents, etc.) will be included.

Dust Control

Several methods of controlling dust will be utilized including sprinkling water or other moisture retaining agents on dirt roadways and covering all haul trucks carrying loose materials (as necessary). The slopes on the edges of the excavations will be covered with a dust and odor-suppressing foam, such as Geomar. The Contractor will also employ dust control measures, such as speed restrictions on Brownfield Site roads, and covering of haul trucks.

Groundwater Treatment

Groundwater will be treated prior to discharge to the combined. Groundwater will be pumped into a settling tank, through bag filters, and finally activated charcoal polishing before discharge to the combined.

Listed below are several general practices that will be employed during remediation:

- Any materials deposited onto public thoroughfares will be promptly removed and properly disposed.
- Captured liquids requiring disposal will be containerized and transported off-Site for treatment and/or proper disposal.
- The pavement will be swept as necessary to maintain a clean work area and prevent silt from entering storm water runoff.

5.0 OPERATION, MAINTENANCE AND INSPECTION

The Contractor will have overall responsibility for implementing, monitoring and maintaining the project schedule and documenting/monitoring that appropriate controls are in place. Before, during, and after remediation of the Brownfield Site, a number of erosion and sedimentation control measures will be implemented as described in Section 4. These controls will be maintained such that the quality and quantity of storm water runoff leaving the Brownfield Site will not be adversely affected by remediation operations. The controls will also be maintained to deter storm water from entering the Brownfield Site and the excavation**.** The Prime Contractor/Subcontractor Certification for SWPPP implementation is provided as Appendix A.

5.1 REMEDIATION-PHASE OPERATION, MAINTENANCE AND INSPECTION

The Contractor will designate a Site Coordinator who will perform regular inspections (at least every seven calendar days and within 24 hours of the end of any storm event of 0.5 inches of rain or greater) to document/monitor that adequate pollution control measures are in place. The Brownfield Site Coordinator will also conduct regular inspections of the erosion control items currently in place to evaluate their adequacy and effectiveness, and will identify any required corrective measures and additional items required to maintain effective erosion control. It will also be the Site Coordinator's responsibility to determine what areas have been satisfactorily stabilized and determine when to remove temporary erosion control measures established for remediation. Disturbed and stabilized areas, changes in flow patterns, fencing, or preventive measures shall be documented on a Site map. A log book will be maintained to record all inspection and maintenance information and made available to regulatory authorities upon request.

The Contractor shall have a Qualified Inspector conduct site inspections in conformance with the GP-0-10-001 requirements. The Qualified Inspector shall prepare an inspection report subsequent to each and every inspection and is required to present photo documentation of practices that are identified as needing corrective actions. The photos need to be date stamped. The SWPPP will be updated monthly to indicate changes that occurred, and anticipated changes for the month ahead.

5.2 POST-REMEDIATION OPERATION, MAINTENANCE AND INSPECTION

A final Site inspection will take place before the filing of the Notice of Termination to certify that the Brownfield Site has undergone final stabilization using vegetative or structural measures and that all temporary controls have been removed or converted to permanent controls (as applicable). All disturbed areas will have permanent measures applied.

6.0 REFERENCES

- Empire State Chapter, Soil and Water Conservation Service, 2004. *Draft New York Guidelines for Urban Erosion and Sediment Control.* 2004.

- New York State Department of Environmental Conservation, 2010. *SPDES General Permit for Storm water Discharges from Construction Activity – Permit GP-0-10-001.* January 2010.

- Center for Watershed Protection, *New York State Storm Water Management Design Manual,* August 2010.

- New York State Department of Environmental Conservation*, New York Standards and Specifications for Erosion and Sediment Control*, August 2005

- New York State Department of Transportation (NYSDOT), *2002. Standard Specifications, Section 209-3, Construction Details.* 2002.

- United States Environmental Protection Agency, *Best Storm water Management Practices*

- New York City Department of Environmental Protection, *Rules and Regulations Governing the Construction of Private Sewers and Drains*

SWPPP
Figures

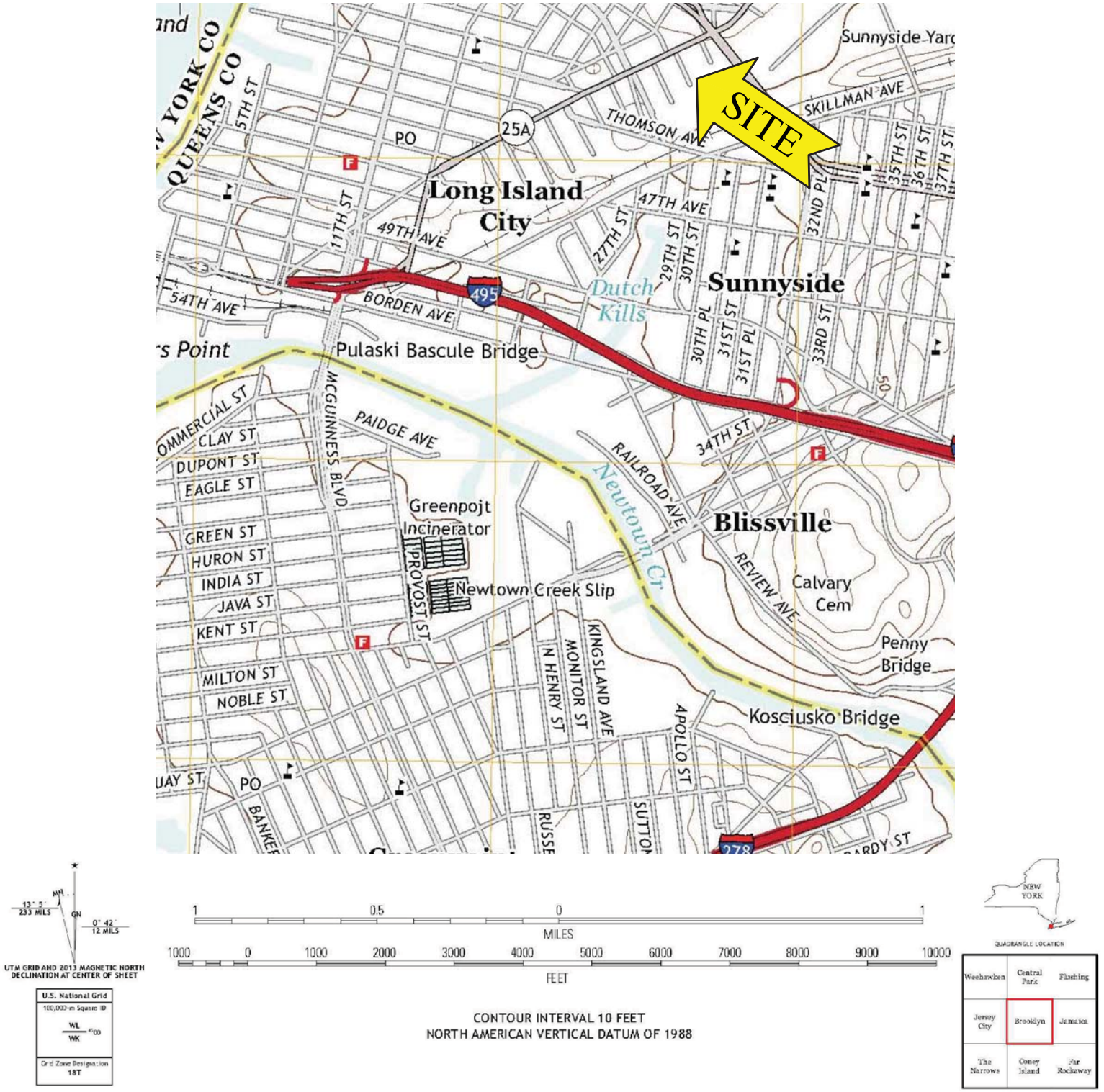


FIGURE 1: SITE LOCATION

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

Fleming Lee Shue

JACKSON AVENUE

ORCHARD STREET

QUEENS BLVD.

AREA A

TAX BLOCK 263
TAX LOT 1&19

2 STORY CONCRETE BUILDING NO. 9

AREA B

TAX BLOCK 264
TAX LOT 1&17

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

AREA C

5 STORY BRICK BUILDING

1 STORY

HIGH 1 STORY BRICK BUILDING

2 STORY BRICK BUILDING NO. 6

1 STORY BRICK BUILDING NO. 6A

2 STORY BRICK BUILDING NO. 2A

AREA D

AREA E

1 STY.

1 STORY BRICK BUILDING NO. 2B/2C

HIGH 1 STORY BRICK BUILDING NO. 5

1 STY.

1 STORY BRICK BUILDING NO. 10

2 STORY BRICK BUILDING NO. 3A/3B

3 STORY BRICK BUILDING NO. 4

5 STORY BRICK & CONCRETE BUILDING NO. 1

AREA F

AREA G

LONG ISLAND RAILROAD

WEST STREET

0 40 80
FEET

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 2.dwg DATE: 6/11/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 2

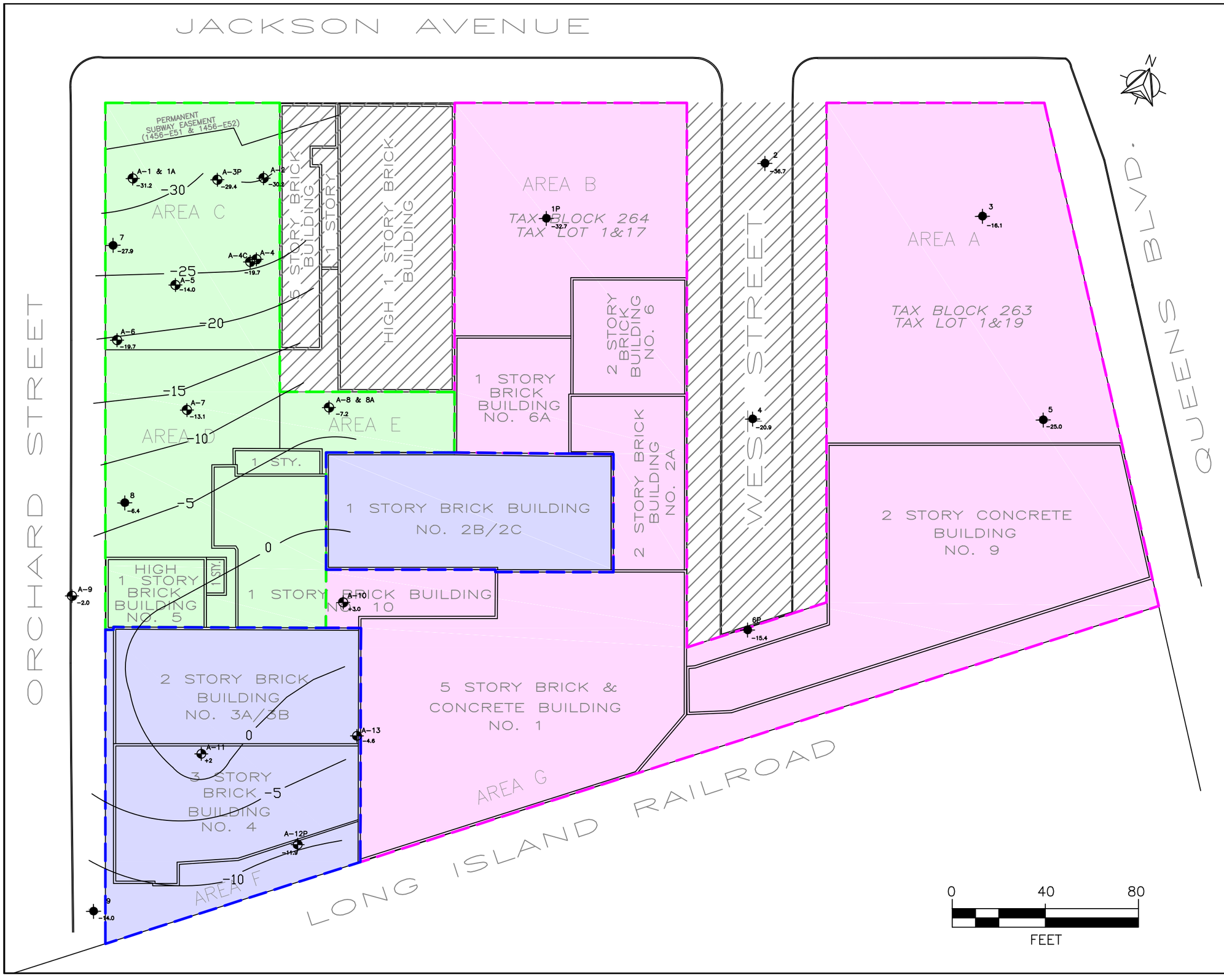
SITE PLAN

Date
June 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE



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New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 3

BEDROCK ELEVATION CONTOUR MAP

Date
June 2014

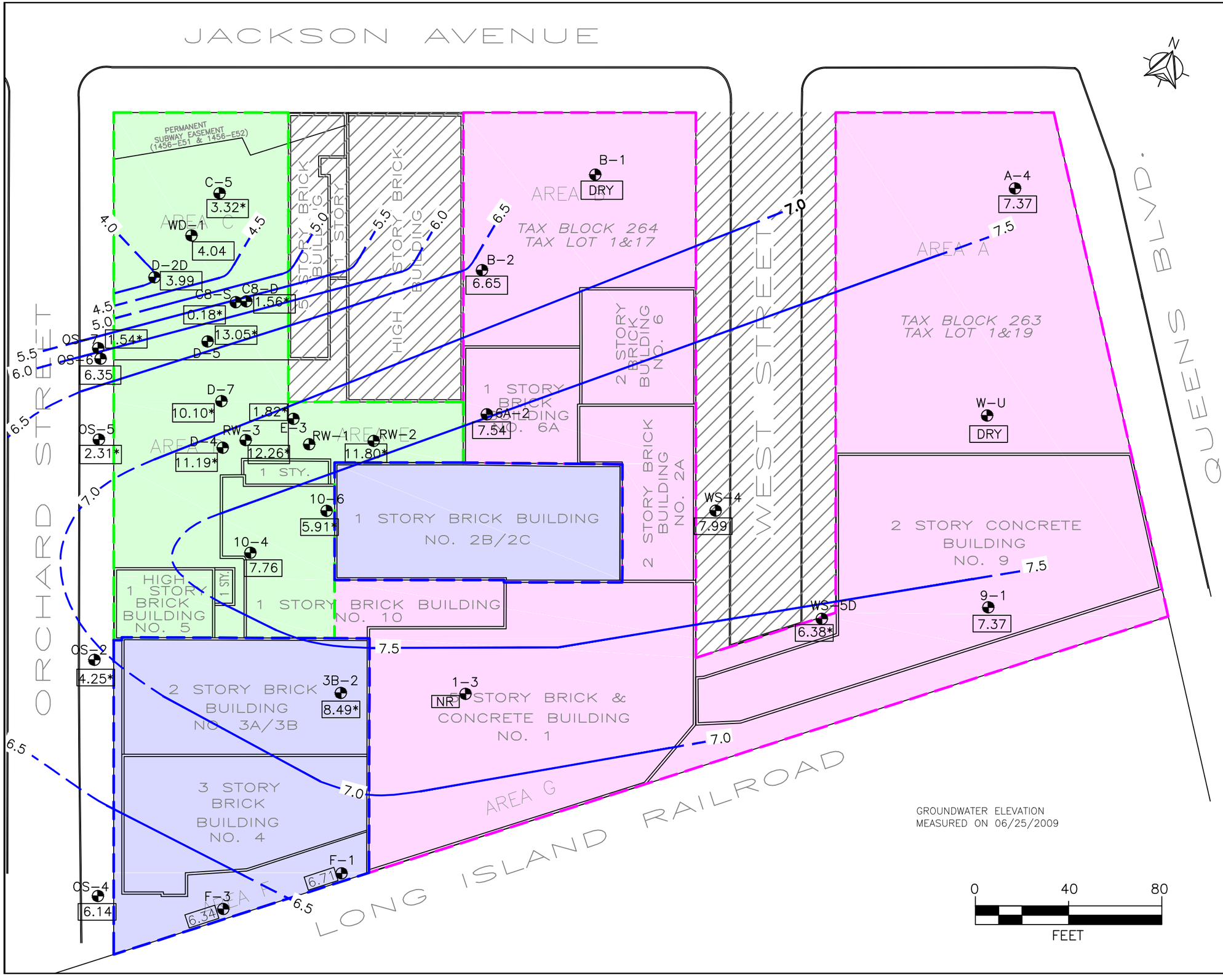
Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- A-10 +3 — BORING MADE IN 2007. ELEVATION OF TOP OF ROCK "P" INDICATED PIEZOMETER INSTALLATION. "A" INDICATED OFFSET FROM ORIGINAL LOCATION
- 9 -14.0 — BORING MADE IN 1988. "P" INDICATED PIEZOMETER INSTALLATION. ELEVATION OF TOP OF ROCK
- 5 — CONTOUR OF ELEVATION OF TOP OF ROCK

ELEVATION IN QUEENS BOROUGH DATUM (QBD) 1929

SOURCE: GEOTECHNICAL SUMMARY REPORT, MUESER RUTLEDGE CONSULTING ENGINEERS, APRIL 20, 2007



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158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 4

GROUNDWATER ELEVATION CONTOUR MAP

Date
June 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (QBD) – DASHED WHERE INFERRED
- 7.37 GROUNDWATER ELEVATION (QBD)
- * ELEVATION NOT USED DUE TO ANOMALOUS READINGS OF GROUNDWATER LEVEL
- NR NOT RECORDED

ELEVATION QUEENS BOROUGH DATUM (QBD) 1929

QBD IS 1.625 FT HIGHER THAN NORTH AMERICAN VERTICAL DATUM (NAVD88). TO CONVERT FROM QBD TO NAVD88 = QBD + 1.625 FT

FILE: P:\Project Files\10112 – Tishman Consulting\001-10 – Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 4.dwg DATE: 7/2/2014

JACKSON AVENUE

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

AREA C

5 STORY BRICK BUILDING

1 STORY

HIGH 1 STORY BRICK BUILDING

AREA B

TAX BLOCK 264
TAX LOT 1&17

2 STORY BRICK BUILDING NO. 6

1 STORY BRICK BUILDING NO. 6A

2 STORY BRICK BUILDING NO. 2A

AREA D

AREA E

1 STY.

1 STORY BRICK BUILDING NO. 2B/2C

HIGH 1 STORY BRICK BUILDING NO. 5

1 STY.

1 STORY BRICK BUILDING NO. 10

2 STORY BRICK BUILDING NO. 3A/3B

5 STORY BRICK & CONCRETE BUILDING NO. 1

3 STORY BRICK BUILDING NO. 4

AREA F

AREA G

LONG ISLAND RAILROAD

WEST STREET

AREA A

TAX BLOCK 263
TAX LOT 1&19

2 STORY CONCRETE BUILDING NO. 9

QUEENS BLVD.

ORCHARD STREET

N

0 40 80

FEET

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 5.dwg DATE: 6/11/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 5

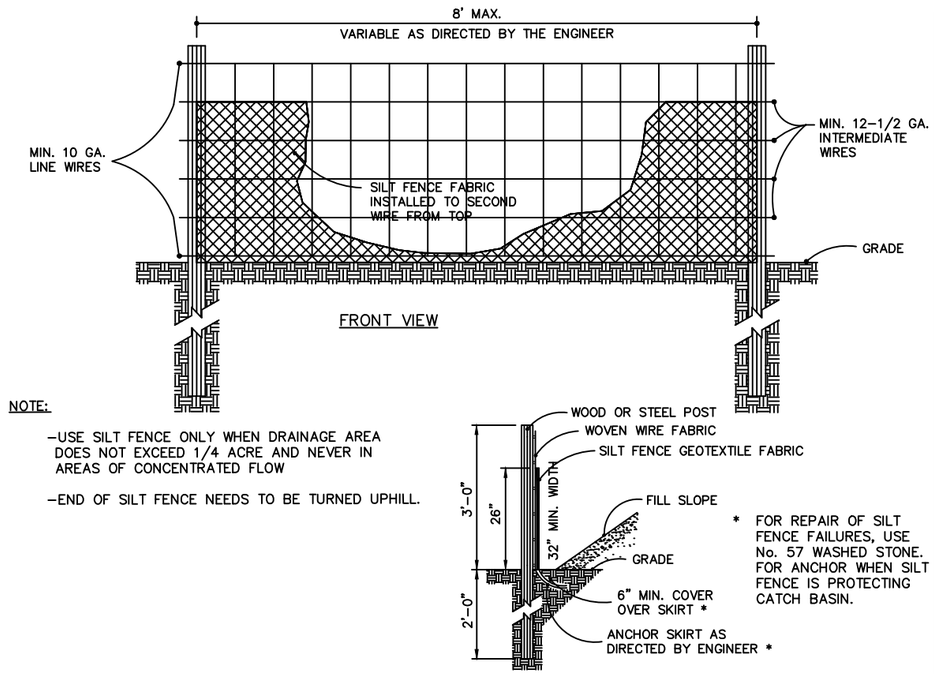
SOIL EROSION AND SEDIMENT CONTROL MEASURES

Date
June 2014

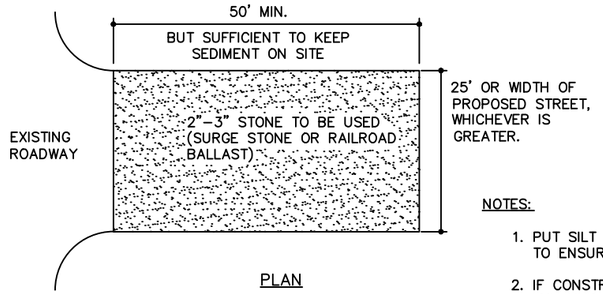
Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE
- TEMPORARY ASPHALT BERM
- CONSTRUCTION FENCE
- COMBINED SEWER LINE
- Ⓢ COMBINED SEWER MANHOLE

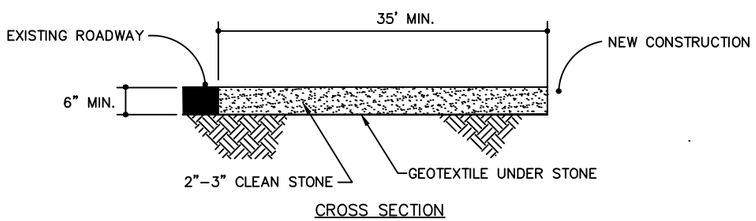


STANDARD TEMPORARY SILT FENCE | 1

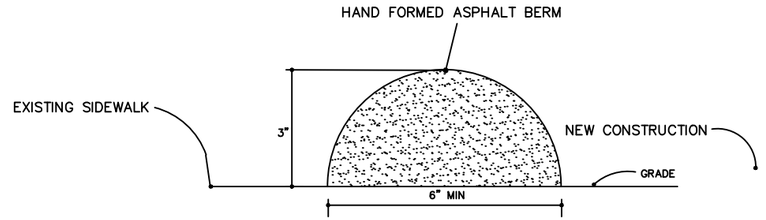


NOTES:

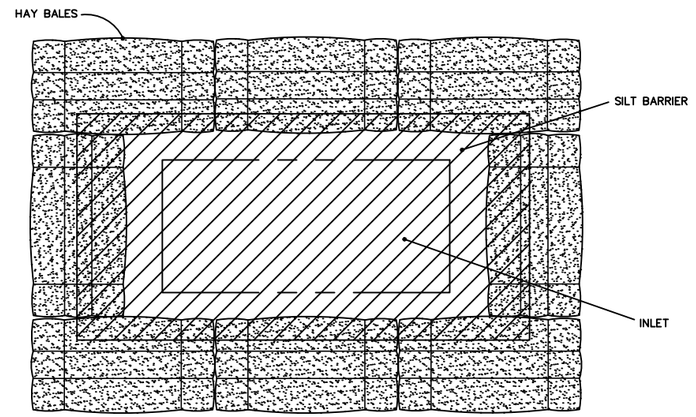
1. PUT SILT FENCE OR TREE PROTECTION FENCE UP TO ENSURE CONSTRUCTION ENTRANCE IS USED.
2. IF CONSTRUCTION ON THE SITE IS SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING THE PUBLIC ROAD.

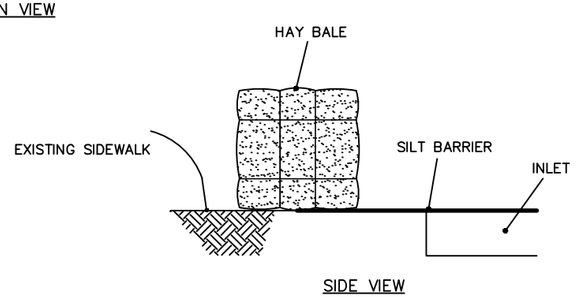


CONSTRUCTION ENTRANCE | 2



TEMPORARY BERM | 3





INLET PROTECTION | 4

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 6

SOIL EROSION AND SEDIMENT CONTROL DETAILS

Date
June 2014

Project Number
10112-005-1

LEGEND

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAMP June 2014\SWPPP Figures\Figure 6.dwg DATE: 6/11/2014

SWPPP
Appendix A

PRIME CONTRACTOR/SUBCONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001) that authorizes the storm water discharges associated with the remediation activities at the Queens Plaza Residential Development Site (Brownfield Site), located along Jackson Avenue at Orchard Street, Long Island City, New York.

Name

Title

Company

Date

CERTIFICATION OF STORM WATER POLLUTION PREVENTION PLAN

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Name

Title

Date

APPENDIX C
Soil Management Plan

Appendix C

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

APPROVED SOIL MANAGEMENT PLAN

LIC Development Owner, LP
c/o Tishman Speyer
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New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

November 2014

Arnold F. Fleming, P.E.

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1.0 Introduction

The Brownfield Site is in Long Island City, Queens County, New York and encompasses an irregularly shaped parcel bounded on the north by the Queens Plaza Residential Site A. (C241151). On the west, Site B abuts Orchard Street, a mapped and dedicated City street. The southern boundary of Brownfield Site B is the Long Island Railroad (LIRR) Sunnyside Yard property. Jackson Avenue and Queens Boulevard border the site on the north and east, respectively.

Brownfield Site topography slopes gently. The average surface elevation is approximately 14 feet North American Vertical Datum 88. Surface soils consist of a fill layer approximately 5 to 9 feet thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. Bedrock is variable beneath the Brownfield Site. All soil has been capped with buildings and concrete.

The bedrock is variable beneath the Brownfield Site and influences contaminant movement. Depth to bedrock varies across the Brownfield Site from approximately 10 ft-bg to 21 ft-bg on the western portion and to 25 feet to 40 or more feet on the eastern side.

Historically, chemical manufacturing was the principal activity. The former Brownfield Site owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. Creosote was used in large quantities for these purposes and creosote spills represent the most significant impacts. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layer at depth. Petroleum releases also have occurred and there is a limited area of free product. Chlorinated solvents appear in soils and groundwater, but to a much lesser extent. A number of locations contain metals concentrations exceeding regulatory limits.

The surrounding properties are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the Long Island Railroad's Yard A, which is a major train repair and service center. The Brownfield Site was historically zoned as "M1-6/R10 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development on the Brownfield Site.

1.1 Purpose

The purpose of the Soil Management Plan (SMP) is to present the methods, procedures, and guidance for handling all aspects of soil connected with Brownfield Site remediation. The SMP specifies the means and methods for dealing with soil and provides overall soil management goals.

1.2 Goals

The goals of the SMP are to handle all contaminated soil and manage activities associated with soil in a manner that prevents contamination from reaching the community, workers, future occupants and workers, and the environment. Contaminated soil must be kept from escaping from Brownfield Site, and all soil must be managed in a manner that ensures removal, transport, and disposal such that it fulfills applicable regulatory requirements. Another goal is to keep objectionable odors from reaching the community. At the conclusion of remediation the Brownfield Site must be secured and stable and left in a condition ready for construction.

2.0 Brownfield Remedy

Excavation is the means of removing contamination. The preferred method is to excavate and load directly into trucks for disposal at off-Brownfield Site facilities because there is insufficient space to stockpile and segregate large volumes of soil and because direct loading is the most effective means to meet the remediation schedule. Some provision will be made for stockpiling and staging soil because of delays, traffic, holidays, weather, and unforeseen events. Therefore, it is necessary to plan for soil stockpiling. There are different types of contaminated soil and debris that may be expected during remediation. Native soil and historic fill are present with varying degrees of VOCs, SVOCs, metals and pesticide contamination from the previous operation of a chemical manufacturer. Also, there are known releases of creosote and petroleum.

Contaminated Concrete and Debris

This is concrete, wood, or other material contaminated with petroleum and/or creosote. Depending on disposal facility requirements, this material may have to be segregated from soil and disposed separately.

Non-Contaminated Concrete and Debris

This is concrete, wood, or other material free of petroleum and/or creosote staining and odors. This material may be disposed as construction and demolition (C&D) and separated from contaminated soils.

3.0 Soil Management

This section describes the procedures for managing soil on the Brownfield Site.

3.1 Pre-Characterization

Where soil will be excavated and directly loaded into trucks or is otherwise slated for disposal, it must first be pre-characterized and accepted by the disposal facility(ies). To provide disposal facilities with characterization data prior to excavation to allow direct load out, a sampling and analysis plan for soil pre-characterization plan prepared by an

independent soil agent will be implemented. The sampling plan will specify soil sample collection procedures that comply with the requirements of licensed disposal facilities. Based on previous sampling results, it is expected that all soil will be disposed as non-hazardous material.

In general, the pre-characterization sampling and analysis plan specifies that the area be divided into sampling grids and that the individual grid cells be sampled using test pits, or borings. Each grid cell is then sampled in accordance with the frequency required by the disposal facility(ies). The discrete sub samples are collected so as to be representative of the soils in each grid cell within the vertical zone of interest. Pre-characterization sampling, because it covers a range of potential disposal facilities in several states, may include full TAGM and Part 375 analyses, full New Jersey residential analyses, ignitability, reactivity, full Toxicity Characteristic Leachate Procedure (TCLP), paint filter, pH, corrosivity, moisture, and total sulfur. Contaminated concrete and debris will also be sampled according to the requirements established by the independent soil agent.

3.2 Brownfield Site Preparation

The Brownfield Site will first be prepared for remediation and soil management. Decontamination pad(s) will be built at the truck exit location(s) and will consist of a gravel pad sufficiently large to accommodate the largest truck and with enough space to allow workers to clean the vehicles before leaving the Brownfield Site. The pad will have the means to collect wash water. Cleaning will take the form of brushing off gross soil followed by spraying with potable water to remove dust or soil residue on both the truck body and undercarriage. The rinse water will be disposed through the dewatering treatment before being discharged to the city sanitary sewer.

Protective fencing and/or barriers will be installed along the Brownfield Site perimeter to protect the public from Brownfield Site work and to control vehicle movement. The barriers will comply with New York City Building Code. Internal barriers for Brownfield Site control and traffic management may also be added as necessary. When all Brownfield Site details are finalized, a Brownfield Site plan will be prepared that depicts the soil staging/stockpiling areas, ingress and egress points, decontamination areas, truck routes, water treatment units, dewatering system, work zones, safety barriers and fencing, and containment structures. The Brownfield Site plan will be presented to NYSDEC and will be updated as necessary.

Creosote can generate strong odors. Consequently, some areas must be excavated beneath an engineered containment structure so that odors and vapors can be controlled. The enclosure(s) will be an engineered structure that may consist of a sprung structure, scaffolding, or an enclosure formed by tarps or plastic coverings attached to adjacent buildings, or a hybrid, as approved by the Department. The enclosure will be sufficiently large to accommodate excavation equipment and accommodate truck loading. Negative air pressure will be maintained by a continuous ventilation system consisting of ventilation fans and activated charcoal filters. Other areas may require excavation within an enclosure if warranted by excessive odors or VOC levels or controlled with the use of

long duration odor suppressing foam and tarp covers. This decision will be made based on field conditions. Conversely, there may be soils that are relatively clean and do not pose an adverse odor threat. These soils may be excavated without an enclosure. This decision will be based on field conditions and discussion with NYSDEC and NYSDOH. Figure 12 in the Site B Interim Remedial Measures Work Plan shows the area of potential excavation inside an enclosure.

A containment structure will be installed, operated and maintained over the excavation areas to prevent off-Site migration of odors and vapors. The structure will be erected and maintained for as long as necessary during excavation. The structure will be designed and engineered to be self-supporting, constructed of a material that is compatible with the proposed environment, impermeable to the anticipated contaminant vapors, adequately lighted, large enough to encompass the excavation operations and able to be moved to encompass other areas, if necessary. The enclosure will comply with local building codes with regard to loading and structural considerations.

The containment structure will be fully enclosed and include an air handling/vapor treatment system. The enclosure will have a vapor management system capable of maintaining a negative air pressure and capturing and treating emissions from the excavation prior to discharge into the atmosphere and/or capable of controlling air emissions by means of direct air flow. Air changes will be sufficient to allow work within the structure at Level C or lower, the preferred level of protection being Level D, as defined in the Health & Safety Plan (HASP) (Appendix D).

The air handling system will consist of at least two blowers that will draw air out of the structure to maintain a negative air pressure and/or by direct air flow so that vapors and odors are contained. The blowers will be sized to include a minimum of six air exchanges/hour, inclusive of the open excavation volume. Selection of the vapor control measures is subject to acceptance by the Department. The levels should be as such to meet the community air monitoring requirements as given in the Community Air Monitoring Plan (Appendix E). Exhaust air will be treated by an air treatment system designed to assure compliance of the discharged air with relevant emissions standards in DAR-1. The vapor treatment system will likely consist of at least two vapor phase granular activated carbon (GAC) units to reduce VOC concentrations in the discharged air. Supplemental emission control (e.g., synthetic foam, “Biosolve”, and/or soil liners) will be available for localized contaminant areas discovered outside the containment structure.

During operation of the air handling system, discharge emissions will be tested, as required by the NYSDEC, to confirm that they meet NYSDEC discharge criteria. Testing will consist of field screening the treated discharge periodically throughout each day using a photo-ionization detector (PID). At a minimum, PID testing will be done each day at start-up, at mid-day, and before shut-down. Vapor samples will also be collected for laboratory analysis using SUMMA canisters for United States Environmental Protection Agency (USEPA) TO-15 analysis at system activation and once again during

contaminated soil removal activities to calibrate the PID measurements to actual containment concentrations.

At the conclusion of each workday, exposed contaminated soil within the containment structure will be covered with plastic and long-duration vapor suppressing foam and then the air handling system will be turned off. Operation of the air handling system will resume the next morning approximately one hour prior to any entry or excavation or loading, to evacuate and treat any vapors in the structure. If the covering of the exposed contaminated soil proves to be inadequate to control vapor/odors, as a contingency measure, at least one blower will be operated during non-working hours to maintain negative pressure within the structure. Contaminated soil containers and roll-off containers, if any, will be covered at the end of each day by vapor suppressing foam and plastic to prevent vapor emissions and the migration of odors and to prevent the infiltration of rainwater.

3.3 Soil Stockpiling

Although the preferred approach is to directly load excavated soil onto trucks, it may be necessary to temporarily stockpile soil. Soil stockpiling areas will be prepared by selecting locations that are sufficiently large to hold soil not directly loaded onto trucks. There should be enough area to accommodate the soil to be staged and to accommodate segregating soil into different types of piles. Since disposal options and costs differ appreciably depending on the type of soil contaminant, pending the results of pre-characterization sampling, enough space must be available to segregate soils into separate piles as the disposal facility(ies) require, where feasible and if space permits. Areas on the neighboring VCP site may be used for soil stockpiling, if necessary.

Each area must be prepared such that it is either lined at a minimum with a double layer of 8-mil plastic or is atop an area to be excavated at a later time. The stockpile area must be such that storm water cannot transport contaminated soil off the Brownfield Site or onto other areas on the Brownfield Site. Storm water control may be accomplished by either encircling the piles with hay bales and silt fencing or equivalent, directing run-off to a point where it can be collected and disposed, or other similar means (refer to the Stormwater Pollution Prevention Plan in Appendix B). All soil piles must be covered by plastic sheeting when inactive and the sheeting weighed down to prevent uncovering. Stockpile areas may be inside the containment structure if handling petroleum or creosote-contaminated soil or outside the containment structure if handling urban fill or native uncontaminated soils.

Some soil will be excavated from below the water table. In this case, the preferred approach is to allow the soil to drain through the site-wide dewatering system prior to excavation. If this is not possible, then either local dewatering or the use of stockpile areas such that drainage is either controlled or directed to a sediment trap and then to the Brownfield Site water treatment unit before being discharged to the city sanitary sewer, or employ an inert material such as ground corn cobs or kiln dust to absorb excess water.

3.4 Soil Segregation

Soil will be segregated on the basis of the pre-characterization results, prior soil sampling results, Brownfield Site knowledge, and direct observations during excavation. Direct observations include visual observations of staining and sheen, odors, and photoionization detector (PID) readings. Segregation decisions will be made by an on-Brownfield Site qualified environmental professional with Brownfield Site knowledge representing the Volunteer. Where soil contains different types of contamination, the more conservative disposal option will be selected (e.g., historic fill with petroleum contamination will be treated as petroleum contaminated; soil with petroleum and creosote contamination will be treated as creosote contaminated), or as the selected disposal facility(ies) require. The environmental professional will direct the contractor to place soil in the various pre-determined stockpiling areas or directly onto the proper trucks.

Segregated soils may require additional soil characterization sampling. Material slated for disposal will follow the requirements of the pre-characterization sampling protocol, modified as necessary for the volume, disposal facility, and previous results.

3.5 Soil Loading, Transport, and Documentation

All trucks used for disposal will be permitted as licensed waste transporters as required by NYCRR Part 364. Trucks will be covered with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). Petroleum or creosote-contaminated soils will be transported in trucks with gasketed rear gates to prevent any liquid discharge during transit.

A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and treated before disposal to the city sanitary sewer. Onsite truck roads will be covered with stone to minimize dust and mud entering public roads.

Details of truck movement and staging will not be complete until a contractor is selected. These will be presented to NYSDEC once they become known. Truck transport routes will be provided to the Department for approval.

Disposal Facilities and Submittals

Disposal facilities will be identified for each anticipated waste stream. All required analytical data will be provided to the disposal facilities for approval. Primary and alternate disposal facilities will be designated and submitted for each anticipated waste stream. Primary facilities will be contracted, upon final approval from the Volunteer, prior to excavation. Copies of contracts from each facility or letters from each facility indicating acceptance of the total estimated volume of material from this project will be submitted to the Department. Additionally, copies of all waste manifests, bills of lading, and certified weight slips from a scale approved for the use of all disposed materials as

well as the Part 364 Permits for all waste transporters will be submitted to the Department.

Vehicle Requirements and Odor Suppressant

All license plates on the trucks will be properly affixed and visible at all times; proper placards will be displayed and extraneous or incorrect placards will be covered and/or removed prior to the truck departing the Site. All required permits will be properly displayed or readily available for verification by the Department. Drivers will remain in the truck at all times unless they are wearing the correct personal protective equipment required for the Site. Standing on the back of the truck will be prohibited and ladders or scaffolding will be used when securing tarps and/or covers. Non-gasketed trucks will be lined with polyethylene material strong enough to withstand the placement of excavated material into the container without tearing, chemically resistant to the contaminants within the material, and be of sufficient length and width to cover the interior bed of the haul truck with no seams while completely covering over the load with overlap. Vehicles and containers used to store and/or transport materials will provided with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). The Department has the right to reject vehicles that are not properly equipped and/or arrive to the Site in a dirty condition. Odor and dust suppressing foam will be available as needed to supplement covers, or if requested by the Department.

Execution

Pre-characterization sample results will allow direct load, transport, and disposal of all impacted material whenever possible. Traffic control at the Site entry will ensure a smooth flow of traffic and minimize congestion at the Site entrance. At a minimum, the traffic control will include the usage of flaggers and proper signage, where required. Trucks containing excavated material will be properly covered prior to exiting the Site to prevent vapor and fugitive dust emissions during transport. The covers will be supplemented with odor suppressant foam or solvent as needed. Gross vehicle truck weights shall conform to the most current DOT regulations for the Federal, State, and local level. All work in and around trucks will be performed in appropriate personal protective equipment in conformance with the Site Specific Constructions HASP.

Prior to leaving the Site, material transport vehicles and containers will be inspected for evidence of contamination (including inside of wheels and undercarriage). All trucks leaving the Site will proceed to a decontamination station for cleaning prior to exiting onto public roads. Trucks and equipment will be cleaned using a broom and/or brushes within the excavation area prior to moving to the decontamination pads to decrease the amount of particulates leaving the remediation area. If necessary, at the decontamination pad, all heavy equipment will be pressure washed before leaving the Site. All equipment leaving the Site will be decontaminated as per these guidelines. In addition, any equipment previously utilized to excavate impacted material will be decontaminated prior to use in backfilling (e.g. excavator bucket). Decontamination pads will be sized to ensure that the largest piece of contractor equipment can be adequately decontaminated

and provisions will be made to control overspray at the decontamination pads. All waste-water from decontamination will be collected and pumped into frac tanks. Wastewater will be transported from the Site by a properly licensed liquid waste hauler or will be discharged in the approved dewatering system. Soils collected from the decontamination pads will be bulked with the impacted material and sent to the properly licensed approved disposal facility, as necessary.

Trucks will proceed directly to the designated disposal facility after leaving the Site and will not be pre-loaded with material for overnight storage. Clean up of any material spilled or leaked in transit, or mud or dirt tracked off-Site will be performed in accordance with all applicable Federal, State, and local regulations. Material from the Site will not be combined with any other material.

Volunteer and/or Volunteer's agent will sign transport bills of lading or manifests. Volunteer will provide a hazardous waste generator number, if required. Maintain copies of all documents involving transportation of materials from the Site. Copies of these records shall be submitted to the Department at a frequency agreed to by Arnold F. Fleming, Remedial Engineer, and Volunteer. All records shall be turned over to the Volunteer at the completion of the Work. It will be ensured that all transport vehicles are properly secured, labeled, and placarded.

3.6 Excavation

Soil excavated as part of remediation will be either directly loaded into trucks or stockpiled for later loading and disposal or testing for re-use as backfill on the Brownfield Site. All stockpiles will have dust controlled by means of water mist if necessary. A source of water and means of applying water spray will be available and within easy access. A foam machine(s) will be available on Brownfield Site to control odors, if necessary, during excavation, soil stockpiling, and loading outside of the containment structure. A bio-degradable, synthetic-based foam concentrate such as Rusmar Long Duration Odor Suppressant Foam AC-600 Series or equivalent may be used. Soils excavated in areas where soils have been heavily impacted by creosote and areas of the Brownfield Site impacted by petroleum releases must be handled entirely within the containment structure.

At the end of each workday the excavation will be secured in a manner that controls odors. If odors become objectionable or have the potential to adversely affect the neighborhood, then odor control will be employed. Control measures may include covering the bottom or excavation sidewalls with tarps, plastic, foam, encapsulant, soil or gravel, or some combination that is effective.

3.7 Imported Backfill

Imported material brought in as backfill must be certified that it is free of contamination as virgin source material with written documentation from the supplier certifying that the soil is from a source not known to have been contaminated or have received hazardous

materials, petroleum or other hydrocarbon-derived, toxic, or radioactive materials. If the material is not virgin, then the material will be tested at a frequency of 1 sample/250 yd^3 for full Part 375 Soil Cleanup Objective parameters analyses from each source area. The tested material will be considered acceptable for reuse on Brownfield Site B if it meets the Part 375 Unrestricted Use criteria as set forth in NYCRR Part 375-6.7(d). Alternatively, recycled concrete aggregate (RCA), a commercial product, may be used as imported backfill without testing.

If more than 1,000 yd^3 are imported from a given off-Brownfield Site non-virgin source, and each of the four samples for the first 1,000 yd^3 meet the stated reuse criteria, then the sample frequency will reduce to 1 composite sample/2,500 yd^3 for additional soil from the same source up to 5,000 yd^3. For volumes greater than 5,000 yd^3, the sampling frequency will be reduced to one sample/5,000 yd^3, provided that all previous samples met the established limits.

All imported soil must be free of organic material, debris, cinders, combustibles, wood, roots, and staining. All imported soils must be approved by NYSDEC before being brought to the Brownfield Site. Backfill placement on-Brownfield Site must be approved by the Brownfield Site environmental professional.

4.0 Demobilization

The Brownfield Site must be stabilized and secured at the conclusion of remediation. This means removing all equipment and materials used for remediation and ensuring that all former soil staging areas and cleaning apparatus have been decommissioned and cleaned and that no contaminated soil or debris remains on Brownfield Site.

APPENDIX D

Health & Safety Plan

Queens Development
Brownfield Cleanup Program Nos. C241105 & C241151
Long Island City, NY

HEALTH & SAFETY PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Submitted to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
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&

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June 2014

I, Tom Eng, CIH certify that the Queens Plaza Residential Development Brownfield Cleanup Program Health & Safety Plan was prepared under my direction. Changes to this document may be made only with approval by T. Eng, Certified Industrial Hygienist (CIH).

4/8/14
Date

Tom C. Eng, CIH
Certified Industrial Hygienist

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1.0 INTRODUCTION

1.1 Purpose

The firms Fleming-Lee Shue, Inc. (FLS), Arnold F. Fleming P.E. (AFF), and Tom Eng of Active EHS LLC, third party Certified Industrial Hygienist (CIH) prepared this site-specific Health and Safety Plan (HASP) to address the health and safety practices and guidelines that will be employed during the environmental investigation and remediation of the Queens Plaza Development Brownfield Site (hereafter referred to as the "Brownfield Site") located in Long Island City, New York. The Brownfield Site is under the Brownfield Cleanup Program (BCP) as Site Nos. C241105 and C241151 administered by the New York State Department of Environmental Conservation (NYSDEC).

This HASP has been developed in accordance with the requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. The HASP establishes the known chemical and physical hazards associated with the work activities and provides a description of the air monitoring requirements, personal protective equipment requirements and safe operating guidelines for use by FLS/AFF and our subcontractors. This HASP applies to the FLS and AFF scope of work: remedial investigation, remedial action, interim remedial measures, and off-site investigation work. All subcontractors working with FLS/AFF will be provided with a copy of this HASP for review. Based on their means and methods of executing the work activities, the subcontractors will either accept the safety procedures outline in this HASP and FLS/AFF Health and Safety Officer's supervision or the subcontractor can provide a HASP addendum, for FLS/AFF review and acceptance, stating any additional procedures that they wish to be incorporated. Other parties (Contractors, subcontractors, and their employees) performing their own scope of work not covered by this HASP can review this HASP but must prepare their own HASP that meets Occupational Safety and Health Administration (OSHA) requirements. Contractors providing their own HASP must indicate that their HASP was prepared under the direction of a CIH. This HASP will be kept onsite during field activities and shall be accessible at all times. This HASP will be reviewed as necessary and amended or revised as conditions change and additional activities arise. All FLS/AFF site personnel and subcontractors will receive site specific HASP training and will be required to sign the Acknowledgement Form (Attachment I). All visitors, who visit the site for the purposes of

observing our work activities will also receive a health and safety briefing, sign the Acknowledgement Form, and be escorted at all times.

1.2. References

The general provisions of this HASP were developed in accordance with the provisions of OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 or 29 CFR 1926.65.

The Occupational Safety and Health Act (1970) requires the following:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.
- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Occupational Safety and Health Act, that are applicable to company business and operations.
- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.
- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

In addition, all work will comply with the Owner Required Safety Performance Standards in the appendix.

2.0 PROJECT INFORMATION

2.1 Site Description

The Brownfield Site is in Long Island City, Queens County, New York and encompasses a trapezoid-shaped parcel (Figure 1). The Site is bound by Jackson Avenue on the north. On the west, the Brownfield Site abuts Orchard Street. The eastern side of the Brownfield Site abuts Queens Boulevard and the southern boundary fronts the Long Island Railroad (LIRR) Sunnyside Yard property. West Street, a 5-story Apartment building and a New York City transit (NYCT) Substation are outside the Brownfield Site.

The Brownfield Site contains paved areas and a number of 1-, 2-, 3-story brick buildings. One 5-story building is also on Site. The Site plan is presented in Figure 2.

The Brownfield Site topography slopes gently to the south. The surface elevation ranges from approximately 12 ft. Queens Borough Datum (QBD) to 16 ft. QBD. The surface soils consist of a fill layer approximately 5 to 9 ft. thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The depth to bedrock is variable beneath the Site; it is shallow near the middle of the western side of the property and deepens to the north, south, and east. All Site soil is capped by buildings, concrete or asphalt.

The Site is in an area designated as M1-5/R9 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a special zoning provision to promote the development and transformation of historical industrial/ manufacturing areas into mixed use commercial and residential spaces

2.2 Site Background and Previous Investigation Findings

2.2.1 Site Background

The Site was occupied by the West Chemical Company (West Chemical) from the early 1900s until 1977. West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. West Chemical stored a variety of other materials on-Site during its tenancy, including muriatic (hydrochloric) acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand

creams, cleaning products (floor waxes and cleaners), and vending machine products. The manufacture of a disinfectant "Coronoleum" (CN+) prior to 1950 resulted in the storage of large quantities of creosote on the western side of the property.

2.2.2 Previous Investigation Findings

Previous Site investigations identified the following three historic instances of creosote contamination:

- Leaks in the bottoms of several aboveground storage tanks (ASTs). These are believed to all be removed.
- In 1950, the New York City Fire Department (FDNY) deliberately released the contents of a 5,000-gallon AST of creosote to the ground during a fire as an explosion prevention measure.
- Former West Chemical personnel identified that creosote was historically delivered to the plant by means of a rail siding and the creosote was pumped into a fill line and delivered to storage tanks.

The following summarizes the history of petroleum bulk storage on the subject property:

- Two, 500-gallon, gasoline underground storage tanks (USTs) were identified and were removed in 2003. They were located near the parking area that lies along Orchard Street.
- Four heating oil USTs were installed between 1947 and 1948. These USTs were originally used to store No. 6 fuel oil and later converted to No. 4 fuel oil. In 1990, the USTs were closed-in-place and a natural gas-fired heating system was installed. These are located in the western part of Building 10.
- Twenty-two aboveground storage tanks (ASTs) were identified on the Site in the 1940s and 1950s. The ASTs ranged in capacity from 3,000 to 24,000 gallons, with a total tank volume of 260,575 gallons. These have been removed.
- Forty-five process/storage vaults and kettles filled with unknown liquid were encountered in Buildings 2B, 3A, and Buildings 3A and 3B, and 10. The composition of the liquid and quantity, if any, is unknown for all of the units, but water mixed with soap and/or lye is suspected in at least one unit.

Seven previous environmental investigations, beginning in 1988, consisted of varying levels of soil and groundwater investigation, Non-Aqueous Phase Liquid (NAPL) product-level

studies, and collection of soil gas data across the Site. Previous investigations included the following studies:

1. *Queens Plaza Site B Investigation,* AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property*, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Investigation*, AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. *Site Characterization Investigation Data Summary,* SCS Engineers, July 12, 2013.

Underground Process Kettles/Vaults and Storage Tanks

According to the 2013 investigation completed by SCS Engineers, there are 17 kettles in Buildings 3A and 3B and 23 vaults in Building 2B. All kettles had some liquid in them and at least one vault contained liquid.

SCS did not identify any hazardous concentrations of gases or the risk of explosion while investigating these units. The measurements were made by a personal multi-gas meter. The SCS July 12, 2013 report provided no information on vapor conditions inside any of the kettles or vaults.

Water samples from nine kettles were collected and analyzed SCS Engineers for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pH. All VOC and SVOC results were below Toxicity Characteristic Leaching Procedures (TCLP) threshold values. One sample exceeded the TCLP threshold for mercury in one kettle (K-9). The pH was between 6.8 and 8.2 standard units.

Soil Contamination

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills on the Site. Much of this contamination is on the western part of the Site.

Creosote spills impacted soils in the form of a smear zone and deeper soils in the form of residual Dense Non-Aqueous Phase Liquid (DNAPL). Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of Building 4; creosote covers the floor and some portion of the basement walls in Building 4.

Comparatively fewer soil borings have been completed on the eastern part of the Site. The primary soil contaminants are the creosote-based and petroleum-based VOCs, benzene, toluene, ethylbenzene, and xylenes, (collectively BTEX) and SVOCs corresponding to the creosote DNAPL. The elevated concentrations of these compounds correspond to observations of soil staining or NAPL on the western part of the property. The soil analytical results are summarized in Attachment II.

Groundwater Contamination

A limited amount of groundwater data are available for the Site. The few samples that were collected during earlier investigations found elevated concentrations of BTEX and low concentrations of chlorinated VOCs. Naphthalene, methylnaphthalene, and other SVOCs associated with creosote were also detected.

Sub-Slab Vapor and Indoor Air Contamination

The previous investigations detected VOCs in the indoor air and sub-slab soil vapor on the Site. The compounds included acetone, benzene, 2-butanone, carbon tetrachloride, chloromethane, dichlorodifluoromethane, ethylbenzene, toluene, xylenes, tetrachloroethylene, trichloroethene, and trichlorofluoromethane.

3.0 SCOPE OF WORK

This HASP addresses the general activities associated with the planned environmental investigation and remediation of the Site. These activities include, but are not limited to, the following:

- Mobilization/demobilization
  - Mobilization and demobilization of equipment and supplies
  - Establishment of Site access procedures, site security and work zones
- Pre-Investigation Activities
  - Site Inspection, Geophysical Survey
  - Utility Clearance (clearing drilling and sampling locations by identifying utilities) and Permitting
- Investigation Activities
  - Inspection of vaults, kettles and other recognized environmental conditions
  - Soil boring installation and soil sample collection
  - Monitoring well installation and groundwater sample collection
  - Test pit installation (when deemed necessary)
  - Soil vapor and indoor air sampling
  - Investigation derived waste handling and storage activities
- Remedial Activities
  - Site enclosure installation
  - Soil excavation
  - Soil and materials management and disposal
  - Collection of samples for remediation (i.e. waste classification, contamination delineation etc.)
  - Sampling, investigation, and remediation of the kettles and vaults

The planned environmental investigation and remediation activities are detailed in the succeeding sections.

3.1 Site Investigation

3.1.1 Kettle Investigation – Buildings 2B, 2C, 3A, 3B & 10

Forty kettles/subsurface mixing vaults with unconfirmed amounts of liquid were found inside Buildings 2B, 2C, 3A, 3B, and 10. Previous investigations revealed traces of disinfectant and lye in the kettles which can be attributed to the historic use of the Site as a soap manufacturing facility. SCS identified VOC, SVOCs, and metals in liquids in some of the units. Mercury only was above the TCLP threshold in one unit (K-9).

A thorough investigation is needed to determine the contents and the exact amount of liquid in each of the kettles. The investigation will be conducted starting with the collection of samples from each vault, analyzing and profiling the liquid samples to determine the appropriate disposal facility, and implementing the necessary action to minimize the potential exposure risk to all workers.

3.1.2 Soil, Groundwater and Soil Vapor Sampling

Soil Investigation

Soil Boring Installation

Soil borings will be installed throughout the Site. A number of soil borings will be converted into monitoring wells. Because the general subsurface geology of the Site consists of fill, silty sand, with glacial till overlying bedrock, a sonic drill rig will be used to advance the soil borings. A Geoprobe direct-push drill rig may be used to advance borings where conditions warrant, such as where borings are shallow and/or inside buildings where access for larger drill rigs is limited.

After the soil borings have been completed, FLS will have a New York State Licensed Surveyor survey the locations.

Soil Screening

Soils will be field-screened using a photoionization detector (PID) and described along the vertical depth of each boring at each sampling location. The PID readings will be documented as well as visual and olfactory observations.

Soil Sampling and Analysis

Soil samples will be obtained by a dedicated plastic liner. The Sonic drill rig sampler will be advanced to collect soil samples down to the proposed development depth or until bedrock is encountered.

The soil samples will be containerized in accordance with EPA analytical protocols. Each sample will be labeled, sealed, and placed in a chilled cooler for shipment to the laboratory and will be analyzed for the following parameters:

- Target compound list (TCL) VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- Target analyte list (TAL) metals by EPA Method 6010/7000

Groundwater Investigation

Monitoring Well Installation

A machine-slotted PVC well screen will be installed into the saturated zone. A No. 1 Morie Sand/equivalent gravel pack will be tremied into the annular space outside the well screen to a minimum of 2 feet above the top of the well screen. A minimum 2-foot bentonite seal will be installed above the gravel pack. Any remaining annular space will be sealed with a Portland cement mix. A surface completion consisting of a flush-mounted, watertight manhole will be cemented into the pavement above the well. The monitoring wells will be developed by pumping with a submersible pump until the discharge is silt-free. Other existing monitoring wells on the Site will also be developed. Diagrams of the construction of the newly installed wells along with the existing ones will be provided in the final report. The wells will be allowed to equilibrate for a minimum of 1 week prior to sampling.

Monitoring Well Gauging

A synoptic round of water-level measurements from the newly installed wells will be collected along with the existing monitoring wells. FLS will also retain a New York State Licensed surveyor to survey the well locations and the top of casing elevations.

Groundwater Sampling and Analysis

Groundwater samples will be collected from each of the monitoring wells using low-flow sampling methods. One trip blank will also be analyzed for quality control. The groundwater samples will be analyzed for the following parameters:

- TCL VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- TAL metals by EPA Method 6010/7000

Soil Vapor Investigation

Sub-slab soil vapor samples will be collected at 12 locations throughout the Site. Soil vapor samples will be collected from temporary soil vapor sample points installed to two feet below the floor slab. At each sample location, a 0.5-inch diameter and 3.5-inch long decontaminated stainless steel sampling probe will be driven approximately 2 feet into the underlying soil under the basement floor slab. The sampling probe will be retracted approximately 4-inches to expose a sampling screen. The borehole above the sampling probe will be sealed with clay to prevent ambient above-ground air from mixing with the soil vapor. To ensure a satisfactory seal above the sampling probe, helium will be utilized to enrich the atmosphere above the sealed borehole. Soil vapor will be purged through a 0.25-inch polyethylene (PE) tubing and screened for the presence of helium, utilizing a calibrated MGD2002 helium leak detector. Once it was confirmed that helium is not being detected in the soil vapor and an appropriate seal was constructed, the soil vapor point will be purged at a flow rate of approximately 0.2

liters per minute (Lpm). Following the purging procedure, an individually-certified clean 6-liter SUMMA canister with a 2-hour regulatory control valve will be connected to the PE tubing to collect a representative soil vapor sample.

Investigation Derived Waste Management

All investigation derived waste (IDW) generated during the Site investigation will be stored in covered 55-gallon, Department of Transportation (DOT) approved, steel drums which will be sealed at the end of each work day Each drum will be labeled with the date, well/boring number, waste type (soil, purge water), and a point of contact. The drums will be stored in a secure area of the Site until the drums can be properly removed. An appropriate waste designation will be assigned based on the remedial investigation results and the IDW will be properly disposed of according to local, state, and federal regulations.

3.2 Description of Brownfield Site Remedy

The proposed remedy on the western quarter of the Site contemplates excavation and disposal of all soils down to an approximate development depth of 15 ft. below grade (ft-bg) (approximately -2.7 QBD) or to bedrock, whichever is shallower, as anticipated in the building. Additional soil removal would occur where accessible grossly contaminated soils are found, but contamination will not be chased beneath the Substation. Inaccessible materials would be addressed by institutional and engineering controls.

The proposed remedy for the eastern three-quarters of the property contemplates a combination of measures depending on the characteristic associated with individual development tracts. The proposed remediation includes removal of the upper 4 ft. of soil/fill to a development grade of 12 ft. QBD accompanied by hot spot removal, limited excavation, and capping.

Soil with LNAPL, DNAPL, creosote, or petroleum staining may be expected. Some of the soil will be extremely odorous. To control odors and dust, excavation may occur within an enclosure over the most contaminated former source and processing area, Area E and adjacent Area D, (see Additional Remedial Investigation Report (Draft), Fleming-Lee Shue, Inc., February 2010).

The enclosure will be large enough to accommodate excavation equipment and soil loading. The structure will have ventilation, air control, and a filter system to manage odors and VOCs. Foam may also be used to control odors.

It is estimated that approximately 30,000 tons of soil will be excavated as part of the remediation on the western quarter of the Site and approximately 20,000 tons of soil on the eastern three-quarters. Large pieces of debris such as wood and concrete will be segregated from the soils and set aside as construction and debris (C & D) for disposal. Stained soils will also be segregated for disposal. Additionally, there will be removal of several USTs, testing and removal of water from derelict processing kettles, and possible concrete demolition. Pre-characterization of soils before remediation begins will also occur. Unknown subsurface utilities may be on Site.

Air Monitoring will be required both on the Site, at the site perimeter, and within the excavation enclosure(s). Air monitoring includes dust monitoring, PID measurements, combustible gas measurements (Oxygen [O_2], Lower Explosive Limit [LEL], Carbon Monoxide [CO], Hydrogen Sulfide [H_2S]), and colorimetric tubes.

There is a NYCT substation and tunnel adjacent to the Site where extensive excavation will occur. There is a very high possibility that ultra-high voltage lines may transect the Site. The Health and Safety Officer (HSO) will work with the NYCT to have these lines clearly marked, de-energized if possible, and/or protected as required by NYCT prior to any excavation work. Work will comply with all utility clearance distances.

3.3 Description of Brownfield Site Kettle & Vault Interim Remedial Measure Plan

Investigation

Further investigation is needed to determine the nature of the contents and liquid volume in each unit before IRM measures can be employed. The investigation will start with opening each unit, collecting vapor measurements and probing for liquid volume and collecting samples from each unit for chemical analysis. The analysis will characterize the contents and profile the liquid for disposal.

Each unit will be explored first by opening the bung with non-sparking tools and inserting an explosimeter and screening for LEL, H_2S, and O_2. If conditions prove non-flammable, then a PID will be inserted to screen for organic vapors as will a Jerome mercury analyzer to monitor mercury vapor levels. Next, a sample of the contents will be collected for analysis using a bailer and/or peristaltic pump, or drum thief or similar apparatus. The units will be probed for their approximate dimensions, condition, and for free product.

Each unit with adequate liquid volume will be sampled and the samples analyzed for the following parameters:

- NYSDEC ASP 2005 TCL VOCs, EPA Method 8260
- NYSDEC ASP 2005 TCL SVOCs, EPA Method 8270
- NYSDEC ASP 2005 TAL metals, EPA Method 6010/7000
- Total Petroleum Hydrocarbons (TPH), Diesel & Gasoline range organics
- TCLP analysis as warranted by analytical results
- Field parameters: pH, conductivity, temperature, oxidation reduction potential, and dissolved oxygen measurement

The first phase will be sampling and evaluation of the results. The second phase will be removal, disposal, and stabilizing of the units.

Remedy

Remediation depends on the chemical and physical conditions of the contents of each unit. In general, the IRM will include the following parts:

1. Render the unit(s) inert to eliminate the potential for flammable and/or toxic vapors. This will be accomplished by either venting the interior with fresh air and/or introducing nitrogen or carbon dioxide to displace any vapors. Rendering the unit(s) inert will not be undertaken if unwarranted by the conditions. The decision on the means and methods for rendering the unit(s) inert will be based on the analytical data and field conditions.

2. Remove the liquid in each unit. Liquids in each unit will be removed by means of a vacuum truck. After removal, the interior may be power washed to remove residue and the rinse volume again removed by vacuum truck. The decision will be field based. The vacuum truck or tanker may remain on Site until all units are emptied, tested, and accepted at an approved disposal facility.

3. The units will be stabilized, after cleaning, if warranted by field conditions. Stabilization may include filling the interior with nitrogen, carbon dioxide, foam, or other inert material to displace the vapors. Alternatively, the top of the units may be removed to allow fresh air to vent the unit in lieu of adding inert materials. This decision will be based on the contents and condition of each unit.

4. The units will be bonded and/or grounded as necessary to reduce sparking from static electricity.

5. All work will be done with bay doors open to promote ventilation, such that there is air flow through the work area. Fans will be available to increase air flow if necessary. Air monitoring will follow the requirements in Table 2.

4.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The Health and Safety meeting will include all personnel and members of the Site Project Team. All Site workers must review and comprehend this HASP before entering the Site. The HSO or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask health and safety questions during attendance at a pre-field safety meeting. Field personnel will sign the acknowledgment form (Attachment I) maintained on-Site by the HSO. The Site Project team organization and roles are described below.

Health and Safety Officer

- Administers all aspects of the occupational health and safety program to FLS and AFF personnel
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites
- Assists management and supervisors in the health and safety training of employees
- Conducts inspections to identify unhealthy or unsafe conditions or work practices. Takes immediate corrective action.
- Investigates all accidents and takes action to eliminate accident causes
- Monitors to determine the degree of hazard
- Determines the protection levels and equipment required to ensure the safety of personnel
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels
- Monitors performance of all personnel to ensure compliance with the required safety procedures
- Ensures that all personnel have been trained in proper site-safety procedures including the use of Personal Protective Equipment (PPE), and have read and signed the Acknowledgment Form (Attachment I)
- Conducts daily health and safety briefings as necessary
- Halts work if necessary

- Ensures strict adherence to the Brownfield Site HASP
- Reviews personnel medical monitoring participation to ensure compliance
- Records safety infractions and corrective actions in field log
- Notifies subcontractors of unsafe conditions
- Ensure overall project objectives are being met
- Ensures that safety equipment is available
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations

Project Manager

- Ensure overall project objectives are being met
- Supports HSO

All FLS and AFF Employees

The minimum personal qualifications for each individual participating in field activities are as follows:

- Has had all OSHA-specific medical examinations including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators
- Participation in the FLS Occupational Health Monitoring Program
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4])
- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper personal protective safety equipment
- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries
- Be alert on Site and communicate unsafe conditions and safety infractions immediately.

Visitors

- Must be escorted upon entering the work location if they meet the health and safety requirements stated above. All non-qualified visitors will be limited to the support zone(s) for observation purposes.

- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper PPE
- Be alert on site and communicate unsafe conditions and safety infractions immediately.

5.0 POTENTIAL CHEMICAL, PHYSICAL AND BIOLOGICAL HAZARDS AND CONTROLS

This section discusses the potential chemical, physical, and biological hazards and controls associated with the investigation tasks above. A summary of potential Brownfield Site tasks, safety hazards, and safety requirements is presented in Table 1.

5.1 Site–Specific Potential Chemical Hazards/Controls

Based on data collected during previous investigations, the potential chemical hazards are creosote, petroleum hydrocarbons, and creosote-based SVOCs. The following are chemicals of concern:

- Creosote
- VOCs
    - Benzene
    - Toluene
    - Ethylbenzene
    - Xylene
- SVOCs
    - Polycyclic Aromatic Hydrocarbons
- Metals
    - Arsenic
    - Cadmium
    - lead
    - Mercury

Attachment III lists the recognized and suspected health hazards, exposure limits, physical and chemical properties, recommended protection levels and symptoms of exposure for the chemicals known or suspected. Any chemical hazards will be minimized by limiting exposure of personnel to soil and groundwater and by engineering control and PPE.

5.2 Physical Hazards/Controls

Physical hazards potentially present at the Site include, but are not limited to, the following:

Hazard	Control
Slip, trip and fall (uneven terrain and slippery surfaces)	Avoid uneven terrain, walk slowly, wear sturdy/supportive shoes
Environmental (heat/cold) stress	A discussion of heat stress and cold stress and related illnesses and controls is provided in Attachment IV.
Dust/Particulate Inhalation Hazard	Dust suppression and monitoring will be employed during this effort. A discussion of the dust suppression plan is presented in Section 7.11. The air monitoring requirements are presented in Section 8.0.
Vehicular Traffic	Avoid working in high traffic areas. If necessary, use cones, reflective vests, and consider use of a flagman/additional protection.
Fire	Ensure class ABC fire extinguisher is nearby to work area when using equipment that can provide an ignition source (heavy machinery, generators, power tools)
Noise hazards	Use ear plugs and/or ear muffs during demolition and excavation activities.
Use of heavy equipment	Stay clear of heavy equipment during operation. Maintain eye contact with operator when approaching equipment.
Flying/Falling Debris	Safety glasses and hard hats will be used during all demolition and excavation activities. Be vigilant.

Anticipated Site operations do not include the need for specific operations such as lockout/tag-out, scaffolds or confined spaces; therefore these items are not addressed in this HASP. If Site activities require these operations, the HASP will be amended and personnel properly trained, experienced and competent personnel shall be utilized.

5.3 Changing Conditions

Physical conditions change on Site and it is important to recognize this situation. One type of changing condition is the temporary enclosure. The structure is vulnerable to movement by wind or equipment and may become unstable with shifting ground and vibration. A growing excavation and building demolition may alter stability. It is important to be mindful of this potential and to periodically look for unsecured or damaged components supporting the structure. If these conditions occur, they should immediately be brought to the attention of the HSO and construction manager.

Other potentially changing conditions include gases and depth of excavation. As the excavation deepens below the breathing zone, it is possible for gases/vapors denser than air to accumulate. These gases must be monitored before entering the excavation or enclosure. This is especially true at the beginning of each work day after gases have had all night to accumulate. If air monitoring results identify concentrations above their established action levels, localized ventilation may be used to reduce the concentrations to below the action levels prior to the start of work.

5.4 Biological Hazards

General biological hazards present at the Brownfield Site include, but not limited to, the following:

- Bites or stings from insects (particularly ticks) resulting in skin inflammation, disease, or allergic reaction
- Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma
- Rodent and/or bird droppings inside vacant buildings

6.0 HEALTH AND SAFETY PROTOCOL

6.1 Site Work Hazard Evaluation

Upon review of contaminant levels and physical hazards, exposure routes and the nature of the remediation/excavation/construction tasks, it has been determined that Level D protection will be used to start all FLS/AFF field activities with a contingency to upgrade to Level C protection if warranted. Air monitoring and action levels for the appropriate level of PPE appear in Table 2.

6.2 Training

Knowledge of the safety rules, supplemented by compliance, is essential to safety. New employees will be provided orientation training by qualified personnel having at a minimum the 40-hour OSHA HAZWOPPER training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site. Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety-training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program. If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics
- Confined space entry (Not anticipated)
- Respirator care/use
- Hazard communication (hazardous chemicals)
- Slip, trip and fall hazards and fall protection
- Lockout/tagout procedures (Not anticipated)
- Scaffold use, and erection/dismantling (Not anticipated)
- Blood-borne Pathogens (Non-Medical)

Specialized training will be documented in the employees' personnel records and/or in a master training record.

6.3 Personal Hygiene

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol at the work site is prohibited. Field personnel taking prescription or non-prescription medication that could impair function or cause drowsiness should alert the HSO before work begins. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater or soil should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

6.4 Levels of Personal Protection

All PPE must be worn as required for each job in all operations where there is an exposure to hazardous conditions. A general description and discussion of the levels of protection that will be used for the Brownfield Site are presented in the succeeding sections.

6.4.1 Level D

Level D applies to work in areas where the possibility of contact with potentially contaminated media exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls
- Safety boots, with steel toe
- Safety glasses or face shield
- Hard hat
- Reflective vest
- Disposable nitrile gloves
- Hearing protection as needed

6.4.2 Level C

Level C is required when the action levels are exceeded per Table 2. Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D
- Full-face air purifying respirator (APR) with the combination cartridges for organic vapors, acid mist, and particulates cartridges. Coated disposable coveralls with hoods, as necessary
- Boot covers

6.5 General Workplace Safety Rules

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager—immediately.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions—Be alert!
- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.

6.6 Construction Equipment Safety Rules

A discussion of health and safety issues related to FLS and AFF employees performing work in the vicinity of common construction elements, such as electrical; compressed gas cylinders; ladders; aerial lifts; cranes; welding and brazing; tools; safety railings and other fall protection; scaffolds; excavations and trenches; motor vehicles and mechanized equipment, is provided in Attachment V.

6.7 Spill Containment Program

The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel. Spill kits, consisting of absorbents and protective equipment should be available to clean up minor spills. A minor chemical spill is one that the FLS and AFF staff is capable of handling safely without the assistance of emergency personnel. All other chemical spills are considered major. For a major spill, contact the HSO.

Procedure for Responding to a Minor Chemical Spill

- Contact HSO to obtain guidance
- Alert people in immediate area of spill
- Wear PPE, minimum level D—**First assess the spill to determine whether you have sufficient protection to continue**
- Upgrade to level C to avoid breathing vapors from spill
- Confine spill to small area using absorbent, debris, soil etc.
- Absorb spill with vermiculite, dry sand, or oil-sorbent pads
- Collect residues, place in DOT-approved containers (labeled) and dispose as chemical waste
- Clean spill area

7.0 INDIVIDUAL SAFETY AND HEALTH PROGRAMS LISTING

The OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

7.1 Hazard Communication Program

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Important elements of the written program are required to include a master listing of chemicals, maintaining material safety data sheets on each chemical, and training of employees on the program, the chemicals exposed to, and safety data sheets.

7.2 Confined Space Entry Program

If employees enter a confined space that contains or has the potential to contain an atmospheric or physical hazard, this program is required. Either the ANSI Z117.1-1989 Safety Requirements or Permit-Required Confined Space Program per OSHA (29 CFR 1910.146) must be used as guidance to develop the company's program. Primary elements of the program are identification of applicable confined spaces, testing/monitoring, control or elimination of hazards, protective equipment, entry authorization, attendants, training, and rescue.

No FLS or AFF employee is authorized to enter a confined space without the specified training AND notifying the HSO and project manager.

7.3 Respiratory Protection Program

If employees are exposed to hazardous chemical, dusts, or aerosols above the OSHA Permissible Exposure Limits or ACGIH Threshold Limit Values, and/or employees wear respirators, this program is required. Program elements are written for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use.

7.4 Occupational Noise Exposure/Hearing Conservation Program

If employees are exposed to noise levels above 85 decibels on the A scale (85 dBA), protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as written program, noise monitoring, hearing evaluations and follow-on testing, personal protective equipment (hearing protection), and maintenance of medical records.

7.5 Lockout/Tagout Program

If employees deactivate or de-energize electrical controls, equipment, or circuits and are thus exposed to electrical energy, this program is required. Program elements include lockout when possible, tagout when lockout not possible, and the employer providing and controlling lockouts.

7.6 Assured Equipment Grounding Conductor Program

If the employer uses assured equipment grounding verses ground fault circuit interrupters to provide employee electrical grounding protection, this program is required. Program elements include the inclusion of all cord sets, receptacles and cord/plug connected equipment and tools; a written program; quarterly testing; recording of each test by logging, color coding, or other equally effective means; and designation of a competent person to run the program.

7.7 Emergency Response Plan

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented to handle anticipated emergencies. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

7.8 Dust Suppression Plan

The following techniques have been shown to be effective for the controlling of the generation and mitigation of dust during construction activities:

- Applying water on haul roads
- Wetting equipment and excavation faces
- Spraying water on buckets during excavation and dumping
- Hauling material in properly sealed or watertight containers

- Restricting vehicle speeds to 10 miles per hour (mph)
- Covering excavated areas and material after excavation activity ceases
- Reducing the excavation size and/or number of excavations
- Applying dust suppressants such as calcium chloride, water, or gravel in high vehicle traffic areas
- To evaluate the effectiveness of the dust suppression measures, air-monitoring utilizing real-time dust-monitoring equipment will be performed. The requirements for air monitoring during soil disturbance activities are presented in Section 7.

7.9 Building Access

FLS and AFF employees are prohibited from entering buildings or other structures deemed unsafe and/or structurally unsound. Building 4 has been determined to pose a Class-1 Immediately Hazardous condition for structural reasons by the New York City Department of Buildings (NYC DOB).

The NYC DOB ECB Violation Number 34993699N (2/08/13) reads:

"FAILURE TO MAINTAIN BLDG WALLS OR APPURTENANCES; NOTED: AT EXPOSURE #1 (ORCHARD STREET SIDE) OBSERVED VERTICAL CRACK FROM 1ST FL TO PARAPIT WALL AT ROOF LINE, WALL BULGING, SEPARATION AT CRACK APPROX. 2", BROKEN"

7.10 Site-Specific Health and Safety Guidelines

Site-Specific Health and Safety guidelines are included in Attachment VI.

8.0 AIR QUALITY MONITORING AND ACTION LEVELS

Air quality monitoring equipment will be used during all work to monitor total organic vapors, dust, O2, LEL, H_2S, CO, and mercury. A PID (to monitor total volatile organic concentrations), a particulate monitor, a combustible gas indicator , an oxygen meter, colorimetric tubes, a CO meter, and a Jerome meter will be used during on-Site activities. Air monitoring requirements by field activity is specified in Table 1. The instruments will be calibrated daily or as necessary due to field conditions and the results noted in the project field book. A background level will be established, at a minimum, on a daily basis, and recorded in the field book. The action levels and required responses are listed in the Table 2.

9.0 SITE/WORK AREA MANAGEMENT

Per the HAZWOPER regulation, site control measures shall be implemented to protect the workers and public. A typical Site work area will consist of an exclusion zone where the actual field activity will take place, a contaminant reduction zone, and a support zone located outside the contaminant reduction and exclusion zones. The HSO will implement these zones based on the work activities that will be performed in each area. The size of the zones will be based on work activities, equipment usage, and air monitoring results. Only 40-hour HAZWOPPER-trained personnel will be allowed beyond the support zone.

Levels of personal protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

Fences, guardrails, and access control devices shall be provided and maintained by the construction contractor throughout the project activities in accordance with 29 CFR 1926. In addition, barricades, warning signs and devices, temporary lighting and other safety measures shall be provided by the construction contractor, as required, to protect site personnel.

9.1 Work Zones

Entry into the work zones begins once a person comes on Site. This approach reflects the dynamic nature of the operations and the need for everyone to be aware of the conditions while on-site. Using the concept of three zones for the Site, the following areas are identified:

Exclusion Zone

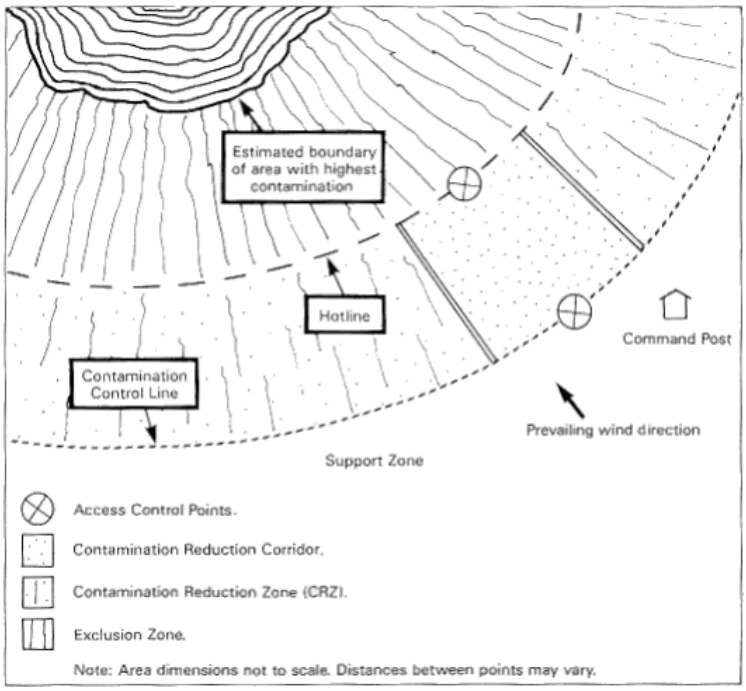
The Exclusion Zone (EZ) will be within a designated area to be determined based on where field activities will take place. No worker shall enter the Exclusion Zone without the required training and PPE. In the event that a worker in the EZ requires a replacement or his/her protective suit or respirator filters, the worker shall exit the EZ and utilize proper decontamination procedures in the CRZ, replace or repair the defective PPE, then re-enter the EZ.

Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) will be within a designated area to be determined based on where field activities will take place. Workers shall be aware of and follow all Site control procedures with respect to entering and exiting the CRZ, to ensure that they are not exposed to contaminants and to minimize the potential for contamination of workers and the spread of contamination outside the EZ. These measures include having workers follow the proper procedures for donning and doffing PPE and washing in the CRZ. The measures also address the decontamination procedures for use when moving equipment between zones. The CRZ shall consist of an area to drop off equipment, plastic bags to dispose of protective clothing, adequate soap and water for workers and equipment decontamination and a means of capturing wash water generated during decontamination.

Support Zone

This area starts at the project/property fence line and extends to the entry to where field work will be conducted. In this area all personnel shall wear Level D PPE. An example of the exclusion zone layout appears below. (Source: https://www.osha.gov/Publications/complinks/OSHG-HazWaste/9-10.pdf.



9.2 Personnel Decontamination

Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps:

Within the CRZ, the following stations will be established for the decontamination of equipment and personnel wearing Level D and Level C protection:

- Station 1: Equipment Drop – equipment used in the exclusion zone is left for use when returning to work after breaks or stored in a designated area at the end of each work day.

- Station 2: Equipment and Personal Protective Equipment Decontamination – If the equipment will be removed from the site, the equipment will be washed or wiped with a mild soap solution (e.g. Alconox or equivalent) and rinsed with clean water and wiped dry. Wash and rinse buckets with brushes should be set up in this station along with containers for trash and water containment for disposal purposes. Plastic sheeting can be used to collect material for containerization and proper disposal.

- Station 3: Respirator Cartridge Change Out – expired respirator cartridges are exchanged for new cartridges and the worker returns to the exclusion zone.

- Station 4: Change Out – removal of boots, gloves, and disposable coveralls. All PPE will be collected and containerized for proper disposal.

- Station 5: Respirator Removal – worker can remove respirator upon arrival at this station. The respirator will receive final cleaning, dried, and properly stored for future use. Workers can then clean their hands with soap and water and proceed to the clean zone.

Level D decontamination stations can be set up in a similar manner as described above with the elimination of Station 3 and Station 5.

9.3 Vehicle Decontamination

For large equipment such as excavators, backhoes, and haul vehicles, a bermed decontamination pad lined with plastic sheeting should be set up to wash the equipment and contain the rinse water prior to leaving the site. A power washer should be used to remove soil and other materials from the entire vehicle before it leaves the containment area. The rinse water should be collected and containerized for disposal.

10.0 EMERGENCY AND CONTINGENCY PLAN

Emergency communications will be maintained during all on-site field activities. The emergency route to the hospital is depicted on Figure 3 and emergency contacts and their phone numbers are presented in Table 3.

A first aid kit will be available on-site at all times for any minor on-site injuries. Emergency medical assistance or ambulance can be reached by calling 911 for more severe injuries.

All OSHA recordable injuries and illnesses will be reported using OSHA Form 301 (Attachment VII).

General Emergency Response Procedures:

Any employee discovering a fire, explosion, or release of hazardous materials, which could potentially harm human health, or the environment, must immediately notify 911 to activate appropriate emergency procedures.

The following steps will be taken to expeditiously secure the appropriate assistance:

- Ascertain pertinent information (location, type of emergency condition, presence of possible victims which may be hurt or trapped nearby to the condition) and immediately contact and provide this information to 911 emergency personnel.

- Identify yourself and give the exact location first, then the type of emergency, and the presence of possible victims which may be hurt or trapped nearby to the condition. Then await the arrival of emergency response police officers, staying a safe distance from the emergency condition if warranted.

- Contact the FLS HSO and Project Manager and notify them of situation while waiting for emergency personnel.

- If possible, have a responsible person nearby to help flag down responding emergency services personnel as they respond.

- Emergency response personnel will assess the reported emergency and advise what appropriate action needs to be taken (i.e., evacuate an area).

Unless specifically trained to handle an emergency of the type you may be reporting, please do not attempt to render assistance in handling the emergency unless ordered to do so by competent authority or emergency services personnel.

Emergency Medical Services

In the event of an injury or illness that requires medical treatment, the HSO will contact emergency services by dialing 911 (ambulance) for the transportation of the individual. In the event ambulance service is not available or the response time is not suitable, the following are driving directions to the hospital:

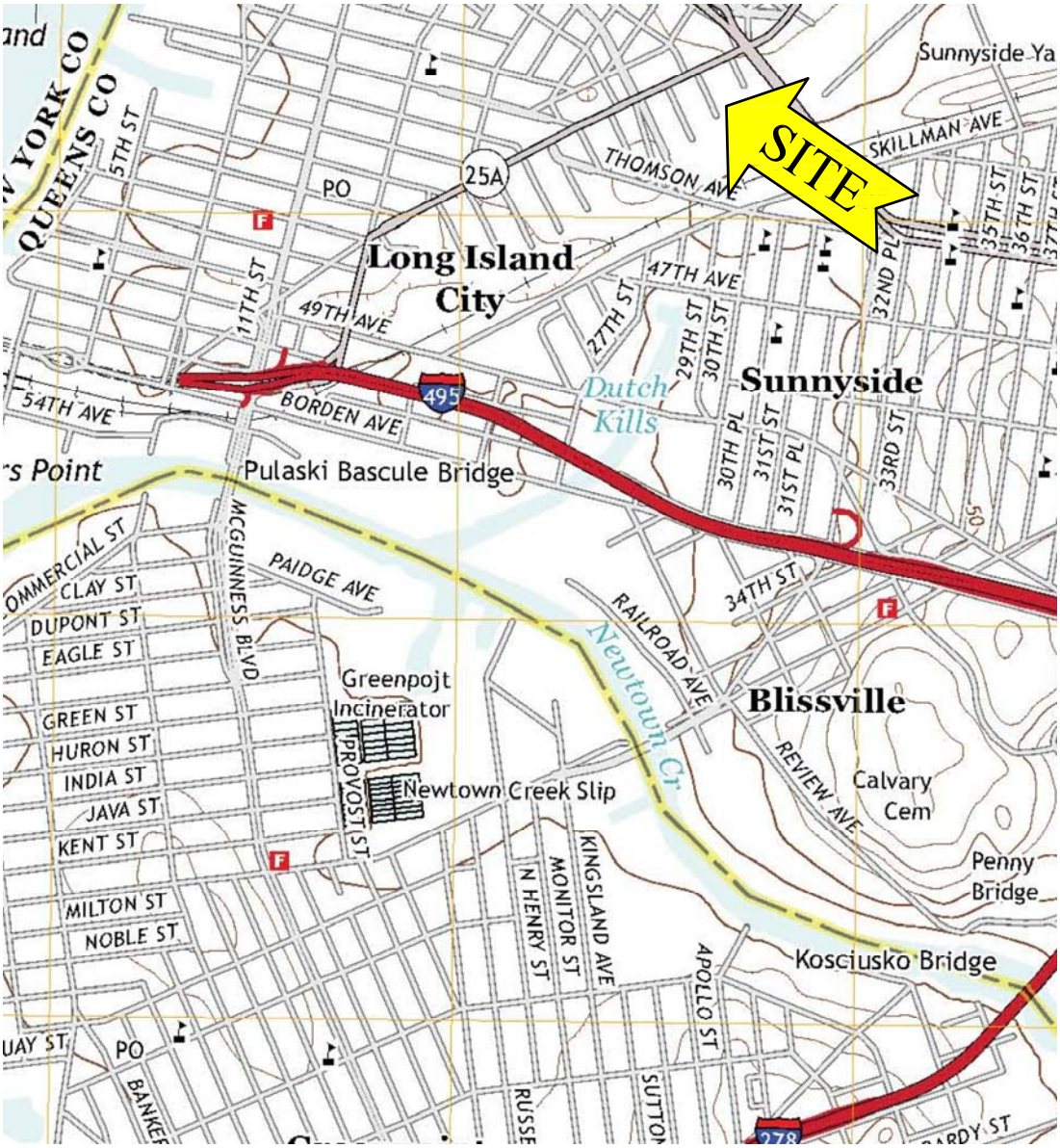
HOSPITAL

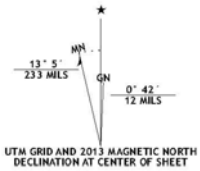
Mt Sinai Hospital of Queens: (718) 932-1000 (main line)
2510 30th Ave, Astoria,
On 30th Avenue
Between Crescent Avenue and 29th Street
NY 11102, US

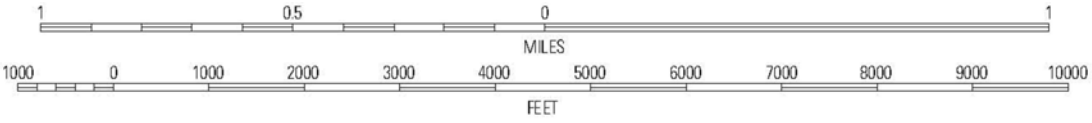
- Proceed northeast on Northern Boulevard
- Continue on 31st Street
- Turn left on 30th Street, arrive at destination

Figure 3 provides a map and route to the hospital.

Figures







CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

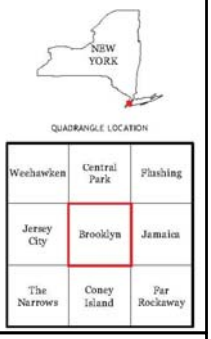


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FIGURE 1: BROWNFIELD SITE LOCATION MAP

SITE: Queens Plaza Development
Long Island City, NY
CLIENT: TST LIC Development LLC

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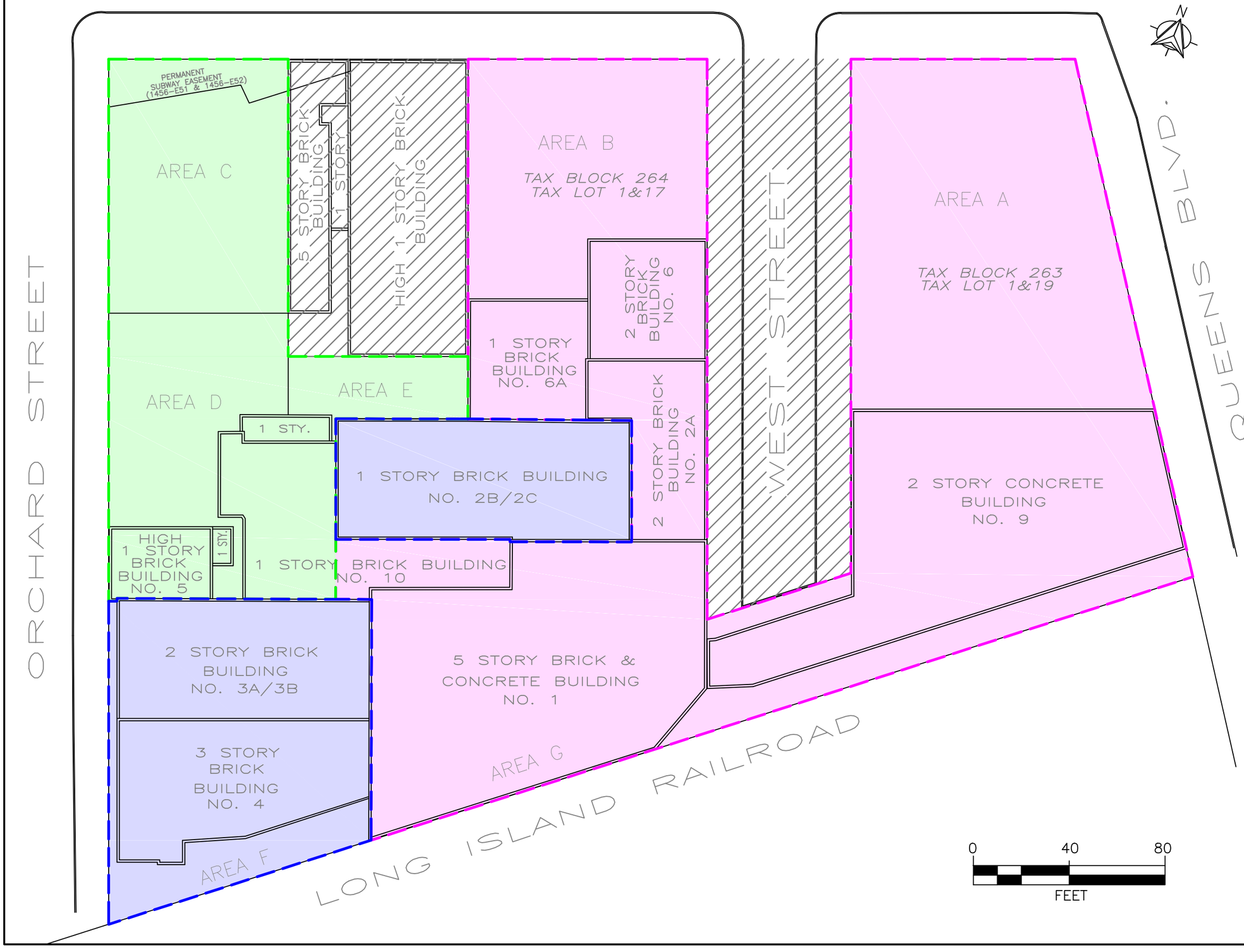

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Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Development

FIGURE 2

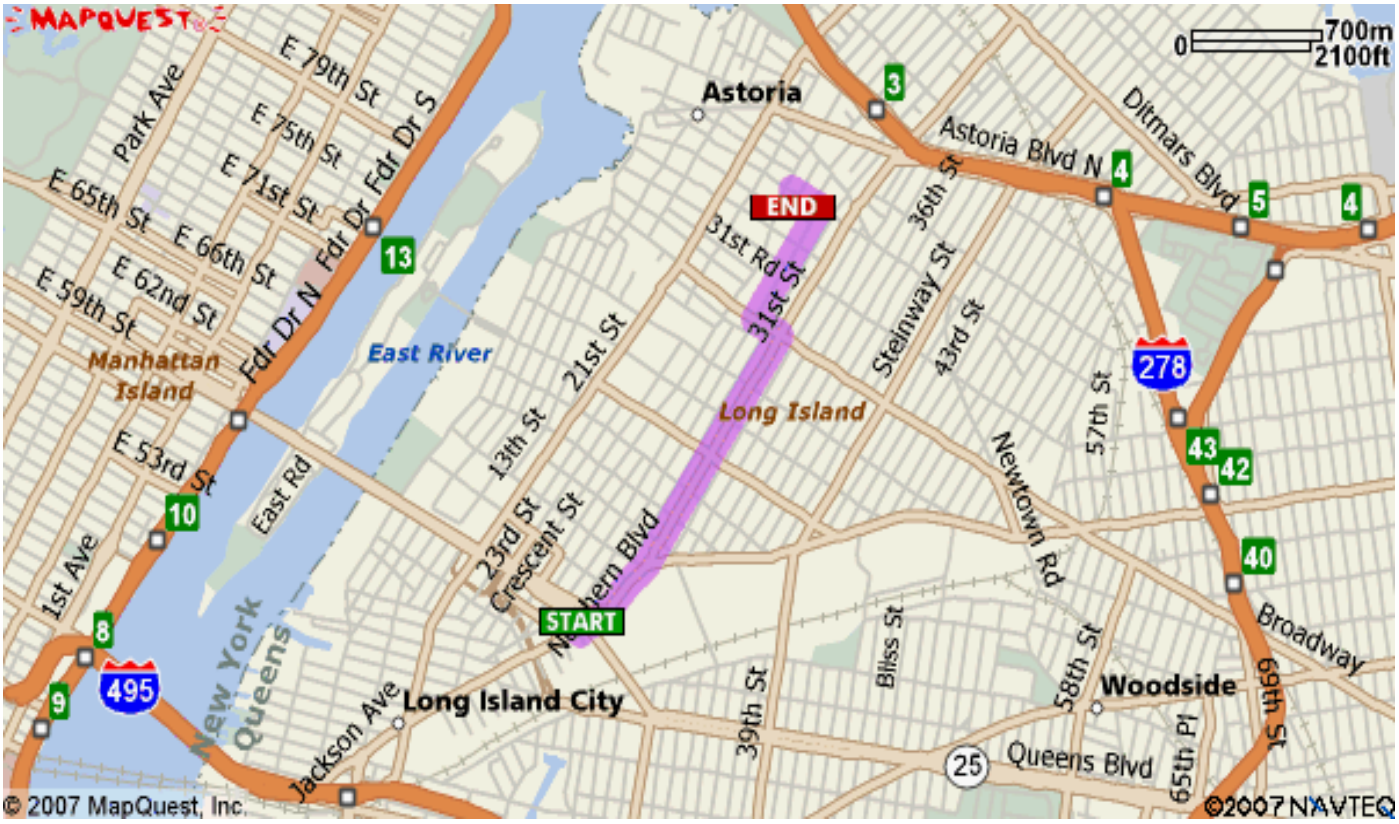
SITE PLAN

Date
May 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE



Mt Sinai Hospital of Queens:
2510 30th Ave, Astoria, NY 11102, US

Directions Distance **Total Est. Time:** 6 minutes **Total Est. Distance:** 1.76 miles

START 1: Start out going NORTHWEST on WEST ST toward JACKSON AVE / NY-25A. <0.1 miles

2: Turn RIGHT onto JACKSON AVE / NY-25A. Continue to follow NY-25A. 0.2 miles

3: Turn SLIGHT LEFT onto 31ST ST. 0.8 miles

4: Turn LEFT onto BROADWAY. <0.1 miles

5: Turn RIGHT onto 29TH ST. 0.3 miles

6: Turn LEFT onto 30TH AVE. 0.1 miles

END 7: End at **Mt Sinai Hospital of Queens:** 2510 30th Ave, Astoria, NY 11102, US

Fleming Lee Shue

FIGURE 3: ROUTE TO THE MOUNT SINAI HOSPITAL OF QUEENS

SITE: Queens Plaza Residential Development
42-14 West Street, Long Island City, Queens, NY
CLIENT: TST LIC Development LLC

Tables

Table 1 – Tasks, Safety Hazards & Safety Requirements

Task/Activity	Hazards	Preventative Measures	Air Monitoring Requirements
Pre-characterization Soil Sampling with Test Pits or Soil Borings	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals.	Clear utilities beforehand, use normal sampling procedures, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, and Jerome measurements for Mercury (test pits only)
Excavation - Outside	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Excavation – Inside Enclosure	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, CO, CO_2, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors each morning and after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and CO, CO_2, LEL measurements.
UST Removal	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Kettle Investigation and Cleaning	Vehicle hazards, trips, falls, materials handling, VOCs, lye, and unknowns	PPE as required with the addition of a face shield to protect against splashing.	PID measurements for VOCs, colorimetric tubes for benzene, and Jerome measurements for Mercury.

LEL - Lower Explosive Limit
PID - Photoionization detector
VOCs - Volatile organic compounds
SVOCs - Semi-volatile organic compounds
LNAPL - Light non-aqueous phase liquid
DNAPL - Dense non-aqueous phase liquid

Table 2 Air Monitoring, Action Levels, PPE

Instrument	Action Level	Response Action
Gas/Vapor		
PID	<0.5 ppm total VOCs in the workers' breathing zone (WBZ)	Continue work in Level D
PID	>0.5 ppm for a sustained period of 5 minutes in the WBZ	Use detector tube to measure benzene concentration
Colorimetric detector tube	> 0.5 ppm for benzene in the WBZ	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the benzene concentration is still greater than 0.5 ppm, upgrade to Level C, notify HSO
PID	1 to 10 ppm in the WBZ (no benzene)	Continue work in Level D
	> 10 ppm for a sustained period of 5 minutes in the WBZ (confirmed absence of benzene)	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the PID reading is still greater than 10 ppm, upgrade to Level C, notify HSO
	> 100 ppm for a sustained period of 5 minutes in the WBZ	Stop work. Resume work when readings are less than 100 ppm
Combustible Gas Indicator	Less than 20% LEL	Continue work
	Greater than 20% LEL	Stop work. Resume work when less than 20% LEL
Oxygen Monitor	Above 19.5% and less than 23.5%	Continue work
	Outside of this range	Stop work. Resume work when concentration is back in this acceptable range
Carbon Monoxide Monitor	Less than 25 ppm	Continue work
	Above 25 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 25 ppm.
Carbon Dioxide Monitor	<1000 ppm	Continue work
	>1000 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 1000 ppm.
Particulates		
Particulate Monitor	<100 µg/m^3 above background (upwind location)	Continue work, Level D
	> 100 µg/m3 above background for a period of 5 minutes in the WBZ	Stop work. Apply dust suppression measures. Resume work using Level D only if <100 µg/m^3 above background.
	>150 µg/m^3 above background for a sustained period of 5 minutes.	Stop work. Re-evaluate work. Collect air samples for As, Pb, Cd, and PAHs.
Mercury		
Jerome Monitor	<0.025 mg/m^3	Continue work, Level D
	> 0.025 mg/m3 for a period of 5 minutes in the WBZ	Stop work. Allow the work area to vent. Use mechanical ventilation as necessary. Resume work using Level D only if <0.025 mg/$m^{3.}$
	** Should Level C be necessary, contact the CIH as special coveralls and respirator cartridges are required.	

Table 3 – Key Personnel Emergency Phone Numbers

New York City Police Department	911
New York City Fire Department	911
New York University Medical Center 550 1st Avenue New York, NY	(212) 263-7300
Mount Sinai of Queens Hospital 25-10 30th Avenue Astoria, NY	(718) 932-1000
Emergency Medical Service (ambulance)	911
Patrick Shiels, Tishman Speyer	(212) 715-0361
Arnold F. Fleming, P. E., Project Director	(212) 675-3225
Steven Panter, FLS Project Manager	(212) 675-3225
TBD, Site Health and Safety Officer	(212) 675-3225
Tom Eng, CIH	(201) 417-3079
National Response Center	(800) 424-8802
NYSDEC Spill Hotline	(800) 457-7362

Attachment I

HASP ACKNOWLEDGMENT FORM

The following personnel have read the site-specific HASP and are familiar with its provisions.

Print Name	*Signature*	*Company*	*Function*	*Date*

Attachment II

Note: The Site is broken into two sections, BCP Site A and BCP Site B. BCP Site B is broken down further into Operable Units 1 & 2. The summary information is presented in this manner.
Refer to Figure 2, Site Plan

Table 7 – Summary of VOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Benzene	94/151	1.1	665	6,440	35,800
Toluene	45/151	0.62	2,250	42,200	195,000
Ethylbenzene	37/151	0.83	3,050	31,200	67,000
Total Xylene	28/151	0.96	11,950	119,500	312,000
BTEX	25/148	0.99	14,4727	192,960	567,300
Methylene chloride	122/151	2	116	4,200	13,000
Total VOCs	110/151	9	13,030	195,154	759,966
Tetrachloroethylene	132/151	2	392	3,300	230,000
Trichloroethylene	13/153	8	368	1,400	2,600

NDs – Number of non-detects among samples (non-detects/no. samples). Min., median, 90th %, and max. for detected results.

Table 8 – Summary of SVOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Naphthalene	17/119	67	111,000	1,500,000	3,320,000
2- Methylnaphthalene	12/83	17	181,000	1,550,000	3,330,000
Benzo(a)pyrene	56/119	16.9	522	2,360	12,000
Benzoaanthracene	43/119	21.5	709	3,420	13,000
Acenaphthene	17/119	21.3	32,200	320,000	707,000
Dibenzofuran	17/119	47	68,900	312,000	780,000
Fluorene	20/119	17.1	19,300	149,000	411,000
Total SVOCs	9/126	11	164,190	2,850,301	8,576,290

Table 9 – Summary of Metals on BCP Site A, mg/kg

Compound	NDs	Min	Median	90th %	Max
Arsenic	20/74	0.48	4	14.8	47
Barium	0/74	10.3	86	290	930
Cadmium	46/74	0.44	0.79	2.5	15.2
Chromium	0/74	3.95	22	41	64
Lead	2/74	2.76	29.8	511	2,190
Mercury	38/74	0.04	0.29	1.6	4.9
Nickel	0/74	2.97	16.7	24	42.7
Selenium	65/74	1.3	2	2.7	2.7
Silver	70/74	0.98	1.0	1.1	1.1
Zinc	0/73	6.36	77	372	6,100

Table 10 – Summary of Pesticides on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Alpha BHC	71/76	10.9	58.2	930	930
Beta BHC	75/76	2.4	2.4	2.4	2.4
Alpha chlordane	36/39	200	580	660	660
Gamma chlordane	21/29	16	178	730	730
44-DDD	43/76	2.3	120	1,300	19,500
44-DDE	60/76	3.1	12.95	350	500
44-DDT	55/76	3.1	52	1,000	1,800
Dieldrin	64/76	5.8	17.5	155	230
Endosulfan II	72/76	2.3	74.5	220	220
Heptachlor epoxide	71/76	43	76	380	380

PCBs: 42 out of 44 samples collected for PBCs were non-detect. The remaining two results measured 99.6 µg/kg and 410 µg/kg.

Attachment III

Attachment III - Health Hazards for Contaminants of Concern

Contaminant	Recognized and Suspected Health Hazards
Creosote	**Recognized** carcinogen
	Suspected respiratory toxicant and skin or sense organ toxicant
Volatile Organic Compounds (VOCs) Including BTEX Benzene, Toulene, Ethylbenzene and Xylene	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Semi- Volatile Organic Compounds (SVOCs) Including Poly Aromatic Hydrocarbons (PAHs)	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Arsenic	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Beryllium	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Copper	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant
Chromium	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Cyanide	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Iron	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant

Contaminant	Recognized and Suspected Health Hazards
Lead	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Mercury	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Nickel	**Recognized** skin or sense organ toxicant and respiratory toxicant
Pesticides	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Polychlorinated Biphenyls	**Recognized** carcinogen, developmental toxicant
	Suspected endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Tetrachloroethylene	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; developmental toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Zinc	**Suspected** cardiovascular or blood toxicant; developmental toxicant; immunotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant

International Chemical Safety Cards

BENZENE

ICSC: 0015

Cyclohexatriene
Benzol
C_6H_6
Molecular mass: 78.1

ICSC # 0015
CAS # 71-43-2
RTECS # CY1400000
UN # 1114
EC # 601-020-00-8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion: see chemical dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin (further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES		face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Sore throat. Vomiting (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Fireproof. Separated from food and feedstuffs, oxidants and halogens.	Do not transport with food and feedstuffs. F symbol T symbol R: 45-11-48/23/24/25 S: 53-45 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0015

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZENE

ICSC: 0015

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
Reacts violently with oxidants and halogens causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm; 32 mg/m^3 (as TWA) A2 (ACGIH 1991-1992).
OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm See Appendix F
NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A
NIOSH IDLH: Potential occupational carcinogen 500 ppm

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and through the skin.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersion, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure far above the occupational exposure limit may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the blood forming organs, liver and immune system. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES	Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 25°C: 0.18 Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: (c.c.) -11°C Auto-ignition temperature: about 500°C Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow: 2.13
ENVIRONMENTAL DATA		

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-7
NFPA Code: H2; F3; R0;

ADDITIONAL INFORMATION

ICSC: 0015 **BENZENE**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE: Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

Material Safety Data Sheet

Beryllium, powder, -325 mesh, 99+%

ACC# 99072

Section 1 - Chemical Product and Company Identification

MSDS Name: Beryllium, powder, -325 mesh, 99+%
Catalog Numbers: AC317870000, AC317870050
Synonyms: None.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-41-7	Beryllium	>99	231-150-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: gray-white flakes.
Warning! Cancer hazard. Can be explosive when exposed to heat or flames. Causes eye, skin, and respiratory tract irritation. Inhalation of fumes may cause metal-fume fever.
Target Organs: Lungs.

Potential Health Effects

Eye: Causes eye irritation. May cause conjunctivitis and corneal inflammation.
Skin: Causes skin irritation. May cause contact dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. If heated, dust or fume may cause respiratory tract irritation.
Chronic: Chronic beryllium disease, an immunologically mediated response occurring after a latent period ranging from a few weeks to many years, causes difficult breathing on exertion, weight loss, nonproductive cough, fatigue, chest pain, anorexia, and weakness.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid.
Extinguishing Media: Do NOT use carbon dioxide. Do NOT use halogenated agents. Use approved class D extinguishing agents or smother with dry sand, clay, or sodium bicarbonate. DO NOT USE WATER!
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not breathe dust. Keep away from heat, sparks and flame. Use only with adequate ventilation or respiratory protection.
Storage: Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Beryllium	0.002 mg/m3 TWA; 0.01 mg/m3 STEL	4 mg/m3 IDLH	2 ug/m3 TWA; 5 æg/m3 Ceiling

OSHA Vacated PELs: Beryllium: 2 ug/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Flakes
Appearance: gray-white
Odor: odorless
pH: Not available.
Vapor Pressure: 1.85 mm Hg
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 2970 deg C
Freezing/Melting Point:1287 deg C
Decomposition Temperature: Not available.
Solubility: Not available.
Specific Gravity/Density:1.85 @ 20C
Molecular Formula: Be
Molecular Weight:9.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Ignition sources, dust generation, excess heat, exposure to flame.
Incompatibilities with Other Materials: Oxidizing agents, phosphorus, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), carbontetrachloride, chlorinated hydrocarbons, Contact with acids causes evolution of flammable hydrogen gas..
Hazardous Decomposition Products: Hydrogen gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-41-7: DS1750000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7440-41-7:

- **ACGIH:**
  A1 - Confirmed Human Carcinogen
- **California:**
  carcinogen, initial date 10/1/87
- **NTP:**
  Known carcinogen
- **IARC:**
  Group 1 carcinogen

Epidemiology: Epidemiologic studies have demonstrated a statistically significant increase in lung cancer mortality in beryllium-exposed workers.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: CAS# 7440-41-7: waste number P015.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	BERYLLIUM POWDER
Hazard Class:		6.1
UN Number:		UN1567
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7440-41-7 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-41-7: 10 lb final RQ (no reporting of releases of this hazardous substance is required

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7440-41-7: immediate, delayed, fire.

Section 313

This material contains Beryllium (CAS# 7440-41-7, >99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7440-41-7 (listed as Beryllium compounds, n.o.s.) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-41-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-41-7 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-41-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Beryllium, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 7440-41-7: 0.1 æg/day NSRL

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+

Risk Phrases:

R 25 Toxic if swallowed.
R 26 Very toxic by inhalation.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 43 May cause sensitization by skin contact.
R 49 May cause cancer by inhalation.
R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 7440-41-7: No information available.

Canada - DSL/NDSL

CAS# 7440-41-7 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B4, D2A, D1A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7440-41-7 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 1/21/1998
Revision #5 Date: 8/23/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet
Chloroform

ACC# 04770

Section 1 - Chemical Product and Company Identification

MSDS Name: Chloroform
Catalog Numbers: AC95232184, S79960, S79960-1, S79960HPLC-2, S79960SPEC-1, S79960SPEC-2, C2974LC, C297POP19, C297POP200, C297POP50, C297RS115, C297RS200, C297RS28, C297RS50, C297SS115, C297SS19, C297SS200, C297SS28, C297SS50, C29820LC, C298FB115, C298FB19, C298FB200, C298FB50, C298J1, C298POP19, C298POP200, C298POP50, C298POPB19, C298POPB200, C298POPB50, C298RB115, C298RB19, C298RB200, C298RB50, C298RB500, C298RS115, C298RS19, C298RS200, C298RS28, C298RS50, C298SS-11, C298SS19, C298SS28, C605-1, C605-4, C606POP19, C606POP200, C606POP50, C606RS115, C606RS200, C606RS28, C606RS50, C606SS115, C606SS19, C606SS200, C606SS28, C606SS50
Synonyms: Formyl Trichloride; Methane Trichloride; Methenyl Trichloride; Methyl Trichloride; Trichlormethan; Trichloroform; Trichloromethane.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-66-3	Chloroform	100	200-663-8
25377-72-4	Amylene	<1.0	246-916-6

Hazard Symbols: XN
Risk Phrases: 22 38 40 48/20/22

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. May cause central nervous system depression. May cause cardiac disturbances. May cause cancer based on animal studies. This substance has caused adverse reproductive and fetal effects in animals. May be harmful if swallowed. **Caution!** Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Light sensitive.
Target Organs: Blood, kidneys, heart, central nervous system, liver, cardiovascular system, excretory system, reproductive system.

Potential Health Effects

Eye: Causes moderate eye irritation. Contact with liquid causes immediate burning pain, tearing, and

reddening of the conjunctiva.
Skin: Causes mild skin irritation. Prolonged or repeated contact may dry/defat the skin and cause irritation. Absorption of liquid through intact skin is possible and may cause sys temic poisoning if contact with liquid is prolonged.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver damage. May cause cardiac disturbances. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Possible aspiration hazard. May cause hallucinations and distorted perceptions.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause cardiac sensitization and possible failure. Inhalation of large amounts may cause respiratory stimulation, followed by respiratory depression, convulsions and possible death due to respiratory paralysis. May be absorbed through the lungs. Causes irritation of the mucous membrane and upper respiratory tract.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects. Toxicity may be increased by exposure to alcohol, steroids, and ketones. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Causes cardiac sensitization to endogenous catelcholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine. Persons with liver, kidney, or central nervous system diseases may be at increased risk from exposure to this product. Alcoholic beverage consumption may enhance the toxic effects of this substance. Effects may be delayed.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Substance is nonflammable. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire. Do NOT get water inside containers. Do NOT use straight streams of water. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use water spray, fog or regular foam. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Do not breathe dust, vapor, mist, or gas. Do not ingest or inhale. Store protected from light.
Storage: Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store near alkaline substances. Separate from strong mineral acids.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chloroform	10 ppm TWA	500 ppm IDLH	50 ppm Ceiling; 240 mg/m3 Ceiling
Amylene	none listed	none listed	none listed

OSHA Vacated PELs: Chloroform: 2 ppm TWA; 9.78 mg/m3 TWA Amylene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweet, fruity odor - ethereal odor
pH: Not available.
Vapor Pressure: 160 mm Hg @ 20 deg C
Vapor Density: 4.12 (Air=1)
Evaporation Rate:11.6 (Butyl acetate=1)

Viscosity: 0.58 cps @ 20 deg C
Boiling Point: 60.5-61.5 deg C
Freezing/Melting Point:-63 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble.
Specific Gravity/Density:1.492 (Water=1)
Molecular Formula:CHCl3
Molecular Weight:119.366

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Light sensitive.
Conditions to Avoid: High temperatures, incompatible materials, light.
Incompatibilities with Other Materials: Strong oxidizing agents, aluminum, fluorine, magnesium, sodium potassium, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), dinitrogen tetraoxide, sodium + methanol, potassium-tert-butoxide, chemically active metals, Attacks some forms of plastics, rubbers, and coatings., nitrogen tetroxide, acetone + alkali, disilane, perchloric acid + phosphorus pentoxide, sodium methylate, triisopropylphosphine, sodium methoxide + methanol.
Hazardous Decomposition Products: Hydrogen chloride, carbon monoxide, carbon dioxide, chlorine, phosgene gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 67-66-3: FS9100000
CAS# 25377-72-4 unlisted.
LD50/LC50:
CAS# 67-66-3:
Draize test, rabbit, eye: 148 mg;
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 47702 mg/m3/4H;
Oral, mouse: LD50 = 36 mg/kg;
Oral, rat: LD50 = 695 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;

CAS# 25377-72-4:

Carcinogenicity:
CAS# 67-66-3:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 10/1/87
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen CAS# 25377-72-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Oral, rat: TDLo = 13832 mg/kg/2Y-C (Tumorigenic - Carcinogen ic by RTECS criteria - Blood - leukemia).; Oral, mouse: TDLo = 127 gm/kg/92W-I (Tumorigenic - Carcinogenic by RTECS criteria - Liver - tumors).; Oral, rat: TD = 98 gm/kg/78W-I (Tumorigenic - neoplastic by RTECS

criteria - Kidney, Ureter, Bladder - Kidney tumors and Endocrine - thyroid tumors).; Oral, mouse: TD = 18 gm/kg/17W-I (Tumorigenic - neoplastic by RTECS criteria - Liver - tumor s).;
Teratogenicity: Oral, rat: TDL0 = 1260 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Specific Developmental Abnormalities - musculoskeletal system.; Inhalation, rat: TCLo = 100 ppm/7H (female 6-15 day(s) after conception) Specific Developmental Abnormalities - gastrointestinal system and homeostasis.; Inhalation, mouse: TCLo = 100 ppm/7H (female 8-15 day(s) after conception) Specific Developmental Abnormalities - craniofacial (including nose and tongue).
Reproductive Effects: Inhalation, rat: TCLo = 30 ppm/7H (female 6-15 day(s) after conception) Fertility - other measures of fertility.; Inhalation, rat: TCLo = 300 ppm/7H (female 6-15 day(s) after conception) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated) and post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Neurotoxicity: No information available.
Mutagenicity: DNA Inhibition: Human, HeLa cell = 19 mmol/L.; Sister Chromatid Exchange: Human, Lymphocyte = 10 mmol/L.; Micronucleus Test: Oral, rat = 4 mmol/kg.; Unscheduled DNA Synthesis: Oral, rat = 1 gm/kg.; Sister Chromatid Exchange: Hamster, Embryo = 100 umol/L.
Other Studies: Open irritation test: Administration onto the skin (rabbit) 10 mg/24H (Mild). Standard Draize Test: Administratio n onto the skin (rabbit) = 500 mg/24H (Mild). Standard D raize Test: Administration into the eye (rabbit) = 20 mg /24H (Moderate).

Section 12 - Ecological Information

Ecotoxicity: Fish: Channel catfish: LC50 = 75 ppm; 96 Hr; Unspecified Rainbow trout: LC50 = 43.8 mg/L; 96 Hr; Static bioassay Fathead Minnow: LC50 = 129.0 mg/L; 96 Hr; Static bioassay (pH = 7.6-8.3) Bluegill/Sunfish: LC50 = 100.0 mg/L; 96 Hr; Static bioassay flea Daphnia: EC50 = 28.9 mg/L; 48 Hr; Static bioassay The majority of the environmental releases from industrial uses are to the atmosphere; releases to water and land will be primarily lost by evaporation and will end up in the atmosphere. Release to the atmosphere may be transported long distances and will photodegrade with a half-life of a few months. Spills and other releases on land will also leach into the groundwater where it will reside for long periods of time.
Environmental: Chloroform will not be expected to bioconcentrate into the food chain but contamination of food is likely due to its use as an extractant and its presence in drinking water.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 67-66-3: waste number U044.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	CHLOROFORM				CHLOROFORM
Hazard Class:	6.1				6.1(9.2)
UN Number:	UN1888				UN1888

Packing Group:	III				II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 67-66-3 is listed on the TSCA inventory.
CAS# 25377-72-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 67-66-3: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 67-66-3: 10 lb final RQ; 4.54 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 67-66-3: 10,000 lb TPQ
SARA Codes
CAS # 67-66-3: acute, chronic. CAS # 25377-72-4: acute, flammable.
Section 313
This material contains Chloroform (CAS# 67-66-3, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 67-66-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 67-66-3 is listed as a Hazardous Substance under the CWA. CAS# 67-66-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 67-66-3 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 67-66-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 25377-72-4 can be found on the following state right to know lists: New Jersey.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Chloroform, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 67-66-3: 20 ug/day NSRL (oral); 40 ug/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 22 Harmful if swallowed.
R 38 Irritating to skin.
R 40 Limited evidence of a carcinogenic effect.

R 48/20/22 Harmful : danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)
CAS# 67-66-3: 3
CAS# 25377-72-4: No information available.
Canada - DSL/NDSL
CAS# 67-66-3 is listed on Canada's DSL List.
CAS# 25377-72-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A, D1B.
Canadian Ingredient Disclosure List
CAS# 67-66-3 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 67-66-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3) OEL-AUSTRALIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-AUSTRIA:TWA 10 ppm (50 mg/m3) OEL-BELGIUM:TWA 10 ppm (49 mg/m3);Carcinogen JAN9 OEL-CZECHO SLOVAKIA:TWA 10 mg/m3;STEL 20 mg/m3 OEL-DENMARK:TWA 2 ppm (10 mg/m3); Carcinogen OEL-FINLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm;Skin;CAR OE L-FRANCE:TWA 5 ppm (25 mg/m3);STEL 50 ppm (250 mg/m3);CAR OEL-GERMANY :TWA 10 ppm (50 mg/m3);Carcinogen JAN9 OEL-HUNGARY:STEL 10 mg/m3 OEL -INDIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-JAPAN:TWA 50 ppm (240 mg/ m3);Carcinogen OEL-THE NETHERLANDS:TWA 10 ppm (50 mg/m3) OEL-THE PHI LIPPINES:TWA 50 ppm (240 mg/m3) OEL-POLAND:TWA 50 mg/m3 OEL-RUSSIA:T WA 50 ppm OEL-SWEDEN:TWA 2 ppm (10 mg/m3);STEL 5 ppm (25 mg/m3);CAR OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm (100 mg/m3) OEL-THA ILAND:TWA 50 ppm (240 mg/m3) OEL-TURKEY:TWA 50 ppm (240 mg/m3) OEL-U NITED KINGDOM:TWA 2 ppm (9.9 mg/m3);Skin OEL IN BULGARIA, COLOMBIA, J ORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM c heck ACGIH TLV

Section 16 - Additional Information

MSDS Creation Date: 6/09/1999
Revision #7 Date: 9/11/2002

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

Chrome
Cr (metal)
Atomic mass: 52.0

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible if in very fine powder. Gives off irritating or toxic fumes (or gases) in a fire.	No open flames if in powder form.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful	Fireproof. Separated from strong oxidants.	R: S:

particles).

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I M P O R T A N T

PHYSICAL STATE; APPEARANCE:
STEEL GREY LUTROUS METAL.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts violently with strong oxidants such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: ppm; 0.5 mg/m^3 (as TWA) (ACGIH 1994-1995).
OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts.
NIOSH REL: TWA 0.5 mg/m^3 See Appendix C
NIOSH IDLH: 250 mg/m^3 (as Cr)

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C	Relative density (water = 1): 7.14 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Explosive limits are unknown in literature. Depending on the degree of exposure, periodic medical examination is indicated.

ADDITIONAL INFORMATION

ICSC: 0029	**CHROMIUM**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

ALDRICH CHEMICAL CO -- DIELDRIN, TECH., CA. 90%, 29121-8 -- 6810-00N037359

========== Product Identification ==========

Product ID:DIELDRIN, TECH., CA. 90%, 29121-8
MSDS Date:01/07/1992
FSC:6810
NIIN:00N037359
MSDS Number: BQRWJ
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

========== Composition/Information on Ingredients ==========

Ingred Name:1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6,
7-EPOXY- 1,4,4A,5,6,7,8,8A-OCTAHYDRO, ENDO, EXO-; (ING 2)
CAS:60-57-1
RTECS #:IO1750000
Fraction by Wt: 90%
OSHA PEL:0.25 MG/M3, S
ACGIH TLV:0.25 MG/M3, S
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:ING 1: (DIELDRIN) (SARA III)
RTECS #:9999999ZZ

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 (ORAL,RAT): 38300 UG/KG.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE:MAY BE FATAL IF INHALED,
SWALLOWED, OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION. CHRONIC:
CARCINOGEN. MAY ALTER GENETIC MATERIAL. OVEREXPOSURE MAY CAUSE
REPRODUCTIVE DISORDER(S) BASED ON TEST S WITH LABORATORY ANIMALS.
TARGET ORGANS: CENTRAL NERVOUS SYSTEM, LIVER, BLOOD. OVEREXPOSURE
CAN CAUSE (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: MALAISE, HEADACHE, NAUSEA, VOMITING,
DIZZINESS, TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY
FAILURE.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT
LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF

WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SH OES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION: WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYS.

========== Fire Fighting Measures ==========

Extinguishing Media:WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MAT ERIAL PICKUP IS COMPLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.
Other Precautions:HIGHLY TOX.CARCIN. MUTAGEN. REPROD HAZ.MAY CAUSE CANCER.MAY CAUSE INHERITABLE GENETIC DMG. READILY ABSORB THRU SKIN. AVOID PRLNGD/RPTD EXPOS. DO NOT BRTH DUST. DO NOT GET IN EYES,ON SKIN,ON CLTHG.VERY TOX BY INHAL,IN CONT W/SKIN & (SUPDAT)

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:CHEM WORK GOG W/FULL LNGTH FCSHLD
Other Protective Equipment:OTHER PROTECTIVE CLOTHING. SAFETY SHOWER AND EYE BATH.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
OTHER PRECAUTIONS: IF SWALLOWED. IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:>289F,>143C
Vapor Density:13.2
Appearance and Odor:ORANGE-TAN POWDER.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES OF CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE GAS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISSOLVE OR MIX MATERIAL WITH COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCURBBER. DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS (FP N).

Disclaimer (provided with this information by the compiling agencies):
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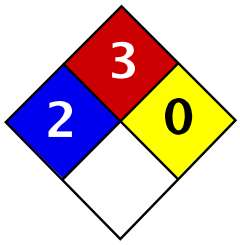

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001)
CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001)
CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States]
TWA: 435 STEL: 545 from OSHA (PEL) [United States]
TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States]
TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)]
TWA: 100 STEL: 125 (ppm) [Belgium]
TWA: 100 STEL: 125 (ppm) [Finland]
TWA: 50 (ppm) [Norway]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether.
Very slightly soluble in cold water or practically insoluble in water.
Soluble in all proportions in Ethyl alcohol.
Soluble in Carbon tetrachloride, Benzene.
Insoluble in Ammonia.
Slightly soluble in Chloroform.
Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials.
Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill:
LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg
Lowest Published Lethal Dose/Conc:
LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data.
May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate.
May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Can cause mild skin irritation. It can be absorbed through intact skin.
Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS)
Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987).
Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene
Illinois toxic substances disclosure to employee act: Ethylbenzene
Illinois chemical safety act: Ethylbenzene
New York release reporting list: Ethylbenzene
Rhode Island RTK hazardous substances: Ethylbenzene
Pennsylvania RTK: Ethylbenzene
Minnesota: Ethylbenzene
Massachusetts RTK: Ethylbenzene
Massachusetts spill list: Ethylbenzene
New Jersey: Ethylbenzene
New Jersey spill list: Ethylbenzene
Louisiana spill reporting: Ethylbenzene
California Director's List of Hazardous Substances: Ethylbenzene
TSCA 8(b) inventory: Ethylbenzene
TSCA 4(a) proposed test rules: Ethylbenzene
TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97
SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R20- Harmful by inhalation.
S16- Keep away from sources of ignition - No smoking.
S24/25- Avoid contact with skin and eyes.
S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet.
-Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA)
-Registry of Toxic Effects of Chemical Substances (RTECS)
-Chemical Hazard Response Information System (CHRIS)
-Hazardous Substance Data Bank (HSDB)
-New Jersey Hazardous Substance Fact Sheet
-Ariel Global View
-Reprotext System

Other Special Considerations: Not available.

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Material Safety Data Sheet

CREOSOTE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	CREOSOTE
OTHER/GENERIC NAMES:	Coal Tar Creosote, KMG-B Coal Tar Creosote Creosote Oil
PRODUCT USE:	Wood preservative
COMPANY:	KMG-Bernuth, Inc. 10611 Harwin, Suite 402 Houston, Texas 77036 Telephone: 713-988-9252
U. S. EPA Registration Nos.	61470-1 61483-7, 61483-8 61483-9, 61483-10

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)

CHEMTREC: 1 800 424 9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Creosote *	8001-58-9	100

* Mixture of 2, 3, & 4-ringed polynuclear aromatic hydrocarbons, including some substituted compounds

Trace impurities and additional material names not fisted above may also appear in Section 15. These materials may be listed for local “Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Creosote is a brown to black oily liquid with a penetrating smoky odor. Vapor causes moderate to severe irritation of eyes, nose, throat and respiratory tract. Liquid can cause burning and itching with reddening of the skin, which is accentuated by sunlight.

POTENTIAL-HEALTH HAZARDS

SKIN: Contact with skin can result in irritation, which when not washed off or when accentuated by sunlight, can result in minor burns.

EYES: Overexposure to product vapors can result in irritation. Eye contact with product will result in irritation, which in the absence of recommended first aid can result in effects ranging from minor burns to severe corneal injury, including keratitis, conjunctivitis and corneal abrasion.

INHALATION: Overexposure to vapor may result in irritation to respiratory tract. Prolonged exposure in significant excess of permissible air concentrations can result in acute toxic effects, such as dizziness, respiratory difficulty, convulsions and possible cardiovascular collapse.

INGESTION: Irritation of the gastrointestinal tract followed by nausea and vomiting, abdominal discomfort. rapid pulse etc. Cardiovascular collapse may occur.

DELAYED EFFECTS: Prolonged and repeated skin exposure over many years in the absence of recommended hygiene practices may lead to changes in skin pigmentation, benign skin growths and may, in some cases, result in skin cancer. Additionally, inhalation may present a lung cancer hazard.

Ingredients found on one of the OSHA designated carcinogen lists me listed below.

INGREDIENT NAME	NTB STATUS	JARC STATUS	OSHA LIST
Creosote	Carcinogen	2A - Probable	–

4. FIRST AID MEASURES

SKIN: Wash thoroughly with waterless hand cleaners, olive oil or soap and water. Avoid solvents.

EYES: Flush eyes immediately with large amounts of water or olive oil for at least 15 minutes. Call a physician

INHALATION: Remove to fresh air. If not breathing, give artificial respiration; preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

INGESTION: If conscious. first induce vomiting, then take 2 tablespoons of activated charcoal (USP-drug grade) in water. Get immediate medical attention. Do not induce vomiting, or give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN: No additional instructions.

5. FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINTS:	> 93º C (> 200º F) / > 93º C (> 200º F)
FLASH POINT METHOD:	Closed Cup / Open Cup
AUTOIGNITION TEMPERATURE:	336º C (637º F)
UPPER FLAME LIMIT (volume 0/6 in air):	Not Determined
LOWER FLAME LIMIT (volume % In air):	Not Determined
FLAME PROPAGATION RATE (solids):	Not Applicable
OSHA FLAMMABILITY CLASS:	Not Determined

EXTINGUISHING MEDIA: Water/fog, carbon dioxide, foam, dry chemicals, sand or steam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Water/fog is recommended for the control of unconfined oil fires, but water may cause frothing or eruption in closed tank.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS: Self-contained breathing apparatus (SCBA) and full protective clothing should be worn when fumes and/or smoke are present.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment)

Avoid breathing vapors and contact with skin and eyes. Avoid sources of ignition (sparks or open flame). Contain the spill or leak with solids, such as sand, earth, etc. Contaminated materials must be handled and managed as RCRA Hazardous Waste and treated before disposal in approved facilities. Do not allow to enter into sewers or waterways.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment)

Wear clothing closed at the neck, long sleeves and non-porous type gloves, eg. neoprene, butyl rubber, nitrile, poly-vinyl alcohol (PVA), polyvinyl chloride (PVC).

STORAGE RECOMMENDATIONS: Recommended temperature for storage is about 140º F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use in areas with adequate natural or local exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:	Avoid skin contact whenever possible by using non-porous type gloves. For outdoor work use a waterproof sunscreen (SPF 25 or greater); reapply every 90 minutes while in direct sun. For exposed skin, use protective creams (for example: MSA's Fend AE-2, Kerodex 51, Jergens SBS-46).
EYE PROTECTION:	Safety glasses, goggles and/or face shield.
RESPIRATORY PROTECTION:	Not required for properly ventilated areas. Use a NIOSH approved respirator with suitable organic vapor cartridge as necessary to control exposures above the TLV of PEL.
ADDITIONAL RECOMMENDATIONS:	Do not take contaminated work clothing home. It is recommended that a complete soap and water shower and/or steam bath be taken at the end of each working day.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Creosote (measured as Coal Tar Pitch Volatiles, CTPV	0.2 mg/m^3	0.2 mg/ m^3	–

HAZARDOUS INGREDIENTS	CAS NUMBER	% BY WT.	EXPOSURE LIMIT	(PPM; MG/M3)
Coal Tar Distillate	65996-92-1		OSHA-TWA -	*
Indene	95-13-6	<10	ACGIH-TWA 10	48
			OSHA-TWA 10	45
Naphthalene	91-20-3	<15	ACGIH-TWA 10	52
			ACGIH-STEL 15	79
			OSHA-TWA 10	50
			OSHA-STEL 15	75
			NIOSH-TWA 10	50
			NIOSH-STEL 15	75
Biphenyl	92-52-4	<5	ACGIH-TWA 0.2	1.3
			OSHA-TWA 0.2	1
Benzene	71-43-2	<1	ACGIH-TWA 10	32**, #
			OSHA-TWA 1	***
			OSHA-STEL 5	-
			NIOSH-TWA 0.1	-
			NIOSH-STEL 1	-
Alkylnaphthalene		<10	none	
Phenanthrene	85-01-8	9-13	NONE	
Benz (a) anthracene	56-55-3	1.6	NONE	
Benzo (a) phenanthrene	218-01-9	1.7	NONE	
Benzo (b) fluoranthene+	205-99-2		NONE	
Benzo (k) fluoranthene+	207-08-9		NONE	
Benzo (j) fluoranthene+	205-82-3		NONE	
7, 12-Dimethylbenz (a) anthracene	57-97-6	2.43	NONE	
Indeno (1,2,3-cd) pyrene	193-39-5	0.25	NONE	
Benzo (a) pyrene	50-32-8	0.92	NONE	
Dibenzo (a,h) anthracene	53-70-3	0.09	NONE	
Benzo (g,h,i) perylene+	191-24-2		NONE	
7-H Dibenzo (c,g) carbazole	194-59-2	0.18	NONE	
Dibenzo (a,l) pyrene	191-30-0	0.02	NONE	
1-Nitropyrene	5522-43-0	0.24	NONE	
Dibenz (a,j) acridine	224-42-0	0.06	NONE	
Dibenz (a,h) acridine	226-36-8	0.04	NONE	

------SARA TITLE III SECTION 313 CHEMICALS------
(SEE SECTION V11 FOR CAS NUMBERS AND PERCENTAGES)

Naphthalene
Biphenyl
Benzene
Phenanthrene / Benz (a) anthracene
Benzo (a) phenanthrene
Benzo (b) fluoranthrene / Benzo (k) fluoranthrene
Benzo (j) fluoranthrene
Benzo (a) pyrene
Dibenzo (a,h) anthracene
Indeno)1,2,3-cd) pyrene
1-Nitropyrene
7,12-Dimethylbenz (a) anthracene
7-H Dibenzo (c,g) carbazole / Benzo (g,h,i) perylene
Dibenzo (a,l) pyrene
Dibenz (a,j) acridine
Dibenz (a,h) acridine

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: None

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark brown to black oily liquid
PHYSICAL STATE:	Liquid
MOLECULAR WEIGHT:	130-210
CHEMICAL FORMULA:	Mixture of organic compounds
ODOR:	Penetrating smoky odor
SPECIFIC GRAVITY (water=1.0):	1.03-1.18 (Avg.: 9.1 lbs/ gal)
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	Not Determined
BOILING POINT:	194 - 400º C
MELTING POINT:	Not Determined
VAPOR PRESSURE (in mm Hg):	at 100º C - 80 mm; at 125º C - 225 mm; at 150º C - 370 mm
VAPOR DENSITY (air = 1.0):	< 1
EVAPORATION RATE:	< 1 COMPARED TO: Butyl Acetate –1
% VOLATILES:	Not Determined
FLASH POINT:	Closed cup: > 93º C (>200º F)
	Open cup: > 93º C (>200º F)

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

STABILITY (CONDITIONS TO AVOID): Product stable under normal conditions.
Due to its low vapor pressure and extremely low evaporation rate, the volatility rate at 20º C is almost zero. Upon heating, at extremely high temperatures, hydrocarbons will be emitted and some degradation will take place. Avoid loading or unloading near open flame.

INCOMPATIBILITIES: Mixing chlorosulfonic acid and creosote oil in a closed container can cause an increase in temperature and pressure (NFPA 491M, 1991)

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose under normal conditions of use. When heated to extreme temperatures creosote emits acrid smoke.

HAZARDOUS POLYMERIZATION: Will not occur

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: Oral LD_{50}; 725 mg/kg (rat); 433 mg/kg (mouse)

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS: Several studies in mice have shown the formation of both local (i.e. skin) and distant (i.e. lung) tumor formation after dermal exposure to creosote. [Poel & Kammer. 1957; Roe et al, 1958]

OTHER DATA: Has caused mutations in *S. typhimurium* strains TA98. TA100, TA1537, TA1538 and mouse lymphoma cell L5178y. [Fed Reg., 1978; Bos et al, 1983] Death from large doses of creosote appears due primarily to cardiovascular collapse. Fatalities have occurred 14-36 hours after the ingestion of creosote (about 7g for adults; about 1 or 2g for children). [Clayton & Clayton, 3rd ed., 1981]

12. ECOLOCICAL INFORMATION

TL_{50}, *Carassius auratus* (goldfish); 3.51 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Lepomis macrochirus* (bluegill); 4.42 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Salnio gairdner* (rainbow trout); 3.72 ppm/24 hours [60:40 mixture of creosote & coal tar]
LD_{50}, *Colinus virginianus* (bobwhite quail); 1260 ppm/8 days [60:40 mixture of creosote & coal tar]
LD_{50}, *Anas platyrhynchos* (mallard duck); 10,388 ppm/8 days [60:40 mixture of creosote & coal tar]

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? YES
If yes, the RCRA ID number is: U051

OTHER DISPOSAL CONSIDERATIONS:

Other waste code designations for creosote containing wastes appear in the December 6, 1990 *Federal Register* as F034; Wastewater's, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachloraphenol. Please consult with the appropriate state regulatory authorities to determine when the F034 designation is effective in the given state.

Creosote-containing waste may also be characteristic hazardous wastes, even if not meeting the U051, K001, or F034 waste code designation.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote). 9
US DOT ID NUMBER: UN 3082
US DOT SHIPPING NAME: RQ, Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote), 9, UN3082, III

For additional information on shipping regulations affecting this material, contact the number found in Section 1.

I5. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on EPA's TSCA Inventory
OTHER TSCA ISSUES: Substance of unknown or variable composition

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	WEIGHT %	SARA/CERCLA RQ (LB)	SARA EHS TPQ (LB)
Creosote	100 %	1	None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802], State Emergency Response Commission and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate, Delayed, Fire

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents an found in Section 2.

INGREDIENT NAME	WEIGHT	COMMENT
Creosote	100%	de minimus concentration is 0.1%

STATE-RIGHT-TO-KNOW

In addition to the ingredients found In Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT	COMMENT
None		

ADDITIONAL REGULATORY INFORMATION: For some applications, Creosote is also regulated as a "Restricted Use" pesticide under the Federal Insecticide, Fungicide. and Rodenticide Act (FIFRA).

WHMIS CLASSIFICATION (CANADA): Class D, Division 2, Subdivision A, very toxic material

FOREIGN INVENTORY STATUS: Listed on the EINECS Inventory - ID# 2322875
Listed on Canadian Inventory Domestic Substance List (DSL)

16. OTHER INFORMATION

CURRENT ISSUE DATE: March 2003
PREVIOUS ISSUE DATE: January 2002

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Updated DOT transportation information
Updated to include 16-section ANSI format for Material Safety Data Sheets

OTHER INFORMATION: NFPA Hazard Ratings:
Health (Blue): 2
Flammability (Red): 2
Reactivity (Yellow): 0

REFERENCES:

1. ACGIH (1995): *"1995-1996 Threshold Limit Values...."*
2. USDOL/OSHA General Industry 29 CFR 1910.1000 Coal Tar Pitch Volatile (CTPV) Permissible Exposure Limit
3. USEPA 40 CFR Parts 112; 261; 268; 300
4. USDOT 49 CFR Part 172
5. USEPA(1986) *"Evaluation of the Potential Carcinogenicity of Creosote (8001-58-9)"*, Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response, Washington, DC
6. National Fire Prevention Association (1991): *"Fire Protection Guide on Hazardous Materials"*, 10th ed. NFPA:Quincy, MA, pg 325M-29, 491M.
7 USEPA (1980) *"Health and Environmental Effects of Creosote"*, EPA # 53, pg 53-12
8. Clayton & Clayton, eds (1981): *"Patty's Industrial Hygiene & Toxicology, Volume 2A, 2B, 2C Toxicology"*, 3rd ed. John Wiley & Sons, New York, NY
9. NIOSH (1977): *"Criteria for a recommended standard...Occupational Exposure to Coal Tar Products"*, USDHEW/NIOSH Publication # 78-107
10. Poel, W.E. and Kammer, A.G. (1957): *"Experimental carcinogenicity of coal-tar fractions: The carcinogenicity of creosote oils"* J NATL CANCER INST 18(1):41-55
11. Roe, F.J.C., Bosch, D., Boutwell, R.K. (1958): *The carcinogenicity of creosote oil: The induction of lung tumors in mice"* CANCER RES 18:1176-1178
12. Bos, R.P., Hulshof, C.T.J., Theuws, J.L.G., Hendershon, P.Th. (1983): *"Mutagenicity of creosote in the Salmonella/microsome assay"* MUT RES 119:21-25
13. FEDERAL REGISTER (1978), Vol 43 #200; October 18th, page 48199
14. IARC (1987): *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man"*, World Health Organization (WHO): Geneva p S7 177
15. NTP (1994): *"National Toxicology Program's 7th Annual Report on Carcinogens 1994 - Summary"*

METAL

MATERIAL SAFETY DATA SHEET

ALDON CORPORATION
221 Rochester Street
Avon, New York 14414-9409
(585) 226-6177

MSDS No.: LL0070 LL0079 LL0080 LL0081 LL0082 LL0085 LL0086
Effective Date: March 29, 2005

SECTION I NAME

Product	Lead Metal
Chemical Synonyms	N/A
Formula	Pb
Unit Size	up to 2.5 Kg.
C.A.S. No.	7439-92-1

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA / HMIS *

Health	3
Fire	0
Reactivity	0

HAZARD RATING
MINIMAL 0 SLIGHT 1 MODERATE 2 SERIOUS 3 SEVERE 4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Lead metal, shot, granular, sheet, foil	99+%	See Section V.
CAUTION! MAY BE HARMFUL OR FATAL IF SWALLOWED		
OR INHALED AS FUMES OR DUST.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Approx. 327.4°C (621°F)	Specific Gravity (H_2O = 1)	11.34 (20/4°C)
Boiling Point (°F)	1753°C (3187°F)	Percent Volatile by Volume (%)	0% at ambient temp.
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	Non-volatile (N/A).
Vapor Density (Air=1)	N/A		
Solubility in Water	Insoluble.		
Appearance & Odor	Bluish, silvery, gray soft metal, granular, shot, sheet, foil; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

			Lower	Upper
Flash Point (Method Used)	Non-flammable (N/A).	Flammable Limits in Air % by Volume N/A	--------	--------
Extinguisher Media	Dry chemical or carbon dioxide should be used on surrounding fire. Do not use water on fires where molten metal is present.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated emits toxic fumes of lead which can react vigorously with oxidizing materials.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA LL0070

Threshold Limited Value
Lead as inorganic compounds, as Pb:
TWA 0.05 mg/m^3 (ACGIH 2001).

Effects of Overexposure
SKIN: Not absorbed through skin. EYES: No specific hazard known. Contact may cause transient irritation. INGESTION: May produce anorexia, vomiting, malaise, convulsions due to increased intracranial pressure. INHALATION: Of dust or fumes can cause lead poisoning. Target organs: Lungs, kidneys.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. EYES: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. SKIN: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		High temperatures to produce fumes.
	Stable	X	

Incompatibility (Materials to Avoid) Strong oxidizing materials.

Hazardous Decomposition Products When heated, emits toxic fumes of lead.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Carefully sweep up without producing dust and recycle for use or place in a suitable container for disposal.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.
Dispose of in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory use at room temperature. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation				
	Local Exhaust	None needed.	Special	No.
	Mechanical (General)	None needed.	Other	No.

Protective Gloves	Recommended - leather.	Eye Protection	Chemical safety glasses.

Other Protective Equipment Smock, apron, eye wash station, lab coat, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.
Store in a cool, dry place away from fire hazards. Wash thoroughly after handling. Remove and wash contaminated clothing.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Lead can react violently with oxidizing materials. Water may become trapped within surface cracks which may cause an explosion when the metal is molten.

Revision No. 9	Date 03/29/05	Approved Michael Raszeja	Chemical Safety Coordinator MR

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. * Hazardous Materials Industrial Standards. Printed on recycled paper.

METAL

10 M

Material Safety Data Sheet
Mercury

ACC# 14020

Section 1 - Chemical Product and Company Identification

MSDS Name: Mercury
Catalog Numbers: S40672B, S41542, S41599, S41599B, S41599E, S41599G, S41599J, S41599K, S41599M, S41600P, S41600S, S41600W, S41630A, S41630B, S41630C, S41631, S41631A, S41631B, S41631C, S41645, S45245, S46981, S50443, S71966, S71967, S71968, S78777, 13501, M139-1LB, M139-5LB, M140-14LB, M140-1LB, M140-5LB, M141-1LB, M141-6LB, NC9534278
Synonyms: Colloidal mercury; Hydrargyrum; Metallic mercury; Quick silver; Liquid silver.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7439-97-6	Mercury	100	231-106-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver liquid.
Danger! Corrosive. Harmful if inhaled. May be absorbed through intact skin. Causes eye and skin irritation and possible burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May cause central nervous system effects. Inhalation of fumes may cause metal-fume fever. May cause liver and kidney damage. Possible sensitizer. This substance has caused adverse reproductive and fetal effects in animals.
Target Organs: Blood, kidneys, central nervous system, liver, brain.

Potential Health Effects
Eye: Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision. Causes eye irritation and possible burns. Contact with mercury or mercury compounds can cause ulceration of the conjunctiva and cornea.
Skin: May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
Ingestion: May cause severe and permanent damage to the digestive tract. May cause perforation

of the digestive tract. May cause effects similar to those for inhalation exposure. May cause systemic effects.
Inhalation: Causes chemical burns to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause respiratory sensitization.
Chronic: May cause liver and kidney damage. May cause reproductive and fetal effects. Effects may be delayed. Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, personality changes. Chronic ingestion may cause accumulation of mercury in body tissues. Prolonged or repeated exposure may cause inflammation of the mouth and gums, excessive salivation, and loosening of the teeth.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Wash mouth out with water.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Treat symptomatically and supportively. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.
Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel. The use of Dimercaprol or BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not breathe vapor.
Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store protected from azides.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Mercury	0.025 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.05 mg/m3 TWA (vapor) 10 mg/m3 IDLH	0.1 mg/m3 Ceiling (vapor)

OSHA Vacated PELs: Mercury: 0.05 mg/m3 TWA (vapor)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: silver
Odor: odorless
pH: Not available.

Vapor Pressure: 0.002 mm Hg @ 25C
Vapor Density: 7.0
Evaporation Rate: Not available.
Viscosity: 15.5 mP @ 25 deg C
Boiling Point: 356.72 deg C
Freezing/Melting Point:-38.87 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:13.59 (water=1)
Molecular Formula: Hg
Molecular Weight:200.59

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, incompatible materials.
Incompatibilities with Other Materials: Oxygen, sulfur, acetylene, ammonia, chlorine dioxide, azides, chlorates, nitrates, sulfuric acid, halogens, rubidium, calcium, 3-bromopropyne, ethylene oxide, lithium, methylsilane + oxygen, peroxyformic acid, tetracarbonylnickel + oxygen, copper, copper alloys, boron diiodophosphide, metals, nitromethane, sodium carbide, aluminum, lead, iron, metal oxides.
Hazardous Decomposition Products: Mercury/mercury oxides.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7439-97-6: OV4550000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7439-97-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Intraperitoneal, rat: TDLo = 400 mg/kg/14D-I (Tumorigenic - equivocal tumorigenic agent by RTECS criteria - tumors at site of application).
Teratogenicity: Inhalation, rat: TCLo = 1 mg/m3/24H (female 1-20 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive Effects: Inhalation, rat: TCLo = 890 ng/m3/24H (male 16 week(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).; Inhalation, rat: TCLo = 7440 ng/m3/24H (male 16 week(s) pre-mating) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Mutagenicity: Cytogenetic Analysis: Unreported, man = 150 ug/m3.
Neurotoxicity: The brain is the critical organ in humans for chronic vapor exposure; in severe cases, spontaneous degeneration of the brain cortex can occur as a late sequela to past exposure.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Channel catfish: LC50 = 0.35 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 = 0.01 mg/L; 48 Hr; Unspecified In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury bound to dust particles in the atmosphere or bed sediment particles in rivers and lakes is generally less substantial. The conversion, in aquatic environments, of inorganic mercury cmpd to methyl mercury implies that recycling of mercury from sediment to water to air and back could be a rapid process.
Environmental: Mercury bioaccumulates and concentrates in food chain (concentration may be as much as 10,000 times that of water). Bioconcentration factors of 63,000 for freshwater fish and 10,000 for salt water fish have been found. Much of the mercury deposited on land, appears to revaporize within a day or two, at least in areas substantially heated by sunlight.
Physical: All forms of mercury (Hg) (metal, vapor, inorganic, or organic) are converted to methyl mercury. Inorganic forms are converted by microbial action in the atmosphere to methyl mercury.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 7439-97-6: waste number U151.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	MERCURY	MERCURY
Hazard Class:	8	8
UN Number:	UN2809	UN2809
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7439-97-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs

CAS# 7439-97-6: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7439-97-6: acute, chronic.

Section 313

This material contains Mercury (CAS# 7439-97-6, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7439-97-6 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7439-97-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7439-97-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7439-97-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

WARNING: This product contains Mercury, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 23 Toxic by inhalation.

R 33 Danger of cumulative effects.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 1/2 Keep locked up and out of reach of children.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 7439-97-6: 3

Canada - DSL/NDSL

CAS# 7439-97-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, E.

Canadian Ingredient Disclosure List

CAS# 7439-97-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/15/1999
Revision #7 Date: 1/20/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

NICKEL

ICSC: 0062

NICKEL
(powder)
Ni
Molecular mass: 58.7

CAS # 7440-02-0
RTECS # QR5950000
ICSC # 0062
EC # 028-002-00-7

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Water in large amounts, foam, dry sand, NO carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest.
• **SKIN**		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Separated from strong acids.	Xn symbol R: 40-43 S: (2-)22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

NICKEL

ICSC: 0062

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** ODOURLESS SILVERY METALLIC SOLID IN VARIOUS FORMS. **PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: ppm; 1 mg/m^3 (as TWA) (ACGIH 1993-1994).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of the dust and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of the fumes may cause pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. The substance may have effects on the nasal sinuses , resulting in inflammation and ulceration.
PHYSICAL PROPERTIES	Boiling point: 2730°C Melting point: 1455°C	Relative density (water = 1): 8.9 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062 **NICKEL**

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Material Safety Data Sheet

PAH Contaminated Soil

ACC# 17974

Section 1 - Chemical Product and Company Identification

MSDS Name: PAH Contaminated Soil
Catalog Numbers: SRS103100
Synonyms: API separator sludge
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Soil	78-99	unlisted
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: not available solid.
Warning! May cause allergic skin reaction. Causes eye and skin irritation. May cause cancer based on animal studies.
Target Organs: Eyes, skin.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and
Inhalation: Causes respiratory tract irritation. May cause effects similar to those described for ingestion.
Chronic: May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Soil	none listed	none listed	none listed
Anthracene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

Benzo(a)pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.5 mg/m3 TWA 2.5 mg/m3 IDLH	0.5 mg/m3 TWA
Naphthalene	10 ppm TWA; 15 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m3 TWA
2-methylnaphthalene	none listed	none listed	none listed

OSHA Vacated PELs: Soil: No OSHA Vacated PELs are listed for this chemical. Anthracene: No OSHA Vacated PELs are listed for this chemical. Pyrene: No OSHA Vacated PELs are listed for this chemical. Dibenzofuran: No OSHA Vacated PELs are listed for this chemical. Benzo(b)fluoranthene: No OSHA Vacated PELs are listed for this chemical. Fluoranthene: No OSHA Vacated PELs are listed for this chemical. Acenaphthylene: No OSHA Vacated PELs are listed for this chemical. 1,2-benzphenanthrene: No OSHA Vacated PELs are listed for this chemical. Benzo(a)pyrene: No OSHA Vacated PELs are listed for this chemical. 1,2-Benzanthracene: No OSHA Vacated PELs are listed for this chemical. Acenaphthene: No OSHA Vacated PELs are listed for this chemical. Phenanthrene: No OSHA Vacated PELs are listed for this chemical. Fluorene: No OSHA Vacated PELs are listed for this chemical. Pentachlorophenol: 0.5 mg/m3 TWA Naphthalene: 10 ppm TWA; 50 mg/m3 TWA 2-methylnaphthalene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: not available
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.
Molecular Formula: Mixture
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures.
Incompatibilities with Other Materials: None reported.
Hazardous Decomposition Products: No data available.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 120-12-7: CA9350000
CAS# 129-00-0: UR2450000; UR2450100
CAS# 132-64-9: HP4430000
CAS# 205-99-2: CU1400000
CAS# 206-44-0: LL4025000
CAS# 208-96-8: AB1254000; AB1254200
CAS# 218-01-9: GC0700000
CAS# 50-32-8: DJ3675000
CAS# 56-55-3: CV9275000
CAS# 83-32-9: AB1000000
CAS# 85-01-8: SF7175000
CAS# 86-73-7: LL5670000
CAS# 87-86-5: SM6300000; SM6314000; SM6321000
CAS# 91-20-3: QJ0525000
CAS# 91-57-6: QJ9635000
LD50/LC50:
CAS# 120-12-7:

Oral, mouse: LD50 = 4900 mg/kg;

CAS# 129-00-0:
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 170 mg/m3;
Inhalation, rat: LC50 = 170 mg/m3;
Oral, mouse: LD50 = 800 mg/kg;
Oral, rat: LD50 = 2700 mg/kg;

CAS# 132-64-9:

CAS# 205-99-2:

CAS# 206-44-0:
Oral, rat: LD50 = 2 gm/kg;
Skin, rabbit: LD50 = 3180 mg/kg;

CAS# 208-96-8:
Oral, mouse: LD50 = 1760 mg/kg;

CAS# 218-01-9:

CAS# 50-32-8:

CAS# 56-55-3:

CAS# 83-32-9:

CAS# 85-01-8:
Oral, mouse: LD50 = 700 mg/kg;
Oral, rat: LD50 = 1.8 gm/kg;

CAS# 86-73-7:

CAS# 87-86-5:
Draize test, rabbit, eye: 100 uL/24H Mild;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, rat: LC50 = 355 mg/m3;
Inhalation, rat: LC50 = 200 mg/m3;
Inhalation, rat: LC50 = 335 mg/m3;
Oral, mouse: LD50 = 36 mg/kg;
Oral, mouse: LD50 = 117 mg/kg;
Oral, mouse: LD50 = 30 mg/kg;
Oral, rabbit: LD50 = 200 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 50 mg/kg;
Skin, rat: LD50 = 96

CAS# 91-20-3:
Draize test, rabbit, eye: 100 mg Mild;
Inhalation, rat: LC50 = >340 mg/m3/1H;
Oral, mouse: LD50 = 316 mg/kg;
Oral, rat: LD50 = 490 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rat: LD50 = >2500 mg/kg;

CAS# 91-57-6:
Oral, rat: LD50 = 1630 mg/kg;

Carcinogenicity:
CAS# 120-12-7:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 205-99-2:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 208-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 56-55-3:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').

- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 86-73-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 87-86-5:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Not listed.
- **IARC:** Not listed.

CAS# 91-20-3:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/19/02
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 91-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 206-44-0: waste number U120.
CAS# 218-01-9: waste number U050.
CAS# 50-32-8: waste number U022.
CAS# 56-55-3: waste number U018.
CAS# 91-20-3: waste

Section 14 - Transport Information

US DOT	Canada TDG

Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Soil is not listed on the TSCA inventory. It is for research and development use only.
CAS# 120-12-7 is listed on the TSCA inventory.
CAS# 129-00-0 is listed on the TSCA inventory.
CAS# 132-64-9 is listed on the TSCA inventory.
CAS# 205-99-2 is not listed on the TSCA inventory. It is for research and development use only.
CAS# 206-44-0 is listed on the TSCA inventory.
CAS# 208-96-8 is listed on the TSCA inventory.
CAS# 218-01-9 is listed on the TSCA inventory.
CAS# 50-32-8 is listed on the TSCA inventory.
CAS# 56-55-3 is listed on the TSCA inventory.
CAS# 83-32-9 is listed on the TSCA inventory.
CAS# 85-01-8 is listed on the TSCA inventory.
CAS# 86-73-7 is listed on the TSCA inventory.
CAS# 87-86-5 is listed on the TSCA inventory.
CAS# 91-20-3 is listed on the TSCA inventory.
CAS# 91-57-6 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97 CAS# 91-20-3: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

CAS# 91-20-3: Testing required by manufacturers, processors

Section 12b

CAS# 91-20-3: Section 4

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 120-12-7: 5000 lb final RQ; 2270 kg final RQ CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ CAS# 205-99-2: 1 lb final RQ; 0.454 kg final RQ CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ CAS# 208-96-8: 5000 lb final RQ; 2270 kg final RQ CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ CAS# 56-55-3: 10 lb final RQ; 4.54 kg final RQ CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ CAS# 86-73-7: 5000 lb final RQ; 2270 kg final RQ CAS# 87-86-5: 10 lb final RQ; 4.54 kg final RQ CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper thre shold)

SARA Codes

CAS # 120-12-7: acute.
CAS # 129-00-0: acute, chronic.
CAS # 206-44-0: acute.

CAS # 50-32-8: acute, chronic.
CAS # 56-55-3: chronic.
CAS # 83-32-9: acute.
CAS # 85-01-8: acute.
CAS # 91-20-3: acute, chronic, flammable.
CAS # 91-57-6: acute.

Section 313

This material contains Anthracene (CAS# 120-12-7, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Dibenzofuran (CAS# 132-64-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Fluoranthene (CAS# 206-44-0, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains 1,2-benzphenanthrene (CAS# 218-01-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Phenanthrene (CAS# 85-01-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Pentachlorophenol (CAS# 87-86-5, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Naphthalene (CAS# 91-20-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed

as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 120-12-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 205-99-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 208-96-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 56-55-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 86-73-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 87-86-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-57-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer. WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer. WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 205-99-2: 0.096 æg/day NSRL (oral) CAS# 218-01-9: 0.35 æg/day NSRL (oral) CAS# 50-32-8: 0.06 æg/day NSRL CAS# 56-55-3: 0.033 æg/day NSRL (oral) CAS# 87-86-5: 40 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 120-12-7: 2
CAS# 129-00-0: No information available.
CAS# 132-64-9: No information available.
CAS# 205-99-2: No information available.
CAS# 206-44-0: No information available.
CAS# 208-96-8: No information available.
CAS# 218-01-9: No information available.
CAS# 50-32-8: No information available.
CAS# 56-55-3: No information available.
CAS# 83-32-9: No information available.
CAS# 85-01-8: No information available.
CAS# 86-73-7: No information available.
CAS# 87-86-5: 3
CAS# 91-20-3: 2
CAS# 91-57-6: No information available.

Canada - DSL/NDSL

CAS# 120-12-7 is listed on Canada's DSL List.
CAS# 129-00-0 is listed on Canada's DSL List.
CAS# 132-64-9 is listed on Canada's DSL List.
CAS# 218-01-9 is listed on Canada's DSL List.
CAS# 50-32-8 is listed on Canada's DSL List.
CAS# 83-32-9 is listed on Canada's DSL List.
CAS# 85-01-8 is listed on Canada's DSL List.
CAS# 86-73-7 is listed on Canada's DSL List.
CAS# 87-86-5 is listed on Canada's DSL List.
CAS# 91-20-3 is listed on Canada's DSL List.
CAS# 91-57-6 is listed on Canada's DSL List.
CAS# 206-44-0 is listed on Canada's NDSL List.
CAS# 208-96-8 is listed on Canada's NDSL List.
CAS# 56-55-3 is listed on Canada's NDSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

Canadian Ingredient Disclosure List

CAS# 120-12-7 is listed on the Canadian Ingredient Disclosure List.
CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 205-99-2 is listed on the Canadian Ingredient Disclosure List.
CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 208-96-8 is not listed on the Canadian Ingredient Disclosure List.
CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 56-55-3 is listed on the Canadian Ingredient Disclosure List.
CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 86-73-7 is not listed on the Canadian Ingredient Disclosure List.
CAS# 87-86-5 is not listed on the Canadian Ingredient Disclosure List.
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

3 PCB

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

Chlorobiphenyl (54% chlorine)
Chlorodiphenyl (54% chlorine)
PCB
Molecular mass: 327 (average)

ICSC # 0939
CAS # 11097-69-1
RTECS # TQ1360000
UN # 2315
EC # 602-039-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		Powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION		Ventilation.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Headache. Numbness.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Consult an expert! Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Severe marine pollutant. Note: C Xn symbol R: 33-50/53 S: 2-35-60-61 UN Hazard Class: 9 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0939

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 2000. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** LIGHT YELLOW VISCOUS LIQUID. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes in a fire producing irritating and toxic gases. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: ppm; 0.5 mg/m^3 A3 (skin) (ACGIH 1999). OSHA PEL: TWA 0.5 mg/m^3 skin NIOSH REL: Ca TWA 0.001 mg/m^3 See Appendix A *Note: The REL also applies to other PCBs. NIOSH IDLH: Potential occupational carcinogen 5 mg/m^3	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
PHYSICAL PROPERTIES	Relative density (water = 1): 1.5 Solubility in water: none	Vapour pressure, Pa at 25°C: 0.01 Octanol/water partition coefficient as log

	Pow: 6.30 (estimated)
ENVIRONMENTAL DATA	In the food chain important to humans, bioaccumulation takes place, specifically in water organisms. It is strongly advised not to let the chemical enter into the environment.

N O T E S

Changes into a resinous state (pour point) at 10°C. Distillation range: 365°-390°C.

Transport Emergency Card: TEC (R)-914

ADDITIONAL INFORMATION

ICSC: 0939 **POLYCHLORINATED BIPHENYL (AROCLOR 1254)**

(C) IPCS, CEC, 2000

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

21 VOC

Material Safety Data Sheet
Tetrachloroethylene

ACC# 22900

Section 1 - Chemical Product and Company Identification

MSDS Name: Tetrachloroethylene
Catalog Numbers: C182 20, C182 4, C182-20, C182-4, C18220, C1824, O4586 4, O4586-4, O45864
Synonyms: Ethylene tetrachloride; Tetrachlorethylene; Perchloroethylene; Perchlorethylene
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
127-18-4	Tetrachloroethylene	99.0+	204-825-9

Hazard Symbols: XN N
Risk Phrases: 40 51/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Irritant. May cause severe eye and skin irritation with possible burns. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May cause cancer based on animal studies. **Caution!** May cause respiratory tract irritation.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects
Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: May cause severe irritation and possible burns.
Ingestion: May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Inhalation of vapor may cause respiratory tract irritation. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause respiratory tract cancer. May cause

adverse nervous system effects including muscle tremors and incoordination. May cause liver and kidney damage. May cause reproductive and fetal effects.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Flush down the spill with a large amount of water. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not reuse this container. Avoid breathing vapors from heated material. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from flames

and other sources of high temperatures that may cause material to form vapors or mists.
Storage: Keep away from heat and flame. Store in a cool, dry place. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetrachloroethylene	25 ppm TWA; 100 ppm STEL	150 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

OSHA Vacated PELs: Tetrachloroethylene: 25 ppm TWA; 170 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweetish odor
pH: Not available.
Vapor Pressure: 15.8 mm Hg
Vapor Density: 5.2
Evaporation Rate:9 (ether=100)
Viscosity: 0.89 mPa s 20 deg C
Boiling Point: 121 deg C
Freezing/Melting Point:-22.3 deg C
Decomposition Temperature:150 deg C
Solubility: Nearly insoluble in water.
Specific Gravity/Density:1.623
Molecular Formula:C2Cl4
Molecular Weight:165.812

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong bases, metals, liquid oxygen, dinitrogen tetroxide.

Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 127-18-4: KX3850000
LD50/LC50:
CAS# 127-18-4:
Draize test, rabbit, eye: 162 mg Mild;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 810 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 5200 ppm/4H;
Inhalation, rat: LC50 = 34200 mg/m3/8H;
Oral, mouse: LD50 = 8100 mg/kg;
Oral, rat: LD50 = 2629 mg/kg;
Carcinogenicity:
CAS# 127-18-4:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen
Epidemiology: Epidemiologic studies have given inconsistent results. Studi es have shown that tetrachloroethylene has not caused canc er in exposed workers. The studies have serious weakne sses such as mixed exposures. In tests with rats and mice, i t appeared that tissue destruction or peroxisome prolifera tion rather than genetic mechanisms were the cause of the observed increases in normally occurring cancers. The oral mouse TDLo that was tumorigenic was 195 gm/kg/50W-I.
Teratogenicity: Has caused musculoskeletal abnormalities. Has caused morphological transformation at a dose of 97mol/L in a study using rat embryos.
Reproductive Effects: Has caused behavioral, biochemical, and metabolic effects on newborn rats when the mother was exposed to the TCLo of 900 ppm/7H at 7-13 days after conception. A dose of 300 ppm/7H 6-15 days after conception caused post-implantation mortality.
Neurotoxicity: No information available.
Mutagenicity: Not mutagenic in Escherichia coli. No mutagenic effects were seen in rat liver after exposure at 200 ppm for 10 weeks. No chromosome changes were seen in the bone marrow cells of exposed mice.
Other Studies: A case of 'obstructive jaundice' in a 6-week old infant has been attributed to tetrachloroethylene in breast milk.

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 5.28 mg/L; 96 Hr.; Static Condition, 12 degrees C Fathead Minnow: LC50 = 18.4 mg/L; 96 Hr.; Flow-through condition Bluegill/Sunfish: LC50 = 12.9 mg/L; 96 Hr.; Static Condition ria: Phytobacterium phosphoreum: EC50 = 120.0 mg/L; 30 minutes; Microtox test No data available.

Environmental: In soil, substance will rapidly evaporate. In water, it will evaporate. In air, it can be expected to exist in the vapor phase.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 127-18-4: waste number U210.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TETRACHLOROETHYLENE				TETRACHLOROETHYLENE
Hazard Class:	6.1				6.1
UN Number:	UN1897				UN1897
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 127-18-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 127-18-4: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 127-18-4: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 127-18-4: acute.
Section 313
This material contains Tetrachloroethylene (CAS# 127-18-4, 99 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:
CAS# 127-18-4 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 127-18-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 127-18-4 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 127-18-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Tetrachloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 127-18-4: 14 ug/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 40 Limited evidence of a carcinogenic effect.
R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 23 Do not inhale gas/fumes/vapour/spray.
S 36/37 Wear suitable protective clothing and gloves.
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 127-18-4: 3
Canada - DSL/NDSL
CAS# 127-18-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D1B, D2A.
Canadian Ingredient Disclosure List
CAS# 127-18-4 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 127-18-4: OEL-ARAB Republic of Egypt:TWA 5 ppm (35 mg/m3);Skin OEL-AUSTRALIA:TWA 50 ppm (335 mg/m3);STEL 150 ppm;CAR OEL-BELGIUM:TWA 50 ppm (339 mg/m3);STEL 200 ppm (1368 mg/m3) OEL-CZECHOSLOVAKIA:TWA 250 mg/m3;STEL 1250 mg/m3 OEL-DENMARK:TWA 30 ppm (200 mg/m3);Skin OEL-FINLAND:TWA 50 ppm (335 mg/m3);STEL 75 ppm (520 mg/m3);Skin OEL-FRANCE:TWA 50 ppm (335 mg/m3) OEL-GERMANY:TWA 50 ppm (345 mg/m3);Carcinogen OEL-HUNGARY:STEL 50 mg/m3;Skin;Carcinogen OEL-JAPAN:TWA 50 ppm (340 mg/m3) OEL-THE NETHERLANDS:TWA 35 ppm (240 mg/m3);Skin OEL-THE PHILIPPINES:TWA 100 ppm (670 mg/m3) OEL-POLAND:TWA 60 mg/m3 OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m3 OEL-SWEDEN:TWA 10 ppm (70 mg/m3);STEL 25 ppm (170 mg/m3) OEL-SWITZERLAND:TWA 50 ppm (345 mg/m3);STEL 100 ppm;Skin OEL-THAILAND:TWA 100 ppm;STEL 200 ppm OEL-UNITED KINGDOM:TWA 50 ppm (335 mg/m3);STEL 15 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA

check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 6/17/1999
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Number: **T3913** * * * * * *Effective Date:* ***10/05/06*** * * * * * *Supercedes:* ***08/03/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TOLUENE

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes:
J.T. Baker: 5375, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

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4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.
Skin Contact:
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 1.1; uel: 7.1
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full

facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic benzene-like.
Solubility:
0.05 gm/100gm water @ 20C (68F).
Specific Gravity:
0.86 @ 20C / 4 C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
111C (232F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.14
Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Toluene (108-88-3)	No	No	3

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12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction

with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Toluene (108-88-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Toluene (108-88-3)	1000	U220	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 5.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **X2000** * * * * * *Effective Date:* ***02/16/06*** * * * * * *Supercedes:* ***04/01/03***

MSDS Material Safety Data Sheet

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes:
J.T. Baker: 5377, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	Yes
o-Xylene	95-47-6	15 - 20%	Yes
p-Xylene	106-42-3	< 20%	Yes
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.
Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.
Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:

lel: 1.0; uel: 7.0
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen.
ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.
Odor:
Characteristic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.86 @ 20C/4C
pH:
Not applicable.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
137 - 140C (279 - 284F)
Melting Point:
-25C (-13F)
Vapor Density (Air=1):
3.7
Vapor Pressure (mm Hg):
8 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.7

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.
Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**

Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.
Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.
Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **Z0858** * * * * * *Effective Date: 05/07/03* * * * * * *Supercedes: 11/02/01*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ZINC METAL POWDER

1. Product Identification

Synonyms: Powdered zinc; blue powder; CI77945; CI Pigment Black 16
CAS No.: 7440-66-6
Molecular Weight: 65.37
Chemical Formula: Zn
Product Codes:
J.T. Baker: 4282
Mallinckrodt: 8681

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Zinc	7440-66-6	96 - 97%	Yes
Zinc Oxide	1314-13-2	0 - 3%	Yes
Lead	7439-92-1	0 - 0.3%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR. WATER REACTIVE. MAY AFFECT THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM (lead component).

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 2 - Moderate

Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; CLASS D EXTINGUISHER
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
No adverse effects expected but dust may cause mechanical irritation. The effects may be expected to resemble those of inhaling an inert dust; possible difficulty in breathing, sneezing, coughing. When heated, the fumes are highly toxic and may cause fume fever.
Ingestion:
Extremely large oral dosages may produce gastrointestinal disturbances, due both to mechanical effects and the possibility of reaction with gastric juice to produce zinc chloride. Pain, stomach cramps and nausea could occur in aggravated cases.
Skin Contact:
May cause irritation.
Eye Contact:
May cause irritation.
Chronic Exposure:
No adverse health effects expected.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

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5. Fire Fighting Measures

Fire:
Autoignition temperature: ca. 460C (ca. 860F)
The listed autoignition temperature is for Zinc powder (layer); dust cloud is ca. 680C (1255F). Zinc powder is not pyrophoric but will burn in air at elevated temperatures. Bulk dust in damp state may heat spontaneously and ignite on exposure to air. Releases flammable hydrogen gas upon contact with acids or alkali hydroxides. Contact with strong oxidizers may cause fire.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Smother with a suitable dry powder (sodium chloride, magnesium oxide, Met-L-X).
Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition and provide mild ventilation in area of spill. Substance may be pyrophoric and self-ignite. Clean-up personnel require protective clothing, goggles and dust/mist respirators. Sweep or vacuum up the spill in a manner that does not disperse zinc powder in the air and place the zinc in a closed container for recovery or disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None for Zinc metal.
-OSHA Permissible Exposure Limit (PEL):
10 mg/m3 (TWA), for zinc oxide fume
-ACGIH Threshold Limit Value (TLV):
10 mg/m3 (TWA), Inhalable fraction, A4 Not classifiable as a human carcinogen for zinc oxide.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Gray or bluish-gray powder.
Odor:
Odorless.

Solubility:
Insoluble in water.
Density:
7.14
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
907C (1665F)
Melting Point:
419C (786F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1 @ 487C (909F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Moist zinc dust can react exothermically and ignite spontaneously in air.
Hazardous Decomposition Products:
Hydrogen in moist air, zinc oxide with oxygen at high temperature. Zinc metal, when melted, produces zinc vapor which oxidizes and condenses in air to form zinc fume.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Zinc powder can react violently with water, sulfur and halogens. Dangerous or potentially dangerous with strong oxidizing agents, lower molecular weight chlorinated hydrocarbons, strong acids and alkalis.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Zinc: Irritation skin, human: 300 ug/3D-I mild; investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Zinc (7440-66-6)	No	No	None
Zinc Oxide (1314-13-2)	No	No	None
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	Yes	Yes
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	No	Yes
Lead (7439-92-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\-----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Zinc (7440-66-6)	No	No	Yes	No
Zinc Oxide (1314-13-2)	No	No	No	Zinc compoun
Lead (7439-92-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\-----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Zinc (7440-66-6)	1000	No	No
Zinc Oxide (1314-13-2)	No	No	No
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
Reactivity: Yes (Mixture / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 4Y
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **1** Other: **Water reactive**

Attachment IV

Attachment IV – Heat Stress / Cold Stress

1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

1.1 Heat Rash

Heat rash also know as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth, such as the variety of sports drinks on the market.

CAUTION SHOULD BE EXERCISED BY PEOPLE WITH HEART PROBLEMS OR THOSE ON LOW SODIUM DIETS WHO WORK IN HOT ENVIRONMENTS. THESE PEOPLE SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting

- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.
AS WITH HEAT CRAMPS, CERTAIN PERSONS SHOULD CONSULT WITH THEIR PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105oF or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

1.6 Protecting Against Heat Stress

There are several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

2.0 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)
- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

Attachment V

Attachment V - Construction Equipment Safety Rules

1.0 ELECTRICAL

1. Live electrical parts shall be guarded against accidental contact by cabinets, enclosure, location, or guarding. Cabinet covers will be replaced.

2. Working and clear space around electric equipment and distribution boxes will be kept clear and assessable.

3. Circuit breakers, switch boxes, etc. will be legibly marked to indicate their purpose.

4. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. If the prime contractor has not provided this protection with GFCI receptacles at the temporary service drop, employees will ensure portable GFCI protection is provided. (Employers may wish to use assured equipment grounding conductor program in lieu of this GFCI protection.) This requirement is in addition to any other electrical equipment grounding requirement or double insulated protection.

5. All extension cords will be three-wire (grounded) type and designed for hard or extra hard usage (Type S, ST, SO, STO, or SJ, SJO, SJT, SJTO).

6. Ground prongs will not be removed.

7. Cords and strain relief devices/clamps will be in good condition.

8. All lamps for general illumination will have the bulbs protected against breakage.

9. Electrical cords will not suspend temporary lights unless cords and lights are designed for such suspension. Flexible cords used for temporary and portable lights will be designed for hard or extra hard usage.

10. Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.

11. Equipment or circuits that are de-energized will be locked out and tagged out. The tags will plainly identify the equipment or circuits being worked on.

2.0 COMPRESSED GAS CYLINDERS

1. All gas cylinders will have their contents clearly marked on the outside of each cylinder.

2. Cylinders must be transported, stored, and secured in an upright position. They will never be left laying on the ground or floor, nor used as rollers or supports.

3. Cylinder valves must be protected with caps and closed when not in use.

4. All leaking or defective cylinders must be removed from service promptly, tagged as inoperable and placed in an open space removed from the work area.

5. Oxygen cylinders and fittings will be kept away from oil or grease.

6. When cylinders are hoisted, they will be secured in a cradle, sling-board, or pallet. Valve protection caps will not be used for lifting cylinders from one vertical level to another.

3.0 LADDERS

1. A competent person to identify any unsafe conditions will periodically inspect ladders.

2. Those ladders with structural defects will be removed from service, and repaired or replaced.

3. Straight ladders used on other than stable, level, and dry surfaces must be tied off, held, or secured for stability.

4. Portable ladder side rails will extend at least three feet above the upper landing to which the ladder is used to gain access.

5. The top or top step of a stepladder will not be used as a step.

4.0 AERIAL LIFTS

1. Aerial lifts include cherry pickers, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and any combinations of the above.

2. Only authorized and trained persons will operate aerial lifts.

3. Lift controls will be tested each day before use.

4. Safety harness will be worn when elevated in the aerial lift.

5. Lanyards will be attached to the boom or basket.

6. Employees will not belt off to adjacent poles, structures, or equipment while working from an aerial lift.

7. Employees will always stand firmly on the floor of the basket, and will not sit or climb on the edge of the basket.

8. Planks, ladders, or other devices will not be used for work position or additional working height.

9. Brakes will be set and outriggers will be used.

10. The aerial lift truck will not be moved with the boom elevated and employees in the `basket, unless the equipment is specifically designed for such.

5.0 CRANES

1. A competent person prior to each use/during use to make sure it is in safe operating condition will inspect all cranes. Also, a certification record of monthly inspections to include date, inspector signature, and crane identifier will be maintained.

2. A thorough annual inspection of hoisting machinery will be made by a competent person, or by a government or private agency, and records maintained.

3. Loads will never be swung over the heads of workers in the area.

4. Employees will never ride hooks, concrete buckets, or other material loads being suspended or moved by cranes.

5. Hand signals to crane operators will be those prescribed by the applicable ANSI standard to the type of crane in use.

6. Tag lines must be used to control loads and keep workers away.

7. Loads, booms, and rigging will be kept at least 10 feet from energized electrical lines rated 50 KV or lower unless the lines are de-energized. For lines rated greater that 50 KV follow OSHA Rules and Regulations, 1926.550(a)(15).

8. Cranes will always be operated on firm, level surfaces, or use mats/pads, particularly for near-capacity lifts.

9. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, will be barricaded in such a manner as to prevent employees from being struck or crushed by the crane.

10. If suspended personnel platforms are to be lifted with a crane, reference 1926.550(g) for general and specific requirements.

11. Rigging equipment (chains, slings, wire rope, hooks, other attachments, etc.) will be inspected prior to use on each shift to ensure it is safe. Defective rigging and equipment will be removed from service.

12. Job or shop hooks or other makeshift fasteners using bolts, wire, etc. will not be used.

13. Wire rope shall be taken out of service when one of the following conditions exist:

- In running ropes, 6 random distributed broken wires in one lay or 3 broken wires in one strand or one lay.
- Wear of one-third the original diameter of outside individual wires.
- Kinking, crushing, bird caging, heat damage, or any other damage resulting in distortion of the rope structure.
- In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.

6.0 WELDING and BRAZING

1. Combustible material will be cleared from the area around cutting or welding operations.

2. Welding helmets and goggles will be worn for eye protection and to prevent flash burns.

3. Eye protection to guard against slag while chipping, grinding and dressing of welds will be worn.

4. Only electrode holders specifically designed for arc welding will be used.

5. All parts subject to electrical current will be fully insulated against the maximum voltage encountered to ground.

6. A ground return cable shall have a safe current carrying capacity equal to, or exceeding, the specified maximum output capacity of the arc-welding unit that it services.

7. Cables, leads, hoses, and connections will be placed so that there are no fire or tripping hazards.

7.0 TOOLS

1. Take special precautions when using power tools.

2. Defective tools will be removed form service.

3. Electric power tools will be the grounded-type or double insulated.

4. Power tools will be turned off and motion stopped before setting tool down.

5. Tools will be disconnected from power source before changing drills, blades or bits, or attempting repair or adjustment. Never leave a running tool unattended.

6. Power saws, table saws, and radial arm saws will have operational blade guards installed and used.

7. Unsafe/defective hand tools will not be used. These include sprung jaws on wrenches, mushroomed head of chisels/punches, and cracked/broken handles of any tool.

8. Portable abrasive grinders will have guards installed covering the upper and back portions of the abrasive wheel. Wheel speed ratings will never be less than the grinder RPM speed.

9. Compressed air will not be used for cleaning purposes except when pressure is reduced to less than 30 psi by regulating or use of a safety nozzle, and then only with effective chip guarding and proper personal protective equipment.

10. Abrasive blasting nozzles will have a valve that must be held open manually.

11. Only trained employees will operate powder-actuated tools.

12. Any employee furnished tools of any nature must meet all OSHA and ANSI requirements.

8.0 SAFETY RAILINGS AND OTHER FALL PROTECTION

1. All open sided floors and platforms six feet or more above adjacent floor/ground level will be guarded by a standard railing (top and mid rail, toeboard if required).

2. A stairway or ladder will be provided at any point of access where there is a break in elevation of 19 inches or more.

3. All stairways of four or more risers or greater than 30 inches high will be guarded by a handrail or stair rails

4. When a floor hole or opening (greater than two inches in its least dimension) is created during a work activity, through which a worker can fall, step into, or material can fall through, a cover or a safety guardrail must be installed immediately.

5. Safety nets will be provided when workplaces are more than 25 feet above the ground, water, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts, is impractical.

6. Safety harnesses, lanyards, lines, and lifelines may be used in lieu of other fall protection systems to provide the required fall protection.

7. Adjustment of lanyards must provide for not more than a six-foot fall, and all tie off points must be at least waist high.

8.1 Scaffolds

1. Scaffolds will be erected, moved, dismantled, or altered only under the supervision of a competent person qualified in scaffold erection, moving, dismantling, or alteration.

2. Standard guardrails (consisting of top-rail and mid-rail) will be installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet above the ground, floor, or lower level.

3. Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches will have standard railings installed on all open sides/ends.

4. Platforms at all working levels will be fully planked. Planking will be laid tight with no more than one inch space between them, overlap at least 12 inches, and extend over end supports 6 - 12 inches.

5. The front edge of all platforms will be no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.

6. Mobile scaffolds will be erected no more than a maximum height of four times their minimum base dimension.

7. Scaffolds will not be overloaded beyond their design loadings.

8. Scaffold components should not be used as tie-off/anchor points for fall protection devices.

9. Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure will be used for access when platforms are more than two feet above or below a point of access.

10. Cross braces will not be used as a mean of access to scaffolds.

11. Scaffolds will not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than the following:

- Three feet from insulated lines of less than 300 volts;
- Ten feet plus for any other insulated or un-insulated lines.

8.2 Excavations and Trenches

1. Any excavation or trench five feet or more in depth will be provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes.

2. Trenches less than five feet in depth and showing potential of cave-in will also be provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.

3. A competent person will inspect each excavation/trench daily prior to start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.

4. Means of egress will be provided in trenches four feet or more in depth so as to require no more than 25 feet of lateral travel for each employee in the trench.

5. Spoil piles and other equipment will be kept at least two feet from the edge of the trench or excavation.

9.0 MOTOR VEHICLES AND MECHANIZED EQUIPMENT

1. All vehicles and equipment will be checked at the beginning of each shift, and during use, to make sure it is in safe operating condition.

2. All equipment left unattended at night adjacent to highways in normal use shall have lights or reflectors, or barricades with lights or reflectors, to identify the location of the equipment.

3. When equipment is stopped or parked, parking brakes shall be set. Equipment on inclines shall have wheels chocked as well as having parking brakes set.

4. Operators shall not use earth-moving or compaction equipment having an obstructed rear view unless vehicle has an audible reverse signal alarm, or is backed only when observer says it is safe to do so.

5. All vehicles shall have in operable condition:

- Horn (bi-directional equipment)
- Seats, firmly secured, for the number of persons carried. Passengers must ride in seats.
- Seat belts properly installed.
- Service, parking and emergency brake system.
- All vehicles with cabs will be equipped with windshields with safety glass.
- All material handling equipment will equipped with rollover protective structures.

10.0 MISCELLANEOUS

1. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the impalement hazard.

2. Enclosed chutes will be used when material, trash, and debris are dropped more than 20 feet outside the exterior walls of a building. A substantial gate will be provided near the discharge end of the chute, and guardrails at the chute openings into which workers drop material.

3. Only trained employees will service large truck wheels. A cage or other restraining device plus an airline assembly consisting of a clip-on chuck, gauge, and length of hose will be used to inflate any large truck tires.

4. Only trained employees will operate forklifts and other industrial trucks.

Attachment VI

EXHIBIT 4

OWNER REQUIRED SAFETY PERFORMANCE STANDARDS

Safety Addendum to Contract Specifications

This document is intended to highlight various safety requirements applicable to the Project, and shall not be construed to waive, or release the construction manager, general contractor and subcontractors (all tiers) from responsibility for compliance with, any and all safety requirements and conditions of federal (including but not limited to OSHA CFR 1926 and 1910), state and local laws, codes, ordinances, regulations and government orders applicable to the Project. Specifically, this Attachment does not purport or attempt to cover all of the safety requirements of local codes, ordinances, regulations and government orders, and construction manager, contractor and subcontractors shall have the specific responsibility to review, understand and incorporate such requirements into the performance of work at the Project.

All safety requirements of any federal, state or local agency with jurisdiction concerning the Project shall be deemed to be included in the Contract Sum of General Contractor ("GC") and/or Construction Manager ("CM") and any subcontractor of any tier, and change orders for the cost of complying with safety requirements stated herein, or required by applicable federal, state or local law, shall not be valid and shall not be considered.

The safety and health requirements attached hereto (the "Requirements") shall be part of the Contract, and shall be followed by all contractors while performing work on site. The Requirements shall be treated as contract requirements, and any material breach of the Requirements shall be grounds for termination under applicable provisions of the Contract Documents. The Requirements specifically include required elements of a site specific safety and health plan which must be developed and implemented by the construction manager, general contractor and the subcontractors.

It will be a condition of the Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract, that the Owner and its affiliated entities or agents are assuming no liability relating to their receipt and review of the GC/CM safety plans or activities. Safety remains the responsibility of the GC/CM and their subcontractors (all tiers), as Owner shall retain no control over the Project work areas. As to the Owner, the GC/CM shall be fully responsible for compliance with all safety requirements applicable to the Project, and for any liability arising out of any failure to comply with such safety requirements.

These Requirements include "best practices" that are standards or requirements that may exceed applicable federal, state or local safety requirements or provide consistency in their application. These Requirements only identify minimum requirements, and do not replace any existing local, state, federal or governing agency requirements. The most stringent requirement, whether found in these Requirements or in applicable federal, state or local law will always apply if a conflict in safety requirements exists. In addition, the Construction Manager and general contractor, and all subcontractors of any tier, shall comply with the safety or Project requirements of any insurance carrier supplying insurance for the Project, as part of the Contract Sum.

The GC/CM shall represent the Owner on all matters of project safety management as it relates to the superintendence of the work on the Project, but under no circumstances shall be considered an agent of the Owner for purposes of complying with or implementing safety requirements.

By the terms of this Contract, the GC/CM agree to impose upon themselves and their subcontractors (all tiers) the following minimum mandatory safety requirements:

1. GC/CM must provide a full time **[part time – Modify as appropriate]** designated on-site safety manager, unless otherwise required by the law, with no other duties other than superintendence of the safety program, with full authority to stop work and remove any person for violation of the project safety program. The safety manager will allocate 100% of his time toward implementing and enforcing the project safety program. The resume of the on-site safety manager shall be submitted for review and reasonable approval of the Owner. GC/CM shall staff additional safety personnel, as necessary, to maintain the effectiveness and integrity of the safety program.

2. Prior to the mobilization, GC/CM shall submit for review a Site Specific Safety Program that includes all of the safety provisions set forth in these Requirements, or otherwise noted in the Contract Documents. The written safety program shall be used as a guideline and direction for the Contractor's and subcontractors' activities. The program and all sections must be project and site specific. This program must meet these Requirements, all applicable federal, state and local legal requirements and include the following minimal provisions: (a) worksite safety policy and mission statement; (b) assigned responsibilities among management supervisors and employees; (c) a system for daily and weekly documented self inspections, including inspections of job sites, materials, work performance and equipment; (d) a thorough accident and injury reporting and investigation process to identify root cause and prevent incident re-occurrence; (e) a safety employee orientation program; (f) a subcontractor orientation program; (f) a safety training program including weekly tool box talks, job hazard analysis, and additional formal training, as required, including but not limited to, fall protection, confined spaces, scaffolding, ladders, excavation safety, lockout/tag out, personnel protective equipment, at a minimum; (g) an employee disciplinary policy; (h) a subcontractor disciplinary

policy including monetary fine system and/or charge back system; (i) include all relevant OSHA subparts; (j) a fire prevention and control program; (k) a task and site specific fall protection program when exposures of 6 feet or greater exist; (l) a hazard communication program; (m) a site specific respiratory protection program; (n) an emergency action plan with contacts, emergency evacuation plan, and notification plan; (o) a property and public protection plan; (p) a site security plan addressing employees, public, venders, suppliers subcontractors, visitors, and control of delivery of equipment and materials to and from the job site. GC/CM must require all subcontractors to submit site specific health and safety programs for review, as well as acknowledgement of compliance with the GC/CM project specific program. GC/CM shall monitor the effectiveness of all subcontractor safety programs by requiring submission of all relevant documentation for review, frequent un-announced attendance at subcontractor safety meetings and site inspections.

3. Require each GC/CM supervisor who works more than 1 hour on the project to possess a federal OSHA 30 Hour Card issued not more than 3 years previously.

4. Require at least one subcontractor supervisor who works more than 1 hour on the project to possess a federal OSHA 10 Hour Card issued not more than 3 years previously.

5. GC/CM shall verbally inform the Owner's Representative at first knowledge of any accident involving property damage or personal injury occurring on the Project and shall provide a written investigation report within 24 hours of having knowledge of such incidents. GC/CM shall establish criteria to ensure that all subcontractors report all incidents immediately to the GC/CM for review and follow-up.

6. GC/CM shall request submission of names of OSHA defined "competent persons" from all subcontractors for all applicable OSHA subparts. Persons shall have the ability to identify hazards and have the authority to stop applicable work.

7. GC/CM and all tier subcontractors shall conduct weekly documented safety meetings for their employees on the job site. Attendees and minutes of the meetings shall be documented. Topics shall include site specific information. Representation of all subcontractor tiers is required at the GC/CM meeting. Subcontractors shall also be required to conduct their own meetings with their own employees. Contractors shall submit meeting schedules to the GC/CM to allow un-announced attendance to their meetings. The GC/CM shall submit subcontractor meeting schedules to the Owner's Representative to allow un-announced attendance at their meetings.

8. GC/CM shall also confirm in writing follow-up and status of any third party, insurance carrier or owner representative safety report identifying site safety recommendations.

9. GC/CM shall implement and enforce a mandatory hard-hat policy for all phases of the Project. Hard hats shall meet ANSI Standard 2.89.1-1969.

10. GC/CM shall ensure that approved safety glasses are available and provided to all employees of all subcontractors on the job-site. GC/CM shall ensure that individual persons have, on person, safety glasses at all times. Safety glasses will be utilized and worn as per OSHA requirements, at a minimum. GC/CM shall ensure that all other protective apparel necessary for the work of any personnel be available at appropriate times, including noise protection, hand protection and protection as to particle or air contaminants, or hazardous chemicals, as may be required by CFR 1926.101 and related provisions.

11. GC/CM shall ensure that the use of horizontal debris netting is installed and maintained not more than two stories below the stripping floor on concrete structures or the utmost finished concrete floor on steel frame structures. Netting shall project outward horizontally a minimum of 10 feet.

12. GC/CM shall ensure that vertical perimeter debris netting is established and maintained at all elevated levels where there is exposure to the public or adjacent property. Vertical safety netting shall have a height not less then 60 inches. The top edge and intermediate height of nets shall be mounted securely to a non-corrosive wire cable capable of withstanding a load of at least 200 pounds applied to any direction except upward. Netting shall be brought to deck level and securely fastened and have openings not over one inch in greatest dimension. This shall be accomplished by utilizing a zero cable or equivalent means.

13. GC/CM shall ensure that sidewalk sheds are provided and adequately designed for the protection of pedestrians, adjacent property and/or site workers adjacent to and/or entering/leaving the building. A sidewalk shed shall be erected when a structure higher than forty feet is to be constructed and the horizontal distance from the structure being built to the inside edge of the permanent or temporary walkway is equal to one half or less of the height of the structure. A sidewalk shed shall be erected regardless of the height of the structure or the horizontal distance between the structure and the sidewalk when material or debris is to be moved by a hoist, crane, derrick or chute or the building or structure is to be demolished.

14. GC/CM shall ensure that procedures are in place to prevent storage of materials at the edge of unprotected floors, roof, etc. so as to minimize materials from blowing or falling off of the building or other structures. GC/CM shall ensure that storage of materials within 10 feet of a perimeter edge is prohibited unless secondary means of securing such materials, and permission from the GC/CM, is obtained. GC/CM shall ensure that procedures are in place to secure all materials stored on the roof at the end of each work

day to minimize materials from blowing or falling off of the building or other structures during non-working hours.

15. GC/CM shall implement and enforce a scaffolding tagging system to identify scaffolds that have been inspected, are deficient or areas where additional means of fall protection should be provided. Inspections shall be made by "competent persons", as defined by OSHA, before each work shift.

16. GC/CM shall ensure that operations rendering signs, signals, and barricades insufficient for the necessary protection on or adjacent to a highway or street, will utilize trained flagmen or other appropriate traffic control.

17. Hot work permits must be issued, submitted by contractors and reviewed by the GC/CM for all welding, cutting and/or brazing operations involving renovations to existing structures.

18. GC/CM shall ensure a fire watch is conducted during the initial hot work and one hour after for final inspection.

19. GC/CM shall develop and implement a project specific safety orientation for all new persons performing work on the Project. No person shall perform any work on this Project until completing such orientation. Contractor orientation shall be presented to the Owner's Representative for review and shall include the following, at a minimum: (a) first aid; (b) emergency facilities; (c) fire protection and prevention; (d) housekeeping; (e) illumination; (f) sanitation; (g) personal protective equipment requirements; (h) fall protection; (i) ladder safety; (j) confined space awareness; (k) lockout/tag out; (l) disciplinary policy; (m) drug/alcohol policy; (n) accident reporting; (o) include site tour; and (p) material handling. GC/CM shall develop a means of tracking individuals who have completed the new employee orientation and shall develop a means of readily identifying such individuals (i.e. hard hat tags) on the Project. GC/CM is responsible for the implementation and presentation of the orientation program to all employees, subcontractors and subcontractor employees.

20. GC/CM shall conduct and document a subcontractor safety orientation prior to engaging in work activity on the Project premises. The orientation program shall meet or exceed project safety plan and Owner requirements. GC/CM must ensure that the orientation is delivered, tracked and maintained. The orientation should be provided to the senior supervisor and/or project manager responsible for the project specific staff.

21. GC/CM shall require all subcontractors to submit a written job hazard analysis ("JHA") for new work and all work of a critical nature. Contractor shall not allow work to proceed until such JHA has been reviewed and approved by the GC/CM safety manager

or designated representative. Subcontractors should communicate the final approved JHA to the entire crew and update such analysis as conditions or scope changes.

22. GC/CM shall ensure mandatory substance abuse testing for all contractors, subcontractor and any sub-tier subcontractor employees in a post-accident situation. GC/CM shall perform substance abuse testing for all contractor, subcontractor and any sub-tier subcontractor employees where reasonable suspicion exists. GC/CM shall prohibit any person failing to pass such substance abuse test from performing work on the Project. Such substance abuse testing shall be conducted within the parameters of accepted industry standards and recognized best practices. Service vendors and material delivery personnel are exempted from this provision. A written substance abuse program shall be developed and submitted.

23. GC/CM and their subcontractors (all tiers) shall implement and enforce a 6 ft. 100% fall protection program for all crafts, trades and activities except steel erection activities that fall under OSHA Subpart R standards and crane operations falling under Subpart N. GC/CM shall be required to ensure the following requirements are initiated:
    a. In addition to OSHA steel erection fall protection requirements covered under subpart R, the following shall apply to all steel erection activities including connecting, work other than connecting, and decking:
        i. All steel workers including deckers and connectors must be required to wear a full body harness and lanyard when a fall exposure of 6 feet or greater exists. Workers shall be provided with documented fall protection training.
        ii. Where existing OSHA Subpart R requirements do not require mandatory fall protection, a positive fall protection system shall still be immediately available and provided as an option for use to all employees exposed to a fall exposure of 6 feet or greater.

    When such requirement is more stringent than that required by the local safety authority, such costs shall be considered by contractors and subcontractors of all tiers at time of bid.

24. GC/CM shall prohibit the use of controlled access zones, warning line systems, controlled decking zones or safety monitoring systems as a means of personal fall protection unless a positive means of fall protection is also provided. Comply also with OSHA 1926.550 and 1926.760 for workers involved in crane operations and steel erection operations respectively.

25. Prior to mobilization, GC/CM shall submit for review a task and Site Specific Fall Protection Program that addresses task and/or activity specific exposures to include, but may not be limited to, unloading areas, stairways, leading edges, elevator shafts, perimeter fall protection, floor openings, etc.

26. GC/CM shall ensure that a third party annual crane inspection shall have been conducted and documented within the last 30 days prior to commencement of operations.

27. GC/CM shall require that all persons operating any crane greater then 15,000 pounds capacity and or equipped with a boom of 25 feet or more shall hold and possess at all times while operating any such crane a current operator's certification as recognized by the National Commission for the Certification of Crane Operators (NCCCO) or its equivalent as approved by the recognized safety authority or state agency having jurisdiction over the Project.

28. GC/CM shall ensure that a "Written Critical Lift Plan" is reviewed and approved prior to any "Critical Lift" including any lift exceeding 75% rated capacity, multiple lifts, lifts involving the hoisting of personnel, lifts within general proximity of power lines, lifts posing risks to property or people, lifts where the operator does not have direct visual contact with the load, static tower crane erection and dismantling, and lifts involving specialized or unique rigging configurations.

29. GC/CM shall ensure that routine crane inspections are documented on a daily and weekly basis.

30. GC/CM shall ensure that any person performing rigging, signaling or supervisor duties for crane operations to carry on his or her person documentation and/or licensing of rigging and signaling safety training prior to assuming such duties. In the absence of such documentation, such individual shall not rig, signal or direct the operation of any crane at any time.

31. GC/CM shall be responsible to ensure that all cranes on the jobsite are free of loads at the end of each day. The act of leaving a load on an unmanned crane shall be prohibited.

32. GC/CM shall implement and enforce a mandatory Ground Fault Circuit Interrupters (GFCI) program. The use of an assured grounding program alone shall be prohibited. Consider installation of GFCI within the main or sub panels on the Project.

33. GC/CM shall ensure that site inspections are conducted daily and weekly, and that written records are maintained of such inspections. GC/CM shall require similar site inspections and records be maintained by subcontractors.

34. GC/CM shall ensure that the use of mobile phones, radios or similar devices by any person when operating vehicles, heavy equipment and other mobile mechanized equipment while on the Project site is expressly prohibited. (Unless specifically utilized for spotting and/or two way communication with a hands-free kit in place per CM approval).

35. GC/CM shall ensure that a "No Smoking" policy is enforced on the Project site. Smoking should only be allowed in exterior designated areas.

36. GC/CM shall permanently remove from the Project any person who, in the opinion of the general contractor, engages in any unsafe work activity, or who in any manner jeopardizes the safety of other workers or any member of the public.

37. All visitors, defined as non-Owner representatives, contractors, subcontractors and service providers, shall sign release forms before entering the Project site. GC/CM shall ensure that all visitors are accompanied at all times.

38. GC/CM shall submit for review a subcontractor pre-qualification and review program that shall be implemented during the pre-qualification of all subcontractors allowed on the Project site. At a minimum, the GC/CM shall obtain and confirm the EMR of each subcontractor seeking pre-qualification. At the Owner's option, any subcontractor with an EMR greater than 1.0 will not be allowed to bid work.

39. GC/CM shall develop and submit for review a public protection program pursuant to the requirements of ANSI standards A10.34 "Public Protection In Construction Zones" and any other applicable regulations.

40. GC/CM shall ensure that lifting loads over persons, occupied or temporary structures is prohibited. GC/CM shall also ensure that for all lifts where loads may expose any employee or member of the public to the hazards of dropped loads, effective and adequate means shall be implemented prior to the lift to eliminate such exposures. The responsible person for taking such action shall be the competent person in charge of the lifting activity and shall be identified in writing by name in any pre-lift written plans and/or job hazard analysis.

TISHMAN SPEYER
SAFETY ATTACHMENT ADDENDA
(NEW YORK)

In addition to the requirements set forth in the Safety Attachment, the following requirements also apply for projects in the City of New York, New York, and the additional requirements are numbered below so as to relate back to the same numbered items in the Safety Attachment, for ease of reference.

1. A competent watchman shall be on duty at the Project site during all hours when operations are not in progress (at least one additional watchman required for each additional 40,000 square feet of construction, or fraction thereof over 5,000). Watchmen shall be familiar with fire alarm boxes and the location and use of fire fighting equipment required to be on the Project site.

11. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

12. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

13. For all buildings 100 feet or more in height, the deck and protective guards of the sidewalk shed shall be extended parallel with the curb at least 20 feet beyond the ends of all faces of the structure, regardless of whether such extensions are in front of the property being developed or in front of adjacent property. The GC/CM shall also comply with all codes applicable to the erection and maintenance of sidewalk sheds.

14. When exterior walls are not in place, material piles shall be kept at least ten feet back from the perimeter of the building; material may be stored within two feet of the edge of a building provided however that such material is stored not more than two stories below the stripping operation on concrete structures or the uppermost concrete floor on steel frame structures (such material shall be secured against accidental movement).

15. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240.

23. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240. GC/CM shall also comply with N.Y. Labor Law § 241 with regard to construction safety.

26. All power-operated cranes must have a certificate of approval, a certificate of operation, and a certificate of on-site inspection (as defined in New York City building code).

27. Riggers and hoisting machine operators shall be licensed as required under Chapter One of Title 26 of the New York City Administrative Code. The operator shall be responsible for making the machine inoperative before leaving the machine.

Attachment VII

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary,* these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____--_____ **Date** ____/ ____/ ____

Information about the employee

1) **Full name** _____

2) **Street** _____

City _____ **State** _____ **ZIP** _____

3) **Date of birth** _____ / _____ / _____

4) **Date hired** _____ / _____ / _____

5) ❒ **Male**
❒ **Female**

Information about the physician or other health care professional

6) **Name of physician or other health care professional** _____

_____

7) **If treatment was given away from the worksite, where was it given?**

Facility _____

Street _____

City _____ **State** _____ **ZIP** _____

8) **Was employee treated in an emergency room?**
❒ **Yes**
❒ **No**

9) **Was employee hospitalized overnight as an in-patient?**
❒ **Yes**
❒ **No**

Information about the case

10) **Case number from the *Log*** _____ *(Transfer the case number from the Log after you record the case.)*

11) **Date of injury or illness** _____ / _____ / _____

12) **Time employee began work** _____ **AM / PM**

13) **Time of event** _____ **AM / PM** ☐ **Check if time cannot be determined**

14) ***What was the employee doing just before the incident occurred?*** **Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific.** ***Examples:*** **"climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."**

15) ***What happened?*** **Tell us how the injury occurred.** ***Examples:*** **"When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."**

16) ***What was the injury or illness?*** **Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore."** ***Examples:*** **"strained back"; "chemical burn, hand"; "carpal tunnel syndrome."**

17) ***What object or substance directly harmed the employee?*** ***Examples:*** **"concrete floor"; "chlorine"; "radial arm saw."** ***If this question does not apply to the incident, leave it blank.***

18) ***If the employee died, when did death occur?*** **Date of death** _____ / _____ / _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

APPENDIX E

Community Air Monitoring Plan

Appendix E

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

COMMUNITY AIR MONITORING PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

September 2014

Arnold F. Fleming, P.E.

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Community Air Monitoring Plan (CAMP)

1.0 Purpose

The purpose of the CAMP is to protect downwind receptors (e.g., residences, businesses, schools, nearby workers, and the public) from potential airborne contaminants released as a direct result of the Interim Remedial Measure (IRM). The CAMP helps to confirm that the IRM does not spread airborne contamination off-site by providing real-time monitoring protocols for VOCs and particulates (i.e., dust) at the downwind Brownfield Site perimeter while the RI is in progress. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown.

The CAMP does not establish action levels for worker respiratory protection, which are given in the Health and Safety Plan included in Appendix D and developed in accordance with 40 CFR 1910 and 1920.

2.0 Contaminant Source

The main contaminants of concern in Brownfield Site soils are creosote-based and petroleum-based VOCs, benzene, toluene, ethylbenzene, and xylenes, (collectively BTEX); the semi-volatile compound naphthalene; and the poly aromatic hydrocarbons (PAHs). Metals and polychlorinated biphenyls (PCBs) represent a secondary and minor concern.

3.0 Remedial Activities

The Brownfield Site B Interim Remedial Measure Work Plan (IRMWP), to which this CAMP is an attachment, details the remediation activities that will be performed at the Brownfield Site.

Creosote and metals-contaminated soils on the Brownfield Site will be removed by excavation and within an enclosure at some locations. All existing buildings and subsurface structures on Brownfield Site will be demolished prior to excavation in those areas. Existing paved areas will be stripped of the pavement (concrete and asphalt) prior to excavation. The excavation and handling of soils will generate dust and airborne particulates.

Groundwater will be exposed once soil is excavated to the water table. The water table will be lowered by groundwater extraction. The extracted groundwater will be treated through a water/oil separator prior to discharge to New York City sewers.

4.0 Receptor Population

Potentially exposed receptors during remediation are passersby, and, to a lesser degree, individuals living, working, and shopping in the vicinity of the project.

5.0 Monitoring Plan

While excavating, stockpiling, or otherwise handling on-site soils, the proposed CAMP, entailing upwind and downwind perimeter monitoring, will be implemented as described in the following sections. Due care will be taken to monitor and control fugitive odors and dust emissions from the Brownfield Site, minimizing the risk of exposure to the surrounding receptor population during remediation.

5.1 Continuous Monitoring

Continuous monitoring will be conducted for all ground-intrusive activities and any handling of soils on the Brownfield Site.

5.2 Periodic Monitoring

Periodic VOC monitoring will occur during non-intrusive activities such as collection of groundwater samples from monitoring wells and soil samples for disposal characterization.

5.2.1 VOC Monitoring, Response Levels, and Actions

VOCs will be continually monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) using a PID. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The PID will be calibrated at least daily, or more often if needed. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, work must cease. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.2.2 Particulate Monitoring, Response Levels, and Actions

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

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

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will cease and a re-evaluation of activities initiated. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration. All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX F

Quality Assurance/ Quality Control Plan

Appendix F

Queens Plaza Residential Development - Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

QUALITY ASSURANCE/QUALITY CONTROL PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

September 2014

Arnold F. Fleming, P.E.

QUALITY ASSURANCE/QUALITY CONTROL PLAN
Queens Plaza Residential Development

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1.0 QUALITY ASSURANCE PROJECT PLAN (QAPP)

The Quality Assurance Project Plan (QAPP) outlines the protocols and procedures that will be followed during the Remedial Investigation and any ensuing Remedial Action on the Brownfeld Site. The QAPP has been prepared in order to ensure Quality Assurance (QA) and Quality Control (QC) for the environmental sampling that will take place under the Interim Remedial Measure Work Plan (IRMWP) to ensure the acquisition of defensible data that fulfill the stated objectives.

Project Team

The project team will consist of FLS personnel and subcontractors. All field personnel and subcontractors will have completed a 40-hour HAZWOPER training course and the annual HAZWOPER 8-hour refresher in accordance with the Occupational Safety and Health Administration (OSHA) regulations and will have the training required for their respective duties as outlined for this investigation.

Project Director

The general oversight of all aspects of the project will be conducted by the project director. Tasks will include the scheduling, budgeting, data management and decision-making for the field program. Mr. Arnold F. Fleming, PE, will act as the Project Director for the RWP.

Project Manager

All components of the Remedial Investigation will be directed and coordinated by the Project Manager. He/she will ensure a smooth flow of information between all parties involved in the investigation by communicating regularly with professionals from the New York State Department of Environmental Conservation (NYSDEC), the Brownfield Site management personnel, and all members of the FLS project team. Mr. Steven Panter, CGWP, Senior Consultant will act as the Project Manager.

Field Team Leader

Daily on-site sampling and health and safety activities will be supervised by a Field Team Leader. The team leader's responsibilities will include ensuring adherence to the work plan and HASP and regularly reporting daily progress and deviations from the work plan to the Project Manager. Upon approval of the RWP, FLS will assign the role of Field Team Leader to appropriate FLS personnel.

Project Quality Assurance / Quality Control Officer

Adherence to the QAPP will be ensured by a FLS QA/QC Officer. Tasks will include reviewing the QA procedures with all personnel before any fieldwork is conducted on-

site as well as completing periodic Brownfield Site visits in order to assess the implementation of these procedures. Mr. Daniel DiRocco, Geologist, will act as the QA/QC officer for the investigation.

Laboratory Quality Assurance / Quality Control Officer

Quality control procedures will be ensured by a laboratory QA/QC officer in the designated laboratory. This officer will be responsible for the adherence to laboratory protocols, quality control procedures, and checks in the laboratory. The officer will track the movement of the samples from check in to issue of the analytical results, conducting a final check on the analytical calculations, and signing off on the laboratory reports. The laboratory QA/QC Officer will be assigned by the laboratory for the investigation.

The sample analytical reports will undergo a third party review of the analyses conducted. The third party (yet to be chosen) will produce a Data Usability Summary Report (DUSR) which will be submitted to the NYSDEC. Five percent of the post-excavation soil samples will undergo third party data review.

2.0 LABORATORY PROCEDURES

The sample container type, preservation, applicable holding time, and laboratory methods of analysis of the field samples have been included as Table 1. Sample analyses will be completed in a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH-ELAP) certified laboratory and reported using Category B deliverables.

Table 1
Summary of Analytical Methods/Quality Assurance
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Soil	VOCs, TCL or NYS STARS	Post-Ex. Grab	50	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil	TCL Pesticides & PCBs	Post-Ex. Grab	50	SW-846 Method 8082 & 8081	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	SVOCs, TCL	Post-Ex. Grab	50	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Metals, TCL	Post-Ex. Grab	50	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Solid Waste	TCLP VOCs	Grab	TBD	SW-846 Methods 1311/8260B	Cool to 4^0 C; no headspace	14 days to TCLP extraction; 14 days from TCLP extraction to analysis	(1) 60 ml VOC vial
Solid Waste	TCLP SVOCs	Grab	TBD	SW-846 Methods 1311/ 8270C	Cool to 4^0 C	14 days to TCLP extraction; 7 days from TCLP extraction to SVOC extraction; 40 days from SVOC extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Pesticides	Grab	TBD	SW-846 Methods 1311/8081A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to pesticide extraction; 40 days from pesticide extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Herbicides	Grab	TBD	SW-846 Methods 1311/8151A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to herbicide extraction; 40 days from herbicide extraction to analysis	(1) 950 mL amber glass jar

Table 1
Summary of Analytical Methods/Quality Assurance
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Solid Waste	TCLP Metals	Grab	TBD	SW 846 Methods 1311/ 6010B/7000 Series	Cool to 4^0 C	Hg: 28 days to TCLP extraction; 28 days from TCLP extraction to analysis Other Metals: 6 months to TCLP extraction; 6 months from TCLP extraction to analysis	(1) 500 mL amber glass jar
Solid Waste	Ignitability	Grab	TBD	SW-846 Method 1010	Cool to 4^0 C	None specified	(1) 500 mL amber glass jar
Solid Waste	Corrosivity	Grab	TBD	SW-846 Method 9045C	Cool to 4^0 C	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar
Solid Waste	Reactive cyanide	Grab	TBD	SW-846 Chapter 7, Section 7.3.3	Cool to 4^0 C; no headspace	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar
Solid Waste	Reactive sulfide	Grab	TBD	SW-846 Chapter 7, Section 7.3.4	Cool to 4^0 C; no headspace	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar

[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations

[2] From date of sample collection

[3] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices

TBD - To Be Determined

TCL – Target Compound List

3.0 QUALITY CONTROL SAMPLING

Additional analysis will be conducted for QC assurance in addition to the laboratory analysis of the field soil and groundwater samples. QC samples will include: one equipment rinsate blank and one set of duplicate samples per twenty field samples, and one trip blank per sample shipment. The quantities of field samples and quality control samples have been summarized in Table 2.

The equipment blank and duplicate samples will be analyzed for the same parameters as the soil and groundwater samples, whereas trip blanks will be analyzed solely for VOCs.

Table 2
Summary of Quality Control Samples
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of QA/QC Samples
Water.	VOCs	Trip Blank	1 per shipment
Soil, Post-Ex.	VOC, SVOC, Metals	Duplicate	1 per 20 samples
Water	VOC, SVOC, Metals	Equipment Blank	1 per 20 samples

4.0 STANDARD OPERATING PROCEDURES

The standard operating procedures (SOPs) for monitoring well installation and development and sampling equipment decontamination are described in the following sections.

Soil Borings

Where soil borings will be installed by means of hollow stem augers, soil samples will be collected on a continuous basis by means of a two-foot long, 2-inch diameter, stainless steel split spoon samplers. The augers will be advanced to the top of the desired sampling interval depth and the split spoon and connected rods will be lowered through the auger and driven into the soil another two-feet using a 140-pound weight dropped through a 30-inch interval. The split spoon and rods will be withdrawn to obtain the soil sample. Where a sonic rig is used, samples will be collected using 3-inch-diameter, 5-foot-long core barrels that are steam-cleaned and/or pressure washed between sample intervals. The appropriate sample volume will be collected based on project-specific procedures.

Where subsurface materials consist mostly of sand mixed with fill material smaller than cobble-size, FLS may obtain soil samples using a smaller direct push Geoprobe® sampling rig. In this case, a macrocore sampler with plastic liners and end plug, as necessary, will collect undisturbed soil cores down to the required depth. The four-foot long macrocore with end plug, as necessary, is pushed into the soil using the hydraulic pressure generated by the Geoprobe® rig. If resistance is encountered the Geoprobe® unit has a vibrating unit that either breaks up the resisting object or vibrates it aside. When the sampling depth is reached, the end plug is removed and the macrocore is then advanced through the sampling interval to collect the soil sample. Plastic acetate liners are placed within the core barrel of the macro core to store the soil/sediment sample, and to prevent any cross-contamination between soil borings. To further reduce the chance of cross-contamination during sampling, the macrocores and equipment will be decontaminated between uses with a non-phosphate detergent wash followed by a clean water rinse, followed by a final rinse with deionized water. Once the macrocore is retrieved from its desired depth, the cutting end of the core barrel is removed, and the plastic core liner is removed. The acetate liner is then cut length-wise with a special knife. PID readings are taken from the soil while still in the core and undisturbed.

The following procedures will be used to complete all soil sampling (these may be superseded by project-specific procedure):

- Identify that the staked-out sampling location is consistent with the location designated on the soil boring location plan, and in a safe location relative to overhead and underground utilities.
- Cleaning/decontamination of the split spoon samplers/macrocores

- The driller will push the sampler, and end plug as necessary, through the overlying strata to the top of the desired sampling interval.
- Recover the sampler and open to retrieve soil core. Split/cut the sample lengthwise for inspection.
- The end plug will be removed at the top of the desired sampling interval and the sampler will then be pushed through the sampling interval.
- Observe the soil core for visual evidence of contamination (i.e., staining, sheens, odor and/or oil-like/ creosote-like material).
- Using a sampling utensil (i.e., sampling spoon), burrow small holes in the core at one-foot intervals, placing the photoionization detector (PID) probe in the holes along the way to retrieve measurements of organic vapor concentrations. Refer to Section 4.6 for project-specific procedures.
- Using the modified Burmister soil classification system to describe visual observations of the soil sample.
- Retrieve an aliquot from each one-foot interval soil samples and seal in a plastic bag in an ice-filled cooler until sample selection for laboratory analysis.
- Choose which samples will be analyzed at the laboratory and label and fill the laboratory-supplied sample jars with the selected soil aliquots from their respective depth intervals. Seal the sample jars and store in a cooler at 4º Celsius.
- Decontaminate soil sampling equipment between sample locations
- Record field observations in the field log book and/or boring log data sheet, including: boring number, sample depth and sample observations (PID readings, evidence of contamination, and soil classification).

Monitoring Well Installation

Borings will be advanced to the desired depths by means of hollow stem augers and a truck-mounted or skid-mounted drill rig for the installation of monitoring wells. The monitoring wells will be constructed of two-inch diameter PVC in accordance with the following procedures:

- Using an oil/water interface probe, measure and record the depth to water in the open hole.
- Lower a PVC riser with a 10-foot to 15-foot length of PVC slotted screen to the bottom of the borehole. Approximately seven feet of the screen will be placed below the water table.
- If dense non-aqueous phase liquids (DNAPL) (such as tetrachloroethene) are suspected, a two-foot sump of steel casing will be attached to the bottom of the screen.

- The PVC screen slot size will be selected based on the sediment grain size observed in the soil. A slot opening of 0.020 inches will be chosen when medium to coarse sand is the dominant grain size. If silty sands or fine sand is dominant, then a 0.010-inch slot size will be chosen.

- In the annular space around the well screen, install the sand filter pack (about one to two feet above the top of the screen).

- For the one to two feet above the filter pack, a bentonite seal will be installed in the annular space.

- The remaining annular space will be filled with a bentonite-cement grout.

- Install a locking cap, flush-with-grade, curb box that has been set in cement. Set up a cement apron around the curb box to direct run-off away from the well.

- Decontaminate the hollow stem augers prior to and following each well installation

- Record data regarding the well installation in the field logbook and/or field data sheets (i.e., location, depth, construction details, water level measurements).

Temporary Well Point Installation

In specific instances where a permanent or semi-permanent monitoring well is not planned or called for, but the field geologist or project manager makes a field decision to collect a groundwater sample; or the location of the boring does not allow the use of a larger hollow-stem auger drill rig, a temporary well point will need to be installed using a Geoprobe® drill rig to collect a groundwater sample. The temporary well point consists of a five to ten-foot length of approximately 1 ¼-inch-diameter PVC well screen placed into a borehole already produced by the Geoprobe® macrocore. A gravel pack consisting of pre-sized sand will be placed in the annular space between the screen and the borehole wall. A groundwater sample will then be collected following the procedures outlined below, except that in a temporary well the 14-day equilibration period will not apply. When the groundwater sample has been collected the PVC well screen and riser pipe will be retrieved and placed in plastic garbage bags for later disposal. The borehole is then backfilled with Bentonite hole plug, and the surface repaired with concrete or asphalt patch.

Monitoring Well Development

The following procedure illustrates the development of all new and existing wells:

- Measure, using a water-level meter or an oil/water interface probe, the depth to the water and, using a weighted tape, the total depth of the well. From these

measurements, calculate the length of the water column (total depth minus depth to water). The volume of water in the well is calculated using the following conversion factors:

Well Diameter (Inches)	Volume per Foot of Water Column (gallons)
1	0.041
1 ¼	0.064
2	0.163
4	0.653
6	1.469

- Discharge the water to 5-gallon buckets using a submersible pump. Transfer water from the buckets to 55-gallon drums designated for well development water.

- When the turbidity is less than 50 nephelometric turbidity units (NTUs) (three successive readings), the well is close to being developed. If after one hour of steady pumping, the turbidity remains high, additional methods of surging and jetting may need to be considered.

- In the field logbook or on field data sheets, record the volume of water removal and any other observations made.

- The equipment must be decontaminated before and after development for each well location

Groundwater Sampling

Groundwater will be sampled according to the USEPA protocol for low-flow purging and sampling (http://epa.gov/region1/lab/qa/pdfs/EQASOP-GW001.pdf). Groundwater samples will be collected from the monitoring wells/well points applying the following procedures no sooner than 14 days following development:

- As the well plug is removed, measure the vapor concentrations in the well using a PID.
- Ensure that any pressure in the well dissipates and that water levels have stabilized before measuring fluid levels.
- Measure depth to water and check for LNAPL or DNAPL utilizing an oil/water interface probe, if applicable. If the NAPL is measurable, groundwater samples will not be collected from such a well.

- During the well development, calculate the mid-point of the water column length within the screen, using the water level and the total well depth measured. [For example, if the total depth is 40 feet, the screened interval is 30 to 40 feet, and the depth to water is 15 feet, the mid-point of the water column within the screened interval would be 35 feet.].
- Connect dedicated polyethylene or Teflon tubing to either a submersible or peristaltic pump and lower such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. The intake should be a minimum of 1 foot above the bottom of the well screen. Record the depth of the intake in the field notes. Connect the discharge end of the tubing to the flow-through cell of a multi-parameter (or equivalent) meter, such as a Hydrolab Quanta or a Horiba U-10 or U-22. Connect tubing to the output of the cell and place the discharge end of the tubing in a 5-gallon bucket.
- At its lowest flow rate setting, activate the pump (but no more than 0.5 L/min.).
- Measure the depth to water within the well. Increase the pump flow rate such that the water level a measurement does not deviate more than 0.3 feet compared to the initial static reading.
- Transfer discharged water from the 5-gallon buckets to 55-gallons drums designated for well-purge water.
- During purging, collect periodic samples (every five minutes) and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, oxidation-reduction potential, and specific conductivity).
- Continue purging the well until water quality indicators have stabilized (three successive readings) for the following parameters and criteria:

Parameter	Stabilization Criteria
pH	+/- 0.1 pH units
Temperature	+/- 3% degrees Celsius
Specific Conductance	+/- 3% S /cm
ORP/Eh	+/- 10 mV
Turbidity	+/- 10% NTUs (< 50 NTUs,): if 3 turbidity values are less than 5 NTU, consider the values as stabilized.
Dissolved Oxygen	10% for values greater than 0.5 mg/L, if 3 DO values are less than 0.5 mg/L, consider stabilized

Strive to reduce turbidity to the lowest practical limit. Record all efforts to stabilize the water quality for the well in the field book and then collect samples as described below. Discontinue purging after three well volumes have been removed and water quality parameters do not stabilize.

- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing (first VOCs

then SVOCs) and place into the required sample containers. Containers are to be labeled as described in Section 5.3.7 and put in an ice-filled cooler.

- All sample bottles shall be filled to the top to minimize aeration and immediately placed on ice and in the dark to minimize temperature or photo-induced changes to the groundwater samples.
- Collect one final field sample and analyze for water quality parameters (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) and record the final readings in the field notes.
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of any sample filters in a 55-gallon drum designated for disposable sampling materials and PPE.
- Decontaminate the pump, oil/water interface probe and flow-through cell as described in Section 5.3.6.
- In the project logbook and field data sheet, record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations.

Decontamination Procedures

Decontamination will be performed on plastic sheeting or in another containment area that is deemed to prevent runoff to the ground. Prior to use on-site and between sampling locations, the macrocore sampler, probe rods, pump, oil/water interface probe, and other non-disposable sampling equipment will be decontaminated using the following protocol:

1. Scrub using tap water / non-phosphate detergent mixture and bristle brush.
2. Rinse with tap water.
3. Repeat step 1 and 2
4. Final rinse with distilled water.
5. Air-dry the equipment.

The solid stem augers and hollow stem augers will be decontaminated with a steam cleaner or pressure washer using a tap water/non-phosphate detergent solution to remove any loose soil and petroleum.

Sample Identification

All samples will be identified using a format that provides the essential information on the use, tracking, location, and media sampled (groundwater, soil, sediment, soil gas, surface water, waste, etc.), date, time, location, and depth interval.

Examples are as follows:

Soil: B-10, 5.5-6.0', indicates that the soil sample was collected from the 5.5 - 6.0-foot

interval in boring B-10.

Groundwater: MW-1 indicates that the sample is a groundwater sample collected in monitoring well 1.

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

Blanks should be spelled out and identify the associated matrix, e.g., Field (Rinsate) Blank (FB)-Soil; Field Blank-Groundwater. Trip Blanks should be labeled with the prefix TB.

Sample Labeling and Shipping

All sample containers must contain the following information—written in waterproof indelible ink (Sharpie)—on the label:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Samplers initials
- Media Sampled

Collected and labeled samples will be placed in ice-filled coolers away from direct sunlight to await shipment/delivery to the laboratory.

To prepare the samples for shipment place each sample in a resealable plastic bag, then wrap each container in bubble wrap, only if being shipped, to prevent breakage. Finally, add fresh ice in two sealable plastic bags, or "blue ice" blocks, and the chain-of-custody form. Samples may be shipped overnight (e.g., via 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. C*oolers must be heavily iced to bring the entire sample contents to* 4^0 *C.*

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured area until arrival at the laboratory or laboratory pick up. Sample possession record from the time of obtainment in the field to the time of delivery to the laboratory or shipping 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; media sampled; date and time of collection and matrix; signatures of individuals involved in sample transfer; and the dates and times of transfers. Laboratory personnel will examine the custody seal's condition at sample check-in.

Field Instrumentation

Equipment will be calibrated at the start of each day of field work in accordance with the manufacturer's specifications. In the instance that an instrument fails calibration, the Project Manager or QA/QC Officer must be contacted immediately so as to arrange repairs or obtain a replacement instrument. A calibration log will be maintained in the field log book in order to record specific details regarding instrument calibration, including: dates, problems, and corrective actions. The PID will be calibrated each day using a standard of 100 parts per million (ppm) isobutylene, zeroed as per manufacturer specifications.

Field personnel will be trained in the proper operation of all field instruments at the start of the field program; however, instruction manuals for all equipment will be stored on-site as a reference of the proper procedures for operation, maintenance and calibration.

APPENDIX G

Citizen Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Queens Plaza Residential Development-Site B
BCP Site No. C241151

Long Island City
Queens County, New York

September 2014

Citizen Participation Plan

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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: **LIC Development Owner, LP ("Applicant")**
Site Name: **Queens Plaza Residential Development ("site")**
Site Address: **28-10 Jackson Avenue, Long Island City, NY 11101**
Site County: **Queens**
Site Number: **C241151**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. 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 the 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 remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (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: **www.dec.state.ny.us/website/der/bcp .**

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

Project Contacts

Appendix B identifies NYSDEC project contact(s) to which the public should address questions or request information about the site's remedial 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.

[1] "Remedial activities", "remedial action", and "remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield 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 remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with NYSDEC to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the Brownfield Site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The Brownfield Site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the Brownfield Site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the Brownfield Site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the site's remedial process.

X **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.

X **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 brownfield site's investigation and remediation.

The public is encouraged to contact project staff at any time during the Brownfield Site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 6 or in the nature and scope of remedial activities. Modifications may include additions to the Brownfield Site contact list and changes in planned citizen participation activities.

3. Site Information

The site (the "Brownfield Site") is a in the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP), BCP No. C241151. LIC Development Owner, LP is the current owner (the "BCP Volunteer") and the "Applicant." The Brownfield Site B consists of approximately 1.89 acres. Brownfield Site B consists of two sections: a smaller section of approximately 10,000 ft^2 known as Operable Unit 1 (OU-1), and a larger area known as OU-2. The Site is also a New York City "E" Designated site. The Brownfield Site is currently vacant.

The Brownfield Site is in Long Island City, Queens County, New York and encompasses an irregularly-shaped parcel bounded on the north by BCP Site A (C241105) and Jackson Avenue. On the west, Site B abuts Orchard Street, a mapped and dedicated City street. The southern boundary of Site B is the Long Island Railroad (LIRR) Sunnyside Yard property. The eastern side of Site B fronts Queens Boulevard. Figure 1 presents a Brownfield Site Location Map and Figure 2 presents a Brownfield Site Plan (close-up view of Site).

The BCP Volunteer proposes mixed-use residential and commercial development across the entire Site. The building(s) would be supported by a combination of slab-on-grade, caissons, or piles. The basement(s) would house physical plant operations and ancillary uses (e.g., maintenance areas, storage, mechanical equipment, etc.) and exclude tenant occupancy. Because of limitations on access to portions of the Brownfield Site, the BCP Volunteer intends to pursue Track 2 Restricted Residential Soil Cleanup Objectives (SCOs)—meaning excavation to 15 feet below final grade or bedrock—with modified Restricted Residential Soil Cleanup criteria (Brownfield Cleanup Track 4) as the fall back soil cleanup goals if Track 2 cannot be attained.

Site Description

The Brownfield Site is located on approximately 1.89 acres. The majority of the Brownfield Site consists of several one-, two-, and one 5-story buildings, which have occupied the Brownfield Site for at least 50 years. The structures are built of reinforced concrete frame and wood post-and-beam construction and have served for commercial purposes. The buildings will be demolished prior to and/or concurrently with remediation and re-development, but their foundations would remain and be removed as appropriate during remediation. The Brownfield Site is currently vacant.

Brownfield Site topography slopes gently to the south. The average surface elevation is approximately 13 feet QBD. Surface soils consist of a fill layer approximately 5 to 9 feet thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. Bedrock is variable beneath the Brownfield Site. All Brownfield Site B soil has been capped with buildings or concrete.

Site History

Prior to development, the Brownfield Site occupied an elevated area between two streams, an unnamed stream to the west and Dutch Kill to the east of the Brownfield Site (Beers, 1868), both discharging into Newtown Creek. Both streams were flanked by a marsh south of the Brownfield Site that now contains the Long Island Railroad (LIRR) Yard. The West Chemical Company (West Chemical) occupied the Brownfield Site from the early 1900s until 1977. During this time West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Prior to 1950, West Chemical manufactured a disinfectant that required storage of large quantities of creosote. Creosote use was discontinued after 1950 because of leaks and a fire that prompted the New York City Fire Department (FDNY) to empty the entire contents of an above-ground, creosote-filled storage tank (on Brownfield Site A) directly to the ground surface in order to prevent its combustion during the fire.

Reportedly, West Chemical stored a variety of other materials on Site during its tenure including muriatic acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand creams, cleaning products (floor waxes and cleaners), and vending machine products. Storage tanks were principally located within the Brownfield Site for use in the adjacent buildings comprising the remainder of the Outlet City VCP site. West Chemical divested the Brownfield Site and transferred ownership to Outlet City, Inc. in 1978.

Environmental History

Seven previous environmental investigations beginning in 1988 consisted of varying levels of soil and groundwater investigation, non-aqueous phase liquid (NAPL) product level studies, and collection of soil gas data on the entire BCP site. Previous investigations included the following:

1. *Queens Plaza Site B Investigation*, AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property*, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Investigation*, AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. SCS Engineers sampling event, April 2013

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills. The sources of these spills are believed on Brownfield Site A in areas C, D, and E.

Creosote spills impacted both shallow soils in the form of a smear zone and the deeper soils in the form of residual Dense Non-aqueous Phase Liquid (DNAPL). Most creosote impacts are on the western part of the Site, adjacent to BCP Site A.

Dissolved contamination appears in the lower and upper portions of the Brownfield Site groundwater flow regime. The dissolved plume exhibits the highest concentration of VOCs and SVOCs in the lower groundwater flow regime where the groundwater plume mirrors the distribution of DNAPL and where groundwater is in contact with the residual DNAPL. In contrast, VOCs and SVOCs were below detection limits for most compounds in the shallow wells.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Brownfield Site is currently in the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP). The Applicant is in the BCP as a Volunteer. The "Volunteer" status means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the Brownfield Site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, 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 Brownfield Site and to contamination that has migrated from the Brownfield Site.

The Volunteer intends further Site characterization and will prepare a qualitative exposure assessment under the BCP and intends to remediate the Brownfield Site to permit restricted residential, commercial, mixed use, or otherwise develop the Site consistent with local zoning requirements.

To achieve this goal, the Applicant will conduct remedial activities at the Brownfield Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant will set forth the responsibilities of each party in conducting a remedial program at the Brownfield Site.

Interim Remedial Measure

The goals of remediation are to identify and remove source contamination and remove the bulk of the contaminated material over the Brownfield Site to the extent that any remaining material

poses no risk to future residents, workers, and the environment. Another goal is to ensure that no free-phase product contaminated groundwater plume either leaves the Brownfield Site or re-contaminates the Brownfield Site from off-site sources. Finally, any remaining potential exposure pathways will be eliminated through engineering and institutional controls. The objectives of the Interim Remedial Measure are as follows:

1. Achieve a cleanup that eliminates and/or mitigates all significant threats from Brownfield Site contaminants to public health and the environment consistent with the contemplated end use

2. Significantly reduce the contaminant mass and/or eliminate exposure pathways to any remaining contaminant, and ensure that all potential receptors are protected

3. Eliminate and/or mitigate movement of any remaining contaminant from migrating off-site or back onto the Brownfield Site

4. Protect workers and the community from Brownfield Site contaminants during remediation and re-development

NYSDEC will determine if the Brownfield Site poses a significant threat to public health and/or the environment. If NYSDEC determines that the Brownfield 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 Brownfield 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 Brownfield 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 eligible Brownfield Site.

For more information about the TAG Program and the availability of TAGs, go online at: **www.dec.state.ny.us/website/der/guidance/tag/ .**

Remedy Selection

The Interim Remedial Measure Work Plan describes how the Applicant would address the contamination related to the Brownfield Site. The public will have the opportunity to review and comment on the draft Interim Remedial Measure Work Plan. The Brownfield Site contact list will be sent a fact sheet that describes the draft Interim Remedial Measure Work Plan and announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Interim Remedial Measure Work Plan.

A public meeting may be held by NYSDEC about the proposed Interim Remedial Measure Work Plan if requested by the affected community and if significant substantive issues are raised about

the draft Interim Remedial Measure Work Plan. Please note that, in order to request a public meeting, the health, economic well-being or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the Brownfield Site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Interim Remedial Measure Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Interim Remedial Measure Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the Brownfield Site. The Brownfield Site contact list will receive notification before the start of Brownfield Site remediation. When the Applicant completes remedial activities, it will prepare a Final Engineering Report (FER) that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the Brownfield Site. The Brownfield Site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the FER.

Certificate of Completion and Site Management

Once NYSDEC approves the FER, it will issue the Applicant a Certificate of Completion (COC). This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved Interim Remedial Measure Work Plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the Brownfield Site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the Interim Remedial Measure 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, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the Brownfield Site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the remediation of the Brownfield Site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about Brownfield Site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Interim Remedial Measure Work Plan.
All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval of, NYSDEC.

6. Major Issues of Public Concern

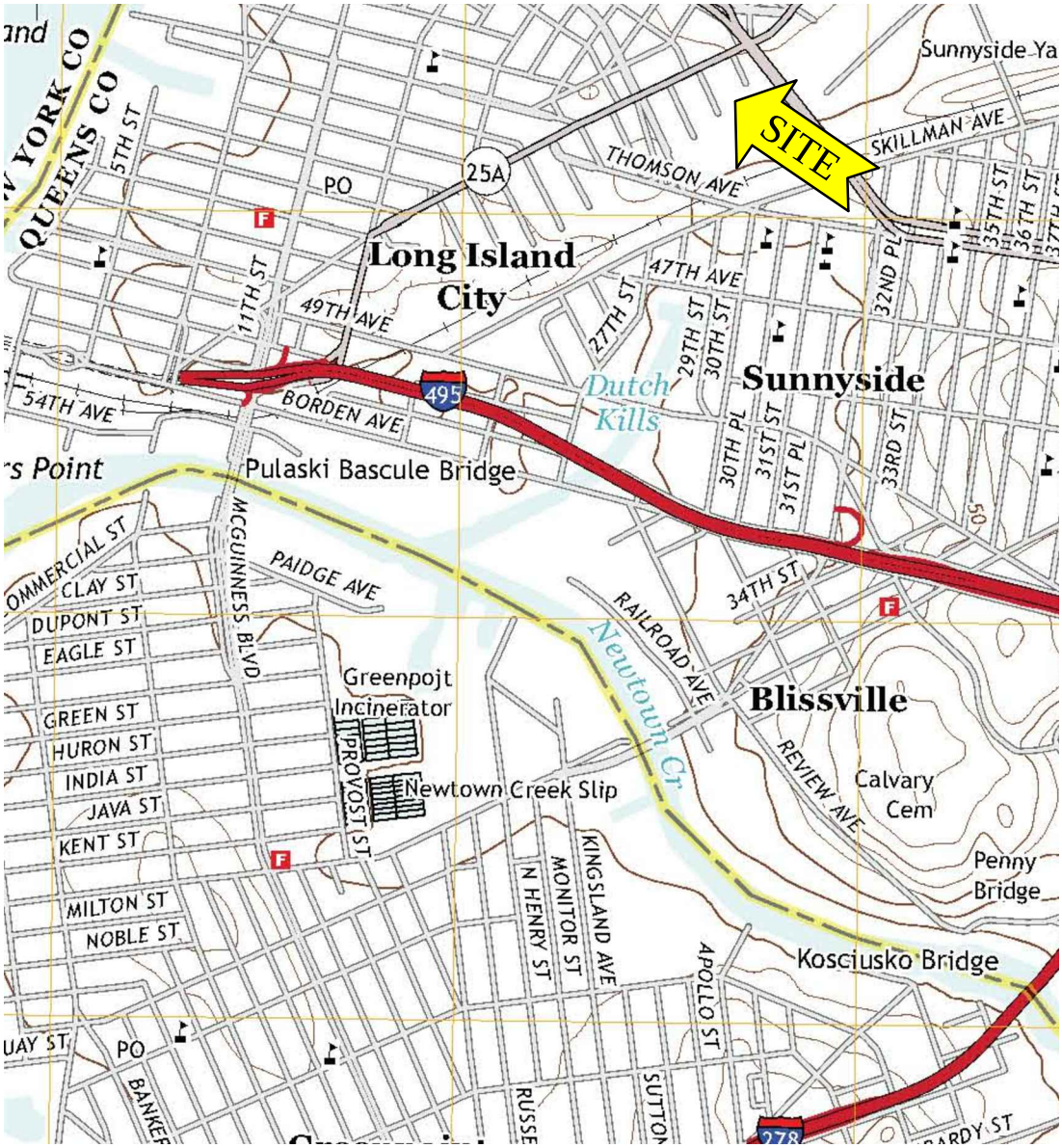
This section of the CP Plan identifies major issues of public concern, if any, that relate to the Brownfield Site. Additional major issues of public concern may be identified during the Brownfield Site's remedial process.

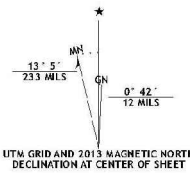
Construction activities will result in increased traffic along Orchard Street and the portion of Jackson Avenue in the vicinity of the Brownfield Site. Queens Boulevard may be affected as well. The increased traffic will consist of general construction crew and delivery vehicles and trucks transporting excavated soils from the Brownfield Site.

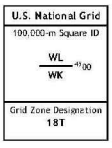
The demolition of existing structures and excavation of Brownfield Site soils will generate noise and airborne dust, which may potentially affect people who live and work in the vicinity of the Brownfield Site.

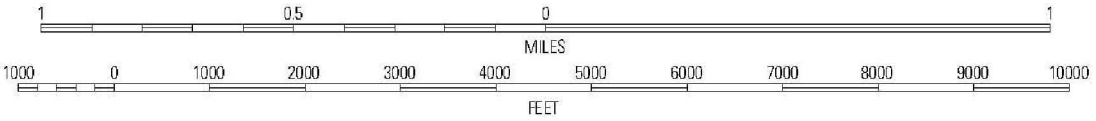
Additionally, due to the presence of creosote in some Site soils, passersby and people who live and work in the vicinity of the Site may potentially be exposed to creosote fumes.

The public issues will be controlled through the use of enclosures and air treatment to control odors and creosote fumes and water to control dust. Noise will be limited to normal working hours. Traffic will be controlled by using the Brownfield Site as much as possible to hold vehicles.









CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

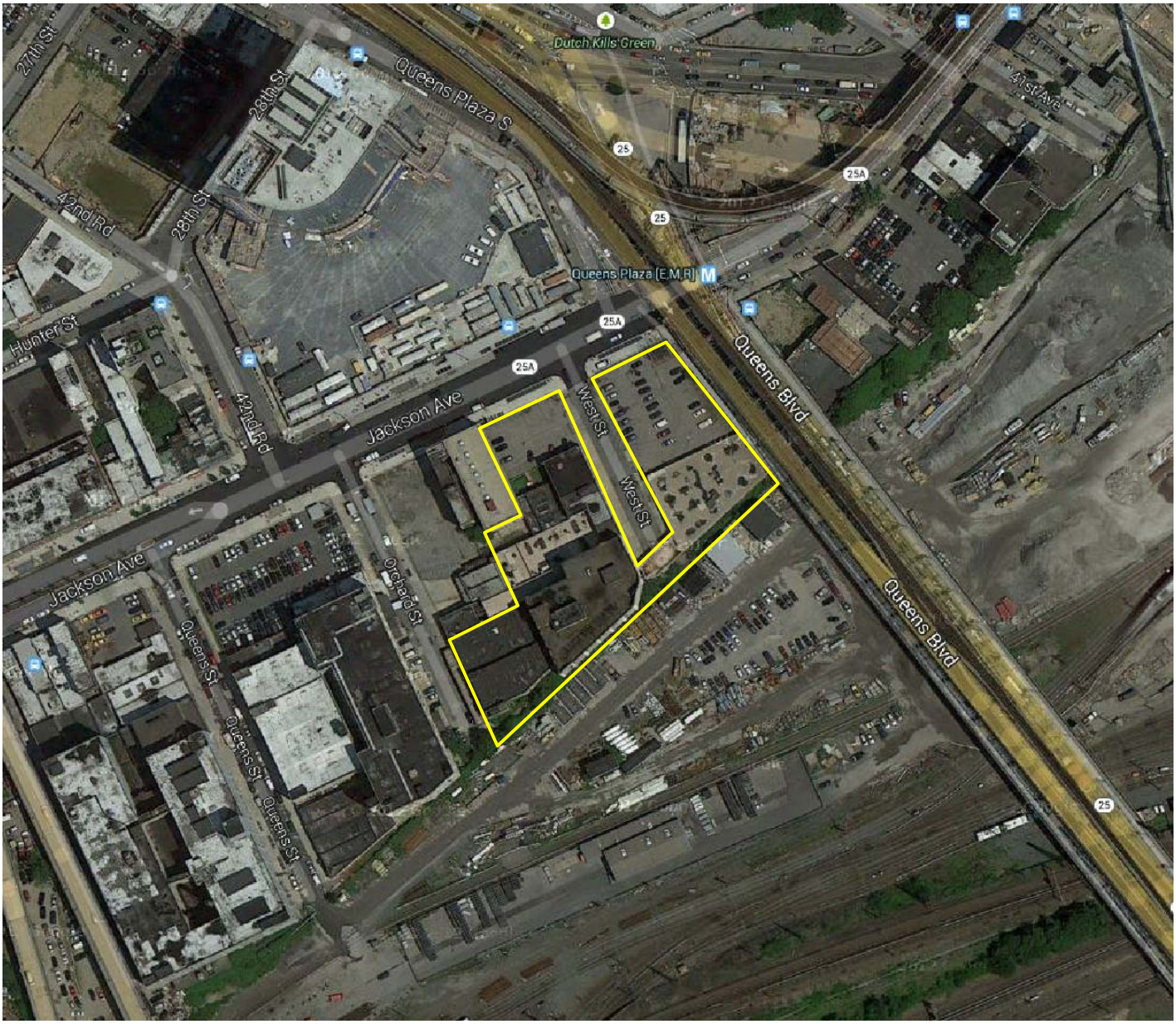
FIGURE 1: BROWNFIELD SITE LOCATION MAP

Fleming Lee Shue

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: LIC Development, Owner LP

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Figures\Site B RAWP June 2014\CAD\Figure 1.dwg DATE: 7/23/2014



0' 200' 400'

Scale in Feet

FIGURE 2: CLOSE-UP VIEW OF SITE

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

Appendix B – Project Contacts and Document Repositories

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):

Robert Schick
NYSDEC
Division of Environmental Remediation
Remedial Bureau B
625 Broadway
Albany, NY 12233-7016
(518) 402-9768

Thomas V. Panzone
Citizen Participation Specialist
NYSDEC Region 2
47-20 21st St.
Long Island City, NY 11101-5407
(718) 482-4953

Michael Haggerty
NYSDEC
Division of Environmental Remediation
Remedial Bureau B
625 Broadway
Albany, NY 12233-7016
(518) 402-9688

New York State Department of Health (NYSDOH):

Christopher Doroski
New York State Dept. of Health
Corning Tower
Empire State Plaza
Albany, NY 12237

Document Repositories

The document repository identified below has been established to provide the public with convenient access to important project documents:

Queens Borough Public Library
Court Square
2501 Jackson Ave.
Long Island City, NY 11101
Attn: Allison McKenna-Miller

Phone: (718) 937-2790
Hours: Mon. 12-7:00 pm, Tues. 1-6:00 pm, Wed. 10-6:00 pm, Thurs. and Fri. 12-6:00 pm

Appendix C – Brownfield Site Contact List

State and Local Officials

NY City Mayor Mayor: Bill de Blasio Address: City Hall New York NY, 10007 Phone: 311 or (212) 788-9600 Fax: (212) 788-2460 Web Email Form: http://nyc.gov/html/mail/html/mayor.html	Queens Borough President Borough President: Melinda Katz Address: 120-55 Queens Boulevard Kew Gardens NY, 11424 Phone: (718) 286-3000 Fax: (718) 286-2885 Email Address: info@queensbp.org
NY City Comptroller Comptroller: Scott M. Stringer Address: Municipal Building 1 Centre Street New York NY, 10007 Phone: (212) 669-3916 Email Address: action@comptroller.nyc.gov	Honorable Andrew Cuomo The State Capitol Albany, NY 12224
NYC Council District - 26 Council Member: Jimmy Van Bramer Address: 47-01 Queens Boulevard (suite 205), Sunnyside, New York 11104 Phone: (718) 383-9566 Fax: (718) 383-9076 Email Address: gioia@council.nyc.ny.us Website:http://www.nyccouncil.info/constituent/member_details.cfm?con_id=54	Francis McLaughlin Assistant Deputy Director, New York State Parks State Office Building 163 W. 125th St., 17th Fl. New York, NY 10027
Honorable Serphin R. Maltese New York State Senate 71-04 Myrtle Ave. Glendale, NY 11385	NY Senate District - 12 Senator: Michael Gianaris 31-19 Newtown Avenue Suite 402 Astoria, NY 11102 Phone: 718-728-0960 Fax: 718-728-0963 Email Address: onorato@senate.state.ny.us
Thomas V. Panzone Regional Citizen Participation Specialist – Region 2 New York State Department of Environmental Conservation 47-20 21st St. Long Island City, NY 11101-5407	Commissioner Emily Lloyd New York City Department Of Environmental Protection 59-17 Junction Boulevard, 13th Floor Flushing, NY 11373

NY Assembly District - 37 Assembly Member: Catherine Nolan Address: 45-25 47th Street, Woodside, NY 11377 Phone: 718-456-9492 Email Address: nolanc@assembly.state.ny.us	US House District - 14 Representative: Joseph Crowley Address: 1651 3rd Ave.,Ste 311 New York, NY, 10128 Phone: (212) 860-0606 Fax: (212) 860-0704
US Senator: Charles E. Schumer Address: 757 3rd Avenue Suite 17-02 New York NY, 10017 Phone: (212) 486-4430 Fax: (212) 486-7693 Web Email Form: http://schumer.senate.gov/SchumerWebsite/contact/webform.cfm	US Senator: Kirsten Gillibrand Address: 780 3rd Avenue Suite 2601 New York NY, 10017 Phone: (212) 688-6262 Fax: (202) 228-0406 Web Email Form: http://clinton.senate.gov/email_form.html
John Zimmerman, Air Resources New York City Department Of Environmental Protection 59-17 Junction Blvd. Corona, NY 11368	John Wuthenow New York City Department Of Environmental Protection 59-17 Junction Blvd. Corona, NY 11368
Honorable Letitia James Public Advocate One Centre St., 15th Fl., North New York, NY 10007-1602	

Community Board

Joseph Conley, Chairman Queens Community Board 2 43-22 50th Street, 2nd Fl. Woodside, NY 11377 Phone: 718.533.8773 Fax: 718.533.8777 Email: qn02@cb.nyc.gov; commboard2@nyc.rr.com	

Media

The Daily News 450 W. 33rd St. New York, NY 10001 www.nydailynews.com	Newsday: Newsday - Queens Edition 235 Pinelawn Road Melville, NY 11747 Queens newsroom: 631-843-2700
Queens Chronicle PO Box 74-7769 Rego Park, NY 11374-7769 Tel: (718) 205-8000	Western Queens Gazette 42-16 34th Ave. Long Island City, NY 11101 Tel. (718) 361-6161

Fax: (718) 205-0150 e-mail: Mailbox@qchron.com	Fax (718)784-7552 Web site- www.qgazette.com E-mail- qgazette@aol.com
Queens Ledger 69-60 Grand Avenue Maspeth, New York Tel: 718-639-7000 news@queensledger.com www.queensledger.com	Daily News/Queens 118-35 Queens Blvd. Forest Hills, NY 11375 ; Queens County www.nydailynews.com Editorial Assistant -- Maxine Simpson Tel: 718-793-332 Fax: 718-793-2910

Local School Officials

Academy of Finance & Enterprise Principal Victoria Armano 30-20 Thomson Ave Long Island City, NY 11101 Phone: 718-389-3623 Fax: 718-389-3724	High School of Applied Communication Principal Daniel Korb 30-20 Thomson Ave Long Island City, NY 11101 Phone: 718-389-3163 Fax: 718-389-3427
Middle College High School Principal Linda Siegmund 31-10 Thomson Ave Long Island City, NY 11101 Phone:718-349-4000 Fax: 718-349-4003	International High School at LaGuardia Principal John Starkey 31-10 Thomson Ave -MB52 Long Island City, NY 11101 Phone: 718-482-5455 Fax: 718-392-6904
NYC Geographic District #30 - RIC # 4 Superintendent Reyes Irizarry 28-11 Queens Plaza N Long Island City, NY 11101	High School for Information Technology Principal Joseph Reed 21-16 44th Rd Long Island City, NY 11101 Phone:718-361-9920 Fax: 718-361-9995
High School for Information Technology Principal Noralee Montemarano 21-16 44th Rd Long Island City, NY 11101 Phone: 718-937-4270 Fax: 718-937-5236	Newcomers High School Principal Orlando Sarimento 28-01 41st Avenue Long Island City, NY 11101 Phone:718-937-6005 Fax: 718-937-6316
Academy of American Studies High School Principal William Bassell 28-01 41st Avenue Long Island City, NY 11101 Phone:718-361-8786 Fax: 718-361-8832	Robert F. Wagner Jr. Institute for Arts & Technology Principal Ann Seifullah 47-07 30th Pl Long Island City, NY 11101 Phone: 718-472-5671 Fax: 718-472-9117

LIC YMCA Early Child Care Program: Michael Keller Senior Executive Director Long Island City YMCA 32-23 Queens Blvd. Long Island City, NY 11101 718-392-7932	LaGuardia Community ECLC I/T 31-10 Thompson Ave Long Island City, NY 11101
LaGuardia Community College 31-10 Thompson Ave Long Island City, NY 11101	LaGuardia Community College ECLC Program Inc. 45-35 Van Dam St Long Island City, NY 11101

Document Repositories

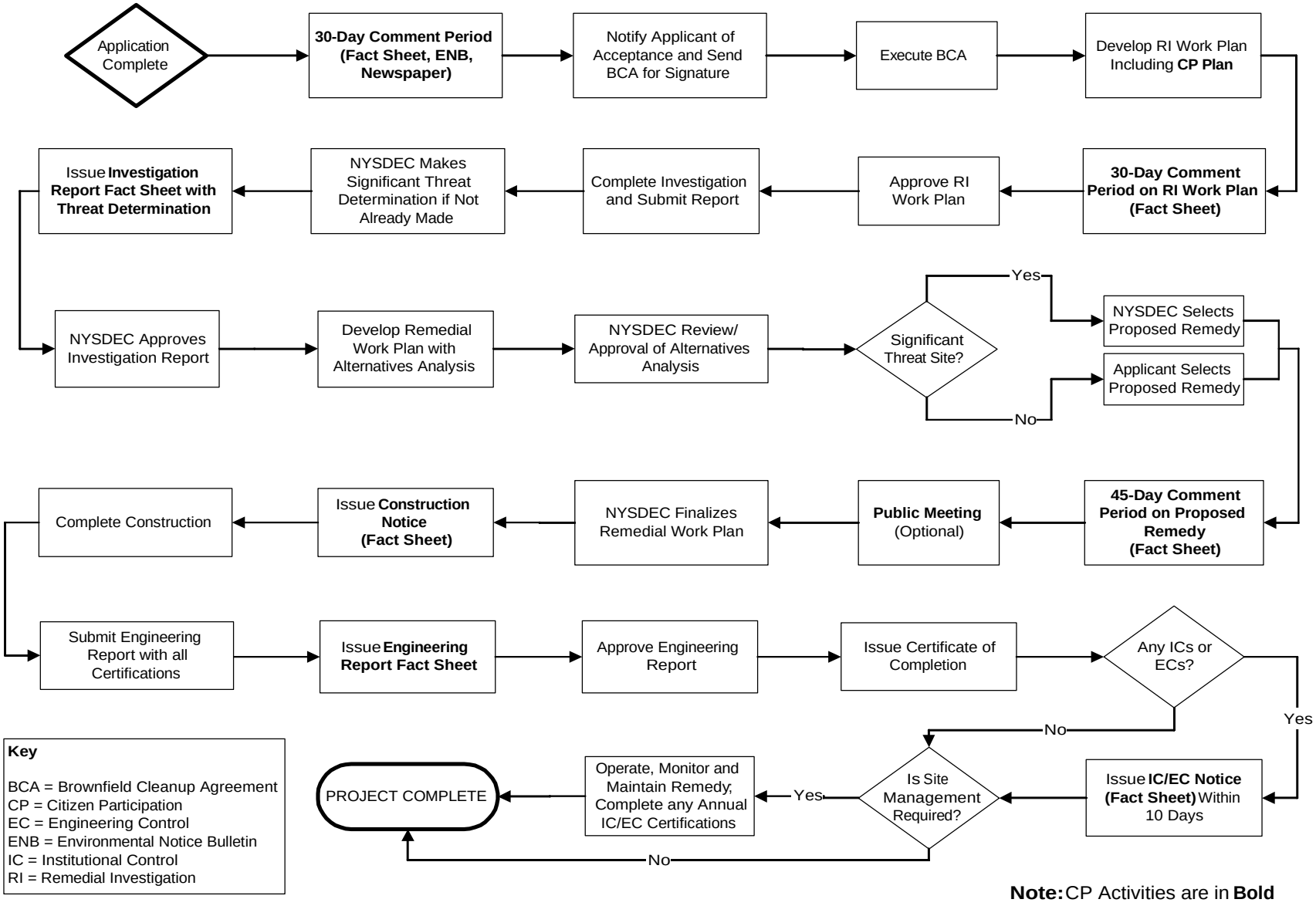
Queens Borough Public Library: Court Square 2501 Jackson Ave. Long Island City, NY	

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories	When Requestor prepares Application to participate in BCP
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period • Publish notice in local newspaper • Mail notice to site contact list (all mailings require certification of mailing sent to NYSDEC within 5 days) • Conduct 30-day public comment period on the complete application	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Draft CP Plan must be submitted within 20 days of execution of BCA. CP Plan must be approved by NYSDEC before distribution.
Before NYSDEC Approves Proposed Remedial Investigation (RI) Work Plan:	
• Place proposed RI Work Plan in document repository • Mail fact sheet to BSCL about proposed RI Work Plan and 30-day public comment period • Conduct 30-day public comment period on the proposed RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.
• Place approved RI Work Plan in document repository	When NYSDEC approves RI Work Plan
Before NYSDEC Approves Remedial Investigation Report:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report.
• Place approved RI Report in the document repository	When NYSDEC approves RI Report

Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Before NYSDEC Approves Interim Remedial Measure Work Plan (IRMWP):	
• Place draft IRMWP in document repository • Mail fact sheet to BSCL about proposed IRMWP and announcing 45-day comment period • Conduct 45-day public comment period about draft IRMWP • Hold public meeting about draft IRMWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves IRMWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
• Place approved IRMWP and final Decision Document in document repository	When NYSDEC approves IRMWP and finalized Decision Document
Before Applicant Starts Interim Remedial Measure (IRM):	
• Mail fact sheet to BSCL summarizing upcoming Interim Remedial Measure	Before the start of Interim Remedial Measure
Before NYSDEC Approves Final Engineering Report:	
• Mail fact sheet to BSCL that describes report, and any proposed institutional engineering controls	Before NYSDEC approves Final Engineering Report
• Place final Engineering Report in document repository	When NYSDEC approves Final Engineering Report
When NYSDEC Issues Certificate of Completion (COC):	
• Place Notice of COC in document repository • Mail fact sheet to BSCL that announces issuance of COC	Within 10 days after NYSDEC issues COC

Appendix E – Brownfield Cleanup Program



Note: CP Activities are in **Bold**

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Queens Plaza Residential Development-Site B
BCP Site No. C241151

28-10 Jackson Avenue
Long Island City,
New York 11101

August 2014

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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: **LIC Development Owner, LP ("Applicant")**
Site Name: **Queens Plaza Residential Development ("site")**
Site Address: **28-10 Jackson Avenue, Long Island City, NY 11101**
Site County: **Queens**
Site Number: **C241151**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. 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 the 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 remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (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: **www.dec.ny.gov/chemical/8450.html .**

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

[1] "Remedial activities", "remedial action", and "remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Project Contacts

Appendix B identifies NYSDEC project contact(s) to which the public should address questions or request information about the site's remedial 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.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield 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 remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with NYSDEC to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the Brownfield Site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The Brownfield Site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the Brownfield Site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the Brownfield Site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP

activities through fact sheets and notices developed at significant points in the site's remedial process.

X **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.

X **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 brownfield site's investigation and remediation.

The public is encouraged to contact project staff at any time during the Brownfield Site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 6 or in the nature and scope of remedial activities. Modifications may include additions to the Brownfield Site contact list and changes in planned citizen participation activities.

3. Site Information

The site (the "Brownfield Site") is in the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP), BCP No. C241151. LIC Development Owner, LP is the current owner (the "BCP Volunteer") and the "Applicant." The Brownfield Site B consists of approximately 1.89 acres. Brownfield Site B consists of two sections: a smaller section of approximately 10,000 ft^2 known as Operable Unit 1 (OU-1), and a larger area known as OU-2. The Site is also a New York City "E" Designated site. The site is currently vacant.

The site is in Long Island City, New York and encompasses an irregularly-shaped parcel bounded on the north by BCP Site A (C241105) and Jackson Avenue. On the west, Site B abuts Orchard Street, a mapped and dedicated City street. The southern boundary of Site B is the Long Island Railroad (LIRR) Sunnyside Yard property. The eastern side of Site B fronts Queens Boulevard. Figure 1 presents a Brownfield Site Location Map and Figure 2 presents a Brownfield Site Plan (close-up view of Site).

The BCP Volunteer proposes mixed-use residential and commercial development across the entire site. The building(s) would be supported by a combination of slab-on-grade, caissons, or piles. The basement(s) would house physical plant operations and ancillary uses (e.g., maintenance areas, storage, mechanical equipment, etc.) and exclude tenant occupancy. Because of limitations on access to portions of the Brownfield Site, the BCP Volunteer intends to pursue Track 2 Restricted Residential Soil Cleanup Objectives (SCOs)—meaning excavation to 15 feet

below final grade or bedrock—with modified Restricted Residential Soil Cleanup criteria (Brownfield Cleanup Track 4) as the fall back soil cleanup goals if Track 2 cannot be attained.

Site Description

The site is located on approximately 1.89 acres. The majority of the site consists of several one-, two-, and one 5-story buildings, which have occupied the site for at least 50 years. The structures are built of reinforced concrete frame and wood post-and-beam construction and have served for commercial purposes. The buildings will be demolished prior to and/or concurrently with remediation and re-development, but their foundations would remain and be removed as appropriate during remediation. The site is currently vacant.

Brownfield Site topography slopes gently to the south. The average surface elevation is approximately 13 feet QBD. Surface soils consist of a fill layer approximately 5 to 9 feet thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. Bedrock is variable beneath the site. All Brownfield Site B soil has been capped with buildings or concrete.

Site History

Prior to development, the site occupied an elevated area between two streams, an unnamed stream to the west and Dutch Kill to the east of the site (Beers, 1868), both discharging into Newtown Creek. Both streams were flanked by a marsh south of the site that now contains the Long Island Railroad (LIRR) Yard. The West Chemical Company (West Chemical) occupied the site from the early 1900s until 1977. During this time West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. Prior to 1950, West Chemical manufactured a disinfectant that required storage of large quantities of creosote. Creosote use was discontinued after 1950 because of leaks and a fire that prompted the New York City Fire Department (FDNY) to empty the entire contents of an above-ground, creosote-filled storage tank (on Brownfield Site A) directly to the ground surface in order to prevent its combustion during the fire.

Reportedly, West Chemical stored a variety of other materials on-site during its tenure including muriatic acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand creams, cleaning products (floor waxes and cleaners), and vending machine products. Storage tanks were principally located within the site for use in the adjacent buildings comprising the remainder of the Outlet City Voluntary Cleanup Program (VCP) site. West Chemical divested the Brownfield Site and transferred ownership to Outlet City, Inc. in
1978.

Environmental History

Seven previous environmental investigations beginning in 1988 consisted of varying levels of soil and groundwater investigation, non-aqueous phase liquid (NAPL) product level studies, and collection of soil gas data on the entire BCP site. Previous investigations included the following:

1. *Queens Plaza Site B Investigation,* AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property,* Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Investigation,* AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. SCS Engineers sampling event, April 2013

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills. The sources of these spills are believed on Brownfield Site A in areas C, D, and E.

Creosote spills impacted both shallow soils in the form of a smear zone and the deeper soils in the form of residual Dense Non-aqueous Phase Liquid (DNAPL). Most creosote impacts are on the western part of the site, adjacent to BCP Site A.

Dissolved contamination appears in the lower and upper portions of the site groundwater flow regime. The dissolved plume exhibits the highest concentration of Volatile Organic Compounds (VOCs) and Semi-volatile Organic Compounds (SVOCs) in the lower groundwater flow regime where the groundwater plume mirrors the distribution of DNAPL and where groundwater is in contact with the residual DNAPL. In contrast, VOCs and SVOCs were below detection limits for most compounds in the shallow wells.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The site is currently in the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP). The Applicant is in the BCP as a Volunteer.

The "Volunteer" status 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 on-site, 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 Brownfield Site and to contamination that has migrated from the site.

The Volunteer intends further Site characterization and will prepare a qualitative exposure assessment under the BCP and intends to remediate the site to permit restricted residential, commercial, mixed use, or otherwise develop the site consistent with local zoning requirements.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement (BCA) executed by NYSDEC and the Applicant will set forth the responsibilities of each party in conducting a remedial program at the site.

Remedial Action

The goals of remediation are to identify and remove source contamination and remove the bulk of the contaminated material over the site to the extent that any remaining material poses no risk to future residents, workers, and the environment. Another goal is to ensure that no free-phase product contaminated groundwater plume either leaves the site or re-contaminates the site from off-site sources. Finally, any remaining potential exposure pathways will be eliminated through engineering and institutional controls. The objectives of the remedial action are as follows:

1. Achieve a cleanup that eliminates and/or mitigates all significant threats from site contaminants to public health and the environment consistent with the contemplated end use

2. Significantly reduce the contaminant mass and/or eliminate exposure pathways to any remaining contaminant, and ensure that all potential receptors are protected

3. Eliminate and/or mitigate movement of any remaining contaminant from migrating off-site or back onto the site

4. Protect workers and the community from Brownfield Site contaminants during remediation and re-development

NYSDEC will determine if 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.

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 eligible site.

For more information about the TAG Program and the availability of TAGs, go online at: **www.dec.ny.gov/regulations/2590.html.**

Remedy Selection

The Remedial Work Plan describes how the Applicant would address the contamination related to the site. The public will have the opportunity to review and comment on the draft Remedial Work Plan. The Site Contact List will be sent a fact sheet that describes the draft Remedial Work Plan and announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that, in order to request a public meeting, the health, economic well-being or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the Brownfield Site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the Brownfield Site. The Brownfield Site contact list will receive notification before the start of Brownfield Site remediation. When the Applicant completes remedial activities, it will prepare a Final Engineering Report (FER) that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The Site Contact List will receive a fact sheet that announces the completion of remedial activities and the review of the FER.

Certificate of Completion and Site Management

Once NYSDEC approves the FER, it will issue the Applicant a Certificate of Completion (COC). This COC states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The COC also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the Site Contact List will receive a fact sheet that discusses such controls.

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 remediated property. An institutional control may be used when the remedial 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, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about Brownfield Site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Remedial Work Plan.
All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval of, NYSDEC.

6. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the remedial process.

Construction activities will result in increased traffic along Orchard Street and the portion of Jackson Avenue in the vicinity of the site. Queens Boulevard may be affected as well. The increased traffic will consist of general construction crew and delivery vehicles and trucks transporting excavated soils from the site.

The demolition of existing structures and excavation of soils will generate noise and airborne dust, which may potentially affect people who live and work in the vicinity of the site.

Additionally, due to the presence of creosote in some site soils, passersby and people who live and work in the vicinity of the site may potentially be exposed to creosote fumes. Potential for noise, odor and truck impacts to the community. All these issues will be addressed.

The public issues will be controlled through the use of enclosures and air treatment to control odors and creosote fumes and water to control dust. Noise will be limited to normal working hours. Traffic will be controlled by using the site as much as possible to hold vehicles.
The site is located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities. The site has a large Hispanic-American population. Therefore, all future fact sheets will be translated into Spanish.

Appendix B – Project Contacts and Document Repositories

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):

Robert Schick
NYSDEC
Division of Environmental Remediation
Remedial Bureau B
625 Broadway
Albany, NY 12233-7016
Tel: (518) 402-9768

Thomas V. Panzone
Citizen Participation Specialist
Office of Communications Services
NYSDEC Region 2
47-20 21st St.
Long Island City, NY 11101-5407
Tel: (718) 482-4953

Michael Haggerty
NYSDEC
Division of Environmental Remediation
Remedial Bureau B
625 Broadway
Albany, NY 12233-7016
Tel: (518) 402-9688
Email: michael.haggerty@dec.ny.gov

New York State Department of Health (NYSDOH):

Christopher Doroski
New York State Dept. of Health
Corning Tower Rm. 1787
Empire State Plaza
Albany, NY 12237
Email: BEEI@health.ny.gov

Document Repositories

The document repository identified below has been established to provide the public with convenient access to important project documents:

Queens Borough Public Library
Court Square
2501 Jackson Ave.
Long Island City, NY 11101
Attn: Allison McKenna-Miller

Phone: (718) 937-2790
Hours: Mon. 11-7:00 pm, Tues. 2-7:00 pm, Wed. 1-7:00 pm, Thurs. and Fri. 11-7:00 pm

Appendix C – Brownfield Site Contact List

State and Local Officials

NYC Mayor Mayor: Hon. Bill de Blasio Address: City Hall New York NY, 10007 Phone: 311 or (212) 788-9600 Fax: (212) 788-2460 Web Email Form: http://nyc.gov/html/mail/html/mayor.html	Queens Borough President Borough President: Hon. Melinda Katz Address: 120-55 Queens Boulevard Kew Gardens NY, 11424 Phone: (718) 286-3000 Fax: (718) 286-2885 Email Address: info@queensbp.org
NY City Comptroller Comptroller: Hon. Scott M. Stringer Address: Municipal Building 1 Centre Street New York NY, 10007 Phone: (212) 669-3916 Email Address: action@comptroller.nyc.gov	Carl Weisbrod, Commissioner NYC Dept. of City Planning 22 Reade Street New York, NY 10007
NYC Council District - 26 Council Member: Hon. Jimmy Van Bramer Address: 47-01 Queens Boulevard (suite 205), Sunnyside, New York 11104 Phone: (718) 383-9566 Fax: (718) 383-9076 Email Address: Website:http://www.nyccouncil.info/constituent/member_details.cfm?con_id=54	
Queens County Clerk Queens County Clerk's Office 88-11 Sutphin Boulevard, 1st Floor Jamaica, NY 11439	NY Senate District - 12 Senator: Hon. Michael Gianaris 21-77 31st Street Astoria, NY 11105 Phone: 718-728-0960 Fax: 718-728-0963
Thomas V. Panzone Regional Citizen Participation Specialist Office of Communications Services New York State Department of Environmental Conservation 47-40 21st St. Long Island City, NY 11101-5407	Commissioneronorato@senate.state.ny.us Emily LloydCommissioner NYC Department Of Environmental Protection 59-17 Junction Boulevard, 13th Floor Flushing, NY 11373

NY Assembly District - 37 Assembly Member: Hon. Catherine Nolan Address: 41-02 Queens Boulevard, Suite 2B Sunnyside, NY 11104 Phone: 718-456-9492 Email Address: nolanc@assembly.state.ny.us	US House of Representatives: Hon. Carolyn Maloney Address: 31-19 Newtown Ave. Astoria, NY, 11102 Phone: (718) 932-1804 Fax: (718) 932-1805
US Senator: Hon. Charles E. Schumer Address: 780 3rd Avenue Suite 2301 New York, NY 10017 Phone: (212) 486-4430 Fax: (212) 486-7693 Web Email Form: http://schumer.senate.gov/SchumerWebsite/contact/webform.cfm	US Senator: Hon. Kirsten Gillibrand Address: 780 3rd Avenue Suite 2601 New York NY, 10017 Phone: (212) 688-6262 Fax: (202) 228-0406 Web Email Form: http://clinton.senate.gov/email_form.html
John Zimmerman, Air Resources NYC Department Of Environmental Protection 59-17 Junction Blvd. Flushing, NY 11373	John Wuthenow Office of Environmental Planning & Assessment NYC Department Of Environmental Protection 96-05 Horace Harding Expressway Flushing, NY 11373
Hon. Letitia James Public Advocate One Centre St., 15th Fl., North New York, NY 10007-1602	

Queens Community Board 2

Joseph Conley, Chairman Queens Community Board 2 43-22 50th Street, 2nd Fl. Woodside, NY 11377 Phone: 718.533.8773 Fax: 718.533.8777 Email: qn02@cb.nyc.gov	Debra Markell-Kleinert, District Manager Queens Community Board 2 43-22 50th Street, 2nd Floor Woodside, NY 11377 Phone: 718-533-8773 Fax: 718-533-8777 Email: qn02@cb.nyc.gov

Local Media Outlets

New York Daily News 4 New York Plaza New York, NY 10004 www.nydailynews.com	Newsday: Newsday - Queens Edition 235 Pinelawn Road Melville, NY 11747 Queens newsroom: 631-843-2700
Queens Chronicle PO Box 74-7769 Rego Park, NY 11374-7769 Tel: (718) 205-8000	Western Queens Gazette 42-16 34th Ave. Long Island City, NY 11101 Tel. (718) 361-6161

Fax: (718) 205-0150 e-mail: Mailbox@qchron.com	Fax (718)784-7552 Web site- www.qgazette.com E-mail- qgazette@aol.com
Queens Ledger 69-60 Grand Avenue Maspeth, NY 11378 Tel: 718-639-7000 news@queensledger.com www.queensledger.com	Daily News/Queens 118-35 Queens Blvd. Forest Hills, NY 11375 ; Queens County www.nydailynews.com Editorial Assistant -- Maxine Simpson Tel: 718-793-332 Fax: 718-793-2910

Local Schools and Daycare Facilities:

Academy of Finance & Enterprise Principal Victoria Armano 30-20 Thomson Ave Long Island City, NY 11101 Phone: 718-389-3623 Fax: 718-389-3724	High School of Applied Communication Principal Daniel Korb 30-20 Thomson Ave Long Island City, NY 11101 Phone: 718-389-3163 Fax: 718-389-3427
Middle College High School Principal Linda Siegmund 31-10 Thomson Ave Long Island City, NY 11101 Phone:718-349-4000 Fax: 718-349-4003	International High School at LaGuardia Principal John Starkey 31-10 Thomson Ave -MB52 Long Island City, NY 11101 Phone: 718-482-5455 Fax: 718-392-6904
NYC Geographic District #30 - RIC # 4 Superintendent Reyes Irizarry 28-11 Queens Plaza N Long Island City, NY 11101	High School for Information Technology Principal Joseph Reed 21-16 44th Rd Long Island City, NY 11101 Phone:718-361-9920 Fax: 718-361-9995
High School for Information Technology Principal Noralee Montemarano 21-16 44th Rd Long Island City, NY 11101 Phone: 718-937-4270 Fax: 718-937-5236	Newcomers High School Principal Orlando Sarmiento 28-01 41st Avenue Long Island City, NY 11101 Phone:718-937-6005 Fax: 718-937-6316
Academy of American Studies High School Principal William Bassell 28-01 41st Avenue Long Island City, NY 11101 Phone:718-361-8786 Fax: 718-361-8832	Robert F. Wagner Jr. Institute for Arts & Technology Principal Ann Seifullah 47-07 30th Pl Long Island City, NY 11101 Phone: 718-472-5671 Fax: 718-472-9117

LIC YMCA Early Child Care Program: Michael Keller Senior Executive Director Long Island City YMCA 32-23 Queens Blvd. Long Island City, NY 11101 718-392-7932	LaGuardia Community ECLC I/T 31-10 Thompson Ave Long Island City, NY 11101
LaGuardia Community College 31-10 Thompson Ave Long Island City, NY 11101	LaGuardia Community College ECLC Program Inc. 45-35 Van Dam St Long Island City, NY 11101

Document Repositories

Queens Borough Public Library: Court Square 2501 Jackson Ave. Long Island City, NY	

Community, Civic, Religious and other Educational Institutions:

Long Island City/Astoria Chamber of Commerce
Court Square Place
24-01 44th Road
Long Island City, NY 11101

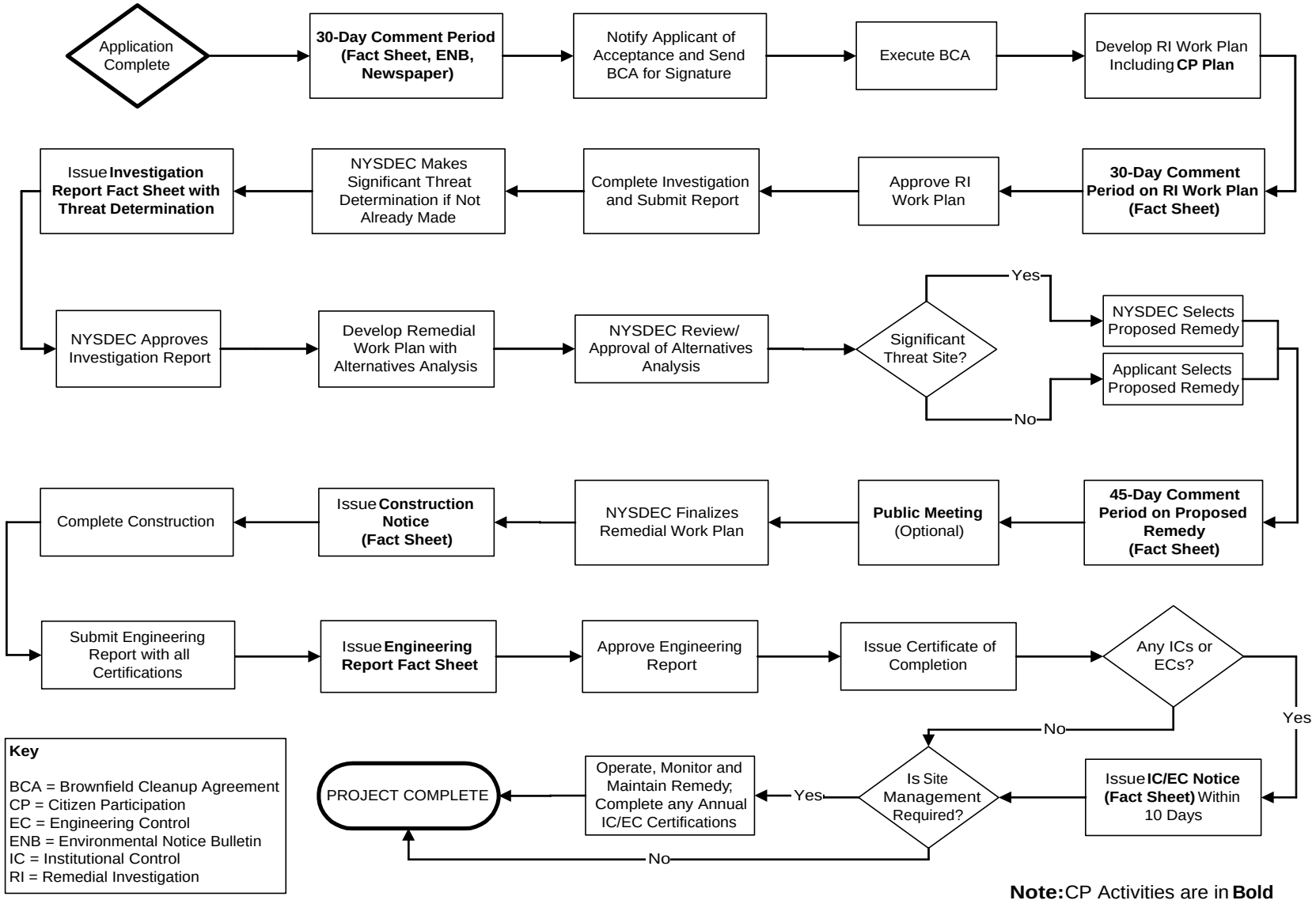
Long Island City Business
Development Corporation (LICBDC)
1 MetLife Plaza
27-01 Queens Plaza North, 9th Floor
Long Island City, NY 11101
Attn: Gayle Baron

Appendix D – Identification of Citizen Participation Activities

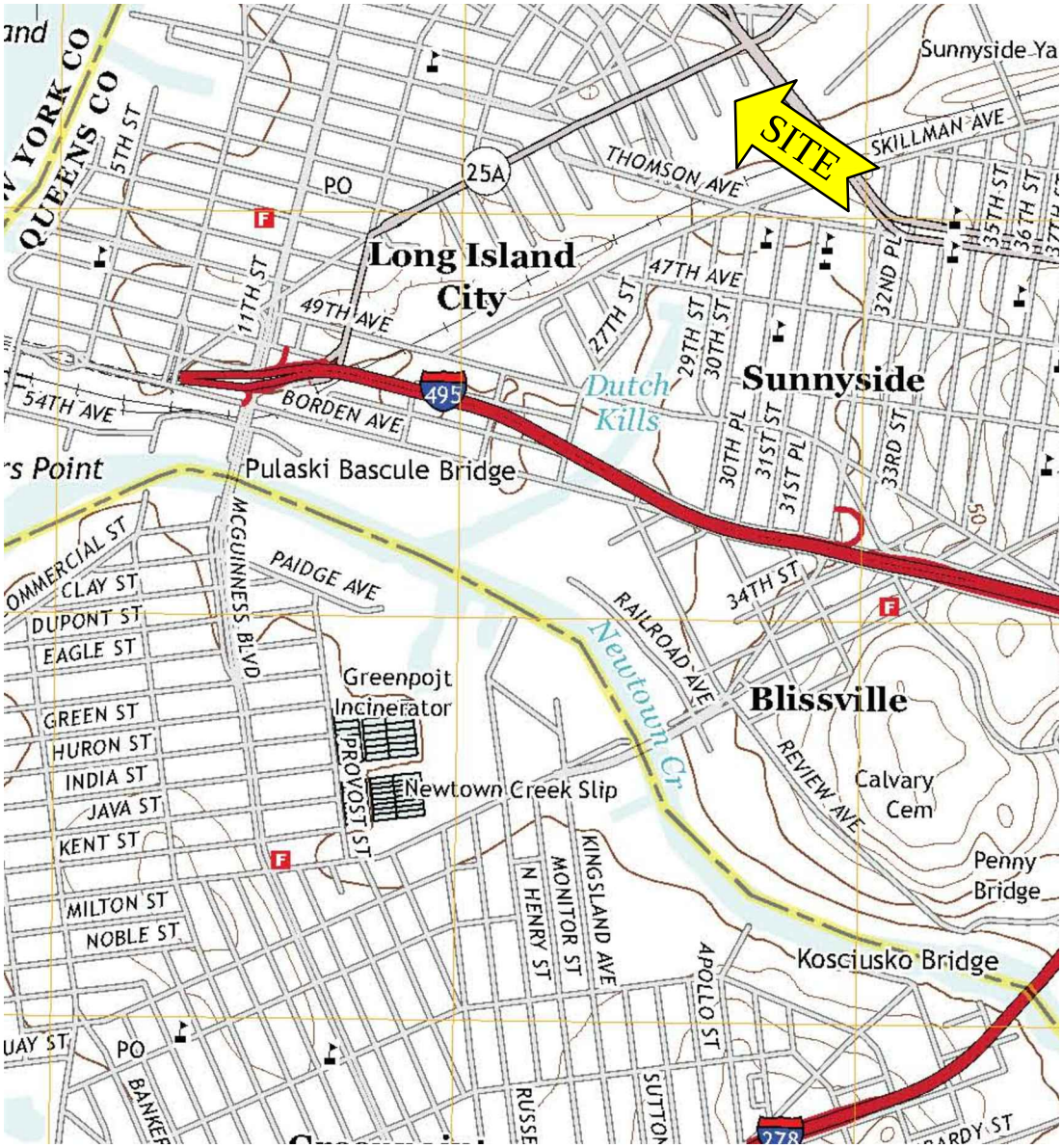
Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories	When Requestor prepares Application to participate in BCP
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period • Publish notice in local newspaper • Mail notice to site contact list (all mailings require certification of mailing sent to NYSDEC within 5 days) • Conduct 30-day public comment period on the complete application	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Draft CP Plan must be submitted within 20 days of execution of BCA. CP Plan must be approved by NYSDEC before distribution.
Before NYSDEC Approves Proposed Remedial Investigation (RI) Work Plan:	
• Place proposed RI Work Plan in document repository • Mail fact sheet to BSCL about proposed RI Work Plan and 30-day public comment period • Conduct 30-day public comment period on the proposed RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.
• Place approved RI Work Plan in document repository	When NYSDEC approves RI Work Plan
Before NYSDEC Approves Remedial Investigation Report:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report.
• Place approved RI Report in the document repository	When NYSDEC approves RI Report

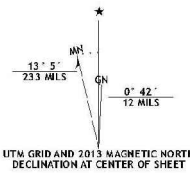
Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Place draft RWP in document repository • Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Conduct 45-day public comment period about draft RWP • Hold public meeting about draft RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
• Place approved RWP and final Decision Document in document repository	When NYSDEC approves RWP and finalized Decision Document
Before Applicant Starts Remedial Action (RA):	
• Mail fact sheet to BSCL summarizing upcoming remedial action	Before the start of remedial action
Before NYSDEC Approves Final Engineering Report:	
• Mail fact sheet to BSCL that describes report, and any proposed institutional engineering controls	Before NYSDEC approves Final Engineering Report
• Place final Engineering Report in document repository	When NYSDEC approves Final Engineering Report
When NYSDEC Issues Certificate of Completion (COC):	
• Place Notice of COC in document repository • Mail fact sheet to BSCL that announces issuance of COC	Within 10 days after NYSDEC issues COC

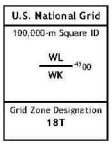
Appendix E – Brownfield Cleanup Program

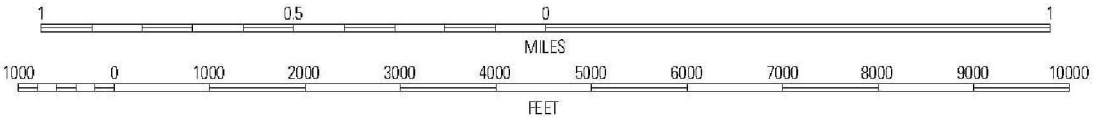


Note: CP Activities are in **Bold**









CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

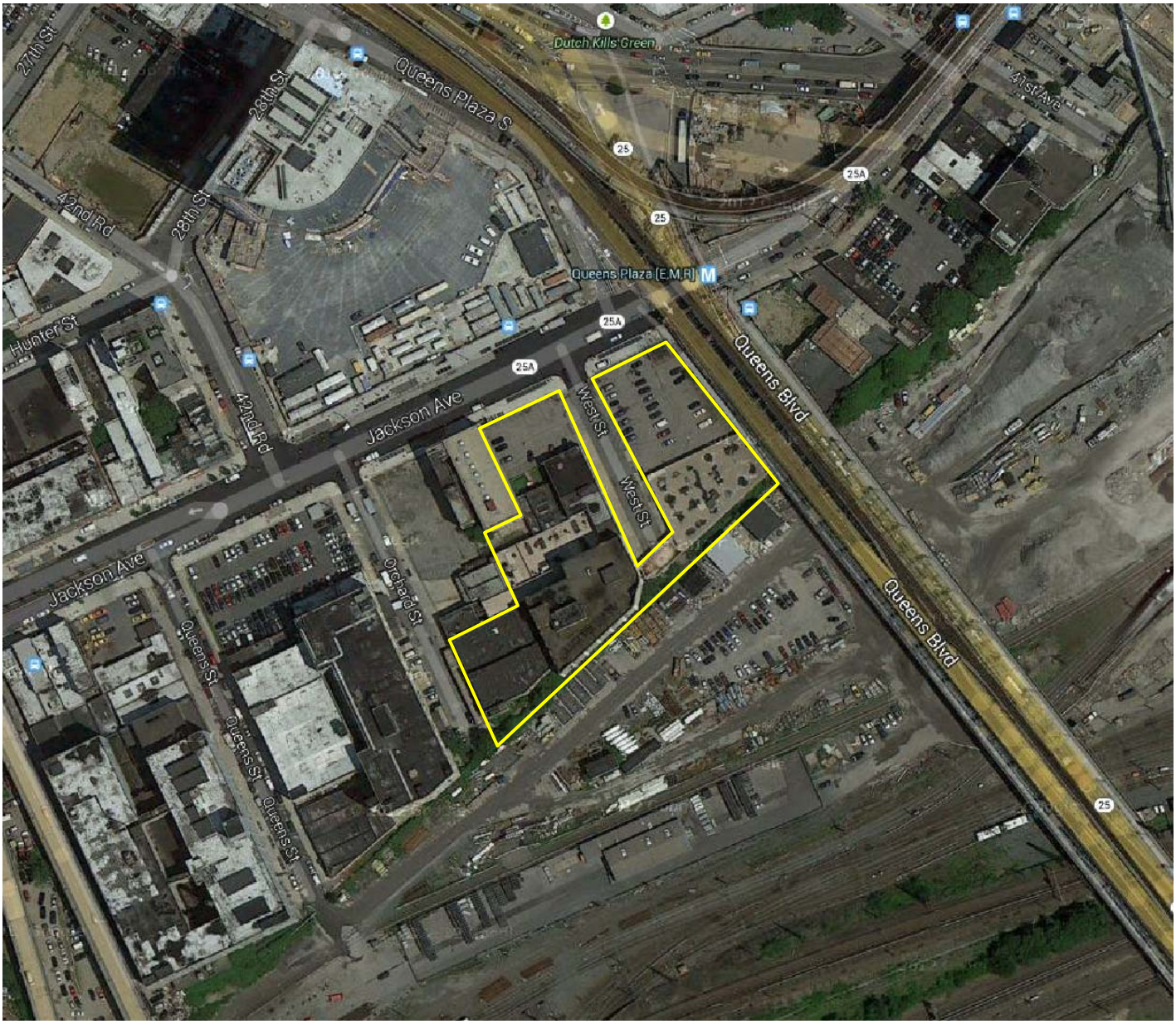
FIGURE 1: BROWNFIELD SITE LOCATION MAP

Fleming Lee Shue

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: LIC Development, Owner LP

FILE: P:\Project Files\10112 – Tishman Consulting\001–10 – Site B\Figures\Site B RAWP June 2014\CAD\Figure 1.dwg DATE: 7/23/2014



0' 200' 400'

Scale in Feet

FIGURE 2: CLOSE-UP VIEW OF SITE

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

APPENDIX H

Soil Management Plan

Appendix H

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

APPROVED SOIL MANAGEMENT PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

July 2015

Arnold F. Fleming, P.E.

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1.0 Introduction

The Brownfield Site is in Long Island City, Queens County, New York and encompasses an irregularly shaped parcel bounded on the north by the Queens Plaza Residential Site A. (C241151). On the west, Site B abuts Orchard Street, a mapped and dedicated City street. The southern boundary of Brownfield Site B is the Long Island Railroad (LIRR) Sunnyside Yard property. Jackson Avenue and Queens Boulevard border the site on the north and east, respectively.

Brownfield Site topography slopes gently. The average surface elevation is approximately 14 feet North American Vertical Datum 88. Surface soils consist of a fill layer approximately 5 to 9 feet thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. Bedrock is variable beneath the Brownfield Site. All soil has been capped with buildings and concrete.

The bedrock is variable beneath the Brownfield Site and influences contaminant movement. Depth to bedrock varies across the Brownfield Site from approximately 10 ft-bg to 21 ft-bg on the western portion and to 25 feet to 40 or more feet on the eastern side.

Historically, chemical manufacturing was the principal activity. The former Brownfield Site owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. Creosote was used in large quantities for these purposes and creosote spills represent the most significant impacts. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layer at depth. Petroleum releases also have occurred and there is a limited area of free product. Chlorinated solvents appear in soils and groundwater, but to a much lesser extent. A number of locations contain metals concentrations exceeding regulatory limits.

The surrounding properties are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the Long Island Railroad's Yard A, which is a major train repair and service center. The Brownfield Site was historically zoned as "M1-6/R10 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development on the Brownfield Site.

1.1 Purpose

The purpose of the Soil Management Plan (SMP) is to present the methods, procedures, and guidance for handling all aspects of soil connected with Brownfield Site remediation. The SMP specifies the means and methods for dealing with soil and provides overall soil management goals.

1.2 Goals

The goals of the SMP are to handle all contaminated soil and manage activities associated with soil in a manner that prevents contamination from reaching the community, workers, future occupants and workers, and the environment. Contaminated soil must be kept from escaping from Brownfield Site, and all soil must be managed in a manner that ensures removal, transport, and disposal such that it fulfills applicable regulatory requirements. Another goal is to keep objectionable odors from reaching the community. At the conclusion of remediation the Brownfield Site must be secured and stable and left in a condition ready for construction.

2.0 Brownfield Remedy

Excavation is the means of removing contamination. The preferred method is to excavate and load directly into trucks for disposal at off-Brownfield Site facilities because there is insufficient space to stockpile and segregate large volumes of soil and because direct loading is the most effective means to meet the remediation schedule. Some provision will be made for stockpiling and staging soil because of delays, traffic, holidays, weather, and unforeseen events. Therefore, it is necessary to plan for soil stockpiling. There are different types of contaminated soil and debris that may be expected during remediation. Native soil and historic fill are present with varying degrees of VOCs, SVOCs, metals and pesticide contamination from the previous operation of a chemical manufacturer. Also, there are known releases of creosote and petroleum.

Contaminated Concrete and Debris

This is concrete, wood, or other material contaminated with petroleum and/or creosote. Depending on disposal facility requirements, this material may have to be segregated from soil and disposed separately.

Non-Contaminated Concrete and Debris

This is concrete, wood, or other material free of petroleum and/or creosote staining and odors. This material may be disposed as construction and demolition (C&D) and separated from contaminated soils.

3.0 Soil Management

This section describes the procedures for managing soil on the Brownfield Site.

3.1 Pre-Characterization

Where soil will be excavated and directly loaded into trucks or is otherwise slated for disposal, it must first be pre-characterized and accepted by the disposal facility(ies). To provide disposal facilities with characterization data prior to excavation to allow direct load out, a sampling and analysis plan for soil pre-characterization plan prepared by an

independent soil agent will be implemented. The sampling plan will specify soil sample collection procedures that comply with the requirements of licensed disposal facilities. Based on previous sampling results, it is expected that all soil will be disposed as non-hazardous material.

In general, the pre-characterization sampling and analysis plan specifies that the area be divided into sampling grids and that the individual grid cells be sampled using test pits, or borings. Each grid cell is then sampled in accordance with the frequency required by the disposal facility(ies). The discrete sub samples are collected so as to be representative of the soils in each grid cell within the vertical zone of interest. Pre-characterization sampling, because it covers a range of potential disposal facilities in several states, may include full TAGM and Part 375 analyses, full New Jersey residential analyses, ignitability, reactivity, full Toxicity Characteristic Leachate Procedure (TCLP), paint filter, pH, corrosivity, moisture, and total sulfur. Contaminated concrete and debris will also be sampled according to the requirements established by the independent soil agent.

3.2 Brownfield Site Preparation

The Brownfield Site will first be prepared for remediation and soil management. Decontamination pad(s) will be built at the truck exit location(s) and will consist of a gravel pad sufficiently large to accommodate the largest truck and with enough space to allow workers to clean the vehicles before leaving the Brownfield Site. The pad will have the means to collect wash water. Cleaning will take the form of brushing off gross soil followed by spraying with potable water to remove dust or soil residue on both the truck body and undercarriage. The rinse water will be disposed through the dewatering treatment before being discharged to the city sanitary sewer.

Protective fencing and/or barriers will be installed along the Brownfield Site perimeter to protect the public from Brownfield Site work and to control vehicle movement. The barriers will comply with New York City Building Code. Internal barriers for Brownfield Site control and traffic management may also be added as necessary. When all Brownfield Site details are finalized, a Brownfield Site plan will be prepared that depicts the soil staging/stockpiling areas, ingress and egress points, decontamination areas, truck routes, water treatment units, dewatering system, work zones, safety barriers and fencing, and containment structures. The Brownfield Site plan will be presented to NYSDEC and will be updated as necessary.

Creosote can generate strong odors. Consequently, some areas must be excavated beneath an engineered containment structure so that odors and vapors can be controlled. The enclosure(s) will be an engineered structure that may consist of a sprung structure, scaffolding, or an enclosure formed by tarps or plastic coverings attached to adjacent buildings, or a hybrid, as approved by the Department. The enclosure will be sufficiently large to accommodate excavation equipment and accommodate truck loading. Negative air pressure will be maintained by a continuous ventilation system consisting of ventilation fans and activated charcoal filters. Other areas may require excavation within an enclosure if warranted by excessive odors or VOC levels or controlled with the use of

long duration odor suppressing foam and tarp covers. This decision will be made based on field conditions. Conversely, there may be soils that are relatively clean and do not pose an adverse odor threat. These soils may be excavated without an enclosure. This decision will be based on field conditions and discussion with NYSDEC and NYSDOH.

A containment structure will be installed, operated and maintained over the excavation areas to prevent off-Site migration of odors and vapors. The structure will be erected and maintained for as long as necessary during excavation. The structure will be designed and engineered to be self-supporting, constructed of a material that is compatible with the proposed environment, impermeable to the anticipated contaminant vapors, adequately lighted, large enough to encompass the excavation operations and able to be moved to encompass other areas, if necessary. The enclosure will comply with local building codes with regard to loading and structural considerations.

The containment structure will be fully enclosed and include an air handling/vapor treatment system. The enclosure will have a vapor management system capable of maintaining a negative air pressure and capturing and treating emissions from the excavation prior to discharge into the atmosphere and/or capable of controlling air emissions by means of direct air flow. Air changes will be sufficient to allow work within the structure at Level C or lower, the preferred level of protection being Level D, as defined in the Health & Safety Plan (HASP) (Appendix D).

The air handling system will consist of at least two blowers that will draw air out of the structure to maintain a negative air pressure and/or by direct air flow so that vapors and odors are contained. The blowers will be sized to include a minimum of six air exchanges/hour, inclusive of the open excavation volume. Selection of the vapor control measures is subject to acceptance by the Department. The levels should be as such to meet the community air monitoring requirements as given in the Community Air Monitoring Plan (Appendix N). Exhaust air will be treated by an air treatment system designed to assure compliance of the discharged air with relevant emissions standards in DAR-1. The vapor treatment system will likely consist of at least two vapor phase granular activated carbon (GAC) units to reduce VOC concentrations in the discharged air. Supplemental emission control (e.g., synthetic foam, "Biosolve", and/or soil liners) will be available for contaminant areas outside the containment structure. A more detailed description of the odor control measures is available in the "Proposed Excavation Outside of Tented Areas – Additional Odor Control Measures" letter prepared by Fleming Lee Shue and dated June 26, 2015.

During operation of the air handling system, discharge emissions will be tested, as required by the NYSDEC, to confirm that they meet NYSDEC discharge criteria. Testing will consist of field screening the treated discharge periodically throughout each day using a photo-ionization detector (PID). At a minimum, PID testing will be done each day at start-up, at mid-day, and before shut-down. Vapor samples will also be collected for laboratory analysis using SUMMA canisters for United States Environmental Protection Agency (USEPA) TO-15 analysis at system activation and once again during contaminated soil removal activities to calibrate the PID measurements to actual containment concentrations.

At the conclusion of each workday, exposed contaminated soil within the containment structure will be covered with plastic and long-duration vapor suppressing foam and then the air handling system will be turned off. Operation of the air handling system will resume the next morning approximately one hour prior to any entry or excavation or loading, to evacuate and treat any vapors in the structure. Contaminated soil containers and roll-off containers, if any, will be covered at the end of each day by vapor suppressing foam and plastic to prevent vapor emissions and the migration of odors and to prevent the infiltration of rainwater.

3.3 Soil Stockpiling

Although the preferred approach is to directly load excavated soil onto trucks, it may be necessary to temporarily stockpile soil. Soil stockpiling areas will be prepared by selecting locations that are sufficiently large to hold soil not directly loaded onto trucks. There should be enough area to accommodate the soil to be staged and to accommodate segregating soil into different types of piles. Since disposal options and costs differ appreciably depending on the type of soil contaminant, pending the results of pre-characterization sampling, enough space must be available to segregate soils into separate piles as the disposal facility(ies) require, where feasible and if space permits. Areas on the neighboring VCP site may be used for soil stockpiling, if necessary.

Each area must be prepared such that it is either lined at a minimum with a double layer of 8-mil plastic or is atop an area to be excavated at a later time. The stockpile area must be such that storm water cannot transport contaminated soil off the Brownfield Site or onto other areas on the Brownfield Site. Storm water control may be accomplished by either encircling the piles with hay bales and silt fencing or equivalent, directing run-off to a point where it can be collected and disposed, or other similar means (refer to the Stormwater Pollution Prevention Plan in Appendix B). All soil piles must be covered by plastic sheeting when inactive and the sheeting weighed down to prevent uncovering. Stockpile areas may be inside the containment structure if handling petroleum or creosote-contaminated soil or outside the containment structure if handling urban fill or native uncontaminated soils.

Some soil will be excavated from below the water table. In this case, the preferred approach is to allow the soil to drain through the site-wide dewatering system prior to excavation. If this is not possible, then either local dewatering or the use of stockpile areas such that drainage is either controlled or directed to a sediment trap and then to the Brownfield Site water treatment unit before being discharged to the city sanitary sewer, or employ an inert material such as ground corn cobs or kiln dust to absorb excess water.

3.4 Soil Segregation

Soil will be segregated on the basis of the pre-characterization results, prior soil sampling results, Brownfield Site knowledge, and direct observations during excavation. Direct observations include visual observations of staining and sheen, odors, and

photoionization detector (PID) readings. Segregation decisions will be made by an on-Brownfield Site qualified environmental professional with Brownfield Site knowledge representing the Volunteer. Where soil contains different types of contamination, the more conservative disposal option will be selected (e.g., historic fill with petroleum contamination will be treated as petroleum contaminated; soil with petroleum and creosote contamination will be treated as creosote contaminated), or as the selected disposal facility(ies) require. The environmental professional will direct the contractor to place soil in the various pre-determined stockpiling areas or directly onto the proper trucks.

Segregated soils may require additional soil characterization sampling. Material slated for disposal will follow the requirements of the pre-characterization sampling protocol, modified as necessary for the volume, disposal facility, and previous results.

3.5 Soil Loading, Transport, and Documentation

All trucks used for disposal will be permitted as licensed waste transporters as required by NYCRR Part 364. Trucks will be covered with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). Petroleum or creosote-contaminated soils will be transported in trucks with gasketed rear gates to prevent any liquid discharge during transit.

A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and treated before disposal to the city sanitary sewer. Onsite truck roads will be covered with stone to minimize dust and mud entering public roads.

Details of truck movement and staging will not be complete until a contractor is selected. These will be presented to NYSDEC once they become known. Truck transport routes will be provided to the Department for approval.

Disposal Facilities and Submittals

Disposal facilities will be identified for each anticipated waste stream. All required analytical data will be provided to the disposal facilities for approval. Primary and alternate disposal facilities will be designated and submitted for each anticipated waste stream. Primary facilities will be contracted, upon final approval from the Volunteer, prior to excavation. Copies of contracts from each facility or letters from each facility indicating acceptance of the total estimated volume of material from this project will be submitted to the Department. Additionally, copies of all waste manifests, bills of lading, and certified weight slips from a scale approved for the use of all disposed materials as well as the Part 364 Permits for all waste transporters will be submitted to the Department.

Vehicle Requirements and Odor Suppressant

All license plates on the trucks will be properly affixed and visible at all times; proper placards will be displayed and extraneous or incorrect placards will be covered and/or removed prior to the truck departing the Site. All required permits will be properly displayed or readily available for verification by the Department. Drivers will remain in the truck at all times unless they are wearing the correct personal protective equipment required for the Site. Standing on the back of the truck will be prohibited and ladders or scaffolding will be used when securing tarps and/or covers. . Vehicles and containers used to store and/or transport materials will be provided with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). The Department has the right to reject vehicles that are not properly equipped and/or arrive to the Site in a dirty condition. Odor and dust suppressing foam will be available as needed to supplement covers, or if requested by the Department.

Execution

Pre-characterization sample results will allow direct load, transport, and disposal of all impacted material whenever possible. Traffic control at the Site entry will ensure a smooth flow of traffic and minimize congestion at the Site entrance. At a minimum, the traffic control will include the usage of flaggers and proper signage, where required. Trucks containing excavated material will be properly covered prior to exiting the Site to prevent vapor and fugitive dust emissions during transport. The covers will be supplemented with odor suppressant foam or solvent as needed. Gross vehicle truck weights shall conform to the most current DOT regulations for the Federal, State, and local level. All work in and around trucks will be performed in appropriate personal protective equipment in conformance with the Site Specific Constructions HASP.

Prior to leaving the Site, material transport vehicles and containers will be inspected for evidence of contamination (including inside of wheels and undercarriage). All trucks leaving the Site will proceed to a decontamination station for cleaning prior to exiting onto public roads. Trucks and equipment will be cleaned using a broom and/or brushes within the excavation area prior to moving to the decontamination pads to decrease the amount of particulates leaving the remediation area. If necessary, at the decontamination pad, all heavy equipment will be pressure washed before leaving the Site. All equipment leaving the Site will be decontaminated as per these guidelines. In addition, any equipment previously utilized to excavate impacted material will be decontaminated prior to use in backfilling (e.g. excavator bucket). Decontamination pads will be sized to ensure that the largest piece of contractor equipment can be adequately decontaminated and provisions will be made to control overspray at the decontamination pads. All waste-water from decontamination will be collected and pumped into frac tanks. Wastewater will be transported from the Site by a properly licensed liquid waste hauler or will be discharged in the approved dewatering system. Soils collected from the decontamination

pads will be bulked with the impacted material and sent to the properly licensed approved disposal facility, as necessary.

Trucks will proceed directly to the designated disposal facility after leaving the Site and will not be pre-loaded with material for overnight storage. Clean up of any material spilled or leaked in transit, or mud or dirt tracked off-Site will be performed in accordance with all applicable Federal, State, and local regulations. Material from the Site will not be combined with any other material.

Volunteer and/or Volunteer's agent will sign transport bills of lading or manifests. Volunteer will provide a hazardous waste generator number, if required. Maintain copies of all documents involving transportation of materials from the Site. Copies of these records shall be submitted to the Department at a frequency agreed to by Arnold F. Fleming, Remedial Engineer, and Volunteer. All records shall be turned over to the Volunteer at the completion of the Work. It will be ensured that all transport vehicles are properly secured, labeled, and placarded.

3.6 Excavation

Soil excavated as part of remediation will be either directly loaded into trucks or stockpiled for later loading and disposal or testing for re-use as backfill on the Brownfield Site. All stockpiles will have dust controlled by means of water mist if necessary. A source of water and means of applying water spray will be available and within easy access. A foam machine(s) will be available on Brownfield Site to control odors, if necessary, during excavation, soil stockpiling, and loading outside of the containment structure. A bio-degradable, synthetic-based foam concentrate such as Rusmar Long Duration Odor Suppressant Foam AC-600 Series or equivalent may be used.

At the end of each workday the excavation will be secured in a manner that controls odors. If odors become objectionable or have the potential to adversely affect the neighborhood, then odor control will be employed. Control measures may include covering the bottom or excavation sidewalls with tarps, plastic, foam, encapsulant, soil or gravel, or some combination that is effective.

3.7 Imported Backfill

Imported material brought in as backfill must be certified that it is free of contamination as virgin source material with written documentation from the supplier certifying that the soil is from a source not known to have been contaminated or have received hazardous materials, petroleum or other hydrocarbon-derived, toxic, or radioactive materials. If the material is not virgin, then the material will be tested at a frequency of 1 sample/250 yd^3 for full Part 375 Soil Cleanup Objective parameters analyses from each source area. The tested material will be considered acceptable for reuse on Brownfield Site B if it meets the Part 375 Unrestricted Use criteria as set forth in NYCRR Part 375-6.7(d) or otherwise approved by the department, for areas meeting Track 1 UUSCOs. Material meeting Part

375 Restricted Residential Use criteria will be considered acceptable for reuse in areas meeting Track 2 RRSCOs or otherwise approved by the department, with the exception of the clean fill cap (uppermost two feet). Alternatively, recycled concrete aggregate (RCA), a commercial product, may be used as imported backfill without testing if it originates from a DEC registered facility. Also, mole rock may be used without testing as backfill for any area.

If more than 1,000 yd^3 are imported from a given off-Brownfield Site non-virgin source, and each of the four samples for the first 1,000 yd^3 meet the stated reuse criteria, then the sample frequency will reduce to 1 composite sample/2,500 yd^3 for additional soil from the same source up to 5,000 yd^3. For volumes greater than 5,000 yd^3, the sampling frequency will be reduced to one sample/5,000 yd^3, provided that all previous samples met the established limits.

All imported soil must be free of organic material, debris, cinders, combustibles, wood, roots, and staining. All imported soils must be approved by NYSDEC before being brought to the Brownfield Site. Backfill placement on-Brownfield Site must be approved by the Brownfield Site environmental professional.

4.0 Demobilization

The Brownfield Site must be stabilized and secured at the conclusion of remediation. This means removing all equipment and materials used for remediation and ensuring that all former soil staging areas and cleaning apparatus have been decommissioned and cleaned and that no contaminated soil or debris remains on Brownfield Site.

APPENDIX I

Health & Safety Plan

Queens Development
Brownfield Cleanup Program Nos. C241105 & C241151
Long Island City, NY

HEALTH & SAFETY PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Submitted to:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

ARNOLD F. FLEMING P.E.

&

Fleming Lee Shue

Environmental Management & Consulting
158 West 29th Street, 9th Floor
New York, New York 10001
http://www.flemingleeshue.com

June 2014

I, Tom Eng, CIH certify that the Queens Plaza Residential Development Brownfield Cleanup Program Health & Safety Plan was prepared under my direction. Changes to this document may be made only with approval by T. Eng, Certified Industrial Hygienist (CIH).

4/8/14
Date

Tom C. Eng, CIH
Certified Industrial Hygienist

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1.0 INTRODUCTION

1.1 Purpose

The firms Fleming-Lee Shue, Inc. (FLS), Arnold F. Fleming P.E. (AFF), and Tom Eng of Active EHS LLC, third party Certified Industrial Hygienist (CIH) prepared this site-specific Health and Safety Plan (HASP) to address the health and safety practices and guidelines that will be employed during the environmental investigation and remediation of the Queens Plaza Development Brownfield Site (hereafter referred to as the "Brownfield Site") located in Long Island City, New York. The Brownfield Site is under the Brownfield Cleanup Program (BCP) as Site Nos. C241105 and C241151 administered by the New York State Department of Environmental Conservation (NYSDEC).

This HASP has been developed in accordance with the requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120. The HASP establishes the known chemical and physical hazards associated with the work activities and provides a description of the air monitoring requirements, personal protective equipment requirements and safe operating guidelines for use by FLS/AFF and our subcontractors. This HASP applies to the FLS and AFF scope of work: remedial investigation, remedial action, interim remedial measures, and off-site investigation work. All subcontractors working with FLS/AFF will be provided with a copy of this HASP for review. Based on their means and methods of executing the work activities, the subcontractors will either accept the safety procedures outline in this HASP and FLS/AFF Health and Safety Officer's supervision or the subcontractor can provide a HASP addendum, for FLS/AFF review and acceptance, stating any additional procedures that they wish to be incorporated. Other parties (Contractors, subcontractors, and their employees) performing their own scope of work not covered by this HASP can review this HASP but must prepare their own HASP that meets Occupational Safety and Health Administration (OSHA) requirements. Contractors providing their own HASP must indicate that their HASP was prepared under the direction of a CIH. This HASP will be kept onsite during field activities and shall be accessible at all times. This HASP will be reviewed as necessary and amended or revised as conditions change and additional activities arise. All FLS/AFF site personnel and subcontractors will receive site specific HASP training and will be required to sign the Acknowledgement Form (Attachment I). All visitors, who visit the site for the purposes of

observing our work activities will also receive a health and safety briefing, sign the Acknowledgement Form, and be escorted at all times.

1.2. References

The general provisions of this HASP were developed in accordance with the provisions of OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 or 29 CFR 1926.65.

The Occupational Safety and Health Act (1970) requires the following:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.
- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Occupational Safety and Health Act, that are applicable to company business and operations.
- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.
- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

In addition, all work will comply with the Owner Required Safety Performance Standards in the appendix.

2.0 PROJECT INFORMATION

2.1 Site Description

The Brownfield Site is in Long Island City, Queens County, New York and encompasses a trapezoid-shaped parcel (Figure 1). The Site is bound by Jackson Avenue on the north. On the west, the Brownfield Site abuts Orchard Street. The eastern side of the Brownfield Site abuts Queens Boulevard and the southern boundary fronts the Long Island Railroad (LIRR) Sunnyside Yard property. West Street, a 5-story Apartment building and a New York City transit (NYCT) Substation are outside the Brownfield Site.

The Brownfield Site contains paved areas and a number of 1-, 2-, 3-story brick buildings. One 5-story building is also on Site. The Site plan is presented in Figure 2.

The Brownfield Site topography slopes gently to the south. The surface elevation ranges from approximately 12 ft. Queens Borough Datum (QBD) to 16 ft. QBD. The surface soils consist of a fill layer approximately 5 to 9 ft. thick. The fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The depth to bedrock is variable beneath the Site; it is shallow near the middle of the western side of the property and deepens to the north, south, and east. All Site soil is capped by buildings, concrete or asphalt.

The Site is in an area designated as M1-5/R9 within the Long Island City Special Purpose District assigned by the Department of City Planning. The Long Island City Special Purpose District is a special zoning provision to promote the development and transformation of historical industrial/ manufacturing areas into mixed use commercial and residential spaces

2.2 Site Background and Previous Investigation Findings

2.2.1 Site Background

The Site was occupied by the West Chemical Company (West Chemical) from the early 1900s until 1977. West Chemical manufactured a variety of commercial and household disinfectants, soaps, floor waxes, insecticides, and paper product dispensing machines. West Chemical stored a variety of other materials on-Site during its tenancy, including muriatic (hydrochloric) acid, alcohol, rosin, fats, and oils. These materials were used in the manufacture of hand

creams, cleaning products (floor waxes and cleaners), and vending machine products. The manufacture of a disinfectant "Coronoleum" (CN+) prior to 1950 resulted in the storage of large quantities of creosote on the western side of the property.

2.2.2 Previous Investigation Findings

Previous Site investigations identified the following three historic instances of creosote contamination:

- Leaks in the bottoms of several aboveground storage tanks (ASTs). These are believed to all be removed.
- In 1950, the New York City Fire Department (FDNY) deliberately released the contents of a 5,000-gallon AST of creosote to the ground during a fire as an explosion prevention measure.
- Former West Chemical personnel identified that creosote was historically delivered to the plant by means of a rail siding and the creosote was pumped into a fill line and delivered to storage tanks.

The following summarizes the history of petroleum bulk storage on the subject property:

- Two, 500-gallon, gasoline underground storage tanks (USTs) were identified and were removed in 2003. They were located near the parking area that lies along Orchard Street.
- Four heating oil USTs were installed between 1947 and 1948. These USTs were originally used to store No. 6 fuel oil and later converted to No. 4 fuel oil. In 1990, the USTs were closed-in-place and a natural gas-fired heating system was installed. These are located in the western part of Building 10.
- Twenty-two aboveground storage tanks (ASTs) were identified on the Site in the 1940s and 1950s. The ASTs ranged in capacity from 3,000 to 24,000 gallons, with a total tank volume of 260,575 gallons. These have been removed.
- Forty-five process/storage vaults and kettles filled with unknown liquid were encountered in Buildings 2B, 3A, and Buildings 3A and 3B, and 10. The composition of the liquid and quantity, if any, is unknown for all of the units, but water mixed with soap and/or lye is suspected in at least one unit.

Seven previous environmental investigations, beginning in 1988, consisted of varying levels of soil and groundwater investigation, Non-Aqueous Phase Liquid (NAPL) product-level

studies, and collection of soil gas data across the Site. Previous investigations included the following studies:

1. *Queens Plaza Site B Investigation,* AKRF, 1988
2. *Outlet City Soil and Groundwater Sampling Results*, AKRF, 1990
3. *Outlet City Property*, Supplemental Site B Assessment/Remedial Investigation, AKRF, 1998
4. *Soil and Groundwater Sampling and Analysis*, ELM, 2001
5. *Site Investigation*, AKRF, 2002
6. *Additional Remedial Investigation Report (Draft),* Fleming-Lee Shue, Inc., February 2007 (and updated draft revision February 2010)
7. *Site Characterization Investigation Data Summary,* SCS Engineers, July 12, 2013.

Underground Process Kettles/Vaults and Storage Tanks

According to the 2013 investigation completed by SCS Engineers, there are 17 kettles in Buildings 3A and 3B and 23 vaults in Building 2B. All kettles had some liquid in them and at least one vault contained liquid.

SCS did not identify any hazardous concentrations of gases or the risk of explosion while investigating these units. The measurements were made by a personal multi-gas meter. The SCS July 12, 2013 report provided no information on vapor conditions inside any of the kettles or vaults.

Water samples from nine kettles were collected and analyzed SCS Engineers for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and pH. All VOC and SVOC results were below Toxicity Characteristic Leaching Procedures (TCLP) threshold values. One sample exceeded the TCLP threshold for mercury in one kettle (K-9). The pH was between 6.8 and 8.2 standard units.

Soil Contamination

The seven previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills on the Site. Much of this contamination is on the western part of the Site.

Creosote spills impacted soils in the form of a smear zone and deeper soils in the form of residual Dense Non-Aqueous Phase Liquid (DNAPL). Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of Building 4; creosote covers the floor and some portion of the basement walls in Building 4.

Comparatively fewer soil borings have been completed on the eastern part of the Site. The primary soil contaminants are the creosote-based and petroleum-based VOCs, benzene, toluene, ethylbenzene, and xylenes, (collectively BTEX) and SVOCs corresponding to the creosote DNAPL. The elevated concentrations of these compounds correspond to observations of soil staining or NAPL on the western part of the property. The soil analytical results are summarized in Attachment II.

Groundwater Contamination

A limited amount of groundwater data are available for the Site. The few samples that were collected during earlier investigations found elevated concentrations of BTEX and low concentrations of chlorinated VOCs. Naphthalene, methylnaphthalene, and other SVOCs associated with creosote were also detected.

Sub-Slab Vapor and Indoor Air Contamination

The previous investigations detected VOCs in the indoor air and sub-slab soil vapor on the Site. The compounds included acetone, benzene, 2-butanone, carbon tetrachloride, chloromethane, dichlorodifluoromethane, ethylbenzene, toluene, xylenes, tetrachloroethylene, trichloroethene, and trichlorofluoromethane.

3.0 SCOPE OF WORK

This HASP addresses the general activities associated with the planned environmental investigation and remediation of the Site. These activities include, but are not limited to, the following:

- Mobilization/demobilization
  - Mobilization and demobilization of equipment and supplies
  - Establishment of Site access procedures, site security and work zones
- Pre-Investigation Activities
  - Site Inspection, Geophysical Survey
  - Utility Clearance (clearing drilling and sampling locations by identifying utilities) and Permitting
- Investigation Activities
  - Inspection of vaults, kettles and other recognized environmental conditions
  - Soil boring installation and soil sample collection
  - Monitoring well installation and groundwater sample collection
  - Test pit installation (when deemed necessary)
  - Soil vapor and indoor air sampling
  - Investigation derived waste handling and storage activities
- Remedial Activities
  - Site enclosure installation
  - Soil excavation
  - Soil and materials management and disposal
  - Collection of samples for remediation (i.e. waste classification, contamination delineation etc.)
  - Sampling, investigation, and remediation of the kettles and vaults

The planned environmental investigation and remediation activities are detailed in the succeeding sections.

3.1 Site Investigation

3.1.1 Kettle Investigation – Buildings 2B, 2C, 3A, 3B & 10

Forty kettles/subsurface mixing vaults with unconfirmed amounts of liquid were found inside Buildings 2B, 2C, 3A, 3B, and 10. Previous investigations revealed traces of disinfectant and lye in the kettles which can be attributed to the historic use of the Site as a soap manufacturing facility. SCS identified VOC, SVOCs, and metals in liquids in some of the units. Mercury only was above the TCLP threshold in one unit (K-9).

A thorough investigation is needed to determine the contents and the exact amount of liquid in each of the kettles. The investigation will be conducted starting with the collection of samples from each vault, analyzing and profiling the liquid samples to determine the appropriate disposal facility, and implementing the necessary action to minimize the potential exposure risk to all workers.

3.1.2 Soil, Groundwater and Soil Vapor Sampling

Soil Investigation

Soil Boring Installation

Soil borings will be installed throughout the Site. A number of soil borings will be converted into monitoring wells. Because the general subsurface geology of the Site consists of fill, silty sand, with glacial till overlying bedrock, a sonic drill rig will be used to advance the soil borings. A Geoprobe direct-push drill rig may be used to advance borings where conditions warrant, such as where borings are shallow and/or inside buildings where access for larger drill rigs is limited.

After the soil borings have been completed, FLS will have a New York State Licensed Surveyor survey the locations.

Soil Screening

Soils will be field-screened using a photoionization detector (PID) and described along the vertical depth of each boring at each sampling location. The PID readings will be documented as well as visual and olfactory observations.

Soil Sampling and Analysis

Soil samples will be obtained by a dedicated plastic liner. The Sonic drill rig sampler will be advanced to collect soil samples down to the proposed development depth or until bedrock is encountered.

The soil samples will be containerized in accordance with EPA analytical protocols. Each sample will be labeled, sealed, and placed in a chilled cooler for shipment to the laboratory and will be analyzed for the following parameters:

- Target compound list (TCL) VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- Target analyte list (TAL) metals by EPA Method 6010/7000

Groundwater Investigation

Monitoring Well Installation

A machine-slotted PVC well screen will be installed into the saturated zone. A No. 1 Morie Sand/equivalent gravel pack will be tremied into the annular space outside the well screen to a minimum of 2 feet above the top of the well screen. A minimum 2-foot bentonite seal will be installed above the gravel pack. Any remaining annular space will be sealed with a Portland cement mix. A surface completion consisting of a flush-mounted, watertight manhole will be cemented into the pavement above the well. The monitoring wells will be developed by pumping with a submersible pump until the discharge is silt-free. Other existing monitoring wells on the Site will also be developed. Diagrams of the construction of the newly installed wells along with the existing ones will be provided in the final report. The wells will be allowed to equilibrate for a minimum of 1 week prior to sampling.

Monitoring Well Gauging

A synoptic round of water-level measurements from the newly installed wells will be collected along with the existing monitoring wells. FLS will also retain a New York State Licensed surveyor to survey the well locations and the top of casing elevations.

Groundwater Sampling and Analysis

Groundwater samples will be collected from each of the monitoring wells using low-flow sampling methods. One trip blank will also be analyzed for quality control. The groundwater samples will be analyzed for the following parameters:

- TCL VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- Pesticides/polychlorinated Biphenyls (PCBs) by EPA Method 8081/8082
- TAL metals by EPA Method 6010/7000

Soil Vapor Investigation

Sub-slab soil vapor samples will be collected at 12 locations throughout the Site. Soil vapor samples will be collected from temporary soil vapor sample points installed to two feet below the floor slab. At each sample location, a 0.5-inch diameter and 3.5-inch long decontaminated stainless steel sampling probe will be driven approximately 2 feet into the underlying soil under the basement floor slab. The sampling probe will be retracted approximately 4-inches to expose a sampling screen. The borehole above the sampling probe will be sealed with clay to prevent ambient above-ground air from mixing with the soil vapor. To ensure a satisfactory seal above the sampling probe, helium will be utilized to enrich the atmosphere above the sealed borehole. Soil vapor will be purged through a 0.25-inch polyethylene (PE) tubing and screened for the presence of helium, utilizing a calibrated MGD2002 helium leak detector. Once it was confirmed that helium is not being detected in the soil vapor and an appropriate seal was constructed, the soil vapor point will be purged at a flow rate of approximately 0.2

liters per minute (Lpm). Following the purging procedure, an individually-certified clean 6-liter SUMMA canister with a 2-hour regulatory control valve will be connected to the PE tubing to collect a representative soil vapor sample.

Investigation Derived Waste Management

All investigation derived waste (IDW) generated during the Site investigation will be stored in covered 55-gallon, Department of Transportation (DOT) approved, steel drums which will be sealed at the end of each work day Each drum will be labeled with the date, well/boring number, waste type (soil, purge water), and a point of contact. The drums will be stored in a secure area of the Site until the drums can be properly removed. An appropriate waste designation will be assigned based on the remedial investigation results and the IDW will be properly disposed of according to local, state, and federal regulations.

3.2 Description of Brownfield Site Remedy

The proposed remedy on the western quarter of the Site contemplates excavation and disposal of all soils down to an approximate development depth of 15 ft. below grade (ft-bg) (approximately -2.7 QBD) or to bedrock, whichever is shallower, as anticipated in the building. Additional soil removal would occur where accessible grossly contaminated soils are found, but contamination will not be chased beneath the Substation. Inaccessible materials would be addressed by institutional and engineering controls.

The proposed remedy for the eastern three-quarters of the property contemplates a combination of measures depending on the characteristic associated with individual development tracts. The proposed remediation includes removal of the upper 4 ft. of soil/fill to a development grade of 12 ft. QBD accompanied by hot spot removal, limited excavation, and capping.

Soil with LNAPL, DNAPL, creosote, or petroleum staining may be expected. Some of the soil will be extremely odorous. To control odors and dust, excavation may occur within an enclosure over the most contaminated former source and processing area, Area E and adjacent Area D, (see Additional Remedial Investigation Report (Draft), Fleming-Lee Shue, Inc., February 2010).

The enclosure will be large enough to accommodate excavation equipment and soil loading. The structure will have ventilation, air control, and a filter system to manage odors and VOCs. Foam may also be used to control odors.

It is estimated that approximately 30,000 tons of soil will be excavated as part of the remediation on the western quarter of the Site and approximately 20,000 tons of soil on the eastern three-quarters. Large pieces of debris such as wood and concrete will be segregated from the soils and set aside as construction and debris (C & D) for disposal. Stained soils will also be segregated for disposal. Additionally, there will be removal of several USTs, testing and removal of water from derelict processing kettles, and possible concrete demolition. Pre-characterization of soils before remediation begins will also occur. Unknown subsurface utilities may be on Site.

Air Monitoring will be required both on the Site, at the site perimeter, and within the excavation enclosure(s). Air monitoring includes dust monitoring, PID measurements, combustible gas measurements (Oxygen [O_2], Lower Explosive Limit [LEL], Carbon Monoxide [CO], Hydrogen Sulfide [H_2S]), and colorimetric tubes.

There is a NYCT substation and tunnel adjacent to the Site where extensive excavation will occur. There is a very high possibility that ultra-high voltage lines may transect the Site. The Health and Safety Officer (HSO) will work with the NYCT to have these lines clearly marked, de-energized if possible, and/or protected as required by NYCT prior to any excavation work. Work will comply with all utility clearance distances.

3.3 Description of Brownfield Site Kettle & Vault Interim Remedial Measure Plan

Investigation

Further investigation is needed to determine the nature of the contents and liquid volume in each unit before IRM measures can be employed. The investigation will start with opening each unit, collecting vapor measurements and probing for liquid volume and collecting samples from each unit for chemical analysis. The analysis will characterize the contents and profile the liquid for disposal.

Each unit will be explored first by opening the bung with non-sparking tools and inserting an explosimeter and screening for LEL, H_2S, and O_2. If conditions prove non-flammable, then a PID will be inserted to screen for organic vapors as will a Jerome mercury analyzer to monitor mercury vapor levels. Next, a sample of the contents will be collected for analysis using a bailer and/or peristaltic pump, or drum thief or similar apparatus. The units will be probed for their approximate dimensions, condition, and for free product.

Each unit with adequate liquid volume will be sampled and the samples analyzed for the following parameters:

- NYSDEC ASP 2005 TCL VOCs, EPA Method 8260
- NYSDEC ASP 2005 TCL SVOCs, EPA Method 8270
- NYSDEC ASP 2005 TAL metals, EPA Method 6010/7000
- Total Petroleum Hydrocarbons (TPH), Diesel & Gasoline range organics
- TCLP analysis as warranted by analytical results
- Field parameters: pH, conductivity, temperature, oxidation reduction potential, and dissolved oxygen measurement

The first phase will be sampling and evaluation of the results. The second phase will be removal, disposal, and stabilizing of the units.

Remedy

Remediation depends on the chemical and physical conditions of the contents of each unit. In general, the IRM will include the following parts:

1. Render the unit(s) inert to eliminate the potential for flammable and/or toxic vapors. This will be accomplished by either venting the interior with fresh air and/or introducing nitrogen or carbon dioxide to displace any vapors. Rendering the unit(s) inert will not be undertaken if unwarranted by the conditions. The decision on the means and methods for rendering the unit(s) inert will be based on the analytical data and field conditions.

2. Remove the liquid in each unit. Liquids in each unit will be removed by means of a vacuum truck. After removal, the interior may be power washed to remove residue and the rinse volume again removed by vacuum truck. The decision will be field based. The vacuum truck or tanker may remain on Site until all units are emptied, tested, and accepted at an approved disposal facility.

3. The units will be stabilized, after cleaning, if warranted by field conditions. Stabilization may include filling the interior with nitrogen, carbon dioxide, foam, or other inert material to displace the vapors. Alternatively, the top of the units may be removed to allow fresh air to vent the unit in lieu of adding inert materials. This decision will be based on the contents and condition of each unit.

4. The units will be bonded and/or grounded as necessary to reduce sparking from static electricity.

5. All work will be done with bay doors open to promote ventilation, such that there is air flow through the work area. Fans will be available to increase air flow if necessary. Air monitoring will follow the requirements in Table 2.

4.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The Health and Safety meeting will include all personnel and members of the Site Project Team. All Site workers must review and comprehend this HASP before entering the Site. The HSO or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask health and safety questions during attendance at a pre-field safety meeting. Field personnel will sign the acknowledgment form (Attachment I) maintained on-Site by the HSO. The Site Project team organization and roles are described below.

Health and Safety Officer

- Administers all aspects of the occupational health and safety program to FLS and AFF personnel
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites
- Assists management and supervisors in the health and safety training of employees
- Conducts inspections to identify unhealthy or unsafe conditions or work practices. Takes immediate corrective action.
- Investigates all accidents and takes action to eliminate accident causes
- Monitors to determine the degree of hazard
- Determines the protection levels and equipment required to ensure the safety of personnel
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels
- Monitors performance of all personnel to ensure compliance with the required safety procedures
- Ensures that all personnel have been trained in proper site-safety procedures including the use of Personal Protective Equipment (PPE), and have read and signed the Acknowledgment Form (Attachment I)
- Conducts daily health and safety briefings as necessary
- Halts work if necessary

- Ensures strict adherence to the Brownfield Site HASP
- Reviews personnel medical monitoring participation to ensure compliance
- Records safety infractions and corrective actions in field log
- Notifies subcontractors of unsafe conditions
- Ensure overall project objectives are being met
- Ensures that safety equipment is available
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations

Project Manager

- Ensure overall project objectives are being met
- Supports HSO

All FLS and AFF Employees

The minimum personal qualifications for each individual participating in field activities are as follows:

- Has had all OSHA-specific medical examinations including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators
- Participation in the FLS Occupational Health Monitoring Program
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4])
- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper personal protective safety equipment
- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries
- Be alert on Site and communicate unsafe conditions and safety infractions immediately.

Visitors

- Must be escorted upon entering the work location if they meet the health and safety requirements stated above. All non-qualified visitors will be limited to the support zone(s) for observation purposes.

- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper PPE
- Be alert on site and communicate unsafe conditions and safety infractions immediately.

5.0 POTENTIAL CHEMICAL, PHYSICAL AND BIOLOGICAL HAZARDS AND CONTROLS

This section discusses the potential chemical, physical, and biological hazards and controls associated with the investigation tasks above. A summary of potential Brownfield Site tasks, safety hazards, and safety requirements is presented in Table 1.

5.1 Site–Specific Potential Chemical Hazards/Controls

Based on data collected during previous investigations, the potential chemical hazards are creosote, petroleum hydrocarbons, and creosote-based SVOCs. The following are chemicals of concern:

- Creosote
- VOCs
    - Benzene
    - Toluene
    - Ethylbenzene
    - Xylene
- SVOCs
    - Polycyclic Aromatic Hydrocarbons
- Metals
    - Arsenic
    - Cadmium
    - lead
    - Mercury

Attachment III lists the recognized and suspected health hazards, exposure limits, physical and chemical properties, recommended protection levels and symptoms of exposure for the chemicals known or suspected. Any chemical hazards will be minimized by limiting exposure of personnel to soil and groundwater and by engineering control and PPE.

5.2 Physical Hazards/Controls

Physical hazards potentially present at the Site include, but are not limited to, the following:

Hazard	Control
Slip, trip and fall (uneven terrain and slippery surfaces)	Avoid uneven terrain, walk slowly, wear sturdy/supportive shoes
Environmental (heat/cold) stress	A discussion of heat stress and cold stress and related illnesses and controls is provided in Attachment IV.
Dust/Particulate Inhalation Hazard	Dust suppression and monitoring will be employed during this effort. A discussion of the dust suppression plan is presented in Section 7.11. The air monitoring requirements are presented in Section 8.0.
Vehicular Traffic	Avoid working in high traffic areas. If necessary, use cones, reflective vests, and consider use of a flagman/additional protection.
Fire	Ensure class ABC fire extinguisher is nearby to work area when using equipment that can provide an ignition source (heavy machinery, generators, power tools)
Noise hazards	Use ear plugs and/or ear muffs during demolition and excavation activities.
Use of heavy equipment	Stay clear of heavy equipment during operation. Maintain eye contact with operator when approaching equipment.
Flying/Falling Debris	Safety glasses and hard hats will be used during all demolition and excavation activities. Be vigilant.

Anticipated Site operations do not include the need for specific operations such as lockout/tag-out, scaffolds or confined spaces; therefore these items are not addressed in this HASP. If Site activities require these operations, the HASP will be amended and personnel properly trained, experienced and competent personnel shall be utilized.

5.3 Changing Conditions

Physical conditions change on Site and it is important to recognize this situation. One type of changing condition is the temporary enclosure. The structure is vulnerable to movement by wind or equipment and may become unstable with shifting ground and vibration. A growing excavation and building demolition may alter stability. It is important to be mindful of this potential and to periodically look for unsecured or damaged components supporting the structure. If these conditions occur, they should immediately be brought to the attention of the HSO and construction manager.

Other potentially changing conditions include gases and depth of excavation. As the excavation deepens below the breathing zone, it is possible for gases/vapors denser than air to accumulate. These gases must be monitored before entering the excavation or enclosure. This is especially true at the beginning of each work day after gases have had all night to accumulate. If air monitoring results identify concentrations above their established action levels, localized ventilation may be used to reduce the concentrations to below the action levels prior to the start of work.

5.4 Biological Hazards

General biological hazards present at the Brownfield Site include, but not limited to, the following:

- Bites or stings from insects (particularly ticks) resulting in skin inflammation, disease, or allergic reaction
- Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma
- Rodent and/or bird droppings inside vacant buildings

6.0 HEALTH AND SAFETY PROTOCOL

6.1 Site Work Hazard Evaluation

Upon review of contaminant levels and physical hazards, exposure routes and the nature of the remediation/excavation/construction tasks, it has been determined that Level D protection will be used to start all FLS/AFF field activities with a contingency to upgrade to Level C protection if warranted. Air monitoring and action levels for the appropriate level of PPE appear in Table 2.

6.2 Training

Knowledge of the safety rules, supplemented by compliance, is essential to safety. New employees will be provided orientation training by qualified personnel having at a minimum the 40-hour OSHA HAZWOPPER training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site. Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety-training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program. If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics
- Confined space entry (Not anticipated)
- Respirator care/use
- Hazard communication (hazardous chemicals)
- Slip, trip and fall hazards and fall protection
- Lockout/tagout procedures (Not anticipated)
- Scaffold use, and erection/dismantling (Not anticipated)
- Blood-borne Pathogens (Non-Medical)

Specialized training will be documented in the employees' personnel records and/or in a master training record.

6.3 Personal Hygiene

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol at the work site is prohibited. Field personnel taking prescription or non-prescription medication that could impair function or cause drowsiness should alert the HSO before work begins. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater or soil should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

6.4 Levels of Personal Protection

All PPE must be worn as required for each job in all operations where there is an exposure to hazardous conditions. A general description and discussion of the levels of protection that will be used for the Brownfield Site are presented in the succeeding sections.

6.4.1 Level D

Level D applies to work in areas where the possibility of contact with potentially contaminated media exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls
- Safety boots, with steel toe
- Safety glasses or face shield
- Hard hat
- Reflective vest
- Disposable nitrile gloves
- Hearing protection as needed

6.4.2 Level C

Level C is required when the action levels are exceeded per Table 2. Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D
- Full-face air purifying respirator (APR) with the combination cartridges for organic vapors, acid mist, and particulates cartridges. Coated disposable coveralls with hoods, as necessary
- Boot covers

6.5 General Workplace Safety Rules

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager—immediately.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions—Be alert!
- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.

6.6 Construction Equipment Safety Rules

A discussion of health and safety issues related to FLS and AFF employees performing work in the vicinity of common construction elements, such as electrical; compressed gas cylinders; ladders; aerial lifts; cranes; welding and brazing; tools; safety railings and other fall protection; scaffolds; excavations and trenches; motor vehicles and mechanized equipment, is provided in Attachment V.

6.7 Spill Containment Program

The cleanup of a chemical spill should only be done by knowledgeable and experienced personnel. Spill kits, consisting of absorbents and protective equipment should be available to clean up minor spills. A minor chemical spill is one that the FLS and AFF staff is capable of handling safely without the assistance of emergency personnel. All other chemical spills are considered major. For a major spill, contact the HSO.

Procedure for Responding to a Minor Chemical Spill

- Contact HSO to obtain guidance
- Alert people in immediate area of spill
- Wear PPE, minimum level D—**First assess the spill to determine whether you have sufficient protection to continue**
- Upgrade to level C to avoid breathing vapors from spill
- Confine spill to small area using absorbent, debris, soil etc.
- Absorb spill with vermiculite, dry sand, or oil-sorbent pads
- Collect residues, place in DOT-approved containers (labeled) and dispose as chemical waste
- Clean spill area

7.0 INDIVIDUAL SAFETY AND HEALTH PROGRAMS LISTING

The OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

7.1 Hazard Communication Program

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Important elements of the written program are required to include a master listing of chemicals, maintaining material safety data sheets on each chemical, and training of employees on the program, the chemicals exposed to, and safety data sheets.

7.2 Confined Space Entry Program

If employees enter a confined space that contains or has the potential to contain an atmospheric or physical hazard, this program is required. Either the ANSI Z117.1-1989 Safety Requirements or Permit-Required Confined Space Program per OSHA (29 CFR 1910.146) must be used as guidance to develop the company's program. Primary elements of the program are identification of applicable confined spaces, testing/monitoring, control or elimination of hazards, protective equipment, entry authorization, attendants, training, and rescue.

No FLS or AFF employee is authorized to enter a confined space without the specified training AND notifying the HSO and project manager.

7.3 Respiratory Protection Program

If employees are exposed to hazardous chemical, dusts, or aerosols above the OSHA Permissible Exposure Limits or ACGIH Threshold Limit Values, and/or employees wear respirators, this program is required. Program elements are written for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use.

7.4 Occupational Noise Exposure/Hearing Conservation Program

If employees are exposed to noise levels above 85 decibels on the A scale (85 dBA), protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as written program, noise monitoring, hearing evaluations and follow-on testing, personal protective equipment (hearing protection), and maintenance of medical records.

7.5 Lockout/Tagout Program

If employees deactivate or de-energize electrical controls, equipment, or circuits and are thus exposed to electrical energy, this program is required. Program elements include lockout when possible, tagout when lockout not possible, and the employer providing and controlling lockouts.

7.6 Assured Equipment Grounding Conductor Program

If the employer uses assured equipment grounding verses ground fault circuit interrupters to provide employee electrical grounding protection, this program is required. Program elements include the inclusion of all cord sets, receptacles and cord/plug connected equipment and tools; a written program; quarterly testing; recording of each test by logging, color coding, or other equally effective means; and designation of a competent person to run the program.

7.7 Emergency Response Plan

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented to handle anticipated emergencies. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

7.8 Dust Suppression Plan

The following techniques have been shown to be effective for the controlling of the generation and mitigation of dust during construction activities:

- Applying water on haul roads
- Wetting equipment and excavation faces
- Spraying water on buckets during excavation and dumping
- Hauling material in properly sealed or watertight containers

- Restricting vehicle speeds to 10 miles per hour (mph)
- Covering excavated areas and material after excavation activity ceases
- Reducing the excavation size and/or number of excavations
- Applying dust suppressants such as calcium chloride, water, or gravel in high vehicle traffic areas
- To evaluate the effectiveness of the dust suppression measures, air-monitoring utilizing real-time dust-monitoring equipment will be performed. The requirements for air monitoring during soil disturbance activities are presented in Section 7.

7.9 Building Access

FLS and AFF employees are prohibited from entering buildings or other structures deemed unsafe and/or structurally unsound. Building 4 has been determined to pose a Class-1 Immediately Hazardous condition for structural reasons by the New York City Department of Buildings (NYC DOB).

The NYC DOB ECB Violation Number 34993699N (2/08/13) reads:

"FAILURE TO MAINTAIN BLDG WALLS OR APPURTENANCES; NOTED: AT EXPOSURE #1 (ORCHARD STREET SIDE) OBSERVED VERTICAL CRACK FROM 1ST FL TO PARAPIT WALL AT ROOF LINE, WALL BULGING, SEPARATION AT CRACK APPROX. 2", BROKEN"

7.10 Site-Specific Health and Safety Guidelines

Site-Specific Health and Safety guidelines are included in Attachment VI.

8.0 AIR QUALITY MONITORING AND ACTION LEVELS

Air quality monitoring equipment will be used during all work to monitor total organic vapors, dust, O2, LEL, H_2S, CO, and mercury. A PID (to monitor total volatile organic concentrations), a particulate monitor, a combustible gas indicator , an oxygen meter, colorimetric tubes, a CO meter, and a Jerome meter will be used during on-Site activities. Air monitoring requirements by field activity is specified in Table 1. The instruments will be calibrated daily or as necessary due to field conditions and the results noted in the project field book. A background level will be established, at a minimum, on a daily basis, and recorded in the field book. The action levels and required responses are listed in the Table 2.

9.0 SITE/WORK AREA MANAGEMENT

Per the HAZWOPER regulation, site control measures shall be implemented to protect the workers and public. A typical Site work area will consist of an exclusion zone where the actual field activity will take place, a contaminant reduction zone, and a support zone located outside the contaminant reduction and exclusion zones. The HSO will implement these zones based on the work activities that will be performed in each area. The size of the zones will be based on work activities, equipment usage, and air monitoring results. Only 40-hour HAZWOPPER-trained personnel will be allowed beyond the support zone.

Levels of personal protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

Fences, guardrails, and access control devices shall be provided and maintained by the construction contractor throughout the project activities in accordance with 29 CFR 1926. In addition, barricades, warning signs and devices, temporary lighting and other safety measures shall be provided by the construction contractor, as required, to protect site personnel.

9.1 Work Zones

Entry into the work zones begins once a person comes on Site. This approach reflects the dynamic nature of the operations and the need for everyone to be aware of the conditions while on-site. Using the concept of three zones for the Site, the following areas are identified:

Exclusion Zone

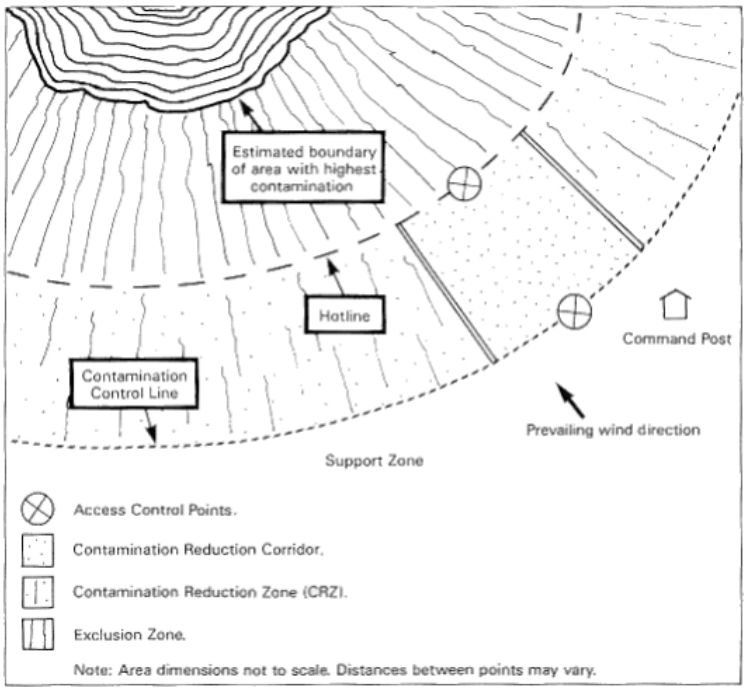
The Exclusion Zone (EZ) will be within a designated area to be determined based on where field activities will take place. No worker shall enter the Exclusion Zone without the required training and PPE. In the event that a worker in the EZ requires a replacement or his/her protective suit or respirator filters, the worker shall exit the EZ and utilize proper decontamination procedures in the CRZ, replace or repair the defective PPE, then re-enter the EZ.

Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) will be within a designated area to be determined based on where field activities will take place. Workers shall be aware of and follow all Site control procedures with respect to entering and exiting the CRZ, to ensure that they are not exposed to contaminants and to minimize the potential for contamination of workers and the spread of contamination outside the EZ. These measures include having workers follow the proper procedures for donning and doffing PPE and washing in the CRZ. The measures also address the decontamination procedures for use when moving equipment between zones. The CRZ shall consist of an area to drop off equipment, plastic bags to dispose of protective clothing, adequate soap and water for workers and equipment decontamination and a means of capturing wash water generated during decontamination.

Support Zone

This area starts at the project/property fence line and extends to the entry to where field work will be conducted. In this area all personnel shall wear Level D PPE. An example of the exclusion zone layout appears below. (Source: https://www.osha.gov/Publications/complinks/OSHG-HazWaste/9-10.pdf.



9.2 Personnel Decontamination

Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps:

Within the CRZ, the following stations will be established for the decontamination of equipment and personnel wearing Level D and Level C protection:

- Station 1: Equipment Drop – equipment used in the exclusion zone is left for use when returning to work after breaks or stored in a designated area at the end of each work day.

- Station 2: Equipment and Personal Protective Equipment Decontamination – If the equipment will be removed from the site, the equipment will be washed or wiped with a mild soap solution (e.g. Alconox or equivalent) and rinsed with clean water and wiped dry. Wash and rinse buckets with brushes should be set up in this station along with containers for trash and water containment for disposal purposes. Plastic sheeting can be used to collect material for containerization and proper disposal.

- Station 3: Respirator Cartridge Change Out – expired respirator cartridges are exchanged for new cartridges and the worker returns to the exclusion zone.

- Station 4: Change Out – removal of boots, gloves, and disposable coveralls. All PPE will be collected and containerized for proper disposal.

- Station 5: Respirator Removal – worker can remove respirator upon arrival at this station. The respirator will receive final cleaning, dried, and properly stored for future use. Workers can then clean their hands with soap and water and proceed to the clean zone.

Level D decontamination stations can be set up in a similar manner as described above with the elimination of Station 3 and Station 5.

9.3 Vehicle Decontamination

For large equipment such as excavators, backhoes, and haul vehicles, a bermed decontamination pad lined with plastic sheeting should be set up to wash the equipment and contain the rinse water prior to leaving the site. A power washer should be used to remove soil and other materials from the entire vehicle before it leaves the containment area. The rinse water should be collected and containerized for disposal.

10.0 EMERGENCY AND CONTINGENCY PLAN

Emergency communications will be maintained during all on-site field activities. The emergency route to the hospital is depicted on Figure 3 and emergency contacts and their phone numbers are presented in Table 3.

A first aid kit will be available on-site at all times for any minor on-site injuries. Emergency medical assistance or ambulance can be reached by calling 911 for more severe injuries.

All OSHA recordable injuries and illnesses will be reported using OSHA Form 301 (Attachment VII).

General Emergency Response Procedures:

Any employee discovering a fire, explosion, or release of hazardous materials, which could potentially harm human health, or the environment, must immediately notify 911 to activate appropriate emergency procedures.

The following steps will be taken to expeditiously secure the appropriate assistance:

- Ascertain pertinent information (location, type of emergency condition, presence of possible victims which may be hurt or trapped nearby to the condition) and immediately contact and provide this information to 911 emergency personnel.

- Identify yourself and give the exact location first, then the type of emergency, and the presence of possible victims which may be hurt or trapped nearby to the condition. Then await the arrival of emergency response police officers, staying a safe distance from the emergency condition if warranted.

- Contact the FLS HSO and Project Manager and notify them of situation while waiting for emergency personnel.

- If possible, have a responsible person nearby to help flag down responding emergency services personnel as they respond.

- Emergency response personnel will assess the reported emergency and advise what appropriate action needs to be taken (i.e., evacuate an area).

Unless specifically trained to handle an emergency of the type you may be reporting, please do not attempt to render assistance in handling the emergency unless ordered to do so by competent authority or emergency services personnel.

Emergency Medical Services

In the event of an injury or illness that requires medical treatment, the HSO will contact emergency services by dialing 911 (ambulance) for the transportation of the individual. In the event ambulance service is not available or the response time is not suitable, the following are driving directions to the hospital:

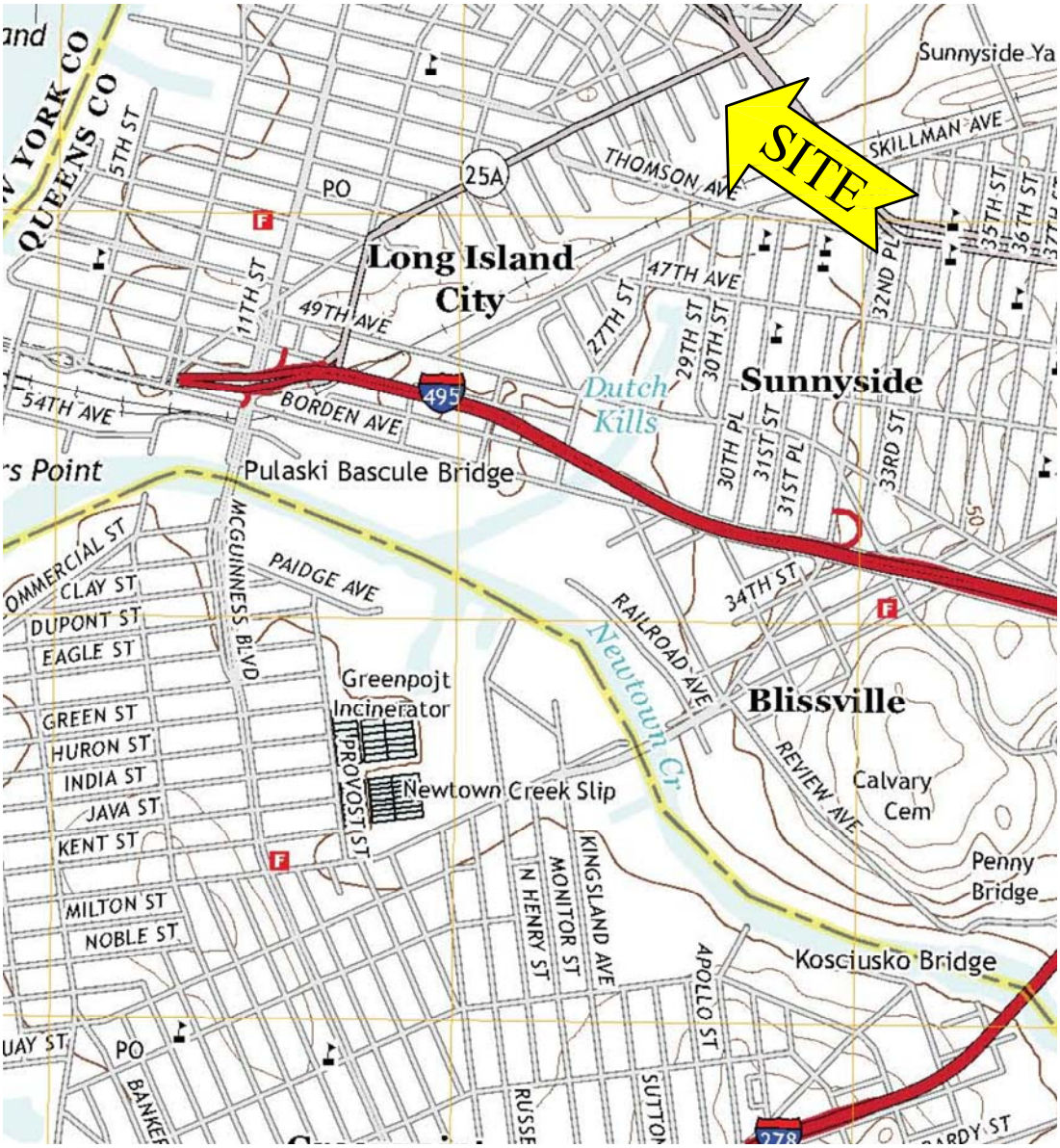
HOSPITAL

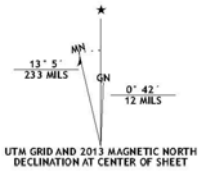
Mt Sinai Hospital of Queens: (718) 932-1000 (main line)
2510 30th Ave, Astoria,
On 30th Avenue
Between Crescent Avenue and 29th Street
NY 11102, US

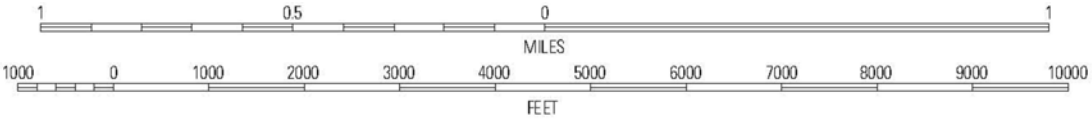
- Proceed northeast on Northern Boulevard
- Continue on 31st Street
- Turn left on 30th Street, arrive at destination

Figure 3 provides a map and route to the hospital.

Figures







CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

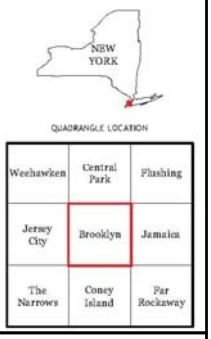


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FIGURE 1: BROWNFIELD SITE LOCATION MAP

SITE: Queens Plaza Development
Long Island City, NY
CLIENT: TST LIC Development LLC

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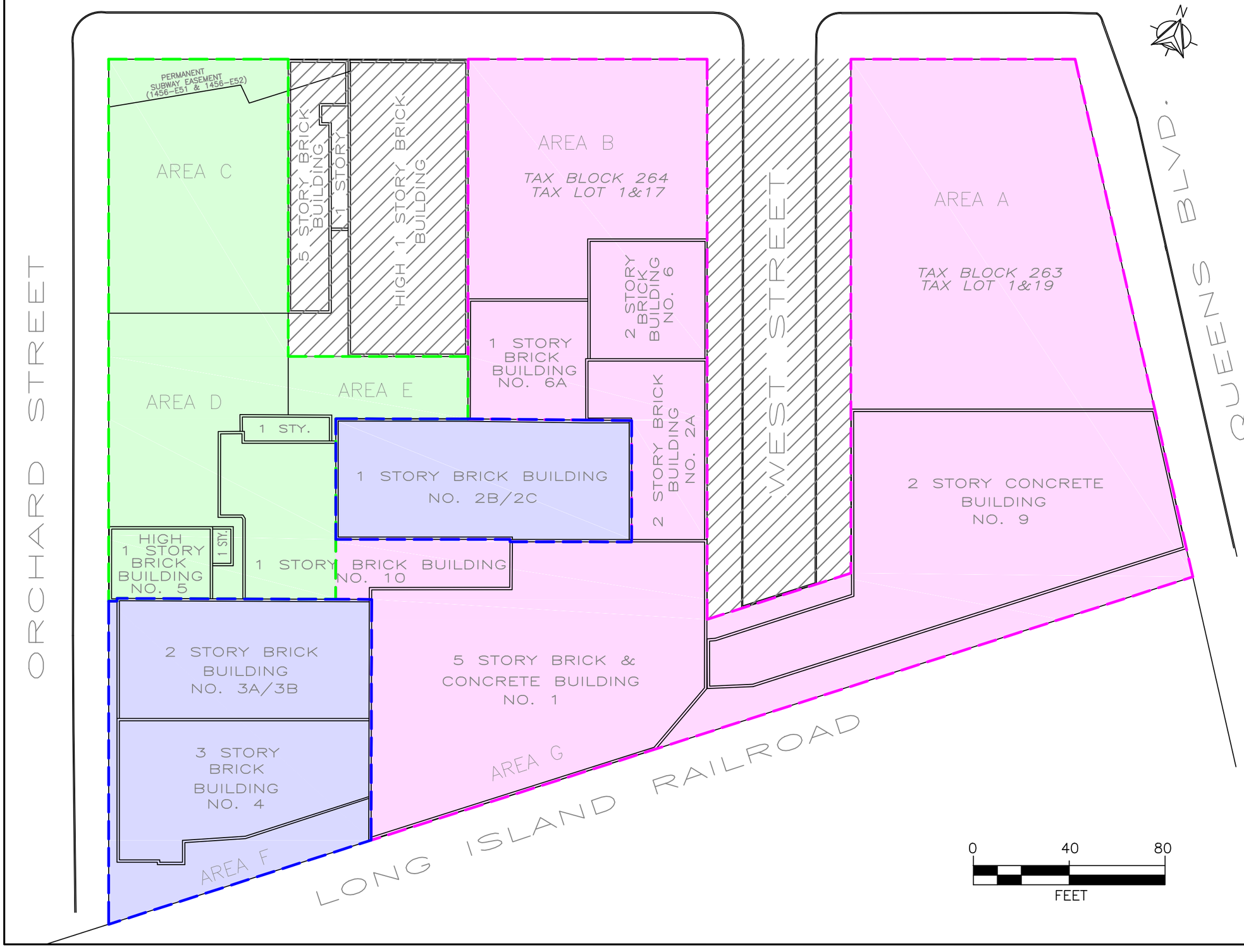

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Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Development

FIGURE 2

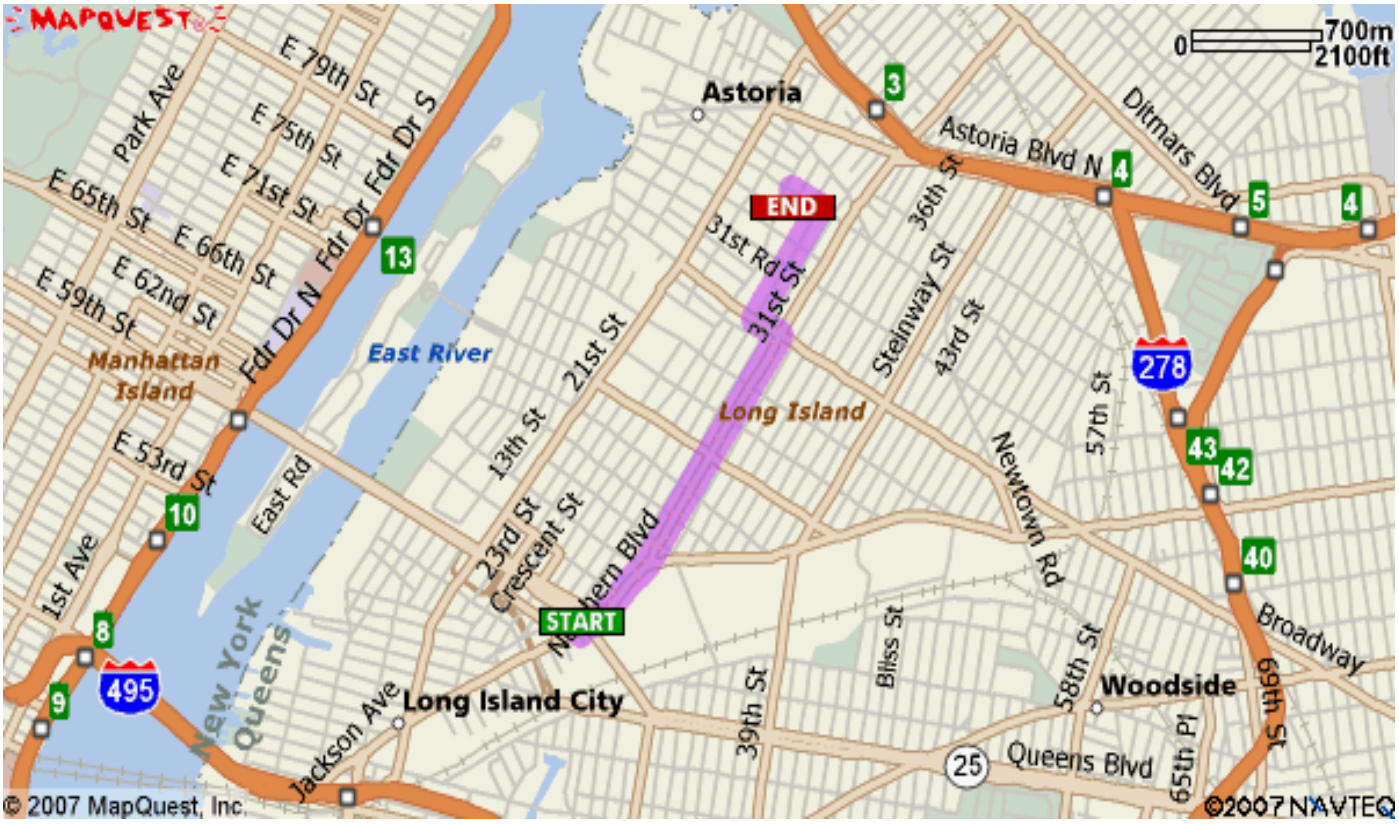
SITE PLAN

Date
May 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE



Mt Sinai Hospital of Queens:
2510 30th Ave, Astoria, NY 11102, US

Directions Distance **Total Est. Time:** 6 minutes **Total Est. Distance:** 1.76 miles

START 1: Start out going NORTHWEST on WEST ST toward JACKSON AVE / NY-25A. <0.1 miles

2: Turn RIGHT onto JACKSON AVE / NY-25A. Continue to follow NY-25A. 0.2 miles

3: Turn SLIGHT LEFT onto 31ST ST. 0.8 miles

4: Turn LEFT onto BROADWAY. <0.1 miles

5: Turn RIGHT onto 29TH ST. 0.3 miles

6: Turn LEFT onto 30TH AVE. 0.1 miles

END 7: End at **Mt Sinai Hospital of Queens:** 2510 30th Ave, Astoria, NY 11102, US

Fleming Lee Shue

FIGURE 3: ROUTE TO THE MOUNT SINAI HOSPITAL OF QUEENS

SITE: Queens Plaza Residential Development
42-14 West Street, Long Island City, Queens, NY
CLIENT: TST LIC Development LLC

Tables

Table 1 – Tasks, Safety Hazards & Safety Requirements

Task/Activity	Hazards	Preventative Measures	Air Monitoring Requirements
Pre-characterization Soil Sampling with Test Pits or Soil Borings	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals.	Clear utilities beforehand, use normal sampling procedures, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, and Jerome measurements for Mercury (test pits only)
Excavation - Outside	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Excavation – Inside Enclosure	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, CO, CO_2, LEL, noise, vibration	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required. Check for accumulation of vapors each morning and after period of inactivity.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and CO, CO_2, LEL measurements.
UST Removal	Subsurface utilities, vehicle hazards, trips, falls, materials handling, VOCs, SVOCs, and metals. Falling objects, LNAPL, DNAPL, LEL, noise	Clear utilities beforehand, exercise caution around equipment and excavations, wet area if necessary to control dust and odors. PPE as required.	PID measurements for VOCs, colorimetric tubes for benzene, particulate monitoring for SVOCs and metals, Jerome measurements for Mercury, and LEL measurements.
Kettle Investigation and Cleaning	Vehicle hazards, trips, falls, materials handling, VOCs, lye, and unknowns	PPE as required with the addition of a face shield to protect against splashing.	PID measurements for VOCs, colorimetric tubes for benzene, and Jerome measurements for Mercury.

LEL - Lower Explosive Limit
PID - Photoionization detector
VOCs - Volatile organic compounds
SVOCs - Semi-volatile organic compounds
LNAPL - Light non-aqueous phase liquid
DNAPL - Dense non-aqueous phase liquid

Table 2 Air Monitoring, Action Levels, PPE

Instrument	Action Level	Response Action
Gas/Vapor		
PID	<0.5 ppm total VOCs in the workers' breathing zone (WBZ)	Continue work in Level D
PID	>0.5 ppm for a sustained period of 5 minutes in the WBZ	Use detector tube to measure benzene concentration
Colorimetric detector tube	> 0.5 ppm for benzene in the WBZ	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the benzene concentration is still greater than 0.5 ppm, upgrade to Level C, notify HSO
PID	1 to 10 ppm in the WBZ (no benzene)	Continue work in Level D
	> 10 ppm for a sustained period of 5 minutes in the WBZ (confirmed absence of benzene)	Discontinue work and allow the work area to vent. Use mechanical ventilation as necessary. If after 15 minutes the PID reading is still greater than 10 ppm, upgrade to Level C, notify HSO
	> 100 ppm for a sustained period of 5 minutes in the WBZ	Stop work. Resume work when readings are less than 100 ppm
Combustible Gas Indicator	Less than 20% LEL	Continue work
	Greater than 20% LEL	Stop work. Resume work when less than 20% LEL
Oxygen Monitor	Above 19.5% and less than 23.5%	Continue work
	Outside of this range	Stop work. Resume work when concentration is back in this acceptable range
Carbon Monoxide Monitor	Less than 25 ppm	Continue work
	Above 25 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 25 ppm.
Carbon Dioxide Monitor	<1000 ppm	Continue work
	>1000 ppm	Stop work. Use mechanical ventilation as necessary. Resume work when less than 1000 ppm.
Particulates		
Particulate Monitor	<100 µg/m^3 above background (upwind location)	Continue work, Level D
	> 100 µg/m3 above background for a period of 5 minutes in the WBZ	Stop work. Apply dust suppression measures. Resume work using Level D only if <100 µg/m^3 above background.
	>150 µg/m^3 above background for a sustained period of 5 minutes.	Stop work. Re-evaluate work. Collect air samples for As, Pb, Cd, and PAHs.
Mercury		
Jerome Monitor	<0.025 mg/m^3	Continue work, Level D
	> 0.025 mg/m3 for a period of 5 minutes in the WBZ	Stop work. Allow the work area to vent. Use mechanical ventilation as necessary. Resume work using Level D only if <0.025 mg/$m^{3.}$
	** Should Level C be necessary, contact the CIH as special coveralls and respirator cartridges are required.	

Table 3 – Key Personnel Emergency Phone Numbers

New York City Police Department	911
New York City Fire Department	911
New York University Medical Center 550 1st Avenue New York, NY	(212) 263-7300
Mount Sinai of Queens Hospital 25-10 30th Avenue Astoria, NY	(718) 932-1000
Emergency Medical Service (ambulance)	911
Patrick Shiels, Tishman Speyer	(212) 715-0361
Arnold F. Fleming, P. E., Project Director	(212) 675-3225
Steven Panter, FLS Project Manager	(212) 675-3225
TBD, Site Health and Safety Officer	(212) 675-3225
Tom Eng, CIH	(201) 417-3079
National Response Center	(800) 424-8802
NYSDEC Spill Hotline	(800) 457-7362

Attachment I

HASP ACKNOWLEDGMENT FORM

The following personnel have read the site-specific HASP and are familiar with its provisions.

Print Name	*Signature*	*Company*	*Function*	*Date*

Attachment II

Note: The Site is broken into two sections, BCP Site A and BCP Site B. BCP Site B is broken down further into Operable Units 1 & 2. The summary information is presented in this manner.
Refer to Figure 2, Site Plan

Table 7 – Summary of VOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Benzene	94/151	1.1	665	6,440	35,800
Toluene	45/151	0.62	2,250	42,200	195,000
Ethylbenzene	37/151	0.83	3,050	31,200	67,000
Total Xylene	28/151	0.96	11,950	119,500	312,000
BTEX	25/148	0.99	14,4727	192,960	567,300
Methylene chloride	122/151	2	116	4,200	13,000
Total VOCs	110/151	9	13,030	195,154	759,966
Tetrachloroethylene	132/151	2	392	3,300	230,000
Trichloroethylene	13/153	8	368	1,400	2,600

NDs – Number of non-detects among samples (non-detects/no. samples). Min., median, 90th %, and max. for detected results.

Table 8 – Summary of SVOCs on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Naphthalene	17/119	67	111,000	1,500,000	3,320,000
2- Methylnaphthalene	12/83	17	181,000	1,550,000	3,330,000
Benzo(a)pyrene	56/119	16.9	522	2,360	12,000
Benzoaanthracene	43/119	21.5	709	3,420	13,000
Acenaphthene	17/119	21.3	32,200	320,000	707,000
Dibenzofuran	17/119	47	68,900	312,000	780,000
Fluorene	20/119	17.1	19,300	149,000	411,000
Total SVOCs	9/126	11	164,190	2,850,301	8,576,290

Table 9 – Summary of Metals on BCP Site A, mg/kg

Compound	NDs	Min	Median	90th %	Max
Arsenic	20/74	0.48	4	14.8	47
Barium	0/74	10.3	86	290	930
Cadmium	46/74	0.44	0.79	2.5	15.2
Chromium	0/74	3.95	22	41	64
Lead	2/74	2.76	29.8	511	2,190
Mercury	38/74	0.04	0.29	1.6	4.9
Nickel	0/74	2.97	16.7	24	42.7
Selenium	65/74	1.3	2	2.7	2.7
Silver	70/74	0.98	1.0	1.1	1.1
Zinc	0/73	6.36	77	372	6,100

Table 10 – Summary of Pesticides on BCP Site A, µg/kg

Compound	NDs	Min	Median	90th %	Max
Alpha BHC	71/76	10.9	58.2	930	930
Beta BHC	75/76	2.4	2.4	2.4	2.4
Alpha chlordane	36/39	200	580	660	660
Gamma chlordane	21/29	16	178	730	730
44-DDD	43/76	2.3	120	1,300	19,500
44-DDE	60/76	3.1	12.95	350	500
44-DDT	55/76	3.1	52	1,000	1,800
Dieldrin	64/76	5.8	17.5	155	230
Endosulfan II	72/76	2.3	74.5	220	220
Heptachlor epoxide	71/76	43	76	380	380

PCBs: 42 out of 44 samples collected for PBCs were non-detect. The remaining two results measured 99.6 µg/kg and 410 µg/kg.

Attachment III

Attachment III - Health Hazards for Contaminants of Concern

Contaminant	Recognized and Suspected Health Hazards
Creosote	**Recognized** carcinogen
	Suspected respiratory toxicant and skin or sense organ toxicant
Volatile Organic Compounds (VOCs) Including BTEX Benzene, Toulene, Ethylbenzene and Xylene	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Semi- Volatile Organic Compounds (SVOCs) Including Poly Aromatic Hydrocarbons (PAHs)	**Suspected** carcinogen; cardiovascular or blood toxicant; gastrointestinal or liver toxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Arsenic	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Beryllium	**Recognized** carcinogen; developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Copper	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant
Chromium	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Cyanide	**Suspected** cardiovascular or blood toxicant; endocrine toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Iron	**Suspected** cardiovascular or blood toxicant; developmental toxicant; gastrointestinal or liver toxicant; kidney toxicant; reproductive toxicant; respiratory toxicant

Contaminant	Recognized and Suspected Health Hazards
Lead	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; respiratory toxicant; skin or sense organ toxicant
Mercury	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Nickel	**Recognized** skin or sense organ toxicant and respiratory toxicant
Pesticides	**Recognized** developmental toxicant
	Suspected cardiovascular or blood toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Polychlorinated Biphenyls	**Recognized** carcinogen, developmental toxicant
	Suspected endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Tetrachloroethylene	**Recognized** carcinogen; developmental toxicant; reproductive toxicant
	Suspected cardiovascular or blood toxicant; developmental toxicant; endocrine toxicant; gastrointestinal or liver toxicant; immunotoxicant; kidney toxicant; neurotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant
Zinc	**Suspected** cardiovascular or blood toxicant; developmental toxicant; immunotoxicant; reproductive toxicant; respiratory toxicant; skin or sense organ toxicant

International Chemical Safety Cards

BENZENE

ICSC: 0015

Cyclohexatriene
Benzol
C_6H_6
Molecular mass: 78.1

ICSC # 0015
CAS # 71-43-2
RTECS # CY1400000
UN # 1114
EC # 601-020-00-8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion: see chemical dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin (further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES		face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Sore throat. Vomiting (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Fireproof. Separated from food and feedstuffs, oxidants and halogens.	Do not transport with food and feedstuffs. F symbol T symbol R: 45-11-48/23/24/25 S: 53-45 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0015

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZENE

ICSC: 0015

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
Reacts violently with oxidants and halogens causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm; 32 mg/m^3 (as TWA) A2 (ACGIH 1991-1992).
OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm See Appendix F
NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A
NIOSH IDLH: Potential occupational carcinogen 500 ppm

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and through the skin.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersion, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure far above the occupational exposure limit may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the blood forming organs, liver and immune system. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES	Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 25°C: 0.18 Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: (c.c.) -11°C Auto-ignition temperature: about 500°C Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow: 2.13
ENVIRONMENTAL DATA		

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-7
NFPA Code: H2; F3; R0;

ADDITIONAL INFORMATION

ICSC: 0015 **BENZENE**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE: Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

Material Safety Data Sheet

Beryllium, powder, -325 mesh, 99+%

ACC# 99072

Section 1 - Chemical Product and Company Identification

MSDS Name: Beryllium, powder, -325 mesh, 99+%
Catalog Numbers: AC317870000, AC317870050
Synonyms: None.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-41-7	Beryllium	>99	231-150-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: gray-white flakes.
Warning! Cancer hazard. Can be explosive when exposed to heat or flames. Causes eye, skin, and respiratory tract irritation. Inhalation of fumes may cause metal-fume fever.
Target Organs: Lungs.

Potential Health Effects

Eye: Causes eye irritation. May cause conjunctivitis and corneal inflammation.
Skin: Causes skin irritation. May cause contact dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. If heated, dust or fume may cause respiratory tract irritation.
Chronic: Chronic beryllium disease, an immunologically mediated response occurring after a latent period ranging from a few weeks to many years, causes difficult breathing on exertion, weight loss, nonproductive cough, fatigue, chest pain, anorexia, and weakness.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid.
Extinguishing Media: Do NOT use carbon dioxide. Do NOT use halogenated agents. Use approved class D extinguishing agents or smother with dry sand, clay, or sodium bicarbonate. DO NOT USE WATER!
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not breathe dust. Keep away from heat, sparks and flame. Use only with adequate ventilation or respiratory protection.
Storage: Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Beryllium	0.002 mg/m3 TWA; 0.01 mg/m3 STEL	4 mg/m3 IDLH	2 ug/m3 TWA; 5 æg/m3 Ceiling

OSHA Vacated PELs: Beryllium: 2 ug/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Flakes
Appearance: gray-white
Odor: odorless
pH: Not available.
Vapor Pressure: 1.85 mm Hg
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 2970 deg C
Freezing/Melting Point:1287 deg C
Decomposition Temperature: Not available.
Solubility: Not available.
Specific Gravity/Density:1.85 @ 20C
Molecular Formula: Be
Molecular Weight:9.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Ignition sources, dust generation, excess heat, exposure to flame.
Incompatibilities with Other Materials: Oxidizing agents, phosphorus, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), carbontetrachloride, chlorinated hydrocarbons, Contact with acids causes evolution of flammable hydrogen gas..
Hazardous Decomposition Products: Hydrogen gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-41-7: DS1750000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7440-41-7:

- **ACGIH:**
  A1 - Confirmed Human Carcinogen
- **California:**
  carcinogen, initial date 10/1/87
- **NTP:**
  Known carcinogen
- **IARC:**
  Group 1 carcinogen

Epidemiology: Epidemiologic studies have demonstrated a statistically significant increase in lung cancer mortality in beryllium-exposed workers.
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: CAS# 7440-41-7: waste number P015.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	BERYLLIUM POWDER
Hazard Class:		6.1
UN Number:		UN1567
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7440-41-7 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-41-7: 10 lb final RQ (no reporting of releases of this hazardous substance is required

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7440-41-7: immediate, delayed, fire.

Section 313

This material contains Beryllium (CAS# 7440-41-7, >99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7440-41-7 (listed as Beryllium compounds, n.o.s.) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-41-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-41-7 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-41-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Beryllium, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 7440-41-7: 0.1 æg/day NSRL

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+

Risk Phrases:

R 25 Toxic if swallowed.
R 26 Very toxic by inhalation.
R 36/37/38 Irritating to eyes, respiratory system and skin.
R 43 May cause sensitization by skin contact.
R 49 May cause cancer by inhalation.
R 48/23 Toxic : danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 7440-41-7: No information available.

Canada - DSL/NDSL

CAS# 7440-41-7 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B4, D2A, D1A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7440-41-7 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 1/21/1998
Revision #5 Date: 8/23/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet
Chloroform

ACC# 04770

Section 1 - Chemical Product and Company Identification

MSDS Name: Chloroform
Catalog Numbers: AC95232184, S79960, S79960-1, S79960HPLC-2, S79960SPEC-1, S79960SPEC-2, C2974LC, C297POP19, C297POP200, C297POP50, C297RS115, C297RS200, C297RS28, C297RS50, C297SS115, C297SS19, C297SS200, C297SS28, C297SS50, C29820LC, C298FB115, C298FB19, C298FB200, C298FB50, C298J1, C298POP19, C298POP200, C298POP50, C298POPB19, C298POPB200, C298POPB50, C298RB115, C298RB19, C298RB200, C298RB50, C298RB500, C298RS115, C298RS19, C298RS200, C298RS28, C298RS50, C298SS-11, C298SS19, C298SS28, C605-1, C605-4, C606POP19, C606POP200, C606POP50, C606RS115, C606RS200, C606RS28, C606RS50, C606SS115, C606SS19, C606SS200, C606SS28, C606SS50
Synonyms: Formyl Trichloride; Methane Trichloride; Methenyl Trichloride; Methyl Trichloride; Trichlormethan; Trichloroform; Trichloromethane.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-66-3	Chloroform	100	200-663-8
25377-72-4	Amylene	<1.0	246-916-6

Hazard Symbols: XN
Risk Phrases: 22 38 40 48/20/22

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. May cause central nervous system depression. May cause cardiac disturbances. May cause cancer based on animal studies. This substance has caused adverse reproductive and fetal effects in animals. May be harmful if swallowed. **Caution!** Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Light sensitive.
Target Organs: Blood, kidneys, heart, central nervous system, liver, cardiovascular system, excretory system, reproductive system.

Potential Health Effects

Eye: Causes moderate eye irritation. Contact with liquid causes immediate burning pain, tearing, and

reddening of the conjunctiva.
Skin: Causes mild skin irritation. Prolonged or repeated contact may dry/defat the skin and cause irritation. Absorption of liquid through intact skin is possible and may cause sys temic poisoning if contact with liquid is prolonged.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver damage. May cause cardiac disturbances. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. Possible aspiration hazard. May cause hallucinations and distorted perceptions.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause cardiac sensitization and possible failure. Inhalation of large amounts may cause respiratory stimulation, followed by respiratory depression, convulsions and possible death due to respiratory paralysis. May be absorbed through the lungs. Causes irritation of the mucous membrane and upper respiratory tract.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause dermatitis. May cause reproductive and fetal effects. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects. Toxicity may be increased by exposure to alcohol, steroids, and ketones. Prolonged exposure may cause liver, kidney, and heart damage.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Causes cardiac sensitization to endogenous catelcholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine. Persons with liver, kidney, or central nervous system diseases may be at increased risk from exposure to this product. Alcoholic beverage consumption may enhance the toxic effects of this substance. Effects may be delayed.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Substance is nonflammable. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire. Do NOT get water inside containers. Do NOT use straight streams of water. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use water spray, fog or regular foam. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Do not breathe dust, vapor, mist, or gas. Do not ingest or inhale. Store protected from light.
Storage: Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store near alkaline substances. Separate from strong mineral acids.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chloroform	10 ppm TWA	500 ppm IDLH	50 ppm Ceiling; 240 mg/m3 Ceiling
Amylene	none listed	none listed	none listed

OSHA Vacated PELs: Chloroform: 2 ppm TWA; 9.78 mg/m3 TWA Amylene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweet, fruity odor - ethereal odor
pH: Not available.
Vapor Pressure: 160 mm Hg @ 20 deg C
Vapor Density: 4.12 (Air=1)
Evaporation Rate:11.6 (Butyl acetate=1)

Viscosity: 0.58 cps @ 20 deg C
Boiling Point: 60.5-61.5 deg C
Freezing/Melting Point:-63 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble.
Specific Gravity/Density:1.492 (Water=1)
Molecular Formula:CHCl3
Molecular Weight:119.366

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Light sensitive.
Conditions to Avoid: High temperatures, incompatible materials, light.
Incompatibilities with Other Materials: Strong oxidizing agents, aluminum, fluorine, magnesium, sodium potassium, lithium, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), dinitrogen tetraoxide, sodium + methanol, potassium-tert-butoxide, chemically active metals, Attacks some forms of plastics, rubbers, and coatings., nitrogen tetroxide, acetone + alkali, disilane, perchloric acid + phosphorus pentoxide, sodium methylate, triisopropylphosphine, sodium methoxide + methanol.
Hazardous Decomposition Products: Hydrogen chloride, carbon monoxide, carbon dioxide, chlorine, phosgene gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 67-66-3: FS9100000
CAS# 25377-72-4 unlisted.
LD50/LC50:
CAS# 67-66-3:
Draize test, rabbit, eye: 148 mg;
Draize test, rabbit, eye: 20 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 47702 mg/m3/4H;
Oral, mouse: LD50 = 36 mg/kg;
Oral, rat: LD50 = 695 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;

CAS# 25377-72-4:

Carcinogenicity:
CAS# 67-66-3:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 10/1/87
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2B carcinogen CAS# 25377-72-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Oral, rat: TDLo = 13832 mg/kg/2Y-C (Tumorigenic - Carcinogen ic by RTECS criteria - Blood - leukemia).; Oral, mouse: TDLo = 127 gm/kg/92W-I (Tumorigenic - Carcinogenic by RTECS criteria - Liver - tumors).; Oral, rat: TD = 98 gm/kg/78W-I (Tumorigenic - neoplastic by RTECS

criteria - Kidney, Ureter, Bladder - Kidney tumors and Endocrine - thyroid tumors).; Oral, mouse: TD = 18 gm/kg/17W-I (Tumorigenic - neoplastic by RTECS criteria - Liver - tumor s).;
Teratogenicity: Oral, rat: TDL0 = 1260 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Specific Developmental Abnormalities - musculoskeletal system.; Inhalation, rat: TCLo = 100 ppm/7H (female 6-15 day(s) after conception) Specific Developmental Abnormalities - gastrointestinal system and homeostasis.; Inhalation, mouse: TCLo = 100 ppm/7H (female 8-15 day(s) after conception) Specific Developmental Abnormalities - craniofacial (including nose and tongue).
Reproductive Effects: Inhalation, rat: TCLo = 30 ppm/7H (female 6-15 day(s) after conception) Fertility - other measures of fertility.; Inhalation, rat: TCLo = 300 ppm/7H (female 6-15 day(s) after conception) Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated) and post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Neurotoxicity: No information available.
Mutagenicity: DNA Inhibition: Human, HeLa cell = 19 mmol/L.; Sister Chromatid Exchange: Human, Lymphocyte = 10 mmol/L.; Micronucleus Test: Oral, rat = 4 mmol/kg.; Unscheduled DNA Synthesis: Oral, rat = 1 gm/kg.; Sister Chromatid Exchange: Hamster, Embryo = 100 umol/L.
Other Studies: Open irritation test: Administration onto the skin (rabbit) 10 mg/24H (Mild). Standard Draize Test: Administratio n onto the skin (rabbit) = 500 mg/24H (Mild). Standard D raize Test: Administration into the eye (rabbit) = 20 mg /24H (Moderate).

Section 12 - Ecological Information

Ecotoxicity: Fish: Channel catfish: LC50 = 75 ppm; 96 Hr; Unspecified Rainbow trout: LC50 = 43.8 mg/L; 96 Hr; Static bioassay Fathead Minnow: LC50 = 129.0 mg/L; 96 Hr; Static bioassay (pH = 7.6-8.3) Bluegill/Sunfish: LC50 = 100.0 mg/L; 96 Hr; Static bioassay flea Daphnia: EC50 = 28.9 mg/L; 48 Hr; Static bioassay The majority of the environmental releases from industrial uses are to the atmosphere; releases to water and land will be primarily lost by evaporation and will end up in the atmosphere. Release to the atmosphere may be transported long distances and will photodegrade with a half-life of a few months. Spills and other releases on land will also leach into the groundwater where it will reside for long periods of time.
Environmental: Chloroform will not be expected to bioconcentrate into the food chain but contamination of food is likely due to its use as an extractant and its presence in drinking water.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 67-66-3: waste number U044.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	CHLOROFORM				CHLOROFORM
Hazard Class:	6.1				6.1(9.2)
UN Number:	UN1888				UN1888

Packing Group:	III				II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 67-66-3 is listed on the TSCA inventory.
CAS# 25377-72-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 67-66-3: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 67-66-3: 10 lb final RQ; 4.54 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 67-66-3: 10,000 lb TPQ
SARA Codes
CAS # 67-66-3: acute, chronic. CAS # 25377-72-4: acute, flammable.
Section 313
This material contains Chloroform (CAS# 67-66-3, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 67-66-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 67-66-3 is listed as a Hazardous Substance under the CWA. CAS# 67-66-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 67-66-3 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 67-66-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 25377-72-4 can be found on the following state right to know lists: New Jersey.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Chloroform, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 67-66-3: 20 ug/day NSRL (oral); 40 ug/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 22 Harmful if swallowed.
R 38 Irritating to skin.
R 40 Limited evidence of a carcinogenic effect.

R 48/20/22 Harmful : danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.

WGK (Water Danger/Protection)
CAS# 67-66-3: 3
CAS# 25377-72-4: No information available.
Canada - DSL/NDSL
CAS# 67-66-3 is listed on Canada's DSL List.
CAS# 25377-72-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A, D1B.
Canadian Ingredient Disclosure List
CAS# 67-66-3 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 67-66-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3) OEL-AUSTRALIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-AUSTRIA:TWA 10 ppm (50 mg/m3) OEL-BELGIUM:TWA 10 ppm (49 mg/m3);Carcinogen JAN9 OEL-CZECHO SLOVAKIA:TWA 10 mg/m3;STEL 20 mg/m3 OEL-DENMARK:TWA 2 ppm (10 mg/m3); Carcinogen OEL-FINLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm;Skin;CAR OE L-FRANCE:TWA 5 ppm (25 mg/m3);STEL 50 ppm (250 mg/m3);CAR OEL-GERMANY :TWA 10 ppm (50 mg/m3);Carcinogen JAN9 OEL-HUNGARY:STEL 10 mg/m3 OEL -INDIA:TWA 10 ppm (50 mg/m3);Carcinogen OEL-JAPAN:TWA 50 ppm (240 mg/ m3);Carcinogen OEL-THE NETHERLANDS:TWA 10 ppm (50 mg/m3) OEL-THE PHI LIPPINES:TWA 50 ppm (240 mg/m3) OEL-POLAND:TWA 50 mg/m3 OEL-RUSSIA:T WA 50 ppm OEL-SWEDEN:TWA 2 ppm (10 mg/m3);STEL 5 ppm (25 mg/m3);CAR OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm (100 mg/m3) OEL-THA ILAND:TWA 50 ppm (240 mg/m3) OEL-TURKEY:TWA 50 ppm (240 mg/m3) OEL-U NITED KINGDOM:TWA 2 ppm (9.9 mg/m3);Skin OEL IN BULGARIA, COLOMBIA, J ORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM c heck ACGIH TLV

Section 16 - Additional Information

MSDS Creation Date: 6/09/1999
Revision #7 Date: 9/11/2002

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

Chrome
Cr (metal)
Atomic mass: 52.0

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible if in very fine powder. Gives off irritating or toxic fumes (or gases) in a fire.	No open flames if in powder form.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful	Fireproof. Separated from strong oxidants.	R: S:

particles).

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1999. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I M P O R T A N T

PHYSICAL STATE; APPEARANCE:
STEEL GREY LUTROUS METAL.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts violently with strong oxidants such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: ppm; 0.5 mg/m^3 (as TWA) (ACGIH 1994-1995).
OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts.
NIOSH REL: TWA 0.5 mg/m^3 See Appendix C
NIOSH IDLH: 250 mg/m^3 (as Cr)

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C	Relative density (water = 1): 7.14 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Explosive limits are unknown in literature. Depending on the degree of exposure, periodic medical examination is indicated.

ADDITIONAL INFORMATION

ICSC: 0029	**CHROMIUM**

(C) IPCS, CEC, 1999

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

ALDRICH CHEMICAL CO -- DIELDRIN, TECH., CA. 90%, 29121-8 -- 6810-00N037359

========== Product Identification ==========

Product ID:DIELDRIN, TECH., CA. 90%, 29121-8
MSDS Date:01/07/1992
FSC:6810
NIIN:00N037359
MSDS Number: BQRWJ
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

========== Composition/Information on Ingredients ==========

Ingred Name:1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6,
7-EPOXY- 1,4,4A,5,6,7,8,8A-OCTAHYDRO, ENDO, EXO-; (ING 2)
CAS:60-57-1
RTECS #:IO1750000
Fraction by Wt: 90%
OSHA PEL:0.25 MG/M3, S
ACGIH TLV:0.25 MG/M3, S
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

Ingred Name:ING 1: (DIELDRIN) (SARA III)
RTECS #:9999999ZZ

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50 (ORAL,RAT): 38300 UG/KG.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:NO
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:ACUTE:MAY BE FATAL IF INHALED,
SWALLOWED, OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION. CHRONIC:
CARCINOGEN. MAY ALTER GENETIC MATERIAL. OVEREXPOSURE MAY CAUSE
REPRODUCTIVE DISORDER(S) BASED ON TEST S WITH LABORATORY ANIMALS.
TARGET ORGANS: CENTRAL NERVOUS SYSTEM, LIVER, BLOOD. OVEREXPOSURE
CAN CAUSE (EFTS OF OVEREXP)
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:HLTH HAZ: MALAISE, HEADACHE, NAUSEA, VOMITING,
DIZZINESS, TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY
FAILURE.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT
LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF

WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SH OES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION: WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYS.

========== Fire Fighting Measures ==========

Extinguishing Media:WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MAT ERIAL PICKUP IS COMPLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:KEEP TIGHTLY CLOSED. STORE IN A COOL DRY PLACE.
Other Precautions:HIGHLY TOX.CARCIN. MUTAGEN. REPROD HAZ.MAY CAUSE CANCER.MAY CAUSE INHERITABLE GENETIC DMG. READILY ABSORB THRU SKIN. AVOID PRLNGD/RPTD EXPOS. DO NOT BRTH DUST. DO NOT GET IN EYES,ON SKIN,ON CLTHG.VERY TOX BY INHAL,IN CONT W/SKIN & (SUPDAT)

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:CHEM WORK GOG W/FULL LNGTH FCSHLD
Other Protective Equipment:OTHER PROTECTIVE CLOTHING. SAFETY SHOWER AND EYE BATH.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
OTHER PRECAUTIONS: IF SWALLOWED. IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:>289F,>143C
Vapor Density:13.2
Appearance and Odor:ORANGE-TAN POWDER.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES OF CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE GAS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISSOLVE OR MIX MATERIAL WITH COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCURBBER. DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS (FP N).

Disclaimer (provided with this information by the compiling agencies):
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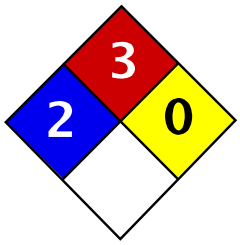

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001)
CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001)
CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States]
TWA: 435 STEL: 545 from OSHA (PEL) [United States]
TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States]
TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)]
TWA: 100 STEL: 125 (ppm) [Belgium]
TWA: 100 STEL: 125 (ppm) [Finland]
TWA: 50 (ppm) [Norway]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether.
Very slightly soluble in cold water or practically insoluble in water.
Soluble in all proportions in Ethyl alcohol.
Soluble in Carbon tetrachloride, Benzene.
Insoluble in Ammonia.
Slightly soluble in Chloroform.
Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials.
Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill:
LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg
Lowest Published Lethal Dose/Conc:
LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data.
May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate.
May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Can cause mild skin irritation. It can be absorbed through intact skin.
Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS)
Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987).
Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene
Illinois toxic substances disclosure to employee act: Ethylbenzene
Illinois chemical safety act: Ethylbenzene
New York release reporting list: Ethylbenzene
Rhode Island RTK hazardous substances: Ethylbenzene
Pennsylvania RTK: Ethylbenzene
Minnesota: Ethylbenzene
Massachusetts RTK: Ethylbenzene
Massachusetts spill list: Ethylbenzene
New Jersey: Ethylbenzene
New Jersey spill list: Ethylbenzene
Louisiana spill reporting: Ethylbenzene
California Director's List of Hazardous Substances: Ethylbenzene
TSCA 8(b) inventory: Ethylbenzene
TSCA 4(a) proposed test rules: Ethylbenzene
TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97
SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R20- Harmful by inhalation.
S16- Keep away from sources of ignition - No smoking.
S24/25- Avoid contact with skin and eyes.
S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet.
-Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA)
-Registry of Toxic Effects of Chemical Substances (RTECS)
-Chemical Hazard Response Information System (CHRIS)
-Hazardous Substance Data Bank (HSDB)
-New Jersey Hazardous Substance Fact Sheet
-Ariel Global View
-Reprotext System

Other Special Considerations: Not available.

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Material Safety Data Sheet

CREOSOTE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	CREOSOTE
OTHER/GENERIC NAMES:	Coal Tar Creosote, KMG-B Coal Tar Creosote Creosote Oil
PRODUCT USE:	Wood preservative
COMPANY:	KMG-Bernuth, Inc. 10611 Harwin, Suite 402 Houston, Texas 77036 Telephone: 713-988-9252
U. S. EPA Registration Nos.	61470-1 61483-7, 61483-8 61483-9, 61483-10

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)

CHEMTREC: 1 800 424 9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Creosote *	8001-58-9	100

* Mixture of 2, 3, & 4-ringed polynuclear aromatic hydrocarbons, including some substituted compounds

Trace impurities and additional material names not fisted above may also appear in Section 15. These materials may be listed for local “Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Creosote is a brown to black oily liquid with a penetrating smoky odor. Vapor causes moderate to severe irritation of eyes, nose, throat and respiratory tract. Liquid can cause burning and itching with reddening of the skin, which is accentuated by sunlight.

POTENTIAL-HEALTH HAZARDS

SKIN: Contact with skin can result in irritation, which when not washed off or when accentuated by sunlight, can result in minor burns.

EYES: Overexposure to product vapors can result in irritation. Eye contact with product will result in irritation, which in the absence of recommended first aid can result in effects ranging from minor burns to severe corneal injury, including keratitis, conjunctivitis and corneal abrasion.

INHALATION: Overexposure to vapor may result in irritation to respiratory tract. Prolonged exposure in significant excess of permissible air concentrations can result in acute toxic effects, such as dizziness, respiratory difficulty, convulsions and possible cardiovascular collapse.

INGESTION: Irritation of the gastrointestinal tract followed by nausea and vomiting, abdominal discomfort. rapid pulse etc. Cardiovascular collapse may occur.

DELAYED EFFECTS: Prolonged and repeated skin exposure over many years in the absence of recommended hygiene practices may lead to changes in skin pigmentation, benign skin growths and may, in some cases, result in skin cancer. Additionally, inhalation may present a lung cancer hazard.

Ingredients found on one of the OSHA designated carcinogen lists me listed below.

INGREDIENT NAME	NTB STATUS	JARC STATUS	OSHA LIST
Creosote	Carcinogen	2A - Probable	–

4. FIRST AID MEASURES

SKIN: Wash thoroughly with waterless hand cleaners, olive oil or soap and water. Avoid solvents.

EYES: Flush eyes immediately with large amounts of water or olive oil for at least 15 minutes. Call a physician

INHALATION: Remove to fresh air. If not breathing, give artificial respiration; preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

INGESTION: If conscious. first induce vomiting, then take 2 tablespoons of activated charcoal (USP-drug grade) in water. Get immediate medical attention. Do not induce vomiting, or give anything by mouth to an unconscious person.

ADVICE TO PHYSICIAN: No additional instructions.

5. FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINTS:	> 93º C (> 200º F) / > 93º C (> 200º F)
FLASH POINT METHOD:	Closed Cup / Open Cup
AUTOIGNITION TEMPERATURE:	336º C (637º F)
UPPER FLAME LIMIT (volume 0/6 in air):	Not Determined
LOWER FLAME LIMIT (volume % In air):	Not Determined
FLAME PROPAGATION RATE (solids):	Not Applicable
OSHA FLAMMABILITY CLASS:	Not Determined

EXTINGUISHING MEDIA: Water/fog, carbon dioxide, foam, dry chemicals, sand or steam.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Water/fog is recommended for the control of unconfined oil fires, but water may cause frothing or eruption in closed tank.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS: Self-contained breathing apparatus (SCBA) and full protective clothing should be worn when fumes and/or smoke are present.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment)

Avoid breathing vapors and contact with skin and eyes. Avoid sources of ignition (sparks or open flame). Contain the spill or leak with solids, such as sand, earth, etc. Contaminated materials must be handled and managed as RCRA Hazardous Waste and treated before disposal in approved facilities. Do not allow to enter into sewers or waterways.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment)

Wear clothing closed at the neck, long sleeves and non-porous type gloves, eg. neoprene, butyl rubber, nitrile, poly-vinyl alcohol (PVA), polyvinyl chloride (PVC).

STORAGE RECOMMENDATIONS: Recommended temperature for storage is about 140º F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use in areas with adequate natural or local exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:	Avoid skin contact whenever possible by using non-porous type gloves. For outdoor work use a waterproof sunscreen (SPF 25 or greater); reapply every 90 minutes while in direct sun. For exposed skin, use protective creams (for example: MSA's Fend AE-2, Kerodex 51, Jergens SBS-46).
EYE PROTECTION:	Safety glasses, goggles and/or face shield.
RESPIRATORY PROTECTION:	Not required for properly ventilated areas. Use a NIOSH approved respirator with suitable organic vapor cartridge as necessary to control exposures above the TLV of PEL.
ADDITIONAL RECOMMENDATIONS:	Do not take contaminated work clothing home. It is recommended that a complete soap and water shower and/or steam bath be taken at the end of each working day.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Creosote (measured as Coal Tar Pitch Volatiles, CTPV	0.2 mg/m^3	0.2 mg/ m^3	–

HAZARDOUS INGREDIENTS	CAS NUMBER	% BY WT.	EXPOSURE LIMIT	(PPM; MG/M3)
Coal Tar Distillate	65996-92-1		OSHA-TWA -	*
Indene	95-13-6	<10	ACGIH-TWA 10	48
			OSHA-TWA 10	45
Naphthalene	91-20-3	<15	ACGIH-TWA 10	52
			ACGIH-STEL 15	79
			OSHA-TWA 10	50
			OSHA-STEL 15	75
			NIOSH-TWA 10	50
			NIOSH-STEL 15	75
Biphenyl	92-52-4	<5	ACGIH-TWA 0.2	1.3
			OSHA-TWA 0.2	1
Benzene	71-43-2	<1	ACGIH-TWA 10	32**, #
			OSHA-TWA 1	***
			OSHA-STEL 5	-
			NIOSH-TWA 0.1	-
			NIOSH-STEL 1	-
Alkylnaphthalene		<10	none	
Phenanthrene	85-01-8	9-13	NONE	
Benz (a) anthracene	56-55-3	1.6	NONE	
Benzo (a) phenanthrene	218-01-9	1.7	NONE	
Benzo (b) fluoranthene+	205-99-2		NONE	
Benzo (k) fluoranthene+	207-08-9		NONE	
Benzo (j) fluoranthene+	205-82-3		NONE	
7, 12-Dimethylbenz (a) anthracene	57-97-6	2.43	NONE	
Indeno (1,2,3-cd) pyrene	193-39-5	0.25	NONE	
Benzo (a) pyrene	50-32-8	0.92	NONE	
Dibenzo (a,h) anthracene	53-70-3	0.09	NONE	
Benzo (g,h,i) perylene+	191-24-2		NONE	
7-H Dibenzo (c,g) carbazole	194-59-2	0.18	NONE	
Dibenzo (a,l) pyrene	191-30-0	0.02	NONE	
1-Nitropyrene	5522-43-0	0.24	NONE	
Dibenz (a,j) acridine	224-42-0	0.06	NONE	
Dibenz (a,h) acridine	226-36-8	0.04	NONE	

------SARA TITLE III SECTION 313 CHEMICALS------
(SEE SECTION V11 FOR CAS NUMBERS AND PERCENTAGES)

Naphthalene
Biphenyl
Benzene
Phenanthrene / Benz (a) anthracene
Benzo (a) phenanthrene
Benzo (b) fluoranthrene / Benzo (k) fluoranthrene
Benzo (j) fluoranthrene
Benzo (a) pyrene
Dibenzo (a,h) anthracene
Indeno)1,2,3-cd) pyrene
1-Nitropyrene
7,12-Dimethylbenz (a) anthracene
7-H Dibenzo (c,g) carbazole / Benzo (g,h,i) perylene
Dibenzo (a,l) pyrene
Dibenz (a,j) acridine
Dibenz (a,h) acridine

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS: None

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark brown to black oily liquid
PHYSICAL STATE:	Liquid
MOLECULAR WEIGHT:	130-210
CHEMICAL FORMULA:	Mixture of organic compounds
ODOR:	Penetrating smoky odor
SPECIFIC GRAVITY (water=1.0):	1.03-1.18 (Avg.: 9.1 lbs/ gal)
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	Not Determined
BOILING POINT:	194 - 400º C
MELTING POINT:	Not Determined
VAPOR PRESSURE (in mm Hg):	at 100º C - 80 mm; at 125º C - 225 mm; at 150º C - 370 mm
VAPOR DENSITY (air = 1.0):	< 1
EVAPORATION RATE:	< 1 COMPARED TO: Butyl Acetate –1
% VOLATILES:	Not Determined
FLASH POINT:	Closed cup: > 93º C (>200º F)
	Open cup: > 93º C (>200º F)

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

STABILITY (CONDITIONS TO AVOID): Product stable under normal conditions.
Due to its low vapor pressure and extremely low evaporation rate, the volatility rate at 20º C is almost zero. Upon heating, at extremely high temperatures, hydrocarbons will be emitted and some degradation will take place. Avoid loading or unloading near open flame.

INCOMPATIBILITIES: Mixing chlorosulfonic acid and creosote oil in a closed container can cause an increase in temperature and pressure (NFPA 491M, 1991)

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose under normal conditions of use. When heated to extreme temperatures creosote emits acrid smoke.

HAZARDOUS POLYMERIZATION: Will not occur

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: Oral LD_{50}; 725 mg/kg (rat); 433 mg/kg (mouse)

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS: Several studies in mice have shown the formation of both local (i.e. skin) and distant (i.e. lung) tumor formation after dermal exposure to creosote. [Poel & Kammer. 1957; Roe et al, 1958]

OTHER DATA: Has caused mutations in *S. typhimurium* strains TA98. TA100, TA1537, TA1538 and mouse lymphoma cell L5178y. [Fed Reg., 1978; Bos et al, 1983] Death from large doses of creosote appears due primarily to cardiovascular collapse. Fatalities have occurred 14-36 hours after the ingestion of creosote (about 7g for adults; about 1 or 2g for children). [Clayton & Clayton, 3rd ed., 1981]

12. ECOLOCICAL INFORMATION

TL_{50}, *Carassius auratus* (goldfish); 3.51 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Lepomis macrochirus* (bluegill); 4.42 ppm/24 hours [60:40 mixture of creosote & coal tar]
TL_{50}, *Salnio gairdner* (rainbow trout); 3.72 ppm/24 hours [60:40 mixture of creosote & coal tar]
LD_{50}, *Colinus virginianus* (bobwhite quail); 1260 ppm/8 days [60:40 mixture of creosote & coal tar]
LD_{50}, *Anas platyrhynchos* (mallard duck); 10,388 ppm/8 days [60:40 mixture of creosote & coal tar]

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? YES
If yes, the RCRA ID number is: U051

OTHER DISPOSAL CONSIDERATIONS:

Other waste code designations for creosote containing wastes appear in the December 6, 1990 *Federal Register* as F034; Wastewater's, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachloraphenol. Please consult with the appropriate state regulatory authorities to determine when the F034 designation is effective in the given state.

Creosote-containing waste may also be characteristic hazardous wastes, even if not meeting the U051, K001, or F034 waste code designation.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote). 9
US DOT ID NUMBER: UN 3082
US DOT SHIPPING NAME: RQ, Environmentally Hazardous Substance, Liquid, N.O.S. (Creosote), 9, UN3082, III

For additional information on shipping regulations affecting this material, contact the number found in Section 1.

I5. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Listed on EPA's TSCA Inventory
OTHER TSCA ISSUES: Substance of unknown or variable composition

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	WEIGHT %	SARA/CERCLA RQ (LB)	SARA EHS TPQ (LB)
Creosote	100 %	1	None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802], State Emergency Response Commission and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate, Delayed, Fire

SARA 313 TOXIC CHEMICALS:
The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents an found in Section 2.

INGREDIENT NAME	WEIGHT	COMMENT
Creosote	100%	de minimus concentration is 0.1%

STATE-RIGHT-TO-KNOW

In addition to the ingredients found In Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT	COMMENT
None		

ADDITIONAL REGULATORY INFORMATION: For some applications, Creosote is also regulated as a "Restricted Use" pesticide under the Federal Insecticide, Fungicide. and Rodenticide Act (FIFRA).

WHMIS CLASSIFICATION (CANADA): Class D, Division 2, Subdivision A, very toxic material

FOREIGN INVENTORY STATUS: Listed on the EINECS Inventory - ID# 2322875
Listed on Canadian Inventory Domestic Substance List (DSL)

16. OTHER INFORMATION

CURRENT ISSUE DATE: March 2003
PREVIOUS ISSUE DATE: January 2002

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Updated DOT transportation information
Updated to include 16-section ANSI format for Material Safety Data Sheets

OTHER INFORMATION: NFPA Hazard Ratings:
Health (Blue): 2
Flammability (Red): 2
Reactivity (Yellow): 0

REFERENCES:

1. ACGIH (1995): *"1995-1996 Threshold Limit Values...."*
2. USDOL/OSHA General Industry 29 CFR 1910.1000 Coal Tar Pitch Volatile (CTPV) Permissible Exposure Limit
3. USEPA 40 CFR Parts 112; 261; 268; 300
4. USDOT 49 CFR Part 172
5. USEPA(1986) *"Evaluation of the Potential Carcinogenicity of Creosote (8001-58-9)"*, Prepared by the Carcinogen Assessment Group, Office of Health and Environmental Assessment, Washington, DC for the Office of Emergency and Remedial Response and the Office of Solid Waste and Emergency Response, Washington, DC
6. National Fire Prevention Association (1991): *"Fire Protection Guide on Hazardous Materials"*, 10th ed. NFPA:Quincy, MA, pg 325M-29, 491M.
7 USEPA (1980) *"Health and Environmental Effects of Creosote"*, EPA # 53, pg 53-12
8. Clayton & Clayton, eds (1981): *"Patty's Industrial Hygiene & Toxicology, Volume 2A, 2B, 2C Toxicology"*, 3rd ed. John Wiley & Sons, New York, NY
9. NIOSH (1977): *"Criteria for a recommended standard...Occupational Exposure to Coal Tar Products"*, USDHEW/NIOSH Publication # 78-107
10. Poel, W.E. and Kammer, A.G. (1957): *"Experimental carcinogenicity of coal-tar fractions: The carcinogenicity of creosote oils"* J NATL CANCER INST 18(1):41-55
11. Roe, F.J.C., Bosch, D., Boutwell, R.K. (1958): *The carcinogenicity of creosote oil: The induction of lung tumors in mice"* CANCER RES 18:1176-1178
12. Bos, R.P., Hulshof, C.T.J., Theuws, J.L.G., Hendershon, P.Th. (1983): *"Mutagenicity of creosote in the Salmonella/microsome assay"* MUT RES 119:21-25
13. FEDERAL REGISTER (1978), Vol 43 #200; October 18th, page 48199
14. IARC (1987): *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man"*, World Health Organization (WHO): Geneva p S7 177
15. NTP (1994): *"National Toxicology Program's 7th Annual Report on Carcinogens 1994 - Summary"*

METAL

MATERIAL SAFETY DATA SHEET

ALDON CORPORATION
221 Rochester Street
Avon, New York 14414-9409
(585) 226-6177

MSDS No.: LL0070 LL0079 LL0080 LL0081 LL0082 LL0085 LL0086
Effective Date: March 29, 2005

SECTION I NAME

Product	Lead Metal
Chemical Synonyms	N/A
Formula	Pb
Unit Size	up to 2.5 Kg.
C.A.S. No.	7439-92-1

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA / HMIS *

Health	3
Fire	0
Reactivity	0

HAZARD RATING
MINIMAL 0 SLIGHT 1 MODERATE 2 SERIOUS 3 SEVERE 4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Lead metal, shot, granular, sheet, foil	99+%	See Section V.
CAUTION! MAY BE HARMFUL OR FATAL IF SWALLOWED		
OR INHALED AS FUMES OR DUST.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Approx. 327.4°C (621°F)	Specific Gravity (H_2O = 1)	11.34 (20/4°C)
Boiling Point (°F)	1753°C (3187°F)	Percent Volatile by Volume (%)	0% at ambient temp.
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	Non-volatile (N/A).
Vapor Density (Air=1)	N/A		
Solubility in Water	Insoluble.		
Appearance & Odor	Bluish, silvery, gray soft metal, granular, shot, sheet, foil; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

			Lower	Upper
Flash Point (Method Used)	Non-flammable (N/A).	Flammable Limits in Air % by Volume N/A	--------	--------
Extinguisher Media	Dry chemical or carbon dioxide should be used on surrounding fire. Do not use water on fires where molten metal is present.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated emits toxic fumes of lead which can react vigorously with oxidizing materials.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA LL0070

Threshold Limited Value
Lead as inorganic compounds, as Pb:
TWA 0.05 mg/m^3 (ACGIH 2001).

Effects of Overexposure
SKIN: Not absorbed through skin. EYES: No specific hazard known. Contact may cause transient irritation. INGESTION: May produce anorexia, vomiting, malaise, convulsions due to increased intracranial pressure. INHALATION: Of dust or fumes can cause lead poisoning. Target organs: Lungs, kidneys.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. EYES: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. SKIN: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		High temperatures to produce fumes.
	Stable	X	

Incompatibility (Materials to Avoid) Strong oxidizing materials.

Hazardous Decomposition Products When heated, emits toxic fumes of lead.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Carefully sweep up without producing dust and recycle for use or place in a suitable container for disposal.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.
Dispose of in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory use at room temperature. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation				
	Local Exhaust	None needed.	Special	No.
	Mechanical (General)	None needed.	Other	No.

Protective Gloves	Recommended - leather.	Eye Protection	Chemical safety glasses.

Other Protective Equipment Smock, apron, eye wash station, lab coat, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.
Store in a cool, dry place away from fire hazards. Wash thoroughly after handling. Remove and wash contaminated clothing.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Lead can react violently with oxidizing materials. Water may become trapped within surface cracks which may cause an explosion when the metal is molten.

Revision No. 9	Date 03/29/05	Approved Michael Raszeja	Chemical Safety Coordinator MR

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. * Hazardous Materials Industrial Standards. Printed on recycled paper.

METAL

10 M

Material Safety Data Sheet
Mercury

ACC# 14020

Section 1 - Chemical Product and Company Identification

MSDS Name: Mercury
Catalog Numbers: S40672B, S41542, S41599, S41599B, S41599E, S41599G, S41599J, S41599K, S41599M, S41600P, S41600S, S41600W, S41630A, S41630B, S41630C, S41631, S41631A, S41631B, S41631C, S41645, S45245, S46981, S50443, S71966, S71967, S71968, S78777, 13501, M139-1LB, M139-5LB, M140-14LB, M140-1LB, M140-5LB, M141-1LB, M141-6LB, NC9534278
Synonyms: Colloidal mercury; Hydrargyrum; Metallic mercury; Quick silver; Liquid silver.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7439-97-6	Mercury	100	231-106-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver liquid.
Danger! Corrosive. Harmful if inhaled. May be absorbed through intact skin. Causes eye and skin irritation and possible burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. May cause central nervous system effects. Inhalation of fumes may cause metal-fume fever. May cause liver and kidney damage. Possible sensitizer. This substance has caused adverse reproductive and fetal effects in animals.
Target Organs: Blood, kidneys, central nervous system, liver, brain.

Potential Health Effects
Eye: Exposure to mercury or mercury compounds can cause discoloration on the front surface of the lens, which does not interfere with vision. Causes eye irritation and possible burns. Contact with mercury or mercury compounds can cause ulceration of the conjunctiva and cornea.
Skin: May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Causes skin irritation and possible burns. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
Ingestion: May cause severe and permanent damage to the digestive tract. May cause perforation

of the digestive tract. May cause effects similar to those for inhalation exposure. May cause systemic effects.
Inhalation: Causes chemical burns to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause respiratory sensitization.
Chronic: May cause liver and kidney damage. May cause reproductive and fetal effects. Effects may be delayed. Chronic exposure to mercury may cause permanent central nervous system damage, fatigue, weight loss, tremors, personality changes. Chronic ingestion may cause accumulation of mercury in body tissues. Prolonged or repeated exposure may cause inflammation of the mouth and gums, excessive salivation, and loosening of the teeth.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. Wash mouth out with water.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: The concentration of mercury in whole blood is a reasonable measure of the body-burden of mercury and thus is used for monitoring purposes. Treat symptomatically and supportively. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.
Antidote: The use of d-Penicillamine as a chelating agent should be determined by qualified medical personnel. The use of Dimercaprol or BAL (British Anti-Lewisite) as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale. Use only in a chemical fume hood. Discard contaminated shoes. Do not breathe vapor.
Storage: Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store protected from azides.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Mercury	0.025 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.05 mg/m3 TWA (vapor) 10 mg/m3 IDLH	0.1 mg/m3 Ceiling (vapor)

OSHA Vacated PELs: Mercury: 0.05 mg/m3 TWA (vapor)
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: silver
Odor: odorless
pH: Not available.

Vapor Pressure: 0.002 mm Hg @ 25C
Vapor Density: 7.0
Evaporation Rate: Not available.
Viscosity: 15.5 mP @ 25 deg C
Boiling Point: 356.72 deg C
Freezing/Melting Point:-38.87 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:13.59 (water=1)
Molecular Formula: Hg
Molecular Weight:200.59

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures, incompatible materials.
Incompatibilities with Other Materials: Oxygen, sulfur, acetylene, ammonia, chlorine dioxide, azides, chlorates, nitrates, sulfuric acid, halogens, rubidium, calcium, 3-bromopropyne, ethylene oxide, lithium, methylsilane + oxygen, peroxyformic acid, tetracarbonylnickel + oxygen, copper, copper alloys, boron diiodophosphide, metals, nitromethane, sodium carbide, aluminum, lead, iron, metal oxides.
Hazardous Decomposition Products: Mercury/mercury oxides.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7439-97-6: OV4550000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7439-97-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Intraperitoneal, rat: TDLo = 400 mg/kg/14D-I (Tumorigenic - equivocal tumorigenic agent by RTECS criteria - tumors at site of application).
Teratogenicity: Inhalation, rat: TCLo = 1 mg/m3/24H (female 1-20 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive Effects: Inhalation, rat: TCLo = 890 ng/m3/24H (male 16 week(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).; Inhalation, rat: TCLo = 7440 ng/m3/24H (male 16 week(s) pre-mating) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Mutagenicity: Cytogenetic Analysis: Unreported, man = 150 ug/m3.
Neurotoxicity: The brain is the critical organ in humans for chronic vapor exposure; in severe cases, spontaneous degeneration of the brain cortex can occur as a late sequela to past exposure.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LC50 = 0.16-0.90 mg/L; 96 Hr; UnspecifiedFish: Channel catfish: LC50 = 0.35 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 = 0.01 mg/L; 48 Hr; Unspecified In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury bound to dust particles in the atmosphere or bed sediment particles in rivers and lakes is generally less substantial. The conversion, in aquatic environments, of inorganic mercury cmpd to methyl mercury implies that recycling of mercury from sediment to water to air and back could be a rapid process.
Environmental: Mercury bioaccumulates and concentrates in food chain (concentration may be as much as 10,000 times that of water). Bioconcentration factors of 63,000 for freshwater fish and 10,000 for salt water fish have been found. Much of the mercury deposited on land, appears to revaporize within a day or two, at least in areas substantially heated by sunlight.
Physical: All forms of mercury (Hg) (metal, vapor, inorganic, or organic) are converted to methyl mercury. Inorganic forms are converted by microbial action in the atmosphere to methyl mercury.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 7439-97-6: waste number U151.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	MERCURY	MERCURY
Hazard Class:	8	8
UN Number:	UN2809	UN2809
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7439-97-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs

CAS# 7439-97-6: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 7439-97-6: acute, chronic.

Section 313

This material contains Mercury (CAS# 7439-97-6, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7439-97-6 (listed as Mercury compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7439-97-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7439-97-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7439-97-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

WARNING: This product contains Mercury, a chemical known to the state of California to cause developmental reproductive toxicity.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 23 Toxic by inhalation.

R 33 Danger of cumulative effects.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 1/2 Keep locked up and out of reach of children.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 7439-97-6: 3

Canada - DSL/NDSL

CAS# 7439-97-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A, E.

Canadian Ingredient Disclosure List

CAS# 7439-97-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/15/1999
Revision #7 Date: 1/20/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

NICKEL

ICSC: 0062

NICKEL
(powder)
Ni
Molecular mass: 58.7

CAS # 7440-02-0
RTECS # QR5950000
ICSC # 0062
EC # 028-002-00-7

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Water in large amounts, foam, dry sand, NO carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• **INHALATION**		Local exhaust or breathing protection.	Fresh air, rest.
• **SKIN**		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Separated from strong acids.	Xn symbol R: 40-43 S: (2-)22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

NICKEL

ICSC: 0062

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** ODOURLESS SILVERY METALLIC SOLID IN VARIOUS FORMS. **PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV: ppm; 1 mg/m^3 (as TWA) (ACGIH 1993-1994).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of the dust and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of the fumes may cause pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. The substance may have effects on the nasal sinuses , resulting in inflammation and ulceration.
PHYSICAL PROPERTIES	Boiling point: 2730°C Melting point: 1455°C	Relative density (water = 1): 8.9 Solubility in water: none
ENVIRONMENTAL DATA		

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062 **NICKEL**

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Material Safety Data Sheet

PAH Contaminated Soil

ACC# 17974

Section 1 - Chemical Product and Company Identification

MSDS Name: PAH Contaminated Soil
Catalog Numbers: SRS103100
Synonyms: API separator sludge
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Soil	78-99	unlisted
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: not available solid.
Warning! May cause allergic skin reaction. Causes eye and skin irritation. May cause cancer based on animal studies.
Target Organs: Eyes, skin.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and
Inhalation: Causes respiratory tract irritation. May cause effects similar to those described for ingestion.
Chronic: May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Soil	none listed	none listed	none listed
Anthracene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

Benzo(a)pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.5 mg/m3 TWA 2.5 mg/m3 IDLH	0.5 mg/m3 TWA
Naphthalene	10 ppm TWA; 15 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m3 TWA
2-methylnaphthalene	none listed	none listed	none listed

OSHA Vacated PELs: Soil: No OSHA Vacated PELs are listed for this chemical. Anthracene: No OSHA Vacated PELs are listed for this chemical. Pyrene: No OSHA Vacated PELs are listed for this chemical. Dibenzofuran: No OSHA Vacated PELs are listed for this chemical. Benzo(b)fluoranthene: No OSHA Vacated PELs are listed for this chemical. Fluoranthene: No OSHA Vacated PELs are listed for this chemical. Acenaphthylene: No OSHA Vacated PELs are listed for this chemical. 1,2-benzphenanthrene: No OSHA Vacated PELs are listed for this chemical. Benzo(a)pyrene: No OSHA Vacated PELs are listed for this chemical. 1,2-Benzanthracene: No OSHA Vacated PELs are listed for this chemical. Acenaphthene: No OSHA Vacated PELs are listed for this chemical. Phenanthrene: No OSHA Vacated PELs are listed for this chemical. Fluorene: No OSHA Vacated PELs are listed for this chemical. Pentachlorophenol: 0.5 mg/m3 TWA Naphthalene: 10 ppm TWA; 50 mg/m3 TWA 2-methylnaphthalene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: not available
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.
Molecular Formula: Mixture
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures.
Incompatibilities with Other Materials: None reported.
Hazardous Decomposition Products: No data available.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 120-12-7: CA9350000
CAS# 129-00-0: UR2450000; UR2450100
CAS# 132-64-9: HP4430000
CAS# 205-99-2: CU1400000
CAS# 206-44-0: LL4025000
CAS# 208-96-8: AB1254000; AB1254200
CAS# 218-01-9: GC0700000
CAS# 50-32-8: DJ3675000
CAS# 56-55-3: CV9275000
CAS# 83-32-9: AB1000000
CAS# 85-01-8: SF7175000
CAS# 86-73-7: LL5670000
CAS# 87-86-5: SM6300000; SM6314000; SM6321000
CAS# 91-20-3: QJ0525000
CAS# 91-57-6: QJ9635000
LD50/LC50:
CAS# 120-12-7:

Oral, mouse: LD50 = 4900 mg/kg;

CAS# 129-00-0:
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 170 mg/m3;
Inhalation, rat: LC50 = 170 mg/m3;
Oral, mouse: LD50 = 800 mg/kg;
Oral, rat: LD50 = 2700 mg/kg;

CAS# 132-64-9:

CAS# 205-99-2:

CAS# 206-44-0:
Oral, rat: LD50 = 2 gm/kg;
Skin, rabbit: LD50 = 3180 mg/kg;

CAS# 208-96-8:
Oral, mouse: LD50 = 1760 mg/kg;

CAS# 218-01-9:

CAS# 50-32-8:

CAS# 56-55-3:

CAS# 83-32-9:

CAS# 85-01-8:
Oral, mouse: LD50 = 700 mg/kg;
Oral, rat: LD50 = 1.8 gm/kg;

CAS# 86-73-7:

CAS# 87-86-5:
Draize test, rabbit, eye: 100 uL/24H Mild;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, rat: LC50 = 355 mg/m3;
Inhalation, rat: LC50 = 200 mg/m3;
Inhalation, rat: LC50 = 335 mg/m3;
Oral, mouse: LD50 = 36 mg/kg;
Oral, mouse: LD50 = 117 mg/kg;
Oral, mouse: LD50 = 30 mg/kg;
Oral, rabbit: LD50 = 200 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 50 mg/kg;
Skin, rat: LD50 = 96

CAS# 91-20-3:
Draize test, rabbit, eye: 100 mg Mild;
Inhalation, rat: LC50 = >340 mg/m3/1H;
Oral, mouse: LD50 = 316 mg/kg;
Oral, rat: LD50 = 490 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rat: LD50 = >2500 mg/kg;

CAS# 91-57-6:
Oral, rat: LD50 = 1630 mg/kg;

Carcinogenicity:
CAS# 120-12-7:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 205-99-2:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 208-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 56-55-3:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2A carcinogen

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (listed as 'Coal tar pitches').

- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 86-73-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 87-86-5:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Not listed.
- **IARC:** Not listed.

CAS# 91-20-3:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/19/02
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 91-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 206-44-0: waste number U120.
CAS# 218-01-9: waste number U050.
CAS# 50-32-8: waste number U022.
CAS# 56-55-3: waste number U018.
CAS# 91-20-3: waste

Section 14 - Transport Information

US DOT	Canada TDG

Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Soil is not listed on the TSCA inventory. It is for research and development use only.
CAS# 120-12-7 is listed on the TSCA inventory.
CAS# 129-00-0 is listed on the TSCA inventory.
CAS# 132-64-9 is listed on the TSCA inventory.
CAS# 205-99-2 is not listed on the TSCA inventory. It is for research and development use only.
CAS# 206-44-0 is listed on the TSCA inventory.
CAS# 208-96-8 is listed on the TSCA inventory.
CAS# 218-01-9 is listed on the TSCA inventory.
CAS# 50-32-8 is listed on the TSCA inventory.
CAS# 56-55-3 is listed on the TSCA inventory.
CAS# 83-32-9 is listed on the TSCA inventory.
CAS# 85-01-8 is listed on the TSCA inventory.
CAS# 86-73-7 is listed on the TSCA inventory.
CAS# 87-86-5 is listed on the TSCA inventory.
CAS# 91-20-3 is listed on the TSCA inventory.
CAS# 91-57-6 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97 CAS# 91-20-3: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

CAS# 91-20-3: Testing required by manufacturers, processors

Section 12b

CAS# 91-20-3: Section 4

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 120-12-7: 5000 lb final RQ; 2270 kg final RQ CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ CAS# 205-99-2: 1 lb final RQ; 0.454 kg final RQ CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ CAS# 208-96-8: 5000 lb final RQ; 2270 kg final RQ CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ CAS# 56-55-3: 10 lb final RQ; 4.54 kg final RQ CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ CAS# 86-73-7: 5000 lb final RQ; 2270 kg final RQ CAS# 87-86-5: 10 lb final RQ; 4.54 kg final RQ CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper thre shold)

SARA Codes

CAS # 120-12-7: acute.
CAS # 129-00-0: acute, chronic.
CAS # 206-44-0: acute.

CAS # 50-32-8: acute, chronic.
CAS # 56-55-3: chronic.
CAS # 83-32-9: acute.
CAS # 85-01-8: acute.
CAS # 91-20-3: acute, chronic, flammable.
CAS # 91-57-6: acute.

Section 313

This material contains Anthracene (CAS# 120-12-7, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Dibenzofuran (CAS# 132-64-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Fluoranthene (CAS# 206-44-0, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains 1,2-benzphenanthrene (CAS# 218-01-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Phenanthrene (CAS# 85-01-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Pentachlorophenol (CAS# 87-86-5, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Naphthalene (CAS# 91-20-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed

as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 120-12-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 205-99-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 208-96-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 56-55-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 86-73-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 87-86-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-57-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer. WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer. WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 205-99-2: 0.096 æg/day NSRL (oral) CAS# 218-01-9: 0.35 æg/day NSRL (oral) CAS# 50-32-8: 0.06 æg/day NSRL CAS# 56-55-3: 0.033 æg/day NSRL (oral) CAS# 87-86-5: 40 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 120-12-7: 2
CAS# 129-00-0: No information available.
CAS# 132-64-9: No information available.
CAS# 205-99-2: No information available.
CAS# 206-44-0: No information available.
CAS# 208-96-8: No information available.
CAS# 218-01-9: No information available.
CAS# 50-32-8: No information available.
CAS# 56-55-3: No information available.
CAS# 83-32-9: No information available.
CAS# 85-01-8: No information available.
CAS# 86-73-7: No information available.
CAS# 87-86-5: 3
CAS# 91-20-3: 2
CAS# 91-57-6: No information available.

Canada - DSL/NDSL

CAS# 120-12-7 is listed on Canada's DSL List.
CAS# 129-00-0 is listed on Canada's DSL List.
CAS# 132-64-9 is listed on Canada's DSL List.
CAS# 218-01-9 is listed on Canada's DSL List.
CAS# 50-32-8 is listed on Canada's DSL List.
CAS# 83-32-9 is listed on Canada's DSL List.
CAS# 85-01-8 is listed on Canada's DSL List.
CAS# 86-73-7 is listed on Canada's DSL List.
CAS# 87-86-5 is listed on Canada's DSL List.
CAS# 91-20-3 is listed on Canada's DSL List.
CAS# 91-57-6 is listed on Canada's DSL List.
CAS# 206-44-0 is listed on Canada's NDSL List.
CAS# 208-96-8 is listed on Canada's NDSL List.
CAS# 56-55-3 is listed on Canada's NDSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

Canadian Ingredient Disclosure List

CAS# 120-12-7 is listed on the Canadian Ingredient Disclosure List.
CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 205-99-2 is listed on the Canadian Ingredient Disclosure List.
CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 208-96-8 is not listed on the Canadian Ingredient Disclosure List.
CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 56-55-3 is listed on the Canadian Ingredient Disclosure List.
CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 86-73-7 is not listed on the Canadian Ingredient Disclosure List.
CAS# 87-86-5 is not listed on the Canadian Ingredient Disclosure List.
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

3 PCB

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

Chlorobiphenyl (54% chlorine)
Chlorodiphenyl (54% chlorine)
PCB
Molecular mass: 327 (average)

ICSC # 0939
CAS # 11097-69-1
RTECS # TQ1360000
UN # 2315
EC # 602-039-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		Powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION		Ventilation.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Headache. Numbness.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Consult an expert! Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Severe marine pollutant. Note: C Xn symbol R: 33-50/53 S: 2-35-60-61 UN Hazard Class: 9 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0939

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 2000. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** LIGHT YELLOW VISCOUS LIQUID. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes in a fire producing irritating and toxic gases. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: ppm; 0.5 mg/m^3 A3 (skin) (ACGIH 1999). OSHA PEL: TWA 0.5 mg/m^3 skin NIOSH REL: Ca TWA 0.001 mg/m^3 See Appendix A *Note: The REL also applies to other PCBs. NIOSH IDLH: Potential occupational carcinogen 5 mg/m^3	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
PHYSICAL PROPERTIES	Relative density (water = 1): 1.5 Solubility in water: none	Vapour pressure, Pa at 25°C: 0.01 Octanol/water partition coefficient as log

	Pow: 6.30 (estimated)
ENVIRONMENTAL DATA	In the food chain important to humans, bioaccumulation takes place, specifically in water organisms. It is strongly advised not to let the chemical enter into the environment.

N O T E S

Changes into a resinous state (pour point) at 10°C. Distillation range: 365°-390°C.

Transport Emergency Card: TEC (R)-914

ADDITIONAL INFORMATION

ICSC: 0939 **POLYCHLORINATED BIPHENYL (AROCLOR 1254)**

(C) IPCS, CEC, 2000

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

21 VOC

Material Safety Data Sheet
Tetrachloroethylene

ACC# 22900

Section 1 - Chemical Product and Company Identification

MSDS Name: Tetrachloroethylene
Catalog Numbers: C182 20, C182 4, C182-20, C182-4, C18220, C1824, O4586 4, O4586-4, O45864
Synonyms: Ethylene tetrachloride; Tetrachlorethylene; Perchloroethylene; Perchlorethylene
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
127-18-4	Tetrachloroethylene	99.0+	204-825-9

Hazard Symbols: XN N
Risk Phrases: 40 51/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Irritant. May cause severe eye and skin irritation with possible burns. May cause central nervous system depression. May cause liver and kidney damage. May cause reproductive and fetal effects. May cause cancer based on animal studies. **Caution!** May cause respiratory tract irritation.
Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects
Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: May cause severe irritation and possible burns.
Ingestion: May cause central nervous system depression, kidney damage, and liver damage. Symptoms may include: headache, excitement, fatigue, nausea, vomiting, stupor, and coma. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: Inhalation of vapor may cause respiratory tract irritation. May cause central nervous system effects including vertigo, anxiety, depression, muscle incoordination, and emotional instability.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or repeated skin contact may cause defatting and dermatitis. May cause respiratory tract cancer. May cause

adverse nervous system effects including muscle tremors and incoordination. May cause liver and kidney damage. May cause reproductive and fetal effects.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Containers may explode in the heat of a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. For small fires, use dry chemical, carbon dioxide, or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Flush down the spill with a large amount of water. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Do not reuse this container. Avoid breathing vapors from heated material. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from flames

and other sources of high temperatures that may cause material to form vapors or mists.
Storage: Keep away from heat and flame. Store in a cool, dry place. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Tetrachloroethylene	25 ppm TWA; 100 ppm STEL	150 ppm IDLH	100 ppm TWA; 200 ppm Ceiling

OSHA Vacated PELs: Tetrachloroethylene: 25 ppm TWA; 170 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: sweetish odor
pH: Not available.
Vapor Pressure: 15.8 mm Hg
Vapor Density: 5.2
Evaporation Rate:9 (ether=100)
Viscosity: 0.89 mPa s 20 deg C
Boiling Point: 121 deg C
Freezing/Melting Point:-22.3 deg C
Decomposition Temperature:150 deg C
Solubility: Nearly insoluble in water.
Specific Gravity/Density:1.623
Molecular Formula:C2Cl4
Molecular Weight:165.812

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat.
Incompatibilities with Other Materials: Strong bases, metals, liquid oxygen, dinitrogen tetroxide.

Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 127-18-4: KX3850000
LD50/LC50:
CAS# 127-18-4:
Draize test, rabbit, eye: 162 mg Mild;
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, skin: 810 mg/24H Severe;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 5200 ppm/4H;
Inhalation, rat: LC50 = 34200 mg/m3/8H;
Oral, mouse: LD50 = 8100 mg/kg;
Oral, rat: LD50 = 2629 mg/kg;
Carcinogenicity:
CAS# 127-18-4:
ACGIH: A3 - Animal Carcinogen
California: carcinogen; initial date 4/1/88
NIOSH: potential occupational carcinogen
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen
Epidemiology: Epidemiologic studies have given inconsistent results. Studi es have shown that tetrachloroethylene has not caused canc er in exposed workers. The studies have serious weakne sses such as mixed exposures. In tests with rats and mice, i t appeared that tissue destruction or peroxisome prolifera tion rather than genetic mechanisms were the cause of the observed increases in normally occurring cancers. The oral mouse TDLo that was tumorigenic was 195 gm/kg/50W-I.
Teratogenicity: Has caused musculoskeletal abnormalities. Has caused morphological transformation at a dose of 97mol/L in a study using rat embryos.
Reproductive Effects: Has caused behavioral, biochemical, and metabolic effects on newborn rats when the mother was exposed to the TCLo of 900 ppm/7H at 7-13 days after conception. A dose of 300 ppm/7H 6-15 days after conception caused post-implantation mortality.
Neurotoxicity: No information available.
Mutagenicity: Not mutagenic in Escherichia coli. No mutagenic effects were seen in rat liver after exposure at 200 ppm for 10 weeks. No chromosome changes were seen in the bone marrow cells of exposed mice.
Other Studies: A case of 'obstructive jaundice' in a 6-week old infant has been attributed to tetrachloroethylene in breast milk.

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 5.28 mg/L; 96 Hr.; Static Condition, 12 degrees C Fathead Minnow: LC50 = 18.4 mg/L; 96 Hr.; Flow-through condition Bluegill/Sunfish: LC50 = 12.9 mg/L; 96 Hr.; Static Condition ria: Phytobacterium phosphoreum: EC50 = 120.0 mg/L; 30 minutes; Microtox test No data available.

Environmental: In soil, substance will rapidly evaporate. In water, it will evaporate. In air, it can be expected to exist in the vapor phase.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 127-18-4: waste number U210.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TETRACHLOROETHYLENE				TETRACHLOROETHYLENE
Hazard Class:	6.1				6.1
UN Number:	UN1897				UN1897
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 127-18-4 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 127-18-4: Effective Date: 6/1/87; Sunset Date: 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 127-18-4: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 127-18-4: acute.
Section 313
This material contains Tetrachloroethylene (CAS# 127-18-4, 99 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:
CAS# 127-18-4 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 127-18-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 127-18-4 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 127-18-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Tetrachloroethylene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 127-18-4: 14 ug/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 40 Limited evidence of a carcinogenic effect.
R 51/53 Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 23 Do not inhale gas/fumes/vapour/spray.
S 36/37 Wear suitable protective clothing and gloves.
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 127-18-4: 3
Canada - DSL/NDSL
CAS# 127-18-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D1B, D2A.
Canadian Ingredient Disclosure List
CAS# 127-18-4 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 127-18-4: OEL-ARAB Republic of Egypt:TWA 5 ppm (35 mg/m3);Skin OEL-AUSTRALIA:TWA 50 ppm (335 mg/m3);STEL 150 ppm;CAR OEL-BELGIUM:TWA 50 ppm (339 mg/m3);STEL 200 ppm (1368 mg/m3) OEL-CZECHOSLOVAKIA:TWA 250 mg/m3;STEL 1250 mg/m3 OEL-DENMARK:TWA 30 ppm (200 mg/m3);Skin OEL-FINLAND:TWA 50 ppm (335 mg/m3);STEL 75 ppm (520 mg/m3);Skin OEL-FRANCE:TWA 50 ppm (335 mg/m3) OEL-GERMANY:TWA 50 ppm (345 mg/m3);Carcinogen OEL-HUNGARY:STEL 50 mg/m3;Skin;Carcinogen OEL-JAPAN:TWA 50 ppm (340 mg/m3) OEL-THE NETHERLANDS:TWA 35 ppm (240 mg/m3);Skin OEL-THE PHILIPPINES:TWA 100 ppm (670 mg/m3) OEL-POLAND:TWA 60 mg/m3 OEL-RUSSIA:TWA 50 ppm;STEL 10 mg/m3 OEL-SWEDEN:TWA 10 ppm (70 mg/m3);STEL 25 ppm (170 mg/m3) OEL-SWITZERLAND:TWA 50 ppm (345 mg/m3);STEL 100 ppm;Skin OEL-THAILAND:TWA 100 ppm;STEL 200 ppm OEL-UNITED KINGDOM:TWA 50 ppm (335 mg/m3);STEL 15 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA

check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 6/17/1999
Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Number: **T3913** * * * * * *Effective Date:* ***10/05/06*** * * * * * *Supercedes:* ***08/03/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TOLUENE

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes:
J.T. Baker: 5375, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

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4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.
Skin Contact:
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 1.1; uel: 7.1
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full

facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic benzene-like.
Solubility:
0.05 gm/100gm water @ 20C (68F).
Specific Gravity:
0.86 @ 20C / 4 C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
111C (232F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.14
Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Toluene (108-88-3)	No	No	3

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction

with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Toluene (108-88-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Toluene (108-88-3)	1000	U220	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 5.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **X2000** * * * * * *Effective Date:* ***02/16/06*** * * * * * *Supercedes:* ***04/01/03***

MSDS Material Safety Data Sheet

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes:
J.T. Baker: 5377, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	Yes
o-Xylene	95-47-6	15 - 20%	Yes
p-Xylene	106-42-3	< 20%	Yes
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.
Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.
Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:

lel: 1.0; uel: 7.0
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen.
ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.
Odor:
Characteristic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.86 @ 20C/4C
pH:
Not applicable.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
137 - 140C (279 - 284F)
Melting Point:
-25C (-13F)
Vapor Density (Air=1):
3.7
Vapor Pressure (mm Hg):
8 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.7

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.
Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**

Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.
Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.
Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **Z0858** * * * * * *Effective Date: 05/07/03* * * * * * *Supercedes: 11/02/01*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ZINC METAL POWDER

1. Product Identification

Synonyms: Powdered zinc; blue powder; CI77945; CI Pigment Black 16
CAS No.: 7440-66-6
Molecular Weight: 65.37
Chemical Formula: Zn
Product Codes:
J.T. Baker: 4282
Mallinckrodt: 8681

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Zinc	7440-66-6	96 - 97%	Yes
Zinc Oxide	1314-13-2	0 - 3%	Yes
Lead	7439-92-1	0 - 0.3%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR. WATER REACTIVE. MAY AFFECT THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM (lead component).

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 2 - Moderate

Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; CLASS D EXTINGUISHER
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
No adverse effects expected but dust may cause mechanical irritation. The effects may be expected to resemble those of inhaling an inert dust; possible difficulty in breathing, sneezing, coughing. When heated, the fumes are highly toxic and may cause fume fever.
Ingestion:
Extremely large oral dosages may produce gastrointestinal disturbances, due both to mechanical effects and the possibility of reaction with gastric juice to produce zinc chloride. Pain, stomach cramps and nausea could occur in aggravated cases.
Skin Contact:
May cause irritation.
Eye Contact:
May cause irritation.
Chronic Exposure:
No adverse health effects expected.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

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5. Fire Fighting Measures

Fire:
Autoignition temperature: ca. 460C (ca. 860F)
The listed autoignition temperature is for Zinc powder (layer); dust cloud is ca. 680C (1255F). Zinc powder is not pyrophoric but will burn in air at elevated temperatures. Bulk dust in damp state may heat spontaneously and ignite on exposure to air. Releases flammable hydrogen gas upon contact with acids or alkali hydroxides. Contact with strong oxidizers may cause fire.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Smother with a suitable dry powder (sodium chloride, magnesium oxide, Met-L-X).
Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Remove all sources of ignition and provide mild ventilation in area of spill. Substance may be pyrophoric and self-ignite. Clean-up personnel require protective clothing, goggles and dust/mist respirators. Sweep or vacuum up the spill in a manner that does not disperse zinc powder in the air and place the zinc in a closed container for recovery or disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None for Zinc metal.
-OSHA Permissible Exposure Limit (PEL):
10 mg/m3 (TWA), for zinc oxide fume
-ACGIH Threshold Limit Value (TLV):
10 mg/m3 (TWA), Inhalable fraction, A4 Not classifiable as a human carcinogen for zinc oxide.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Gray or bluish-gray powder.
Odor:
Odorless.

Solubility:
Insoluble in water.
Density:
7.14
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
907C (1665F)
Melting Point:
419C (786F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1 @ 487C (909F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Moist zinc dust can react exothermically and ignite spontaneously in air.
Hazardous Decomposition Products:
Hydrogen in moist air, zinc oxide with oxygen at high temperature. Zinc metal, when melted, produces zinc vapor which oxidizes and condenses in air to form zinc fume.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Zinc powder can react violently with water, sulfur and halogens. Dangerous or potentially dangerous with strong oxidizing agents, lower molecular weight chlorinated hydrocarbons, strong acids and alkalis.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Zinc: Irritation skin, human: 300 ug/3D-I mild; investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Zinc (7440-66-6)	No	No	None
Zinc Oxide (1314-13-2)	No	No	None
Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	Yes	Yes
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Zinc (7440-66-6)	Yes	Yes	No	Yes
Zinc Oxide (1314-13-2)	Yes	Yes	No	Yes
Lead (7439-92-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\-----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Zinc (7440-66-6)	No	No	Yes	No
Zinc Oxide (1314-13-2)	No	No	No	Zinc compoun
Lead (7439-92-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\-----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Zinc (7440-66-6)	1000	No	No
Zinc Oxide (1314-13-2)	No	No	No
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
Reactivity: Yes (Mixture / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 4Y
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **1** Other: **Water reactive**

Attachment IV

Attachment IV – Heat Stress / Cold Stress

1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

1.1 Heat Rash

Heat rash also know as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth, such as the variety of sports drinks on the market.

CAUTION SHOULD BE EXERCISED BY PEOPLE WITH HEART PROBLEMS OR THOSE ON LOW SODIUM DIETS WHO WORK IN HOT ENVIRONMENTS. THESE PEOPLE SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting

- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.
AS WITH HEAT CRAMPS, CERTAIN PERSONS SHOULD CONSULT WITH THEIR PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105oF or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

1.6 Protecting Against Heat Stress

There are several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

2.0 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)
- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

Attachment V

Attachment V - Construction Equipment Safety Rules

1.0 ELECTRICAL

1. Live electrical parts shall be guarded against accidental contact by cabinets, enclosure, location, or guarding. Cabinet covers will be replaced.

2. Working and clear space around electric equipment and distribution boxes will be kept clear and assessable.

3. Circuit breakers, switch boxes, etc. will be legibly marked to indicate their purpose.

4. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. If the prime contractor has not provided this protection with GFCI receptacles at the temporary service drop, employees will ensure portable GFCI protection is provided. (Employers may wish to use assured equipment grounding conductor program in lieu of this GFCI protection.) This requirement is in addition to any other electrical equipment grounding requirement or double insulated protection.

5. All extension cords will be three-wire (grounded) type and designed for hard or extra hard usage (Type S, ST, SO, STO, or SJ, SJO, SJT, SJTO).

6. Ground prongs will not be removed.

7. Cords and strain relief devices/clamps will be in good condition.

8. All lamps for general illumination will have the bulbs protected against breakage.

9. Electrical cords will not suspend temporary lights unless cords and lights are designed for such suspension. Flexible cords used for temporary and portable lights will be designed for hard or extra hard usage.

10. Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.

11. Equipment or circuits that are de-energized will be locked out and tagged out. The tags will plainly identify the equipment or circuits being worked on.

2.0 COMPRESSED GAS CYLINDERS

1. All gas cylinders will have their contents clearly marked on the outside of each cylinder.

2. Cylinders must be transported, stored, and secured in an upright position. They will never be left laying on the ground or floor, nor used as rollers or supports.

3. Cylinder valves must be protected with caps and closed when not in use.

4. All leaking or defective cylinders must be removed from service promptly, tagged as inoperable and placed in an open space removed from the work area.

5. Oxygen cylinders and fittings will be kept away from oil or grease.

6. When cylinders are hoisted, they will be secured in a cradle, sling-board, or pallet. Valve protection caps will not be used for lifting cylinders from one vertical level to another.

3.0 LADDERS

1. A competent person to identify any unsafe conditions will periodically inspect ladders.

2. Those ladders with structural defects will be removed from service, and repaired or replaced.

3. Straight ladders used on other than stable, level, and dry surfaces must be tied off, held, or secured for stability.

4. Portable ladder side rails will extend at least three feet above the upper landing to which the ladder is used to gain access.

5. The top or top step of a stepladder will not be used as a step.

4.0 AERIAL LIFTS

1. Aerial lifts include cherry pickers, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, and any combinations of the above.

2. Only authorized and trained persons will operate aerial lifts.

3. Lift controls will be tested each day before use.

4. Safety harness will be worn when elevated in the aerial lift.

5. Lanyards will be attached to the boom or basket.

6. Employees will not belt off to adjacent poles, structures, or equipment while working from an aerial lift.

7. Employees will always stand firmly on the floor of the basket, and will not sit or climb on the edge of the basket.

8. Planks, ladders, or other devices will not be used for work position or additional working height.

9. Brakes will be set and outriggers will be used.

10. The aerial lift truck will not be moved with the boom elevated and employees in the `basket, unless the equipment is specifically designed for such.

5.0 CRANES

1. A competent person prior to each use/during use to make sure it is in safe operating condition will inspect all cranes. Also, a certification record of monthly inspections to include date, inspector signature, and crane identifier will be maintained.

2. A thorough annual inspection of hoisting machinery will be made by a competent person, or by a government or private agency, and records maintained.

3. Loads will never be swung over the heads of workers in the area.

4. Employees will never ride hooks, concrete buckets, or other material loads being suspended or moved by cranes.

5. Hand signals to crane operators will be those prescribed by the applicable ANSI standard to the type of crane in use.

6. Tag lines must be used to control loads and keep workers away.

7. Loads, booms, and rigging will be kept at least 10 feet from energized electrical lines rated 50 KV or lower unless the lines are de-energized. For lines rated greater that 50 KV follow OSHA Rules and Regulations, 1926.550(a)(15).

8. Cranes will always be operated on firm, level surfaces, or use mats/pads, particularly for near-capacity lifts.

9. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, will be barricaded in such a manner as to prevent employees from being struck or crushed by the crane.

10. If suspended personnel platforms are to be lifted with a crane, reference 1926.550(g) for general and specific requirements.

11. Rigging equipment (chains, slings, wire rope, hooks, other attachments, etc.) will be inspected prior to use on each shift to ensure it is safe. Defective rigging and equipment will be removed from service.

12. Job or shop hooks or other makeshift fasteners using bolts, wire, etc. will not be used.

13. Wire rope shall be taken out of service when one of the following conditions exist:

- In running ropes, 6 random distributed broken wires in one lay or 3 broken wires in one strand or one lay.
- Wear of one-third the original diameter of outside individual wires.
- Kinking, crushing, bird caging, heat damage, or any other damage resulting in distortion of the rope structure.
- In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.

6.0 WELDING and BRAZING

1. Combustible material will be cleared from the area around cutting or welding operations.

2. Welding helmets and goggles will be worn for eye protection and to prevent flash burns.

3. Eye protection to guard against slag while chipping, grinding and dressing of welds will be worn.

4. Only electrode holders specifically designed for arc welding will be used.

5. All parts subject to electrical current will be fully insulated against the maximum voltage encountered to ground.

6. A ground return cable shall have a safe current carrying capacity equal to, or exceeding, the specified maximum output capacity of the arc-welding unit that it services.

7. Cables, leads, hoses, and connections will be placed so that there are no fire or tripping hazards.

7.0 TOOLS

1. Take special precautions when using power tools.

2. Defective tools will be removed form service.

3. Electric power tools will be the grounded-type or double insulated.

4. Power tools will be turned off and motion stopped before setting tool down.

5. Tools will be disconnected from power source before changing drills, blades or bits, or attempting repair or adjustment. Never leave a running tool unattended.

6. Power saws, table saws, and radial arm saws will have operational blade guards installed and used.

7. Unsafe/defective hand tools will not be used. These include sprung jaws on wrenches, mushroomed head of chisels/punches, and cracked/broken handles of any tool.

8. Portable abrasive grinders will have guards installed covering the upper and back portions of the abrasive wheel. Wheel speed ratings will never be less than the grinder RPM speed.

9. Compressed air will not be used for cleaning purposes except when pressure is reduced to less than 30 psi by regulating or use of a safety nozzle, and then only with effective chip guarding and proper personal protective equipment.

10. Abrasive blasting nozzles will have a valve that must be held open manually.

11. Only trained employees will operate powder-actuated tools.

12. Any employee furnished tools of any nature must meet all OSHA and ANSI requirements.

8.0 SAFETY RAILINGS AND OTHER FALL PROTECTION

1. All open sided floors and platforms six feet or more above adjacent floor/ground level will be guarded by a standard railing (top and mid rail, toeboard if required).

2. A stairway or ladder will be provided at any point of access where there is a break in elevation of 19 inches or more.

3. All stairways of four or more risers or greater than 30 inches high will be guarded by a handrail or stair rails

4. When a floor hole or opening (greater than two inches in its least dimension) is created during a work activity, through which a worker can fall, step into, or material can fall through, a cover or a safety guardrail must be installed immediately.

5. Safety nets will be provided when workplaces are more than 25 feet above the ground, water, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts, is impractical.

6. Safety harnesses, lanyards, lines, and lifelines may be used in lieu of other fall protection systems to provide the required fall protection.

7. Adjustment of lanyards must provide for not more than a six-foot fall, and all tie off points must be at least waist high.

8.1 Scaffolds

1. Scaffolds will be erected, moved, dismantled, or altered only under the supervision of a competent person qualified in scaffold erection, moving, dismantling, or alteration.

2. Standard guardrails (consisting of top-rail and mid-rail) will be installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet above the ground, floor, or lower level.

3. Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches will have standard railings installed on all open sides/ends.

4. Platforms at all working levels will be fully planked. Planking will be laid tight with no more than one inch space between them, overlap at least 12 inches, and extend over end supports 6 - 12 inches.

5. The front edge of all platforms will be no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.

6. Mobile scaffolds will be erected no more than a maximum height of four times their minimum base dimension.

7. Scaffolds will not be overloaded beyond their design loadings.

8. Scaffold components should not be used as tie-off/anchor points for fall protection devices.

9. Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure will be used for access when platforms are more than two feet above or below a point of access.

10. Cross braces will not be used as a mean of access to scaffolds.

11. Scaffolds will not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than the following:

- Three feet from insulated lines of less than 300 volts;
- Ten feet plus for any other insulated or un-insulated lines.

8.2 Excavations and Trenches

1. Any excavation or trench five feet or more in depth will be provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes.

2. Trenches less than five feet in depth and showing potential of cave-in will also be provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.

3. A competent person will inspect each excavation/trench daily prior to start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.

4. Means of egress will be provided in trenches four feet or more in depth so as to require no more than 25 feet of lateral travel for each employee in the trench.

5. Spoil piles and other equipment will be kept at least two feet from the edge of the trench or excavation.

9.0 MOTOR VEHICLES AND MECHANIZED EQUIPMENT

1. All vehicles and equipment will be checked at the beginning of each shift, and during use, to make sure it is in safe operating condition.

2. All equipment left unattended at night adjacent to highways in normal use shall have lights or reflectors, or barricades with lights or reflectors, to identify the location of the equipment.

3. When equipment is stopped or parked, parking brakes shall be set. Equipment on inclines shall have wheels chocked as well as having parking brakes set.

4. Operators shall not use earth-moving or compaction equipment having an obstructed rear view unless vehicle has an audible reverse signal alarm, or is backed only when observer says it is safe to do so.

5. All vehicles shall have in operable condition:

- Horn (bi-directional equipment)
- Seats, firmly secured, for the number of persons carried. Passengers must ride in seats.
- Seat belts properly installed.
- Service, parking and emergency brake system.
- All vehicles with cabs will be equipped with windshields with safety glass.
- All material handling equipment will equipped with rollover protective structures.

10.0 MISCELLANEOUS

1. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the impalement hazard.

2. Enclosed chutes will be used when material, trash, and debris are dropped more than 20 feet outside the exterior walls of a building. A substantial gate will be provided near the discharge end of the chute, and guardrails at the chute openings into which workers drop material.

3. Only trained employees will service large truck wheels. A cage or other restraining device plus an airline assembly consisting of a clip-on chuck, gauge, and length of hose will be used to inflate any large truck tires.

4. Only trained employees will operate forklifts and other industrial trucks.

Attachment VI

EXHIBIT 4

OWNER REQUIRED SAFETY PERFORMANCE STANDARDS

Safety Addendum to Contract Specifications

This document is intended to highlight various safety requirements applicable to the Project, and shall not be construed to waive, or release the construction manager, general contractor and subcontractors (all tiers) from responsibility for compliance with, any and all safety requirements and conditions of federal (including but not limited to OSHA CFR 1926 and 1910), state and local laws, codes, ordinances, regulations and government orders applicable to the Project. Specifically, this Attachment does not purport or attempt to cover all of the safety requirements of local codes, ordinances, regulations and government orders, and construction manager, contractor and subcontractors shall have the specific responsibility to review, understand and incorporate such requirements into the performance of work at the Project.

All safety requirements of any federal, state or local agency with jurisdiction concerning the Project shall be deemed to be included in the Contract Sum of General Contractor ("GC") and/or Construction Manager ("CM") and any subcontractor of any tier, and change orders for the cost of complying with safety requirements stated herein, or required by applicable federal, state or local law, shall not be valid and shall not be considered.

The safety and health requirements attached hereto (the "Requirements") shall be part of the Contract, and shall be followed by all contractors while performing work on site. The Requirements shall be treated as contract requirements, and any material breach of the Requirements shall be grounds for termination under applicable provisions of the Contract Documents. The Requirements specifically include required elements of a site specific safety and health plan which must be developed and implemented by the construction manager, general contractor and the subcontractors.

It will be a condition of the Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract, that the Owner and its affiliated entities or agents are assuming no liability relating to their receipt and review of the GC/CM safety plans or activities. Safety remains the responsibility of the GC/CM and their subcontractors (all tiers), as Owner shall retain no control over the Project work areas. As to the Owner, the GC/CM shall be fully responsible for compliance with all safety requirements applicable to the Project, and for any liability arising out of any failure to comply with such safety requirements.

These Requirements include "best practices" that are standards or requirements that may exceed applicable federal, state or local safety requirements or provide consistency in their application. These Requirements only identify minimum requirements, and do not replace any existing local, state, federal or governing agency requirements. The most stringent requirement, whether found in these Requirements or in applicable federal, state or local law will always apply if a conflict in safety requirements exists. In addition, the Construction Manager and general contractor, and all subcontractors of any tier, shall comply with the safety or Project requirements of any insurance carrier supplying insurance for the Project, as part of the Contract Sum.

The GC/CM shall represent the Owner on all matters of project safety management as it relates to the superintendence of the work on the Project, but under no circumstances shall be considered an agent of the Owner for purposes of complying with or implementing safety requirements.

By the terms of this Contract, the GC/CM agree to impose upon themselves and their subcontractors (all tiers) the following minimum mandatory safety requirements:

1. GC/CM must provide a full time **[part time – Modify as appropriate]** designated on-site safety manager, unless otherwise required by the law, with no other duties other than superintendence of the safety program, with full authority to stop work and remove any person for violation of the project safety program. The safety manager will allocate 100% of his time toward implementing and enforcing the project safety program. The resume of the on-site safety manager shall be submitted for review and reasonable approval of the Owner. GC/CM shall staff additional safety personnel, as necessary, to maintain the effectiveness and integrity of the safety program.

2. Prior to the mobilization, GC/CM shall submit for review a Site Specific Safety Program that includes all of the safety provisions set forth in these Requirements, or otherwise noted in the Contract Documents. The written safety program shall be used as a guideline and direction for the Contractor's and subcontractors' activities. The program and all sections must be project and site specific. This program must meet these Requirements, all applicable federal, state and local legal requirements and include the following minimal provisions: (a) worksite safety policy and mission statement; (b) assigned responsibilities among management supervisors and employees; (c) a system for daily and weekly documented self inspections, including inspections of job sites, materials, work performance and equipment; (d) a thorough accident and injury reporting and investigation process to identify root cause and prevent incident re-occurrence; (e) a safety employee orientation program; (f) a subcontractor orientation program; (f) a safety training program including weekly tool box talks, job hazard analysis, and additional formal training, as required, including but not limited to, fall protection, confined spaces, scaffolding, ladders, excavation safety, lockout/tag out, personnel protective equipment, at a minimum; (g) an employee disciplinary policy; (h) a subcontractor disciplinary

policy including monetary fine system and/or charge back system; (i) include all relevant OSHA subparts; (j) a fire prevention and control program; (k) a task and site specific fall protection program when exposures of 6 feet or greater exist; (l) a hazard communication program; (m) a site specific respiratory protection program; (n) an emergency action plan with contacts, emergency evacuation plan, and notification plan; (o) a property and public protection plan; (p) a site security plan addressing employees, public, venders, suppliers subcontractors, visitors, and control of delivery of equipment and materials to and from the job site. GC/CM must require all subcontractors to submit site specific health and safety programs for review, as well as acknowledgement of compliance with the GC/CM project specific program. GC/CM shall monitor the effectiveness of all subcontractor safety programs by requiring submission of all relevant documentation for review, frequent un-announced attendance at subcontractor safety meetings and site inspections.

3. Require each GC/CM supervisor who works more than 1 hour on the project to possess a federal OSHA 30 Hour Card issued not more than 3 years previously.

4. Require at least one subcontractor supervisor who works more than 1 hour on the project to possess a federal OSHA 10 Hour Card issued not more than 3 years previously.

5. GC/CM shall verbally inform the Owner's Representative at first knowledge of any accident involving property damage or personal injury occurring on the Project and shall provide a written investigation report within 24 hours of having knowledge of such incidents. GC/CM shall establish criteria to ensure that all subcontractors report all incidents immediately to the GC/CM for review and follow-up.

6. GC/CM shall request submission of names of OSHA defined "competent persons" from all subcontractors for all applicable OSHA subparts. Persons shall have the ability to identify hazards and have the authority to stop applicable work.

7. GC/CM and all tier subcontractors shall conduct weekly documented safety meetings for their employees on the job site. Attendees and minutes of the meetings shall be documented. Topics shall include site specific information. Representation of all subcontractor tiers is required at the GC/CM meeting. Subcontractors shall also be required to conduct their own meetings with their own employees. Contractors shall submit meeting schedules to the GC/CM to allow un-announced attendance to their meetings. The GC/CM shall submit subcontractor meeting schedules to the Owner's Representative to allow un-announced attendance at their meetings.

8. GC/CM shall also confirm in writing follow-up and status of any third party, insurance carrier or owner representative safety report identifying site safety recommendations.

9. GC/CM shall implement and enforce a mandatory hard-hat policy for all phases of the Project. Hard hats shall meet ANSI Standard 2.89.1-1969.

10. GC/CM shall ensure that approved safety glasses are available and provided to all employees of all subcontractors on the job-site. GC/CM shall ensure that individual persons have, on person, safety glasses at all times. Safety glasses will be utilized and worn as per OSHA requirements, at a minimum. GC/CM shall ensure that all other protective apparel necessary for the work of any personnel be available at appropriate times, including noise protection, hand protection and protection as to particle or air contaminants, or hazardous chemicals, as may be required by CFR 1926.101 and related provisions.

11. GC/CM shall ensure that the use of horizontal debris netting is installed and maintained not more than two stories below the stripping floor on concrete structures or the utmost finished concrete floor on steel frame structures. Netting shall project outward horizontally a minimum of 10 feet.

12. GC/CM shall ensure that vertical perimeter debris netting is established and maintained at all elevated levels where there is exposure to the public or adjacent property. Vertical safety netting shall have a height not less then 60 inches. The top edge and intermediate height of nets shall be mounted securely to a non-corrosive wire cable capable of withstanding a load of at least 200 pounds applied to any direction except upward. Netting shall be brought to deck level and securely fastened and have openings not over one inch in greatest dimension. This shall be accomplished by utilizing a zero cable or equivalent means.

13. GC/CM shall ensure that sidewalk sheds are provided and adequately designed for the protection of pedestrians, adjacent property and/or site workers adjacent to and/or entering/leaving the building. A sidewalk shed shall be erected when a structure higher than forty feet is to be constructed and the horizontal distance from the structure being built to the inside edge of the permanent or temporary walkway is equal to one half or less of the height of the structure. A sidewalk shed shall be erected regardless of the height of the structure or the horizontal distance between the structure and the sidewalk when material or debris is to be moved by a hoist, crane, derrick or chute or the building or structure is to be demolished.

14. GC/CM shall ensure that procedures are in place to prevent storage of materials at the edge of unprotected floors, roof, etc. so as to minimize materials from blowing or falling off of the building or other structures. GC/CM shall ensure that storage of materials within 10 feet of a perimeter edge is prohibited unless secondary means of securing such materials, and permission from the GC/CM, is obtained. GC/CM shall ensure that procedures are in place to secure all materials stored on the roof at the end of each work

day to minimize materials from blowing or falling off of the building or other structures during non-working hours.

15. GC/CM shall implement and enforce a scaffolding tagging system to identify scaffolds that have been inspected, are deficient or areas where additional means of fall protection should be provided. Inspections shall be made by "competent persons", as defined by OSHA, before each work shift.

16. GC/CM shall ensure that operations rendering signs, signals, and barricades insufficient for the necessary protection on or adjacent to a highway or street, will utilize trained flagmen or other appropriate traffic control.

17. Hot work permits must be issued, submitted by contractors and reviewed by the GC/CM for all welding, cutting and/or brazing operations involving renovations to existing structures.

18. GC/CM shall ensure a fire watch is conducted during the initial hot work and one hour after for final inspection.

19. GC/CM shall develop and implement a project specific safety orientation for all new persons performing work on the Project. No person shall perform any work on this Project until completing such orientation. Contractor orientation shall be presented to the Owner's Representative for review and shall include the following, at a minimum: (a) first aid; (b) emergency facilities; (c) fire protection and prevention; (d) housekeeping; (e) illumination; (f) sanitation; (g) personal protective equipment requirements; (h) fall protection; (i) ladder safety; (j) confined space awareness; (k) lockout/tag out; (l) disciplinary policy; (m) drug/alcohol policy; (n) accident reporting; (o) include site tour; and (p) material handling. GC/CM shall develop a means of tracking individuals who have completed the new employee orientation and shall develop a means of readily identifying such individuals (i.e. hard hat tags) on the Project. GC/CM is responsible for the implementation and presentation of the orientation program to all employees, subcontractors and subcontractor employees.

20. GC/CM shall conduct and document a subcontractor safety orientation prior to engaging in work activity on the Project premises. The orientation program shall meet or exceed project safety plan and Owner requirements. GC/CM must ensure that the orientation is delivered, tracked and maintained. The orientation should be provided to the senior supervisor and/or project manager responsible for the project specific staff.

21. GC/CM shall require all subcontractors to submit a written job hazard analysis ("JHA") for new work and all work of a critical nature. Contractor shall not allow work to proceed until such JHA has been reviewed and approved by the GC/CM safety manager

or designated representative. Subcontractors should communicate the final approved JHA to the entire crew and update such analysis as conditions or scope changes.

22. GC/CM shall ensure mandatory substance abuse testing for all contractors, subcontractor and any sub-tier subcontractor employees in a post-accident situation. GC/CM shall perform substance abuse testing for all contractor, subcontractor and any sub-tier subcontractor employees where reasonable suspicion exists. GC/CM shall prohibit any person failing to pass such substance abuse test from performing work on the Project. Such substance abuse testing shall be conducted within the parameters of accepted industry standards and recognized best practices. Service vendors and material delivery personnel are exempted from this provision. A written substance abuse program shall be developed and submitted.

23. GC/CM and their subcontractors (all tiers) shall implement and enforce a 6 ft. 100% fall protection program for all crafts, trades and activities except steel erection activities that fall under OSHA Subpart R standards and crane operations falling under Subpart N. GC/CM shall be required to ensure the following requirements are initiated:
    a. In addition to OSHA steel erection fall protection requirements covered under subpart R, the following shall apply to all steel erection activities including connecting, work other than connecting, and decking:
        i. All steel workers including deckers and connectors must be required to wear a full body harness and lanyard when a fall exposure of 6 feet or greater exists. Workers shall be provided with documented fall protection training.
        ii. Where existing OSHA Subpart R requirements do not require mandatory fall protection, a positive fall protection system shall still be immediately available and provided as an option for use to all employees exposed to a fall exposure of 6 feet or greater.

    When such requirement is more stringent than that required by the local safety authority, such costs shall be considered by contractors and subcontractors of all tiers at time of bid.

24. GC/CM shall prohibit the use of controlled access zones, warning line systems, controlled decking zones or safety monitoring systems as a means of personal fall protection unless a positive means of fall protection is also provided. Comply also with OSHA 1926.550 and 1926.760 for workers involved in crane operations and steel erection operations respectively.

25. Prior to mobilization, GC/CM shall submit for review a task and Site Specific Fall Protection Program that addresses task and/or activity specific exposures to include, but may not be limited to, unloading areas, stairways, leading edges, elevator shafts, perimeter fall protection, floor openings, etc.

26. GC/CM shall ensure that a third party annual crane inspection shall have been conducted and documented within the last 30 days prior to commencement of operations.

27. GC/CM shall require that all persons operating any crane greater then 15,000 pounds capacity and or equipped with a boom of 25 feet or more shall hold and possess at all times while operating any such crane a current operator's certification as recognized by the National Commission for the Certification of Crane Operators (NCCCO) or its equivalent as approved by the recognized safety authority or state agency having jurisdiction over the Project.

28. GC/CM shall ensure that a "Written Critical Lift Plan" is reviewed and approved prior to any "Critical Lift" including any lift exceeding 75% rated capacity, multiple lifts, lifts involving the hoisting of personnel, lifts within general proximity of power lines, lifts posing risks to property or people, lifts where the operator does not have direct visual contact with the load, static tower crane erection and dismantling, and lifts involving specialized or unique rigging configurations.

29. GC/CM shall ensure that routine crane inspections are documented on a daily and weekly basis.

30. GC/CM shall ensure that any person performing rigging, signaling or supervisor duties for crane operations to carry on his or her person documentation and/or licensing of rigging and signaling safety training prior to assuming such duties. In the absence of such documentation, such individual shall not rig, signal or direct the operation of any crane at any time.

31. GC/CM shall be responsible to ensure that all cranes on the jobsite are free of loads at the end of each day. The act of leaving a load on an unmanned crane shall be prohibited.

32. GC/CM shall implement and enforce a mandatory Ground Fault Circuit Interrupters (GFCI) program. The use of an assured grounding program alone shall be prohibited. Consider installation of GFCI within the main or sub panels on the Project.

33. GC/CM shall ensure that site inspections are conducted daily and weekly, and that written records are maintained of such inspections. GC/CM shall require similar site inspections and records be maintained by subcontractors.

34. GC/CM shall ensure that the use of mobile phones, radios or similar devices by any person when operating vehicles, heavy equipment and other mobile mechanized equipment while on the Project site is expressly prohibited. (Unless specifically utilized for spotting and/or two way communication with a hands-free kit in place per CM approval).

35. GC/CM shall ensure that a "No Smoking" policy is enforced on the Project site. Smoking should only be allowed in exterior designated areas.

36. GC/CM shall permanently remove from the Project any person who, in the opinion of the general contractor, engages in any unsafe work activity, or who in any manner jeopardizes the safety of other workers or any member of the public.

37. All visitors, defined as non-Owner representatives, contractors, subcontractors and service providers, shall sign release forms before entering the Project site. GC/CM shall ensure that all visitors are accompanied at all times.

38. GC/CM shall submit for review a subcontractor pre-qualification and review program that shall be implemented during the pre-qualification of all subcontractors allowed on the Project site. At a minimum, the GC/CM shall obtain and confirm the EMR of each subcontractor seeking pre-qualification. At the Owner's option, any subcontractor with an EMR greater than 1.0 will not be allowed to bid work.

39. GC/CM shall develop and submit for review a public protection program pursuant to the requirements of ANSI standards A10.34 "Public Protection In Construction Zones" and any other applicable regulations.

40. GC/CM shall ensure that lifting loads over persons, occupied or temporary structures is prohibited. GC/CM shall also ensure that for all lifts where loads may expose any employee or member of the public to the hazards of dropped loads, effective and adequate means shall be implemented prior to the lift to eliminate such exposures. The responsible person for taking such action shall be the competent person in charge of the lifting activity and shall be identified in writing by name in any pre-lift written plans and/or job hazard analysis.

TISHMAN SPEYER
SAFETY ATTACHMENT ADDENDA
(NEW YORK)

In addition to the requirements set forth in the Safety Attachment, the following requirements also apply for projects in the City of New York, New York, and the additional requirements are numbered below so as to relate back to the same numbered items in the Safety Attachment, for ease of reference.

1. A competent watchman shall be on duty at the Project site during all hours when operations are not in progress (at least one additional watchman required for each additional 40,000 square feet of construction, or fraction thereof over 5,000). Watchmen shall be familiar with fire alarm boxes and the location and use of fire fighting equipment required to be on the Project site.

11. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

12. Safety netting required when construction activity is on a structure more than 6 stories or 75 feet above the adjoining ground or roof level.

13. For all buildings 100 feet or more in height, the deck and protective guards of the sidewalk shed shall be extended parallel with the curb at least 20 feet beyond the ends of all faces of the structure, regardless of whether such extensions are in front of the property being developed or in front of adjacent property. The GC/CM shall also comply with all codes applicable to the erection and maintenance of sidewalk sheds.

14. When exterior walls are not in place, material piles shall be kept at least ten feet back from the perimeter of the building; material may be stored within two feet of the edge of a building provided however that such material is stored not more than two stories below the stripping operation on concrete structures or the uppermost concrete floor on steel frame structures (such material shall be secured against accidental movement).

15. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240.

23. GC/CM shall strictly comply with applicable laws and regulations pertaining to scaffolding, including, but not limited to Title 27, Subchapter 19, Article 8 of the New York City building code as well as N.Y. Labor Law § 240. GC/CM shall also comply with N.Y. Labor Law § 241 with regard to construction safety.

26. All power-operated cranes must have a certificate of approval, a certificate of operation, and a certificate of on-site inspection (as defined in New York City building code).

27. Riggers and hoisting machine operators shall be licensed as required under Chapter One of Title 26 of the New York City Administrative Code. The operator shall be responsible for making the machine inoperative before leaving the machine.

Attachment VII

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary,* these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____--_____ **Date** ____/ ____/ ____

Information about the employee

1) **Full name** _____

2) **Street** _____

City _____ **State** _____ **ZIP** _____

3) **Date of birth** _____ / _____ / _____

4) **Date hired** _____ / _____ / _____

5) ❒ **Male**
❒ **Female**

Information about the physician or other health care professional

6) **Name of physician or other health care professional** _____

_____

7) **If treatment was given away from the worksite, where was it given?**

Facility _____

Street _____

City _____ **State** _____ **ZIP** _____

8) **Was employee treated in an emergency room?**
❒ **Yes**
❒ **No**

9) **Was employee hospitalized overnight as an in-patient?**
❒ **Yes**
❒ **No**

Information about the case

10) **Case number from the *Log*** _____ *(Transfer the case number from the Log after you record the case.)*

11) **Date of injury or illness** _____ / _____ / _____

12) **Time employee began work** _____ **AM / PM**

13) **Time of event** _____ **AM / PM** ☐ **Check if time cannot be determined**

14) ***What was the employee doing just before the incident occurred?*** **Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific.** ***Examples:*** **"climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."**

15) ***What happened?*** **Tell us how the injury occurred.** ***Examples:*** **"When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."**

16) ***What was the injury or illness?*** **Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore."** ***Examples:*** **"strained back"; "chemical burn, hand"; "carpal tunnel syndrome."**

17) ***What object or substance directly harmed the employee?*** ***Examples:*** **"concrete floor"; "chlorine"; "radial arm saw."** ***If this question does not apply to the incident, leave it blank.***

18) ***If the employee died, when did death occur?*** **Date of death** _____ / _____ / _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

APPENDIX J

Quality Assurance/Quality Control Plan

Appendix J

Queens Plaza Residential Development - Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

QUALITY ASSURANCE/QUALITY CONTROL PLAN

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

September 2014

Arnold F. Fleming, P.E.

QUALITY ASSURANCE/QUALITY CONTROL PLAN
Queens Plaza Residential Development

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1.0 QUALITY ASSURANCE PROJECT PLAN (QAPP)

The Quality Assurance Project Plan (QAPP) outlines the protocols and procedures that will be followed during the Remedial Investigation and any ensuing Remedial Action on the Brownfeld Site. The QAPP has been prepared in order to ensure Quality Assurance (QA) and Quality Control (QC) for the environmental sampling that will take place under the Interim Remedial Measure Work Plan (IRMWP) to ensure the acquisition of defensible data that fulfill the stated objectives.

Project Team

The project team will consist of FLS personnel and subcontractors. All field personnel and subcontractors will have completed a 40-hour HAZWOPER training course and the annual HAZWOPER 8-hour refresher in accordance with the Occupational Safety and Health Administration (OSHA) regulations and will have the training required for their respective duties as outlined for this investigation.

Project Director

The general oversight of all aspects of the project will be conducted by the project director. Tasks will include the scheduling, budgeting, data management and decision-making for the field program. Mr. Arnold F. Fleming, PE, will act as the Project Director for the RWP.

Project Manager

All components of the Remedial Investigation will be directed and coordinated by the Project Manager. He/she will ensure a smooth flow of information between all parties involved in the investigation by communicating regularly with professionals from the New York State Department of Environmental Conservation (NYSDEC), the Brownfield Site management personnel, and all members of the FLS project team. Mr. Steven Panter, CGWP, Senior Consultant will act as the Project Manager.

Field Team Leader

Daily on-site sampling and health and safety activities will be supervised by a Field Team Leader. The team leader's responsibilities will include ensuring adherence to the work plan and HASP and regularly reporting daily progress and deviations from the work plan to the Project Manager. Upon approval of the RWP, FLS will assign the role of Field Team Leader to appropriate FLS personnel.

Project Quality Assurance / Quality Control Officer

Adherence to the QAPP will be ensured by a FLS QA/QC Officer. Tasks will include reviewing the QA procedures with all personnel before any fieldwork is conducted on-

site as well as completing periodic Brownfield Site visits in order to assess the implementation of these procedures. Mr. Daniel DiRocco, Geologist, will act as the QA/QC officer for the investigation.

Laboratory Quality Assurance / Quality Control Officer

Quality control procedures will be ensured by a laboratory QA/QC officer in the designated laboratory. This officer will be responsible for the adherence to laboratory protocols, quality control procedures, and checks in the laboratory. The officer will track the movement of the samples from check in to issue of the analytical results, conducting a final check on the analytical calculations, and signing off on the laboratory reports. The laboratory QA/QC Officer will be assigned by the laboratory for the investigation.

The sample analytical reports will undergo a third party review of the analyses conducted. The third party (yet to be chosen) will produce a Data Usability Summary Report (DUSR) which will be submitted to the NYSDEC. Five percent of the post-excavation soil samples will undergo third party data review.

2.0 LABORATORY PROCEDURES

The sample container type, preservation, applicable holding time, and laboratory methods of analysis of the field samples have been included as Table 1. Sample analyses will be completed in a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH-ELAP) certified laboratory and reported using Category B deliverables.

Table 1
Summary of Analytical Methods/Quality Assurance
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Soil	VOCs, TCL or NYS STARS	Post-Ex. Grab	50	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil	TCL Pesticides & PCBs	Post-Ex. Grab	50	SW-846 Method 8082 & 8081	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	SVOCs, TCL	Post-Ex. Grab	50	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Metals, TCL	Post-Ex. Grab	50	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Solid Waste	TCLP VOCs	Grab	TBD	SW-846 Methods 1311/8260B	Cool to 4^0 C; no headspace	14 days to TCLP extraction; 14 days from TCLP extraction to analysis	(1) 60 ml VOC vial
Solid Waste	TCLP SVOCs	Grab	TBD	SW-846 Methods 1311/ 8270C	Cool to 4^0 C	14 days to TCLP extraction; 7 days from TCLP extraction to SVOC extraction; 40 days from SVOC extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Pesticides	Grab	TBD	SW-846 Methods 1311/8081A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to pesticide extraction; 40 days from pesticide extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Herbicides	Grab	TBD	SW-846 Methods 1311/8151A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to herbicide extraction; 40 days from herbicide extraction to analysis	(1) 950 mL amber glass jar

Table 1
Summary of Analytical Methods/Quality Assurance
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples[1]	Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Solid Waste	TCLP Metals	Grab	TBD	SW 846 Methods 1311/ 6010B/7000 Series	Cool to 4^0 C	Hg: 28 days to TCLP extraction; 28 days from TCLP extraction to analysis Other Metals: 6 months to TCLP extraction; 6 months from TCLP extraction to analysis	(1) 500 mL amber glass jar
Solid Waste	Ignitability	Grab	TBD	SW-846 Method 1010	Cool to 4^0 C	None specified	(1) 500 mL amber glass jar
Solid Waste	Corrosivity	Grab	TBD	SW-846 Method 9045C	Cool to 4^0 C	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar
Solid Waste	Reactive cyanide	Grab	TBD	SW-846 Chapter 7, Section 7.3.3	Cool to 4^0 C; no headspace	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar
Solid Waste	Reactive sulfide	Grab	TBD	SW-846 Chapter 7, Section 7.3.4	Cool to 4^0 C; no headspace	As soon as possible (within 3 days of collection)	(1) 500 mL amber glass jar

[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations

[2] From date of sample collection

[3] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices

TBD - To Be Determined

TCL – Target Compound List

3.0 QUALITY CONTROL SAMPLING

Additional analysis will be conducted for QC assurance in addition to the laboratory analysis of the field soil and groundwater samples. QC samples will include: one equipment rinsate blank and one set of duplicate samples per twenty field samples, and one trip blank per sample shipment. The quantities of field samples and quality control samples have been summarized in Table 2.

The equipment blank and duplicate samples will be analyzed for the same parameters as the soil and groundwater samples, whereas trip blanks will be analyzed solely for VOCs.

Table 2
Summary of Quality Control Samples
Queens Plaza Residential Development

Sample Matrix	Analytical Parameter	Sample Type	No. of QA/QC Samples
Water.	VOCs	Trip Blank	1 per shipment
Soil, Post-Ex.	VOC, SVOC, Metals	Duplicate	1 per 20 samples
Water	VOC, SVOC, Metals	Equipment Blank	1 per 20 samples

4.0 STANDARD OPERATING PROCEDURES

The standard operating procedures (SOPs) for monitoring well installation and development and sampling equipment decontamination are described in the following sections.

Soil Borings

Where soil borings will be installed by means of hollow stem augers, soil samples will be collected on a continuous basis by means of a two-foot long, 2-inch diameter, stainless steel split spoon samplers. The augers will be advanced to the top of the desired sampling interval depth and the split spoon and connected rods will be lowered through the auger and driven into the soil another two-feet using a 140-pound weight dropped through a 30-inch interval. The split spoon and rods will be withdrawn to obtain the soil sample. Where a sonic rig is used, samples will be collected using 3-inch-diameter, 5-foot-long core barrels that are steam-cleaned and/or pressure washed between sample intervals. The appropriate sample volume will be collected based on project-specific procedures.

Where subsurface materials consist mostly of sand mixed with fill material smaller than cobble-size, FLS may obtain soil samples using a smaller direct push Geoprobe® sampling rig. In this case, a macrocore sampler with plastic liners and end plug, as necessary, will collect undisturbed soil cores down to the required depth. The four-foot long macrocore with end plug, as necessary, is pushed into the soil using the hydraulic pressure generated by the Geoprobe® rig. If resistance is encountered the Geoprobe® unit has a vibrating unit that either breaks up the resisting object or vibrates it aside. When the sampling depth is reached, the end plug is removed and the macrocore is then advanced through the sampling interval to collect the soil sample. Plastic acetate liners are placed within the core barrel of the macro core to store the soil/sediment sample, and to prevent any cross-contamination between soil borings. To further reduce the chance of cross-contamination during sampling, the macrocores and equipment will be decontaminated between uses with a non-phosphate detergent wash followed by a clean water rinse, followed by a final rinse with deionized water. Once the macrocore is retrieved from its desired depth, the cutting end of the core barrel is removed, and the plastic core liner is removed. The acetate liner is then cut length-wise with a special knife. PID readings are taken from the soil while still in the core and undisturbed.

The following procedures will be used to complete all soil sampling (these may be superseded by project-specific procedure):

- Identify that the staked-out sampling location is consistent with the location designated on the soil boring location plan, and in a safe location relative to overhead and underground utilities.
- Cleaning/decontamination of the split spoon samplers/macrocores

- The driller will push the sampler, and end plug as necessary, through the overlying strata to the top of the desired sampling interval.
- Recover the sampler and open to retrieve soil core. Split/cut the sample lengthwise for inspection.
- The end plug will be removed at the top of the desired sampling interval and the sampler will then be pushed through the sampling interval.
- Observe the soil core for visual evidence of contamination (i.e., staining, sheens, odor and/or oil-like/ creosote-like material).
- Using a sampling utensil (i.e., sampling spoon), burrow small holes in the core at one-foot intervals, placing the photoionization detector (PID) probe in the holes along the way to retrieve measurements of organic vapor concentrations. Refer to Section 4.6 for project-specific procedures.
- Using the modified Burmister soil classification system to describe visual observations of the soil sample.
- Retrieve an aliquot from each one-foot interval soil samples and seal in a plastic bag in an ice-filled cooler until sample selection for laboratory analysis.
- Choose which samples will be analyzed at the laboratory and label and fill the laboratory-supplied sample jars with the selected soil aliquots from their respective depth intervals. Seal the sample jars and store in a cooler at 4º Celsius.
- Decontaminate soil sampling equipment between sample locations
- Record field observations in the field log book and/or boring log data sheet, including: boring number, sample depth and sample observations (PID readings, evidence of contamination, and soil classification).

Monitoring Well Installation

Borings will be advanced to the desired depths by means of hollow stem augers and a truck-mounted or skid-mounted drill rig for the installation of monitoring wells. The monitoring wells will be constructed of two-inch diameter PVC in accordance with the following procedures:

- Using an oil/water interface probe, measure and record the depth to water in the open hole.
- Lower a PVC riser with a 10-foot to 15-foot length of PVC slotted screen to the bottom of the borehole. Approximately seven feet of the screen will be placed below the water table.
- If dense non-aqueous phase liquids (DNAPL) (such as tetrachloroethene) are suspected, a two-foot sump of steel casing will be attached to the bottom of the screen.

- The PVC screen slot size will be selected based on the sediment grain size observed in the soil. A slot opening of 0.020 inches will be chosen when medium to coarse sand is the dominant grain size. If silty sands or fine sand is dominant, then a 0.010-inch slot size will be chosen.

- In the annular space around the well screen, install the sand filter pack (about one to two feet above the top of the screen).

- For the one to two feet above the filter pack, a bentonite seal will be installed in the annular space.

- The remaining annular space will be filled with a bentonite-cement grout.

- Install a locking cap, flush-with-grade, curb box that has been set in cement. Set up a cement apron around the curb box to direct run-off away from the well.

- Decontaminate the hollow stem augers prior to and following each well installation

- Record data regarding the well installation in the field logbook and/or field data sheets (i.e., location, depth, construction details, water level measurements).

Temporary Well Point Installation

In specific instances where a permanent or semi-permanent monitoring well is not planned or called for, but the field geologist or project manager makes a field decision to collect a groundwater sample; or the location of the boring does not allow the use of a larger hollow-stem auger drill rig, a temporary well point will need to be installed using a Geoprobe® drill rig to collect a groundwater sample. The temporary well point consists of a five to ten-foot length of approximately 1 ¼-inch-diameter PVC well screen placed into a borehole already produced by the Geoprobe® macrocore. A gravel pack consisting of pre-sized sand will be placed in the annular space between the screen and the borehole wall. A groundwater sample will then be collected following the procedures outlined below, except that in a temporary well the 14-day equilibration period will not apply. When the groundwater sample has been collected the PVC well screen and riser pipe will be retrieved and placed in plastic garbage bags for later disposal. The borehole is then backfilled with Bentonite hole plug, and the surface repaired with concrete or asphalt patch.

Monitoring Well Development

The following procedure illustrates the development of all new and existing wells:

- Measure, using a water-level meter or an oil/water interface probe, the depth to the water and, using a weighted tape, the total depth of the well. From these

measurements, calculate the length of the water column (total depth minus depth to water). The volume of water in the well is calculated using the following conversion factors:

Well Diameter (Inches)	Volume per Foot of Water Column (gallons)
1	0.041
1 ¼	0.064
2	0.163
4	0.653
6	1.469

- Discharge the water to 5-gallon buckets using a submersible pump. Transfer water from the buckets to 55-gallon drums designated for well development water.

- When the turbidity is less than 50 nephelometric turbidity units (NTUs) (three successive readings), the well is close to being developed. If after one hour of steady pumping, the turbidity remains high, additional methods of surging and jetting may need to be considered.

- In the field logbook or on field data sheets, record the volume of water removal and any other observations made.

- The equipment must be decontaminated before and after development for each well location

Groundwater Sampling

Groundwater will be sampled according to the USEPA protocol for low-flow purging and sampling (http://epa.gov/region1/lab/qa/pdfs/EQASOP-GW001.pdf). Groundwater samples will be collected from the monitoring wells/well points applying the following procedures no sooner than 14 days following development:

- As the well plug is removed, measure the vapor concentrations in the well using a PID.
- Ensure that any pressure in the well dissipates and that water levels have stabilized before measuring fluid levels.
- Measure depth to water and check for LNAPL or DNAPL utilizing an oil/water interface probe, if applicable. If the NAPL is measurable, groundwater samples will not be collected from such a well.

- During the well development, calculate the mid-point of the water column length within the screen, using the water level and the total well depth measured. [For example, if the total depth is 40 feet, the screened interval is 30 to 40 feet, and the depth to water is 15 feet, the mid-point of the water column within the screened interval would be 35 feet.].
- Connect dedicated polyethylene or Teflon tubing to either a submersible or peristaltic pump and lower such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. The intake should be a minimum of 1 foot above the bottom of the well screen. Record the depth of the intake in the field notes. Connect the discharge end of the tubing to the flow-through cell of a multi-parameter (or equivalent) meter, such as a Hydrolab Quanta or a Horiba U-10 or U-22. Connect tubing to the output of the cell and place the discharge end of the tubing in a 5-gallon bucket.
- At its lowest flow rate setting, activate the pump (but no more than 0.5 L/min.).
- Measure the depth to water within the well. Increase the pump flow rate such that the water level a measurement does not deviate more than 0.3 feet compared to the initial static reading.
- Transfer discharged water from the 5-gallon buckets to 55-gallons drums designated for well-purge water.
- During purging, collect periodic samples (every five minutes) and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, oxidation-reduction potential, and specific conductivity).
- Continue purging the well until water quality indicators have stabilized (three successive readings) for the following parameters and criteria:

Parameter	Stabilization Criteria
pH	+/- 0.1 pH units
Temperature	+/- 3% degrees Celsius
Specific Conductance	+/- 3% S /cm
ORP/Eh	+/- 10 mV
Turbidity	+/- 10% NTUs (< 50 NTUs,): if 3 turbidity values are less than 5 NTU, consider the values as stabilized.
Dissolved Oxygen	10% for values greater than 0.5 mg/L, if 3 DO values are less than 0.5 mg/L, consider stabilized

Strive to reduce turbidity to the lowest practical limit. Record all efforts to stabilize the water quality for the well in the field book and then collect samples as described below. Discontinue purging after three well volumes have been removed and water quality parameters do not stabilize.

- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing (first VOCs

then SVOCs) and place into the required sample containers. Containers are to be labeled as described in Section 5.3.7 and put in an ice-filled cooler.

- All sample bottles shall be filled to the top to minimize aeration and immediately placed on ice and in the dark to minimize temperature or photo-induced changes to the groundwater samples.
- Collect one final field sample and analyze for water quality parameters (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) and record the final readings in the field notes.
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of any sample filters in a 55-gallon drum designated for disposable sampling materials and PPE.
- Decontaminate the pump, oil/water interface probe and flow-through cell as described in Section 5.3.6.
- In the project logbook and field data sheet, record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations.

Decontamination Procedures

Decontamination will be performed on plastic sheeting or in another containment area that is deemed to prevent runoff to the ground. Prior to use on-site and between sampling locations, the macrocore sampler, probe rods, pump, oil/water interface probe, and other non-disposable sampling equipment will be decontaminated using the following protocol:

1. Scrub using tap water / non-phosphate detergent mixture and bristle brush.
2. Rinse with tap water.
3. Repeat step 1 and 2
4. Final rinse with distilled water.
5. Air-dry the equipment.

The solid stem augers and hollow stem augers will be decontaminated with a steam cleaner or pressure washer using a tap water/non-phosphate detergent solution to remove any loose soil and petroleum.

Sample Identification

All samples will be identified using a format that provides the essential information on the use, tracking, location, and media sampled (groundwater, soil, sediment, soil gas, surface water, waste, etc.), date, time, location, and depth interval.

Examples are as follows:

Soil: B-10, 5.5-6.0', indicates that the soil sample was collected from the 5.5 - 6.0-foot

interval in boring B-10.

Groundwater: MW-1 indicates that the sample is a groundwater sample collected in monitoring well 1.

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

Blanks should be spelled out and identify the associated matrix, e.g., Field (Rinsate) Blank (FB)-Soil; Field Blank-Groundwater. Trip Blanks should be labeled with the prefix TB.

Sample Labeling and Shipping

All sample containers must contain the following information—written in waterproof indelible ink (Sharpie)—on the label:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Samplers initials
- Media Sampled

Collected and labeled samples will be placed in ice-filled coolers away from direct sunlight to await shipment/delivery to the laboratory.

To prepare the samples for shipment place each sample in a resealable plastic bag, then wrap each container in bubble wrap, only if being shipped, to prevent breakage. Finally, add fresh ice in two sealable plastic bags, or "blue ice" blocks, and the chain-of-custody form. Samples may be shipped overnight (e.g., via 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. C*oolers must be heavily iced to bring the entire sample contents to* 4^0 *C.*

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured area until arrival at the laboratory or laboratory pick up. Sample possession record from the time of obtainment in the field to the time of delivery to the laboratory or shipping 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; media sampled; date and time of collection and matrix; signatures of individuals involved in sample transfer; and the dates and times of transfers. Laboratory personnel will examine the custody seal's condition at sample check-in.

Field Instrumentation

Equipment will be calibrated at the start of each day of field work in accordance with the manufacturer's specifications. In the instance that an instrument fails calibration, the Project Manager or QA/QC Officer must be contacted immediately so as to arrange repairs or obtain a replacement instrument. A calibration log will be maintained in the field log book in order to record specific details regarding instrument calibration, including: dates, problems, and corrective actions. The PID will be calibrated each day using a standard of 100 parts per million (ppm) isobutylene, zeroed as per manufacturer specifications.

Field personnel will be trained in the proper operation of all field instruments at the start of the field program; however, instruction manuals for all equipment will be stored on-site as a reference of the proper procedures for operation, maintenance and calibration.

APPENDIX K

Construction Dewatering Plan

Hudson Meridian
Construction Group

40 Rector Street, 18th Floor
New York, NY 10006

(212) 608-6600
(212) 608-7611 Fax

Submittal Review Cover Sheet
For

DEWATERING - MORETRENCH

Posillico Civil Inc.

Hudson Meridian
Construction Group

Queens Plaza Residential Development

Project #: 15-0100

Submittal #: 02200-009

Spec Section: 02200

Reviewed By: Greg Rinaldi

Date: 03/10/15

This submittal has been reviewed by HMCG for conformance with the contract documents and shall not be considered approved for design purposes.

Transmittal

Posillico | We know how.

Posillico Business Unit: [X] Civil [ ] Materials [ ] Environmental [ ] Drilling [ ] Consulting [ ] Development

To:	Gregory Rinaldi	Transmittal No.:	10
Company:	Hudson Meridian	Date:	3/9/2015
Phone/Fax:	212-608-6600 212-608-7611	Project:	Queens Plaza Residential Development
Address:	40 Rector St 18th Floor New York, NY 10006	Subject:	Dewatering Plan
		Sent Via:	Email/ProCore

[X] Attached [ ] Catalog Cuts [ ] Certifications [ ] Schedule [ ] Change Order

[ ] Letter [X] Shop [ ] Specifications [ ] Subcontract [X] Submittal #:

Copies	Date	No	Description
1	3/9/15	1	Queens Plaza Dewatering - Moretrench Submittal

The above is transmitted as checked below:

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MORETRENCH
....since 1931

SUBMITTAL

MORETRENCH
...since 1931

Queens Plaza Development

Long Island City, NY

DEWATERING

.....

March 3rd, 2015

Presented to:

Posillico
1750 New Highway
Farmingdale, NY 11735

Queens Plaza Develop

MORETRENCH
....since 1931

Long Island City, NY

DEWATERING

Submitted to: Posillico

Prepared by

Moretrench American Corporation
51 Smart Avenue, Yonkers NY 10704

The submitted plan is based upon information provided by others. This submittal is based on sound engineering principles and accepted industry practices and is reasonable for the described application subject to the risks explained here-in. Responsibility for the design and construction of all structural elements, including but not limited to sheeting, underpinning, wood lagging, soldier beams and piles is by others. Responsibility for potential structure settlement, contaminant migration and proper operation and supervision of the attached plan are the responsibility of others as specified here-in.

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....since 1931

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Appendix C	Dewatering Layout / Job Location Map
Appendix D	Flow Rate Estimates

March 3rd, 2015

MORETRENCH AMERICAN CORPORATION
51 Smart Avenue – Yonkers, NY 10704
(914) 423-1331

System Overview

Excavation will take place for the construction of Queens Plaza Development located along Jackson Avenue and Queens Blvd in Long Island City, NY. Three towers are proposed, Tower A, Tower B-1, and Tower B-2. A dewatering system has been designed to provide workable conditions at the project location.

The grade is approximately +28' at the east side, and gradually slopes down to +12' at the southwest corner. The Groundwater table was measured between El +3.2 and El +7.8'. These elevations are based off of the Queens Datum, which is 2.725 feet above mean sea level at Sandy Hook, NJ.

The elevations for excavation below the water table can be shown as follows:

- The contaminated soil "hot spots" which extend to elevations ranging from El. +16' to El. -7'. Specifically, the southwest corner requires deep soil remediation.
- The bottom of the proposed foundation slab which extends to approximately El. +6'/+8'.
- Bottom of pile caps which extend to El. +2.5'/-1'.
- Bottom of three deep elevator pits which extend to elevations ranging from El. -10'/-13.3'.
- Bottom of the heal blocks for the rakers which extend to approximately El. -6'/-7'.

The general subsurface conditions of the site consist of a stratum of Fill, underlain by sand, varved silt and clay, glacial till, decomposed rock, and bedrock. Although the existing stratigraphy varies across the site it can be summarized as follows:

- The upper most layer consists of a layer of granular fill ranging in thickness from 1.7-2 feet. The fill stratum consists of loose to medium compact, brown fine to medium sand, some silt and gravel, with occasional brick, cinders, concrete, cobbles, and wood (NYC class 11-65).
- A stratum of natural sand ranging in thickness from 2 to 11.3 feet. This material consists of medium compact to compact, gray-brown silty fine sand, trace clay seams and layers, grading to a medium to fine sand, some silt, trace gravel, clay seams, and occasional cobbles (NYC class 7-65).
- Varved silt and clay, which is a layering caused by seasonal deposition. This is 2-10 feet in thickness (NYC class 6-65, 8-65, and 10-65).
- Glacial Till is below the above described strata ranging from 1-38 feet (NYC class 6-65).
- In one boring, decomposed rock exists on top of Rock which was encountered at 4.5' (NYC class 7-65)

- All borings were terminated after penetrating 5 to 10 feet into intact bedrock. The bedrock is generally hard to medium hard unweather to slightly weathered gray gneiss with white pegmatite, blocky to jointed, with slightly weathered joints.

System Design

A combination of soldier beams, timber lagging, rakers, tiebacks and secant pile walls will be installed as the SOE. Others will excavate to approximately 2' above the water table or at El +6 or lower if possible (localized sumping maybe required) and Moretrench will install a wellpoint system around inside perimeter of the SOE. Along the secant wall on north side, the header pipe will be installed at El +10 due to the raker installation and can be lowered later on to keep the entire header pipe at same level. Moretrench assumes others will attempt to sump for the heal blocks and deep pits for the three towers.

From the borings presented in the Geotechnical Report and from previous dewatering work in sites within close proximity to this work show that **the wellpoints need to be drilled into place.**

Eight (8) monitoring wells will be installed outside the excavation to monitor the drawdowns during pumping. Individual wellpoints can be used as observation wells to measure the groundwater table during pumping if required.

Discharge:
The pumped water from wellpoints will be treated via a temporary treatment plant and discharged into an existing 18" combined sewer on Jackson Ave along with maximum allowance of 286 gpm. Should additional flow be required, an additional 314 gpm is allowed to pump into an existing 20" combined sewer along Jackson Ave just north of the 18" combined sewer. A flow meter will be installed at the discharge location(s) to monitor the flow.

System Configuration and Method of Construction

The suction wellpoint system will consist of two major components; the interconnecting suction piping including the suction header and swing hose connections, and the pumping station.

Vacuum Wellpoint Suction System:
The dewatering system may consist of wellpoints installed along the interior perimeter of the excavation. Upon the installation, each wellpoint will be individually tested to assure that they do not pump fines and to confirm adequate yields. From review of the soil conditions and past experience, the wellpoints will consist of 1.5" diameter wellpoint, approximately 21 foot in length for the perimeter. The annulus around the wellpoint will

be sanded. The points will be spaced approximately 8 to 12 feet on center depending on the soil conditions in the area. The wellpoints will be connected to a twelve inch header pipe with the use of a swing hose. The header pipes will be connected to vacuum cans where the water is to be collected. Once the system is turned on and the water table begins to drop, excavation will begin.

Centralized Vacuum Pumping Station:
The individual wellpoints will be pumped simultaneously with the use of an electric-powered vacuum pump hooked up to the vacuum header pipe. This centralized Vacuum Pump Station will be located at the southwest corner at surface level. A Vacuum Can will be placed below the surface and the pump inside the Vacuum Can will then pump the water to general grade to be discharged into the sewer system. The general contractor will need to dig an area to water table to install the Vacuum Can.

The Vacuum Station will be hooked to a generator for power supply. A back up generator will be supplied.

The vacuum pump, vacuum can and pumps will be inter-connected to the header manifold such that there will always be spare capacity to run the system in the event that a failure may occur.

Materials of Construction

Wellpoints
Wellpoints will consist of Self-jetting Schedule 40 1.5" PVC and/or stainless steel wellpoints with PVC or steel risers will be used. The well screen will be .02 or .03-inch slot, slotted PVC with a stainless steel Dutch weave screen exterior sleeve. Each wellpoint will be connected to the suction header with a clear suction hose swing. Each swing connection will be equipped with a valve for isolating and tuning of the wells.

Filter Sand
The filter sand, either Morie #2 or Ricci #1 will be installed in the annulus between the wellpoint and the jetted hole.

Header and Discharge Pipe
The vacuum header piping will consist of 12" inch PVC pipe. Joints may be glued with bell and spigot or fastened rubber expansion couplings may be used. Moretrench custom fabricated O-ring swing connectors will be fitted into the header piping from the wellpoint.

Vacuum Station
The wellpoint Vacuum Station is Moretrench manufactured. They are designed for wellpoint dewatering systems, capable of pumping high volumes of air and water. The pumps are electric and are used in conjunction with a generator. The vacuum is capable

of producing 175 cfm, it has a 15 hp motor that runs on a 230v/460v three phase electrical supply. The vacuum station is supplied with a standby station, backup generator, and double throw switch as a precaution to mechanical difficulties. This station comes complete with a lifting eye.

Float Can
The Float Can is constructed of either steel or schedule 40 PVC piping with bell and spigot glue joints. The Float Can serves as a collection point and separator for the effluent water and air. The water is separated from the air and will gravity feed into the pump can. The air is separated in the float chamber and released through the vacuum station. The float can is capable of processing approximately 275 cfm of air.

Pump Can
Once the Float Can separates the water and air, the effluent water is gravity fed to the pump can. Each Pump Can is supplied with a submersible pump typically between 10hp and 20hp Prosser pump or equivalent located inside the vacuum can. The water is then pumped to the surface, collected, and directed to the discharge location to be gravity fed into the sewer system.

Generators:
The generators are manufactured by Multiquip or equivalent. Two generators will be supplied, one operating and one as a backup system. The generators are 3 phase and supplies 480v. The generators may supply an output between 100-150kw, depending upon the power requirements.

One face wall

Portion of the wellpoints will be required to be installed inside the proposed building perimeter within the proposed slab as one face wall. Wellpoints will be installed within the area of new foundation slab and inside the proposed foundation wall. The header will be required to be attached to the SOE.

Prior to placing the slab, each wellpoint will be required to be boxed out. Boxing out around each point will allow the wellpoint to be grouted, cut below the top of the slab, waterproofed and cemented over. Moretrench will grout the points below slab, others will be responsible to cut, waterproof and patch the slab around the points.

After the placement of the concrete slab, the header will be required to be removed from the existing building wall and placed on the new slab. This will allow the installation of the foundation wall without the header pipe in the way, and maintain the groundwater drawdown. Valves will be placed on either end of the header pipe to facilitate this transition without shutting the entire system off.

Dewatering Impacts

Dewatering of large areas may cause groundwater drawdown underneath adjacent building foundations and other structures, resulting in the consolidation of clayey soils, and cause building settlements. Moretrench is not responsible for any effect for the lowering of the groundwater on existing water supply wells, structures or utilities. Adjacent buildings shall be monitored for any settlement. It is the responsibility of the General Contractor to meet these requirements.

The General Contractor is responsible for monitoring the dewatering operation for possible settlement and for taking all appropriate field action to manage risks associated with settlement prior to and during the operation of the dewatering system.

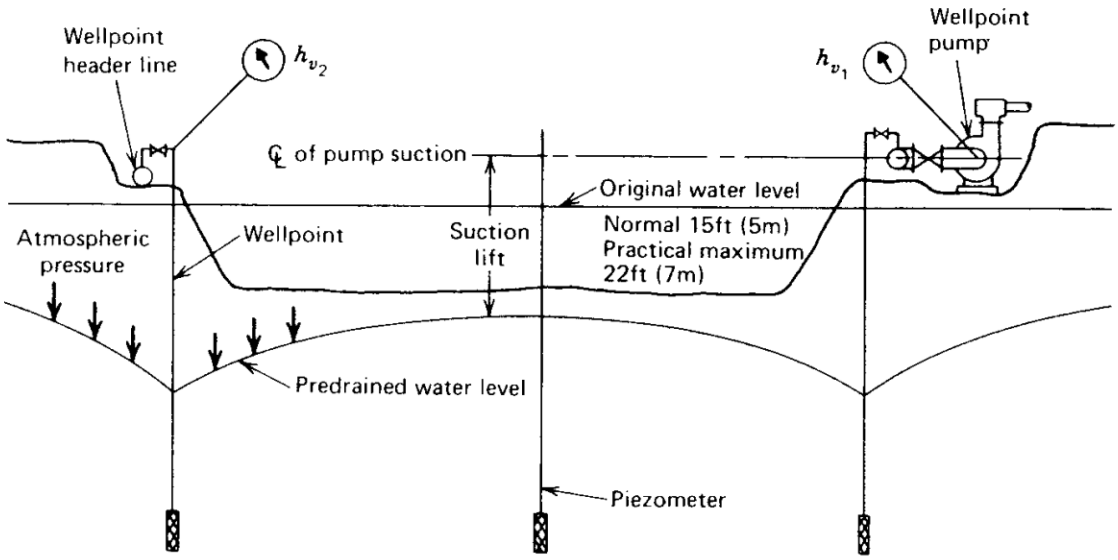
Operating and Monitoring

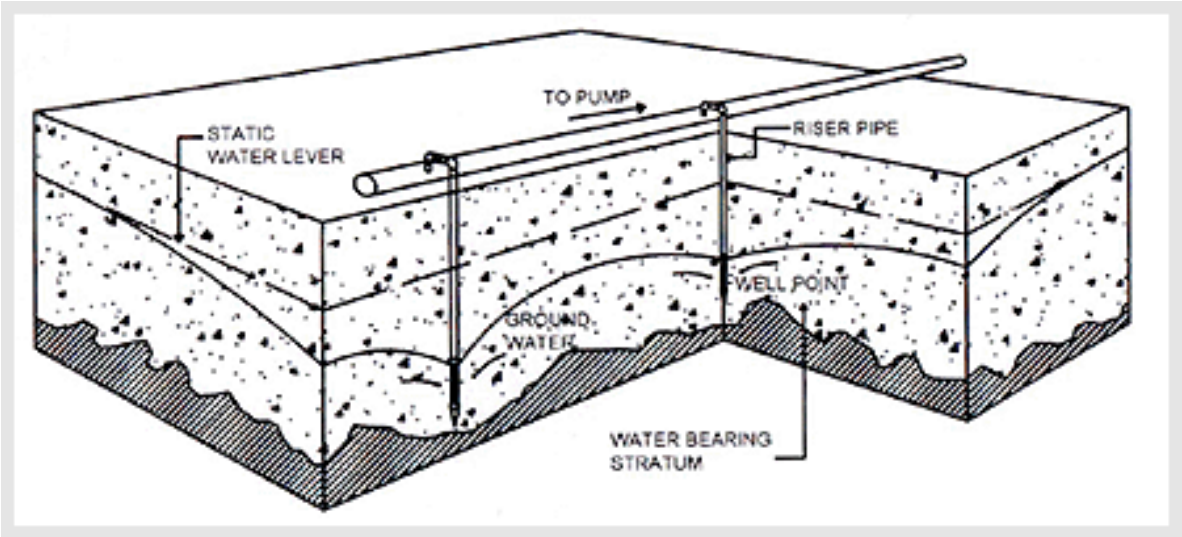
The dewatering system will be operated and monitored as follows:

- The General Contractor will operate and monitor the dewatering system.
- Baseline reading for the piezometers shall be established by the general contractor by taking three independent sets of readings prior to the start of dewatering operations.
- The total discharge volume, average pump rate and times of pump operations will be read weekly by the General Contractor and shall be submitted to the owner within 24 hours of taking the readings. The flow meter will be equipped with totalizers.
- Suspended particles content of the dewatering discharge will be monitored by the General Contractor. This test will be performed at the system discharge location utilizing a Rossum Sand Tester.
- Standby power and a standby vacuum pump will be on site and maintained in proper working order by the General Contractor.

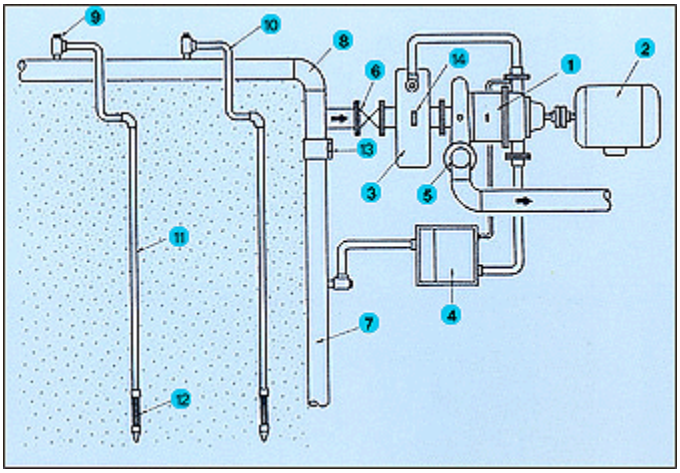
Appendix A

- **Wellpoint System Section**
- **Dewatering System Sections**
- **Vacuum Station**
- **Typical Wellpoint**
- **Generators**
- **Drill Rig**





General Wellpoint System



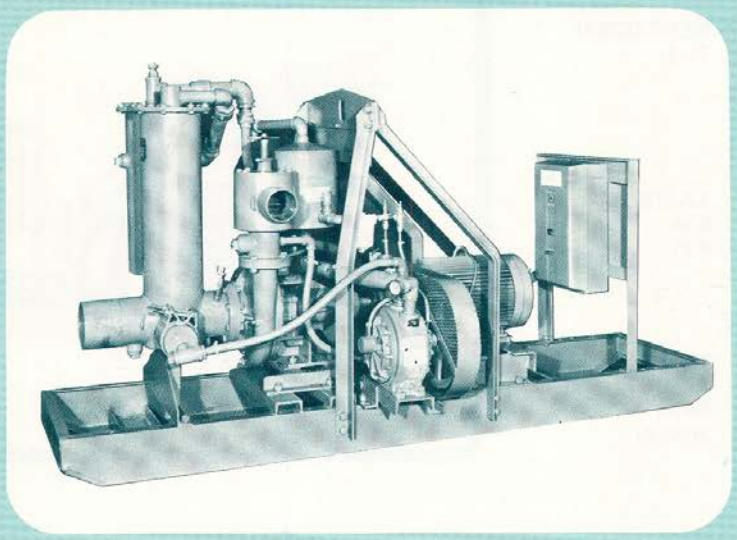
1.Well point pump
2.Motor
3.Separate tank
4.Cooling water regulator
5.Check valve
6.Gate valve
7.Header line pipe
8.Header line fitting
9.Quick opening valve
10.Swing joint
11.Riser pipe
12.Well point
13.Header Coupling
14.Vacuum gauge

Typical Wellpoint System / and Vacuum Stations Examples:

Queens Plaza
Long Island City, NY

MORETRENCH AMERICAN

Model No. 40 SF
pumping unit



The Moretrench American Model 40SF is a light-duty, small-volume (400 GPM) wellpoint pump. It is compact and highly mobile when tire mounted (optional), and has a limited jetting capability. It is generally used to increase water pressure from city mains for the installation of wellpoints in loose soil formations.

Standard Equipment

Power Unit – Diesel engine or electric motor

Frame – Steel channel skid frame with lifting bale

Centrifugal Pump – Horizontal end suction with double mechanical seal

Vacuum Pump – Belt driven • Water-cooled • Oil Lubricated • Rotary type Model MTA 71-4

Air Separation Chamber – Twin fabricated float chambers with float control valves for maximum air removal and vacuum pump protection

Discharge Check Valve – Automatic spring-loaded type with handle, stem and locknut provided for setting back pressure and for positive closure

Optional Equipment

Two-Wheel Mounting – Includes one 3000 lb. axle with swivel plate and tow bar

Tire Construction – 6.70 x 15 four-ply implement type

Hospital Type Mufflers

Vacuum Pump – Model MTA 71-5 for added air capacity

Custom Painting

Towing Safety Package

MA MORETRENCH AMERICAN

Queens Plaza
Long Island City, NY

Technical Data

MORETRENCH AMERICAN Model No. 40 SF
pumping unit

Power

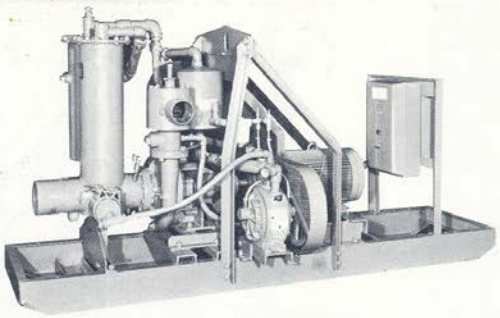
Diesel:	HERC D2300
Vacuum:	71-4

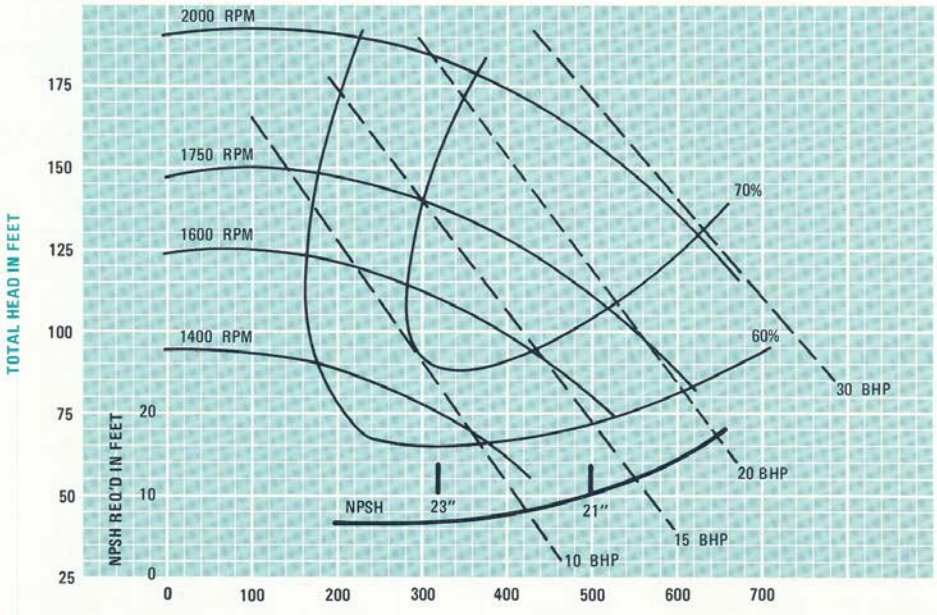
Centrifugal

P-3012-1	
Impeller:	12-3/32 in.
Suction:	6 in.
Discharge:	4 in.

Dimensions

Length:	106 in.
Width:	43 in.
Height:	54 in.
Weight:	2670 lb





- Performance curve indicates approximate performance of a new or reconditioned MTA pump under standard conditions.
- NPSH curves indicate approximate suction lift limits.
- For certified performance under specific conditions consult MTA.
- In the interest of product improvement, specifications and performance subject to change without notice.

MORETRENCH AMERICAN

MultiQuip DCA-100SSVU Generator

DCA-100SSVU

From stationary standby power sources to mobile construction applications, MQ Power's WhisperWatt portable generators will meet your most demanding requirements.

With a standby output of 110kVA/88kW and prime output of 100/80kW, the DCA-100SSVU is ideal for all portable, standby and studio applications. A 129-horsepower, 4 cycle, turbocharged John Deere 6068TF250 diesel engine drives the generator which surpasses all OSHA standards for low-noise operation. this unit's sound level is 67dBA at 23 feet full load.

Specifications	
Performance Data	
Standby Output	88 kW
Prime Output	80 kW
Generator RPM	1800 RPMs
Generator Design	Revolving Field Self-Ventilated Dip-Proof Single Bearing
Voltage Regulation - (No Load to Full Load)	1 %
Power Factor	0.8
Armature Connection	Star with Neutral / Zigzag
Excitation	Brushless with AVR
No. Poles	4 Pole
Frequency	60 Hz
Available Voltages - 3 Phase	208, 220, 240, 416, 440, 460, 480V Switchable Volts
Available Voltages - Single Phase	120, 127, 139, 240, 254, 277 Switchable Volts
Amps - Single Phase 120V	222.2 (4 Wire) 241x2 (Zigzg) Amps
Amps - Single Phase 240V	111.1 (4 Wire) 241 (Zigzg) Amps
Amps - Three Phase 240V	241 Amps
Amps - Three Phase 480V	120 Amps
Insulation	Class F
Sound Level dB(A) - Full Load at 23 feet	70 dB(A)
Power Source	
Engine Make / Model	Volvo TAD520GE
Dimensions	
Overall Length	120 in
Overall Width	44 in
Overall Height	56 in
Approx. Net Wt. Dry	4036 lbs

KR 802-I

With its total weight of approx. 8,1 tons, the KR 802-1 is a universal drilling rig for holes up to 254 mm in diameter and drilling depths up to 40 m

The following options are available for the various drilling processes:

- Rotary heads up to 16 kNm
- Hydraulic drifters up to 12 kNm
- Hydraulic clamping and breaking device for drill tubes up to 254 mm diameter
- Hydraulic winch up to 10 kN line pull
- Flushing pump with up to 170 l/min capacity
- Pneumatic lubrication device for down-the-hole hammer applications
- Tube rack and tube handling system (tube hoist)

The drill mast with feed drive provides a feed and retraction force of 40 kN and has a maximum drill tube feed length of 4,0 m. An automatic chain tensioning device is fitted as standard.

An important characteristic of a drill rig is its ability to set-up quickly over hole after hole. In this respect, the kinematic system of the KR 802-1 drill rig sets new standards, even in restricted site conditions. The standard crawler base, which is pivot mounted to the base unit, provides good ground contact when moving over uneven surfaces and also aids setting-up and loading of the rig.

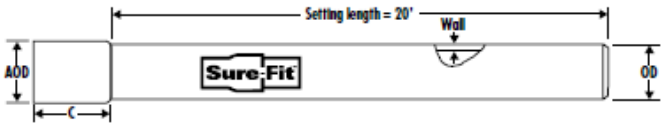
Appendix B

Material Specifications

- **Piping System**
- **Filter Sand**
- **Flow Meter**
- **Rossum Sand Tester**

Nominal Size	O.D.	Class	Min. Wall Thickness	Inside Diameter Min.	Inside Diameter Max.	Bell Dimensions AOD	Bell Dimensions C	Weight lbs./ft.	RHCP PSI	Part Number
2"	2.375	SCH 40	0.154	2.025	2.067	2.71	4.50	.705	306	650031
3"	3.500	SCH 40	0.216	3.012	3.068	3.97	4.00	1.453	262	650833
4"	4.500	SDR 32.5	0.138	4.106	4.223	4.81	6.50	1.243	29	659621
		SDR 26	0.173	4.033	4.154	4.88	6.50	1.539	59	652134
		SDR 21	0.214	4.016	4.072	4.97	6.50	1.886	115	654138
		SCH 40	0.237	3.968	4.026	5.02	6.50	2.078	158	650130
4 1/2"	4.950	SDR 26	0.190	4.502	4.570	5.37	6.50	1.864	59	651830
		SCH 40	0.248	4.379	4.454	5.49	6.50	2.403	135	651137
		SDR 17	0.291	4.288	4.368	5.58	6.50	2.794	224	656538
5"	5.563	SDR 26	0.214	5.009	5.135	6.04	7.00	2.359	59	652233
		SDR 21*	0.265	4.941	5.033	6.15	7.00	2.911	115	654244
		SDR 17	0.327	4.810	4.909	6.28	7.00	3.528	224	656637
6"	6.625	SDR 32.5	0.204	6.093	6.217	7.08	7.00	2.710	29	660030
		SDR 26	0.255	5.984	6.115	7.19	7.00	3.347	59	652332
		SCH 40	0.280	5.961	6.065	7.24	7.00	3.675	79	650239
		SDR 21	0.316	5.885	5.993	7.32	7.00	4.117	115	654336
		SDR 17	0.390	5.728	5.845	7.47	7.00	5.006	224	656736
6 1/4"	6.900	DR 27.6	0.250	6.270	6.400	7.45	7.00	3.433	49	659539
		SDR 21**	0.329	6.128	6.242	7.62	7.00	4.460	115	654930
		SDR 17	0.406	5.964	6.088	7.78	7.00	5.453	224	656835
8"	8.625	SDR 26	0.332	7.771	7.961	9.35	7.00	5.663	59	652431
		SDR 21	0.410	7.666	7.805	9.52	7.00	6.915	115	654435
10"	10.750	SDR 26	0.413	9.724	9.924	11.65	7.50	8.782	59	652530
		SDR 21	0.511	9.567	9.728	11.86	7.50	10.805	115	654534
12"	12.750	SDR 26	0.490	11.561	11.770	13.82	8.00	12.382	59	652639
		SDR 21	0.606	11.345	11.538	14.06	8.00	15.050	115	654633
14"	14.000	SCH 40	0.437	12.924	13.126	14.96	8.00	12.217	31	650635
16"	16.000	SCH 40	0.500	14.790	15.000	17.11	8.00	16.099	31	650734
		SDR 26	0.616	14.544	14.768	17.35	8.00	19.328	59	652837

* Equivalent to SCH 40
** Commonly referred to as 6 1/8"



Notes
- Dimensions are in inches.
- All dimensions and weights are subject to normal manufacturing tolerances.
- RHCP = Resistance to Hydraulic Collapse Pressure at room temperature (predicted failure point - no safety factor included). See brochure on the Selection of PVC Well Casing Based on Hydraulic Collapse Considerations, Literature Code 40-37-02, for additional details.
- Plain-End casing available on a special order basis.
- PVC Casing is normally referred to by SDR or SCH number. Class equivalents are:
- SDR 32.5 = Class 125 SDR 21 = Class 200
- SDR 26 = Class 160 SDR 17 = Class 250

RICCI BROS. Sand Co., Inc.

Filter Sands

Effective Size (mm)	Typical Uniformity
0.35-0.45	1.6, 1.5, 1.4
0.40-0.50	1.5, 1.4
0.45-0.55	1.5, 1.4
0.55-0.65	1.6, 1.5
0.60-0.80	1.5
0.8-1.2	1.5
1.0-1.4	1.5

(Other sizes and uniformity are available - call or email for exact requirements)

Specific gravity (ASTM C128): >2.50, **Acid Solubility (AWWA B100):** < 5%, **Hardness (Mohs Scale):** 6-8, **Sphericity and Roundness (API RP56):** 0.6, **Sodium Soundness (ASTM C88):** <15%, **Test for Clay (ASTM C40 or C117):** plate 1 and 2, **Unit Weight and Voids (ASTM C29):** 100 lb/cu ft, **Chemical analysis:** SiO_2: 98-99; Al_2O_3: 0.03-0.3, Fe_2O_3: 0.03-0.3, Na_2O, K_2O, TiO_2, MnO_2, MgO: to 0.05.

Well Gravel

Slot Size-in.	Slot Size-mm.	Use This Grade
0.067	1.70	4 or Larger
0.045	1.18	3 or Larger
0.033	0.85	2 or Larger
0.023	0.60	1 or Larger
0.016	0.42	O or Larger
0.012	0.30	OON or Larger
0.010	0.25	OO or Larger

The Mc Propeller is a uniquely-designed propeller meter good for both clean and dirty water flows, and is the top-selling flowmeter in the US for agriculture and turf irrigation applications. Here are the product specifications and design features for the Mc Propeller

:

- Accuracy of +/-2%
- Repeatability of +/-0.25%
- Turndown up to 15:1
- Very low permanent headloss
- Mechanical instantaneous flowrate indicator and totalizer standard
- Optional electronic digital register available
- Unique magnetic coupling system, isolates register from flow
- Needs 5 diameters upstream, 1 diameter downstream
- Straightening veins to generate optimum flow profiles
- Epoxy-coated carbon steel body; all stainless available
- Pre-calibrated, corrosion-resistant polymer impeller
- AWWA approved for cold water use
- Register options: forward/reverse flow; test hand/index wheel; anti-reverse totalizer; custom scale; extended digit totalizer
- Impeller options: high temperature resistant; acid and caustic resistant

Rossum Sand Tester

The Rossum Sand Tester is used to measure sand content of pumped water. This device is reliable, easy to use and relatively inexpensive. American Water Works Association Standard for Water Wells (AWWA A 100) Appendix E, Section E.4.6 "Measurement of Sand Content" states "Measurement of sand content may be accomplished by the installation of the Rossum centrifugal sand sampler..." This device has been manufactured by Roscoe Moss Company for over 40 years.

Measurement of sand content is often required of new water wells to determine if specified operating parameters have been achieved. However, well owners should include regularly scheduled sand tests in operation and maintenance programs.

Measurement of sand production on a regular basis may provide a timely indication of well problems. Should structural defects be detected early enough they may be repaired. If not abated, some conditions could lead to complete well failure resulting in decommissioning and replacement; a costly alternative that may have been avoided.

Directions for Using the Rossum Sand Tester

The Rossum Sand Tester is used to measure sand content of pumped water. These directions will allow the user to calculate this measurement in units represented as parts per million by volume.

The Rossum Sand Tester can be used to measure sand content in any water system. However, the water sample for sand determination must be carefully obtained. A sample collected from a horizontal pipe at low flow in unacceptable. The sample should be obtained from a vertical or horizontal pipe with highly turbulent flow. Samples taken immediately downstream from elbows, tees, and other fittings that create turbulence are generally satisfactory.

Procedure

1. Install the Rossum Sand Tester as shown in drawing below. The inlet should be located on the horizontal centerline of the discharge pipe and be as close to the discharge head or other turbulent flow area as possible.

2. Completely open the inlet valve to the tester. Adjust the outlet valve to 1/2 gpm (this will fill a quart container in 30 seconds or a gallon container in 2 minutes).

3. Close the inlet valve, remove, clean, and replace the Pyrex tube.

4. When ready to start the test, completely open the inlet valve and note the time.

5. Periodically record the accumulated sand and time. It is important to note, the most common mistake made when doing the final calculation is dividing total accumulation of

sand by total time. This provides only the average sand content. Instead, it is necessary to divide the incremental sand increase by the
incremental time increase. This will provide the sand production at specific time ie. sand production 15 minutes after the start of the test.

6. Check the flow rate through the tester during each run. If the flow rate is not 1/2 gpm, repeat the test.

7. Record the pump discharge rate (gpm) during each sand test and whether any surging was done prior to the test.

Rossum Sand Tester Calculations

Calculation:

The sand content is determined from the following formula:

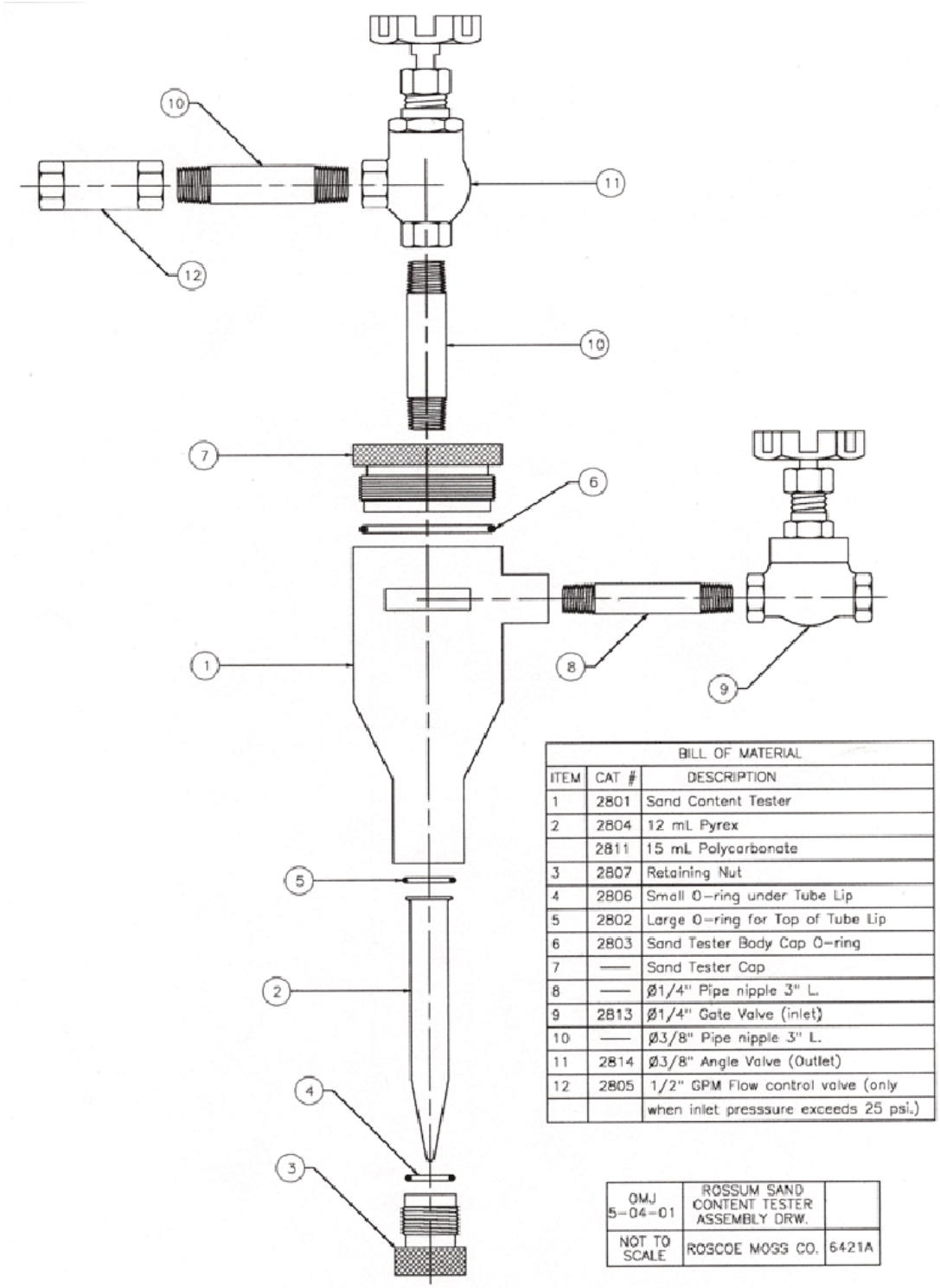
ml sand per ml water = incremental accumulation (ml) / incremental time (mins)
_____ .5 gpm x 231 in3/gal x 16.387 ml/in3

Therefore:

Sand content (ppm) = ml sand per ml water x 1,000,000

Simplified:

sand content (ppm) = incremental sand accumulation (ml) x 528.3
_____ incremental time interval (mins)



BILL OF MATERIAL		
ITEM	CAT #	DESCRIPTION
1	2801	Sand Content Tester
2	2804	12 mL Pyrex
	2811	15 mL Polycarbonate
3	2807	Retaining Nut
4	2806	Small O-ring under Tube Lip
5	2802	Large O-ring for Top of Tube Lip
6	2803	Sand Tester Body Cap O-ring
7	——	Sand Tester Cap
8	——	Ø1/4" Pipe nipple 3" L.
9	2813	Ø1/4" Gate Valve (inlet)
10	——	Ø3/8" Pipe nipple 3" L.
11	2814	Ø3/8" Angle Valve (Outlet)
12	2805	1/2" GPM Flow control valve (only
		when inlet presssure exceeds 25 psi.)

OMJ 5-04-01	ROSSUM SAND CONTENT TESTER ASSEMBLY DRW.	
NOT TO SCALE	ROSCOE MOSS CO.	6421A

Queens Plaza
Long Island City, NY

Appendix C

- **Dewatering Layout**
- **Job Location Map**

Queens Plaza
Long Island City, NY

JACKSON AVENUE

LIMITS OF SUBWAY STATION MEZZANINE

LIMITS OF NYCT SUBWAY STRUCTURE

EXISTING NYCT VENT STRUCTURE

EXISTING NYCT SUBSTATION DUCT BANKS

EXISTING NYCT SUBWAY ENTRANCE

Approx.Discharge Location TBD in the Field

30" DIA. SECANT PILE WALL

W14 SOLDIER PILE AT SECANT WALL (TYP.)

DRILLED 24"O.D. PIPE SOLDIER PILES AT 8'-0" O.C.=64'-0"

EXISTING NYCT EJECTOR ROOM AT TRACK LEVEL

RELOCATE EXISTING ELECTRICAL MANHOLE PRIOR TO SOLDIER PILE WALL INSTALLATION

℄ SOLDIER PILES

DRILLED 24"O.D. PIPE SOLDIER PILES 7 EQUAL SPACES=59'-6"±

EDGE OF EXISTING ELEVATED STRUCTURE ABOVE

BMT-MH#3

BMT-MH#3A

MH-213A

CURB

MH#212

EXISTING CURB

108-A

PROPERTY LINE

EXISTING NYCT VENT STRUCTURE

℄ PIPE SOLDIER PILES

EXISTING NYCT SUBWAY ENTRANCE

MH#1A DIV.26E

BMT-MH#5

109-C

109-A

BMT MH#4

EXISTING CURB

EXISTING NYCT DUCT BANK (TYP.)

NYCT QUEENS BOUND TRACK

APPROXIMATE INFLUENCE LINE OF SUBWAY TUNNEL

℄ SOLDIER PILES

℄ HP SOLDIER PILES

DRILLED 24"O.D. PIPE SOLDIER PILES AT 9 EQUAL SPACES = 73'-4"

SUBGRADE EL. 10.0

SUBWAY EASEMENT LINE

EXISTING NYCT SUB-STATION #26 (BRICK BUILDING) (SEE NOTE 4)

SUBSTATION GROUNDING TERMINAL (TYP., SEE NOTE 5)

EXISTING CELLAR SLAB TO REMAIN

SOLDIER PILES @ 4'-0" O.C. IN 30" DIA. SECANT PILE WALL - 124'-0"±

EXISTING CELLAR EL. 12±

SOLDIER PILES @ 4'-0" O.C. IN 30" DIA. SECANT PILE WALL - 68'-0"

4'-0" (℄ TO ℄ 24"O.D. SOLDIER PILE)

SUBGRADE EL.-1.5

TOE OF BERM AT EL. 11±

SUBGRADE AT TOP OF ROCK

SUBGRADE EL.-1.5 OR TOP OF ROCK IF HIGHER. (EXCAVATE LOCALLY BELOW EL.-1.5 FOR FOOTINGS ON ROCK)

℄ DRILLED 24"O.D. PIPE SOLDIER PILES

2 LEVELS OF TIEBACKS

ORCHARD STREET

SIM.

TIMBER LAGGING (TYP.)

DOUBLE CHANNEL WALE (TYP.)

SUBGRADE EL.-2.5 OR TOP OF ROCK IF HIGHER (EXCAVATE LOCALLY BELOW EL.-2.5 FOR FOOTINGS ON ROCK)

EXISTING CURB

TIEBACK (TYP.)

EXISTING CURB

CORNER BRACE (TYP.)

EXCAVATE TO TOP OF ROCK

RAKER (TYP.)

WALE (TYP.)

PROPERTY LINE

℄ 24" O.D. PIPE SOLDIER PILES

℄ HP AND 24" O.D. PIPE SOLDIER PILES

24" O.D. PIPE SOLDIER PILE (TYP., U.O.N.)

4'-0"

1'-0"

8'-6"±

SOLDIER PILES AT 8'-0" O.C. = 288'-0"

Pumps + Generators + Treatment + Settling Tank

WALE (TYP.)

CORNER BRACE (TYP.)

3'-0" (MIN.)

SUBGRADE EL.-13.3

SUBGRADE EL. 0

PIPE RAKER (TYP.)

RAKER (TYP.)

CONCRETE HEEL BLOCK (TYP.)

TEMPORARY SHEETING AND BRACING FOR BUILDING CORE EXCAVATION (SEE DWG. NO. SOE-102)

℄ W14 SOLDIER PILES

LOCALLY EXCAVATE TO TOP OF ROCK LEAVING STABLE SLOPES FOR INSTALLATION OF RAKER SUPPORTS

WEST STREET (DEMAPPED)

TOE OF BERM (TYP.)

TOP OF BERM (TYP.)

SUBGRADE EL.-3.0

TOP OF ROCK CONTOUR (TYP.)

SUBGRADE EL. 6.0

EXISTING BASE SLAB TO REMAIN UNTIL SOE IS INSTALLED.

HP SOLDIER PILE (TYP.)

wellpoints + header pipe

24" O.D. PIPE SOLDIER PILES FILLED WITH CONCRETE WITH EMBEDDED HP14

SOLDIER PILES AT 8'-0" O.C. = 457'-0"

LONG ISLAND RAILROAD SUNNYSIDE YARD

PROPERTY LINE

℄ SOLDIER PILES

DOUBLE CHANNEL WALE (TYP.)

EXISTING GRADE ELEVATION (TYP.)

MH-213B

MH#2 DIV.26E

PIPE SOLDIER PILE (TYP.)

COLUMN FOOTING FOR ELEVATED NYCT STRUCTURE (TYP.)

SUBGRADE EL.-11.0

EXISTING RETAINING WALL TO REMAIN

SUBGRADE EL. 3.0

SUBGRADE EL. 1.0

SUBGRADE EL.-3.0

EXISTING BLDG. WALL TO REMAIN

SUBGRADE EL.-6.0

EXISTING BLDG. BASE SLAB TO REMAIN.

DRILLED 24"O.D. PIPE SOLDIER PILES AT 8'-0" O.C. = 120'-0"

DRILLED 24"O.D. PIPE SOLDIER PILES AT 7'-0" O.C. = 66'-0"

QUEENS BOULEVARD

EXISTING SOUTH ABUTMENT

Legend

- Valves
- Piezometers

Dewatering Layout

3-04-2015

MORETRENCH

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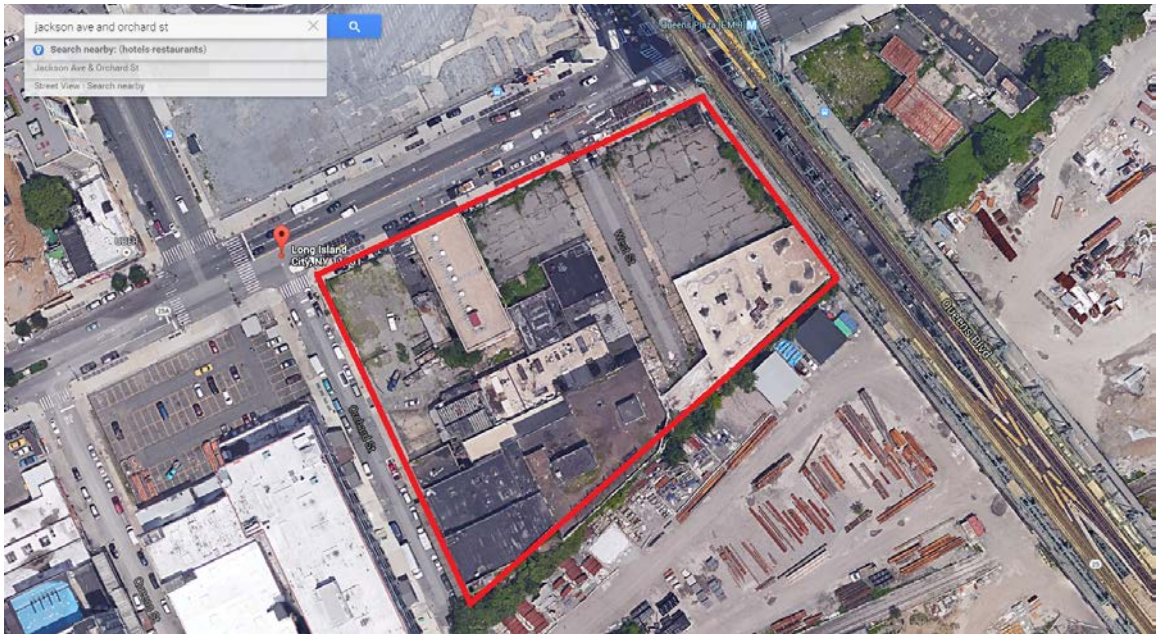
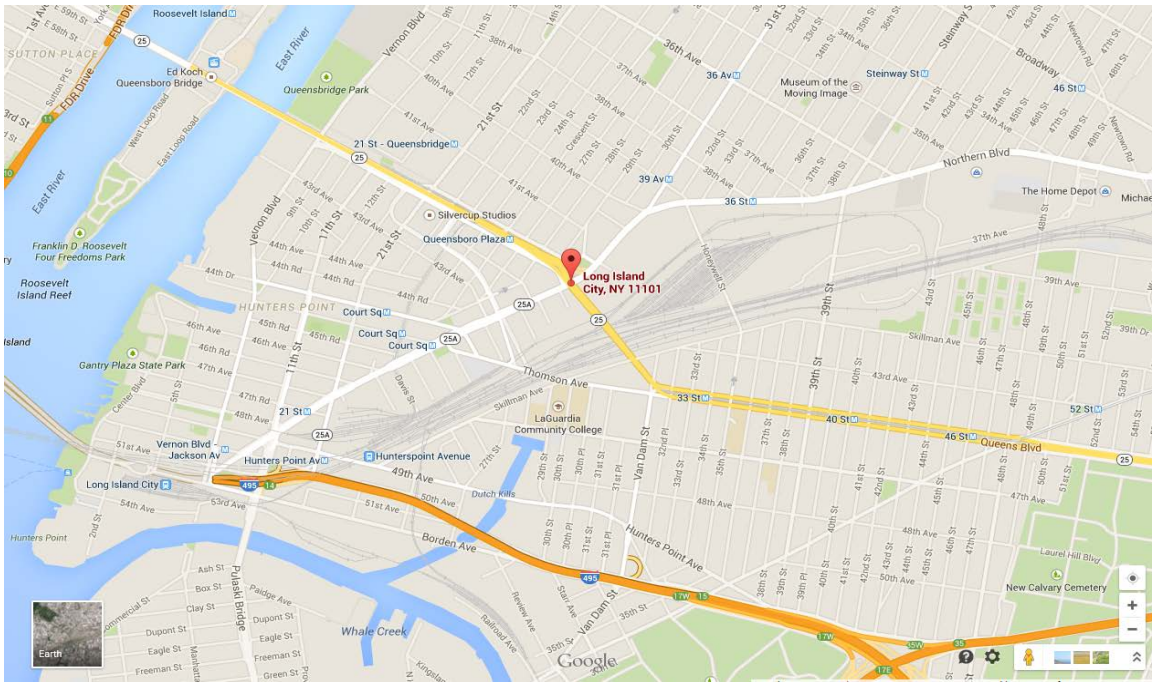




Queens Plaza
Long Island City, NY

Appendix D

- **Flow Rate Estimates**

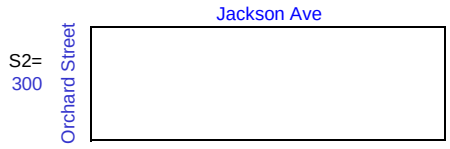
MORETRENCH

....since 1931

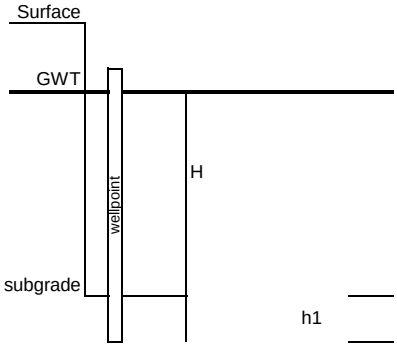
General Contractor: Posillico
Address: 1750 New Highway, Farmingdale, NY 11735
Project: Queens Plaza
Job Location: Jackson Ave & Orchard Street
City: Long Island City, NY
Subject: Discharge Estimates

Date: 3/3/2015

S1= 450 ft sections



Not to Scale



Elevations

Surface	15
GWT	5
	-13
	-16

90 days

Equations from :
Patrick Powers "*Construction Dewatering*" 1992

Estimated discharge volume
Conditions are based on time and Steady State Dewatering

	Cs=	0.15				Storage Coefficient
	K=	53	gpd/sqft	25	ų/s	Permeability (Silt and Clay)
	B=	-16 to 5		21	ft	Aquifer Thickness
EQ 4.1a	**T=**	**K*B**	53 x 21	1113	gpd/ft	Transmissivity
EQ 6.10	**r**	**√((S1*S2)/π))**	√((450 * 300/Π))	208	ft	Equivalent Radius of wells
	Stage of drawdown to El	-13	(24 hrs/day)			
	H=	-16 to 5 =		21.0	ft	
	h1=	-16 to -13 =		3	ft	
	t=	90 days x 1440	min	129600	min	
EQ 6.13	**R_0=**	**r+√ (T*t) / (4790*Cs)**	(1113 * 129600) / (4790 * 0.15)	657	ft	Radius of Influence
Table 6.1	**Q=**	**K(H²-h²) / 458 ln (R/r)**	53 (21 ^2-3 ^2) / 458ln(657/ 208)	44	GPM	Estimated flow rate

NOTE: The initial flow rate will be at least 50% higher than the estimated steady state flow rate due to the depletion of initial storage.

It may take up to a week to achieve the requried drawdown after system startup.

The above flowrates are estimates based on accepted conventions and information. They are not guarantees and actual flow rates can vary under actual field conditions

MORETRENCH
....since 1931

• BORED PILES & SHAFTS

• CUTOFF/CONTAINMENT WALLS

• DEWATERING

• GROUND FREEZING

• GROUNDWATER REMEDIATION

• INDUSTRIAL INFRASTRUCTURE

• LANDFILL GAS/LEACHATE SYSTEMS

• SOIL MODIFICATION/SOIL STABILIZATION

Queens Plaza
Long Island City, NY

APPENDIX L

Storm Water Pollution Prevention Plan and Erosion Control

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

STORM WATER POLLUTION PREVENTION PLAN AND EROSION CONTROL

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street
Long Island City, NY 11101-5407

Arnold F. Fleming, P.E.

November 2014

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Figure 1 Brownfield Site Location Map

Figure 2 Site Plan

Figure 3 Bedrock Elevation

Figure 4 Groundwater Elevation Contour Map

Figure 5 Soil Erosion and Sediment Control Measures

Figure 6 Soil Erosion and Sediment Control Details

1.0 INTRODUCTION

1.1 PURPOSE OF STORM WATER POLLUTION PREVENTION PLAN

This Storm water Pollution Prevention Plan (SWPPP) was prepared by Arnold F. Fleming, P.E. to address conditions as specified in the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001). The SWPPP was developed according to the current New York State Storm Water Management Design Manual and the New York Standards and Specifications for Erosion and Sediment Control. The SWPPP describes the measures for controlling runoff and pollutants during the implementation of the proposed soil remediation of the Queens Plaza Residential Development – Site B (the "Brownfield Site"). Note that the Site area is less than 1 acre and technically is outside the jurisdiction SWPPP requirements. This plan is prepared for the sake of completeness and to support best management practices.

The Brownfield Site is in the NYSDEC Brownfield Cleanup Program (C241151). LIC Development Owner, L.P. (the "Volunteer") is a contract vendee and the BCP Volunteer. The Brownfield Site remediation will be conducted in accordance with the approved Interim Remedial Measure Work Plan (IRMWP). The objectives of the SWPPP include the following:

- Reduction and minimization of erosion during and after remediation and sediment loading of storm water entering or exiting the Brownfield Site during remediation activities
- Control and reduction of storm water entering the Brownfield Site during excavation and remediation
- Control of the volume and peak rate of runoff during and after remediation
- Maintenance of storm water controls before, during and after remediation.

In order to comply with the SPDES General Permit for storm water Discharges from Construction Activity Permit, the SWPPP identifies potential pollution sources that could affect the quality of storm water discharges during remediation. The SWPPP also identifies controls and practices that will be used during and after remediation to minimize runoff, reduce pollutants in discharges, and establish compliance with terms and conditions of the SPDES permit.

The storm water pollution prevention devices and practices described in this document and in the remediation documents will provide effective attenuation and removal of sediments and pollutants in storm water runoff during remediation at the Brownfield Site.

The improvements are designed to control the rate, the volume, and the sediment/pollutant loading of storm water discharges during and after the proposed remediation. Proper implementation of this SWPPP will result in compliance with the provisions of the General Permit GP-0-10-001.

1.2 IMPLEMENTATION OF STORM WATER POLLUTION PREVENTION PLAN

The Contractor will be responsible for complying with all conditions and requirements of this SWPPP, in addition to the conditions of the General Permit GP-0-10-001. The Contractor shall keep all remediation activities under surveillance, management and control to avoid pollution of surface waters and groundwater. The Contractor will be required to submit a Method of Erosion Control and a final Site-specific Erosion and Sediment Control Plan. The Contractor will be required to initiate and maintain erosion controls before and during remediation to prevent siltation of any affected collection basins, manholes, channels, combined sewers, storm sewers, down gradient properties, or receiving waters, as well as any public right-of-ways. In the event that the temporary controls implemented by the Contractor prove to be ineffective or inadequate in controlling sediment and erosion at the Brownfield Site or otherwise unacceptable, the SWPPP will be modified accordingly and the Contractor will then be required to make the appropriate modifications or additions at the remediation site. Furthermore, if a new Contractor or Subcontractor assumes responsibility for implementing any portion of the SWPPP or if there is a significant change in design, remediation, operation or maintenance that was not considered or addressed in the SWPPP, the SWPPP shall be revised to include the relevant information and controls. If significant changes are made, the revised SWPPP will be certified and resubmitted to the NYSDEC for review and approval.

1.3 PROJECT DURATION

Remediation/demolition is anticipated to begin in August 2014 and terminate in December 2015.

2.0 PROJECT DESCRIPTION

2.1 PRE-REMEDIATION SITE CONDITIONS

The Brownfield Site is in the Brownfield Cleanup Program (BCP) and is listed as BCP Site No. C241151. LIC Development Owner, L.P. (the "BCP Volunteer") is a contract vendee and the BCP Applicant. The Brownfield Site B consists of two and three-story buildings, and one 5-story building: Buildings 3A, 3B, Building 4, and a small open area known as Area F. The Brownfield Site is also a New York City "E" Designated site. The Site is currently vacant.

The Brownfield Site is in Long Island City, Queens County, New York and encompasses a trapezoid-shaped parcel bounded on the north by the Queens Plaza Residential Brownfield Site A. (C241105) and Jackson Avenue. On the west, Brownfield Site B abuts Orchard Street, a mapped and dedicated city street. The southern boundary of Site B is the Long Island Rail Road (LIRR) Sunnyside Yard property. The eastern side of Brownfield Site B abuts Queens Boulevard. Figure 1 presents a Brownfield Site Location Map and Figure 2 presents a Brownfield Site Plan. This SWPPP applies to the Brownfield Site, which covers approximately 1.89 acres.

Historically, chemical manufacturing/storage was the principal activity on the Brownfield Site. The former owner, West Chemical Company, manufactured soaps, disinfectants, floor waxes and other household and industrial cleaners and products. Creosote was used in large quantities as a disinfectant and creosote spills represent the most significant contamination of the Brownfield Site's soil and groundwater. Creosote has impacted soils and formed a contaminated zone atop the bedrock and till layers at depth. Chlorinated solvents appear in soils and groundwater at lower levels.

The surrounding properties are primarily used for light manufacturing and/or commercial purposes, with sporadic residential use. To the south is the LIRR Sunnyside Yard, which is a major train repair and service center. The Brownfield Site was historically zoned as "M1-6/R10 Light Manufacturing," until the 2001 Long Island City rezoning changed the classification to M1-6/R10 under the special Long Island City Mixed Use District, allowing high density commercial, retail and residential development on the Brownfield Site.

2.1.1 Drainage

The Brownfield Site is currently served by the New York City combined sewer located in Orchard Street. Storm water inlets are located in various locations on the Brownfield Site. The Brownfield Site is paved with concrete/asphalt, and there is no storm water infiltration. No off-Site discharges have been noted during significant rainfall events.

2.1.2 Geology and Hydrogeology

The Brownfield Site is located on gently sloping land with a surface elevation of approximately 13.6 feet relative to the North American Vertical Datum 88 (NAVD88). The generalized subsurface profile consists of fill overlying silty sand and glacial till, with bedrock below the till. A bedrock elevation contour map is shown as Figure 3.

Surface soils consist of a fill layer approximately 5 to 9 feet in thickness. This fill is a mixture of fine to medium sand, with some silt and gravel and traces of brick, cinders, concrete, cobbles, and wood. The fill is underlain by silty sand and glacial deposits followed by a layer of fine sand with intermittent seams of silt and clay. Thicker layers of varied silt and clay are present within this sand unit in some locations on the Brownfield Site. The sand layer varies in thickness from approximately 5 to 7 feet. Additionally, a till layer is present over most of the Brownfield Site beginning from approximately -0.4 to -9 feet NAVD88and extending to the top of bedrock at elevations of approximately -2 to -12 feet NAVD88. Based on soil boring data from previous investigations, bedrock at the Brownfield Site is gneiss.

Groundwater occurs within the unconsolidated geologic materials covering the Brownfield Site. The upper surface of the groundwater reservoir is marked by the groundwater table, which fluctuates seasonally in response to precipitation. The groundwater table elevation ranges from approximately 9 feet to 11 feet NAVD88 over most of the Brownfield Site. Groundwater flow direction is predominantly to the south-southwest. Figure 5 shows the direction of groundwater flow on the Brownfield Site.

No surface water bodies exist on the Brownfield Site. The closest surface water body is the Dutch Kill coming from the Newtown Creek, located approximately 1,600 feet south of the Brownfield Site, and the East River approximately 4,200 feet to the west.

2.1.3 Results of Previous Investigations

Previous investigations found that soil contamination originated predominantly from creosote spills and to a lesser extent from petroleum-based spills. The sources of these spills are greatest near where the material was stored and processed on Brownfield Site A, immediately north of Brownfield Site B.

Creosote spills impacted soils in the form of a smear zone and deeper soils in the form of residual DNAPL. Creosote has migrated through soil and possibly over the bedrock surface to where it has entered the basement of Building 4. Creosote covers the floor and some portion of the basement walls in Building 4. Comparatively fewer soil borings have been completed on Brownfield Site B because buildings cover most of the Site. For this reason, the understanding of contamination on Site B is limited.

2.2 INTERIM REMEDIAL MEASURE WORK PLAN

The elements of the proposed remediation (i.e. excavation, dewatering, sheeting and shoring etc.) for the Brownfield Site will be implemented during remediation. The remediation will be phased so as to minimize the exposure of soils underneath the current building slab and prevent sediment and pollutant runoff from occurring.

2.2.1 Remediation Phasing

The Interim Remedial Measure will consist of the following elements:

- Installation of site fencing
- Installation of stabilized remediation entrance

- Demolition of existing building
- Installation of a containment structure
- Installation of temporary sheeting and shoring
- Installation of berm along the Site perimeter
- Excavation
- Dewatering
- Remediation of building foundations
- Site Paving

2.2.2 Excavation

The method is to excavate and load soil (and debris) directly into trucks for disposal at off-Site facilities without stockpiling; however, some temporary stockpiling within the excavation may be necessary based on the availability of transport vehicles. There is insufficient space to routinely stockpile and segregate large volumes of soil and direct loading is the most effective means to meet the remediation schedule and control potential odors. Soil will be removed using appropriate or otherwise suitable excavation equipment. The excavation of OU-1, where creosote or petroleum contamination is anticipated, will be performed within an engineered containment structure designed for constant negative air pressure to contain odors. The area covered by the containment structure may be expanded based on the Remedial Investigation data.

Soil will be excavated over the entire BCP Site area and loaded directly into trucks for off-site disposal whenever possible. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible, but may still require alternative odor control measures. This decision will be made in conjunction with the Department. Soils not anticipated to be contaminated by petroleum or creosote may be excavated outside of a containment structure, if feasible. Any soil stockpiled outside a containment structure will be placed upon plastic sheeting and covered with plastic sheeting at the end of each day. Soils stockpiled within the containment structure will be placed on plastic sheeting but not covered. At the conclusion of each work day, exposed contaminated soil within the containment structure will be covered with plastic and/or long-duration foam and then the air handling system will be turned off.

2.2.3 Temporary Sheeting, Shoring and Underpinning

Within the Brownfield Site, a combination of sheeting, shoring, and underpinning will stabilize the excavation. Shoulder beams and lagging will be constructed along the Brownfield Site perimeter accessible to the public (along Orchard Street and along the southern perimeter where there are no adjacent building foundations). Underpinning will be used to support the foundations of the buildings that abut the eastern, northern and southern boundaries of the Brownfield Site. Where excavation is shallow, slope stabilization, slope cuts (1:1 or 2:1, as necessary) or other acceptable means may be used where sheeting and shoring are unnecessary.

2.2.4 Permanent Sheeting

It is possible that NAPL could migrate back into the remediated OU-1 area from sources outside the Brownfield Site. A means of preventing re-contamination of the remediated areas is

therefore necessary. Three methods of preventing re-contamination will be used depending on the structures and nature of the contamination near them. Steel sheeting will be used where there is insufficient space to drive the sheet piles and where the structures can sustain the vibration and pounding. Where these conditions cannot be met, the approach will be to use underpinning of the structures. If foundation walls extend to bedrock, then these will be left in place to control migration, if conditions warrant.

2.2.5 Containment Structure

Creosote is responsible for most of the impacts and generates strong odors. Consequently, soils in the Brownfield Site must be excavated beneath an enclosure (OU-1) so that odors can be controlled. The enclosure(s) may be a sprung structure, scaffolding, or an enclosure formed by tarps or plastic coverings attached to adjacent buildings, or a hybrid. The enclosure will be sufficiently large to accommodate excavation equipment and accommodate truck loading and will have air exchange with filtering. Other areas may require excavation within an enclosure if warranted by excessive odors or VOC levels. This decision will be made based on field conditions.

2.2.6 Dewatering

Dewatering will be used as necessary in OU-1 to complete the work and excavate to the desired depths. Water will be pumped from the excavation to temporary well points placed on the perimeter of the Brownfield Site in the sheeting excavation. Groundwater will then be pumped to a treatment suite consisting of settling tanks to remove suspended solids, a separator to remove any free product, and granular activated charcoal (GAC) units to remove dissolved organic contaminants. From there the water will be discharged to the New York City combined sewer through a connection to the existing sewer line on Orchard Street. Discharge will comply with New York City Department of Environmental Protection (NYCDEP) permit requirements. No dewatering liquids will be discharged back into the excavation. No dewatering is anticipated in OU-2.

3.0 PROPOSED STORM DRAINAGE CONDITIONS

The proposed storm drainage system will be adapted to Site conditions as the Brownfield Site is developed.

Existing Conditions

The Brownfield Site is currently served by the New York City combined sewer located in Orchard Street. Storm water inlets are located on the Brownfield Site as shown on Figure 5.

Remediation

The anticipated storm water control and remediation sequencing at the Brownfield Site is described below. If changes are made to the remediation sequencing, the SWPPP will be adapted as necessary.

1. Prior to beginning excavation, install a security fence around the perimeter of the Brownfield Site open to public access. A temporary asphalt berm will be installed around the outer perimeter of the Brownfield Site along Orchard Street, preventing storm water from entering the Brownfield Site from off-Site sources.
2. Paving will be removed across the Brownfield Site, to bring the Site elevation below sidewalk elevation, preventing storm water from leaving the Brownfield Site. If necessary, during this process, storm water will be collected on-Site and pumped into a baker tank, and then pumped into the New York City combined.
3. The entire perimeter of the Brownfield Site along Orchard Street will be sheeted, outside the property line on the sidewalk. The area between the property line and the proposed sheeting will be excavated to facilitate sheeting installation. Temporary well points will be installed in this excavation at various points around the Brownfield Site to collect storm water and eventually groundwater. These well points will act as the dewatering system for the excavation, once underway.
4. Along the buildings on the eastern northern and northern sides of the Brownfield Site, underpinning will be installed to support the adjacent buildings' foundations. On sides where the boundary of the Brownfield Site does not abut a building, sheeting will be installed for stabilization.
5. Stabilized pads will be installed at each vehicle access point. These locations will be determined by the Contractor prior to beginning work on-Site.
6. Excavation will be at least to the depths below ground surface as identified in the Remedial Investigation. Excavation may be deeper in some places. Creosote-impacted soils will be characterized for waste characteristics, removed from the Brownfield Site, and disposed off-site at an approved facility. Once operational, the remediation dewatering system will collect the storm water and groundwater and pump it to the on-Site treatment system (see Section 4.0). After treatment, the storm water will discharge to the combined on Orchard Street.

7. Brownfield Site remediation activities will be completed, including excavation of contaminated soil, transportation of contaminated soil from the Brownfield Site, and backfilling of the disturbed area as necessary to support the proposed building foundation. The dewatering system will operate until the building superstructure is stabilized.

8. The SWPPP plan calls for minimizing the stockpiling of soil. But in the event temporary stockpiling becomes unavoidable, then either of two options will be used. Option 1, the preferred option, will be to stockpile soil within the excavation, where the lower elevation will prevent runoff. Exposed stockpiles will be covered by plastic sheeting, when inactive, until removal. The second option, available only at the very beginning of the project when on-Site unexcavated space is available, will be to temporarily stockpile soil on asphalt/concrete, cover it with plastic sheeting, and encircle it with hay bales, when inactive, until removal. The SWPPP controls will prevent additional protection against runoff from the Site.

4.0 EROSION AND SEDIMENT CONTROLS

Adequate erosion and sediment control methods will be provided prior to any grading, excavating, trenching or otherwise disturbing any areas. The following describes the temporary erosion and sediment controls that will be implemented at the Brownfield Site, as shown on Figure 6.

Stabilized Remediation Entrances

A stabilized pad will be installed consisting of gravel underlain by filter cloth. This temporary measure will be used to reduce the tracking of sediments outside the work area onto adjacent pavements and public streets. A pad of gravel will be placed at the point of entry for remediation traffic onto the Brownfield Site, which will be determined by the Contractor prior to beginning work on-Site. Tires will be washed before leaving the Project Site. The truck wash wastewater drain will connect to the New York City combined on Orchard Street through the dewatering system.

Storm Drain Inlet Protection

Silt barrier/geotextile material and hay bales will be placed around existing and newly constructed inlets to reduce or eliminate sediment entering the storm drainage system. Inlet protection will be critical in reducing sediment content of water entering the storm drain system (See Figures 7 and 8).

Temporary Berm

A temporary berm will be constructed to prevent storm water from entering or exiting the Brownfield Site. The hand-formed asphalt berm will be approximately 3 inches high. The berm will be constructed along Orchard Street as shown on Figures 7 and 8.

Spill Prevention Control and Countermeasure (SPCC) Plan

The Contractor will submit a Site-specific SPCC plan detailing its methods for preventing spills to the ground during all handling and operations. The SPCC plan shall include details of all containment and contingencies for quickly and effectively cleaning up any spilled material. Specifications and locations of materials (absorbents, etc.) will be included.

Dust Control

Several methods of controlling dust will be utilized including sprinkling water or other moisture retaining agents on dirt roadways and covering all haul trucks carrying loose materials (as necessary). The slopes on the edges of the excavations will be covered with a dust and odor-suppressing foam, such as Geomar. The Contractor will also employ dust control measures, such as speed restrictions on Brownfield Site roads, and covering of haul trucks.

Groundwater Treatment

Groundwater will be treated prior to discharge to the combined. Groundwater will be pumped into a settling tank, through bag filters, and finally activated charcoal polishing before discharge to the combined.

Listed below are several general practices that will be employed during remediation:

- Any materials deposited onto public thoroughfares will be promptly removed and properly disposed.
- Captured liquids requiring disposal will be containerized and transported off-Site for treatment and/or proper disposal.
- The pavement will be swept as necessary to maintain a clean work area and prevent silt from entering storm water runoff.

5.0 OPERATION, MAINTENANCE AND INSPECTION

The Contractor will have overall responsibility for implementing, monitoring and maintaining the project schedule and documenting/monitoring that appropriate controls are in place. Before, during, and after remediation of the Brownfield Site, a number of erosion and sedimentation control measures will be implemented as described in Section 4. These controls will be maintained such that the quality and quantity of storm water runoff leaving the Brownfield Site will not be adversely affected by remediation operations. The controls will also be maintained to deter storm water from entering the Brownfield Site and the excavation**.** The Prime Contractor/Subcontractor Certification for SWPPP implementation is provided as Appendix A.

5.1 REMEDIATION-PHASE OPERATION, MAINTENANCE AND INSPECTION

The Contractor will designate a Site Coordinator who will perform regular inspections (at least every seven calendar days and within 24 hours of the end of any storm event of 0.5 inches of rain or greater) to document/monitor that adequate pollution control measures are in place. The Brownfield Site Coordinator will also conduct regular inspections of the erosion control items currently in place to evaluate their adequacy and effectiveness, and will identify any required corrective measures and additional items required to maintain effective erosion control. It will also be the Site Coordinator's responsibility to determine what areas have been satisfactorily stabilized and determine when to remove temporary erosion control measures established for remediation. Disturbed and stabilized areas, changes in flow patterns, fencing, or preventive measures shall be documented on a Site map. A log book will be maintained to record all inspection and maintenance information and made available to regulatory authorities upon request.

The Contractor shall have a Qualified Inspector conduct site inspections in conformance with the GP-0-10-001 requirements. The Qualified Inspector shall prepare an inspection report subsequent to each and every inspection and is required to present photo documentation of practices that are identified as needing corrective actions. The photos need to be date stamped. The SWPPP will be updated monthly to indicate changes that occurred, and anticipated changes for the month ahead.

5.2 POST-REMEDIATION OPERATION, MAINTENANCE AND INSPECTION

A final Site inspection will take place before the filing of the Notice of Termination to certify that the Brownfield Site has undergone final stabilization using vegetative or structural measures and that all temporary controls have been removed or converted to permanent controls (as applicable). All disturbed areas will have permanent measures applied.

6.0 REFERENCES

- Empire State Chapter, Soil and Water Conservation Service, 2004. *Draft New York Guidelines for Urban Erosion and Sediment Control.* 2004.

- New York State Department of Environmental Conservation, 2010. *SPDES General Permit for Storm water Discharges from Construction Activity – Permit GP-0-10-001.* January 2010.

- Center for Watershed Protection, *New York State Storm Water Management Design Manual,* August 2010.

- New York State Department of Environmental Conservation*, New York Standards and Specifications for Erosion and Sediment Control*, August 2005

- New York State Department of Transportation (NYSDOT), *2002. Standard Specifications, Section 209-3, Construction Details.* 2002.

- United States Environmental Protection Agency, *Best Storm water Management Practices*

- New York City Department of Environmental Protection, *Rules and Regulations Governing the Construction of Private Sewers and Drains*

Figures

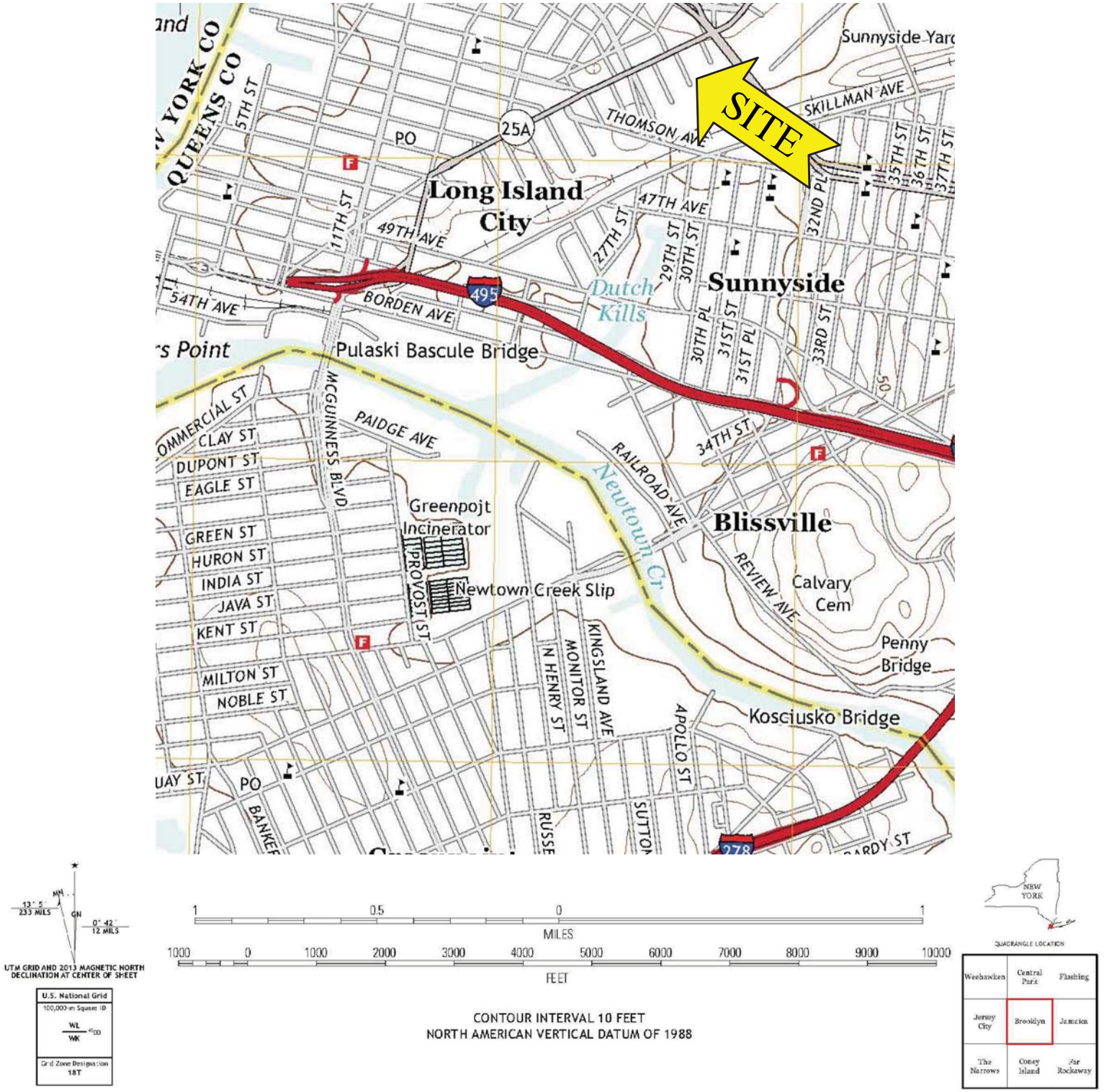


FIGURE 1: SITE LOCATION

SITE: Queens Plaza Residential Development - Site B
Long Island City, NY

CLIENT: TST LIC Development LLC

Fleming Lee Shue

JACKSON AVENUE

ORCHARD STREET

QUEENS BLVD.

AREA A

TAX BLOCK 263
TAX LOT 1&19

2 STORY CONCRETE BUILDING NO. 9

AREA B

TAX BLOCK 264
TAX LOT 1&17

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

AREA C

5 STORY BRICK BUILDING

1 STORY

HIGH 1 STORY BRICK BUILDING

2 STORY BRICK BUILDING NO. 6

1 STORY BRICK BUILDING NO. 6A

2 STORY BRICK BUILDING NO. 2A

AREA D

AREA E

1 STY.

1 STORY BRICK BUILDING NO. 2B/2C

HIGH 1 STORY BRICK BUILDING NO. 5

1 STY.

1 STORY BRICK BUILDING NO. 10

2 STORY BRICK BUILDING NO. 3A/3B

3 STORY BRICK BUILDING NO. 4

5 STORY BRICK & CONCRETE BUILDING NO. 1

AREA F

AREA G

LONG ISLAND RAILROAD

WEST STREET

0 40 80
FEET

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 2.dwg DATE: 6/11/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 2

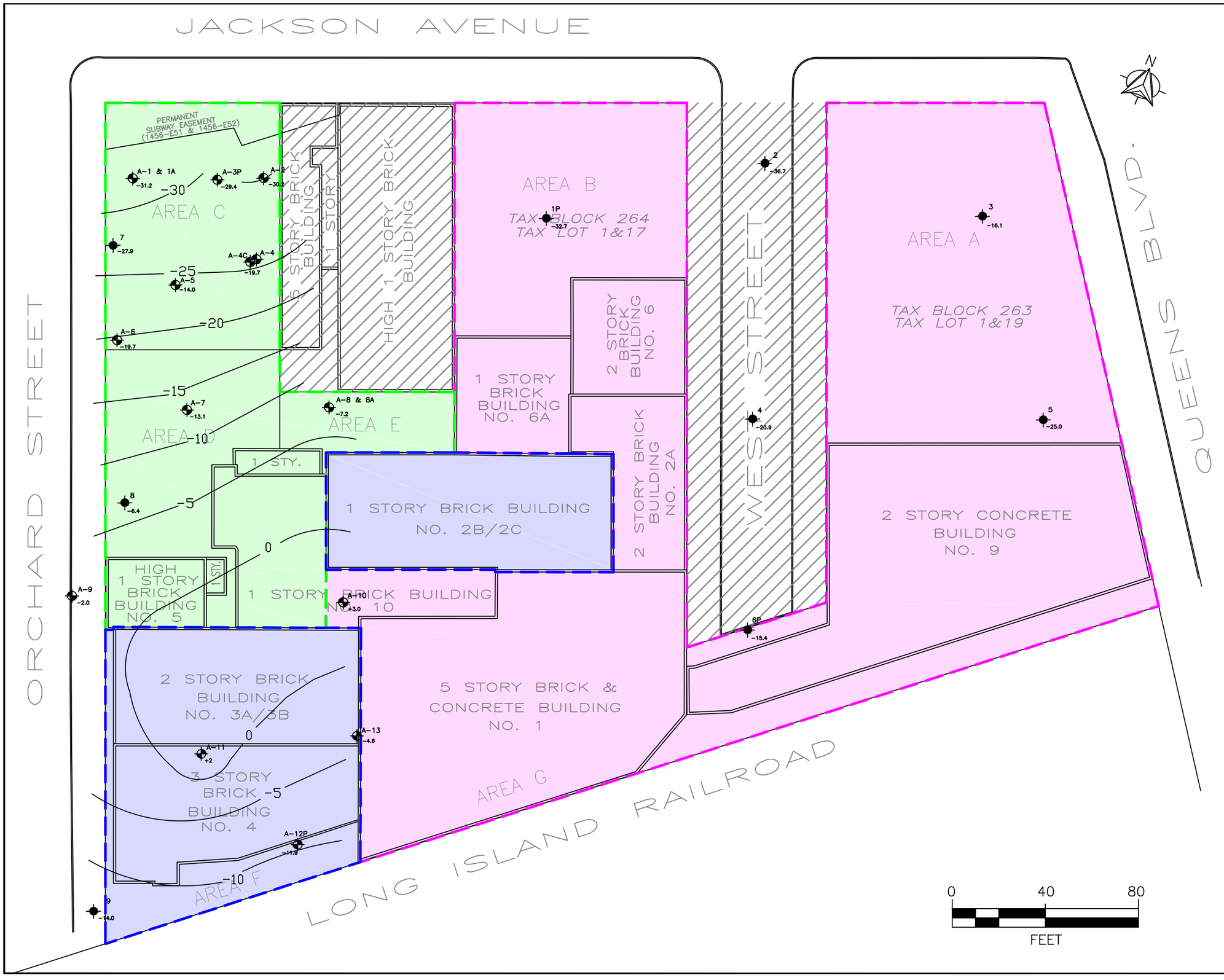
SITE PLAN

Date
June 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE



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Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 3

BEDROCK ELEVATION CONTOUR MAP

Date
June 2014

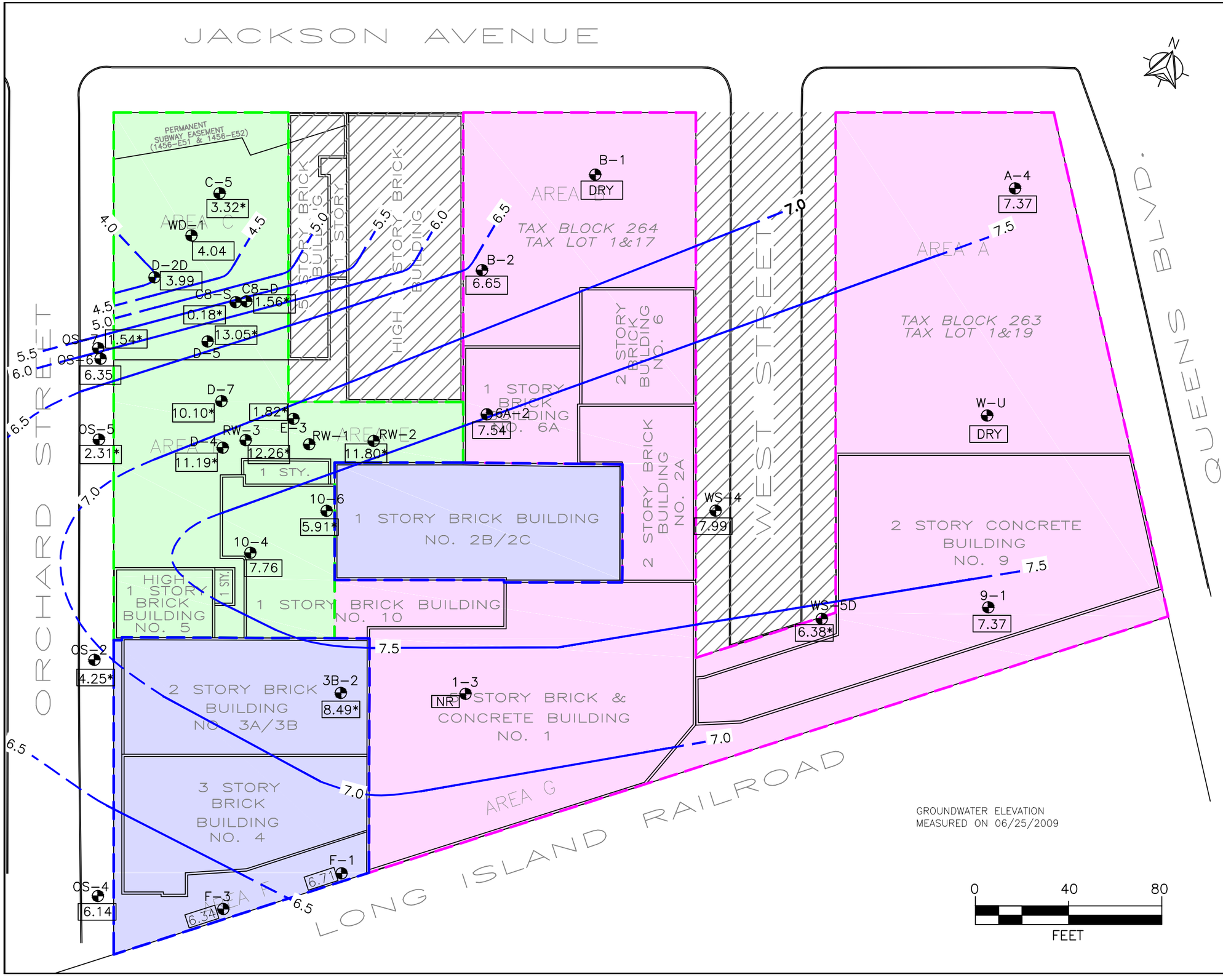
Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- A-10 +3 — BORING MADE IN 2007. ELEVATION OF TOP OF ROCK "P" INDICATED PIEZOMETER INSTALLATION. "A" INDICATED OFFSET FROM ORIGINAL LOCATION
- 9 -14.0 — BORING MADE IN 1988. "P" INDICATED PIEZOMETER INSTALLATION. ELEVATION OF TOP OF ROCK
- 5 — CONTOUR OF ELEVATION OF TOP OF ROCK

ELEVATION IN QUEENS BOROUGH DATUM (QBD) 1929

SOURCE: GEOTECHNICAL SUMMARY REPORT, MUESER RUTLEDGE CONSULTING ENGINEERS, APRIL 20, 2007



Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 4

GROUNDWATER ELEVATION CONTOUR MAP

Date
June 2014

Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU-1
- BCP SITE B – OU-2
- OUTSIDE OF SITE
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (QBD) – DASHED WHERE INFERRED
- 7.37 GROUNDWATER ELEVATION (QBD)
- * ELEVATION NOT USED DUE TO ANOMALOUS READINGS OF GROUNDWATER LEVEL
- NR NOT RECORDED

ELEVATION QUEENS BOROUGH DATUM (QBD) 1929

QBD IS 1.625 FT HIGHER THAN NORTH AMERICAN VERTICAL DATUM (NAVD88). TO CONVERT FROM QBD TO NAVD88 = QBD + 1.625 FT

FILE: P:\Project Files\10112 – Tishman Consulting\001-10 – Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 4.dwg DATE: 7/2/2014

JACKSON AVENUE

PERMANENT SUBWAY EASEMENT (1456-E51 & 1456-E52)

AREA C

5 STORY BRICK BUILDING

1 STORY

HIGH 1 STORY BRICK BUILDING

AREA B

TAX BLOCK 264
TAX LOT 1&17

2 STORY BRICK BUILDING NO. 6

1 STORY BRICK BUILDING NO. 6A

2 STORY BRICK BUILDING NO. 2A

AREA D

AREA E

1 STY.

1 STORY BRICK BUILDING NO. 2B/2C

HIGH 1 STORY BRICK BUILDING NO. 5

1 STY.

1 STORY BRICK BUILDING NO. 10

2 STORY BRICK BUILDING NO. 3A/3B

5 STORY BRICK & CONCRETE BUILDING NO. 1

3 STORY BRICK BUILDING NO. 4

AREA F

AREA G

LONG ISLAND RAILROAD

WEST STREET

AREA A

TAX BLOCK 263
TAX LOT 1&19

2 STORY CONCRETE BUILDING NO. 9

QUEENS BLVD.

ORCHARD STREET

N

0 40 80

FEET

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAWP June 2014\SWPPP Figures\Figure 5.dwg DATE: 6/11/2014

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 5

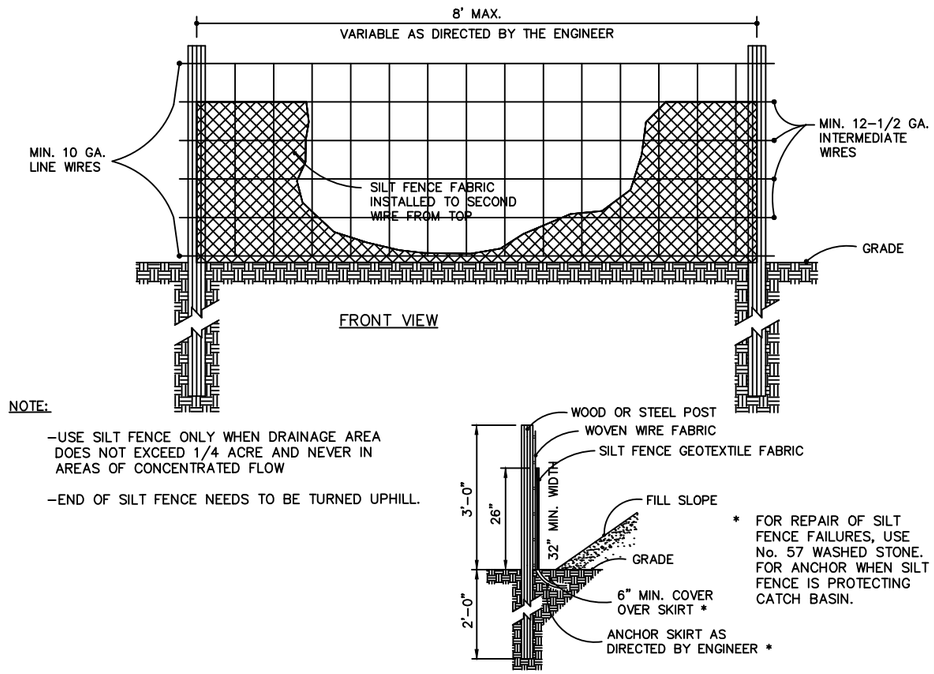
SOIL EROSION AND SEDIMENT CONTROL MEASURES

Date
June 2014

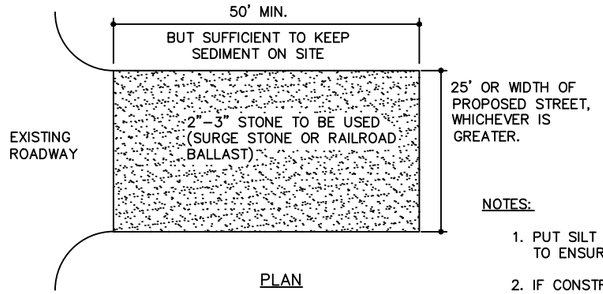
Project Number
10112-005-1

LEGEND

- BCP SITE A
- BCP SITE B – OU–1
- BCP SITE B – OU–2
- OUTSIDE OF SITE
- TEMPORARY ASPHALT BERM
- CONSTRUCTION FENCE
- COMBINED SEWER LINE
- Ⓢ COMBINED SEWER MANHOLE

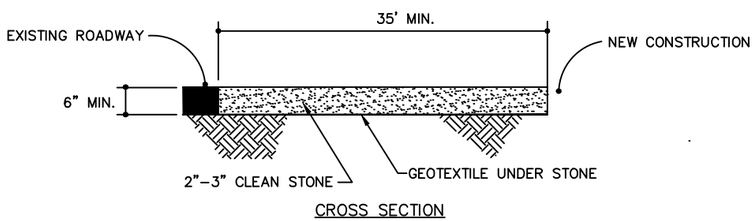


STANDARD TEMPORARY SILT FENCE | 1

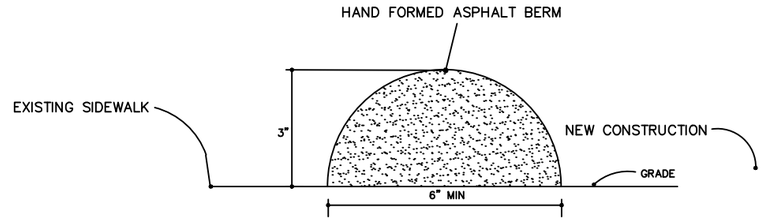


NOTES:

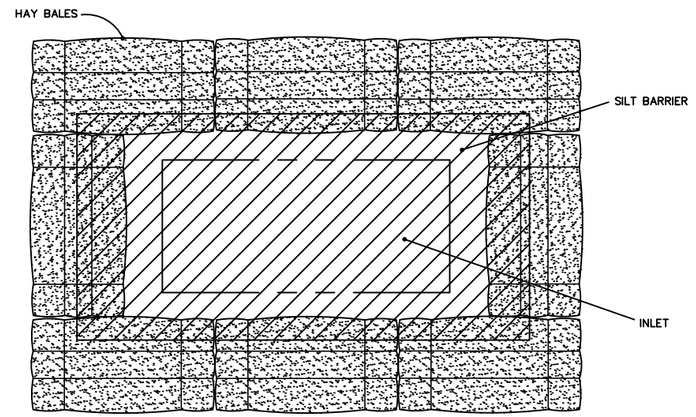
1. PUT SILT FENCE OR TREE PROTECTION FENCE UP TO ENSURE CONSTRUCTION ENTRANCE IS USED.
2. IF CONSTRUCTION ON THE SITE IS SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING THE PUBLIC ROAD.

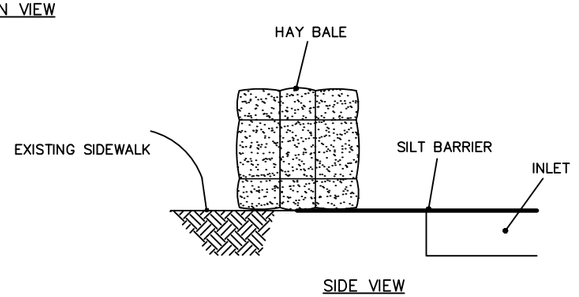


CONSTRUCTION ENTRANCE | 2



TEMPORARY BERM | 3





INLET PROTECTION | 4

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

Queens Plaza Residential Development - Site B (C241151)

FIGURE 6

SOIL EROSION AND SEDIMENT CONTROL DETAILS

Date
June 2014

Project Number
10112-005-1

LEGEND

FILE: P:\Project Files\10112 - Tishman Consulting\001-10 - Site B\Figures\Site B RAMP June 2014\SWPPP Figures\Figure 6.dwg DATE: 6/11/2014

Appendix A

CERTIFICATION OF STORM WATER POLLUTION PREVENTION PLAN

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Name

Title

Date

PRIME CONTRACTOR/SUBCONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001) that authorizes the storm water discharges associated with the remediation activities at the Queens Plaza Residential Development Site (Brownfield Site), located along Jackson Avenue at Orchard Street, Long Island City, New York.

Name

Title

Company

Date

APPENDIX M

Community Air Monitoring Program

Appendix M

Queens Plaza Residential Development – Site B
Brownfield Cleanup Program (BCP) No. C241151
Long Island City, NY

COMMUNITY AIR MONITORING PROGRAM

LIC Development Owner, LP
c/o Tishman Speyer
45 Rockefeller Plaza
New York, New York 10111

Project Number: 10112-004

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

September 2014

Arnold F. Fleming, P.E.

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5.2.2 Particulate Monitoring, Response Levels, and Actions 3

Community Air Monitoring Plan (CAMP)

1.0 Purpose

The purpose of the CAMP is to protect downwind receptors (e.g., residences, businesses, schools, nearby workers, and the public) from potential airborne contaminants released as a direct result of the Interim Remedial Measure (IRM). The CAMP helps to confirm that the IRM does not spread airborne contamination off-site by providing real-time monitoring protocols for VOCs and particulates (i.e., dust) at the downwind Brownfield Site perimeter while the RI is in progress. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown.

The CAMP does not establish action levels for worker respiratory protection, which are given in the Health and Safety Plan included in Appendix D and developed in accordance with 40 CFR 1910 and 1920.

2.0 Contaminant Source

The main contaminants of concern in Brownfield Site soils are creosote-based and petroleum-based VOCs, benzene, toluene, ethylbenzene, and xylenes, (collectively BTEX); the semi-volatile compound naphthalene; and the poly aromatic hydrocarbons (PAHs). Metals and polychlorinated biphenyls (PCBs) represent a secondary and minor concern.

3.0 Remedial Activities

The Brownfield Site B Interim Remedial Measure Work Plan (IRMWP), to which this CAMP is an attachment, details the remediation activities that will be performed at the Brownfield Site.

Creosote and metals-contaminated soils on the Brownfield Site will be removed by excavation and within an enclosure at some locations. All existing buildings and subsurface structures on Brownfield Site will be demolished prior to excavation in those areas. Existing paved areas will be stripped of the pavement (concrete and asphalt) prior to excavation. The excavation and handling of soils will generate dust and airborne particulates.

Groundwater will be exposed once soil is excavated to the water table. The water table will be lowered by groundwater extraction. The extracted groundwater will be treated through a water/oil separator prior to discharge to New York City sewers.

4.0 Receptor Population

Potentially exposed receptors during remediation are passersby, and, to a lesser degree, individuals living, working, and shopping in the vicinity of the project.

5.0 Monitoring Plan

While excavating, stockpiling, or otherwise handling on-site soils, the proposed CAMP, entailing upwind and downwind perimeter monitoring, will be implemented as described in the following sections. Due care will be taken to monitor and control fugitive odors and dust emissions from the Brownfield Site, minimizing the risk of exposure to the surrounding receptor population during remediation.

5.1 Continuous Monitoring

Continuous monitoring will be conducted for all ground-intrusive activities and any handling of soils on the Brownfield Site.

5.2 Periodic Monitoring

Periodic VOC monitoring will occur during non-intrusive activities such as collection of groundwater samples from monitoring wells and soil samples for disposal characterization.

5.2.1 VOC Monitoring, Response Levels, and Actions

VOCs will be continually monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) using a PID. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The PID will be calibrated at least daily, or more often if needed. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, work must cease. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.2.2 Particulate Monitoring, Response Levels, and Actions

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

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

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will cease and a re-evaluation of activities initiated. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration. All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX N

FLS Resumes of Key Personnel

Fleming Lee Shue

Environmental Management & Consulting

Arnold F. Fleming, PE
Owner

Education
- Bachelor of Science, Civil Engineering, Manhattan College (1968)
- Masters of Engineering, Manhattan College (1969)

Professional Registration
Professional Engineer, New York

General Expertise
Arnold F. Fleming is an environmental engineer with over 30 years of experience in the areas of water quality and planning studies, domestic and industrial wastewater treatment and disposal, environmental impact analysis, contaminated materials assessment and remediation, and environmental permitting. Mr. Fleming was one of the founders of Allee King Rosen & Fleming, Inc., AKRF, Inc., and AKRF Engineering P.C. For over 20 years, Mr. Fleming has provided these firms with engineering expertise in all technical areas relating to permitting and hazardous waste assessment and management and the assessment of impacts in these technical areas. Mr. Fleming has been Principal in charge for Phase II Environmental Assessments for over 100 residential, commercial and industrial sites in the Metropolitan New York area. Duties include design of sampling program, oversight of means and methods of sample collection, and preparation of final reports including recommendations for remediation. He has also been involved with the design for over 50 remediation systems including UST tank removals, contaminated soil disposal, soil vapor extraction systems, sparged air/ soil vapor extraction systems. Remedial designs include approximately 20 sites remediated under the State of New York Voluntary Clean-up program, and two sites on the Registry of Inactive Hazardous Waste Sites. Mr. Fleming has been the Principal in charge of the preparation of Phase I Environmental Assessments for several hundred residential, commercial and industrial properties, as well as several hospitals throughout the New York Metropolitan Area. He has been the Project manager for the preparation of 208 wastewater facility planning studies, and has prepared the infrastructure and utility assessments for over 100 EIS's in the Metropolitan New York Area.

PROJECT EXPERIENCE

535 West 23rd Street Development
Prepared the Phase I and asbestos surveys for this Manhattan development site. Designed the Phase II sampling program, executed the sampling and on the basis of the findings obtained approval to remediate an extensive oil spill via bio-remediation. The system was designed and installed under the new building with operation to begin upon occupancy of the building. The approach allowed the construction schedule to proceed without delay due to the discovered contamination.

Queens West Redevelopment
Technical representative to the Queens West Development Corporation (QWDC) a subsidiary to the Empire State Development Corporation charged with developing the 78 area redevelopment of the Hunters Point waterfront into a mixed commercial/residential development. Mr. Fleming developed a model remediation plan for the first residential building in 1995 and has applied this model to the next three residential development sites in Stage 1 of the development, the first having opened for residency in the summer of 2002. Mr. Fleming is assisting QWDC in selecting a developer for Stage 2 and 4 and is advising them on the remediation of Stage 2, a former oil refinery and paint factories. Development of Stage 2 is to occur simultaneous to the remediation efforts in the refinery portion of the site.

Staten Island Muss Site Redevelopment
Managed the initial Phase II sampling for this former industrial site re-zoned for single family residential development. The site was listed on the Registry of Inactive Hazardous Waste Sites. Prepared in Remedial Investigation and Feasibility Studied that led to a Record of Decision (ROD) setting forth the remediation for the site. Prepared the remedial Design to satisfy the ROD and managed the oversight of the remediation leading up to the removal of the site from the registry. Designed a revetment system to protect the capping material that was an integral part of the remediation from storm related erosion from the adjacent Raritan Bay. Petitioned the Federal Emergency Management Agency to remove the site from the 100-year flood plain on the basis of the new elevations and erosion measures implemented on the site.

Rego Park, Queens Remediation
Prepared a Voluntary Clean-up Application, performed additional sampling and developed a remedial work plan to remove solvent contaminated soils from this development site. Designed a sparged air/ Vapor Extraction System to remediated contaminated groundwater and site soils. Operated the system for two years reducing the groundwater contamination by over 90%. The sparged air / VES was designed to be installed under the building avoiding the delay of remediation the site prior to construction.

Hudson River Park Redevelopment
For this new park stretching from Battery Park City to 59th Street, Mr. Fleming oversaw the preparation of the US Army Corps of Engineers and the New York State Department of Environmental Conservation permit application s and responses to comments leading to issuance of this waterfront development permit. This permit was unique in that it addressed the first segment that was designed and ready to be built as well as the entire park for which no design was available. To address the future segments, schematic design drawings were submitted showing conceptual designs that would be refined as the park was designed and build. A permit condition to submit each segment design for review and determination of consistency with the master permit was included to assure that no impacts were introduced in the design process. If a determination on any segment were made that the design was not consistent with the master permit, a new permit process would be initiated.

Greenpoint Brooklyn Waterfront Development Planning
For a private developer, Mr. Fleming has prepared an evaluation of the permitting concerns including a jurisdictional assessment of the existing waterfront edge, to assist in the establishing of a development plan that will be compatible with the requirements of federal and state permits.

Queens West Redevelopment
Mr. Fleming led the permitting effort to allow redevelopment of the waters edge associated with this 78 acre mixed Commercial/Residential waterfront development. The project has three stages, the first under construction and permitted in 1995. Mr. Fleming managed the permitting effort for this first waterfront permit. The current application to the state and federal permitting agencies is for a project wide permit covering the remaining 3 stages of which 2 are under design. The final stage of the project was the subject to a schematic design only. Notable in the current permit is the reconstruction of collapsed platforms that are to become a site wide park and esplanade providing water access to this portion of the east river for the first time in over a century.

West Side Ferry Terminal
For the New York City Economic Development Corporation, Mr. Fleming led the permit effort to allow a new public ferry terminal located within the bounds of the Hudson River Park. Because the ferry terminal was not approved when the Park permit was issued, this project was carved out of the park permitting process and followed a separate permit track. The permit application was assembled using updated submissions from the Park permit application and addressed the specific concerns of the State and federal permitting

Jersey City Colgate Site Redevelopment
For this mixed commercial/residential waterfront redevelopment project, Mr. Fleming prepared the state Coastal Zone Development permit and a US army Corp of Engineers dredge and fill permit to allow a marina, esplanade and a new combined sewer manifold to be built. The sewer manifold was placed in the river because of space limitations and was permitted, the first fill permit in this portion of the Hudson River in 20 years.

River East Environmental Permits for Shoreline Protection
For this 10 acre site obtained the permits to install 500 feet of revetment to allow a 1.4 million square foot residential development on a former oil terminal. Also prepared the Remedial Action Work Plan to remove historic spilled oil simultaneous to Vernon Realty shoreline construction.

Fleming Lee Shue

Environmental Management & Consulting

Steven E. Panter, CGWP

- Senior Consultant/Hydrogeologist

Education

- Master of Science, Environmental Engineering, Concentration in Hydrogeology New Jersey Institute of Technology (1990)
- Graduate Studies, Soil Sciences, Rutgers University (1979)
- Bachelor of Science, Forest Science, University of Wisconsin (1978)

Certifications/Training

- OSHA 40-Hour HAZWOPER Training
- OSHA 8-Hour Supervisor Training
- Fracture Trace and Lineament Analysis, April 1995
- Intensive training course in identifying fractures and lineaments in rocks of Pennsylvania.
- The course emphasized the importance of identifying these features in order to assess and understand ground water movement and to understand contaminant migration in geologic settings where these features can play a key role.
- Treatment Technology for Contaminated Soils and Ground Water, February 1995.
- Assessment, Control and Remediation of LNAPL Contaminated Sites, October 1994.
- Ground Water Flow through Fractured Media, University of Wisconsin, 1993.
- Hydrogeology of the Glacial Deposits of New Jersey: An Applied Field Course, presented by Cook College in Cooperation with Rutgers University, 1993.
- Design and Analysis of Aquifer Pumping Tests - Association of Ground Water Scientists and Engineers, Dublin, Ohio, 1991.

Professional Registration

- Certified Ground Water Professional (CGWP No. 437) by the National Ground Water. Association (NGWA), June 1993

General Expertise

Steven Panter is a Hydrogeologist with over 30 years of experience in environmental consulting. Mr. Panter has supervised or played a key technical role in many soil and ground water investigations involving investigations and remediation of fuel oil, PCE, TCE, polychlorinated biphenyls (PCBs), cumene, gasoline, organic compounds, metals, dioxins, and coal tar. They have been performed for landfills, chemical processing plants, underground storage tanks (UST), fuel oil terminals, manufacturing plants and power production facilities. The clients have been primarily large corporations, utilities, or municipalities, although some work has been done for small businesses. He is responsible for projects that range from less than $20K to more than $20,000,000. Mr. Panter has developed sampling and analysis programs for a variety of ground water and subsurface soil investigations. His expertise also extends to technical oversight and legal

support; and environmental auditing. Mr. Panter also has worked on environmental impact statements for several proposed power plant facilities and power plant upgrades in New York State.

He has extensive experience in New York State Brownfield Cleanup Program projects. Mr. Panter has directed or played a key technical role in a number of Brownfield projects involving the investigation and remediation of petroleum and coal tar contaminated media.

PROJECT EXPERIENCE

Queens West Parcel 8 Remediation
Mr. Panter oversaw and directed the investigation of a Brownfield Cleanup Program site contaminated with 80,000 pounds of coal tar waste. He developed an innovative *in situ* remediation approach, RemMetrik®, which eliminated excavation and saved the client $7 to $9 million dollars in cleanup costs and eliminated community exposure. The treatment focused on oxidation of 47,000 pounds of coal tar contaminant in the treatment interval. This was the first remediation of its kind in New York State. NYSDEC approved the results and issued a Certificate of Completion within 14 months of the beginning of cleanup. Treatment lasted five months in one application.

Queens West Center Boulevard Remediation
Mr. Panter oversaw and directed the investigation of a Voluntary Cleanup Site contaminated with 18,500 pounds of coal tar waste. He developed an innovative *in situ* remediation approach, RemMetrik®, which eliminated excavation of the street and disruption to the community and eliminated public exposure. This was the second remediation of its kind in New York State. NYSDEC review is ongoing. Treatment lasted two months in one application.

Queens West Redevelopment
Mr. Panter oversees environmental compliance for a very large scale redevelopment of the New York City waterfront, and entails remediation of numerous parcels of former industrial waterfront that are heavily contaminated with petroleum, coal tar, and numerous other wastes. The site will be redeveloped into commercial and residential space with parks and green spaces. Mr. Panter advises QWDC on all aspects of environmental compliance, contaminated site investigation, hazardous materials management, and remediation.

Long Island City, Queens, New York Redevelopment
Mr. Panter prepared a detailed assessment of soil disposal options and costs for a facility contaminated with creosote and metals. He used a statistical analysis approach to advise the client on the most cost effective means of selecting soil disposal options depending on the type and degree of soil contamination.

West 23rd Street 10th Avenue Redevelopment
On a site contaminated with gasoline and fuel oil, Mr. Panter prepared an analysis differentiating the sources of on-site and off-site contamination in order to justify closing the spill number. This was a multivariate analysis demonstrating that the on-site

contamination was clearly different from the off-site contamination. What was unique about the analysis is that conventional reporting of results did not distinguish between the different sources, but the multivariate analysis—using the same data—showed a distinct difference.

West 30th Street and 11th Avenue Redevelopment
On a site contaminated with metals near a former coal gas plant slated for a major residential development, Mr. Panter analyzed groundwater issues stemming from benzene contamination and successfully predicted contaminant plume behavior during dewatering. He developed an indoor air monitoring program for a neighboring residential building as a protective measure against inducing contamination to residents. He also presented data supporting the case that chromium levels were the result of natural conditions rather than contamination.

Gansevoort Street to West 23rd Street; The High Line
Mr. Panter managed the waste characterization portion of the High Line project in New York City, where a defunct elevated industrial railway is being converted into a major urban park and green space. Mr. Panter directed testing, removal, and management of contaminated track ballast and was a key individual in planning waste management for all track bed materials. He was responsible for directing and planning inspections for hazardous materials throughout the entire program and also directed air sampling and monitoring for the construction phase.

Astoria, Queens, NY Astoria Gas Turbines Well Reconnaissance Program
Mr. Panter managed a well reconnaissance program at the Astoria Gas Turbine facility to assist the development of a remediation program to close out petroleum spills inherited from the previous site owner. The program encompassed evaluation of more than 70 monitoring wells, groundwater and product level measurements, groundwater sampling, a summary of the findings, and recommendations for improving the monitoring network and resolving ambiguities in the well information. Mr. Panter effectively coordinated meetings between station representatives, off-site NRG managers, and an independent project manager working for NRG. He also facilitated very productive meetings between the previous site owner and NRG in order to obtain additional well information and secure permission to access wells in off-site, adjacent areas.

Staten Island, NRG Arthur Kill Generating Station, Staten Island Ignition Oil Area Recovery Program
Mr. Panter has been assisting NRG at the Arthur Kill Generating Station with a product recovery/monitoring in the Ignition Oil Area. This effort entails monthly monitoring, recovery, and reporting of product levels in five recovery wells installed by a consulting firm when the plant belonged to Con Edison. At NRG's request, the program was recently extended. Station personnel often call the Mr. Panter to discuss other environmental matters because of his extensive site knowledge and excellent rapport with the Station managers and staff.

Staten Island, Transformer Explosion Remediation Program
Following a transformer fire and rupture that released PCBs in concentrations exceeding 300,000 ppm, Mr. Panter managed a major remediation program encompassing massive

interior and exterior portions of the power plant including soils, pavement, and walls. This was done under a Consent Order and had potential penalties of $500,000,000. Mr. Panter oversaw and directed all aspects of the field program and represented Con Edison at numerous meetings with regulatory personnel. This portion of the remedial program lasted one year.

Staten Island, Property Sale Site Assessment
Project manager for a large-scale expedited site assessment of the Arthur Kill Generating Station as part of the property sale to Visy Paper Company and the New York City Economic Development Corporation. Directed, planned, and coordinated the investigation. Played a critical role in numerous meetings with representatives of the New York State Department of Environmental Conservation (NYSDEC) from the Acting Regional Director and Director of Hazardous Waste to NYSDEC field staff. Rapidly and thoroughly completed the site investigation and remedial assessment to a level whereby the findings and recommendations were easily accepted by NYSDEC. Acceptance of results and remedial strategies was facilitated by the excellent rapport with NYSDEC representatives.

All Boroughs, Site Investigation, New York City Housing Authority
Supervised and coordinated the investigation of 20 housing project sites with leaking USTs and pipelines for the New York City Housing Authority. Provided client contact, prepared work plans, supervised field programs, interpreted and analyzed data, and prepared final reports and recommendations. The focus of the program was to characterize and delineate the extent of oil-contaminated soils and ground water contamination, prior to remediation. Program included installation of monitoring wells and interpretation of soil and ground water contamination in a variety of geologic settings throughout the five boroughs including marine deposits, bedrock, glacial outwash and till.

Manhattan and Brooklyn, Environmental Assessment, New York City School Construction Authority
Project Manager for an environmental assessment of three properties proposed for an elementary and two middle schools in New York City. Directed technical and administrative aspects of the project. Program consisted of installation of deep monitoring wells in glacial outwash deposits and evaluation of ground water flow and quality.

Environmental Assessment, New York City Economic Development Corporation.
Managed environmental assessments of two NYC-owned properties slated for commercial development. Directed technical aspects of the project including soil gas testing and monitoring well installation and sampling.

All Boroughs, Site Investigations, New York City Housing Authority
Supervised the investigation of 20 sites with leaking USTs for the New York City Housing Authority.

Fuel Oil Terminal Demolition, Paragon Cable Company/Rucci Oil Company
Oversaw the demolition of two fuel oil terminals in NYC. Prepared a remedial action and sampling plan to expedite the cleanup process and comply with New York State

Department of Environmental Conservation regulations. Supervised and directed the activities of several contractors with field crews of 10 to 20 people. Advised corporate principals on project progress, issues and alternatives. Met with regulatory officials on behalf of the client. One facility contained more than 18 large aboveground and underground fuel oil tanks. Total storage capacity was 2.3 million gallons. The second facility had seven underground storage tanks and one aboveground tank. Total storage capacity was 385,000 gallons.

Rockaway (NJ) Borough Superfund Site Ground Water Investigation Program
Developed a ground water investigation program for a buried glacial aquifer system in northern New Jersey. Designed the investigation to examine the effect of TCE contamination on a local aquifer. The program consisted of a network of shallow, deep and intermediate level monitoring wells and associated ground water sampling.

All Boroughs, Ground Water and Soil Sampling, New York City Housing Authority
Developed a ground water and soils sampling program to assess fuel oil contamination at approximately 20 New York City Housing Authority sites.

Site Investigation, New York City School Construction Authority
Conducted site investigations of soils and ground water in Manhattan and Brooklyn.

Soil Sampling Program, Paragon Cable/Rucci Oil Company
Conducted a soil sampling program as part of the demolition of two fuel oil terminals in NYC. The program included the sampling of waste soil piles and the excavations.

Expert Witness Testimony and Report Preparation
Mr. Panter testified as an expert witness as part of a technical panel before the New York State Board of Public Utilities as part of a power plant siting hearing. In this capacity, Mr. Panter was cross-examined on his written testimony by a panel of attorney's on the side of the opposition. He testified on technical matters involving hazardous materials and contamination of soil and groundwater and the impacts to the community depending on the project. Mr. Panter also served as a fact expert for a New York State agency in a contamination lawsuit against a Fortune 100 company. Mr. Panter was deposed as part of this case. He drafted and corroborated on two expert reports prepared and prepared counter arguments for the case. The case had a successful outcome for the client.

Publications

Mr. Panter has authored numerous technical papers on site investigation and remediation and has given technical presentations on these topics and on effective presentation of technical information.

Fleming Lee Shue

Environmental Management & Consulting

Mark Hutson
Senior Project Manager

Education
B.I.S., Geological Sciences and Applied Biological Sciences, Arizona State University, Tempe, AZ

Awards / Certifications / Training
- OSHA 40-HAZWOPER Training
- OSHA 8-Hour Supervisor Training
- OSHA 10-Hour Construction Safety
- First Aid/CPR

General Expertise
Mark Hutson is a Senior Project Manager with over 9 years of experience in environmental consulting, specializing in environmental liability management. Mark provides clients with innovative, cost effective strategies to manage their environmental liability and compliance issues. His expertise include site characterization, sub-surface investigations, soil and ground water remediation, remedial design and implementation, data management and interpretation, regulatory compliance and reporting, stakeholder management, cost to incident closure estimates, and insurance claim investigations. He has considerable leadership and supervisory experience including direct interface with clients, and third party stakeholders such as property owners, real estate developers and regulatory agencies including the NYSDEC, NYCDEP, NYCOER, NYSDOH and various county health departments.

PROJECT EXPERIENCE

Project Manager, Retail Petroleum/Bulk Storage Facilities Portfolio, New York

Served as project manager for numerous active and former retail petroleum facilities in varying lifecycle stages including site characterization, remedial design and implementation, and closure for a major petroleum client. Responsibilities included site characterization, scope development, remedial design and implementation, data management and interpretation, budget forecasting and management, regulatory compliance and reporting, and management of project teams and subcontractors.

Project Manager/Regional Lead, Insurance Claim Investigation and Support, NY/NJ

Served as the regional lead and project manager for an international insurance company acting as environmental expert to assist the insurer in claim determinations. Responsibilities included claim investigation and technical support on projects associated with petroleum and industrial chemical releases, remediation, and UST removals in New

York and New Jersey. Responsible for developing cost to incident closure estimates, determining what is reasonable and necessary regarding an insured's response to a claim, preparation of claim recommendations and reports including reviewing insured's invoices and invoice tracking.

Project Manager, Former Retail Petroleum Facility Redevelopment, Brooklyn, NY

Served as project manager for the remediation and redevelopment of a former retail petroleum facility with a open NYSDEC spill number. Remediation of the underlying soil and groundwater occurred simultaneously with the construction of a 12-story multi-use building. Remediation included the excavation of contaminated soil to 15 feet bgs followed by In Situ Chemical Oxidation of residual soil and ground water impacts. Project required interface with and coordination of numerous stakeholders and regulatory agencies including the NYSDEC, NYCOER, NYCDEP, NYCTA and NYCDOB.

Project Manager, Soil Vapor Intrusion Investigation, Brooklyn, NY

Served as project manager for a large soil vapor intrusion investigation of a former retail petroleum facility now a PETCO retail store. Responsible for the development and execution of a sampling plan in compliance with NYSDOH/EPA guidelines which included the installation of numerous subsurface soil vapor sampling points and indoor/outdoor sampling of ambient air conditions to determine potential exposure scenarios.

Project Lead, Commingled Plume Investigation/Remediation, Blythe, CA

Acted as field geologist/environmental scientist for a public municipality client responsible for a commingled gasoline/diesel plume emanating from multiple sources. Responsibilities included plume characterization, site investigation, remedial design, implementation and operation, permitting, data collection and analysis, and waste management. Oversaw the installation of five multi-phase extraction (MPE) systems and was responsible for the operation, maintenance and optimization of the MPE systems operating simultaneously.

Fleming Lee Shue

Environmental Management & Consulting

Raphael J. Rosenbaum
Environmental Scientist

Education

- Masters of Science (MS), Environmental Science, The City University of New York, Brooklyn College (2017 Anticipated Graduation)
- Bachelor of Arts (BA), Environmental Studies, The State University Of New York at Buffalo (2010)

Health and Safety Training

- OSHA 40-Hour HAZWOPER Training
- OSHA 8-Hour HAZWOPER Supervisor Training
- OSHA 10-Hour Construction Safety Training
- Confined Space Awareness Training
- Amtrak Contractor Safety Training

General Expertise

Raphael J. Rosenbaum is currently an Environmental Scientist with Fleming Lee-Shue. Raphael has over 5 years of experience in the field of environmental consulting. As an Environmental Scientist, Mr. Rosenbaum has been responsible for conducting remedial investigations, soil, soil vapor and groundwater monitoring and sampling, air monitoring, implementation of Community Air Monitoring Program (CAMP), sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system monitoring, overseeing underground storage tank (UST) removals and closures, soil excavation, regulatory reporting, analytical data review, cost estimating, and general experience in subcontractor oversight and contractor relations.

PROJECT EXPERIENCE

Queens Plaza Residential Development

Served as a primary field team leader to oversee remedial activities on a former chemical factory and implement a sophisticated CAMP setup using telemetry-based components. Oversaw the remediation of multiple USTs, dozens of underground chemical storage units and a variety of hazardous substances. Trained incoming field team member on site-specific procedures and ensured internal compliance with Quality Assurance/Quality Control (QA/QC) procedures and Standard Operating Procedures (SOPs). Provided environmental health and safety oversight under guidance from a certified industrial hygienist and provided environmental site safety orientations to all incoming personnel onsite.

Eagle Electronics Warehouse Redevelopment

Completed Phase II investigation, waste characterization sampling and additional soil vapor investigations. Oversight of the closure of large volume aboveground storage tanks

(AST) and the restoration of a coal furnace. Drafted reports to documents investigation and characterization results and completed petroleum bulk storage registration and closure.

Court Square Fleet Site Residential Development
Initiated and supervised the implementation of CAMP by a team of peers and subcontractors during site preparation and development. Attained a Track 1 Unrestricted Use Cleanup and the release from requirements to have an active SSDS through detailed documented supporting field observations.

Harlem River Brownfield Opportunity Area Redevelopment
Participated in collaborative efforts to assess the environmental liabilities and opportunities in the redevelopment of properties along the Bronx side of the Harlem River Brownfield Opportunity Area. Tabulated Phase I background information on sites of interest and generated submission documents for presentation to the project team.

500 West 30th Street Redevelopment
Conducted waste characterization sampling, implemented CAMP uniquely designed in consideration of the High Line Park, a high-traffic public space which passed directly through and overhead of the Site. Completed daily, weekly and monthly reporting to the New York City Office of Environmental Remediation (OER), oversaw the removal of multiple USTs, oversaw and reported on the manifesting of over 5,000 tons of hazardous soil and approximately 15,000 tons of non-hazardous soil.

Coney Island Seaside Park
Ensured compliance with a Remedial Action Work Plan to remediate a group of properties to be redeveloped into a public amphitheater. Implemented CAMP while overseeing the excavation of hot spots and the import of soil under OER's Clean Soil Bank program.

517 West 28th Street Redevelopment
Oversaw the installation of injection and groundwater monitoring wells. Conducted pre-treatment and post-treatment groundwater monitoring and sampling to determine baseline groundwater parameters and measure effect of remedial treatment. Measured groundwater elevation and drafted figures illustrating groundwater contours and flow direction.

3595 Broadway Redevelopment
Conducted a remedial investigation, a supplemental remedial investigation, and soil characterization sampling to classify nature and extent of contamination onsite for redevelopment. Implemented the CAMP, drafted the Remedial Action Report to culminate project completion, oversaw the SSDS sizing test and conducted final SSDS startup testing.

529 West 29th Street Redevelopment
Implemented and oversaw CAMP structured for contractor implementation of visual particulate monitoring and roaming PID monitoring during intrusive soil activities.

Skillman Avenue Environmental Liability Assessment & Remediation
Conducted site specific groundwater sampling protocols, including dosing and application of field preservation. Provided oversight during a supplemental remedial investigation utilizing membrane interface probe technology to determine the extent and distribution of chlorinated volatile organics in a complex geologic setting. Developed groundwater monitoring wells and conducted slug testing to determine hydraulic conductivity. Drafted and formatted analytical data tables and iso-contour maps. Provided cost estimating for well abandonment.

Queens West Redevelopment
Conducted quarterly groundwater sampling as required under the SMP. Inspected and maintained a recovery system for light non-aqueous phase liquid. Completed annual inspection of engineering controls for inclusion in the Periodic Review Reports. Provided oversight and air monitoring for the removal of soil to develop and construct a children's garden and dog run.

Queens West Parcel 8 Remediation
Provided environmental oversight to installation of geothermal test well through residually impacted soil management zone, as required under SMP, and oversaw the implementation of quarterly groundwater sampling as required under the SMP.

167 North Broadway Remediation
Completed UST closure report after performing and providing oversight to remedial investigation and tank closure activities. Conducted five quarters of groundwater monitoring and completed quarterly groundwater reports to meet NYSDEC monitoring requirements.

200 East 16th Street Vapor Intrusion Investigation
Completed proposal for and conducted a complete vapor intrusion investigation on a former dry cleaning operation inside of a residential use building with multiple commercial tenants occupying neighboring spacing.

Oak Point Properties Storm Water Pollution Prevention Plan
Conducted monthly inspections of the waterfront property for compliance with the Storm Water Pollution Prevention Plan (SWPPP).

650 Fountain Avenue Remediation
Provided subcontractor oversight, air monitoring and regulatory reporting for indoor and outdoor UST removal and closure.

1112 Myrtle Avenue
Conducted additional groundwater sampling as requested by client, to successfully contest findings of previous Phase II Investigation.

388 Bridge Street Redevelopment
Conducted SSDS/SVE systems inspections and vapor sampling.

Fleming Lee Shue

Environmental Management & Consulting

Edward Ryan
Geologist

Education

- Bachelor of Science (BS), Geology, Bloomsburg University of Pennsylvania (2011)
- Bachelor of Science (BS), Planetary Science, Bloomsburg University of Pennsylvania (2011)

Health and Safety Training

- OSHA 40-HAZWOPER Training
- OSHA 10-Construction Safety and Health
- Asbestos
- Bloodborne Pathogens
- First Aid CPR AED

General Expertise

Edward Ryan is currently a Geologist with Fleming Lee-Shue with over four years of experience conducting remedial investigations, soil, soil vapor, groundwater, monitoring and sampling, SSDS and SVE monitoring, UST removal, developing and maintaining extensive data bases for multiple project sites. Mr. Ryan has interacted with multiple regulatory agencies including New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (NYCDEP), NYC Office of Environmental Remediation (NYCOER), NJ Department of Environmental Protection, and the US Environmental Protection Agency.

PROJECT EXPERIENCE

Queens Plaza Residential Development

Served as a primary field team leader to oversee remedial activities on a former chemical factory and implemented a sophisticated CAMP setup using telemetry-based components. Oversaw the remediation of multiple USTs, dozens of underground chemical storage units and a variety of hazardous substances. Trained incoming field team member on site-specific procedures and ensured internal compliance with Quality Assurance/Quality Control (QA/QC) procedures and Standard Operating Procedures (SOPs). Provided environmental health and safety oversight under guidance from a certified industrial hygienist and provided environmental site safety orientations to all incoming personnel onsite.

388 Bridge Street Redevelopment

Conducted inspection and monitoring of Soil Vapor Extraction System (SVE) and SSDS for Site with chlorinated solvents impacts. Optimized system for maximum removal. Collected and analyzed soil vapor data.

Oak Point Properties Storm Water Pollution Prevention Plan
Conducted monthly inspections of the waterfront property for compliance with the Storm Water Pollution Prevention Plan (SWPPP).

Nutley Development Site
Coordinated with environmental project managers to manage all field activities for remediation of large former Pharmaceutical Company. Conducted extensive groundwater, surface water, soil and air sampling. Provided oversite for monitoring well installation and UST removal. Oversaw Membrane Interface Probe investigation. Coordinated all waste water management onsite. Planned and executed test pits and remedial hot spot excavation. Ensured compliance to all environmental regulations and procedures. Provided general oversight to comply with industry standards while documenting all processes. Coordinated and manage multiple drilling crews.

Chesapeake Energy
Submitted detailed reports and operational updates daily. Coordinated with Operations Geologist. Collection, preparation, analysis and description of geological sample cuttings to determine lithology. Interpreted and correlated lithology, gas, and gamma ray to call geological formation tops.

Fleming Lee Shue

Environmental Management & Consulting

Adam T. Conti, E.I.T.
Environmental Engineer

Education

- Bachelor of Science, Environmental Systems Engineering, The Pennsylvania State University (2011)

Health and Safety Training

- OSHA 40-Hour HAZWOPER Training
- 10-Hour Construction Safety and Health Training
- 8-Hour OSHA Site Supervisor Training

General Expertise

Adam Conti is currently an Environmental Engineer with Fleming Lee-Shue with over four years of experience in the environmental field. As an Environmental Engineer, Mr. Conti has been involved with remedial investigations & design, monitoring & sampling of groundwater, soil, soil vapor, and indoor air, implementation of Community Air Monitoring Program (CAMP), and the design, set up, and maintenance of various sub-slab depressurization systems (SSDS) and Soil Vapor Extraction systems (SVE) . He also has experience in performing Phase I Environmental Site Assessments (ESAs) in accordance with ASTM standard E1527-13 and providing due diligence updates for commercial real estate transactions. Mr. Conti has interacted with various regulatory agencies including New York State Department of Environmental Conservation (NYSDEC), New York City Office of Environmental Remediation (NYCOER), New York City Department of Environmental Protection (NYCDEP), NJ Department of Environmental Protection (NJDEP), and the US Environmental Protection Agency (USEPA). He has participated in the redevelopment of various Sites in the Brownfields Cleanup Program (BCP) for NYSDEC, and the Voluntary Cleanup Program (VCP) for the NYCOER. Mr. Conti also participated in the development and remediation of New York City e-designation Sites.

PROJECT EXPERIENCE

Queens Plaza Residential Development

Served as a primary field team leader to oversee remedial activities on a former chemical factory and implemented a sophisticated CAMP setup using telemetry-based components. Oversaw the remediation of multiple USTs, dozens of underground chemical storage units and a variety of hazardous substances. Trained incoming field team member on site-specific procedures and ensured internal compliance with Quality Assurance/Quality Control (QA/QC) procedures and Standard Operating Procedures (SOPs). Provided environmental health and safety oversight under guidance from a certified industrial hygienist and provided environmental site safety orientations to all incoming personnel onsite. Drafted the Waste Characterization Work Plan for the Brownfield BCP site.

Executed intricately designed waste characterization work plan which included the collection and analysis of over 150 soil samples.

16th Street Development
Collected soil vapor samples to determine chlorinated solvent impacts. Oversaw the removal of contaminated dry cleaning equipment and materials. Assisted in the design of and oversaw construction of the SSDS. Conducted pre and post-construction diagnostic testing for SSDS. Drafted Construction Completion Report (CCR).

17th Street Co-Op
Conducted Site inspection and collected mercury vapor samples to determine historical mercury impacts.

388 Bridge Street Redevelopment
Conducted monthly inspections and monitoring of Soil Vapor Extraction System (SVE) and SSDS for Site with chlorinated solvents impacts. Optimized system for maximum contaminant removal. Collected and analyzed soil vapor data.

Avenue C Development
Performed extensive soil vapor sampling to determine chlorinated solvent impacts in a residential building. Drafted letter report to discuss findings.

Park Avenue Development
Coordinated and oversaw the disposal of 8,000 cubic yards of contaminated soil for a NYSDEC Brownfields Site. Implemented Community Air Monitoring Program (CAMP) in accordance with Remedial Action Work Plan. Prepared Air Quality and Noise Installation Report required for the OER e-designation.

Skillman Avenue Environmental Liability Assessment & Remediation
Conducted site specific groundwater sampling protocols, including dosing and application of field preservation. Provided oversight during a supplemental remedial investigation utilizing membrane interface probe technology to determine the extent and distribution of chlorinated volatile organics in a complex geologic setting. Assisted with the research for applicability of new electrical resistance heating technology to remediate chlorinated volatile organics in a complex geologic setting for a NYSDEC VCP Site. Assisted with the design of an in-situ bioremediation treatment to remediate off-Site groundwater.

Walsh Avenue New Windsor, NY
Conducted groundwater gauging and site inspection for the Brownfield BCP Site. Drafted SMP and FER.

Queens West Parcel 8 and Center Boulevard Remediation
Conducted quarterly groundwater sampling and reporting for the Voluntary Cleanup Site previously contaminated with 18,500 pounds of coal tar waste.

Queens West Redevelopment
Conducted quarterly groundwater sampling as required under the SMP. Inspected and maintained a recovery system for light non-aqueous phase liquid. Completed annual inspection of engineering controls for inclusion in the Periodic Review Reports.

Port Newark, NJ
Operated and maintained large-scale remediation system for the treatment LNAPL. Conducted quarterly groundwater sampling as required under the RAWP.

Washington, NJ
Operated and maintained large-scale vapor mitigation and remediation system for the treatment DNAPL. Conducted weekly vapor sampling as required by the Superfund program.

Edgewater, NJ
Conducted sediment logging and sampling as required by the Superfund program.

Troy Hills, NJ
Operated and maintained vapor mitigation and remediation system for LNAPL.

Laurel, MD
Conducted quarterly groundwater sampling and cover system monitoring as required by the Superfund program.

Washington Navy Yard, DC
Conducted quarterly groundwater sampling and cover system monitoring as required by the Superfund program.

Fleming Lee Shue

Environmental Management & Consulting

Maya Zung
Geologist

Education

- Master of Liberal Arts in Extension Studies; Sustainability and Environmental Management, Sustainability, Harvard University (2016)
- Bachelor of Arts (BA), Geology: Environmental Studies, Binghamton University, State University of New York (2011)

Health and Safety Training

- OSHA 40-HAZWOPER Training
- OSHA 10-Construction Safety and Health
- Bloodborne Pathogens
- First Aid CPR AED

General Expertise

Maya Zung is currently a Geologist with Fleming Lee-Shue with over four years of experience conducting remedial investigations, soil, soil vapor, groundwater, monitoring and sampling, SSDS and SVE monitoring, redevelopment and assessment of Brownfields sites and New York City e-designation Sites, developing and maintaining extensive data bases for multiple project sites, reviewing environmental remediation insurance claims to find evidence for litigation support, implementation of Community Air Monitoring Program (CAMP), cost estimating, general experience in subcontractor oversight and contractor relations, overseeing underground storage tank (UST) removals and closures, soil excavation, analytical data review, and various regulatory report drafting and editing. Ms. Zung has interacted with multiple regulatory agencies including New York State Department of Environmental Conservation (NYSDEC), New York City Department of Environmental Protection (NYDEP), the New York City Office of Environmental Remediation (NYCOER), New Jersey Department of Environmental Protection (NYSDEP), and the US Environmental Protection Agency (USEPA).

PROJECT EXPERIENCE

Queens Plaza Residential Development

Drafted a Remedial Action Work Plan for the Brownfield BCP site. Assisted in creating a Stormwater Pollution Prevention Plan, Soil Management Plan, Quality Assurance Control Plan, and Citizen Participation Plan. Served as a primary field team leader to oversee remedial activities on a former chemical factory and implemented a sophisticated CAMP setup using telemetry-based components. Oversaw the remediation of multiple USTs, dozens of underground chemical storage unit, a variety of hazardous substances

and disposal of soil attributed with heavy levels of creosote and petroleum contamination. Trained incoming field team member on site-specific procedures and ensured internal compliance with Quality Assurance/Quality Control (QA/QC) procedures and Standard Operating Procedures (SOPs). Provided environmental health and safety oversight under guidance from a certified industrial hygienist and provided environmental site safety orientations to all incoming personnel onsite. Provided oversight for 72 hour well pump test that helps estimate the hydraulic properties for the site; which will be used in groundwater modeling. Drafted the Waste Characterization Work Plan for the Brownfield BCP site. Executed plan which included the collection and analysis of over 150 soil samples. Conducted supervision and air monitoring of remediation activities.

Park Avenue Development
Coordinated and oversaw the disposal of 8,000 cubic yards of contaminated soil for a NYSDEC Brownfields Site. Implemented Community Air Monitoring Program (CAMP) in accordance with Remedial Action Work Plan. Prepared Air Quality and Noise Installation Report required for the OER e-designation.

West 30th Street Redevelopment
Developed and drafted a Phase II Noise Remedial Action Plan for a 28-story mixed commercial and residential building encompassing 270,000 gross square feet. Oversaw implementation of the Community Air Monitoring Program during excavation and ground intrusive activities. Composed daily reports provided to the New York City Mayor's Office of Remediation.

Coney Island, Brooklyn, Redevelopment
Oversaw and conducted site investigation over a 130,000 square feet E-Designated property for the Office of Environmental Remediation. Drafted Remedial Investigation and Remedial Action Work Plan. Coordinated the import of 14,000 cubic yards of clean soil. Implemented the Community Air Monitoring Program according to the Remedial Action Work Plan. Coordinated the removal of multiple Underground Storage tanks and removal of hot spot material. Completed daily, weekly and monthly reporting to the New York City Office of Environmental Remediation (OER).

Skillman Avenue Environmental Liability Assessment & Remediation
Conducted site specific groundwater sampling protocols, including dosing and application of field preservation. Provided oversight during a supplemental remedial investigation utilizing membrane interface probe technology to determine the extent and distribution of chlorinated volatile organics in a complex geologic setting.

Harlem River Brownfield Opportunity Area Redevelopment
Participated in collaborative efforts to assess the environmental liabilities and opportunities in the redevelopment of properties along the Bronx side of the Harlem River Brownfield Opportunity Area. Tabulated Phase I background information on sites of interest and generated submission documents for presentation to the project team.

Queens West Parcel 8 Remediation

Conducted quarterly groundwater sampling and reporting for the Voluntary Cleanup Site previously contaminated with 18,500 pounds of coal tar waste. Design, coordinate abandonment of groundwater wells on site.

Queens West Redevelopment
Conducted quarterly groundwater sampling as required under Site Management Plan (SMP). Inspected and maintained a recovery system for light non-aqueous phase liquid. Compiled data in EDD formats for submittal to NYSDEC database. Coordinated the reduction of the Site Management Plan and the abandonment of 16 groundwater monitoring wells. Provided oversight and air monitoring for the removal of soil to develop and construct a children's garden and dog run.

Queens West Centre Boulevard Remediation
Conducted quarterly groundwater sampling and reporting for the Voluntary Cleanup Site previously contaminated with 18,500 pounds of coal tar waste.

167 North Broadway Remediation
Conducted quarterly of groundwater monitoring and completed quarterly groundwater reports to meet NYSDEC monitoring requirements.

216-367 Jersey Street, Staten Island
Managed continued monitoring of residual contamination by the quarterly collection of groundwater samples. Implemented additional remediation of residual contamination with Epsom salt

511 West 21st Street Redevelopment
Conducted remedial investigation for Site with former Underground Storage Tanks and an active spill. Prepared Remedial Investigation Report (RIR) for NYSDEC's BCP.

388 Bridge Street, Brooklyn
Conducted monthly and weekly inspections and monitoring of a Soil Vapor Extraction System (SVE) and SSDS for Site with chlorinated solvents impacts. Collected and analyzed soil vapor data.

Jackson Avenue Fleet Redevelopment
Oversaw and conducted waste characterization sampling to characterize the site's soil for future planned excavation. Coordinate communication with client for site oversight. Implemented the Community Air Monitoring Program according to the Remedial Action Work Plan and coordinated intricate soil disposal while site was undergoing massive excavation and foundation building. Documented field observations that led to the attainment of a Track 1 Unrestricted Use Cleanup and the release from requirements to have an active SSDS. Completed the remedial closure report to gain Certificate of Occupancy approval for site.

Co-Op City Remediation
Drafted a three separate Site Characterization Work Plans for three dry cleaners spread throughout Co-Op City area. Coordinated with various subcontractors to plan multi-site soil

and soil gas sampling. Conducted site investigation and drafted three Site Characterization Reports.

Newtown, CT Remediation
Conducted quarterly groundwater sampling and reporting for the Voluntary Cleanup Site previously contaminated with heating oil from a trucking accident. Interacted with USEPA providing sampling results and quarterly reports.

Fair Lawn, NJ Remediation
Coordinated the remediation of a dry cleaners with soil and groundwater contaminated with chlorinated solvents. Conducted groundwater, soil, soil vapor, and indoor air sampling to monitor the results of the installed electrical resistance heating (ERH) system. Helped to coordinate installation of sub-slab depressurization systems (SSDS) at multiple residences to reduce the levels of PCE vapors. Developed extensive database of 10 years of groundwater, soil, and vapor sampling data, and monitoring well and soil boring locations. Interacted with NJDEP providing sampling results and quarterly reports.

APPENDIX O

Brownfield Signage

SITE SIGNS FOR REMEDIAL PROGRAMS

Sign Requirements

Size: **Horizontal format - 96" wide by 48" high**

Construction Materials: **Aluminum or wood blank sign boards with vinyl sheeting.**

Inserts: "Queens Plaza Residential Development", "Site Number C241151", "LIC Development Owner, L.P." and "Governor Andrew Cuomo, Mayor Bill de Blasio, Commissioner Joseph Martens, Municipal Executive Venetia Lannon"

Color Scheme: **Copy surrounding DEC logo - "NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" - PMS 355**

DEC logo: **PMS 301 Blue**
PMS 355 Green

Text:

Brownfield Cleanup Program	**PMS 301**
"Queens Plaza Residential Development", "Site Number C241151", LIC Development Owner, L.P., Inc.	**PMS 355**
Governor Andrew Cuomo, Mayor Bill De Blasio, Commissioner Joseph Martens, Municipal Executive Venetia Lannon	**PMS 301**
Transform the Past.....Build for the Future	**PMS 355**

Type Specifications: **All type is Caslon 540, with the exception of the logotype.**
Format is: center each line of copy with small caps and initial caps.

Production Notes: **96" wide x 48" high aluminum blanks will be covered with vinyl sheeting to achieve background color. Copy and logo will be silk screened on this surface.**

See attached format

Brownfield Cleanup Program

Queens Plaza Residential Development

Site Number C241151

LIC Development Owner, L.P.

Governor Andrew Cuomo

Mayor Bill de Blasio

Commissioner Joseph Martens

Municipal Executive Venetia Lannon

Transform the Past…. Build for the Future

APPENDIX P

Estimated Remedial Cost

Appendix P - Estimated Remedial Cost, BCP Site No. C241151

Potential Eligible Costs	Estimated Remediation Costs
Support of Excavation	$19,126,681
Demolition	$2,908,762
Foundation	$9,438,136
Van Alst Site	$500,000
Kettles and Vaults Removal	$1,800,000
Soil Remediation	$11,731,754
Remedial Oversight & Support	$2,019,444
Total	$48,000,000

APPENDIX Q

Spill Prevention Plan

Spill Prevention Control and

Countermeasure Plan

Queens Plaza Residential Development
Long Island City, New York 11101

Submitted to:
Hudson Meridian
40 Rector Street, 18th Floor
New York, New York 11101

Submitted by:

Posillico, Inc.
1750 New Highway
Farmingdale, NY 11735

March 2015

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Appendix A – *Emergency Contact Information*
Appendix B – *Matrixes*

1.0 INTRODUCTION

1.1 Purpose

The objective of this plan is to first detail the corrective actions, and then the emergency response procedures in place to maintain a safe work environment for the entirety of the job in the event of a spill or possible hazardous situation. Posillico shall be responsible for any corrective actions required to maintain all temporary controls and environmental protection measures in working order. Secondly, this plan describes the precautions and steps which will be taken should an accident or failure of any major equipment occur. Posillico will provide all labor, materials and equipment for odor suppression at any time throughout the execution of the Work. This plan also references Posillico's Site-Specific Health and Safety Plan.

2.0 CONTROLS

2.1 Pollution Control

Posillico will provide the methods, means and facilities required to prevent contamination of soil, water, atmosphere, storm and sanitary sewer systems, and surface water bodies by the discharge of noxious substances from construction operations. Posillico will also provide equipment and personnel to perform emergency measures required to contain any spillages.

2.2 Maintenance and Cleanup

Posillico will maintain temporary controls and environmental protection measures which will then be phased out upon completion of the construction work.

2.2.1 During Construction Activities

Posillico will:

- Keep the Work and surrounding premises within work limits free of accumulations of dirt, dust, waste materials, debris and rubbish
- Keep dust-generating areas wetted down without ponding of water
- Containers shall be provided for storage of waste materials, debris and rubbish until time of disposal

2.2.2 Project Completion

- Posillico will collect, containerize and manage all excess or waste materials, debris, rubbish, and temporary facilities from the Site in accordance with specifications;
- Repair pavement, roads and all other areas affected by construction operations and restore them to original condition and in accordance with applicable standards or agency requirements;
- Clean all pavements and ground surfaces;

3.0 EMERGENCY RESPONSE PROCEDURES

3.1 Standard Procedures

Employees working on-site must have completed the 40-Hour training requirements of 29 CFR 1910.120 and 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response (HAZWOPER). All personnel on-site must read understand and sign the Site Specific Health and Safety Plan (HASP). Visitors to the Site must be briefed on health and safety protocols and must review and sign the HASP Acknowledgment Form. In case of need, the Emergency Response Personnel must satisfy OSHA 29 CFR 1910.120(e) (7) standards.

All material safety data sheets (MSDS) will be kept on-site.. These MSDSs will be provided to emergency and transport personnel. Containers and drums holding contaminated material will be labeled and staged according to state and federal regulations. Adequate personal protective equipment (PPE) will be kept on-site and provided to workers during operating procedures or in an emergency. Accidents may occur during handling of drums and other hazardous waste containers. Such incidents could include detonation, fires, explosions, vapor generation, and/or physical injury. OSHA regulations (29 CFR Parts 1910 and 1926) include general requirements and standards for storing, containing, and handling chemicals and containers that must be followed on-site. All personnel handling these containers are required to understand this criterion.

A Perimeter Air Monitoring Plan (PAMP) has been created in order to monitor and control the emission of hazardous chemicals as intrinsic work begins on the Site. Many hazardous pollutants could become airborne and therefore be inhaled and/or ingested. This plan will be enforced by Fleming Lee Shue`s Perimeter Air Monitoring Plan Technician (PAMPT) and followed by all personnel on-site. If the level of concentration of the hazardous chemicals exceeds the action levels identified in the PAMP, an alarm will alert the PAMPT on-site who will implement the PAMP`s guidelines to protect the safety and well-being of the workers and the community.

3.2 Required Equipment

In accordance with 40 CFR Part 265 Subpart C regulations, the following equipment will be available on-site:

• Cell phone or a hand-held two-way radio: devices will be supplied to all workers in order to quickly contact them in case of an unexpected event; the same device will be used to communicate with emergency personnel listed in Table 1, Appendix A. Extra devices and chargers will be kept on-site in case of damage to the equipment or need of charge.

• An internal communications system: in case of an emergency, an alarm will sound alerting all workers. The alarm's noise intensity will be over 110 decibels. Evacuation notification will be three (3) blasts of an air horn; if two (2) short blasts are heard, workers will shut down all equipment and await further instructions; in the case of one (1) continuous blast, first-aid personnel will respond to injured worker(s). In any of the referenced scenarios, all workers will follow SOPs and carry out their previously rehearsed drills. After reaching a designated safe location, the Site Safety Office (SS), and/or Project Manager (PM) will provide immediate emergency instructions. Other methods, such as hand signals, can be used between workers to communicate in case of emergency and will be reviewed in all drills performed.

• Portable fire extinguishers Type ABC: this type of device can control different types of fire originated from common combustible materials, flammable or combustible liquids, as well as electric explosions. The Contractor will be responsible for maintaining water at a sufficient pressure to, at a minimum, satisfy firefighting requirements. If these requirements are not met then water trucks, water spray systems, or foam producing equipment must be brought to the Site.

• Spill and decontamination equipment will be accessible in designated locations that are of easy access to all employees. All equipment must be inspected according to manufacturer and regulatory agencies, as well as tested and maintained to assure effectiveness in case of emergency. The equipment would include at a minimum:

Absorbent pads;
Dry absorbents;
Oil booms;
Shovels;
Nitrile gloves;
Tyvek suits;
Over boots; and
Odor suppressants/inhibitors.

The equipment will be replaced after each use.

• Personal Protective Equipment (PPE) will be available in the support zone; special PPE will be found on-site as a precaution for exceedances or unplanned releases of hazardous chemicals found on-site. Different levels of PPE (C &D) will be accessible in case of emergency. The types of PPE included are as follows:

Eye and face protection (as per ANSI Z87.1-1989);
Head protection (as per ANSI Z89.1-1989);
Foot protection (as per ANSI Z41-1991);
Hand protection (work, chemical, and cut-resistant types of gloves);
Hearing protection (plugs and muffs);
Respiratory protection (dust masks, full-face, escape & emergency respirators);
Disposable coveralls (including chemical resistant barrier suits); and
Fire resisting clothing.

• First Aid kits and Eye Wash stations will also be available in designated areas of the Site. All personnel must have knowledge of the closest location of this basic equipment in case of need. At a minimum, the following emergency materials will be found on site:

Band aids;
Non-stick pads;
Kling rolled bandages;
Triangular bandages;
Hypo-allergenic first aid cream;
Adhesive Tape;
Scissors;
Butterfly bandages;
Antiseptic wipes;
Burn cream;
Foil packs;
Amoply (ammonia inhalants);
Tylenol;
Oval eye pads;
Examination gloves;
Cold packs; and
Direct reading instruments.

3.3 Possible Scenarios

3.3.1 Fire and Explosion(s)

In case of fire or an explosion involving hazardous material, the New York Fire Department will be contacted, via 911 emergency telephone calls. In the case of a small fire (flames not exceeding one's height) in an escape situation; type ABC fire extinguishers will be provided on-site; use these only if properly trained and qualified; if not, evacuate the Site. All MSDS will be given to trained responders who will then address the situation appropriately. Follow the Fire Matrix shown in Appendix B to properly respond to this hazard.

Contact the following agencies if additional assistance is required:

New York Fire Department: Dial 911
New York Police Department: Dial 911

3.3.2 Toxic Inhalation

Airborne contaminants may be in the form of dusts, mists, gases, vapors or fumes. These chemicals are usually colorless; each depicting different acute and chronic levels of exposure. If permissible, follow the guidelines in section 4.3.4 "Decontamination" prior to handling the injured worker(s). Do not attempt to provide first aid if not trained, or if the conditions do not permit it. If a worker is unconscious due to inhalation of contaminated fumes, contact the emergency hospital listed in Appendix A. Personnel can also call EMS (911) to care for the victim. Follow the Toxic Inhalation Matrix shown in Appendix B to accurately take action in this scenario.

Contact the following personnel if assistance is required:

Hospital: Dial 911
New York Police Department: Dial 911
Poison Control Center: 1-800-222-1222

3.3.3 Drum Spills

When handling drums, follow these standard requirements:

- Drums containing hazardous substances or materials contaminated with hazardous chemicals must be properly labeled, handled, transported, and disposed in accordance with 29 CFR 1910.120.
- Before moving any drums, these must be inspected for integrity. All personnel who will relocate the containers must be informed of the chemicals the drums might contain.
- In case of a spill, implement a spill containment program in accordance with OSHA 29 CFR 1910.120(j) (1) (viii), to isolate and contain the entire volume of any hazardous substances that might leak or spill from a container or spill during transfer from one container to another.
- Do not become in contact with material from the spill if not using appropriate PPE and thoroughly qualified.
- Implement decontamination procedures if exposed to hazardous materials and methodically follow all guidelines.
- In the event of a spill, drinking water systems and sanitary districts will also need to be alerted. In the occurrence of an air release of toxic materials, the local authorities are to be immediately informed in order to assess the need for evacuation.

Carefully review the Emergency Contact Information listed in Table 1, Appendix A for the appropriate agencies' information. Follow the Spill Control Matrix found in Appendix B to properly mitigate this problem.

Contact the following agencies if additional assistance is required:

Chemtrec (HAZMAT responders): 1-800-262-8200
NYC Spill Hotline: 1-800-457-7362
National Response Center: 1-800-424-8802/1-202-267-2675

3.3.4 Contamination

Personnel visiting or working on the Site have the potential to become exposed to hazardous chemicals by breathing hazardous vapors, being splashed by chemicals while sampling or handling open containers, walking through puddles of liquids or on contaminating soils, as well as by using instruments that were not properly cleaned. In order to minimize exposure, the Site will be continuously monitored, evaluated, and secured to prevent worker exposure, cross contamination, and public health exposures. Additionally, the Site will contain clearly delineated work areas. These areas will be the exclusion zone (EZ), contaminant reduction zone (CRZ), and support zone (SZ). These zones are described as follows:

Exclusion Zone - All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an exclusion zone. This zone will be clearly delineated by cones, tapes or other means.

Contamination Reduction Zone - Is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides an area for decontamination of personnel and portable hand-held equipment, tools, and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Support Zone - Is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will also be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

Regardless of all precautions, contamination can still occur. If this is the case, all personnel must:

- Remove and dispose of PPE in designated drums. Depending on the level of protection, consult HASP standards for proper order of removal.
- Wash any skin that might have been in contact with chemicals with soap and water. Report immediately abnormal symptoms.
- Report any exposures to the Safety Superintendent (SS), Construction Oversight Engineer (COE), or Project Superintendent (PS).

- Contact EMS number provided in Appendix A if any changes are observed.

Personal and equipment decontamination will take place only in designated areas of the CRZ, in order to prevent cross-contamination. The instruments must be rinsed with water, washed with water and detergent, and then rinsed with regular water, again. The bi-products of decontamination must be collected and treated via the on-site water treatment facility, prior to discharge to the combined sanitary/storm sewer system (via approved TWA permit).

Decontamination areas will be constructed in order to contain all contaminated sediments, water, and/or used PPE. The area will be large enough to accommodate the equipment and personnel to be decontaminated.

At a minimum, the decontamination equipment will include the following:

Wash Tubs;
Scrub Brushes;
Disposable Towels;
Seating to Facilitate Boot Cleaning;
Decontamination Solution;
Hand Soap;
Skin Wash Water Source; and
Garbage Cans.

Contact the following personnel if further assistance is required due to contamination:

Hospital: Dial 911
Poison Control Center: 1-800-222-1222

4.0 EVACUATION PROCEDURES

Evacuation routes have been established for all work area locations for the site. All employees must follow the subsequent steps:

- Personnel must evacuate the site immediately (in accordance with the emergency evacuation plan) if three (3) horns of an air blast are heard.
- They must keep walking upwind of smoke, vapors, or spill location.
- Workers should exit through the decontamination corridor, if permissible; if not possible, employees must remove contaminated clothing near the exclusion zone and decontaminate to the maximum extent possible.
- Meet at the Assembly/Muster Point agreed or some other pre-determined location.

For emergency situations that do not require evacuation, employees will meet at the muster point. The muster point will be at the entrance/egress gate of the support zone. For emergency

situations that require evacuation, the route of evacuation for the Site has been selected to be the route to the Mount Sinai of Queens Hospital. Employees will be briefed every morning during the health and safety tailgate meeting, as to the location of the wind vain. The appropriate evacuation route will be in an upwind direction with safe passage to Jackson Avenue, and will also be discussed during the tailgate meeting.

5.0 DESIGNATED RESPONSIBILITIES ON-SITE

5.1 Emergency Response Coordinator

As per 40 CFR 256.56 the emergency coordinator has primary responsibility to control hazardous waste emergencies. The COE (primary), SSO (secondary), PM (tertiary) will serve as the emergency coordinator. They will be responsible for evacuating workers and providing decontamination, as well as arranging for medical treatment or first aid for any person injured or requiring medical attention. The emergency coordinators will determine when conditions on the Site are safe.

In case of emergency, the COE, SSO, or PM will instruct the orders to activate alarms and communication systems to notify all personnel on-site, and contact the necessary local and government agencies to control the situation. The character, source, amount, and extent of any released materials, as well as possible hazards to human health or the environment from a release fire or explosion will also be evaluated and reported at this time. If evacuation of the local area is required, the police and National Response Center will be contacted. Prior to evacuation all reasonable measures necessary to reduce chances that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste areas on the Site must be taken. After these steps are taken, the COE will then report the incident to all relevant contacts found in Table 1 of the Plan and the emergency contacts of the parties involved on the Site. The COE will then proceed to complete all mandatory forms and reports by local, state, and federal agencies. The emergency coordinators are also responsible for treatment, storage or disposal of the recovered waste and contaminated areas, due to any chemical releases or fires. Prior to resuming operations, all emergency equipment must be cleaned and fit for its intended use, and the owner operator must notify the Regional Administrator, and appropriate State and local authorities, that the facility is in compliance with paragraph (h) of 40 CFR 256.56.

The contact information for the emergency coordinator is as follows:

COE – ERM
Greg Rinaldi
Office Address: 40 Rector Street, 18th Floor, New York, NY 11101
Phone: 917-612-7944

SSO – Posillico Environmental
John Lane
Office Address: 1750 New Highway, Farmingdale, NY 11735
Cellular/Office Phone: 732-759-1500

PM – Posillico Environmental
Robert Delmonte
Office Address: 1750 New Highway, Farmingdale, NY 11735
Office Phone: 631-249-1872
Cellular Phone: 516-807-1934

5.2 Additional Personnel

Additional personnel, such as the PS and SS on-site, will be held responsible in case of an emergency. All designated individuals must have successfully completed mandatory OSHA training, and possess extensive knowledge of regulatory laws. These individuals must have several years of field experience in related projects that involved contingency of hazardous substances. By meeting all these qualifications, the SS and PS will be able to effectively fulfill their roles in case of an unexpected event or perform the function of the COE if this person were to be absent from the Site.

A list of the names of designated employees on-site who will respond to different hazardous emergencies will be provided. This listing will include the contact information of those selected individuals that have been trained in spills response, first aid, CPR, or firefighting. Regardless of the training received, only the COE, SS or PS will determine, based on the nature of the situation, if these individuals can respond to the emergency situation.

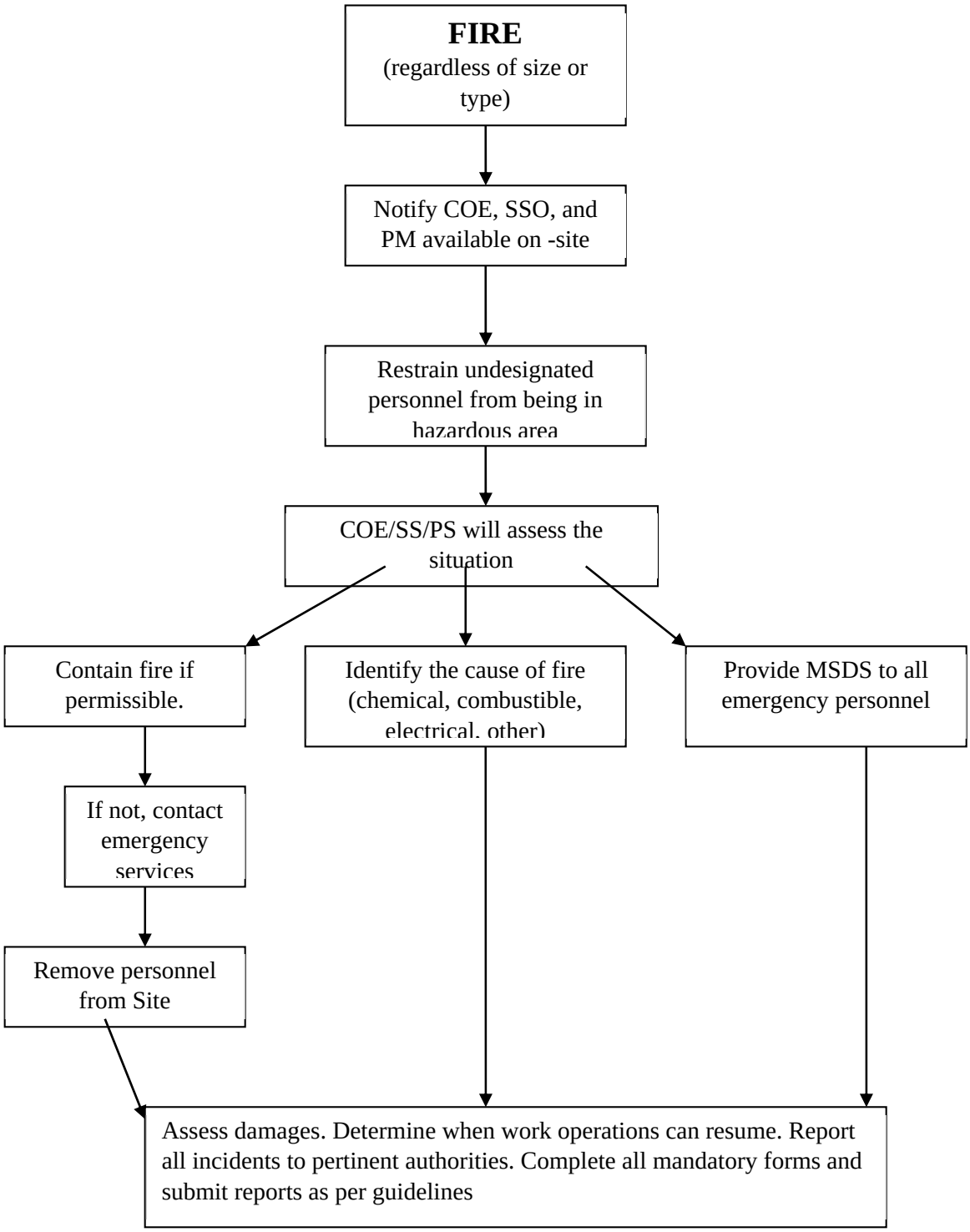
Appendices

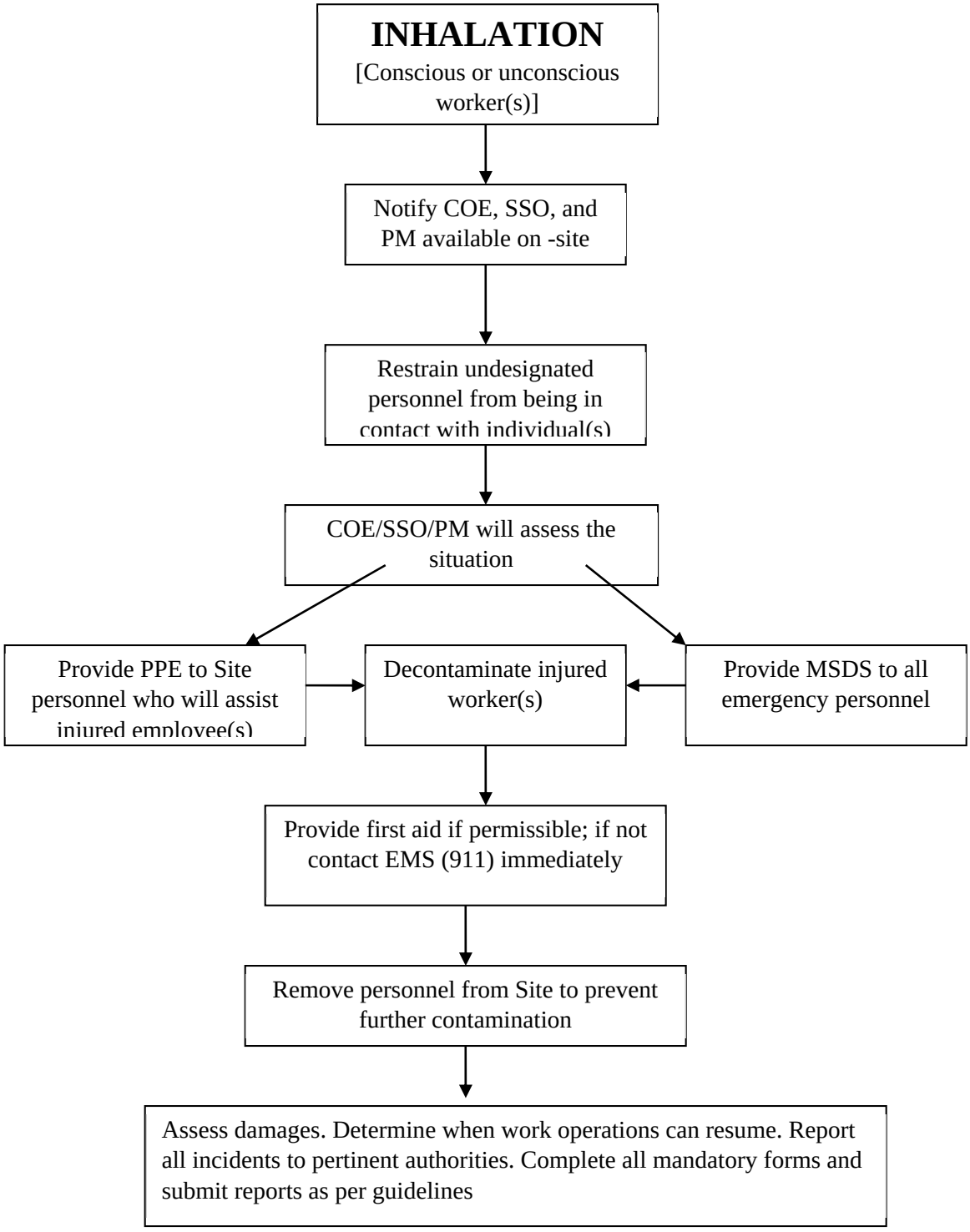
Appendix A - EMERGENCY SERVICES CONTACT INFORMATION

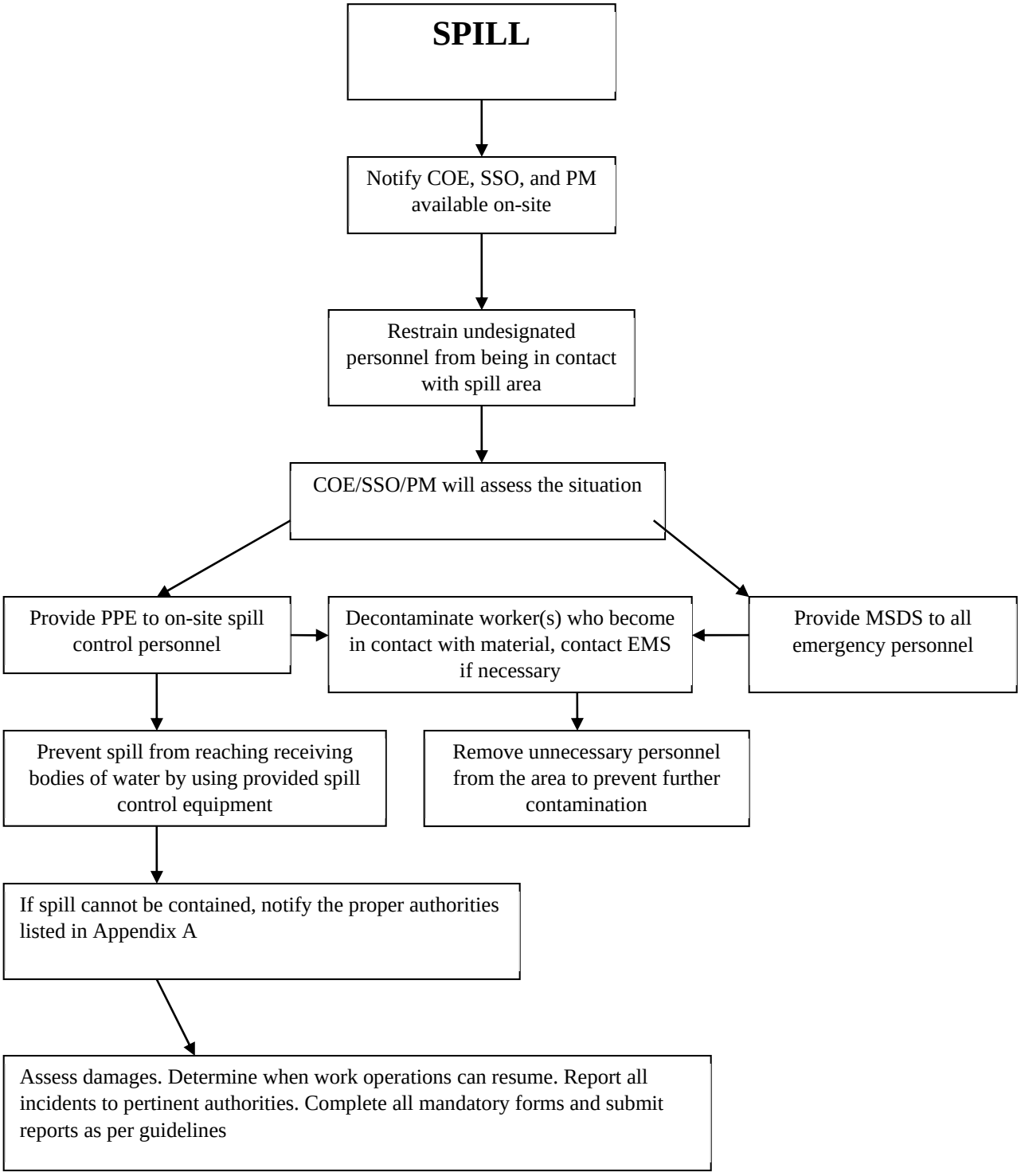
The following table provides a list of emergency services contact numbers.

Agency Name	Phone Number
Fire /Police/ EMS	911
Hospital: Mount Sinai of Queens Hospital 25-10 30th Avenue Astoria, NY 11102 Chemical Trauma & Decontamination Capabilities Find directions in HASP Appendix A Driving Time: ~ 10 minutes Distance: 1.8 miles	(718) 932-1000
Poison Control Center	1-800-222-1222
Center for Disease Control	1-800-232-4636
Chemtrec	1-800-262-8200
PSE&G Emergency Hotline:	800-436-PSEG (7734)
National Response Center:	1-800-424-8802 202-267-2675
New York Department of Environmental Protection Spill Hotline	1-800-457-7362
U.S. Coast Guard/USEPA National Response Center	1-800-424-8802
Occupational Safety and Health Administration	1-800-321-OSHA (6742)
Hudson Meridian Construction Oversight Engineer – Greg Rinaldi	Cell: 917-612-7944
Posillico Site Safety Office – John Lane	Cell: 516-697-4383
Posillico Project Manager – Robert Delmonte	Cell: 516-807-1934

Appendix B - Matrixes




INHALATION
[Conscious or unconscious worker(s)]
Notify COE, SSO, and PM available on -site
Restrain undesignated personnel from being in contact with individual(s)
COE/SSO/PM will assess the situation
Provide PPE to Site personnel who will assist injured employee(s)
Decontaminate injured worker(s)
Provide MSDS to all emergency personnel
Provide first aid if permissible; if not contact EMS (911) immediately
Remove personnel from Site to prevent further contamination
Assess damages. Determine when work operations can resume. Report all incidents to pertinent authorities. Complete all mandatory forms and submit reports as per guidelines


SPILL
Notify COE, SSO, and PM available on-site
Restrain undesignated personnel from being in contact with spill area
COE/SSO/PM will assess the situation
Provide PPE to on-site spill control personnel
Decontaminate worker(s) who become in contact with material, contact EMS if necessary
Provide MSDS to all emergency personnel
Prevent spill from reaching receiving bodies of water by using provided spill control equipment
Remove unnecessary personnel from the area to prevent further contamination
If spill cannot be contained, notify the proper authorities listed in Appendix A
Assess damages. Determine when work operations can resume. Report all incidents to pertinent authorities. Complete all mandatory forms and submit reports as per guidelines